1983

SHOP MANUAL



Bombardier snowmobiles

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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 replica's 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.

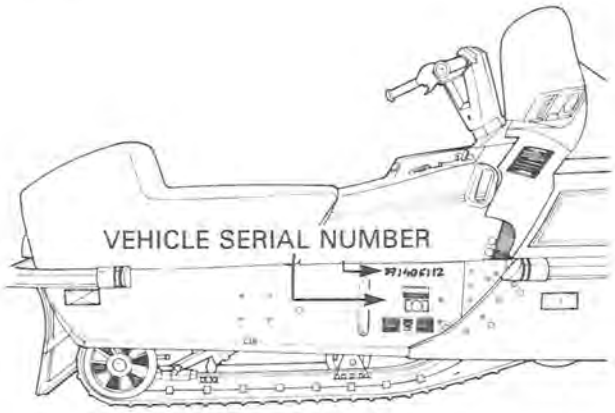
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INTRODUCTION

This Shop Manual covers the following Bombardier made 1983 snowmobiles.

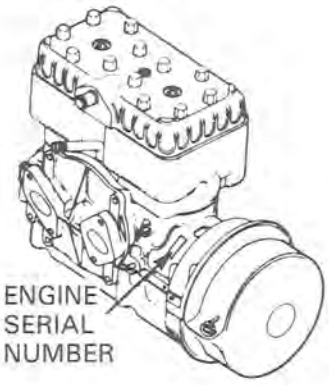
Elan
Citation 3500
Citation 4500/E
Citation SS
Nordik
Skandic 277/377
Everest 500/E
Everest L/C
Blizzard 5500 MX
Blizzard 9700
Alpine 503
Spirit
Mirage II

Furthermore, each vehicle has its particular vehicle serial number.

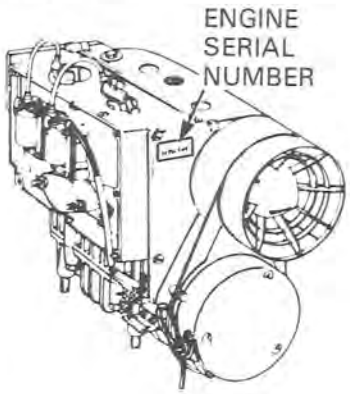


The engine also has a serial number.

Liquid cooled engines

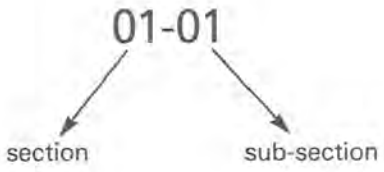


Fan cooled engines



DEFINITION OF NUMBERING SYSTEMS

The manual makes uses 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.

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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

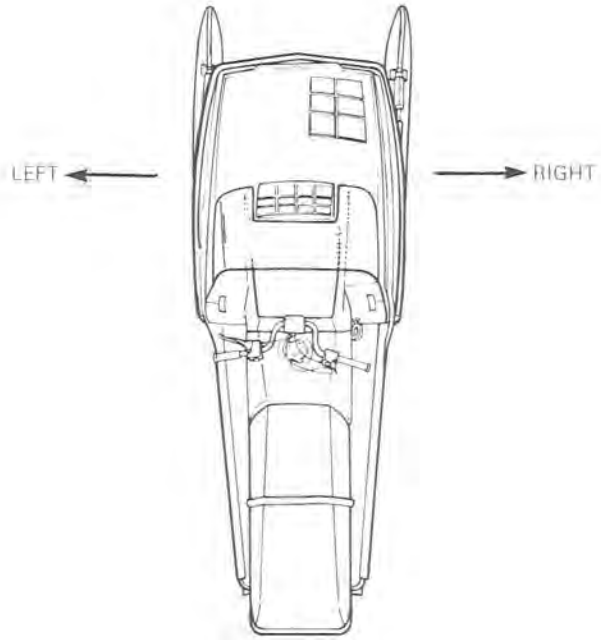
Each section is comprised of various sub-sections, and again, each sub-section has one or more division.

EX.: 02 ENGINE

04 Engine type 464 Everest

— 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 component/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 sligthly 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.), the specific parts are circled 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.

This manual is published by the
Technical Publications
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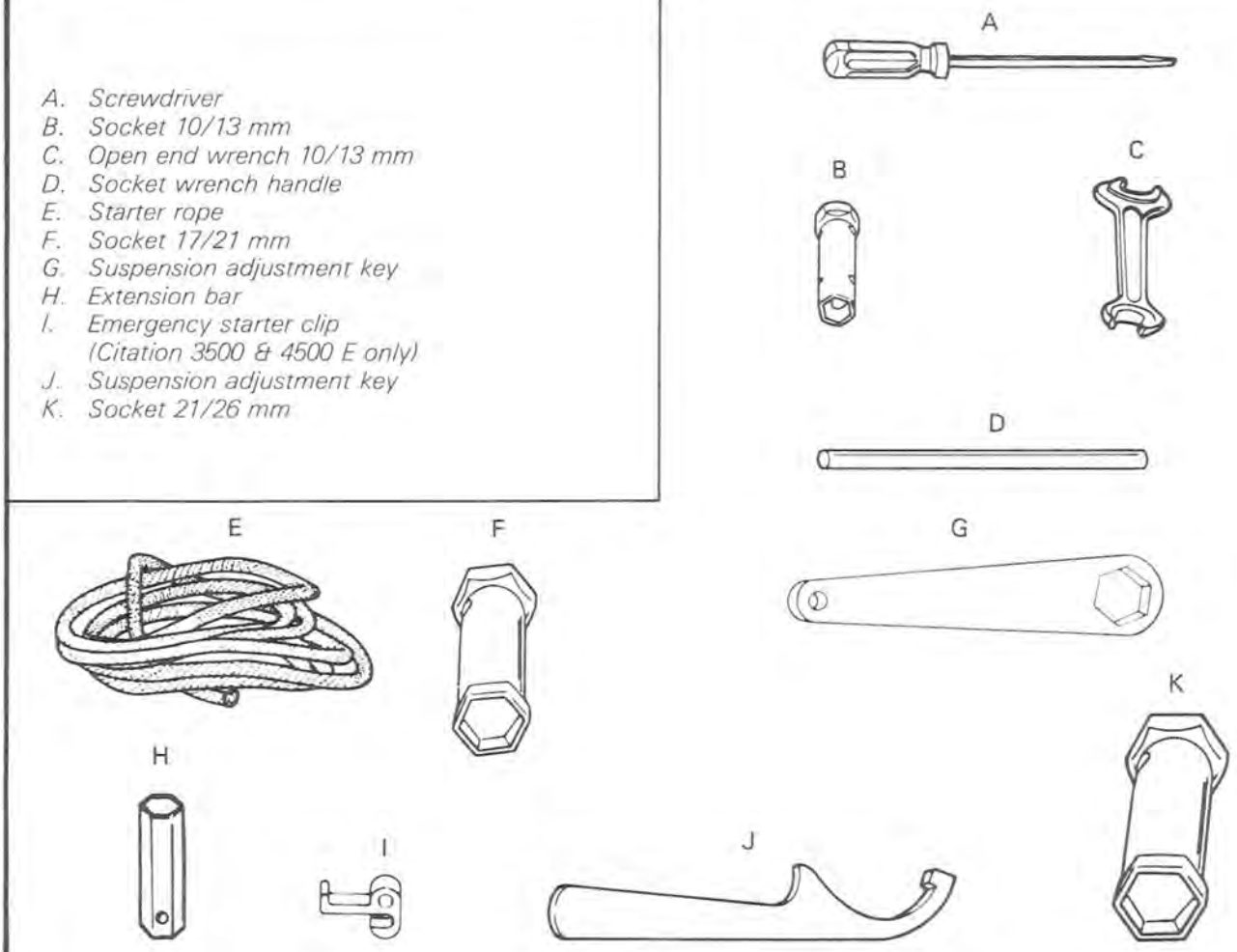
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BASIC TOOLS

A. Screwdriver
B. Socket 10/13 mm
C. Open end wrench 10/13 mm
D. Socket wrench handle
E. Starter rope
F. Socket 17/21 mm
G. Suspension adjustment key
H. Extension bar
I. Emergency starter clip (Citation 3500 & 4500 E only)
J. Suspension adjustment key
K. Socket 21/26 mm

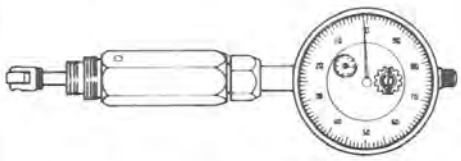
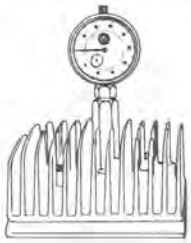
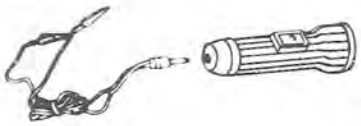
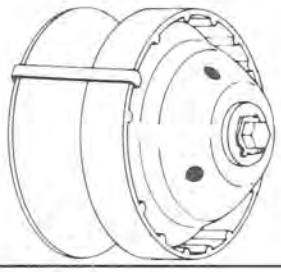


1983 MODELS	APPLICABLE TOOLS
Elan, Spirit	A, B, C, D, E, K.
Citation, Mirage (All)	A, B, C, D, E, I, K.
Nordik, Skandic	A, B, C, D, E, K.
Blizzard 5500 MX	A, B, C, D, E, G, J, K.
Blizzard 9700,	A, B, C, D, E, G, K.
Everest 500, E, L/C,	A, B, C, D, E, F, G.
Alpine	A, B, C, D, E, H, K.

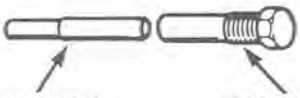
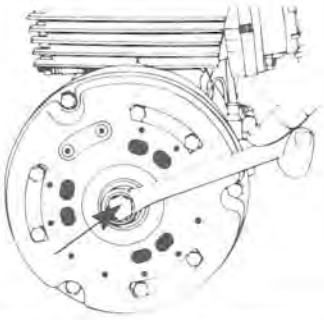
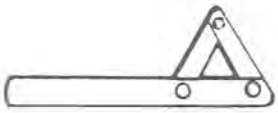
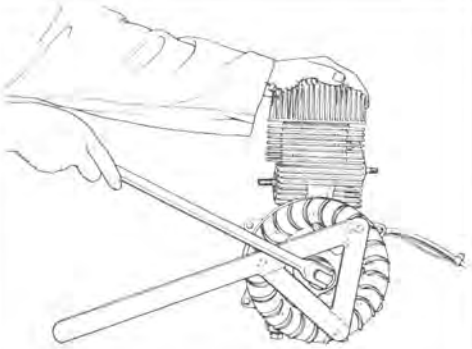
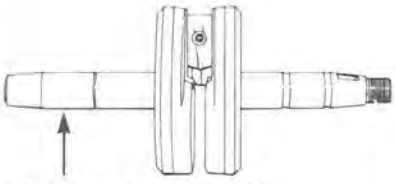
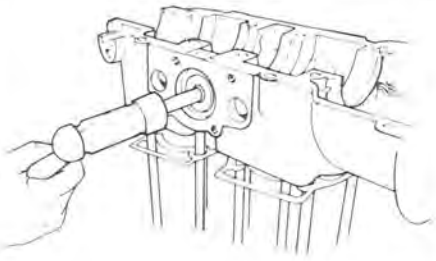
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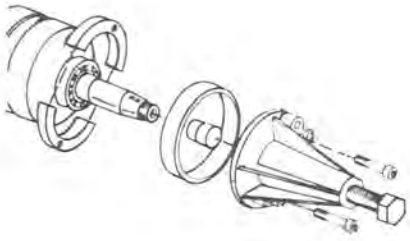
SERVICE TOOLS

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

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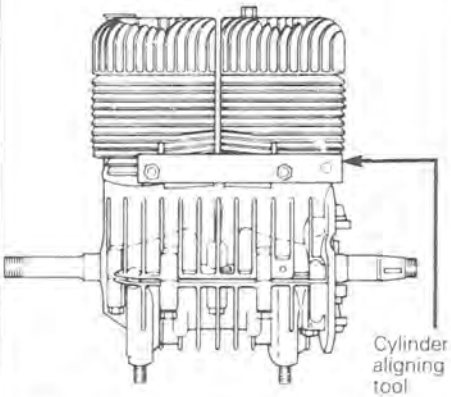
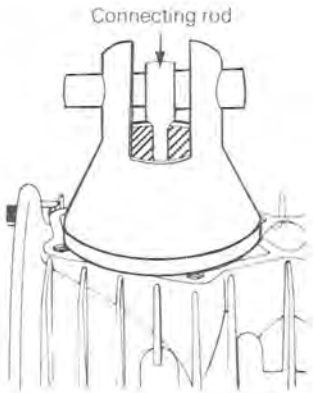
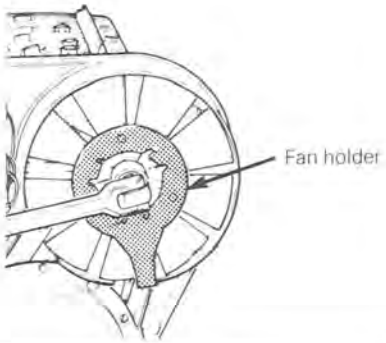
Drive pulley puller. 529 0021 00  860 4142 00 (metric)  (529 003 000) (529 002 800)	To remove drive pulley from crankshaft. 	Taper shaft engines.
Magneto housing holder. 420 976 550 		Single cylinder engine types.
Seal sleeve 247 engines PTO 420 977 910 MAG 420 276 900  Water pump seal sleeve 464, 534 water pump 420 876 490 rotary valve 420 876 495	To avoid seal damage during crankshaft installation  Seal sleeve (on crankshaft)	All engines types except 277, 377, 503.
Rotary valve shaft pusher. 420 876 610 		Liquid cooled Rotary valve engines.

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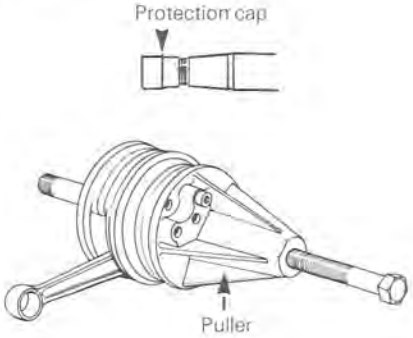
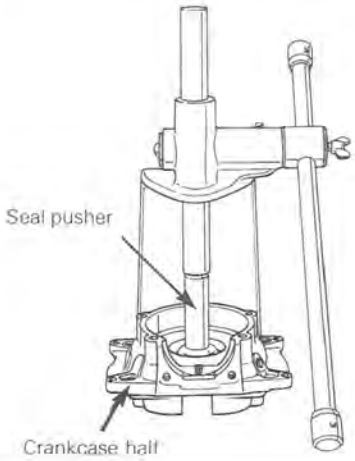
Puller assembly. 420 876 296 With 145 mm screw. 		All engine types.

Screw M8 x 70 (2)	420 841 200	engine 377, 464, 534, 503
Screw M8 x 40 (2)	420 840 680	engine 247, 277, 534, 464
Crankshaft protector PTO	420 876 550	engine 277, 377, 464, 503, 534
Crankshaft protector Mag	420 876 555	engine 277, 377, 503, 534
Distance ring	420 876 560	engine 377, 464, 503, 534
Puller ring	420 977 480	all engines
Half ring ass'y	420 276 020	all engines
Distance ring	420 876 565	377, 503 engines only
	420 876 567	534 engine only
Puller ring	420 977 490	engine 277, 377, 503, 534
Half ring ass'y	420 977 470	engine 277, 377, 503, 534

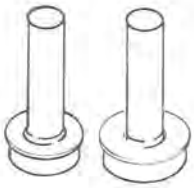
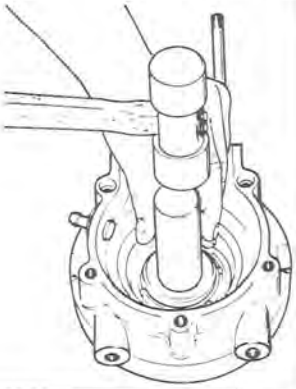
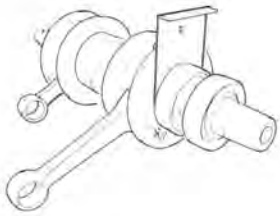
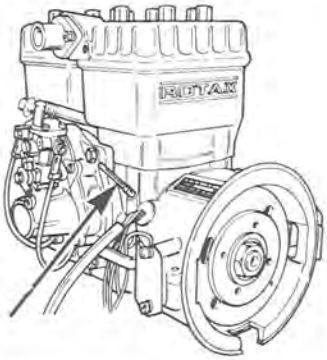
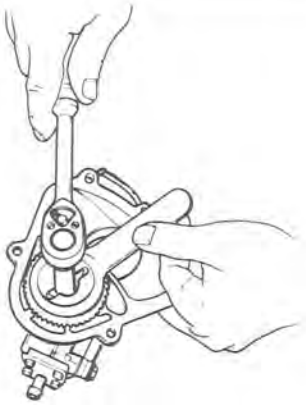
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Cylinder aligning tool. 377, 503 engines 420 876 171 464 engine 420 876 575 534 engine 420 876 570   377, 503 engines 420 240 275		Twin cylinder engines
Connecting rod holder. 420 977 900 		247 and 277 engines
Degree wheel 414 352 900 	To mark timing position of rotary valve	464 and 534 engines
Fan holder 503 engine 420 876 355 377 engine 420 876 357 		Twin cylinder fan-cooled engines

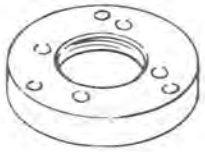
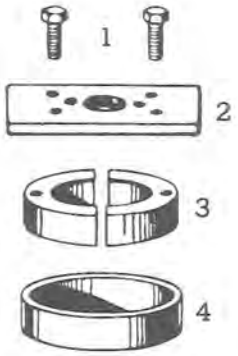
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Protection cap.  247, 277 engines 18 mm 420 976 890 377, 464, 503 22 mm 420 876 402	Protect crankshaft end, when using bearing puller. 	All engine types.
Engine seal pusher 247 engine 420 977 920 277 engine 420 277 865 420 876 660 		247, 277 engine types
Seal pusher 420 876 510 Bearing pusher 420 876 500 	To install water pump bearing and seal.	464, 534 engine types.
Rotary valve seal pusher 420 876 600 - 534 engine 420 876 605 - 464 engine 	To install rotary valve shaft seal.	534, 464 engines.

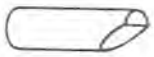
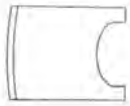
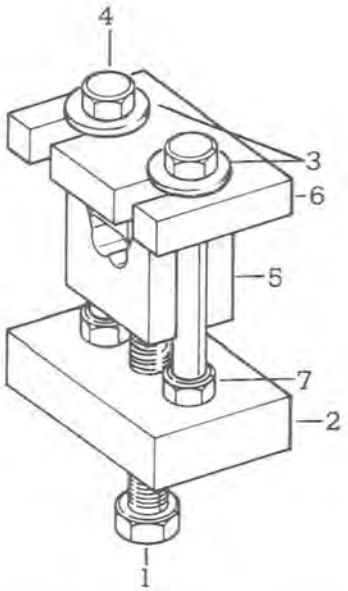
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Polyamid ring pusher engine 277 MAG 420 276 930 PTO 420 276 940 	To install polyamid ring in crankcase. 	277 engine
Crankshaft feeler gauge. 377 & 503 engine PTO 420 876 620 		PTO: all 377 & 503 engines
Crankshaft locking tool 420 876 640 	To lock crankshaft 	277, 377, 534, 464, 503 engines
Injection pump gear holder 277, 377, 503 Engine 420 876 690 464 engine 420 277 900 		All injection engines.

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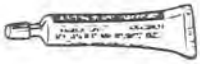
Magneto puller ring. 420 876 655 	To remove magneto.	277, 377, 464, 503 and 534 engines.
Magneto puller 247 engine 420 976 235 277, 377, 464, 503, 534 engines 420 876 065 	To remove magneto.	247, 277, 377, 464, 503 and 534 engines.
3 speeds transmission bearings extractor. 	To remove the bearings from the drive shaft and the lay shaft. 1- screw M8 x 25 (2) 420 240 275 2- plate 420 977 700 3- half ring (2) 420 876 330 4- ring 420 977 480	Alpine 3 speeds transmission

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Transmission ball mounting bolt. 420 476 020 	Transmission cover index rod ball installation	Alpine 3 speeds transmission
Alignment tool 420 476 010 	Drive shaft and layshaft sprocket alignment.	Alpine 3 speeds transmission
Nippondenso electronic ignition tester 419 008 400 	Engine ignition system components tests.	- All Nippondenso electronic ignition systems - (All engine types except 247)
Clip-O-Matic 529 004 500 	For track inserts installation. 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 529 004 300 cleats up to 1975) 6- male block 529 004 000 7- hexagonal nut (2) 389 804 000	All types of track.

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SERVICE PRODUCTS

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 	For threadlocking, threadsealing, gasketing, bonding and retaining applications on engines, pulleys and fasteners etc.	
LOCK'N SEAL (242) BLUE MEDIUM STRENGTH 24 ml 413 7025 00 	A medium-strength adhesive for threadlocking and threadsealing. Vibration-proofs nuts, bolts and screws.	General purpose, nuts, bolts screws. Magneto ring nut, crank-case studs, etc.
LOCK'N SEAL (271) RED HIGH STRENGTH 6 ml 747 020 000 	Hi-strength threadlocking threadsealing adhesive for large parts.	Fasteners and studs under 1" dia.
MOLYKOTE G-n paste 2.8 oz 413 7037 00 	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).	For rewind starter locking spring. (Not to be used on rewind springs as it does not stay on when dried.)

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G.E. VERSILUBE G341 M 8 oz 413 7040 00 	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).	Used to lubricate manual starter rewind spring. (Not to be used on rewind starter locking spring as the vibration makes it run out).
PRIMER CRANKCASE SEALANT (SPRAY) 6 oz 413 7024 00 	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.	Mainly used when assembling engine crankcase.
CHISEL gasket remover (spray) 300 g 413 7045 00 	Creates a foaming action that lifts gaskets off in minutes.	Mainly used to remove gasket residues from any metal surface.
ANTISEIZE LUBRICANT 413 7010 00 	Protects moving and stationary parts against high temperature seizing. Prevents rust and corrosion on parts exposed to high heat.	Unpainted surfaces of drive pulley countershaft.
SILICONE DIELECTRIC GREASE 3 oz. 413 7017 00 	Special dielectric grease that prevents moisture and corrosion build-up in electric connections.	On all electric connections. High tension coil. Spark plug connections. Connector housings, etc.
GREASE TUBE LMZ No 1 400 g 498 0281 00 	Multi purpose Lithium based grease containing zinc monoxide which makes it a good conductor for heat & electricity.	Mainly used between regulators or rectifiers and upper column to transfer the heat build-up and to assure a good ground.

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CLUTCH LUBE 4 oz 413 8007 00 	Special low temperature metallic lubricant for clutch shafts only.	For roller round shaft drive pulleys.
INJECTOR OIL 413 8015 00 	High quality lubricant with good resistance to high operating temperatures. Low foaming action.	Rotary valve lubricant
CHAINCASE OIL 200 ml 413 8019 00 	Specially formulated oil for chain and roller lubrication. Assures proper lubrication at low temperatures.	Chaincase lubricant on all models.
BOMBARDIER OIL 50/1 496 0132 00 - 473 ml 	Specially formulated oil that meets lubrication requirements of the Bombardier-Rotax engine.	All models.
INJECTION OIL 496 013 300 - 1 litre 496 013 400 - 4 litres 	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. Fully efficient for: **INJECTION, PRE-MIX, ROTARY VALVE.**	All engine types.
GREASE TUBE SPHEEROL MULTI EP 400 g 413 7044 00 	Multi-purpose lithium based grease. It is an antifriction, anticorrosion and water resistant bearing grease for use through temperatures between -50°F to 225°F (-45°C to 107°C).	For idler bearings, ski legs, leaf spring cushion pads, seal interior lips, rear hub bearings, bogie wheels, countershaft bearings, etc...

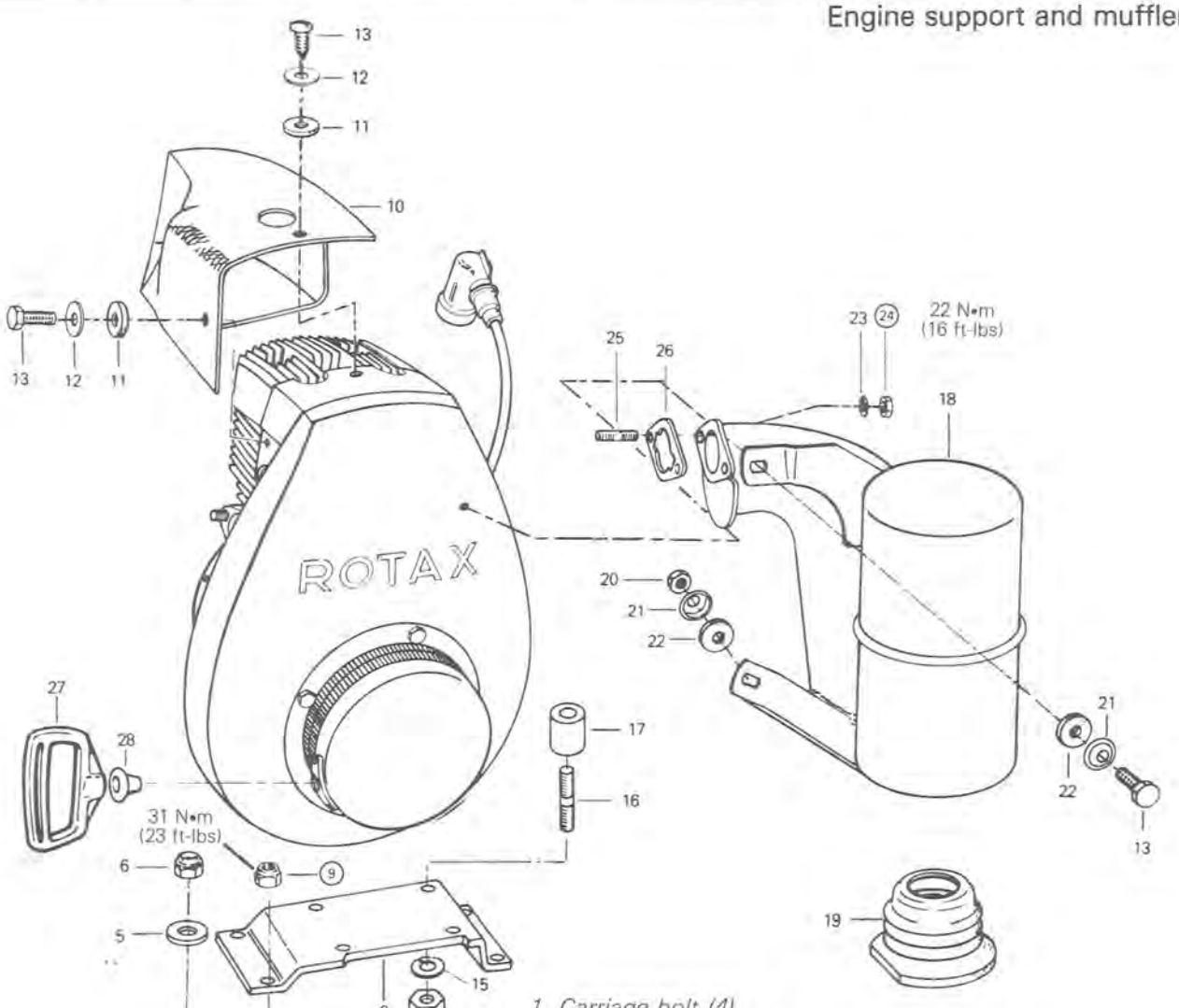
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247 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION

Engine support and muffler



1. Carriage bolt (4)
2. Threaded spacer (4)
3. Insulator rubber (4)
4. Support (2)
5. Washer (4)
6. Nut (4)
7. Bolt (4)
8. Bracket
9. Nut (4)
10. Air deflector
11. Rubber spacer (3)
12. Washer
13. Screw
14. Nut (4)
15. Lockwasher (4)
16. Stud (4)
17. Distance sleeve (4)
18. Muffler
19. Exhaust grommet
20. Nut
21. Retainer washer (2)
22. Rubber washer (2)
23. Lockwasher (2)
24. Nut (2)
25. Stud M8 x 19 (2)
26. Exhaust gasket
27. Handle grip
28. Rubber buffer

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REMOVAL FROM VEHICLE

Remove or disconnect the following then lift engine from vehicle.

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

ENGINE SUPPORT AND MUFFLER DISASSEMBLY & ASSEMBLY

⑨ Torque to 31 N•m (23 ft-lbs).

⑭ Torque to 35 N•m (26 ft-lbs).

㉔ Torque to 22 N•m (16 ft-lbs).

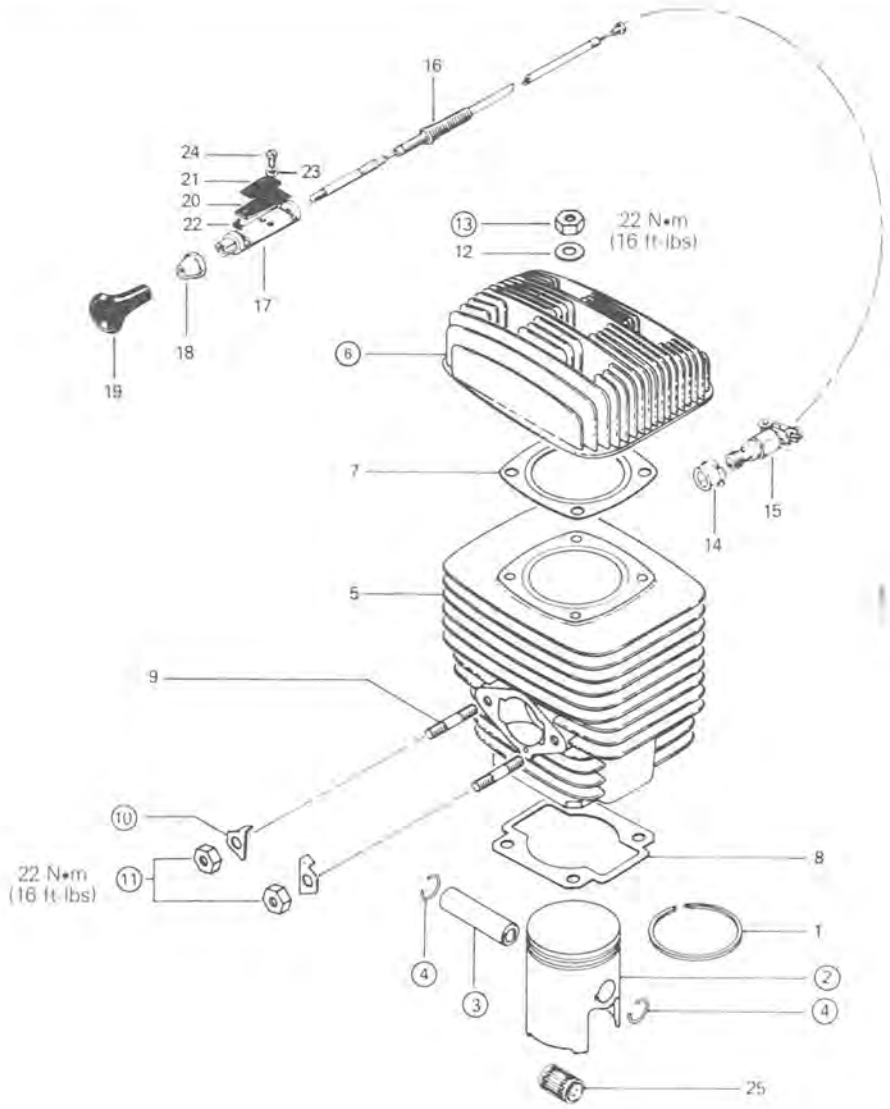
INSTALLATION ON VEHICLE

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

- Check tightness of engine mount nuts, ⑭ and drive pulley bolt.
- After throttle cable installation, check maximum throttle slide opening.
- Check pulley alignment and drive belt tension.

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TOP END



1. Piston ring
2. Piston
3. Gudgeon pin
4. Circlip (2)
5. Cylinder
6. Cylinder head
7. Gasket (head/cylinder)
8. Gasket (cylinder/crankcase)
9. Stud (2)
10. Locking tab (2)
11. Nut (2)
12. Flat washer (4)
13. Nut (head) (4)
14. Locking sleeve
15. Decompressor
16. Cable
17. Switch housing
18. Cap nut
19. Knob
20. Spring plate
21. Spring plate reinforcement
22. Spring lock
23. Lockwasher
24. Screw
25. Needle bearing

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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

②③④Place a clean cloth over crankcase to prevent circlips from falling into crankcase. Use a pointed tool to remove circlips from piston.

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

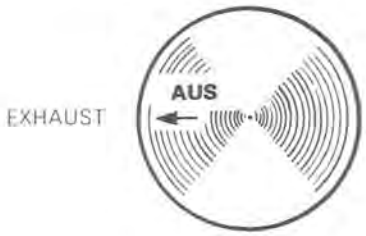
The inspection of the engine top end must include the following measurements:

MEASUREMENTS	TOLERANCES		
	FITTING NEW PARTS (MIN.)	(MAX.)	WEAR LIMIT
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")

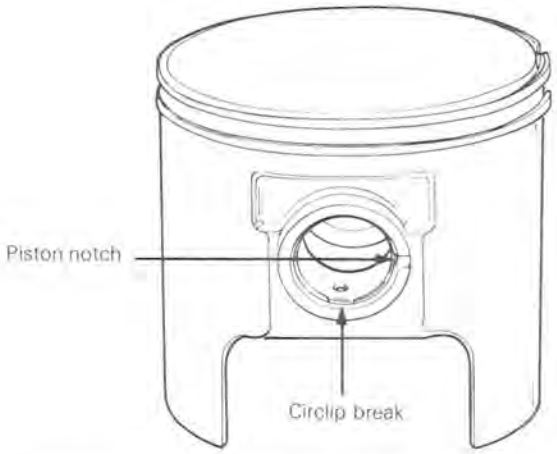
NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 07.

ASSEMBLY

②At 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.



④To 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.

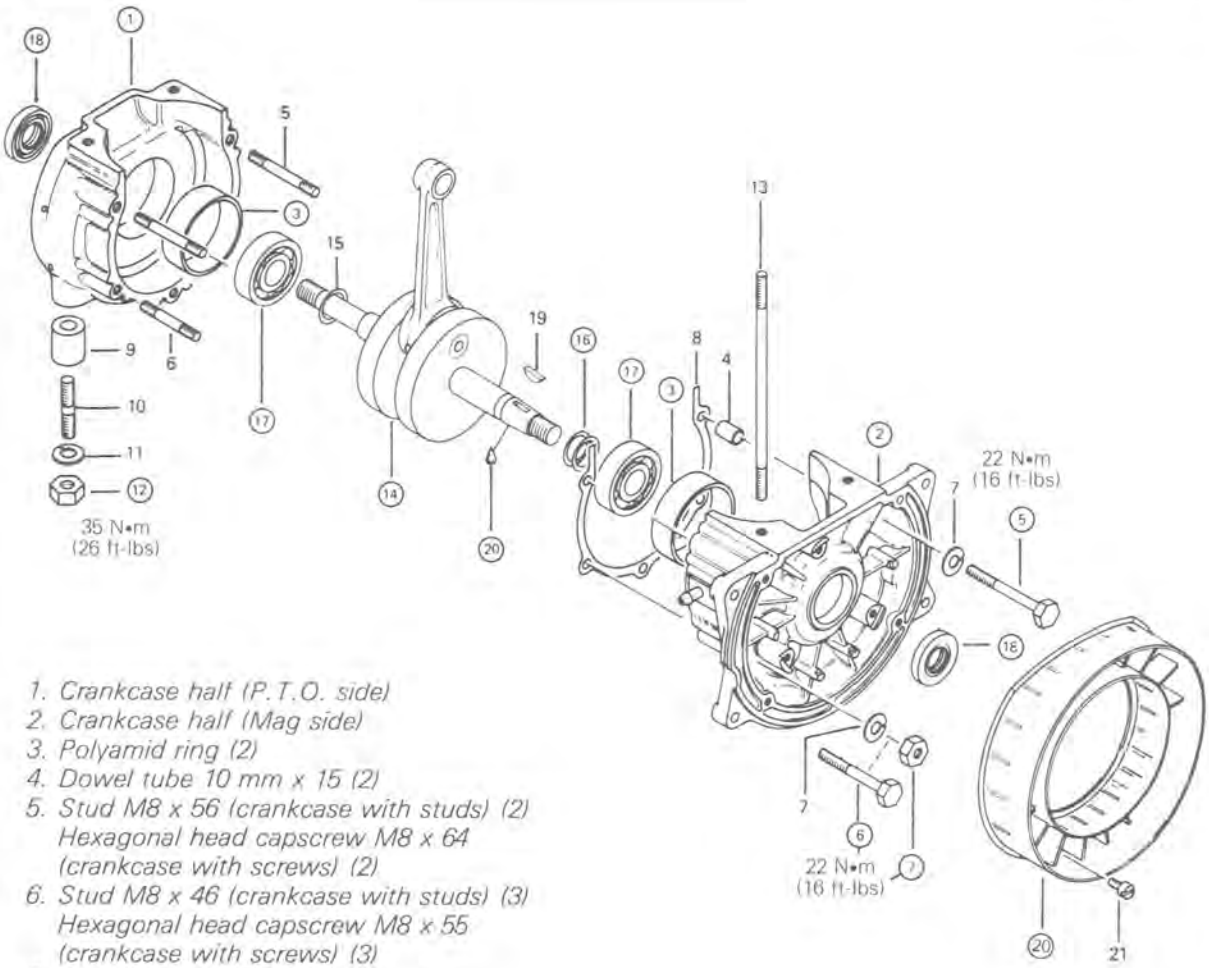


⑥⑬Position cylinder head on cylinder with fins in line with crankshaft center line. Cross torque retaining nuts to 22 N•m (16 ft-lbs).

⑩Tab washer should be replaced if bent more than three (3) times. If in doubt replace.

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BOTTOM END



1. *Crankcase half (P.T.O. side)*
2. *Crankcase half (Mag side)*
3. *Polyamid ring (2)*
4. *Dowel tube 10 mm x 15 (2)*
5. *Stud M8 x 56 (crankcase with studs) (2)*
   Hexagonal head capscrew M8 x 64 (crankcase with screws) (2)
6. *Stud M8 x 46 (crankcase with studs) (3)*
   Hexagonal head capscrew M8 x 55 (crankcase with screws) (3)
7. *Lockwasher 8 (5)*
   Hexagonal nut 8 mm (crankcase with studs) (5)
8. *Crankcase gasket*
9. *Distance sleeve 22 mm (2)*
10. *Stud M10 x 42 (4)*
11. *Lockwasher 10 (4)*
12. *Hexagonal nut 10 mm (4)*
13. *Stud M8 x 171 (4)*
14. *Crankshaft*
15. *Shim 1.0 mm*
16. *Shim 0.1, 0.2, 0.3, 0.5, 1 mm*
17. *Ball bearing 6305 (2)*
18. *Oil seal (2)*
19. *Woodruff key 5 x 6.5*
20. *Labyrinth ring*
21. *Cylindrical slotted head screw M6 x 10 (4)*

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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.

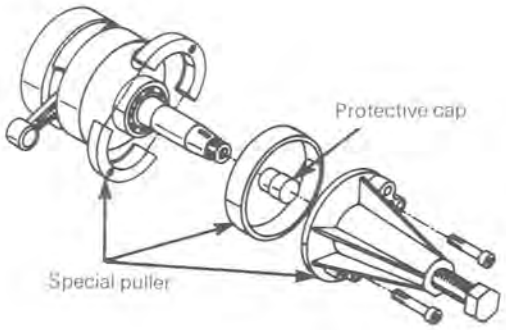
①②When disassembling crankcase halves, do not heat the crankcase. If heat is necessary, temperature must not exceed 55°C (130°F).

③Do not remove polyamid rings unless necessary.

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

⑱To remove seals, push from outside the crankcase towards the inside.

⑰To 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.	.10 mm (.0039")
Connecting rod big end axial play	.20 mm (.0079")	.53 mm (.0208")	1.0 mm (.0394")
Connecting rod alignment	N.A.	N.A.	N.A.
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 07.

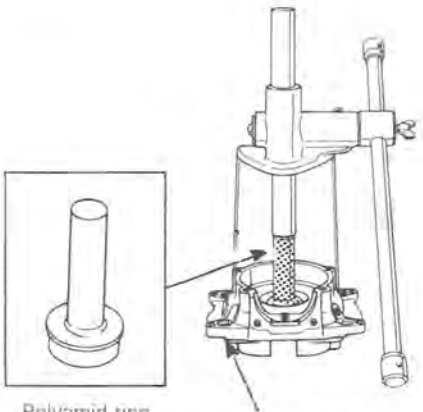
ASSEMBLY

⑰Prior 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.

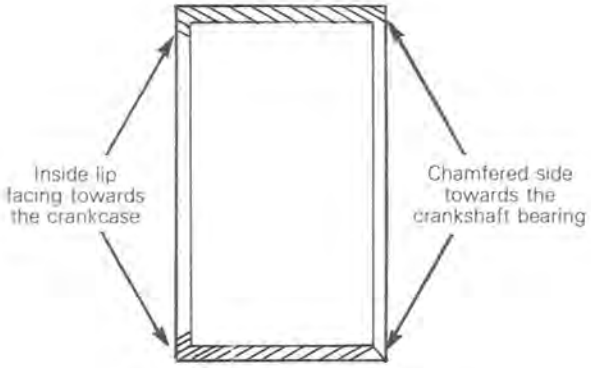
Install bearings with groove outward.

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 07.

③To install polyamid ring, apply oil on outside diameter then use a suitable pusher.



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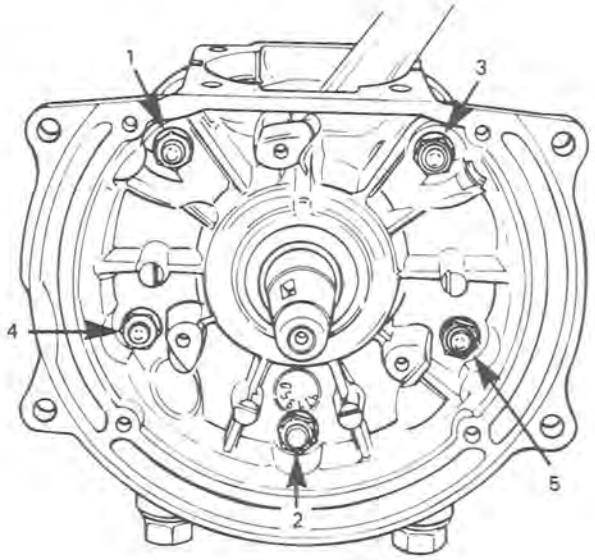
⑱ To install new seal into crankcase use an appropriate oil seal pusher as illustrated. (See Tools Section).



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.

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

⑤ ⑥ ⑦ Torque to 22 N•m (16 ft-lbs) following illustrated sequence.



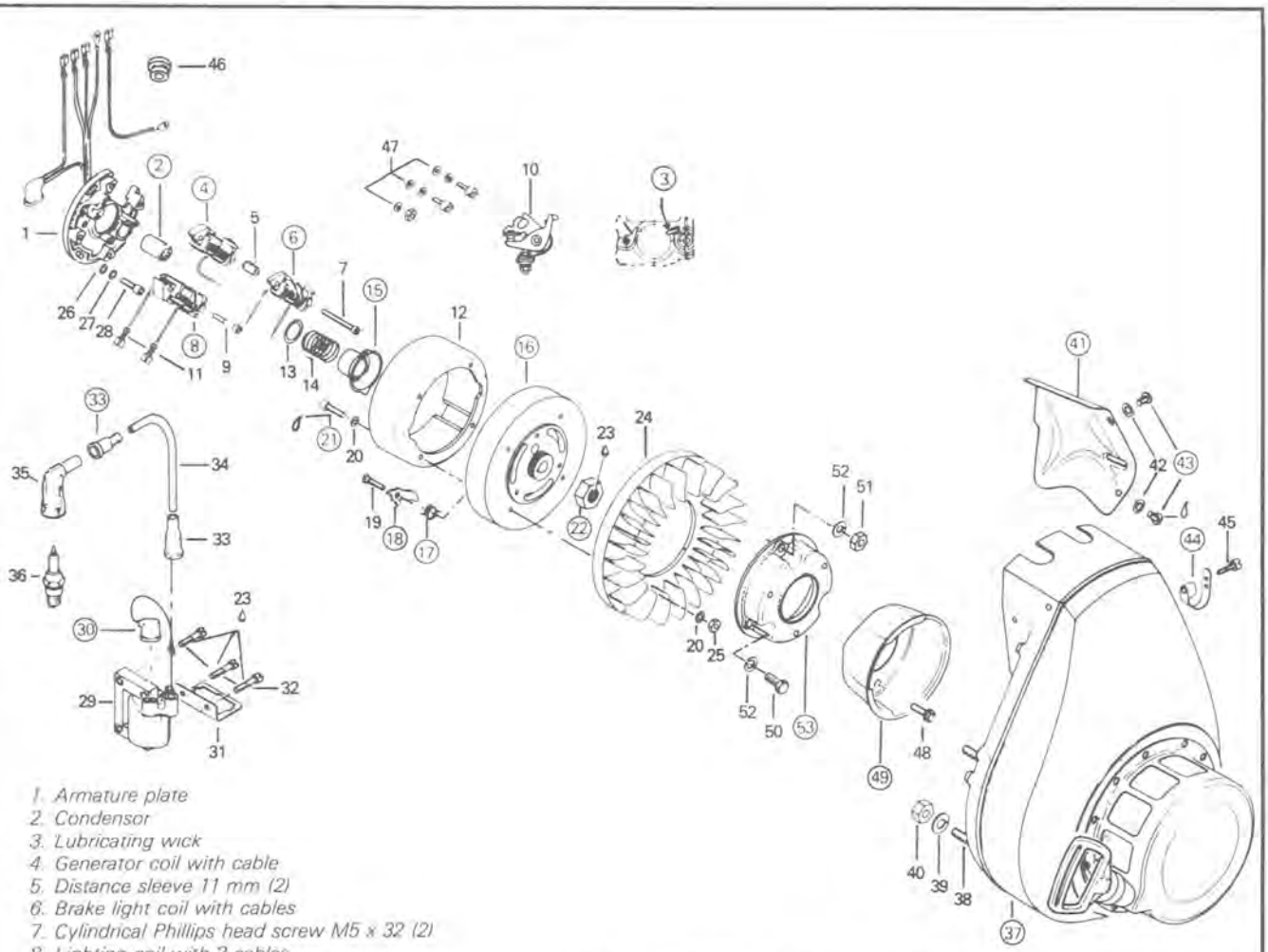
⑫ Torque to 35 N•m (26 ft-lbs).

⑳ Position labyrinth ring with bevelled side on top.

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

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MAGNETO AND COOLING SYSTEM



1. Armature plate
2. Condensor
3. Lubricating wick
4. Generator coil with cable
5. Distance sleeve 11 mm (2)
6. Brake light coil with cables
7. Cylindrical Phillips head screw M5 x 32 (2)
8. Lighting coil with 2 cables
9. Cylindrical Phillips head screw M5 x 28 (2)
10. Breaker point set
11. Female connector 6.3 (5)
12. Magneto ring
13. Cam spring washer
14. Breaker cam spring
15. Breaker cam
16. Magneto housing
17. Centrifugal weight spring
18. Centrifugal weight
19. Bearing screw M6
20. Lockwasher 6 (8)
21. Hexagonal socket head cap screw M6 x 22 (4)
22. Hexagonal nut 18 mm x 1.5
23. Loctite 242 (blue, medium strength)
24. Fan
25. Hexagonal nut 6 mm (4)
26. Washer 5.3 (3)
27. Lockwasher 5 (3)
28. Hexagonal socket head cap screw M5 x 18 (3)
29. Ignition coil
30. Mass cable 80 mm
31. Junction box bracket
32. Cylindrical slotted head screw M5 x 22 (3)
33. Protection cap (2)
34. Ignition cable 360 mm
35. Spark plug protector
36. Spark plug M 175 T 1 (M 7 A)
37. Fan cowl
38. Stud M8 x 23 (3)
    Stud M8 x 34
39. Lockwasher 8 (4)
40. Hexagonal nut 8 mm (4)
41. Air deflector
42. Spring washer B5 (2)
43. Flat slotted head screw M5 x 8 (2)
44. Cable clamp
45. Cylindrical slotted head screw M3 x 16
46. Grommet
47. Magneto parts set
48. Hexagonal self tapping screw M6 x 12 (3)
49. Starting pulley
50. Hexagonal nut M6
51. Hexagonal screw M6 x 20 (2)
52. Lockwasher 6 (3)
53. Pulley spacer

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CLEANING

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

▼ CAUTION: Clean armature using only a clean cloth.

DISASSEMBLY

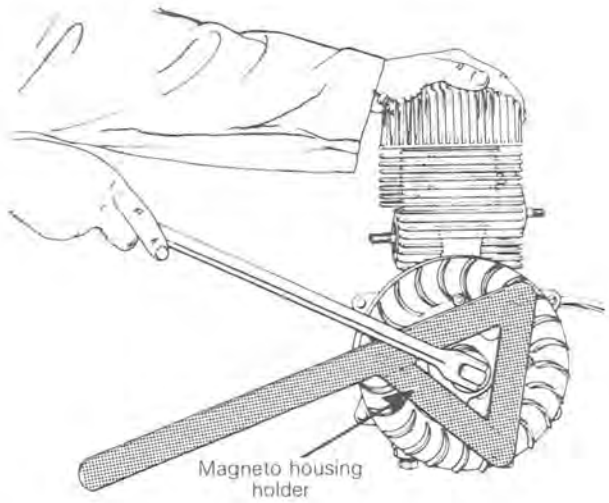
● To gain access to magneto assembly, remove:

- muffler
- upper column
- air duct
- air deflector (41)
- spark plug cable clamp (44)
- fan cowl (37)
- starting pulley (49)
- pulley spacer (53)

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

● (22) To remove magneto retaining nut:

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

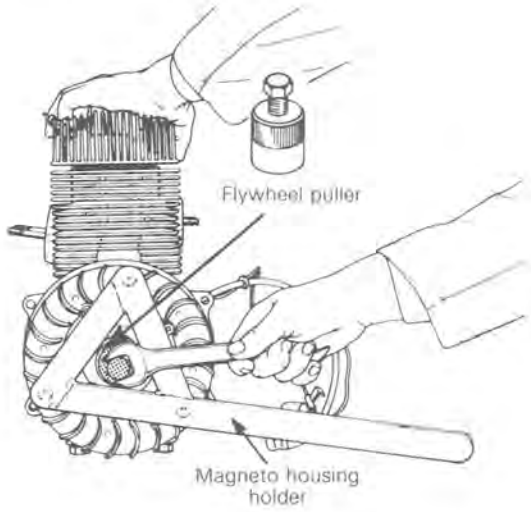


◯ NOTE: It should be noted that to correctly remove a "Loctite" locked fastener it is first necessary to tap on the fastener to break Loctite bond. This will eliminate the possibility of thread breakage.

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

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

● (16) 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

● (2) 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.

● (3) When replacing contact breaker,

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

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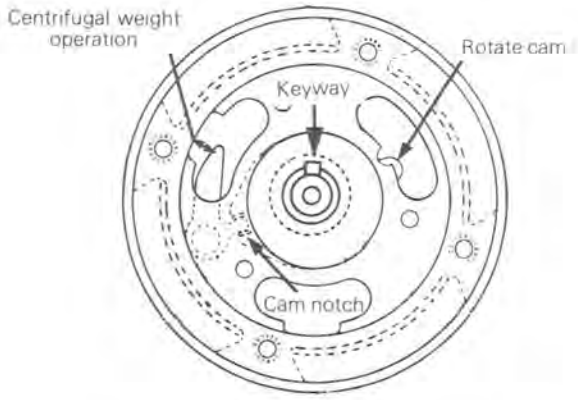
● ④ ⑤ ⑧ Whenever a coil is replaced, the air gap (distance between magnet and coil end) must be adjusted.

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:



- ⑮ ⑱ Rotate breaker cam to check centrifugal weight operation.
- ⑰ At assembly, apply a small amount of grease into spring seating.
- ㉑ ㊸ At assembly, apply "Loctite 242" on screw threads.
- ㉒ At assembly, thoroughly clean threads and apply "Loctite 242", then torque retaining nut to 85 N•m (63 ft-lbs).
- ㉚ ㉝ At reassembly coat all electric connections with dielectric or lithium grease to prevent corrosion or moisture from penetrating.

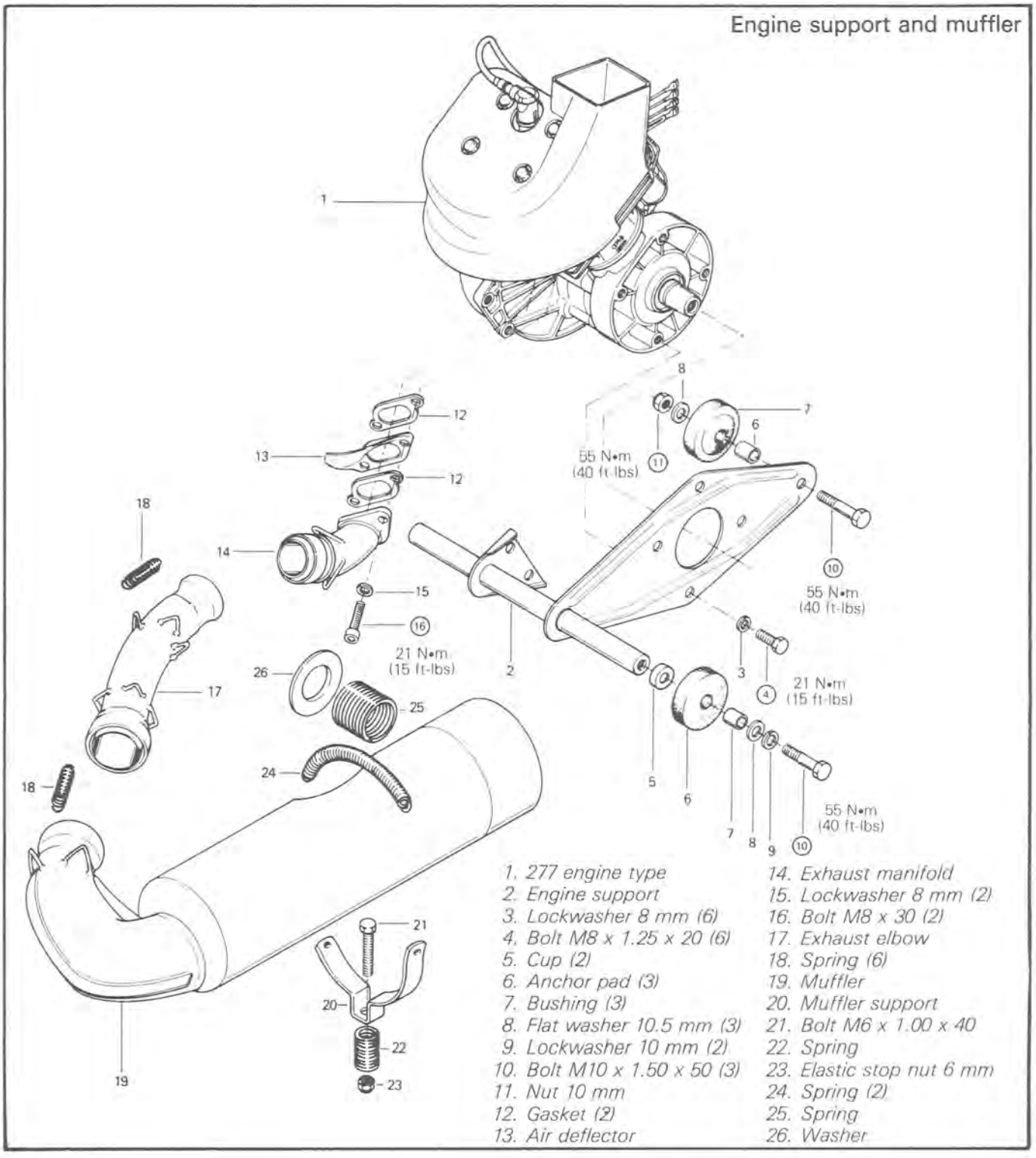
CAUTION: Do not use silicone sealant, this product will corrode contacts.

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277 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION

Engine support and muffler



1. 277 engine type
2. Engine support
3. Lockwasher 8 mm (6)
4. Bolt M8 x 1.25 x 20 (6)
5. Cup (2)
6. Anchor pad (3)
7. Bushing (3)
8. Flat washer 10.5 mm (3)
9. Lockwasher 10 mm (2)
10. Bolt M10 x 1.50 x 50 (3)
11. Nut 10 mm
12. Gasket (2)
13. Air deflector
14. Exhaust manifold
15. Lockwasher 8 mm (2)
16. Bolt M8 x 30 (2)
17. Exhaust elbow
18. Spring (6)
19. Muffler
20. Muffler support
21. Bolt M6 x 1.00 x 40
22. Spring
23. Elastic stop nut 6 mm
24. Spring (2)
25. Spring
26. Washer

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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
- 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 DISASSEMBLY & ASSEMBLY

④ ⑯Torque to 21 N•m (15 ft-lbs).

⑩ ⑪Torque to 55 N•m (40 ft-lbs).

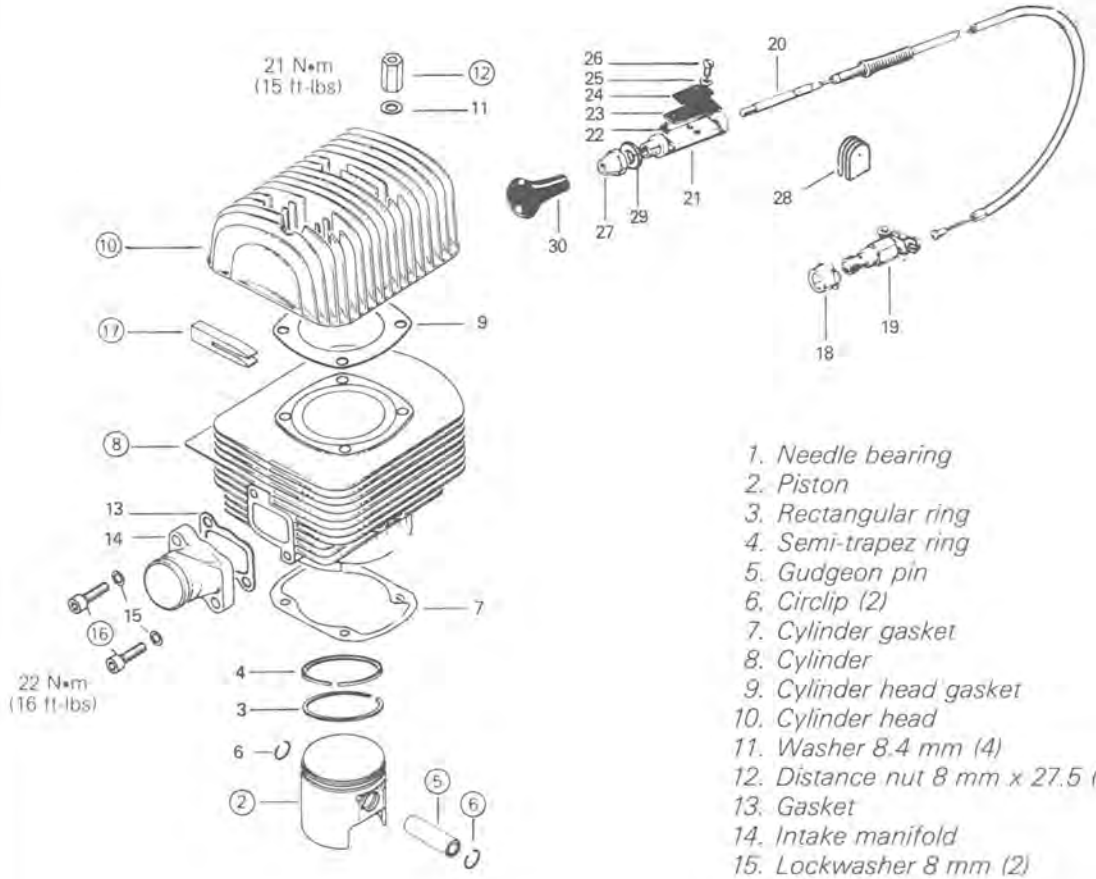
INSTALLATION ON VEHICLE

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.

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TOP END



1. *Needle bearing*
2. *Piston*
3. *Rectangular ring*
4. *Semi-trapez ring*
5. *Gudgeon pin*
6. *Circlip (2)*
7. *Cylinder gasket*
8. *Cylinder*
9. *Cylinder head gasket*
10. *Cylinder head*
11. *Washer 8.4 mm (4)*
12. *Distance nut 8 mm x 27.5 (4)*
13. *Gasket*
14. *Intake manifold*
15. *Lockwasher 8 mm (2)*
16. *Bolt M8 x 30 (2)*
17. *Insulating rubber*
18. *Locking and sealing sleeve**
19. *Decompressor**
20. *Decompressor cable**
21. *Switch housing**
22. *Lock spring**
23. *Switch spring**
24. *Reinforcement spring**
25. *Lockwasher 4**
26. *Cylindrical slotted head screw M4 x 7**
27. *Cap nut M12 x 1**
28. *Grommet**
29. *Spacer**
30. *Decompressor knob**

**: Applicable from engine number 3,376,858 only*

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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

②⑤⑥ Place a clean cloth over crankcase to prevent circlips from falling into crankcase. Use a pointed tool to remove circlips from piston.

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

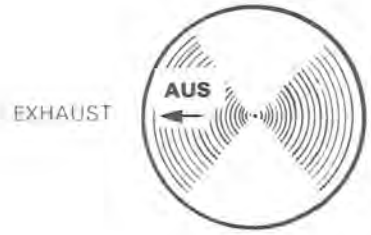
The inspection of the engine top end must include the following measurements:

MEASUREMENTS	TOLERANCES		
	FITTING NEW PARTS (MIN.)	(MAX.)	WEAR LIMIT
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")

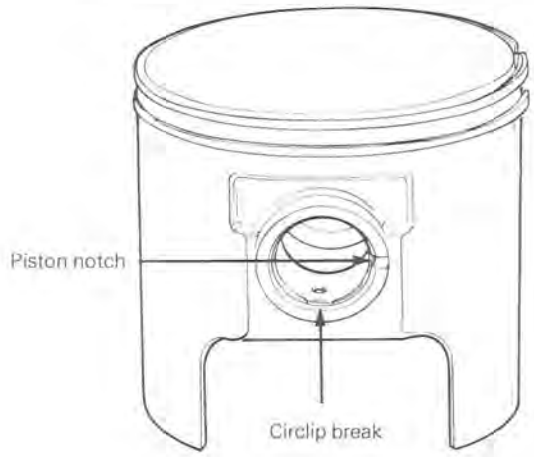
NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 07.

ASSEMBLY

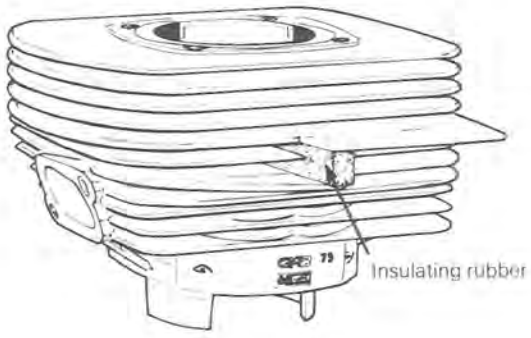
② At assembly, place the piston over the connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in direction of the exhaust port.



⑥ 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.

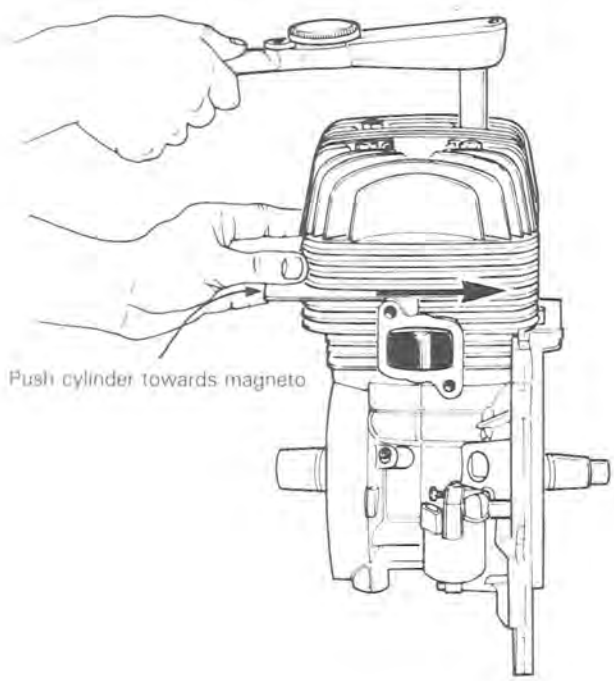


⑰ Position insulating rubber as illustrated.



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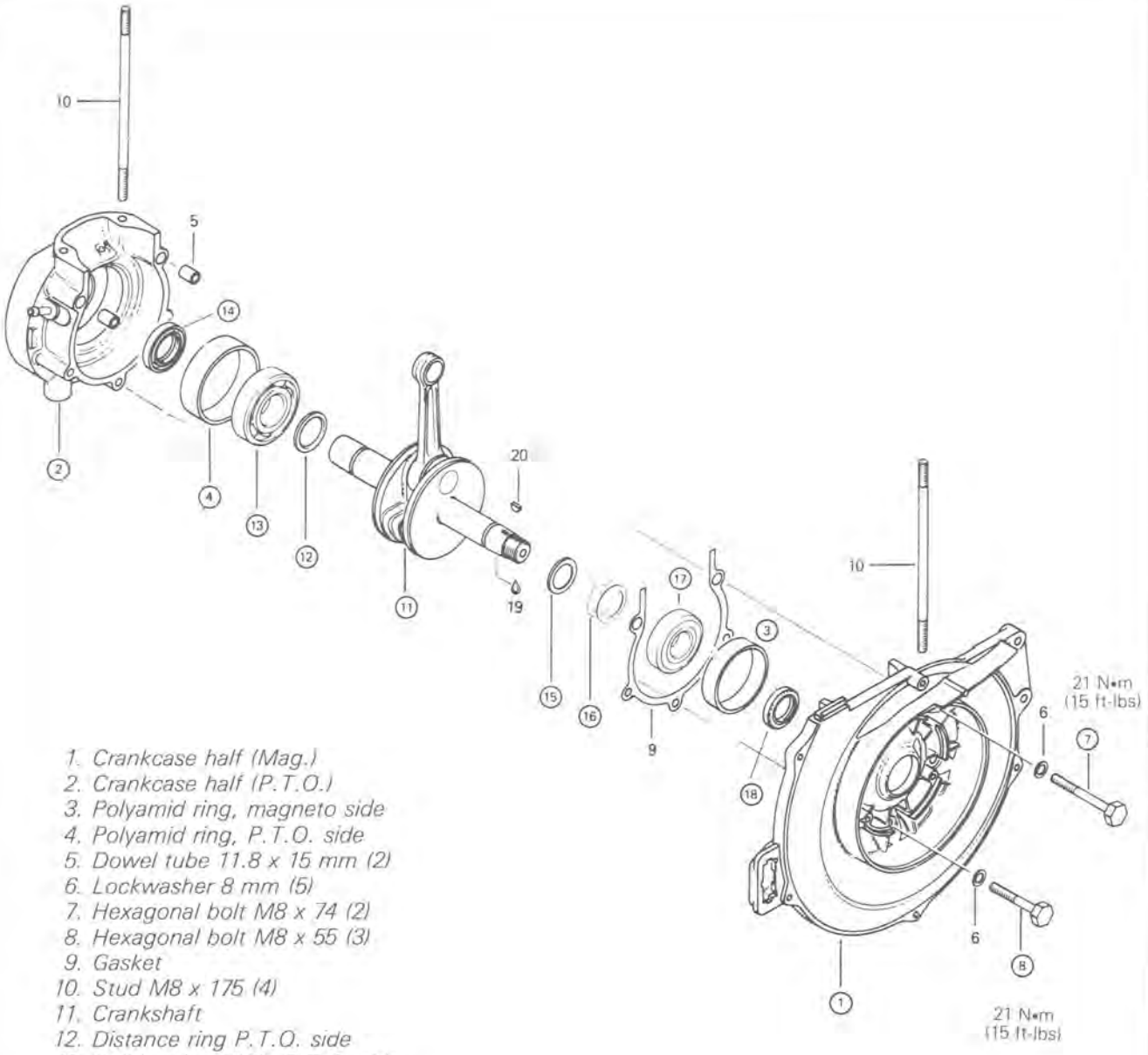
⑧⑩⑫ Position cylinder head on cylinder with nuts and push cylinder towards magneto while cross torquing nuts to 21 N•m (15 ft-lbs).



Push cylinder towards magneto

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BOTTOM END



1. Crankcase half (Mag.)
2. Crankcase half (P.T.O.)
3. Polyamid ring, magneto side
4. Polyamid ring, P.T.O. side
5. Dowel tube 11.8 x 15 mm (2)
6. Lockwasher 8 mm (5)
7. Hexagonal bolt M8 x 74 (2)
8. Hexagonal bolt M8 x 55 (3)
9. Gasket
10. Stud M8 x 175 (4)
11. Crankshaft
12. Distance ring P.T.O. side
13. Ball bearing 6306, P.T.O. side
14. Seal, P.T.O. side
15. Distance ring, magneto side
16. Shim 0.1, 0.2, 0.3 or 0.5 mm
17. Ball bearing 6305, magneto side
18. Seal, magneto side
19. "Loctite 242" (blue, medium strength)
20. Woodruff key

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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.

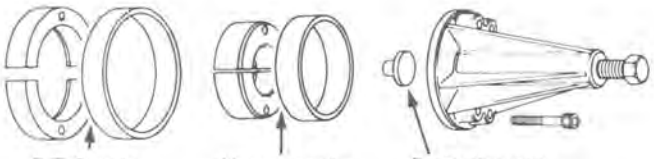
To remove magneto, refer to "Magneto" in this section.

③ ④ Do not remove polyamid rings unless necessary.

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

⑭ ⑱ To remove seals, push from outside the crankcase towards the inside.

⑬ ⑰ 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) 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		
	FITTING NEW PARTS (MIN.)	(MAX.)	WEAR LIMIT
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")
Connecting rod alignment	N.A.	N.A.	N.A.
Crankshaft end play	.20 mm (.0078")	.40 mm (.0156")	N.A.

NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 07.

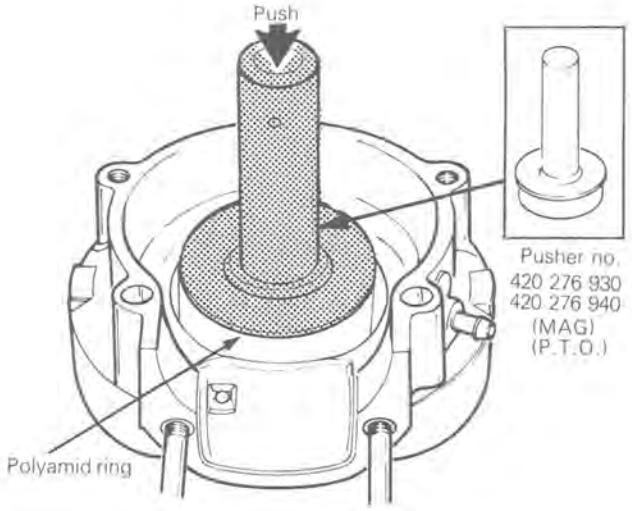
ASSEMBLY

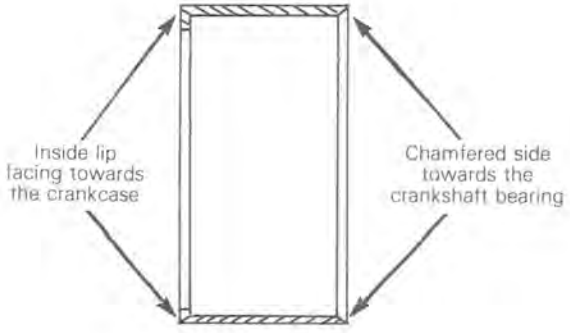
⑬ ⑰ Prior to installation, place bearings into an oil container and heat the oil to 100°C (210°F) for 5 to 10 min. This will expand bearings and ease installation.

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 07.

③ ④ 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.

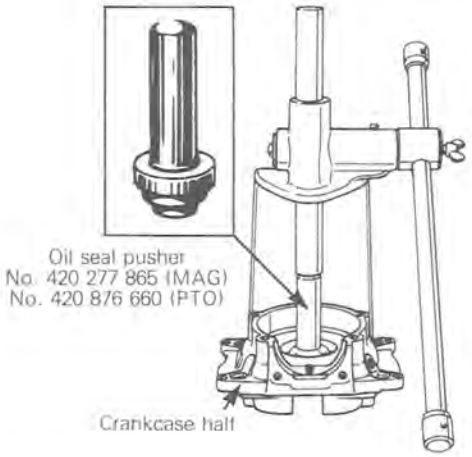




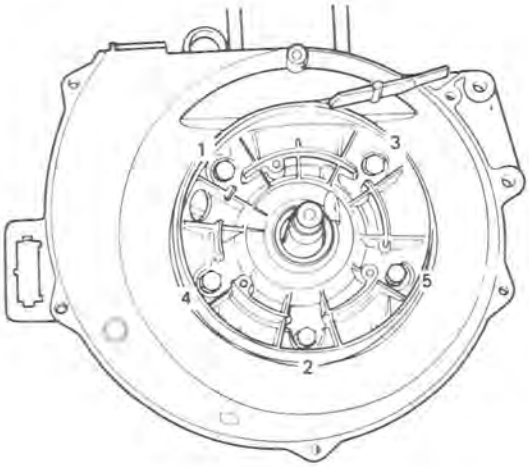
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⑭ ⑱Install a seal inside the crankcase, use no. 420 277 865 pusher for magneto side and no. 420 876 660 pusher for P.T.O. side.

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



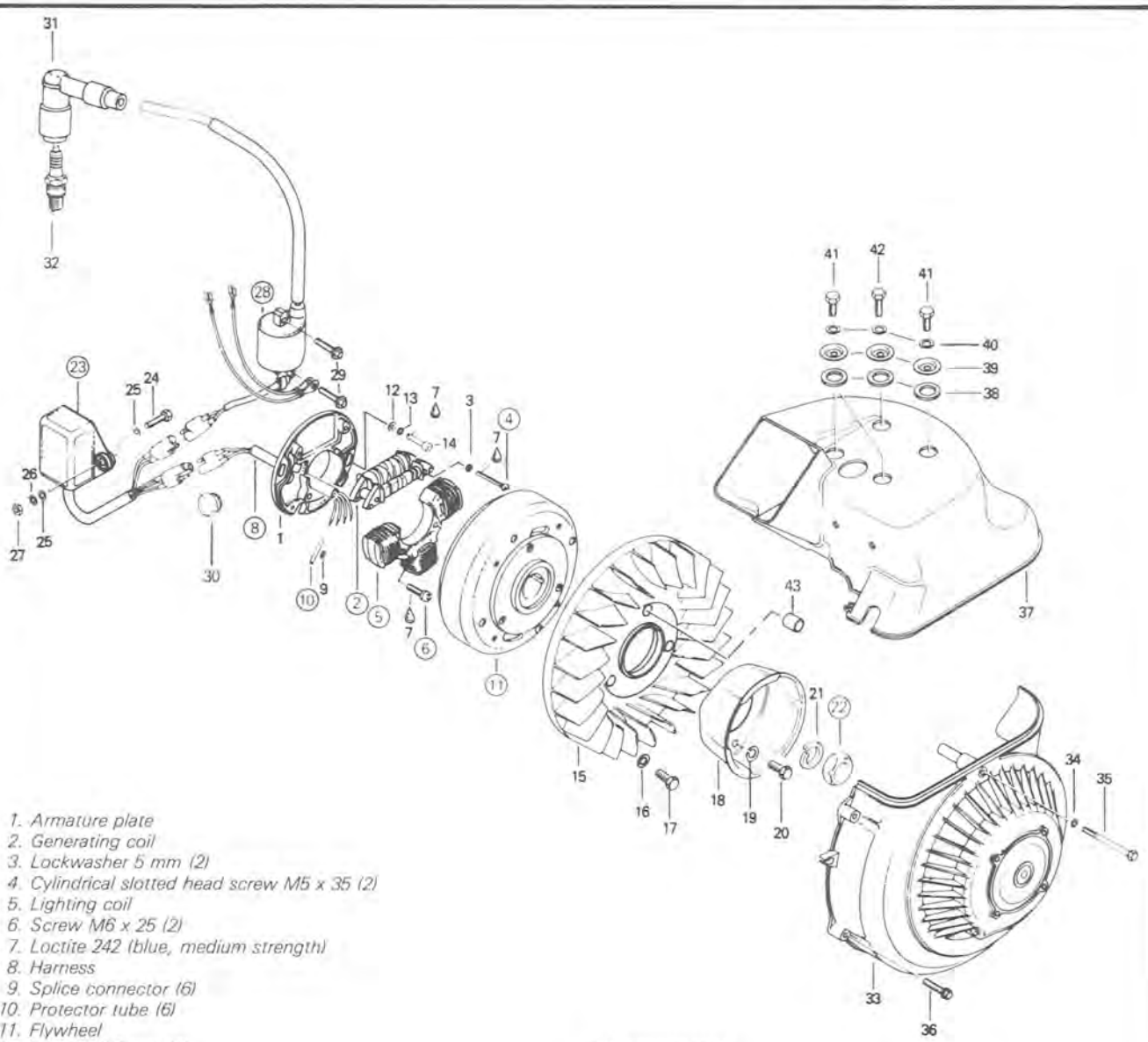
⑦ ⑧At assembly, torque to 21 N•m (15 ft-lbs) following illustrated sequence.



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

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MAGNETO AND COOLING SYSTEM



1. Armature plate
2. Generating coil
3. Lockwasher 5 mm (2)
4. Cylindrical slotted head screw M5 x 35 (2)
5. Lighting coil
6. Screw M6 x 25 (2)
7. Loctite 242 (blue, medium strength)
8. Harness
9. Splice connector (6)
10. Protector tube (6)
11. Flywheel
12. Washer 5.3 mm (2)
13. Lockwasher 5 mm (2)
14. Allen screw M5 x 18 (2)
15. Fan
16. Lockwasher 6 mm (4)
17. Hexagonal screw M6 x 12 (4)
18. Starting pulley
19. Lockwasher 6 mm (3)
20. Hexagonal screw M6 x 12 (3)
21. Lockwasher 18 mm
22. Hexagonal nut 18 x 1.5 mm
23. C.D. box
24. Hexagonal screw M6 x 20 (2)
25. Washer 6.4 mm (4)
26. Lockwasher 6 mm (2)
27. Hexagonal nut 6 mm (2)
28. Ignition coil
29. Hexagonal head taptite screw M5 x 20 (2)
30. Grommet
31. Spark plug protector
32. Spark plug NGK BR8ES
33. Fan cowl
34. Lockwasher 6 mm
35. Hexagonal screw M6 x 73
36. Hexagonal head taptite screw M6 x 30 (5)
37. Cylinder cowl
38. Rubber washer (4)
39. Cowl cover (4)
40. Lockwasher 8 mm (4)
41. Hexagonal screw M8 x 16 (3)
42. Hexagonal screw M8 x 25
43. Distance sleeve

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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 (if applicable)

– loosen cylinder cowl bolts

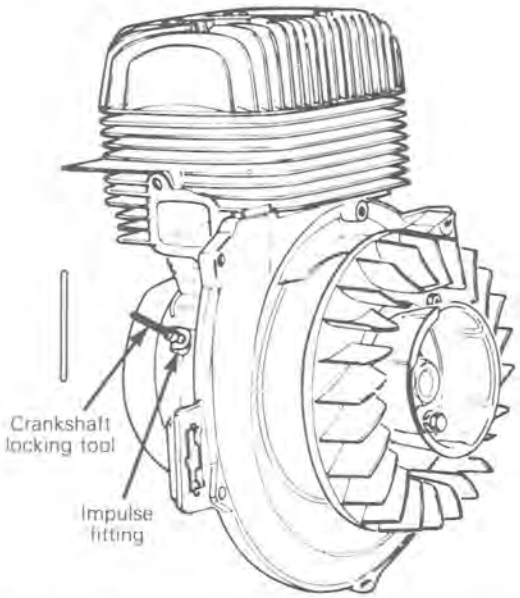
– remove fan cowl.

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

● ㉒ To remove magneto flywheel retaining nut:

– lock crankshaft with crankshaft locking tool (service tool) as illustrated (piston must be at top dead center);

– remove magneto retaining nut.

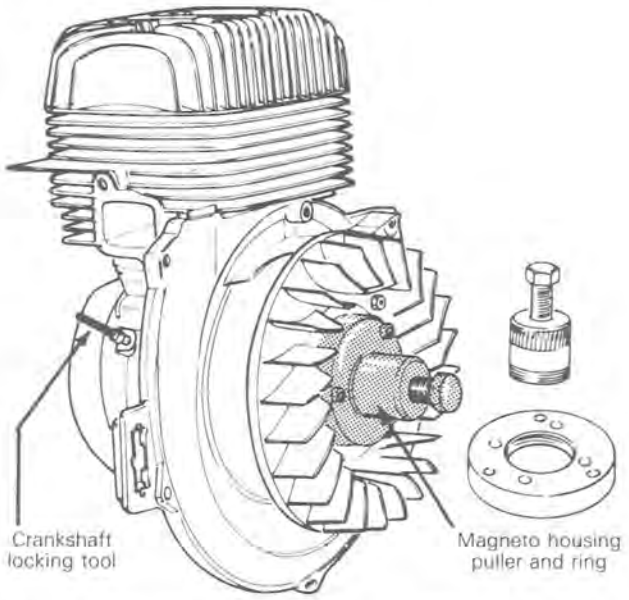


○ **NOTE:** It should be noted that to correctly remove a "Loctite" locked fastener it is first necessary to tap on the fastener to break "Loctite" bond. This will eliminate the possibility of thread breakage.

● ⑪ To remove magneto housing (flywheel):

– lock crankshaft with crankshaft locking tool (service tool)

– adjust magneto housing puller and puller ring (service tools) as illustrated

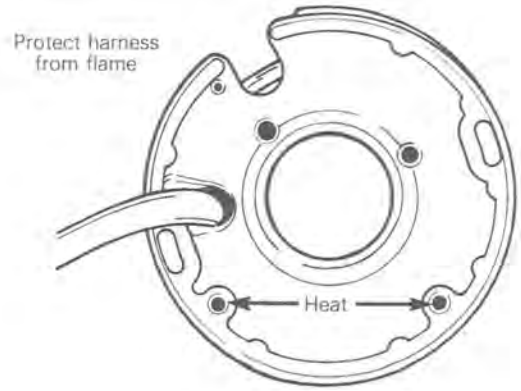


– tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper.

REPAIR

● ② To replace generating coil:

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

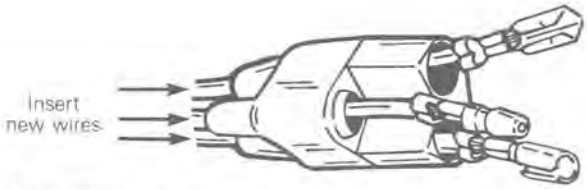


▼ **CAUTION: Protect harness from flame.**

– Remove screws (use Phillips no. 2 or suitable flat screw driver).

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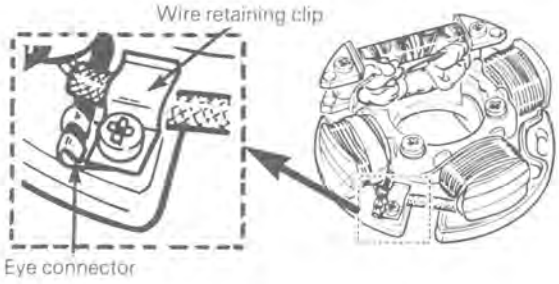
– Cut the four wires as close as possible to the coil body.
– To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube.
– Insert the new wires into the old connector housing and install connectors.



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.

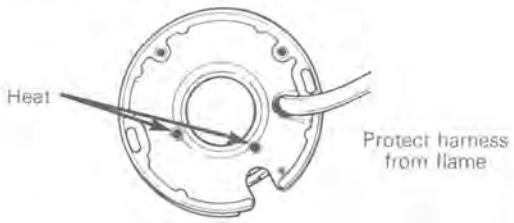
Solder an eye connector to the lead and fasten it under the wire retaining clip.



– 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 ④ before assembly.

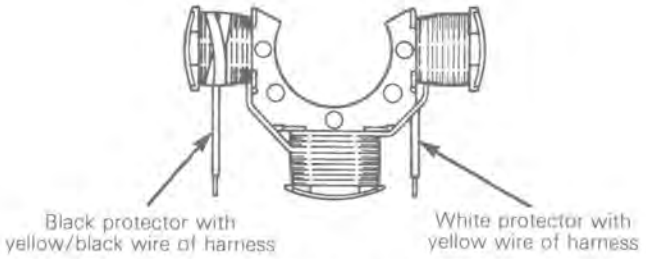
CAUTION: Before reinstalling the magneto, remove the loose epoxy from harness.

● ⑤To 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.



– ⑩ Position protector tubes over connections.
– ⑥ 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.

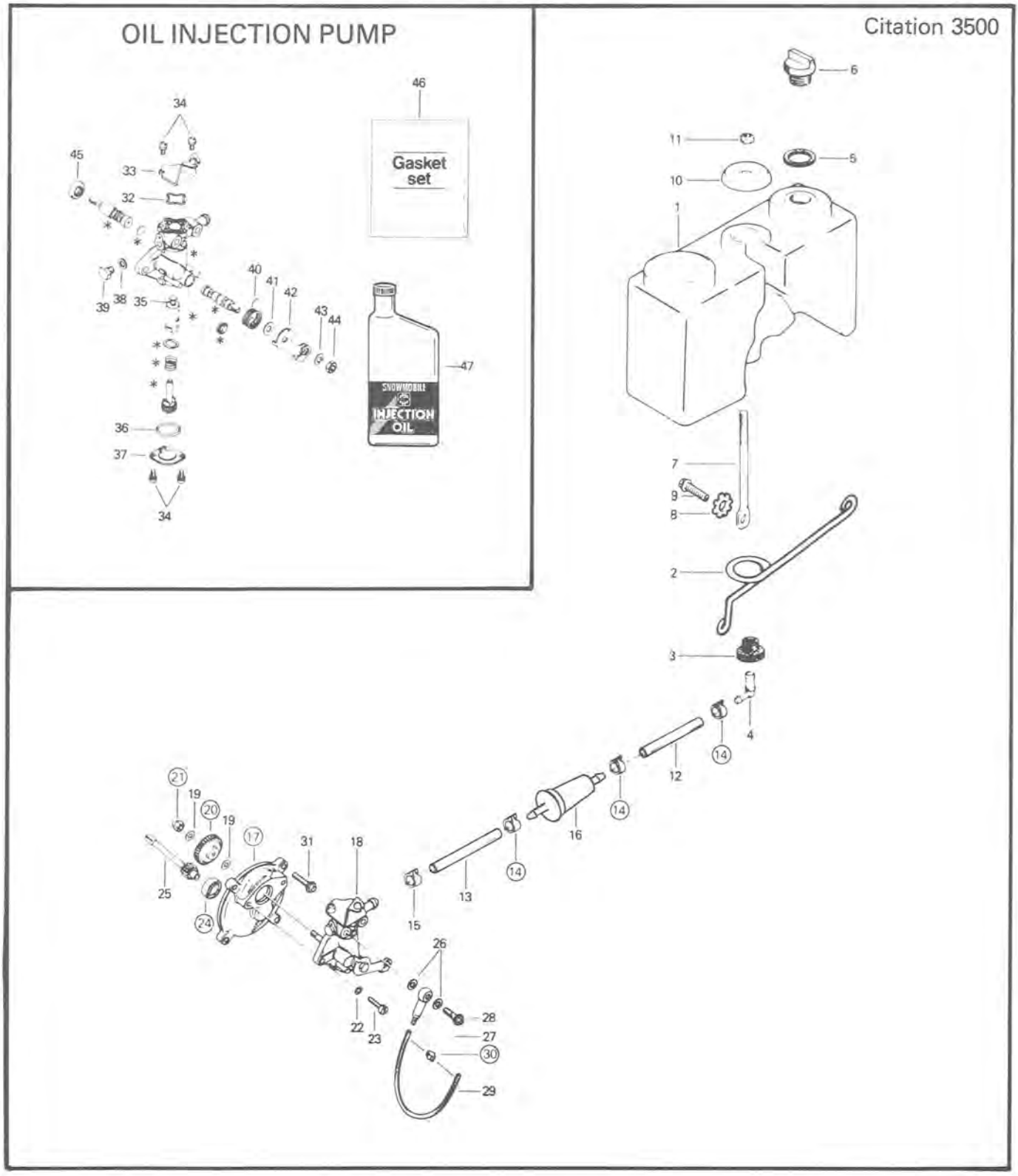
ASSEMBLY

– Clean crankshaft extension (taper).
– Apply "Loctite 242" on taper.
– Position key and magneto housing on crankshaft.
– ㉒ Clean nut threads and apply "Loctite 242" (blue, medium strength) before tightening nut to 85 N•m (63 ft-lbs).
– ⑧㉓㉘At reassembly coat all electric connections with dielectric of lithium grease to prevent corrosion or moisture penetration.

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

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OIL INJECTION PUMP AND RESERVOIR



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1. *Injection oil tank*
2. *Support*
3. *Grommet*
4. *Male connector*
5. *O'ring*
6. *Oil tank cap*
7. *Retainer rod*
8. *External tooth lockwasher 1/4*
9. *Hexagonal washer head taptite screw M6 x 30*
10. *Retaining washer*
11. *Hexagonal elastic stop nut*
12. *Oil line 1.5" (38 mm)*
13. *Oil line 5" (127 mm)*
14. *Spring clip (3)*
15. *Spring clip*
16. *Filter*
17. *Oil pump mounting flange*
18. *Oil pump*
19. *Washer 6.2 (2)*
20. *Oil pump gear 27 teeth*
21. *Lock nut 6 mm*
22. *Locwasher 5 (12)*
23. *Cylindrical slotted screw M5 x 16 (2)*
24. *Ball bearing*
25. *Gear 9 teeth*
26. *Oil banjo gasket (2)*
27. *Banjo*
28. *Banjo bolt*
29. *Oil line 380 mm (15")*
30. *Clamp (4)*
31. *Taptite screw M5 x 20 (4)*
32. *O'ring (4)*
33. *Plate*
34. *Screw with lockwasher*
35. *Retainer*
36. *O'ring*
37. *Cam casing plate*
38. *Washer*
39. *Hexagonal head cap screw M6 x 7*
40. *Spring*
41. *Washer*
42. *Lever*
43. *Lockwasher 6*
44. *Hexagonal nut 6 mm*
45. *Seal*
46. *Gasket set*
47. *Oil*

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

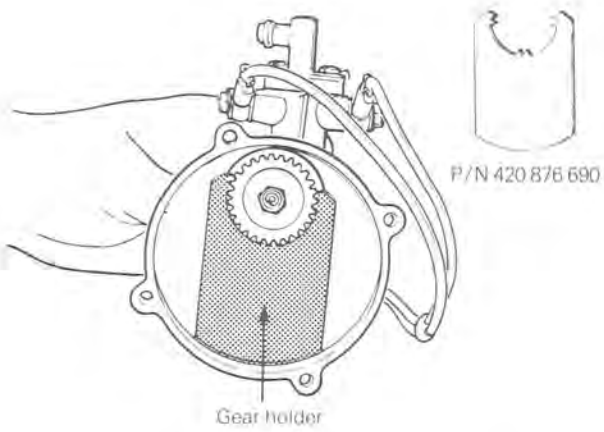
CLEANING

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

DISASSEMBLY

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

⑳ ㉑ To remove retaining nut, lock gear in place using no. 420 876 690 tool.



⑰ ㉔ To remove bearing, heat ⑰ mounting flange to approximately 175°-200°C (350°-400°F) using a propane torch. Then strike cover on hard flat surface and bearing will fall out.

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

ASSEMBLY

⑰ ㉔ To install bearing, use a press to push bearing in mounting flange.

⑳ At gear assembly, apply a light coat of grease on gear teeth.

⑭ ⑮ ㉚ Always check for spring clip and clamp tightness.

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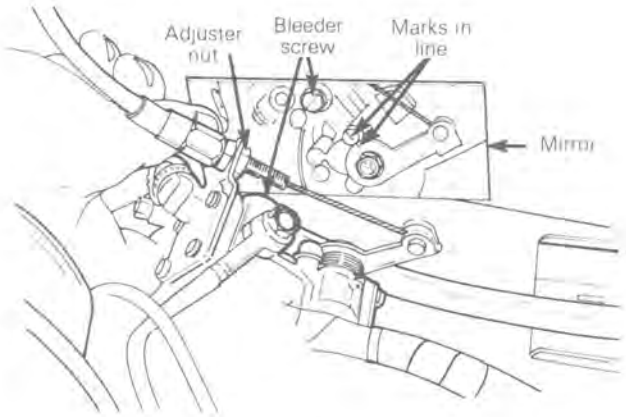
ADJUSTMENT

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.

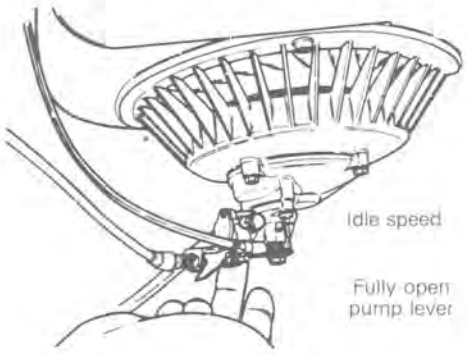


To bleed oil lines:

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.



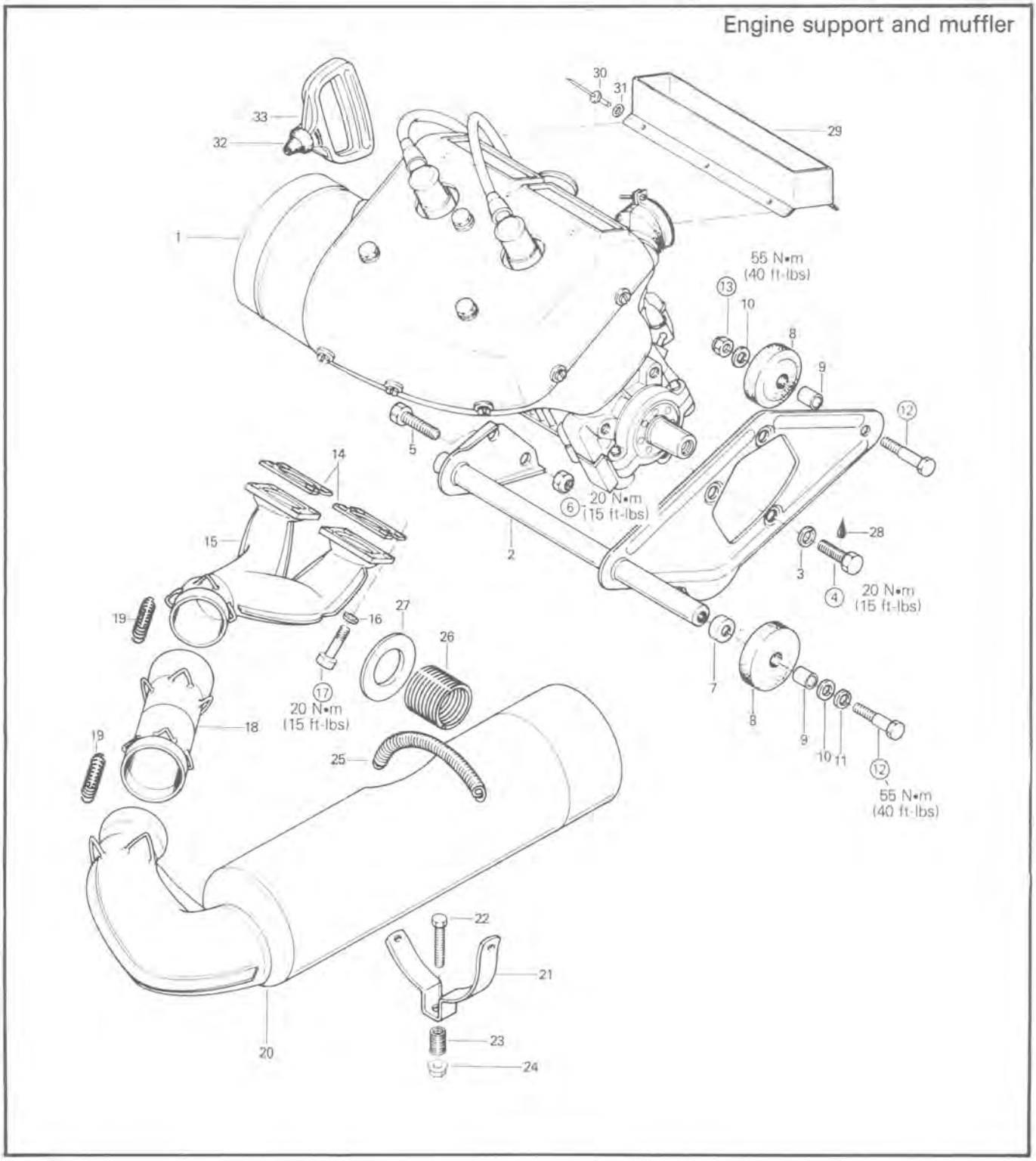
◆ WARNING: Ensure not to operate carburetor throttle mechanism. Secure the rear of the vehicle on a stand.

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377 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION

Engine support and muffler



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1. *Rotax engine 377*
2. *Engine bracket (electric)*
3. *Lockwasher 10 mm (3)*
4. *Hexagonal head cap screw M10 x 25 (3)*
5. *Hexagonal head cap screw M10 x 35 (2)*
6. *Hexagonal elastic stop nut 10 mm (2)*
7. *Cup (2)*
8. *Rubber mount (3)*
9. *Bushing (3)*
10. *Flat washer 10.5 x 21 x 2 (3)*
11. *Lockwasher 10 mm (2)*
12. *Hexagonal head cap screw M10 x 45 (3)*
13. *Hexagonal elastic stop nut 10 mm*
14. *Gasket (4)*
15. *Exhaust manifold*
16. *Lockwasher 8 mm (4)*
17. *Hexagonal socket head cap screw M8 x 30 (4)*
18. *Connector*
19. *Spring (6)*
20. *Muffler*
21. *Muffler support*
22. *Hexagonal head cap screw M6 x 1.00 x 40*
23. *Spring*
24. *Hexagonal flanged elastic stop nut 6 mm*
25. *Spring (2)*
26. *Spring*
27. *Washer*
28. *Loctite 242 blue medium strength*
29. *Air duct*
30. *Rivet (6)*
31. *Flat washer 7/32 x 5/8 x .060 (6)*
32. *Rubber buffer*
33. *Starter grip*

REMOVAL FROM VEHICLE

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

- Pulley guard, drive belt
- Muffler
- Air intake silencer
- Throttle cable at carburetor
- Oil and fuel lines

NOTE: Secure fuel lines so that the opened ends are higher than the fuel level in the tank.

- Hood retaining cable
- Rewind starter cable
- Wiring harness

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

- Engine support nuts

ENGINE SUPPORT AND MUFFLER DISASSEMBLY AND ASSEMBLY

④ Apply "Loctite 222 or 242" on threads then torque to 20 N•m (15 ft-lbs).

⑥ ⑰ Torque to 20 N•m (15 ft-lbs).

⑫ ⑬ Torque to 55 N•m (40 ft-lbs).

INSTALLATION ON VEHICLE

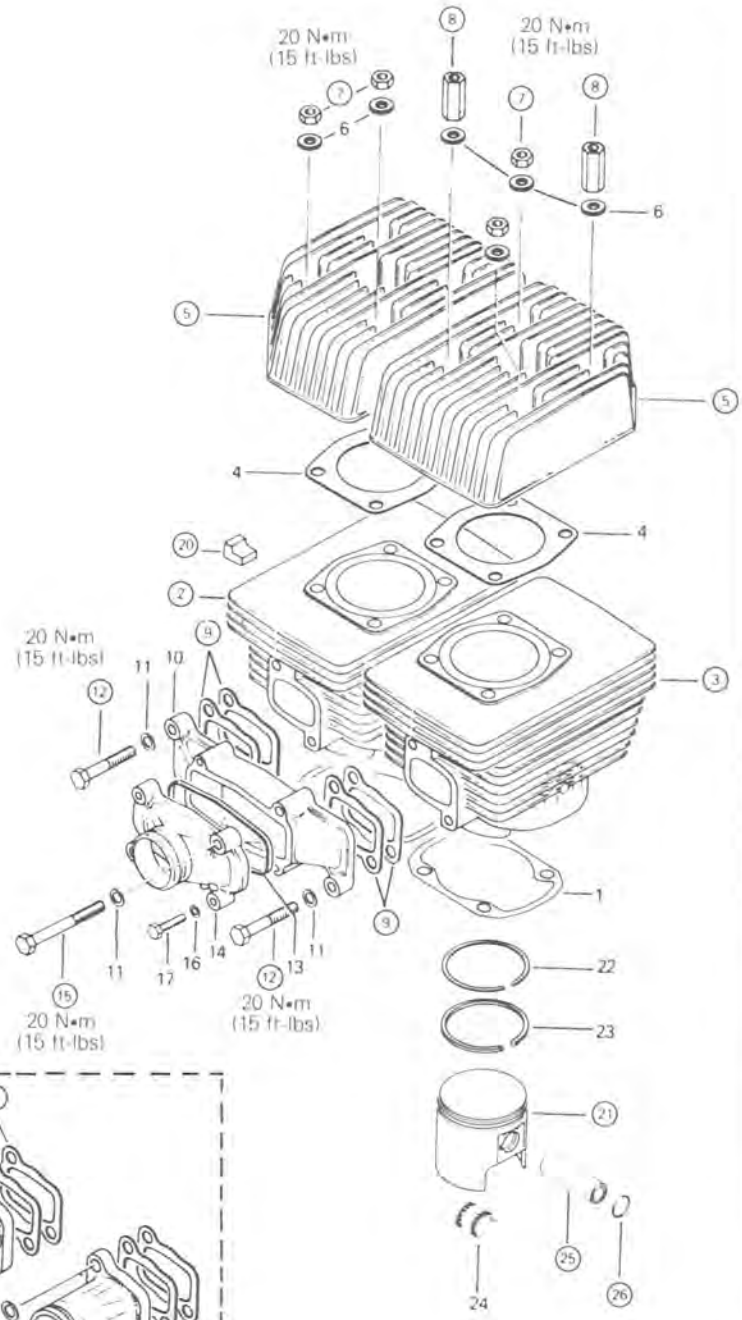
To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

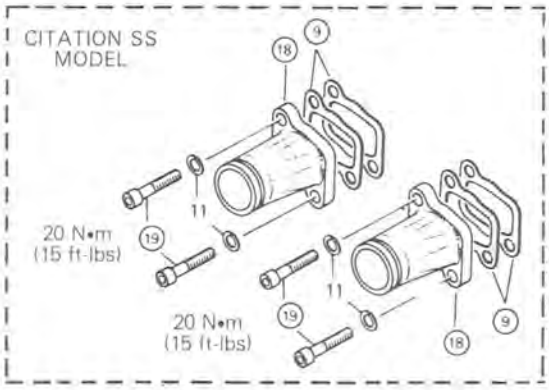
- Check tightness of engine mount nuts
- After throttle cable installation, check maximum throttle slide opening
- Check pulley alignment and drive belt tension

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TOP END

1. *Cylinder flange gasket*
2. *Cylinder, P.T.O. side*
3. *Cylinder, magneto side*
4. *Cylinder head gasket (2)*
5. *Cylinder head*
6. *Washer 8.4 mm (8)*
7. *Hexagonal nut 8 mm (5)*
8. *Distance nut 8 x 33 mm (3)*
9. *Intake manifold gasket (4)*
10. *Intake manifold*
11. *Lockwasher 8 mm (4)*
12. *Hexagonal head bolt M8 x 40 mm (2)*
13. *O'ring*
14. *Intake manifold cover*
15. *Hexagonal head bolt M8 x 74 mm (2)*
16. *Lockwasher 6 mm (2)*
17. *Hexagonal head bolt M6 x 25 mm (2)*
18. *Intake manifold (2)*
19. *Hexagonal socket head bolt M8 x 35 mm*
20. *Noise damper*
21. *Piston (2)*
22. *Rectangular ring (2)*
23. *Rectangular ring (2)*
24. *Needle bearing (2)*
25. *Gudgeon pin (2)*
26. *Circlip (4)*





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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 ㉖Place a clean cloth over crankcase to prevent circlips from falling into crankcase. Use a pointed tool to remove circlips from piston.

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.)	(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 07.

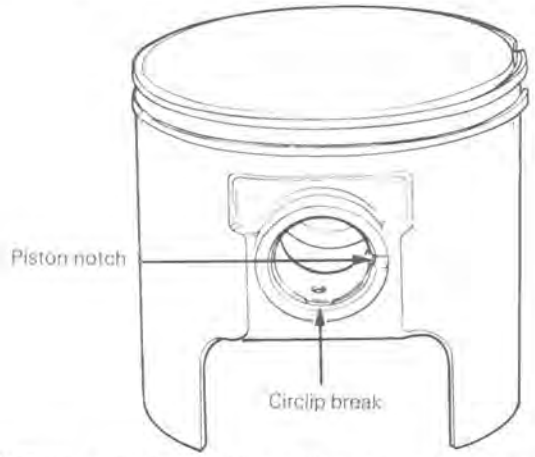
ASSEMBLY

㉑ 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.

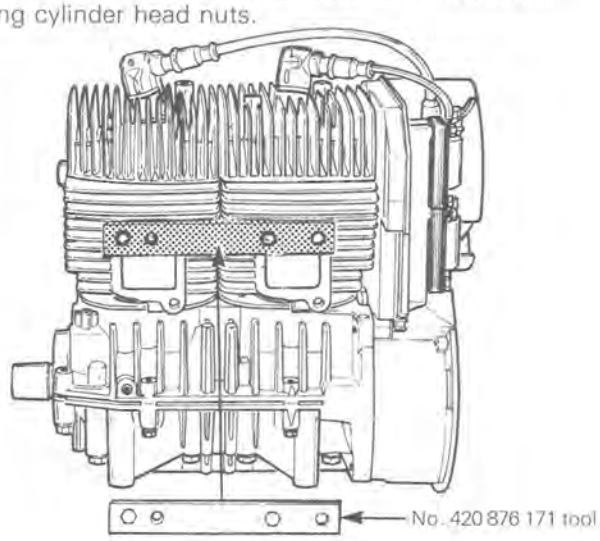


㉖ To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated.

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

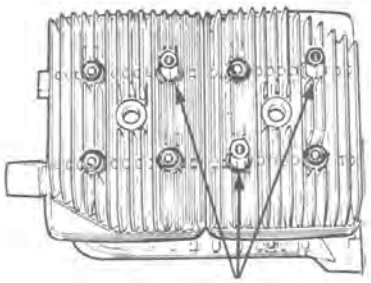


② ③ ⑤ At cylinder and/or cylinder head installation, use P/N 420 876 171 aligning tool to secure sealing of intake manifold and exhaust (See Tools section), before tightening cylinder head nuts.



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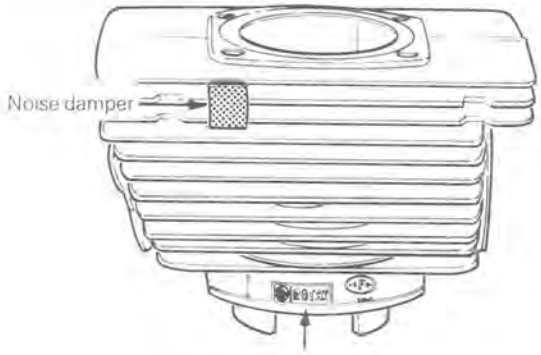
⑦ ⑧ Position nuts and distance nuts as illustrated.



Distance nuts

Cross torque cylinder head nuts to 20 N•m (15 ft-lbs); torque each cylinder head individually.

⑳ Position noise damper as per following illustration.



P. T. O. side cylinder

Install armature plate, fan housing and then air deflector.

⑨ Install a gasket on each side of the air deflector.

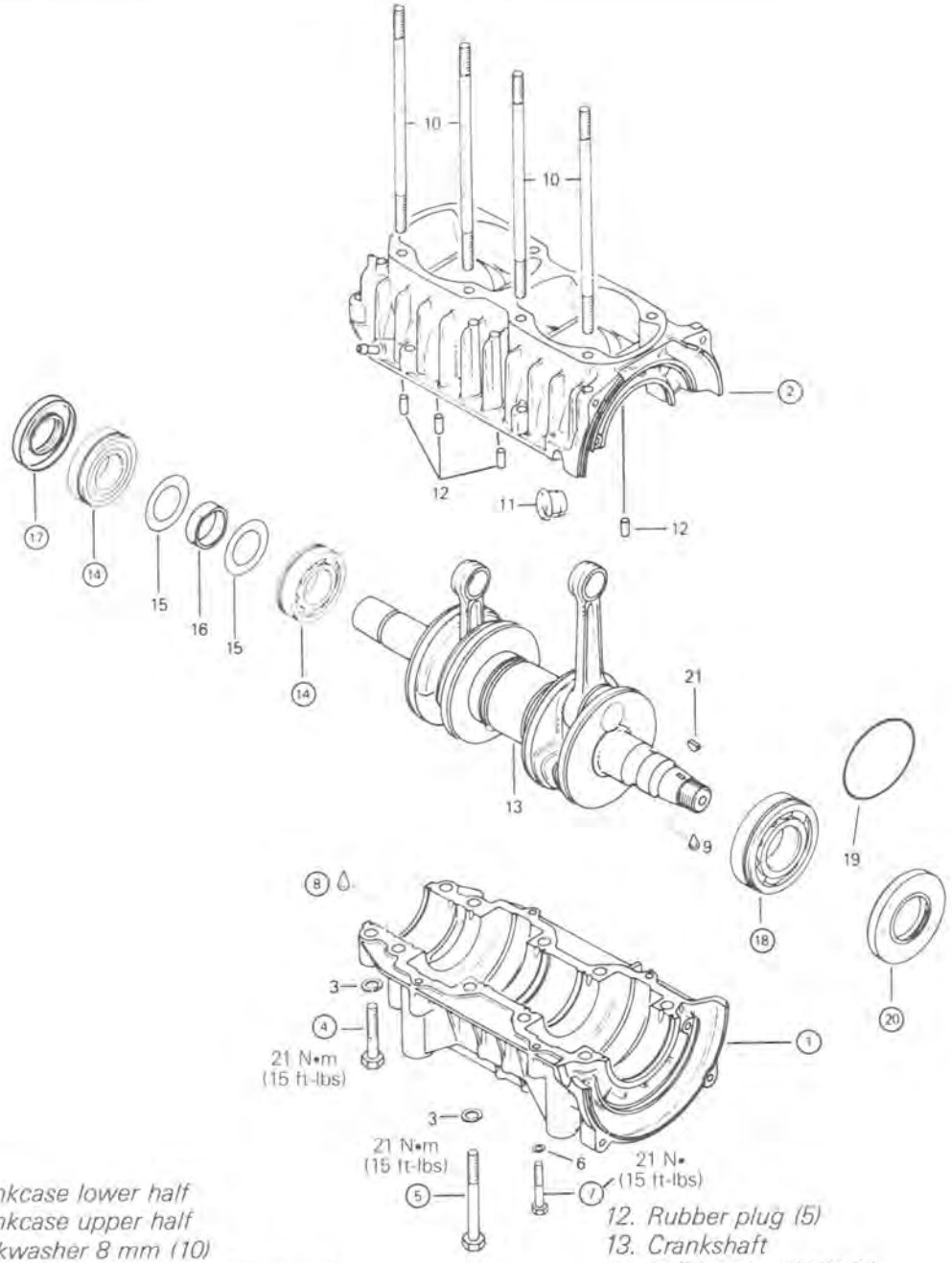
⑫ ⑮ ⑲ Torque to 20 N•m (15 ft-lbs).

⑱ Install intake manifold with identification marks towards cylinder head.



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BOTTOM END



1. Crankcase lower half
2. Crankcase upper half
3. Lockwasher 8 mm (10)
4. Hexagonal screw M8 x 45 mm (2)
5. Hexagonal screw M8 x 70 mm (8)
6. Lockwasher 6 mm (4)
7. Hexagonal screw M6 x 40 mm (4)
8. "Loctite 515"
9. "Loctite 242" (blue, medium strength)
10. Stud M8 x 167 mm (8)
11. Cable grommet
12. Rubber plug (5)
13. Crankshaft
14. Ball bearing 6206 (2)
15. Shim 1 mm (2)
16. Spacer
17. Seal, P.T.O. side
18. Ball bearing 6207
19. O'ring
20. Seal, magneto side
21. Woodruff key 3 x 3.7 mm

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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.

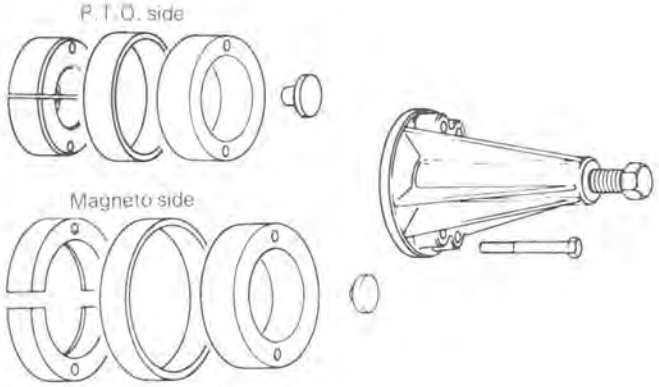
DISASSEMBLY

General

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

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

⑭ ⑱ 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 07.

ASSEMBLY

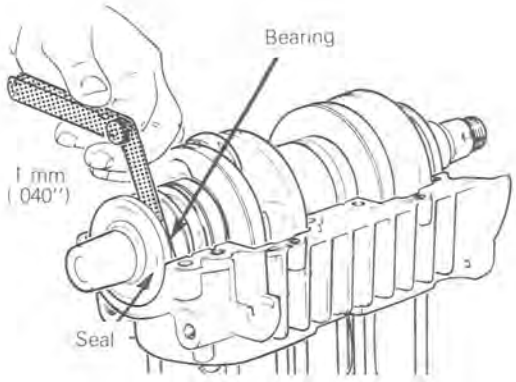
⑭ ⑱ Prior to installation, place bearings into an oil container heated to 100°C (210°F).

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.

⑰ ⑳ 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.

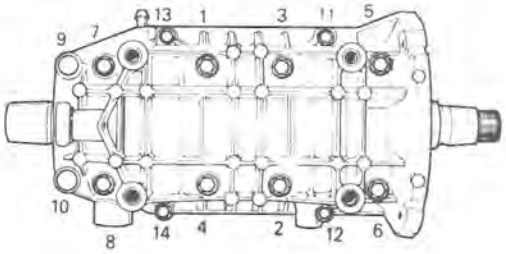


① ② ⑧ Crankcase halves are factory matched and therefore, are not interchangeable as single halves.

Prior to joining of crankcase halves, 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 21 N•m (15 ft-lbs) following illustrated sequence.

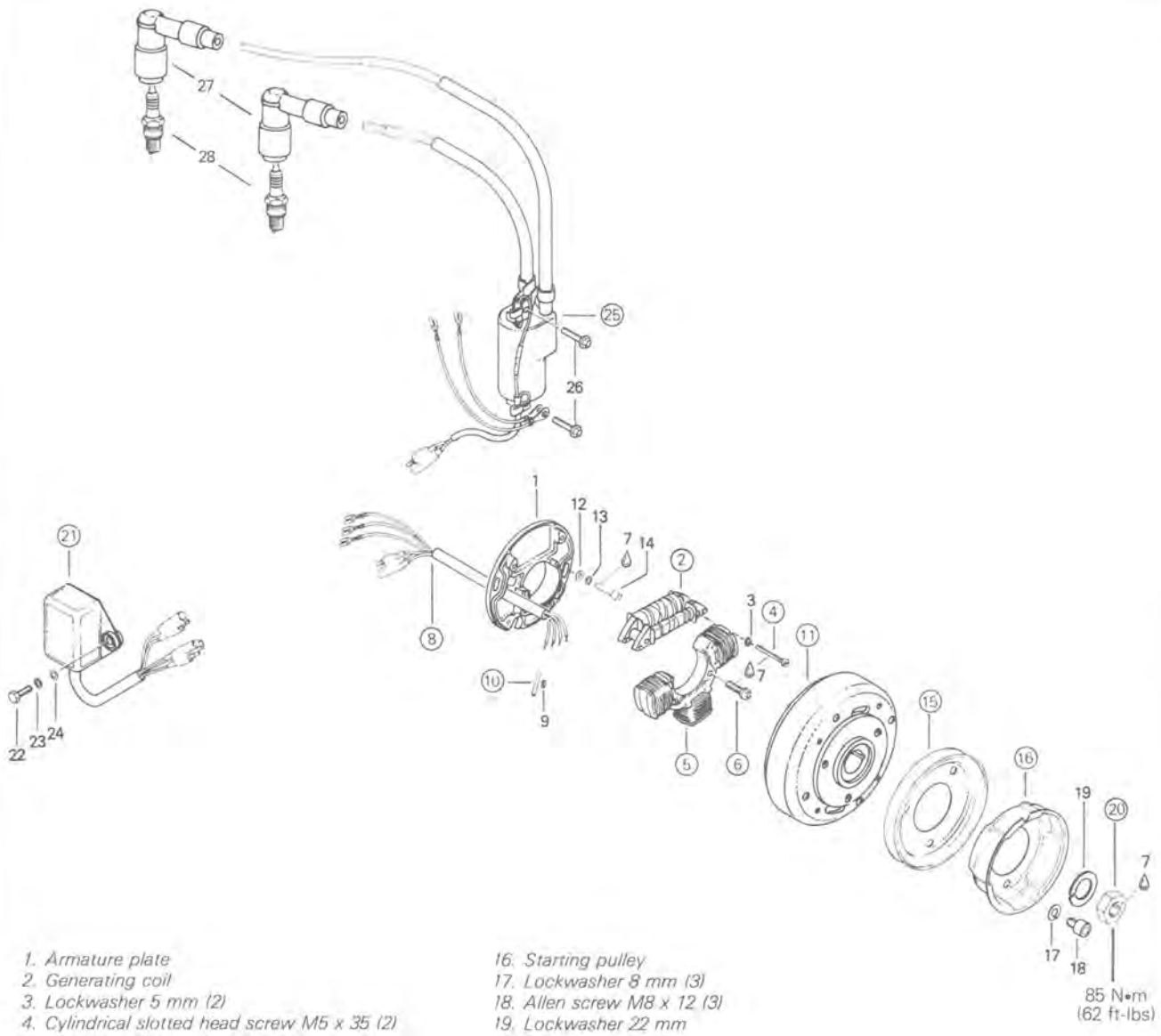


④ ⑤ ⑦ Torque to 21 N•m (15 ft-lbs).

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

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MAGNETO



1. Armature plate
2. Generating coil
3. Lockwasher 5 mm (2)
4. Cylindrical slotted head screw M5 x 35 (2)
5. Lighting coil
6. Screw M6 x 25 (2)
7. Loctite 242 (blue, medium strength)
8. Harness
9. Splice connector (6)
10. Protector tube (6)
11. Flywheel
12. Washer 5.3 mm (2)
13. Lockwasher 5 mm (2)
14. Allen screw M5 x 18 (2)
15. V-belt pulley
16. Starting pulley
17. Lockwasher 8 mm (3)
18. Allen screw M8 x 12 (3)
19. Lockwasher 22 mm
20. Hexagonal nut 22 x 1.5 mm
21. C.D. box
22. Hexagonal screw M6 x 20 (2)
23. Lockwasher 6 mm (2)
24. Washer 6.4 mm (2)
25. Ignition coil
26. Hexagonal head taptite screw M5 x 25 (2)
27. Spark plug protector (2)
28. Spark plug NGK BR-8ES (2)

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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:

– injection oil reservoir (if applicable)

– starter housing

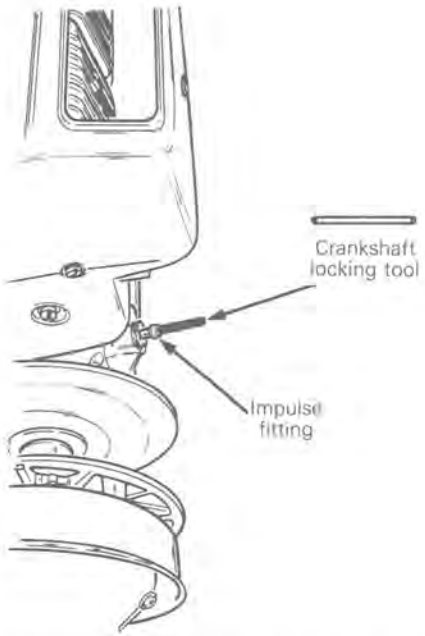
– starting and v-belt pulleys ⑯ ⑮

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

● ⑳ 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)

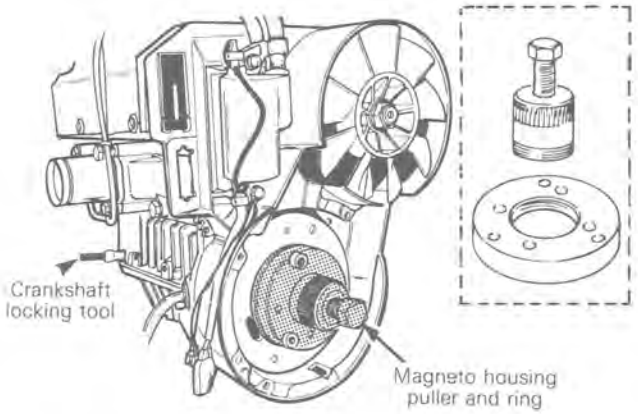
– remove magneto retaining nut



◯ 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 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.

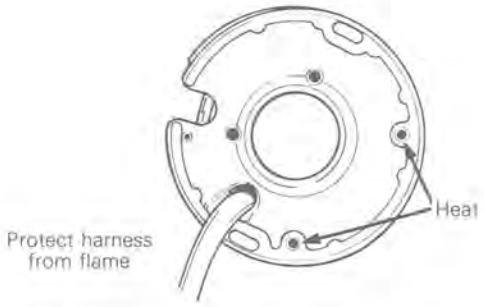


– tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper

REPAIR

● ② To replace generating coil:

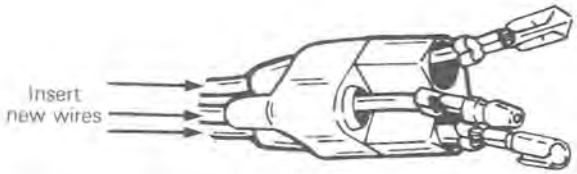
– Heat the armature plate around the screw holes to break the Loctite bond (200°F)



▼ CAUTION: Protect harness from flame.

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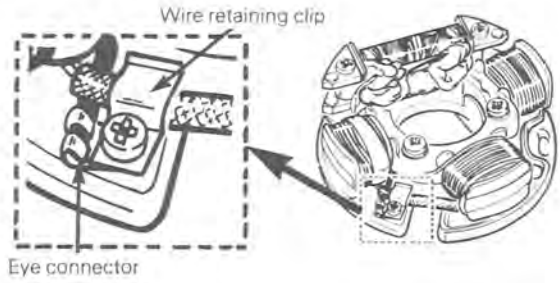
- Remove screws (use Phillips no. 2 or suitable flat screw driver)
- Cut the four wires as close as possible to the coil body
- To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube
- Insert the new wires into the old connector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

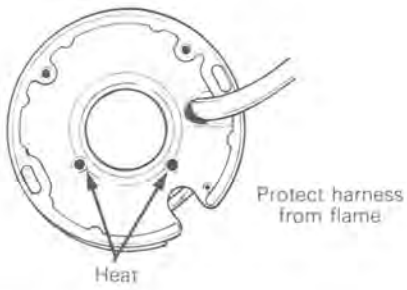


- To install the new coil on the armature plate, remove the shipping nuts from the coil and apply Loctite 242 (blue, medium strength) to screws ④ before assembly

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

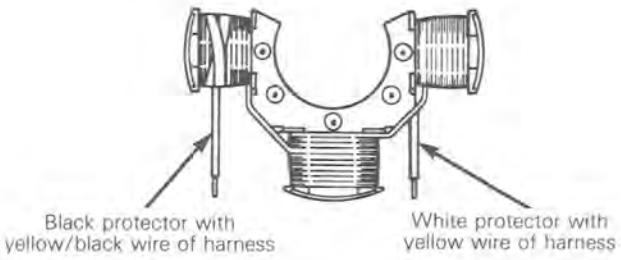
● ⑤ To replace lighting coil:

- 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



- ⑩ Position protector tubes over connections
- ⑥ Prior to assembly, apply "Loctite 242" (blue, medium strength)
- Fasten retaining clip onto protector tubes

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



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

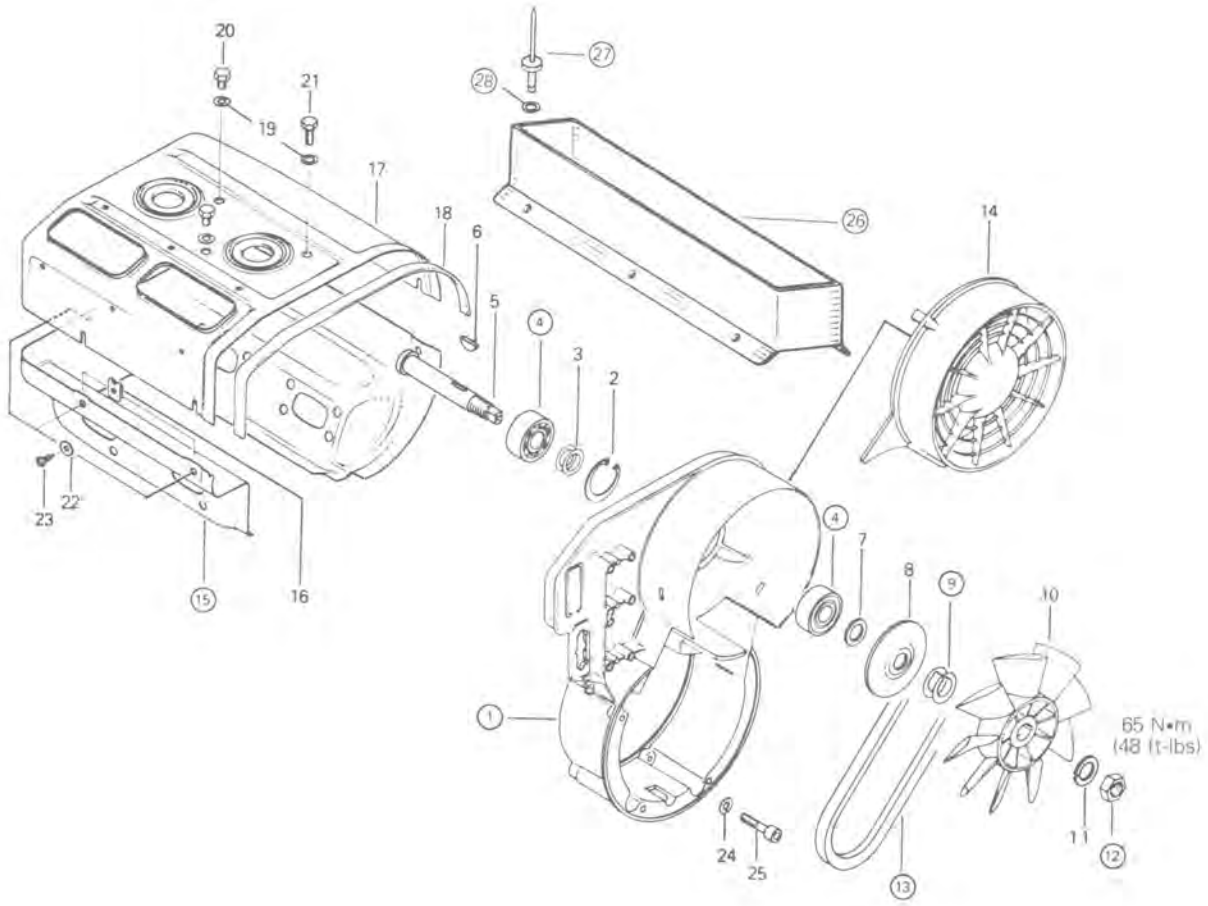
ASSEMBLY

- Clean crankshaft extension taper
- Apply "Loctite 242" (blue, medium strength) on taper
- Position key and magneto housing on crankshaft
- ⑳ Clean nut threads and apply "Loctite 242" (blue, medium strength) before tightening nut to 85 N•m (63 ft-lbs)
- ⑧ ㉑ ㉕ ㉗ At reassembly coat all electric connections with dielectric of lithium grease to prevent corrosion or moisture penetration

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

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COOLING SYSTEM



1. Fan housing
2. Circlip
3. Shim 1.0 mm
4. Ball bearing
5. Fan shaft
6. Woodruff key
7. Distance sleeve
8. Pulley half
9. Shim
10. Fan
11. Lockwasher
12. Hexagonal nut
13. Fan belt
14. Fan cover
15. Cylinder cowl
16. Speed nut
17. Cylinder head cowl
18. Cowl sealing strip
19. Lockwasher 8 mm
20. Hexagonal screw
21. Hexagonal screw
22. Washer
23. Screw
24. Lockwasher
25. Allen screw
26. Air duct
27. Rivet (closed end)
28. Washer

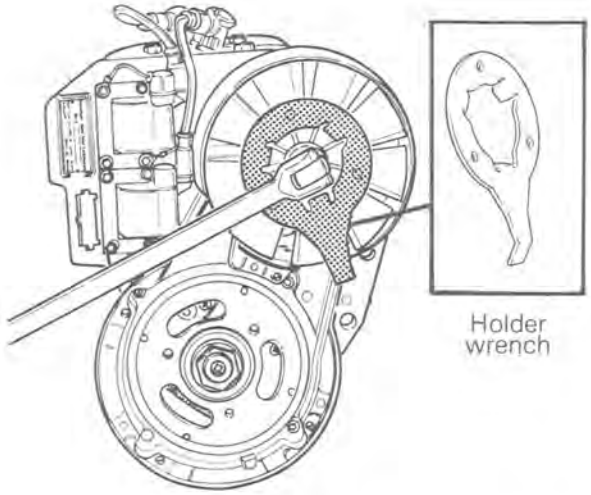
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CLEANING

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

DISASSEMBLY AND ASSEMBLY

⑫To 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).



⑨ ⑬Fan 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.

①④It is first necessary to heat bearing housing to 65°C (150°F) to remove or install bearing.

㉖ ㉗ ㉘ Air duct can be removed by drilling out rivets.

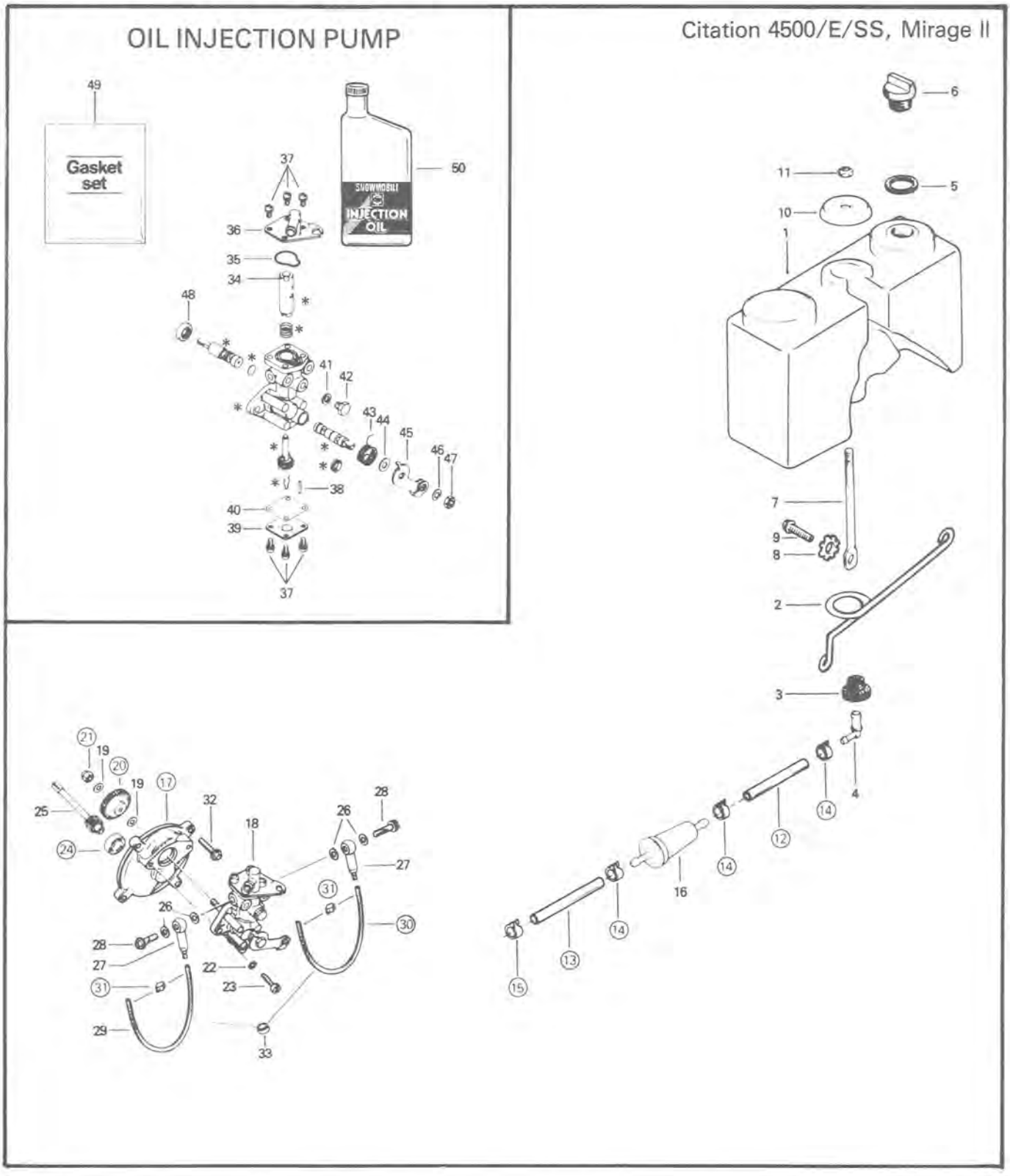
▼ **CAUTION: At reassembly, use only closed end rivets to avoid rivet ends from falling into magneto.**

⑮A gasket must be placed on both sides (inner and outer) of intake and exhaust holes.

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

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OIL INJECTION PUMP AND RESERVOIR



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1. *Injection oil tank*
2. *Support*
3. *Grommet*
4. *Male connector*
5. *O'ring*
6. *Oil tank cap*
7. *Retainer rod*
8. *External tooth lockwasher 1/4*
9. *Hexagonal washer head taptite screw M6 x 30*
10. *Retaining washer*
11. *Hexagonal elastic stop nut*
12. *Oil line 1.5" (38 mm)*
12. *Oil line 1.5" (38 mm)*
13. *Oil line 13" (330 mm)*
13. *Oil line 13" (330 mm)*
14. *Spring clip (3)*
14. *Spring clip (3)*
15. *Spring clip*
15. *Gear clamp*
16. *Filter*
17. *Oil pump mounting flange*
18. *Oil pump*
19. *Washer 6.2 (2)*
20. *Oil pump gear 27 teeth*
21. *Lock nut 6 mm*
22. *Locwasher 5 (2)*
23. *Cylindrical slotted screw M5 x 16 (2)*
24. *Ball bearing*
25. *Gear 9 teeth*
26. *Oil banjo gasket (4)*
27. *Banjo(2)*
28. *Banjo bolt (2)*
29. *Oil line 325 mm (13")*
29. *Oil line 300 mm (12")*
30. *Oil line 325 mm (13")*
30. *Oil line 360 mm (14 1/4")*
31. *Clamp (4)*
32. *Taptite screw M5 x 16 (4)*
33. *Rubber ring*
34. *Retainer*
35. *O'ring*
36. *Plate*
37. *Screw with lockwasher (8)*
38. *Stop pin*
39. *Gasket*
40. *Cam casing plate*
41. *Washer*
42. *Hexagonal head screw M6 x 7*
43. *Spring*
44. *Washer*
45. *Lever*
46. *Lockwasher 6*
47. *Hexagonal nut 6 mm*
48. *Seal*
49. *Gasket set*
50. *Oil*

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

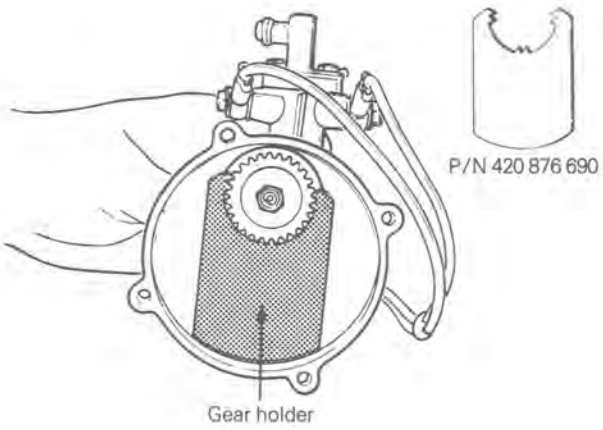
CLEANING

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

DISASSEMBLY

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

⑳ ㉑ To remove retaining nut, lock gear in place using no. 420 876 690 tool.



⑰ ㉔ To remove bearing, heat ⑰ mounting flange to approximately 175°-200°C (350°-400°F) using a propane torch. Then strike cover on hard flat surface and bearing will fall out.

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

ASSEMBLY

⑰ ㉔ To install bearing, use a press to push bearing in mounting flange.

⑳ At gear assembly, apply a light coat of grease on gear teeth.

⑭ ⑮ ㉛ Always check for spring clip and clamp tightness.

⑫ ⑬ ㉙ ㉚ CAUTION: On electric start models, it is recommended to install black rubber lines (P/N 414 2867 00) that will not be altered by battery fumes.

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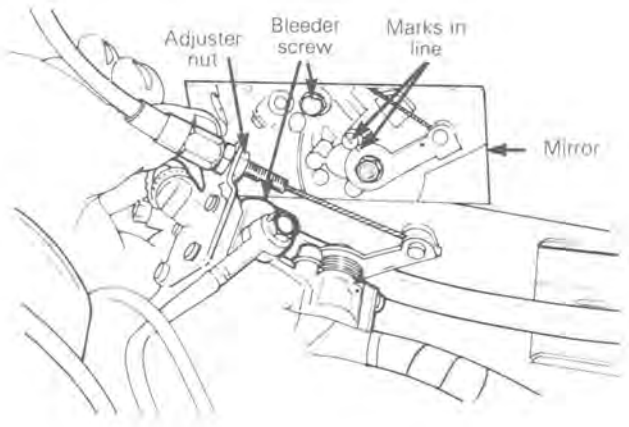
ADJUSTMENT

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.



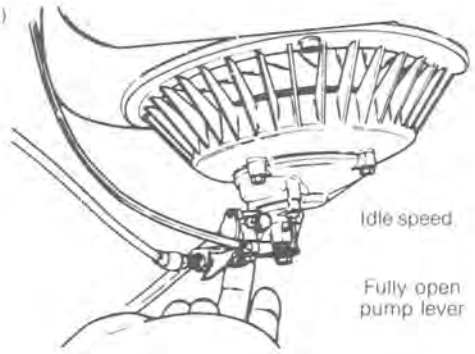
To bleed oil lines:

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)



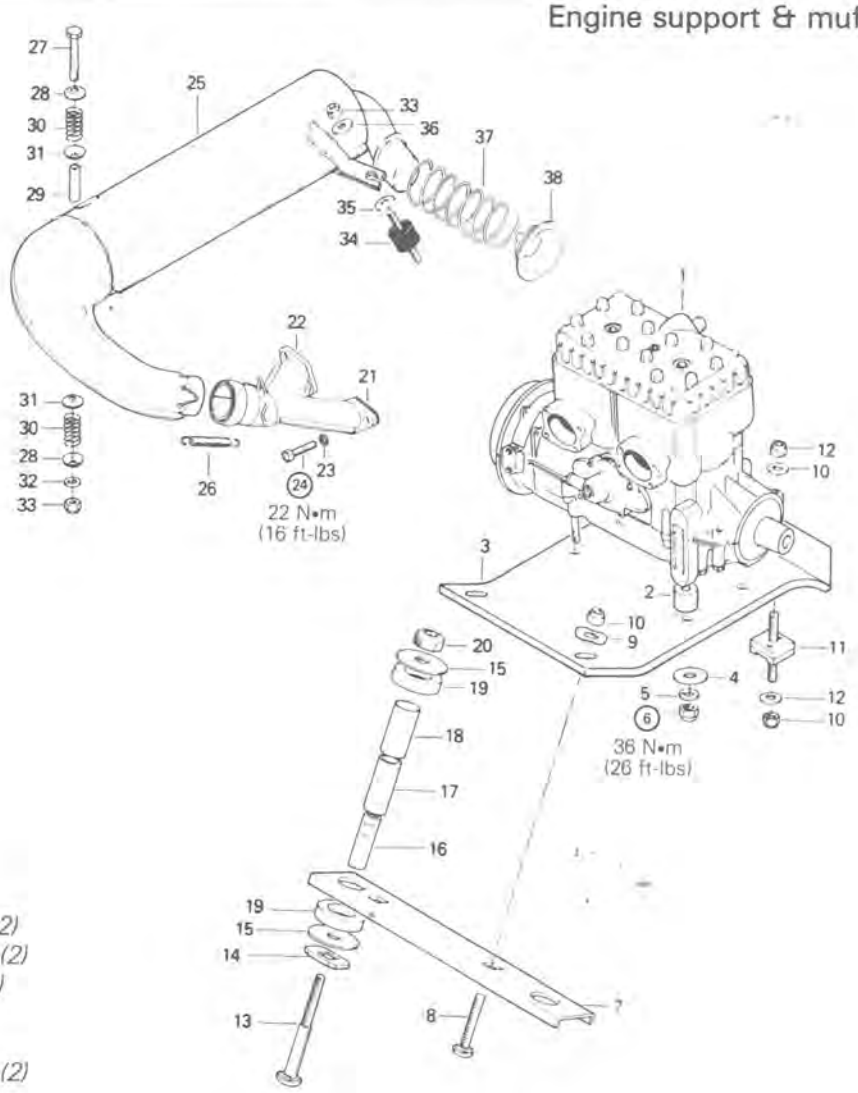
◆ **WARNING: Ensure not to operate carburetor throttle mechanism. Secure the rear of the vehicle on a stand.**

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464 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION

Engine support & muffler



1. *464 Rotax engine*
2. *Distance sleeve (4)*
3. *Engine support*
4. *Flat washer 10.5 mm (4)*
5. *Lockwasher 10 mm (4)*
6. *Hexagonal nut 10 mm (4)*
7. *Cross support*
8. *Carriage bolt 3/8-16 x 1 1/4" (2)*
9. *Internal tooth dished washer (2)*
10. *Hexagonal elastic stop nut (4)*
11. *Rubber mount*
12. *Washer (2)*
13. *Carriage bolt 7/16-14 x 2 3/4" (2)*
14. *Retainer plate (2)*
15. *Washer (4)*
16. *Threaded bushing (2)*
17. *Rubber bushing (2)*
18. *Bushing (2)*
19. *Damper (4)*
20. *Elastic stop nut 7/16-14 (2)*
21. *Gasket (2)*
22. *Exhaust manifold*
23. *Lockwasher 8 mm (4)*
24. *Capscrew M8 x 30 (4)*
25. *Muffler*
26. *Spring (3)*
27. *Capscrew 5/16-18 x 2 3/4"*
28. *Retaining washer (2)*
29. *Bushing*
30. *Spring (2)*
31. *Retaining washer (2)*
32. *Flat washer 5/16 x 3/4 x .060*
33. *Elastic stop nut 5/16-18 (2)*
34. *Rubber mount*
35. *Insulating washer*
36. *Washer*
37. *Spring*
38. *Spring seat*

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REMOVAL FROM VEHICLE

Disconnect or remove the following from vehicle:

- Pulley guard and drive belt
- Air silencer and throttle cable
- Fuel lines, primer, pulsation and oil injection lines
- Muffler and rewind starter
- Electric wires

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

- Drain the cooling system and disconnect hoses at engine
- Rotary valve oil reservoir
- Disconnect rewind starter at engine

ENGINE SUPPORT AND MUFFLER DISASSEMBLY AND ASSEMBLY

⑥ Torque to 36 N•m (26 ft-lbs).

㉔ Torque to 22 N•m (16 ft-lbs).

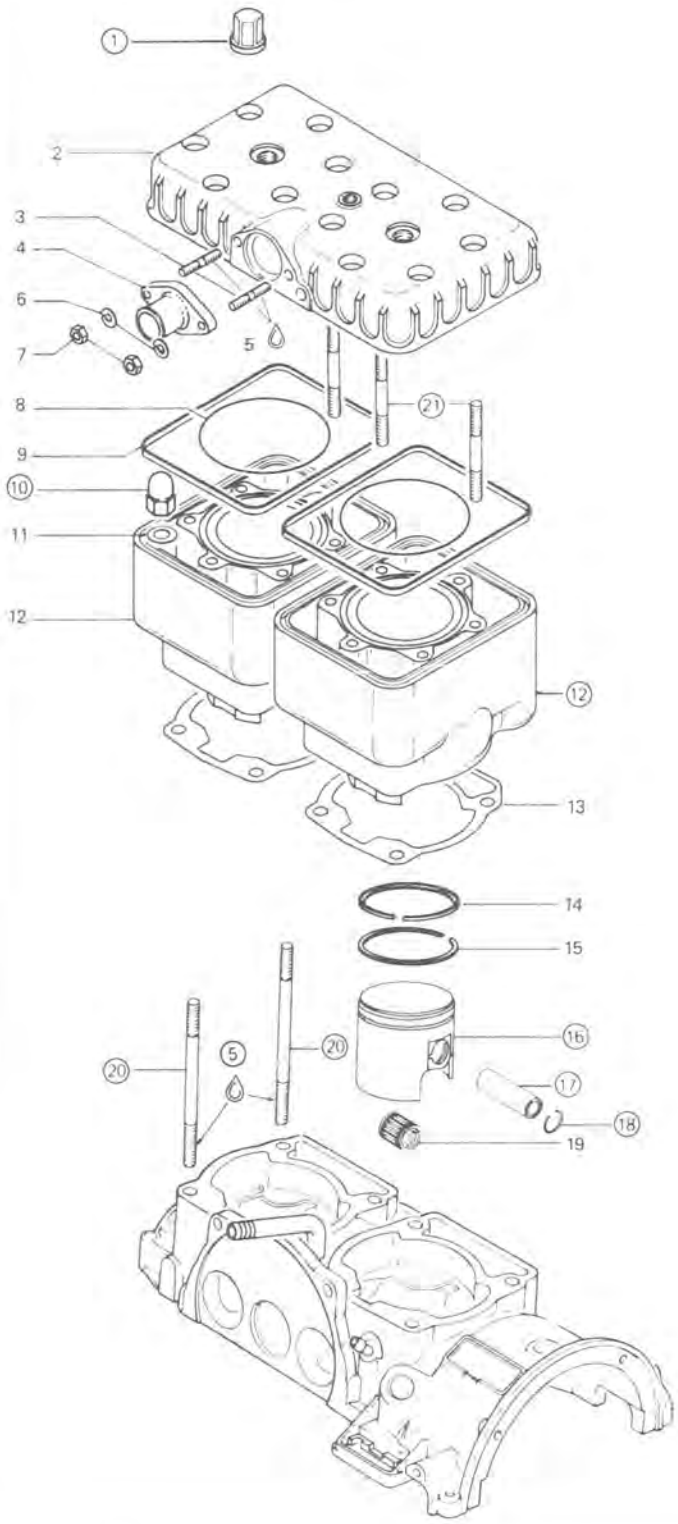
INSTALLATION ON VEHICLE

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

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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 M10 (8)
11. Flat washer 8.4 (8)
12. Cylinder (2)
13. Cylinder/crankcase gasket (2)
14. "L" ring
15. "Rectangular" ring
16. Piston
17. Circlip (4)
18. Gudgeon pin
19. Needle bearing
20. Cylinder stud M8 x 79 (8)
21. Stud (head) M8 x 44 (12)

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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 Place a clean cloth over crankcase to prevent circlips from falling into crankcase then use a pointed tool to remove circlips from piston.

Drive the gudgeon pins in or 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 07.

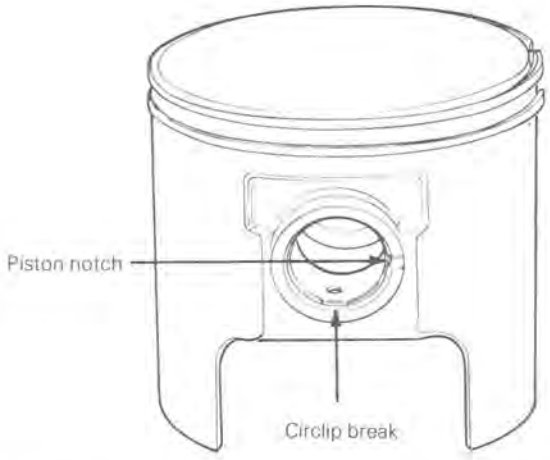
ASSEMBLY

⑯ 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.

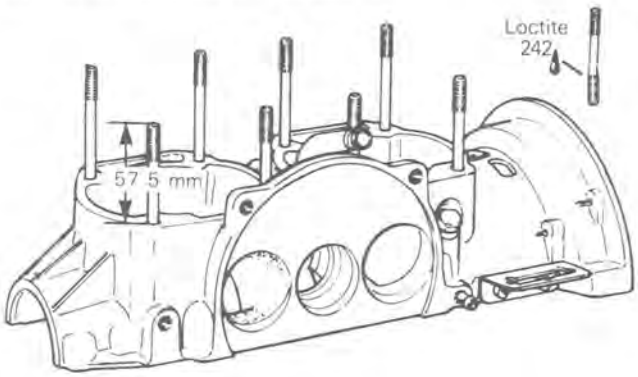


⑱ To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated.

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



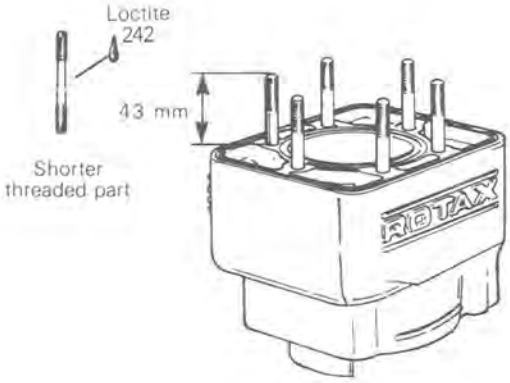
⑤ ⑳ Because of cap nuts, cylinder studs have to be screwed into the crankcase so that they do not protrude by more than 57.5 mm (2.260").



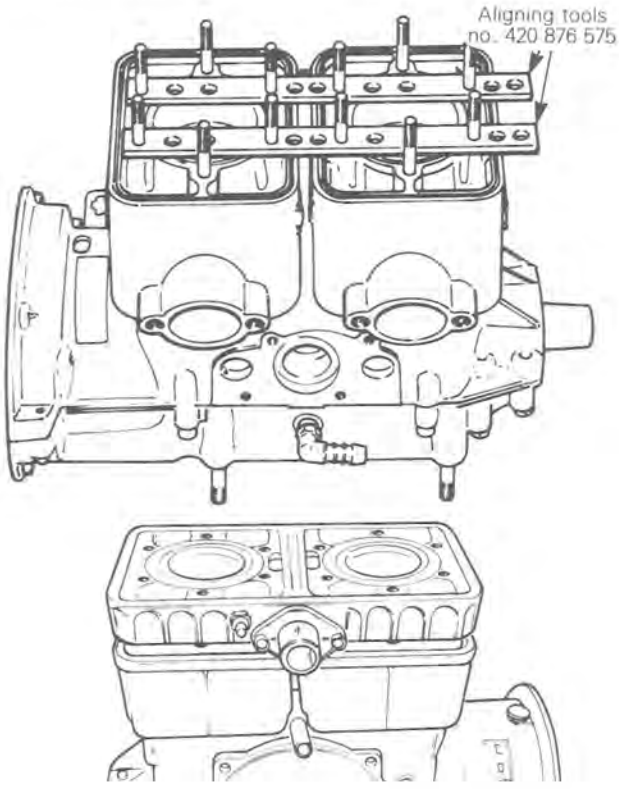
Apply "Loctite 242" on the threaded end of the studs going into the crankcase.

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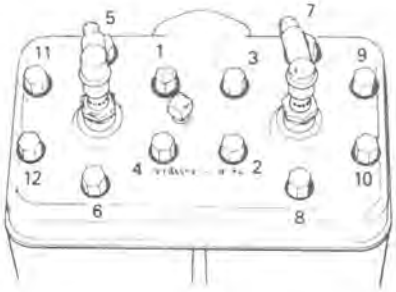
⑩ ⑫ ㉑ Because of cap nuts, cylinder head studs have to be screwed into the cylinder so that they do not protrude by more than 43 mm (1.700''). If it is not possible to obtain this length, add a washer between cylinder head and cap nut. Shorter threaded part of stud should be screwed into cylinder.



⑩ ⑫ 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).



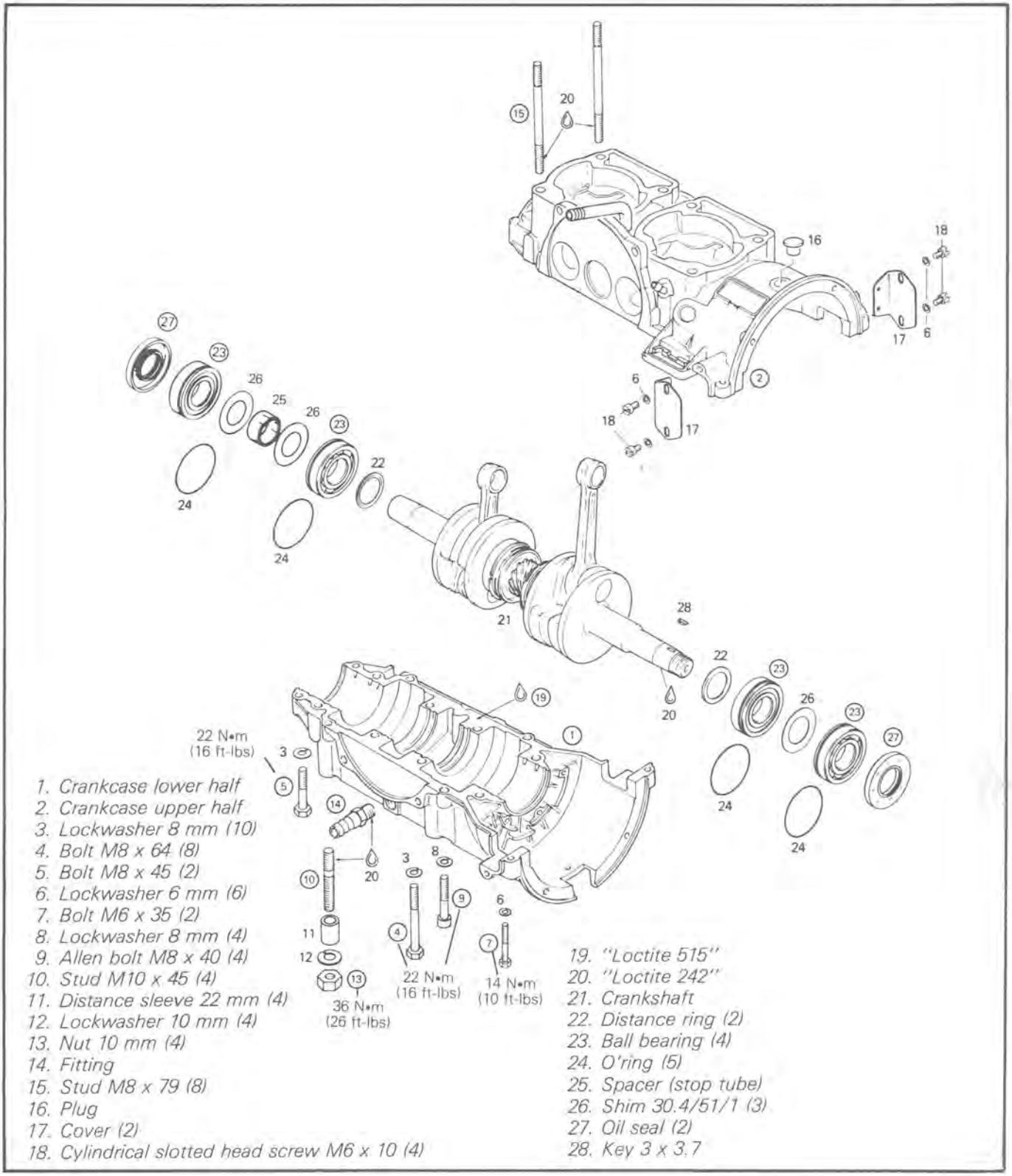
Torque cylinder head nuts to 22 N•m (16 ft-lbs) following illustrated sequence.



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BOTTOM END



1. Crankcase lower half
2. Crankcase upper half
3. Lockwasher 8 mm (10)
4. Bolt M8 x 64 (8)
5. Bolt M8 x 45 (2)
6. Lockwasher 6 mm (6)
7. Bolt M6 x 35 (2)
8. Lockwasher 8 mm (4)
9. Allen bolt M8 x 40 (4)
10. Stud M10 x 45 (4)
11. Distance sleeve 22 mm (4)
12. Lockwasher 10 mm (4)
13. Nut 10 mm (4)
14. Fitting
15. Stud M8 x 79 (8)
16. Plug
17. Cover (2)
18. Cylindrical slotted head screw M6 x 10 (4)
19. "Loctite 515"
20. "Loctite 242"
21. Crankshaft
22. Distance ring (2)
23. Ball bearing (4)
24. O'ring (5)
25. Spacer (stop tube)
26. Shim 30.4/51/1 (3)
27. Oil seal (2)
28. Key 3 x 3.7

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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.

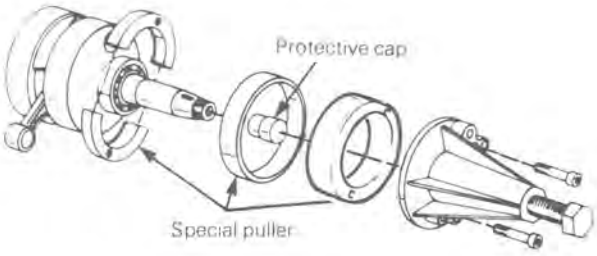
DISASSEMBLY

General

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

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

㉓ To remove bearings from crankshaft use a protective cap special puller as illustrated.



INSPECTION

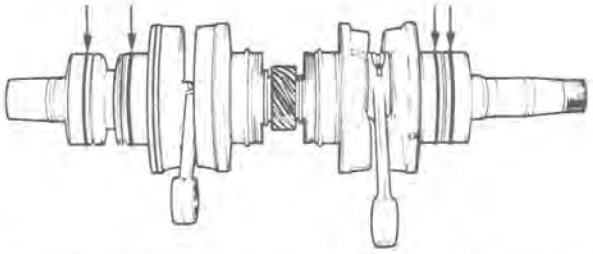
The inspection of the engine bottom end must include the following measurements:

MEASUREMENTS	TOLERANCES		
	FITTING NEW PARTS (MIN.)	(MAX.)	WEAR LIMIT
Crankshaft deflection	N.A.	N.A.	.08 mm (.0031")
Connecting rod big end axial play	.40 mm (.0157")	.73 mm (.0287")	1.20 mm (.0468")
Connecting rod alignment	N.A.	N.A.	N.A.

NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 07.

ASSEMBLY

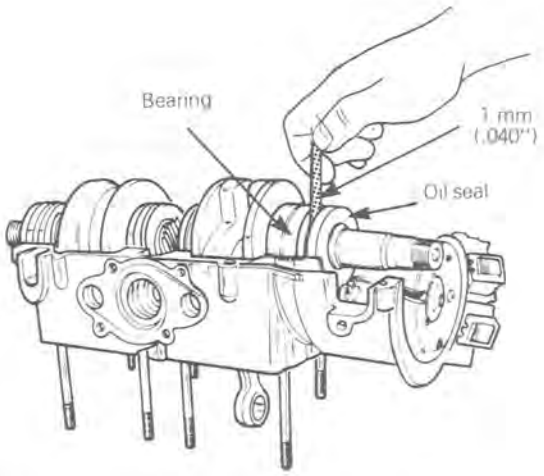
㉓ Prior to installation, place bearings into an oil container previously heated to 100°C (210°F). This will expand bearing and ease installation. Install bearings with oil seal groove as per the following illustration.



㉗ 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.

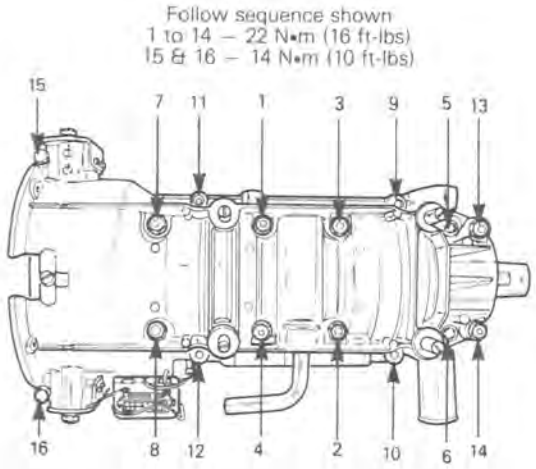


① ② ⑲ Crankcase halves are factory matched and therefore, are not interchangeable or available as single halves. Prior to joining of crankcase halves, apply a light coat of "Loctite 515" (413 7027 00) on mating surfaces.

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

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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 22 N•m (16 ft-lbs) following illustrated sequence.



NOTE: Torque the two smaller bolts (15 and 16) on magneto side to 14 N•m (10 ft-lbs).

④ ⑤ ⑨ Torque to 22 N•m (16 ft-lbs).

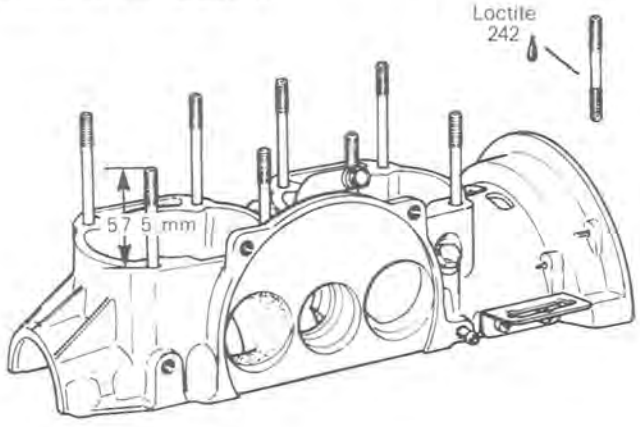
⑦ Torque to 14 N•m (10 ft-lbs).

⑩ At assembly on crankcase, apply "Loctite 242" on threads.

⑬ Torque to 36 N•m (26 ft-lbs).

⑭ Apply "Loctite 242" on threads prior to assembly.

⑮ Because of cap nuts, cylinder studs have to be screwed into the crankcase so that they do not exceed further than 57.5 mm (2.260").



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

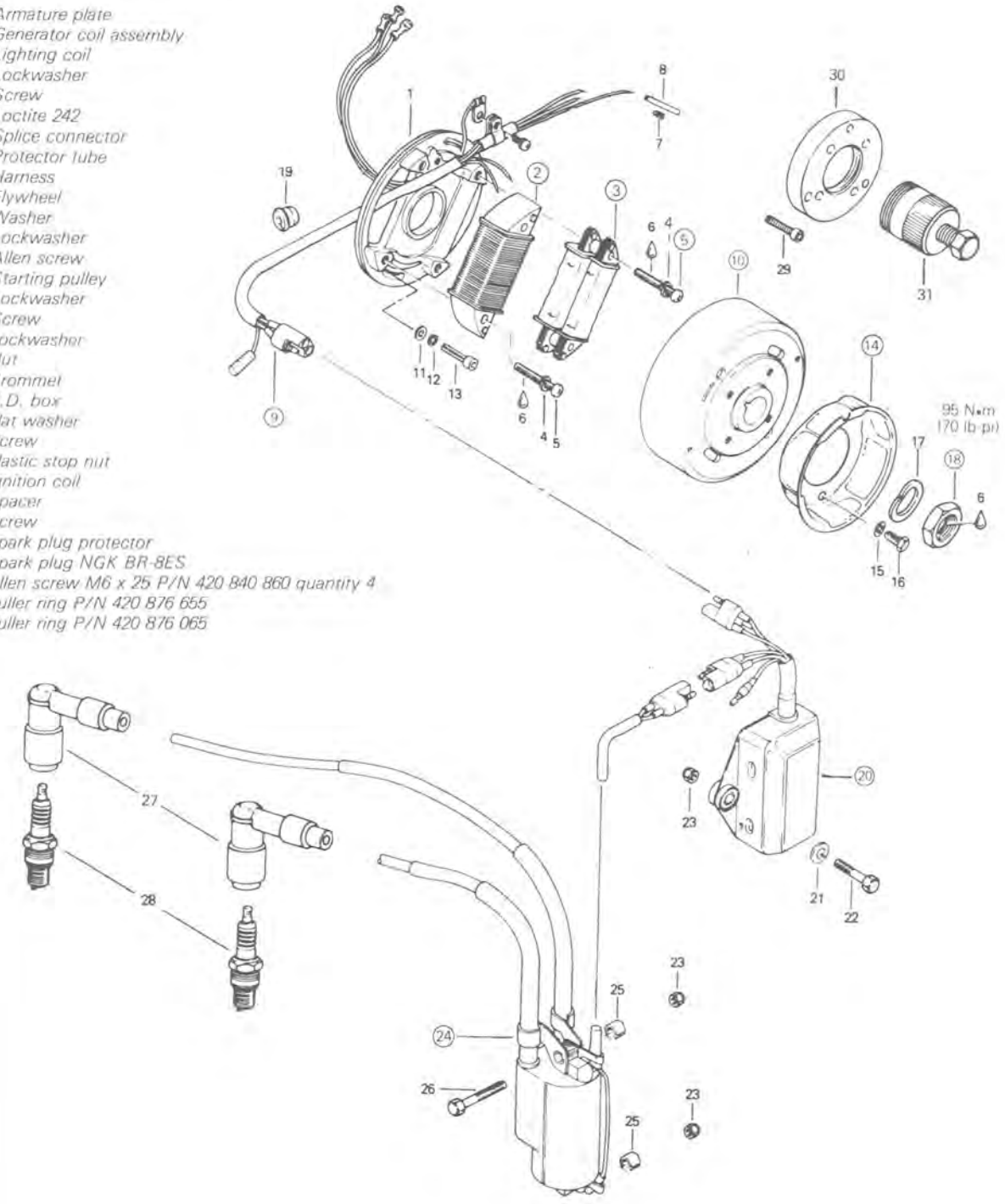
To install magneto, refer to "Magneto" in this section.

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MAGNETO

1. Armature plate
2. Generator coil assembly
3. Lighting coil
4. Lockwasher
5. Screw
6. Loctite 242
7. Splice connector
8. Protector tube
9. Harness
10. Flywheel
11. Washer
12. Lockwasher
13. Allen screw
14. Starting pulley
15. Lockwasher
16. Screw
17. Lockwasher
18. Nut
19. Grommet
20. C.D. box
21. Flat washer
22. Screw
23. Elastic stop nut
24. Ignition coil
25. Spacer
26. Screw
27. Spark plug protector
28. Spark plug NGK BR-8ES
29. Allen screw M6 x 25 P/N 420 840 860 quantity 4
30. Puller ring P/N 420 876 655
31. Puller ring P/N 420 876 065



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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

– rewind starter

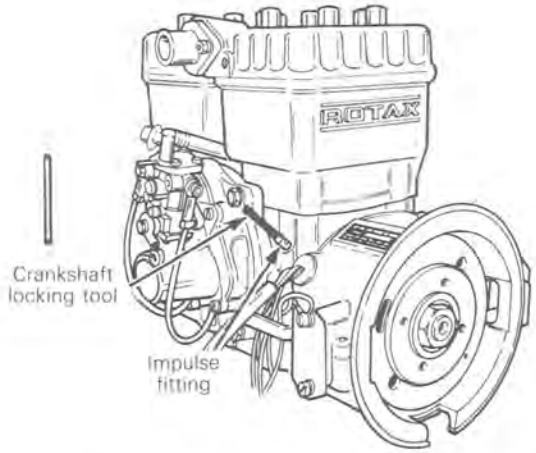
– starting pulley ⑭

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

● ⑱ 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)

– remove magneto retaining nut

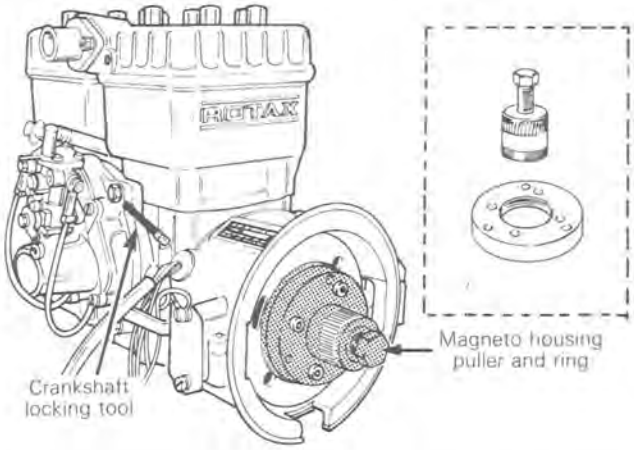


○ NOTE: It should be noted that to correctly remove a "Loctite" locked fastener it is first necessary to tap on the fastener to break "Loctite" bond. This will eliminate the possibility of thread breakage.

● ⑩ To remove magneto housing (flywheel):

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

– adjust magneto housing puller and puller ring as illustrated

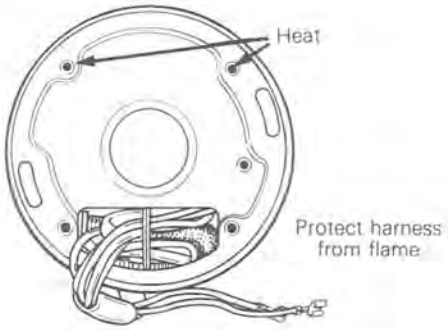


– tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper.

REPAIR

● ③ To replace generating coil:

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



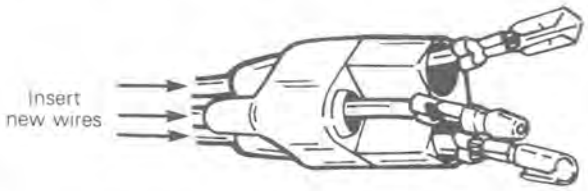
▼ CAUTION: Protect harness from flame.

– Remove screws (use Phillips no. 2 or suitable flat screw driver)

– Cut the four wires as close as possible to the coil body

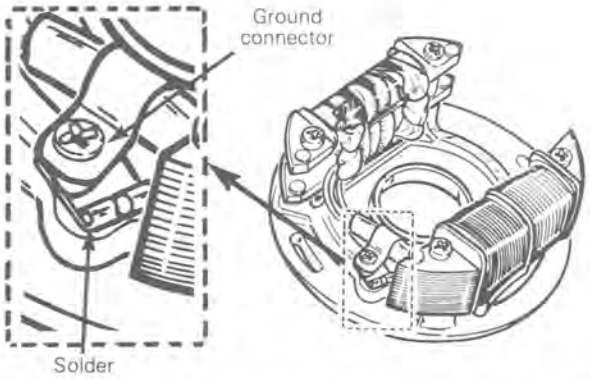
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– To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube
– Insert the new wires into the old connector housing and install connectors



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

– Install a new receptacle connector to the red/black striped wire
– Install the ground connector to the armature plate as illustrated

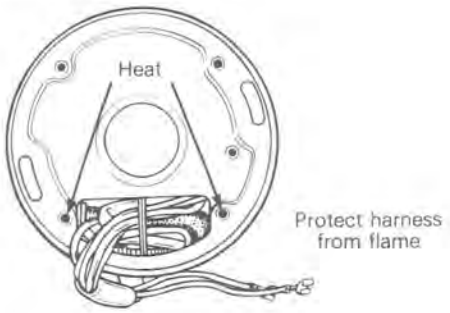


– To install the new coil on the armature plate, remove the shipping nuts from the new coil and apply Loctite 242 (blue, medium strength) to screws ⑤ before assembly

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

● ② 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
– Position protector tube over connection.
– Tie wires to the coil as illustrated
– ⑤ Prior to assembly, apply "Loctite 242" (blue, medium strength)

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

ASSEMBLY

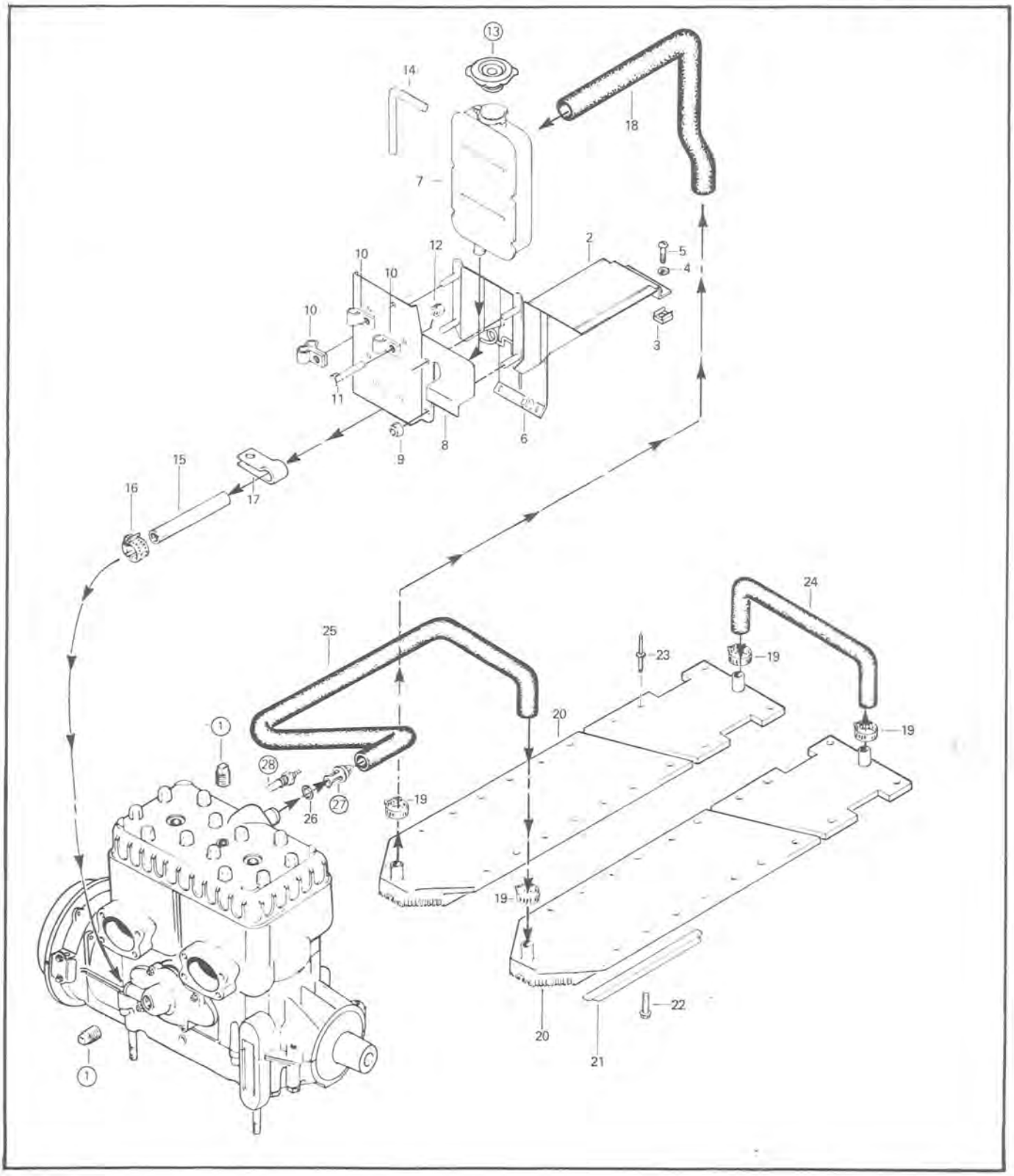
– Clean crankshaft extension taper
– Apply "Loctite 242" (blue, medium strength) on taper
– Position key and magneto housing on crankshaft
– ⑱ Clean nut threads and apply "Loctite 242" before tightening nut to 95 N•m (70 ft-lbs)
– ⑨ ⑳ ㉔ ㉗ At reassembly coat all electric connections with dielectric of lithium grease to prevent corrosion or moisture penetration

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

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COOLING SYSTEM



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1. *Plug*
2. *Plate (battery)*
3. *Clip nut (2)*
4. *Lockwasher 1/4 (2)*
5. *Round slotted head machine screw 1/4-20 x 1/2 (2)*
6. *Hexagonal elastic stop nut 1/4-20 (2)*
7. *Coolant tank*
8. *Bracket*
9. *Hexagonal flanged elastic stop nut 1/4-20 (4)*
10. *Clip (4)*
11. *Hexagonal head cap screw M6 x 1.00 x 16 (2)*
12. *Hexagonal elastic stop nut 6 x 1.00 (2)*
13. *Pressure cap*
14. *Overflow hose 16" (406 mm)*
15. *Hose 23" (584 mm)*
16. *Gear clamp (2)*
17. *Clip*
18. *Inlet hose*
19. *Gear clamp (6)*
20. *Heat exchanger (2)*
21. *Radiator protector (2)*
22. *Hexagonal washer head self-tapping screw 10-24 x 1/2 (2)*
23. *Rivet (42)*
24. *"U" hose*
25. *Outlet hose*
26. *Grommet*
27. *Thermostat*
28. *Sensor*

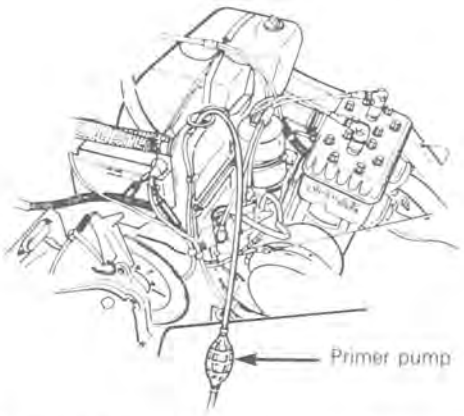
INSPECTION

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.



DISASSEMBLY & ASSEMBLY

① ㉘ Apply pipe thread sealant to avoid leaks.

⑬ See if the cap pressurizes the system. If not, install a new 13 lbs cap, do not exceed 13 lbs of pressure.

㉗ To check thermostat, put it in water and heat water thermostat should open when water temperature reaches 43°C (110°F).

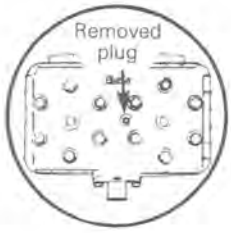
REFILLING THE SYSTEM

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.**

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.



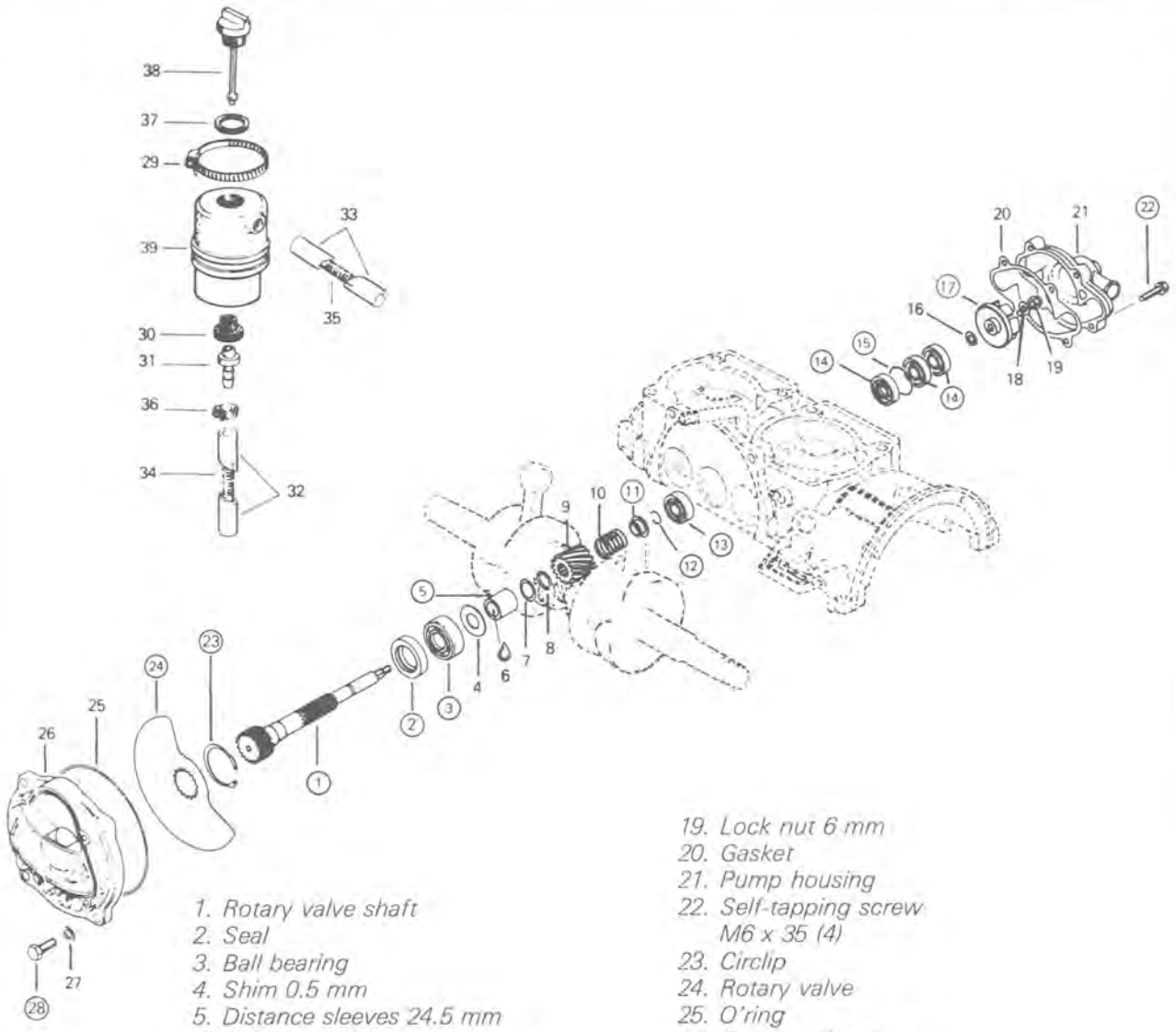
With the pressure cap removed, start engine to allow the coolant to circulate and let it run until normal temperature is reached. Stop engine.

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.**

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ROTARY VALVE, COOLANT PUMP AND RESERVOIR



1. Rotary valve shaft
2. Seal
3. Ball bearing
4. Shim 0.5 mm
5. Distance sleeves 24.5 mm
6. "Loctite 271" (red, high strength)
7. Shim 0.5 mm
8. O'ring
9. Gear
10. Spring
11. Spring seat
12. Circlip
13. Ball bearing
14. Seal (3)
15. Distance ring
16. Washer 8.4 mm
17. Pump impeller
18. Washer 6.2 mm
19. Lock nut 6 mm
20. Gasket
21. Pump housing
22. Self-tapping screw M6 x 35 (4)
23. Circlip
24. Rotary valve
25. O'ring
26. Rotary valve cover
27. Lockwasher 4
28. Bolt 4
29. Clamp
30. Grommet
31. Fitting
32. Oil line 216 mm (8.5")
33. Oil line 121 mm (4.75")
34. Spring
35. Spring
36. Clamp (4)
37. Gasket
38. Cap
39. Oil tank

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CLEANING

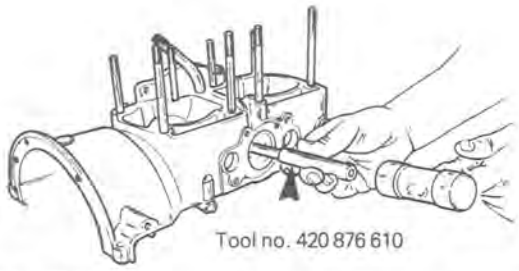
Discard all seals and "O" rings.

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

DISASSEMBLY & ASSEMBLY

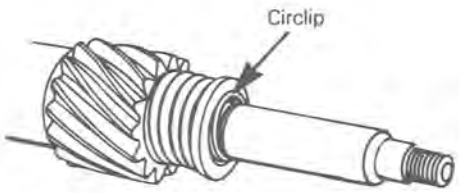
① through ⑫ Rotary valve shaft assembly

To remove rotary valve shaft assembly from crankcase, first remove coolant pump impeller ⑰ and circlip ㉓. Using the suitable pusher (P/N 420 876 610) and a fiber hammer, push shaft assembly.

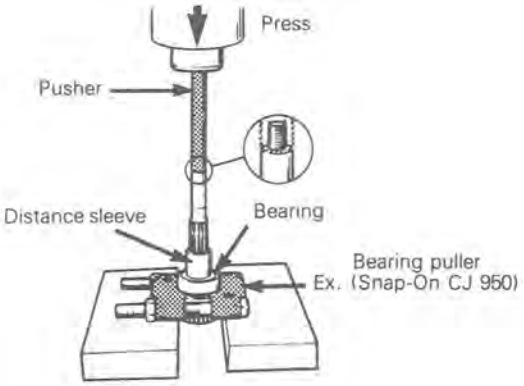


CAUTION: To prevent damage to the end of the rotary valve shaft, use pusher (tool P/N 420 876 610).

If it is necessary to disassemble components of rotary valve shaft assembly, compress spring retaining cup ⑪ in order to remove circlip ⑫.



⑤ To remove the distance sleeve use a bearing puller (Ex: Snap-on no. CJ 950) and pusher (P/N 420 876 610) as illustrated.

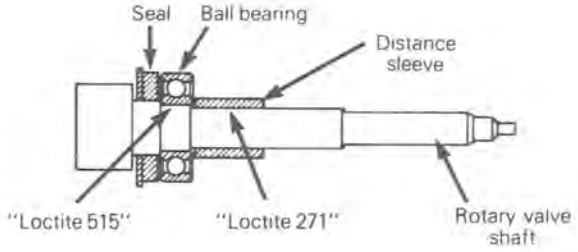


CAUTION: Ensure that the rotary valve shaft is perfectly perpendicular with the press tip or damage will occur.

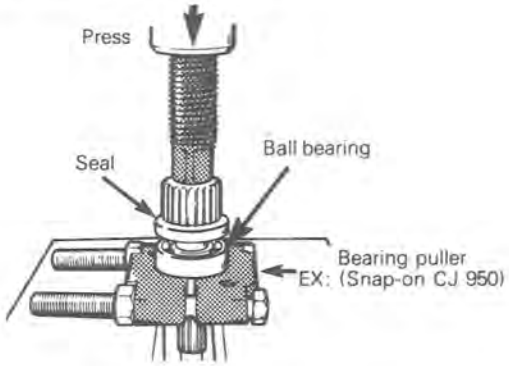
Clean rotary valve shaft and inside of distance sleeve. At assembly apply "Loctite 271" inside of distance sleeve.

①③ At assembly, apply crankcase sealant "Loctite 515" on bearing and rotary valve shaft mating surfaces.

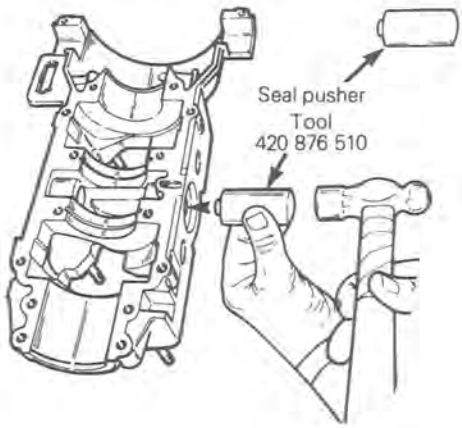
② At assembly apply lithium grease on seal lips.



④ Install ball bearing as illustrated.

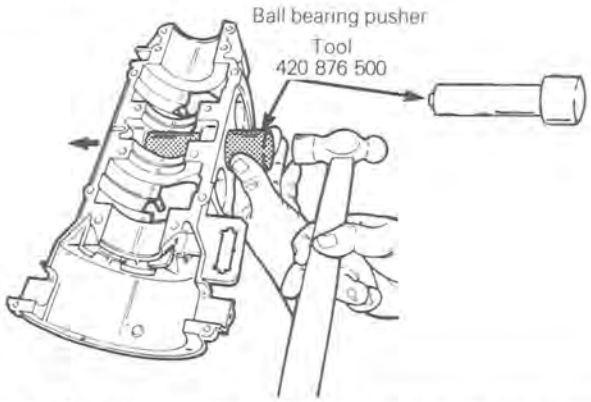


⑬ ⑭ ⑮ To remove seals and bearing:



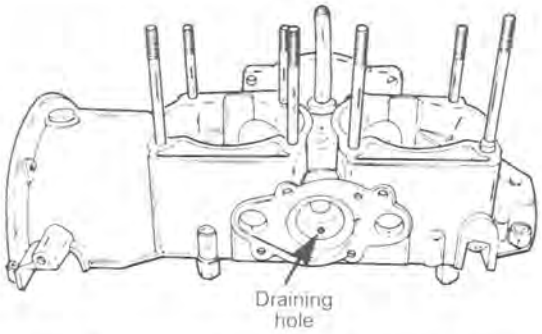
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⑬To install ball bearing.



NOTE: Ball bearing ⑬ shielded side must be facing water pump.

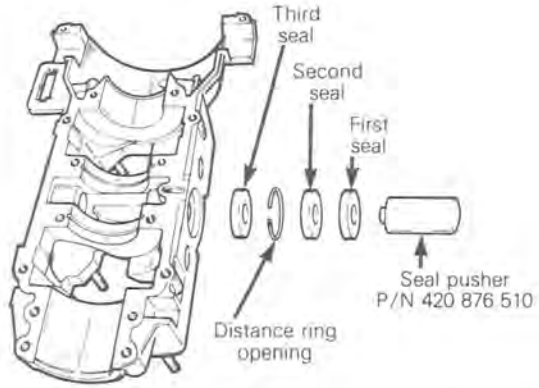
⑭ ⑮To install seals proceed as follows:



35% of the distance between first and second seals (first seal being flush with crankcase) must be filled with lithium grease or equivalent.

Distance ring opening must be in line with crankcase half draining hole.

(Apply lithium grease on seal lips).



NOTE: After installation of seals ⑭ check if the bearing ⑬ is correctly positioned (use pusher P/N 420 876 500).

㉒Apply "Loctite 242" on threads.

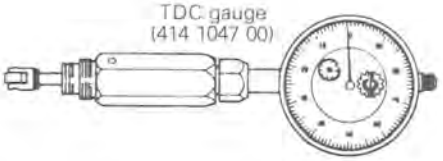
㉔Rotary valve adjustment when replacing crankcase having no timing marks.

REQUIRED TOOLS

Angle finder
(414 3529 00)



TDC gauge
(414 1047 00)

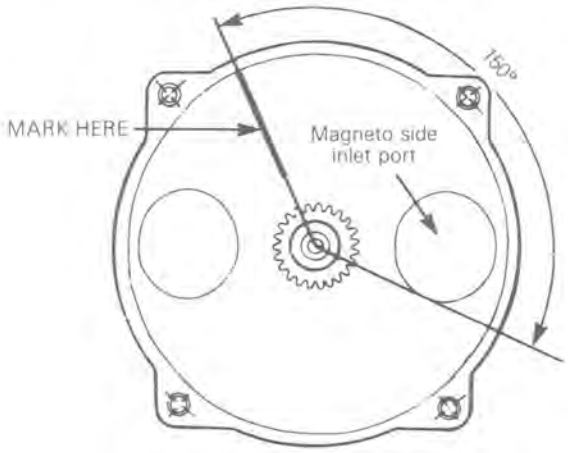


ENGINE TYPE	TIMING MARKS opening, closing
Everest	150°, 49°

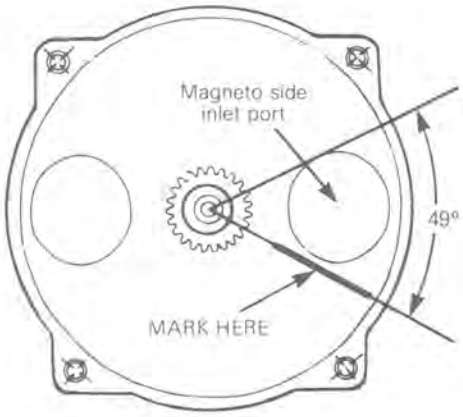
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For example: 150° opening
49° closing

Using angle finder, mark crankcase at 150° from bottom edge of magneto side inlet port.



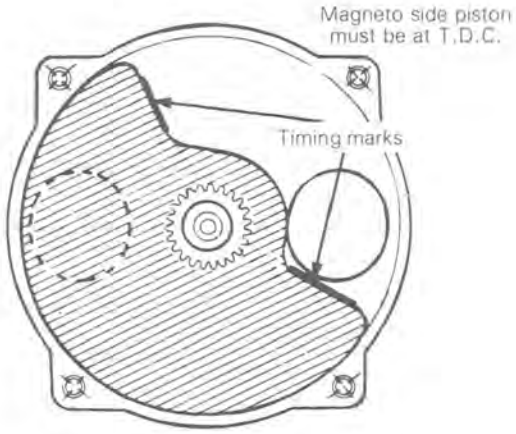
From top edge of magneto side inlet port, mark crankcase at 49°.



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.

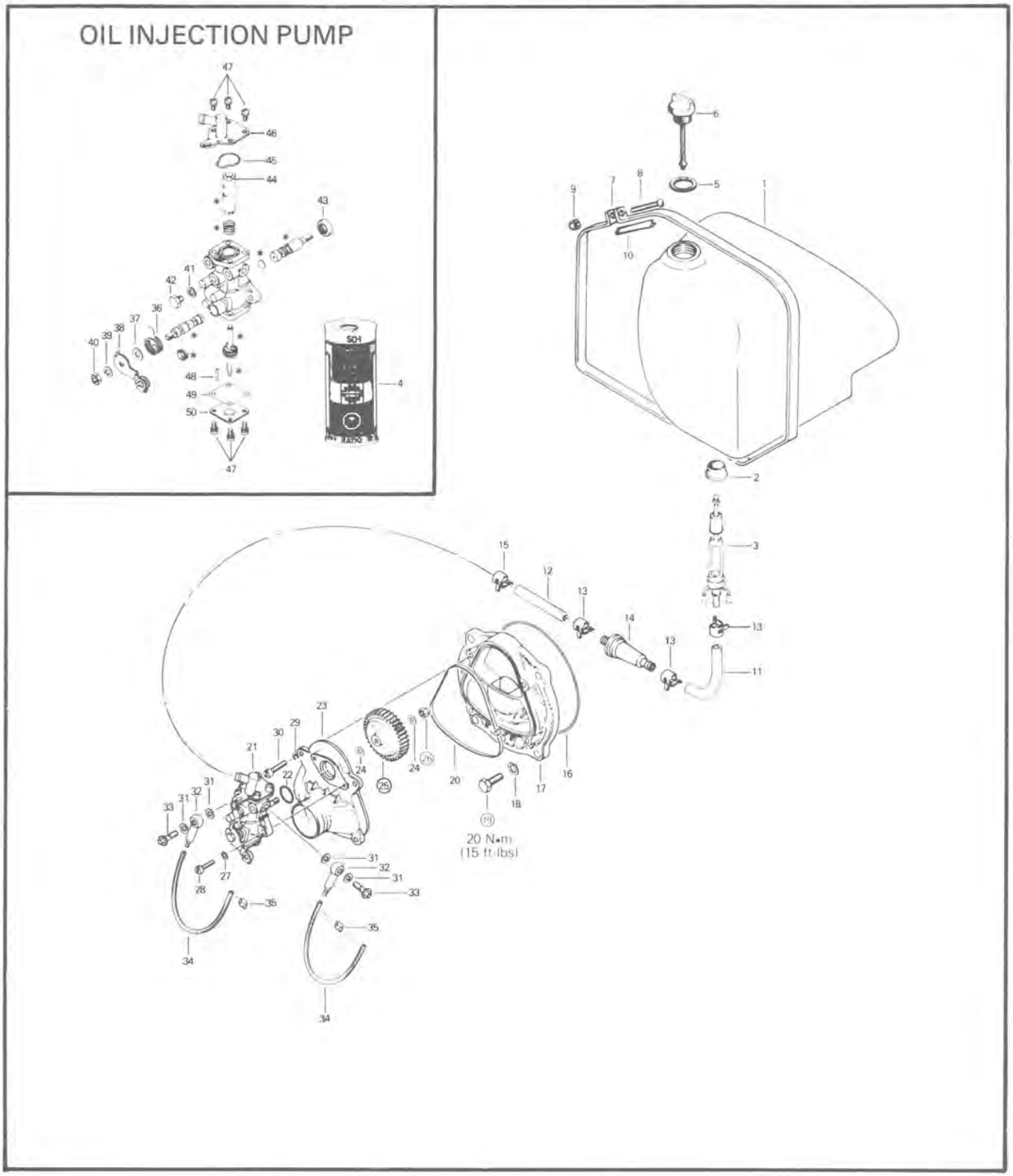
NOTE: The rotary valve disc is asymmetrical, therefore, at assembly, try positioning each side of disc on gear to determine best installation position.



㉘Torque to 20 N•m (15 ft-lbs).

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OIL INJECTION PUMP AND RESERVOIR



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1. *Injection oil tank*
2. *Grommet*
3. *Oil level sensor*
4. *Oil*
5. *Gasket*
6. *Oil tank cap*
7. *Retainer strip*
8. *Screw*
9. *Elastic stop nut*
10. *Trim*
11. *Oil line 127 mm (5")*
12. *Oil line 60 mm (2 3/8")*
13. *Spring clip*
14. *Filter*
15. *Spring clip*
16. *O'ring*
17. *Rotary valve cover*
18. *Lockwasher*
19. *Screw*
20. *Rubber ring*
21. *Oil pump*
22. *O'ring*
23. *Intake cover*
24. *Washer*
25. *Oil pump gear*
26. *Lock nut*
27. *Lockwasher*
28. *Screw*
29. *Lockwasher*
30. *Screw*
31. *Gasket*
32. *Banjo*
33. *Screw*
34. *Oil line 170 mm (6 3/4")*
35. *Clamp*
36. *Spring*
37. *Washer*
38. *Lever*
39. *Lockwasher*
40. *Nut*
41. *Washer*
42. *Screw*
43. *Seal*
44. *Retainer*
45. *O'ring*
46. *Plate*
47. *Screw with lockwasher*
48. *Stop pin*
49. *Gasket*
50. *Cam casing plate*

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

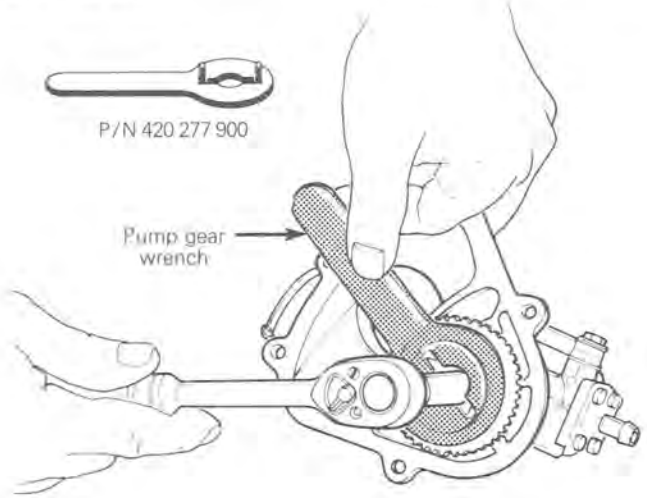
CLEANING

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

DISASSEMBLY

◯ **NOTE:** Oil pump is not available in single parts.

㉕㉖To remove retaining nut, lock gear using no. 420 277 900 tool.



ASSEMBLY

⑲Torque to 20 N•m (15 ft-lbs)

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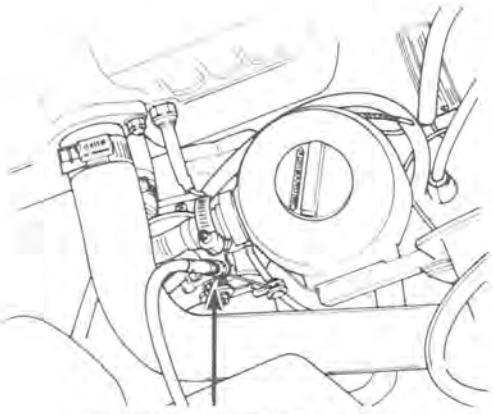
ADJUSTMENT

Always perform carburetor adjustment prior to oil injection pump adjustment.

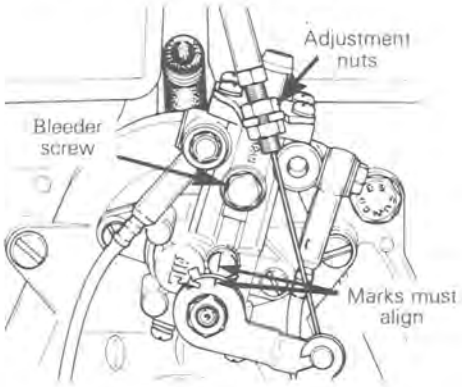
To synchronize pump with carburetor:

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 adjuster 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 and let the air escape until oil starts to flow out.

Make sure tank has enough oil

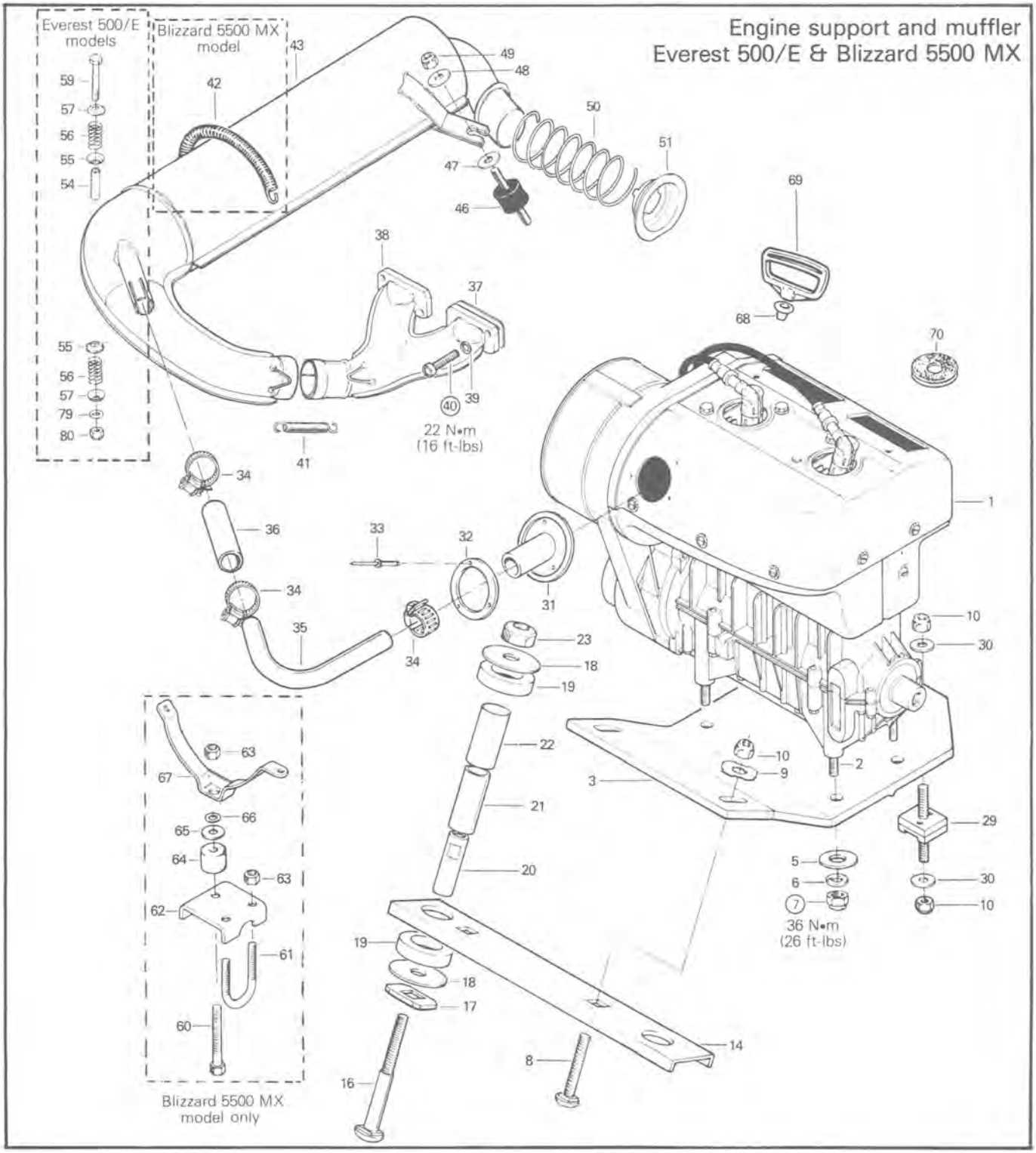
To bleed the small injector oil lines, start the engine and let it run at idle speed. Move injection pump lever to fully open position until lines are full of oil.

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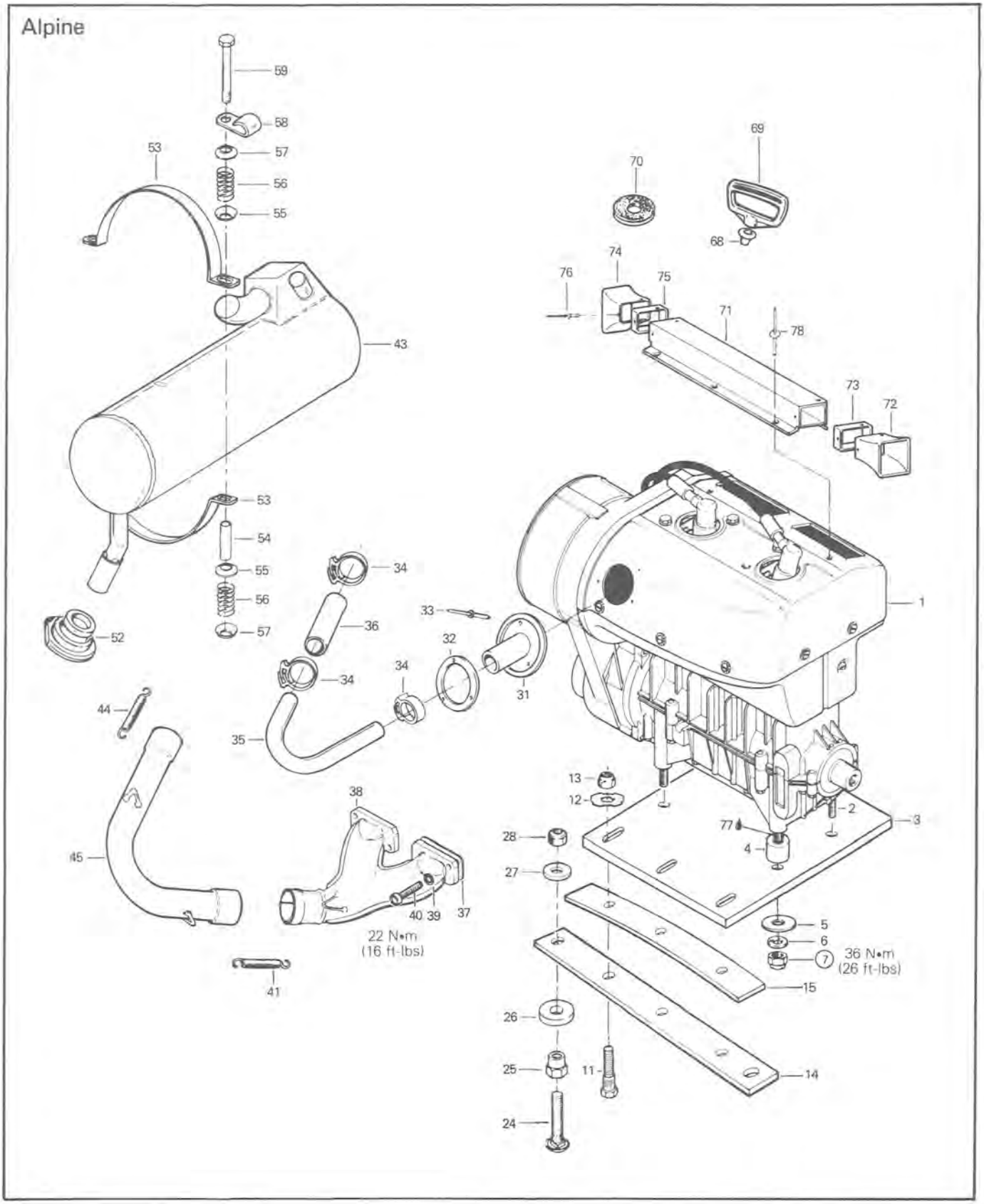
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503 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION



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1. Engine Rotax type 503
2. Stud M10 x 25 (4) (Everest 500/E, Blizzard 5500 MX)
   Stud M10 x 45 (4) (Alpine)
3. Engine bracket
4. Distance sleeve
5. Flat washer 10.5 mm x 21 x 2 (4)
6. Lockwasher 10 mm (4)
7. Cross support
8. Carriage bolt 3/8-16 x 1 1/4 (2)
9. Internal tooth dished washer (2)
10. Hexagonal elastic stop nut 3/8-16 (4)
11. Screw N/knurling 5/16-24 x 1 3/16 (6)
12. Internal tooth dished washer (6)
13. Hexagonal elastic stop nut 5/16- 24 (6)
14. Cross support
15. Leaf spring
16. Carriage bolt 7/16-14 x 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 x 1 1/2 (4)
25. Threaded spacer bushing (4)
26. Insulator rubber (4)
27. Flat washer 25/64 x 7/8 x 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 x 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 x 3 1/4 (2)
60. Hexagonal head cap screw 1/4-20 x 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 x 7/8 x .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)
79. Flat washer 5/16 x 3/4 x .060
80. Hexagonal elastic stop nut 5/16-18 (2)

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EVEREST 500/E, BLIZZARD 5500 MX MODELS

REMOVAL FROM VEHICLE

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

- Pulley guard, drive belt
- Muffler
- Air intake silencer
- Throttle cable at carburetor
- Fuel lines and pulsation line

NOTE: Secure fuel lines so that the opened ends are higher than the fuel level in the tank.

- Hood retaining cable
- Rewind starter cable
- Wiring harness and starter wire.

WARNING: Always disconnect battery ground cable prior to any other wire of the starting system.

- Engine support and reinforcing cross support nuts (3).

ENGINE SUPPORT AND MUFFLER DISASSEMBLY AND ASSEMBLY

⑦ Torque to 36 N•m (26 ft-lbs).

㊵ Torque 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 cable installation, check maximum throttle slide opening.
- Check pulley alignment and drive belt tension.

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ALPINE MODEL

REMOVAL FROM VEHICLE

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

- Drive belt
- Muffler
- Air intake silencer tube
- Fuel lines at carburetor

CAUTION: Secure fuel lines so that the opened ends are higher than the fuel level in the tank.

- Disconnect negative cable (ground) from battery, then disconnect electrical connections leading to engine
- Remove steering shaft
- Remove console
- Remove upper column
- Engine mount nuts.

ENGINE SUPPORT AND MUFFLER DISASSEMBLY AND ASSEMBLY

⑦ Torque to 36 N•m (26 ft-lbs).

㊵ Torque to 22 N•m (16 ft-lbs).

INSTALLATION ON VEHICLE

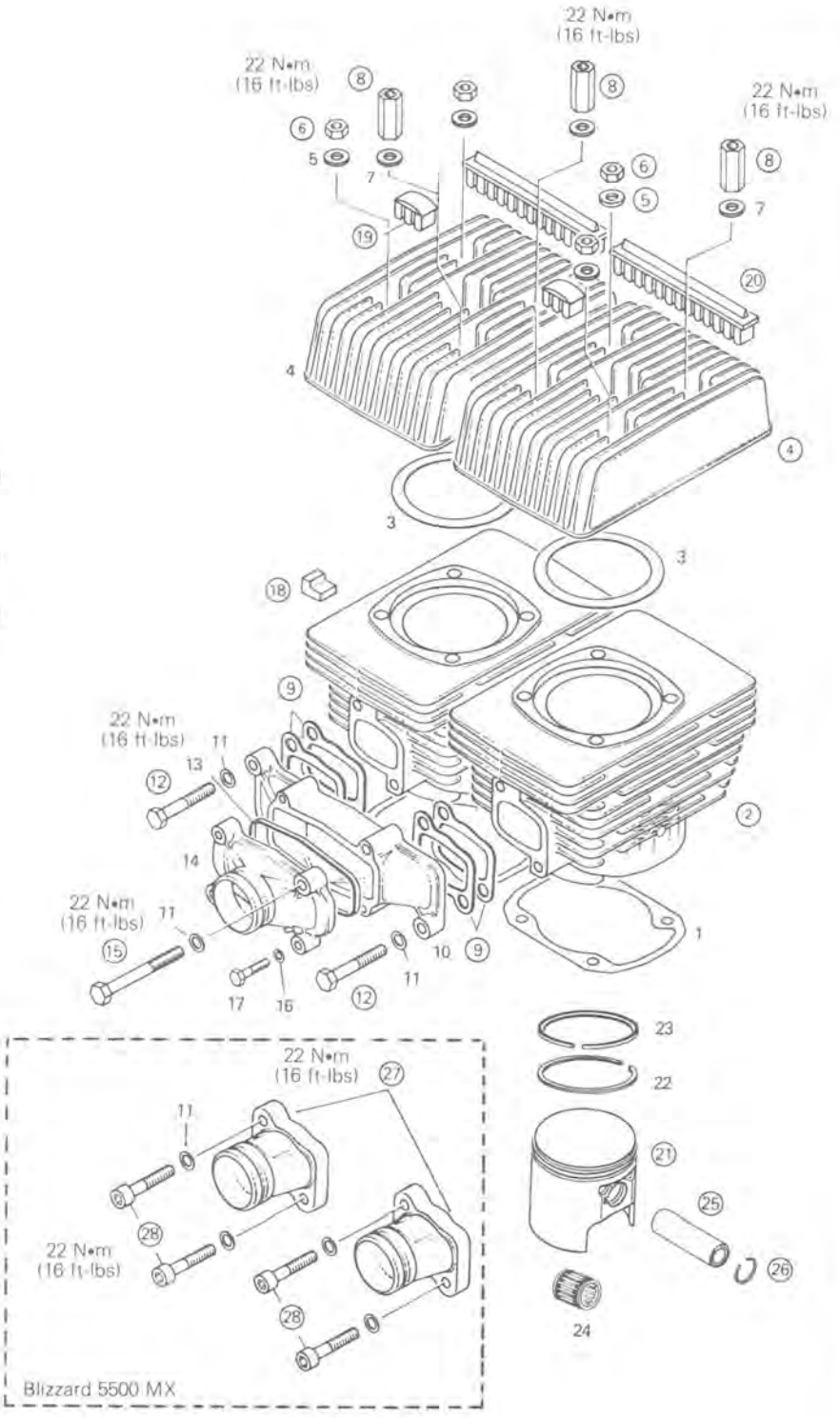
To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

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

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TOP END

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 x 37 mm (4)
9. Intake manifold gasket (4)
10. Intake manifold
11. Lockwasher 8 mm (4)
12. Hexagonal bolt M8 x 40 mm (4)
13. O'ring
14. Intake manifold cover
15. Hexagonal bolt M8 x 64 mm (2)
16. Lockwasher 6 mm (2)
17. Hexagonal bolt M6 x 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 x 40 mm (4)



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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 Place a clean cloth over crankcase to prevent circlips from falling into crankcase. Use a pointed tool to remove circlips from piston.

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

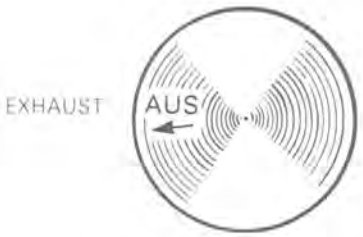
INSPECTION

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

MEASUREMENTS	TOLERANCES		
	FITTING NEW PARTS (MIN.)	(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	.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")

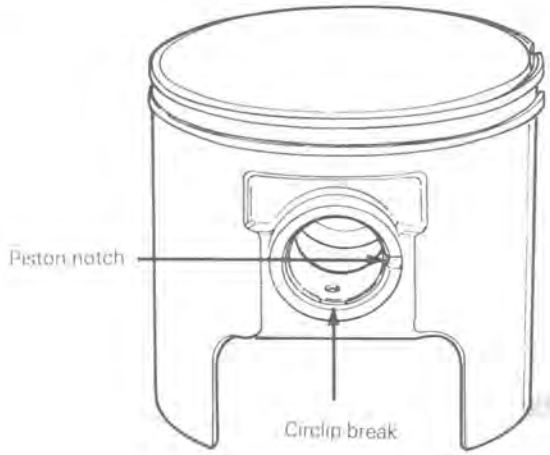
NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 07.

㉑ 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.



㉖ To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated.

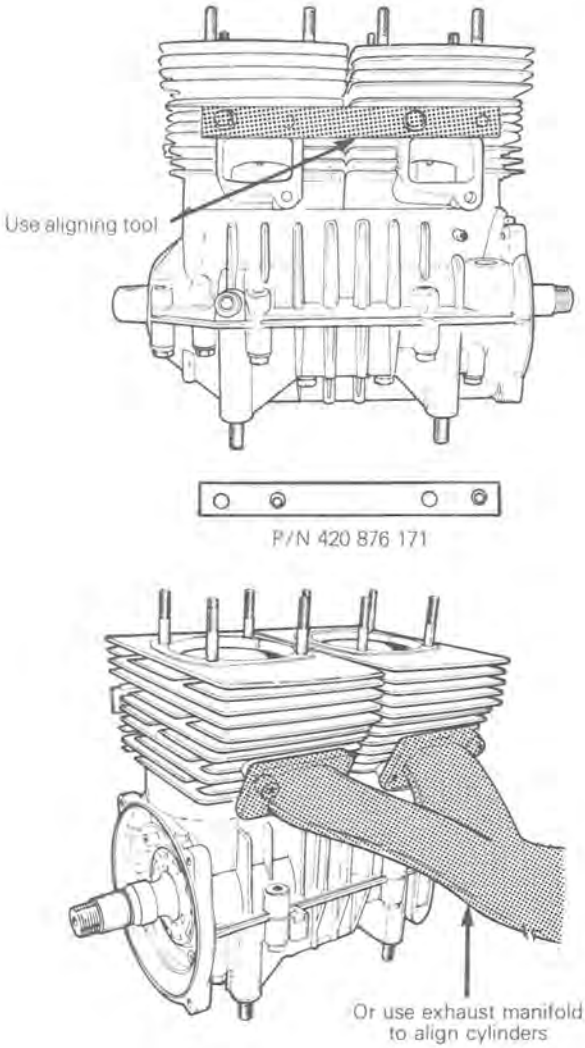
Remove any burrs from piston caused through circlip installation using very fine emery cloth.



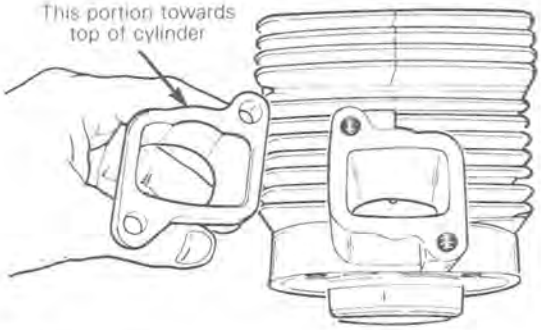
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ASSEMBLY

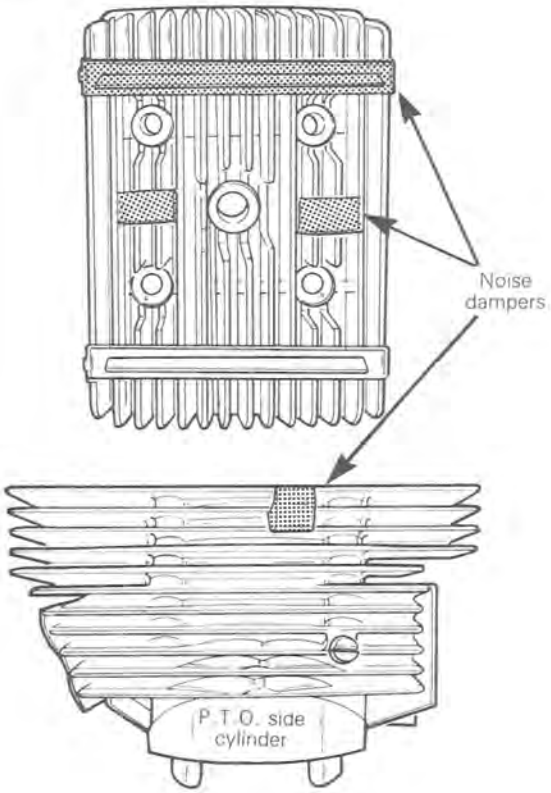
②④ At cylinder and/or cylinder head installation, use P/N 420 876 171 aligning tool (or exhaust manifold) to ensure sealing of intake manifold and exhaust (See Tools Section), before tightening cylinder head nuts.



㉗ Install intake manifold as per the following illustration (Blizzard 5500 MX model).

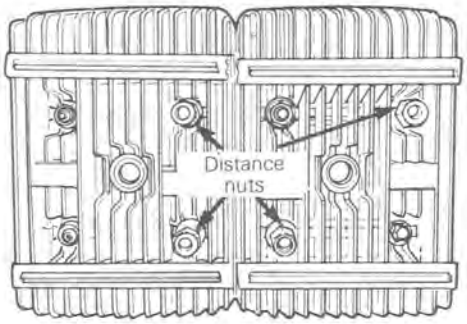


⑱ ⑲ ⑳ For proper position of noise dampers, refer to the following illustrations.



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⑥ ⑧Position nuts and distance nuts as illustrated.



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

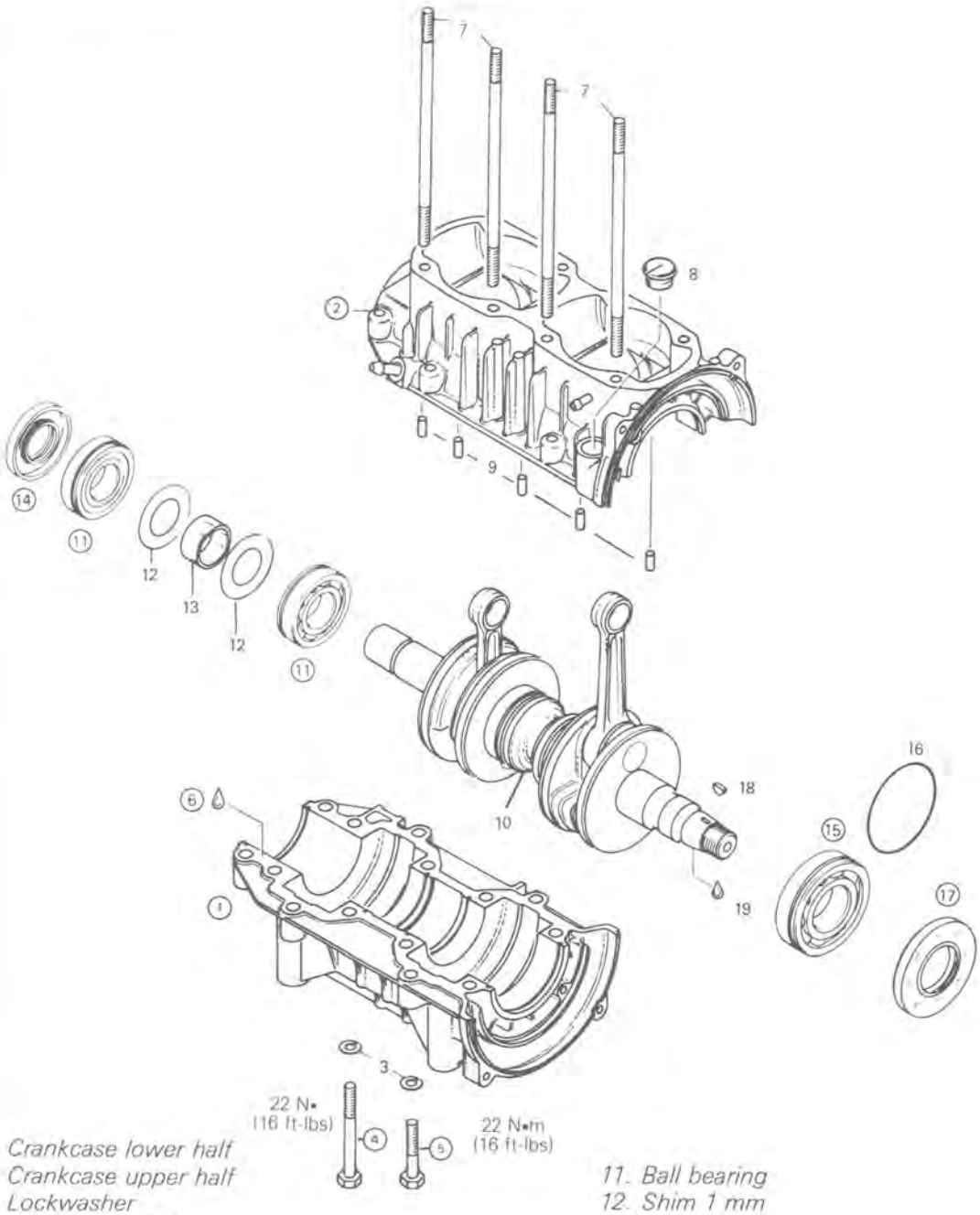
Install armature plate, fan housing and then air deflector.

⑨ Install a gasket on each side of the air deflector.

⑫ ⑮ ㉘ Torque intake manifold bolts to 22 N•m (16 ft-lbs).

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BOTTOM END



1. Crankcase lower half
2. Crankcase upper half
3. Lockwasher
4. Screw M8 x 45
5. Screw M8 x 70
6. Loctite 515
7. Stud
8. Cable grommet
9. Rubber plug
10. Crankshaft
11. Ball bearing
12. Shim 1 mm
13. Spacer
14. Seal P.T.O. side
15. Ball bearing
16. O'ring
17. Seal mag side
18. Woodruff key
19. Loctite 242

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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.

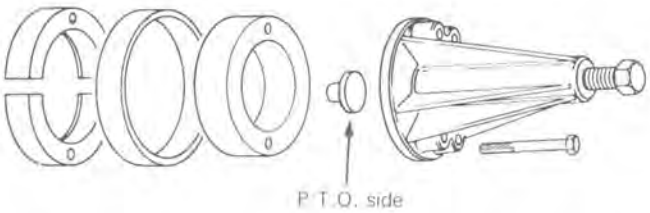
DISASSEMBLY

General

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

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

⑪⑮To 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		
	FITTING NEW PARTS (MIN.)	(MAX.)	WEAR LIMIT
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")
Connecting rod alignment	N.A.	N.A.	N.A.

NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 07.

ASSEMBLY

⑪⑮ Prior to installation, place bearings into an oil container heated to 100°C (212°F).

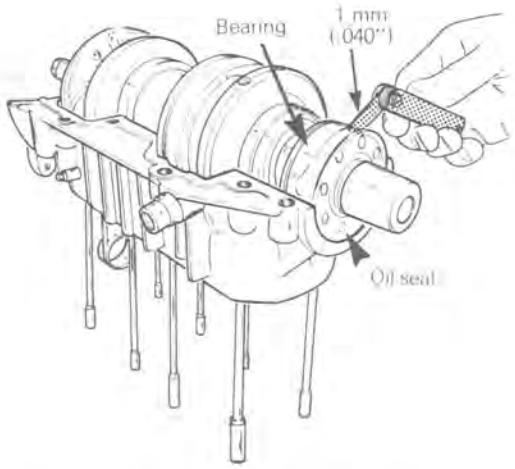
This will expand bearings and ease installation. Install bearings with groove as per exploded view.

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

⑭⑰ 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.



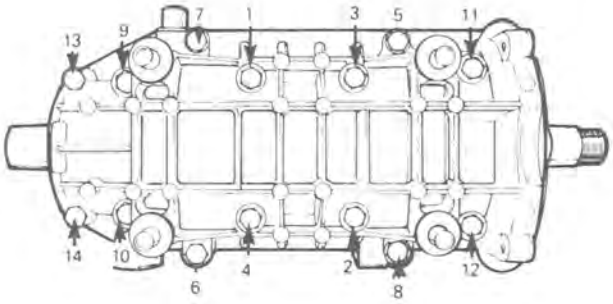
①②Crankcase halves are factory matched and therefore, are not interchangeable as single halves.

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⑥ Prior to joining of crankcase halves, apply "Loctite 515" (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 nuts (or bolts) to 22 N•m (16 ft-lbs) following illustrated sequence.

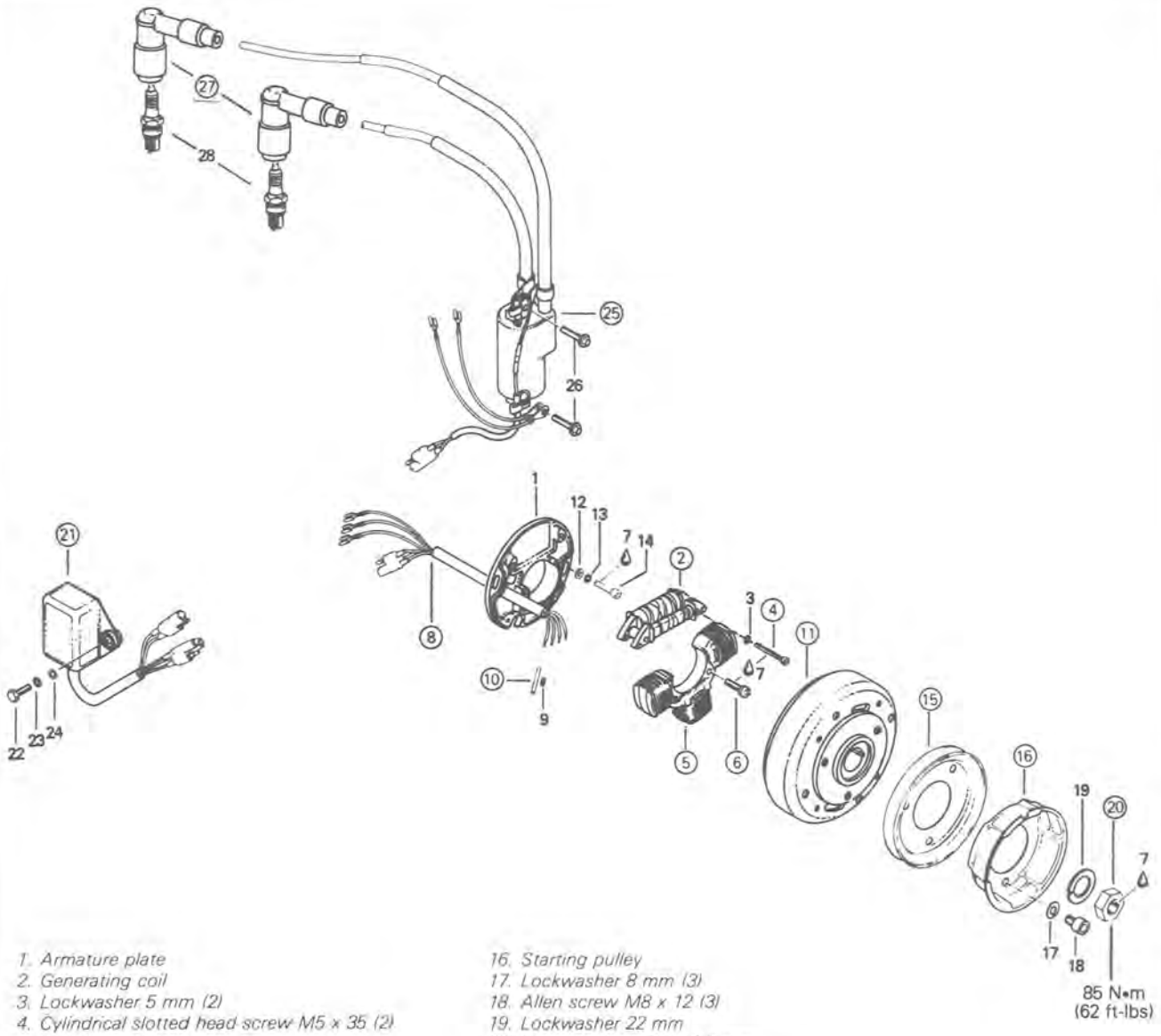


④ ⑤ Torque to 22 N•m (16 ft-lbs).

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

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MAGNETO



1. Armature plate
2. Generating coil
3. Lockwasher 5 mm (2)
4. Cylindrical slotted head screw M5 x 35 (2)
5. Lighting coil
6. Screw M6 x 25 (2)
7. Loctite 242 (blue, medium strength)
8. Harness
9. Splice connector (6)
10. Protector tube
11. Flywheel
12. Washer 5.3 mm (2)
13. Lockwasher 5 mm (2)
14. Allen screw M5 x 18 (2)
15. V-belt pulley
16. Starting pulley
17. Lockwasher 8 mm (3)
18. Allen screw M8 x 12 (3)
19. Lockwasher 22 mm
20. Hexagonal nut 22 x 1.5 mm
21. C.D. box
22. Hexagonal screw M6 x 20 (2)
23. Lockwasher 6 mm (2)
24. Washer 6.4 mm (2)
25. Ignition coil
26. Hexagonal head taptite screw M5 x 25 (2)
27. Spark plug protector (2)
28. Spark plug NGK BR-7ES (2)

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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:

– rewind starter;

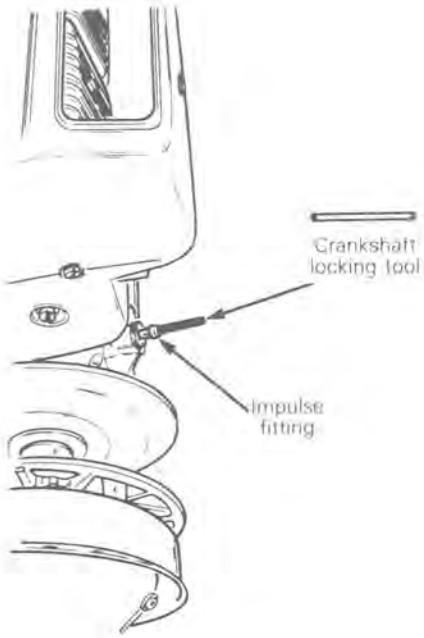
– starting and V-belt pulleys ⑮ ⑯.

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

● ⑳ 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);

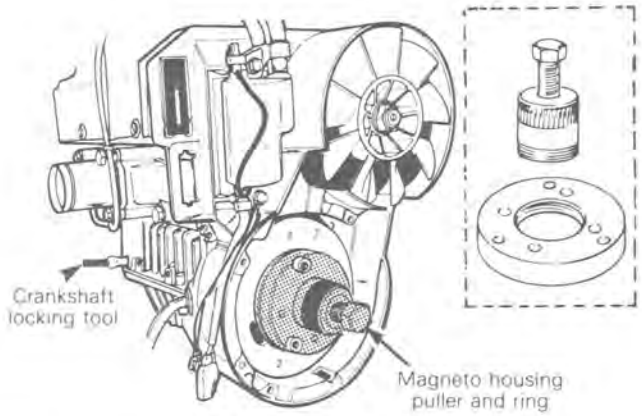
– remove magneto retaining nut.



○ 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 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.

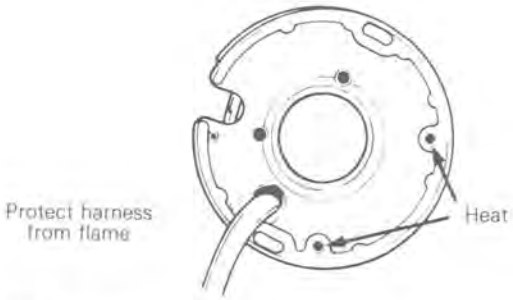


– tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper.

REPAIR

● ② To replace generating coil:

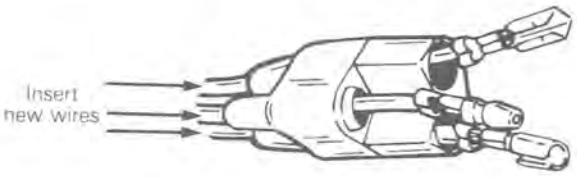
– Heat the armature plate around the screw holes to break the Loctite bond (200°F).



▼ CAUTION: Protect harness from flame.

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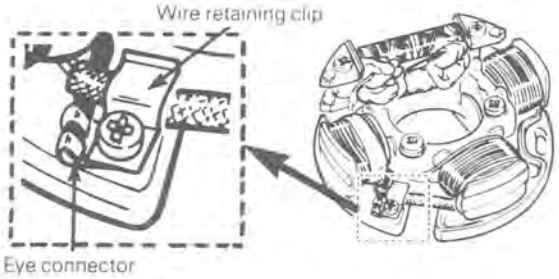
- Remove screws (use Phillips no. 2 or suitable flat screw driver)
- Cut the four wires as close as possible to the coil body
- To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube
- Insert the new wires into the old connector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

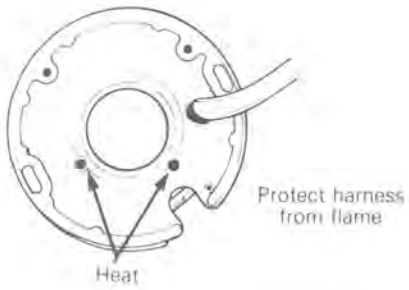


- To install the new coil on the armature plate, remove the shipping nuts from the coil and apply Loctite 242 (blue, medium strength) to screws ④ before assembly

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

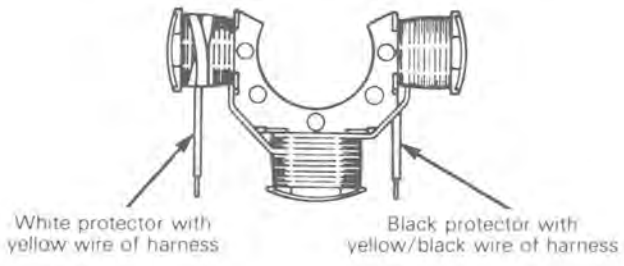
● ⑤ To replace lighting coil:

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



CAUTION: Protect harness from flame.

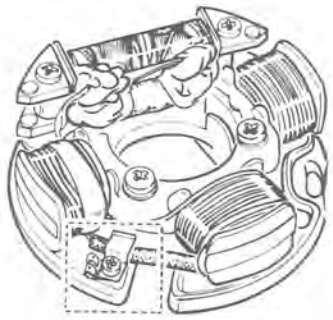
- Remove screws (use Phillips no. 3 screwdriver)
- Remove the wire retaining clip from armature plate
- Pull out protector tubes and unsolder the splice connectors
- Solder the yellow wire in the harness to the white tube protected wire of the coil
- Solder the yellow/black striped wire in the harness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



- ⑩ Position protector tubes over connections
- ⑥ Prior to assembly, apply "Loctite 242" (blue, medium strength)
- Fasten retaining clip onto protector tubes

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



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

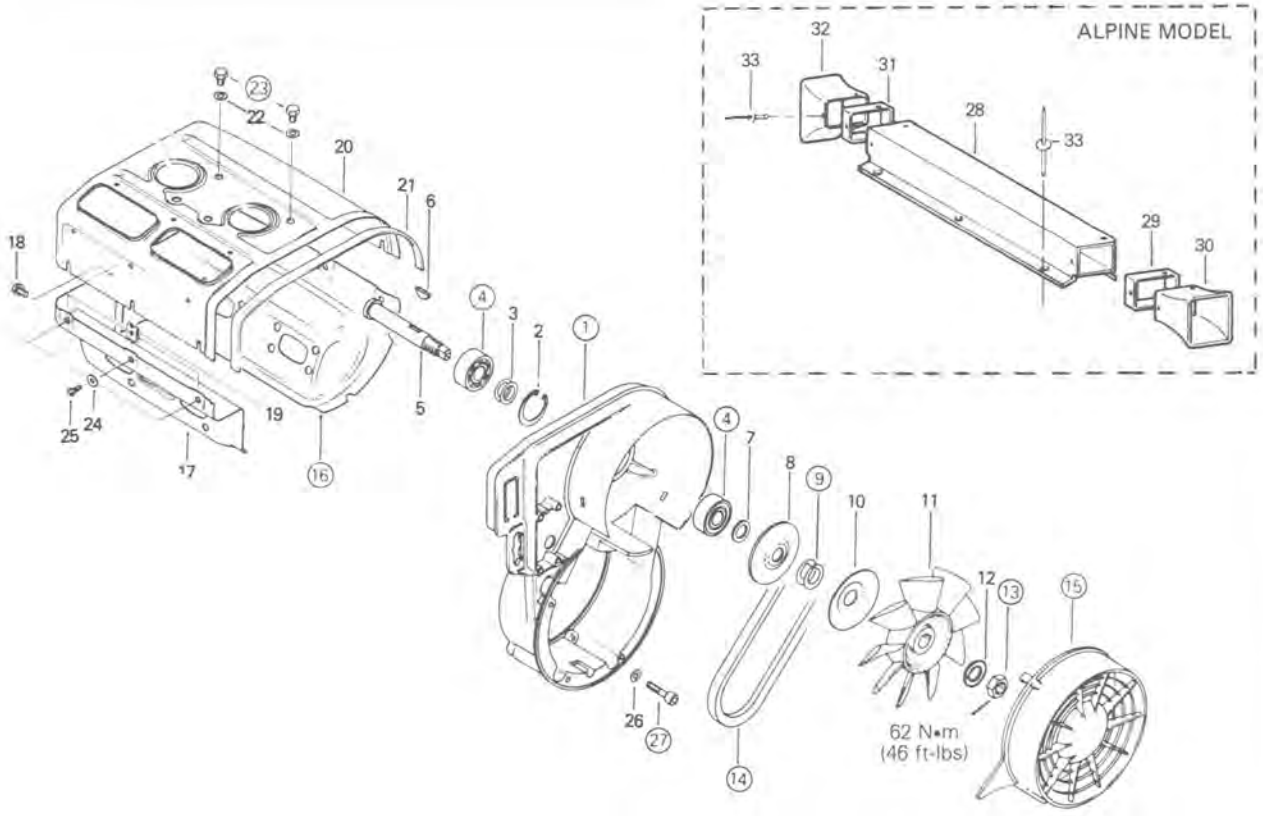
ASSEMBLY

- Clean crankshaft extension taper
- Apply "Loctite 242" (blue, medium strength) on taper
- Position key and magneto housing on crankshaft
- ⑳ Clean nut threads and apply "Loctite 242" (blue, medium strength) before tightening nut to 85 N•m (63 ft-lbs)
- ⑧ ㉑ ㉕ ㉗ At reassembly coat all electric connections with dielectric of lithium grease to prevent corrosion or moisture penetration

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

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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. Locking washer 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 dust
29. R.H. retainer clamp
30. R.H. outlet duct
31. L.H. retainer clamp
32. L.H. outlet duct
33. Rivet

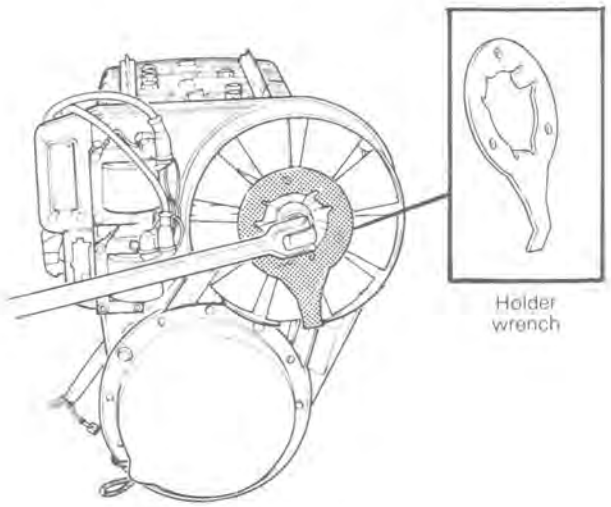
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CLEANING

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

DISASSEMBLY AND ASSEMBLY

⑬To remove or install fan pulley retaining nut, lock fan pulley with special holder wrench. (Use tool P/N 420 876 355). At assembly, torque nut to 62 N•m (46 ft-lbs).



⑨⑭Fan 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.

①④It is first necessary to heat bearing housing to 65°C (150°F) to remove or install bearing.

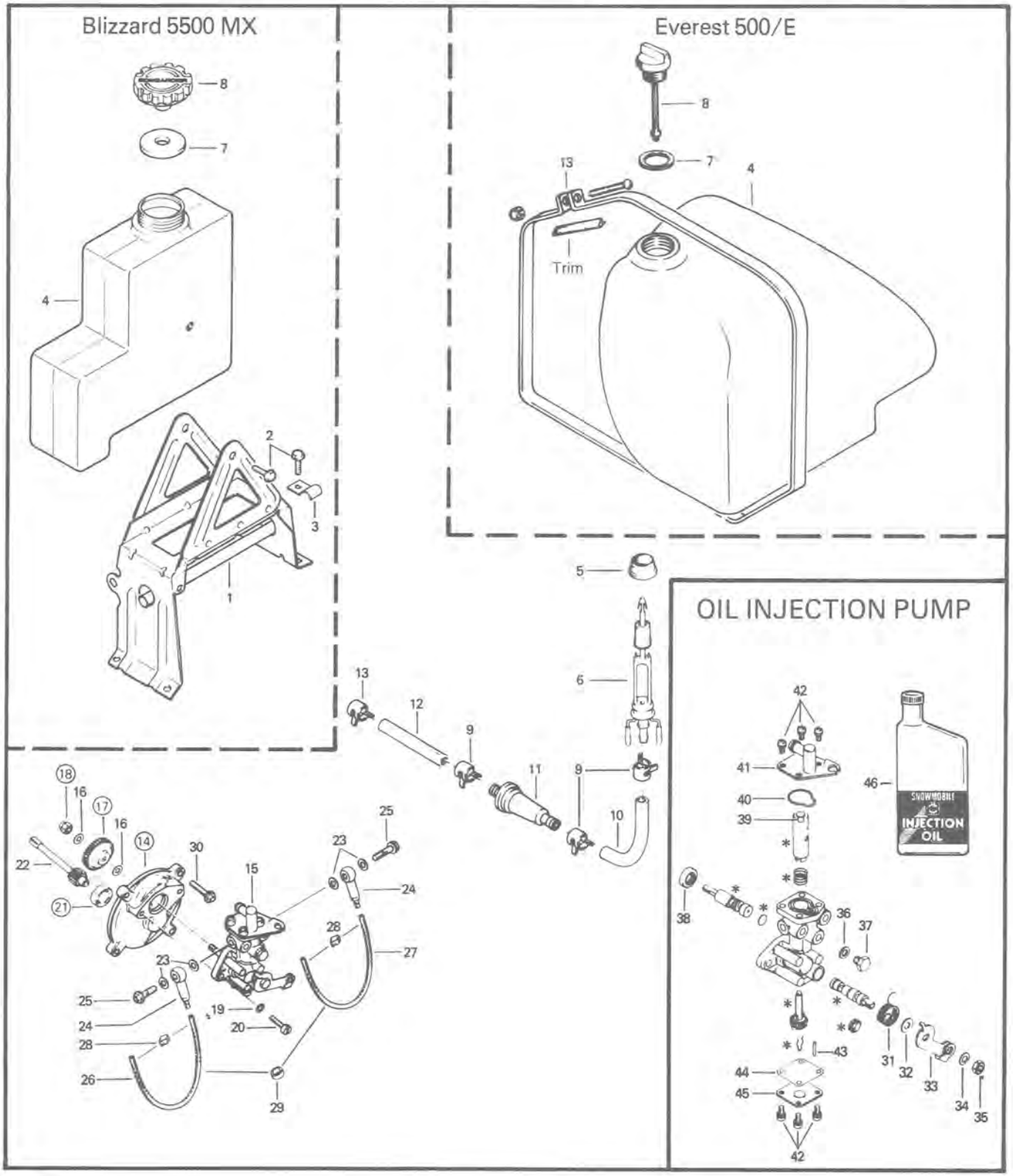
⑮㉓㉗At assembly, apply a light coat of "Loctite 242" on threads. It should be noted that to correctly remove a Loctite locked screw, it is first necessary to slightly tap on head screw to break Loctite bond. The screw can then be removed. This will eliminate the possibility of screw breakage.

⑯A gasket must be placed on both sides (inner and outer) of intake and exhaust holes.

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

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OIL INJECTION PUMP AND RESERVOIR



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1. *Support*
2. *Hexagonal washer head powerlock screw 1/4-20 x 1/2 (6)*
3. *Clip*
4. *Injection oil tank*
5. *Grommet*
6. *Oil level switch*
7. *Gasket*
8. *Oil tank cap*
9. *Spring clip (3)*
10. *Oil line 4" (102 mm)*
11. *Filter*
12. *Oil line 4" (102 mm)*
13. *Retaining strip*
14. *Oil pump mounting flange*
15. *Oil pump (with inlet elbow)*
16. *Washer 6.2 (2)*
17. *Oil pump gear 27 teeth*
18. *Lock nut 6 mm*
19. *Lockwasher 5 (2)*
20. *Cylindrical slotted screw M5 x 16 (2)*
21. *Ball bearing*
22. *Gear 9 teeth*
23. *Oil banjo gasket (4)*
24. *Banjo(2)*
25. *Banjo bolt (2)*
26. *Oil line 230 mm (9")*
27. *Oil line 360 mm (14")*
28. *Clamp (4)*
29. *Rubber ring*
30. *Taptite screw M5 x 16 (4)*
31. *Spring*
32. *Washer*
33. *Lever*
34. *Lockwasher 6 mm*
35. *Hexagonal nut 6*
36. *Washer*
37. *Hexagonal head screw M6 x 7*
38. *Seal*
39. *Retainer*
40. *O'ring*
41. *Plate (with inlet elbow)*
42. *Screw with lockwasher (8)*
43. *Stop pin*
44. *Gasket*
45. *Cam casing plate*
46. *Oil*

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

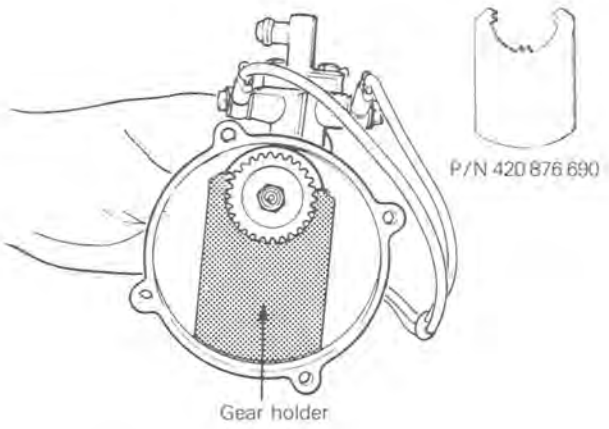
CLEANING

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

DISASSEMBLY

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

⑰⑱To remove retaining nut, lock gear in place using no. 420 876 690 tool.



⑭㉑To remove bearing, heat mounting flange to approximately 175°-200°C (350°-400°F) using a propane torch. Then strike cover on hard flat surface and bearing will fall out.

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

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ASSEMBLY

⑭ ㉑To install bearing, use a press to push bearing in mounting flange.

⑰ At gear assembly, apply a light coat of grease on gear teeth.

⑨ ⑬ ㉘ Always check for spring clip and clamp tightness.

ADJUSTMENT

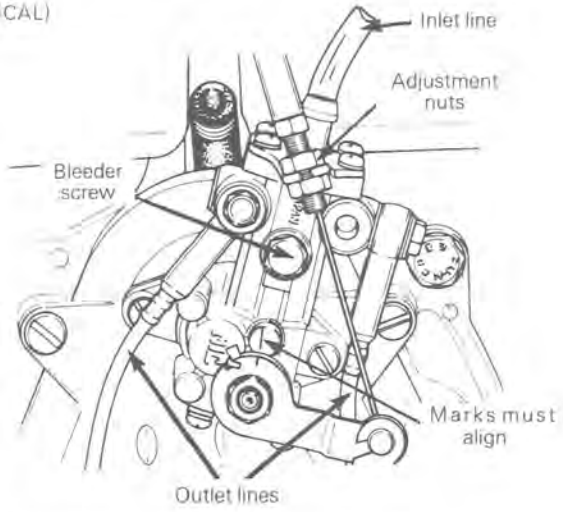
CAUTION: The carburetors must be adjusted before adjusting the oil injection pump. Make sure the idle speed is 1800-2000 R.P.M.

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 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)



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:

IMPORTANT: Make sure all oil lines are full. If required, bleed the inlet line and the pump by loosening the bleeder screw. To bleed the outlet lines, hold the pump lever in a fully open position with the engine at idle speed until the air is bleed off.

WARNING: Perform this operation in a well ventilated area.

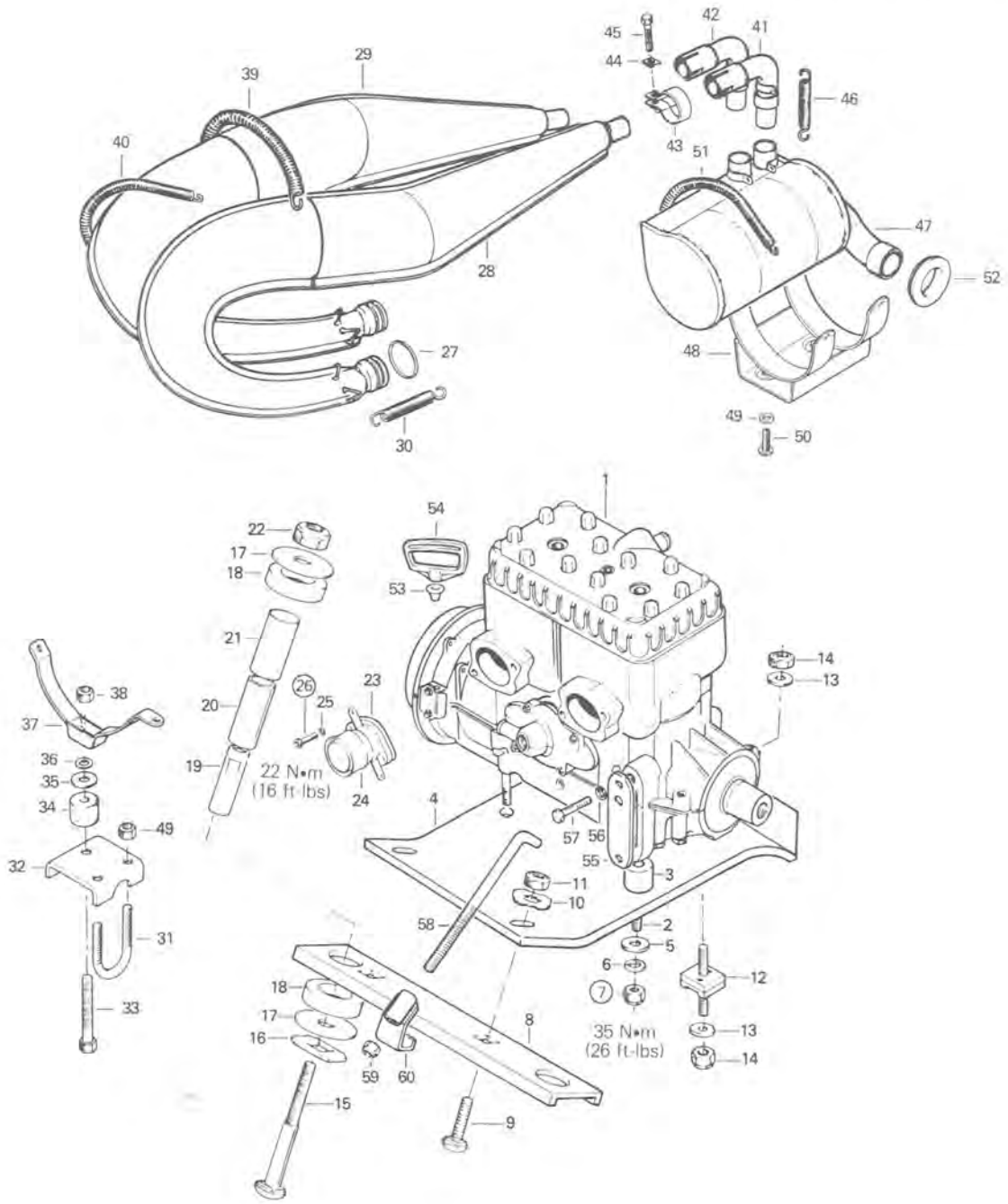
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534 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION

Engine support and muffler



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1. *Engine Rotax 534*
2. *Stud M10 x 42 (4)*
3. *Distance sleeve (4)*
4. *Engine bracket*
5. *Flat washer 10.5 x 21 x 2 mm (4)*
6. *Lockwasher 10 (4)*
7. *Hexagonal nut 10 mm (4)*
8. *Cross support*
9. *Carriage bolt 3/8-16 x 1 1/4 (2)*
10. *Internal tooth dished washer (2)*
11. *Hexagonal elastic stop nut 3/8-16 (2)*
12. *Rubber mount*
13. *Washer (2)*
14. *Hexagonal elastic stop nut 3/8-16 (2)*
15. *Carriage bolt 7/16-14 x 2 3/4 (threaded 1 1/4") (2)*
16. *Retainer plate (2)*
17. *Washer (4)*
18. *Damper (4)*
19. *Threaded bushing (2)*
20. *Rubber sleeve (2)*
21. *Sleeve (2)*
22. *Hexagonal elastic stop nut 7/16-14 (2)*
23. *Gasket (2)*
24. *Exhaust socket (2)*
25. *Lockwasher 8 (4)*
26. *Allen screw M8 x 30 (4)*
27. *Sealing ring (4)*
28. *Tuned muffler P.T.O. side*
29. *Tuned muffler magneto side*
30. *Spring (4)*
31. *"U" bolt*
32. *Muffler support bracket*
33. *Hexagonal head cap screw 1/4-20 x 1 1/4*
34. *Rubber spacer*
35. *Asbestos washer*
36. *Flat washer 17/64 x 7/8 x .060*
37. *Muffler support*
38. *Hexagonal elastic stop nut 1/4-20 (3)*
39. *Spring*
40. *Spring*
41. *Tail pipe P.T.O. side*
42. *Tail pipe magneto side*
43. *Clamp (2)*
44. *Reinforcement plate (2)*
45. *Hexagonal head cap screw M8 x 1.25 x 20 (2)*
46. *Spring (4)*
47. *After muffler*
48. *Support*
49. *Flat washer 17/64 x 5/8 x .060 (3)*
50. *Truss slotted head power lock screw 1/4-20 x 1/2 (3)*
51. *Spring (2)*
52. *Exhaust grommet*
53. *Rubber buffer*
54. *Starter grip*
55. *Retainer plate*
56. *Lockwasher 8 (2)*
57. *Hexagonal head cap screw M8 x 1.25 x 20 (2)*
58. *Brace*
59. *Hexagonal nut 3/8-16 (2)*
60. *Hook*

REMOVAL FROM VEHICLE

Disconnect or remove the following from vehicle:

- Pulley guard and drive belt
- Air silencer and throttle cable
- Fuel lines, primer and 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 DISASSEMBLY AND ASSEMBLY

⑦ Torque to 35 N•m (26 ft-lbs).

㉖ Torque to 22 N•m (16 ft-lbs).

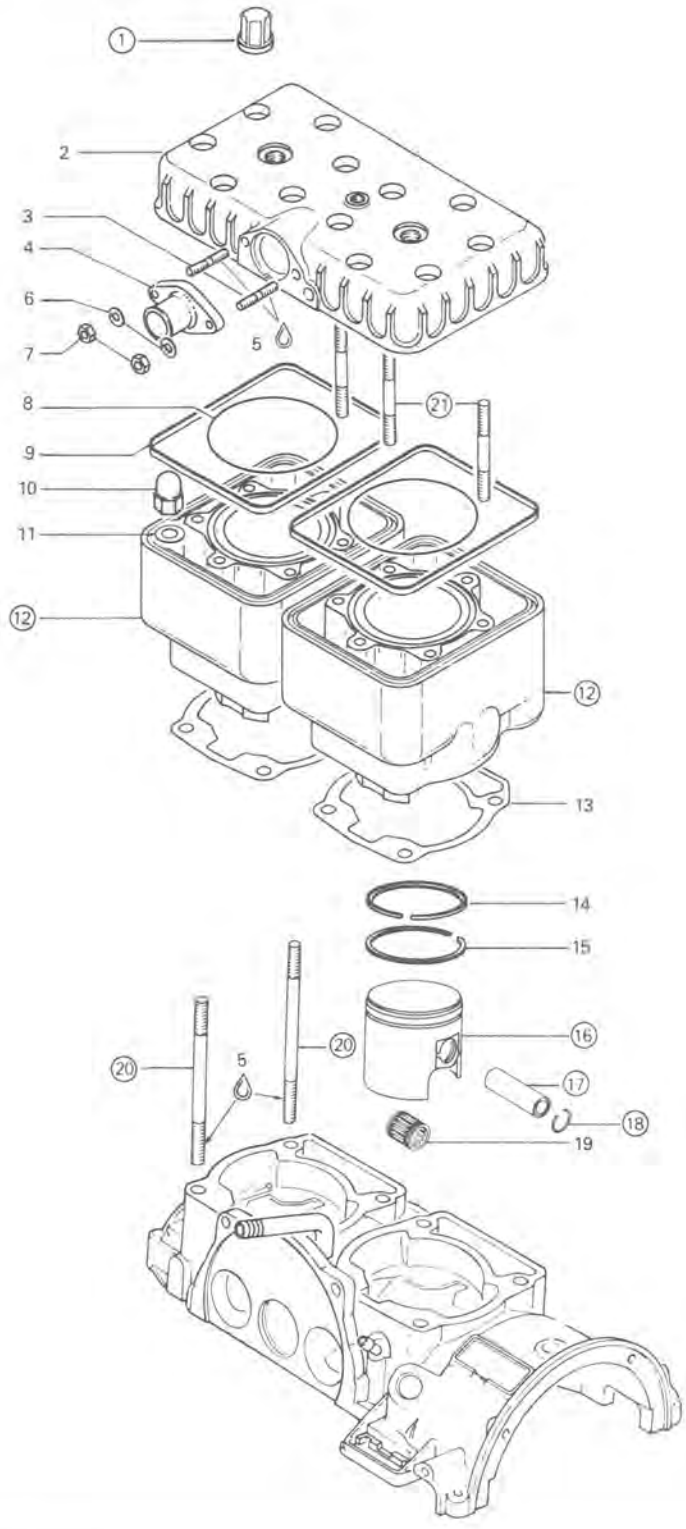
INSTALLATION ON VEHICLE

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.
- Check pulley alignment and drive belt tension.

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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 M10 (8)
11. Flat washer 8.4 (8)
12. Cylinder (2)
13. Cylinder/crankcase gasket (2)
14. "L" ring
15. "Rectangular" ring
16. Piston
17. Circlip (4)
18. Gudgeon pin
19. Needle bearing
20. Cylinder stud M8 x 79 (8)
21. Stud (head) M8 x 44 (12)

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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 Place a clean cloth over crankcase to prevent circlips from falling into crankcase then use a pointed tool to remove circlips from piston.
Drive the gudgeon pins in or 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	.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 07.

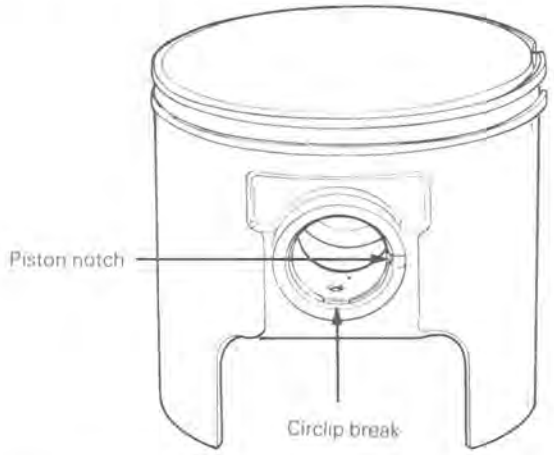
ASSEMBLY

⑯ 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.

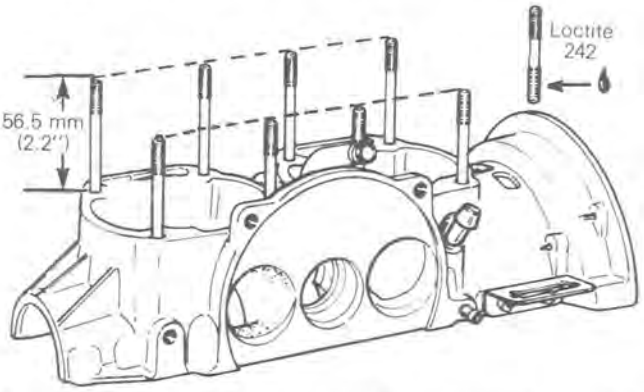


⑰ To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated.

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



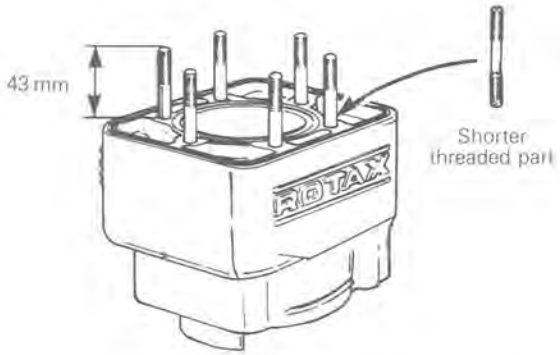
⑳ Because of cap nuts, cylinder studs have to be screwed into the crankcase so that they do not protrude by more than 56.5 mm (2.2").



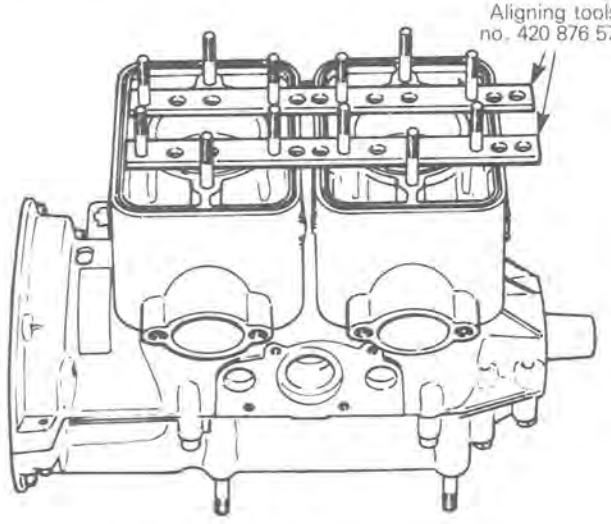
Apply "Loctite 242" blue medium strength on the threaded end of the studs going into the crankcase.

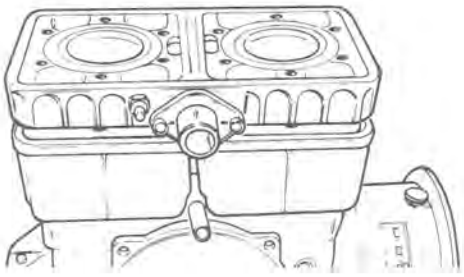
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⑫ ㉑ Because of cap nuts, cylinder head studs have to be screwed into the cylinder so that they do not protrude by more than 43 mm (1.700"). If it is not possible to obtain this length, add a washer between cylinder head and cap nut. Shorter threaded part of stud should be screwed into cylinder.

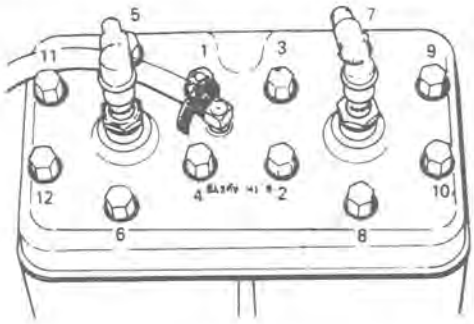


⑩ ⑫ When reassembling the cylinders to the crankcase, it is important to have them properly aligned so that the cylinder head holes will match up with the studs. A special tool (as per illustration) (or cylinder head itself) can be used to align the cylinders. Cross torque cylinder nuts to 22 N•m (16 ft-lbs).





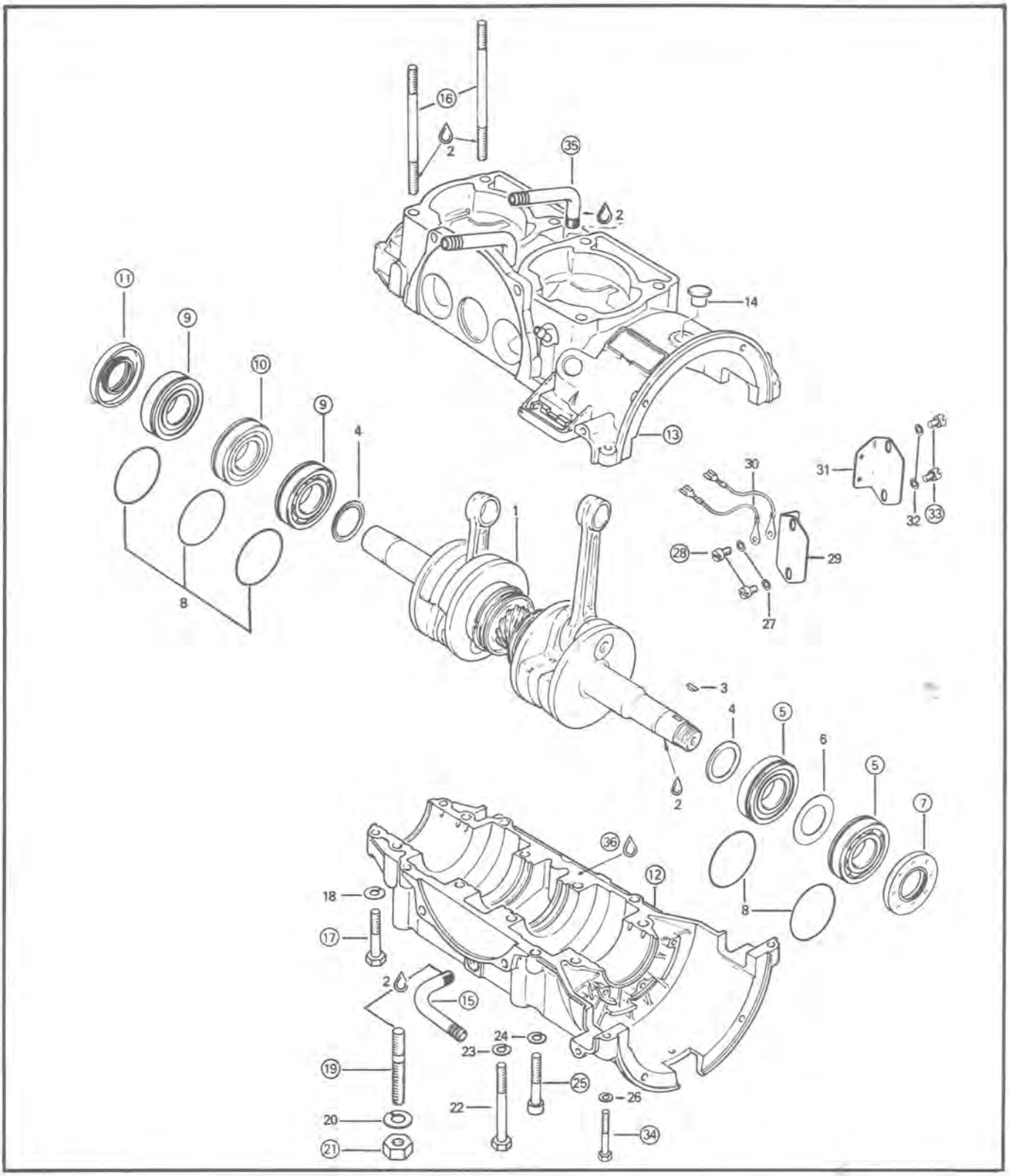
① Torque cylinder head nuts to 24 N•m (18 ft-lbs) following illustrated sequence.



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BOTTOM END



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1. *Crankshaft*
2. *Loctite 242, blue (medium strength)*
3. *Woodruff key*
4. *Distance ring*
5. *Ball bearing 6206*
6. *Shim (1 mm)*
7. *Oil seal*
8. *"O" ring*
9. *Ball bearing 6207*
10. *Labyrinth sleeve*
11. *Oil seal*
12. *Crankcase lower half*
13. *Crankcase upper half*
14. *Plug*
15. *Angular tube, oil outlet*
16. *Stud M8 x 79*
17. *Screw M8 x 45 (2)*
18. *Lock washer 8 (10)*
19. *Stud M10 x 42 (4)*
20. *Lock washer 10 (4)*
21. *Nut M10 (4)*
22. *Screw M8 x 64 (8)*
23. *Lock washer 8 (10)*
24. *Lock washer 8 (4)*
25. *Screw M8 x 40 (4)*
26. *Lock washer 6 (2)*
27. *Lock washer 6 (4)*
28. *Screw M6 x 10 (4)*
29. *Cover*
30. *Mass cable ass'y (2)*
31. *Cover*
32. *Lock washer 6 (4)*
33. *Screw M6 x 10 (4)*
34. *Screw M6 x 35 (2)*
35. *Angular tube, oil inlet*
36. *Loctite 515*

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.

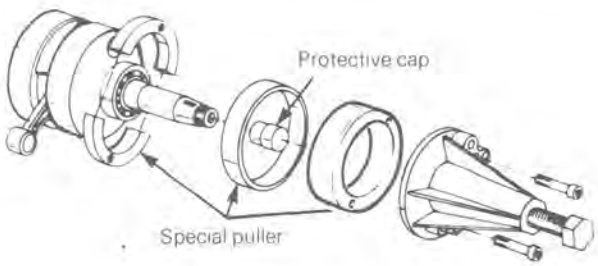
DISASSEMBLY

General

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

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

⑤⑨⑩ To remove bearings from crankshaft use a protective cap and special puller as illustrated.



INSPECTION

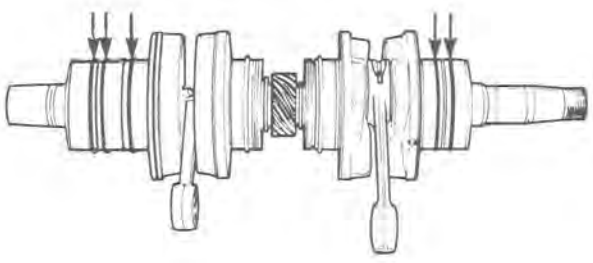
The inspection of the engine bottom end must include the following measurements:

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

NOTE: For the measurement procedures, refer to "Engine Tolerances Measurement", section 02, sub-section 07.

ASSEMBLY

⑤⑨⑩ 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.

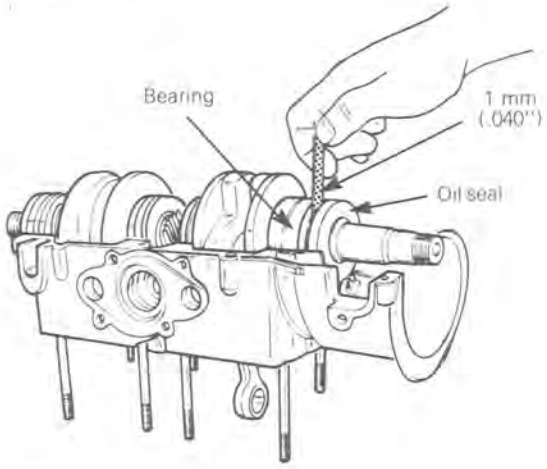


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⑦ ⑪ At seal assembly, apply a light coat of lithium grease on seal lips.

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.

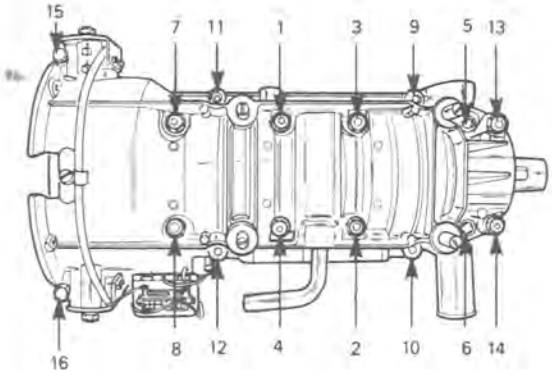


⑫ ⑬ ㊱ Crankcase halves are factory matched and therefore, are not interchangeable or available as single halves. Prior to joining of crankcase halves, apply a light coat of "Loctite 515" (413 7027 00) on mating surfaces.

▼ 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.

Follow sequence shown
1 to 14 – 22 N•m (16 ft-lbs)
15 & 16 – 14 N•m (10 ft-lbs)



○ NOTE: Torque the two smaller bolts (15 and 16) on magneto side to 14 N•m (10 ft-lbs).

⑮ ㉘ ㉝ ㉟ Apply "Loctite 242" on threads prior to assembly.

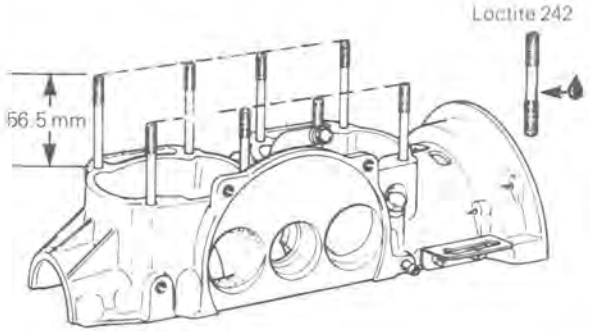
⑰ ㉕ Torque to 22 N•m (16 ft-lbs)

㉞ Torque to 14 N•m (10 ft-lbs).

⑲ At assembly on crankcase, apply "Loctite 242" on threads.

㉑ Torque to 35 N•m (26 ft-lbs).

⑯ 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").



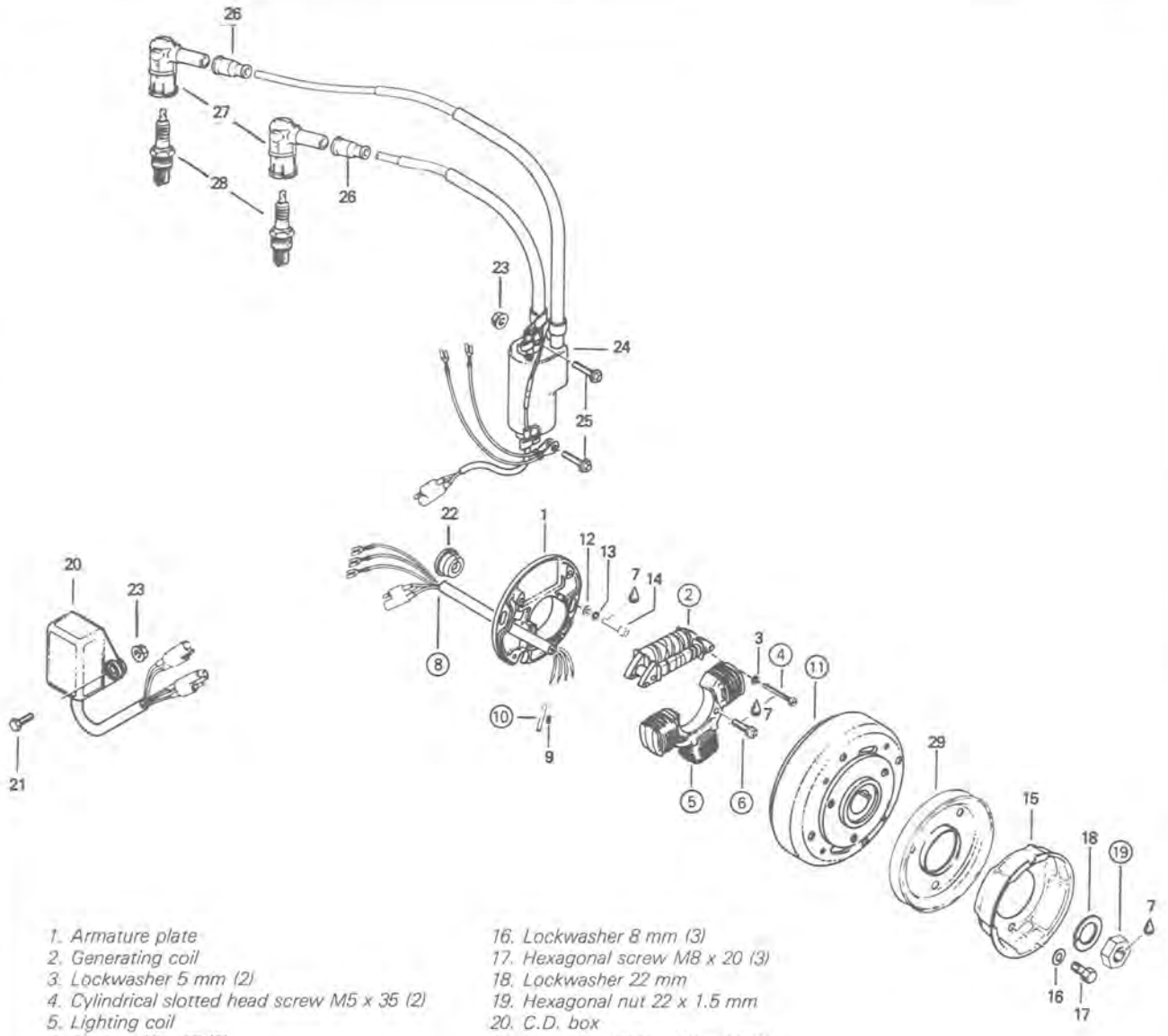
Apply "Loctite 242" on the threaded end of the studs going into the crankcase.

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

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MAGNETO



1. Armature plate
2. Generating coil
3. Lockwasher 5 mm (2)
4. Cylindrical slotted head screw M5 x 35 (2)
5. Lighting coil
6. Screw M6 x 25 (2)
7. Loctite 242 (blue, medium strength)
8. Harness
9. Splice connector (6)
10. Protector tube
11. Flywheel
12. Washer 5.3 mm (2)
13. Lockwasher 5 mm (2)
14. Allen screw M5 x 18 (2)
15. Starting pulley
16. Lockwasher 8 mm (3)
17. Hexagonal screw M8 x 20 (3)
18. Lockwasher 22 mm
19. Hexagonal nut 22 x 1.5 mm
20. C.D. box
21. Hexagonal screw M6 x 20 (2)
22. Cable grommet
23. Hexagonal flanged nut 6 mm
24. Ignition coil
25. Hexagonal head taptite screw M5 x 25 (2)
26. Protector cap (2)
27. Spark plug protector (2)
28. Spark plug NGK BR-7ES (2)
29. Flywheel counterweight

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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

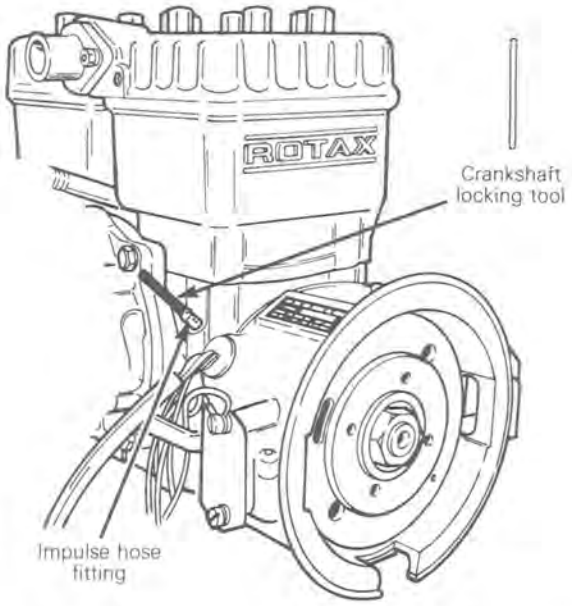
To gain access to magneto assembly, remove:

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

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

⑲ To remove magneto flywheel retaining nut:

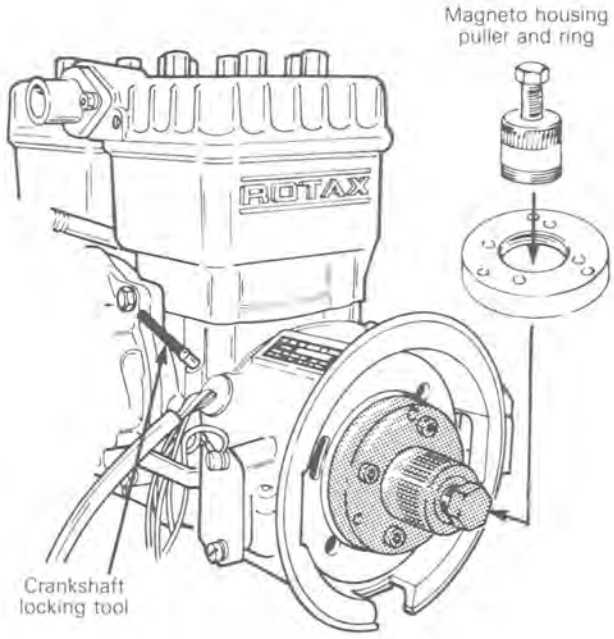
- lock crankshaft with crankshaft locking tool (service tool) as illustrated (magneto side piston must be at top dead center)
- remove magneto retaining nut.



◯ 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 To remove magneto housing (flywheel):

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

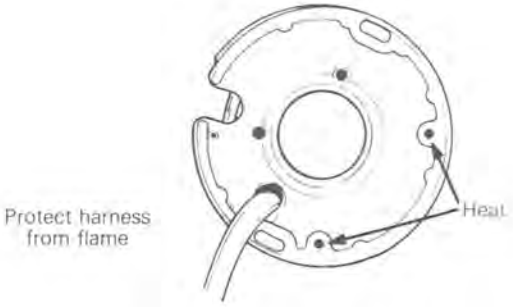


- tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto from its taper.

REPAIR

② To replace generating coil:

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



▼ CAUTION: Protect harness from flame.

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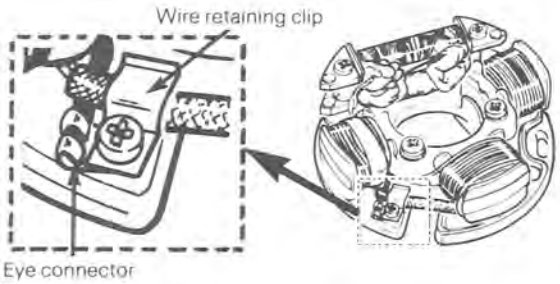
- Remove screws (use Phillips no. 2 or suitable flat screw driver).
- Cut the four wires as close as possible to the coil body.
- To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube.
- Insert the new wires into the old connector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

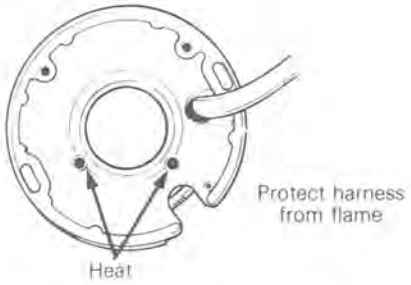


- ④ To install the new coil on the armature plate, remove the shipping nuts from the new coil and apply Loctite 242 (blue, medium strength) to screws before assembly.

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

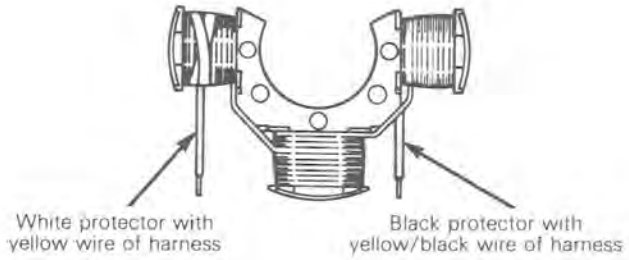
⑤ To replace lighting coil:

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



CAUTION: Protect harness from flame.

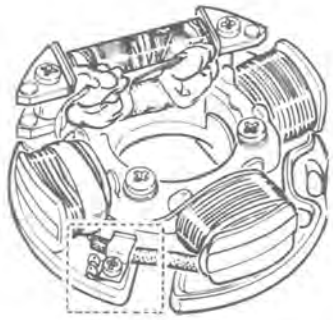
- Remove screws (use Phillips no. 3 screwdriver).
- Remove the wire retaining clip from armature plate.
- Pull out protector tubes and unsolder the splice connectors.
- Solder the yellow wire in the harness to the white tube protected wire of the coil
- Solder the yellow/black striped wire in the harness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



- ⑩ Position protector tubes over connections.
- ⑤ Prior to assembly, apply "Loctite 242" (blue, medium strength).
- Fasten retaining clip onto protector tubes.

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



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

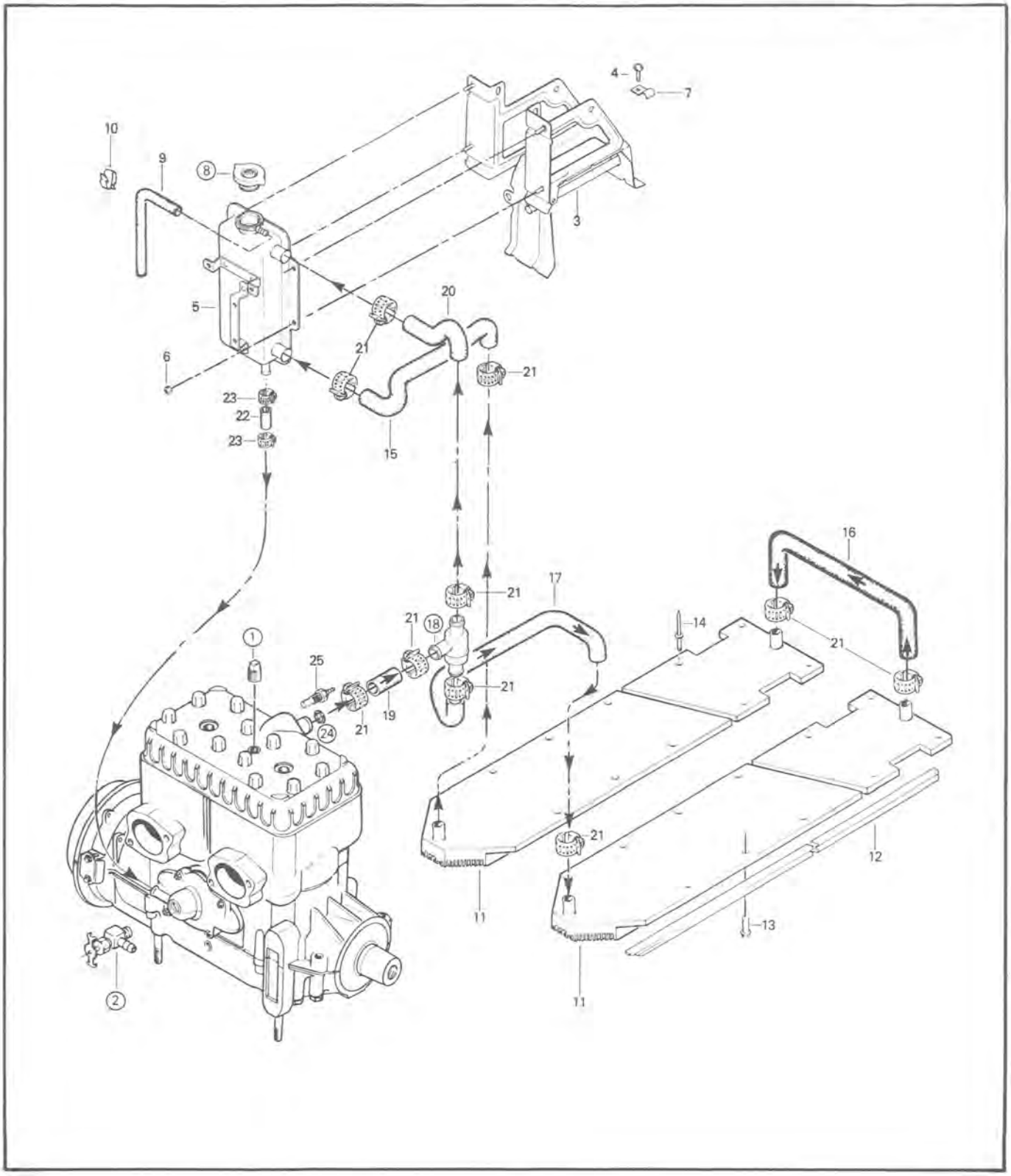
ASSEMBLY

- Clean crankshaft extension (taper).
- Apply "Loctite 242" on taper.
- Position key and magneto housing on crankshaft.
- ⑲ Clean nut threads and apply "Loctite 242" (blue, medium strength) before tightening nut to 85 N•m (63 ft-lbs).
- ⑧ ⑳ ㉔ ㉖ At reassembly coat all electric connections with dielectric or lithium grease to prevent corrosion or moisture penetration.

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

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COOLING SYSTEM



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1. *Plug*
2. *Drain valve*
3. *Tank support*
4. *Hexagonal washer head powerlock screw 1/4-20 x 1/2 (4)*
5. *Coolant tank*
6. *Hexagonal elastic stop nut 10-24 (4)*
7. *Clip*
8. *Pressure cap*
9. *Overflow hose*
10. *Clip*
11. *Heat exchangers (2)*
12. *Radiator protector (2)*
13. *Hexagonal washer head self tapping screw 10-24 x 1/2 (2)*
14. *Rivet (38)*
15. *Hose*
16. *"U" hose*
17. *Hose*
18. *Thermostat*
19. *Hose 3.88" (98.6 mm)*
20. *Hose*
21. *Clamp (10)*
22. *Hose 19.5 (495 mm)*
23. *Clamp (2)*
24. *Grommet*
25. *Sender*

INSPECTION

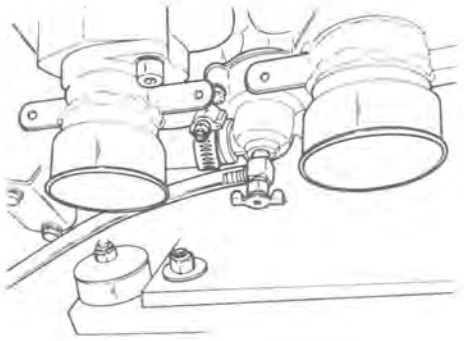
Check general condition of hoses and clamp tightness.

DRAINING SYSTEM

To drain the cooling system, remove the coolant tank cap.

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

Connect a drain hose to the drain valve at pump housing. Open valve and drain system.



○ **NOTE:** Open end of drain hose should be lower than engine base.

However, to completely drain the system, blow into the tank through the vent tube while blocking the tank filler neck with one hand to prevent air leakage.



DISASSEMBLY & ASSEMBLY

①②㉔Apply pipe thread sealant to avoid leaks.

⑧Check if the cap pressurizes the system. If not, install a new 13 lbs cap, do not exceed 13 lbs of pressure.

⑱To check thermostat, put it in water and heat water. Thermostat should open when water temperature reaches 50°C (122°F).

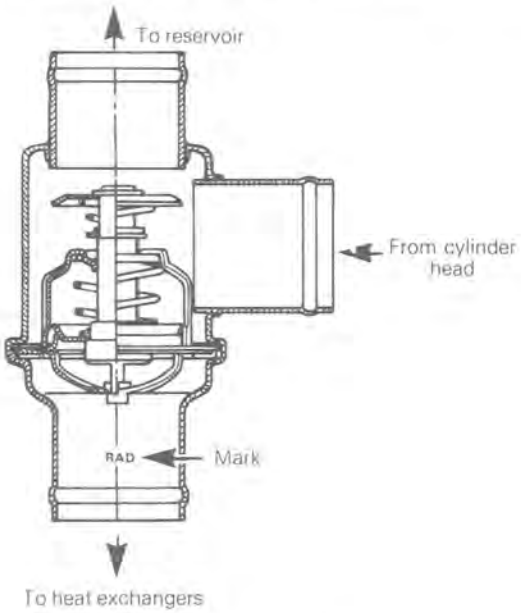
This thermostat is a "double action type":

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).

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These two functions have the advantage of preventing a massive entry of cold water into the engine.



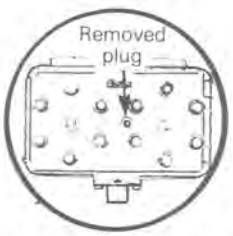
REFILLING THE SYSTEM

Capacity:

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

▼ CAUTION: Always use ethylene-glycol anti-freeze 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.

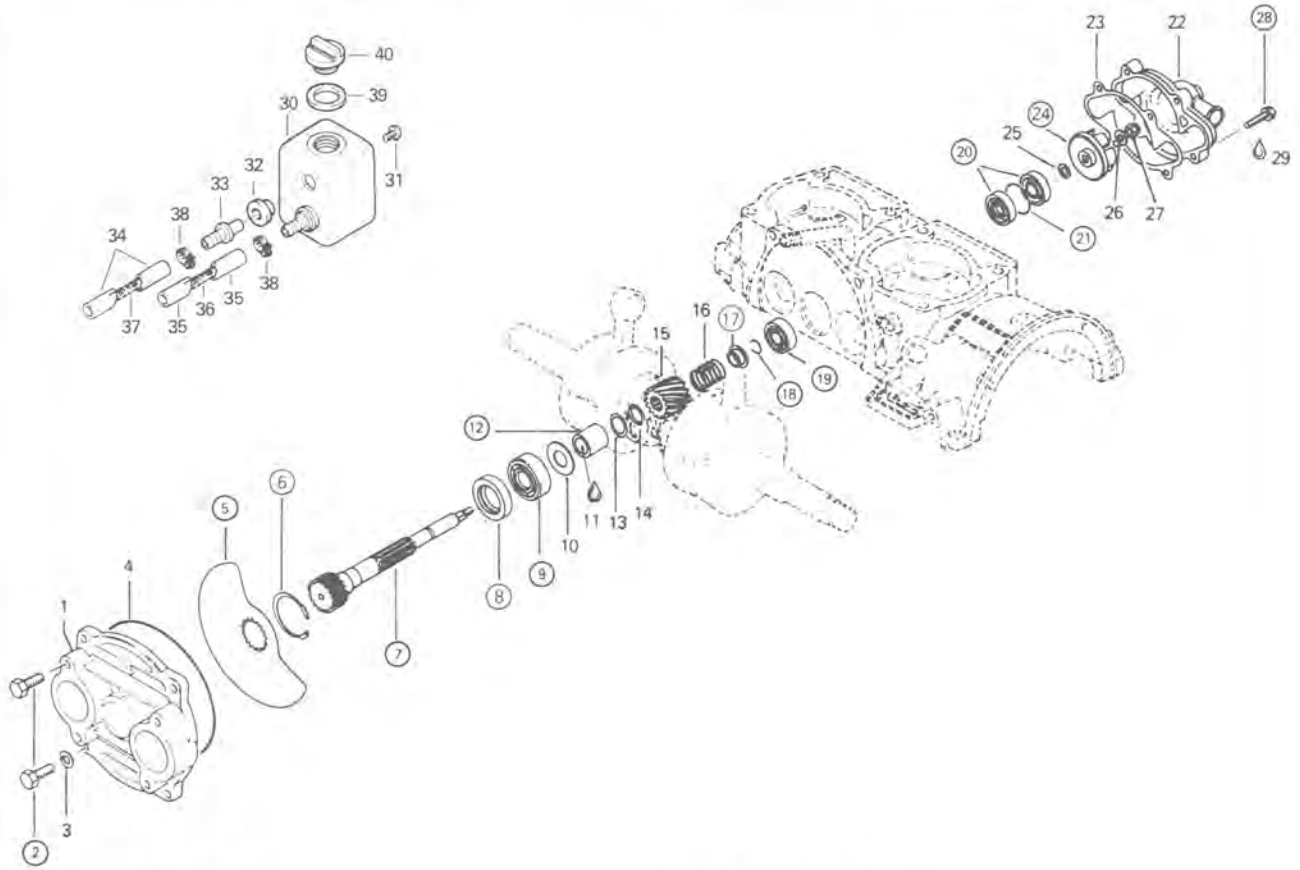
Then recheck coolant level, ensuring that it is 25 mm (1") below filler neck of reservoir.

◆ WARNING: Always unscrew cap to the first step with a cloth to release pressure, before removing it.

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ROTARY VALVE, COOLANT PUMP AND RESERVOIR



1. *Rotary valve cover*
2. *Bolt M8 x 20 (8)*
3. *Lockwasher 8 mm (4)*
4. *"O" ring*
5. *Rotary valve*
6. *Circlip*
7. *Rotary valve shaft*
8. *Seal*
9. *Bearing*
10. *Shim 0.5 mm*
11. *"Loctite 271"*
12. *Distance sleeve 24.5 mm*
13. *Shim 0.5 mm*
14. *"O" ring*
15. *Gear*
16. *Spring*
17. *Spring retaining cup*
18. *Circlip*
19. *Bearing*
20. *Seal (2)*
21. *Distance ring*
22. *Pump housing*
23. *Gasket*
24. *Pump impeller*
25. *Washer 8.4 mm*
26. *Washer 6.2 mm*
27. *Nut M6*
28. *Bolt M6 x 25 (4)*
29. *"Loctite 242"*
30. *Oil tank*
31. *Hexagonal washer head powerlock screw 1/4-20 x 1/2*
32. *Grommet (2)*
33. *Male connector (2)*
34. *Oil line*
35. *Oil line*
36. *Spring*
37. *Spring*
38. *Gear clamp (4)*
39. *Gasket*
40. *Oil tank cap*

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CLEANING

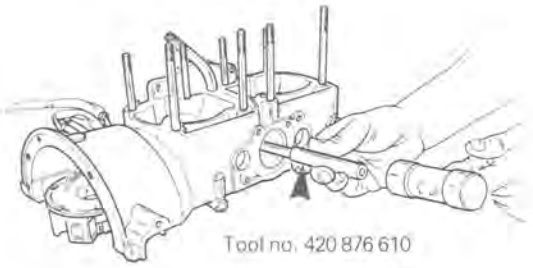
Discard all seals and "O" rings.

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

DISASSEMBLY & ASSEMBLY

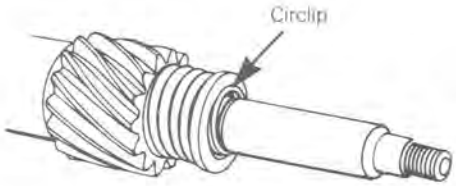
⑦ through ⑱ Rotary valve shaft assembly

⑥ ㉔ 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.

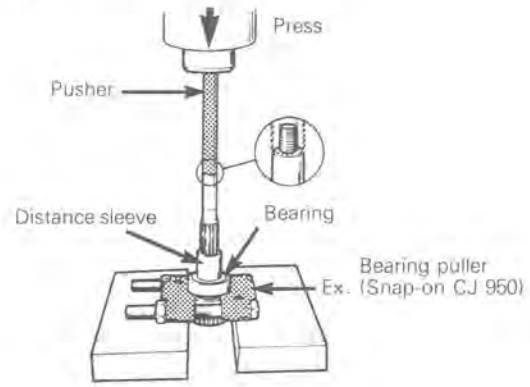


▼ CAUTION: To prevent damage to the end of the rotary valve shaft, use pusher (tool P/N 420 876 610).

⑰ ⑱ If it is necessary to disassemble components of rotary valve shaft assembly, compress spring retaining cup in order to remove circlip.



⑫ To remove the distance sleeve use a bearing puller (Ex: Snap-on no. CJ 950) and pusher (P/N 420 876 610) as illustrated.

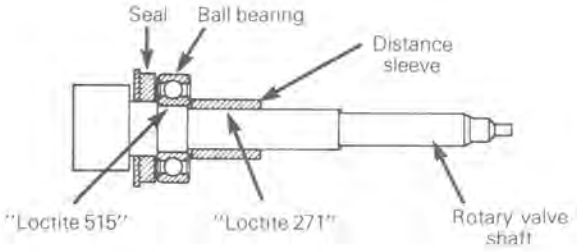


▼ CAUTION: Ensure that the rotary valve shaft is perfectly perpendicular with the press tip or damage will occur.

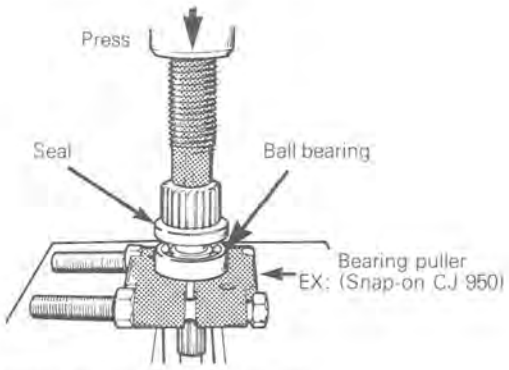
Clean rotary valve shaft and inside of distance sleeve. At assembly apply "Loctite 271" inside of distance sleeve.

⑦ ⑨ At assembly, apply crankcase sealant "Loctite 515" on bearing and rotary valve shaft mating surfaces.

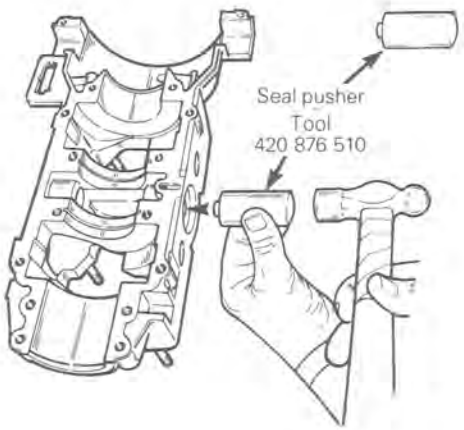
⑧ At assembly apply lithium grease on seal lips.



⑨ Install ball bearing as illustrated.

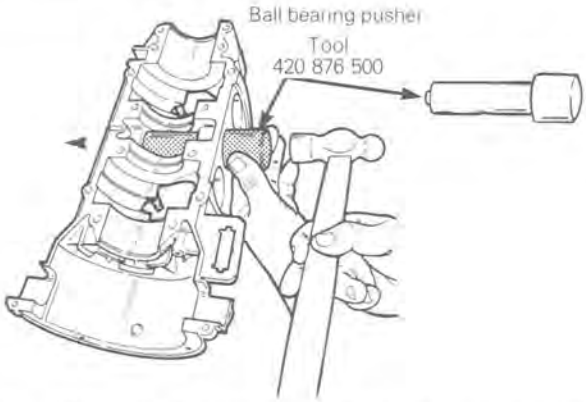


⑲ ⑳ ㉑ To remove seals and bearing.



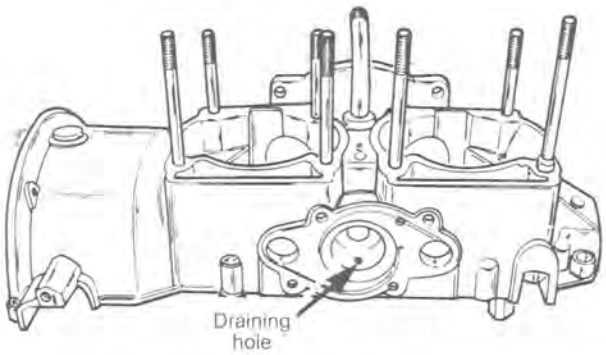
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⑲To install ball bearing.



NOTE: ⑲ Ball bearing shielded side must be facing water pump.

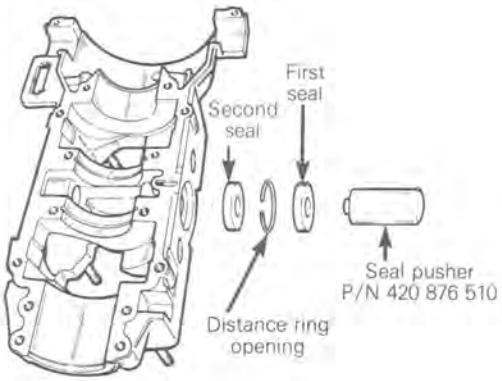
⑳㉑To install seals proceed as follows:



35% of the distance between first and second seals (first seal being flush with crankcase) must be filled with lithium grease or equivalent.

Distance ring opening must be in line with crankcase half draining hole.

(Apply lithium grease on seal lips).



NOTE: ⑬⑭After installation of seals check if the bearing is correctly positioned (use pusher P/N 420 876 510).

㉘Apply "Loctite 242" on threads.

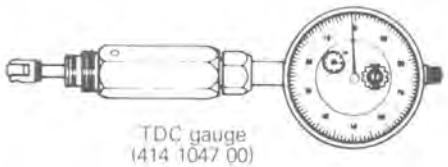
②Torque to 20 N•m (15 ft-lbs).

⑤Rotary valve adjustment when replacing crankcase having no timing marks.

REQUIRED TOOLS



Angle finder
(414 3529 00)



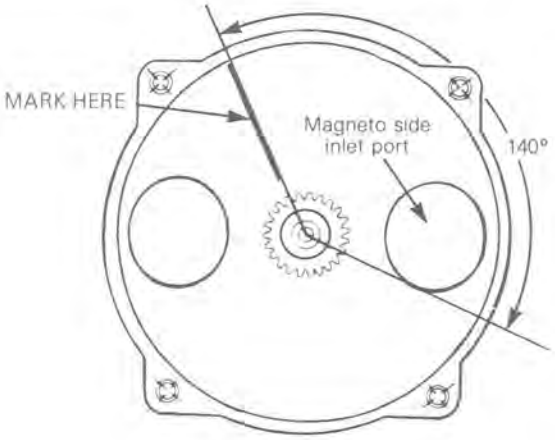
TDC gauge
(414 1047 00)

ENGINE TYPE	TIMING MARKS opening, closing
534	140°, 61°

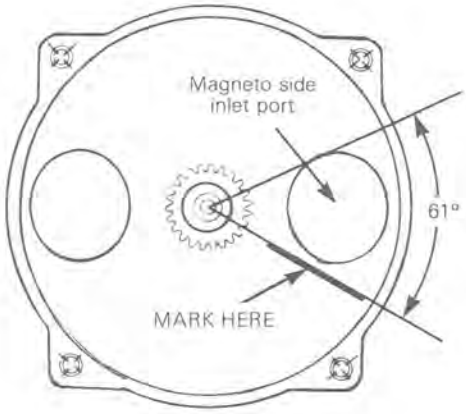
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For example: 140° opening
61° closing

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



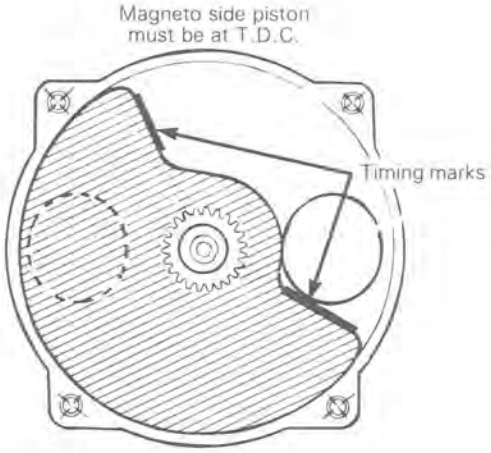
From top edge of magneto side inlet port, mark crankcase at 61°.



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.



(28) Torque to 20 N•m (15 ft-lbs).

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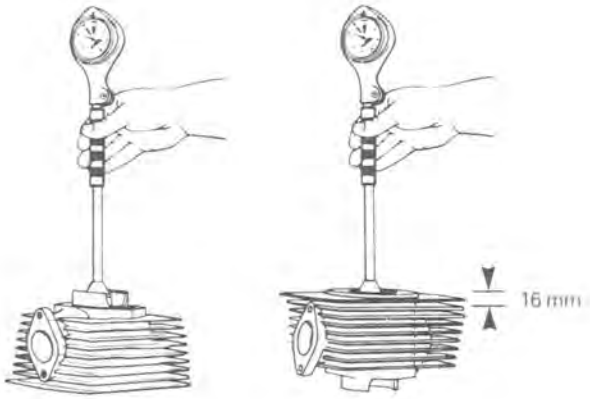
ENGINE TOLERANCES MEASUREMENT

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.

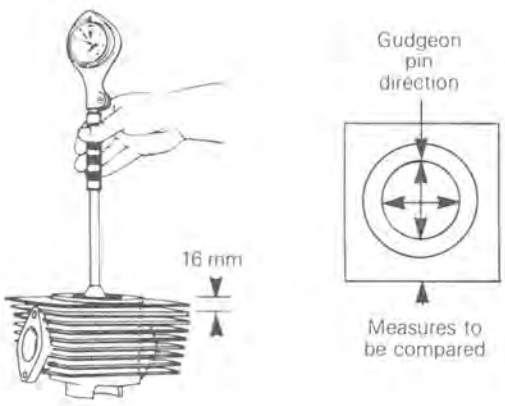
On rotary valve engines, measure just below auxiliary transfer port, facing exhaust port. If the difference exceeds 0.08 mm (.003") the cylinder should be rebored and honed or should be replaced.



CYLINDER 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.



CYLINDER/PISTON CLEARANCE

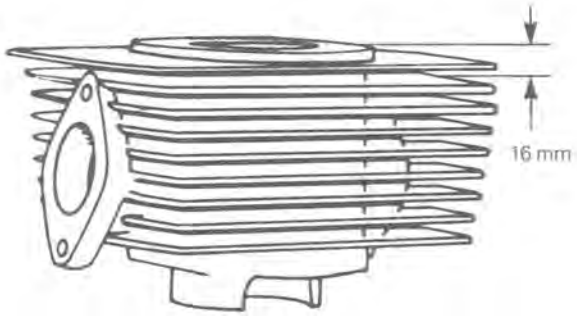
ENGINE TYPE	PISTON TO WALL CLEARANCE MINIMUM – MAXIMUM
247	0.065 – 0.200 mm (.0026 – .008")
277	0.070 – 0.090 mm (.0028 – .0035")
377	0.080 – 0.10 mm (.0031 – .0039")
464	0.080 – 0.100 mm (.0031 – .0039")
503	0.070 – 0.090 mm (.0028 – .0035")
534	0.100 – 0.120 mm (.0039 – .0047")

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.



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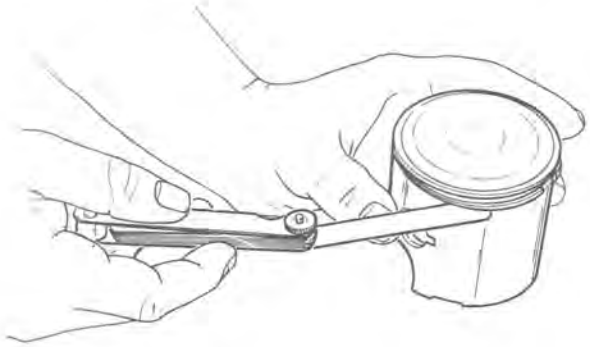


The difference between these two measurements should be within specified tolerance.

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.



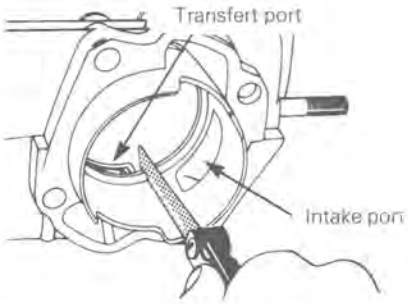
RING END GAP

ENGINE TYPE	RING END GAP (new ring)	MAXIMUM RING END GAP (worn ring)
247,277 377,464 503,534	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.

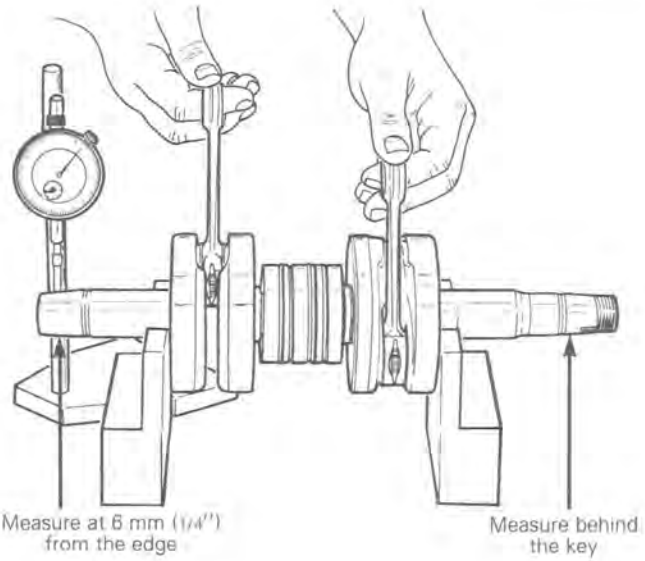
Using a feeler gauge, check ring end gap. If gap exceeds specified tolerance the ring should be replaced.



CRANKSHAFT DEFLEXION

TYPE	MAXIMUM
247,277	1.0 mm (0.039")
377,464 503,534	0.08 mm (0.031")

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.

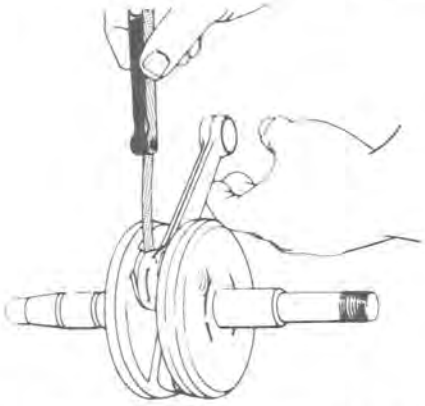


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CONNECTING ROD BIG END AXIAL PLAY

TYPE	MINIMUM — MAXIMUM
247,277,377 503	0.20 — 1.00 mm (.008 — .039")
464,534	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.



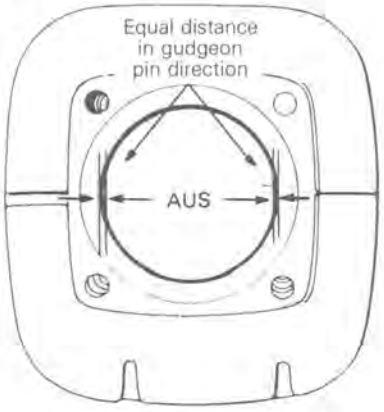
CONNECTING ROD ALIGNMENT

Check if connecting rod is bent as follows:

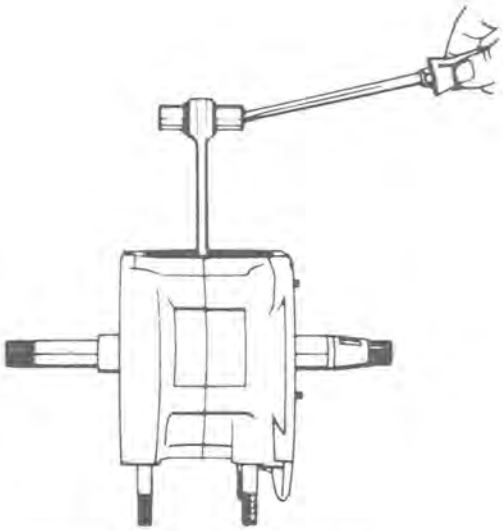
— Once engine crankcase is assembled with the piston mounted on connecting rod without its piston rings, position cylinder on piston.

NOTE: The cylinder/crankcase gasket must not be installed.

— Rotate crankshaft slowly and at the same time observe piston movement within the cylinder. If piston bears against one side (PTO or mag. side), the connecting rod is bent.



— To correct position needle bearing and gudgeon pin on connecting rod then pry connecting rod as illustrated.



CRANKSHAFT END-PLAY — 247 & 277 ENGINE TYPE

Specification:

MINIMUM	— MAXIMUM
0.20 mm	— 0.40 mm
(.008")	— (.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 blade.

The following is required for the adjustment procedure:

— adjustment shims (refer to parts catalog) (thicknesses available)

0.10 mm (.004")
0.20 mm (.008")
0.30 mm (.012")
0.50 mm (.020")
1.00 mm (.040") - 247 only

— micrometer

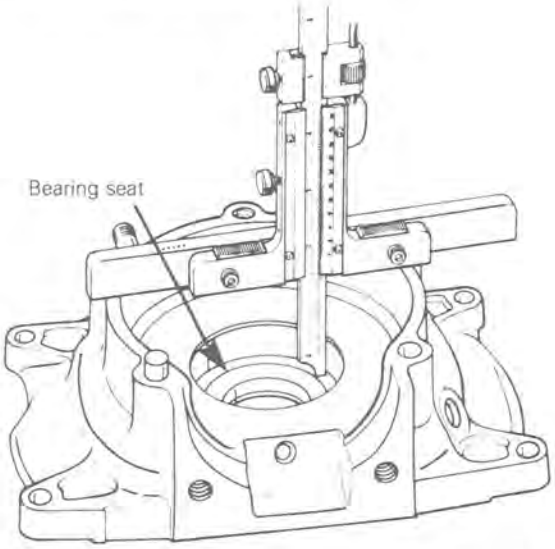
— vernier

• Total shim thickness needed for the end-play adjustment is determined with the following procedure:

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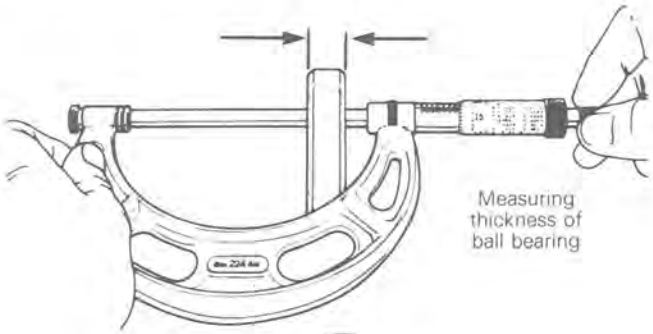
a) Measure crankcase halves as illustrated (M_1 and M_2).

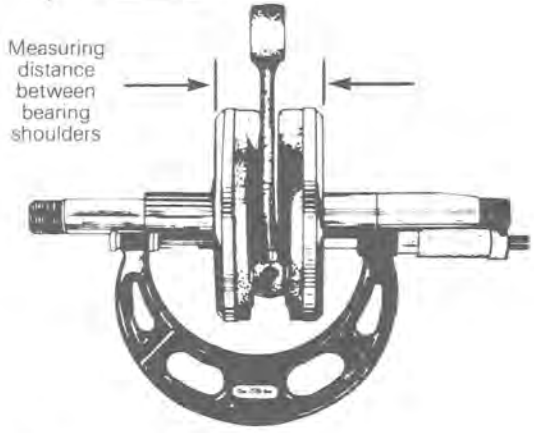
A standard compressed crankcase gasket will have a 0.30 mm (.012") thickness (M_3). Add these measurements to obtain dimension "A".



b) Measure the thickness of each ball bearing (M_4 and M_5).

Measure distance between bearing shoulders on crankshaft (M_6). Measure the distance ring and adjustment shims thickness (M_7 and M_8). Add these measurements to obtain dimension B.





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).

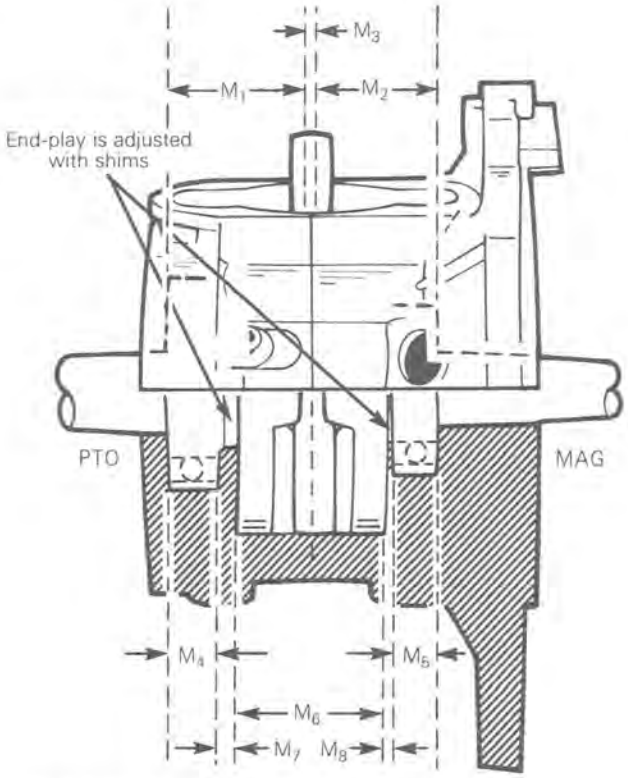
TO SUMMARIZE: (247 & 277 engine type)

$A = M_1 + M_2 + M_3$

$B = M_4 + M_5 + M_6 + M_7 + M_8$

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, 464, 534 ENGINE TYPES

These engine types do not have end-play adjustment.

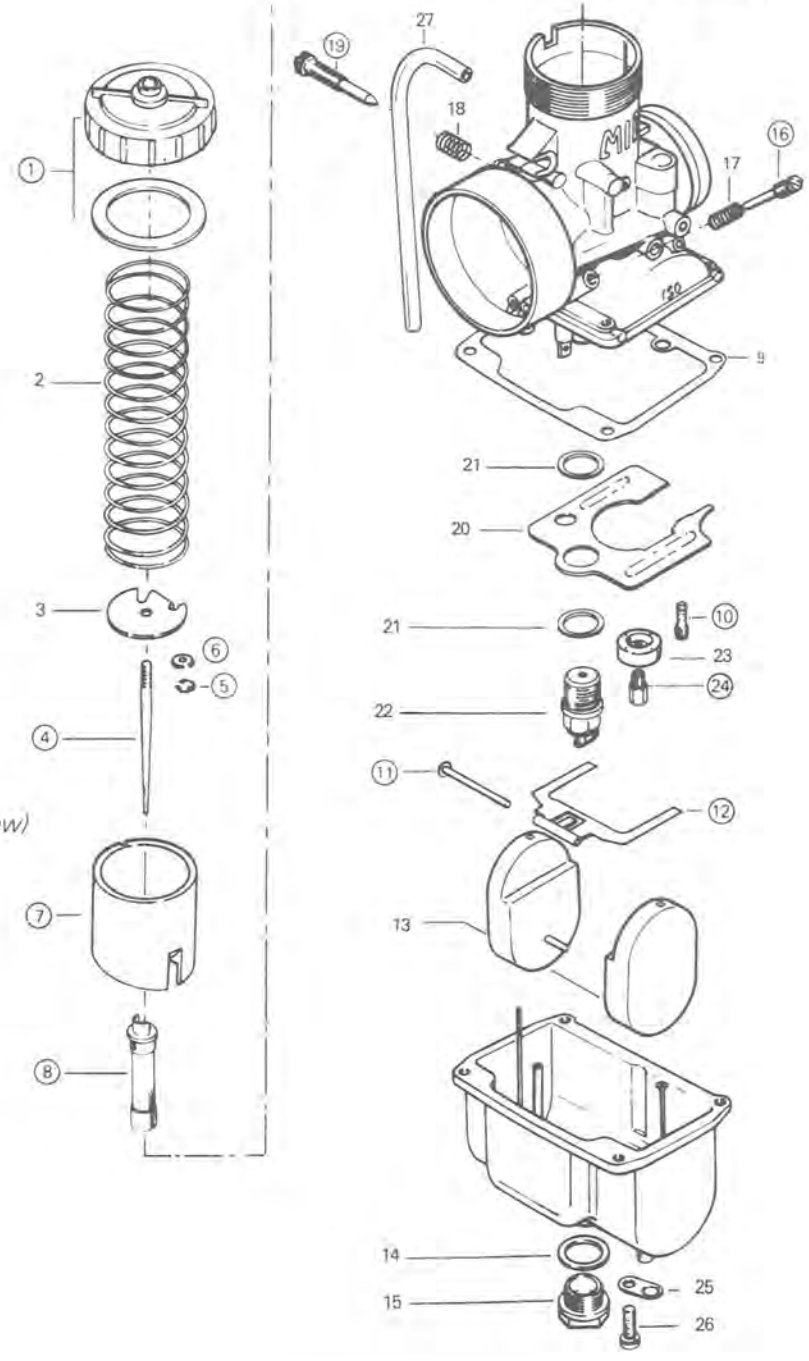
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CARBURETOR AND FUEL PUMP

MIKUNI CARBURETOR

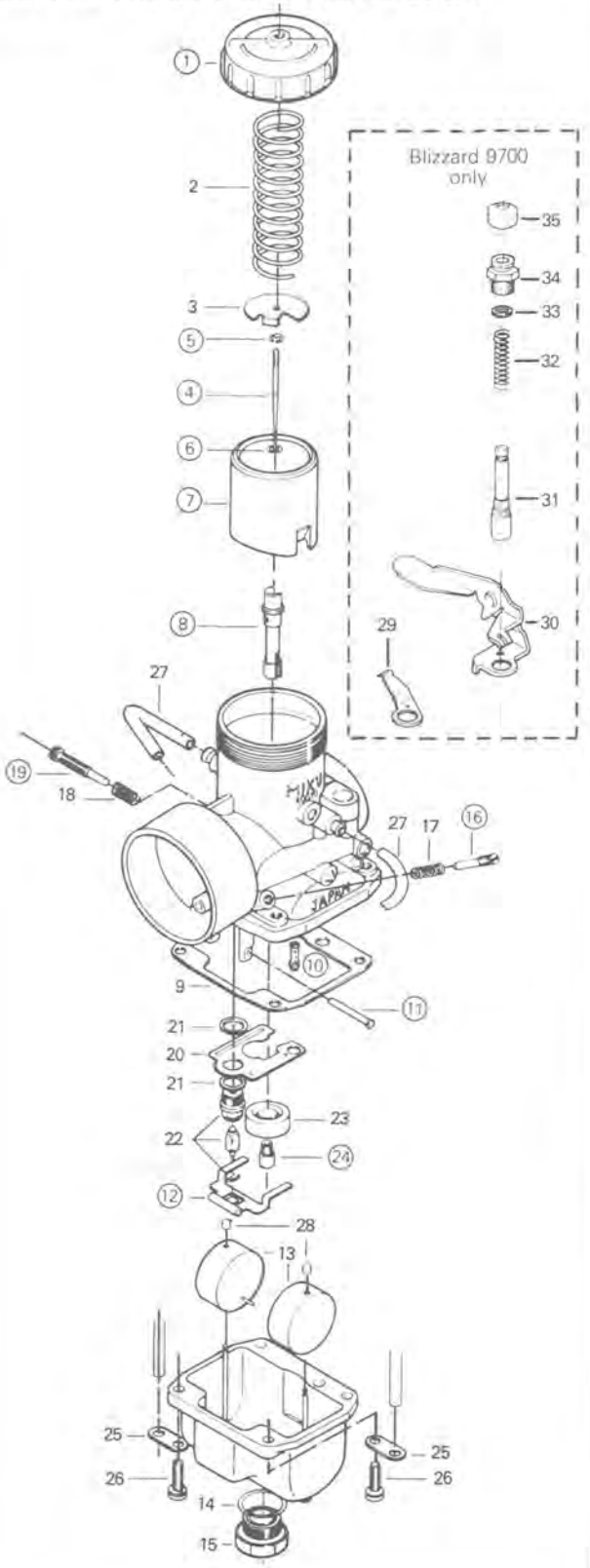
(ALL MODELS)
Except VM 28, VM 36 & VM 40

1. Cover
2. Spring (throttle valve)
3. Needle retainer plate
4. Jet needle
5. Circlip
6. Packing
7. Throttle valve
8. Needle
9. Gasket
10. Pilot jet
11. Float arm pin
12. Float arm
13. Float
14. O'ring
15. Plug screw
16. Idle 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

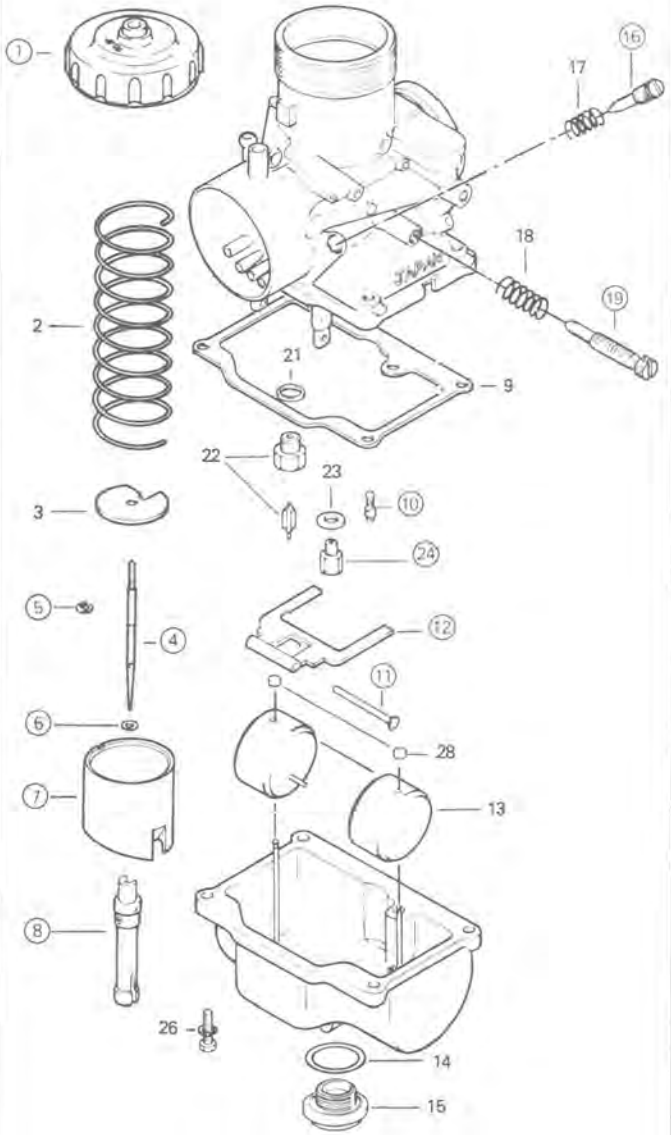


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Carburetor VM 36-114 & VM 40-23-24



Carburetor VM 28-242



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REMOVAL

Remove air silencer box, fuel inlet line and primer line.

Unscrew carburetor cover then pull out throttle slide ass'y from carburetor.

▼ CAUTION: 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.

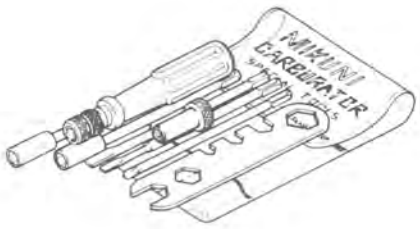
Check inlet needle tip condition. If worn, the inlet needle and seat must be replaced as a matched set.

Check throttle slide for wear. Replace as necessary.

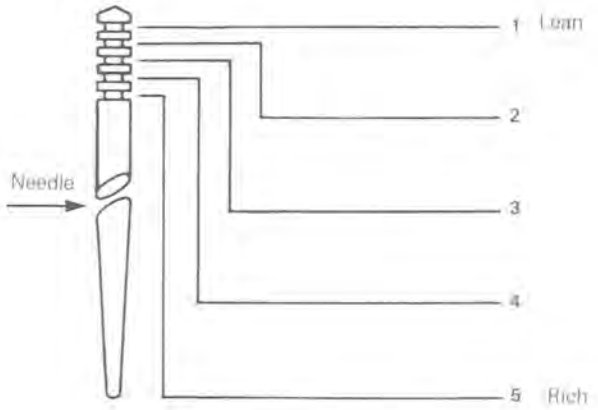
▼ CAUTION: Heavy duty carburetor cleaner may be harmful to the float material and to the rubber parts, O'ring, etc. Therefore, it is recommended to remove those parts prior to cleaning.

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.



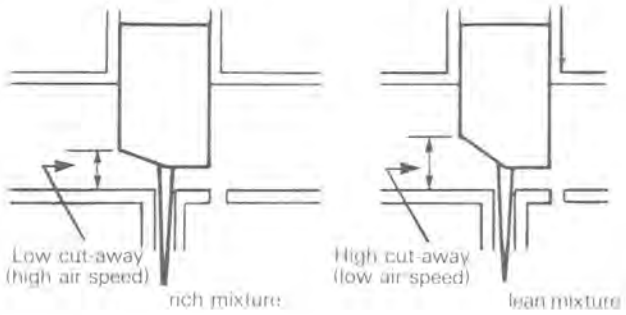
④ ⑤ The position of the needle in the throttle slide is adjustable by means of an "E" clip inserted into one of 5 grooves located on the upper part of the needle. Position 1 is the leanest, 5 the richest.



Example: 6DH4-3

Needle identification — Position of the "E" clip from top.

⑦ 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 The main jet installed in the carburetor is suitable for a wide range of temperature (-30° to 5°C/-20° à 40°F) at sea level. However, different jetting is available. Always check spark plug tip color to find out correct jetting.

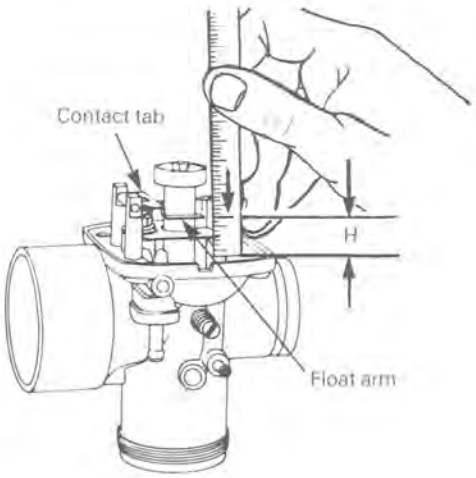
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MIKUNI CARBURETOR FLOAT LEVEL ADJUSTMENT

⑪ ⑫ 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



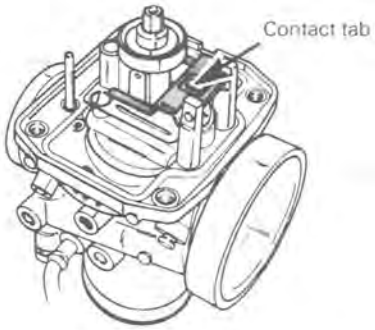
Float arm height dimensions:

CARBURETOR DIMENSION	VM 28	VM 30 VM 34	VM 36
H (inch) (mm)	.59 ≈ .66 15 ≈ 17	.86 ≈ .94 22 ≈ 24	.66 ≈ .74 17 ≈ 19

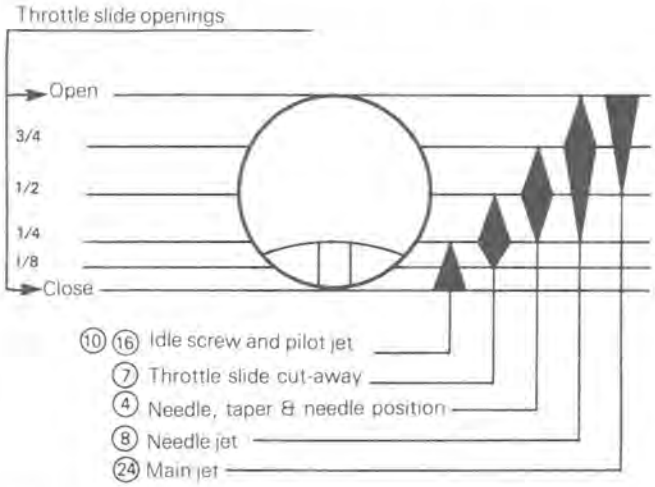
NOTE: As a general rule, the float arm must be parallel with the flange rib.

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).

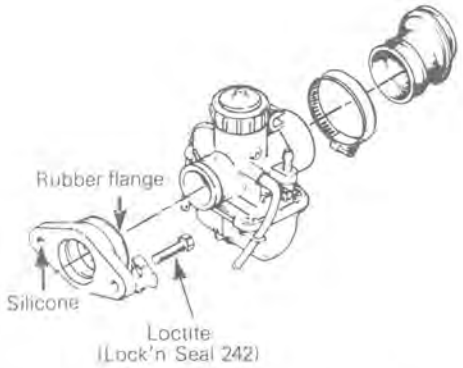
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INSTALLATION

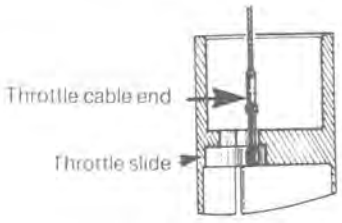
To install carburetor(s) on engine, inverse removal procedure.

However, pay attention to the following:

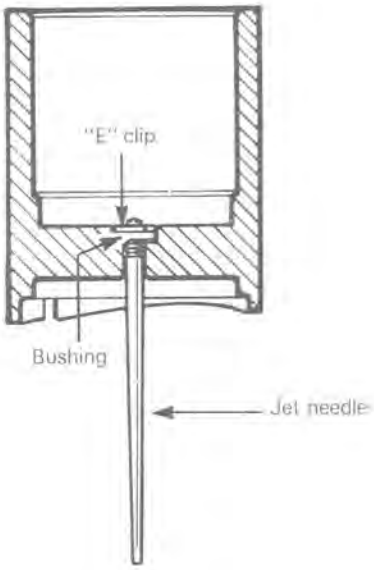
- Apply a thin layer of silicone sealant between carburetor rubber flange and intake cover on engine.
- Apply Loctite Lock'n Seal 242 on bolts retaining rubber flange to intake cover.
- When installing throttle cable end in throttle slide, hook up cable by using the stopper at the extremity of the cable.



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.



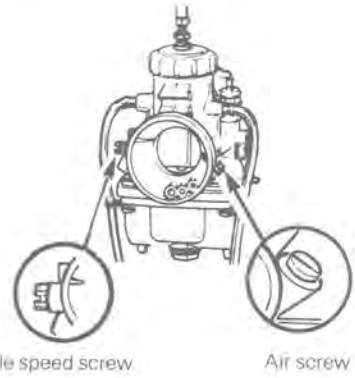
⑥⑦Mikuni carburetors are equipped with a new throttle slide. The new design has a deeper "E" clip seat, to permit the installation of a nylon bushing between the "E" clip and its seat.



Make sure the bushing 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).

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Throttle slide adjustment

◆ WARNING: Ensure the engine is turned **OFF**, prior to the throttle slide adjustment.

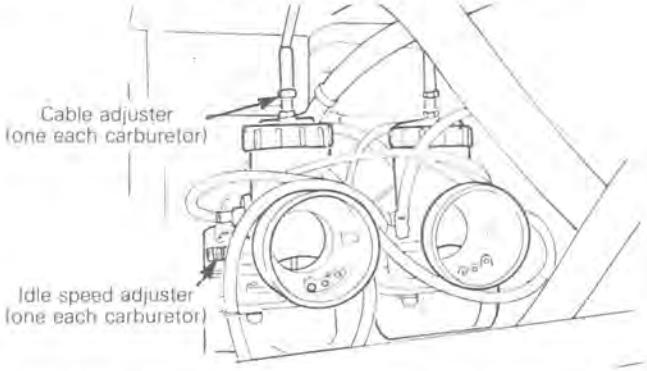
For maximum performance, correct carburetor throttle slide adjustment is critical.

The following method should be used:

with engine turned off:

– Remove the air intake silencer.

– Back off the idle speed screw(s) 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(s) with the throttle cable adjuster jam nut(s) 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.

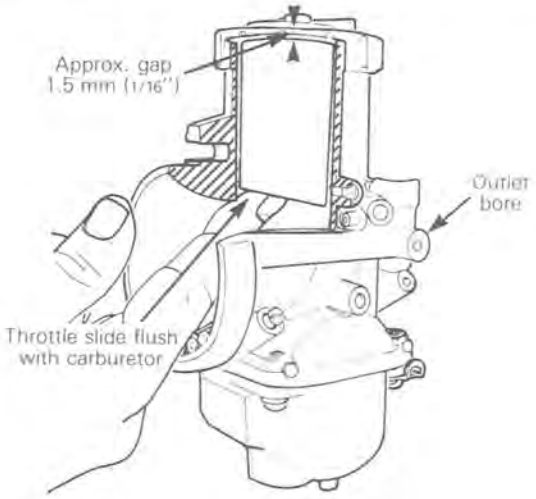
Tighten the cable adjuster jam nut(s).

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(s) adjustment be performed to ensure proper functioning of throttle mechanism.

Once carburetor(s) 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(s). Readjust accordingly.



◆ WARNING: This gap is very important. If the throttle slide(s) rests against the carburetor cover(s) at full throttle opening, this will create too much strain and may damage the throttle cable.

Recheck carburetor(s) synchronization.

▼ CAUTION: On oil injection models, the oil injection pump adjustment must be checked each time carburetor is adjusted.

⑲ Idle speed 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 up then adjust idle speed to specifications by turning idle speed screw clockwise or counter-clockwise.

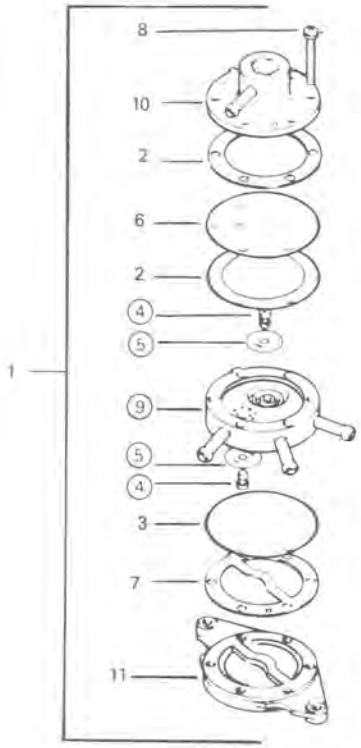
(Refer to Section 09 "Technical Data" for the specifications).

▼ CAUTION: Do not attempt to set the idle speed by using the air screw. Severe engine damage can occur.

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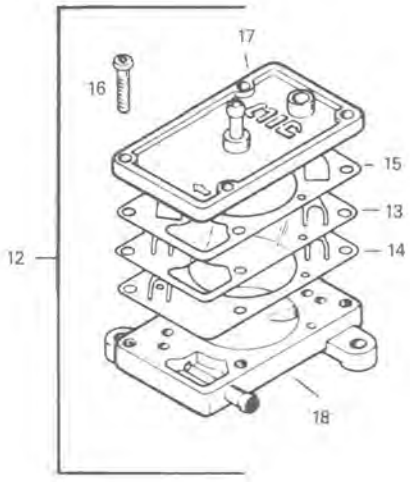
MIKUNI FUEL PUMP

FIG. (A)



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*

FIG (B)



ONE OUTLET PUMP

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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(s).
– Remove nuts and bolts securing fuel pump.

FIG. (A)

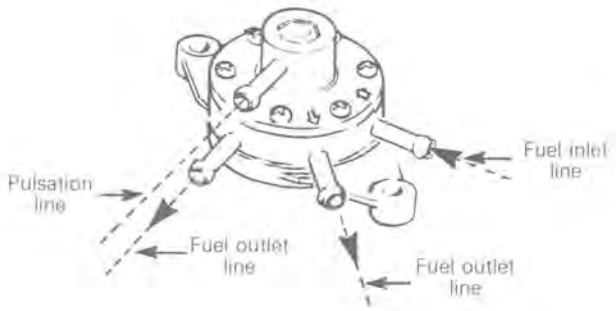
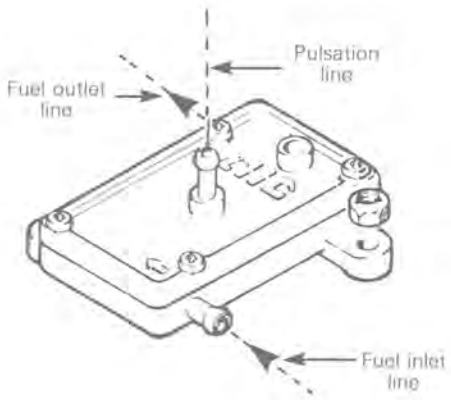


FIG (B)

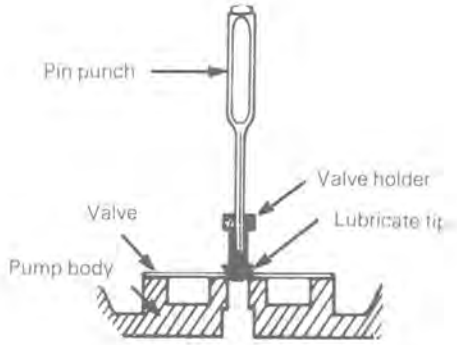


DISASSEMBLY & ASSEMBLY

④ ⑤ ⑨ 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 carburetor 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.

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AIR INTAKE SILENCER AND FUEL TANK

(ALL MODELS)

DISASSEMBLY & ASSEMBLY

NOTE: For additional information (ex: exploded view, fuel line(s) dimension, etc.) refer to the correspondent parts catalogue.

Always reposition hose retaining spring clips after any repair to prevent possible leaks.

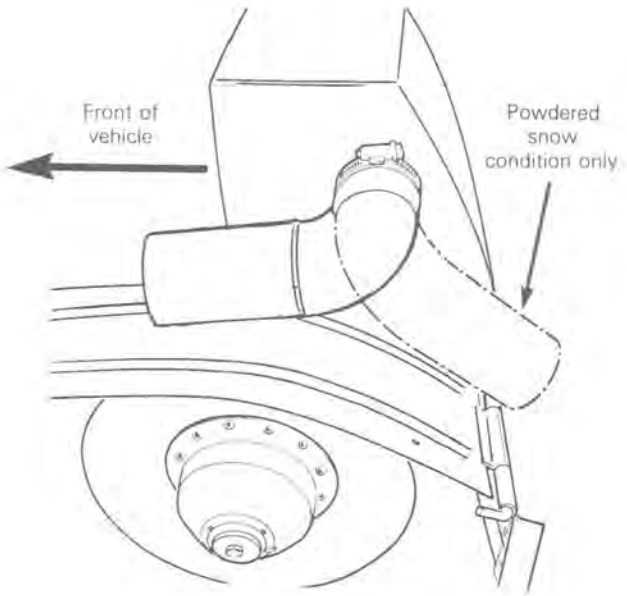
AIR SILENCER

CAUTION: Never operate your snowmobile with the air intake silencer disconnected. Serious engine damage will occur if this notice is disregarded.

Everest models

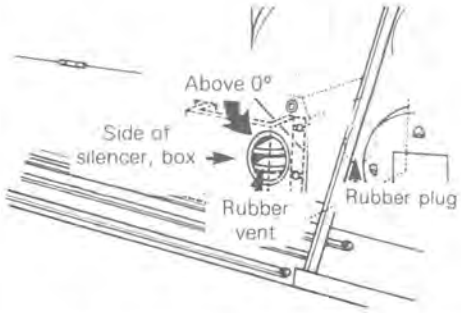
The air intake silencer elbow must always be turned to the front of the vehicle when operated in cold, warm temperature.

If the vehicle is to be operated in deep powdered snow it is recommended to turn the elbow towards the rear of the vehicle.



Alpine model

When operating the vehicle in temperature exceeding 0°C (32°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 temperatures below 0°C (32°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.

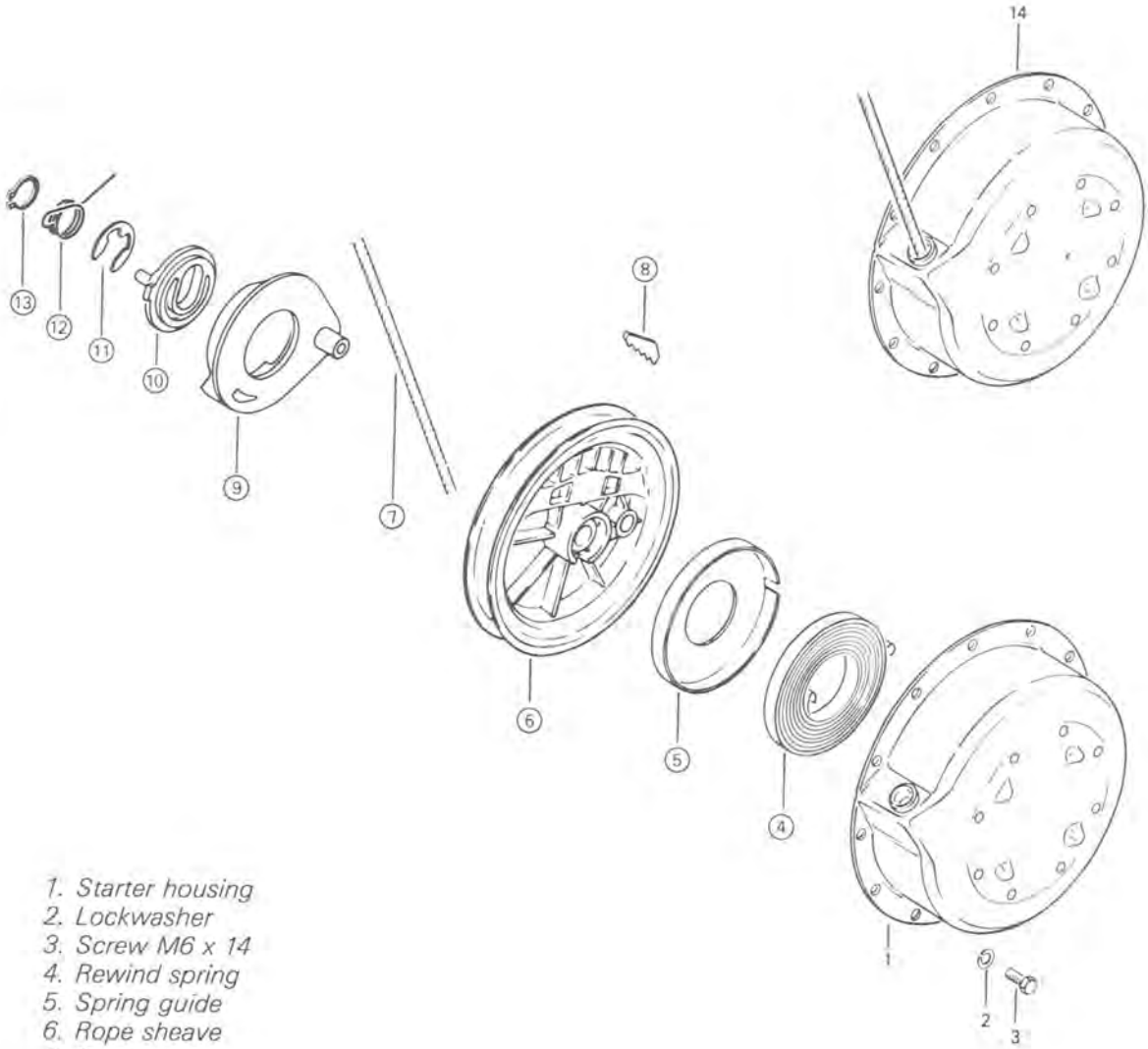
CAUTION: Observe temperature changes and locate plugs accordingly. Incorrect location of plugs may cause carburetor ice-up or engine overheating.

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REWIND STARTER

(All models)



1. Starter housing
2. Lockwasher
3. Screw M6 x 14
4. Rewind spring
5. Spring guide
6. Rope sheave
7. Starter rope
8. Key
9. Pawl
10. Pawl lock
11. Circlip
12. Lock spring
13. Lock ring
14. Starter ass'y

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PULLEY GUARD

DISASSEMBLY AND ASSEMBLY

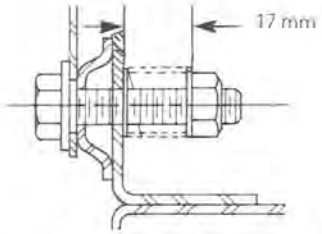
NOTE: For additional information (ex.: exploded view) refer to the 1983 correspondent parts catalogue.

WARNING: Engine should be running only when belt guard and/or pulley guard are well secured in place.

Elan, Spirit and Alpine models

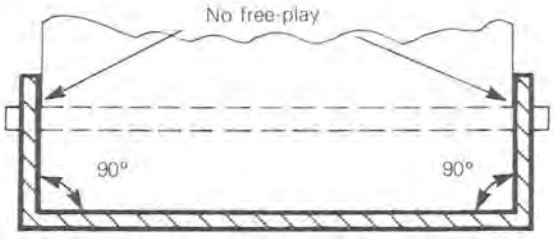
The length of the uncompressed retaining pin spring should not be less than 47 mm (1 7/8").

An uncompressed front guard spring should not be less than 20 mm (13/16"). When assembling adjust length to 17 mm (11/16").



Check condition of any retaining coil pin. 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.

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DRIVE BELT

APPLICATION CHART (1983 MODELS)

MODEL	NUMBER	MAX. WIDTH (NEW)	MIN. WIDTH (WEAR LIMIT)
ELAN SPIRIT	570 0411 00	30 mm (1 3/16")	27 mm (1 1/16")
CITATION 3500 CITATION 4500/E MIRAGE II CITATION SS NORDIK SKANDIC 277/377 EVEREST 500/E EVEREST L/C BLIZZARD 5500 MX ALPINE 503	414 3758 00	33.3 mm (1 5/16")	30 mm (1 3/16")
BLIZZARD 9700	414 5059 00	35 mm (1 3/8")	32 mm (1 1/4")

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ROTATION DIRECTION

The maximum drive belt life span is obtained when the belt has the proper rotation direction.

CORRECT



Identification

STANDING FACE TO PULLEYS

INCORRECT



Identification

STANDING FACE TO PULLEYS

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.

For **Citation, Mirage, Nordik and Skandic** models, to remove belt from pulleys and vehicle:

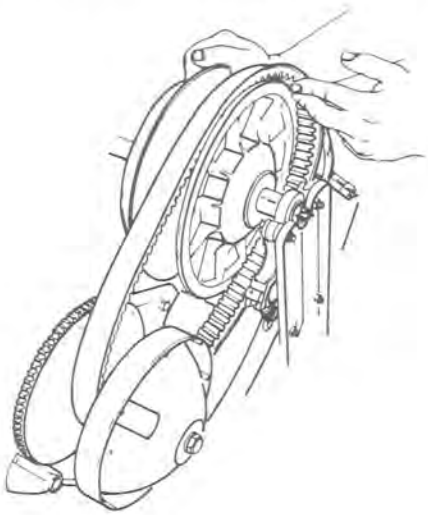
– Loosen the countershaft bearing retaining screw and open the bearing cage.



– Open the driven pulley by twisting and pushing the sliding half. Hold in fully open position.

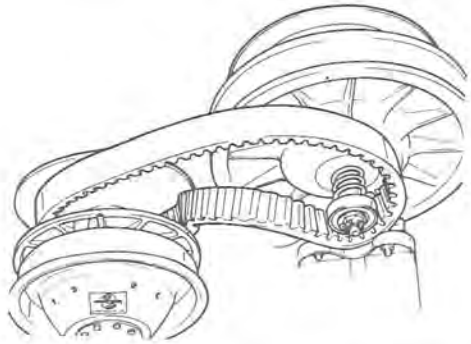


– Slip the belt over the top edge of the sliding half.



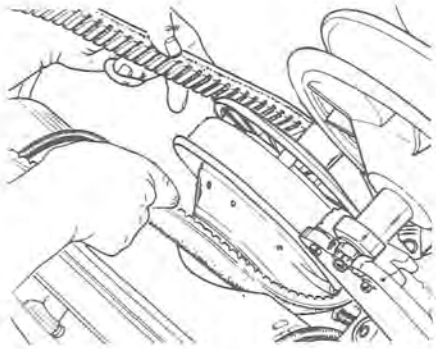
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– Lift the countershaft upward approx. 50 mm (2 in.) and slip the belt between the shaft and the bearing cage to remove completely.

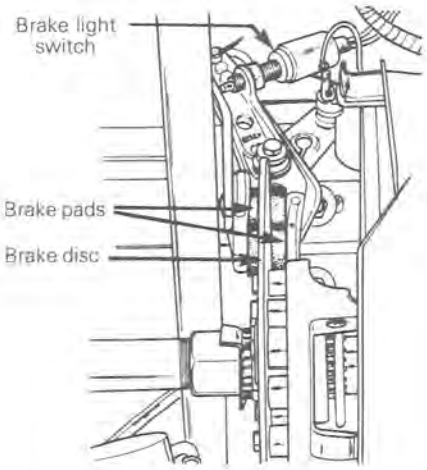


NOTE: It may be necessary to loosen the brake adjustment in order to easily lift the countershaft.

– 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.

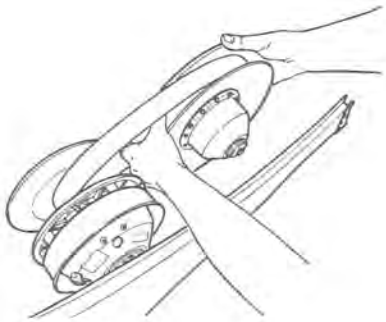


– To install the drive belt, reverse the procedure.

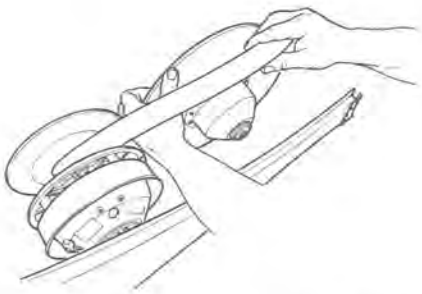
CAUTION: Once belt is installed, be sure to secure the countershaft bearing by closing the bearing cage and firmly tightening the retaining screw.

For **Elan, Spirit, Everest, Blizzard 5500 MX and Blizzard 9700** to remove belt from pulleys and vehicle:

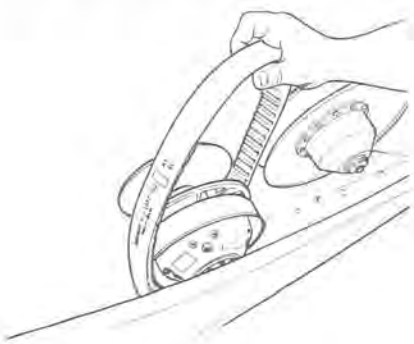
– Open the driven pulley by twisting and pushing the sliding half. Hold in fully open position.



– Slip the belt over the top edge of the sliding half.



– Slip the belt out from the drive pulley and remove completely from the vehicle.



– To install the drive belt reverse procedure.

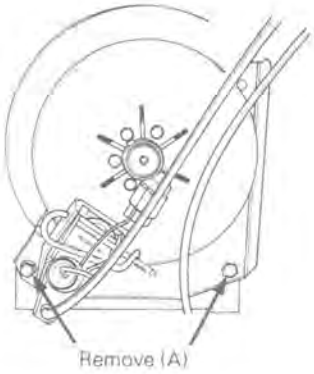
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For **Alpine** model:

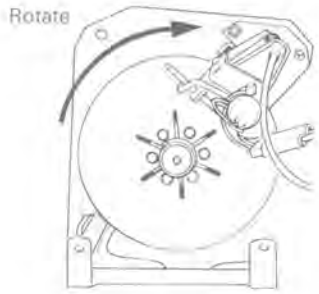
– To remove belt from pulleys, follow the Elan procedure.

– To remove belt from vehicle:

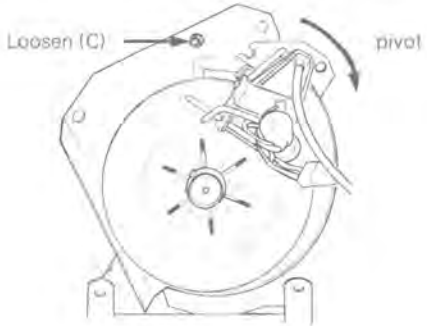
A) Remove the two bolts holding brake support to the frame.



B) Rotate the brake support on the transmission shaft.



C) Loosen the nut holding the brake caliper to brake bracket and pivot the brake assembly half a turn.



D) 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.

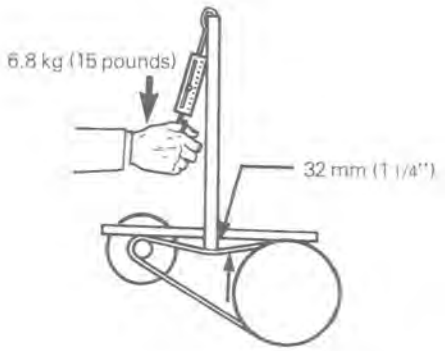
Before checking the belt deflection, ensure vehicle has its proper belt number and correct belt width. (Refer to the application chart, at the beginning of this subsection.)

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").

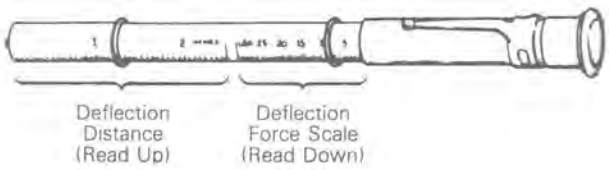
To check tension

– Position a reference rule on drive belt.

– Using a wooden stick and fish scale, apply a 6.8 kg (15 pounds) pressure on drive belt. Deflection must be 32 mm (1 1/4").

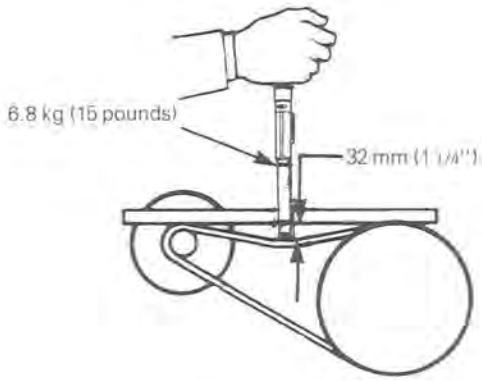


– Using the belt tension tester P/N 414 3482 00 (service tool).



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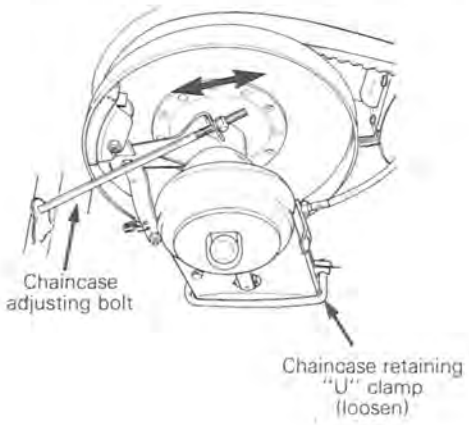
1. Slide lower "O" ring of deflection distance scale to 32 mm (1 1/4").
2. Slide upper "O" ring to zero pound on the deflection force scale.
3. Apply pressure until lower "O" ring is flush with edge of rule.
4. Read deflection force on the upper scale (at top edge of "O" ring). Reading of 6.8 kg (15 pounds) should be obtained.



DEFLECTION ADJUSTMENT

Elan model: adjust deflection by moving chaincase.

To do so, loosen the chaincase retaining "U" clamp and screw or unscrew the chaincase adjusting bolt.



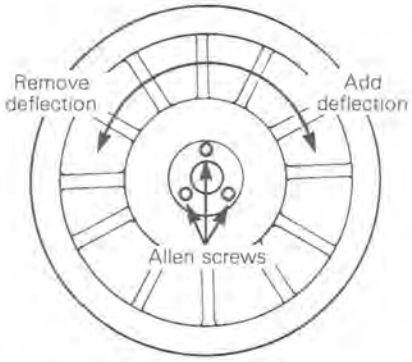
Citation/Mirage, Nordik/Skandic, Everest/Blizzard models:

The drive belt deflection can be adjusted using the three (3) Allen screws located to the outer face of the driven (fixed half) pulley.

To add deflection, equally screw the three Allen screws.

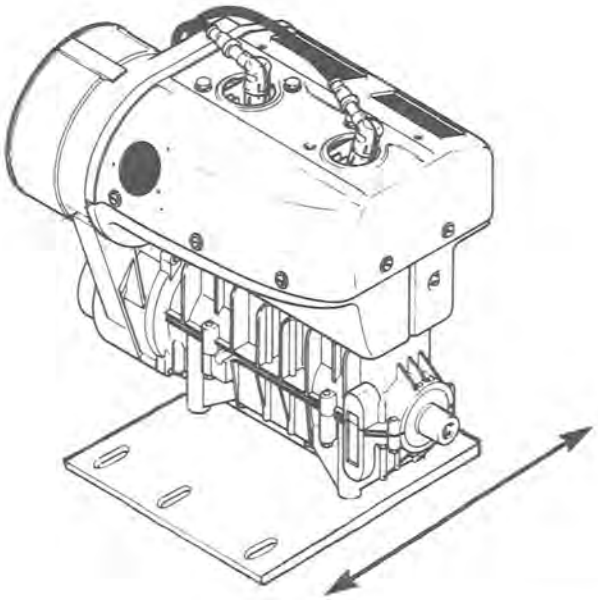
To remove deflection, equally unscrew the three Allen screws.

NOTE: At drive belt deflection adjustment, turn the Allen screws 1/4 turn at a time.



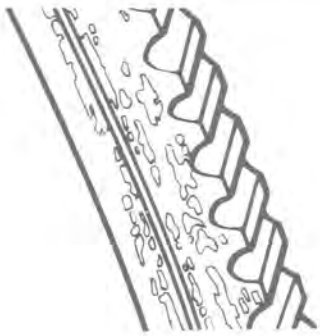
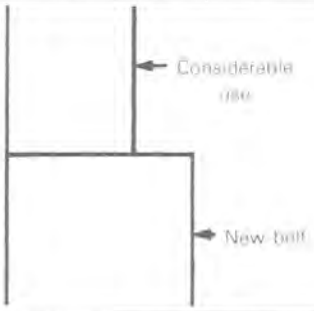
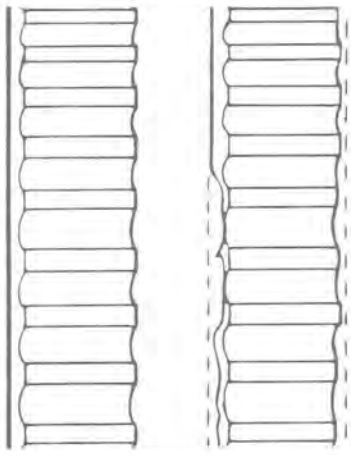
Alpine model: adjust deflection by moving engine bracket.

To do so, loosen engine bracket nuts and adjust distance between pulleys.

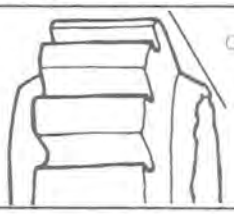
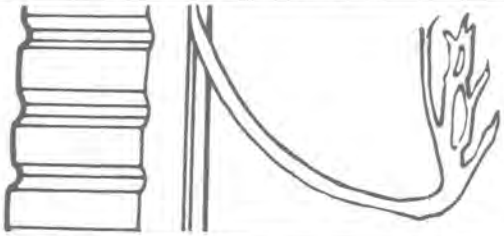
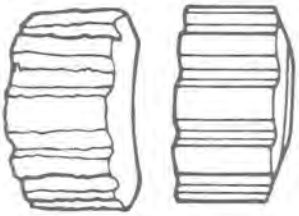
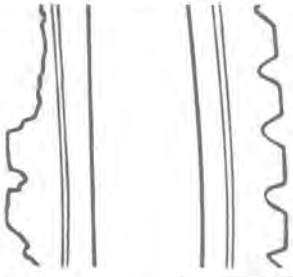


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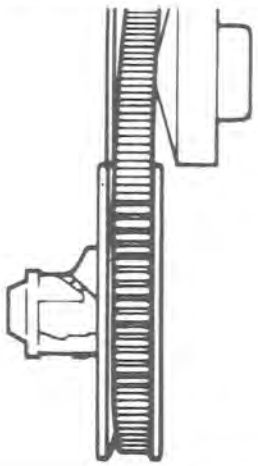
TROUBLE SHOOTING

1. Uneven belt wear on one side only.		
	CAUSE a) Loose engine mount b) Pulley misalignment c) Rough or scratched pulley surfaces	REMEDY a) Tighten engine mount nuts equally b) Align pulleys c) Repair or replace pulley half
2. Belt glazed excessively or having baked appearance.		
	CAUSE Excessive slippage caused by a) Insufficient pressure on belt sides b) Rusted drive or driven pulley shafts c) Oil on pulley surfaces d) Incorrect centrifugal governor	REMEDY 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.		
	CAUSE 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	REMEDY 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 ($\frac{1}{8}$'') less than recommended width (see Technical Data)
4. Belt worn narrow in one section.		
	CAUSE Excessive slippage in drive pulley caused by 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	REMEDY a) Liberate track from ice or check track tension and alignment. b) Repair or replace drive pulley c) Reduce engine RPM d) Using unspecified type of belt. Replace belt with correct Bombardier belt e) Readjust to specifications

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5. Belt sides worn concave.		
	CAUSE a) Rough or scratched pulley surfaces b) Unspecified type of belt	REMEDY a) Repair or replace b) Replace belt with correct Bombardier belt
6. Belt desintegration.		
	CAUSE a) Excessive belt speed b) Oil on pulley surfaces	REMEDY 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.		
	CAUSE a) Pulley misalignment	REMEDY a) Align pulleys
8. Flex cracks between cogs.		
	CAUSE a) Considerable use, belt wearing out	REMEDY a) Replace belt
9. Sheared cogs, compression section fracture or torn.		
	CAUSE a) Improper belt installation b) Belt rubbing stationary object on pulleys c) Violent engagement of drive pulley	REMEDY a) Refer to Installation section. b) Check drive components c) Grease, replace spring or drive pulley

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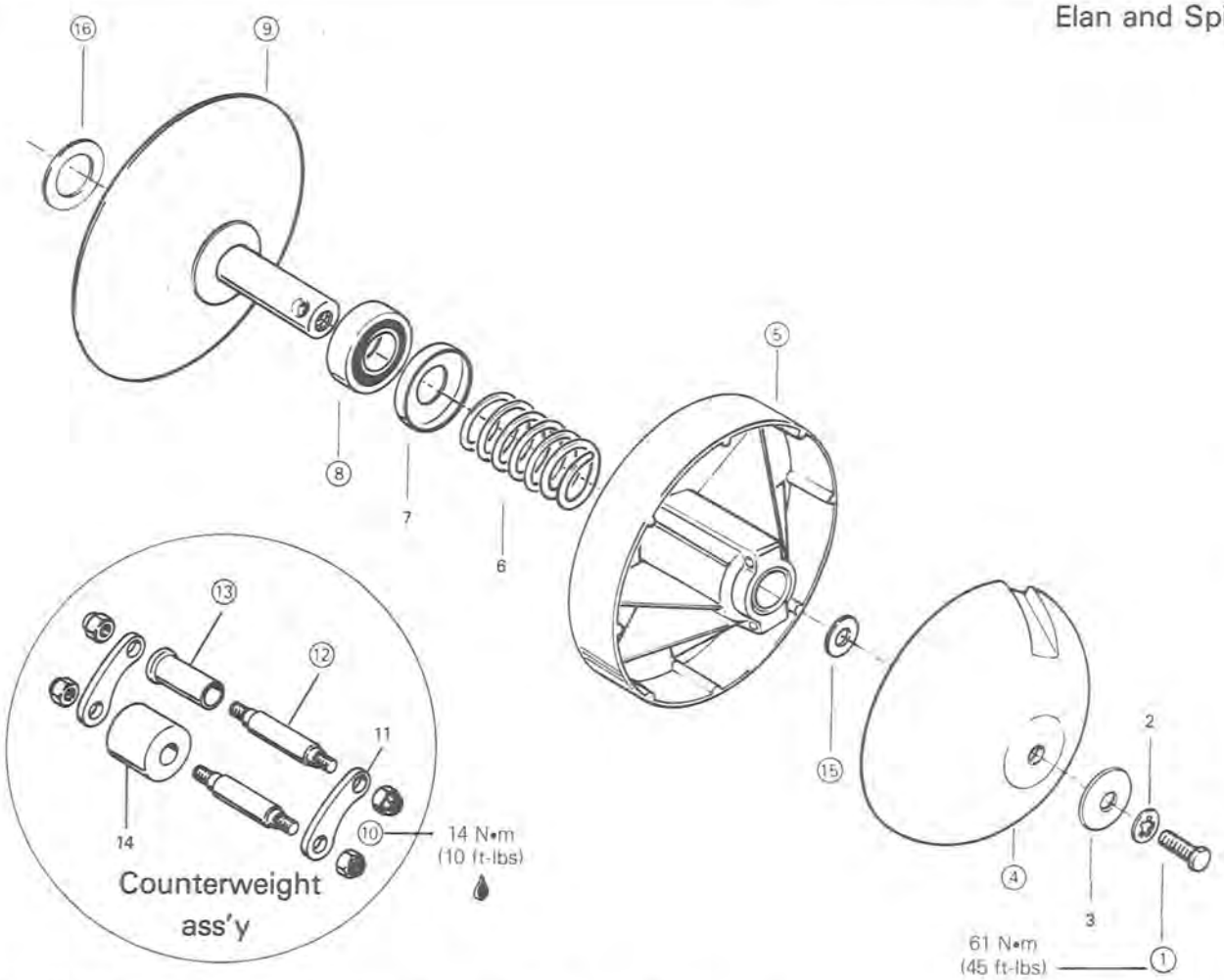
10. Belt "Flip-Over" at high speed.		
	CAUSE a) Pulley misalignment. b) Using unspecified type of belt.	REMEDY a) Align pulleys. b) Replace belt with correct Bombardier belt.

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DRIVE PULLEY

ROLLER ROUND SHAFT TYPE

Elan and Spirit



◆ WARNING: Drive pulley repairs that include any dissassembly 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.

1. *Capscrew*
2. *Lockwasher*
3. *Washer*
4. *Governor cup*
5. *Outer half*
6. *Spring*
7. *Spring seat*
8. *Bearing*
9. *Inner half*
10. *Nut "Loctite 242"*
11. *Counterweight*
12. *Shouldered pin*
13. *Bushing*
14. *Roller*
15. *Shim*
16. *Shim*

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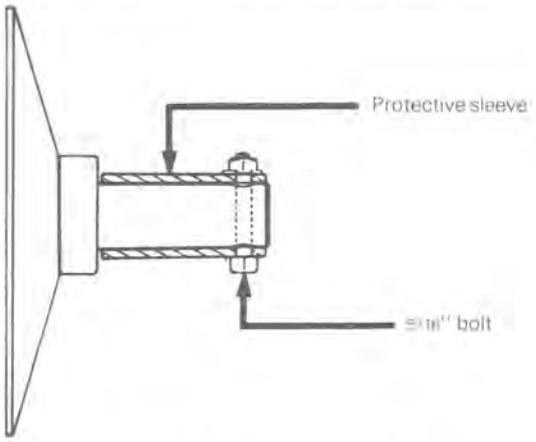
REMOVAL

① ⑨ 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.

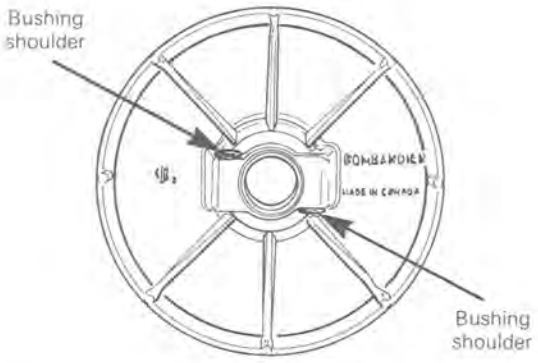
If it is necessary to remove the inner half, slide a length of steel pipe over shaft. Attach with a 5/16" nut and bolt, as illustrated. The inner half can then be removed with a pipe wrench. (Uncrew counterclockwise.)



DISASSEMBLY & ASSEMBLY

① At assembly, torque bolt to 61 N•m (45 ft-lbs).

⑤ ⑬ Shouldered pin bushings must be installed in outer half as per illustration.



⑩ ⑫ Apply Loctite 242 or equivalent on threads then torque nuts to 14 N•m (10 ft-lbs).

CAUTION: Do not disassemble counterweights unless replacement is necessary.

⑮ Use as required, maximum of two (2). Used to obtain a neutral function of the drive pulley when engine is idling: refer to INSTALLATION.

⑯ Used to obtain correct pulley alignment, refer to section 03-05.

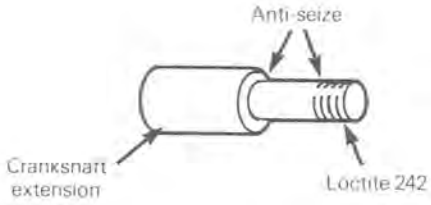
CLEANING

Clean pulley faces and shaft with fine steel wool and dry cloth. Clean outer half bushing with clean dry cloth.

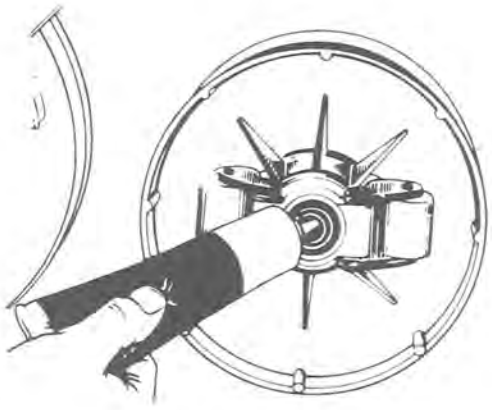
INSTALLATION

Lock crankshaft in position as explained in removal procedure. Make sure crankshaft is rotated 45° **counterclockwise** 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.



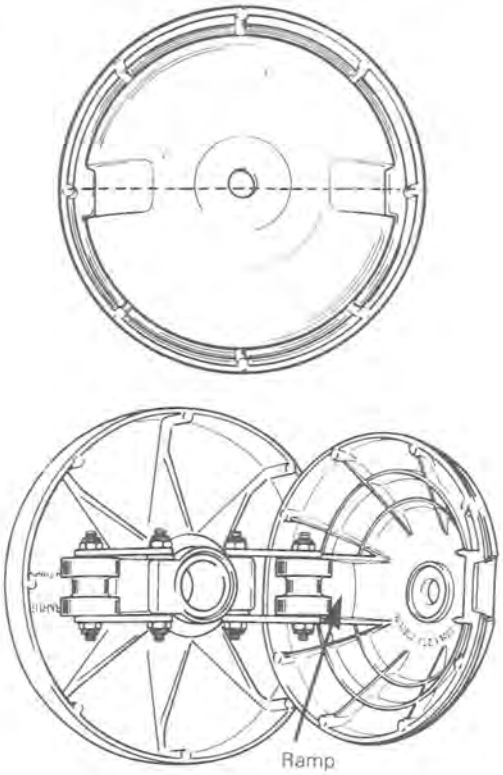
Pack inside of pulley shaft with High Performance Drive Pulley Lubricant P/N 413 800 700.



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④ Install governor cup correctly as per illustration making sure that the rollers are sliding on their ramp.

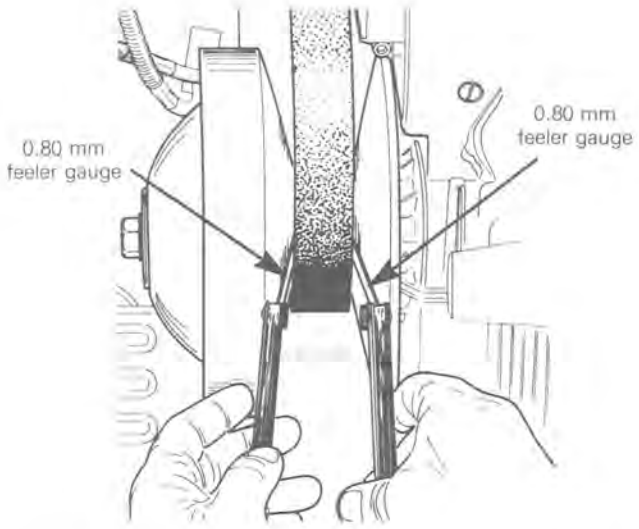
▼ CAUTION: Ensure rollers are in good condition. Replace as required.



Position the capscrew then lube torque to 61 N•m (45 ft-lbs).

◆ WARNING: Shim(s) ⑮ 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 bearing.



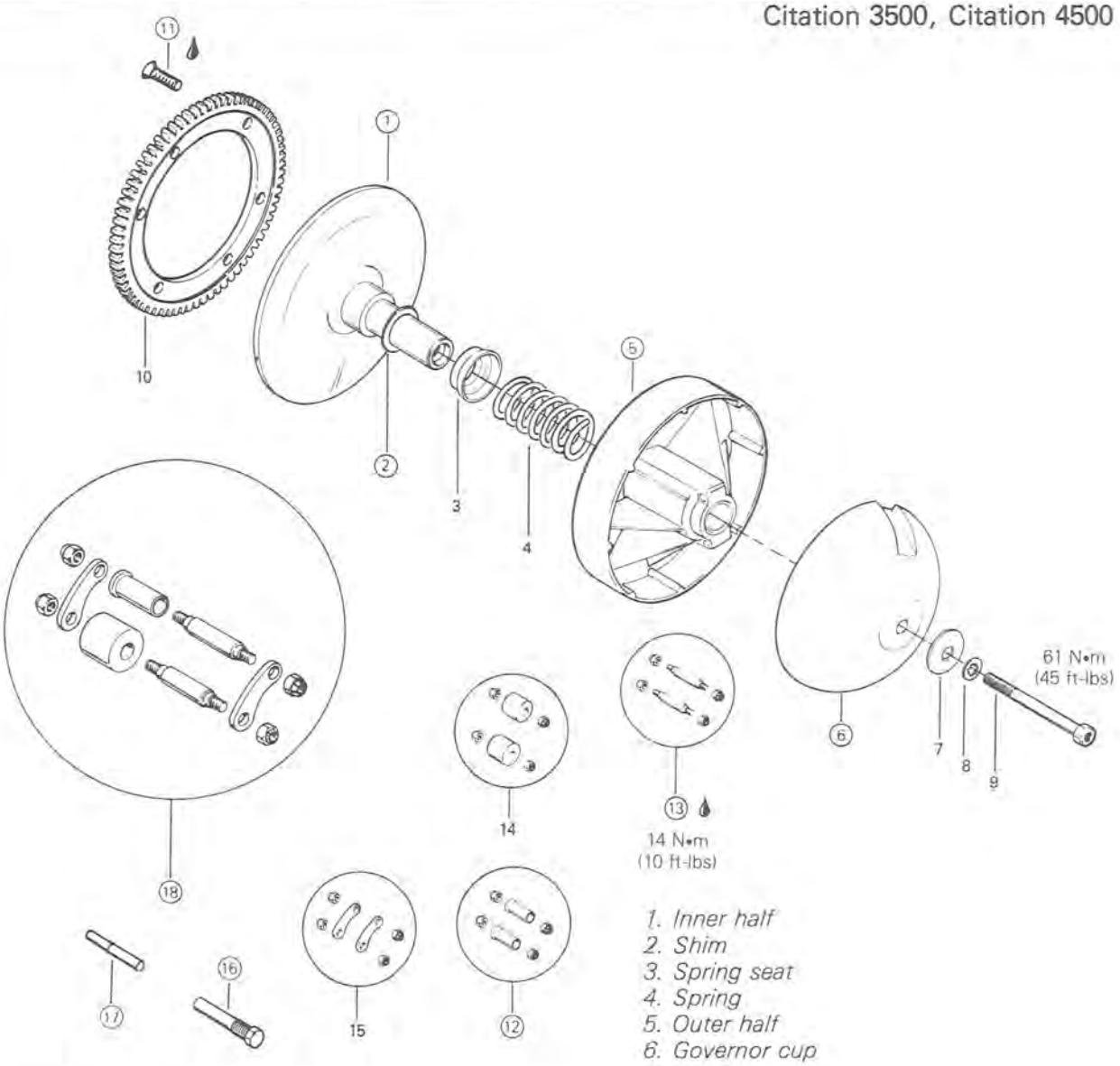
Shim ⑮ located between governor cup and drive pulley shaft will help you to obtain correct adjustment. Do not use more than two (2) shims.

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ROUND SHAFT (TAPER) TYPE

Citation 3500, Citation 4500 E



1. *Inner half*
2. *Shim*
3. *Spring seat*
4. *Spring*
5. *Outer half*
6. *Governor cup*
7. *Washer*
8. *Lockwasher*
9. *Cap screw*
10. *Starter gear (electric model)*
11. *Screw 6 "Loctite 271"*
12. *Bushing kit*
13. *Shouldered pin ass'y "Loctite 242"*
14. *Roller ass'y*
15. *Lever ass'y*
16. *Puller (P/N 529 002 800)*
17. *Puller pin (P/N 529 003 000)*
18. *Center weight ass'y*

◆ WARNING: Drive pulley repairs that include any dissassembly 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.

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▼ CAUTION: These models are equipped with drive pulleys of METRIC dimensions.

REMOVAL:

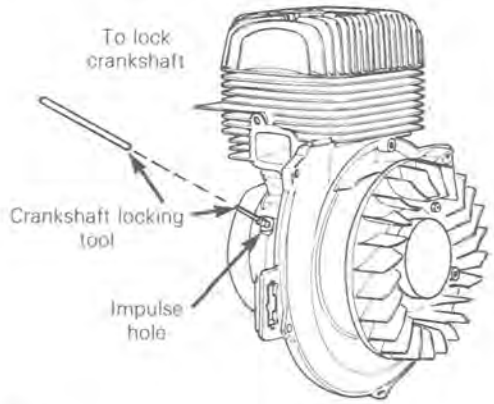
To remove drive pulley, proceed as follows:

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.

⑯ ⑰ If it is necessary to remove inner half, use drive pulley puller no. 529 002 800, 529 003 000.

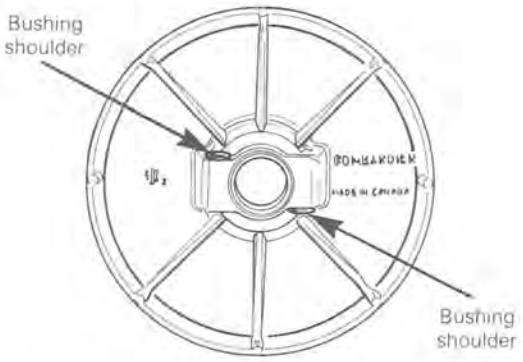
▼ CAUTION: This pulley has metric threads. Do not use standard thread puller.

Remove starter rope blocking piston, then reblock piston after having turned 45° **counter-clockwise** from T.D.C. position; or install crankshaft locking tool.

Install puller in pulley shaft then tighten, at the same time knock slightly on puller head to disengage pulley from engine crankshaft.

DISASSEMBLY & ASSEMBLY

⑫ Shouldered pin bushings must be installed in outer half as per illustration.



⑬ ⑱ Apply Loctite 242 or equivalent on threads then torque nuts to 14 N•m (10 ft-lbs).

▼ CAUTION: Do not disassemble counterweights unless replacement is necessary.

⑪ Apply "Loctite 271" or equivalent on threads then torque the screws to 14 N•m (10 ft-lbs) or tighten with an impact screwdriver.

CLEANING

Clean pulley faces and shaft with fine steel wool and dry cloth. Clean outer half bushing with clean dry cloth.

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.

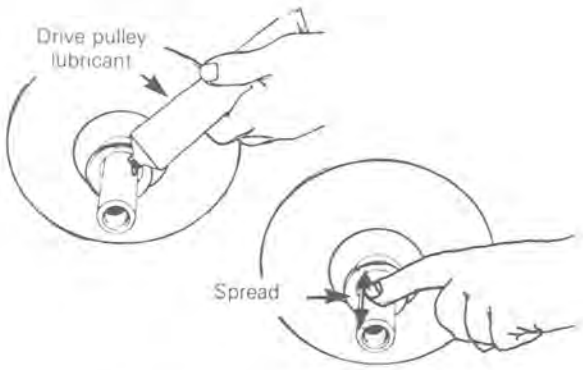
▼ CAUTION: Avoid contact between crankshaft seal and acetone because damage may occur.

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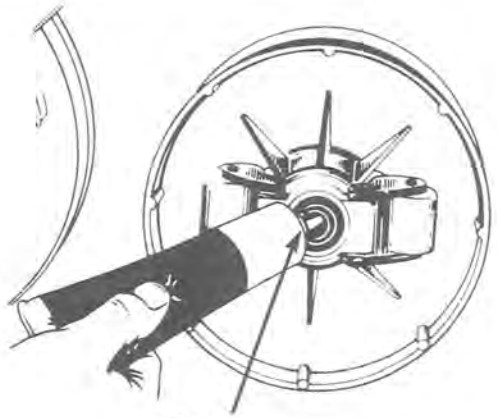
INSTALLATION

Lock crankshaft in position as explained in removal procedure. Make sure crankshaft is rotated 45° **counterclockwise** from T.D.C. position and that cylinder is completely filled with a starter rope.

① Lubricate lightly pulley shaft with drive pulley lubricant P/N 413 800 700.

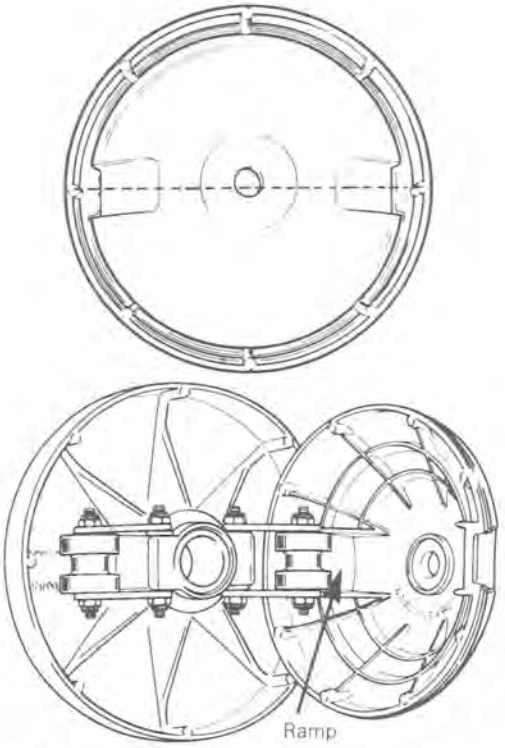


⑤ Pack inside of pulley shaft with drive pulley lubricant P/N 413 800 700.



⑥ Install governor cup correctly as per illustration making sure that the rollers are sliding on their ramp.

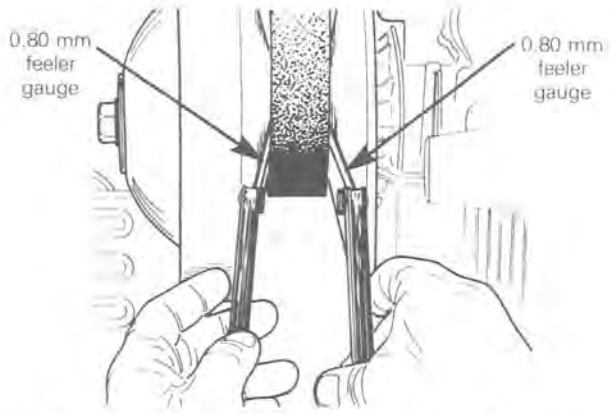
▼ CAUTION: Ensure rollers are in good condition. Replace as required.



Position the capscrew then lube and torque to 61 N•m (45 ft-lbs).

◆ WARNING: Shim(s) ② 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 bearing.



Shim ② located between governor cup and drive pulley shaft will help you to obtain correct adjustment. Do not use more then two (2) shims.

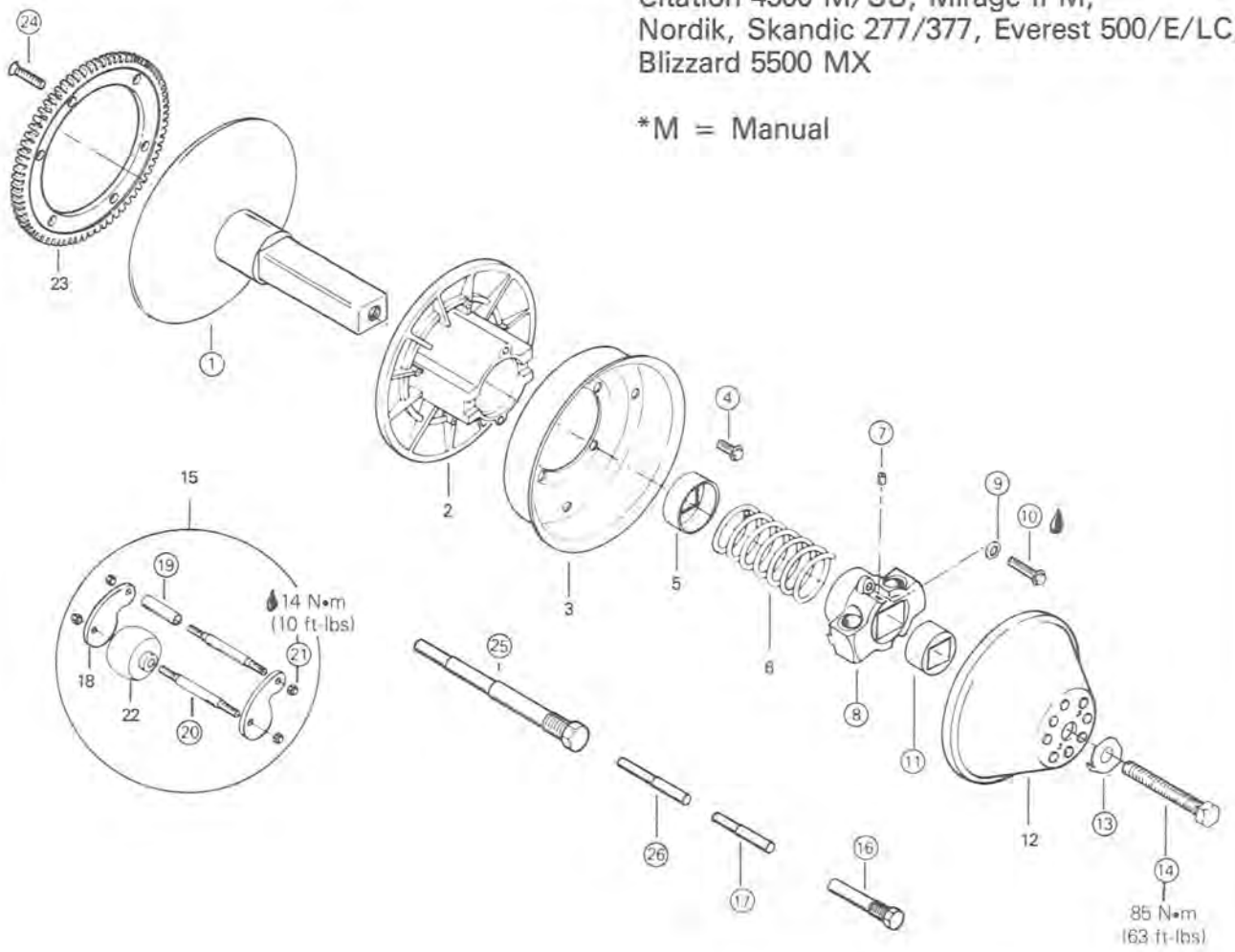
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ROLLER SQUARE SHAFT WITH DURALON BUSHING

Citation 4500 M/SS, Mirage II M,
Nordik, Skandic 277/377, Everest 500/E/LC,
Blizzard 5500 MX

*M = Manual



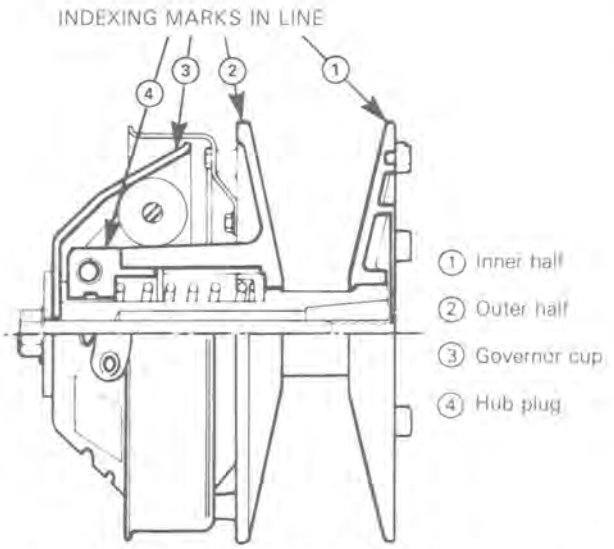
1. *Inner half*
2. *Outer half*
3. *Guard*
4. *Bolt*
5. *Spring seat*
6. *Spring*
7. *Allen screw*
8. *Hub plug*
9. *Internal tooth lockwasher*
10. *Bolt "Loctite 242"*
11. *"Duralon" bushing*
12. *Governor cup*
13. *Lock tab*
14. *Capscrew*
15. *Counterweight ass'y*
16. *Puller P/N 529 002 800*
17. *Puller pin P/N 529 003 000*
18. *Counterweight*
19. *Bushing*
20. *Shouldered pin*
21. *Nut "Loctite 242"*
22. *Roller*
23. *Starter gear (electric models)*
24. *Self locking screw "Loctite 271"*
25. *Puller P/N 529 002 100*
26. *Puller pin P/N 529 004 800*

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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. If components lack such marks, marking should be done manually before disassembly, as per illustration.



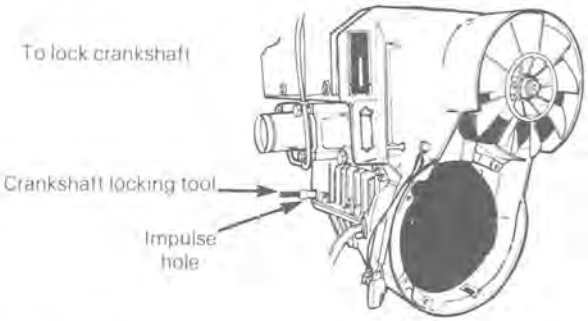
To remove drive pulley, proceed as follows:

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

If it is necessary to remove inner half, proceed as follows:

⑯ ⑰ On models Citation 4500 M/SS, Mirage II/M, Nordik use metric threads puller (P/N 529 002 800 & P/N 529 003 000).

⑯ ㉖ On Skandic models use metric threads puller (P/N 529 002 800 & 529 004 800).

CAUTION: This pulley has metric threads. Do not use standard threads puller.

㉕ On other models use a standard thread puller (P/N 529 002 100).

Remove starter rope blocking piston, then reblock piston after having turned 45° counter-clockwise from T.D.C. position; or install crankshaft locking tool.

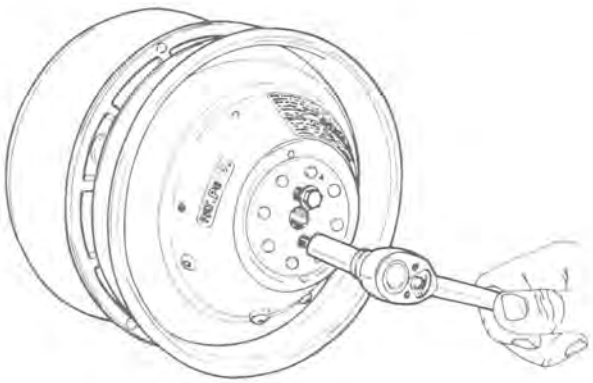
Install puller in pulley shaft then tighten, at the same time knock slightly on puller head to disengage pulley from engine crankshaft.

DISASSEMBLY & ASSEMBLY

Remove outer half assembly and governor cup.

CAUTION: Do not tap on the governor cup.

The governor cup can be easily removed by inserting two (2) 1/4" x 1" NC bolts and tightening alternately until cup pulls out.



Some bolts of the drive pulley having "Loctite" on their threads, it is advisable to use a tool such as an impact to break the "Loctite" seal before attempting to unscrew.

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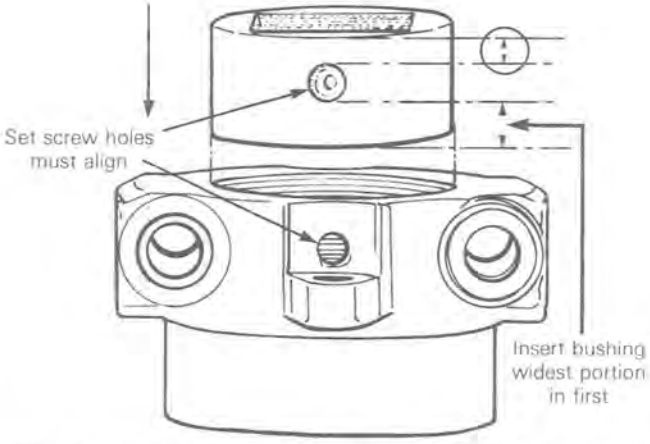
④ Torque to 7 N•m (5 ft-lbs).

⑦ Apply "Loctite 242" on threads then screw in until head is **flush** with hub plug. Do not allow head to bite into hub plug.

⑧ ⑨ ⑩ 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. At assembly, apply "Loctite 242" on threads of bolts then torque to 16 N•m (12 ft-lbs).

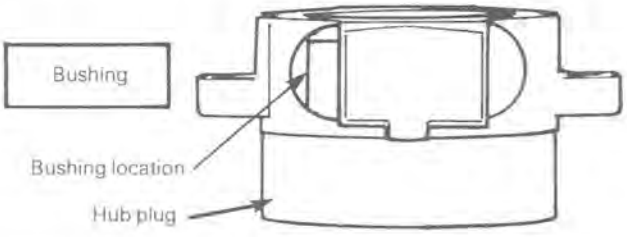
㉔ Apply "Loctite 271" or equivalent on threads then torque the screws to 14 N•m (10 ft-lbs) or tighten with an impact screwdriver.

⑪ To install or remove "Duralon" bushing from hub plug, use suitable pusher and hammer or press. Install bushing as per illustration.



▼ **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.**

⑲ ⑧ Install shouldered pin bushing as shown.



⑳ ㉑ Apply "Loctite 242" on threads and torque to 14 N•m (10 ft-lbs).

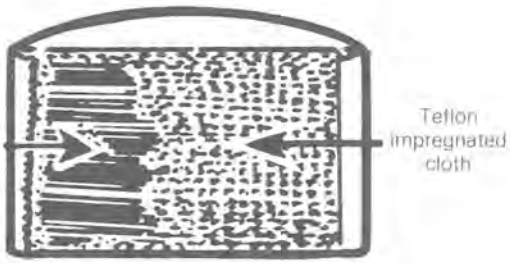
▼ **CAUTION: Do not disassemble counterweights unless replacement is necessary.**

INSPECTION & CLEANING

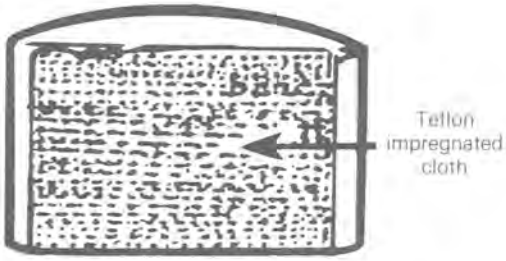
Drive pulley should be inspected annually.

Check general condition of pulley and inspect "Duralon" bushing faces, as per illustrations.

GOOD



GOOD



WORN (must be changed)



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.

▼ CAUTION: Ensure rollers are in good condition. Replace as required.

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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.

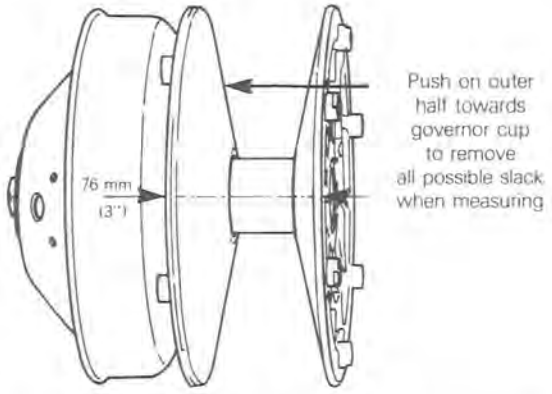
Lock crankshaft in position as explained in removal procedure. Make sure crankshaft is rotated 45° **counterclockwise** from T.D.C. position and that cylinder is completely filled with a starter rope or use crankshaft locking tool.

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.

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).

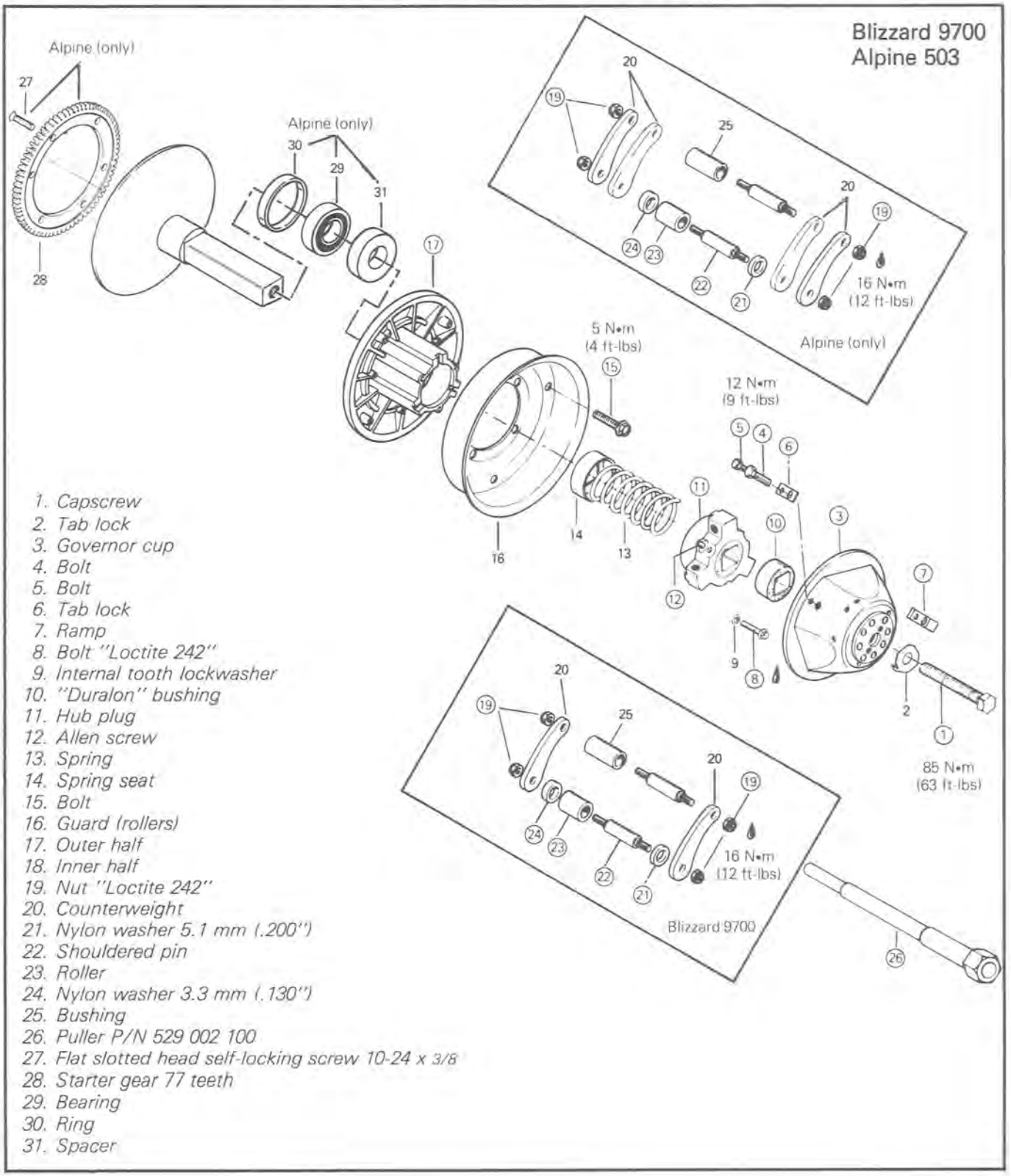
CAUTION: Incorrect seating of shaft end in governor cup can cause crankshaft bending. When pulley is completely assembled always measure distance of both pulley halves to make sure that the pulley is properly installed. Distance must be 76 mm (3").



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.

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SQUARE SHAFT WITH THREE COUNTERWEIGHT ASSEMBLIES



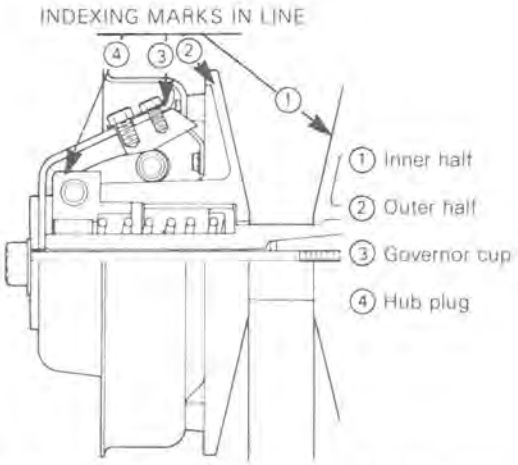
1. *Capscrew*
2. *Tab lock*
3. *Governor cup*
4. *Bolt*
5. *Bolt*
6. *Tab lock*
7. *Ramp*
8. *Bolt "Loctite 242"*
9. *Internal tooth lockwasher*
10. *"Duralon" bushing*
11. *Hub plug*
12. *Allen screw*
13. *Spring*
14. *Spring seat*
15. *Bolt*
16. *Guard (rollers)*
17. *Outer half*
18. *Inner half*
19. *Nut "Loctite 242"*
20. *Counterweight*
21. *Nylon washer 5.1 mm (.200")*
22. *Shouldered pin*
23. *Roller*
24. *Nylon washer 3.3 mm (.130")*
25. *Bushing*
26. *Puller P/N 529 002 100*
27. *Flat slotted head self-locking screw 10-24 x 3/8*
28. *Starter gear 77 teeth*
29. *Bearing*
30. *Ring*
31. *Spacer*

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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. If components lack such marks, marking should be done manually before disassembly, as per illustration.

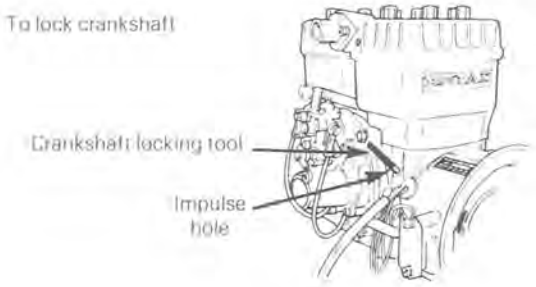


To remove drive pulley, proceed as follows:

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.

① Remove the capscrew.

㉖ If it is necessary to remove inner half, use drive pulley puller P/N 529 002 100.

CAUTION: This pulley has standard threads. Do not use metric threads puller.

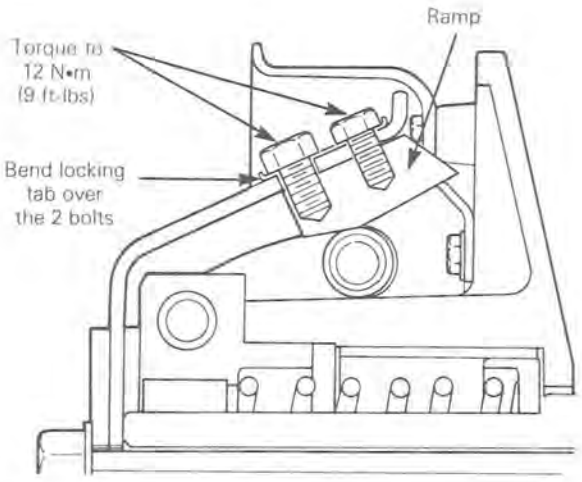
Remove starter rope blocking piston, then reblock piston after having turned 45° counter-clockwise from T.D.C. position; or install crankshaft locking tool.

Install puller in pulley shaft then tighten, at the same time knock slightly on puller head to disengage pulley from engine crankshaft.

DISASSEMBLY & ASSEMBLY

Some bolts of the drive pulley having "Loctite" on their threads, it is advisable to break the "Loctite" seal before attempting to unscrew.

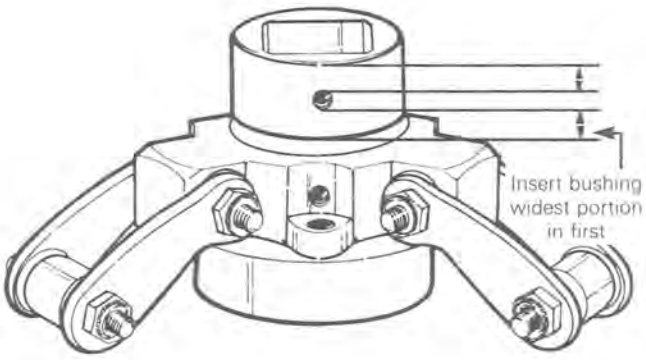
④ ⑤ ⑥ ⑦ Install ramps and torque bolts as per illustration.

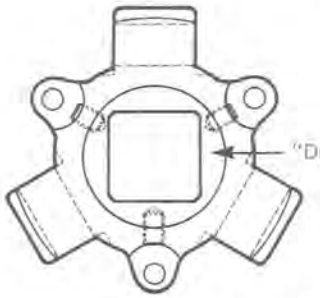


⑧ ⑪ ⑰ At disassembly, hold hub plug firmly against outer half until the three (3) bolts are completely removed. This will prevent damage of the outer half threads. At assembly, apply "Loctite 242" on threads of bolts then torque to 16 N•m (12 ft-lbs).

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⑩ ⑪ ⑫ To install or remove "Duralon" bushing from hub plug, use suitable pusher and hammer or press. Install bushing as per illustration.





Apply "Loctite 242" on threads, then tighten until screw slightly rests against bottom of "Duralon" bushing hole.

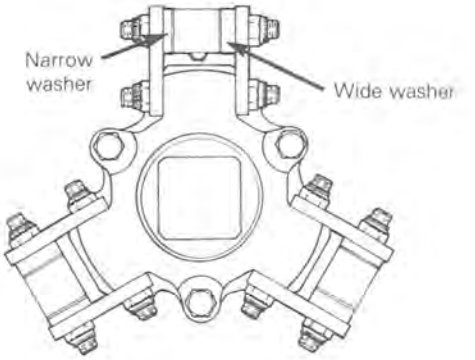
▼ CAUTION: Be careful when installing outer half assembly on square shaft of drive pulley to avoid scratches on "Duralon" bushing caused by square shaft edge.

⑮ Torque to 5 N•m (4 ft-lbs).

⑲ ㉒ At reassembly, apply "Loctite 242" on threads and torque to 16 N•m (12 ft-lbs).

▼ CAUTION: Do not disassemble counterweights unless replacement is necessary.

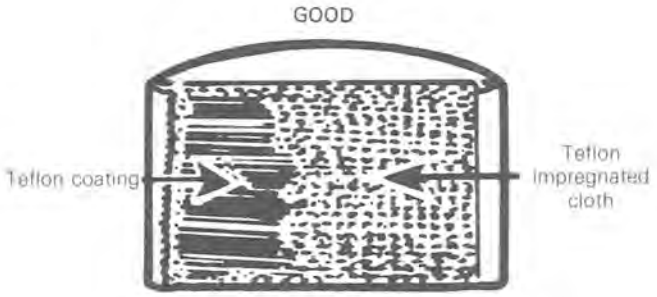
㉑ ㉓ ㉔ Rollers and nylon washers must move freely; install them as per illustration.

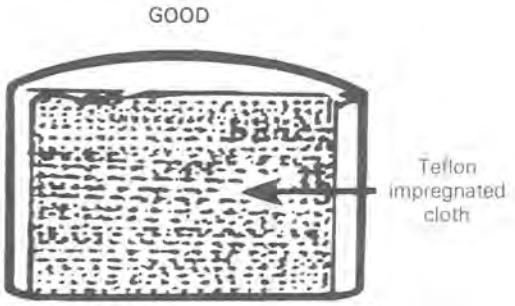


INSPECTION & CLEANING

Drive pulley should be inspected annually.

Check general condition of pulley and inspect "Duralon" bushing faces, as per illustrations.







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.

▼ CAUTION: Ensure rollers are in good condition. Replace as required.

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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.

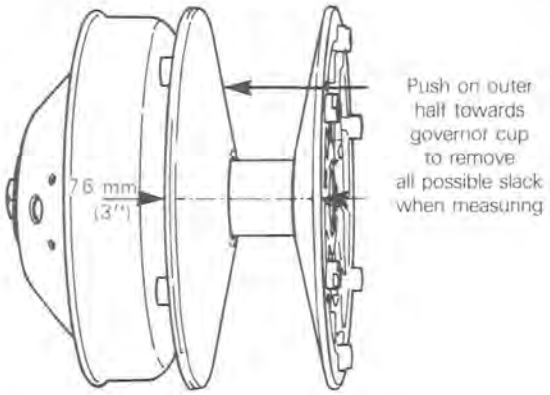
Lock crankshaft in position as explained in removal procedure. Make sure crankshaft is rotated 45° counterclockwise from T.D.C. position and that cylinder is completely filled with a starter rope or use crankshaft locking tool.

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.

①③ 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").

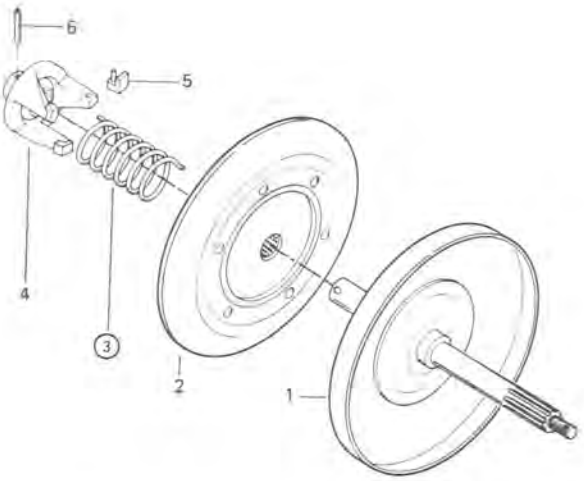


① Lift rear of vehicle off the ground. Install drive belt and pulley guard then start engine and apply throttle and brake, 2-3 times. Stop engine and retorque capscrew. Bend one side of locking tab over governor bolt.

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DRIVEN PULLEY

ELAN AND SPIRIT



1. *Fixed half*
2. *Sliding half*
3. *Release spring*
4. *Outer cam*
5. *Cam slider shoe*
6. *Roll pin*

REMOVAL

Remove pulley guard, drive belt and muffler.

Slacken steering column bolts.

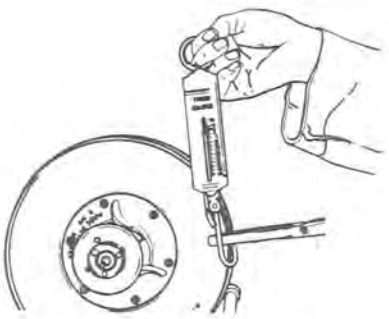
Release chain tension. Remove cotter pin and nut securing pulley drive shaft to chaincase.

NOTE: Attach to frame to prevent it falling inside of chaincase.

Pull driven pulley toward engine and remove from vehicle.

DISASSEMBLY & ASSEMBLY

③In order to measure driven pulley spring tension, 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 tension pre-load should be 3.6 kg (8 lbs).

To correct spring tension, either relocate spring end in sliding pulley half or gradually rotate outer cam.

INSTALLATION

With drive chain tension released, hold upper sprocket and chain in position then insert assembled driven pulley shaft through chaincase and sprocket.

Install spring washer and castellated nut.

Tighten castellated nut fully then back off nut 1/6 of a turn.

Lock in position with a new cotter pin.

CAUTION: It is important that nut is backed off or damage may occur due to a burnt or seized bearing.

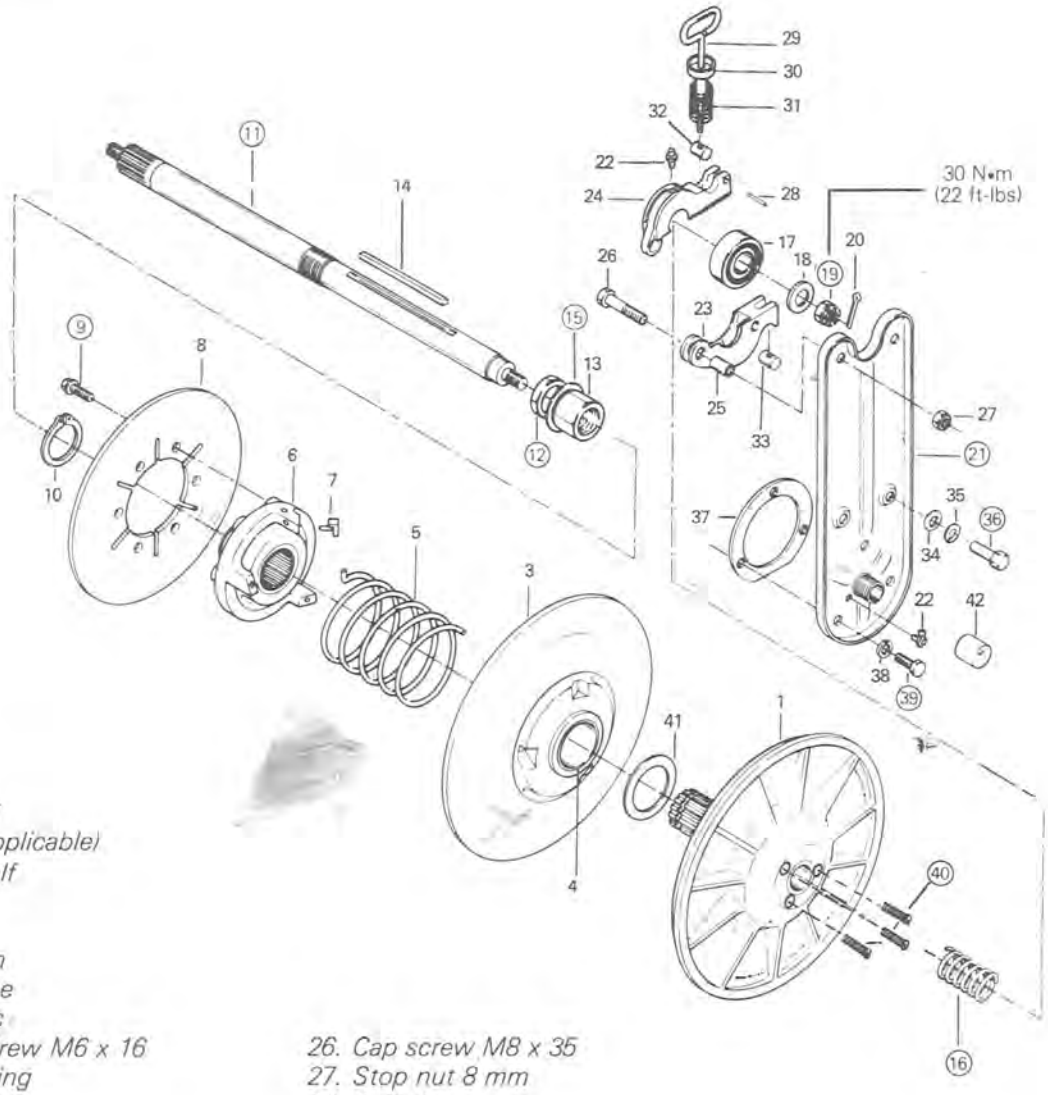
Apply chain tension.

Install muffler and tighten steering column bolts.

Install drive belt and pulley guard.

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CITATION, MIRAGE II, NORDIK, SKANDIC



1. Fixed half
2. Plug (if applicable)
3. Sliding half
4. Bushing
5. Spring
6. Outer cam
7. Slider shoe
8. Brake disc
9. Taptite screw M6 x 16
10. Retainer ring
11. Countershaft
12. Jam nut
13. Adjuster nut
14. Key
15. Tab lock
16. Spring
17. Bearing
18. Flat washer 17/32 x 1 1/16"
19. Slotted nut 14 mm
20. Cotter pin
21. Support
22. Grease fitting
23. Bearing housing
24. Bearing housing
25. Bushing
26. Cap screw M8 x 35
27. Stop nut 8 mm
28. Roll pin
29. Eye bolt
30. Bushing
31. Spring
32. Barrel
33. Barrel
34. Flat washer 8.4 x 25 x 1.6 mm
35. Lockwasher 8 mm
36. Cap screw M8 x 1.25 x 16
37. Retainer ring
38. Lockwasher 6 mm
39. Cap screw M6 x 16
40. Allen screw
41. Thrust washer
42. Plug

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DRIVEN PULLEY REMOVAL

Remove the following items:

- pulley guard and drive belt
- ⑯ ⑲ Support screws and drive axle housing screws
- ㉑ Tilt support forward.
- remove the driven pulley assembly from the countershaft.

DISASSEMBLY AND ASSEMBLY

WARNING: The driven pulley cam is spring loaded. Hold in place when removing the circlip.



Check sliding half bushing wear, replace bushing if wear is excessive.

To replace bushing, push out using a press.



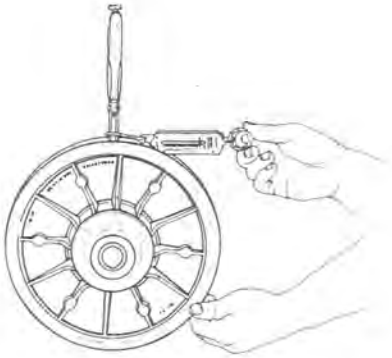
Install new bushing using same procedure.



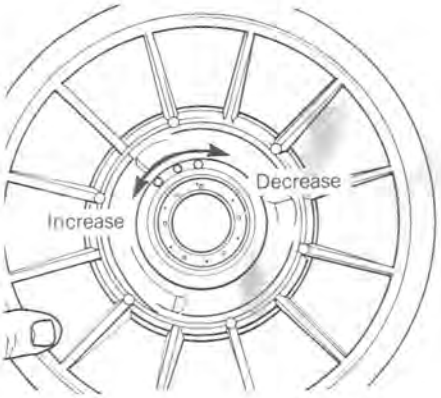
Check tension using a fish scale positioned at 90° with the pulley axle.

⑤ The spring tension pre-load should be:

5,5 kg ± 1 (12 lbs ± 2)



To correct spring tension displace spring end accordingly.



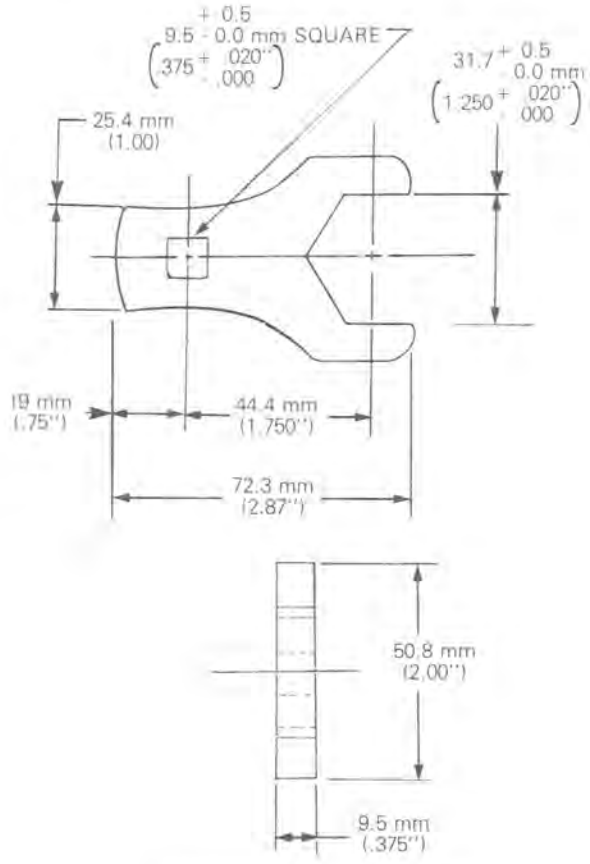
INSTALLATION

⑨ Torque to 9 N•m (6 ft-lbs).

⑪ Always apply anti-seize compound (Loctite anti-seize lubricant P/N 413 7010 00) on unpainted surface of countershaft.

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⑫To 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 rold.

NOTE: For an accurate torque wrench reading you **must** use the following formulas:

$$\frac{\text{Torque wrench length (cm (in))}}{\text{Torque wrench length + 4.44 cm (1.750 in)}} = \textbf{Correction factor}$$

$$\frac{\text{Torque wrench reading}}{\text{Correction factor}} = \textbf{Real reading}$$

Ex:

Torque wrench length: 25.4 cm (10 in)
Torque wrench reading: 60 N•m (45 ft-lbs)

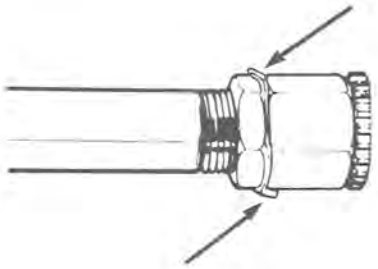
Correction factor

$$\frac{25.4 \text{ cm (10 in)}}{25.4 \text{ cm (10 in)} + 4.44 \text{ cm (1.750 in)}} = 0.85$$

Real reading

$$\frac{60 \text{ N•m (45 ft-lbs)}}{.85} = 70 \text{ N•m (52 ft-lbs)}$$

⑮Make sure the lock tab is properly folded over each nut.



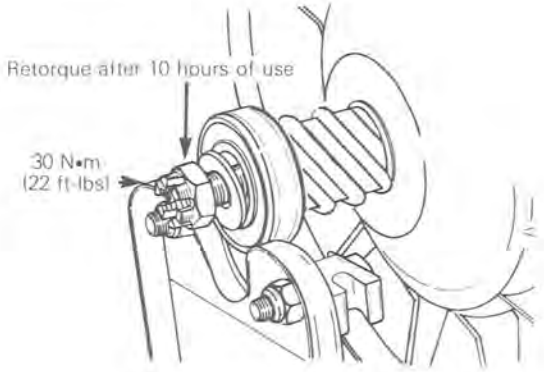
CAUTION: Do not bend lock tab more than twice. If necessary, install a new one (P/N 504 0480 00).

Reassemble driven pulley to countershaft and install by inversing the removal procedure.

Check pulley alignment.

⑯Install spring, the bearing, washer and nut.

⑲Torque to 30 N•m (22 ft-lbs)

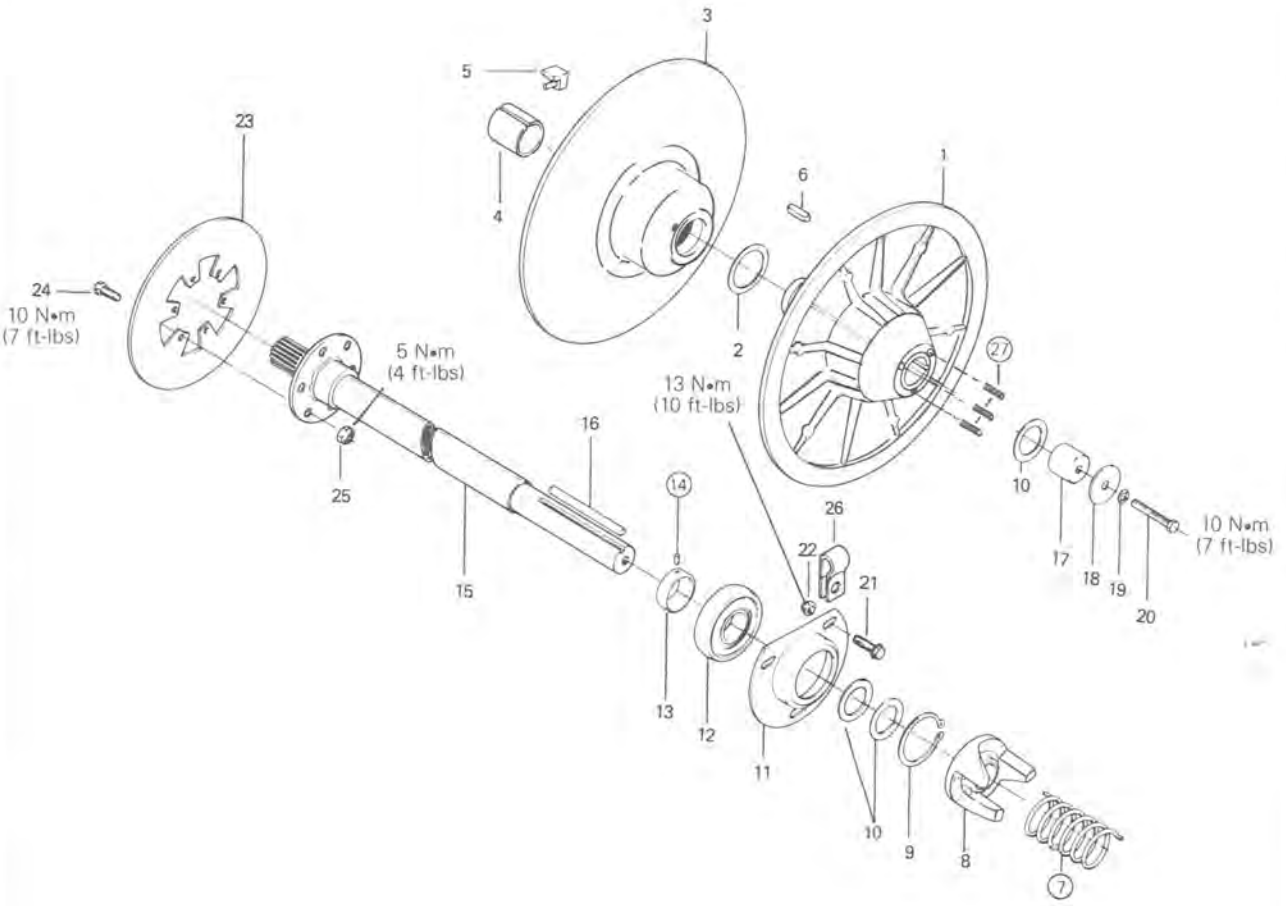


Reinstall a new cotter pin.

⑩At assembly, the Allen screws must be set in accordance with the drive belt deflection specification (see section 03, sub-section 02 Drive Belt).

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EVEREST, BLIZZARD 5500 MX, BLIZZARD 9700



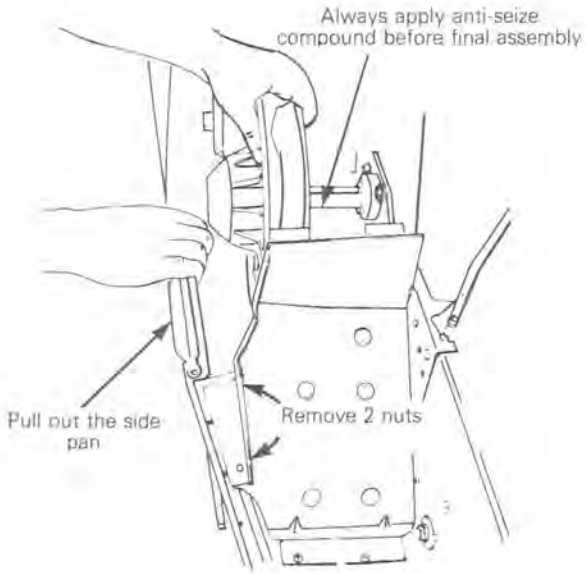
1. Fixed half
2. Shim
3. Sliding half
4. Bushing
5. Slider shoe
6. Key
7. Spring
8. Cam
9. Snap ring
10. Shim
11. Bearing flange
12. Bearing
13. Collar
14. Socket set screw 1/4-20 x 1/4
15. Countershaft
16. Key
17. Extension
18. Washer
19. Lockwasher 1/4
20. Screw 1/4-20 x 1 3/4
21. Screw 5/16-18 x 5/8
22. Elastic stop nut 5/16-18
23. Disc
24. Screw 10-32 x 3/4
25. Elastic stop nut 10-32
26. Clip
27. Allen screw

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DRIVEN PULLEY REMOVAL

Remove the following items:

- Upper elastic stop nut retaining the front side pan bracket.
- Two rear side pan retaining nuts.
- Belt guard and drive belt.



CAUTION: Always apply anti-seize compound on the countershaft before final pulley installation (Loctite anti-seize lubricant P/N 413 7010 00).

Pull out the side pan and remove pulley assembly.

DISASSEMBLY AND ASSEMBLY

WARNING: The driven pulley cam is spring loaded. Hold in place when removing the circlip.



Check sliding half bushing wear, replace bushing if wear is excessive.

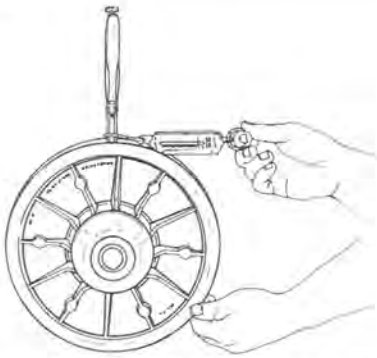
To replace bushing, push out using a press.



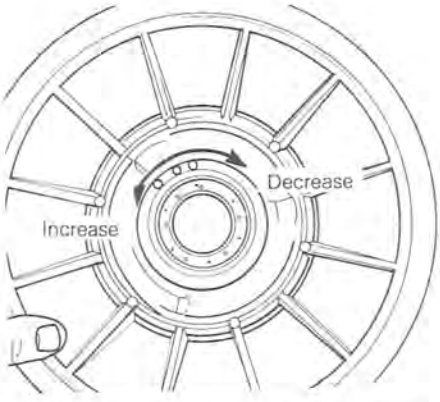
Install new bushing using same procedure.



Check tension using a fish scale positioned at 90° with the pulley axle.



To adjust spring tension, displace spring end accordingly.



Reassemble by reversing removal procedure.

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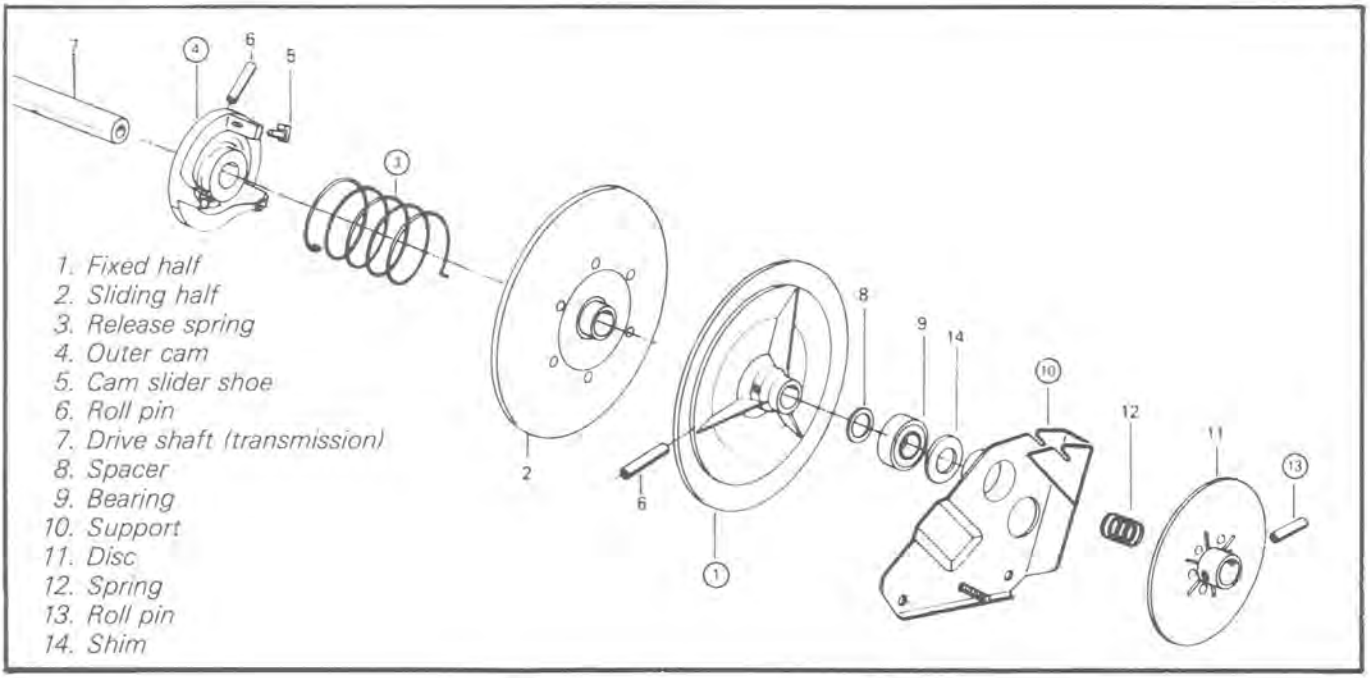
⑦ The spring pre-load should be:
5.9 kg (13 lbs)

㉗ At assembly, the Allen screws must be set in accordance with the drive belt deflection specification (see section 03, sub-section 02 Drive Belt).

⑭ At assembly, apply "Loctite 242" blue (medium strength) on threads.

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ALPINE



REMOVAL

Remove pulley guard and drive belt.

Remove disc brake assembly.

Position a wooden block under the drive shaft then using a hammer and a pin punch, remove roll pin ⑬ locking disc in position. Tap on inner side of brake and bracket assembly ⑩ disengage it from bearing.

Remove lower bracket of steering column attached to the gearbox. Slacken upper bracket of steering column. Disconnect transmission rod from gearbox.

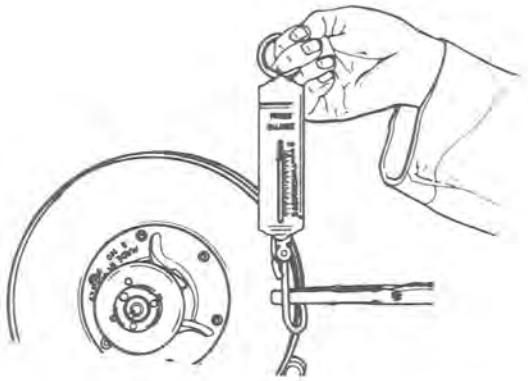
Remove gearbox upper housing.

Release chain tension then separate chain. Withdraw driven pulley.

DISASSEMBLY & ASSEMBLY

①③④ I necessary heat hub of fixed pulley and outer cam to facilitate removal.

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 spring tension either relocate spring end in sliding pulley half, or gradually rotate outer cam.

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Connect the drive chain using a connecting link.

Reinstall the gearbox cover (refer to section 03-08 (gearbox) for complete gearbox information).

Adjust the chain tension and check the gearbox oil level.

Install the gearbox rod and adjust (see section 03-08).

Install the driven pulley support.

Check pulley alignment and install the drive belt.

Install the pulley guard.

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PULLEY ALIGNMENT

The offset adjustment is a factor that will affect the efficiency of the transmission system.

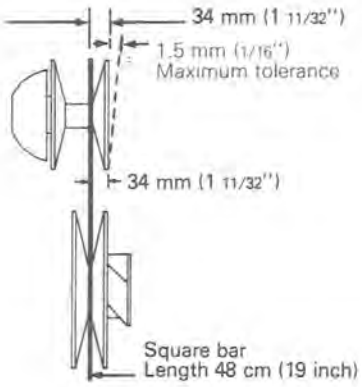
Proper offset adjustment will allow the drive belt to operate at its highest speed and will reduce wear to a minimum.

NOTE: Before pulley alignment, always check drive belt tension. Refer to section 03, sub-section 02 "Drive Belt".

OFFSET MEASUREMENT

All models, except Blizzard and Everest models must have 34 mm (1 11/32") offset.

NOTE: As illustrated below, a tolerance up to 1.5 mm (1/16") is allowed to compensate for the twist due to the drive pulley torque. Refer to the illustration.

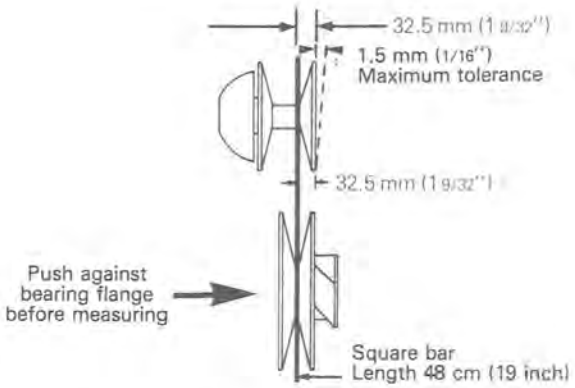


The Blizzard 9700 model must have 34.5 mm (1 23/64") offset.

The Blizzard 5500 MX and Everest 500/E/L/C models must have 32.5 mm (1 9/32") offset.

Because of the floating type driven pulley, the offset must be measured after pushing the driven pulley against the bearing flange.

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.



OFFSET ADJUSTMENT

Elan-Spirit

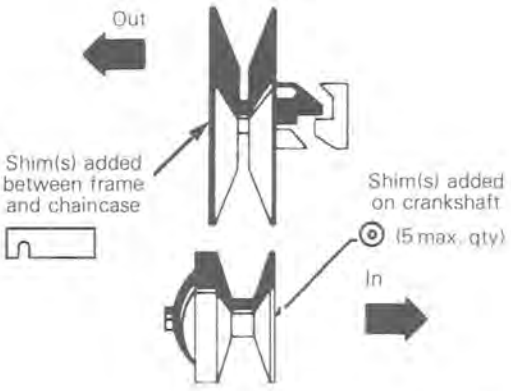
Two methods can be used to adjust offset:

– Drive pulley alignment (first method):
If drive pulley is too far in, remove drive pulley and add shim(s) on crankshaft. Shim P/N 504 0504 00 (.032" thickness).

CAUTION: Never use more than 5 shims on crankshaft.

WARNING: Always torque drive pulley bolt within specifications. (See Technical Data).

– Driven pulley alignment (second method):
If drive pulley is too far out, add shim(s) between frame and chaincase. Shim P/N 504 0504 00 (.032" thickness).



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Citation 4500/E/SS, Mirage II, Nordik, Skandic 277/377

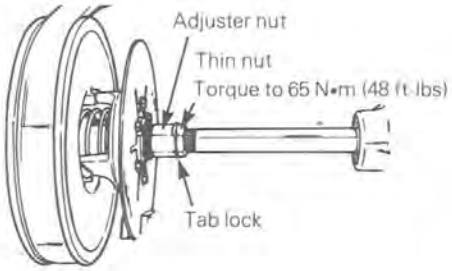
If the driven pulley is too far in or out, it can be corrected by sliding it toward the appropriate side.

To adjust the offset:

Straighten the tab lock

Loosen the thin nut.

Turn the adjuster nut in order to have a dimension of 34 mm (1 11/32") at the offset measurement.

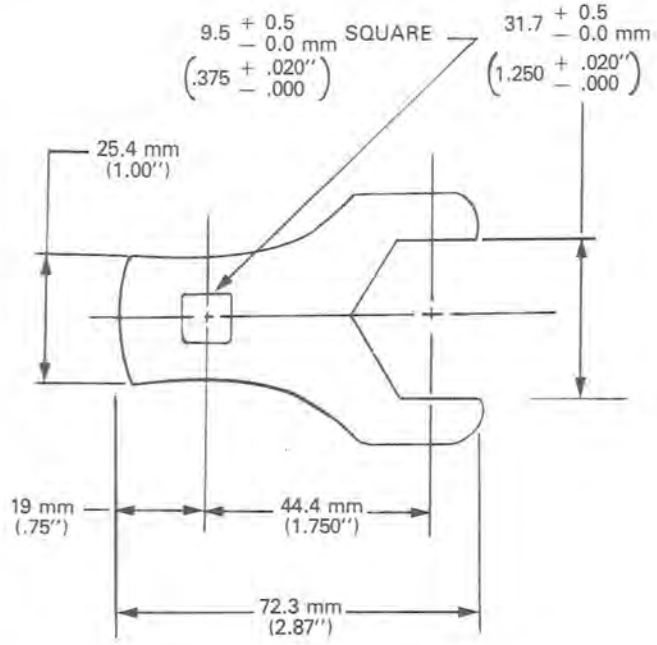


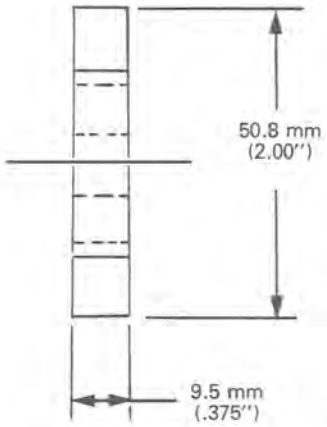
Holding the adjuster nut, tighten the thin nut and bend the tab lock.

Make sure the tab lock is properly folded over each nut.

CAUTION: Do not bend tab lock more than twice. If necessary, install a new one (P/N 504 0480 00).

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 rold.

NOTE: For an accurate torque wrench reading you **MUST** use the following formulas:

$$\frac{\text{Torque wrench length (cm (in))}}{\text{Torque wrench length + 4.44 cm (1.750 in)}} = \textbf{Correction factor}$$

$$\frac{\text{Torque wrench reading}}{\text{Correction factor}} = \textbf{Real reading}$$

Ex:

Torque wrench length: 25.4 cm (10 in)
Torque wrench reading: 60 N•m (45 ft-lbs)

Correction factor

$$\frac{\text{25.4 cm (10 in)}}{\text{25.4 cm (10 in) + 4.44 cm (1.750 in)}} = 0.85$$

Real reading

$$\frac{\text{60 N•m (45 ft-lbs)}}{0.85} = \textbf{70 N•m (52 ft-lbs)}$$

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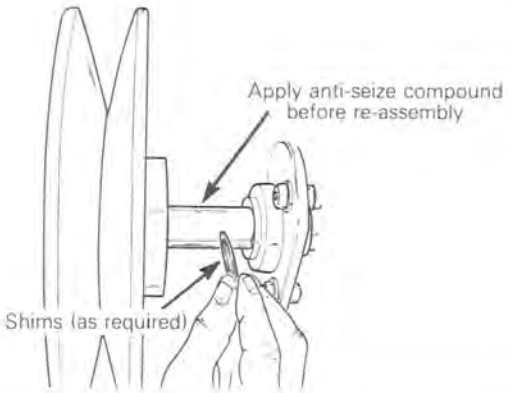
Everest, Blizzard models

Two methods can be used to adjust offset:

– Slide engine on its support (first method):

– Driven pulley alignment (second method):
The driven pulley offset is adjusted by adding or removing shim(s). P/N 504 1082 00 (.036" thickness).

NOTE: To add or remove shim(s), pulley assembly must be removed as per driven pulley removal procedure. Refer to section 03, sub-section 04.



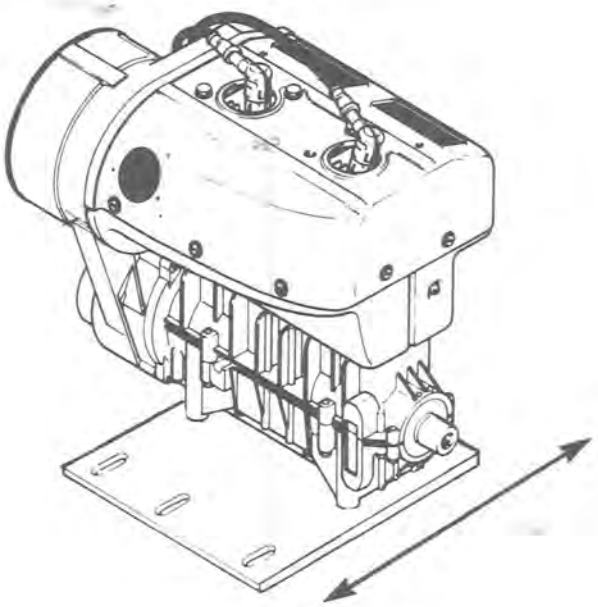
Reinstall the pulley, outer shims, lockwasher and bolt. Torque to 9 N•m (7 ft-lbs).

IMPORTANT: Maximum free-play should not exceed 3 mm (1/8").

CAUTION: Always apply anti-seize compound (Loctite anti-seize lubricant P/N 413 7010 00) on the countershaft before final assembly.

Alpine

Slide engine on its support as illustrated.



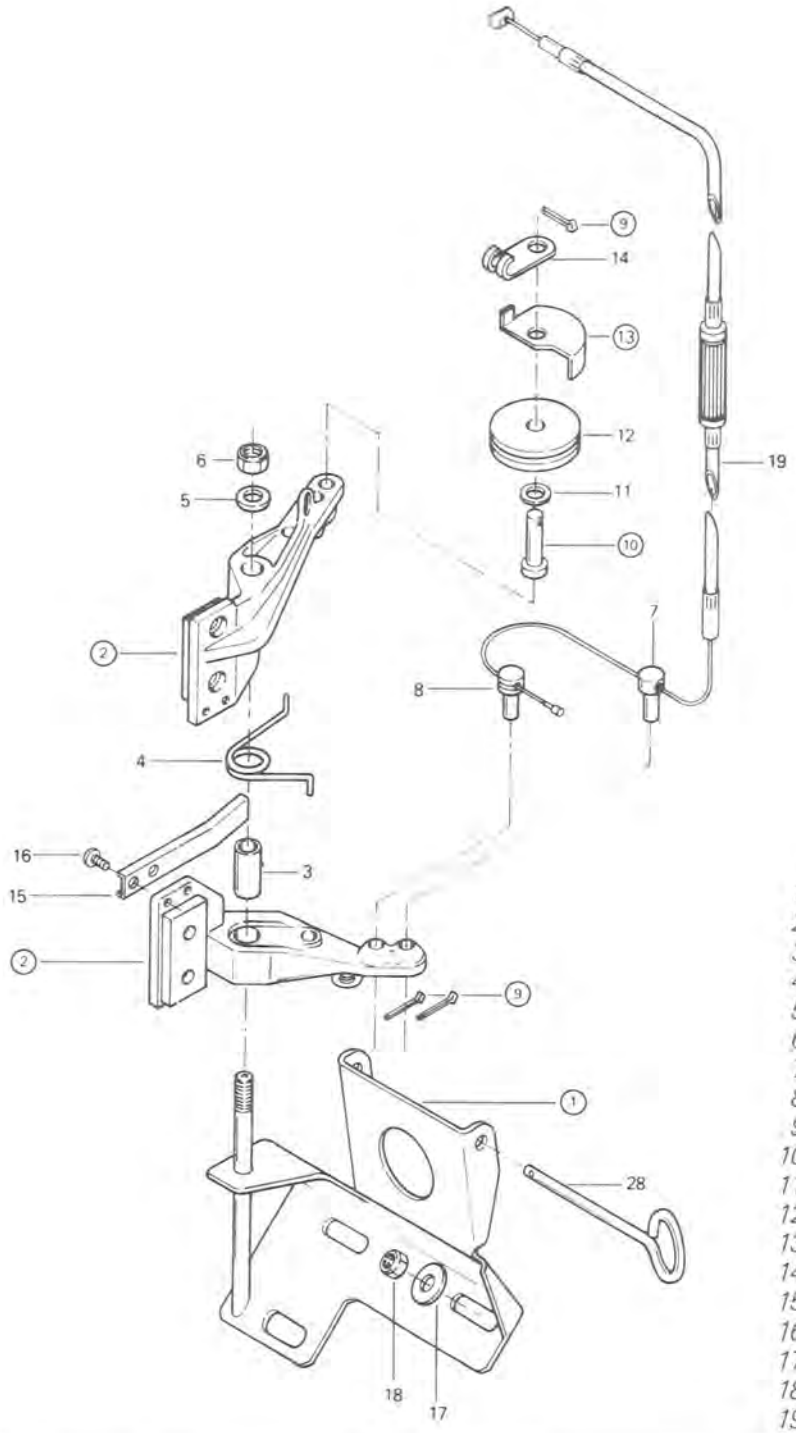
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BRAKE

DISC BRAKE

Citation, Mirage II
Nordik, Skandic



1. *Bracket*
2. *Brake lever and lining*
3. *Bushing*
4. *Spring*
5. *Flat washer*
6. *Nut*
7. *Barrel*
8. *Barrel*
9. *Cotter pin*
10. *Pin*
11. *Spring washer*
12. *Pulley*
13. *Stop plate*
14. *Cable bracket (Europe)*
15. *Brake switch bracket*
16. *Screw*
17. *Flat washer*
18. *Nut*
19. *Cable*

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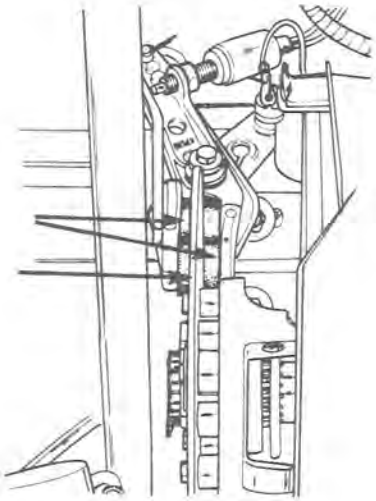
REMOVAL

Remove the following:

air silencer,
brake retainer nut, then pull out brake assembly,
brake light switch,
pulley,
brake cable (disconnect and remove).

Assembly and installation, reverse the procedure.

① When reinstalling caliper brake ass'y, always align caliper ass'y so that the brake disc is well centered between the brake pads.



② Replace when pad thickness is less than 3 mm (1/8").

⑨ Always reinstall a new cotter pin at assembly.

⑩ Install pulley shaft in outer hole of the brake lever.

⑬ Make sure the guard lock tab is inserted in the brake lever hole.

◆ **WARNING: Always readjust the brake light switch after adjusting or removing the brake assembly.**

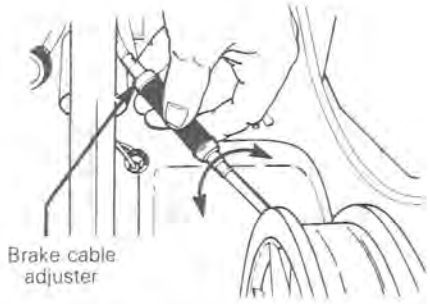
INSPECTION

Measure the thickness of the brake pads. If less than 3 mm (1/8") the pad and lever assembly should be replaced.

ADJUSTMENT

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 counterclockwise until the brake disc can no longer turn then back off the adjuster approximately 1 1/2 turns. Recheck brake operation.

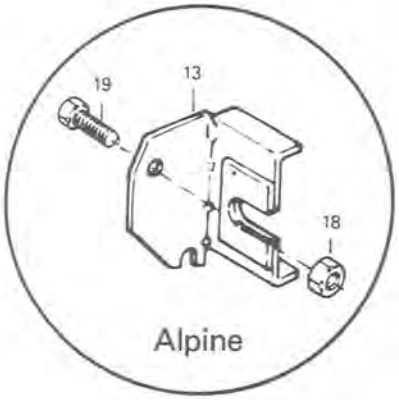


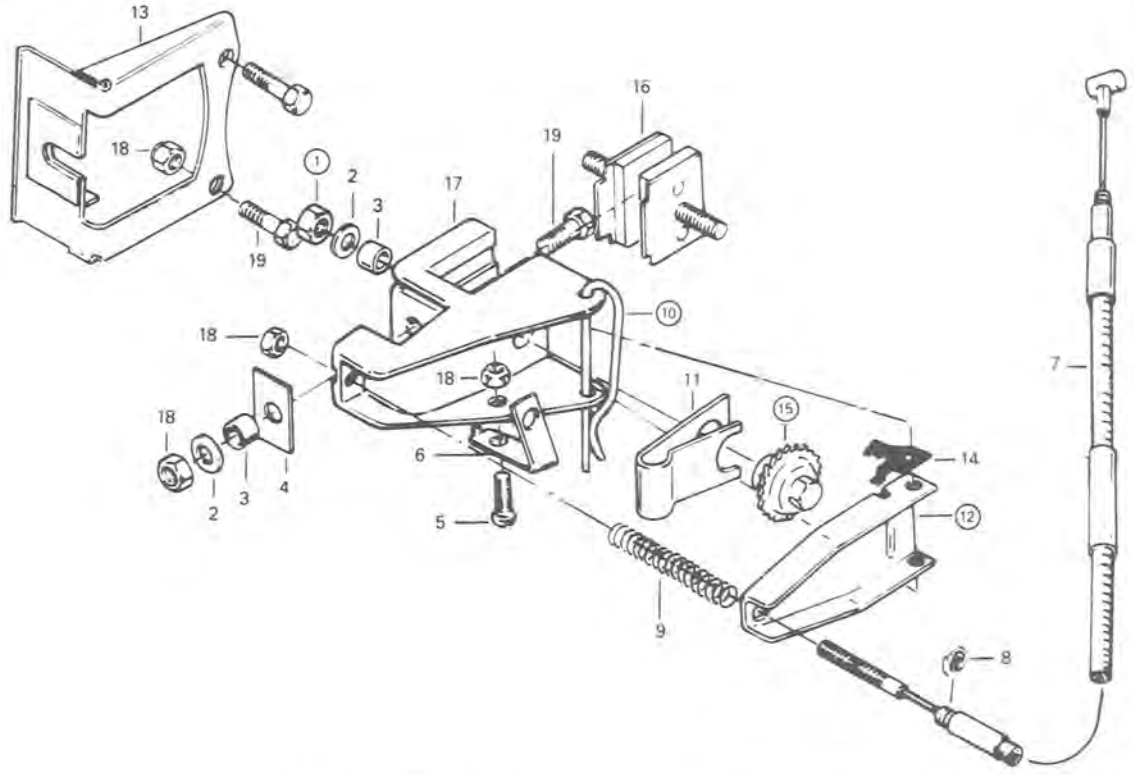
◆ **WARNING: Whenever the brake is readjusted, the brake light switch operation must also be checked and adjusted.**

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SELF ADJUSTING DISC BRAKE

Everest, Blizzard, Alpine





1. *Nut (nylon)*
2. *Washer*
3. *Spacer*
4. *Square washer*
5. *Bolt*
6. *Brake switch support*
7. *Brake cable and housing*
8. *Circlip*
9. *Spring*
10. *Hair pin cotter*
11. *Release spring*
12. *Lever*
13. *Brake support*
14. *Ratchet spring*
15. *Ratchet wheel*
16. *Brake pad*
17. *Caliper*
18. *Nut*
19. *Bolt*

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REMOVAL

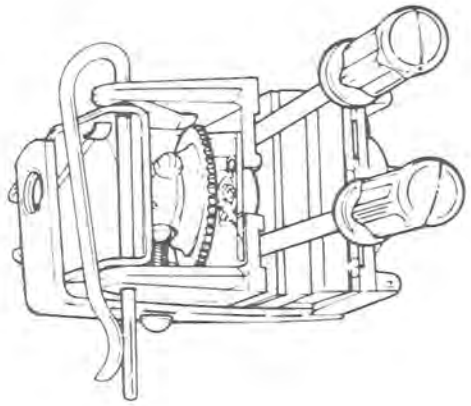
Disconnect brake switch and brake cable.

Remove nuts and/or bolts securing brake support to chaincase.

Slide brake caliper ass'y from brake support.

DISASSEMBLY & ASSEMBLY

⑩ ⑫ To ease hair pin cotter assembly, activate lever and wedge two (2) screwdriver blades between caliper and brake pad to release lever tension.



⑮ Apply low temperature grease on threads and spring seat prior to installation. At assembly, fully tighten then back off 1/2 turn.

① At assembly, torque to 20 N•m (15 ft-lbs).

CLEANING & INSPECTION

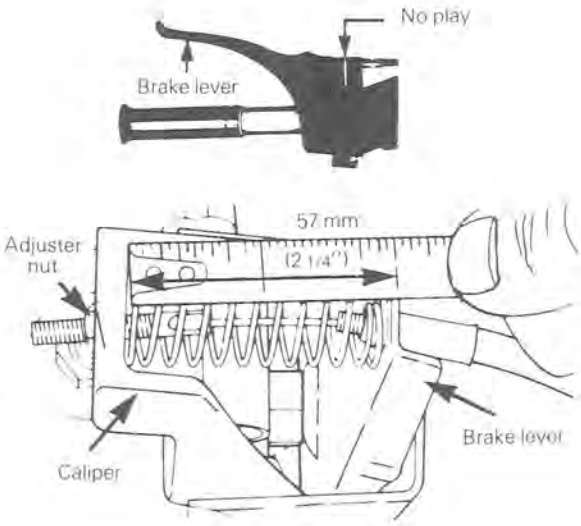
Measure thickness of brake pad. If less than 3 mm (1/8"), the pad should be replaced.

Clean all metal components in a general purpose solvent. Using dry rag.

INSTALLATION & ADJUSTMENT

Slide caliper ass'y onto its support then secure support to vehicle.

- Activate lever by hand until ratchet klick is no longer heard.
- Secure brake cable housing to lever, slide spring over cable then attach cable to housing with adjuster nut.
- 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 ± 3 (2 1/4" ± 1/8") between lever and caliper.



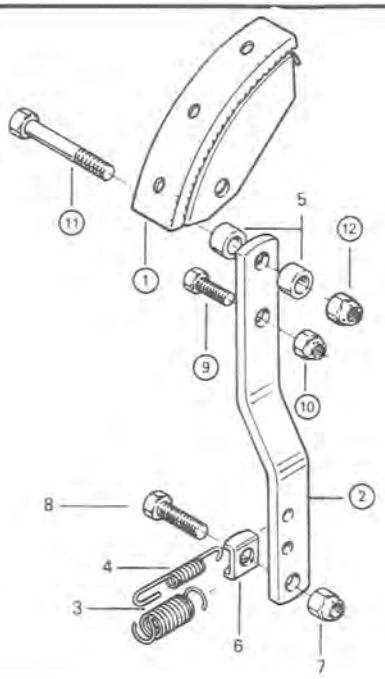
NOTE: It may be necessary to change brake light switch support position to obtain recommended gap between lever and caliper housing.

Connect brake light switch and check operation. Adjust if necessary using two (2) adjuster nuts.

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DRUM BRAKE

Elan and Spirit



1. *Brake shoe*
2. *Brake lever*
3. *Spring*
4. *Brake light switch spring*
5. *Spacer*
6. *Cable lock*
7. *Nut*
8. *Bolt (cable)*
9. *Bolt*
10. *Nut*
11. *Bolt (shoe)*
12. *Nut (shoe)*

DISASSEMBLY & ASSEMBLY

① ⑪ ⑫ At assembly, torque shoe retaining nut. However shoe must be able to pivot when slight pressure is applied.

② ⑨ ⑩ When attaching brake lever assembly to chaincase bracket, tighten nut until lever pivots freely and all side play is eliminated.

◯ NOTE: Lubricate all moving metal parts of brake with light machine oil.

◆ WARNING: Avoid getting oil on brake shoe.

INSPECTION

Check brake lining for wear. If necessary, replace.

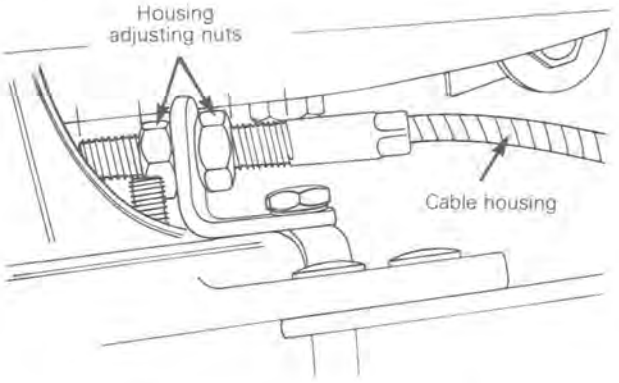
◯ NOTE: If oil traces are found on lining or drum, check chaincase seal for correct installation position or damage. Replace as needed. Wipe oil from pulley and replace brake shoe.

INSTALLATION & ADJUSTMENT

Connect brake cable to brake lever and 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.



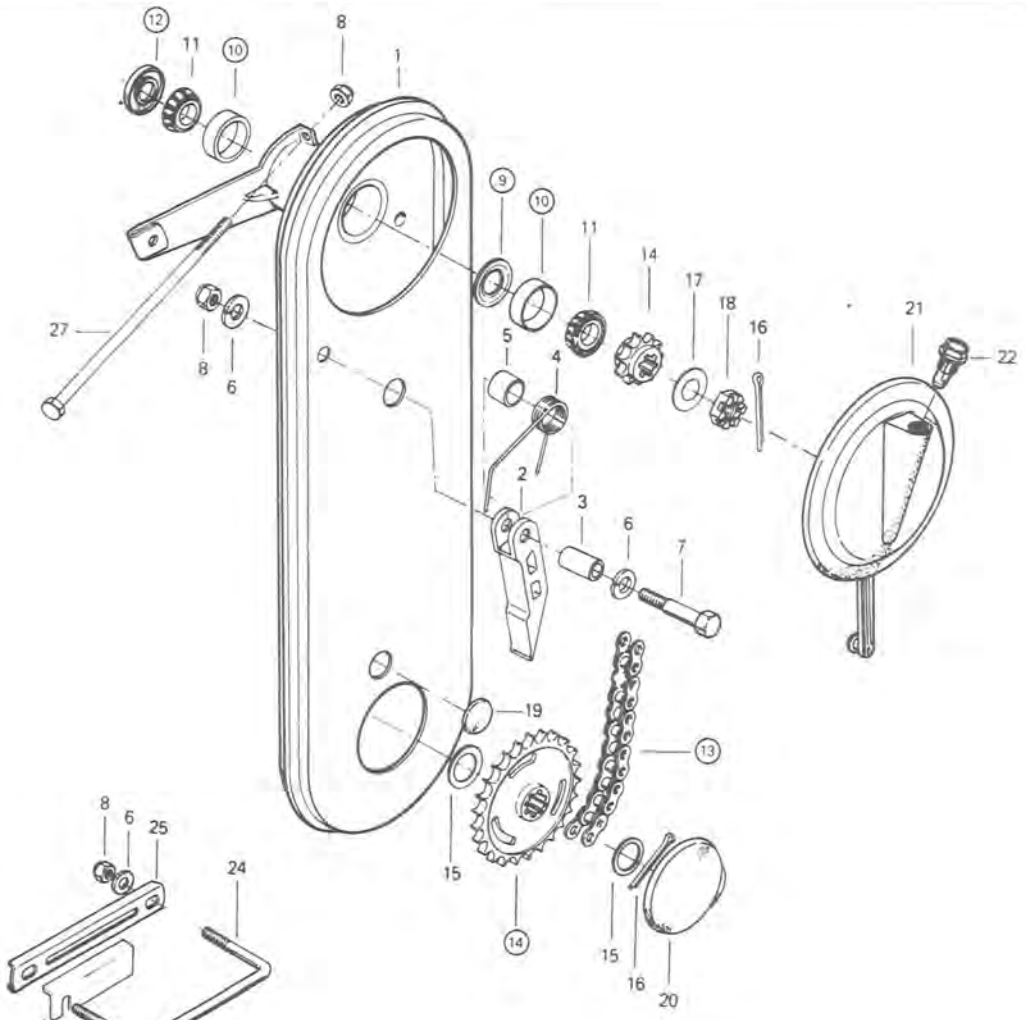
Check brake light operation. If necessary, loosen brake light switch lock nuts and adjust.

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CHAINCASE

ELAN, SPIRIT



1. Chaincase
2. Chain tensioner
3. Bushing
4. Spring
5. Spacer
6. Washer
7. Bolt
8. Nut
9. Oil retainer ring
10. Bearing cup
11. Cone bearing
12. Oil seal
13. Chain
14. Sprocket
15. Spacer
16. Cotter pin
17. Spring washer
18. Castellated nut
19. Oil level plug
20. Access plug (lower)
21. Access plug (upper)
22. Breather
23. Bracket
24. "U" clamp
25. Spacer plate
26. Shim
27. Hinge rod

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REMOVAL

Remove the tool box.

Remove pulley guard, drive belt and access plug (upper).

Release chain tension.

Release track tension.

Pry oil seal from chaincase (lower part) and drain oil.

Disconnect brake cable.

Pry out lower access plug. Remove cotter pin and spacer.

Remove nut on hinge rod at chaincase bracket.

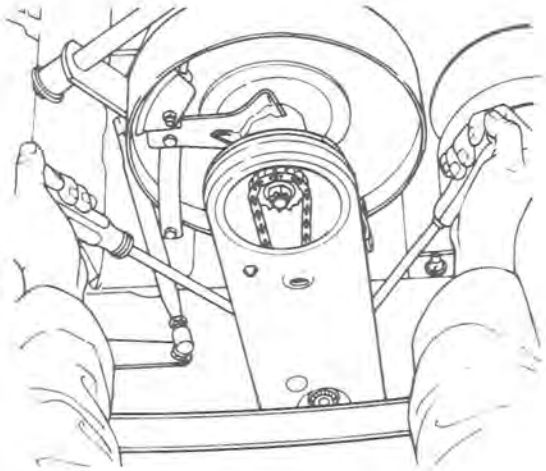
From the inner side of frame, remove the nut securing chaincase lower bracket. Remove bracket.

Remove nuts, washers and "U" clamp holding the chaincase to the frame.

Remove chaincase shim(s) if applicable. Move chaincase towards drive pulley to disengage hinge rod.

Remove drive axle.

Using two (2) large screwdrivers inserted between chaincase and frame, pry complete assembly from vehicle.

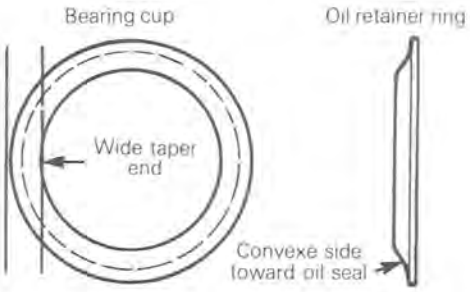


INSPECTION

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.

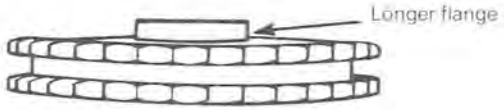
DISASSEMBLY & ASSEMBLY

⑨ ⑩ Position oil retainer ring then sit bearing cup in chaincase aperture. Cup must be seated so that wide taper end is facing oil retainer ring.



⑫ Using an appropriate pusher, press oil seal into chaincase hub. Oil seal must sit flush with case hub edge.

⑬ ⑭ Place lower sprocket with longer flange toward track side of chaincase. (For proper sprocket and chain use, see Technical Data.)

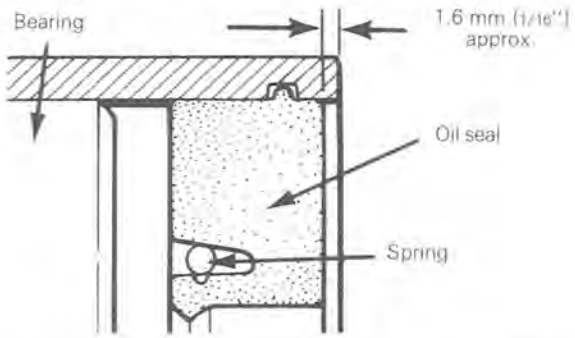


INSTALLATION

Position assembled chaincase and driven pulley in location. Install drive axle. (Ensure that spacer has remained on axle). Install spacer and cotter pin to secure lower sprocket to axle. Install lower access plug. Install hinge rod, lower bracket, "U" clamp and previously removed aligning shim(s).

Install oil seal into chaincase flange.

NOTE: A gap of approximately 1.6 mm (1/16") should exist between the end chaincase flange and oil seal.



Proceed with pulley alignment. Apply chain tension.

Pour Bombardier chaincase oil into chaincase until it reaches 13 mm (1/2") lower than the oil level plug.

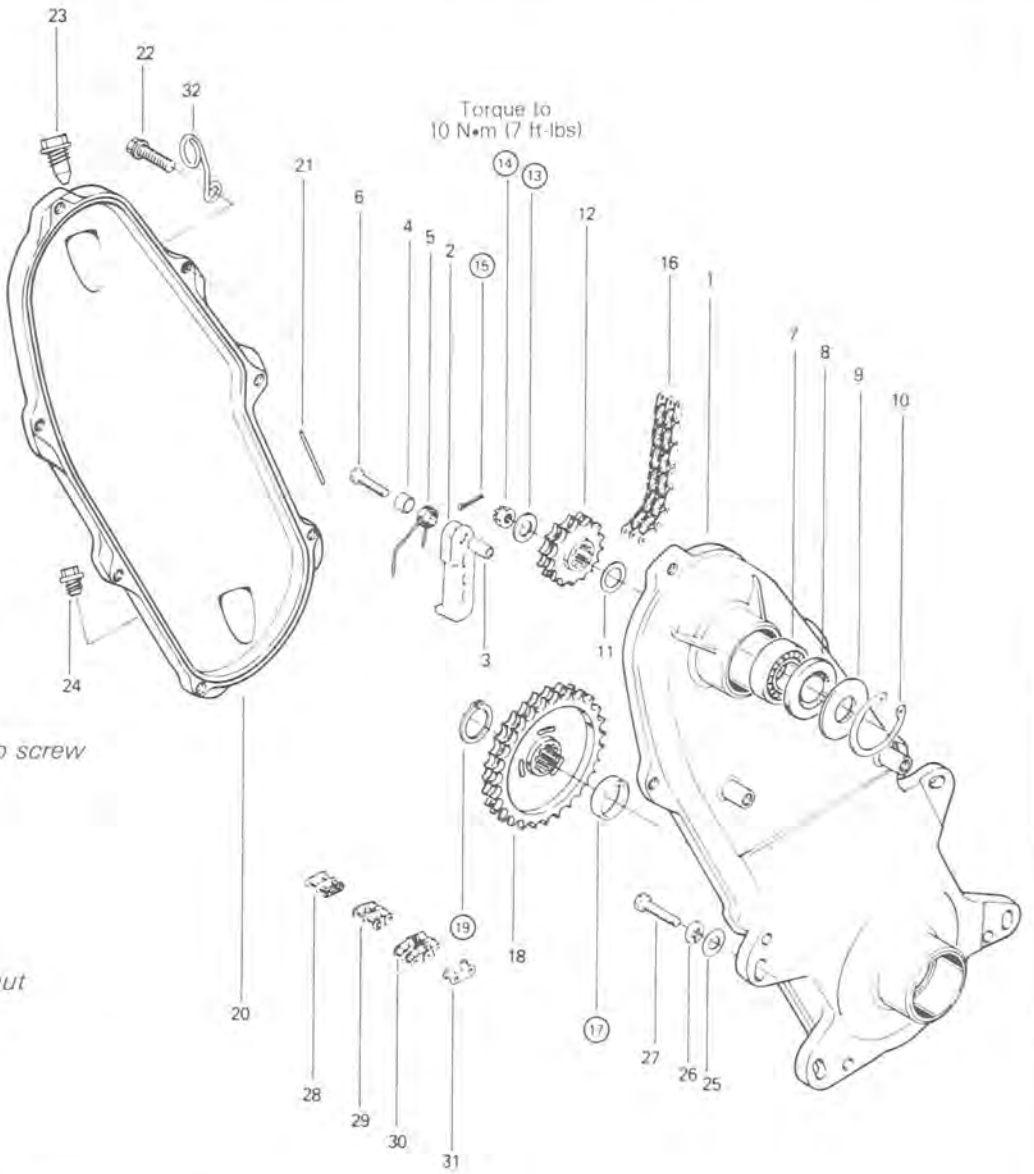
Connect and adjust brake. Apply track tension.

Install drive belt and pulley guard.

Reinstall the tool box.

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CITATION, MIRAGE II, NORDIK, SKANDIC



1. Chaincase
2. Chain tensioner
3. Bushing
4. Spacer
5. Spring
6. Hexagonal head cap screw
7. Bearing
8. Seal
9. Stopper spacer
10. Snap ring
11. Spacer
12. Sprocket
13. Spring washer
14. Hexagonal slotted nut
15. Cotter pin
16. Driving chain
17. Spacer
18. Sprocket
19. Snap ring
20. Chaincase cover
21. O'ring
22. Hexagonal washer head taptite screw
23. Breather
24. Plug
25. Flat washer 8 mm
26. Lockwasher 8 mm
27. Hexagonal head cap screw M8 x 25
28. Connecting link single, 3/8" pitch double
29. Cranked link single, 3/8" pitch double
30. Cranked link double, 3/8" pitch double
31. Inner link, 3/8" pitch double
32. Rope guide

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REMOVAL

Remove

- suspension
- injection oil reservoir (if applicable)
- battery and battery holder (if applicable)
- chaincase cover and drain the oil

Pry out drive axle oil seal from chaincase. Remove cotter pins, nuts, washers, sprockets and chain. Remove bolts and nuts securing chaincase to frame.

INSPECTION

Visually inspect the chain for cracked, damaged or missing link rollers. Inspect for defective bearing, sprockets.

DISASSEMBLY & ASSEMBLY

Remove the oil seal, snap ring and bearing from the chaincase.

INSTALLATION

Install the chaincase to the frame (do not tighten). Position the drive axle into location.

Prior to lower sprocket installation ensure that the spacer ⑰ is on the drive axle.

Reinstall the sprockets, chain, flat washers.

⑬⑭Reinstall spring washer and slotted nut, torque to 10 N•m (7 ft-lbs).

⑮ Install new cotter pin.

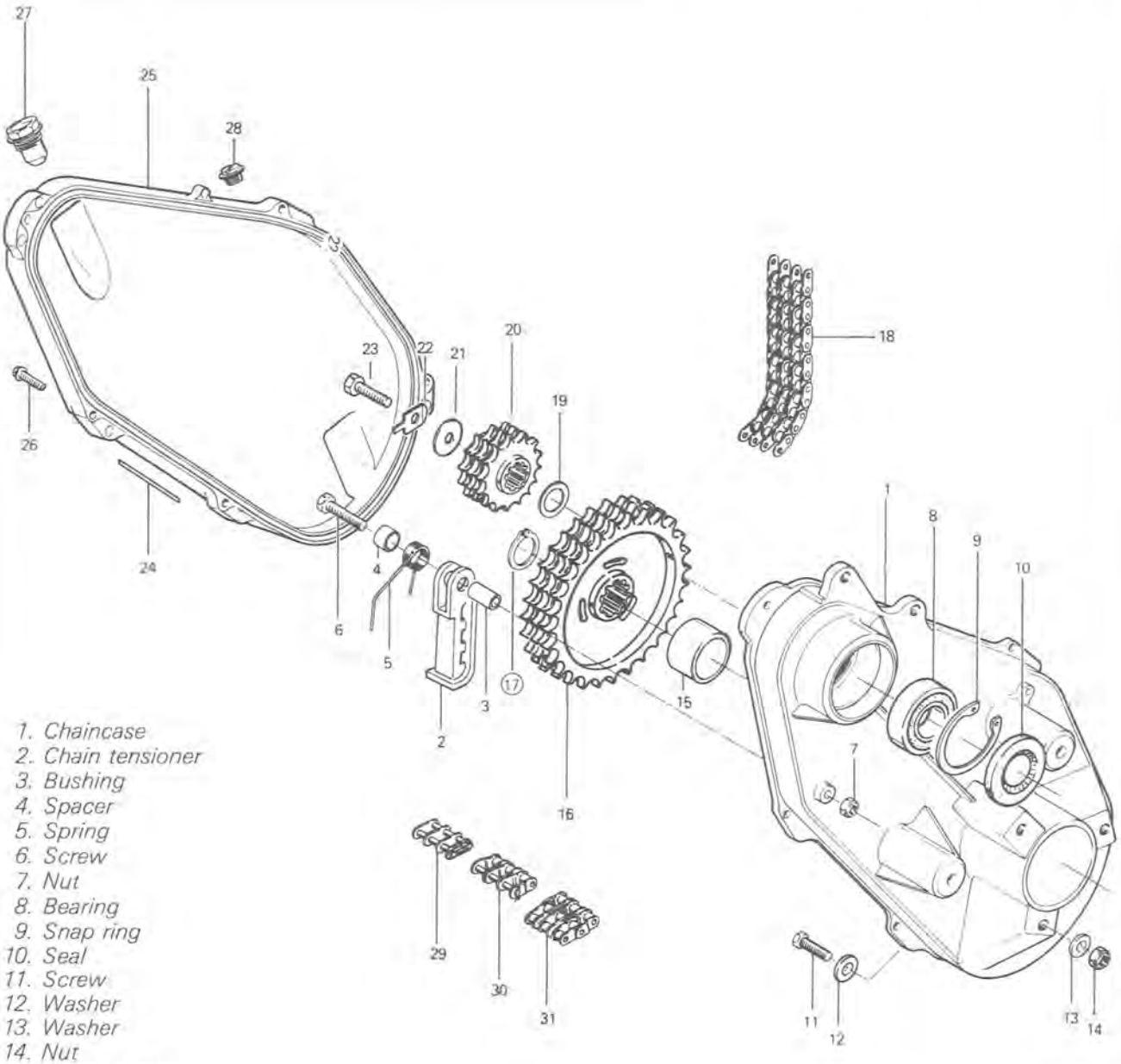
⑲ Reinstall snap ring (lower sprocket).

Reinstall the chaincase cover.

Refill with chaincase oil. (200 ml (7 fl. oz)).

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EVEREST, BLIZZARD



1. Chaincase
2. Chain tensioner
3. Bushing
4. Spacer
5. Spring
6. Screw
7. Nut
8. Bearing
9. Snap ring
10. Seal
11. Screw
12. Washer
13. Washer
14. Nut
15. Lower spacer
16. Sprocket
17. Circlip
18. Drive chain, 3/8" pitch triple
19. Upper spacer
20. Sprocket
21. Washer
22. Lock tab
23. Cap screw
24. O'ring
25. Chaincase cover
26. Washer head hexagonal screw
27. Breather
28. Plug
29. Connecting link single, 3/8" pitch triple
30. Cranked link single, 3/8" pitch triple
31. Cranked link double, 3/8" pitch triple

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REMOVAL

Remove the suspension.

NOTE: On the Blizzard 9700 disconnect the muffler and push it aside underneath the exhaust pipes.

Remove the chaincase cover and drain the oil.

Slacken the end bearing housing.

Pry out the drive axle oil seal from the chaincase.

Release chain tension then open the tab lock locking the sprocket. Remove the screw, washer, sprocket, circlip and chain.

Remove bolts and/or nuts securing the chaincase to the frame.

INSPECTION

Visually inspect the chain for cracked, damaged or missing link rollers. Inspect for defective bearing, sprockets, etc.

DISASSEMBLY & ASSEMBLY

Remove the oil seal, snap ring and bearing from the chaincase.

Using an appropriate pusher, press the oil seal into chaincase hub. Oil seal must fit flush with the case hub edge.

INSTALLATION

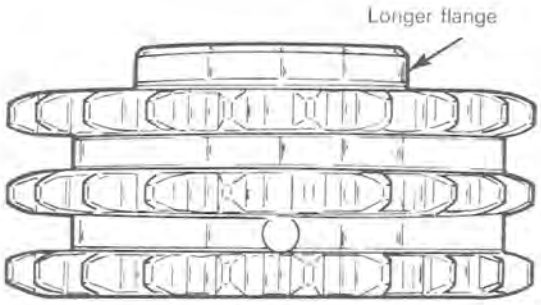
Install the chaincase to the frame (do not tighten). Position the drive axle into location. Tighten the end bearing housing. Prior to lower sprocket installation ensure that the spacer is on the drive axle.

Reinstall the sprockets, chain, flat washers.

Position the sprockets with the longer flanges facing inside the chaincase. (For proper sprocket and chain use, see Technical Data).

⑰ The lower sprocket holding device is a circlip.

CAUTION: It is of the upmost importance to install the circlip otherwise damage to the chaincase components may occur.

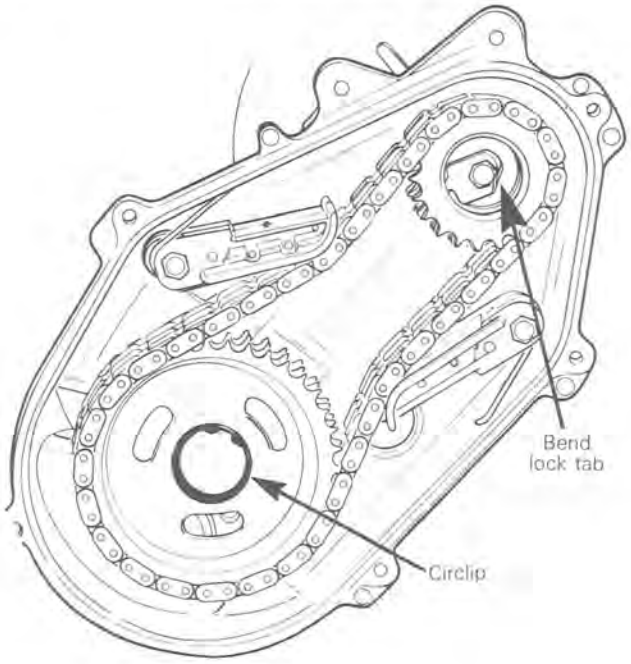


Install the tab lock as illustrated.

Install the screw and torque to 9.5 N•m (7 ft-lbs).

Bend the tab lock.

CAUTION: Lock tab should be replaced if bent more than twice. If in doubt, replace.



Reinstall the chaincase cover.

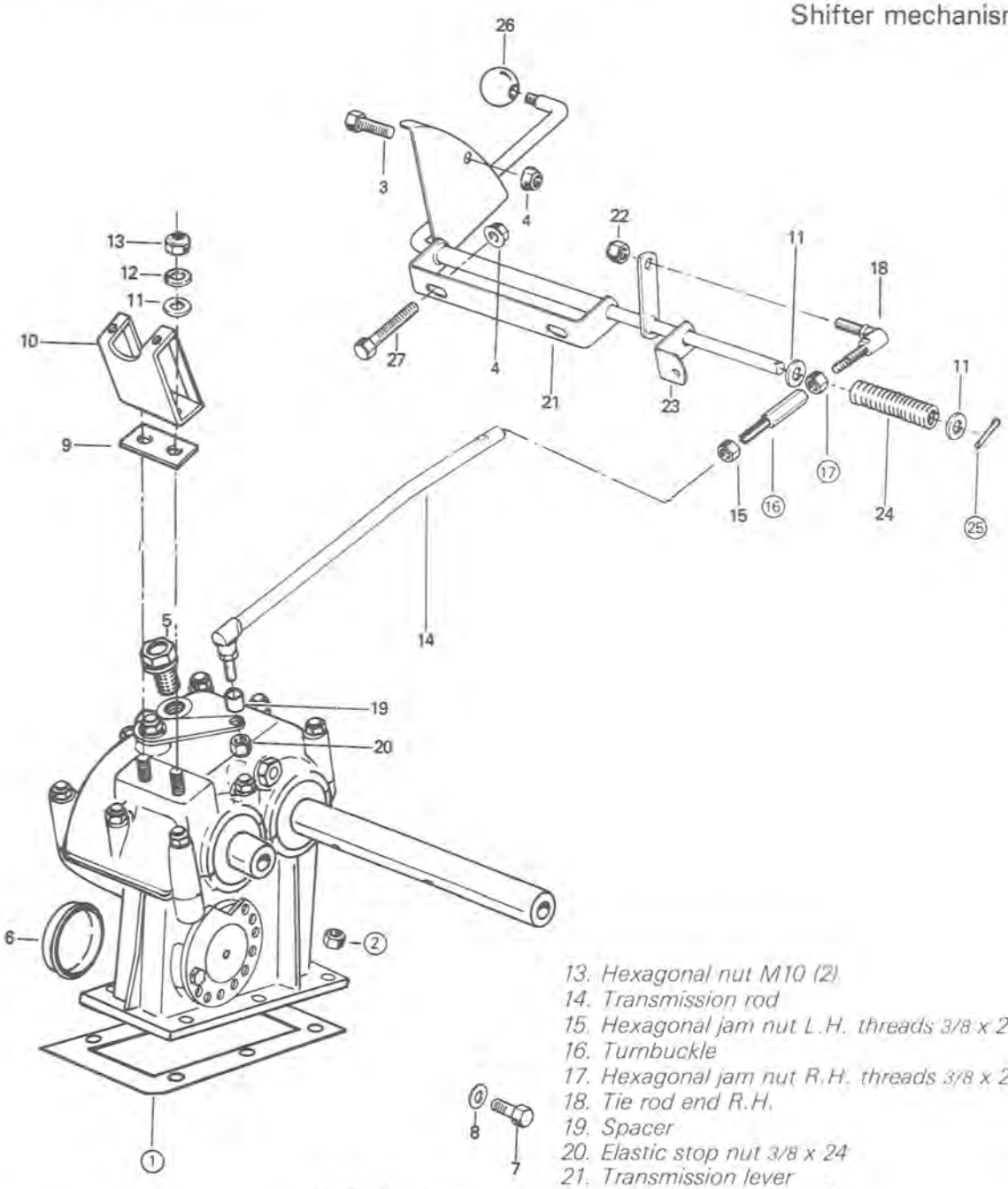
Refill with chaincase oil.

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GEAR BOX

3 SPEEDS GEARBOX (ALPINE)

Shifter mechanism



1. Gasket
2. Elastic stop nut 5/16 x 24 (6)
3. Hexagonal screw 1/4 x 20 x 3/4
4. Hexagonal elastic stop nut 1/4 x 20 (4)
5. Breather plug
6. Rubber cover
7. Drain screw
8. Flat washer
9. Spacer
10. Steering bracket
11. Flat washer (4)
12. Lockwasher (2)
13. Hexagonal nut M10 (2)
14. Transmission rod
15. Hexagonal jam nut L.H. threads 3/8 x 24
16. Turnbuckle
17. Hexagonal jam nut R.H. threads 3/8 x 24
18. Tie rod end R.H.
19. Spacer
20. Elastic stop nut 3/8 x 24
21. Transmission lever
22. Elastic stop nut 3/8 x 24
23. Bracket
24. Spring
25. Cotter pin
26. Ball (handle)
27. Hexagonal screw 1/4 x 20 x 1 1/4 (3)

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DISASSEMBLY & ASSEMBLY

① At assembly, ensure the gasket is properly positioned.

② At assembly torque to 22 N•m (16 ft-lbs).

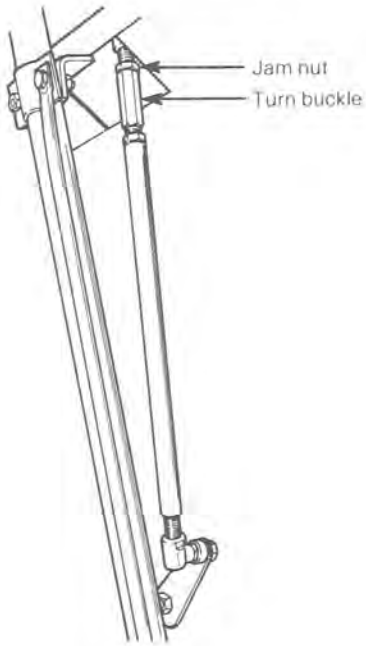
㉕ At assembly, always reinstall a new cotter pin.

SHIFTER ADJUSTMENT

With gearbox lever properly engaged in gear, adjust so that shifter lever fits correctly in corresponding gear groove.

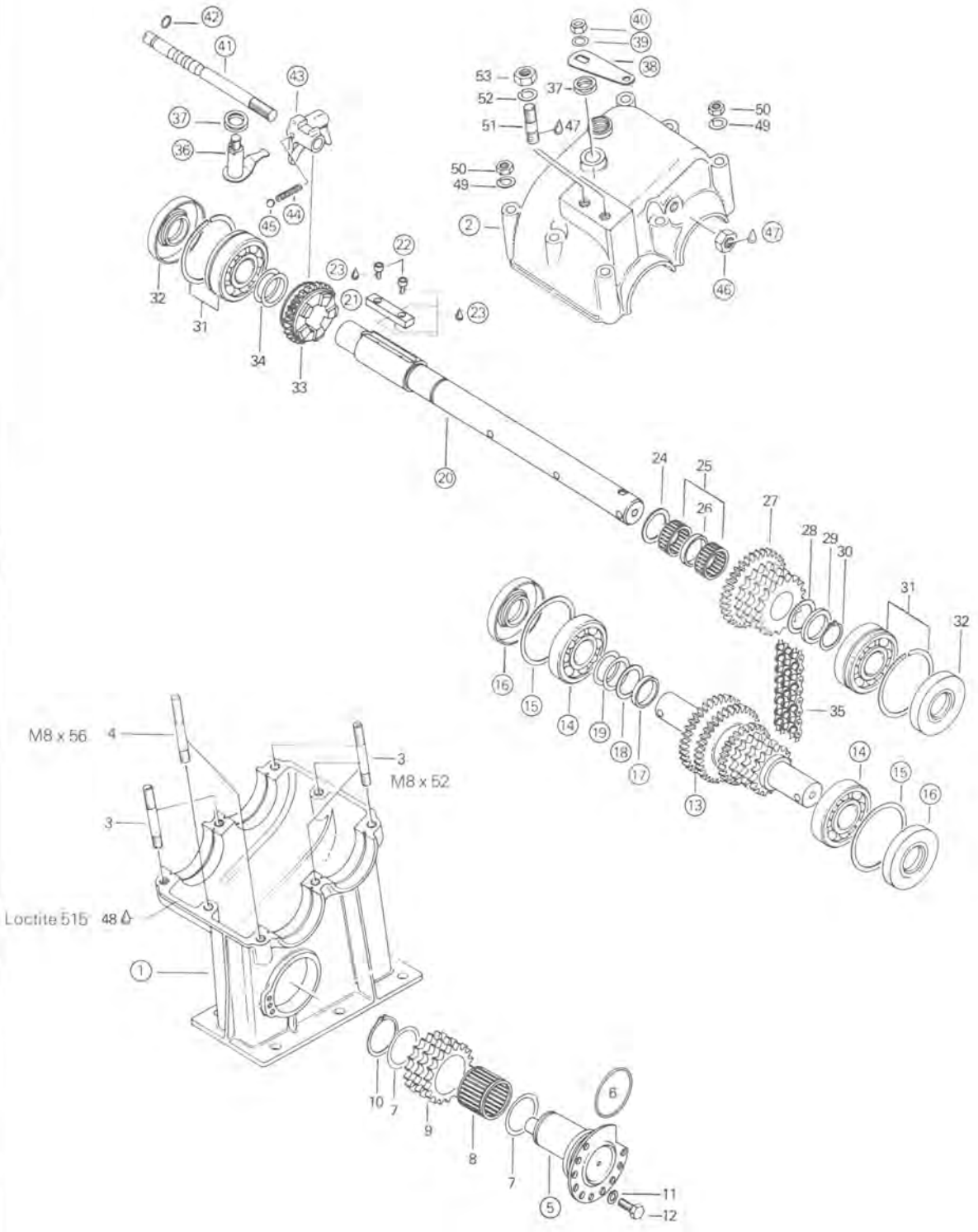
To adjust, loosen ⑰ jam nut and adjust ⑯ turnbuckle as required.

Retighten ⑰ jam nut.



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3 speeds gearbox (Alpine)



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1. *Transmission housing*
2. *Transmission cover*
3. *Stud M8 x 52 (6)*
4. *Stud M8 x 56 (2)*
5. *Tensioner axle*
6. *O'ring*
7. *Washer*
8. *Needle bearing*
9. *18 teeth tensioner sprocket*
10. *Circlip*
11. *Lockwasher*
12. *Hexagonal screw M6 x 14*
13. *Layshaft assembly*
14. *Ball bearing 6005 (2)*
15. *Washer (2)*
16. *Seal (2)*
17. *Distance sleeve*
18. *Shim 25.5/34/1*
19. *Shim (as required)*
20. *Drive shaft*
21. *Key*
22. *Allen screw M4 x 8 (2)*
23. *Loctite 271 (red)*
24. *Washer*
25. *Needle bearing*
26. *Distance sleeve*
27. *19 teeth shift sprocket*
28. *Shim 25.5/34/1*
29. *Distance ring*
30. *Circlip*
31. *Ball bearing 6205 (2)*
32. *Seal*
33. *23 teeth shift sprocket*
34. *Shim (as required)*
35. *90 links, triple roller chain*
36. *Gear change shaft*
37. *Shim (as required)*
38. *Gear change lever*
39. *Washer*
40. *Lock nut M8*
41. *Index rod*
42. *O'ring*
43. *Gear change fork*
44. *Index spring*
45. *Ball 1/4"*
46. *Hexagonal nut M10*
47. *Loctite 242 (blue)*
48. *Loctite 515 (violet)*
49. *Lockwasher (8)*
50. *Hexagonal nut M8 (8)*
51. *Stud M10 x 23 (2)*
52. *Lockwasher (2)*
53. *Hexagonal nut M10 (2)*

REMOVAL

Remove hood, pulley guard, drive belt and exhaust manifold from vehicle.

Remove brake assembly and shifter mechanism.

Remove upper column retaining brace.

Remove steering lower bracket from the gearbox.

Slacken upper bracket.

Release chain tension using tensioner.

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.

Remove oil seals from end bearing housings and center frame (to drain the oil).

Remove end bearing housings. (Pry out housings with two (2) screwdrivers inserted between housing and frame).

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.

Remove gearbox and gasket from frame.

DISASSEMBLY

① ② Remove the transmission cover from the transmission housing.

Remove the transmission components and set them on a table.

Remove the transmission cover components and set them on a table.

Clean the transmission housing and cover mating surfaces of Loctite residue.

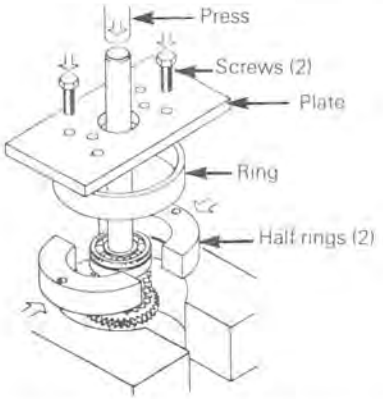
⑬ to ⑲ Remove the layshaft components and inspect for wear and/or damage.

⑳ to ㉝ Remove the shaft seals and the bearing circlips.

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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.

Visually inspect the components for damage or wear.

ASSEMBLY

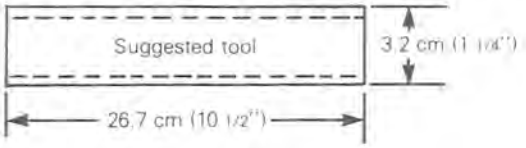
NOTE: Apply a small amount of motor oil (SAE 30) to the components before assembly.

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.

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 other components.
- Install the other shaft end bearing with shim(s) as required using the above mentioned tool.
  - Available shims:

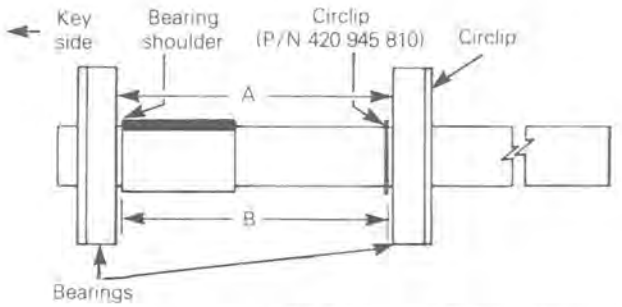
    25.5/34/0.2 (P/N 420 944 470)
    25.5/34/0.3 (P/N 420 944 471)
    25.5/34/0.5 (P/N 420 944 472)

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 ± .011").

Refer to the following illustration.



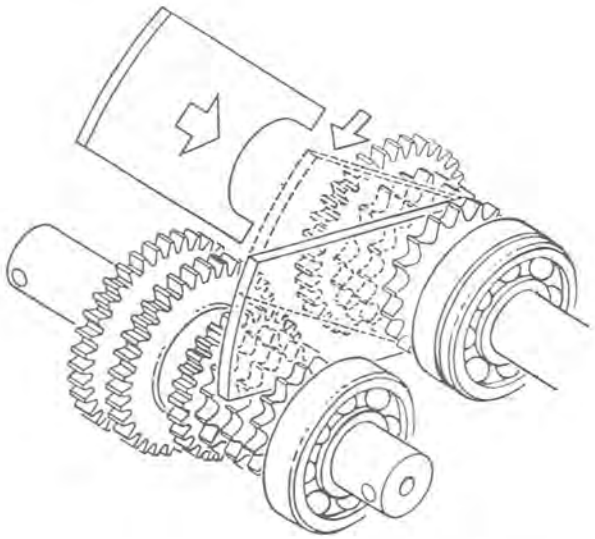
A-B = 0.1 ± 0.3 mm (0.003 ± .011")

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.

Verify sprocket alignment using the alignment tool (P/N 420 476 010). Proceed as follows:

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– Set alignment tool on shift sprocket 19 th and turn it into the corresponding layshaft and tensioner sprockets as illustrated.

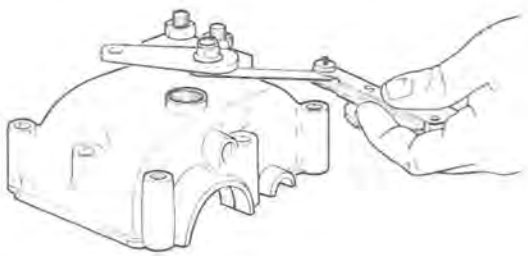


If necessary readjust clearance by transferring shim(s) on drive shaft to the opposite side.

CAUTION: Ensure the drive shaft and layshaft gears align with the tensioner gear and that all clearances are respected.

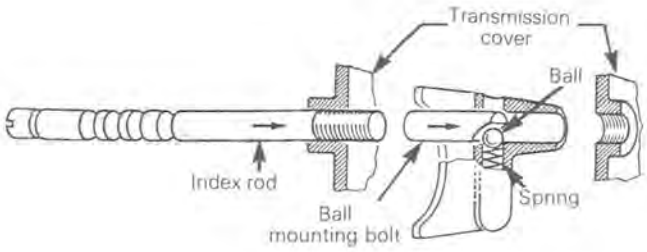
㊱ to ㊼ Reinstall the transmission cover components in the transmission cover.

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.

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.



Install the retaining nut and the washer. Torque to 23 N•m (17 ft-lbs).

Set the shift sprocket 23 teeth to **reverse** position.

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.

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

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.

Set the shifter lever to NEUTRAL position, turn driven pulley clockwise and adjust shifter arm position using the adjuster screw located ot the R.H. transmission cover portion. This will ensure the transmission is perfectly adjusted.

– Verify pulley alignment and reinstall the drive belt and the belt guard.

CAUTION: Check condition of drive axle seals; replace if necessary.

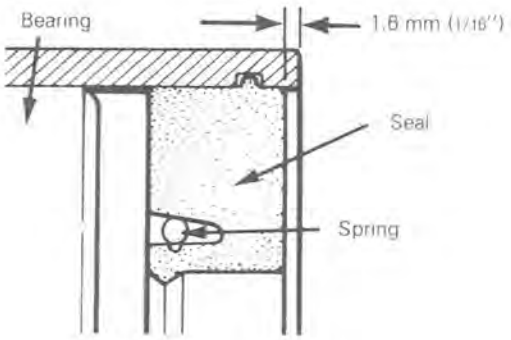
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From the left side of vehicle, place the drive axle within the track. Push the end bearing side of axle through the orifice in left side of frame, then push the splined end of axle into gearbox lower sprocket. Install opposite drive axle.

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.

Rotate the tensioner axle ⑤ to obtain 6 mm (1/4") maximum drive chain free-play.

Fill gearbox with 450 ml (16 Imp. ounces) of Bombardier chaincase oil.

Install exhaust manifold, drive belt and brake assembly. Proceed with pulley alignment.

Proceed with track tension and alignment.

Reinstall the hood.

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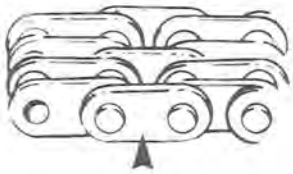
DRIVE CHAIN

GENERAL

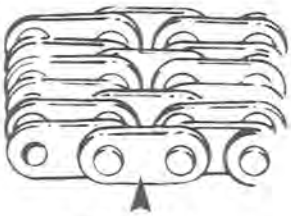
There are three (3) types of the Bombardier drive chains: a **single 1/2" pitch,** a **double 3/8" pitch,** and a **triple 3/8" pitch.** For proper use refer to Technical Data.



1/2" SINGLE



3/8" DOUBLE

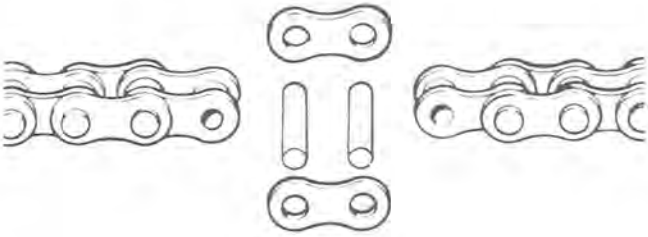


3/8" TRIPLE

There are two (2) variations of chains: detachable and endless.

CHAIN SEPARATION

When separating an endless chain, always use a chain bearing pin extractor. Also, make sure to remove one complete link.



1/2" SINGLE LINK



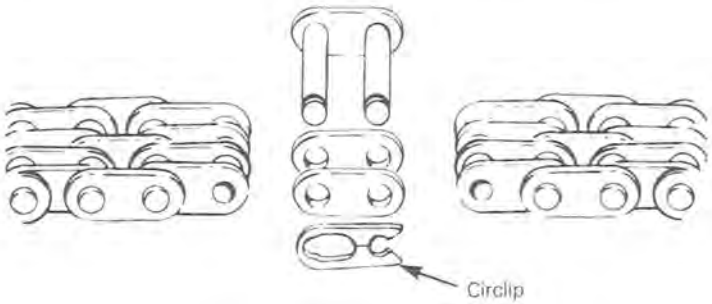
3/8" TRIPLE LINK



3/8" DOUBLE LINK

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.



CONNECTING LINK 3/8" DOUBLE



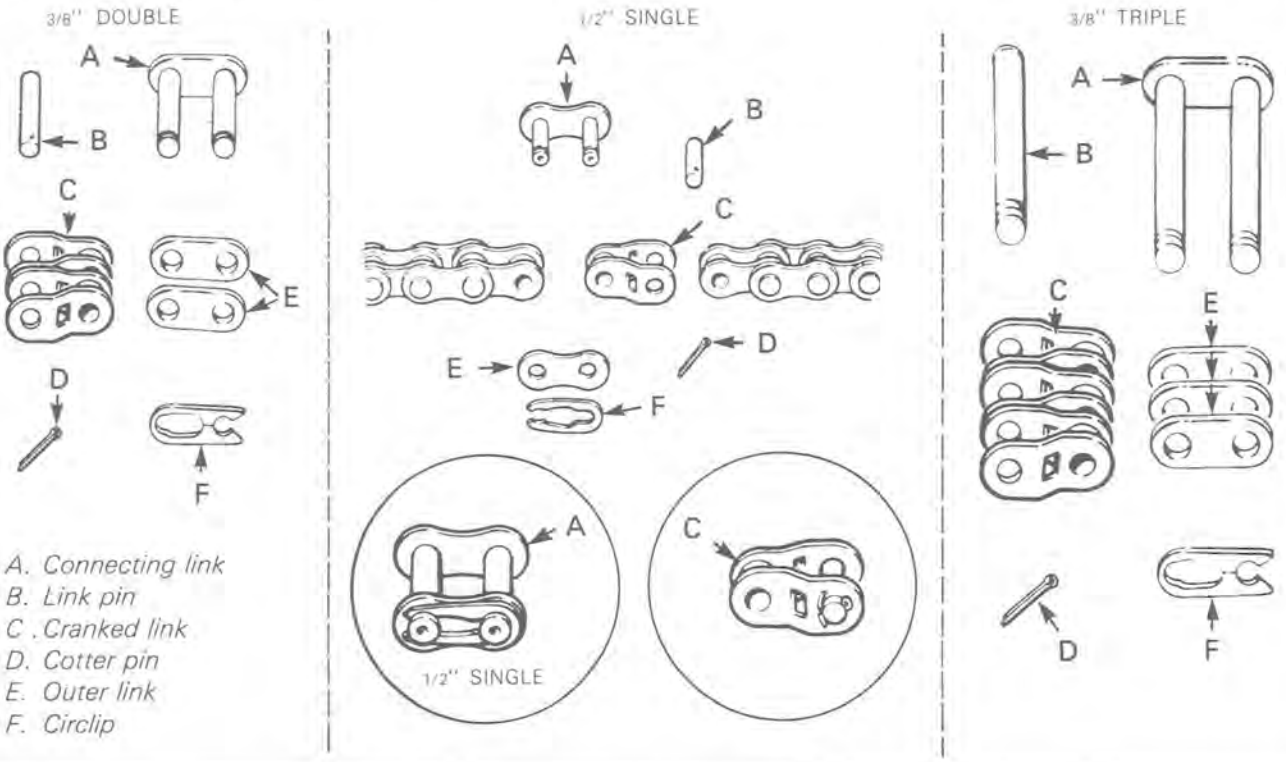
1/2" SINGLE



3/8" TRIPLE

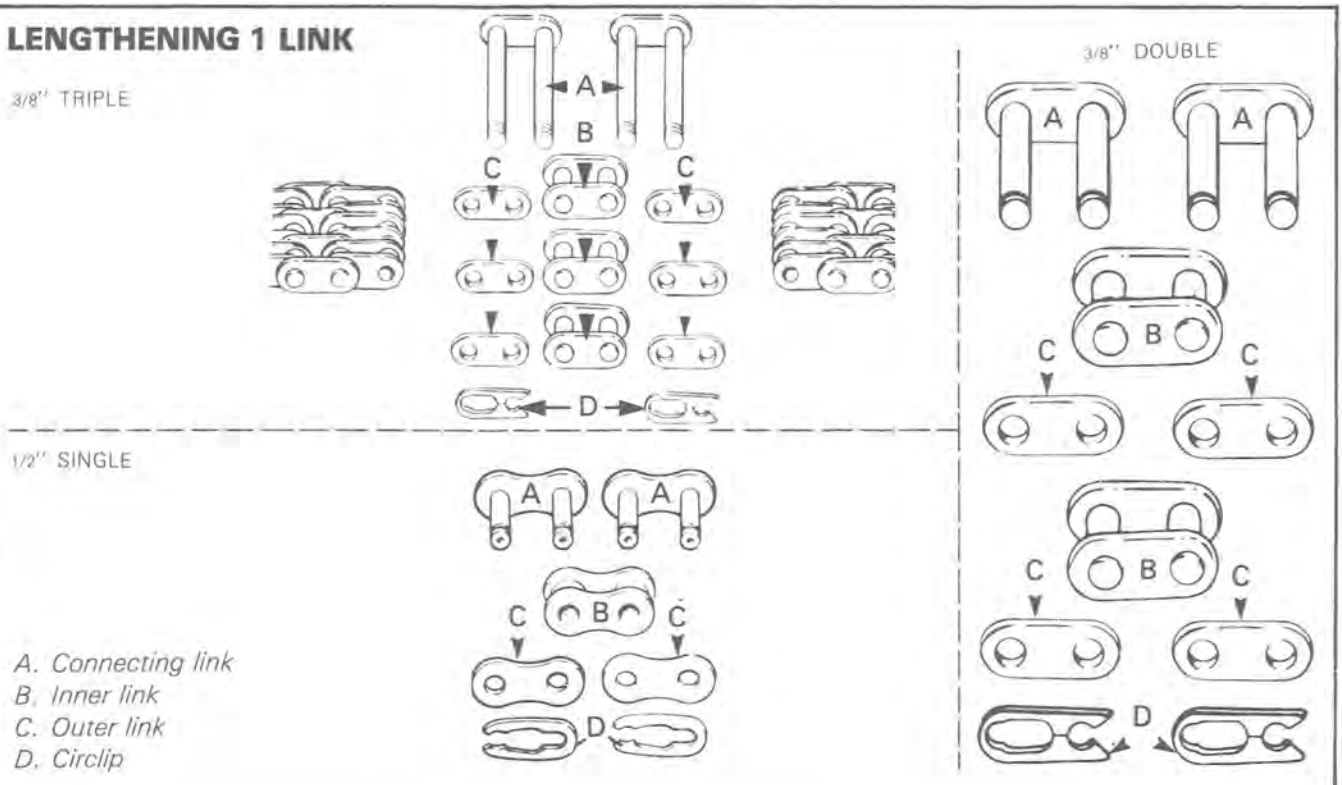
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LENGTHENING 1/2 LINK



A. Connecting link
B. Link pin
C . Cranked link
D. Cotter pin
E. Outer link
F. Circlip

LENGTHENING 1 LINK

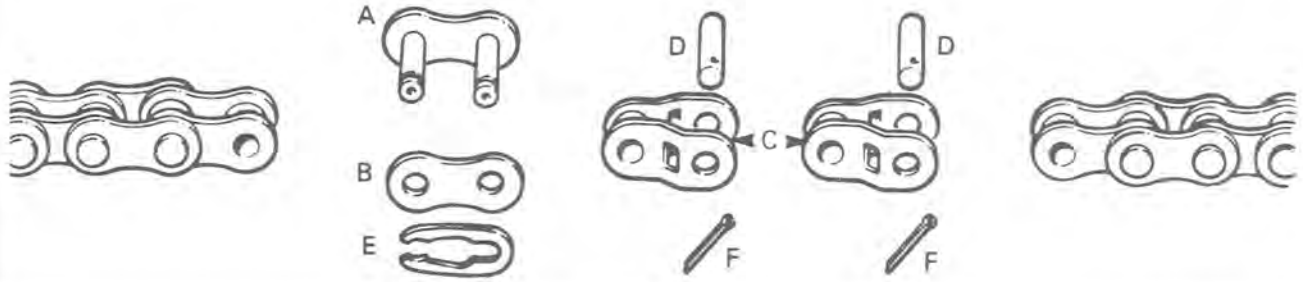


A. Connecting link
B. Inner link
C. Outer link
D. Circlip

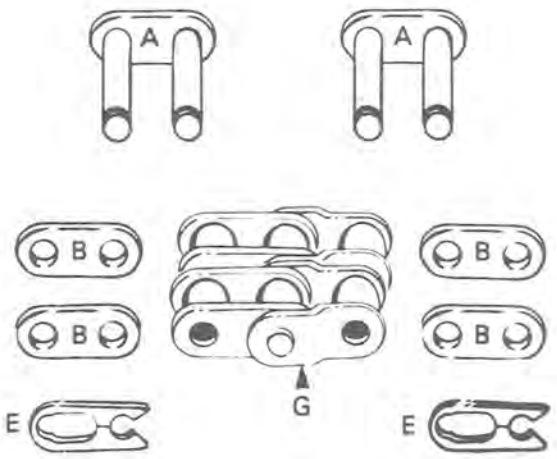
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LENGTHENING 1 1/2 LINK

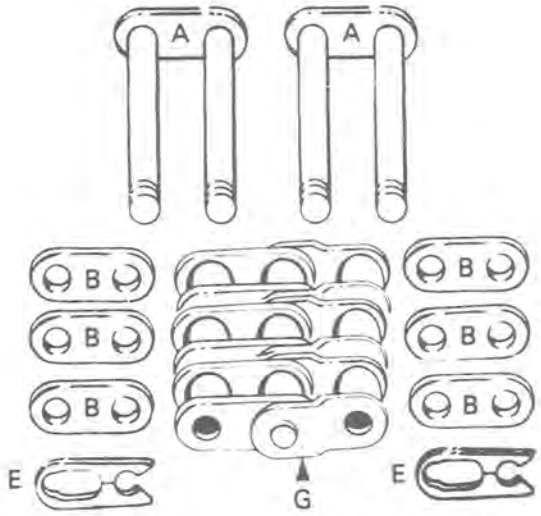
1/2" SINGLE



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

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ELECTRIC CHARTS

MODEL	CHART PAGE	HEADLAMP (watt)	TAILLIGHT (watt)	ELECTRICAL SYSTEM OUTPUT (watt)
Elan - Spirit	2	60/60	5/21	75/23
Citation 3500	3	60/60	5/21	160
Citation 4500 - Mirage II	3	60/60	5/21	160
Citation SS	3	60/60	5/21	160
Skandic 277 & 377	3	60/60	5/21	160
Nordik	4	60/60	5/21	160
Citation 4500 E	5	60/60	5/21	160
Everest 500	6	60/60	5/21	160
Blizzard 5500 MX	6	60/60	5/21	160
Everest 500E	7	60/60	5/21	160
Everest L/C	8	60/60	5/21	140
Blizzard 9700	9	60/60	5/21	160
Alpine 503	10	60/60	5/21	160

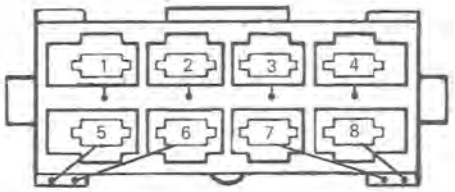
CHART CODES

WIRING COLOUR CODE

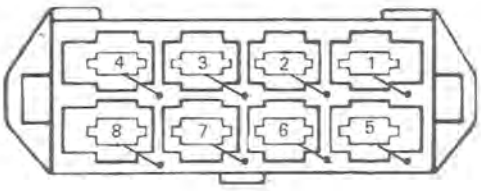
COLOUR CODE	
BK – BLACK	GN – GREEN
WH – WHITE	GY – GREY
RD – RED	VI – VIOLET
BL – BLUE	OR – ORANGE
YL – YELLOW	BR – BROWN

Connector position code

Receptacle housing

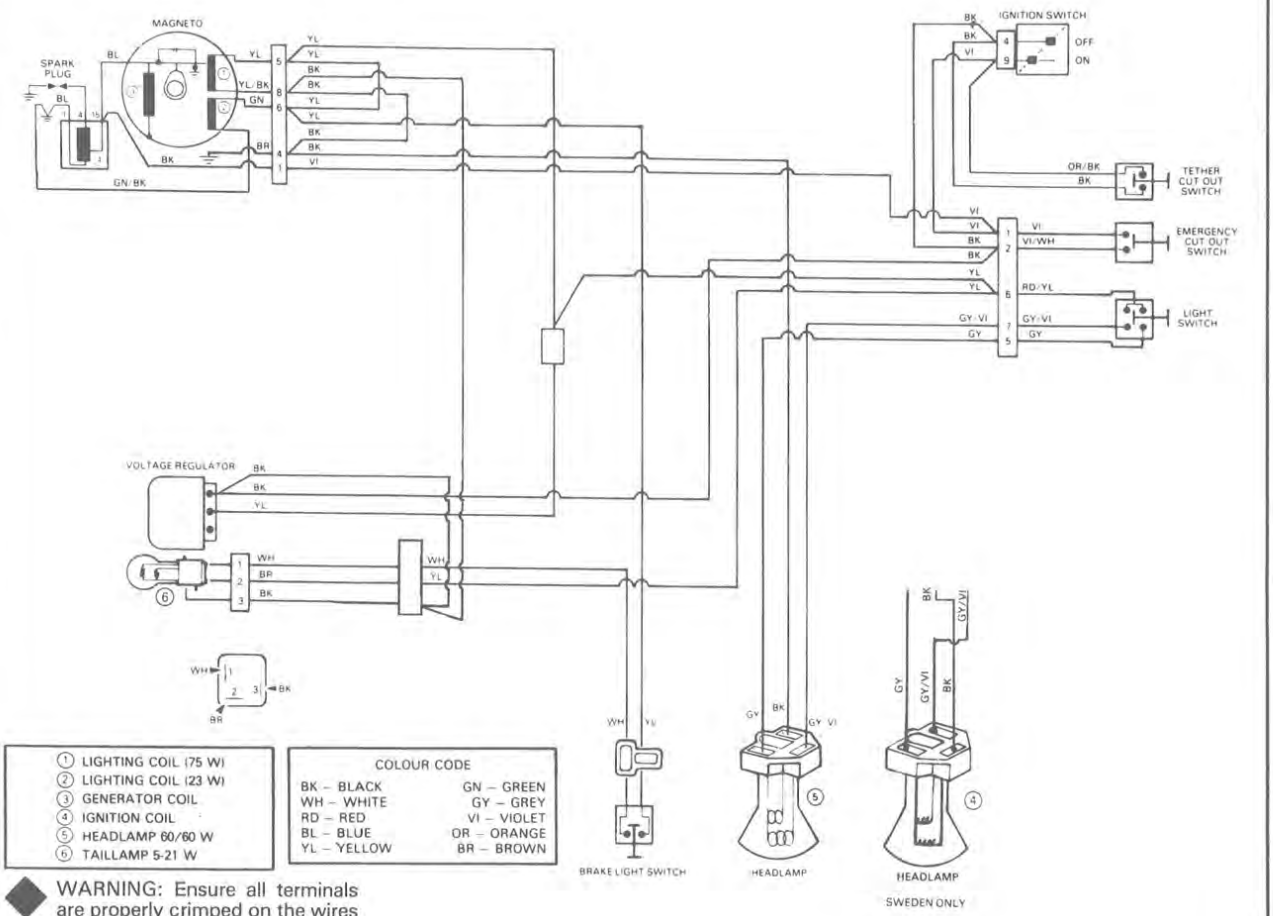


Tab housing



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1983 Elan - Spirit



①	LIGHTING COIL (75 W)
②	LIGHTING COIL (23 W)
③	GENERATOR COIL
④	IGNITION COIL
⑤	HEADLAMP 60/60 W
⑥	TAILLAMP 5-21 W

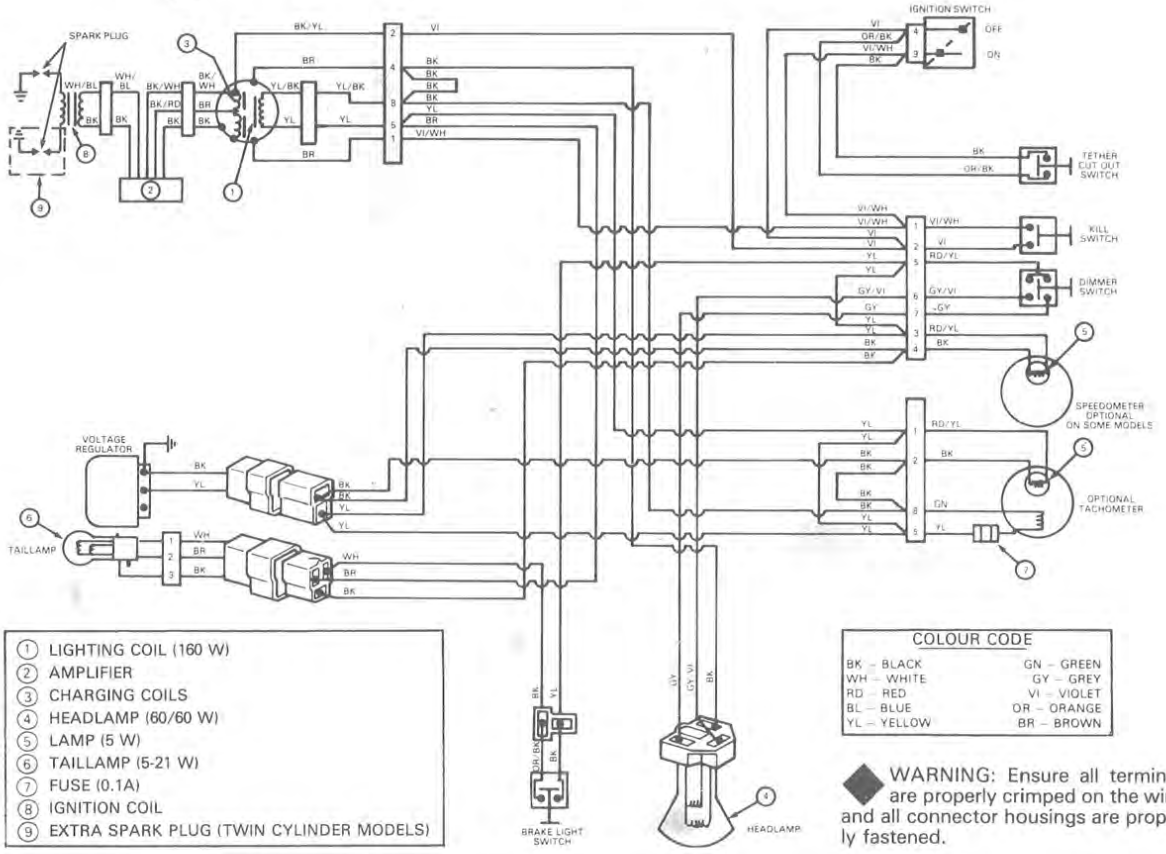
COLOUR CODE

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.

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1983 Citation 3500
4500
SS
Mirage II
Skandic 277
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 (0.1A)
8. IGNITION COIL
9. EXTRA SPARK PLUG (TWIN CYLINDER MODELS)

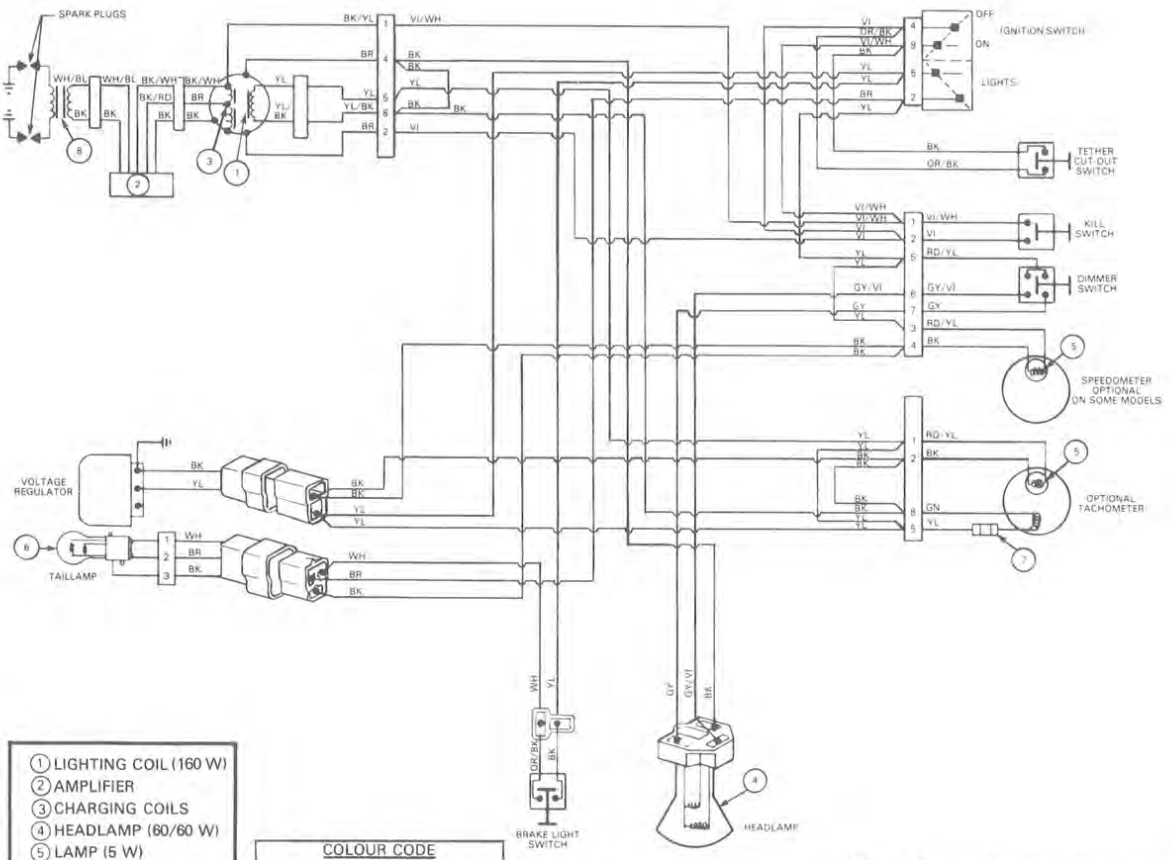
COLOUR CODE

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.

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1983 Nordik



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

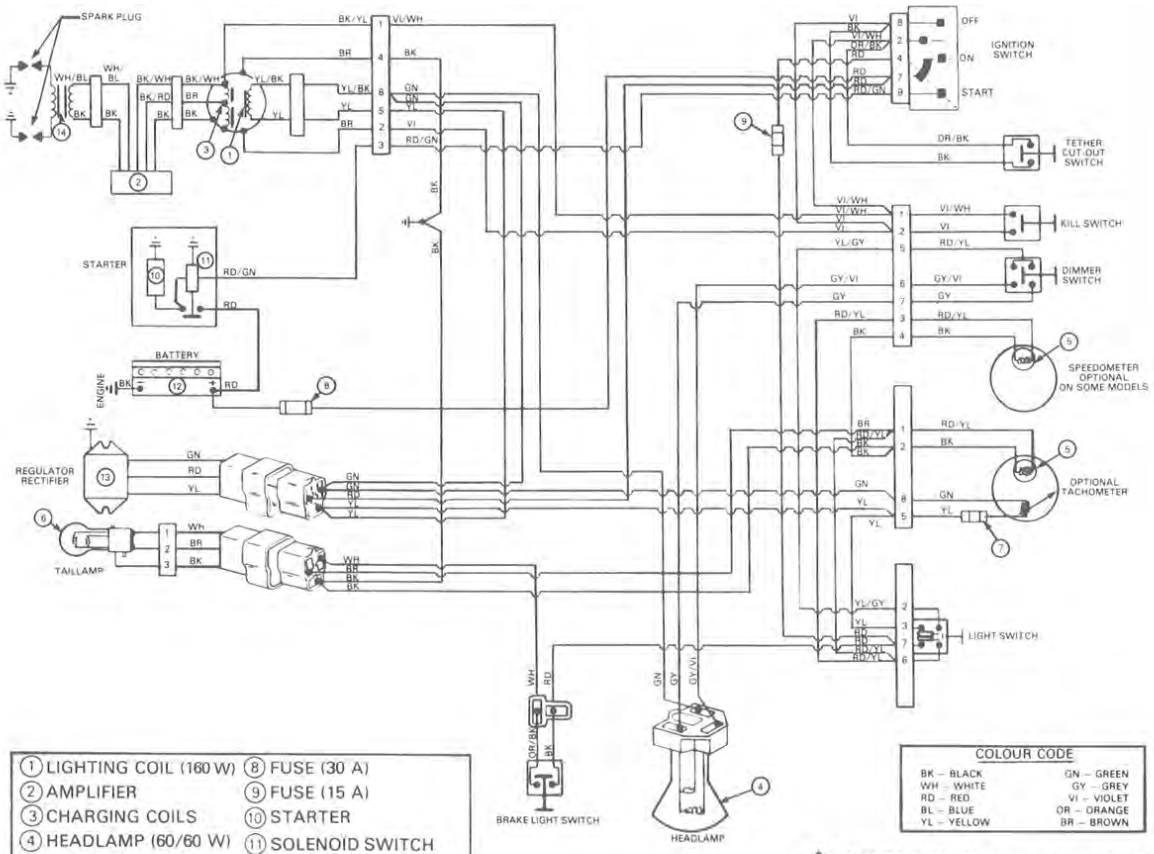
COLOUR CODE

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.

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1983 Citation 4500 E



① LIGHTING COIL (160 W)	⑧ FUSE (30 A)
② AMPLIFIER	⑨ FUSE (15 A)
③ CHARGING COILS	⑩ STARTER
④ HEADLAMP (60/60 W)	⑪ SOLENOID SWITCH
⑤ LAMP (5 W)	⑫ BATTERY (24 A)
⑥ TAILLAMP (5/21 W)	⑬ REGULATOR RECTIFIER
⑦ FUSE (0.1 A)	⑭ IGNITION COIL

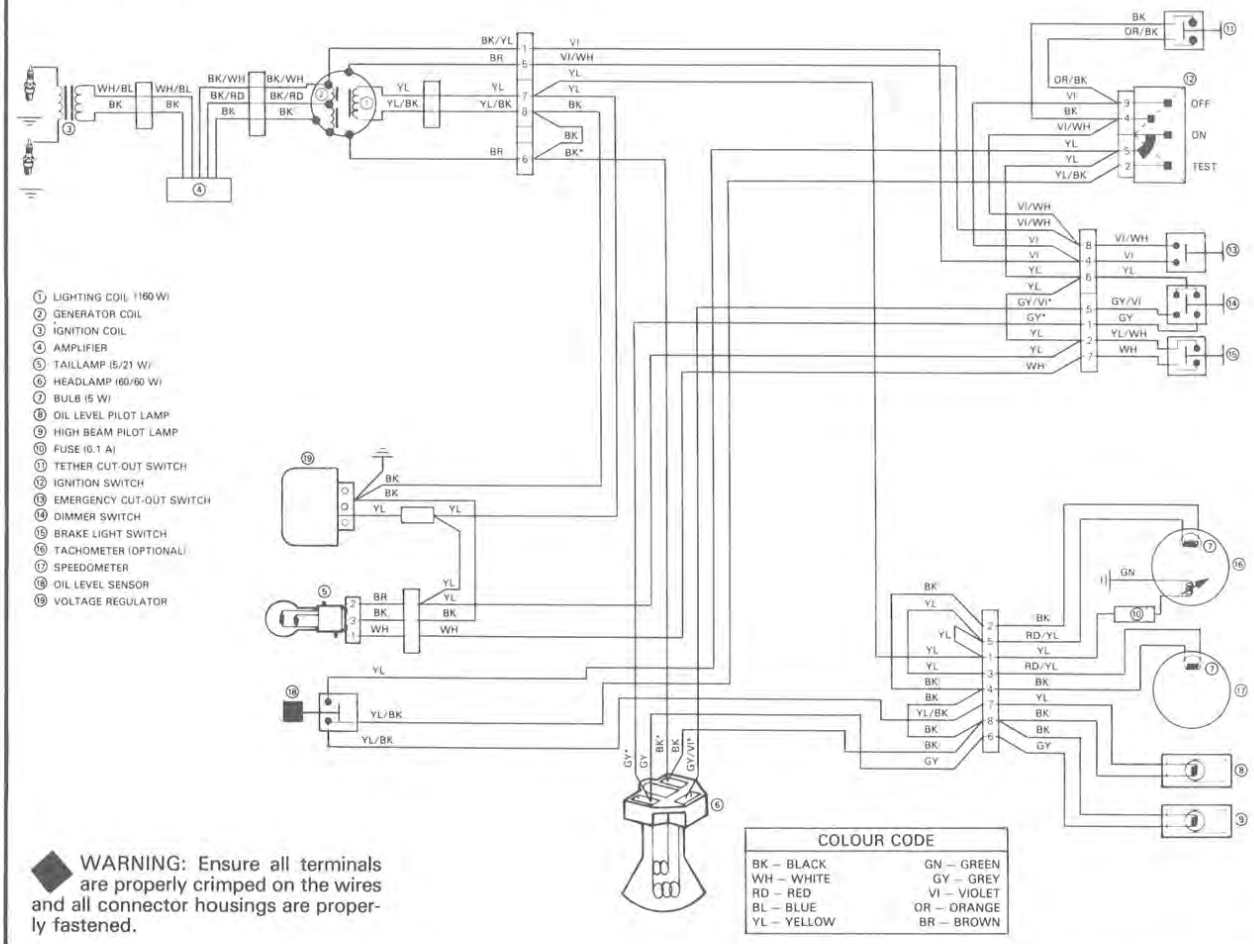
COLOUR CODE

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.

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1983 Everest 500
Blizzard 5500 MX

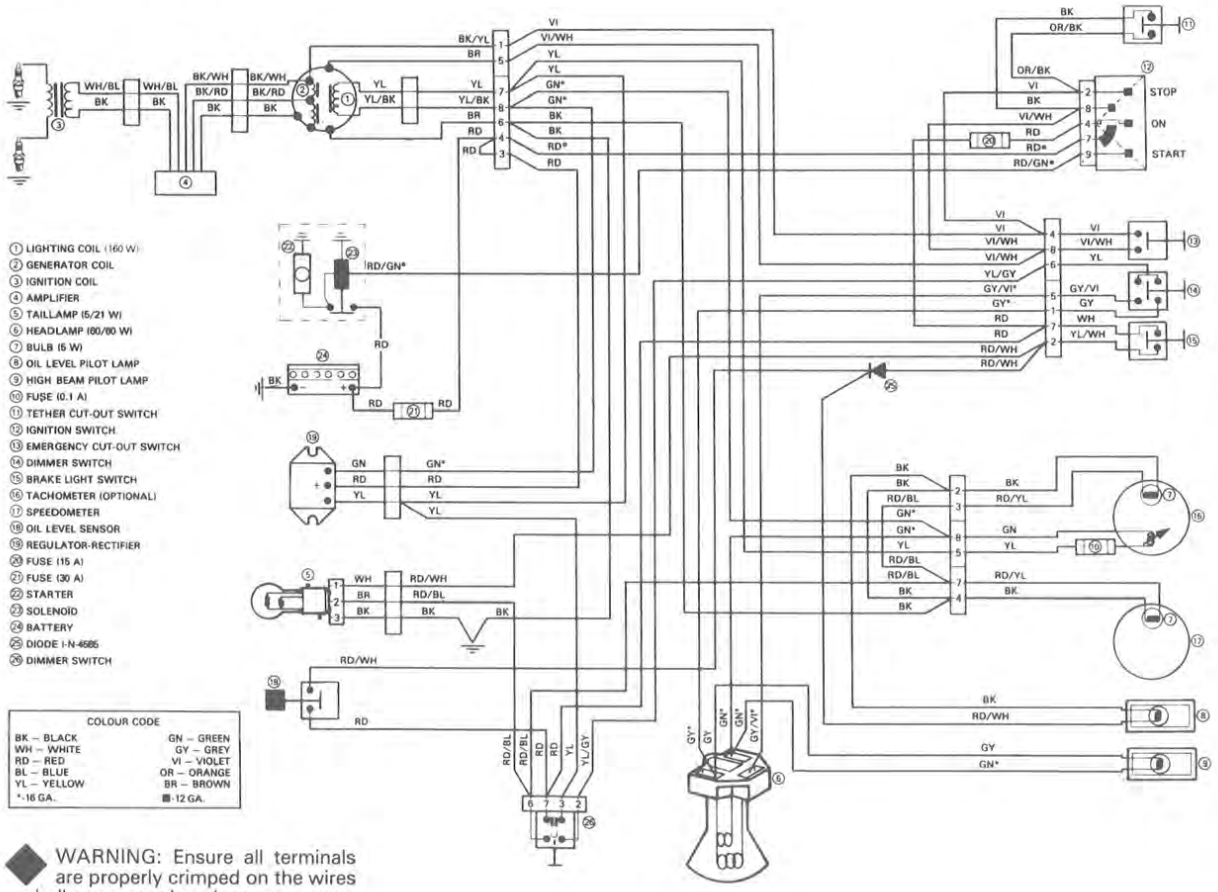


① LIGHTING COIL (160 W)
② GENERATOR COIL
③ IGNITION COIL
④ AMPLIFIER
⑤ TAILLAMP (5/21 W)
⑥ HEADLAMP (60/60 W)
⑦ BULB (5 W)
⑧ OIL LEVEL PILOT LAMP
⑨ HIGH BEAM PILOT LAMP
⑩ FUSE (0.1 A)
⑪ TETHER CUT-OUT SWITCH
⑫ IGNITION SWITCH
⑬ EMERGENCY CUT-OUT SWITCH
⑭ DIMMER SWITCH
⑮ BRAKE LIGHT SWITCH
⑯ TACHOMETER (OPTIONAL)
⑰ SPEEDOMETER
⑱ OIL LEVEL SENSOR
⑲ VOLTAGE REGULATOR

◆ WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.

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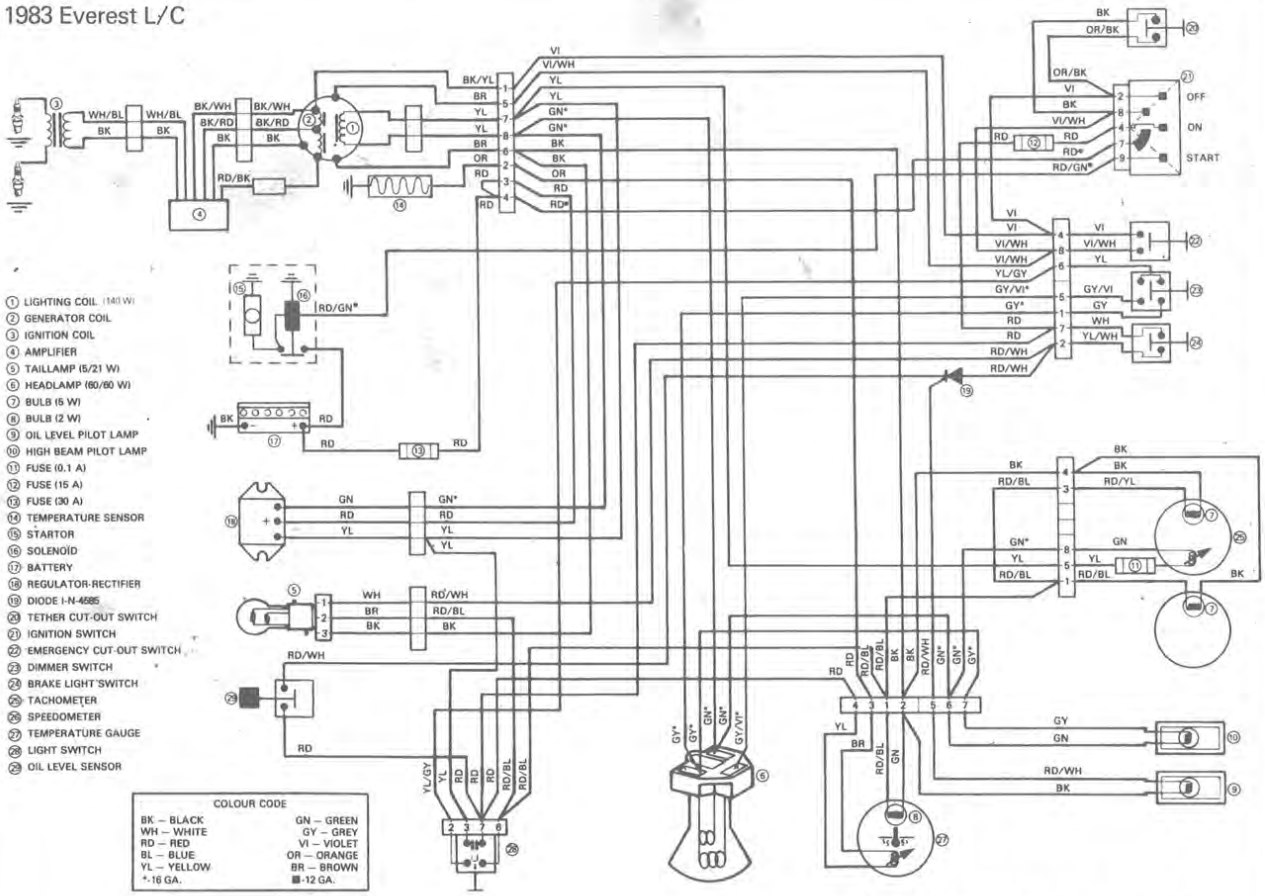
1983 Everest 500 E



◆ WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.

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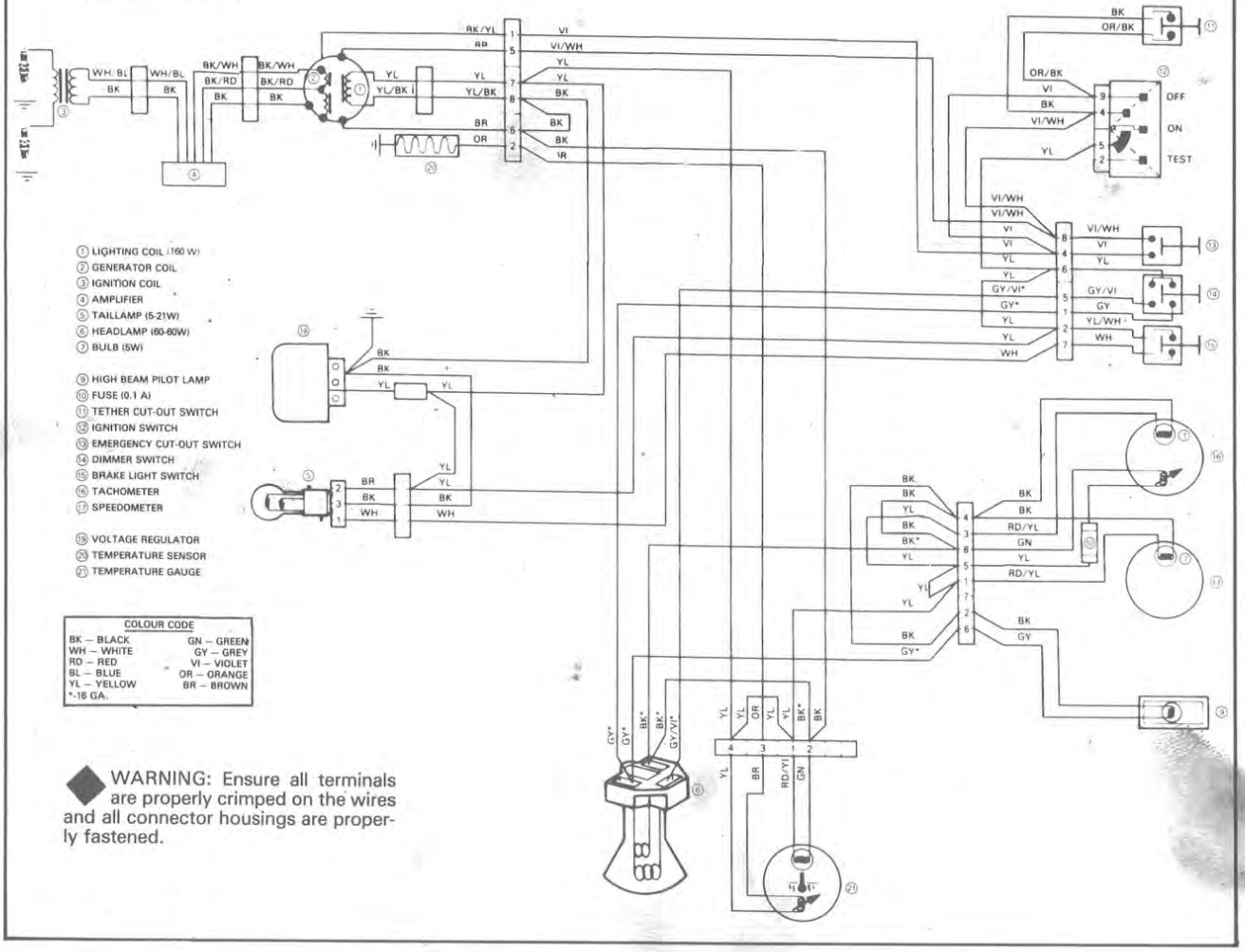
1983 Everest L/C



◆ WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.

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1983 Blizzard 9700



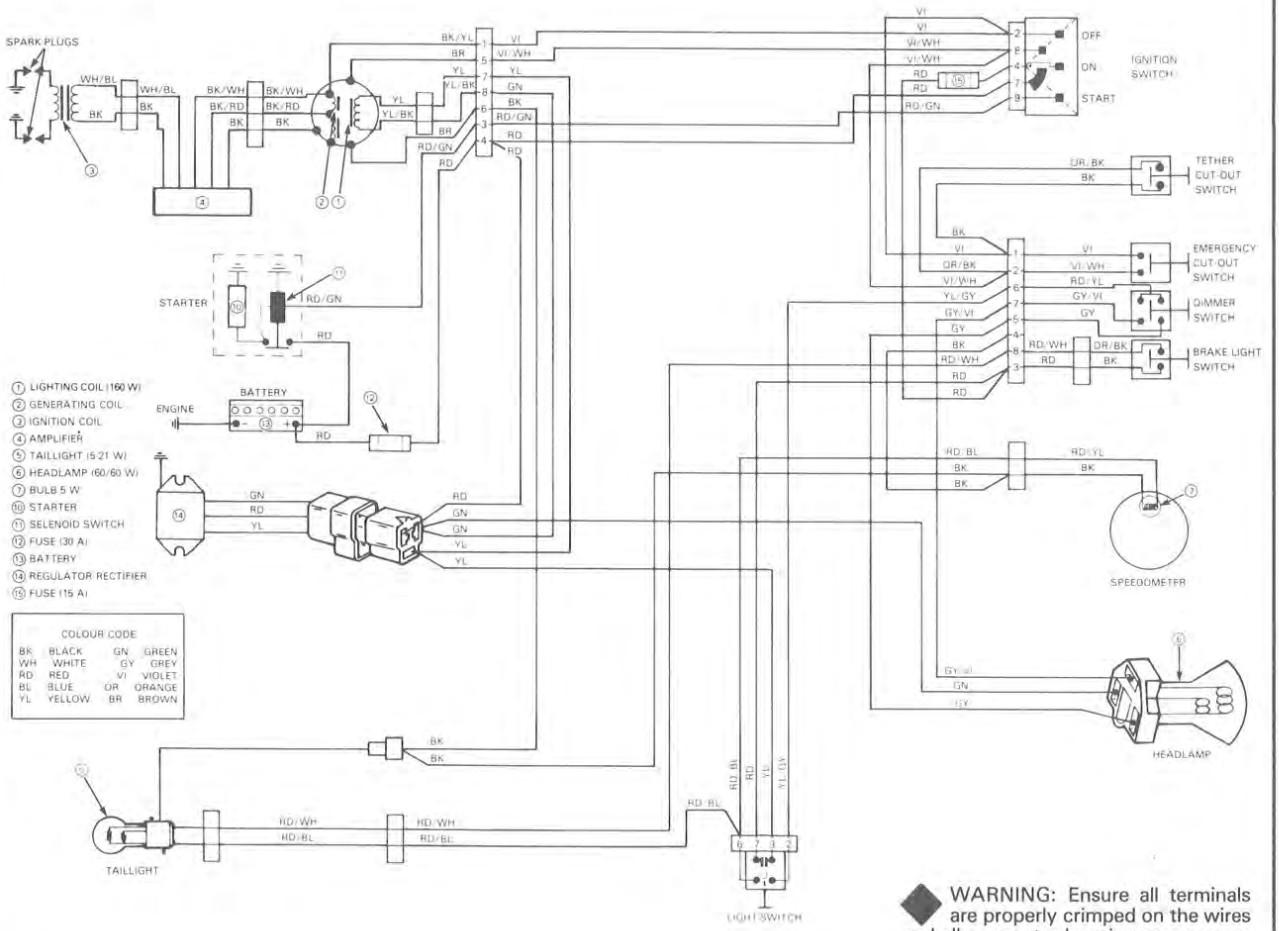
COLOUR CODE

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.

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1983 Alpine



◆ WARNING: Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.

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IGNITION TIMING

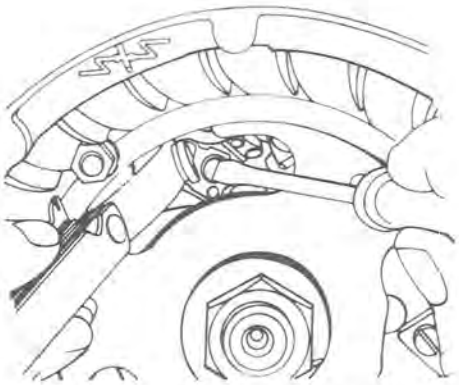
BREAKER POINTS IGNITION SYSTEMS

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) 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

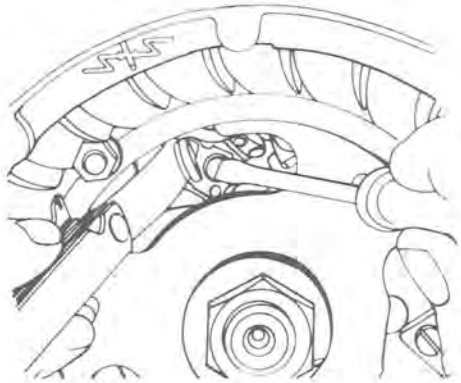
Too late
Turn armature
plate counter-clockwise

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.

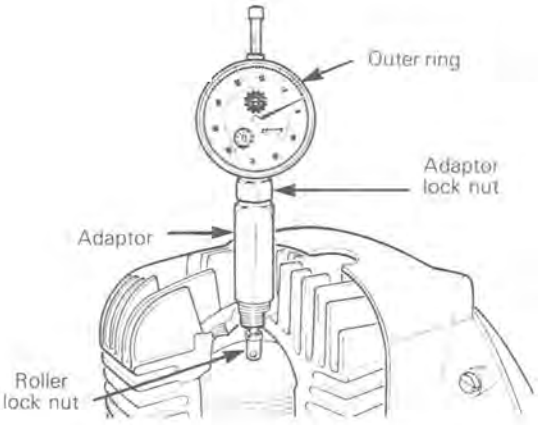
NOTE: Breaker points gap can change upon tightening. Always recheck after tightening.



4. Disconnect junction block at engine then connect one lead of a timing instrument (flashlight type) to the blue wire coming from engine. Connect other to ground (metallic portion of the engine).

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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.

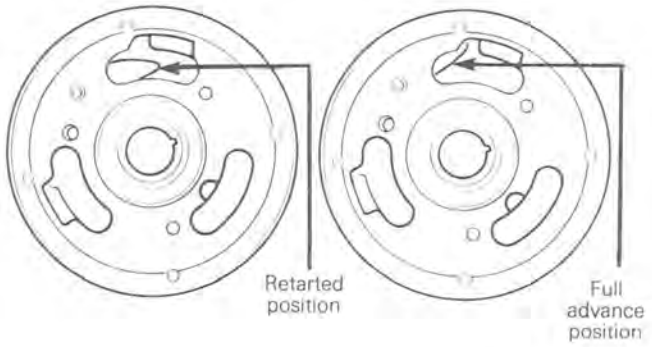
6. Slacken the three (3) armature plate retaining screws and turn timing instrument ON.
7. Rotate magneto counter-clockwise until piston is at:

   DIRECT TIMING: 3.98 ± 0.25 mm BTDC
   (0.157 ± .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.

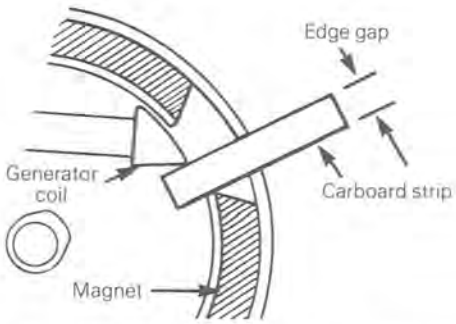
Edge gap verification

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.

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ELECTRONIC IGNITION SYSTEMS — NIPPONDENSO

277 ENGINE TYPE

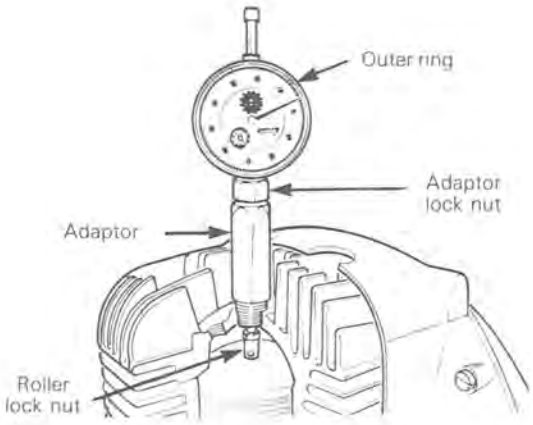
Two methods are detailed in this section, the first using a **Top dead center gauge,** the second using a **stroboscopic timing light.**

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 "0" 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.

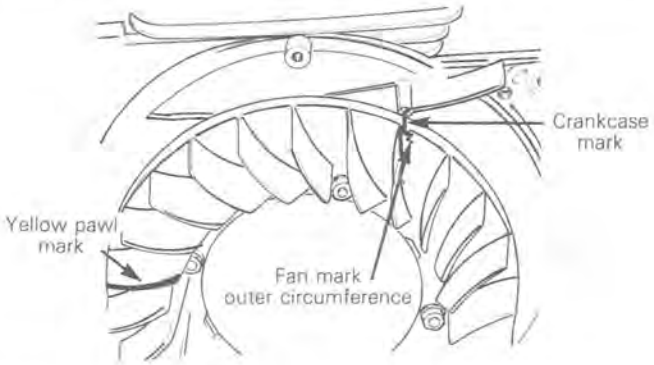
- Serial number 3,376,858 & above

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.

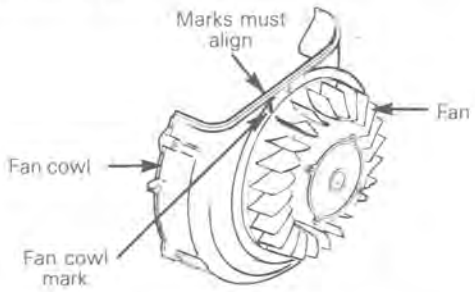
At this point, the crankcase mark and the fan outer circumference mark MUST align.



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.

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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.

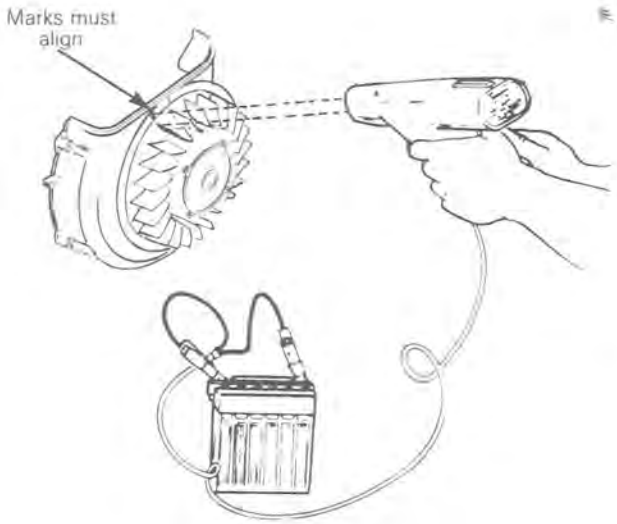
The ignition components are affected by temperature variation, therefore, timing must be checked when engine is cold, after MAXIMUM 20 seconds idling.

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.

Start the engine and point timing light straight in line with the fan cowl timing mark.



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.

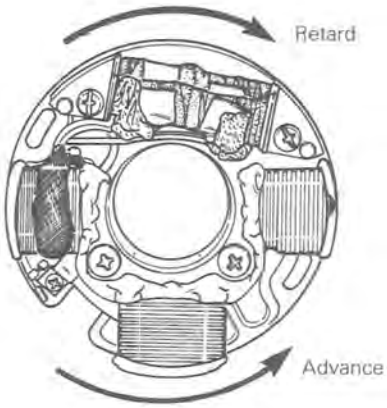
Stop engine.

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).

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377, 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.

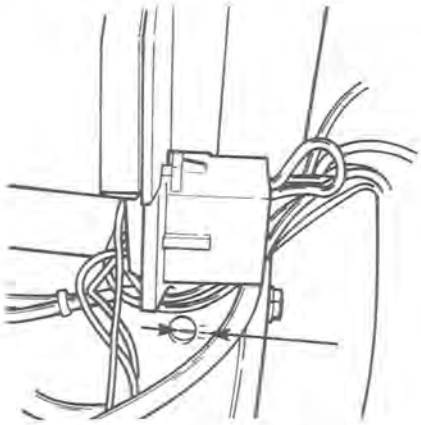
Bring magneto side piston to top dead center position.

Back-off (rotate counter-clockwise) piston to:

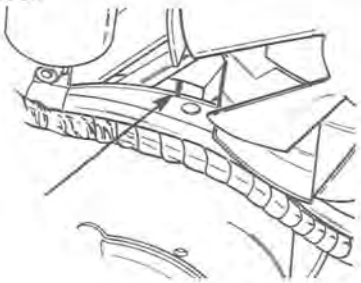
377 engine type: 2.31 mm (0.091") BTDC
503 engine type: 2.29 mm (0.090") BTDC

BTDC: Before top dead center.

377 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 Speciality, 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).

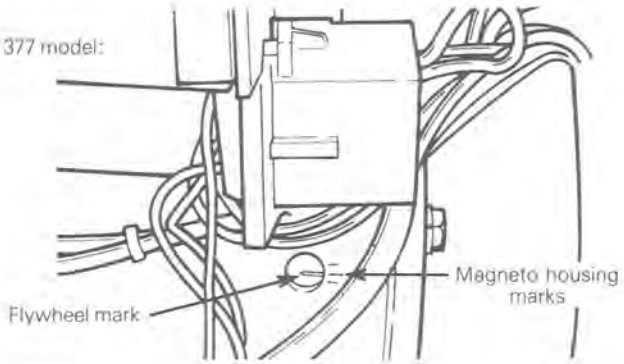
◆ **WARNING: Place ski tips against a wall, raise rear of the vehicle on a stand so that the track does not contact the ground. Make sure no one passes behind the vehicle while engine is running. Keep clear of track and other moving parts.**

○ **NOTE:** Turn headlamp "ON" when checking the timing.

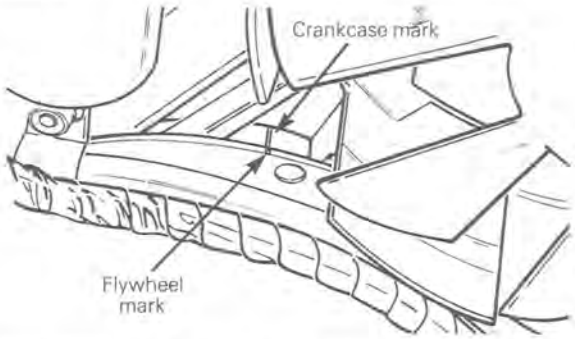
Start engine and point timing ligth straight in line with the timing marks:

377: Look through inspection hole.
503: Look through the fan.

377 model:



503 model:



Check timing mark alignment. If timing marks align, timing is correct.

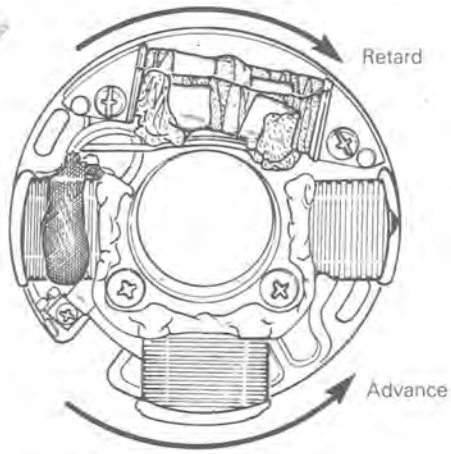
For both models (377 & 503 engine) if the timing marks do not align, armature plate must be adjusted.

Armature plate will have to be moved to advance or retard timing.

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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).

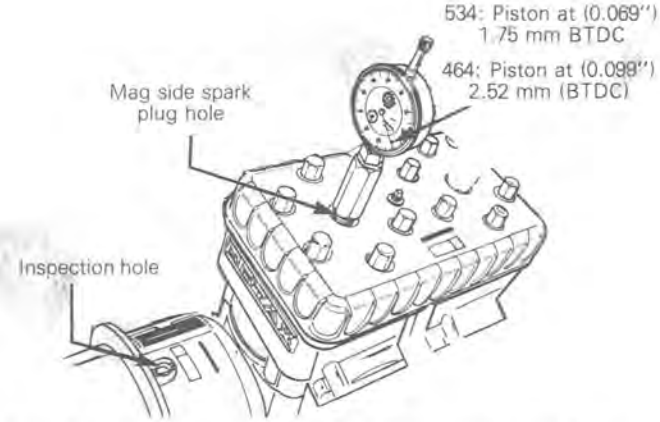
464, 534 ENGINE TYPE

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.

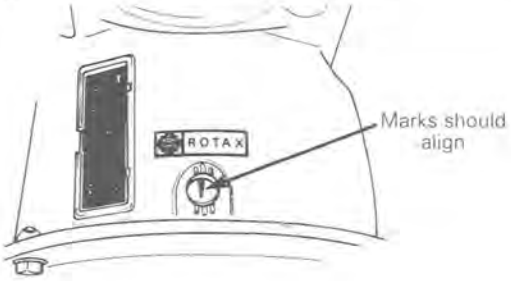
Back-off (rotate counter-clockwise) piston to:

464 engine type: 2.52 mm (0.099") BTDC
534 engine type: 1.75 mm (0.069") BTDC

BTDC: before top dead center.

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.

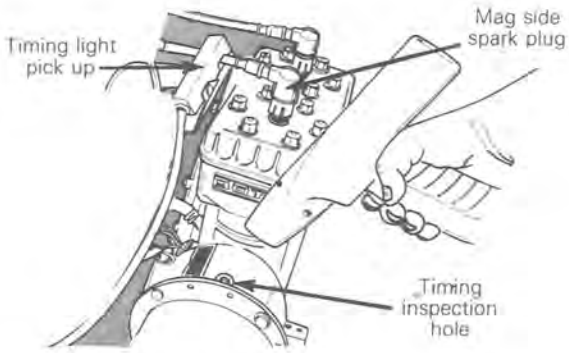
Remove the timing inspection plug on magneto housing.

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.

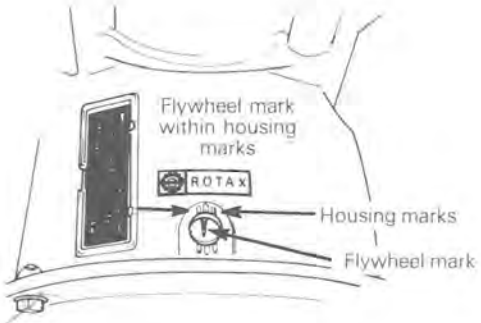


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Bring engine to 6000 R.P.M. for a brief instant.

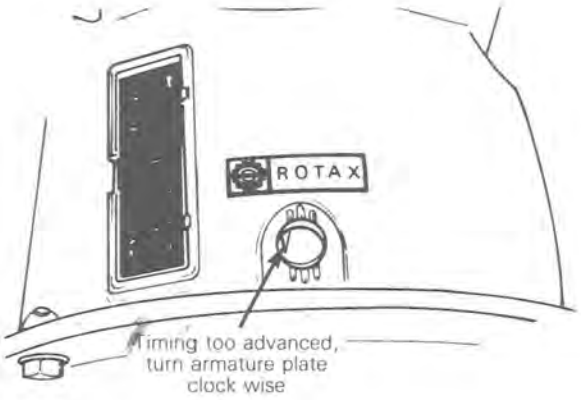
Check timing mark alignment. If flywheel mark aligns within housing marks, timing is correct.

Stop engine.



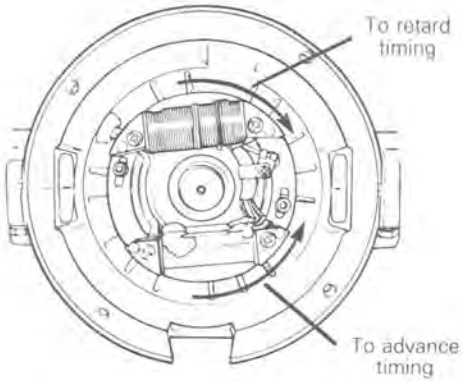
If flywheel mark did not align within magneto housing marks, armature plate must be adjusted.

Armature plate will have to be moved to advance or retard timing.



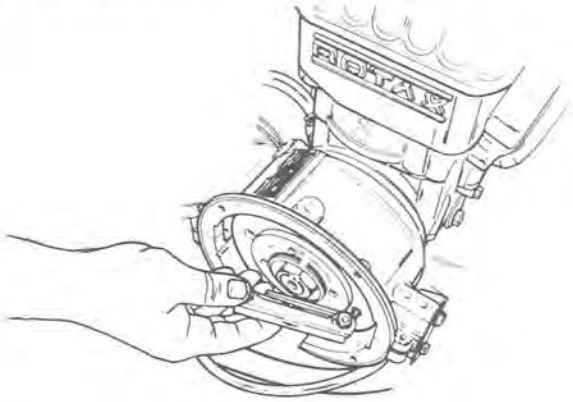
To adjust remove rewind starter assembly and starter pulley.

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.

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SPARK PLUGS

NOTE: The 1983 Bombardier snowmobiles are using two (2) spark plug types. One type is the Bosch spark plug and the other type is NGK spark plug.

BOSCH SPARK PLUG TYPE

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

1983 CROSS REFERENCE CHART

List of Bosch spark plugs used on 1983 Bombardier snowmobiles.

New number	Old number
M 7 A	M 175 T 1

NOTE: To convert from Bosch to NGK spark plugs, see Service Bulletin 82-12.

NGK SPARK PLUG TYPE

SPARK PLUG NUMBERING SYSTEM

Bombardier is using the NGK spark plug type on most of the 1983 snowmobile models.

The heat range identification system is:

High number	cold plug
Low number	hot plug

1983 CROSS REFERENCE CHART

List of NGK spark plugs used on 1983 Bombardier snowmobiles.

BR-7ES
BR-8ES

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EXPLANATION OF NGK SYSTEM

BR-7ES

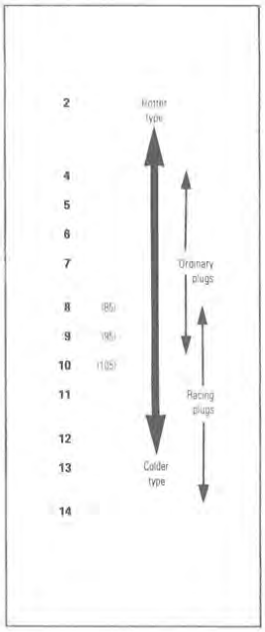
First letter prefix for thread and hexagon size

Letter	Thread size Hexagon size	Example
A	18 mm 25.4 mm (1")	A-6
B	14 mm 20.6 mm (13/16")	B-6ES
C	10 mm 16.0 mm (5/8")	C-7HS
D	12 mm 18.0 mm (0.708")	D-7ES
F	7/8" 18 23.8 mm (15/16")	F-23
G	PF 1/2" 14 23.8 mm (15/16")	G-27

Second & third letter prefix for construction feature, except single prefix

Letter	Construction feature	Example
B	Hexagon size is 20.6 mm	A-B-6
C	Hexagon size is 16.0 mm	B-C-6E
G	Hexagon size is 23.8 mm	A-G-6
M	Short type plug (Bantam)	B-M-6A
P	Projected insulator nose type	B-P-6ES
R	Resistor type	BP-R-6FS
S	Shielded type	B-S-6E
U	Surface discharge type	B-U-HX

Heat rating number



First letter suffix for thread reach

Letter	Thread reach	Example
E	19.0 mm (3/4") (Racing type 18.0 mm)	B6 E-S
H	12.7 mm (1/2") (Racing type 12.5 mm)	D6-H-S
L	11.2 mm (7/16")	B-6-L
	12.0 mm (0.472") (thread dia. 18 mm)	A-6
	9.5 mm (3/8") (thread dia. 14 mm)	B-6-S
None	22.5 mm (0.886") (thread dia. PF 1/2" 14)	G-27
	16.0 mm (5/8") (thread dia. 7/8" 18)	F-23
	Conical seat type	
	A-F 10.9 mm (0.429")	AP6-F-S
	B-F 11.2 mm (0.441")	BP6-F-S
	BM-F 7.8 mm (0.307")	BM-6-F
	B-EF 17.5 mm (0.689")	BP6E-F-S

Second suffix letter for construction feature, etc.

Letter	Construction feature, etc.	Example
A	Special method	BP5E-A
B	For CVCC	B6E-B
C	Competition type	BBH-C-S
F	Conical seat type	AP6-F-S
K	Multiple ground electrodes (2 electrodes)	BP6E-K-A
L	Middle heat range	BP5EA-L
M	For Rotary, multiple ground electrodes (2 electrodes)	B7E-M
N	Racing plugs, Nickel ground electrode	B-8E-N
P	Racing plugs, platinum, ground electrode	B-8E-P
Q	Multiple ground electrodes (4 electrodes)	BP5E-Q-13
S	Copper core center electrode	BP6E-S
T	For Rotary, multiple ground electrodes (3 electrodes)	B7E-T
V	Center electrode of precious metals	B6E-V
W	Tungsten electrode	BUH-W
X	Series gap plugs	BUH-X

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HEAT RANGE

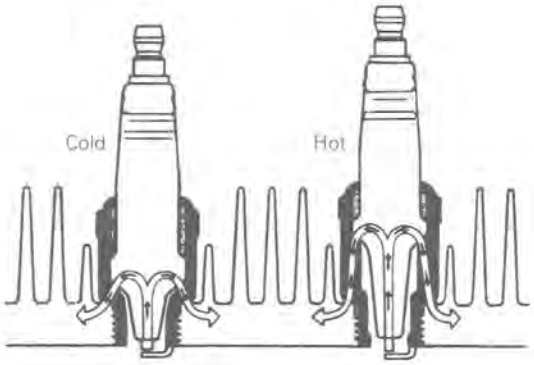
The proper operating temperature or heat range of the spark plug is determined by the spark plug's ability to dissipate the heat generated by combustion.

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



Overheated (light grey) | Normal (brownish) | Fouled (black)

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.

   Bosch - "M" plug (18 mm) 37 N•m (27 ft-lbs)
   NGK - "B" plug (14 mm) 27 N•m (20 ft-lbs)

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SPARK PLUG CHART

Models	Engine type	Spark plugs
Elan & Spirit	247	Bosch M 175 T 1 (M 7 A)
Citation 3500 & Skandic 277	277	NGK BR-8ES
Citation 4500/E & Mirage II	377	NGK BR-8ES
Citation SS	377	NGK BR-8ES
Nordik & Skandic 377	377	NGK BR-8ES
Blizzard 5500 MX	503	NGK BR-7ES
Blizzard 9700	534	NGK BR-8ES
Everest 500/E	503	NGK BR-7ES
Everest L/C	464	NGK BR-8ES
Alpine	503	NGK BR-7ES

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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.

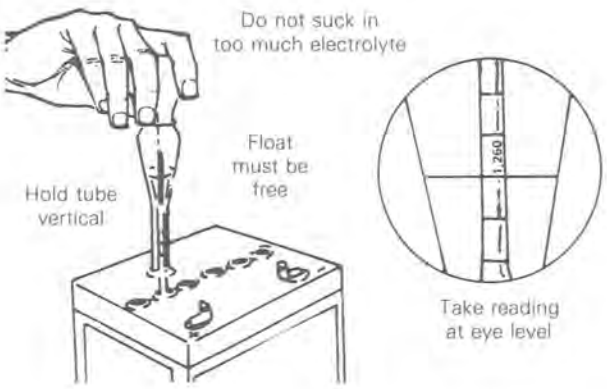
INSPECTION

Visually inspect battery casing for cracks or other possible damage. If casting is damaged, replace battery.

Inspect battery posts for security of mounting. Inspect for cracked or damaged battery caps. Ensure that vent holes are unobstructed. Replace defective caps. If vent hole is blocked, clean using a firm strand of wire.

◆ 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.

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Temperature-Corrected Specific Gravity	Battery State of Charge	Freezing Point of Battery
1.260	Fully Charged	-59°C (-74°F)
1.230	¾ charged	-40°C (-40°F)
1.200	½ charged	-27°C (-16°F)
1.170	¼ 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 (if unavailable use drinkable water)

▼ CAUTION: Do not overfill bottom of vent wells.

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 soak through battery cells.
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 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 vibrating lightly the battery by hand.
7. Readjust electrolyte level to UPPER LEVEL.
8. Reinstall the caps and wipe off any spillage 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.

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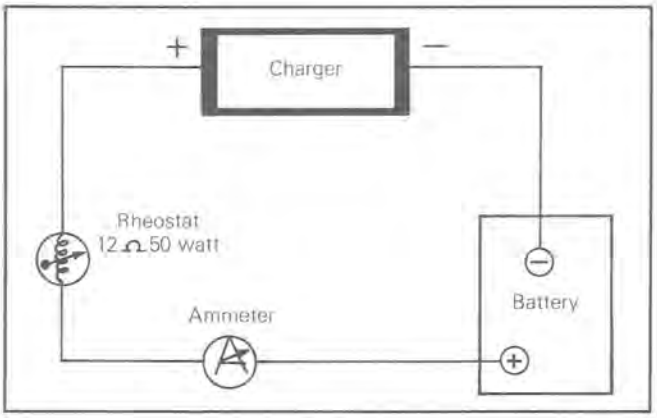
BATTERY CHARGING EQUIPMENT

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.

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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.

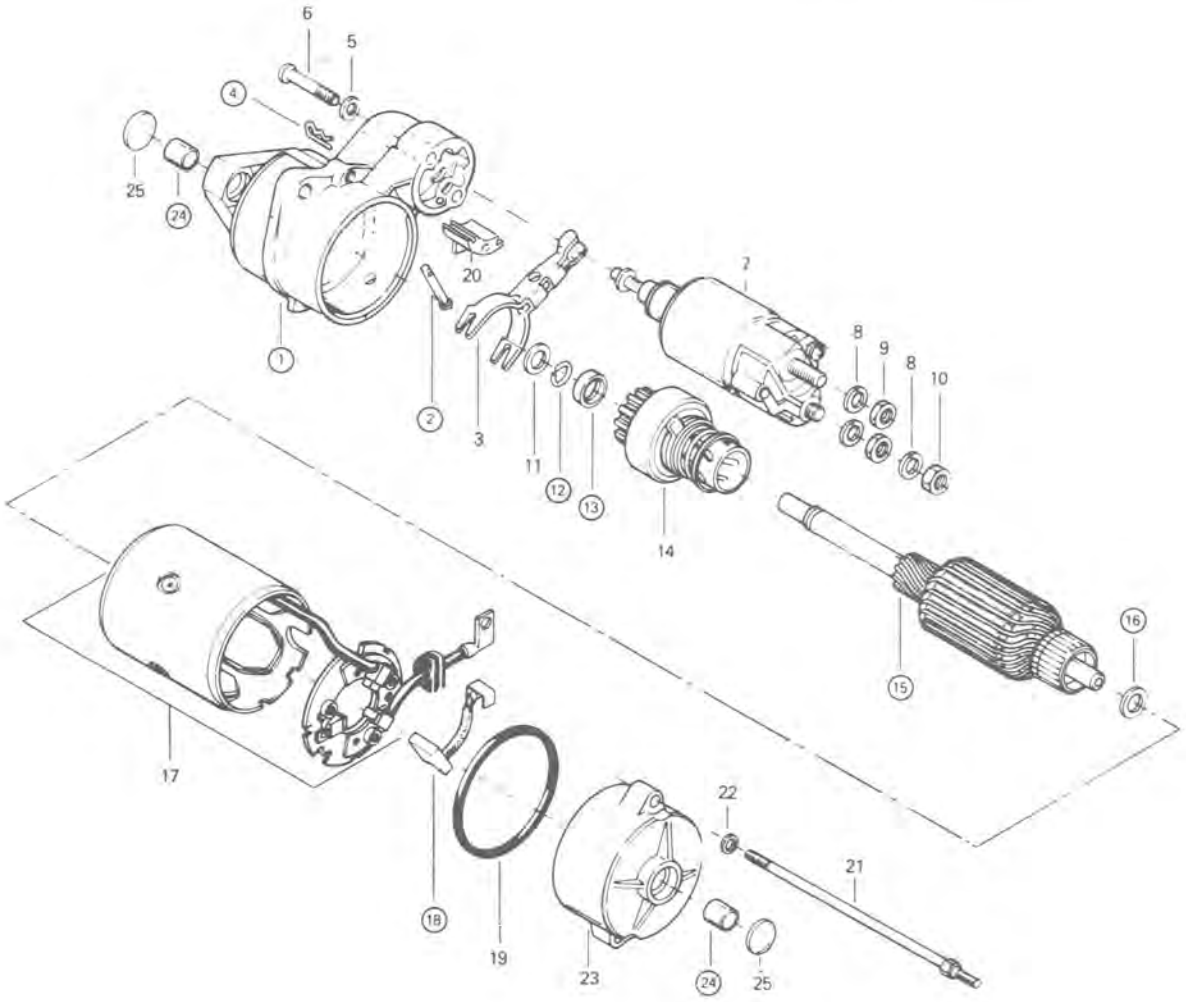
TROUBLE SHOOTING:

Symptom	Cause	Remedy
Discharged or weak battery	*1. Faulty rectifier	1. Replace rectifier
	2. Faulty charging coil	2. Replace charging coil
	3. Loose or bad ground connections	3. Tighten cable terminals
	4. Battery poles and/or cable terminals oxidized	4. Clean battery posts and cable terminals
	5. Faulty battery (cracked casing, damaged or loose posts)	5. 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.

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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

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REMOVAL

Disconnect black cable ground connection from battery. Disconnect red battery cable and red and green wire from solenoid switch. Remove starter.

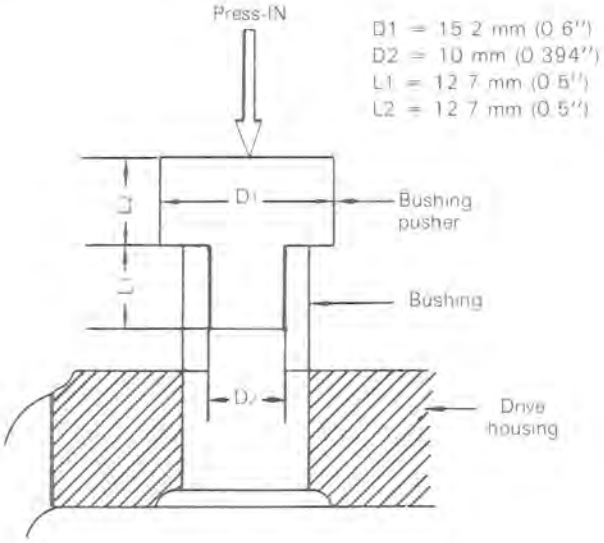
DISASSEMBLY & ASSEMBLY

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) 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 bushing to obtain proper fit.

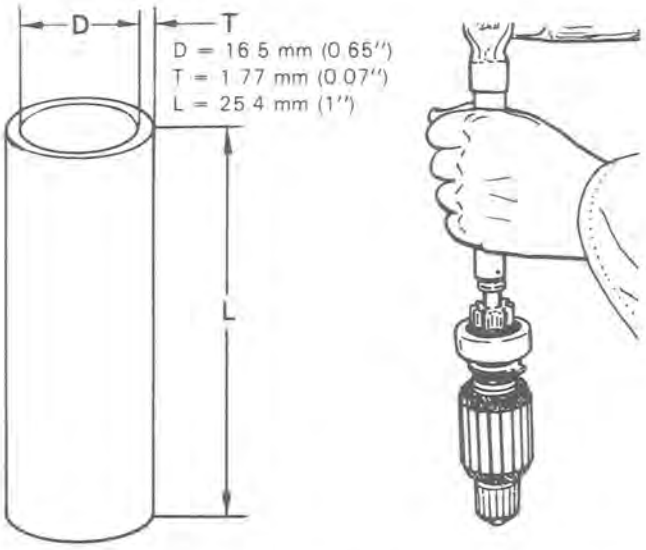


(2)(4) To pull out the armature with overrunning clutch assembly and the drive lever from the drive housing, remove the hair pin and pull out the drive lever set pin.

(15)(16) 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) To remove the pinion stop collar from the armature, make a too similar to the illustration below.

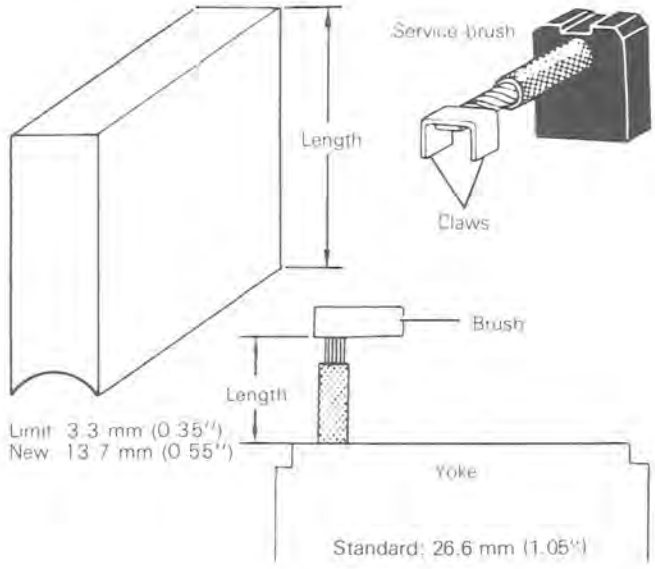
Drive out the pinion stop collar toward the overrunning clutch using the tool as shown below then remove snap ring.



(18) Check the brush length if less than 9 mm (0.350"), replace the brush. (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").

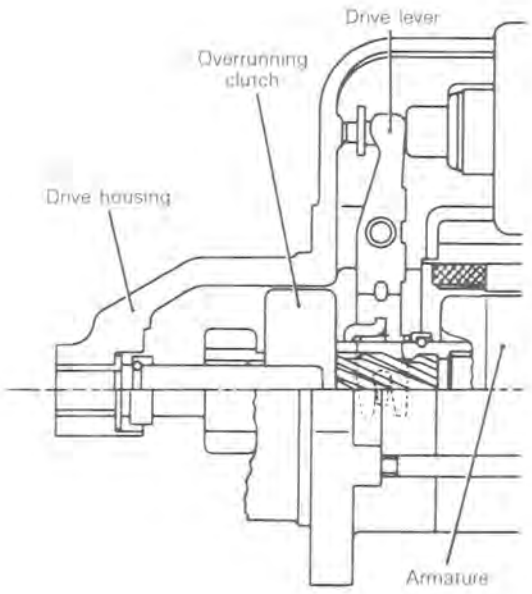


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For assembly, follow the disassembly procedure in the reverse order, paying attention to the following.

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 use of an ohmmeter can be applicable for all tests except for the one concerning the shorted windings in the armature.

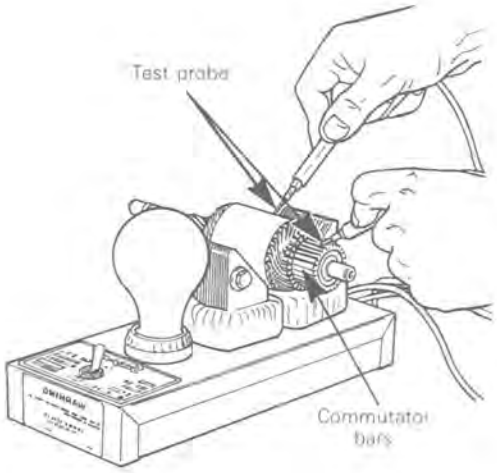
Check the commutator for roughness, burnt or scored surface. If necessary, turn the commutator in a lathe, enough to remove grime only.

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.

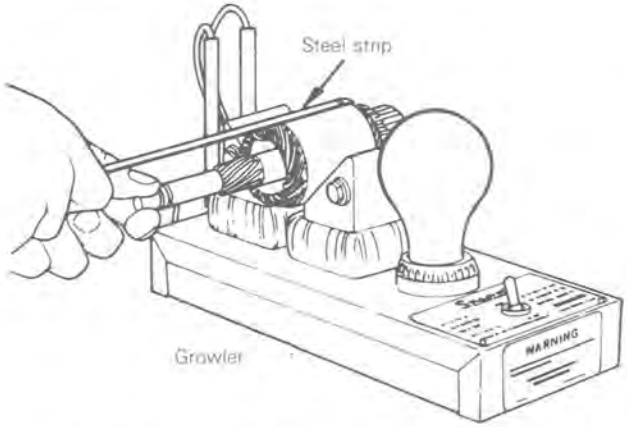
Check the commutator for mica depth. If the depth is less than 0.20 mm (0.008"), undercut the mica. Be sure that no burrs are left and no copper dust remains between the segments after the undercutting operation is completed.

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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.



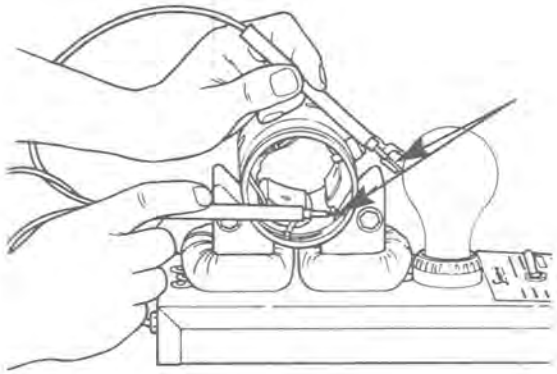
Test armature for shorted windings using a growler. When the armature is rotated in the growler with a steel strip held above it, the strip will vibrate over that area of the armature which has short circuited.



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.

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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.

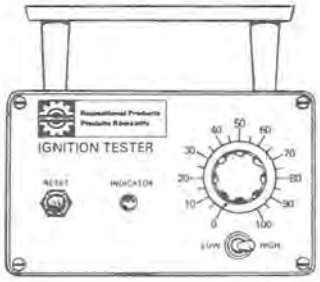
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Starter turns, but overrunning clutch pinion does not mesh with flywheel.	Worn clutch pinion gear. Defective clutch. Poor movement of clutch on splines. Worn clutch bushing. Worn starter bushing(s). Worn ring gear.	Replace clutch. Replace clutch. Clean and correct. Replace clutch. Replace bushing(s). Replace ring gear.
Starter motor keeps running.	Shorted solenoid switch winding(s). Melted solenoid switch contacts. Starter switch returns poorly.	Replace solenoid switch. Replace solenoid switch. Replace ignition switch.

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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 temperatue 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.

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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.

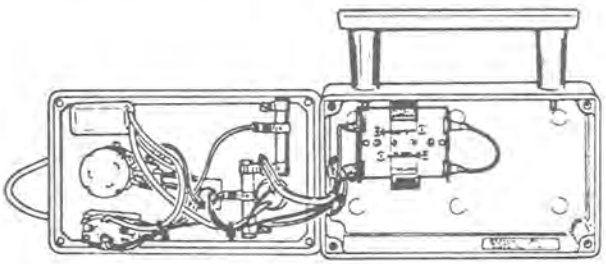
b) Set tester dial to 50, or below.

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. Recheck alignment.

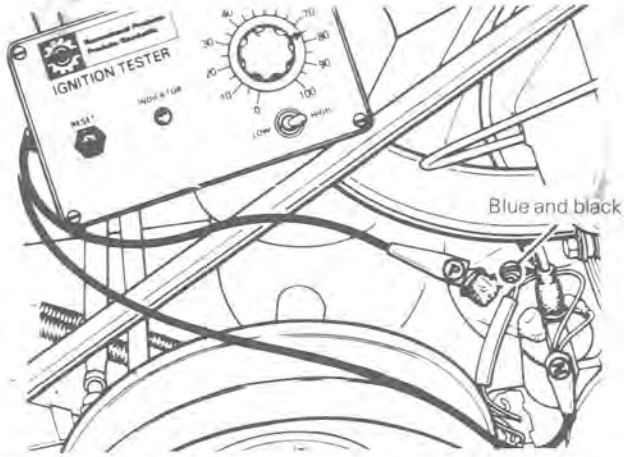
NOTE: If after adjustment, the knob is turned fully counter-clockwise and it does not exactly align with the 0, it is of no consequence.

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

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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.

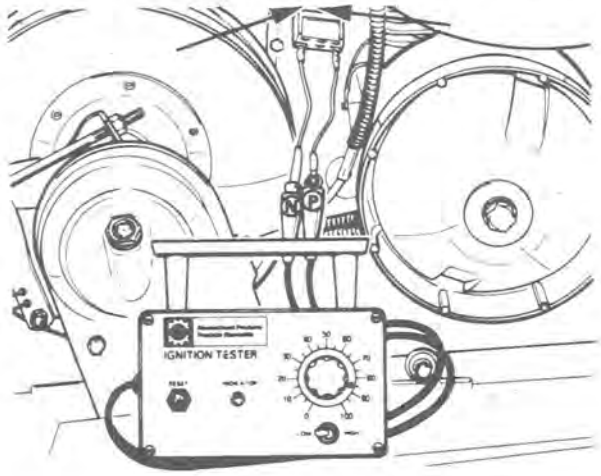
2. Lighting coils output (247 engine type)

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.

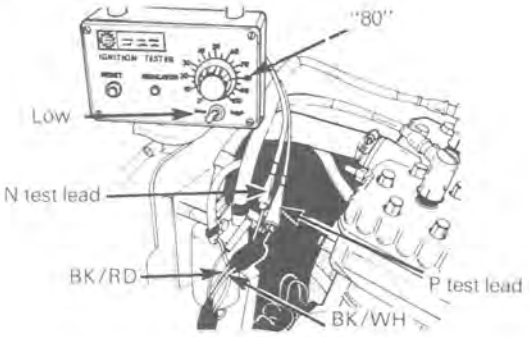
277, 377, 464, 503, 534 CDI SYSTEMS VERIFICATION

1. Generator coil output

1) Disconnect **blue/red and black** wires from P.T.O. side ignition coil.

2) Connect tester **P** lead to **blue/red** and **black** wires previously disconnected. Connect **N** lead to a good engine ground.

(TYPICAL)



3) Set tester switch and dial as follows:

Engine type	Switch position	Dial
277,377,464, 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.

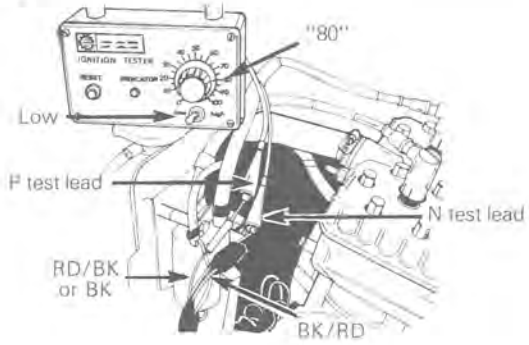
◆ WARNING: Do not touch tester P lead clip while cranking the engine. Also make sure that tester leads do not touch any metallic object.

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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:
   464: RD/BK wire.
   277, 377, 503, 534: BK wire.
   and connect tester N test lead to black/red wire.

(TYPICAL)



3) Set tester switch and dial as follows:

Engine type	Switch position	Dial
277,377,464, 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...).**

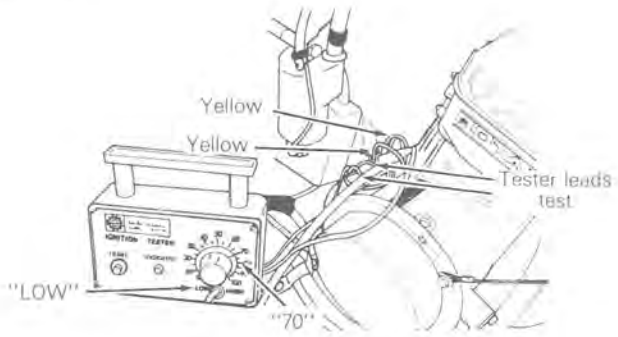
a) **Indicator lamp lights:** Low speed charging coil is up to specifications. Repeat test at least three (3) times to verify reading and check for consistency.

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:
   464: YL wire.
   277, 377, 503, 534: YL/BK wire.
   and connect tester N test lead to YL wire.

(TYPICAL)



3) Set tester and dial as follows:

Engine type	Switch position	Dial
277,377,464, 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.

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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 Ⓐ & Ⓑ	1.4 – 2.6Ω Ⓐ 2.8-4.2Ω Ⓑ	Low 80 Ⓐ & Ⓑ	If the reading is: 0Ω - short circuit ∞Ω - open circuit
	Low speed charging coil	RD/BK with BK/RD Ⓐ BK with BK/RD Ⓑ	125 – 235Ω Ⓐ 120-180Ω Ⓑ	Low 80 Ⓐ & Ⓑ	
	Lighting coil	YL with YL Ⓐ YL/BK with YL Ⓑ	0.09 – 0.2Ω Ⓐ 0.21-0.31Ω Ⓑ	Low 70 Ⓐ & Ⓑ	
IGNITION COIL	Primary	BK with WH/BL Ⓐ & Ⓑ	0.23 – 0.43Ω Ⓐ & Ⓑ	N.A.	
	Secondary winding	High tension wire with high tension wire Ⓒ Ⓕ	2.45 – 4.55KΩ Ⓒ 3.0-5.6 KΩ Ⓓ	N.A.	
	Insulation	WH/BL with core Ⓐ BK with core Ⓑ		N.A.	
		WH/BL with high tension wire Ⓐ BK with high tension wire Ⓑ	∞Ω	N.A.	

Ⓐ : 464 engine type
Ⓑ : 277, 377, 503, 534 engine type
Ⓒ : all except 277 engine type
Ⓓ : 277 engine type only
Ⓔ : 377 and 503 engine type
Ⓕ : for 277 engine type, the secondary winding resistance reading is between the high tension wire and the coil ground.
N.A.: not applicable

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BOMBARDIER CDI CHECKER



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.

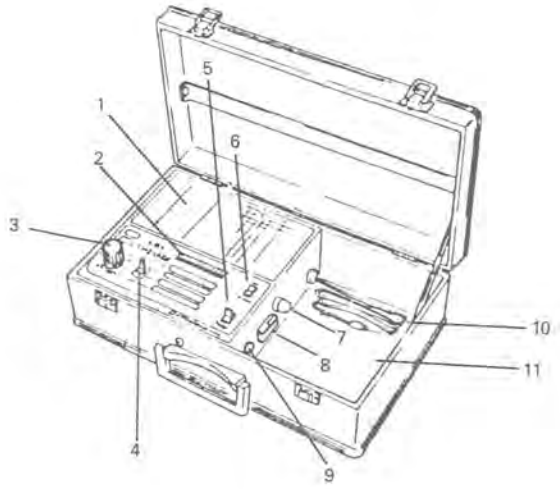
NOTE: The Bombardier CDI checker is only applicable to the Nippondenso CDI systems used on the Bombardier recreational products.

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



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

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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)	464	Generator coil (HI & LO) Control unit Spark test
2	4-5P (Harness B)	277,377,503, 534	Generator coil Control unit diode Control unit Spark test

This checker tests the following items:

TEST		CHECK POINT	APPLICABLE	
			CODE NO.	IGNITION TYPE
Generator coil test	HI	Output of high speed	1,2	4-4P 4-5P
	LO	Output of high and low speed generator coil	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

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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, 503, 534 engine type)

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 (464 engine type)

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 of 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).

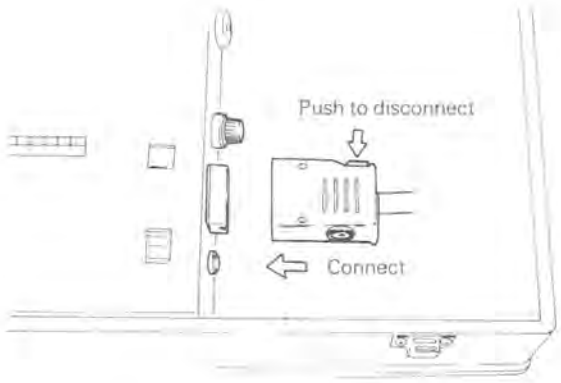
CAUTION: To prevent any damage to the checker, do not try other power source than the above mentioned one and ensure that the checker is installed on a plane surface, away from vehicle vibrations.

CONNECTION OF TEST WIRE HARNESS

a) Choose the right test wire harness according to the following.

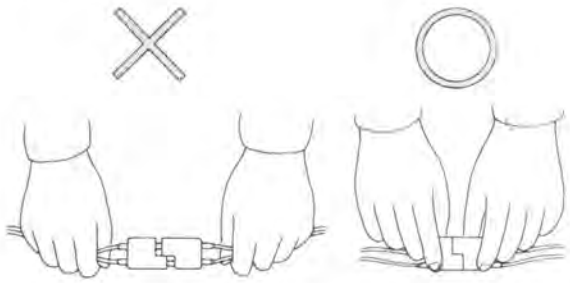
CODE NO.	IGNITION TYPE	ENGINE TYPE	TEST WIRE HARNESS
1	4-4P	464	A
2	4-5P	277,377,503, 534	B

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.



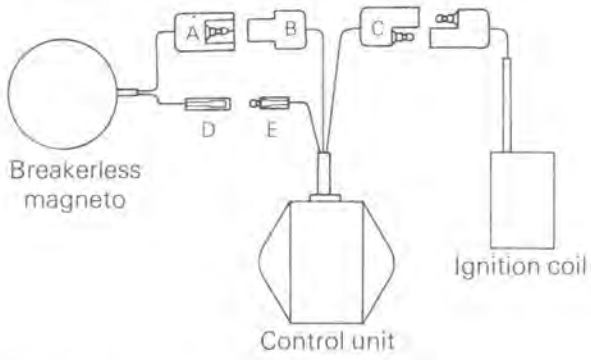
d) Securely connect the connectors of test wire harness.

CAUTION: When connecting, be sure that the test wire harness does not interfere with moving part of engine.

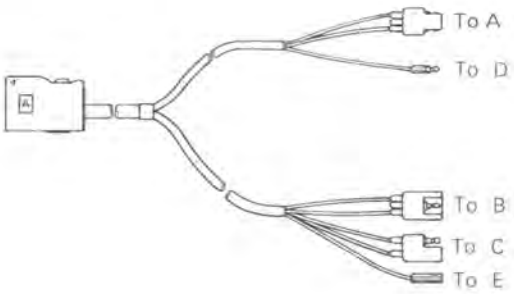
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4-4P ignition type engine (464)

(Vehicle wiring)

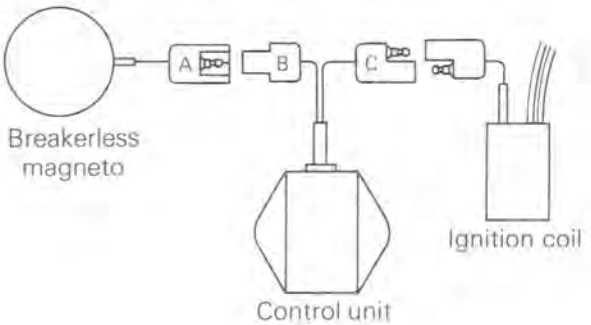


(Test wire harness) A

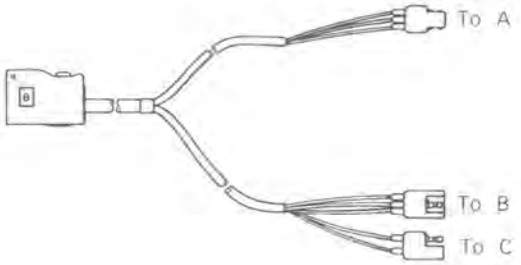


4-5P ignition type engine (277, 377, 503, 534)

(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 Ⓐ 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.).

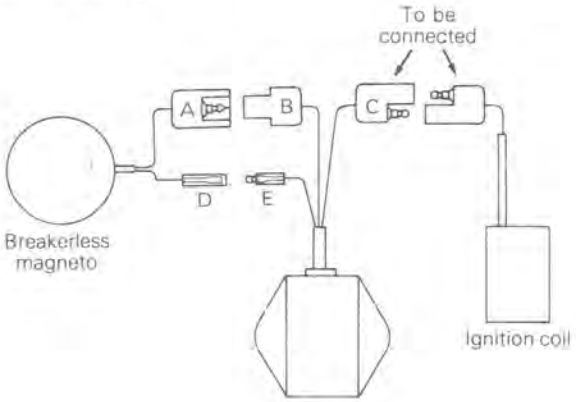
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SPARK TEST

a) Before performing this test, ensure that the control unit and the control unit diode (if applicable) have been checked.

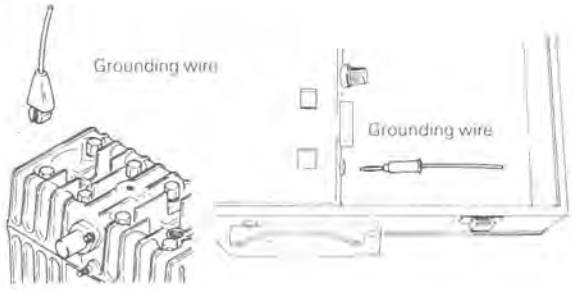
b) Disconnect the checker from the connector of the control unit output side (originally connected to the ignition coil).

(Vehicle wiring)



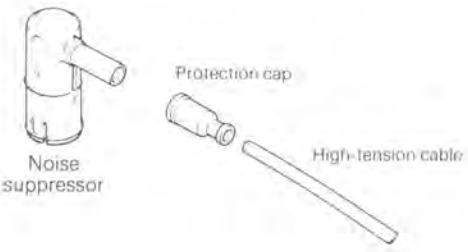
C) Connect the ignition coil connectors to the control unit connectors.

d) Connect the grounding wire to the checker and to a bare surface of the engine.

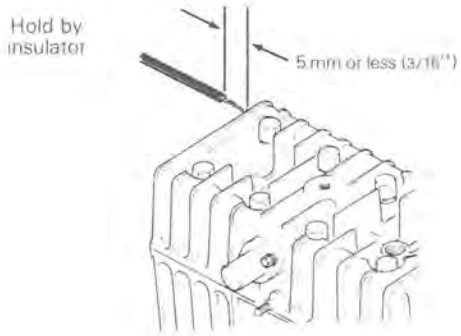


e) Set the selector to CONTROL UNIT position.

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**

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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

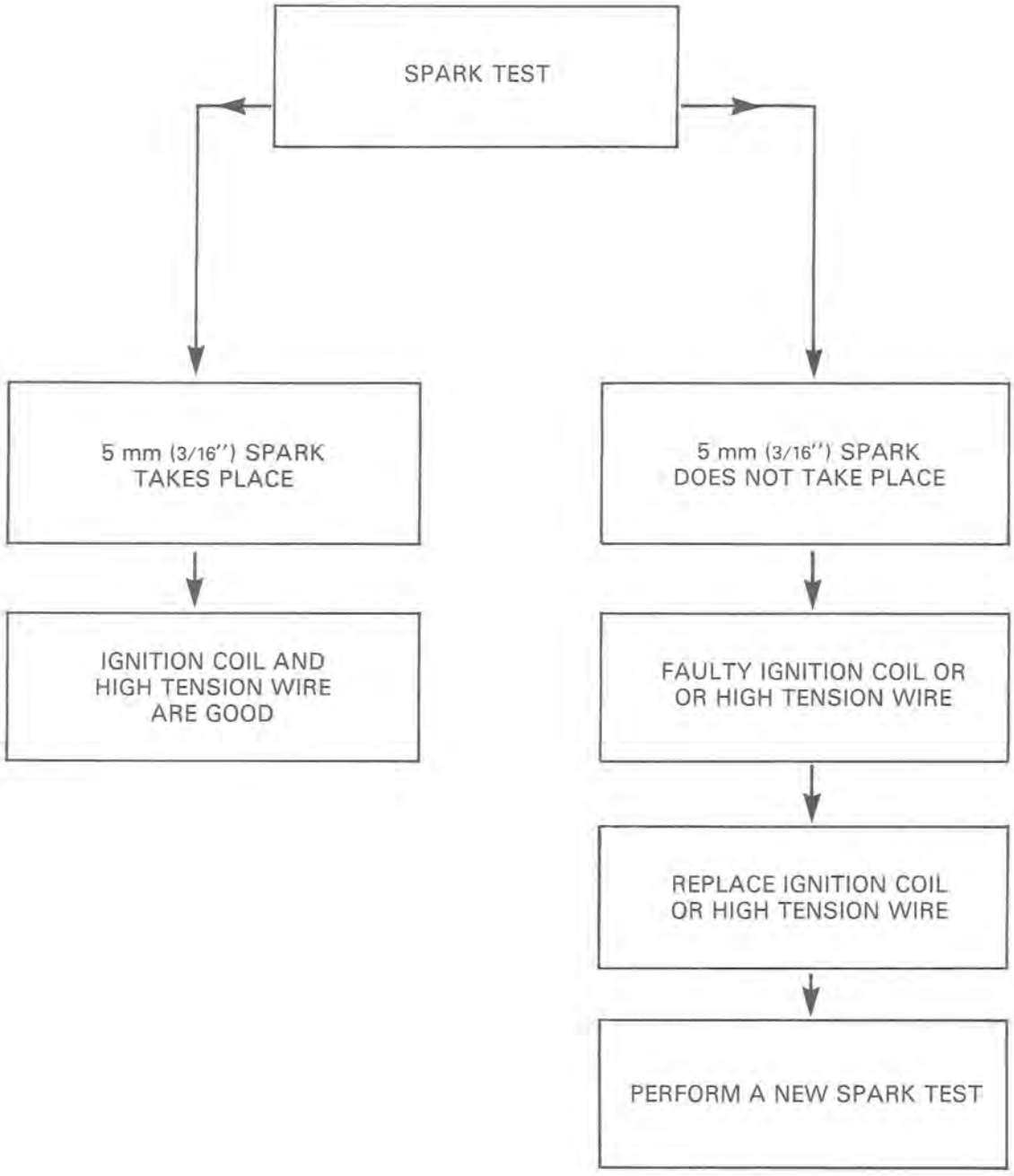
After every test, perform the diagnosis comparing with the diagnostic chart as shown in below.

CODE NO.	IGNITION TYPE	CHECK PART		LEVEL INDICATOR 0	1	2	3	4	5	6	NG 7	8	OK 9	HARNESS	ENGINE TYPE
1	4-4P	Generator coil	HI											A	464
			LO												
		Control unit													
2	4-5P	Generator coil	HI											B	277,377,503, 534
			LO												
		Control unit													
		Control unit diode													
				0	1	2	3	4	5	6	7	8	9		

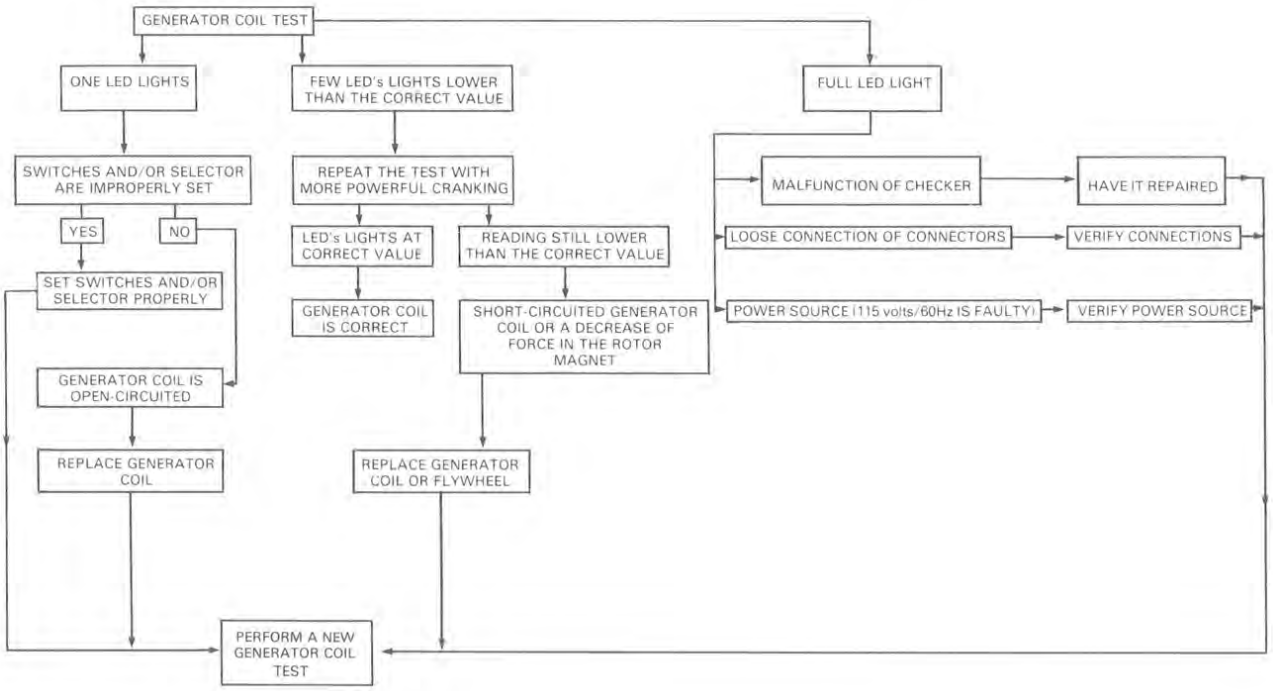
If the reading of the LED level indicator is higher or lower than the correct value (OK zone), refer to "Analysis of test resu as described hereafter.

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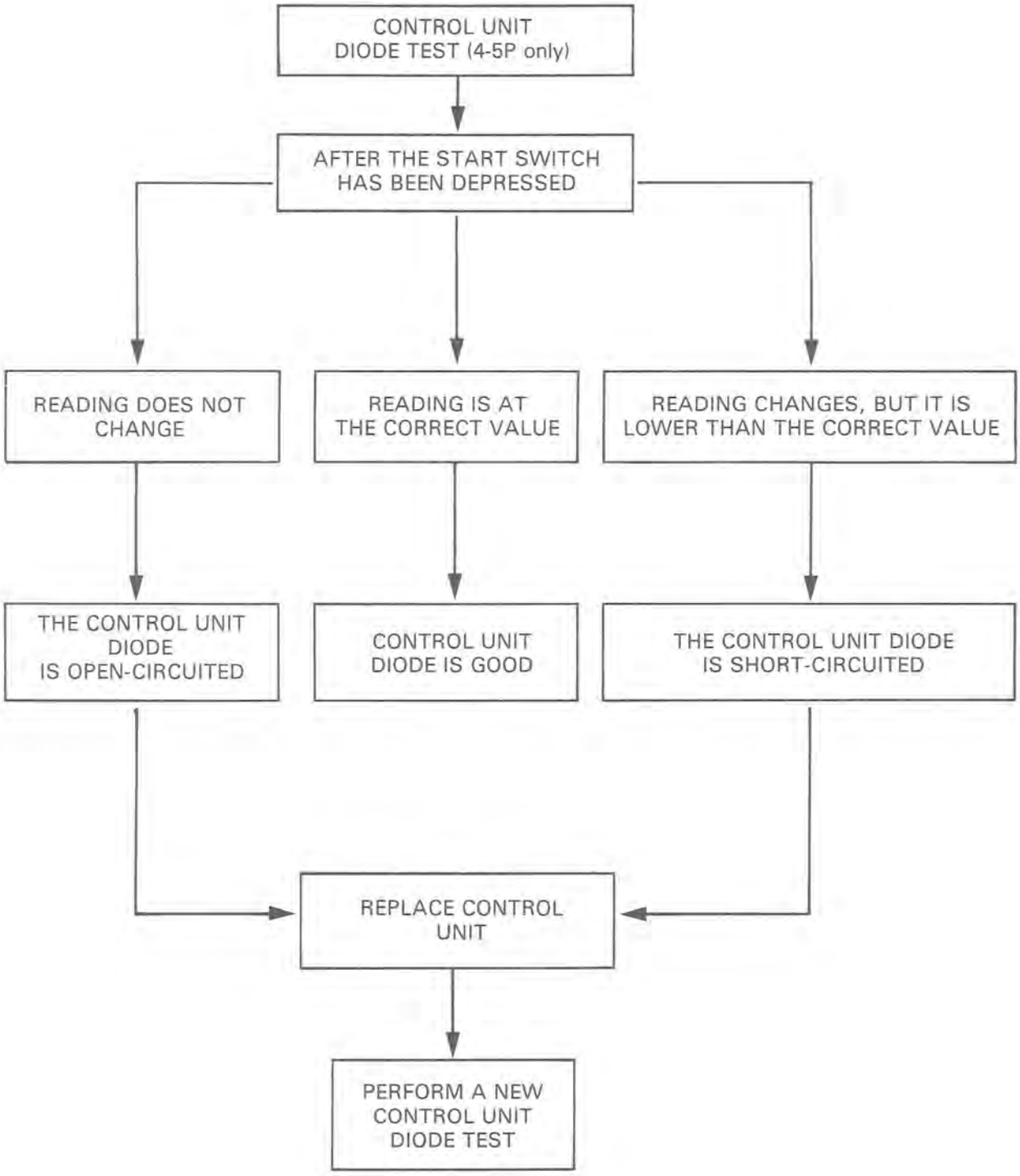
TROUBLE SHOOTING CHART — NIPPONDENSO CDI SYSTEMS



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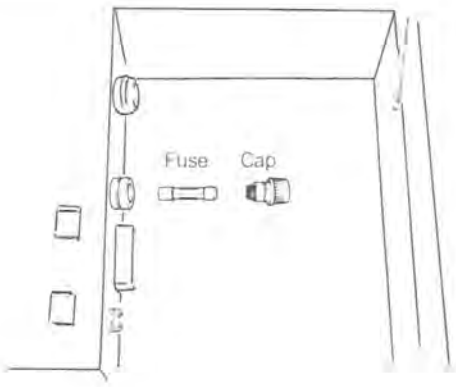
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FUSE REPLACEMENT

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, Ø 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.

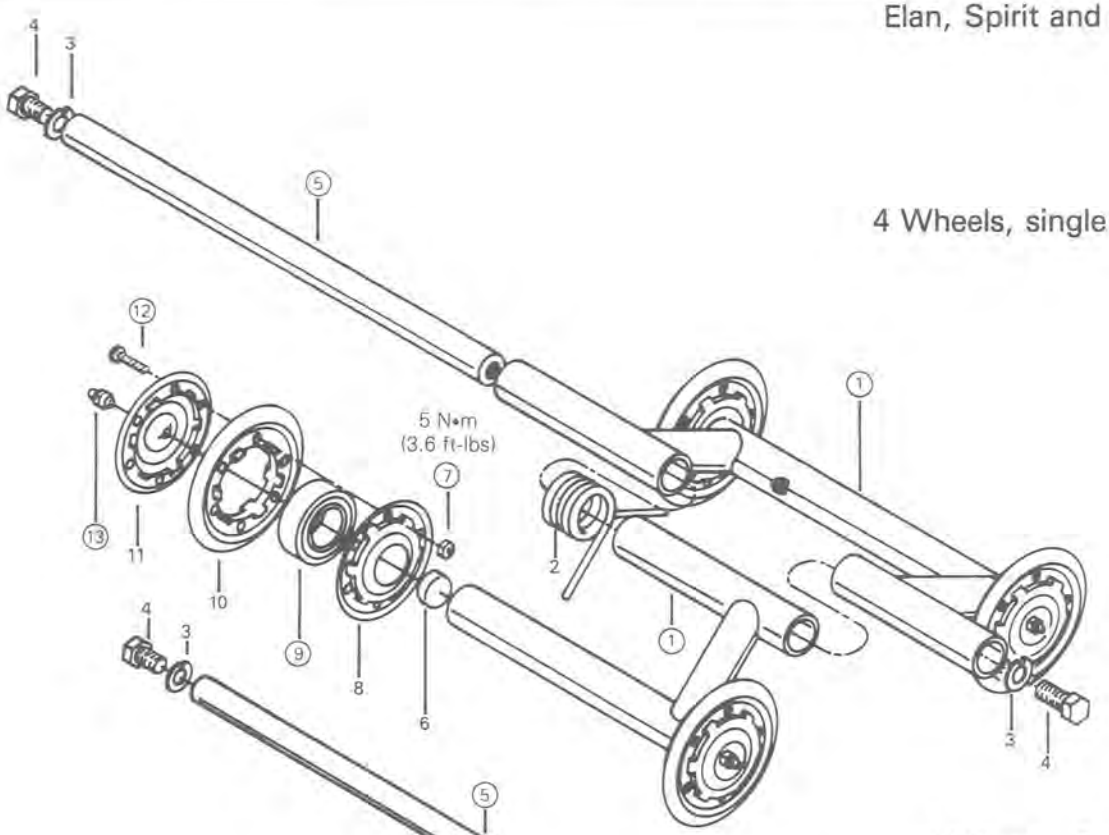
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Canada (M1S 3R6)

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BOGIE WHEELS

Elan, Spirit and Alpine



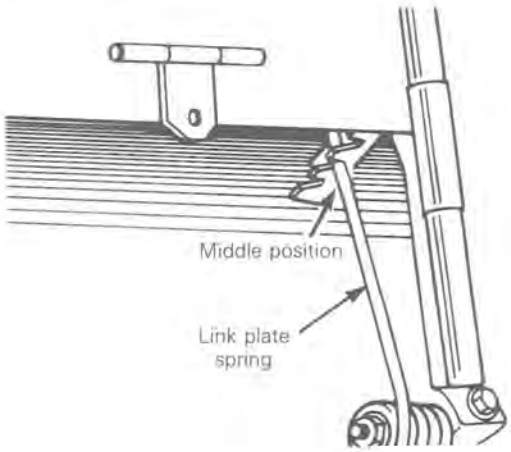
1. *Wheel support*
2. *Spring*
3. *Lock washer (cross shaft)*
4. *Bolt (cross shaft)*
5. *Cross shaft*
6. *Grease cap*
7. *Nut (flange)*
8. *Inner flange*
9. *Bearing*
10. *Wheel tire*
11. *Outer flange*
12. *Bolt (flange)*
13. *Grease fitting*

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REMOVAL

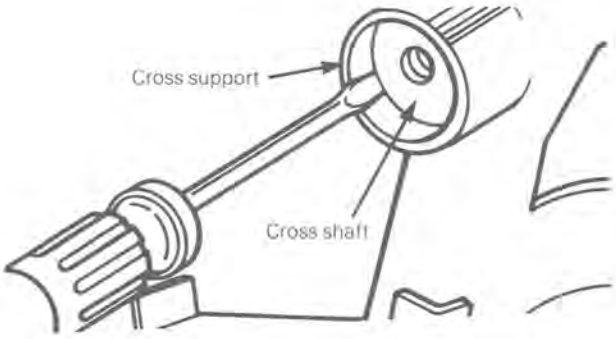
Raise and block rear of vehicle off the ground.

Release track tension by unlocking the link plate springs using an appropriate tool.



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.

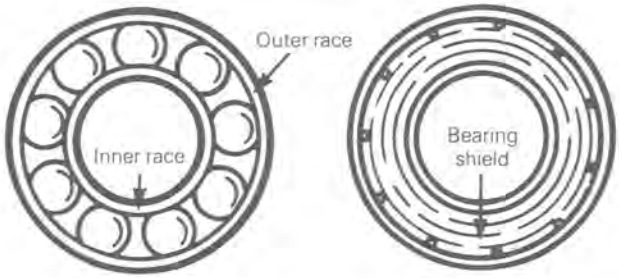
Repeat operation for remaining bogie wheel sets.

DISASSEMBLY & ASSEMBLY

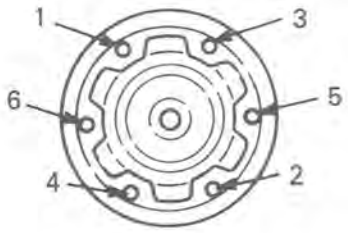
① Heat wheel support anchor before attempting to open or close anchor.

⑤ Clean, then lubricate cross shaft with low temperature grease before installation.

⑨ 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.



⑦⑫ 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).



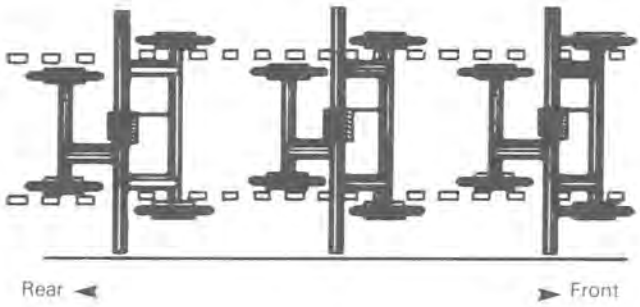
Torque sequence

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INSTALLATION

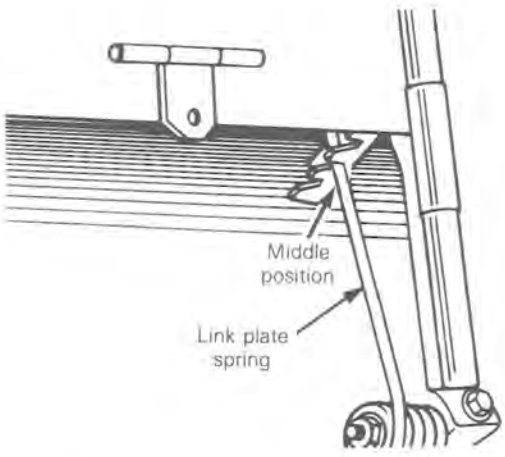
With rear of vehicle supported off the ground, position front bogie wheel set in location and secure to frame using lock washers and bolts. Secure rear set then remaining set(s) to frame.

NOTE: On Elan and Spirit models, put the wider portion of bogie wheel to the front direction of vehicle (On Alpine inverse the position.)



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.



⑬ Lubricate each bogie wheel until new grease appears at joint. Wipe off excess grease (grease P/N 498 028 100).

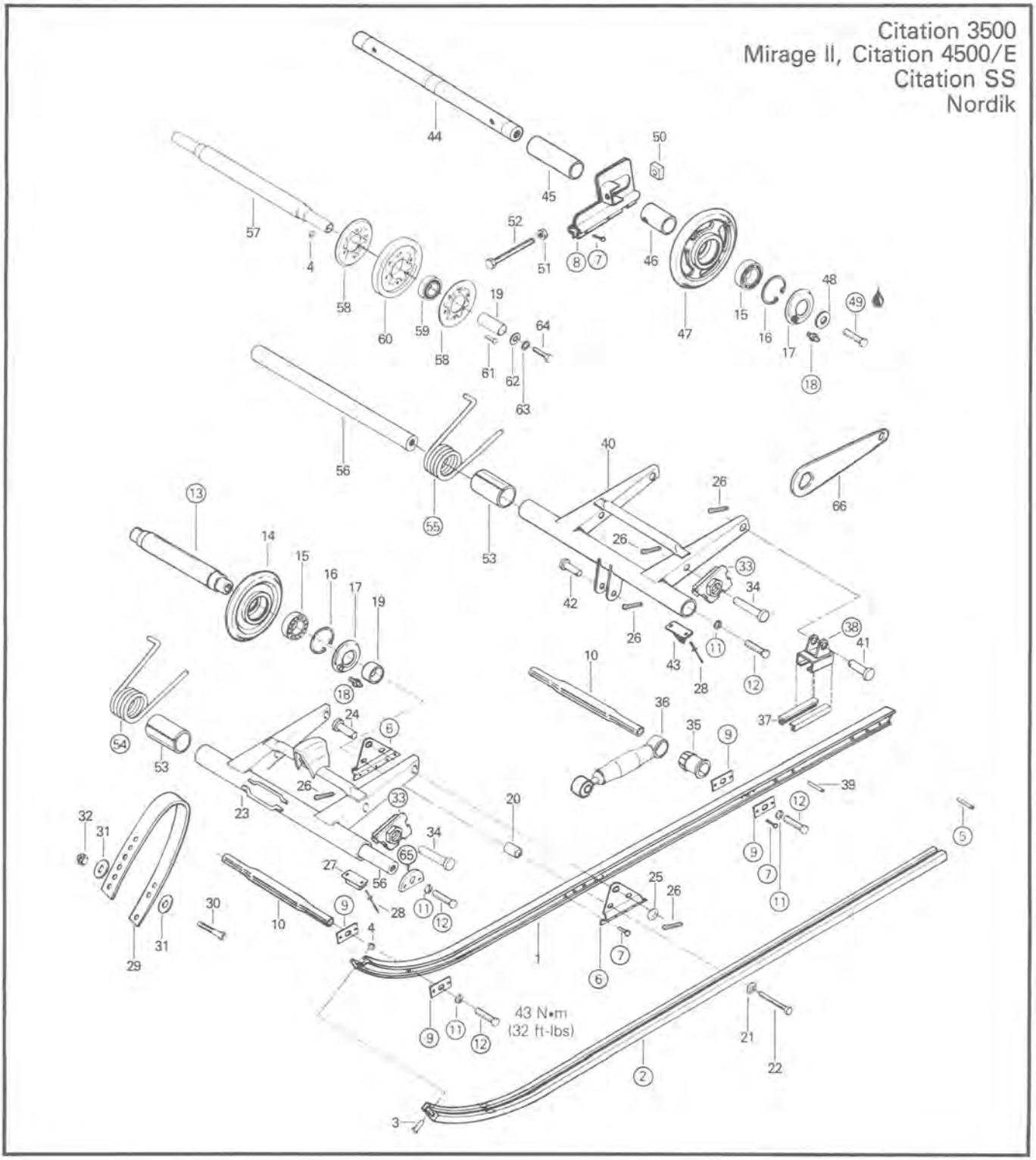
NOTE: To adjust the track tension and alignment refer to section 05-05.

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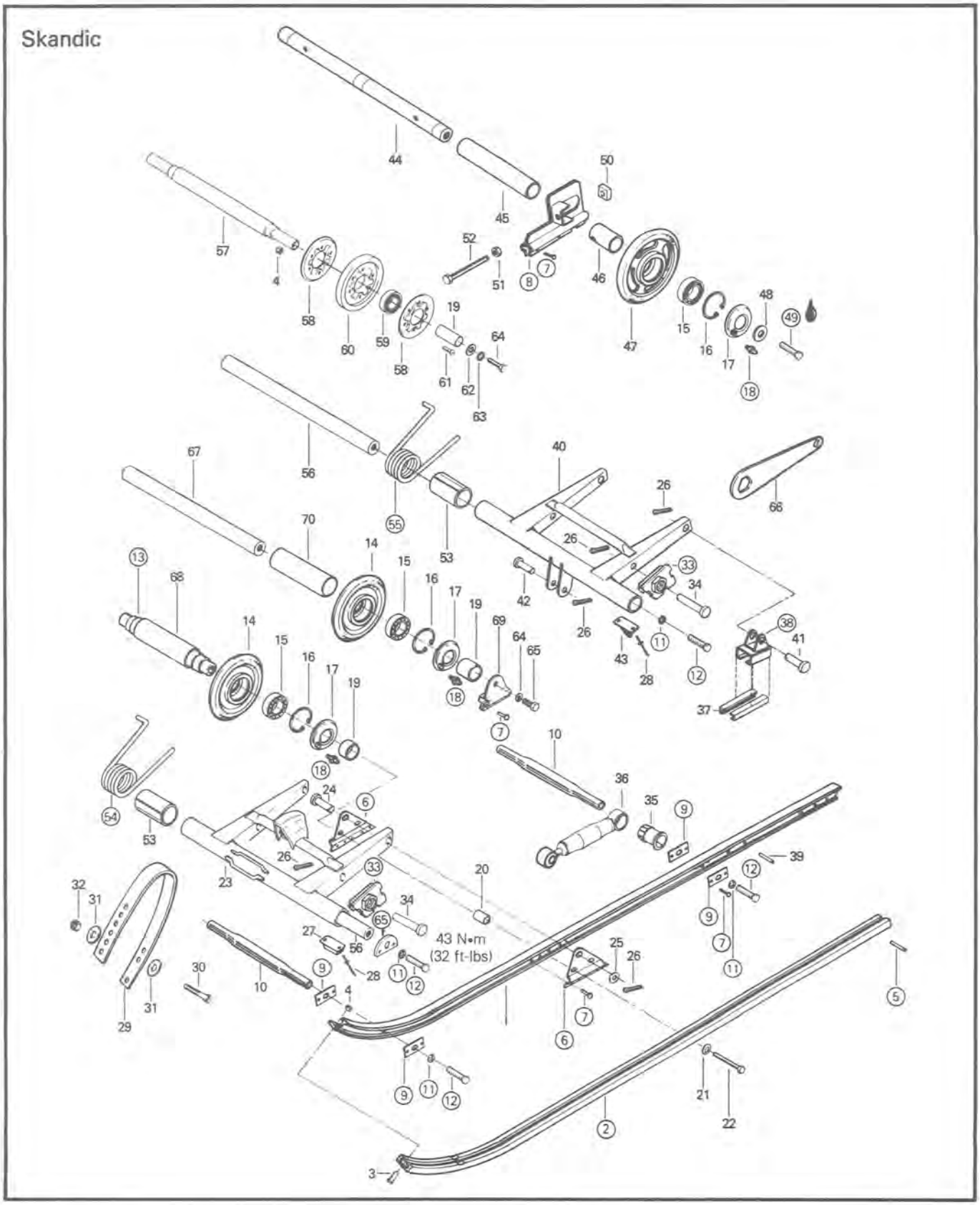
SLIDE & MX SUSPENSION

"TORQUE REACTION" TYPE SUSPENSION

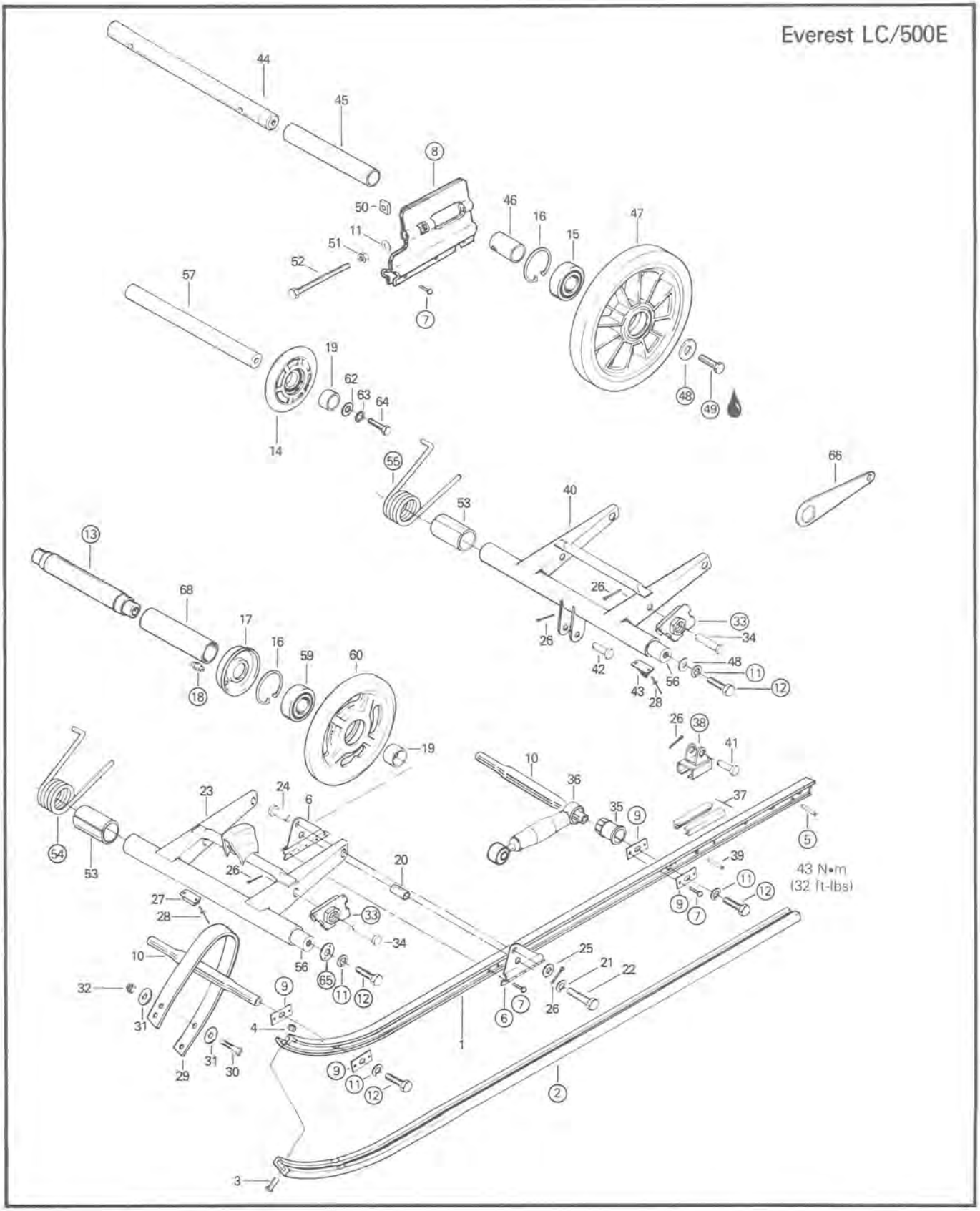


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Skandic

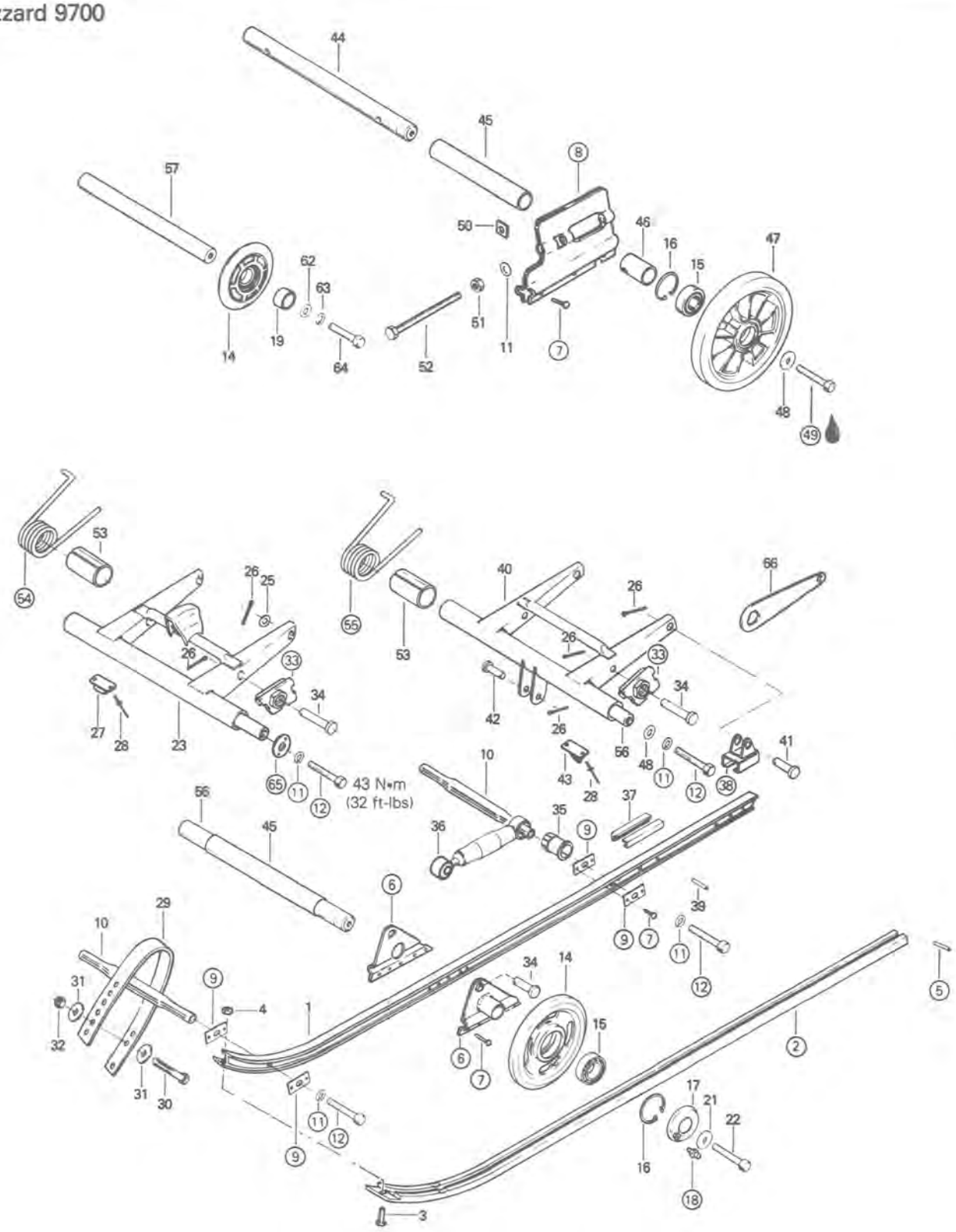


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Blizzard 9700



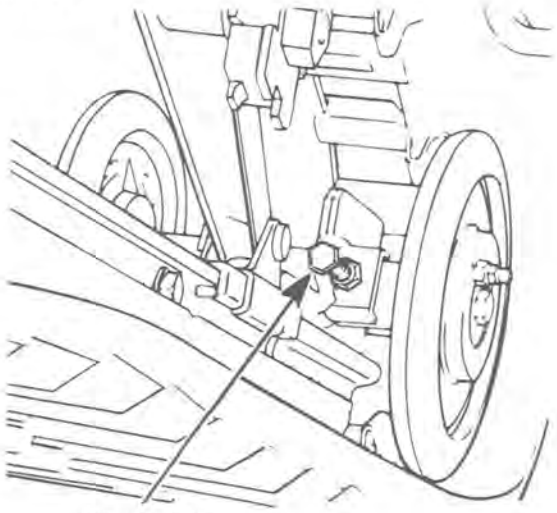
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1. *Runner*
2. *Slider shoe*
3. *Screw*
4. *Stop nut*
5. *Spiral pin*
6. *Front arm bracket*
7. *Rivet*
8. *Adjustment plate*
9. *Reinforcement bracket*
10. *Tube*
11. *Lockwasher*
12. *Screw*
13. *Front idler shaft*
14. *Idler*
15. *Bearing*
16. *Retainer ring*
17. *Cap*
18. *Grease fitting*
19. *Spacer*
20. *Spacer*
21. *Lockwasher*
22. *Screw*
23. *Front arm*
24. *Clevis pin*
25. *Flat washer*
26. *Cotter pin*
27. *Rubber stopper*
28. *Rivet*
29. *Stopper strap*
30. *Screw*
31. *Washer*
32. *Stop nut*
33. *Adjustment cam*
34. *Clevis pin*
35. *Bushing*
36. *Shock absorber*
37. *Slider pad*
38. *Slider support*
39. *Spiral pin*
40. *Rear arm*
41. *Clevis pin*
42. *Clevis pin*
43. *Rubber stopper*
44. *Rear axle*
45. *Tube*
46. *Tube*
47. *Idler*
48. *Washer*
49. *Screw "Loctite 242"*
50. *Nut*
51. *Nut*
52. *Adjustment screw*
53. *Bushing*
54. *Front spring*
55. *Rear spring*
56. *Cross shaft*
57. *Rear idler shaft*
58. *Flange*
59. *Bearing*
60. *Wheel tire*
61. *Screw*
62. *Flat washer*
63. *Lockwasher*
64. *Screw*
65. *Washer*
66. *Wrench*
67. *Wheel axle*
68. *Spacer tube*
69. *Wheel support*

REMOVAL

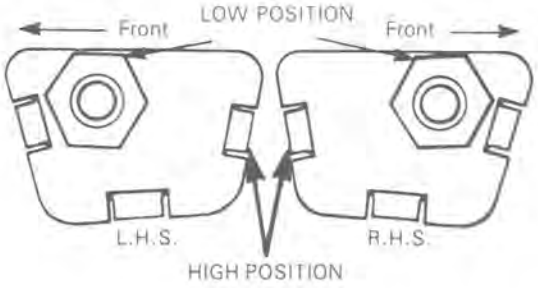
Release track tension by loosening adjuster bolts located on inner side of rear idler wheels.

(TYPICAL)



Adjuster bolt

Position the adjustment cams at the lowest elevation.



Remove the four (4) bolts securing suspension to frame.

Lift rear of vehicle then withdraw suspension assy from track area.

NOTE: To prevent cross shaft from turning within the suspension arm, wedge the blade of a small screwdriver between the shaft and suspension arm.

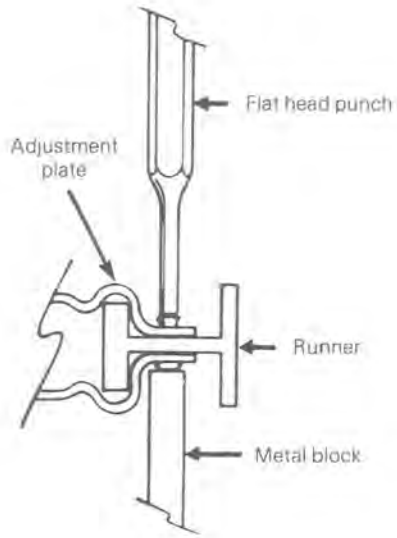
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DISASSEMBLY & ASSEMBLY

②⑤ To replace a worn slider shoe, remove the rear spiral pin. Slide the shoe rearwards out of the runner.

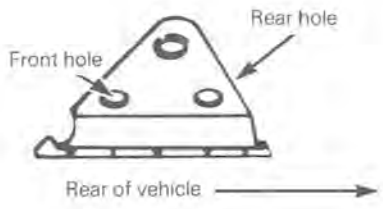
⑦⑧ To remove the rivets securing the adjustment plate on the front arm supports, cut off the rivet heads using a cold chisel.

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.

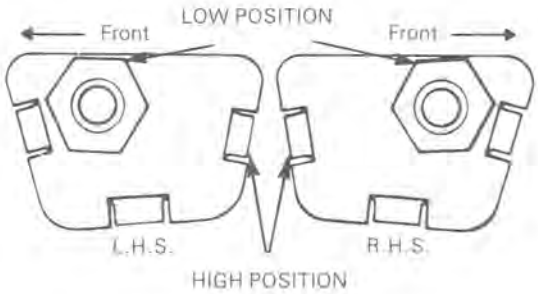


⑦⑨ To remove rivet use a 3/16" dia. drill. At assembly secure reinforcemnt bracket to runner with two (2) 10-32 x 1/2" bolts and nuts.

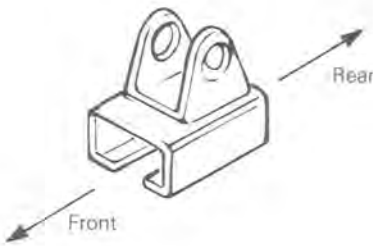
⑥⑬ The front idler shaft must be positioned in the front hole of the front arm bracket.



㉝ At assembly, adjustment cam must be installed to that hexagonal projection on cam is located toward front of vehicle.



㊳ Sliding support must be installed with offset toward front.



㊾ Clean all traces of plastic from threads. Prior to assembly, apply a light coat of "Loctite 242" or equivalent on threads.

㊹㊺ Prior to assembly, identify front and rear springs.

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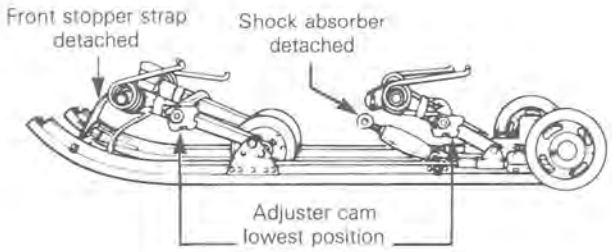
INSTALLATION

On all slide suspension models, except Blizzard 5500 MX, install the suspension ass'y as shown.

Preparation

- Detach the front stopper strap.
- Remove the cotter pin locking the shock absorber clevis pin and detach the shock absorber by removing the clevis pin.
- Set the adjuster cam to the lowest position and fix the springs with a tape.
- Push the rear idler wheel forward.

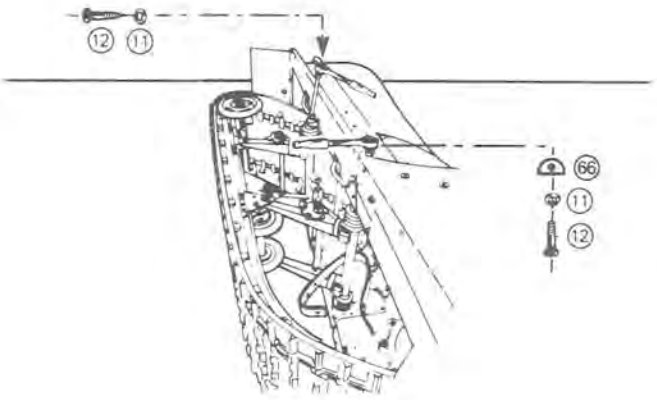
(TYPICAL)



Installation

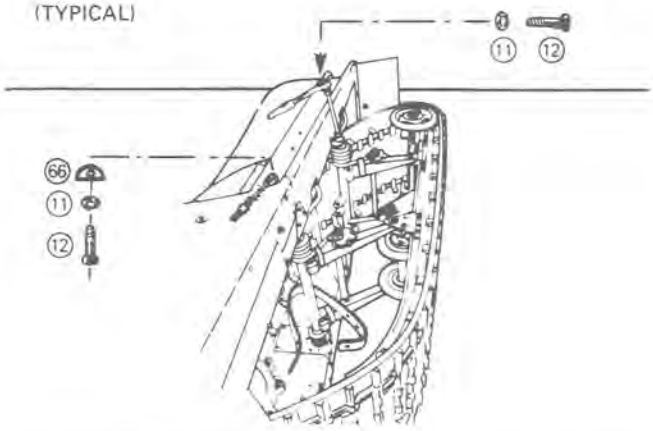
- Place a cardboard on the floor.
- Plug the chaincase vent hole with a small wire to prevent leaks.
- Tilt vehicle on one side.
- Attach front suspension and the rear suspension arm to the frame. Do not torque.

(TYPICAL)



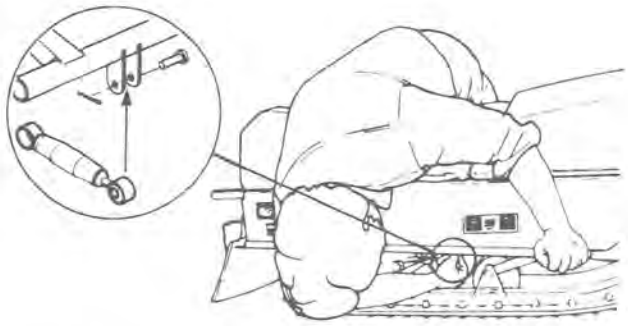
- Tilt the vehicle on the other side.
- Attach the front then the rear suspension arm to frame.

(TYPICAL)



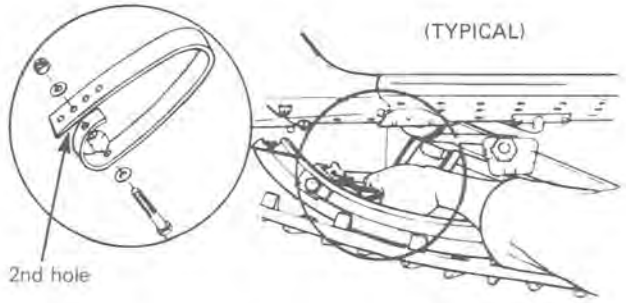
- Reposition vehicle on the ground. Position adjuster cams at the lowest elevation.
- Torque the four suspension retaining bolts to 43 N•m (32 ft-lbs).
- Apply downward pressure on the seat.
- Secure the extended shock with clevis pin and a new cotter pin.

(TYPICAL)



- Attach front stopper strap at 2nd hole.

(TYPICAL)



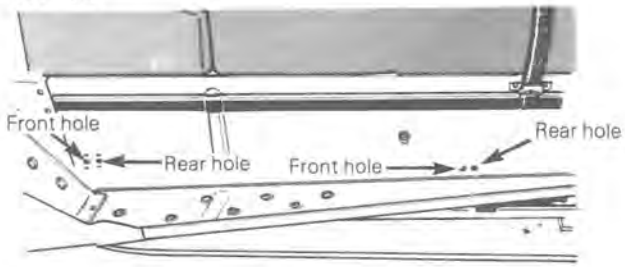
- Remove chaincase vent hole plug.

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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.

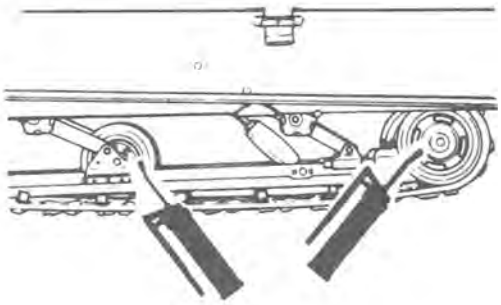
CAUTION: Ensure that suspension arms are at the same position on each side of the frame to avoid any damage to the suspension system and to the track.

(TYPICAL)



⑱ 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)



Grease fittings

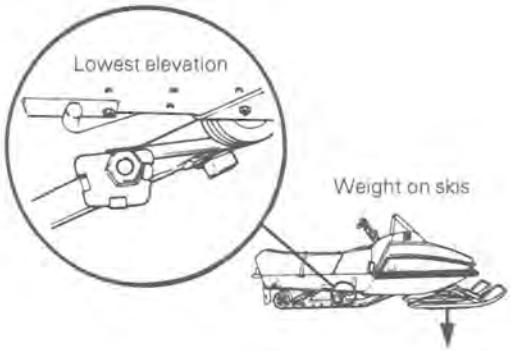
NOTE: To adjust the track tension and alignment, refer to section 05-05.

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 negociating icy snow.

The rear adjuster blocks should be adjusted to rider preference.

(TYPICAL)

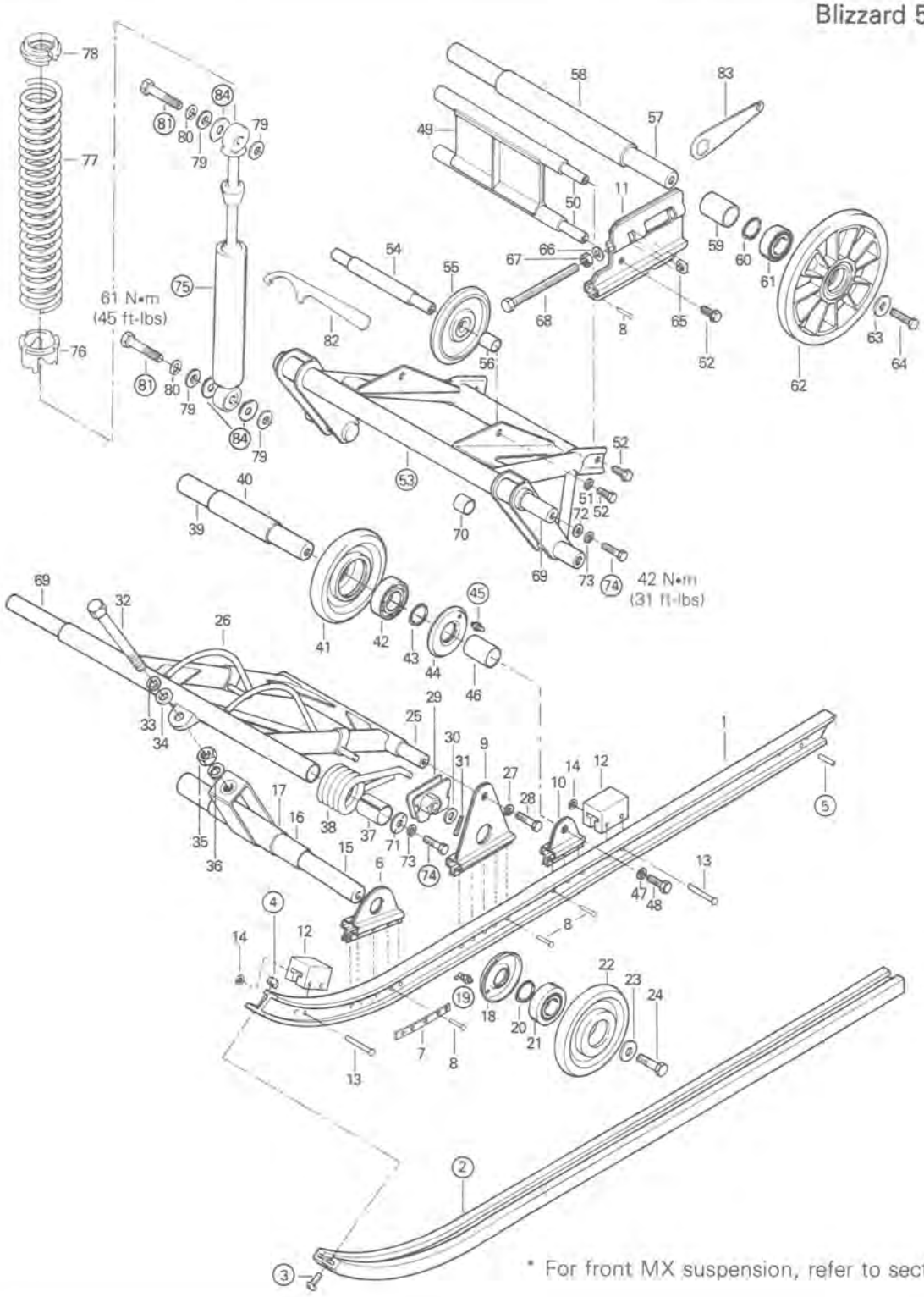


CAUTION: Always turn left side adjustment cams in a clockwise direction, the right side cams in a counter-clockwise direction. Left and right adjustment cams of each adjustment (front and rear), must always be set at the same elevation.

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REAR MX SUSPENSION

Blizzard 5500 MX



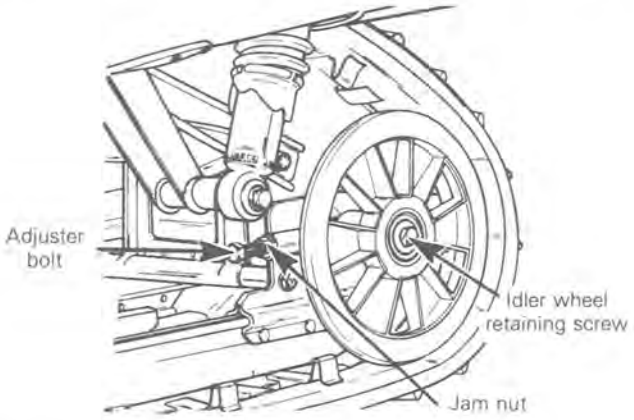
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1. Runner
2. Slider shoe
3. Round slotted head machine screw
4. Hexagonal elastic stop nut 10-24
5. Spiral pin
6. Front wheel bracket
7. Reinforcement strip
8. Rivet
9. Front arm support
10. Wheel support
11. R.H. adjustment plate
    L.H. adjustment 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 ring
77. Spring
78. Spring collar
79. Flat washer
80. Lockwasher
81. Hexagonal head cap screw
82. Hexagonal wrench
    (adjustment cam P/N 529 003 800)
83. Adjustment wrench
    (shock spring P/N 529 002 400)
84. Special washer

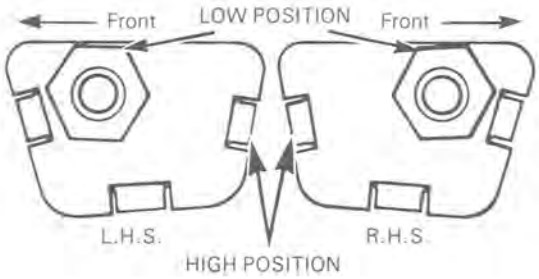
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REMOVAL

Release track tension by loosening adjuster bolts located on inner side of rear idler wheels.



Position the adjustment cams at the lowest elevation.



Remove the two lower shock absorber screws.

Remove the four bolts securing suspension to frame.

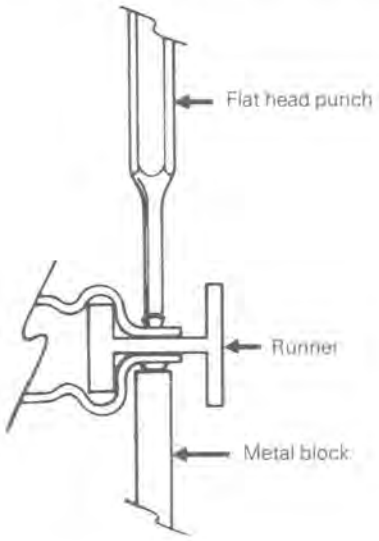
Remove suspension.

DISASSEMBLY & ASSEMBLY

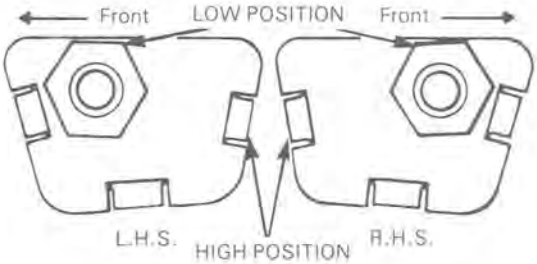
②③④⑤To replace a worn slider shoe, remove the screw and spiral pin. Slide the shoe rearwards out of the runner.

⑧To 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.



㉙At assembly, adjustment cam must be installed to that hexagonal projection on cam which is located toward front of vehicle.



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INSTALLATION

Lift the rear of vehicle off the ground.

Place suspension within the track and align front arm of suspension with front holes of frame and secure using bolts and washers (74). Torque to 42 N•m (31 ft-lbs).

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 bolts and washers (74). Torque to 42 N•m (31 ft-lbs).

(81) (75) (53) Secure shock absorbers to rear arm, torque bolt to 61 N•m (45 ft-lbs).

(19) (45) If necessary, lubricate the idler wheels at grease fittings until grease appears at joints. Use low temperature grease only (P/N 498 028 100).

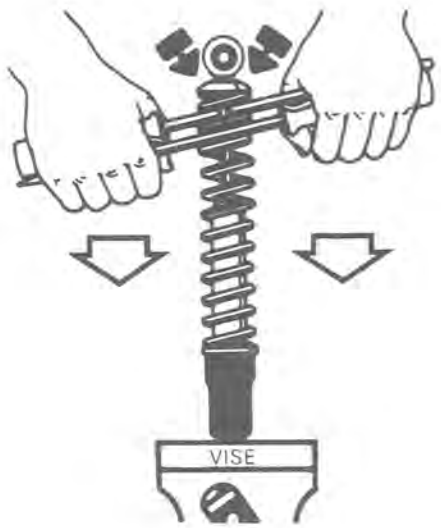
NOTE: To adjust the track tension and alignment, refer to section 05-05.

WARNING: Ensure to install the special washer (84) 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:

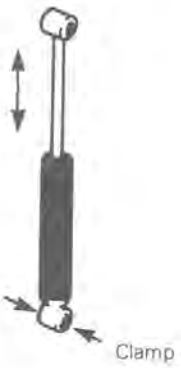
Clamp the shock absorber lower mount in a vise and press the spring down with a pair of screwdrivers as illustrated, remove the spring collar and the spring.



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:

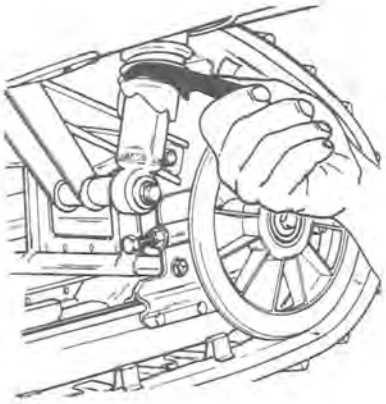
- A skip or a hang back when reversing stroke at mid travel.
- Seizing or binding condition except at extreme end of either stroke.
- Oil leakage.
- A gurgling noise, after completing one full compression and extension stroke.

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REAR SUSPENSION ADJUSTMENT

Shock spring adjustment

The rear suspension may be adjusted by turning the shock absorber cam collars with the adjustment key.



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).

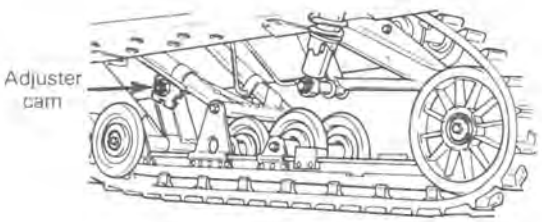
3rd Position: For rider weight of 82 kg (180 lbs) and higher.

CAUTION: Always turn the left side adjuster block in a clockwise direction, the right side adjuster block in a counter-clockwise direction. Left and right adjuster blocks must always be set at the same elevation.

Front spring adjustment

The suspension can be tuned to the rider's specific requirement using the front adjuster cams.

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.

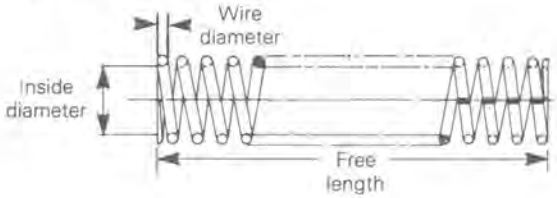


NOTE: It is possible to use "Optional" shock springs (P/N 503 069 400) on rear shock absorbers. (See shock spring diagram.)

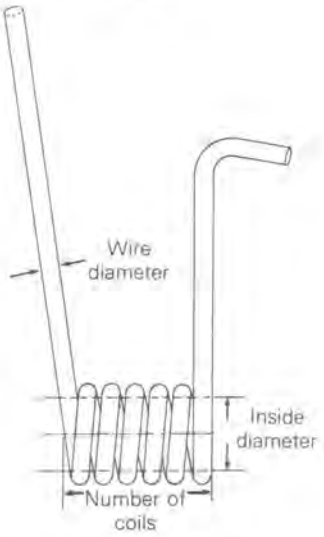
CAUTION: Optional parts are calibrated to operate together. Failure to follow this recommendation may affect handling of the vehicle.

SUSPENSION SPRING IDENTIFICATION

Shock springs



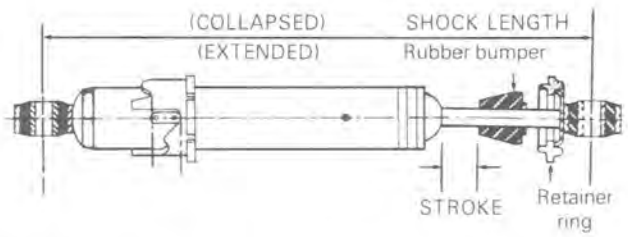
Slide suspension springs



Shock specifications

	REAR SHOCK (without spring)
Part number	414 476 400
Stroke	13.20 cm (5.200")
Length ① collapsed*	23.78 cm (9.360")
Length extended*	36.98 ± 0.3 cm (14.560 ± 0.125")
Colour code	Blue dot

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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.

① 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.

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)
PIN	503 069 500	503 069 600	N.A.	503 069 400	414 477 500	414 477 600	N.A.	N.A.
NUMBER OF COILS	16.6	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 (11.42 ± 0.12")	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")	8.38 cm (3.30")	N.A.	10.89 cm (4.29")	N.A.	N.A.	N.A.	N.A.
COLOUR 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

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OPTIONAL PARTS INSTALLATION

Lift the rear of the vehicle until the track is "off" the ground.

Remove the shock covers.

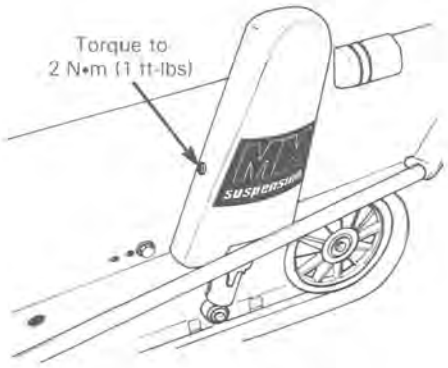
Remove the shock assemblies.

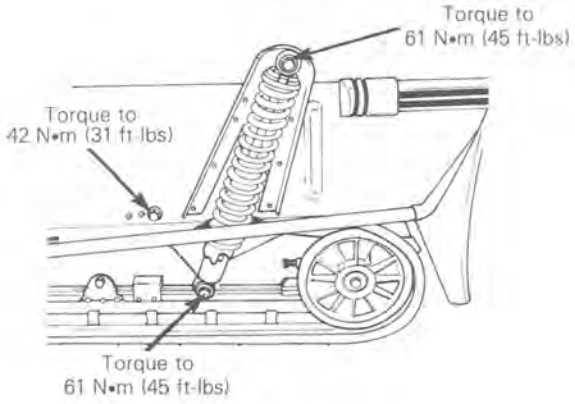
Remove the springs from the shocks.

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.



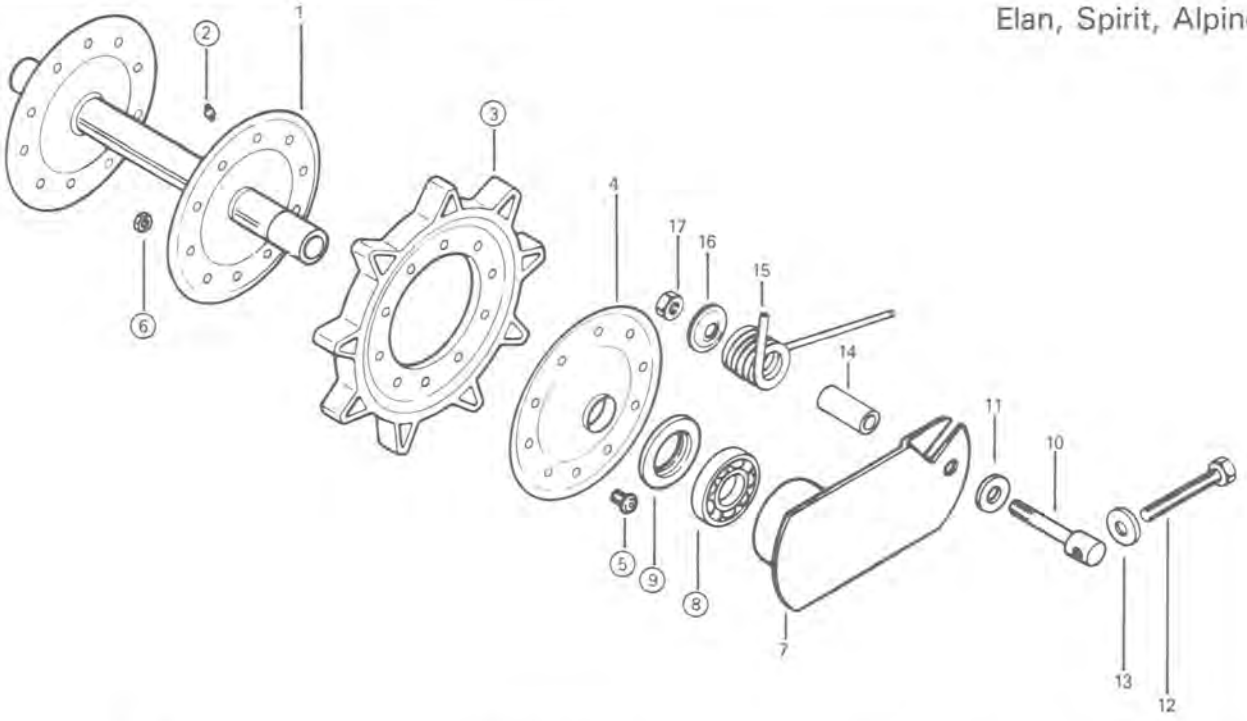


NOTE: To adjust the track tension and alignment, refer to section 05-05.

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REAR AXLE



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

REMOVAL

Lift and block rear of vehicle off the ground.

Remove the link plate spring lock nuts and retainer washers.

Using an appropriate tool, unlock link plate springs.

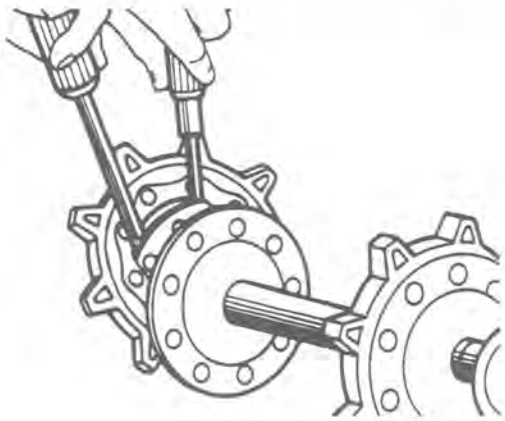
Remove track adjuster bolts, eye bolts, hardener washers and adjuster sleeves.

Withdraw rear axle from vehicle.

DISASSEMBLY & ASSEMBLY

③ Sprockets are factory riveted. When separation is necessary, remove rivets securing idler with a 1/4" dia. drill.

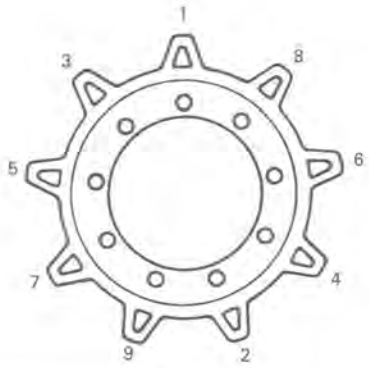
To remove sprocket, apply liquid soap or petroleum jelly on sprocket bead and flange then with two (2) screwdrivers (round bars), pass the sprocket over flange. Reverse change-over procedure to install sprockets.



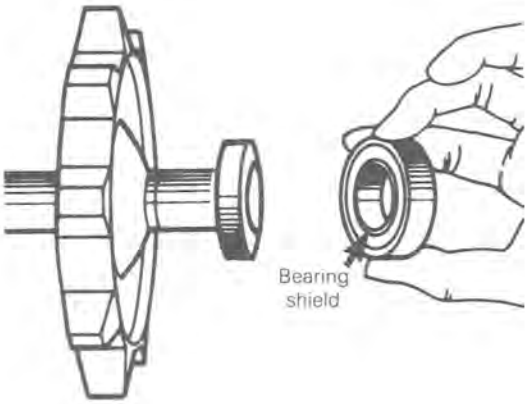
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Secure idler wheels and flanges using bolts and nuts tightened in the following sequence to 3.5 N•m (3 ft-lbs).

⑤⑥ Tightening torques for sprockets are 3.5 N•m (3 ft-lbs).



⑧ Always pull or push the bearing by inner race. Install bearing with shield facing the sprocket.



⑨ 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

With rear of vehicle off the ground, position the rear axle within the track.

Install sleeves, hardener washers and eye bolts.

Partially screw-in the track adjuster bolts.

Hook the link plate springs. If applicable, hook springs into middle position of 3 position anchors.

Install retainer washers and partially tighten the link plate spring lock nuts.

Carry out track tension and alignment.

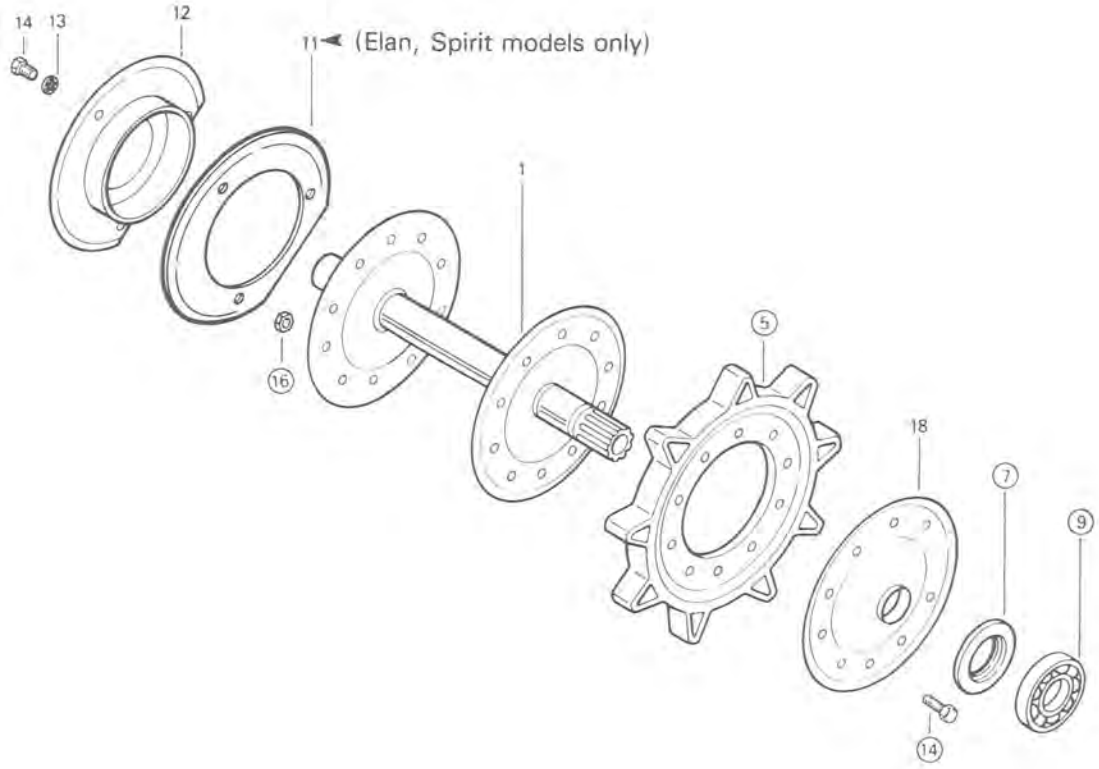
②If necessary, lubricate idler wheels at grease fittings until grease appears at joints. Use low temperature grease only (P/N 498 028 100).

NOTE: To adjust the track tension and alignment, refer to Section 05-05.

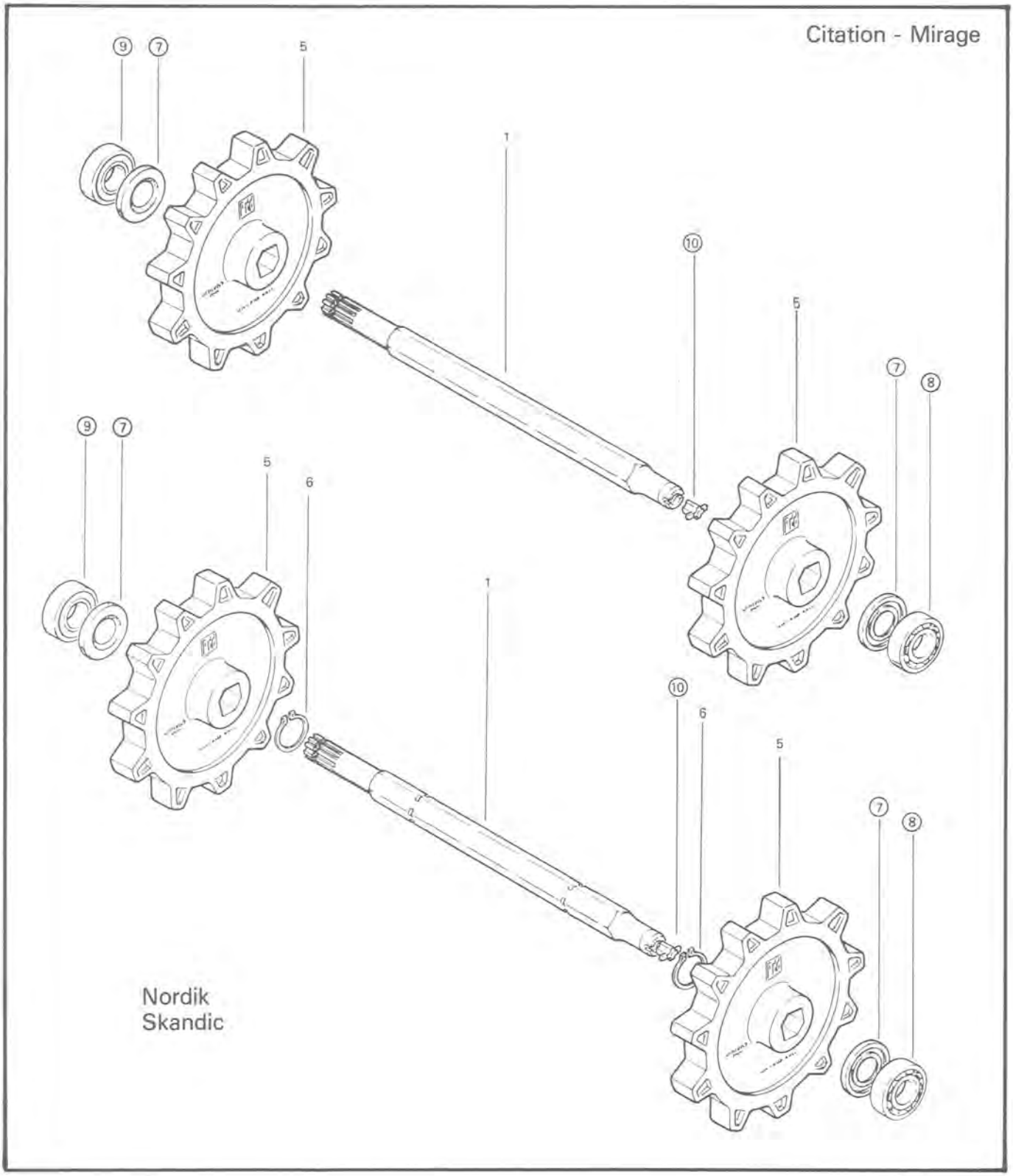
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DRIVE AXLE

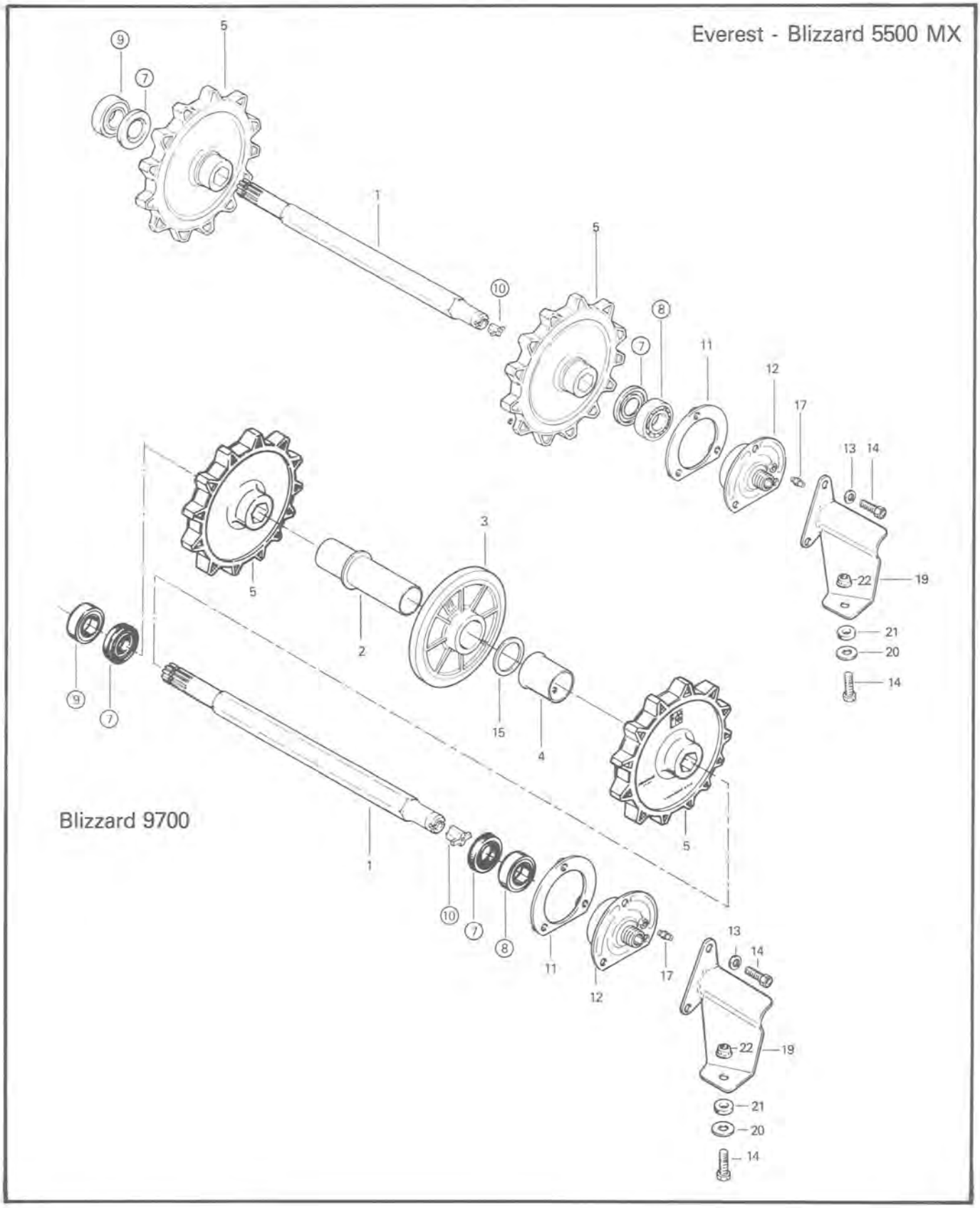
Elan, Spirit, Alpine



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1. *Drive axle*
2. *Spacer tube*
3. *Idler*
4. *Spacer tube*
5. *Sprocket*
6. *Circlip*
7. *Seal*
8. *Bearing*
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*

REMOVAL

Drain oil from chaincase or gear box. Release drive chain tension (if applicable).

Raise and block rear of vehicle off ground.

Remove suspension.

Pry oil seals from chaincase and end bearing housing.

Remove end bearing housing and unlock drive axle 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.

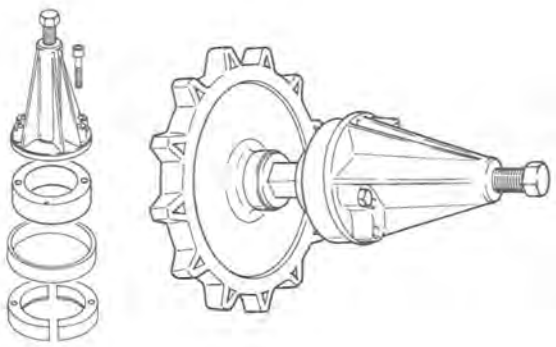
Release drive sprocket teeth from track notches, at the same time, pulling the drive axle towards the end bearing housing side of frame.

Remove drive axle from vehicle. If applicable, pull out shim located between bearing and lower chaincase sprocket.

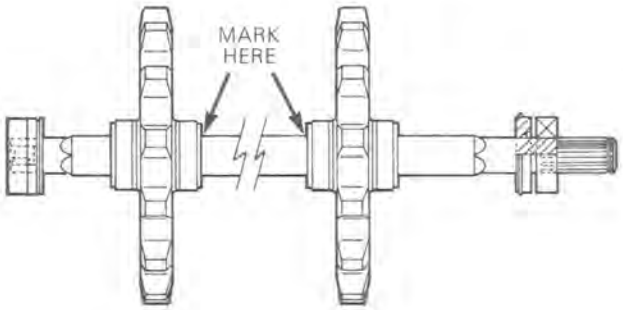
DISASSEMBLY

⑩Remove speedo drive insert (if applicable).

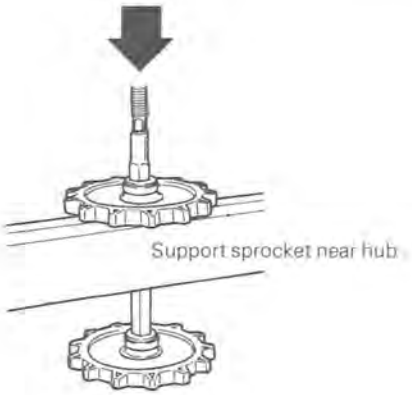
⑦⑧To remove bearings, use puller assembly, ring and half rings as illustrated. (Refer to tools section).



⑤When replacing sprockets, make a reference mark on the axle to facilitate reassembly of the new sprockets.



To remove, press fit sprockets (drive axle without flange), use a press and a suitable support as illustrated.

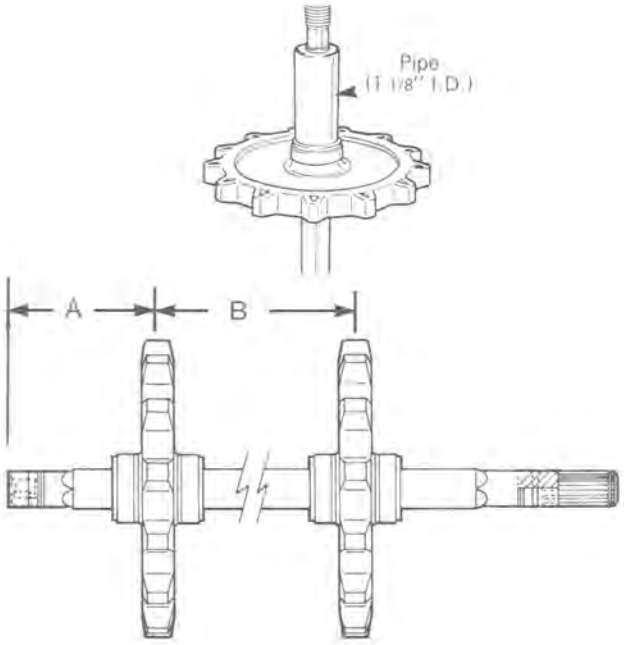


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ASSEMBLY

NOTE: 1983 models have two different axle-sprocket press fits. Ensure to replace ring reinforced sprockets with the same type.

⑤To assemble press fit sprockets, use a press and a pipe (1 1/8 I.D.) as illustrated. Sprockets must be assembled with the following dimensions.



On Citation and Mirage models:

Dimension A = 100 mm (3 15/16")
Dimension B = 225.5 mm (8 7/8")

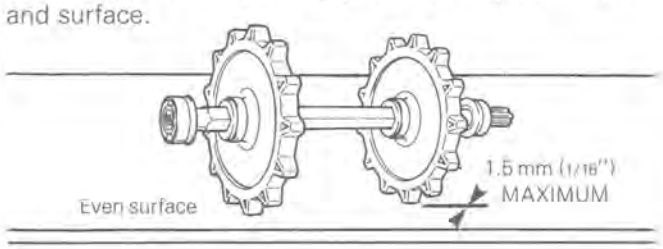
On Everest, Blizzard 5500 MX and Blizzard 9700 models:

Dimension A = 104.5 mm (4 7/64")
Dimension B = 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.

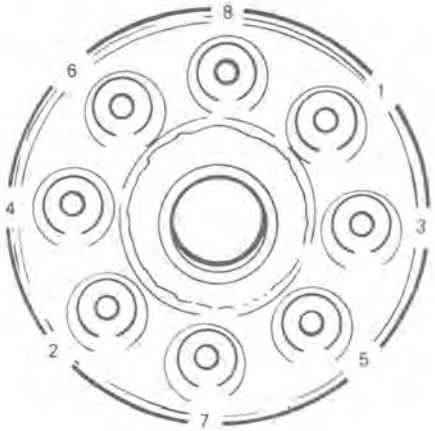


CAUTION: The same sprocket must not be pressed twice on the axle. If synchronization is found to be defective, use a new sprocket.

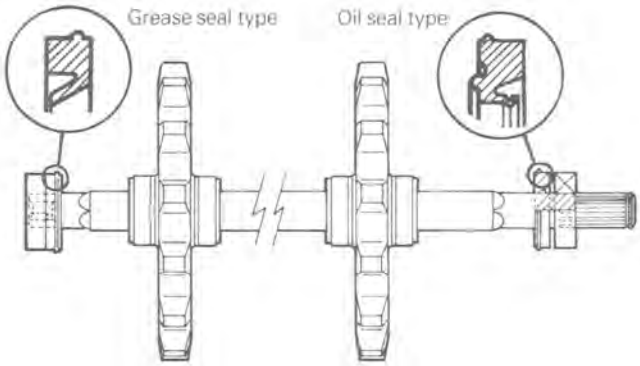
NOTE: Idler wheel ③ must turn freely.

⑭⑯Tightening torque for axle flanges is 3-4 N•m (2-3 ft-lbs).

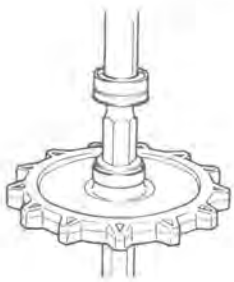
When reassembling, install a new nut or apply "Loctite" (or equivalent) on old threads. Tighten in the following sequence.



⑦When assembling drive axle, always position a new seal on each end of drive axle. The seal lip must face sprocket as illustrated.

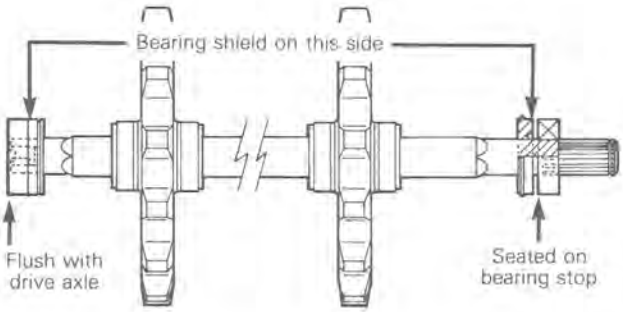


⑧⑨Always push bearing by inner race.



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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.

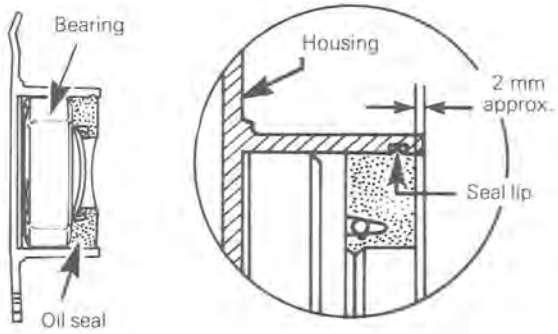


INSTALLATION

⑩If 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/ Spirit models) or circlip (other single track models).

Reinstall the chaincase cover.

Refill with chaincase oil.

Install the suspension. Apply track tension and carry out track alignment procedure.

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TRACK

TRACK TYPE APPLICATION

Refer to the "Technical Data" section (09-05).

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, Spirit

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, Mirage, Nordik, Skandic

Remove the following items:
- Pulley guard and drive belt
- Air silencer
- Injection oil reservoir (if so equipped)
- Battery and battery support (if so equipped)
- Speedometer, angle drive (if so equipped)
- Chaincase cover, sprockets and chain
- Suspension
- Countershaft bearing housing (clamp)
- Drive axle shaft bearing housing (left side)
- Drive axle (outwards from left side)
- Upper center idler(s) assembly
- Track

Everest, 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).

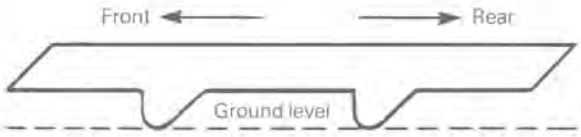
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INSTALLATION:

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.



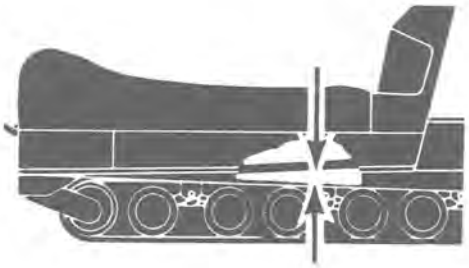
Track tension & alignment

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, Spirit

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 and bottom of foot board.



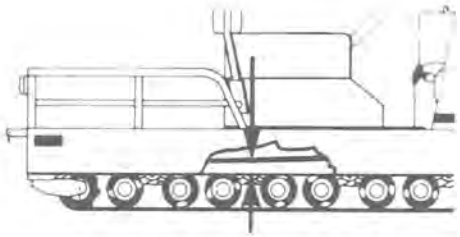
If applicable, ensure that the link plate springs are in the middle position of the 3 position slotted anchors.

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.

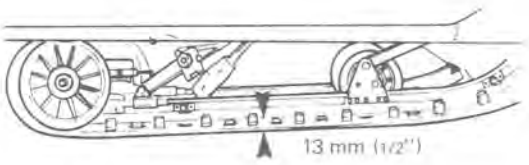
Tighten link plate spring lock nuts.

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 suspension models except Blizzard 5500 MX)

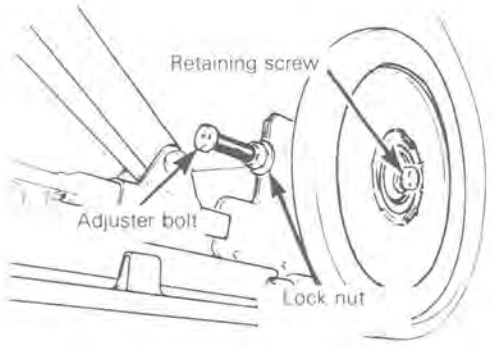
Lift the rear of vehicle and support with a mechanical stand. Allow the slide to extend normally. Check the gap 13 mm (1/2") between the slider shoe and the bottom inside of the track.



CAUTION: Too much or too little tension will result in powder loss and excessive stress on suspension components.

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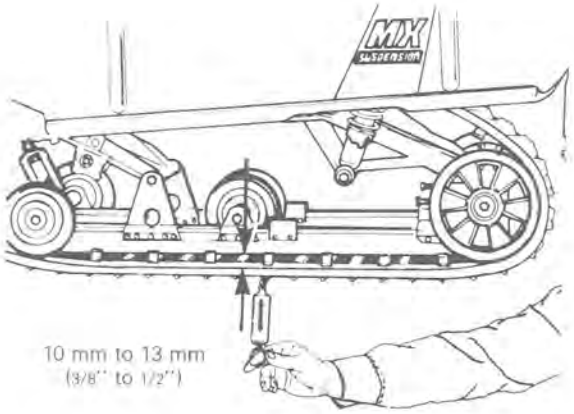
To adjust. Loosen the rear idler wheel retaining screw and the adjuster bolt lock nut; then loosen or tighten the adjuster bolts located on the inner side of the rear idler wheels.



NOTE: If the track tension is too loose, the track will have a tendency to thump.

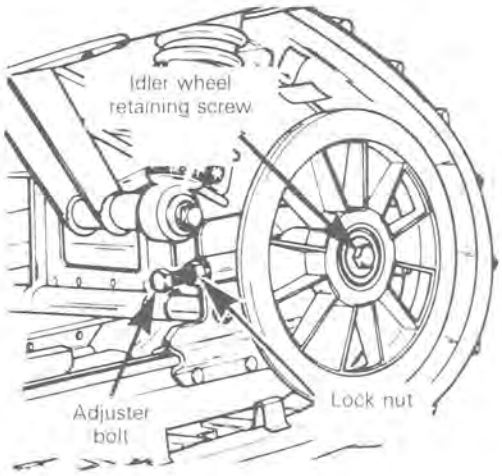
Tension (for Blizzard 5500 MX)

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 powder 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.



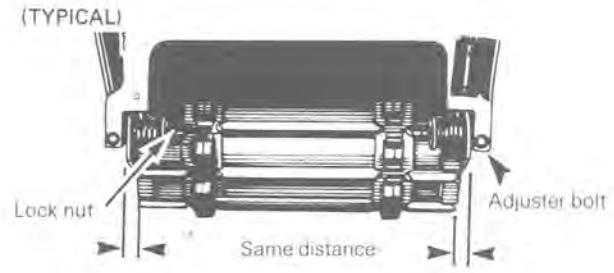
NOTE: If the track tension is too loose, the track will have a tendency to thump.

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.

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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.

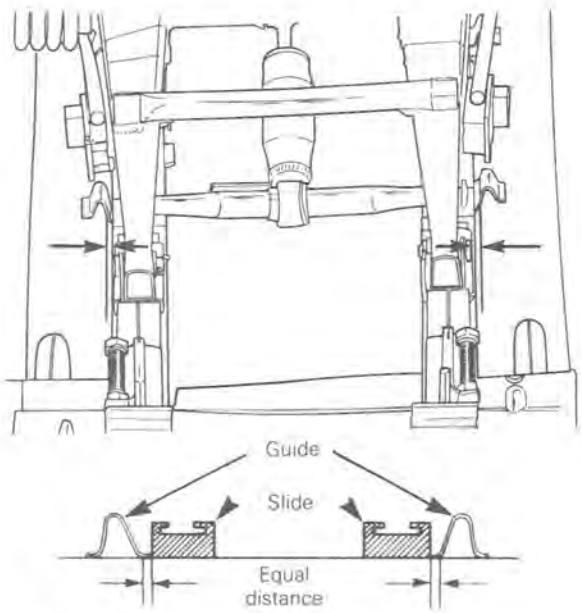
Tighten link plate spring lock nut.

Alignment (slide 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)



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 N°. 529 004 500 tool (with two standard jigs)

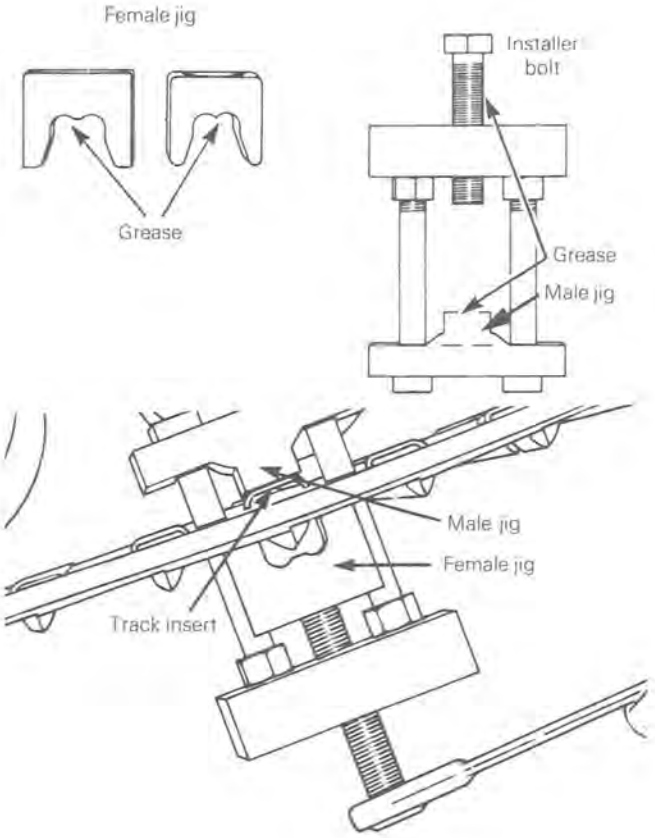
("Moto-Ski" jig P/N 529 004 300)

Tilt vehicle on its side to expose the track notches then place insert into position.

Place the track insert installer into track notches and position male jig on top of track insert.

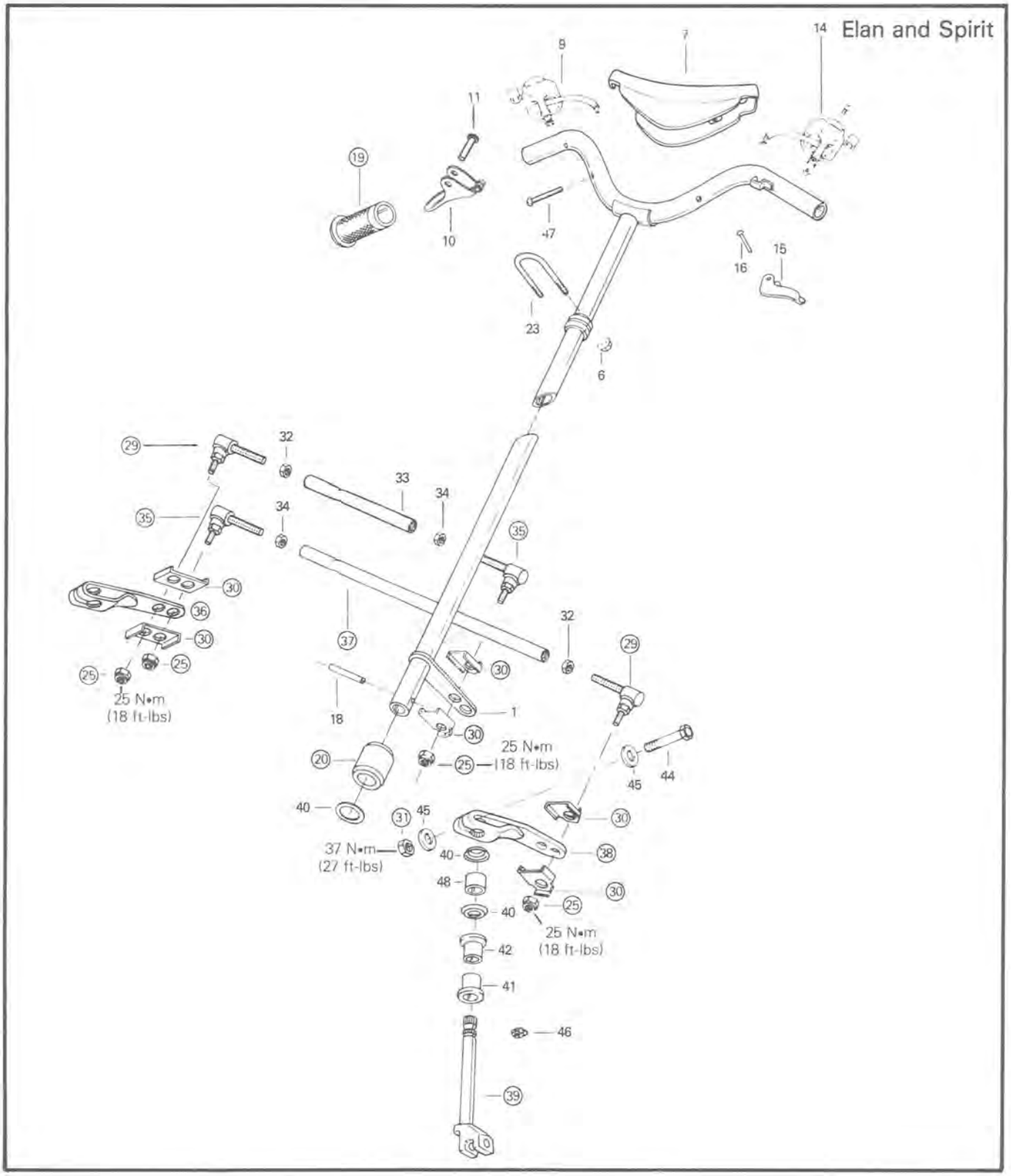
Tighten installer bolt until track insert is locked in place.

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.



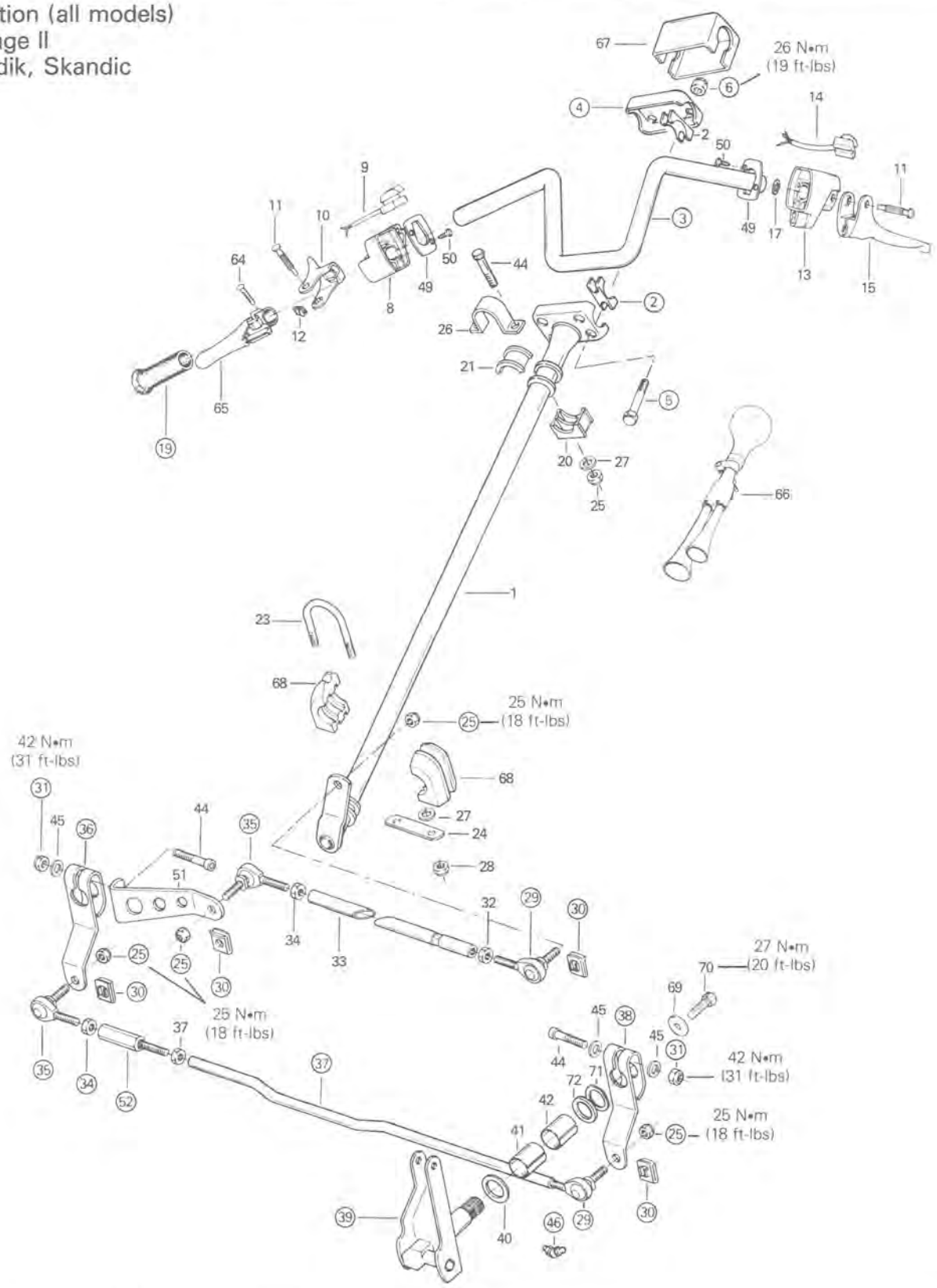
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STEERING SYSTEM

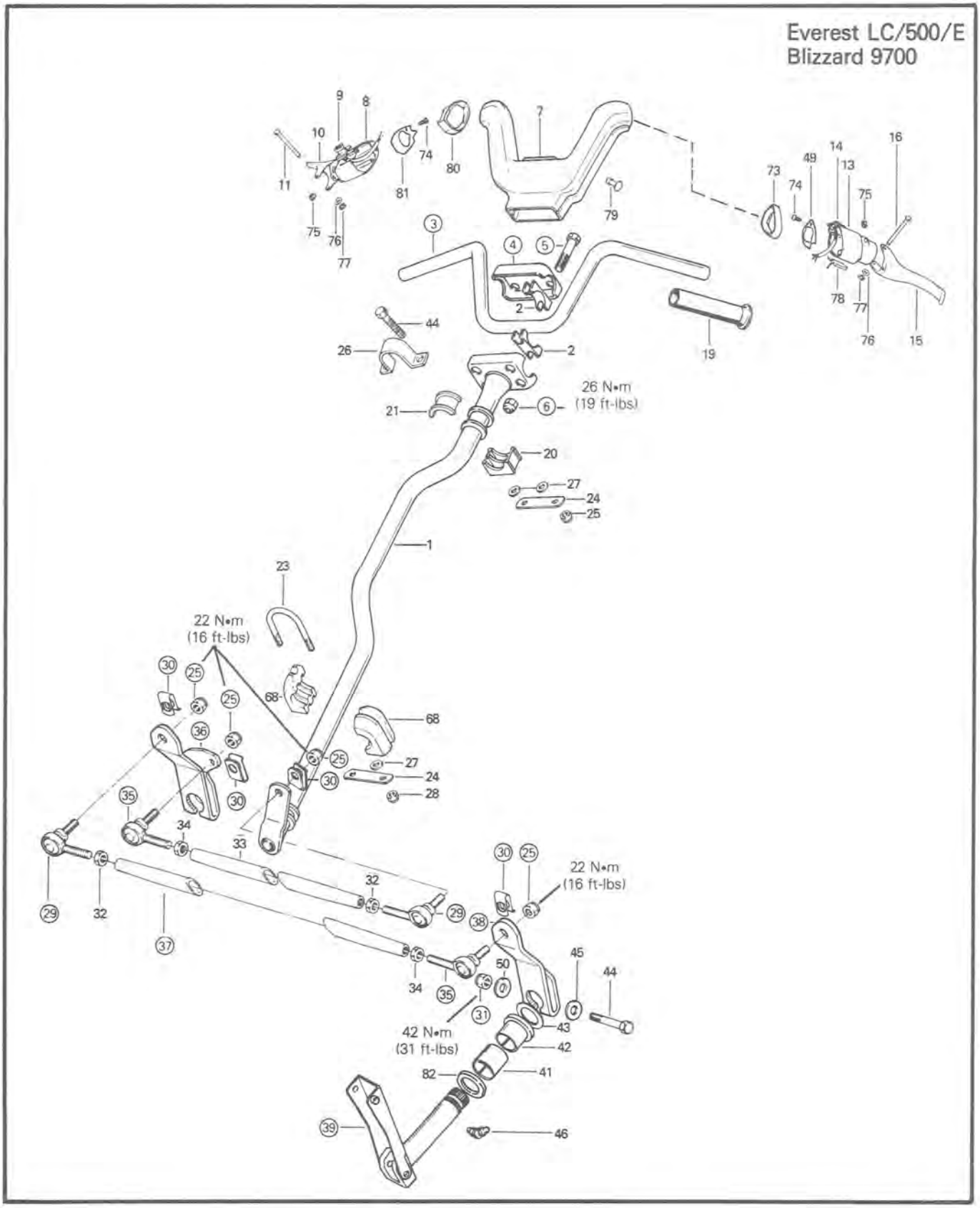


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Citation (all models)
Mirage II
Nordik, Skandic

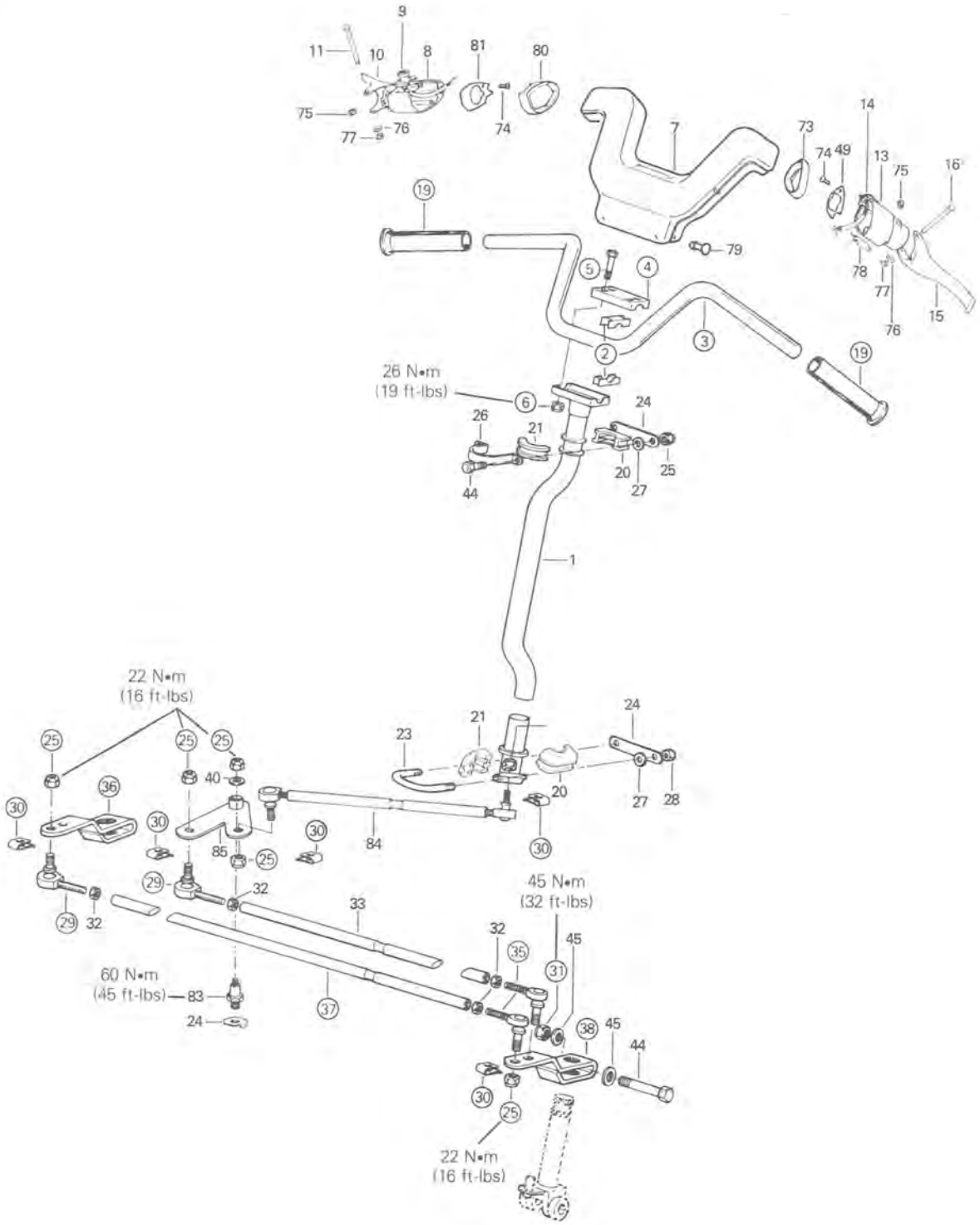


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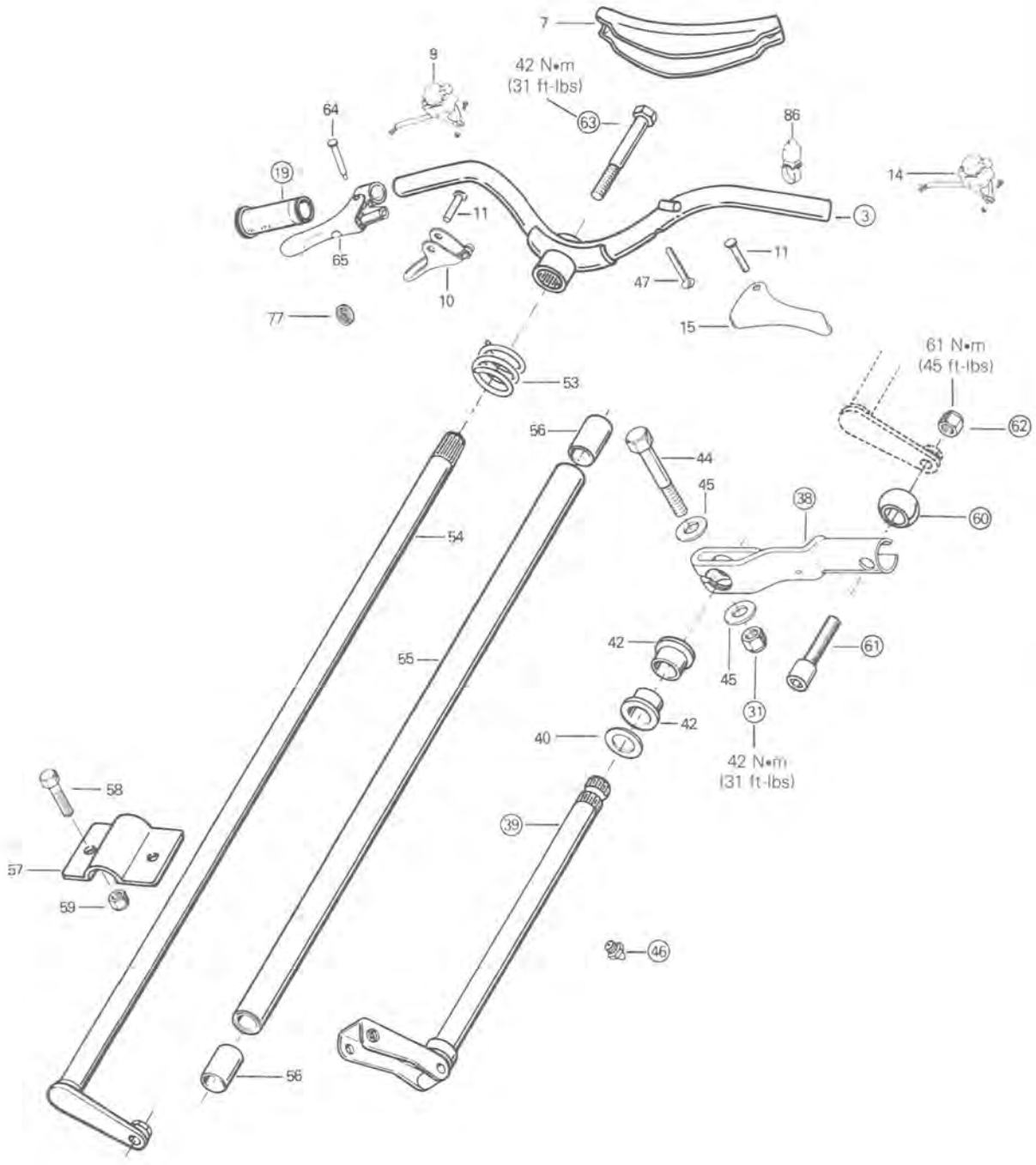
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Blizzard 5500 MX



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Alpine



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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 column
56. Bushing
57. Retainer bracket
58. Bolt
59. Nut
60. Ball bushing
61. Allen bolt
62. Nut
63. Cap screw
64. Rivet (Europe only)
65. Parking handle (Europe only)
66. Horn (Europe only)
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 taping 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. Horn button

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INSPECTION

Check skis and runner shoes for excessive wear, replace as necessary. (See section 06-02.)

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

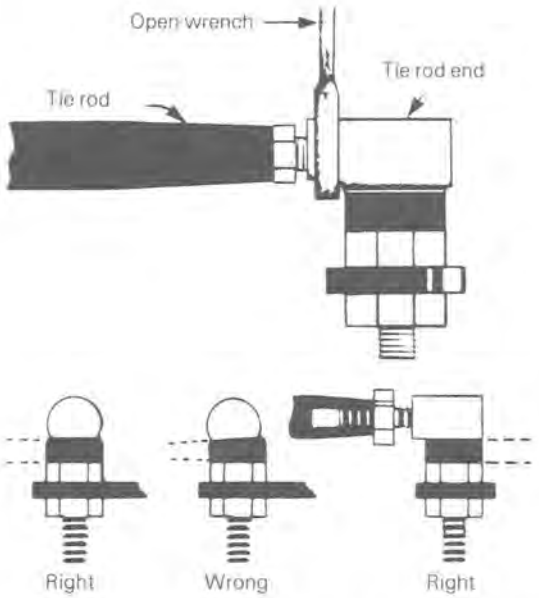
⑲ Grips can be removed and installed without any damage by injecting compressed air into the handlebar.

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 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 Technical Data.



㉚ When assembling components, always position new lock tabs.

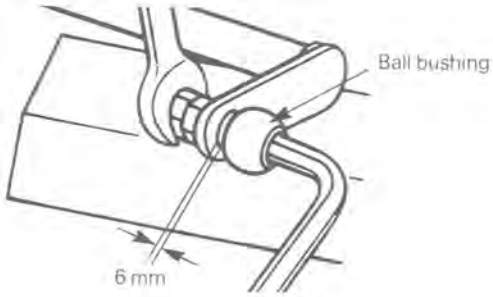
㊱ ㊳ The steering arm angles should be equal on both sides when skis are parallel with vehicle.

㉕ Tighten ball joint nuts to specified torque and bend lock tabs over nuts. (See illustration.)

㉛ Tighten steering arm nuts to specified torque and bend lock tabs over nuts. (See illustration.)

Alpine

㊵ ㊶ ㊷ 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.



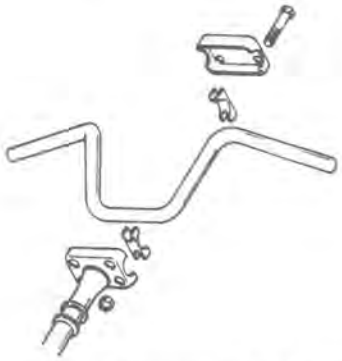
Torque nut to 61 N•m (45 ft-lbs)

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ADJUSTABLE STEERING HANDLE

If applicable, remove and discard the U clamp and nuts holding the steering handle to the steering column.

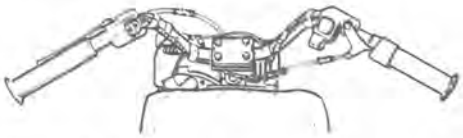
Install the four (4) clamps ②, the cover ④, the four (4) screws ⑤ and nuts ⑥ to the column, as illustrated.



On all vehicles, adjust the steering handle to the desired position.

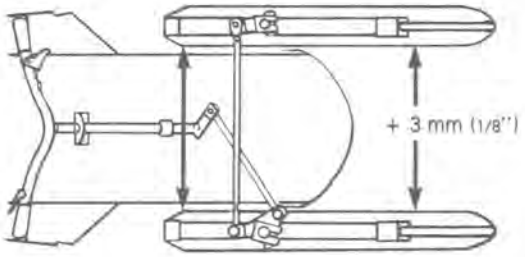
Lock the handle in place by tightening the four (4) screws to 26 N•m (19 ft-lbs).

CAUTION: Tighten the screws equally in a criss-cross sequence and ensure there is an equal gap on each side of the clamps.



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:

Loosen the jam nuts locking the tie rod(s) ㉜ ㉞ 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

When assembling steering arm ㊳ and ski leg ㊴ the handlebar must be horizontal with the ski perpendicular to the vehicle.

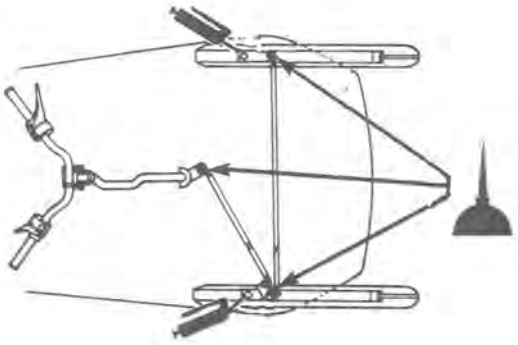
LUBRICATION

WARNING: Do not lubricate throttle and/or brake cable and housings, and spring coupler bolts.

㊻ Using low temperature grease only.

Lubricate the ski legs at grease fittings until new grease appears at joints. Lubricate tie rod end ball joints.

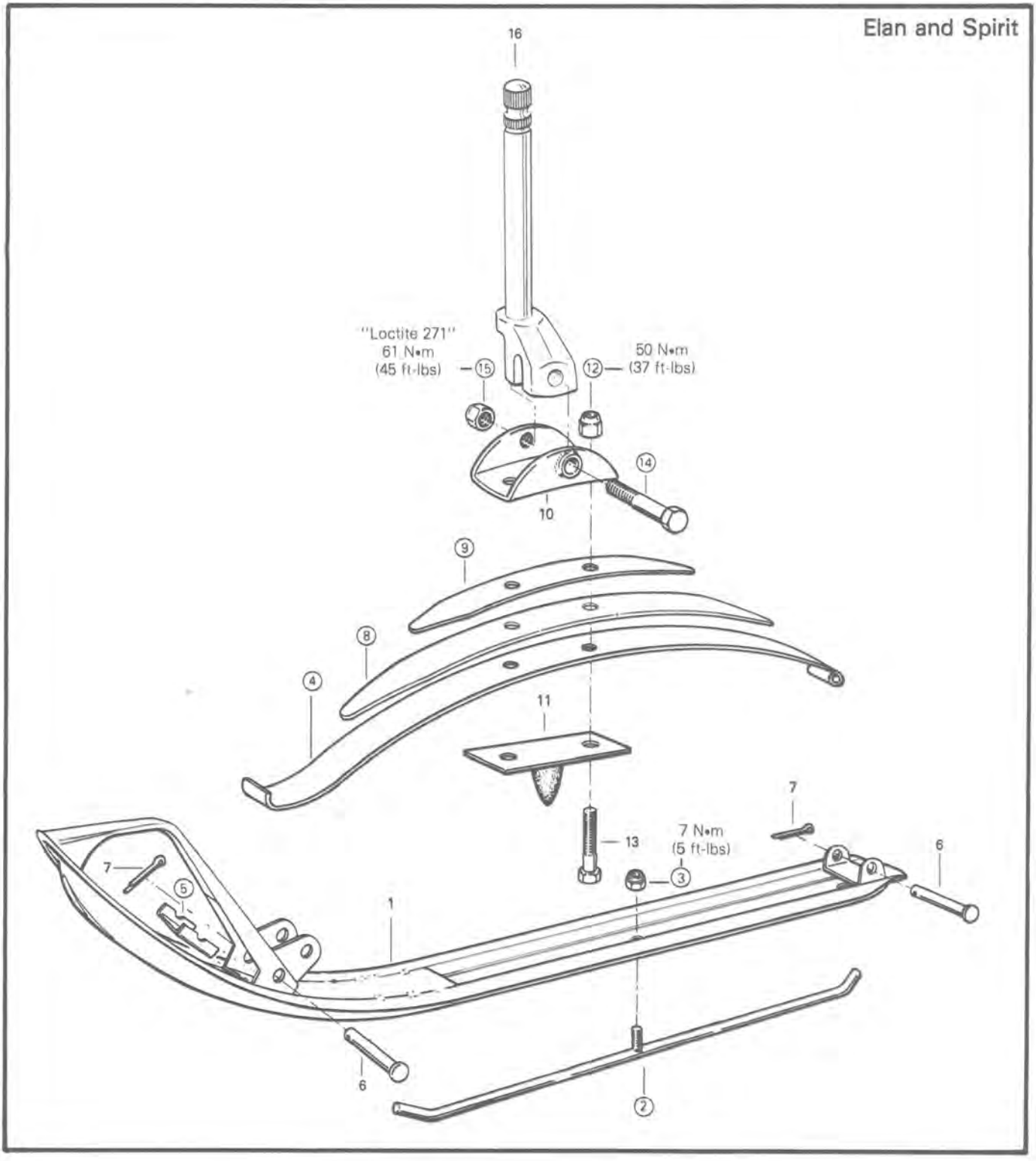
(TYPICAL)



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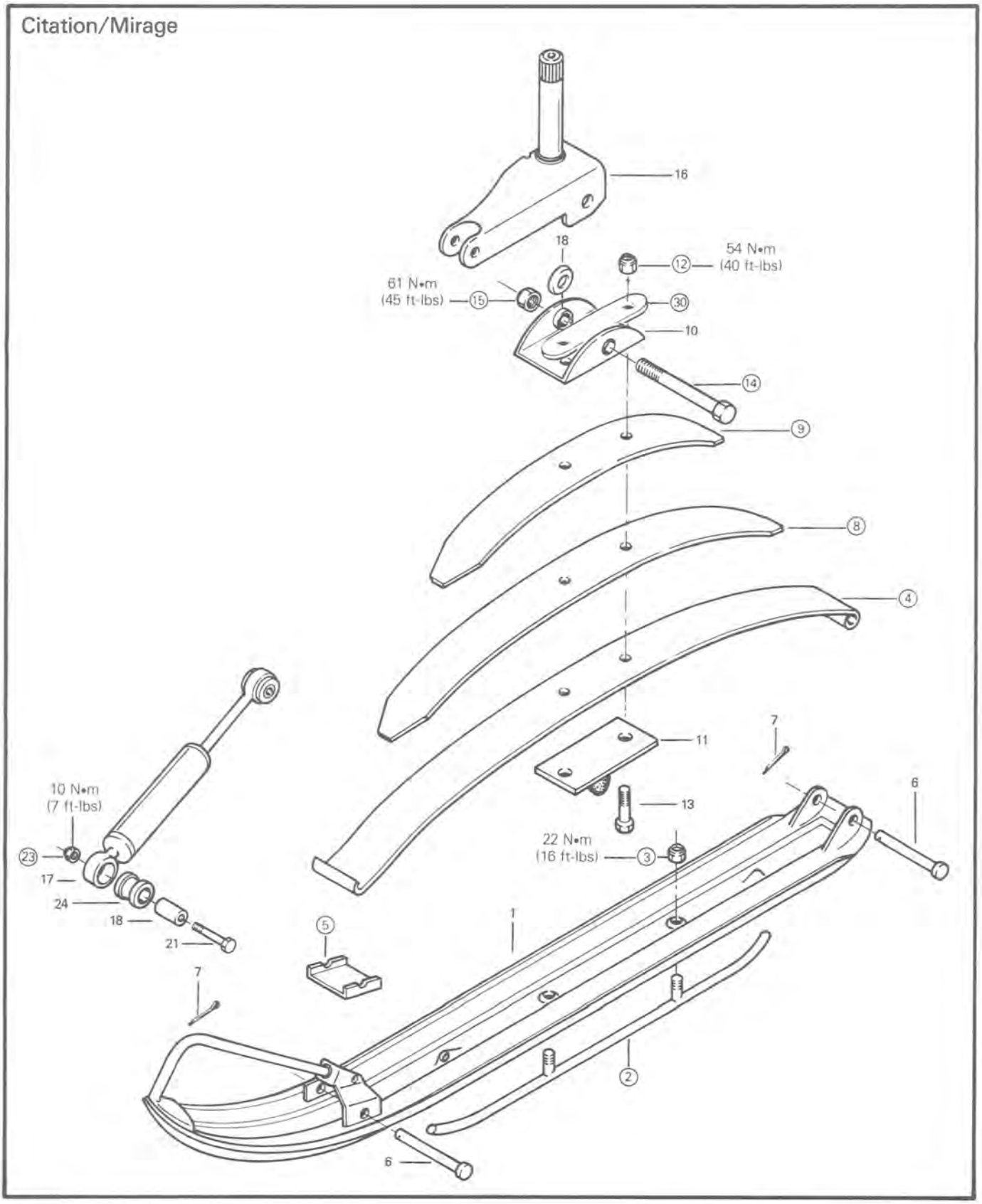
SKI SYSTEM

LEAF SPRING SUSPENSION



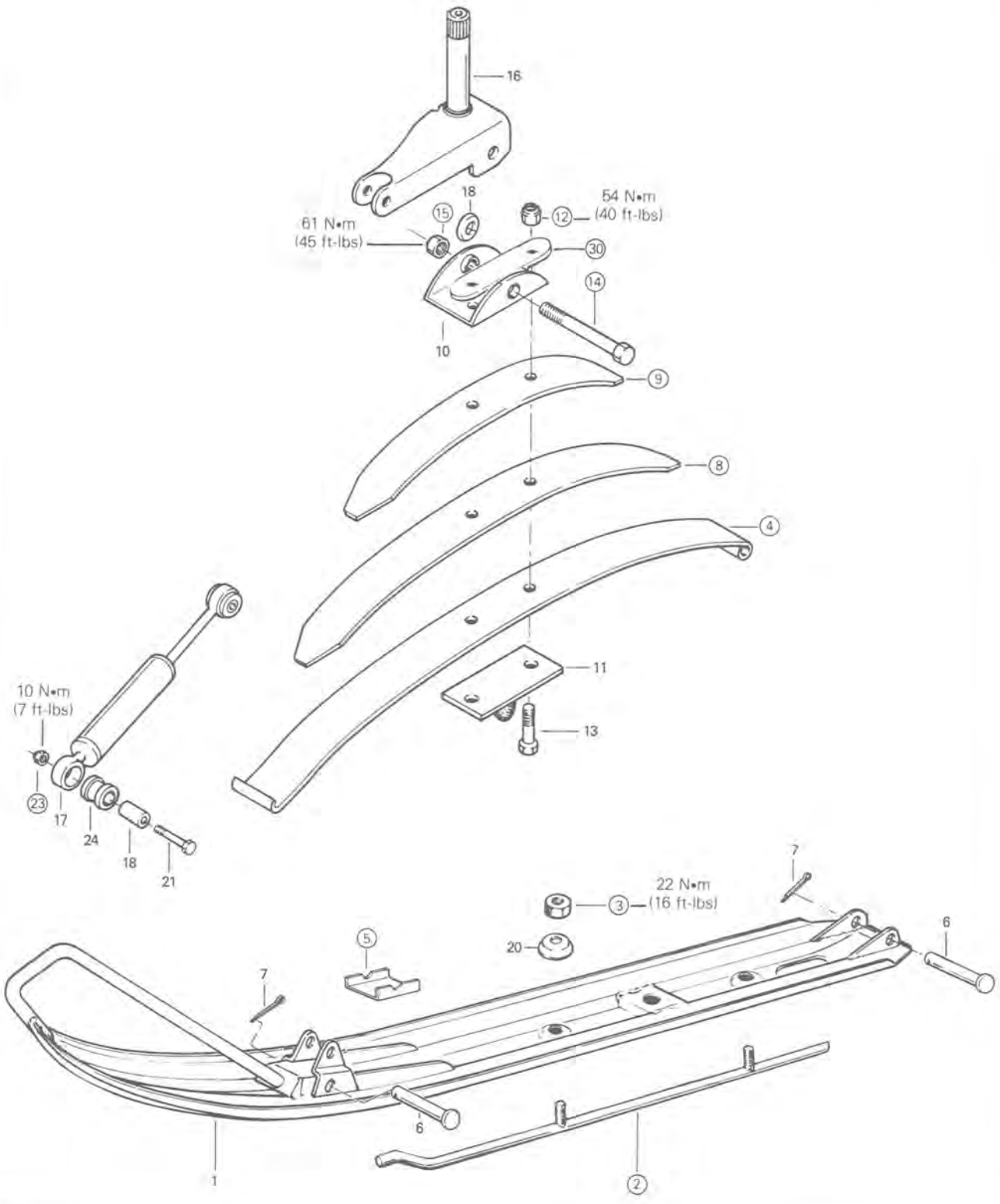
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Citation/Mirage



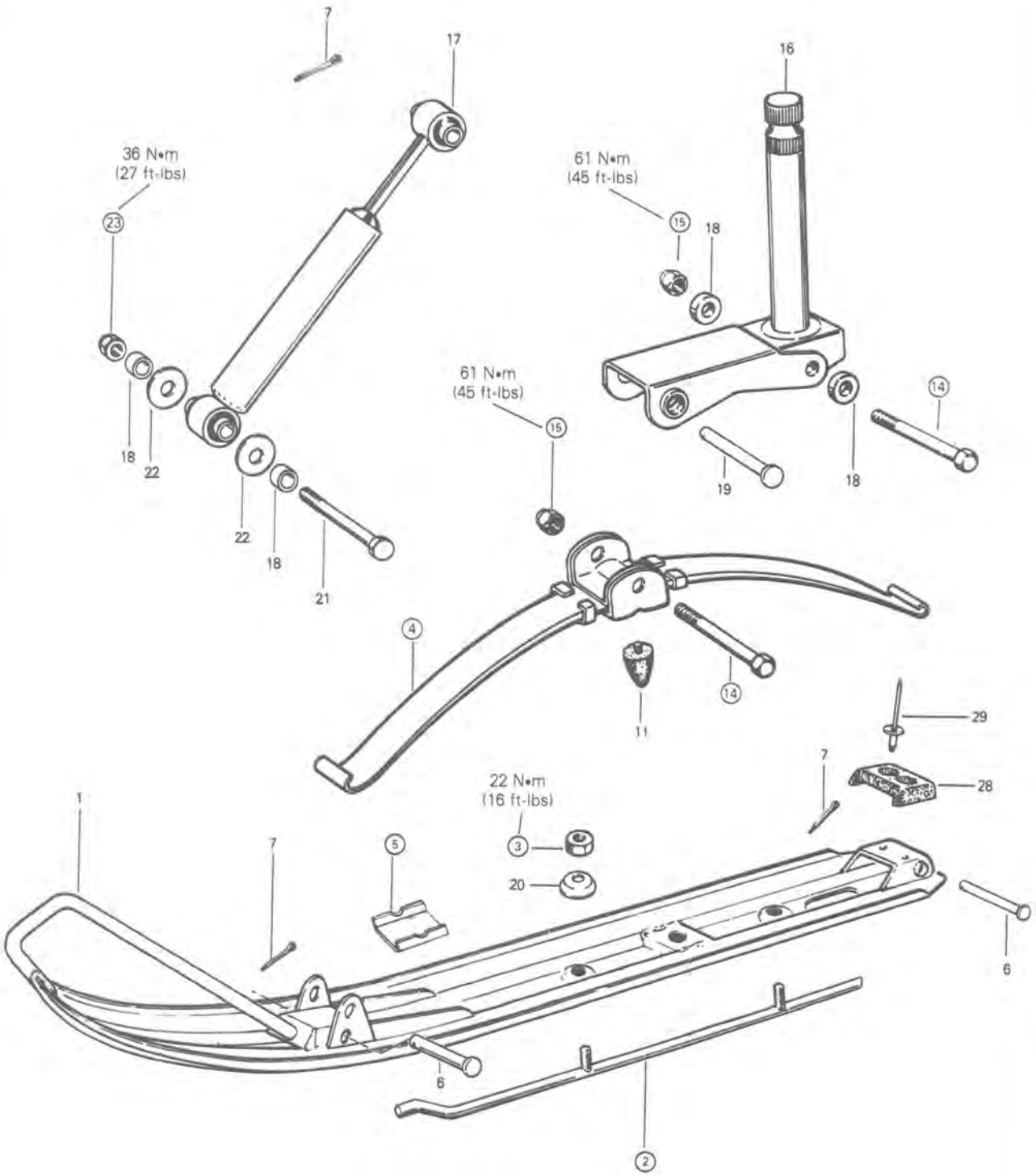
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Nordik, Skandic

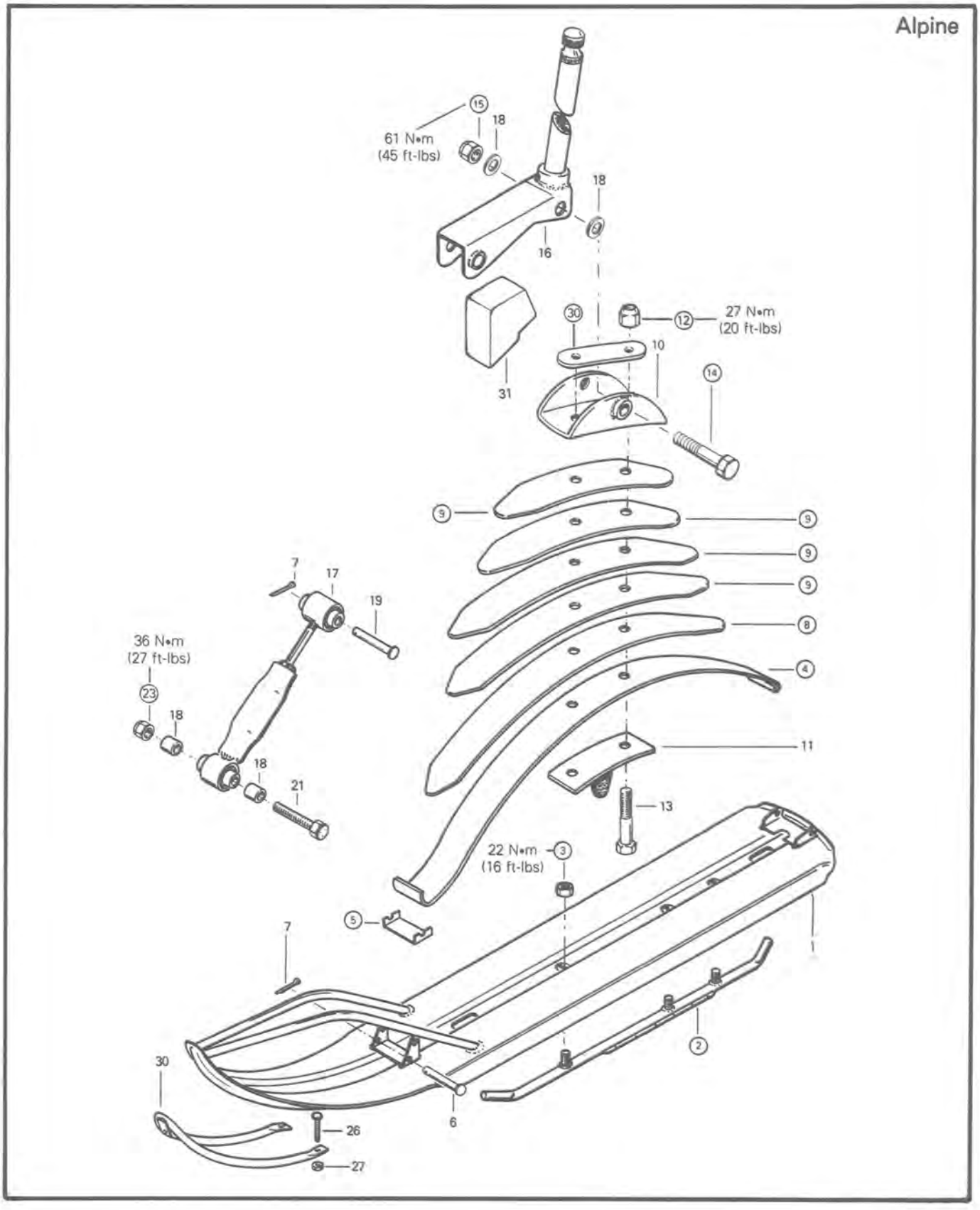


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Everest LC/500/E
Blizzard



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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 (Europe)*
26. *Screw*
27. *Nut*
28. *Rubber bumper*
29. *Rivet*
30. *Tab lock*
31. *Ski bumper*

INSPECTION

Check skis and runner shoes for excessive wear, replace if necessary.

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 **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.**

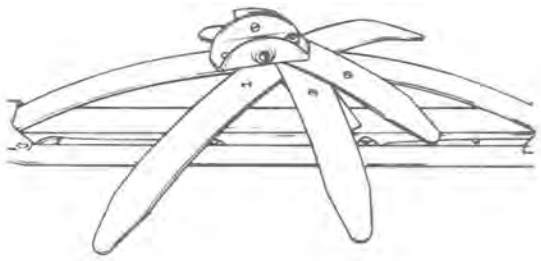
② Replace when half worn.

③ On Elan and Spirit vehicles, torque to 7 N•m (5 ft-lbs). On all others vehicles, torque to 22 N•m (16 ft-lbs).

▼ ④ ⑧ ⑨ **CAUTION: When disassembling leaf coupler from spring leaves be careful of leaf tension.**

When assembling spring leaves, cross each and temporarily insert one (1) nut ⑫ and bolt (for Citation, Mirage II, Skandic, Nordik and Alpine models install a tab lock ㉚), 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.**



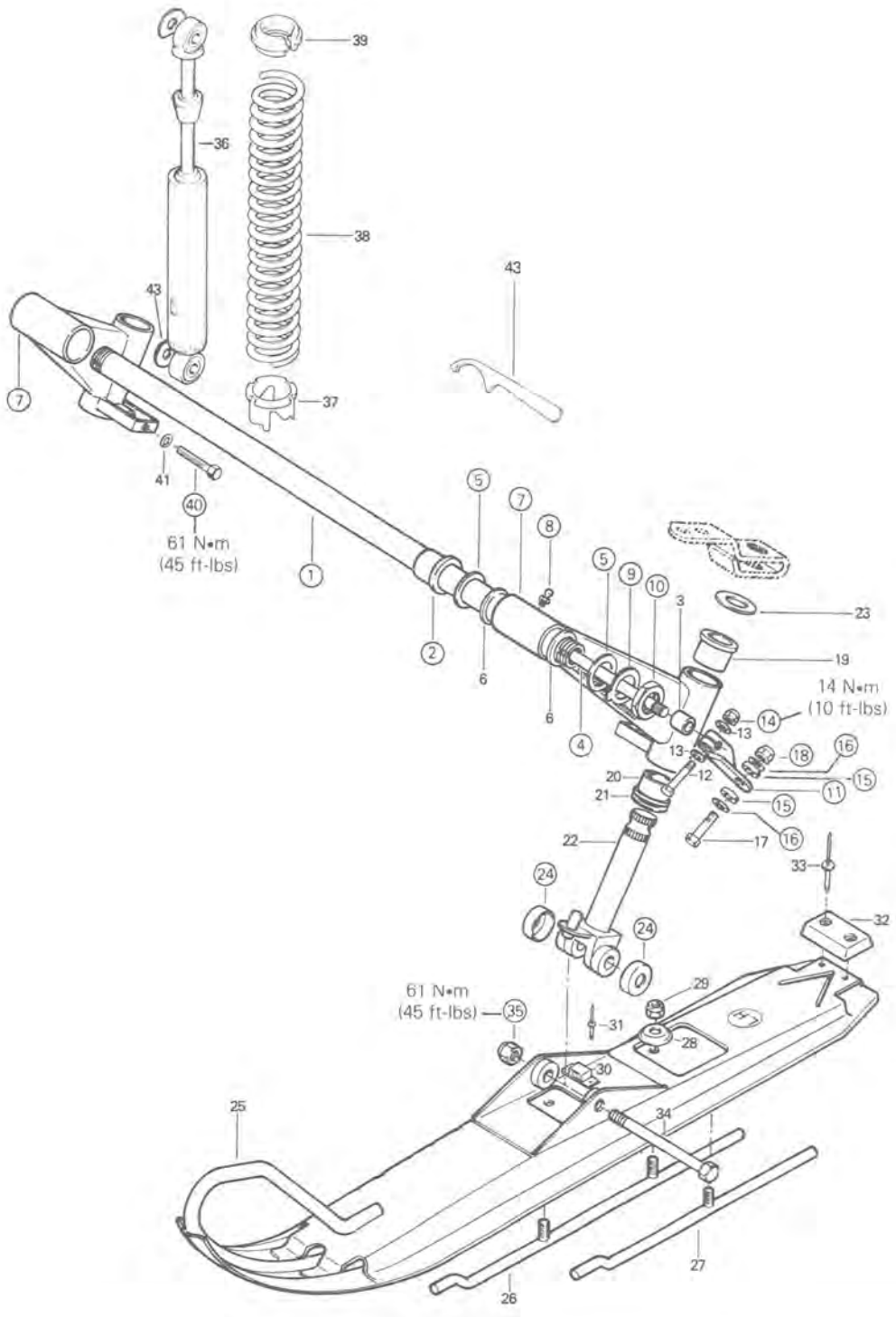
⑤ Apply Lithium grease at least once a year.

⑭ ⑮ 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.

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MX SUSPENSION

Blizzard 5500 MX



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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 bonding*
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.

Remove skis.

Remove rivets of the side pan plastic caps.

Remove shock absorbers.

⑪ Remove one stabilizer arm.

④ Disconnect the other stabilizer arm from the swing arm and pull out stabilizer bar.

⑤ ⑨ ⑩ Open lock tab and remove nut, lock tab, shim.

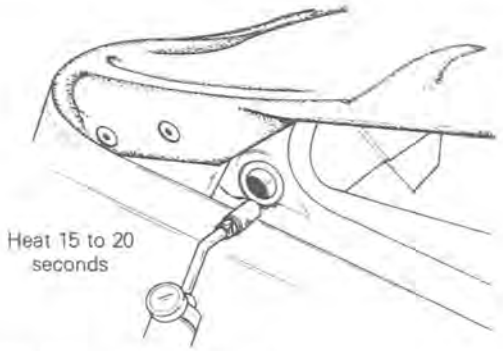
① ⑦ Slip both swing arms from stabilizer tube.

① Pull out stabilizer tube.

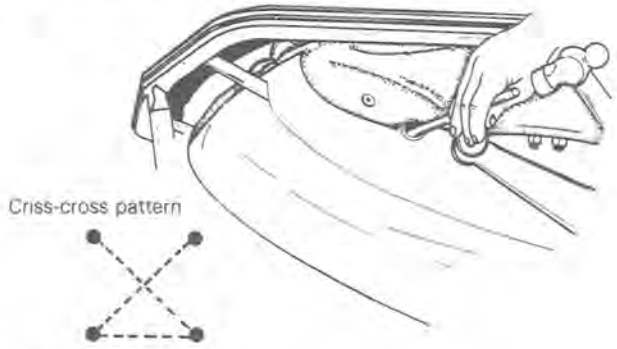
Bushing replacement

② 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.



Using a steel bar, remove bushing.



CAUTION: Always push out bushing in a criss-cross pattern.

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CLEANING

Clean all metal components in a non ferrous metal cleaner.

② 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 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 Reinstall stabilizer tube, shims, swing arms, shims.

① ⑩ Hand tighten nuts so that stabilizer tube threads exceed equally on both sides.

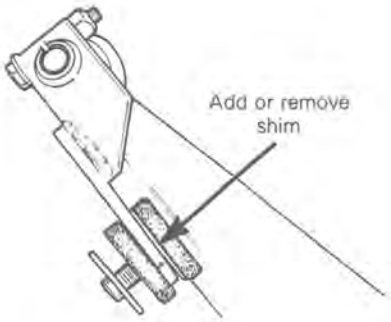
⑩ Torque nut to 35 N•m (26 ft-lbs), unscrew and retorque to 1 N•m (10 in-lbs).

◆ **WARNING: Do not exceed 1 N•m (10 in-lbs) on final torquing of nut.**

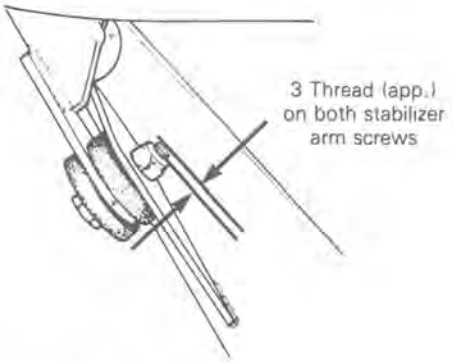
⑨ Bend lock tab.

④ Reinstall stabilizer bar.

⑦ ⑪ ⑮ ⑯ 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.



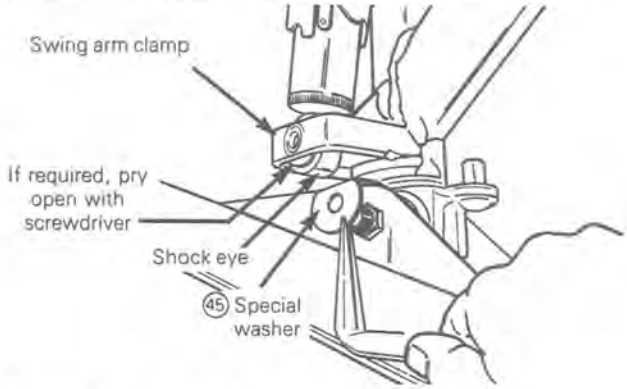
⑪ ⑱ Tighten stabilizer arm nuts equally on both arms.



Shock installation

⑩ Reinstall shocks absorber as shown. Torque the screws to 61 N•m (45 ft-lbs).

Lower shock bushing



Upper shock bushing



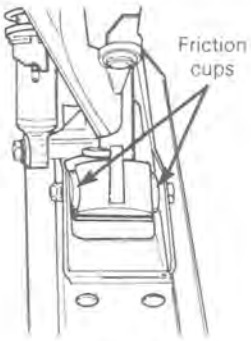
◆ **WARNING: Ensure to install the special washer ⑮ as illustrated, or the shock absorber rubber bushings may slip out of their shock eye.**

Secure side pan plastic caps with new rivets.

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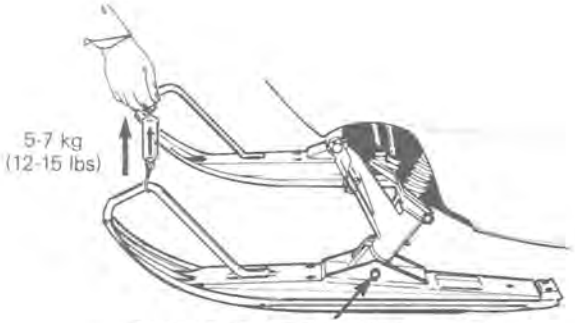
Ski installation

㉔ Position the skis with a friction cup on each side of the ski leg.



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.)



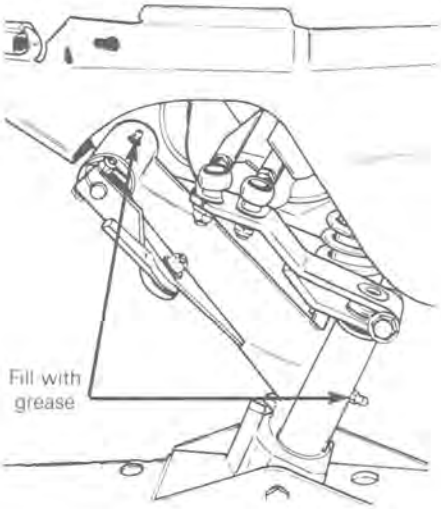
Torque to have 5-7 kg (12-15 pounds) at the front of the ski with a scale

㉟ Torque the elastic stop nut on the ski leg coupler to 56-57 N•m (42-50 ft-lbs).

For the skis alignment, see section 06-01.

Lubrication

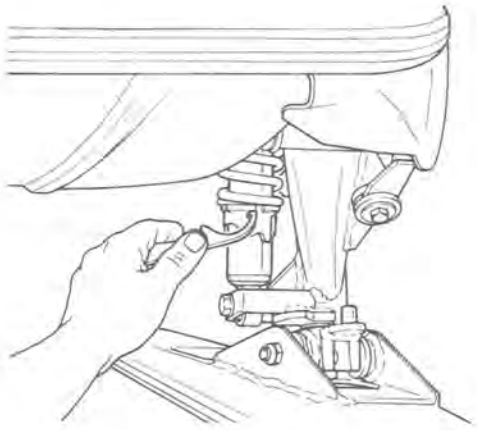
⑧ Using low temperature grease only, lubricate swing arms and ski leg until grease appears at joints. After the operation wipe all excess grease from the swing arm and ski leg housing.



NOTE: The "ski system" must be greased at an interval of 1200 to 1600 kilometers (800 to 1000 miles).

FRONT SUSPENSION ADJUSTMENT

The front suspension may be pre-loaded by turning clockwise or counter-clockwise the shock absorber cam collar with the adjustment key.



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.

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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).
- Skis (single runner shoe type)

  (R) P/N 580 4573 00
  (L) P/N 580 4574 00

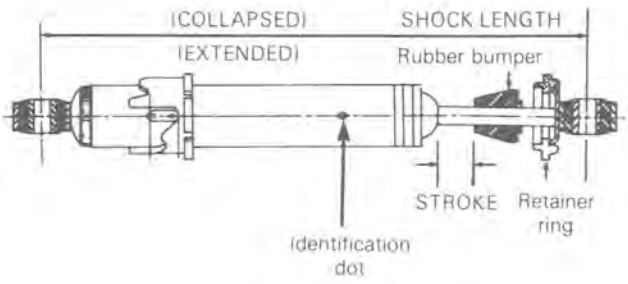
  For more aggressive steering.
- Carbide runners P/N 414 1964 00 can replace the standard short runner or can be installed on the optional skis.

CAUTION: Optional parts are calibrated to be operated together. Failure to follow this recommendation may affect handling of the vehicle.

* (R) Right hand side
  (L) Left hand side

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



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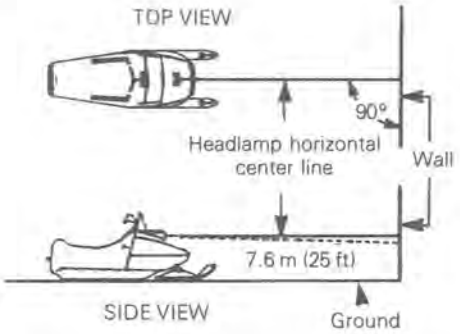
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HOOD

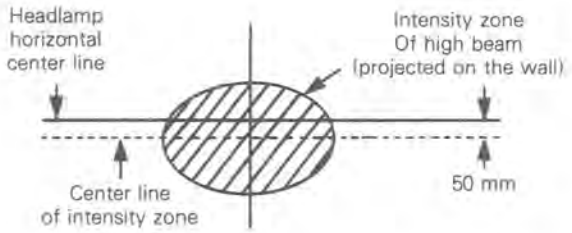
For illustrations (ex.: exploded view) refer to 1983 parts catalog for the appropriate model.

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, on vehicles so equipped remove the headlamp chrome ring, 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 tailling 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.

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.

Inspect hood and repair damage. Repair kits are available at your authorized dealer.

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.

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.

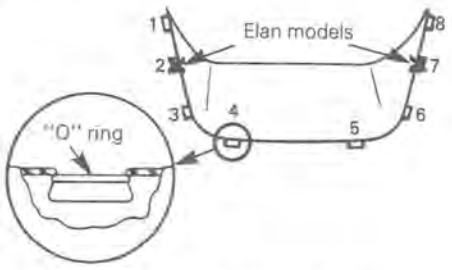
WINDSHIELD INSTALLATION

Elan, Spirit, Citation, Mirage, Skandic

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 "O" rings.

Elan models: do not install "O" rings on second and seventh tabs.



If applicable, install the windshield trim.

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Nordik, Everest, Blizzard 5500 MX, Blizzard 9700

Peel off protective film from windshield.

Position windshield on the hood then push down until tabs are fully inserted into hood slots.

Lock windshield tabs in position using the "O" rings.

Properly seat the windshield in place.

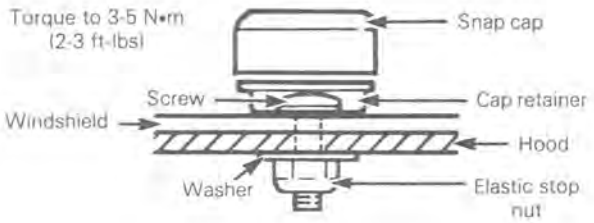
Using windshield holes as a guide, drill 5 mm dia. (3/16") holes through the hood.

CAUTION: Ensure the electrical wires are protected inside the hood.

Clean the hood.

If applicable, install the darts.

Install the windshield fixtures.



Alpine

Peel off protective film from the new windshield.

Position windshield on hood then push until tabs are fully inserted into slots. Lock windshield tabs in position using the eleven (11) "O" rings (install two (2) "O" rings on outer tabs).

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FRAME

For illustrations (ex.: exploded view) refer to 1983 parts catalog for the appropriate model.

FRAME WELDING

Steel frame:

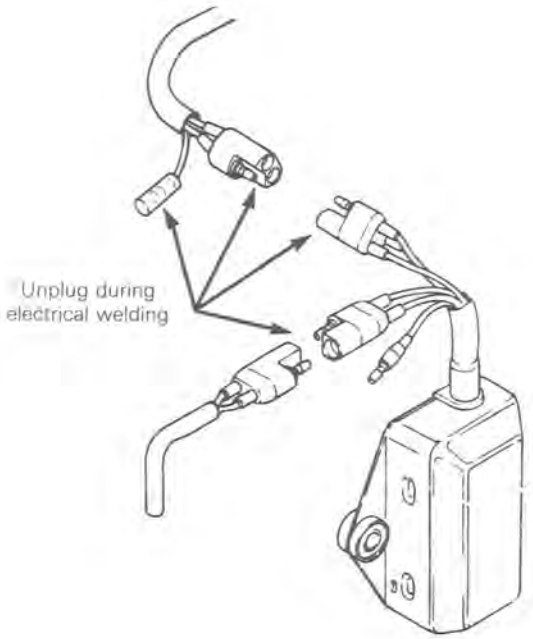
- Electric Welding
- Amperage: 70-110 Amp.
- Voltage: 20-24 volts
- Rod: E-7014 (3/32")

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.



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 1983 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.

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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

GENERAL

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	BOMBARDIER ROTAX TYPE VEHICLE MODEL	247 ELAN/ SPIRIT	277 CITATION 3500	377 CITATION 4500/E	377 MIRAGE II	377 CITATION SS	377 NORDIK	277 SKANDIC
ENGINE	No. of cylinders	1	1	2	2	2	2	1
	Bore mm (inch)	69.5 (2.736)	72 (2.834)	62 (2.440)	62 (2.440)	62 (2.440)	62 (2.440)	72 (2.834)
	Stroke mm (inch)	66 (2.598)	66 (2.598)	61 (2.401)	61 (2.401)	61 (2.401)	61 (2.401)	66 (2.598)	
	Displacement cm^3 ($in.^3$)	250.4 (15.28)	268.7 (16.4)	368.3 (22.5)	368.3 (22.5)	368.3 (22.5)	368.3 (22.5)	268.7 (16.4)
	Compression ratio (corrected)	5.6	6.7	6.9	6.9	6.55	6.9	6.7
	Maximum operating R.P.M.	6000	7500	7500	7500	8000	7500	7500
	Type of piston ring	2R	1 LST 1R	1 LST 1R	1 LST 1R	1 LST 1R	1 LST 1R	1 LST 1R
	Ring end gap mm(inch) min.(new) mm (inch) max.(used)	0.20 (.008) 1.0 (.039)	0.20 (.008) 1.0 (.039)	0.20 (.008) 1.0 (.039)	0.20 (.008) 1.0 (.039)	0.20 (.008) 1.0 (.039)	0.20 (.008) 1.0 (.039)	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)	0.080 – 0.100 (.0031 – .0039)	0.070 – 0.090 (.0027 – .0035)
	Piston oversize dia. 1st 2nd	N.A. N.A.	72.25 (2.844") 72.50 (2.854")	62.25 (2.450") N.A.				72.25 (2.844") 72.50 (2.854")
	Crankshaft end-play mm min./max. (inch) min./max.	0.20 – 0.40 (.008 – .016)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Rotary valve timing (marks position)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
CARBURETION	Mikuni carburetor	VM 28-242	VM 34-255	VM 34-276	VM 34-276	2 x VM 34-277	VM 34-276	VM 34-255
	Main jet (sea level)	160	220	260	260	160	260	220
	Needle jet	182 O-8	159 P-2	159 P-2	159 P-2	159 P-0	159 P-2	159 P-2
	Pilot jet	30	30	35	35	40	35	30
	Needle identification	6DP1-3	6DH4-3	6DH4-3	6DH4-3	6DH2-3	6DH4-3	6DH4-3
	Needle setting from top	3rd	3rd	3rd	3rd	3rd	3rd	3rd
	Slide cut-away	2.0	3.0	3.0	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	1 1/2	1 1/2
	Idle speed R.P.M.	1300-1500	1100-1300	1800-2000	1800-2000	1800-2000	1800-2000	1100-1300
	Fuel grade	Regular - leaded or unleaded						
	Fuel oil/ratio	50/1	oil injection	oil injection	oil injection	oil injection	50/1	50/1

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377 SKANDIC	503 BLIZZARD 5500 MX	534 BLIZZARD 9700	503 EVEREST 500	503 EVEREST 500 E	464 EVERST L/C	503 ALPINE
2	2	2	2	2	2	2
62 (2.440)	72 (2.834)	72 (2.834)	72 (2.834)	72 (2.834)	69.5 (2.736)	72 (2.834)
61 (2.401)	61 (2.401)	64 (2.519)	61 (2.401)	61 (2.401)	61 (2.401)	61 (2.401)
368.3 (22.5)	496.7 (30.31)	521.2 (31.80)	496.7 (30.31)	496.7 (30.31)	462.8 (28.24)	496.7 (30.31)
6.9	6.2	6.5	6.2	6.2	7.0	6.3
7500	7500	8750	7500	7500	7500	6500
1 LST 1R	1 LST 1R	1 LST 1R	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)	0.20 (.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)	0.100 – 0.120 (.0039 – .0047)	0.070 – 0.090 (.0027 – .0035)	0.070 – 0.090 (.0027 – .0035)	0.080 – 0.100 (.0031 – .0039)	0.070 – 0.090 (.0027 – .0035)
62.25 (2.450") N.A.	72.25 (2.844") 72.50 (2.854")				69.75 (2.746") N.A.	72.25 (2.844") 72.50 (2.854")
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
N.A.	N.A.	Opening 140° Closing 66°	N.A	N.A.	Opening 150° Closing 49°	N.A.
VM 34-276	2 x VM 34-203	PTO: VM 40-23 MAG: VM 40-24	VM 36-114	VM 36-114	VM 34-227	VM 34-297
260	220	PTO: 330 MAG: 350	300	300	380	250
159 P-2	159 P-4	224-AA5	159 P-6	159 P-6	159 P-4	159 P-2
35	35	40	35	35	40	30
6DH4-3	6DH2-3	7DH2-3	6F9-3	6F9-3	6EJ1-3	6DH3-3
3rd	3rd	3rd	3rd	3rd	3rd	3rd
3.0	3.0	2.5	3.0	3.0	3.0	2.0
1 1/2	1 1/2	1	1 1/2	1 1/2	1 1/2	1 1/2
1800-2000	1800-2000	1800-2000	1800-2000	1800-2000	1800-2000	1800-2000
		Premium 92 leaded or unleaded	Regular - leaded or unleaded			
50/1	oil injection	30/1	oil injection	oil injection	oil injection	50/1

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	BOMBARDIER ROTAX TYPE / VEHICLE MODEL		247 ELAN/ SPIRIT	277 CITATION 3500	377 CITATION 4500/E	377 MIRAGE II	377 CITATION SS	377 NORDIK	277 SKANDIC
ELECTRICAL	Magneto generator outpout (watts)		75/23	160	160	160	160	160	160
	Ignition type		BP	CD	CD	CD	CD	CD	CD
	Spark plug no.		Bosch M 175 T 1 (W 7 A)	NGK BR-8ES	NGK BR-8ES	NGK BR-8ES	NGK BR-8ES	NGK BR-8ES	NGK BR-8ES
	Spark plug gap	mm (inch)	0.50 (.020)	0.40 (.016)	0.40 (.016)	0.40 (.016)	0.40 (.016)	0.40 (.016)	0.40 (.016)
	TIMING B.T.D.C. Direct Ⓐ	mm (inch)	3.98 (.157)	Ⓓ 2.31 (.090)	Ⓓ 2.31 (.090)	Ⓓ 2.31 (.090)	Ⓓ 2.31 (.090)	Ⓓ 2.31 (.090)	Ⓓ 2.31 (.090)
	TIMING B.T.D.C. Indirect Ⓑ	mm (inch)	N.A.	Ⓓ 2.6 (.102)	N.A.	N.A.	N.A.	N.A.	Ⓓ 2.6 (.102)
	TIMING B.T.D.C. Breaker point gap	mm (inch)	0.35 – 0.40 (.014 – .016)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	OHM Edge gap Ⓒ	mm (inch)	5 – 8 (0.197 – 0.135)	N.A.	N.A.	N.A.	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	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
	OHM Lighting coil large		0.38 – 0.58	0.21 – 0.31	0.21 – 0.31	0.21 – 0.31	0.21 – 0.31	0.21 – 0.31	0.21 – 0.31
	OHM Lighting coil small		1.85 – 2.35	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	OHM H.T. coil primary		1.65 – 2.65	0.23 – 0.43	0.23 – 0.43	0.23 – 0.43	0.23 – 0.43	0.23 – 0.43	0.23 – 0.43
	OHM H.T. coil secondary		4850 – 5850	3.0 – 5.6 K	2.45 – 4.55 K	2.45 – 4.55 K	2.45 – 4.55 K	2.45 – 4.55 K	3.0 – 5.6 K
	Headlamp bulb	watt	60/60	60/60	60/60	60/60	60/60	60/60	60/60
	Tail & stop bulb	watt	5/21	5/21	5/21	5/21	5/21	5/21	5/21
	Tacho & speedo – bulb	watt	N.A.	N.A.	N.A.	N.A.	5	5	5
	Fuse Starter solenoïd	amp	N.A.	N.A.	③ N.A. / 30 ④	N.A.	N.A.	N.A.	N.A.
	Fuse Tachometer	amp	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Fuse Instrumentation	amp	N.A.	N.A.	③ N.A. / 15 ④	N.A.	N.A.	N.A.	N.A.

DIRECT MEASUREMENT B.T.D.C. Ⓐ



INDIRECT MEASUREMENT B.T.D.C. Ⓑ



EDGE GAP Ⓒ



Ⓓ At 6000 R.P.M. (engine cold)
③ CITATION 4500
④ CITATION 4500 E

BP: Breaker points
CD: Solid state ignition
R: Rectangular
LST: "L" semi-trapez
L.S: Low speed
H.S: High speed
N.A.: Not applicable

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377 SKANDIC	503 BLIZZARD 5500 MX	534 BLIZZARD 9700	503 EVEREST 500	503 EVEREST 500 E	464 EVERST L/C	503 ALPINE
160	160	160	160	160	140	160
CD	CD	CD	CD	CD	CD	CD
NGK BR-8ES	NGK BR-7ES	NGK BR-8ES	NGK BR-7ES	NGK BR-7ES	NGK BR-8ES	NGK BR-7ES
0.40 (.016)	0.40 (.016)	0.40 (.016)	0.40 (.016)	0.40 (.016)	0.40 (.016)	0.40 (.016)
Ⓓ 2.31 (.090)	Ⓓ 2.31 (.090)	Ⓓ 1.75 (.068)	Ⓓ 2.31 (.090)	Ⓓ 2.31 (.090)	Ⓓ 2.52 (.099)	Ⓓ 2.31 (.090)
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
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	L.S: 120 – 180 H.S: 2.8 – 4.2	L.S: 120 – 180 H.S: 2.8 – 4.2	L.S: 125 – 235 H.S: 1.4 – 2.6	L.S: 120 – 180 H.S: 2.8 – 4.2
0.21 – 0.31	0.21 – 0.31	0.21 – 0.31	0.21 – 0.31	0.21 – 0.31	0.09 – 0.20	0.21 – 0.31
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
0.23 – 0.43	0.23 – 0.43	0.23 – 0.43	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	2.45 – 4.55 K	2.45 – 4.55 K	2.45 – 4.55 K
60/60	60/60	60/60	60/60	60/60	60/60	60/60
5/21	5/21	5/21	5/21	5/21	5/21	5/21
5	5	5	5	5	5	5
N.A.	N.A.	N.A.	N.A	30	30	30
N.A.	N.A.	0.1.	N.A.	N.A.	0.1.	N.A.
N.A.	N.A.	N.A.	N.A.	15	15	N.A.

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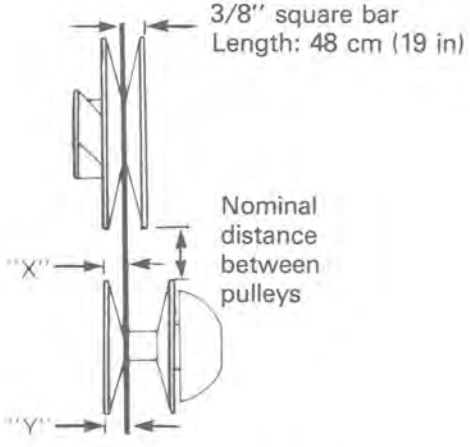
	MODEL		ELAN/ SPIRIT	CITATION 3500	CITATION 4500/E	MIRAGE II	CITATION SS	NORDIK	SKANDIC 277
POWER TRAIN	Gear ratio		10/25	15/34	16/33	16/33	17/35	14/35	14/35
	Chain pitch (inch)		1/2 single	3/8 double	3/8 double	3/8 double	3/8 double	3/8 double	3/8 double
	Drive pulley	Type of drive pulley	R.R.S.	R.R.S.	③ R.S.S. | R.R.S. ④	R.S.S.	R.S.S.	R.S.S.	R.S.S.
		Drive pulley retaining nut torque N•m (ft-lbs)	61 (45)	85 (63)	85 (63)	85 (63)	85 (63)	85 (63)	85 (63)
		Pressure lever identification	E4	B2KS	③ B3KSH | C7LX ④	B3KSH	A3SH	B3KSH	B2KSH
		Spring color	Bronze	Black	Yellow	Yellow	Yellow	Yellow	Brown
		Spring length mm ± 1.5 (in ± .060)	81.3 (3.200)	104.7 (4.122)	③ 100 (3.938) | 88.9 (3.500) ④	100 (3.938)	100 (3.938)	100 (3.938)	77 (3.031)
		Clutch engagement R.P.M.	2000-2200	3300-3600	③ 3900-4200 / ④ 3200-3500	3900-4200	3900-4200	3700-3900	3300-3500
	Driven pulley spring preload kg ± 0,9 (lbs) ± 2		3.6 (8)	5.4 (12)	5.4 (12)	5.4 (12)	5.4 (12)	5.4 (12)	5.4 (12)
	Pulley distance (nominal) mm (inch)		43-44.5 (1 11/16-1 3/4)	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
	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)	34 (1 11/32)
	Drive belt number		570 0411 00	414 3758 00	414 3758 00	414 3758 00	414 3758 00	414 3758 00	414 3758 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)	33.33 (1 5/16)	33.33 (1 5/16)	33.33 (1 5/16)
	Track	Track width cm (inch)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)
		Track length cm (inch)	289.5 (114)	269.2 (106)	289.5 (114)	289.5 (114)	289.5 (114)	315 (124)	353 (139)
	Suspension type		Bogie	Slide	Slide	Slide	Slide	Slide	Slide
	Bogie suspension	Track tension mm (inch)	Elan/Spirit: 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.						
DIMENSIONS	Engine type		247	277	377	377	377	377	277
	Overall length cm (inch)		224.8 (88.5)	249 (98)	262.9 (103.5)	262.9 (103.5)	262.9 (103.5)	274 (107.8)	289.5 (114)
	Overall width cm (inch)		77.5 (30.5)	92.7 (36.5)	92.7 (36.5)	92.7 (36.5)	92.7 (36.5)	90.5 (35.6)	96.5 (38)
	Overall height cm (inch)		① 106.7 (42) | 94.6 (37.2) ②	100.3 (39.5)	100.3 (39.5)	100.3 (39.5)	100.3 (39.5)	130.8 (51.5)	108 (42.5)
	Ski stance cm (inch)		64.7 (25.5)	81.9 (32.2)	81.9 (32.2)	81.9 (32.2)	81.9 (32.2)	76.2 (30)	82 (32.2)
	Mass weight kg (lbs)		129.3 (285)	156.5 (345)	③ 172.4 (380) / ④ 181.4 (400)	172.4 (380)	172.4 (380)	181.4 (400)	181 (399)
	Bearing area cm^2 in^2		6916.5 (1072)	5839 (905)	6225 (965)	6225 (965)	6225 (965)	6865 (1064)	7579 (1175)
	Ground pressure kPa ($lb\text{-}in^2$)		1.813 (.263)	2.626 (.381)	③ 2.709 (.393) | 2.854 (.414) ④	2.709 (.393)	2.709 (.393)	2.590 (.376)	2.341 (.340)
	Frame material		Steel	Alu. & steel	Alu. & steel	Alu. & steel	Alu. & steel	Alu. & steel	Alu. & steel
	Cab material		① Poly. | Fib. ②	Poly.	Poly.	Poly.	Poly.	Poly.	Poly.

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SKANDIC 377	BLIZZARD 5500 MX	BLIZZARD 9700	EVEREST 500	EVEREST 500E	EVEREST L/C	ALPINE 503
14/35	19/40	21/38	19/40	19/40	17/34	19/42
3/8 double	3/8 triple	3/8 triple	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.S.S.	R.S.S.R.B.
85 (63)	85 (63)	85 (63)	85 (63)	85 (63)	85 (63)	85 (63)
B3KSH	C7LH	A6S	C6LH	C6LH	C7LH	A3S (double)
Yellow	Orange	White	Gold	Gold	Light blue	Purple
100 (3.938)	96.5 (3.800)	87.3 (3.437)	74.4 (2.930)	74.4 (2.930)	119 (4.688)	63.5 (2.90)
3700-3900	3600-3800	4000-4400	2900-3200	2900-3200	3400-3700	2000-2200
5.4 (12)	5.9 (13)	5.9 (13)	5.9 (13)	5.9 (13)	5.9 (13)	5.9 (13)
Fixed	31.75 – 38.1 (1 1/4 – 1 1/2)	31.75 – 38.1 (1 1/4 – 1 1/2)	31.75 – 38.1 (1 1/4 – 1 1/2)	31.75 – 38.1 (1 1/4 – 1 1/2)	31.75 – 38.1 (1 1/4 – 1 1/2)	44.45 – 47.62 (1 3/4 – 1 7/8)
34 (1 11/32)	32.5 (1 9/32)	34.5 (1 23/64)	32.5 (1 9/32)	32.5 (1 9/32)	32.5 (1 9/32)	34 (1 11/32)
414 3758 00	414 3758 00	414 5059 00	414 3758 00	414 3758 00	414 3758 00	414 3758 00
33.33 (1 5/16)	33.33 (1 5/16)	34.92 (1 3/8)	33.33 (1 5/16)	33.33 (1 5/16)	33.33 (1 5/16)	33.33 (1 5/16)
38.1 (15)	41.9 (16.5)	41.9 (16.5)	41.9 (16.5)	41.9 (16.5)	41.9 (16.5)	2 x 38.1 (2 x 15)
353 (139)	289.5 (114)	289.5 (114)	314.9 (124)	314.9 (124)	314.9 (124)	2 x 353 (2 x 139)
Slide	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).						
377	503	534	503	503	464	503
289.5 (114)	264.1 (104)	264.1 (104)	276.8 (109)	276.8 (109)	276.8 (109)	288.3 (113.5)
96.5 (38)	100.3 (39.5)	100.3 (39.5)	99 (39)	99 (39)	99 (39)	90.17 (35.5)
108 (42.5)	108.9 (42.9)	96.5 (38)	106.7 (42)	106.7 (42)	106.7 (42)	123.2 (48.5)
81.9 (32.2)	86.1 (33.9)	85.1 (33.5)	85.1 (33.5)	85.1 (33.5)	85.1 (33.5)	N.A.
188 (416)	223.1 (492)	223.1 (492)	204.5 (451)	219.5 (484)	229.1 (505)	291.4 (642.5)
7579 (1175)	7239 (1122)	7239 (1122)	8710 (1350)	8710 (1350)	8710 (1350)	13936.3 (2160)
2.44 (.354)	2.825 (.438)	2.825 (.438)	2.302 (.334)	2.468 (.358)	2.578 (.374)	2.054 (.298)
Alu. & steel	Alu. & steel	Alu. & steel	Alu. & steel	Alu. & steel	Alu. & steel	Steel
Poly.	Fib.	Fib.	Fib.	Fib.	Fib.	Fib.

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	MODEL		ELAN/ SPIRIT	CITATION 3500	CITATION 4500/E	MIRAGE II	CITATION SS	NORDIK	SKANDIC 277
LIQUID CAPACITIES	Fuel tank	SI ℓ	13.6	28.4	28.4	28.4	28.4	28.4	28.4
		Imperial gal	3	6.25	6.25	6.25	6.25	6.25	6.25
		U.S. gal	3.6	7.5	7.5	7.5	7.5	7.5	7.5
	Chaincase ml (oz)		200 (7)	200 (7)	200 (7)	200 (7)	200 (7)	200 (7)	200 (7)
	Rotary valve reservoir ml (oz)		N.A.	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.	N.A.
		Imperial oz							
		U.S. oz							
	Injection oil reservoir ℓ (oz)		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)	2.55 (90 Imp. oz/ 86 U.S. oz)	N.A.	N.A.
COOLING	Cooling type		Radial fan	Radial fan	Axial fan	Axial fan	Axial fan	Axial fan	Radial fan
	Cooling system capacity	liter	N.A.	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.	N.A.
	Radiator pressure cap		N.A.	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.	N.A.
TORQUE SPECIFICATIONS (Engine cold) N•m (ft-lbs)	Magneto ring nut		85 (62)	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)	21 (15)
	Cylinder head nut (cold)		21 (15)	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)	21 (15)
	Fan shaft nut		N.A.	N.A.	65 (48)	65 (48)	65 (48)	65 (48)	N.A.



— 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

① Elan
② Spirit
③ Citation 4500
④ Citation 4500 E

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SKANDIC 377	BLIZZARD 5500 MX	BLIZZARD 9700	EVEREST 500	EVEREST 500E	EVEREST L/C	ALPINE 503
28.4	27.3	27.3	27.3	27.3	27.3	22.7
6.25	6	6	6	6	6	5
7.5	7.2	7.2	7.2	7.2	7.2	6
200 (7)	200 (7)	200 (7)	200 (7)	200 (7)	200 (7)	454 (16)
N.A.	N.A.	454 (16)	N.A.	N.A.	568 (20)	N.A.
N.A.	N.A.	4.20 148 142	N.A.	N.A.	4.54 160 154	N.A.
N.A.	2.27 (80 Imp./oz 77 U.S. oz)	2.27 (80 Imp./oz 77 U.S. oz)	2.27 (80 Imp./oz 77 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	Axial fan	Liquid cooled	Axial fan
N.A.	N.A.	4.20 148 142	N.A.	N.A.	4.54 160 154	N.A.
N.A.	N.A.	50°C (122°F)	N.A.	N.A.	43°C (110°F)	N.A.
N.A.	N.A.	90 kPa (13 PSI)	N.A.	N.A.	90 kPa (13 PSI)	N.A.
N.A.	N.A.	60/40	N.A.	N.A.	60/40	N.A.
85 (62)	85 (62)	95 (70)	85 (62)	85 (62)	95 (70)	85 (62)
M6: 9 (7) M8: 21 (15)	21 (15)	M6: 9 (7) M8: 21 (15)	21 (15)	21 (15)	M6: 9 (7) M8: 21 (15)	21 (15)
21 (15)	21 (15)	21 (15)	21 (15)	21 (15)	21 (15)	21 (15)
38 (28)	38 (28)	38 (28)	38 (28)	38 (28)	38 (28)	38 (28)
65 (48)	65 (48)	N.A.	65 (48)	65 (48)	N.A.	65 (48)

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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

*THE INTERNATIONAL SYSTEM OF UNITS (SYSTEME INTERNATIONAL) ABREVIATES "SI" IN ALL LANGUAGES.

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WARRANTY

THE 1983 "LIMITED WARRANTY"

1 - PERIOD

BOMBARDIER® INC. as manufacturer, warrants FROM THE DATE OF FIRST CONSUMER SALES, every 1983 SKI-DOO® /MOTO-SKI® snowmobile, sold as NEW AND UNUSED, by an authorized SKI-DOO or MOTO-SKI dealer respectively, 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 or 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 Customer 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.

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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 2LO

April 1982
Bombardier Inc.
Valcourt, Quebec, Canada, JOE 2LO

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