



1984 SHOP MANUAL



**Bombardier
snowmobiles**



1984

SHOP MANUAL



snowmobiles
Bombardier

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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair the Bombardier snowmobiles.

This edition was primarily published to be used by snowmobile mechanics who are already familiar with all service procedures relating to Bombardier made snowmobiles.

Please note that the instructions will apply only if proper hand tools and special service tools are used.

This shop manual uses technical terms which may be slightly different from the ones used in parts catalogue.

The content of Bombardier Inc. Recreational Product Shop Manual depicts parts and/or procedures applicable to the particular product at its time of manufacture. It does not include dealer modifications, whether authorized or not by Bombardier, after the products manufacture.

In addition, the sole purpose of the illustrations/photographs throughout the manual, is to assist identification of the general configuration of the parts. They are not to be interpreted as technical drawings or exact replicas of the parts.

The use of Bombardier parts is most strongly recommended when considering replacement of any component. Dealer and/or distributor assistance should be sought in case of doubt.

Torque wrench tightening specifications must be strictly adhered by. Locking devices (ex.: tab lock, nylon lock) must be installed or replaced by new ones, where specified. If the efficiency of a locking device is impaired, it must be renewed.

This manual emphasizes particular information denoted by the wording and symbols;

- ◆ **WARNING:** Identifies and instruction which, if not followed, could cause personal injury.
- ▼ **CAUTION:** Denotes an instruction which, if not followed, could severely damage vehicle components.
- **NOTE:** Indicates supplementary information needed to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information will promote its correct use.

◆ **WARNING:** This information relates to the preparation and use of Bombardier snowmobiles and has been utilized safely and effectively by Bombardier Inc.. However, Bombardier Inc. disclaims liability for all damages and/or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic. It is understood that certain modifications may render use of the vehicle illegal under existing federal, provincial and state regulations.

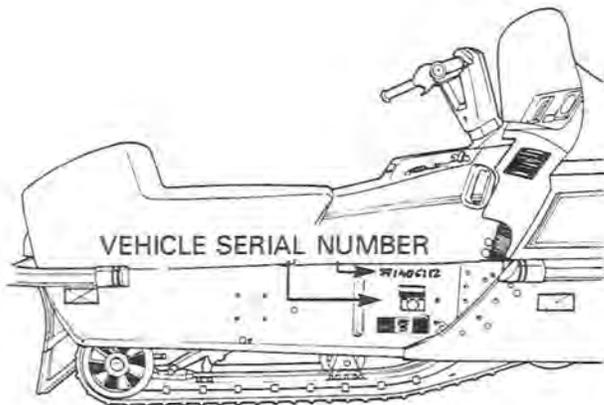
1984 BOMBARDIER SNOWMOBILES SHOP MANUAL

INTRODUCTION

This Shop Manual covers the following Bombardier made 1984 snowmobiles.

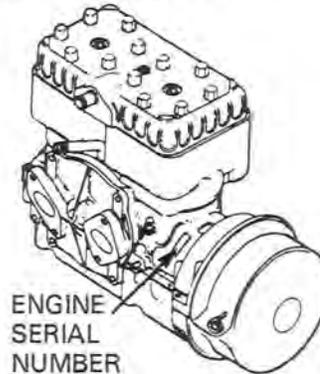
Elan
Citation 3500
Skandic 377/R
Safari 377/E
Safari 447
Safari Grand Luxe
SS-25
Blizzard 5500 MX
Blizzard 9700
Alpine 503
Sonic L/C

Furthermore, each vehicle has its particular vehicle serial number.

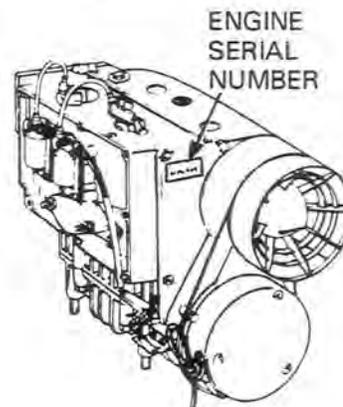


The engine also has a serial number.

Liquid cooled engines

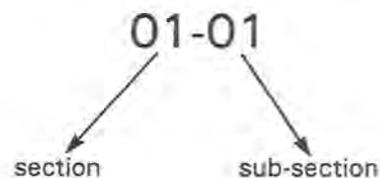


Fan cooled engines



DEFINITION OF NUMBERING SYSTEMS

The manual makes use of a 2-part digital numbering system (i.e. 01-01), in which the first digit represents the Section, the second digit the Sub-section.



The numerotation at the bottom of each page assists the user in page location.

ARRANGEMENT OF THE MANUAL

The manual is divided into ten (10) major sections:

- 01 Tools
- 02 Engine
- 03 Transmission
- 04 Electrical
- 05 Suspension
- 06 Steering and skis
- 07 Hood and frame
- 08 Fuel line, wiring harness and cable routing
- 09 Technical data
- 10 Warranty

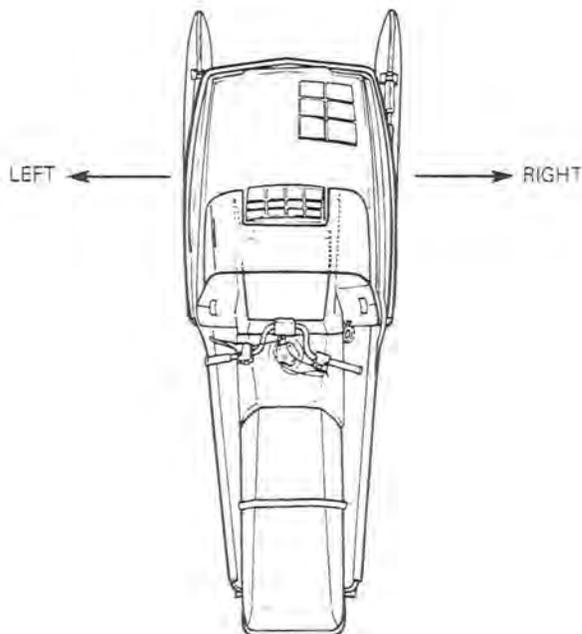
Each section is divided in various sub-sections, and again, each sub-section has one or more division.

EX.: 02 ENGINE

04 Engine type 447

- Cooling system
- Magneto

The use of "Right" and "Left" indications in the text, always refers to driving position (when sitting on vehicle).



GENERAL

The information, illustrations and components/system descriptions contained in this manual are correct at time of publication. Bombardier Inc. however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured.

Bombardier Inc. reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring obligation.

ILLUSTRATIONS & PROCEDURES

An exploded view is conveniently located at the beginning of each section and is meant to assist the user in identifying parts and components.

This Shop Manual uses technical terms which may be slightly different from the ones of the parts catalogue.

When ordering parts always refer to the parts catalogue.

The illustrations show the typical construction of the different assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts shown, however, they represent parts which have the same or a similar function.

When something special applies (such as adjustment, ... etc.), bold numbers are used for specific parts and referred to in the text.

As many of the procedures in this manual are interrelated, we suggest, that before undertaking any task, you read and thoroughly understand the entire section or sub-section in which the procedure is contained.

A number of procedures throughout the book require the use of special tools. Where a special tool is indicated, refer to section 01. Before commencing any procedure, be sure that you have on hand all the tools required, or approved equivalents.

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Valcourt, Quebec, Canada



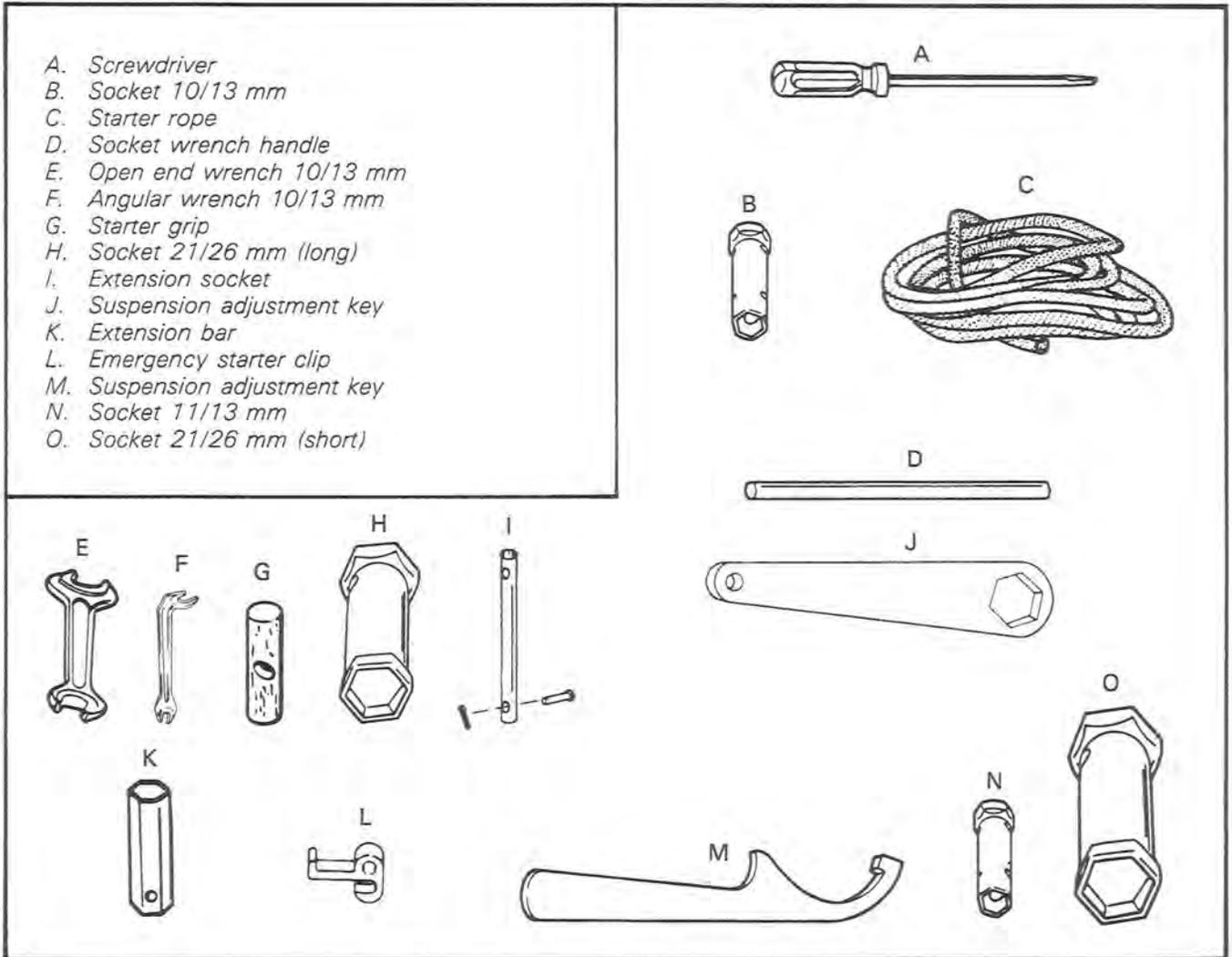
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BASIC TOOLS

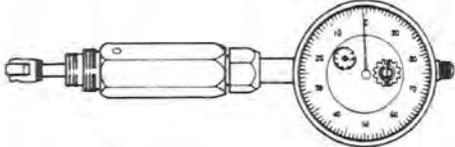
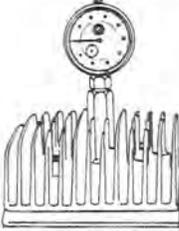
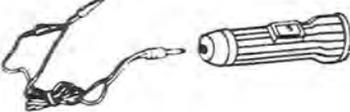
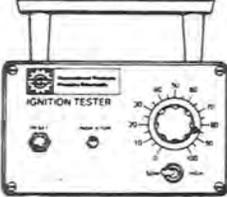
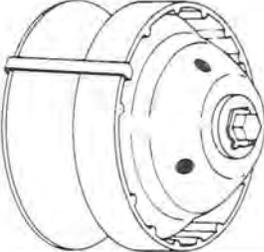
- A. Screwdriver
- B. Socket 10/13 mm
- C. Starter rope
- D. Socket wrench handle
- E. Open end wrench 10/13 mm
- F. Angular wrench 10/13 mm
- G. Starter grip
- H. Socket 21/26 mm (long)
- I. Extension socket
- J. Suspension adjustment key
- K. Extension bar
- L. Emergency starter clip
- M. Suspension adjustment key
- N. Socket 11/13 mm
- O. Socket 21/26 mm (short)



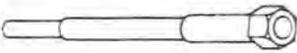
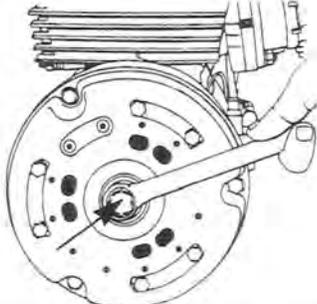
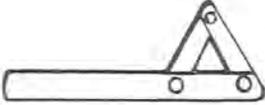
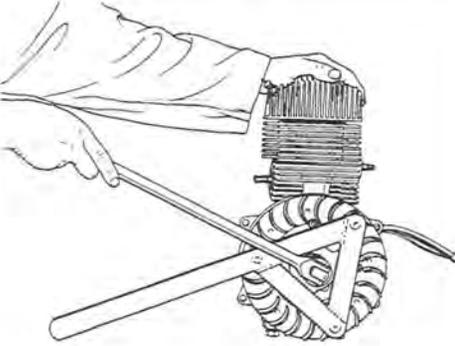
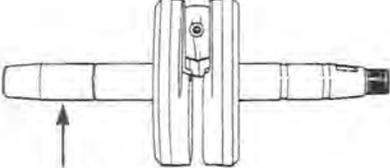
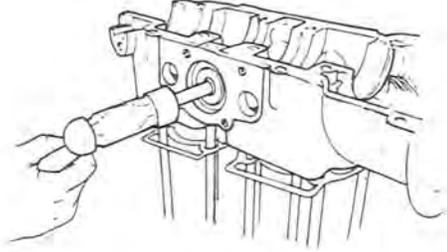
1984 MODELS	APPLICABLE TOOLS
Elan Citation Skandic, Skandic "R" Safari 377/E, 447, Grand Luxe Sonic L/C, SS-25 Blizzard 5500 MX Blizzard 9700 Alpine	A, B, C, D, F, H. A, B, C, D, E, G, H, J, L. A, B, C, D, E, G, H, J, L. A, B, C, D, E, G, H, J. A, B, C, D, E, G, J, O. A, B, C, D, E, H, J, M. A, B, C, D, E, J, O. A, B, C, D, E, H, I, K, N.



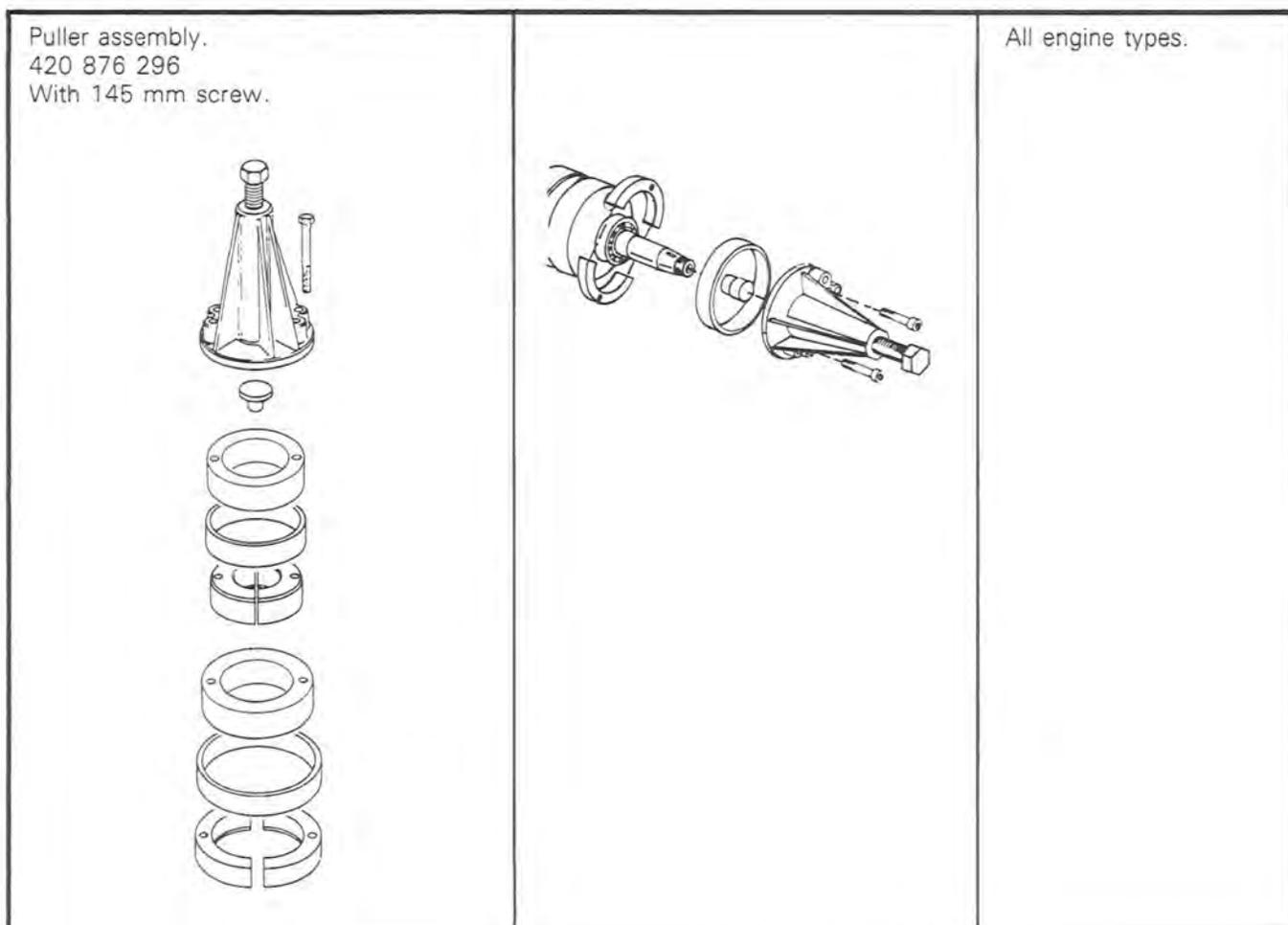
SERVICE TOOLS

ITEM	USE	APPLICABLE TO
Dial indicator (T.D.C. gauge). 414 1047 00 	Engine timing, to determine T.D.C. 	All engine types.
Circuit tester (continuity light). 414 0122 00 	Engine timing (static). Continuity tests.	All engine types.
Bombardier ignition tester. 419 0033 00 	Engine electrical components tests.	All engine types.
Drive pulley retainer. 529 0017 00 	For indexation of governor cup. 	Square shaft drive pulley.
Belt tension tester 414 3482 00 	To adjust belt deflection and tension to specification	All engines

SECTION 01 TOOLS
 SUB-SECTION 02 (SERVICE TOOLS)

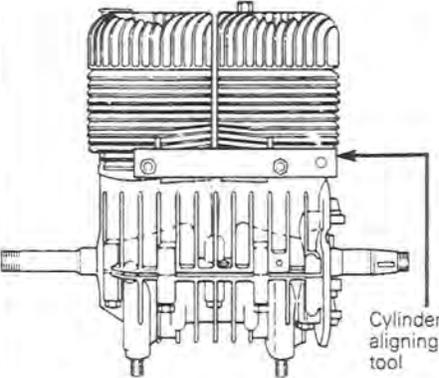
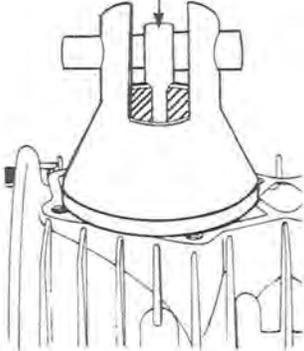
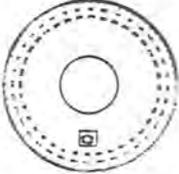
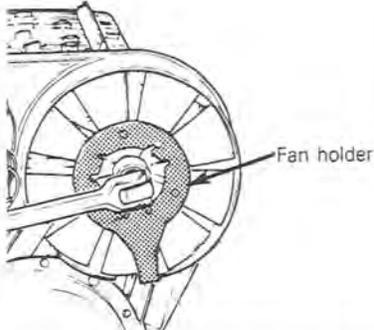
<p>Drive pulley puller. 529 0021 00</p>  <p>860 4142 00 (metric)</p>  <p>(529 003 000) (529 002 800)</p>	<p>To remove drive pulley from crankshaft.</p> 	<p>Taper shaft engines.</p>
<p>Magneto housing holder. 420 976 550</p> 		<p>Single cylinder engine types.</p>
<p>Seal sleeve 247 engines PTO 420 977 910 MAG 420 276 900</p>  <p>Water pump seal sleeve 462, 534 water pump 420 876 490 rotary valve 420 876 495</p>	<p>To avoid seal damage during crankshaft installation</p>  <p>Seal sleeve (on crankshaft)</p>	<p>All engines types except 277, 377, 447, 503</p>
<p>Rotary valve shaft pusher. 420 876 610</p> 		<p>Liquid cooled Rotary valve engines.</p>

SECTION 01 TOOLS
SUB-SECTION 02 (SERVICE TOOLS)

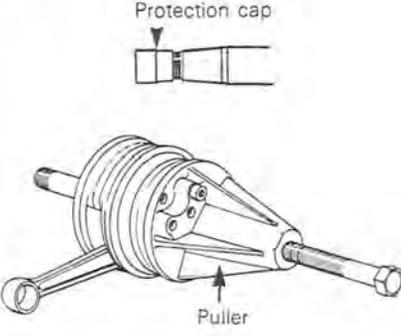
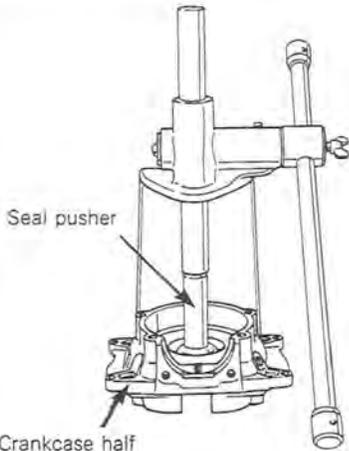


PULLER COMPONENTS		ENGINE TYPES						
		247	277	377	447	462	503	534
Screw M8 x 70 (2)	420 841 200			x	x	x	x	x
Screw M8 x 40 (2)	420 840 680	x	x			x		x
Crankshaft protector PTO	420 876 550		x	x	x	x	x	x
Crankshaft protector Mag	420 876 555		x	x	x		x	x
Distance ring	420 876 560			x	x	x	x	x
Puller ring	420 977 480	x	x	x	x	x	x	x
Half ring ass'y	420 276 020	x	x	x	x	x	x	x
Distance ring	420 876 565			x	x		x	
Distance ring	420 876 567							x
Puller ring	420 977 490		x	x	x		x	x
Half ring ass'y	420 977 470		x	x	x		x	x
Puller assembly	420 876 296	x	x	x	x	x	x	x

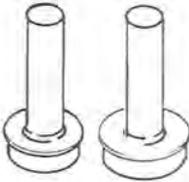
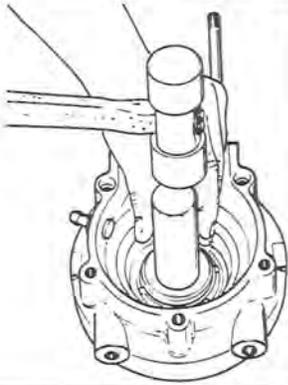
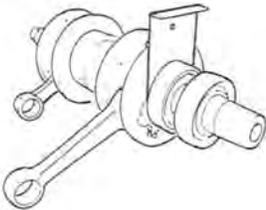
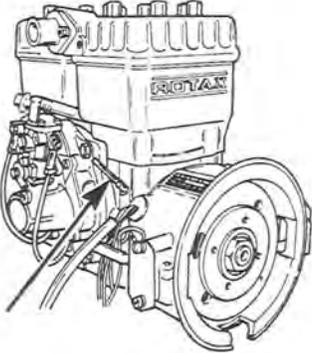
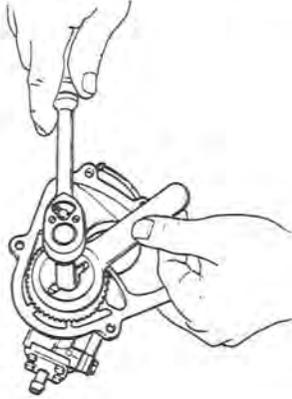
SECTION 01 TOOLS
 SUB-SECTION 02 (SERVICE TOOLS)

<p>Cylinder aligning tool. 377, 447, 503 engines 420 876 171 462 engine 420 876 175 534 engine 420 876 570</p>  <p> 377, 503 engines 420 240 275</p>		<p>Twin cylinder engines</p>
<p>Connecting rod holder. 420 977 900</p> 	<p>Connecting rod</p> 	<p>247 and 277 engines</p>
<p>Degree wheel 414 352 900</p> 	<p>To mark timing position of rotary valve</p>	<p>462 and 534 engines</p>
<p>Fan holder 503 engine 420 876 355 377, 447 engines 420 876 357</p> 		<p>Twin cylinder fan-cooled engines</p>

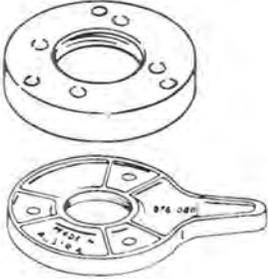
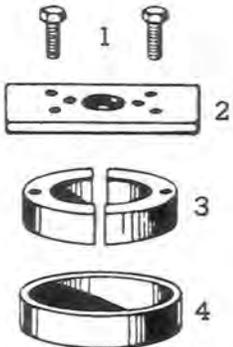
SECTION 01 TOOLS
 SUB-SECTION 02 (SERVICE TOOLS)

<p>Protection cap.</p>  <p>247, 277 engines 18 mm 420 976 890 377, 447, 462, 503 22 mm 420 876 402</p>	<p>Protect crankshaft end, when using bearing puller.</p>  <p>Protection cap</p> <p>Puller</p>	<p>All engine types.</p>
<p>Engine seal pusher 247 engine 420 977 920 277 engine 420 277 865 420 876 660</p> 	 <p>Seal pusher</p> <p>Crankcase half</p>	<p>247, 277 engine types</p>
<p>Seal pusher 420 876 510 Bearing pusher 420 876 500</p> 	<p>To install water pump bearing and seal.</p>	<p>462, 534 engine types.</p>
<p>Rotary valve seal pusher 420 876 600 - 534 engine 420 876 605 - 462 engine</p> 	<p>To install rotary valve shaft seal.</p>	<p>462, 534 engines.</p>

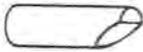
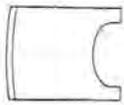
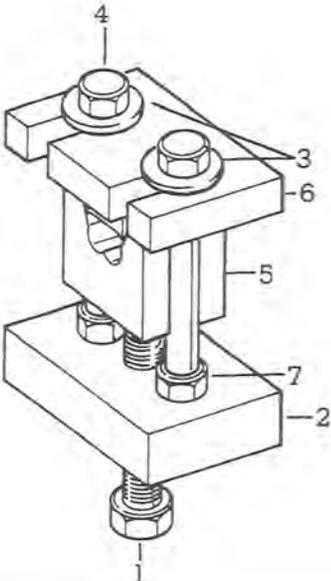
SECTION 01 TOOLS
 SUB-SECTION 02 (SERVICE TOOLS)

<p>Polyamid ring pusher engine 277 MAG 420 276 930 PTO 420 276 940</p> 	<p>To install polyamid ring in crankcase.</p> 	<p>277 engine</p>
<p>Crankshaft feeler gauge. 377, 447 & 503 engines PTO 420 876 620</p> 		<p>PTO: all 377, 447 & 503 engines</p>
<p>Crankshaft locking tool 420 876 640</p> 	<p>To lock crankshaft</p> 	<p>277, 377, 447, 462 503, 534 engines</p>
<p>Injection pump gear holder 277, 377, 447, 503 Engine 420 876 690 462 engine 420 277 900</p> 		<p>All injection engines.</p>

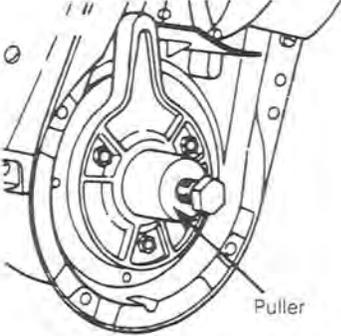
SECTION 01 TOOLS
SUB-SECTION 02 (SERVICE TOOLS)

<p>Magneto puller ring. 462 engine with 140W (4-4P) magneto 420 876 655 277, 377, 447, 462, 503, 534 engines 420 876 080</p> 	<p>To remove magneto</p>	<p>277, 377, 447, 462, 503 and 534 engines</p>
<p>Magneto puller. 247 engine 420 976 235 277, 377, 447, 462, 503, 534 engines 420 876 065</p> 	<p>To remove magneto.</p>	<p>247, 277, 377, 447, 462, 503 and 534 engines</p>
<p>3 speeds transmission bearings extractor</p> 	<p>To remove the bearings from the drive shaft and the lay shaft.</p> <p>1- screw M8 x 25 (2) 420 240 275</p> <p>2- plate 420 977 700</p> <p>3- half ring (2) 420 876 330</p> <p>4- ring 420 977 480</p>	<p>Alpine 3 speeds transmission</p>

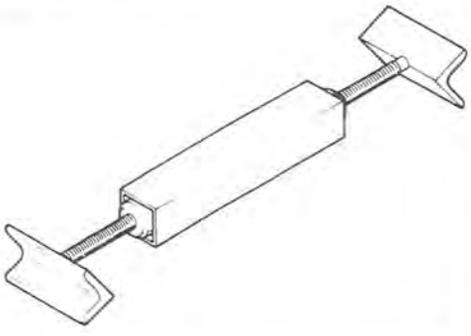
SECTION 01 TOOLS
 SUB-SECTION 02 (SERVICE TOOLS)

<p>Transmission ball mounting bolt. 420 476 020</p> 	<p>Transmission cover index rod ball installation</p>	<p>Alpine 3 speeds transmission</p>
<p>Alignment tool 420 4760 10</p> 	<p>Drive shaft and layshaft sprocket alignment.</p>	<p>Alpine 3 speeds transmission</p>
<p>Nippondenso electronic ignition tester 419 008 400</p> 	<p>Engine ignition system components tests.</p>	<ul style="list-style-type: none"> - All Nippondenso electronic ignition systems - (All engine types except 247)
<p>Clip-O-Matic 529 004 500</p> 	<p>For track inserts installation.</p> <ul style="list-style-type: none"> 1- screw 5/16 - 11 x 6'' 529 003 900 2- pressure plate 529 004 400 3- washer (2) 391 302 900 4- hexagonal screw (2) 1/2-20 x 6'' 391 717 200 5- bending block no. 1 (wide cleats) 529 004 100 bending block no. 2 (narrow cleats) 529 004 200 bending block no. 3 (Moto-Ski cleats up to 1975) 529 004 300 6- male block 529 004 000 7- hexagonal nut (2) 389 804 000 	<p>All types of track.</p>

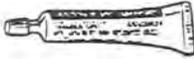
SECTION 01 TOOLS
 SUB-SECTION 02 (SERVICE TOOLS)

<p>Magneto housing holder. All twin cylinders F.C. 420 876 080</p> 	 <p>Puller 420 876 065</p>	<p>Twin cylinder engine types</p>
<p>Puller extension pin. 529 004 800</p> 	<p>To remove drive pulley from crankshaft (use with puller screw 529 0028 00)</p>	<p>277 engine type with square shaft drive pulley.</p>
<p>Distance gauge 420 876 820</p> 	<p>To position crankshaft bearings, P.T.O. side.</p>	<p>462 engine.</p>
<p>Spring installer 529 0050 00</p> 	<p>To install suspension springs.</p>	<p>All torque reaction slide suspensions.</p>

SECTION 01 TOOLS
SUB-SECTION 02 (SERVICE TOOLS)

<p>Drive axle holder 529 0051 00</p> 	<p>To hold drive axle during installation or removal of chaincase and/or end bearing housing.</p>	<p>All torque reaction slide suspensions.</p>
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SERVICE PRODUCTS

<p>LOCTITE SEALANT KIT 413 7026 00 contains: PST Pipe Sealant with Teflon (50 mL) 413 7023 00 Gasket Eliminator 515 (50 mL) 413 7027 00 Retaining Compound RC/601 (10 mL) 413 7031 00 Threadlocker 242 (10 mL) 413 7030 00 Threadlocker 271 (10 mL) 413 7029 00 Super Bonder 495 (3-gram tube) 413 7032 00</p> 	<p>For threadlocking, threadsealing, gasketing, bonding and retaining applications on engines, pulleys and fasteners etc.</p>	
<p>LOCK'N SEAL (242) BLUE MEDIUM STRENGTH 24 ml 413 7025 00</p> 	<p>A medium-strength adhesive for threadlocking and threadsealing. Vibration-proofs nuts, bolts and screws.</p>	<p>General purpose, nuts, bolts screws. Magneto ring nut, crank-case studs, etc.</p>
<p>LOCK'N SEAL (271) RED HIGH STRENGTH 6 ml 747 020 000</p> 	<p>Hi-strength threadlocking threadsealing adhesive for large parts.</p>	<p>Fasteners and studs under 1" dia.</p>
<p>MOLYKOTE G-n paste 2.8 oz 413 7037 00</p> 	<p>A balanced blend of molybdenum disulfide and other lubricating solids to handle extreme pressure. Reduces frictional force and surface damage. Provides excellent protection against fretting wear. Temperature range from -100°F to 750°F (-73°C to 399°C).</p>	<p>For rewind starter locking spring. (Not to be used on rewind springs as it does not stay on when dried.)</p>

SECTION 01 TOOLS
 SUB-SECTION 03 (SERVICE PRODUCTS)

<p>G.E. VERSILUBE G341 M 8 oz 413 7040 00</p> 	<p>This General Electric silicone lubricant is highly resistant to oxidation, shear and heat decomposition - and will provide excellent lubrication over long intervals of no maintenance under such conditions. Lubricates under temperatures from -73°C to 204°C (-100°F to 400°F).</p>	<p>Used to lubricate manual starter rewind spring. (Not to be used on rewind starter locking spring as the vibration makes it run out).</p>
<p>PRIMER CRANKCASE SEALANT (SPRAY) 6 oz 413 7024 00</p> 	<p>Very fast cure primer. Primer NF provides fixturing in only 15-30 seconds with full cure in 4 hours or less. On part life is 30 minutes and parts should be assembled as soon as possible after adhesive is applied.</p>	<p>Mainly used when assembling engine crankcases.</p>
<p>CHISEL gasket remover (spray) 300 g 413 7045 00</p> 	<p>Creates a foaming action that lifts gaskets off in minutes.</p>	<p>Mainly used to remove gasket residues from any metal surface.</p>
<p>ANTISEIZE LUBRICANT 413 7010 00</p> 	<p>Protects moving and stationary parts against high temperature seizing. Prevents rust and corrosion on parts exposed to high heat.</p>	<p>Unpainted surfaces of drive pulley countershaft.</p>
<p>SILICONE DIELECTRIC GREASE 3 oz. 413 7017 00</p> 	<p>Special dielectric grease that prevents moisture and corrosion build-up in electric connections.</p>	<p>On all electric connections. High tension coil. Spark plug connections. Connector housings, etc.</p>
<p>GREASE TUBE LMZ No 1 400 g 498 0281 00</p> 	<p>Multi purpose Lithium based grease containing zinc monoxide which makes it a good conductor for heat & electricity.</p>	<p>Mainly used between regulators or rectifiers and upper column to transfer the heat build-up and to assure a good ground.</p>

SECTION 01 TOOLS
SUB-SECTION 03 (SERVICE PRODUCTS)

<p>CLUTCH LUBE 4 oz 413 8007 00</p> 	<p>Special low temperature metallic lubricant for clutch shafts only.</p>	<p>For roller round shaft drive pulleys.</p>
<p>INJECTOR OIL 413 8015 00</p> 	<p>High quality lubricant with good resistance to high operating temperatures. Low foaming action.</p>	<p>Rotary valve lubricant.</p>
<p>CHAINCASE OIL 200 ml 413 8019 00</p> 	<p>Specially formulated oil for chain and roller lubrication. Assures proper lubrication at low temperatures.</p>	<p>Chaincase lubricant on all models.</p>
<p>BLIZZARD OIL 496 0135 00 -500 ml</p> 	<p>Specially formulated oil that meets lubrication requirements of the Bombardier-Rotax engine.</p>	<p>All models.</p>
<p>INJECTION OIL 496 013 300 - 1 litre 496 013 400 - 4 litres</p> 	<p>This oil will flow at -40°C (-40°F). Compounded of base oils and additives, specially selected to provide outstanding lubrication, engine cleanliness and minimum spark plugs fouling.</p> <p>Fully efficient for: INJECTION, PRE-MIX, ROTARY VALVE.</p>	<p>All engine types.</p>
<p>GREASE TUBE SPHEEROL MULTI EP 400 g 413 7044 00</p> 	<p>Multi-purpose lithium based grease. It is an antifricition, anticorrosion and water resistant bearing grease for use through temperatures between -50°F to 225°F (-45°C to 107°C).</p>	<p>For idler bearings, ski legs, leaf spring cushion pads, seal interior lips, rear hub bearings, bogie wheels, countershaft bearings, etc...</p>

SECTION 01 TOOLS
SUB-SECTION 03 (SERVICE PRODUCTS)

Primer for gasket eliminator
413 7053 00



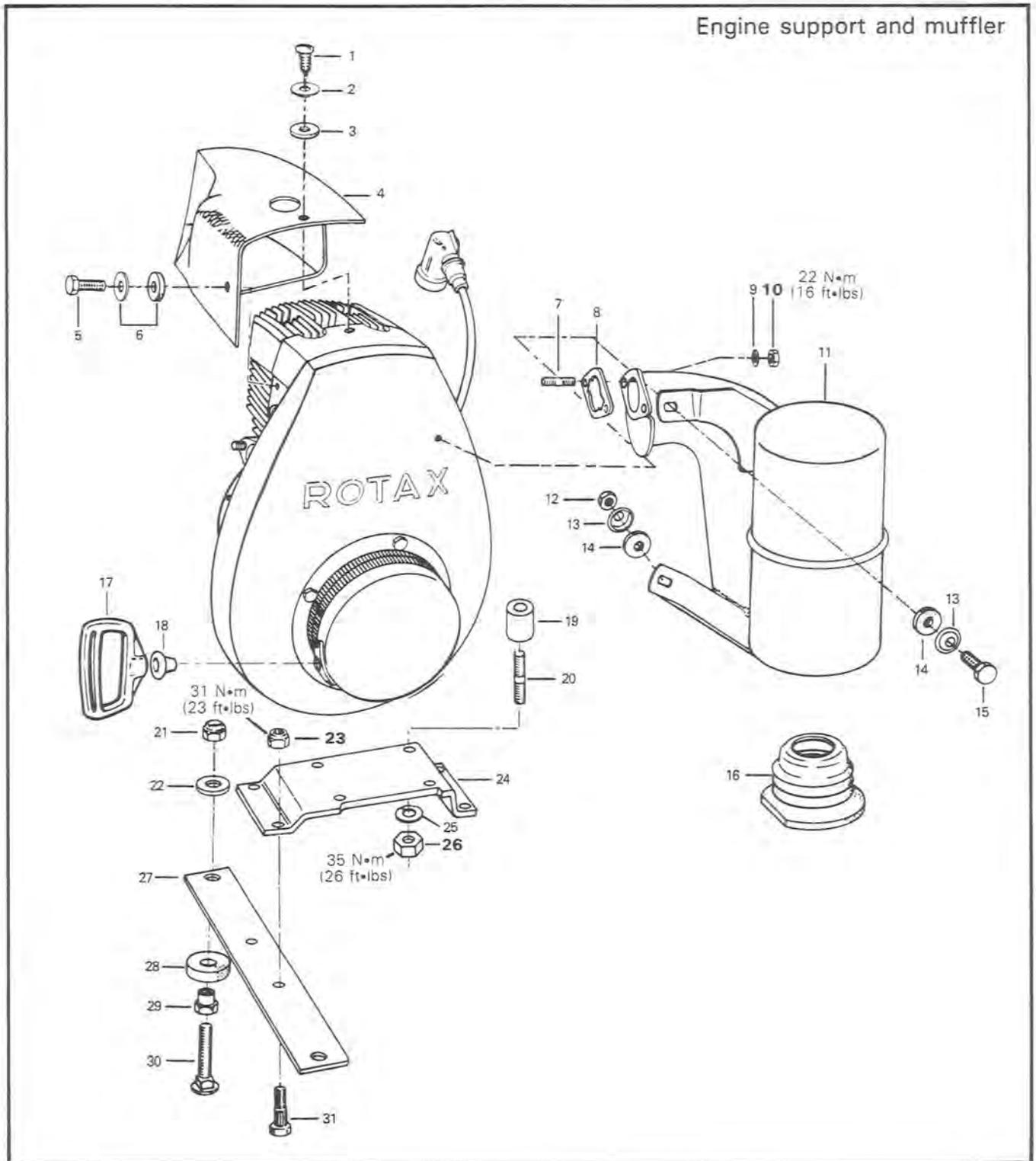
General purpose primer. Primer N assures fixturing of parts in 15-30 minutes and full cure in 12 hours or less. On part life is 30 days, but it is recommended that parts be joined within 10 minutes after adhesive is applied over primer.

Mainly used when assembling engine and transmission crankcases.

247 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION

Engine support and muffler



SECTION 02 ENGINE

SUB-SECTION 01 (247 ENGINE TYPE)

1. Metal screw 8 x 5/8 (2)
2. Washer (2)
3. Rubber spacer (2)
4. Air duct
5. Hexagonal screw 1/4 x 20
6. Washer
7. Stud M8 x 19 (2)
8. Muffler gasket
9. Lockwasher 8 mm (2)
10. Hexagonal nut 8 mm (2)
11. Muffler
12. Hexagonal nut 8 mm
13. Retainer washer (2)
14. Rubber washer
15. Hexagonal screw M8 x 25
16. Exhaust grommet

17. Starter grip
18. Rubber buffer
19. Distance sleeve 22 mm (4)
20. Stud M10 x 42 (4)
21. Elastic stop nut 3/8-24 (4)
22. Washer (4)
23. Elastic stop nut 5/16-24 (4)
24. Engine support
25. Lockwasher 10 mm (4)
26. Hexagonal nut 10 mm (4)
27. Cross support (2)
28. Vibration damper (4)
29. Threaded spacer (4)
30. Carriage bolt 3/8-24 (4)
31. Knurled screw 5/16-24 (4)
32. Rotax engine 247

REMOVAL FROM VEHICLE

Remove or disconnect the following then lift engine from vehicle.

- Console.
- Pulley guard.
- Drive belt.
- Muffler
- Primer hose.
- Decompressor cable.
- Throttle cable.
- Fuel lines.
- Electrical connector.
- Separate steering column support at upper column.
- Engine mount nuts.

ENGINE SUPPORT AND MUFFLER DISASSEMBLY & ASSEMBLY

10,23,26, Manifold nuts, engine support nuts & engine mount nuts

Torque the manifold nuts to 22 N•m (16 ft•lbs)

Torque the engine support nuts to 31 N•m (23 ft•lbs).

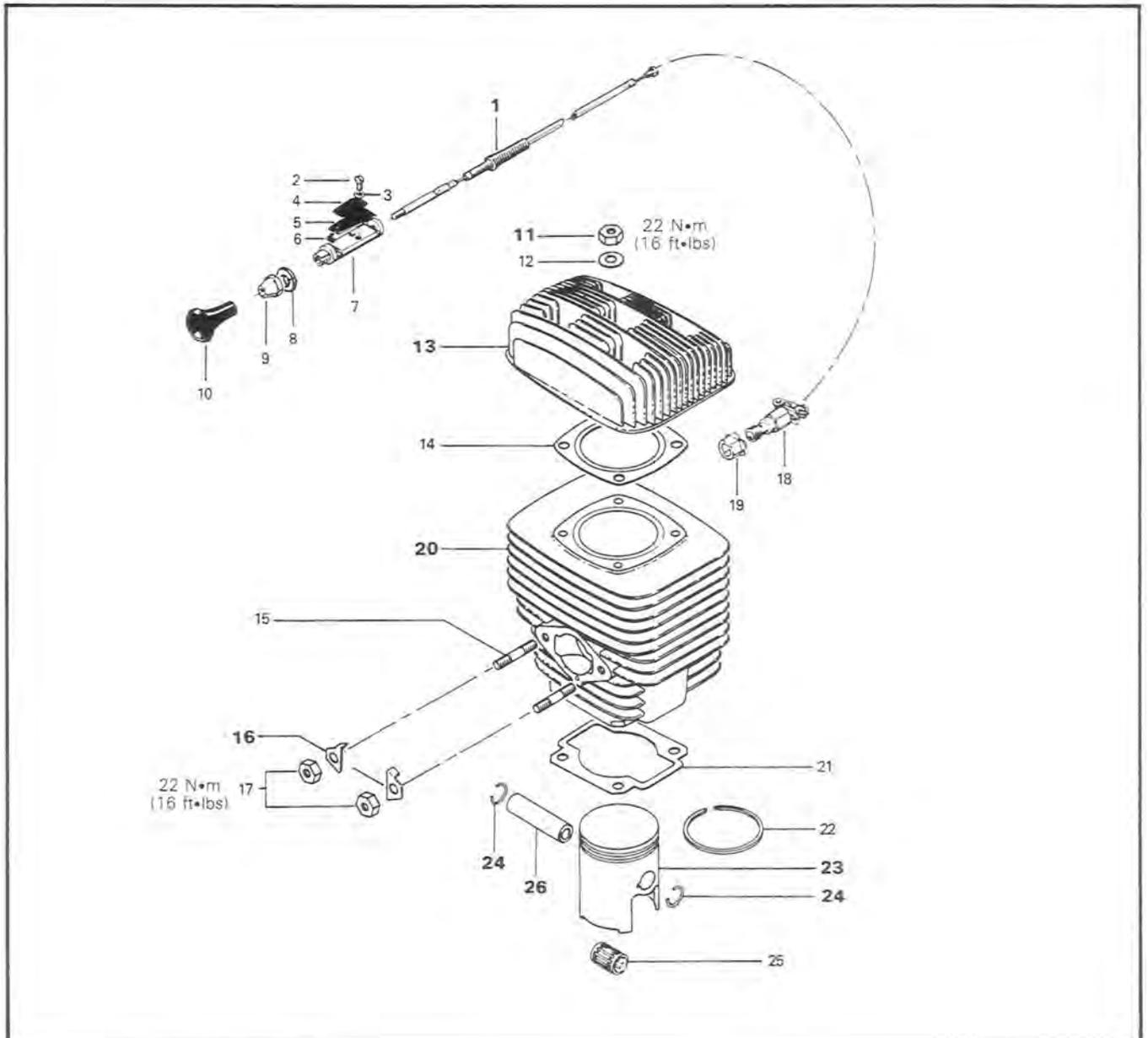
Torque the engine mount nuts to 35 N•m (26 ft•lbs).

INSTALLATION ON VEHICLE

To install engine on vehicle, inverse removal procedure. However, pay attention to the following.

- Check tightness of engine mount nuts, and drive pulley bolt.
- After throttle cable installation, check maximum throttle slide opening.
- Check pulley alignment and drive belt tension.

TOP END



- 1. Decompressor cable
- 2. Screw M4 x 7 (2)
- 3. Lockwasher 4 mm (2)
- 4. Reinforcement spring (2)
- 5. Switch spring
- 6. Lock spring
- 7. Switch housing
- 8. Spacer
- 9. Cap nut M12
- 10. Decompressor knob
- 11. Nut 8 mm (4)
- 12. Washer 8,4 mm (4)
- 13. Cylinder head

- 14. Head gasket
- 15. Stud M8 x 19,5 (2)
- 16. Tab lock (2)
- 17. Nut 8 mm (2)
- 18. Decompressor
- 19. Locking sleeve
- 20. Cylinder
- 21. Flange gasket
- 22. Rectangular ring (2)
- 23. Piston
- 24. Circlip (2)
- 25. Needle bearing
- 26. Gudgeon pin

SECTION 02 ENGINE

SUB-SECTION 01 (247 ENGINE TYPE)

CLEANING

Discard all gaskets.
Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port, cylinder head and piston dome using a wooden spatula.

○ **NOTE:** The letters "AUS" (over an arrow on the piston dome) must be visible after cleaning.

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

DISASSEMBLY

23,24,26, Piston, circlips & gudgeon pin

Place a clean cloth over crankcase then with a pointed tool inserted in piston notch, remove circlip from piston. Drive the gudgeon pin out of piston using a suitable drive punch and hammer.

▼ **CAUTION:** When tapping out gudgeon pins, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

INSPECTION

The inspection of the engine top end must include the following measurements:

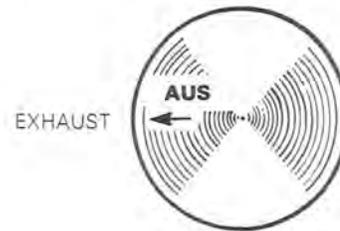
MEASUREMENTS	TOLERANCES		WEAR LIMIT
	FITTING NEW PARTS (MIN.)	(MAX.)	
Cylinder taper	N.A.	N.A.	.08 mm (.0031")
Cylinder out of round	N.A.	N.A.	.05 mm (.0018")
Cylinder/piston clearance	.065 mm (.0026")	.20 mm (.0079")	.20 mm (.0079)
Ring/piston groove clearance	.05 mm (.0018")	.20 mm (.0079")	.20 mm (.0079")
Ring end gap	.20 mm (.0079")	.35 mm (.0138")	1.0 mm (.0394")

○ **NOTE:** For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

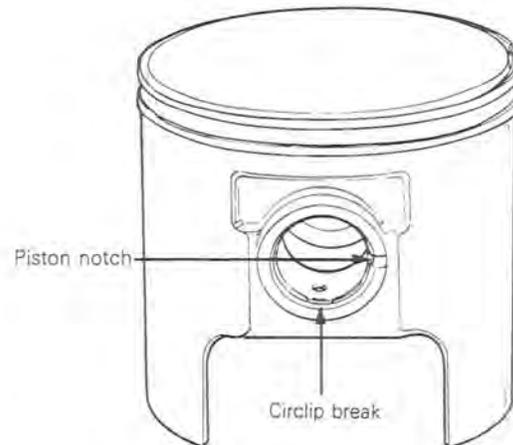
ASSEMBLY

23,24, Piston & circlips

At assembly, place the piston over the connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in direction of the exhaust port.



To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Remove any burrs on piston caused through circlip installation with very fine emery cloth.



20, Cylinder

Before inserting piston in the cylinder, lubricate the cylinder with new injection oil or equivalent.

11,13, Nuts & cylinder head

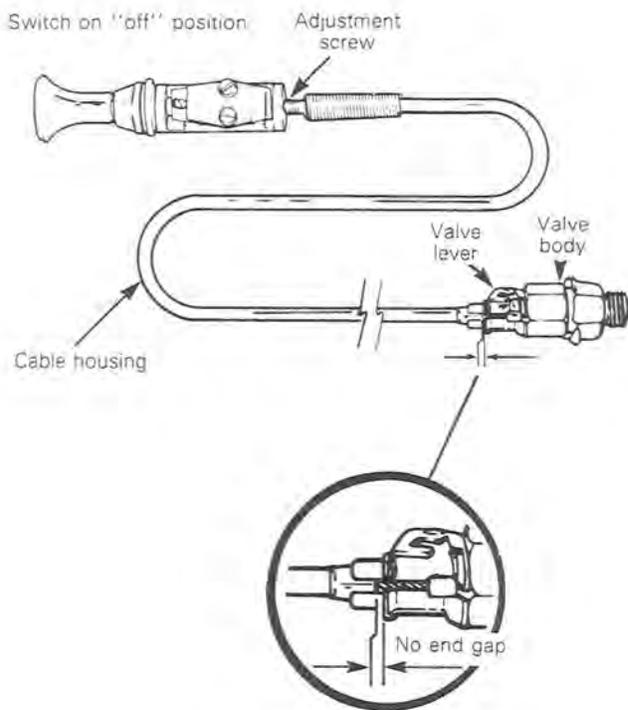
Position cylinder head on cylinder with fins in line with crankshaft center line. Cross torque retaining nuts to 22 N•m (16 ft•lbs).

16, Tab lock

Tab lock should be replaced if bent more than three (3) times. If in doubt replace.

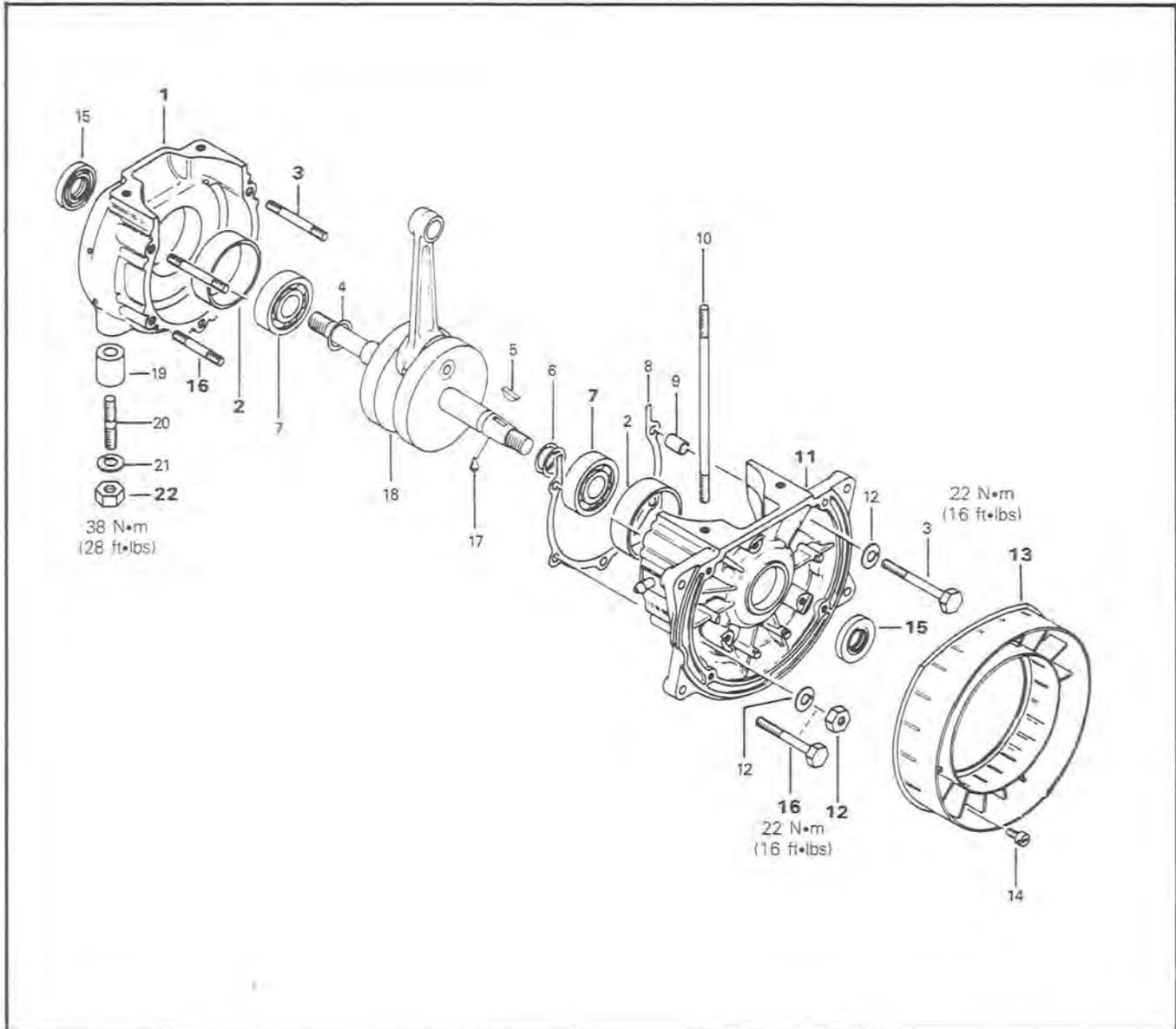
1 to 10,18,19, Decompressor ass'y

To adjust the decompressor, put the decompressor switch on "off" position. If there is some end gap between cable housing and decompressor valve lever, turn the adjustment screw counterclockwise until you eliminate that end gap. Beware not to compress the valve lever.



SECTION 02 ENGINE
SUB-SECTION 01 (247 ENGINE TYPE)

BOTTOM END



- | | |
|--|---|
| <ul style="list-style-type: none"> 1. Crankcase half (P.T.O. side) 2. Polyamid ring (2) 3. Stud M8 x 56 (crankcase with studs) (2)
Hexagonal cap screw M8 x 64 (crankcase with screws) (2) 4. Shim 1,0 mm 5. Woodruff key 5 x 6,5 6. Shim 0,1, 0,2, 0,3, 0,5, 1,0 mm 7. Ball bearing 6305 (2) 8. Crankcase gasket 9. Dowel tube 10 mm x 15 (2) 10. Stud M8 x 171 (4) 11. Crankcase half (mag side) 12. Lockwasher 8 mm (5)
Hexagonal nut 8 mm (crankcase with studs) (5) | <ul style="list-style-type: none"> 13. Labyrinth ring 14. Slotted head screw M6 x 10 (4) 15. Seal (2) 16. Stud M8 x 46 (crankcase with studs) (3)
Hexagonal cap screw M8 x 55 (crankcase with screws) (3) 17. Loctite 242 18. Crankshaft 19. Distance sleeve 22 mm (4) 20. Stud M10 x 42 (4) 21. Lockwasher 10 mm (4) 22. Hexagonal nut 10 mm (4) |
|--|---|

CLEANING

Discard all oil seals and gaskets.

Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY

General

To remove drive pulley, refer to "Drive Pulley", section 03, sub-section 03.

To remove magneto, refer to "Magneto" in this section.

1,11, Crankcase halves

When disassembling crankcase halves, do not heat the crankcase. If heat is necessary, temperature must not exceed 55°C (130°F).

2, Polyamid rings

Do not remove polyamid rings unless necessary.

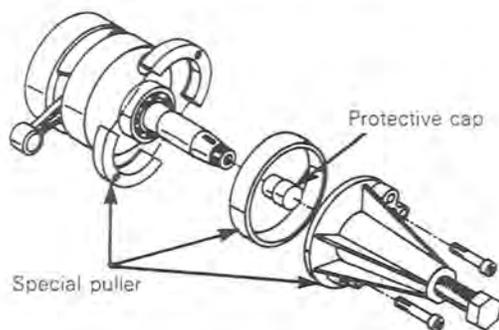
To remove, heat slightly with a butane torch then pry out using a screwdriver.

15, Seals

To remove seals, push from outside the crankcase towards the inside.

7, Ball bearings

To remove bearings from crankshaft use a protective cap and special puller as illustrated. (See Tools Section).



INSPECTION

The inspection of the engine bottom end must include the following measurements:

MEASUREMENTS	TOLERANCES		WEAR LIMIT
	FITTING NEW PARTS (MIN.)	(MAX.)	
Crankshaft deflection	N.A.	N.A.	.10 mm (.0039")
Connecting rod big end axial play	.20 mm (.0079")	.53 mm (.0208")	1.0 mm (.0394")
Crankshaft end play	.20 mm (.0079")	.40 mm (.0158")	N.A.

○ NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

7, Bearings

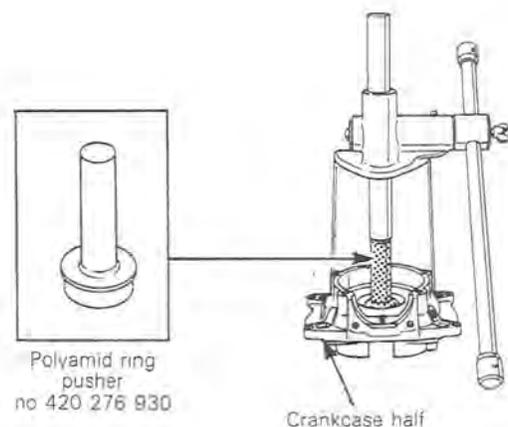
Prior to installation, place bearings into an oil container and heat the oil to 100°C (210°F) for 5 to 10 min. This will expand bearings and ease installation.

Install bearings with groove outward.

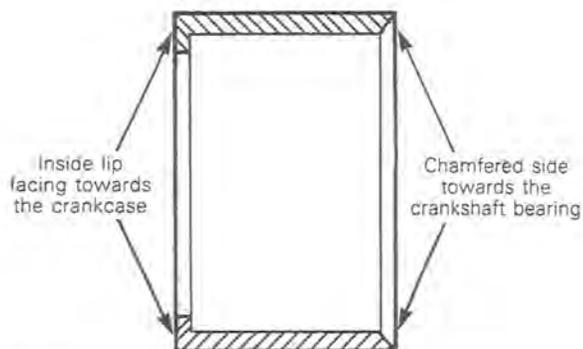
○ NOTE: Crankshaft end-play requires adjustment only when crankshaft and/or crankcase is replaced. Prior to magneto side bearing installation, determine crankshaft end-play and install required shim(s) on crankshaft extension. For the crankshaft end-play adjustment procedure, refer to Engine Tolerances Measurement, section 02, sub-section 08.

2, Polyamid rings

To install polyamid ring, apply oil on outside diameter then use a suitable pusher.

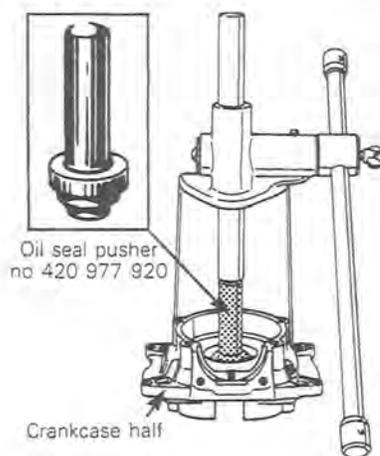


SECTION 02 ENGINE
SUB-SECTION 01 (247 ENGINE TYPE)



15, Seals

To install new seal into crankcase use an appropriate oil seal pusher as illustrated. (See Tools Section).

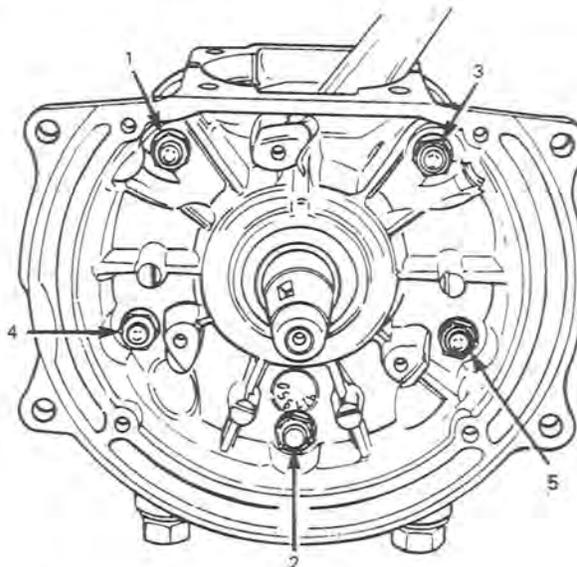


Also, prior to crankcase adjoining, install a protector sleeve on each crankshaft extension to prevent oil seal damage (See Tool Section). Apply a light coat of lithium grease on seal lip. Spray some new injection oil on all moving parts of the crankshaft.

CAUTION: To ensure appropriate crankshaft bearing lubrication, seal outer surface must be pressed on seal crankcase shoulder.

3,12,16, Studs or bolts & nuts

Torque the nuts or bolts to 22 N•m (16 ft•lbs) following illustrated sequence.



22, Engine mount nuts

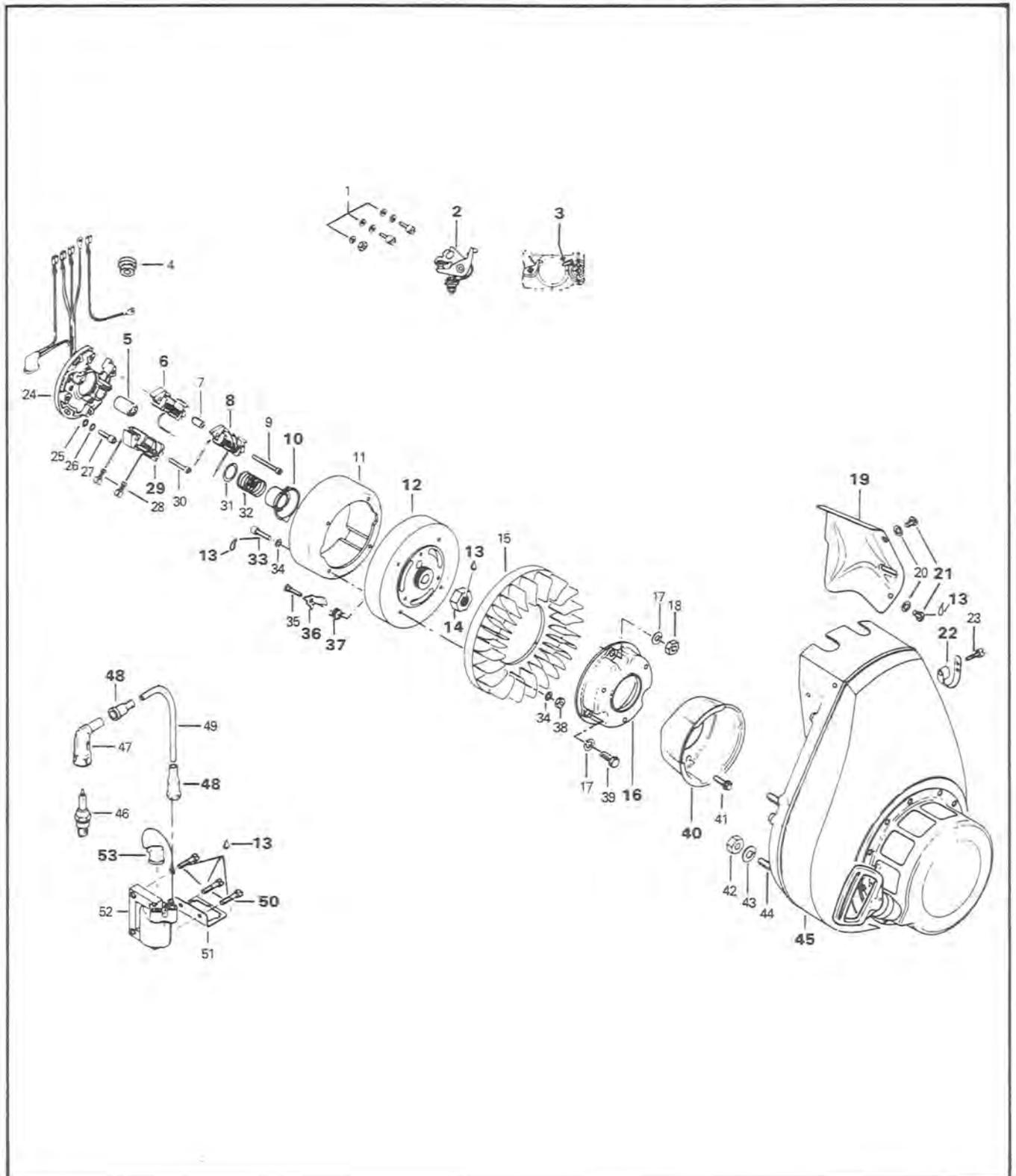
Torque the engine mount nuts to 38 N•m (28 ft•lbs).

13, Labyrinth ring

Position labyrinth ring with bevelled side on top.

To install magneto, refer to "Magneto" in this section.

MAGNETO AND COOLING SYSTEM



SECTION 02 ENGINE

SUB-SECTION 01 (247 ENGINE TYPE)

1. Magneto parts set
2. Contact breaker set
3. Lubricating wick
4. Grommet
5. Condensar
6. Generator coil with cable
7. Distance sleeve 11 mm (2)
8. Brake light coil with cable
9. Phillips head screw M5 x 32 (2)
10. Breaker cam
11. Magneto ring
12. Magneto housing
13. Loctite 242
14. Hexagonal nut 18 mm x 1.5
15. Fan
16. Pulley spacer
17. Lockwasher 6 mm (3)
18. Hexagonal nut M6
19. Air deflector
20. Spring washer B5 (2)
21. Slotted head screw M5 x 8 (2)
22. Cable clamp
23. Slotted head screw M3 x 16
24. Armature plate
25. Washer 5.3 mm (3)
26. Lockwasher 5 mm (3)
27. Hexagonal cap screw M5 x 18 (3)
28. Female connector 6.3 (5)
29. Lighting coil with 2 cables
30. Phillips head screw M5 x 28 (2)
31. Cam spring washer
32. Breaker cam spring
33. Hexagonal cap screw M6 x 22 (4)
34. Lockwasher 6 mm (8)
35. Bearing screw M6
36. Centrifugal weight
37. Centrifugal weight spring
38. Hexagonal nut M6 (4)
39. Hexagonal screw M6 x 20 (2)
40. Starting pulley
41. Hexagonal self tapping screw (3)
42. Hexagonal nut 8 mm (4)
43. Lockwasher 8 mm (4)
44. Stud M8 x 23 (3)
Stud M8 x 34
45. Fan cowl
46. Spark plug M175 T1 (M7A)
47. Spark plug protector
48. Protection cap (2)
49. Ignition cable 360 mm
50. Slotted head screw M5 x 22 (3)
51. Junction box bracket
52. Ignition coil
53. Mass cable

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

▼ **CAUTION:** Clean armature using only a clean cloth.

DISASSEMBLY

To gain access to magneto assembly, remove:

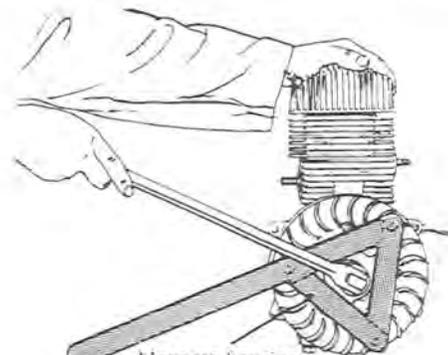
- muffler
- upper column
- air duct
- air deflector
- spark plug cable clamp
- fan cowl
- starting pulley
- pulley spacer

○ **NOTE:** Before disassembling magneto, indexing marks should be located to facilitate reassembly.

14, Magneto retaining nut

To remove magneto retaining nut:

- Lock crankshaft with magneto housing holder (service tool) as illustrated.
- Remove magneto retaining nut.



Magneto housing holder
P/N: 420 976 550

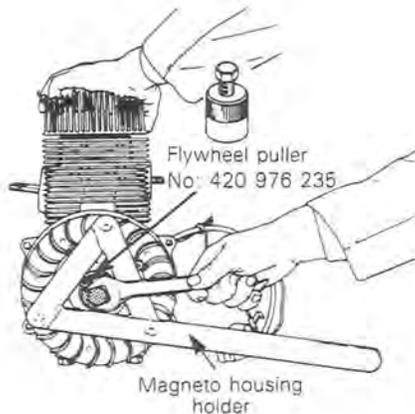
○ **NOTE:** It should be noted that to correctly remove a "Loctite" locked fastener it is first necessary to tap on the fastener to break Loctite bond. This will eliminate the possibility of thread breakage.

If magneto housing holder is not available, crankshaft can be locked with the following procedure:

- With engine cold, remove spark plug(s).
- Bring piston at top dead center position.
- Rotate magneto 45° counterclockwise.
- Insert enough starter rope into cylinder to fill it completely.
- Remove magneto retaining nut.

12, Magneto housing

To remove magneto housing (flywheel): use flywheel puller (service tool) and magneto housing holder (service tool) as illustrated.



Tighten puller nut and, at same time, tap on bolt head using a hammer to release magneto from its taper.

REPAIR

5, Condensor

To replace a condensor:

- Disconnect the two black leads using a soldering iron.
- Drive the condensor out of the armature plate using a suitable pusher.
- To reinstall, reverse procedure.

2,3, Contact breaker & lubricating wick

When replacing contact breaker,

- apply a light coat of grease on lubricating wick
- clean breaker points with acetone, alcohol or ether.

6,8,29, Generator coil, brake light coil & lighting coil

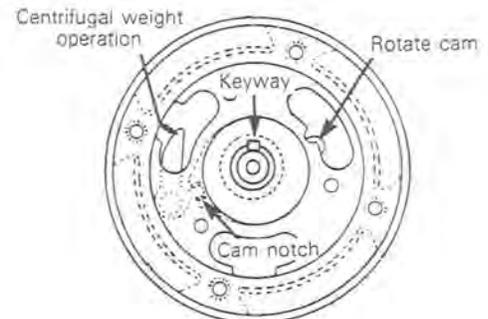
Whenever a coil is replaced, the air gap (distance between magnet and coil end) must be adjusted.

To check air gap, insert a feeler gauge of 0.25-0.38 mm (.010"-.015") between magnet and coil ends. If necessary to adjust, slacken retaining screws and relocate coil.



ASSEMBLY

- Clean crankshaft extension (taper).
- Apply Loctite 242 (blue, medium strength).
- Position magneto on crankshaft with the keyway and the cam notch indexed as illustrated:



10,36, Breaker cam & centrifugal weight

Rotate breaker cam to check centrifugal weight operation.

37, Centrifugal weight spring

At assembly, apply a small amount of grease into spring seating.

13,21,33,50, "Loctite 242", air deflector screws, magneto ring screws & junction box screws.

At assembly of air deflector, magneto and junction box, apply "Loctite 242" on screw threads.

SECTION 02 ENGINE
SUB-SECTION 01 (247 ENGINE TYPE)

13,14, "Loctite 242" & magneto housing nut

At assembly, thoroughly clean threads and apply "Loctite 242", then torque retaining nut to 85 N•m (63 ft•lbs).

48,53, Protection cap & mass cable

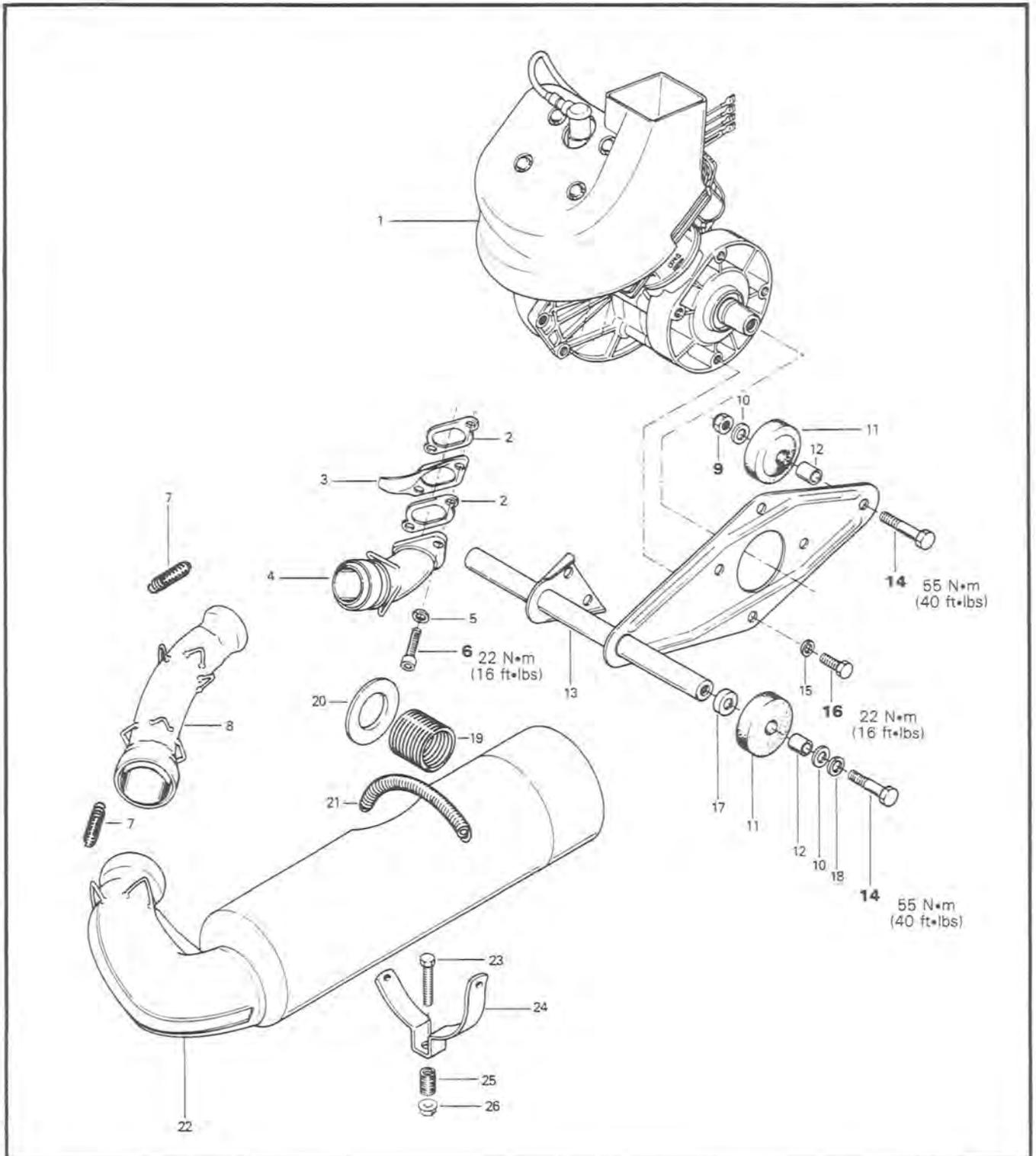
At reassembly coat all electric connections with silicone dielectric grease to prevent corrosion or moisture from penetrating.

 **CAUTION: Do not use silicone "sealant", this product will corrode contacts.**

For ignition timing refer to section 04 sub-section 02.

277 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION



SECTION 02 ENGINE

SUB-SECTION 02 (277 ENGINE TYPE)

- | | |
|----------------------------|---|
| 1. Engine Rotax 277 | 14. Hexagonal cap screw M10 x 45 (3) |
| 2. Gasket (2) | 15. Lockwasher 8 mm (6) |
| 3. Air deflector | 16. Hexagonal cap screw M8 x 20 (6) |
| 4. Exhaust socket | 17. Cup (2) |
| 5. Lockwasher 8 mm (2) | 18. Lockwasher 10 mm (2) |
| 6. Allen screw M8 x 30 (2) | 19. Spring |
| 7. Spring (6) | 20. Washer |
| 8. Exhaust elbow | 21. Spring (2) |
| 9. Elastic stop nut 10 mm | 22. Muffler |
| 10. Washer 10,5 (3) | 23. Hexagonal cap screw M6 x 40 |
| 11. Rubber mount | 24. Muffler support |
| 12. Bushing (3) | 25. Spring |
| 13. Engine bracket | 26. Hexagonal flanged elastic stop nut 6 mm |
-

REMOVAL FROM VEHICLE

Remove or disconnect the following then lift engine from vehicle.

- Pulley guard and drive belt
- Muffler
- Throttle cable and intake silencer
- Oil and fuel lines
- Oil injection pump cable
- Pulsation line
- Decompressor cable (applicable from engine number 3,376,858)
- Electrical connectors
- Hood retaining cable
- Bolts (3) securing engine support to chassis

ENGINE SUPPORT AND MUFFLER ASSEMBLY

6, 16, Exhaust manifold bolts & crankcase to engine support bolts

Torque to 22 N•m (16 ft•lbs).

9, 14, Engine support nuts & bolts

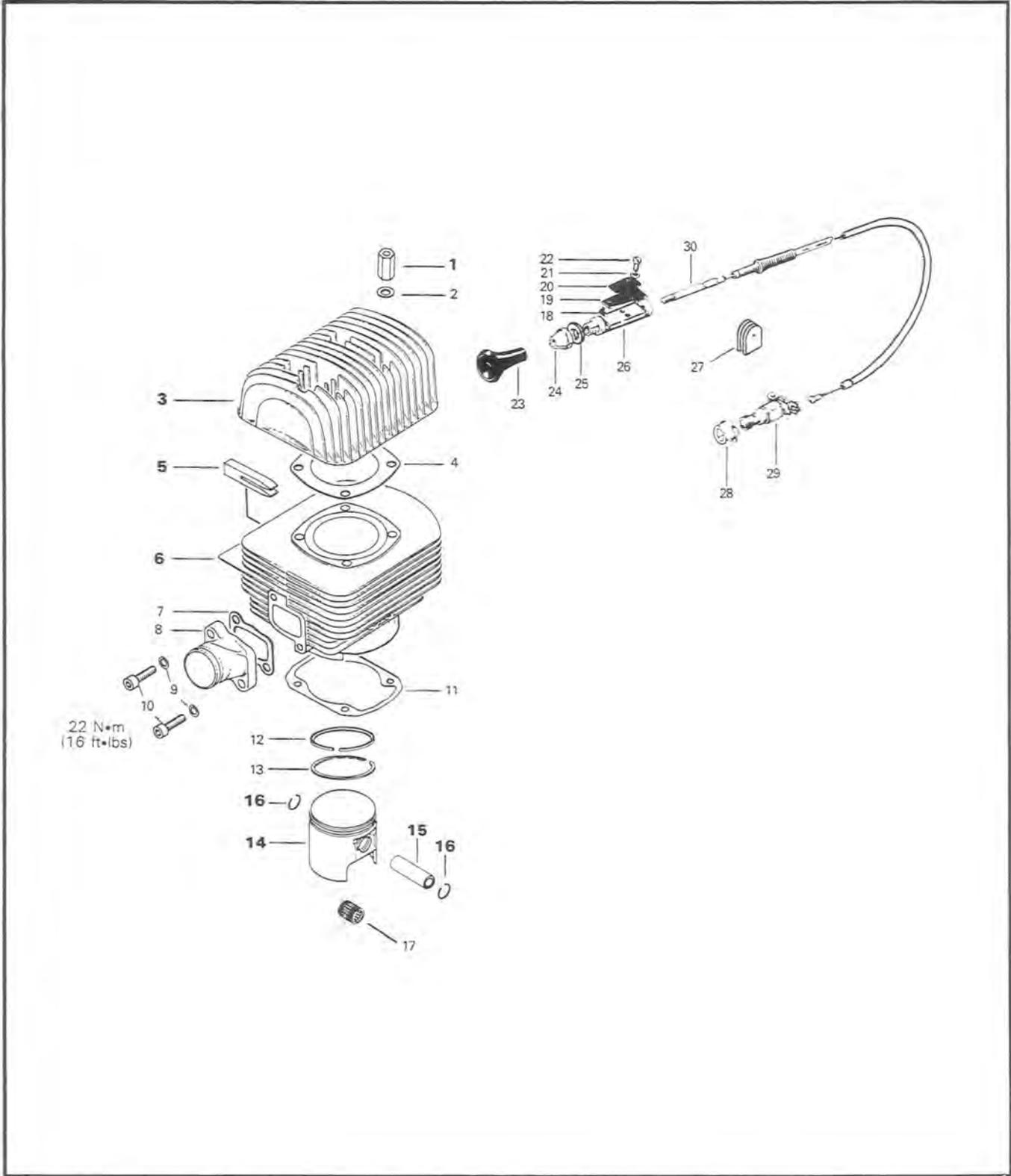
Torque to 55 N•m (40 ft•lbs).

INSTALLATION ON VEHICLE

To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

- Check tightness of engine mount nuts, and drive pulley bolt.
- After throttle cable installation, check carburetor maximum throttle slide opening.
- Check pulley alignment and drive belt tension.

TOP END



SECTION 02 ENGINE

SUB-SECTION 02 (277 ENGINE TYPE)

1. Hexagonal distance nut 8 mm (4)
2. Washer 8,4 mm (4)
3. Cylinder head
4. Head gasket
5. Insulating rubber
6. Cylinder
7. Intake manifold gasket
8. Intake manifold
9. Lockwasher 8 mm (2)
10. Allen screw M8 x 30 (2)
11. Cylinder flange gasket
12. Semi-trapez ring
13. Rectangular ring
14. Piston
15. Gudgeon pin

16. Circlip (2)
17. Needle bearing
18. Lock spring
19. Switch spring
20. Reinforcement spring
21. Screw M4 x 7 (2)
22. Lockwasher 4 mm (2)
23. Decompressor knob
24. Cap nut M12
25. Spacer
26. Switch housing
27. Grommet
28. Locking and sealing sleeve
29. Decompressor
30. Decompressor cable

CLEANING

Discard all gaskets.
Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port, cylinder head and piston dome using a wooden spatula.

 **NOTE:** The letters "AUS" (over an arrow on the piston dome) must be visible after cleaning.

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

DISASSEMBLY

14, 15, 16, Piston, gudgeon pin and circlips

Place a clean cloth over crankcase to prevent circlips from falling into crankcase. Then with a pointed tool inserted in piston notch, remove circlips from piston.

Drive the gudgeon pin out of piston using a suitable drive punch and hammer.

 **CAUTION:** When tapping out gudgeon pins, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

INSPECTION

The inspection of the engine top end must include the following measurements:

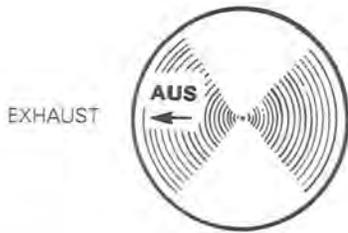
MEASUREMENTS	TOLERANCES		WEAR LIMIT
	FITTING NEW PARTS (MIN.)	(MAX.)	
Cylinder taper	N.A.	N.A.	.08 mm (.0031")
Cylinder out of round	N.A.	N.A.	.05 mm (.0018")
Cylinder/piston clearance	.07 mm (.0028")	.09 mm (.0035")	.20 mm (.0079")
Ring/piston groove clearance	.04 mm (.0016")	.11 mm (.0043")	.20 mm (.0079")
Ring end gap	.20 mm (.0079")	.35 mm (.0138")	1.0 mm (.0394")

 **NOTE:** For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

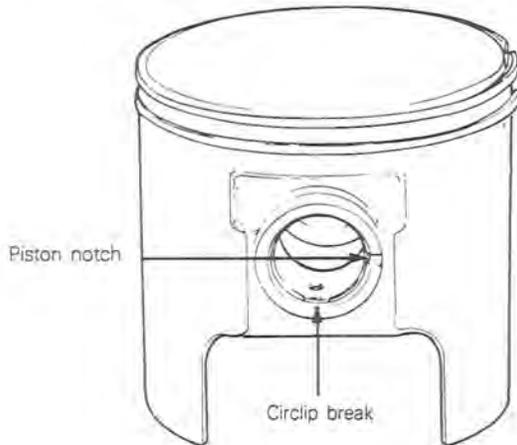
14,16, Piston & circlips

At assembly, place the piston over the connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in direction of the exhaust port.



Spare parts pistons and cylinders are identified with a green or red dot, it is important to match the piston with the cylinder of the same color.

To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Remove any burrs on piston caused through circlip installation with very fine emery cloth.

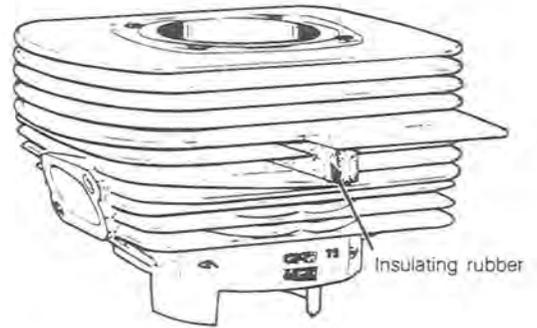


6, Cylinder

Before inserting piston in cylinder lubricate the cylinder with new injection oil or equivalent.

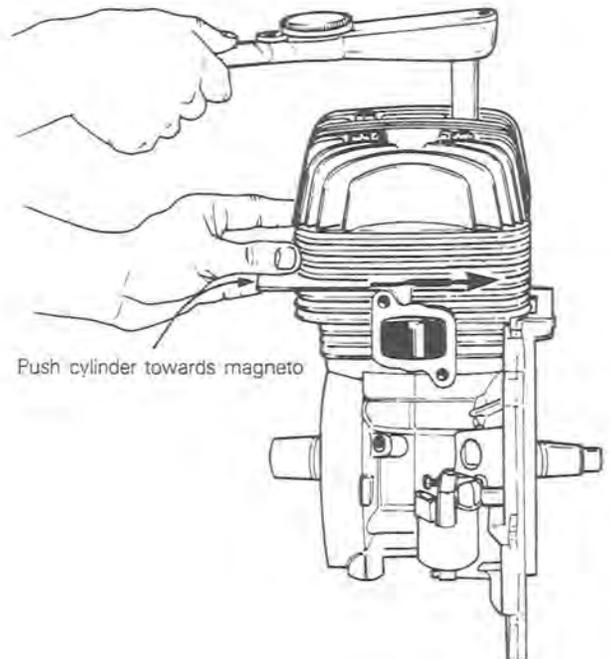
5, Insulating rubber

Position insulating rubber as illustrated.



1,3,6, Head nuts, cylinder head & cylinder

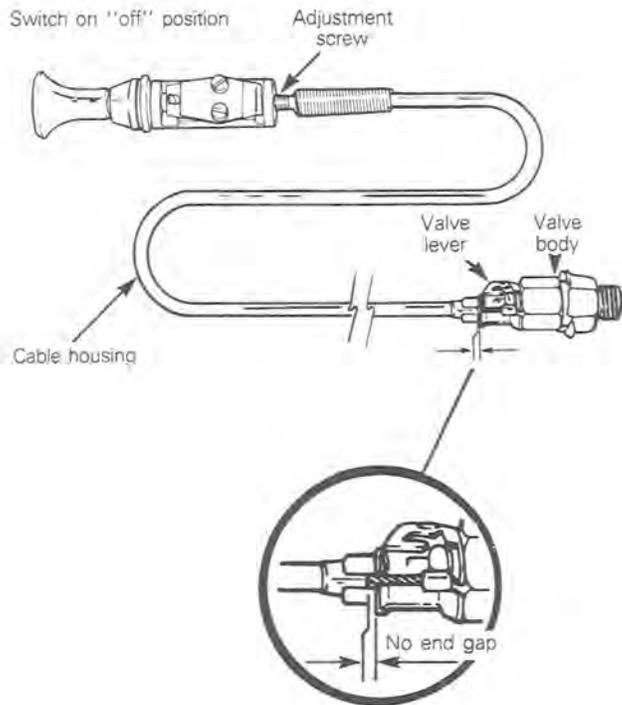
Position cylinder head on cylinder with nuts and push cylinder towards magneto while cross torquing nuts to 21 N•m (15 ft•lbs).



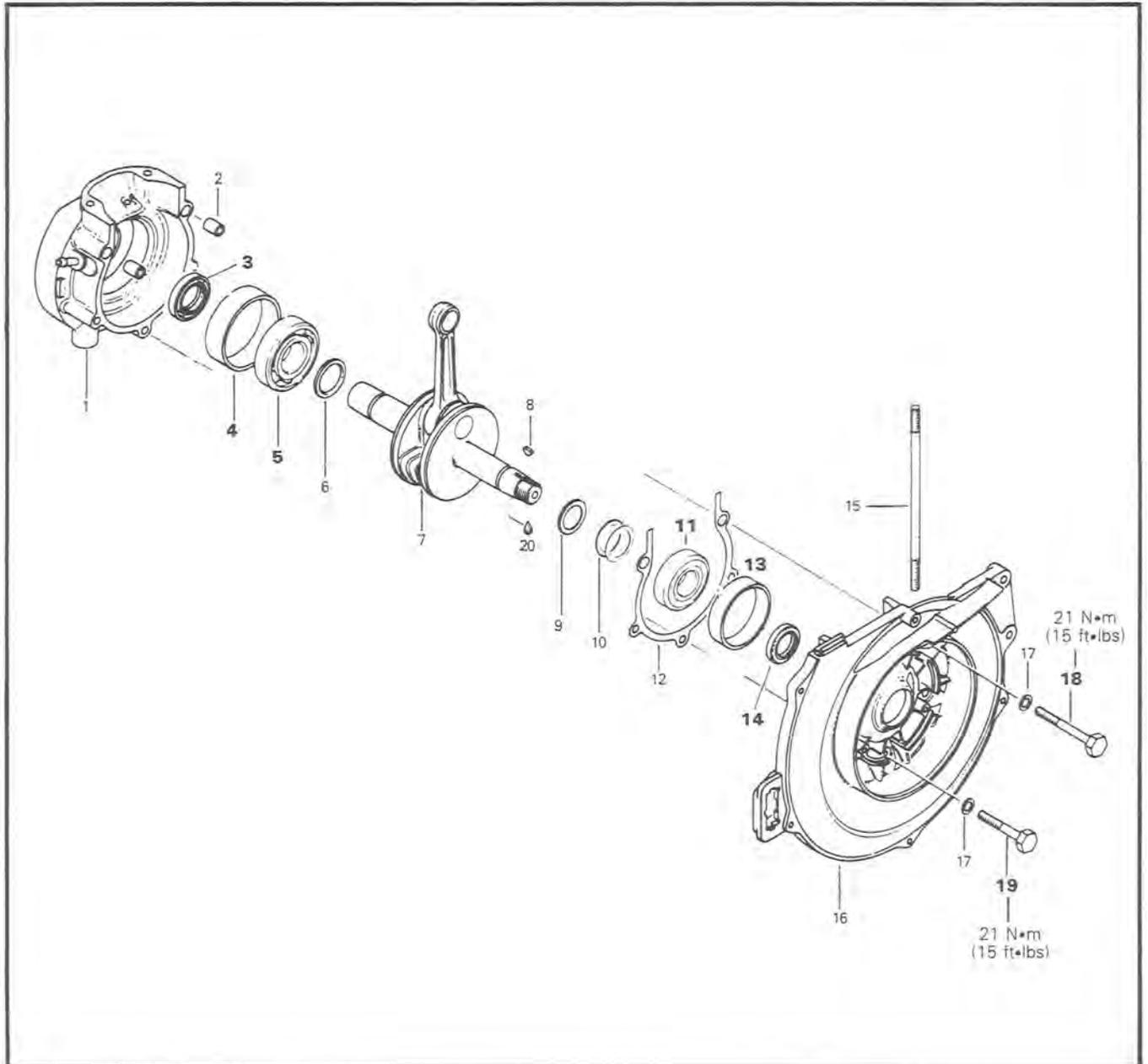
SECTION 02 ENGINE
SUB-SECTION 02 (277 ENGINE TYPE)

18 to 30, Decompressor ass'y

To adjust the decompressor, put the decompressor switch on "off" position. If there is some end gap between cable housing and decompressor valve lever, turn the adjustment screw counterclockwise until you eliminate that end gap. Beware not to compress the valve lever.



BOTTOM END



1. Crankcase half (P.T.O. side)
2. Dowel tube 11,8 x 15 (2)
3. Seal P.T.O. side
4. Polyamid ring, P.T.O. side
5. Ball bearing 6306 P.T.O. side
6. Distance ring P.T.O. side
7. Crankshaft
8. Woodruff key 3 x 3,7
9. Distance ring Mag. side
10. Shim 0,1, 0,2, 0,3 or 0,5 mm

11. Ball bearing 6206 Mag. side
12. Gasket
13. Polyamid ring Mag. side
14. Seal, Mag. side
15. Stud M8 x 175 (4)
16. Crankcase half (mag. side)
17. Lockwasher 8 mm (5)
18. Hexagonal screw M8 x 74 (2)
19. Hexagonal screw M8 x 55 (3)
20. Loctite 242

SECTION 02 ENGINE

SUB-SECTION 02 (277 ENGINE TYPE)

CLEANING

Discard all seals and gaskets.

Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY

General

To remove drive pulley, refer to "Drive Pulley", section 03, sub-section 03.

To remove magneto, refer to "Magneto" in this section.

4,13, Polyamid rings

Do not remove polyamid rings unless necessary.

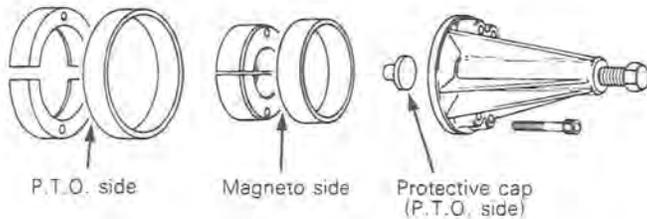
To remove, heat slightly with a butane torch then pry out using a screwdriver.

3,14, Seals

To remove seals, push from outside the crankcase towards the inside.

5,11, Ball bearings 6306 & 6206

Use appropriate puller to remove ball bearings from crankshaft (see Tools section).



NOTE: Prior to magneto side bearing installation, install required shim(s) (crankshaft end-play see section 02-08) on crankshaft extension. At assembly, place bearings into an oil container heated to 100°C (210°F). This will expand the bearings and permit them to slide easily on the shaft.

INSPECTION

The inspection of the engine bottom end must include the following measurements:

MEASUREMENTS	TOLERANCES		WEAR LIMIT
	FITTING NEW PARTS (MIN.)	(MAX.)	
Crankshaft deflection	N.A.	N.A.	.08 mm (.003")
Connecting rod big end axial play	.20 mm (.0079")	.53 mm (.0208")	1.0 mm (.0394")
Crankshaft end play	.20 mm (.0079")	.40 mm (.0158")	N.A.

NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

5,11, Ball bearings 6306 & 6206

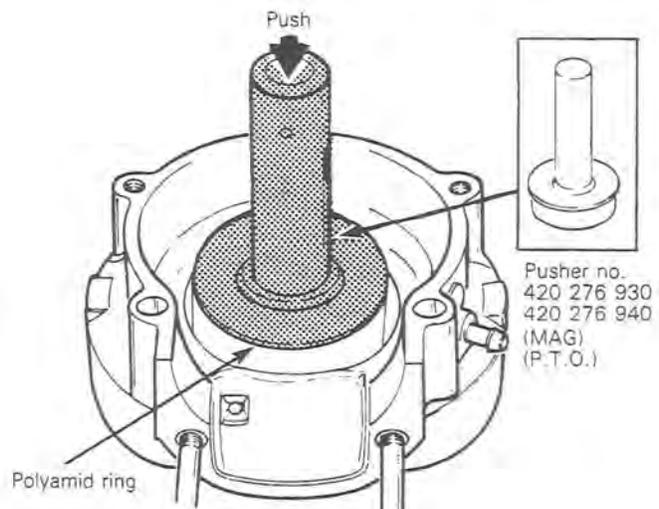
Prior to installation, place bearings into an oil container and heat the oil to 100°C (210°F) for 5 to 10 min. This will expand bearings and ease installation.

Install bearings with groove outward.

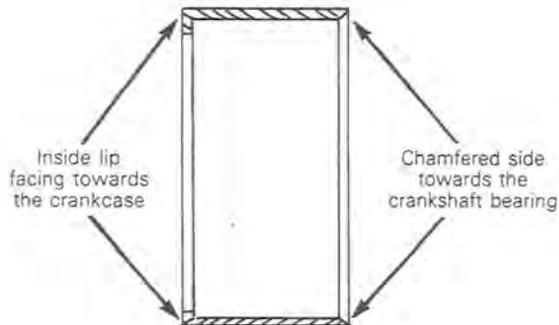
NOTE: Crankshaft end-play requires adjustment only when crankshaft and/or crankcase is replaced. Prior to magneto side bearing installation, shim(s) on crankshaft extension. For the crankshaft end-play adjustment procedure, refer to Engine Tolerances Measurement, section 02, sub-section 08.

4,13, Polyamid rings P.T.O. side & mag. side

To install polyamid rings, apply oil on outside diameter then use no. 420 276 930 pusher for magneto side and no. 420 276 940 pusher for P.T.O. side.

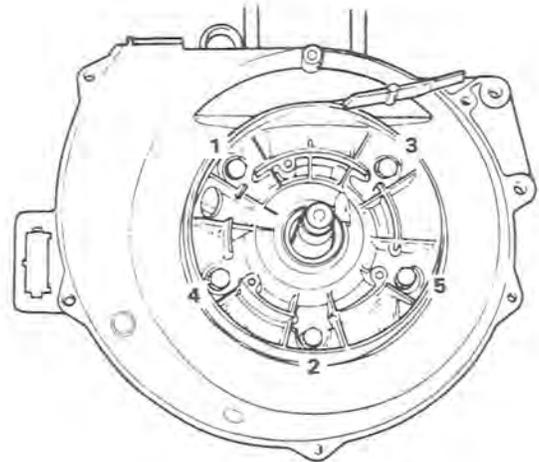


SECTION 02 ENGINE
SUB-SECTION 02 (277 ENGINE TYPE)



18,19, Crankcase bolts M8 x 74 & M8 x 55

At assembly, torque to 21 N•m (15 ft•lbs) following illustrated sequence.

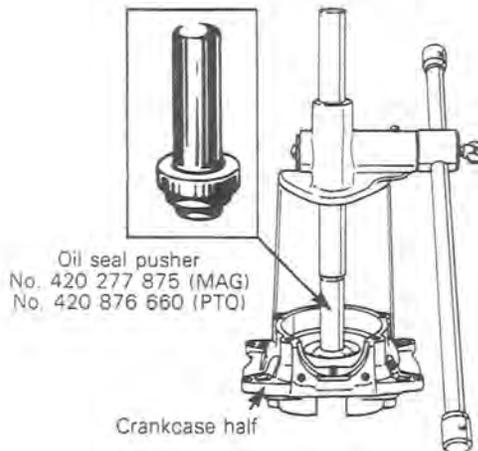


3,14, Seals P.T.O. side & mag. side

Install a seal inside the crankcase, use no. 420 277 875 pusher for magneto side and no. 420 876 660 pusher for P.T.O. side.

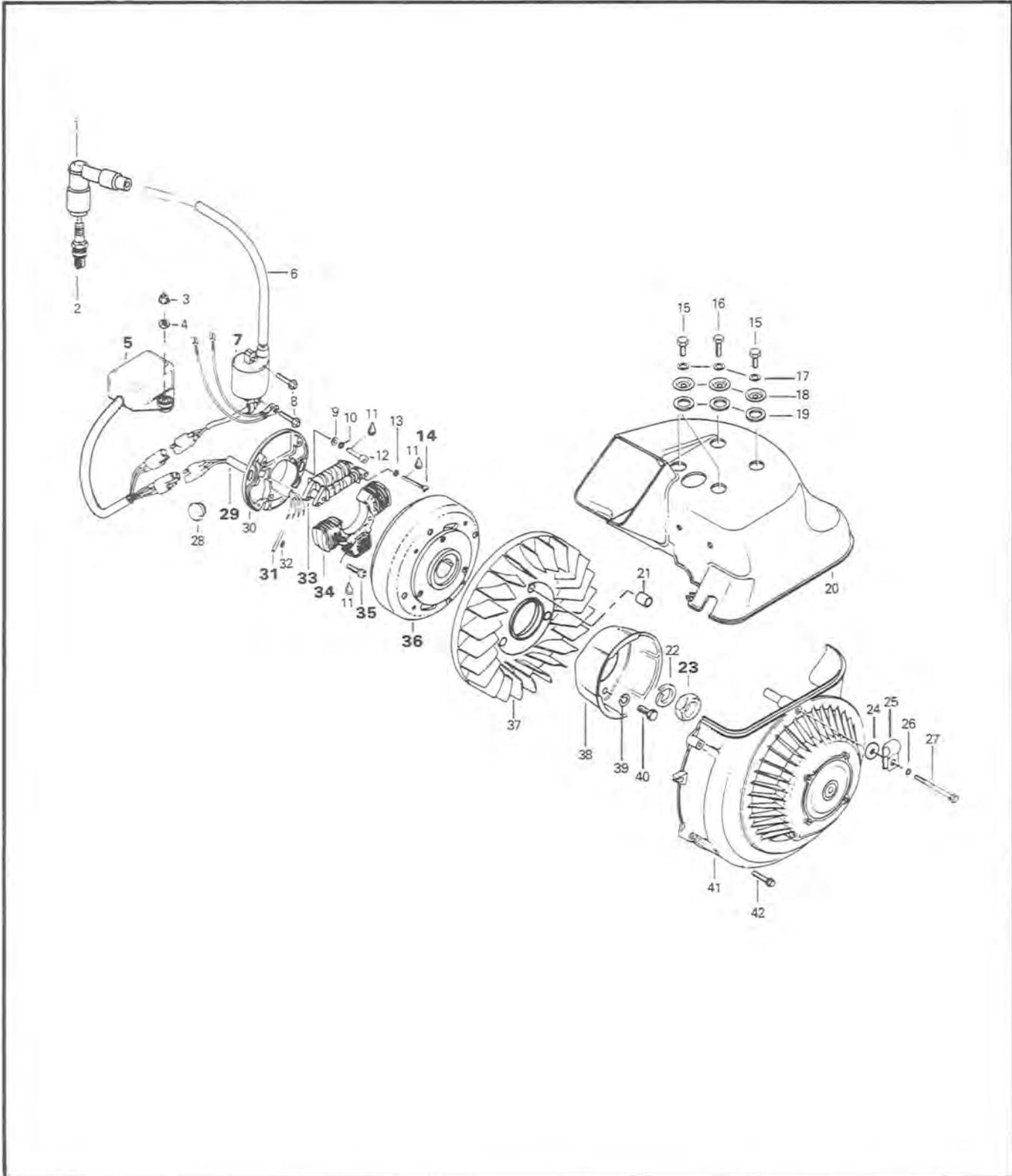
○ NOTE: To install seals, push from inside towards the outside of the crankcase.

To install magneto, refer to "Magneto" in this section.



Apply a light coat of lithium grease on seal lip. Spray some new injection oil or equivalent on all moving parts of the crankshaft.

MAGNETO AND COOLING SYSTEM



1. Spark plug protector
2. Spark plug NGK BR8ES
3. Hexagonal flanged elastic stop nut 6 mm (2)
4. Washer 6,4 mm (2)
5. C.D. box
6. Protector hose 300 mm
7. Ignition coil
8. Hexagonal taptite screw M5 x 20 (2)
9. Washer 5,3 mm (2)
10. Lockwasher 5 mm (2)
11. "Loctite 242"
12. Allen screw M5 x 18 (2)
13. Lockwasher 5 mm (2)
14. Slotted head screw M5 x 35 (2)
15. Hexagonal screw M8 x 16 (3)
16. Hexagonal screw M8 x 25
17. Lockwasher 8 mm (4)
18. Cowl cover (4)
19. Rubber washer (4)
20. Cylinder cowl
21. Distance sleeve

22. Lockwasher 22 mm
23. Nut 22 x 1,5
24. Washer 14 mm
25. Clip
26. Lockwasher 6 mm
27. Hexagonal screw M6 x 73
28. Grommet
29. Harness
30. Armature plate
31. Protector tube (6)
32. Splice connector (6)
33. Generating coil
34. Lighting coil
35. Screw M6 x 25 (2)
36. Flywheel
37. Fan
38. Starting pulley
39. Lockwasher 8 mm (3)
40. Hexagonal screw M8 x 25 (3)
41. Fan cowl
42. Hexagonal taptite screw M6 x 30 (5)

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

▼ **CAUTION:** Clean armature using only a clean cloth.

DISASSEMBLY

To gain access to magneto assembly:

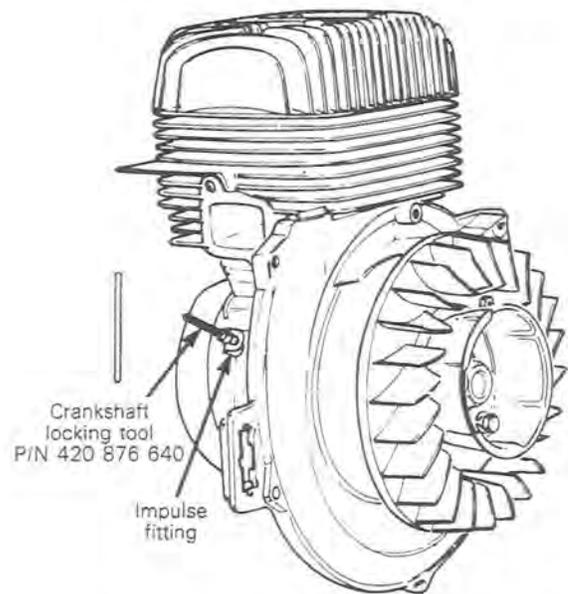
- disconnect engine block connector
- disconnect oil injection supply line
- loosen cylinder cowl bolts
- remove fan cowl.

○ **NOTE:** Before disassembling magneto plate, indexing marks should be located to facilitate re-assembly.

23, Flywheel nut 22 x 1,5

To remove magneto flywheel retaining nut:

- lock crankshaft with crankshaft locking tool (service tool P/N 420 876 640) as illustrated (piston must be at top dead center);
- remove magneto retaining nut.



○ **NOTE:** It should be noted that to correctly remove a "Loctite" locked fastener it is first necessary to tap on the fastener to break "Loctite" bond. This will eliminate the possibility of thread breakage.

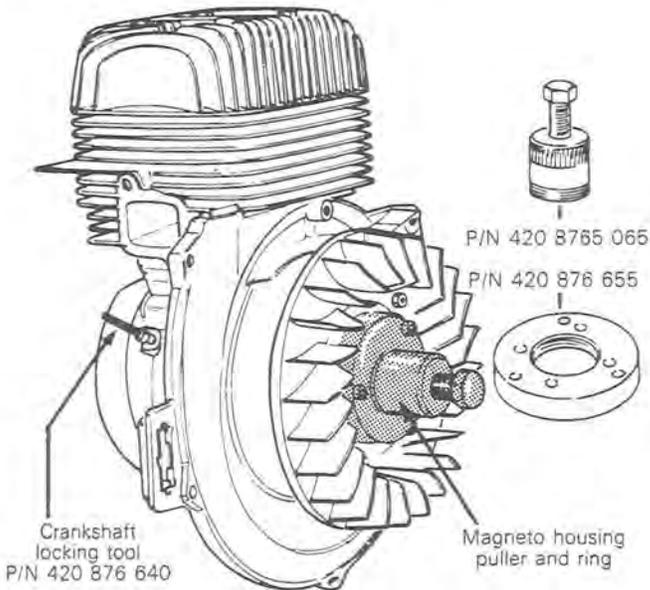
SECTION 02 ENGINE

SUB-SECTION 02 (277 ENGINE TYPE)

36, Flywheel

To remove magneto housing (flywheel):

- lock crankshaft with crankshaft locking tool (service tool P/N 420 876 640)
- adjust magneto housing puller and puller ring (service tools) as illustrated



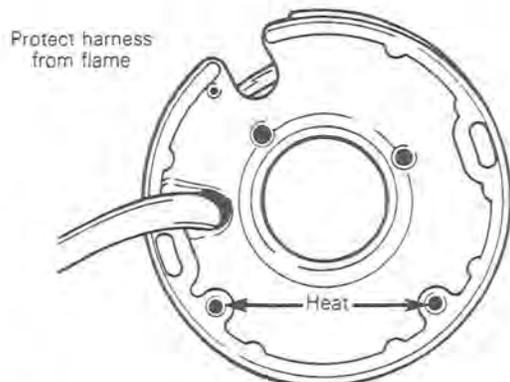
- tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper.

REPAIR

33, Generating coil

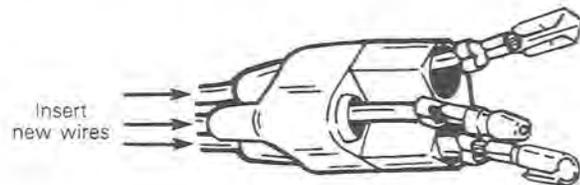
To replace generating coil:

- Heat the armature plate around the screw holes to break the Loctite bond (200°F).



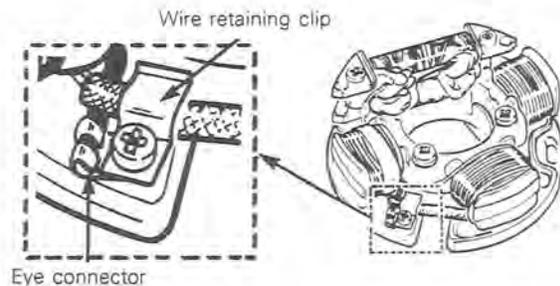
CAUTION: Protect harness from flame.

- Remove screws (use Phillips no. 2 or suitable flat screw driver).
- Cut the four wires as close as possible to the coil body.
- To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube.
- Insert the new wires into the old connector housing and install connectors.



CAUTION: Replace the old wires in the connector with the same color coded new wires.

- Install a new receptacle connector to the black/yellow striped wire.
- To install the ground connector of the armature plate, tape the new black lead to the old one and pull it under the lighting coil with the old wire.
- Solder an eye connector to the lead and fasten it under the wire retaining clip.



14, Generating coil bolts

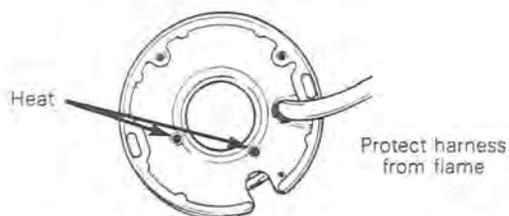
To install the new coil on the armature plate, remove the shipping nuts from the coil and apply Loctite 242 blue (medium strength) to screws before assembly.

CAUTION: Before reinstalling the magneto, remove the loose epoxy from harness.

34, Lighting coil

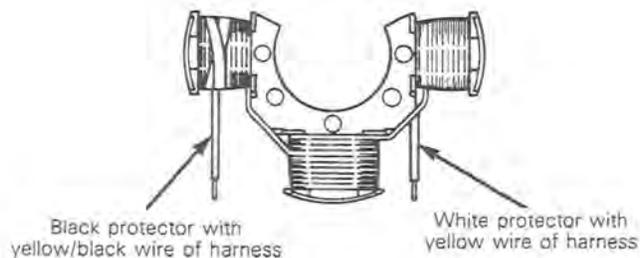
To replace lighting coil:

- Heat the armature plate around the screw holes to break the Loctite bond (200°F).



▼ CAUTION: Protect harness from flame.

- Remove screws (use Phillips no. 3 screwdriver).
- Remove the wire retaining clip from armature plate.
- Pull out protector tubes and unsolder the splice connectors.
- Solder the yellow wire in the harness to the white tube protected wire of the coil.
- Solder the yellow/black striped wire in the harness to the black tube protected wire of the coil.



31, Protector tubes

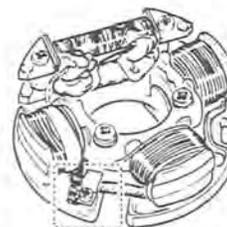
Position protector tubes over connections.

35, Lighting coil bolts

Prior to assembly, apply "Loctite 242" (blue, medium strength).

- Fasten retaining clip onto protector tubes.

The ground terminal from generating coil must be fastened under this clip.



▼ CAUTION: Before reinstalling magneto, remove the loose epoxy from harness.

ASSEMBLY

- Clean crankshaft extension (taper).
- Apply "Loctite 242" on taper.
- Position key and magneto housing on crankshaft.

23, Flywheel nut

Clean nut threads and apply "Loctite 242" (blue, medium strength) before tightening nut to 85 N•m (63 ft•lbs).

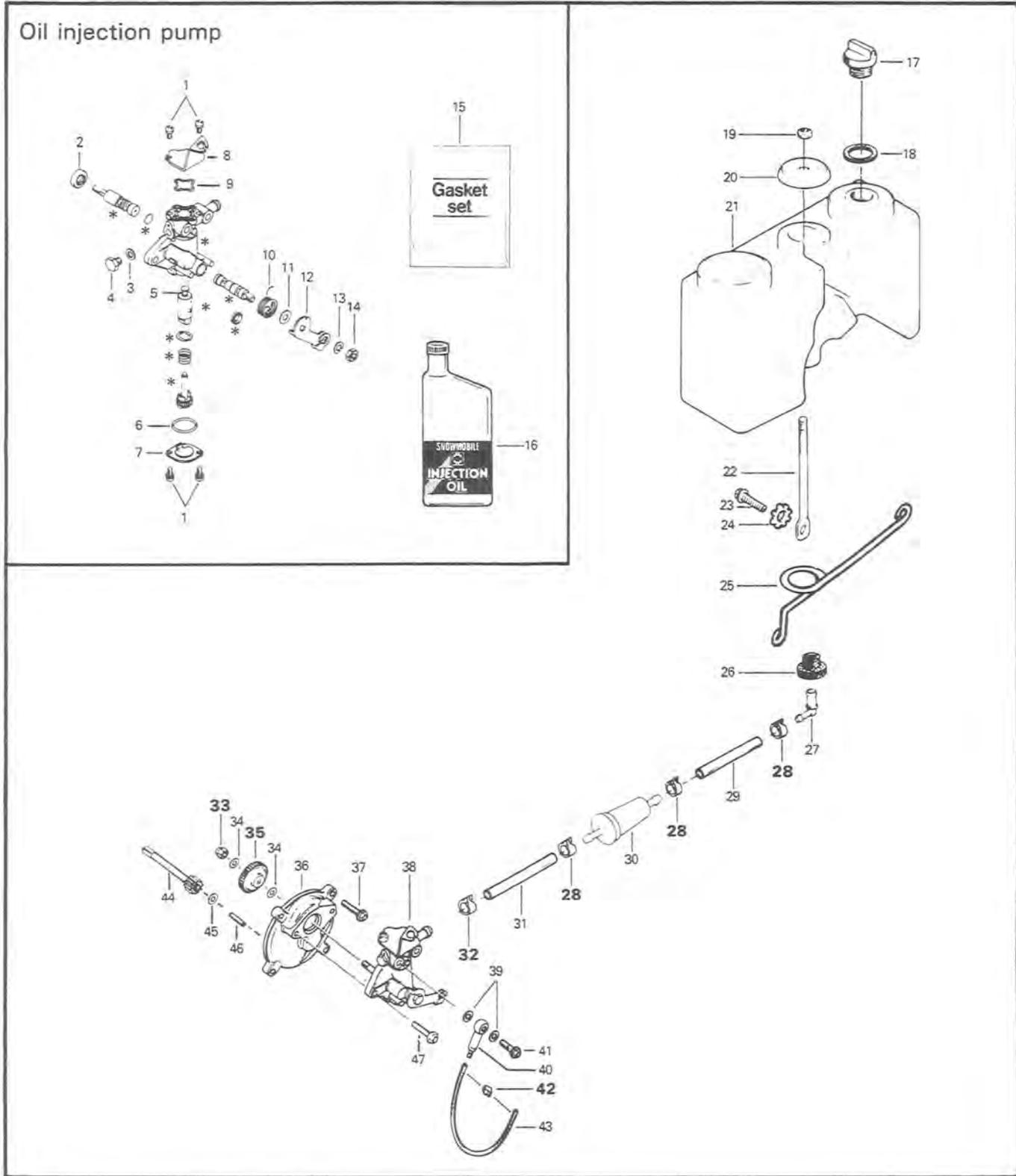
5,7,29, C.D. box, ignition coil & harness

At reassembly coat all electric connections with silicone dielectric grease to prevent corrosion or moisture penetration.

▼ CAUTION: Do not use silicone "sealant", this product will corrode contacts.

For ignition timing refer to section 04 sub-section 02.

OIL INJECTION PUMP AND RESERVOIR



1. Screw with lockwasher (4)
2. Seal
3. Washer
4. Hexagonal cap screw M6 x 7
5. Retainer
6. O'ring
7. Cam casing plate
8. Plate
9. O'ring
10. Spring
11. Washer
12. Lever
13. Lockwasher 6 mm
14. Hexagonal nut 6 mm
15. Gasket set
16. Injection oil
17. Oil tank cap
18. O'ring
19. Elastic stop nut
20. Retainer washer
21. Injection oil tank
22. Retainer rod
23. Hexagonal washer head taptite screw M6 x 30
24. External tooth lockwasher 1/4"
25. Support
26. Grommet
27. Male connector
28. Spring clip (3)
29. Oil line 38 mm
30. Filter
31. Oil line 127 mm
32. Spring clip
33. Lock nut 6 mm
34. Washer 6,2 mm (2)
35. Oil pump gear 27 teeth
36. Oil pump mounting flange
37. Taptite screw M5 x 20 (4)
38. Oil pump
39. Oil banjo gasket (2)
40. Banjo
41. Banjo bolt
42. Clamp (2)
43. Oil line 380 mm
44. Gear 9 teeth
45. Washer 4,3 mm
46. Needle roller B4 x 17,8
47. Taptite screw M5 x 16 (2)

Parts in illustration marked with * are not available as spare parts

CLEANING

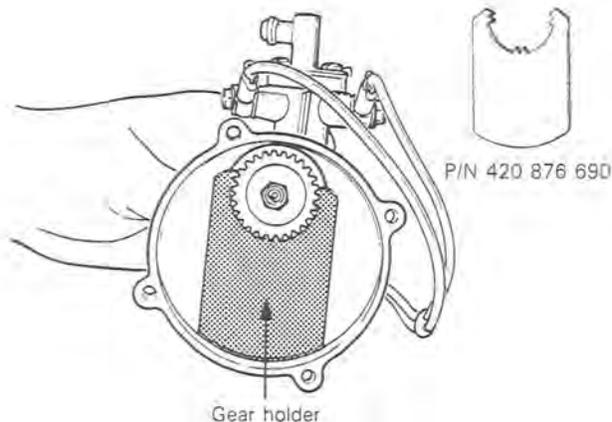
Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY

○ NOTE: Some oil pump components are not available as spare parts.

33,35, Gear retaining nut & oil pump gear

To remove gear retaining nut, first extract the needle roll with pliers then lock gear in place using no. 420 876 690 tool.



ASSEMBLY

35, Oil pump gear

At gear assembly, apply a light coat of grease on gear teeth.

28,32,42, Spring clips & clamp

Always check for spring clip and clamp tightness.

SECTION 02 ENGINE

SUB-SECTION 02 (277 ENGINE TYPE)

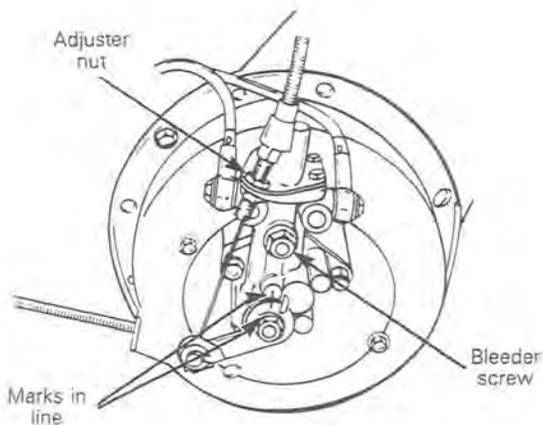
ADJUSTMENT

Prior to adjusting the pump, make sure all carburetor adjustments are completed.

To synchronize pump with carburetor:

Eliminate the throttle cable free-play by pressing the throttle lever until a light resistance is felt, then hold in place. The aligning marks on the pump casting and on the lever must align. If not, loosen the adjuster nut and adjust accordingly.

Retighten the adjuster nut.

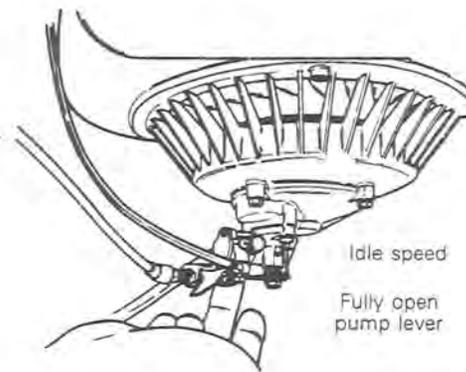


To bleed oil lines:

All oil lines should be full of oil. If required, bleed the main oil line (between tank and pump) by loosening the bleeder screw until all air has escaped from the line.

Make sure the tank is sufficiently filled.

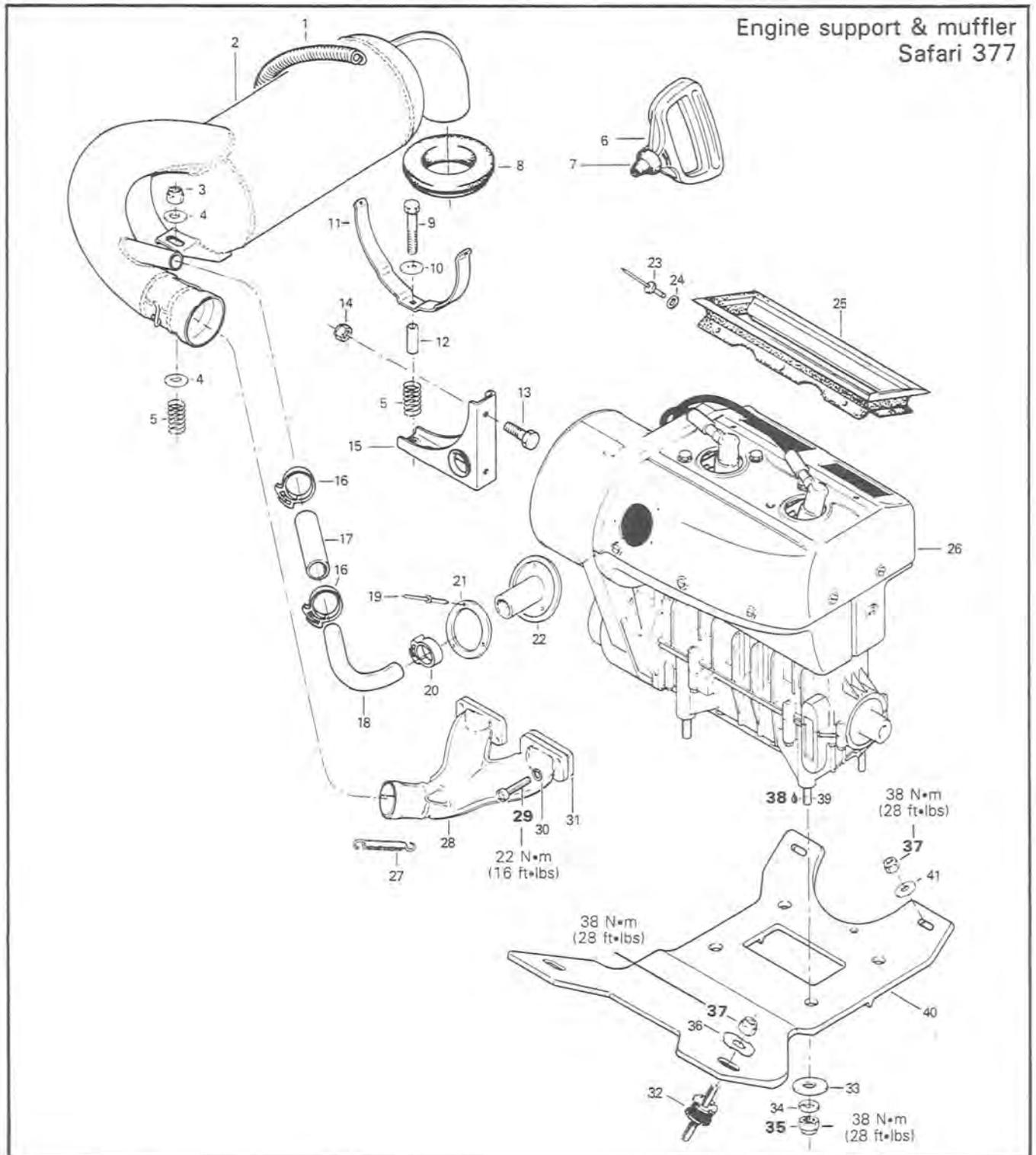
Check the small oil lines (between pump and intake manifold). If required, fill the lines by running the engine at idle speed while holding the pump lever in fully open position.



◆ **WARNING:** Ensure not to operate carburetor throttle mechanism. Secure the rear of the vehicle on a stand.

377 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION

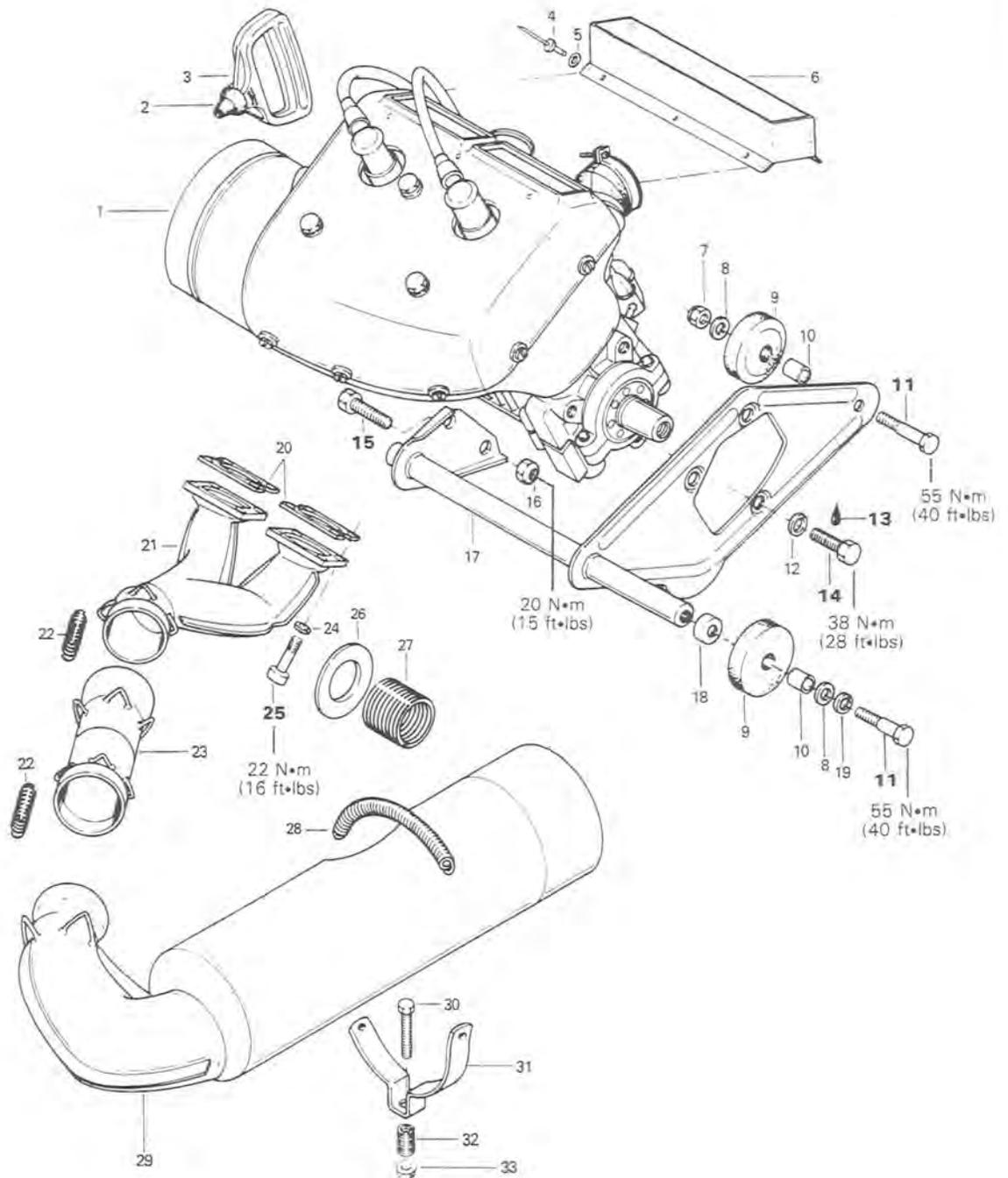


SECTION 02 ENGINE
SUB-SECTION 03 (377 TYPE)

- | | |
|-------------------------------|------------------------------------|
| 1. Spring | 22. Connector |
| 2. Muffler | 23. Rivet (6) |
| 3. Elastic stop nut M8 × 1.25 | 24. Washer (6) |
| 4. Washer 8.4 mm (2) | 25. Air duct |
| 5. Spring (2) | 26. Rotax engine 377 |
| 6. Starter grip | 27. Spring (2) |
| 7. Rubber buffer | 28. Exhaust manifold |
| 8. Exhaust washer | 29. Allen screw M8 × 30 (4) |
| 9. Cap screw M6 × 20 | 30. Lockwasher 8 mm (4) |
| 10. Washer 6 mm | 31. Gasket (4) |
| 11. Muffler attachment | 32. Rubber mount (4) |
| 12. Bushing | 33. Washer 10.5 mm (4) |
| 13. Cap screw M6 × 16 (2) | 34. Lock washer 10 mm (4) |
| 14. Elastic stop nut (2) | 35. Hexagonal nut 10 mm (4) |
| 15. Muffler support | 36. Internal tooth cup washer (2) |
| 16. Plastic clamp (2) | 37. Elastic stop nut M10 × 1.5 (4) |
| 17. Hose | 38. "Loctite 242" |
| 18. Elbow | 39. Stud M10 × 25 (4) |
| 19. Rivet (3) | 40. Engine support |
| 20. Plastic clamp | 41. Washer (2) |
| 21. Connector ring | |
-

ENGINE REMOVAL AND INSTALLATION

Engine support & muffler
Skandic 377



SECTION 02 ENGINE

SUB-SECTION 03 (377 TYPE)

1. Engine Rotax 377
2. Rubber buffer
3. Starter grip
4. Rivet (6)
5. Washer (6)
6. Air duct
7. Elastic stop nut 10 mm
8. Washer 10.5 mm (3)
9. Rubber mount (3)
10. Bushing (3)
11. Cap screw M10 x 45 (3)
12. Lockwasher 10 mm (3)
13. "Loctite 242"
14. Cap screw M10 x 25 (3)
15. Cap screw M10 x 35 (2)
16. Elastic stop nut 10 mm (2)
17. Engine bracket

18. Cup (2)
19. Lockwasher 10 mm (2)
20. Gasket (4)
21. Exhaust manifold
22. Spring (6)
23. Connector
24. Lockwasher 8 mm (4)
25. Allen screw M8 x 30 (4)
26. Exhaust washer
27. Spring
28. Spring (2)
29. Muffler
30. Cap screw M6 x 40
31. Muffler support
32. Spring
33. Elastic stop nut 6 mm

REMOVAL FROM VEHICLE

Remove or disconnect the following (if applicable) then lift engine out of vehicle.

Safari 377

- Pulley guard, drive belt, drive pulley
- Exhaust manifold
- Elbow tube on cylinder cowl
- Clamp between carburator and intake manifold
- Oil injection pump cable
- Oil lines
- Pulsation line
- Hood retaining cable
- Rewind starter cable

WARNING: Before disconnecting any electrical wire in starter system always first disconnect the battery cable.

- Wiring harness
- Engine stud nuts (under engine support)

Skandic 377

- Pulley guard, drive belt, drive pulley
- Exhaust manifold
 - Clamp between carburator and intake manifold
 - Pulsation line
 - Rewind starter cable

WARNING: Before disconnecting any electrical wire in starter system always first disconnect the battery cable.

- Wiring harness
- Hood retaining cable
- Engine support bolts

ENGINE SUPPORT AND MUFFLER ASSEMBLY

Safari 377

29,35,37,38, Manifold bolts, engine stud nuts, engine support & Loctite 242

Apply Loctite 242 on the engine stud nuts then torque to 38 N•m (28 ft•lbs).

Torque the engine support nuts to 38 N•m (28 ft•lbs).

Torque the exhaust manifold bolts to 22 N•m (16 ft•lbs).

Skandic 377

11,13,14,15,25, Engine support bolts, loctite, engine to engine support bolts & exhaust manifold bolts

Apply Loctite 242 on the engine to engine support screw then torque to 38 N•m (28 ft•lbs).

Torque the engine to engine support, bolts and nuts to 20 N•m (15 ft•lbs).

Torque the engine support bolts to 55 N•m (40 ft•lbs).

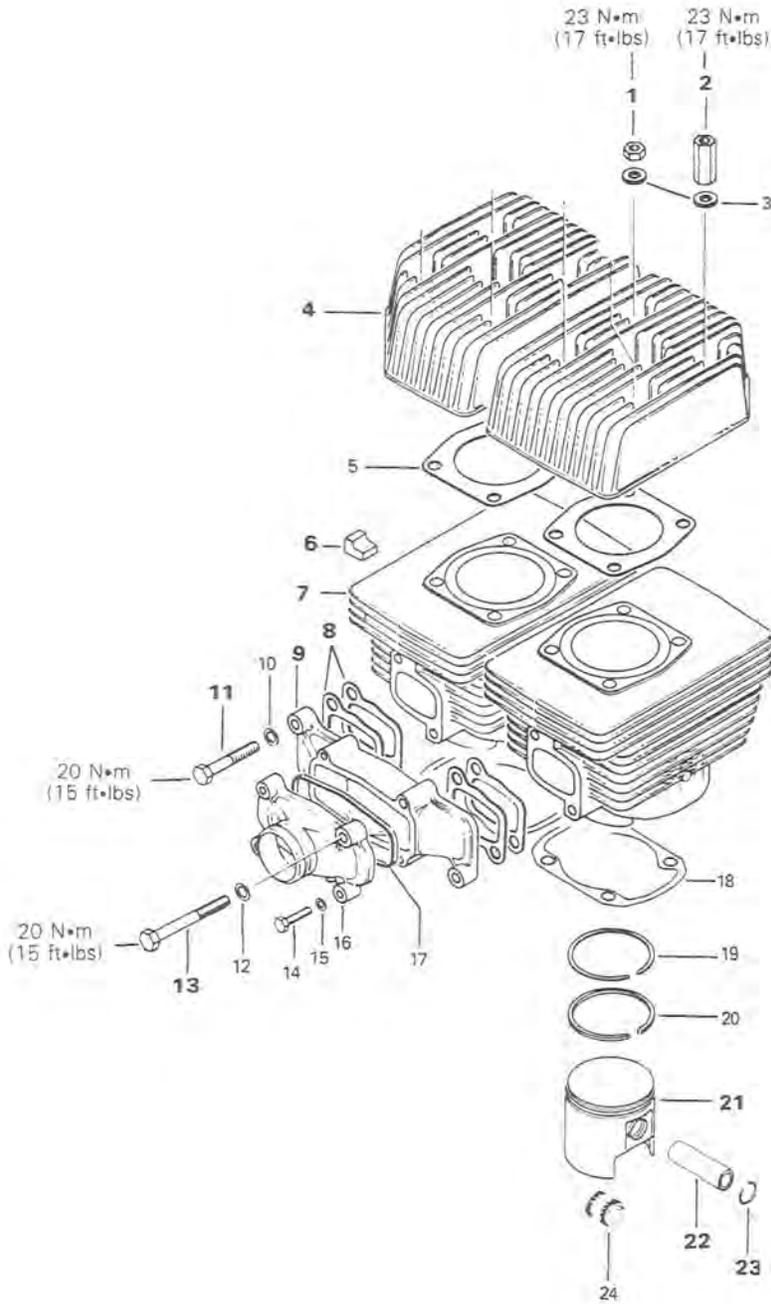
Torque the exhaust manifold bolts to 22 N•m (16 ft•lbs).

INSTALLATION ON VEHICLE

To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

- Check tightness of engine mount nuts.
- After throttle cable installation, check maximum throttle slide opening.
- Check pulley alignment and drive belt tension.

TOP END



- | | |
|--------------------------------|---------------------------------|
| 1. Hex. nut M8 (5) | 13. Hex. screw M8 × 74 (2) |
| 2. Distance nut M8 × 27,5 (3) | 14. Hex. screw M6 × 25 (2) |
| 3. Washer (8) | 15. Lock washer 6 mm (2) |
| 4. Cylinder head (2) | 16. Intake cover (1) |
| 5. Gasket, cylinder head (2) | 17. Rubber ring (1) |
| 6. Support damper (1) | 18. Gasket, cylinder flange (2) |
| 7. Cylinder (2) | 19. Semi-trapez ring (2) |
| 8. Gasket, intake manifold (4) | 20. Rectangular ring (2) |
| 9. Intake manifold (1) | 21. Piston (2) |
| 10. Lock washer 8 mm (2) | 22. Gudgeon pin (2) |
| 11. Hex. screw M8 × 40 (2) | 23. Circlip (4) |
| 12. Lock washer 8 mm (2) | 24. Needle cage (2) |

CLEANING

Discard all gaskets.

Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port, cylinder head and piston dome using a wooden spatula.

○ **NOTE:** The letters "AUS" (over an arrow on the piston dome) must be visible after cleaning.

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

DISASSEMBLY

21,22,23, Piston, gudgeon pin & circlips

Place a clean cloth over crankcase to prevent circlips from falling into crankcase. Then with a pointed tool inserted in piston notch, remove cliclips from piston.

Drive the gudgeon pin out of piston using a suitable drive punch and hammer.

▼ **CAUTION:** When tapping out gudgeon pins, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

INSPECTION

The inspection of the engine top end must include the following measurements:

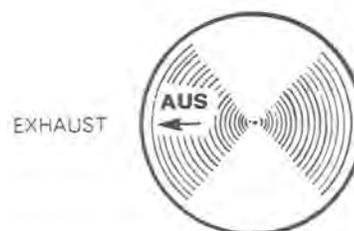
MEASUREMENTS	TOLERANCES		
	FITTING NEW PARTS (MIN.)	FITTING NEW PARTS (MAX.)	WEAR LIMIT
Cylinder taper	N.A.	N.A.	.08 mm (.0032")
Cylinder out of round	N.A.	N.A.	.050 mm (.0018")
Cylinder/piston clearance	.08 mm (.0031")	.10 mm (.0039")	.20 mm (.0079")
Ring/Piston groove clearance	.04 mm (.0016")	.11 mm (.0043")	.20 mm (.0079")
Ring end gap	.20 mm (.0079")	.35 mm (.0138")	1.0 mm (.0394")

○ **NOTE:** For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

21,23, Pistons & circlips

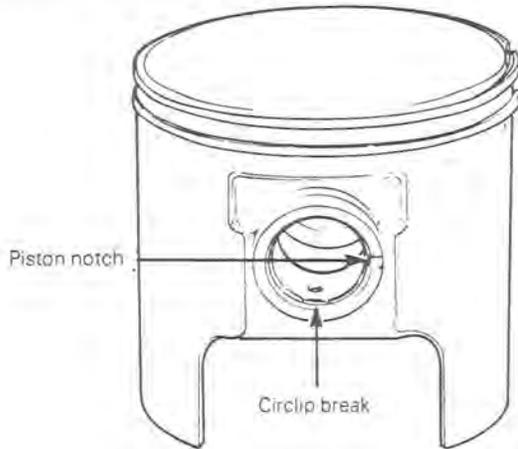
At assembly, place the piston over the connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in direction of the exhaust port.



SECTION 02 ENGINE
SUB-SECTION 03 (377 TYPE)

To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated.

Remove any burrs on piston caused through circlip installation using very fine emery cloth.

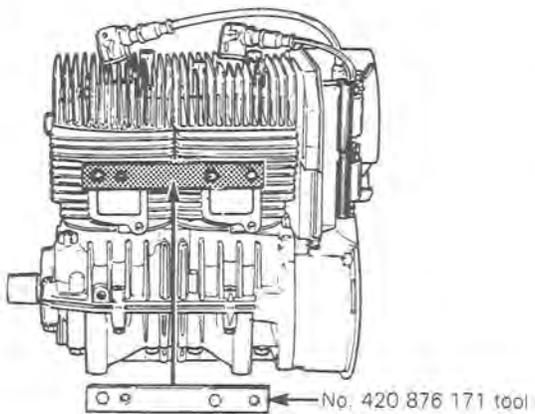


7, Cylinder

Before inserting piston in cylinder, lubricate the cylinder with new injection oil or equivalent.

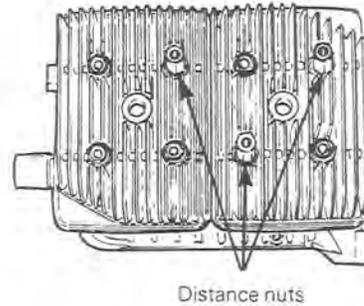
4,7, Cylinder heads & cylinders

At cylinder and/or cylinder head installation, use P/N 420 876 171 aligning tool to secure sealing of intake manifold and exhaust (see Tools section), before tightening cylinder head nuts.



1,2, Nuts & distance nuts

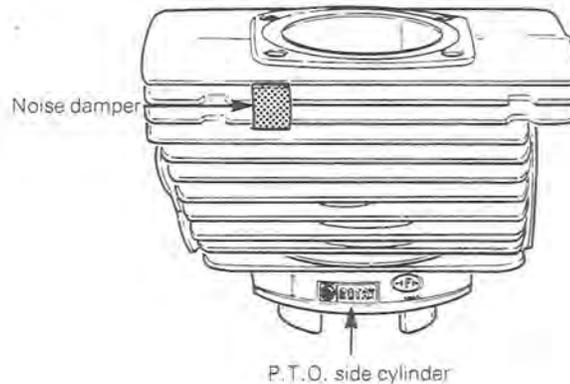
Position nuts and distance nuts as illustrated.



Cross torque cylinder head nuts to 23 N•m (17 ft•lbs) torque each cylinder head individually.

6, Dampers

Position noise damper as per following illustration.



Install armature plate, fan housing and then air deflector.

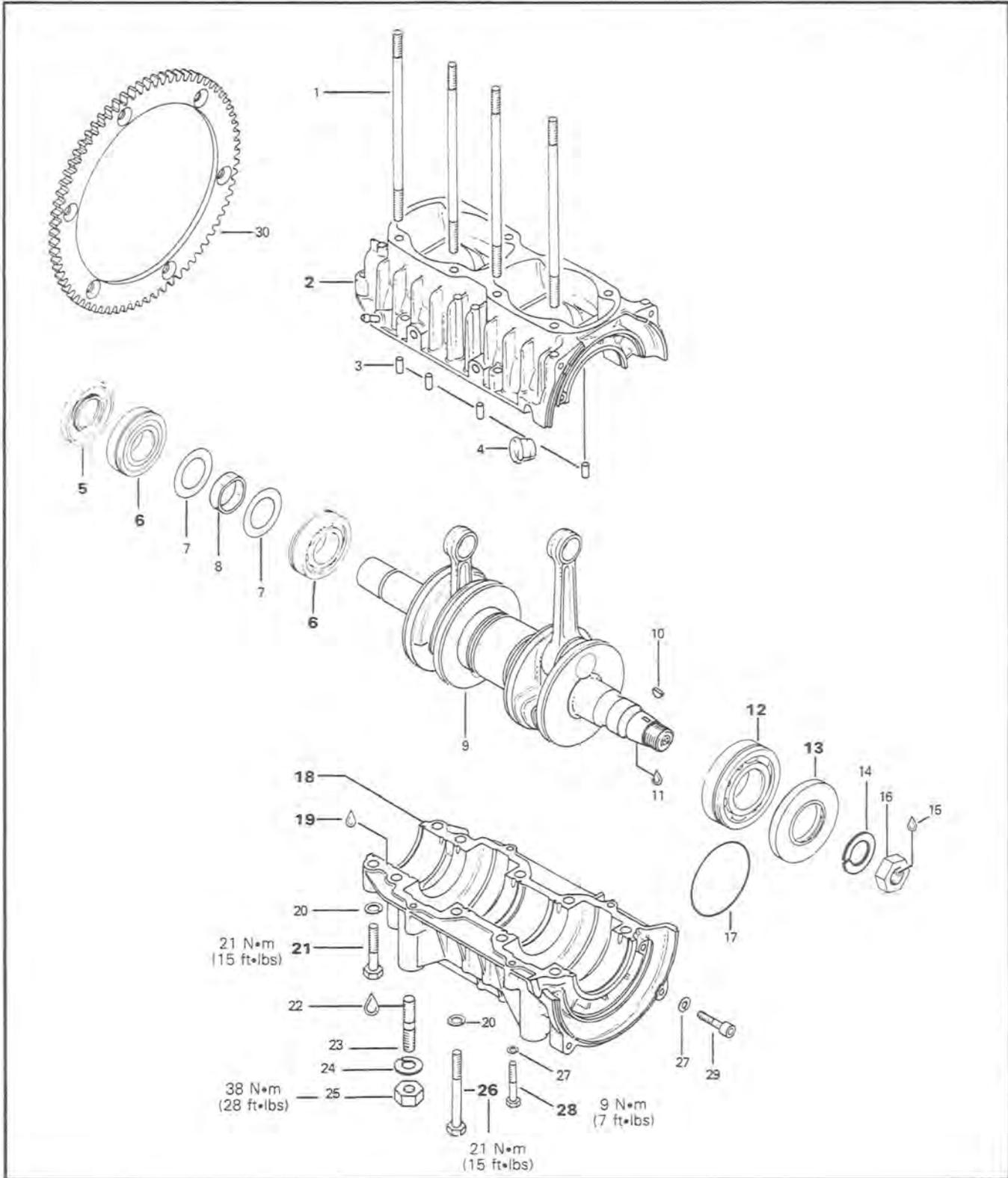
8, gasket

Install a gasket on each side of the air deflector.

9,11,13, Intake manifold & screws

Install intake manifold with identifications marks towards cylinder head and torque the four manifold screws to 22 N•m (16 ft•lbs).

BOTTOM END



SECTION 02 ENGINE

SUB-SECTION 03 (377 TYPE)

1. Stud M8 × 173 (8)
2. Upper crankcase
3. Rubber plug (5)
4. Cable grommet
5. Oil seal P.T.O. side
6. Ball bearing 6206 (2)
7. Shim (2)
8. Spacer
9. Crankshaft
10. Woodruff key 3 × 3,7
11. "Loctite 242"
12. Ball bearing 6207
13. Oil seal, magneto side
14. Lock washer 22 mm
15. "Loctite 242"

16. Hex. Nut 22 × 1,5
17. "O" ring
18. Lower crankcase
19. "Loctite 515"
20. Lock washer 8 mm (10)
21. Hex. screw M8 × 45 (2)
22. "Loctite 242"
23. Stud M10 × 25 (4)
24. Lock washer 10 mm (4)
25. Hex. nut M10 (4)
26. Hex. screw M8 × 70 (8)
27. Lock washer 6 mm (8)
28. Hex. screw M6 × 40 (4)
29. Allen screw M6 × 30 (4)
30. Ring gear

CLEANING

Discard all seals, gaskets and "O" rings.

Clean all metal components in a non-ferrous metal cleaner.

Remove old sealant from crankcase mating surfaces with Bombardier sealant tripper.

CAUTION: Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

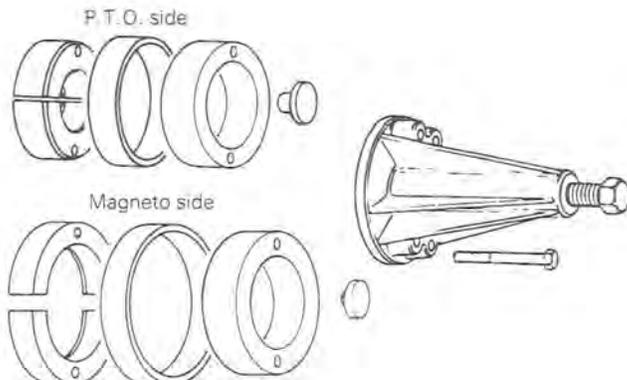
General

To remove drive pulley, refer to "Drive Pulley", section 03, sub-section 03.

To remove magneto, refer to "Magneto" in this section.

6,12, P.T.O. side bearing and MAG. side bearing

To remove bearings from crankshaft use a protective cap and special puller, as illustrated. (See Tools section).



INSPECTION

The inspection of the engine bottom end must include the following measurements:

MEASUREMENTS	TOLERANCES		WEAR LIMIT
	FITTING NEW PARTS (MIN.)	(MAX.)	
Crankshaft deflection	N.A.	N.A.	.08 mm (.0032")
Connecting rod big end axial play	.20 mm (.0078")	.53 mm (.0208")	1,0 mm (.0394")

NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

6,12, P.T.O. side bearing & MAG. side bearing

Prior to installation, place bearings into an oil container heated to 100°C (210°F).

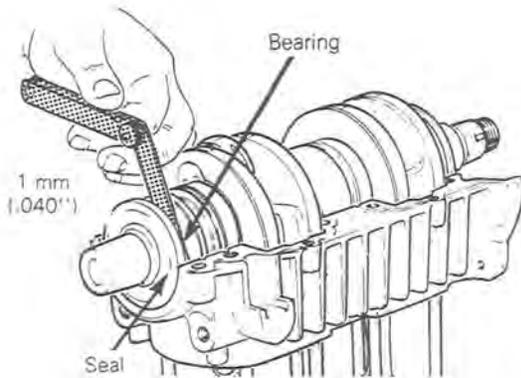
This will expand bearings and ease installation. Install bearings with groove as per exploded view.

Bearings are pressed on crankshaft until they rest against radius. This radius maintains the gap needed for bearing lubrication.

5,13, Oil seal P.T.O. side & oil seal MAG. side

At seal installation, apply a light coat of lithium grease on inside diameter lip of seals.

For bearing lubrication purpose, a gap of 1.0 mm (.040") must be maintained between seals and bearings. When installing plain seals (without locating ring or without spacing legs), ensure to maintain the specified gap as illustrated.



2, 18, 19, Upper crankcase, lower crankcase & Loctite

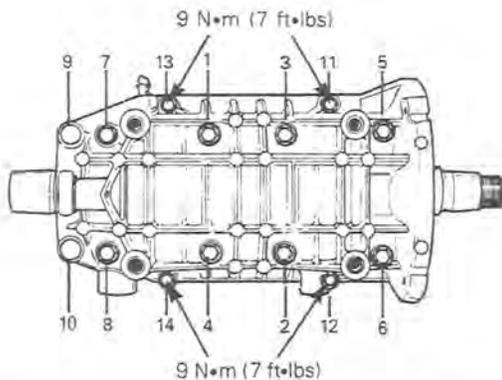
Crankcase halves are factory matched and therefore, are not interchangeable as single halves.

Prior to joining of crankcase halves, spray some new injection oil on all the moving parts of the crankshaft. Then apply "Loctite 515" (no. 413 7027) on mating surfaces.

Position the crankcase halves together and tighten nuts (or bolts) by hand then install armature plate (tighten) on magneto side to correctly align the crankcase halves.

Torque bolts to proper torque following illustrated sequence.

Follow sequence shown All the other bolts are torque to 21 N•m (15 ft•lbs)



21, 26, Screws M8 × 45, M8 × 70

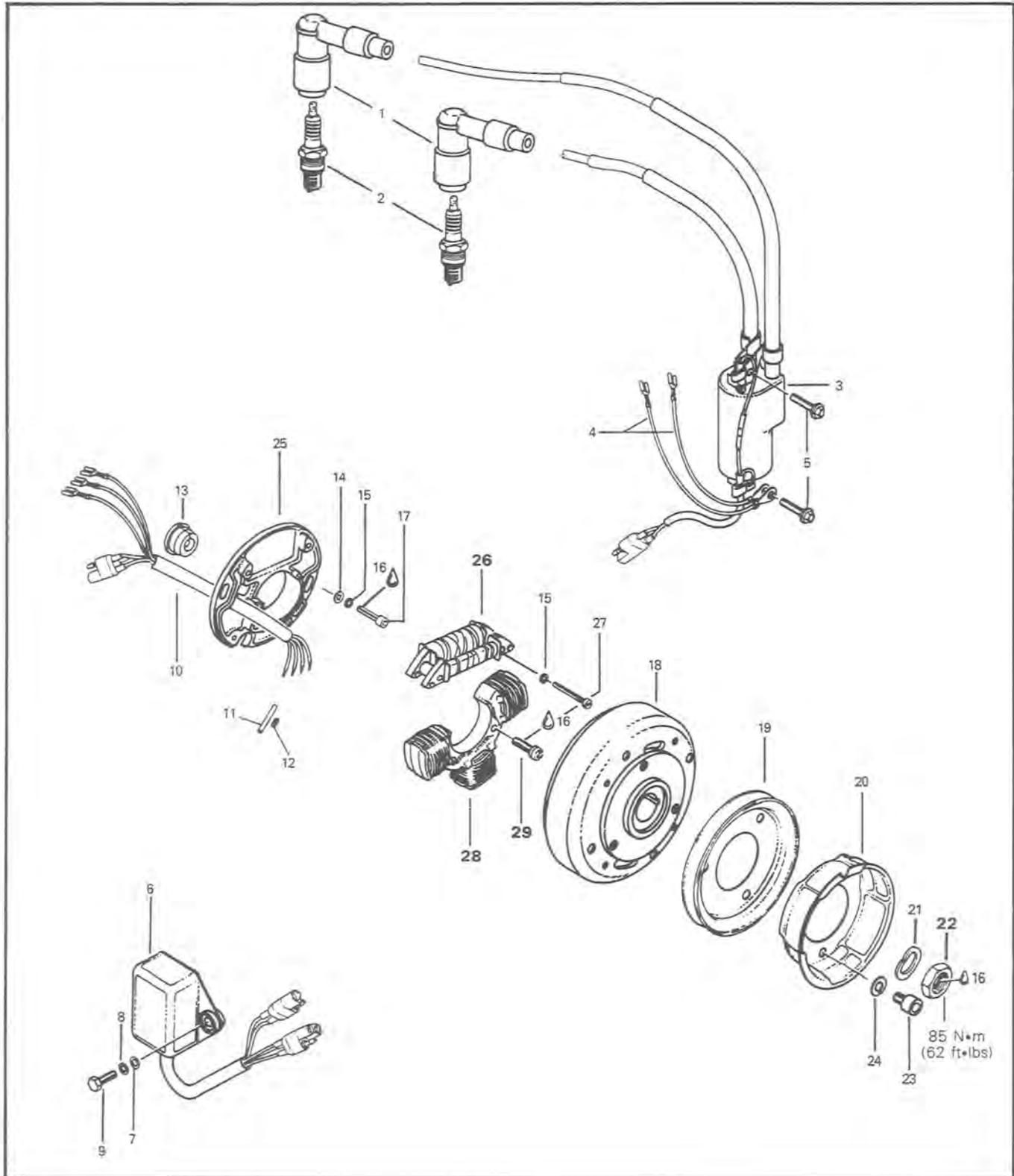
The bigger screws have to be torqued to 21 N•m (15 ft•lbs).

28, Screws M6 × 40

The smaller screws have to be torqued to 9 N•m (7 ft•lbs).

To install magneto, refer to "magneto" in this section.

MAGNETO



1. Spark plug protector (2)
2. Spark plug (2)
3. Ignition coil
4. Ground wire (2)
5. Taprite screw M6 × 25 (2)
6. Amplifier box
7. Washer 6,4 mm (2)
8. Lock washer 6 mm (2)
9. Hex. screw M6 × 20 (2)
10. Wire ass'y
11. Protection Hose (6)
12. Splice connector (6)
13. Cable grommet
14. Washer 5,5 mm (2)
15. Lock washer 5 mm (4)
16. "Loctite 242"
17. Allen screw M5 × 18 (2)
18. Magneto flywheel
19. V-belt pulley
20. Starting pulley
21. Lock washer 22 mm
22. Hex. nut 22 × 1,5
23. Screw M8 × 12 (3)
24. Lock washer 8 mm (3)
25. Armature plate
26. Coil kit, primary
27. Combined screw M5 × 35 (2)
28. Lighting coil
29. Phillips screw M6 × 25 (2)

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

▼ **CAUTION:** Clean armature and magneto using only a clean cloth.

DISASSEMBLY

19,20,22, V-belt pulley, starting pulley, nut

To gain access to magneto assembly, remove:

- injection oil line (safari)
- rewind starter
- starting and V-belt pulleys

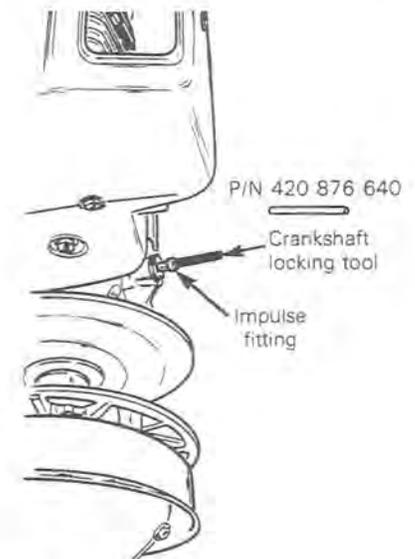
○ **NOTE:** Before disassembling magneto plate, indexing marks should be located to facilitate reassembly.

To remove magneto flywheel retaining nut:

- lock crankshaft with crankshaft locking tool (P/N 420 876 640) as illustrated (magneto side piston must be at top dead center)

○ **NOTE:** It should be noted that to correctly remove a "Loctite" locked fastener it is first necessary to tap on the fastener to break "Loctite" bond. This will eliminate the possibility of thread breakage.

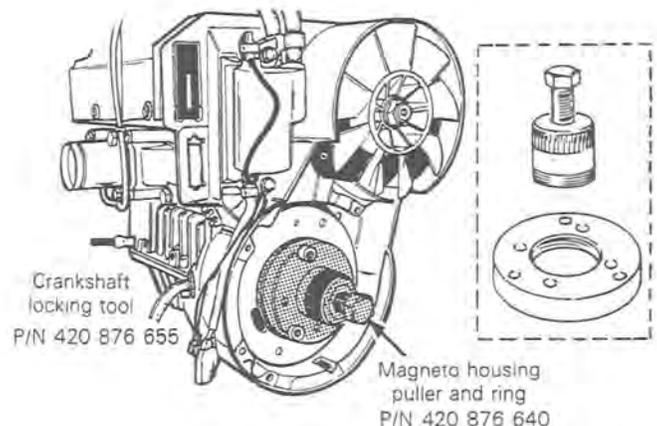
- remove magneto retaining nut



18, Magneto flywheel

To remove magneto housing (flywheel):

- lock crankshaft with crankshaft locking tool (service tool) and adjust magneto housing puller and puller ring (service tool) as illustrated.



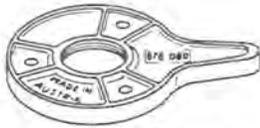
SECTION 02 ENGINE
SUB-SECTION 03 (377 TYPE)

- tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper

NOTE: For the above procedure, the locking type puller can be used without crankshaft locking tool. used without crankshaft locking tool.



P/N 420 876 065



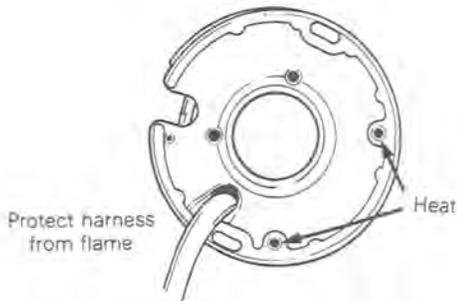
P/N 420 876 080

REPAIR

26, Generating coil

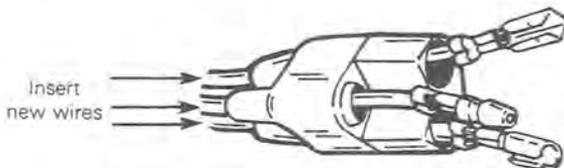
To replace generating coil:

- Heat the armature plate around the screw holes to break the Loctite bond (200°F)



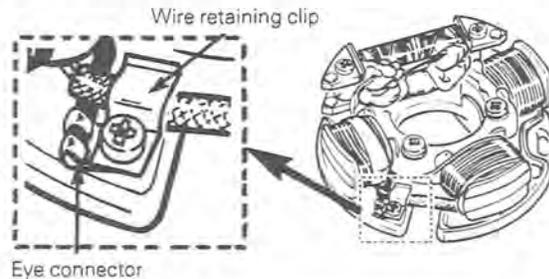
CAUTION: Protect harness from flame.

- Remove screws (use Phillips no. 2 or suitable flat screw driver)
- Cut the four wires as close as possible to the coil body
- To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube
- Insert the new wires into the old connector housing and install connectors



CAUTION: Replace the old wires in the connector with the same color coded new wires.

- Install a new receptacle connector to the black/yellow striped wire
- To install the ground connector of the armature plate, tape the new black lead to the old one and pull it under the lighting coil with the old wire
- Solder an eye connector to the lead and fasten it under the wire retaining clip.



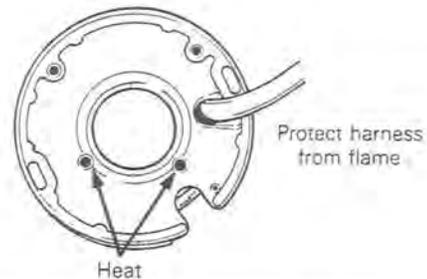
- To install the new coil on the armature plate, remove the shipping nuts from the coil and apply Loctite 242 (blue, medium strength) to screws before assembly

CAUTION: Before reinstalling the magneto, remove the loose epoxy from harness.

11,12,28,29, Protector tubes, splice connectors, lighting coil & screws

To replace lighting coil:

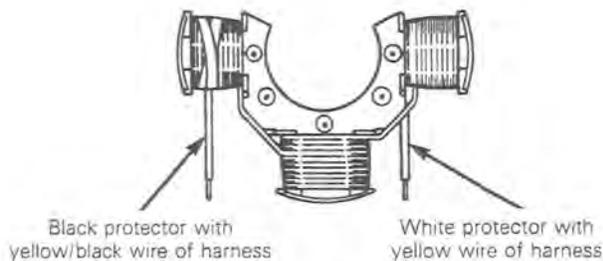
- Heat the armature place around the screw holes to break the Loctite bond (200°F)



CAUTION: Protect harness from flame.

- Remove screws (use Phillips no. 3 screwdriver)
- Remove the wire retaining clip from armature plate
- Pull out protector tubes and unsolder the splice connectors

- Solder the yellow wire in the harness to the white tube protected wire of the coil
- Solder the yellow/black striped wire in the harness to the black tube protected wire of the coil



- Position protector tubes over connections
- Prior to assembly, apply "Loctite 242" (blue, medium strength) on the lighting coil screws
- Fasten retaining clip onto protector tubes

▼ **CAUTION:** Before reinstalling magneto, remove the loose epoxy from harness.

ASSEMBLY

13,18,21,22, Armature plate, magneto flywheel, lock washer & nut

Position the armature plate on the crankcase aligning the marks on both parts.

Clean crankshaft extension taper

Apply "Loctite 242" (blue, medium strength) on taper

Position key, magneto flywheel and lockwasher on crankshaft

- Clean nut threads and apply "Loctite 242" (blue, medium strength) before tightening nut to 85 N•m (63 ft•lbs).
- At reassembly coat all electric connections with silicone dielectrique grease P/N 413 7017 00 grease to prevent corrosion or moisture penetration

▼ **CAUTION:** Do not use silicone "sealant", this product will corrode contacts.

○ **NOTE:** For ignition timing procedure refer to "ignition timing section 04 sub-section 02"

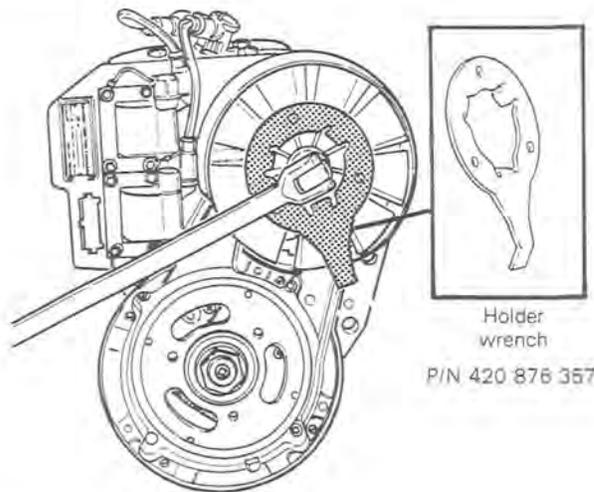
CLEANING

Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY AND ASSEMBLY

21, Fan nut

To remove or install fan pulley retaining nut, lock fan pulley with special holder wrench P/N 420 876 357. At assembly, torque nut to 65 N•m (48 ft•lbs).



18,22, Shims & V-belt

Fan belt free-play must be 6 mm (1/4"). To adjust, install or remove shim(s) between pulley halves. Install excess shim(s) between fan and lockwasher.

12,15, Ball bearing & fan housing

It is first necessary to heat bearing housing to 65°C (150°F) to remove or install bearing.

24,25,26, Air duct, washer & rivet (closed end)

Air duct can be removed by drilling out rivets.

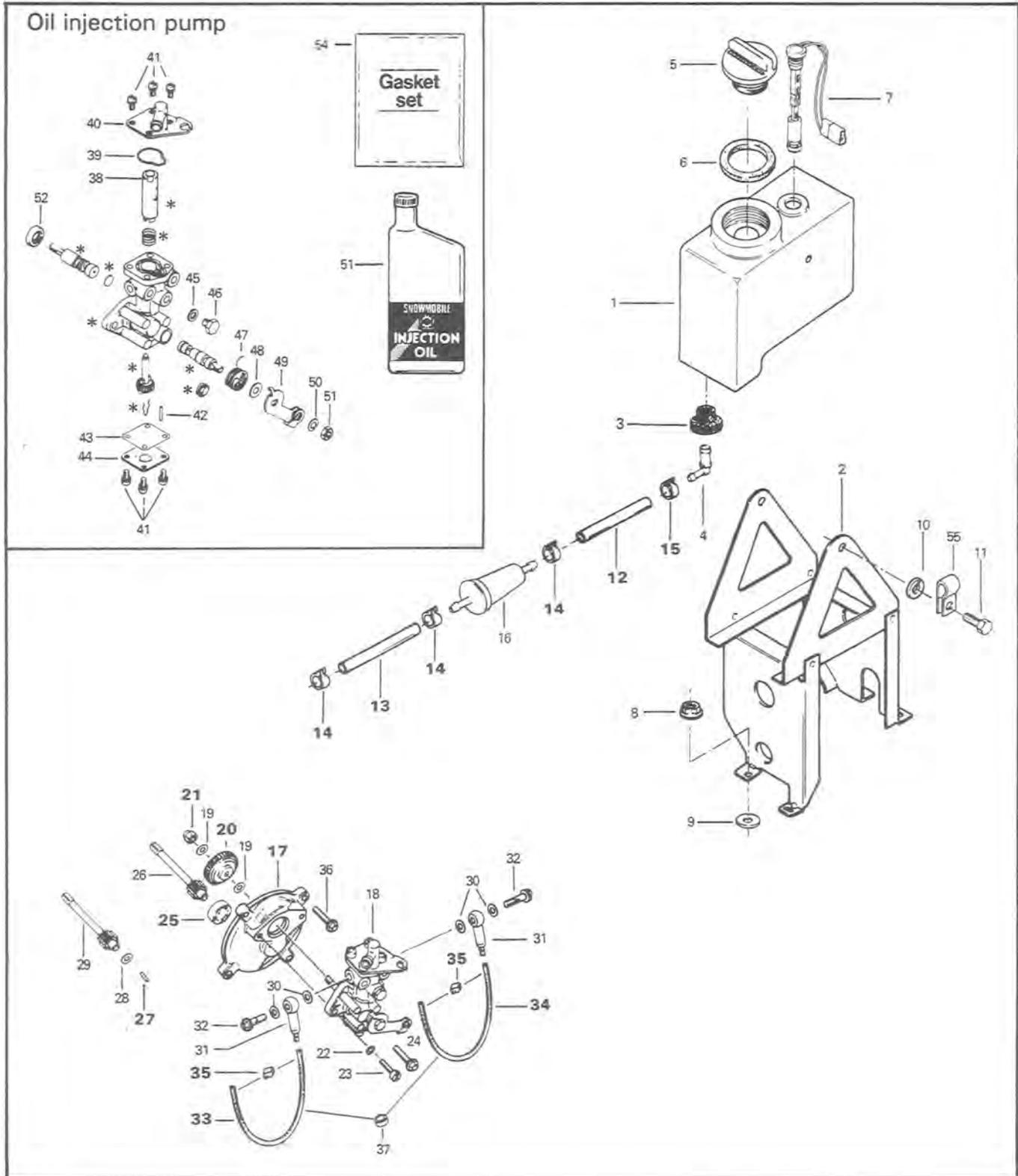
▼ **CAUTION:** At reassembly, use only closed end rivets to avoid rivet ends from falling into magneto.

6, Cylinder cowl

A gasket must be placed on both sides (inner and outer) of intake and exhaust holes on cylinder cowl.

◆ **WARNING:** If fan protector is removed, always reinstall after servicing.

OIL INJECTION PUMP AND RESERVOIR



1. Injection oil tank
2. Oil reservoir support
3. Grommet
4. Male connector
5. Oil tank cap
6. Gasket
7. Oil level sensor
8. Elastic stop nut M5 × 0,8 (4)
9. Rubber washer (4)
10. Lockwasher 6 mm. (2)
11. Screw M6 × 12 (2)
12. Oil line 38 mm
13. Oil line 102 mm
14. Spring clip (3)
15. Spring clip (1)
16. Filter
17. Oil pump mounting flange
18. Oil pump
19. Washer 6,2 mm (2)
20. Oil pump gear 27 teeth
21. Lock nut 6 mm
22. Lock washer 5 mm (2)
23. Screw M5 × 16 (2)
24. Tapitite screw M5 × 16 (2)
25. Ball bearing
26. Gear 9 teeth
27. Needle roll
28. Washer 4,3
29. Gear 9 teeth

30. Banjo oil gasket (4)
31. Banjo (2)
32. Banjo bolt (2)
33. Oil line 325 mm
34. Oil line 325 mm
35. Clamp (4)
36. Tapitite screw M5 × 16 (4)
37. Rubber ring
38. Retainer
39. "O" ring
40. Plate
41. Screw with lockwasher (8)
42. Stop pin
43. Gasket
44. Plate
45. Washer
46. Hex. screw M6 × 7
47. Spring
48. Washer
49. Lever
50. Lockwasher 6 mm
51. Nut 6 mm
52. Seal
53. Gasket set
54. Injection oil
55. Clip

Parts in illustration marked with * are not available as spare parts.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

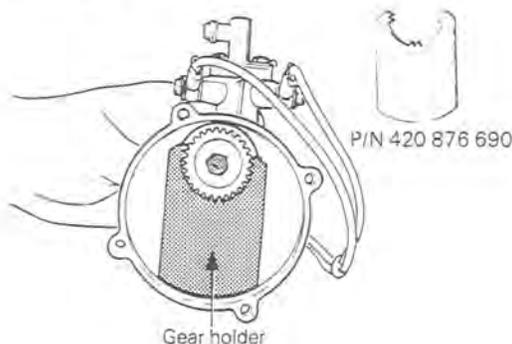
DISASSEMBLY

○ NOTE: Some oil pump components are not available as single parts.

Procedure concerning engine with serial number from 3,409.891

20,21,27, Oil pump gear, lock nut 6 mm & needle roll

To remove retaining nut, first extract the needle roll with pliers then lock gear in place using no 420 876 690 tool.



Procedure concerning engine with serial number up to 3,409.890

17,25, Oil pump mounting flange & ball bearing

To remove bearing, heat mounting flange to approximately 175° – 200°C (350° – 400°F) using a propane torch. Then strike flange on hard flat surface and bearing will fall out.

◆ WARNING: Always wear protective gloves, to avoid burns while handling flange.

ASSEMBLY

20, Oil pump gear

At gear assembly, apply a light coat of grease on gear teeth.

27, Needle roll

The needle roll must be engaged as deep as possible in the pump mounting flange.

14,15,35, Spring clips & clamps

Always check for spring clips and clamps tightness.

SECTION 02 ENGINE

SUB-SECTION 03 (377 TYPE)

12,13,33,34, Oil lines

▼ **CAUTION:** On electric start models, it is recommended to install black rubber oil lines (P/N 414 2867 00) that will not be altered by battery fumes.

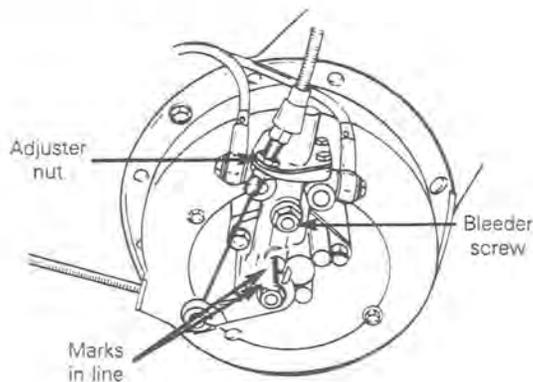
ADJUSTMENT

Prior to adjusting the pump, make sure all carburetor adjustments are completed.

To synchronize pump with carburetor:

Eliminate the throttle cable free-play by pressing the throttle lever until a light resistance is felt, then hold in place. The aligning marks on the pump casting and on the lever must align. If not, loosen the adjuster nut and adjust accordingly.

Retighten the adjuster nut.



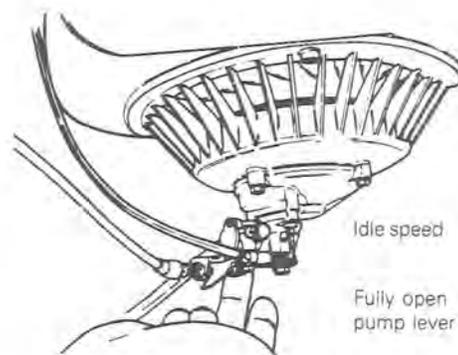
To bleed oil lines:

All oil lines should be full of oil. If required, bleed the main oil line (between tank and pump) by loosening the bleeder screw until all air has escaped from the line.

Make sure the tank is sufficiently filled.

Check the small oil lines (between pump and intake manifold). If required, fill the lines by running the engine at idle speed while holding the pump lever in fully open position.

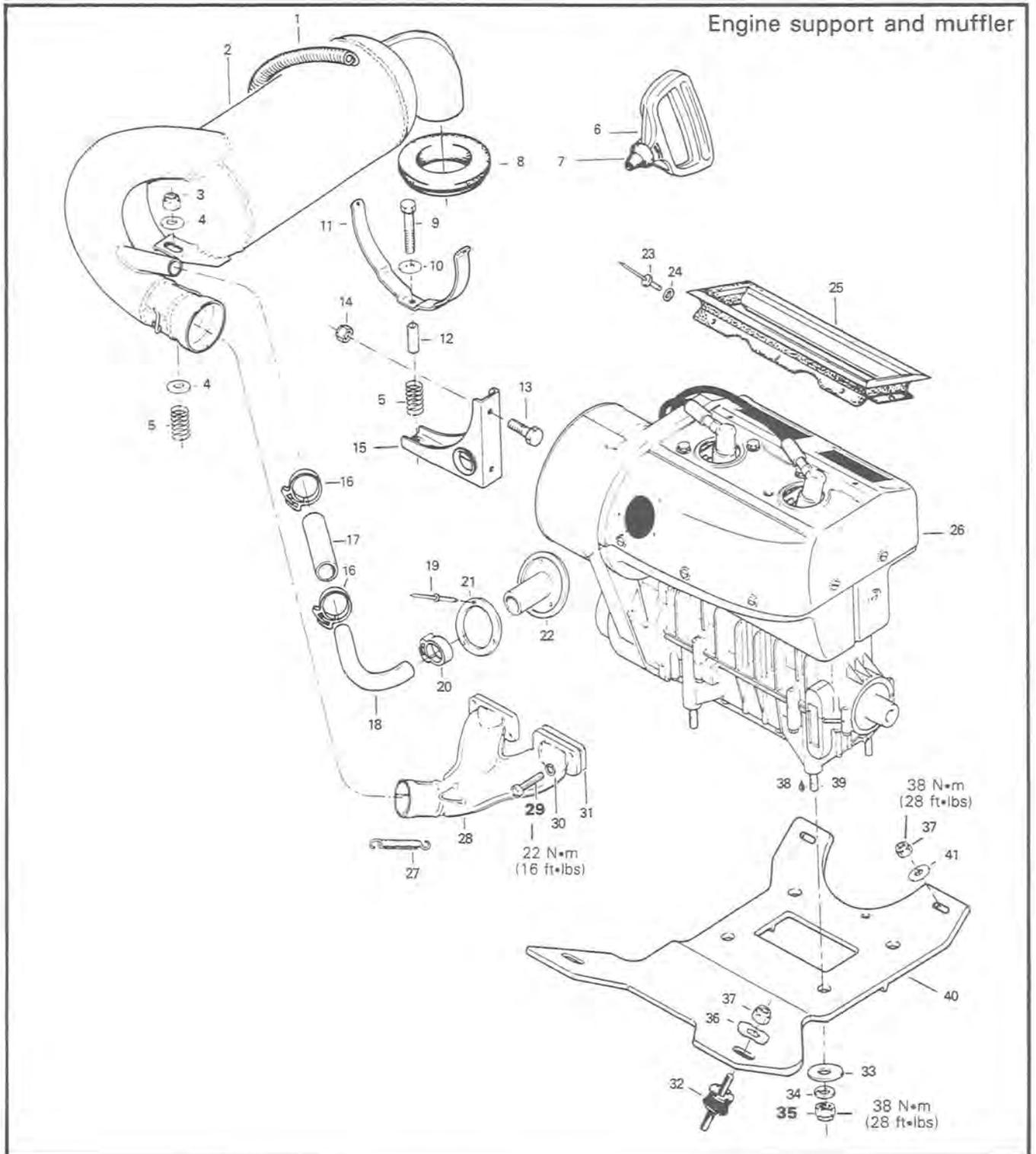
(TYPICAL)



◆ **WARNING:** Ensure not to operate carburetor throttle mechanism. Secure the rear of the vehicle on a stand.

447 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION



SECTION 02 ENGINE

SUB-SECTION 04 (447 ENGINE TYPE)

- | | |
|---------------------------|-----------------------------------|
| 1. Spring | 22. Connector |
| 2. Muffler | 23. Rivet (6) |
| 3. Elastic stop nut M8 | 24. Washer (6) |
| 4. Washer 8.4 mm (2) | 25. Air duct |
| 5. Spring (2) | 26. Motor ass'y |
| 6. Starter grip | 27. Spring (2) |
| 7. Rubber buffer | 28. Exhaust manifold |
| 8. Exhaust washer | 29. Allen screw M8 x 30 (4) |
| 9. Cap screw M6 x 20 | 30. Lockwasher 8 mm (4) |
| 10. Washer 6 mm | 31. Gasket (4) |
| 11. Muffler attachment | 32. Rubber mount (4) |
| 12. Bushing | 33. Washer 10.5 mm (4) |
| 13. Cap screw M6 x 16 (2) | 34. Lockwasher 10 mm (4) |
| 14. Elastic stop nut (2) | 35. Hexagonal nut 10 mm (4) |
| 15. Muffler support | 36. Internal tooth cup washer (2) |
| 16. Plastic clamp (2) | 37. Elastic stop nut M10 (4) |
| 17. Hose | 38. "Loctite 242" |
| 18. Elbow | 39. Stud M10 x 25 (4) |
| 19. Rivet (3) | 40. Engine support |
| 20. Plastic clamp | 41. Washer (2) |
| 21. Connector ring | |
-

REMOVAL FROM VEHICLE

Remove or disconnect the following (if applicable) then lift engine out of vehicle.

- Pulley guard, drive belt, drive pulley.
- Exhaust manifold.
- Elbow tube on cylinder head cowl.
- Clamp between carburetor and intake manifold.
- Oil injection pump cable.
- Oil lines.
- Pulsation line.
- Hood retaining cable.
- Rewind starter cable.

WARNING: Before disconnecting any electrical wire in starter system always first disconnect the battery cable.

- Wiring harness.
- Engine support nuts under engine support.

29,35, Engine support nuts & manifold bolts

Torque the engine support nuts to 38 N•m (28 ft•lbs).

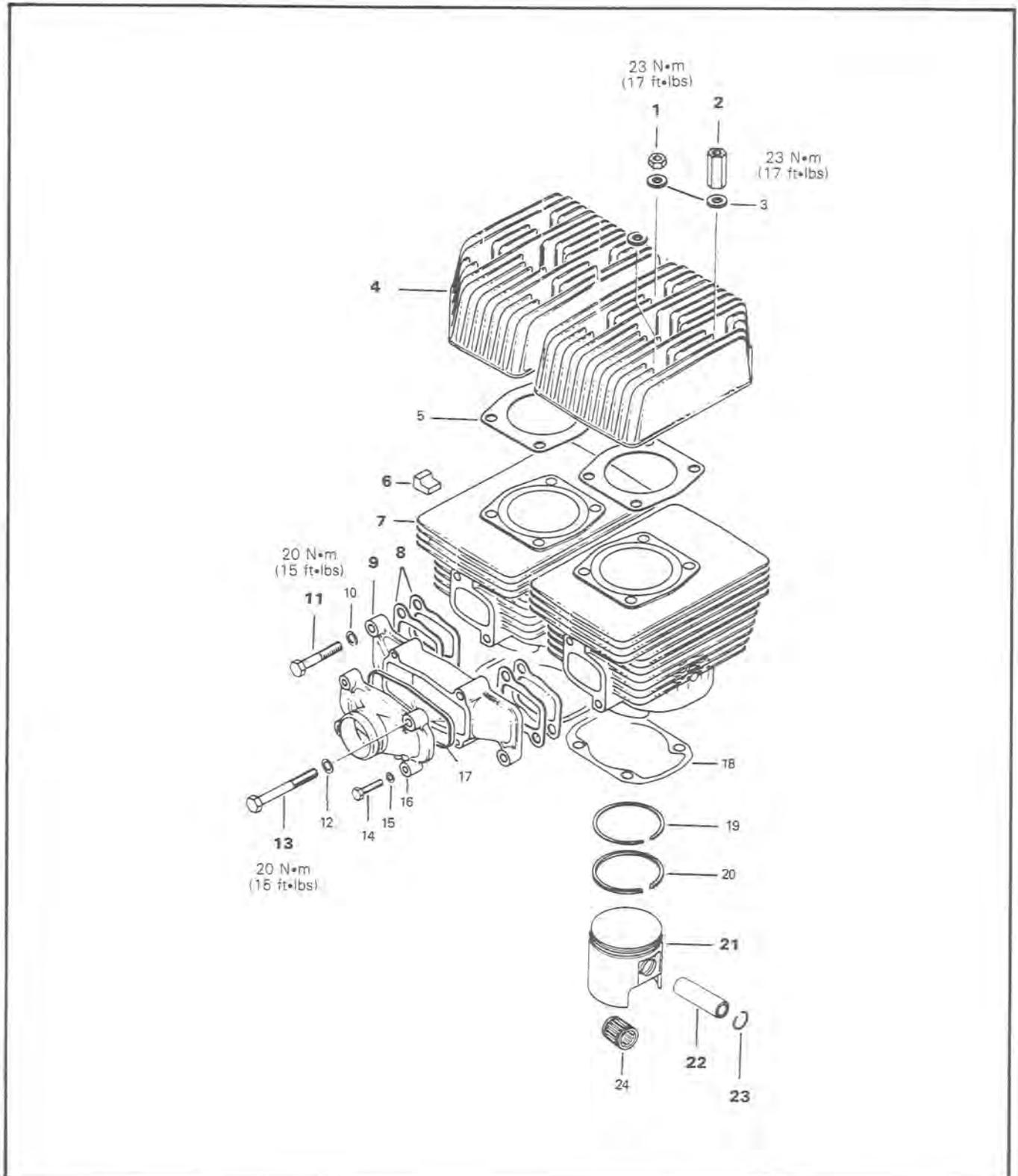
Torque the manifold bolts to 22 N•m (16 ft•lbs).

INSTALLATION ON VEHICLE

To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

- Check tightness of engine mount nuts.
- After throttle cable installation, check maximum throttle slide opening.
- Check pulley alignment and drive belt tension.

TOP END



SECTION 02 ENGINE

SUB-SECTION 04 (447 ENGINE TYPE)

1. Hexagonal nut M8 (5)
2. Distance nut M8 x 27.5 (3)
3. Cone sleeve (8)
4. Cylinder head (2)
5. Gasket, cylinder head (2)
6. Support damper (1)
7. Cylinder with sleeve (2)
8. Gasket, intake manifold (4)
9. Intake manifold (1)
10. Lockwasher 8 mm (2)
11. Hexagonal screw M8 x 40 (2)
12. Lockwasher 8 mm (2)

13. Hexagonal screw M8 x 74 (2)
14. Hexagonal screw M6 x 25 (2)
15. Lockwasher 6 mm (2)
16. Intake cover
17. Rubber ring
18. Gasket, cylinder flange (2)
19. Semi-trapez ring (2)
20. Rectangular ring (2)
21. Piston (2)
22. Gudgeon pin (2)
23. Circlip (4)
24. Needle cage (2)

CLEANING

Discard all gaskets.
Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port, cylinder head and piston dome using a wooden spatula.

 **NOTE:** The letters "AUS" (over an arrow on the piston dome) must be visible after cleaning.

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

DISASSEMBLY

21,22,23, Piston, gudgeon pin & circlip

Place a clean cloth over crankcase to prevent circlips from falling into crankcase. Then with a pointed tool inserted in piston notch, remove circlips from piston.

Drive the gudgeon pin out of piston using a suitable drive punch and hammer.

 **CAUTION:** When tapping out gudgeon pins, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

INSPECTION

The inspection of the engine top end must include the following measurements:

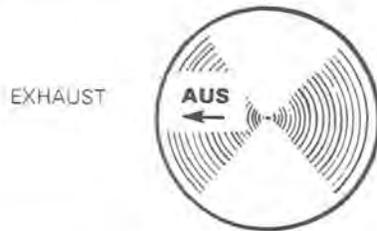
MEASUREMENTS	TOLERANCES		
	FITTING NEW PARTS (MIN.)	FITTING NEW PARTS (MAX.)	WEAR LIMIT
Cylinder taper	N.A.	N.A.	.08 mm (.0032")
Cylinder out of round	N.A.	N.A.	.05 mm (.0018")
Cylinder/piston clearance	.08 mm (.0031")	.10 mm (.0039")	.20 mm (.0079")
Ring/piston groove clearance	.04 mm (.0016")	.11 mm (.0043")	.20 mm (.0079")
Ring end gap	.20 mm (.0079")	.35 mm (.0138")	1.0 mm (.0394")

 **NOTE:** For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

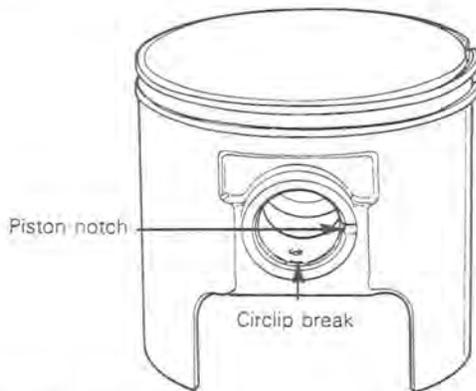
21,23, Pistons and circlips

At assembly, place the piston over the connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in direction of the exhaust port.



To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated.

Remove any burrs on piston caused through circlip installation using very fine emery cloth.



19,20, Semi-trapez, rectangular rings

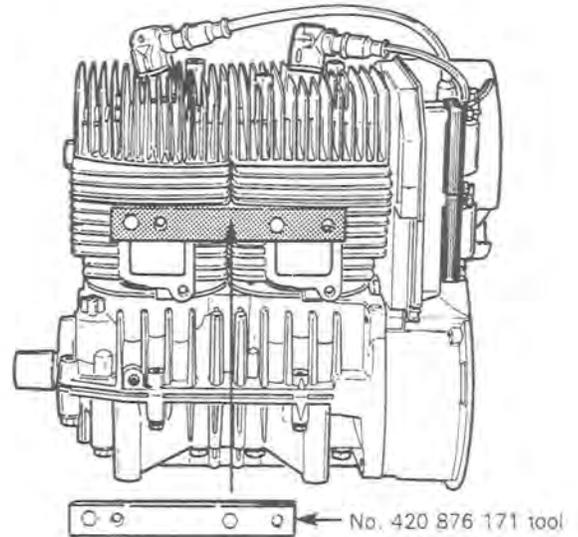
Check piston rings position.

7, Cylinder

Before inserting piston in cylinder, lubricate the cylinder with new injection oil or equivalent.

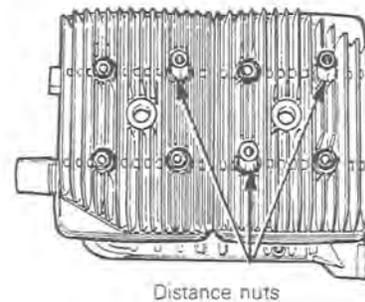
4,7, Cylinder head & cylinder

At cylinder and/or cylinder head installation, use P/N 420 876 171 aligning tool to secure sealing of intake manifold and exhaust (See Tools section), before tightening cylinder head nuts.



1,2, Nuts & distance nuts

Position nuts and distance nuts as illustrated.

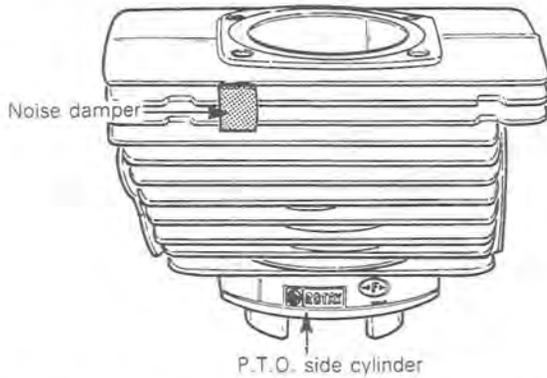


Cross torque cylinder head nuts to 23 N•m (17 ft•lbs); torque each cylinder head individually.

SECTION 02 ENGINE
SUB-SECTION 04 (447 ENGINE TYPE)

6, Damper

Position noise damper as per following illustration.



Install armature plate, fan housing and then air deflector.

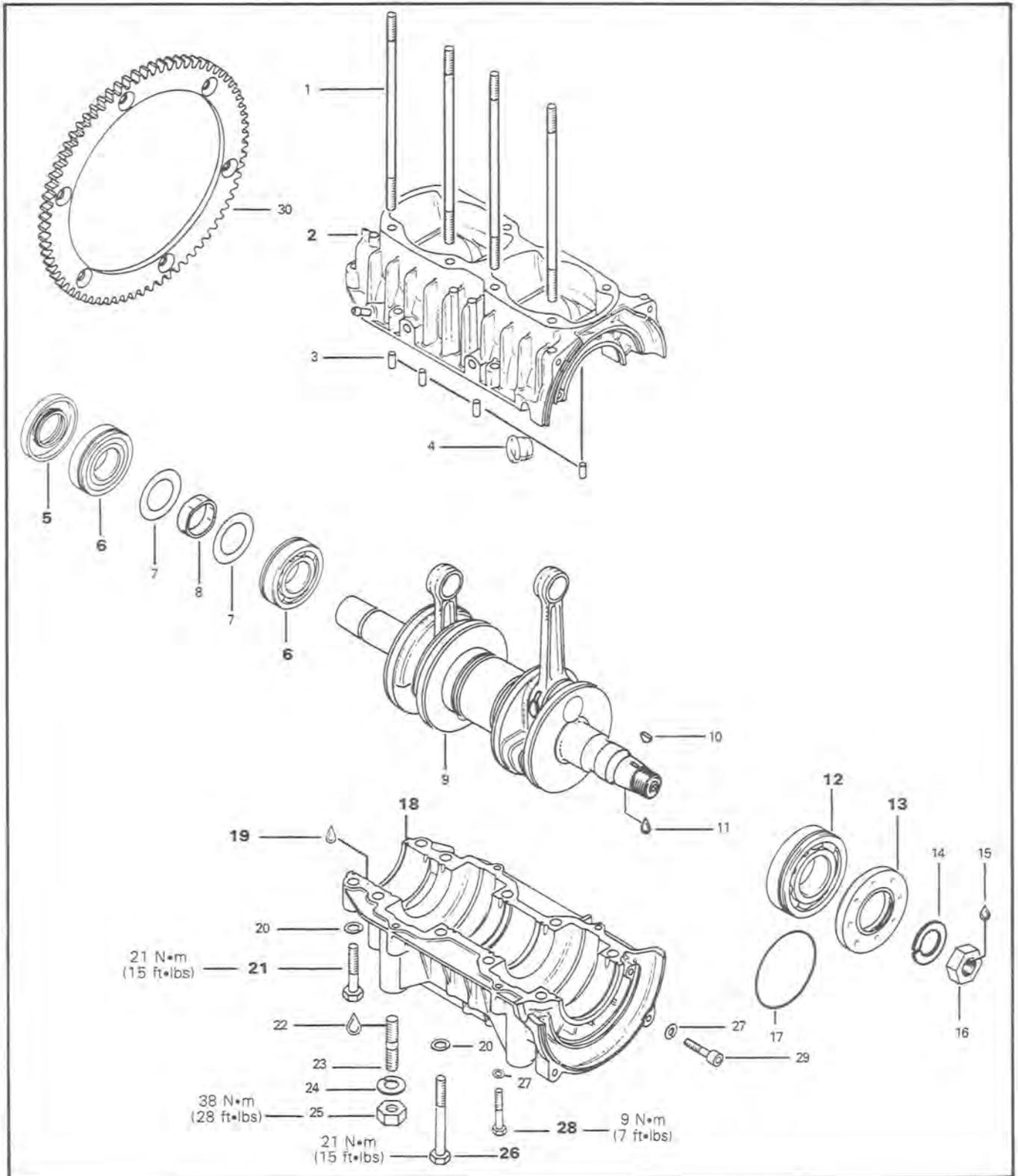
8, Gasket

Install a gasket on each side of the air deflector.

9, 11, 13, Intake manifold, screws M8 x 40 & M8 x 74

Install intake manifold with identifications marks towards cylinder head and torque the four manifold screws to 22 N•m (16 ft•lbs).

BOTTOM END



SECTION 02 ENGINE

SUB-SECTION 04 (447 ENGINE TYPE)

1. Stud M8 x 173 (8)
2. Upper crankcase
3. Rubber plug (5)
4. Cable grommet
5. Oil seal P.T.O. side
6. Ball bearing 6206 (2)
7. Shim (2)
8. Spacer
9. Crankshaft
10. Woodruff key 3 x 3.7
11. "Loctite 242"
12. Ball bearing 6207
13. Oil seal, magneto side
14. Lockwasher 22 mm
15. "Loctite 242"

16. Hexagonal nut 22 x 1.5
17. "O" ring
18. Lower crankcase
19. "Loctite 515"
20. Lockwasher 8 mm (10)
21. Hexagonal screw M8 x 45 (2)
22. "Loctite 242"
23. Stud M10 x 25 (4)
24. Lockwasher 10 mm (4)
25. Hexagonal nut M10 (4)
26. Hexagonal screw M8 x 70 (8)
27. Lockwasher 6 mm (8)
28. Hexagonal screw M6 x 40 (4)
29. Allen screw M6 x 30 (4)
30. Ring gear

CLEANING

Discard all seals, gaskets and "O" rings.

Clean all metal components in a non-ferrous metal cleaner.

Remove old sealant from crankcase mating surfaces with Bombardier sealant stripper.

CAUTION: Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

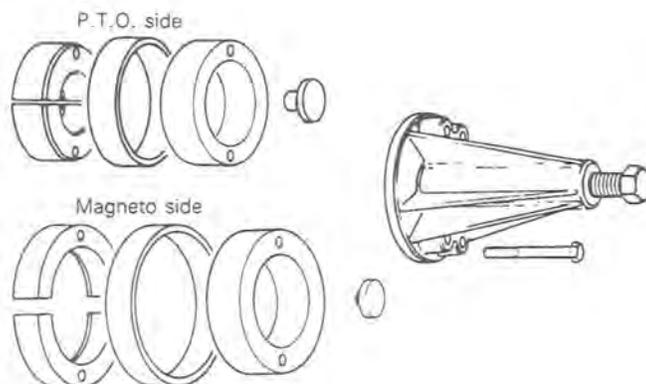
General

To remove drive pulley, refer to "Drive Pulley", section 03, sub-section 03.

To remove magneto, refer to "Magneto" in this section.

6, 12, P.T.O. side bearing & mag side bearing

To remove bearings from crankshaft use a protective cap and special puller, as illustrated. (See Tools section).



INSPECTION

The inspection of the engine bottom end must include the following measurements:

MEASUREMENTS	TOLERANCES		
	FITTING NEW PARTS (MIN.)	(MAX.)	WEAR LIMIT
Crankshaft deflection	N.A.	N.A.	.08 mm (.0032")
Connecting rod big end axial play	.20 mm (.0078")	.53 mm (.0208")	1.0 mm (.0394")
Connecting rod alignment	N.A.	N.A.	N.A.

NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

6, 12, Bearing P.T.O. side & bearing magneto side

Prior to installation, place bearings into an oil container heated to 100°C (210°F).

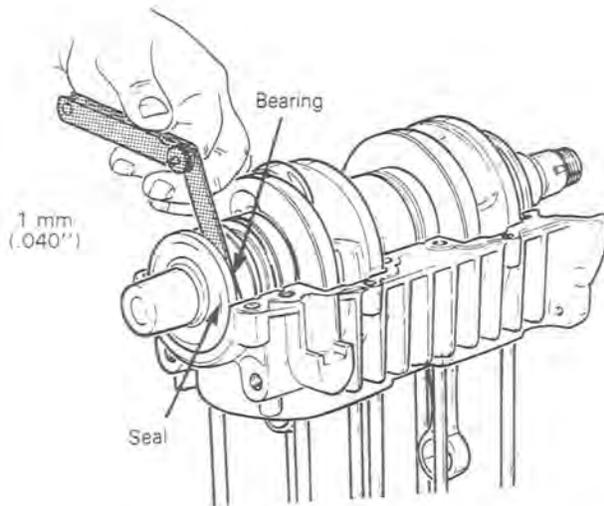
This will expand bearings and ease installation. Install bearings with groove as per exploded view.

Bearings are pressed on crankshaft until they rest against radius. This radius maintains the gap needed for bearings lubrication.

5, 13, Oil seal P.T.O. side & oil seal magneto side

At seal installation, apply a light coat of lithium grease on inside diameter lip of seals.

For bearings lubrication purpose, a gap of 1.0 mm (.040") must be maintained between seals and bearings. When installing plain seals (without locating ring or without spacing legs), ensure to maintain the specified gap as illustrated.



2, 18, 19, Upper crankcase, lower crankcase & loctite

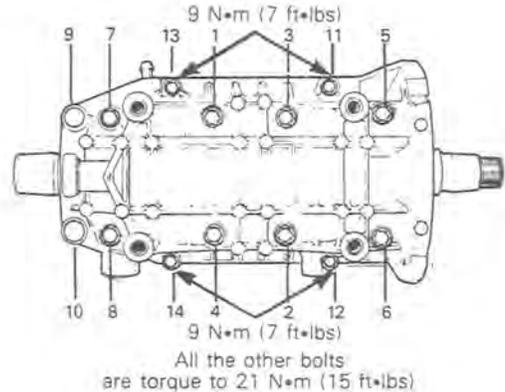
Crankcase halves are factory matched and therefore, are not interchangeable as single halves.

Prior to joining of crankcase halves, spray some new injection oil on all the moving parts of the crankshaft. Then apply "Loctite 515" (no. 413 7027) on mating surfaces.

Position the crankcase halves together and tighten nuts (or bolts) by hand then install armature plate (tighten) on magneto side to correctly align the crankcase halves.

Torque bolts to proper torque following illustrated sequence.

Follow sequence shown.



21, 26, Screw M8 x 45 & M8 x 70

The bigger screws have to be torque to 21 N·m (15 ft·lbs).

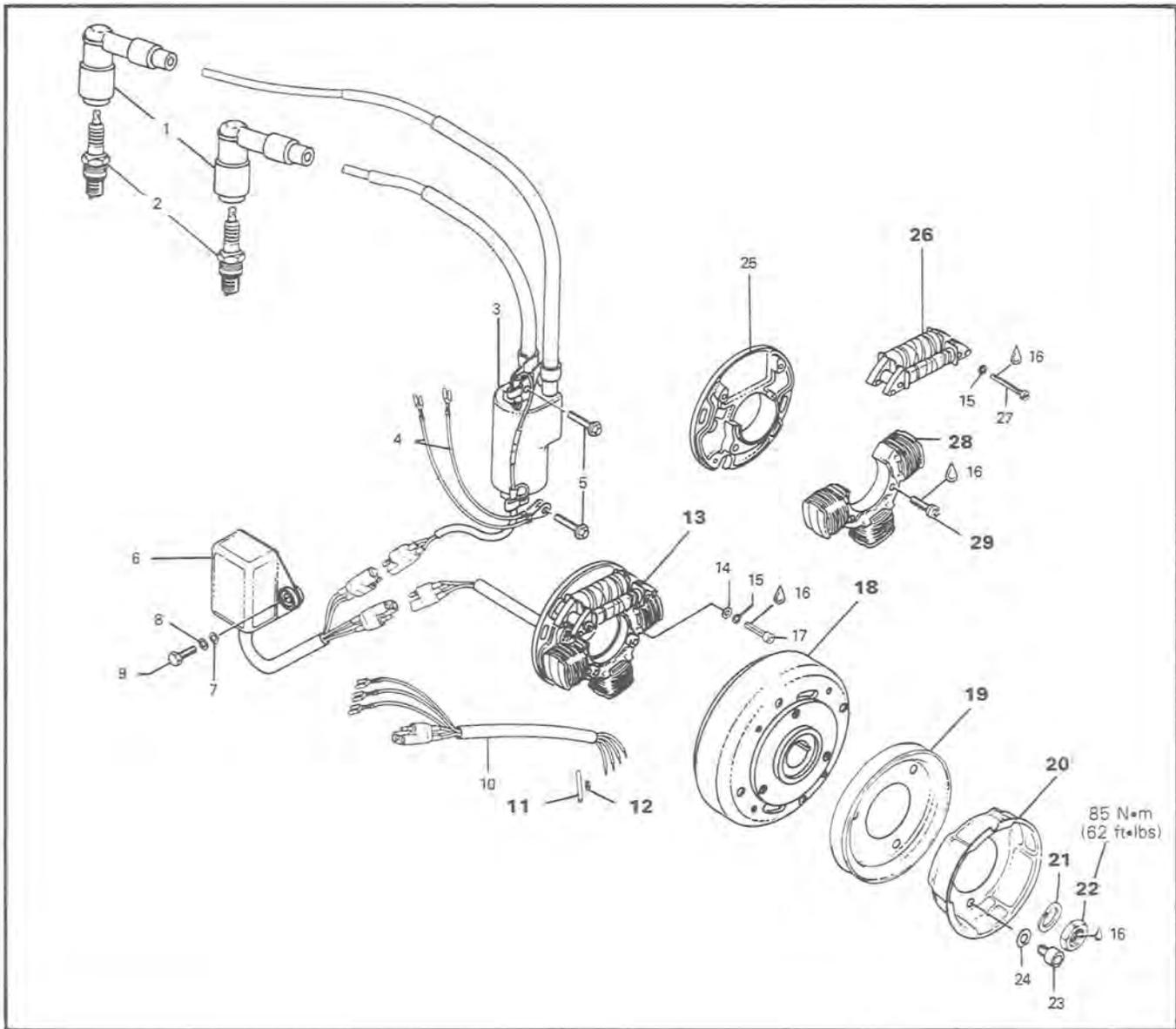
28, Screw M6 x 40

The smaller screws have to be torque to 9 N·m (7 ft·lbs).

To install magneto, refer to "Magneto" in this section.

SECTION 02 ENGINE
 SUB-SECTION 04 (447 ENGINE TYPE)

MAGNETO



- 1. Spark plug protector (2)
- 2. Spark plug (2)
- 3. Ignition coil
- 4. Ground wire (2)
- 5. Taptite screw M6 x 25 (2)
- 6. Amplifier box
- 7. Washer 6.4 mm (2)
- 8. Lockwasher 6 mm (2)
- 9. Hexagonal screw M6 x 20 (2)
- 10. Wire ass'y
- 11. Protection hose (6)
- 12. Splice connector (6)
- 13. Armature plate ass'y
- 14. Washer 5.5 mm (2)
- 15. Lockwasher 5 mm (4)

- 16. "Loctite 242"
- 17. Allen screw M5 x 18 (2)
- 18. Magneto flywheel
- 19. V-belt pulley
- 20. Starting pulley
- 21. Lockwasher 22 mm
- 22. Hexagonal nut 22 x 1.5
- 23. Screw M8 x 12 (3)
- 24. Lockwasher 8 mm (3)
- 25. Armature plate
- 26. Coil kit, primary
- 27. Combined screw M5 x 35 (2)
- 28. Lighting coil
- 29. Phillips screw M6 x 25 (2)

85 N•m
(62 ft•lbs)

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

▼ **CAUTION:** Clean armature and magneto using only a clean cloth.

DISASSEMBLY

19,20,22, V-belt pulley, starting pulley, & nut

To gain access to magneto assembly, remove:

- injection oil line
- rewind starter
- starting and v-belt pulley

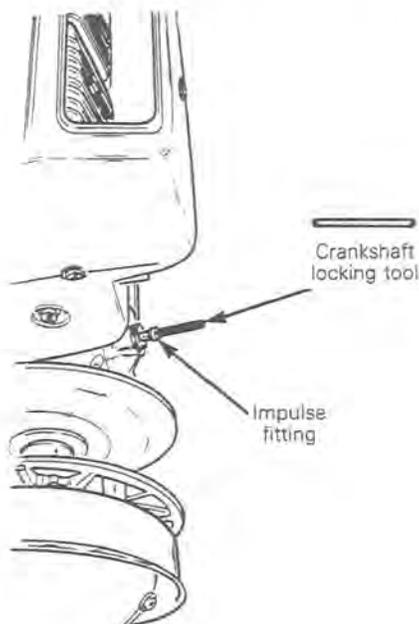
○ **NOTE:** Before disassembling magneto plate, indexing marks should be located to facilitate reassembly.

To remove magneto flywheel retaining nut:

- lock crankshaft with crankshaft locking tool (P/N 420 876 640) as illustrated (magneto side piston must be at top dead center).

○ **NOTE:** It should be noted that to correctly remove a "Loctite" locked fastener it is first necessary to tap on the fastener to break "Loctite" bond. This will eliminate the possibility of thread breakage.

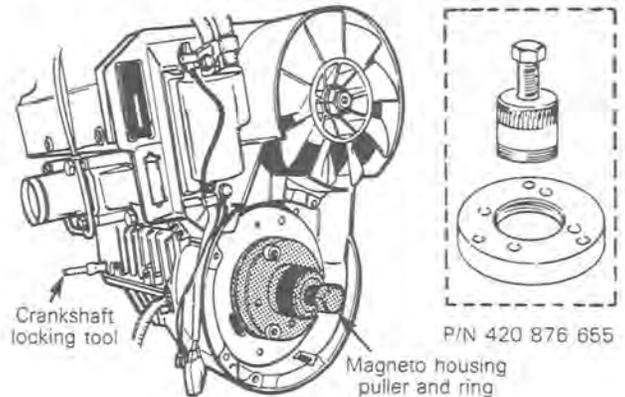
- remove magneto retaining nut.



18, Magneto flywheel

To remove magneto housing (flywheel):

- lock crankshaft with crankshaft locking tool (service tool) and adjust magneto housing puller and puller ring (service tool) as illustrated



- tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper

○ **NOTE:** For the above procedure, the locking type puller can be used without crankshaft locking tool.

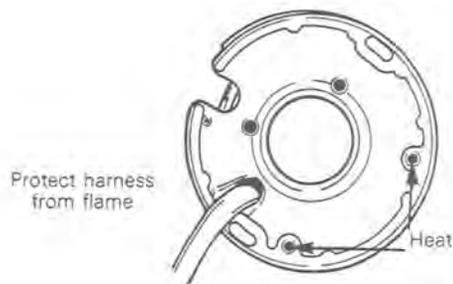


REPAIR

26, Generating coil

To replace generating coil:

- Heat the armature plate around the screw holes to break the Loctite bond (200°F).

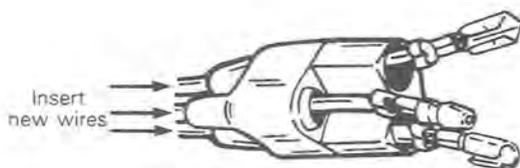


▼ **CAUTION:** Protect harness from flame.

SECTION 02 ENGINE

SUB-SECTION 04 (447 ENGINE TYPE)

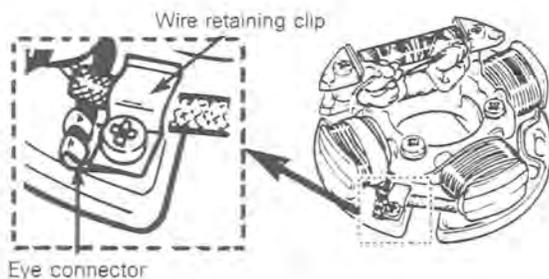
- Remove screws (use Phillips no. 2 or suitable flat screw driver)
- Cut the four wires as close as possible to the coil body.
- To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube.
- Insert the new wires into the old connector housing and install connectors.



CAUTION: Replace the old wires in the connector with the same color coded new wires.

- Install a new receptacle connector to the black/yellow striped wire.
- To install the ground connector of the armature plate, tape the new black lead to the old one and pull it under the lighting coil with the old wire.

Solder an eye connector to the lead and fasten it under the wire retaining clip.



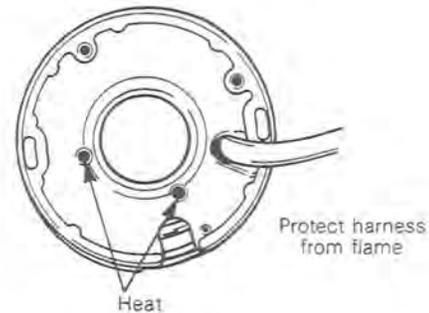
- To install the new coil on the armature plate, remove the shipping nuts from the coil and apply Loctite 242 (blue, medium strength) to screws before assembly.

CAUTION: Before reinstalling the magneto, remove the loose epoxy from harness.

11,12,28,29, Protector tube, splice connector lighting coil & screw

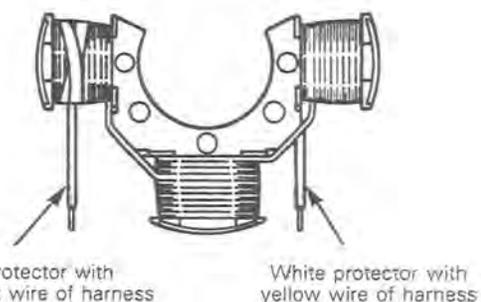
To replace lighting coil:

- Heat the armature plate around the screw holes to break the Loctite bond (200°F).



CAUTION: Protect harness from flame.

- Remove screws (use Phillips no. 3 screwdriver).
- Remove the wire retaining clip from armature plate.
- Pull out protector tubes and unsolder the splice connectors.
- Solder the yellow wire in the harness to the white tube protected wire of the coil.
- Solder the yellow/black striped wire in the harness to the black tube protected wire of the coil.



- Position protector tubes over connections.
- Prior to assembly, apply "Loctite 242" (blue, medium strength) on the lighting coil screws.
- Fasten retaining clip onto protector tubes.

CAUTION: Before reinstalling magneto, remove the loose epoxy from harness.

ASSEMBLY

13,18,21,22, Armature plate, magneto flywheel, lockwasher & nut

Position the armature plate on the crankcase aligning the marks on both parts.

Clean crankshaft extension taper.

Apply "Loctite 242" (blue, medium strength) on taper.

Position key, magneto flywheel and lockwasher on crankshaft.

Clean nut threads and apply "Loctite 242" (blue, medium strength) before tightening nut to 85 N•m (63 ft•lbs).

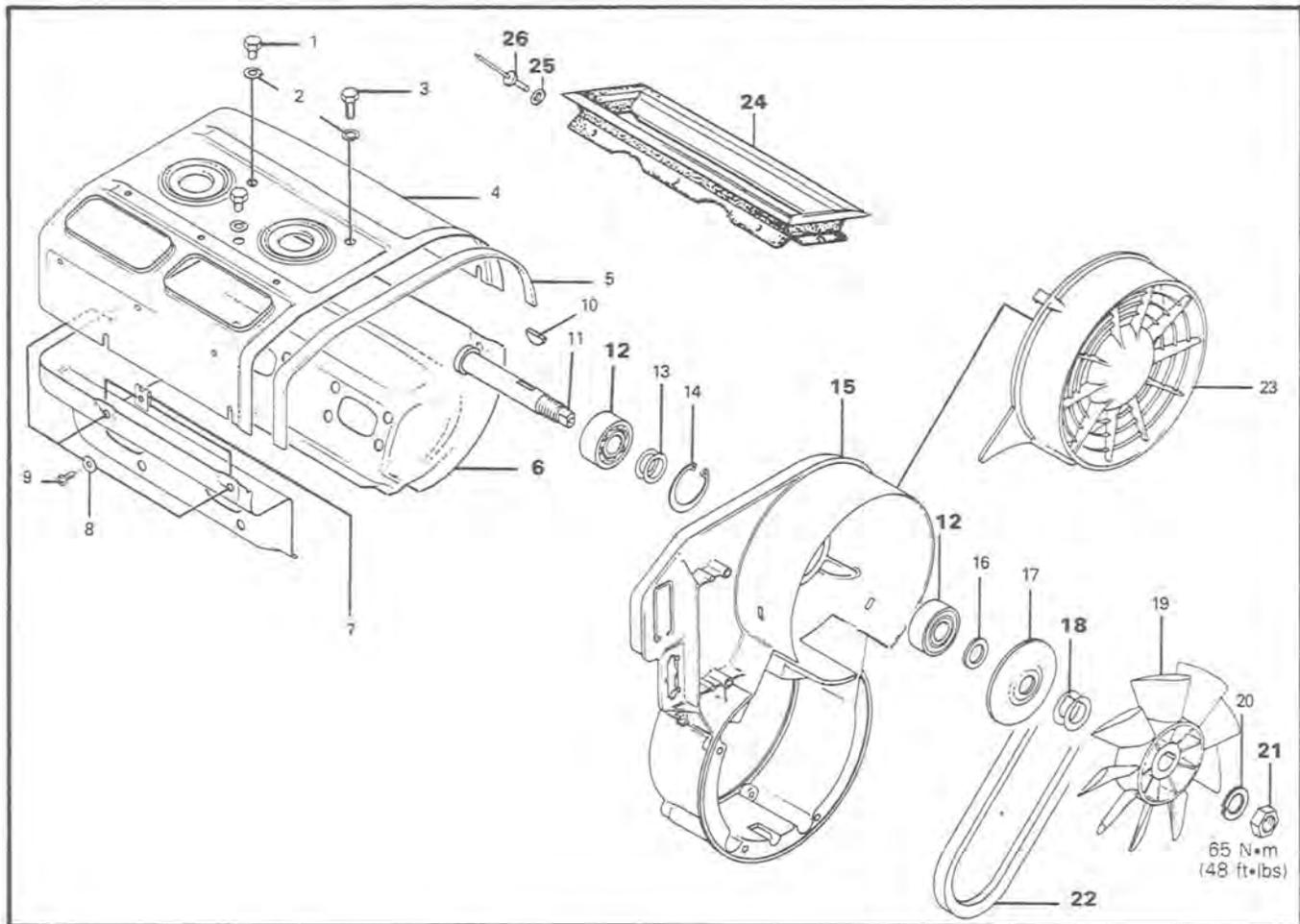
At reassembly coat all electric connections with silicone dielectric grease to prevent corrosion or moisture penetration.

▼ **CAUTION:** Do not use silicone sealant, this product will corrode contacts.

○ **NOTE:** For ignition timing procedure refer to "Ignition timing" section 04, sub-section 02.

SECTION 02 ENGINE
SUB-SECTION 04 (447 ENGINE TYPE)

COOLING SYSTEM



- | | |
|-------------------------------|------------------------|
| 1. Hexagonal screw M8 x 9 (2) | 14. Circlip |
| 2. Lockwasher 8 mm (3) | 15. Fan housing |
| 3. Hexagonal screw M8 x 16 | 16. Distance sleeve |
| 4. Cylinder head cowl | 17. Pulley half |
| 5. Sealing strip | 18. Shim 0.5 mm |
| 6. Cylinder cowl | 19. Fan |
| 7. Spring nut 4.8 (6) | 20. Lockwasher 16 mm |
| 8. Washer (6) | 21. Hexagonal nut M16 |
| 9. Screw 8 x 16 (6) | 22. V-belt |
| 10. Woodruff key 3 x 5 | 23. Fan cover |
| 11. Fan shaft | 24. Air duct |
| 12. Ball bearing 6203 (2) | 25. Washer |
| 13. Shim (2) | 26. Rivet (closed end) |

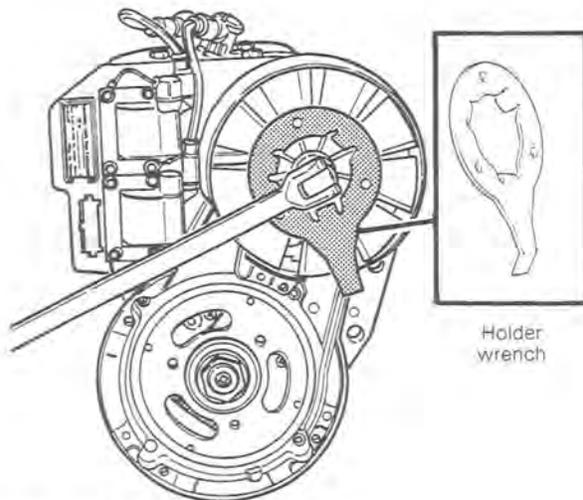
CLEANING

Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY AND ASSEMBLY

21, Fan nut

To remove or install fan pulley retaining nut, lock fan pulley with special holder wrench P/N 420 876 357. At assembly, torque nut to 65 N•m (48 ft•lbs).



18,22, Shim & V-belt

Fan belt free-play must be 6 mm (1/4"). To adjust, install or remove shim(s) between pulley halves. Install excess shim(s) between fan and lockwasher.

12,15, Ball bearing & fan housing

It is first necessary to heat bearing housing to 65°C (150°F) to remove or install bearing.

24,25,26, Air duct, washer & rivet (closed end)

Air duct can be removed by drilling out rivets.

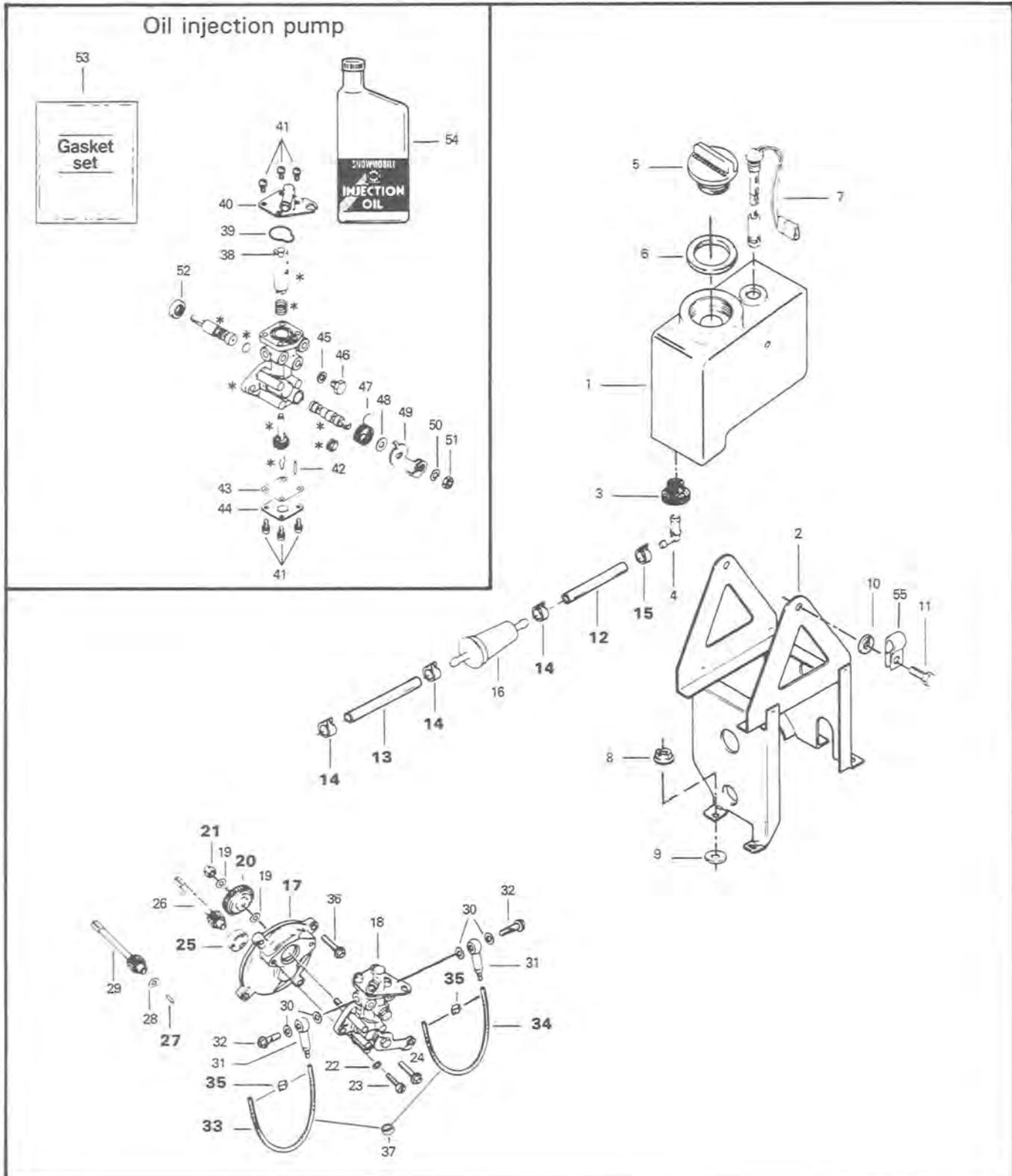
▼ **CAUTION:** At reassembly, use only closed end rivets to avoid rivet ends from falling into magne-

6, Cylinder cowl

A gasket must be placed on both sides (inner and outer) of intake and exhaust holes on cylinder cowl.

◆ **WARNING:** If fan protector is removed, always reinstall after servicing.

OIL INJECTION PUMP AND RESERVOIR



SECTION 02 ENGINE
SUB-SECTION 04 (447 ENGINE TYPE)

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Injection oil tank 2. Oil reservoir support 3. Grommet 4. Male connector 5. Oil tank cap 6. Gasket 7. Oil level sensor 8. Elastic stop nut M5 x 0.8 (4) 9. Rubber washer (4) 10. Lockwasher 6 mm (2) 11. Screw M6 x 12 (2) 12. Oil line (38 mm) 13. Oil line (102 mm) 14. Spring clip (3) 15. Spring clip 16. Filter 17. Oil pump mounting flange 18. Oil pump 19. Washer 6.2 mm (2) 20. Oil pump gear 27 teeth 21. Lock nut 6 mm 22. Lockwasher 5 mm (2) 23. Screw M5 x 16 (2) 24. Taptite screw M5 x 16 (2) 25. Ball bearing 26. Gear 9 teeth 27. Needle roll 28. Washer 4.3 29. Gear 9 teeth | <ol style="list-style-type: none"> 30. Banjo oil gasket (4) 31. Banjo (2) 32. Banjo bolt (2) 33. Oil line 325 mm 34. Oil line 325 mm 35. Clamp (4) 36. Taptite screw M5 x 16 (4) 37. Rubber ring 38. Retainer 39. "O" ring 40. Plate 41. Screw with lockwasher (8) 42. Stop pin 43. Gasket 44. Plate 45. Washer 46. Hexagonal screw M6 x 7 47. Spring 48. Washer 49. Lever 50. Lockwasher 6 mm 51. Nut 6 mm 52. Seal 53. Gasket set 54. Oil injection 55. Clip |
|--|--|

Parts in illustration marked with * are not available as spare parts.

CLEANING

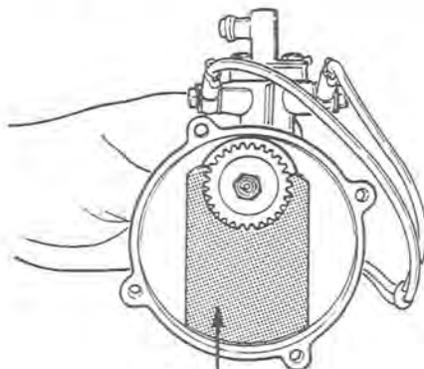
Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY

○ NOTE: Some oil pump components are not available as single parts.

20,21,27, Oil pump gear, lock nut & needle roll

To remove retaining nut, extract the needle roll with pliers and lock gear in place using no 420 876 690 tool.



Gear holder

P/N 420 876 690

ASSEMBLY

20, Oil pump gear

At gear assembly, apply a light coat of grease on gear teeth.

27, Needle roll

The needle roll must be engage as deep as possible in the pump mounting flange.

14,15,35, Spring clip & clamp

Always check for spring clips and clamps tightness.

12,13,33,34, Oil lines

▼ CAUTION: On electric start models, it is recommended to install black rubber oil lines (P/N 414 2867 00) that will not be altered by battery fumes.

SECTION 02 ENGINE

SUB-SECTION 04 (447 ENGINE TYPE)

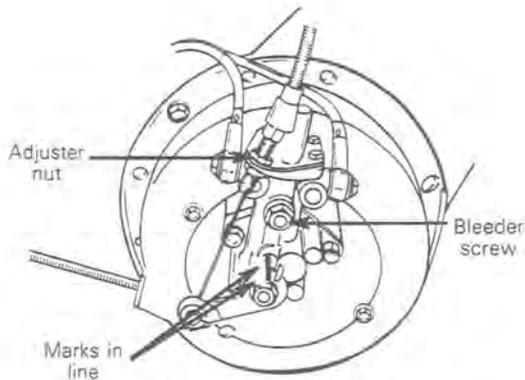
ADJUSTMENT

Prior to adjusting the pump, make sure all carburetor adjustments are completed.

To synchronize pump with carburetor:

Eliminate the throttle cable free-play by pressing the throttle lever until a light resistance is felt, then hold in place. The aligning marks on the pump casting and on the lever must align. If not, loosen the adjuster nut and adjust accordingly.

Retighten the adjuster nut.

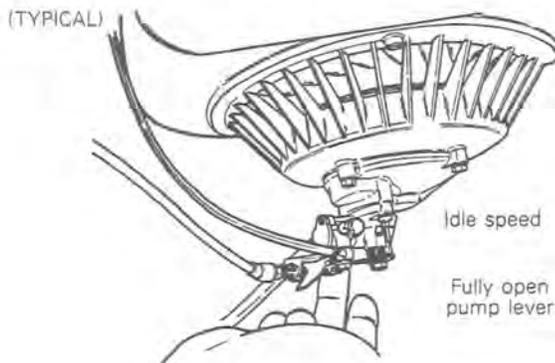


To bleed oil lines:

All oil lines should be full of oil. If required, bleed the main oil line (between tank and pump) by loosening the bleeder screw until all air has escaped from the line.

Make sure the tank is sufficiently filled.

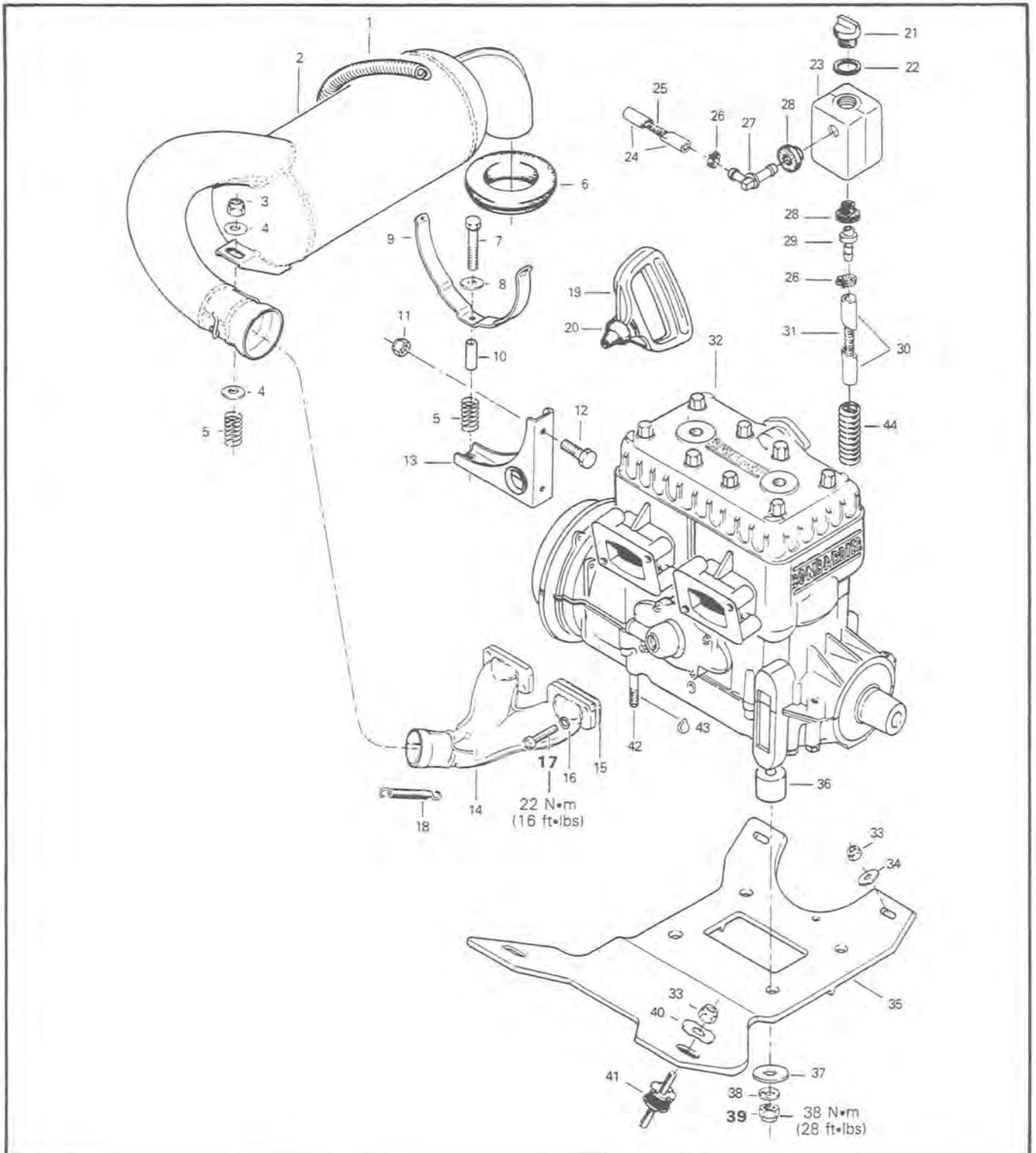
Check the small oil lines (between pump and intake manifold). If required, fill the lines by running the engine at idle speed while holding the pump lever in fully open position.



◆ **WARNING:** Ensure not to operate carburetor throttle mechanism. Secure the rear of the vehicle on a stand.

462 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION



SECTION 02 ENGINE

SUB-SECTION 05 (462 ENGINE TYPE)

- | | |
|-------------------------------|------------------------------------|
| 1. Muffler | 23. Rotary valve oil tank |
| 2. Spring | 24. Oil line |
| 3. Elastic stop nut M8 | 25. Spring |
| 4. Washer 8,4 mm (2) | 26. Gear clamp (4) |
| 5. Spring (2) | 27. Elbow male connector |
| 6. Exhaust washer | 28. Grommet (2) |
| 7. Hex. screw M6 × 20 | 29. Male connector |
| 8. Washer 6 mm | 30. Oil line |
| 9. Muffler attachment | 31. Spring |
| 10. Bushing | 32. Engine rotax 462 |
| 11. Elastic stop nut 6 mm (2) | 33. Elastic stop nut M10 × 1.5 (4) |
| 12. Hex. screw M6 × 16 (2) | 34. Washer (2) |
| 13. Muffler support | 35. Engine support |
| 14. Exhaust manifold | 36. Distance sleeve 15 mm (4) |
| 15. Gasket (2) | 37. Washer 10,5 mm |
| 16. Lockwasher 8 mm (4) | 38. Lockwasher 10 mm (4) |
| 17. Allen screw M8 × 25 (4) | 39. Nut 10 mm (4) |
| 18. Spring (2) | 40. Internal tooth cup washer (2) |
| 19. Starter grip | 41. Rubber mount (4) |
| 20. Rubber buffer | 42. Stud M10 × 42 (4) |
| 21. Cap | 43. Loctite 242 |
| 22. Sealing ring | 44. Grip 394 mm (15.5") |
-

REMOVAL FROM VEHICLE

Disconnect or remove the following from vehicle:

- coolant hose (drain cooling system first)
- exhaust manifold
- oil injection hose
- oil injection cable

◆ **WARNING:** Always disconnect ground cable first, before any other wire of the starting system.

- wiring harness
- rewind starter cable
- pulsation hose
- rotary valve lubrication hose
- pulley guard
- belt
- clutch
- engine support nut (under engine support)
- clamp between carburator and intake manifold

ENGINE SUPPORT AND MUFFLER DISASSEMBLY AND ASSEMBLY

17,39, Manifold bolts & engine nuts

Torque the engine support nuts (under engine support) to 38 N•m (28 ft•lbs).

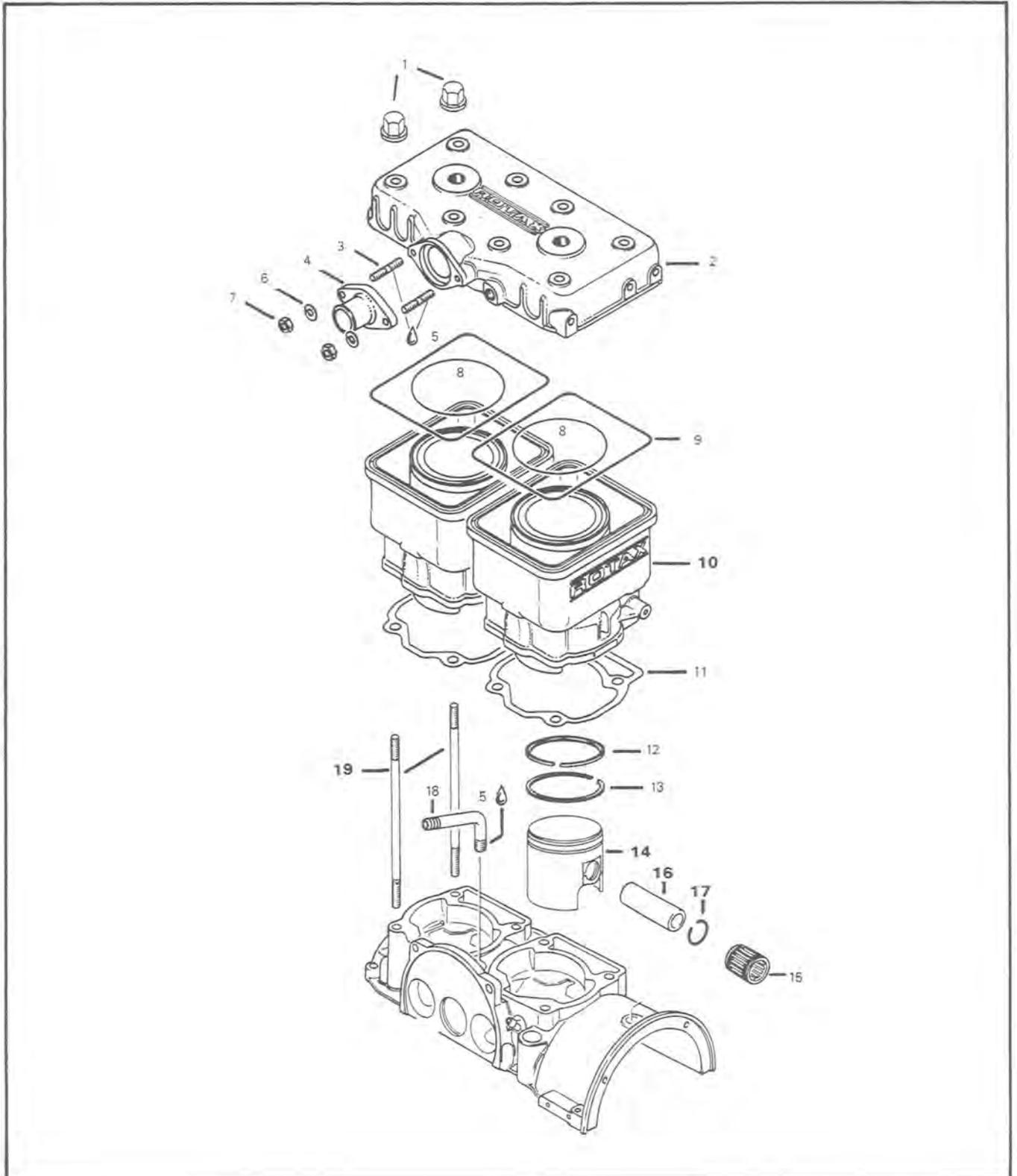
Torque the manifold bolts to 22 N•m (16 ft•lbs).

INSTALLATION ON VEHICLE

To install engine on vehicle reverse removal procedure. However, pay attention to the following:

- Check tightness of engine mount nuts.
- After throttle cable installation, check carburetor maximum throttle slide opening and oil pump adjustment.
- Check pulley alignment and drive belt tension.

TOP END



SECTION 02 ENGINE

SUB-SECTION 05 (462 ENGINE TYPE)

1. Cap nut M8 (8)
2. Cylinder head
3. Stud M6 × 25 (2)
4. Coolant outlet collar
5. Loctite 242 blue (medium strength)
6. Lockwasher 6 mm (2)
7. Nut M6 (2)
8. Gasket ("O" ring) (2)
9. Gasket ("O" ring) (2)
10. Cylinder (2)

11. Cylinder/crankcase gasket (2)
12. "L" ring
13. "Rectangular" ring
14. Piston
15. Needle bearing
16. Gudgeon pin
17. Circlip (4)
18. Angular tube, oil inlet
19. Cylinder stud M8 × 175 (8)

CLEANING

Discard all gaskets.

Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port, cylinder head and piston dome using a wooden spatula.

○ **NOTE:** The letters "AUS" (over an arrow on the piston dome) must be visible after cleaning.

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

DISASSEMBLY

14,16,17, Piston, gudgeon pin & circlip

Place a clean cloth over crankcase to prevent circlips from falling into crankcase, then with a pointed tool inserted in piston notch remove circlips from piston.

Drive the gudgeon pins out using a suitable drive punch and hammer.

▼ **CAUTION:** When tapping gudgeon pin in or out of piston, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

INSPECTION

The inspection of the engine top end must include the following measurements:

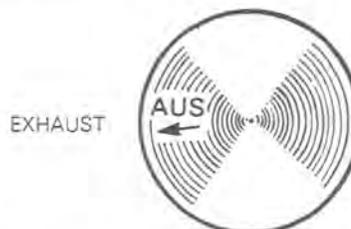
MEASUREMENTS	TOLERANCES		
	FITTING NEW PARTS (MIN.)	(MAX.)	WEAR LIMIT
Cylinder taper	N.A.	N.A.	.08 mm (.0031")
Cylinder out of round	N.A.	N.A.	.05 mm (.0020")
Cylinder/piston clearance	.08 mm (.0031")	.10 mm (.0039")	.20 mm (.0079")
Ring/piston groove clearance	.04 mm (.0016")	.11 mm (.0043")	.20 mm (.0079")
Ring end gap	.20 mm (.0079")	.35 mm (.0138")	1.0 mm (.0394")

○ **NOTE:** For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

14, Piston

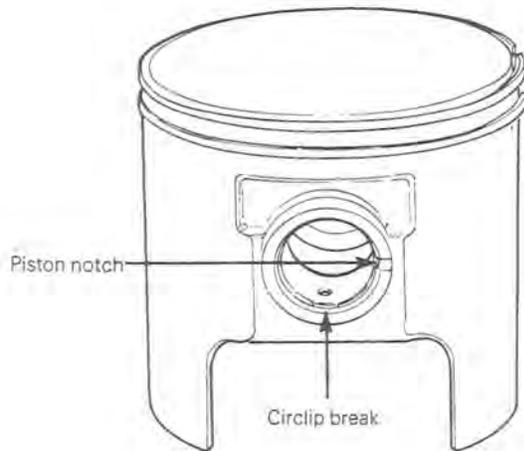
At assembly, place the pistons over the connecting rods with the letters AUS (over an arrow on the piston dome) facing the direction of the exhaust port.



17, Circlip

To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated.

Using very fine emery cloth, remove any burrs on piston caused through circlip installation.



10, Cylinder

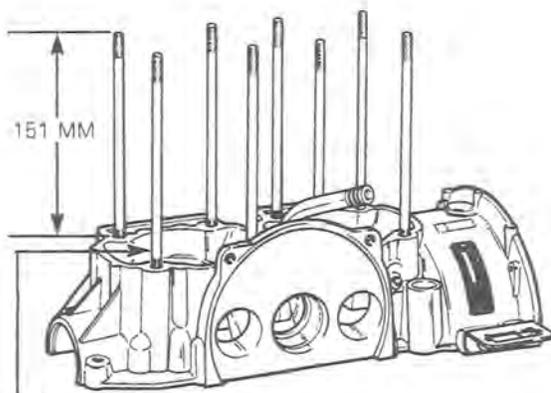
Before inserting piston in cylinder, lubricate the cylinder with new injection oil or equivalent.

Cylinders are identical they can be interchanged as far as the pistons are matched to their own cylinder.

Spare parts pistons and cylinders are identified with a green or red dot, it is important to match piston and cylinder with the same color.

19, Cylinder studs

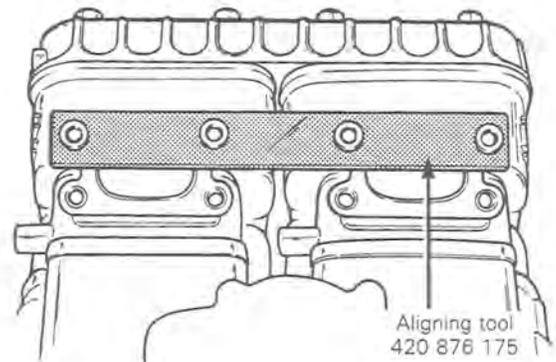
Because of cap nuts, cylinder studs have to be screwed into the crankcase so that they do not protrude by more than 151 mm (5.950"). Longest threaded part should be in the crankcase.



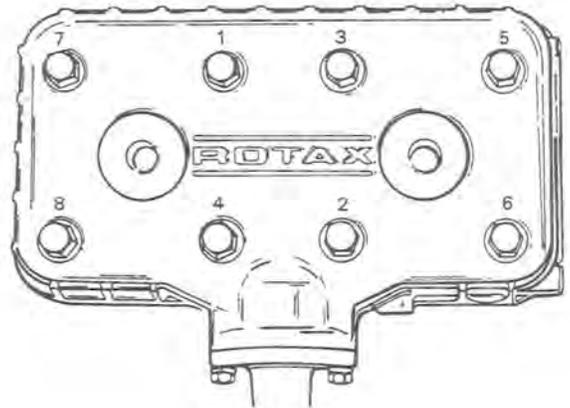
Longest threaded
end in
the crankcase

10, Cylinder

When reassembling the cylinders to the crankcase, it is important to have them properly aligned so that the cylinder head holes will match up with the studs. A special tool (as per illustration) can be used to align the cylinders.

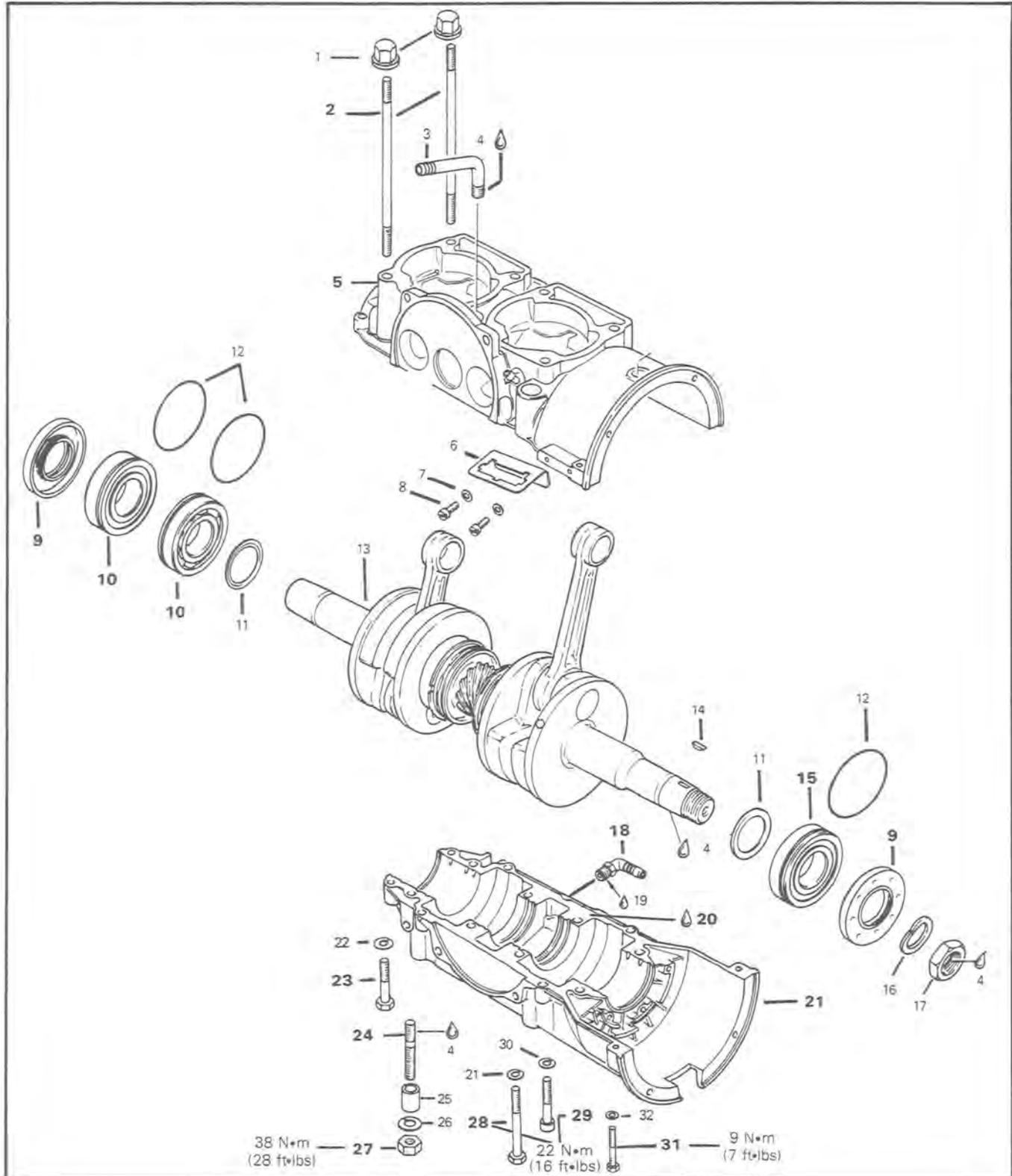


Torque cylinder head nuts to 22 N•m (16 ft•lbs) following illustrated sequence.



SECTION 02 ENGINE
SUB-SECTION 05 (462 ENGINE TYPE)

BOTTOM END



1. Cap nut M8 (8)
2. Stud M8 × 175 (8)
3. Angular tube, oil inlet
4. "Loctite 242"
5. Crankcase upper half
6. Junction box bracket
7. Lock washer 5 mm (2)
8. Cyl. screw M5 × 12 (2)
9. Oil seal (2)
10. Ball bearing, (2)
11. Distance ring (2)
12. "O" ring (3)
13. Crankshaft
14. Woodruff key 3 × 3.7
15. Ball bearing (1)
16. Lockwasher 22 mm

17. Hex. nut, M22 × 1.5
18. Angular tube, oil outlet
19. "Loctite 271"
20. "Loctite 515"
21. Crankcase lower half
22. Lockwasher 8 mm (10)
23. Hex. screw M8 × 45 (2)
24. Stud M10 × 42 (4)
25. Distance sleeve 15 mm (4)
26. Lockwasher 10 mm (4)
27. Hex. nut M10 (4)
28. Hex. screw M8 × 70 (8)
29. Allen bolt M8 × 40 (4)
30. Lockwasher 8 mm (4)
31. Hex. screw M6 × 35 (2)
32. Lockwasher 6 mm (2)

CLEANING

Discard all oil seals, gaskets, "O" rings and sealing rings. Clean all metal components in a non-ferrous metal cleaner. Remove old "Loctite" from crankcase mating surfaces with Bombardier sealant stripper.

▼ **CAUTION:** Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

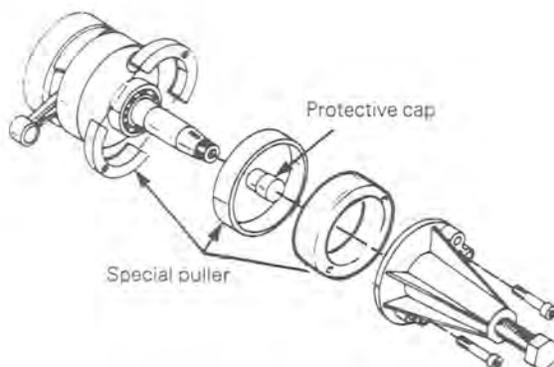
General

To remove drive pulley, refer to "Drive Pulley", section 03, sub-section 03.

To remove magneto, refer to "Magneto" in this section.

10,15, Ball bearings

To remove bearings from crankshaft use a protective cap special puller as illustrated.



INSPECTION

The inspection of the engine bottom end must include the following measurements:

MEASUREMENTS	TOLERANCES		WEAR LIMIT
	FITTING NEW PARTS (MIN.)	(MAX.)	
Crankshaft deflection	N.A.	N.A.	.08 mm (.0031")
Connecting rod big end axial play	.20 mm (.0079")	.53 mm (.0208")	1.00 mm (.0394")

○ **NOTE:** For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

10,15, Ball bearings

Prior to installation, place bearings into an oil container previously heated to 100°C (210°F). This will expand bearing and ease installation. Then put the distance rings on each side of the crankshaft, flat side of the inner diameter against the bearing and round side against the counterweight.

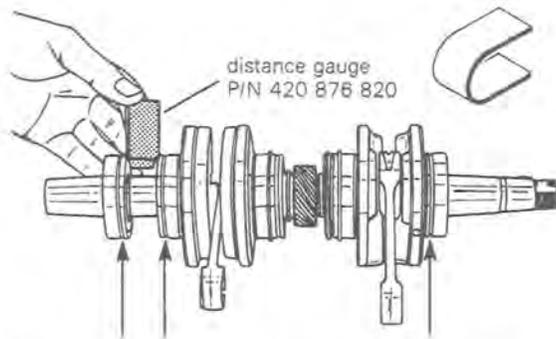
Install the bearings being careful not to mix them. The two bearings on the PTO side have more clearance between the balls and the bearing cage, and it also has plastic cage.

Make sure that the distance ring does not move between the counter-weight and the bearing on each side of the crankshaft.

Use the distance gauge (P/N 420 876 820) to adjust the position of the second bearing on PTO side. See illustration.

SECTION 02 ENGINE
SUB-SECTION 05 (462 ENGINE TYPE)

Install the bearings with oil seal groove as per the following illustration:



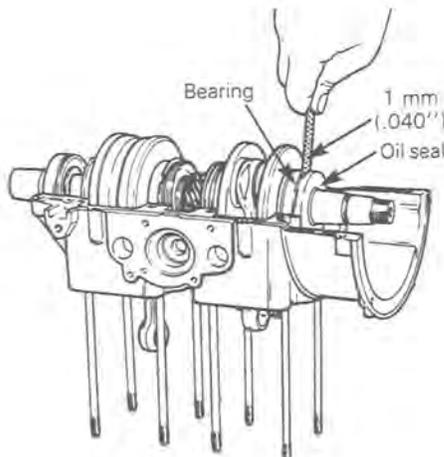
▼ **CAUTION:** Do not mix up the bearings. The two bearings on PTO side have more clearance between the balls and the bearing cage, and it also has plastic cage.

9, Oil seal

At seal assembly, apply a light coat of lithium grease on seal lips.

For bearing lubrication purpose, a gap of 1.0 mm (.040") must be maintained between seals and bearings.

When installing plain seals (seal without locating ring or without spacing legs), ensure to maintain the specified gap as illustrated.

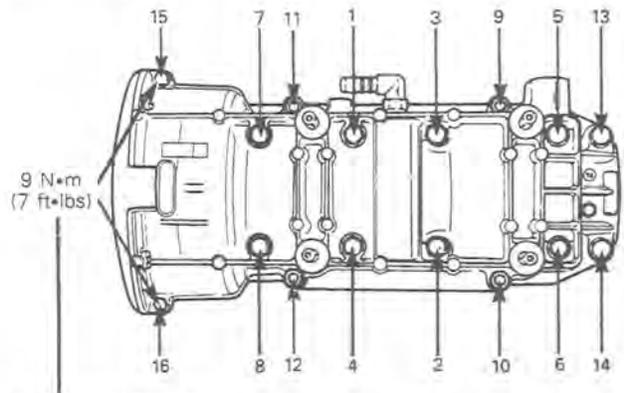


5,20,21, Crankcase halves & Loctite

Crankcase halves and factory matched and therefore, are not interchangeable or available as single halves. Prior to joining of crankcase halves, spray some new injection oil (or equivalent) on all the moving parts of the crankshaft. Then apply a light coat of "Loctite 515" (413 7027 00) on mating surfaces.

▼ **CAUTION:** Before joining of crankcase halves be sure that crankshaft rotary valve gear is well engaged with rotary valve shaft gear.

Position the crankcase halves together and torque bolts by hand, then install armature plate (tighten) on magneto side to correctly align crankcase halves. Torque bolts to proper torque following illustrated sequence.



All the other bolts are torqued to 22 N•m (16 ft•lbs)

○ **NOTE:** Torque the two smaller bolts (6 mm) on magneto side to 9 N•m (7 ft•lbs).

23,28,29, Hexagonal screws & Allen bolts M8

Torque, the M8 screws to 22 N•m (16 ft•lbs).

31, Hexagonal screw M6 x 35

Torque the M6 screws to 9 N•m (7 ft•lbs).

24, Stud

At assembly on crankcase, apply "Loctite 242" on threads.

27, Hexagonal nut

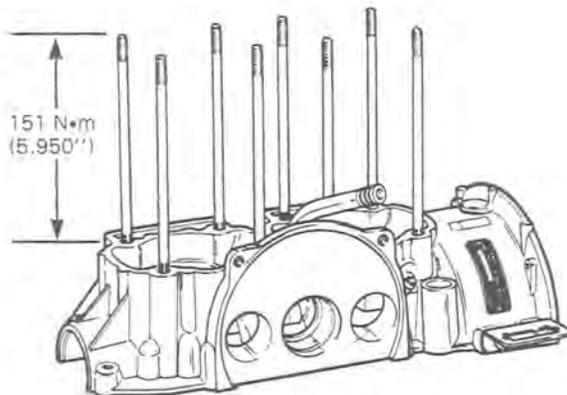
Torque to 36 N•m (26 ft•lbs).

18, Angular tube & oil outlet

Apply "Loctite 271" on threads prior to assembly.

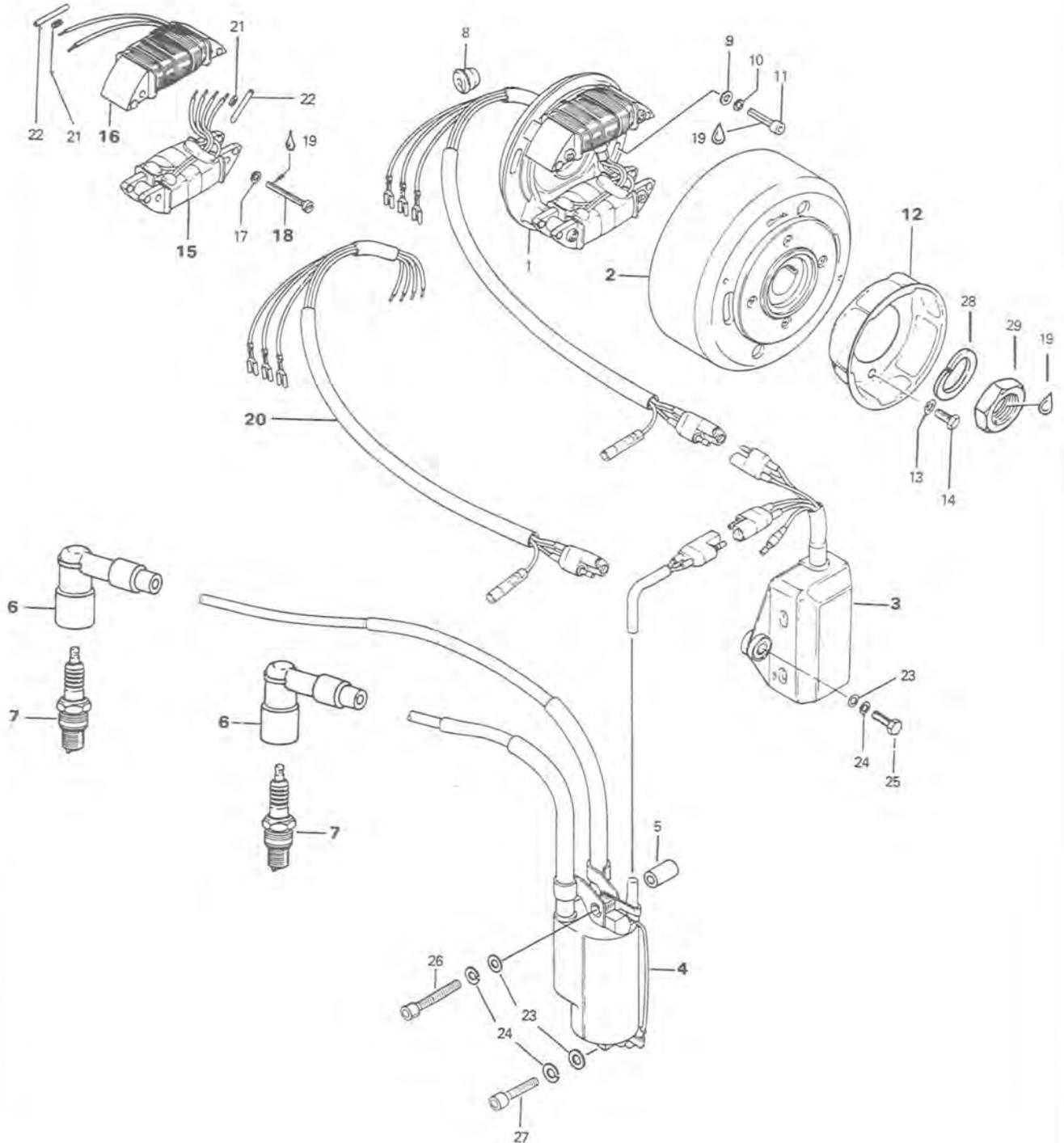
2, Stud

Because of cap nuts, cylinder studs have to be screwed into the crankcase so that they do not exceed further than 5 mm (5.950"). Longest threaded end should be in the crankcase.



MAGNETO GENERATOR

12V 140W



SECTION 02 ENGINE

SUB-SECTION 05 (462 ENGINE TYPE)

1. Armature plate ass'y
2. Magneto flywheel ass'y
3. C.D. Box
4. Ignition coil
5. Distance sleeve (2)
6. Spark plug protector ass'y (2)
7. Spark plug (2)
8. Cable grommet
9. Washer 5.5 mm (2)
10. Lock washer 5 mm (2)
11. Allen screw M5 x 18 (2)
12. Starting pulley (1)
13. Lock washer 8 mm (3)
14. Hex. screw M8 x 16 (3)
15. Generating coil
16. Lightning coil

17. Lock washer 5 mm (2)
18. Screw M5 x 35 (2)
19. Loctite 242
20. Wire ass'y
21. Cable terminal (6)
22. Protection tube (6)
23. Washer 6 mm (4)
24. Lock washer 6 mm (4)
25. Hex. screw M6 x 25 (2)
26. Allen screw M6 x 50 (1)
27. Allen screw M6 x 45 (1)
28. Lock washer 22
29. Hex. nut M22 x 1,5
30. Armature plate
31. Combined screw M6 x 25 (2)

How to easily distinguish the 140W and 160W magneto

	140W (4-4P)	160W (4-5P)
C.D. box part no	070000-680	070000-0770
C.D. box connectors (qty.)	3	2
Starting pulley retaining screws (qty.)	4	3
Magneto poles (qty.)	4	5

On the 140W (4-4P) C.D. box there is an additional red/black wire with a single connector.

The 140W (4-4P) C.D. box is bigger than the 160W 4-5P amplifier box.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

CAUTION: Clean armature and magneto using only a clean cloth.

DISASSEMBLY

To gain access to magneto assembly, remove:

- rewind starter
- starting pulley, **12**

NOTE: Before disassembling magneto plate, indexing marks should be located to facilitate re-assembly.

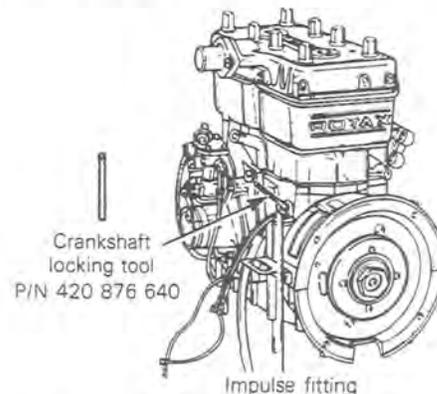
29, Hexagonal nut

To remove magneto flywheel retaining nut:

- lock crankshaft with crankshaft locking tool (service tool) as illustrated (magneto side piston must be at top dead center)

NOTE: It should be noted that to correctly remove a "Loctite" locked fastener it is first necessary to tap on the fastener to break "Loctite" bond. This will eliminate the possibility of thread breakage.

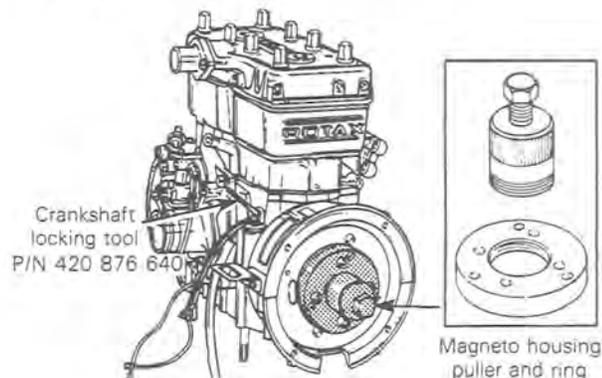
- remove magneto retaining nut



2, Magneto flywheel assembly

To remove magneto housing (flywheel):

- lock crankshaft with crankshaft locking tool (service tool) as illustrated
- adjust magneto housing puller and puller ring as illustrated



**SECTION 02 ENGINE
SUB-SECTION 05 (462 ENGINE TYPE)**

- tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper.

1, Armature plate assembly

To remove the armature plate:

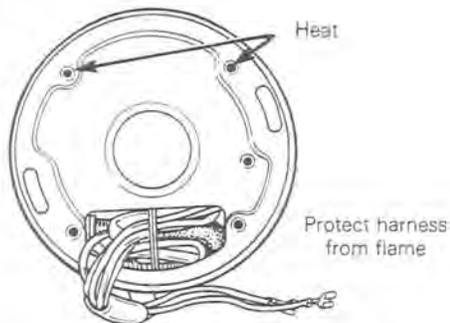
- Remove Allen screws
- Take off the grommet from crankcase
- Pull out the armature, being careful when passing the connectors through the crankcase.

REPAIR

15, Generating coil

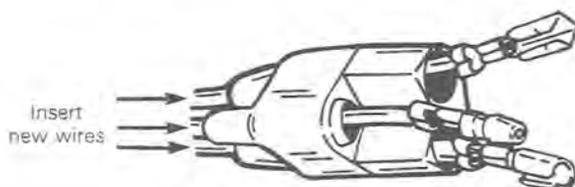
To replace generating coil:

- Heat the armature plate around the screw holes to break the Loctite bond (200°F)



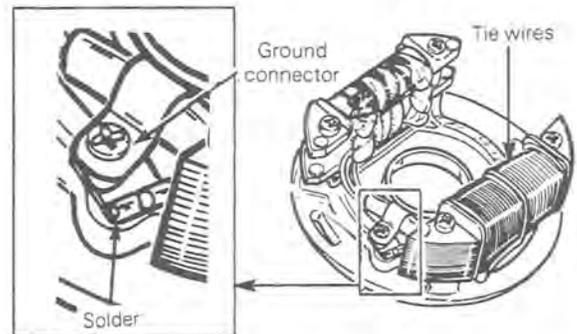
▼ **CAUTION: Protect harness from flame.**

- Remove screws (use Phillips no. 2 or suitable flat screw driver)
- Cut the four wires as close as possible to the coil body
- To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube
- Insert the new wires into the old connector housing and install connectors



▼ **CAUTION: Replace the old wires in the connector with the same color coded new wires.**

- Install a new receptacle connector to the red/black wire (on 140W 4-4P models only)
- Install the ground connector to the armature plate as illustrated



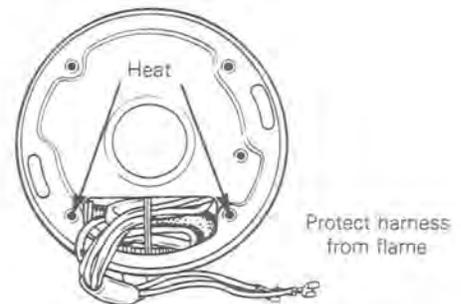
- To install the new coil on the armature plate, remove the shipping nuts from the new coil and apply Loctite 242 (blue, medium strength) to screws before assembly

▼ **CAUTION: Before reinstalling the magneto, remove the loose epoxy from harness.**

16, Lightning coil

To replace lighting coil:

- Heat the armature plate around the screw holes to break the Loctite bond (200°F)



▼ **CAUTION: Protect harness from flame.**

- Remove screws (use Phillips no. 2 or suitable flat screwdriver)
- Pull out protector tubes and unsolder the splice connectors
- Solder the two yellow wires in the harness to the leads of the lighting coil

SECTION 02 ENGINE

SUB-SECTION 05 (462 ENGINE TYPE)

- Position protector tube over connection
- Tie wires to the coil as illustrated (on 140W 4-4P models only)

18,31, Screw & combined screw

Prior to assembly, apply "Loctite 242" (blue, medium strength)

▼ **CAUTION:** Before reinstalling magneto remove the loose epoxy from harness.

ASSEMBLY

Put back the armature plate, locating the indexing mark.

Clean crankshaft extension taper.

Apply "Loctite 242" (blue, medium strength) on taper.

Position key and magneto housing on crankshaft.

29, Hexagonal nut

Clean nut threads and apply "Loctite 242" before tightening nut to 95 N•m (70 ft•lbs).

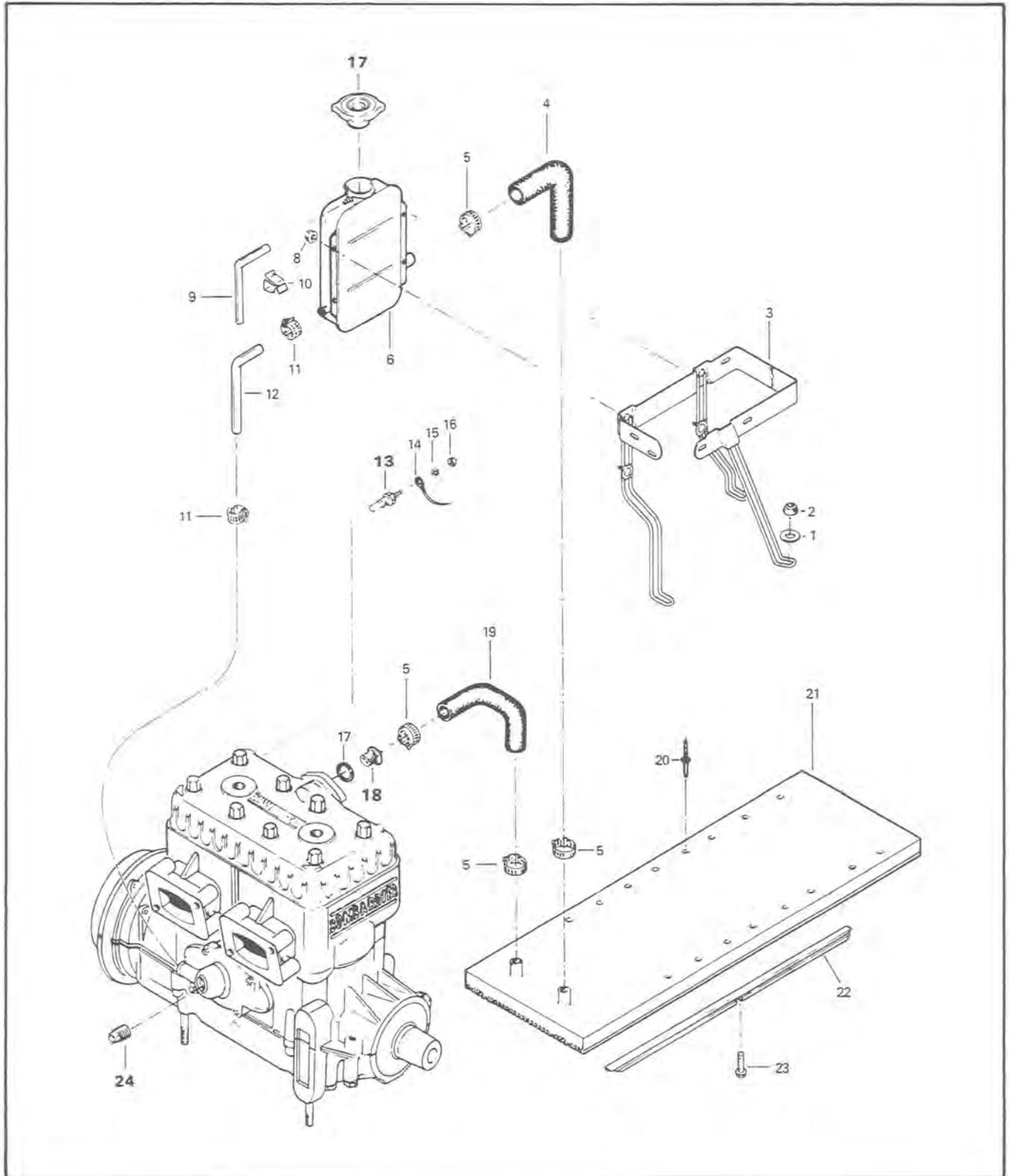
3,4,6,20, Amplifier box, ignition coil, spark plug protector ass'y & wire ass'y

At reassembly coat all electric connections with silicone dielectric "grease" to prevent corrosion or moisture penetration.

▼ **CAUTION:** Do not use silicone "sealant", this product will corrode contacts.

○ **NOTE:** For ignition timing refer to section 04 sub-section 02.

COOLING SYSTEM



SECTION 02 ENGINE

SUB-SECTION 05 (462 ENGINE TYPE)

1. Washer 6,2 mm (3)
2. Elastic stop nut M5 (3)
3. Tank support
4. Hose
5. Clamp (4)
6. Coolant tank
7. Pressure cap
8. Elastic stop nut M5 (4)
9. Overflow hose 343 mm
10. Clip
11. Clamp (2)
12. Hose 419 mm

13. Sender
14. Sender wire
15. Lockwasher
16. Hex. nut
17. Grommet
18. Thermostat
19. Hose
20. Rivet (18)
21. Radiator
22. Radiator protector (2)
23. Taptite screw M5 x 15 (2)
24. Plug

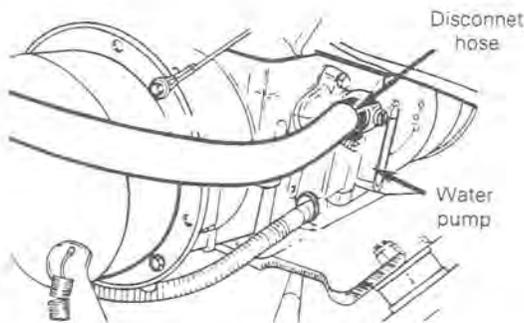
INSPECTION

Check general condition of hoses and clamp tightness.

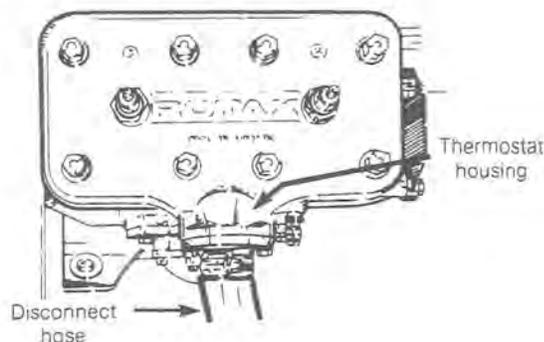
DRAINING THE SYSTEM

◆ **WARNING:** Never drain or refill the cooling system when engine is hot.

To drain the cooling system remove the engine coolant hose from coolant pump. Then, remove coolant tank cap and lift the rear of the vehicle to drain the heat exchanger.



When the coolant level is low enough, remove the hose from thermostat housing.



DISASSEMBLY AND ASSEMBLY

13,24, Plug, sender

Apply Loctite pipe thread sealant to avoid leaks.

7, Pressure cap

Check that the cap pressurizes the system. If not, install a new 13 lbs cap. (do not exceed 13 lbs of pressure).

18, Thermostat

To check thermostat, put it in water and heat water. Thermostat should open when water temperature reaches 43°C (110°F).

REFILLING THE SYSTEM

Capacity:

Approximately 5 liters
(1.1 Imp. gal) (1.3 U.S. gal.)
60% antifreeze + 40% water

▼ **CAUTION:** Always use ethylene-glycol anti-freeze containing corrosion inhibitors specifically recommended for aluminum engines.

Reinstall coolant pump hose.

Refill tank until coolant overfills at thermostat housing.

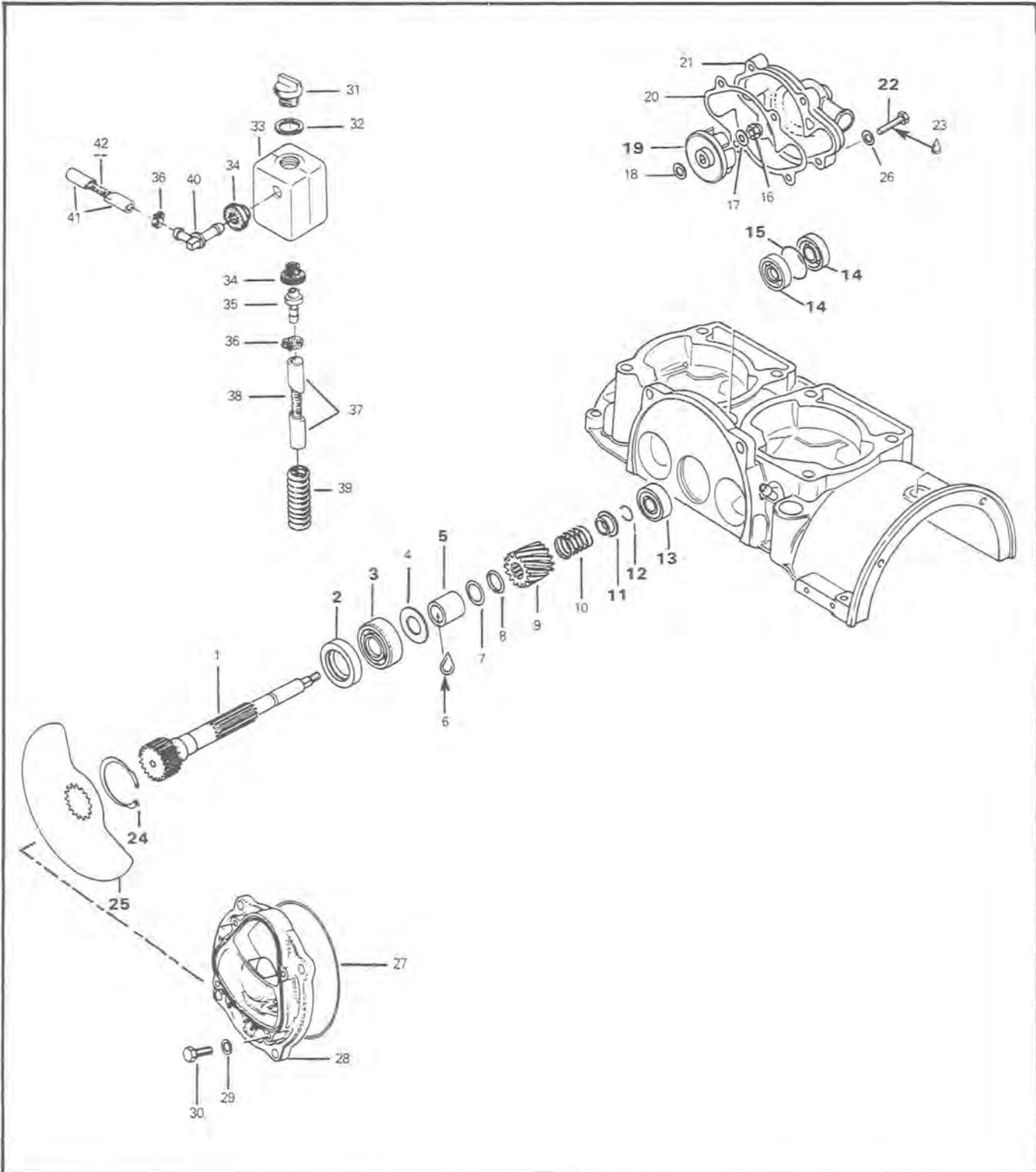
Reinstall hose at thermostat housing.

Continu to pour the liquid in the coolant tank until level reaches 2.5 cm (1.") below filler neck.

Without tank cap, start engine, let it run until it reaches its operating temperature and thermostat opens. Allow it to run a few minutes more. Stop engine and check coolant level, refills as necessary.

◆ **WARNING:** Before removing the cap place a cloth over the coolant tank and release the cap to the first step to release the pressure. Loss of fluid and possibility of sever burns could occur if this notice is dissegarded.

**ROTARY VALVE,
COOLANT PUMP AND OIL RESERVOIR**



1. Shaft, rotary valve
2. Oil seal
3. Ball bearing
4. Shim 0,5 mm
5. Distance sleeve 24,3 mm
6. "Loctite 271"
7. Shim 0,5 mm
8. O-ring
9. Sprocket 14 t
10. Spring
11. Spring holder cup
12. Circlip
13. Ball bearing
14. Oil seal (2)
15. Distance ring
16. Lock nut M6
17. Washer 6,2 mm
18. Washer 8,4 mm
19. Impeller, coolant pump
20. Gasket
21. Housing, coolant pump

22. Hex. screw M6 × 25 (4)
23. "Loctite 242"
24. Locking ring
25. Rotary valve
26. Gasket ring 6 mm (4)
27. "O" ring
28. Cover
29. Lock washer 8 mm (4)
30. Hex. screw M8 × 20 (4)
31. Cap
32. Sealing ring
33. Rotary valve oil tank
34. Grommet (2)
35. Male connector
36. Gear clamp
37. Oil line
38. Spring
39. Oil line housing
40. Elbow male connector
41. Oil line
42. Spring

CLEANING

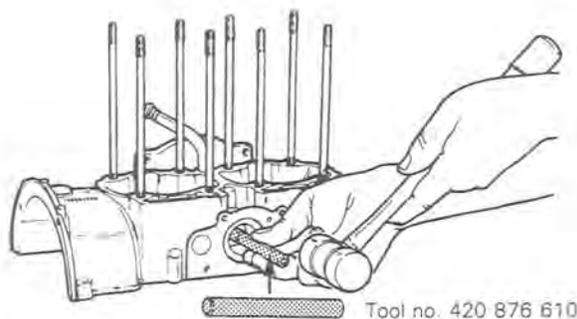
Discard all seals and "O" rings.

Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY AND ASSEMBLY

19,24, Coolant pump impeller & circlip

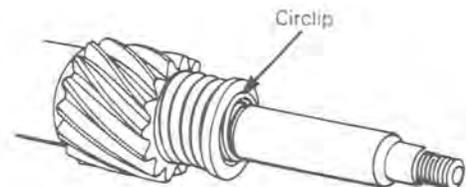
To remove rotary valve shaft assembly from crankcase, first remove coolant pump impeller and circlip. Using the suitable pusher (P/N 420 876 610) and a fiber hammer, push shaft assembly.



CAUTION: To prevent damage to the end of the rotary valve shaft, use pusher (tool P/N 420 876 610).

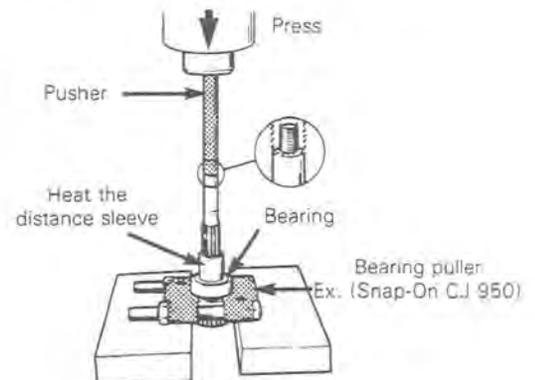
11,12, Spring holder cup & circlip

If it is necessary to disassemble components of rotary valve shaft assembly, compress spring retaining cup in order to remove circlip.



5, Distance sleeve

To remove the distance sleeve use a bearing puller (Ex: Snap-on no. CJ 950) and pusher (P/N 420 876 610). Heat the distance sleeve. Proceed as illustrated:



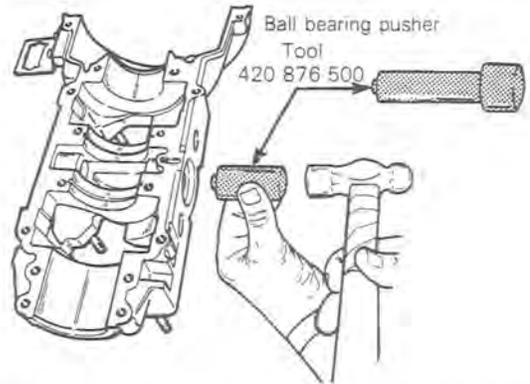
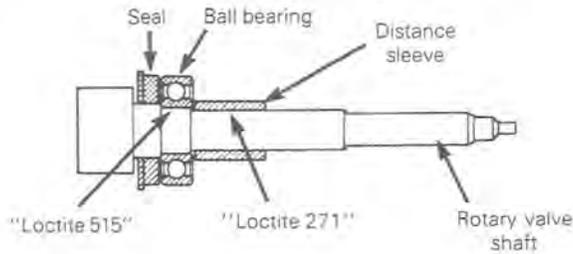
CAUTION: Ensure that the rotary valve shaft is perfectly perpendicular with the press tip or damage will occur.

Clean rotary valve shaft and inside of distance sleeve. At assembly apply "Loctite 271" inside of distance sleeve.

SECTION 02 ENGINE
SUB-SECTION 05 (462 ENGINE TYPE)

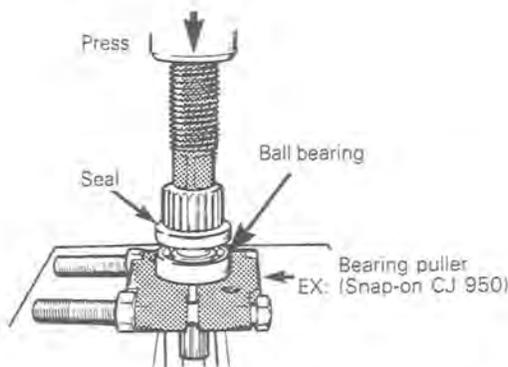
2, Oil seal

At assembly apply lithium grease on seal lips.



3, Ball bearing

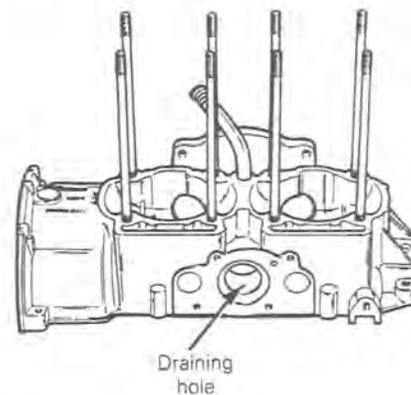
Install ball bearing as illustrated.



○ **NOTE:** Ball bearing **13** shielded side must be facing crankshaft.

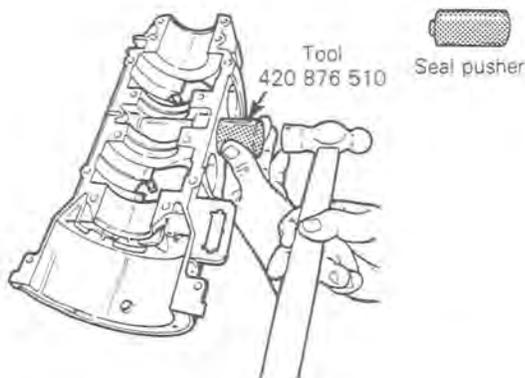
14,15, Oil seal & distance ring

To install seals proceed as follows:



13,14,15, Ball bearing, oil seal & distance ring

To remove seals and bearing:



Apply lithium grease on seal lips.

First seal sits on bearing outer ring. Then come the distance ring with the opening in line with crankcase draining hole. The second seal sits on the distance ring.

The spring side of the seals must face toward crankshaft.

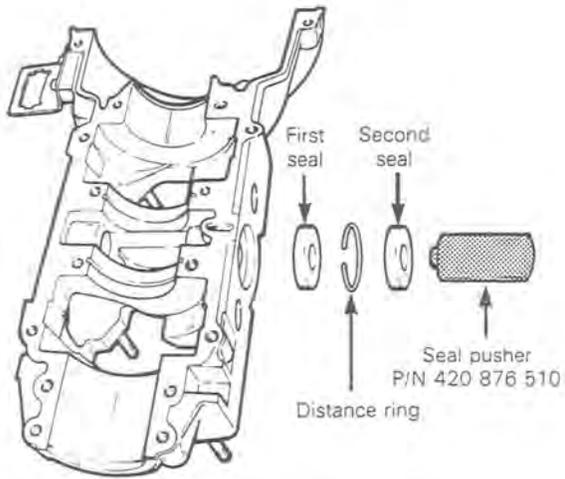
○ **NOTE:** 35% of the distance between first and second seals must be filled with lithium grease or equivalent.

○ **NOTE:** The draining hole is used to detect seal malfunctions. If you notice oil or coolant at the exist of the drain hole this means that oil seal, or coolant seal leaks.

13, Ball bearing

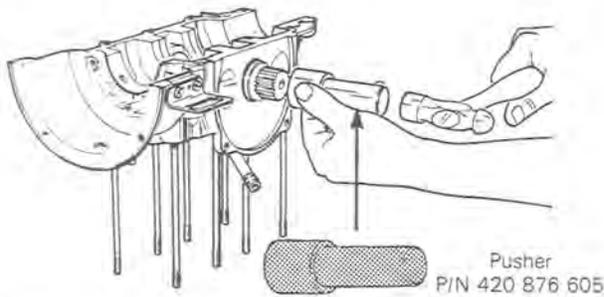
To install ball bearing.

SECTION 02 ENGINE
SUB-SECTION 05 (462 ENGINE TYPE)



○ **NOTE:** After installation of seals check if the bearing is correctly positioned (use pusher P/N 420 876 500).

To install rotary valve shaft proceed as follow with the suitable pusher (P/N 420 876 605):



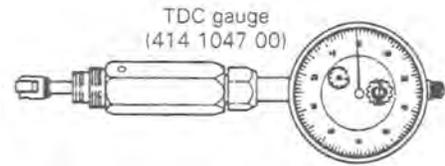
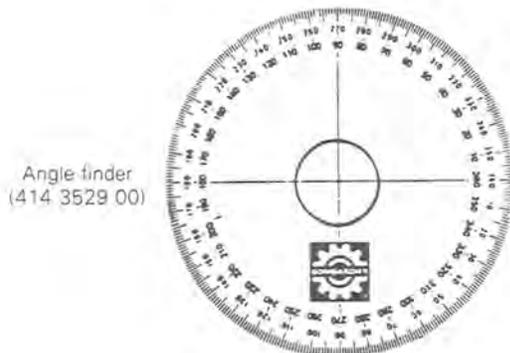
22, Hexagonal screw

Apply "Loctite 242" on threads.

25, Rotary valve

Rotary valve adjustment when replacing crankcase having no timing marks.

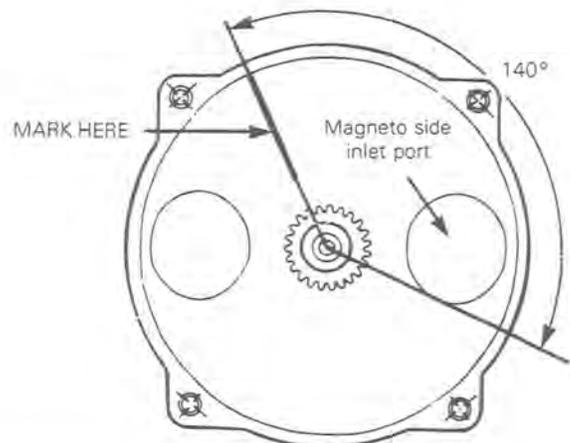
REQUIRED TOOLS



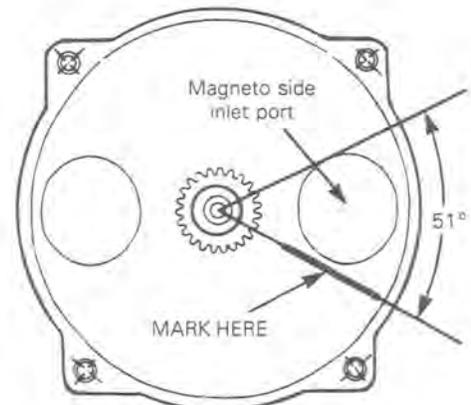
ENGINE TYPE	TIMING MARKS opening, closing
462	140°, 51°

For example: 140° opening
51° closing

Using angle finder, mark crankcase at 140° from bottom edge of magneto side inlet port..



From top edge of magneto side inlet port, mark crankcase at 51°.



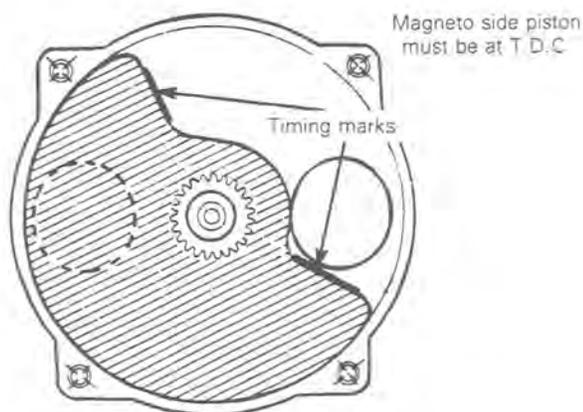
SECTION 02 ENGINE

SUB-SECTION 05 (462 ENGINE TYPE)

To correctly install the rotary valve disc proceed as follows:

- Turning crankshaft counter-clockwise, (drive pulley side) bring magneto side piston to Top Dead Center using a T.D.C. gauge.
- Position the rotary valve disc on gear to have edges as close as possible to the marks.

○ **NOTE:** The rotary valve disc is asymmetrical, therefore, at assembly, try positioning each side of disc on gear to determine best installation position.



Spray some injection oil on rotary valve before closing rotary valve cover.

30, Screw M8 × 20

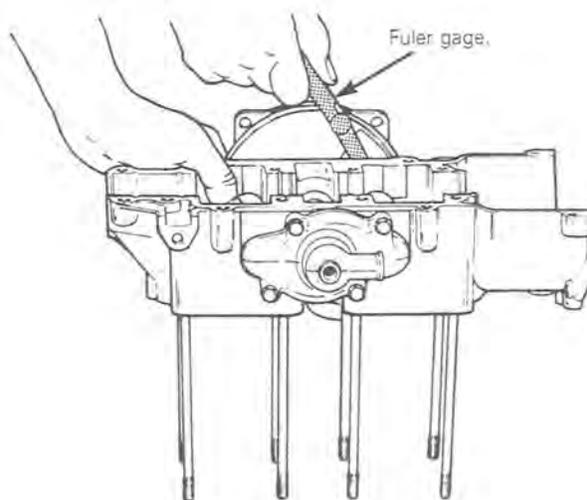
Torque the four cover screws to 20 N•m (15 ft•lbs).

INSPECTION

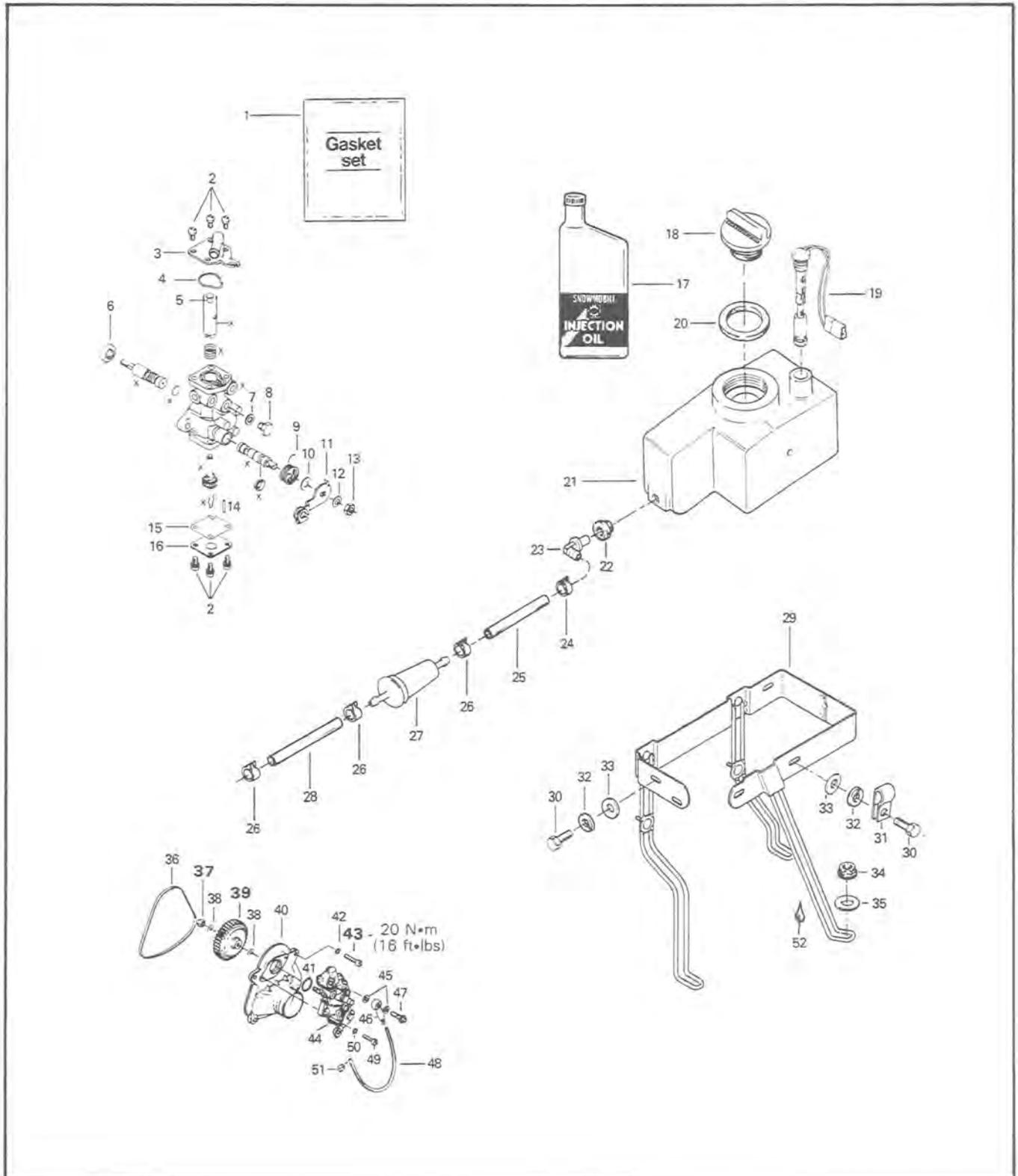
25,28, Rotary valve, rotary valve cover

A gap of .27 - .48 mm (0.011" - 0.019") must be maintain between the rotary valve and the crankcase.

To measure this gap you can use a feeler gage inserted between rotary valve and upper crankcase with the rotary valve cover in place without it's "O" ring. Check the more surface you can. Follow the same procedure for the lower crankcase.



OIL INJECTION PUMP AND RESERVOIR



SECTION 02 ENGINE

SUB-SECTION 05 (462 ENGINE TYPE)

1. Gasket set
2. Screw with lockwasher (8)
3. Plate
4. "O" ring
5. Retainer
6. Seal
7. Washer
8. Hex. screw M6 x 7
9. Spring
10. Washer
11. Lever
12. Lockwasher 6 mm
13. Nut 6 mm
14. Stop pin
15. Gasket
16. Cam casing plate
17. Oil injection
18. Oil tank cap
19. Oil level sensor
20. Gasket
21. Injection oil tank
22. Grommet
23. Male connector
24. Spring clip
25. Hose 60,2 mm
26. Spring clip (3)

27. Filter
28. Hose 79,2 mm
29. Support
30. Hex. screw M6 x 12 (5)
31. Clip
32. Lockwasher 6 mm (5)
33. Washer 6,4 mm (5)
34. Elastic stop nut M5 (3)
35. Washer 6,2 mm (3)
36. Rubber ring
37. Nut 6 mm
38. Washer 6,2 mm (2)
39. Oil pump gear 44 teeth
40. Oil pump mounting flange
41. "O" ring
42. Lockwasher 6 mm (4)
43. Screw M6 x 20 (4)
44. Oil pump
45. Oil banjo gasket (4)
46. Banjo (2)
47. Banjo bolt M6 x 16 (2)
48. Oil line 170 mm
49. Screw M5 x 16 (2)
50. Lockwasher 5 mm (2)
51. Clamp (4)
52. Loctite 277

Parts in illustration marked with * are not available as spare parts.

CLEANING

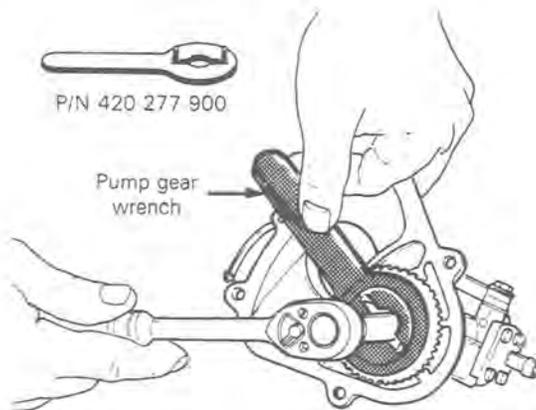
Discard all seals and O'rings. Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY

 **NOTE:** Some oil pump parts are not available in single parts.

37,39, Lock nut & oil pump gear

To remove retaining nut, lock gear using no. 420 277 900 tool.



ASSEMBLY

43, Hexagonal screw

Torque to 20 N•m (15 ft•lbs).

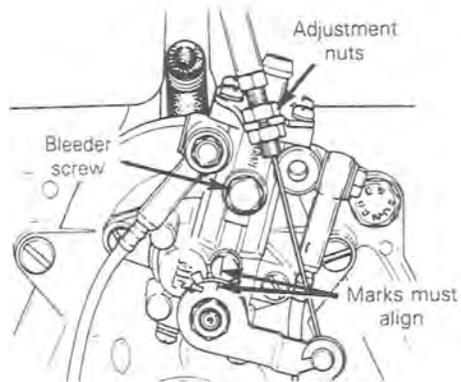
ADJUSTMENT

Always perform carburetor adjustment prior to oil injection pump adjustment.

To synchronize pump with carburetor:

Eliminate the throttle cable free-play by pressing the throttle lever until a light resistance is felt, then hold in place. The aligning marks on the pump casting and on the lever must align. If not, loosen the adjuster nut and adjust accordingly. Tighten the lock nut.

Injection pump cable adjustment



▼ **CAUTION:** Proper oil injection pump adjustment is very important. Any delay in the opening of the pump can result in serious engine damage.

To bleed oil lines:

All oil lines should be full of oil. To bleed the main oil line (between tank and pump), loosen the bleeder screw (do not start engine) and let the air escape until oil starts to flow out.

Make sure tank has enough oil

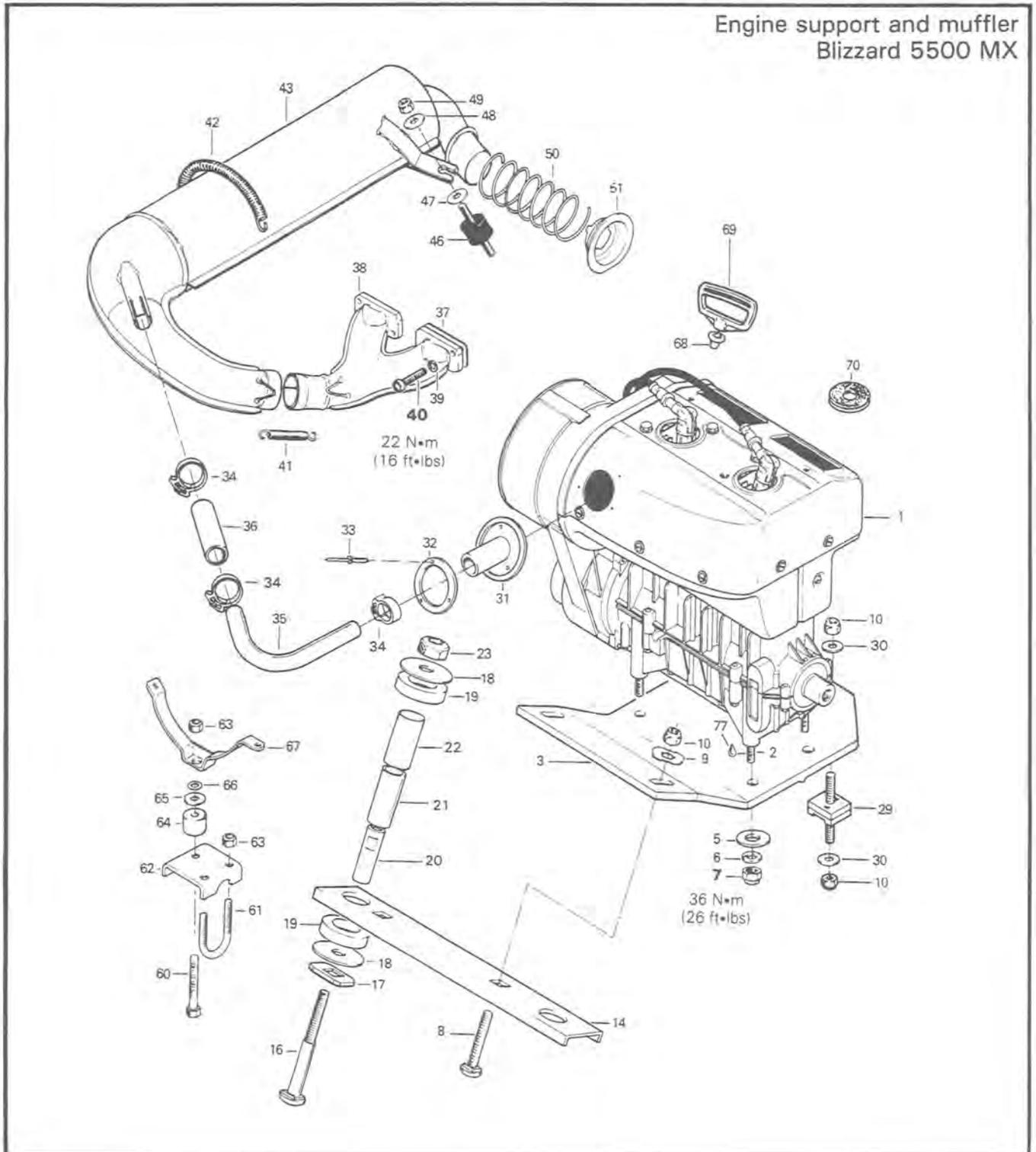
To bleed the small injector of lines, start the engine and let it run at idle speed. Move injection pump lever to fully open position until lines are full of oil.



503 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION

Engine support and muffler
Blizzard 5500 MX



SECTION 02 ENGINE

SUB-SECTION 06 (503 ENGINE TYPE)

1. Engine Rotax type 503
2. Stud M10 × 25 (4) (Blizzard 5500 MX)
Stud M10 × 45 (4) (Alpine)
3. Engine bracket
4. Distance sleeve
5. Flat washer 10.5 mm × 21 × 2 (4)
6. Lockwasher 10 mm (4)
7. Hexagonal nut 10 mm (4)
8. Carriage bolt 3/8" 16 × 1 1/4" (2)
9. Internal tooth dished washer (2)
10. Hexagonal elastic stop nut 3/8" 16 (4)
11. Screw W/Knurling (6)
12. Retainer plate
13. Hexagonal elastic stop nut 5/16" 24 (6)
14. Cross support
15. Leaf spring
16. Carriage bolt 7/16" 14 × 2 3/4" (threaded 1 1/4") (2)
17. Retainer plate (2)
18. Washer (4)
19. Damper (4)
20. Threaded bushing (2)
21. Rubber sleeve (2)
22. Sleeve
23. Hexagonal elastic stop nut 7/16" 14 (2)
24. Carriage bolt 3/8" 24 × 1 1/2" (4)
25. Threaded spacer bushing (4)
26. Insulator rubber (4)
27. Flat washer 25/64" × 7/8" × 0.90" (4)
28. Hexagonal elastic stop nut 3/8" 24 (4)
29. Rubber mount
30. Washer
31. Connector
32. Connector ring
33. Rivet (3)
34. Clamp (3)
35. Elbow
36. Hose 4" (102 mm)
37. Gasket (4)
38. Exhaust manifold
39. Lock washer 8 mm (4)
40. Hexagonal socket head cap screw M8 × 30 (4)
41. Spring (3)
42. Spring
43. Muffler
44. Spring (6)
45. Connector pipe
46. Rubber mount
47. Isolating washer
48. Washer
49. Hexagonal elastic stop nut 5/16" 18
50. Spring
51. Spring seat
52. Exhaust grommet
53. Muffler clamp (2)
54. bushing (2)
55. Cup (4)
56. Spring (4)
57. Cup (4)
58. Clip
59. Hexagonal head cap screw 5/16" 18 × 3 1/4" (2)
60. Hexagonal head cap screw 1/4" 20 × 1 1/4"
61. "U" bolt
62. Muffler support bracket
63. Hexagonal elastic stop nut 1/4" 20 (3)
64. Rubber spacer
65. Asbestos washer
66. Flat washer 17/64" × 7/8" × .060"
67. Muffler support
68. Rubber buffer
69. Starter grip
70. Grommet (spark plug) (2)
71. Air duct
72. L.H. outlet duct
73. L.H. retainer clamp
74. R.H. outlet duct
75. R.H. retainer clamp
76. Rivet
77. Loctite 242 (blue, medium strength)
78. Rivet (6)

REMOVAL FROM VEHICLE

Remove or disconnect the following (if applicable) then lift engine out of vehicle.

Pulley guard, drive belt

Muffler

Clamp between intake manifold and carburator

Oil line

Oil pump cable

Pulsation line

Hood retaining cable

Rewind starter cable

Wiring harness

Engine support and reinforcing cross support nuts

ENGINE SUPPORT AND MUFFLER DISASSEMBLY AND ASSEMBLY

7,40, Crankcase/engine bracket nuts & exhaust manifold bolts

Torque the crankcase/engine bracket nut to 36 N•m (26 ft•lbs)

Torque the exhaust manifold bolt to 22 N•m (16 ft•lbs)

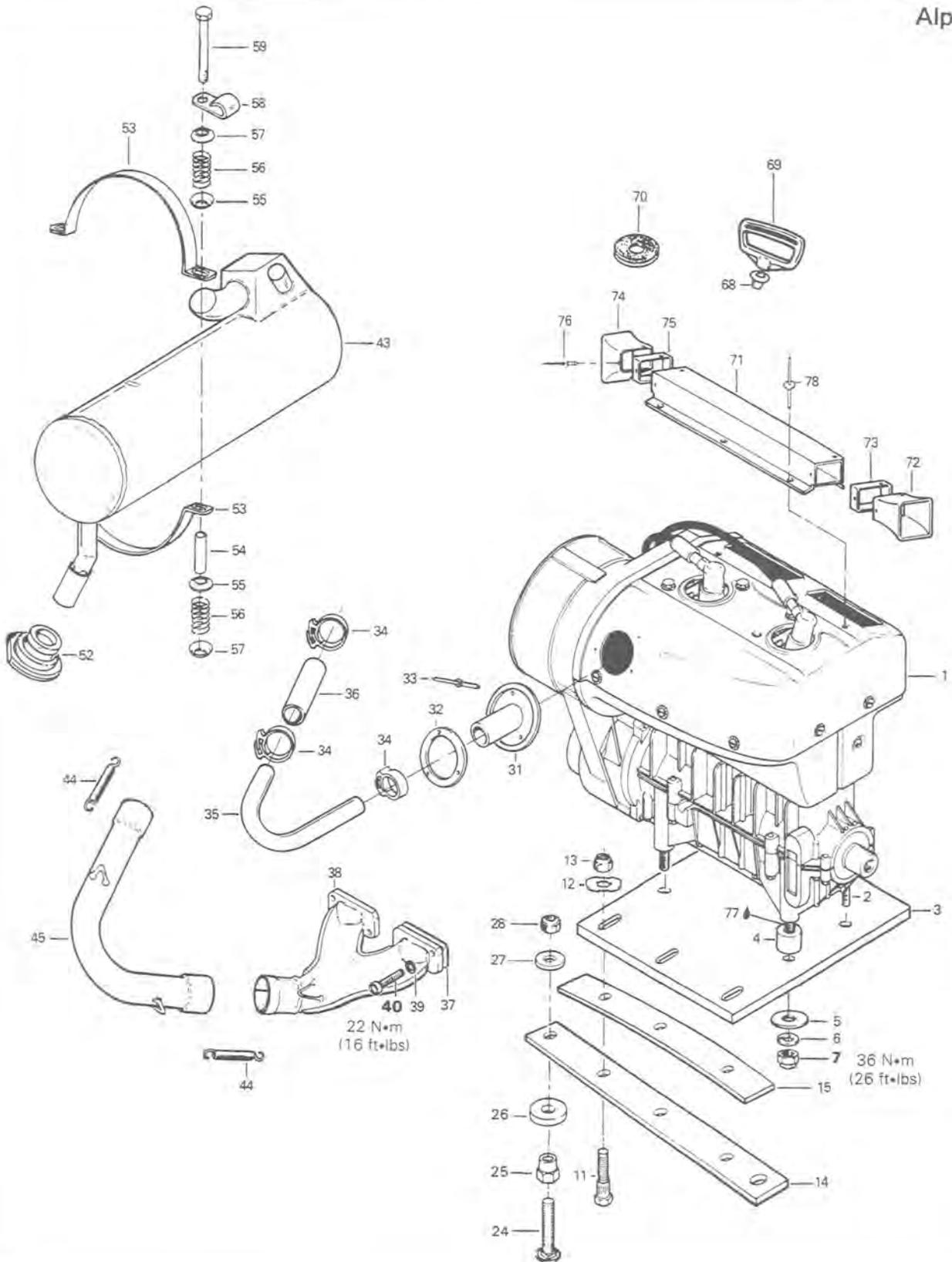
INSTALLATION ON VEHICLE

To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

- Check tightness of engine mount and cross support nuts.
- After throttle cables installation, check maximum throttle slides opening.
- Check pulley alignment and drive belt tension.

SECTION 02 ENGINE
 SUB-SECTION 06 (503 ENGINE TYPE)

Alpine



SECTION 02 ENGINE

SUB-SECTION 06 (503 ENGINE TYPE)

REMOVAL FROM VEHICLE

Remove or disconnect the following (if applicable) then lift engine out of vehicle.

Pulley guard, drive belt

Muffler

Clamp between intake manifold and carburetor

Disconnect negative cable (ground) from battery, then disconnect electrical connections leading to engine.

Remove steering shaft

Transmission rod

Speed cable on speedo

Brake cable on caliper

Throttle cable on carburetor

Console

Upper column

Engine mount nuts.

ENGINE SUPPORT AND MUFFLER DISASSEMBLY AND ASSEMBLY

7,40, Crankcase/engine bracket nuts & exhaust manifold bolts

Torque the crankcase/engine bracket nut to 36 N•m (26 ft•lbs)

Torque the exhaust manifold bolt to 22 N•m (16 ft•lbs)

INSTALLATION ON VEHICLE

To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

- Check tightness of engine mount nuts.
- After throttle cables installation, check carburetor maximum throttle slide opening.
- Check pulley alignment and drive belt tension.

SECTION 02 ENGINE

SUB-SECTION 06 (503 ENGINE TYPE)

1. Cylinder flange gasket (2)
2. Cylinder (2)
3. Cylinder head gasket (2)
4. Cylinder head (2)
5. Washer 8.4 mm (4)
6. Hexagonal nut 8 mm (4)
7. Washer 8.4 mm (4)
8. Distance nut 8 × 37 mm (4)
9. Intake manifold gasket (4)
10. Intake manifold
11. Lockwasher 8 mm (4)
12. Hexagonal bolt M8 × 40 mm (2)
13. O-ring
14. Intake manifold cover

15. Hexagonal bolt M8 × 64 mm (2)
16. Lockwasher 6 mm (2)
17. Hexagonal bolt M6 × 30 mm (2)
18. Noise damper
19. Noise damper (short) (4)
20. Noise damper (long) (4)
21. Piston (2)
22. Rectangular ring (2)
23. Semi-trapez ring (2)
24. Needle bearing (2)
25. Gudgeon pin (2)
26. Circlip (4)
27. Intake manifold (2)
28. Allen screw M8 × 40 mm (4)

CLEANING

Discard all gaskets.

Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port, cylinder head and piston dome using a wooden spatula.

 **NOTE:** The letters "AUS" (over an arrow on the piston dome) must be visible after cleaning.

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

DISASSEMBLY

21,25,26, Piston gudgeon pin & circlips.

Place a clean cloth over crankcase to prevent circlips from falling into crankcase. Then with a pointed tool inserted in piston notch, remove circlip from piston.

Drive the gudgeon pin out of piston using a suitable drive punch and hammer.

 **CAUTION:** When tapping out gudgeon pins, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

INSPECTION

The inspection of the engine top end must include the following measurements:

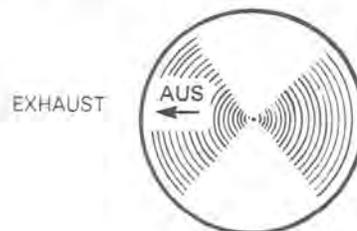
MEASUREMENTS	TOLERANCES		WEAR LIMIT
	FITTING NEW PARTS (MIN.)	(MAX.)	
Cylinder taper	N.A.	N.A.	.08 mm (.0031")
Cylinder out of round	N.A.	N.A.	.05 mm (.0020")
Cylinder/piston clearance	.07 mm (.0028")	.09 mm (.0035")	.20 mm (.0079")
Ring/piston groove clearance	.04 mm (.0016")	.11 mm (.0043")	.20 mm (.0079")
Ring end gap	.20 mm (.0079")	.35 mm (.0138")	1.0 mm (.0394")

 **NOTE:** For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

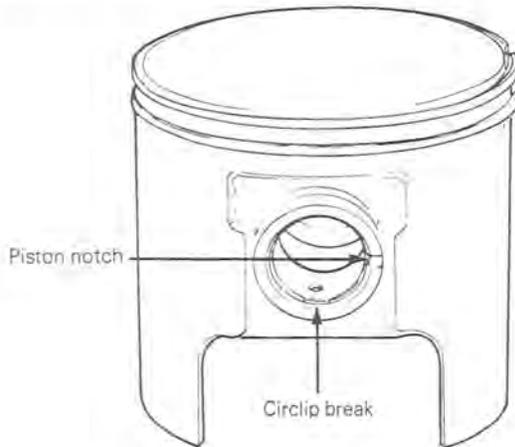
21,26, Pistons & circlips

At assembly, place the pistons over the connecting rods with the letters "AUS" (over an arrow on the piston dome) facing in the direction of the exhaust port.



○ NOTE: Spare parts pistons and cylinders are identified with a green or red dot, it is important to match the piston with the cylinder of the same color. To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated.

Remove any burrs from piston caused through circlip installation using very fine emery cloth.

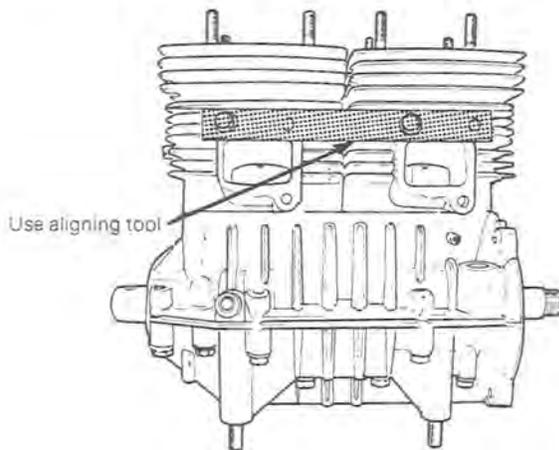


2,21, Cylinders & pistons

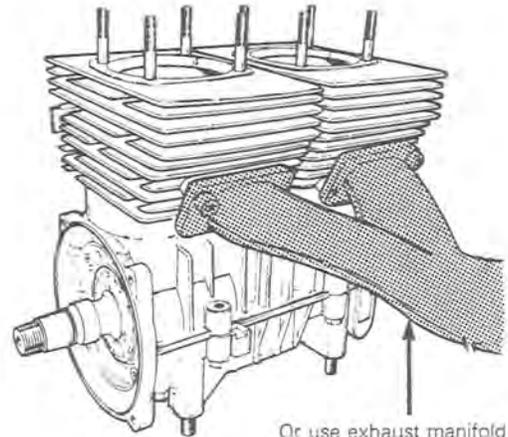
Before inserting piston in cylinder, lubricate the cylinder with new injection oil or equivalent.

2,4, Cylinders & cylinder heads

At cylinder and/or cylinder head installation, use P/N 420 876 171 aligning tool (or exhaust manifold) to ensure sealing of intake manifold and exhaust (See Tools Section), before tightening cylinder head nuts.

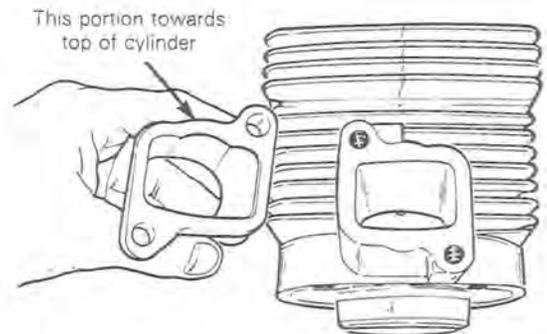


P/N 420 876 171



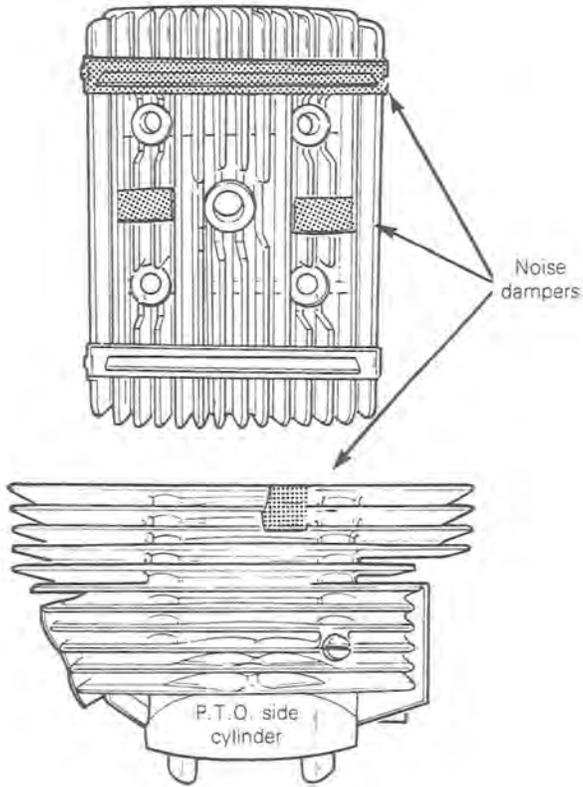
27, Intake manifolds (Blizzard 5500 MX)

Install intake manifold as per the following illustration (Blizzard 5500 MX model).



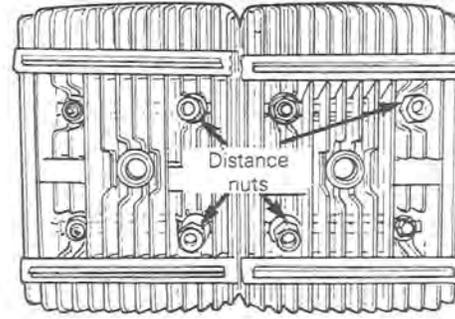
18,19,20, Noise dampers

For proper position of noise dampers, refer to the following illustrations.



6,8, Nuts & distance nuts

Position nuts and distance nuts as illustrated.



Cross torque cylinder head nuts to 22 N•m (16 ft•lbs); torque each cylinder head individually.

Install armature plate, fan housing and then air deflector.

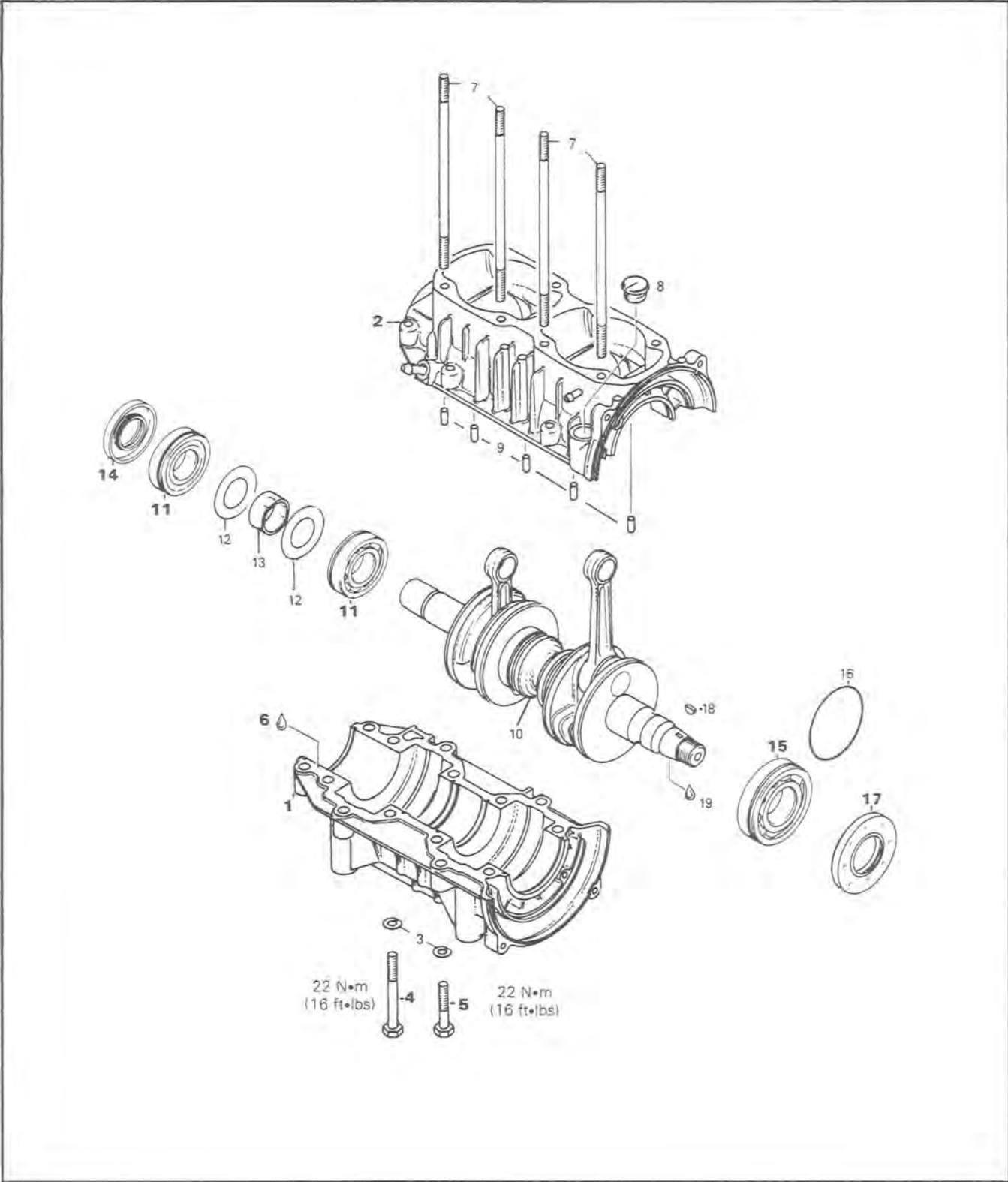
9, Intake manifold gaskets

Install a gasket on each side of the air deflector.

12,15,28, intake manifold bolts

Torque intake manifold bolts to 22 N•m (16 ft•lbs).

BOTTOM END



SECTION 02 ENGINE

SUB-SECTION 06 (503 ENGINE TYPE)

1. Crankcase lower half
2. Crankcase upper half
3. Lockwasher 8 mm (14)
4. Screw M8 x 70 (6)
5. Screw M8 x 45 (8)
6. Loctite 515
7. Stud M8 x 173 (8)
8. Cable grommet
9. Rubber plug (5)
10. Crankshaft

11. Ball bearing 6206 (2)
12. Shim 1 mm (2)
13. Spacer
14. Seal P.T.O. side
15. Ball bearing 6207
16. O'ring
17. Seal mag side
18. Woodruff key
19. Loctite 242

CLEANING

Discard all seals, gaskets and "O" rings

Clean all metal components in a non-ferrous metal cleaner.

Remove old sealant from crankcase mating surfaces with Bombardier sealant stripper.

CAUTION: Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

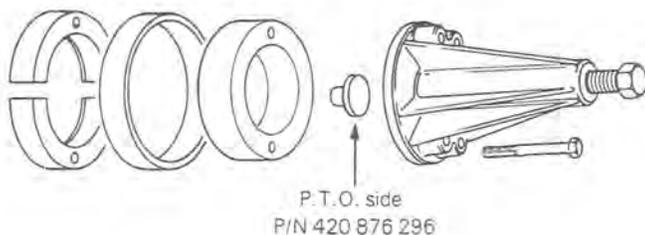
General

To remove drive pulley, refer to "Drive Pulley", section 03, sub-section 03.

To remove magneto, refer to "Magneto" in this section.

11,15, P.T.O. side bearings & mag. side bearing

To remove ball bearings from crankshaft, use a special puller (see Tools).



INSPECTION

The inspection of the engine bottom end must include the following measurements:

MEASUREMENTS	TOLERANCES		WEAR LIMIT
	FITTING NEW PARTS (MIN.)	(MAX.)	
Crankshaft deflection	N.A.	N.A.	.08 mm (.0031)
Connecting rod big end axial play	.20 mm (.0079")	.53 mm (.0208")	1.0 mm (.0394")

NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

11,15, P.T.O. side bearings & mag. side bearing

Prior to installation, place bearings into an oil container heated to 100°C (212°F).

This will expand bearings and ease installation. Install bearings with groove as per exploded view.

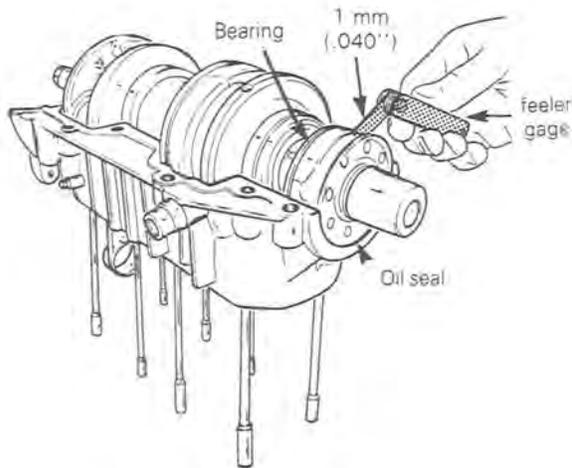
Bearings are pressed on crankshaft until they rest against radius. These radius maintain the gap needed for bearings lubrication.

14,17, Oil seals

At seal assembly, apply a light coat of lithium grease on seal lip.

For bearing lubrication purpose, a gap of 1.0 mm (.040") must be maintained between seals and bearings.

When installing plain seals (seal without locating ring or without spacing legs), ensure to maintain the specified gap as illustrated.



1,2, Lower and upper crankcase

Crankcase halves are factory matched and therefore, are not interchangeable as single halves.

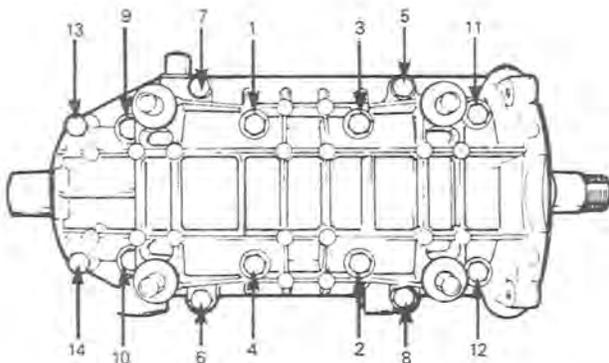
6, Loctite 515

Prior to joining of crankcase halves spray some new injection oil (or equivalent) on all moving parts of the crankshaft. Then apply "Loctite 515" (413 7027) on crankcases mating surfaces.

Position the crankcase halves together and tighten bolts by hand then install armature plate (tighten) on magneto side to correctly align the crankcase halves.

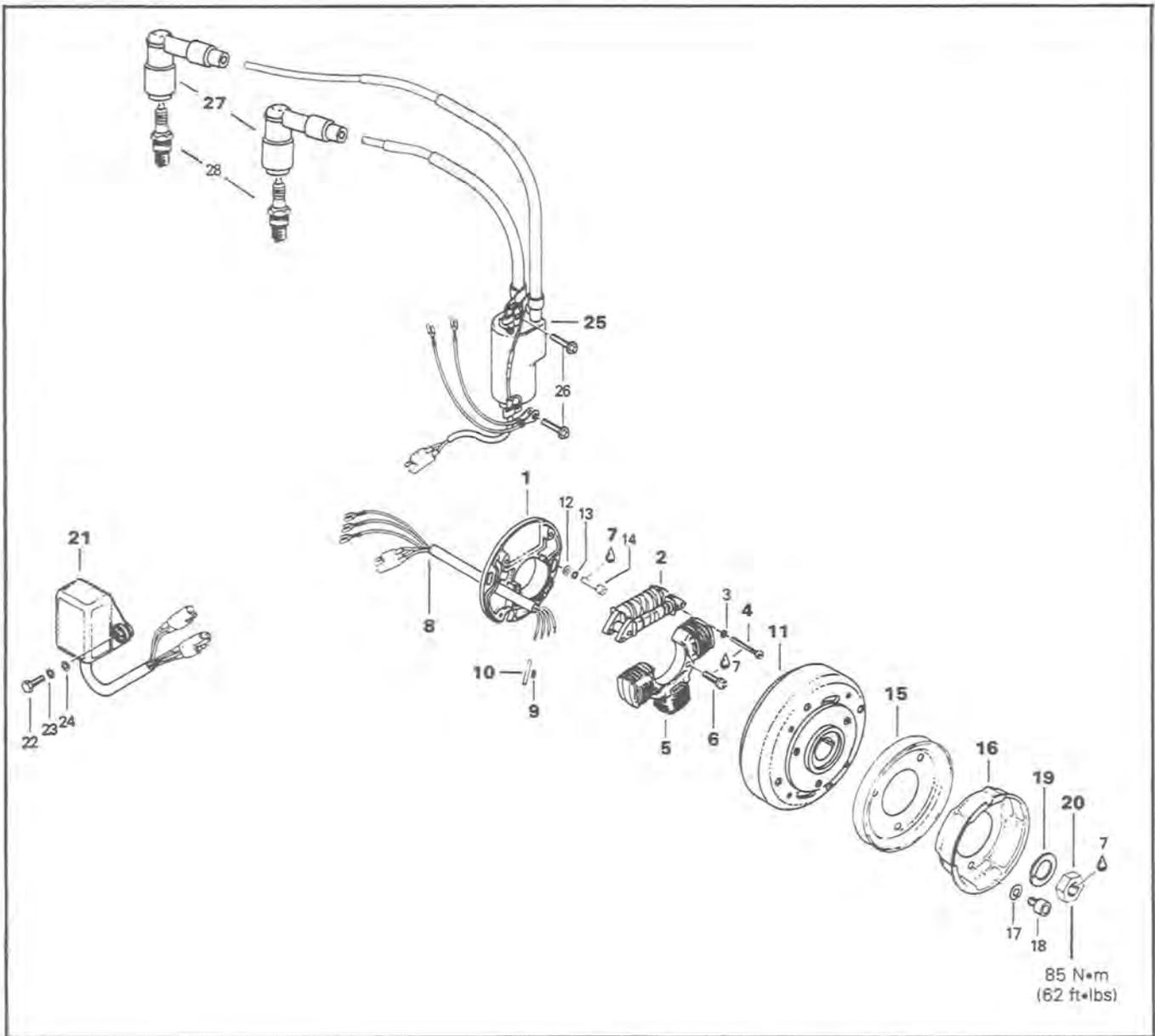
4,5, Crankcases bolts

Torque bolts to 22 N•m (16 ft•lbs) following illustrated sequence.



To install magneto, refer to "Magneto" in this section.

MAGNETO



- 1. Armature plate
- 2. Generating coil
- 3. Lockwasher 5 mm (2)
- 4. Cylindrical slotted head screw M5 × 35 (2)
- 5. Lighting coil
- 6. Screw M6 × 25 (2)
- 7. Loctite 242 (blue, medium strength)
- 8. Harness
- 9. Splice connector (6)
- 10. Protector tube
- 11. Flywheel
- 12. Washer 5.5 mm (2)
- 13. Lockwasher 5 mm (2)
- 14. Allen screw M5 × 18 (2)

- 15. V-belt pulley
- 16. Starting pulley
- 17. Lockwasher 8 mm (3)
- 18. Allen screw M8 × 12 (3)
- 19. Lockwasher 22 mm
- 20. Hexagonal nut 22mm x 2.0
- 21. C.D. box
- 22. Hexagonal screw M6 × 2.0 mm (2)
- 23. Lockwasher 6 mm (2)
- 24. Washer 6.4 mm (2)
- 25. Ignition coil
- 26. Hexagonal head tapite screw M5 × 25 (2)
- 27. Spark plug protector (2)
- 28. Spark plug NGK BR-7ES (2)

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

▼ **CAUTION:** Clean armature and magneto using only a clean cloth.

DISASSEMBLY

15,16, V-belt pulley and starting pulley

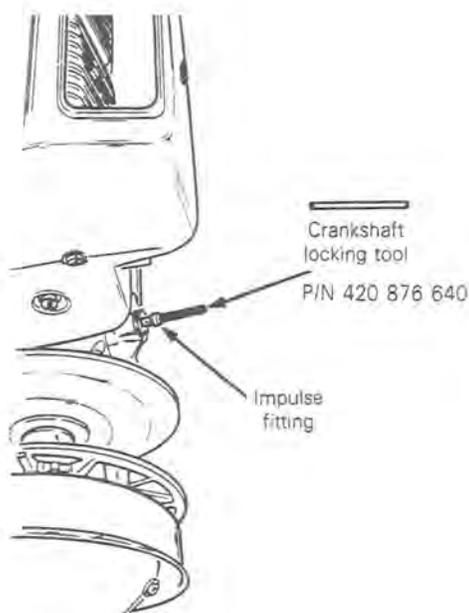
To gain access to magneto assembly, remove:
rewind starter;
starting and V-belt pulleys

○ **NOTE:** Before disassembling magneto plate, indexing marks should be located to facilitate re-assembly.

20, Flywheel retaining nut

To remove magneto flywheel retaining nut:

- lock crankshaft with crankshaft locking tool (P/N 420 876 640) as illustrated (magneto side piston must be at top dead center);
- remove magneto retaining nut.

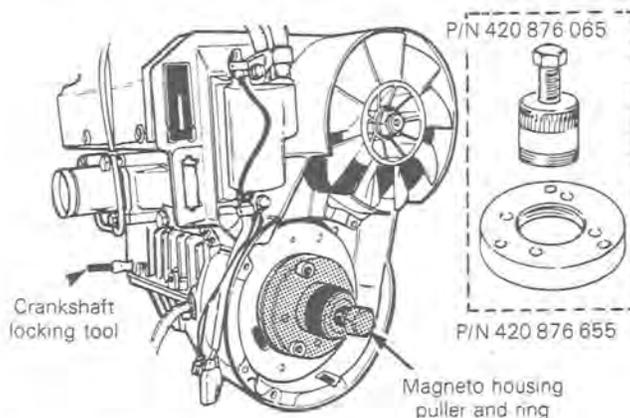


○ **NOTE:** It should be noted that to correctly remove a "Loctite" locked fastener it is first necessary to tap on the fastener to break "Loctite" bond. This will eliminate the possibility of thread breakage.

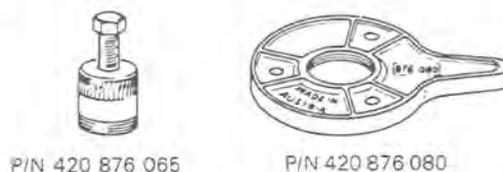
11, Magneto housing flywheel

To remove magneto housing (flywheel):

- lock crankshaft with crankshaft locking tool (service tool) and adjust magneto housing puller and puller ring (service tool) as illustrated;



○ **NOTE:** For the above procedure, the locking type puller can be used without crankshaft locking tool.



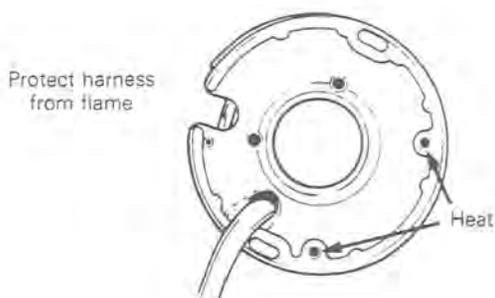
- tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper.

REPAIR

2, Generating coil

To replace generating coil:

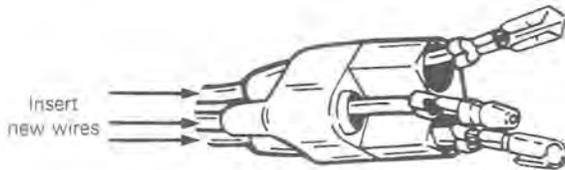
- Heat the armature plate around the screw holes to break the Loctite bond (200°F).



SECTION 02 ENGINE
SUB-SECTION 06 (503 ENGINE TYPE)

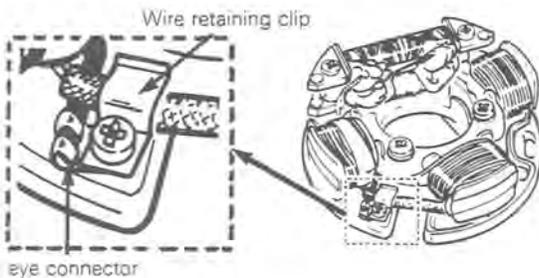
CAUTION: Protect harness from flame.

- Remove screws (use Phillips no. 2 or suitable flat screw driver)
- Cut the four wires as close as possible to the coil body
- To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube
- Insert the new wires into the old connector housing and install connectors



CAUTION: Replace the old wires in the connector with the same color coded new wires.

- Install a new receptacle connector to the black/-yellow striped wire
- To install the ground connector of the armature plate, tape the new black lead to the old one and pull it under the lighting coil with the old wire
- Solder an eye connector to the lead and fasten it under the wire retaining clip.



4,7, Generating coil screws & "Loctite 242"

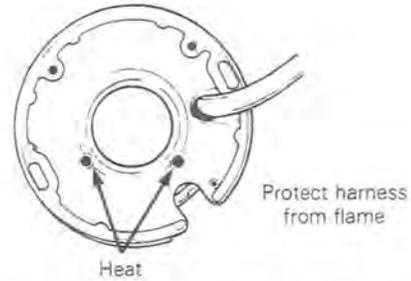
- To install the new coil on the armature plate, remove the shipping nuts from the coil and apply Loctite 242 (blue, medium strength) to screws before assembly

CAUTION: Before reinstalling the magneto, remove the loose epoxy from harness.

5, Lighting coil

To replace lighting coil:

- Heat the armature plate around the screw holes to break the Loctite bond (200°F)

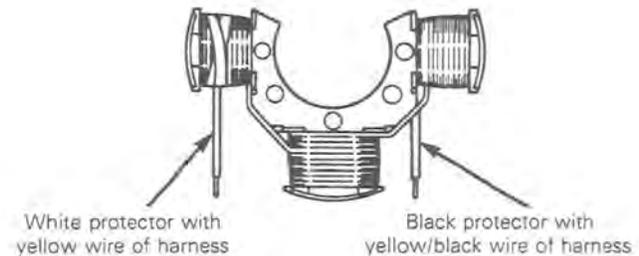


CAUTION: Protect harness from flame.

- Remove screws (use Phillips no. 3 screwdriver)
- Remove the wire retaining clip from armature plate

9,10, Splice connectors and protector tube

- Pull out protector tubes and unsolder the splice connectors
- Solder the yellow wire in the harness to the white tube protected wire of the coil
- Solder the yellow/black striped wire in the harness to the black tube protected wire of the coil



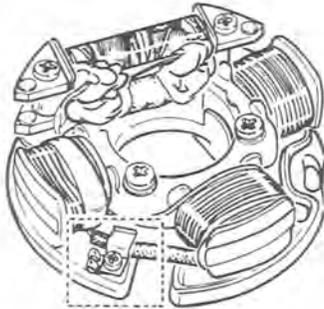
Position protector tubes over connections

6,7, Lighting coil screws & "Loctite 242"

Prior to assembly, apply "Loctite 242" (blue, medium strength) on lighting coil screws.

- Fasten retaining clip onto protector tubes

The ground terminal from generating coil must be fastened under this clip.



▼ **CAUTION:** Before reinstalling magneto, remove the loose epoxy from harness.

ASSEMBLY

1, Armature plate

Position armature plate on crankcase, aligning marks on both parts.

7, "Loctite 242"

Clean crankshaft extension taper.

Apply "Loctite 242" (blue medium strength) on taper.

11,19, Flywheel, lockwasher 22 mm, woodruff key

Position woodruff key, magneto flywheel and lockwasher on crankshaft.

7,20, "Loctite 242" & nut

Clean nut threads and apply "Loctite 242" (blue, medium strength) before tightening nut to 85 N•m (63 ft•lbs).

8,21,25,27, Harness, C.D. Box, Ignition coil & spark plug protectors

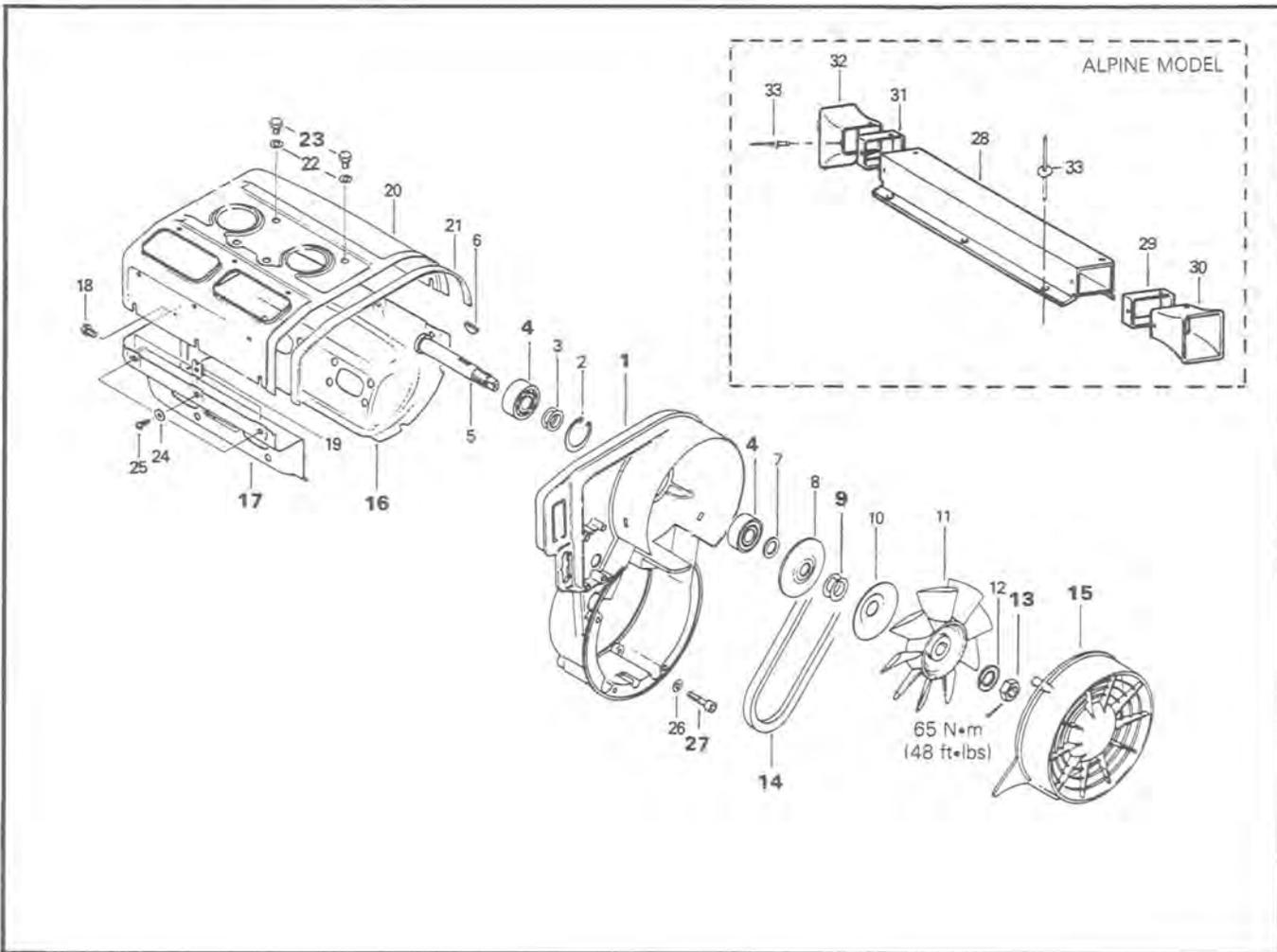
At reassembly coat all electric connections with silicone dielectric grease to prevent corrosion or moisture penetration.

▼ **CAUTION:** Do not use silicone "sealant", this product will corrode contacts.

○ **NOTE:** For ignition timing procedure refer to "ignition timing" section 04 sub-section 02.

SECTION 02 ENGINE
SUB-SECTION 06 (503 ENGINE TYPE)

COOLING SYSTEM



1. Fan housing
2. Locking ring
3. Shim 1.0 mm (2)
4. Ball bearing (2)
5. Fan shaft
6. Woodruff key 3 x 5
7. Distance sleeve
8. Pulley half
9. Shim 0.5 mm
10. Pulley half
11. Fan
12. Lockwasher 16
13. Hexagonal nut 16 x 1.5
14. V-Belt
15. Fan cover
16. Cylinder cowl, lower half, exhaust side
17. Cylinder cowl, lower half, carburetor side

18. Taptite screw M6 x 12
19. Spring nut V4,8 (8)
20. Cylinder cowl, upper half
21. Sealing strip 440 mm
22. Lockwasher 8 (4)
23. Hexagonal screw M8 x 16 (4)
24. Washer 4 x 15,8 (8)
25. Screw B4,8 x 16 (8)
26. Lockwasher 6 (4)
27. Cylindrical screw M6 x 30 (4)
28. Air duct
29. R.H. retainer clamp
30. R.H. outlet duct
31. L.H. retainer clamp
32. L.H. outlet duct
33. Rivet

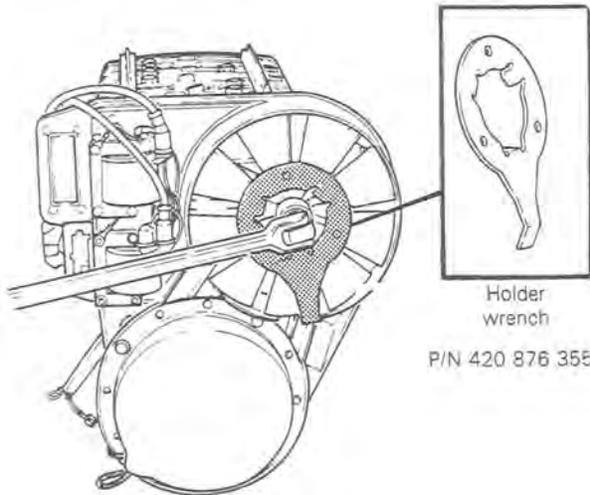
CLEANING

Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY AND ASSEMBLY

13, Fan retaining nut

To remove or install fan pulley retaining nut, lock fan pulley with special holder wrench. (Use tool P/N 420 876 355). At assembly, torque not to 65 N•m (48 ft•lbs).



9,14, Shim & V-belt

Fan belt free-play must be 6 mm (1/4"). To adjust, install or remove shim(s) between pulley halves. Install excess shim(s) between fan and lockwasher.

1,4, Fan housing & bearings

It is first necessary to heat bearing housing to 65°C (150°F) to remove or install bearing.

23,27, Upper fan cowl screws & fan housing screws

At assembly, apply a light coat of "Loctite 242" on threads. It should be noted that to correctly remove a Loctite locked screw, it is first necessary to slightly tap on head screw to break Loctite bond. The screw can then be removed. This will eliminate the possibility of screw breakage.

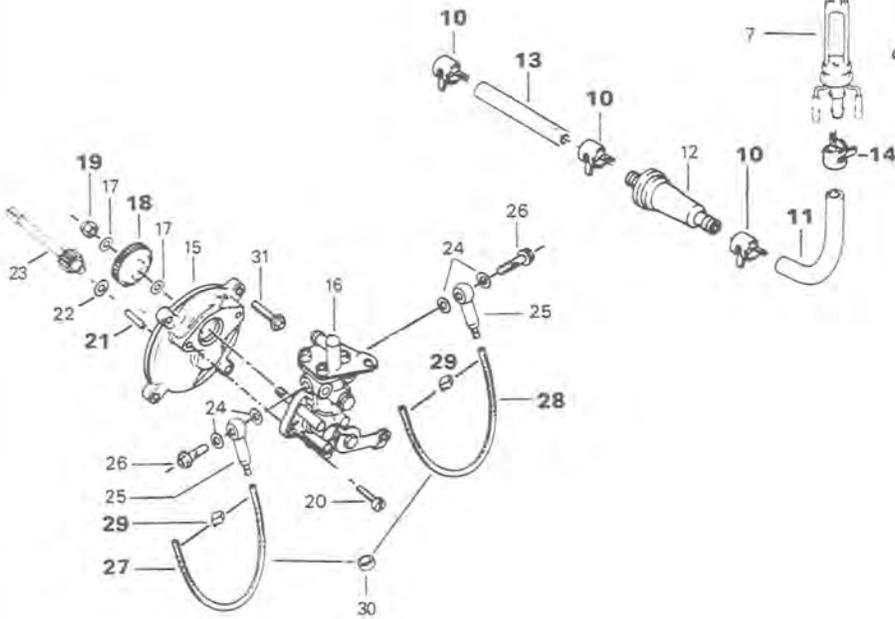
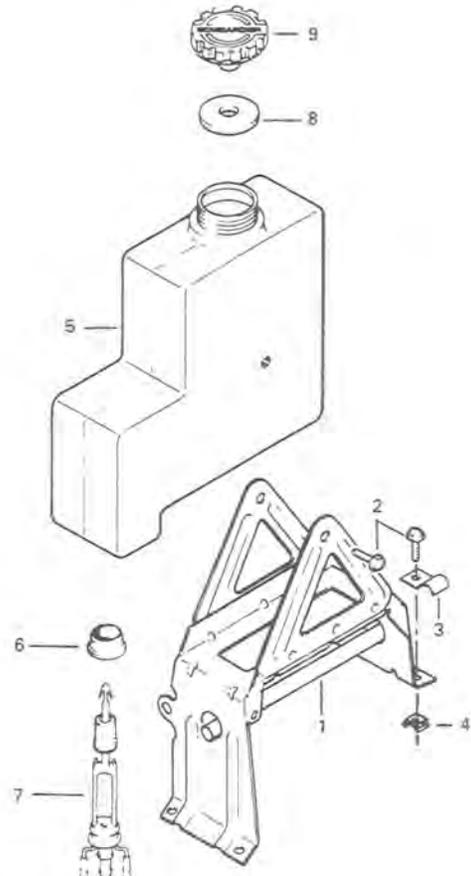
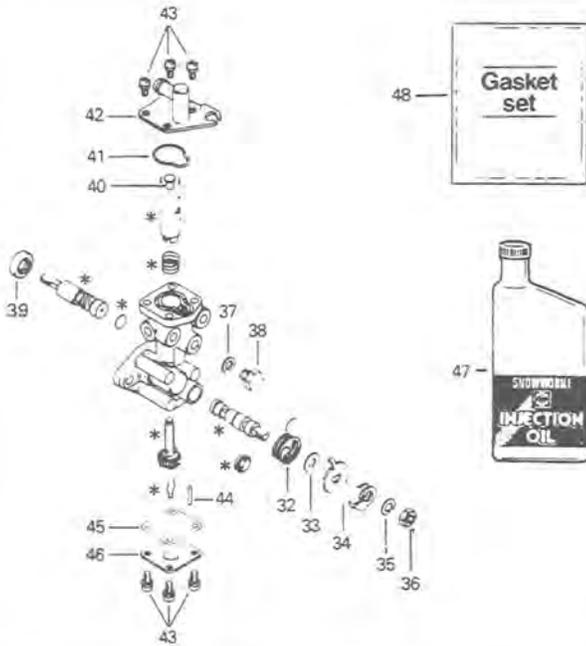
16,17, Cylinder cowls

A gasket must be placed on both sides (inner and outer) of intake and exhaust holes of cylinder cowl.

WARNING: If fan protector is removed, always reinstall after servicing.

OIL INJECTION PUMP AND RESERVOIR

Oil injection pump



1. Support
2. Hex. washer head powerlock screw 1/4"-20 x 1/2" (6)
3. Clip
4. Clip nut (4)
5. Injection oil tank
6. Grommet
7. Oil lever switch
8. Gasket
9. Oil tank cap
10. Spring clip (3)
11. Oil line 102 mm
12. Filter
13. Oil line 102 mm
14. Spring clip
15. Oil pump mounting flange
16. Oil pump
17. Washer 6,2 mm (2)
18. Oil pump gear 27 teeth
19. Lock nut 6 mm
20. Taptite screw M5 x 16 (2)
21. Needle roll B4 x 17,8
22. Washer 4,3 mm
23. Gear 9 teeth
24. Oil banjo gasket (4)

25. Banjo (2)
26. Banjo bolt (2)
27. Oil line 230 mm
28. Oil line 360 mm
29. Clamp (4)
30. Rubber ring (2)
31. Taptite screw M5 x 16 (4)
32. Spring
33. Washer
34. Lever
35. Lockwasher 6 mm
36. Hex. nut 6 mm
37. Washer
38. Hex. head screw M6 x 7
39. Seal
40. Retainer
41. O-Ring
42. Plate
43. Screw with lockwasher (8)
44. Stop pin
45. Gasket
46. Cam casing plate
47. Oil injection
48. Gasket set

Parts in illustration marked with * are not available as spare parts.

CLEANING

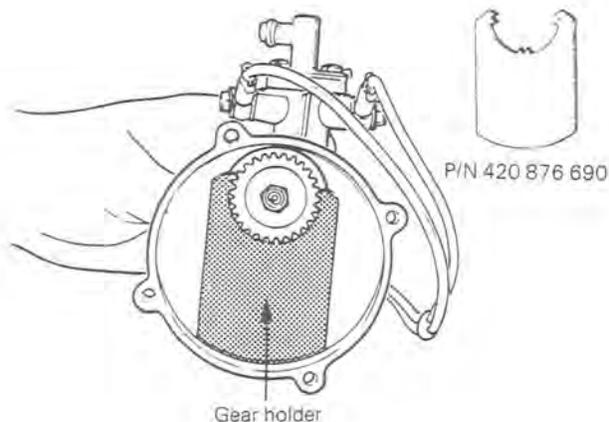
Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY

NOTE: Some oil pump components are not available as single parts.

18,19,21, Oil pump gear, lock nut & needle roll

To remove retaining nut, first extract needle roll with pliers and lock gear in place using gear holder (P/N 420 876 690).



ASSEMBLY

18, Oil pump gear

At gear assembly, apply a light coat of grease on gear teeth.

21, Needle roll

The needle roll must be engage as deep as possible in the pump mounting flange.

10,14,29, Spring clips & clamps

Always check for spring clips and clamp tightness.

11,13,27,28, Oil lines

CAUTION: On electric start models, it is recommended to install black rubber oil lines (P/N 414 2867 00) that will not be altered by battery fumes.

ADJUSTMENT

CAUTION: The carburetors must be adjusted before adjusting the oil injection pump. Make sure the idle speed is 1800-2000 R.P.M.

To synchronize pump with carburetor:

Eliminate the throttle cable free-play by pressing the throttle lever until a light resistance is felt, then hold in

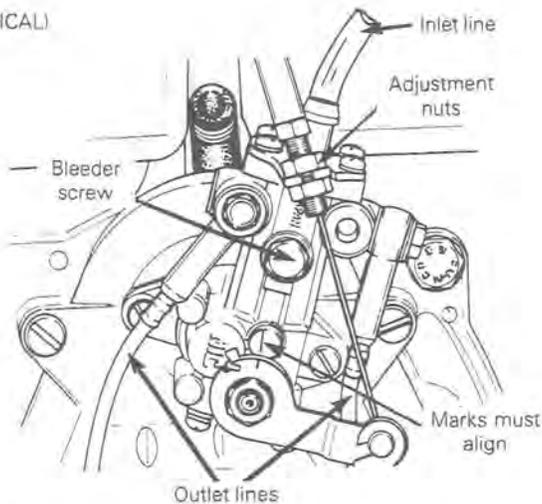
SECTION 02 ENGINE

SUB-SECTION 06 (503 ENGINE TYPE)

place. The aligning marks on the pump casting and on the lever must align. If not, loosen the adjuster nut and adjust accordingly.

Tighten the adjuster nut.

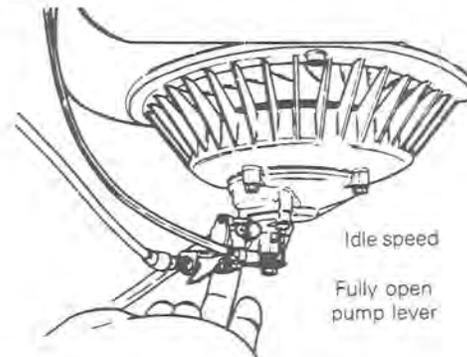
(TYPICAL)



Make sure the tank is sufficiently filled.

Check the small oil lines (between pump and intake manifold). If required, fill the lines by running the engine at idle speed while holding the pump lever in fully open position.

(TYPICAL)



◆ **WARNING:** Ensure not to operate carburetor throttle mechanism. Secure the rear of the vehicle on a stand.

◆ **WARNING:** Perform this operation in a well ventilated area.

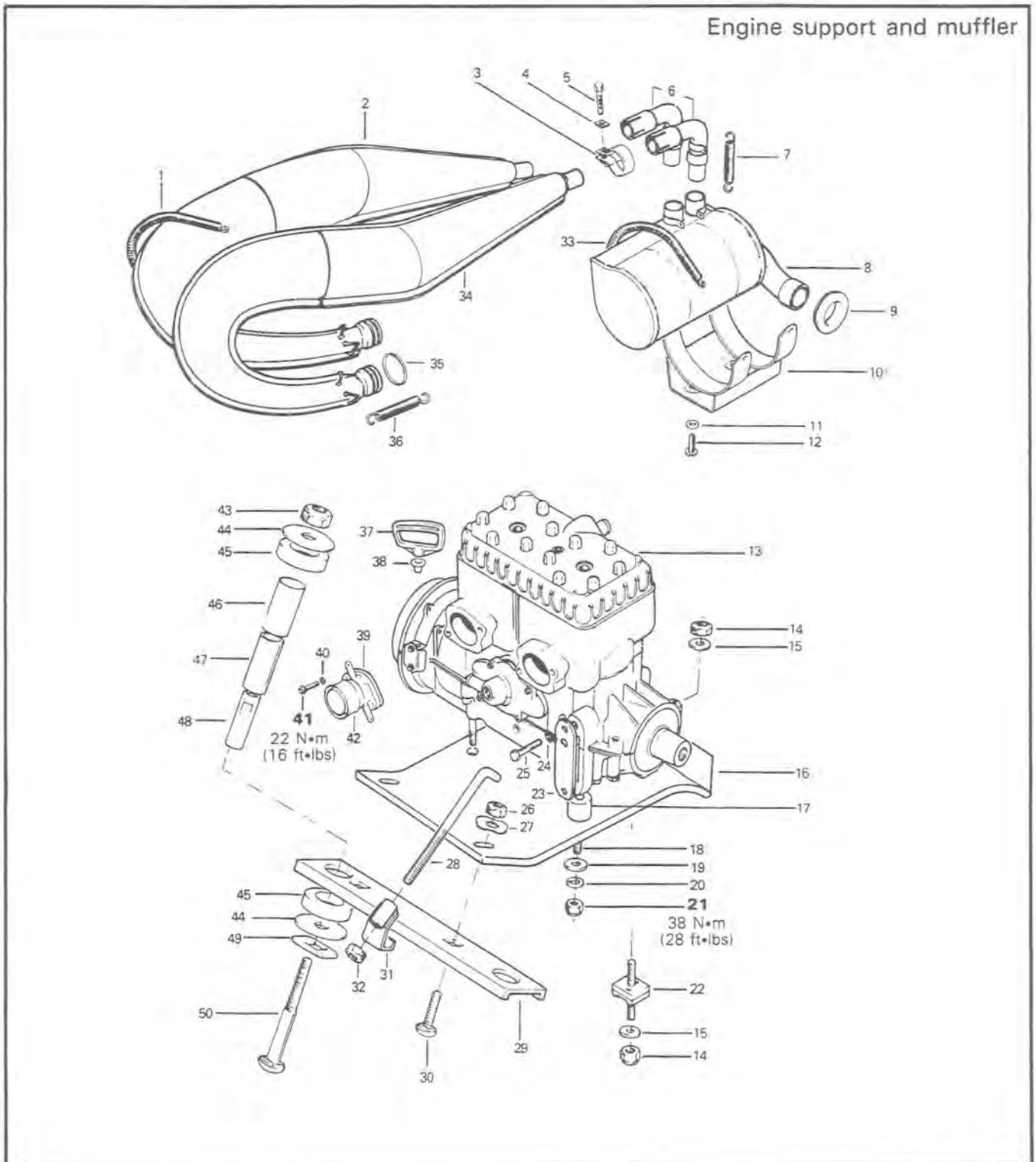
▼ **CAUTION:** Proper oil injection pump adjustment is very important. Any delay in the opening of the pump can result in serious engine damage.

To bleed oil lines:

All oil lines should be full of oil. If required, bleed the main oil line (between tank and pump) by loosening the bleeder screw until all air has escaped from the line.

534 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION



SECTION 02 ENGINE

SUB-SECTION 07 (534 ENGINE TYPE)

1. Spring (2)
2. Tune pipe mag. side
3. Clamp (2)
4. Reinforcement plate (2)
5. Hex. head cap screw M8 x 20 (2)
6. Tail pipe (2)
7. Spring (4)
8. After muffler
9. Exhaust grommet
10. Support
11. Flat washer 17/64" x 5/8" x .060" (3)
12. Truss slotted head power lock screw 1/4"-20 x 1/2" (3)
13. Rotax engine 534
14. Hex. elastic stop nut 3/8"-16 (2)
15. Washer (2)
16. Engine bracket
17. Distance sleeve (4)
18. Stud M10 x 42 (4)
19. Flat washer 10,5 x 21 x 2 mm (4)
20. Lockwasher 10 mm (4)
21. Hex. nut 10 mm (4)
22. Rubber mount
23. Retainer plate
24. Lockwasher 8 mm (2)
25. Hex. head cap screw M8 x 1.25 x 20 (2)
26. Hex. elastic stop nut 3/8 x 16 (2)
27. Internal tooth dished washer (2)
28. Brace
29. Cross support
30. Carriage bolt 3/8"-16 x 1 1/4" (2)
31. Hook
32. Hex. nut 3/8 - 16
33. Spring (2)
34. Tuned pipe P.T.O. side
35. Sealing ring (4)
36. Spring (4)
37. Starter grip
38. Rubber buffer
39. Gasket (2)
40. Lockwasher 8 mm (4)
41. Allen screw M8 x 30 (4)
42. Exhaust socket (2)
43. Hex. elastic stop nut 7/16"-14 (2)
44. Washer (4)
45. Damper (4)
46. Sleeve (2)
47. Rubber sleeve (2)
48. Threaded bushing (2)
49. Retainer plate (2)
50. Carriage bolt 7/16"-14 x 2 3/4" (2)

REMOVAL FROM VEHICLE

Disconnect or remove the following from vehicle:

- Pulley guard and drive belt
- Clamp between carburetor and intake manifold
- Pulsation lines
- Muffler
- Electric wires
- Drain the cooling system and disconnect hoses at engine
- Rotary valve oil reservoir
- Disconnect rewind starter at engine

ENGINE SUPPORT AND MUFFLER ASSEMBLY

21,41, Crankcase/engine support nuts & exhaust socket Allen screws

Torque the crankcase to engine nuts to 38 N•m (28 ft•lbs).

Torque the exhaust socket Allen screws to 22 N•m (16 ft•lbs).

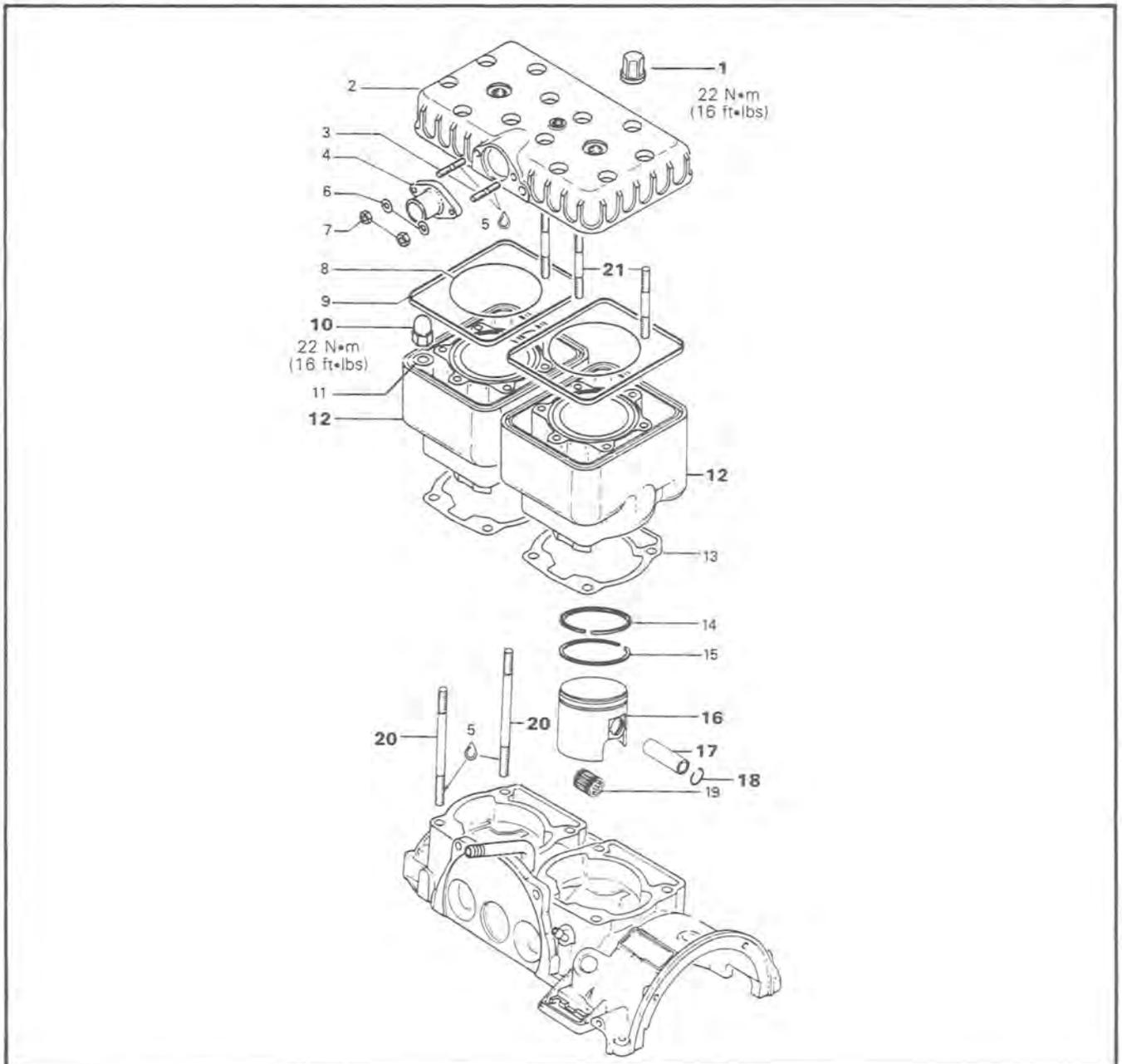
INSTALLATION ON VEHICLE

To install engine on vehicle, reverse removal procedure. However, pay attention to the following.

Check tightness of engine mount nuts.

Check pulley alignment and drive belt tension.

TOP END



- 1. Cap nut M8 (12)
- 2. Cylinder head
- 3. Stud M6 x 15 (2)
- 4. Coolant outlet collar
- 5. Loctite 242 blue (medium strength)
- 6. Lockwasher 6 mm (2)
- 7. Nut M6 (2)
- 8. Gasket ("O" ring) (2)
- 9. Gasket (2)
- 10. Cap nut M8 (8)
- 11. Flat washer 8,4 (8)

- 12. Cylinder (2)
- 13. Cylinder/crankcase gasket (2)
- 14. "L" ring
- 15. "Rectangular" ring
- 16. Piston
- 17. Gudgeon pin
- 18. Circlip (4)
- 19. Needle bearing
- 20. Cylinder stud M8 x 79 (8)
- 21. Stud (head) M8 x 50 (12)

SECTION 02 ENGINE

SUB-SECTION 07 (534 ENGINE TYPE)

CLEANING

Discard all gaskets.

Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port, cylinder head and piston dome using a wooden spatula.

○ **NOTE:** The letters "AUS" (over an arrow on the piston dome) must be visible after cleaning.

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

DISASSEMBLY

16,17,18, Piston, gudgeon pin & circlips

Place a clean cloth over crankcase then with a pointed tool inserted in piston notch, remove circlip from piston. Drive the gudgeon pin out of piston using a suitable drive punch and hammer.

▼ **CAUTION:** When tapping gudgeon pin in or out of piston, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

INSPECTION

The inspection of the engine top end must include the following measurements:

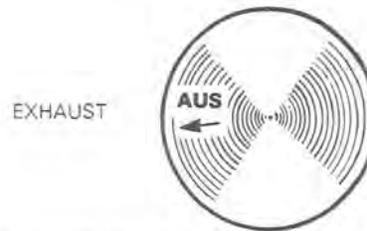
MEASUREMENTS	TOLERANCES		WEAR LIMIT
	FITTING NEW PARTS (MIN.)	(MAX.)	
Cylinder taper	N.A.	N.A.	.08 mm (.0031")
Cylinder out of round	N.A.	N.A.	.05 mm (.0020")
Cylinder/piston clearance	.10 mm (.0039")	.12 mm (.0047")	.20 mm (.0079")
Ring end gap	.20 mm (.0079")	.35 mm (.0138")	1.0 mm (.0394")

○ **NOTE:** For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

16, Piston

At assembly, place the pistons over the connecting rods with the letters AUS (over an arrow on the piston dome) facing in direction of the exhaust port.

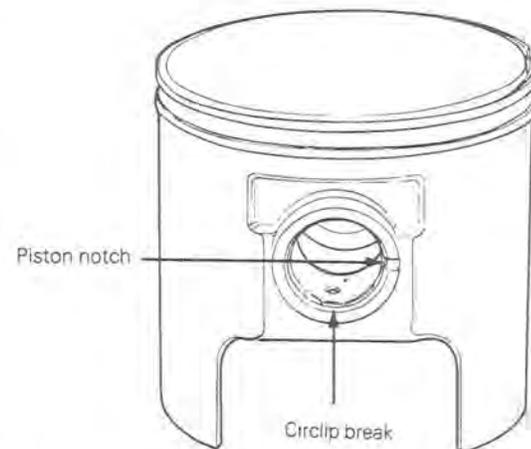


○ **NOTE:** Spare parts pistons and cylinders are identified with a green or red dot, it is important to match the piston with the cylinder of the same color.

18, Circlip

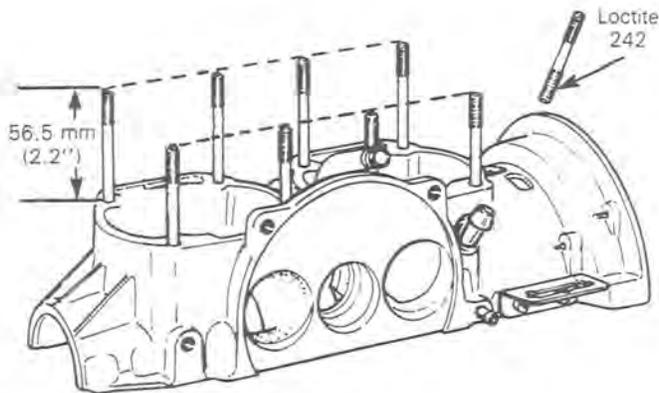
To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated.

Using very fine emery cloth, remove any burrs on piston caused through circlip installation.



20, Crankcase studs

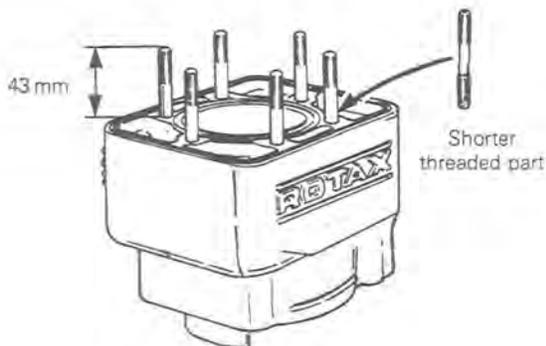
Because of cap nuts, cylinder studs have to be screwed into the crankcase so that they do not protrude by more than 56.5 mm (2.2'').



Apply "Loctite 242" blue medium strength on the threaded end of the studs going into the crankcase.

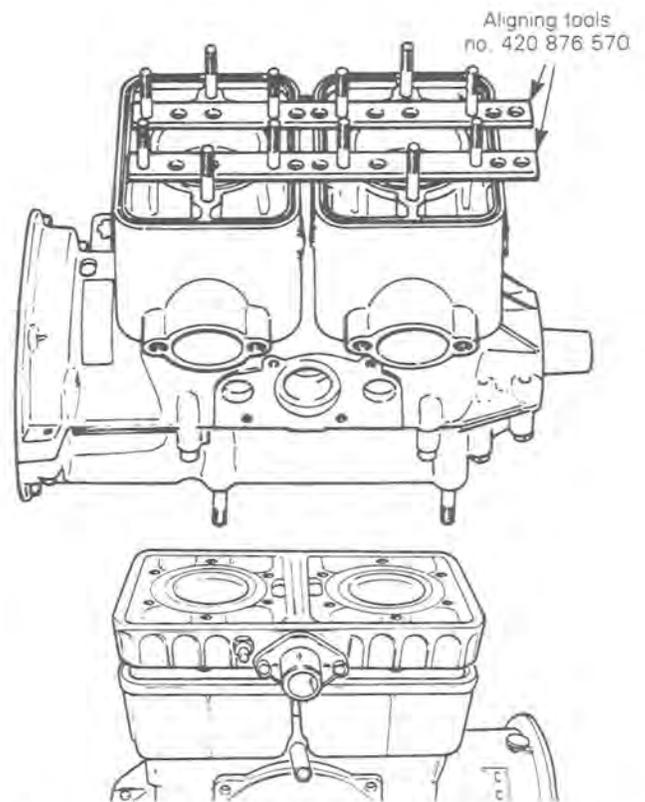
12,21, Cylinder & cylinder head stud

Because of cap nuts, cylinder head studs have to be screwed into the cylinder so that they do not protrude by more than 43 mm (1.700''). If it is not possible to obtain this length, add a washer between cylinder head and cap nut. Shorter threaded part of stud should be screwed into cylinder.



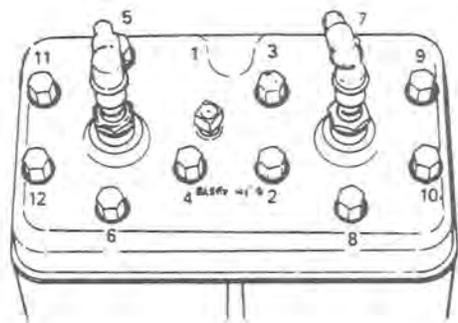
10,12, Crankcase/cylinder nuts and cylinders

When reassembling the cylinders to the crankcase, it is important to have them properly aligned so that the cylinder head holes will match up with the studs. A special tool (as per illustration) (or cylinder head itself) can be used to align the cylinders. Cross torque cylinder nuts to 22 N•m (16 ft•lbs).



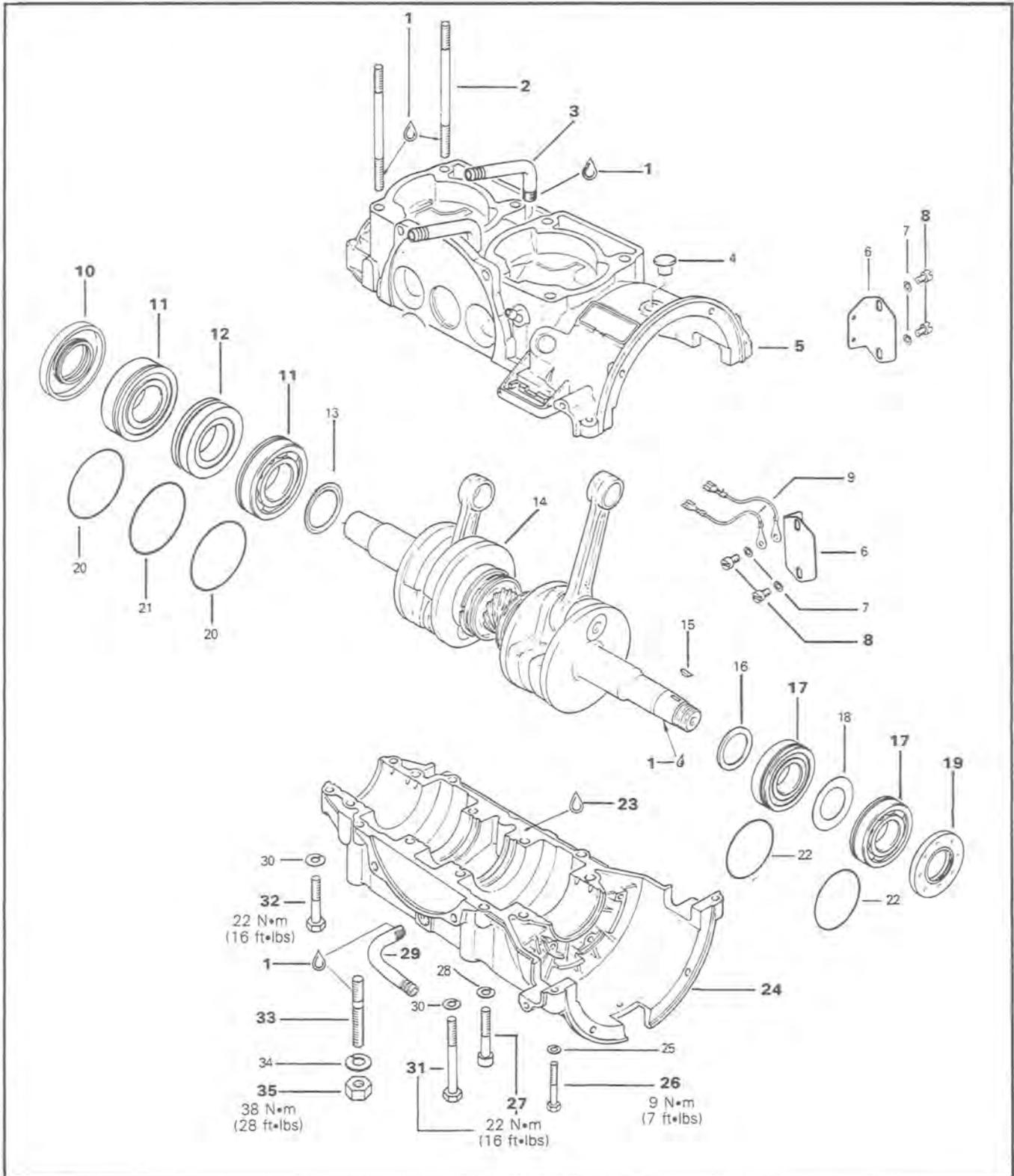
1, Cylinder head nut

Torque cylinder head nuts to 22 N•m (16 ft•lbs) following illustrated sequence.



SECTION 02 ENGINE
SUB-SECTION 07 (534 ENGINE TYPE)

BOTTOM END



1. "Loctite 242"
2. Stud M8 × 79 (8)
3. Angular tube, oil inlet
4. Plug
5. Crankcase upper half
6. Cover (2)
7. Lockwasher 6 mm (4)
8. Cyl. slotted head screw M6 × 10 (4)
9. Mass cable ass'y
10. Seal
11. Ball bearing 6207 (2)
12. Labyrinth sleeve
13. Distance ring
14. Crankshaft
15. Woodruff key 3 × 3,7
16. Distance ring
17. Ball bearing 6206 (2)
18. Shim 1 mm

19. Seal
20. "O" ring (2)
21. "O" ring
22. "O" ring (2)
23. "Loctite 515"
24. Crankcase lower half
25. Lockwasher 6 mm (2)
26. Hex. screw M6 × 35 (2)
27. Screw M8 × 40 (4)
28. Lockwasher 8 mm (4)
29. Angular tube, oil outlet
30. Lockwasher 8 mm (10)
31. Hex. screw M8 × 64 (8)
32. Hex. screw M8 × 45 (2)
33. Stud M10 × 42 (4)
34. Lockwasher 10 mm (4)
35. Hex. nut M10 (4)

CLEANING

Discard all oil seals, gaskets, "O" rings and sealing rings.

Clean all metal components in a non-ferrous metal cleaner. Remove old "Loctite" from crankcase mating surfaces with Bombardier sealant stripper or equivalent.

CAUTION: Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

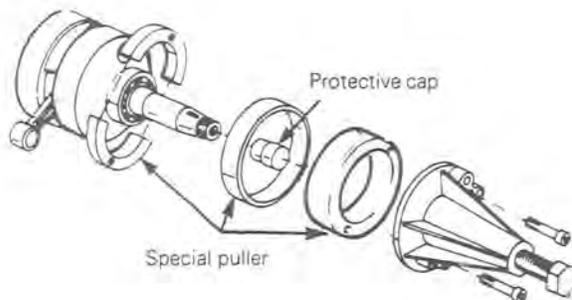
General

To remove drive pulley, refer to "Drive Pulley", section 03, sub-section 03.

To remove magneto, refer to "Magneto" in this section.

11,12,17, Crankshaft bearings

To remove bearings from crankshaft use a protective cap and special puller as illustrated.



INSPECTION

The inspection of the engine bottom end must include the following measurements:

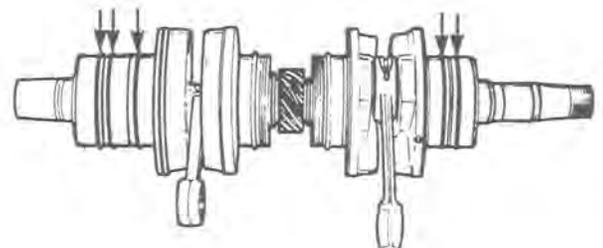
MEASUREMENTS	TOLERANCES		WEAR LIMIT
	FITTING NEW PARTS (MIN.)	(MAX.)	
Crankshaft deflection	N.A.	N.A.	.08 mm (.0032")
Connecting rod big end axial play	.40 mm (.0157")	.73 mm (.0287")	1.2mm (.0468")

NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 08.

ASSEMBLY

11,12,17, Crankshaft bearings & labyrinth sleeve

Prior to installation, place bearings into an oil container previously heated to 100°C (210°F). This will expand bearing and ease installation. Install bearings and labyrinth sleeve with groove as per the following illustration.



SECTION 02 ENGINE

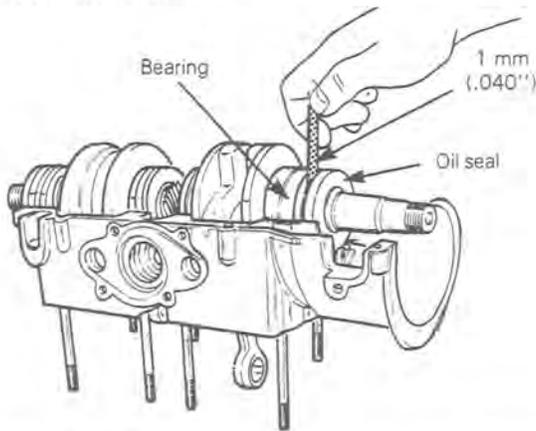
SUB-SECTION 07 (534 ENGINE TYPE)

10,19, Seals

At seal assembly, apply a light coat of lithium grease on seal lips.

For bearing lubrication purpose, a gap of 1.0 mm (.040") must be maintained between seals and bearings.

When installing plain seals (seal without locating ring or without spacing legs), ensure to maintain the specified gap as illustrated.

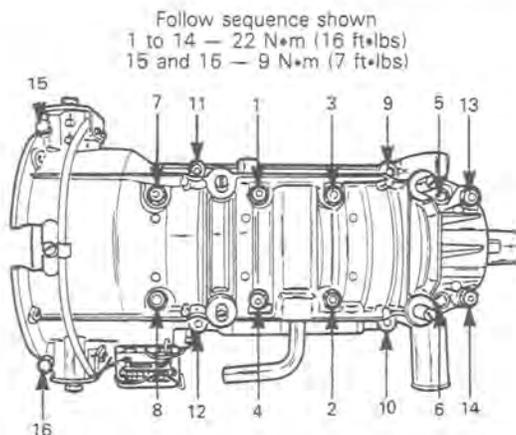


5,23,34, Upper crankcase, Loctite 515 & lower crankcase

Crankcase halves are factory matched and therefore, are not interchangeable or available as single halves. Prior to joining of crankcase halves, apply a light coat of "Loctite 515" (413 7027 00) on mating surfaces.

CAUTION: Before joining of crankcase halves be sure that crankshaft rotary valve gear is well engaged with rotary valve shaft gear.

Position the crankcase halves together and torque bolts by hand, then install armature plate (tighten) on magneto side to correctly align crankcase halves. Torque bolts as specified following illustrated sequence.



NOTE: Torque the two smaller bolts (15 and 16) on magneto side to 9 N•m (7 ft•lbs).

1,3,8,29, "Loctite 242", angular tubes (oil inlet & oil outlet) & cover screws

Apply "Loctite 242" on threads prior to assembly angular tubes and cover screws.

27,31,32, Crankcase M8 screws

Torque the crankcase M8 screws to 22 N•m (16 ft•lbs).

26, Crankcase M6 screws

Torque the crankcase M6 screws to 9 N•m (7 ft•lbs).

1,33, "Loctite 242" & crankcase stud

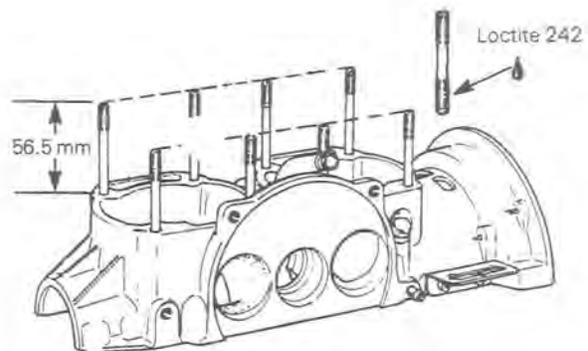
At assembly on crankcase, apply "Loctite 242" on stud threads.

35, Crankcase/engine bracket nut

Torque the crankcase/engine bracket nut to 38 N•m (28 ft•lbs).

1,2, "Loctite 242" & upper crankcase studs

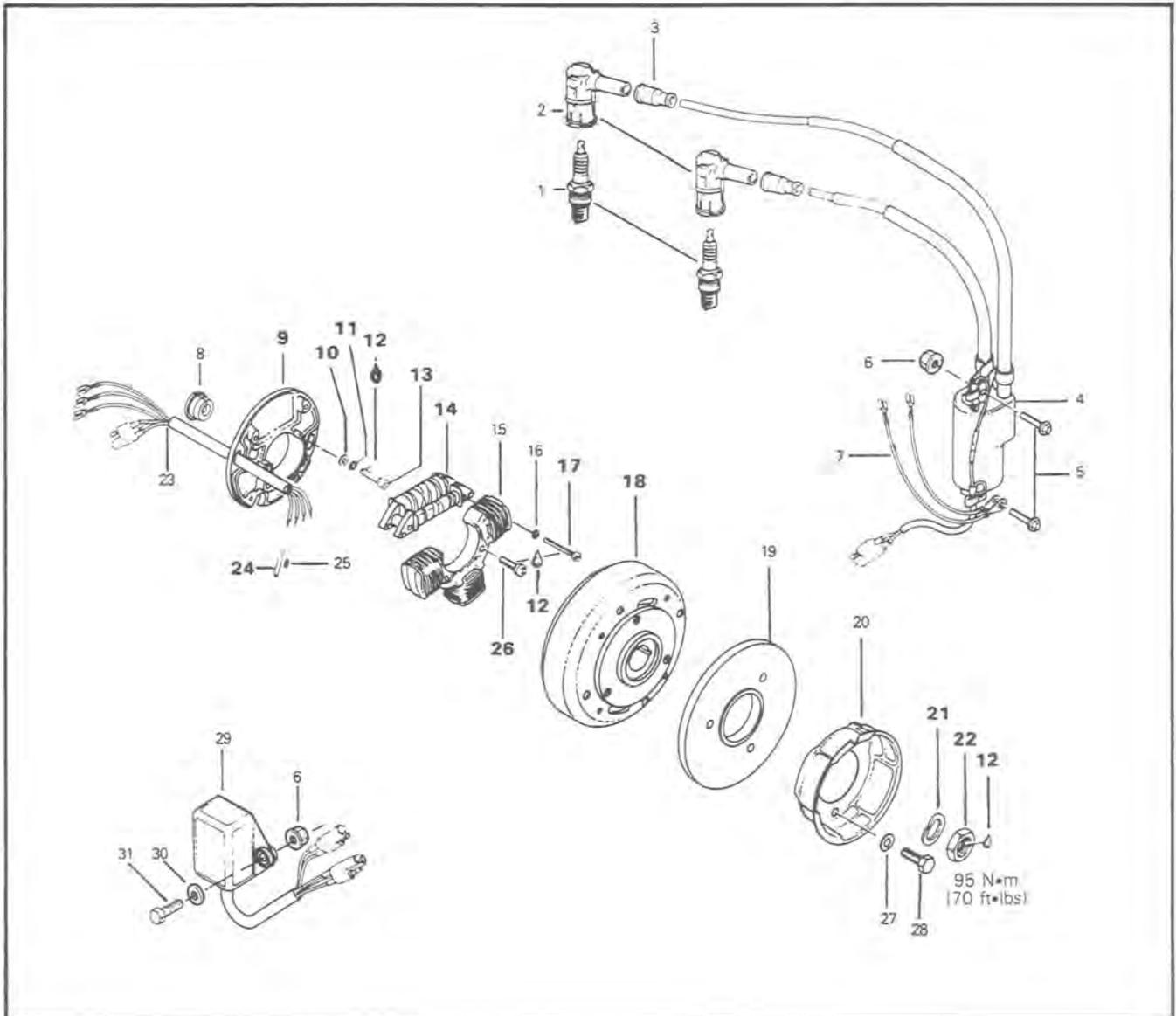
Because of cap nuts, cylinder studs have to be screwed into the crankcase so that they do not exceed further than 56.5 mm (2.22").



Apply "Loctite 242" on the threaded end of the studs going into the crankcase.

To install magneto, refer to "Magneto" in this section.

MAGNETO



- 1. Spark plug NGK BR-8ES (2)
- 2. Spark plug protector (2)
- 3. Protector cap
- 4. Ignition coil
- 5. Taptite screw M6 × 25 (2)
- 6. Hex. flanged nut 6 mm (4)
- 7. Mass cable
- 8. Cable grommet
- 9. Armature plate
- 10. Washer 5,5 mm (2)
- 11. Lockwasher 5 mm (2)
- 12. "Loctite 242"
- 13. Allen screw M5 × 18 (2)
- 14. Generating coil
- 15. Lighting coil
- 16. Lockwasher 5 mm (2)

- 17. Cylindrical slotted head screw M5 × 35 (2)
- 18. Flywheel
- 19. Flywheel counterweight
- 20. Starting pulley
- 21. Lockwasher 22 mm
- 22. Hex. nut 22 × 1,5 mm
- 23. Harness
- 24. Protector tube
- 25. Splice connector
- 26. Screw M6 × 25 (2)
- 27. Lockwasher 8 mm (3)
- 28. Hex. screw M8 × 20 (3)
- 29. C.D. Box
- 30. Washer 6,4 mm (2)
- 31. Hex. screw M6 × 20 (2)

95 N•m
(70 ft•lbs)

SECTION 02 ENGINE

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CLEANING

Clean all metal components in a non-ferrous metal cleaner.

▼ **CAUTION:** Clean armature and magneto using only a clean cloth.

DISASSEMBLY

To gain access to magneto assembly, remove:

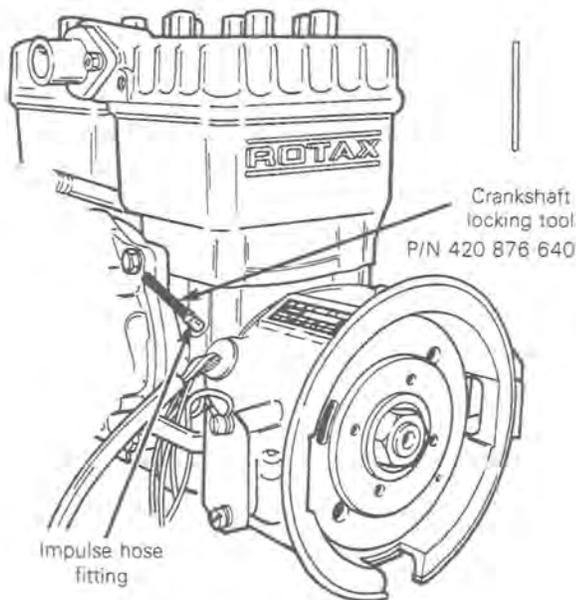
- muffler (if applicable)
- rewind starter
- starting pulley.

○ **NOTE:** Before disassembling magneto plate, indexing marks should be located to facilitate reassembly.

22, Flywheel retaining nut

To remove magneto flywheel retaining nut:

- lock crankshaft with crankshaft locking tool (service tool) as illustrated (magneto side piston must be be at top dead center)
- remove magneto retaining nut.



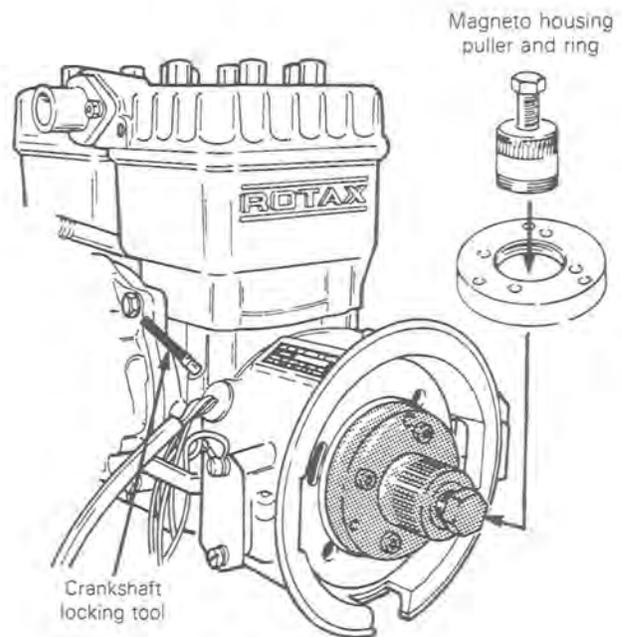
○ **NOTE:** It should be noted that to correctly remove a "Loctite" locked fastener it is first necessary to tap on the fastener to break "Loctite" bond. This will eliminate the possibility of thread breakage.

18, Flywheel

To remove magneto housing (flywheel):

lock crankshaft with crankshaft locking tool (service tool) as illustrated;

adjust magneto housing puller and puller ring as illustrated;



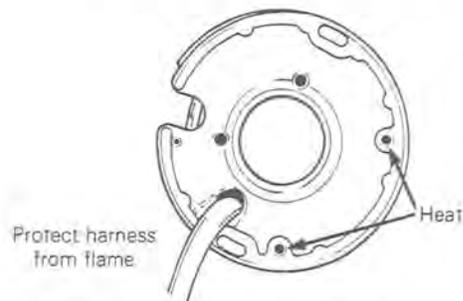
- tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper.

REPAIR

14, Generating coil

To replace generating coil:

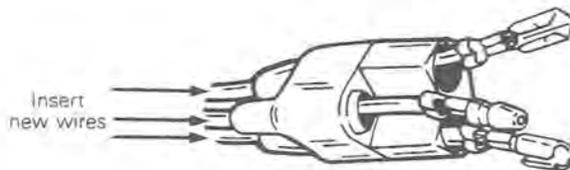
- Heat the armature plate around the screw holes to break the Loctite bond (200°F).



▼ **CAUTION:** Protect harness from flame.

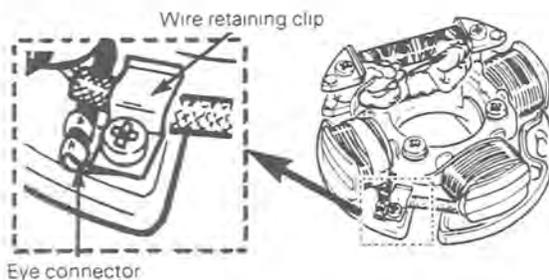
**SECTION 02 ENGINE
SUB-SECTION 07 (534 ENGINE TYPE)**

- Remove screws (use Phillips no. 2 or suitable flat screw driver).
- Cut the four wires as close as possible to the coil body.
- To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube.
- Insert the new wires into the old connector housing and install connectors.



▼ **CAUTION:** Replace the old wires in the connector with the same color coded new wires.

- Install a new receptacle connector to the black/yellow striped wire.
- To install the ground connector to the armature plate, tape the new black lead to the old one and pull it under the lighting coil with the old wire.
- Solder an eye connector to the lead and fasten it under the wire retaining clip.



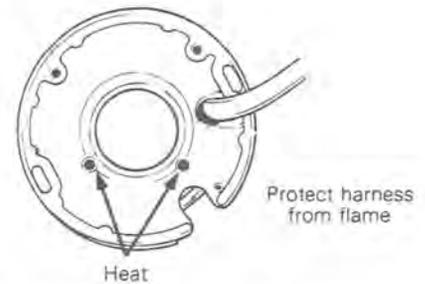
12,17, Generating coil screw & "Loctite 242"

To install the new coil on the armature plate, remove the shipping nuts from the new coil and apply Loctite 242 (blue, medium strength) to screws before assembly.

▼ **CAUTION:** Before reinstalling the magneto, remove the loose epoxy from harness.

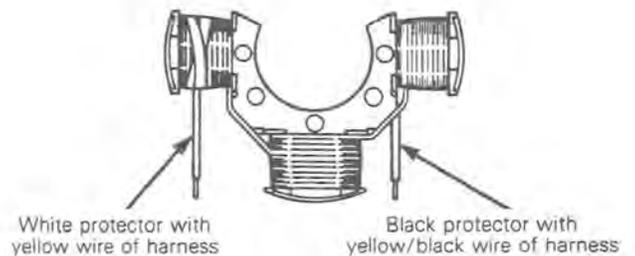
To replace lighting coil:

- Heat the armature plate around the screw holes to break the Loctite bond (200°F).



▼ **CAUTION:** Protect harness from flame.

- Remove screws (use Phillips no. 3 screwdriver).
- Remove the wire retaining clip from armature plate.
- Pull out protector tubes and unsolder the splice connectors.
- Solder the yellow wire in the harness to the white tube protected wire of the coil.
- Solder the yellow/black striped wire in the harness to the black tube protected wire of the coil.



24, Protector tube

Position protector tubes over connections.

12,26, "Loctite 242" & lighting coil screws

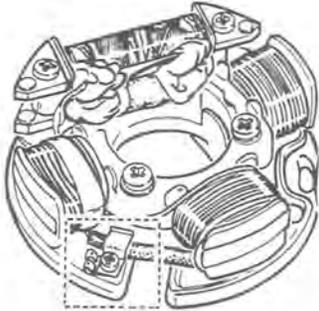
Prior to assembly, apply "Loctite 242" (blue, medium strength).

- Fasten retaining clip onto protector tubes.

SECTION 02 ENGINE

SUB-SECTION 07 (534 ENGINE TYPE)

The ground terminal from generating coil must be fastened under this clip.



▼ **CAUTION:** Before reinstalling magneto remove the loose epoxy from harness.

ASSEMBLY

9,10,11,12,13, Armature plate, lockwashers, washers, "Loctite 242" & screws

Position the armature plate on the crankcase, aligning the marks on both parts.

Put a drop of "Loctite 242" on screw threads and tighten.

Clean crankshaft extension (taper).

Apply "Loctite 242" on taper.

12,18,21,22, "Loctite 242", flywheel, lockwasher & nut

Position woodruff key, magneto flywheel, lockwasher on crankshaft.

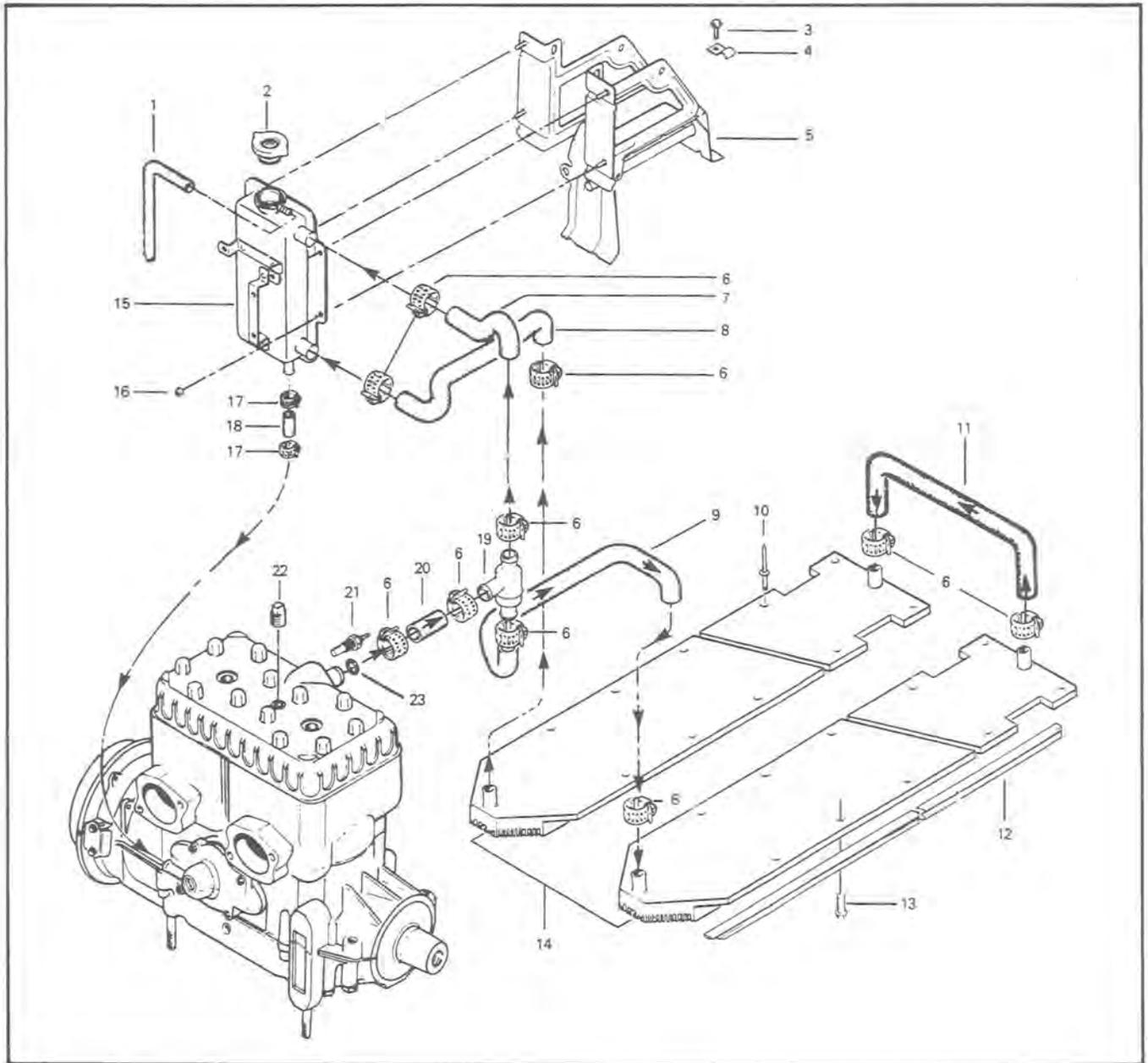
Clean nut threads and apply "Loctite 242" (blue, medium strength) before tightening nut to 95 N•m (70 ft•lbs).

At reassembly coat all electric connections with silicone dielectric grease to prevent corrosion or moisture penetration.

▼ **CAUTION:** Do not use silicone "sealant", this product will corrode contacts.

○ **NOTE:** For ignition timing procedure refer to "ignition timing" section 04 sub-section 02.

COOLING SYSTEM



- 1. Overflow hose 381 mm
- 2. Pressure cap
- 3. Hex. washer head powerlock screw 1/4"-20 x 3/4" (4)
- 4. Clip
- 5. Tank support
- 6. Clamp (10)
- 7. Hose
- 8. Hose
- 9. Hose
- 10. Rivet
- 11. "U" hose
- 12. Radiator protector (2)

- 13. Hex. washer head self tapping screw 10-24 x 1/2" (2)
- 14. Radiator (2)
- 15. Coolant tank
- 16. Hex. elastic stop nut 10 - 24 (4)
- 17. Clamp (2)
- 18. Hose 495 mm
- 19. Thermostat
- 20. Hose 98,6 mm
- 21. Sender
- 22. Plug
- 23. Grommet

SECTION 02 ENGINE

SUB-SECTION 07 (534 ENGINE TYPE)

INSPECTION

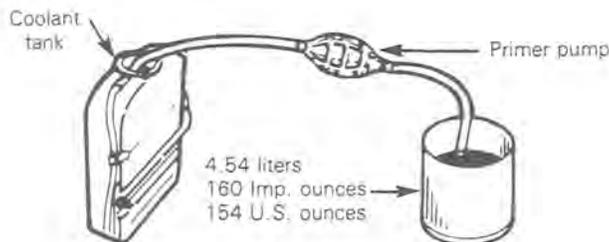
Check general condition of hoses and clamp tightness.

DRAINING THE SYSTEM

◆ **WARNING:** Never drain or refill the cooling system when engine is hot.

To drain the cooling system, remove the coolant tank cap and siphon the coolant mixture using a primer pump, a length of plastic hose and steel tubing inserted as deep as possible into the lower hose of the tank.

◆ **WARNING:** Use PRIMER PUMP to siphon the coolant mixture. Do not siphon with your mouth. The coolant mixture is poison and can be fatal if swallowed.



When the coolant level is low enough, remove the engine filler plug.

DISASSEMBLY AND ASSEMBLY

21,22, Sender & plug

Apply thread sealant on sender and plug to avoid leaks.

2, Pressure cap

Check if the cap pressurizes the system. If not, install a new 13 lbs cap, do not exceed 13 lbs of pressure.

19, Thermostat

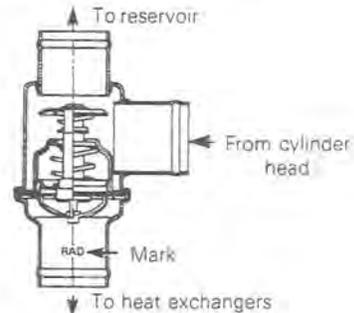
To check thermostat, put it in water and heat water. Thermostat should open when water temperature reaches 50°C (122°F).

This thermostat is a "double action type".

A - Its function is to give a faster warm up of the engine by provoking a circuit; water pump - engine - reservoir. This is done by closing the heat exchanger circuit.

B - When the liquid is warmed to 50°C (122°F), the thermostat opens the circuit, water pump - engine - heat exchangers - reservoir to keep the liquid at the desired temperature. (See the diagram to the exploded view).

These two function have the advantage of preventing a massive entry of cold water into the engine.



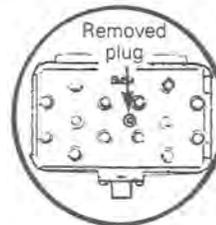
REFILLING THE SYSTEM

Capacity:

Approximately 5 liters
(1.1 Imp. gal.) (1.3 U.S. gal.)
60% antifreeze + 40% water

▼ **CAUTION:** Always use ethylene-glycol antifreeze containing corrosion inhibitors specifically recommended for aluminum engines.

To refill the cooling system, unscrew the plug on top of the cylinder head, then slowly pour the liquid into the coolant tank until it reaches the plug hole in the cylinder head. Reinstall the plug. Continue to pour the liquid in the coolant tank until the coolant level reaches 25 mm (1") below filler neck of reservoir.

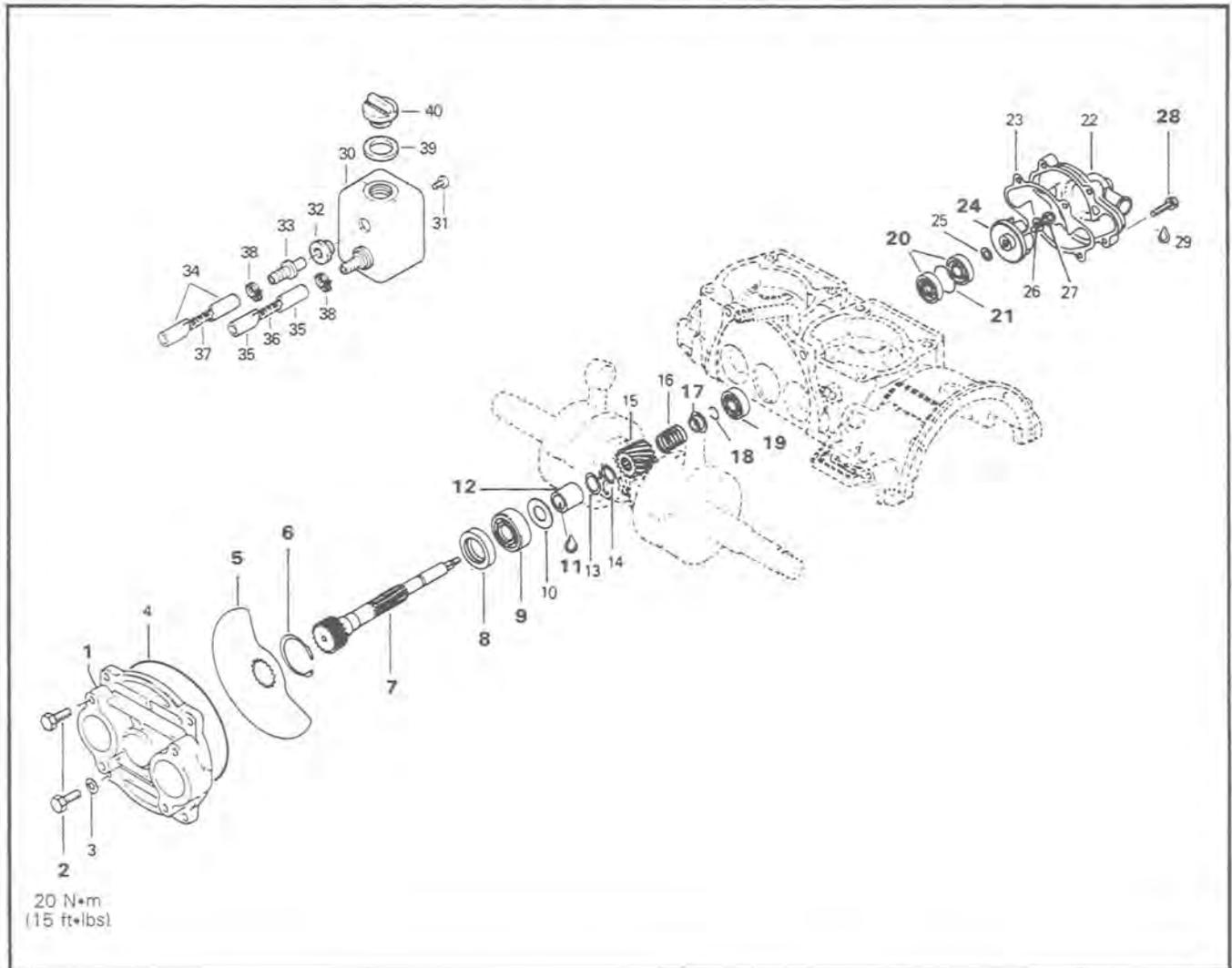


With the pressure cap removed, start engine to allow the coolant to circulate and let it run until normal temperature is reached. Stop engine.

Then recheck coolant level, ensuring that it is 25 mm (1") below filler neck of reservoir.

◆ **WARNING:** Always unscrew cap to the first step with a cloth to release pressure, before removing it.

ROTARY VALVE, COOLANT PUMP AND RESERVOIR



- | | |
|-----------------------------|--|
| 1. Rotary valve cover | 21. Distance ring |
| 2. bolt M8 × 20 (8) | 22. Pump housing |
| 3. Lockwasher 8 mm (4) | 23. Gasket |
| 4. "O" ring | 24. Pump impeller |
| 5. Rotary valve | 25. Washer 8.4 mm |
| 6. Circlip | 26. Washer 6.2 mm |
| 7. Rotary valve shaft | 27. Nut M6 |
| 8. Seal | 28. Bolt M6 × 25 (4) |
| 9. Bearing 6203 | 29. "Loctite 242" |
| 10. Shim 0.5 mm | 30. Oil tank |
| 11. "Loctite 271" | 31. Hexagonal washer head powerlock screw 1/4"-20 x 1/2" |
| 12. Distance sleeve 24.5 mm | 32. Grommet (2) |
| 13. Shim 0.5 mm | 33. Male connector (2) |
| 14. "O" ring | 34. Oil line |
| 15. Gear | 35. Oil line |
| 16. Spring | 36. Spring |
| 17. Spring retaining cup | 37. Spring |
| 18. Circlip | 38. Gear clamp (4) |
| 19. Bearing 6201 | 39. Gasket |
| 20. Seal (2) | 40. Oil tank cap |

SECTION 02 ENGINE

SUB-SECTION 07 (534 ENGINE TYPE)

CLEANING

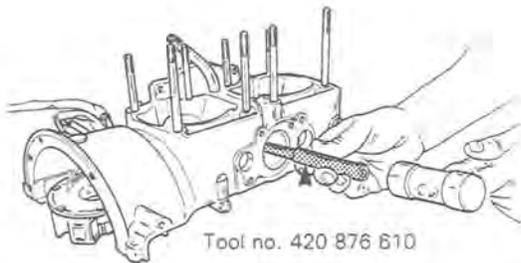
Discard all seals and "O" rings.

Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY AND ASSEMBLY

6,24, Circlip & pump impeller

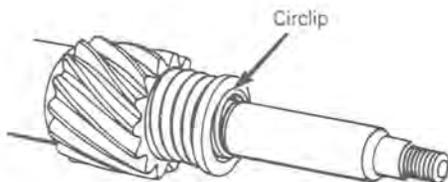
To remove rotary valve shaft assembly from crankcase, first remove coolant pump impeller and circlip. Using the suitable pusher (P/N 420 876 610) and a fiber hammer, push shaft assembly.



CAUTION: To prevent damage to the end of the rotary valve shaft, use pusher (tool P/N 420 876 610).

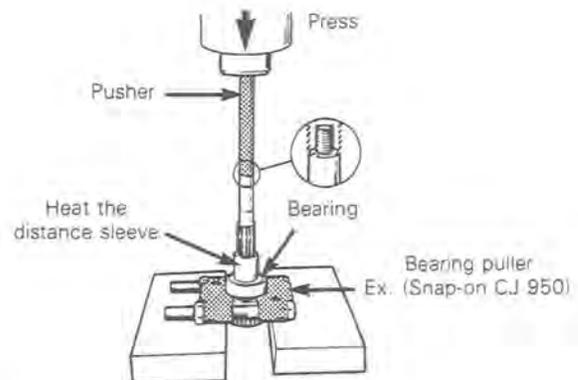
17,18, Spring retaining cup & circlip

If it is necessary to disassemble components of rotary valve shaft assembly, compress spring retaining cup in order to remove circlip.



11,12, "Loctite 271" & distance sleeve

To remove the distance sleeve use a bearing puller (Ex: Snap-On no. CJ 950) and pusher (P/N 420 876 610) as illustrated. Heat the distance sleeve to break the Loctite bond (200°F) and proceed as illustrated.

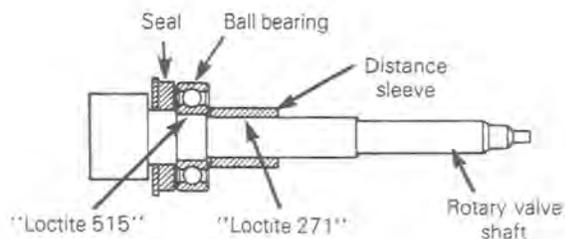


CAUTION: Ensure that the rotary valve shaft is perfectly perpendicular with the press tip or damage will occur.

Clean rotary valve shaft and inside of distance sleeve. At assembly apply "Loctite 271" inside of distance sleeve.

7,8, Rotary valve shaft & seal

At assembly apply lithium grease on seal lips. Position the seal with shielded portion towards rotary valve.



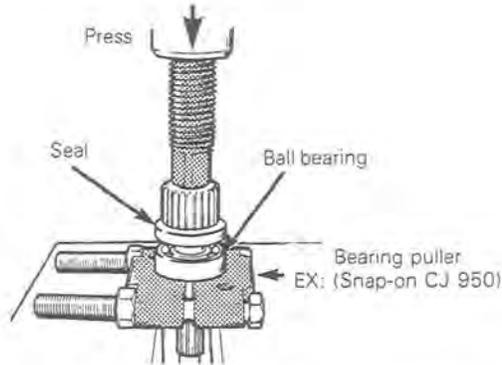
7,9, Rotary valve shaft & bearing 6203

At assembly apply crankcase sealant "Loctite 515" on bearing and rotary valve shaft mating surfaces.

CAUTION: Don't put any Loctite on bearings ball.

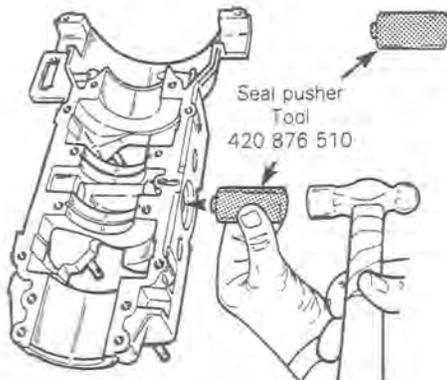
SECTION 02 ENGINE
SUB-SECTION 07 (534 ENGINE TYPE)

Install ball bearing as illustrated.

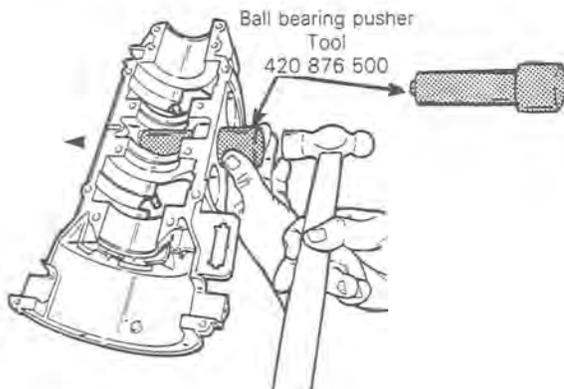


19,20,21, Bearing 6201, seal & distance ring

To remove bearing 6201, seals and distance ring use pusher (P/N 420 876 510)



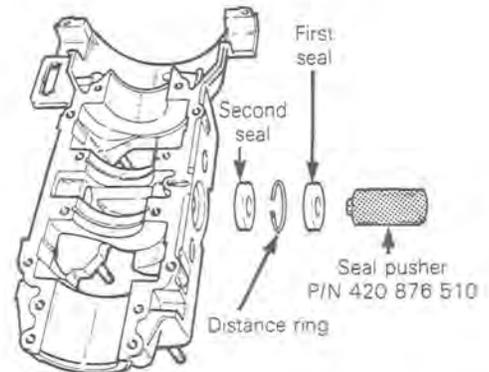
To install ball bearing 6201 use ball bearing pusher (P/N 420 876 500).



NOTE: Ball bearing shielded side must be facing rotary valve.

20,21, Seals & distance ring

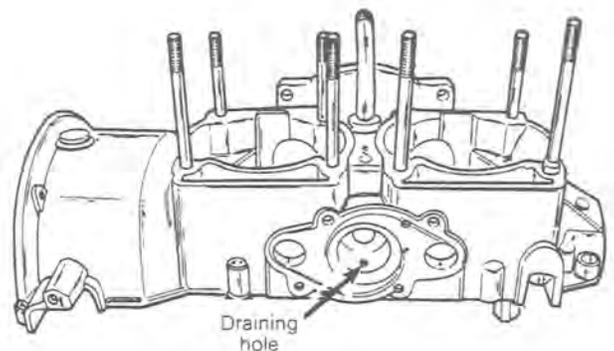
To install seals on water pump side proceed as follow:



Apply some lithium grease or equivalent on seal lips. Position all seals with shielded portion towards water pump using pusher (P/N 420 876 510). Align distance ring opening with crankcase draining hole (see note and illustration). Push seals and distance ring assembly against bearing.

NOTE: 35% of the distance between first and second seals must be filled with lithium grease or equivalent.

NOTE: The draining hole is use to detect seals malfunctions. If you notice oil, or coolant at the exit of the draining hole, this mean that oil seal or coolant seal leaks.

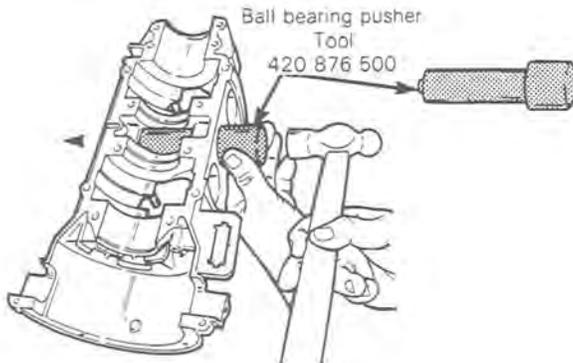


CAUTION: Failure to position the seals as specified may provoke the seal spring to be corroded by coolant. Severe damages will occur if these notices are disregarded.

SECTION 02 ENGINE
SUB-SECTION 07 (534 ENGINE TYPE)

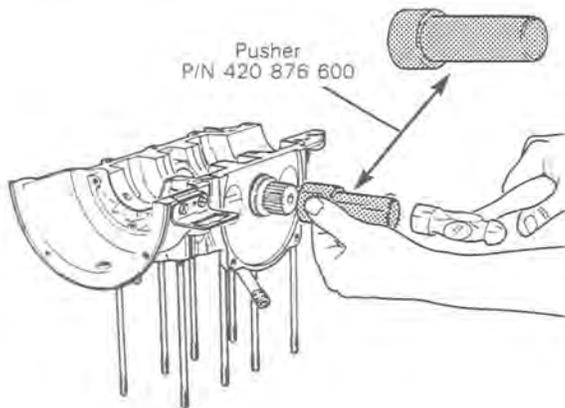
19,20,21, Bearing 6201, seals & distance ring

NOTE: After seals installation, check if the water pump end bearing is correctly positioned (use pusher P/N 420 876 500).



7, Rotary valve shaft

To install rotary valve shaft proceed as follow with the suitable pusher (P/N 420 876 600).



28,29, Pump housing bolts & "Loctite 242"

Apply Loctite 242 on bolts thread.

2, Rotary valve cover bolts

Torque the rotary valve cover bolts to 20 N•m (15 ft•lbs).

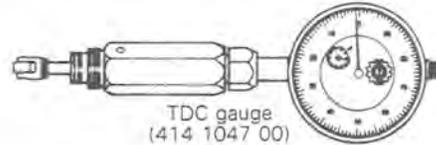
5, Rotary valve

Rotary valve adjustment when replacing crankcase having no timing marks.

REQUIRED TOOLS



Angle finder
(414 3529 00)

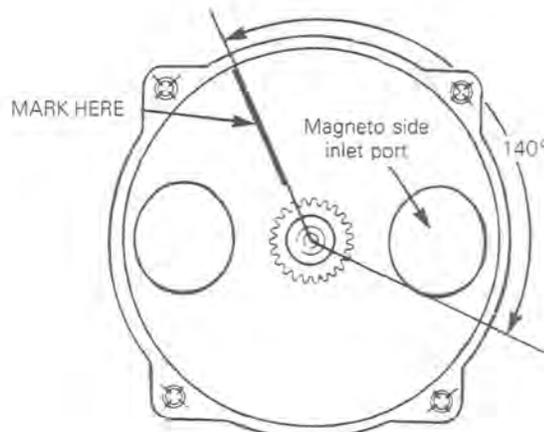


TDC gauge
(414 1047 00)

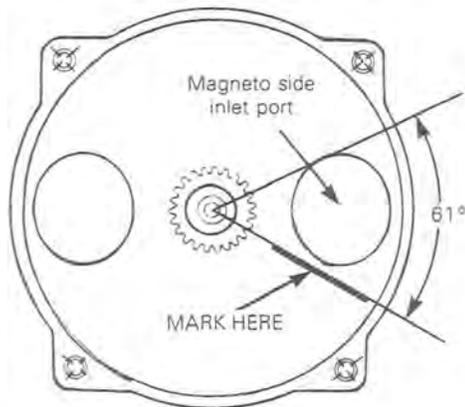
ENGINE TYPE	TIMING MARKS opening, closing
534	140°, 61°

For example: 140° opening
61° closing

Using angle finder, mark crankcase at 140° from bottom edge of magneto side inlet port.



From top edge of magneto side inlet port, mark crankcase at 61° .

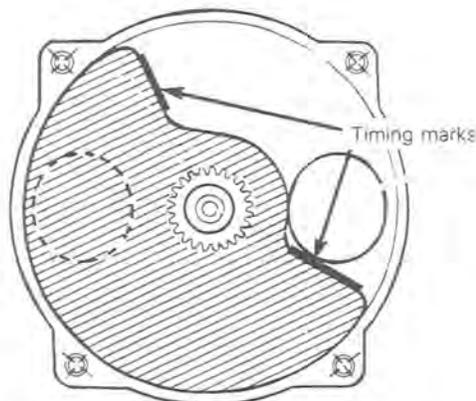


To correctly install the rotary valve disc proceed as follows:

- Turning crankshaft counter-clockwise, (drive pulley side) bring magneto side piston to Top Dead Center using a T.D.C. gauge.
- Position the rotary valve disc on gear to have edges as close as possible to the marks.

○ **NOTE:** The rotary valve disc is asymmetrical, therefore, at assembly, try positioning each side of disc on gear to determine best installation position.

Magneto side piston must be at T.D.C.



Spray some injection oil on rotary valve before closing the rotary valve cover.

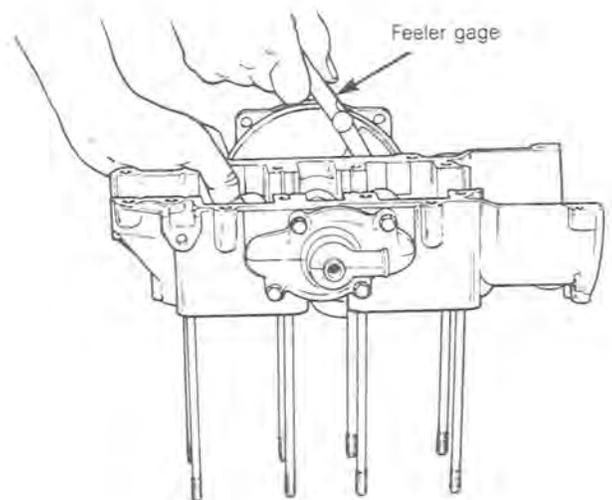
2, Rotary valve cover bolts

The rotary valve cover bolts must be torque to 20 N•m (15 ft•lbs).

INSPECTION

1,5, Rotary valve cover & rotary valve

To measure this gap you can use a feeler gage inserted between rotary valve an upper crankcase with the rotary valve cover in place without it's "O" ring. Check the more surface you can. Follow the same procedure for the lower crankcase.





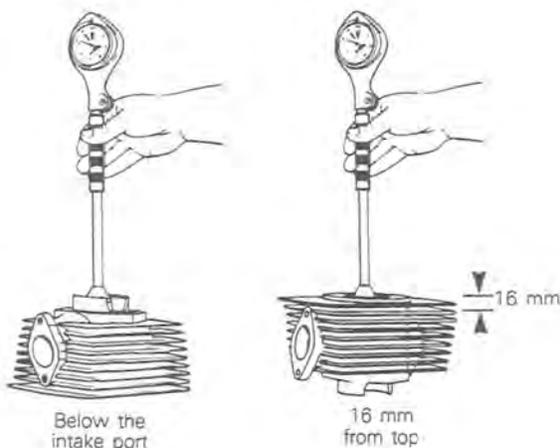
ENGINE DIMENSIONS MEASUREMENT

CYLINDER TAPER

Maximum: 0.08 mm (.003'')

Compare cylinder diameter 16 mm (5/8'') from top of cylinder to just below its intake port area.

On rotary valve engines, measure just below auxiliary transfer port, facing exhaust port. If the difference exceeds 0.08 mm (.003'') the cylinder should be rebored and honed or should be replaced.



CYLINDER/PISTON CLEARANCE

ENGINE TYPE	PISTON TO WALL CLEARANCE MINIMUM — MAXIMUM	WEAR LIMIT
247	0.065 — 0.200 mm (.0026 — .008'')	0.20 mm (0.0079'')
277	0.070 — 0.090 mm (.0028 — .0035'')	0.20 mm (0.0079'')
377	0.080 — 0.10 mm (.0031 — .0039'')	0.20 mm (0.0079'')
447	0.080 — 0.10 mm (.0031 — .0039'')	0.20 mm (0.0079'')
462	0.080 — 0.100 mm (.0031 — .0039'')	0.20 mm (0.0079'')
503	0.070 — 0.090 mm (.0028 — .0035'')	0.20 mm (0.0079'')
534	0.100 — 0.120 mm (.0039 — .0047'')	0.20 mm (0.0079'')

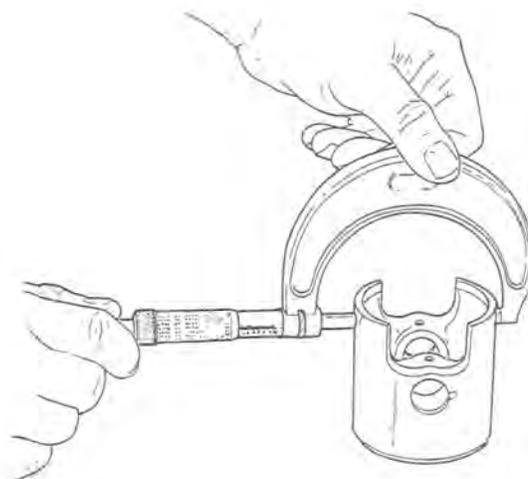
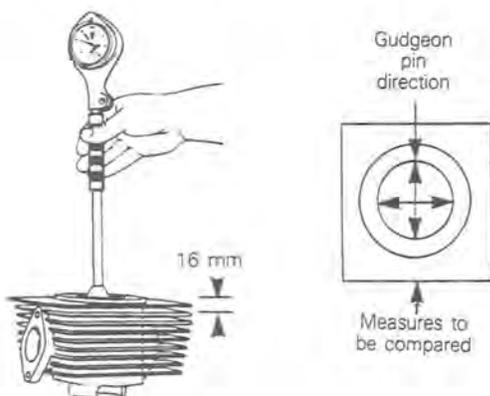
Measurement

To determine piston to wall clearance, the piston should be measured right under the axis hole and the cylinder should be measured 16 mm (5/8'') below its top edge.

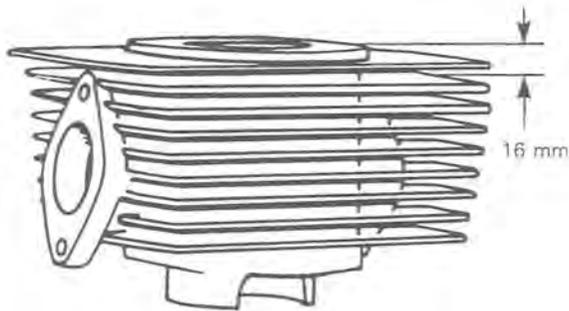
CYLINDER OUT OF ROUND

Maximum: 0.05 mm (.002'')

Measuring 16 mm (5/8'') from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than 0.05 mm (.002''). If larger, cylinder should be rebored and honed or should be replaced.



SECTION 02 ENGINE
 SUB-SECTION 08 (ENGINE DIMENSIONS MEASUREMENT)



The difference between these two measurements should be within specified tolerance.

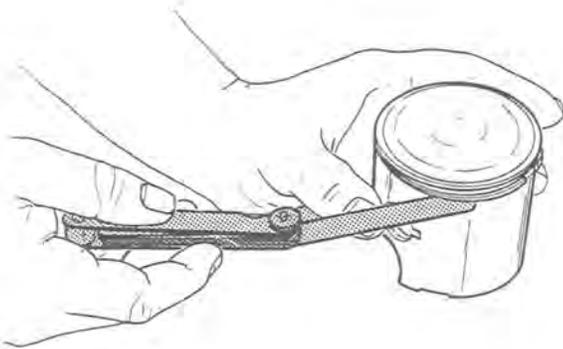
RING PISTON GROOVE CLEARANCE

MINIMUM — MAXIMUM (wear limit)

0.04 mm — 0.20 mm
 (.002'' — (.008'')

Using a feeler gauge check clearance between rectangular ring and groove. If clearance exceeds specified tolerance, replace piston.

○ **NOTE:** Ring piston groove clearance can be measured only on rectangular ring.



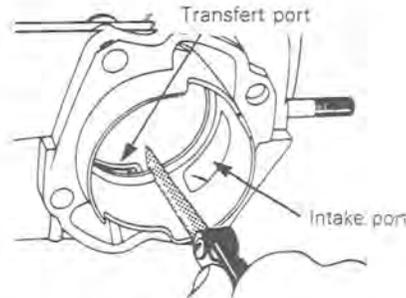
RING END GAP

ENGINE TYPE	RING END GAP (new ring)	MAXIMUM RING END GAP (worn ring)
All 1984 engines	0.20 — 0.35 mm (.008 — .014'')	1.0 mm (.039'')

Position ring half way between transfer ports and intake port. On rotary valve engines, position ring just below transfer ports.

○ **NOTE:** In order to correctly position the ring in the cylinder, use piston as a pusher.

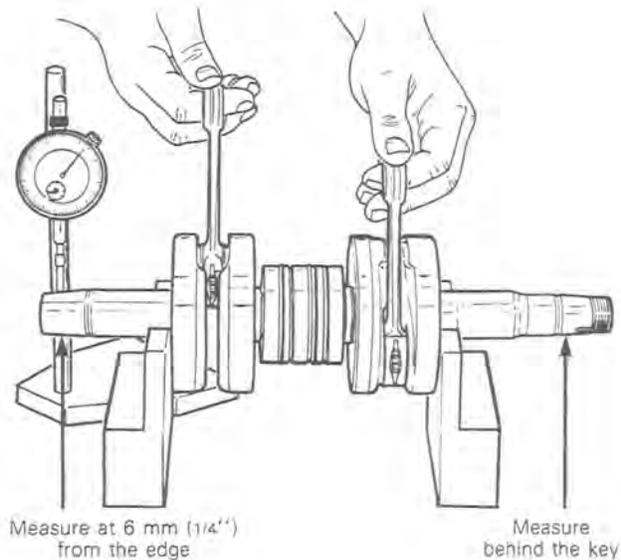
Using a feeler gauge, check ring end gap. If gap exceeds specified tolerance the ring should be replaced.



CRANKSHAFT DEFLEXION

TYPE	MAXIMUM
247	0.1 mm (0.0039'')
277,377,447, 462,503,534	0.08 mm (0.0031'')

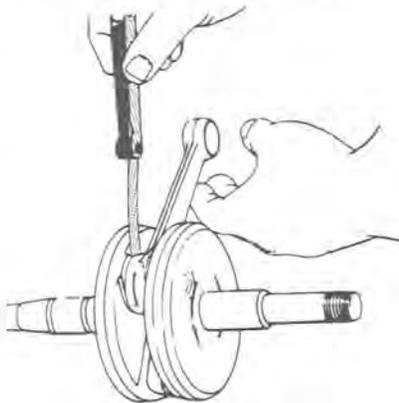
Turn crankshaft on "V" shaped blocks; using a dial indicator measure deflection on each side as illustrated. If deflection exceeds specified tolerance, the crankshaft should be repaired or replaced.



CONNECTING ROD BIG END AXIAL PLAY

TYPE	MINIMUM — MAXIMUM (WEAR LIMIT)
247,277,377, 447,462,503	0.20 — 1.00 mm (.008 — .039")
534	0.40 — 1.20 mm (.016 — .047")

Using a feeler gauge measure distance between thrust washer and crankshaft balancer. If the distance exceeds specified tolerance, repair or replace the crankshaft.

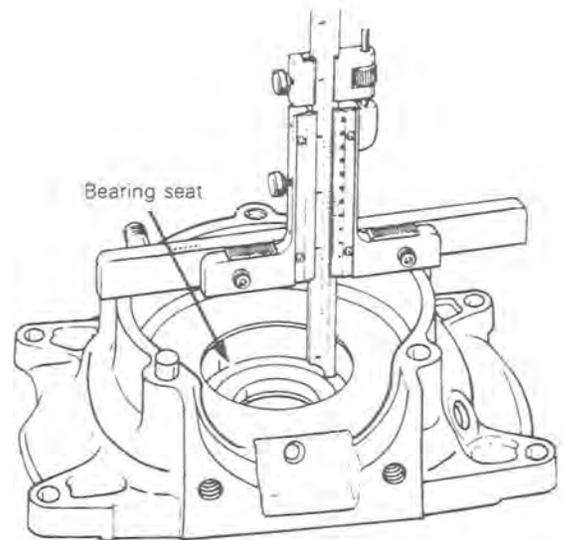


- 0.10 mm (.004")
- 0.20 mm (.008")
- 0.30 mm (.012")
- 0.50 mm (.020")
- 1.00 mm (.040") - 247 only

- micrometer
- vernier

Total shim thickness needed for the end-play adjustment is determined with the following procedure:

- a) Measure crankcase halves as illustrated (M₁ and M₂).
A standard compressed crankcase gasket will have a 0.30 mm (.012") thickness (M₃). Add these measurements to obtain dimension "A".



CRANKSHAFT END-PLAY — 247 & 277 ENGINE TYPE

Specification:

MINIMUM	MAXIMUM
0.20 mm (.008")	0.40 mm (.016")

ADJUSTMENT:

Crankshaft end-play is adjusted with shims located between crankshaft and magneto side bearing.

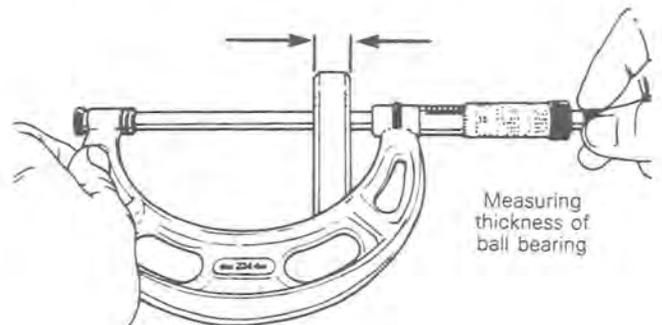
CAUTION: Always install end-play adjustment shims on the magneto side between bearing and crankshaft counterweight.

The following is required for the adjustment procedure:

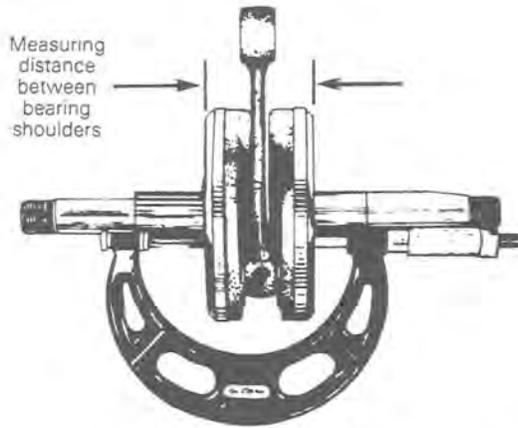
- adjustment shims (refer to parts catalog) (thicknesses available)

- b) Measure the thickness of each ball bearing (M₄ and M₅).

Measure distance between bearing shoulders on crankshaft (M₆). Measure the distance ring and adjustment shims thickness (M₇ and M₈). Add these measurements to obtain dimension B.



SECTION 02 ENGINE
 SUB-SECTION 08 (ENGINE DIMENSIONS MEASUREMENT)



○ NOTE: The 247 engine type has one distance ring on PTO side and adjustment shims on MAG side. The 277 engine type has one distance ring on PTO side and one distance ring and adjustment shims on MAG side.

c) From dimension A, subtract dimension B.

The result is the actual crankshaft end-play that must be within specification.

If the result is over specification, add adjustment shim(s).

If the result is under specification, remove adjustment shim(s).

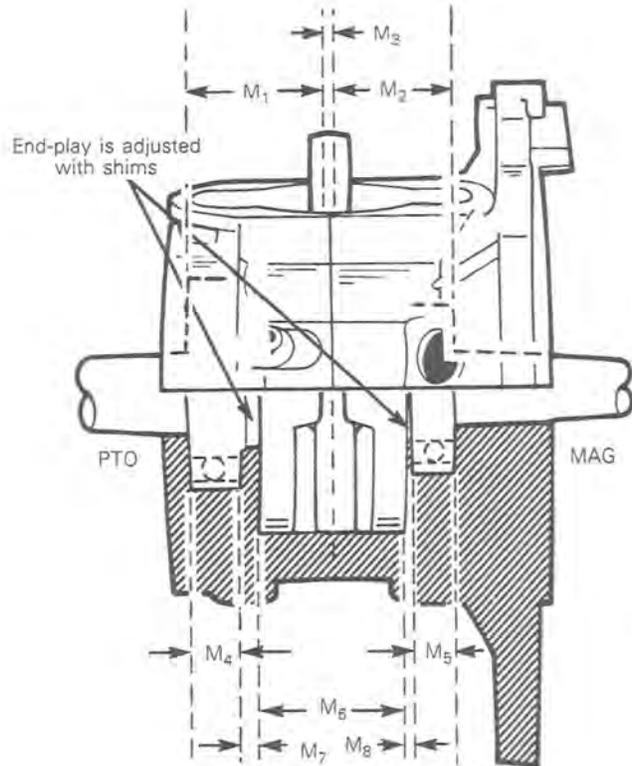
TO SUMMARIZE: (247 & 277 engine type)

$$A = M_1 + M_2 + M_3$$

$$B = M_4 + M_5 + M_6 + M_7 + M_8$$

A-B = actual end-play that must be within specification.

M_8 is the dimension that must be adjusted to obtain the specified crankshaft end-play.



**CRANKSHAFT END-PLAY
 377,447,462,503,534 ENGINE TYPES**

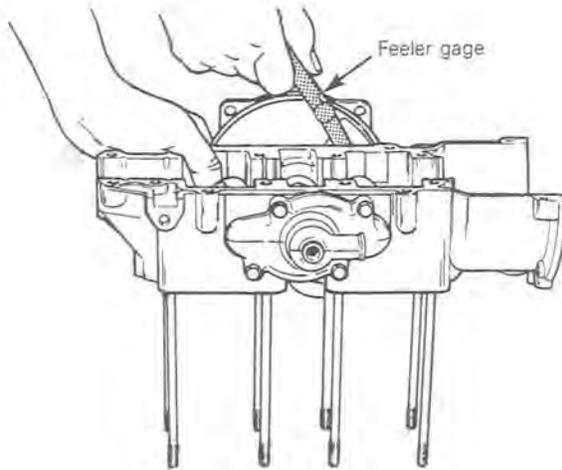
These engine types do not have end-play adjustment.

CRANKCASE/ROTARY VALVE GAP

TYPE	MINIMUM	MAXIMUM
462,534	0.27 mm (0.011")	0.48 mm (0.019")

SECTION 02 ENGINE
SUB-SECTION 08 (ENGINE DIMENSIONS MEASUREMENT)

To measure this gap you can use a feeler gage inserted between rotary valve and upper crankcase with the rotary valve cover in place without its "O" ring. Check the most surface you can. Follow the same procedure with the lower crankcase.

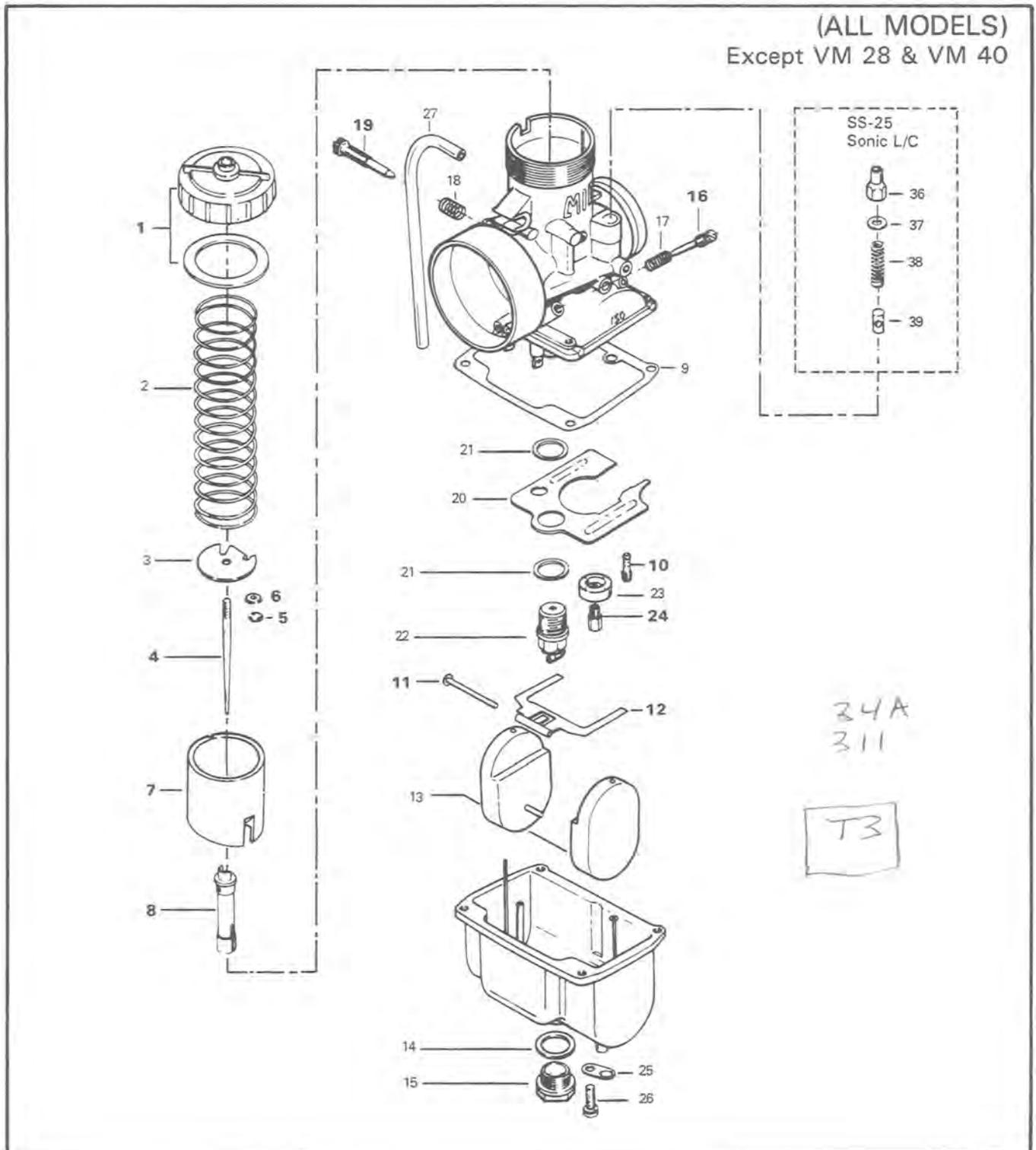




CARBURETOR AND FUEL PUMP

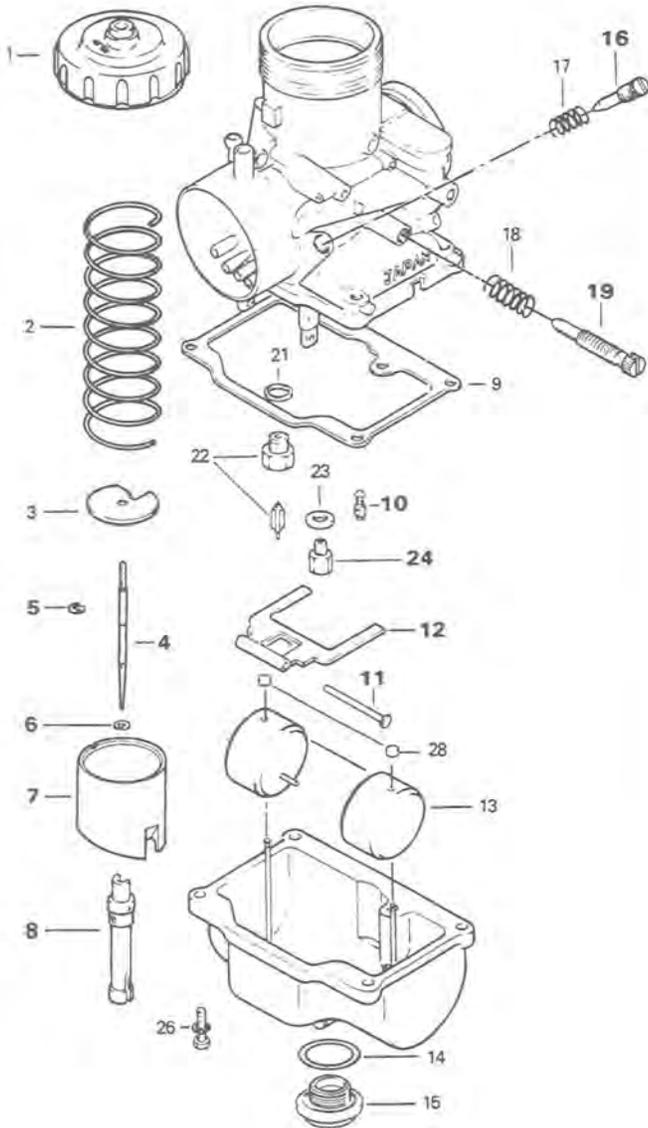
MIKUNI CARBURETOR

(ALL MODELS)
Except VM 28 & VM 40

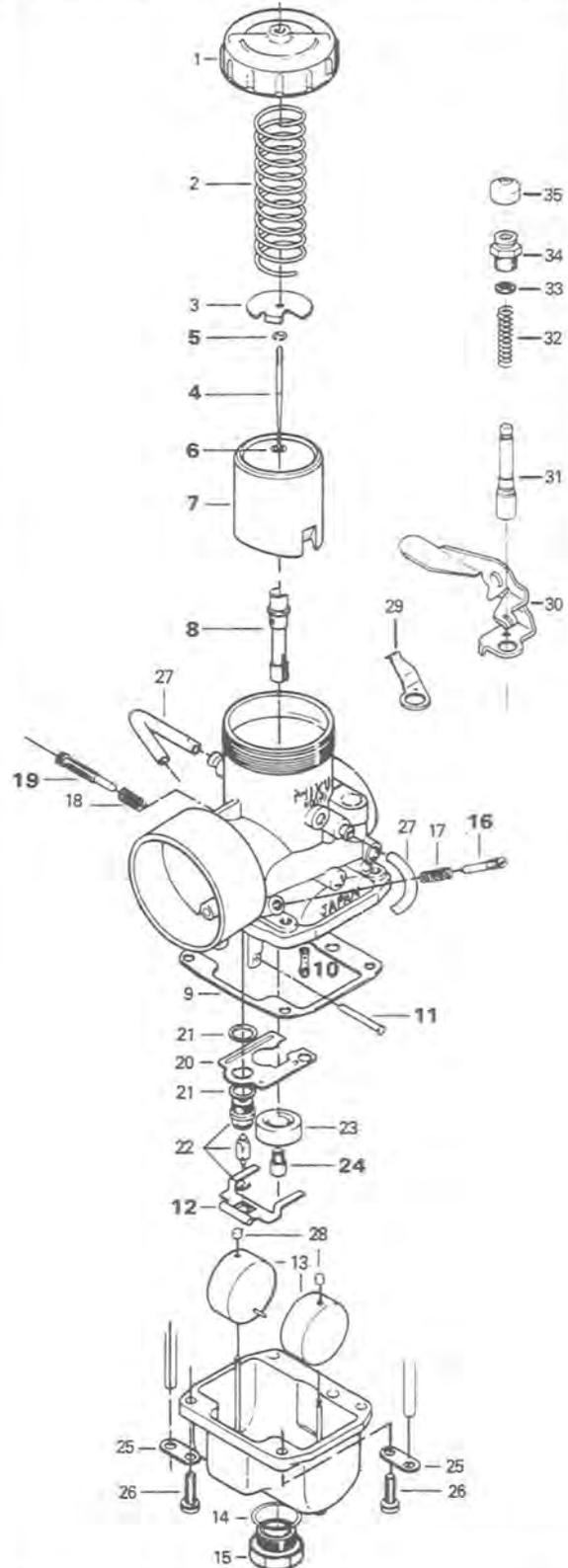


SECTION 02 ENGINE
 JB-SECTION 09 (CARBURETOR AND FUEL PUMP)

Carburetor VM 28-242 (Elan)



Carburetor VM 40 23-24 (Blizzard 9700)



1. Cover
2. Spring (throttle valve)
3. Needle retainer plate
4. Needle
5. Circlip
6. Packing
7. Throttle slide
8. Needle jet
9. Gasket
10. Pilot jet
11. Float arm pin
12. Float arm
13. Float
14. O'ring
15. Plug screw
16. Idle air screw
17. Spring
18. Spring (throttle stop screw)
19. Throttle stop screw
20. Baffle plate

21. Washer
22. Needle valve
23. Baffle ring
24. Main jet
25. Tube retainer plate
26. Screw and lockwasher
27. Vent tube
28. Cap
29. Spring
30. Choke lever
31. Starting piston
32. Spring
33. "O" ring
34. Plunger cap
35. Rubber cap
36. Holder guide
37. Washer
38. Spring
39. Plunger

REMOVAL

Remove air silencer box, fuel inlet line and primer line. Unscrew carburetor cover then pull out throttle slide assembly from carburetor.

WARNING: Exercise care when handling throttle slide. Scratches incurred may cause throttle slide to stick open in operation.

Untighten rubber flange clamp then remove carburetor from engine.

CLEANING & INSPECTION

The entire carburetor should be cleaned with a general solvent and dried with compressed air before disassembly.

Carburetor body and jets should be cleaned in a carburetor cleaner following manufacturer's instructions.

WARNING: Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as they are flammable and explosive.

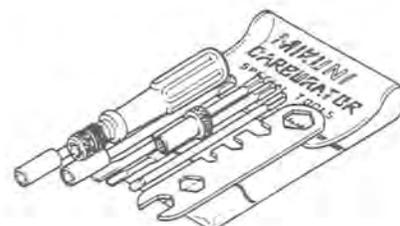
Check inlet needle tip condition. If worn, the inlet needle and seat must be replaced as a matched set.

Check throttle slide for wear. Replace as necessary.

CAUTION: Heavy duty carburetor cleaner may be harmful to the float material and to the rubber parts, O'ring, etc. Therefore, it is recommended to remove those parts prior to cleaning.

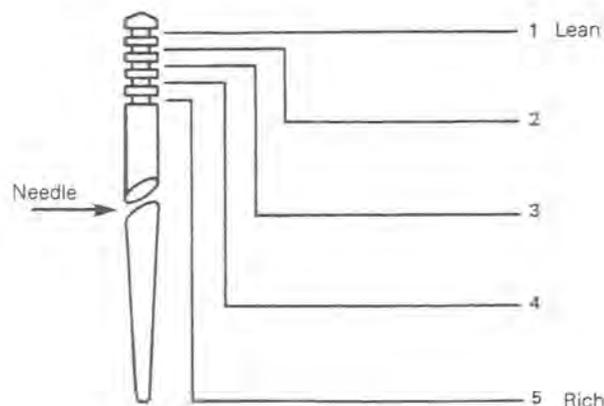
DISASSEMBLY & ASSEMBLY

NOTE: To ease the Mikuni carburetor disassembly and assembly procedures it is recommended to use a special tool kit available under P/N 404 112 000.



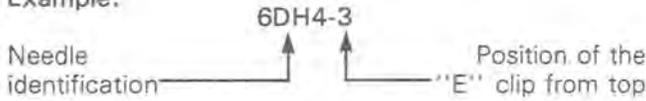
4,5, Needle, circlip

The position of the needle in the throttle slide is adjustable by means of an "E" clip inserted into one of 5 grooves located on the upper part of the needle. Position 1 is the leanest, 5 the richest.



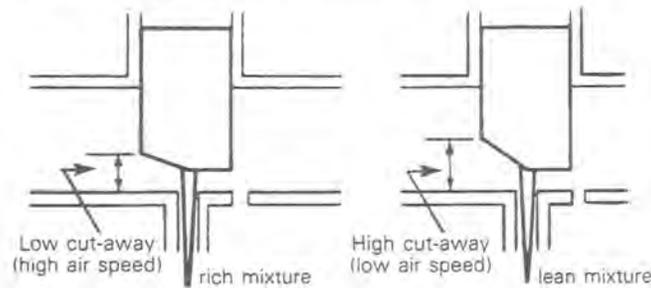
SECTION 02 ENGINE
SUB-SECTION 09 (CARBURETOR AND FUEL PUMP)

Example:



7, Throttle slide

The size of the throttle slide cut-away affects the fuel mixture between 1/8 to 1/2 throttle opening. A certain amount of richness is needed for that particular range because this is where the transition from the low speed to the high speed circuit takes place.



24, Main jet

The main jet installed in the carburetor is suitable for a wide range of temperature (-30° to 5°C / -20° to 40°F) at sea level. However, different jetting is available. Always check spark plug tip color to find out correct jetting.

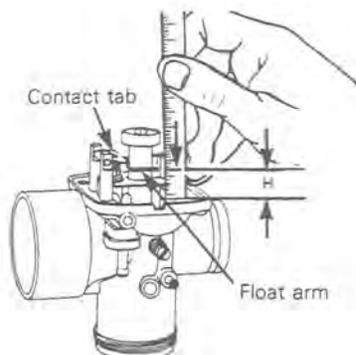
MIKUNI CARBURETOR FLOAT LEVEL ADJUSTMENT

11,12, Float arm pin & float arm

Correct fuel level in float chamber is vital toward maximum engine efficiency. To check for correct float level proceed as follows:

- Remove float chamber and gasket from carburetor.
- With carburetor chamber upside-down, measure height "H" between float chamber flange rib and top edge of float arm.

Ex.: VM 36 carburetor



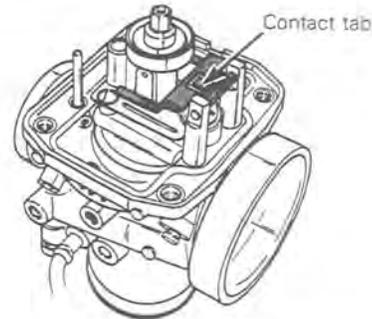
Float arm height dimensions:

CARBURETOR DIMENSION	VM 28	VM 34	VM 40
H (inch)	.59 ≈ .66	.86 ≈ .94	.67 ≈ .75
(mm)	15 ≈ 17	22 ≈ 24	17 ≈ 19

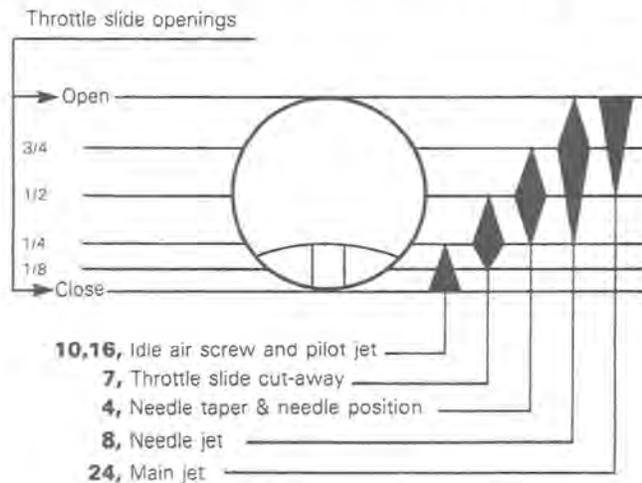
○ **NOTE:** As a general rule, the float arm must be parallel with the flange rib.

To adjust height "H":

- Bend the contact tab of float arm until the specified height is reached.



The illustration below shows which part of the carburetor begins to function at different throttle slide openings.



○ **NOTE:** For fine tuning refer to Section 09 (technical data) and to Section 04-03 (Spark Plug).

○ **NOTE:** For high altitude regions, the "High Altitude Technical Data" booklet can inform you about the carburetor tuning according to altitude.

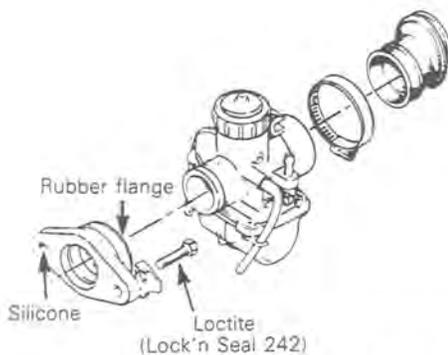
INSTALLATION

To install carburetor on engine, inverse removal procedure.

However, pay attention to the following:

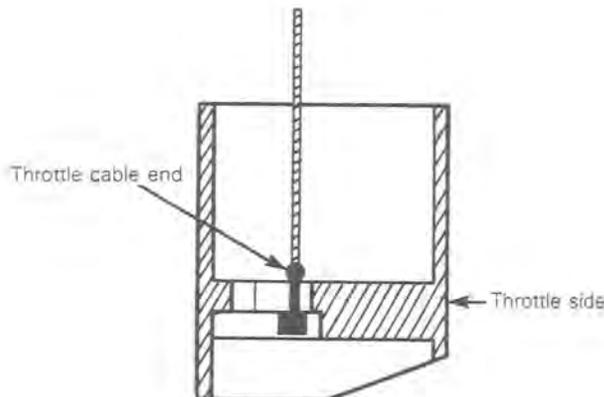
Apply a thin layer of silicone sealant between carburetor rubber flange and intake cover on engine.

Apply Loctite Lock'n Seal 242 on bolts retaining flange to intake cover.

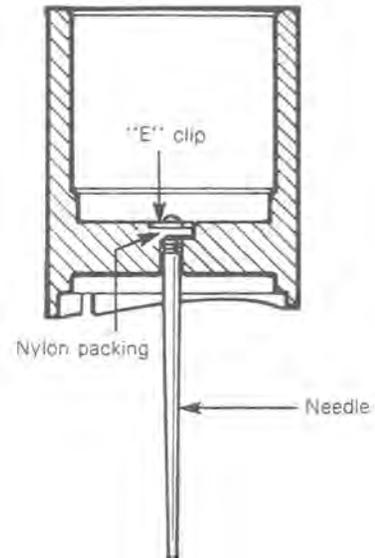


CAUTION: The rubber flange must be checked for cracks and/or damage. At assembly, the flange must be perfectly matched with the air intake manifold or severe engine damage will occur.

When installing throttle cable end in throttle slide, hook up cable by using the stopper at the extremity of the cable.



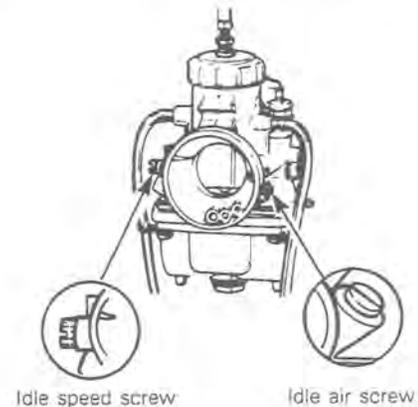
4,6, Needle, nylon packing



Make sure the nylon packing is installed on all applicable throttle slides.

CAUTION: Serious engine damage can occur if this notice is disregarded.

CARBURETOR ADJUSTMENTS



16, Air screw adjustment

Completely close the air screw (until a slight seating resistance is felt) then back off as specified.

(Refer to Section 09 "Technical Data" for the specifications).

SECTION 02 ENGINE

SUB-SECTION 09 (CARBURETOR AND FUEL PUMP)

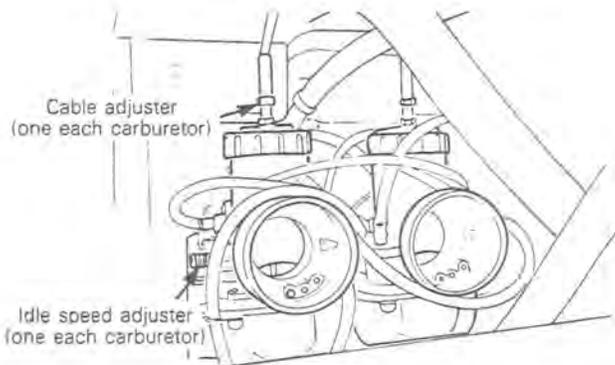
7, Throttle slide adjustment

◆ **WARNING:** Ensure the engine is turned **OFF**, prior to the throttle slide adjustment.

For maximum performance, correct carburetor throttle slide adjustment is critical.

The following method should be used:
with engine turned off:

- Remove the air intake silencer.
- Back off the idle speed screw completely.



Turn the idle-speed screw clockwise until it contacts the throttle slide then continue turning two (2) additional turns. Repeat on the other carburetor. This will ensure identical throttle slide idle setting.

Tighten carburetor cover with the throttle cable adjuster jam nut unlocked, press the throttle lever against the handle grip.

(All models except Blizzard 9700)

By turning the cable adjuster, adjust the carburetor slide cut away so that it is flush with the top of the carburetor bore.

(Blizzard 9700)

By turning the cable adjuster, adjust the carburetor slide, so that it is flush with the top of the carburetor outlet bore.

Tighten the cable adjuster jam nut.

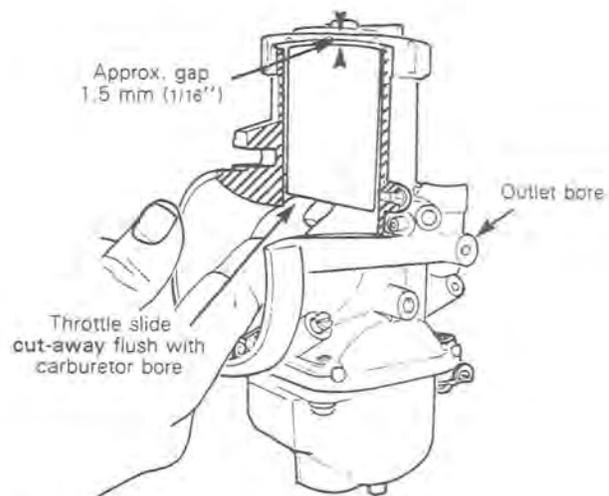
Repeat for the other carburetor (if applicable).

▼ **CAUTION:** On twin carburetor models, make sure both carburetors start to operate simultaneously.

◆ **WARNING:** It is important that the throttle slide adjustment be performed to ensure proper functioning of throttle mechanism.

▼ **CAUTION:** On twin carburetor model with rotary valve (Blizzard 9700) do not interchange carburetors, the jetting is different on each side.

Once carburetor adjustment is performed, check that with the throttle lever fully depressed, there is a free play of 1/16'' between the cover(s) and throttle slide. Readjust accordingly.



◆ **WARNING:** This gap is very important. If the throttle slide rests against the carburetor cover at full throttle opening, this will create too much strain and may damage the throttle cable.

Recheck carburetor synchronization.

▼ **CAUTION:** On oil injection models, the oil injection pump adjustment must be checked each time carburetor is adjusted.

19, Idle speed final adjustment

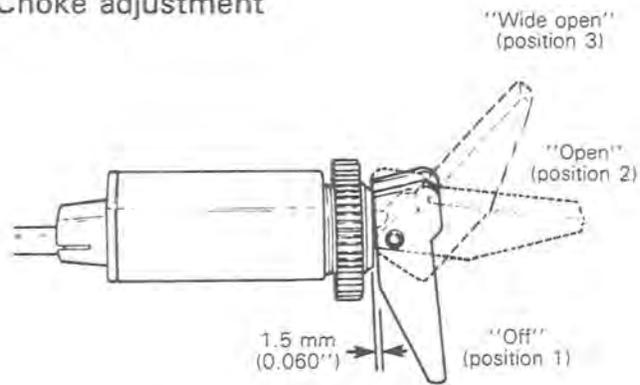
Turn idle speed screw clockwise until it contacts the throttle slide then continue turning two (2) additional turns.

This will provide a preliminary idle speed setting. Start engine and allow it to warm then adjust idle speed to specifications by turning idle speed screw clockwise or counter-clockwise.

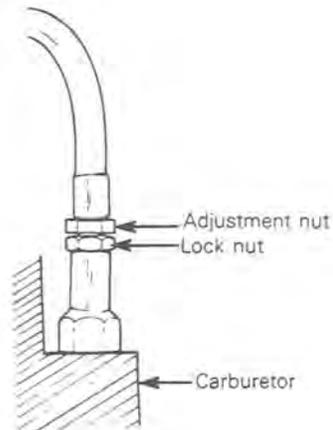
(Refer to Section 09 "Technical Data" for the specifications).

▼ **CAUTION:** Do not attempt to set the idle speed by using the air screw. Severe engine damage can occur.

Choke adjustment



Pull the choke lever until you feel a light resistance. You must maintain a free-play of 1.5 mm (0.060") on "off" (position 1).



To achieve that adjustment on carburetor, unlock the lock nut unscrew the adjustment nut to reduce the free-play or screw the adjustment to increase the free-play.

MIKUNI FUEL PUMP

FIG. (A)

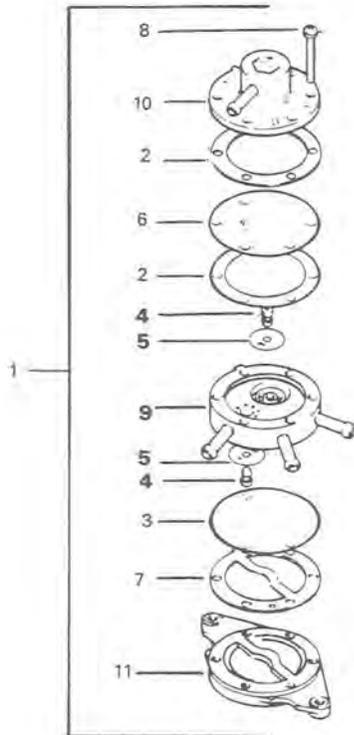
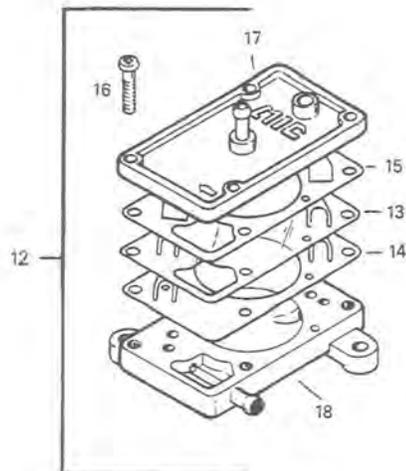


FIG (B)



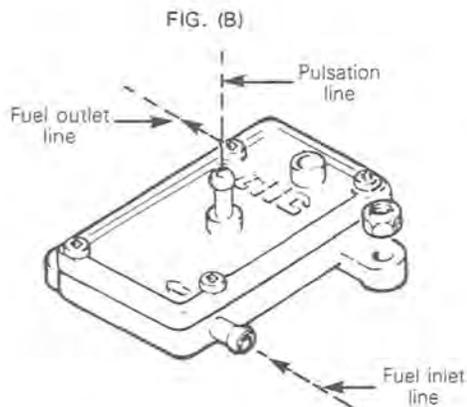
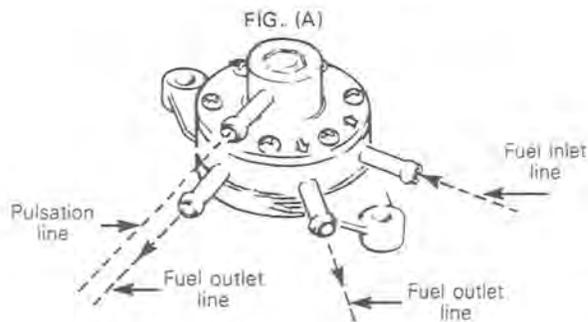
ONE OUTLET
PUMP

1. Fuel pump assembly
2. Packing
3. Diaphragm
4. Grommet
5. Valve
6. Diaphragm
7. Packing (cap)
8. Screw
9. Pump body

10. Pulse chamber
11. Cover
12. Fuel pump assembly
13. Diaphragm
14. Membrane
15. Packing (cap)
16. Screw
17. Cover
18. Pulse chamber

REMOVAL

- Disconnect fuel inlet line at fuel pump then secure fuel line to steering support so that the open end is located higher than the fuel tank.
- Disconnect fuel outlet line(s).
- Disconnect pulsation line.
- Remove nuts and bolts securing fuel pump.



DISASSEMBLY & ASSEMBLY

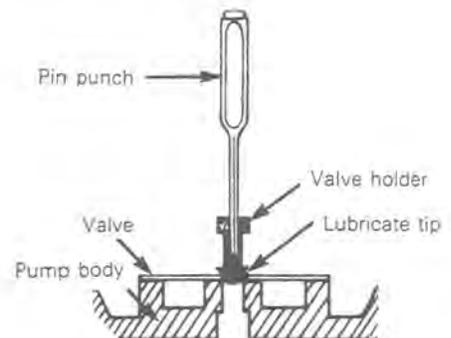
4,5,9, Grommet, valve, pump body

Do not disassemble valve unless replacement is indicated.

To install a new valve, proceed as follows:

- Place new valve flat on its seat.

- Insert a 3/32" pin punch inside valve holder and lubricate tip of holder with a drop of oil.
- Push holder into pump body as illustrated.



CLEANING & INSPECTION

The entire pump should be cleaned with general purpose solvent before disassembly.

Fuel pump components should be cleaned in general purpose solvent and dried with compressed air.

WARNING: Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as each is flammable and explosive.

Inspect diaphragm. The pumping area should be free of holes or imperfections. Replace as needed.

Check fuel pump valves operation as follows:

Connect a length of clean plastic tubing to the inlet nipple and alternately apply pressure and vacuum with the mouth. The inlet valve should release with pressure and hold under vacuum.

Repeat the same procedure at the outlet nipple. This time the outlet valve should hold with pressure and release under vacuum.

NOTE: On model fitted with two outlets, plug one outlet with finger while checking outlet valve.

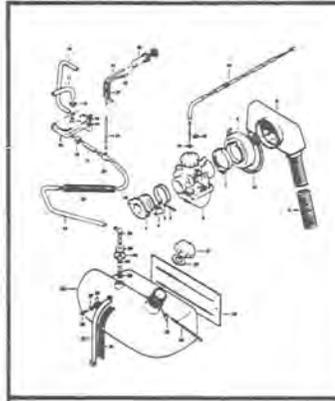
INSTALLATION

To install, inverse removal procedure.

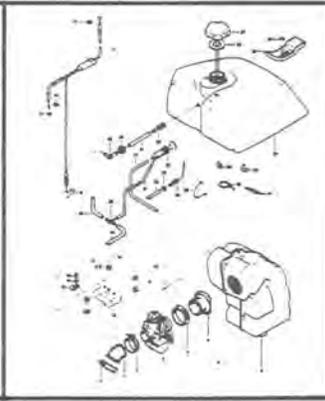


AIR INTAKE SILENCER AND FUEL TANK

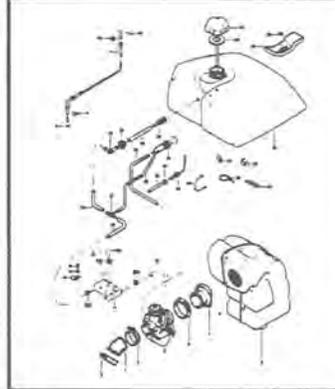
Elan



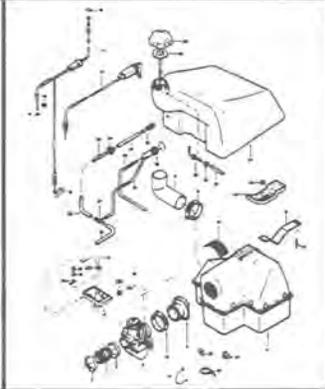
Citation



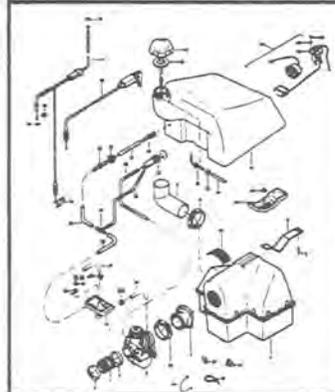
Skandic



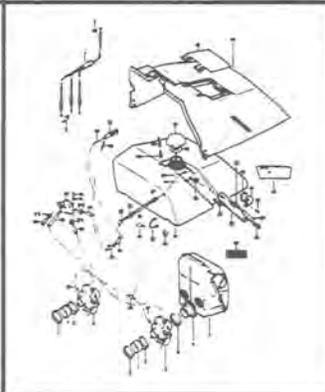
Safari



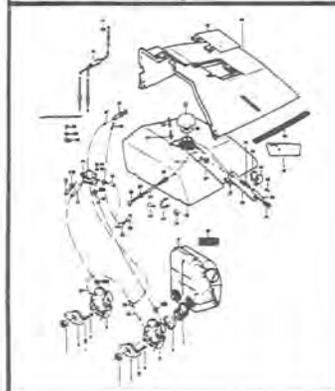
SS-25, Sonic L/C



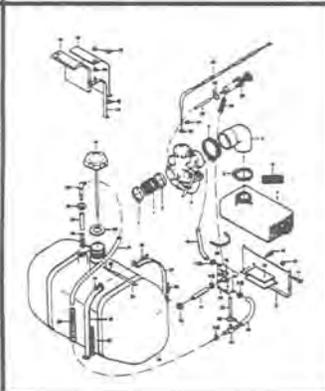
Blizzard 5500 MX



Blizzard 9700

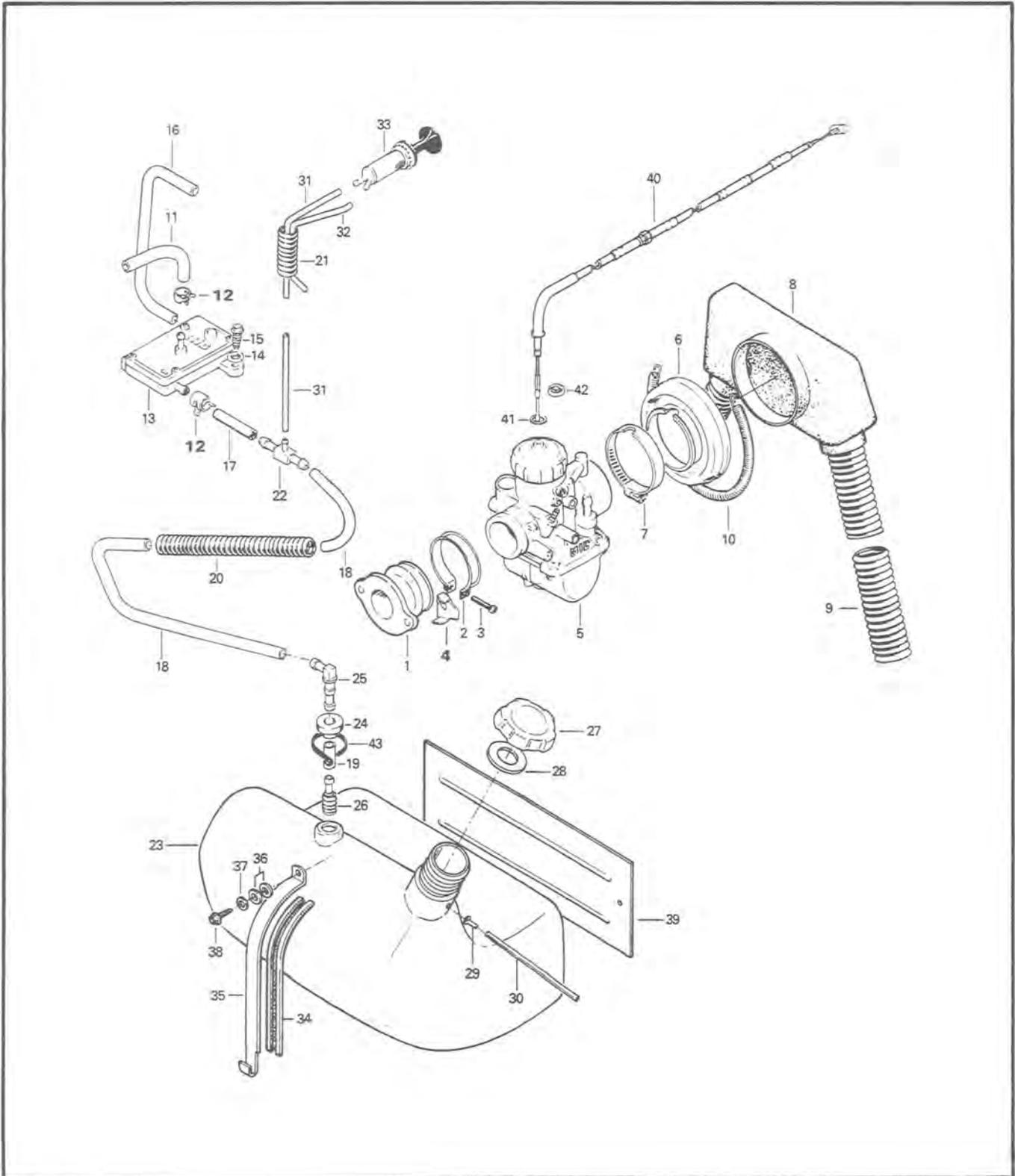


Alpine



SECTION 02 ENGINE
SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

ELAN



SECTION 02 ENGINE

SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

- | | |
|---|--|
| 1. Carburetor adaptor | 23. Fuel tank |
| 2. Clamp | 24. Grommet |
| 3. Screw | 25. Male connector |
| 4. Tab lock (2) | 26. Fuel filter |
| 5. Carburetor VM28-242 | 27. Fuel tank cap |
| 6. Adaptor | 28. Gasket |
| 7. Clamp | 29. Air vent fitting |
| 8. Air intake box | 30. Air vent tube 27" (586 mm) |
| 9. Tube (2) | 31. Primer tube 18 1/2" (470 mm) |
| 10. Spring | 32. Primer tube 7" (178 mm) |
| 11. Impulse hose 7 1/4" (184 mm) | 33. Primer valve |
| 12. Spring clip (2) | 34. Protector strip 9" (229 mm) |
| 13. Fuel pump | 35. Retainer strip |
| 14. Internal tooth lockwasher 1/4" (2) | 36. Rubber spacer (2) |
| 15. Hexagonal washer head metal screw 12 x 3/4" (2) | 37. Flat washer 7/32" x 5/8" x .060" |
| 16. Fuel line 17" (332 mm) | 38. Hexagonal washer head self tapping screw 12 x 1" |
| 17. Fuel line 1 1/2" (38 mm) | 39. Heat shield |
| 18. Fuel line 36 1/2" (927 mm) | 40. Throttle cable & housing |
| 19. Fuel line 14" (356 mm) | 41. O-ring |
| 20. Isolating line 29 1/2" (750 mm) | 42. Retaining ring |
| 21. Isolating line 4" (102 mm) | 43. Tie wrap |
| 22. Tee | |
-

4, Tab lock

Always bend tab lock over screws and replace if they seem worn.

12, Spring clips

Always reposition spring clips after any repair to prevent possible leaks.

SECTION 02 ENGINE

SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

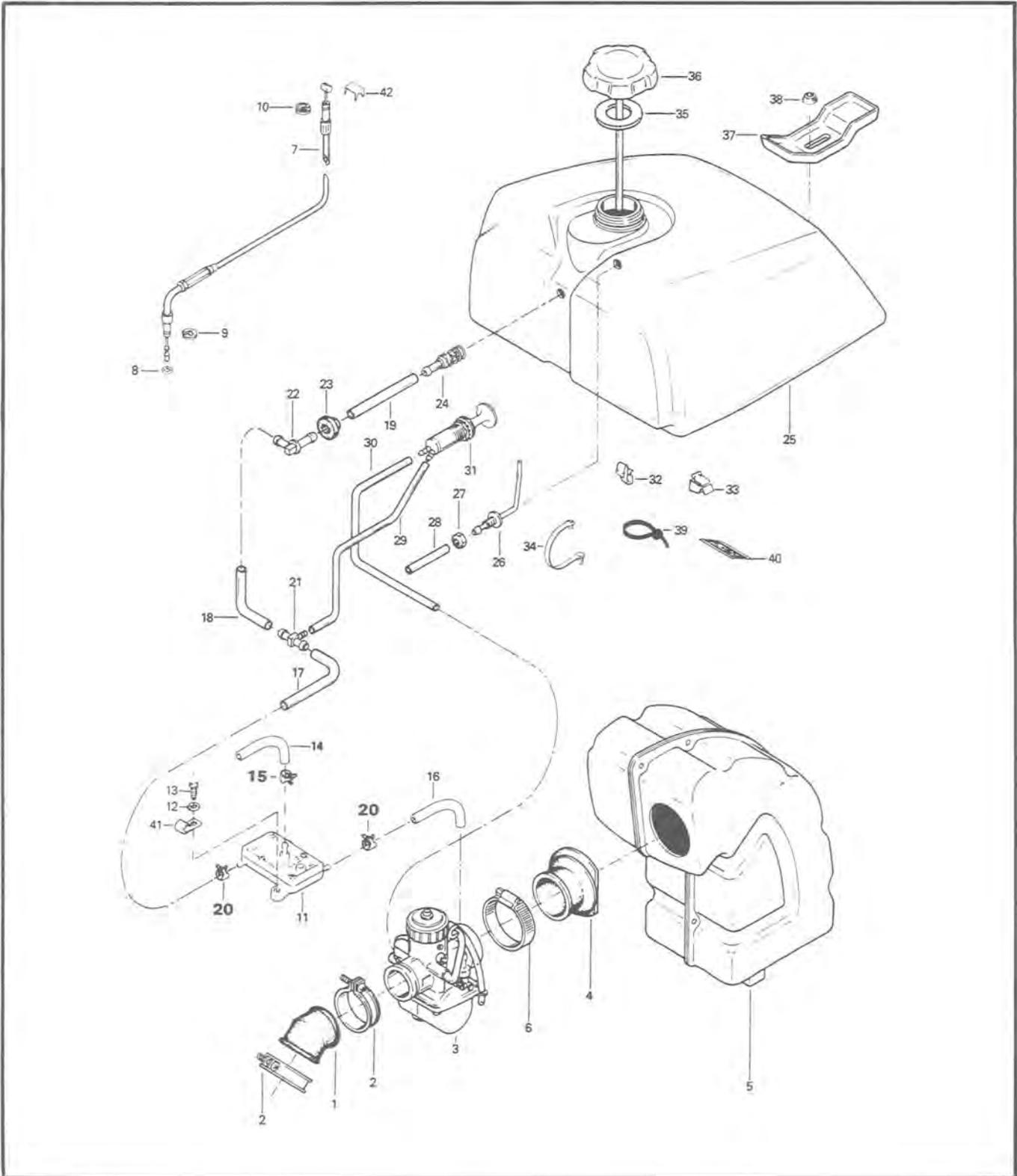
- | | |
|--|---|
| 1. Rubber flange | 22. Spring clip (2) |
| 2. Clamp (2) | 23. Tee |
| 3. Carburetor VM34-255 | 24. Male connector |
| 4. Adaptor | 25. Grommet |
| 5. Air silencer | 26. Fuel filter |
| 6. Clamp | 27. Fuel tank |
| 7. Throttle cable & housing | 28. Air vent fitting |
| 8. Tab lock | 29. Hexagonal nut 5/16"-18 |
| 9. O-ring | 30. Air vent tube 62" (1575 mm) |
| 10. Retaining ring | 31. Primer tube 20" (508 mm) 7" (178 mm) |
| 11. Circlip | 32. Primer valve |
| 12. Fuel pump | 33. Clip |
| 13. Clip | 34. Clip |
| 14. Internal tooth lockwasher 1/4" (2) | 35. Cable clip |
| 15. Hexagonal washer head self-tapping screw 1/2" x 3/4" (2) | 36. Gasket |
| 16. Impulse hose 11" (280 mm) | 37. Cap |
| 17. Spring clip | 38. Retainer |
| 18. Fuel line 20" (508 mm) | 39. Hexagonal flanged elastic stop nut 6 mm (2) |
| 19. Fuel line 20" (508 mm) | 40. Tie rap |
| 20. Fuel line 15" (380 mm) | 41. Warning label |
| 21. Fuel line 14" (356 mm) | |

17,22, Spring clips

Always reposition spring clips after any repair to prevent possible leaks.

SECTION 02 ENGINE
SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

SKANDIC



SECTION 02 ENGINE
SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

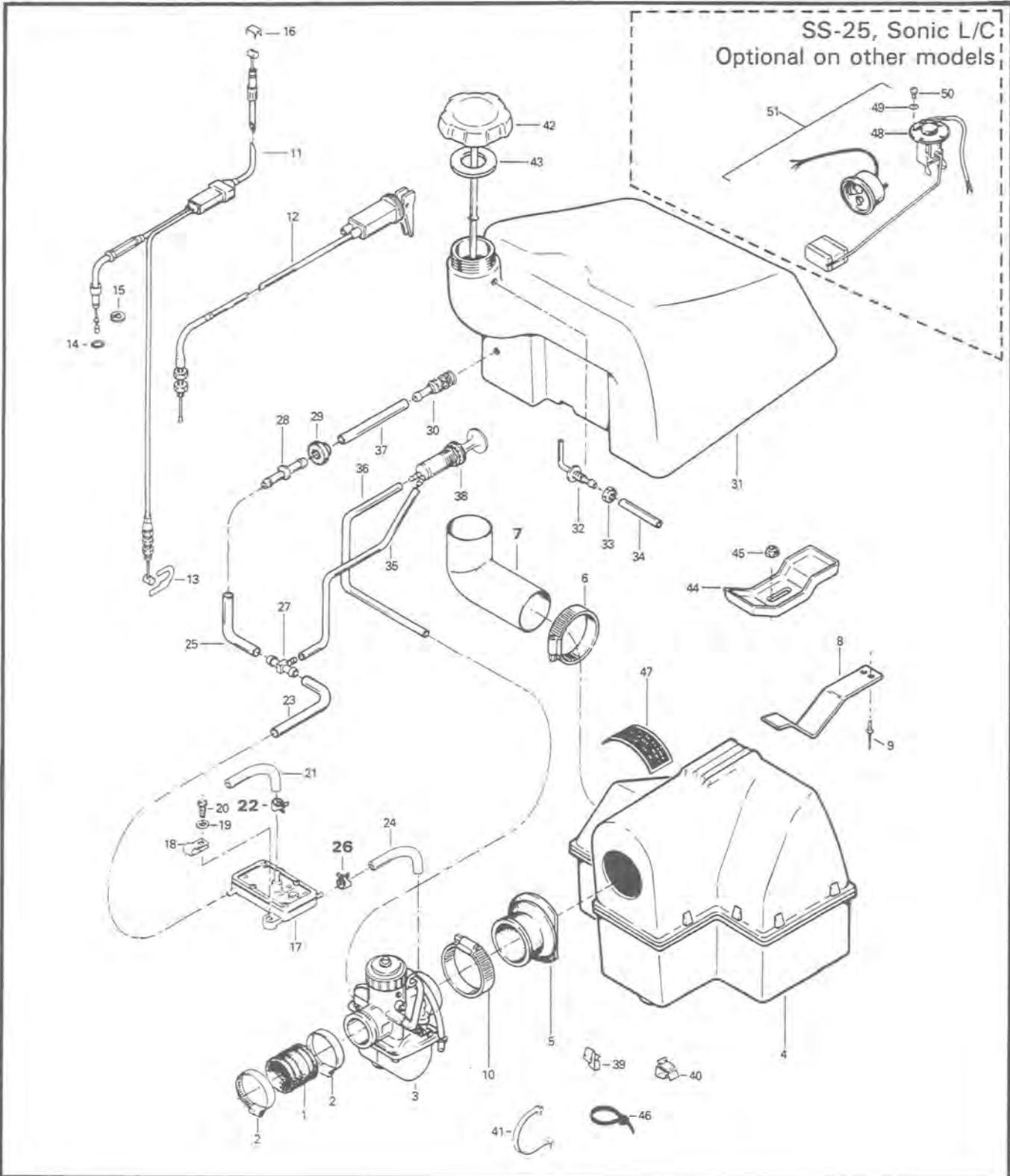
- | | |
|---|--|
| <ol style="list-style-type: none">1. Rubber flange2. Clamp (2)3. Carburetor VM 34-2764. Adaptor5. Air silencer6. Clamp7. Throttle cable & housing8. O'ring9. Retaining ring10. Circlip11. Fuel pump12. Internal tooth lockwasher 1/4" (2)13. Hexagonal washer head self-tapping screw M6 x 1 x 20 (2)14. Impulse hose 11" (280 mm)15. Spring clip16. Fuel line 20" (508 mm)17. Fuel line 20" (508 mm)18. Fuel line 15" (380 mm)19. Fuel line 14" (356 mm)20. Spring clip (2)21. Tee | <ol style="list-style-type: none">22. Male connector23. Grommet24. Fuel filter25. Fuel tank26. Air vent fitting27. Hexagonal nut 5/16"-1828. Air vent tube29. Primer tube 7" (178 mm)30. Primer tube (amorkeur) 20" (508 mm)31. Primer valve32. Clip33. Clip34. Cable clip35. Gasket36. Cap37. Retainer38. Hexagonal flanged elastic stop nut 6 mm (2)39. Tie rap40. Warning label41. Clip42. Lock tab |
|---|--|

15,20, Spring clips

Always reposition spring clips after any repair to prevent possible leaks.

SECTION 02 ENGINE
SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

SS-25, SONIC L/C
SAFARI 377, 447, GRAND LUXE



SECTION 02 ENGINE
SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

1. Rubber flange
2. Clamp (2)
3. Carburetor
4. Air silencer
5. Adaptor
6. Clamp
7. Elbow
8. Air silencer support
9. Rivet (2)
10. Clamp
11. Throttle cable & housing
12. Choke cable & housing
13. Tab lock
14. O-ring
15. Retaining ring
16. Lock tab
17. Fuel pump
18. Clip
19. Internal tooth lockwasher 1/4" (2)
20. Hexagonal washer head self-tapping screw 12 x 3/4" (2)
21. Impulse hose
22. Spring clip (2)
23. Fuel line
24. Fuel line
25. Fuel line 6.5" (177 mm)
26. Spring clip
27. Tee
28. Male connector
29. Grommet
30. Fuel filter
31. Fuel tank
32. Air vent fitting
33. Hexagonal nut 5/16"-18
34. Air vent tube 65" (1665 mm)
35. Primer tube 7.0" (177 mm)
36. Primer tube 16.5" (419 mm)
37. Fuel line 17"
38. Primer valve
39. Clip
40. Clip
41. Cable clip
42. Cap
43. Gasket
44. Retainer (2)
45. Hexagonal flanged elastic stop nut 6 mm (4)
46. Tie rap
47. Warning label
48. Fuel level sensor
49. External tooth lockwasher 5 mm (5)
50. Cylindrical Phillips head screw M5 x 14 (5)
51. Fuel level sensor kit with dial indicator

22,26, Spring clips

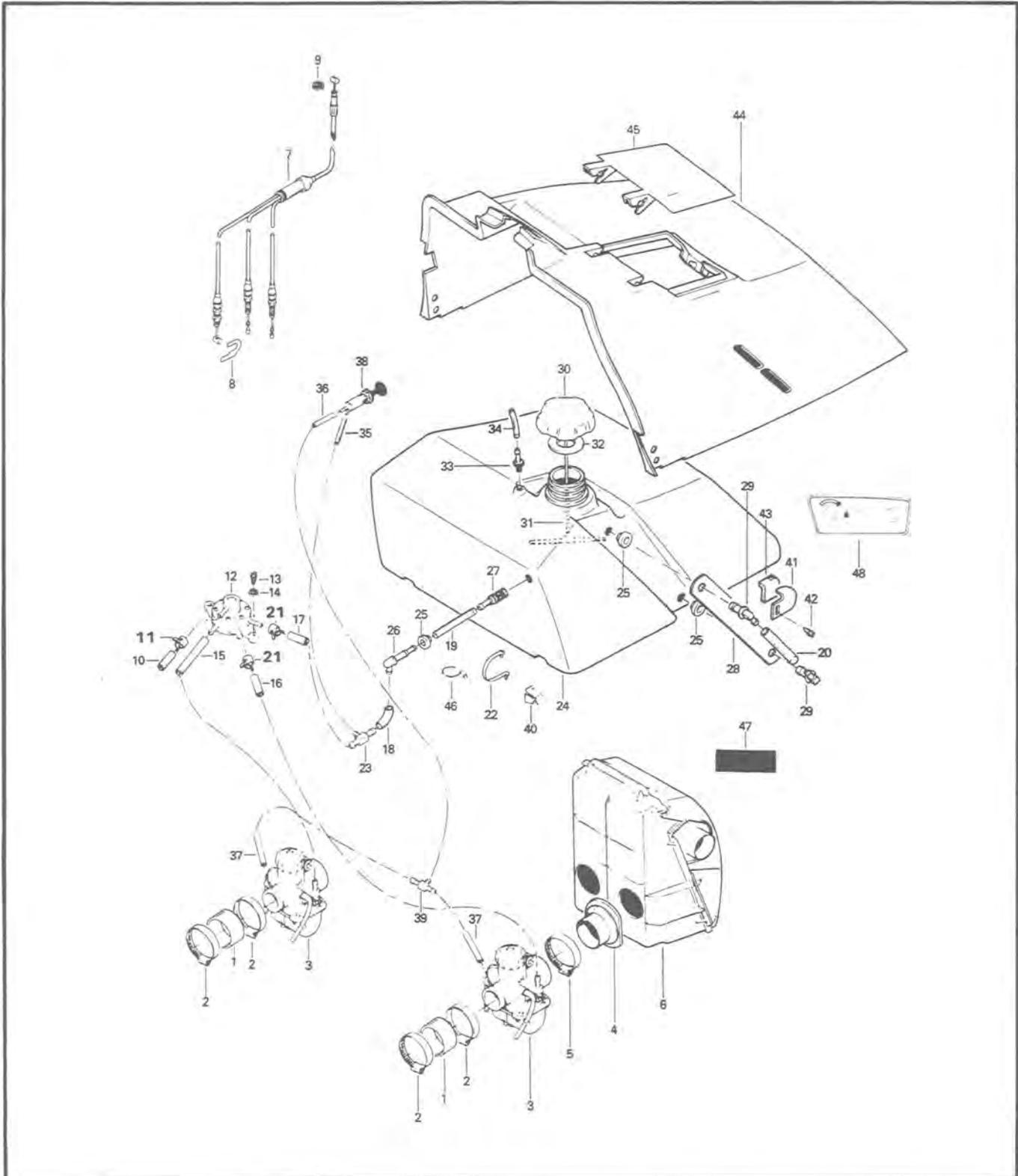
Always reposition spring clips after any repair to prevent possible leaks.

7, Elbow

The air box elbow must be maintain upward in any condition.

SECTION 02 ENGINE
SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

BLIZZARD 5500 MX



SECTION 02 ENGINE
SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

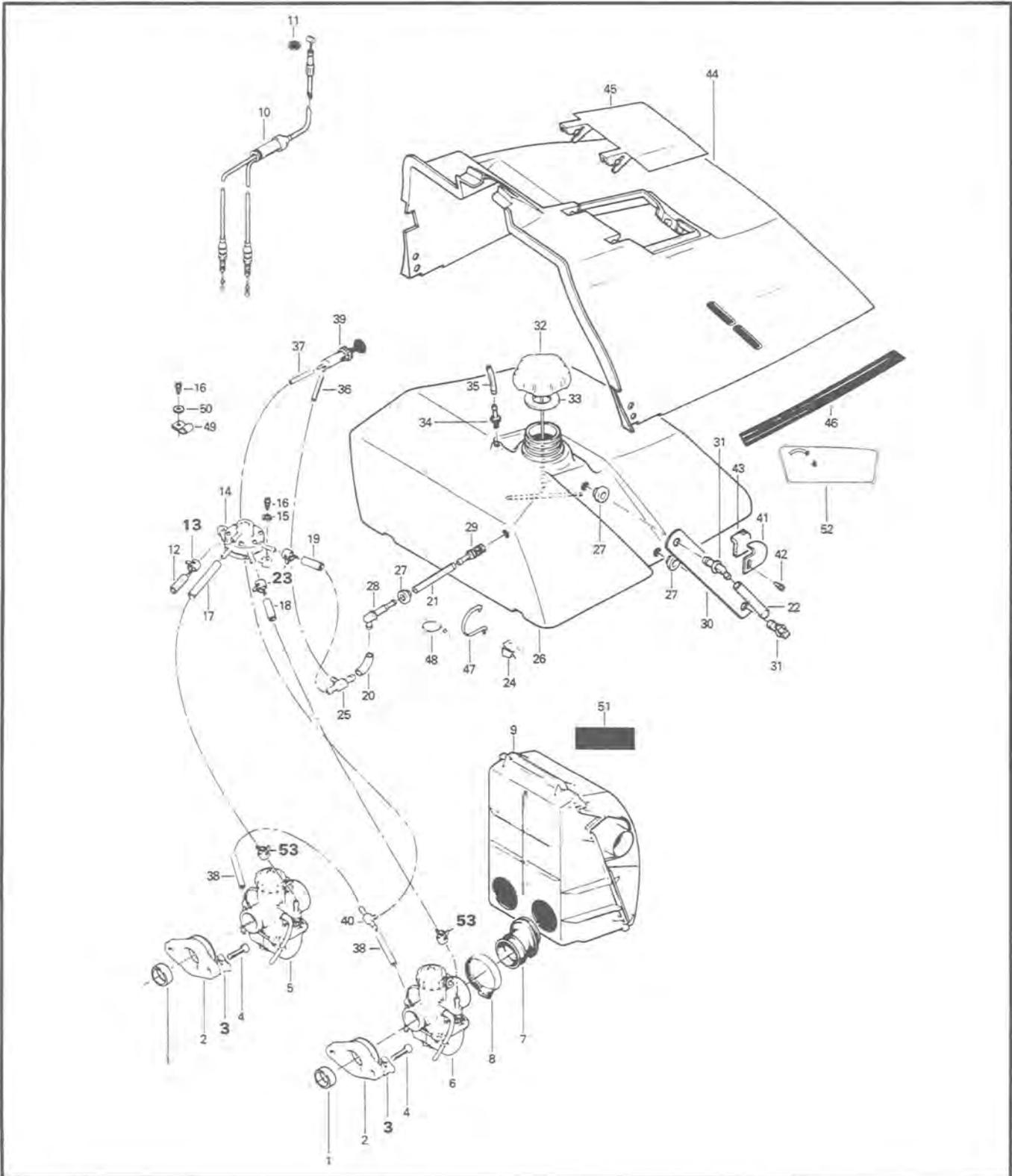
- | | |
|--|--|
| 1. Rubber flange (2) | 25. Grommet (3) |
| 2. Clamp (4) | 26. Male connector |
| 3. Carburetor VM 34-203 (2) | 27. Fuel filter |
| 4. Adaptor (2) | 28. Back plate |
| 5. Gear clamp (2) | 29. Male connector (2) |
| 6. Air intake | 30. Fuel tank cap |
| 7. Throttle cable & housing | 31. Cap holder |
| 8. Cable lock | 32. Gasket |
| 9. Circlip | 33. Air vent fitting |
| 10. Impulse hose 11" (280 mm) | 34. Air vent tube 58" (1473 mm) |
| 11. Spring clip | 35. Primer tube 24" (610 mm) |
| 12. Fuel pump | 36. Primer tube 31" (788 mm) |
| 13. Hexagonal washer head self-tapping screw 12 x 3/4" (2) | 37. Primer tube 4.5" (115 mm) |
| 14. Internal tooth lockwasher 1/4" (2) | 38. Primer valve |
| 15. Fuel line 15" (381 mm) | 39. Tee |
| 16. Fuel line 15" (381 mm) | 40. Clip |
| 17. Fuel line 16" (407 mm) | 41. Tank retainer |
| 18. Fuel line 7" (175 mm) | 42. Hexagonal washer head self-tapping screw 12 x 3/4" |
| 19. Fuel line 20" (508 mm) | 43. Felt strip 1.75" x 2 (45 mm x 2) |
| 20. Fuel gauge 7.37" (187 mm) | 44. Tank cover |
| 21. Spring clip (2) | 45. Access door |
| 22. Cable clip | 46. Tie rap |
| 23. Tee | 47. Warning label |
| 24. Fuel tank | 48. Verification plate |

11,21, Spring clips

Always reposition spring clips after any repair to prevent possible leaks.

SECTION 02 ENGINE
SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

BLIZZARD 9700



SECTION 02 ENGINE

SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

- | | |
|---|--|
| <ol style="list-style-type: none">1. Plastic sleeve (2)2. Rubber Flange with clamp (2)3. Tab lock (4)4. Hexagonal head cap screw M8 x 20 (4)5. Carburetor magneto side VM40-246. Carburetor P.T.O. side VM40-237. Adaptor (2)8. Gear clamp (2)9. Air silencer10. Throttle cable & housing11. Circlip12. Impulse hose 11" (280 mm)13. Spring clip (2)14. Fuel pump15. External tooth lockwasher M5 (2)16. Hexagonal washer head self-tapping screw 12 x 3/4" (3)17. Fuel line 15" (381 mm)18. Fuel line 18.5" (470 mm)19. Fuel line 25.5" (648 mm)20. Fuel line 6" (153 mm)21. Fuel line 20" (508 mm)22. Fuel gauge 7.37" (187 mm)23. Spring clip24. Clip25. Tee26. Fuel tank27. Grommet (3) | <ol style="list-style-type: none">28. Male connector29. Fuel filter30. Back plate31. Male connector (2)32. Fuel tank cap33. Gasket34. Air vent fitting35. Air vent tube 58" (1473 mm)36. Primer tube 24" (610 mm)37. Primer tube 31" (788 mm)38. Primer tube 4.5" (115 mm) x 239. Primer valve40. Tee41. Tank retainer42. Hexagonal washer head self-tapping screw 12 x 3/4"43. Felt strip 1.75" x 2 (45 mm x 2)44. Tank cover45. Access door46. Decal set47. Cable clip48. Tie rap49. Clip50. Flat washer 7/32" x 5/8" x .060"51. Warning label52. Verification label53. Spring clip (2) |
|---|--|

3, Tab lock

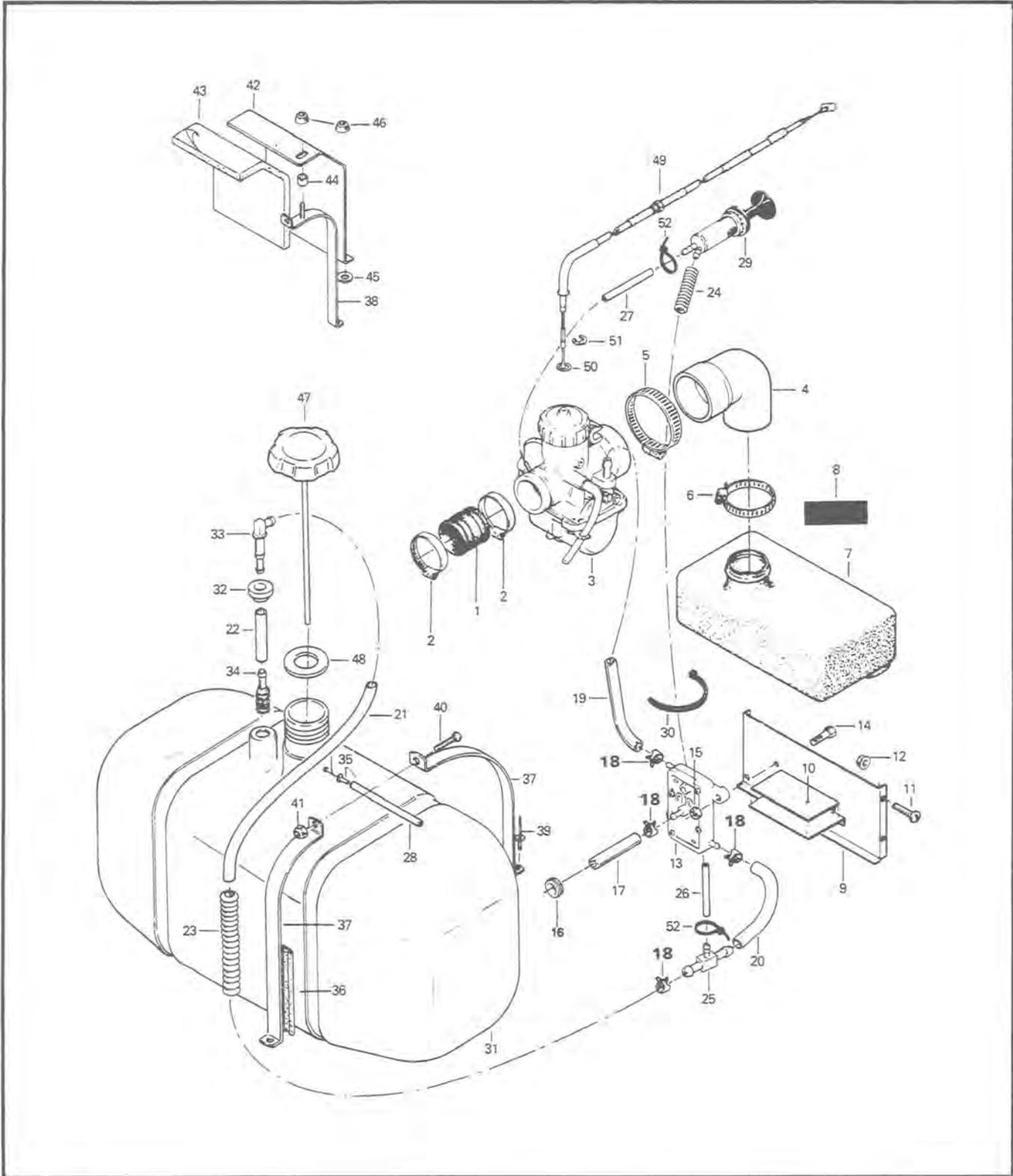
Always bend tab lock over screws and replace if they seem worn.

13,23,53, Spring clips

Always reposition spring clips after any repair to prevent possible leaks.

SECTION 02 ENGINE
SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

ALPINE



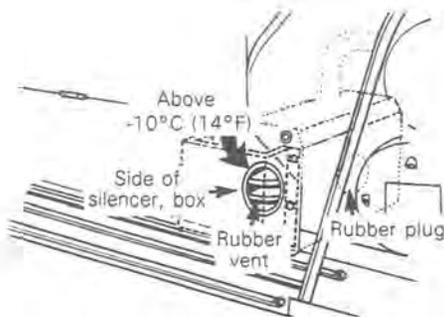
SECTION 02 ENGINE SUB-SECTION 10 (AIR INTAKE SILENCER AND FUEL TANK)

1. Carburetor adaptor
2. Clamp (2)
3. Carburetor VM34-297
4. Air intake elbow
5. Gear clamp
6. Hose clamp
7. Air intake
8. Warning label
9. Baffle
10. Foam for baffle
11. Pan slotted head machine screw $1/4''-20 \times 3/4''$ (4)
12. Hexagonal flanged elastic stop nut $1/4''-20$ (4)
13. Fuel pump
14. Hexagonal head cap screw $1/4''-20 \times 3/4''$ (2)
15. Hexagonal elastic stop nut $1/4''-20$ (2)
16. Grommet
17. Impulse hose 16'' (407 mm)
18. Spring clip (4)
19. Fuel line 26'' (661 mm)
20. Fuel line 15'' (381 mm)
21. Fuel line 49.5'' (1258 mm)
22. Fuel line 17'' (432 mm)
23. Isolating line 34'' (864 mm)
24. Isolating line 10'' (254 mm)
25. Tee (primer valve)
26. Primer tube 22'' (559 mm)
27. Primer tube 14'' (356 mm)
28. Air vent tube 57.5'' (1461 mm)
29. Primer valve
30. Tie wrap
31. Fuel tank
32. Grommet
33. Male connector
34. Fuel filter
35. Air vent fitting
36. Protector strip 4 x 9'' (229 mm)
37. Retainer strip (3)
38. Retainer strip
39. Rivet (4)
40. Round slotted head machine screw 10-24 x 3'' (2)
41. Hexagonal elastic stop nut 10-24 (2)
42. Tank deflector
43. Foam
44. Rubber spacer
45. Rubber washer (2)
46. Hexagonal flanged elastic stop nut $1/4''-20$ (3)
47. Fuel tank cap
48. Gasket
49. Throttle cable & housing
50. O'ring
51. Retainer ring
52. Tie rap

18, Spring clips

Always reposition spring clips after any repair to prevent possible leaks.

When operating the vehicle in temperature exceeding -10°C (14°F), the rubber plug must block the engine side orifice and the rubber vent must be positioned on the side of the silencer box to allow cold air circulation.



In temperature below -10°C (14°F) and/or powder snow, the rubber plug must block the entry of fresh air on the side of the silencer box and the rubber vent must allow the warm air being emitted from the engine to be directed over the carburetor.

CAUTION: Observe temperature changes and locate plugs accordingly. Incorrect location of plugs may cause carburetor ice-up or engine overheating.



PULLEY GUARD

DISASSEMBLY & ASSEMBLY

○ NOTE: For additional information (ex.: exploded view) refer to the 1984 correspondent parts catalog.

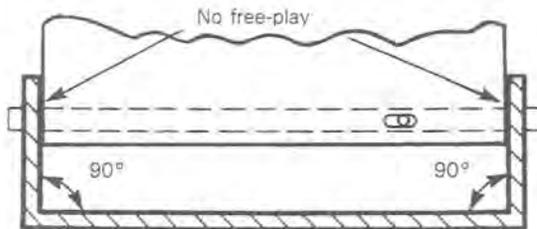
◆ WARNING: Engine should be running only when belt guard and/or pulley guard are well secured in place.

INSPECTION

Elan & Alpine models

Check the spring loaded retaining pin for free operation. Replace any damaged parts.

Prior to installation, ensure that pulley guard and frame bracket are 90° with frame.



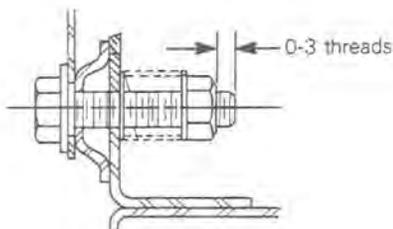
◆ WARNING: No lateral free-play should exist between drive pulley guard and frame bracket.

ADJUSTMENT

Elan, Citation, Skandic & Alpine models

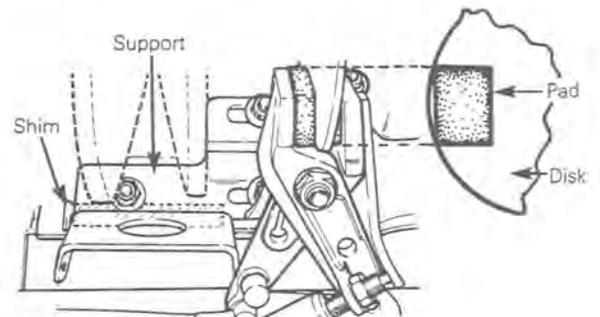
The length of the uncompressed retaining pin spring should not be less than 47 mm (1 7/8").

An uncompressed front guard spring should not be less than 20 mm (13/16"). When assembling adjust length as illustrated below.



Citation & Skandic models

When replacing the belt guard and brake support bracket, the support bracket must be leveled to ensure full contact of brake pad on disk. Use shim as illustrated below.





DRIVE BELT

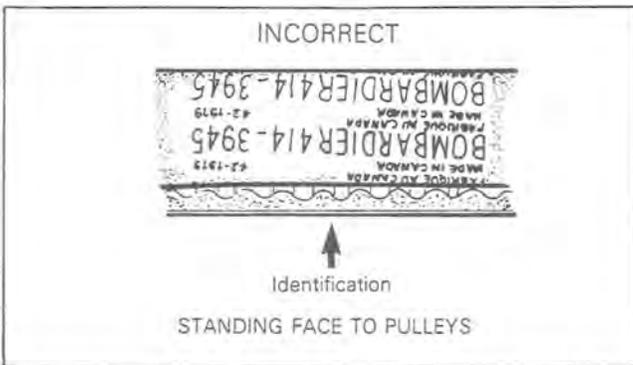
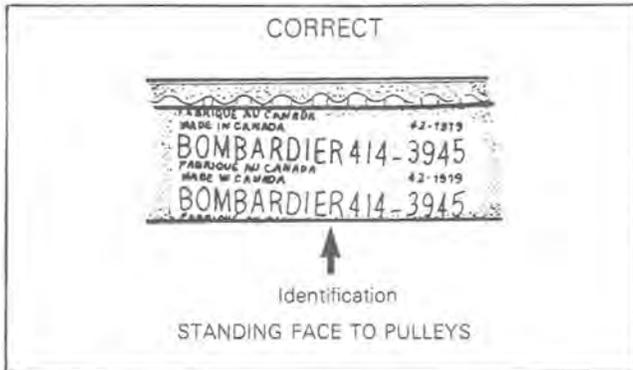
APPLICATION CHART (1984 MODELS)

MODEL	NUMBER	MAX. WIDTH (NEW)	MIN. WIDTH (WEAR LIMIT)
ELAN	570 0411 00	30 mm (1 3/16")	27 mm (1 1/16")
CITATION 3500 SKANDIC 377/R BLIZZARD 5500 MX ALPINE 503	414 3758 00	33.3 mm (1 5/16")	30 mm (1 3/16")
SAFARI SS-25 SONIC L/C	414 5233 00	35 mm (1 3/8")	32 mm (1 1/4")
BLIZZARD 9700	414 5059 00	35 mm (1 3/8")	32 mm (1 1/4")

SECTION 03 TRANSMISSION SUB-SECTION 02 (DRIVE BELT)

ROTATION DIRECTION

The maximum drive belt life span is obtained when the belt has the proper rotation direction.



○ NOTE: For used drive belt, mark and reinstall in the same rotation direction.

REMOVAL & INSTALLATION

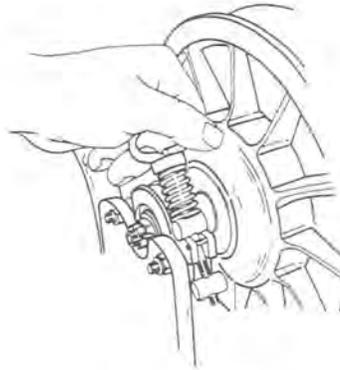
▼ CAUTION: Do not force or use tools to pry the belt into place, as this could cut or break the cords in the belt.

◆ WARNING: Do not operate snowmobile without drive belt or its guard installed. Serious bodily injury could occur.

Tilt cab and remove pulley or belt guard.

Citation & Skandic models

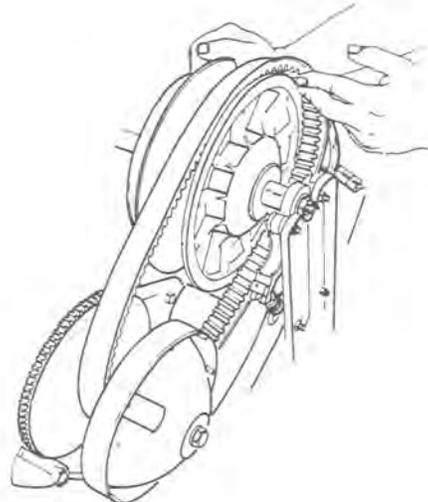
Loosen the countershaft bearing retaining screw and open the bearing cage.



Open the driven pulley by twisting and pushing the sliding half. Hold in fully open position.

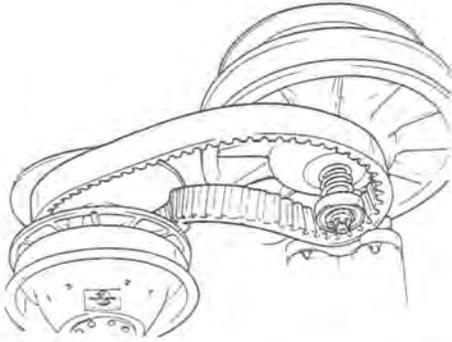


Slip the belt over the top edge of the fixed half.

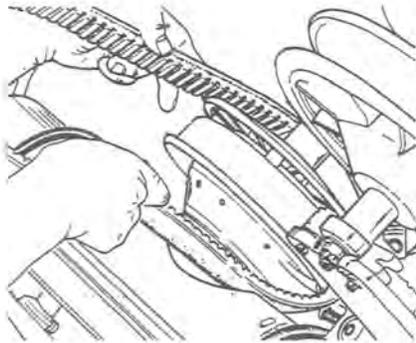


SECTION 03 TRANSMISSION SUB-SECTION 02 (DRIVE BELT)

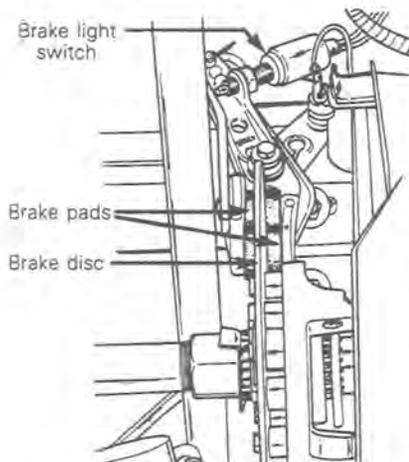
Lift the countershaft upward approx. 50 mm (2 in.) and slip the belt between the shaft and the bearing cage to remove completely.



○ **NOTE:** It may be necessary to loosen the brake adjustment in order to easily lift the countershaft. Slip the belt out from the drive pulley.



◆ **WARNING:** After drive belt installation, always check that the brake disc is correctly installed between the brake pads and that the brake is well adjusted. Check brake light operation.

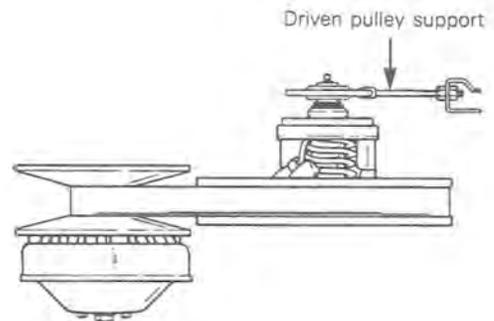


To install the drive belt, reverse the procedure.

▼ **CAUTION:** Once belt is installed, be sure to secure the countershaft bearing by closing the bearing cage and firmly tightening the retaining screw.

Safari, SS-25 & Sonic L/C models

Unlock and raise the driven pulley support.



Open the driven pulley by twisting and pushing the sliding half. Hold in fully open position.

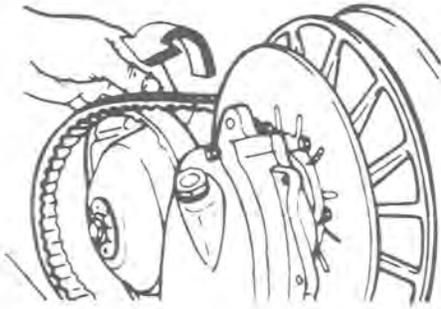


Slip slackened belt over the top edge of the sliding half.



SECTION 03 TRANSMISSION
SUB-SECTION 02 (DRIVE BELT)

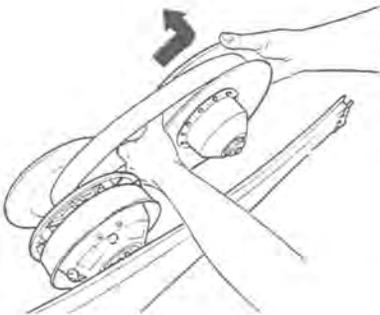
Slip the belt out from the drive pulley and remove completely from vehicle.



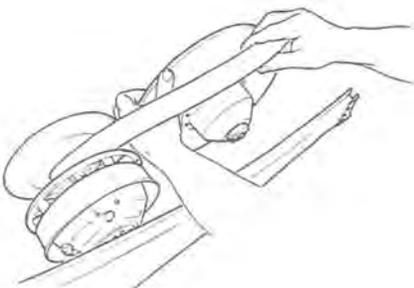
To install the drive belt, reverse the procedure.

Elan, Blizzard 5500 MX & Blizzard 9700 models

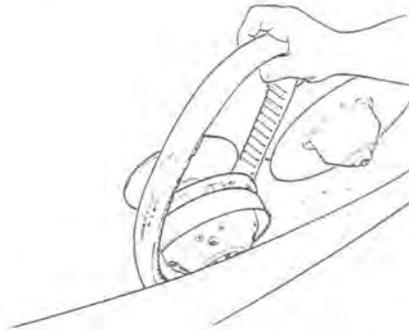
Open the driven pulley by twisting and pushing the sliding half. Hold in fully open position.



Slip the belt over the top edge of the fixed half.



Slip the belt out from the drive pulley and remove completely from the vehicle.



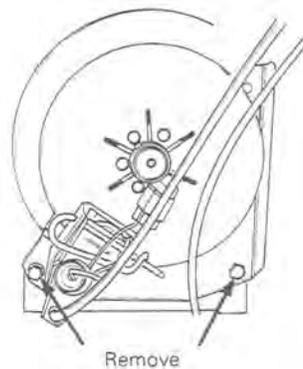
To install the drive belt reverse procedure.

Alpine model

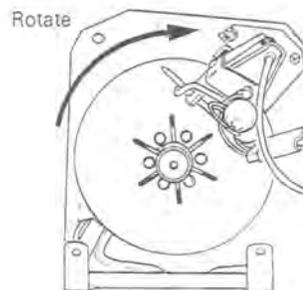
To remove belt from pulleys, follow the Elan procedure.

To remove belt from vehicle:

- Remove the two bolts holding brake support to the frame.

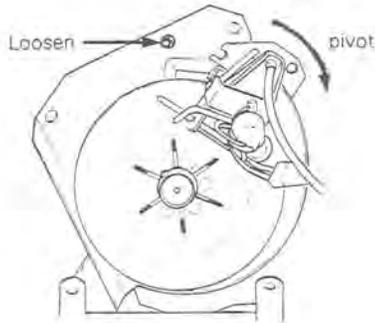


- Rotate the brake support on the transmission shaft.



SECTION 03 TRANSMISSION SUB-SECTION 02 (DRIVE BELT)

- Loosen the nut holding brake caliper to brake bracket and pivot the brake assembly half a turn.



- Slip the belt over the transmission shaft.
- To install drive belt, reverse procedure.

DRIVE BELT DEFLECTION MEASUREMENT

○ **NOTE:** The drive belt deflection measurement must be performed each time a new drive belt is installed.

○ **NOTE:** To obtain an accurate drive belt deflection measurement, it is suggested to allow a break-in period of 50 km (30 miles) to the drive belt.

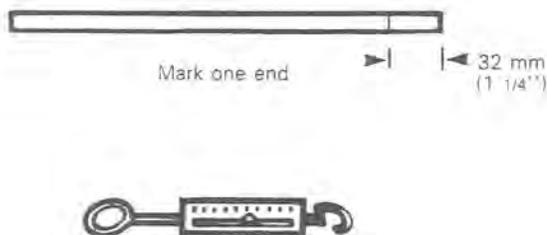
Before checking the belt deflection, ensure vehicle has its proper belt number and correct belt width. (Refer to the application chart, at the beginning of this sub-section.)

To obtain maximum vehicle performance, the belt tension must be adjusted to 6.8 kg (15 pounds) with a deflection of 32 mm (1 1/4").

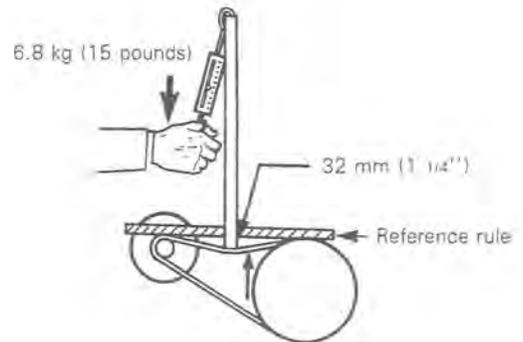
To check tension

Position a reference rule on drive belt.

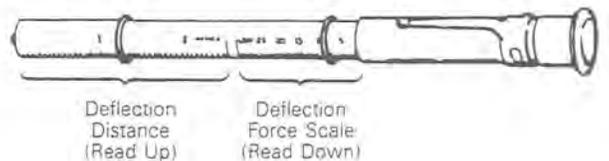
Wooden stick and fish scale method:



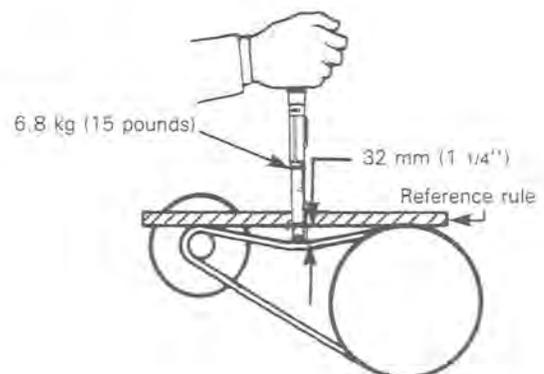
Apply a 6.8 kg (15 pounds) pressure on drive belt. Deflection must be 32 mm (1 1/4").



Using the belt tension tester P/N 414 3482 00 (service tool).



1. Slide lower "O" ring of deflection distance scale to 32 mm (1 1/4").
2. Slide upper "O" ring to zero pound on the deflection force scale.
3. Apply pressure until lower "O" ring is flush with edge of rule.
4. Read deflection force on the upper scale (at top edge of "O" ring). Reading of 6.8 kg (15 pounds) should be obtained.



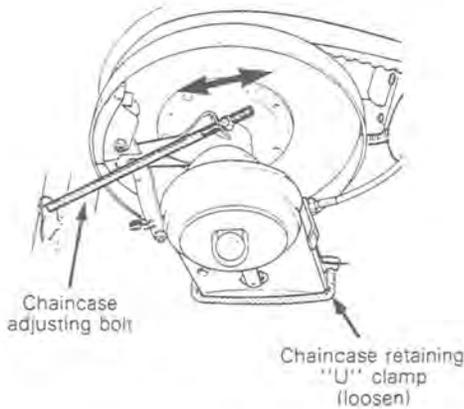
SECTION 03 TRANSMISSION
SUB-SECTION 02 (DRIVE BELT)

DEFLECTION ADJUSTMENT

Elan model

The proper drive belt deflection is obtained by chaincase movement.

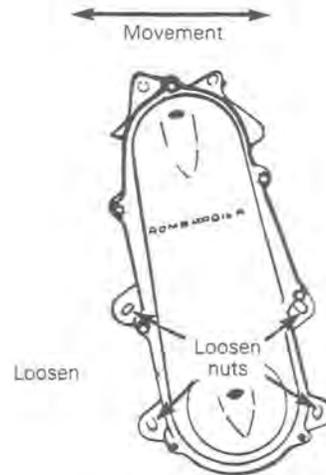
To do so, loosen the chaincase retaining "U" clamp and screw or unscrew the chaincase adjusting bolt.



Safari, SS-25 & Sonic models

Drive belt deflection is adjusted with the movement of the chaincase/countershaft assembly.

To do so, loosen the 4 chaincase retaining nut; unlock the countershaft support attachment and screw or unscrew to adjust distance between pulleys.



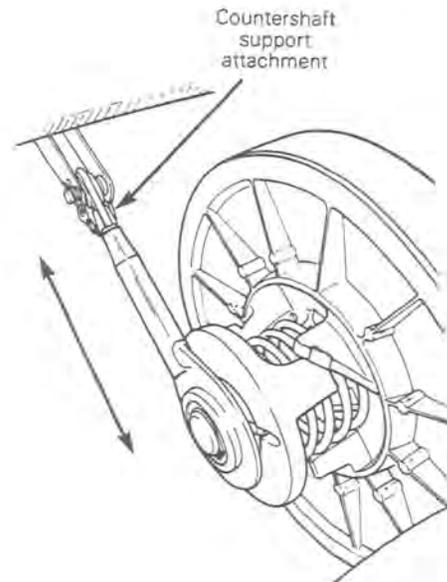
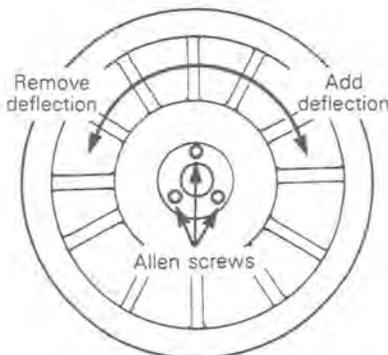
Citation, Skandic & Blizzard models

The drive belt deflection is adjusted with three (3) Allen screws located to the outer face of the driven (fixed half) pulley.

To add deflection, equally screw the three Allen screws.

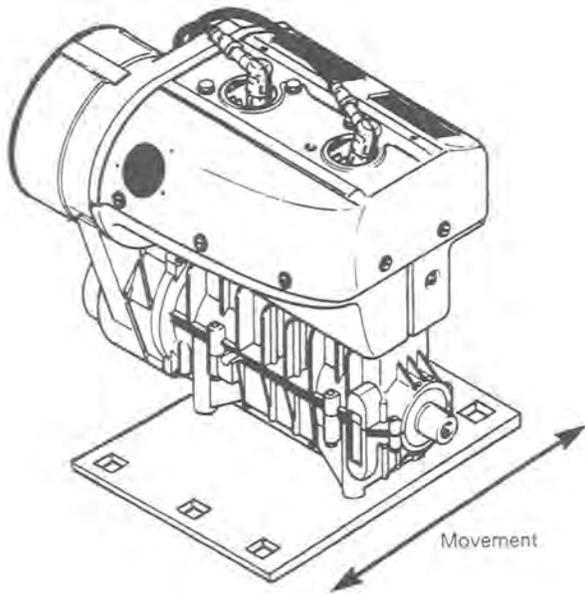
To remove deflection, equally unscrew the three Allen screws.

○ NOTE: At drive belt deflection adjustment, turn the Allen screws 1/4 turn at a time.



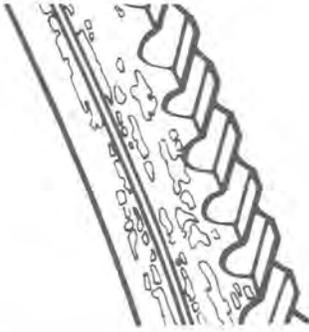
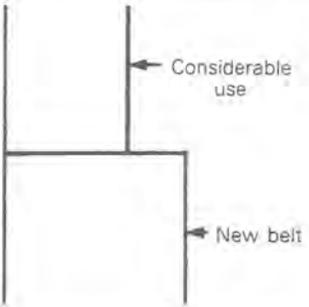
Alpine model

The deflection is adjusted by moving engine bracket.
To do so, loosen engine bracket nuts and adjust distance
between pulleys.

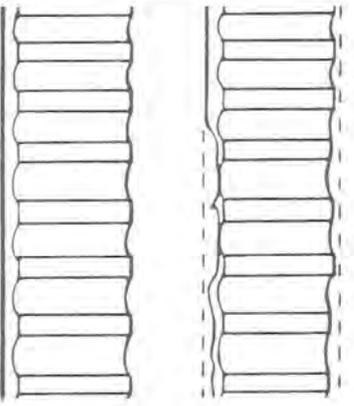
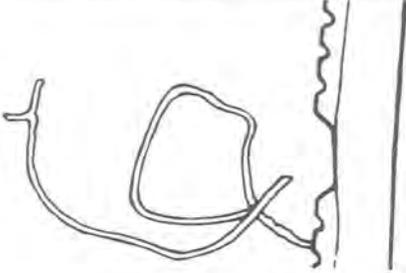
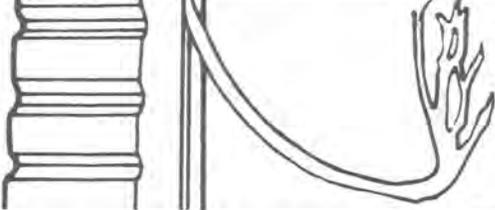
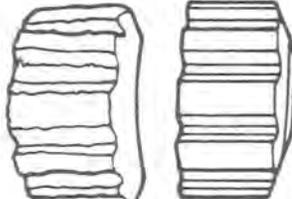


SECTION 03 TRANSMISSION
 SUB-SECTION 02 (DRIVE BELT)

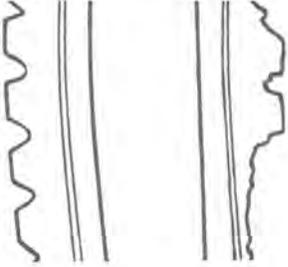
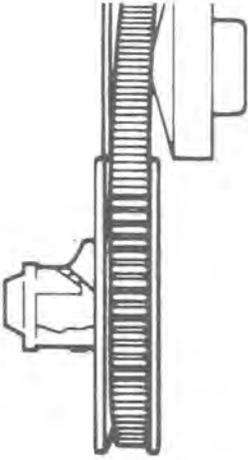
TROUBLE SHOOTING

1. Uneven belt wear on one side only.		
	<p>CAUSE</p> <ul style="list-style-type: none"> a) Loosen engine mount. b) Pulley misalignment. c) Rough or scratched pulley surfaces. 	<p>REMEDY</p> <ul style="list-style-type: none"> a) Tighten engine mount nuts equally. b) Align pulleys. c) Repair or replace pulley half.
2. Belt glazed excessively or having baked appearance.		
	<p>CAUSE</p> <p>Excessive slippage caused by:</p> <ul style="list-style-type: none"> a) Insufficient pressure on belt sides. b) Rusted drive or driven pulley shafts. c) Oil on pulley surfaces. d) Incorrect centrifugal governor. 	<p>REMEDY</p> <ul style="list-style-type: none"> a) Check drive pulley for worn or missing flyweights/rollers. b) Clean shaft with steel wool and lubricate with low temperature grease. c) Clean pulley surfaces with fine emery cloth and clean cloth. d) Install correct governor.
3. Belt worn excessively in top width.		
	<p>CAUSE</p> <ul style="list-style-type: none"> a) Excessive slippage due to irregular outward actuation movement of drive pulley. b) Rough or scratched pulley surfaces. c) Improper belt angle. d) Considerable use. 	<p>REMEDY</p> <ul style="list-style-type: none"> a) Carry out inspection. b) Repair or replace pulley. c) Using unspecified type of belt. Replace belt with correct Bombardier belt. d) Replace belt if 3 mm (1/8") less than recommended width (see Technical Data).

SECTION 03 TRANSMISSION
SUB-SECTION 02 (DRIVE BELT)

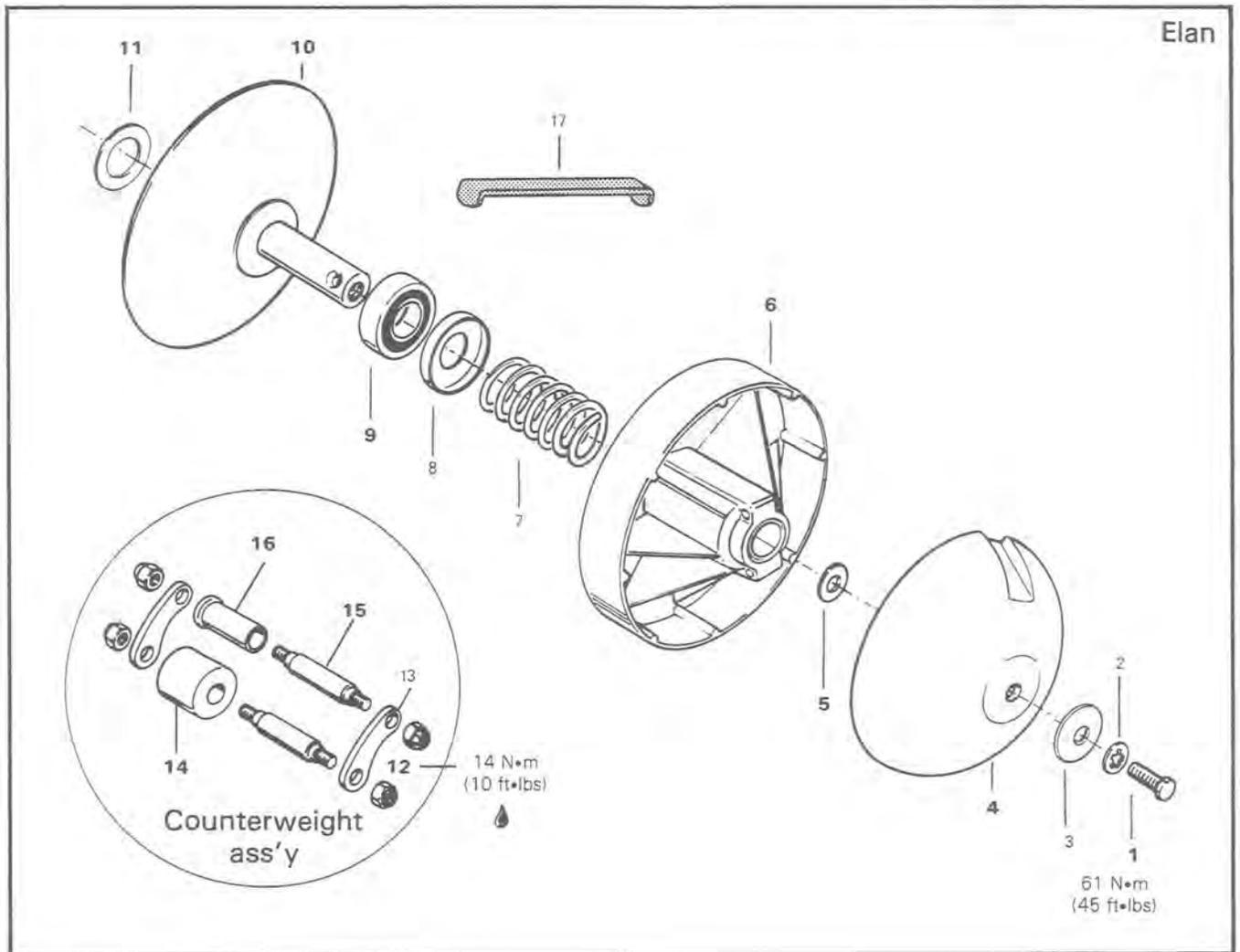
4. Belt worn narrow in one section.		
	<p>CAUSE</p> <p>Excessive slippage in drive pulley caused by:</p> <ul style="list-style-type: none"> a) Frozen or too tight track. b) Drive pulley not functioning properly. c) Engine idle speed too high. d) Incorrect belt length. e) Incorrect pulley distance 	<p>REMEDY</p> <ul style="list-style-type: none"> a) Liberate track from ice or check track tension and alignment. b) Repair or replace drive pulley. c) Reduce engine R.P.M. d) Using unspecified type of belt. Replace belt with correct Bombardier belt. e) Readjust to specifications.
5. Belt sides worn concave.		
 <p style="text-align: center;">Original angle</p>	<p>CAUSE</p> <ul style="list-style-type: none"> a) Rough or scratched pulley surfaces. b) Unspecified type of belt. 	<p>REMEDY</p> <ul style="list-style-type: none"> a) Repair or replace. b) Replace belt with correct Bombardier belt
6. Belt desintegration.		
	<p>CAUSE</p> <ul style="list-style-type: none"> a) Excessive belt speed. b) Oil on pulley surfaces. 	<p>REMEDY</p> <ul style="list-style-type: none"> a) Using unspecified type of belt. Replace belt with proper type of belt. b) Clean pulley surfaces with fine emery cloth and lubricate with low temperature grease.
7. Belt edge cord breakage.		
	<p>CAUSE</p> <ul style="list-style-type: none"> a) Pulley misalignment. 	<p>REMEDY</p> <ul style="list-style-type: none"> a) Align pulleys.
8. Flex cracks between cogs.		
	<p>CAUSE</p> <ul style="list-style-type: none"> a) Considerable use, belt wearing out. 	<p>REMEDY</p> <ul style="list-style-type: none"> a) Replace belt.

SECTION 03 TRANSMISSION
 SUB-SECTION 02 (DRIVE BELT)

9. Sheared cogs, compression section fracture or torn.		
	<p>CAUSE</p> <ul style="list-style-type: none"> a) Improper belt installation. b) Belt rubbing stationary object on pulleys. c) Violent engagement of drive pulley. 	<p>REMEDY</p> <ul style="list-style-type: none"> a) Refer to Installation section. b) Check drive components. c) Grease, replace spring or drive pulley.
10. Belt "Flip-Over" at high speed.		
	<p>CAUSE</p> <ul style="list-style-type: none"> a) Pulley misalignment. b) Using unspecified type of belt. 	<p>REMEDY</p> <ul style="list-style-type: none"> a) Align pulleys. b) Replace belt with correct Bombardier belt.

DRIVE PULLEY

ROLLER ROUND SHAFT TYPE



1. Capscrew
2. Lockwasher
3. Washer
4. Governor cup
5. Shim
6. Outer half
7. Spring
8. Spring seat
9. Bearing
10. Inner half
11. Shim
12. Nut "Loctite 242"
13. Counterweight
14. Roller
15. Shouldered pin
16. Shouldered bushing
17. Drive pulley retainer P/N 529 0017 00

SECTION 03 TRANSMISSION

SUB-SECTION 03 (DRIVE PULLEY)

◆ **WARNING:** Drive pulley repairs that include any disassembly or assembly procedures must be performed by an authorized Bombardier dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

1,4,6, Outer half & Governor cup

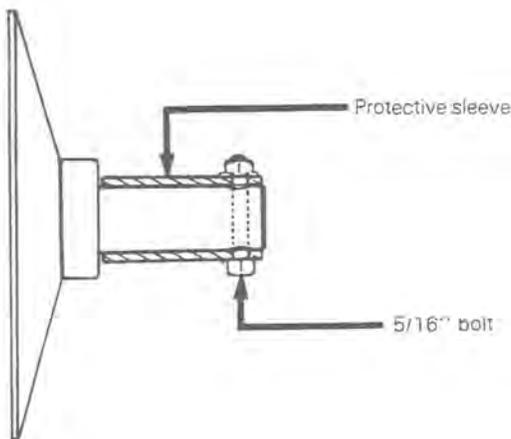
With engine cold, remove spark plug(s) then bring P.T.O. (Power Take Off) piston at T.D.C. (Top Dead Center) position.

Rotate drive pulley 45° clockwise then insert enough starter rope into cylinder to fill it completely.

◆ **WARNING:** Spring pressure can force assembly apart; therefore, it is imperative that the governor cup be held firmly during governor retaining bolt removal. Use drive pulley retainer P/N 529 0017 00.

10, Inner half

To remove the inner half, slide a length of steel pipe over shaft. Attach with a 5/16" nut and bolt, as illustrated. The inner half can then be removed with a pipe wrench. (Unscrew counter-clockwise.)



DISASSEMBLY

▼ **CAUTION:** Do not disassemble counterweights unless replacement is necessary.

9,10, Bearing

To disassemble bearing from inner half, use a suitable bearing puller.

CLEANING

6,10, Inner & outer half

Clean pulley faces and shaft with fine steel wool and dry cloth. Clean outer half bushing with clean dry cloth.

INSPECTION

Drive pulley should be inspected annually.

6,10, Inner & outer half

Check outer half for excessive lateral play and inner half shaft for scratches.

14, Roller

Check for roundness of external diameter.

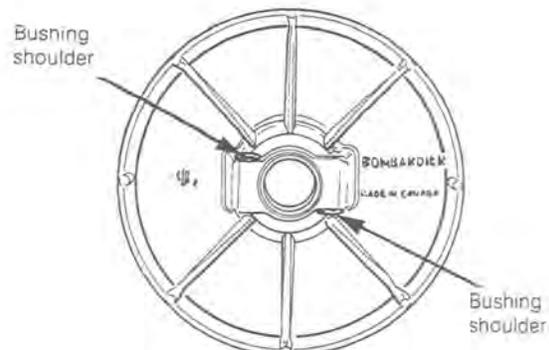
16, Shouldered bushing

Check for excessive wear.

ASSEMBLY

6,16, Shouldered bushings

Shouldered bushings must be assembled in outer half as per illustration.



12,13,14,15, Counterweight ass'y

Apply Loctite 242 or equivalent on threads then torque nuts to 14 N•m (10 ft•lbs).

9,10, Bearing

To assemble bearing on inner half, press on bearing inner race with a suitable pusher.

INSTALLATION

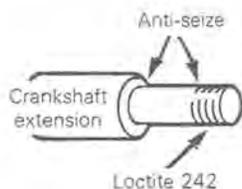
11, Shim (alignment)

This shim is used to obtain correct pulley alignment, refer to section 03-05.

10, Inner half

To install the inner half, lock crankshaft in position as explained in removal procedure. Make sure crankshaft is rotated 45° counter-clockwise from T.D.C. position and that cylinder is completely filled with a starter rope.

Clean crankshaft extension and apply anti-seize on the unthreaded portion and Loctite 242 or equivalent on threads, (as illustrated) then install inner half on extension.



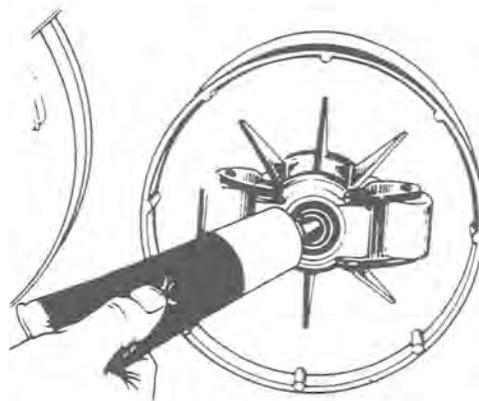
To tighten inner half, use a protective sleeve as shown in the removal procedure.

5, Shim (neutral)

This shim is used to obtain a neutral function of the drive pulley when engine is idling; use as required, maximum of two (2). Refer to ADJUSTMENT.

6, Outer half

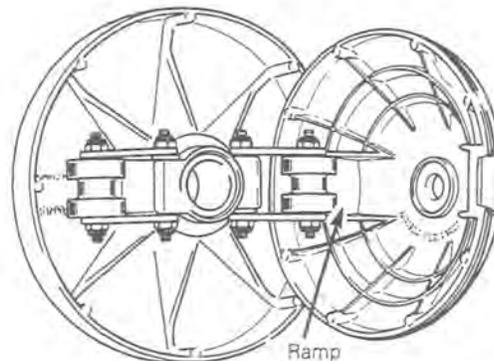
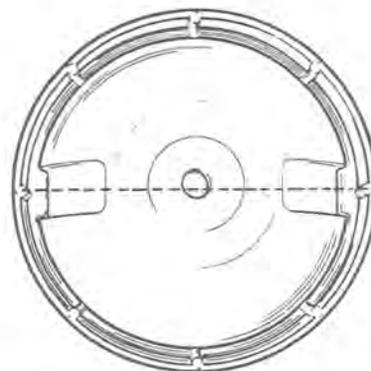
Pack pulley bore with High Performance Drive Pulley Lubricant P/N 413 800 700.



1,4,6, Governor cup

Install governor cup correctly as per illustration making sure that the rollers are sliding on their ramp.

▼ **CAUTION:** Ensure rollers are in good condition. Replace as required.



Position the capscrew then lube and torque to 61 N•m (45 ft•lbs).

SECTION 03 TRANSMISSION

SUB-SECTION 03 (DRIVE PULLEY)

ADJUSTMENT

11, Shim (alignment)

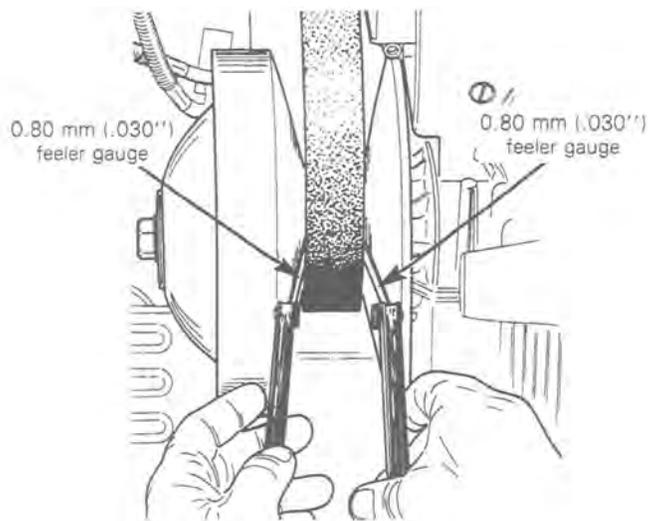
For pulley alignment procedure, refer to section 03-05.

5, Shim (neutral)

For neutral adjustment, proceed as indicated below.

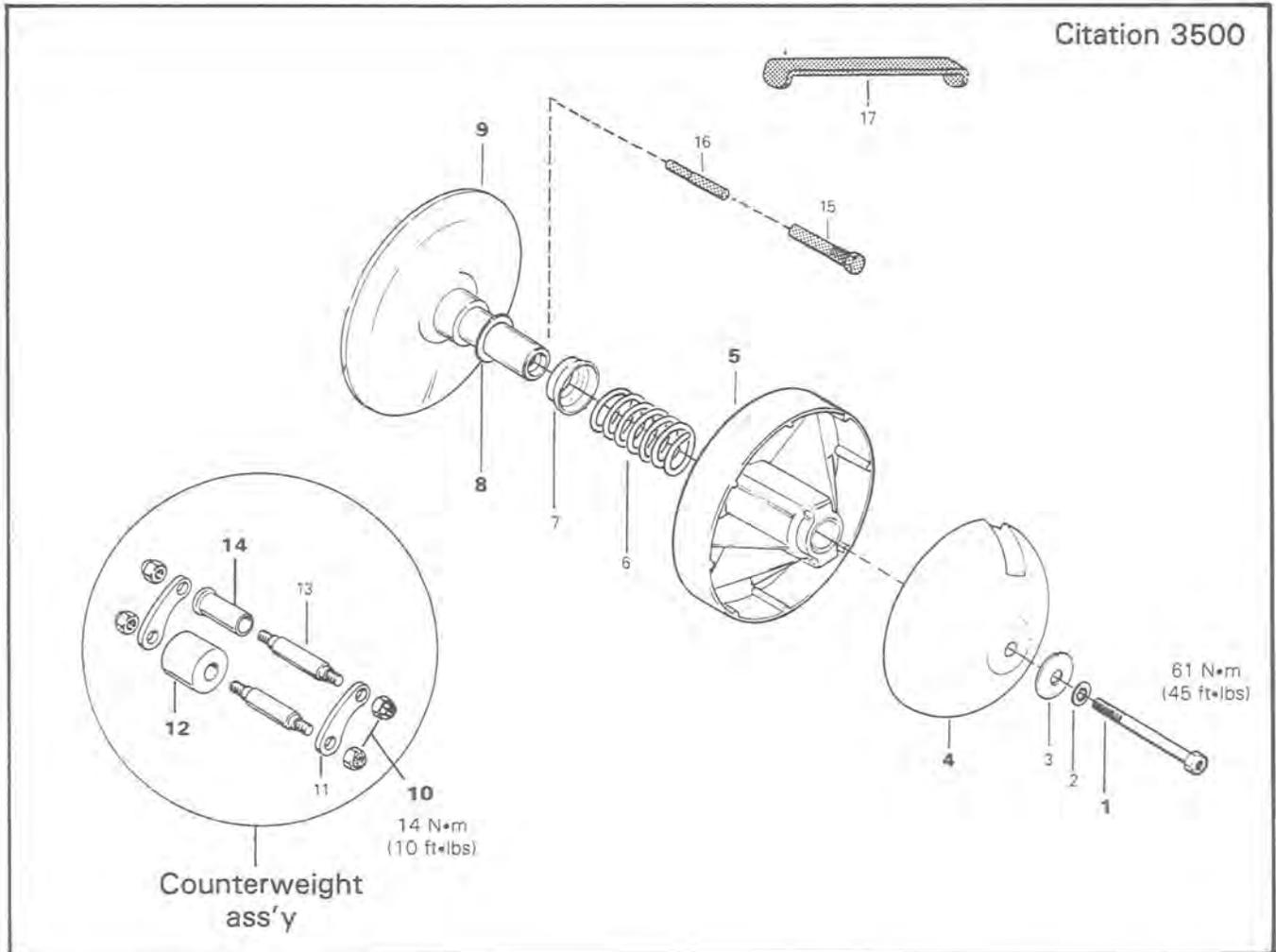
◆ **WARNING:** Shim(s) 5 is(are) used to obtain a neutral function of the drive pulley when engine is idling. Proceed as follows when retaining bolt is torqued:

With a **new** drive belt installed, you should be able to insert a minimum of 0.80 mm (.030") thick feeler gauge on each side of the drive belt simultaneously pushing drive belt to sit on bearing.



Shim 5 located between governor cup and drive pulley shaft will help in obtaining correct adjustment. Do not use more than two (2) shims.

ROUND SHAFT (TAPER) TYPE



1. Capscrew
2. Lockwasher
3. Washer
4. Governor cup
5. Outer half
6. Spring
7. Spring seat
8. Shim
9. Inner half
10. Nut "Loctite 242"
11. Lever
12. Roller
13. Shouldered pin
14. Shouldered bushing
15. Puller P/N 529 0028 00
16. Puller P/N 529 0030 00
17. Drive pulley retainer P/N 529 0017 00

SECTION 03 TRANSMISSION SUB-SECTION 03 (DRIVE PULLEY)

▼ **CAUTION:** This model is equipped with drive pulley of metric dimensions.

◆ **WARNING:** Drive pulley repairs that include any disassembly or assembly procedures must be performed by an authorized Bombardier dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

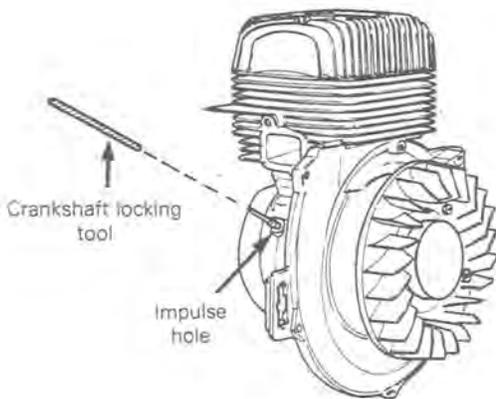
1,4,5, Outer half & Governor cup

Lock the crankshaft by using one of the following method:

Insert the crankshaft locking tool P/N 420 876 640 into the impulse hole of the engine. Slowly rotate the crankshaft until it locks into position.

▼ **CAUTION:** Do not use any type of pin other than the tool P/N 420 876 640.

(TYPICAL)



Or:

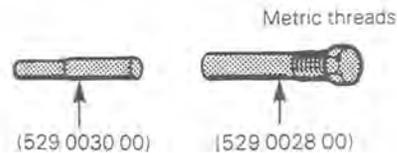
Remove spark plug(s) then bring P.T.O.: piston at T.D.C. position.

Rotate drive pulley 45° clockwise then insert enough starter rope into cylinder to fill it completely.

◆ **WARNING:** Spring pressure can force assembly apart; therefore, it is imperative that the governor cup be held firmly during governor retaining bolt removal. Use drive pulley retainer P/N 529 0017 00.

9, Inner half

If it is necessary to remove inner half, use drive pulley puller no. 529 002 800, 529 003 000.



▼ **CAUTION:** This pulley has metric threads. Do not use standard thread puller.

To block engine crankshaft:

Remove starter rope blocking piston, then reblock piston after having turned 45° counter-clockwise from T.D.C. position; or install crankshaft locking tool.

To remove inner half:

Install puller in pulley shaft tighten, at the same time knock slightly on puller head to disengage pulley from engine crankshaft.

DISASSEMBLY

▼ **CAUTION:** Do not disassemble counterweights unless replacement is necessary.

CLEANING

5,9, Inner & Outer half

Clean pulley faces and shaft with fine steel wool and dry cloth. Clean outer half bushing with clean dry cloth.

9, Inner half & crankshaft

Using cleaner such as acetone, clean crankshaft tapered end and the taper inside the inner half of the drive pulley.

◆ **WARNING:** This procedure must be performed in a well ventilated area.

▼ **CAUTION:** Avoid contact between crankshaft seal and acetone because damage may occur.

INSPECTION

Drive pulley should be inspected annually.

5,9, Inner & outer half

Check outer half for excessive lateral play and inner half shaft for scratches.

12, Roller

Check for roundness of external diameter.

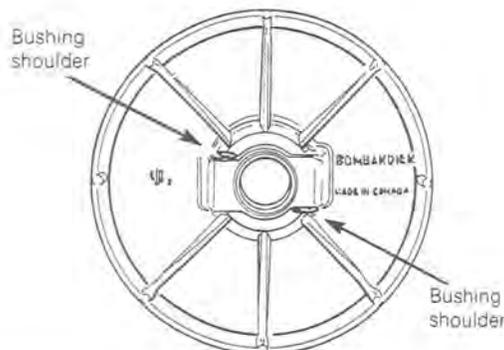
14, Shouldered bushing

Check for excessive wear.

ASSEMBLY

14, Shouldered bushing

Shouldered pin bushings must be installed in outer half as per illustration.



10,11,12,13, Counterweight assy

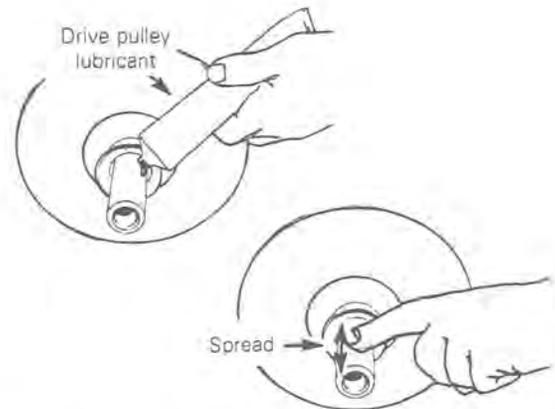
Apply Loctite 242 or equivalent on nut threads then torque nuts to 14 N•m (10 ft•lbs).

INSTALLATION

Lock crankshaft in position as explained in removal procedure. Make sure crankshaft is rotated 45° counter-clockwise from T.D.C. position and that cylinder is completely filled with a starter rope.

9, Inner half

Lubricate lightly pulley shaft drive pulley lubricant P/N 413 800 700.

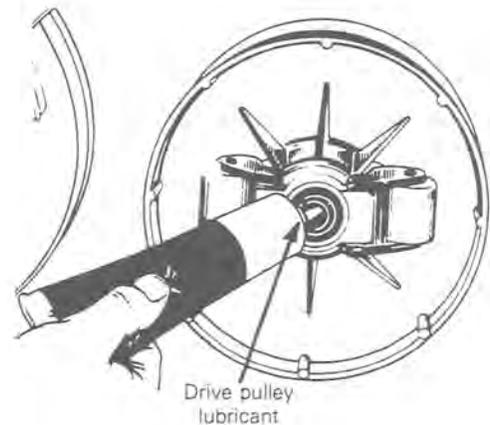


8, Shim (neutral)

This shim is used to obtain neutral function of the drive pulley when engine is idling: use as required, maximum of three (3). Refer to ADJUSTMENT.

1,4,5, Outer half

Pack pulley bore with drive pulley lubricant P/N 413 800 700.

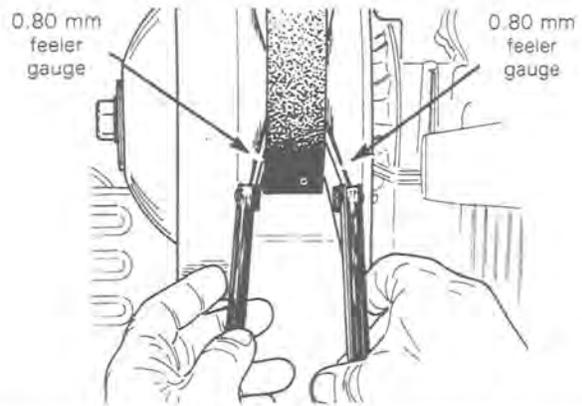
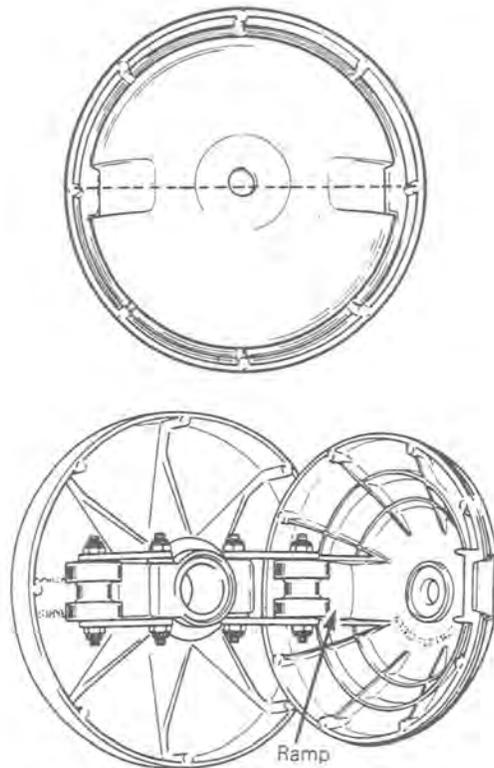


Install governor cup correctly as per illustration making sure that the rollers are sliding on their ramp.

CAUTION: Ensure rollers are in good condition. Replace as required.

SECTION 03 TRANSMISSION

SUB-SECTION 03 (DRIVE PULLEY)



Shim 8 located between governor cup and drive pulley shaft will help in obtaining correct adjustment. Do not use more than three (3) shims.

Position the capscrew then lube and torque to 61 N•m (45 ft•lbs).

ADJUSTMENT

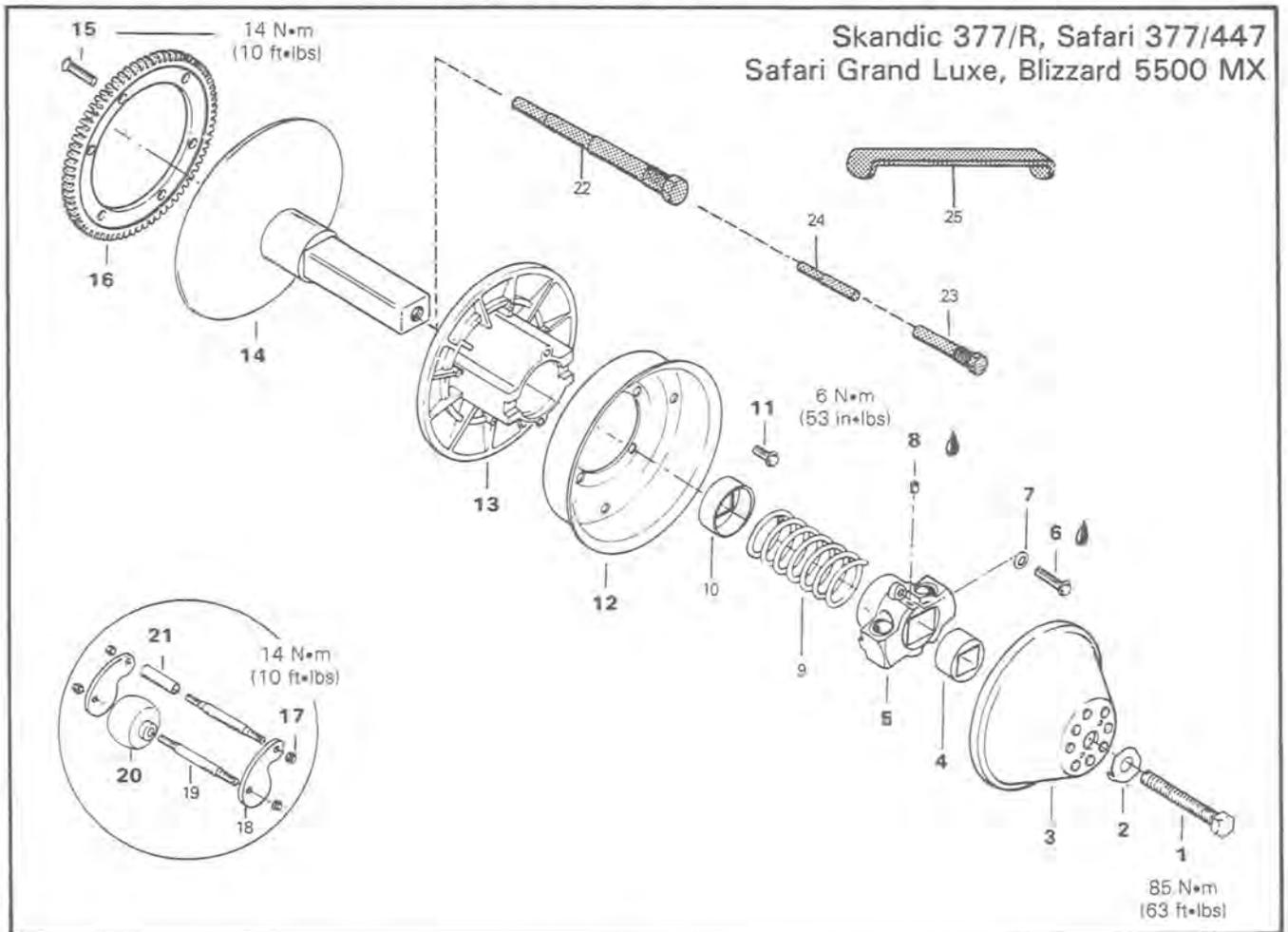
8, Shim (neutral)

For neutral adjustment, proceed as indicated below.

◆ **WARNING:** Shim(s) 8 is(are) used to obtain a neutral function of the drive pulley when engine is idling. Proceed as follows when retaining bolt is torqued:

With a new drive belt installed, you should be able to insert a minimum of 0.80 mm (.030'') thick feeler gauge on each side of the drive belt simultaneously when pushing drive belt to sit on inner half shaft.

ROLLER SQUARE SHAFT WITH DURALON BUSHING



1. Capscrew
2. Lock tab
3. Governor cup
4. "Duralon" bushing "Loctite 277"
5. Hub plug
6. Capscrew "Loctite 242"
7. Internal tooth lockwasher
8. Allen setscrew "Loctite 242"
9. Spring
10. Spring seat
11. Capscrew
12. Guard
13. Outer half

14. Inner half
15. Self locking screw "Loctite 271"
16. Starter gear
17. Nut "Loctite 242"
18. Counterweight
19. Shouldered pin
20. Roller
21. Bushing
22. Puller P/N 529 0021 00
23. Puller P/N 529 0028 00
24. Puller pin P/N 529 0030 00
25. Drive pulley retainer 529 0017 00

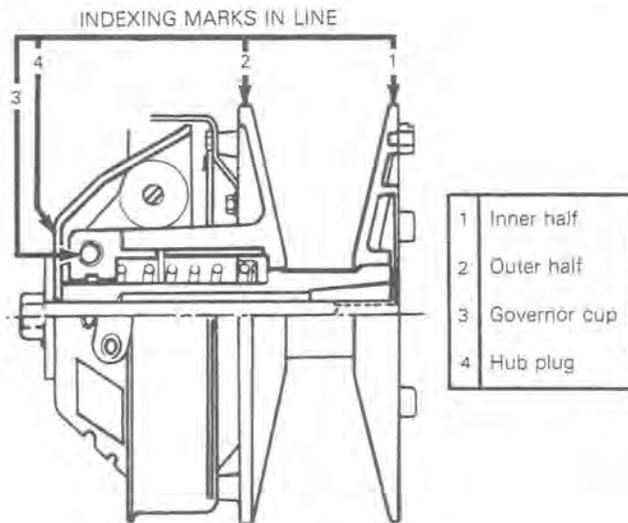
SECTION 03 TRANSMISSION SUB-SECTION 03 (DRIVE PULLEY)

WARNING: Drive pulley repairs that include any disassembly or assembly procedures must be performed by an authorized Bombardier dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

NOTE: Some pulley components are marked to insure proper assembly, thereby maintaining optimum balancement.

If components lack such marks, marking should be done manually before disassembly, as per illustration.



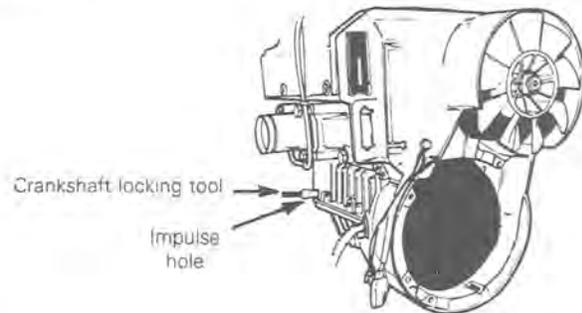
1,3,13, Outer half & Governor cup

Lock the crankshaft by using one of the following method:

Insert the crankshaft locking tool P/N 420 876 640 into the impulse hole of the engine. Slowly rotate the crankshaft until it locks into position.

CAUTION: Do not use any type of pin other than the tool P/N 420 876 640.

(TYPICAL)



Or:

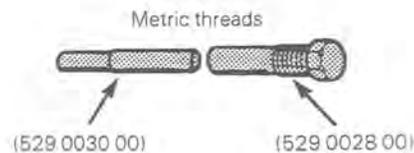
Remove spark plug(s) then bring P.T.O. piston at T.D.C. position.

Rotate drive pulley 45° clockwise then insert enough starter rope into cylinder to fill it completely.

Remove the capscrew.

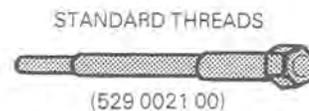
14, Inner half

To remove inner half on Skandic models, use metric threads puller:



CAUTION: Skandic model pulley has metric threads. Do not use standard threads puller.

On Safari and Blizzard models, use standard threads puller:



To block engine crankshaft:

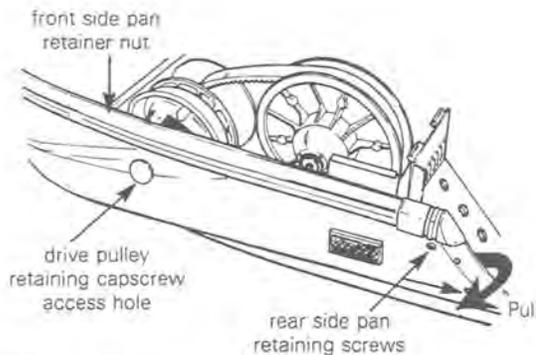
Remove starter rope blocking piston, then reblock piston after having turned 45° counter-clockwise from T.D.C. position; or install crankshaft locking tool.

To remove inner half:

Install puller in pulley shaft then tighten, at the same time knock slightly on puller head to disengage pulley from engine crankshaft.

○ **NOTE:** on Blizzard models, side pan must be pulled out and drive pulley removed as an assembly. Proceed as follows:

- Remove rear side pan retaining bolt and remove the nut securing the side pan to the ski shock mounting bracket.
- Remove the governor cup.
- Then remove drive pulley assembly from engine crankshaft using puller P/N 529 0021 00. Pull out side pan to remove pulley from vehicle.

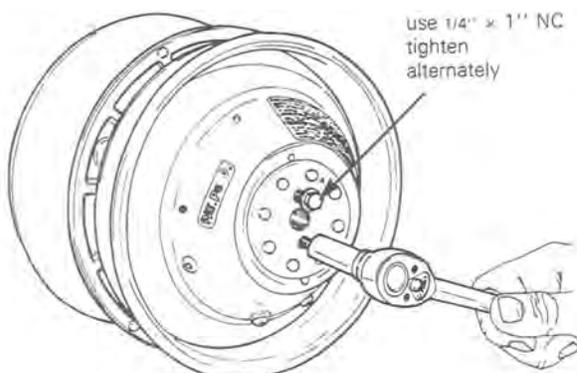


DISASSEMBLY

○ **NOTE:** Some bolts of the drive pulley have "Loctite" on their threads, it is advisable to use a tool such as an impact to break the "Loctite" seal before attempting to unscrew.

3,13, Outer half assembly & governor cup

- ▼ **CAUTION:** Do not tap on the governor cup. The governor cup can be easily removed by inserting two (2) 1/4" × 1" NC bolts and tightening alternately until cup pulls out.



5,6,7, Hub plug

The hub plug is pushed by the clutch spring pressure.

At disassembly, hold hub plug firmly against outer half until the two (2) bolts are completely removed. This will prevent damage of the outer half threads.

4,5,8, "Duralon" bushing

To disassembly "duralon" bushing from hub plug, remove set screw and use a suitable pusher and hammer or press.

- ▼ **CAUTION:** Do not disassemble counterweights unless replacement is necessary.

CLEANING

13,14, Inner & Outer half

Inside of outer half should be cleaned with a clean cloth. The square shaft can be cleaned with fine steel wool and a clean cloth.

14, Inner half & crankshaft

Using cleaner such as acetone, clean crankshaft tapered end and the taper inside the fixed half of the drive pulley.

- ◆ **WARNING:** This procedure must be performed in a well ventilated area.

- ▼ **CAUTION:** Avoid contact between crankshaft seal and acetone because damage may occur.

INSPECTION

Drive pulley should be inspected annually.

20, Roller

Check for roundness of external diameter.

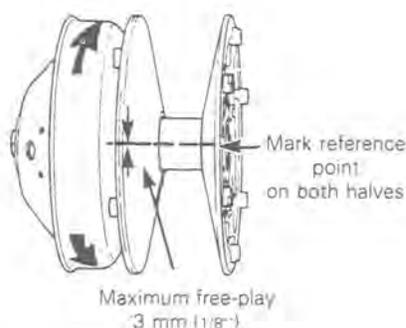
21, Shouldered bushing

Check for excessive wear.

4, "Duralon" bushing

Inspect the Duralon bushing condition by checking the free-play of the sliding half pulley. This is achieved by restraining the inner half and checking if the sliding half moves in the direction of the arrows more than 3 mm (1/8").

SECTION 03 TRANSMISSION SUB-SECTION 03 (DRIVE PULLEY)



ASSEMBLY

15,16, Starter ring gear

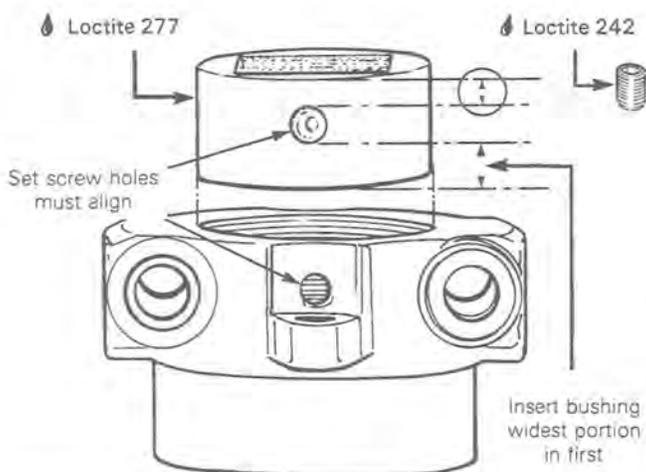
Apply "Loctite 271" or equivalent on threads then torque the screws to 14 N•m (10 ft•lbs) or tighten with an impact screwdriver.

11,12, Guard

Torque to 6 N•m (53 ft•lbs)

4,5,8, "Duralon" bushing

To install "Duralon" bushing on hub plug, use suitable pusher and hammer or press. Install bushing as per illustration.

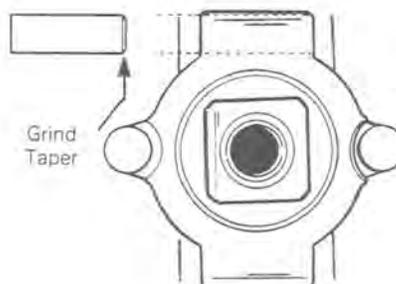


Apply "Loctite 277" on "Duralon" bushing. Do not fill set screw holes with loctite.

Apply "Loctite 242" on set screw threads, then tighten screw slightly until it then rests against bottom of "Duralon" bushing hole.

5,21, Bushing

Gently grind a small taper at one end to ease bushing assembly and push into hub plug as illustrated.



17,18,19,20 Counterweight ass'y

Apply "Loctite 242" on threads and torque to 14 N•m (10 ft•lbs).

CAUTION: Be careful when installing outer half assembly on square shaft of drive pulley to avoid scratches on "Duralon" bushing caused by square shaft edge.

5,6,7,13, Hub plug

Apply "Loctite 242" on threads of bolts then torque to 16 N•m (12 ft•lbs).

INSTALLATION

Clean crankshaft extension using fine steel wool and a clean cloth.

CAUTION: When installing drive pulley on engine, reference mark on inner half, outer half and governor cup must be in line.

13,14, Inner & Outer half

Lock crankshaft in position as explained in removal procedure. Make sure crankshaft is rotated 45° counter-clockwise from T.D.C. position and that cylinder is completely filled with a starter rope or use crankshaft locking tool.

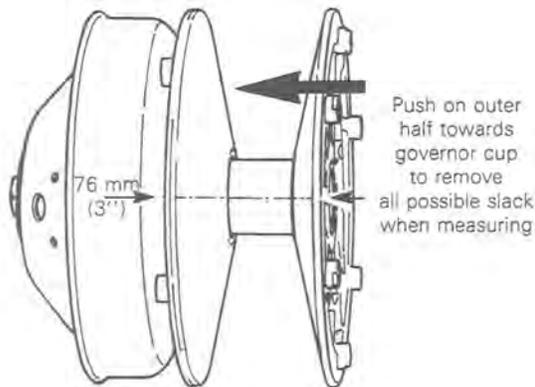
Install inner half on crankshaft extension then position outer half assembly on inner half square shaft.

▼ CAUTION: Be careful when installing outer half assembly on square shaft of drive pulley to avoid scratches on "Duralon" bushing caused by square shaft edge.

1,2,3, Governor cup

Install governor cup making sure that the shaft end rests in governor cup seating. Position capscrew with a new locking tab then torque to 85 N•m (63 ft•lbs).

▼ CAUTION: Incorrect seating of shaft end in governor cup can cause crankshaft bending. When pulley halves to make sure that the pulley is properly installed. Distance must be 76 mm (3").

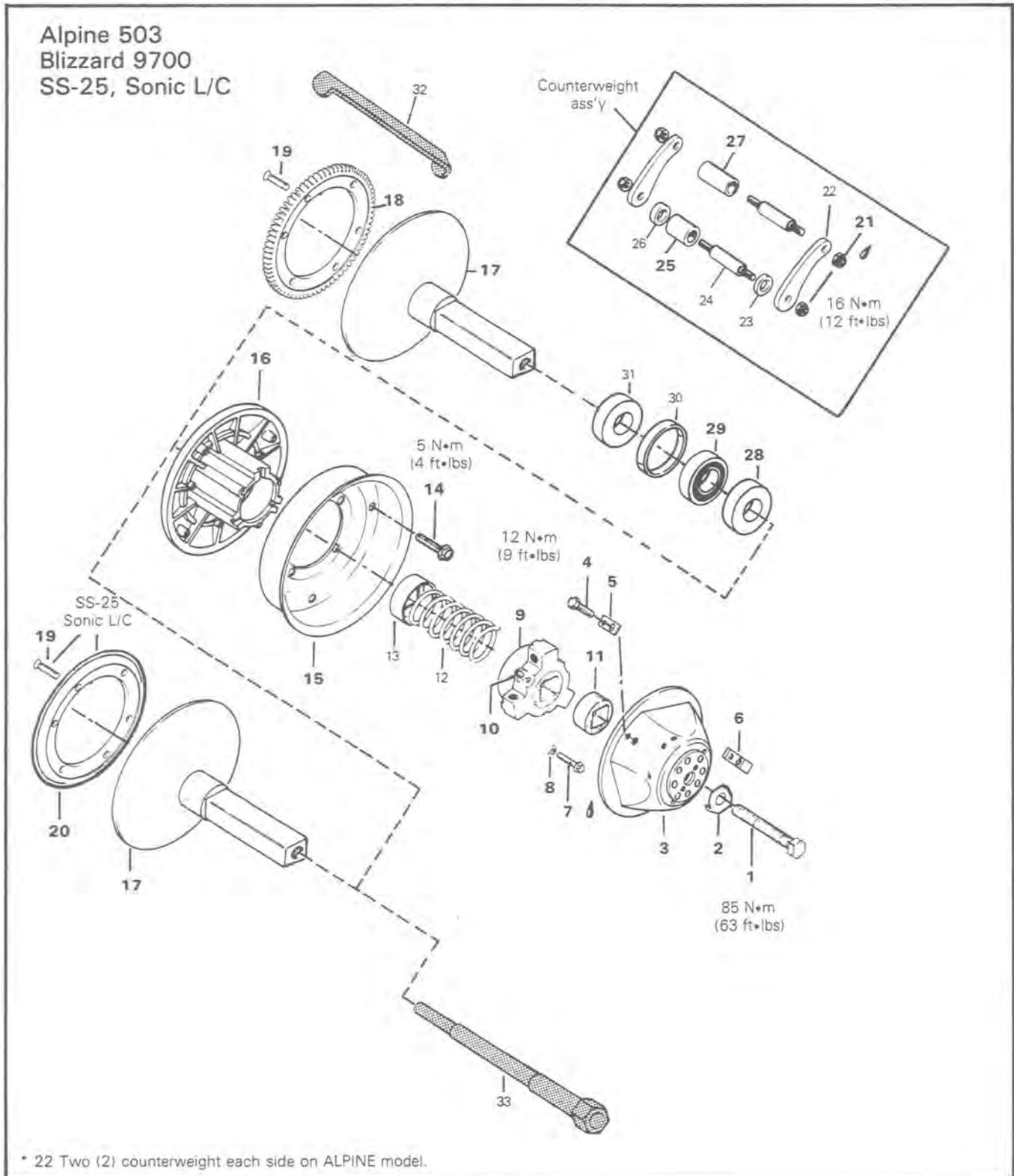


2, Lock tab

Lift rear of vehicle off the ground. Install drive belt and pulley guard then start engine and apply throttle and brake, 2-3 times. Stop engine and retorque capscrew. Bend one side of locking tab over governor bolt.

SECTION 03 TRANSMISSION
SUB-SECTION 03 (DRIVE PULLEY)

SQUARE SHAFT WITH THREE COUNTERWEIGHT ASSEMBLIES



* 22 Two (2) counterweight each side on ALPINE model.

SECTION 03 TRANSMISSION SUB-SECTION 03 (DRIVE PULLEY)

1. Capscrew
2. Tab lock
3. Governor cup
4. Capscrew
5. Tab lock
6. Ramp
7. Capscrew "Loctite 242"
8. Internal tooth lockwasher
9. Hub plug
10. Allen set screw
11. "Duralon" bushing
12. Spring
13. Spring seat
14. Capscrew
15. Guard
16. Outer flange
17. Inner flange

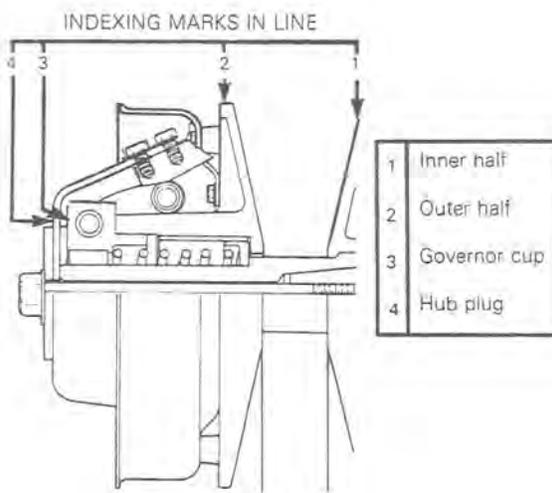
18. Starter ring gear
19. Flat slotted head self locking screw
20. Damper ring
21. Nut
22. Counterweight
23. Nylon washer 5.1 mm (.200") thickness
24. Shouldered pin
25. Bushing
26. Nylon washer 3.3 mm (.130") thickness
27. Bushing
28. Spacer (thick)
29. Bearing
30. Ring
31. Spacer (thin)
32. Drive pulley retainer 529 0017 00
33. Puller P/N 529 0021 00

CAUTION: SS-25 and Sonic LC engine must not be operated without clutch damper ring. Severe engine damage may occur if this notice is disregarded.

WARNING: Drive pulley repairs that include any disassembly or assembly procedures must be performed by an authorized Bombardier dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

Some pulley components are marked to insure proper assembly, thereby maintaining optimum balancement. If components lack such marks, marking should be done manually before disassembly, as per illustration.

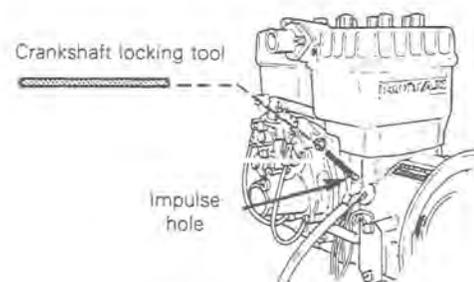


1,3,16, Outer half & Governor cup

— Lock the crankshaft by using one of the following method:

Insert the crankshaft locking tool P/N 420 876 640 into the impulse hole of the engine. Slowly rotate the crankshaft until it locks into position.

CAUTION: Do not use any type of pin other than the tool P/N 420 876 640.



Or:

Remove spark plug(s) then bring P.T.O. piston at T.D.C. position.

Rotate drive pulley 45° clockwise then insert enough starter rope into cylinder to fill it completely.

— Remove the capscrew.

17, Inner half

If it is necessary to remove inner half, use drive pulley puller P/N 529 002 100.

SECTION 03 TRANSMISSION SUB-SECTION 03 (DRIVE PULLEY)

▼ **CAUTION:** This pulley has standard threads. Do not use metric threads puller.



To block engine crankshaft:

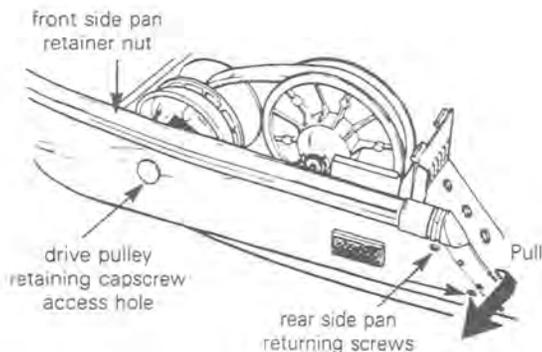
Remove starter rope blocking piston, then reblock piston after having turned 45° counter-clockwise from T.D.C. position; or install crankshaft locking tool.

To remove inner half:

Install puller in pulley shaft then tighten, at the same time knock slightly on puller head to disengage pulley from engine crankshaft.

○ **NOTE:** on Blizzard models, side pan must be pulled out and drive pulley removed as an assembly. Proceed as follows:

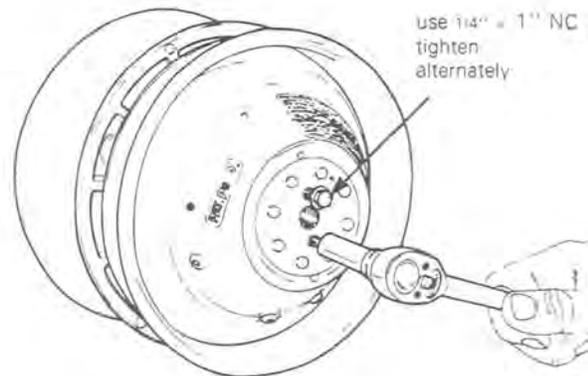
- Remove rear side pan retaining bolt and front side pan retainer nut.
- Remove the governor cup.
- Then remove drive pulley assembly from engine crankshaft using puller P/N 529 0021 00. Pull out side pan to remove pulley from vehicle.



3,16, Outer half assembly & governor cup

▼ **CAUTION:** Do not tap on the governor cup.

The governor cup can be easily removed by inserting two (2) 1/4" × 1" NC bolts and tightening alternately until cup pulls out.



7,8,9, Hub plug

The hub plug is pushed by the clutch spring pressure. At disassembly, hold hub plug firmly against outer half until the three (3) bolts are completely removed. This will prevent damage of the outer half threads.

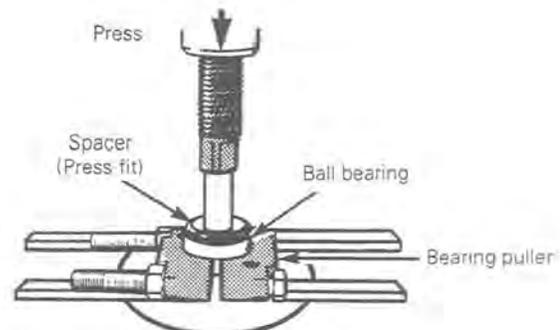
10,11, "DURALON" bushing

To disassemble "duralon" bushing from hub plug, use a suitable pusher and hammer or press.

▼ **CAUTION:** Do not disassemble counterweights unless replacement is necessary.

28,29, Bearing (Alpine model)

To disassemble bearing from inner half shaft, use a suitable bearing puller.



DISASSEMBLY

○ **NOTE:** Some bolts of the drive pulley have "Loctite" on their threads, it is advisable to break the "Loctite" seal before attempting to unscrew.

○ NOTE: The press fit is on the thicker spacer only.

CLEANING

16,17, Inner & Outer half

Inside of outer half should be cleaned with a clean cloth. The square shaft can be cleaned with fine steel wool and a clean cloth.

17, Inner half & crankshaft

Using cleaner such as acetone, clean crankshaft tapered end and the taper inside the fixed half of the drive pulley.

◆ WARNING: This procedure must be performed in a well ventilated area.

▼ CAUTION: Avoid contact between crankshaft seal and acetone because damage may occur.

INSPECTION

Drive pulley should be inspected annually.

25, Roller

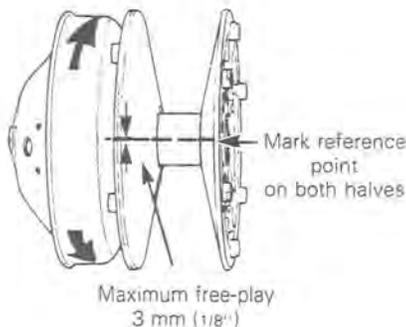
Check for roundness of external diameter.

27, Shouldered pin bushing

Check for excessive wear.

11, "Duralon" bushing

Inspect the Duralon bushing condition by checking the free-play of the sliding half pulley. This is achieved by restraining the inner half and checking if the sliding half moves in the direction of the arrows more than 3 mm (1/8").



▼ CAUTION: Ensure rollers are in good condition. Replace as required.

ASSEMBLY

29, Bearing

To install bearing on inner half, use a suitable pusher and a press.

18,19,20, Starter ring gear or damper ring

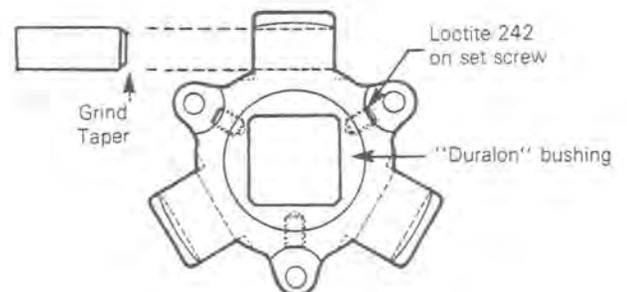
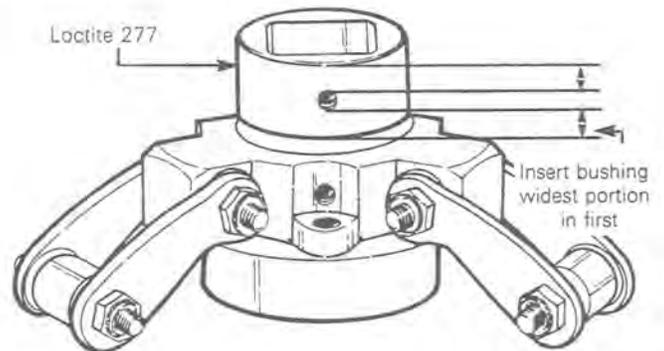
Apply "Loctite 271" or equivalent on threads then torque the screws to 14 N•m (10 ft•lbs) or tighten with an impact screwdriver.

14,15, Guard

Torque to 6 N•m (53 in•lbs)

9,10,11 "Duralon" bushing

To install or remove "Duralon" bushing from hub plug, use suitable pusher and hammer or press. Install bushing as per illustration.



SECTION 03 TRANSMISSION SUB-SECTION 03 (DRIVE PULLEY)

Apply "Loctite 277" on "Duralon" bushing. Do not fill set screw holes with loctite.

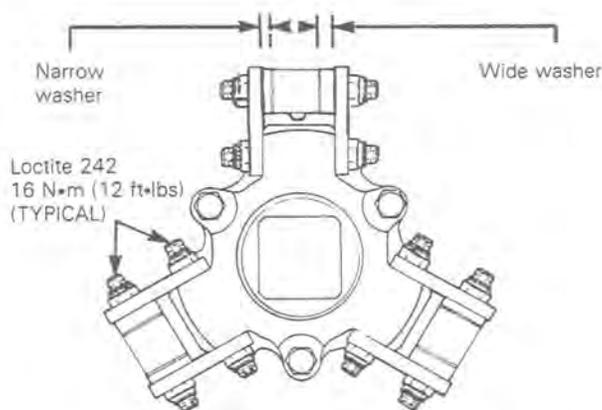
Apply "Loctite 242" on set screw threads, then tighten until screw slightly rests against bottom of "Duralon" bushing hole.

27, Bushings

Gently grind a small taper at our end to ease bushing assembly and push into hub plug as illustrated above.

21 to 26, Counterweight ass'y.

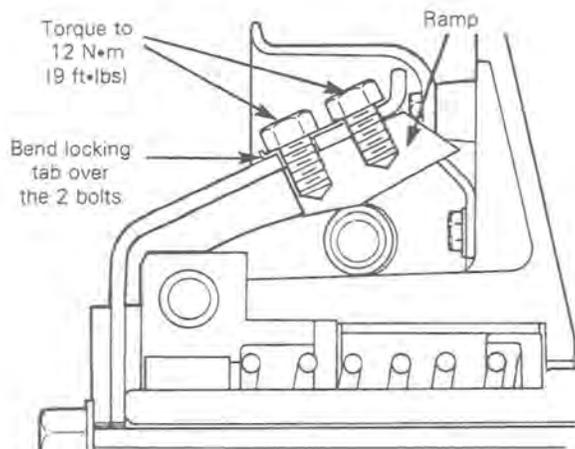
Rollers and nylon washers must move freely; install them as per illustration.



Apply "Loctite 242" on shouldered pin threads and torque to 16 N•m (12 ft•lbs)

4,5,6, Ramps

Assemble ramps and torque capscrews as per illustration.



INSTALLATION

Clean crankshaft extension using fine steel wool and a clean cloth.

▼ **CAUTION:** When installing drive pulley on engine, reference mark on inner half, outer half and governor cup must be in line.

16,17, Inner & Outer half

Lock crankshaft in position as explained in removal procedure. Make sure crankshaft is rotated 45° counter-clockwise from T.D.C. position and that cylinder is completely filled with a starter rope or use crankshaft locking tool.

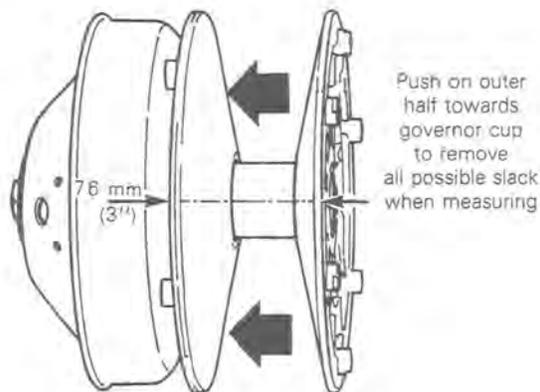
Install inner half on crankshaft extension then position outer half assembly on fixed half square shaft.

▼ **CAUTION:** Be careful when installing outer half assembly on square shaft of drive pulley to avoid scratches on "Duralon" bushing caused by square shaft edge.

3, Governor cup

Install governor cup making sure that the shaft end rests in governor cup seating. Position capscrew with a new locking tab then torque to 85 N•m (63 ft•lbs).

▼ **CAUTION:** Incorrect seating of shaft end in governor cup can cause crankshaft bending. When pulley is completely assembled always measure distance of both pulley halves to make sure that the pulley is properly installed. Distance must be 76 mm (3").

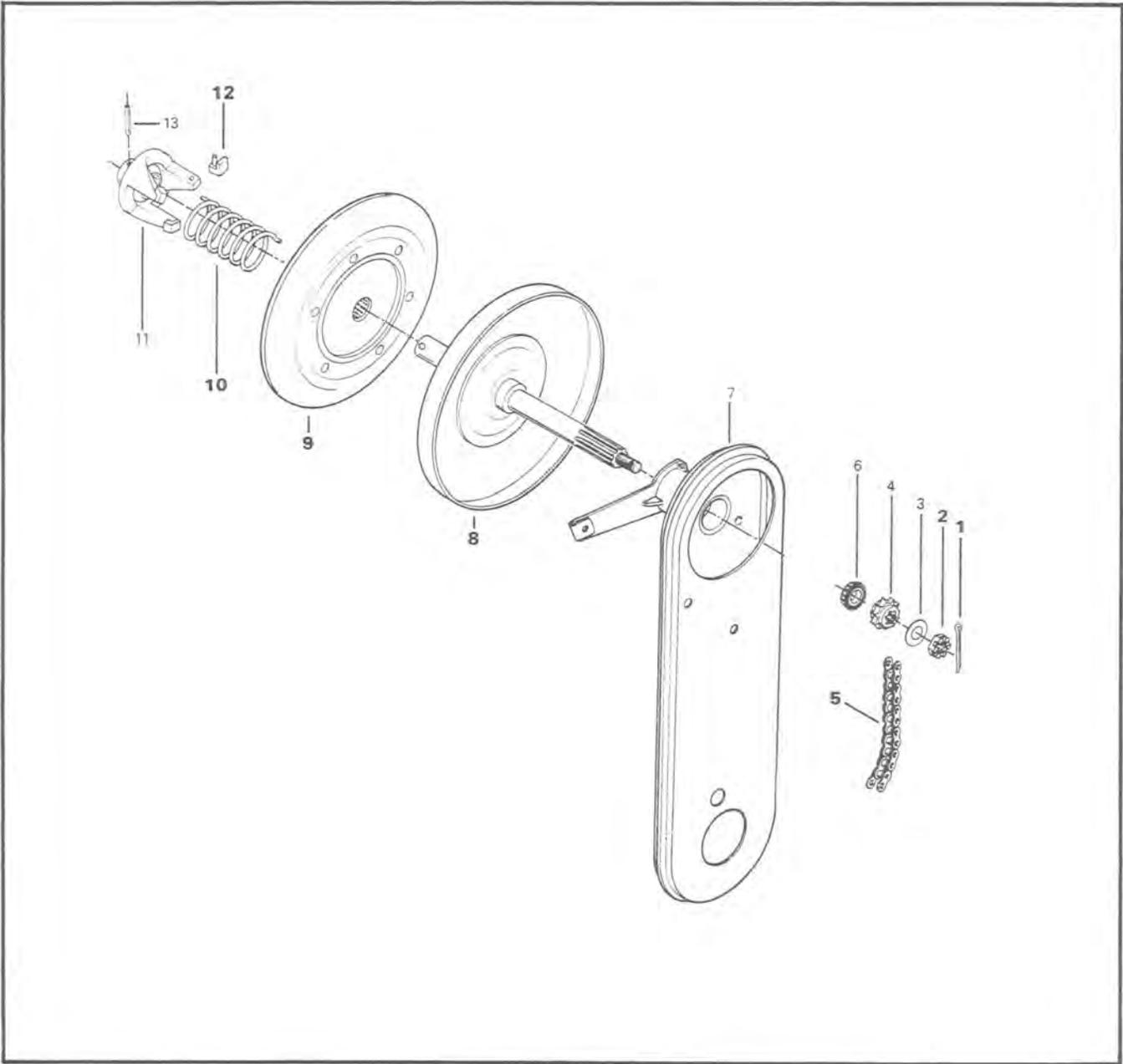


2, Lock tab

Lift rear of vehicle off the ground. Install drive belt and pulley guard then start engine and apply throttle and brake, 2-3 times. Stop engine and retorque capscrew. Bend one side of locking tab over governor bolt.

DRIVEN PULLEY

ELAN



- 1. Cotter pin
- 2. Castellated nut
- 3. Spring washer
- 4. Sprocket
- 5. Driving chain
- 6. Bearing cone
- 7. Chaincase

- 8. Fixed half
- 9. Sliding half
- 10. Release spring
- 11. Outer cam
- 12. Cam slider shoe
- 13. Roll pin

SECTION 03 TRANSMISSION
SUB-SECTION 04 (DRIVEN PULLEY)

DISASSEMBLY

11,13, Roll pin and outer cam

Use a pin punch to remove roll pin from the outer cam.

REMOVAL

Pulley guard and drive belt

Remove.

Steering column bolts

Slacken.

5, Drive chain

Release tension.

1,2, Cotterpin and castellated nut

Remove from pulley shaft.

5, Drive chain

Attach to frame to prevent from falling inside chain-case.

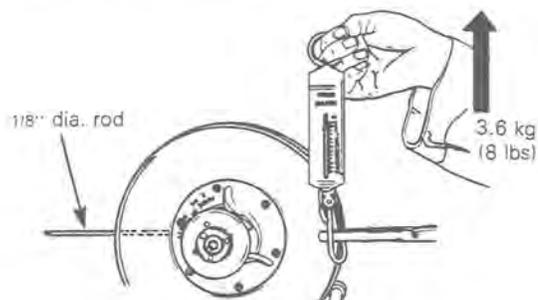
Driven pulley assembly

Pull toward engine and remove from vehicle.

INSPECTION

10, Spring torsional pre-load

In order to measure driven pulley spring torsional pre-load, pulley halves must be separated. To do this, insert length of 1/8" dia. rod between the halves. Check tension using a fish scale positioned 90° with pulley axle.



Spring pre-load should be 3.6 kg (8 lbs).
To correct pre-load see ADJUSTMENT.

12, Cam slider shoe

Inspect outer cam for worn slider shoes.

ASSEMBLY

Assemble driven pulley by reversing disassembly procedure.

12, Cam Slider Shoe

When replacing slider shoes, always install a set of new shoes to maintain balanced pressures on the cam.

INSTALLATION

Reinstall the driven pulley on vehicle by reversing the removal procedure.

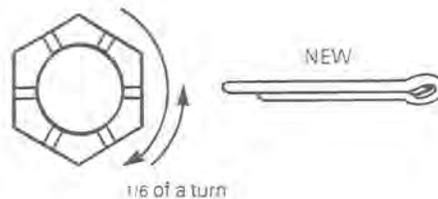
4,5, Sprocket and chain

With drive chain tension released, hold upper sprocket and chain in position then insert assembled driven pulley shaft through chaincase and sprocket.

2, Castellated nut

Install spring washer and castellated nut.

Tighten castellated nut fully then back off nut 1/6 of a turn.



CAUTION: It is important that nut is backed off or damage may occur due to a burnt or seized bearing.

1, Cotter pin

Lock assembly in position with a new cotter pin.

5, Drive chain

Apply chain tension.

ADJUSTMENT

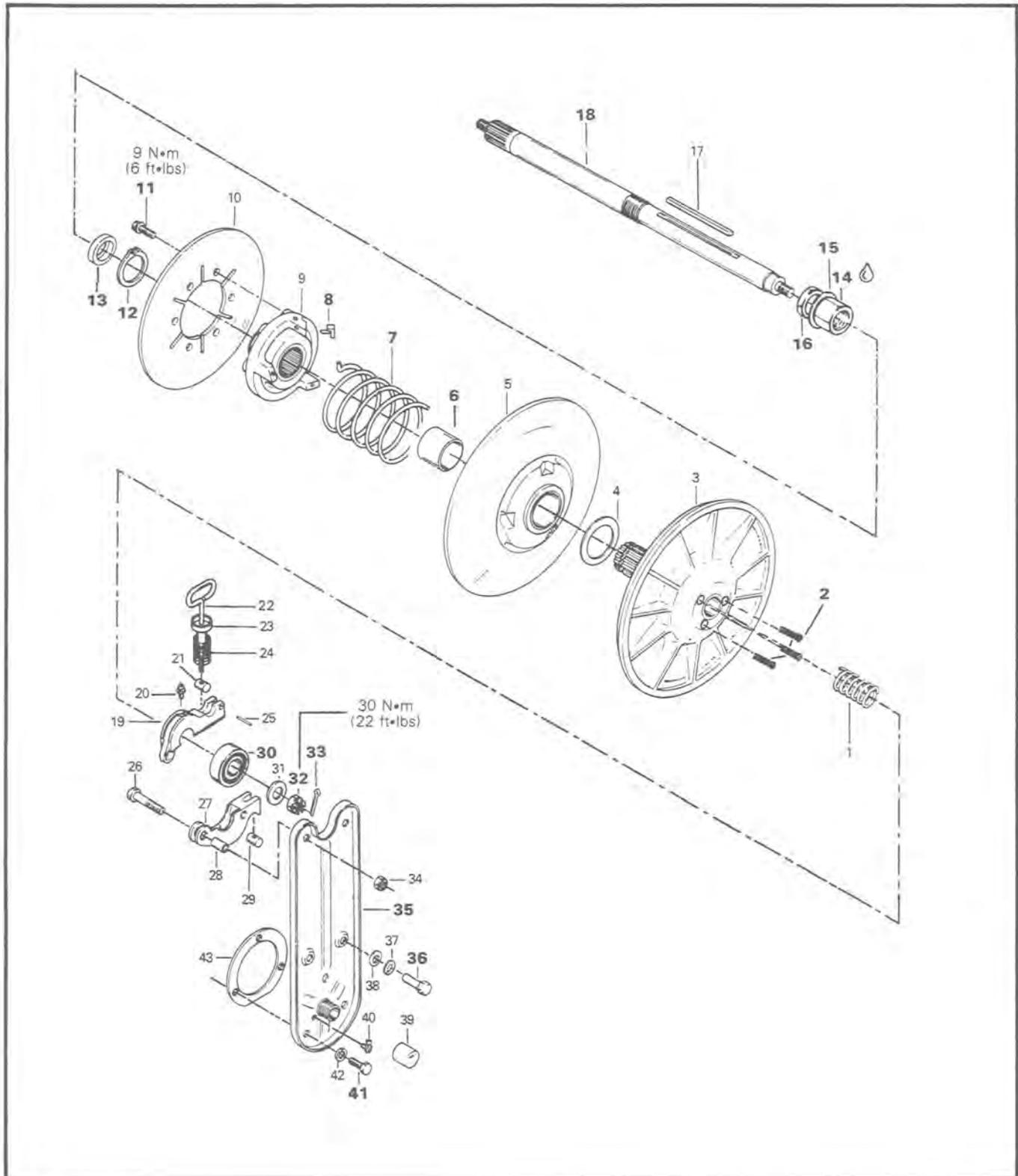
10, Spring torsional pre-load

Spring torsional pre-load should be 3.6 kg (8 lbs).

To correct spring pre-load relocate spring end in sliding pulley half.

SECTION 03 TRANSMISSION
SUB-SECTION 04 (DRIVEN PULLEY)

CITATION, SKANDIC



SECTION 03 TRANSMISSION SUB-SECTION 04 (DRIVEN PULLEY)

1. Spring
2. Allen set screw
3. Fixed half
4. Thrust washer
5. Sliding half
6. Bushing
7. Spring
8. Slider shoe
9. Outer cam
10. Brake disc
11. Tapite screw
12. Snap ring
13. Thrust washer
14. Adjuster nut "Loctite 277"
15. Tab lock
16. Jam nut "Loctite 277"
17. Key
18. Countershaft
19. Bearing housing (upper half)
20. Grease fitting
21. Barrel
22. Eye bolt

23. Bushing
24. Spring
25. Roll pin
26. Cap screw M8 x 35
27. Bearing housing (lower half)
28. Bushing
29. Barrel
30. Bearing
31. Flat washer 17/32" x 1 1/16"
32. Slotted nut 14 mm
33. Cotter pin
34. Stop nut 8 mm
35. Support
36. Cap screw M8 x 1.25 x 16
37. Lockwasher 8 mm
38. Flat washer 8.4 x 24 x 1.6 mm
39. Plug
40. Grease fitting
41. Cap screw M6 x 16
42. Lockwasher 6 mm
43. Retainer flange

REMOVAL

To remove driven pulley assembly, countershaft support must be tilted toward front of vehicle. Proceed as follows:

Pulley guard and drive belt

Remove from vehicle.

30, Bearing

To remove from countershaft, use a suitable bearing puller.

35,36,41, Support and screws

Remove support screws and drive axle screws. Tilt support forward.

Driven pulley assembly

Remove from vehicle.

DISASSEMBLY

12, Scrap ring

◆ **WARNING:** The driven pulley cam is spring loaded. Hold in place when removing the snap ring.



5, Sliding half bushing

To remove a worn bushing push out using a press.



SECTION 03 TRANSMISSION

SUB-SECTION 04 (DRIVEN PULLEY)

INSPECTION

6, Sliding half bushing

Check sliding half bushing wear, replace bushing if wear is excessive.

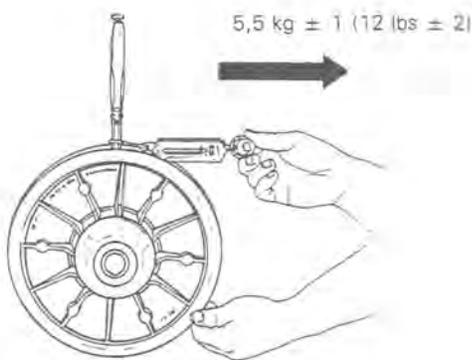
8, Slider shoe

Check for excessive wear.

7, Spring torsional pre-load

Check pre-load using a fish scale positioned at 90° with the pulley axle.

The spring pre-load should be: $5,5 \text{ kg} \pm 1$ ($12 \text{ lbs} \pm 2$)

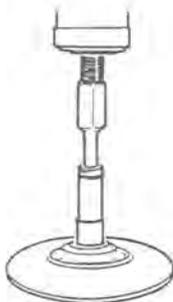


To correct, refer to ADJUSTMENT.

ASSEMBLY

6, Sliding half bushing

Install a new bushing using a press and a suitable pusher.



11, Brake disc capscrews

Torque to $9 \text{ N}\cdot\text{m}$ ($6 \text{ ft}\cdot\text{lbs}$).

8, Cam Slider Shoe

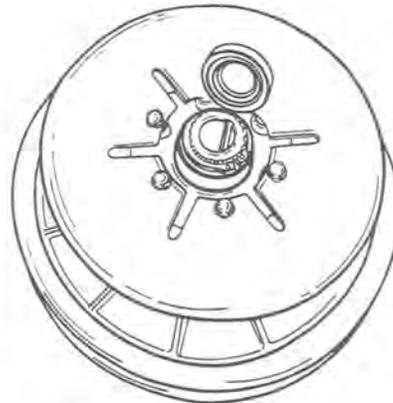
When replacing slider shoes, always install a new set of three shoes to maintain balanced pressures on the cam.

INSTALLATION

Reinstall the driven pulley on countershaft by reversing the removal procedure.

13, Thrust washer

Must be installed as illustrated to provide thrust area for the pulley snap ring.



18, Countershaft

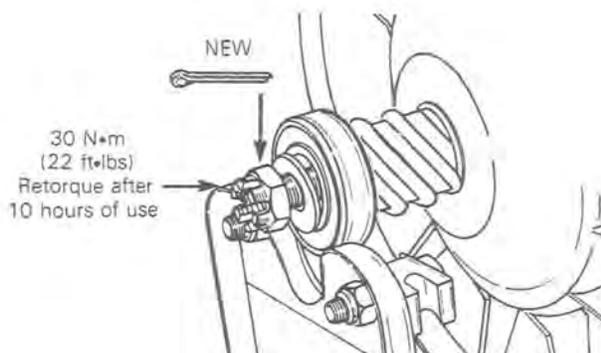
Always apply anti-seize compound (Loctite anti-seize lubricant P/N 413 7010 00) on unpainted surface of countershaft.

30, Bearing

Press on inner race with suitable pusher.

32, Nut

Torque to $30 \text{ N}\cdot\text{m}$ ($22 \text{ ft}\cdot\text{lbs}$).



33, Cotter pin

Reinstall a new cotter pin.

Pulley alignment

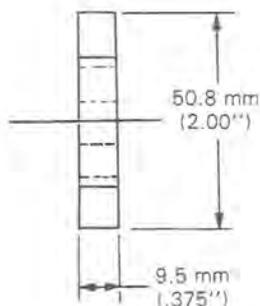
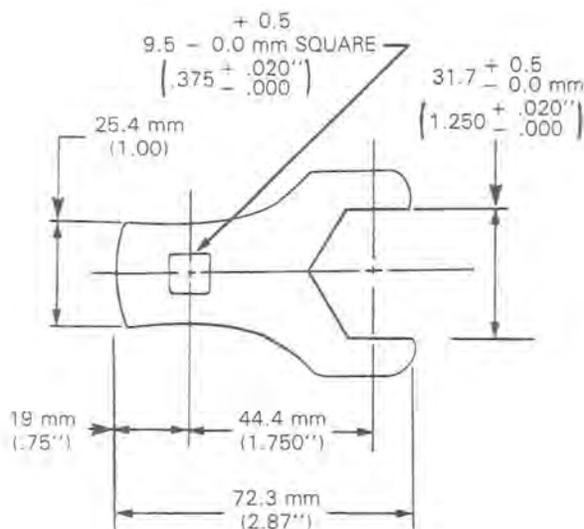
For pulley alignment procedure, refer to section 03-05.

14,16, Adjuster and jam nut

Apply "Loctite 277" or equivalent on threads of both nuts.

Torque jam nut to 60-70 N•m (45-52 ft•lbs).

To torque the jam nut, it is necessary to make the following tool or use a Snap On extension key no. FC-40. Torque to: 60-70 N•m (45-52 ft•lbs).



Material: Steel bar 9.5 mm (3/8") thickness cold roll.

Torque wrench length (cm (in)) = Correction factor
Torque wrench length + 4.44 cm (1.750 in)

Torque wrench reading _____ = Real reading
Correction factor

Ex:

Torque wrench length: 25.4 cm (10 in.)

Torque wrench reading: 60 N•m (45 ft•lbs)

Correction factor

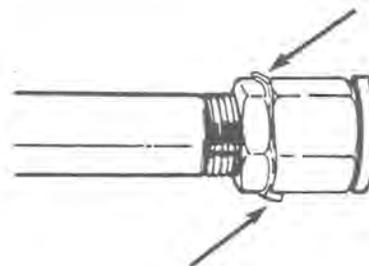
$$\frac{25.4 \text{ cm (10 in)}}{25.4 \text{ cm (10 in)} + 4.44 \text{ cm (1.750 in)}} = 0.85$$

Real reading

$$\frac{60 \text{ N}\cdot\text{m (45 ft}\cdot\text{lbs)}}{.85} = 70 \text{ N}\cdot\text{m (52 ft}\cdot\text{lbs)}$$

15, Tab lock

Make sure the tab lock is properly folded over each nut.

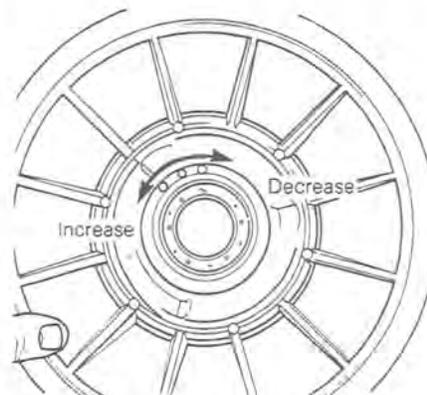


CAUTION: Do not bend lock tab more than twice. If necessary, install a new one (P/N 504 0480 00).

ADJUSTMENT

7, Spring torsional pre-load

To adjust spring pre-load displace spring end accordingly.



NOTE: For an accurate torque wrench reading you must use the following formulas:

SECTION 03 TRANSMISSION
SUB-SECTION 04 (DRIVEN PULLEY)

Pulley alignment

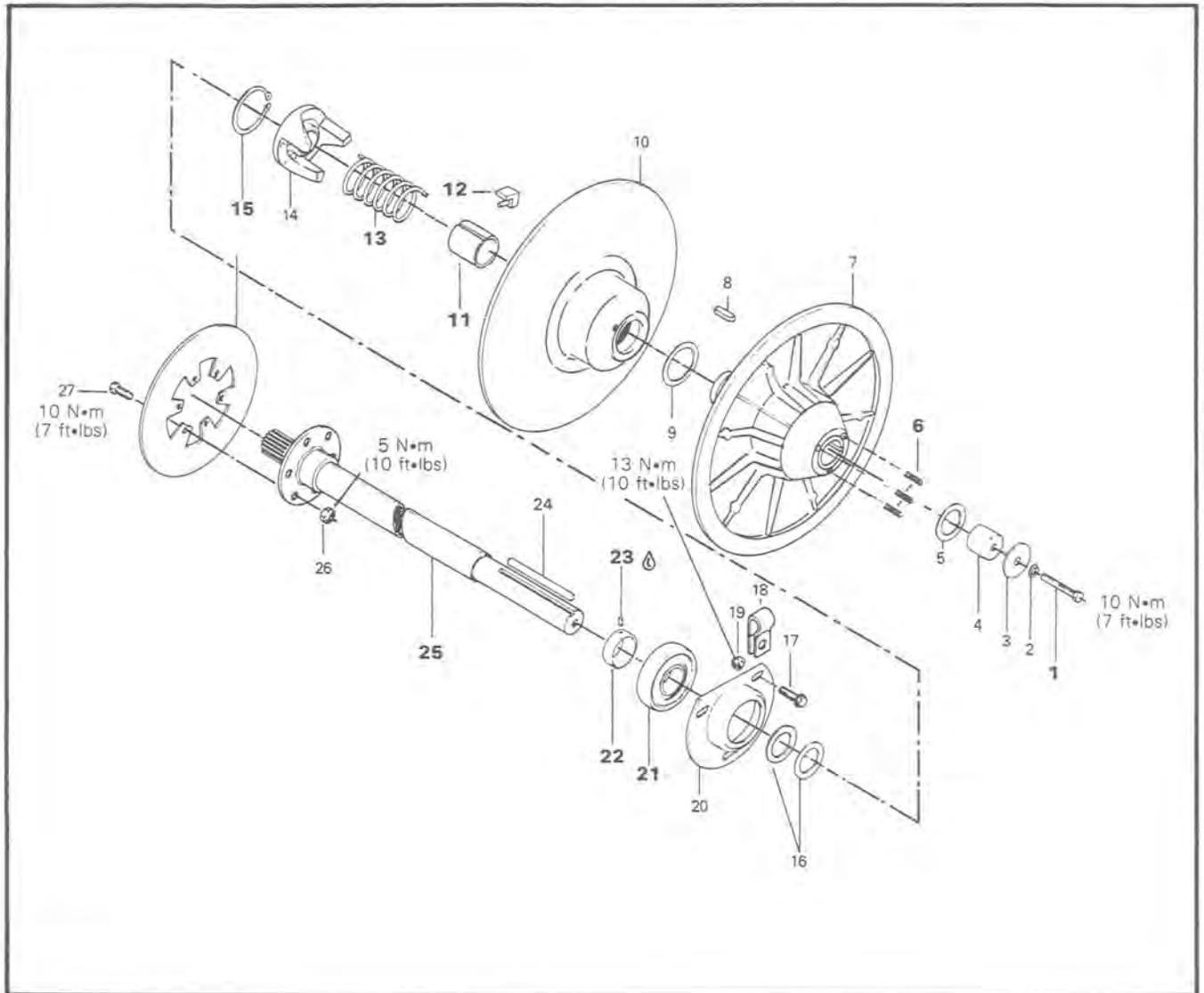
For pulley alignment procedure, refer to section 03-05.

2, Belt deflection set crews

At assembly, the Allen screws must be set in accordance with the drive belt deflection specification (see section 03, sub-section 02 Drive Belt).

SECTION 03 TRANSMISSION
SUB-SECTION 04 (DRIVEN PULLEY)

BLIZZARD 5500 MX, BLIZZARD 9700



1. Screw 1/4 - 20 x 1 3/4"
2. Lockwasher 1/4
3. Washer
4. Extension
5. Shim
6. Set screw
7. Fixed half
8. Key (cam)
9. Thrust washer
10. Sliding half
11. Bushing
12. Slider shoe
13. Spring
14. Outer cam

15. Snap ring
16. Shim
17. Screw 5/16 - 18 x 5/8"
18. Clip
19. Elastic stop nut 5/16 - 18
20. Bearing flange
21. Bearing
22. Collar
23. Socket set screw 1/4 - 20 x 1/4"
24. Key (pulley assy.)
25. Courtershaft
26. Elastic stop nut 10-32
27. Screw 10 - 32 x 3/4

SECTION 03 TRANSMISSION

SUB-SECTION 04 (DRIVEN PULLEY)

REMOVAL

To remove driven pulley assembly, side pan must be pulled out. Proceed as follows:

Pulley guard and drive belt

Remove

Side pan

Remove the two rear and the front side pan retaining nut. On the MX model, remove the nut securing the side pan to the ski shock mounting bracket.

Pulley assembly

Pull out the side pan and remove the pulley assembly.



INSPECTION

11, Sliding half bushing

Check bushing wear, replace if wear is excessive.

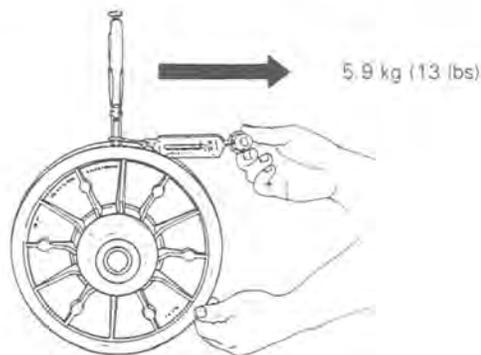
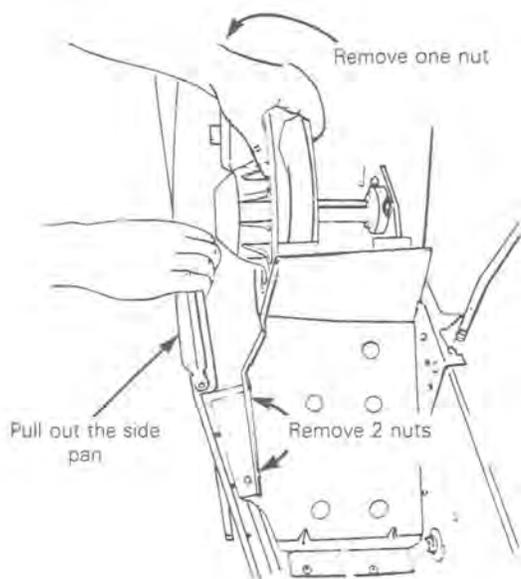
12, Slider shoe

Check for excessive wear.

13, Spring torsional pre-load

Check pre-load using a fish scale positioned at 90° with the pulley axle.

The spring pre-load should be: 5.9 kg (13 lbs)



DISASSEMBLY

15, Snap ring

Remove snapping to disassemble the outer cam and the two pulley halves.

11, Sliding half bushing

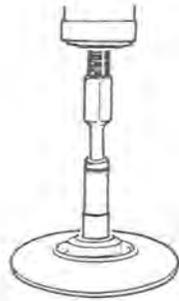
To disassemble a worn bushing, use a press and a suitable pusher.

To correct, refer to ADJUSTMENT.

ASSEMBLY

11, Sliding half bushing

Assemble a new bushing using a press and a suitable pusher.



12, Cam slider shoe

When replacing slider shoes, always install a new set of three shoes to maintain balanced pressures on the cam.

INSTALLATION

Reinstall the pulley on the countershaft by reversing the removal procedure.

25, Countershaft

▼ **CAUTION:** Always apply anti-seize compound on the countershaft before final pulley installation (Loctite anti-seize lubricant P/N 413 7010 00).

21,22 Bearing and collar

Lock the slide fit bearing on countershaft with the eccentric collar.

23, Socket set screw

Lock eccentric collar in position with the set screw and apply "Loctite 242" blue (medium strength) on threads.

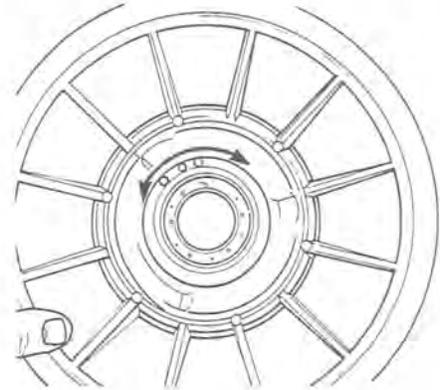
1, Pulley retaining screw

Torque to 10 N•m (7 ft•lbs).

ADJUSTMENT

13, Spring torsional pre-load

To adjust spring pre-load displace spring end accordingly.

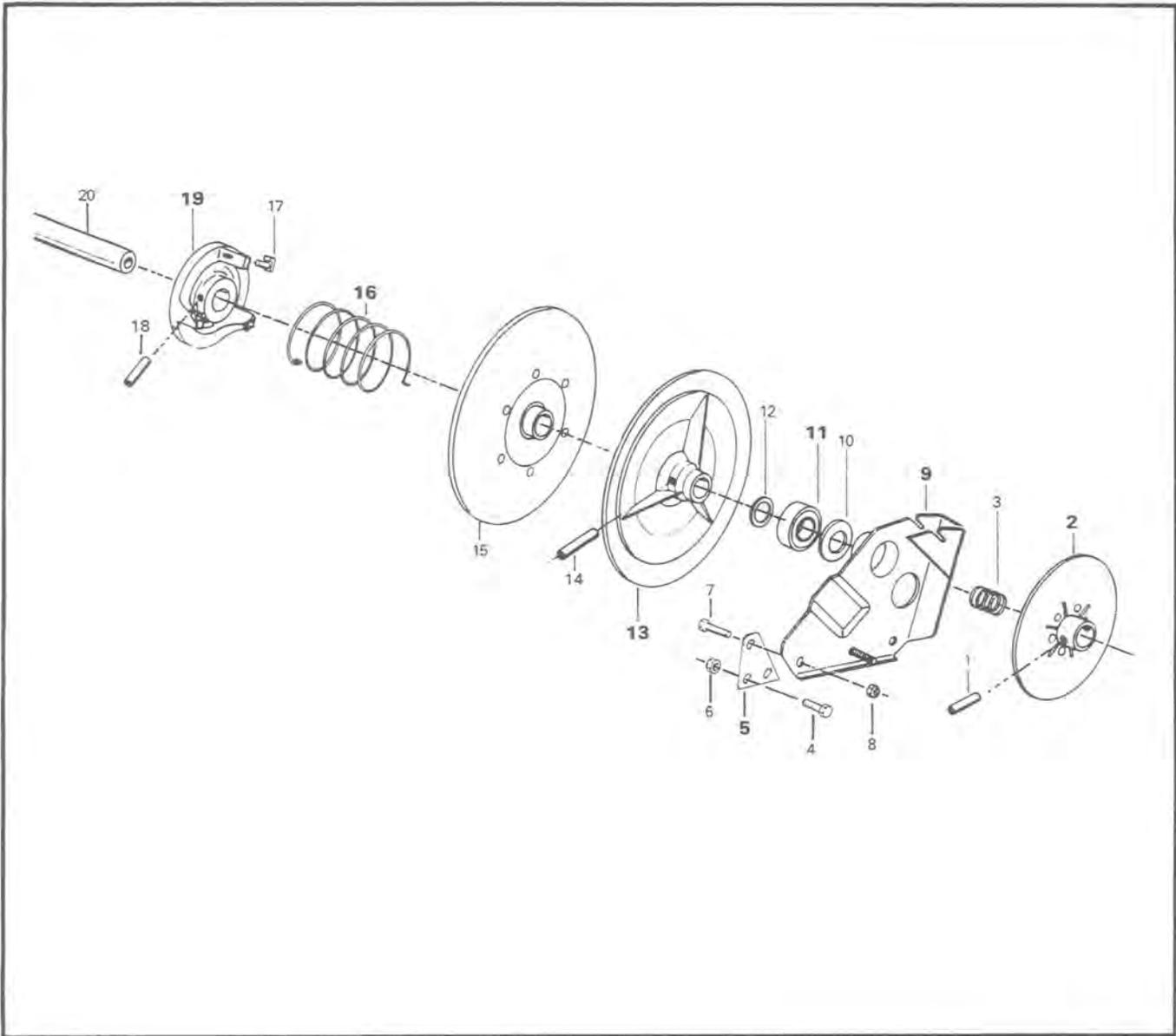


6, Drive belt deflection adjustment set screws

At assembly, the Allen screws must be set in accordance with the drive belt deflection specification (see section 03, sub-section 02 Drive Belt).

SECTION 03 TRANSMISSION
 SUB-SECTION 04 (DRIVEN PULLEY)

ALPINE



- 1. Roll pin
- 2. Brake disc
- 3. Spring
- 4. Cap screw $1/4 - 20 \times 3/4$
- 5. Support bracket
- 6. Elastic stop nut $1/4 - 20$
- 7. Cap screw $5/16 - 18 \times 3/4$
- 8. Elastic stop nut $5/16 - 18$
- 9. Bearing support
- 10. Shim

- 11. Bearing
- 12. Spacer
- 13. Fixed half
- 14. Roll pin
- 15. Sliding half
- 16. Spring
- 17. Slider shoe
- 18. Roll pin
- 19. Outer cam
- 20. Transmission input shaft

REMOVAL

Driven pulley can be removed from the transmission shaft using the following procedure:

Pulley guard and drive belt

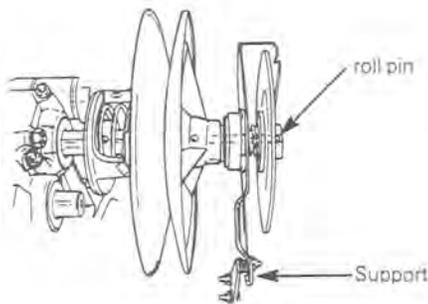
Remove from vehicle.

Brake caliper assembly

Remove from bearing support.

2,9 Disc and support

Position a suitable support under the drive shaft then punch the roll pin out of the shaft.



The transmission shaft support is removed with the disc. Disengage support from bearing by tapping on its inner side.

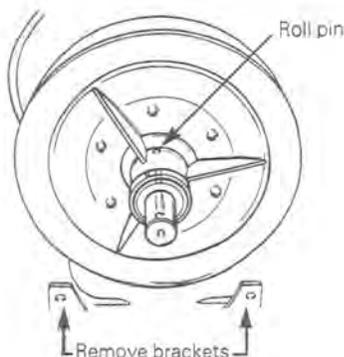
Pull disc and support out of the shaft.

11, Bearing

Use a suitable bearing puller.

5,13 Fixed half and support brackets

Remove the two support brackets. Push the roll pin out of the shaft and remove the fixed half.



19, Outer cam

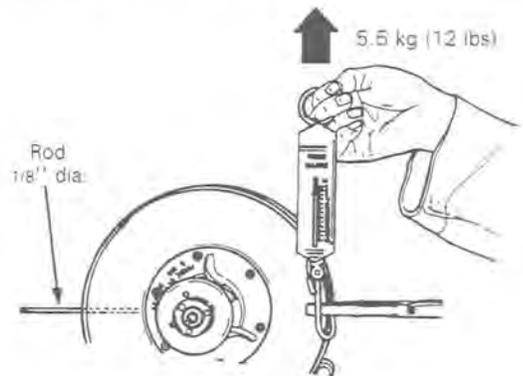
With sliding half and spring removed, push the roll pin out of the shaft and remove the outer cam.

○ NOTE: If necessary, heat hub of fixed pulley and outer cam to facilitate removal.

INSPECTION

16, Spring torsional load

In order to measure driven pulley spring tension, the pulley halves must be separated. To do this, insert a length of 1/8" dia. rod between the halves. Check tension using a fish scale positioned 90° with pulley axle. Spring tension pre-load should be 5.5 kg (12 lbs).



To correct, see ADJUSTMENT.

ASSEMBLY

17, Cam Slider Shoe

When replacing slider shoes, always install a new set of three shoes to maintain balanced pressures on the cam.

INSTALLATION

To install driven pulley, bearing, support and disc, reverse removal procedure.

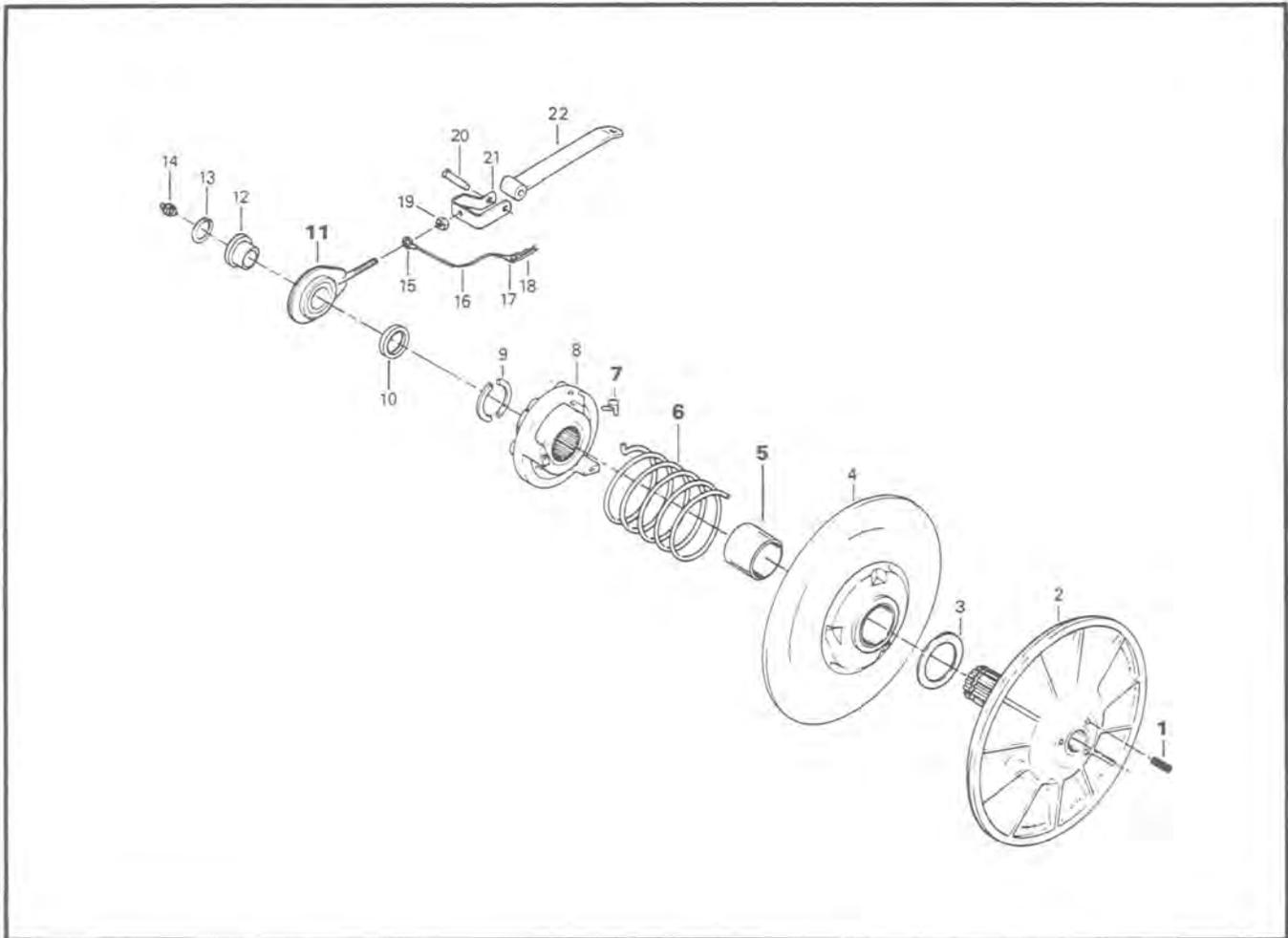
ADJUSTMENT

16, Spring torsional pre-load

to adjust spring pre-load, relocate spring end in sliding pulley half.

SECTION 03 TRANSMISSION
SUB-SECTION 04 (DRIVEN PULLEY)

SKANDIC-R



- 1. Allen set screw M6 × 20
- 2. Fixed half
- 3. Thrust washer
- 4. Sliding half
- 5. bushing
- 6. Spring
- 7. Slider shoe
- 8. Outer cam
- 9. C-clip
- 10. Spacer
- 11. Support

- 12. Flanged ring
- 13. Snap ring
- 14. Grease fitting
- 15. Ring terminal
- 16. Wire 102 mm
- 17. Ring terminal
- 18. Hair pin
- 19. Nut M8 × 1,25 × 6
- 20. Clevis pin
- 21. Support bracket
- 22. Support clamp

REMOVAL

To remove driven pulley assembly, carburetor, air silencer and steering column have to be removed. Follow this procedure:

Pulley guard and drive belt

Remove from vehicle.

Air silencer

Remove from vehicle.

Carburetor

Disconnect carburetor rubber coupling at engine and move to side.

Steering column

Disconnect steering column upper and lower attaching bracket. Move steering to the foremost right.

○ **NOTE:** Maximum right steering movement is obtained when skis are turned to right.

11, Support

Disconnect countershaft support from support clamp. Remove circlip and using a suitable puller, remove countershaft support.

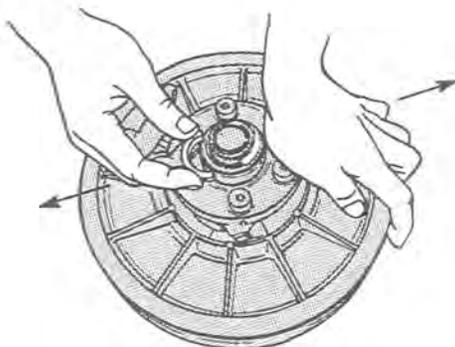
Driven pulley assembly

Remove from countershaft.

DISASSEMBLY

9, C-clip

Push outer cam and remove the C-clips.



Remove C-clips

5, Sliding half bushing

To disassemble a worn bushing, use a press and a suitable pusher.



INSPECTION

5, Bushing

Check sliding half bushing wear, replace bushing if wear is excessive.

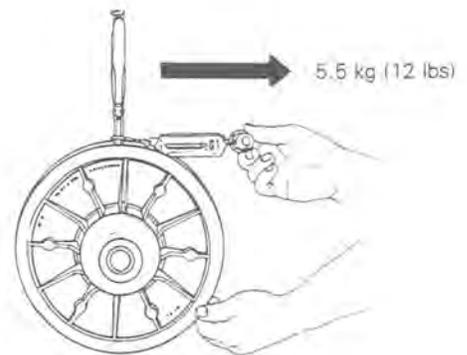
7, Slider shoe

Check for excessive wear.

6, Spring torsional pre-load

Check pre-load using a fish scale positioned at 90° with the pulley axle.

The spring pre-load should be: 5,5 kg (12 lbs)



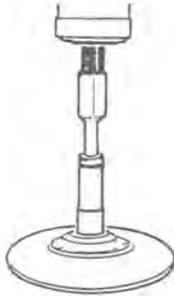
To correct, refer to ADJUSTMENT.

ASSEMBLY

5, Bushing

Assemble a new bushing using a press and a suitable pusher.

SECTION 03 TRANSMISSION
SUB-SECTION 04 (DRIVEN PULLEY)



7, Cam Slider Shoe

When replacing slider shoes, always install a new set of three shoes to maintain balanced pressures on the cam.

INSTALLATION

Reinstall the pulley on the countershaft by reversing the removal procedure.

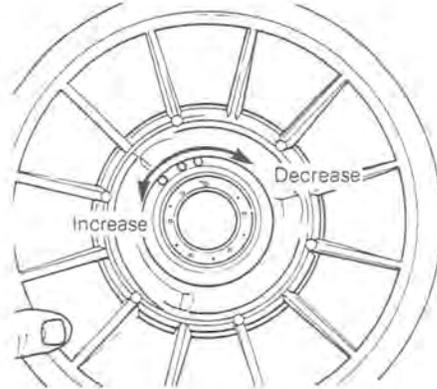
Countershaft

▼ **CAUTION:** Always apply anti-seize compound on the countershaft before final pulley installation (Loctite anti-seize lubricant P/N 413-7010 00).

ADJUSTMENT

5, Spring torsional pre-load

To adjust spring pre-load displace spring end accordingly.

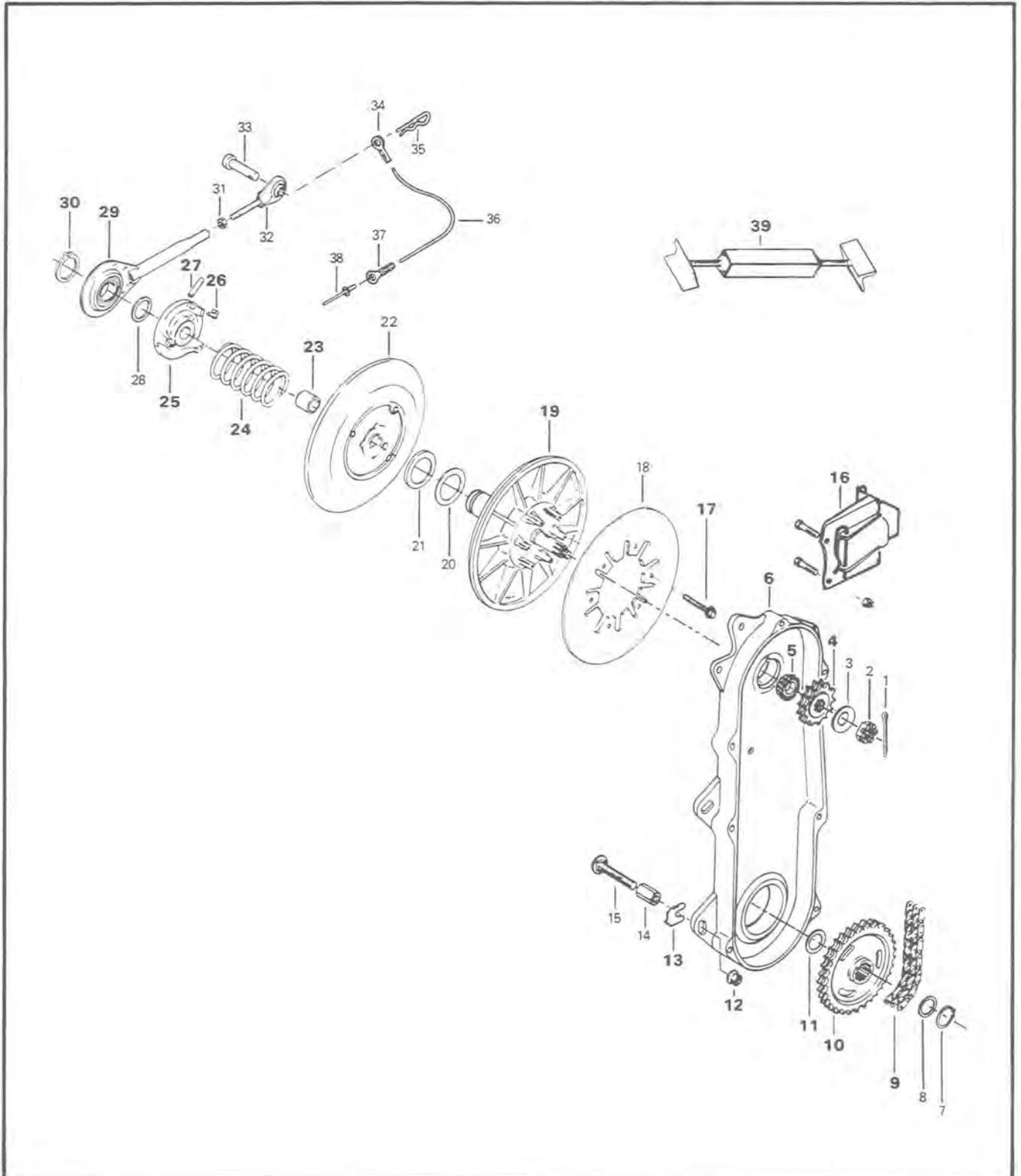


1, Drive belt deflection adjustment set screws

At assembly, the Allen screws must be set in accordance with the drive belt deflection specification (see section 03, sub-section 02 Drive Belt).

SECTION 03 TRANSMISSION
SUB-SECTION 04 (DRIVEN PULLEY)

SS-25, SAFARI, SONIC L/C



SECTION 03 TRANSMISSION

SUB-SECTION 04 (DRIVEN PULLEY)

1. Cotter pin
2. Castellated nut
3. Spring washer
4. Sprocket
5. Bearing cone
6. Chaincase
7. Snap ring
8. Spacer (thin)
9. Chain
10. Sprocket
11. Spacer (thick)
12. Elastic flanged stop nut M8 x 1.25
13. Shim
14. Threaded spacer
15. Carrage bolt M8 x 1.25 x 55
16. Brake assy
17. Taptile screw M6 x 16
18. Brake disc
19. Fixed half
20. Shim

21. Shim
22. Sliding half
23. Bushing
24. Spring
25. Outer cam
26. Slider shoe
27. Roll pin
28. Spacer
29. Support
30. Snap ring
31. Nut
32. Ball joint
33. Clevis pin
34. Ring terminal
35. Hair pin
36. Wire
37. Ring terminal
38. Rivet
39. Drive axle holder

REMOVAL

To remove driven pulley from vehicle, chaincase and driven pulley must be removed as an assembly. Follow this procedure:

Pulley guard and drive belt

Remove from vehicle.

16, Brake caliper

Remove from chaincase.

29,33,35, Countershaft support

To disconnect from support clamp, remove hair pin and clevis pin.

6, Chaincase

Open and drain oil.

4,9,10, Sprockets and chain

Remove lower sprocket snap ring.
Remove cotter pin and upper sprocket castellated nut.
Remove sprockets and chain.

5,11, Bearing and spacer

Remove from chaincase.

12,13, Retaining nuts and shims

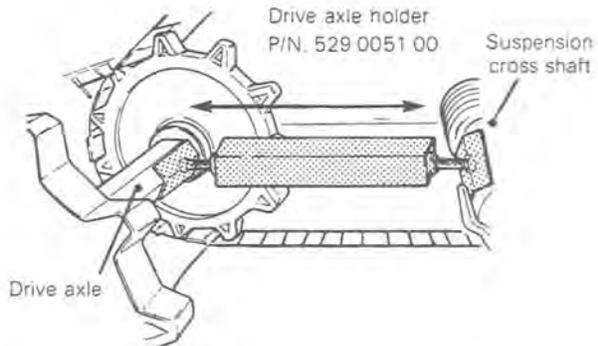
Remove the four chaincase retaining nuts and save aligning shims for installation.

Drive axle seal

Push towards drive axle sprocket.

39, Drive axle holder

Remove tension exerted by the track on the drive axle using drive axle holder as illustrated.



Chaincase and pulley assembly

Pull out of vehicle.

DISASSEMBLY

Driven pulley and chaincase

To disassemble driven pulley from chaincase, press pulley shaft out of chaincase or knock with a plastic hammer.

29,30, Snap ring and support

Remove snap ring and slide support out of pulley shaft.

25,27, Roll pin and outer cam

Remove roll pin and slide outer cam out of pulley shaft.

23, Sliding half bushing

To disassemble a worn bushing, use a press and a suitable pusher.



INSPECTION

23, Sliding half bushing

Check sliding half bushing wear, replace bushing if wear is excessive.

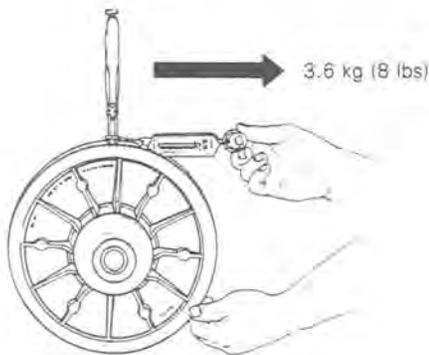
26, Slider shoe

Check for excessive wear.

24, Spring torsional pre-load

Check pre-load using a fish scale positioned at 90° with the pulley axle.

The spring pre-load should be: 3.6 kg (8 lbs)

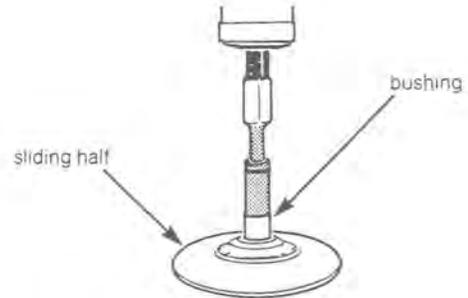


To correct, refer to ADJUSTMENT.

ASSEMBLY

23, Sliding half bushing

Assemble a new bushing using a press and a suitable pusher.



Driven pulley and chaincase

Assemble by reversing the disassembly procedure.

19, Fixed half shaft

▼ CAUTION: Always apply anti-seize compound on the pulley shaft before final pulley installation (Loctite anti-seize lubricant P/N 413 7010 00).

26, Cam Slider Shoe

When replacing slider shoes, always install a new set of three shoes to maintain balanced pressures on the cam.

INSTALLATION

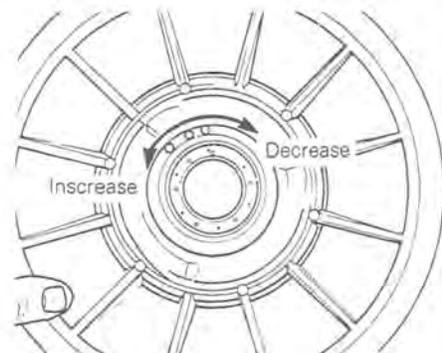
Driven pulley and chaincase

Reinstall by reversing the removal procedure.

ADJUSTMENT

24, Spring torsional pre-load

To adjust spring pre-load displace spring end accordingly.



SECTION 03 TRANSMISSION
SUB-SECTION 04 (DRIVEN PULLEY)

Track tension and alignment

Refer to section 05-05.

Drive belt deflection

Refer to section 03-02.

PULLEY DISTANCE AND ALIGNMENT

GENERAL

The pulley distance we will refer to, in this section, is the space separating the drive and driven pulley outside diameters.

This basic distance is provided as an assembly guide and indicates the dimensions between which satisfactory belt deflection will be obtained.

Both pulley distance adjustment and pulley alignment must be carried out to ensure the highest efficiency of the transmission system. Furthermore, the high drive belt operation and minimum wear will be obtained only with proper pulley alignment.

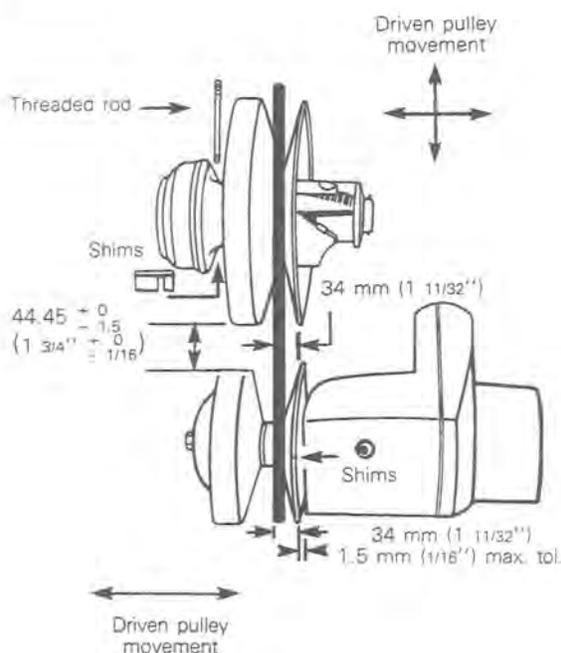
Drive belt deflection

NOTE: When pulley distance and alignment are adjusted to specifications, adjust drive belt deflection in accordance with section 03-02.

After adjustment checks

CAUTION: This section deals mainly with adjustment procedures. For complete assembly requirements, refer to the proper ENGINE or TRANSMISSION installation section.

ELAN 250



Pulley distance specification

$$44.45 \text{ mm} \pm \begin{matrix} 0.0 \\ 1.5 \end{matrix} (1 \frac{3}{4}'' \pm \begin{matrix} .000 \\ .060 \end{matrix})$$

Pulley distance adjustment method

With the threaded rod and nut located between chaincase and frame, shift chaincase to obtain the specified distance.

Pulley alignment specification

$$34 \text{ mm} \pm .75 (1 \frac{11}{32}'' \pm 1/32)$$

NOTE: A tolerance up to 1.5 mm (1/16'') is allowed on the offset measurement to compensate for the twist due to the drive pulley torque. Refer to the illustration.

Pulley alignment methods

Drive pulley alignment:

If drive pulley is too far in, remove drive pulley and add shim(s) on crankshaft. Shim P/N 504 0504 00, 0.81 mm (.032'') thickness.

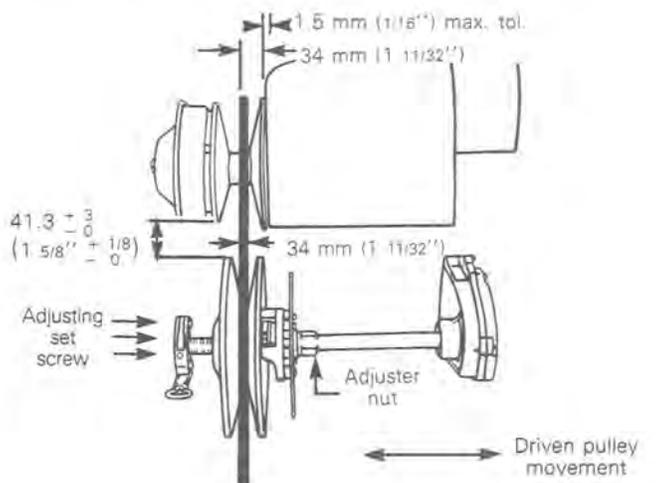
CAUTION: Never use more than 5 shims on crankshaft.

WARNING: Always torque drive pulley bolt within specifications. (See section 03-03).

Driven pulley alignment:

If driven pulley is too far in, add shim(s) between frame and chaincase. Shim P/N 504 0504 00, 0.81 mm (.032'') thickness.

SKANDIC 377, CITATION 3500



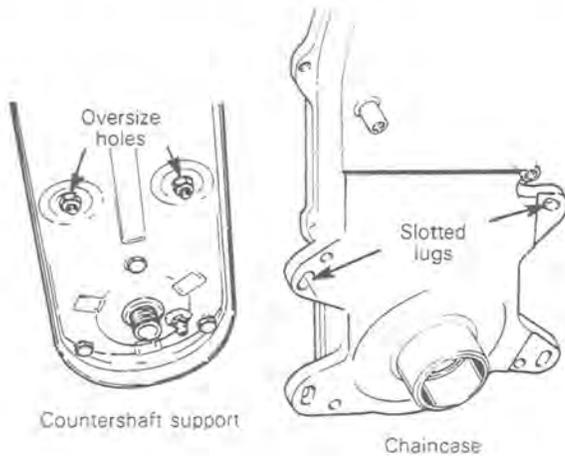
SECTION 03 TRANSMISSION
SUB-SECTION 05 (PULLEY DISTANCE AND ALIGNMENT)

Pulley distance specification

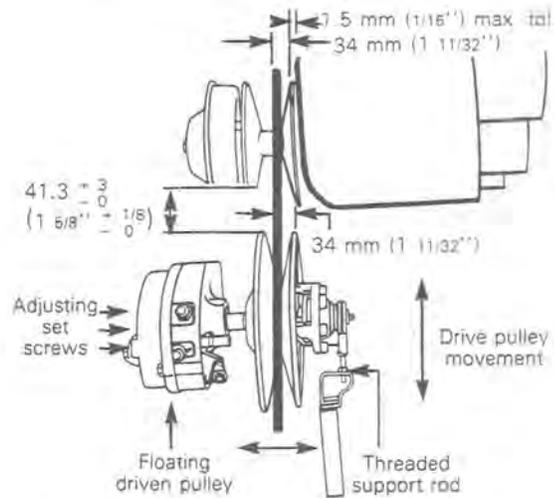
41.3 mm $\pm \frac{3}{0}$ (1 5/8" $\pm \frac{1}{8}$)

Pulley distance adjustment method

Oversize holes on countershaft support and slotted lugs on chaincase casting allow movement of the countershaft.



SKANDIC 377R



Pulley distance specification

41.3 mm $\pm \frac{3}{0}$ (1 5/8" $\pm \frac{1}{8}$)

Pulley distance adjustment method

Slotted lugs on gear box casting allow movement of the gearbox. Countershaft support has a threaded rod.

Adjustment:

Disconnect support from clamp, move gearbox until specified pulley distance is obtained and adjust support accordingly.

Move countershaft to obtain specified distance between pulleys.

Pulley alignment specification

34 mm $\pm .75$ (1 11/32" $\pm 1/32$).

NOTE: A tolerance up to 1.5 mm (1/16'') is allowed on the offset measurement to compensate for the twist due to the drive pulley torque. Refer to the illustration.

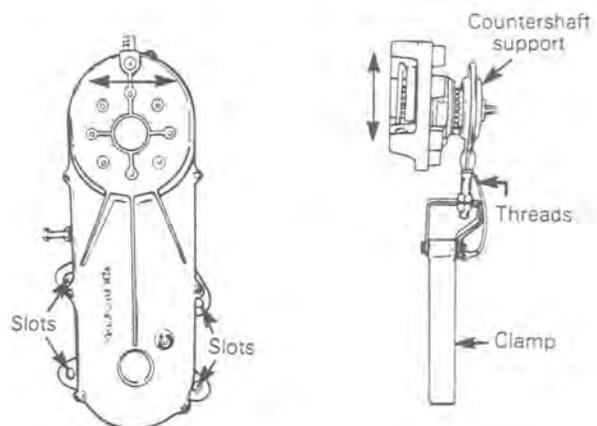
Pulley alignment method

Driven pulley alignment:

An adjuster nut and a spring are mounted on the countershaft to align the driven pulley.

Align driven pulley to obtain specified dimensions.

For proper tightening of the adjuster and jam nuts, refer to Driven Pulley, section 03-04.



Pulley alignment specification

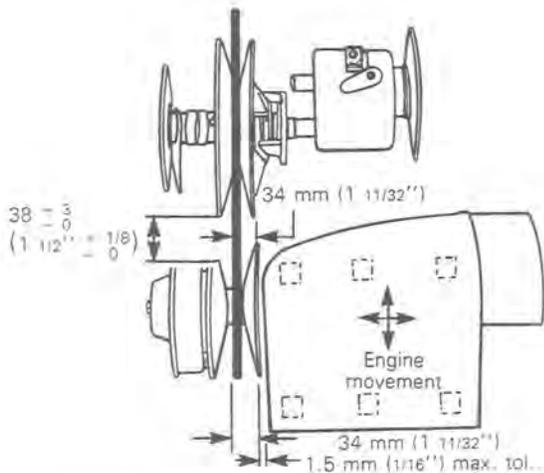
34 mm ± .75 (1 11/32" ± 1/32).

NOTE: A tolerance up to 1.5 mm (1/16") is allowed on the offset measurement to compensate for the twist due to the drive pulley torque. Refer to the illustration.

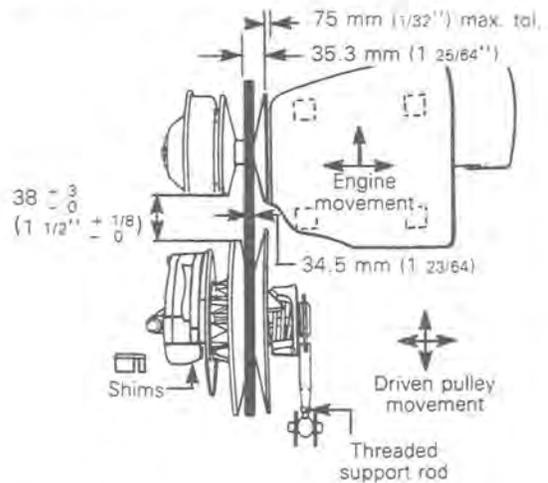
Pulley alignment method

The floating type driven pulley is self aligning.

ALPINE



SS-25, SONIC L/C SAFARI 447/377



Pulley distance specification

38 mm ± 3/8 (1 1/2" ± 1/8)

Pulley distance adjustment method

Slotted lugs on chaincase casting allow movement of the chaincase. Countershaft support has a threaded rod.

Adjustment:

Disconnect support from clamp, move chaincase until specified pulley distance is obtained and adjust support accordingly.

Pulley distance specification

44.45 mm ± 3/8 (1 3/4" ± 1/8)

Pulley distance adjustment method

Engine mounting bracket is provided with slotted holes. Move engine to obtain specified distance between pulleys.

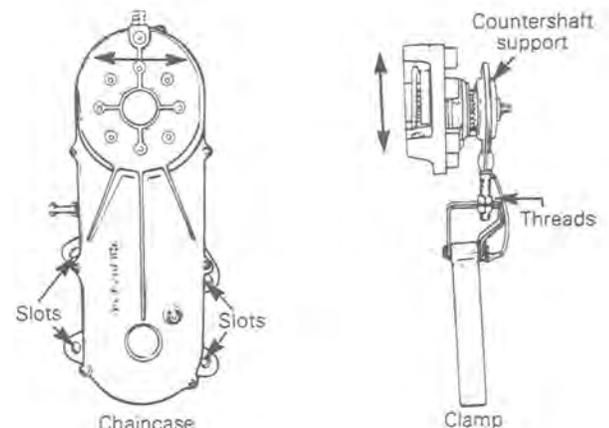
Pulley alignment specification

34 mm ± .75 (1 11/32" ± 1/32).

NOTE: A tolerance up to 1.5 mm (1/16") is allowed on the offset measurement to compensate for the twist due to the drive pulley torque. Refer to the illustration.

Pulley alignment method

Move engine to obtain the specified pulley alignment.



SECTION 03 TRANSMISSION

SUB-SECTION 05 (PULLEY DISTANCE AND ALIGNMENT)

Pulley alignment specification

Front of drive pulley measurement

34.5 mm \pm .4 (1 23/64" \pm 1/64).

Rear of drive pulley measurement

35.3 mm \pm .75 (1 25/64" \pm 1/32).

Pulley alignment method

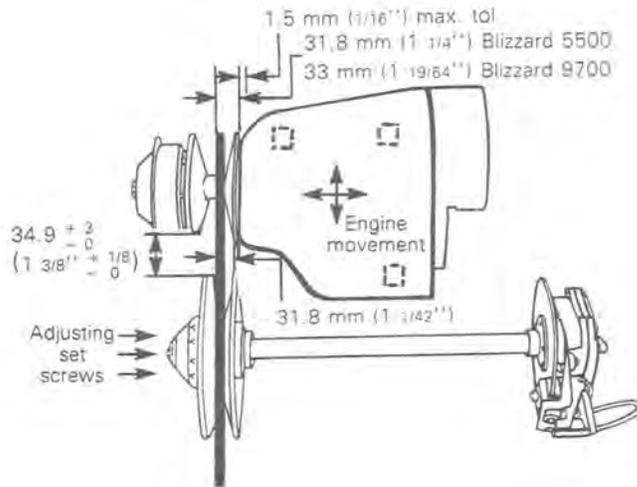
Engine movement:

Engine mounting bracket has slotted holes. Slide engine bracket on mounting studs to obtain specified pulley alignment.

Driven pulley movement:

Shims can be mounted between chaincase and frame. Shim P/N 504 0398 00, 0.53 mm (.021") thickness.

BLIZZARD 5500/9700



BLIZZARD 9700

33 mm \pm 1.5 (1 19/64" \pm 1/16)

NOTE: A tolerance up to 1.5 mm (1/16") is allowed on the offset measurement to compensate for the twist due to the drive pulley torque. Refer to the illustration.

Pulley alignment method

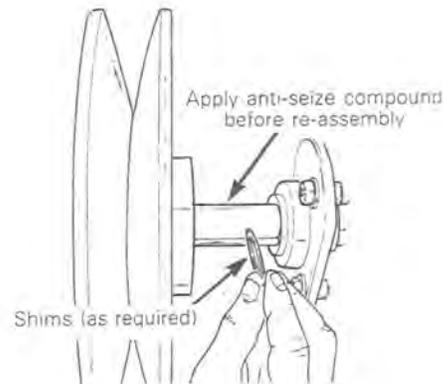
NOTE: The floating type driven pulley must have a 3 mm (1/8") maximum free play and the offset must be measured after pushing the driven pulley against the bearing flange.

Engine movement:

Slide engine bracket on mounting studs to obtain the specified alignment.

Driven pulley alignment:

Add or remove shims on countershaft (P/N 504 1082 00), 0.91 mm (.036" thickness). For pulley removal and installation procedure, see section 03-04.



Pulley distance specification

34.9 mm \pm .3 (1 3/8" \pm 1/8)

Pulley distance adjustment method

Engine movement:

The engine bracket has slotted mounting holes. Move engine to obtain specified distance between pulleys.

Pulley alignment specification

BLIZZARD 5500 MX

31.8 mm \pm 1.5 (1 1/4" \pm 1/16)

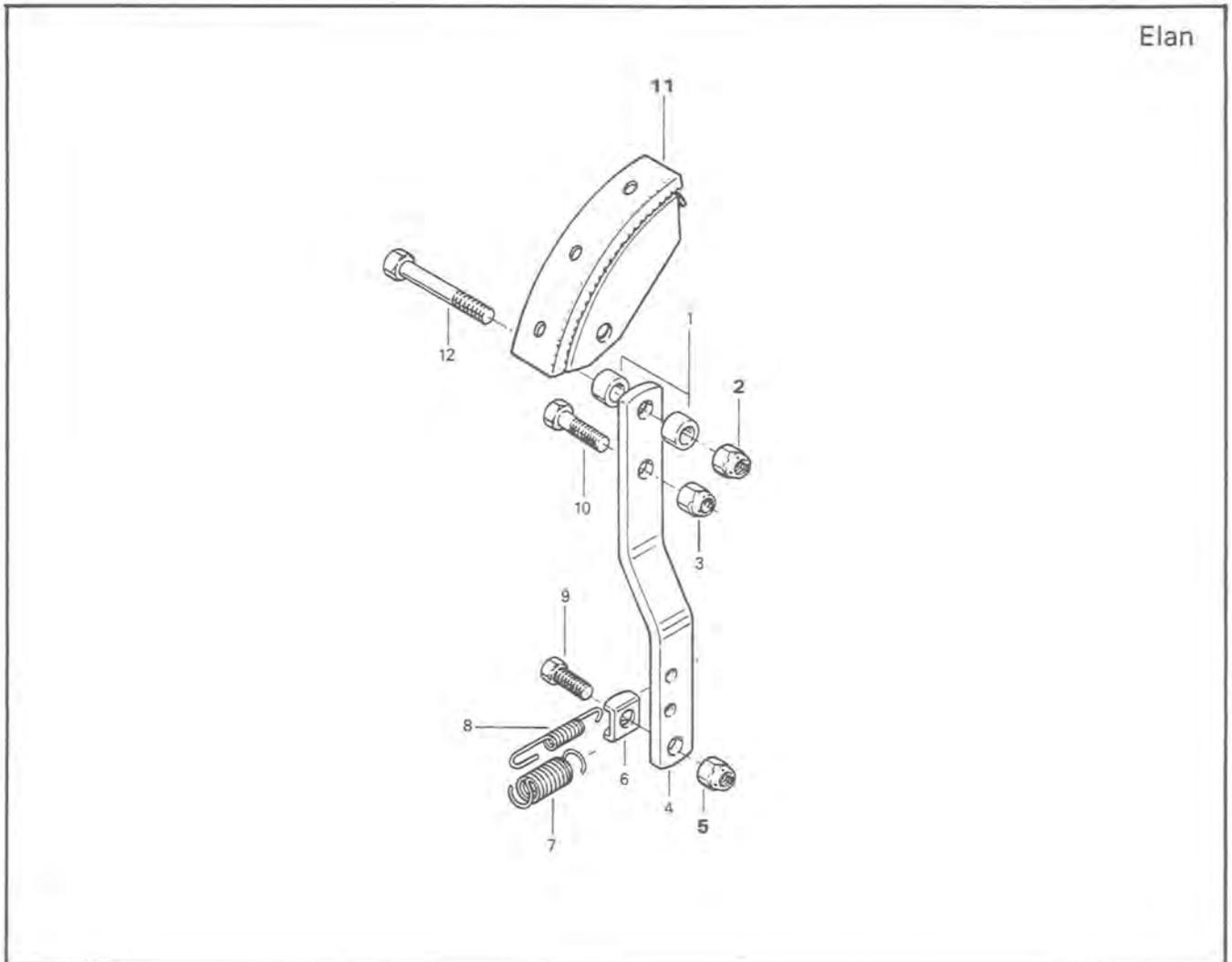
CAUTION: Always apply anti-seize compound (Loctite anti-seize lubricant P/N 413 7010 00) on the countershaft before final assembly.

CAUTION: Torque pulley retaining bolt to 10 N•m (7 ft•lbs).

BRAKE

DRUM BRAKE

Elan



- 1. Spacer
- 2. Nut (shoe)
- 3. Nut
- 4. Brake lever
- 5. Nut
- 6. Cable lock
- 7. Spring
- 8. Brake light switch spring
- 9. Bolt (cable)
- 10. Bolt
- 11. Brake shoe
- 12. Bolt (shoe)

INSPECTION

11, Brake shoe

Check brake lining for wear. If necessary, replace.

○ **NOTE:** If oil traces are found on lining or drum, check chaincase seal for correct installation position or damage. Replace as needed. Wipe oil from pulley and replace brake shoe.

INSTALLATION

2, Shoe retaining nut

When torquing shoe retaining nut, shoe must be allowed to pivot when slight pressure is applied.

5, Lever retaining nut

When attaching brake lever assembly to chaincase bracket, tighten nut until lever pivots freely and all side play is eliminated.

LUBRICATION

○ **NOTE:** Lubricate all moving metal parts of brake with light machine oil.

◆ **WARNING:** Avoid getting oil on brake shoe.

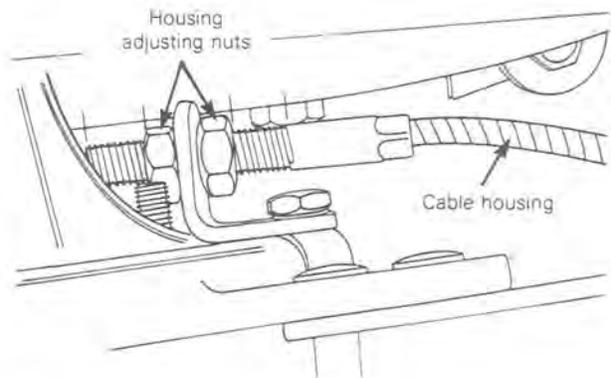
ADJUSTMENT

Brake lever control

Adjust so that brake applies fully when lever is 25 mm (1") from handlebar grip.

○ **NOTE:** Prior to cable installation, make sure cable housing adjusting nuts are located half way on adjuster threads.

If a final adjustment is indicated, use housing adjusting nuts.

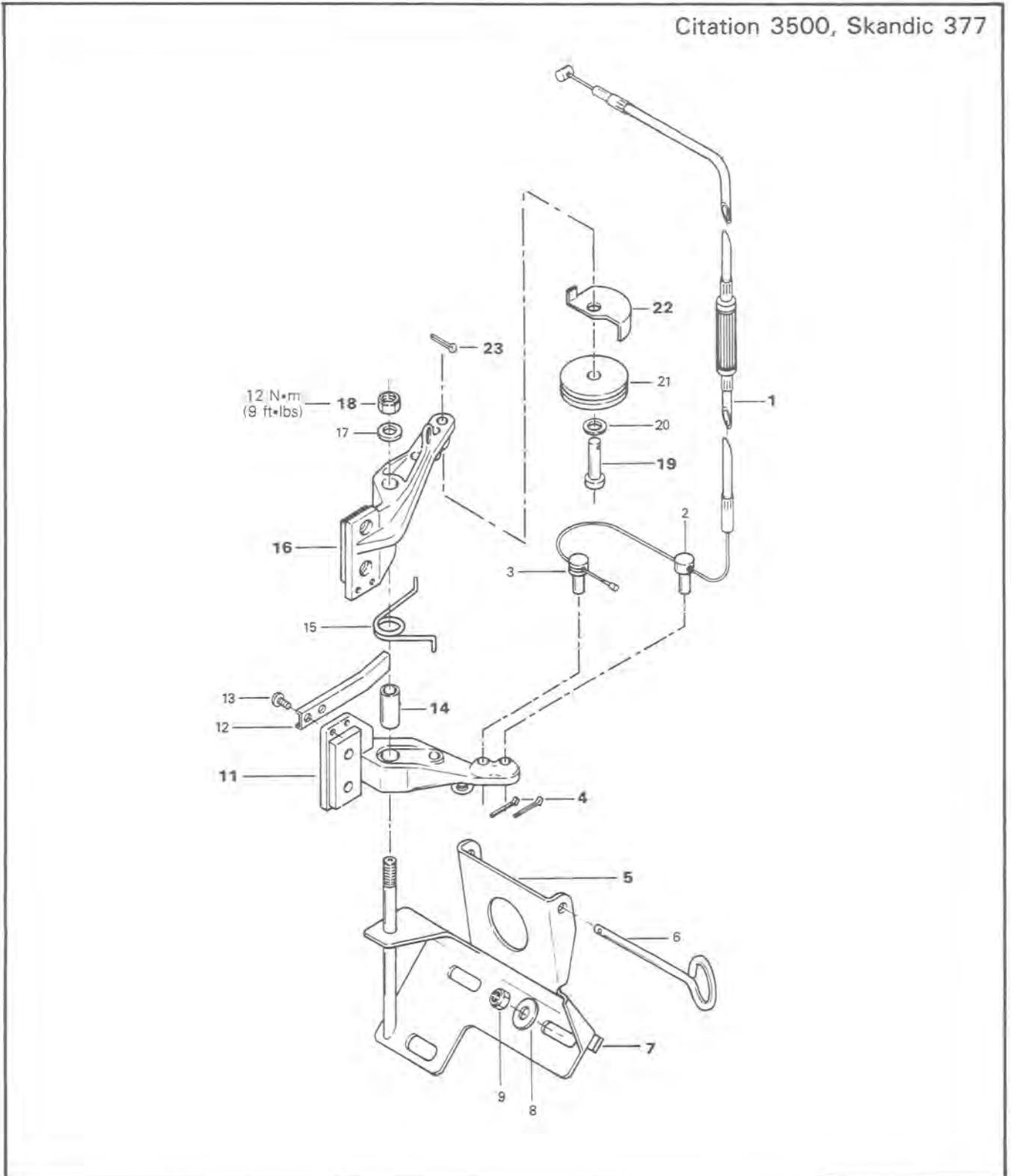


Brake light operation

Check brake light operation. If necessary, loosen brake light switch lock nuts and adjust.

DISC BRAKE

Citation 3500, Skandic 377



SECTION 03 TRANSMISSION SUB-SECTION 06 (BRAKE)

1. Cable
2. Barrel
3. Barrel
4. Cotter pin
5. Brake mounting bracket
6. Pin
7. Shim
8. Flat washer 8 mm
9. Elastic stop nut 8 mm
10. Flat washer 10 mm
11. Brake lever and pad
12. Brake switch bracket

13. Taptite screw M4 x 8
14. Bushing
15. Release spring
16. Brake lever and pad
17. Flat washer 10 mm
18. Elastic stop nut 10 mm
19. Pulley shaft
20. Spring washer
21. Pulley
22. Stop plate
23. Cotter pin

REMOVAL

Brake assembly

Disconnect brake light switch at connector and remove brake retainer nut, then pull out brake assembly, light switch and cable. Disconnect and remove brake cable.

◆ **WARNING:** Always readjust the brake light switch after removing the brake assembly.

INSPECTION

11,16, Brake pads

Measure the thickness of the brake pads. If less than 3 mm (1/8") the pad and lever assembly should be replaced.

14, Bushing

Inspect for excessive wear.

1, Cable

Inspect for frayed braids.

ASSEMBLY

4,23, Cotter pin

Always reinstall new cotter pin.

19, Pulley shaft

Install in outer hole of brake lever.

22, Stop plate

Make sure the guard lock tab is inserted in the brake lever hole.

18, Elastic stop nut

Torque to 12 N•m (9 ft•lbs).

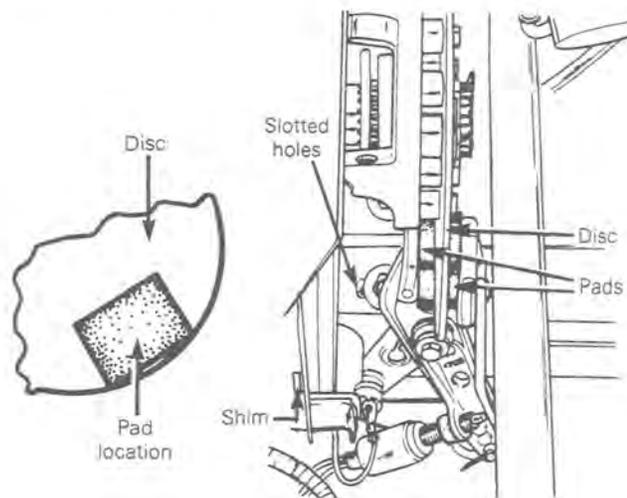
INSTALLATION

Reverse the removal procedure and pay particular attention to the following:

5,7, Brake mounting bracket & shim

Use shim P/N 507 0174 00 (.8 mm/.032" thickness) to ensure maximum pad friction area on disc.

Using mounting bracket slotted holes always align caliper ass'y so that the brake disc is well centered between the brake pads.

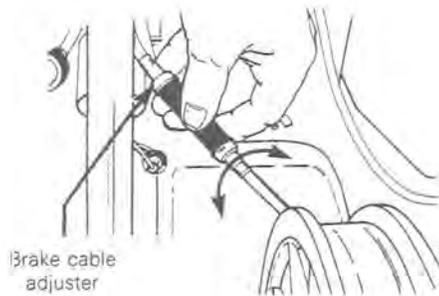


ADJUSTMENT

Control lever travel

Brake should apply fully while the brake control lever is approximately 13 mm (1/2") from the handlebar grip.

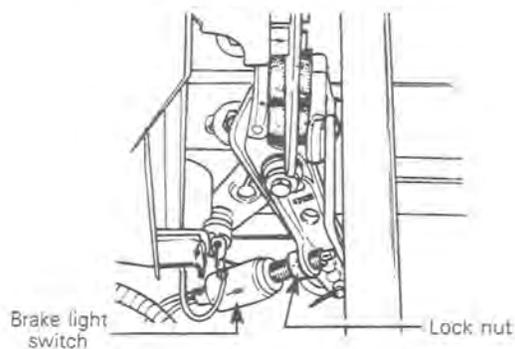
If adjustment is required, turn the brake cable adjuster counter-clockwise until the brake disc can no longer turn then back off the adjuster approximately 1 1/2 turns. Recheck brake operation.



Light switch

◆ **WARNING:** Whenever the brake is readjusted, the brake light switch operation must also be checked and adjusted.

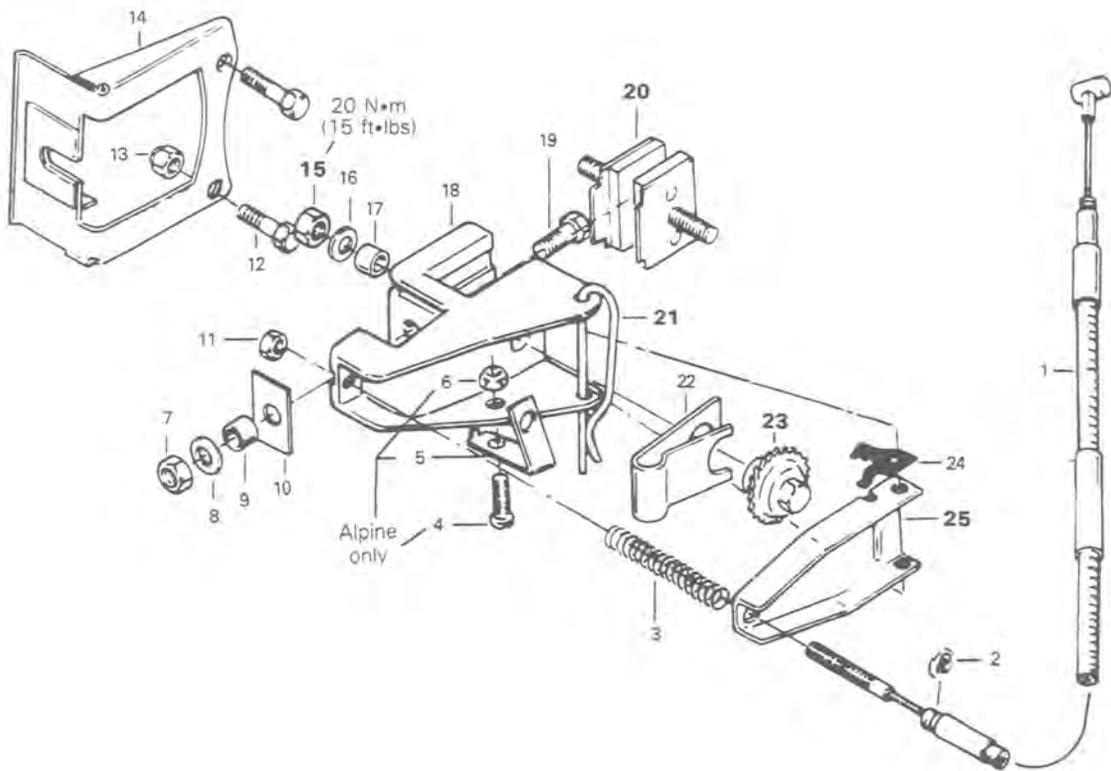
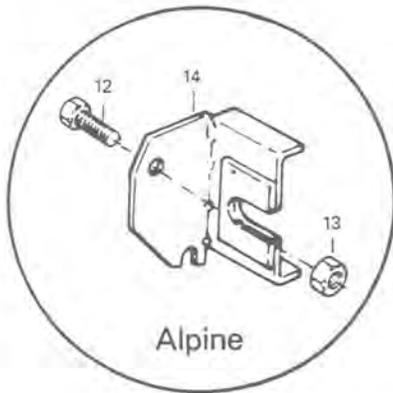
To adjust, disconnect switch at terminal, loosen lock nut and screw switch as required.



Check brake light operation and tighten lock nut.

SELF ADJUSTING DISC BRAKE

Safari, SS-25, Sonic L/C,
Blizzard, Alpine



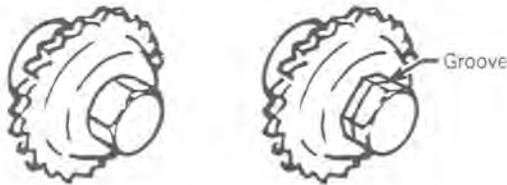
1. Cable
2. Snap ring
3. Release spring
4. Bolt
5. Brake light switch support
6. Elastic stop nut 10-24
7. Eslock nut 5/16 - 18
8. Washer
9. Bushing
10. Spacer
11. Elastic stop nut 10 - 24
12. Bolt
13. Elastic stop nut

14. Brake mounting bracket
15. Nylon nut 3/8 - 16
16. Flat washer 3/8 x 7/8 x .060"
17. Bushing
18. Caliper
19. Cap screw 5/16 - 18 x 3/4
20. Shoes
21. Pin
22. Release spring
23. Ratchet wheel
24. Ratchet spring
25. Lever

23, Ratchet wheel

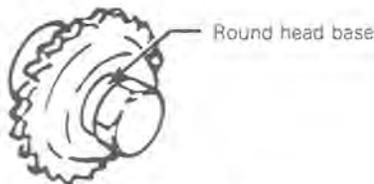
▼ **CAUTION:** Similar ratchet wheels on caliper type disc brakes may have metric or standard threads. Identify with the following illustration

Standard thread ratchet wheels



Hexagonal bolt head with or without groove.

Metric thread ratchet wheel



Hexagonal head with round head base

REMOVAL

Caliper assembly

To remove, disconnect brake cable. On ALPINE models, disconnect brake light switch at connector.

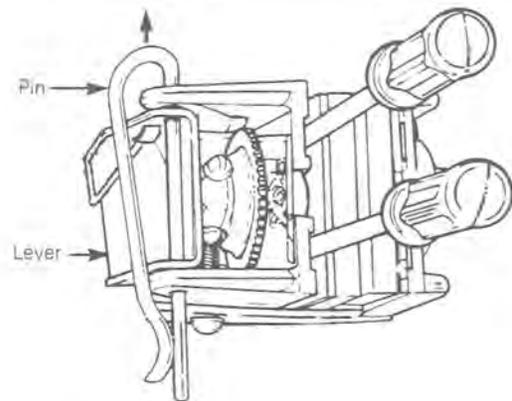
Remove nuts and/or bolts securing brake support to chaincase.

Slide brake caliper ass'y from brake support.

DISASSEMBLY

21,25, Pin & lever

To ease disassembly, activate lever and wedge two (2) screwdriver blades between caliper and brake shoe to release lever tension.



CLEANING

Clean all metal components in a general purpose solvent. Using dry rag.

INSPECTION

20, Brake lining thickness

Measure thickness of brake lining. If less than 3 mm (1/8"), the lining should be replaced.

SECTION 03 TRANSMISSION

SUB-SECTION 06 (BRAKE)

ASSEMBLY

23, Ratchet wheel

Apply low temperature grease on threads and spring seat prior to installation. Fully tighten then back off 1/2 turn.

15, Nylon nut

Torque to 20 N•m (15 ft•lbs).

INSTALLATION

Caliper assembly

Slide caliper ass'y onto its support then secure support to vehicle.

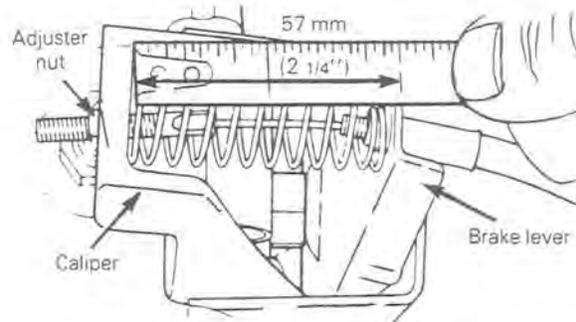
Activate lever by hand until ratchet click is no longer heard.

Secure brake cable housing to lever, slide spring over cable then attach cable to housing with adjuster nut.

ADJUSTMENT

Brake control lever

Using adjuster nut, adjust until there is no free-play between the brake lever and its housing, and there is a gap of 57 mm \pm 3 (2 1/4" \pm 1/8") between lever and caliper.



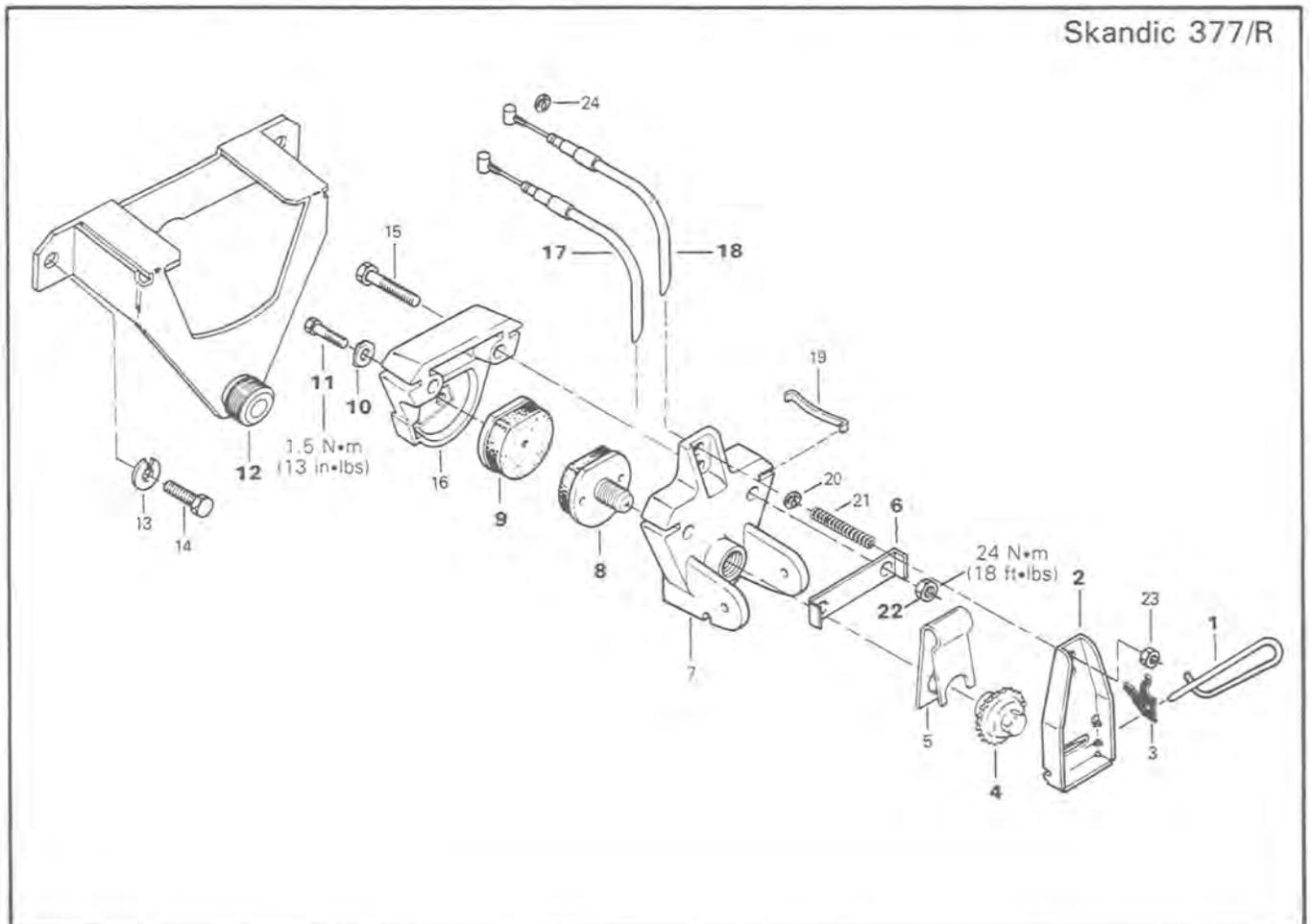
○ **NOTE:** On Alpine models, it may be necessary to change brake light switch support position to obtain recommended gap between lever and caliper housing.

Brake light switch (Alpine models)

Connect brake light switch and check operation. Adjust if necessary using two (2) adjuster nuts.

SELF ADJUSTING DISC BRAKE

Skandic 377/R



- 1. Pin
- 2. Brake lever
- 3. Pawl
- 4. Ratchet
- 5. Release spring
- 6. Tab lock
- 7. Outer caliper half
- 8. Outer shoe (sliding)
- 9. Inner shoe (fixed)
- 10. Tab lock
- 11. Cap screw M5 × .80 × 12
- 12. Brake support

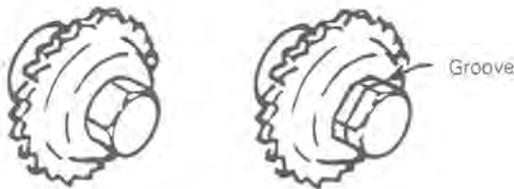
- 13. Lockwasher M8
- 14. Cap screw M8 × 1.25 × 16
- 15. Cap screw M8 × 1.25 × 50
- 16. Inner caliper half
- 17. Parking brake cable and housing
- 18. Service brake cable and housing
- 19. Caliper support spring
- 20. Snap ring
- 21. Spring
- 22. Elastic stop nut M8 × 1.25
- 23. Elastic stop nut 10 - 24

SECTION 03 TRANSMISSION SUB-SECTION 06 (BRAKE)

RATCHET WHEEL

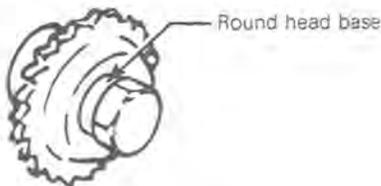
▼ **CAUTION:** Similar ratchet wheels on caliper type disc brakes may have metric or standard threads. Identify with the following illustration.

Standard thread ratchet wheels



Hexagonal bolt head with or without groove.

Metric thread ratchet wheel



Hexagonal head with round head base.

REMOVAL

Brake assembly

The splitted caliper type brake must be removed from vehicle as an assembly. Proceed as follows.

12, Brake support

Remove support bolts and slide assembly from disc.

17,18, Brake cables

Disconnect from brake lever.

Speedometer cable

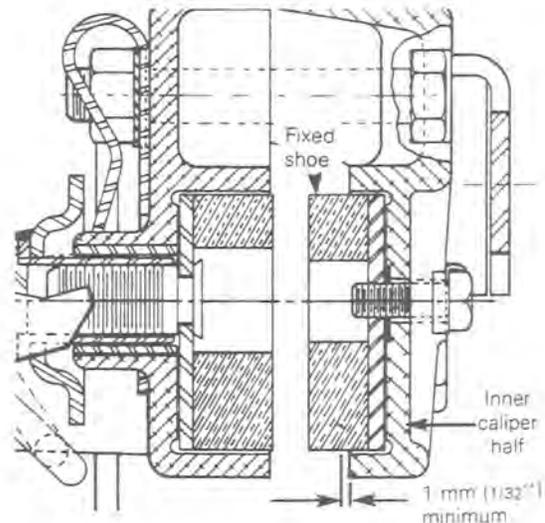
Disconnect front angle drive.

Pull brake assembly out of vehicle.

INSPECTION

8,9, Brake lining thickness

Brake linings are servicable when fixed shoe projects a minimum of 1 mm (1/32'') from caliper.



ASSEMBLY

4, Ratchet wheel

Apply low temperature grease on threads and spring seat prior to installation. Fully tighten then back off 1/2 turn.

10,11, Inner shoe bolt & tab lock

Tighten bolt to 1.5 N•m (13 in•lbs) and secure with tab lock.

6,22, Caliper ass'y nut & tab lock

With the release spring in position, slide the tab lock between the spring inner faces and secure the two caliper halves with nuts. Torque nuts to 24 N•m (18 ft•lbs). Caliper half side slots must align.

Bend tab lock over flat surface of nuts.

1, Pin

Must be assembled from the pawl side and locked in the caliper casting recess to prevent from rotation.

INSTALLATION

To install brake assembly, reverse removal procedure and pay attention to the following:

Caliper assembly

Slide caliper ass'y with springs onto its support then secure support to vehicle.

Activate lever by hand until ratchet click is no longer heard.

Secure brake cable housing to lever, slide spring over cable then attach cable to housing with adjuster nut.

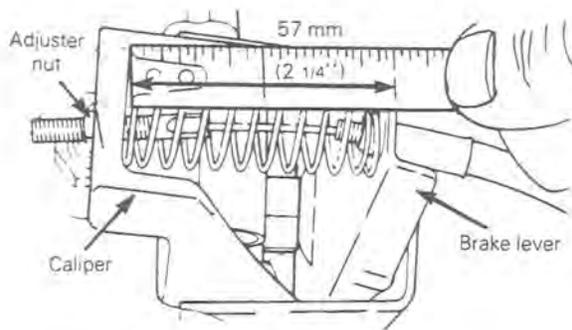
17,18, Brake cables

The service brake cable must be installed in the lever upper hole.

ADJUSTMENT

Lever travel

To insure optimum self adjusting function of the ratchet, screw the adjuster nut until there is a gap of 57 mm \pm 3 (2 1/4" \pm 1/8") between lever and cable support lug.



Brake control lever

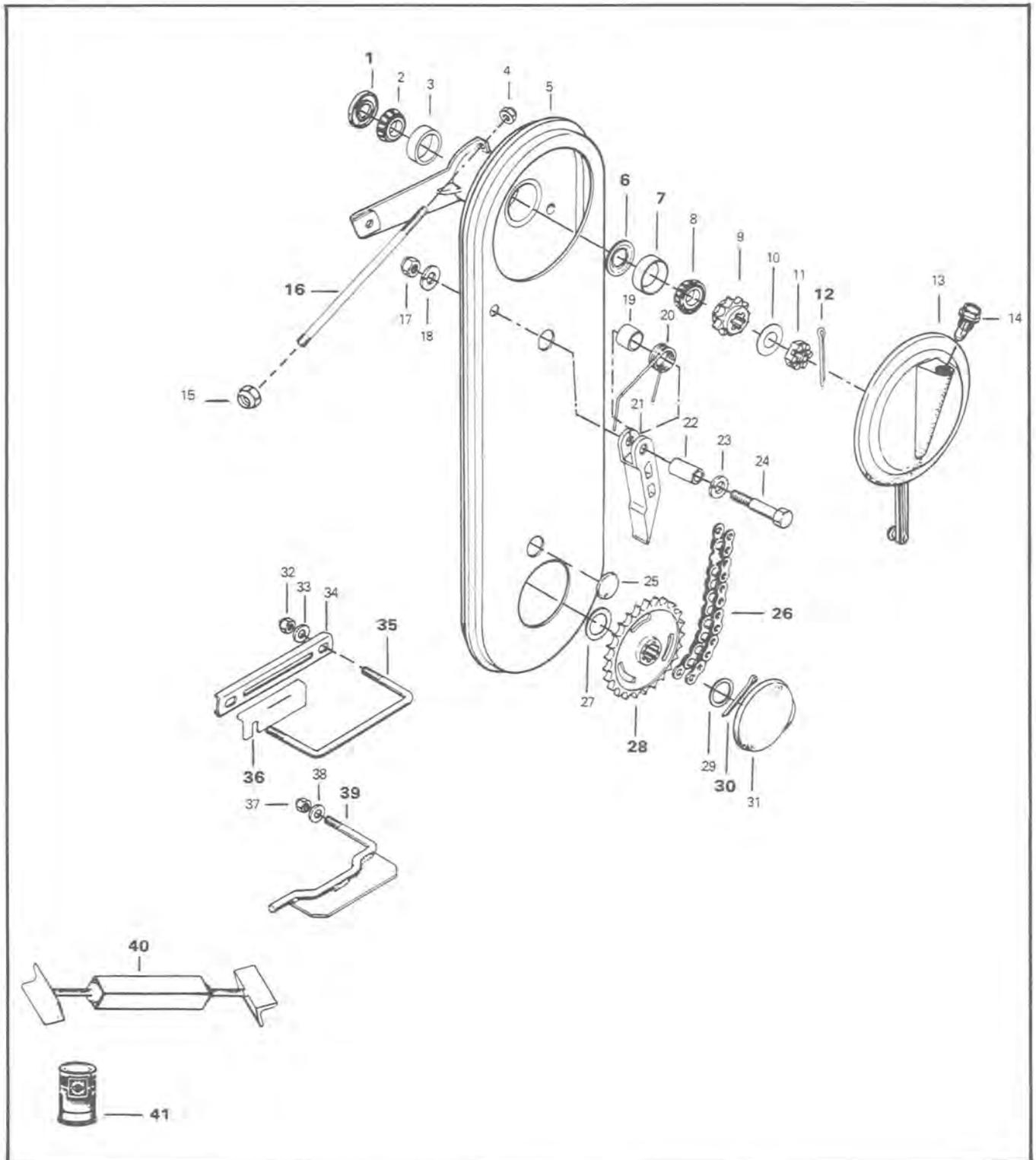
Using adjuster nut, screw until there is no free play between the brake lever and its housing. With brake unapplied, brake shoes must not restrict disc movement.





CHAINCASE

ELAN



SECTION 03 TRANSMISSION

SUB-SECTION 07 (CHAINCASE)

1. Seal
2. Bearing cone
3. Bearing cup
4. Elastic stop nut 5/16-18
5. Chaincase
6. Oil deflector
7. Bearing cup
8. Bearing cone
9. Sprocket 10 teeth
10. Washer
11. Castellated nut 1/2-20
12. Cotter pin
13. Inspection cover
14. Breather
15. Elastic stop nut 5/16-18
16. Threaded rod
17. Elastic stop nut 1/4-20
18. Fiber washer
19. Spacer
20. Spring
21. Chain tensioner
22. Bushing
23. Fiber washer
24. Hexagonal cap screw 1/4-20 x 1 3/4
25. Chain case plug
26. Chain
27. Spacer
28. Sprocket 25 teeth
29. Spacer
30. Cotter pin
31. Access plug
32. Elastic stop nut 5/16-18
33. Flat washer
34. Spacer plate
35. U-clamp
36. Shim
37. Elastic stop nut 5/16-18
38. Flat washer
39. Bracket
40. Drive axle holder
41. Chaincase oil 200 ml (7 oz)

REMOVAL

Chaincase & driven pulley assembly

Chaincase and driven pulley can be removed from vehicle as a complete assembly. Proceed as follows.

Remove tool box, pulley guard, drive belt.

26, Drive chain

Remove access plug (upper) and release chain tension.

41, Chaincase oil

Pry lower oil seal from chaincase and drain oil.

Brake cable

Disconnect from chaincase.

30, Lower sprocket cotter pin

Pry out lower access plug, remove cotter pin and spacer.

16, Threaded rod

Disconnect from chaincase.

35,39, U-clamp & bracket

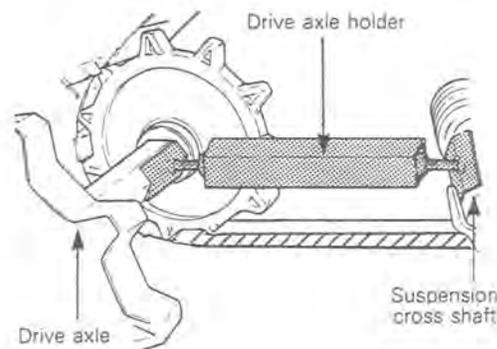
From the inner side of the frame, remove the nut securing chaincase lower bracket and remove bracket. Remove the nuts, washers and u-clamp holding the chaincase to frame.

36, Shims

Remove and save for installation.

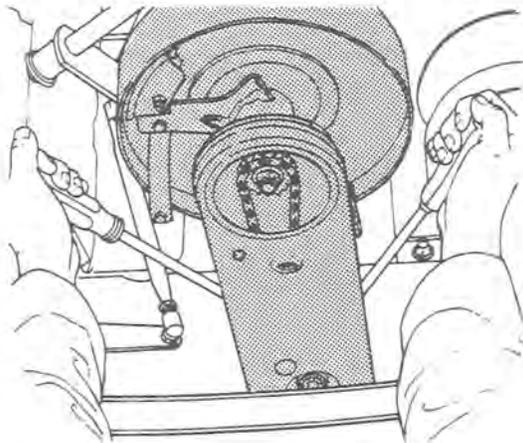
40, Drive axle holder

Release track tension or use drive axle holder P/N 529 0051 00.



Chaincase & driven pulley assembly

Using two (2) large screwdrivers inserted between chaincase and frame, pry complete assembly from vehicle.



DISASSEMBLY

Disassemble driven pulley from chaincase. Refer to Driven pulley 03-04.

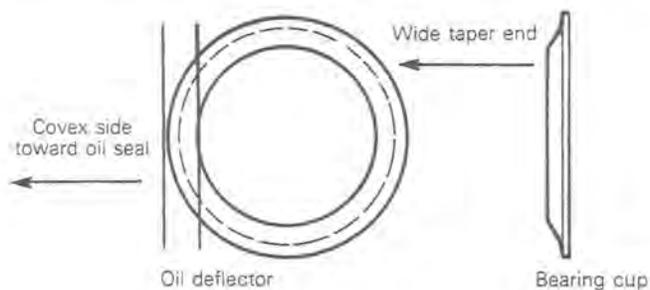
INSPECTION

Visually inspect chain for cracked, damaged or missing link rollers. Inspect for defective bearing cones, bearing cups and oil retainer ring. Inspect sprockets for damage, wear.

ASSEMBLY

6,7, Oil deflector & bearing cup

Position oil retainer ring then sit bearing cup in chaincase aperture. Cup must be seated so that wide taper end is facing oil deflector.

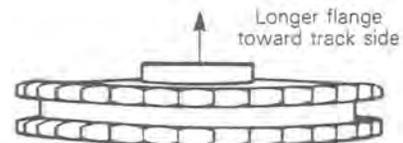


1, Oil seal

Using an appropriate pusher, press oil seal into chaincase hub. Oil seal must sit flush with case hub edge.

28, Sprocket

Place lower sprocket with longer flange toward track side of chaincase. (For proper sprocket and chain use, see Technical Data.)



INSTALLATION

To install chaincase - driven pulley assembly, reverse removal procedure and pay attention to the following.

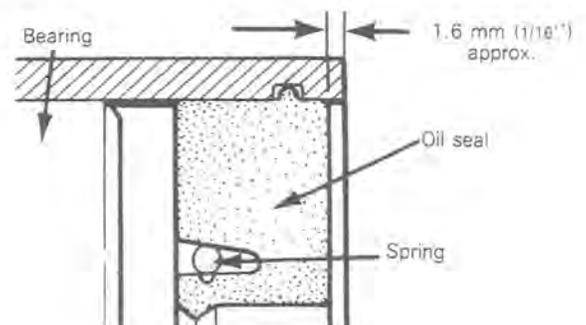
12,30, Cotter pins

Install new cotter pins.

Lower oil seal

Install oil seal into chaincase flange.

NOTE: A gap of approximately 1.6 mm (1/16") should exist between the end of chaincase flange and oil seal.



41, Chaincase oil

Fill with 200 ml (7 oz) of chaincase oil.

Pour Bombardier chaincase oil into chaincase until it reaches 13 mm (1/2") lower than the oil level plug.

SECTION 03 TRANSMISSION
SUB-SECTION 07 (CHAINCASE)

ADJUSTMENT

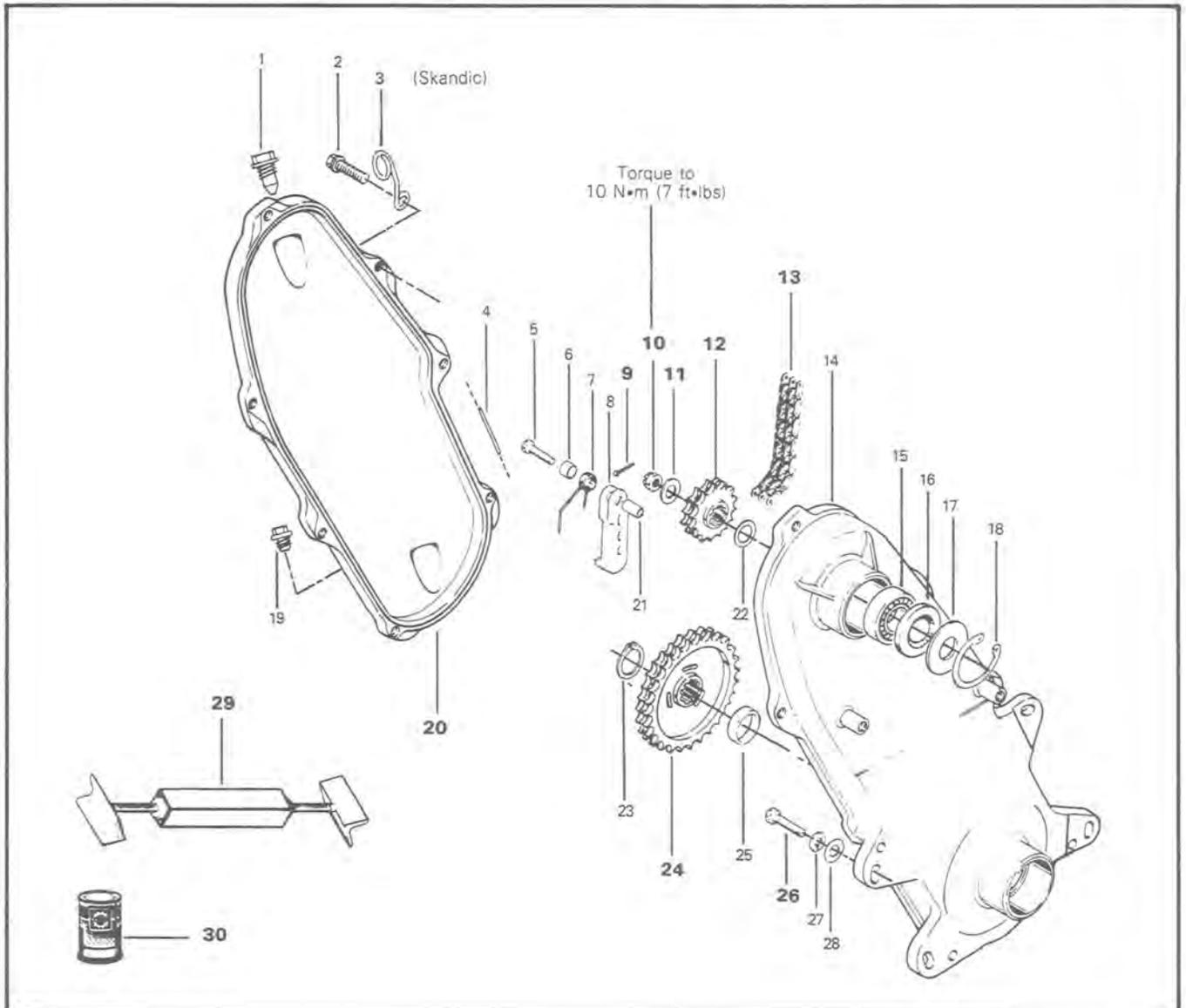
Pulley alignment

Refer to "Pulley Distance and Alignment" sub-section 05.

Brake operation & brake light

Refer to "Brake" sub-section 06.

CITATION 3500, SKANDIC 377



- | | |
|-----------------------------|---------------------------------|
| 1. Breather | 16. Seal |
| 2. Washer head tapite screw | 17. Stopper spacer |
| 3. Rope guide | 18. Snap ring |
| 4. O'ring | 19. Plug |
| 5. Cap screw | 20. Chaincase cover |
| 6. Spacer | 21. Bushing |
| 7. Spring | 22. Spacer |
| 8. Chain tensioner | 23. Snap ring |
| 9. Cotter pin | 24. Sprocket |
| 10. Castellated nut | 25. Spacer |
| 11. Spring washer | 26. Cap screw M8 x 25 |
| 12. Sprocket | 27. Lockwasher 8 mm |
| 13. Driving chain | 28. Flatwasher 8 mm |
| 14. Chaincase | 29. Drive axle holder |
| 15. Bearing | 30. Chaincase oil 200 ml (7 oz) |

SECTION 03 TRANSMISSION

SUB-SECTION 07 (CHAINCASE)

REMOVAL

To remove chaincase from vehicle, proceed as follows:

Injection oil reservoir

On Citation model, remove from vehicle.

20, Chaincase cover

Remove and drain oil.

Drive axle oil seal

Pry out from chaincase.

12,13,24, Sprockets & chain

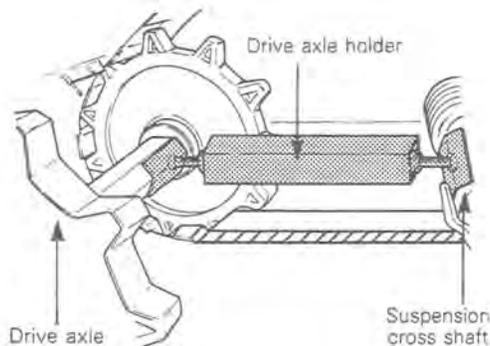
Remove from chaincase.

26, Chaincase retaining bolts

Remove bolts and nuts securing chaincase to frame.

29, Drive axle holder

Remove track tension on drive axle using tool P/N 529 0051 00 and pull chaincase out of vehicle.



INSPECTION

Visually inspect the chain for cracked, damaged or missing link rollers. Inspect for defective bearing, sprockets.

INSTALLATION

Reverse removal procedure. Pay particular attention to the following.

10,11, Castellated nut & spring washer

Install spring washer and torque nut to 10 N•m (7 ft•lbs).

9, Cotter pin

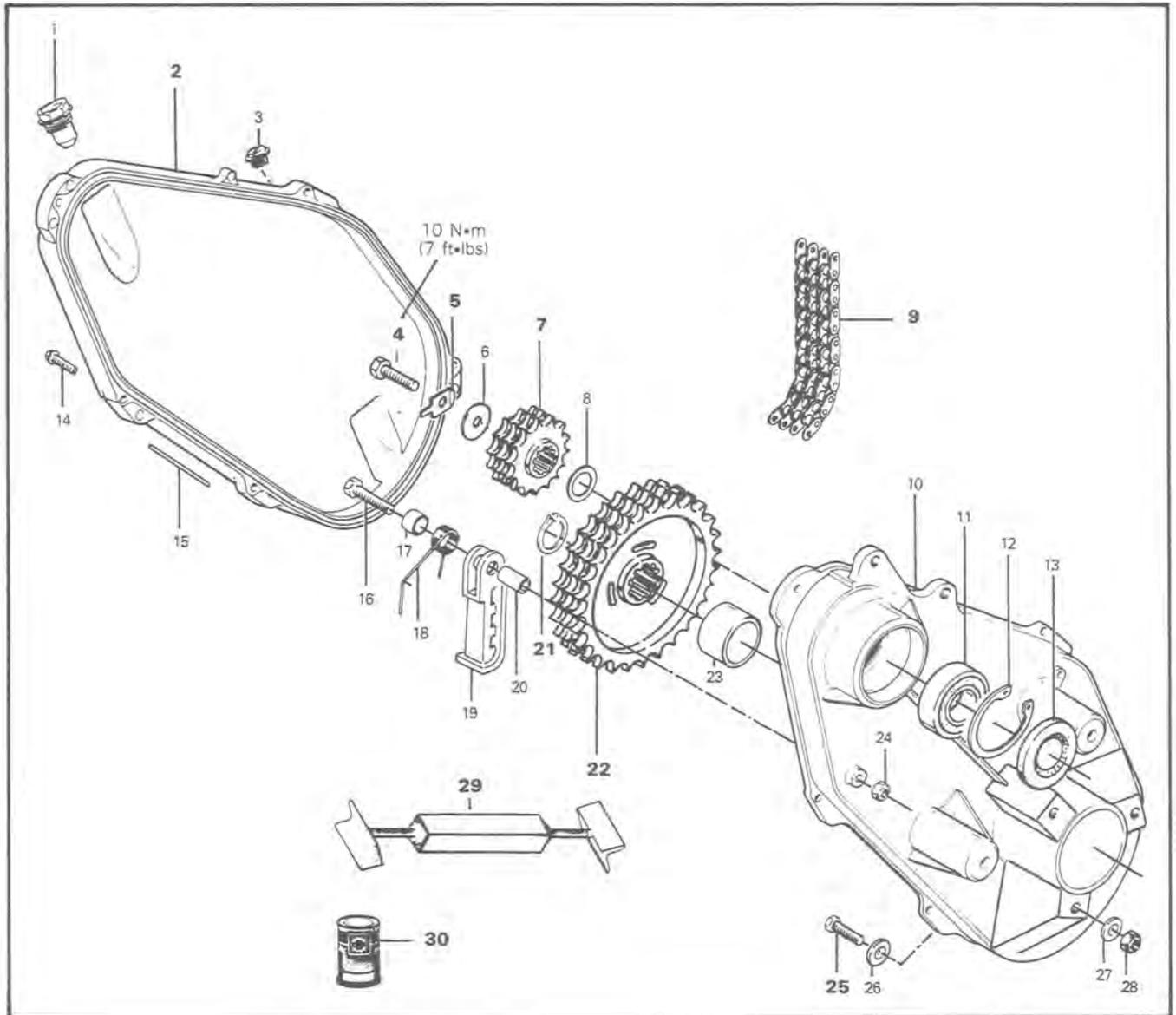
Install a new cotter pin.

30, Chaincase oil

Refill with chaincase oil (200 ml/7 fl.oz.).

SECTION 03 TRANSMISSION
SUB-SECTION 07 (CHAINCASE)

BLIZZARD



- | | |
|-----------------------------------|----------------------------------|
| 1. Breather | 16. Cap screw 1/4-20 |
| 2. Chaincase cover | 17. Spacer |
| 3. Plug | 18. Spring |
| 4. Cap screw 1/4-20 x 3/4 | 19. Chain tensioner |
| 5. Tab lock | 20. Bushing |
| 6. Washer | 21. Snap ring |
| 7. Sprocket 19 teeth | 22. Sprocket 40 teeth |
| 8. Upper spacer | 23. Lower spacer |
| 9. Drive chain | 24. Elastic stop nut 1/4-20 |
| 10. Chaincase | 25. Cap screw 5/16-18 x 1 |
| 11. Bearing | 26. Brass washer |
| 12. Snap ring | 27. Flat washer |
| 13. Seal | 28. Elastic stop nut 5/16-18 |
| 14. Self locking screw 1/4-20 x 1 | 29. Drive axle holder |
| 15. O-ring | 30. Chaincase oil 200 ml (7 oz.) |

SECTION 03 TRANSMISSION

SUB-SECTION 07 (CHAINCASE)

REMOVAL

To remove chaincase from vehicle proceed as follows.

○ **NOTE:** On the Blizzard 9700 disconnect the muffler and push it aside underneath the exhaust pipes.

2, Chaincase cover

Remove and drain oil.

End bearing housing

Slacken to ease chaincase removal.

Drive axle oil seal

Pry out from chaincase.

7,9,22, Sprockets & chain

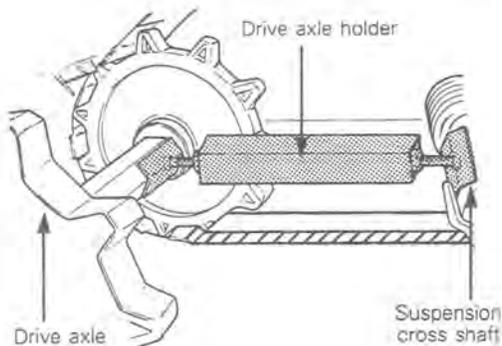
Release chain tension then open the tab locks locking the sprocket. Remove the screw, washer, sprocket, circlip and chain.

25, Chaincase retaining bolts

Remove bolts and/or nuts securing the chaincase to the frame.

29, Drive axle holder

Release track tension or use drive axle holder P/N 529 0051 00.



Pull chaincase out of vehicle.

INSPECTION

Visually inspect the chain for cracked, damaged or missing link rollers. Inspect for defective bearing, sprockets, etc.

INSTALLATION

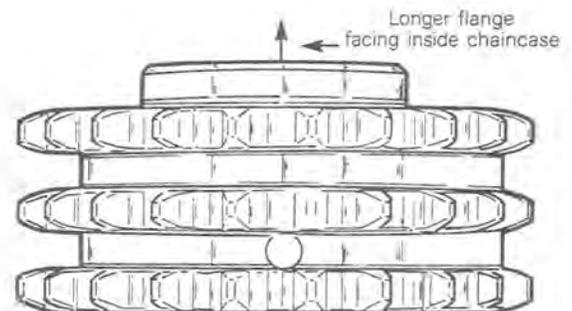
Reverse removal procedure and pay attention to the following:

Oil seal

Using an appropriate pusher, press the oil seal into chaincase hub. Oil seal must fit flush with the case hub edge.

7,22, Sprockets

Position the sprockets with the longer flanges facing inside the chaincase. (For proper sprocket and chain use, see Technical Data).



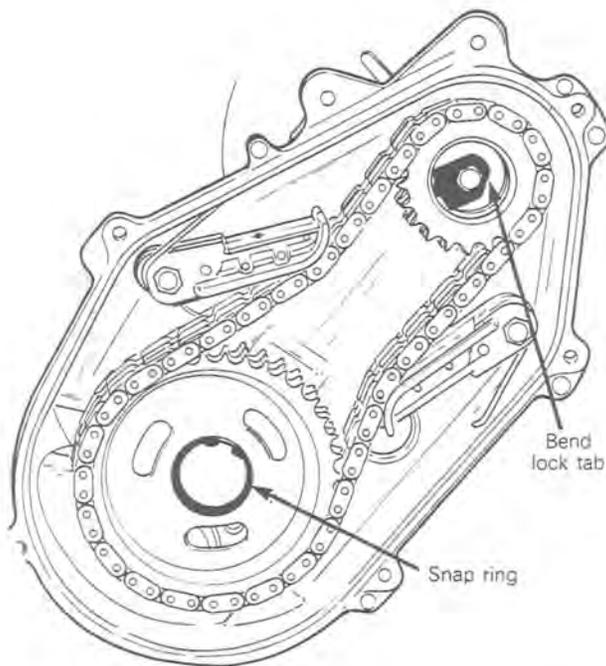
4, Upper sprocket screw

Torque to 10 N•m (7 ft•lbs).

5,21, Tab lock & snap ring

On upper sprocket, install and bend the tab lock as illustrated.

▼ CAUTION: Lock tab should be replaced if bent more than twice. If in doubt, replace.



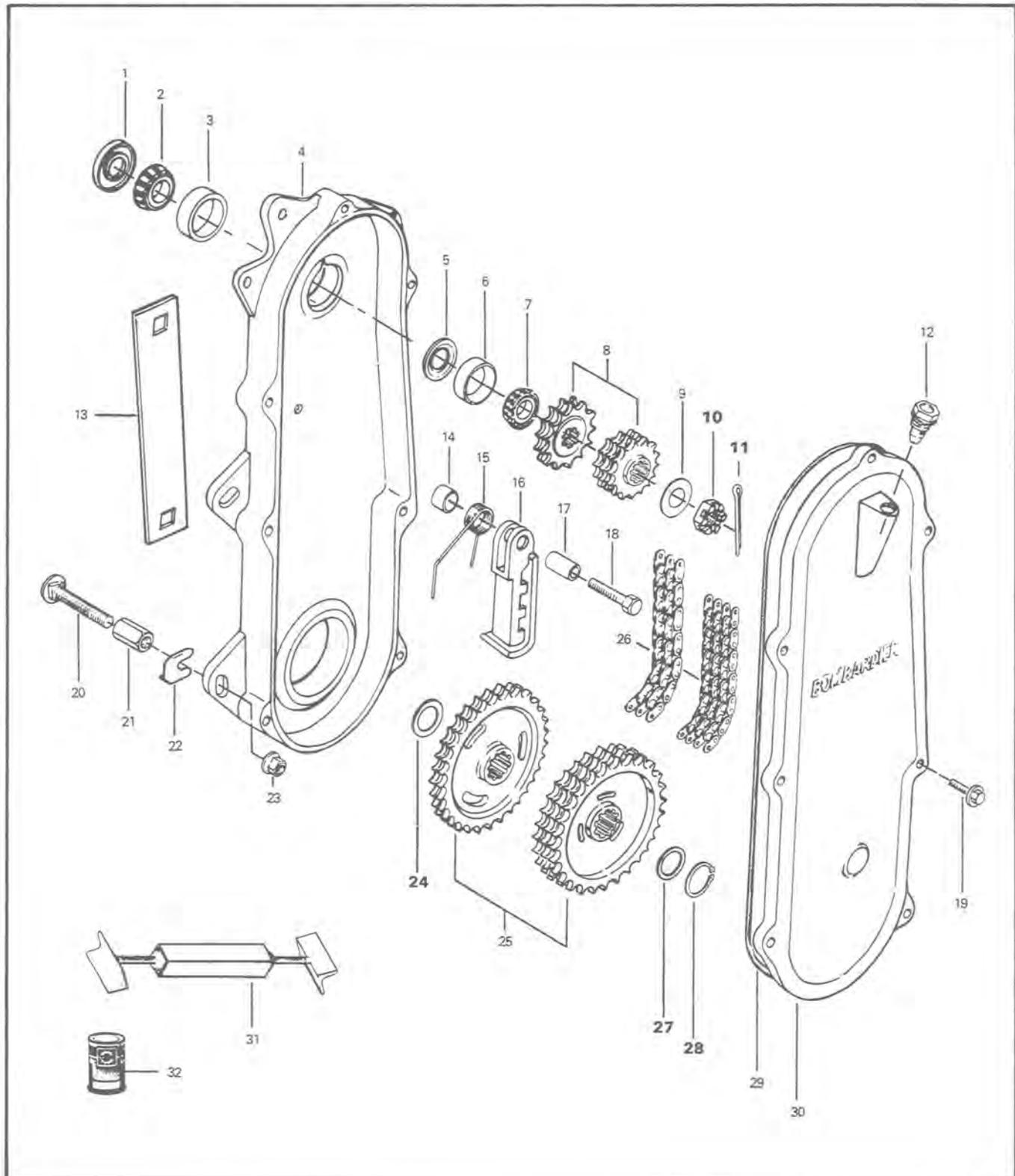
▼ CAUTION: It is of the utmost importance to install the snap ring otherwise damage to the chaincase components may occur.

30, Chaincase oil

Refill with 200 ml (7 oz) of chaincase oil.

SECTION 03 TRANSMISSION
SUB-SECTION 07 (CHAINCASE)

SAFARI, SS-25, SONIC L/C



1. Oil seal
2. Bearing cone
3. Bearing cup
4. Chaincase
5. Oil deflector
6. Bearing cup
7. Bearing cone
8. Sprocket 16 teeth
9. Spring washer
10. Castellated nut
11. Cotter pin
12. Breather
13. Reinforcement
14. Spacer
15. Spring
16. Chain tensioner

17. Bushing
18. Screw
19. Tapite screw M6 x 30
20. Carriage bolt M8 x 1.25 x 55
21. Threaded spacer
22. Shim
23. Elastic stop nut M8 x 1.25
24. Spacer (thicker)
25. Sprocket 34 teeth
26. Drive chain
27. Spacer thinner
28. Snap ring
29. O-ring
30. Chaincase cover
31. Drive axle holder
32. Chaincase oil 200 ml (7 oz)

REMOVAL

Chaincase and driven pulley can be removed from vehicle as an assembly. Refer to Driven Pulley sub-section 04, see the corresponding models.

DISASSEMBLY

To disassemble chaincase from driven pulley, press pulley shaft out of chaincase or knock with a plastic hammer.

INSPECTION

Visually inspect the chain for cracked, damaged or missing link rollers. Inspect for defective bearing, sprockets, etc.

INSTALLATION

Reverse removal procedure and pay attention to the following:

24,27, Spacers

Install the thicker spacer on the chaincase side of the sprocket.

10, Castellated nut

Torque to 12-17 N•m (9-12 ft•lbs). Loosen the nut and retorque to a maximum value of 10-15 N•m (7-11 ft•lbs).

11, Cotter pin

Install a new cotter pin.

28, Snap ring

 **CAUTION:** It is of the utmost importance to install the snap ring otherwise damage to the chaincase components may occur.

ADJUSTMENT

Pulley alignment

For pulley distance and adjustment, refer to sub-section 05.

SECTION 03 TRANSMISSION

SUB-SECTION 08 (GEARBOX)

- | | |
|-----------------------------------|------------------------------|
| 1. Cap screw 1/4-20 x 3/4 | 16. Bolt 1/4-20 x 1 1/4 |
| 2. Handle | 17. Transmission rod |
| 3. Elastic stop nut 1/4-20 | 18. Spacer |
| 4. Elastic stop nut 3/8 x 24 | 19. Elastic stop nut 3/8-24 |
| 5. Flat washer | 20. Elastic stop nut 5/16-24 |
| 6. Tie rod end (R.H.) | 21. Drain plug |
| 7. Flat washer | 22. Flat washer |
| 8. Cotter pin | 23. Gasket |
| 9. Spring | 24. Rubber cover |
| 10. Jam nut 3/8-24 (R.H. threads) | 25. Breather |
| 11. Turnbuckle | 26. Spacer |
| 12. Jam nut 3/8-24 (L.H. threads) | 27. Steering bracket |
| 13. Bracket | 28. Flat washer |
| 14. Transmission lever | 29. Lock washer |
| 15. Elastic stop nut 1/4 x 20 | 30. Nut M10 |

INSTALLATION

At assembly, pay attention to the following.

23, Gasket

Ensure the gasket is properly positioned.

20, Gearbox retaining nuts

Torque to 22 N•m (16 ft•lbs).

8, Cotter pin

Reinstall a new cotter pin.

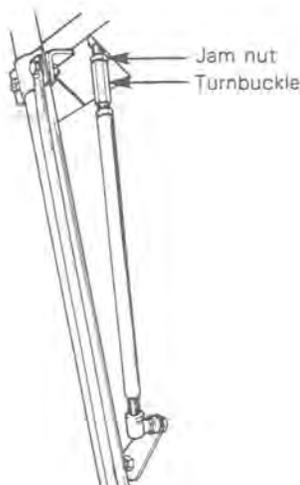
ADJUSTMENT

10,11, Turnbuckle

With gearbox lever properly engaged in gear, adjust so that shifter lever fits correctly in corresponding gear groove.

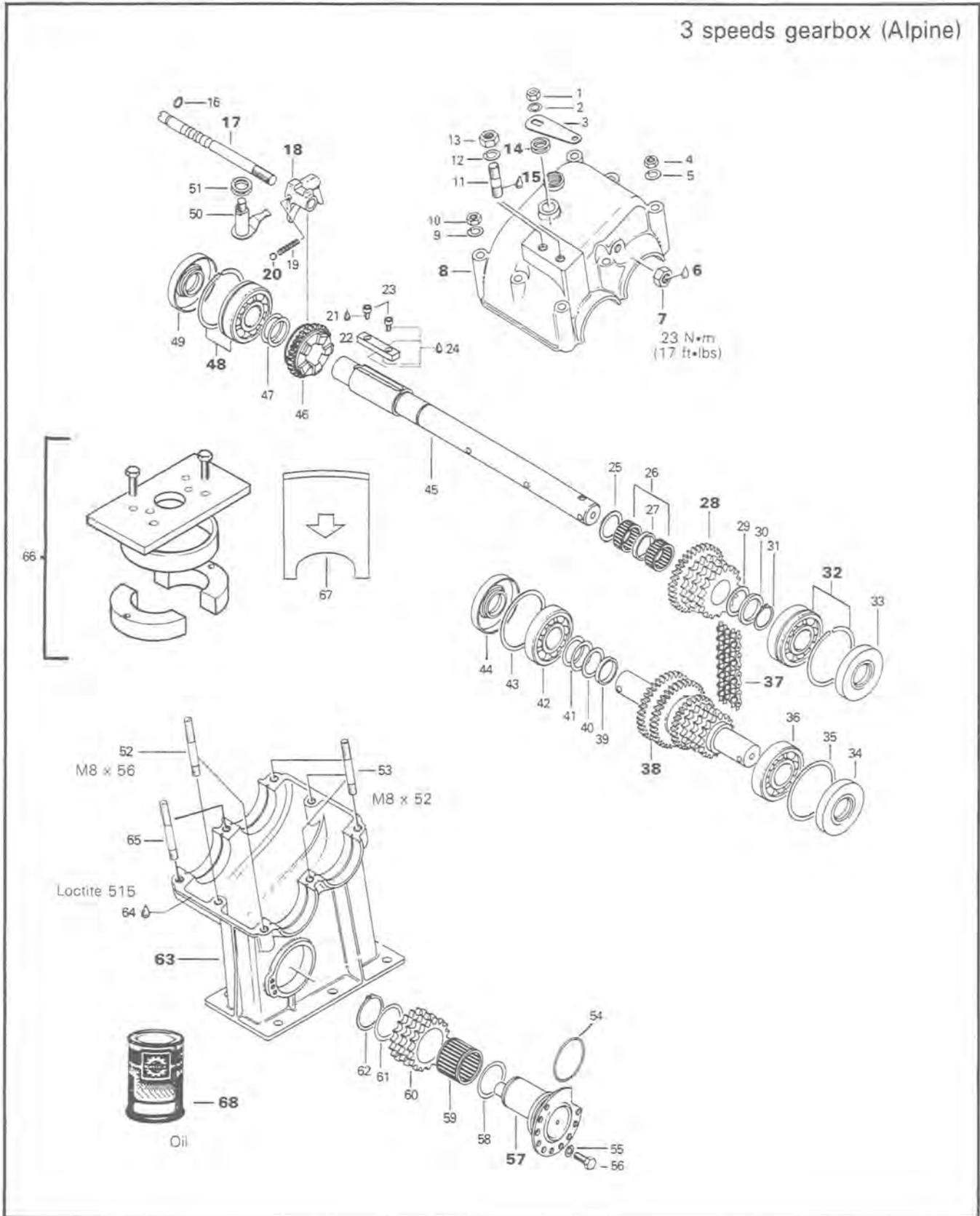
To adjust, loosen jam nut and adjust turnbuckle as required.

Retighten jam nut.



SECTION 03 TRANSMISSION
 SUB-SECTION 08 (GEARBOX)

3 speeds gearbox (Alpine)



SECTION 03 TRANSMISSION

SUB-SECTION 08 (GEARBOX)

1. Lock nut M8
2. Washer
3. Gear change lever
4. Hexagonal nut M8
5. Lockwasher
6. "Loctite 242" (blue)
7. Hexagonal nut M10
8. Transmission cover
9. Lockwasher
10. Hexagonal nut M8
11. Stud M10 x 23
12. Lockwasher
13. Hexagonal nut M10
14. Shim
15. "Loctite 242" (blue)
16. O-ring
17. Index rod
18. Gear change fork
19. Shim
20. Steel ball (1/4")
21. "Loctite 271" (red)
22. Key
23. Allen cap screw M4 x 8
24. "Loctite 271" (red)
25. Washer
26. Needle bearing
27. Distance sleeve
28. 19 teeth shift sprocket
29. Shim 25.5/34/1
30. Distance ring
31. Snap ring
32. Ball bearing 6205
33. Seal
34. Seal

35. Washer
36. Ball bearing 6005
37. 90 links triple roller chain
38. Layshaft ass'y
39. Distance sleeve
40. Shim 25.5/34/1
41. Shim
42. Ball bearing 6005
43. Washer
44. Seal
45. Drive shaft
46. 23 teeth shift sprocket
47. Shim
48. Ball bearing 6205
49. Seal
50. Gear change shaft
51. Shim
52. Stud M8 x 56
53. Stud M8 x 52
54. O-ring
55. Lockwasher
56. Cap screw M6 x 14
57. Tensioner axle
58. Washer
59. Needle bearing
60. 18 teeth tensioner sprocket
61. Washer
62. Snap ring
63. Transmission housing
64. "Loctite 515" (violet)
65. Stud M8 x 52
66. Bearing puller ass'y
67. Chain alignment tool
68. Chaincase oil 450 ml (16 oz)

REMOVAL

First remove the following

- hood, pulley guard and drive belt
- exhaust manifold
- brake assembly
- shifter mechanism
- upper column retaining brace
- lower steering bracket from gearbox and slacken upper bracket.

57, Tensioner

Release chain tension.

Track tension removal

Release track tension by unlocking link plate springs. Insert a pry bar between structural members of center bogie wheel sets and pry sets upward to reverse installation position. Reverse front then rear bogie wheel sets. Remove rear axles.

Oil seals

Remove oil seals from end bearing housings and center frame (to drain the oil).

End bearing housing

Remove end bearing housings. (Pry out housings with two (2) screwdrivers inserted between housing and frame).

Drive axles

Release drive axle sprocket teeth from track notches while at the same time, pulling the drive axle towards end bearing side of frame. (This action will disengage the axle splines from the lower sprocket of the gearbox).

Allow drive axles to remain within the tracks.

63, Gear box

Remove gearbox and gasket from frame.

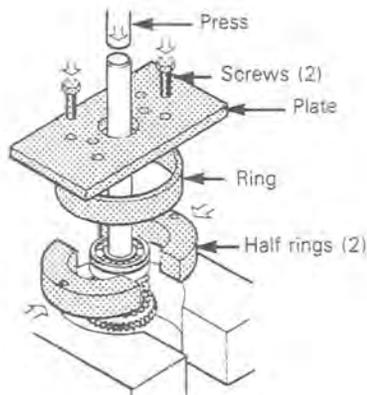
DISASSEMBLY

32,48, Bearings

Use the following tools and proceed as follows:

Remove the bearings from the drive shaft using the following tools:

- 1 hydraulic press
- 2 ring halves (P/N 420 876 330)
- 1 ring (P/N 420 977 480)
- 1 plate (P/N 420 977 700)
- 2 hexagonal screws M8 x 25 (P/N 420 240 275)



Remove the circlip, the distance ring, the shim, the shift sprocket (19 th), the needle bearings, the distance sleeve, the washer and the shift sprocket (23 th) from shaft.

CLEANING

8,63, Transmission housing and cover

Clean mating surfaces of Loctite residue.

INSPECTION

Visually inspect the components for damage or wear.

ASSEMBLY

NOTE: Apply a small amount of motor oil (SAE 30) to the components before assembly.

38, Layshaft and components

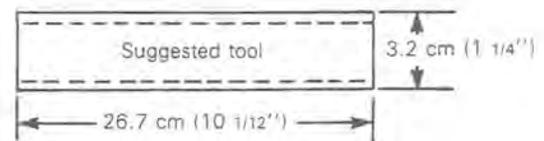
Reinstall the layshaft components on the layshaft.

Compensate the distance on the layshaft up to a clearance of 0.1 to 0.3 mm (.003 to .011") and assemble.

45, Drive shaft and components

To reinstall the drive shaft components on the drive shaft, proceed as follows:

- Install the driven pulley shaft side bearing (P/N 420 432 040) on the shaft using the following suggested tool:
- cylindrical steel tube.



Material: cylindrical steel tube
32 mm (1 1/4'') O.D.
26.8 mm (1.055'') I.D.

- Install the circlip over the bearing.
- Install the remaining components.
- Install the other shaft end bearing with shim(s) as required using the above mentioned tool.
- Available shims:
 - 25.5/34/0.2 (P/N 420 944 470)
 - 25.5/34/0.3 (P/N 420 944 471)
 - 25.5/34/0.5 (P/N 420 944 472)

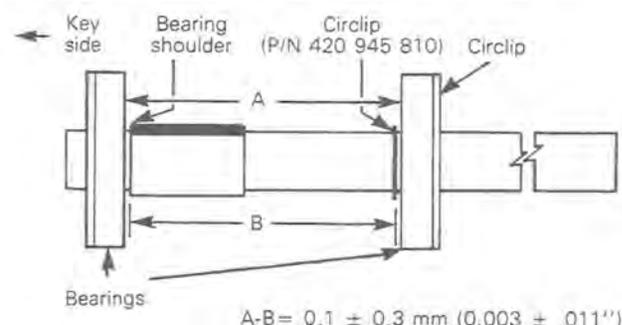
Drive shaft clearance

Place ball bearings with circlips mounted in the transmission housing and measure (A) distance between the bearings.

Measure (B) distance on drive shaft between the circlip (P/N 420 945 810) and the shaft bearing shoulder (key side).

The difference between measures A and B should be 0.1 ± 0.3 mm ($0.003 \pm .011$ ").

Refer to the following illustration.



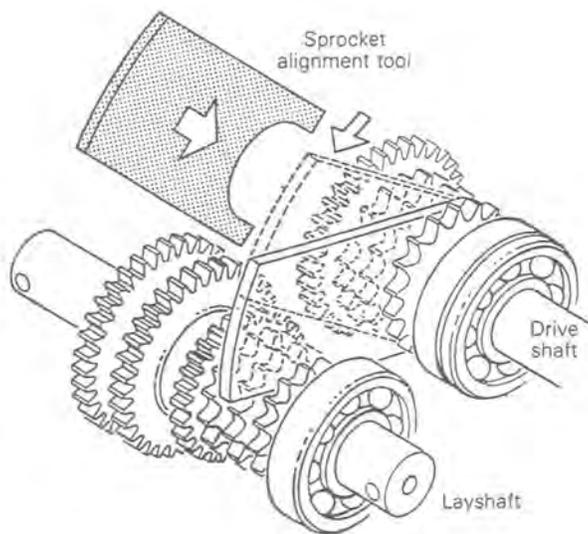
SECTION 03 TRANSMISSION SUB-SECTION 08 (GEARBOX)

To obtain the proper drive shaft clearance it may be necessary to add or remove shim(s) between the key side bearing and the shaft bearing shoulder.

28,38, Sprocket alignment

Verify sprocket alignment using the alignment tool (P/N 420 476 010). Proceed as follows:

- Set alignment tool on shift sprocket 19 th and turn it into the corresponding layshaft and tensioner sprockets as illustrated.

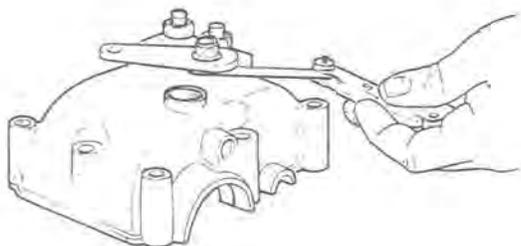


If necessary readjust clearance by transferring shim(s) on drive shaft to the opposite side.

CAUTION: Ensure the drive shaft and layshaft gears align with the tensioner gear and that all clearances are respected.

14, Gear change lever shims

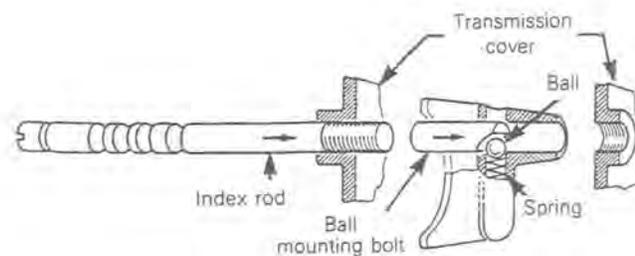
Lubricate gear change shaft and compensate clearance with shims (required end play 0.3 mm (.011')). Set 1 shim 0.3 mm on inner side and as many as required on outer side under gear change lever, leaving 0.3 mm (.011') play.



CAUTION: The finger of the gear change shaft must not block the gear change fork.

17,18,20, Gear change fork & components

Mount gear change fork and index rod with index spring and ball. To do this, press ball and index spring into the bore of gear change using a ball mounting bolt P/N 420 476 020 then the ball mounting bolt is pushed through with the index rod and the index rod is screwed in.



6,7, Index rod lock nut

Apply "Loctite 242" to nut and torque to 23 N•m (17 ft•lbs).

37, Chain

NOTE: If a master link is required, install it in order to have the locking clip facing the driven pulley side with its closed end towards the rotary motion direction when in "FORWARD" position.

8,63, Housing and cover

Set the shift sprocket 23 teeth to **reverse** position.

Apply Loctite 515 (P/N 413 7027 00) to the transmission housing mating surface and reinstall the transmission cover. Torque the retaining nuts in a criss-cross sequence to: 27 N•m (20 ft•lbs).

CAUTION: Before cover installation, ensure that the shifter arm and the 23 teeth shift sprocket are in **REVERSE** position.

INSTALLATION

Gear box assembly

Position gasket on frame studs and place lower sprocket in drive chain. Secure gearbox to frame.

- Set the shifter lever in REVERSE.
- Install the shifter rod to the shifter lever.

Drive axles & seals

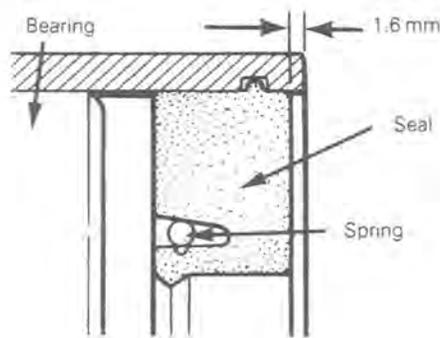
CAUTION: Check condition of drive axle seals; replace if necessary.

From the left side of vehicle, place the drive axle within the track. Push the end bearing side of axle through the orifice in left side of frame, then push the splined end of axle into gearbox lower sprocket. Install opposite drive axle.

Press each end bearing housing into frame and over axle bearing. Secure housings to frame.

Install seals.

NOTE: A gap of approximately 1.6 mm (1/16") should exist between the end of bearing housing and seal.



Install rear axle and bogie wheel sets to their original position.

68, Chaincase oil

Fill gearbox with 450 ml (16 Imp. ounces) of Bombardier chaincase oil.

Adjustments

Shifter arm position

Set the shifter lever to NEUTRAL position, turn driven pulley clockwise and adjust shifter arm position using the adjuster screw located at the R.H. transmission cover portion. This will ensure the transmission is perfectly adjusted.

Chain tension

Rotate the tensioner axle **57** to obtain 6 mm (1/4") maximum drive chain free-play.

Pulley alignment

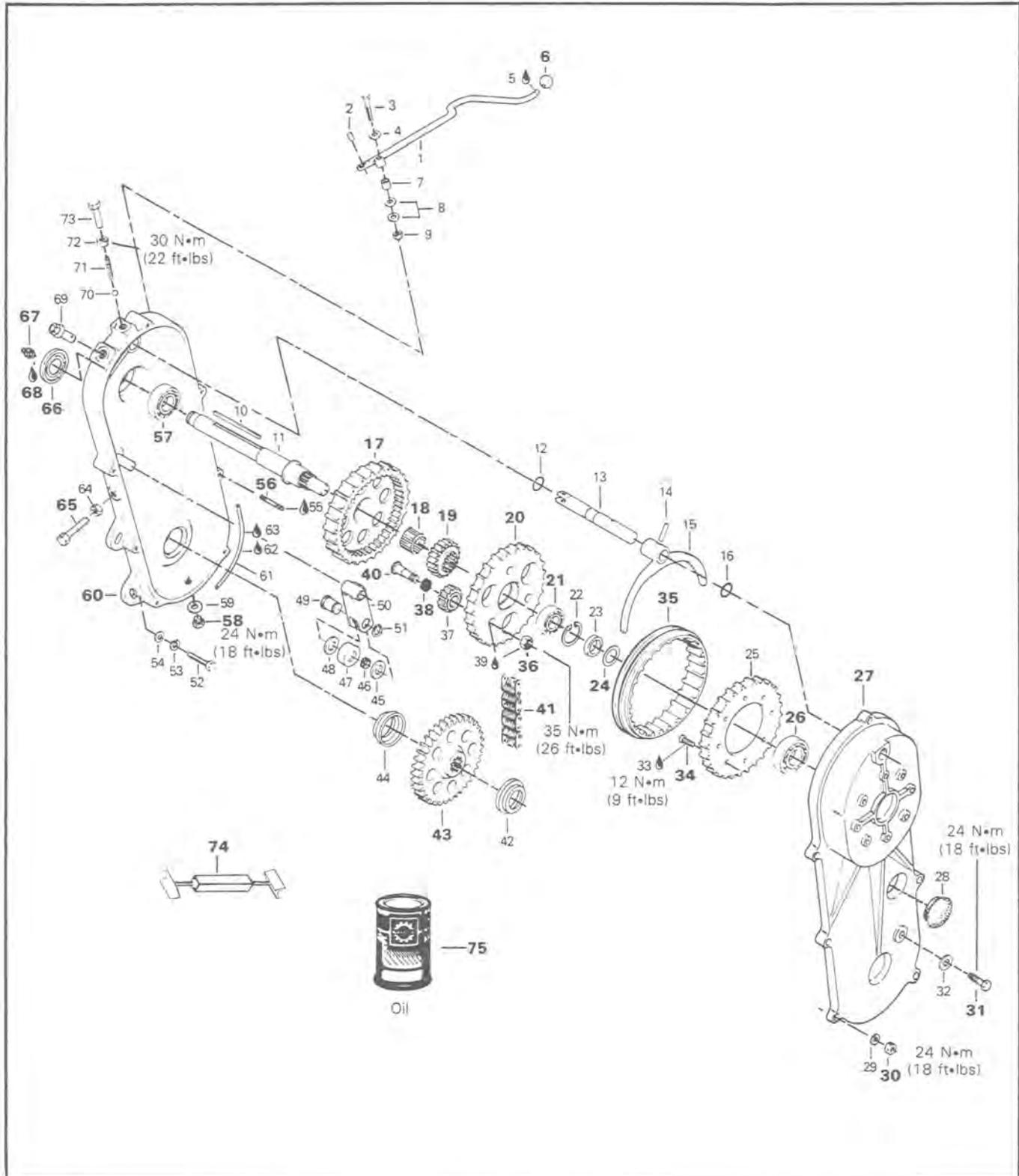
Refer to section 03-05.

Track tension & alignment

Refer to section 05-05.

SECTION 03 TRANSMISSION
SUB-SECTION 08 (GEARBOX)

2 SPEEDS GEARBOX (SKANDIC 377R)



1. Transmission lever
2. Pin
3. Cap screw M6 x 1 x 40
4. Washer 6.2 x 20 x 2
5. Loctite 242 (blue)
6. Handle
7. Spacer
8. Washer 6.2 x 20 x 2
9. Flanged elastic stop nut M6 x 1
10. Key
11. Countershaft
12. O'ring
13. Fork shaft
14. Pin
15. Fork
16. O'ring
17. Planetary ring gear
18. Needle bearing
19. Sun gear
20. Planet carrier
21. Ball bearing
22. Snap ring
23. Spacer
24. Shim
25. Blocking wheel (reverse driving hub)
26. Ball bearing
27. Transmission cover
28. Rubber cap
29. Lockwasher 8 mm
30. Nut M8 x 1.25
31. Cap screw M8 x 1.25 x 12
32. Brass washer
33. Loctite 262
34. Flat head screw 5/8"
35. Planetary connecting sleeve
36. Nut M10 x 15
37. Planet wheel
38. Needle bearing
39. Loctite 262
40. Planet wheel shaft
41. Chain 92 links
42. Flanged ring
43. Sprocket 40 teeth
44. Flanged ring
45. Spacer
46. Needle bearing
47. Tensioner roller
48. Spacer
49. Tensioner shaft
50. Tensioner
51. Snap ring
52. Cap screw M8 x 1.25 x 25
53. Lockwasher 8 mm
54. Washer 8.4 x 17 x 1.6
55. Loctite 262
56. Stud
57. Ball bearing
58. Drain plug M8 x 1.25 x 12
59. Brass washer
60. Transmission case
61. O'ring
62. Loctite 515
63. Locquic primer-N-
64. Nut M10 x 1.5
65. Chain tension adjustment screw
66. Seal
67. Grease fitting
68. Loctite 262
69. Breather plug
70. Ball #8
71. Spring
72. Lock nut M12 x 1.75
73. Screw M12 x 1.75 x 25
74. Drive axle holder
75. Chaincase oil 450 ml (16 oz)

REMOVAL

Gear box and driven pulley can be removed from vehicle as an assembly. Proceed as follows.

Pulley guard & drive belt

Remove from vehicle.

58, Drain plug

Remove and drain oil from gear box (450 ml/16 oz).

1, Transmission lever

Disconnect from fork shaft.

Countershaft support

Disconnect from support clamp by removing hair pin and clevis pin.

65, Chain tension

Remove chain tension and remove transmission cover.

19,20,35, Carrier ass'y & connecting sleeve and sun gear

Pull out of countershaft.

17,41,43, Ring gear, chain & sprocket

Pull out of transmission case.

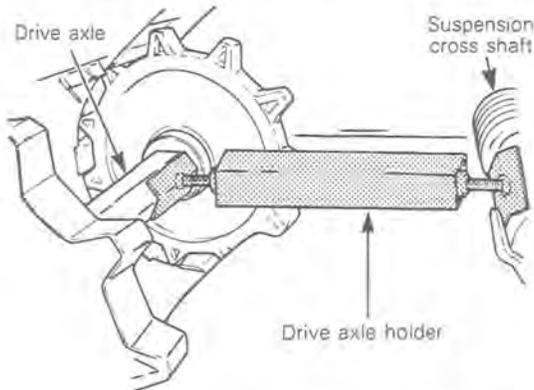
Drive axle oil seal

Push seal towards axle sprocket.

SECTION 03 TRANSMISSION SUB-SECTION 08 (GEARBOX)

74, Drive axle holder

Hold drive axle with tool P/N 529 0051 00.



Transmission case & driven pulley ass'y

Pull out of vehicle.

DISASSEMBLY

Driven pulley

Remove snap ring, support assembly, driven pulley and key from countershaft.

66, Seal

Remove seal from transmission case.

11, Countershaft

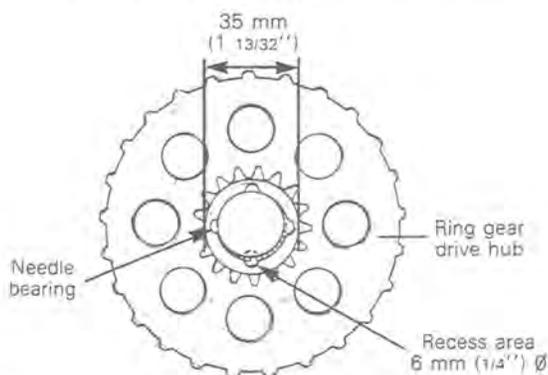
Press countershaft out of transmission case.

57, Ball bearing (case)

Press countershaft out of bearing.

18, Needle bearing (ring gear)

Use a suitable pusher and press bearing out of ring gear through bearing access recess.



36, Planet wheels and components

"Loctite" mounted shaft nut may require heat for disassembly. For easier disassembly heat up to 150°C (300°F).

To remove bearing from planet wheels, use a press and a suitable pusher (15.96 mm/5/8" Ø max.).

21, Planet carrier bearing

Remove snap ring and use a suitable pusher to press bearing out of carrier.

25, Blocking wheel (reverse driving hub)

"Loctite" mounted screws may require heat for disassembly. For easier disassembly heat up to 150°C (300°F).

CLEANING

27,60, Transmission cover & case

Remove "Loctite" residue from cover and case mating surfaces.

INSPECTION

Visually inspect the components for excessive wear and damage.

ASSEMBLY

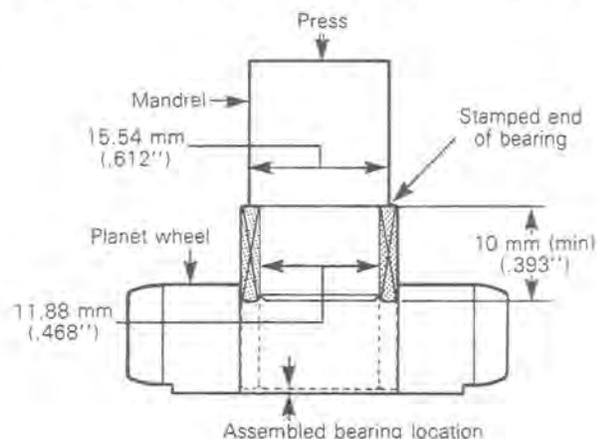
25,34, Blocking wheel (reverse driving hub)

Apply "Loctite 262" on screw threads, and torque to 12 N•m (9 ft•lbs).

38,40, Planet wheel & needle bearing

The bearing is press fitted into the planet wheel and must be pushed down only from its stamped end.

CAUTION: Never pound the bearing into its housing with a hammer or other impact tool, even in conjunction with the proper assembly mandrel.



○ NOTE: Assemble bearing must not project out of planet wheel.

20,36, Carrier assembly

Apply "Loctite 262" in planet wheel shaft bores. With planet wheel installed on shaft, press shaft into carrier bore.

Apply "Loctite 262" on shaft threads.

Install and torque nut to 35 N•m (26 ft•lbs).

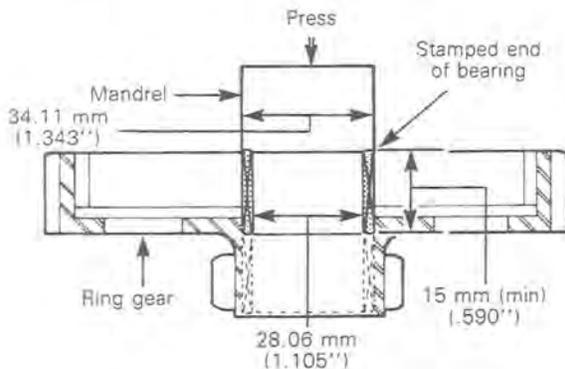
21, Planet carrier bearing

With a suitable pusher, press bearing into carrier bore and lock in place with snap ring.

18, Ring gear needle bearing

The bearing is press fitted into the ring gear and must be pushed down only from its stamped end.

▼ CAUTION: Never pound the bearing into its housing with a hammer or other impact tool, even in conjunction with the proper assembly mandrel.



26, Cover bearing

With a suitable pusher, press bearing into cover.

57, Case bearing

With a suitable pusher, press bearing on countershaft.

11, Countershaft

Press countershaft with the assembled ball bearing into the transmission case bore.

56, Studs

Assemble studs in transmission case with "Loctite 262" and torque to 5 N•m (44 in•lbs).

6, Transmission lever handle

Put "Loctite 242" on handle threads.

47, Tensioner ass'y

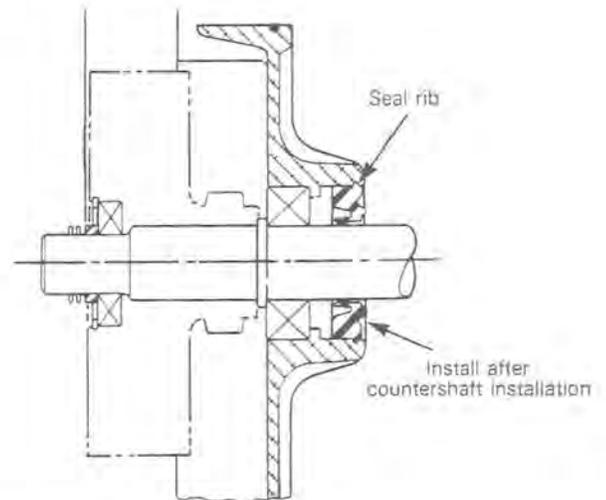
Ensure that roller turns freely.

67, Grease fitting

At grease fitting assembly, apply "Loctite 262" on grease fitting threads.

66, Seal (countershaft)

Install seal in transmission case so that the seal rib is seated in the bore groove.



Driven pulley assembly

Coat countershaft with antiseize compound and assemble driven pulley and support.

INSTALLATION

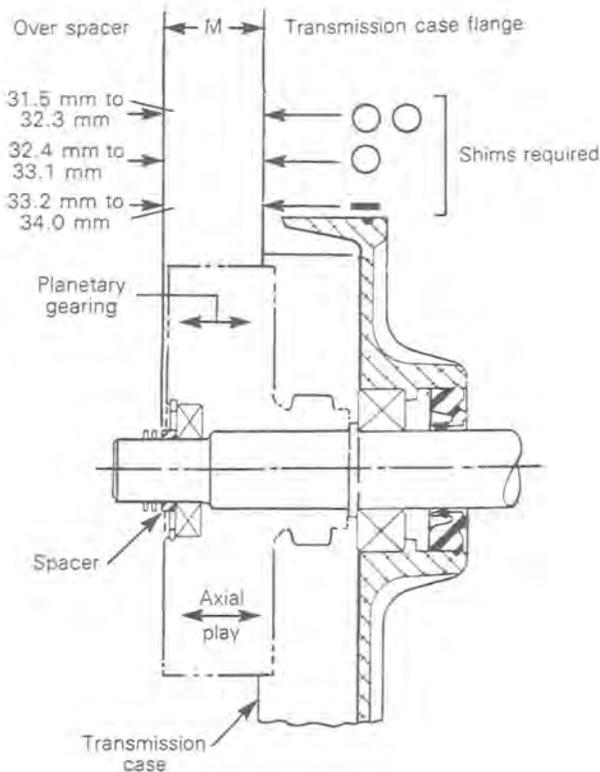
Reverse removal procedure, paying particular attention to the following.

24, Shim (axial play)

The planetary gearing axial free-play must be controlled with shim. To determine shim thickness, measure distance "M" from transmission case flange to spacer. In accordance with the following table, select the proper amount of shims.

**SECTION 03 TRANSMISSION
SUB-SECTION 08 (GEARBOX)**

M		REQUIRED SHIMS
FROM	TO	
31.5 mm (1.240'')	32.3 mm (1.271'')	2
32.4 mm (1.275'')	33.1 mm (1.303'')	1
33.2 mm (1.304'')	34.0 mm (1.339'')	0



○ NOTE: Planet carrier bearing must be assembled in carrier and locked with snap ring. Spacer must be installed on countershaft.

27,60, Transmission cover & case

- To properly seal the transmission, proceed as follows:
- Apply "Locquic Primer N" on both case and cover flanges and in the cover o-ring groove. Allow 5 minutes to dry.
- Put "Loctite 515" in the o-ring cover groove, install o-ring and install cover to case.

— Install cover lockwasher and nuts and torque to 24 N•m (18 ft•lbs).

○ NOTE: Cover must be installed within ten minutes from LOCTITE application.

○ NOTE: Allow a drying period of two (2) hours before refilling with oil.

75, Oil

Refill with 450 ml (16 oz) of fresh chaincase oil.

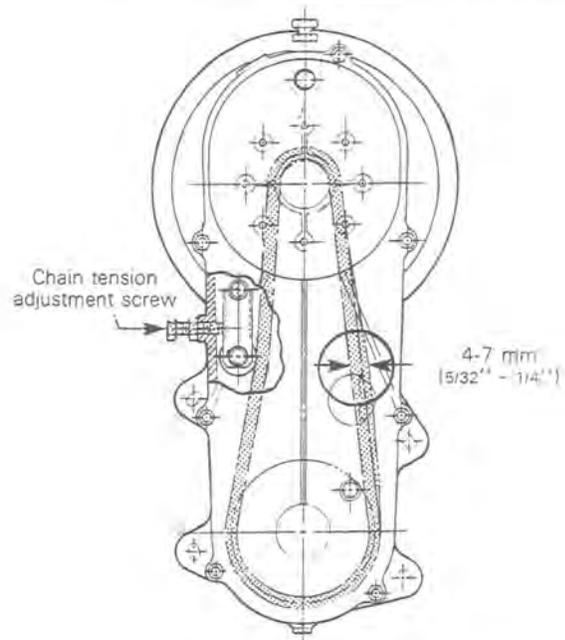
31, Oil level plug

Torque to 24 N•m (18 ft•lbs).

ADJUSTMENT

65, Chain tension

Turn adjustment screw until 4-7 N•m (5/32" - 1/4") chain travel is obtained. Torque lock nut to 30 N•m (22 ft•lbs).



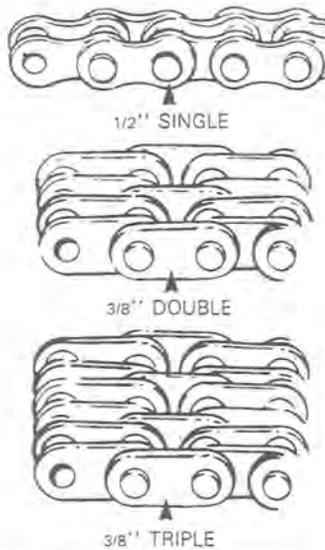
Pulley distance

Refer to section 03-05.

DRIVE CHAIN

GENERAL

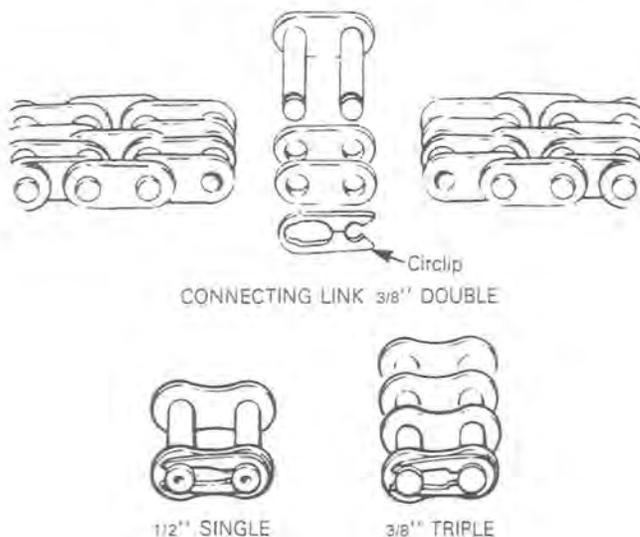
There are three (3) types of the Bombardier drive chains: a **single 1/2" pitch**, a **double 3/8" pitch**, and a **triple 3/8" pitch**. For proper use refer to Technical Data.



There are two (2) variations of chains: detachable and endless.

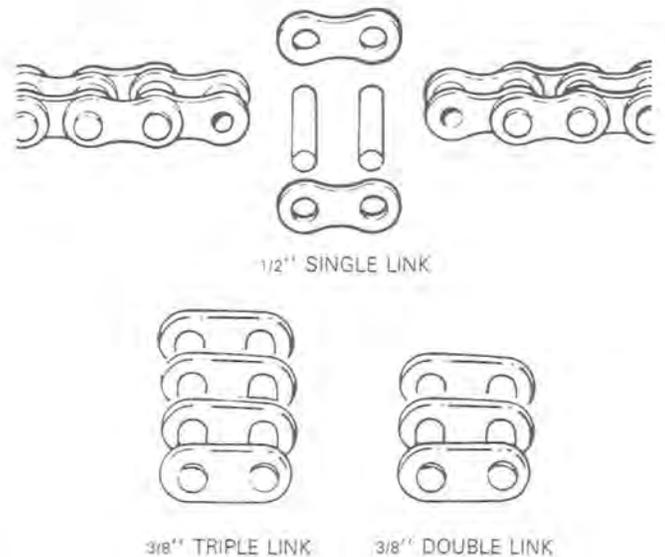
CHAIN ATTACHMENT

When joining chain ends, the **open end of the circlip must be on opposite side of chain rotation**. The circlip should also be facing the outer side of chaincase.



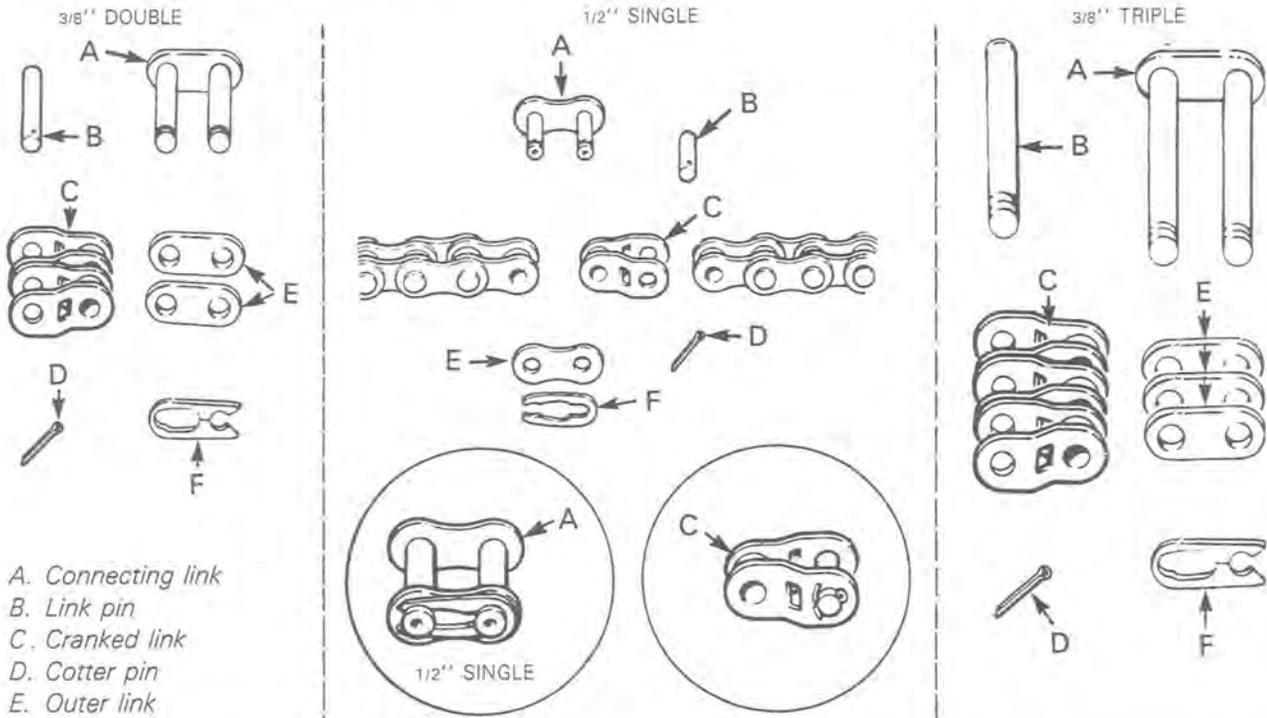
CHAIN SEPARATION

When separating an endless chain, always use a chain bearing pin extractor. Also, make sure to remove one complete link.



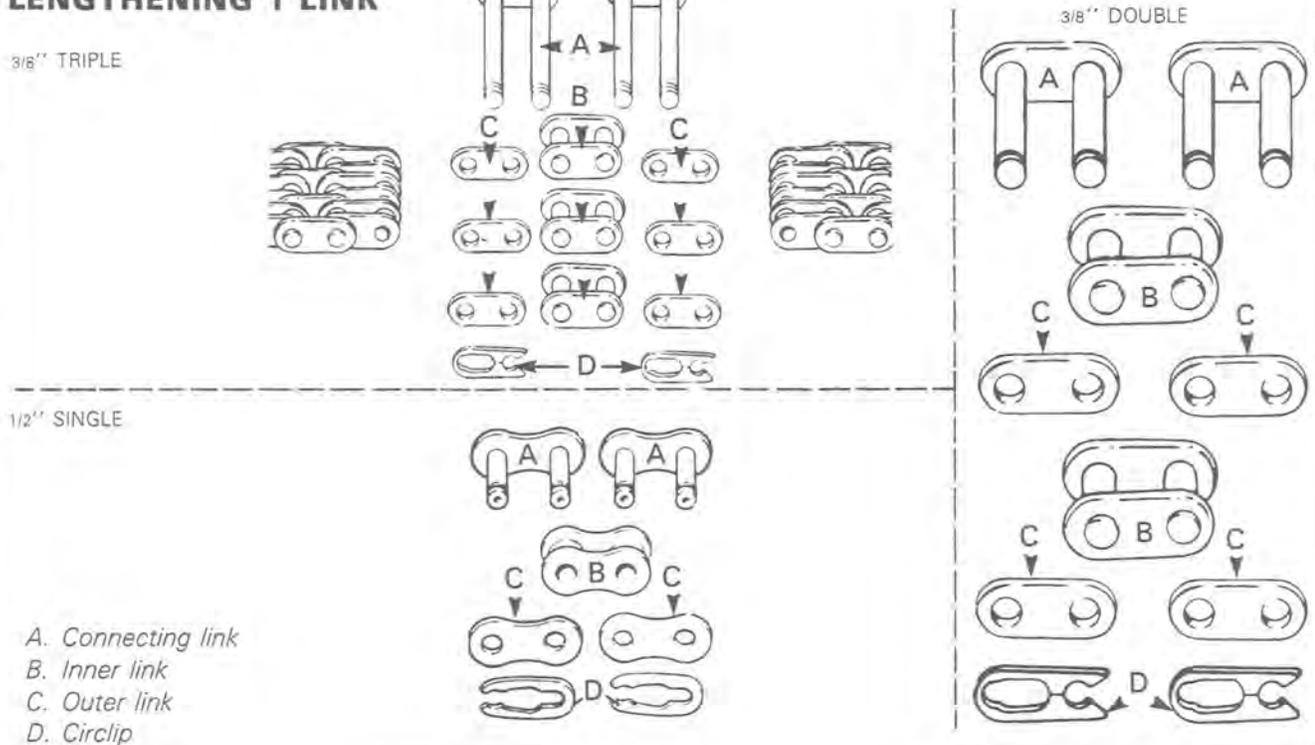
SECTION 03 TRANSMISSION
 SUB-SECTION 09 (DRIVE CHAIN)

LENGTHENING 1/2 LINK



- A. Connecting link
- B. Link pin
- C. Cranked link
- D. Cotter pin
- E. Outer link
- F. Circlip

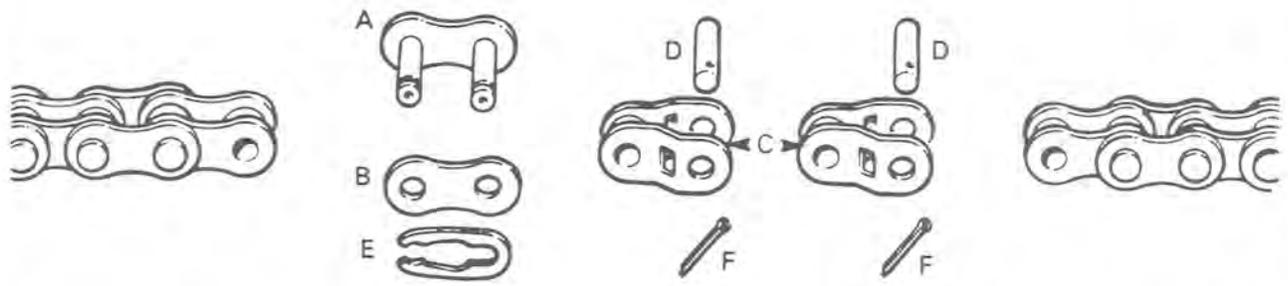
LENGTHENING 1 LINK



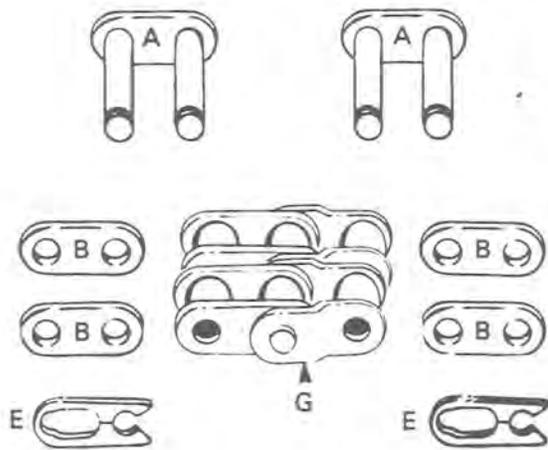
- A. Connecting link
- B. Inner link
- C. Outer link
- D. Circlip

LENGTHENING 1 1/2 LINK

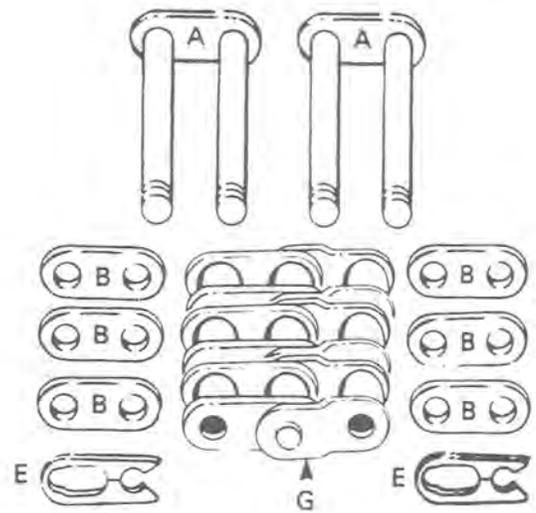
1/2" SINGLE



3/8" DOUBLE



3/8" TRIPLE



- A. Connecting link
- B. Outer link
- C. Cranked link
- D. Link pin
- E. Circlip
- F. Cotter pin
- G. Double cranked link



ELECTRIC CHARTS

MODEL	CHART PAGE	HEADLAMP (watt)	TAILLIGHT (watt)	ELECTRICAL SYSTEM OUTPUT (watt)
Elan	280	60/60	5/21	75/23
Citation 3500	281	60/60	5/21	160
Skandic 377/R	282	60/60	5/21	160
Safari 377/E	283	60/60	5/21	160
Safari 447	282	60/60	5/21	160
Safari Grand Luxe	283	60/55	5/21	160
SS-25, Sonic L/C	284	60/55	5/21	140/160*
Blizzard 5500 MX	286	60/60	5/21	160
Blizzard 9700	287	60/60	5/21	160
Alpine	288	60/60	5/21	160

*To find out the difference between 140W (4-4P) and 160W (4-5P) look in section 02 sub-section 05 pages 92,93.

CHART CODES

WIRING COLOUR CODE

First color of a wire is the main color, second color is the stripe.

Example: YL/BK is a yellow wire with a black stripe.

COLOUR CODE	
BK - BLACK	GN - GREEN
WH - WHITE	GY - GREY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN

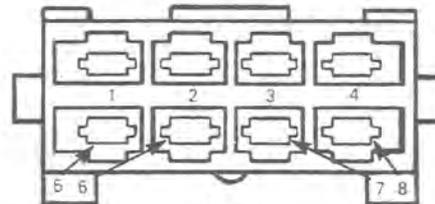
CONNECTOR POSITION CODE

Numbers are printed at the back of the connectors housings.

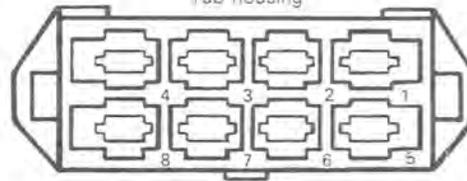
They correspond to the numbers on connectors of the electrical chart.

NOTE: Normally we use 18 GA wires. Sometime we use 16 GA and it is note with an * beside color code of charts.

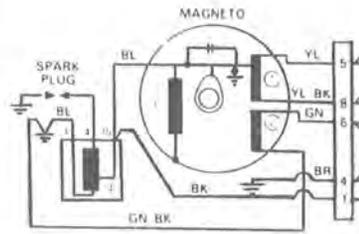
Seen from wires side
Receptacle housing



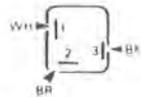
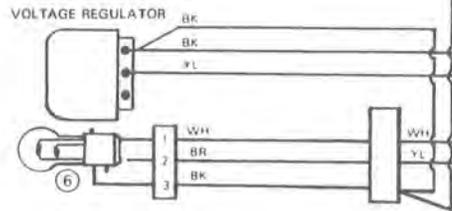
Tab housing



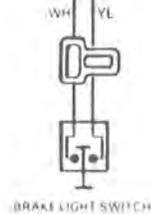
Elan



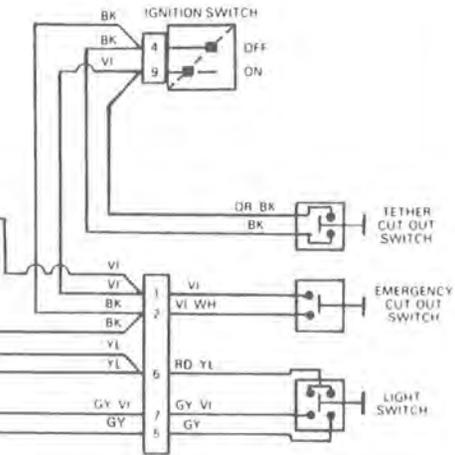
- ① LIGHTING COIL (75W)
- ② LIGHTING COIL (23W)
- ③ GENERATOR COIL
- ④ IGNITION COIL
- ⑤ HEADLAMP (60/60 W)
- ⑥ TAILLAMP (5/21 W)



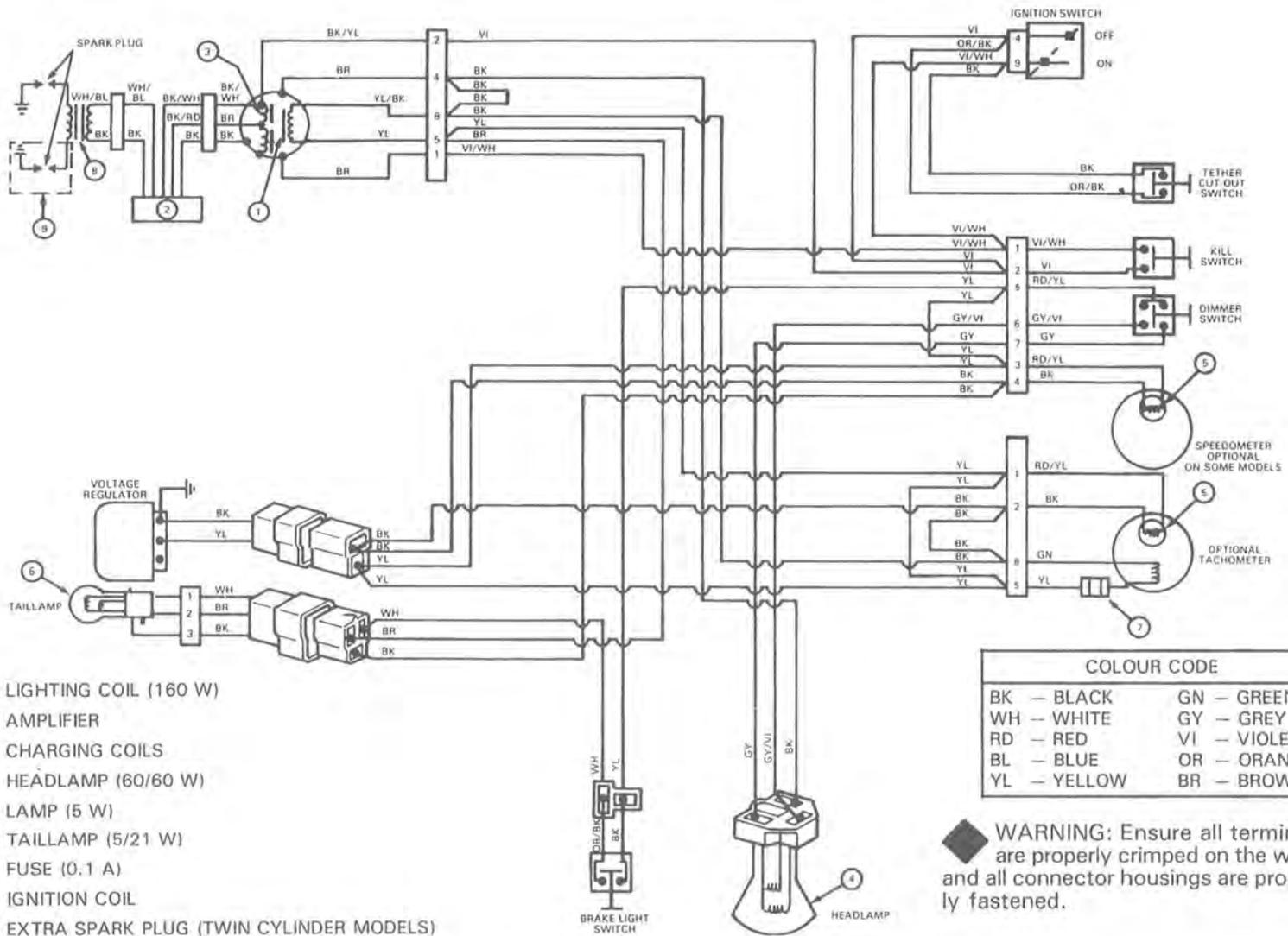
COLOUR CODE	
BK - BLACK	GN - GREEN
WH - WHITE	GY - GREY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN



WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.



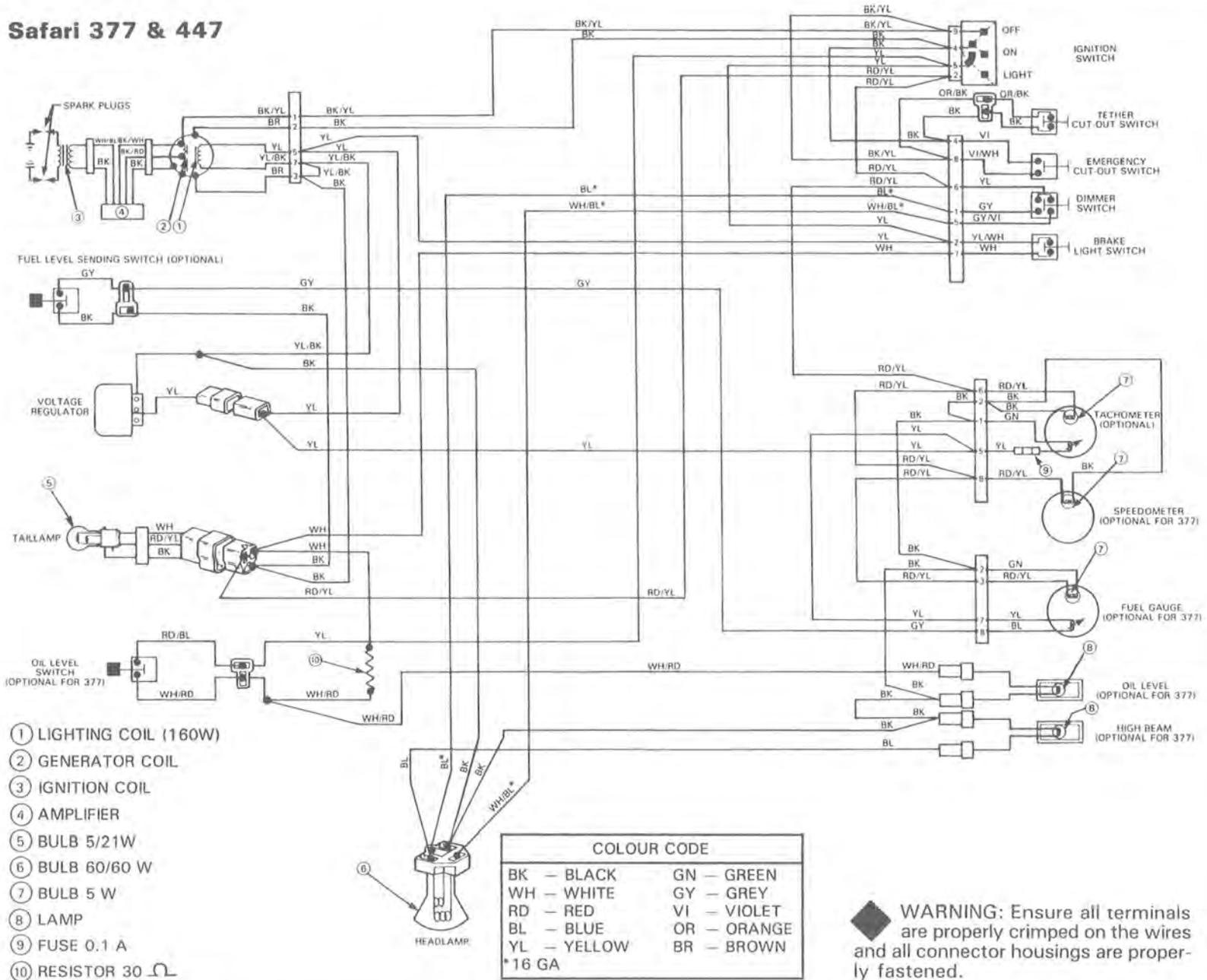
Citation 3500 & Skandic 377



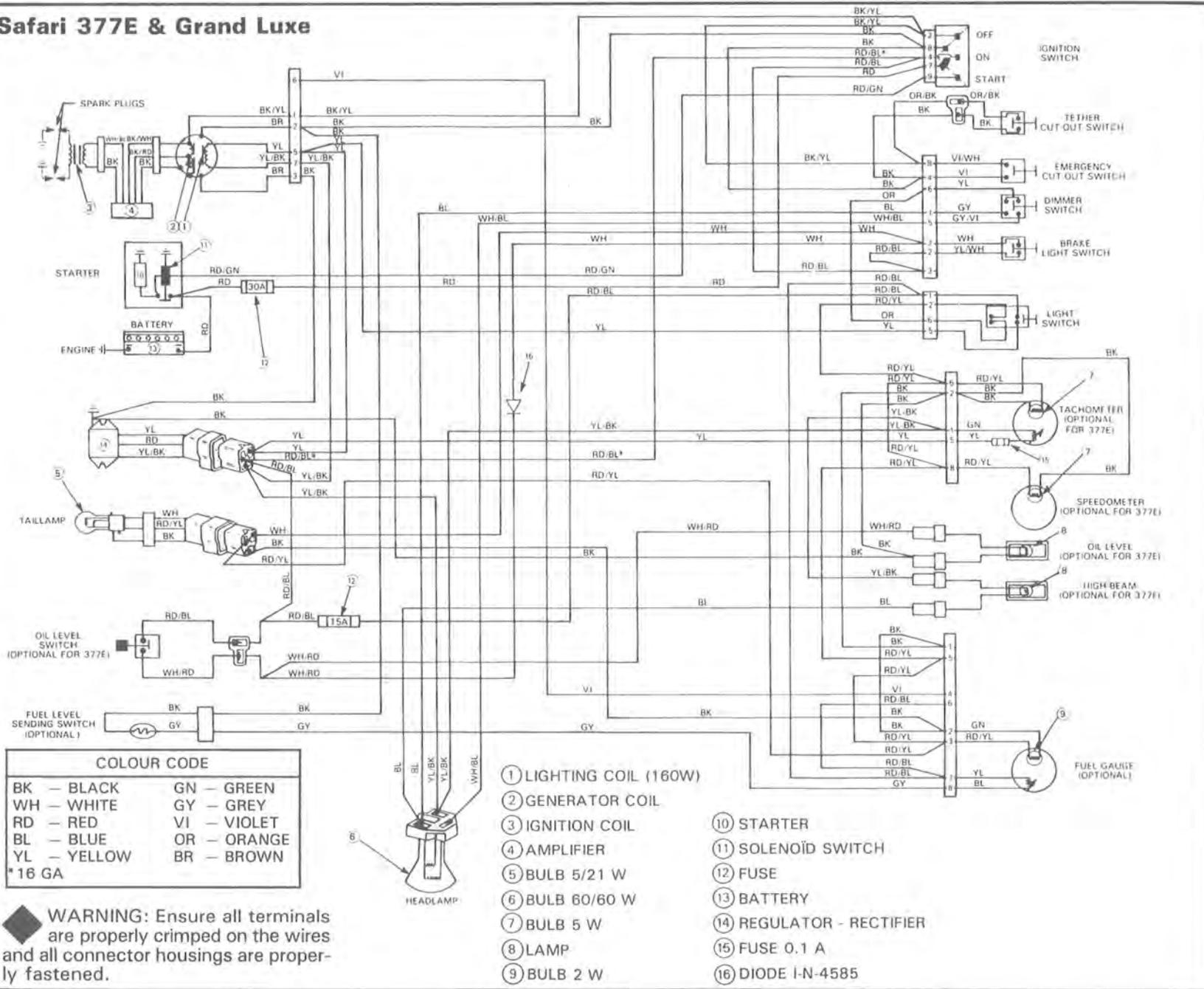
- ① LIGHTING COIL (160 W)
- ② AMPLIFIER
- ③ CHARGING COILS
- ④ HEADLAMP (60/60 W)
- ⑤ LAMP (5 W)
- ⑥ TAILLAMP (5/21 W)
- ⑦ FUSE (0.1 A)
- ⑧ IGNITION COIL
- ⑨ EXTRA SPARK PLUG (TWIN CYLINDER MODELS)

SECTION 04 ELECTRICAL
SUB-SECTION 01 (ELECTRIC CHARTS)

Safari 377 & 447



Safari 377E & Grand Luxe



COLOUR CODE

BK - BLACK	GN - GREEN
WH - WHITE	GY - GREY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN

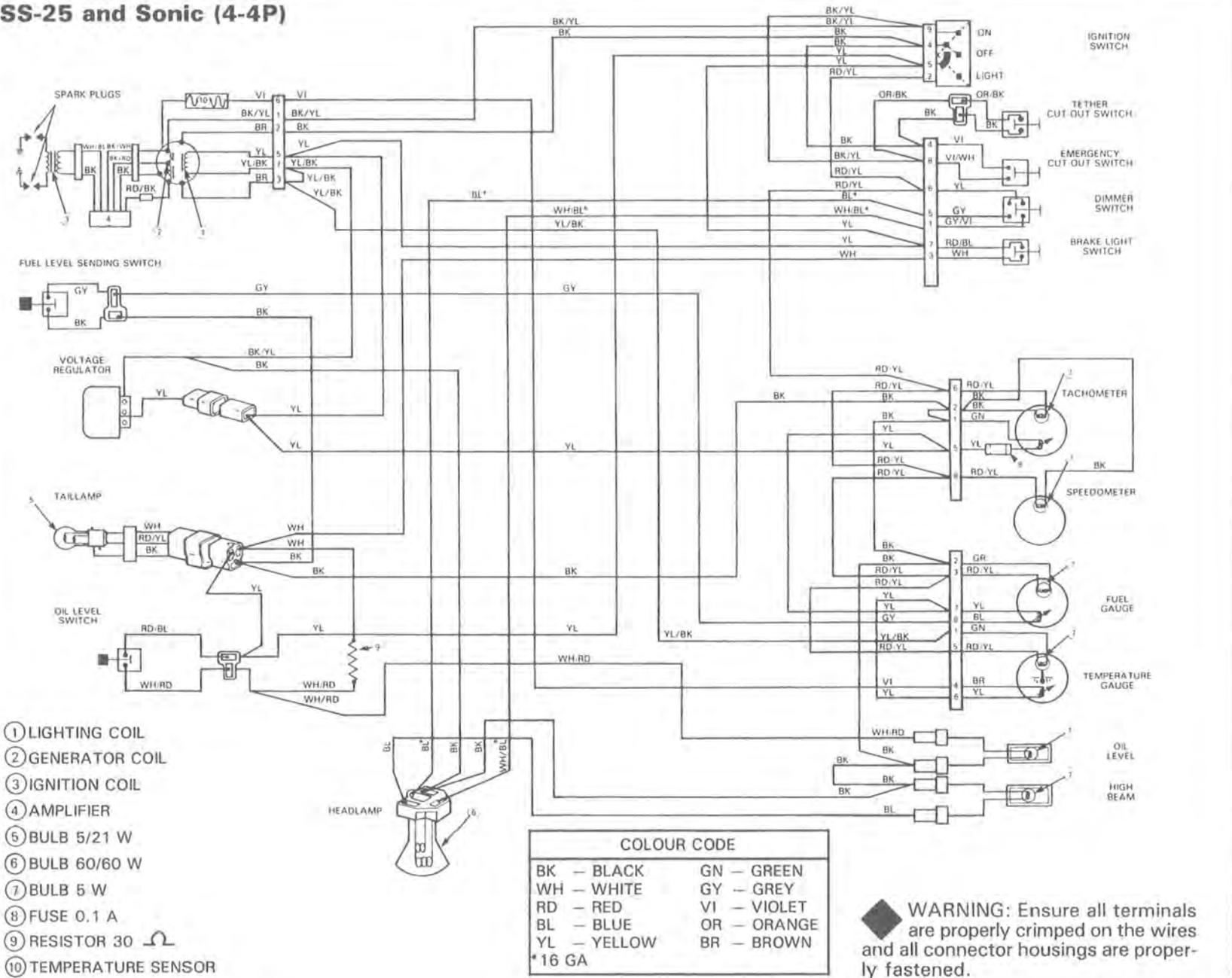
* 16 GA

- ① LIGHTING COIL (160W)
- ② GENERATOR COIL
- ③ IGNITION COIL
- ④ AMPLIFIER
- ⑤ BULB 5/21 W
- ⑥ BULB 60/60 W
- ⑦ BULB 5 W
- ⑧ LAMP
- ⑨ BULB 2 W
- ⑩ STARTER
- ⑪ SOLENOID SWITCH
- ⑫ FUSE
- ⑬ BATTERY
- ⑭ REGULATOR - RECTIFIER
- ⑮ FUSE 0.1 A
- ⑯ DIODE I-N-4585

WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.

SECTION 04 ELECTRICAL
SUB-SECTION 01 (ELECTRIC CHARTS)

SS-25 and Sonic (4-4P)

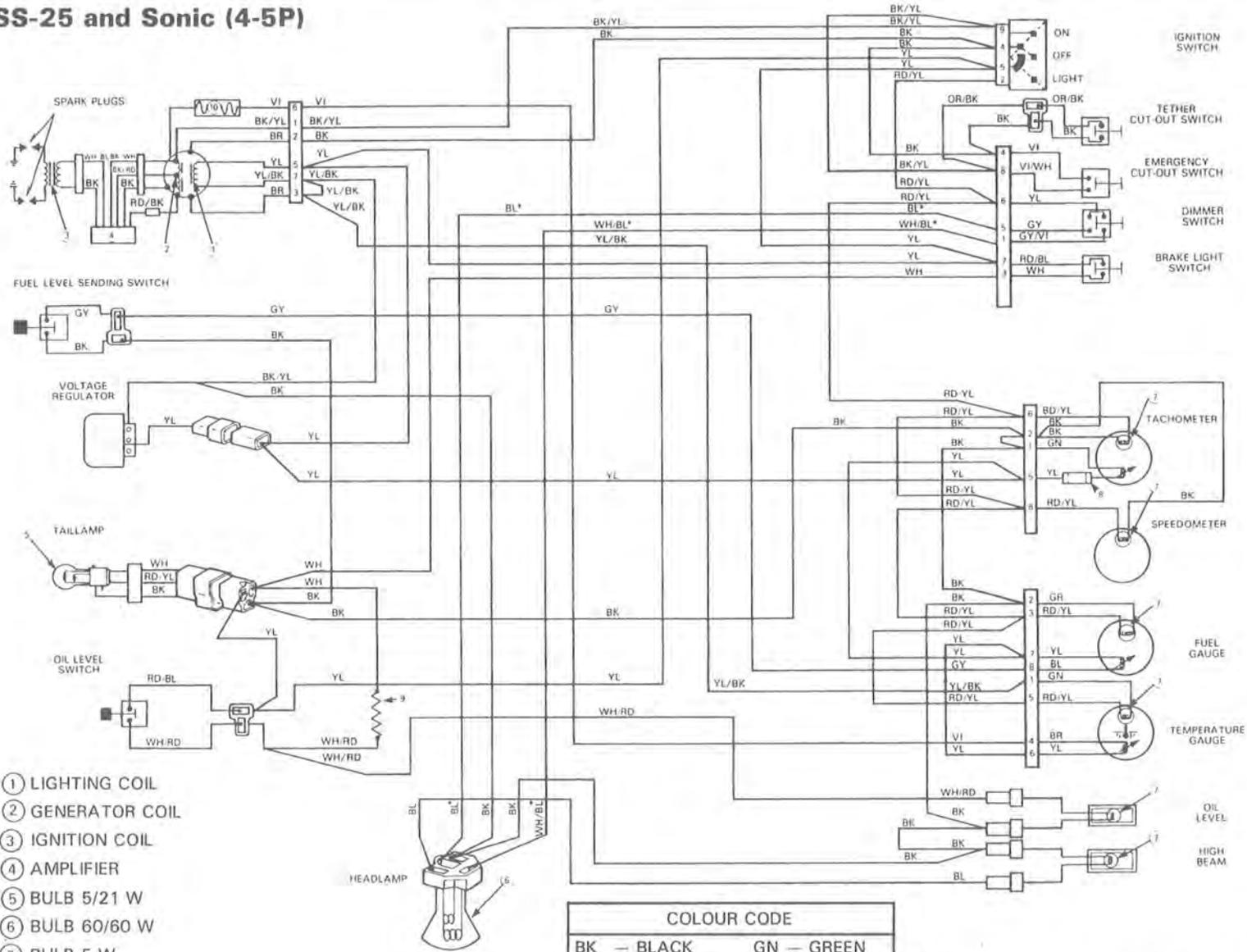


- ① LIGHTING COIL
- ② GENERATOR COIL
- ③ IGNITION COIL
- ④ AMPLIFIER
- ⑤ BULB 5/21 W
- ⑥ BULB 60/60 W
- ⑦ BULB 5 W
- ⑧ FUSE 0.1 A
- ⑨ RESISTOR 30 Ω
- ⑩ TEMPERATURE SENSOR

COLOUR CODE	
BK - BLACK	GN - GREEN
WH - WHITE	GY - GREY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN
* 16 GA	

WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.

SS-25 and Sonic (4-5P)

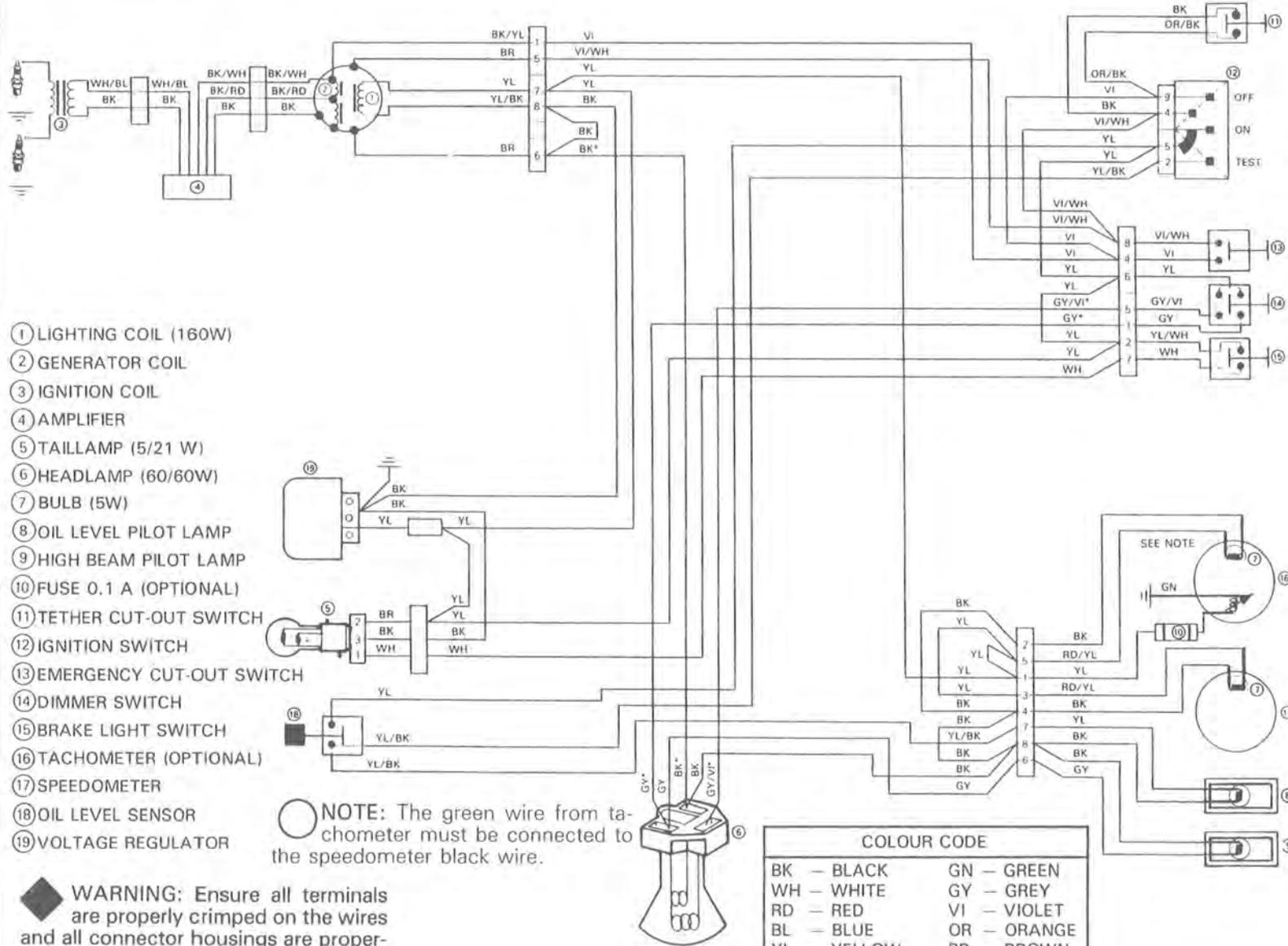


- ① LIGHTING COIL
- ② GENERATOR COIL
- ③ IGNITION COIL
- ④ AMPLIFIER
- ⑤ BULB 5/21 W
- ⑥ BULB 60/60 W
- ⑦ BULB 5 W
- ⑧ FUSE 0.1 A
- ⑨ RESISTOR 30
- ⑩ TEMPERATURE SENSOR

COLOUR CODE	
BK - BLACK	GN - GREEN
WH - WHITE	GY - GREY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN
*16 GA	

WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.

Blizzard 5500 MX



- ① LIGHTING COIL (160W)
- ② GENERATOR COIL
- ③ IGNITION COIL
- ④ AMPLIFIER
- ⑤ TAILLAMP (5/21 W)
- ⑥ HEADLAMP (60/60W)
- ⑦ BULB (5W)
- ⑧ OIL LEVEL PILOT LAMP
- ⑨ HIGH BEAM PILOT LAMP
- ⑩ FUSE 0.1 A (OPTIONAL)
- ⑪ TETHER CUT-OUT SWITCH
- ⑫ IGNITION SWITCH
- ⑬ EMERGENCY CUT-OUT SWITCH
- ⑭ DIMMER SWITCH
- ⑮ BRAKE LIGHT SWITCH
- ⑯ TACHOMETER (OPTIONAL)
- ⑰ SPEEDOMETER
- ⑱ OIL LEVEL SENSOR
- ⑲ VOLTAGE REGULATOR

○ NOTE: The green wire from tachometer must be connected to the speedometer black wire.

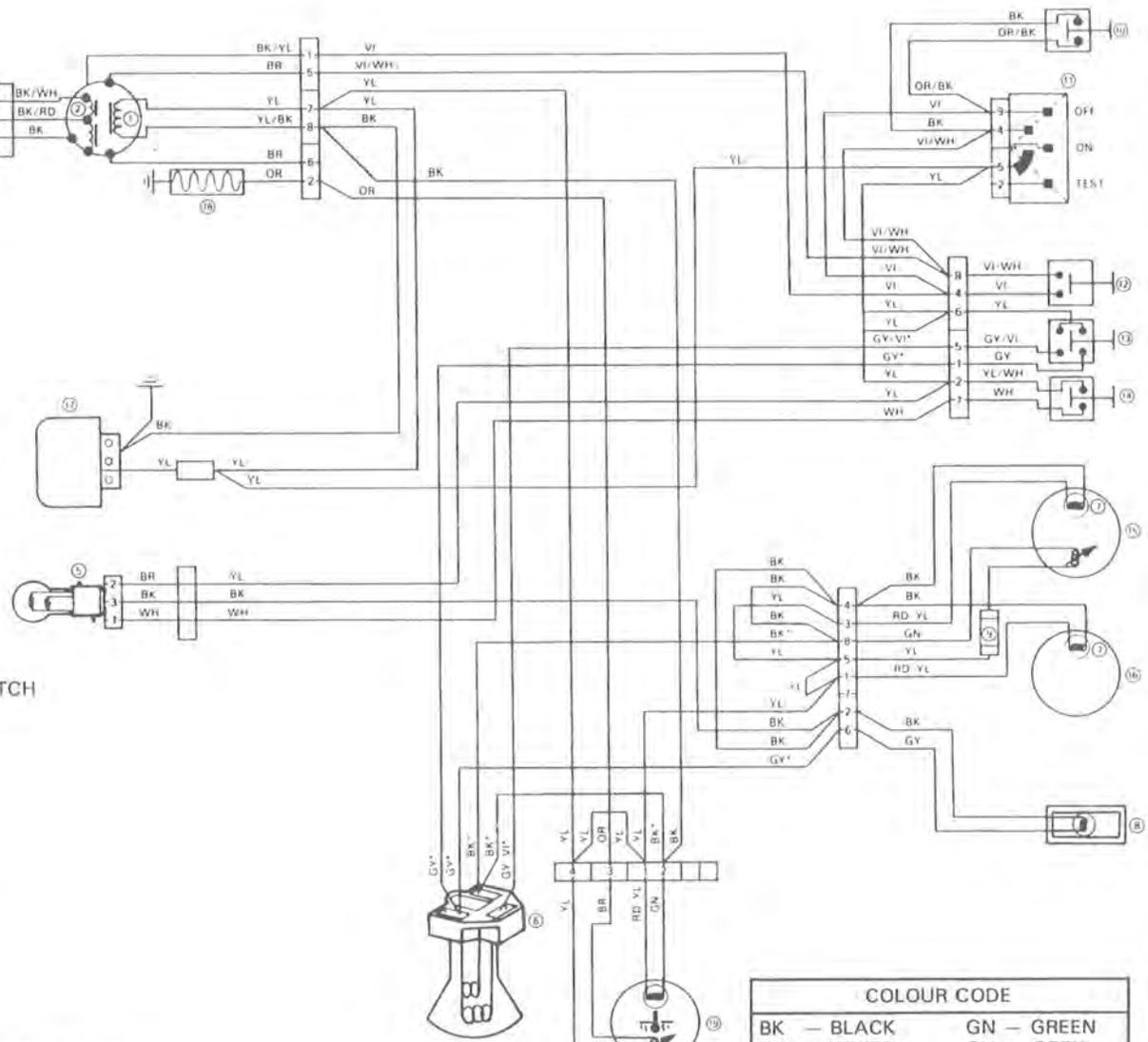
COLOUR CODE	
BK - BLACK	GN - GREEN
WH - WHITE	GY - GREY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN
*16 GA	

◆ WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.

Blizzard 9700

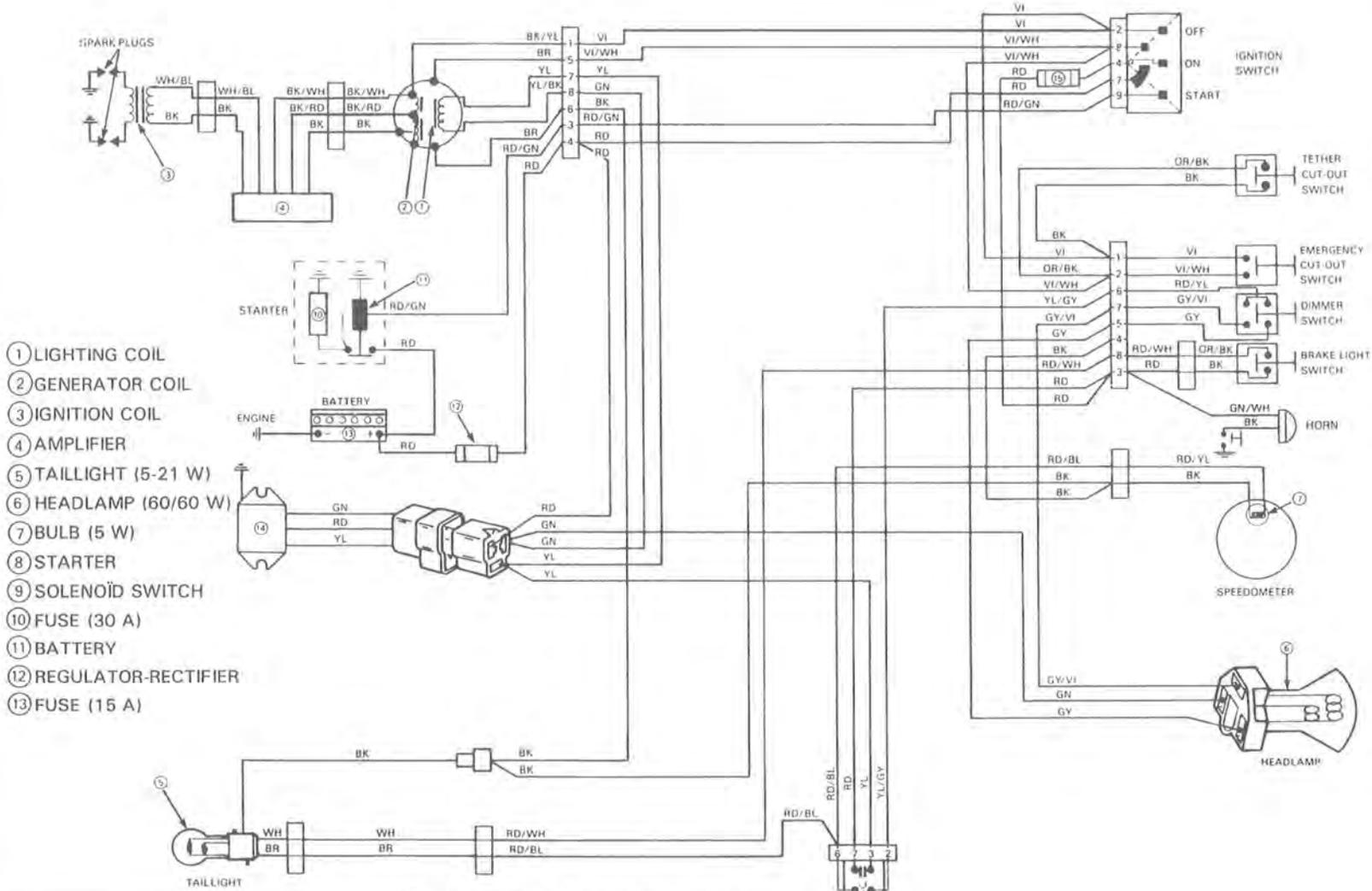
- ① LIGHTING COIL (160 W)
- ② GENERATOR COIL
- ③ IGNITION COIL
- ④ AMPLIFIER
- ⑤ TAILLAMP (5-21W)
- ⑥ HEADLAMP (60/60 W)
- ⑦ BULB (5 W)
- ⑧ HIGH BEAM PILOT LAMP
- ⑨ FUSE (0.1 A)
- ⑩ TETHER CUT-OUT SWITCH
- ⑪ IGNITION SWITCH
- ⑫ EMERGENCY CUT-OUT SWITCH
- ⑬ DIMMER SWITCH
- ⑭ BRAKE LIGHT SWITCH
- ⑮ TACHOMETER
- ⑯ SPEEDOMETER
- ⑰ VOLTAGE REGULATOR
- ⑱ TEMPERATURE SENSOR
- ⑲ TEMPERATURE GAUGE

WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.



COLOUR CODE	
BK — BLACK	GN — GREEN
WH — WHITE	GY — GREY
RD — RED	VI — VIOLET
BL — BLUE	OR — ORANGE
YL — YELLOW	BR — BROWN
* 16 GA	

Alpine



- ① LIGHTING COIL
- ② GENERATOR COIL
- ③ IGNITION COIL
- ④ AMPLIFIER
- ⑤ TAILLIGHT (5-21 W)
- ⑥ HEADLAMP (60/60 W)
- ⑦ BULB (5 W)
- ⑧ STARTER
- ⑨ SOLENOID SWITCH
- ⑩ FUSE (30 A)
- ⑪ BATTERY
- ⑫ REGULATOR-RECTIFIER
- ⑬ FUSE (15 A)

COLOUR CODE	
BK - BLACK	GN - GREEN
WH - WHITE	GR - GREY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN
* 16 GA	

WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.

IGNITION TIMING

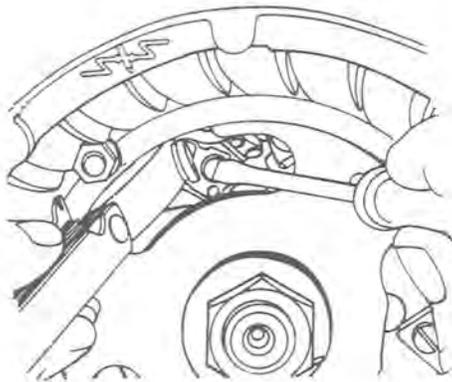
BREAKER POINTS IGNITION SYSTEMS

247 ENGINE TYPE

Two methods are detailed in this section; the first using the timing marks, stamped on the engine, the second using a Top Dead Center gauge.

Timing marks procedure

1. Disconnect spark plug wire and remove spark plug.
2. Remove rewind starter assembly from engine then remove the starting pulley from magneto ring.
3. Rotate crankshaft until breaker points, visible through magneto ring opening, are fully opened. Adjust points gap to 0.35-0.40 mm (0.014-0.016") using a feeler gauge and a screwdriver as illustrated.



NOTE: Breaker points gap can change upon tightening. Always recheck after tightening.

4. Disconnect junction block at engine then connect one lead of a timing light (flashlight type P/N 414 0122 00) to the blue wire leading from engine. Connect other to ground (metallic portion of the engine).
5. Turn timing instrument ON and rotate crankshaft until timing marks align. Slacken the three (3) armature plate retaining screws then rotate armature plate until timing light fluctuates.

Retighten retaining screws at this position.



Too early
Turn armature
plate clockwise

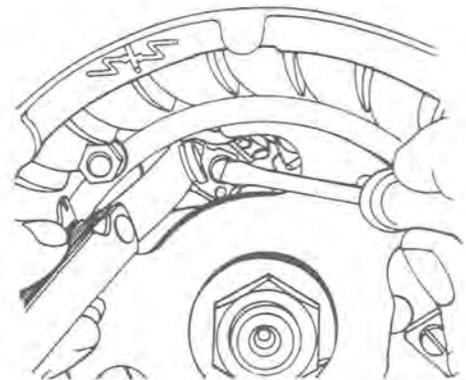
Too late
Turn armature
plate counter-clockwise

NOTE: Ignition timing can change upon tightening. Always recheck after tightening.

Top dead center gauge procedure

1. Disconnect spark plug wire and remove spark plug.
2. Remove rewind starter assembly from engine then remove the starting pulley from magneto ring.
3. Rotate crankshaft until breaker points, visible through magneto ring opening, are fully open. Adjust points gap to 0.35-0.40 mm (0.014-0.016") using a feeler gauge and a screwdriver as illustrated.

NOTE: Breaker points gap can change upon tightening. Always recheck after tightening.



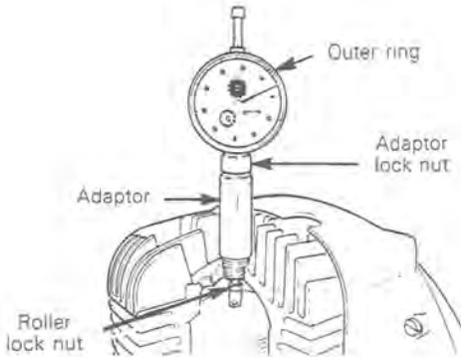
4. Disconnect junction block at engine then connect one lead of a timing instrument (flashlight type P/N 414 0122 00) to the blue wire coming from engine. Connect other to ground (metallic portion of the engine).

SECTION 04 ELECTRICAL

SUB-SECTION 02 (IGNITION TIMING)

5. Install and adjust T.D.C. gauge on engine as follows:

- Rotate magneto clockwise until piston is just before top dead center.
- With gauge in adaptor, adjust roller so that it is parallel with dial face. Tighten roller lock nut.



- Loosen adaptor lock nut then holding gauge with dial face toward magneto, screw adaptor in spark plug hole.
- Slide gauge far enough into adaptor to obtain a reading then finger tighten adaptor lock nut.
- Rotate magneto until piston is at Top Dead Center.
- Unlock outer ring of dial and turn it until "O" on dial aligns with pointer.
- Lock outer ring in position.

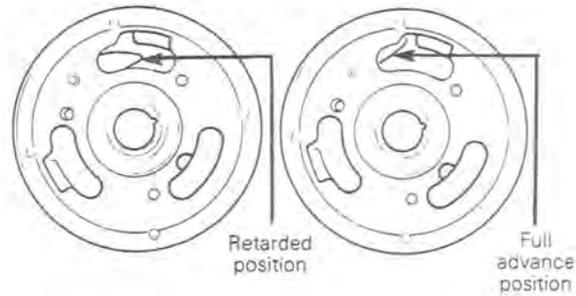
6. Slacken the three (3) armature plate retaining screws and turn timing instrument ON.

7. Rotate magneto counter-clockwise until piston is at:
DIRECT TIMING 3.98 ± 0.25 mm BTDC
 ($0.157 \pm .010''$)

BTDC: Before top dead center.

Slowly rotate armature plate until timing light fluctuates. Retighten retaining screws.

○ **NOTE:** For 247 engine type, hold advance mechanism centrifugal lever in full advance position (toward magneto rim).



○ **NOTE:** Ignition timing can change upon tightening. Always recheck after tightening.

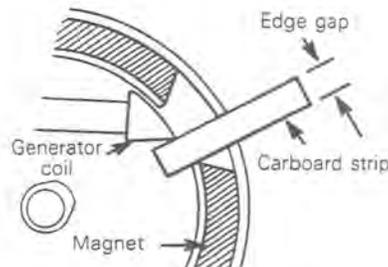
Edge gap verification

By following either of the two procedures herein mentioned the edge gap will automatically be adjusted. However, if the edge gap is to be verified, proceed as follows:

From timing marks, rotate magneto clockwise 1/4 of a turn, (for 247 engine type hold advance mechanism centrifugal weight in full advance position (toward magneto rim)), then slowly turn magneto back counter-clockwise until timing light fluctuates.

At this point check the distance between generator coil end and magnet (edge gap), with a cardboard strip of appropriate width.

ENGINE TYPE	EDGE GAP
247	5 - 8 mm (0.197 - 0.315'')



If edge gap is more or less than specified, the problem lies with engine internal components (crankshaft out of alignment, broken Woodruff key, loose breaker cam, etc.); corrective measures should be applied.

ELECTRONIC IGNITION SYSTEMS — NIPPONDENSO

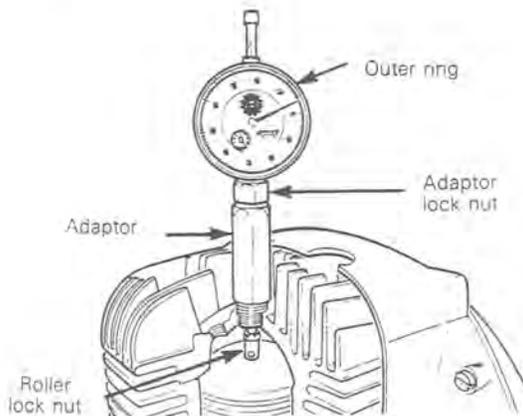
277 ENGINE TYPE

Two methods are detailed in this section, the first using a Top dead center gauge, the second using a Stroboscopic timing light.

Top dead center gauge verification

1. Disconnect spark plug wire and remove spark plug.
2. Remove the cylinder cowl and hold the hood in an open position.
3. Install and adjust T.D.C. gauge on engine as follows:
 - Rotate magneto clockwise until piston is just before top dead center.
 - With gauge in adaptor, adjust roller so that it is parallel with dial face. Tighten roller lock nut.

(TYPICAL)



- Loosen adaptor lock nut then holding gauge with dial face toward magneto, screw adaptor in spark plug hole.
- Slide gauge far enough into adaptor to obtain a reading then finger tighten adaptor lock nut.
- Rotate magneto until piston is at Top Dead Center.
- Unlock outer ring of dial and turn it until "O" on dial aligns with pointer.
- Lock outer ring in position.

4. Rotate the crankshaft by the fan counter-clockwise until the piston is at:

— Up to serial number 3,376,857

INDIRECT TIMING: 2.85 mm (0.112") B.T.D.C.

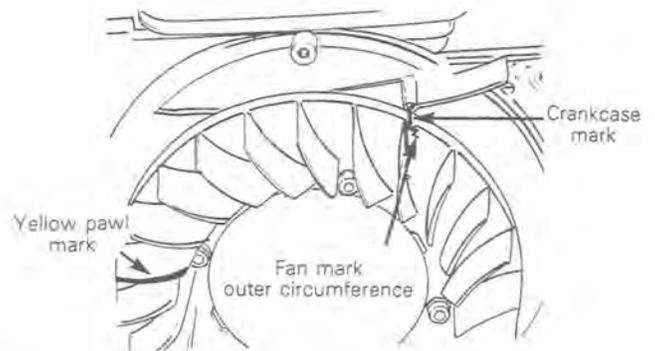
— Serial number 3,376,858 & above

INDIRECT TIMING: 2.6 mm (0.102") B.T.D.C.

DIRECT TIMING: 2.3 mm (0.090") B.T.D.C.

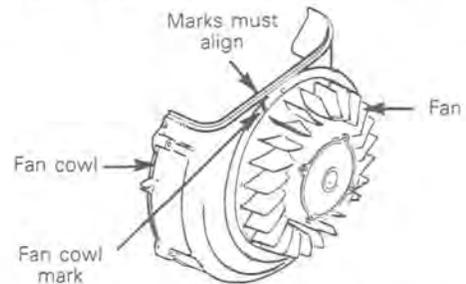
BTDC: Before top dead center.

At this point, the crankcase mark and the fan outer circumference mark **MUST** align.



If the marks do not align, reinstall the cylinder cowl and verify if the fan yellow pawl mark aligns with the fan cowl mark.

- A) If the yellow pawl mark aligns with the fan cowl mark, remove the cowl and make a new fan outer circumference mark in line with the crankcase mark.
- B) If the yellow pawl mark does not align with the fan cowl mark, make a new fan cowl mark in line with the yellow pawl mark.



CAUTION: Timing marks verification cannot be used as a timing procedure, therefore, always check the timing (using a stroboscopic timing light) at 6000 R.P.M. after the marks have been aligned. Reinstall the cylinder cowl and the spark plug.

SECTION 04 ELECTRICAL SUB-SECTION 02 (IGNITION TIMING)

Stroboscopic timing light

○ **NOTE:** To perform this procedure we strongly recommend a stroboscopic timing light which is able to go over 6000 R.P.M., such as:

SNAP-ON MT 212

ELECTRO-SPECIALTY, model 978.

The ignition components are affected by temperature variation, therefore, timing must be checked when engine is cold, after MAXIMUM 20 seconds idling.

Connect timing light pick-up to the spark plug lead.

○ **NOTE:** Use a separate battery to supply timing light.

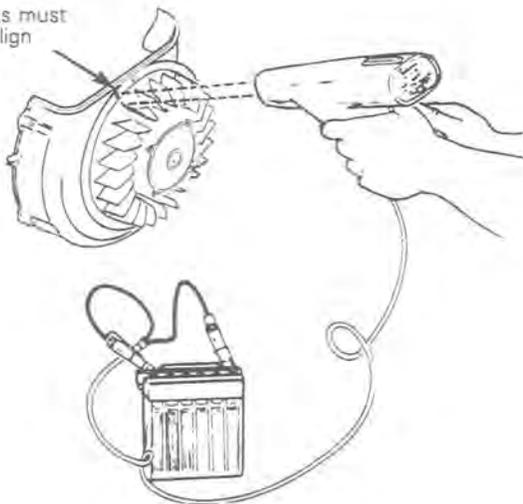
◆ **WARNING:** Place ski tips against a wall, raise rear of vehicle on a stand so that track does not contact the ground. Make sure no one passes behind the vehicle while engine is running. Keep clear of track and other moving parts.

○ **NOTE:** Turn headlamp "ON" when checking the timing.

Start the engine and point timing light straight in line with the fan cowl timing mark.

Cold engine

Marks must align



Bring engine to 6000 R.P.M. for a brief instant.

Check timing mark alignment. If flywheel mark aligns within housing marks, timing is correct.

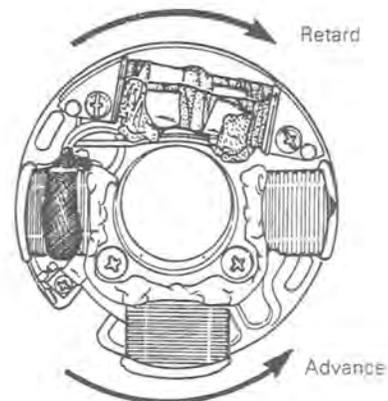
Stop engine.

If the marks do not align, armature plate must be adjusted.

Armature plate will have to be moved to advance or retard timing.

To adjust remove rewind starter assembly and starter pulley.

Loosen the armature plate retaining screws, move the plate in appropriate direction. Refer to the following illustration.



Tighten the armature plate screws.

▼ **CAUTION:** Make sure the armature plate screws are well secured.

Reassemble starter pulley and assembly.

Reverify engine timing (make sure engine is cold).

377, 447, 503, ENGINE TYPES

Two methods are detailed in this section, the first using a Top dead center gauge, the second using a Stroboscopic timing light.

Top dead center gauge verification

Remove the spark plugs.

On 503 models, remove the fan cover.

◆ **WARNING:** Ensure the engine is cold before fan cover removal on 503 models.

○ **NOTE:** (On a Blizzard 5500 MX). The only way to remove the fan cover without damage is to slide it against the muffler in a forward direction. Reverse procedure at installation.

Install a dial indicator in magneto side spark plug hole.

Bring magneto side piston to top dead center position.

Back-off (rotate counter-clockwise) piston to:

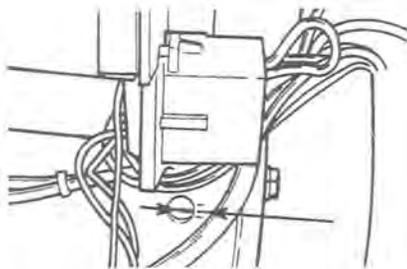
377 engine type: 2.31 mm (0.091") BTDC

447 engine type: 1.88 mm (0.074") BTDC

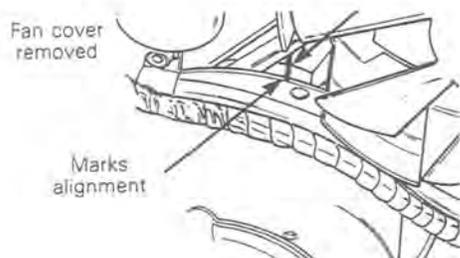
503 engine type: 2.29 mm (0.090") BTDC

BTDC: Before top dead center.

377,447, engine type: Look through inspection hole and check if the flywheel and magneto housing marks align. If the marks do not correspond to the specification, scribe a new mark on the flywheel.



503 engine type: Look through the fan and check if the flywheel and the crankcase marks align. If the marks do not correspond to the specification, scribe a new mark on the flywheel.



Stroboscopic timing light

○ **NOTE:** Timing can be checked using a stroboscopic timing light (Snap-On MT 212 or Electro Specialty, model 978). The ignition components are affected by temperature variation, therefore, timing must be checked when engine is cold after approximately 20 seconds idling.

Connect timing light pick-up to magneto side spark plug lead (on manual start models use a separate battery to supply timing light).

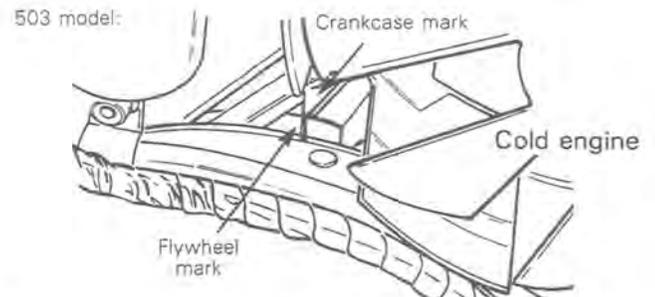
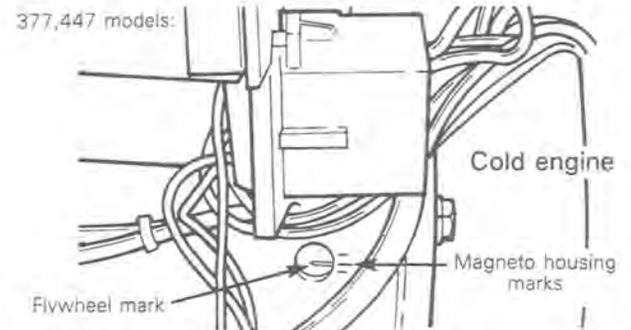
◆ **WARNING:** Place ski tips against a wall, raise rear of the vehicle on a stand so that the track does not contact the ground. Make sure no one passes behind the vehicle while engine is running. Keep clear of track and other moving parts.

○ **NOTE:** Turn headlamp "ON" when checking the timing.

Start engine and point timing light straight in line with the timing marks:

377,447: Look through inspection hole.

503: Look through the fan.



Check timing mark alignment. If timing marks align, timing is correct.

For the three models (377,447 & 503 engine) if the timing marks do not align, armature plate must be adjusted.

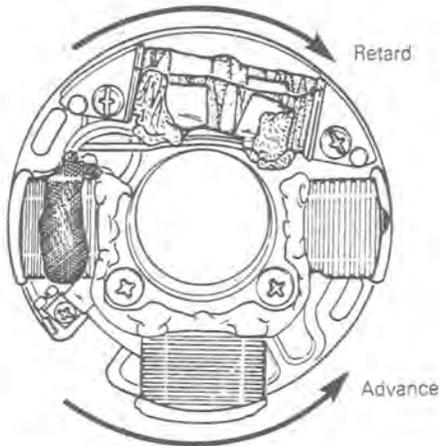
Armature plate will have to be moved to advance or retard timing.

SECTION 04 ELECTRICAL

SUB-SECTION 02 (IGNITION TIMING)

To adjust, remove rewind starter assembly and starter pulley.

Loosen the armature plate screws, move the plate in the appropriate direction.



Tighten armature plate screws.

CAUTION: Make sure armature plate screws are well secured.

Reassemble starter pulley and assembly.

Recheck engine timing (make sure engine is cold).

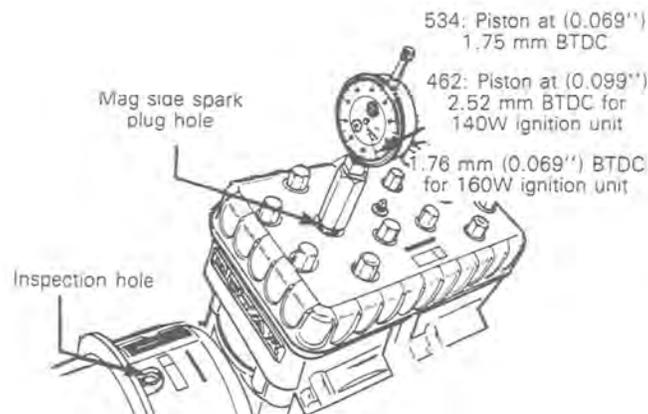
462, 534 ENGINE TYPE

Two methods are detailed in this section, the first using a Top dead center gauge, the second using a Stroboscopic timing light.

Top dead center gauge verification

Remove spark plugs.

Remove inspection plug on magneto housing.



Install dial indicator in magneto side spark plug hole.

Bring magneto side piston to top dead center.

Back-off (rotate counter-clockwise) piston to:

462 engine type: 2.52 mm (0.099") BTDC for 140W
ignition unit.

1.76 mm (0.069") BTDC for 160W
ignition unit.

534 engine type: 1.75 mm (0.069") BTDC

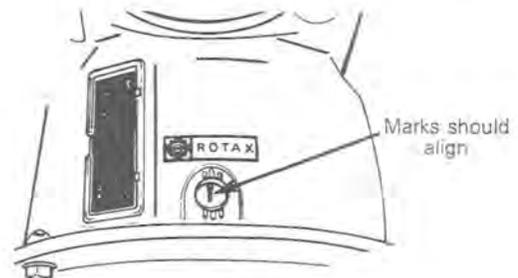
BTDC: before top dead center.

How to easily distinguish the 140W & 160W magneto

	140W (4-4P)	160W (4-5P)
Amplifier box part no	070000-680	070000-0770
Amplifier box connectors (qty)	3	2
Starting pulley retaining screw (qty)	4	3
Magneto poles (qty)	4	5
On the 140 W (4-4P) amplifier box there is an additional red/black wire with a single connector.		
The 140W (4-4P) amplifier box is bigger than the 160W (4-5P) amplifier box.		

Look through inspection hole and check if flywheel and magneto housing timing marks align.

If the marks do not correspond to the specifications, scribe a new mark on the magneto housing.



Stroboscopic timing light

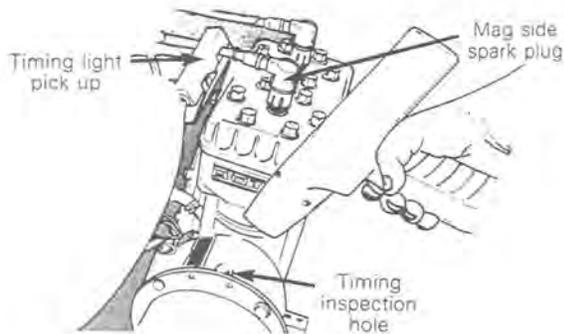
NOTE: Timing can be checked using a stroboscopic timing light (Electro Specialty 978, Snap-On MT 212 or equivalent). The ignition components are affected by temperature variation, therefore, timing must be checked when engine is cold.

SECTION 04 ELECTRICAL
SUB-SECTION 02 (IGNITION TIMING)

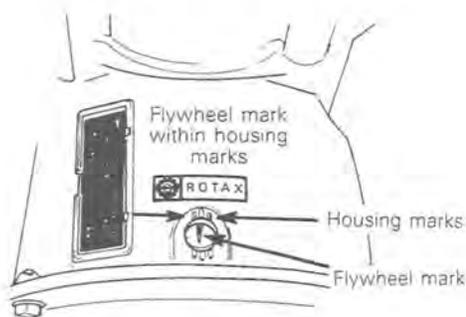
Remove the timing inspection plug on magneto housing.
Connect timing light pick-up to magneto side spark plug lead (on manual start models use a separate battery to supply timing light).

◆ **WARNING:** Place ski tips against a wall, raise rear of vehicle on a stand so that track does not contact the ground. Make sure no one passes behind the vehicle while engine is running. Keep clear of track and other moving parts.

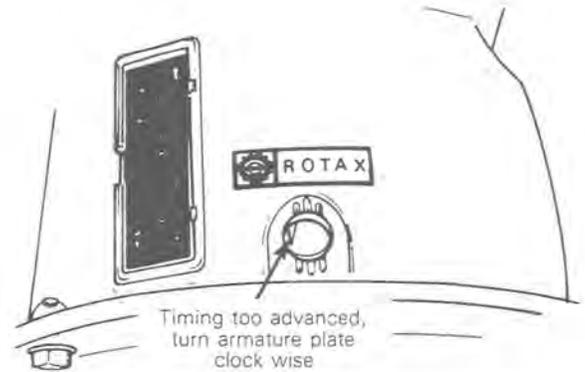
○ **NOTE:** Turn headlamp "on" when checking timing.
Start engine and point timing light straight into inspection hole.



Bring engine to 6000 R.P.M. for a brief instant.
Check timing mark alignment. If flywheel mark aligns within housing marks, timing is correct.
Stop engine.

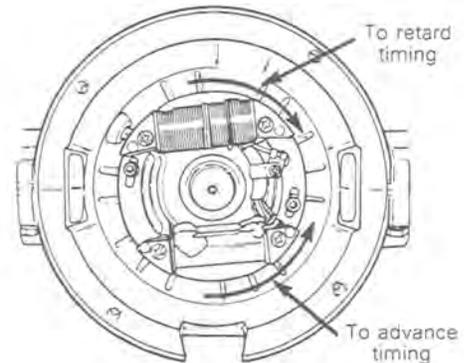


If flywheel mark did not align within magneto housing marks, armature plate must be adjusted.
Armature plate will have to be moved to advance or retard timing.



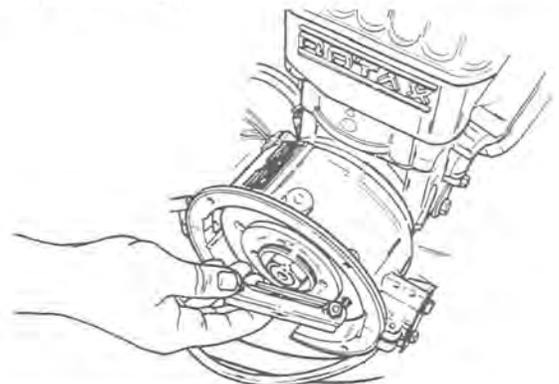
To adjust remove rewind starter assembly and starter pulley.

Using a 4 mm Allen key, loosen the two armature plate retaining screws and lightly move plate in appropriate direction. (Refer to the difference between timing marks to determine how much to move the armature plate).



Tighten the armature plate screws.

▼ **CAUTION:** Make sure armature plate screws are well secured.



Reassemble starter pulley and assembly.
Recheck engine timing (make sure engine is cold).
Reinstall inspection plug.



SPARK PLUGS

○ **NOTE:** The 1984 Bombardier snowmobiles are using three (3) spark plug types, Bosch spark plugs, NGK spark plugs and Nippondenso spark plugs.

BOSCH SPARK PLUG TYPE

(Elan)

SPARK PLUG NUMBERING SYSTEM

Bosch has introduced a new numbering code for its complete line of spark plugs. The new code is shorter, therefore easier to use. The following charts will assist you in making the change-over easily and effectively.

IMPORTANT: The new code has a different heat range identification system.

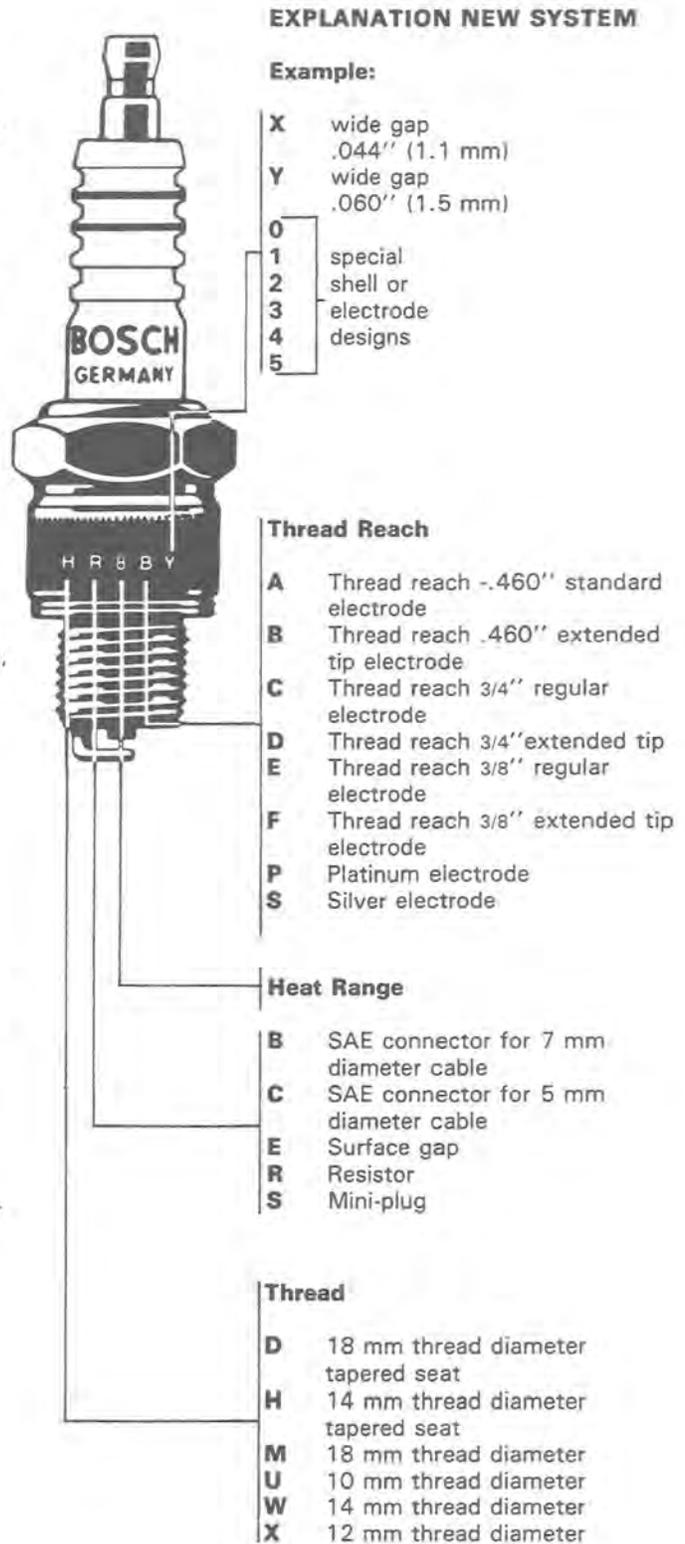
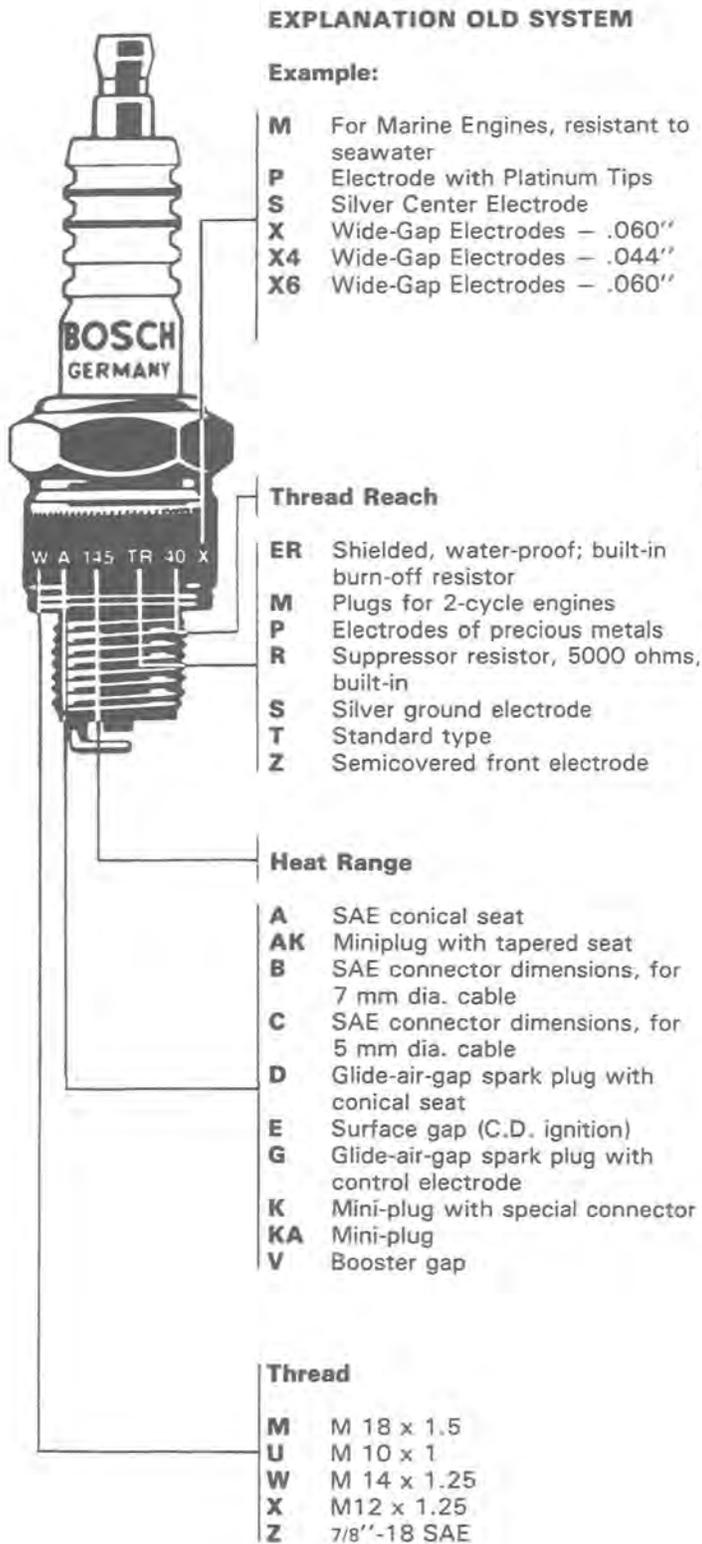
High number	hot plug
Low number	cold plug

1984 CROSS REFERENCE CHART

List of Bosch spark plugs used on 1984 Bombardier snowmobiles.

New number	Old number
M 7 A	M 175 T 1

SECTION 04 ELECTRICAL SYSTEM
 SUB-SECTION 03 (SPARK PLUGS)



NGK SPARK PLUG TYPE

Citation, Skandic, Alpine, SS-25, Sonic L/C
Blizzard 5500 MX, Blizzard 9700

SPARK PLUG NUMBERING SYSTEM

Bombardier is using the NGK spark plug type on most of the 1984 snowmobile models.

The heat range identification system is:

High number → cold plug
Low number → hot plug

1984 CROSS REFERENCE CHART

List of NGK spark plugs used on 1984 Bombardier snowmobiles.

BR-7ES
BR-8ES

Design symbols used in NGK spark plugs

—PREFIX—

—SUFFIX—

—WIDE GAP—

BP5ES-15

10: 1.0 mm (.040")
 11: 1.1 mm (.044")
 13: 1.3 mm (.050")
 14: 1.4 mm (.055")
 15: 1.5 mm (.060")
 20: 2.0 mm (.080")

Thread	
A:	18 mm ϕ
B:	14 mm ϕ
C:	10 mm ϕ
D:	12 mm ϕ

Heat rating numbers	
2	Hot
4	↑ ↓
5	
6	
7	
8	
9	
10	Cold

Reach	
E:	19 mm (3/4")
F:	Taper seat
H:	12.7 mm (1/2")
L:	11.2 mm (7/16")
Blank	
	18 mm ϕ 12 mm
	14 mm ϕ 9.5 mm (3/8")

Construction	
M:	Compact type
P:	Projected Insulator Type
R:	Resistor type
U:	Surface Discharge type
Z:	Suppressor

Construction	
A:	Special Design
B:	Special Design for Honda CVCC
G:	Racing use
GV:	Special Construction of V-Type, Racing Use
K:	2-Ground electrode Special for Toyota
L:	Half heat range (See Heat range chart)
LM:	Compact type for Lawn Mower
M:	2-Ground electrode For Mazda Rotary Eng.
N:	Racing Type
Q:	4-Ground electrode
S:	Standard Copper Core Center electrode
T:	3-Ground electrode
V:	Fine wire center electrode
W:	Tungsten electrode
X:	Booster gap
Y:	Special Design for Toyota

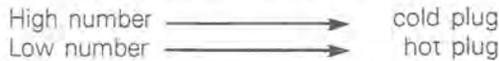
NIPPONDENSO (ND) SPARK PLUG TYPE

Safari 377/E, Safari 447, Safari Grand Luxe

SPARK PLUG NUMBERING SYSTEM

The new Bombardier Safari models use Nippondenso spark plug type.

The heat range identification system is:



The sales symbol is composed of a "Heat Range" number, together with prefix and suffix letters, to indicate major features of the plug design. Each letter has a definite meaning.

W 16 E X -U 11

• THREAD AND HEX

Letter	Seat	Thread Size	Hex
M		18 mm	25.4 mm
L		18 mm	22.0 mm
MA	Taper seat	18 mm	20.6 mm
T	Taper seat	14 mm	16.0 mm
W		14 mm	20.6 mm
WA	Taper seat	14 mm	16.0 mm
X		12 mm	18.0 mm
U		10 mm	16.0 mm
J		14 mm	20.6 mm
SF		14 mm	20.6 mm

• HEAT RANGE

HOT	COLD
9 14 16 20 22 24 25 27 29 31 34 37	

• THREAD REACH

A,B,E: 19.0 mm (3/4")
F: 12.7 mm (1/2")
L: 11.2 mm (7/16")
None: 12.0 mm (15/32") ..18 mm Thread
None: 9.5 mm (3/8")14 mm Thread

1984 CROSS REFERENCE CHART

List of Nippondenso spark plugs used on 1984 Bombardier snowmobiles.

W 24 ESR-U

W 16 E X -U 11

• WIDE GAP

9: 0.9 mm (.035")
10: 1.0 mm (.040")
11: 1.1 mm (.044")
13: 1.3 mm (.050")
15: 1.5 mm (.060")

• SPECIAL DESIGN

Letter	Description	Example
-GU	Gold palladium with U electrode	W24ES-GU
-U	With U-grooved ground electrode	X24ES-U
-V	Fine center electrode	X24ES-V
-S	Special type for MITSUBISHI	W20EP-S11
-L	Special type: *For Honda CVCC Engines *Extra projected type for mopeds	W20ES-L W14FP-L

• SPECIAL DESIGN

Letter	Description	Example
A	Dual ground electrodes	W22EA
B	Triple ground electrodes	W22EB
D	4 ground electrodes	W27EDR14
LM	Compact type (for Lawn Mower Engines)	W14LM-U
M	Compact type	W20M-U
N	Racing type (Nickel ground electrode)	W27EN
Pt	Racing type (Platinum ground electrode)	W27EPt
P	Projected type	W16EP-U
R	Resistor type	W16EPR-U
S	Regular type-copper cored center electrode	W24ES-U
T	Dual ground electrodes (for Toyota)	W20ET-S
X	Extra projected type	W16EX-U

SPARK GAP

inch	.020	.024	.028	.032	.035	.040	.044	.050	.060	.080
mm	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.5	2.0

SECTION 04 ELECTRICAL SYSTEM

SUB-SECTION 03 (SPARK PLUGS)

DISASSEMBLY

First unscrew the spark plug one turn.

Clean the spark plug and cylinder head with pressurized air.

Then unscrew completely.

HEAT RANGE

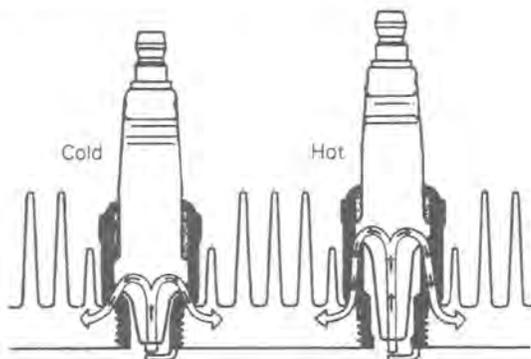
The proper operating temperature or heat range of the spark plug is determined by the spark plug's ability to dissipate the heat generated by combustion.

The longer the heat path between the electrode tip to the plug shell, the hotter the spark plug operating temperature will be — and inversely, the shorter the heat path, the colder the operating temperature will be.

A "cold" type plug has a relatively short insulator nose and transfers heat very rapidly into the cylinder head.

Such a plug is used in heavy duty or continuous high speed operation to avoid overheating.

The "hot" type plug has a longer insulator nose and transfers heat more slowly away from its firing end. It runs hotter and burns off combustion deposits which might tend to foul the plug during prolonged idle or low speed operation.



CAUTION: Severe engine damage can occur if a wrong heat range plug is used:

A too "hot" plug will result in overheating and pre-ignition, etc.

A too "cold" plug will result in fouling (shorting the spark plug) or may create carbon build up which can heat up red-hot and cause pre-ignition or detonation.

FOULING

Fouling of the spark plug is indicated by irregular running of the engine, decreasing engine speed due to misfiring, reduced performance, and increased fuel consumption. This is due to a loss of compression. Other possible causes are: prolonged idling, running the engine with the

choke on, or running on a too rich a mixture due to a faulty carburetor adjustment or incorrect fuel and/or fuel mixing. The plug face of a fouled spark plug has either a dry coating of soot or an oily, glossy coating given by an excess either of oil or of oil with soot. Such coatings form a conductive connection between the center electrode and ground.

SPARK PLUG ANALYSIS



The plug face (and piston dome) reveals the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug face (i.e. the part of the plug projecting into the combustion chamber) and the piston dome.

SPARK PLUG INSTALLATION

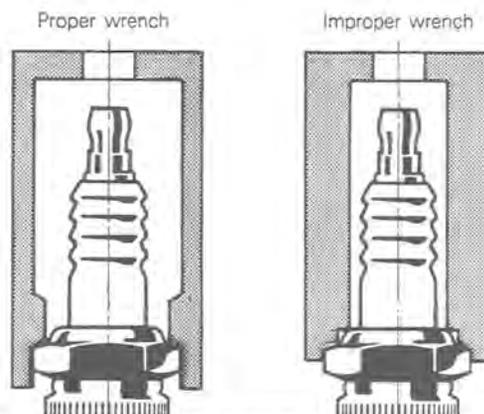
Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, set electrode gap.
2. Apply a light coat of graphite grease over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench:

Bosh - "M" plug (18 mm) 37 N•m (27 ft•lbs)

NGK - "B" plug (14 mm) 27 N•m (20 ft•lbs)

Nippondenso - "W" plug (14 mm) 27 N•m (20 ft•lbs)



Use a proper wrench to tighten the spark plug.

SPARK PLUG CHART

Models	Engine type	Spark plugs
Elan	247	Bosch M 175 T 1 (M 7 A)
Citation 3500	277	NGK BR-8ES
Skandic 377	377	NGK BR-8ES
Safari 377	377	Nippondenso W 24 ESR-U
Safari 447	447	Nippondenso W 24 ESR-U
Safari Grand Luxe	447	Nippondenso W 24 ESR-U
SS-25	462	NGK BR-8ES
Sonic L/C	462	NGK BR-8ES
Blizzard 5500 MX	503	NGK BR-7ES
Blizzard 9700	534	NGK BR-8ES
Alpine	503	NGK BR-7ES



BATTERY

REMOVAL

◆ **WARNING:** When disconnecting battery cables, always remove the black negative cable first then the positive cable (red). Care should be taken while disconnecting above mentioned cables otherwise battery post breakage could occur.

CLEANING

Clean the battery casing, vent caps, cables and battery posts using a solution of baking soda and water.

▼ **CAUTION:** Do not allow cleaning solution to enter battery interior since it will destroy the electrolyte.

Remove corrosion from battery cable terminals and battery posts using a firm copper brush.

INSPECTION

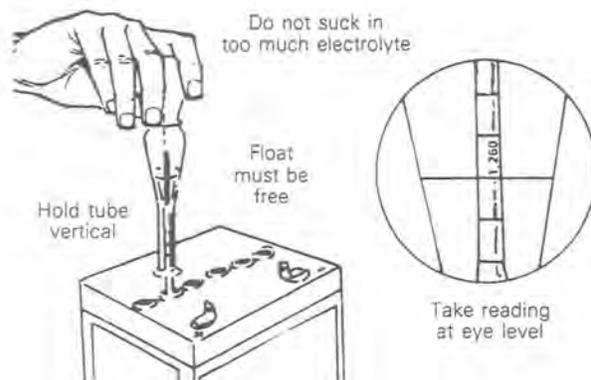
Visually inspect battery casing for cracks or other possible damage. If casing is damaged, replace battery.

Inspect battery posts for security of mounting.

Inspect for cracked or damaged battery caps, replace defective caps.

◆ **WARNING:** Some battery caps do not have holes. Make sure that overflow tube is unobstructed.

HYDROMETER TEST



A hydrometer measures a battery's state of charge in terms of specific gravity. Most hydrometers only read true at 27°C (80°F).

In order to obtain correct readings, adjust the initial reading by adding .004 points to the hydrometer readings for each 5.5°C (10°F) above 27°C (80°F) and by subtracting .004 points for every 5.5°C (10°F) below 27°C (80°F).

THE ILLUSTRATION WILL AID YOU IN FINDING THE CORRECT READING.

	°C	°F			
At	38	100	add	.008	to the reading
	32	90	"	.004	" " "
	27	80			correct reading
	21	70	subtract	.004	from the reading
	16	60	"	.008	" " "
	10	50	"	.012	" " "
	4	40	"	.016	" " "
	-1	30	"	.020	" " "
	-7	20	"	.024	" " "
	-12	10	"	.028	" " "
	-18	0	"	.032	" " "
	-23	-10	"	.036	" " "
	-29	-20	"	.040	" " "
	-34	-30	"	.044	" " "
	-40	-40	"	.048	" " "

EXAMPLE NO. 1

Temperature below 27°C (80°F)
Hydrometer Reading 1.250
Acid temperature -7°C (20°F)
Subtract .024 Sp. Gr.
Corrected Sp. Gr. is 1.226

EXAMPLE NO. 2

Temperature above 27°C (80°F)
Hydrometer Reading 1.235
Acid temperature 38°C (100°F)
Add .008 Sp. Gr.
Corrected Sp. Gr. is 1.243

▼ **CAUTION:** Do not install a partially charged battery on a snowmobile since the casing may crack at freezing temperature. The following chart shows the freezing point of the electrolyte in relation to the battery's state of charge.

SECTION 04 ELECTRICAL

SUB-SECTION 04 (BATTERY)

Temperature-Corrected Specific Gravity	Battery State of Charge	Freezing Point of Battery
1.260	Fully Charged	-59°C (-74°F)
1.230	$\frac{3}{4}$ charged	-40°C (-40°F)
1.200	$\frac{1}{2}$ charged	-27°C (-16°F)
1.170	$\frac{1}{4}$ charged	-18°C (0°F)
1.110	Discharged	-7°C (+19°F)

BATTERY STORAGE

Disconnect and remove battery from the vehicle.

Check electrolyte level in each cell, add distilled water as required.

CAUTION: Do not overfill.

The battery should always be stored in fully charged conditions. If required, recharge until specific gravity of 1.260 is obtained.

CAUTION: Battery electrolyte must not exceed 50°C (122°F).

Clean battery terminals and cable connections using a copper brush. Apply a light coat of dielectric grease or petroleum jelly on terminals.

Clean battery casing and vent caps using a solution of baking soda and water. (Do not allow cleaning solution, to enter battery, otherwise it will destroy the electrolyte). Rinse battery with clear water and dry well using a clean cloth.

Store battery on a wooden shelf in a cool, dry place. Such conditions reduce self-discharging and keep fluid evaporation to a minimum.

During the storage period, recheck electrolyte level and specific gravity readings at least every forty (40) days. As necessary, keep the battery "topped up" and near full charge as possible (trickle charge).

ACTIVATION OF NEW BATTERY

A new battery is factory fresh dry charged. For storage purposes, it is fitted with a temporary sealing tube. Do not remove the sealing tube or loosen battery caps unless activation is desired.

In case of accidental premature removal of caps or sealing tube, battery should be given a full charge.

Perform the following at pre-delivery operations and anytime you have to install a new battery.

1. Remove the sealing tube from the vent elbow. Install overflow tube included in the battery kit.

WARNING: Failure to remove the sealing tube could result in an explosion.

2. Remove caps and fill battery to the UPPER LEVEL line with electrolyte (specific gravity: 1.260 at 20°C (68°F)).

3. Allow the battery to stand for 30 minutes MINIMUM so that electrolyte can dissolve.

4. Readjust the electrolyte level to the UPPER LEVEL.

5. Charge battery at a charging rate of 2.0 amperes for 10 to 20 hours.

CAUTION: If charging rate raises higher than 2.4 amps reduce it immediately.

CAUTION: If cell temperature rises higher than 50°C (122°F) discontinue charging temporarily or reduce the charging rate.

6. After charging, allow the gas bubbles to escape by lightly shaking the battery by hand. Let it settle for 1 hour.

7. Readjust electrolyte level to UPPER LEVEL.

8. Reinstall the caps and wipe off any electrolyte spilt on battery using baking soda and water solution.

WARNING: Overflow tube must be free and open. A kinked or bent tube will restrict ventilation and create gas accumulation that could result in an explosion.

NOTE: It is recommended to verify once a month the battery state. If necessary readjust the battery at fully charged condition.

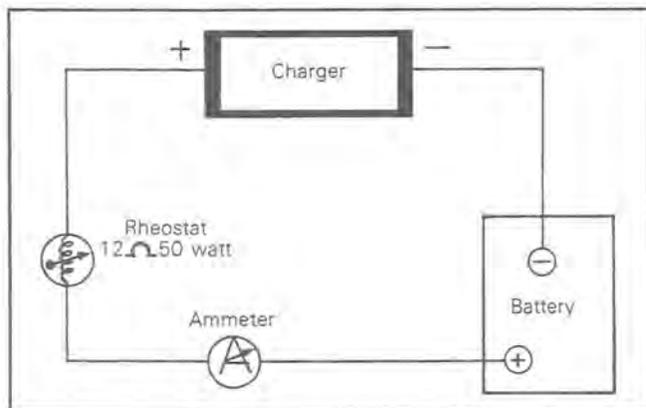
BATTERY CHARGING EQUIPMENT

The battery charger must have an adjustable charging rate. Variable adjustment is preferred, but a unit which can be adjusted in small increments is acceptable.

The battery charger must be equipped with an ammeter capable of accurately measuring current of less than one ampere.

If your present charger is not adjustable to the proper current values, a rheostat can be connected in series with the battery to provide adjustment. 12 Ohm, 50 watt rheostats, such as OHMITE - 0314 or MALLORY 50K 12P, are available from electronic parts supply shops and they are suitable for use with most chargers if the peak current is held below 2 amps.

If you need an accurate ammeter, we recommend the use of: SHURITE - 5202 (0 to 3 amps) or - 5203 (0 to 5 amps) available from electronic parts supply shops.



For a service application and a permanent installation, both ammeter and rheostat can be built into a small box adjacent your charger.

▼ **CAUTION:** Adequate ventillation **MUST** be provided to cool the rheostat.

SECTION 04 ELECTRICAL
SUB-SECTION 04 (BATTERY)

INSTALLATION OF BATTERY

Install battery, connect positive cable (red) then negative cable (black).

Coat battery posts with petroleum jelly then slide protective cap over positive post.

Connect battery overflow tube to outlet tube located on bottom plate.

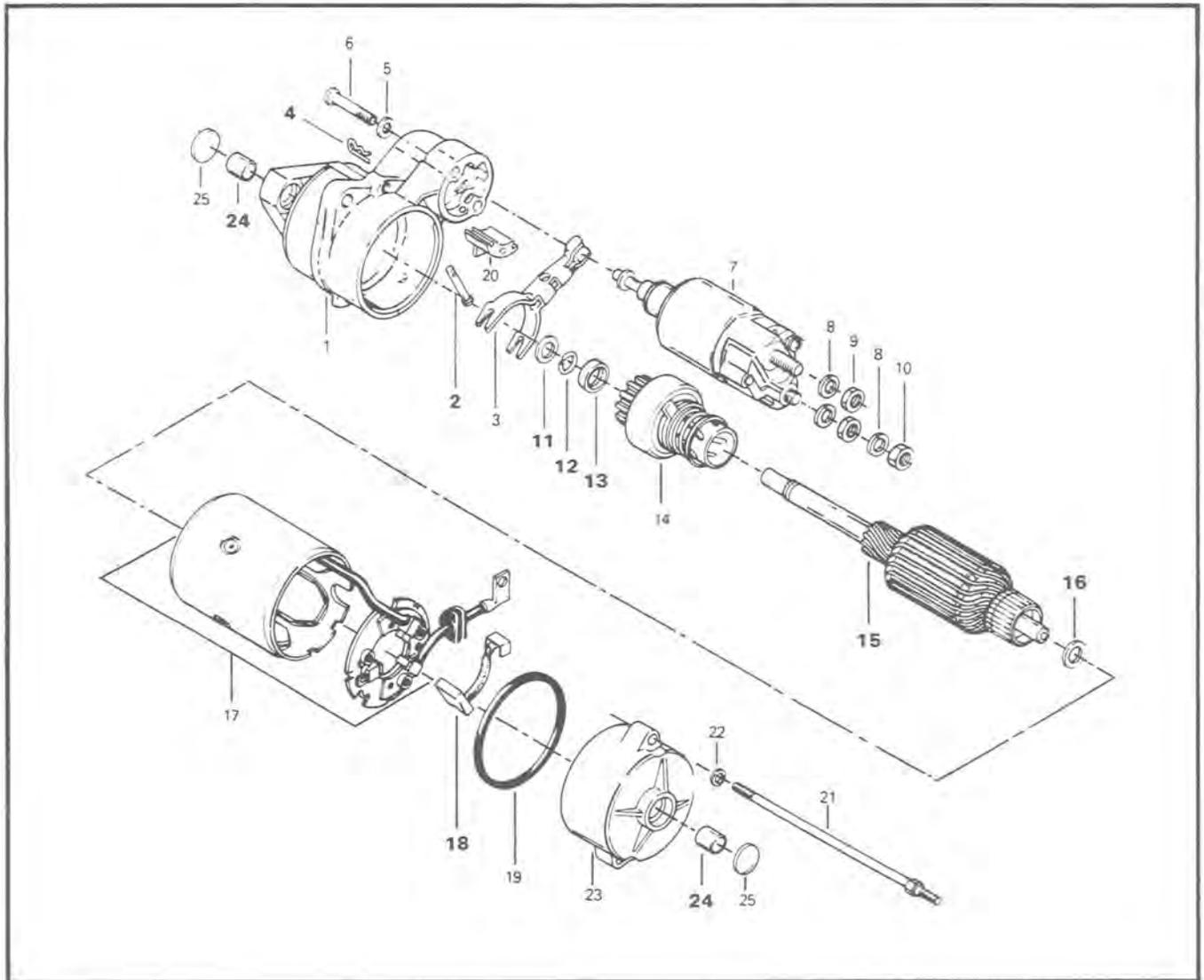
▼ **CAUTION:** Ensure that neither the positive or the negative cables touch the muffler.

TROUBLE SHOOTING:

Symptom	Cause	Remedy
Discharged or weak battery	<ul style="list-style-type: none">*1. Faulty rectifier2. Faulty charging coil3. Loose or bad ground connections4. Battery poles and/or cable terminals oxidized5. Faulty battery (cracked casing, damaged or loose posts)	<ul style="list-style-type: none">1. Replace rectifier2. Replace charging coil3. Tighten cable terminals4. Clean battery posts and cable terminals5. Replace battery

* To test the charging system, disconnect positive cable at the battery, install an ammeter between cable and battery post. If the reading indicates that the charging system operates normally, check items 2, 3 and 4.

ELECTRIC STARTER



1. Drive housing assembly
2. Drive lever set pin
3. Pinion drive lever
4. Snap pin
5. Lockwasher
6. Magnetic switch screw
7. Magnetic switch
8. Lockwasher 8 mm
9. Hexagonal nut 8 mm
10. Hexagonal nut 8 mm
11. Shim
12. Snap ring
13. Clutch stop collar

14. Clutch
15. Armature
16. Washer
17. Yoke
18. Brush
19. Rubber packing
20. Rubber seal
21. Through bolt
22. Lockwasher
23. End frame
24. Bushing
25. Bushing cover

SECTION 04 ELECTRICAL
SUB-SECTION 05 (ELECTRIC STARTER)

REMOVAL

Disconnect black cable ground connection from battery. Disconnect red battery cable and red and green wire from solenoid switch. Remove starter.

DISASSEMBLY & ASSEMBLY

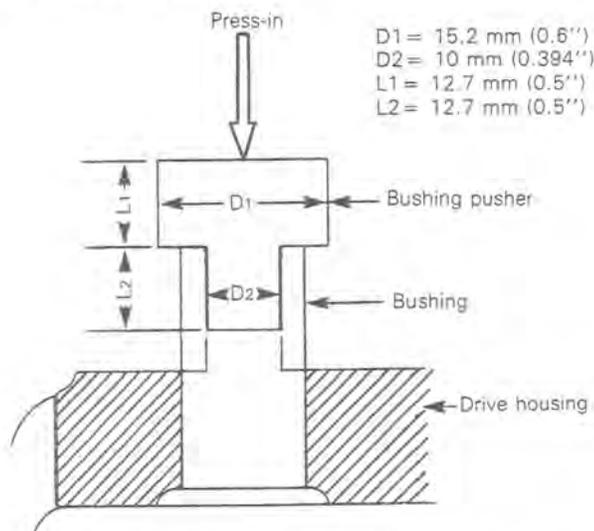
CAUTION: To carry out some of the following procedures, it is necessary that special equipment be available. If you do not possess such equipment, either replace the damaged components or have the parts overhauled in a workshop equipped with proper tooling.

24, Bushings

Check the wear on bushings by measuring the amount of side play between the armature shaft and the bushings.

The side play should not exceed 0.20 mm (0.008"). If excessive, replace the bushing. To replace a bushing, press out the old one and press in a new one with a bushing pusher. The correct size of the bushing pusher to use is given in the illustration below.

NOTE: It may be required to ream the new bushing to obtain proper fit.



2,4, Drive lever set pin & snap pin

To pull out the armature with overrunning clutch assembly and the drive lever from the drive housing, remove the hair pin and pull out the drive lever set pin.

11,15,16, Shims, armature & washer

Note the number and the position of the washers and shims located at both ends of the armature. An end play of 0.050 to 0.35 mm (0.002 — 0.014") should exist between armature and end housing.

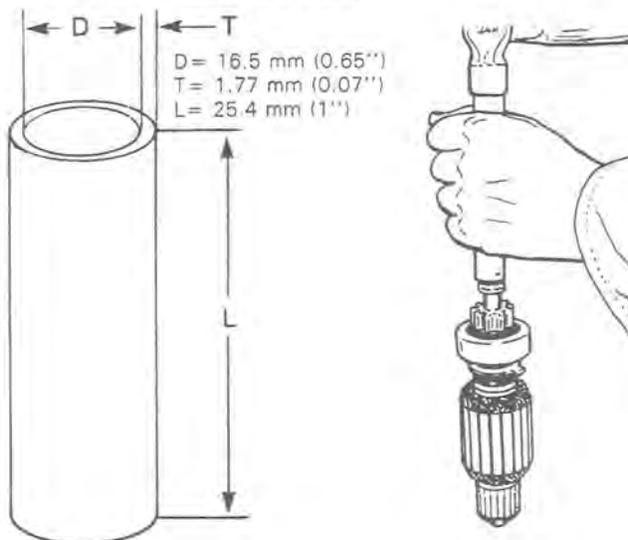
12,13, Snap ring & clutch stop collar

To remove the clutch stop collar from the armature, make a tool similar to the illustration below.

First push the clutch stop collar towards the clutch.

Take off snap ring.

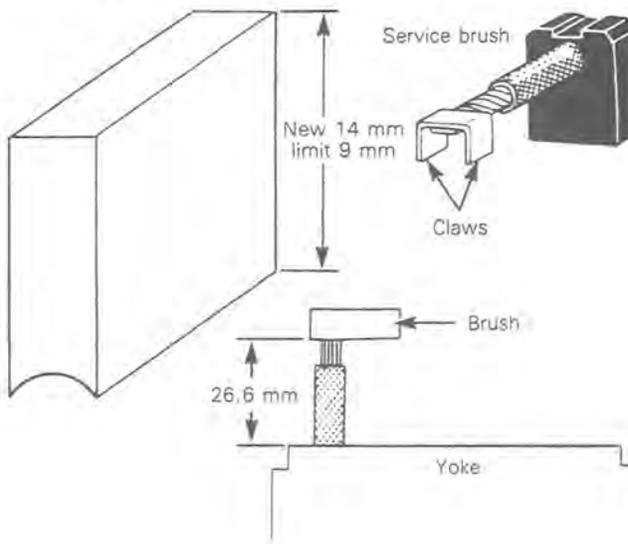
Drive out the clutch stop collar.



18, Brushes

Check the brushes length if less than 9 mm (0.350"), replace the brushes. (A new brush is 14 mm (.550") long).

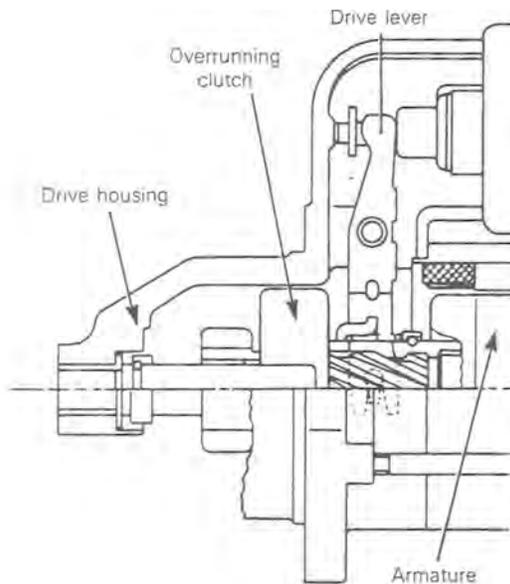
To replace a brush, cut off the old brush from the yoke and insert the remaining brush lead on the yoke between the claws of the new brush. Solder it in place. Cover the soldered portion with the tube on the new brush lead. Standard brush lead length is 26.6 mm (1.05").



For assembly, follow the disassembly procedure in the reverse order, paying attention to the following.

Coat the sliding surfaces and moving portions of the armature splines, overrunning clutch, bushings and the solenoid switch plunger with multipurpose grease (water, climate and coldness resistant).

Reinstall the drive lever as illustrated below,



When reassembling the yoke to the drive housing align the embossment on the yoke with the notch pin on the drive housing.

When reassembling the brush holder to the yoke align the embossment on the brush holder with the notch on the yoke.

○ NOTE: Make sure to reinstall the same number of shims on the armature at the place noted during disassembly.

When reassembling the commutator end frame to the brush holder align the notch on the commutator end frame with the pilot embossment on the brush holder.

CLEANING

▼ CAUTION: Armature starter yoke ass'y and drive unit assembly must not be immersed in cleaning solvent.

Clean brushes and holders with a clean cloth soaked in solvent. Brushes must be dried thoroughly with a clean cloth.

Blow brush holders clean using compressed air.

Remove dirt, oil or grease from commutator using a clean cloth soaked in suitable solvent. Dry well using a clean, dry cloth.

Clean engine starter gear teeth and drive unit (clutch).

○ NOTE: Bearing bushing of the drive unit must not be cleaned with grease dissolving agents.

Immerse all metal components in cleaning solution. Dry using a clean, dry cloth.

INSPECTION

Armature

○ NOTE: For the following testing procedures, the except for the one concerning the shorted windings in the armature.

Check the commutator for roughness, burnt or scored surface. If necessary, turn the commutator in a lathe, enough to remove grime only.

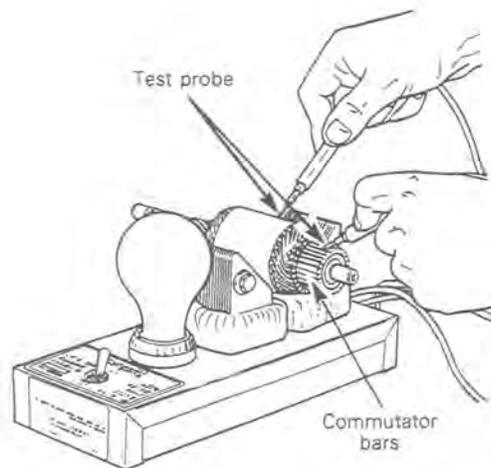
Check the commutator out-of-round condition with V Blocks and an indicator. If the commutator out-of-round is more than 0.40 mm (.016"), the commutator should be turned on a lathe.

Check the commutator for mica depth. If the depth is less than 0.20 mm (0.008"), undercut the mica. Be sure that no burrs are left and no copper dust remains between the segments after the undercutting operation is completed.

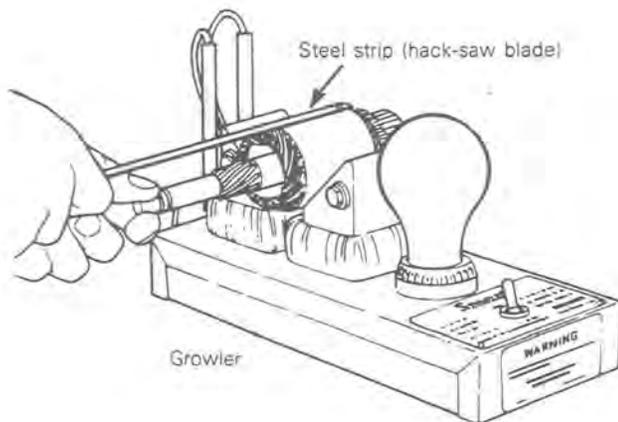
SECTION 04 ELECTRICAL

SUB-SECTION 05 (ELECTRIC STARTER)

Test for ground circuit in the armature using growler test probes. Check between armature core and the commutator bars. If growler lamp turns on, bars are grounded.



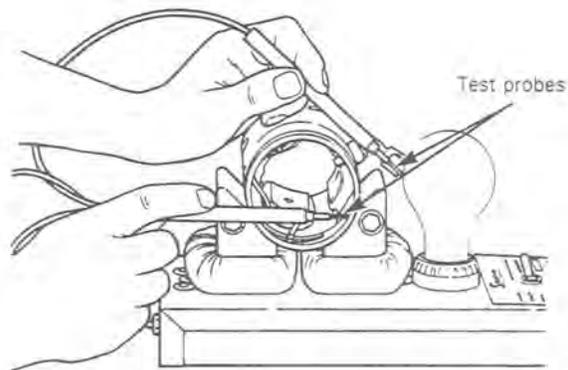
Test armature for shorted winding using a growler. When the armature is rotated in the growler with a steel strip (hack-saw blade) held above it, the strip will vibrate over that area of the armature which has short circuited.



Test the armature for open circuit using growler test probes. Place one test probe on a commutator bar and the other test probe on the neighboring bar. Repeat this operation for all bars, moving one test probe at a time. If the growler lamp does not turn on, the armature circuit between these two (2) bars has an open circuit. The armature should be replaced or repaired; open circuits most often occur at the commutator riser where coils are soldered. (Burnt commutator bars are usually an indication of an open-circuited armature coil.)

Field windings and brushes

Test the field winding for open circuit using growler test probes. Place one test probe on the negative brush and the other test probe on the yoke. If growler lamp does not turn on, the field winding has an open-circuit. The yoke has to be repaired or replaced.



Check the dynamic brake winding for open circuit by placing one test probe on the positive brush and the other probe on the negative brush.

If growler lamp does not turn on, the winding circuit is open-circuit and the yoke has to be repaired or replaced.

Brush holder

Check the brush holder for insulation performance using growler test probes. Place one test probe on the insulated brush holder and the other test probe on the brush holder plate. If the growler lamp turns on, the brush holder has poor insulation and has to be repaired or replaced.

Check the brush spring tension with a spring scale. This should be done by placing the brush holder into position in the armature with brushes resting on the commutator. The tension reading should be made when the spring has just come off the brush.

The spring tension should be from 850.5 — 1162.3 grams (30-41 oz).

Overrunning clutch

The pinion of the overrunning clutch should turn smoothly in the counter-clockwise direction, and should not slip in a clockwise direction with the armature fixed. If it is defective, replace.

Check the pinion teeth for wear and damage. If defective, replace.

INSTALLATION

Make sure that starter and engine mating surfaces are free of grime. Serious trouble may arise if starter is not properly aligned.

Install starter.

Connect the red battery cable and the red wire to the large terminal of the solenoid. Connect red/green wire to small terminal of solenoid.

Connect black cable to battery.

TROUBLE SHOOTING

Causes of troubles are not necessarily in the starting system (starter) but may be due to a faulty battery, switches, electrical cables and/or connections. Trouble may also be attributed to a malfunctioning of the ignition system and/or fuel system. The following trouble shooting table is limited to the starting system.

◆ WARNING: Short circuiting the electric starter is always a danger, therefore disconnect the ground cable at the battery before carrying out any kind of maintenance on the starting system. Do not place tools on battery.

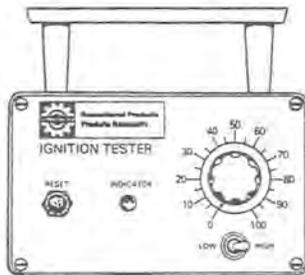
SYMPTOM	CAUSE	REMEDY
Starter does not turn.	Poor contact of starter switch contact points.	Repair or replace switch.
Starter turns; but does not crank the engine.	Burnt or poor contact of solenoid switch contact disc.	Replace solenoid switch
	Open circuit of solenoid switch pull-in winding.	Replace solenoid switch.
	Open circuit of solenoid switch hold-in winding.	Replace solenoid switch.
	Poor contact of brush.	Straighten commutator and brush.
	Burnt out commutator.	Turn commutator in lathe.
	Commutator mica too high.	Undercut mica.
	Shorted field coil.	Repair or replace yoke.
	Shorted armature.	Repair or replace armature.
	Weak brush spring tension.	Replace spring.
	Worn bushings.	Replace bushings.
	Weak battery.	Recharge battery.
	Shorted battery cell(s).	Replace battery.
	Poor contact of battery terminal(s).	Clean and tighten terminal(s).
Open circuit between starter switch and solenoid switch.	Repair.	
Poor battery ground cable connection.	Clean and tighten.	

SECTION 04 ELECTRICAL
 SUB-SECTION 05 (ELECTRIC STARTER)

<p>Starter turns, but overrunning clutch pinion does not mesh with ring gear.</p>	<p>Worn clutch pinion gear. Defective clutch. Poor movement of clutch on splines. Worn clutch bushing. Worn starter bushing(s). Worn ring gear.</p>	<p>Replace clutch. Replace clutch. Clean and correct. Replace clutch. Replace bushing(s). Replace ring gear.</p>
<p>Starter motor keeps running.</p>	<p>Shorted solenoid switch winding(s). Melted solenoid switch contacts. Starter switch returns poorly.</p>	<p>Replace solenoid switch. Replace solenoid switch. Replace ignition switch.</p>

TESTING PROCEDURE

BOMBARDIER IGNITION TESTER



GENERAL

The Bombardier ignition tester is an electrical energy measuring device capable of measuring the peak energy output of a coil.

The tester is of solid state construction and performs as a comparator. The correct value of energy output is indicated in each test and is then compared with the value taken from the engine being tested.

The energy output is verified by means of a 0-100 scale on the tester. The greater the energy output, the greater value indication on the scale. The indication is in the form of an incandescent lamp that lights when the scale knob is set at the position corresponding to the energy output.

The tester has two input ranges selected by a toggle switch. The **LOW** range is sensitive to AC or DC voltages from 0.5 to 27 volts. The **HIGH** range is sensitive to AC or DC voltages of from approximately 75 to 500 volts.

TEST CONDITION

All tests are performed on the vehicle at cranking speed.

Vigorous cranking against compression causes the flywheel to snap over, raising the output higher than by cranking without compression, therefore, do not remove spark plug.

Test values listed are taken against compression.

Always crank vigorously as in actual starting.

Read all instructions **thoroughly** and as you become familiar with this test instrument it will be possible to test a complete ignition system in a matter of minutes. Always proceed in the following order:

1. Connect tester P and N clip leads as illustrated.
2. Follow test procedure sequence.
3. After every test that lights the indicator lamp, **reset** the indicator circuit by depressing the reset button.

ANALYSIS OF TEST RESULTS

Indicator lamp lights at specific setting

Output is as specified. Test results should repeat three times. If readings do not repeat, output is erratic and cause should be investigated (loose connections or components, etc.).

Indicator lamp lights at lower setting

This indicates that the output is less than that designed to operate in a satisfactory manner. However, before coming to the conclusion of a faulty condition be certain that correct engine cranking conditions were met before condemning the ignition.

Indicator lamp does not light

One component is defective. Proceed as instructed to find defective component.

Intermittent ignition problems

In dealing with intermittent problems there is no easy diagnosis. For example, problems that occur only at normal engine operating temperature have to be tested under similar conditions.

In most cases of temperature and/or vibration failure, only parts replacement can solve the problem as most of these failures return to normal when engine is not running.

Double trouble

There is always the possibility of more than one faulty parts. If after a component has been replaced, the problem still persists, carefully repeat the complete test procedure to find the other faulty part.

SECTION 04 ELECTRICAL SUB-SECTION 06 (TESTING PROCEDURE)

ANALYSER TEST AND MAINTENANCE

A test simulator is provided with each tester as a means to test the lamp, detector circuit, and batteries.

High scale test

- a) Place switch in **HIGH** position. Plug the simulator into an electric outlet (117 VAC) for ten seconds.

CAUTION: After charging, do not touch plug terminals while pressing test button. A mild shock will result.

- b) Remove the simulator from the outlet, and connect the "P" and "N" leads from the tester to the simulator as indicated on the button of the simulator.
- c) Set the tester dial to 50, or below. Depress the button of the simulator. The indicator lamp on the tester should light.

NOTE: For each test performed by the simulator, it must be recharged.

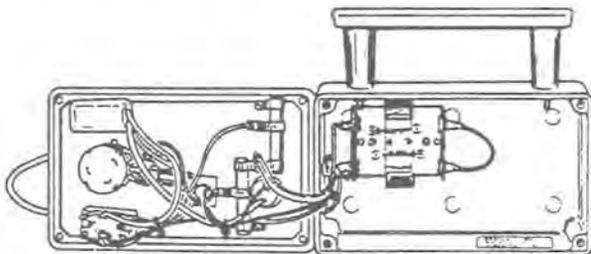
Low scale test

- a) Place switch in **LOW** position.
- b) Set tester dial to 50, or below.
- c) Connect **N** lead to negative terminal of 12 volt battery. Connect **P** lead to positive terminal of 12 volt battery; indicator lamp should light.

If lamp does not light, check tester batteries. If they are installed correctly and are good, check the clip leads for faulty connections. If no fault can be found, refer to the warranty statement for instructions for sending the tester back to Electro-Specialties, Inc.

Battery replacement

1. Remove the four (4) screws securing cover to case.
2. Carefully lift cover.
3. Replace batteries with size "C" Alkaline batteries. Be sure to observe polarity markings on battery holder or lamp will not light.



4. Carefully install cover on case being certain that no wires are pinched between cover and case. Secure cover.

NOTE: Weak batteries will not impair tester operation or calibration. The light will glow dim.

The ignition tester may give false readings if the rivets on the back cover come in contact with metal.

Indicator knob alignment

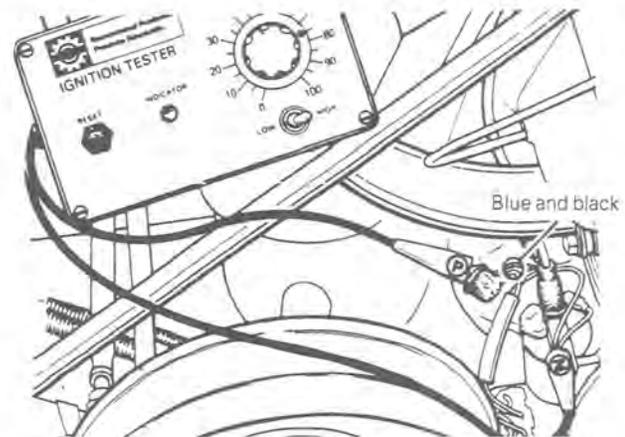
Check indicator knob alignment by turning knob fully clockwise. The white mark on the knob must align with no. 100 on the scale. If the marks does not line up with the no. 100, loosen the knob set screw, line the mark on the knob with no. 100, and tighten the set screw. Re-check alignment.

NOTE: If after adjustment, the knob is turned fully counter-clockwise and it does not exactly align with the 0, it is of no consequence.

ONE CYLINDER ENGINES (247 engine type)

1. Generator coil output

- 1) Disconnect blue and black wires from terminal (15) of ignition coil.
- 2) Attach tester **P** lead to **blue and black** wires previously disconnected. Connect tester **N** lead to a good engine ground.



- 3) Set tester dial and switch as follows:

Engine type	Switch position	Dial
247	HIGH	75

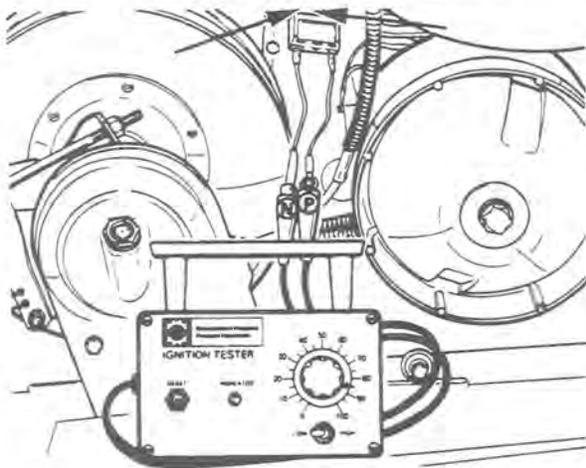
- 4) Turn ignition key to ON position, disable emergency cut-out button circuit and tether cut-out switch then crank engine.
 - a) **Indicator lamp lights:** Coil output is up to specifications. Repeat test at least three (3) times to verify reading and check for consistency.
 - b) **Indicator lamp does not light:** Coil output is below specifications. This could be caused by a faulty coil or breaker points. Check breaker points condition and adjustment, and correct as necessary. Repeat test. If lamp still does not light the coil is defective and should be replaced.

2. Lighting coils output (247 engine type)

NOTE: There are two independent coils; main (large) coil wires are yellow and yellow/black while brake light coil (small) wires are green and green/black.

- 1) Disconnect wiring harness junction block at engine.
- 2) Connect tester leads as illustrated using two (2) harness adaptors.

large coil: yellow and yellow/black wires
small coil: green and green/black (or ground) wires



- 3) Set tester dial and switch as follows:

Engine type	Switch position	Dial
247	LOW	85

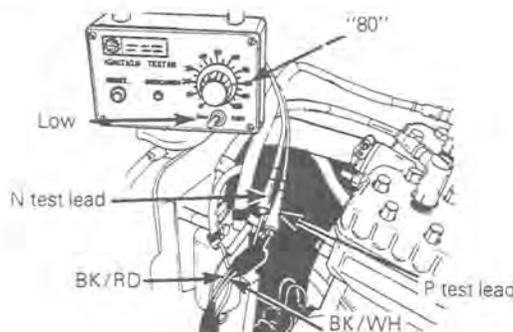
- 4) Crank engine.
 - a) **Indicator lamp lights:** Coil output is up to specifications. Repeat test at least three (3) times to verify reading and consistency.
 - b) **Indicator lamp does not light:** Coil is faulty.

277, 377, 447, 462, 503, 534 CDI SYSTEMS VERIFICATION

1. High speed charging coil

- 1) Disconnect wire connectors from C.D.I. electronic box harness at engine.
- 2) Connect tester P test lead to black/white wire and connect tester N test lead to black/red wire at the magneto harness.

(TYPICAL)



- 3) Set tester switch and dial as follows:

Engine type	Switch position	Dial
277,377,447, 462,503,534	LOW	80

- 4) Turn ignition key to ON position, set cut-out switch and tether cut-out switch to OFF position then crank engine.

WARNING: To prevent powerful electric shocks when engine is running, do not touch any components related to electronic ignition system (ignition coil, high tension wire, wire harness, etc...).

- a) **Indicator lamp lights:** Coil output is up to specifications. Repeat at least three (3) times to verify reading and consistency.
- b) **Indicator lamp does not light:** The problem is a faulty high speed charging coil.

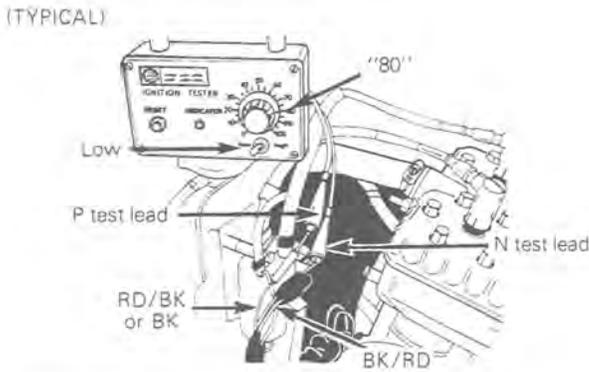
WARNING: Do not touch tester P lead clip while cranking the engine. Also make sure that tester leads do not touch any metallic object.

SECTION 04 ELECTRICAL
SUB-SECTION 06 (TESTING PROCEDURE)

2. Low speed charging coil

- 1) Disconnect wire connectors from C.D.I. electronic box harness to engine.
- 2) At the magneto harness, connect tester P test lead to:
 *462 (140W 4-4P): RD/BK wire
 277, 377, 447, *462 (160W 4-5P), 503, 534: BK wire and connect tester N test lead to black/red wire.

*To find out the difference between 140W (4-4P) and 160W (4-5P) look in section 02 sub-section 05 pages 92,93.



3) Set tester switch and dial as follows:

Engine type	Switch position	Dial
277,377,447, 462,503,534	LOW	80

4) Turn ignition switch to ON position, set cut-out switch and tether cut-out switch to OFF position then crank engine.

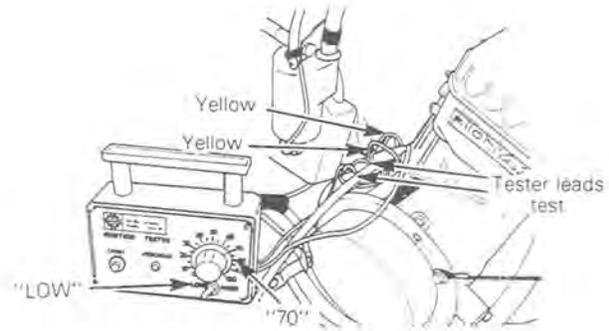
WARNING: To prevent powerful electric shocks when engine is running, do not touch any electronic ignition components (ignition coil, high tension wire, wire harness, etc...).

- a) **Indicator lamp lights:** Low speed charging coil is up to specifications. Repeat test at least three (3) times to verify reading and check for consistency.
- b) **Indicator lamp does not light:** Low speed charging coil is faulty.

3. Lighting coil

- 1) Disconnect wiring harness junction block at engine.
- 2) Connect tester P test lead to:
 277,377,447,462,503,534: YL/BK wire and connect N test lead to YL wire.

(TYPICAL)



3) Set tester and dial as follows:

Engine type	Switch position	Dial
277,377,447, 462,503,534	LOW	70

4) Crank engine.

- a) **Indicator lamp lights:** Lighting coil output is up to specifications. Repeat test at least three (3) times to verify reading and consistency.
- b) **Indicator lamp does not light:** Lighting coil is faulty.

C.D.I. PARTS INSPECTION PROCEDURE

Disconnect the connectors of the C.D.I. electronic box, ignition coil and junction block at engine. Check the resistance or continuity between each terminals with an ohmmeter and refer to the following:

PART NAME		WIRE COLOR	RESISTANCE	BOMBARDIER IGNITION TESTER SETTING	REMARKS
MAGNETO	High speed charging coil	BK/WH with BK/RD (A) & (B)	1.4 - 2.6Ω(A) 2.8-4.2Ω(B)	Low 80 (A) & (B)	If the reading is: 0Ω - short circuit ∞Ω - open circuit
	Low speed charging coil	RD/BK with BK/RD (A) BK with BK/RD (B)	125 - 235Ω(A) 120-180Ω(B)	Low 80 (A) & (B)	
	Lighting coil	YL with YL (A) YL/BK with YL (B)	0.09 - 0.2Ω(A) 0.21-0.31Ω(B)	Low 70 (A) & (B)	
IGNITION COIL	Primary	BK with WH/BL (A) & (B)	0.23 - 0.43Ω (A) & (B)	N.A.	
	Secondary winding	High tension wire with high tension wire (C) (F)	2.45 - 4.55KΩ(C) 3.0-5.6 KΩ (D)	N.A.	
	Insulation	WH/BL with core (A) BK with core (B)		N.A.	
WH/BL with high tension wire (A) BK with high tension wire (B)		∞ Ω	N.A.		

(A): 462 engine type

(B): 277, 377, 447, 503, 534, engine type

(C): all except 277 engine type

(D): 277 engine type only

(E): 377 and 503 engine type

(F) for 277 engine type, the secondary winding resistance reading is between the high tension wire and the coil ground.

N.A.: not applicable

BOMBARDIER CDI CHECKER



SPECIFICATION AND CONSTRUCTION

Specification

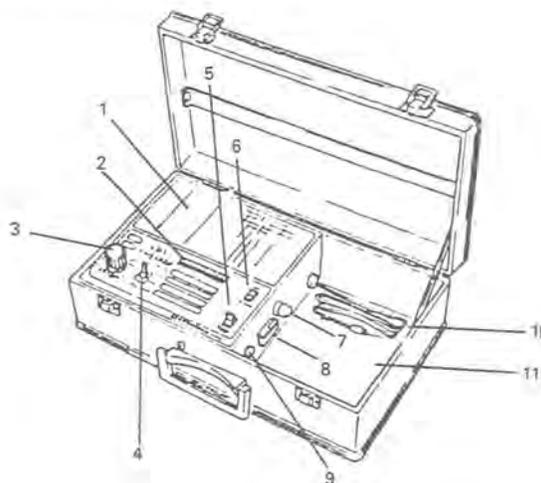
Power source:	AC 115 volts/60 Hz
Power consumption:	Less than 50 watts
Ambient temperature:	-10°C to 40°C (for usage) -30°C to 60°C (for storage)
Dimensions:	370 (H) x 230 (W) x 120 (D)
Weight:	Approx. 4.0 kg
Standard accessories:	Test wire harness A, B and C Grounding wire

Construction

GENERAL

The Bombardier CDI checker is a feature for the verification of the NIPPONDENSO CDI systems. This checker combines the function of all test equipments into one checker, and it tests all NIPPONDENSO systems under actual operating conditions with one set of connections. All test results are digitized and will show on the LED level indicator which is calibrated from 0 to 9. You can diagnose the CDI system by comparing the test results with the diagnostic chart.

○ **NOTE:** The Bombardier CDI checker is only applicable to the Nippondenso CDI systems used on the Bombardier recreational products.



1. Diagnostic chart
2. LED level indicator
3. Selector
4. HI & LO switch
5. START & RESET switch
6. Power switch
7. Fuse box
8. Test wire harness connector
9. Grounding wire connector
10. Power cord
11. Accessories box

Precautions & safety

- a) Do not give a shock to the checker.
- b) Never touch the connector terminals when the power switch is on position.
- c) Before connecting the test wire harness, be sure that the engine is stopped.
- d) Use the checker under the specified temperature. (-10°C to 40°C).
- e) Connect the power cord to the recognized power source. (AC 115 volts/60Hz).
- f) When spark test, do not touch the high-tension cable. A mild shock will result. Hold high-tension cable by an insulator.

Test items

CODE NUMBER	IGNITION TYPE	ENGINE TYPE	TEST ITEM
1	4-4P (Harness A)	*462	Generator coil (HI & LO) Control unit Spark test
2	4-5P (Harness B)	277,377,447, *462,503,534	Generator coil Control unit diode Control unit Spark test

*To find out the difference between 140W (4-4P) and 160W (4-5P) look in section 02 sub-section 05 pages 92,93.

This checker tests the following items:

TEST	CHECK POINT	APPLICABLE	
		CODE NO.	IGNITION TYPE
Generator coil test	HI	1,2	4-4P 4-5P
	LO	1,2	4-4P 4-5P
Control unit test	Output of control unit	1,2	4-4P 4-5P
Control unit diode test	Check of control diode in control unit	2	4-5P
Spark test	Check of ignition spark	1,2	4-4P 4-5P

SECTION 04 ELECTRICAL

SUB-SECTION 06 (TESTING PROCEDURE)

Generator coil test (HI and LO)

This test is performed on the vehicle at cranking speed. The two generator coils are called high and low speed generator coils. The checker indicates the output of these coils by switching HI and LO positions as follows.

HI: Output of high speed generator coil

LO: Output of high and low speed generator coil

Analysis of this test is diagnosed by its level.

Control unit test

The CDI checker inputs alternative current into the control unit instead of the generator coil.

The output of the control unit will be indicated on the LED level indicator. Analysis of this test is diagnosed by its level.

Control unit diode test (for 4-5P ignition type, 277, 377, 447, *462 (160W 4-5P), 503,534)

The control unit includes the diode which controls the output of the generator coil according to the engine speed. This checker can diagnose this diode. The result will be indicated on the LED level indicator.

Spark test

Using an ignition coil equipped on the vehicle, this tester can cause the spark across the high-tension wire and engine body.

○ NOTE: This checker cannot check the following items.

- Lighting coil output
- Control unit diode of 4-4P ignition type (*462 engine type)

*To find out the difference between 140W (4-4P) and 160W (4-5P) look in section 02 sub-section 05 pages 92,93.

○ NOTE: For lighting coil test, refer to the Bombardier Ignition tester procedure.

BEFORE TESTING

To prevent engine from starting and erroneous indication on the LED level indicator, remove the spark plug(s).

▼ CAUTION: To prevent dust or foreign matter from being introduced inside the cylinder(s) when cranking the engine install a clean rag over the cylinder head.

Connect the power cord to the power source (115 volts AC/60Hz).

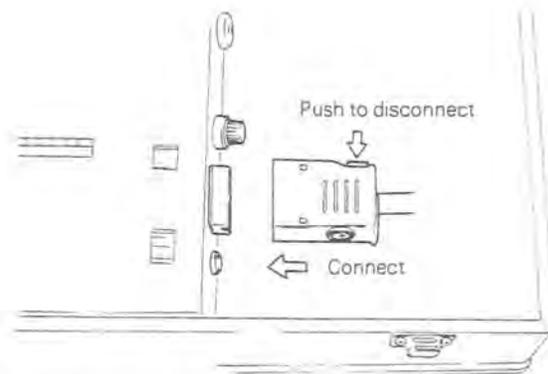
▼ CAUTION: To prevent any damage to the checker, do not try other power source than the above mentioned one and ensure that the checker is installed on a plane surface, away from vehicle vibrations.

CONNECTION OF TEST WIRE HARNESS

a) Choose the right test wire harness according to the following.

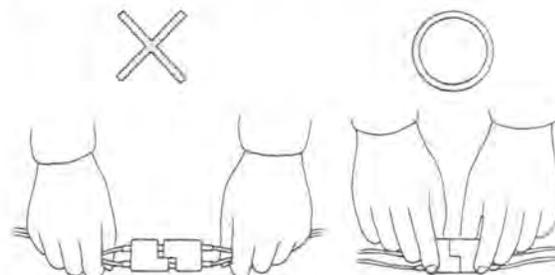
CODE NO.	IGNITION TYPE	ENGINE TYPE	TEST WIRE HARNESS
1	4-4P	462	A
2	4-5P	277,377,447, 462,503,534	B

b) Connect the test wire harness to the checker aligning the arrow marks.



c) Disconnect the connectors of magneto and control unit.

▼ CAUTION: Never pull the wire harness to disconnect.



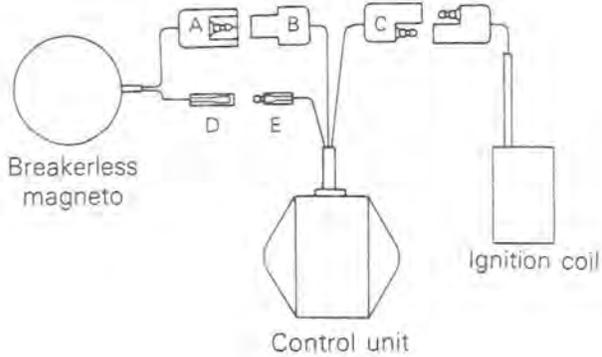
d) Securely connect the connectors of test wire harness.

▼ CAUTION: When connecting, be sure that the test wire harness does not interfere with moving part of engine.

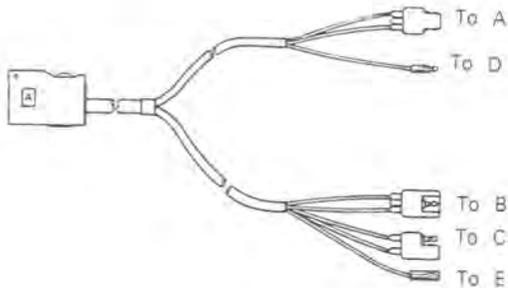
SECTION 04 ELECTRICAL
SUB-SECTION 06 (TESTING PROCEDURE)

4-4P ignition type engine (*462, 160W, 4-4P)

(Vehicle wiring)

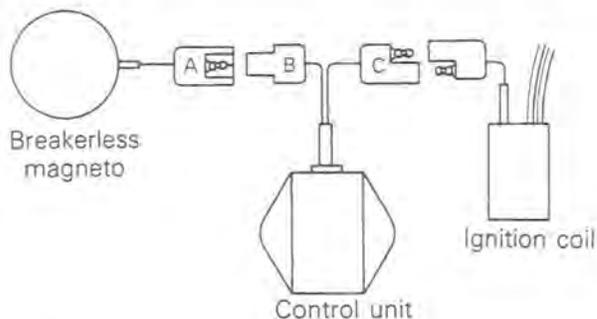


(Test wire harness) A

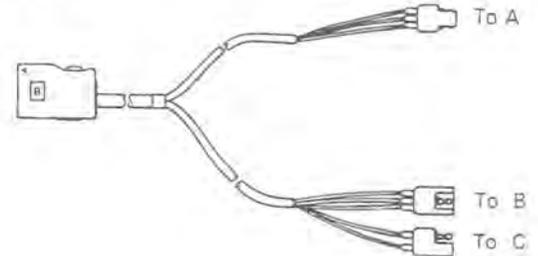


4-5P ignition type engine (277, 377, 447, *462, (160W, 4-5P), 503, 534)

(Vehicle wiring)



(Test wire harness) B



NOTE: The harness © supplied in the kit is only applicable to the Can-Am 504 engine type. For complete 504 engine type testing procedure, refer to the appropriate Can-Am Shop Manual. The harness A is also applicable to older engine types 354 and 454 equipped with a Nippondenso CDI system.

TEST

a) Turn the power switch on. Then one LED or two LEDs will light to indicate the checker is operating. Reset the indication circuit by depressing the reset switch, then one LED will remain to indicate the checker is operating.

NOTE: After every test when the LED level indicator holds its indication a few minutes, reset the indication circuit by depressing the reset switch.

b) Set the selector to the desired position.

c) Perform each test.

NOTE: When cranking the manual starter type engine, perform it repeatedly.

d) If the test results are over or lower than the limit, see "Analysis of test".

NOTE: Test results should be repeated two or three times. If reading does not repeat, output is erratic and cause should be investigated. (Loose connection of components, etc.).

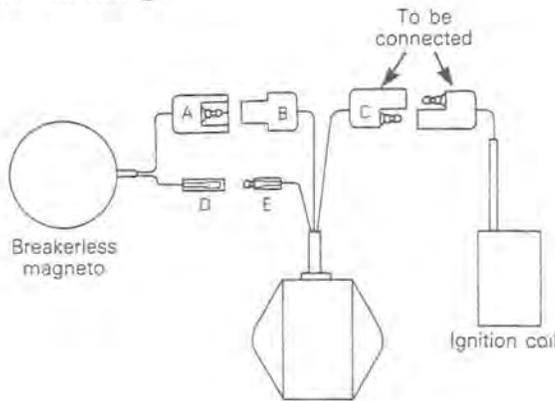
*To find out the difference between 140W (4-4P) and 160W (4-5P) look in section 02 sub-section 05 pages 92,93.

SECTION 04 ELECTRICAL
SUB-SECTION 06 (TESTING PROCEDURE)

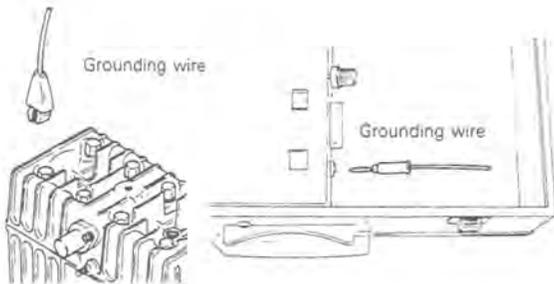
SPARK TEST

- a) Before performing this test, ensure that the control unit and the control unit diode (if applicable) have been checked.
- b) Disconnect the checker from the connector of the control unit output side (originally connected to the ignition coil).

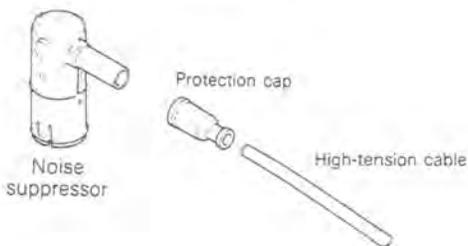
(Vehicle wiring)



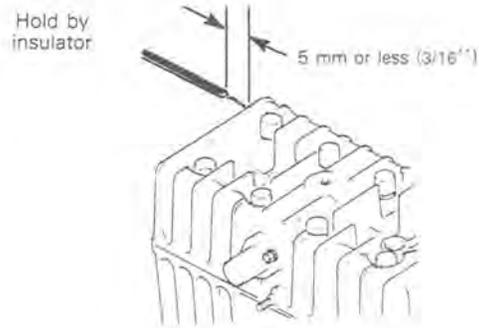
- c) Connect the ignition coil connectors to the control unit connectors.
- d) Connect the grounding wire to the checker and to a bare surface of the engine.



- e) Set the selector to CONTROL UNIT position.
- f) Remove the noise suppressor and the protection cap from the end of high-tension wire.



- g) Keep the distance 5 mm (3/16") or less between bare surface of the engine and end of high-tension cable and depress the START SWITCH. Then spark will take place between them.



WARNING: Do not touch the high tension wire while doing this procedure. Hold high tension wire with an insulator.

Generator coil test

- a) This test should be performed at both HI & LO switch positions. Switch LO position and set the selector to GENERATOR COIL position.
- b) Crank the engine and read the LED level indicator. Reading should be:
 - for 4-4P: from 2 to 8
 - for 4-5P: from 2 to 8
- c) Switch to HI position and repeat procedure. Reading should be:
 - for 4-4P: from 3 to 8
 - for 4-5P: from 2 to 8

Control unit test

- a) To perform this test, switch can be at LO or HI position.
- b) Set the selector to CONTROL UNIT position.
- c) Depress START switch for 5 seconds minimum and read LED level indicator. Reading should be:
 - for 4-4P: from 4 to 5
 - for 4-5P: from 4 to 5

Control unit diode test

NOTE: This test is applicable only to 4-5P ignition systems.

- a) Set the selector to CONTROL UNIT DIODE position. Then, four or five LEDs will light. If four or five LEDs do not light, check the power source and that the selector and switches are positioned correctly.
- b) Depress the START switch and read LED level indicator. Reading should be:
for 4-5P only: from 6 to 8

ANALYSIS OF TEST RESULT

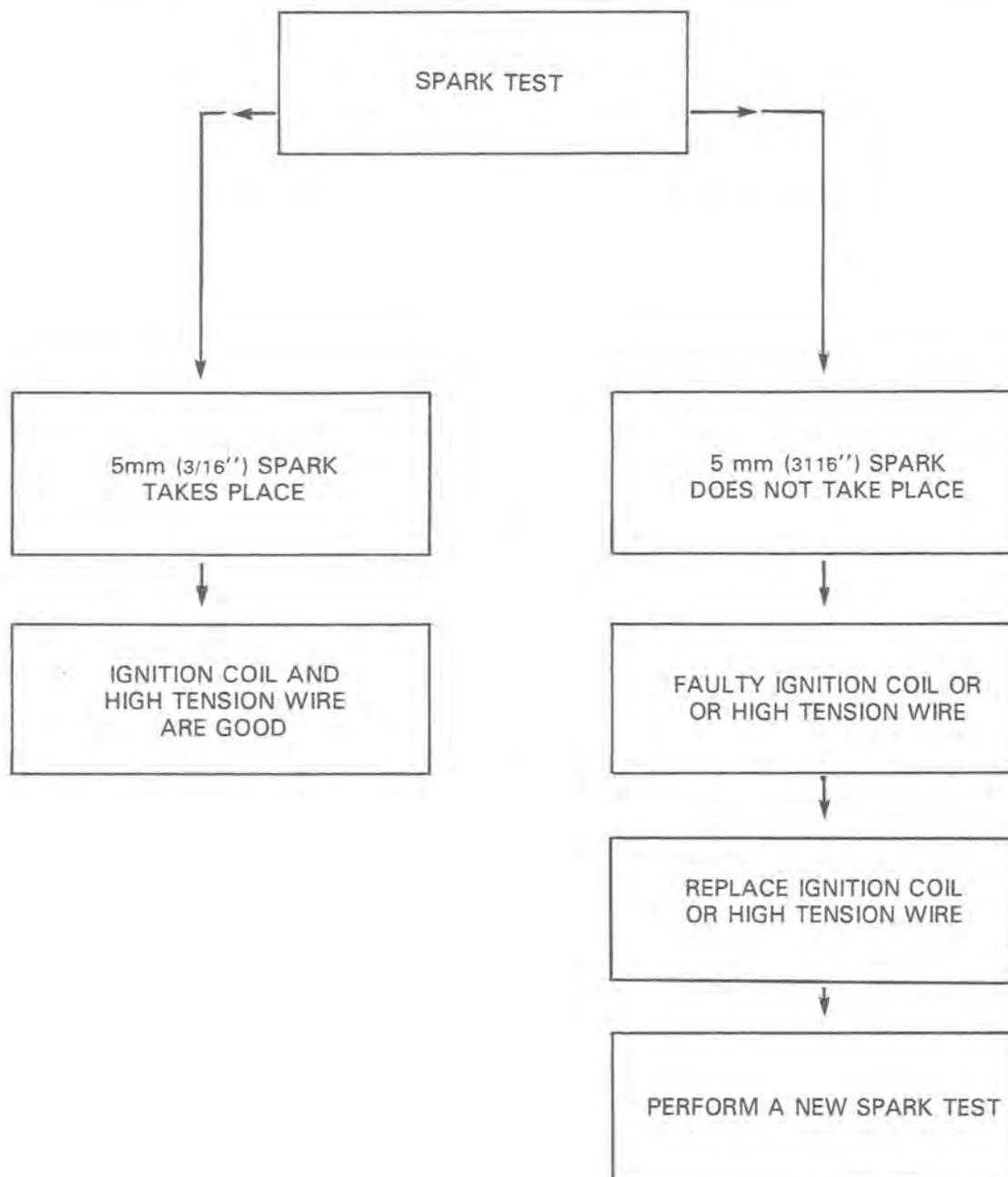
After every test, perform the diagnosis comparing with the diagnostic chart as shown in below.

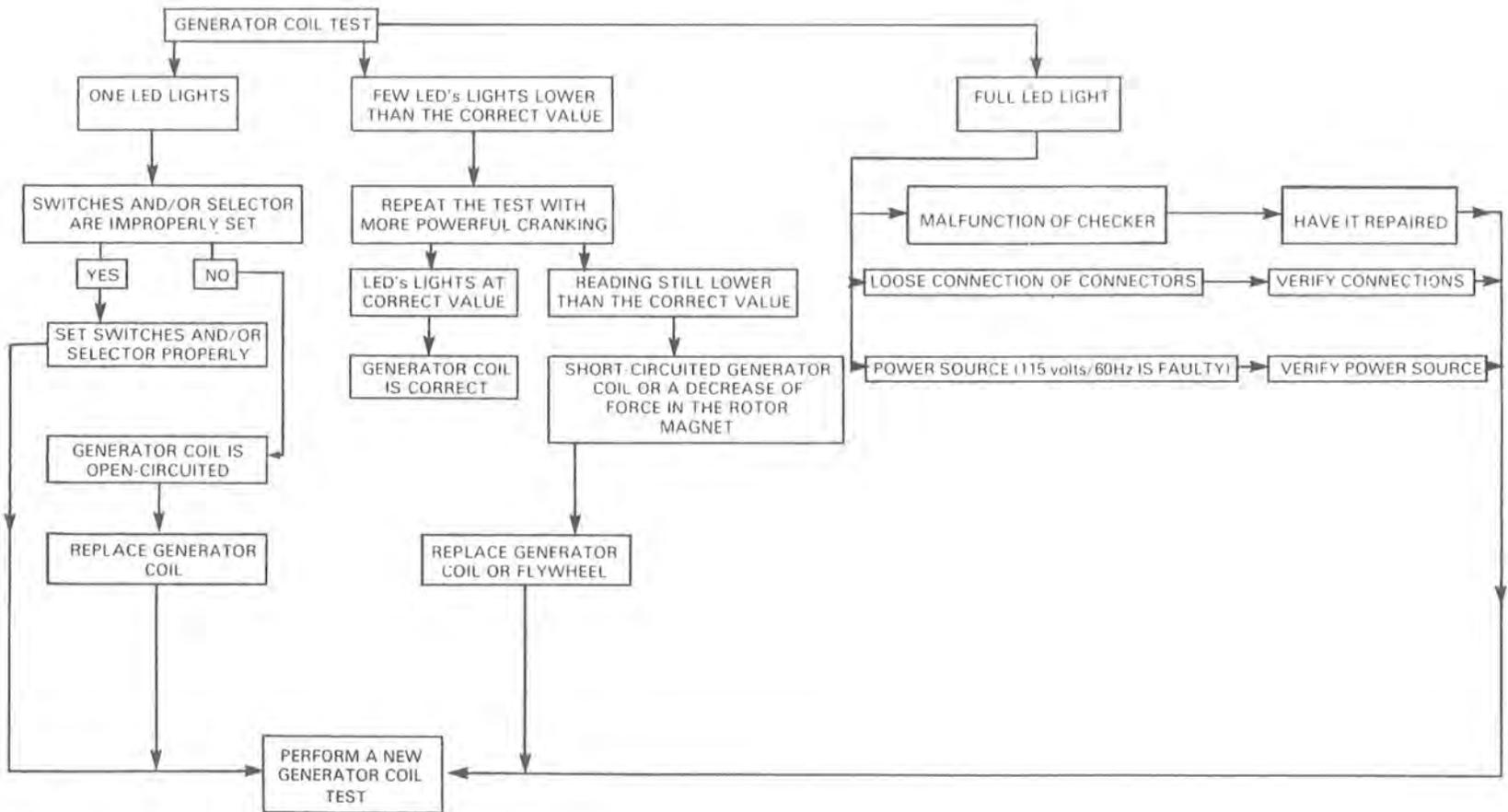
CODE NO.	IGNITION TYPE	CHECK PART		LEVEL INDICATOR										HARNESS	ENGINE TYPE	
				0	1	2	3	4	5	6	7	8	9			
1	4-4P	Generator coil	HI												A	*462
			LO													
		Control unit														
2	4-5P	Generator coil	HI											B	277,377,447 *462,503,534	
			LO													
		Control unit														
		Control unit diode														
				0	1	2	3	4	5	6	7	8	9			

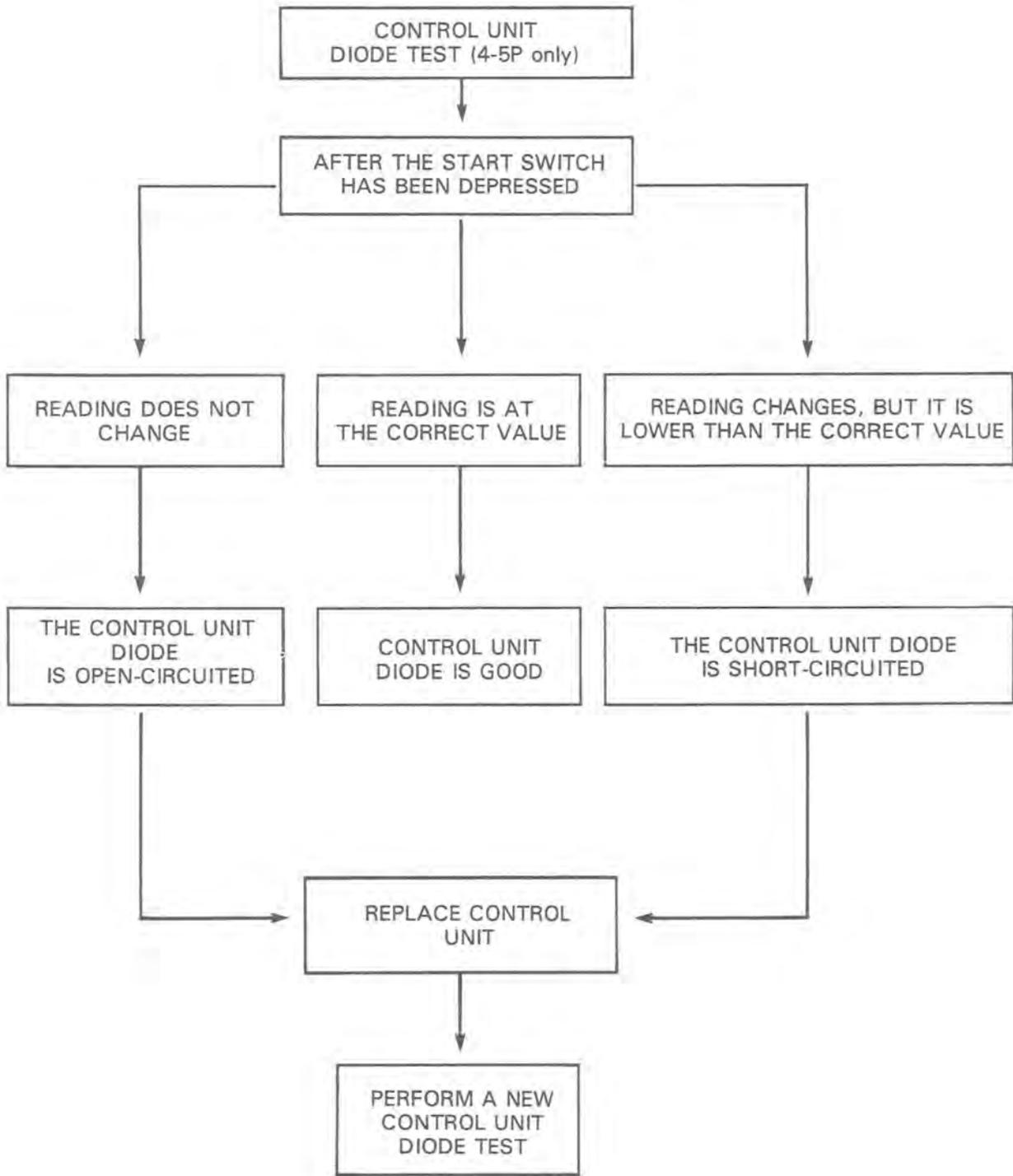
If the reading of the LED level indicator is higher or lower than the correct value (OK zone), refer to "Analysis of test result" as described hereafter.

*To find out the difference between 140W (4-4P) and 160W (4-5P) look in section 02 sub-section 05 pages 92,93.

TROUBLE SHOOTING CHART – NIPPONDENSO CDI SYSTEMS



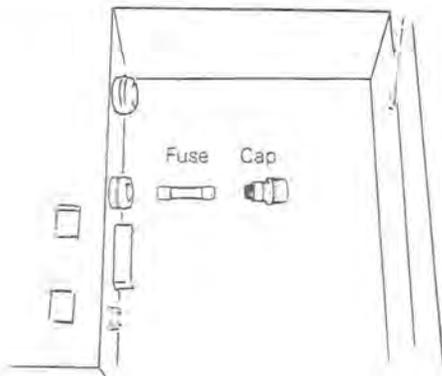




FUSE REPLACEMENT

If no LED lights, check fuse provided in checker.

- a) Unscrew the cap.
- b) Replace the fuse with new one (1 amps Midget glass tube type, \varnothing 6.4 x 30 mm) if necessary.



REPAIR AND AFTER-CARE SERVICE

In the event of a failure or fault calling for repair, contact Nippondenso Canada Ltd. It is strictly prohibited that the user should disassemble the instrument. Be aware that some semiconductors may be damaged even by static electricity stored in the human body.

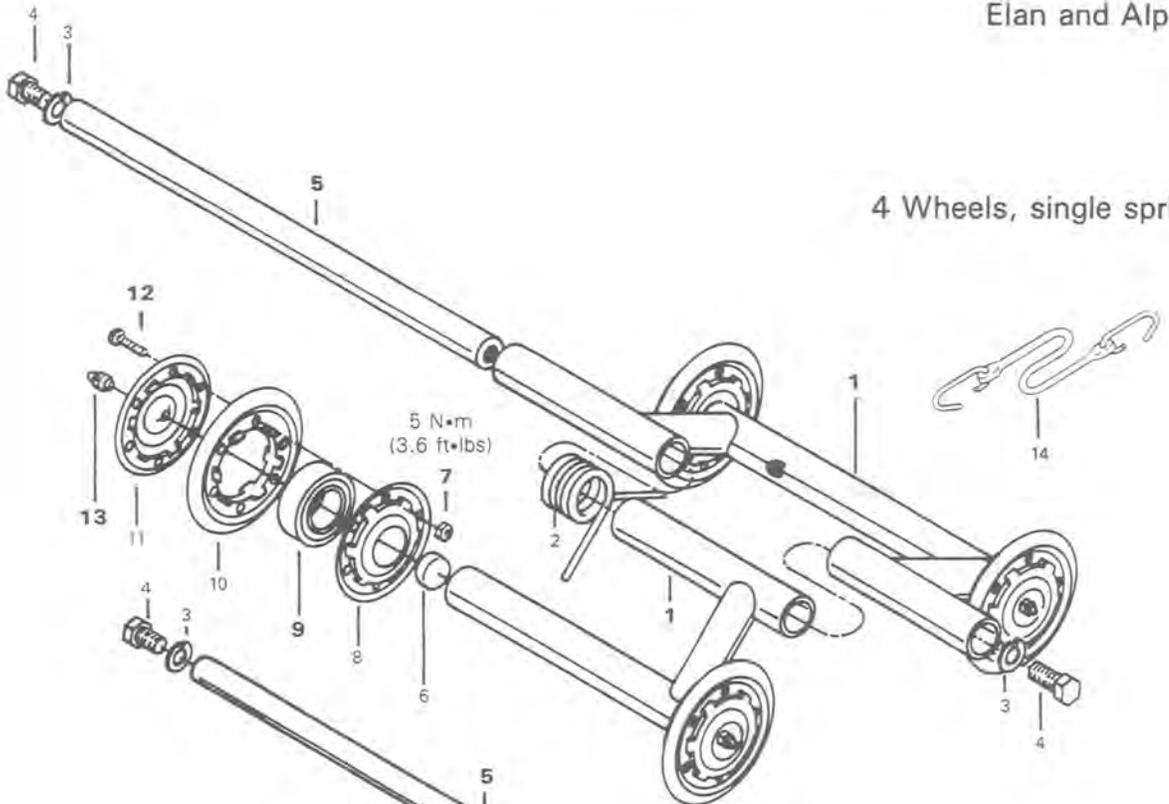
Also, contact Nippondenso Canada Ltd, for the supply of accessories.

Nippondenso Canada Ltd.
4500 Sheppard Avenue East, Unit 29
Agincourt, Ontario
Canada (M1S 3R6)

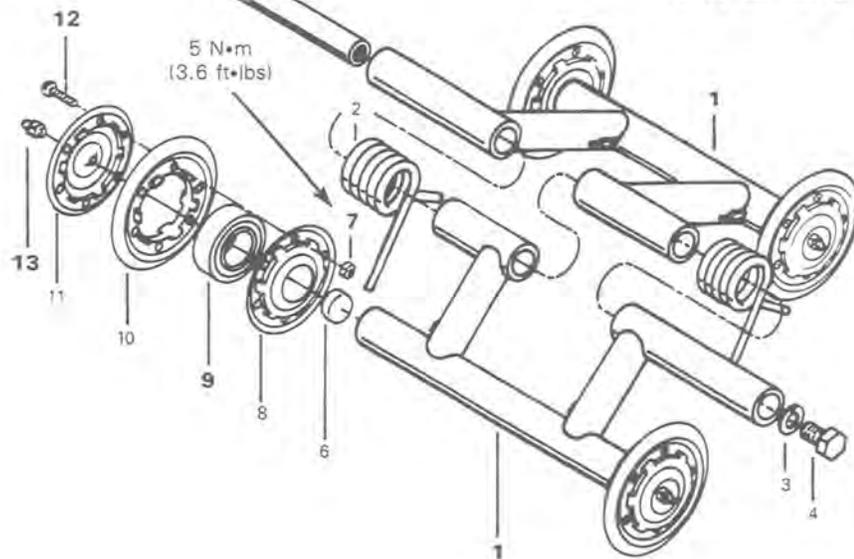
BOGIE WHEELS

Elan and Alpine

4 Wheels, single spring



4 Wheels, 2 springs



SECTION 05 SUSPENSION

SUB-SECTION 01 (BOGIE WHEELS)

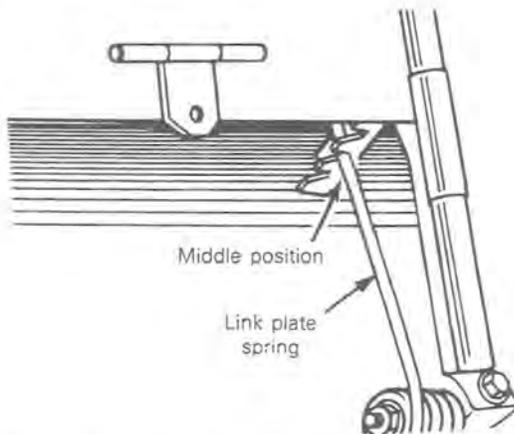
1. Wheel support
2. Spring
3. Lock washer (cross shaft)
4. Cap screw (cross shaft)
5. Cross shaft
6. Grease cap
7. Nut (flange)

8. Inner flange
9. Bearing
10. Wheel tire
11. Outer flange
12. Bolt (flange)
13. Grease fitting
14. Elastic band

REMOVAL

Raise and block rear of vehicle off the ground.

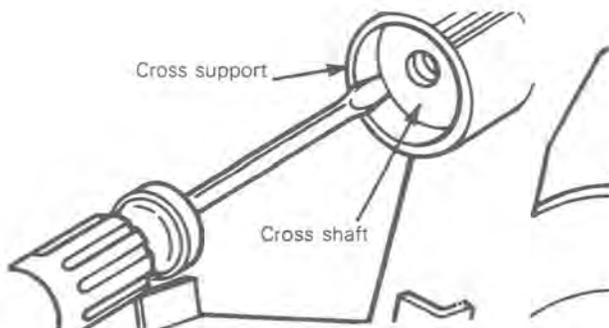
Release track tension by unlocking the link plate springs using an appropriate tool.



3,4,5, Lockwashers, cap screws & cross shafts

Starting at center bogie wheel set, remove bolts and lock washers securing cross shaft to frame.

NOTE: To prevent the cross shaft from rotating within the cross support, wedge a screwdriver blade between the cross shaft and cross support.



Remove bogie wheel set.

NOTE: Since spring diameter may vary depending upon actual installation location, it is important to identify the installation of each bogie wheel set. Observe this position when reinstalling sets.

Repeat operation for remaining bogie wheel sets.

DISASSEMBLY & ASSEMBLY

1, Wheel support

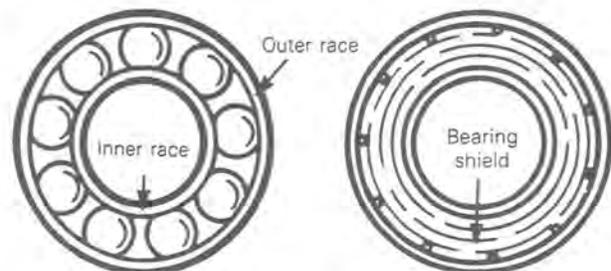
Heat spring anchor on wheel support before attempting to open or close anchor.

5, Cross shafts

Clean, then lubricate cross shaft with low temperature grease before installation.

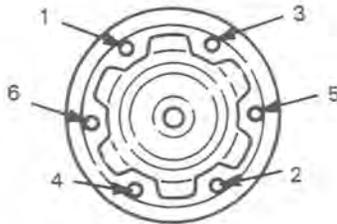
1,9, Wheel support & bearing

Always pull or push bearing by inner race. When installing bearing on wheel support, position bearing shield towards inner flange, then press down until bearing is sitting flush with support end.



7,12, Flanges nuts & bolts

Bogie wheels are factory riveted. When separation is necessary, remove rivets securing wheel tire and flanges by using a 3/16" dia. drill. Secure flanges and tire using bolts and nuts tighten in the following sequence to 5 N•m (3.6 ft•lbs).



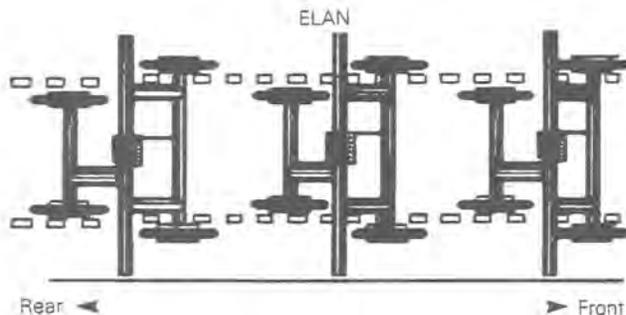
Torque sequence

INSTALLATION

3,4,5, Lock washers, cap screws & cross shafts

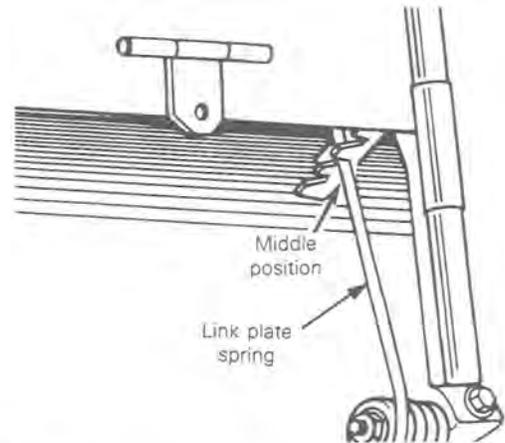
With rear of vehicle supported off the ground, position front bogie wheel set in location and secure to frame using lock washers and cap screws. Secure rear set then remaining set(s) to frame.

- NOTE: On Elan models, put the wider portion of bogie wheel to the front direction of vehicle.



Using an appropriate tool, apply track tension by hooking the link plate springs into the anchors.

- NOTE: If applicable, place spring ends in middle position of the 3 position slotted anchor.



1,14, Wheel support & elastic band

On Alpine models it is necessary to place an elastic band between rear tube of front bogie and front tube of rear bogie. This will prevent center bogies from tipping up.

Lubricate each bogie wheel until new grease appears at joint. Wipe off excess grease (grease P/N 498 028 100).

- NOTE: To adjust the track tension and alignment refer to section 05-05.

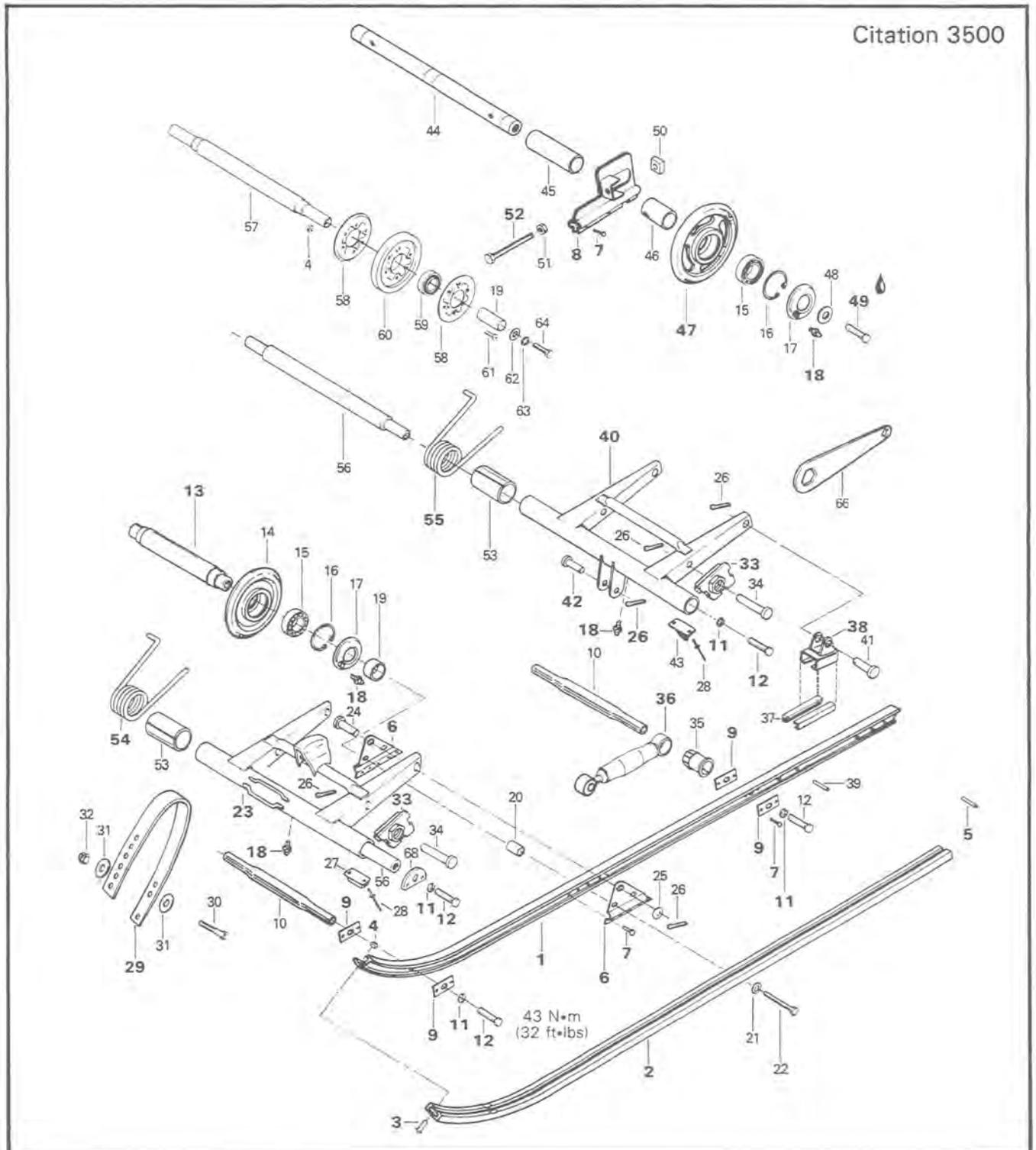
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③

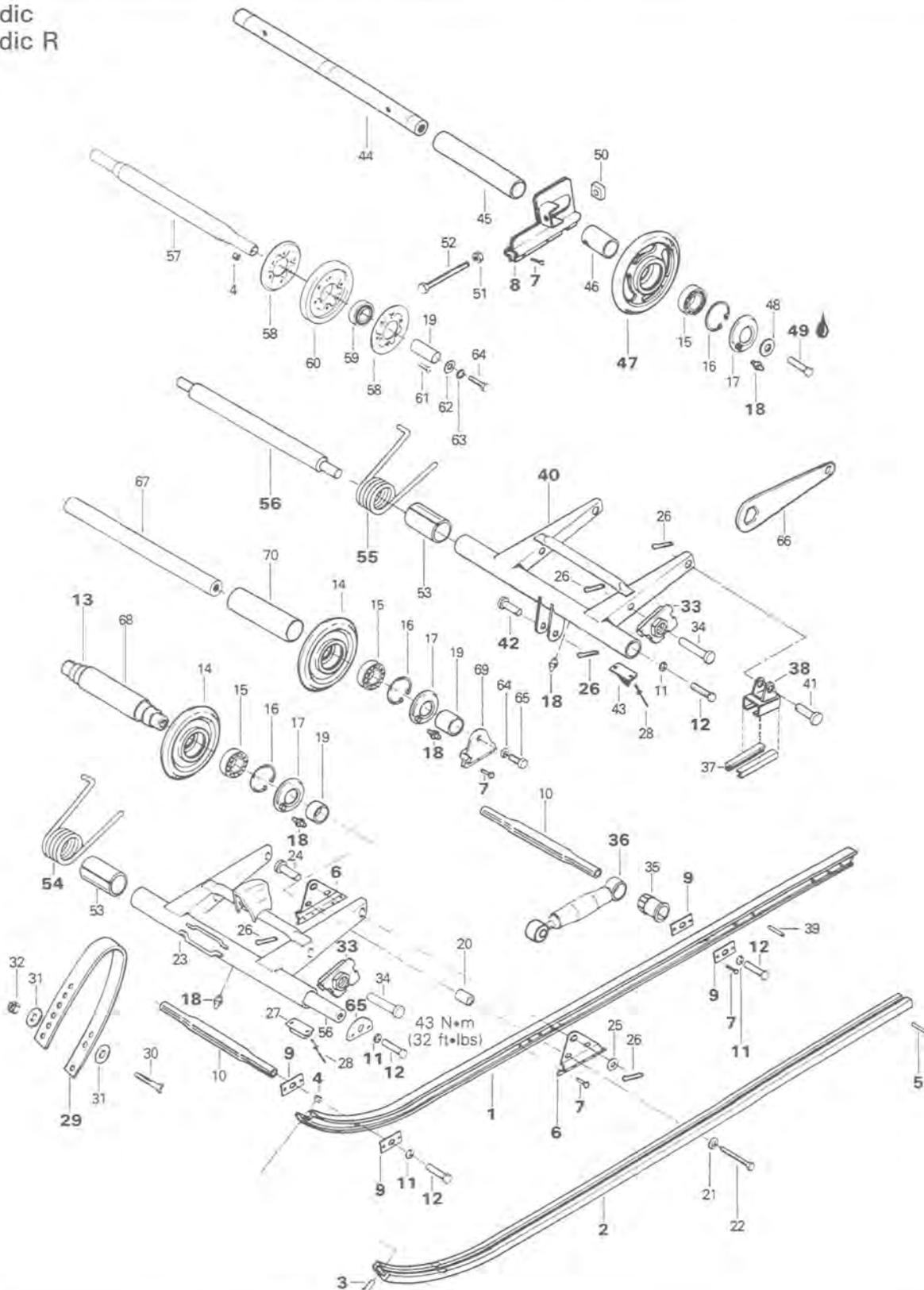
SLIDE, MX AND TRS 6 SUSPENSION

"TORQUE REACTION" TYPE SUSPENSION



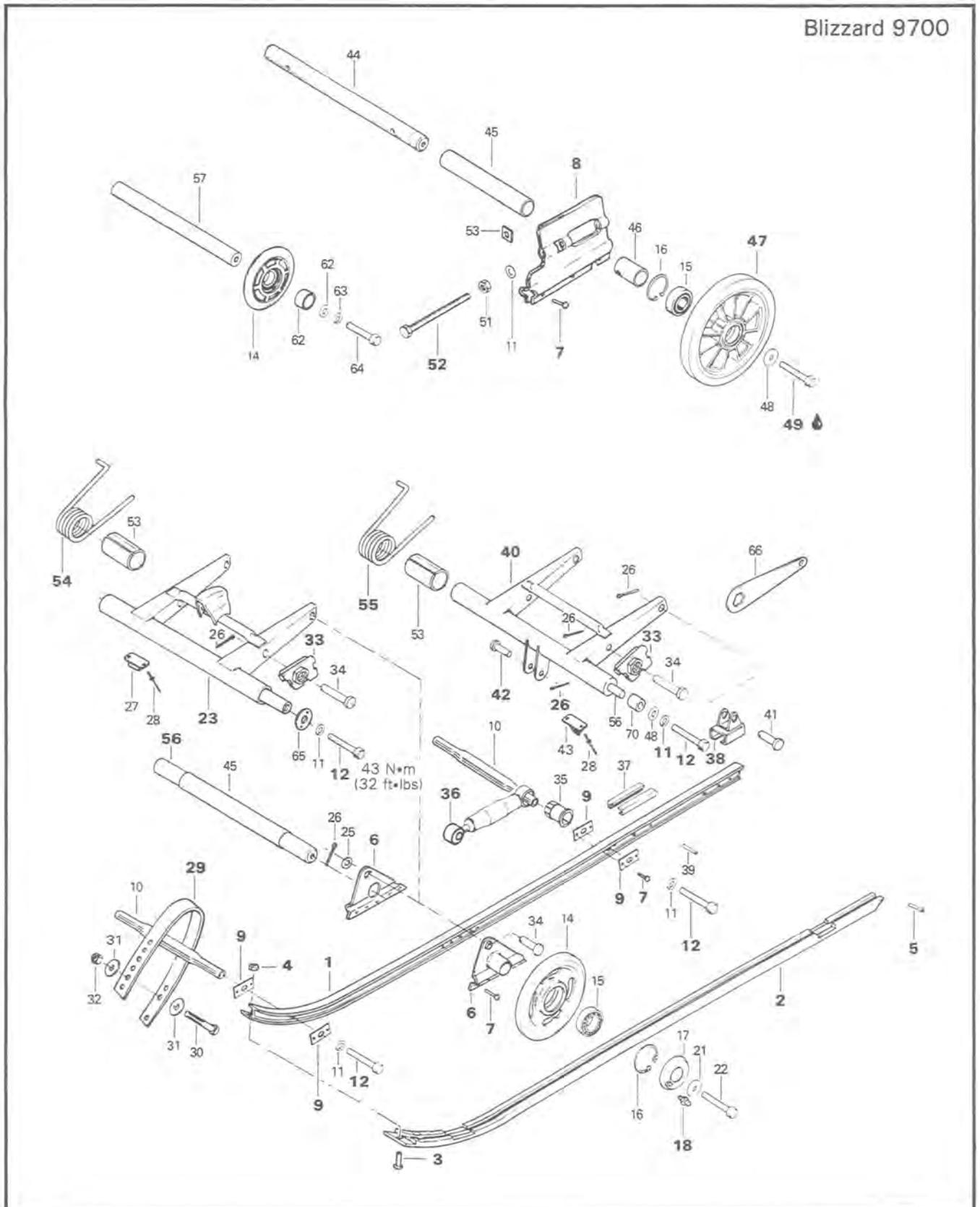
SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

Skandic
Skandic R



SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

Blizzard 9700



SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

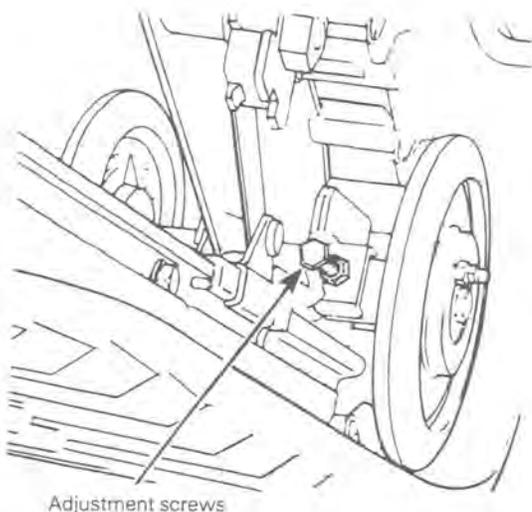
- | | |
|--------------------------|-------------------------|
| 1. Runner | 36. Shock absorber |
| 2. Slider shoe | 37. Slider pad |
| 3. Screw | 38. Slider support |
| 4. Stop nut | 39. Spiral pin |
| 5. Spiral pin | 40. Rear arm |
| 6. Front arm bracket | 41. Clevis pin |
| 7. Rivet | 42. Clevis pin |
| 8. Adjustment plate | 43. Rubber stopper |
| 9. Reinforcement bracket | 44. Rear axle |
| 10. Tube | 45. Tube |
| 11. Lockwasher | 46. Tube |
| 12. Screw | 47. Idler |
| 13. Front idler shaft | 48. Washer |
| 14. Idler | 49. Screw "Loctite 242" |
| 15. Bearing | 50. Nut |
| 16. Retainer ring | 51. Nut |
| 17. Cap | 52. Adjustment screw |
| 18. Grease fitting | 53. Bushing |
| 19. Spacer | 54. Front spring |
| 20. Spacer | 55. Rear spring |
| 21. Lockwasher | 56. Cross shaft |
| 22. Screw | 57. Rear idler shaft |
| 23. Front arm | 58. Flange |
| 24. Clevis pin | 59. Bearing |
| 25. Flat washer | 60. Wheel tire |
| 26. Cotter pin | 61. Screw |
| 27. Rubber stopper | 62. Flat washer |
| 28. Rivet | 63. Lockwasher |
| 29. Stopper strap | 64. Screw |
| 30. Screw | 65. Washer |
| 31. Washer | 66. Wrench |
| 32. Stop nut | 67. Wheel axle |
| 33. Adjustment cam | 68. Spacer tube |
| 34. Clevis pin | 69. Wheel support |
| 35. Busing | 70. Bushing |

REMOVAL

52, Adjustment screws

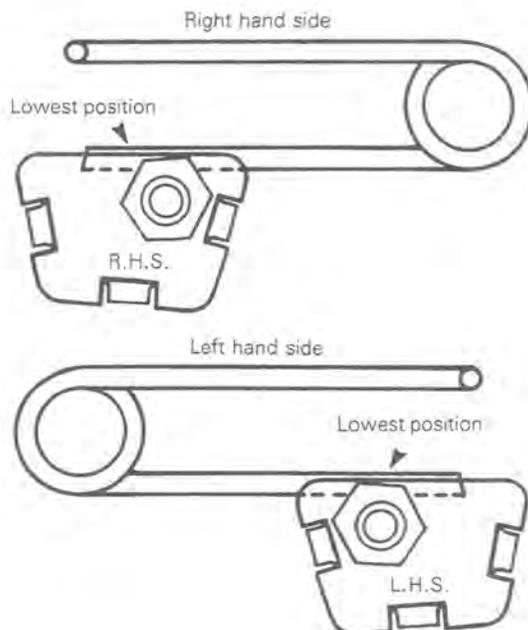
Release track tension by loosening adjustment screws located on inner side of rear idler wheels.

(TYPICAL)



33, Adjustment cams

Position the adjustment cams at the lowest position.



SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

12,56, Screws & cross shafts

Remove the four (4) screws securing front and rear arm to frame.

Remove suspension system.

○ **NOTE:** To prevent cross shaft from turning within the suspension arm, wedge the blade of a small screwdriver between the shaft and suspension arm.

DISASSEMBLY AND ASSEMBLY

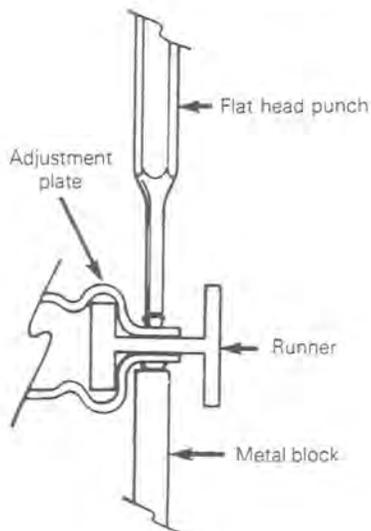
1,2,3,4,5, Runners, slider shoes, screws, stop nuts & spiral pins

To replace a worn slider shoe, remove the rear spiral pin, the front screw and stop nut, then slide the shoe rearwards out of the runner.

7,8, Rivets & adjustment plates

To remove the rivet securing the adjustment plate on the front arm supports, cut off the rivet heads using a cold chisel.

At assembly, position the rivet head on a suitable metal block and hold the assembly firmly in place. With a flat head punch and hammer secure the rivet in place.

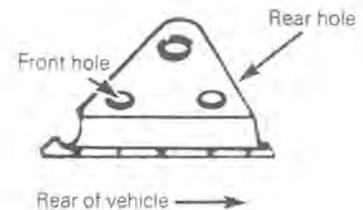


7,9, Rivets & reinforcement bracket

To remove rivet use a 3/16" dia. drill. At assembly secure reinforcement bracket to runner with two (2) 10-32 x 1/2" bolts and nuts.

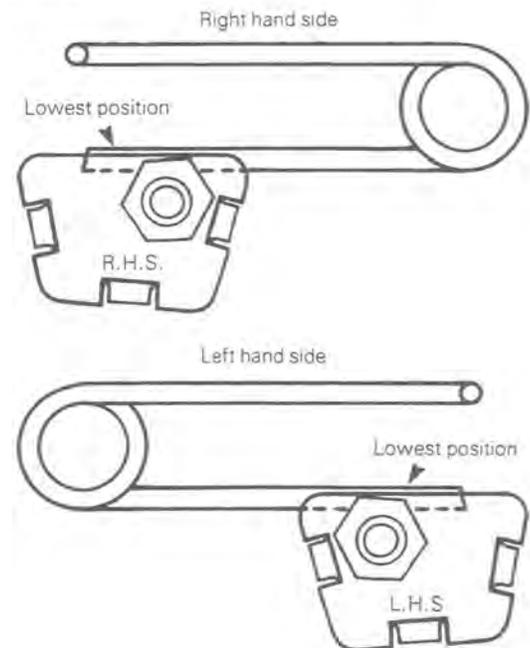
6,13, Front arm bracket & front idler shaft (Citation, Skandic & Skandic "R")

The front idler shaft must be positioned in the front hole of the front arm bracket.



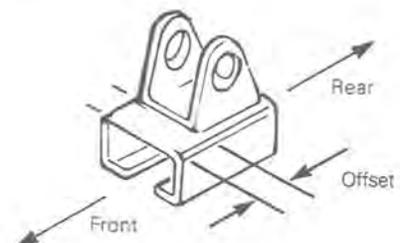
33, Adjustment cams

At assembly, position the adjustment cams at the lowest position.



38, Slider support

Sliding support must be installed with offset toward front.



SECTION 05 SUSPENSION

SOUS-SECTION 02 (SUSPENSION À GLISSIÈRES, MX ET TRS6)

49, Screw & "Loctite 242"

Clean all traces of plastic from threads. Prior to assembly, apply a light coat of "Loctite 242" or equivalent on threads.

54,55, Front & rear springs

Prior to assembly, identify front and rear springs.

Front spring: light blue

Rear spring: white

INSTALLATION

On all slide suspension models, install the suspension ass'y as shown.

Preparation

29, Stopper strap

— Detach the front stopper strap.

24,36,42, Cotter pin, shock absorber and clevis pin

— Remove the cotter pin locking the shock absorber clevis pin and detach the shock absorber by removing the clevis pin.

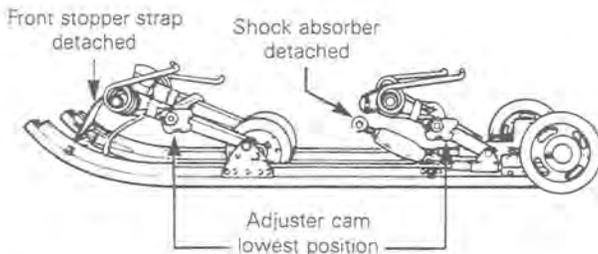
33, Adjustment cam

— Set the adjuster cam to the lowest position and fix the springs with a tape.

47, Rear idler wheel

— Push the rear idler wheel forward.

(TYPICAL)



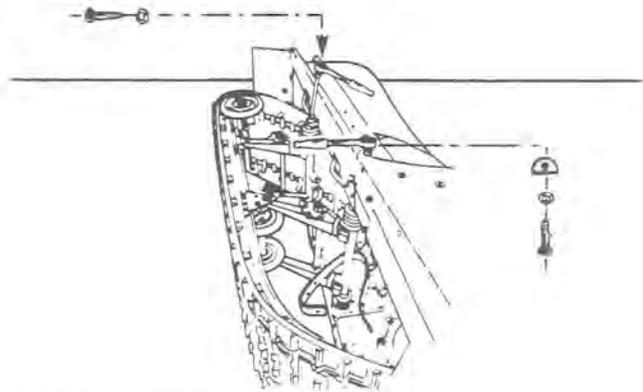
Installation

- Place a cardboard on the floor.
- Plug the chaincase vent hole with a small wire to prevent leaks.
- Tilt vehicle on one side.

23,40, Front & rear arm

— Attach front suspension and the rear suspension arm to the frame. Do not torque.

(TYPICAL)

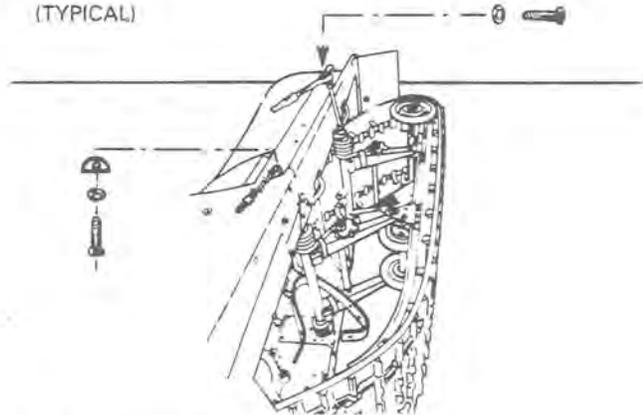


— Tilt the vehicle on the other side.

23,40, Front & rear arm

— Attach the front then the rear suspension arm to frame.

(TYPICAL)



— Reposition vehicle on the ground.

33, Adjustment cams

— Position adjustment cams at the lowest elevation.

12, Screws (front & rear arms)

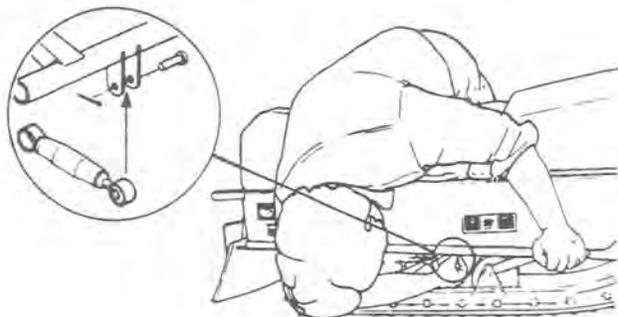
- Torque the four suspension retaining screws to 43 N•m (32 ft•lbs).
- Apply downward pressure on the seat.

26,36,42, Cotter pin, clevis pin & shock absorber

— Secure the extended shock with clevis pin and a new cotter pin.

SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

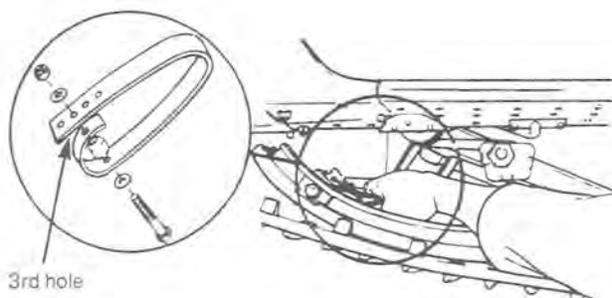
(TYPICAL)



29, Stopper strap

— Attach front stopper strap at 3rd hole. 2nd hole for Skandic.

(TYPICAL)



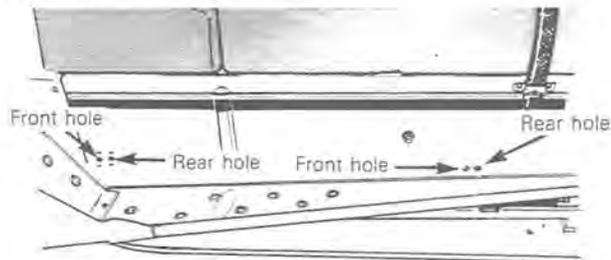
— Remove chaincase vent hole plug.

○ NOTE: On all models, the holes in the frame provide the possibility of locating the suspension arms for easier track tension adjustment 13 mm (1/2") clearance. It means that if the slide suspension adjustment screws are at the maximum adjustment and the suspension arms are at the front holes in the frame, you may move the suspension arms at the rear holes and obtain greater track tension adjustment.

▼ CAUTION: Ensure that suspension arms are at the same position on each side of the frame to avoid any damage to the suspension system and to the track.

▼ CAUTION: Ensure that front and rear suspension arms are at the same position on each end (front, rear) of the frame to avoid any damage to the suspension system and to the track.

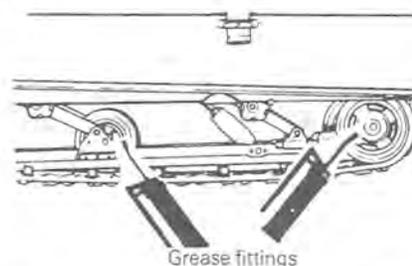
(TYPICAL)



18, Grease fittings

If necessary, lubricate the idler wheels at grease fittings until grease appears at joints. Use low temperature grease only (P/N 498 028 100).

(TYPICAL)

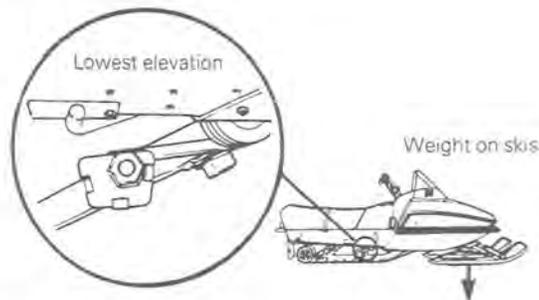


○ NOTE: To adjust the track tension and alignment, refer to section 05-05.

RIDE ADJUSTMENT

The front adjustment cams are used for snow condition, and the rear for driver's weight. The front adjustment cams should be positioned at the highest elevation for deep snow conditions. A lower elevation is preferred when negotiating icy snow.

The rear adjuster blocks should be adjusted to rider preference.

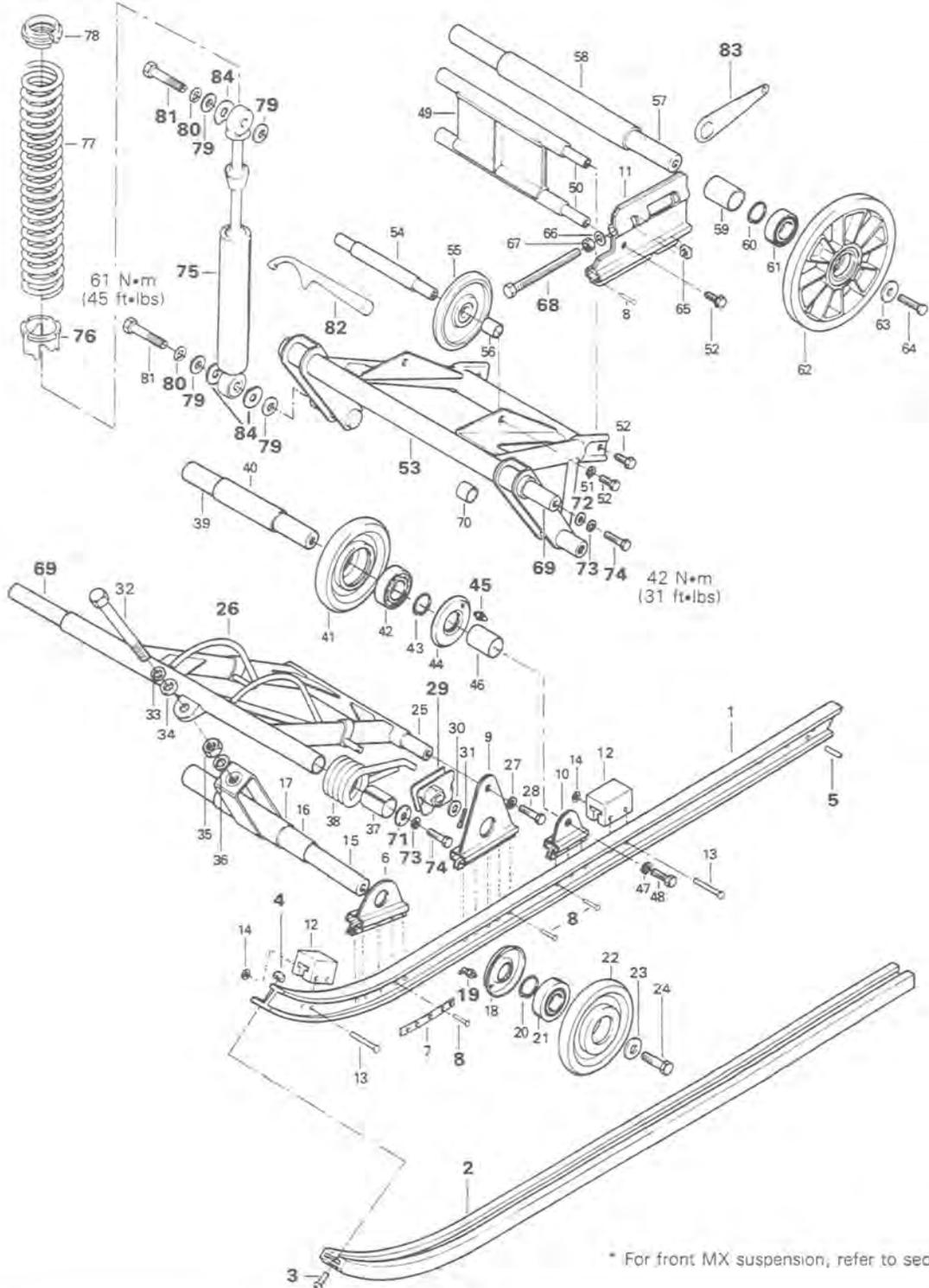


▼ CAUTION: Always turn left side adjustment cams in a clockwise direction, the right side cams in a counter-clockwise direction. Left and right adjustment cams of each adjustment (front and rear), must always be set at the same elevation.

SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

REAR MX SUSPENSION

Blizzard 5500 MX



SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

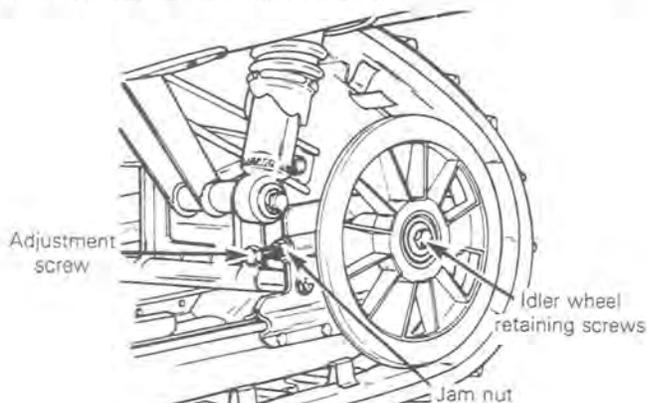
1. Runner
2. Slider shoe
3. Round slotted head machine screw
4. Hexagonal elastic stop nut 10-24
5. Spiral pin
6. Front wheel bracket
7. Reinforcement strip
8. Rivet
9. Front arm support
10. Wheel support
11. R.H. adjustment plate
L.H. adjustment plate
12. Rubber stopper
13. Pin
14. Push nut
15. Cross shaft
16. Spacer tube
17. Stopper bracket
18. Cap
19. Grease fitting
20. Circlip
21. Ball bearing
22. Idler
23. Washer
24. Hexagonal head cap screw
25. Cross shaft
26. Front arm
27. Lockwasher 3/8"
28. Hexagonal head cap screw
29. R.H. adjustment cam
L.H. adjustment cam
30. Flat washer
31. Cotter pin
32. Stopper bolt
33. Flat washer
34. Damper
35. Hexagonal jam nut
36. Lockwasher
37. Bushing
38. R.H. spring
L.H. spring
39. Wheel axle
40. Spacer tube
41. Idler

42. Ball bearing
43. Circlip
44. Cap
45. Grease fitting
46. Spacer tube
47. Lockwasher
48. Hexagonal head cap screw
49. Pivot arm
50. Pivot shaft
51. Lockwasher
52. Hexagonal head cap screw
53. Rear arm
54. Idler shaft
55. Idler
56. Spacer
57. Rear axle
58. Spacer tube
59. Spacer tube
60. Circlip
61. Ball bearing
62. Idler
63. Washer
64. Hexagonal head cap screw
65. Square nut
66. Flat washer
67. Hexagonal nut
68. Hexagonal adjustment screw
69. Cross shaft
70. Bushing
71. Washer
72. Flat washer
73. Lockwasher
74. Hexagonal head cap screw
75. Shock absorber
76. Adjuster cam
77. Spring
78. Spring collar
79. Flat washer
80. Lockwasher
81. Hexagonal head cap screw
82. Adjustment wrench (adjuster cam P/N 529 003 800)
83. Hexagonal wrench (shock spring P/N 529 002 400)
84. Special washer

REMOVAL

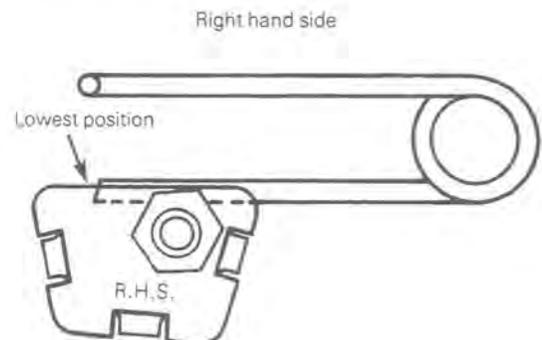
68, Adjustment screws

Release track tension by loosening adjuster bolts located on inner side of rear idler wheels.



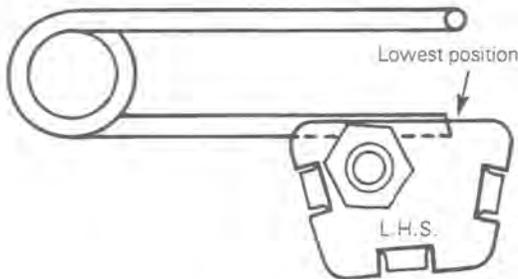
29, Adjustment cams

Position the adjustment cams at the lowest position.



SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

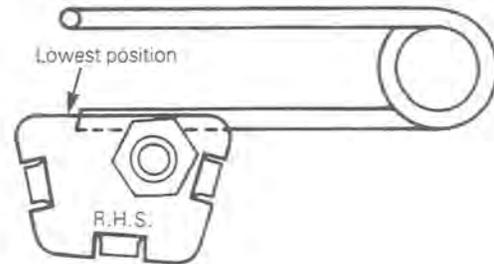
Left hand side



29, Adjustment cams

At assembly, position the adjustment cams at the lowest position.

Right hand side



81, Shock absorbers screws

Remove the two lower shock absorber screws.

69,74, Cross shafts & cap screws

Remove the four cap screws securing front and rear arm to frame.

Remove suspension system.

DISASSEMBLY & ASSEMBLY

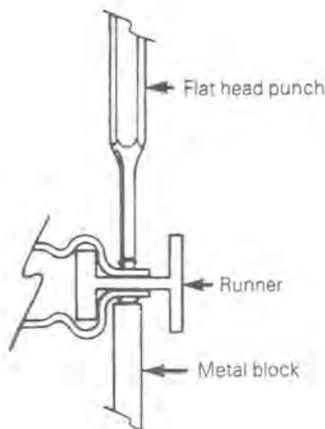
2,3,4,5, Slider shoes, screws, elastic stop nuts & spiral pins

To replace a worn slider shoe, remove the screw and spiral pin. Slide the shoe rearwards out of the runner.

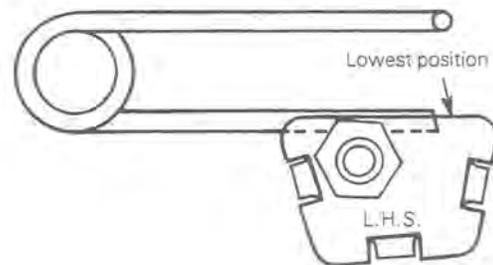
8, Rivets

To remove the rivets securing the adjustment plate on the front arm supports, cut off the rivet heads using a cold chisel.

At assembly, position the rivet head on a suitable metal block and hold the assembly firmly in place. With a flat head punch and hammer secure the rivet in place.



Left hand side



INSTALLATION

Lift the rear of vehicle off the ground.

26,71,73,74, Front arm, flat washer, lockwasher & cap screws

Place suspension within the track and align front arm of suspension with front holes of frame and secure using cap screws and washer. Torque to 42 N•m (31 ft•lbs).

53,72,73,74, Rear arm, flat washers, lockwashers & cap screws

Raise the rear section of the suspension and track into the tunnel and align rear arm with rear holes in frame. Secure to frame using cap screws and washers. Torque to 42 N•m (31 ft•lbs).

53,75,79,80,81,84, Rear arm, shock absorber, flat washer, lockwasher, cap screws & special washer

Secure shock absorbers to rear arm, torque cap screws to 61 N•m (45 ft•lbs).

19,45, Grease fittings

If necessary, lubricate the idler wheels at grease fittings until grease appears at joints. Use low temperature grease only (P/N 498 028 100).

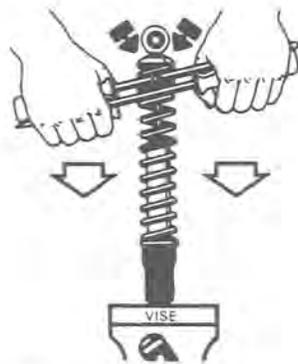
○ NOTE: To adjust the track tension and alignment refer to section 05-05.

◆ WARNING: Ensure to install the special washer as illustrated or the shock absorber rubber bushing may slip out of their shock eye.

SHOCK ABSORBER SPRINGS REPLACEMENT

To replace a shock spring proceed as follows:

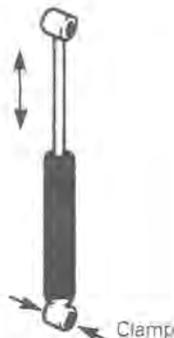
Clamp the shock absorber lower mount in a vise and press the spring down with a pair of screwdrivers as illustrated, remove the spring collar and the spring.



Install the new spring.

SHOCK ABSORBER SERVICING

The shocks may be checked by partially creating the operating position. To do this, secure the proper shock end in a vise using the shock eye as a clamping point.



▼ CAUTION: Do not clamp directly on shock body.

Compress and extend each shock by hand at various speeds and compare the resistance of one shock to the other.

○ NOTE: Obtain a known good shock for comparison purposes and keep in mind that the rebound resistance (extending the shock) is normally stronger than the compression resistance.

Pay attention to the following conditions that will denote a defective shock:

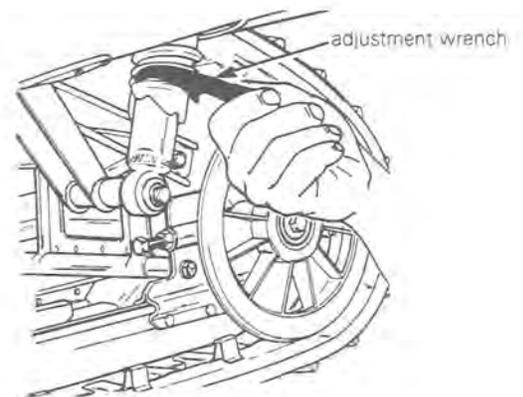
- A skip or a hang back when reversing stroke at mid travel.
- Seizing or binding condition except at extreme end of either stroke.
- Oil leakage.
- A gurgling noise, after completing one full compression and extension stroke.

REAR SUSPENSION ADJUSTMENT

Shock spring adjustment

76,82, Adjuster cam & adjustment wrench

The rear suspension may be adjusted by turning the shock absorber adjuster cam with the adjustment wrench.



1st Position: For rider weight of 0 to 68 kg (0 to 150 lbs).

2nd Position: For rider weight of 68 to 82 kg (150 to 180 lbs).

3rd Position: For rider weight of 84 kg (180 lbs) and higher.

▼ CAUTION: Left and right adjuster cam must always be set at the same position.

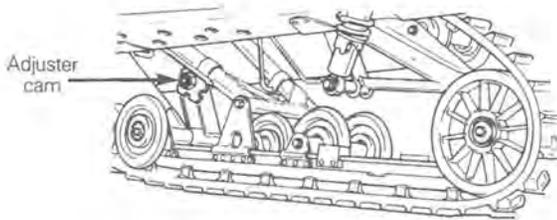
SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

Front spring adjustment

29,83, Adjustment cam & hexagonal wrench

The suspension can be tuned to the rider's specific requirement using the front adjuster cams and hexagonal wrench.

CAUTION: Always turn the left side adjuster cam clockwise, the right side adjuster cam counter-clockwise. Left and right adjuster cams must always be set at the same position.

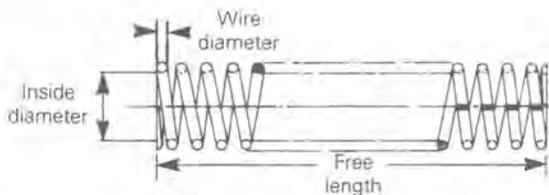


NOTE: It is possible to use "Optional" shock springs (P/N 503 069 400) on rear shock absorbers. (See shock spring diagram).

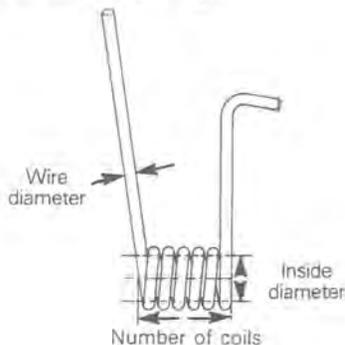
CAUTION: Optional parts are calibrated to operate together. Failure to follow this recommendation may affect handling of the vehicle.

SUSPENSION SPRING IDENTIFICATION

Shock springs

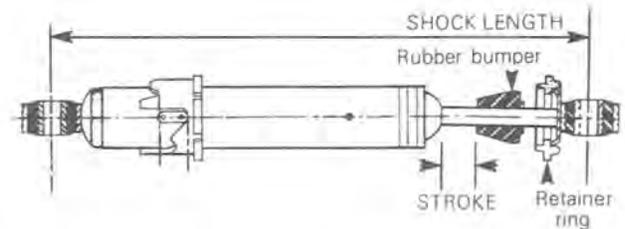


Slide suspension springs



Shock specifications

REAR SHOCK (without spring)	
Part number	414 476 600
Stroke	13.20 cm (5.200'')
Length collapsed*	23.78 cm (9.360'')
Length extended*	36.98 ± 0.3 cm (14.560 ± 0.125'')
Colour code	Blue dot



CAUTION: The front and rear shocks have different valving calibration and therefore must not be interchanged. Ensure that the shocks are properly positioned. Refer to the color code: white dot front, yellow dot rear.

The collapsed length at bumper contact is:

26.87 cm (10.58'')

And at retainer contact is:

24.18 cm (9.52'')

* The collapsed and extended lengths are always measured center to center of shock eyes.

SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

Springs specifications

	SHOCK SPRINGS ①				FRONT SPRINGS ②			
	FRONT (STANDARD)	REAR (STANDARD)	FRONT (OPTIONAL)	REAR (OPTIONAL)	RIGHT SIDE (STANDARD)	LEFT SIDE (STANDARD)	RIGHT SIDE (OPTIONAL)	LEFT SIDE (OPTIONAL)
P/N	503 069 500	503 069 600	N.A.	503 069 400	414 477 500	414 477 600	N.A.	N.A.
NUMBER OF COILS	16.8	13.0	N.A.	15.0	5.5	5.5	N.A.	N.A.
FREE LENGTH	28.93 ± 30 cm (11.39 ± 0.12")	28.93 ± 30 cm (11.39 ± 0.12")	N.A.	29.0 ± 30 cm 29.0 ± 30 cm	②	②	②	②
SPRING RATE	14.35 ± 0.7 kN/m (82 ± 4 lbs/in)	16.62 ± 0.7 kN/m 95 ± 4 lbs/in	N.A.	19.25/28.0 ± 0.7 kN/m (110/160 ± 4 lbs/in)	N.A.	N.A.	N.A.	N.A.
INSIDE DIAMETER	+ 0.76 38.35 - 0.00 mm (+ .030" (1.51 - .000")	+ 0.76 38.35 - 0.00 mm (+ .030" (1.51 - .000")	N.A.	+ 0.76 38.35 - 0.00 mm (+ .030" (1.51 - .000")	34.8 mm	34.8 mm	N.A.	N.A.
WIRE DIAMETER	6.65 ± .05 mm (0.262 ± .002")	6.65 ± .05 mm (0.262 ± .002")	N.A.	7.14 ± .05 mm (0.281 ± .002")	10.31 mm (0.406")	10.31 mm (0.406")	N.A.	N.A.
COMPRESSED LENGTH	10.79 cm (4.25")	8.98 cm (3.30")	N.A.	10.89 cm (4.29")	N.A.	N.A.	N.A.	N.A.
CLOUR CODE	Green/Red	Green/Blue	N.A.	Green/Yellow	Yellow	Yellow	N.A.	N.A.

① "Shock Springs" illustration

② "Slide Suspension Springs" illustration

N.A.: Not applicable

OPTIONAL PARTS ILLUSTRATION

Lift the rear of the vehicle until the track is "off" the ground.

Remove the shock covers.

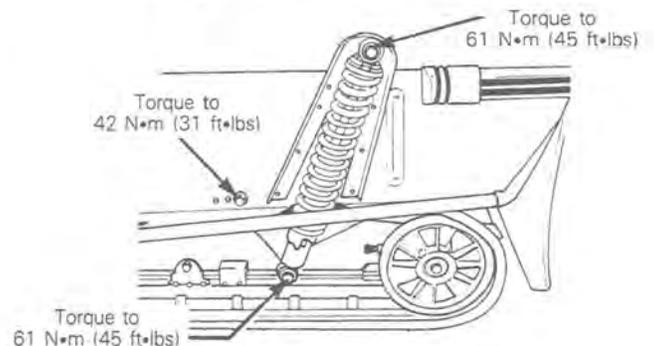
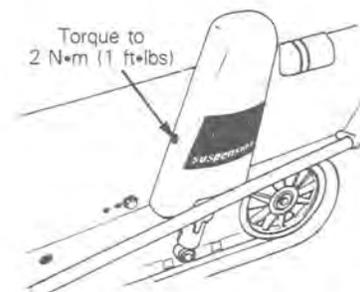
Remove the shock assemblies.

Remove the springs from the shocks.

Install optional springs (503 069 400) on the shocks.

Install the two (2) shock assemblies on vehicle, torque the retainer bolts to 61 N•m (45 ft•lbs). Refer to the illustration.

Install the shock covers and torque the retainer screws to 2 N•m (1 ft•lbs) — refer to illustration.

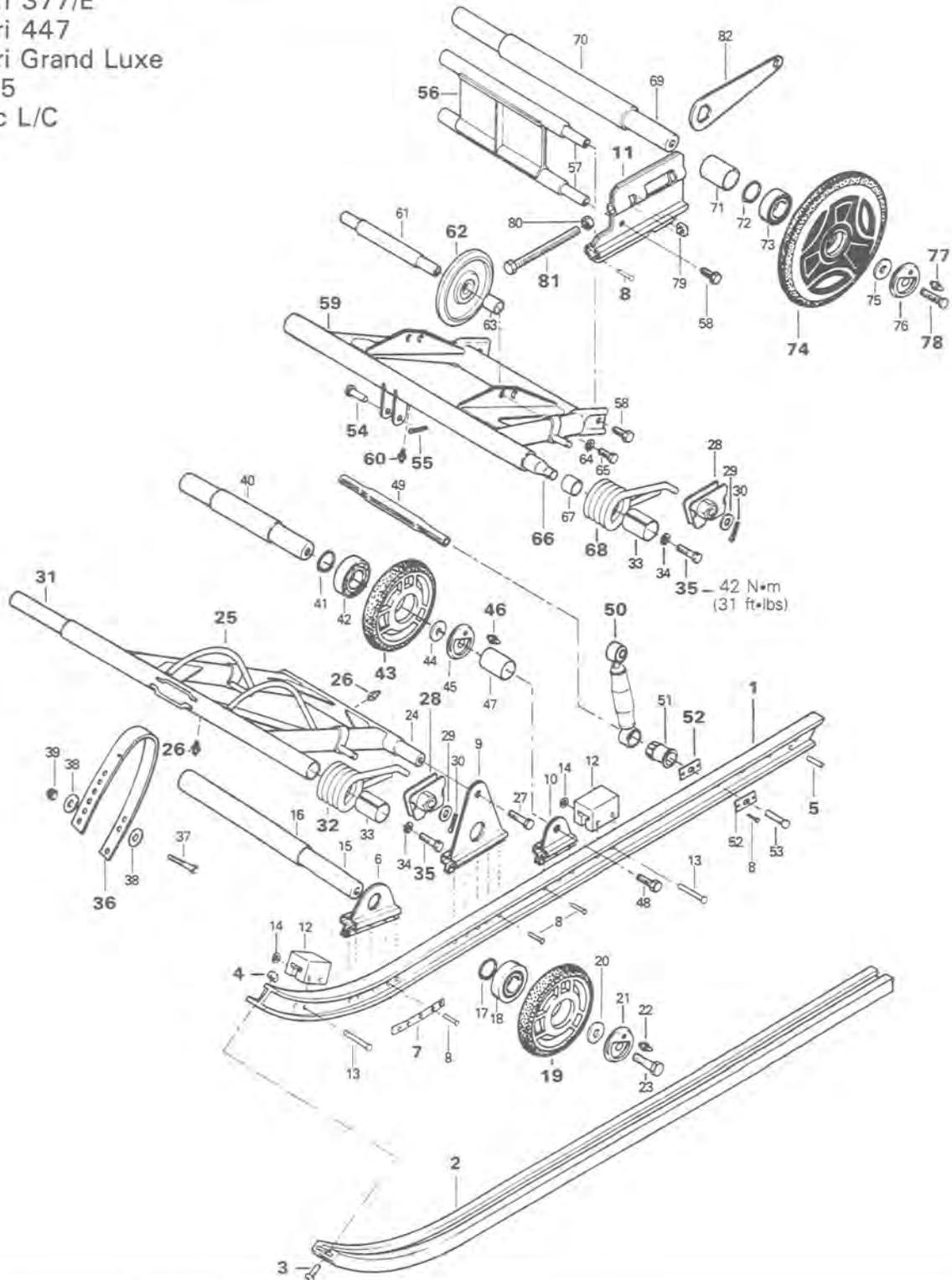


○ NOTE: To adjust the track tension and alignment, refer to section 05-05.

SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

"TRS 6" TYPE SUSPENSION

Safari 377/E
Safari 447
Safari Grand Luxe
SS-25
Sonic L/C



SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

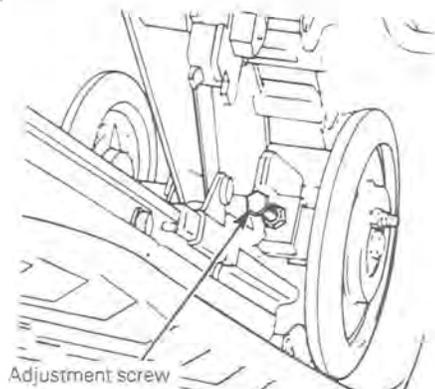
- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Runner (2) 2. Slider shoe (2) 3. Cyl. slotted head machine screw M5 × 20 (2) 4. Hex. elastic stop nut M5 (2) 5. Spiral pin (2) 6. Front wheel support (2) 7. Reinforcement strip (2) 8. Rivet (36) 9. Front arm support (2) 10. Wheel support (2) 11. R.H. Adjustment plate
L.H. Adjustment plate 12. Rubber stopper (4) 13. Rivet (8) 14. Push nut (8) 15. Cross shaft 16. Spacer tube 17. Circlip (2) 18. Ball bearing (2) 19. Idler (2) 20. Washer (2) 21. Cap (2) 22. Grease fitting (2) 23. Hex. head cap screw M10 × 35 (2) 24. Front cross shaft 25. Front arm 26. Grease fitting (2) 27. Hex. head cap screw M10 × 35 (2) 28. R.H. Adjustment cam (2)
L.H. Adjustment cam (2) 29. Flat washer (4) 30. Cotter pin (4) 31. Front cross shaft 32. R.H. Front spring
L.H. Front spring 33. Bushing (4) 34. Lockwasher M10 (4) 35. Hex. head cap screw M10 × 35 (4) 36. Stopper strap 37. Hex. head cap screw M8 × 40 38. Washer (2) 39. Hex. elastic stop nut 8 mm 40. Center axle | <ol style="list-style-type: none"> 41. Circlip (2) 42. Ball bearing (2) 43. Idler (2) 44. Washer (2) 45. Cap (2) 46. Grease fitting (2) 47. Spacer tube (2) 48. Hex. head cap screw M10 × 35 (2) 49. Swaged tube 50. Shock absorber 51. Auto-lock bushing 52. Reinforcement bracket (4) 53. Hex. head cap screw M10 × 35 (2) 54. Clevis pin 55. Cotter pin 56. Pivot arm 57. Pivot shaft (2) 58. Hex. washer head powerlock screw M8 × 20 (4) 59. Rear arm 60. Grease fitting 61. Idler shaft 62. Idler (2) 63. Spacer (2) 64. Lockwasher 8 mm (2) 65. Hex. head cap screw M8 × 25 (2) 66. Rear cross shaft 67. Bushing (2) 68. Rear R.H. spring
Rear L.H. spring 69. Rear axle 70. Spacer tube 71. Spacer tube (2) 72. Circlip (2) 73. Ball bearing (2) 74. Idler (2) 75. Washer (2) 76. Cap (2) 77. Grease fitting (2) 78. Hex. head cap screw M10 × 35 (2) 79. Square nut (2) 80. Hex. nut M10 (2) 81. Hex. adjustment screw M10 × 110 (2) 82. Hex. wrench (cam adjustment) |
|--|--|

REMOVAL

81, Adjustment screws

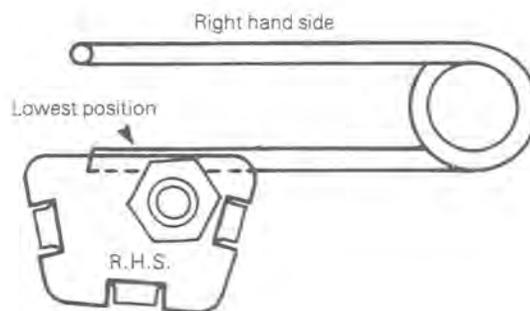
Release track tension by loosening adjuster bolts located on inner side of rear idler sheels.

(TYPICAL)

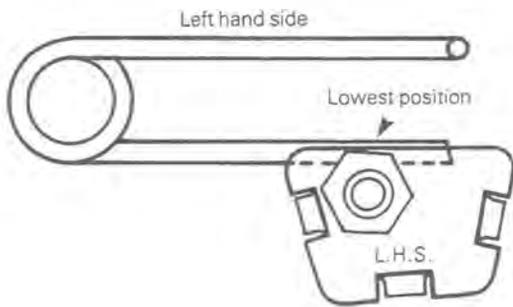


28, Adjustment cams

Position the adjustment cams at the lowest position.



SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)



31,35,66, Screws & cross shafts

Remove the four (4) screws securing suspension to frame.

Remove suspension system.

NOTE: To prevent cross shaft from turning within the suspension arm, wedge the blade of a small screwdriver between the shaft and suspension arm.

DISASSEMBLY & ASSEMBLY

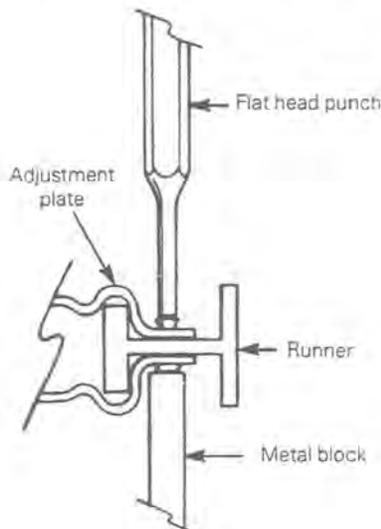
1,2,3,4,5, Runners, slider shoes, screws, stop nuts & spiral pins

To replace a worn slider shoe, remove the rear spiral pin, the front screw and stop nut, then slide the shoe rearwards out of the runner.

8,11, Rivets & adjustment plates

To remove the rivets securing the adjustment plate on the front arm supports, cut off the rivet heads using a cold chisel.

At assembly, position the rivet head on a suitable metal block and hold the assembly firmly in place. With a flat head punch and hammer secure the rivet in place.

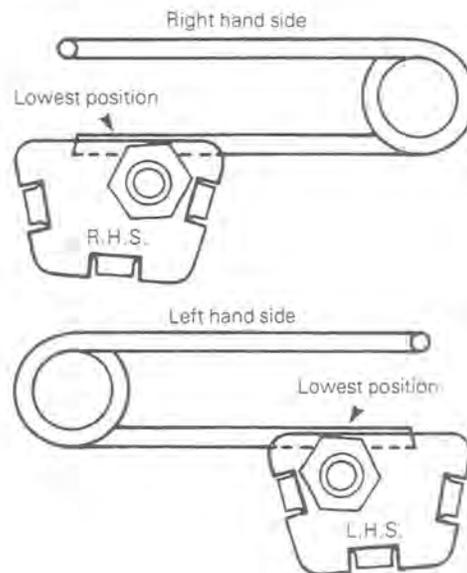


7,8,52, Reinforcement strips, rivets & reinforcement bracket

To remove rivet use a 3/16" dia. drill. At assembly secure reinforcement brackets to runner with two (2) 10-32 x 1/2" bolts and nuts, and five (5) bolts and nuts for the reinforcement strips.

28, Adjustment cams

At assembly, position the adjustment cams at the lowest position.



78, Idlers screws & "Loctite 242"

Clean all traces of plastic from threads. Prior to assembly, apply a light coat of "Loctite 242" or equivalent on threads.

32,68, Front & rear springs

Prior to assembly, identify front and rear springs.

Front spring: red dot

Rear spring: brown dot

INSTALLATION

Preparation

36, Stopper strap

— Detach the front stopper strap.

SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

50,54,55, Shock absorber, clevis pin & cotter pin

- Remove the cotter pin locking the shock absorber clevis pin and detach the shock absorber by removing the clevis pin.

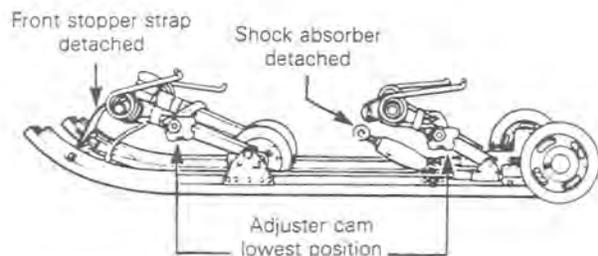
28, Adjuster cams

- Set the adjuster cam to the lowest position and fix the springs with a tape.

74, Rear idler wheel

- Push the rear idler wheel forward.

(TYPICAL)



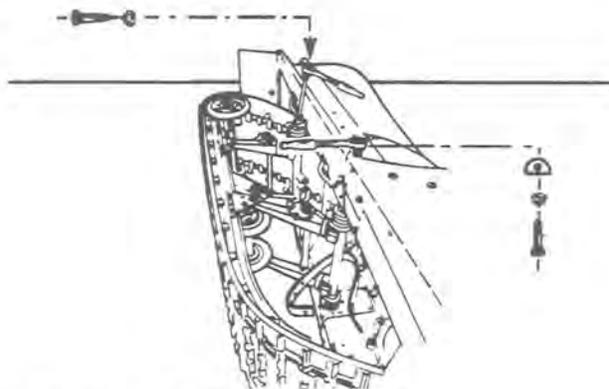
Installation

- Place a cardboard on the floor.
- Plug the chaincase vent hole with a small wire to prevent leaks.
- Tilt vehicle on one side.

25,29, Front arm & rear arm

- Attach front suspension and the rear suspension arm to the frame. Do not torque.

(TYPICAL)

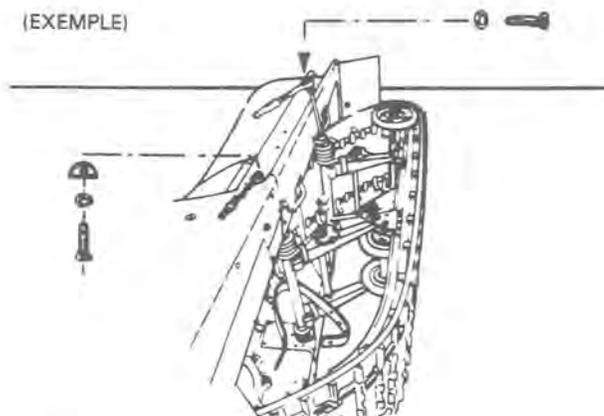


- Tilt the vehicle on the other side.

25,29, Front & rear arm

- Attach the front then the rear suspension arm to frame.

(EXAMPLE)



- Reposition vehicle on the ground.

28, Adjuster cam

- Position adjustment cams at the lowest elevation.

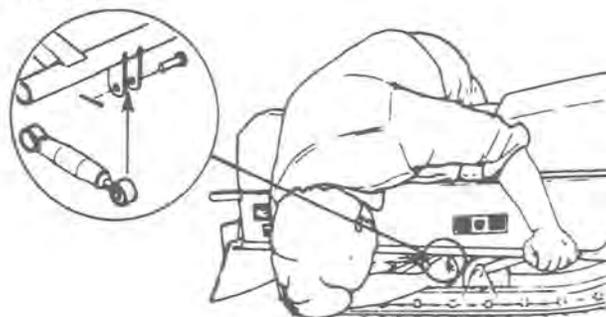
35, Screws (front & rear arms)

- Torque the four suspension retaining bolts to 43 N•m (32 ft•lbs).
- Apply downward pressure on the seat.

50,54,55, Shock absorber, clevis pin & cotter pin

- Secure the extended shock with clevis pin and a new cotter pin.

(TYPICAL)

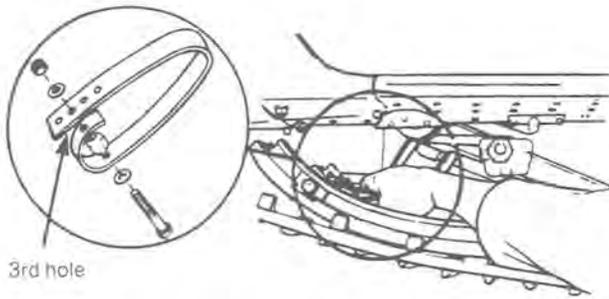


SECTION 05 SUSPENSION
SUB-SECTION 02 (SLIDE, MX & TRS 6 SUSPENSION)

36, Stopper strap

— Attach front stopper strap at 3rd hole.

(TYPICAL)

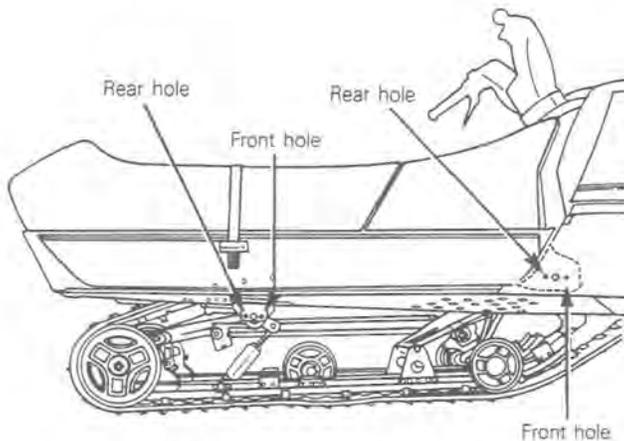


— Remove chaincase vent hole plug.

○ **NOTE:** On all models, the holes in the frame provide the possibility of locating the suspension arms for easier track tension adjustment 13 mm (1/2") clearance. It means that if the slide suspension adjustment screws are at the maximum adjustment and the suspension arms are at the front holes in the frame, you may move the suspension arms at the rear holes and obtain greater track tension adjustment.

▼ **CAUTION:** Ensure that suspension arms are at the same position on each side of the frame to avoid any damage to the suspension system and to the track.

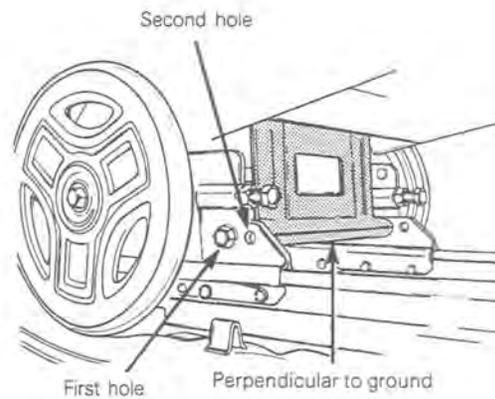
▼ **CAUTION:** Ensure that front and rear suspension arms are at the same position on each end (front, rear) of the frame to avoid any damage to the suspension system and to the track.



○ **NOTE:** The front adjustment holes in the frame (near footrest) are not completely drilled. If you have to re-locate the front and rear arms you have to drill these holes.

11,56, Adjustment plate & pivot arm

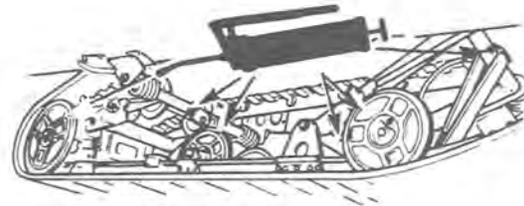
When repositioning front and rear suspension arms; ensure that the pivot arm is as perpendicular as possible by locating it in the first or second holes of the adjustment plate.



19,43,62,74, Idler wheels

22,26,46,60,77, Grease fittings

Lubricate idler wheels, front and rear arms at grease fittings until grease appears at joints. Use low temperature grease only (P/N 498 028 100).



○ **NOTE:** A needle fitted unto grease gun must be used to lubricate idler wheels.



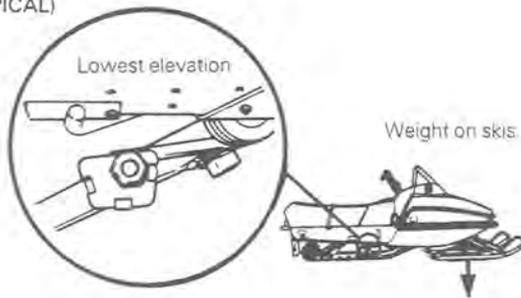
○ **NOTE:** To adjust the track tension and alignment, refer to section 05-05.

RIDE ADJUSTMENT

The front adjustment cams are used for snow condition, and the rear for driver's weight. The front adjustment cams should be positioned at the highest elevation for deep snow conditions. A lower elevation is preferred when negotiating icy snow.

The rear adjuster blocks should be adjusted to rider preference.

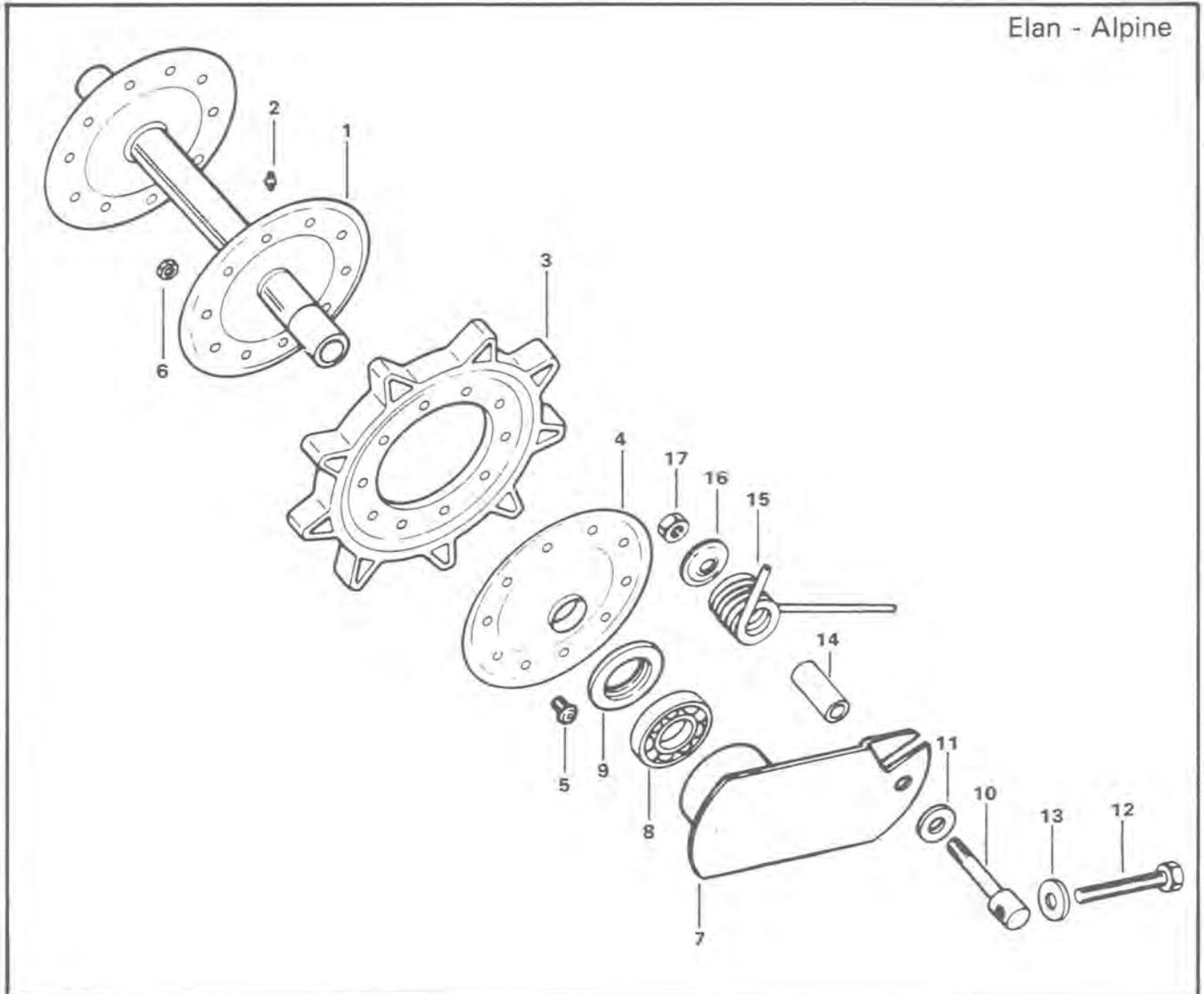
(TYPICAL)



▼ **CAUTION:** Always turn left side adjustment cams in a clockwise direction, the right side cams in a counter-clockwise direction. Left and right adjustment cams of each adjustment (front and rear), must always be set at the same elevation.

REAR AXLE

Elan - Alpine



1. Rear axle
2. Grease fitting
3. Sprocket
4. Mobile flange
5. Bolt (flange)
6. Nut (flange)
7. Link plate
8. Bearing
9. Seal

10. Eye bolt
11. Hardener washer
12. Adjuster bolt
13. Washer (except for Alpine)
14. Sleeve
15. Link plate spring
16. Retainer washer
17. Lock nut

SECTION 05 SUSPENSION

SUB-SECTION 03 (REAR AXLE)

REMOVAL

Lift and block rear of vehicle off the ground.

16,17, Retainer washers & lock nuts

Remove the link plate spring lock nuts and retainer washers.

15, Link plate springs

Using an appropriate tool, unlock link plate springs.

10,11,12,13,14, Eye bolts, hardener washers, adjuster bolts, washers (Elan) & sleeves

Remove track adjuster bolts, eye bolts, hardener washers and adjuster sleeves.

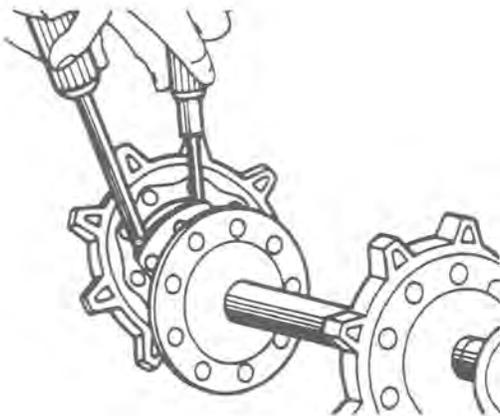
Withdraw rear axle from vehicle.

DISASSEMBLY & ASSEMBLY

3, Sprockets

Sprockets are factory riveted. When separation is necessary, remove rivets securing idler with a 1/4" dia. drill.

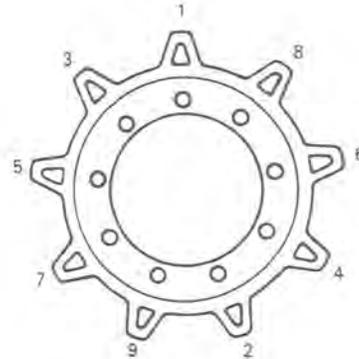
To remove sprocket, apply liquid soap or petroleum jelly on sprocket bead and flange then with two (2) screwdrivers (round bars), pass the sprocket over flange. Reverse change-over procedure to install sprockets.



1,3,4,5,6, Rear axle, sprockets, mobile flanges, bolt & nut

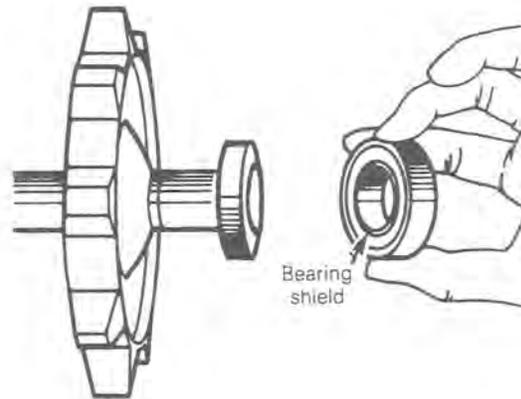
Secure idler wheels and flanges using bolts and nuts tightened in the following sequence to 3.5 N•m (3 ft•lbs).

Torque sequence



8, Bearing

Always pull or push the bearing by inner race. Install bearing with shield facing the sprocket.



7,9, Link plate & seal

When assembling, always position a new seal. When inserting seals into link plate, seal lip must sit correctly in groove of link plate. After lubricating the rear axle, ensure that seals remain in position.

INSTALLATION

1, Rear axle

With rear of vehicle off the ground, position the rear axle within the track.

10,11,14, Eye bolts, hardener washers & sleeves

Install sleeves, hardener washers and eye bolts.

12, Adjuster bolts

Partially screw-in the track adjuster bolts.

15, Link plate springs

Hook the link plate springs. If applicable, hook springs into middle position of 3 position anchors.

16,17, Retainer washers & lock nuts

Install retainer washers and partially tighten the link plate spring lock nuts.

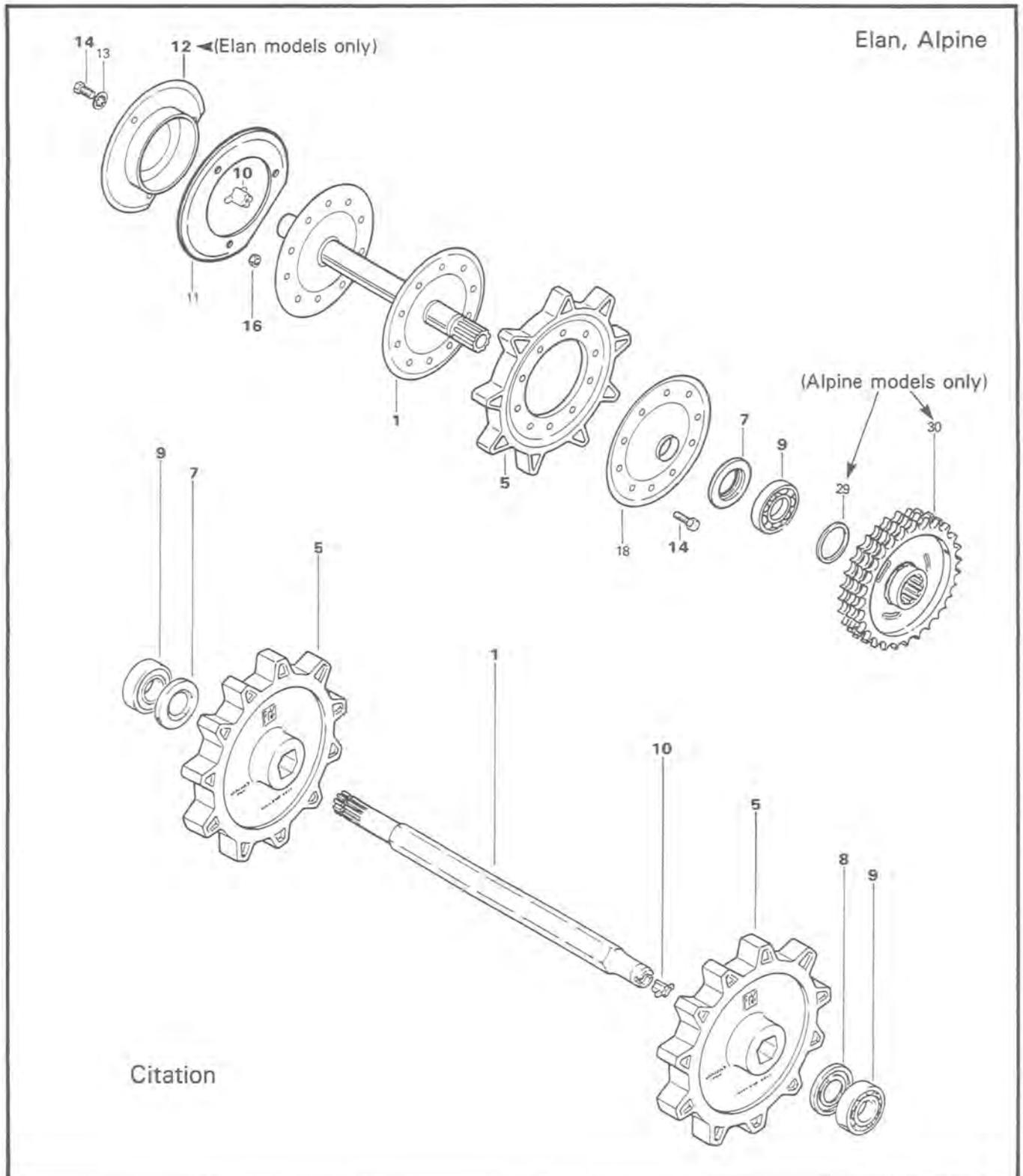
Carry out track tension and alignment.

○ **NOTE:** To adjust the track tension and alignment, refer to Section 05-05.

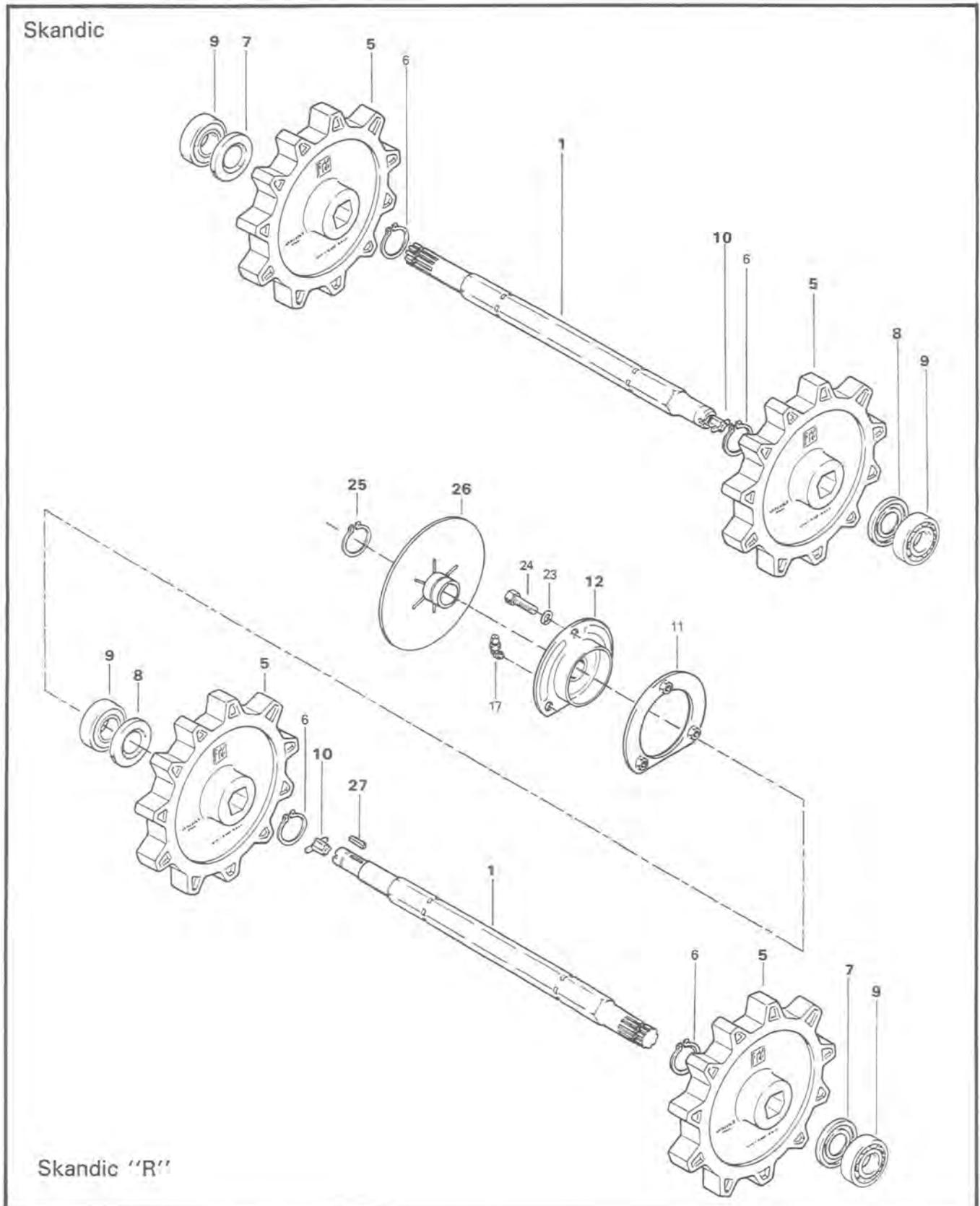
2, Grease fittings

If necessary, lubricate idler wheels at grease fittings until grease appears at joints. Use low temperature grease only (P/N 498 028 100).

DRIVE AXLE

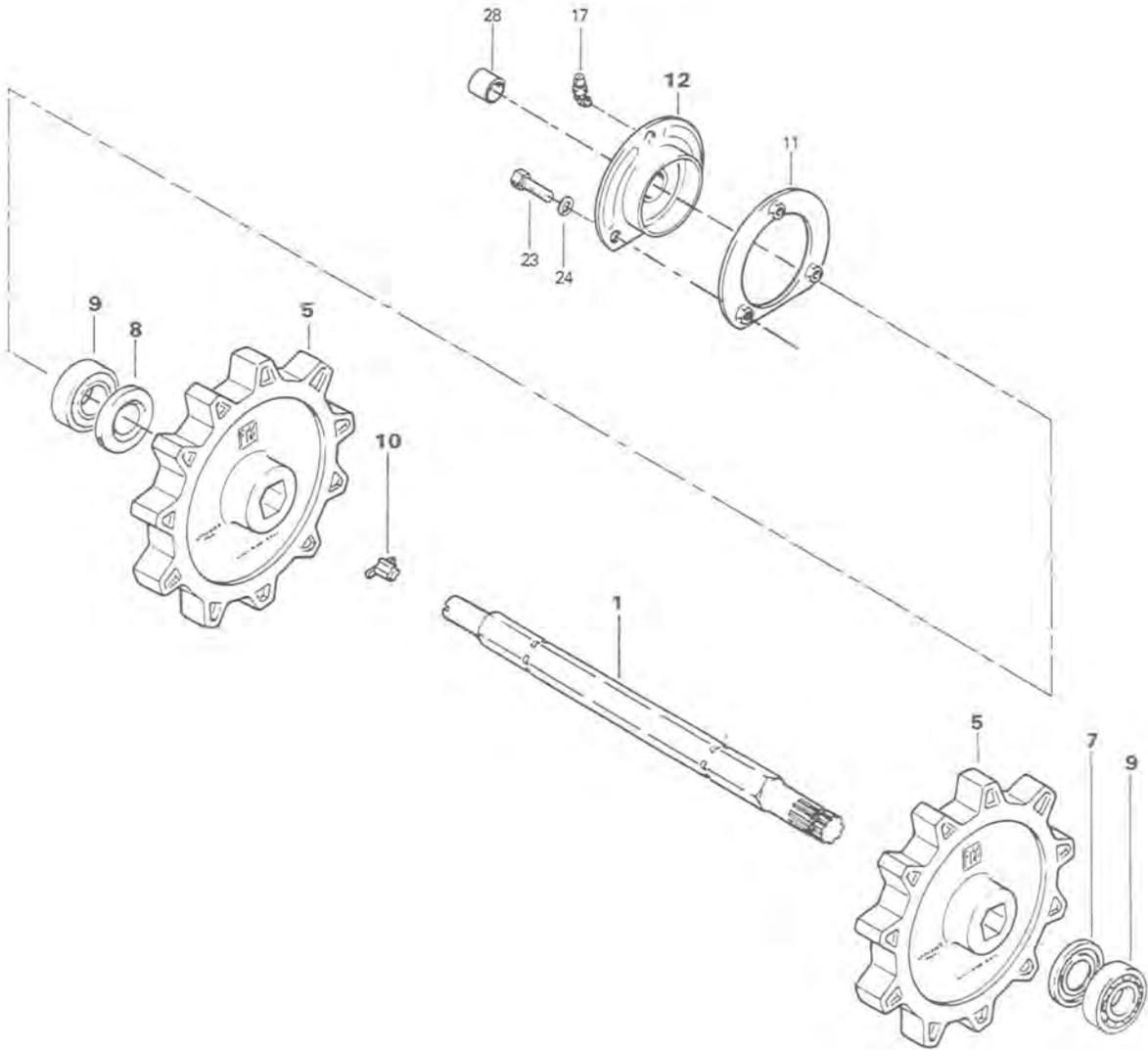


SECTION 05 SUSPENSION
SUB-SECTION 04 (DRIVE AXLE)

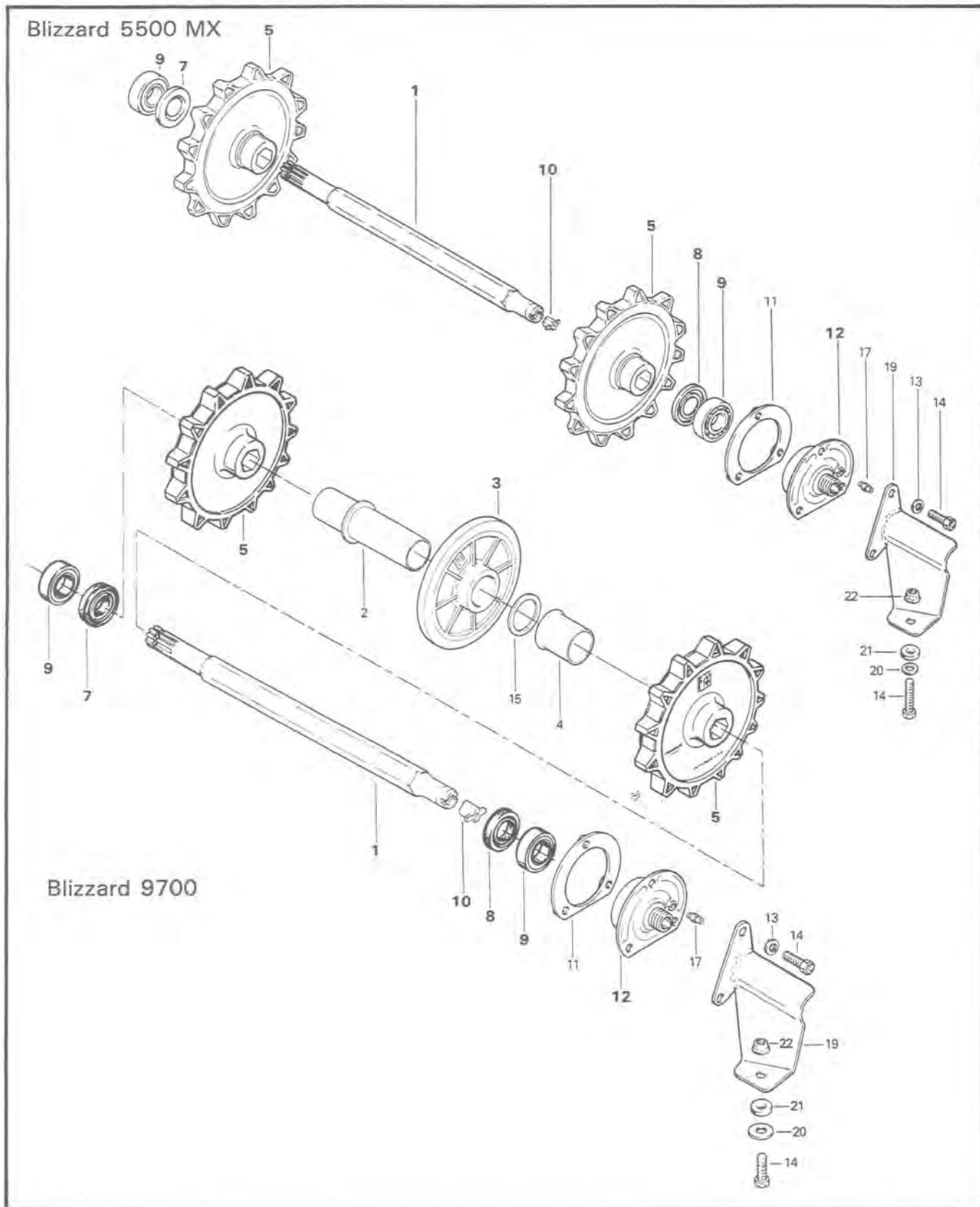


SECTION 05 SUSPENSION
SUB-SECTION 04 (DRIVE AXLE)

SS-25, Sonic L/C
Safari 377, 377E, 447, Grand Luxe



SECTION 05 SUSPENSION
SUB-SECTION 04 (DRIVE AXLE)



1. Drive axle
2. Spacer tube
3. Idler
4. Spacer tube
5. Sprocket
6. Circlip
7. Seal
8. Seal
9. Bearing
10. Speedo drive insert
11. Retainer ring
12. End bearing housing
13. Lockwasher 5/16"
14. Hexagonal head cap screw 1/4"-20 x 3/4"
15. Shim

16. Hexagonal flanged elastic stop nut 1/4"-20
17. Grease fitting
18. Mobile flange
19. Cable protector
20. Flat washer 17/64" x 7/8" x .060"
21. Rubber spacer
22. Hexagonal flanged elastic stop nut 1/4"-20
23. Lockwasher 6 mm
24. Hexagonal head cap screw M6 x 16
25. Circlip
26. Brake disc
27. Key
28. Cap
29. Spacer
30. Sprocket

REMOVAL

Drain oil from chaincase or gear box. Remove chaincase cover. Release drive chain tension (if applicable).

Raise and block rear of vehicle off ground.

Remove suspension. (See section 05 sub-section 01-02).

7,8,12, Seals & bearing housing

Pry oil seals from chaincase and end bearing housing.

Remove end bearing housing and unlock drive axle end sprocket (single track models).

NOTE: If applicable, remove battery and its seat. If vehicle is equipped with a speedometer, remove angle drive unit and coupling cable.

25,26,27, Circlip, brake disc & key

On Skandic "R" models, remove brake caliper, circlip, brake disc and key before removing end bearing housing.

1,5, Drive axle & sprockets

Release drive sprockets teeth from track notches, at the same time, pulling the drive axle towards the end bearing housing side of frame.

Remove drive axle from vehicle. If applicable, pull out shim located between bearing and lower chaincase sprocket.

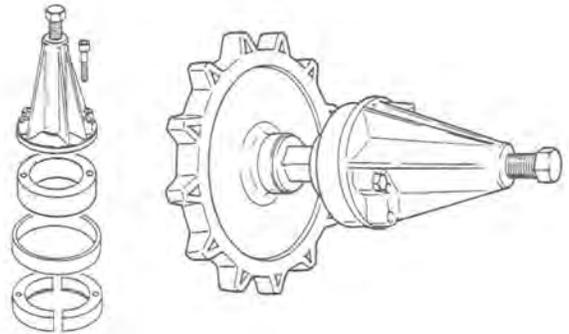
DISASSEMBLY

10, Speedo drive insert

Remove speedo drive insert (if applicable).

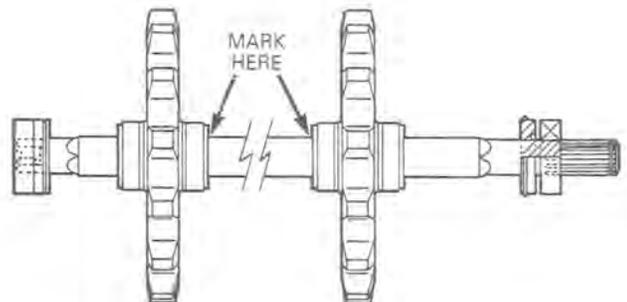
9, Bearings

To remove bearings, use puller assembly, ring and half rings as illustrated. (Refer to tools section).



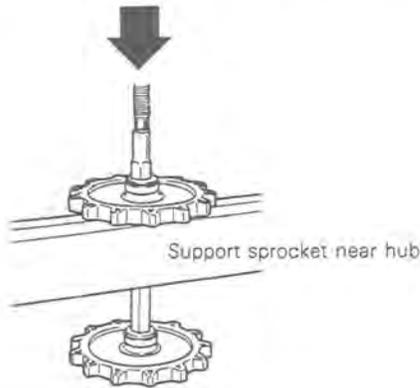
5, Sprockets

When replacing sprockets, make a reference mark on the axle to facilitate reassembly of the new sprockets.



SECTION 05 SUSPENSION SUB-SECTION 04 (DRIVE AXLE)

To remove, press fit sprockets (drive axle without flange), use a press and a suitable support as illustrated.

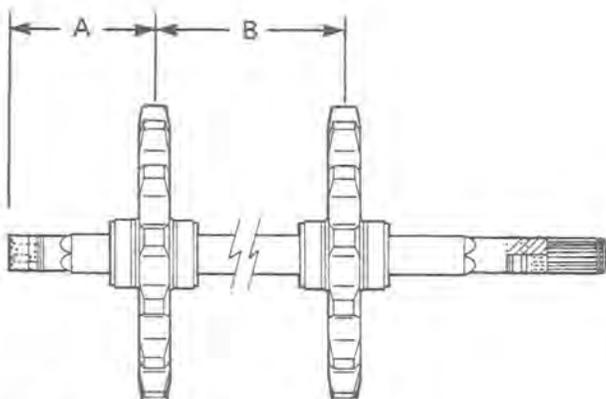
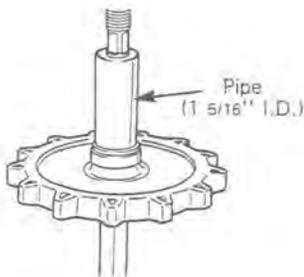


NOTE: 1984 models have two different axle-sprocket press fits. Ensure to replace ring reinforced sprockets with the same type.

ASSEMBLY

1,5, Drive axle & sprocket

To assemble press fit sprockets, use a press and a pipe (1 5/16" I.D.) as illustrated. Sprockets must be assembled with the following dimensions.

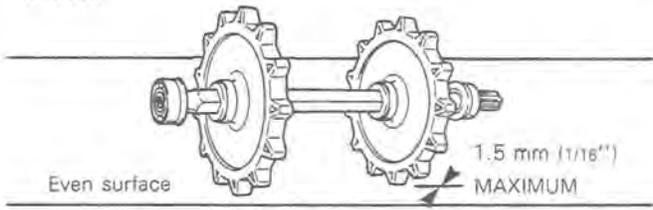


	A	B
Citation 3500	100 mm (3 15/16")	225 mm (8 7/8")
Skandic	91.7 mm (3 39/64")	242 mm (9 17/32")
Skandic "R"	146 mm (5 3/4")	242 mm (9 17/32")
Safari 377, SS-25, Sonic L/C	113 mm (4 29/64")	225.5 mm (8 7/8")
Safari 377E, 447, Grand Luxe	104.5 mm (4 7/64")	242 mm (9 17/32")
Blizzard 5500 MX, 9700	104.5 mm (4 7/64")	242 mm (9 17/32")

Ensure to align indexing marks on each sprocket before assembling the second sprocket.

The maximum synchronization tolerance for the sprockets is 1.5 mm (1/16").

To check this tolerance, place axle assembly on a plane surface and measure the gap between sprocket teeth and surface.



CAUTION: The same sprocket must not be pressed twice on the axle. If synchronization is found to be defective, use a new sprocket.

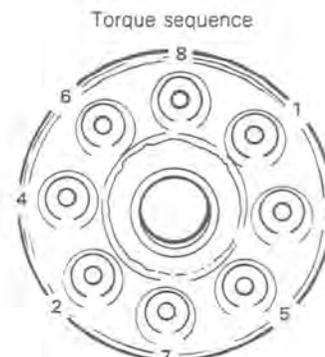
3, Idler wheel

On Blizzard 9700 idler wheel must turn freely.

14,16, Cap screws & elastic stop nut

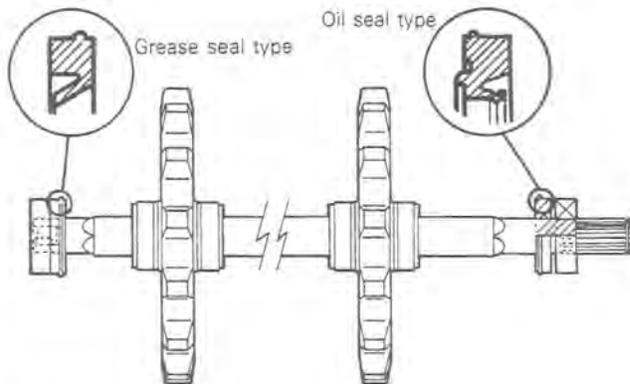
On Elan and Alpine, tightening torque for axle flanges is 3-4 N•m (2-3 ft•lbs).

When reassembling, install a new nut or apply "Loctite" (or equivalent) on old threads. Tighten in the following sequence.



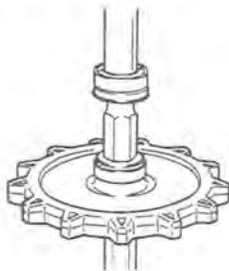
1,7, Drive axle, seals

When assembling drive axle, always position a new seal on each end of drive axle. The seal lip must face sprocket as illustrated.



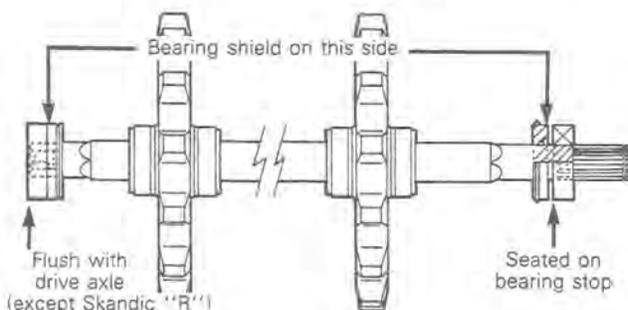
9, Bearings

Always push bearing by inner race.



The bearing on the splined side of axle must be pushed until it is seated on bearing stop. The end bearing housing bearing must be flush with end of drive axle. Each bearing must have its shield facing the sprocket.

NOTE: On Skandic "R" model, the two bearings on drive axle must be seated against bearing stop. The completely sealed bearing must be install on disc brake side.



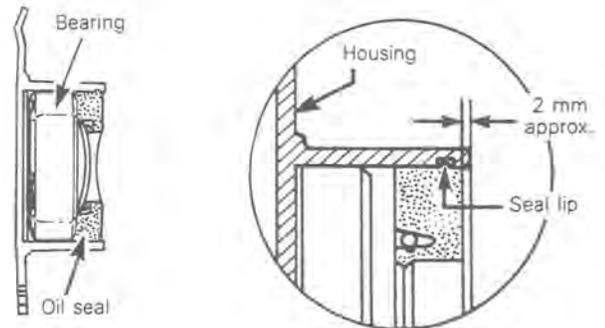
INSTALLATION

10, Speedo drive insert

If the drive axle to be installed is a new component and the vehicle is equipped with a speedometer, a correct size speedometer drive insert must be installed into the axle end. Ensure that insert is flush with end of axle.

Position drive axle assembly into location. Install shim(s) between bearing and lower chaincase sprocket. Install end bearing housing.

Install chaincase and position seals, making sure that a gap of approximately 2 mm (1/16") exists between end of bearing housing and each seal.



Lock drive axle sprocket with a new cotter pin (Elan model) or circlip (other single track models).

Reinstall the chaincase cover.

Refill with chaincase oil. (See technical data, section 09).

Install the suspension. Apply track tension and carry out track alignment procedure. (See section 05, sub-section 05).



TRACK

TRACK TYPE APPLICATION

Refer to the "Technical Data" section 09.

INSPECTION

Visually inspect track for cuts and abnormal wear. Inspect track for broken rods. If excessive damage is evident and rods are broken, replace track. Inspect track for damaged or missing inserts. Replace damaged insert(s).

WARNING: Do not operate a snowmobile with a cut, torn or damaged track.

REMOVAL

Elan

Remove the following items:

- Tool box
- Chaincase access plug
- Drive axle cotter pin and washer
- Suspension
- Rear axle
- The two drive axle seals
- End bearing housing
- Drive axle
- Track

Citation, Skandic, Skandic "R"

Remove the following items:

- Pulley guard and drive belt
- Air silencer
- Injection oil reservoir (if so equipped)
- Speedometer, angle drive (if so equipped)
- Chaincase cover, sprockets and chain
- Suspension
- Countershaft bearing housing (clamp)
- Brake caliper (Skandic "R")
- Circlip (Skandic "R")
- Brake disc (Skandic "R")
- Key (Skandic "R")
- Drive axle shaft bearing housing (left side)

- Drive axle (outwards from left side)
- Upper center idler(s) assembly
- Track

Blizzard, Blizzard MX

Remove the following items:

- Speedometer cable and protector (if so equipped)
- Chaincase cover, sprockets and chain
- Suspension
- Two drive axle seals
- Chaincase
- Drive axle (outwards from chaincase side)
- Upper center idler wheel (if applicable)
- Track

Alpine

Remove the following items:

- Release the chain tensioner of the transmission chain
- Bogie wheels
- Rear axle(s) assembly(ies)
- Drain the transmission oil
- Drive axle seal(s)
- End bearing(s) housing
- Drive axle(s) (outwards from end bearing(s) housing)
- Track(s)

SS-25, Sonic L/C, Safari 377, 377E, 447, Grand Luxe

Remove the following items:

- Speedometer cable
- Battery and battery support (if so equipped)
- Chaincase cover, sprockets and chain
- Suspension
- Two drive axle seals
- Drive axle (outwards from end bearing housing)
- Track

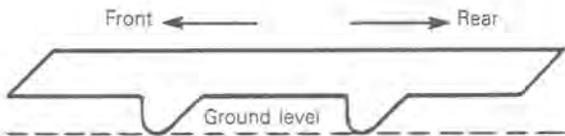
SECTION 05 SUSPENSION SUB-SECTION 05 (TRACK)

INSTALLATION:

All models:

Reverse the removal procedure.

NOTE: When installing the track, ensure the right angle of bearing surface of the track rib is facing the front of vehicle.



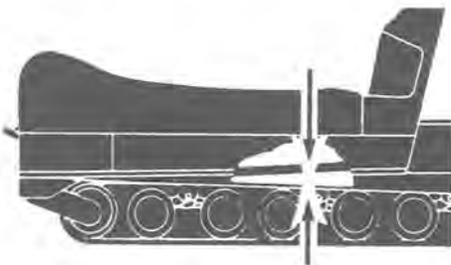
Track tension & alignment

Track tension and alignment are inter-related. Do not adjust one without checking the other. Track tension procedure must be carried out prior to track alignment.

CAUTION: Each item must be installed following the procedure detailed in this manual.

Tension (bogie wheel), Elan

With rear of vehicle blocked off the ground, check the track tension at middle set of bogie wheels: 35 mm (1 3/8'') between top inside edge of track and bottom of foot board.



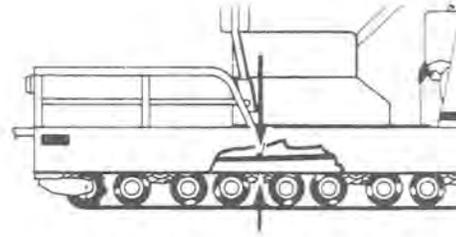
If applicable, ensure that the link plate springs are in the middle position of the 3 position slotted anchors.

To correct track tension, loosen link plate spring lock nuts on inner side of link plate springs. Turn adjuster bolts clockwise to tighten track or counter-clockwise to slacken.

Tighten link plate spring lock nuts.

Tension (bogie wheel), Alpine

With rear of vehicle blocked off the ground, check the tension of each track: 57 mm (2 1/4'') between top inside edge and bolt of center wheel set retaining bolt.



To correct track tension, loosen link plate spring lock nuts on inner side of link plate springs. Turn adjuster bolts clockwise to tighten track or counter-clockwise to slacken.

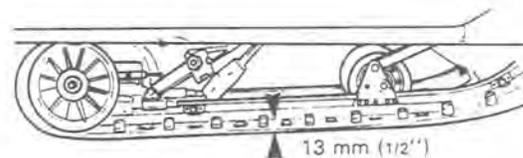
Tighten link plate spring lock nuts.

CAUTION: Too much or too little tension will result in power loss and excessive stress on suspension components.

NOTE: If the track tension is too loose, the track will have a tendency to thump.

Tension (for all slide and TRS6 suspension models except Blizzard 5500 MX)

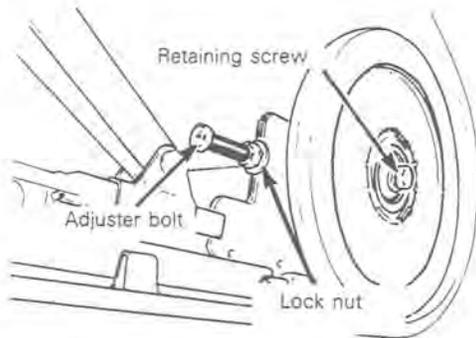
Lift the rear of vehicle and support with a mechanical stand. Allow the slide to extend normally. Check the gap 13 mm (1/2'') between the slider shoe and the bottom inside of the track.



CAUTION: Too much or too little tension will result in power loss and excessive stress on suspension components.

SECTION 05 SUSPENSION
SUB-SECTION 05 (TRACK)

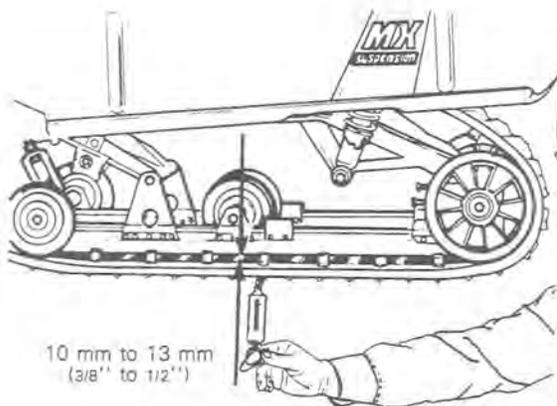
To adjust. Loosen the rear idler wheel retaining screw and the adjuster bolt lock nut; then loosen or tighten the adjuster bolts located on the inner side of the rear idler wheels.



○ NOTE: If the track tension is too loose, the track will have a tendency to thump.

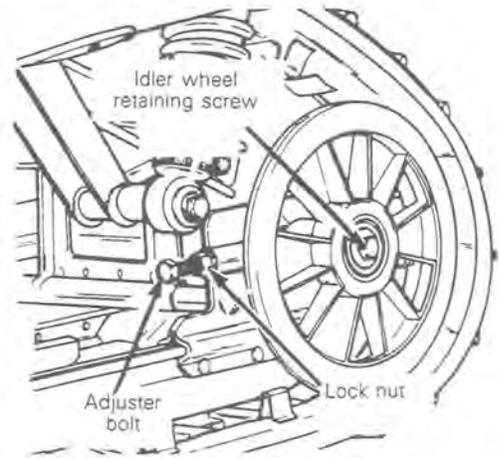
Tension (for Blizzard 5500 MX)

Lift rear of vehicle and support it with a stand. Allow the track to extend normally. Adjust the gap between track and slider shoe between 10 mm & 13 mm (3/8" & 1/2") when pulling down on the track with a force of 3 kg (6.5 lbs).



▼ CAUTION: Too much or too little tension will result in power loss and excessive stress on suspension components.

To adjust, loosen the rear idler wheel retaining screw and the adjuster bolt lock nut, then loosen or tighten the adjuster bolts.



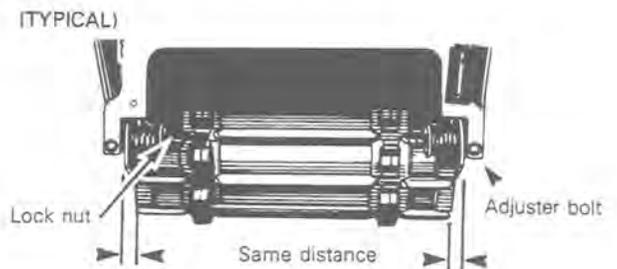
○ NOTE: If the track tension is too loose, the track will have a tendency to thump.

Alignment (bogie wheel all models)

With rear of vehicle supported off the ground, start engine and allow the track to rotate slowly.

Check if track is well centered and turns evenly on rear sprockets. Distance between edge of track and link plate must be equal on both sides. (If applicable, ensure link plate springs are in the middle position of the 3 position slotted anchors).

◆ WARNING: Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, feet, tools and clothing clear of track.



Rotate track slowly and recheck alignment and tension.

SECTION 05 SUSPENSION SUB-SECTION 05 (TRACK)

To correct alignment, loosen link plate spring lock nut on side where track is closest to the link plate.

Turn track adjuster bolt on same side, clockwise until track re-aligns.

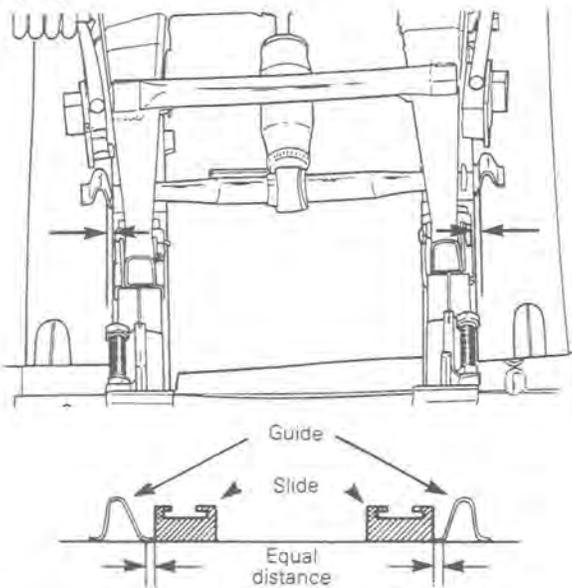
Tighten link plate spring lock nut.

Alignment (slide and TRS6 suspension all models)

With rear of vehicle supported off the ground, start engine and allow the track to rotate **slowly**.

Check that track is well centered and turns evenly. To correct, stop engine then loosen the lock nuts and tighten the adjuster bolt on side where guides are closest to slide. Tighten lock nuts and recheck alignment.

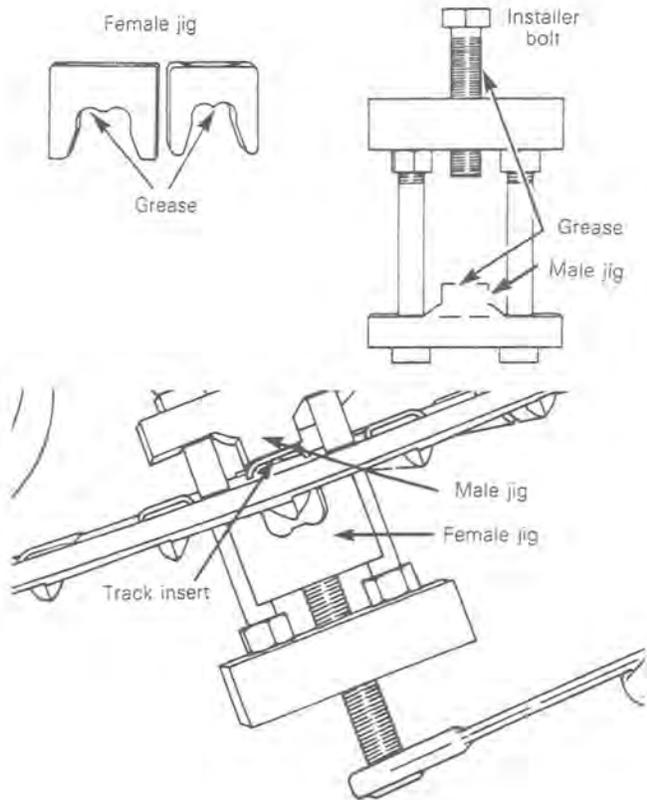
(TYPICAL)



Place the track insert installer into track notches and position male jig on top of track insert.

Tighten installer bolt until track insert is locked in place.

CAUTION: To prevent damages and for an easier operation of the tool, apply grease on male jig, female jig and to the installer bolt threads.



WARNING: Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track.

TRACK INSERT INSTALLATION

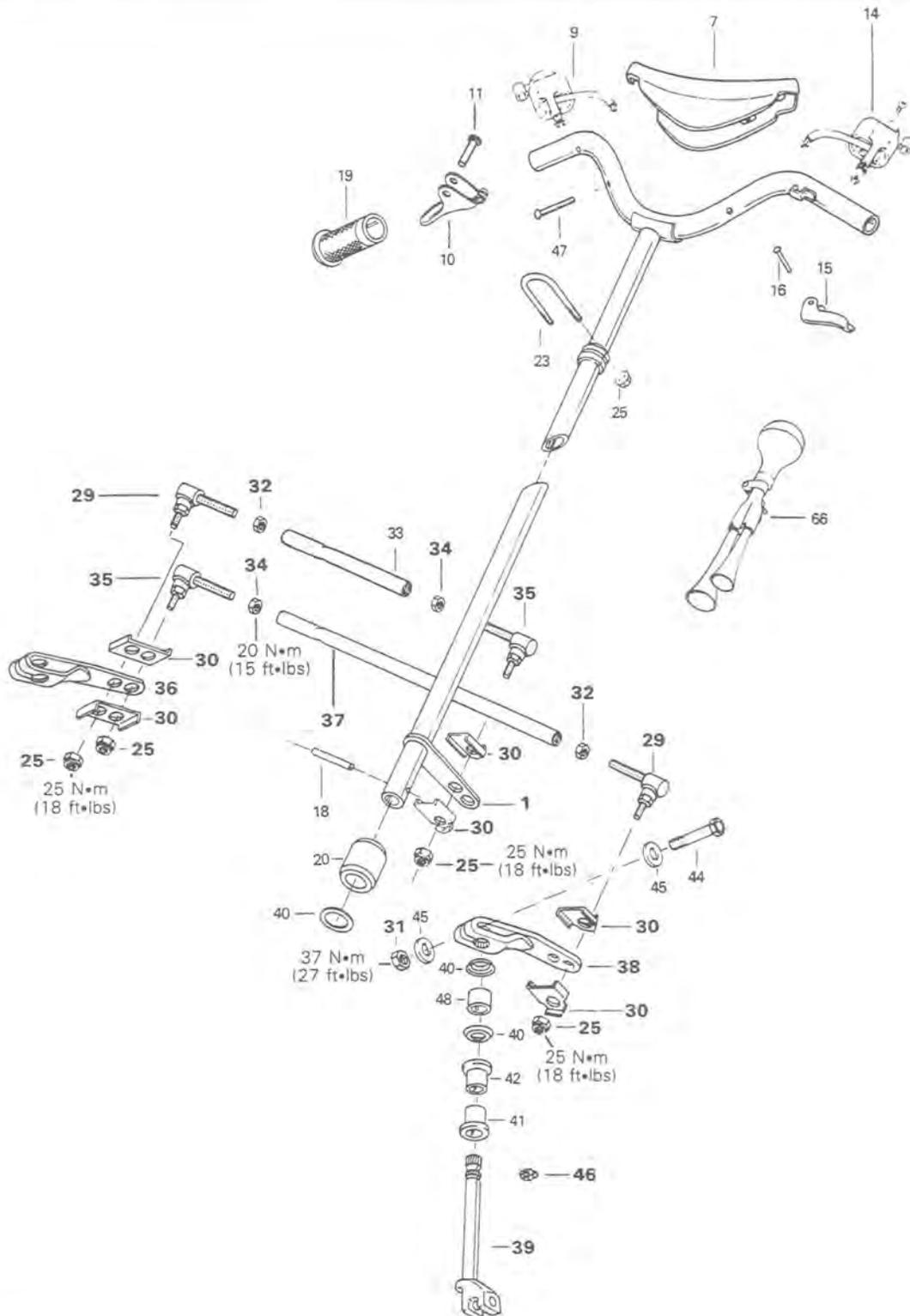
Using #529 004 500 tool (with two standard jigs)

Tilt vehicle on its side to expose the track notches then place insert into position.

NOTE: Skandic "R" track has a cleat guide at every two pitches instead of three.

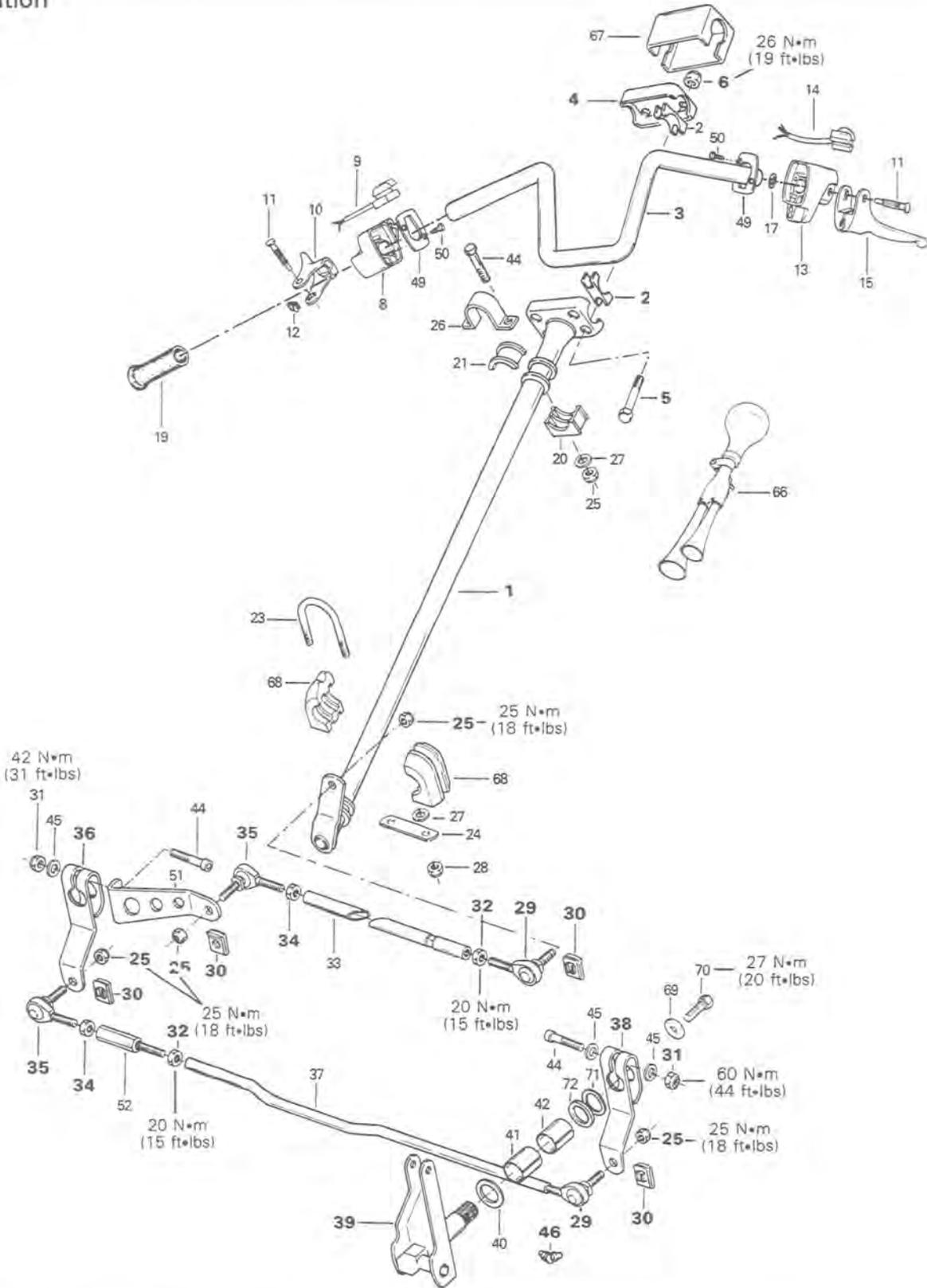
STEERING SYSTEM

Elan



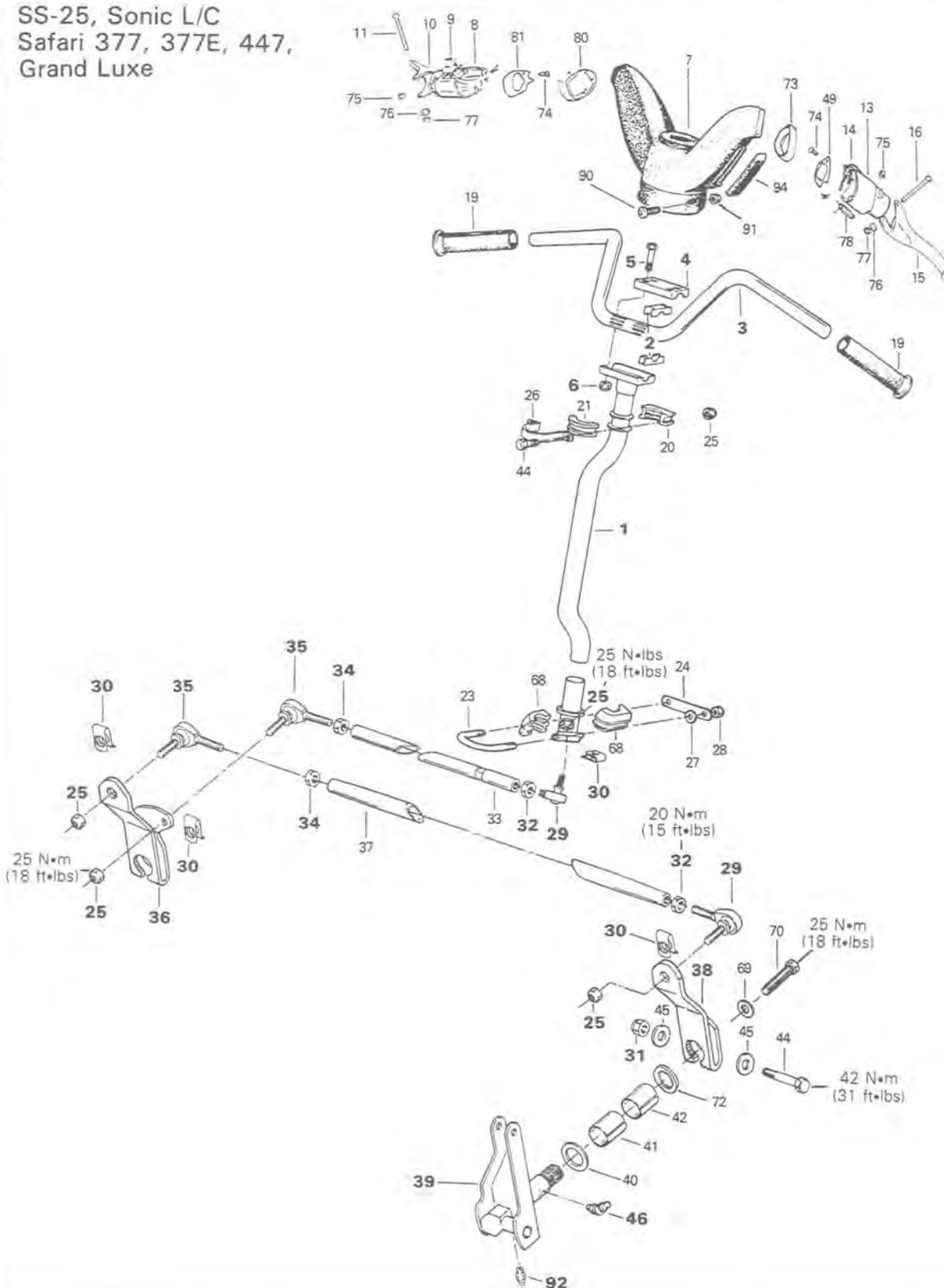
SECTION 06 STEERING/SKIS
SUB-SECTION 01 (STEERING SYSTEM)

Citation



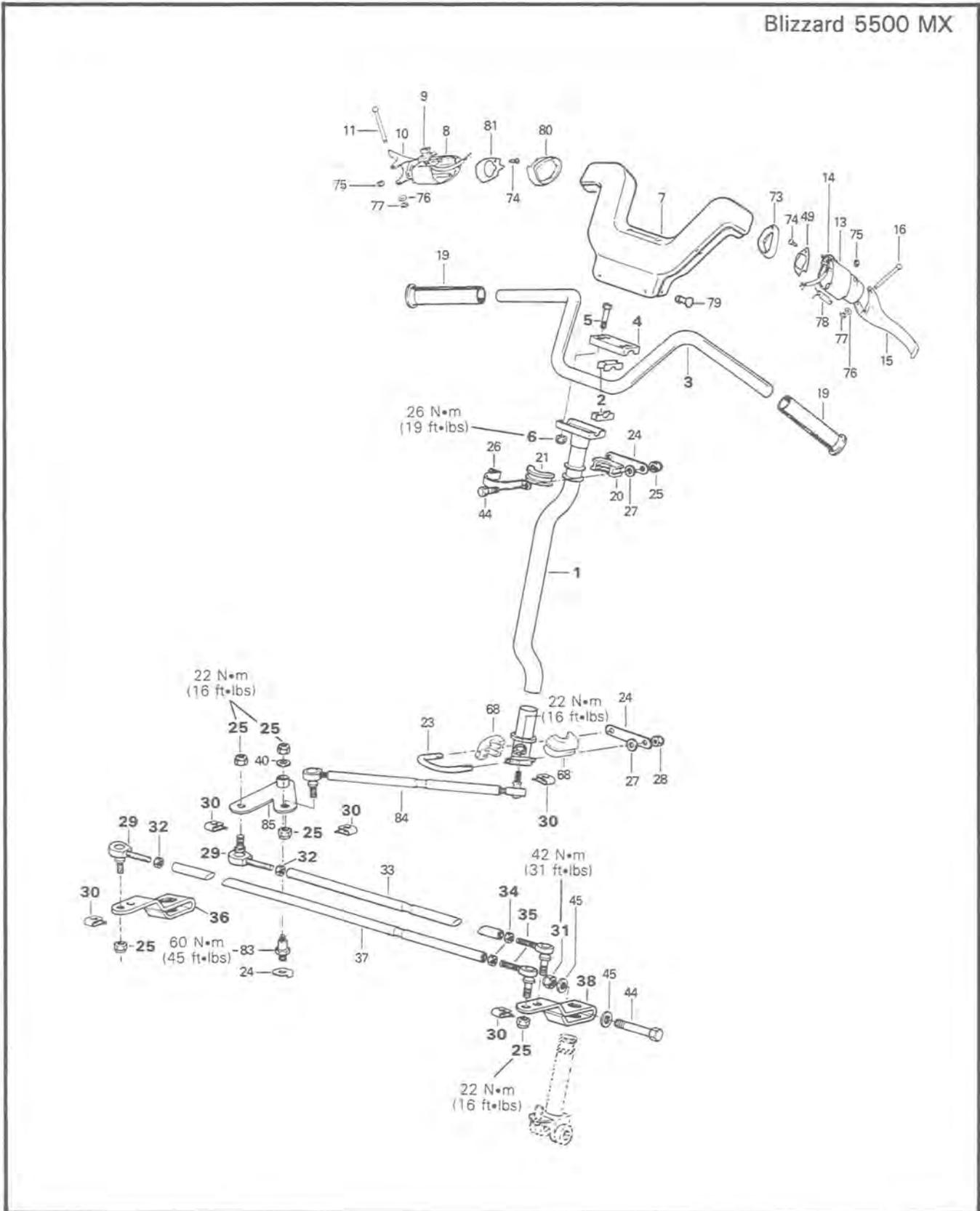
SECTION 06 STEERING/SKIS
 SUB-SECTION 01 (STEERING SYSTEM)

SS-25, Sonic L/C
 Safari 377, 377E, 447,
 Grand Luxe



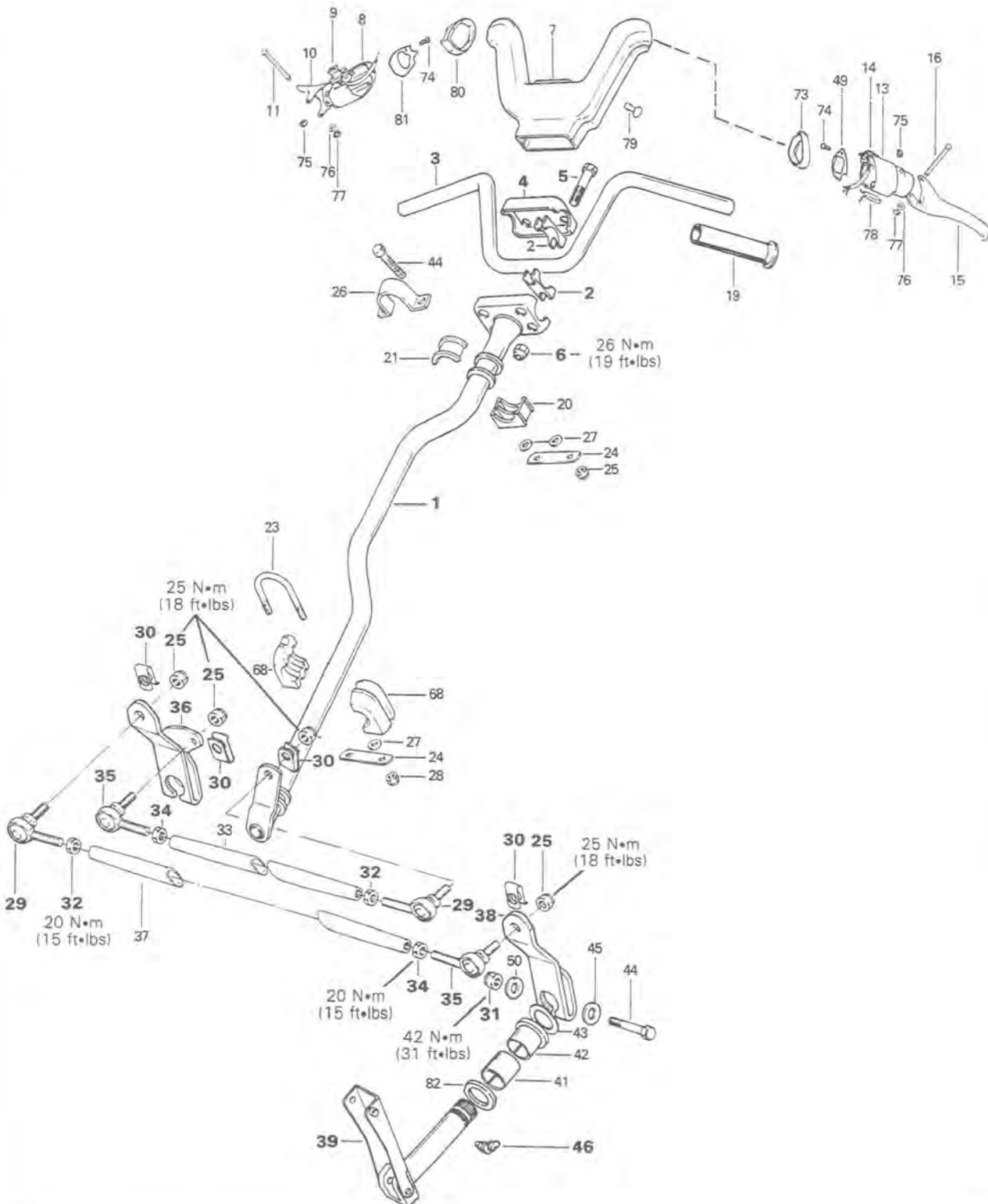
SECTION 06 STEERING/SKIS
SUB-SECTION 01 (STEERING SYSTEM)

Blizzard 5500 MX



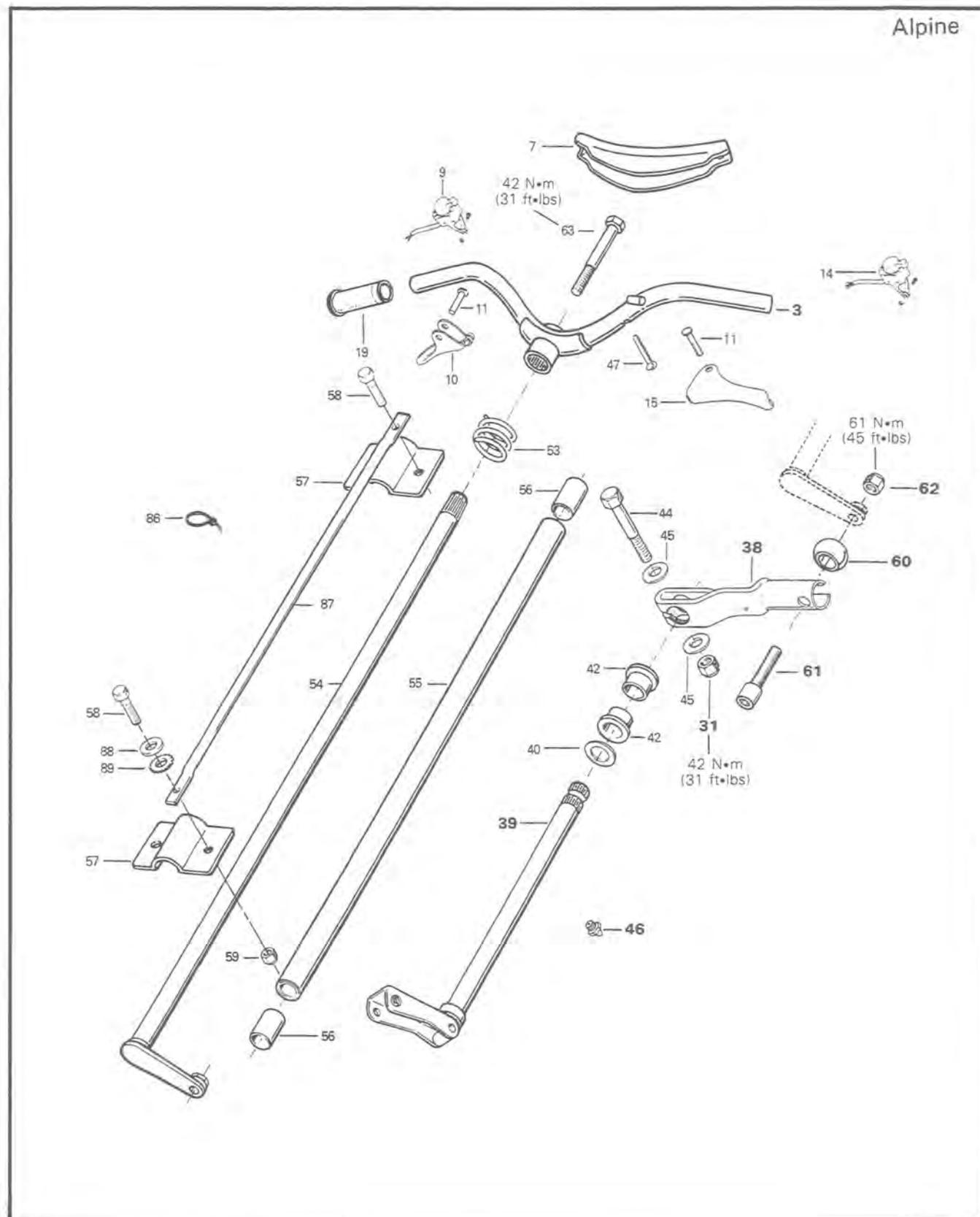
SECTION 06 STEERING/SKIS
 SUB-SECTION 01 (STEERING SYSTEM)

Blizzard 9700



SECTION 06 STEERING/SKIS
SUB-SECTION 01 (STEERING SYSTEM)

Alpine



SECTION 06 STEERING/SKIS

SUB-SECTION 01 (STEERING SYSTEM)

1. Steering column
2. Handlebar support
3. Handlebar
4. Steering clamp
5. Cap screw
6. Elastic stop nut
7. Steering pad
8. Throttle handle housing
9. Emergency cut-out switch
10. Throttle handle
11. Pin
12. Retainer
13. Brake handle housing
14. Dimmer switch
15. Brake handle
16. Pin
17. Push nut
18. Spiral pin
19. Grip
20. Lower bushing
21. Upper bushing
22. Retainer bracket
23. "U" clamp
24. Lock tab
25. Elastic Stop Nut
26. Retainer bracket
27. Flat washer
28. Elastic stop nut
29. Ball joint L.H.
30. Lock tab
31. Elastic stop nut
32. Jam nut L.H.
33. Tie rod
34. Jam nut R.H.
35. Ball joint R.H.
36. Steering arm
37. Tie rod
38. Steering arm
39. Ski leg
40. Washer
41. Bushing
42. Bushing
43. Shim
44. Cap screw
45. Flat washer
46. Grease fitting
47. Screw
48. Rubber spacer
49. Housing cap
50. Screw
51. Steering arm extension
52. Turnbuckle
53. Spring
54. Steering shaft (main)
55. Steering housing
56. Bushing
57. Retainer bracket
58. Bolt
59. Nut
60. Ball bushing
61. Allen bolt
62. Nut
63. Cap screw
64. Rivet
65. Parking handle
66. Horn
67. Steering cover
68. Bushing
69. Flat washer 8.4 x 25
70. Cap screw
71. Spring washer
72. Washer 7/8"
73. Brake adaptor
74. Self tapping screw
75. Set screw
76. Washer
77. Circlip
78. Brake light switch
79. Dart
80. Throttle adaptor
81. Throttle cover
82. Brass washer
83. Pivot (stud)
84. Tie rod
85. Pivot arm
86. Tie rap
87. Retainer brace
88. Flat washer
89. External tooth lockwasher
90. Bolt
91. Nut
92. Grease fitting
93. Driven pulley holder clamp
94. Clip

INSPECTION

Check skis and runner shoes for excessive wear, replace as necessary. (See section 06-02.)

36,38,39, Steering arms & ski legs

Make sure steering arm and ski leg splines interlock.

Check general condition of steering system.

Check general condition of steering system components for wear and replace if necessary.

DISASSEMBLY & ASSEMBLY

19, Grips

Grips can be removed and installed without any damage by injecting compressed air into the handlebar.

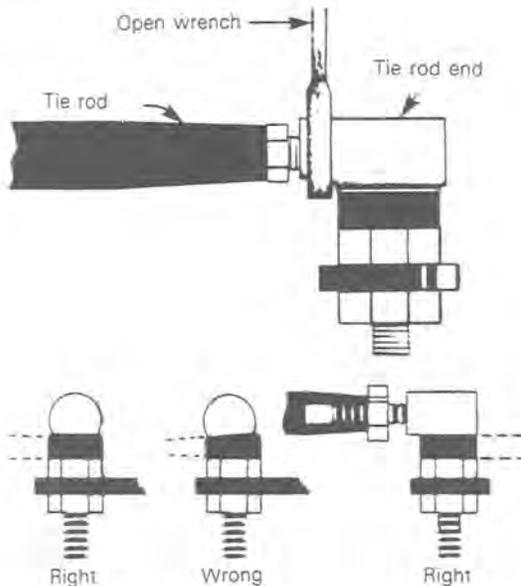
Another way to install grips consists in soaking them in soapy water (detergent for dishes) and in pushing them onto the handlebar with a soft hammer.

29,35, Ball joints

Inspect ball joint ends for wear or looseness, if excessive, replace.

○ **NOTE:** Screw the longest threaded end of ball joint into the tie rod, ensure that half of the total number of threads are inserted into the tie rod.

The cut-off section of the tie rod end must run parallel with the horizontal line of the steering arm when assembled on vehicle. The tie rod end should be restrained when tightening tie rod end lock nut. For torque specifications see illustrations.



30, Lock tabs

When assembling components, always position new lock tabs.

36,38, Steering arms

The steering arm angles should be equal on both sides when skis are parallel with vehicle.

25,30, Ball joint nuts & lock tabs

Tighten ball joint nuts to specified torque and bend lock tabs over nuts. (See illustration.)

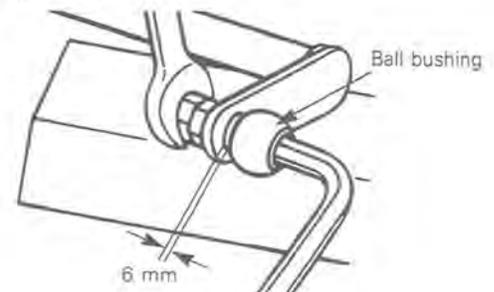
30,31, Steering arm nuts & lock tabs

Tighten steering arm nuts to specified torque and bend lock tabs over nuts. (See illustration.)

Alpine

60,61,62, Ball bushing, Allen bolt & nut

Affix the ball bushing to steering shaft using appropriate Allen head bolt. Tighten bolt until there is approximately 6 mm (1/4") free-play existing between ball bushing and steering shaft.



Torque nut to 61 N•m (45 ft•lbs)

ADJUSTABLE HANDLEBAR

1,3, Steering column & handlebar

If applicable, remove the steering clamp and nuts holding the handlebar to the steering column.

2,4,5,6, Handlebar support, steering clamp, bolts & nuts

Install the four (4) handlebar support, steering clamp, the four (4) screws and nuts to the column, as illustrated.

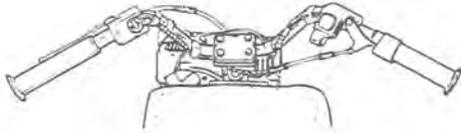


On all vehicles, adjust the steering handle to the desired position.

Lock the handle in place by tightening the four (4) screws to 26 N•m (19 ft•lbs).

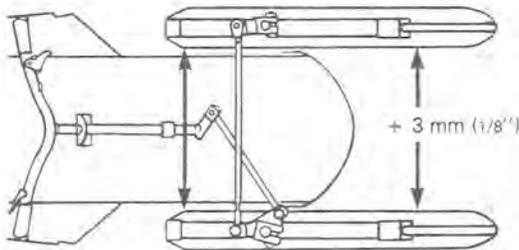
▼ **CAUTION:** Tighten the screws equally in a criss-cross sequence and ensure there is an equal gap on each side of the clamps.

SECTION 06 STEERING/SKIS SUB-SECTION 01 (STEERING SYSTEM)



◆ **WARNING:** Do not adjust the handlebar too high to avoid contact between the brake lever and windshield, when turning.

STEERING ADJUSTMENT (SKIS)



Skis should have a toe out of 3 mm (1/8''). To check, measure distance between each ski at front and rear of skis. The front distance should be 3 mm (1/8'') more than the rear when the handlebar is horizontal. If adjustment is required:

32,34, Tie rods jam nuts

Loosen the jam nuts locking the tie rod(s) in place. Turn tie rod(s) manually until alignment is correct. Tighten jam nuts firmly.

IMPORTANT: Close front of skis manually to take all slack from steering mechanism.

All models (except Alpine)

Check that handlebar is horizontal while skis are parallel with the vehicle. To correct loosen shorter tie rod jam nuts.

Turn tie rod manually until handlebar is horizontal.

Tighten jam nuts firmly.

Alpine

38,39, Steering arm & ski leg

When assembling steering arm and ski leg the handlebar must be horizontal with the ski in line with the vehicle.

LUBRICATION

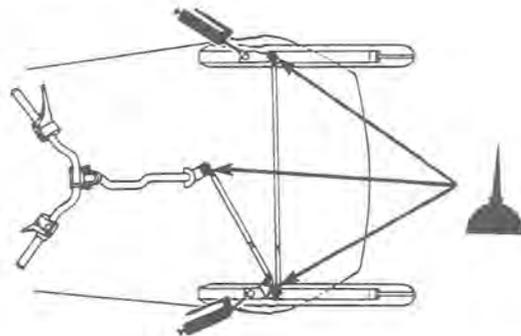
◆ **WARNING:** Do not lubricate throttle and/or brake cable and housings, and spring coupler bolts.

46,92, Ski leg & grease fittings

Using low temperature grease only.

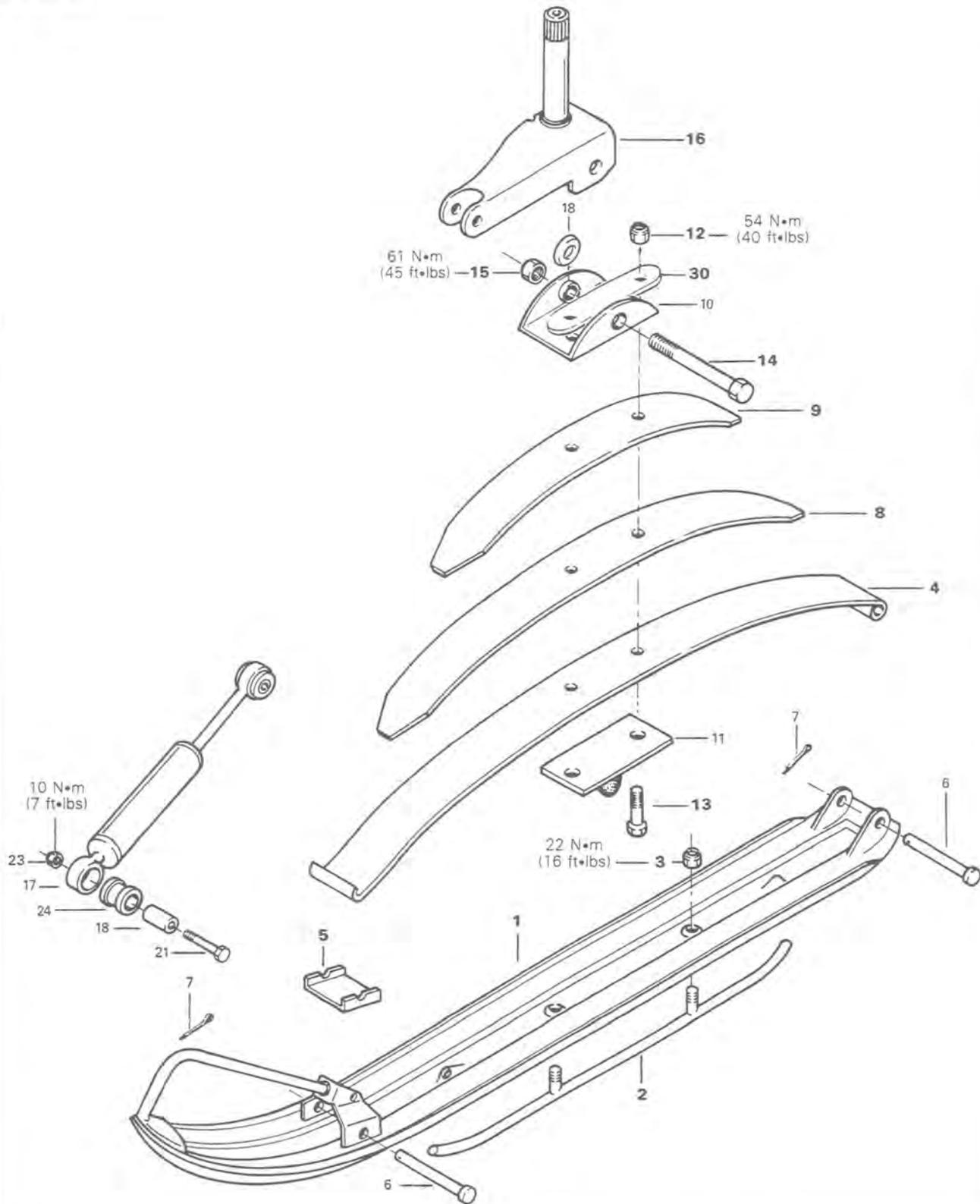
Lubricate the ski legs at grease fittings until new grease appears at joints. Lubricate tie rod end ball joints.

(TYPICAL)



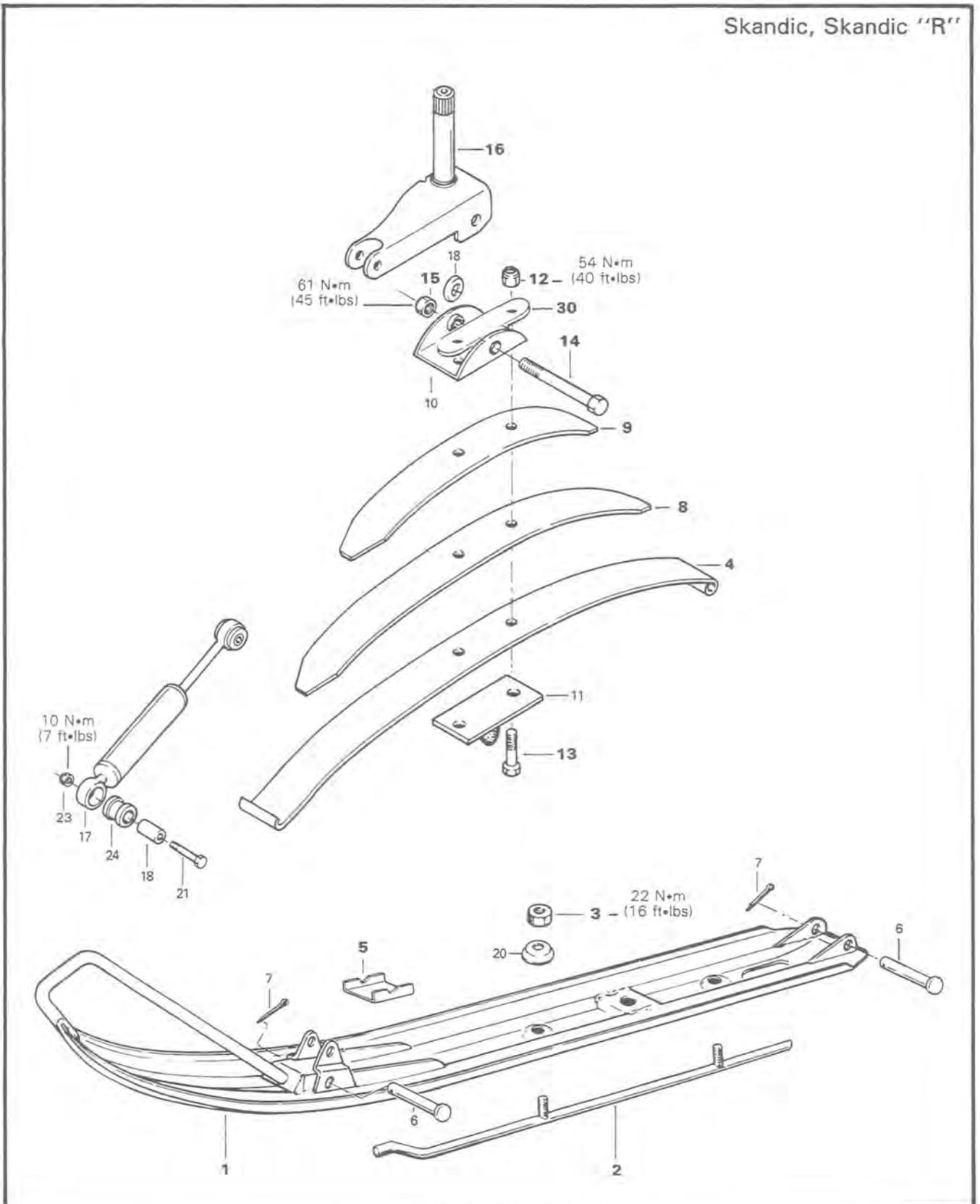
SECTION 06 STEERING/SKIS
SUB-SECTION 02 (SKI SYSTEM)

Citation



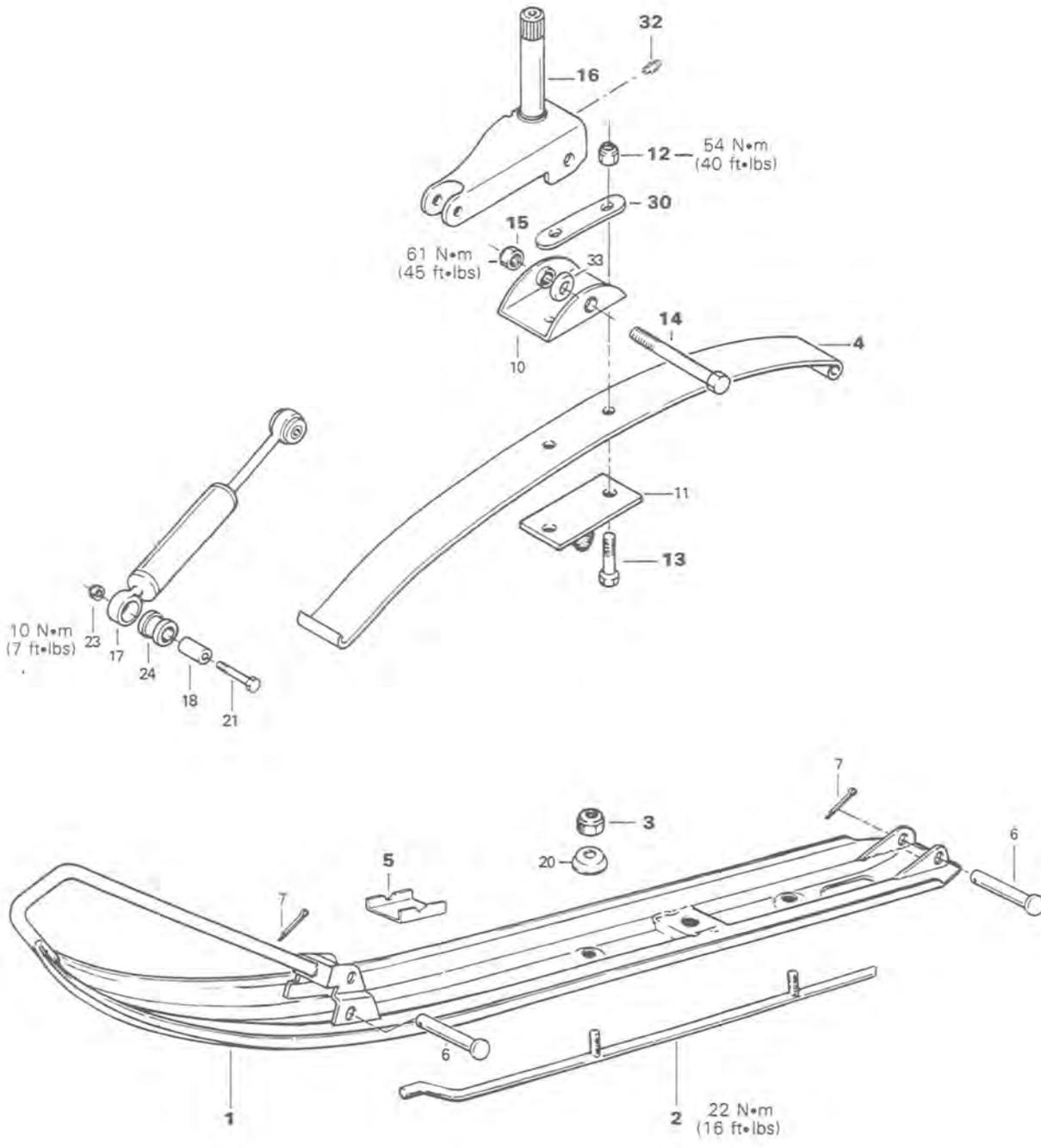
SECTION 06 STEERING/SKIS
SUB-SECTION 02 (SKI SYSTEM)

Skandic, Skandic "R"



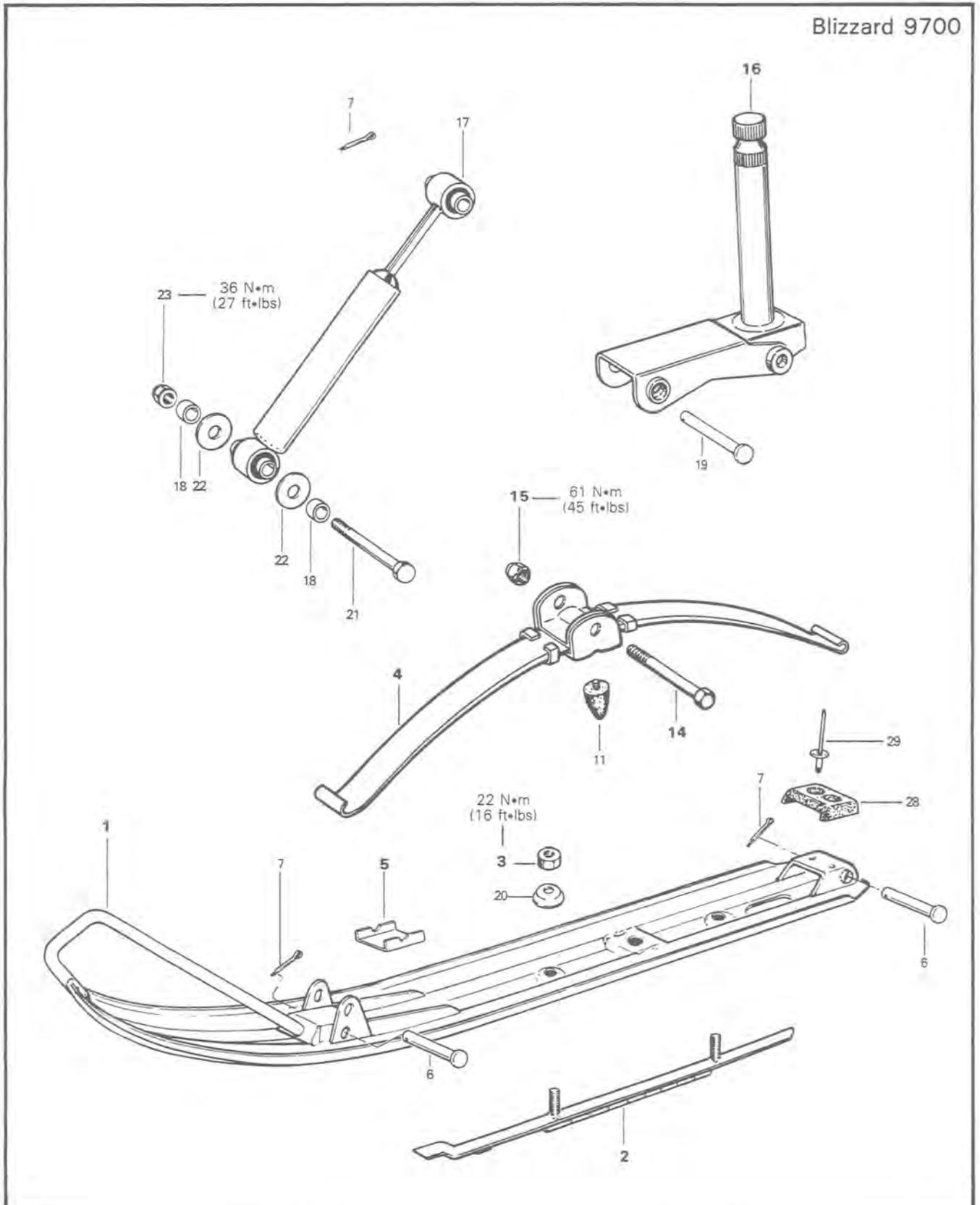
SECTION 06 STEERING/SKIS
SUB-SECTION 02 (SKI SYSTEM)

SS-25, Sonic L/C
Safari 377, 377E, 447, Grand Luxe



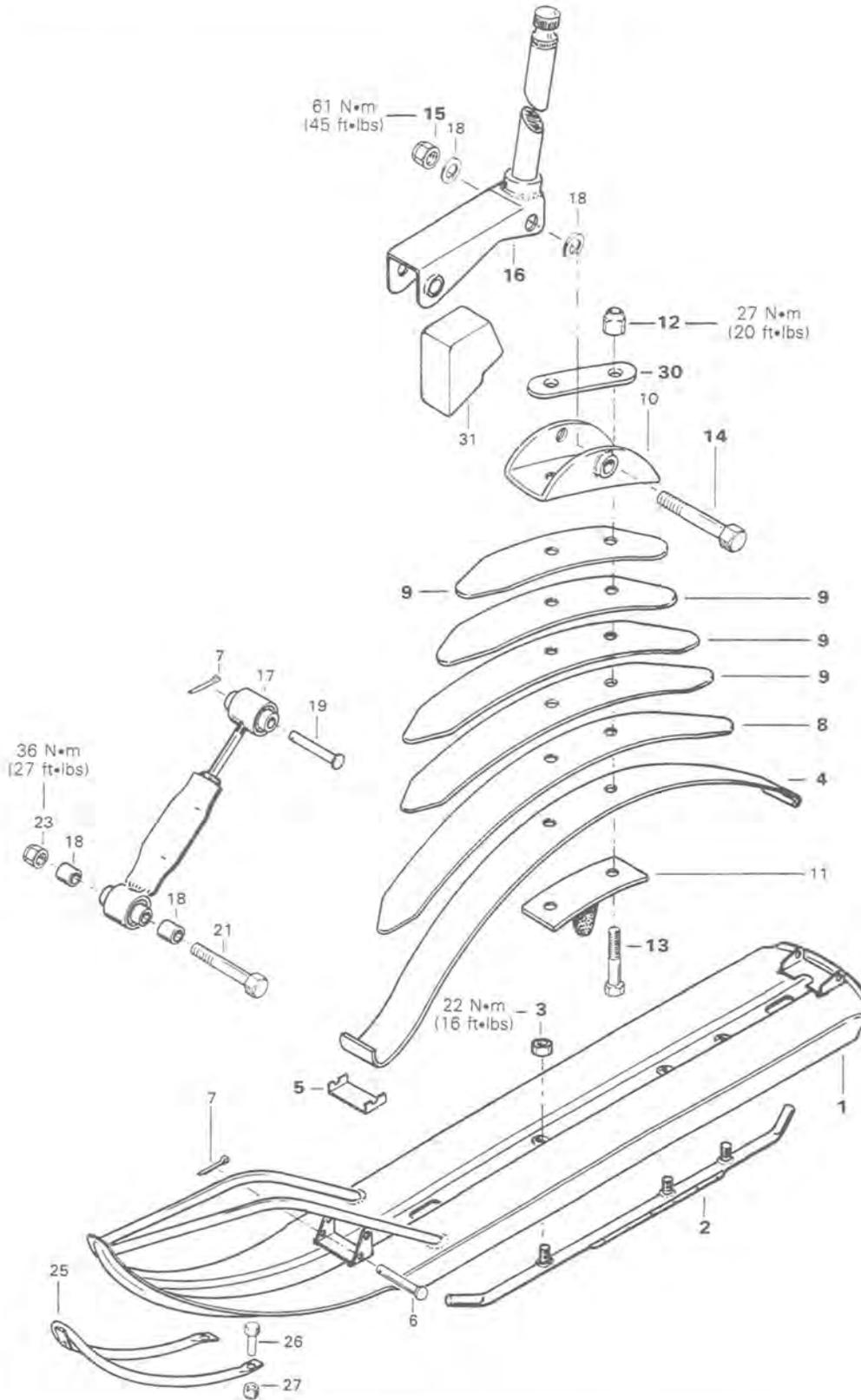
SECTION 06 STEERING/SKIS
SUB-SECTION 02 (SKI SYSTEM)

Blizzard 9700



SECTION 06 STEERING/SKIS
SUB-SECTION 02 (SKI SYSTEM)

Alpine



1. Ski
2. Runner shoe
3. Nut
4. Main spring leaf
5. Spring slider cushion
6. Retainer pin
7. Cotter pin
8. Auxiliary spring leaf
9. Auxiliary spring leaf
10. Spring leaf coupler
11. Rebound stopper
12. Nut
13. Bolt
14. Bolt
15. Nut
16. Ski leg
17. Shock

18. Spacer
19. Retainer pin
20. Cup
21. Bolt
22. Washer
23. Nut
24. Rubber bushing
25. Protector tube
26. Screw
27. Nut
28. Rubber bumper
29. Rivet
30. Tab lock
31. Ski bumper
32. Grease fitting
33. Friction cup

INSPECTION

1,2, Skis & runner shoes

Check skis and runner shoes for excessive wear, replace if necessary.

16, Ski leg

Make sure steering arm and ski leg splines interlock.

Check general condition of steering system components for wear and replace if necessary.

DISASSEMBLY & ASSEMBLY

2, Runner shoes

◆ **WARNING:** Observe caution while prying or removing steel runner shoes from ski slots as the shoes are under tension. Check that ski runner shoes are not worn more than half of their original thickness.

Replace runner shoes when half worn.

3, Runner shoe nuts

On Elan vehicle, torque to 7 N•m (5 ft•lbs). On all others vehicles, torque to 22 N•m (16 ft•lbs).

4,8,9, Main and auxiliary leaf springs

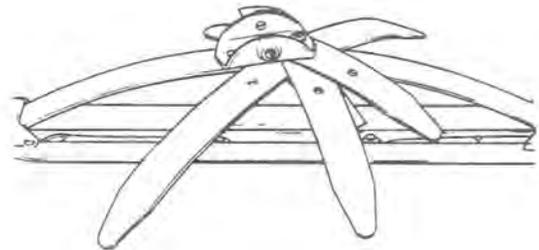
▼ **CAUTION:** When disassembling leaf coupler from spring leaves be careful of leaf tension.

12,13,30, Nut, bolt & tab lock

When assembling spring leaves, cross each and temporarily insert one (1) nut and bolt (for Elan, Citation, Skandic, Skandic "R", SS-25, Sonic L/C, Safari 377/E, 447,

Grand Luxe and Alpine models install a tab lock), then position them parallel to each other and install remaining bolt and nut. Tighten nuts to specified torque and for models equipped with a tab lock bend the tab over the nuts.

◆ **WARNING:** Should removal of a nylon lock nut be required when undergoing repairs/disassembly, always replace by new ones. Tighten as specified.



5, Spring slider cushions

Apply lithium grease on spring slider cushions at least once a year.

14,15, Spring coupler bolt & nut

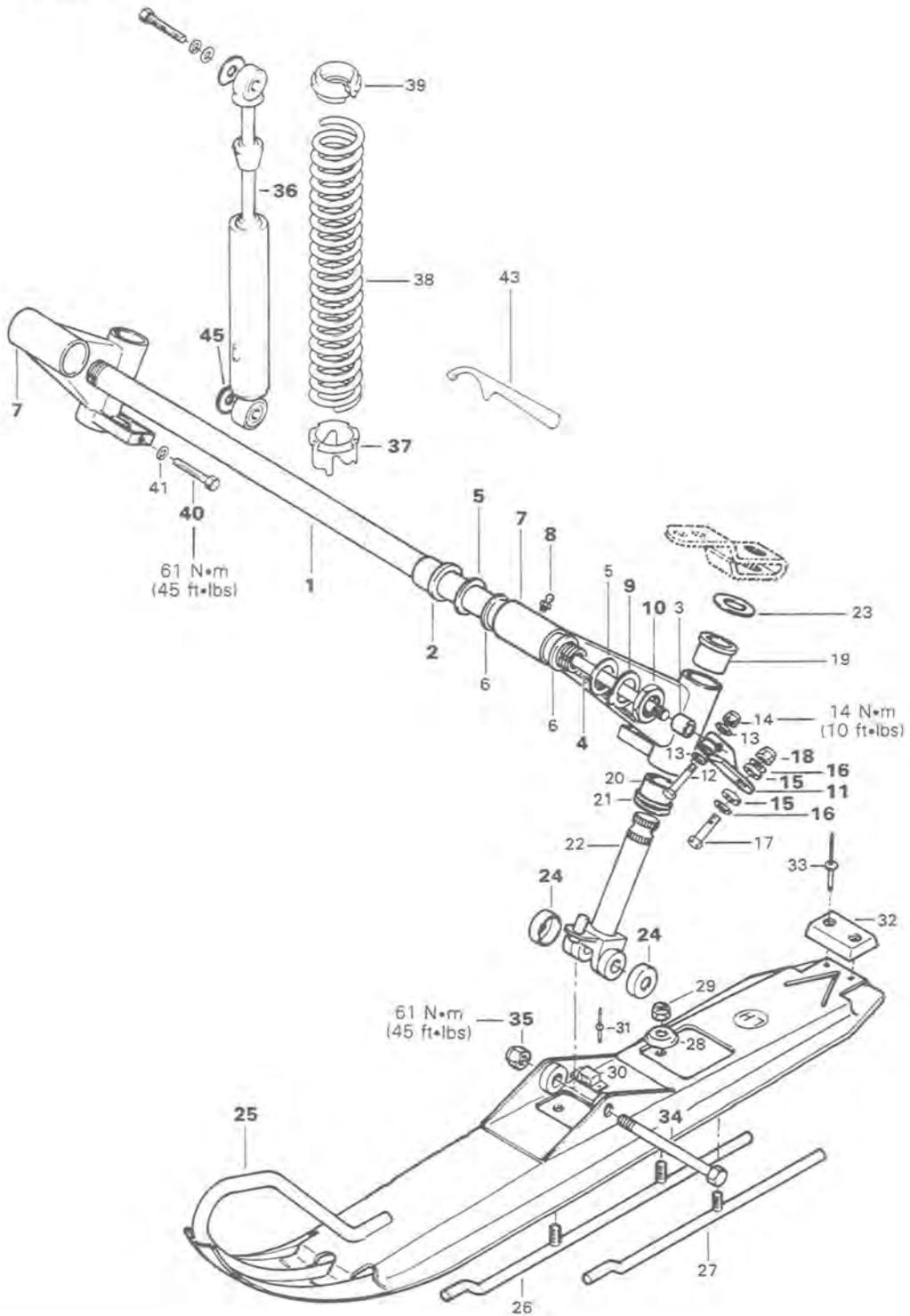
Torque bolt and move ski by hand to check that it pivots on ski leg. Torque locking nut to 61 N•m (45 ft•lbs). For all models.

32, Grease fitting

On SS-25, Sonic L/C and Safari 377/E, 447, Grand Luxe models lubricate ski leg through grease fitting.

MX SUSPENSION

Blizzard 5500 MX



1. Tube
2. Bushing
3. Bushing
4. Stabilizer bar
5. Shim
6. Bushing
7. R.H. swing arm
L.H. swing arm
8. Grease fitting
9. Lock tab
10. Nut
11. R.H. stabilizer arm
L.H. stabilizer arm
12. Hexagonal head cap screw
13. Flat washer
14. Hexagonal elastic stop nut
15. Rubber washer
16. Flat washer
17. Hexagonal head cap screw
18. Hexagonal elastic stop nut
19. Bushing
20. Bushing
21. Brass washer
22. Ski leg

23. Shim
24. Friction cup
25. R.H. ski
L.H. ski
26. Inner runner shoe
27. Outer runner shoe
28. Cup
29. Hexagonal eslock nut
30. Stop banding
31. Rivet
32. Protector
33. Rivet
34. Hexagonal head cap screw
35. Hexagonal elastic stop nut
36. Damper
37. Adjuster ring
38. Spring
39. Spring collar
40. Hexagonal head cap screw
41. Lockwasher 3/8"
42. Flat washer 13/32" x 7/8"
43. Adjuster wrench
44. Flat washer
45. Special washer

R.H.: Right hand side
L.H.: Left hand side

DISASSEMBLY

Lift front end of vehicle off the ground and rest on a stand.

25, Skis

Remove skis.

Rivets

Remove rivets of the side pan plastic caps.

36, Dampers

Remove dampers.

11, Stabilizer arm

Remove one stabilizer arm.

4,11, Stabilizer bar & stabilizer arm

Disconnect the other stabilizer arm from the swing arm and pull out stabilizer bar.

5,9,10, Shims, lock tabs & nuts

Open lock tab and remove nuts, lock tabs, shims.

1,7, Stabilizer tube & swing arms

Slip both swing arms from stabilizer tube.

1, Stabilizer tube

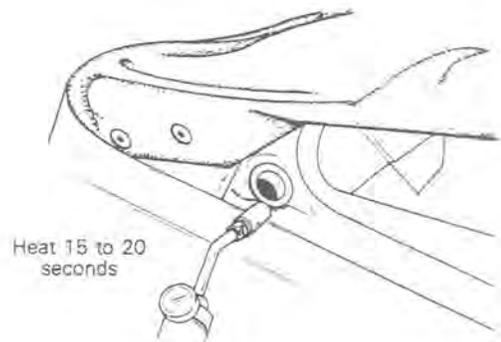
Pull out stabilizer tube.

Bushing replacement

2, Bushings

If it is necessary to change the bushing(s) proceed as shown:

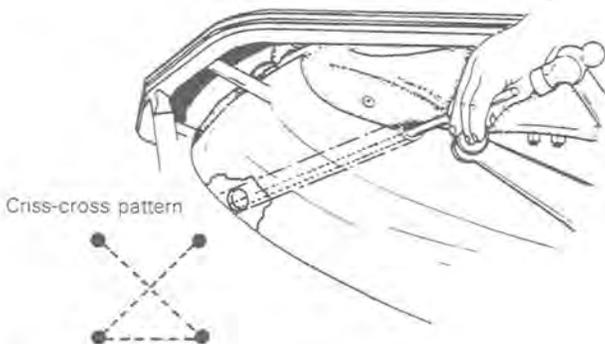
Heat bushing with propane torch (approximately 15-20 seconds) to break Loctite bond.



SECTION 06 STEERING/SKIS

SUB-SECTION 02 (SKI SYSTEM)

Using a steel bar, remove bushing.



CAUTION: Always push out bushing in a criss-cross pattern.

CLEANING

Clean all metal components in a non ferrous metal cleaner.

2, Bushings

Clean bushing seat with Loctite Safety Solvent or Acetone.

WARNING: This procedure must be performed in a well ventilated area.

SHOCK SERVICING

See section 05-02.

CAUTION: The front and rear shocks have different valving calibration and therefore must not be interchanged. Ensure that the shocks are properly positioned. Refer to the part number stamped on the shock body. (Front shock: P/N 414 4664 00 and rear shock: P/N 414 4764 00.)

ASSEMBLY

2, Bushings

Apply Loctite RC 680 or equivalent on bushing and seat and push bushing in using appropriate pusher or a piece of wood.

Repeat for the other bushing.

1,5,7, Stabilizer tube, shims & swing arms

Reinstall stabilizer tube, shims, swing arms.

1,10, Stabilizer tube & nuts

Hand tighten nuts so that stabilizer tube threads exceed equally on both sides.

Torque nut to 35 N•m (26 ft•lbs), unscrew and retorque to 1 N•m (0.7 ft•lbs).

WARNING: Do not exceed 1 N•m (0.7 ft•lbs) on final torquing of nut.

9, Lock tabs

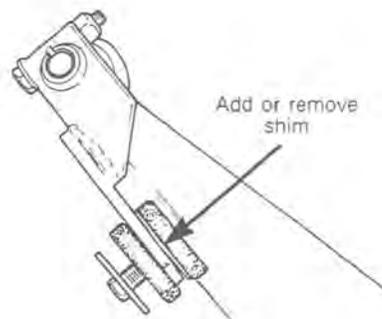
Bend lock tabs.

4, Stabilizer bar

Reinstall stabilizer bar.

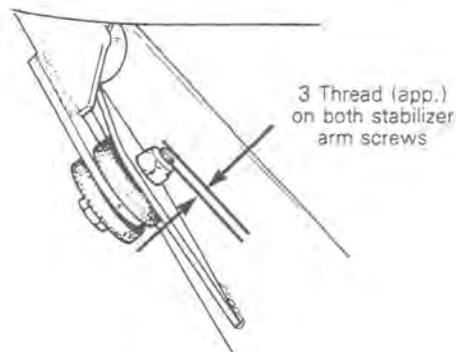
7,11,15,16, Swing arms, stabilizer arms, rubber washers, flat washers

Reinstall stabilizer arm so that it is parallel to the other arm. In order to avoid tension on stabilizer bar add or remove shim between rubber washer and swing arm.



11,18, Stabilizer arms & elastic stop nuts

Tighten stabilizer arm nuts equally on both arms.

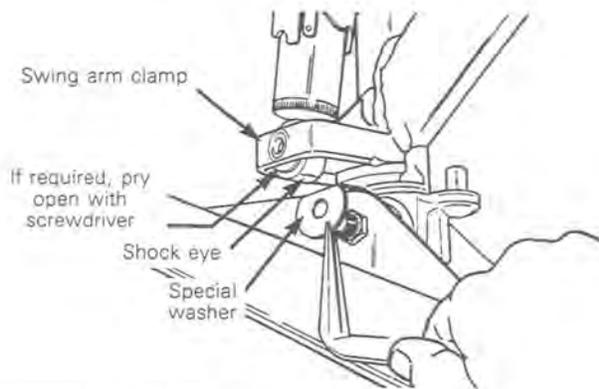


Shock installation

40,45, Cap screws & special washers

Reinstall shocks absorber as shown. Torque the screws to 61 N•m (45 ft•lbs).

Lower shock bushing



Upper shock bushing



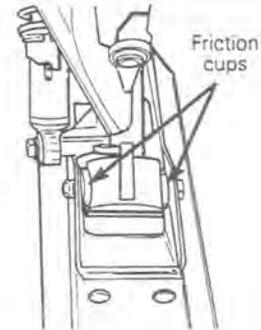
WARNING: Ensure to install the special washer as illustrated, or the shock absorber rubber bushings may slip out of their shock eye.

Secure side pan plastic caps with new rivets.

Ski installation

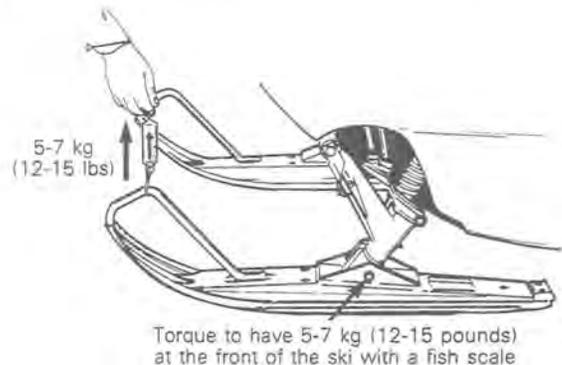
24,34,35, Friction cups, bolt & nut

Position the skis with a friction cup on each side of the ski leg. Do not put any grease in the friction cups.



Install the ski leg/coupler bolt and torque to obtain 5-7 kg (12-15 lbs) on the lift tube at the front of the ski.

NOTE: You must pull on the ski at an angle of 90° with the ski surface. (Front of vehicle "Off" the ground.)



35, Elastic stop nut

Torque the elastic stop nut on the ski leg coupler to 60-67 N•m (44-50 ft•lbs).

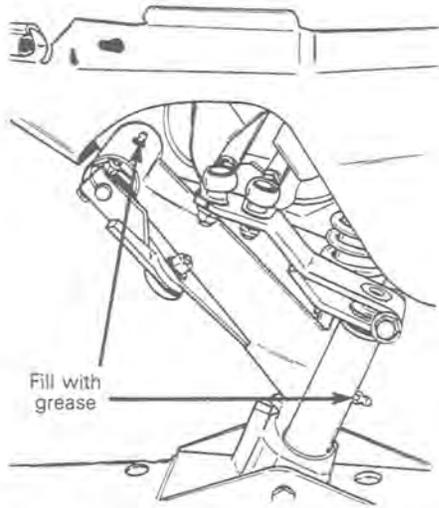
For the skis alignment, see section 06-01.

Lubrication

8, Grease fittings

Using low temperature grease only, lubricate swing arms and ski leg until grease appears at joints. After the operation wipe all excess grease from the swing arm and ski leg housing.

SECTION 06 STEERING/SKIS
SUB-SECTION 02 (SKI SYSTEM)

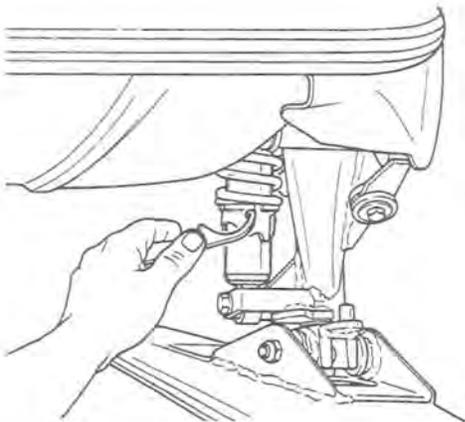


○ **NOTE:** The "ski system" must be greased at an interval of 1200 to 1600 kilometers (800 to 1000 miles).

FRONT SUSPENSION ADJUSTMENT

37, Adjuster ring

The front suspension may be pre-loaded by turning clockwise or counter-clockwise the shock absorber adjuster ring with the adjustment key.



Optional parts

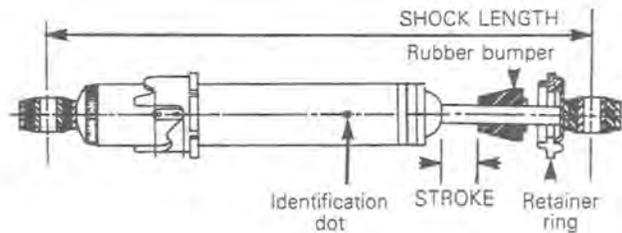
The front suspension may be tuned to the rider's specific requirement using the optional following parts:

- Shock springs P/N 503 0694 00 (see rear shock springs diagram, section 05-02),
- Carbide runners P/N 414 1964 00 can replace the standard short runner or can be installed on the optional skis.

▼ **CAUTION:** Optional parts are calibrated to be operated together. Failure to follow this recommendation may affect handling of the vehicle.

Front shocks specifications

	FRONT SHOCK (without spring)
Part number	414 4664 00
Stroke	13.20 cm (5.200'')
Length collapsed	23.78 cm (9.360'')
Length extended	36.98 ± 0.3 cm (14.560 ± 0.125'')
Colour code	Red dot



Cam adjustment

1st Position: Smooth ride — bumps 5 to 8 cm (2 to 3'') — 0 to 64 km/h (0 - 40 M.P.H.).

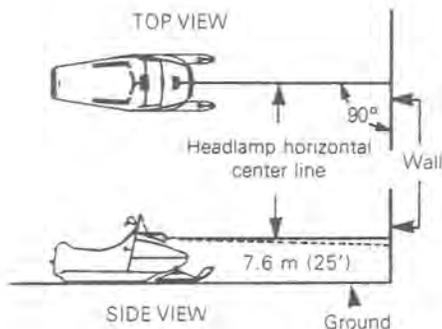
2nd Position: Medium ride — bumps 5 to 10 cm (2 to 4'') — 64 to 96 km/h (40 - 60 M.P.H.).

3rd Position: Sport ride — bumps 10 cm (4'') and more — 96 km/h (60 M.P.H.) and more.

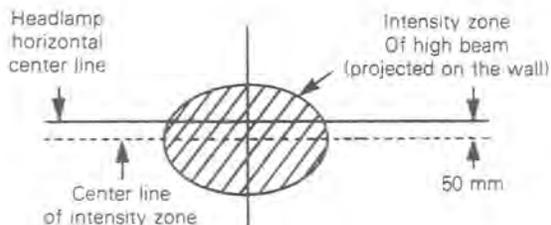
HOOD

HEADLAMP BEAM AIMING

Place the vehicle on a flat surface 7.6 m (25') from a wall or screen.



With the suspension correctly adjusted, the rider seated on the vehicle and the high beam ON (engine must be running on manual start models), check that the center of the high intensity zone of the high beam is 50 mm (2") below the horizontal line of the headlamp height.



To adjust, remove headlamps ring or adjusting screw caps, turn the upper or lower adjusting screws to obtain the desired beam position.

BULB REPLACEMENT

If headlamp is burnt, tilt cab, unplug the connector from the headlamp. Remove the rubber boot and unfasten the bulb retainer clips. Detach the bulb and replace. If the tailing bulb is burnt, expose the bulb by removing red plastic lens. To remove, unscrews the two (2) Phillips head screws. Verify all lights after replacement.

CAUTION: Never touch glass portion of an halogen bulb with bare fingers, it shorter it's operating life. If by any mistake you have touch the glass portion clean it with a glass cleaner that won't leave a film on the bulb.

HOOD MAINTENANCE

Clean the vehicle thoroughly, removing all dirt and grease accumulation.

CAUTION: Plastic alloy components such as fuel tank, windshield, hood, etc. can be cleaned using mild detergents or isopropyl alcohol. Do not use strong soaps, degreasing solvents, abrasive cleaners, paint thinners, etc.

NOTE: Apply wax on glossy finish of hood only. Protect the vehicle with a cover to prevent dust accumulation during storage.

CAUTION: If for some reason the snowmobile has to be stored outside it is necessary to cover it with an opaque tarpaulin. This caution will prevent the sun rays affecting the plastic components and the vehicle finish.

HOOD, CAB NOSE & BOTTOM PAN REPAIR

Hood, cab nose and bottom pan are made of fiberglass or different plastic products. Refer to table below to see what parts are repairable or not.

SECTION 07 CHASSIS
SUB-SECTION 01 (HOOD)

		REPARABLE		IRREPARABLE	
		FIBERGLASS	R.I.M.	POLYCARBONATE	SURLYN
Elan	Cab			X	
Citation	Cab			X	
Skandic (R)	Cab			X	
Safari 377, 377E, 447	Cab			X	
	Cab nose				X
Grand Luxe	Bottom pan		*X		*X
SS-25	Cab	X			
Sonic L/C	Cab nose		X		
	Bottom pan		*X		*X
Blizzard 5500 MX	Cab	X			
Blizzard 9700	Cab	X			
Alpine	Cab	X			
	Bottom pan	X			

○ ***NOTE:** A few bottom pans on Safaris, SS-25 & Sonic L/C models are made of Surlyn (irreparable).

- Surlyn is stiffer than R.I.M.. Coloration is from one side to the other.
- R.I.M. is painted outside only, the inside is more grey.
- Surlyn bottom pan have an aluminum protection plate glued on the inner side, near the muffler.

For fiberglass parts different repair kits are available at your authorized dealer.

For R.I.M. urethane parts you can use two 3M products:

- 3M structural adhesive tube kit P/N 8101
- 3M flexible parts repair material P/N 05900
- For deeply scratched or tears R.I.M. surface:

Sand the damaged area with water sandpaper #600. Apply 3M structural adhesive P/N 8101 or flexible parts repair material P/N 05900.

Sand the dried surface with #800 or #1000. Lay a coat of polyurethane paint using the proper mix.

- For lightly scratched R.I.M. surface:

Sand the damaged area with water sandpaper #600. Lay a coat of polyurethane paint using the proper mix.

PAINT CODES

MODELS	COLOR	BRAND NAME & MIXTURE
Elan, Alpine:	Black semi gloss 20 gloss units	R.-M. Inmont "Super Max" enamel: 01-100 41-420 42-580 43-820 850-1000
Citation, Skandic, Blizzard:	Black high gloss 90 gloss units	R.-M. Inmont "Super Max" enamel: 01-100 41-500 42-700 43-1000
Sonic L/C:	Midnight blue	R.-M. Inmont "Super Max" enamel: 01-100 21-575 41-836 66-964 94-1000
Sonic L/C:	Orange for cab	R.-M. Inmont "Super Max" enamel: 01-100 94-150 72-550 79-1000
Alpine:	New ice orange for cab	R.-M. Inmont "Super Max" enamel: 01-100 72-738 79-963 94-1000
SS-25:	Yellow for cab	R.-M. Inmont lacquer acrylic: 90-100 172-642 190-747 179-784 142-800 100-1000

SECTION 07 CHASSIS

SUB-SECTION 01 (HOOD)

DECAL

To remove a decal, pull it off.

Clean the surface.

Apply liquid soap on the new decal. Position the decal and pass a sponge over it to remove air bubbles and water. Allow to air dry.

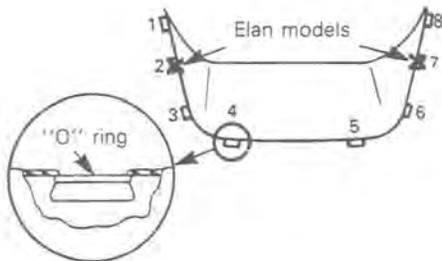
WINDSHIELD INSTALLATION

Elan, Citation, Safari 377/E, 447, Grand Luxe, Sonic L/C, SS-25, Alpine

Peel off protective film from windshield.

Position the windshield on the hood then push it down until the tabs are fully inserted into the hood slots. Lock the windshield tabs in position using the applicable "O" rings supplied in the kit.

NOTE: ELAN models: Do not install "O" rings on second and seventh tabs.



Skandic 377/R, Blizzard 5500 MX, Blizzard 9700

Position windshield on the hood then push down until tabs are fully inserted into hood slots.

Lock windshield tabs in position using the applicable "O" rings supplied in the kit.

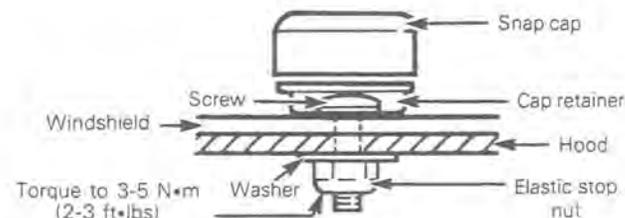
Properly seat the windshield in place.

Using windshield holes as a guide, drill 5 mm dia. (3/16") holes through the hood.

Clean the hood.

Peel off protective film from windshield.

Install the applicable windshield fixtures.



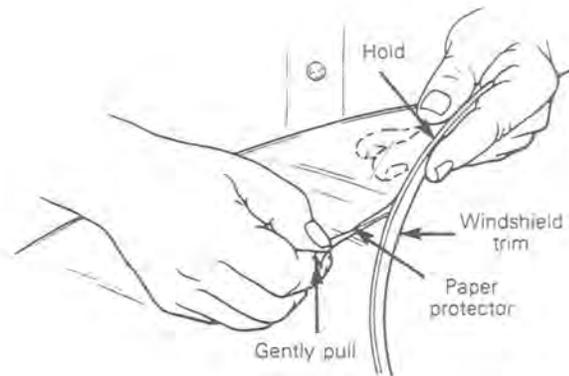
WINDSHIELD TRIM INSTALLATION

Elan, Citation, Skandic, Blizzard 5500 MX, Blizzard 9700 & Alpine

Using a rag, clean windshield mating surface.

Install trim with it's paper protector on windshield outside portion.

Gently pull out the paper protector as shown:



Ensure the trim is in place and adhere properly to windshield.

Cut excess trim length.

CAB NOSE INSTALLATION

Safari 377/E, 447, Grand Luxe

Put cab nose attachment in cab nose.

Install it on cab torquing the nuts to 1.2 to 2.0 N•m (0.9 to 1.5 ft•lbs).

CAUTION: Torque is important, it prevent cab deformation.

Sonic L/C, SS-25

Torque bolt to 2.0 to 2.8 N•m (1.5 to 2.0 ft•lbs).

CAUTION: Torque is important, it prevent cab nose insert to come off.

RETRACTABLE HEADLAMP ADJUSTMENT

Safari 377/E, 447, Grand Luxe

Assemble all retractable headlamp mechanism without bolting gear cover.

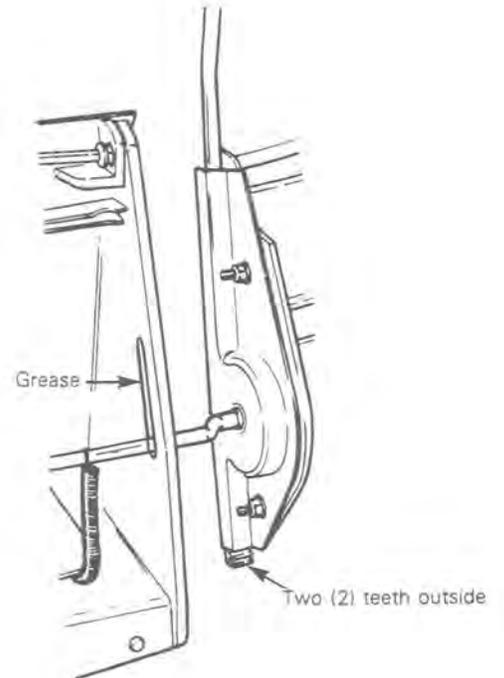
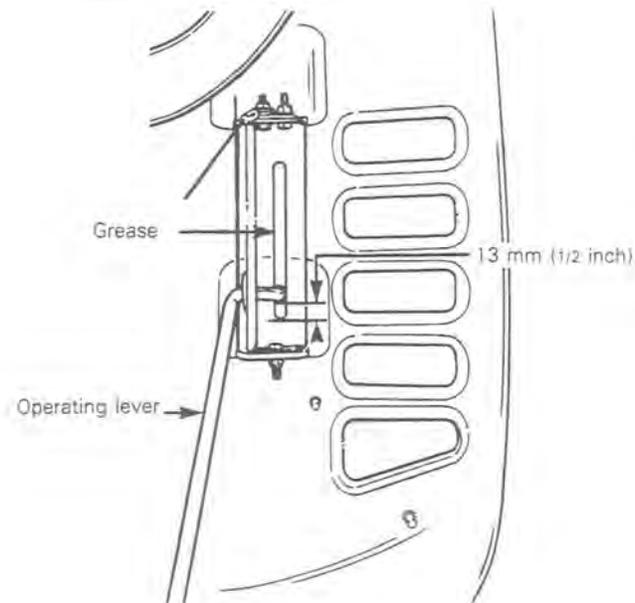
Place the rack on the pinion.

Good rack and pinion adjustment is correct when you open the headlamp housing and feel a second step that lock housing in place.

Two reference points are necessary to achieve that adjustment (see illustration below):

- Operating lever must be located 13.0 mm (1/2 inch) before cab slot end when headlamp housing is open.
- Rack must have two teeth outside gear cover when headlamp housing is open.

Tighten gear cover.



CAUTION: Make sure that headlamp housing is lock in place when you open it.

Lubricate the two headlamp housing slot, rack and pinion, and lever guide with low temperature grease.

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FRAME

FRAME CLEANING

Clean frame. For aluminum frame use only "Aluminum cleaner" and follow instructions on container. (Dursol cleaner or equivalent).

Touch up all metal spots where paint has been scratched off. Spray all bare metal parts of vehicle with metal protector.

Seat cleaning

For all 1984 models, it is recommend to clean the seat with a solution of soft soap/warm water and a soft cloth.

▼ **CAUTION:** Avoid use of harsh detergent such as strong soaps, degreasing solvents, abrasive cleaners, paint thinners, etc...they may cause damage to the seat cover.

Bottom pan repair

Some bottom pans are made of fiberglass or plastic products, to know if they are repairable or not and how to repair them refer to section 07 sub-section 01.

FRAME WELDING

Steel frame:

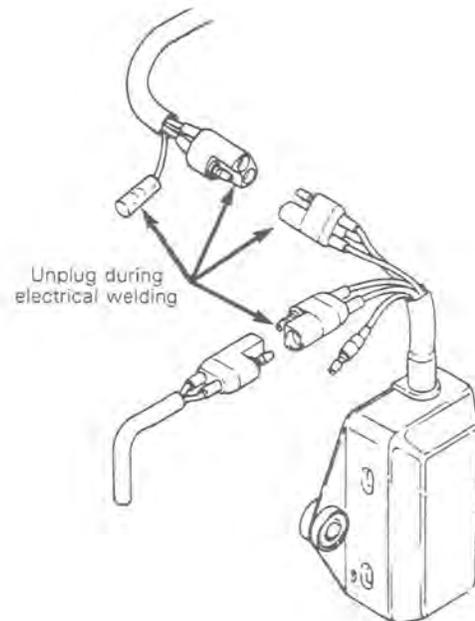
- Electric Welding
- Amperage: 70-110 Amp.
- Voltage: 20-24 volts
- Rod: E-7014 (3/32")

Aluminum frame: (refer to specialized welding shop)

- Argon-oxygen/acetylen welding
- Rod: ER-4043 (3/32")

▼ **CAUTION:** When electrical welding is to be performed anywhere on the vehicle, unplug the multiple connector at the electronic box prior to connecting the welding wire to the vehicle. This will protect the electronic box against damage caused by flowing current when welding.

○ **NOTE:** This procedure applies to all electronic ignition systems.



▼ **CAUTION:** When welding is to be performed near bottom pan of Sonic L/C, SS-25, Safari 377/E, 447, Grand Luxe, protect bottom pan against fire, sparks and excessive heat. R.I.M. bottom pan are flammable.



FUEL LINE, WIRING HARNESS & CABLE ROUTING

WIRING HARNESS (ALL MODELS)

◆ **WARNING:** Ensure all terminals are properly crimped on the wires and that all connector housings are properly fastened. Ensure to protect them from any rotating parts, moving parts, heating parts and vibrating parts.

CABLE (ALL MODELS)

◆ **WARNING:** Before installation, ensure that all cables are in perfect condition. Properly install the cable ends and secure them in place. Pay attention to route them properly, away of any rotating parts, moving parts, heating parts and vibrating parts.

FUEL LINE (ALL MODELS)

◆ **WARNING:** Always ensure that the fuel lines are properly fixed to the connectors, that they are not perforated or kinked and that they are properly routed, away of any rotating parts, moving parts, heating parts and vibrating parts.

○ **NOTE:** For the fixation of the fuel lines, use as required the following spring clips:

- Impulse hose to fuel pump and engine: 414 4152 00
- Fuel line to carburetor and fuel pump: 414 2786 00

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TECHNICAL DATA

SI* METRIC INFORMATION CHART

BASE UNITS		
DESCRIPTION	UNIT	SYMBOL
length	meter	m
mass	kilogram	kg
liquid	liter	l
temperature	celsius	°C
pressure	kilopascal	kPa
torque	Newton meter	N•m
speed	kilometer per hour	km/h

PREFIXES			
PREFIX	SYMBOL	MEANING	VALUE
kilo	k	one thousand	1,000
centi	c	one hundredth of a	0.01
milli	m	one thousandth of a	0.001

CONVERSION TABLE		
MULTIPLY	BY	TO OBTAIN
meter	39.370	inch
kilogram	2.205	pound
liter	0.264	U.S. gallon
liter	0.220	Imperial gallon
kilopascal	0.145	PSI
Newton meter	0.738	ft•lbs
kilometer	0.621	mile
$\text{Degrees Celsius} = \frac{5}{9} \times (\text{degrees Fahrenheit} - 32)$		

*THE INTERNATIONAL SYSTEM OF UNITS (SYSTÈME INTERNATIONAL) ABBREVIATES "SI" IN ALL LANGUAGES.

SECTION 09 TECHNICAL DATA

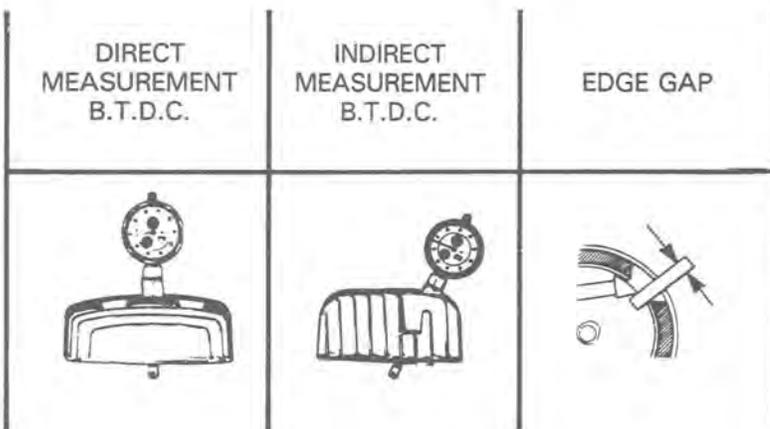
BOMBARDIER ROTAX TYPE VEHICLE MODEL		247 ELAN®	277 CITATION® 3500	377 SKANDIC*	377/E SAFARI*	447 SAFARI® GRAND LUXE	
ENGINE	No. of cylinders	1	1	2	2	2	
	Bore	mm (inch)	69.5 (2.736)	72 (2.834)	62 (2.440)	62 (2.440)	67.5 (2.657)
	Stroke	mm (inch)	66 (2.598)	66 (2.598)	61 (2.401)	61 (2.401)	61 (2.401)
	Displacement	cm ³ (in. ³)	250.4 (15.28)	268.7 (16.4)	368.3 (22.5)	368.3 (22.5)	436.6 (26.6)
	Compression ratio (corrected)		5.6	6.7	6.9	6.9	6.3
	Maximum operating R.P.M.		6000	7500	7500	7500	7500
	Type of piston ring		2R	1 LST 1R	1 LST 1R	1 LST 1R	1 LST 1R
	Ring end gap	mm(inch) min.(new) mm(inch) max. (wear limit)	0.20 (.008) 1.0 (.039)				
	Piston/cylinder wall clearance	mm min./max. (inch) min./max.	0.066 - 0.203 (.0026 - .0079)	0.070 - 0.090 (.0027 - .0035)	0.080 - 0.100 (.0031 - .0039)	0.080 - 0.100 (.0031 - .0039)	0.080 - 0.100 (.0031 - .0039)
	Crankshaft end-play	mm min./max. (inch) min./max.	0.20 - 0.40 (.008 - .016)	0.20 - 0.40 (.008 - .016)	N.A.	N.A.	N.A.
	Rotary valve timing (marks position)		N.A.	N.A.	N.A.	N.A.	N.A.
	CARBURETION	Mikuni carburetor	VM 28-242	VM 34-255	VM 34-276	VM 34-309	VM 34-310
Main jet (sea level)		160	220	260	240	240	
Needle jet		182 O-8	159 P-2	159 P-2	159 P-6	159 P-8	
Pilot jet		30	30	35	30	35	
Needle identification		6DP1-3	6DH4-3	6DH4-3	6DH4-3	6DH7-3	
Needle setting from top		3rd	3rd	3rd	3rd	3rd	
Slide cut-away		2.0	3.0	3.0	3.0	3.0	
Air screw adjustment (turn) ± 1/8		1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	
Idle speed R.P.M.		1300-1500	1100-1300	1800-2000	1800-2000	1800-2000	
Fuel grade		Regular - leaded or unleaded			Regular - leaded		
Fuel oil ratio	50/1	oil injection	50/1	oil injection	oil injection		

SECTION 09 TECHNICAL DATA

462 SS-25 SONIC®/C	503 ALPINE®	503 BLIZZARD® 5500 MX	534 BLIZZARD® 9700
2	2	2	2
69.5 (2.736)	72 (2.834)	72 (2.834)	72 (2.834)
61 (2.401)	61 (2.401)	61 (2.401)	64 (2.519)
462.8 (28.2)	496.7 (30.31)	496.7 (30.31)	521.2 (31.80)
6.7	6.3	6.2	6.5
7200	6500	7500	8750
1 LST 1R	1 LST 1R	1 LST 1R	1 LST 1R
0.20 (.008) 1.0 (.039)	0.20 (.008) 1.0 (.039)	0.20 (.008) 1.0 (.039)	0.20 (.008) 1.0 (.039)
0.080 - 0.100 (.0031 - .0039)	0.070 - 0.090 (.0027 - .0035)	0.070 - 0.090 (.0027 - .0035)	0.100 - 0.120 (.0039 - .0047)
N.A.	N.A.	N.A.	N.A.
Opening: 140° Closing: 51°	N.A.	N.A.	Opening: 140° Closing: 61°
VM 34-311	VM 34-297	2 × VM 34-203	PTO: VM 40-23 MAG: VM 40-24
290	250	220	PTO: 330 MAG: 350
159 P-4	159 P-2	159 P-4	224-AA5
40	30	35	40
6FL14-3	6DH3-3	6DH2-3	7DH2-3
3rd	3rd	3rd	3rd
3.0	2.0	3.0	2.5
1 1/2	1 1/2	1 1/2	1
1800-2000	1800-2000	1800-2000	1800-2000
Regular - leaded or unleaded			Premium S2 leaded or unleaded
Oil injection	50/1	oil injection	30/1

SECTION 09 TECHNICAL DATA

BOMBARDIER ROTAX TYPE VEHICLE MODEL		247 ELAN®	277 CITATION® 3500	377 SKANDIC*	377/E SAFARI*	447 SAFARI* GRAND LUXE
Magneto generator output (watts)		75/23	160	160	160	160
Ignition type		BP	CD	CD	CD	CD
Spark plug no		Bosch M 175 T1 (W7A)	NGK BR-8ES	NGK BR-8ES	ND W24ESRV	ND W24ESRV
Spark plug gap		mm (inch)	0.50 (.020)	0.40 (.016)	0.40 (.016)	0.40 (.016)
TIMING B.T.D.C.	Direct ①	mm (inch)	3.98 (.157)	2.31 (.090)	2.31 (.090)	1.88 (.074)
	Indirect ①	mm (inch)	N.A.	2.6 (.102)	N.A.	N.A.
	Breaker point gap	mm (inch)	0.35 – 0.40 (.014 – .016)	N.A.	N.A.	N.A.
OHM	Generating coil		3 – 3.07	L.S: 120 – 180 H.S: 2.8 – 4.2	L.S: 120 – 180 H.S: 2.8 – 4.2	L.S: 120 – 180 H.S: 2.8 – 4.2
	Lighting coil – large		0.38 – 0.58	0.21 – 0.31	0.21 – 0.31	0.21 – 0.31
	Lighting coil – small		1.85 – 2.35	N.A.	N.A.	N.A.
	H.T. coil primary		1.65 – 2.05	0.23 – 0.43	0.23 – 0.43	0.23 – 0.43
	H.T. coil secondary		4.85 – 5.85 K	3.0 – 5.6 K	2.45 – 4.55 K	2.45 – 4.55 K
Headlamp bulb		watt	60/60	60/60	60/60	60/55 hal.
Tail & stop bulb		watt	5/21	5/21	5/21	5/21
Tacho & speedo bulb		watt	5	5	5	5
Fuse	Starter solenoid	amp	N.A.	N.A.	N.A.	30
	Tachometer	amp	N.A.	N.A.	N.A.	0.1
	Ignition switch	amp	N.A.	N.A.	N.A.	15



BP: Breaker points
 CD: Solide state ignition
 R: Rectangular
 LST: "L" semi trapez
 L.S: Low speed
 H.S: High speed
 N.A.: Not applicable

① At 6000 R.P.M. (engine cold)
 **Trademarks of Bombardier Inc.

SECTION 09 TECHNICAL DATA

462 SS-25 SONIC* L/C	503 ALPINE®	503 BLIZZARD® 5500 MX	534 BLIZZARD® 9700
140/160	160	160	160
CD	CD	CD	CD
NGK BR-BES	NGK BR-7ES	NGK BR-7ES	NGK BR-BES
0.40 (.016)	0.40 (.016)	0.50 (.020)	0.40 (.016)
Type 2.52 Type 1.76 44P (.085) 45P (.069)	2.29 (.090)	2.29 (.090)	1.75 (.068)
N.A.	N.A.	N.A.	N.A.
N.A.	N.A.	N.A.	N.A.
L.S.:125 - 235 H.S.: 1.4 - 2.6	L.S.: 120 - 180 H.S.: 2.8 - 4.2	L.S.: 120 - 180 H.S.: 2.8 - 4.2	L.S.: 120 - 180 H.S.: 2.8 - 4.2
0.09 - 0.20	0.21 - 0.31	0.21 - 0.31	0.21 - 0.31
N.A.	N.A.	N.A.	N.A.
0.23 - 0.43	0.23 - 0.43	0.23 - 0.43	0.23 - 0.43
2.45 - 4.55 K	2.45 - 4.55 K	2.45 - 4.55 K	2.45 - 4.55 K
60/55 hal.	60/60	60/60	60/60
5/21	5/21	5/21	5/21
5	5	5	5
N.A.	30	N.A.	N.A.
N.A.	N.A.	N.A.	0.1
0.1	15	N.A.	N.A.

SECTION 09 TECHNICAL DATA

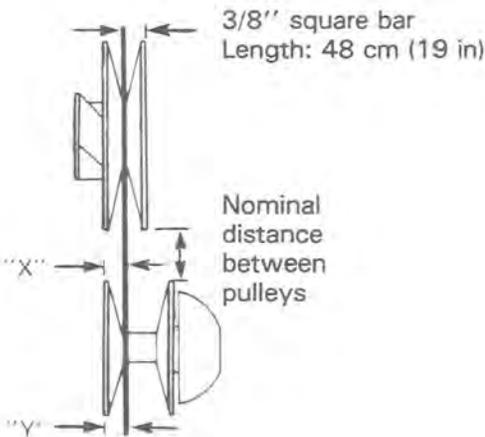
		MODEL	ELAN® 250	CITATION® 3500	SKANDIC* 377	SKANDIC* 377R	SAFARI* 377	SAFARI 377E		
		DIMENSIONS		Engine type	247	277	377	377	377	377
Overall length	cm (inch)			224.8 (88.5)	249 (98)	289.5 (114)	289.5 (114)	266.7 (105)	266.7 (105)	
Overall width	cm (inch)			77.5 (30.5)	92.7 (36.5)	96.5 (38)	96.5 (38)	96.5 (38)	96.5 (38)	
Overall height	cm (inch)			106.7 (42)	100.3 (39.5)	108 (42.5)	108 (42.5)	96.5 (38)	96.5 (38)	
Ski stance	cm (inch)			64.7 (25.5)	81.9 (32.2)	81.9 (32.2)	81.9 (32.2)	81.9 (32.2)	81.9 (32.2)	
Mass weight	kg(lbs)			129.5 (285)	156.5 (345)	188 (416)	194 (428)	176.9 (390)	194.1 (429)	
Bearing area	cm ² (inch ²)			6916 (1072)	5839 (905)	7579 (1175)	7579 (1175)	6645 (1030)	7064 (1095)	
Ground pressure	kPa (PSI)			1.813 (.263)	2.626 (.381)	2.44 (.354)	2.51 (.364)	2.613 (.379)	2.696 (.391)	
Frame material				Steel	Alu. & steel	Alu. & steel	Alu. & steel	Alu. & steel	Alu. & steel	
Cab material				Poly.	Poly.	Poly.	Poly.	Poly.	Poly.	
POWER TRAIN				Gear ratio (driven pulley to drive axle)	10/25	15/34	14/35	17/40	16/34	16/34
		Chain pitch		1/2" single	3/8" double	3/8" double	3/8 silent	3/8" double	3/8" double	
		Drive pulley	Type of drive pulley		R.R.S.	R.R.S.	R.S.S.	R.S.S.	R.S.S.	R.S.S.
			Drive pulley retaining nut/bolt torque	N*m (ft-lbs)	62 (45)	85 (63)	85 (63)	85 (63)	85 (63)	85 (63)
			Pressure lever identification		E4	B2KS	B3KSH	B3KSH	C6LH	C6LH
			Spring color		Bronze	Black	Yellow	Yellow	Olive	Olive
			Spring length	mm ± 1.5 (in ± .060)	81.3 (3.200)	104.7 (4.122)	100 (3.938)	100 (3.938)	106 (4.173)	106 (4.173)
			Clutch engagement R . P . M .		2000-2200	3300-3600	3700-3900	3700-3900	3400-3600	3400-3600
		Driven pulley spring preload	kg ± 0.9 (lbs) ± 2	3.6 (8)	5.4 (12)	5.4 (12)	5.4 (12)	3.6 (8)	3.6 (8)	
		Pulley distance	mm (inch)	42.85 - 44.45 (1 11/16 - 1 3/4)	41.27 - 44.40 (1 5/8 - 1 3/4)	41.27 - 44.40 (1 5/8 - 1 3/4)	41.27 - 44.40 (1 5/8 - 1 3/4)	36.6 - 38.1 (1 7/16 - 1 1/2)	36.6 - 38.1 (1 7/16 - 1 1/2)	
		Offset dimension X & Y	mm ± 1 (in ± 1/32")	34 (1 11/32)	34 (1 11/32)	34 (1 11/32)	34 (1 11/32)	34 (1 11/32)	34 (1 11/32)	
		Drive belt number		570 0411 00	414 3758 00	414 3758 00	414 3758 00	414 5233 00	414 5233 00	
		Drive belt width	mm (inch)	30 (1 3/16)	33.33 (1 5/16)	33.33 (1 5/16)	33.33 (1 5/16)	34.92 (1 3/8)	34.92 (1 3/8)	
		Drive belt tension & deflection	N (lbf) mm (inch)	57 N (15lbf) pressure on belt between pulleys must produce 32 mm (1 1/4 in) of deflection						
		Track	Track width	cm (inch)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)	41.9 (16.5)
			Track length	cm (inch)	289.5 (114)	269.2 (106)	353 (139)	353 (139)	289.5 (114)	289.5 (114)
		Suspension type		Bogie	Slide	Slide	Slide	Slide	Slide	
Bogie suspension	Track tension	mm (inch)	Elan® : 35 mm (1 3/8") distance between top inside edge of track and the bottom of the footboard.							
	Track alignment		Equal distance between edges of track and link plates.							
Slide suspension	Track tension	mm (inch)	13 mm (1/2") gap should exist between slider shoe and the bottom inside of track.							
	Track alignment		Equal distance between edges of track guides and slider shoes.							

SECTION 09 TECHNICAL DATA

SAFARI® 447	SAFARI® GRAND LUXE	SS-25 SONIC® L/C	BLIZZARD® 5500 MX	BLIZZARD® 9700	ALPINE® 503
447	447	462	503	534	503
279.4 (110)	279.4 (110)	266.7 (105)	264.1 (104)	264.1 (104)	288.3 (113.5)
96.5 (38)	96.5 (38)	96.5 (38)	100.3 (39.5)	100.3 (39.5)	90.17 (35.5)
96.5 (38)	96.5 (38)	93.0 (36.6)	108.9 (42.9)	96.5 (38)	123.2 (48.5)
81.9 (32.2)	81.9 (32.2)	81.9 (32.2)	86.1 (33.9)	85.1 (33.5)	N.A.
182.7 (402)	195 (429)	191.8 (422)	223.1 (492)	223.1 (492)	291.4 (642.5)
7593 (1177)	7593 (1177)	6645 (1030)	7239 (1122)	7239 (1122)	13936.3 (2160)
2.35 (.341)	2.51 (.364)	2.82 (.409)	3.02 (.438)	3.02 (.438)	2.054 (.298)
Alu. & steel	Alu. & steel	Alu. & steel	Alu. & steel	Alu. & steel	Steel
Poly.	Poly.	Fib.	Fib.	Fib.	Fib.
19/39	19/39	21/37	19/40	21/38	19/42
3/8" double	3/8" double	3/8" triple	3/8" triple	3/8" triple	3/8" triple
R.S.S.	R.S.S.	R.S.S.R.	R.S.S.	R.S.S.R.	R.S.S.R.B.
85 (63)	85 (63)	85 (63)	85 (63)	85 (63)	85 (63)
C7LH	C7LH	A8S	C7LH	A6S	A3S (double)
Yellow	Yellow	Orange	Orange	White	Purple
100 (3.938)	100 (3.938)	81 (3.189)	96.5 (3.800)	87.3 (3.437)	73.6 (2.90)
3500-3700	3500-3700	3300-3500	3600-3800	4000-4400	2000-2200
3.6 (8)	3.6 (8)	3.6 (8)	5.9 (13)	5.9 (13)	5.9 (13)
36.6 - 38.1 (1 7/16 - 1 1/2)	36.6 - 38.1 (1 7/16 - 1 1/2)	36.6 - 38.1 (1 7/16 - 1 1/2)	34.92 - 38.10 (1 3/8 - 1 1/2)	34.92 - 38.10 (1 3/8 - 1 1/2)	44.40 - 47.62 (1 3/4 - 1 7/8)
34 (1 11/32)	34 (1 11/32)	34 (1 11/32)	32.5 (1 9/32)	34.5 (1 23/64)	34 (1 11/32)
414 5233 00	414 5233 00	414 5233 00	414 3758 00	414 5059 00	414 3758 00
34.92 (1 3/8)	34.92 (1 3/8)	34.92 (1 3/8)	33.33 (1 5/16)	34.92 (1 3/8)	33.33 (1 5/16)
41.9 (16.5)	41.9 (16.5)	38.1 (15)	41.9 (16.5)	41.9 (16.5)	2 × 38.1 (2 × 15)
315 (124)	315 (124)	289.5 (114)	289.5 (114)	289.5 (114)	2 × 353 (2 × 139)
Slide	Slide	Slide	Slide	Slide	Bogie
*ALPINE: 57 mm (2 1/4") distance between top inside edge of track and the center of the bogie wheel set retaining bolt.					
*BLIZZARD 5500 MX: 10-13 mm (3/8 1/2") gap should exist between slider shoe and bottom inside of track when pulling down on track with a force of 3 kg (6.5 lbs)					

SECTION 09 TECHNICAL DATA

LIQUID CAPACITIES	MODEL		ELAN® 250	CITATION® 3500	SKANDIC* 377	SKANDIC* 377R	SAFARI* 377	SAFARI 377E	
	Fuel tank	SI	L	13.6	28.4	28.4	28.4	28.6	28.6
		Imperial	gal	3	6.25	6.25	6.25	6.3	6.3
		U.S.	gal	3.6	7.5	7.5	7.5	7.6	7.6
	Chaincase	mL (oz)		200 (7)	200 (7)	200 (7)	450 (16)	200 (7)	200 (7)
	Rotary valve reservoir	mL (oz)		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Cooling system	SI	L	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
		Imperial	oz						
U.S.		oz							
Injection oil reservoir	L(oz)		N.A.	2.55 (90 Imp. oz/ 86 U.S. oz)	N.A.	N.A.	2.55 (90 Imp. oz/ 86 U.S. oz)	2.55 (90 Imp. oz/ 86 U.S. oz)	
COOLING	Cooling type		Radial fan	Radial fan	Axial fan	Axial fan	Axial fan	Axial fan	
	Cooling system Capacity	liter	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	
		imperial							
		U.S.							
	Thermostat		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	
	Radiator pressure cap		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	
Coolant mixture antifreeze/water		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		
TORQUE SPECIFICATIONS (Engine cold) #*m (ft.-lbs)	Magneto ring nut		85 (62)	85 (62)	85 (62)	85 (62)	85 (62)	85 (62)	
	Crankcase nut		21 (15)	21 (15)	M6: 9 (7) M8: 21 (15)	M6: 9 (7) M8: 21 (15)	M6: 9 (7) M8: 21 (15)	M6: 9 (7) M8: 21 (15)	
	Cylinder head nut (cold)		21 (15)	21 (15)	21 (15)	21 (15)	21 (15)	21 (15)	
	Engine base/support nut		38 (28)	21 (15)	38 (28)	38 (28)	38 (28)	38 (28)	
	Fan Shaft nut		N.A.	N.A.	65 (48)	65 (48)	65 (48)	65 (48)	



- Dimension "X" must never exceed dimension "Y".
- Dimension "Y" can exceed dimension "X" by 1.6 mm (1/16").

Elect.: Electric starter
 Man.: Manual starter
 Poly.: Polycarbonate
 Alu.: Aluminum
 Fib.: Fiberglass
 N.A.: Not applicable
 R.S.S.: Roller square shaft
 R.R.S.: Roller round shaft
 R.S.S.R.B.: Roller square shaft with 3 ramps & bearing
 R.S.S.R.: Roller square shaft with 3 ramps
 Hal.: Halogen

**Trademarks of Bombardier Inc.

SECTION 09 TECHNICAL DATA

SAFARI® 447	SAFARI® GRAND LUXE	SS-25 SONIC®L/C	BLIZZARD® 5500 MX	BLIZZARD® 9700	ALPINE® 503
28.6	28.6	28.6	27.3	27.3	22.7
6.3	6.3	6.3	6	6	5
7.6	7.6	7.6	7.2	7.2	6
200 (7)	200 (7)	200 (7)	200 (7)	200 (7)	454 (16)
N.A.	N.A.	56.8 (2)	N.A.	454 (16)	N.A.
N.A.	N.A.	4.54 160 154	N.A.	4.20 148 142	N.A.
2.55 (90 Imp. oz/ 86 U.S. oz)	2.55 (90 Imp. oz/ 86 U.S. oz)	2.55 (90 Imp. oz/ 86 U.S. oz.)	2.27 (80 Imp. oz/ 77 U.S. oz)	2.27 (80 Imp. oz 77 U.S. oz)	N.A.
Axial fan	Axial fan	Liquid cooled	Axial fan	Liquid cooled	Axial fan
N.A.	N.A.	4.54 160 154	N.A.	4.20 148 142	N.A.
N.A.	N.A.	43°C (110°F)	N.A.	50°C (122°F)	N.A.
N.A.	N.A.	90 kPa (13 PSI)	N.A.	90 kPa (13 PSI)	N.A.
N.A.	N.A.	60/40	N.A.	60/40	N.A.
85 (62)	85 (62)	95 (70)	85 (62)	95 (70)	85 (62)
M6: 9 (7) M8: 21 (15)	M6: 9 (7) M8: 21 (15)	M6: 9 (7) M8: 21 (15)	21 (15)	M6: 9 (7) M8: 21 (15)	21 (15)
23 (17)	23 (17)	23 (17)	21 (15)	21 (15)	21 (15)
38 (28)	38 (28)	38 (28)	38 (28)	38 (28)	38 (28)
65 (48)	65 (48)	N.A.	65 (48)	N.A.	65 (48)



LIMITED WARRANTY

THE 1984 LIMITED WARRANTY — SKI-DOO

1 - PERIOD

BOMBARDIER® INC. as manufacturer, warrants FROM THE DATE OF FIRST CONSUMER SALES, every 1984 SKI-DOO® snowmobile, sold as NEW AND UNUSED, by an authorized SKI-DOO dealer for a period of:

- 12 consecutive months.

2 - WHAT BOMBARDIER WILL DO

BOMBARDIER will repair and/or replace, at its option, components defective in material and/or workmanship (under normal use and service,) with a genuine BOMBARDIER component without charge for parts or labour, at any authorized SKI-DOO dealer during said warranty period.

3 - CONDITION TO HAVE WARRANTY WORK PERFORMED

Present to the servicing dealer, the hard copy of the BOMBARDIER Warranty Registration card received by the customer from the selling dealer at time of purchase.

4 - WARRANTY TRANSFER

This warranty is transferable to subsequent owner(s) for remainder of warranty period from original date of sale.

5 - EXCLUSIONS - ARE NOT WARRANTED

- Normal wear on all items such as, but not limited to:
 - drive belts
 - slider shoes
 - spark plugs
 - bulbs
 - runners on skis
- Replacement parts and/or accessories which are not genuine BOMBARDIER parts and/or accessories.
- Damage resulting from installation of parts other than genuine BOMBARDIER parts.
- Damage caused by failure to provide proper maintenance as detailed in the Operator Manual. The labour, parts and lubricants costs of all maintenance services, including tune-ups and adjustments will be charged to the owner.
- Wet cells battery.
- Vehicles designed and/or used for racing purposes.
- All optional accessories installed on the vehicle.
(The normal warranty policy for parts and accessories, if any, applies).
- Damage resulting from accident, fire or other casualty, misuse, abuse or neglect.

SECTION 10 WARRANTY

- Damage resulting from operation of the snowmobile on surfaces other than snow.
- Damage resulting from modification to the snowmobile not approved in writing by BOMBARDIER.
- Losses incurred by the snowmobile owner other than parts and labour, such as, but not limited to, transportation, towing, telephone calls, taxis, or any other incidental or consequential damages.

6 - BATTERY WARRANTY:

- 12 consecutive months. (Pro-rated.)

100% warranty coverage will start on the date the snowmobile was purchased and run to the following April 30th. The remainder of the 12 months period will be pro-rated as follows:

- 50% from April 30th to December 1st.
- 40% from December 1st to December 31st.
- 30% from January 1st to end of warranty.

Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply.

7 - EXPRESSED OR IMPLIED WARRANTIES

This warranty gives you specific rights, and you may also have other legal rights which may vary from state to state, or province to province. Where applicable this warranty is expressly in lieu of all other expressed or implied warranties of BOMBARDIER, its distributors and the selling dealer, including any warranty of merchantability of fitness for any particular purpose; otherwise the implied warranty is limited to the duration of this warranty. However, some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply.

Neither the distributor, the selling dealer, nor any other person has been authorized to make any affirmation, representation or warranty other than those contained in this warranty, and if made, such affirmation, representation or warranty shall not be enforceable against BOMBARDIER or any other person.

BOMBARDIER INC. reserves the right to modify its warranty policy at any time, being understood that such modification will not alter the warranty conditions applicable to vehicles sold while the above warranty is in effect.

8 - CONSUMER ASSISTANCE

If a servicing problem or other difficulty occurs, we suggest the following:

1. Try to resolve the problem at the dealership with the Service Manager or Owner.
2. If this fails, contact your area distributor listed in the Operator Manual.
3. Then if your grievance still remains unsolved, you may write to us:

Bombardier Inc.
Service Department
Recreational Products Division
Valcourt, Quebec, Canada, JOE 2L0

February 1983
Bombardier Inc.
Valcourt, Quebec, Canada, JOE 2L0

®*Trademarks of Bombardier Inc.

THE 1984 LIMITED WARRANTY — MOTO-SKI

1 - PERIOD

BOMBARDIER® INC. as manufacturer, warrants FROM THE DATE OF FIRST CONSUMER SALES, every 1984 MOTO-SKI® snowmobile, sold as NEW AND UNUSED, by an authorized MOTO-SKI dealer for a period of:

- 12 consecutive months.

2 - WHAT BOMBARDIER WILL DO

BOMBARDIER will repair and/or replace, at its option, components defective in material and/or workmanship (under normal use and service,) with a genuine BOMBARDIER component without charge for parts or labour, at any authorized MOTO-SKI dealer during said warranty period.

3 - CONDITION TO HAVE WARRANTY WORK PERFORMED

Present to the servicing dealer, the hard copy of the BOMBARDIER Warranty Registration card received by the customer from the selling dealer at time of purchase.

4 - WARRANTY TRANSFER

This warranty is transferable to subsequent owner(s) for remainder of warranty period from original date of sale.

5 - EXCLUSIONS - ARE NOT WARRANTED

- Normal wear on all items such as, but not limited to:
 - drive belts
 - slider shoes
 - spark plugs
 - bulbs
 - runners on skis
- Replacement parts and/or accessories which are not genuine BOMBARDIER parts and/or accessories.
- Damage resulting from installation of parts other than genuine BOMBARDIER parts.
- Damage caused by failure to provide proper maintenance as detailed in the Operator Manual. The labour, parts and lubricants costs of all maintenance services, including tune-ups and adjustments will be charged to the owner.
- Wet cells battery.
- Vehicles designed and/or used for racing purposes.
- All optional accessories installed on the vehicle.
(The normal warranty policy for parts and accessories, if any, applies).
- Damage resulting from accident, fire or other casualty, misuse, abuse or neglect.
- Damage resulting from operation of the snowmobile on surfaces other than snow.

- Damage resulting from modification to the snowmobile not approved in writing by BOMBARDIER.
- Losses incurred by the snowmobile owner other than parts and labour, such as, but not limited to, transportation, towing, telephone calls, taxis, or any other incidental or consequential damages.

6 - BATTERY WARRANTY:

- 12 consecutive months. (Pro-rated.)
100% warranty coverage will start on the date the snowmobile was purchased and run to the following April 30th. The remainder of the 12 months period will be pro-rated as follows:
 - 50% from April 30th to December 1st.
 - 40% from December 1st to December 31st.
 - 30% from January 1st to end of warranty.

Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply.

7 - EXPRESSED OR IMPLIED WARRANTIES

This warranty gives you specific rights, and you may also have other legal rights which may vary from state to state, or province to province. Where applicable this warranty is expressly in lieu of all other expressed or implied warranties of BOMBARDIER, its distributors and the selling dealer, including any warranty of merchantability of fitness for any particular purpose; otherwise the implied warranty is limited to the duration of this warranty. However, some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply.

Neither the distributor, the selling dealer, nor any other person has been authorized to make any affirmation, representation or warranty other than those contained in this warranty, and if made, such affirmation, representation or warranty shall not be enforceable against BOMBARDIER or any other person.

BOMBARDIER INC. reserves the right to modify its warranty policy at any time, being understood that such modification will not alter the warranty conditions applicable to vehicles sold while the above warranty is in effect.

SECTION 10 WARRANTY

8 - CONSUMER ASSISTANCE

If a servicing problem or other difficulty occurs, we suggest the following:

1. Try to resolve the problem at the dealership with the Service Manager or Owner.
2. If this fails, contact your area distributor listed in the Operator Manual.
3. Then if your grievance still remains unsolved, you may write to us:

Bombardier Inc.
Service Department
Recreational Products Division
Valcourt, Quebec, Canada, JOE 2L0
February 1983
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