



VOLUME 1

SHOP

MANUAL

Ski-Doo®



**ELAN
TUNDRA
TOURING
FORMULA
SKANDIC**

**II LT
E/E LT/LE/SLE
S/SL
380/500**

1996

484 0628 00



ski-doo®

1996
Shop Manual

VOLUME 1

ELAN
TUNDRA II LT
TOURING E / LE / LE LT / SLE
FORMULA S / SL
SKANDIC 380/ 500





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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair 1996 Ski-Doo 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 catalog.

It is understood that this manual may be translated into another language. In the event of any discrepancy, the English version shall prevail.

The content 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 manufacturing the product.

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

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

The engines and the corresponding components identified in this document should not be utilized on product(s) other than those mentioned in this document.

Torque wrench tightening specifications must be strictly adhered to. Locking devices (ex. : locking tab, elastic stop nut, etc.) must be installed or replaced with 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 an instruction which, **if not followed, could cause serious personal injury including possibility of death.**

▼ **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. Always use common shop safety practice.

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.

1996 BOMBARDIER SNOWMOBILES SHOP MANUAL

INTRODUCTION

This *Shop Manual VOLUME 1* covers the following
Bombardier made 1996 snowmobiles :

MODELS	MODEL NUMBER
ÉLAN®	3053
TUNDRA* II LT	3264
TUNDRA* II LT (Sweden)	3265
SKANDIC* 380 (Canada)	1534
SKANDIC* 380 (U.S.)	1535
SKANDIC* 380 (Sweden)	1536
SKANDIC* 500 (Canada)	1531
SKANDIC* 500 (U.S.)	1532
SKANDIC* 500 (Sweden)	1533
TOURING* E (Canada)	1530
TOURING* E LT (Canada)	1542
TOURING* E LT (Sweden)	1543
TOURING* LE (Canada)	1527
TOURING* LE (U.S.)	1528
TOURING* LE (Sweden)	1529
TOURING* SLE (Canada)	1524
TOURING* SLE (U.S.)	1525
TOURING* SLE (Sweden)	1526
FORMULA* S (Canada)	1523
FORMULA* S (Sweden)	1541
FORMULA* SL (Canada)	1521
FORMULA* SL (U.S.)	1522
FORMULA* SL (Sweden)	1540

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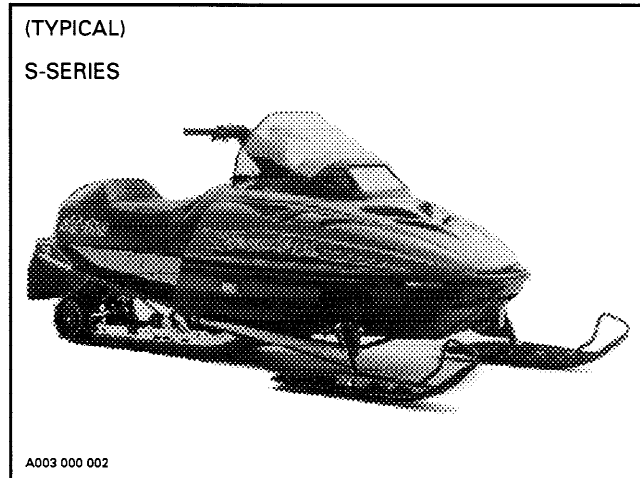
LIST OF MODELS GROUPED BY COMMUN CHASSIS

S-Series consists of :

Touring E / LE / LE LT / SLE

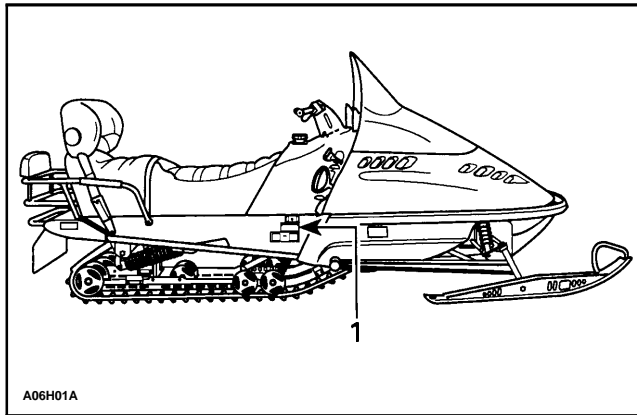
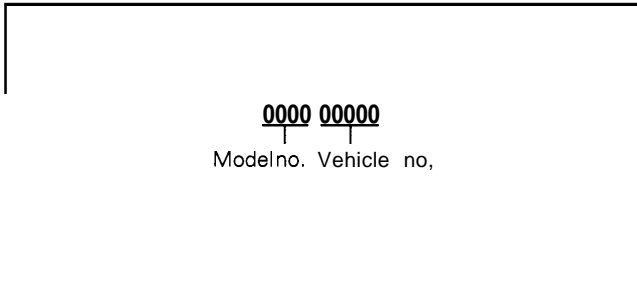
Skandic 380 / 500

Formula S / SL



Each vehicle has its particular vehicle serial number

Serial Number Meaning :

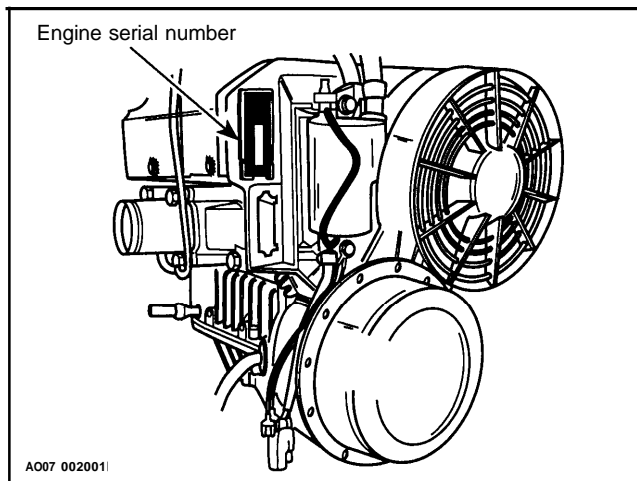


TYPICAL

1. Vehicle serial number

The engine also has a serial number.

Fan-Cooled Engines



ARRANGEMENT OF THE MANUAL

The manual is divided into 10 major sections :

01 SERVICE TOOLS AND SERVICE PRODUCTS

02 LUBRICATION AND MAINTENANCE

03 TROUBLESHOOTING

04 ENGINE

05 TRANSMISSION

06 ELECTRICAL

07 REAR SUSPENSION

08 STEERING/ FRONT SUSPENSION

09 BODY/ FRAME

10 TECHNICAL DATA

ANNEXES

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

This *Shop Manual* uses technical terms which may be slightly different from the ones in the parts catalog.

TYPICAL PAGE

Page heading indicates section and sub-section detailed.

Sub-section title indicates beginning of the sub-section.

Sub-title at top right corner of exploded view indicates pertaining models.

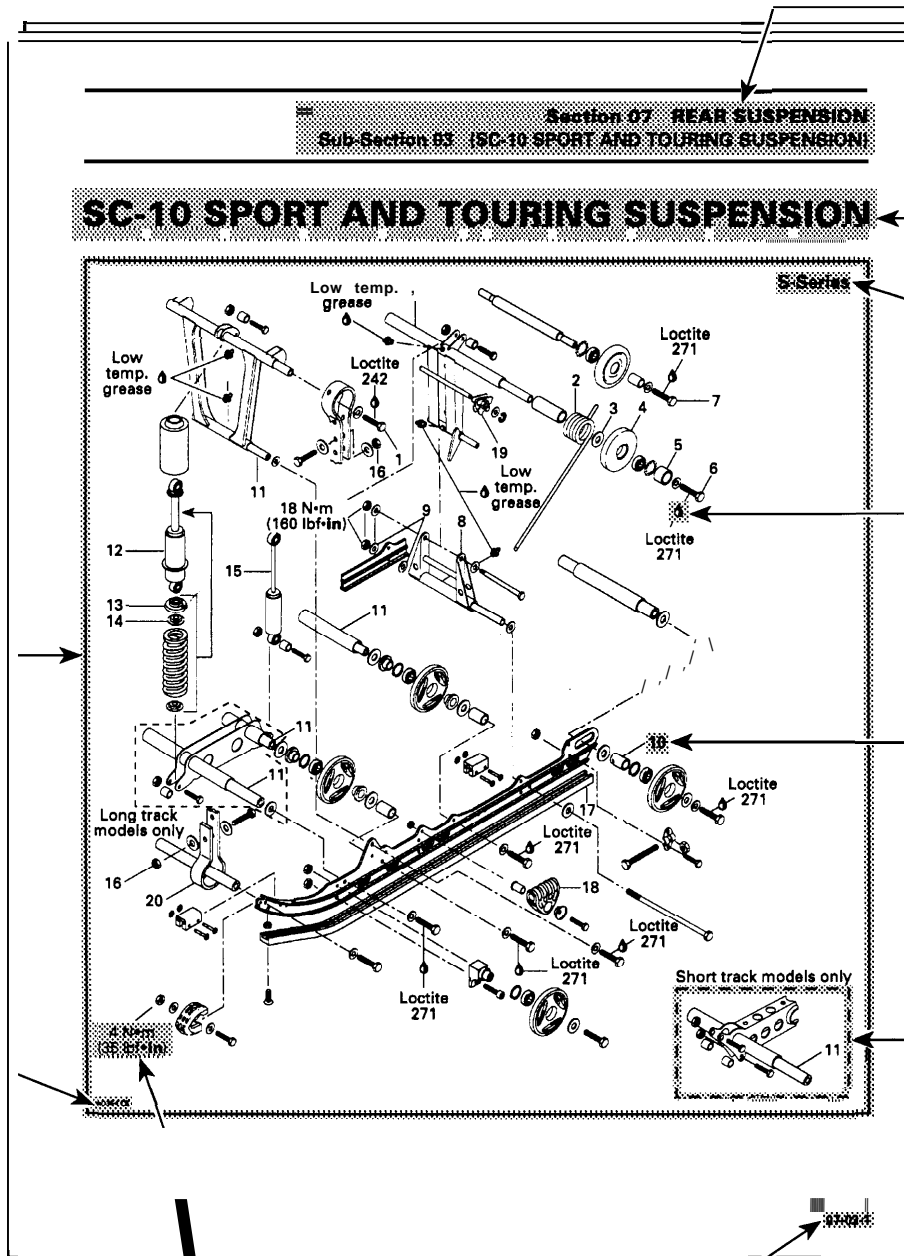
Drop represents a liquid product to be applied to a surface. In this case Loctite 271 to screw threads.

Bold face number indicates special procedure concerning this part.

Dotted box contains parts of a particular model, in this case the short track models only.

Exploded view assists you in identifying part and related positions.

Illustration number for publishing process.



Tightening torque nearby fastener. In this case, nut must be torqued to 4 N•m or 35 lbf•in.

CAUTION : Pay attention to torque specifications. Some of these are in **lbf•in** instead of **lbf•ft**. Use appropriate torque wrench.

Page numbering system :
07 : REAR SUSPENSION section
03 : SC-10 SPORT AND TOURING SUSPENSION sub-section
1 : First page of this sub-section

TYPICAL PAGE

"Side view" caption at top helps you in understanding illustration,

Detailed view of illustration.

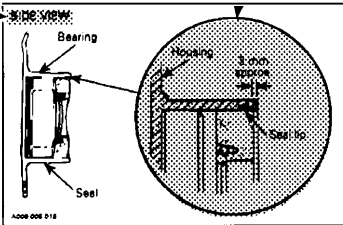
Sub-title beginning with part reference number of sub-section exploded view followed by part name(s).

Italic bold face type setting indicates a particular procedure concerning a model.

Illustration always follows text to which it pertains.

Italic bold face setting in this case indicate that particular procedure for B-series is finished so from this point, all models are concerned.

Section 07 REAR SUSPENSION
Sub-Section 08 (DRIVE AXLE)



LUBRICATION

15, Grease Fitting
Lubricate end housing bearing with low temperature grease (P/N 4137061 00).

ADJUSTMENT

Sprocket / Track Alignment

▼ **CAUTION: Do not tamper with sprocket/track alignment if frame or suspension is damaged.**

All Models Except Élan

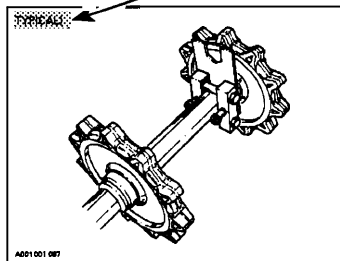
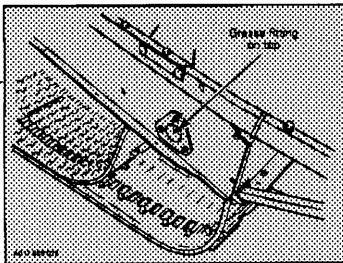
Sprockets might be repositioned to fit track holes (lugs on liquid cooled models and Skandic II 503 R SLT) without removing drive axle. Use drive axle sprocket adjuster kit (P/N 861 7257 00).

Retainer Ring

Make sure that welded nuts are toward inside of tunnel.

B-Series

When installing end bearing housing, ensure to position grease fitting on top. This is required to have proper alignment with access hole.



All Models

Lock drive axle sprocket with a circlip (use new cotter pin on Élan).

Reinstall the chaincase cover (if applicable).

Refill with chaincase 011. Refer to TECHNICAL DATA 10

Install the suspension. Refer to TRACK 07-09 and adjust track tension and carry out track alignment procedure.

Title indicates main procedure to be carried-out.

"Typical" caption at top left corner indicates a general view which does not represent full detail. In this case, track is not illustrated even if the adjustment can be made when installed.

07.08-9

Reference to look up a certain section and sub-section (TRACK 07-09). In this case it concerns track adjustment.

GENERAL INFORMATION

The information 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.

Due to late changes, it may have some differences between the manufactured product and the description and /or specifications in this document.

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

USEFUL PUBLICATIONS

Refer to *Parts Catalogs* to order the right parts,

PARTS CATALOG	
MODELS	P/N
ÉLAN	480140200
FORMULA S FORMULA SL FORMULA SLS	480140700
SKANDIC 380 SKANDIC 500 TOURING E / LT TOURING LE TOURING SLE	480140400
TUNDRA II LT	480140300

Use *Tools and Accessories Catalog* to order the tools you need. See also SERVICE TOOLS 01-01.

1994 TOOLS AND ACCESSORIES (P/ N 4801343 00).

Use *Specification Book/et* to find rapidly the right specs.

1990-1996 SPECIFICATION BOOKLET (P/ N 4801400 00).

ILLUSTRATIONS AND PROCEDURES

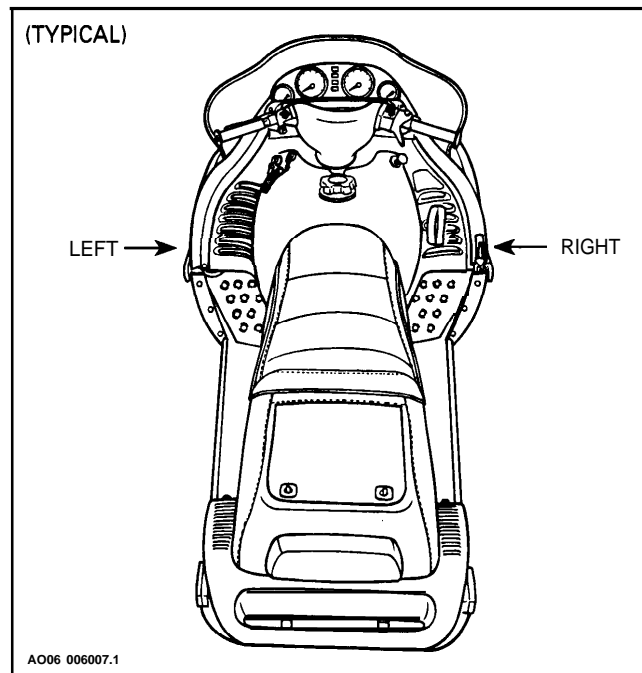
The illustrations show the typical construction of the different assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts shown, however, they represent parts which have the same or a similar function.

CAUTION : Most components of those vehicles are built with parts dimensioned in the metric system. Most fasteners are metric and must not be replaced by customary fasteners or vice versa. Mismatched or incorrect fasteners could cause damage to the vehicle or possible personal injury.

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. Before commencing any procedure, be sure that you have on hand all the tools required, or approved equivalents.

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



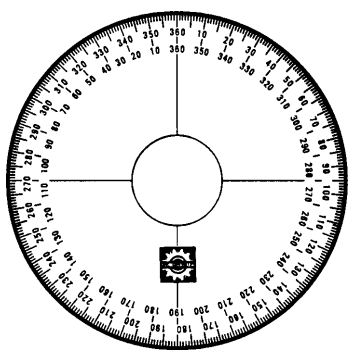
Technical Publications
Bombardier Inc.
Valcourt (Quebec) Canada

SERVICE TOOLS

ENGINE (Mandatory service tools)

O NOTE : Reversal numbers (example : ) correspond to those of the *Ski-Doo Service Tools Order Form* and to those of the *Tools and Service Products Catalog*.

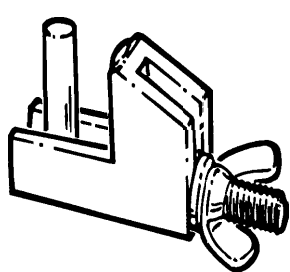
Degree wheel
(P/ N 4143529 00) **1**



A000 001111

APPLICATION
454, 494, 582, 583 and 670 engines.

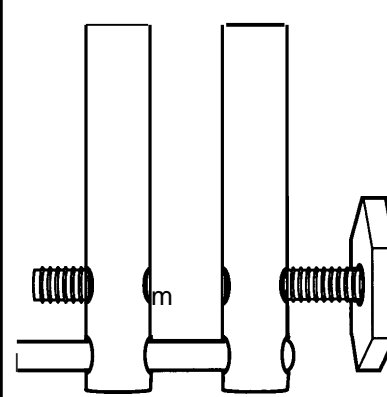
Hose pincher (2)
(p/ N 5290099 00) **2**



A001 001090


APPLICATION
All vehicles.

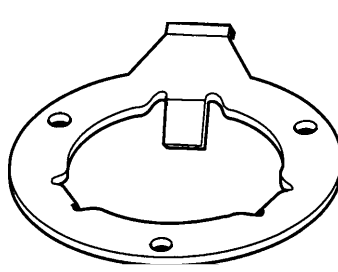
Large hose pincher
(p/ N 5290304 00)



F01B234


APPLICATION
All vehicles.

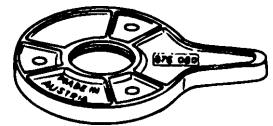
Fan Holder 
(p/ N 4208763 57)



A000 002026

APPLICATION
377, 443 and 503 engines.

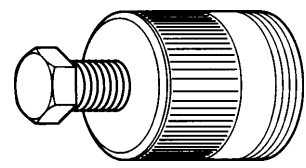
Magneto puller ring 
(p/ N 4208760 80)



A000 002063


APPLICATION
All engines except 247.


Magneto puller **5**
(p/ N 5290225 00)



A000 002046

APPLICATION
All engines except 247.

Aligning pin (4) 
(p/ N 5290189 00)

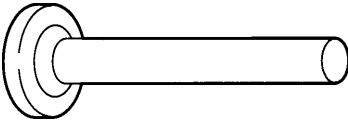
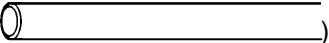
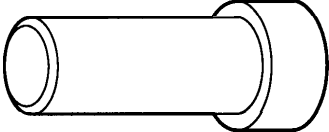



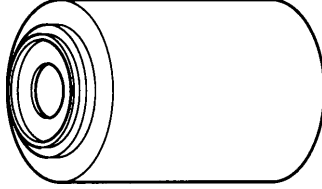
A000 000049

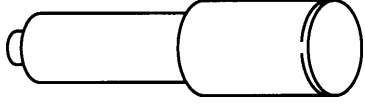
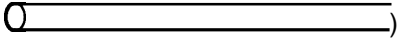
APPLICATION
467 and 582 engines.

Section **01 SERVICE TOOLS AND SERVICE PRODUCTS**
Sub-Section **01 (SERVICE TOOLS)**

ENGINE (Mandatory service tools)

<p>Pusher (washer under impeller of cooling system) (p/ N 5290207 00)</p>  <p>A000 002125</p>	<p>7</p>
<p>APPLICATION Rotary valve engines.</p>	
<p>Rotary valve shaft pusher (p/ N 4208766 12)</p>  <p>A000 002015</p>	<p>8</p>
<p>APPLICATION Rotary valve engines.</p>	
<p>Rotary valve seal pusher (p/ N 4208766 07)</p>  <p>A000 002034</p>	<p>9</p>
<p>APPLICATION Rotary valve engines.</p>	

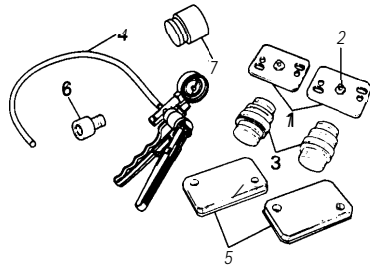
<p>Seal pusher (p/ N 4208765 12)</p>  <p>A000 002115</p>	<p>m</p>
<p>APPLICATION Rotary valve engines.</p>	
<p>Rotary valve shaft seal pusher (p/ N 4208770 50)</p>  <p>A000 002033</p>	<p>m</p>
<p>APPLICATION Rotary valve engines.</p>	

<p>Bearing pusher (p/ N 4208765 00)</p>  <p>A000 001091</p>	<p>12</p>
<p>APPLICATION Rotary valve engines.</p>	
<p>Crankshaft locking tool (P/ N 4208766 40)</p>  <p>A000 002039</p>	<p>13</p>
<p>APPLICATION All engines.</p>	

Section 01 **SERVICE TOOLS AND SERVICE PRODUCTS**
Sub-Section 01 (SERVICE TOOLS)

ENGINE (Mandatory service tools)

Engine leak tester kit
(P/ N 8617390 00)



A01B2D4

APPLICATION

All engines.

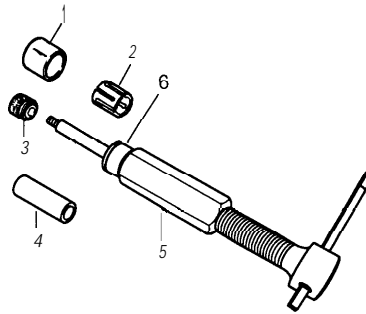
Parts included in the kit:

- 1) Exhaust outlet plug (2)
(P/ N 5290109 00)
- 2) Air valve (4)
(P/ N 7420600 04)
- 3) Intake manifold plug (2)
(P / N 5290110 00)
- 4) Air pump (1)
(p/ N 5290111 00)
- 5) RAVE system plug (2)
(p/ N 5290112 00)
- 6) Adapter (2)
(p/ N 5172349 00)
- 7) Intake manifold plug -779
(p/ N 5290305 00)
- 8) 2-1/4 in plug (1)
(p/ N 5290211 00)
- 9) 2-3/4 in plug (1)
(p/ N 5290212 00)
- 10) Plates (2)
(p/ N 5290213 00)
- 11) Radiator plug (1)
(P/ N 5290214 00)
- 12) Clamp (1)
(p/ N 4088035 00)

NOTE : Must maintain a pressure of 5 lb during 3 minutes. Never pressurize over 5 lb.

Piston pin puller
(p/ N 5290290 00)

16



A001 001161

APPLICATION

All engines.

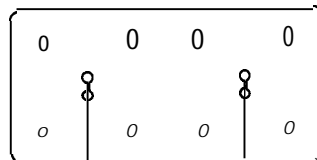
Parts included :

- 1) Locating sleeve
(p/ N 5290238 00)
- 2) Expansion sleeve
(p/ N 5290237 00)
- 3) Stopper
(p/ N 5290277 02)
- 4) Adaptor
(p/ N 5290236 00)
- 5) Extractor
(p/ N 5290277 00)
- 6) Bushing
(p/ N 5290277 03)

Rubber pad

17

(p/ N 5290234 00)



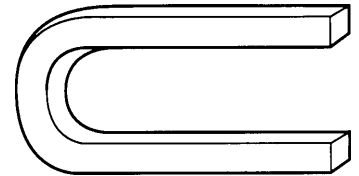
A001 001156

APPLICATION

All cageless bearing engines (277 and 503).

Rotary valve shaft spring
compressor
(P/ N 5290291 00)

18



A000 002126

APPLICATION

All rotary valve engines.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Sub-Section 01 (SERVICE TOOLS)

ENGINE (Optional service tools)

The following tools are highly recommended to optimize your basic tool kit and reduce tear down time on the applicable models you are servicing most frequently.

1- Puller assembly

200

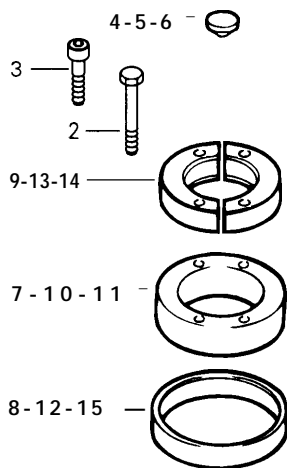
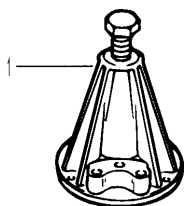
(p/ N 4208762 98)

For 779 :

(p/ N 4208776 35)

With 145 mm screw :

(P/ N 4209407 55)



A000 002129

APPLICATION

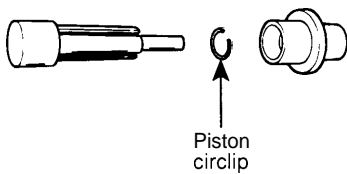
All engines.

2- Screw M8 x 70 (4)	P / N 420841201
All engines except 247.	
3- Screw M8 x 40 (4)	P / N 420840681
247, 277, 467 and 670 engines.	
4- Crankshaft protector PTO	P / N 420876552
All engines except 247.	
5- Crankshaft protector MAG	P / N 420976890
247 engine.	
6- Crankshaft protector MAG	P / N 420876557
All engines except 247.	
7- Distance ring	P / N 420876560
All engines except 247 and 277.	
8- Puller ring	P / N 420977480
All engines.	
9- Half ring ass'y	P / N 420276025
All engines except 377, 503 and 779.	
10- Distance ring	P / N 420876565
377 and 503 engines.	
11- Distance ring	P / N 420876569
377, 443, 503, 582, 583 and 670 engines.	
12- Puller ring	P / N 420977490
All engines.	
13- Half ring ass'y	P / N 420977475
All engines except 247 and 779.	
14- Half ring ass'y	P / N 420977479
779 engine.	
15- Puller ring	P / N 420977494
779 engine.	

Section 01 **SERVICE TOOLS AND SERVICE PRODUCTS**
Sub-Section 01 (SERVICE TOOLS)

ENGINE (Optional service tools)

Piston circlip installer **202**
 All engines except 670
 (P / N 5290169 00)
 670 engine
 (p/ N 2908770 16)



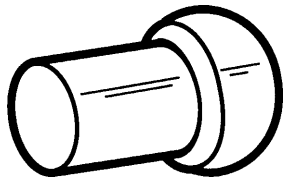
A001 001061

APPLICATION

All engines.

Piston pin / connecting
 rod centering tool **203**
 (P / N 5290091 00)

NOTE : New diameter is
 9.65 mm (0.380").

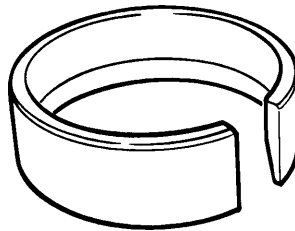


A001 001063

APPLICATION

All engines.

Ring compressor
 A)(p/N4208760 90) **204**
 (62 mm)
 B) (p/N 4208769 74) **205**
 (69.5 mm)
 C) (p / N 4208769 70) **206**
 (72 mm)
 D)(p-N4208769 72) **207**
 (76 mm)

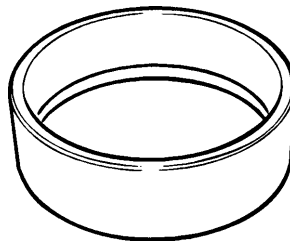


A001 001065

APPLICATION

- A) 377 engine.
- B) 467 engine.
- C) 503 engine.
- D) 582 and 583 engines.

Magneto coil centering **209**
 ring
 (p/ N 4208769 22)

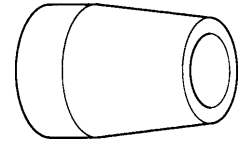


A001 001067

APPLICATION

All engines with Nippondenso
 CDI (160 W).

Seal sleeve
 (P/ N 4209779 10) **210**
 (PTO)
 (p/ N 4202769 00) **211**
 (MAG)

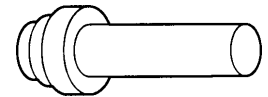


A000 002013

APPLICATION

247 engine.

Engine seal pusher **212**
 (P / N 4209779 20)

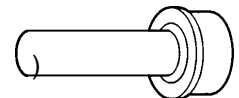


A000 002031

APPLICATION

247 engine.

Polyamid ring pusher **213**
 (P / N 4202769 30)



A000 002035

APPLICATION

247 engine.

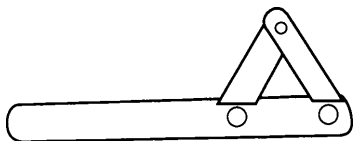
Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Sub-Section 01 (SERVICE TOOLS)

ENGINE (Optional service tools)

Magneto housing holder **215**

(p/ N 4209765 50)



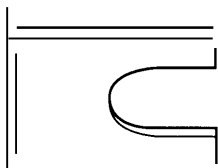
A000 002067

APPLICATION

247 engine.

Crankshaft feeler gauge **216**

(p/ N 4208766 20)



A000 002037

APPLICATION

377, 443 and 503 engines.

Crankshaft distance gauge **217**

(p/ N 4208768 22)



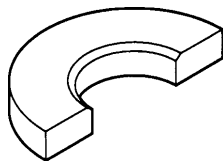
A000 002081

APPLICATION

377 and 443 engines.

Crankshaft distance gauge **218**

(P/ N 4208768 24)



A000 002118

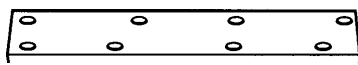
APPLICATION

503 engine.

Cylinder aligning tool **220**

A) (P/N 4208769 02)
(on exhaust side)

B) (p/N 4208761 71)
(on intake side)



A000 001008

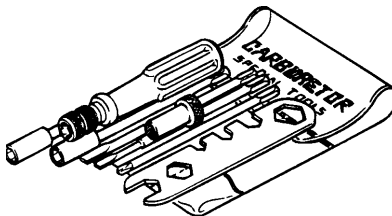
APPLICATION

A) 467, 582, 583 and 670 engines.

B) 377, 443 and 503 engines.

Mikuni carburetor tool kit **222**

(p/ N 4041120 00)



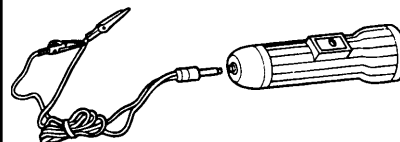
A000 001087

APPLICATION

All models.

Circuit tester (continuity light) **223**

(P / N 4140122 00)



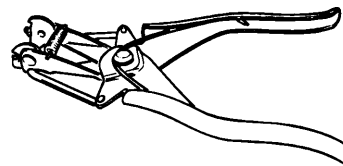
A000 002073

APPLICATION

All vehicles.

Piston ring expander **224**

(P / N 5290097 00)



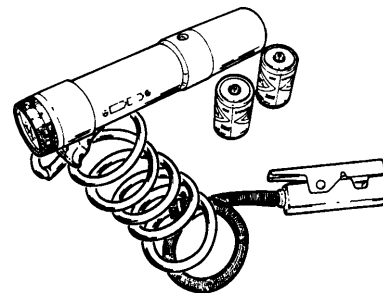
A001 001088

APPLICATION

All engines.

Stroboscopic timing light **225**

(p/ N 5290092 00)



A001 001092

APPLICATION

All engines.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS
Sub-Section 01 (SERVICE TOOLS)

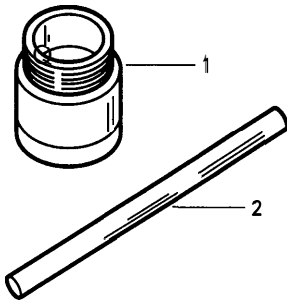
ENGINE (Optional service tools)

RAVE movement indicator **226**

(p/ N 8617258 00)

Parts included in the kit :

- 1) Indicator guide
(p/ N 5290113 00)
- 2) Indicator
(P/ N 4208766 40)



A018 001001

APPLICATION

583, 670 and 779 engines.

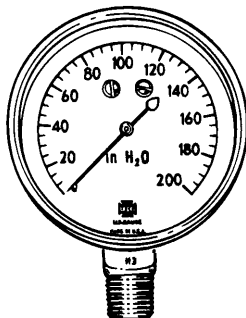
Air pressure gauge, 0-200 inch of water **227**

(P/ N 5290104 00)

Adaptor 1/4-1/8 NPT **228**

(p/ N 5290105 00)

NOTE : Fits on air pump from kit (P/ N 861 7256 00).



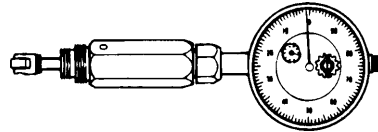
A018 001003

APPLICATION

583, 670 and 779 engines.

Dial indicator (TDC gauge) **230**

(P/ N414 1047 00)



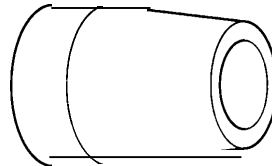
A000 001086

APPLICATION

All engines.

Seal protector sleeve **231**

(p/ N 4208769 80)
(for 10 mm shaft)



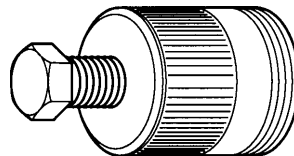
A000 002013

APPLICATION

467, 582, 583 and 670 engines.

Magneto puller **233**

(p/ N 4209762 35)



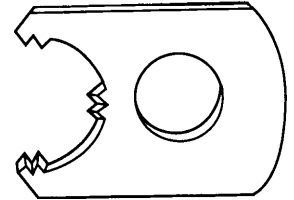
A000 002046

APPLICATION

247 engine.

Injection pump gear holder **234**

(p/ N 4208766 95)



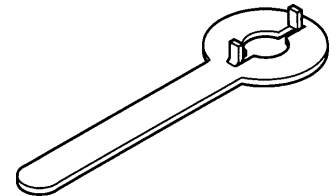
A000 001109

APPLICATION

253, 377, 443 and 503 engines.

Injection pump gear holder **235**

(p/ N 4202779 05)



A000 002042

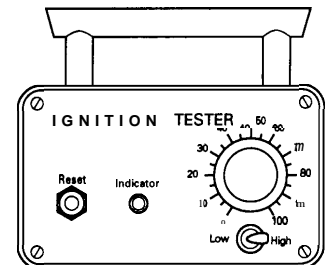
APPLICATION

467, 582, 583, 670 and 779 engines.

Bombardier ignition tester **236**

tester

(p/ N419 0033 00)



A000 002058

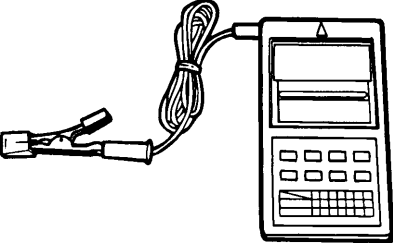
APPLICATION

All engines.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS
 Sub-Section 01 (SERVICE TOOLS)

ENGINE (Optional service tools)

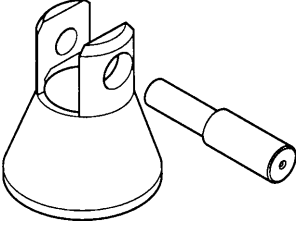
Digital / induction type tachometer **237**
 (p/ N 5290145 00)



F001 001052

APPLICATION
 All engines.

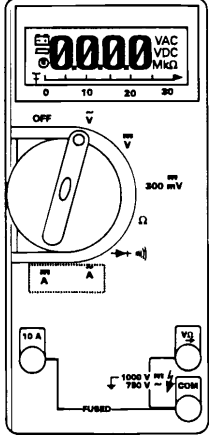
Connecting rod holder **238**
 (p/ N 4209779 00)



A000 002023

APPLICATION
 247 engine.

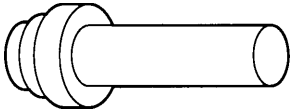
Fluke multimeter **242**
 (P/ N 5290220 00)



F001 001060

APPLICATION
 All models.

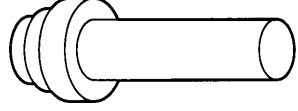
MAG seal pusher **243**
 (p/ N 4202778 75)



A000 002031

APPLICATION
 277 engine.

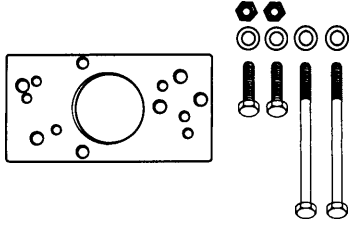
PTC seal pusher **244**
 (p/ N 420 8766 60)



A000 002031

APPLICATION
 277 engine.

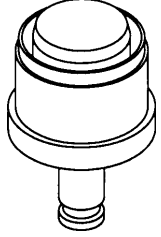
Base puller plate kit **245**
 (p/ N 5290249 00)



A005 002022

APPLICATION
 277 engine.

Insertion jig **247**
 (P /N 4208765 16)



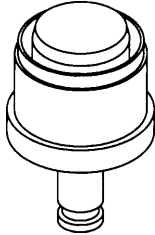
A000 002137

APPLICATION
 779 engine,

ENGINE (Optional service tools)

Insertion jig
(P/ N 4208765 14)

248



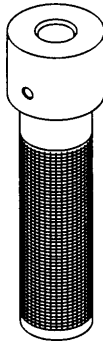
A000 002138

APPLICATION

454 and 670 engines.

Handle for insertion jig
(p/ N 4208776 50)

249



A00C3V4

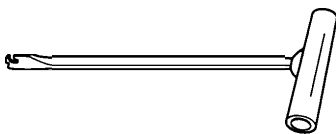
APPLICATION

454, 670 and 779 engines.

Exhaust spring installer/
remover

253

(p/ N 5290281 00)



A000 002136

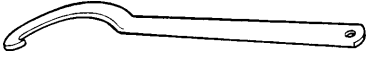
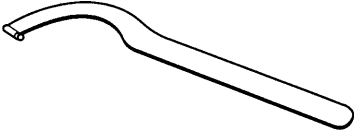
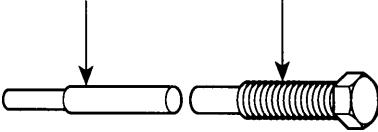
APPLICATION


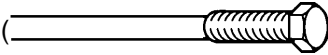
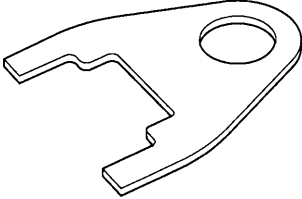
All models.

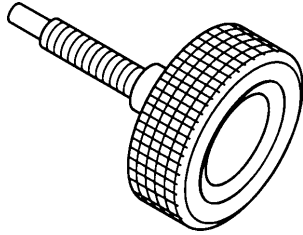

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Sub-Section 01 (SERVICE TOOLS)

TRANSMISSION (Mandatory service tools)

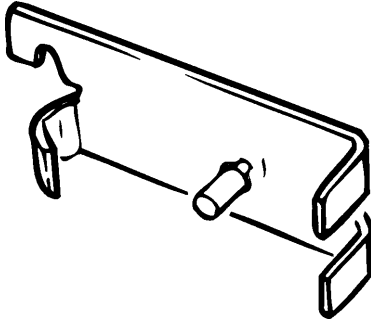
Clutch holder (p/ N 5290064 00)	51
	
A001 001041	
APPLICATION All TRA drive pulleys.	
Clutch holder (p/ N 5290276 00)	51
	
A002 001003	
APPLICATION Bombardier Lite drive pulley.	
Drive pulley puller (P/ N 5290275 00)	53
Consists of :	
P / N 529013400 and P / N 529027400	
	
A000 002009	
APPLICATION 277 engine.	

TRA drive pulley puller (P/ N 5290224 00)	75
	
A006 001001	
APPLICATION TRA drive pulley for the 670-779 engines.	
TRA drive pulley puller	56
(N/ p 5290079 00)	
	
A018 001004	
APPLICATION TRA drive pulley (except 670 and 779 engines).	
Forks (3)	57
(N/ p 5290055 00)	
	
A016 001001	
APPLICATION All vehicles equipped with a TRA drive pulley.	

Drive belt installer (p/ N 5290172 00)	58
	
A000 000046	
APPLICATION All vehicles except Elan and Tundra II.	
Alignment bar	
A) (P/N 5290267 00)	59
B) (P/N 5290269 00)	
C) (p/N 5290282 00)	
D) (P/N 5290283 00)	
E) (p/N 5290300 00)	
	
A001 001157	
APPLICATION A) F-Series and S-Series with 503. B) Tundra II LT. C) Alpine II. D) Elan. E) S-Series with 377 engine.	

TRANSMISSION (Mandatory service tools)

Spring scale hook **62**
 (p/ N 5290152 00)



A001 001043

APPLICATION

S and F Series and Alpine II models.

Belt tension adjuster tool **63**

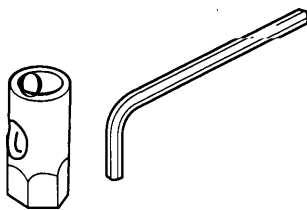
(p/ N 5290087 00)

Consist of :

3 mm Allen key

(p/ N 5290089 00)

Socket (P/ N 5290090 00)



A015 001004

APPLICATION

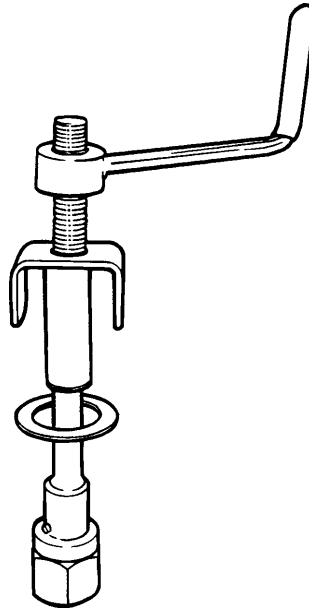
All vehicles except Elan, Tundra II, Skandic WT and Ski Hill SP.

Spring compressor / TRA clutch flare tool **G4**

(p/ N 5290186 00)

Parts included in the kit :

1) Spring compressor
 (P/ N 5290151 00)



A001 001111

APPLICATION

S and F-Series and Alpine II driven pulley type.

All TRA pulley.

Spring compressor / TRA clutch flare tool **G4**

(p/ N 5290186 00)

Parts included in the kit :

2) **TRA clutch spring cover bushing flare tool**

A) INTERIOR flare tool

(p/ N 5290180 00)

EXTERIOR flare tool

(p/ N 5290181 00)

○ NOTE : Letter B stamper on tools,

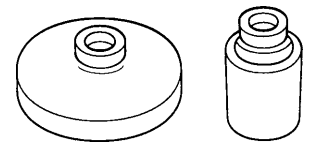
B) INTERIOR flare tool

(p/ N 5290182 00)

EXTERIOR flare tool

(p/ N 5290183 00)

○ NOTE : Letter B stamper on tools.



A001 001123

APPLICATION

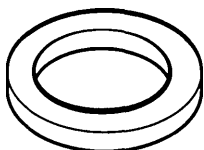
A) TRA pulley (25 mm shaft).

B) TRA pulley (27 mm shaft).

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS
Sub-Section 01 (SERVICE TOOLS)

TRANSMISSION (Mandatory service tools)

Spring compressor /
 TRA clutch flare tool **64**
 (p/ N 5290186 00)
Parts included in the kit:
3) Washer (2)
 (p/ N 7329000 15)



A001 001137

APPLICATION

All applications.

Spring compressor /
 TRA clutch flare tool **64**
 (p/ N 5290186 00)
 Parts included in the kit :
4) TRA clutch outer half bush-
ing flare tool
 INTERIOR flare tool
 (p/ N 5290184 00)
 EXTERIOR flare tool
 (P/ N 5290185 00)

NOTE : Letter C stamper
 on tools.



b

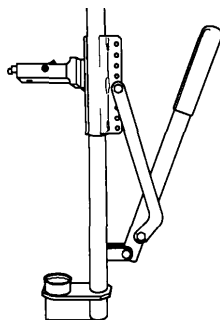
@

A001 001126

APPLICATION

All TRA drive pulleys.

Shock spring remover kit **65**
 (p/ N 5290271 00)
 Pin
 (p/ N414 5284 00)



A001 001166

APPLICATION

All suspensions with coil spring.

Tension tester **74**
 (P/ N 4143482 00)



A000 002007

APPLICATION

All models,

Countershaft bearing
 installer
 (p/ N 5290302 00)

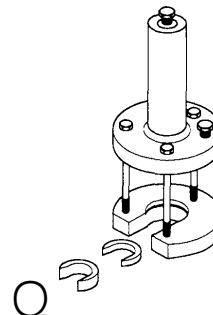


A000 000045

APPLICATION

S and F Series.

Countershaft bearing
 remover
 (P/ N 5290301 00)

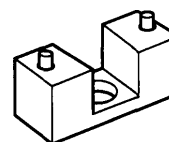


AO0A274

APPLICATION

S and F series.

Spring cover tool
 (p/ N 5290273 00)

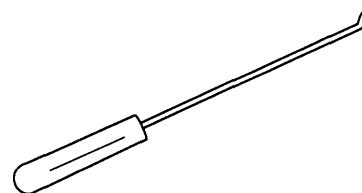


A001 001166

APPLICATION

Tundra II and 377 equipped
 S-Series drive pulley.

Transmission adjuste **76**
 (p/ N 5290285 00)



A000 003033

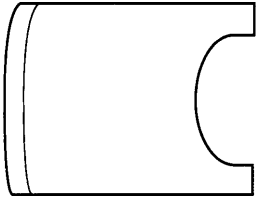
APPLICATION

F-Series equipped with reverse
 gear.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS
Sub-Section 01 (SERVICE TOOLS)

TRANSMISSION (Optional service tools)

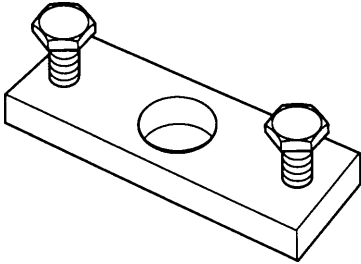
Alignment tool
(P/ N 4204760 10) **306**



A000 002049

APPLICATION
Skandic WT gearbox.

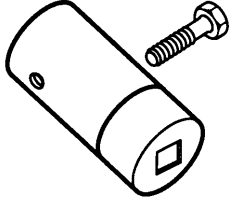
Cam pusher
(p/ N 5290129 00) **309**



A018 001006

APPLICATION
Tundra II LT.

Drive pulley puller
(P/ N 5290231 00) **318**



A000 002127

APPLICATION
Elan.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Sub-Section 01 (SERVICE TOOLS)

SUSPENSION (Optional service tools)

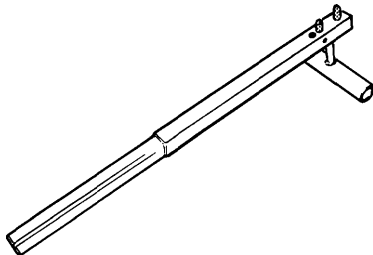
A) Track cleat remover **345**

(P / N 5290082 00)

Pins **346**

(p/ N 5290082 04)

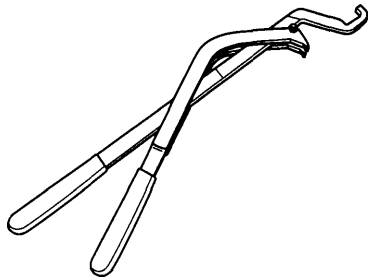
○ NOTE : Pins can be rotated 180° depending on whether the tool is used by a left-hander or right-hander.



A001 001055

B) Track cleat remover **254**

(P / N 5290287 00)



A001 005074

APPLICATION

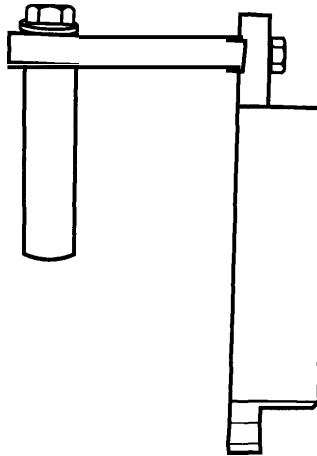
- A) Elan and Tundra II LT.
- B) All others models.

Camber alignment tool **343**

(p/ N 5290216 00)

○ NOTE : Angle finder with a magnet base must be used.

Suggestion : K-D tool no. 2968



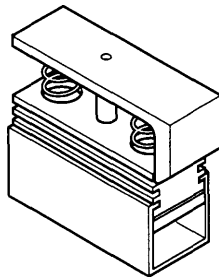
A006 001002

APPLICATION

All DSA front suspensions.

Track tension gauge **342**

(P / N 5290215 00)



A000 001141

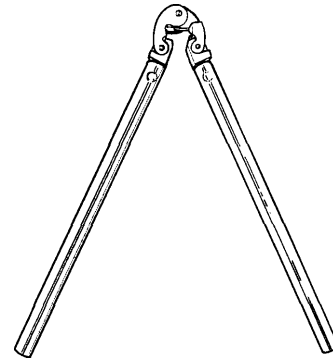
APPLICATION

All models except Elan.

Track cleat installer

A) (p/ N 5290085 00) **347**

B) (P / N 5290288 00) **255**



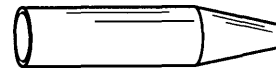
A001 001056

APPLICATION

- A) Elan and Tundra.
- B) All other models.

Dome guide

(p/ N 529026500)



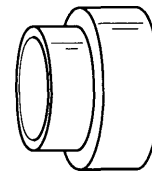
A006 006047

APPLICATION

MX Z T / A shocks.

Piston guide

(p/ N 5290266 00)



A006 005 048

APPLICATION

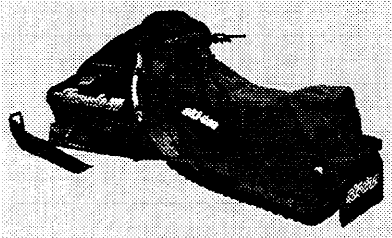
MX Z T / A shocks.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Sub-Section 01 (SERVICE TOOLS)

VEHICLES (Optional service tools)

Protective mat
(P / N 529 0306 00)



A01B454

APPLICATION

All vehicles.

SERVICE PRODUCTS


MANDATORY SERVICE PRODUCTS

O NOTE : Reversal numbers (example :) correspond to those of the *Ski-Doo Service Tools Order Form* and to those of the *Tools and Service Products Catalog*.

Loctite® is a trademarks of Loctite corporation.

Dow Corning® is a trademarks of Dow Corning Corporation.

Retaining compound **151**
(P / N 413703f 00)
Loctite® RC / 609:
Retaining compound (10 mL)
(green)



A000 001 129

APPLICATION

Used for retaining bushings, bearings in slightly worn housing or on shaft,

Medium-strength thread locker **154**
(P / N 4137030 00)
Loctite® 242 :
Threadlocker (10 mL)
(blue, medium strength)




A000 024

APPLICATION

Flywheel nut, crankcase studs, etc.

Chisel gasket / paint remover **156**
(P / N 4137085 00)
Loctite® 79040 Chisel
510 g (18 oz)




A000 001 129

APPLICATION

Clean mating surfaces of cylinders and crankcase. Remove carbon in combustion chambers.

Paste gasket **152**
(P / N 4137027 00)
Loctite® 515 :
Gasket eliminator (50 mL)




A000 ml 50

APPLICATION

Crankcase halves transmission and gearbox mating surfaces.

High strength thread locker **155**
(P / N 4137074 00)
Loctite® 271 :
Threadlocker (10 mL)
(red, high strength)

(TYPICAL)



A000 024

APPLICATION

Fasteners and studs up to 1" diameter,

Cleaning solvent **157**
(P / N 4137082 00)
Loctite® 755-59
340 g (12 oz)



A000 001 129

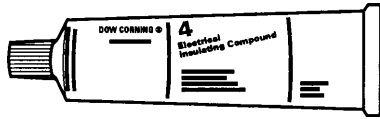
APPLICATION

Clean carburetor parts and degrease all oily surfaces.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS
 Sub-Section 02 (SERVICE PRODUCTS)

OPTIONAL SERVICE PRODUCTS

Silicone dielectric grease **350**
 (3 Oz)
 (P/ N413 7017 00)



A00B1X4

APPLICATION

On all electric connections. High tension coil and spark plug connections. Connector housings, etc.

Grease tube LMZ no. 1 **351**
 (400 g)
 (f' / N 4137075 00)



A000 001070

APPLICATION

Mainly used between regulators or rectifiers and upper column to transfer the heat build-up and to assure a good ground.

Chaincase oil (250 mL) **353**
 (p/ N413 8019 00)



A000 001099

APPLICATION

Chaincase lubricant on Elan and Tundra II LT.

Synthetic chaincase oil **354**
 (P/ N 4138028 00)



A01B404

APPLICATION

Chaincase lubricant on all models except Elan and Tundra II LT.

Blizzard oil **355**
 (12 x 500 mL)
 (P/ N 4960144 00)



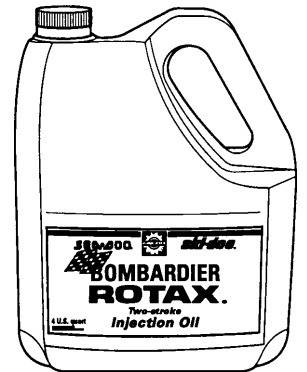
A000 001098

APPLICATION

All models.

Injection oil **356**
 (p/ N 4960133 00)
 (12 x 1 liter)

(p/ N 4960140 00) **357**
 (3x 4 liters)



FO01 001044

APPLICATION

All engines.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS
Sub-Section 02 (SERVICE PRODUCTS)

OPTIONAL SERVICE PRODUCTS

Pipe sealant **358**

(p/ N413 7023 00)
 Loctite 592 (50 mL)



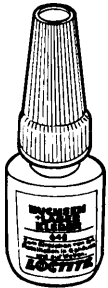
A000 001104

APPLICATION

Engine plugs and senders.

High temperature thread locker **359**

(P/ N 4208997 88)
 Loctite 648 (green)
 (5 g)



A000 001121

APPLICATION

For RAVE valve rod distance nut on 583, 670 and 779 engines.

Anti-seize lubricant **362**

(p/ N413 7010 00)
 Loctite anti-seize lubricant 454 g (16 oz)



FO01 001043

APPLICATION

Unpainted surfaces of drive pulley countershaft.

Bearing grease **363**

(400 g)
 (P/ N 4137061 00)



A000 001093

APPLICATION

For idler bearings, ski legs, leaf spring cushion pads, seal interior lips, rear hub bearings, bogie wheels, countershaft bearings, etc.

Storage oil **304**

(350 g spray can)
 (P/ N 4960141 00)



A000 001116

APPLICATION

All models.

Degreaser **365**

(p/ N413 7084 00)
 Permatex® 48 TA
 433 g (15 oz)



A000 001126

APPLICATION

Engine, chaincase, pulleys and any greasy surfaces.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS
Sub-Section 02 (SERVICE PRODUCTS)

OPTIONAL SERVICE PRODUCTS

Gel instant adhesive **366**
(P/ N 4137083 00)
Loctite 454-40
20 g (.70 oz)



A000 001132

APPLICATION

Isolating foam, rubber strip.

Tough adhesive **367**
(p/ N413 4083 00)
Loctite Black Max 38004
3mL (.1 O oz)

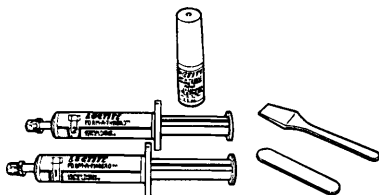


A000 001133

APPLICATION

Shifter boot or grip.

Stripped threads repair kits **368**
(p/ N413 7086 00)
Loctite 81668
Form-A-thread 81668



A000 000055

APPLICATION

Repair damaged threads of grade 5 (English) or 8.8 (metric) maximum. Do not use in applications where temperatures will exceed 149°C (300°F) or on critical assemblies.

HYLOMAR sealant **369**
(loo g)
(p/ N 4137071 00)



A000 001123

APPLICATION

To form an oil resistant seal (ex : transmission).

Paint for frame touch-up **370**
(p/ N413 4010 00)
Black semi-gloss
(spray can)



A000 001125

APPLICATION

All models with a black frame.

General purpose instant adhesive **373**
(495)
(p/ N413 7032 00)



A000 001103

APPLICATION

Rubber to metal bonding and most hard plastic

Sealant Dow Corning 736 **374**
(P/ N413 7092 00)



A000 001138

APPLICATION

All models.

Fuel stabilizer **375**
(P/ N413 4086 00)



A000 001139

APPLICATION

All models.

Molykote 111 **376**
(P/ N413 7070 00)



A00B3W4

APPLICATION

Rotary valve shaft seals.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS
Sub-Section 02 (SERVICE PRODUCTS)

OPTIONAL SERVICE PRODUCTS

Shock oil
(1 liter)

(p/ N413 7094 00)



A06FOP4

APPLICATION

MX Z T / A shocks.

Penetrating lubricant

(p/ N 2936000 16)






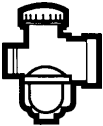



A001 001169

APPLICATION





Steering ball joints on all models.

Section 02 LUBRICATION AND MAINTENANCE
Sub-Section 01 (LUBRICATION AND MAINTENANCE)

LUBRICATION AND MAINTENANCE CHART

		①	②	③	④	⑤	⑥	REFER TO
	Starting Rope Condition						✓	—
	Engine Head Nuts	✓			✓			Appropriate section : See Top End
	Engine Mount Nuts	✓			✓			Appropriate section : See ENGINE SUPPORT AND MUFFLER
	Exhaust System	✓		✓				Appropriate section: See ENGINE SUPPORT AND MUFFLER
	Engine Lubrication					✓		This section no. 1
	Cooling System Condition	✓			✓			Sub-section 04-06
	Coolant Replacement (Except Fan Cooled)						✓	Page 04-09-5
	Condition of Seals						✓	Sub-section 04-03
	Injection Oil Filter Condition (Except Élan)			✓				Page 04-07-1
	Injection Oil Filter Replacement (Except Élan)						✓	Sub-section 04-05
	Oil Injection Pump Adjustment (Except Élan)	✓			✓			Page 04-05-5
	Fuel Stabilizer					✓		This section no. 2
	Fuel Filter Replacement						✓	This section no. 3
	Fuel Lines and Connections	✓					✓	Sub-section 04-09
	Carburetor Adjustment	✓			✓			Page 04-08-8
	Throttle Cable Inspection	✓			✓		✓	Sub-section 04-09
	Air Filter Cleaning			✓				This section no. 4
	Drive Belt Condition	✓	✓					This section no. 5
	Condition of Drive and Driven Pulleys	✓		✓		✓		Sub-sections 05-02 and 03-03
	Cleaning of Drive and Driven Pulleys						✓	Sub-sections 05-02 and 03-03
	Retorquing of Drive Pulley Screw	✓						Sub-section 05-02
	Driven Pulley Preload	✓			✓			Sub-section 05-03
	Brake Condition	✓	✓					Sub-section 05-05
	Brake Adjustment			✓				Sub-section 05-05
	Lubrication of Ratchet Wheel or Fluid Change (Except Élan)						✓	Sub-section 05-05
	Drive Chain Tension	✓		✓				Sub-sections 05-06 and 05-07
	Countershaft Lubrication (S and F Series)	✓		✓		✓		Sub-section 05-05
	Chaincase / Gearbox Oil Level	✓		✓		✓		Sub-sections 05-06 and 05-07
	Lubrication of drive axle bearing	✓		✓		✓		Sub-section 07-05

Section 02 LUBRICATION AND MAINTENANCE
 Sub-Section 01 (LUBRICATION AND MAINTENANCE)

		①	②	③	④	⑤	⑥	REFER TO
	Handlebar Bolts. Retorque to 26 N•m (19 lbf•ft)	✓						Page 08-01-1
	Steering and Front Suspension Mechanism	✓		✓		✓		Sub-sections 08-01 and 08-02
	Wear and Condition of Skis and Runners	✓	✓					Sub-section 08-02
	Steering and Ski Leg Camber Adjustment	✓		✓				Sub-section 08-01
	Suspension Adjustments (Except Elan)	AS REQUIRED						Section 07: See appropriate sub-section and <i>Operator's Guide</i>
	Suspension Lubrication			✓		✓		Section 07: See appropriate sub-section
	Suspension Condition	✓			✓			Section 07: See appropriate sub-section
	Suspension Stopper Strap Condition (Except Elan)				✓			Section 07: See appropriate sub-section
	Track Condition	✓		✓				Sub-section 07-06
	Track Tension and Alignment	✓	AS REQUIRED					
	Spark Plugs*	✓						Sub-section 06-03
	Engine Timing	✓					✓	Sub-section 06-02
	Battery Condition	✓		✓		✓		Sub-section 06-04
	Headlight Beam Aiming				✓			Page 09-01-1
	Wiring Harnesses, Cables and Lines	✓		✓				Page 09-01-13
	Operation of Lighting System (HI/LO Beam, Brake Light, etc.) Test Operation of Emergency Cut-Out Switch and Tether Cut-Out Switch	✓	✓				✓	<i>Operator's Guide</i>
	Rags in Air Intake and Exhaust System					✓	✓	This section no. 6
	Engine Compartment	✓		✓				This section no. 7
	General Inspection	✓		✓		✓		This section no. 8

* Before installing new spark plugs at pre-season preparation, it is suggested to burn excess storage oil by starting the engine with the old spark plugs. Only perform this operation in a well ventilated area.

- ① 10-HOUR INSPECTION (To be performed by dealer)
- ② WEEKLY OR EVERY 240 km (150 mi)
- ③ MONTHLY OR EVERY 800 km (500 mi)
- ④ ONCE A YEAR OR EVERY 3200 km (2000 mi)
- ⑤ STORAGE
- ⑥ PRE-SEASON PREPARATION (To be performed by dealer)

NO. 1 ENGINE LUBRICATION

Engine internal parts must be lubricated to protect them from possible rust formation during the storage period.

To perform the storage procedures, proceed as follows :

Start the engine and allow it to run at idle speed until the engine reaches its operating temperature,

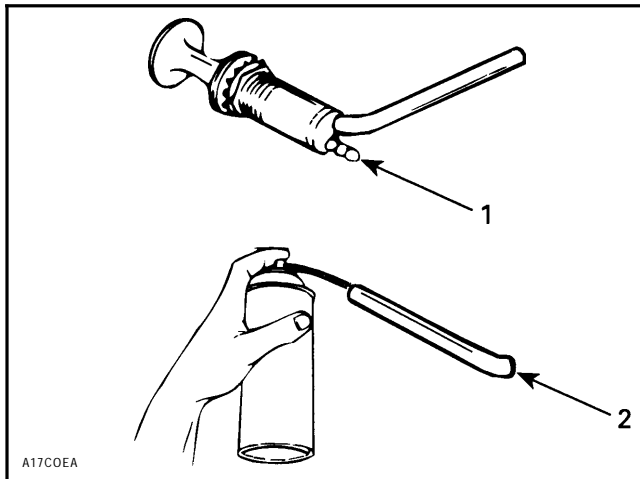
◆ **WARNING** : Ensure the track is **free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.**

Stop the engine.

All Models Except Mach Z

To prevent fuel from draining, primer button should be pushed all the way in.

Disconnect the outlet primer hose from the primer valve (straight coupling).



1. Straight coupling
2. To intake manifold

Insert storage oil (P/ N 4960141 00) nozzle into primer outlet hose.

Mach Z Only

Remove air silencers to spray storage oil into each carburetor bore.

All Models

Restart engine and run at idle speed.

Inject storage oil until the engine stalls or until a sufficient quantity of oil has entered the engine (approximately half a can).

With the engine stopped, remove the spark plug and spray storage oil (P/ N 4960141 00) into each cylinder. Crank slowly 2 or 3 revolutions to lubricate cylinders.

Reinstall the spark plugs and the outlet primer hose or air silencers.

● **WARNING** : This procedure must only be performed in a well ventilated area. Do not run engine during storage period.

NO. 2 FUEL STABILIZER

A fuel stabilizer (P/N 4134086 00) can be added in fuel tank to prevent fuel deterioration and avoid draining fuel system for storage. Follow manufacturer's instructions for proper use.

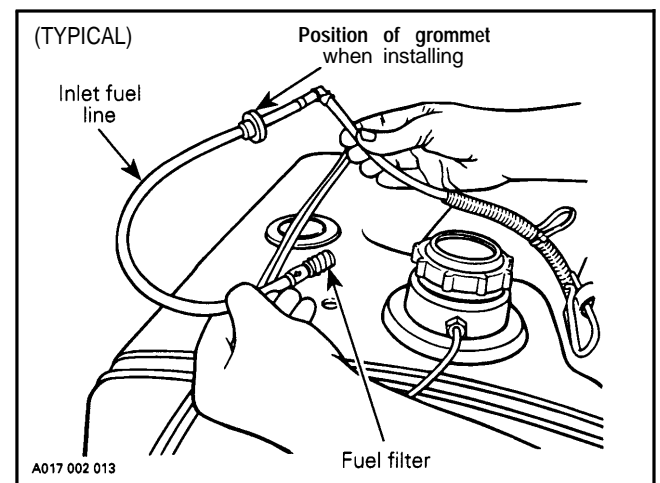
If above fuel stabilizer is not used, drain fuel system including fuel tank and carburetor(s).

▼ **CAUTION** : Fuel stabilizer should be added prior engine lubrication to ensure carburetor(s) protection against varnish deposit.

NO. 3 FUEL FILTER REPLACEMENT

On all models except Elan and Alpine II, drain fuel tank.

On all models, remove fuel line grommet from fuel tank and pull out inlet fuel line from tank.



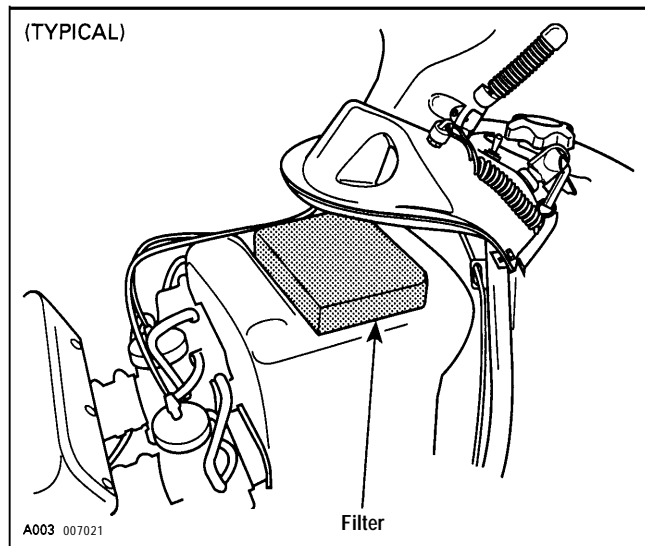
Replace fuel filter. To facilitate the fuel line installation, slide grommet on fuel line about 50 mm (2 in) away from elbow then install grommet on fuel tank and push elbow through grommet.

Section 02 LUBRICATION AND MAINTENANCE
Sub-Section 01 (LUBRICATION AND MAINTENANCE)

NO. 4 AIR FILTER CLEANING

S-Series

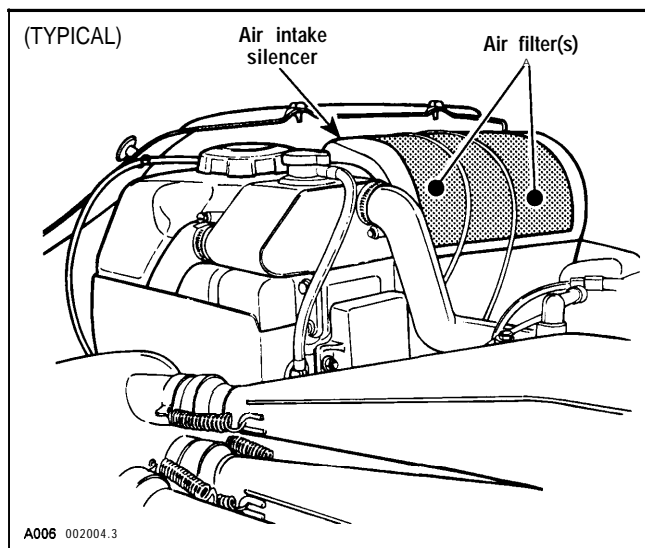
Lift hood and remove air filter from air intake silencer.



To clean the filter, shake the snow out of it then, dry it out.

F-Series

Lift hood and remove air filter(s) from air intake silencer.



Shake the snow out of filter(s) then, dry it out.

All Models

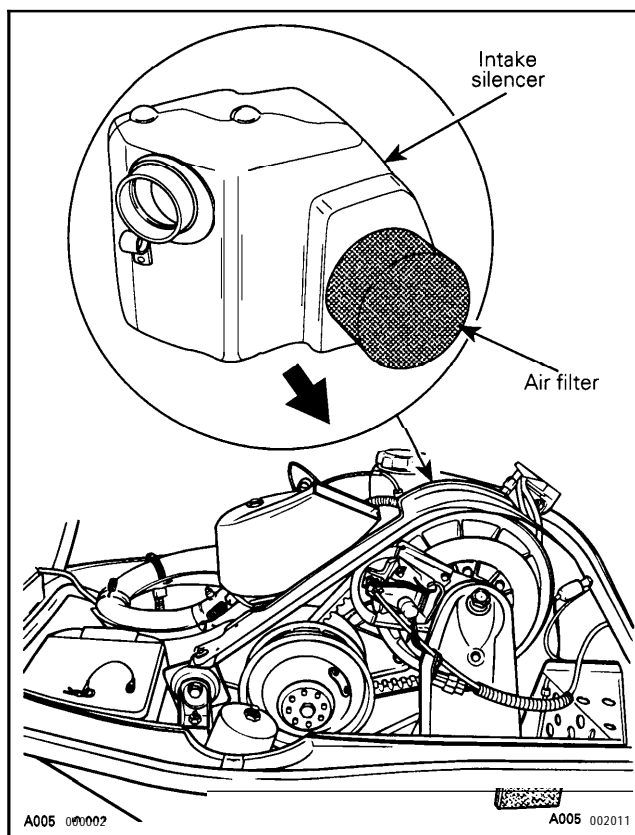
Check that the air box is clean and dry then properly reinstall the filter.

▼ **CAUTION** : These snowmobiles have been calibrated with the filter installed. Operating the snowmobile without it may cause engine damage.

Tundra II LT

Air filter is located on lower side portion of air intake silencer. Lift hood and remove belt guard. Gently pull air filter sideward.

Ensure it is clean and dry. Shake snow out. Clean with a solvent and dry as necessary



NO. 5 DRIVE BELT CONDITION

Inspect belt for cracks, fraying or abnormal wear (uneven wear, wear on one side, missing cogs, cracked fabric). If abnormal wear is noted, probable cause could be pulley misalignment, excessive RPM with frozen track, fast starts without warm-up period, burred or rusty sheave, oil on belt or distorted spare belt.

Check the drive belt width. Replace the drive belt if width is less than the minimum width recommended in DRIVE BELT 05-01.

NO. 6 RAGS IN AIR INTAKE AND EXHAUST SYSTEM

At storage preparation, block air intake hole and exhaust system hole using clean rags.

Remove those rags at pre-season preparation.

NO. 7 ENGINE COMPARTMENT

Keep clean of grass, twigs, cloth, etc. These are combustible under certain conditions.

NO. 8 GENERAL INSPECTION

Grease or oil at all recommended lubrication points. Wipe off surplus.

Block air intake hole and exhaust system hole using clean cloths.

Remove any dirt or rust.

To clean the entire vehicle, use only flannel clothes or Kimtowels® wipers no. 58-380 from Kimberly-Clark.

▼ **CAUTION : It is necessary to use flannel cloths or" Kimtowels" wipers on windshield and hood to avoid damaging further surfaces to clean.**

To clean the entire vehicle, including metallic parts with a **thick** coat of grease, use "Endust" imported by Bristol Myers, available at hardware stores or supermarkets.

To clean the entire vehicle, including metallic parts with a **thin** coat of grease, use "Simple Green" from Sunshine Makers Inc., available at hardware stores or at automotive parts retailer,

To remove scratches on windshield or hood : Start with "Slip Streamer Motorcycle Windshield Heavy Duty Scratch, Remover". Finish with "Slip Streamer Motorcycle Cleaner and Polish".

○ **NOTE** : The latest product may be use alone if only light scratches are noticeable.

▼ **CAUTION : Never clean plastic parts or hood with strong detergent, decreasing agent, paint thinner, acetone, products containing chlorine, etc.**

Inspect the hood and repair any damage. Touch up all metal spots where paint has been scratched off. Spray all metal parts including shock chromed rods with antirust product (P/ N 2936000 06). Wax the hood and the painted portion of the frame for better protection.

○ **NOTE** : Apply wax on glossy finish only. Protect the vehicle with a cover to prevent dust accumulation during storage.

▼ **CAUTION : The snowmobile has to be stored in a cool and dry place and covered with an opaque tarpaulin This will prevent sun rays and grime from affecting plastic components and vehicle finish.**

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ENGINE

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	ENGINE BACKFIRES.
CONDITION	NORMAL USE.
Test / Inspection	1) Check spark plug(s). a) Carbon accumulation caused by defective spark plug(s). <i>Clean carbon accumulation and replace spark plug(s).</i>
	2) Check cooling system. a) Loose fan belt. <i>Adjust or replace fan belt (refer to technical data 10).</i> b) Low antifreeze level. <i>Adjust antifreeze level. Then check clamps or hoses.</i> c) Defective tank cap. <i>Replace cap.</i> d) Air in system. <i>Bleed system.</i>
	3) Check ignition timing. a) Timing is too advanced. <i>Set timing according to specifications (refer to technical data 10).</i>

Section 03 TROUBLESHOOTING
 Sub-Section 01 (ENGINE)

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Perform engine leak test (tool P / N 8617390 00). Refer to engine leak verification flow chart. Check possible piston seizure.</p> <p>a) Damaged gasket and/or seal. <i>Replace defective parts.</i></p> <hr/> <p>2) “Four-corner” seizure of piston(s).</p> <p>a) Accelerating too fast when engine is cold. Piston expands faster than cylinder. <i>Replace piston(s). Ask driver to refer to warm-up procedure in Operator’s Guide.</i></p> <hr/> <p>3) Piston(s) seizure on exhaust side (color on piston dome is correct).</p> <p>a) Kinked fuel tank vent tube. <i>Relocate fuel tank vent tube.</i></p> <p>b) Leaks at fuel line connections. <i>Replace defective lines.</i></p> <p>c) Fuel does not flow through carburetor(s) (plastic particles in needle area and / or varnish formation in carburetor(s)). <i>Clean carburetor(s).</i></p> <p>d) Spark plug heat range is too warm. <i>Install sparkplug(s) with appropriate heat range (refer to technical data 10).</i></p> <p>e) Improper ignition timing. <i>Adjust according to specifications (refer to technical data 10).</i></p> <p>f) Restriction in exhaust system. <i>Replace.</i></p> <p>g) Compression ratio is too high. <i>Install genuine parts.</i></p> <p>h) Carburetor calibration is too lean. <i>Adjust according to specifications (refer to technical data 10).</i></p> <p>i) Improper rotary valve timing or improper valve. <i>Adjust according to specifications (refer to technical data 10) and/or install Bombardier’s recommended rotary valve.</i></p> <p>j) Poor quality oil. <i>Use Bombardier Rotax oil.</i></p> <p>k) Leaks at air intake silencer. <i>Replace air intake silencer grommets.</i></p>

Section 03 TROUBLESHOOTING
Sub-Section 01 (ENGINE)

	<p>4) Melted and / or perforated piston dome; melted section at ring end gap.</p> <p>a) When piston reaches TDC, mixture is ignited by heated areas in combustion chamber. This situation is due to an incomplete combustion of a poor quality oil. <i>Clean residue accumulation in combustion chamber and replace piston(s). Use Bombardier Rotax oil.</i></p> <p>b) Spark plug heat range is too high. <i>Install recommended sparkplug(s) (refer to technical data 10).</i></p> <p>c) Ignition timing is too advanced. <i>Adjust according to specifications (refer to technical data 10).</i></p> <p>d) Inadequate fuel quality. <i>Use appropriate fuel.</i></p> <p>e) Carburetion is too lean. <i>Adjust according to specifications (refer to technical data 10).</i></p> <hr/> <p>5) Seized piston all around the circumference (dry surface).</p> <p>a) Lack of oil, damaged oil line or defective injection pump. <i>Replace defective part(s).</i></p> <hr/> <p>6) Grooves on intake side of piston only.</p> <p>a) Oil film eliminated by water (snow infiltration in engine). <i>Replace piston(s) and check if intake system leaks.</i></p> <hr/> <p>7) Piston color is dark due to seizure on intake and exhaust sides.</p> <p>a) Broken or loose fan belt. <i>Replace fan belt or adjust its tension (refer to technical data 10).</i></p> <p>b) Cooling system leaks and lowers coolant level. <i>Tighten clamps or replace defective parts. Add antifreeze in cooling system until appropriate level is reached.</i></p> <p>c) Accumulation of foreign particles in needle and /or main jet area. <i>Clean carburetor(s).</i></p> <hr/> <p>8) Cracked or broken piston(s).</p> <p>a) Cracked or broken piston(s) due to excessive piston / cylinder clearance or engine overrevving. <i>Replace piston(s). Check piston / cylinder clearance (refer to technical data 10). Adjust drive pulley according to specifications (refer to technical data 10) and/or clean pulley sheaves if they are contaminated with greasy particles.</i></p>
SYMPTOM	PISTON RING AND CYLINDER SURFACES ARE GROOVED.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check oil quality.</p> <p>a) Poor oil quality. <i>Use Bombardier Rotax oil.</i></p> <hr/> <p>2) Check injection pump and its hoses.</p> <p>a) Inadequate injection pump adjustment and / or defective hoses. <i>Adjust pump according to specifications (refer to Engine section 04) and/ or replace hoses.</i></p> <hr/> <p>3) Check fuel / oil premix (Élan).</p> <p>a) Inadequate fuel / oil mixture. <i>Drain fuel tank. Use manufacturer's recommended mixture (refer to fuel and oil section in Operator's Guide).</i></p>

Section 03 TROUBLESHOOTING

Sub-Section 01 (ENGINE)

SYMPTOM	ENGINE DOES NOT OFFER MAXIMUM POWER AND / OR DOES NOT REACH MAXIMUM OPERATING RPM.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check spark plug condition. a) Fouled spark plug(s). <i>Replace.</i></p> <hr/> <p>2) Check if there is water in fuel. a) There is water in fuel. <i>Drain fuel system, then fill it with appropriate fuel.</i></p> <hr/> <p>3) Check items listed in “Engine runs out of fuel” (refer to fuel and oil system sub-section 02).</p> <hr/> <p>4) Check carburetor adjustments and cleanliness. a) Inadequate carburetor adjustments or dirt accumulation. <i>Adjust according to specifications (refer to technical data 10) or clean.</i></p> <hr/> <p>5) Check drive belt. a) Worn belt. <i>Replace belt if width is 3 mm (1/8”) less than nominal dimension (refer to technical data 10).</i></p> <hr/> <p>6) Check track adjustment. a) Too much tension and / or improper alignment. <i>Align track and adjust its tension to specifications (refer to technical data 10).</i></p> <hr/> <p>7) Check drive pulley. a) Improper calibration screw adjustments (TRA pulley) and/or worn bushing(s). <i>Adjust according to specifications (refer to technical data 10) and/or replace bushing(s).</i></p> <hr/> <p>8) Check driven pulley. a) Worn bushing and / or spring tension. <i>Replace spring and /or adjust its tension according to specifications (refer to technical data 10).</i></p> <hr/> <p>9) Check exhaust system. a) Restriction. <i>Replace.</i></p> <hr/> <p>10) Check ignition timing. a) Decrease in power due to retarded ignition. <i>Adjust according to specification (refer to technical data 10).</i></p> <hr/> <p>11) Check engine compression. a) Worn piston(s) and ring(s). <i>Replace (refer to technical data 10 for specification).</i></p> <hr/> <p>12) Check engine cooling system. a) Engine overheats. Improper fan belt tension. <i>Adjust fan belt (refer to technical data 10).</i> b) Antifreeze level is low, cap fails to pressurize system or air circulates through lines. <i>Adjust level, replace cap or bleed cooling system.</i></p>

Section 03 TROUBLESHOOTING
Sub-Section 01 (ENGINE)

SYMPTOM	ENGINE DETONATION AT MAXIMUM RPM.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check which type of fuel is used. a) Octane number is too low and /or alcohol level is too high. <i>Use recommended fuel type.</i></p>
	<p>2) Check spark plug type. a) Improper spark plug heat range. <i>Install recommended sparkplug(s) (refer to technical data 10).</i></p>
	<p>3) Check exhaust system. a) Too much restriction. <i>Replace.</i></p>
	<p>4) Check ignition timing. a) Timing is too advanced. <i>Adjust according to specification (refer to technical data 10).</i></p>
	<p>5) Check carburetion. a) Fouled and / or improper carburetor components. <i>Clean or replace according to specification (refer to technical data 10).</i></p>
	<p>6) Check compression ratio and squish area. a) Compression ratio is too high. <i>Install genuine parts.</i></p>
SYMPTOM	ENGINE TURNS OVER BUT FAILS TO START.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check switches. a) Ignition switch, emergency cut-out switch or tether switch is in the OFF position. <i>Place all switches in the RUN or ON position.</i></p>
	<p>2) Check fuel level. a) Mixture not rich enough to start cold engine. <i>Check fuel tank level and use primer.</i></p>
	<p>3) Check spark plug. a) Defective spark plug (no spark). <i>Replace spark plug(s).</i></p>
	<p>4) Check amount of fuel on spark plug. a) Flooded engine (spark plug wet when removed). <i>Do not overprime. Remove wet sparkplug(s), turn ignition switch to OFF and crank engine several times. Install clean dry sparkplug. Start engine following usual starting procedure.</i></p>
	<p>5) Check fuel lines. a) No fuel to the engine (spark plug dry when removed). <i>Check fuel tank level; turn fuel valve on if applicable; check fuel filter, replace if clogged; check condition of fuel and impulse lines and their connections.</i></p>
	<p>6) Check engine compression. a) Insufficient engine compression. <i>Replace defective part(s) (ex.: piston(s), ring(s), etc.).</i></p>

Section 03 TROUBLESHOOTING

Sub-Section 01 (ENGINE)

SYMPTOM	IRREGULAR ENGINE IDLE.
CONDITION	NORMAL USE AFTER ENGINE WARM UP.
Test / Inspection	1) Check primer. a) Fuel leaks at primer nipple which is mounted to carburetor. <i>Replace.</i>
	2) Check choke. a) Choke plunger may be partially opened. <i>Readjust.</i>
	3) Check carburetor adapter. a) Air enters through a crack. <i>Replace.</i>
	4) Check air screw position. a) Inadequate fuel / air mixture. <i>Adjust according to specifications (refer to technical data 10).</i>
	5) Check ignition system trigger coil air gap. a) Air gap is too large. <i>Adjust according to specifications (refer to technical data 10).</i>
	6) Check dimension of pilot jet. a) Inadequate fuel / air mixture. <i>Adjust according to specifications (refer to technical data 10).</i>
	7) Pet-form engine leak test (tool P / N 8617390 00). a) Leaking gaskets allow air to enter in engine. <i>Replace defective parts.</i>
SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
Test / Inspection	1) Check temperature gauge sensor. a) False reading. <i>Replace.</i>
	2) Check fan belt. a) Belt slides because it is too loose. <i>Adjust according to specifications (refer to technical data 10).</i>
	3) Verify antifreeze level and check if there is air infiltration in the system or if there are leaks in gasket areas. a) Low antifreeze level or air in system. <i>Add antifreeze until recommended level is reached, bleed system and/or tighten clamps at fitting.</i>
	4) Check if antifreeze flows through system properly. a) Foreign particles and / or broken coolant pump impeller. <i>Clean cooling system and/ or replace coolant pump impeller.</i>
	5) Check thermostat. a) Thermostat reacts slowly or not at all. <i>Replace.</i>

Section 03 TROUBLESHOOTING
Sub-Section 01 (ENGINE)

	<p>6) Check antifreeze concentration. a) Antifreeze concentration is too high. <i>Adjust concentration according to Bombardier's recommendations.</i></p>
	<p>7) Check tank cap. a) Cap does not hold pressure. <i>Replace.</i></p>
	<p>8) Check carburetion. a) Improperly adjusted or inadequate carburetor components. <i>Adjust according to specifications (refer to technical data 10) or replace inadequate component(s).</i></p>
	<p>9) Check cylinder head gaskets. a) Worn gaskets. <i>Replace.</i></p>
	<p>10) Check ignition timing. a) Ignition timing is too advanced. <i>Adjust according to specifications (refer to technical data 10).</i></p>
	<p>11) Check if there are leaks at air intake silencer and / or engine crankcase. a) Leak(s). <i>Repair or replace.</i></p>
	<p>12) Check condition and heat range of spark plug(s). a) Melted spark plug tip or inadequate heat range. <i>Replace.</i></p>
SYMPTOM	ENGINE EQUIPPED WITH "RAVE" VALVE DOES NOT REACH ITS FULL OPERATING RPM (500 TO 1000 RPM SLOWER).
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check "RAVE" valve pistons. a) Valve piston(s) is (are) too far out. <i>Screw valve piston(s) to bottom.</i></p>
	<p>2) Check "RAVE" valve stems. a) Bent "RAVE" valve stem(s). <i>Replace.</i></p>
	<p>3) Check "RAVE" valves. a) Jamed valve(s). <i>Clean.</i></p>
	<p>4) Check tension of "RAVE" springs. a) Inadequate spring tension. <i>Replace.</i></p>
	<p>5) Check "RAVE" pressure holes. a) Clogged holes. <i>Clean.</i></p>
	<p>6) Check clamps or sleeves. a) Damaged clamp(s) or sleeve(s). <i>Replace.</i></p>

Section 03 TROUBLESHOOTING
 Sub-Section 01 (ENGINE)

SYMPTOM	ENGINE EQUIPPED WITH "RAVE". ENGINE HESITATES AT MID-SPEED AND REACHES MAXIMUM PERFORMANCE ONLY AFTER A WHILE.
CONDITION	NORMAL USE.
Test / Inspection	1) Check "RAVE" valve spring(s). a) Spring tension is too weak or spring(s) is (are) broken. <i>Replace.</i>
	2) Check "RAVE" valve cover red adjustment screws. a) Adjustment screw(s) is (are) too loose. <i>Fully tighten.</i>
	3) Check "RAVE" valve movement ("RAVE" movement indicator P / N 8617258 00). a) Valve(s) is (are) stuck in open position. <i>Clean.</i>
SYMPTOM	REWIND STARTER ROPE DOES NOT REWIND.
CONDITION	NORMAL USE.
Test / Inspection	1) Check rewind spring. a) Broken spring. <i>Replace spring.</i>
SYMPTOM	REWIND STARTER PAWL DOES NOT ENGAGE.
CONDITION	NORMAL USE.
Test / Inspection	1) Check stopper spring. a) Broken stopper spring. <i>Replace.</i>
	2) Check pawl and pawl lock. a) Pawl and pawl lock have stuck together because of heat. <i>Replace.</i>
	3) Check pawl and rope sheave. a) Pawl and rope sheave have stuck together because of heat. <i>Replace.</i>

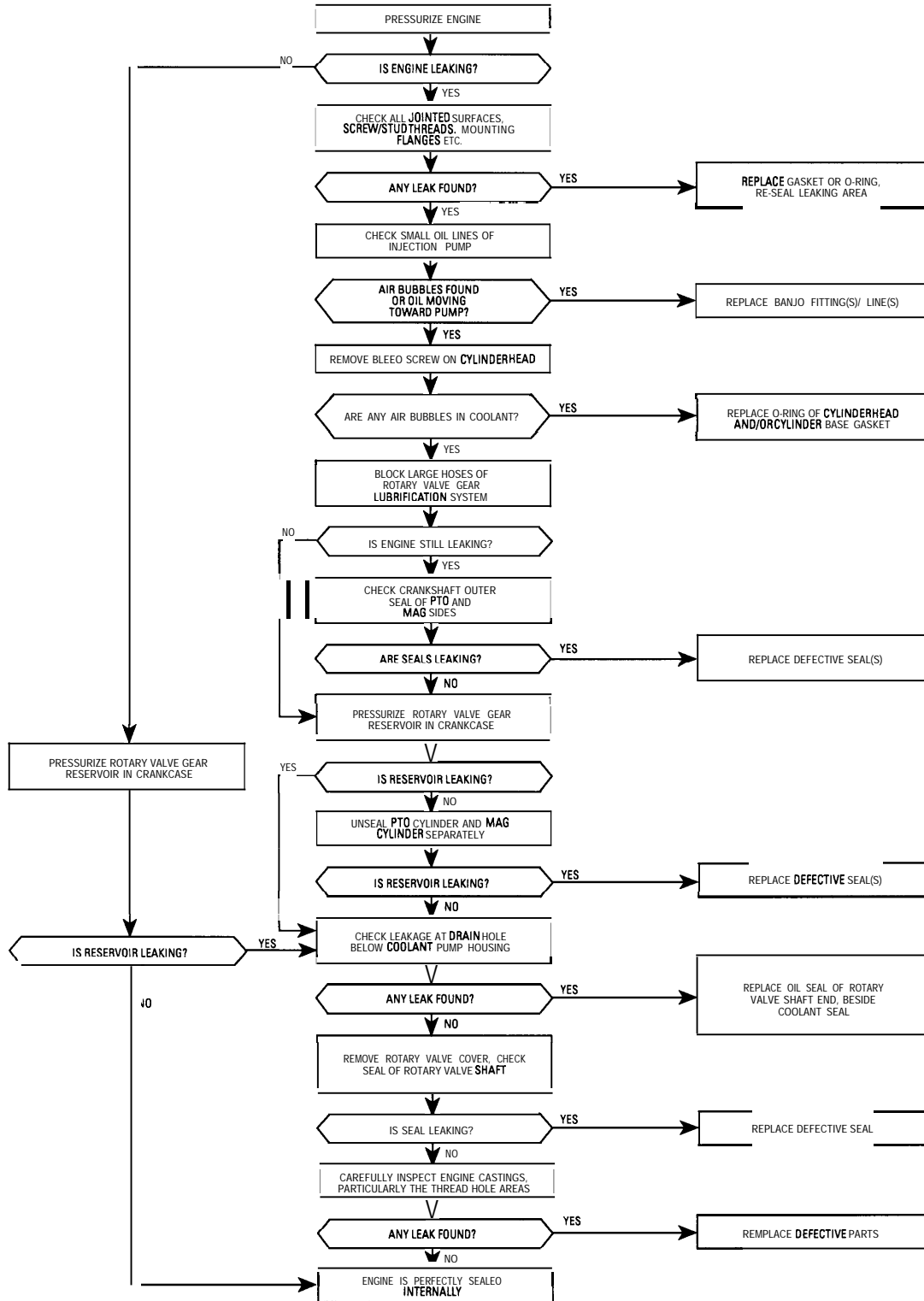
Section 03 TROUBLESHOOTING
Sub-Section 01 (ENGINE)

SYMPTOM	ENGINE PINGING.
CONDITION	NORMAL USE.
Test / Inspection	1) Check fuel lines. a) Bent fuel lines (preventing fuel from flowing through). <i>Relocate or replace fuel lines.</i>
	2) Check if carburetor(s) is (are) clean. a) Dirt prevents fuel from flowing through. <i>Clean.</i>
	3) Check ignition timing. a) Timing is too advanced. <i>Adjust according to specifications (refer to technical data 10).</i>
	4) Check compression ratio. a) Compression ratio is too high. <i>Replace inadequate part(s) to obtain manufacturer's recommended compression ratio or use a higher grade fuel.</i>
SYMPTOM	ENGINE GENERATES A LOT OF VIBRATIONS.
CONDITION	NORMAL USE.
Test / Inspection	1) Check engine supports. a) Loose broken supports or interference between support(s) and chassis. <i>Retighten to specification (refer to technical data 10) or replace.</i>
	2) Check drive pulley (refer to: vibrations coming from drive pulley).
	3) Check carburetor synchronization. a) Throttle slide heights are adjusted differently and / or throttle slide openings are unsynchronized. <i>Adjust throttle slide heights and throttle cable.</i>

Section 03 TROUBLESHOOTING
 Sub-Section 01 (ENGINE)

O NOTE : For fan cooled engines, ignore information pertaining to coolant system and crankcase rotary valve gear reservoir.

**ENGINE LEAK VERIFICATION
 FLOW CHART**



A00A23S

FUEL AND OIL SYSTEMS

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline, Some causes or corrections may not apply to a specific model.

SYMPTOM	HIGH FUEL CONSUMPTION (OR RICH MIXTURE).
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check fuel tank. a) Perforated fuel tank. <i>Replace fuel tank.</i></p> <p>2) Check fuel pump reservoir and carburetor fittings. a) Leaking fittings. <i>Replace defective part.</i></p> <p>3) Check primer. a) Fuel flows through primer while engine runs. <i>Replace primer.</i></p> <p>4) Check float height in carburetor(s). a) Fuel level is too high in float bowl(s). <i>Adjust according to specifications (refer to technical data 10).</i></p> <p>5) Check needle valve. a) Foreign particles prevent needle valve(s) from closing and / or worn seating area. <i>Clean or replace needle valve(s), then clean seating area.</i></p> <p>6) Check H.A.C. system. a) Connection to atmosphere is plugged. <i>Clean.</i> b) Leakage in H.A.C. to carburetor tube. <i>Replace.</i> c) Leak in H.A.C. sealed chamber. <i>Replace.</i> d) H.A.C. frozen. <i>Replace.</i></p>
SYMPTOM	FUEL LEAKS IN ENGINE BASE WHEN ENGINE IS STOPPED.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check items 3,4 and 5 of “High fuel consumption”.</p> <p>2) Check fuel pump diaphragm. a) Cracked diaphragm. <i>Replace.</i></p>

Section 03 TROUBLESHOOTING
 Sub-Section 02 (FUEL AND OIL SYSTEMS)

SYMPTOM	ENGINE LACKS POWER OR STALLS AT HIGH RPM.
CONDITION	NORMAL USE.
Test / Inspection	1) Check fuel tank vent hose. a) Kinked or clogged hose. <i>Relocate or replace.</i>
	2) Check fuel filter. a) Clogged filter. <i>Replace.</i>
	3) Check fuel lines. a) Kinked or clogged lines. <i>Relocate or replace.</i>
	4) Check fuel pump flow. a) Dried diaphragm. <i>Replace.</i>
	5) Check if carburetor(s) is (are) clean. a) Varnish. <i>Clean.</i>
SYMPTOM	HIGH INJECTION OIL CONSUMPTION.
CONDITION	NORMAL USE.
Test / Inspection	1) Check oil injection pump adjustment. a) Oil injection pump adjusted too rich. <i>Adjust.</i>
	2) Check injection oil lines and their fitting. a) Leaking lines and / or cover. <i>Replace defective part(s).</i>
	3) Check injection pump cover gasket. a) Worn gasket. <i>Replace.</i>
	4) Pressurize crankcase rotary valve gear reservoir. a) Leaking gasket(s). <i>Replace gasket(s).</i>

Section 03 TROUBLESHOOTING
Sub-Section 02 (FUEL AND OIL SYSTEMS)

SYMPTOM	ENGINE RUNS OUT OF FUEL (OR LEAN MIXTURE).
CONDITION	NORMAL USE.
Test / Inspection	1) Check fuel filter ball located in fuel tank. Ball must move freely. a) Corrosion due to oxidation at installation. <i>Replace fuel filter.</i>
	2) Check if lines are perforated or kinked and make sure they do not leak at fittings. a) Lines are too big for their fittings or are improperly routed. <i>Replace or properly relocate lines.</i>
	3) Check fuel pump outlet flow. a) Dirt clogging fuel pump lines or torn membrane. <i>Clean or replace fuel pump.</i>
	4) Check carburetor needle valve(s). a) Dirt (varnish, foreign particle) clogging fuel line inlets. <i>Clean.</i>
	5) Check main jet. a) Dirt (varnish, foreign particle) accumulation at main jet. <i>Clean.</i>
	6) Check float height in carburetor bowl(s). a) Running out of fuel at high speed because float height is too low. <i>Adjust float lever height according to specification.</i>
	7) Check H.A.C. system. a) Plugged hole in air jet inlet, <i>Clean.</i> b) H.A.C. frozen. <i>Replace.</i>

TRANSMISSION AND BRAKE SYSTEM

The following charts are provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

TRANSMISSION

SYMPTOM	THE SNOWMOBILE ACCELERATES SLOWLY, ESPECIALLY WHEN IT IS STOPPED.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check drive belt condition. a) Belt is too narrow (drive belt engagement is higher in drive pulley). <i>Replace belt if width is 3 mm (1/8") less than a new one (refer to technical data 10).</i></p> <p>2) Check distance between pulleys and / or drive belt deflection. a) Distance is too small between pulleys or deflection is too high (drive belt engagement is higher in drive pulley). <i>Adjust distance between pulleys and/ or drive belt deflection according to specifications (refer to technical data 10).</i></p> <p>3) Check driven pulley sliding half play. a) Jammed sliding half. <i>Replace.</i></p> <p>4) Check spring tension of driven pulley sliding half. a) Sliding half rotation is accelerated when spring tension is too weak. <i>Adjust according to specifications (refer to technical data 10).</i></p> <p>5) Refer to "Vibrations originating from driven pulley and check items listed.</p> <p>6) Check drive pulley spring tension. a) Spring tension is too weak. <i>Replace.</i></p>
SYMPTOM	ENGINE MAXIMUM RPM IS TOO HIGH AND TOP SPEED IS NOT REACHED.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check items 1, 2 and 3 of "The snowmobile accelerates slowly, especially when it is stopped".</p> <p>2) Check driven pulley spring tension. a) Spring tension is too stiff. <i>Adjust according to specification (refer to technical data 10).</i></p> <p>3) Check position of the calibration screws. (TRA drive pulley) a) Selected numbers are too high. <i>Adjust according to specification (refer to technical data 10).</i></p> <p>4) Refer to "Vibrations originating from driven pulley" and check items listed.</p>

Section 03 TROUBLESHOOTING
 Sub-Section 03 (TRANSMISSION AND BRAKE SYSTEM)

SYMPTOM	LOOSENESS IS FELT IN DRIVE SYSTEM WHEN ACCELERATING/ DECELERATING.
CONDITION	NORMAL USE.
Test / Inspection	1) Check drive chain tension. a) Drive chain is too loose. <i>Adjust.</i>
	2) Check play of driven pulley Woodruff key (aluminum frame models) a) Worn Woodruff key or keyway. <i>Replace.</i>
SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVEN PULLEY.
CONDITION	NORMAL USE.
Test / Inspection	1) Check drive belt. a) Belt width is uneven at many places. <i>Replace (refer to technical data 10 for the part number).</i>
	2) Check tightening torque of drive pulley screw. a) Moving governor cup. <i>Retighten bolt.</i>
	3) Spring cover bolts. a) Spring cover moves and restrains sliding half movement. <i>Retighten bolts.</i>
	4) Check spring cover (TRA TYPE) and / or outer half bushings. a) Excessive gap between bushings and inner half shaft, thus restraining sliding half movements. <i>Replace bushing(s) (IMPORTANT : flare edges of each bushing using appropriate tool (TRA model)).</i>
	5) Check sliding half slider shoes. a) Worn slider shoes. <i>Replace.</i>
SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVEN PULLEY.
CONDITION	NORMAL USE.
Test / Inspection	1) Check sliding half play. a) Sliding half runout. <i>Replace sliding half bushing.</i>
	2) Check sliding half and fixed half straightness. a) Sliding half/ fixed half runout. <i>Replace.</i>
	3) Check cam slider shoes. a) One or two slider shoes out of three are broken. <i>Replace.</i>

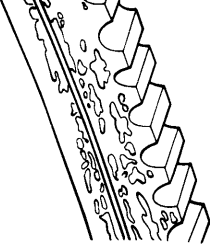
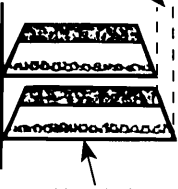
Section 03 TROUBLESHOOTING
Sub-Section 03 (TRANSMISSION AND BRAKE SYSTEM)

SYMPTOM	PULLEYS DO NOT DOWN SHIFT PROPERLY.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check driven pulley spring tension. a) Spring tension is too weak. <i>Adjust according to specifications (refer to technical data 10).</i></p> <hr/> <p>2) Refer to “Vibrations coming from driven pulley” and check items listed.</p> <hr/> <p>3) Check drive pulley bushings (cleanliness, wear, etc.). a) Bushings stick to fixed half pulley shaft. <i>Clean or replace.</i></p> <hr/> <p>4) Check driven pulley spring tension. a) Spring tension is too weak. <i>Replace.</i></p>
SYMPTOM	IT IS DIFFICULT TO ENGAGE TRANSMISSION IN FORWARD OR REVERSE GEAR.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check position of gear shift lever adjustment screw. a) Improper adjustment. <i>Adjust according to specifications (refer to transmission section 05).</i></p>
SYMPTOM	UNEVEN BELT WEAR ON ONE SIDE ONLY.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check tightening torque of engine mount bolts. a) Loose engine mount. <i>Tighten engine mount nuts/bolts equally.</i></p> <hr/> <p>2) Check pulley alignment. a) Pulley misalignment. <i>Align pulleys.</i></p> <hr/> <p>3) Check drive belt contact area on pulleys. a) Rough or scratched pulley surfaces. <i>Repair or replace pulley half.</i></p> <hr/> <p>4) Check driven pulley sliding half play. a) Driven pulley bushing worn. <i>Replace bushing.</i></p>

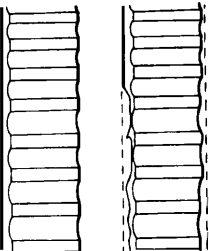

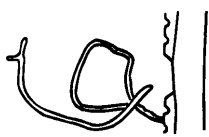


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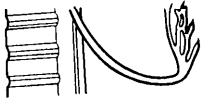
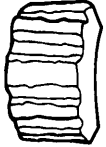
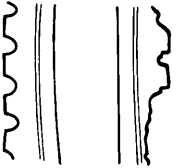
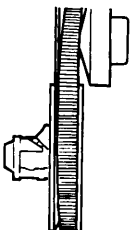
Section **03** TROUBLESHOOTING
 Sub-Section 03 (TRANSMISSION AND BRAKE SYSTEM)

SYMPTOM	BELT GLAZED EXCESSIVELY OR HAVING BAKED APPEARANCE.
CONDITION	NORMAL USE.
Test / Inspection  <small>A000 003 010</small>	1) Check if drive pulley bushings are worn. a) Insufficient pressure on belt sides. <i>Replace bushing.</i>
	2) Check condition of drive pulley fixed half shaft. a) Rusted drive or driven pulley shafts. <i>Clean shaft with fine steel wool and lubricate with low temperature grease (If applicable only).</i>
	3) Check if pulley halves are clean. a) Oil on pulley surfaces. <i>Clean pulley halves.</i>
	4) Check pulley calibration. a) Improper pulley calibration. <i>Calibrate according to specification.</i>
SYMPTOM	BELT WORN EXCESSIVELY IN TOP WIDTH.
CONDITION	NORMAL USE.
Test / Inspection Considerable use  New belt <small>A000 003 011</small>	1) Check drive pulley. a) Excessive slippage due to irregular outward actuation movement of drive pulley. <i>Carry out drive pulley inspection.</i>
	2) Check drive belt identification number. a) Improper belt angle. (wrong type of belt). <i>Replace belt with an appropriate drive belt.</i>
	3) Check drive belt width. a) Considerable use. <i>Replace belt if 3 mm (1/8") less than recommended width (see Technical data 10).</i>

Section 03 TROUBLESHOOTING
Sub-Section 03 (TRANSMISSION AND BRAKE SYSTEM)

SYMPTOM	BELT WORN NARROW IN ONE SECTION.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check track tension / alignment. a) Frozen or too tight track. <i>Liberate track from ice or check track tension and alignment.</i></p> <p>2) Check drive pulley. a) Drive pulley not functioning properly. <i>Repair or replace drive pulley.</i></p> <p>3) Check idle speed. a) Engine idle speed too high. <i>Adjust according to specification.</i></p> <p>4) Check drive belt length. a) Incorrect belt length. <i>Replace belt with an appropriate drive belt (refer to technical data 10).</i></p> <p>5) Check distance between pulleys. a) Incorrect pulley distance. <i>Readjust according to specification.</i></p> <p>6) Check belt deflection. a) Deflection is too small. <i>Adjust according to specification.</i></p> <p>7) Check if parking brake is released. a) Parking brake is engaged. <i>Release parking brake.</i></p>
	
A000 003012	
SYMPTOM	BELT SIDES WORN CONCAVE.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check pulley half surfaces. a) Rough or scratched pulley half surfaces. <i>Repair or replace.</i></p> <p>2) Check drive belt identification number. a) Unspecified type of belt. <i>Replace belt with an appropriate drive belt (refer to technical data 10).</i></p>
	
A000 003013	
SYMPTOM	BELT DISINTEGRATION.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check drive belt identification number. a) Excessive belt speed. <i>Using unspecified type of belt. Replace belt with proper type of belt (refer to technical data 10).</i></p> <p>2) Check if pulley halves are clean. a) Oil on pulley surfaces. <i>Clean pulley surfaces with fine emery cloth and wipe clean using alcohol and a cloth.</i></p>
	
A000 003015	

Section 03 TROUBLESHOOTING
 Sub-Section 03 (TRANSMISSION AND BRAKE SYSTEM)

SYMPTOM	BELT EDGE CORD BREAKAGE.
CONDITION	NORMAL USE.
Test / Inspection  <small>A000 003 015</small>	1) Check pulley alignment. a) Pulley misalignment. <i>Align pulley according to specifications (refer to technical data 10).</i>
SYMPTOM	FLEX CRACKS BETWEEN COGS.
CONDITION	NORMAL USE.
Test / Inspection  <small>A000 003 016</small>	1) Check drive belt condition. a) Considerable use, belt wearing out. <i>Replace.</i>
SYMPTOM	SHEARED COGS, COMPRESSION SECTION FRACTURED OR TORN.
CONDITION	NORMAL USE.
Test / Inspection  <small>A000 003 017</small>	1) Check drive belt rotational direction. a) Improper belt installation. <i>Replace.</i> 2) Check if drive belt rubs against components. a) Belt rubbing on stationary object. <i>Relocate components.</i> 3) Check drive pulley. a) Violent engagement of drive pulley. <i>Check drive pulley engagement speed, drive pulley bushings and components.</i>
SYMPTOM	BELT "FLIP-OVER" AT HIGH SPEED.
CONDITION	NORMAL USE.
Test / Inspection  <small>A000 003 018</small>	1) Check pulley alignment. a) Pulley misalignment. <i>Align pulley according to specifications (refer to technical data 10).</i> 2) Check drive belt identification number. a) Using unspecified type of belt. <i>Replace belt with an appropriate drive belt.</i>

BRAKE SYSTEM
MECHANICAL BRAKE

SYMPTOM	BRAKE DOES NOT ADJUST AUTOMATICALLY.
CONDITION	NORMAL USE.
Test / Inspection	1) Check ratchet wheel spring. a) Broken ratchet wheel tag. <i>Replace.</i>
	2) Check mobile pad stud. a) Stud rotates in pad. <i>Replace.</i>
SYMPTOM	BRAKE HANDLE DOES NOT RETURN COMPLETELY.
CONDITION	NORMAL USE.
Test / Inspection	1) Check brake return spring. a) Broken return spring. <i>Replace.</i>
	2) Check if brake cable moves freely in its housing. a) Brake cable movement is limited due to oxidation or dirt accumulation. <i>Replace.</i>
	3) Check distance between brake lever and caliper. a) Distance is too wide. <i>Adjust according to specifications (refer to transmission section 05).</i>

HYDRAULIC BRAKE

SYMPTOM	SPONGY BRAKE CONDITION.
CONDITION	NORMAL USE.
Test / Inspection	<i>Replace brake fluid and bleed system. If problem still occurs, replace master cylinder.</i>
SYMPTOM	BRAKE FLUID LEAKING.
CONDITION	NORMAL USE.
Test / Inspection	1) Check for loosen hose connectors. <i>Retighten.</i>
	2) Check for damaged hose, master cylinder and caliper. <i>Replace part(s) and check for proper mounting.</i>

Section 03 TROUBLESHOOTING
Sub-Section 03 (TRANSMISSION AND BRAKE SYSTEM)

MECHANICAL AND HYDRAULIC BRAKES

SYMPTOM	BRAKE SYSTEM IS NOISY.
CONDITION	NORMAL USE.
Test / Inspection	1) Check brake pad thickness. a) Pads are worn up to wear warner. <i>Replace.</i>

ELECTRICAL SYSTEM

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	STARTER DOES NOT TURN.
CONDITION	NORMAL USE.
Test / Inspection	1) Check fuse. a) Burnt fuse. <i>Check wiring condition and replace fuse.</i>
	2) Check continuity of starter switch contact points. a) Poor contact of starter switch contact points. <i>Repair or replace switch.</i>
	3) Check continuity between starter switch and solenoid. a) Open circuit between starter switch and solenoid switch. <i>Repair.</i>
SYMPTOM	STARTER TURNS ; BUT DOES NOT CRANK THE ENGINE.
CONDITION	NORMAL USE.
Test / Inspection	1) Check battery capacity. a) Shorted battery cell(s). <i>Replace.</i>
	2) Check battery charge. a) Weak battery. <i>Recharge.</i>
	3) Check wire connection. a) Inadequate connection (too much resistance). <i>Clean and reconnect.</i>
	4) Check solenoid switch contact disc. a) Burnt or poor contact of solenoid switch contact disc. <i>Replace solenoid switch.</i>
	5) Check continuity of solenoid switch pull-in winding. a) Open circuit of solenoid switch pull-in winding. <i>Replace solenoid switch.</i>
	6) Check continuity of solenoid switch hold-in winding. a) Open circuit of solenoid switch hold-in winding. <i>Replace solenoid switch.</i>
	7) Check brushes. a) Poor contact of brushes. <i>Replace brushes.</i>
	8) Check commutator. a) Burnt commutator. <i>Turn commutator in lathe.</i>


Section 03 **TROUBLESHOOTING**
 Sub-Section 04 **(ELECTRICAL SYSTEM)**

	<p>9) Check height of commutator mica. a) Commutator mica too high. <i>Undercut mica.</i></p>
	<p>10) Check field coil resistance. a) Shorted field coil. <i>Repair or replace yoke.</i></p>
	<p>11) Check armature resistance. a) Shorted armature. <i>Repair or replace armature.</i></p>
	<p>12) Check tension of brush springs. a) Weak brush spring tension. <i>Replace springs.</i></p>
	<p>13) Check yoke assembly magnets. a) Weak magnets. <i>Replace yoke assembly.</i></p>
	<p>14) Check if bushings are worn. a) Worn bushings. <i>Replace bushings.</i></p>
SYMPTOM	STARTER TURNS, BUT OVERRUNNING CLUTCH PINION DOES NOT MESH WITH RING GEAR.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check clutch pinion gear. a) Worn clutch pinion gear. <i>Replace clutch.</i></p>
	<p>2) Check clutch. a) Defective clutch. <i>Replace clutch.</i></p>
	<p>3) Check movement of clutch on splines. a) Poor movement of clutch on splines. <i>Clean and correct.</i></p>
	<p>4) Check clutch bushing. a) Worn clutch bushing. <i>Replace clutch.</i></p>
	<p>5) Check starter bushings. a) Worn starter bushing(s). <i>Replace bushing(s).</i></p>
	<p>6) Check ring gear. a) Worn ring gear. <i>Replace ring gear.</i></p>

Section 03 TROUBLESHOOTING
Sub-Section 04 (ELECTRICAL SYSTEM)

SYMPTOM	ELECTRIC STARTER KEEPS TURNING WHEN ENGINE IS STARTED.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check clutch. a) Jammed clutch pinion gear. <i>Replace or clean.</i></p> <hr/> <p>2) Check movement of clutch on splines. a) Clutch is stuck on splines. <i>Clean.</i></p> <hr/> <p>3) Check ignition switch. a) Ignition switch does not return to its ON position or is short-circuited. <i>Adjust retaining screw or replace switch.</i></p> <hr/> <p>4) Check solenoid. a) Shorted solenoid switch winding(s). <i>Replace solenoid switch.</i></p> <hr/> <p>5) Check solenoid switch contacts. a) Melted solenoid switch contacts. <i>Replace solenoid switch.</i></p> <hr/> <p>6) Check starter switch. a) Starter switch returns poorly. <i>Replace ignition switch.</i></p>
SYMPTOM	NOISE OCCURENCE WHEN STARTING ENGINE.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check if ring gear is well mounted to drive pulley inner half. a) Loose and /or broken bolts. <i>Retighten bolts using thread locker or replace ring gear and drive pulley inner half.</i></p>
SYMPTOM	ELECTRIC STARTER SOMETIMES DOES NOT WORK WHEN TURNING IGNITION SWITCH.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Check battery cables and starter wires. a) Corroded and/or loose connection(s). <i>Clean and/ or retighten.</i></p> <hr/> <p>2) Check fuse. a) Oxidized fuse. <i>Clean.</i></p> <hr/> <p>3) Check wiring harness connections. a) Oxidized connections. <i>Clean or replace defective terminals.</i></p> <hr/> <p>4) Check ignition switch. a) Defective contacts in ignition switch. <i>Replace.</i></p> <hr/> <p>5) Check solenoid of electric starter. a) Shorted solenoid wiring harness or eroded contact washer. <i>Replace.</i></p>

Section 03 TROUBLESHOOTING
 Sub-Section 04 (ELECTRICAL SYSTEM)

SYMPTOM	HEADLAMP NOT LIGHTING.
CONDITION	WHITE BULB.
Test / Inspection	1) Check bulb. a) Gas leak. <i>Replace bulb.</i>
CONDITION	BROKEN ELEMENT.
Test / Inspection	1) Check for loose headlamp housing and bulb socket. a) Vibration problem. <i>Tighten headlamp mounting screws. Lock bulb in socket. Replace bulb.</i>
CONDITION	MELTED FILAMENT (ENDS OF ELEMENT HOLDER) AND BLACK BULB.
Test / Inspection	1) Check voltage at headlamp at different speeds. It must not be above 15 VAC.  NOTE: If quartz halogen bulb is involved, ensure that voltage regulator P/N41O908900 is used. a) Excessive voltage in lighting circuit. <i>Replace voltage regulator and ensure proper grounding. Retest.</i>
SYMPTOM	HEADLAMP DIMING.
CONDITION	NORMAL USE.
Test / Inspection	1) Check voltage at headlamp at different speeds. It must not be below 11 VAC. a) Insufficient voltage in lighting circuit. <i>Replace voltage regulator and retest.</i>
	2) Visually inspect wiring harness for damaged and / or melted wires and / or bad wire terminal crimping and / or connections. a) Heating, rotating or sharp part in contact with harness. Improper harness routing. <i>Repair/replace damaged wires and/or terminals. Reroute harness where necessary.</i>
	3) On manual start models : Verify if there is an interconnection between AC and DC current. a) Rusted or loose retaining screws. <i>Clean, apply lithium grease (LMZ1) and firmly tighten screws.</i>
	4) On electrical start models : Verify if there is an interconnection between AC and DC current. a) Faulty installation of optional equipment. <i>Find optional equipment connected directly to DC ground (BK wire or chassis) or to any DC hot wire (RD, RD / BL). Disconnect and reconnect to AC current (YL and YL / BK wires).</i>
	5) Verify of optional electric accessories are overloading the magneto / generator. a) Excessive electrical load to magneto / generator. <i>Reduce the electrical load by removing excess accessories. Reconnect as recommended by manufacturer.</i>
	6) Hot Grips brand : Verify if they were connected in parallel by mistake. a) Excessive electrical load to magneto/generator. <i>Reconnect as recommended by manufacturer.</i>
	7) Bombardier heating grips: Verify if the return wires of the elements were grounded to the chassis by mistake. a) Faulty installation of optional equipment. <i>Reconnect as recommended by manufacturer.</i>

Section 03 TROUBLESHOOTING
Sub-Section 04 (ELECTRICAL SYSTEM)

	<p>8) Verify if heating grips installation overloads the magneto / generator capacity (ex : Élan).</p> <p>a) Excessive electrical load to magneto / generator. <i>Reduce the electrical load by removing accessories.</i></p>
SYMPTOM	FALSE FUEL AND /OR TEMPERATURE GAUGE READINGS.
CONDITION	NORMAL USE.
Test / Inspection	<p>1) Verify if gauge was connected on DC current by mistake (in case of optional installation).</p> <p>a) Faulty installation of optional equipment. <i>Find optional wires connected directly to DC ground (BK wire to chassis) or to any DC hot wire (RD, RD/BL). Disconnect and reconnect to AC current (YL and YL / BK wires).</i></p>
	<p>2) Verify sender unit for free movement and / or correct arm position.</p> <p>a) Defective or damaged part. <i>Correct or replace sender unit.</i></p>
	<p>3) Verify sender unit/ gauge wiring harness condition.</p> <p>a) Heating, rotating or sharp part in contact with harness. Improper harness routing. <i>Replace or repair damaged wires. Reroute where necessary.</i></p>
SYMPTOM	ENGINES DOES NOT START - NO SPARK AT SPARK PLUG.
CONDITION	AT ENGINE CRANKING.
Test / Inspection	<p>1) Verify spark plug condition.</p> <p>a) Defective, improperly set, worn-out, fouled. <i>Identify source of problem and correct. Replace sparkplug.</i></p>
	<p>2) Verify spark plug cap resistance with an ohmmeter.</p> <p>a) Defective part. <i>Replace cap.</i></p>
	<p>3) Verify if problem originated from electrical system wiring harness and/or accessories and / or ignition cut-out switches by unplugging the 4-wire connectors between the magneto / generator and the vehicle wiring harness. Check condition of connectors.</p> <p>a) Heating, rotating or sharp part in contact with harness. Improper harness routing. Defective switch. Corroded connector terminals. <i>Replace or repair damaged wires. Reroute where necessary. Replace defective switch. Clean terminals and apply silicone dielectric grease.</i></p>
	<p>4) Verify trigger coil resistance with an ohmmeter and connector condition.</p> <p>a) Defective coil. Corroded connector terminals. <i>Replace defective coil. Clean terminals and apply silicone dielectric grease.</i></p>
	<p>5) Verify condition of ignition coil.</p> <p>a) Mechanically damaged part. Vibration problem. Electrically damaged part. <i>Tighten mounting screws. Replace ignition coil.</i></p>
	<p>6) Verify condition of ignition generator coils.</p> <p>a) Mechanically damaged part. Vibration problem. Electrically damaged part. <i>Tighten mounting screws. Replace coils.</i></p>
	<p>7) Verify CDI (Capacitor discharge ignition) module.</p> <p>a) Mechanically damaged part. Vibration problem. Electrically damaged part. <i>Tighten mounting screws. Replace CDI module, retest and verify ignition timing.</i></p>

Section 03 TROUBLESHOOTING
 Sub-Section 04 (ELECTRICAL SYSTEM)

SYMPTOM	ENGINE STALLS.
CONDITION	AT LOW SPEED.
Test / Inspection	1) Verify items 4,5 and 6 above.
SYMPTOM	IRREGULAR ENGINE SPEED.
CONDITION	AT HIGH SPEED.
Test / Inspection	1) Verify items 4,5 and 6 above.
CONDITION	AT LOW SPEED.
Test / Inspection	1) Verify items 4 and 5 above and trigger coil / flywheel protrusion air-gap. a) Air-gap too large. <i>Readjust air-gap.</i>
SYMPTOM	ENGINE IS MISFIRING - ERRATIC SPARK AT SPARK PLUG.
CONDITION	RIDING ON WET SNOW.
Test / Inspection	1) Verify if spark plug wires and / or spark plug cap seals are sealing-out moisture. a) Defective wires and/or seals. <i>Replace defective part.</i>
	2) Verify if ignition system wiring harness connectors are in good condition and / or are sealing-out moisture. a) Loose connectors, corroded terminals or defective parts. <i>Clean terminals and apply silicone dielectric grease. Replace defective parts.</i>
CONDITION	NORMAL USE.
Test / Inspection	1) Verify misfiring by observing flash of stroboscopic timing light ; unplug connectors between magneto / generator and vehicle wiring harness to isolate problem. Check condition of connectors. a) Defective spark plug and / or cables / caps. Defective electrical system wiring harness and / or accessories and / ignition cut-out switches. Condition of connector terminals. <i>Replace defective parts and /or repair damaged wires. Replace defective switch. Clean terminals and apply silicone dielectric grease.</i>
CONDITION	RIDING IN DEEP AND THICK SNOW.
Test / Inspection	1) Perform all verifications outlined under “Engine does not start - no spark at spark plug”.
	2) Verify spark plug(s). Proceed with spark plug analysis in order to identify source of problem. a) Defective and/or worn spark plug(s) and /or cable(s) and/or cap(s). <i>Replace defective part(s). Proceed with ignition system testing procedures. Perform engine analysis.</i>

Section 03 TROUBLESHOOTING
Sub-Section 04 (ELECTRICAL SYSTEM)

SYMPTOM	FOULED (BLACK) SPARK PLUG TIP.
CONDITION	NORMAL USE.
Test / Inspection	1) Check carburetor(s). a) Carburetion is too rich. <i>Adjust according to specifications (refer to technical data 10).</i>
	2) Check injection oil consumption. a) Injection pump flow is too high. <i>Adjust according to specification or replace.</i>
	3) Check oil quality. a) Poor oil quality that creates deposits. <i>Use Bombardier oil.</i>
	4) Check engine compression. a) Leaking piston ring(s). <i>Replace.</i>
SYMPTOM	SPARK PLUG TIP(S) IS (ARE) LIGHT GREY.
CONDITION	NORMAL USE.
Test / Inspection	1) Refer to “Engine slows down or stops at high RPM” and check items listed.
	2) Check spark plug heat range. a) Spark plug heat range is too high. <i>Replace by Bombardier’s recommended sparkplug (refer to technical data 10).</i>
	3) Check if air intake silencer leaks. a) Air surplus coming from opening(s) located between halves. <i>Seal.</i>
	4) Check carburetor adapter collars. a) Loose collar(s). <i>Tighten.</i>
	5) Check carburetor adapter(s). a) Cracked or deformed adapter(s). <i>Replace.</i>
SYMPTOM	BRAKE LIGHT REMAINS ON.
CONDITION	NORMAL USE.
Test / Inspection	1) Check if bulb is properly installed. a) Bulb is not installed correctly (contact elements are reversed). <i>Install bulb correctly.</i>
	2) Check brake switch. a) Switch contact remains closed. <i>Adjust brake cable or brake switch.</i>

Section 03 TROUBLESHOOTING
Sub-Section 04 (ELECTRICAL SYSTEM)

SYMPTOM	REAR LIGHT BULB FLASHES.
CONDITION	NORMAL USE.
Test / Inspection	1) Check bulb tightness in housing. a) Looseness at bulb contact elements. <i>Install bulb correctly.</i>
	2) Check if rear light is properly connected. a) Connector housing is partially connected. <i>Install connector housing properly.</i>
	3) Check continuity of wires. a) Corroded terminals and / or broken wires. <i>Replace terminal(s) or crimp defective wires.</i>
SYMPTOM	TACHOMETER DOES NOT WORK.
CONDITION	NORMAL USE.
Test / Inspection	1) Check fuse. a) Burnt fuse. <i>Replace.</i>
	2) Check continuity of wires. a) Corroded terminals and / or broken wires. <i>Replace terminal(s) or crimp defective wires.</i>

SUSPENSION SYSTEM AND TRACK

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	REAR SUSPENSION BOTTOMS OUT.
CONDITION	NORMAL USE.
Test / Inspection	1) Check rear spring preload or rear arm spring preload. a) Spring tension is too low. <i>Increase rear arm spring preload.</i>
SYMPTOM	SLIDER SHOES WEAR OUT PREMATURELY.
CONDITION	NORMAL USE.
Test / Inspection	1) Check track tension. a) Pressure is too great on slider shoes. <i>Adjust according to specifications (refer to technical data 10). Replace defective parts.</i>
SYMPTOM	TRACK CLEATS BECOME BLUE.
CONDITION	NORMAL USE.
Test / Inspection	1) Check track tension. a) Pressure is too great on cleats. <i>Adjust according to specifications (refer to technical data 10).</i> 2) Check slider shoes and / or suspension retaining screws. a) Worn slider shoes or lost retaining screws. <i>Replace defective parts and/ or tighten loose screws.</i>
SYMPTOM	NOISE OR VIBRATIONS ORIGINATING FROM THE TRACK.
CONDITION	NORMAL USE.
Test / Inspection	1) Check slide suspension retaining bolts. a) Missing bolt(s) allowing movement of certain components which in turn interfere with track rotation. <i>Replace missing bolt(s).</i> 2) Check condition of idler wheel(s). a) Idle wheel rubber is damaged. <i>Replace.</i> 3) Check guide cleats. a) Top portion of guide cleat(s) is bent. <i>Replace.</i> 4) Check sprockets. a) One or various teeth of drive shaft sprockets are broken. <i>Replace sprocket(s).</i> 5) Check track rods and/ or internal traction teeth. a) One or various track rods and /or teeth are broken. <i>Replace track.</i>

Section 03 TROUBLESHOOTING
Sub-Section 05 (SUSPENSION SYSTEM AND TRACK)

SYMPTOM	DERAILING TRACK.
CONDITION	NORMAL USE.
Test / Inspection	1) Check track tension. a) Track is too loose. <i>Adjust.</i>
	2) Check if track and slider shoes are properly aligned. a) Improper alignment. <i>Adjust.</i>
SYMPTOM	REAR SUSPENSION IS LOW OR TOO STIFF.
CONDITION	NORMAL USE.
Test / Inspection	1) Check track tension. a) Track is too tight. <i>Adjust.</i>
	2) Check if axles are properly lubricated. a) Improper lubrication and/or contaminated grease (sticky oil sludge). <i>Clean and/ or lubricate.</i>
	3) Check rear spring preload. a) Insufficient preload. <i>Increase preload using shock adjustment cams.</i>
SYMPTOM	WHEN HANDLEBAR IS TURNED, SNOWMOBILE TURNS BEARLY OR NOT AT ALL.
CONDITION	NORMAL USE.
Test / Inspection	1) Check ski runner condition. a) Worn ski runners. <i>Replace.</i>
	2) Check tension of front spring adjustment cams. a) Insufficient ski pressure on the ground. <i>Increase spring preload.</i>
	3) Check if front arm stopper strap is too long. a) Insufficient ski pressure on the ground. <i>Shorten stopper strap.</i>
	4) Check front arm spring tension. a) Insufficient ski pressure on the ground. <i>Slacken spring tension.</i>

Section 03 TROUBLESHOOTING
Sub-Section 05 (SUSPENSION SYSTEM AND TRACK)

SYMPTOM	HANDLE BAR IS DIFFICULT TO TURN.
CONDITION	NORMAL USE.
Test / Inspection	1) Check position of front spring adjustment cams. a) More pressure on the ground when cam increases spring preload. <i>Reduce front spring preload.</i>
	2) Check position of stopper strap. a) More weight when stopper strap is short. <i>Lengthen front arm stopper strap.</i>
	3) Check position of front arm shock adjustment cam(s). a) When spring tension is weak, more weight is transferred to the skis. <i>Increase spring preload.</i>
	4) Check condition of ball joints. a) Corrosion restrains movement. <i>Lubricate or replace.</i>
	5) Check swing arm camber (liquid cooled models). a) Too much ski leg inclination. <i>Adjust camber to $0^{\circ} \pm .5^{\circ}$.</i>
SYMPTOM	THE SNOWMOBILE IS UNSTABLE (IT MOVES FROM LEFT TO RIGHT AND VICE VERSA).
CONDITION	NORMAL USE.
Test / Inspection	1) Check ski runner condition. a) Worn or bent ski runners. <i>Replace ski runners.</i>
	2) Check ski alignment. a) Improper ski alignment. <i>Align skis in order to obtain proper toe-out (opening) (to adjust, refer to section 08 Steering system).</i>
	3) Check if bushings are too loose in steering system. a) Bushings are too loose. <i>Replace.</i>

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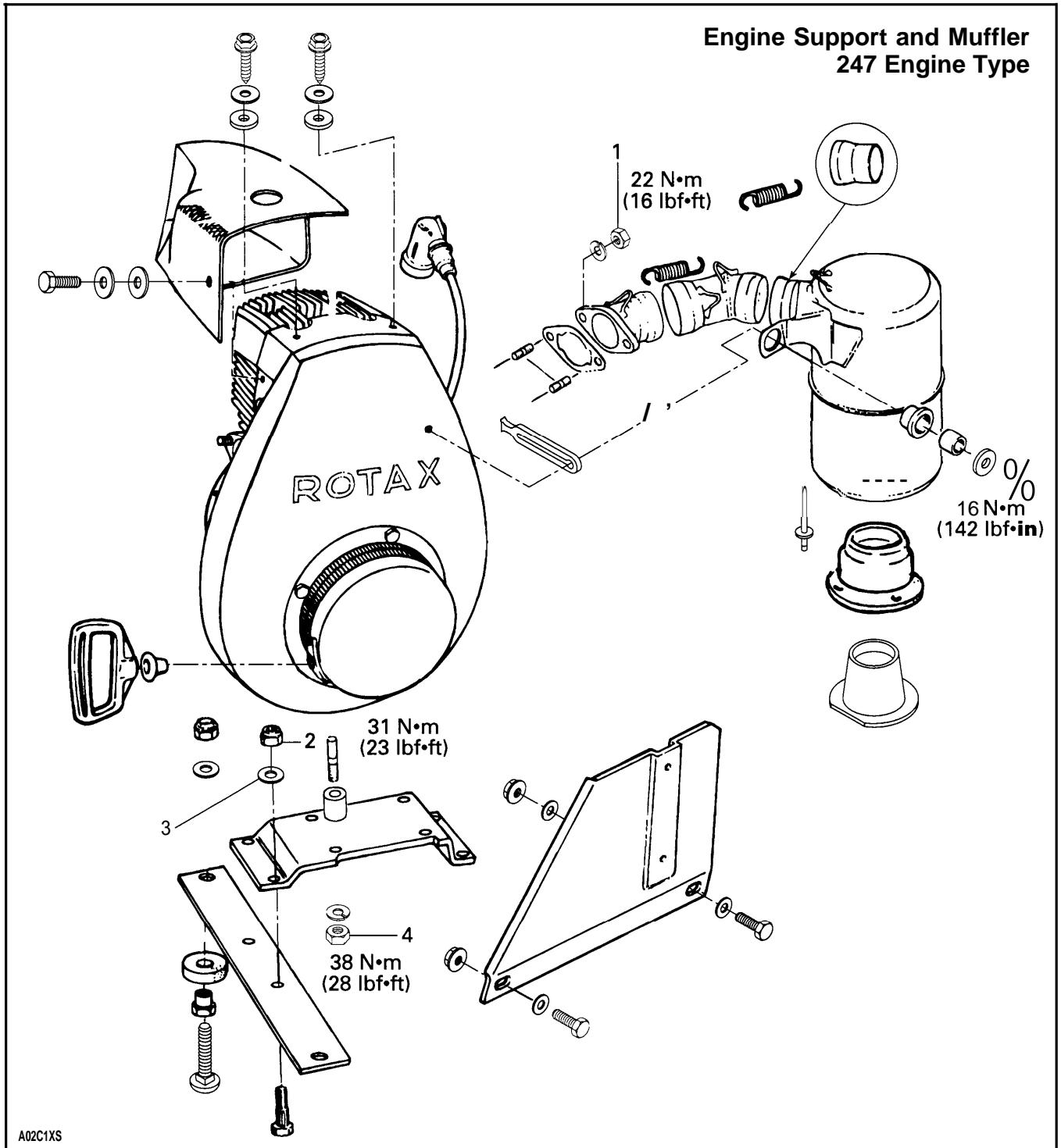
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247 AND 277 ENGINE TYPES

ENGINE REMOVAL AND INSTALLATION



Section 04 ENGINE

Sub-Section 01 (247 AND 277 ENGINE TYPES)

REMOVAL FROM VEHICLE

Remove or disconnect the following then lift engine from vehicle :

- console
- pulley guards
- drive belt
- muffler
- primer hose
- decompressor cable
- throttle cable
- fuel lines
- impulse line
- electrical connectors
- separate steering column support at upper column
- engine mount nuts

ENGINE SUPPORT AND MUFFLER DISASSEMBLY AND ASSEMBLY

1,2,3,4, Manifold Nut, Engine Support Nut, Engine Mount Nut and Hardened Washer

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

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

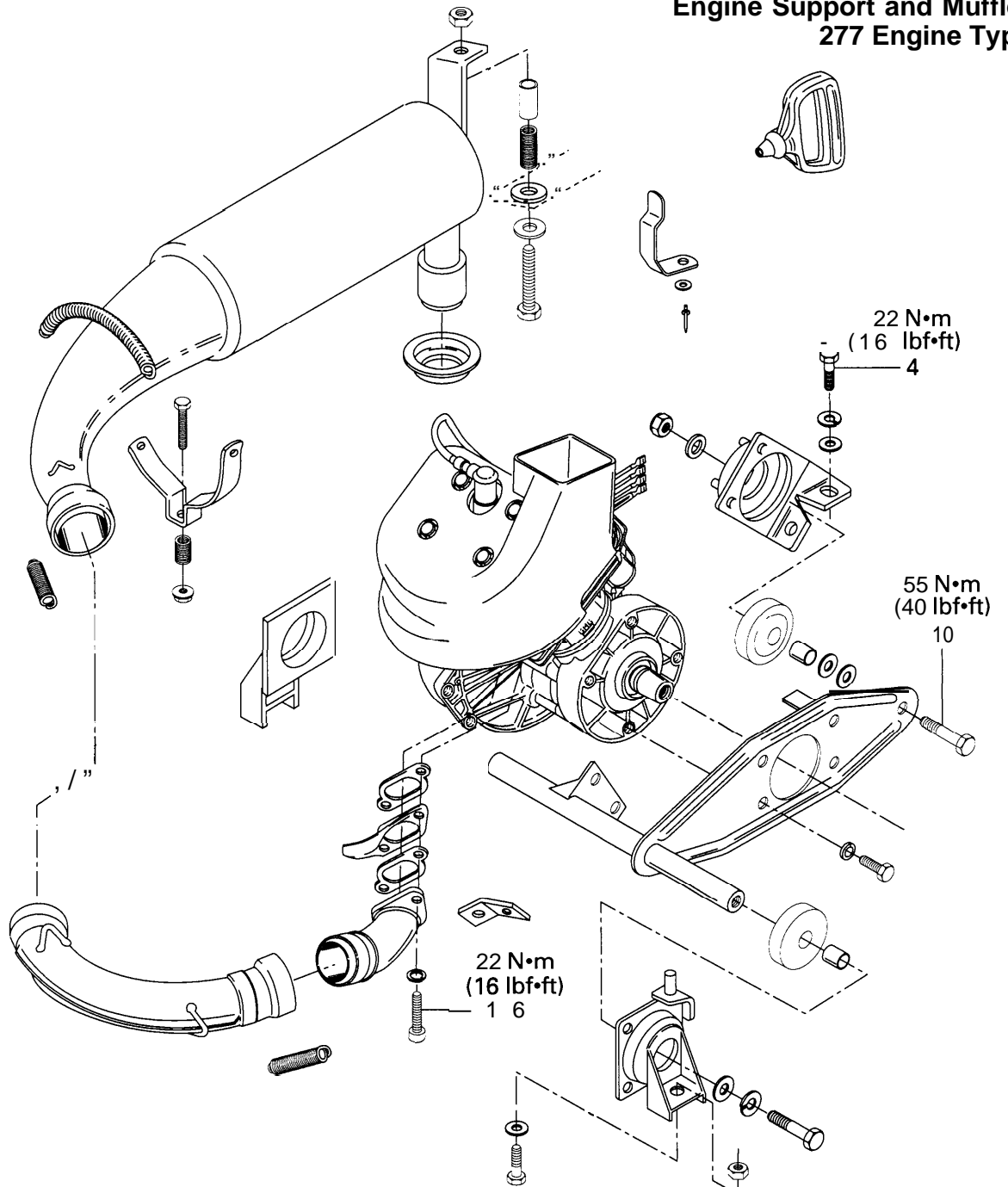
Torque the engine mount nuts to 38 N•m (28 lbf•ft).

INSTALLATION ON VEHICLE

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

- Check tightness of engine mount nuts, and drive pulley screw.
- After throttle cable installation, check maximum throttle slide opening.
- Check pulley alignment and drive belt tension.
- Should a light exhaust leak is experienced at muffler ball joint, Dow Corning sealer no. 736 RTV(P/N413 7092 00) can be used. However after some hours of use, carbon deposits accumulation should seal joint.

Engine Support and Muffler
277 Engine Type



A05COKS

Section 04 ENGINE

Sub-Section 01 (247 AND 277 ENGINE TYPES)

REMOVAL FROM VEHICLE

Remove or disconnect the following then lift engine from vehicle :

- belt guard
- drive belt
- muffler
- carburetor
- decompressor cable
- oil injection pump cable
- oil injection inlet fitting
- impulse line
- electrical connectors
- hood retaining cable
- engine mount nuts

ENGINE SUPPORT AND MUFFLER DISASSEMBLY AND ASSEMBLY

4,10,16, Screw

Torque the manifold screws to 22 N•m (16 lbf•ft).

Torque the engine support screws to 55 N•m (40 lbf•ft).

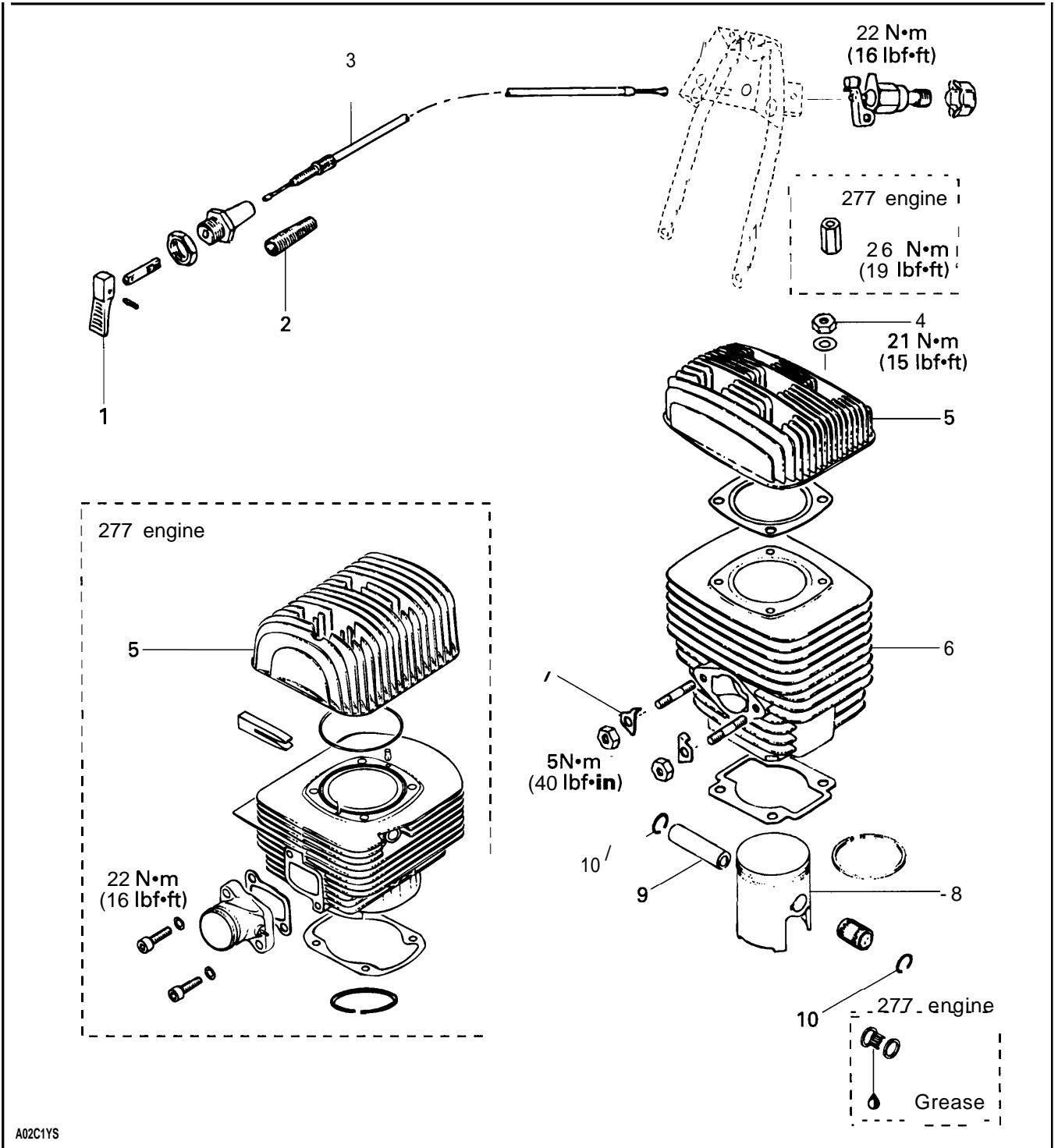
Torque the engine mount screws to 22 N•m (16 lbf•ft).

INSTALLATION ON VEHICLE

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

- Check tightness of engine mount nuts, and drive pulley screw.
- After throttle cable installation, check maximum throttle slide opening.
- Check pulley alignment and drive belt tension.
- Should a light exhaust leak is experienced at muffler ball joint, Dow Corning sealer no. 736 RTV(P/N413 7092 00) can be used.

TOP END



A02C1YS

Section 04 ENGINE

Sub-Section 01 (247 AND 277 ENGINE TYPES)

TROUBLESHOOTING

Before completely disassemble engine, check airtightness. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT 04-03.

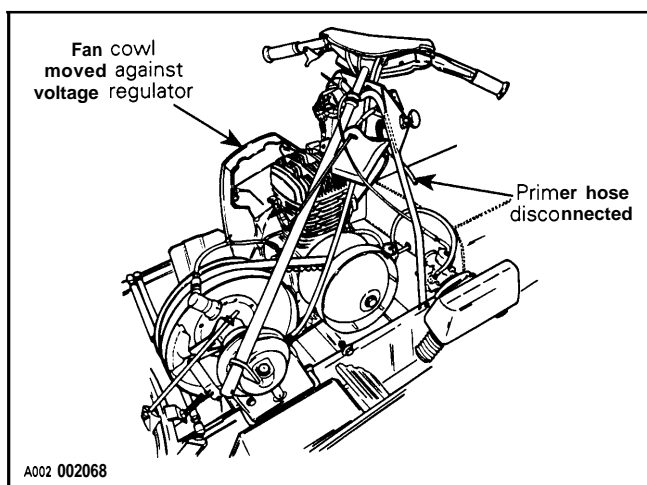
O NOTE : The following procedures can be done without removing the engine from chassis.

TOP END REMOVAL (without removing engine from chassis)

247 Engine Type

Remove the following then lift cylinder head and cylinder :

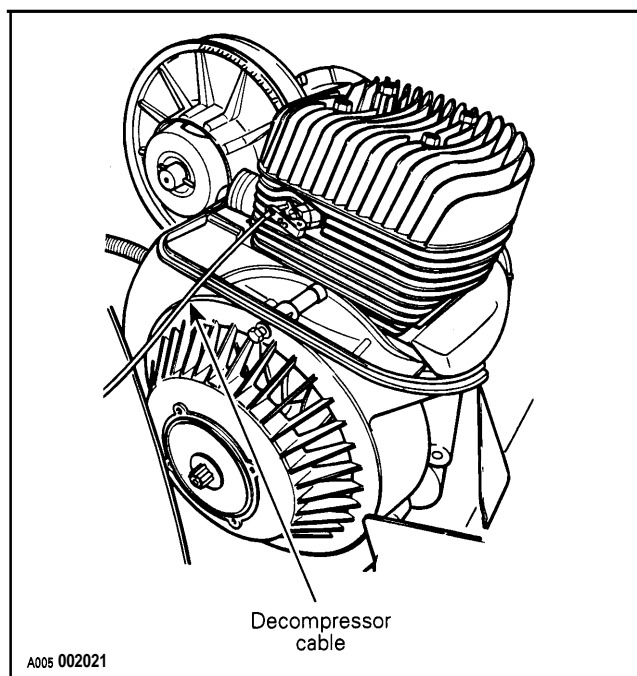
- console
- pulley guards
- spark plug
- air duct
- muffler, connecting tube and exhaust socket
- spark plug cable clamp from fan cowl
- primer hose from carburetor
- untighten rubber flange collar then move carburetor
- steering column U-bolt at upper column and spiro pin, washer and short tie rod from bottom end
- air deflector and decompressor cable at cylinder
- 4 nuts retaining fan cowl and move it sideways until it is against the voltage regulator
- move steering column toward left to clear engine top end



277 Engine Type

Remove the following then lift cylinder head and cylinder :

- belt guard
- carburetor
- exhaust system
- spark plug
- oil injection inlet
- fan cowl and hood cable
- decompressor cable at cylinder
- cylinder head nuts and washers



CLEANING

All Models

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.

O 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

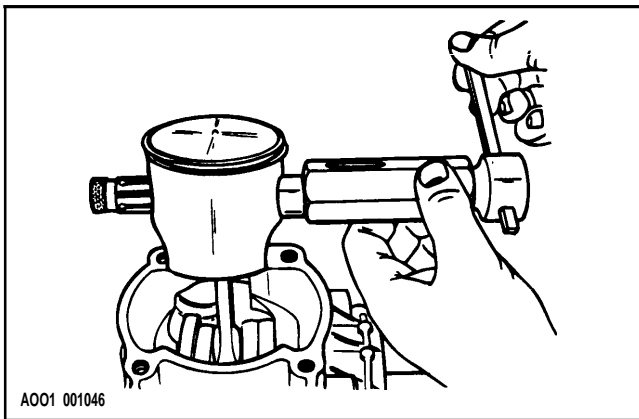
8,9,10, Piston, Piston Pin and Circlip

247 Engine Type Only

Place a clean cloth over crankcase, then with a pointed tool inserted in piston notch, remove circlip from piston.

To remove piston pin, use piston pin puller (P/N 529 0210 00) as follows :

- Fully screw puller handle.
- Insert puller end into piston pin.
- Screw (LH threads) extracting nut.
- Hold puller firmly and rotate puller handle counter-clockwise to pull' piston pin.

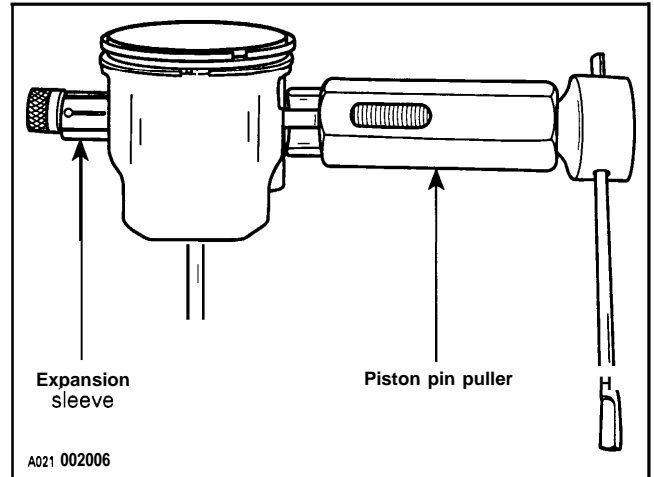


NOTE : 0.5 mm oversize piston and rings are Unavailable if necessary.

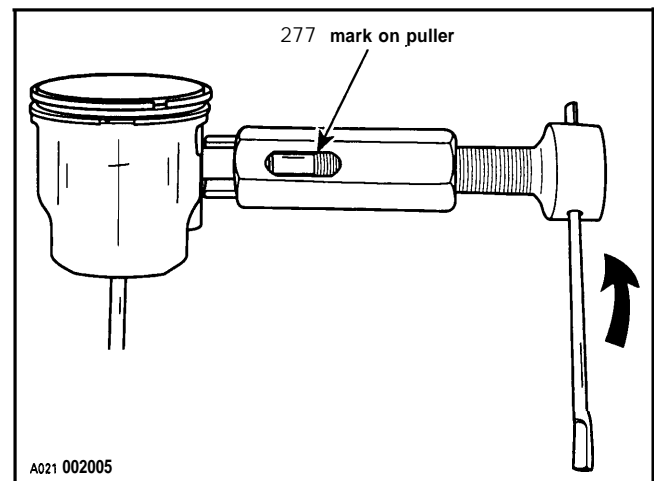
277 Engine Type

On this engine, piston pin needle bearing is mounted without a cage.

- Use piston pin puller (P / N 5290210 00) along with expansion sleeve and locating sleeve.
- Place a clean cloth or rubber pad (P / N 5290234 00) over crankcase to prevent circlips from falling into crankcase. Then with a pointed tool inserted in piston notch, remove circlips from piston.
- Insert piston pin puller (P/N 529 0210 00) then install expansion sleeve over puller rod.



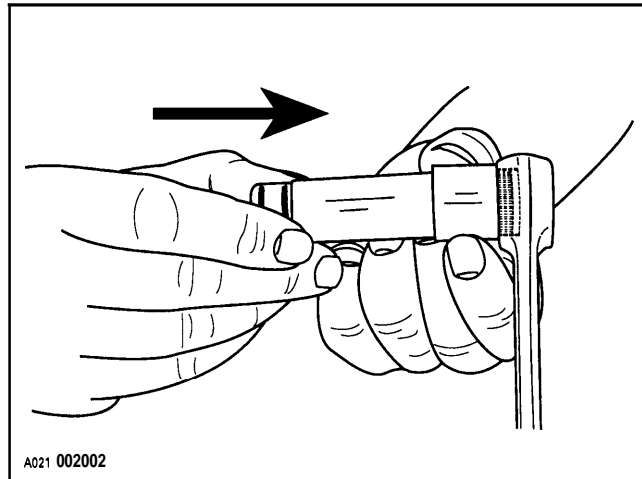
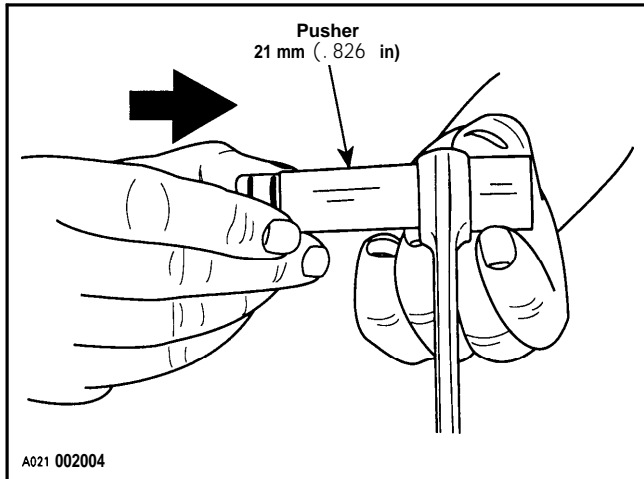
- Pull out piston pin by unscrewing puller until first thread of puller rod aligns with 277 mark.



- Screw in puller in order to remove it from piston.
- Remove piston from connecting rod.
- Install locating sleeve. Then push needle bearings along with thrust washers using a 21 mm (.826 in) diameter pusher.

Section 04 ENGINE

Sub-Section 01 (247 AND 277 ENGINE TYPES)



○ **NOTE :** 0.25 and 0.5 mm oversize pistons and rings are available if necessary.

Use a locking tie to fasten all needles and thrust washers along with sleeves.

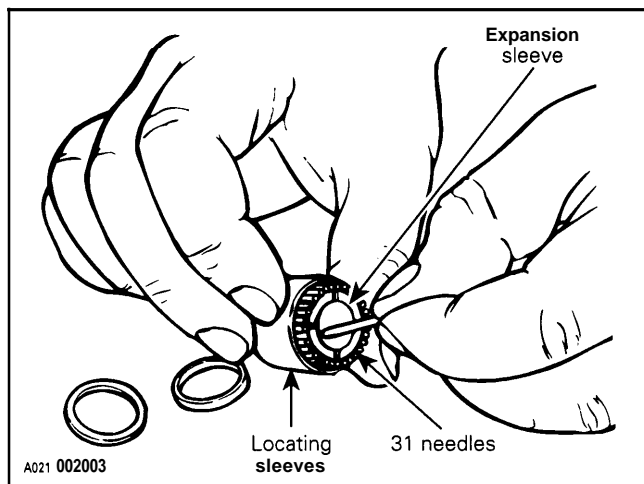
INSPECTION

Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT 04-03.

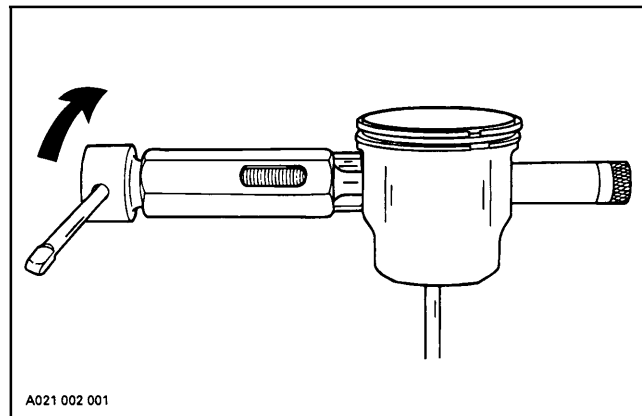
ASSEMBLY

277 Engine Type Only

When reinstalling original needle bearings, make sure that 31 needles are inserted between expansion sleeve and locating sleeve.



- Mount piston over connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in the direction of exhaust port (see illustration below).
- Install piston pin puller (P/N 5290210 00) and turn handle" until piston pin is correctly positioned in piston.

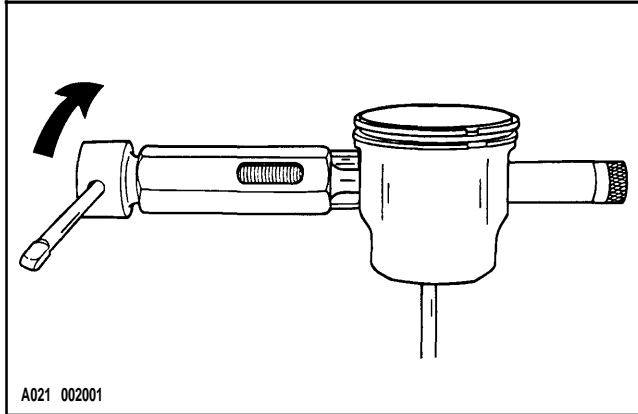


- Remove piston pin puller and expansion sleeve.
- Install circlips as described below.

When installing new needle bearing, insert needles with thrust washers. Instead of expansion sleeve, needles are held in place by 2 inner plastic cage halves.

- Use piston pin puller (P/N 5290210 00) to insert piston pin. Plastic halves should come off piston. If not, pull them using a long nose pliers.

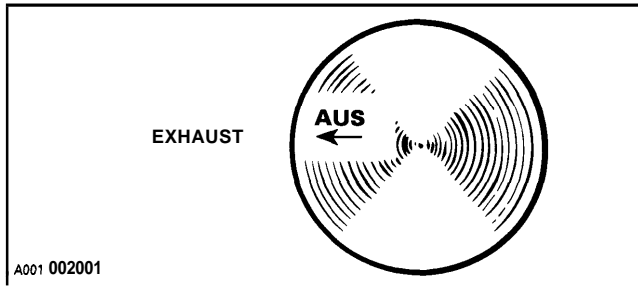
- Grease thrust washers and install them on each end of needles.
- Using a 21 mm (.826 in) diameter pusher, insert needles into connecting rod.



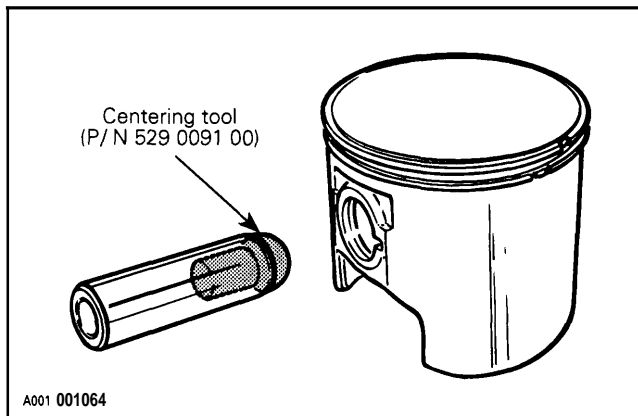
- Install circlips as described below.

8,9,10, Piston, Piston Pin and Circlip 247 Engine Type Only

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

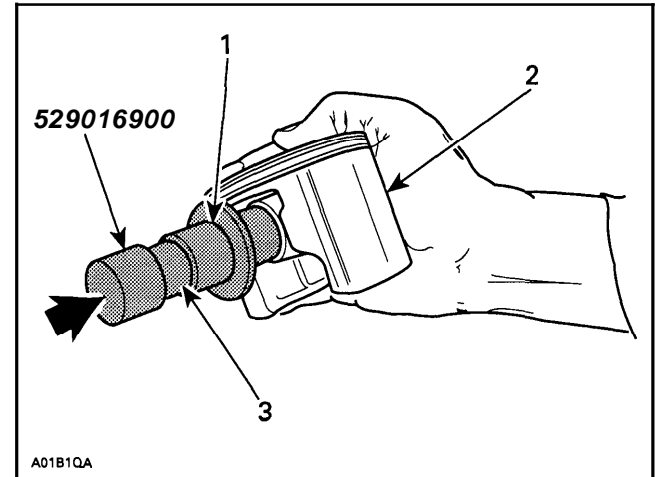


To center the piston pin with the connecting rod bearing, use centering tool (P/ N 5290091 00).

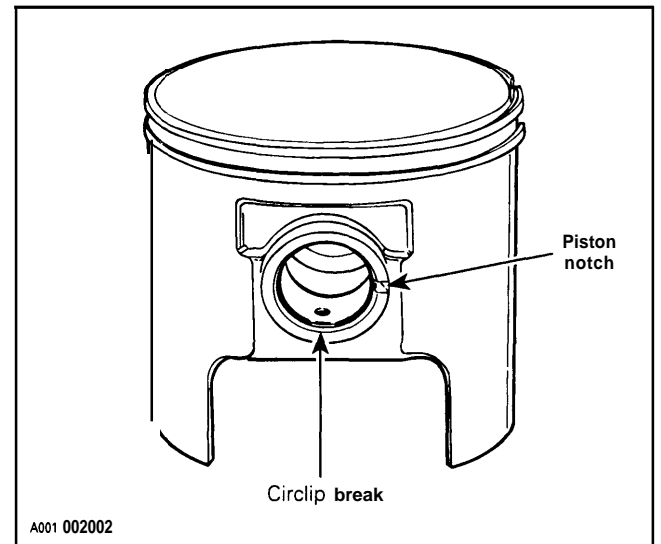


O NOTE : The circlip on the opposite side can be installed before pin installation, the tool will easily go out.

To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Use piston circlip installer (P/ N 5290086 00).



1. Place circlip in
2. Restrain
3. Oil



CAUTION : Circlips must not move freely in the groove after installation. If so, replace them.

6, Cylinder

All Models

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

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

Section 04 ENGINE

Sub-Section 01 (247 AND 277 ENGINE TYPES)

4,5, Nut and Cylinder Head

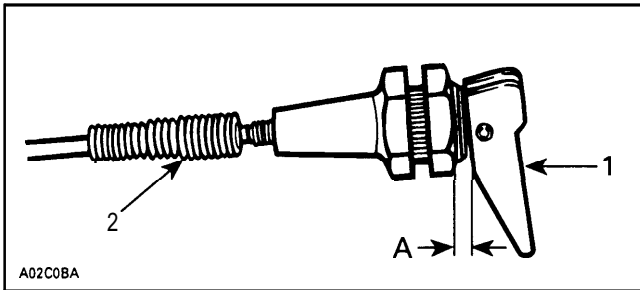
Position cylinder head on cylinder with fins in line with crankshaft center line. Cross torque retaining nuts to 21 N•m (15 lbf•ft) for 247 engine type and 26 N•m (19 lbf•ft) for 277 engine type.

7, Locking Tab

Locking tab should be replaced if bent more than 3 times. If in doubt replace.

1,2,3, Lever, Spring and Decompressor Cable

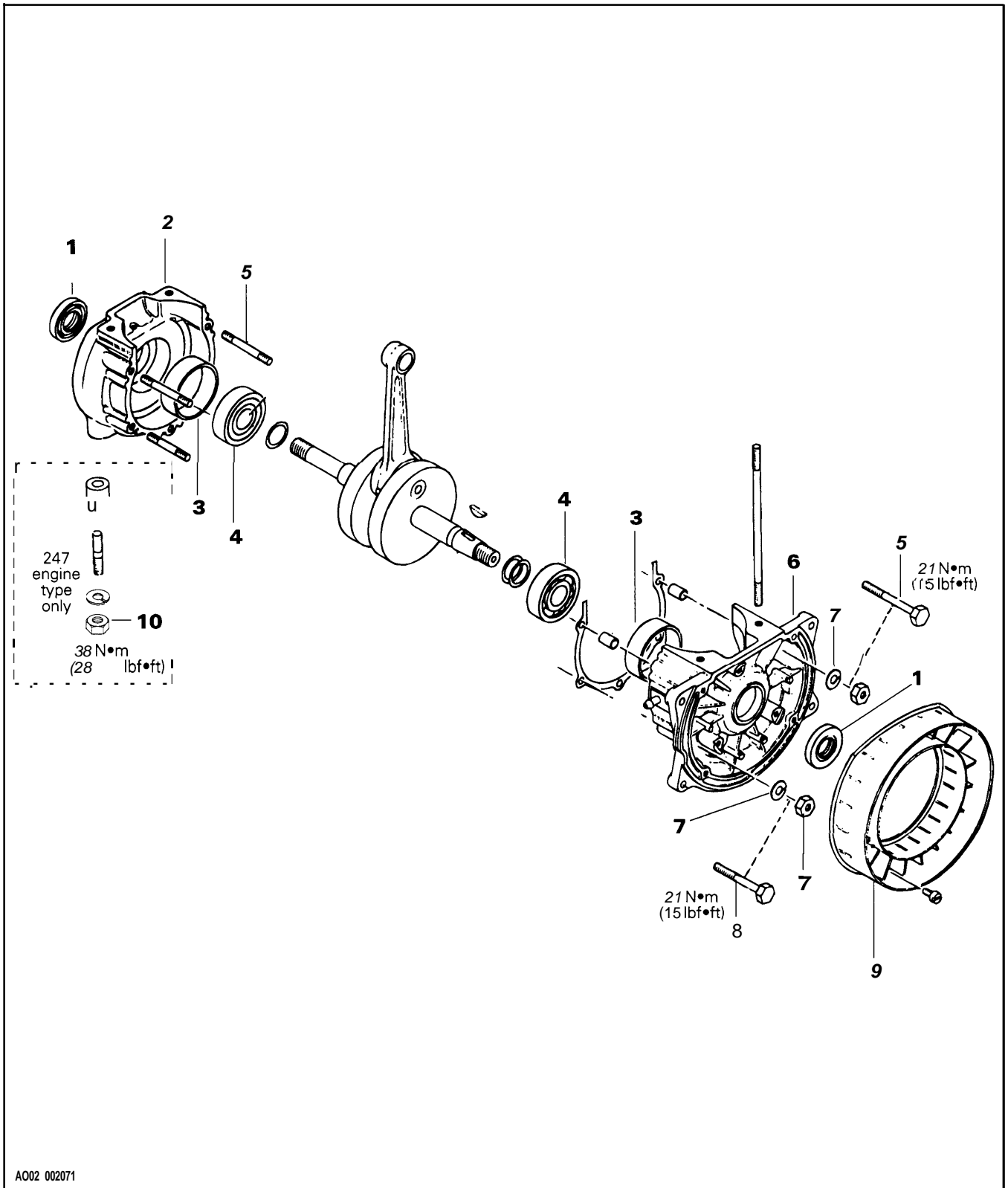
From OFF position, pull lever to feel a light resistance. A gap of 1.5 mm (1/16 in) is required.



1. OFF position
2. Adjustment sleeve
- A. 1.5 mm (1/16 in)

To adjust, turn adjustment sleeve clockwise to increase free-play or counterclockwise to reduce.

BOTTOM END



Section 04 ENGINE

Sub-Section 01 (247 AND 277 ENGINE TYPES)

NOTE : Engine must be removed from chassis to perform the following procedures.

CLEANING

Discard all oil seals and gaskets.

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

DISASSEMBLY

Genera I

To remove drive pulley, refer to DRIVE PULLEY 05-02.

To remove magneto, refer to MAGNETO in this section.

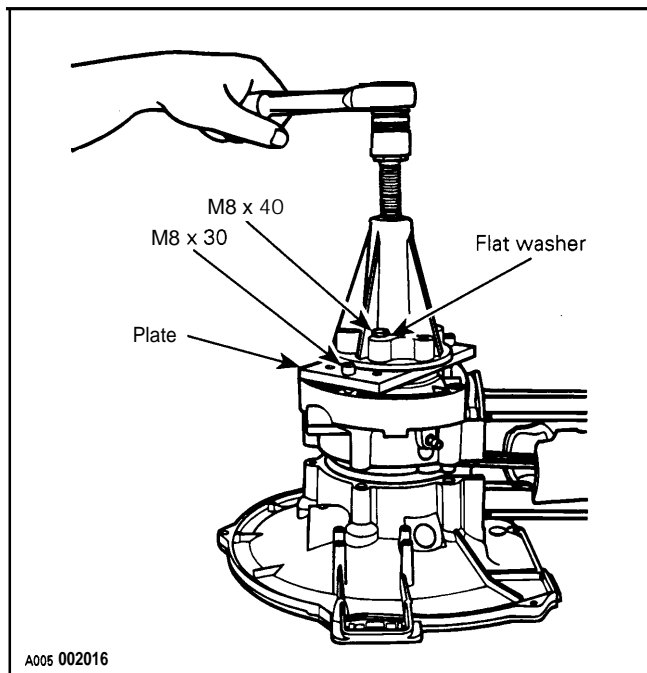
2,6, Crankcase Half

247 Engine Type

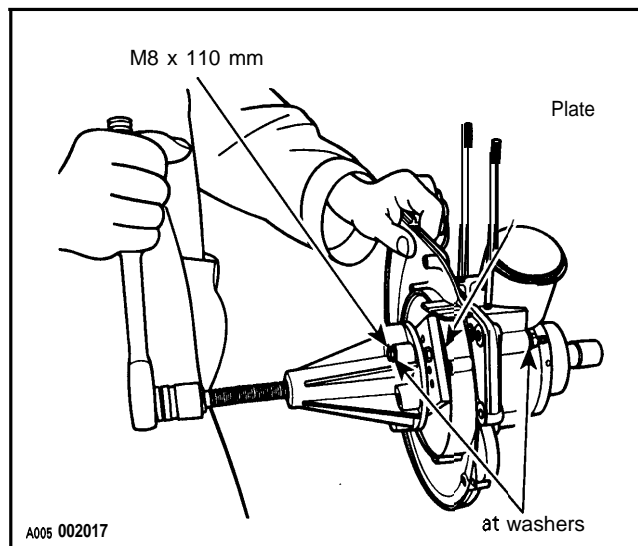
When disassembling crankcase halves, do not heat the crankcase. If heat is necessary, temperature must not exceed 55°C (130°F).

277 Engine Type

Heat to 110-120°C (230-248°F) all around bearing seat on PTO side. Install puller (P/ N 4208762 98) to plate (P/ N 5290249 00) with washer under screw heads and extract PTO side crankcase half.



Heat to 110-120°C (230-248°F) all around bearing seat on MAG side. Install puller with plate, long bolts M8 x 110 mm and flat washers. Extract MAG side crankcase half.



247 Engine Type

3, Polyamid Ring

Do not remove polyamid rings unless necessary.

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

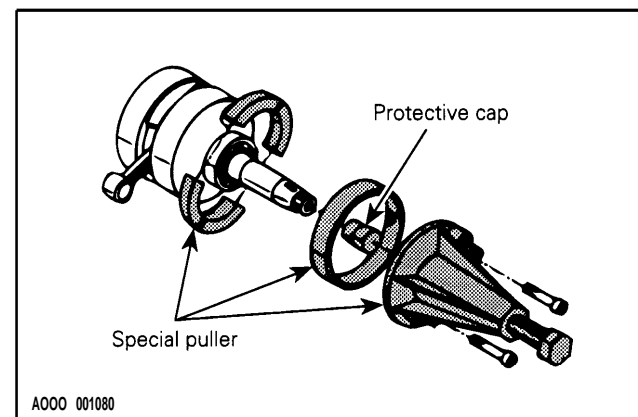
All Engines

1, Seal

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

4, Ball Bearing

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



INSPECTION

Refer to ENGINE DIMENSIONS MEASUREMENT 04-05.

ASSEMBLY

4, Bearing

Smear antiseize lubricant (P / N413 7010 00) on part of crankshaft where bearing fits.

Prior to installation, place bearings into an oil container and heat the oil to 75°C (167°F) for 5 to 10 min. This will expand bearings and ease installation.

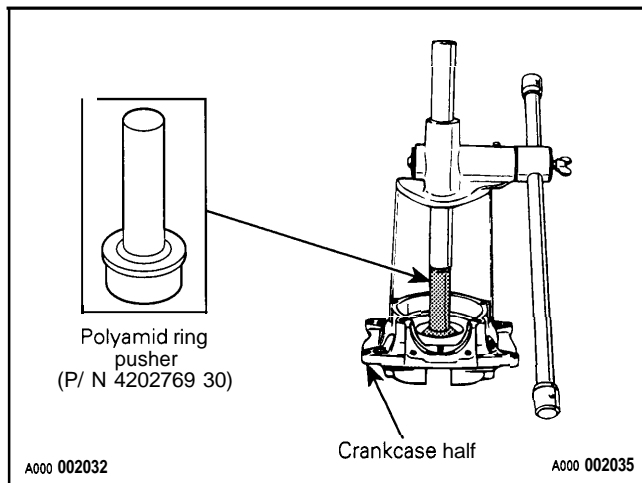
Install bearings with groove outward.

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 LEAK TEST AND ENGINE DIMENSION MEASUREMENT 04-03.

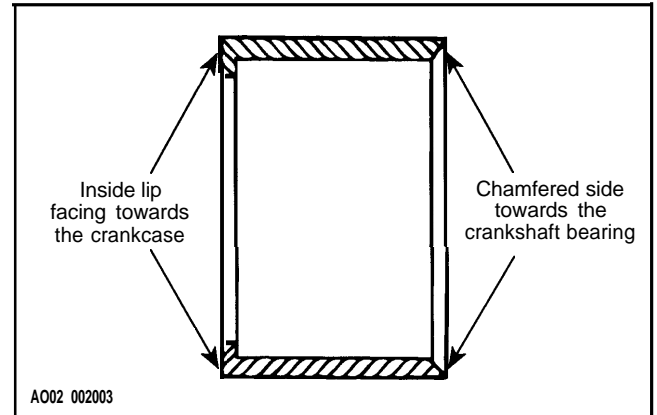
3, Polyamid Ring

247 Engine Type

To install polyamid ring, apply oil on outside diameter then use polyamid ring pusher (P / N 4202769 30).

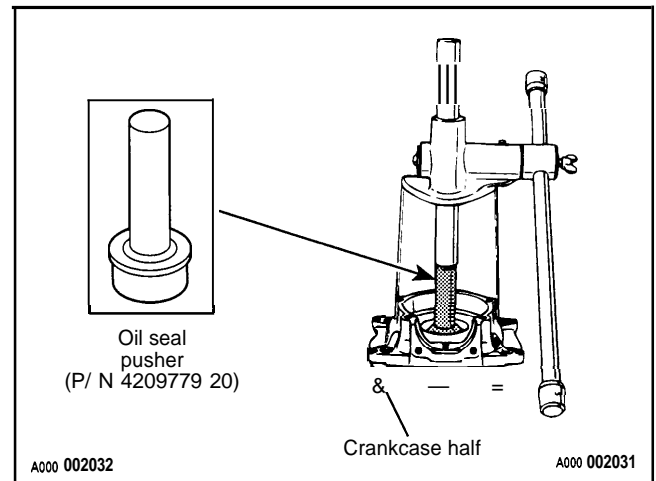


Install as illustrated.



1, Seal

To install new seal into crankcase use oil seal pusher (P / N 4209779 20).



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

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

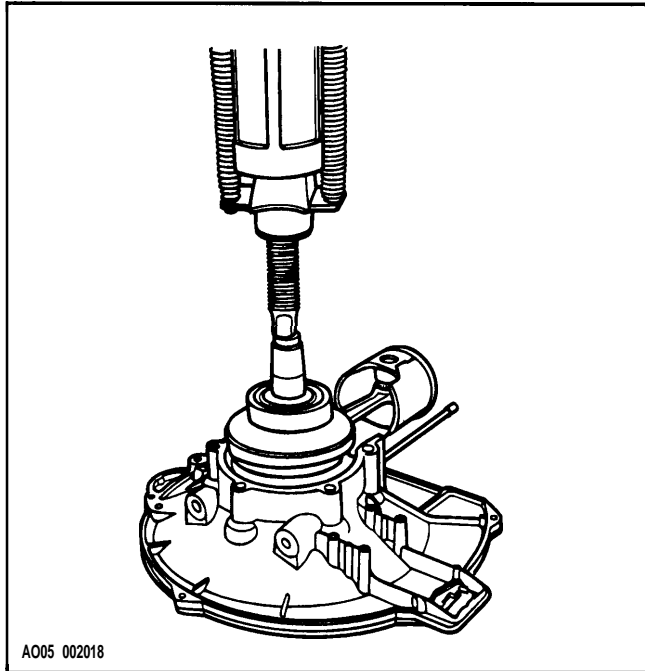
277 Engine Type

Install crankshaft seals with pusher (P / N 4202778 75) for MAG side seal and (P/N 4208766 60) for PTO side seal.

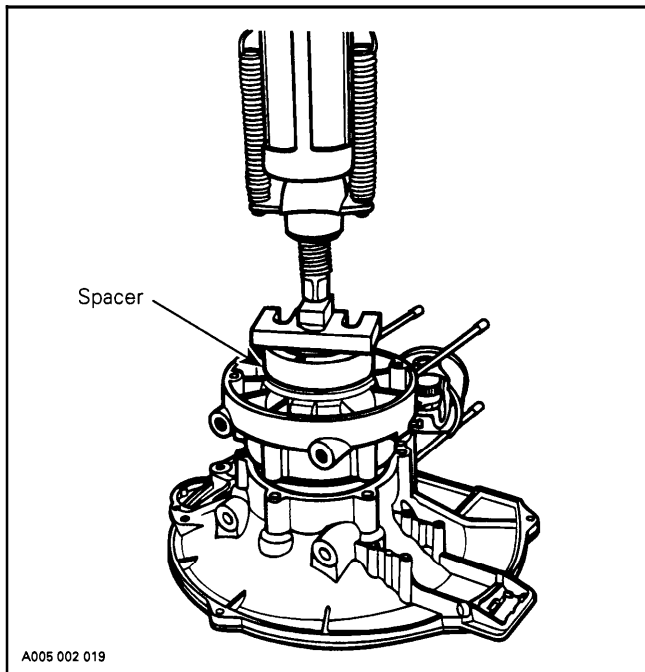
Using a press, install crankshaft into MAG side crankcase half.

Section 04 ENGINE

Sub-Section 01 (247 AND 277 ENGINE TYPES)



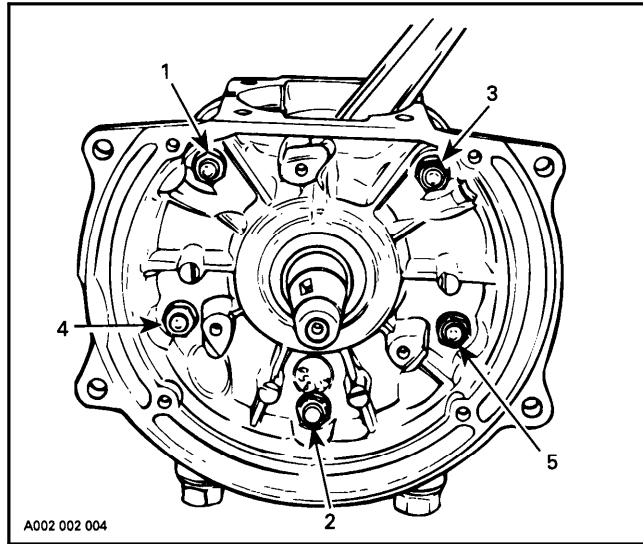
Press down PTO side crankcase half onto crankshaft using appropriate spacer(s).



5,7,8, Stud or Screw and Nut

247 Engine Type

Torque the nuts or screw to 21 N•m (15 lbf•ft) following illustrated sequence,



277 Engine Type

Torque screws to 22 N•m (16 lbf•ft) following above sequence.

247 Engine Type

10, Engine Mount Nut

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

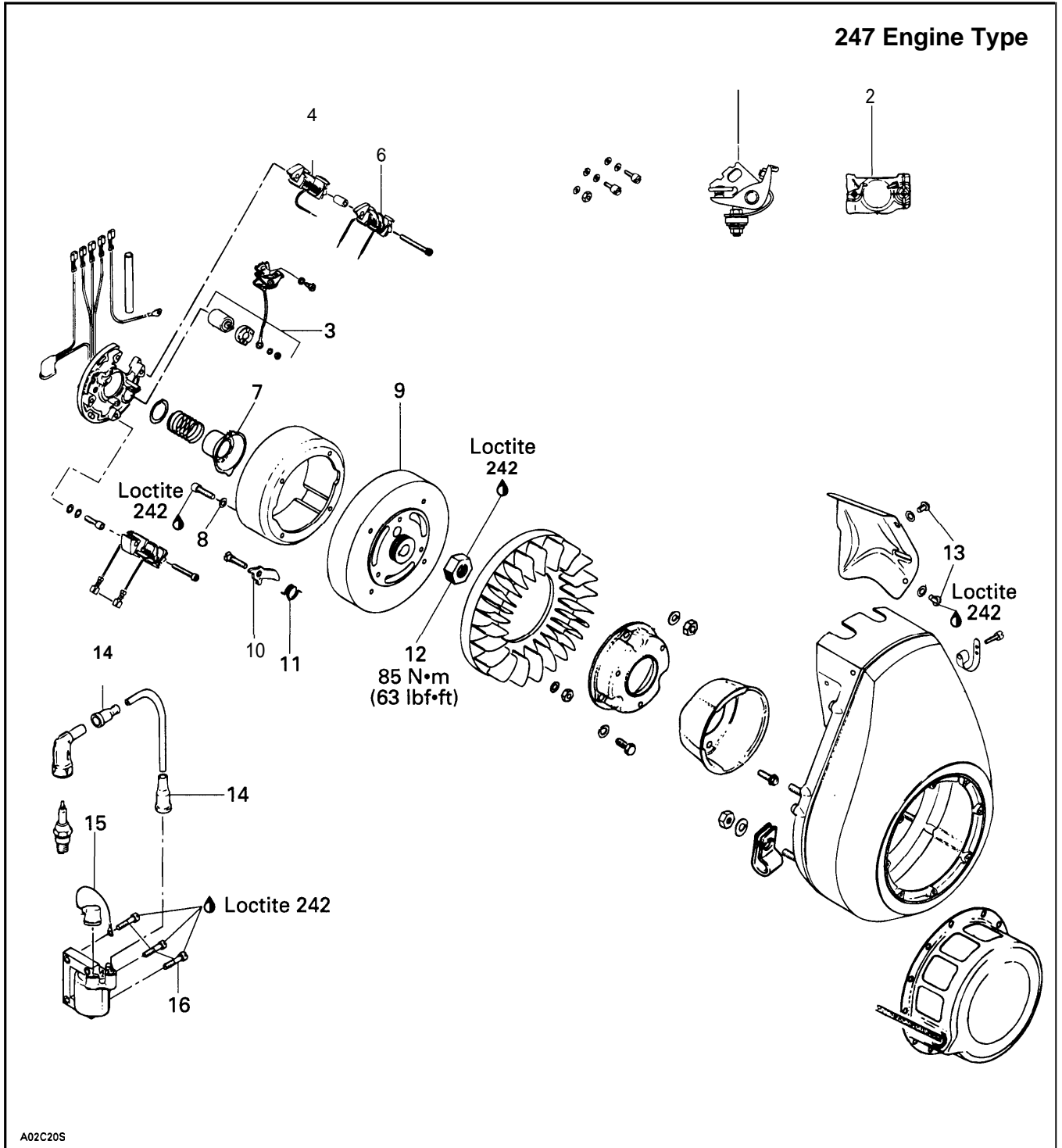
9, Labyrinth Ring

Position labyrinth ring with bevelled side on top.

To install magneto, refer to MAGNETO in this section.

MAGNETO AND COOLING SYSTEM

Refer to CDI MAGNETO 04-04 for 277 engine type.



Section 04 ENGINE

Sub-Section 01 (247 AND 277 ENGINE TYPES)

○ NOTE : The following procedures can be done without removing the engine from chassis.

CLEANING

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

▼ CAUTION : Clean armature using only a clean cloth.

DISASSEMBLY

To gain access to magneto assembly, remove :

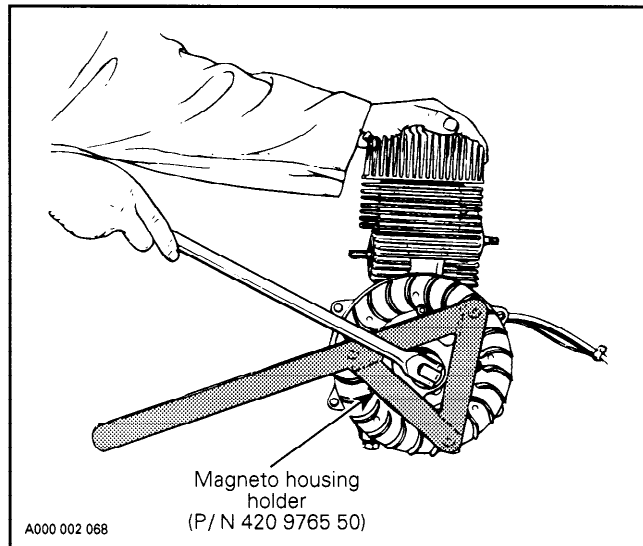
- muffler
- upper column
- air duct
- air deflector
- spark plug cable clamp
- fan cowl
- starting pulley
- pulley spacer

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

12, Magneto Retaining Nut

To remove magneto retaining nut :

- Lock crankshaft with magneto housing holder (P / N 420 9765 50) as illustrated.
- Remove magneto retaining nut.

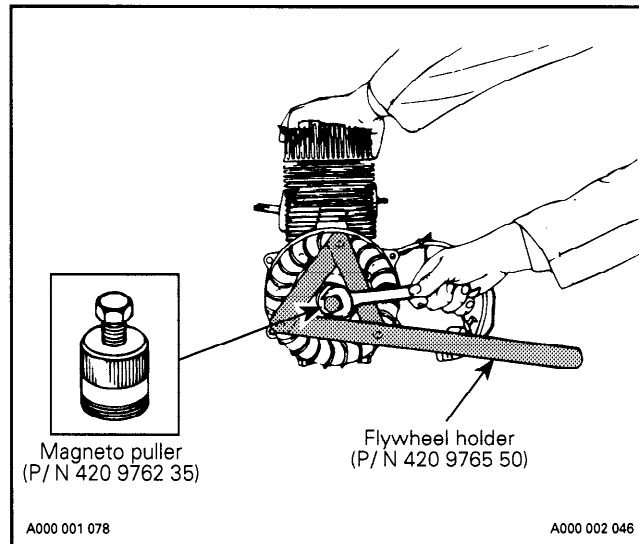


○ NOTE : To correctly remove a threadlocked fastener it is first necessary to tap on the fastener to break threadlocker bond. This will eliminate the possibility of thread breakage.

○ NOTE : Crankshaft can be locked with crankshaft locking tool (P / N 420 8766 40) inserted in pulsation line fitting.

9, Flywheel

To remove flywheel : use flywheel puller (P / N 420 9762 35) and flywheel holder (P / N 420 9765 50) as illustrated or crankshaft locking tool (P / N 420 8766 40).



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

REPAIR

3, Condenser

To replace a condenser :

- Unscrew condenser nut and remove both black leads.
- Drive the condenser out of the armature plate using a suitable pusher.
- To reinstall, reverse procedure.

1,2, Contact Breaker and Lubricating Wick

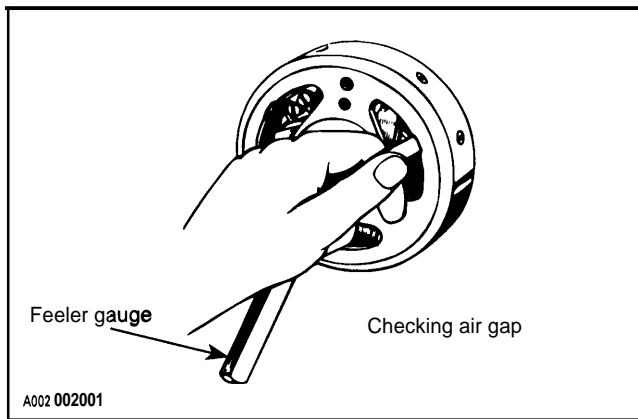
When replacing contact breaker :

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

4,5,6, Generating Coil, Lighting Coil and Brake Lighting Coil

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

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

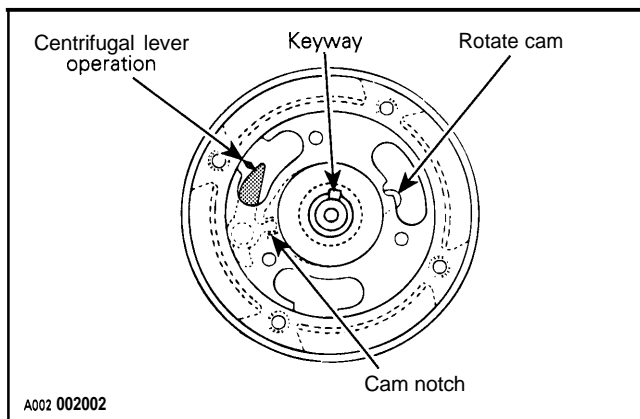


ASSEMBLY

Clean crankshaft extension (taper).

Apply Loctite 242 (P/N 4137030 00).

Position magneto on crankshaft with the keyway and the cam notch indexed as illustrated :



7,10, Breaker Cam and Centrifugal Lever

Rotate breaker cam to check centrifugal lever operation.

11, Centrifugal Lever Spring

At assembly, apply a small amount of low temperature grease (P/ N 4137061 00) into spring seating.

8,13,16, Magneto Ring Screw, Air Deflector Screw and Junction Box Screw

At assembly of air deflector, magneto and junction box, apply Loctite 242 (P/ N 4137030 00) on screw threads.

12, Magneto Housing Nut

At assembly, thoroughly clean threads and apply Loctite 242 (P/ N 4137030 00), then torque retaining nut to 85 N•m (63 lbf•ft).

14,15, Protection Cap and Mass Cable

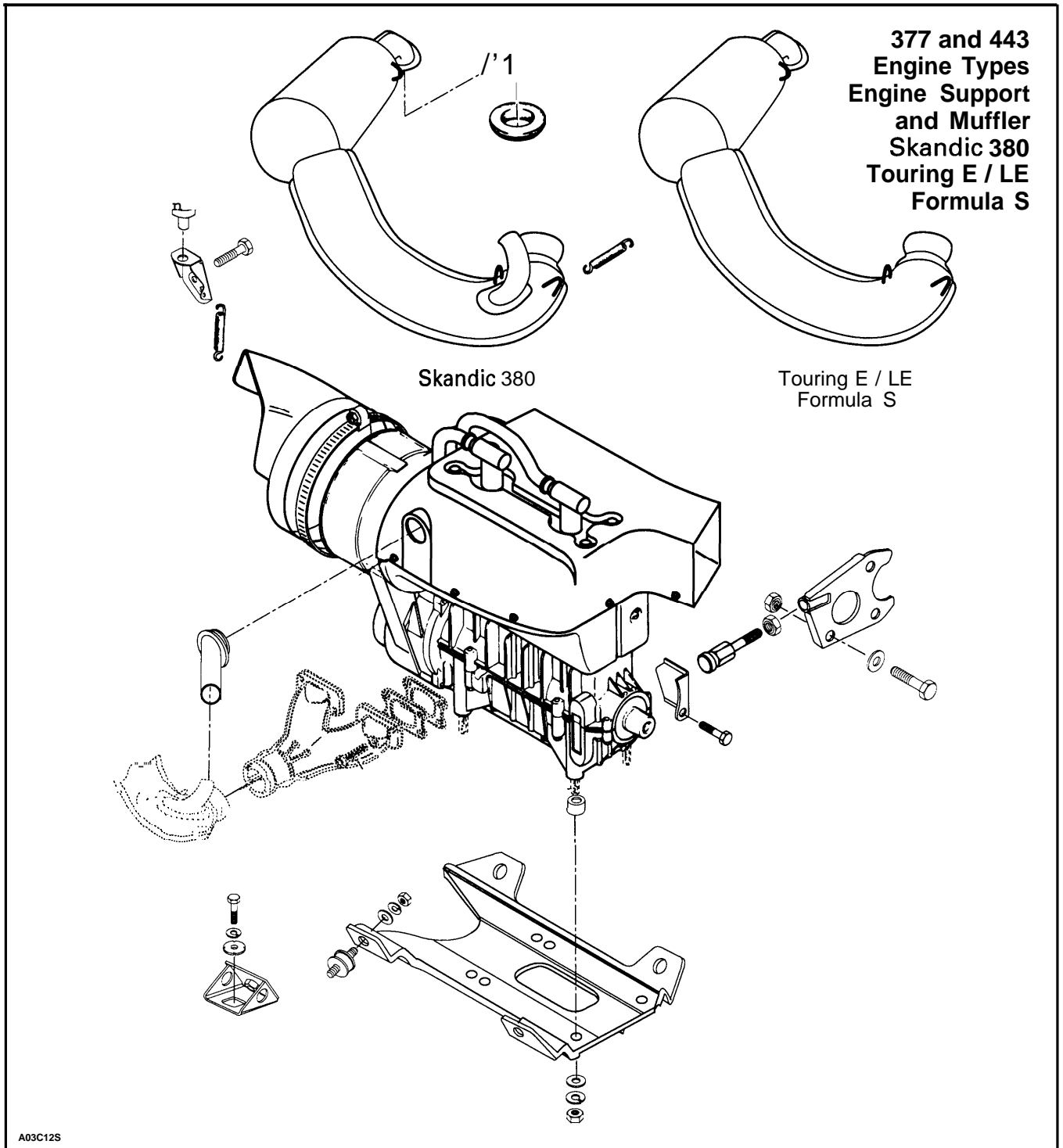
At reassembly, coat all electric connections with silicone dielectric grease (P / N 413 7017 00) to prevent corrosion or moisture from penetrating.

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

For ignition timing adjustment refer to IGNITION TIMING 06-02.

377,443 AND 503 ENGINE TYPES

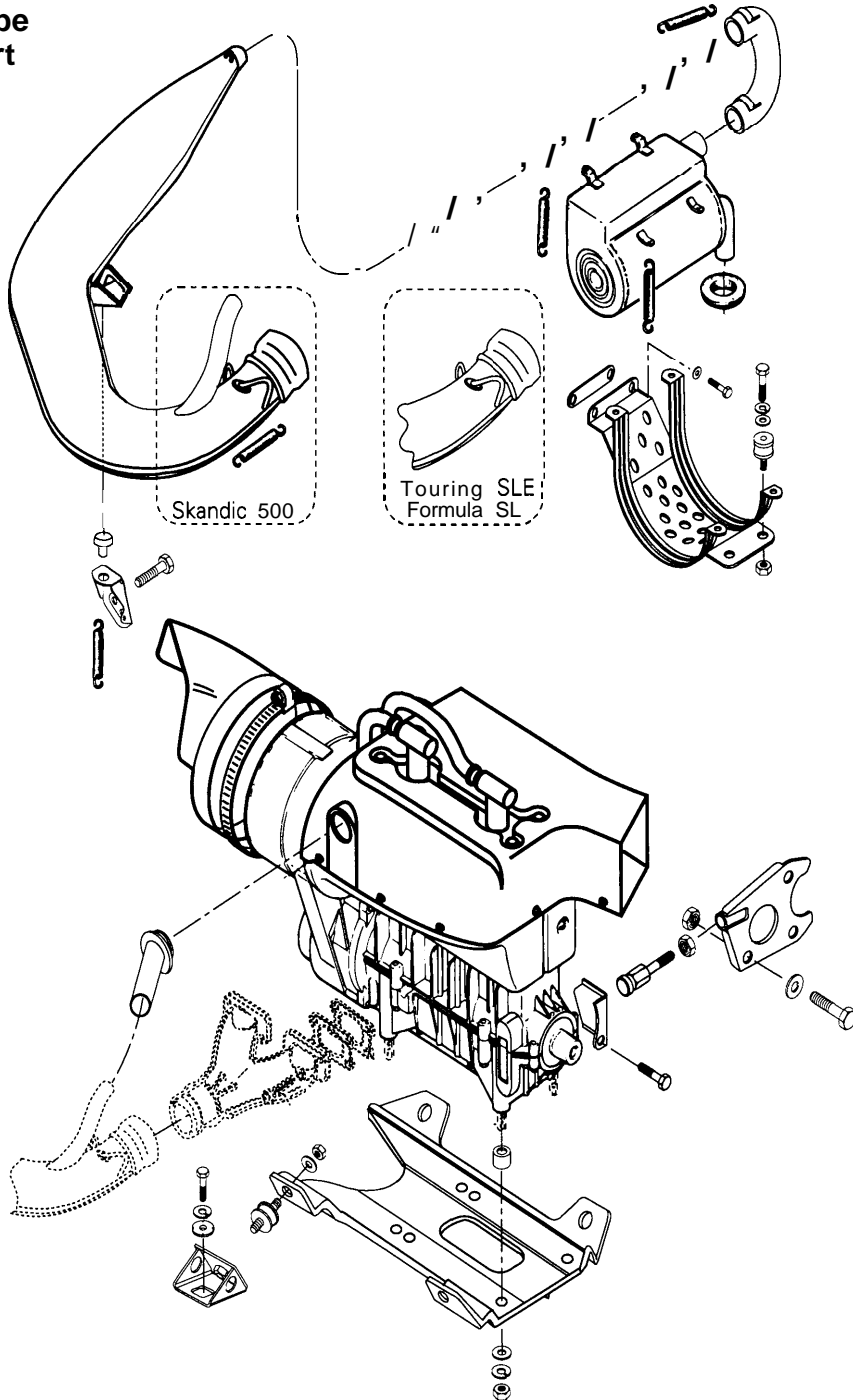
ENGINE REMOVAL AND INSTALLATION



Section 04 ENGINE

Sub-Section 02 (377, 443 AND 503 ENGINE TYPES)


503 Engine Type
Engine Support
and Muffler
Skandic 500
Touring SLE
Formula SL



A003 002 039

ENGINE REMOVAL AND INSTALLATION

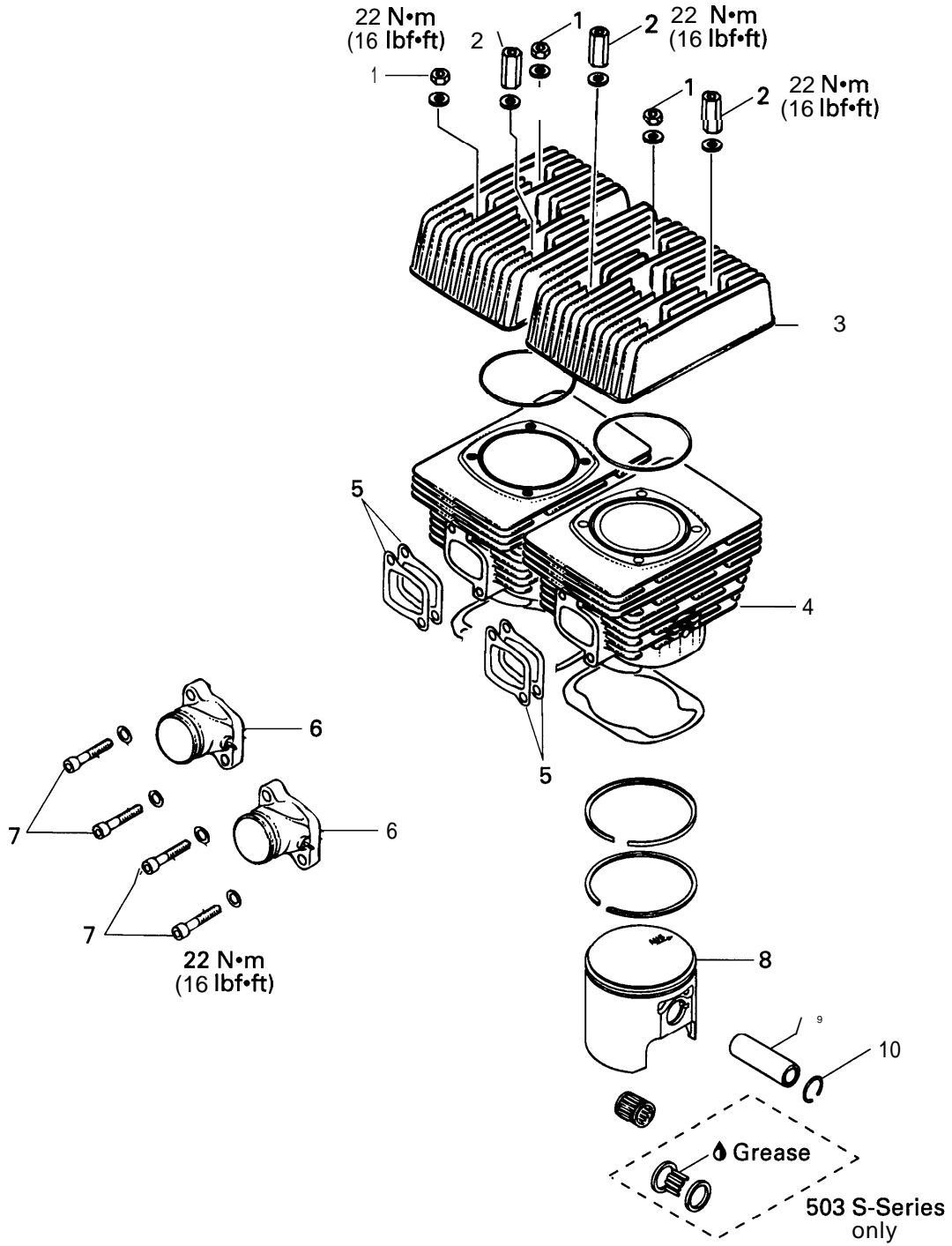
Disconnect or remove the following :

 **WARNING** : Before disconnecting any electrical wire in starter system always first disconnect the BLACK negative battery cable (on electric starting models).

- negative cable from battery (on electric starting models)
- belt guard
- drive belt
- drive pulley using appropriate puller, refer to 05-02 DRIVE PULLEY
- air silencer and carburetors
- impulse line from engine crankcase
- 4-connector housing
- exhaust pipe and exhaust cooling hose on so equipped models
- oil pump inlet tube and plug it
- oil pump cable
- hood retaining cable

Section 04 ENGINE
Sub-Section 02 (377, 443 AND 503 ENGINE TYPES)

TOP END



A23C05S

NOTE : The following procedures can be done without removing the engine from chassis.

CLEANING

Discard all gaskets. Use Gasket Remover (P/ N 413 7085 00) to clean mating surfaces.

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" and 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

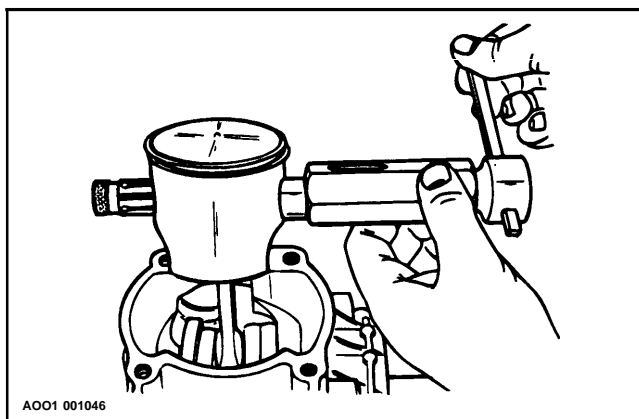
8,9,10, Piston, Piston Pin and Circlip

All Engines Except 503

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

To remove piston pin, use piston pin puller (P/N 529 0210 00) as follows :

- Fully screw puller handle.
- Insert puller end into piston pin.
- Screw (LH threads) extracting nut.
- Hold puller firmly and rotate puller handle counter-clockwise to pull piston pin.



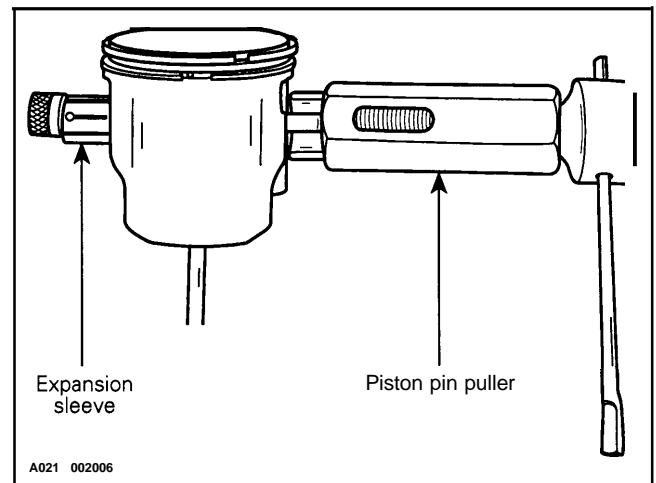
NOTE : The PTO cylinder or fan housing have to be removed to give access to MAG piston pin with the puller.

503 Only

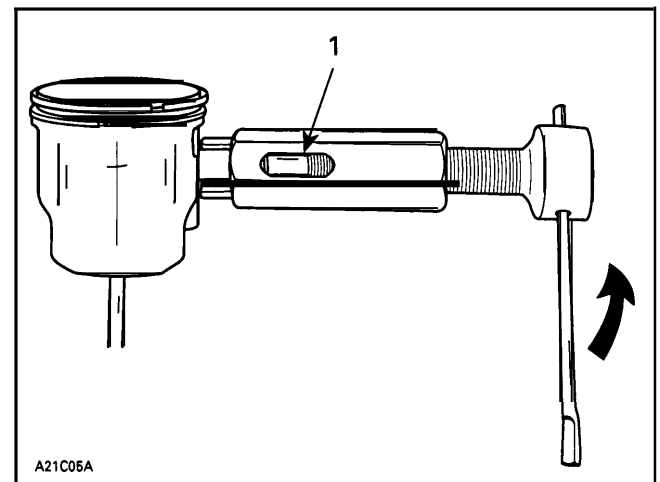
On these 503 engines, piston pin needle bearing is mounted without a cage.

Use piston pin puller (P/ N 5290210 00) along with expansion sleeve and locating sleeve.

- Place a clean cloth or rubber pad (P / N 5290234 00) over crankcase to prevent circlips from falling into crankcase. Then with a pointed tool inserted in piston notch, remove circlips from piston.
- Insert piston pin puller (P/N 529 0210 00) then install expansion sleeve over puller rod.



- Pull out piston pin by unscrewing puller until first thread of puller rod aligns with 503 mark.

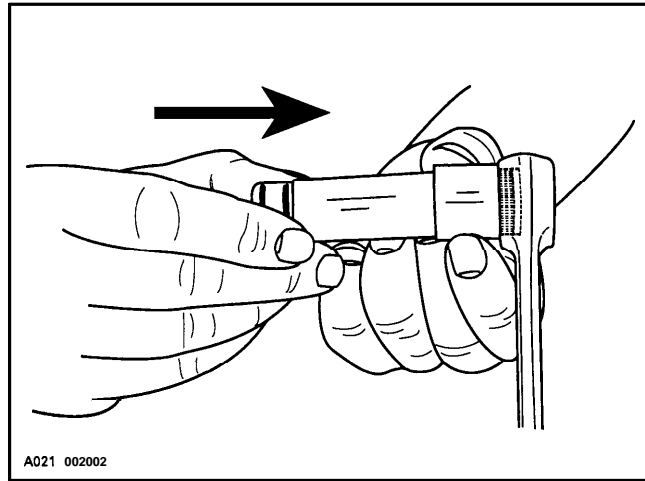
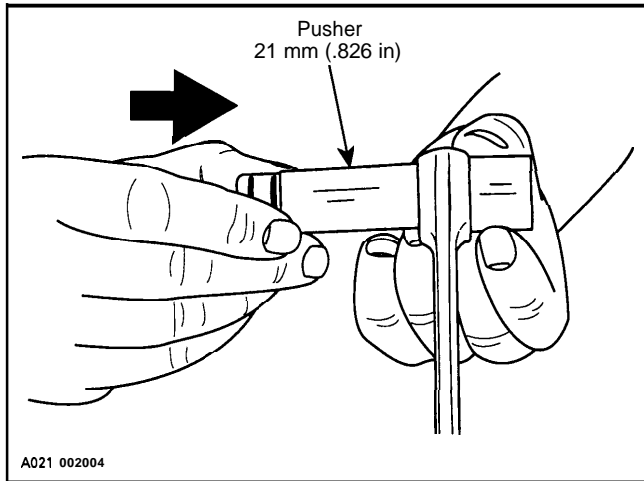


1. 503 mark on puller

- Screw in puller in order to remove it from piston.
- Remove piston from connecting rod.
- Install locating sleeve. Then push needle bearings along with thrust washers using a 21 mm (.826 in) diameter pusher.

Section 04 ENGINE

Sub-Section 02 (377, 443 AND 503 ENGINE TYPES)



O NOTE : 0.25 and 0.5 mm oversized piston and rings are available if necessary,

Use a locking tie to fasten all needles and thrust washers along with sleeves.

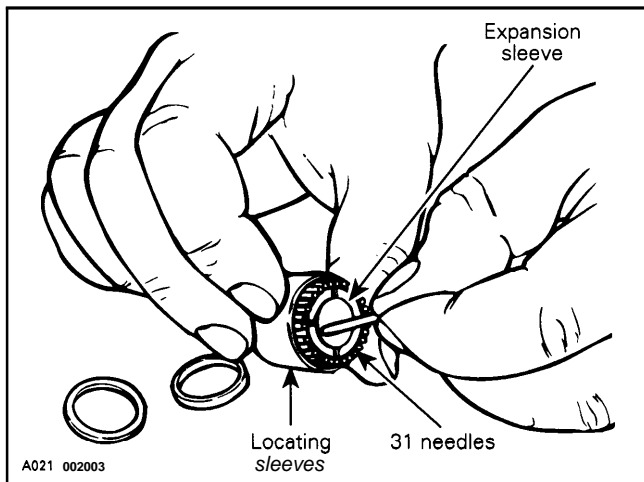
INSPECTION

Refer to ENGINE DIMENSIONS MEASUREMENT 04-03.

ASSEMBLY

503 *Only*

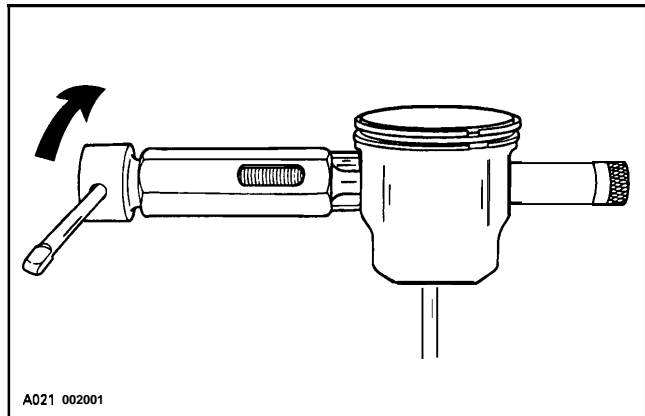
When reinstalling original needle bearings, make sure that 31 needles are inserted between expansion sleeve and locating sleeve.



— Grease thrust washers and install them on each end of needles.

- Using a 21 mm (.826 in) diameter pusher, insert needles into connecting rod.

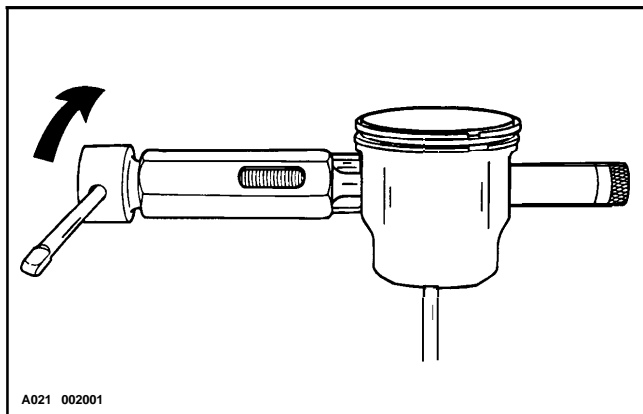
- Mount piston over connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in the direction of exhaust port (see illustration below).
- Install piston pin puller (P/N 5290210 00) and turn handle until piston pin is correctly positioned in piston.



- Remove piston pin puller and expansion sleeve.
- Install circlips as described below.

When installing new needle bearing, insert needles with thrust washers. Instead of expansion sleeve, needles are held in place by 2 inner plastic cage halves.

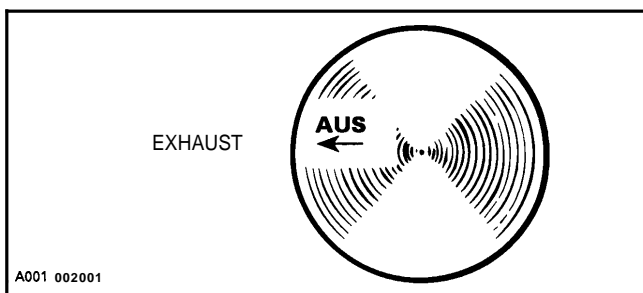
- Use piston pin puller (P/ N 5290210 00) to insert piston pin. Plastic halves should come off piston. If not, pull them out using long nose pliers.



– Install circlips as described below.

8,10, Piston and Circlip

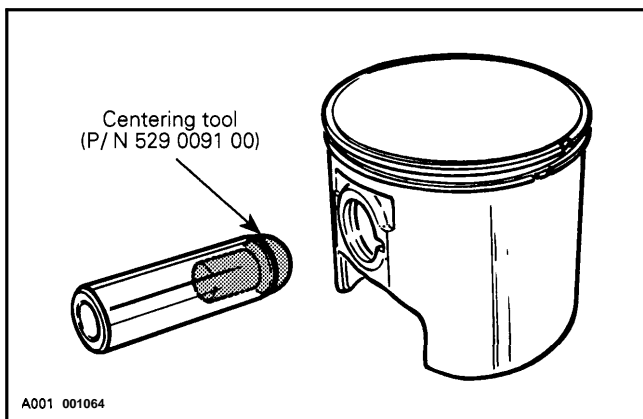
At assembly, place the pistons over the connecting rods with the letters “AUS” (over an arrow on the piston dome) facing in the direction of the exhaust port.



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

All Engines Except 503

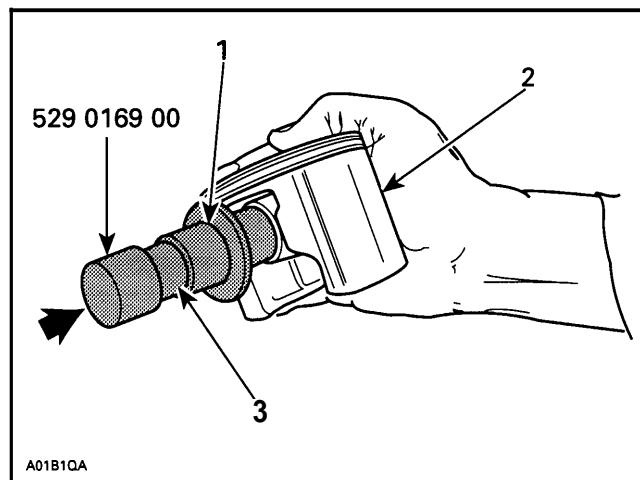
To center the piston pin with the connecting rod bearing, use centering tool (P/ N 5290091 00)



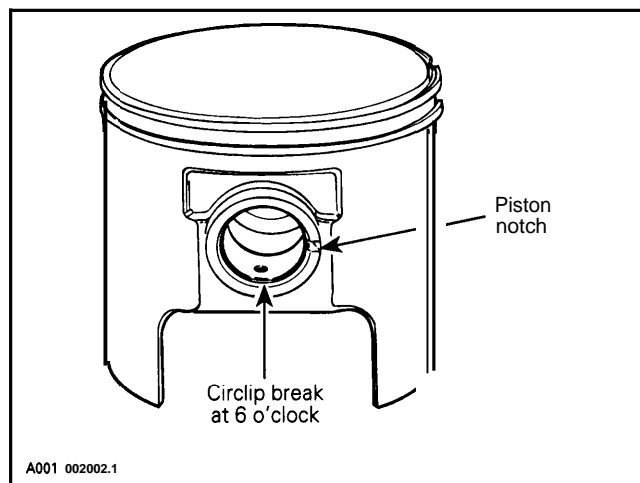
NOTE : The circlip on the opposite side can be installed before pin installation, the tool will easily go out.

All Models

To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Use piston circlip installer (P/ N 5290086 00).



1. Place circlip in
2. Restrain
3. Oil



CAUTION : Circlips must not move freely in the groove after installation. If so, replace them.

4,8, Cylinder and Piston

NOTE : Be sure to restore the chamfer around all cylinder sleeve port openings.

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

Install proper ring compressor on piston assembly.

Section 04 ENGINE

Sub-Section 02 (377, 443 AND 503 ENGINE TYPES)

ENGINE TYPE	RING COMPRESSOR P/N
377	420876090
503	420876970

O NOTE : The ring compressor will not fit on over size pistons.

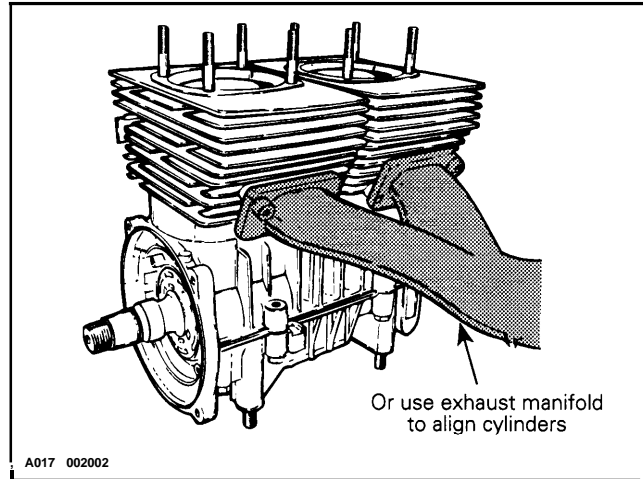
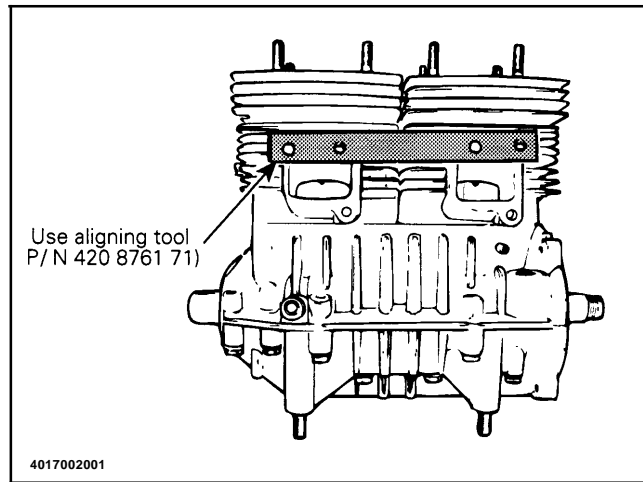
3,4,6, Cylinder Head, Cylinder and Intake Socket

Check flatness of intake sockets.

Refer to ENGINE DIMENSION MEASUREMENT 04-03 and look for checking surface flatness,

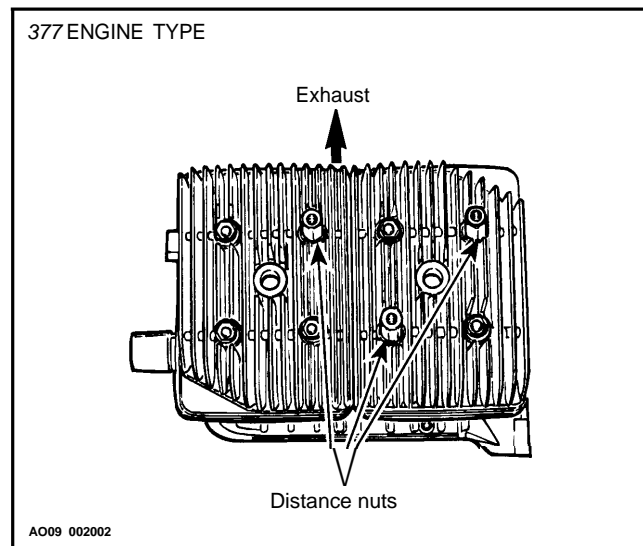
At cylinder and/or cylinder head installation, use aligning tool or exhaust manifold itself to ensure sealing of intake manifold and exhaust before tightening cylinder head nuts.

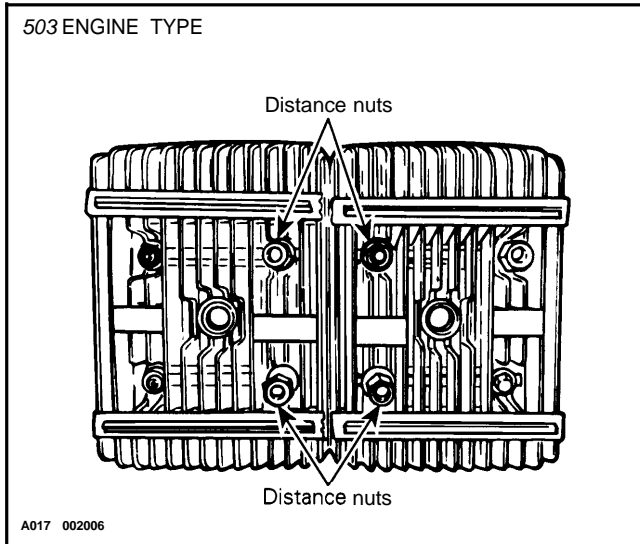
ENGINE TYPE	ALIGNING TOOL P/N
377, 443 and 503	420876171



6,8, Nut and Distance Nut

Position distance nuts as illustrated.





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

Install armature plate, fan housing and then air deflector.

5, Intake Manifold Gasket

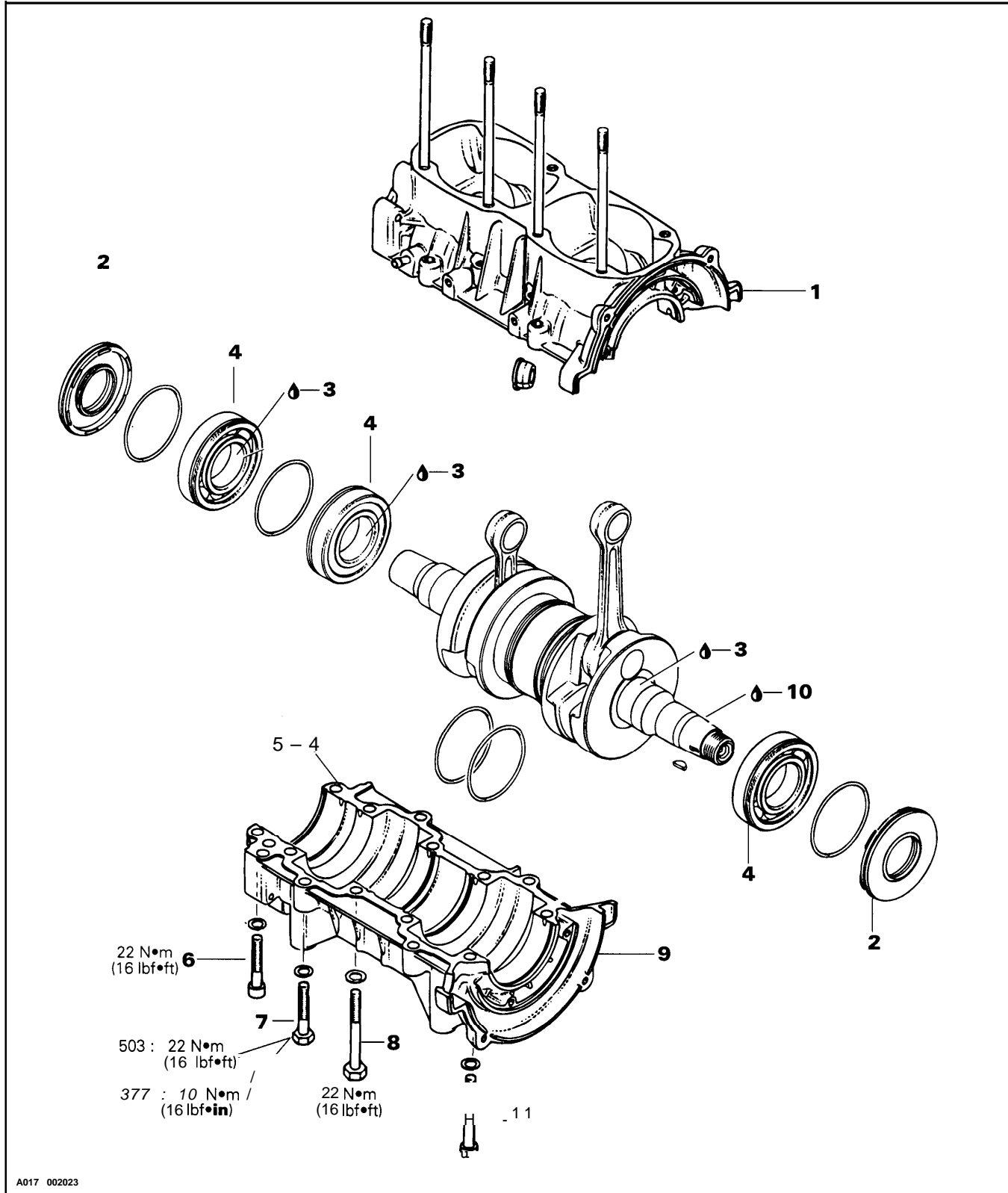
Install a gasket on each side of the air deflector.

7, Intake Socket Bolt

Torque intake Socket bolts to 22 N•m (16 lbf•ft).

Section 04 ENGINE
Sub-Section 02 (377, 443 AND 503 ENGINE TYPES)

BOTTOM END



NOTE : Engine must be removed from chassis to perform the following procedures.

CLEANING

Discard all seals, gaskets and O-rings.

Clean all metal components in a non-ferrous metal cleaner. Use gasket remover (P/ N 4137085 00) accordingly.

10, Loctite 242

Remove all trace of Loctite from crankshaft taper.

Remove old sealant from crankcase mating surfaces with Bombardier gasket remover (P/ N 4137085 00).

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

DISASSEMBLY

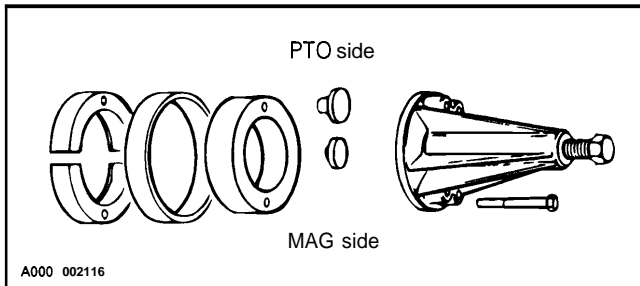
General

To remove drive pulley, refer to DRIVE PULLEY 05-02.

To remove magneto, refer to CDI MAGNETO 04-04.

4, Ball Bearing

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



INSPECTION

Refer to ENGINE DIMENSIONS MEASUREMENT 04-03.

ASSEMBLY

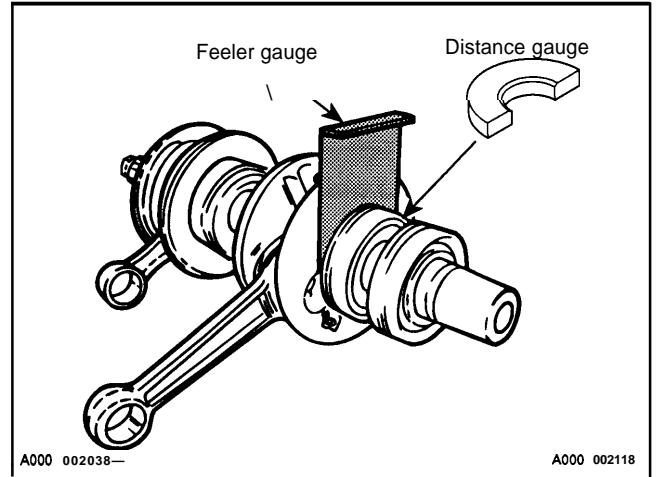
3,4, Antiseize Lubricant and Ball Bearing

Smear antiseize lubricant (P/N413 7010 00) on part of crankshaft where bearing fits.

PTO Side Bearings

To check proper clearance between bearing and counterweight, use feeler gauge (P/ N 4208766 20).

Mount second bearing with distance gauge (P/ N 420 8768 22) for 377 and 443 and (P/ N 4208768 24) for 503 for proper positioning.



Prior to installation, place bearings into an oil container filled with oil heated to 75°C (167°F).

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

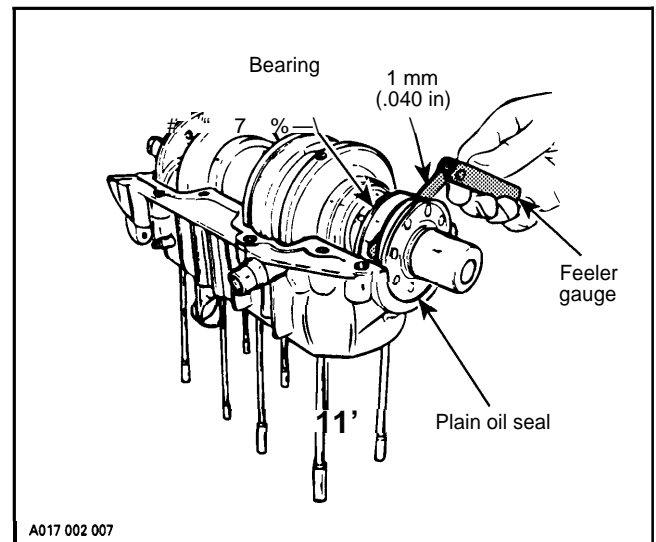
Bearings are pressed on crankshaft until they rest against radius. These radius maintain the gap needed for bearings lubrication.

2, Seal

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

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

When installing plain oil seals (seal without locating ring or without spacing legs), ensure to maintain 1.0 mm (.040 in) gap.



Section 04 ENGINE

Sub-Section 02 (377, 443 AND 503 ENGINE TYPES)

1,9, Upper Crankcase and Lower

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

5, Paste Gasket

Prior to joining of crankcase halves, spray some new injection oil (or equivalent) on all moving parts of the crankshaft. Spray Activator (P/ N 413 7081 00) on mating surfaces to ensure paste gasket will fully cured. It increases cure speed and gap filling capability,

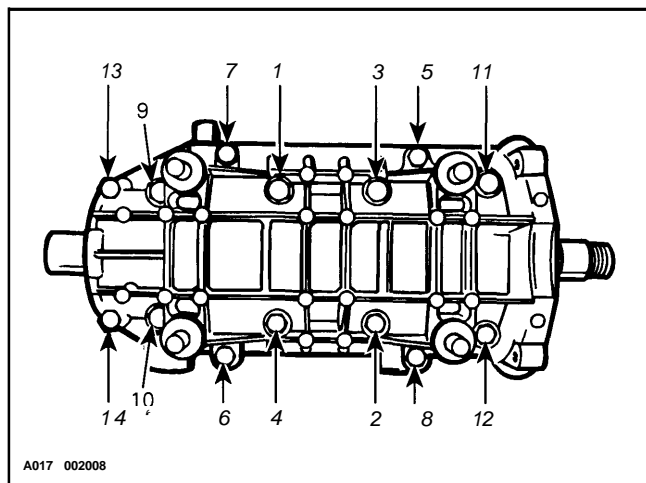
Then apply paste gasket (P/ N 4137027 00) on crankcase mating surfaces.

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

6,7,8,11, Crankcase Bolt

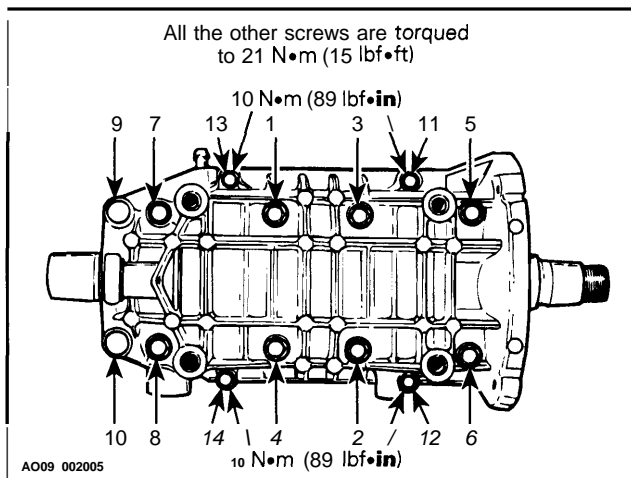
503 Engine Type

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



377 and 443 Engines

Torque screws to proper torque in the following sequence.



All Engines

To install magneto, refer to CDI MAGNETO 04-04.

LEAK TEST AND ENGINE DIMENSION MEASUREMENT

LEAK TEST

The following gives verification procedures for liquid cooled engines though it also applies to fan cooled engines. For FC engines, do not consider information pertaining to coolant system and crankcase rotary valve gear reservoir / components.

On twin-cylinder engines, each cylinder can not be verified individually due to leakage from one cylinder to the other through rotary valve (except on engines with separate intake manifolds). Besides, on FC engines, leak will occur through labyrinth sleeve in center of crankshaft.

PREPARATION

1. Remove tuned pipe / muffler and exhaust manifold.
2. Install plug(s) over exhaust flange(s). Tighten with previously removed screws.
3. On engines with RAVE system, remove RAVE valves and install plugs over flanges. Tighten with previously removed screws.
4. Remove carburetor(s).
5. Insert plug(s) in intake rubber boot(s). Tighten with clamps already there.
6. Using a hose pincher(s) (P/N 5290099 00), block impulse hose(s).

○ NOTE : Do not block large hoses of rotary valve gear lubrication system.

7. Install air pump on any valve of exhaust plug.

○ NOTE : If necessary, lubricate air pump piston with mild soap.

▼ CAUTION : Using hydrocarbon lubricant (such as engine oil) will damage rubber seal of pump piston.

8. Rotate crankshaft so that piston goes to B.D.C. (Bottom Dead Center) on side where the pump is installed. This will open exhaust port.
9. Activate pump and pressurize engine to 140 in H₂O (5 PSI). Do not exceed this pressure.

10. Engine must stand this pressure during 3 minutes. If pressure drops before 3 minutes, check tester kit by spraying a soapy solution on pump piston, all plugs and fittings.
 - If tester kit is leaking, bubbles will indicate where leak comes from.
 - If tester kit is not leaking, check engine as per following procedure.

PROCEDURE

○ NOTE : A flow chart has been prepared as a visual reference. See last page of sub-section ENGINE 03-01.

Using flow chart and following text, pressurize area to be tested and spray soapy solution at the indicated location.

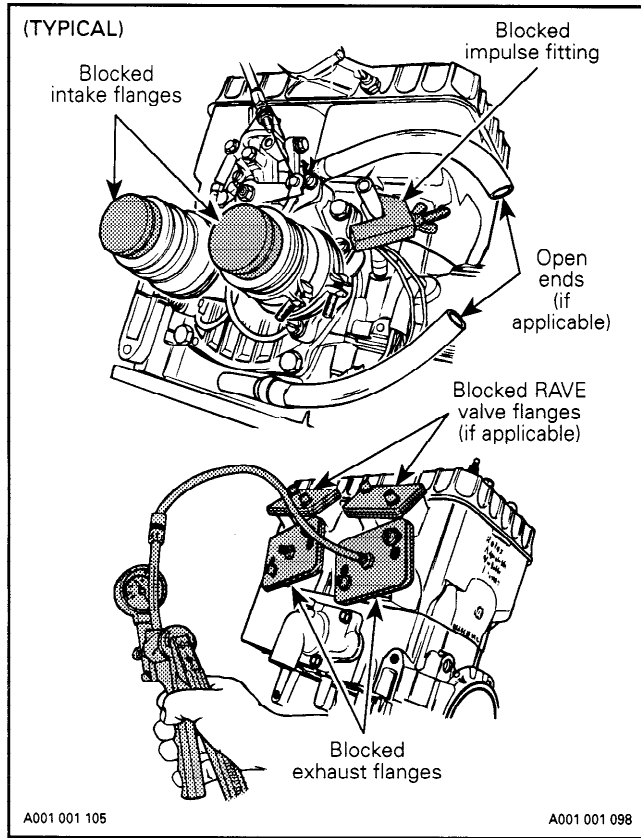
TEST PRESSURE : 140 in H₂O (5 PSI) for 3 minutes
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- If there is a leak at the tested location, it is recommended to continue testing next items before overhauling engine. There is a possibility of more than one leak.
- If there is no leak at the tested location, continue pumping to maintain pressure and continue with next items until leak is found.

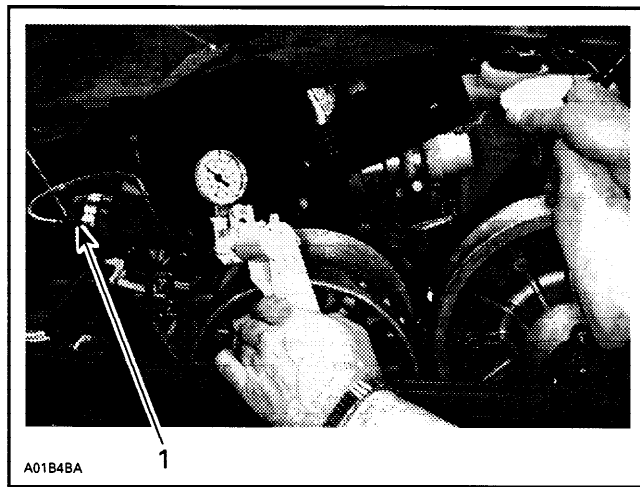
Section 04 ENGINE

Sub-Section 03 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

Engine



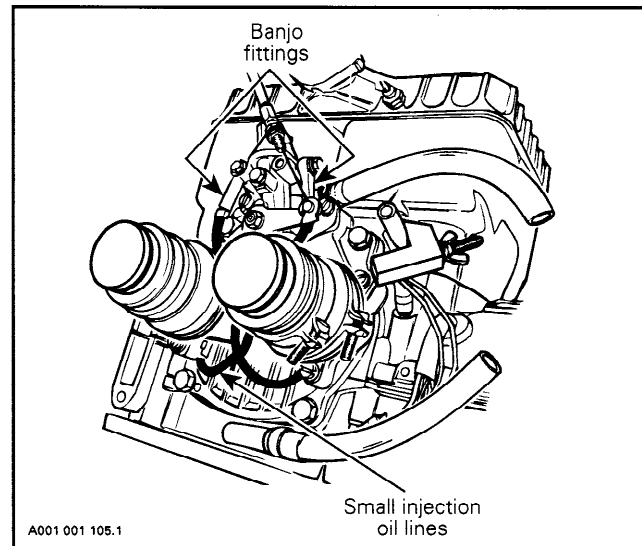
When exhaust manifold is installed, use rubber plug. (In this case it is not necessary to move piston to B.D.C.).



1. Rubber Plug

Check the following :

1. All jointed surfaces and screw / stud threads of engine :
 - spark plug base, insulator
 - cylinder head
 - decompressor valve (247 and 277 types only)
 - cylinder base
 - crankcase halves (joint)
 - rotary valve cover
 - oil injection pump mounting flange (O-ring, seal)
 - coolant pump housing
 - bleed screws / plugs
2. Small injection oil lines coming from pump.



Check for air bubbles or oil column going toward pump. It indicates defective check valve in banjo fitting (or lines).

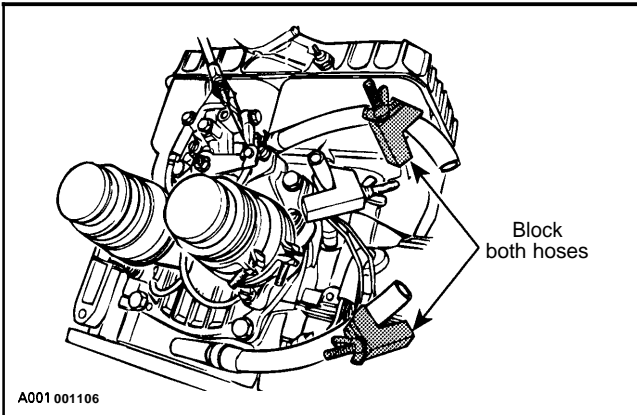
3. Remove cooling system cap.

Check for air bubbles in antifreeze. It indicates defective cylinder head O-ring or cylinder base gasket.

4. Block both hoses of rotary valve gear lubrication system with hose pincers.

Section 04 ENGINE

Sub-Section 03 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)



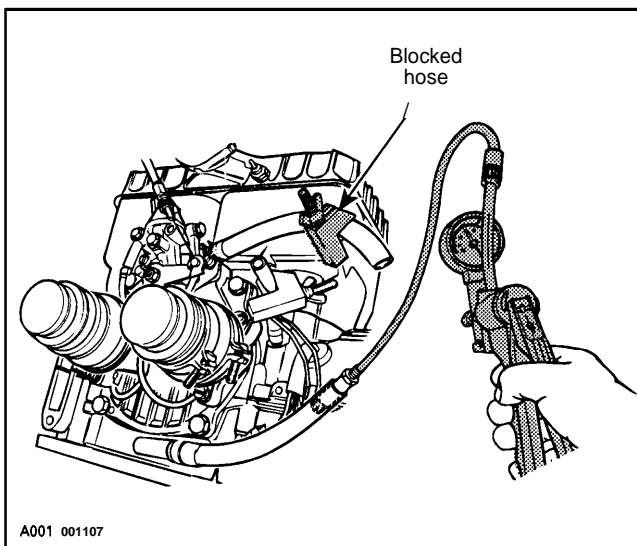
If leakage stops, ignore remaining items and check crankcase rotary valve gear reservoir as per Crankcase Rotary Valve Gear Reservoir of this section.

5. Remove clutch then check crankshaft outer seal.
6. Remove rewind starter and magneto system then check crankshaft outer seal.
7. Check crankcase rotary valve gear reservoir.

Crankcase Rotary Valve Gear Reservoir

Block one hose of rotary valve gear lubrication system with a hose pincer and install an adapter in remaining hose.

Install air pump on adapter and pressurize as before.



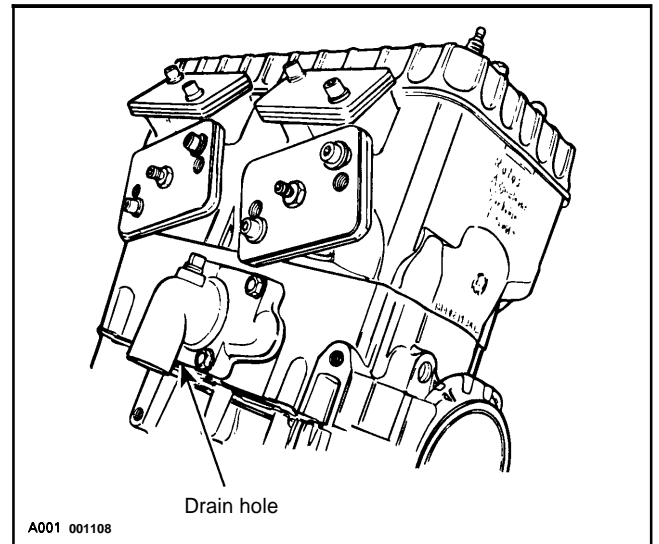
1. Remove a spark plug or any plug of leak tester kit on PTO side.

If pressure drops, it indicates defective crankshaft inner seal on PTO side.

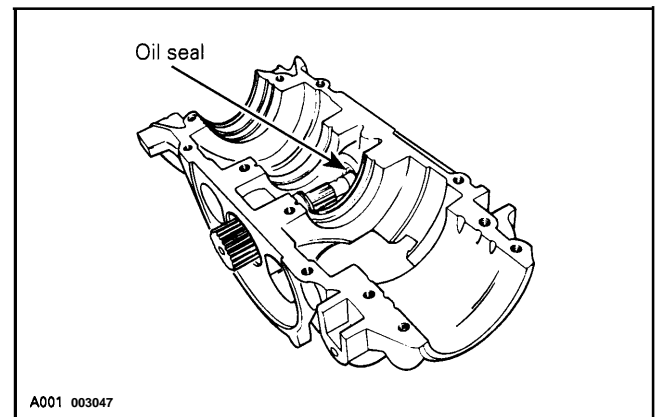
2. Remove a spark plug or any plug of leak tester kit on MAG side.

If pressure drops, it indicates defective crankshaft inner seal on MAG side.

3. Check drain hole below coolant pump housing with soapy water.



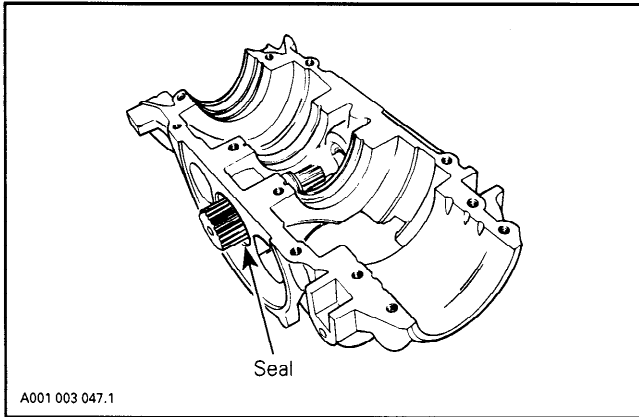
If there is a leak, it indicates defective seal of rotary valve shaft (oil seal beside coolant seal).



Section 04 ENGINE

Sub-Section 03 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

4. Remove rotary valve cover and check for leak of rotary valve seal with soapy water.



5. If leak still persists, it indicates a defective casting somewhere in engine.

Disassemble engine and carefully check for defects in castings. Pay attention to tapped holes which may go through engine sealed area and thus leading to leakage.

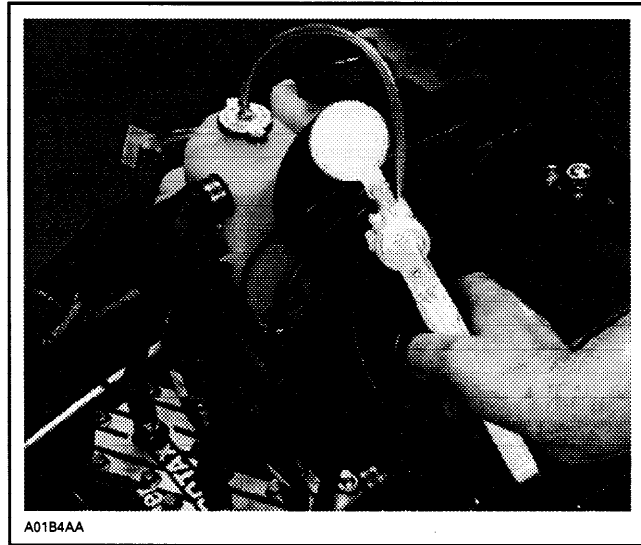
FINALIZING REASSEMBLY

After reassembling engine, always recheck for leakage.

COOLING SYSTEM LEAK TEST

Use special plug (radiator cap) (P / N 529 0214 00) and pressurize to 15 PSI.

Check all hoses and cylinder / base for coolant leaks. Spray a soap / water solution and look for presence of air bubbles. Refer to LIQUID COOLING SYSTEM 04-09 for exploded views.



TYPICAL

ENGINE DIMENSION MEASUREMENT

This section covers all engine types.

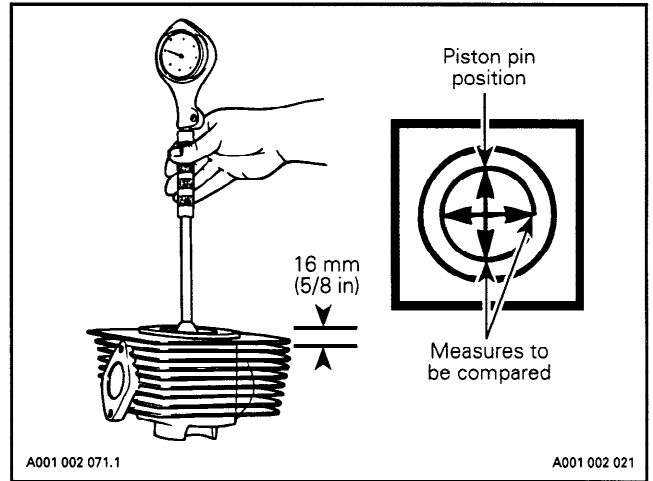
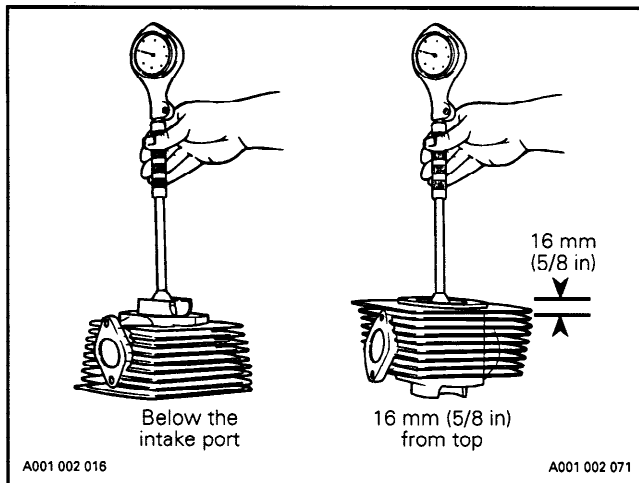
CYLINDER TAPER

ENGINE TYPE	MAXIMUM
All	0.08 mm (.003 in)

Compare cylinder diameter 16 mm (5/8 in) 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 the specified dimension the cylinder should be rebored and honed or should be replaced.

NOTE : Be sure to restore the chamfer around all cylinder sleeve port openings.



CYLINDER / PISTON CLEARANCE

Measurement (used parts)

Check cylinder taper and out-of-round as described above before proceeding with piston / cylinder clearance.

To accurately determine piston to cylinder clearance, the piston should be measured under the axis hole and 90° to piston pin axis. Find the biggest diameter.

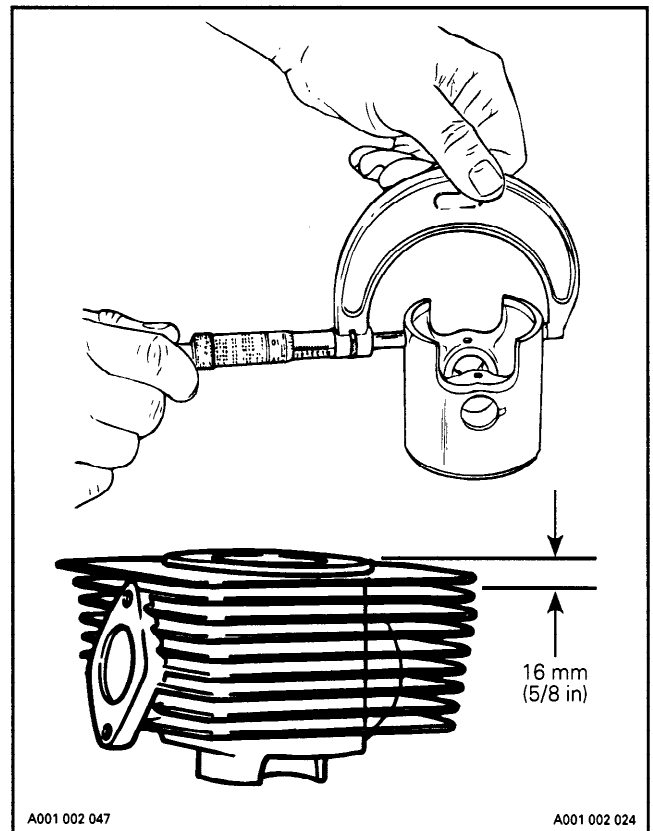
The cylinder should be measured 16 mm (5/8 in) below its top edge. Find the smallest diameter.

CYLINDER OUT OF ROUND

ENGINE TYPE	MAXIMUM
All	0.05 mm (.002 in)

Measuring 16 mm (5/8 in) from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than the specified dimension. If larger, cylinder should be rebored and honed or should be replaced.

NOTE : Be sure to restore the chamfer around all cylinder sleeve port openings.



Section 04 ENGINE

Sub-Section 03 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

The difference between these 2 measurements should be within specified tolerance. Refer to TECHNICAL DATA 10-02,

Measurement (fitting new parts)

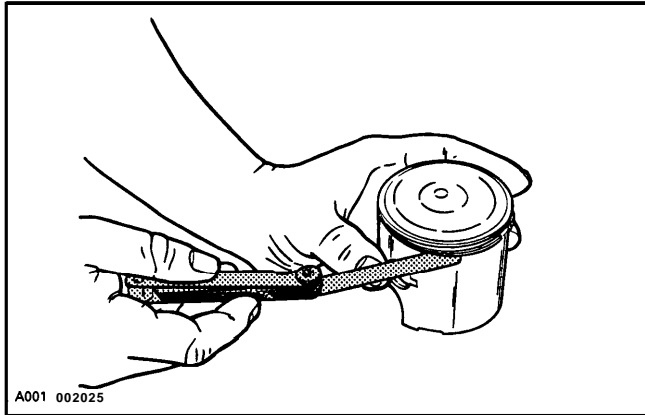
With an inside micrometer, measure cylinder diameter above the exhaust port,

With a micrometer, measure the piston diameter perpendicularly (90°) to piston axis and 3 mm (1/8 in) above bottom edge.

The difference of both measurements is the clearance.

RING / PISTON GROOVE CLEARANCE

Using a feeler gauge check clearance between rectangular ring and groove. Replace piston. If clearance exceeds specified tolerance. Refer to TECHNICAL DATA 10-02.

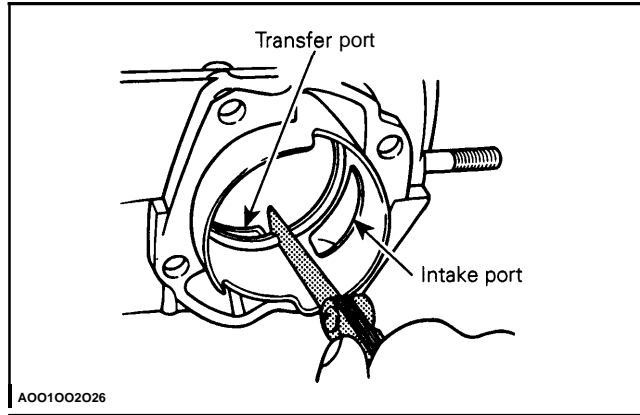


RING END GAP

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. Replace ring. If gap exceeds specified tolerance, refer to TECHNICAL DATA 10-02,



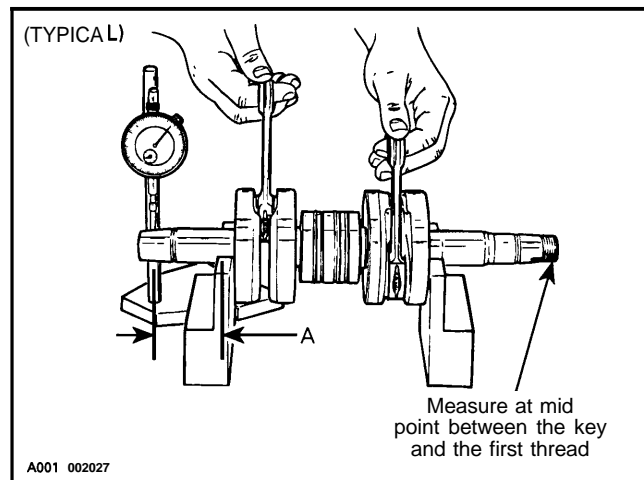
CRANKSHAFT DEFLECTION

Crankshaft Deflection in Mid of Crankshaft

ENGINE TYPE	MAXIMUM IN MID OF CRANKSHAFT
All	0.08 mm (0.0031 in)

Crankshaft deflection can also be measured each end with a dial indicator.

First, check deflection with crankshaft in engine. If deflection exceeds the specified tolerance, it can be either bearing wear or bent crankshaft. Remove crankshaft bearings and check deflection again on V-shaped blocks at A measurement as illustrated.



Crankshaft Deflection on PTO Side

ENGINE TYPE	DISTANCE A mm (in)	MAXIMUM ON PTO SIDE mm (in)
377, 443	75.5 (2.972)	0.05 (.002)
454, 494, 582 and 583	86 (3.386)	0.06 (.002)
503	82.5 (3.248)	
670	100 (3.937)	
599, 779	94.5 (3.720)	0.03 (.001)

Crankshaft Deflection on MAG Side

ENGINE TYPE	MAXIMUM ON MAG SIDE mm (in)
All except 779	0.03 (.001)
779	0.05 (.002)

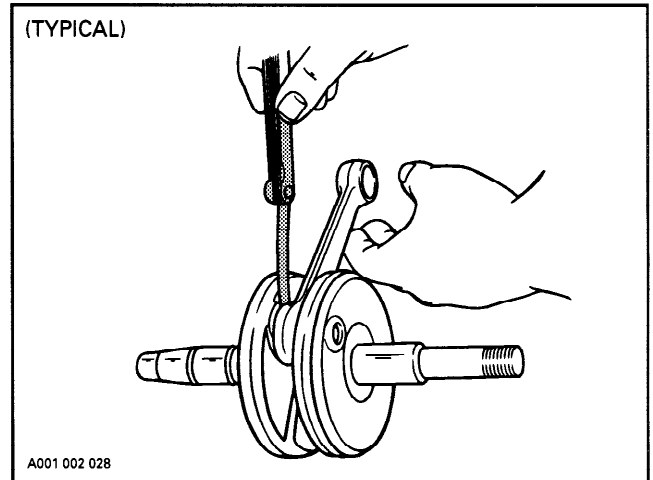
NOTE : Crankshaft deflection can not be correctly measured between centers of a lathe.

If the deflection exceeds the specified tolerance, crankshaft should be repaired or replaced.

CONNECTING ROD BIG END AXIAL PLAY

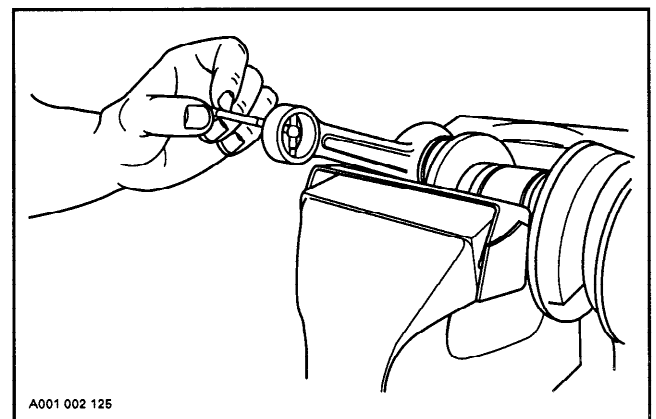
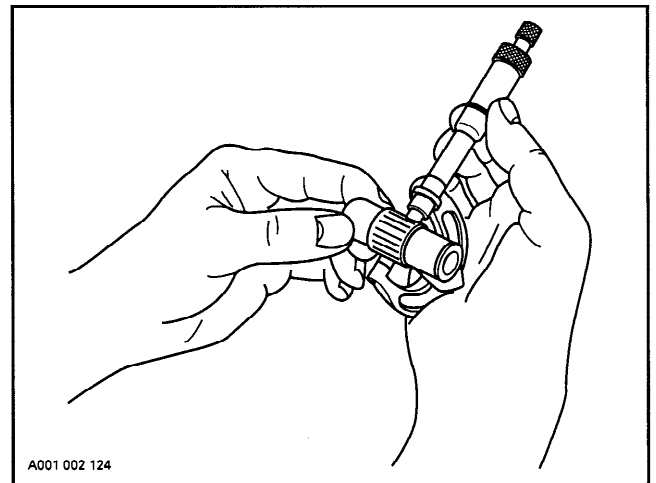
ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
247, 277, 377 443 and 503	0.20 - 0.53 mm (.008 - .021 in)	1.00 mm (.039 in)
454, 494, 582, 583, 670 and 779	0.40 - 0.75 mm (.016 - .029 in)	1.20 mm (.047 in)

Using a feeler gauge, measure distance between thrust washer and crankshaft counterweight. If the distance exceeds specified tolerance, repair or replace the crankshaft.



CONNECTING ROD / PISTON PIN CLEARANCE

Measure piston pin with its needle bearing. Compare to inside diameter of connecting rod.



Section 04 ENGINE

Sub-Section 03 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
All	0.03-0.012 mm (.0001 -.0005 in)	0.015 mm (.0006 in)

CONNECTING ROD / CRANKPIN CLEARANCE

ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
247	0.020-0.032 mm (.0008 -.0013 in)	0.05 mm (.0020 in)
277	0.020-0.030 mm (.0008 -.0012 in)	
177, 443 and 503	0.020-0.033 mm (.0008 -.0013 in)	
454, 494, 582,, 583, 670 and 779	0.038-0.050 mm (.0015-.0020 in)	0.06 mm (.0024 in)

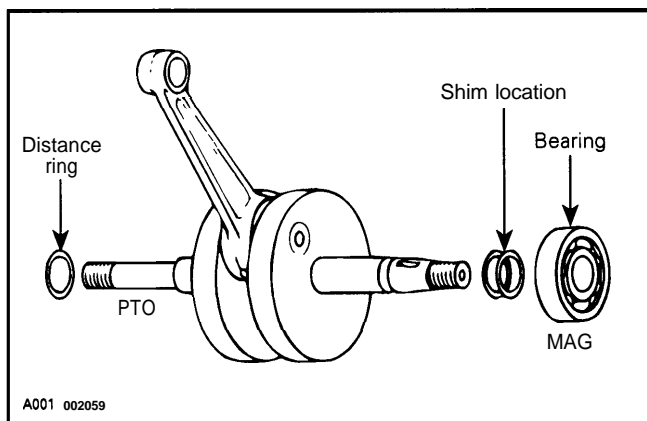
CRANKSHAFT END-PLAY

247 and 277 Engine Types

ENGINE TYPE	MINIMUM	MAXIMUM
247 and 277	0.10 mm (.004 in)	0.30 mm (.012 in)

Adjustment

Crankshaft end-play is adjusted with shims located between crankshaft and magneto side bearing.



CAUTION : Always install end-play adjustment shims on the magneto side between bearing and crankshaft counterweight.

The following is required for the adjustment procedure :

— adjustment shims (refer to parts catalog)

thicknesses available : 0.10 mm (.004 in)
0.20 mm (.008 in)
0.30 mm (.012 in)
0.50 mm (.020 in)
1.00 mm (.040 in)

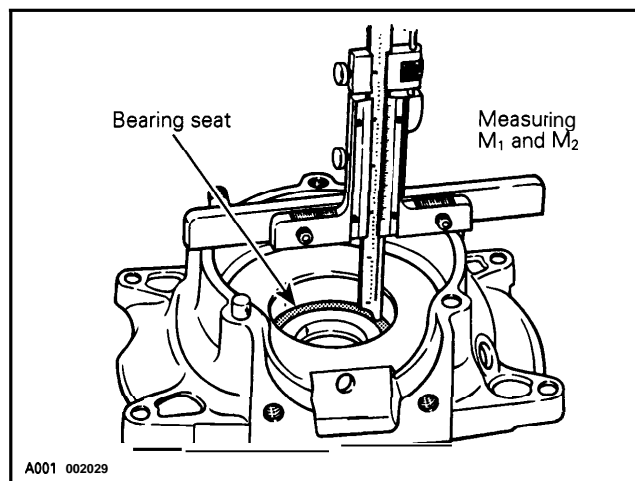
— micrometer

— vernier

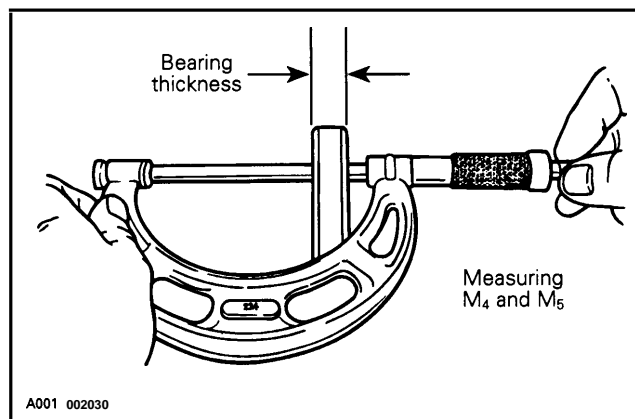
Total shim thickness needed for the end-play adjustment is determined with the following procedure :

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

A standard compressed crankcase gasket will have a 0.30 mm (.012 in) thickness (M_2). Add these measurements to obtain dimension A.



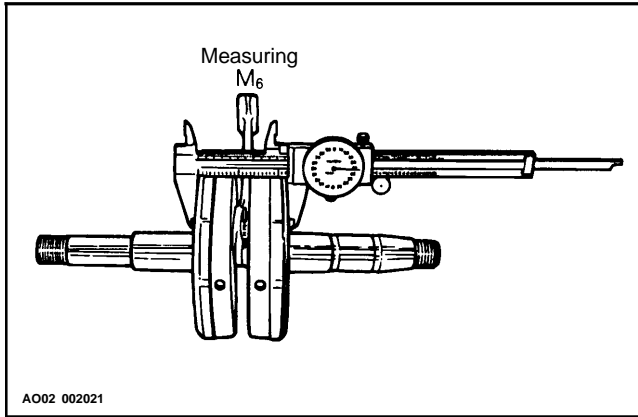
b) Measure the thickness of each bearing (M_4 and M_5).



Section 04 ENGINE

Sub-Section 03 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

c) Measure distance between bearing shoulders on crankshaft (M_6).



d) Measure the distance ring (MJ and adjustment shims thickness (M_8). Add **these** measurements to obtain dimension B.

e) 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) to reach this specification.

If the result is under specification, remove adjustment shim(s) to reach this specification.

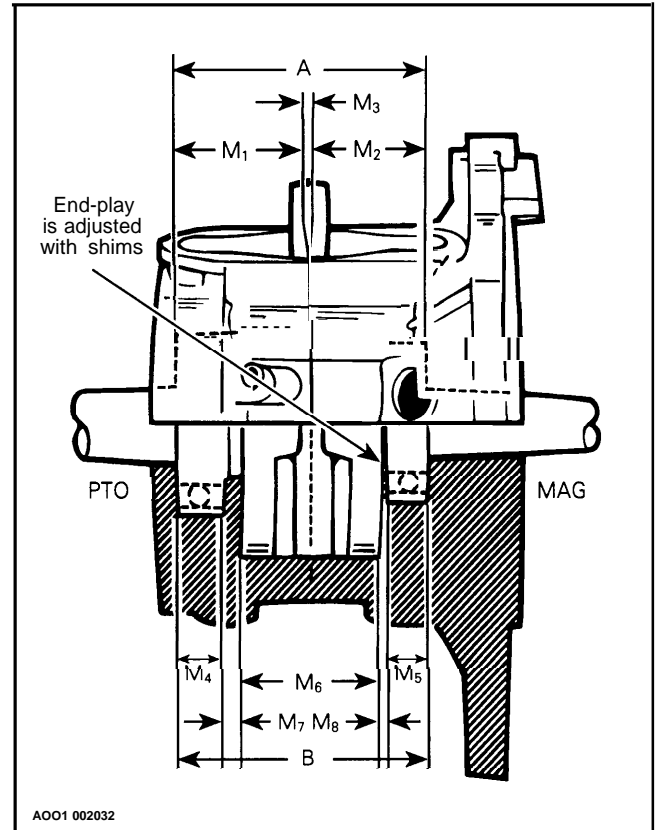
To Summarize

$$A = M_1 + M_2 + M_3$$

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

$A - B =$ Actual end-play that must be within specification.

M_3 is the dimension that must be adjusted to obtain the specified crankshaft end-play.



377,443,454,494,503, 582,583,670,779 Engine Types

End-play is not adjustable but it should be between 0,10-0.30 mm (**.004 -.012** in).

CRANKCASE / ROTARY VALVE GAP

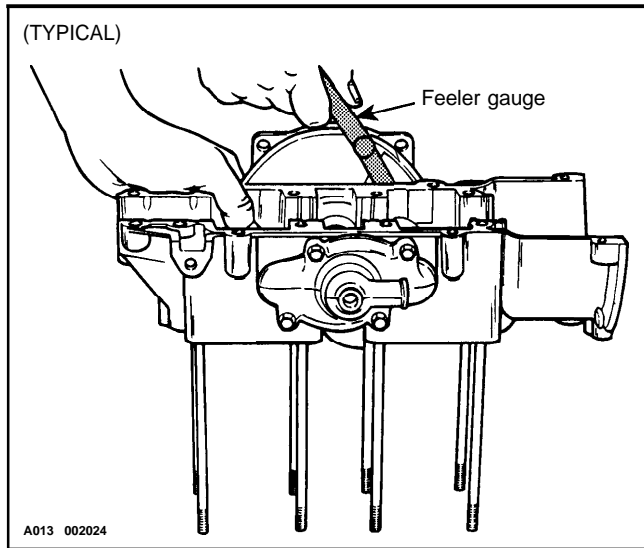
ENGINE TYPE	MINIMUM	MAXIMUM
Liquid cooled engines	0.27 mm (0.011 in)	0.40 mm (0.016 in)

First Method

To measure this gap use a feeler gauge inserted between rotary valve and upper crankcase with the rotary valve cover in place without its O-ring. Check the most surface as possible. Follow the same procedure with the lower crankcase.

Section 04 ENGINE

Sub-Section 03 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)



The gap can be measured with the engine installed on vehicle. Use 45° bent blade feeler gauge (Snap-On FB300A) inserted through intake socket of valve cover.

If gap is under tolerances, rotary valve cover can be refaced to increase clearance.

If gap is over tolerances, cover replacement may be necessary. Check if surfaces on crankcase halves are damaged, replacement wear plate is available.

Second Method

Remove rotary valve cover and its O-ring.

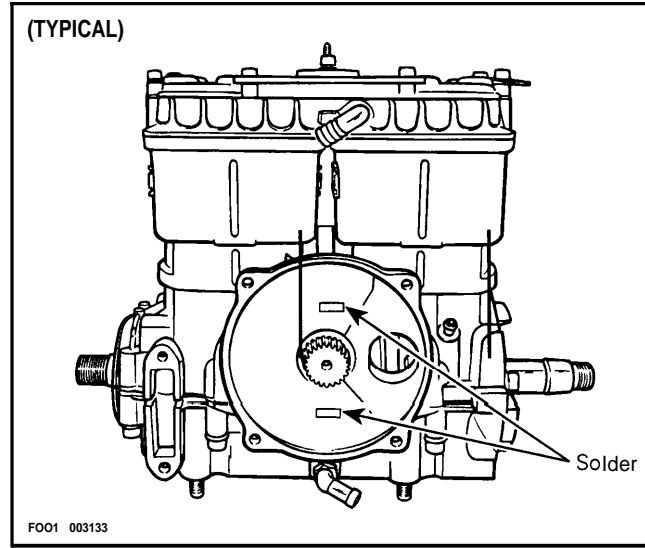
Use the following type of solder :

- rosin core
- diameter : 0.5 mm (0.020 in)
- electronic application (available at electronic stores)

Install 2 short pieces (13 mm (1/2 in) long) of solder directly on rotary valve, one above and one below rotary valve gear. Apply grease to hold solder in position.

Reinstall cover in place WITHOUT its O-ring and torque screws to 20 N•m (15 lbf•ft).

Remove cover then clean and measure compressed solder thickness, it must be within the specified tolerance.



CHECKING SURFACE FLATNESS

Intake manifold, intake manifold cover, rotary valve cover can be checked for perfectly mating surfaces.

Lay part on a surface plate (marble, mirror or thick glass plate).

Holding down one end of part, try pushing down the other end.

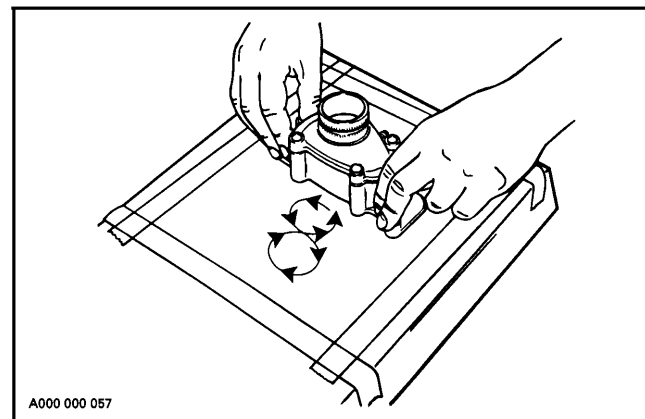
If any play is felt, part must be rectified.

RECTIFYING SURFACES

Stick a fine sand paper sheet on the surface plate then lightly oil the sand paper.

Rub manifold mating surface on sand paper using 8-figure movements.

Sand until mating surface is perfectly straight.



CHECKING CRANKSHAFT ALIGNMENT

Install a degree wheel (P/N 4143529 00) on crankshaft end.

Remove both spark plugs.

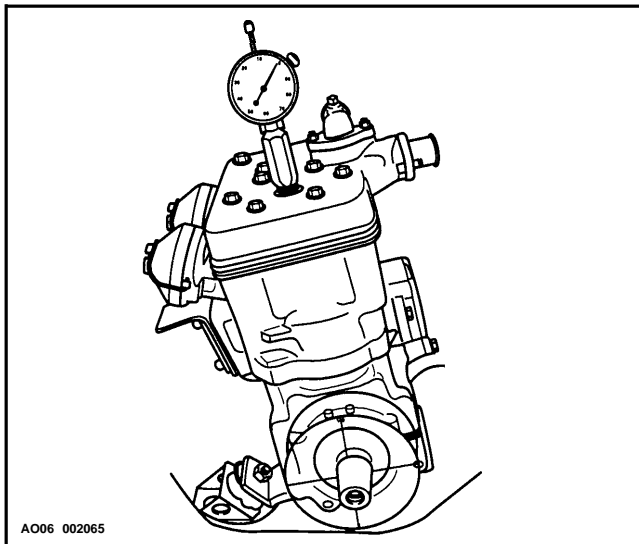
Install a TDC gauge (P/N 4141047 00) in spark plug hole on MAG side,

Bring MAG piston at top dead center.

Rotate degree wheel (not crankshaft) so that 360° mark aligns with center of crankcase. Scribe a mark on crankcase.

Remove TDC gauge and install it on PTO side.

Bring PTO piston to top dead center.

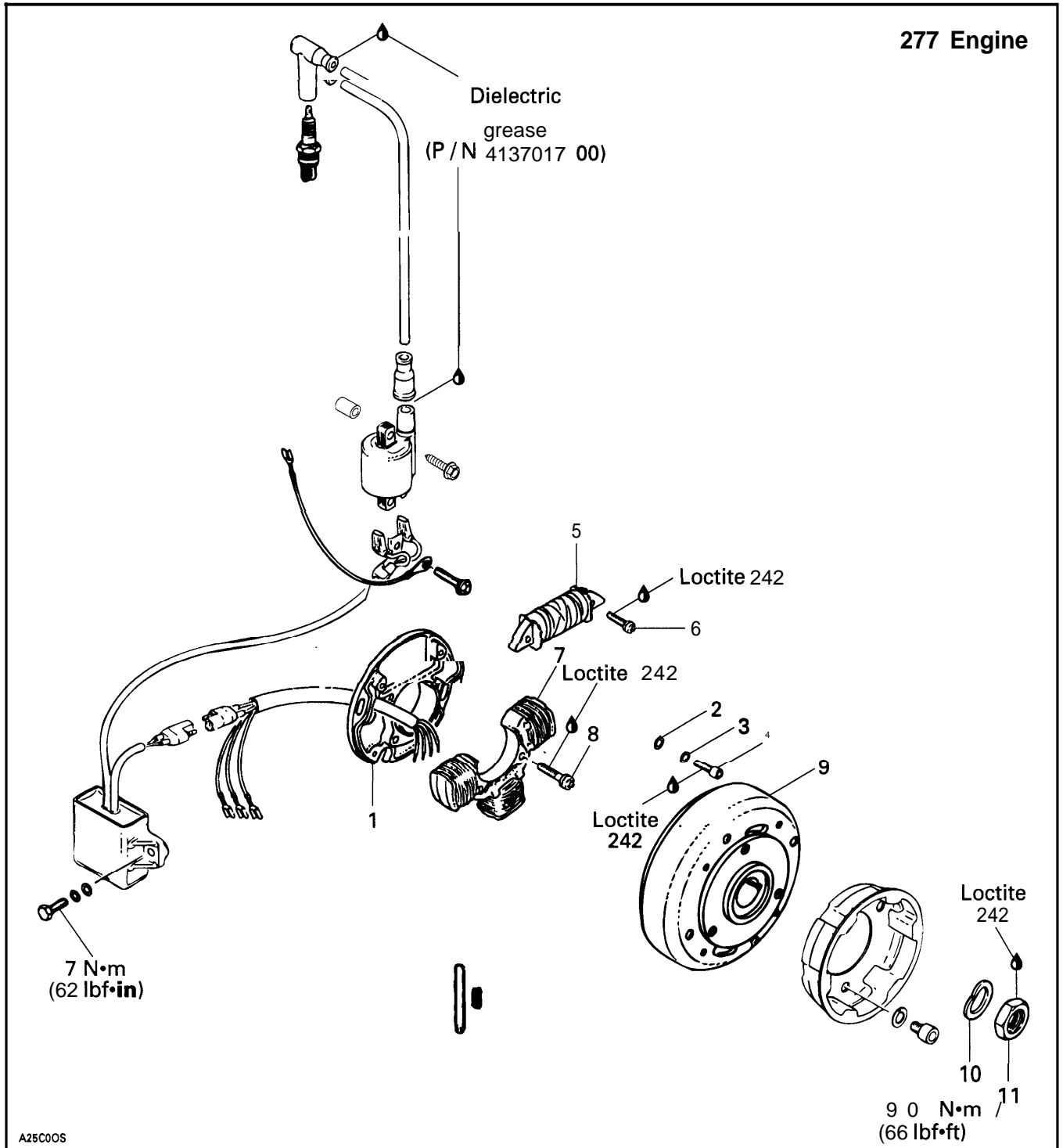


Interval between cylinders must be exactly 180°, 120° for 779 engine.

Any other reading indicates a misaligned crankshaft.

CDI SYSTEM

NIPPONDENSO **IGNITION** SYSTEM WITH **SINGLE** GENERATING COIL



Section 04 ENGINE

Sub-Section 04 (CDI SYSTEM)

○ **NOTE** : The following procedures can be done without removing the engine from chassis.

CLEANING

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

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

DISASSEMBLY

11, Magneto Flywheel Nut

To gain access to magneto assembly, remove the following parts as needed on different engines :

- tuned pipe and muffler
- oil injection pump mounting plate from rewind starter
- rewind starter
- starting and V-belt pulleys

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

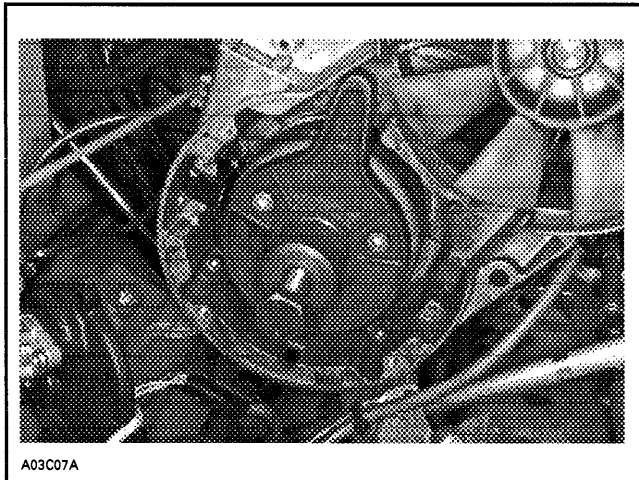
To remove magneto flywheel retaining nut, install puller ring (P / N 420 8760 80) and M8 x 20 screws.

- Remove magneto flywheel nut, using a 30 mm socket machined to 40 mm (1.580 in) outside diameter by 16 mm (5/8 in) long.

○ **NOTE** : To correctly remove a threadlocked fastener it is first necessary to tap on the fastener to break threadlocker bond. This will eliminate the possibility of thread breakage.

9, Magneto Flywheel

To remove magneto flywheel, install the magneto puller (P / N 529 0225 00).



A03C07A

TYPICAL

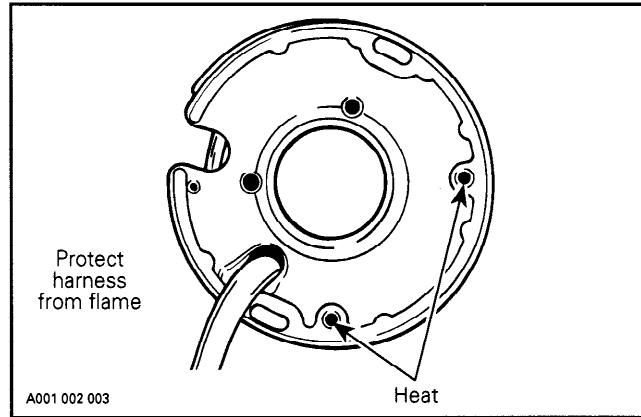
- Tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto flywheel from its taper.

REPAIR

2, Ignition Generator Coil

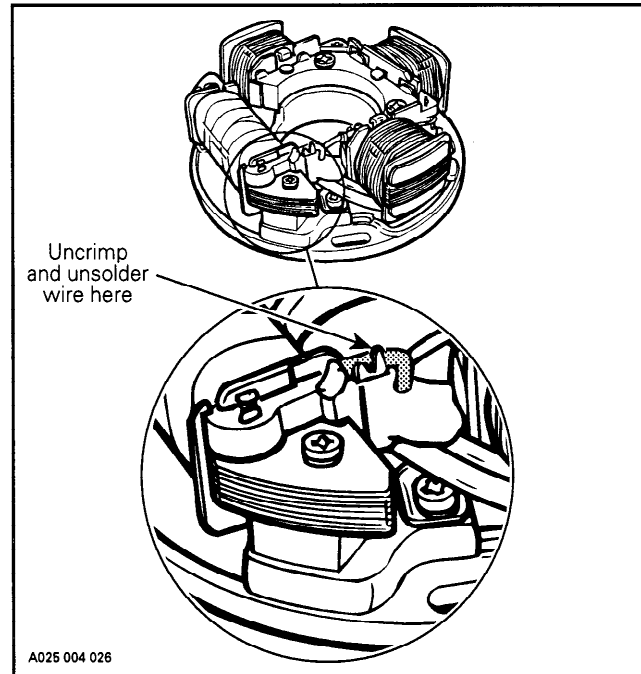
To replace generator coil :

- Heat the armature plate to 93°C (200°F) around the screw holes to break the threadlocker bond.



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

- Remove screws.
- Uncrimp and unsolder BLACK / RED wire from coil terminal.

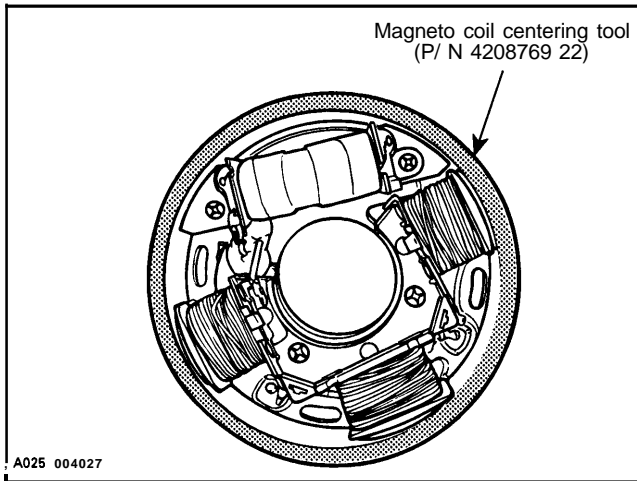


- Strip end of old wire then crimp and solder on new coil.

6,8, Screw and Loctite 242 (Blue)

Apply Loctite 242 (blue) to screws and install the new coil on armature plate.

Use magneto coil centering tool (P/ N 4208769 22) and install it so that it fits around armature plate before tightening screws.

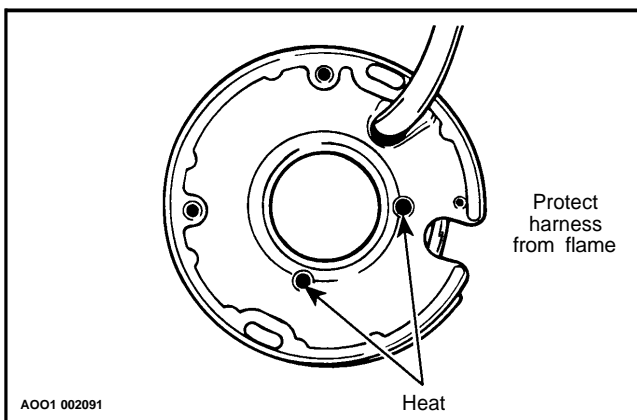


- ▼ **CAUTION** : Before reinstalling the magneto, remove the loose epoxy from harness.

7, Lighting Generator Coil

To replace lighting generator coil :

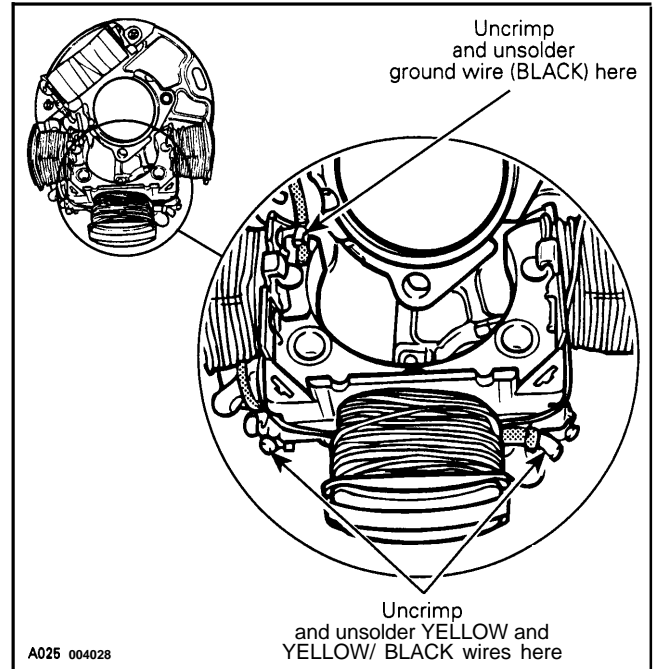
- Heat the armature plate to 93°C (200°F) around the screw holes to break the threadlocker bond.



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

- Remove screws.

- Uncrimp and unsolder YELLOW and YELLOW/BLACK wires from coil terminals.
- Uncrimp and unsolder ground wire (BLACK) from coil core.

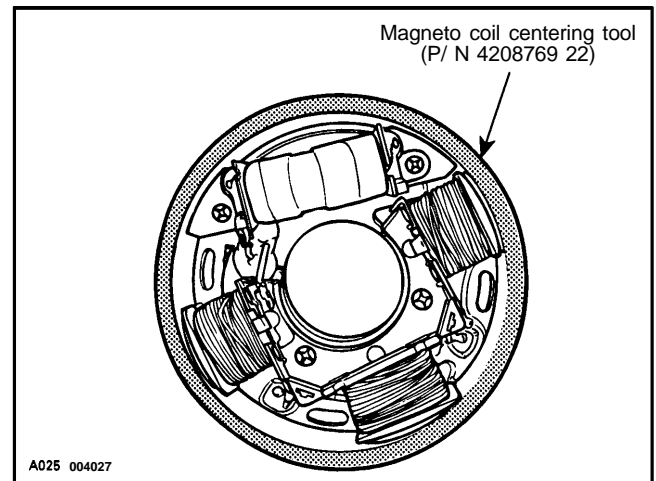


- Position new coil, crimp and solder all wires.

8, Lighting Generator Coil Screw

- Prior to assembly, apply Loctite 242 (blue).

Use magneto coil centering tool (P/ N 4208769 22) and install it so that it fits around armature plate before tightening screws.



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

Section 04 ENGINE

Sub-Section 04 (CDI SYSTEM)

ASSEMBLY

1,2,3,4, Armature Plate, Washer, Lock Washer and Screw

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

Put a drop of Loctite 242 (blue) on screw threads and tighten.

Clean crankshaft extension (taper).

Apply Loctite 242 (blue) on taper.

9,10,11, Flywheel, Lock Washer and Nut

Position Woodruff key, magneto flywheel and lock washer on crankshaft.

Clean nut threads and apply Loctite 242 (blue) before tightening nut.

Torque nut to 90 N•m (66 lbf•ft).

At reassembly coat all electric connections with silicone dielectric grease (P/ N 4137017 00) to prevent corrosion or moisture penetration.

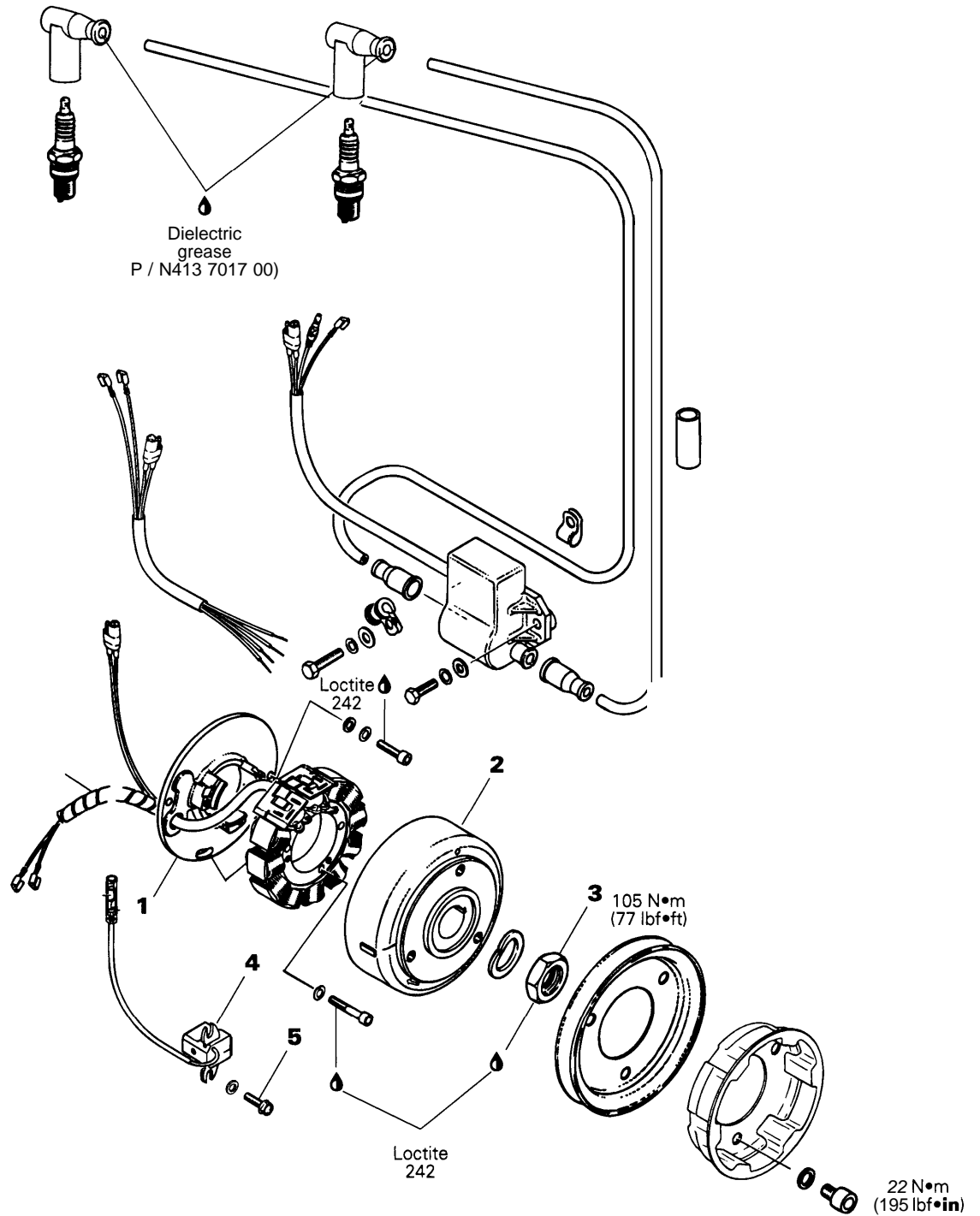
▼ CAUTION : Do not use silicone "sealant", this product will corrode contacts.

Ignition Timing

Check ignition timing as described in IGNITION TIMING 06-02.

DUCATI IGNITION SYSTEM

377, 503 Engines



Section 04 ENGINE

Sub-Section 04 (CDI SYSTEM)

○ **NOTE** : The following procedures can be done without removing the engine from chassis.

CLEANING

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

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

DISASSEMBLY

3, Magneto Flywheel Nut

To gain access to magneto assembly, remove the following parts as needed on different engines :

- tuned pipe and muffler
- oil injection pump mounting plate from rewind starter
- rewind starter
- starting and V-belt pulleys

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

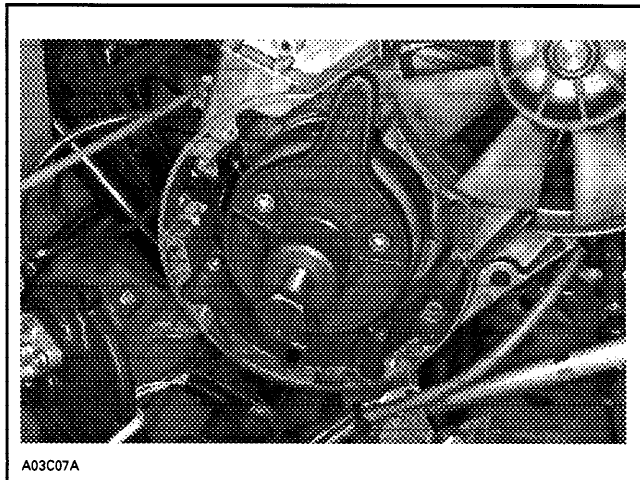
To remove magneto flywheel retaining nut, install puller ring (P / N 420 8760 80) and M8 x 20 screws.

- Remove magneto flywheel nut, using a 30 mm socket machined to 40 mm (1.580 in) outside diameter by 16 mm (5/8 in) long.

○ **NOTE** : To correctly remove a threadlocked fastener it is first necessary to tap on the fastener to break threadlocker bond. This will eliminate the possibility of thread breakage.

2, Magneto Flywheel

To remove magneto flywheel, install the magneto puller (P / N 529 0225 00).



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

REPAIR

2, Ignition Generator Coil

To replace generator coil :

- Heat the armature plate to 93°C (200°F) around the screw holes to break the threadlocker bond.

4,9, Trigger Coil and Screw

To replace trigger coil :

- Disconnect trigger coil wire (RED).
- Remove grommet from crankcase where trigger coil wire exits magneto housing.
- Remove retaining screws.
- Remove trigger coil and carefully pull wire.
- Install new trigger coil and other parts removed.

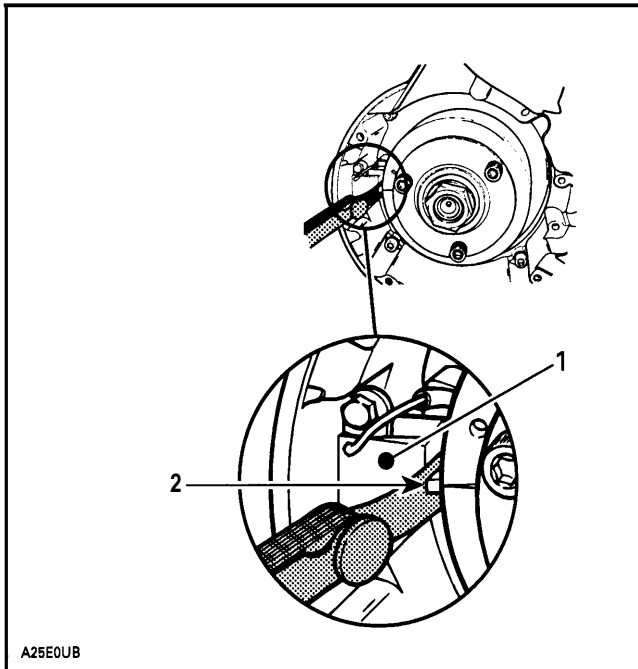
Adjustment

Whenever the trigger coil or the magneto flywheel is removed or replaced, the air-gap between the trigger coil and the flywheel protrusion must be checked and adjusted. The purpose of this adjustment is to obtain the minimum clearance between these parts - without touching at any RPM - so that the trigger coil produces its proper electrical output. Ignition timing must also be checked.

Proceed as follows :

1. Rotate flywheel so that one protrusion aligns with trigger coil.
2. Using a feeler gauge of 0.45 mm (.018 in) to 0.55 mm (.022 in) thick, check air-gap between center pole of trigger coil and flywheel protrusion.
3. If necessary, adjust by slackening retaining screws and moving trigger coil toward or away of protrusion.
4. Retighten screws and recheck air-gap.

Adjusting trigger coil air-gap.



1. Trigger coil
2. Flywheel protrusion

1, Armature with Armature Plate

To replace armature :

- disconnect the 2-wire connector (GREEN and WHITE wires).
- Disconnect YELLOW/ BLACK and YELLOW wires.
- Remove grommet from crankcase where magneto harness exits magneto housing.
- Remove armature plate retaining screws.
- Remove armature plate with armature and carefully pull wires.
- Install new parts and other parts removed.

ASSEMBLY

2,3, Magneto Flywheel and Nut

Clean crankshaft extension (taper).

Apply Loctite 242 (blue) on taper.

Position Woodruff key, flywheel and lock washer on crankshaft.

Clean nut threads and apply Loctite 242 (blue) before tightening nut to 105 N•m (77 lbf•ft).

At reassembly coat all electric connections with silicone dielectric grease (P/ N 4137017 00) to prevent corrosion or moisture penetration.

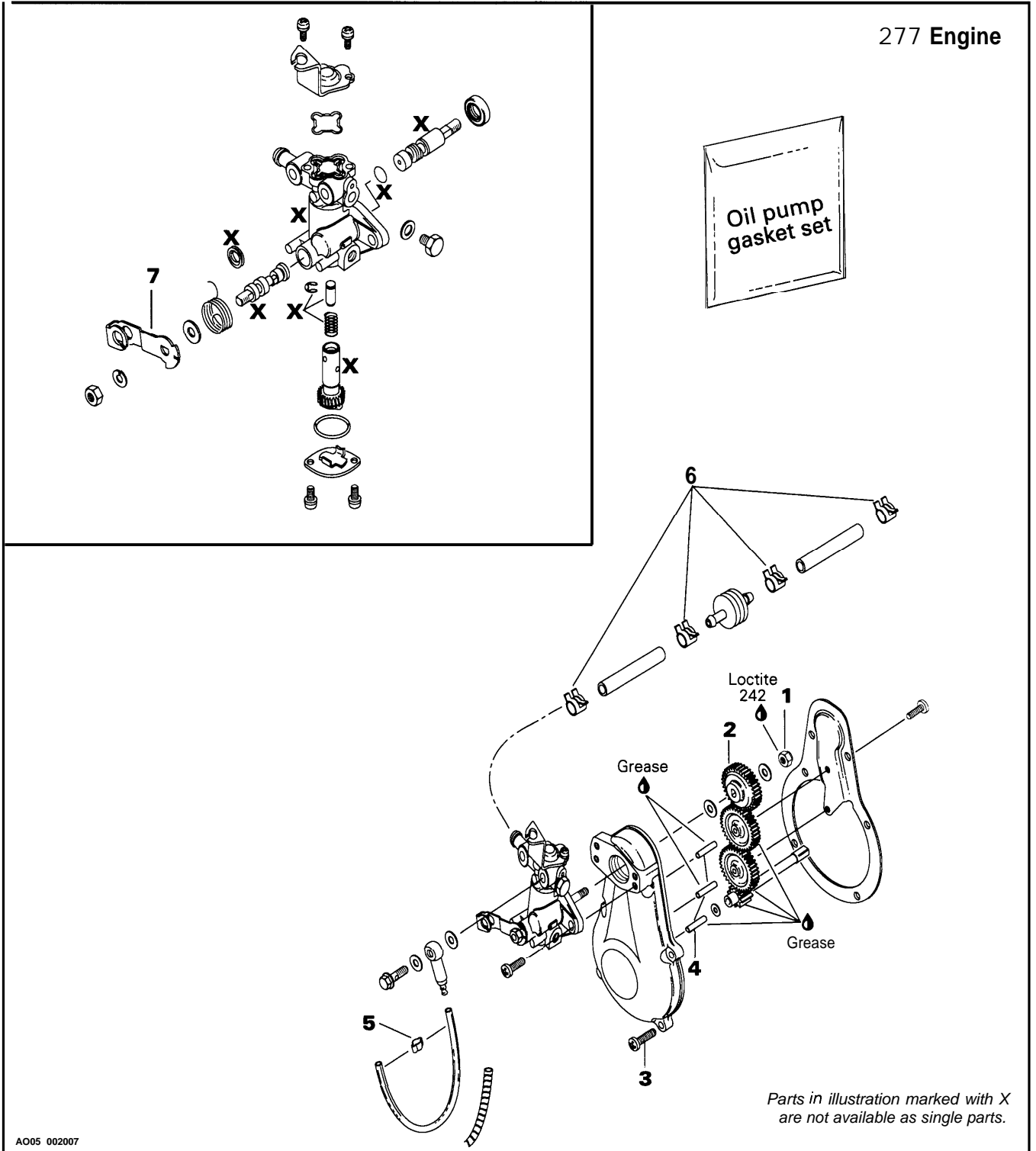
▼ CAUTION : Do not use silicone “sealant”, this product will corrode contacts.

Ignition Timing

Check as described in IGNITION TIMING 06-02.

OIL INJECTION SYSTEM

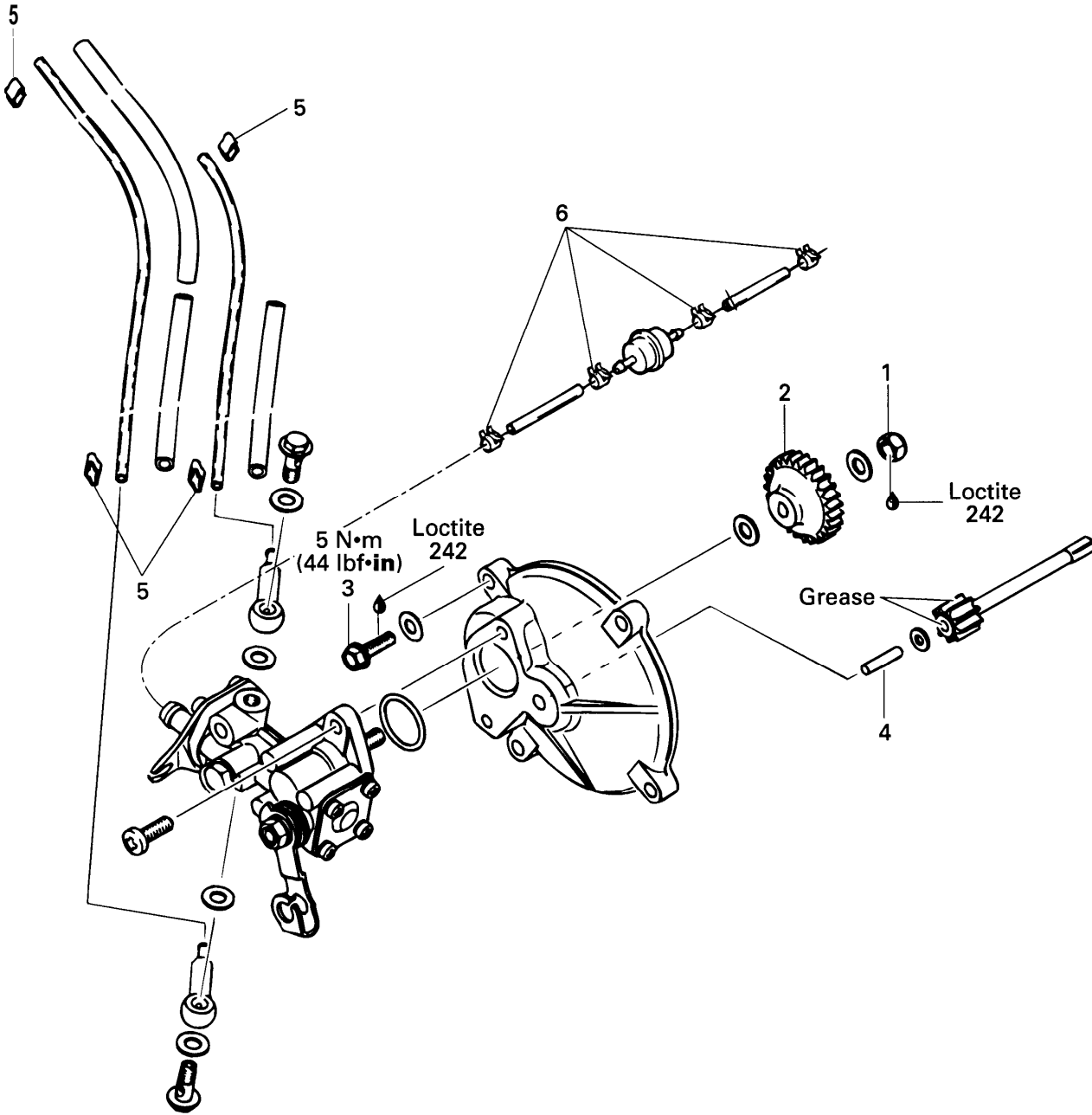
OIL INJECTION PUMP



Section 04 ENGINE

Sub-Section 05 (OIL INJECTION SYSTEM)

277 Engine



A03C17S

OIL PUMP IDENTIFICATION

7, Pump Lever

Different engines need different pumps. Oil pumps are identified on their levers.

▼ **CAUTION** : Always mount proper pump on engine.

ENGINE TYPE	OIL PUMP IDENTIFICATION
277	135 T
377	L4
443	E4
503	E4

○ **NOTE** : The following procedures can be done without removing the engine from chassis.

CLEANING

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

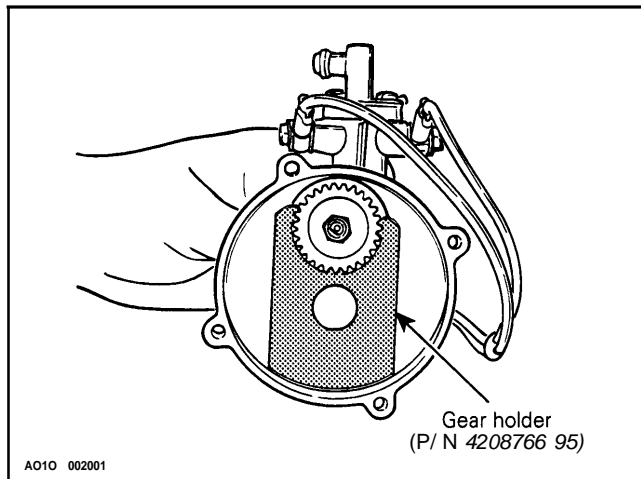
DISASSEMBLY

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

1,2, Gear Retaining Nut and Oil Pump Gear

To remove gear retaining nut, first extract the needle roller with pliers then lock gear in place using one of the following gear holder :

ENGINE TYPE	TOOL P / N
377 / 443/ 503	420876695



ASSEMBLY

2, Oil Pump Gear

At gear assembly, apply a light coat of low temperature grease (P/ N 4137061 00) on gear teeth,

4, Needle Roller

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

5,6, Spring Clip and Clamp

Always check for spring clips and clamps tightness.

3, Screw

Torque to 5 N•m (44 lbf•in).

All Models

Make sure cable barrel is well seated in oil pump lever.

Secure barrel with plastic washer and circlip.

Verify cable and oil pump lever operation.

ADJUSTMENT

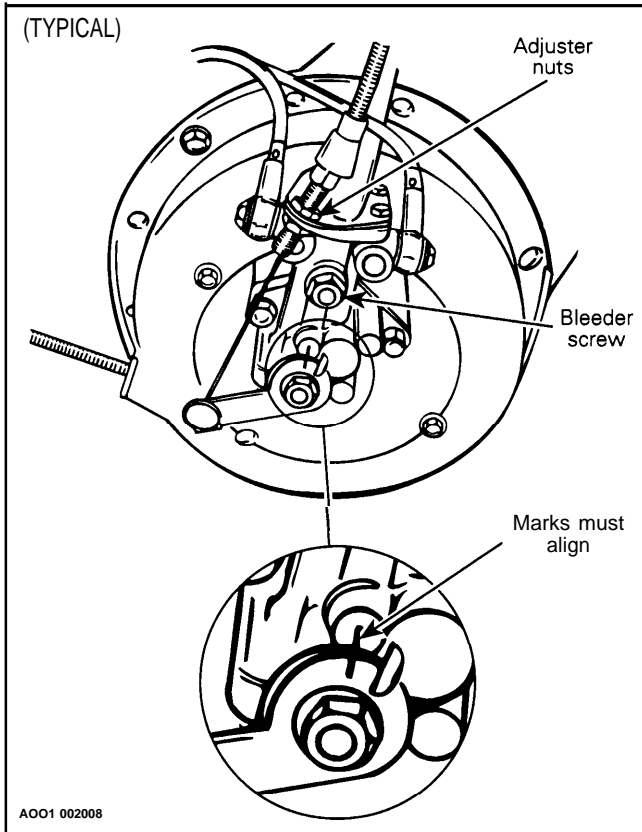
Prior to adjusting the pump, make sure all carburetor adjustments are completed.

Synchronizing 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.

Section 04 ENGINE
Sub-Section 05 (OIL INJECTION SYSTEM)



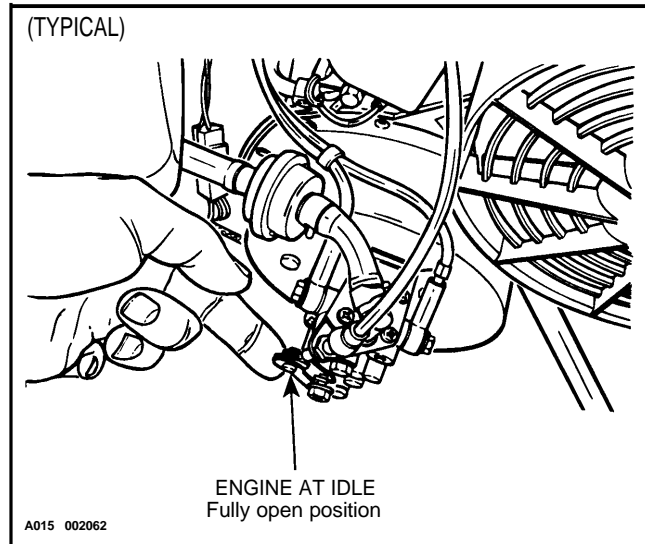
▼ CAUTION : Proper oil injection pump adjustment is very important. Any delay in the opening of the pump can result in serious engine damage.

To Bleed Oil Lines :

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

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.

CHECKING OPERATION

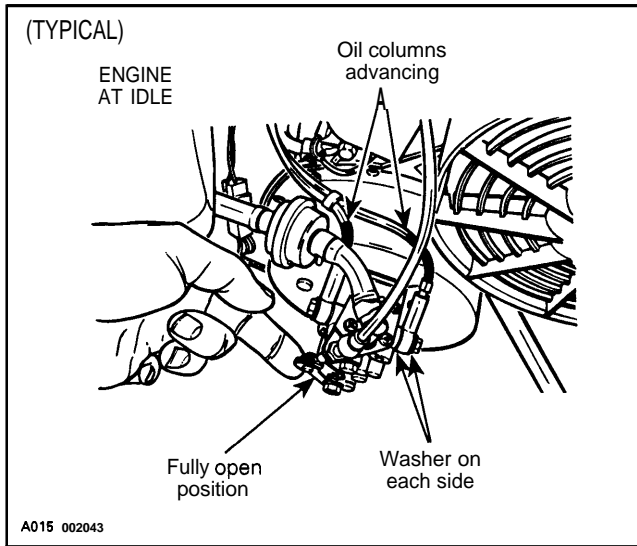
On Vehicle

○ NOTE : Main oil line must be full of oil. See bleeding procedure above.

Lift rear of vehicle and support with a mechanical stand. Unbolt banjo fittings from pump. Start engine and stop it as soon as it fires.

Check that oil level in small oil lines is passed banjo fittings end by about 25 mm (1 in) (this will be indicated by a clear section of small oil lines of about 25 mm (1 in)). Repeat the procedure until this condition is attained.

Reconnect banjo fittings with a washers on each side, start engine and run at idle while holding the pump lever in fully open position. Oil columns must advance into small oil lines.

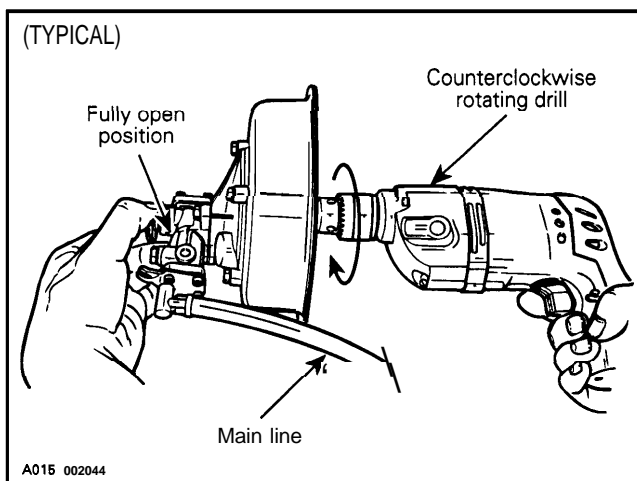


If not, remove pump assembly and check the pump gear and drive shaft (if applicable) for defects, replace as necessary. Test pump as describes below.

○ NOTE : Through normal use, oil level must not drop in small tubes. If oil drops, verify check valve operation in banjo fittings. Replace as necessary.

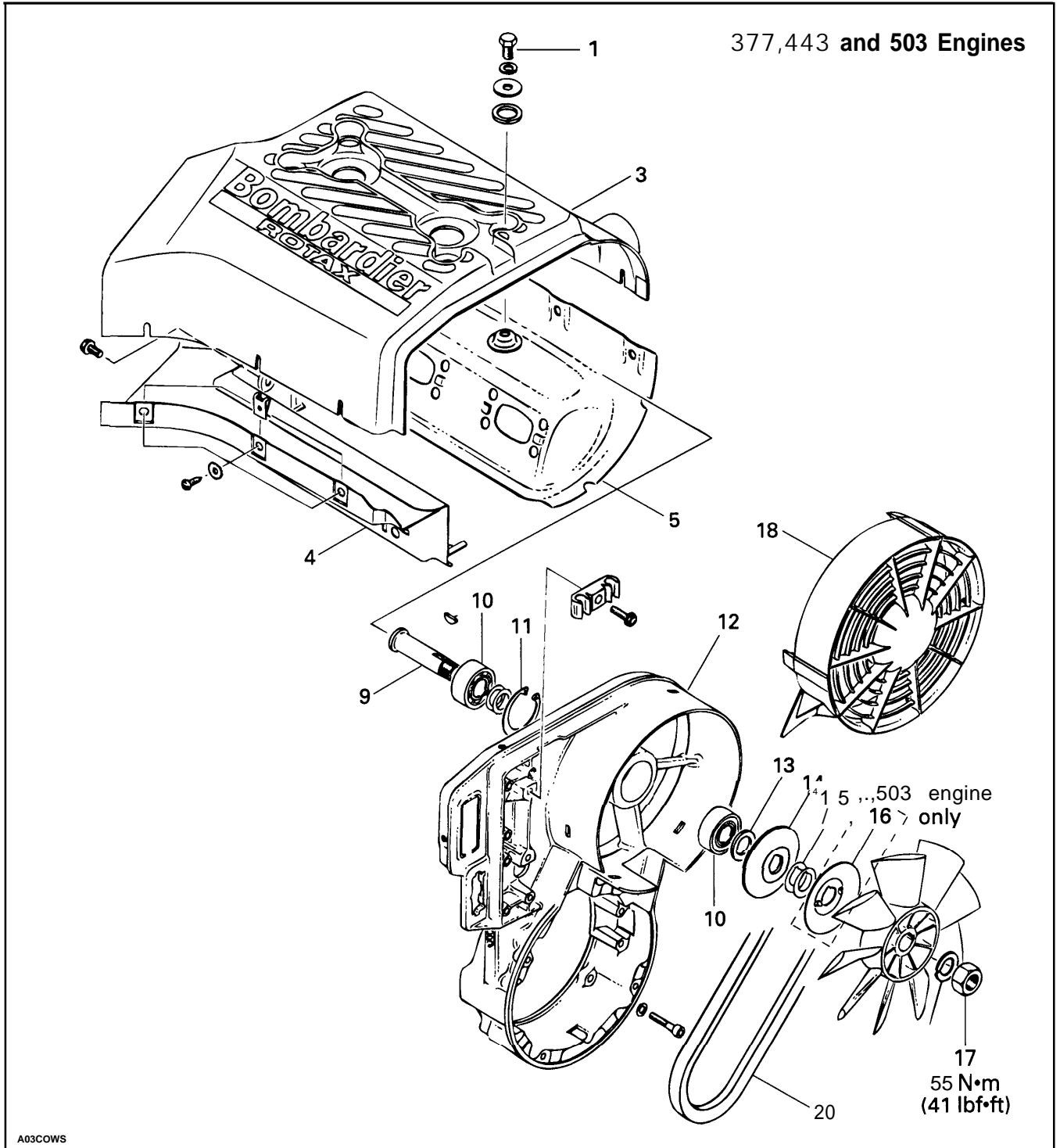
Oil Pump Test Bench

Connect a hose filled with injection oil to main line fitting. Insert other hose end in an injection oil container. Using a counterclockwise rotating drill rotate pump shaft. Oil must drip from outer holes while holding lever in a fully open position. If not replace pump,



AXIAL FAN COOLING SYSTEM

NOTE : For 247 and 277 engine radial fan cooling system, refer to 247 and 277 engine types 04-01.
0



A03COWS

Section 04 ENGINE

Sub-Section 06 (AXIAL FAN COOLING SYSTEM)

O NOTE : The following procedures can be done without removing engine from chassis.

CLEANING

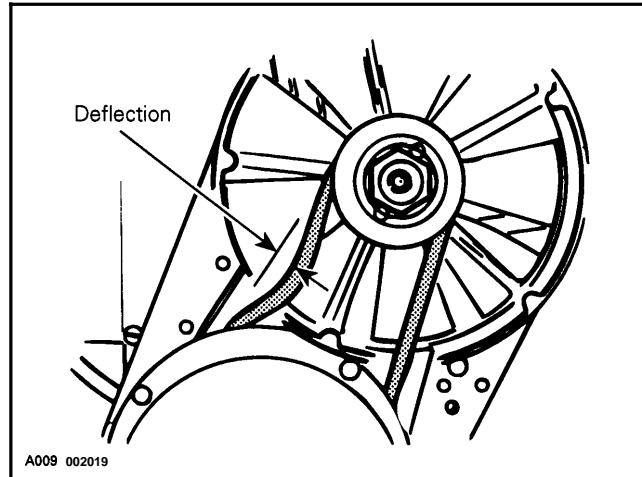
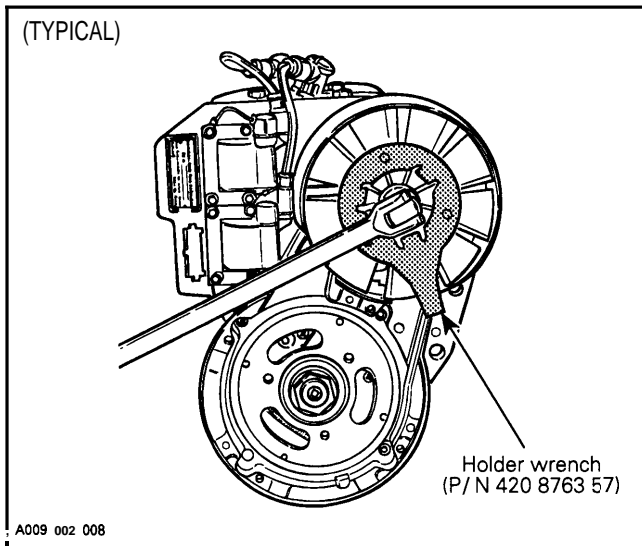
Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY AND ASSEMBLY

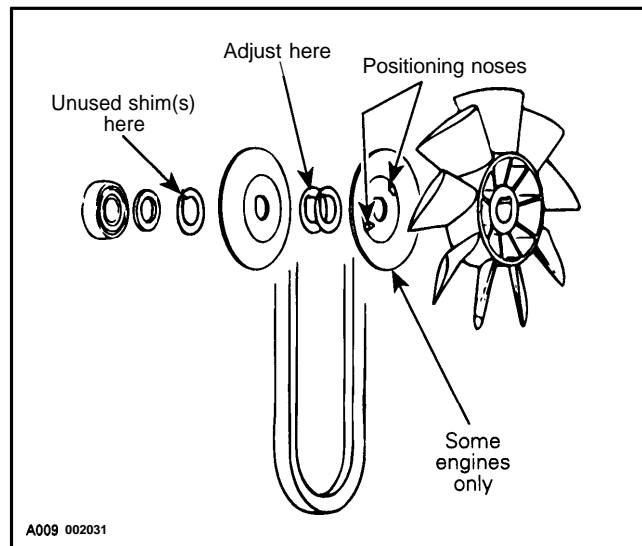
17, Fan Nut

Remove fan protector

To remove or install fan pulley retaining nut, lock fan pulley with special holder wrench (P/ N 4208763 57). At assembly, torque nut to 65 N•m (48 lbf•ft).



To adjust tension, add or remove shim(s) between pulley halves. Install excess shim(s) between distance sleeve and half pulley (housing side).



13,14,15,16,20, Distance Sleeve, Pulley Halves, Shim and V-belt

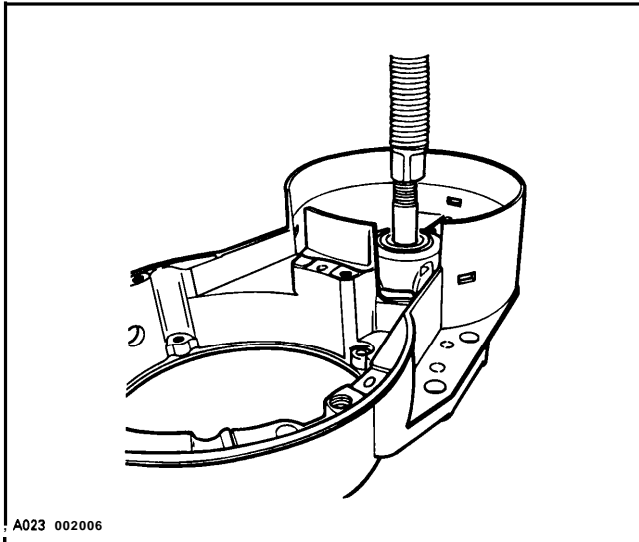
Fan belt deflection must be as specified when applying the proper force midway between pulleys.

ENGINE TYPE	BELT DEFLECTION	FORCE APPLIED
377, 443	8.5 mm (1 1/32 in)	5 kg (11 lb)
503	9.5 mm (3/8 in)	

Some engines have a separate metal pulley half instead of using back of fan as pulley half. On first mentioned engines, select pulley halves so that the one with 2 positioning noses will be on fan side. Ensure to insert these noses into fan notches.

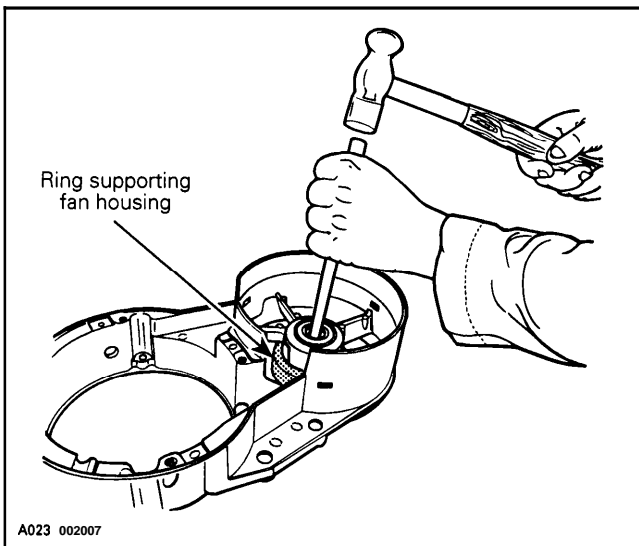
9, Fan Shaft

Using a press, drive the fan shaft out.



10,12, Bearing and Fan Housing

Support fan housing with a ring. With a punch, working all around bearing inner race, drive bearing out of fan housing. Keep shims for installation.



10,11, Bearing and Circlip

Remove circlip then remaining bearing.

To install, press one bearing in place then install circlip and shims. Press the other bearing from opposite side until it is flush with housing. Press fan shaft from engine side of fan housing. Check for free rolling action.

1,2,3, Screw, Loctite 242 (Blue) and Cylinder Cowl

At assembly, apply a light coat of Loctite 242 (blue) on threads. It should be noted that to correctly remove a threadlocked screw, it is first necessary to slightly tap on screw head to break threadlocker bond. This will eliminate the possibility of screw breakage.

6,7,8, Rivet, Washer and Air Duct

Check for damage or permanent deformation.

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.

Install washer over air duct.

On all engines, check fit of engine air duct with hood air duct, Adjust hood as necessary.

4,5, Cylinder Cowl

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

18, Fan Protector

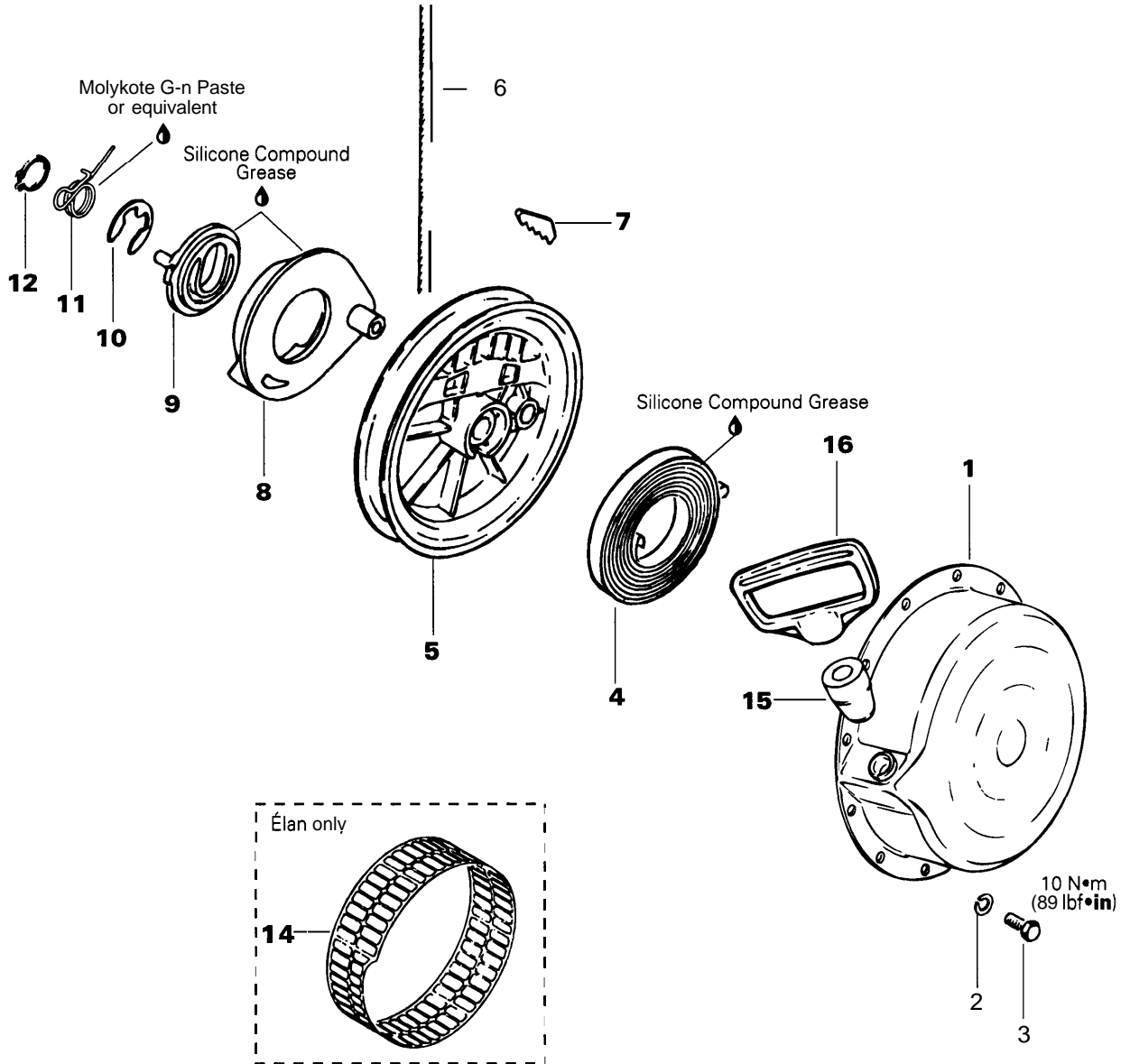
Reinstall properly.

◆ WARNING : Always reinstall fan protector after servicing.

REWIND STARTER

(TYPICAL)

All Models



AOO1 002072

REMOVAL

16, Starter Grip

Using a small screwdriver, extract rope knot from starter grip. Cut rope close to knot.

1,2,3, Starter Housing, Lock Washer and Screw

Remove screws and washers securing rewind starter to engine then remove rewind starter.

On fan cooled models with oil injection pump remove pump from rewind starter cover.

DISASSEMBLY

To remove rope from rewind starter mechanism :

8,9,10,11,12, Pawl, Pawl Lock, Circlip, Locking Spring and Locking Ring

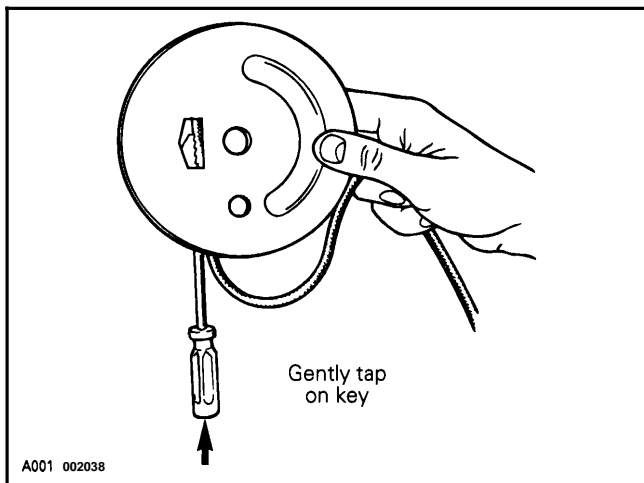
— First remove locking ring, locking spring, circlip, pawl lock and pawl.

1,5, Starter Housing and Rope Sheave

— Remove sheave from starter housing.

6,7, Starter Rope and Key

— Disengage key and pull out rope.

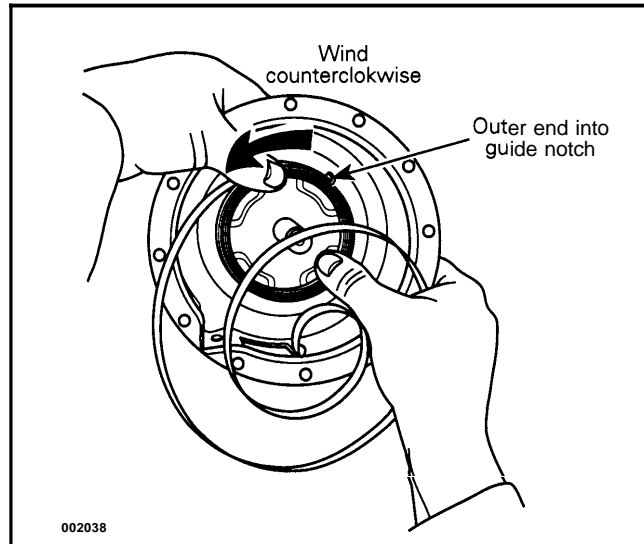


ASSEMBLY

4,18, Rewind Spring and Silicone Compound Grease

At assembly, position spring outer end into spring guide notch then wind the spring counterclockwise into guide.

◆ **WARNING** : Since the spring is tightly wound inside the guide it may fly out when rewind is handled. Always handle with care.

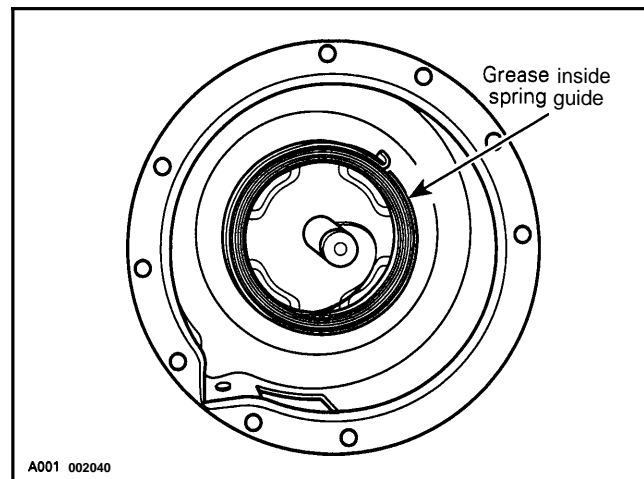


○ **NOTE** : Due to dust accumulation, rewind starter must be periodically cleaned, inspected and relubricated.

▼ **CAUTION** : It is of the utmost importance that the rewind starter spring(s) be lubricated periodically using specific lubricants. Otherwise, rewind starter component life will be shortened and / or rewind starter will not operate properly under very cold temperatures.

Lubricate spring assembly with silicone compound grease (P/ N 4208970 61) and position into starter housing as illustrated.

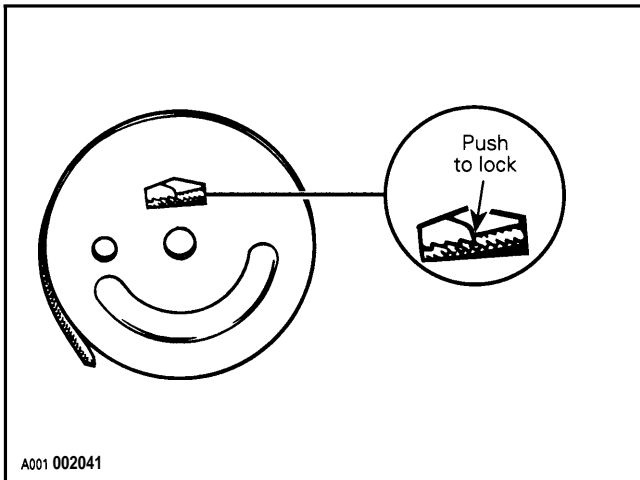
▼ **CAUTION** : This lubricant must NOT be used on rewind starter locking spring as it does not stay on under vibration.



▼ **CAUTION :** The use of standard multi-purpose grease could result in rewind starter malfunction.

5,6,7, Rope Sheave, Starter Rope and Key

To install a new rope : insert rope into sheave orifice and lock it with the key as illustrated.

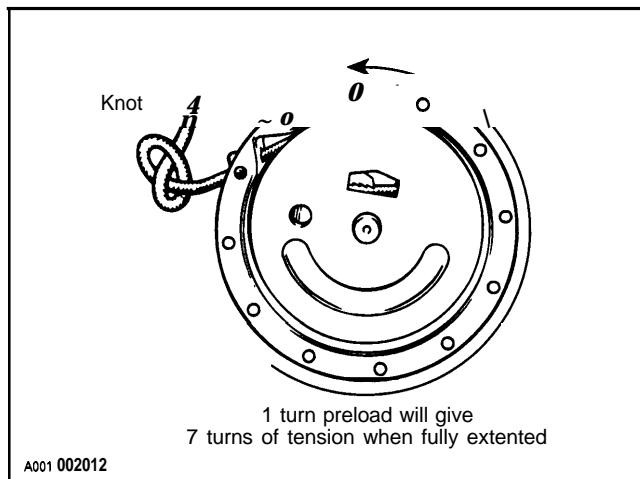


To adjust rope tension :

Wind rope on sheave and place rope sheave into starter housing making sure that the sheave hub notch engages in the rewind spring hook.

Rotate the sheave counterclockwise until rope end is accessible through starter housing orifice.

Pull the rope out of the starter housing and temporarily make a knot to hold it.

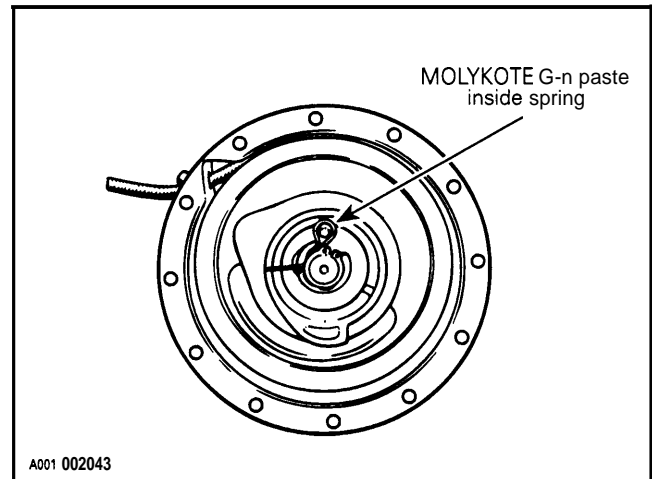


8,9,10, Pawl, Pawl Lock and Circlip

Position pawl, pawl lock and circlip.

11,17, Locking Spring and Molykote G-n Paste

Install locking spring and lubricate with MO LYKOTE G-n paste from Dow Corning® or equivalent.



Install locking ring.

▼ **CAUTION :** This lubricant must NOT be used on rewind springs as it does not stay on when dry.

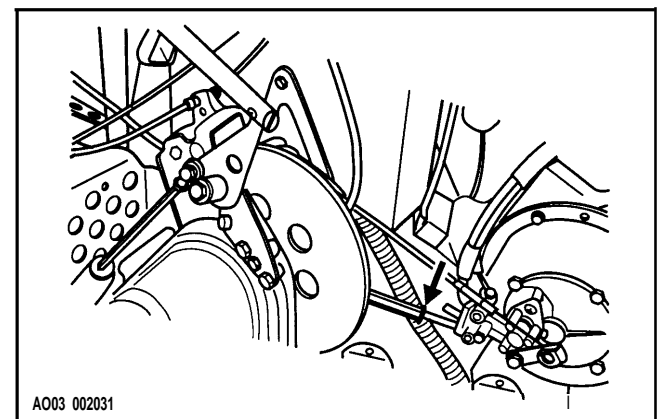
INSTALLATION

On fan cooled models with oil injection pump, reinstall oil pump on rewind starter assembly.

Reinstall rewind starter assembly on engine.

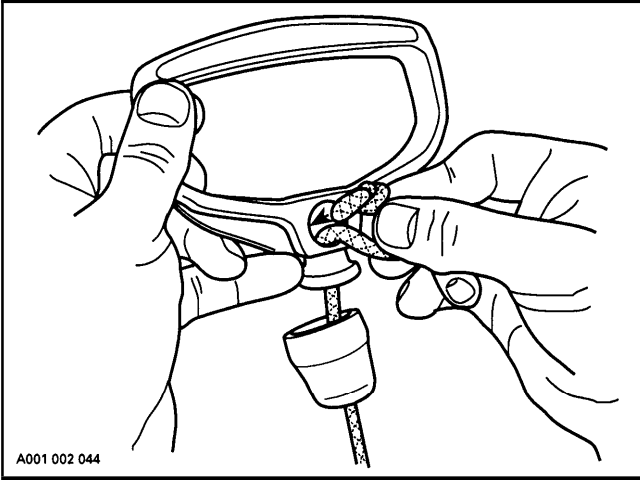
6, Starter Rope

Thread starter rope through rope guide when applicable.



16, Starter Grip

Prior to installing starter grip on new rope, it is first necessary to fuse the rope end with a lit match. Pass rope through rubber buffer and starter grip and tie a knot in the rope end. Fuse the knot with a lit match then insert rope end down and pull the starter grip over the knot.

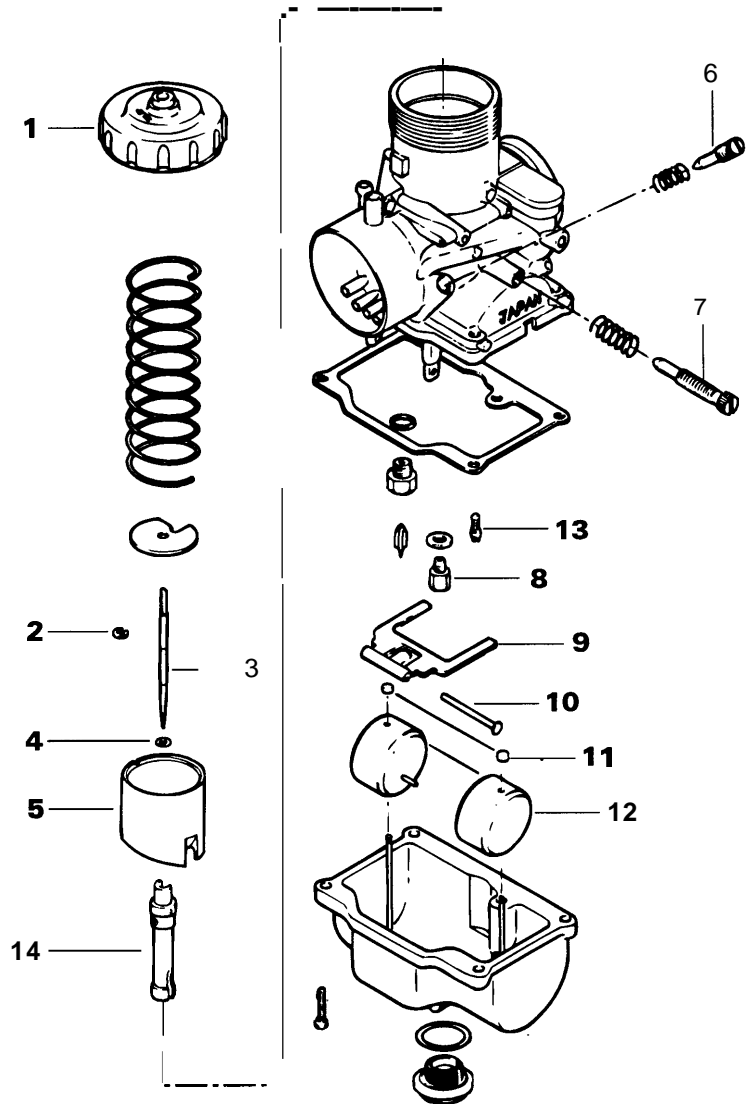


CARBURETOR AND FUEL PUMP

MIKUNI FLOAT CARBURETOR

List of engines and their respective carburetors	
ENGINE TYPE	CARBURETOR MIKUNI NO.
247	VM28-470
277	VM 34-443
377	PTO : VM 30-188 MAG : VM 30-188
443	PTO : VM 34-467 MAG : VM 34-468
503	PTO : VM 34-465 MAG : VM 34-466

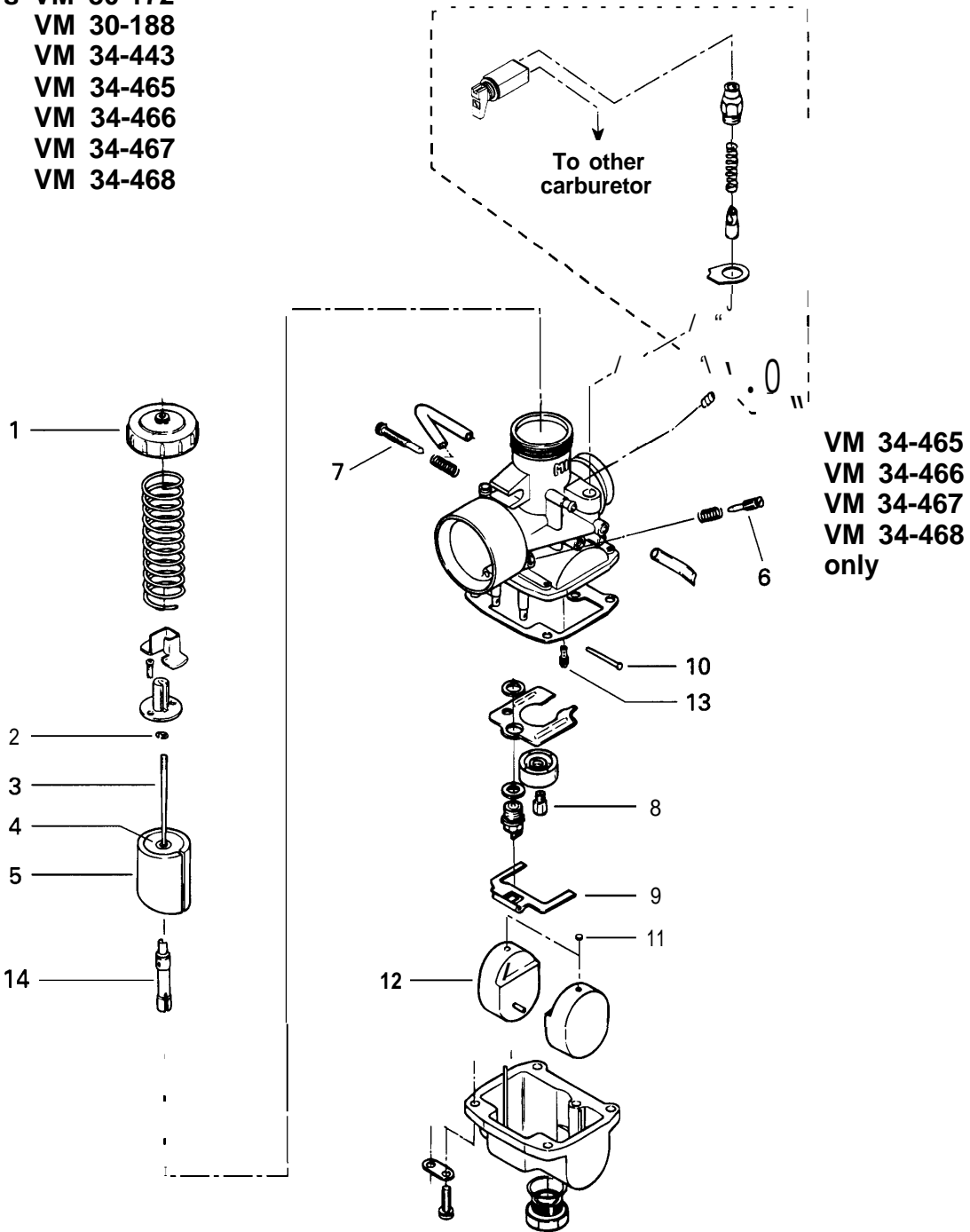
Carburetor VM 28-470



Section 04 ENGINE

Sub-Section 08 (CARBURETOR AND FUEL PUMP)

Carburetors VM 30-172
VM 30-188
VM 34-443
VM 34-465
VM 34-466
VM 34-467
VM 34-468



A15C2AS

REMOVAL

Élan Only

Remove console.

All Models

Remove air silencer(s). For S-Series, see BATTERY 06-04.

Disconnect fuel inlet line.

Disconnect primer line from carburetor on some models.

Disconnect choke cable on some models.

1,5, Cover and Throttle Slide

Unscrew carburetor cover then pull out throttle slide from carburetor.

● **WARNING : Exercise care when handling throttle slide. Scratches incurred may cause throttle slide to stick open in operation.**

Disconnect throttle cable from throttle slide.

Untighten rubber flange clamps then remove carburetor from engine.

CLEANING AND INSPECTION

The entire carburetor should be cleaned with a general solvent and dried with compressed air before disassembly.

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

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.

○ **NOTE : Install needle valve for snowmobile carburetor only. It is designed to operate with a fuel pump system.**

Check throttle slide for wear. Replace as necessary.

11,12, Cap and Float

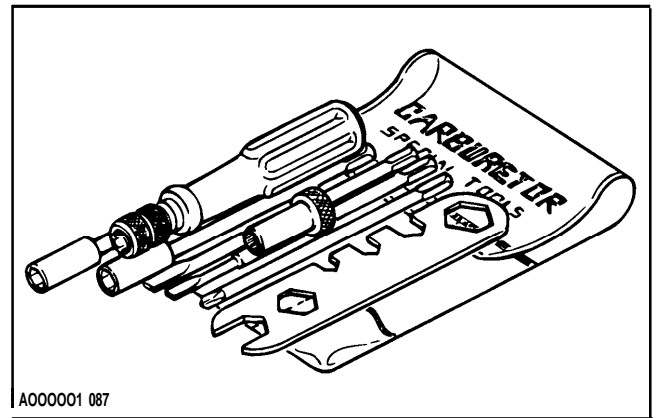
Check for fuel inside float.

If fuel is noticed :

- Check cap for fuel tightness ; replace as necessary.
- Check float for cracks or other damage affecting fuel tightness ; replace as necessary.

DISASSEMBLY AND ASSEMBLY

○ **NOTE : To ease the carburetor disassembly and assembly procedures it is recommended to use carburetor tool kit (P/ N 4041120 00).**



2,3, E-clip and Needle

All Models Except Élan

Remove screws from needle retaining plate to withdraw the needle.

The position of the needle in the throttle slide is adjustable by means of an E-clip inserted into 1 of 5 grooves located on the upper part of the needle. Position 1 (at top) is the leanest, 5 (at bottom) the richest.

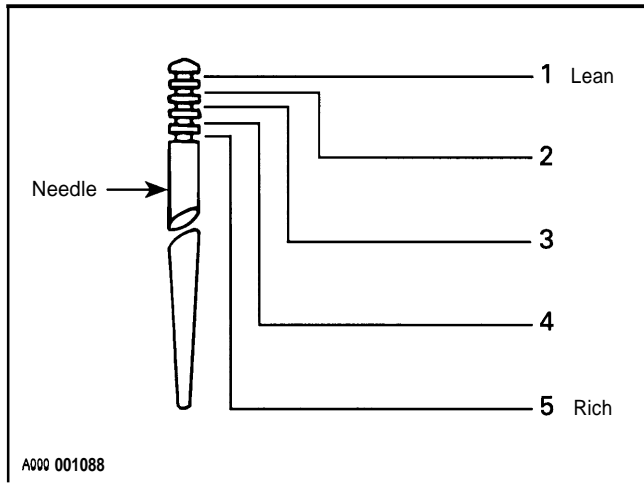
○ **NOTE : The last digit of the needle identification number gives the recommended position of the E-clip from the top of the needle.**

Example : 6DH4-3

Needle identification _____ ↑ Recommended position of the E-clip from top

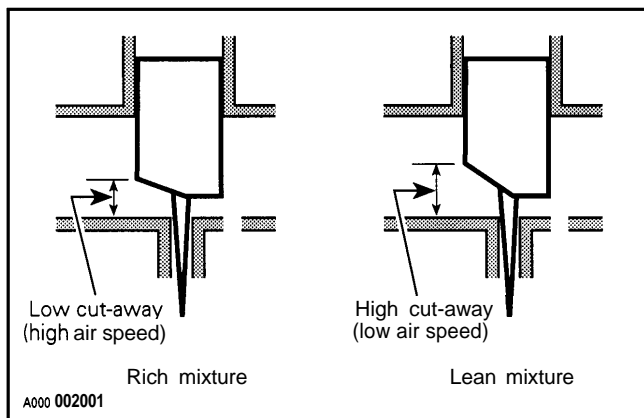
Section 04 ENGINE

Sub-Section 08 (CARBURETOR AND FUEL PUMP)



5, Throttle Slide

The size of the throttle slide cut-away affects the fuel mixture between 1/8 to 1/2 throttle opening. A certain amount of richness is needed for that particular range because this is where the transition from the low speed to the high speed circuit takes place.



8, Main Jet

The main jet installed in the carburetor has been selected for a temperature of -20°C (0°F) at sea level. Different jetting can be installed to suit temperature and / or altitude changes. Always check spark plug tip and / or piston dome color to find out correct jetting.

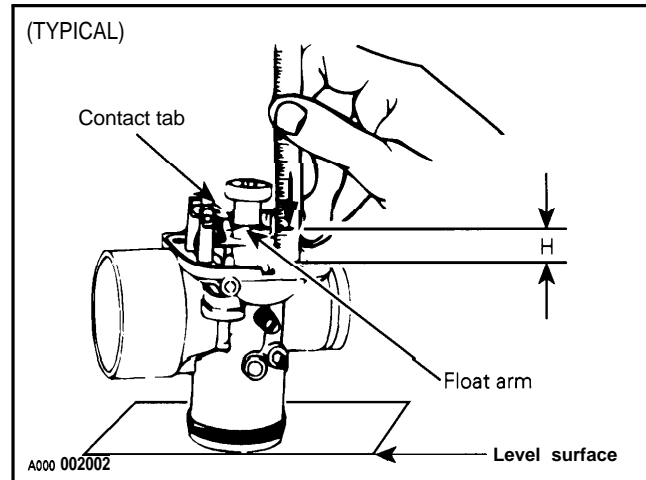
CARBURETOR FLOAT LEVEL ADJUSTMENT

9,10, Float Arm and Float Arm Pin

Correct fuel level in float chamber is vital toward maximum engine efficiency. To check for correct float level proceed as follows :

— Remove float bowl and gasket from carburetor.

—With carburetor chamber upside-down on a level surface, measure height H between bowl seat and top edge of float arm._

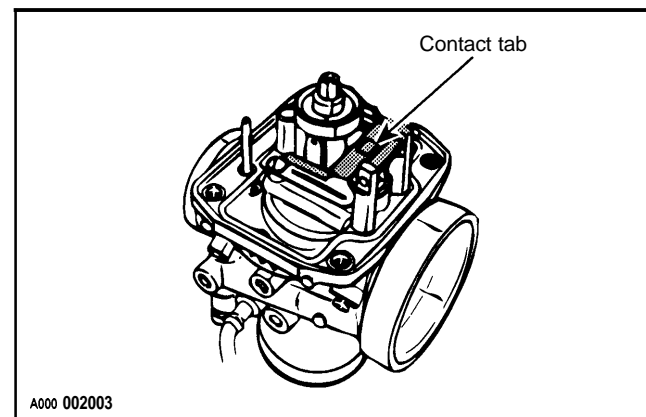


Float arm height dimensions :

CARBURETOR MODEL	FLOAT HEIGHT H	
	± 1 mm	(± .040 in)
VM 28	17.3	(.681)
VM 30 VM 34	23.9	(.941)

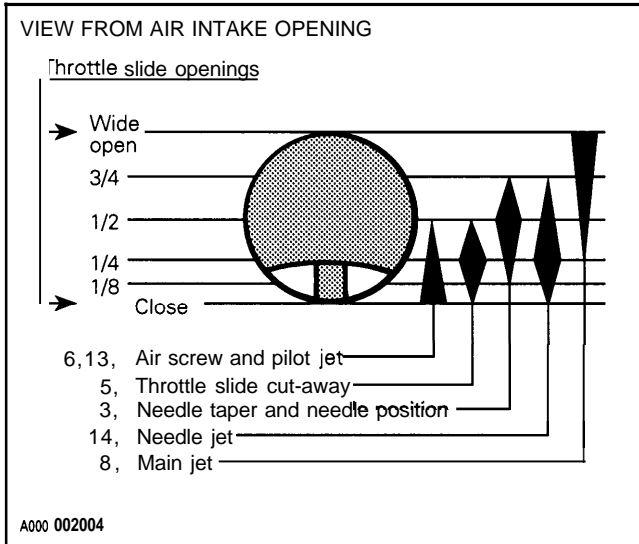
To Adjust Height H :

— Bend the contact tab of float arm until the specified height is reached.



The illustration below shows which part of the carburetor begins and to stops to function at different throttle slide openings.

Note that the wider part of symbol corresponds to the opening mostly affected. For instance, throttle slide cut-away function at close position but it is most effective at 1/4 opening and decreases up to 1/2 opening.



NOTE: For fine tuning refer to TECHNICAL DATA section 10 and to SPARK PLUG 06-03.

NOTE : For high altitude regions, the *High Altitude Technical Data* (P/N 484062400 and 484 054500 for binder) gives information about calibration according to altitude and temperature.

INSTALLATION

CAUTION : Never allow throttle slide(s) to snap shut.

To install carburetor on engine, inverse removal procedure.

However, pay attention to the following :

— Inspect throttle cable and housing prior to installation.

On applicable models, make sure to align tab of carburetor and air intake silencer (if applicable) with notch of adaptor(s). On applicable models, install adaptor with up mark facing up.

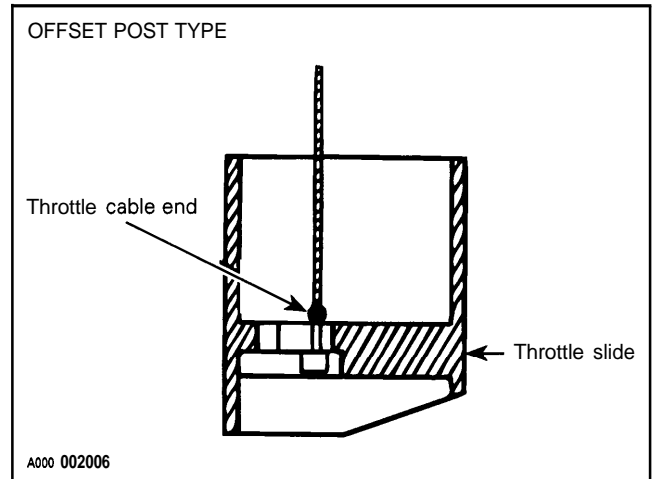
CAUTION : The rubber flange must be checked for cracks and /or damage. At assembly, the flange must be perfectly matched with the air intake manifold or severe engine damage will occur.

Install clamps in a way that their tightening bolts are staggered — not aligned.

Offset Post Retaining

Élan Only

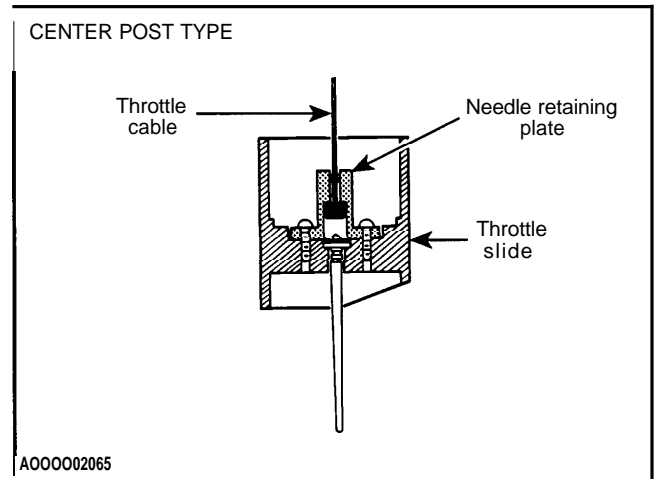
When installing throttle cable end in throttle slide, hook up cable in throttle slide.



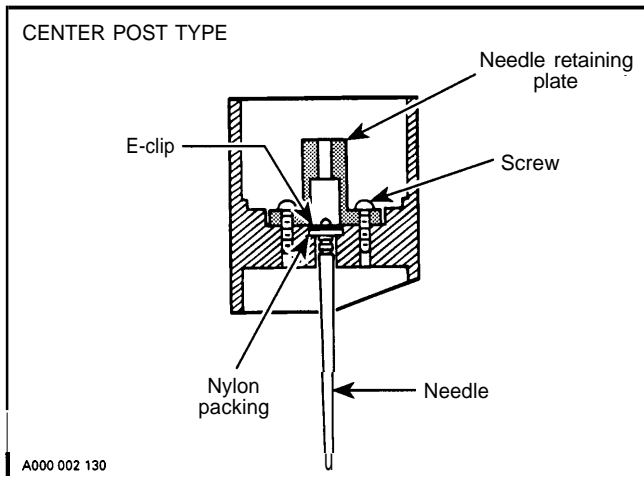
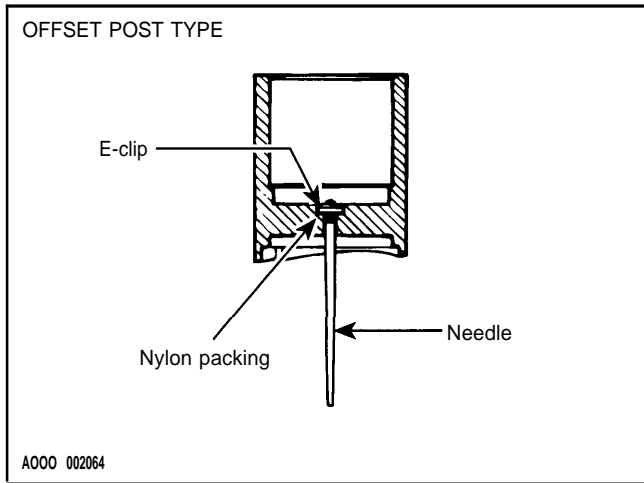
Center Post Retaining (all other models)

Hook throttle cable into the needle retainer plate.

NOTE : Do not obstruct hole in throttle slide when installing needle retaining plate. This is important to allow air escaping through and thus allowing a quick response.



3,4, Needle and Nylon Packing

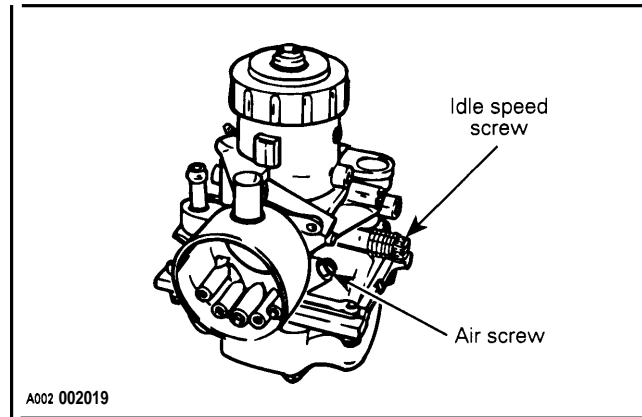


Make sure the nylon packing is installed on all applicable throttle slides.

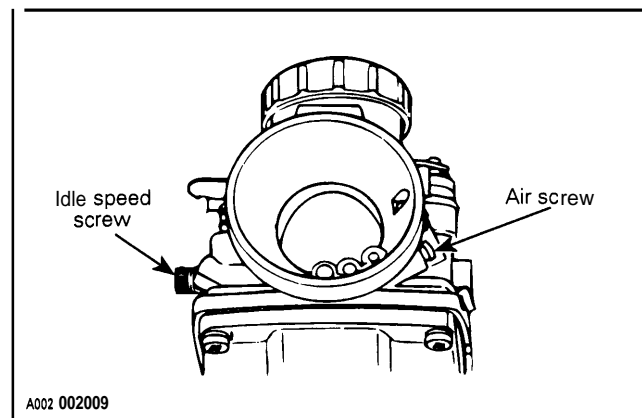
CAUTION : Serious engine damage can occur if this notice is disregarded.

CARBURETOR ADJUSTMENTS

Élan



All Other Models



6, Air Screw Adjustment

Completely close the **air screw** (until a slight seating resistance is felt) then back off as specified.

Turning screw in clockwise enriches mixture and conversely, turning it out counterclockwise leans mixture.

Refer to TECHNICAL DATA section 10 for the specifications.

Carburetor Synchronization

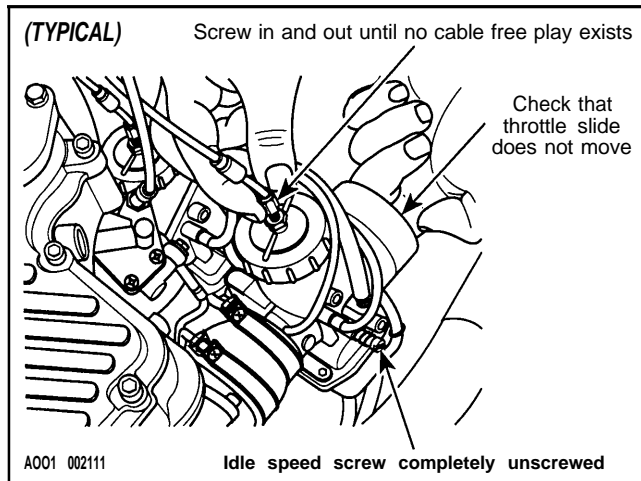
Twin Cylinder Models Only

Both carburetor slides must start to open at the same time.

Completely unscrew idle speed screw on both carburetors.

Unlock cable adjustment lock nut then screw in adjuster until throttle slide bottoms out. Proceed the same for both carburetors.

Unscrew cable adjuster to eliminate all cable play but without raising throttle slide. Proceed with care on both carburetors then tighten jam nuts. Both carburetor slide must start to open at the same time, depress throttle lever to check it and turn cable adjuster as required.



Check throttle slide position at wide open throttle. Throttle slide must be flush with carburetor **inlet** bore. At that same position, check that throttle slide does not contact carburetor cover. Turn cable adjuster and recheck synchronisation.

▼ **CAUTION** : If the throttle slide rests against the carburetor cover at full throttle opening, this will create too much strain and may damage the throttle cable or other components in throttle mechanism.

Throttle Slide Adjustment

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

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

The following method should be used with engine turned off:

— **Idle speed** screw must be completely unscrewed. It must not contact throttle slide.

Turn the **idle speed screw** clockwise until it contacts the throttle slide then continue turning 2 additional turns.

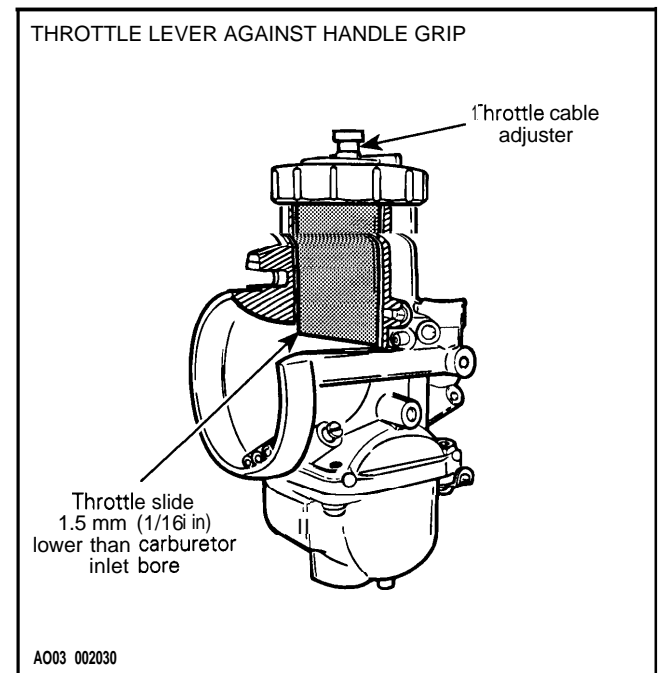
On twin carburetor models: Repeat on the other one. This will ensure identical throttle slide preliminary idle setting. Recheck carburetor synchronization. Adjust idle by turning both idle speed screws of the same amount,

▼ **CAUTION** : On twin carburetor models, make sure both carburetors start to operate simultaneously. Beside do not interchange carburetors, the jetting may be different on each side. A red dot is printed on one carburetor and on the engine. Match the carburetor and the engine dots when applicable.

▼ **CAUTION** : On oil injection models, the oil injection pump adjustment must be checked each time carburetor is adjusted. Refer to OIL INJECTION SYSTEM 04-05.

Tundra II LT

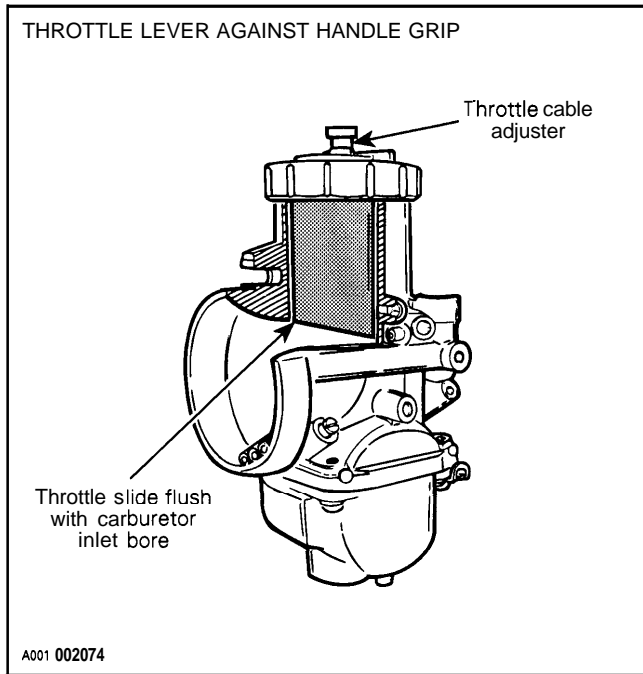
Throttle slide must be 1.5 mm (1/16 in) lower than the top of carburetor **inlet** bore.



Section 04 ENGINE
 Sub-Section 08 (CARBURETOR AND FUEL PUMP)

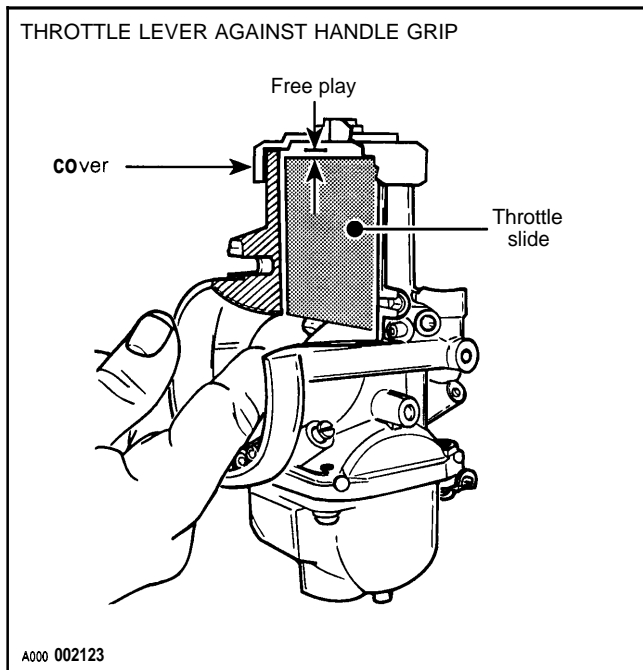
All Models Except Tundra II LT

Throttle slide flush with carburetor inlet bore.



All Models

Once carburetor adjustment is performed, check that with the throttle lever fully depressed, there is a free play between the carburetor cover and top of throttle slide.



WARNING : This gap is very important. If the throttle slide rests against the carburetor cover at full throttle opening, this will create too much strain and may damage the throttle cable or other components in throttle mechanism.

On twin-carburetor models : Recheck carburetor synchronization.

CAUTION : On oil injection models, the oil injection pump adjustment must be checked each time carburetor is adjusted. Refer to OIL INJECTION SYSTEM 04-05.

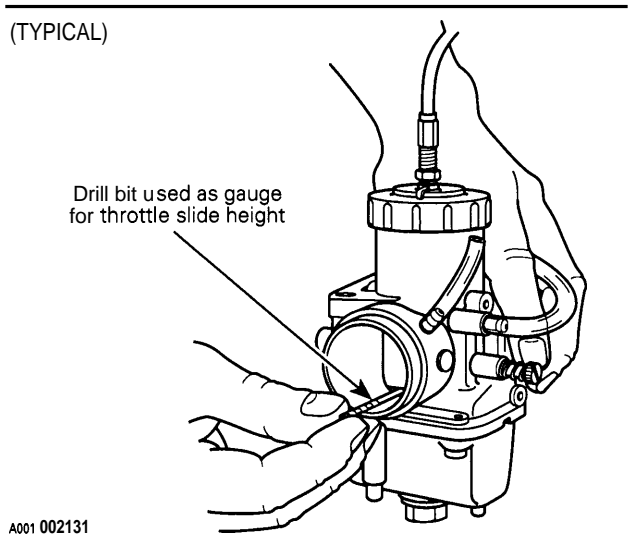
PRELIMINARY IDLE SPEED ADJUSTMENT

Adjust throttle slide height (see table) by turning idle speed screw no. 7.

Final adjustment (engine running at idle speed) should be within 1/2 turn of idle speed screw from preliminary adjustment.

Models	Throttle Slide Height mm (in)
Tundra II LT, Skandic 380, Touring E / LE / SLE, Formula S, Alpine II	1.3 (.051)
Élan, Touring SLE Skandic 500, Formula SL	1.5 (.059)
Touring LE	1.8 (.071)

(TYPICAL)



IDLE SPEED FINAL ADJUSTMENT

7, Idle Speed Screw

Check idle speed screw straightness. Replace as necessary.

Start engine and allow it to warm then adjust idle speed to specifications by turning idle speed screw clockwise to increase engine speed or counterclockwise to decrease it.

NOTE : On twin-carburetor models : Turn adjustment screw the same amount to keep carburetors synchronized.

Refer to TECHNICAL DATA section 10 for the specifications.

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

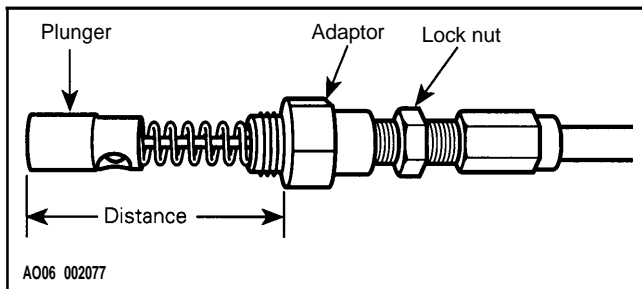
CHOKE

Touring LE / SLE, Skandic 500 and Formula SL

Choke Plunger Adjustment

Adjust cable length to obtain the following plunger/adaptor distance. Retighten lock nut.

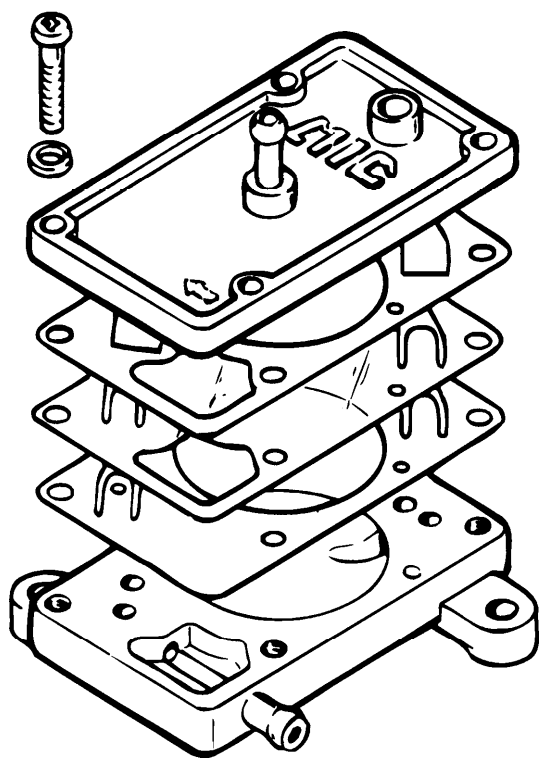
CARBURETOR	PLUNGER / ADAPTOR DISTANCE ± 0.3 mm (± .012 in)
PTO	32.5 (1 .280)
MAG	31.3 (1 .232)



Section 04 ENGINE
Sub-Section 08 (CARBURETOR AND FUEL PUMP)

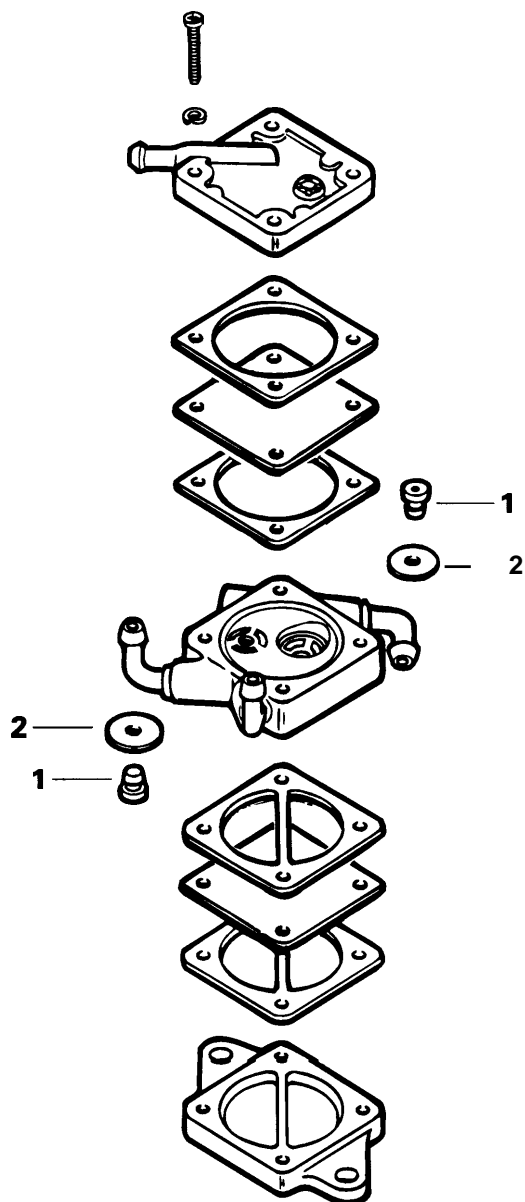
FUEL PUMP

Elan and Tundra LT



A000 002076

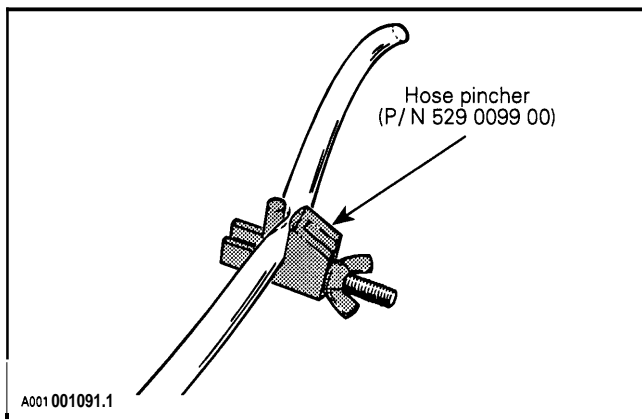
S-Series



A000 002119

REMOVAL

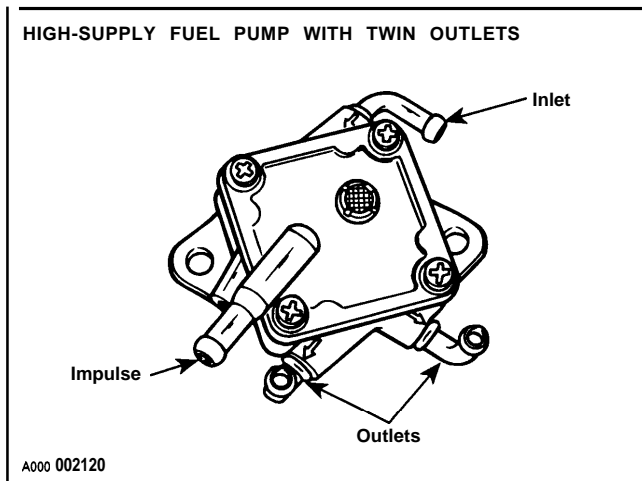
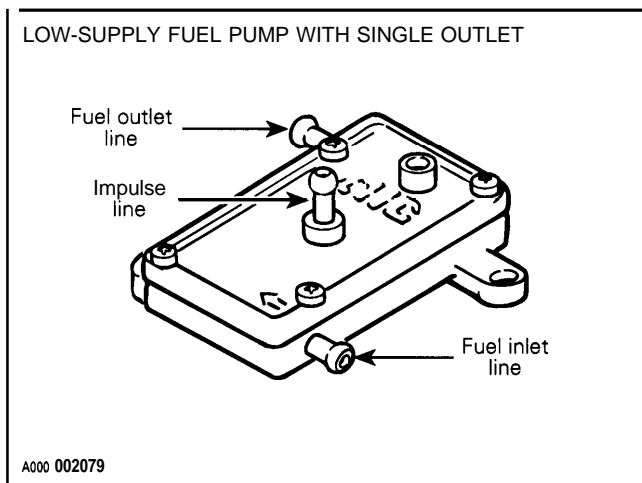
Install a hose pincer (P / N 5290099 00) on fuel supply line close to pump inlet.



Disconnect fuel outlet line(s).

Disconnect impulse line.

Remove screws (or nuts if applicable) securing fuel pump.



PUMP VERIFICATION

Check fuel pump valves operation as follows :

Connect a 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 2 outlets, plug 1 outlet with finger while checking outlet valve.

Check impulse diaphragm and gasket on high-supply fuel pump with twin outlets as follows :

Connect a clean plastic tubing to the impulse nipple and plug vent hole on top cover. Either apply pressure or vacuum. The diaphragm / gasket must not leak.

DISASSEMBLY

1,2, Grommet and Valve (high-supply pump with twin outlets only)

Do not disassemble valves unless replacement is necessary.

CLEANING AND 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, tears or imperfections. Replace as needed.

High-supply pump with twin outlets : Thoroughly clean filter on top cover. Replace filter if necessary.

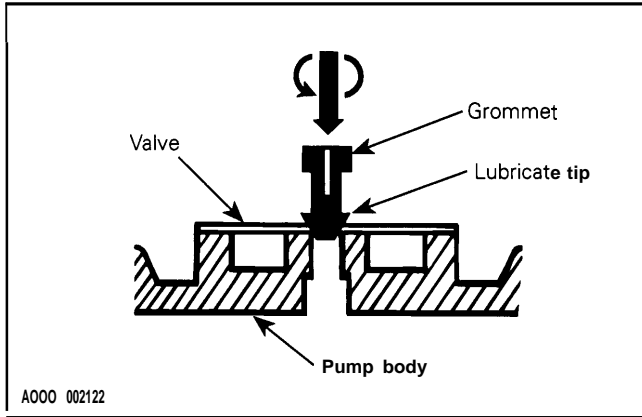
Section 04 ENGINE

Sub-Section 08 (CARBURETOR AND FUEL PUMP)

ASSEMBLY

To install a new valve, proceed as follows :

- Place new valve flat on its seat.
- Slightly oil taper tip of grommet.
- Push grommet with a rotational movement until it crosses its housing.



When assembling pump, ensure to properly position stages together. Refer to previous illustrations if necessary.

INSTALLATION

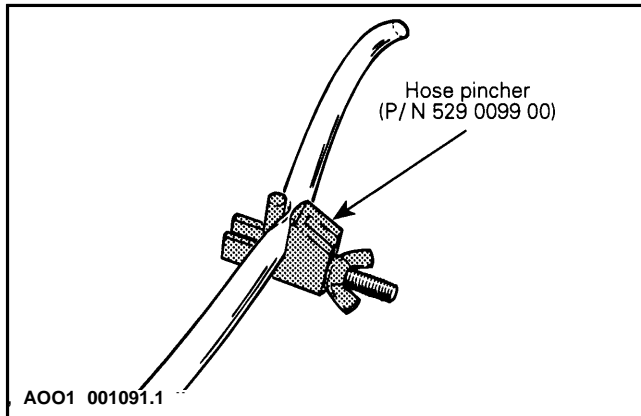
To install, inverse removal procedure.

- **WARNING** : Pressure test to ensure there is no leak **in fuel system**.

FUEL TANK AND THROTTLE CABLE

Fuel Tank Lines

◆ **WARNING :** When draining a fuel tank or whenever a fuel line is disconnected, obstruct line with a hose pincher (P / N 5290099 00) or equivalent device. Fuel is flammable and explosive under certain conditions. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity.



Impulse / Fuel Lines Spring Clips (All Models)

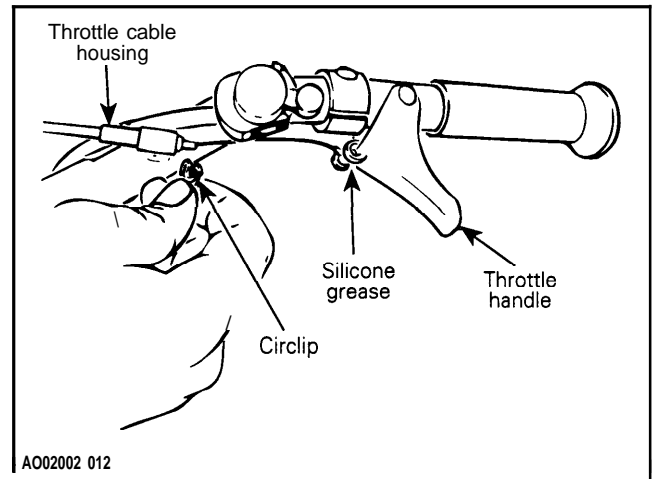
Always reposition spring clips after any repair to prevent possible leaks.

Throttle Cable Circlip at Handlebar (All Models)

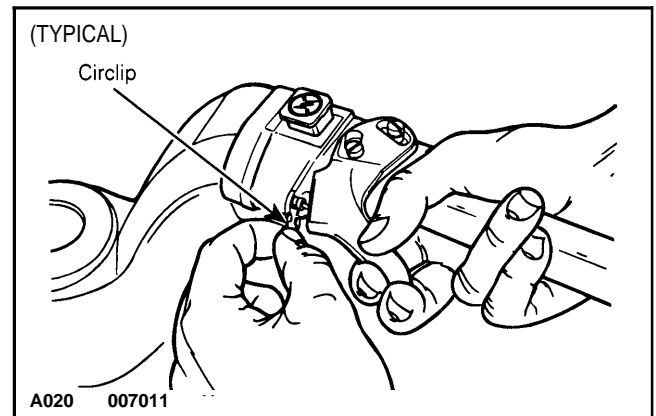
Put silicone grease (P / N 4137017 00) around cable barrel. Locate circlip as per illustration.

◆ **WARNING :** If this procedure is disregarded, throttle might be half-open at normally closed position and the engine will speed **up when starting.**

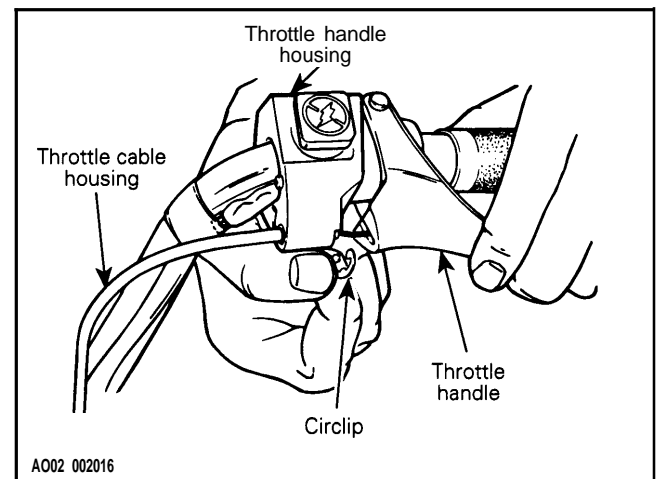
Élan Only



Models with Easy Action Throttle Lever



Other Models



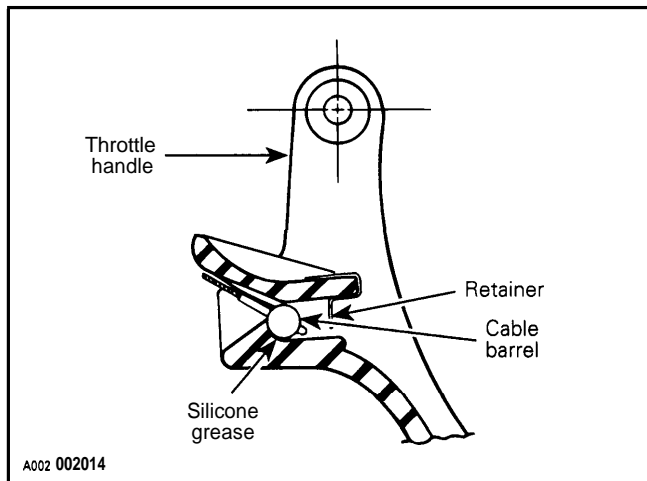
Section 04 ENGINE

Sub-Section 09 (FUEL TANK AND THROTTLE CABLE)

Throttle Cable Retainer

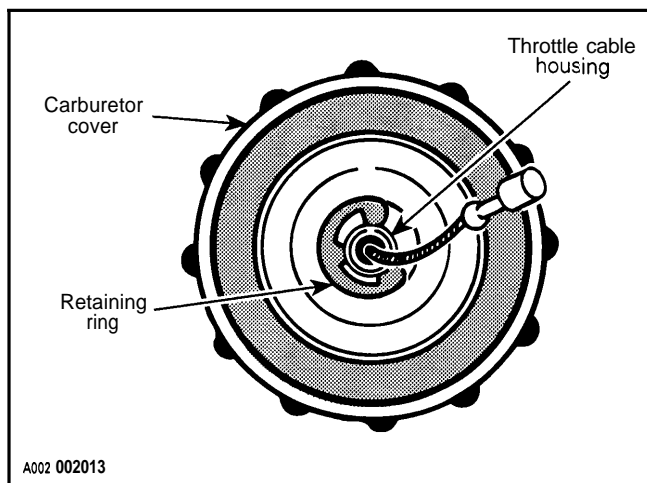
Tundra II LT Models

The retainer must be pushed on the throttle handle tab until it sits properly.



Throttle Cable O-ring and Retaining Ring at Carburetor (some models)

Locate O-ring outside of carburetor cover and retaining ring inside.



Adjust throttle cable as specified in CARBURETOR AND FUEL PUMP 04-08.

Throttle Cable Routing

▼ **CAUTION** : Check that throttle cable is routed away from sharp, edges, hot or vibrating parts. When turning steering while engine is running, idle speed must not vary.

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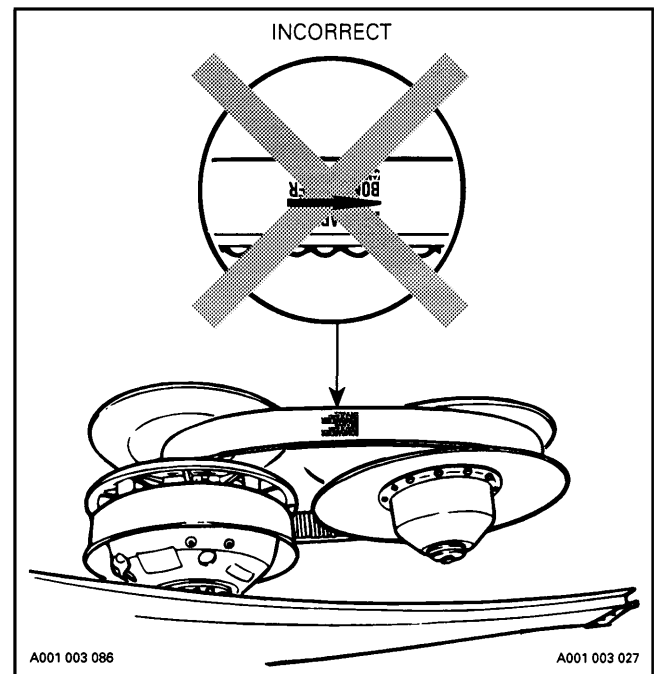
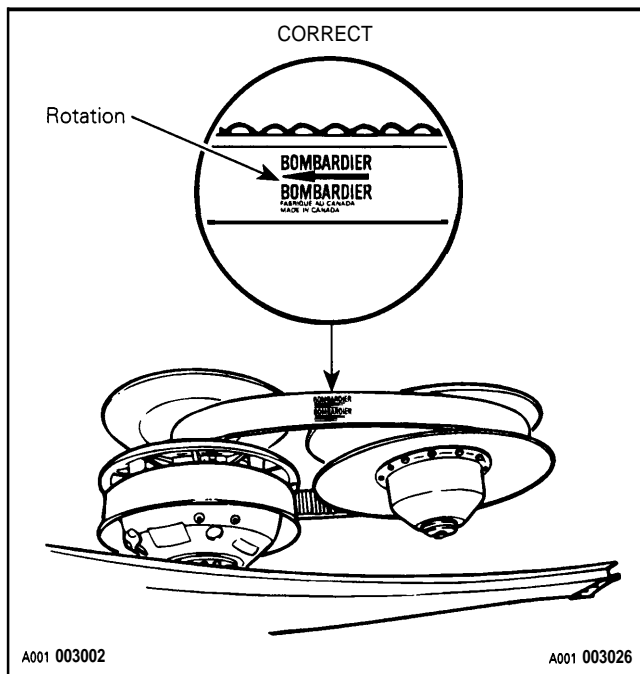
DRIVE BELT

1996 APPLICATION CHART

MODEL	PART NUMBER	WIDTH (NEW) ± 0.25 mm (.01() in)	MINIMUM WIDTH (WEAR LIMIT)
ELAN	570041100	30.2 mm (1-3/16")	26.4 mm (1-3/64")
TUNDRA II LT	414827600	33.3 mm (1-5/16")	30 mm (1-3/16")
S-SERIES	414883300	34.3 mm (1-27/64")	32 mm (1-1/4")

ROTATION DIRECTION

The maximum drive belt life span is obtained when the drive belt is installed as shown. This will ensure that correct direction of rotation is respected.



0 **NOTE :** For used drive belt, mark and reinstall in the same position.

Section 05 TRANSMISSION

Sub-Section 01 (DRIVE BELT)

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 mi).

Before checking the belt deflection, ensure vehicle has the proper belt (Refer to the application chart).

Adjust pulley distance and alignment. Refer to 05-04 PULLEY DISTANCE AND ALIGNMENT.

To obtain maximum vehicle performance, the belt tension must be adjusted according to specifications shown in the accompanying chart.

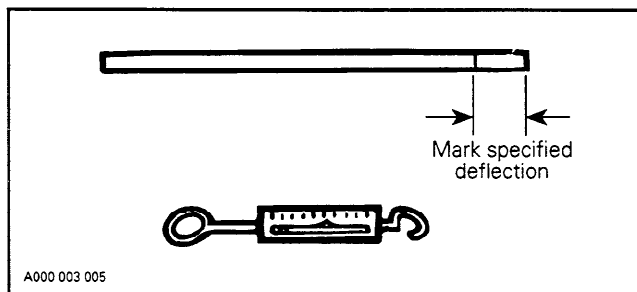
MODEL	DEFLECTION mm (in)	FORCE kg (lb)	HEIGHT [†] OVER DRIVEN PULLEY
Élan	33 ± 3 (1-19/64 ± 1/8)	5 (11)	0 - 1.5 mm (0 - 1/16")
Tundra II LT, S-Series	32 ± 5 (1-1/4 ± 13/64)	6.8 (15)	0 - 1.5 mm (0 - 1/16")

† For reference only

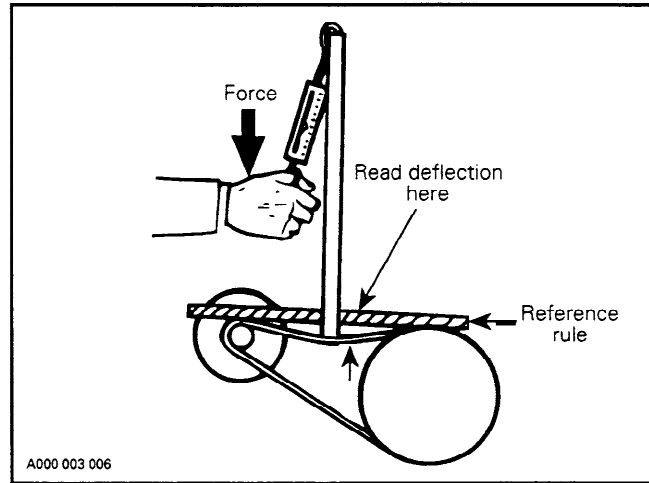
To Check Tension

Position a reference rule on drive belt.

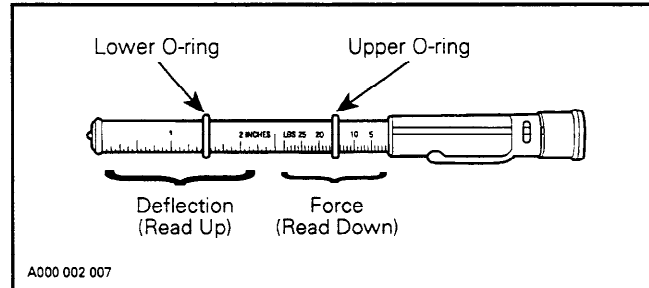
Wooden Stick and Spring Scale Method :



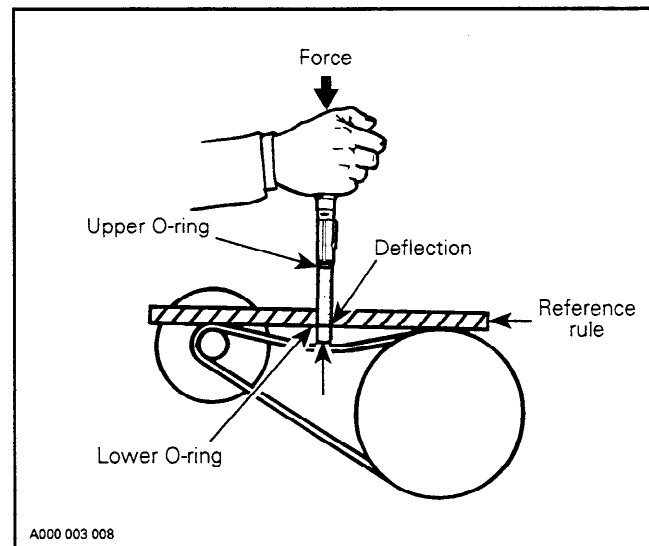
Using spring scale and stick, apply specified force on drive belt halfway between pulleys as shown.



Or use the belt tension tester (P / N 414 3482 00).



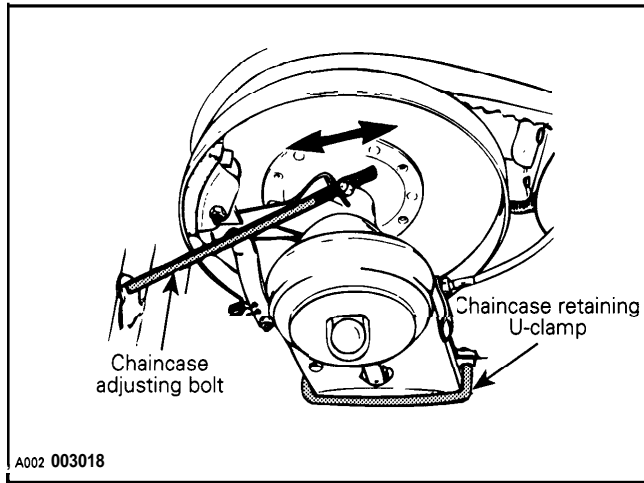
1. Slide lower O-ring of deflection scale to specified measure.
2. Slide upper O-ring to zero on the force scale.
3. Apply pressure until lower O-ring is flush with edge of rule and read force on the upper scale at top edge of O-ring.



DEFLECTION ADJUSTMENT

Élan

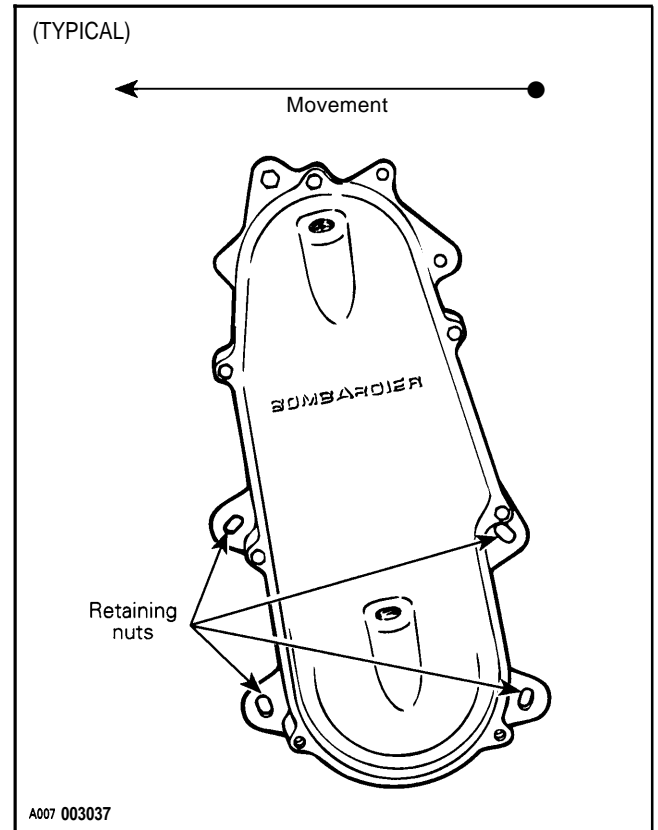
Drive belt deflection is adjusted by moving chaincase. To do so, loosen the chaincase retaining U-clamp and screw or unscrew the chaincase adjusting bolt.



Adjust pulley distance according to specification, refer to PULLEY DISTANCE AND ALIGNMENT 05-04 and measure drive belt deflection. Readjust pulley distance if required then tighten retaining U-clamp.

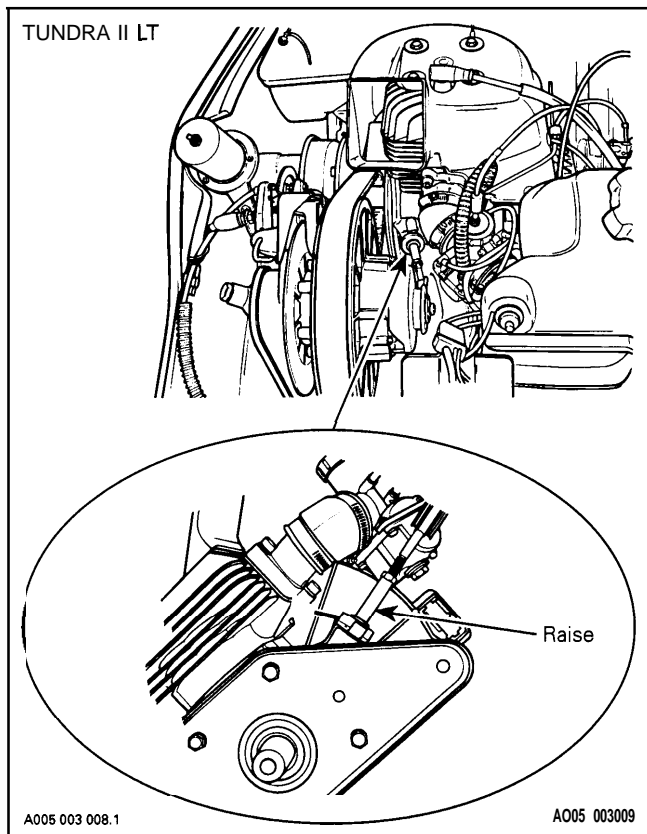
Tundra II LT

Drive belt deflection is adjusted by moving chaincase.



To do so, loosen the 4 chaincase retaining nuts, unlock and raise driven pulley support.

Section 05 TRANSMISSION
 Sub-Section 01 (DRIVE BELT)



Adjust pulley distance according to specification, refer to PULLEY DISTANCE AND ALIGNMENT 05-04 and measure drive belt deflection. Readjust pulley distance if required, then tighten the 4 nuts. Adjust driven pulley support and lock it to engine,

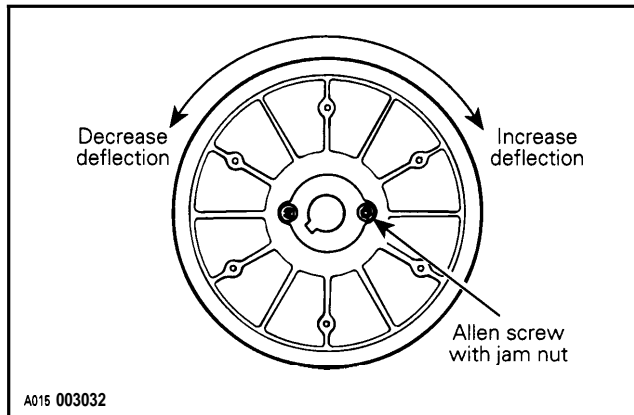
S-Series

Adjust pulley distance according to specification, refer to PULLEY DISTANCE AND ALIGNMENT 05-04, then adjust drive belt deflection using Allen screw, as shown.

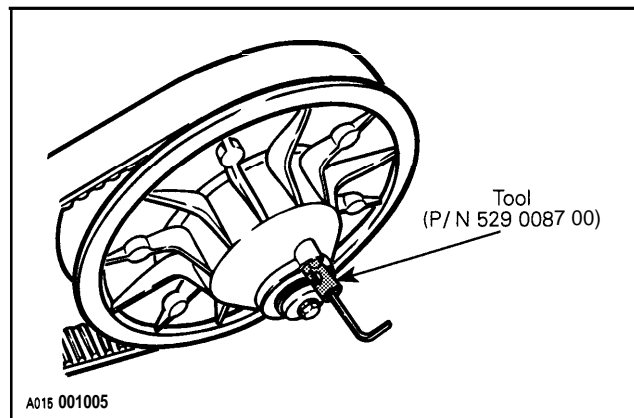
To increase deflection : turn Allen screws **clockwise**.

To decrease deflection : turn Allen screws **counter-clockwise**.

NOTE : Turn Allen screws 1/4 turn at a time, then rotate driven pulley to allow drive belt to settle in pulley. Check deflection, repeat as required,



Allen screws should be restrained while tightening jam nut to prevent throwing adjustment out. Use drive belt tension adjuster (P/ N 5290087 00).



Restrain Allen screws with the wrench and tighten nut with the socket using socket handle provided in tool box.

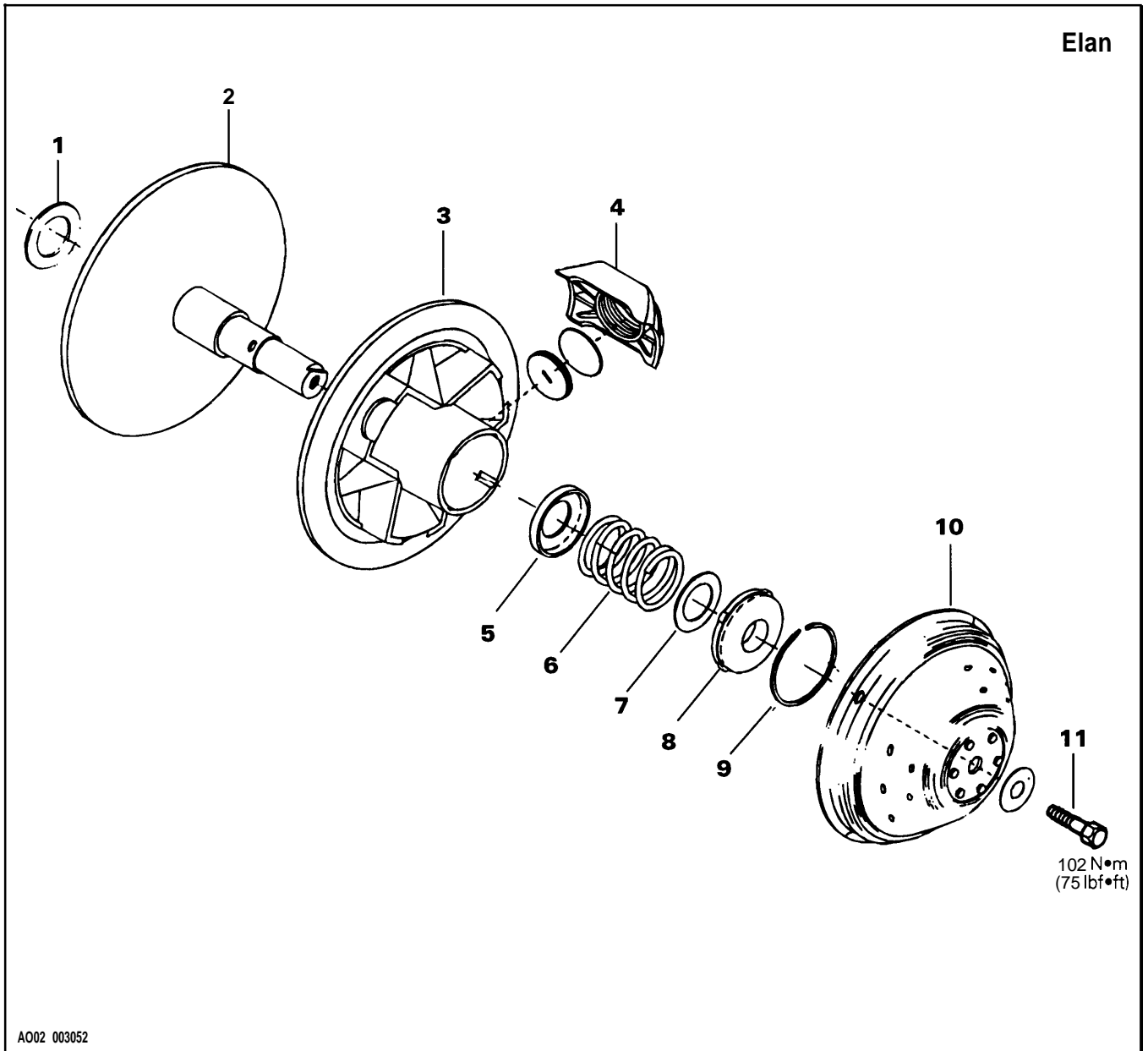
NOTE : After belt deflection adjustment is performed, the height of the top of the drive belt over the driven pulley should be according to specifications (see table above). If not, check pulley distance and make sure proper belt is used.

DRIVE PULLEY

BOMBARDIER LITE DRIVE PULLEY

NOTE : This is a lubrication free drive pulley.

○



Section 05 TRANSMISSION

Sub-Section 02 (DRIVE PULLEY)

GENERAL

Some drive pulley components (return spring, calibration disk) can be changed to improve vehicle performance in high altitude regions. The *High Altitude Technical Data* booklet (P/ N 484062400 and 484054500 for binder) gives information about calibration according to altitude.

▼ **CAUTION** : Such modifications should only be performed by experience mechanics since they can greatly affect vehicle performance.

◆ **WARNING** : Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

3,10,11, Sliding Half, Governor Cup and Cap Screw

Lock the crankshaft by using one of the following method :

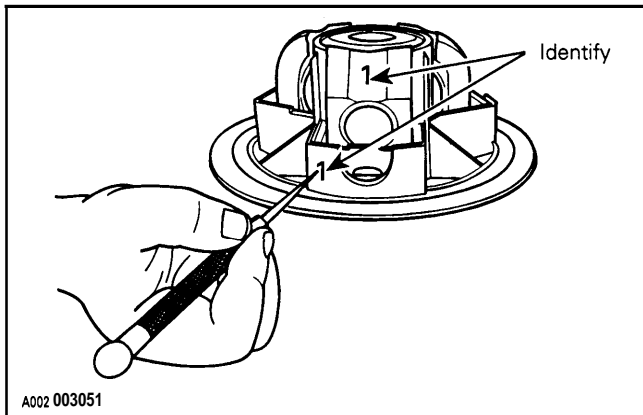
Insert the crankshaft locking tool (P/ N 4208766 40) into the impulse hole of the engine. Slowly rotate the crankshaft until it locks into position.

▼ **CAUTION** : Do not use any type of pin other than the tool (P/ N 4208766 40).

Or:

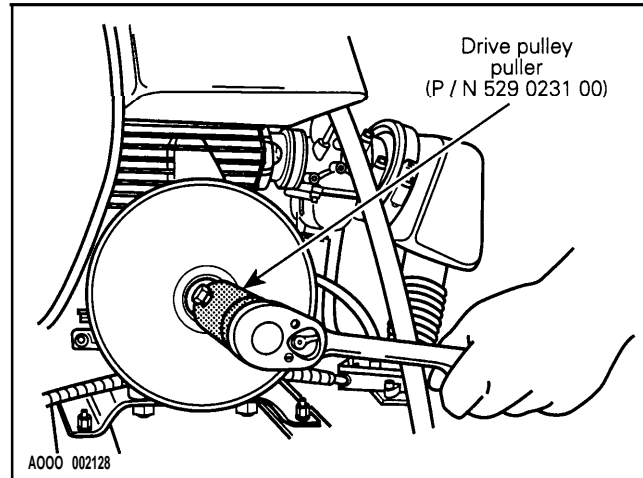
Install clutch holder (P/ N 5290276 00).

Identify blocks with their respective positions for reassembly.



2, Fixed Half

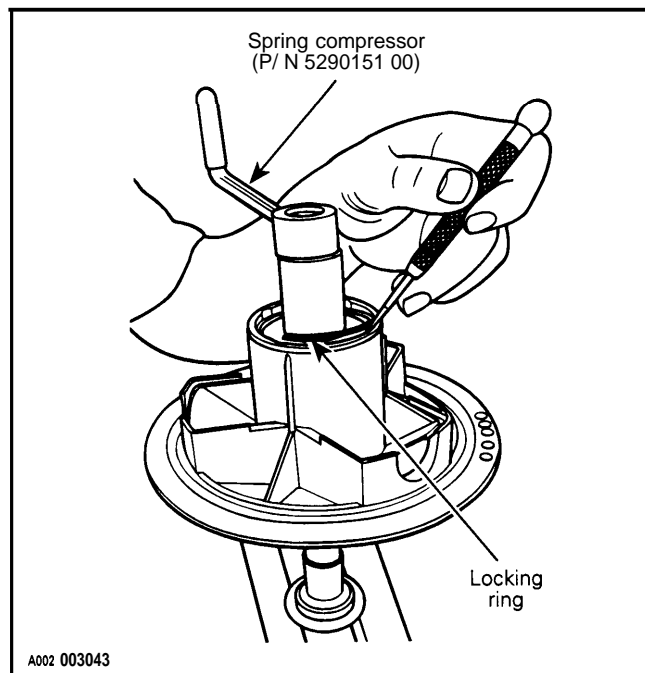
To remove the fixed half, slide drive pulley puller (P / N 5290231 00) over shaft. Attach with nut and bolt, as illustrated. The fixed half can then be removed with a 1/2 in ratchet. (Unscrew counterclockwise).



DISASSEMBLY

5,6,7,8,9, Spring Seat, Spring, Shim, Spring Stopper and Locking Ring

Using spring compressor (P/ N 5290151 00) and a bushing, push spring stopper to remove locking ring.



CLEANING

2,3, Sliding Half and Fixed Half

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

INSPECTION

Drive pulley should be inspected annually.

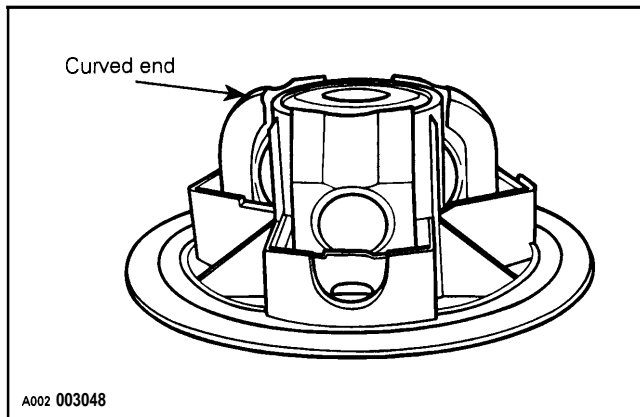
2,3, Sliding Half and Fixed Half

Check sliding half for excessive lateral play and fixed half shaft for scratches. Replace as required.

ASSEMBLY

4, Block

Make sure to install blocks at their original position and with their curved end toward governor cup. There must be 6 calibration disks per block under the nylon threaded plug.



INSTALLATION

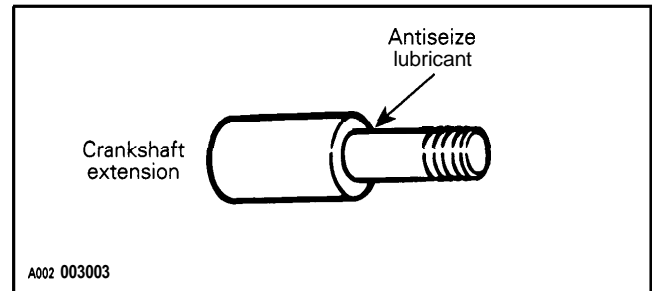
1, Shim (alignment)

This shim is used to obtain correct pulley alignment, refer to PULLEY DISTANCE AND ALIGNMENT 05-04.

2, Fixed Half

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

Clean crankshaft extension and apply antiseize lubricant (P/ N 413 7010 00) then install fixed half on extension.

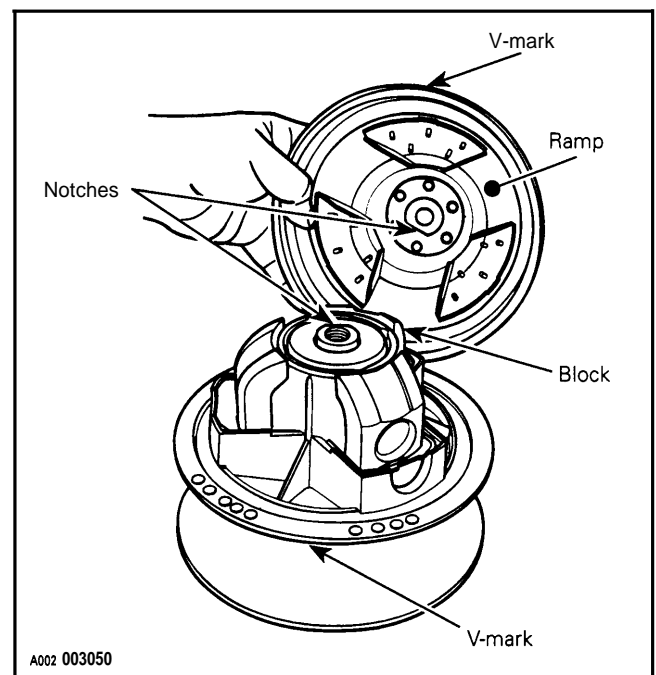


To tighten fixed half, use drive pulley puller (P/N 529 0231 00) as shown in the removal procedure.

3,10,11, Sliding Half, Governor Cup and Cap Screw

When installing governor cup, align ramps with blocks. Also align V-marks.

Turn governor cup to engage notches.



Position the cap screw and torque to 102 N•m (75 lbf•ft).

Install drive belt, pulley guard and close hood. Accelerate vehicle and bring at intermediate speed then at the same time apply brake. Repeat 2 or 3 times. Stop engine and retorque cap screw.

ADJUSTMENT

1, Shim (alignment)

For pulley alignment procedure, refer to PULLEY DISTANCE AND ALIGNMENT 05-04.

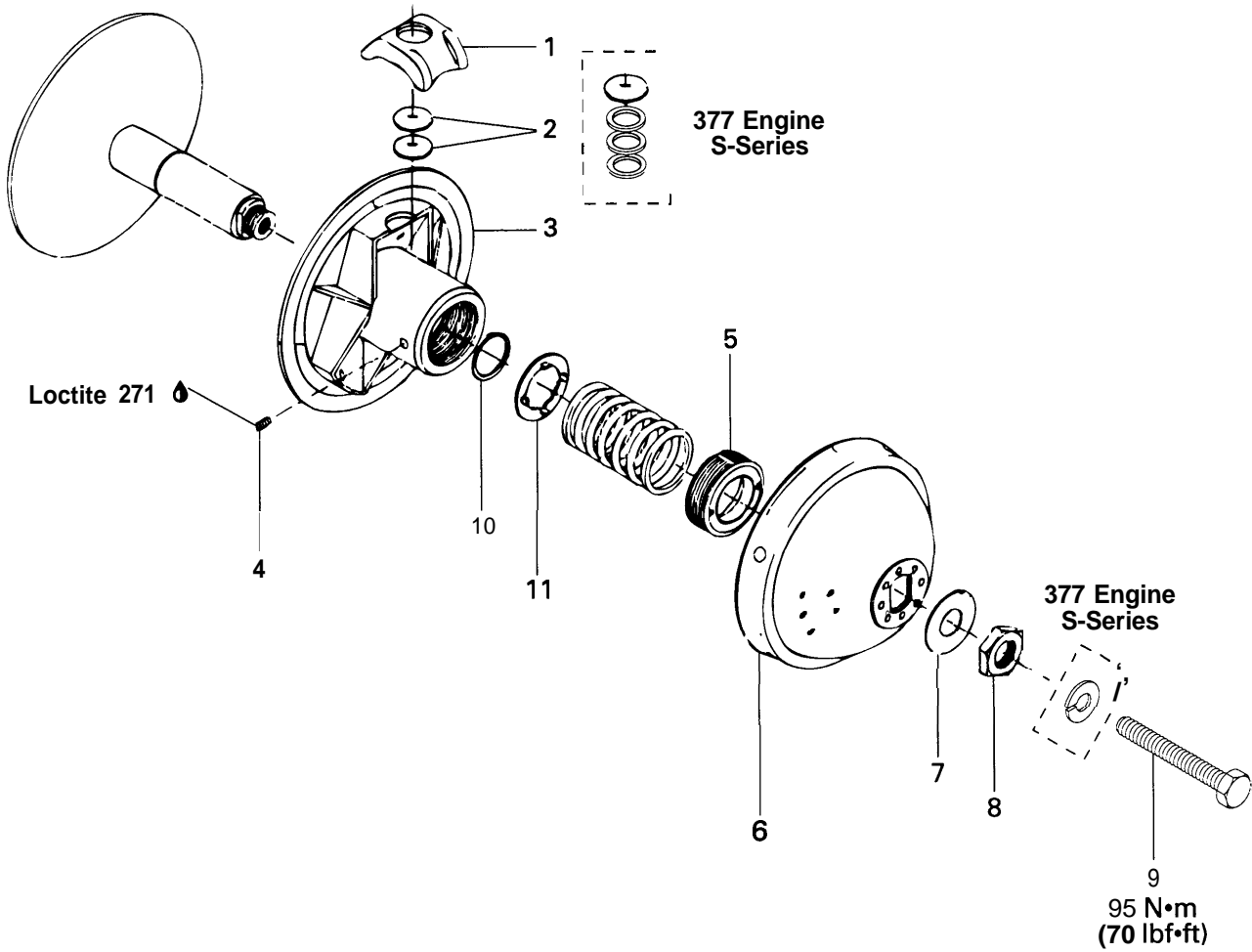
Section 05 TRANSMISSION
Sub-Section 02 (DRIVE PULLEY)

BOMBARDIER LITE

NOTE : This is a lubrication free drive pulley.

○

Tundra II LT
377 Engine S-Series



A05D01S

GENERAL

Some drive pulley components (return spring, calibration disk) can be changed to improve vehicle performance in high altitude regions. The *High Altitude Technical Data* booklet (P/N 484062400 and 484054500 for binder) gives information about calibration according to altitude.

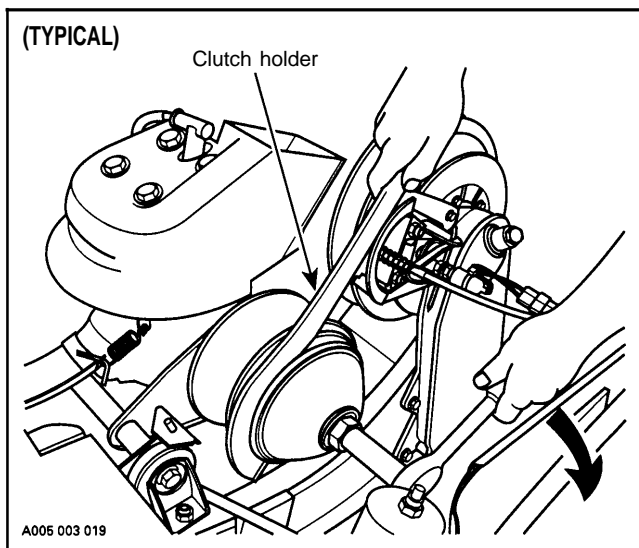
▼ **CAUTION** : Such modifications should only be performed by experience mechanics since they can greatly affect vehicle performance.

● **WARNING** : Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures-detailed.

REMOVAL

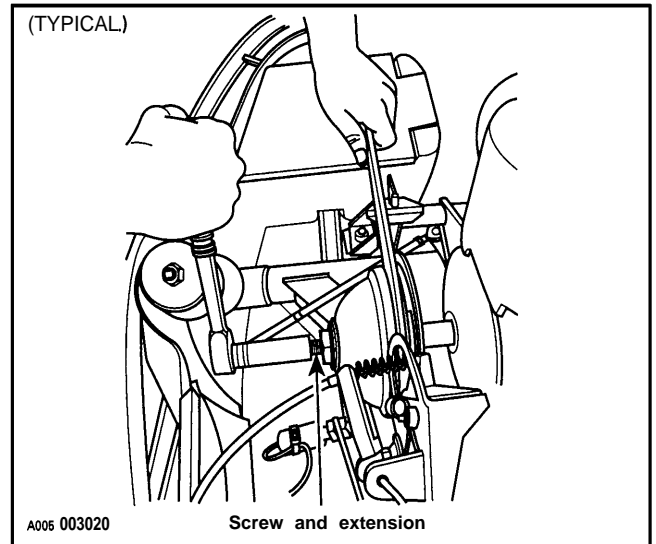
9, Retaining Screw

Use clutch holder (P/ N 5290276 00).



Remove retaining screw.

Insert drive pulley puller (P/ N 5290275 00) with its screw then remove drive pulley.



NOTE : Drive pulley puller (P/N 5290275 00) includes screw (P/ N 5290274 00) and extension (P/ N 5290134 00).

DISASSEMBLY

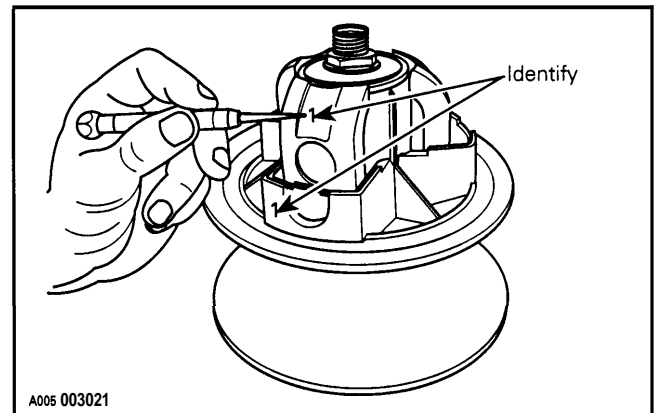
3,6,7,8, Sliding Half, Governor Cup, Tab Washer and Nut

Use clutch holder (P/ N 5290276 00) then unscrew nut, Remove tab washer.

Mark governor cup and sliding half for proper indexing at reassembly.

1,3, Block and Sliding Half

Identify blocks and their respective positive positions for reassembly.



Section 05 TRANSMISSION

Sub-Section 02 (DRIVE PULLEY)

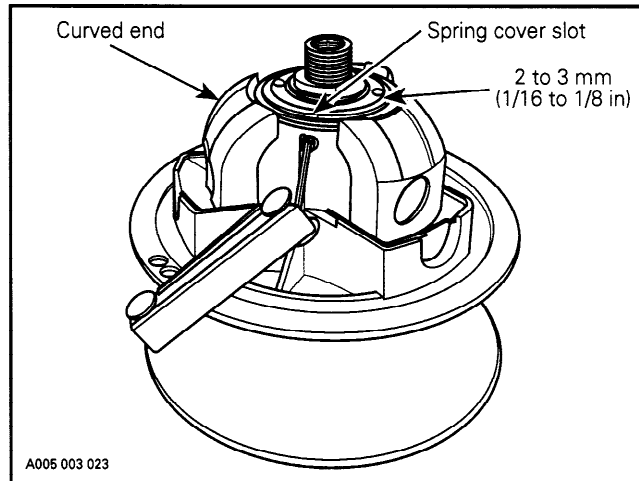
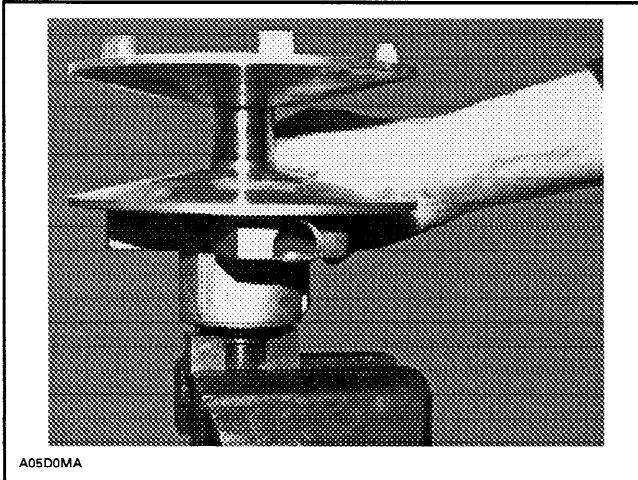
2, Nylon Threaded Plug

These are calibration parts. Refer to 10 TECHNICAL DATA.

4,5, Set Screw and Spring Cover

Unscrew set screw then use spring cover tool (P / N 529 0273 00) to unscrew spring cover.

Mount tool in a vise for cover hand-unscrewing.



8, Nut

Tighten nut to 128 N•m (95 lbf•ft).

INSTALLATION

Torque screw to 105 N•m (77 lbf•ft).

Install drive belt and belt guard.

Raise and block the rear of the vehicle and support it with a mechanical stand.

◆ **WARNING :** Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at intermediate speed and apply the brake, repeat 5 times.

Reduce the screw torque to 85 N•m (63 lbf•ft) then, retorque to 95 N•m (70 lbf•ft).

◆ **WARNING :** After 10 hours of operation the transmission system of the vehicle must be inspected to ensure the retaining screw is properly torqued.

10,11, Circlip and Washer

Remove washer then circlip.

CLEANING

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

INSPECTION

Check sliding half for excessive lateral play and fixed half shaft for scratches. Replace as required.

ASSEMBLY

10,11, Circlip and Washer

Install circlip then washer.

1,5, Block and Spring Cover

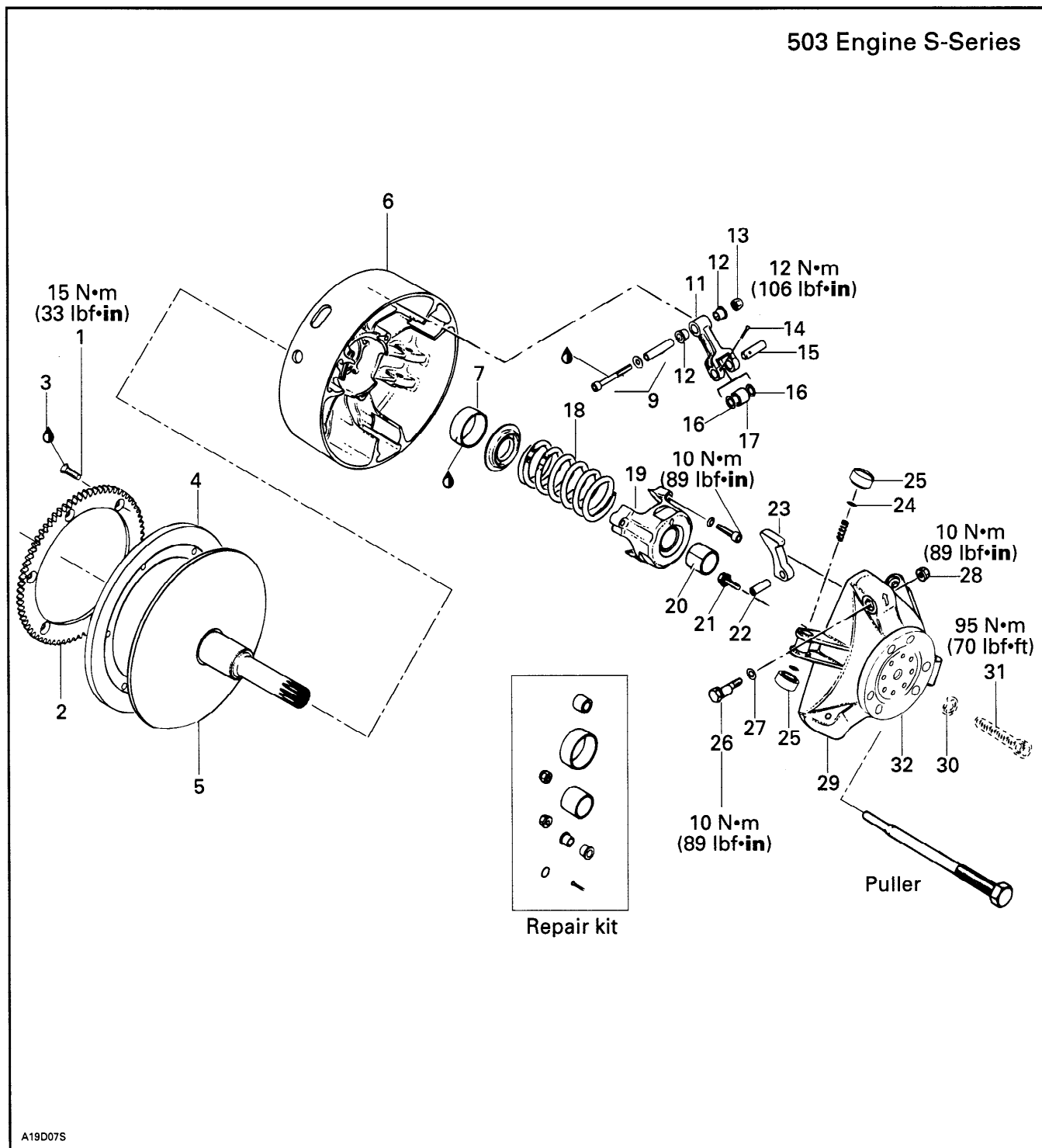
Make sure to install blocks at their original position and with their curved end toward governor cup.

Screw spring cover down to 2 to 3 mm (1/16 to 1/8 in) out of sliding half. Apply Loctite 271 on screw threads. Install set screw aligned with spring cover slot.

Section 05 TRANSMISSION
Sub-Section 02 (DRIVE PULLEY)

TRA

○ NOTE : This is a lubrication free drive pulley.



Section 05 TRANSMISSION

Sub-Section 02 (DRIVE PULLEY)

GENERAL

Some drive pulley components (return spring, ramp) can be changed to improve vehicle performance in high altitude regions. The *High Altitude Technical Data* booklet (P / N 484 0624 00 and 484 0545 00 for binder) gives information about calibration according to altitude.

▼ **CAUTION** : Such modifications should only be performed by experience mechanics since they can greatly affect vehicle performance.

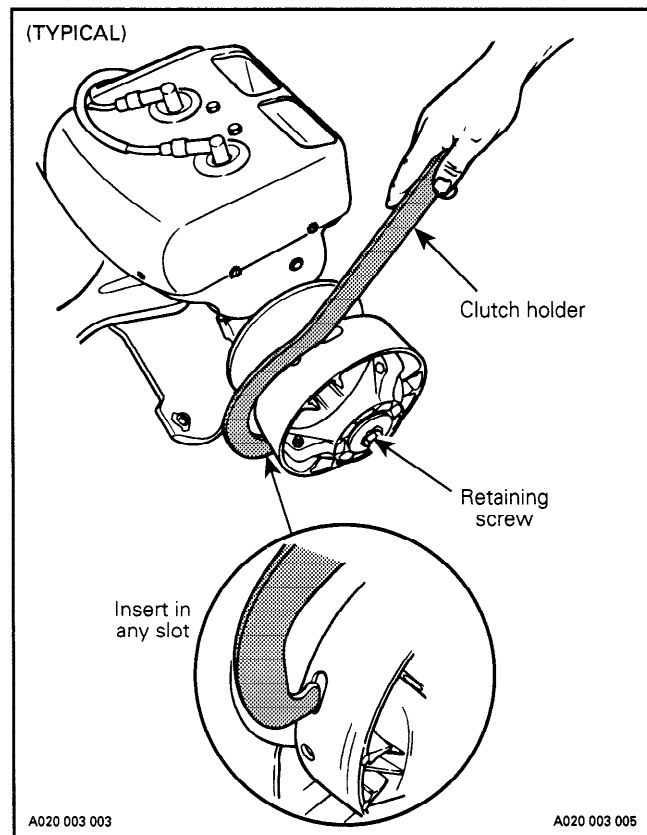
○ **NOTE** : TRA clutch stands for Total Range Adjustable clutch.

◆ **WARNING** : Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

30,31, Conical Spring Washer and Screw

Use clutch holder (P / N 529 0064 00).



○ **NOTE** : Sliding half can be removed while fixed half remains on crankshaft.

◆ **WARNING** : Never use any type of impact wrench at drive pulley removal and installation.

Remove retaining screw.

To remove drive pulley ass'y and / or fixed half from engine, use puller (P / N 529 0079 00).

▼ **CAUTION** : These pulleys have metric threads. Do not use imperial threads puller. Always tighten puller by hand to ensure that the drive pulley have the same type of threads (metric vs imperial) prior to fully tighten.

To Remove Drive Pulley Ass'y :

Retain drive pulley with clutch holder.

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

DISASSEMBLY

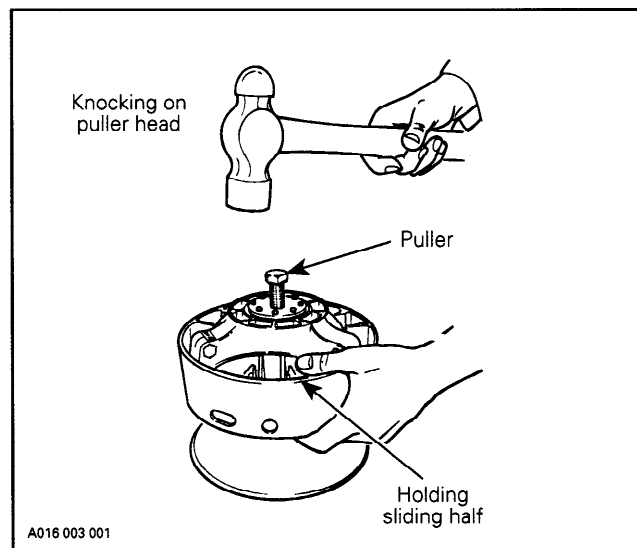
1,2, Screw and Ring Gear

▼ **CAUTION** : Retaining screws must be heated before disassembly.

5,6, Fixed and Sliding Half or Flywheel

▼ **CAUTION** : Do not tap on governor cup.

Screw puller into fixed half shaft about 13 mm (1/2 in). Raise drive pulley and hold it by the sliding half while knocking on puller head to disengage fixed half.



○ **NOTE** : No components marking is required before disassembling this drive pulley since it has factory mark and arrows as indexing reference.

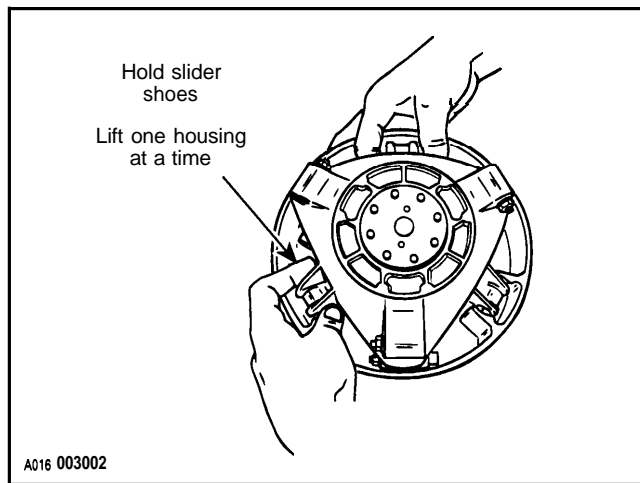
25,29, Slider Shoe and Governor Cup

Carefully lift governor cup until slider shoes come at their highest position into guides.

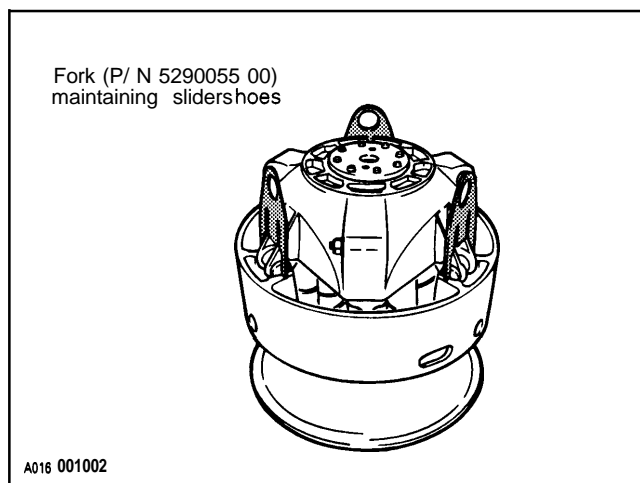
Hold a slider shoe set then carefully lift its housing and remove them. Proceed the same way for other housings lifting one at a time.

32, Cushion Drive

▼ **CAUTION** : Do not disassemble cushion drive. Governor cup and cushion drive are factory balanced as an assembly.



○ **NOTE** : To ease disassembly, forks (P/N 529 0055 00) should be used to hold slider shoes prior to removing governor cup.

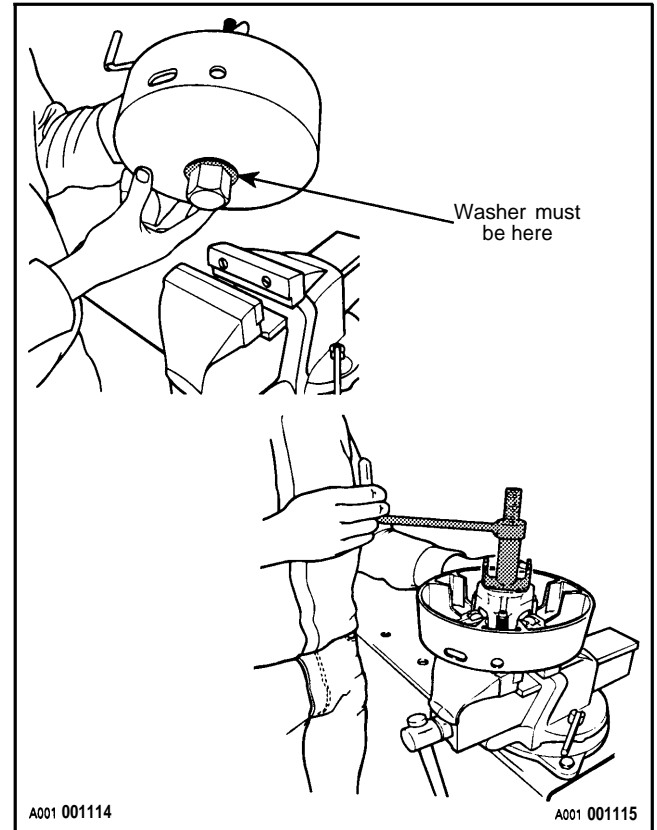


19, Spring Cover Ass'y

It is pushed by clutch spring pressure.

◆ **WARNING** : Clutch spring is very strong. Never attempt to remove spring cover without the recommended tools.

Use spring compressor (P/ N 5290151 00).



Install tools as shown. Remove 3 Allen screws retaining spring cover then unscrew compressor.

CLEANING

5,6, Fixed and Sliding Half

Clean pulley faces and shaft with fine steel wool and dry cloth.

5, Fixed Half and Crankshaft End

Parts must be at room temperature before cleaning.

Using a paper towel with cleaning solvent (P/N 413 7082 00), clean crankshaft tapered end and the taper inside the fixed half of the drive pulley, crankshaft threads and retaining screw threads.

◆ **WARNING** : This procedure must be performed in a well ventilated area.

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

Remove all hardened oil deposits that have baked on crankshaft and pulley tapered surfaces with coarse or medium steel wool and /or sand paper no. 600.

▼ **CAUTION** : Do not use any other type of abrasive.

Section 05 TRANSMISSION
Sub-Section 02 (DRIVE PULLEY)

Reclean mounting surfaces with paper towel and cleaning solvent (P/ N 4137082 00).

Wipe off the mounting surfaces with a clean, dry paper towel.

▼ **CAUTION : Mounting surfaces must be free of any oil, cleaner or towel residue.**

INSPECTION

Drive pulley should be inspected annually.

16,17, Thrust Washer and Roller

Check roller for roundness of external diameter. Check thrust washer for thickness wear. Replace as required.

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

9,12, Fitting Bolt Ass’y and Flanged Bushing

Check for wear, replace as required. When installing old style flanged bushing (made of black plastic), use a size “O” (letter) drill bit to ream inside diameter.

24,25, O-ring and Slider Shoe

Check if O-rings are cracked, cut or crushed. Replace as required.

Check slider shoes for wear. Replace if groove is not apparent on top.

5,29, Fixed Half and Governor Cup

Inspect splines and free play between both parts. Maximum free-play is 0.5 mm (.020 in) measured at calibration screw radius. Replace if required.

7,20, Sliding Half and Spring Cover Kahrlon Bushing

Visually inspect kahrlon coating. Replace if worn.

Sliding Half Bushing Replacement

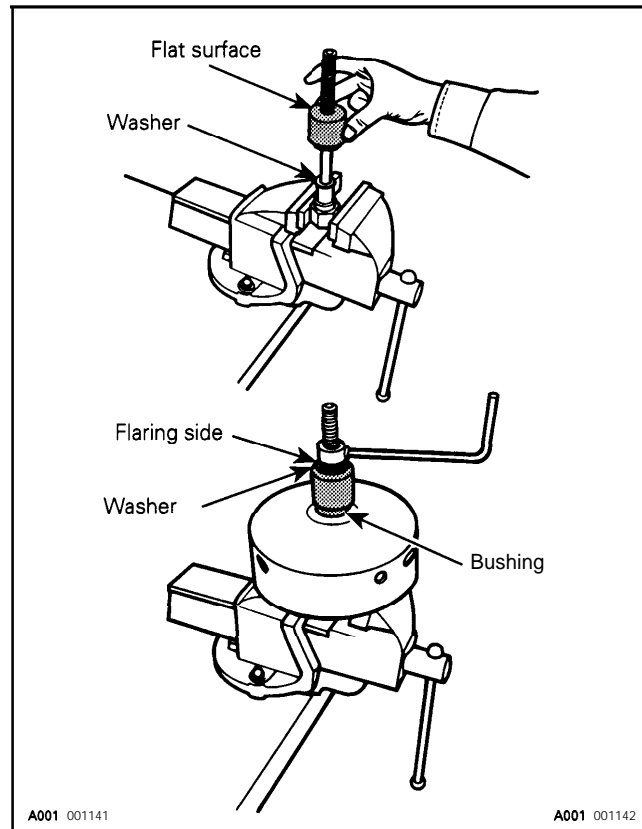
Use a suitable pusher to remove the old bushing. Clean sliding half with ethyl alcohol.

▼ **CAUTION : Bushing must be bonded with retaining compound (P/ N 413 7031 00) then flared to prevent displacement in sliding half.**

To flare bushing, use spring compressor (P/N 529 0151 00) and appropriate flare tools.

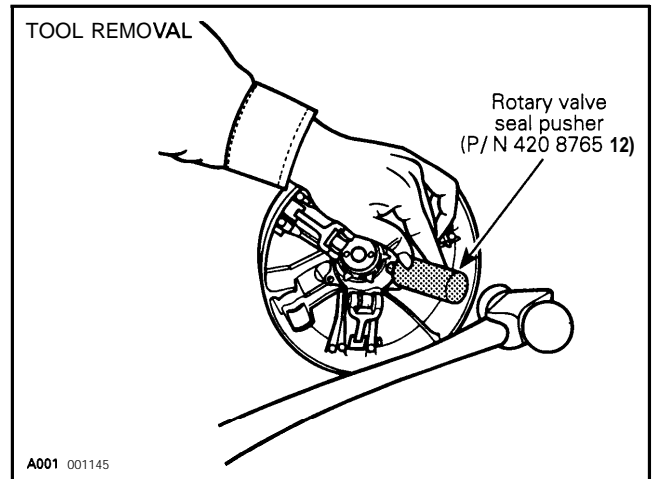
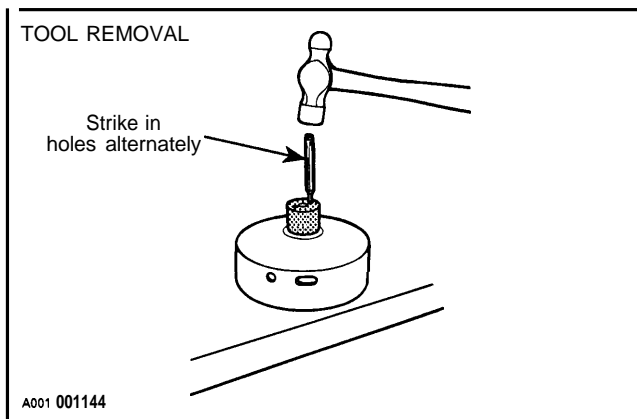
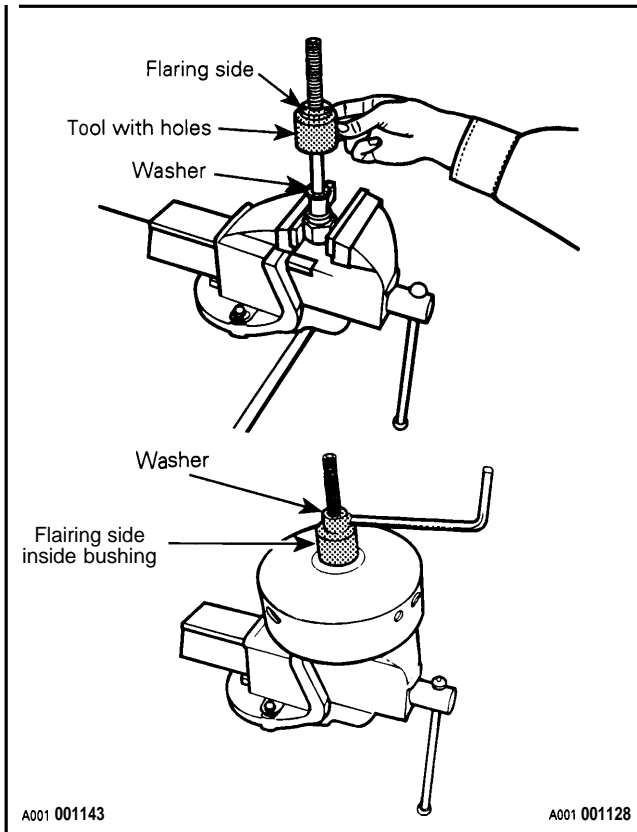
FLARE TOOL	STAMPED LETTER	P / N
INTERIOR	C	529018400
EXTERIOR	C	529018500

Apply retaining compound (P/ N 4137031 00) outside of bushing then insert into its housing making sure there is the same distance both sides.



Then flare bushing.

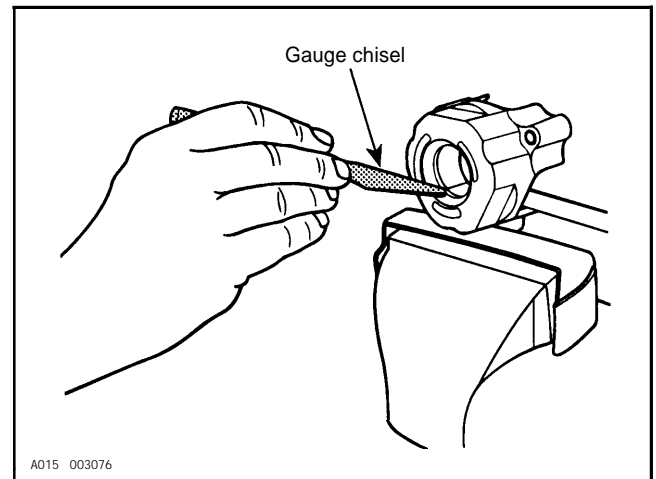
Section 05 TRANSMISSION
Sub-Section 02 (DRIVE PULLEY)



▼ **CAUTION :** Do not install sliding half on a vise to remove remaining tool.

Spring Cover Bushing Replacement

Use a gauge chisel to remove old bushing.



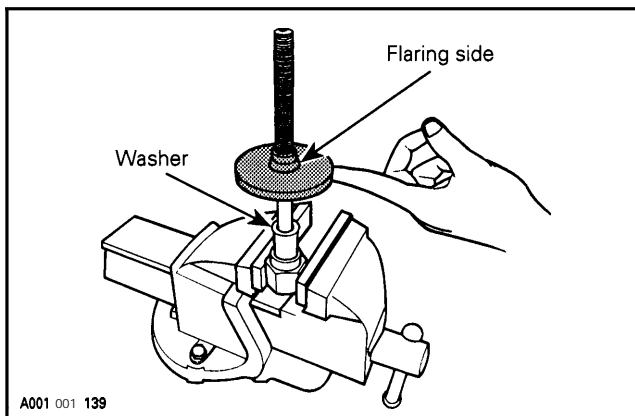
▼ **CAUTION :** Bushing must be bonded with retaining compound then flared to prevent displacement in spring cover.

Apply retaining compound outside of bushing. Insert flush to spring cover from the outside not the spring side, with spring compressor (P/ N 5290151 00) and appropriate flare tools.

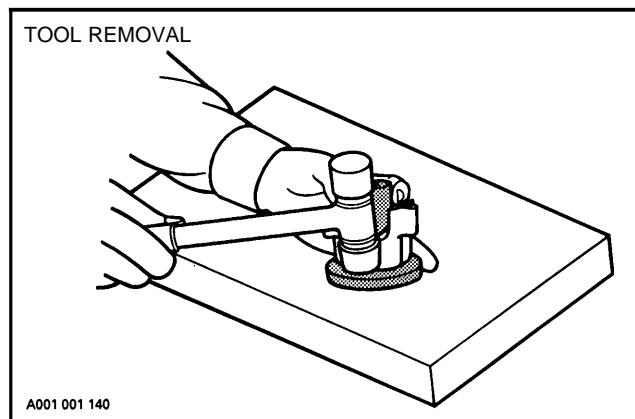
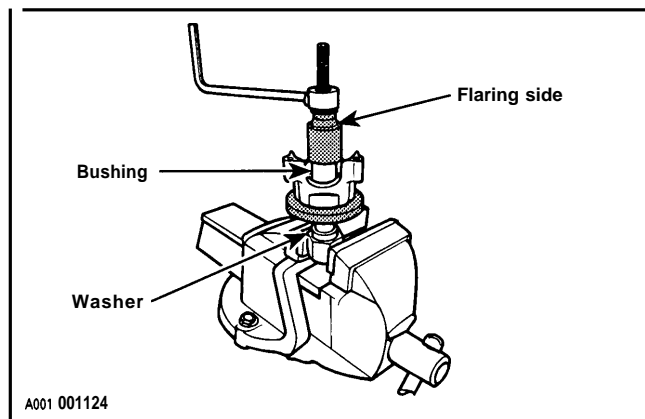
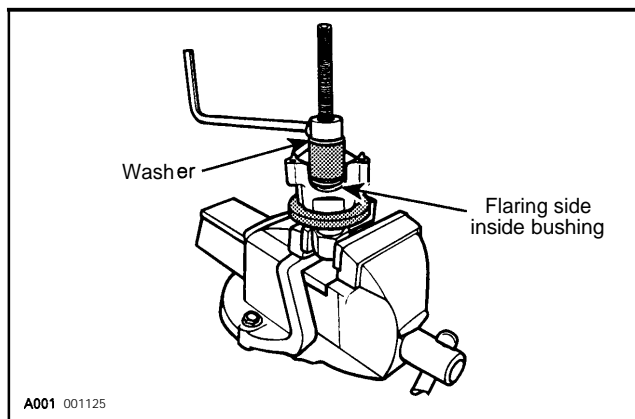
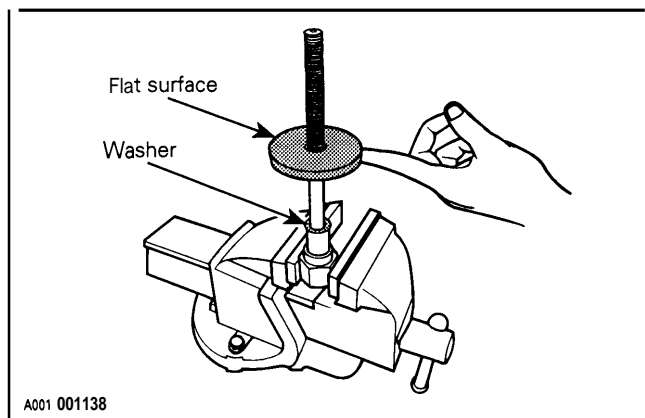
Section 05 TRANSMISSION
 Sub-Section 02 (DRIVE PULLEY)

FLARE TOOL	STAMPED LETTER	MODEL	P / N
INTERIOR	A	ALL EXCEPT F-Series (25 mm ø)	529018000
INTERIOR	B	F-Series (27 mm ø)	529018200
EXTERIOR	A	ALL EXCEPT F-Series (25 mm ø)	529018100
EXTERIOR	B	F-Series (27 mm ø)	529018300

Then, flare bushing.



CAUTION : Insert bushing from spring side (in terior) of spring cover.



ASSEMBLY

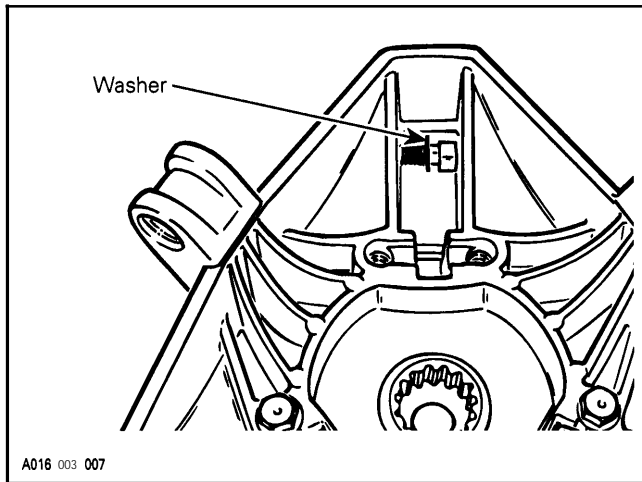
NOTE : This drive pulley is lubrication free. Do not lubricate any component.

1,2,3,4, Screw, Ring Gear, Loctite 271 and Flywheel

Apply Loctite 271 (P/N 4137029 00) on threads and head countersink then torque to 15 N•m (133 lbf•in)

26,27,28, Calibration Screw, Washer and Locking Nut

When installing calibration screw, make sure to install washer as shown.



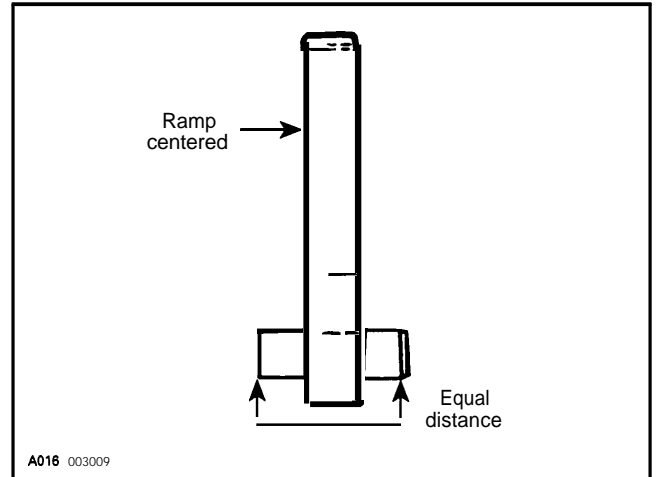
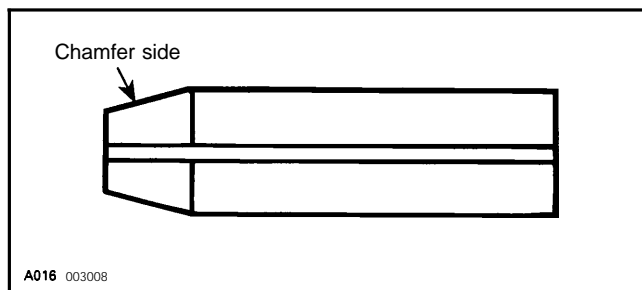
Torque locking nut to 10 N•m (89 lbf•in)

15, Pin

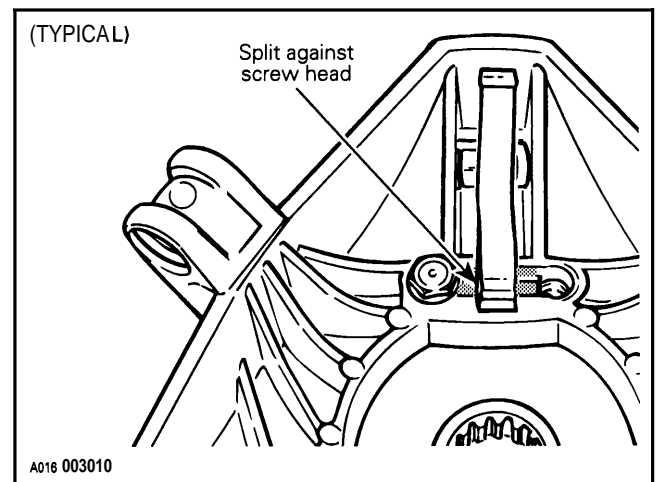
Always use the same type of pin as originally installed when servicing. Different types have different weights for calibration purpose. Refer to TECHNICAL DATA 10.

21,22,23, Ramp, Dowel Tube and Screw

Insert dowel tube from chamfered side. Make sure ramp is centered on dowel tube.



CAUTION : Dowel tube split must be installed against screw head or nut to block properly and prevent from turning.



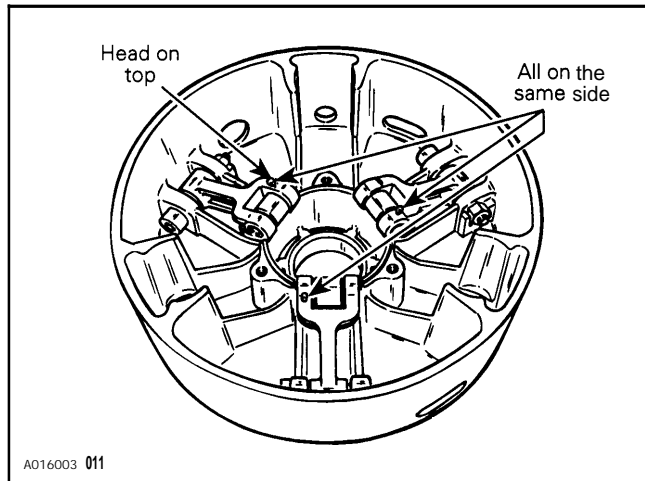
Torque screws to 10 N•m (89 lbf•in).

9,11,13,14, Screw, Lever Ass'y, Nut and Cotter Pin

Always install lever assemblies so that cotter pins are at the shown side, Besides install cotter pin head on top when lever is sat at bottom of sliding half. Bend cotter pin ends to sit perfectly against lever.

WARNING : Whenever replacing centrifugal levers, always replace all 3 at the same time. Otherwise, clutch misbalancing will occur because of levers difference.

Section 05 TRANSMISSION
 Sub-Section 02 (DRIVE PULLEY)



▼ **CAUTION** : Lever assemblies must be installed so that cotter pins are on the same side.

Torque nuts to 12 N•m (106 lbf•in).

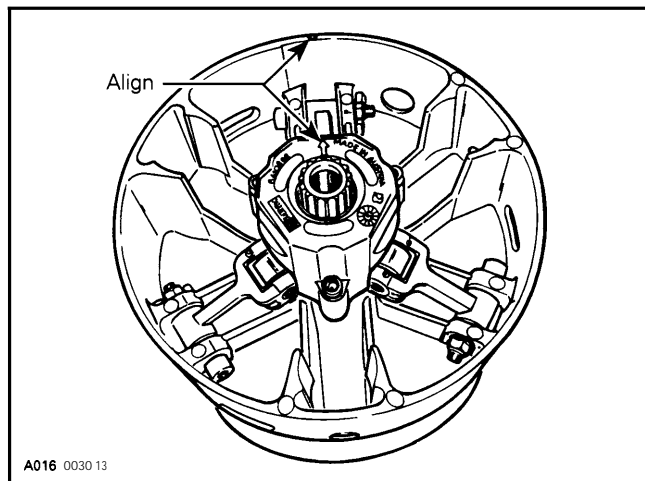
▼ **CAUTION** : Lever ass'y and rollers must move easily after installation.

5,6,18,19, Fixed Half, Sliding Half, Spring, Spring Cover and Screw

To install spring cover, use spring compressor (P/N 5290151 00).

Assemble fixed and sliding halves. Note that fixed halves have different cone angle, Match cone angle with crankshaft.

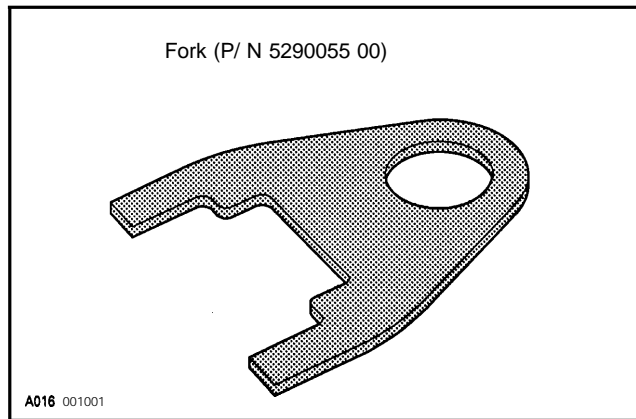
Lift sliding half against spring cover and align spring cover arrow with sliding half mark.



Install and torque screws to 10 N•m (89 lbf•in).

6,25,29, Sliding Half, Slider Shoe and Governor Cup

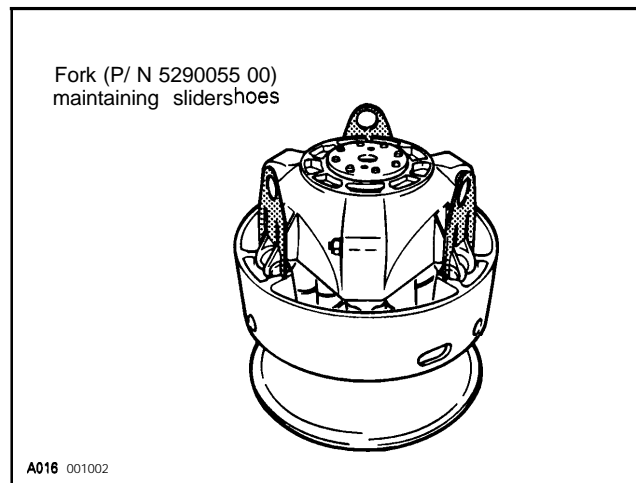
To install governor cup, use following tool :



Insert spring and slider shoes into governor cup so that groove in each slider shoe is vertical to properly slide in guides.

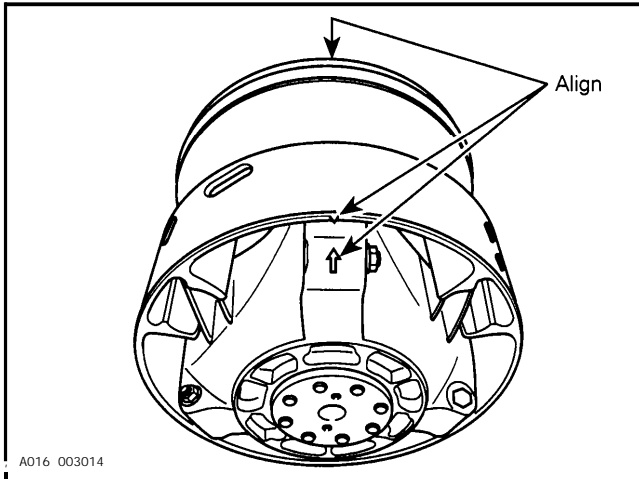
▼ **CAUTION** : Make sure O-rings are installed on slider shoes and their grooves are positioned vertically.

Install fork (P/ N 5290055 00) into slider shoe grooves to maintain them for governor cup installation. Proceed on 3 set of slider shoes.



Make sure to align governor cup arrow with sliding half and fixed half mark.

NOTE : If fixed half has no mark, align governor cup mark with segment no. 1 of inner half. Segments are identified on engine side.



Carefully slide governor cup into sliding half. Align mark of governor cup with mark of fixed half,
Remove forks and push governor cup so that its splines engage with fixed half shaft splines.

▼ **CAUTION** : Make sure splines of both parts are fully engaged.

INSTALLATION

◆ **WARNING** : Do not apply antiseize or any lubricant on crankshaft and drive pulley tapers.

◆ **WARNING** : Never use any type of impact wrench at drive pulley removal and installation.

Clean mounting surfaces as described in CLEANING above.

Drive Pulley Assry

The installation procedure must be strictly adhered to as follows.

Lock crankshaft in position as explained in removal procedure.

Install drive pulley on crankshaft extension.

Install conical washer with its concave side towards drive pulley then install screw.

◆ **WARNING** : Never substitute lock washer and/or screw with jobber ones. Always use Bombardier genuine parts for this particular case.

Torque screw to 105 N•m (77 lbf•ft).

Install drive belt and belt guard.

Raise and block the rear of the vehicle and support it with a mechanical stand.

◆ **WARNING** : Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at intermediate speed and apply the brake, repeat 5 times.

Reduce the screw torque to 85 N•m (63 lbf•ft) then, retorque to 95 N•m (70 lbf•ft).

◆ **WARNING** : After 10 hours of operation the transmission system of the vehicle must be inspected to ensure the retaining screw is properly torqued.

DRIVE PULLEY ADJUSTMENT

The drive pulley is factory calibrated to transmit maximum engine power at a predefined RPM. Factors such as ambient temperature, altitude or surface condition may vary this critical engine RPM thus affecting snowmobile efficiency.

This adjustable drive pulley allows setting maximum engine RPM in the vehicle to maintain maximum power.

Calibration screws should be adjusted so that actual maximum engine RPM in vehicle matches with the maximum horsepower RPM given in TECHNICAL DATA 10.

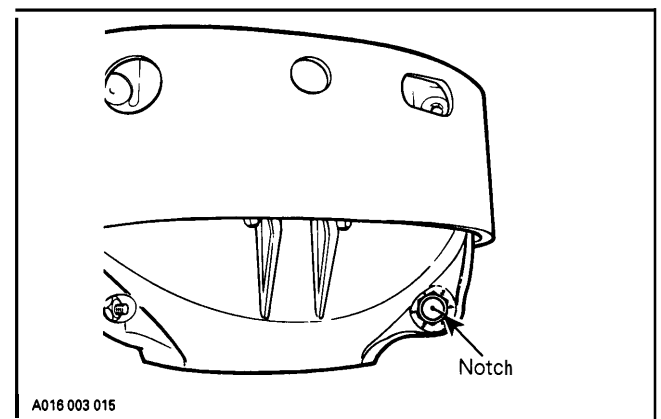
○ **NOTE** : Use precision digital tachometer for engine RPM adjustment.

○ **NOTE** : The adjustment has an effect on high RPM only.

To adjust, modify ramp end position by turning calibration screws.

26,28,29, Calibration Screw, Locking Nut and Governor Cup

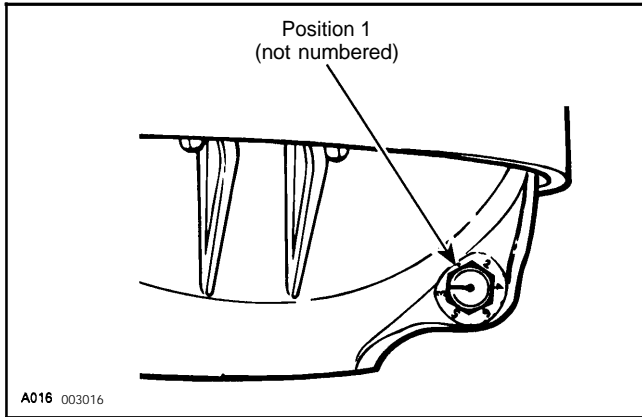
Calibration screw has a notch on top of its head.



Governor cup has 6 positions numbered 2 to 6. Note that in position 1 the number is substituted by a dot (due to its location on casting).

See TECHNICAL DATA 10 for original setting.

Section 05 TRANSMISSION
Sub-Section 02 (DRIVE PULLEY)



Each number modifies maximum engine RPM by about **200 RPM**.

Lower numbers decrease engine RPM in steps of 200 RPM and higher numbers increase it in steps of 200 RPM.

Example :

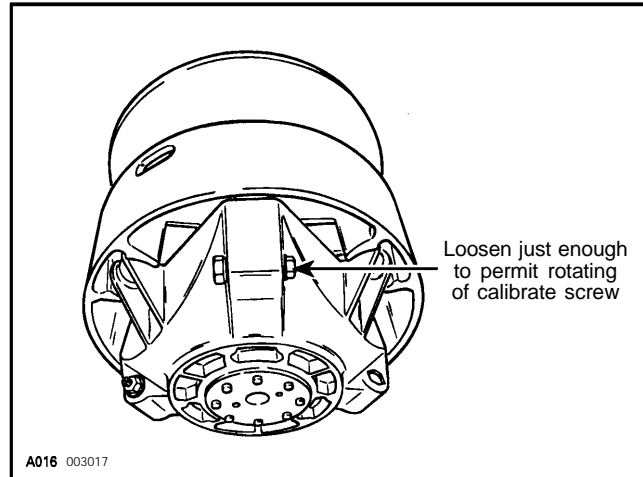
Calibration screw is set at position 4 and is changed to position 6. So maximum engine RPM is increased of 400 RPM.

To Adjust :

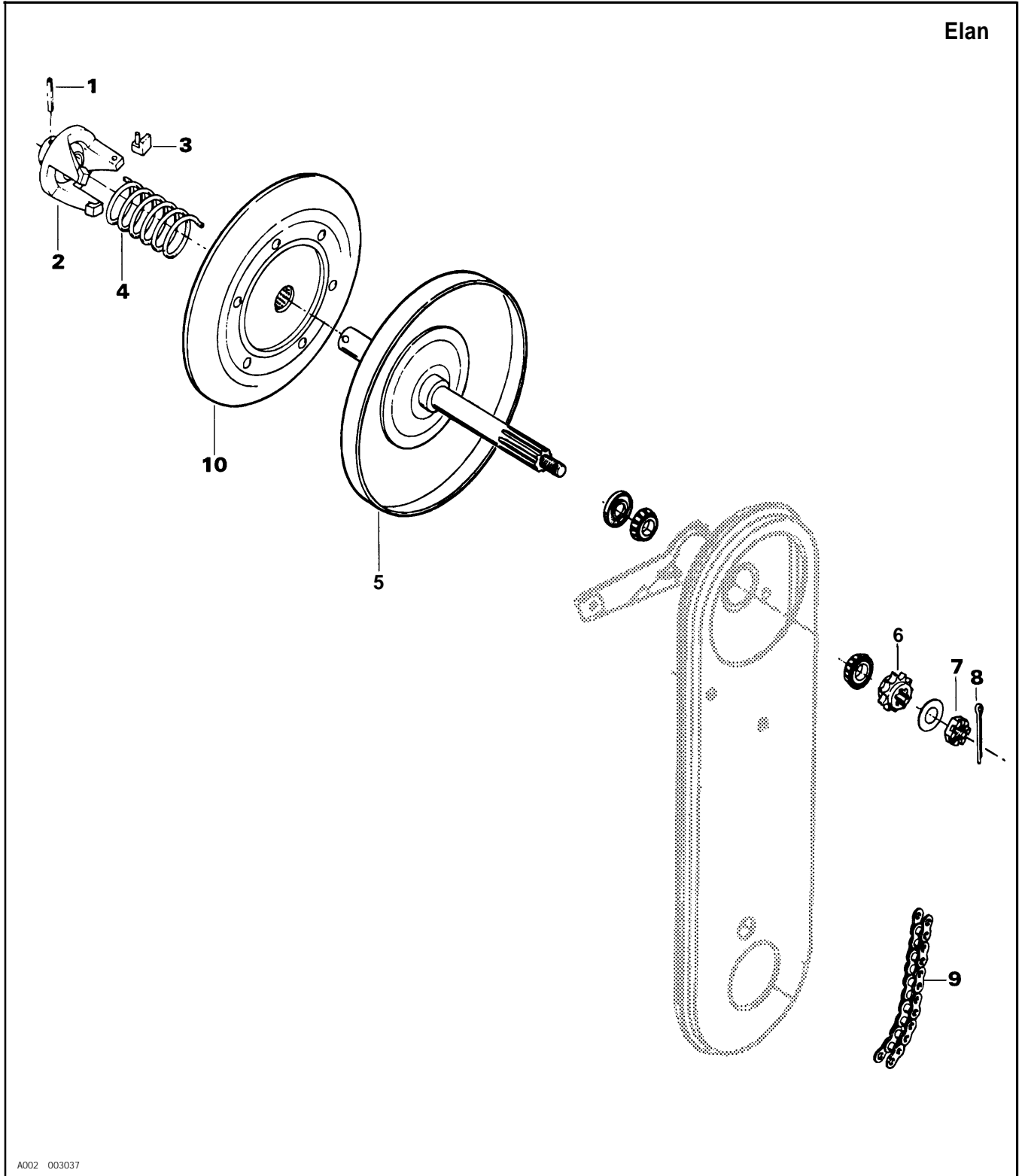
Just loosen locking nut enough to pull calibration screw **partially out and-adjust to-desired position**. **Do not completely remove the locking nut**. Torque locking nuts to **10 N•m (89 lbf•in)**.

▼ **CAUTION** : Do not completely remove calibration screw or its inside washer will fall off.

▼ **CAUTION** : Always adjust all 3 calibration screws and make sure they are all set at the same number.



DRIVEN PULLEY



Section 05 TRANSMISSION

Sub-Section 03 (DRIVEN PULLEY)

NOTE : Driven pulley components (cam, shoes, spring, etc.) except fixed half can be serviced without removing the whole driven pulley from chain-case. Simply remove roll pin as explained in disassembly portion.

REMOVAL

Pulley Guard and Drive Belt

Remove.

Steering Column Bolts

Slacken.

9, Drive Chain

Release tension.

7,8, **Castellated** Nut and Cotter **Pin**

Remove from fixed half shaft.

9, Drive Chain

Attach to frame to prevent from falling inside chain-case.

Driven Pulley Assembly

Pull toward engine and remove from vehicle.

DISASSEMBLY

1,2, Outer Cam and Roll Pin

Use a pin punch to remove roll pin from the outer cam.

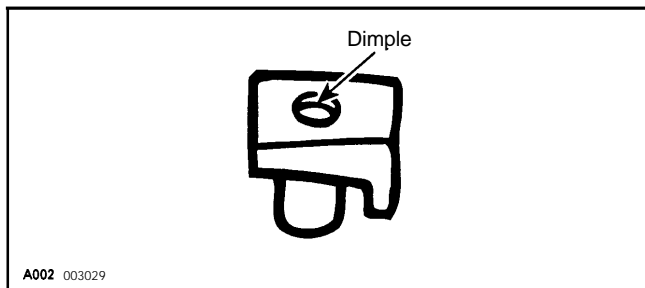
3, Cam Slider Shoe

Heat surrounding area, cam slider shoe will come off.

INSPECTION

3, Cam Slider Shoe

Slider shoe must be replaced when dimple in the working surface is barely visible or worn to less than 0.5 mm (.020 in) deep. See illustration.



10, Sliding Half

See Formula driven pulley below for sliding half radial play measurement.

ASSEMBLY

3, Cam Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam.

5, Fixed Half Shaft

Thoroughly clean the fixed half shaft.

Apply a light film of low-temperature grease(P/N413 7061 00) on the shaft. Always wipe off surplus.

NOTE : Activate the sliding half several times to distribute lubricant over full length of shaft. Be careful that lubricant does not get on inner halves of pulley.

Assemble driven pulley components by reversing disassembly procedure.

INSTALLATION

Install a new upper chaincase oil seal.

Reinstall the driven pulley on vehicle by reversing the removal procedure.

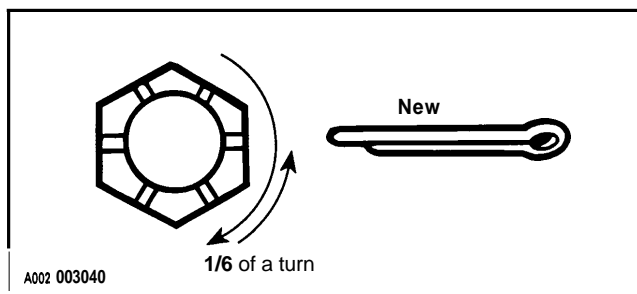
6,9, Sprocket and Chain

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

7, **Castellated** Nut

Install spring washer and castellated nut.

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



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

Section 05 TRANSMISSION
Sub-Section 03 (DRIVEN PULLEY)

8, Cotter Pin

Lock assembly in position with a new cotter pin.

9, Drive Chain

Check chain tension.

ADJUSTMENT

4, Release Spring

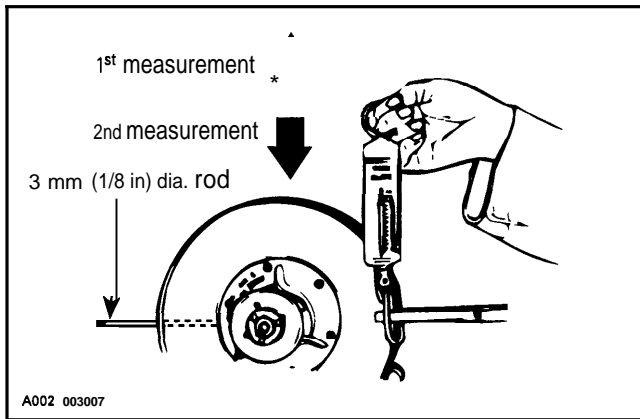
Spring Torsional Pre-Load

In order to measure driven pulley spring torsional pre-load, pulley halves must be separated. To do this, insert length of 3 mm (1/8 in) dia. rod between the halves. Check tension using a fish scale positioned 90° with pulley axle.

Take a measurement when opening driven pulley and another one when driven pulley begins to close after a rotation of 10 mm (3/8 in). Spring pre-load is the average measurement between these 2.

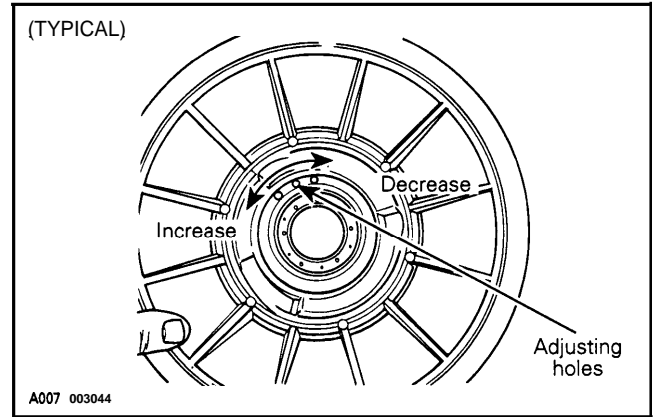
$$\frac{\text{1st measurement (when opening)} + \text{2nd measurement (when closing)}}{2} = \text{Spring pre-load}$$

Example : $\frac{3.8 \text{ kg (8.4 lb)} + 3.4 \text{ kg (7.9 lb)}}{2} = 3.6 \text{ kg (8 lb)}$ = Actual spring pre-load



Spring pre-load should be 3.6 kg (8 lb).

To correct spring pre-load, relocate spring end in sliding pulley half, moving it clockwise to decrease the pre-load or counterclockwise to increase it.



NOTE : Always recheck torsional spring pre-load after adjusting.

Chaincase

Check oil level and refill as required. Refer to CHAIN-CASE 05-06.

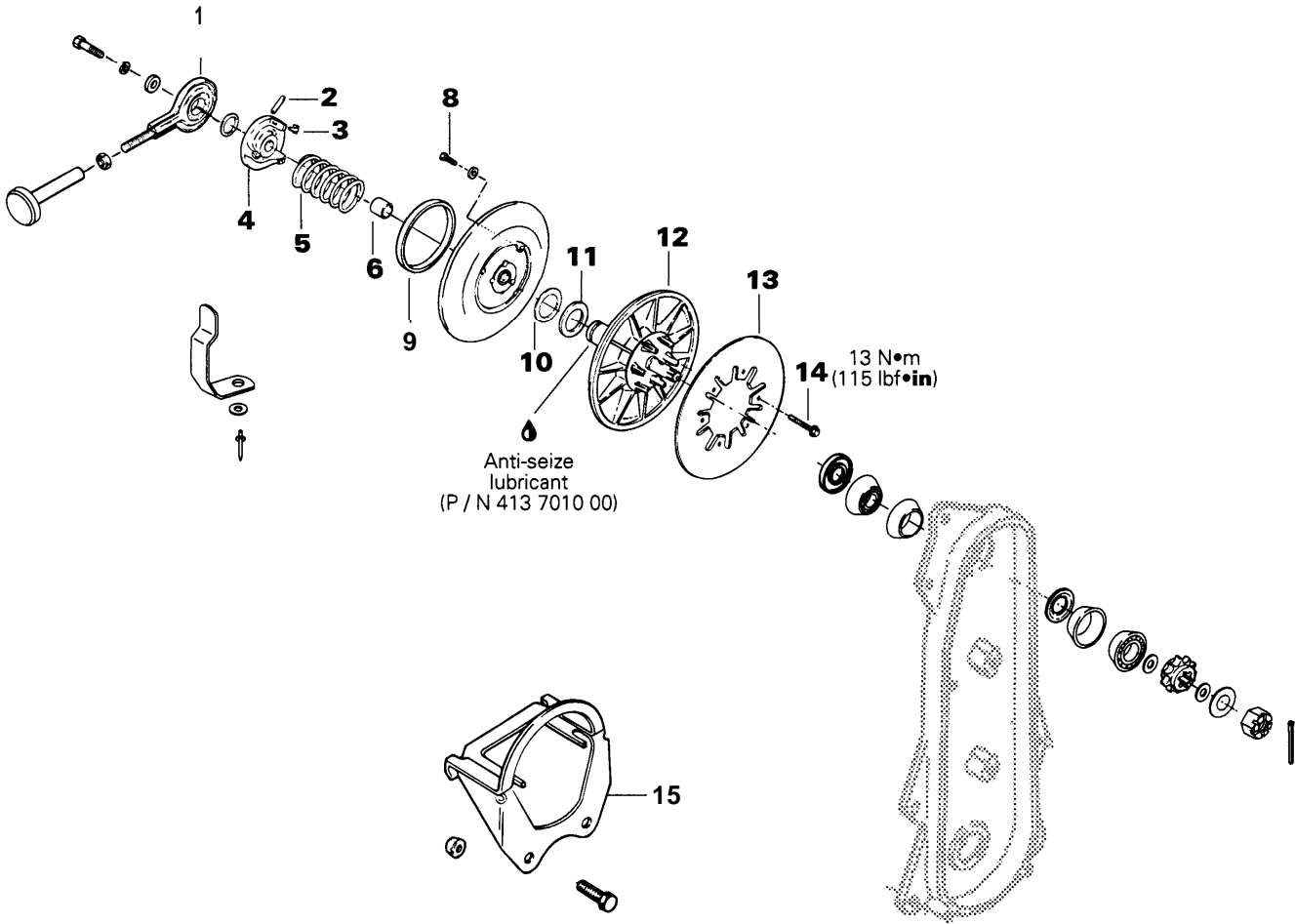
Pulley Alignment and Drive Belt Deflection

Refer to PULLEY ALIGNMENT 05-04 and DRIVE BELT 05-01 to perform adjustments.

CAUTION : Drive belt and pulley adjustments must **always be** checked whenever pulleys have been removed, replaced or disassembled.

Section 05 TRANSMISSION
Sub-Section 03 (DRIVEN PULLEY)

Tundra II LT



AO09 003026

Section 05 TRANSMISSION Sub-Section 03 (DRIVEN PULLEY)

NOTE : Driven pulley components (support, cam, shoes, etc.) can be serviced without removing the whole driven pulley from chaincase. Refer to the following procedures but neither remove brake caliper nor open chaincase for those cases.

REMOVAL

To remove driven pulley from chaincase, follow this procedure.

Belt Guard and Drive Belt

Remove from vehicle.

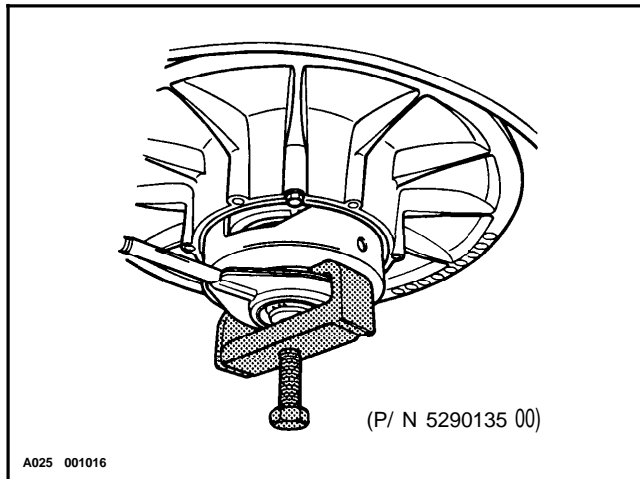
13, Brake Support

Remove from chaincase with brake ass'y.

1, Countershaft Support

Free countershaft support from support clamp.

To remove driven pulley support use support puller (P/ N 5290135 00).



Chaincase

Open chaincase and drain oil. Unlock and remove upper sprocket.

The following is required to have enough space to remove driven pulley from chaincase :

Slacken upper retaining screws of steering column.

Disconnect carburetor boots from intake manifold and air intake silencer.

Disconnect impulse hose from engine.

Disconnect oil injection supply line at injection pump and plug line to prevent draining.

Remove screws retaining rear engine support to chassis.

Tip engine forward just enough to allow driven pulley removal from chaincase. Block in this position.

NOTE : In some cases, chaincase retaining screws might have to be slackened to allow pivoting of chaincase. In this case, note position of alignment shims. Besides, air intake silencer and oil injection reservoir might have to be slightly moved to get enough space to pull driven pulley.

DISASSEMBLY

Chaincase and Driven Pulley

Remove bearing cone.

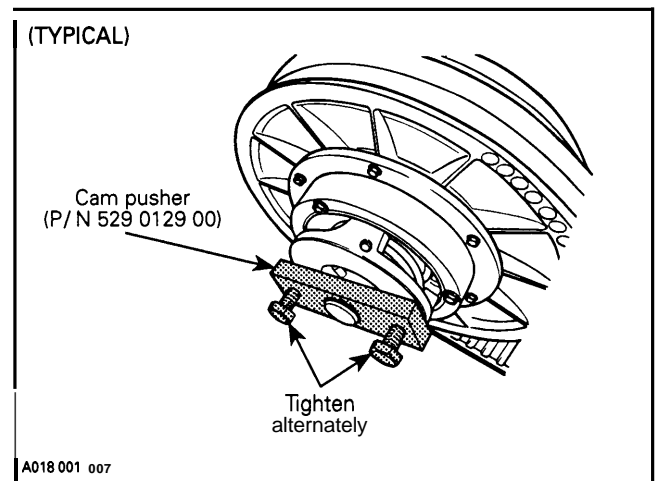
Knock driven pulley shaft with a plastic hammer and pull driven pulley out.

1, support

Remove support using a suitable puller.

2,4, Roll Pin and Outer Cam

Remove roll pin and slide outer cam out of pulley shaft. Install tool (P/ N 5290129 00), reinstall washer, lock washer and screw. Tighten tool screws alternately then remove roll pin.



Note spring original setting (adjusting hole in sliding half).

Section 05 TRANSMISSION

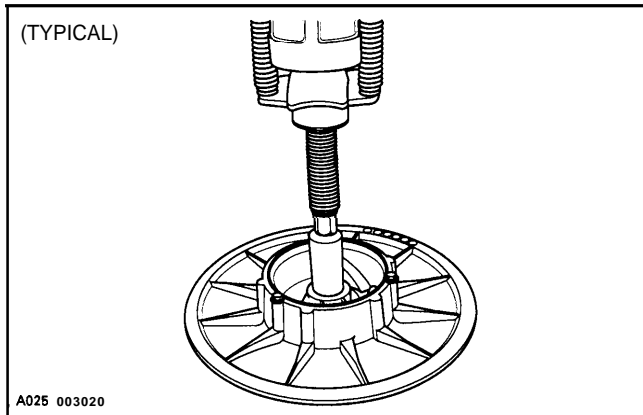
Sub-Section 03 (DRIVEN PULLEY)

INSPECTION

6,9, Sliding Half Bushing and Bushing

Check bushings for wear. See F-Series driven pulley below.

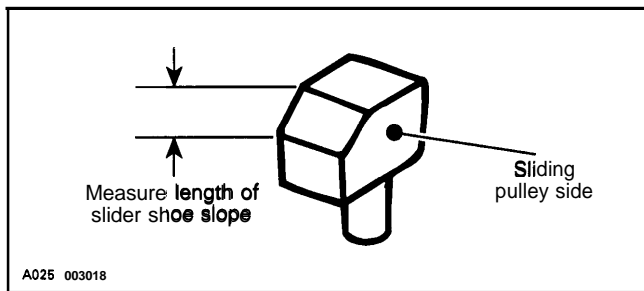
To disassemble a worn bushing (small), use a press and a suitable pusher.



Remove 3 screws and washers and pry large bushing out.

3, Slider Shoe

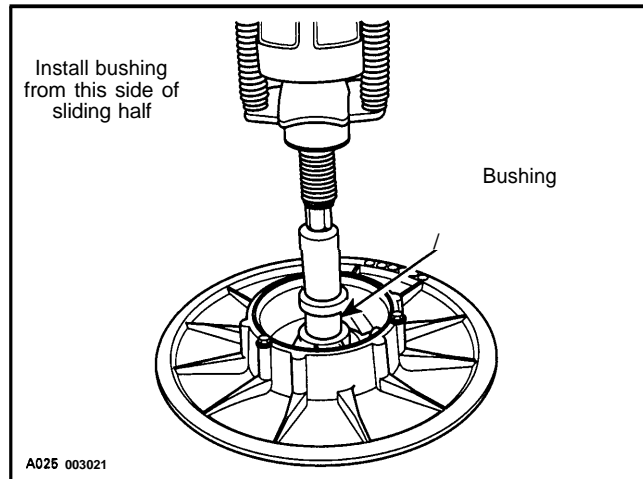
Check cam slider shoes for wear. Replace when inside edge of cam slider shoe slope is worn to 1 mm (.039 in) or less.



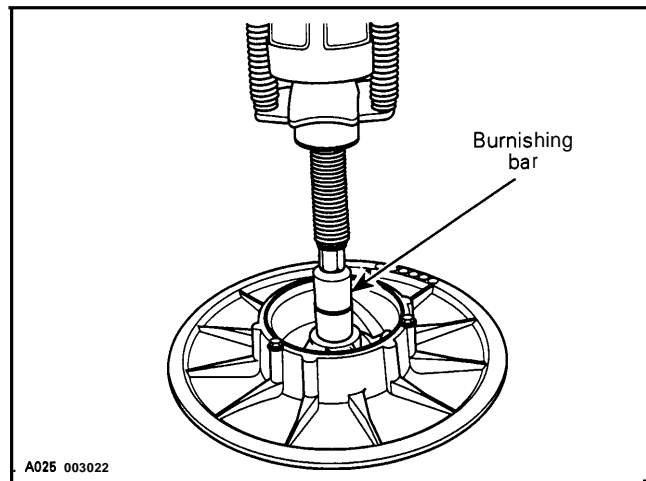
ASSEMBLY

6, Sliding Half Bushing

Clean mounting surfaces with Loctite Safety Solvent. Using a press and a suitable pusher, install bushing as illustrated.



After bushing installation, try fixed half shaft inside bushing. If it is too tight, use burnishing bar (P/N 529 0264 00) then retry. If it is still too tight, use burnishing bar with oil on it.



8,9, Screw and Bushing

Align notches with screw positions and press down. Torque screws to 5 N•m (44 lbf•in).

3, Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam.

Section 05 TRANSMISSION Sub-Section 03 (DRIVEN PULLEY)

12, Fixed Half Shaft

Thoroughly clean the fixed half shaft. Remove rust with no. 320 grit sand paper.

Apply a light film of antiseize lubricant (P/N 4137010 00) on the shaft. Always wipe off surplus.

NOTE : Activate the sliding half several times to distribute lubricant over full length of shaft. Be careful that lubricant does not get on inner halves of pulley.

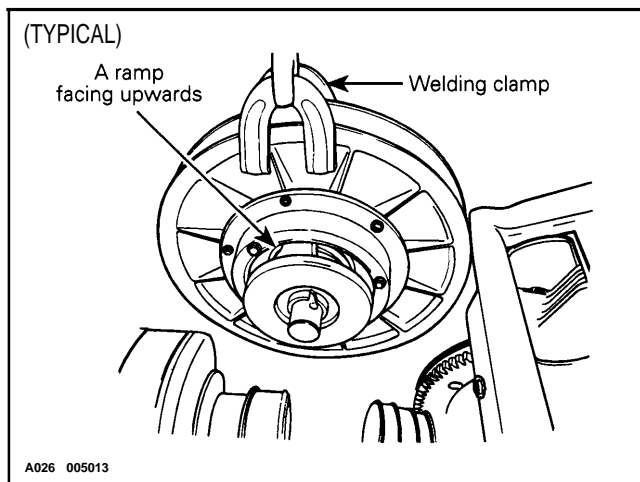
13,14, Brake Disc and Screw

Install brake disc on fixed half and torque screws to 13 N•m (1 15 lbf•in).

Assemble driven pulley components by reversing the disassembly procedure.

2,4,5, Roll Pin, Outer Cam and Spring

One of its ramps facing upwards, hold sliding half with welding clamps. Install spring into sliding half at its original setting (previously noted adjusting hole). Insert other spring end in outer cam and turn clockwise until a slider shoe corresponds with the ramp facing upwards. Push cam all the way in then install roll pin coated with antiseize lubricant (P/ N 4137010 00).



INSTALLATION

Driven Pulley and Chaincase

Install a new upper chaincase oil seal and a new chaincase cover seal.

Reinstall the driven pulley on vehicle by reversing the removal procedure.

NOTE : If chaincase screws have been slack-ened, chaincase can be reinstalled to its initial position by securing driven pulley support before tightening chaincase retaining screws. Make sure to install alignment shims as noted at removal.

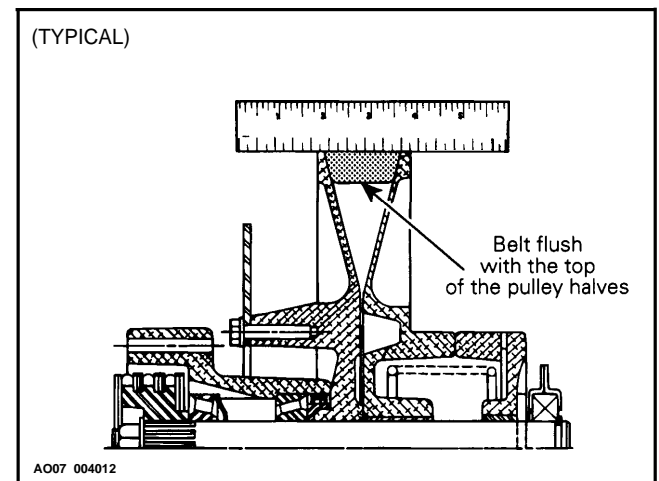
CAUTION : Bleed oil injection pump on models that injection oil supply line has been removed. Refer to INJECTION OIL SYSTEM 04-05.

ADJUSTMENT

10,11, Shim

NOTE : The following adjustment must be performed with a new drive belt.

For best performance, particularly at starting, top of drive belt should be flush with top of driven pulley halves.



Shim(s) no. 10 and no. 11 provide belt height adjustment between pulley halves. Adding shim lower the belt in driven pulley while removing shim raise the belt. Adjust properly.

5, Spring

Spring Torsional Pre-Load

To check spring pre-load adjustment, use spring scale hook (P/ N 5290065 00) and a spring scale.

Install the hook on the sliding half with the spring scale perpendicular with pulley axle.

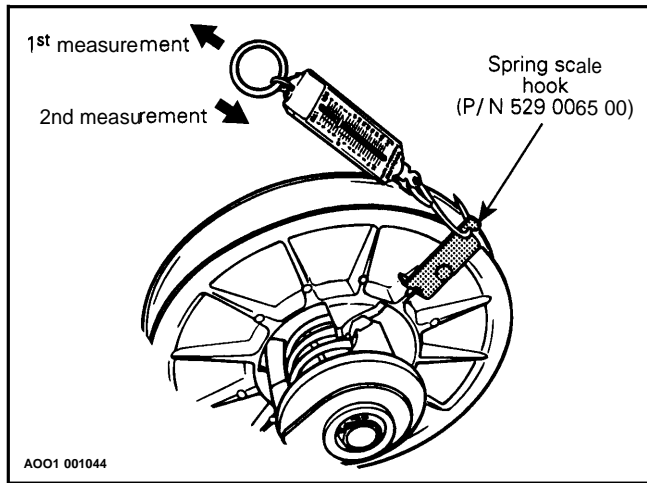
Take a measurement when opening driven pulley and another one when driven pulley begins to close after a rotation of 10 mm (3/8 in). Spring pre-load is the average measurement between these 2.

Section 05 TRANSMISSION

Sub-Section 03 (DRIVEN PULLEY)

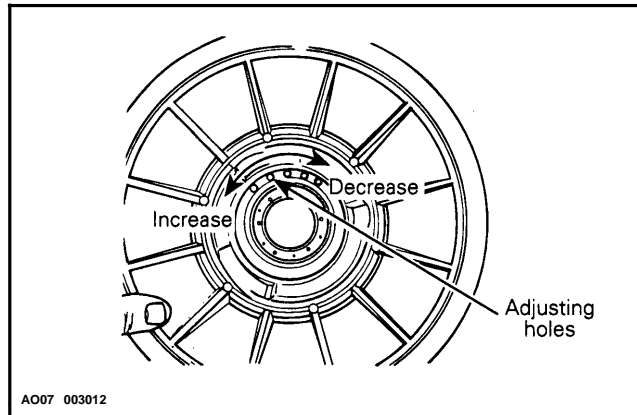
$$\frac{\begin{array}{l} \text{1st measurement} \\ \text{(when opening)} \end{array} + \begin{array}{l} \text{2nd measurement} \\ \text{(when closing)} \end{array}}{2} = \text{Spring pre-load}$$

Example : $\frac{3.8 \text{ kg (8.4 lb)} + 3.4 \text{ kg (7.9 lb)}}{2} = 3.6 \text{ kg (8 lb)}$ Actual spring pre-load



Spring pre-load should be as TECHNICAL DATA section 10.

To adjust spring pre-load relocate spring end in sliding pulley, moving it clockwise to decrease the pre-load and counterclockwise to increase it.



○ NOTE : Always recheck torsional pre-load after adjusting.

Chaincase

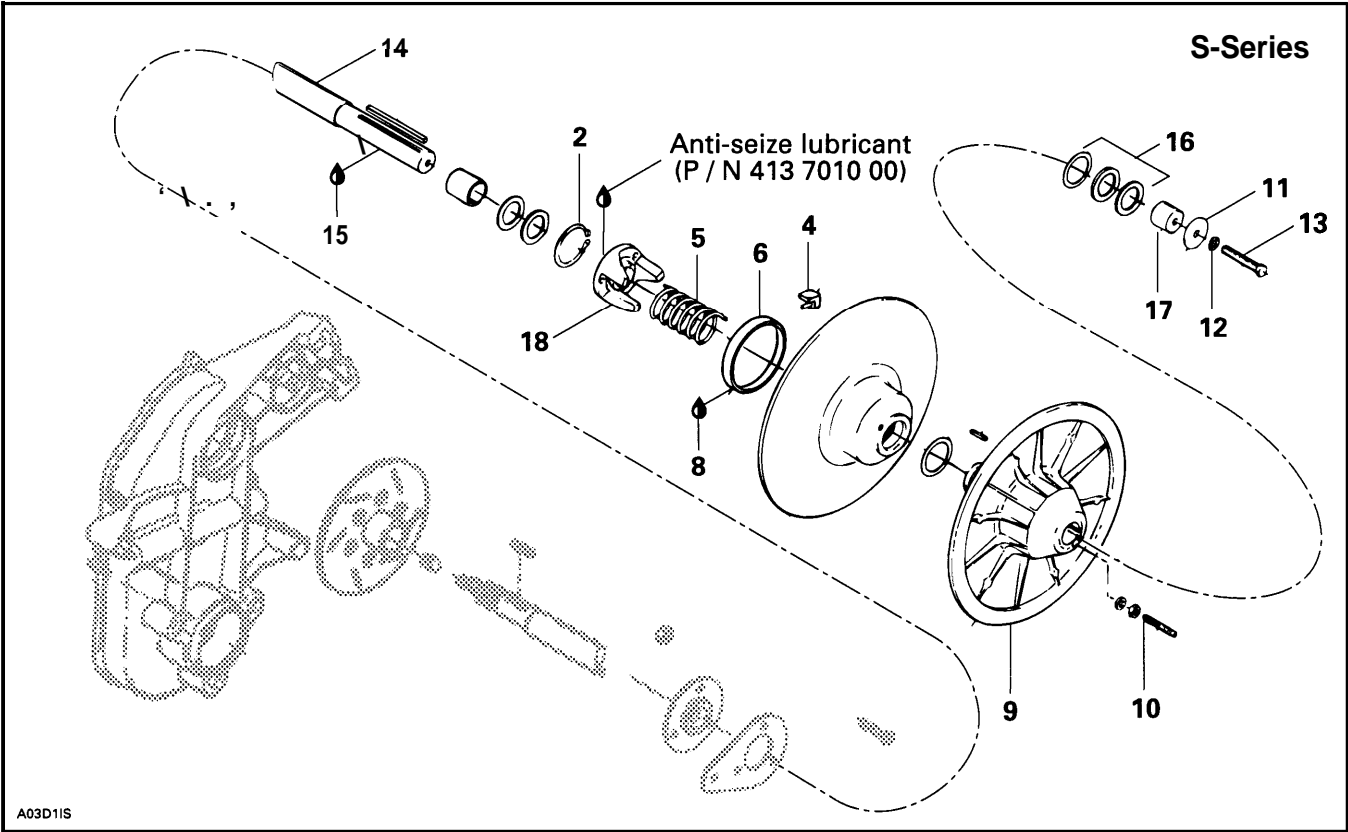
Check oil level and refill as required. Refer to CHAIN-CASE 05-06.

Pulley Alignment and Drive Belt Deflection

Refer to PULLEY DISTANCE AND ALIGNMENT 05-04 and DRIVE BELT 05-01 to perform adjustments.

▼ CAUTION : Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

Section 05 TRANSMISSION
Sub-Section 03 (DRIVEN PULLEY)



Section 05 TRANSMISSION

Sub-Section 03 (DRIVEN PULLEY)

REMOVAL

Belt Guard and Drive Belt

Remove from vehicle.

11,12,13,16,17, Washer, Lock Washer, Screw, Shim and Extension

Remove the cap screw, pull the driven pulley from the countershaft.

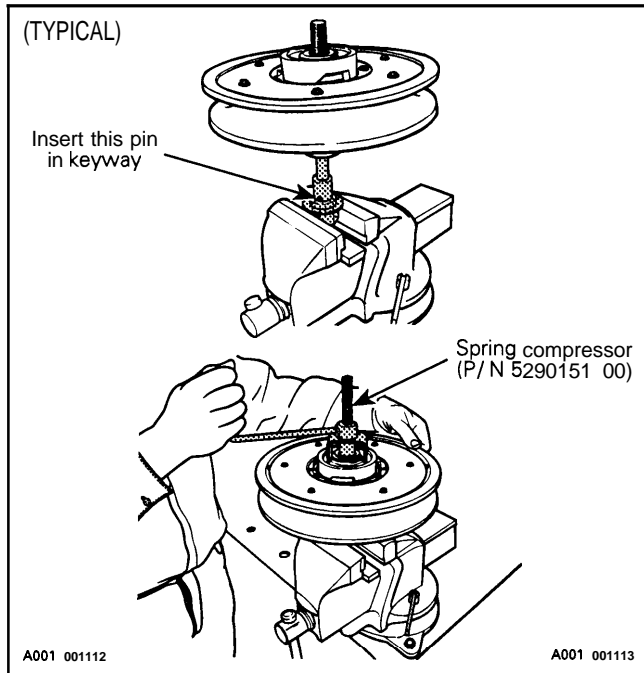
14, Countershaft (Liquid Cooled Models Only)

Should removal be required, refer to BRAKE 05-05 then look for Countershaft and Brake Disc Removal.

DISASSEMBLY

2, Snap Ring

Use spring compressor (P/ N 5290151 00).



Remove snap ring to disassemble the outer cam and the 2 pulley halves.

◆ **WARNING** : Driven pulley cam is spring loaded, use above mentioned tool.

CLEANING

7, Small Bushing

Only clean it using petroleum based solvent such as Varsol.

▼ **CAUTION** : Do not use acetone.

6, Large Bushing

During break-in period (about 10 hours of use), teflon from bushing moves to cam surface. A teflon over teflon running condition occurs, leading to low friction. So it is normal to see gray teflon deposit on cam. Do not remove that deposit, it is not dust.

When a dust deposit has to be removed from the cam, use dry cloth to avoid removing transferred teflon.

INSPECTION

6,7, Bushings

Check for cracks, scratch and for free movement when assembled to fixed half.

6, Large Bushing

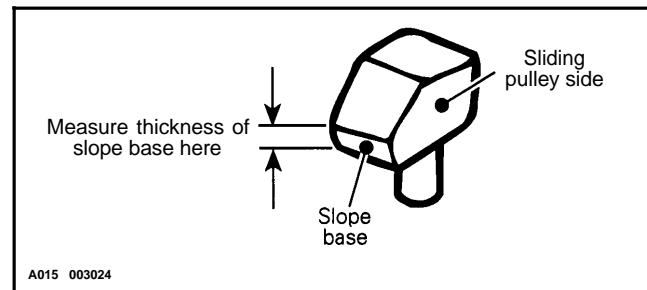
That bushing is made of teflon coated porous bronze. Wear limit is attained when 80% of surface is bronze.

7, Small Bushing

Under normal use there is no need to replace this bushing.

4, Slider Shoe

Check cam slider shoes for wear. Replace when inside edge of cam slider shoe slope base is worn to 1 mm (.039 in) or less.



ASSEMBLY

4, Cam Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam.

Assemble driven pulley components by reversing the disassembly procedure.

18, Cam

Coat cam interior with antiseize lubricant.

INSTALLATION

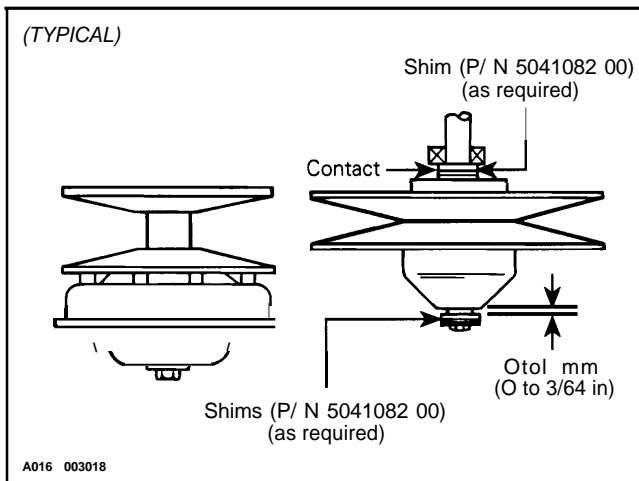
14, Countershaft

CAUTION : Always apply antiseize lubricant (P / N 4137010 00) on the countershaft before final pulley installation.

Should installation procedure be required, refer to BRAKE 05-05 then look for **Brake Disc** and **Countershaft Bearing Adjustment**.

Reinstall the pulley on the countershaft by reversing the removal procedure.

Check end play of driven pulley on countershaft by pushing pulley towards outer housing so that the inner shims (P/ N 5041082 00) contact it. Measure end play at the mounting screw end between shim(s) and pulley. See illustration.



13, Pulley Retaining Screw

Torque to 25 N•m (18 lbf•ft).

ADJUSTMENT

Refer to PULLEY DISTANCE AND ALIGNMENT 05-04 to adjust pulley distance. Adjust drive belt height between pulley halves to obtain specified belt deflection.

5, Spring

Spring Torsional Pre-Load

To check spring pre-load adjustment, use spring scale hook (P/ N 5290065 00) and a spring scale.

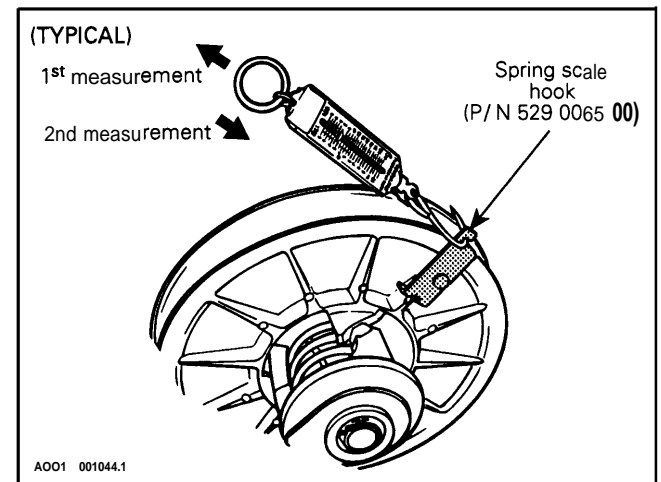
Remove drive belt.

Install the hook on the sliding half. Preventing fixed half from turning, pull sliding half with the spring scale perpendicular with pulley axle.

Take a measurement when opening driven pulley and another one when driven pulley begins to close after a rotation of 10 mm (3/8 in). Spring pre-load is the average measurement between these 2.

$$\frac{1^{\text{st}} \text{ measurement (when opening)} + 2^{\text{nd}} \text{ measurement (when closing)}}{2} = \text{Spring pre-load}$$

$$\text{Example : } \frac{3.8 \text{ kg (8.4 lb)} + 3.4 \text{ kg (7.9 lb)}}{2} = \text{Actual spring pre-load } 3.6 \text{ kg (8 lb)}$$

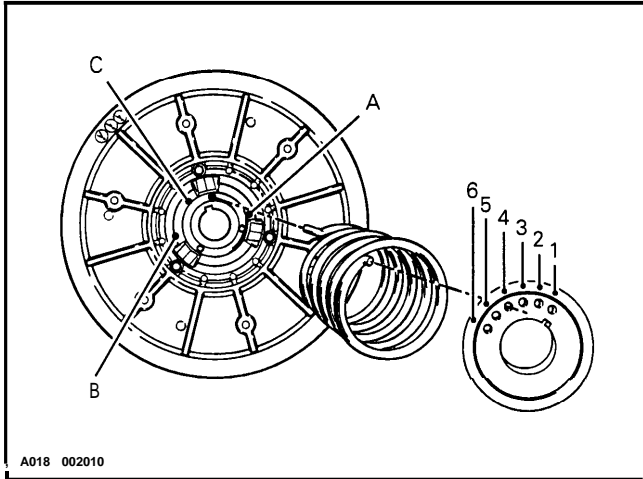


To adjust spring pre-load, relocate spring end in cam, moving it clockwise to increase the pre-load and counterclockwise to decrease it. Refer to 10 TECHNICAL DATA.

NOTE : If spring pre-load can not be adjusted, try **O** to relocate the other end of spring in sliding pulley (holes A, B, C).

Section 05 TRANSMISSION

Sub-Section 03 (DRIVEN PULLEY)



Letters and numbers shown in illustration are actual letters and numbers embossed on parts.

NOTE : Always recheck torsional pre-load after adjusting.

Pulley Alignment and Drive Belt Deflection

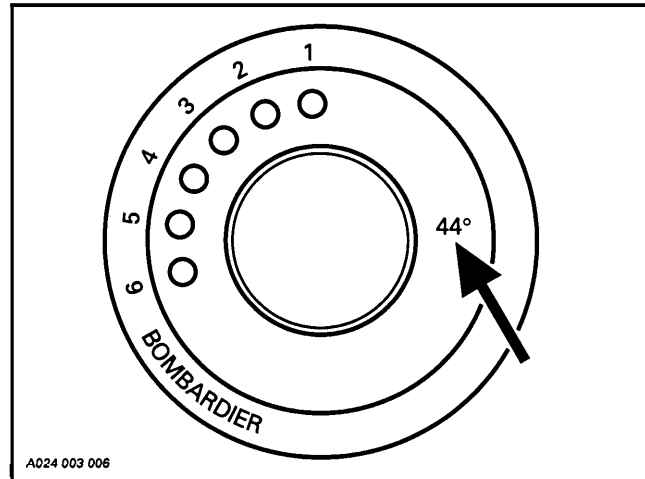
Refer to PULLEY DISTANCE AND ALIGNMENT 05-04 and DRIVE BELT 05-01 to perform adjustments.

CAUTION : Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

3, Outer Cam

Make sure to install proper cam. Refer to TECHNICAL DATA.

Cam angle is identified on cam.



NOTE : For high altitude regions, the *High Altitude Technical Data Book/et* (P/N 484062400 and 4840545 00 for binder) gives information about calibration according to altitude.

PULLEY DISTANCE AND ALIGNMENT

GENERAL

The pulley distance we will refer to, in this section, is the space separating the drive and driven pulley outside diameters (Z measurement).

This basic distance is provided as an assembly guide and indicates the dimensions between which satisfactory belt deflection will be obtained.

Both pulley distance adjustment and pulley alignment must be carried out to ensure the highest efficiency of the transmission system. Furthermore, optimum drive belt operation and minimal wear will be obtained only with proper pulley alignment.

▼ **CAUTION :** Before checking pulley adjustment, the rear suspension must be mounted on the vehicle and track tension / alignment must be done. Always check pulley adjustment after suspension is adjusted.

◆ **WARNING :** Failure to correctly perform pulley alignment may cause the vehicle to creep forward at idle.

All pulley alignment specifications refer to :

X = Distance between straight bar and drive pulley fixed half edge, **measured between pulleys.**

Y = Distance between straight bar and drive pulley fixed half edge, **measured at the end of straight bar.**

Z = Distance between outside diameter of pulleys.

○ **NOTE :** The Élan drive and driven pulleys are inverted compared with other models.

GENERAL PROCEDURE

Remove belt guard and drive belt.

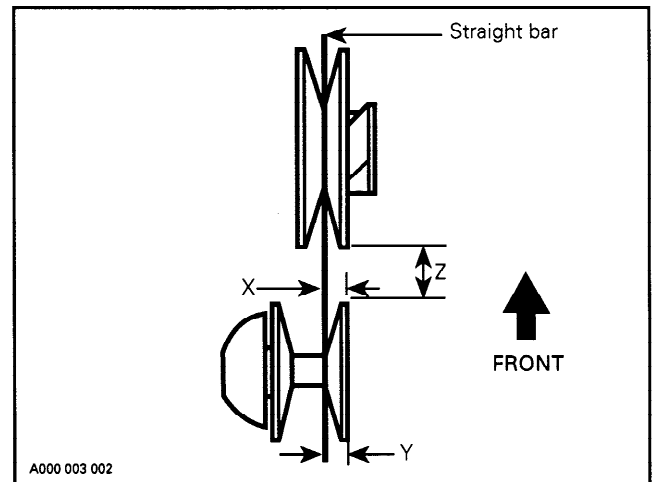
By turning and pushing the sliding half, open the driven pulley. Insert a straight bar 9.5 mm (.375 in) square, 48 cm (19 in) long or the proper alignment template into the opened driven pulley.

Measuring Procedure

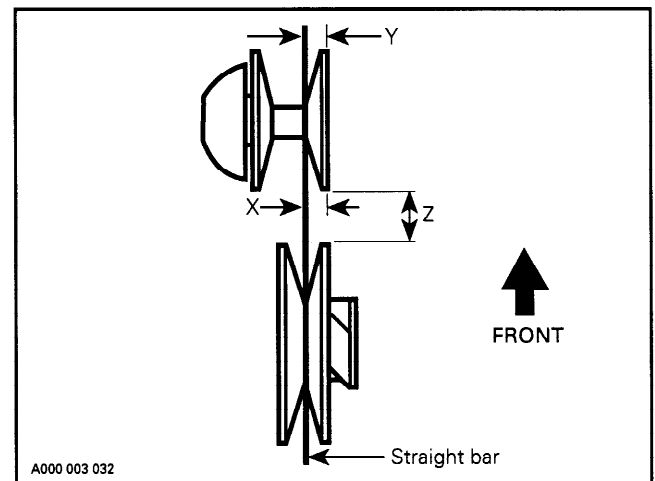
Using Straight Bar :

Always measure distances X and Y from the farther straight bar side (including its thickness to the fixed half edge.)

Élan



All Others



On all models except Élan, the distance Y **must** exceed distance X to compensate for the twist due to the engine torque.

Section 05 TRANSMISSION

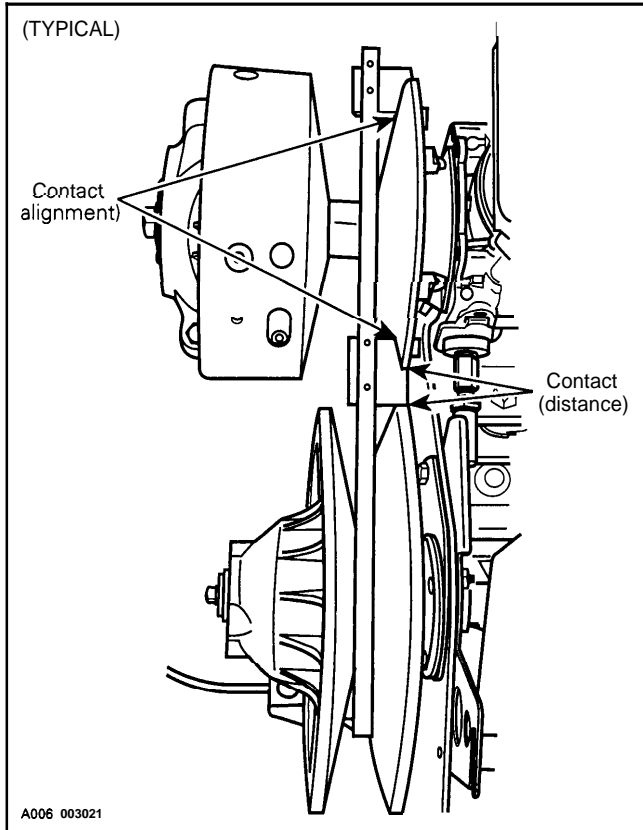
Sub-Section 04 (PULLEY DISTANCE AND ALIGNMENT)

Nominal Value Procedure and Quick Alignment and Distance Check

Alignment template tabs must fully contact fixed half of drive pulley.

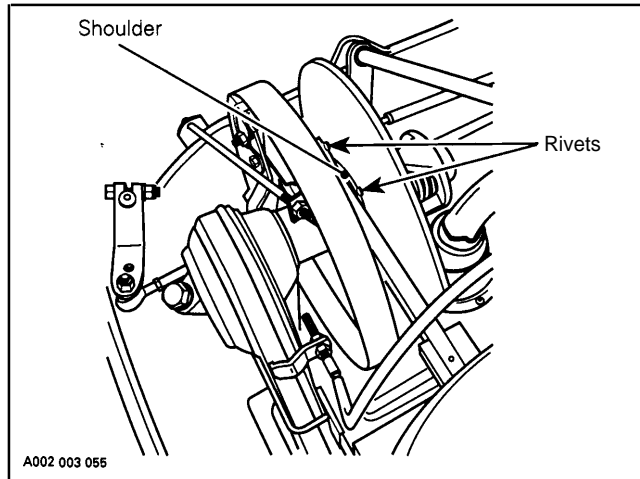
Pulley distance is correct when tab contacts both pulley halves.

Refer to below chart for proper alignment template.



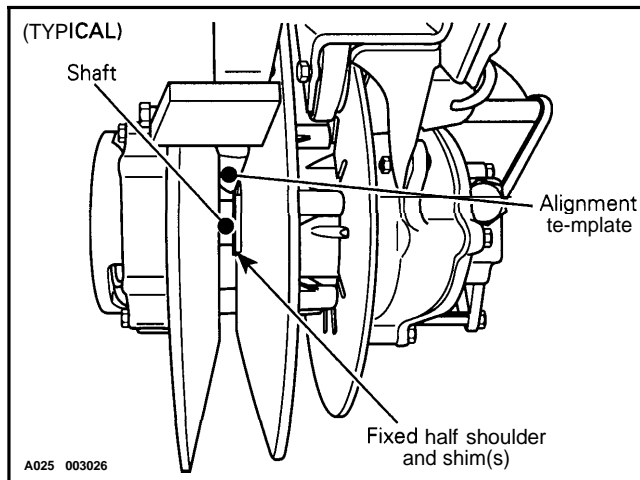
Élan Only

Alignment template must clear rivets and seat on sliding half shoulder and not on shaft.



Tundra II LT Only

Bottom of alignment template must not seat on shaft nor fixed half shoulder and shim(s).



Drive Belt Deflection

NOTE : When pulley distance and alignment are adjusted to specifications, refer to DRIVE BELT 05-01 to adjust drive belt deflection.

CAUTION : This section deals mainly with adjustment procedures. For complete assembly requirements, refer to the proper ENGINE or TRANSMISSION installation section.

Section 05 TRANSMISSION
Sub-Section 04 (PULLEY DISTANCE AND ALIGNMENT)

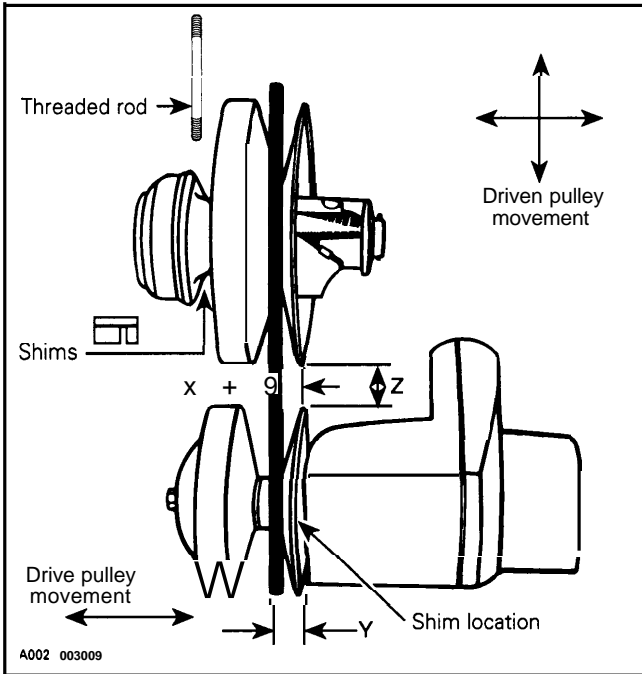
PULLEY ALIGNMENT AND DISTANCE SPECIFICATIONS CHART

MODEL	PULLEY DISTANCE	OFFSET		ALIGNMENT TEMPLATE
	Z	X	Y-X	①
	+ 0, - 1 mm (+ 0,-0.040 in)	± 0.50 mm (0.020 in)	± 0.5 mm (0.020 in)	P/N
Élan	45.78 (1.802)	34.44 (1.356)	0	529028300
Tundra II LT	37.0 (1.460)	36.0 (1.420)	0 to 1.5 mm (0 to 0.060 in)	529026900
Bombardier Lite Equipped S-Series	25.0 (0.984)	33.4 (1.315)	1.0 (0.040)	529030000
TRA Equipped S-Series	16.5 (0.650)	35.0 (1.380)	1.5 (0.060)	529026700

① Alignment templates have been made according to pulley alignment nominal values. However, they do not take into account allowed tolerances for alignment specifications. They are used as GO / NO GO gauges for quick alignment and pulley distance check and as templates to reach alignment nominal values.

Section 05 TRANSMISSION
Sub-Section 04 (PULLEY DISTANCE AND ALIGNMENT)

Elan 250



Pulley Distance Adjustment Method

With the threaded rod and nut located between chaincase and frame, shift chaincase to obtain the specified distance.

Pulley Alignment Methods

Drive Pulley Movement

If drive pulley is too far in, remove drive pulley and add shim(s) on crankshaft. Use shim (P/ N 5040820 00).

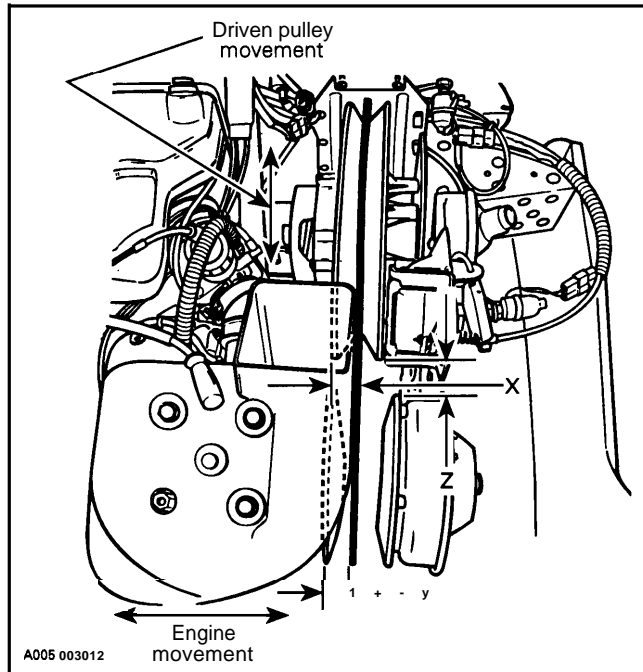
▼ **CAUTION** : Never use more than 5 shims on crankshaft.

◆ **WARNING** : Always torque drive pulley bolt within specifications. Refer to DRIVE BELT 05-01.

Driven Pulley Movement

If driven pulley is too far in, add shim(s) between frame and chaincase. Use shim (P/ N 5040504 00), 0.81 mm (.032 in) thickness.

Tundra II LT



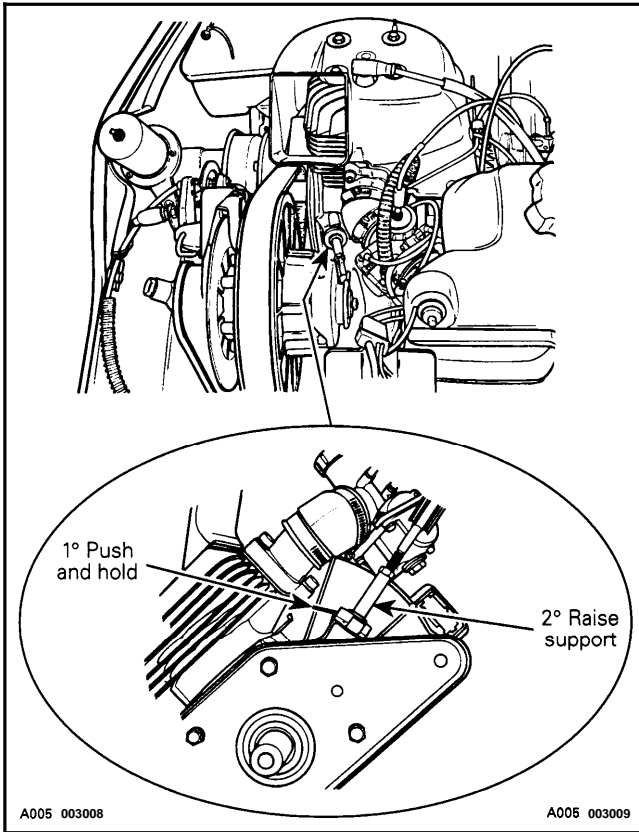
▼ **CAUTION** : The rear suspension must be mounted on the vehicle and track tension and alignment must be done to provide the right frame width.

Pulley Distance Adjustment Method

Slacken the 4 chaincase retaining bolts, unlock and raise pulley support.

Move chaincase to obtain specific adjustment and adjust driven pulley support length accordingly (light contact).

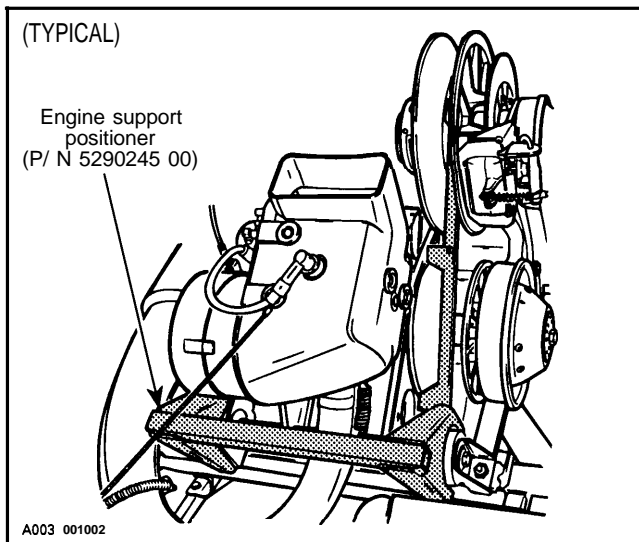
Section 05 TRANSMISSION
Sub-Section 04 (PULLEY DISTANCE AND ALIGNMENT)



Pulley Alignment Method

Engine Movement

Slacken the support retaining bolts and install engine support positioner (P/ N 529 0245 00) to keep from altering distance between both supports.

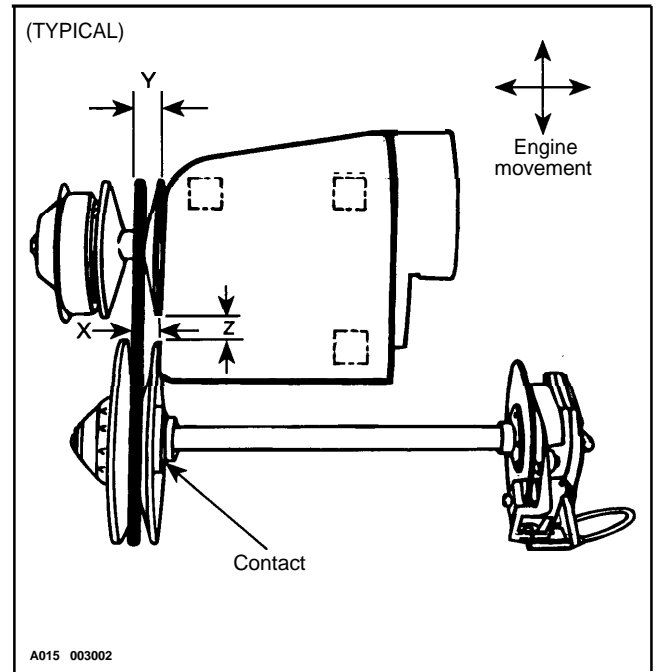


Move the engine to obtain specified pulley alignment, torque engine support bolts to 55 N•m (41 lbf•ft) and remove engine support positioner.

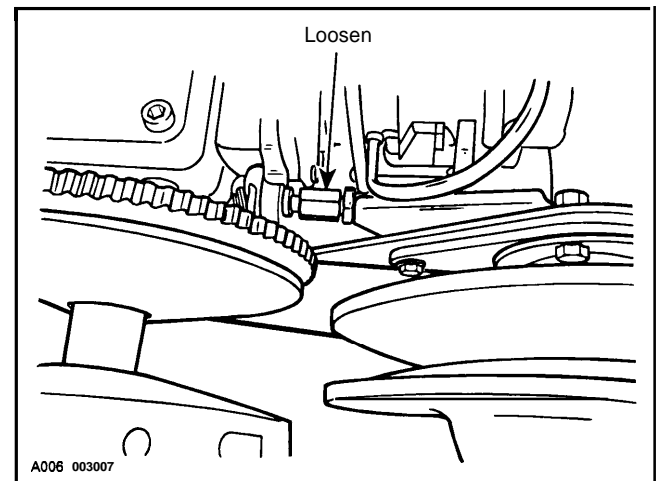
Driven Pulley Movement

Shims can be mounted between chaincase and frame. Use shim (P/ N 5040398 00), 0.53 mm (.021 in) thick.

S-Series



NOTE : Prior to performing pulley adjustment, 0 loosen torque rod nut to allow engine movement. Engine brackets" have tendency to stick to frame, work engine loose prior to aligning.



Section 05 TRANSMISSION

Sub-Section 04 (PULLEY DISTANCE AND ALIGNMENT)

Pulley Distance Adjustment Method

Engine Movement

The engine bracket has slotted mounting holes. Move engine to obtain specified distance between pulleys.

Pulley Alignment Method

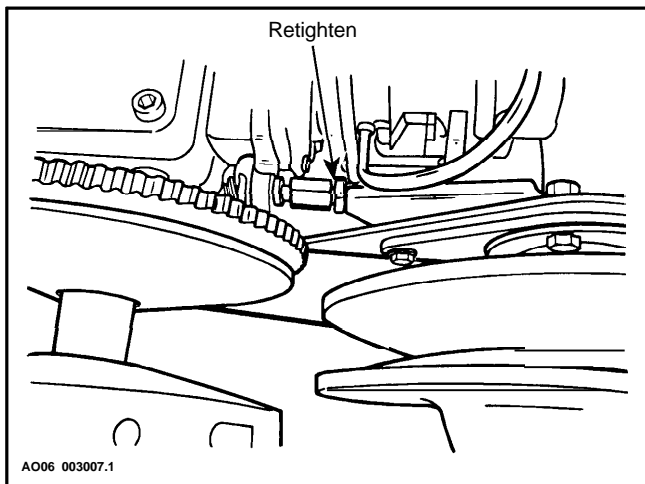
Driven Pulley Movement

When engine slotted mounting holes do not allow to set proper pulley offset (**X**), adjust with shims (P/ N 5041082 00) between pulley and countershaft bearing support (pulley pushed toward brake disc).

Engine Movement

Loosen the 4 bolts retaining engine bracket to the frame. Position engine to obtain the specified alignment,

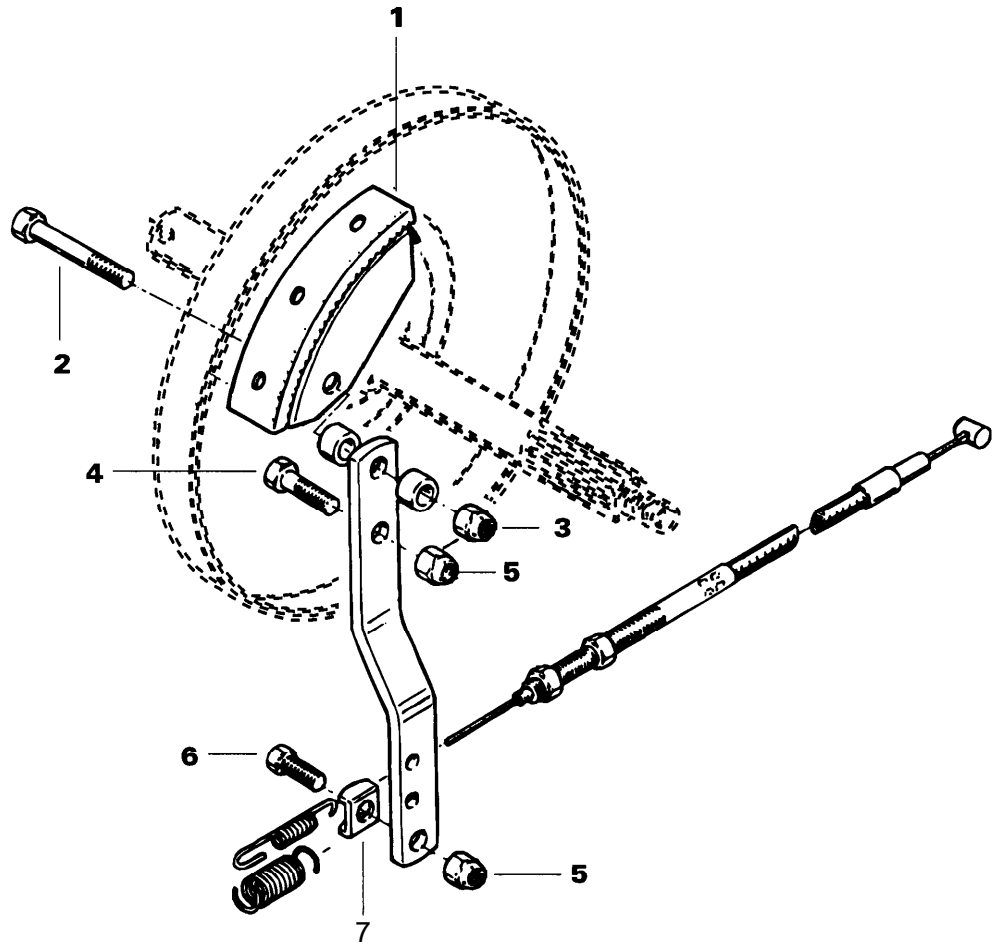
NOTE : After adjustment, just tighten torque rod nut so it sits against washer. Do not over tighten, it will disalign pulleys,



BRAKE

DRUM BRAKE

Elan



AO02 003041

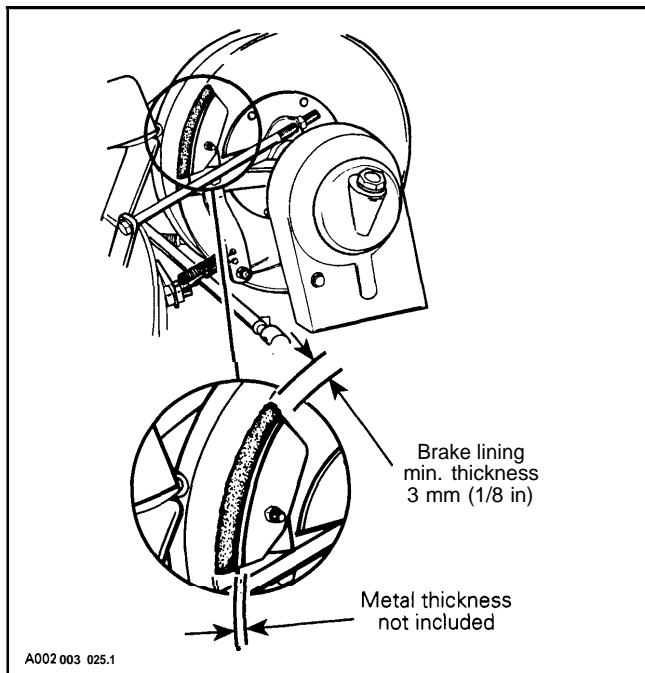
Section 05 TRANSMISSION

Sub-Section 05 (BRAKE)

INSPECTION

1, Brake Shoe

Check brake lining for wear. Replace if brake lining thickness is less than 3 mm (1/8 in).



NOTE : If traces of oil are found on lining and/or pulley, check chaincase seal for leaks or incorrect installation; Replace or repair as needed. Wipe all traces of oil from pulley. Install new brake shoe.

INSTALLATION

2,3, Shoe Retaining Bolt and Nut

When torquing shoe retaining nut, shoe must pivot when slight pressure is applied.

4,5, Lever Retaining Bolt and Nut

When attaching brake lever assembly to chaincase bracket, tighten nut until all side play is eliminated and brake lever can still pivot freely.

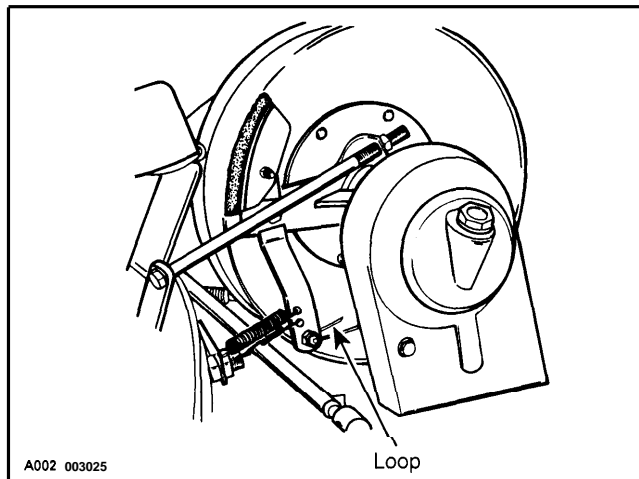
LUBRICATION

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

WARNING : Avoid getting oil on brake shoe. Do not lubricate or apply antirust or antifreeze solution in cable.

5,6,7, Nut, Bolt and Cable Retaining Bracket

Brake cable must form a loop around the bolt so that the cable may be firmly pinched between the bolt head and the bracket.

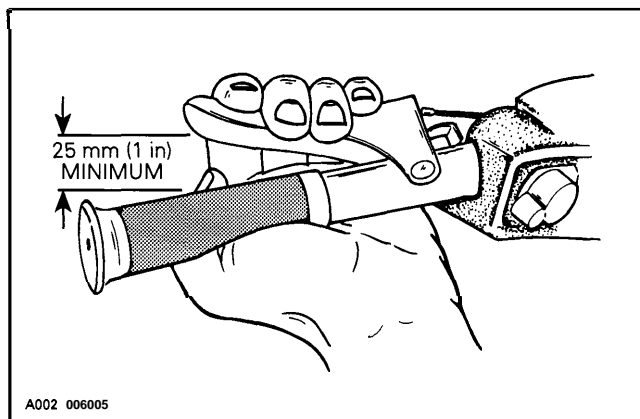


NOTE : When replacing brake cable, adjust the length of the loop so that the cable adjusting nuts are halfway on their threads. This will allow adequate final adjustment.

ADJUSTMENT

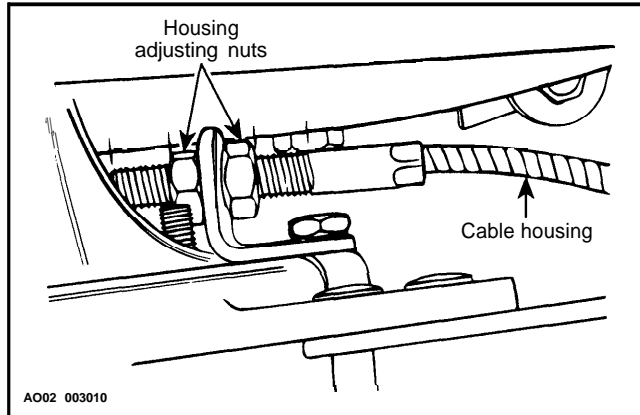
Brake Handle

Adjust so that brake applies fully when brake handle is 25 mm (1 in) from handlebar grip.



NOTE : Prior to cable installation, make sure cable housing adjusting nuts are located halfway on adjuster threads.

If a final adjustment is indicated, use housing adjusting nuts.



Brake Light Operation

To check operation :

Pull the brake handle and check that a light resistance is felt while rotating the driven pulley, This is the position where the switch should have lit the brake light,

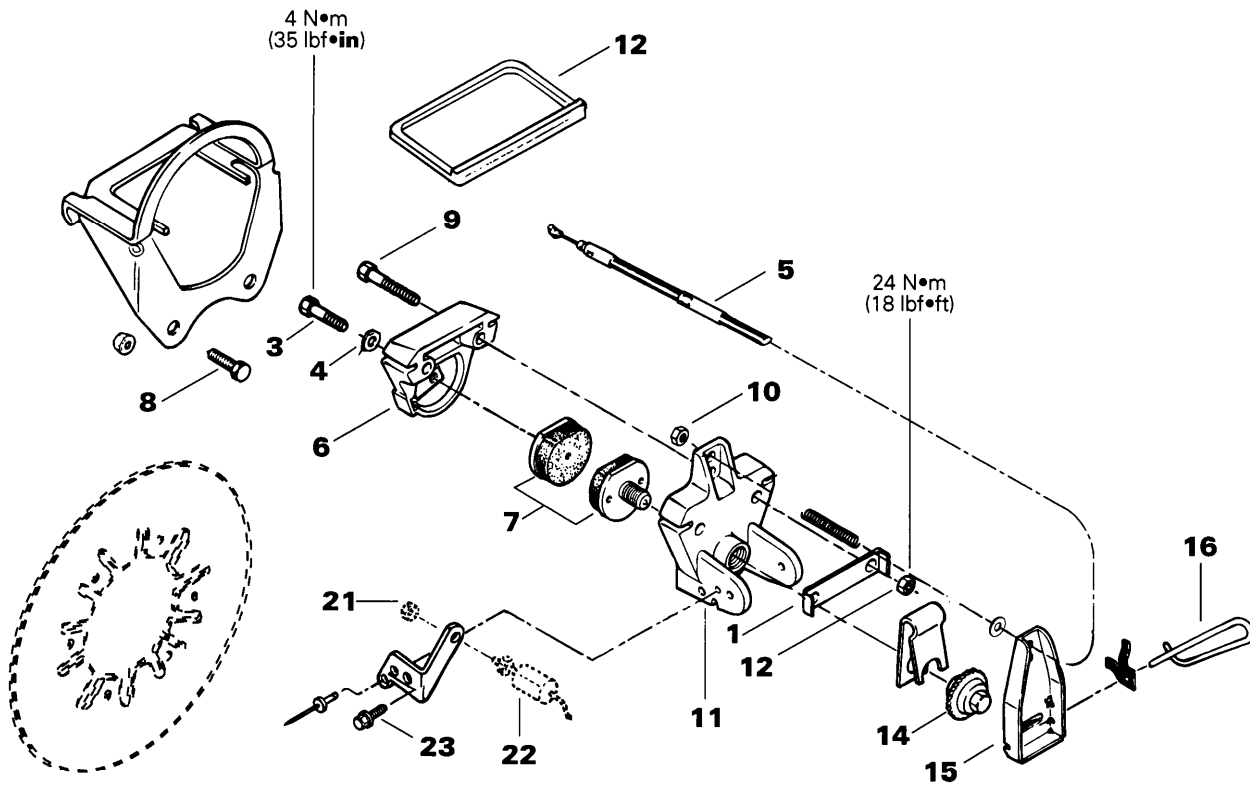
To adjust :

- Loosen the brake switch lock nut.
- Holding brake handle at the lit position, unscrew the switch to put on the light or screw it in to put it out.

Section 05 TRANSMISSION
Sub-Section 05 (BRAKE)

DISC BRAKE

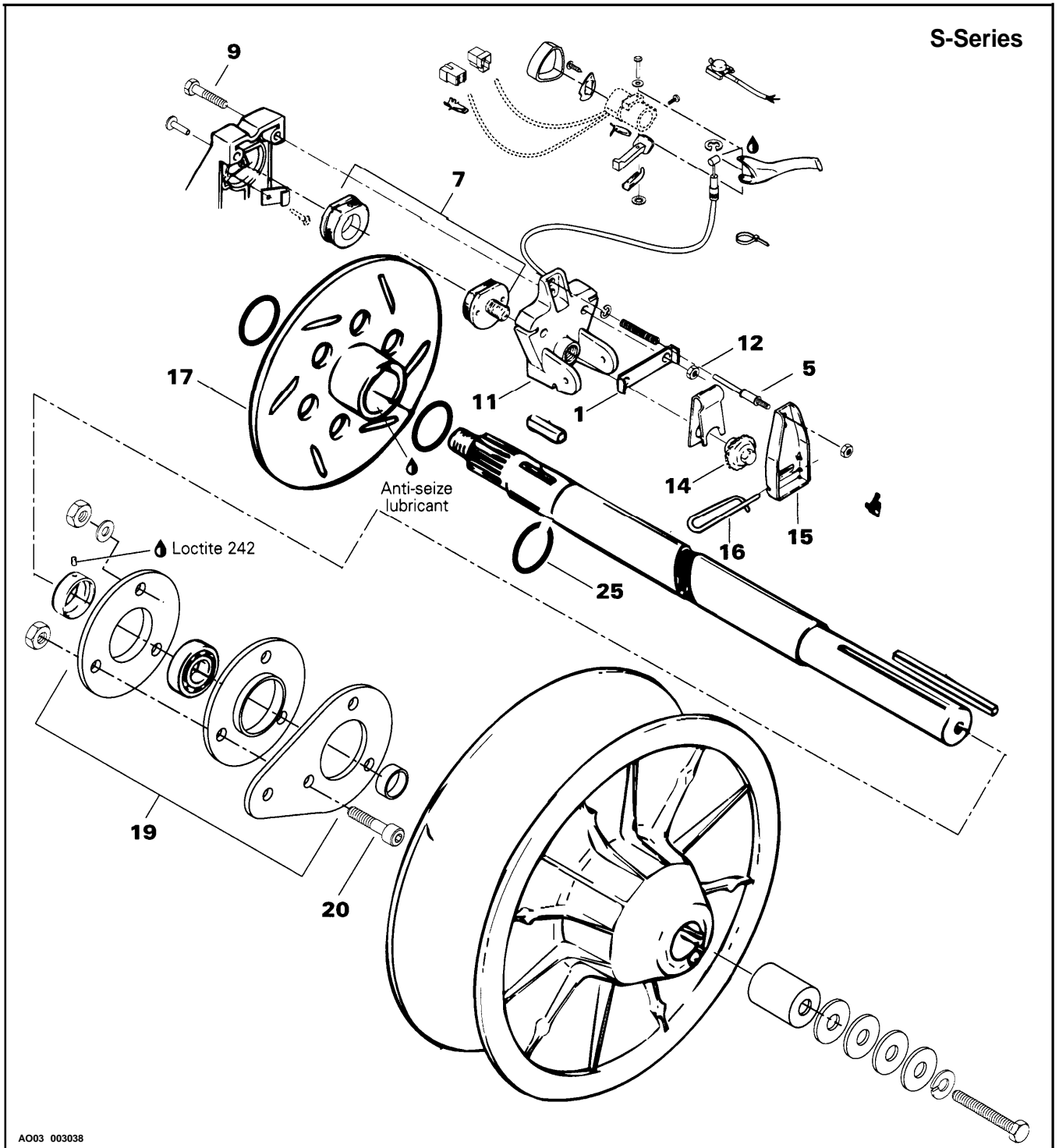
Tundra II LT



AO09 003024

Section 05 TRANSMISSION
Sub-Section 05 (BRAKE)

S-Series



AO03 003038

Section 05 TRANSMISSION

Sub-Section 05 (BRAKE)

REMOVAL

Tundra II LT

The split caliper type brake should be removed from chaincase as an assembly. Proceed as follows :

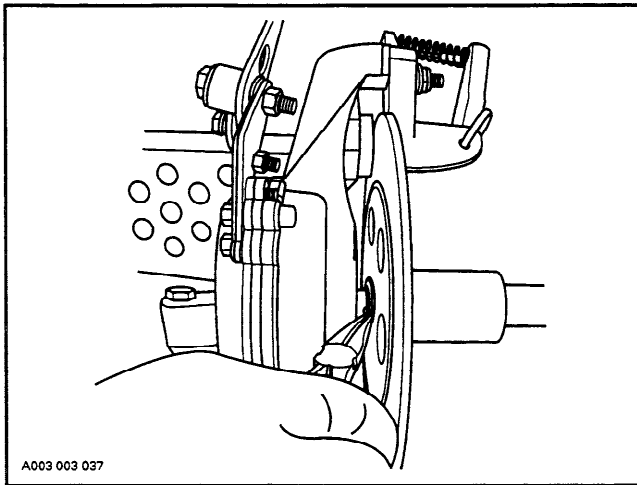
- Remove belt guard.
- Disconnect brake cable.
- Remove bolts no. 8 securing brake support to chaincase.
- Slide brake caliper ass'y out of brake support.
- To remove brake disc, refer to DRIVEN PULLEY 05-03.

BRAKE DISC REMOVAL

S-Series

Brake disc can be withdraw without removing caliper. Proceed as follows :

- Remove belt guard, belt and driven pulley.
- Remove air silencer.
- Remove clip no. 25 on countershaft.

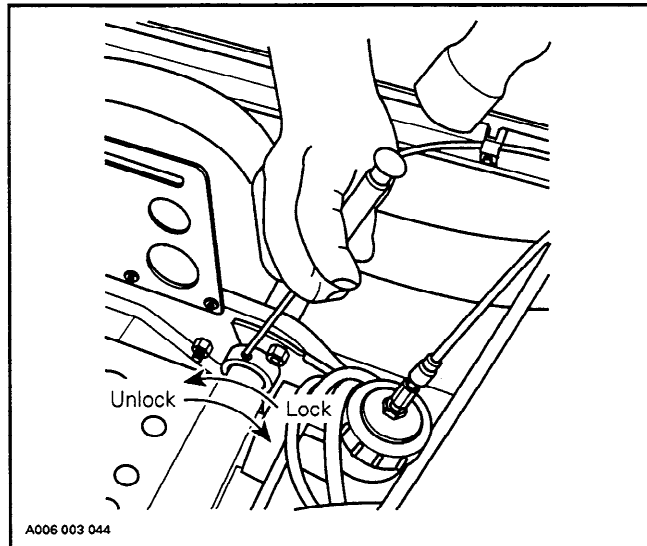


- Unbolt bearing support from chassis.
- Open chaincase and remove upper sprocket.
- Pull countershaft toward driven pulley side to free from chaincase and disc.
- Remove disc.

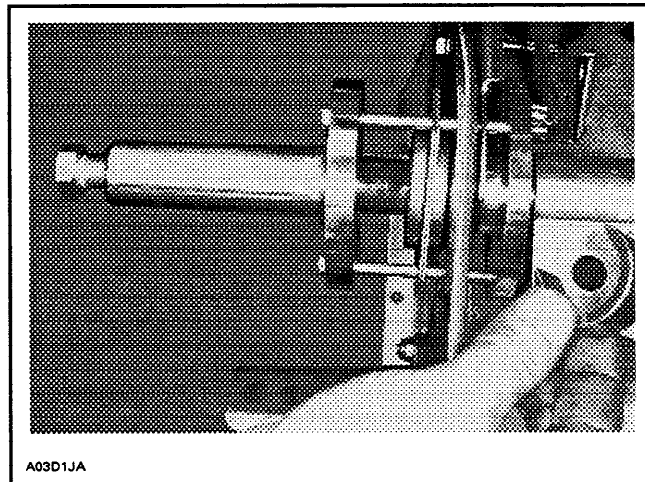
COUNTERSHAFT REMOVAL

S-Series

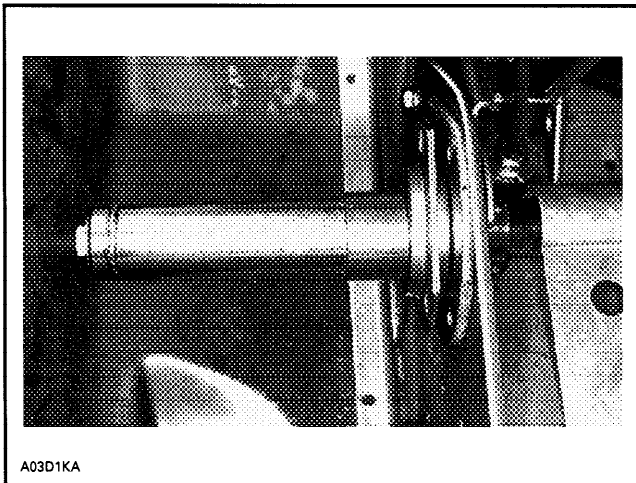
Proceed the same as for brake disc removal but unlock bearing collar on driven pulley side.



Unbolt bearing plates then push bearing to driven pulley side out of countershaft, using remover (P / N 529 0301 00). Begin with only the remover then add a spacer of different width as the bearing comes out.



To install bearing on coutershaft, use installer (P / N 529 0302 00).

**DISASSEMBLY****7,15,16,23, Brake Pad, Brake Lever, Pin and Screw****All Models**

Pull pin out off caliper and remove lever.

On Tundra II LT, remove self-tapping screw. Unscrew ratchet wheel in order to remove moving pad.

Remove fixed pad.

S-Series

Fixed pad is riveted to chaincase on these models. Caliper must be split to remove moving pad. To removed fixed pad, drill out its rivet then pry disc in order to remove fixed pad.

All Models**CLEANING**

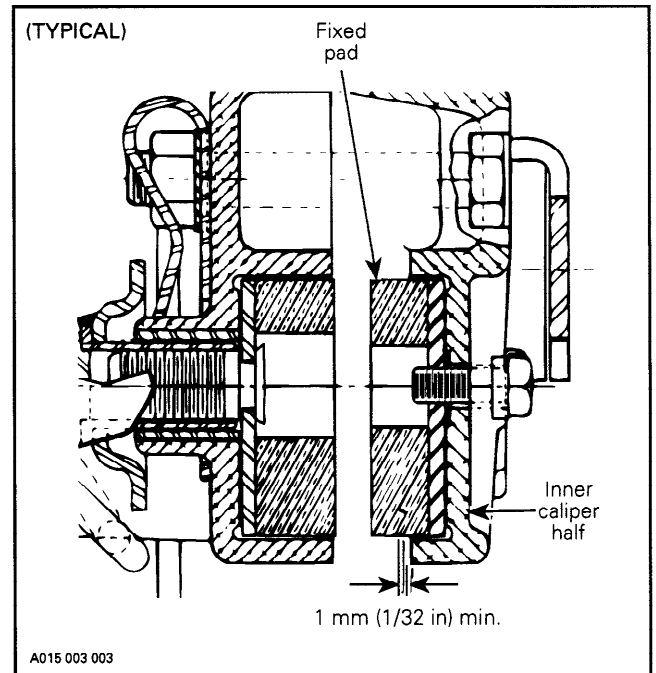
Clean all metal components in a general purpose solvent. Thoroughly dry all components before assembling.

▼ **CAUTION** : Do not clean brake pads in solvent. Soiled brake pads must be replaced by new ones.

INSPECTION**7, Brake Pad Thickness**

Brake pads must be replaced when fixed pad projects only 1 mm (1/32 in) from caliper.

▼ **CAUTION** : Brake pads must always be replaced in pairs.

**Brake Disc**

Check for scoring, cracking or heat discoloration, replace as required. Refer to DRIVEN PULLEY 05-03 for procedures on applicable models.

▼ **CAUTION** : Brake disc should never be machined.

ASSEMBLY**14, Ratchet Wheel**

Apply low temperature grease (P / N 413 7061 00) on threads and spring seat prior to installing. Fully tighten then back off one turn.

16, Pin

Install so that it can only be removed upward. Lock it in the caliper casting notch.

Section 05 TRANSMISSION

Sub-Section 05 (BRAKE)

3,4,7, Screw, Locking Tab and Fixed Brake Pad *Tundra II LT*

Torque screw to 4 N•m (35 lbf•in). Bend locking tab over a flat of screw head.

2,7, Nut and Fixed Brake Pad *S-Series*

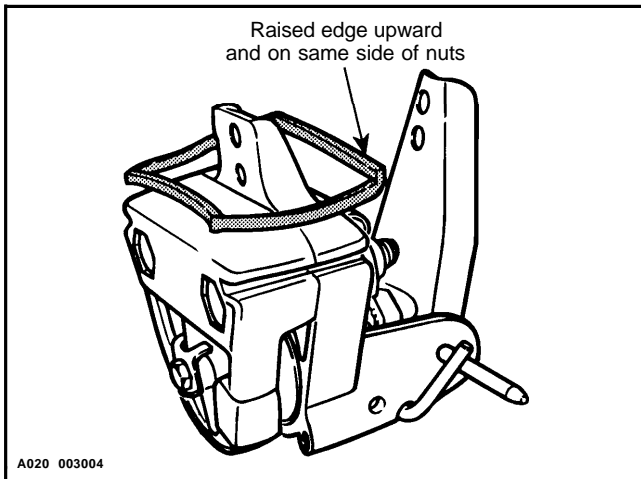
Torque nut to 8 N•m (71 lbf•in).

1,6,11,12, Locking Tab, Inner, Outer Caliper and Nut

Tundra II LT

Assemble both caliper halves. Insert bolts, locking tab, then nuts. Torque nuts to 24 N•m (18 lbf•ft). Caliper half side slots must align to allow proper sliding in brake support. Bend locking tab over a flat of each nut.

Install rubber slider **no. 12** lubricated with shortening (cooking fat) into side slots of caliper. It must be installed so that the raised edge is upward and on the same side of nuts as shown.



▼ **CAUTION** : Positioning of rubber slider is important to avoid the possibility of damage against locking tab edges.

INSTALLATION

To install brake, reverse removal procedure paying attention to the following.

◆ **WARNING** : Avoid getting oil on brake pads. Do not lubricate or apply antirust or antifreeze solution in brake cable.

17, Brake Disc

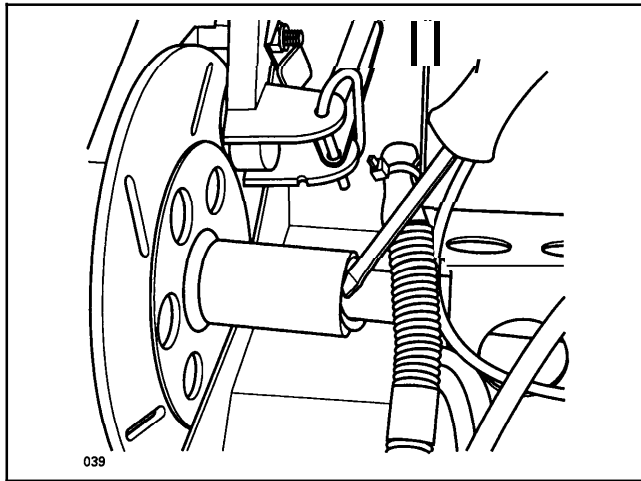
S-Series

The brake disc must be floating on countershaft for efficient operation of brake.

Apply antiseize lubricant (P/N 4137010 00) on shaft and check that disc slides freely.

The disc hub exceeds the disc more from one side than from the other. Install disc with the longer exceeding portion toward driven pulley.

Push O-rings inside disc hub.



Countershaft Bearing Adjustment

S-Series

Insert countershaft (with brake disc) from chaincase side through countershaft support (driven pulley side), then insert into chaincase.

Install countershaft bearing no. 19 and ensure that countershaft is properly aligned, then tighten 3 retaining screws.

○ **NOTE** : A misaligned countershaft will result in difficulty to center the bearing in its support.

Refer to DRIVE AXLE 05-05 then look **Chaincase Perpendicularity Adjustment**.

Torque castellated nut of upper sprocket to 53 N•m (39 lbf•ft).

▼ **CAUTION** : Upper sprocket castellated nut must be tightened before adjusting bearing collar.

Slide collar no. 18 towards bearing and turn, by hand, to engage the eccentric. This should require about a quarter turn.

Turn collar in direction of countershaft rotation until collar and inner race lock together.

Insert a punch into collar hole and strike sharply in the same direction to lock firmly.

Apply medium strength threadlocker (P/N 4137030 00) on set screw threads, then tighten.

Close chaincase referring to CHAINCASE 05-06.

1,11,12, Locking Tab, Outer Caliper and Nut S-Series

Install caliper retaining bolts.

Assemble outer caliper. Install locking tab then nuts. Torque nuts to 24 N•m (18 lbf•ft). Bend locking tab over a flat of each nut.

5,10, Brake Cable and Nut

Insert brake cable into upper hole in brake lever and caliper. Install nut and tighten until a few threads exceed.

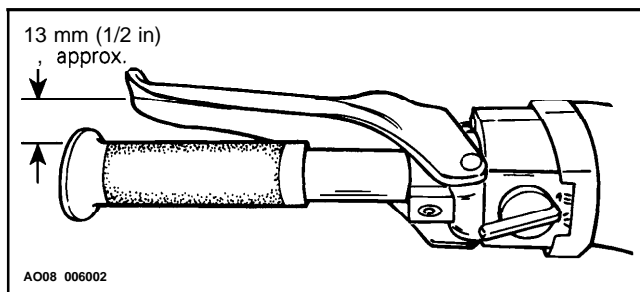
◆ **WARNING** : At least 3 threads must exceed the elastic stop nut.

ADJUSTMENT

Brake

All Models

Fully depress brake handle several times to obtain 13 mm (1/2 in) between brake handle and handlebar grip when brake is fully applied.



Should this adjustment be unattainable, retighten nut **no. 10** as needed.

Brake Light

All Models Except Tundra II LT

Brake light should light up before brake pads touch brake disc. To adjust, unscrew nut **no. 10** until brake light goes on.

◆ **WARNING** : At least one full thread must exceed the elastic stop nut.

Check brake adjustment as described above.

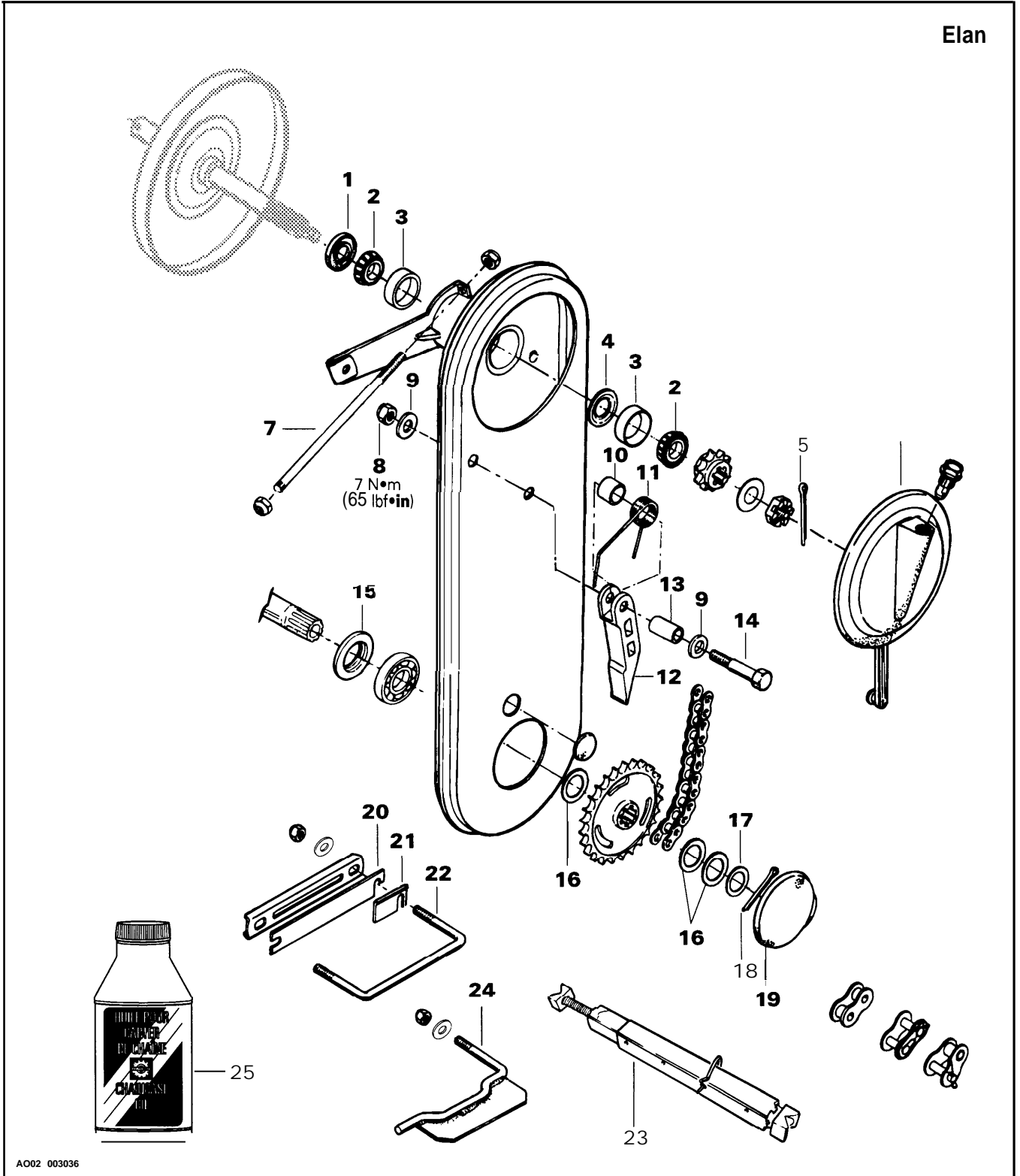
○ **NOTE** : If brake light adjustment is unattainable while respecting brake adjustment, ratchet wheel may be too far out. If so, tighten ratchet wheel.

Tundra II LT

Brake light should light up before brake pads touch brake disc. To adjust, unlock nut no. 21 and turn brake switch no. 22 accordingly. Lock in position by tightening nut **no. 21**.

CHAINCASE

Elan



AO02 003036

Section 05 TRANSMISSION

Sub-Section 06 (CHAINCASE)

REMOVAL

Chaincase and Driven Pulley Assembly

Chaincase and driven pulley are removed from vehicle as a complete assembly. Proceed as follows :

Remove tool box, pulley guard and drive belt.

6,8 to 14, Inspection Cover and Tensioner Assembly

Remove inspection cover and hold tensioner assembly. Remove chain tensioner bolt, elastic stop nut and fiber washers. Remove tensioner assembly from chaincase.

15,25, Lower Oil Seal and Chaincase Oil

Pry lower oil seal from chaincase and drain oil.

Brake Cable

Disconnect from chaincase.

16,17,18,19, Spacer, Shim, Lower Sprocket Cotter Pin and Access Plug

Pry out access plug, remove cotter pin, shim and spacers.

7, Threaded Rod

Disconnect from chaincase.

22,24, U-clamp and Bracket

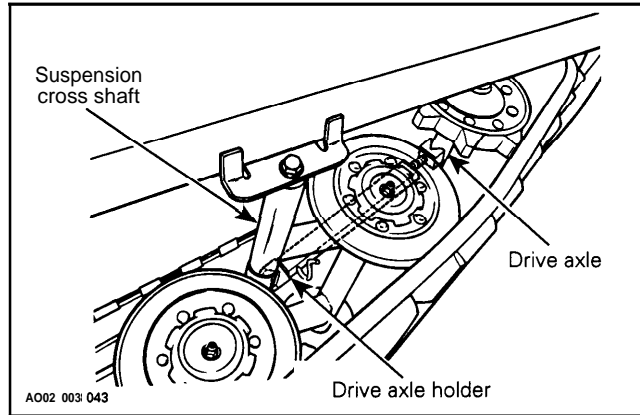
From the inner side of the frame, remove the nut securing chaincase lower bracket and remove bracket. Remove the nuts, washers and U-clamp holding the chaincase to frame.

20,21, Shim

Remove and save for installation.

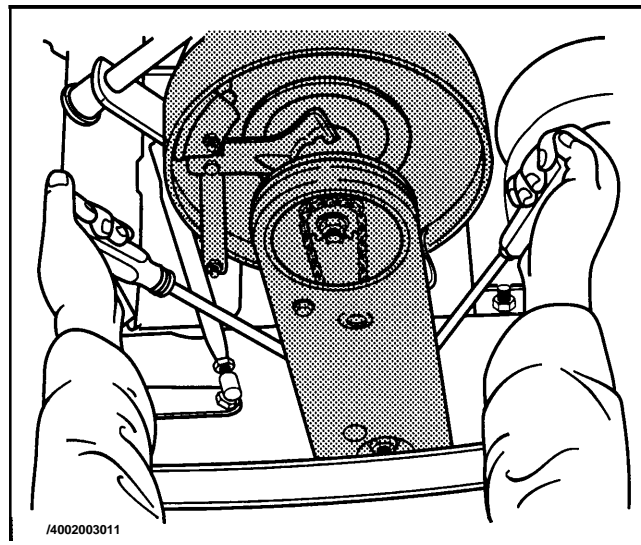
23, Drive Axle Holder

Release track tension and use drive axle holder (P/ N 5290072 00),



Chaincase and Driven Pulley Assembly

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



DISASSEMBLY

Disassemble driven pulley from chaincase. Refer to DRIVEN PULLEY 05-03.

INSPECTION

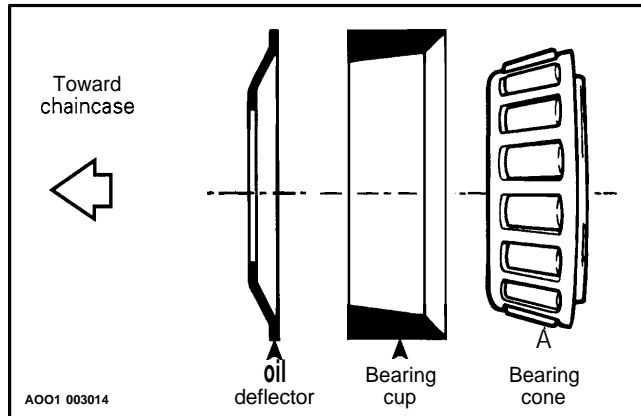
Visually inspect chain for cracked, damaged or missing link rollers. Check for defective bearing cones, bearing cups and oil deflector. Inspect sprockets and chain tensioner assembly for wear.

◆ **WARNING : If chain deflection is greater than 38 mm (1.5 in) (without chain tensioner), replace chain and check condition of sprockets.**

ASSEMBLY

2,3,4, Bearing Cone, Bearing Cup and Oil Deflector

Position oil deflector ring then sit bearing cup in chaincase aperture as shown.



1, Oil Seal

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

INSTALLATION

To install chaincase driven pulley assembly, reverse removal procedure paying special attention to the following :

5,18, Cotter Pin

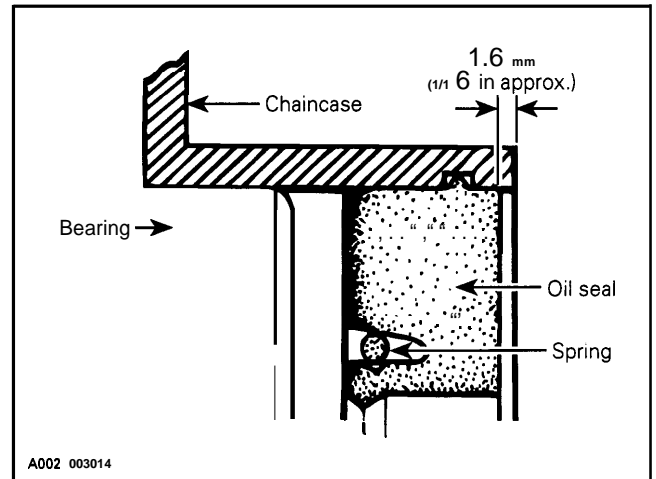
Install new cotter pins.

CAUTION : When removing a cotter pin always replace with a new one.

15, Lower Oil Seal

Install new oil seal into chaincase flange as shown.

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

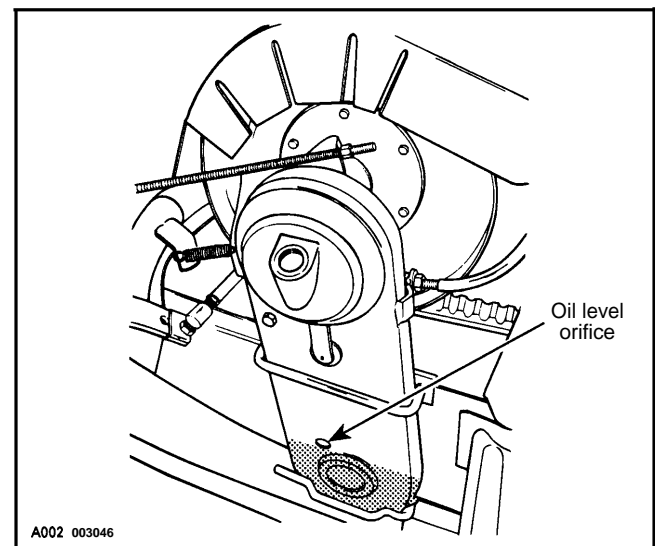


25, Chaincase Oil

Remove filler cap and pour 200 mL (7 fl.oz) of chaincase oil (P/ N 4138019 00) into chaincase.

NOTE : Chaincase oil capacity is 200 mL (7 fl.oz).
O

Check the oil level by removing the chaincase oil level plug.



ADJUSTMENT

Pulley Alignment

Refer to PULLEY DISTANCE AND ALIGNMENT 05-04.

Brake Operation and Brake Light

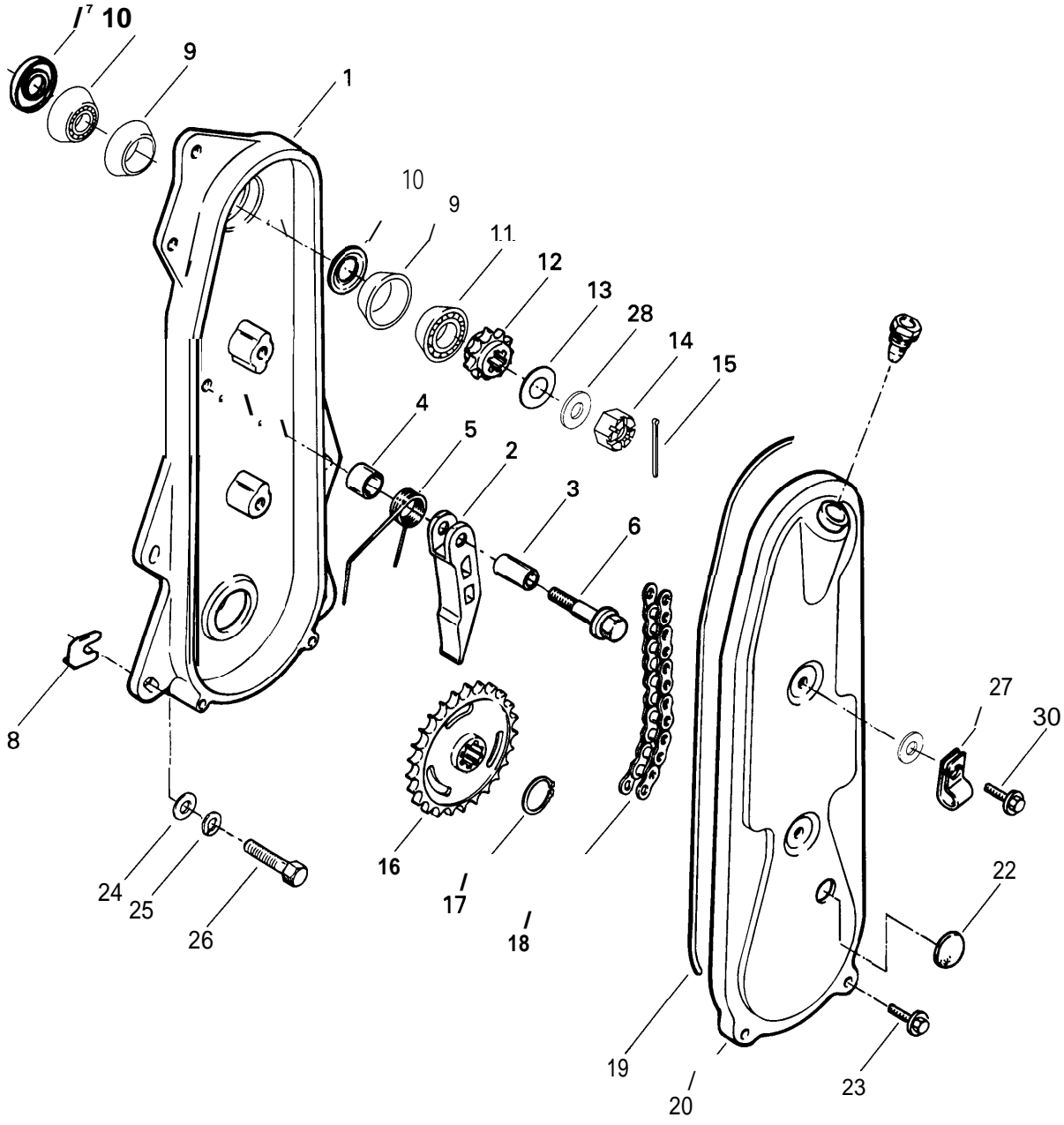
Refer to BRAKE 05-05.

Track Tension and Alignment

Refer to TRACK 07-06.

Section 05 TRANSMISSION
Sub-Section 06 (CHAINCASE)

Tundra II LT



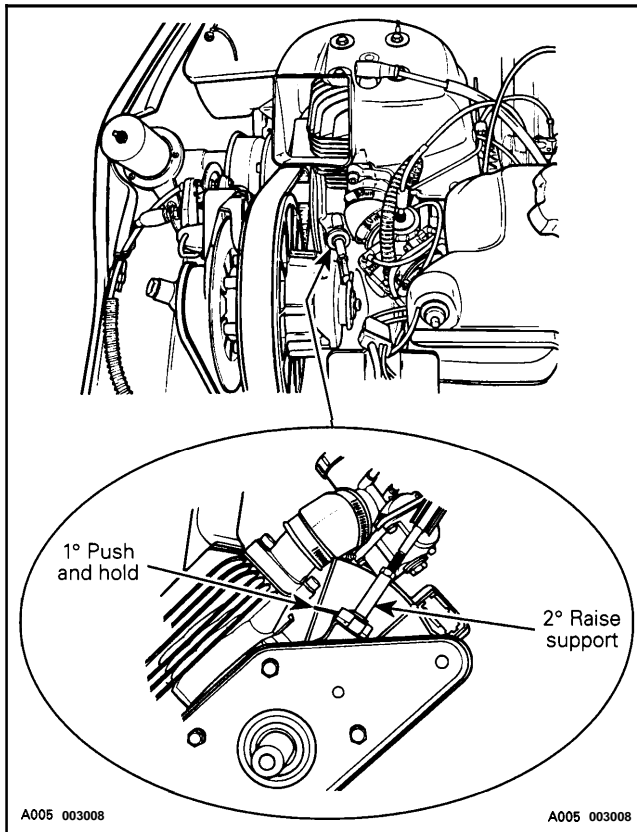
A03DOQS

REMOVAL

Chaincase and driven pulley can be removed from the vehicle as an assembly. "

Remove belt guard and drive belt.

Unlock and raise driven pulley support.



NOTE : On electric starting model, disconnect and remove battery from its rack.

CAUTION : Be careful not to ground positive terminal with the chassis. Always disconnect BLACK negative cable first.

21, Chaincase Cover

Remove and drain oil.

14, Drive Axle Oil Seal

Pry out from chaincase.

6,9 to 13,15,16, Sprockets, Tensioner Assembly and Chain

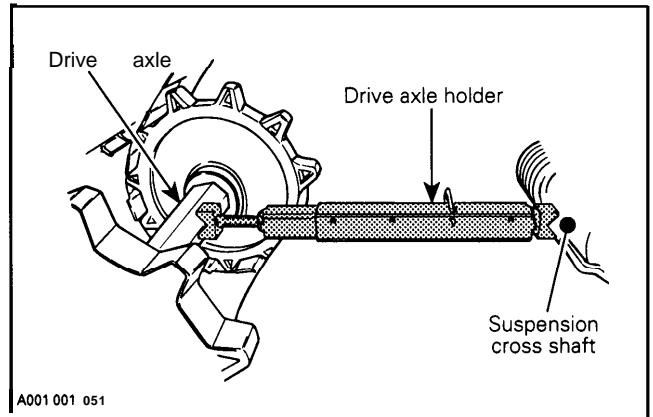
Unscrew the bolt on the upper sprocket and remove circlip on the bottom one. Remove chain tensioner assembly, then simultaneously remove chain and both sprockets.

17,18,19, Washer and Cap Screw

Remove the 4 cap screws securing chaincase to frame. Save alignment shims for installation.

22, Drive Axle Holder

Release track tension, use drive axle holder (P/ N 529 0072 00).



Chaincase and Driven Pulley Assembly

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

DISASSEMBLY

Disassemble driven pulley from chaincase. Refer to DRIVEN PULLEY 05-03.

INSPECTION

Visually inspect the chain for cracked, damaged or missing link rollers. Check for defective bearings, sprockets and worn chain tensioner components.

WARNING : If chain deflection is greater than 38 mm (1.5 in) (without chain tensioner), replace chain and check condition of sprockets.

GEAR RATIO MODIFICATION

For particular applications, the number of teeth of the sprockets can be increased or decreased on lower and upper sprockets.

Available lower sprocket : 27 teeth

Available upper sprockets : 11, 12, 15 teeth

Available chains : 62, 64 links

Section 05 TRANSMISSION

Sub-Section 06 (CHAINCASE)

The chain length may be affected depending the combination of lower/ upper sprockets as follows :

GEAR RATIO / CHAIN LENGTH CHART		
GEAR RATIO	CHAIN LENGTH (LINKS)	STANDARD ON
11 /27*	62	OPT.
14/25	62	Tundra II LT

OPT. = Optional

* Chaincase protector no. 8 is mandatory with this sprocket.

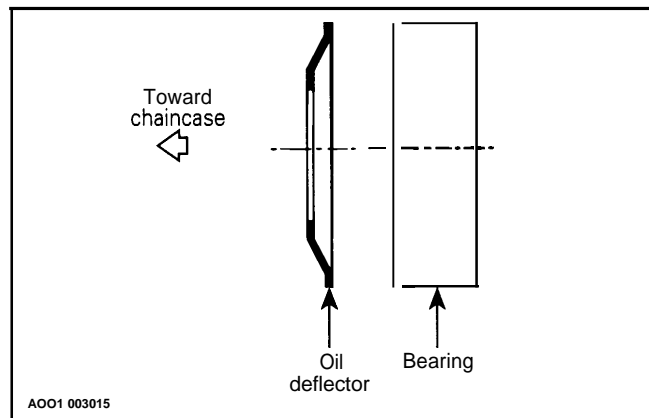
CAUTION : Such modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance.

NOTE : For high altitude regions, the *High Altitude Technical Booklet* (P/N 484062400 and P / N 484054500 for binder) gives information about calibration according to altitude.

ASSEMBLY

2,3,4,5, Bearing, Spacer, Oil Retainer Ring and Bearing

Position oil deflector ring then sit bearing in chaincase aperture. Install spacer then the other bearing.



1, Oil Seal

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

INSTALLATION

Reverse removal procedure. Pay particular attention to the following :

7, Castelled Nut

Torque to 14 N•m (124 lbf•in), slacken then retorque to 0.5-2.5 N•m (5-22 lbf•in).

8, Protector

In case of a vehicle equipped with an 11 teeth sprocket, check the wear of protectors. Replace if required.

20, Gasket

Grease new gasket with petroleum jelly, or other suitable product, and install gasket making sure gasket it does not shift from its correct position. Tighten bolts evenly.

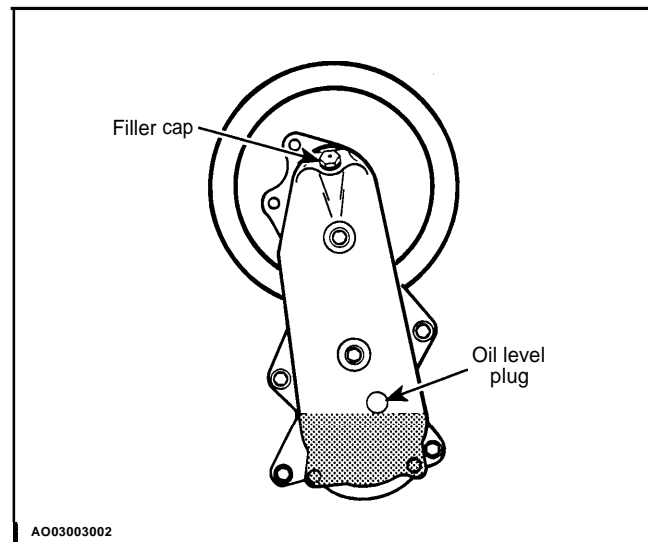
NOTE : Bottom pan has an emboss below chaincase housing to ease installation.

23, Chaincase Oil

Remove filler cap and pour 200 mL (7 fl.oz) of chaincase oil (P/ N 4138019 00) into chaincase.

NOTE : Chaincase oil capacity is 200 mL (7 fl.oz).

Check the oil level by removing the chaincase oil level plug.



The oil should be leveled with the bottom of the oil level orifice.

Reinstall battery and connect cables on electric starting model.

CAUTION : Always connect positive RED cable first to prevent sparks.

ADJUSTMENT

Pulley Alignment

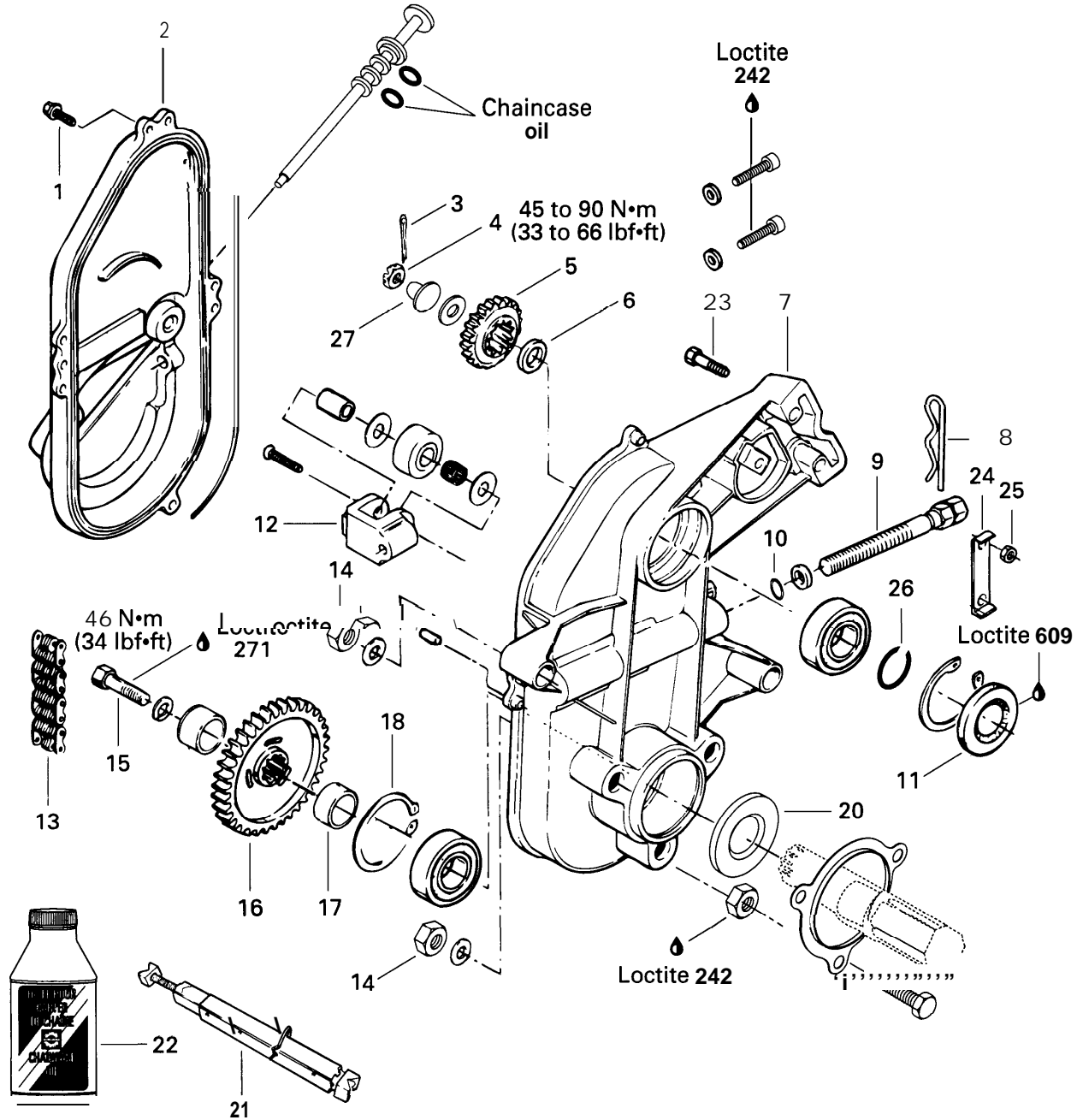
Refer to PULLEY DISTANCE AND ALIGNMENT 05-04.

Track Tension and Alignment

Refer to TRACK 07-06.

Section 05 TRANSMISSION
Sub-Section 06 (CHAINCASE)

S-Series Without Reverse Gear



A06D17S

REMOVAL

To remove chaincase proceed as follows.

Remove tuned exhaust pipe and muffler.

◆ **WARNING** : Never remove exhaust components when engine is hot.

8,9,12, Hair Pin, Adjustment Screw and Chain Tensioner

Remove hair pin. Release drive chain tension by unscrewing tensioner adjustment screw.

1,2, Chaincase Cover and Screw

Drain oil by removing chaincase cover.

3,4,5,6,13,16,17, Cotter Pin, Nut, Sprocket, Shim and Drive Chain

Remove cotter pin, nut, washer retaining upper sprocket and screw retaining lower sprocket. Pull sprockets and drive chain simultaneously. Remove shims.

○ **NOTE** : Should countershaft removal be required, refer to BRAKE 05-05 then look for Brake disc.

S-Series Only

26, Circlip

Remove circlip. Refer to BRAKE 05-05 then look for brake disc.

All Models

14, Nut

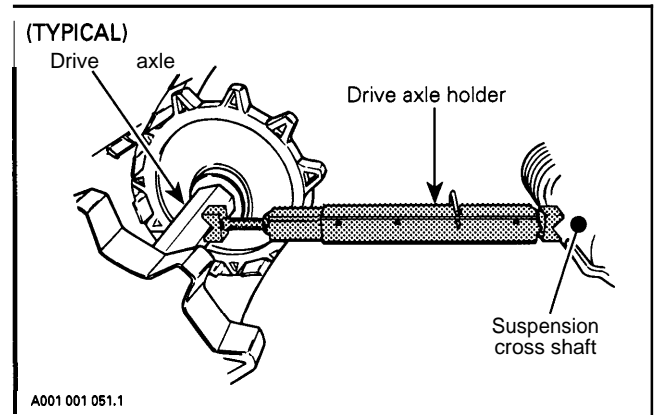
Remove 5 nuts. Three nuts are behind the lower sprocket.

23,24,25, Screw, Locking Tab and Nut

Unfold locking tab, unscrew nuts then remove caliper retaining screws.

21, Drive Axle Holder

Release track tension, use drive axle holder (P/ N 529 0072 00).



20, Drive Axle Oil Seal

Pry out from chaincase.

Pull chaincase from drive axle and countershaft.

7, Chaincase

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

INSPECTION

Visually inspect the chain for cracked, damaged or missing links. Check for worn or defective bearings, sprockets and chain tensioner components.

● **WARNING** : If chain deflection is greater than 38 mm (1.5 in) (without chain tensioner), replace chain and check condition of sprockets.

GEAR RATIO MODIFICATION

For particular applications, the number of teeth of the sprockets can be increased or decreased on lower and upper sprockets.

Refer to TECHNICAL DATA 10 for gear ratios.

▼ **CAUTION** : Gear ratio modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance.

○ **NOTE** : For high altitude regions, the *High Altitude Technical Book/et* (P/N 484062400 and P / N 484054500 for binder) gives information about calibration according to altitude.

INSTALLATION

Reverse removal procedure and pay attention to the following. Replace oil seals, gaskets and O-rings.

Refer to DRIVE AXLE 07-05 for drive axle axial play adjustment.

Section 05 TRANSMISSION

Sub-Section 06 (CHAINCASE)

11, Oil Seal

Clean chaincase bore with Loctite Safety Solvent (p/ N 413 708200) then apply Loctite 609 to oil seal mounting surface (outside).

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

NOTE : Should installation procedure for countershaft be required, refer to BRAKE 05-05 then look for **Brake disc and Countershaft bearing adjustment.**

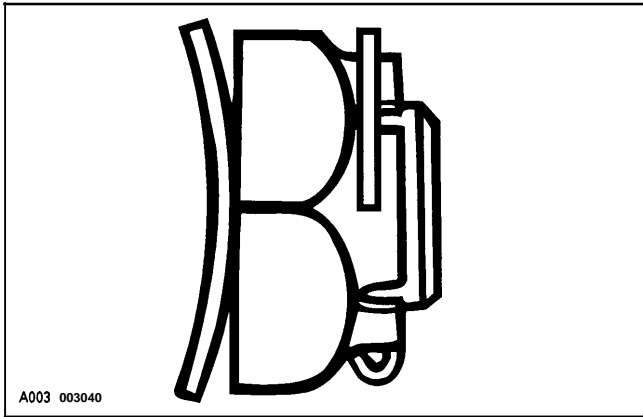
5,16, Sprockets

Position the sprockets with the writing facing the chaincase cover.

S-Series Only

27, Conical Spring Washer

Install washer with its concave side towards drive pulley.



All Models

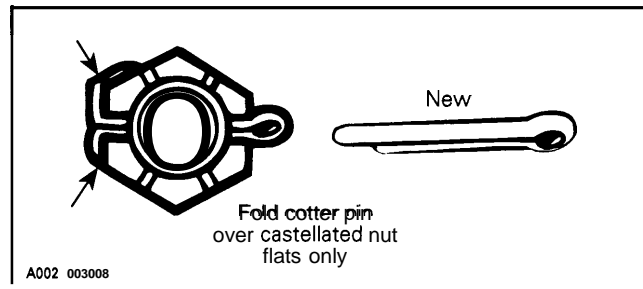
4, Upper Sprocket Castellated Nut

Torque to 45 to 90 N•m (33 to 66 lbf•ft).

Install new cotter pin in the position shown.

▼ **CAUTION :** When removing a cotter pin always replace with a new one.

▼ **CAUTION :** Cotter pin will rub on chaincase cover if installed otherwise.



18, Circlip

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

DRIVE CHAIN ADJUSTMENT

10, O-ring

Replace O-ring on tensioner adjustment screw. Fully tighten tensioner adjustment screw **by hand, then back off** only far enough for hair pin to engage in locking hole.

This initial adjustment should provide 3-5 mm (1/8-13/64 in) free-play when measured at the outer circumference of the brake disk.

▼ **CAUTION :** Free-play must not exceed 5 mm (13/64 in), readjust if necessary.

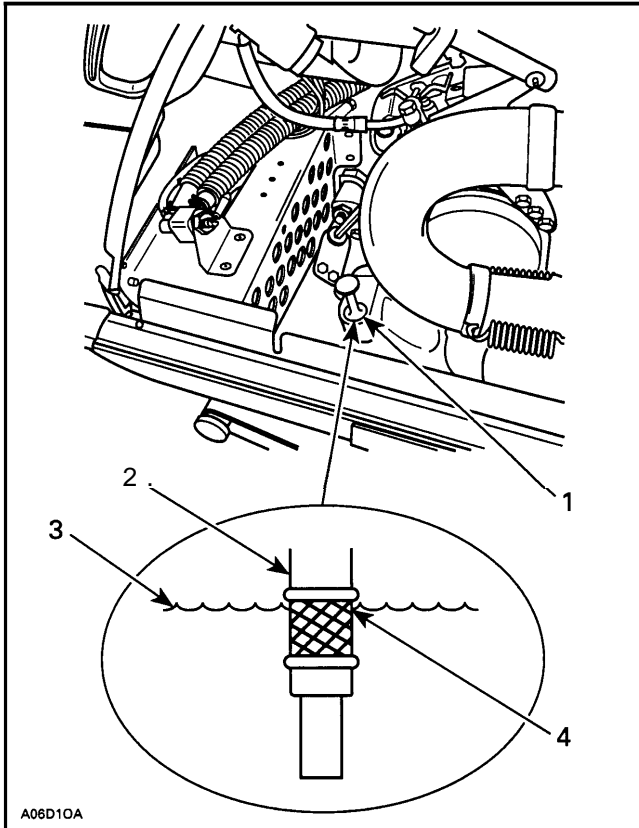
● **WARNING :** If the specified free-play is not reached with the tensioner screw fully tightened, replace chain and check the condition of sprockets.

22, Chaincase Oil

Pour 250 mL (8.5 fl. oz) of chaincase oil (P / N 4138019 00) into chaincase.

NOTE : Chaincase oil capacity is 250 mL (8.5 fl. oz).

Check oil level with the dipstick **unscrewed then add if required.**



TYPICAL

1. Dipstick
2. Dipstick
3. Oil level
4. Level between marks

NOTE : Chaincase must be in its proper position when checking oil level.

ADJUSTMENT

Pulley Alignment

Refer to PULLEY DISTANCE AND ALIGNMENT 05-04.

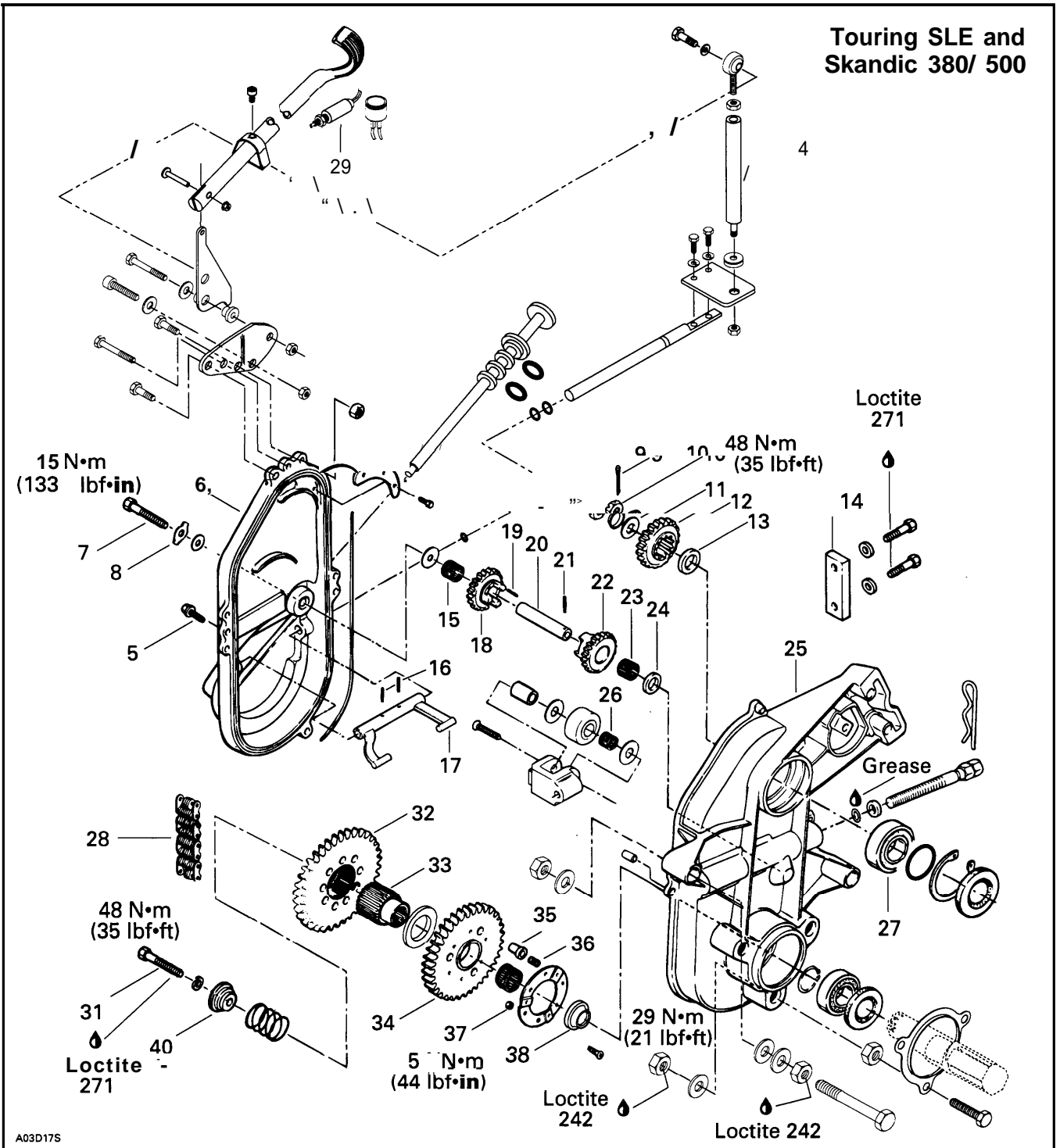
Track Tension and Alignment

Refer to TRACK 07-06.

GEARBOX

2-SPEED GEARBOX

Touring SLE and
 Skandic 380/ 500



A03D17S

Section 05 TRANSMISSION

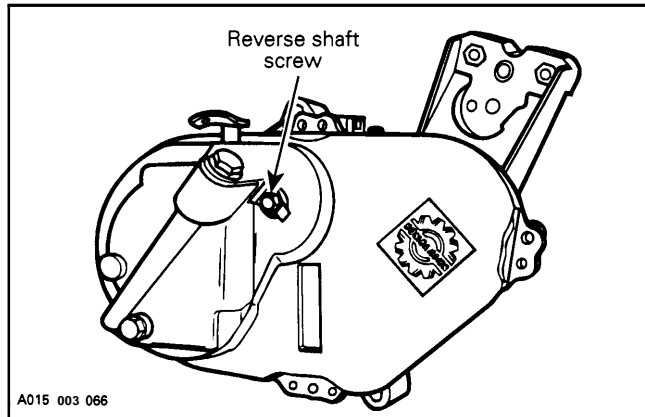
Sub-Section 07 (GEARBOX)

DISASSEMBLY

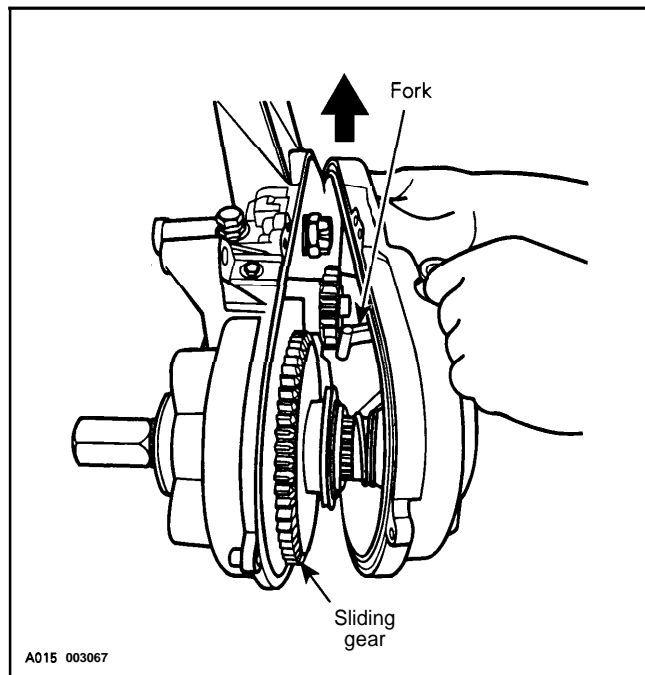
NOTE : It is possible to see the sliding gear in motion through oil gauge hole.

5,6,7, Screw, Gearbox Cover and Screw
Unbolt gear shift linkage from shifter.

Unscrew cover screws as well as reverse shaft screw.



Separate cover from housing and move it toward the front in order to disengage fork from sliding gear.

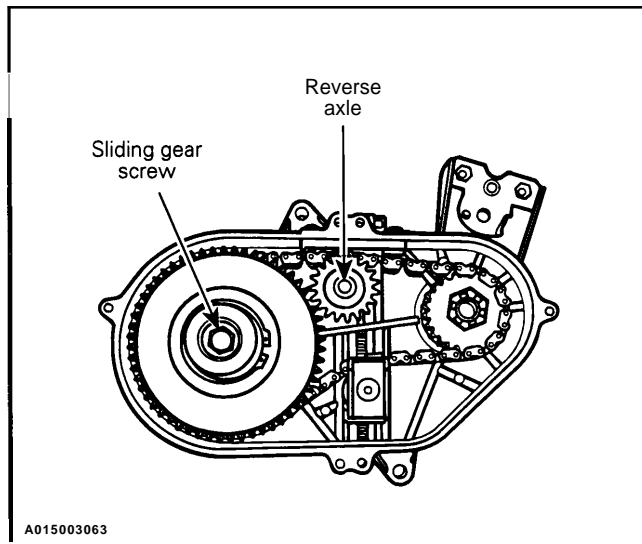


31,32, Screw and Sliding Gear

Slacken chain tension, unscrew sliding gear retaining screw, then remove sliding gear.

18,20, Reverse Gear and Reverse Axle

First remove 19-tooth reverse gear and then remove reverse axle.



28,33,34,38, Chain, Coupling Shaft, Sprocket and Spacer

Remove coupling shaft, 44-tooth sprocket, spacer and chain.

10,12, Castellated Nut and Sprocket

First unscrew castellated nut, then remove 22-tooth sprocket.

16,17, Spring Pin and Fork

Force 2 spring pins out to disengage fork from its axle.

INSPECTION

14, Chain Slider

Replace slider if maximum wear is 1.0 mm (.039 in) at contact point.

15,23,26,27,30,37, Bearing

Check bearing condition. There must be no discoloration, missing rollers, broken cages, etc.

Sprockets and Gears

Check teeth.

ASSEMBLY

Reinstall drive shaft.

25, Gearbox Housing

Reinstall gearbox housing.

NOTE : Adjustment screw can only be installed when housing is removed.

Do not reuse removed oil seals. Replace them by new ones.

Install drive axle with track then bearing and circlip in chaincase bore. Install spacer no. 38 with its large outer diameter against sprocket, 44-tooth sprocket no. 34, coupling shaft no. 33, cap no. 40 and screw no. 31.

Place a 25 cm (10-inch) rule against sprockets. Maximum allowable offset is 1 mm (.040 in).

A) If upper sprocket too far in, possible causes are :

- 1) Countershaft bearing on driven pulley side may be too far in. To check, pull out bearing using countershaft bearing remover (P/N 529 0301 00) then recheck sprocket alignment. Use bearing installer (P / N 529 0302 00) to reposition bearing. Bearing housing (triangle) must be against frame without preload.
- 2) Add shim(s) between chaincase and frame and reposition bearing on driven pulley side accordingly.

B) If upper sprocket is too far out, check:

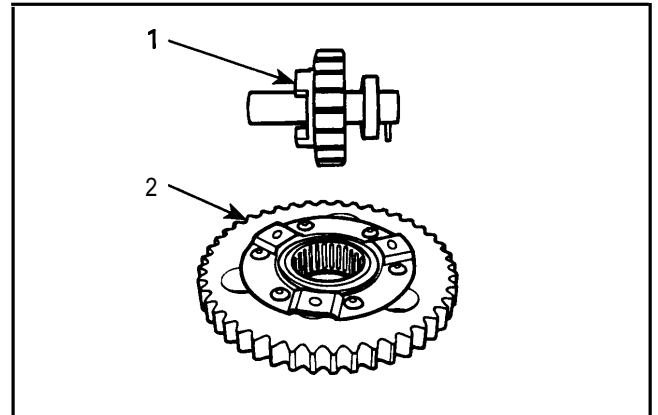
If there are too many shims between chaincase and frame. Remove shims accordingly and reposition bearing on driven pulley side.

34,35,36,37, Sprocket, Drive Pin, Spring and Bearing

Press needle bearing in 44-tooth sprocket. Assemble drive pins and their spring on 44-tooth sprocket. Tighten to 5 N•m (44 lbf•in) in a criss-cross sequence.

19,20,22,23,24, Spring Pin, Reverse Axle, Sprocket, Bearing and Ring

Insert spring pin in reverse axle up to inside diameter. Press needle bearing in 19-tooth sprocket. Install ring and 19-tooth sprocket on reverse axle.



9,10,11,12,13, Cutter Pin, Castellated Nut, Washer, Sprocket and Shim

Install shim, 22-tooth sprocket (drive) and washer then tighten castellated nut. Secure with a new cotter pin.

28,32,33,38, Chain, Sliding Gear, Coupling Shaft and Spacer

Install chain, 44-tooth sprocket and its spacer. Spacer's large outer diameter must be against sprocket. Insert coupling shaft in 44-tooth sprocket.

15,18, Needle Bearing and Reverse Gear

Install needle bearing (wider one) in reverse gear.

18,21, Reverse Gear and Alignment Rod

Install reverse axle (assembly) making sure to properly position spring pin in housing slot. Install alignment rod, reverse gear and spacer. Drive sprocket hole and driven gear hole must be aligned to insert alignment rod.

9,16,17, Chain Tensioner, Spring Pin, Fork and Fork Axle

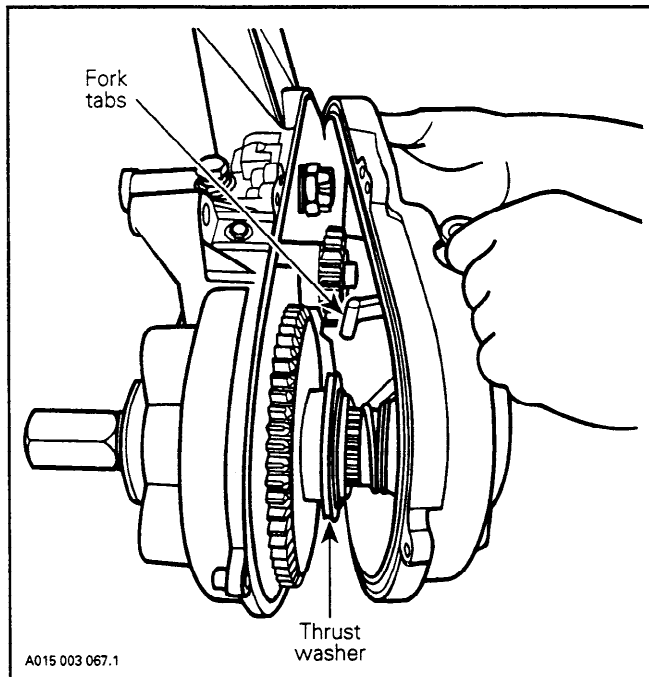
Mount chain tensioner (assembly) to adjustment screw already fixed to gearbox. Assemble fork to axle using spring pins. Apply grease on O-rings.

Section 05 TRANSMISSION

Sub-Section 07 (GEARBOX)

6, Cover

Join cover (assembly) to housing by passing fork tabs behind sliding sprocket thrust washer.



▼ **CAUTION** : Gearbox cover must completely lay against housing.

5,7,8, Screws and Locking Tab

Tighten screws in a criss-cross sequence starting with the one above reverse axle. Install reverse shaft screw and bend locking tab against screw head flat. Bolt shift linkage to shifter.

ADJUSTMENT

28, Chain

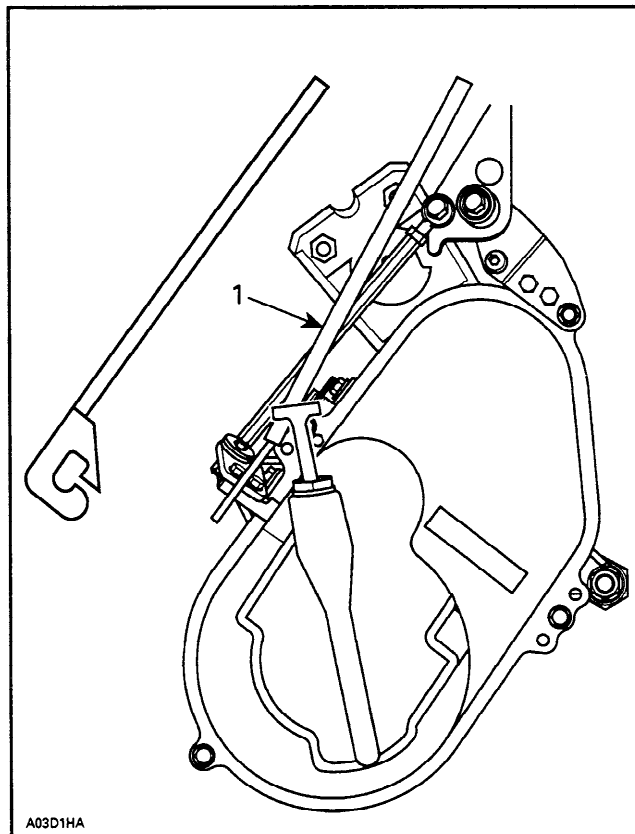
Fully tighten adjustment screw by hand, then back off only far enough for hair pin to engage in locking hole.

4, Gear Shift Linkage

1. Check proper fit of handle in console.
2. Shift into reverse gear.

○ **NOTE** : If it is impossible to shift into reverse gear, shorten tie-rod and try again. If it is impossible, check if the cover to inspect components.

3. Completely slacken ball joint lock nut on the gear shift linkage.
4. Using tool (P/N 529 0303 00) to push and hold down tie-rod plate to make sure transmission is in reverse gear. Pull shifter handle in reverse position making sure all slack is removed. Lengthen tie-rod until it contacts the rubber washer then add an additional turn.



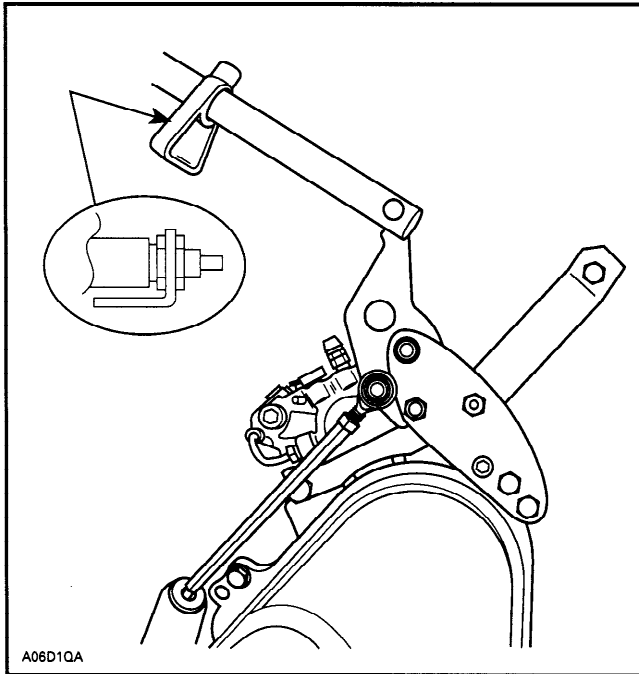
1. Tool

○ **NOTE** : It is normal to feel a light friction when shifting into gear.

5. Statically test transmission operation in forward and reverse positions.
6. Hold linkage and tighten ball joint jam nut.

29, Alarm Switch

Adjust backup alarm so that it sounds when transmission is in reverse gear while engine is running.



OIL CHANGE

Place a container under bottom pan (gearbox side).

Unbolt gear shift linkage from fork axle. Unbolt and remove cover by separating it from housing and by moving it toward the front in order to release fork from sliding sprocket.

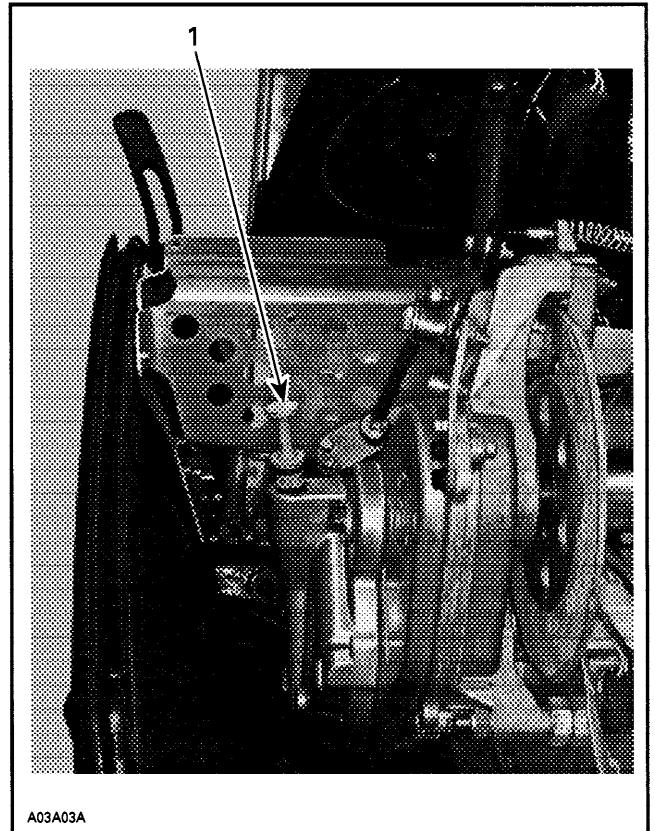
Clean cover interior.

NOTE : It is normal to find metallic particles stuck to dipstick magnet. If bigger pieces of metal are found, disassemble and check all parts.

Reinstall cover as previously described during assembly.

Fill housing with chaincase oil (P / N 413 8019 00). Oil capacity is 250 mL (8.5 oz).

Check oil level with dipstick. With dipstick unscrewed, oil level must be between MIN. and MAX. marks.



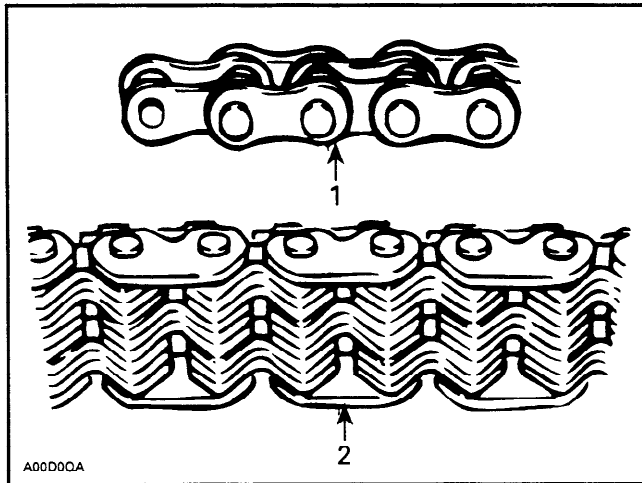
1. Dipstick

Shifter can be put in reverse position to ease removal of dipstick.

DRIVE CHAIN

GENERAL

Bombardier drive chains exist in 2 types, for proper use refer to TECHNICAL DATA 10.



1. 1/2 in single
2. 3/8 in silent chain

SILENT CHAIN

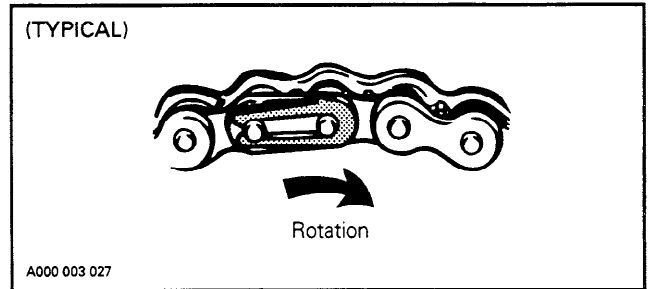
For 1996 there are 2 types of silent chain. One is 11-link wide and the other (stronger) is 13-link wide. Do not interchange sprockets. Fit chain on sprockets to make sure using right ones according to width.

○ **NOTE** : No work (separation, lengthening) can be done on the silent chain type.

CHAIN ATTACHMENT

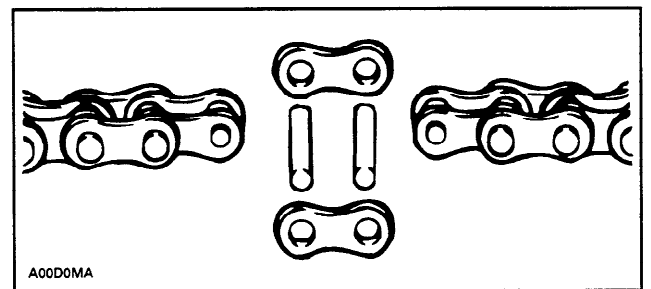
When joining chain ends, the open end of the circlip must be on opposite side of chain rotation. The circlip should also be facing the outer side of chaincase.

◆ **WARNING** : Always ensure that the connecting link circlip is in good condition and is properly secured.



CHAIN SEPARATION

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

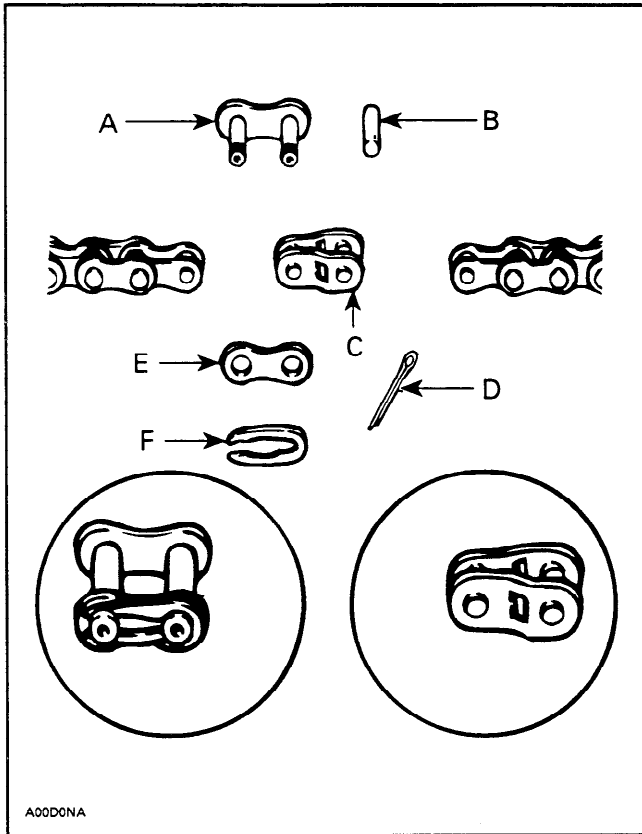


○ **NOTE** : Chain connecting link should only be used to lengthen or shorten a chain when changing the number of teeth of sprocket(s). A stretched chain must never be shortened because the chain pitch has changed (increased) and will not properly match the sprocket pitch, causing premature wear.

○ **NOTE** : Refer to CHAINCASE 05-06, for chain length according to gear ratio of each specific vehicle.

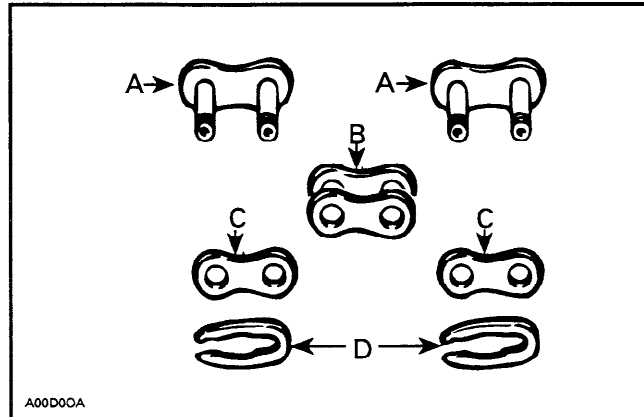
Section 05 TRANSMISSION

Sub-Section 08 (DRIVE CHAIN)



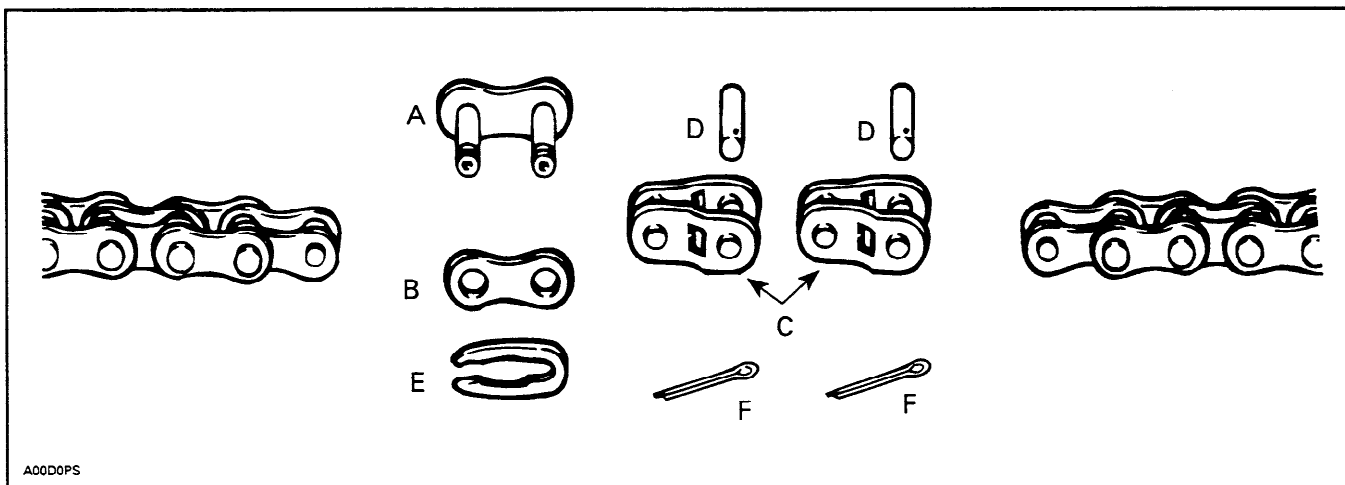
LENGTHENING 1/2 LINK

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



LENGTHENING 1 LINK

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



LENGTHENING 1-1/2 LINK

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

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WIRING DIAGRAMS

MODEL	WIRING DIAGRAM PAGE	HEADLIGHT (watt)	TAILLIGHT (watt)	ELECTRICAL SYSTEM OUTPUT (watt)
Élan	Annex 1	60 / 55 hal.	8 / 27	75 / 23
Tundra II LT	Annex 2	60 / 55 hal.	8 / 27	160
Formula S / SL, Skandic 380 / 500	Annex 3	60 / 55 hal.	8 / 27	240
Touring E / LE / SLE / E LT	Annex 4	60 / 55 hal.	8 / 27	240

hal. = halogen

CHART CODES

Wiring Color Code

The first color of a wire is the main color, second color is the stripe.

Example : YL / BK is a YELLOW wire with a BLACK stripe.

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

Section 06 ELECTRICAL

Sub-Section 01 (WIRING DIAGRAMS)

Following table shows wire colors related to electrical circuits.

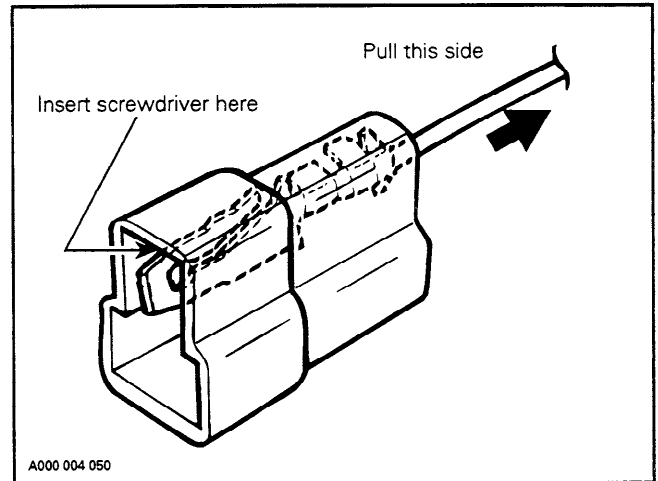
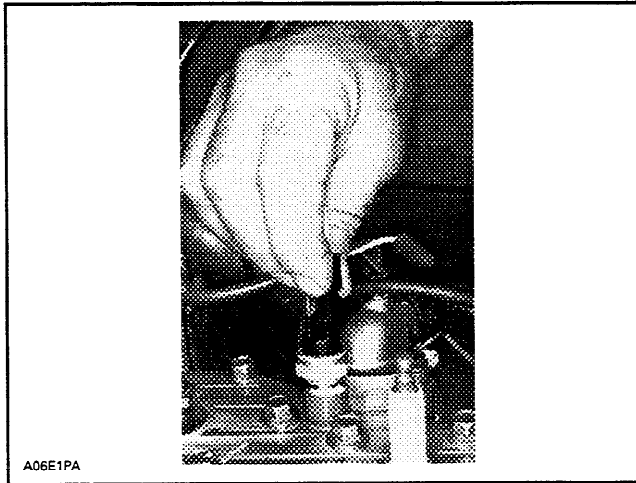
WIRE COLORS	ELECTRICAL CIRCUIT	ADDITIONAL INFORMATION
BLACK / YELLOW	ENGINE SHUT OFF – Key switch – Tether cord switch – Emergency switch	Must be grounded to stop engine.
BLACK (small)	Ground for shut off	
BLACK (Big)	Ground for starter (-)	
YELLOW YELLOW / BLACK	12 volts (A.C.)	If shorted, magneto stops producing electricity.
RED	12 volts (D.C.) (+) For starter motor	
RED / GREEN	12 volts (D.C.) (+) For starter solenoid	
RED / BLUE	12 volts (D.C.) (+) Rectifier output	
GREY	12 volts (A.C.) High beam	Current returns by YELLOW / BLACK wire connected to headlamp.
VIOLET / GREY	12 volts (A.C.) Low beam	
WHITE	12 volts (A.C.) Brake light	Current returns by YELLOW / BLACK wire connected to taillight.
WHITE / RED	12 volts (A.C.) Low oil level	Current returns by YELLOW / BLACK wire connected to oil level sensor.
BLUE	12 volts (A.C.) Fuel level indicator	Current returns by YELLOW wire connected to fuel level sensor.
ORANGE	12 volts (A.C.) Heated grips (max.)	Current returns by YELLOW / BLACK wire connected to heating elements.
ORANGE / VIOLET	12 volts (A.C.) Heated grips (min.)	
BROWN	12 volts (A.C.) Heated throttle level (max.)	
BROWN / YELLOW	12 volts (A.C.) Heated throttle level (min.)	
GREEN	12 volts (A.C.) Temperature gauge	Current returns by YELLOW wire connected to sensor.
VIOLET	12 volts (A.C.) Engine overheating light	

Connector Location

Connectors on wiring diagrams carry the letter C followed by a number. Use this code with wiring diagram legend to find connector location on vehicle.

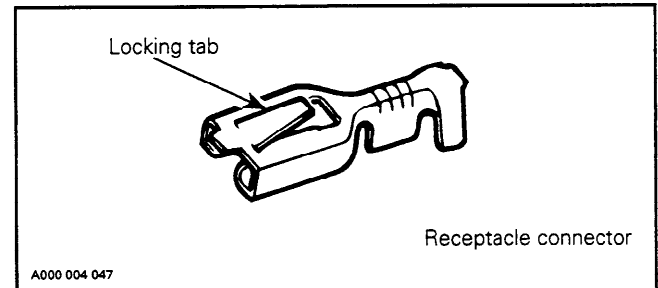
UNPLUGGING CONNECTORS

Always unplug connectors by pulling on housing not on wire. This is particularly important with connectors on temperature sender and heating element switches.



Receptacle Connector

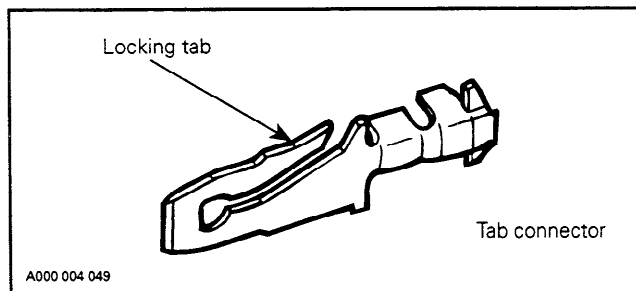
It is locked in its housing by a small tab on top. Removal is done by squeezing this tab.



TAB AND RECEPTACLE CONNECTORS REMOVAL

Tab Connector

It is locked in its housing by a spring tab on its side. Removal is done by squeezing this tab.



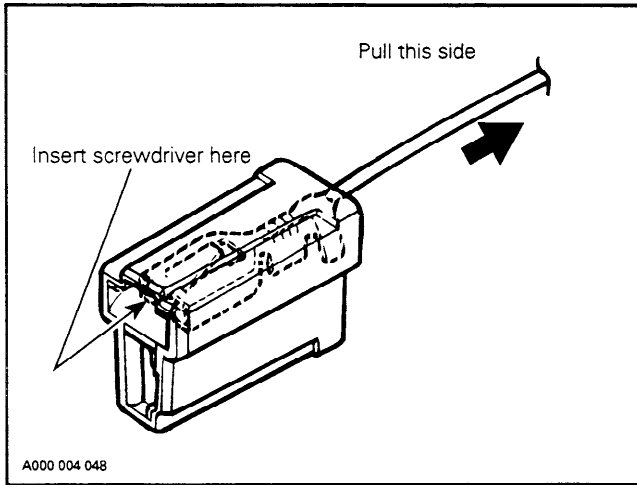
To remove :

- Insert a small screwdriver or Snap-on TT 600-5 in access opening, opposite of wire side, between receptacle and its housing and squeeze locking tab.
- While holding locking tab squeezed, pull connector toward wire side.

To remove :

- Insert a screwdriver or Snap-on TT 600-5 from side opposite of wire and pry locking tab.
- While holding locking tab pryed, pull connector toward wire side.

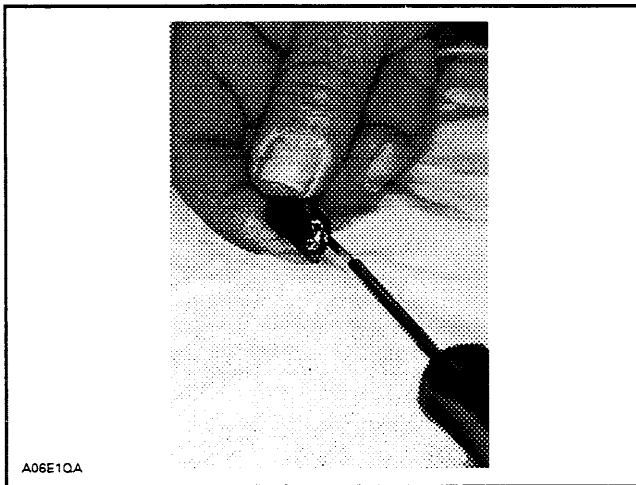
Section 06 ELECTRICAL
Sub-Section 01 (WIRING DIAGRAMS)



Locking Receptacle Connector

To remove:

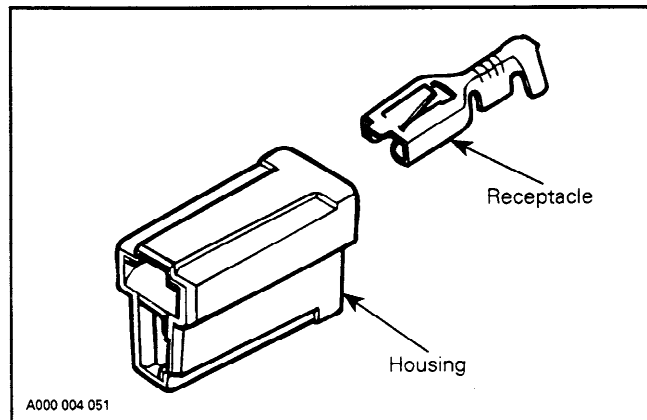
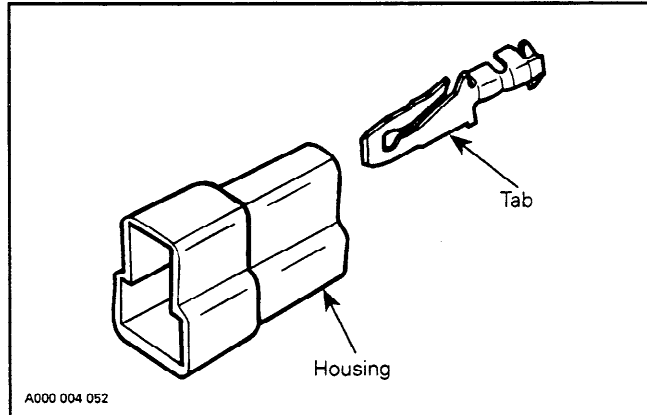
- Insert tool Snap-on TT 600-5 in access opening then pull housing toward wire side.



TAB AND RECEPTACLE CONNECTORS INSTALLATION

Prior to installing, make sure locking tab is sufficiently lifted to properly lock.

Insert tab and receptacle connectors in their respective housings as shown in following illustrations. Push sufficiently so that they snap. Try pulling wire to ensure they are properly locked.



ACCESSORIES INSTALLATION

On all electric start models : The direct current (DC) utilizes the snowmobile frame as ground "wire" while all alternating current (AC) consumers (lights, heated grips, fuel gauge, etc.) utilize a separate ground wire.

Never interconnect AC and DC grounds as an AC voltage drop will result. When installing accessories on any snowmobile, connect their wires directly to the YELLOW and YELLOW / BLACK lighting coil wires.

Even if manual start models have an AC ground to the chassis (on voltage regulator), all accessories utilize a ground wire isolated from chassis. When an electric starter kit is installed, the voltage regulator and its ground wire are replaced by a voltage rectifier / regulator unit permitting a completely isolated AC circuit.

◆ **WARNING :** Never secure electrical wires / cables with fuel lines. Keep wires away from any rotating, moving, heating, vibrating or sharp edge. Use proper fastening devices as required.

IGNITION TIMING

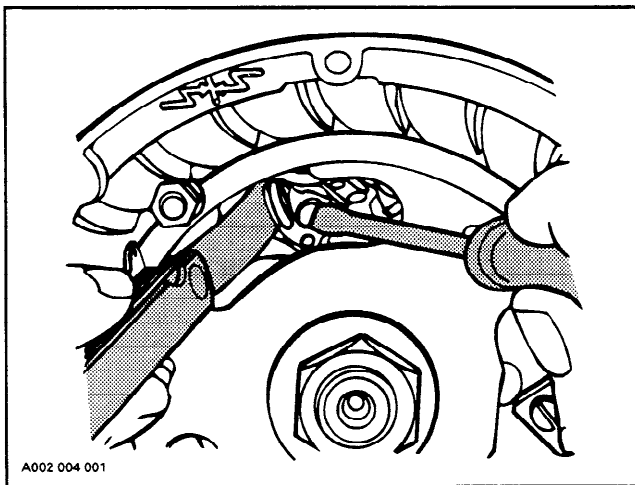
BREAKER-POINT IGNITION SYSTEM

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

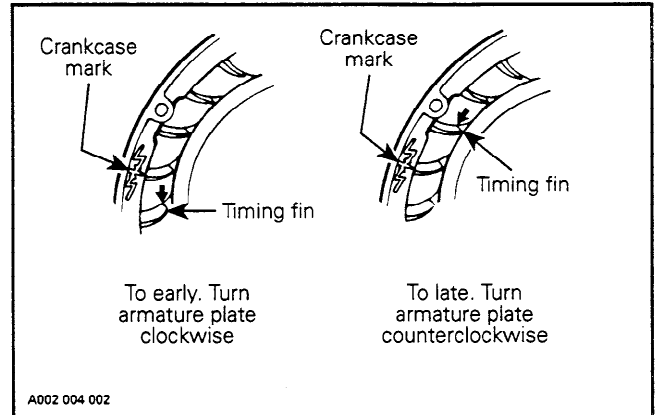
1. Disconnect spark plug wire and remove spark plug.
2. Remove rewind starter assembly from engine then remove the starting pulley from flywheel.
3. Rotate flywheel until breaker points, visible through flywheel opening, are fully opened. Adjust points gap to 0.30-0.40 mm (0.012-0.016 in) using a feeler gauge and a screwdriver as illustrated.



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

4. Disconnect connector housing at engine then connect one lead of a test light (ex. : flashlight type (P / N 414 0122 00) to the BLACK wire leading from engine. Connect other to ground (metallic portion of the engine).
5. Rotate flywheel until timing marks align. Slacken the 3 armature plate retaining screws then rotate armature plate until test light fluctuates.

Retighten retaining screws at this position.



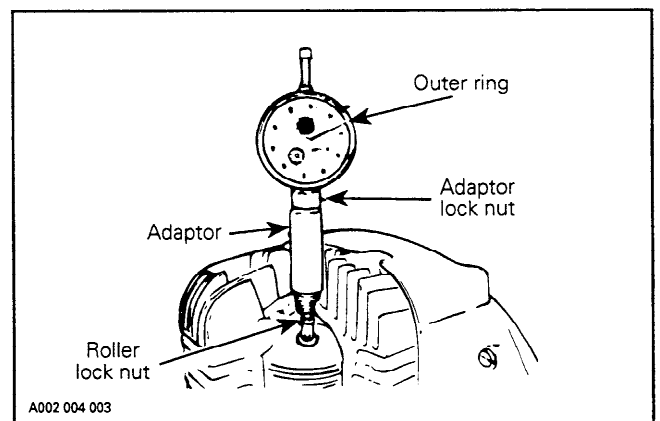
○ NOTE : The arrow (embossed on the fan) indicates the timing fin.

○ NOTE : Ignition timing may change upon tightening armature plate screws. Always recheck after tightening.

Top Dead Center Gauge Procedure

The first 4 steps are the same as timing marks procedure.

5. Install and adjust TDC gauge on engine as follows :
 - Rotate flywheel clockwise until piston is just Before Top Dead Center.



Section 06 ELECTRICAL

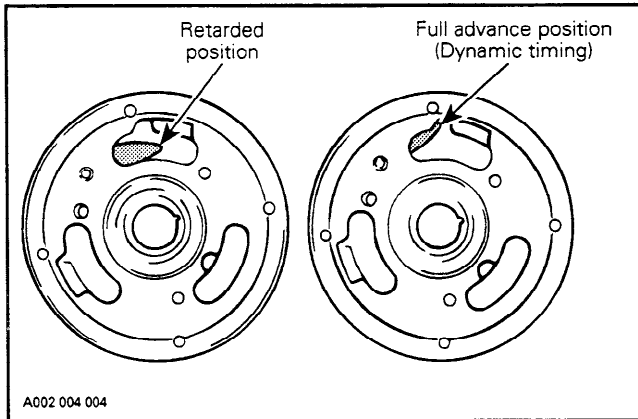
Sub-Section 02 (IGNITION TIMING)

- 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 flywheel until piston is at Top Dead Center.
 - Unlock outer ring of dial and turn it until "0" (zero) on dial aligns with pointer.
 - Lock outer ring in position.
6. Slacken the 3 armature plate retaining screws and turn timing instrument on.
 7. Rotate flywheel counterclockwise until dial reads :
 3.98 ± 0.25 mm BTDC*
 $(0.157 \pm .010)$ in

* BTDC : Before Top Dead Center.

Slightly rotate armature plate until timing instrument switch off. Retighten retaining screws.

NOTE : Hold advance mechanism centrifugal lever in full advance position (toward magneto rim) to perform dynamic timing.



NOTE : Ignition timing may change upon tightening armature plate screws. Always recheck after tightening.

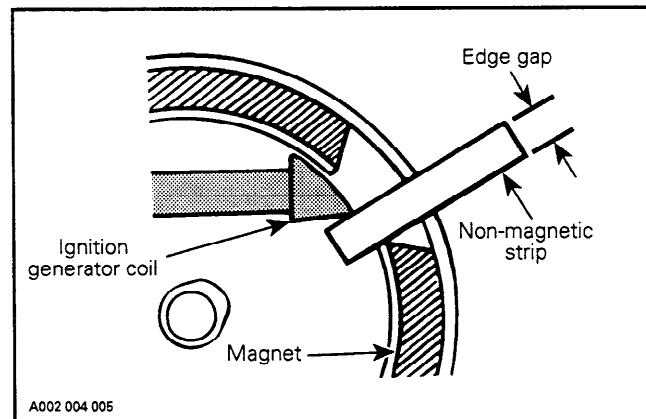
Edge Gap Verification

By following either of the 2 procedures herein mentioned the edge gap should automatically be adjusted. However, if the edge gap is to be verified, proceed as follows :

From timing marks, rotate flywheel clockwise 1/4 of a turn (hold advance mechanism centrifugal lever in full advance position toward magneto rim to perform dynamic edge gap verification), then slowly turn flywheel back counterclockwise until timing instrument fluctuates.

At this point check the distance between ignition generator coil end and magnet (edge gap), with a nonmagnetic strip of appropriate width.

ENGINE TYPE	DYNAMIC EDGE GAP
247	7 - 10 mm 9/32 - 25/64 in)



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.

NIPPONDENSO CDI SYSTEM (WITHOUT TRIGGER COIL)

277 ENGINE TYPE

The 277 engine type uses a single coil ignition system. Refer to CDI SYSTEM 04-06 for more informations.

This section is mainly divided in 2 parts, the first one using a Top Dead Center gauge to **verify the magneto flywheel timing mark position**. The second one using a stroboscopic timing light to **check ignition timing**.

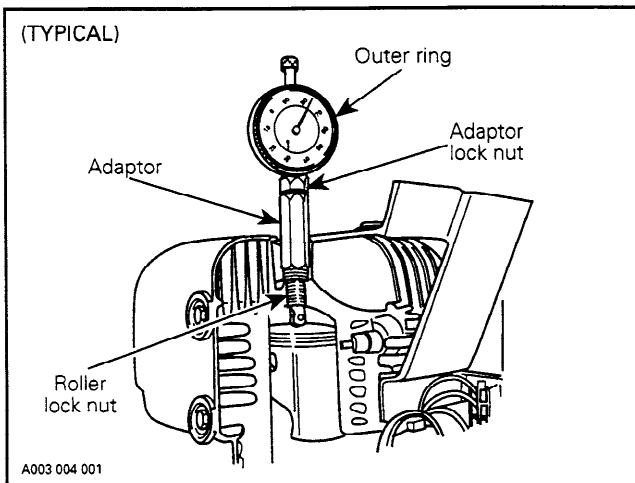
Flywheel timing mark position verification is required to :

1. Troubleshoot a missing or broken magneto flywheel Woodruff key.
2. Troubleshoot a magneto flywheel corresponding to a different engine type.
3. Scribe the timing mark on a new service magneto flywheel.

Always verify magneto flywheel timing mark position before checking ignition timing.

Verifying Magneto Flywheel Timing Mark Position.

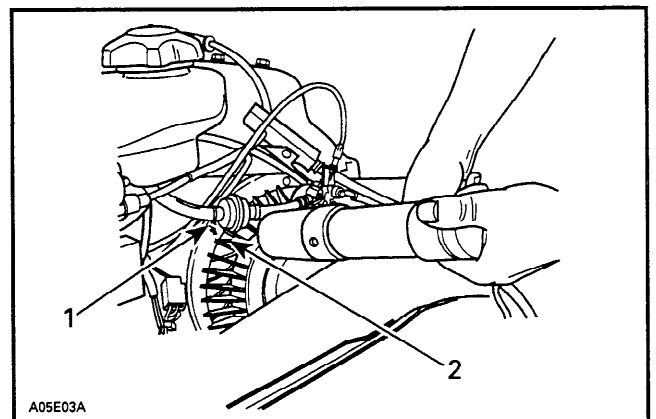
1. Disconnect spark plug wire and remove spark plug.
2. Install and adjust TDC gauge on engine as follows :
 - Rotate magneto flywheel clockwise until piston is just Before Top Dead Center.



- 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 flywheel clockwise until piston is at Top Dead Center.
 - Unlock outer ring of dial and turn it until "0" (zero) on dial aligns with pointer.
 - Lock outer ring in position.
3. From this point, rotate magneto flywheel back 1/4 turn then rotate it clockwise to reach the specified position. Refer to 10 TECHNICAL DATA.

Check if yellow fin aligns with mark on fan cowl.



1. Fan cowl timing mark
2. Yellow fin

If marks do not align, there is something wrong with fan mounting. Check Woodruff key and fan.

CAUTION : Always check the timing with a stroboscopic timing light at 6000 RPM after the marks have been checked.

Checking Ignition Timing

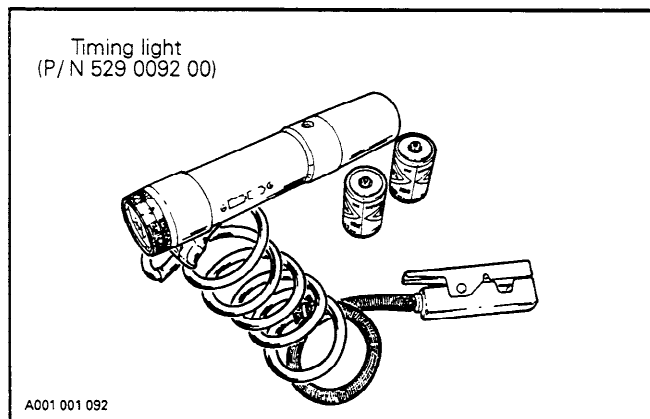
NOTE : To perform this procedure we strongly recommend a stroboscopic timing light which is able to exceed 6000 RPM.

To check ignition timing, use a timing light (P / N 529.0092 00).

NOTE : This timing light is battery powered (2 alkaline batteries, type C) and therefore needs no auxiliary power supply. If a different timing light requiring auxiliary power supply is used on manual start models, use a separate battery to power timing light.

Section 06 ELECTRICAL

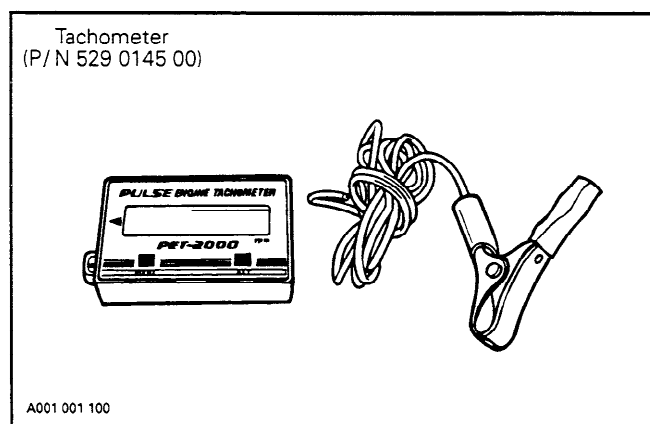
Sub-Section 02 (IGNITION TIMING)



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

○ **NOTE** : On applicable models, turn heating grips off prior to checking ignition timing.

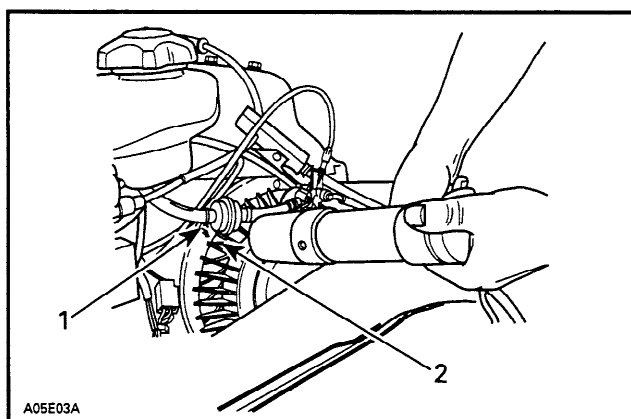
1. Connect timing light pick-up to the spark plug lead. Use a digital induction type tachometer (P / N 529 0145 00).



Connect tachometer wire to spark plug wire or aim tachometer toward spark plug wire without using any connection wire.

◆ **WARNING** : Place ski tips against a wall, raise rear of vehicle on a stand so that track does not contact the ground. Do not allow anyone in front or behind the vehicle while engine is running. Keep clear of track and do not wear loose clothing which can get caught in moving parts.

2. Start the engine and point timing light straight in line with the fan cowl timing mark. Bring engine to 6000 RPM for a brief instant.



1. Fan cowl timing mark
2. Yellow fin
3. Check if the yellow fin aligns with the fan cowl timing mark. Tolerance is $\pm 1^\circ$.

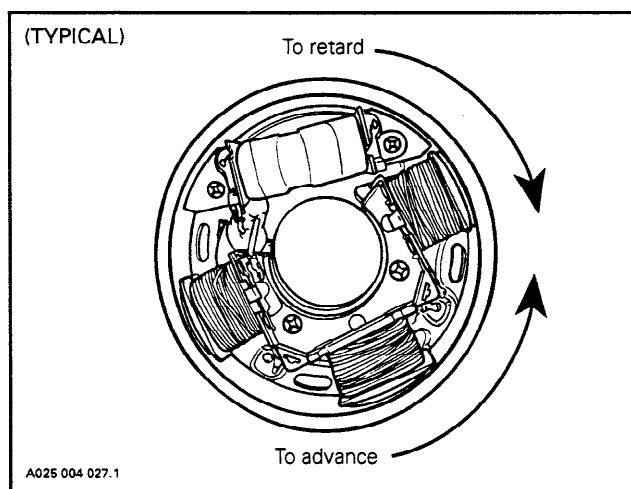
○ **NOTE** : On the NIPPONDENSO ignition system, timing advance decreases as engine speed increases. When marks are aligned at 6000 RPM, spark occurrence is still Before Top Dead Center.

If the yellow fin aligns with the fan cowl timing mark, timing is correct.

If timing adjustment is required, rewind starter and starter pulley have to be removed. For removal procedure, refer to CDI SYSTEM 04-06.

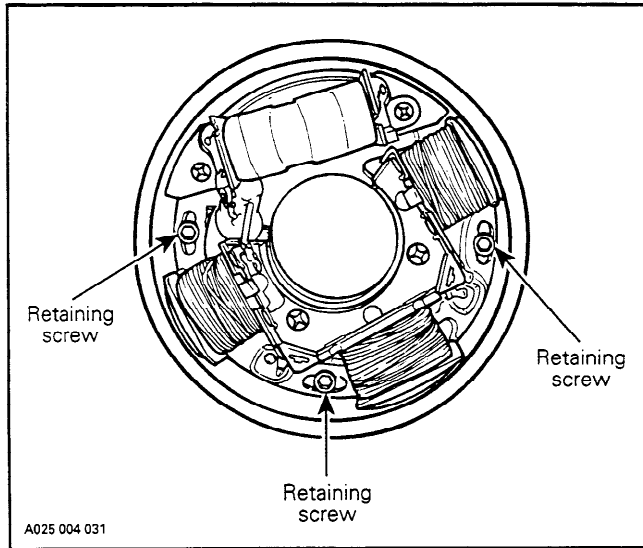
IGNITION TIMING ADJUSTMENT

Timing is performed by moving armature plate, clockwise to retard spark occurrence, counterclockwise to advance.



To adjust, loosen 3 armature plate retaining screws and lightly rotate armature plate in proper direction.

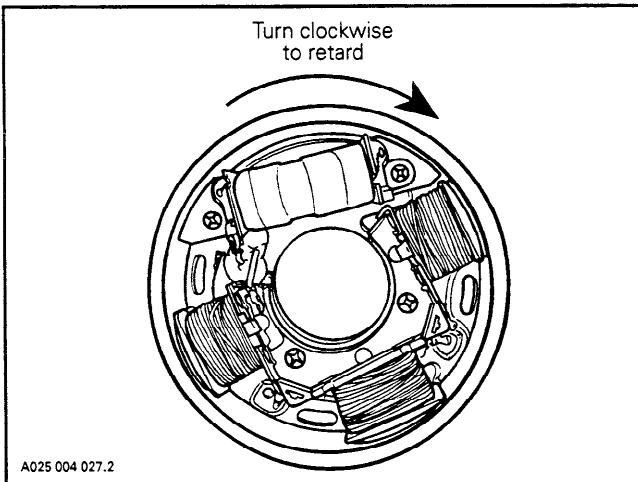
Section 06 ELECTRICAL
Sub-Section 02 (IGNITION TIMING)



Refer to the difference between the fan cowl timing mark and the yellow fin to determine the amount of rotation.

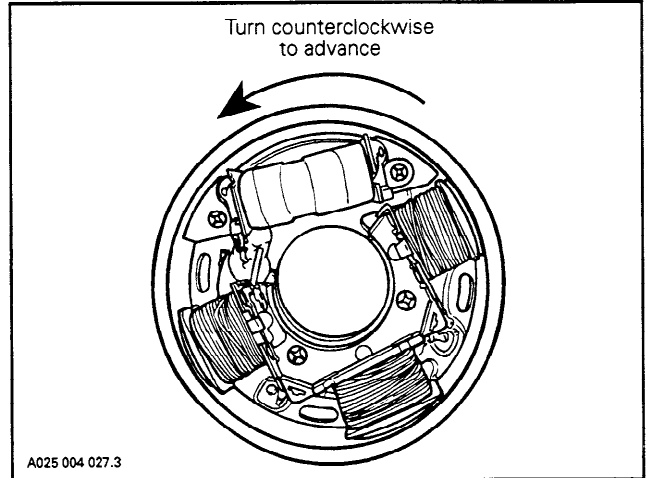
When the yellow fin is on left side of fan cowl timing mark, it indicates too advanced timing.

In this case, turn armature plate clockwise.



When the yellow fin is on right side of fan cowl timing mark, it indicates retarded timing.

In this case, turn armature plate counterclockwise.



After adjustment, tighten armature plate retaining screws.

CAUTION : Make sure armature plate screws are well secured. Armature plate screws must have medium strength threadlocker (P / N 413 7030 00) applied before tightening.

Reinstall removed parts.

Recheck ignition timing (make sure engine is cold).

Section 06 ELECTRICAL

Sub-Section 02 (IGNITION TIMING)

DUCATI CDI SYSTEM

377, 443 AND 503 ENGINE TYPES

Proper ignition timing is determined by trigger coil position.

If for any reason, ignition timing accuracy is suspected, it can be verified as follows.

Verifying Magneto Flywheel Timing Mark Position

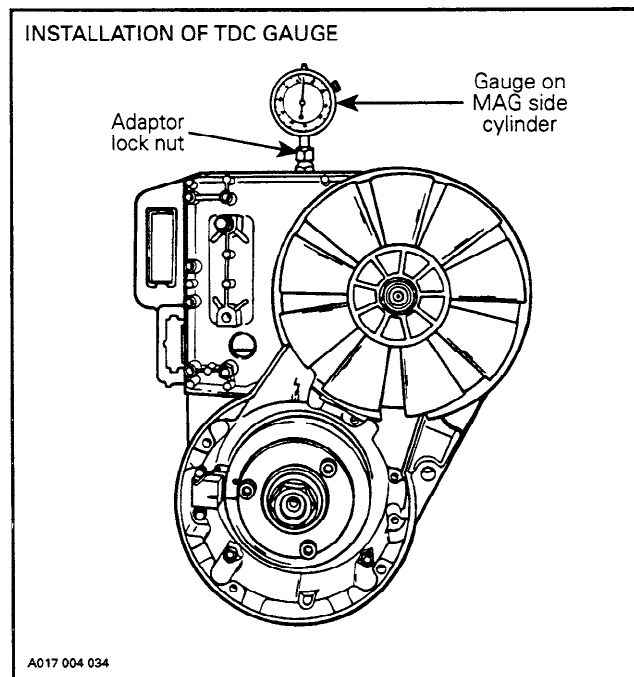
Prior to checking the timing, it may be necessary to verify the position of the timing mark on the magneto flywheel, for the following reasons :

1. To detect a missing or broken magneto flywheel Woodruff key which would allow a change of timing to occur, with eventual break down of the engine.
2. To correctly locate and mark a timing mark on a new service magneto flywheel.
3. To verify the correct location of the factory timing mark.
4. To detect a wrong magneto flywheel.

To verify the position of the timing mark on the magneto flywheel, proceed as follows :

1. Clean the area around the spark plugs, and remove them.
2. Remove the rewind starter from the engine.

3. Install the TDC gauge in the spark plug hole, (magneto / generator side) and adjust as follows :
 - a. Position the magneto flywheel at approximately TDC.



- b. Assemble the gauge to the adaptor and tighten the roller lock nut. Do not tighten the adaptor lock nut.
 - c. Screw the adaptor into the spark plug hole and tighten to prevent movement in the plug hole.
 - d. Position the dial face toward the magneto / generator. Move the gauge down until the needle just begins to move, then move down a further 5 or 6 mm (approximately 1/4 in). Tighten adaptor lock nut by hand.
4. Locate the piston TDC position as follows :
 - a. Slowly rotate the magneto flywheel back and forth across TDC while observing the needle. Note that the needle stops moving only as the piston is changing direction.
 - b. Rotate the dial face so that "0" is in line with the needle when it stops moving.
 - c. Again, slowly rotate the magneto flywheel back and forth across TDC and adjust the dial face to "0", until the needle always stops exactly at "0" before changing direction.
 - d. "0" now indicates exact TDC.

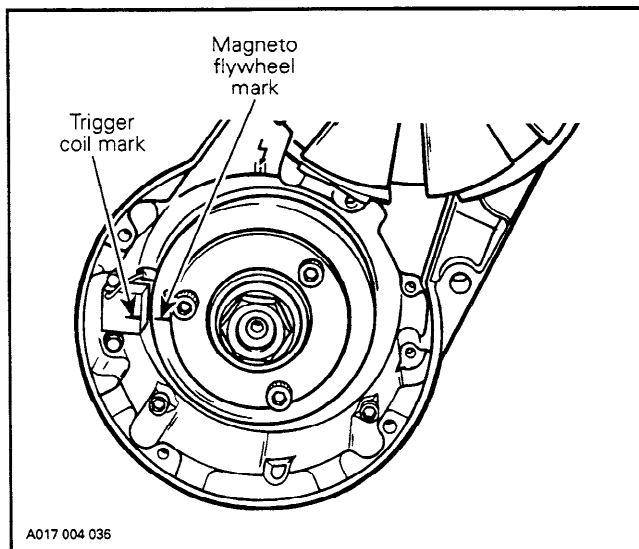
Section 06 ELECTRICAL

Sub-Section 02 (IGNITION TIMING)

5. Verify the position of the timing mark on the magneto flywheel as follows :

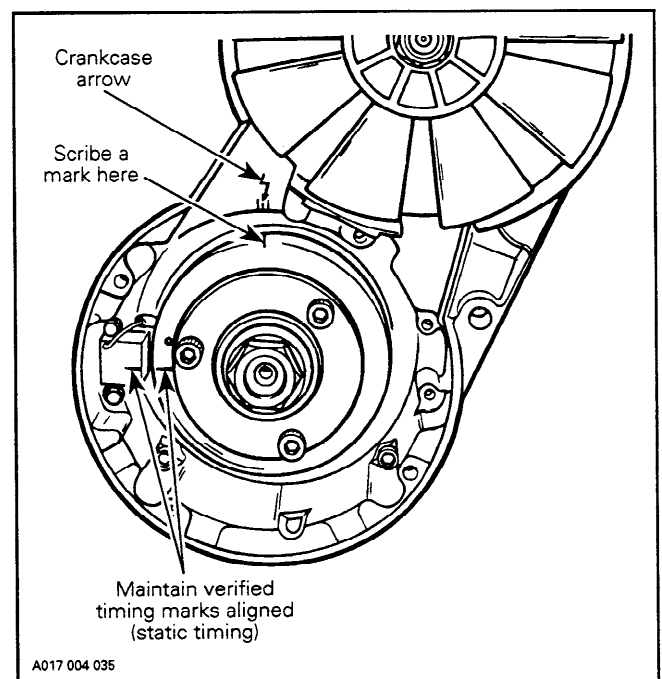
○ **NOTE** : When checking timing, certain procedures require that the magneto flywheel be turned in a clockwise direction, viewed facing the magneto / generator. If it is necessary to turn back (counterclockwise) for any reason, rotate the magneto flywheel at least one-quarter turn counterclockwise, and then rotate it clockwise. The last magneto flywheel movement when making a critical check must always be in a clockwise direction, to ensure that the slack in engine moving parts is taken-up.

- Rotate the magneto flywheel counterclockwise, one-quarter turn then carefully rotate it clockwise until the needle indicates the specified measurement. Refer to 10 TECHNICAL DATA.
- Verify that the magneto flywheel mark perfectly aligns with the mark on the trigger coil, refer to illustration.
- If the marks do not align, check magneto flywheel and trigger coil part numbers and check Woodruff key condition. If all parts are the appropriate ones and if Woodruff key is in good condition, continue the procedure.



○ **NOTE** : These marks can not be used to check dynamic (with engine running) ignition timing with a timing light : a new mark must be scribed on magneto flywheel for this purpose.

6. Scribe a new mark on magneto flywheel as follows.
 - Remove the fan cover from the engine.
 - Maintain magneto flywheel so that previous marks remain aligned.
 - Scribe or punch a mark on magneto flywheel so that it perfectly aligns with the arrow on crankcase, refer to illustration. This new timing mark should be used for future timing checks (dynamic timing).
 - Reinstall rewind starter.
 - Check the timing with a timing light.



Checking Ignition Timing

Use timing light (P / N 529 0092 00).

To check the ignition timing, refer to illustration and proceed as follows :

○ **NOTE** : Engine should be cold when checking timing. Do not idle engine for more than 20 seconds and make checks quickly.

◆ **WARNING** : Place ski tips against a wall, raise rear of vehicle on a stand, so that track does not contact the ground. Do not allow anyone in front of or behind the vehicle while engine is running. Keep clear of track and do not wear loose clothing which can get caught in moving parts.

Section 06 ELECTRICAL

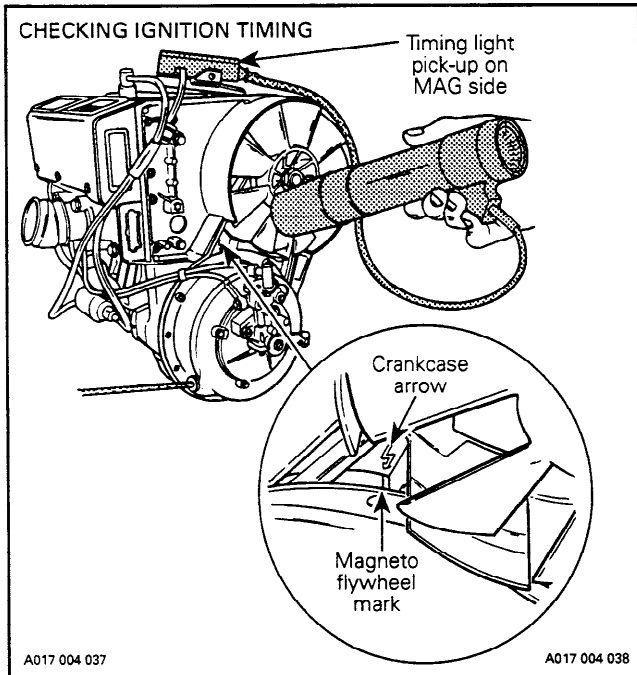
Sub-Section 02 (IGNITION TIMING)

1. Connect the timing light pick-up to a spark plug cable and the power connections to the battery.

○ NOTE : To avoid an incorrect reading due to parallax, view the magneto flywheel and the crankcase timing marks in a straight line.

2. Start the engine and raise the engine speed at least to 2000 RPM while observing the timing marks, refer to illustration. The magneto flywheel mark scribed previously and the crankcase arrow should be perfectly aligned. If the marks do not align, a faulty trigger coil (check proper grounding of coil) or a faulty CDI module could be the cause : substitute one part at a time and recheck timing marks (check connectors condition prior to substituting any part).

○ NOTE : Ignition timing may be verified when engine speed is anywhere within 2000-6000 RPM.



3. Install parts which were removed.

SPARK PLUGS

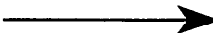

○ NOTE : The 1996 Bombardier snowmobiles covered in this manual are using 2 spark plug brands, Bosch and NGK spark plugs.

BOSCH SPARK PLUG

Élan

BOSCH SPARK PLUG NUMBERING SYSTEM

The heat range identification system is :

High number  hot plug
Low number  cold plug

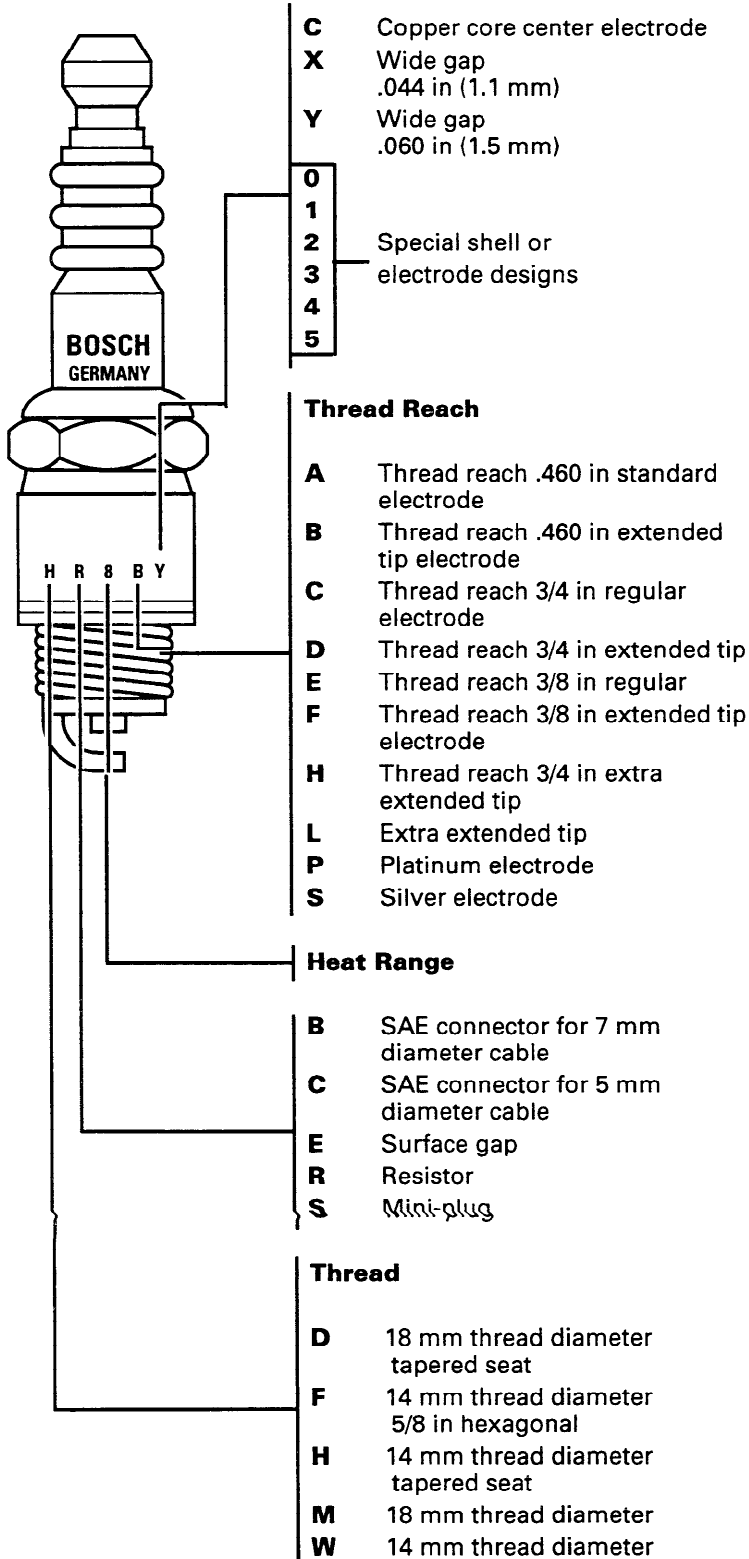
1996 REFERENCE CHART

Bosch spark plug used on the 1996 Élan snowmobile :

- M 7 A

Section 06 ELECTRICAL
Sub-Section 03 (SPARK PLUGS)

DESIGN SYMBOLS USED ON BOSCH SPARK PLUGS



A001 004 047


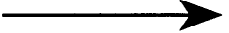
NGK SPARK PLUG

All Models Except Élan

NGK SPARK PLUG NUMBERING SYSTEM

Bombardier is using the NGK spark plug type on most of the 1996 snowmobile models.

The heat range identification system is :

High number  cold plug
Low number  hot plug

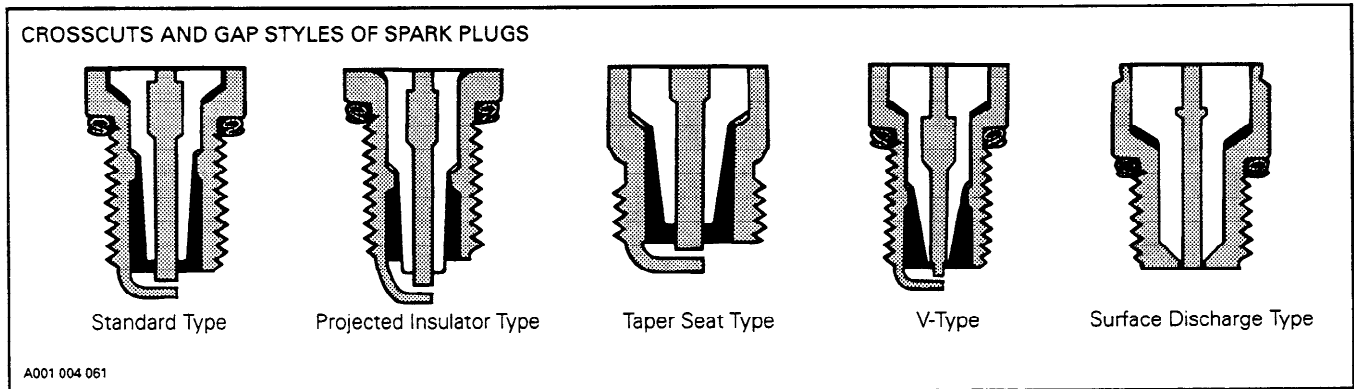
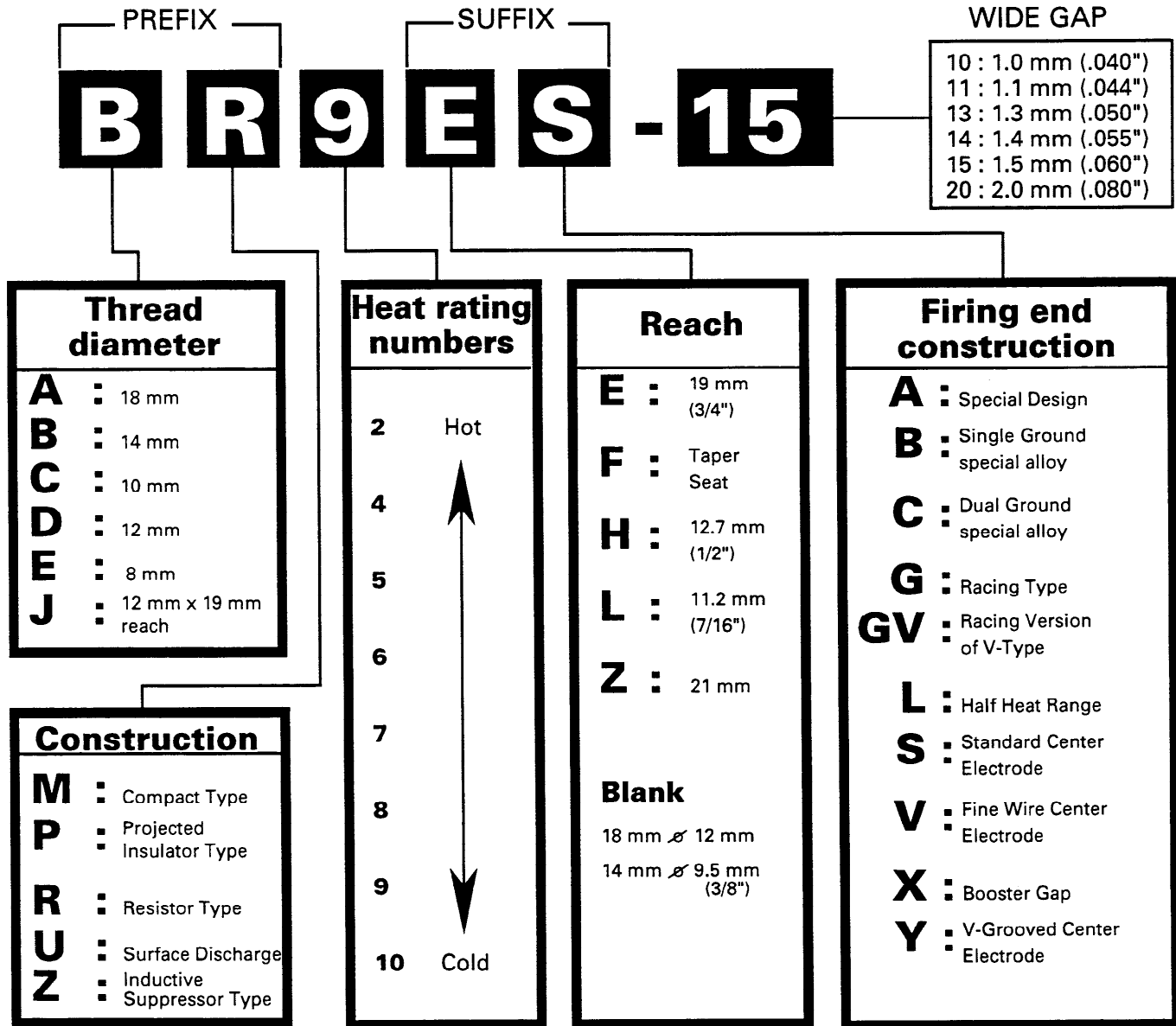
1996 REFERENCE CHART

NGK spark plugs used on 1996 Bombardier snowmobiles covered in this manual :

– BR9ES

Section 06 ELECTRICAL
Sub-Section 03 (SPARK PLUGS)

DESIGN SYMBOLS USED IN NGK SPARK PLUGS



DISASSEMBLY

First unscrew the spark plug 1 turn.

Clean the spark plug and cylinder head with pressurize air then completely unscrew.

◆ **WARNING** : Whenever using compressed air, always wear protective eye wear.

HEAT RANGE

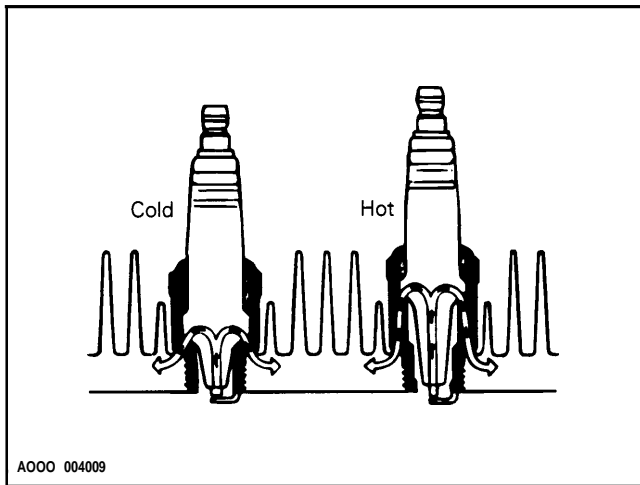
The proper operating temperature or heat range of the spark plugs is determined by the spark plug ability to dissipate the heat generated by combustion.

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 might occur if a wrong heat range plug is used.

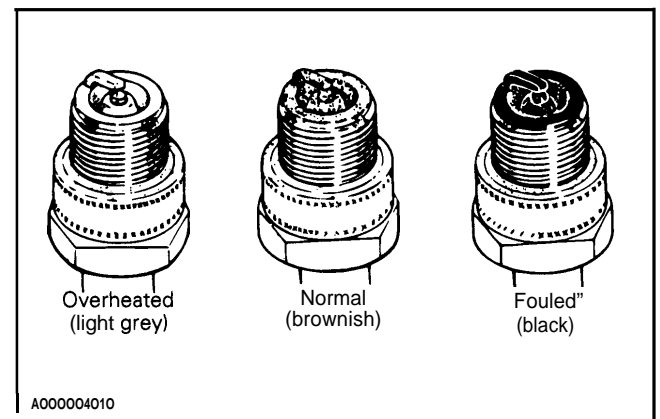
A too “hot” plug will result in overheating and pre-ignition, etc.

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, decreased 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, or running on a too rich mixture due to a faulty carburetor adjustment or incorrect fuel and /or fuel mixing. The plug face of a fouled spark plug has either a dry coating of soot or an oily, glossy coating given by an excess either of oil or of oil with soot. Such coatings form a conductive connection between the center electrode and ground.

SPARK PLUG ANALYSIS



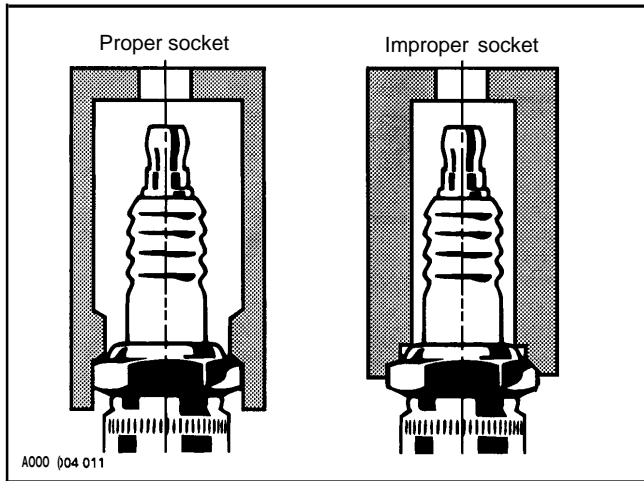
The plug face (and piston dome) reveals the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug face (i.e. the part of the plug projecting into the combustion chamber) and the piston dome.

Section 06 ELECTRICAL
Sub-Section 03 (SPARK PLUGS)

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 according to 10 TECHNICAL DATA.
2. Apply antiseize lubricant (P/N 4137010 00) over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench and a proper socket.



SPARK PLUG TIGHTENING TORQUE

Models	Spark plugs	Torque N•m (lbf•ft)
Élan	Bosch M7A or NGK A6	37 (27)
All other models	NGK	27(20)

BATTERY

REMOVAL

All Models

◆ **WARNING** : Battery BLACK negative cable must always be disconnected first and connected last.

◆ **WARNING** : Never charge or boost battery while installed on vehicle.

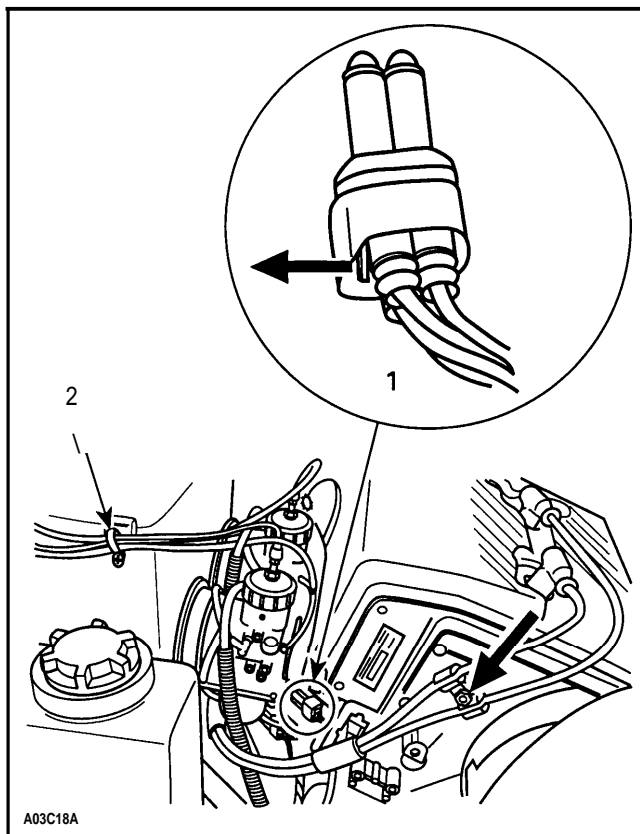
Remove belt guard.

Unfasten spark plug cables from fan housing. Unplug spark plug caps.

Remove throttle cable and primer hose attachment from air silencer.

Unplug CDI box harness connector.

Slacken collar on carburetor adaptors. Remove air silencer. CDI box will come along with.

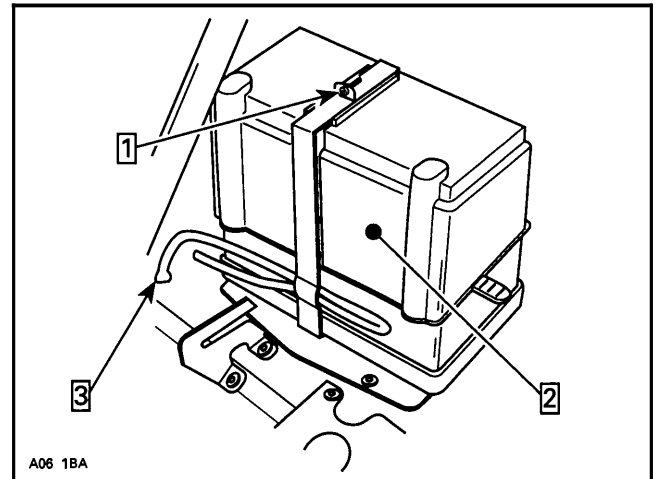


1. CDI box harness connector
2. Attachment

Unfasten retaining strips.

Open strips and lift battery protective boot.

Remove vent tube.



Step 1 : Unfasten and open

Step 2 : Lift protective boot

Step 3 : Remove vent tube

All Models

Withdraw battery from vehicle being careful not lean it so that electrolyte flows out of vent tube.

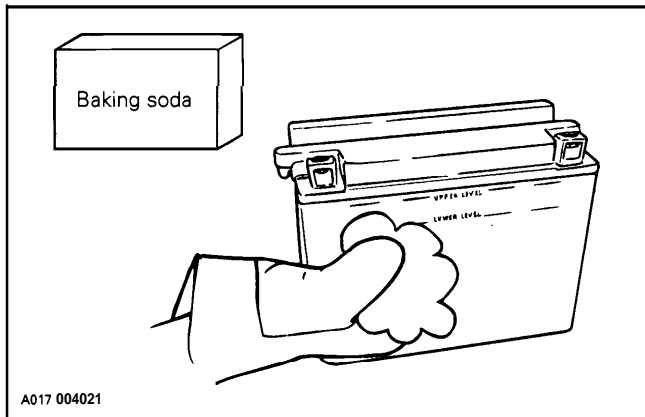
▼ **CAUTION** : Should any electrolyte spillage occur, immediately wash off with a solution of baking soda and water to prevent damage to vehicle components.

CLEANING

Clean the battery, battery casing, vent tube, 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.

Section 06 ELECTRICAL
Sub-Section 04 (BATTERY)



Remove corrosion from battery cable terminals and battery posts using a firm wire brush.

INSPECTION

Visually inspect battery casing for cracks or other possible damage. If casing is damaged, replace battery and thoroughly clean battery tray and close area with water and baking soda.

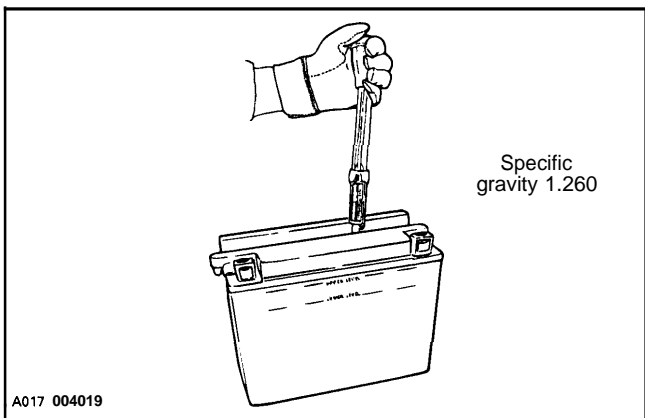
◆ **WARNING** : Should the battery casing be damaged, wear a suitable pair of non-absorbent gloves when removing the battery by hand.

Inspect battery posts for security of mounting.

Inspect for cracked or damaged battery caps, replace defective caps.

◆ **WARNING** : Battery caps do not have vent holes. Make sure that vent tube is not obstructed.

HYDROMETER TEST



A hydrometer measures the charge of a battery in terms of specific gravity of the electrolyte. Most hydrometers give a true reading 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 (1 0°F) above 27°C (80°F) and by subtracting .004 point for every 5.5°C (1 0°F) below 27°C (80°F).

This chart will be useful to find the correct reading.

ELECTROLYTE TEMPERATURE		OPERATION TO PERFORM
"C	"F	
38	100	add .008 to the reading .004
32	90	
27	80	correct reading
21	70	subtract .024 from the reading .004 .008 .012 .016 .020 .028 .032 .036 .040 .044 .048
16	60	
10	50	
4	40	
-1	30	
-7	20	
-12	10	
-18	0	
-23	-10	
-29	-20	
-34	-30	
-40	-40	

EXAMPLE NO. 1

Temperature below 27°C (80°F):
Hydrometer Reading : 1.250
Electrolyte 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
Electrolyte temperature : 38°C (1 00°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 might crack at freezing temperature. The following chart shows the freezing point of the electrolyte in relation to the charge of the battery.

Temperature - Corrected Specific Gravity	Battery Charge	Freezing Point of Electrolyte
1.260	Fully Charged	- 59°C (- 74°F)
1.230	3/4 Charged	-400C (- 40°F)
1.200	1/2 Charged	- 27°C (- 16°F)
1.170	1/4 Charged	- 18°C (0°F)
1.110	Discharged	- 70C (+ 19°F)

BATTERY STORAGE

Disconnect and remove battery from the vehicle.

Check electrolyte level in each cell, add distilled water up to upper level line.

▼ **CAUTION** : Do not overfill.

The battery must always be stored in fully charged condition. If required, charge until specific gravity of 1.260 is obtained,

▼ **CAUTION** : Battery electrolyte temperature must not exceed 50°C (122°F). The casing should not feel hot.

Clean battery terminals and cable connections using a wire brush. Apply a light coat of dielectric grease (P/ N 4137017 00) or petroleum jelly on terminals.

Clean battery casing and 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 40 days. As necessary, keep the battery at its upper level line and near full charge as possible (trickle charge).

ACTIVATION OF NEW BATTERY

● **WARNING** : Never charge or boost battery while installed on vehicle.

▼ **CAUTION** : Prior to charging the battery, always remove it from the vehicle to prevent electrolyte spillage.

A new battery is factory fresh dry charged. For storage purposes, it is fitted with a temporary sealing tube.

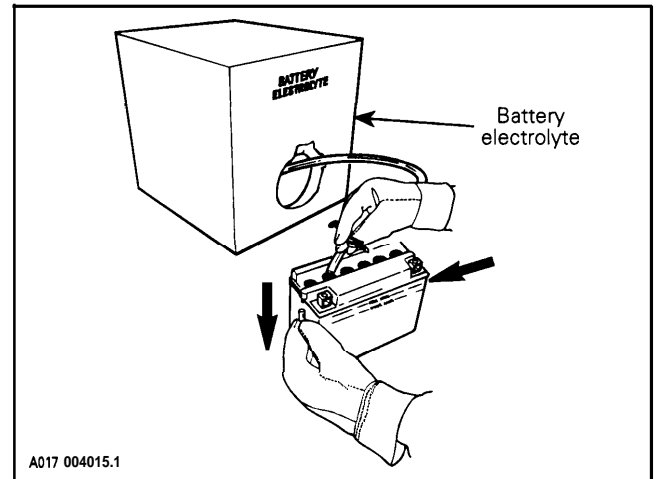
Do not remove the sealing tube or loosen battery caps unless activation is desired.

In case of accidental premature removal of caps or sealing tube, battery should be given a full charge.

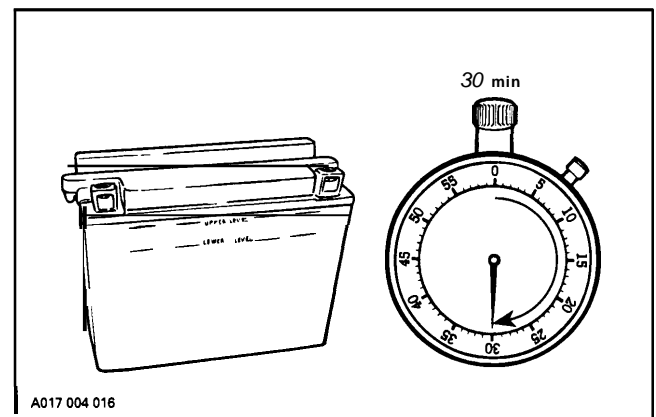
Perform the following operations anytime a new battery is to be installed,

1. Remove the sealing tube from the vent elbow. Install vent tube, included in the battery kit, to battery elbow.

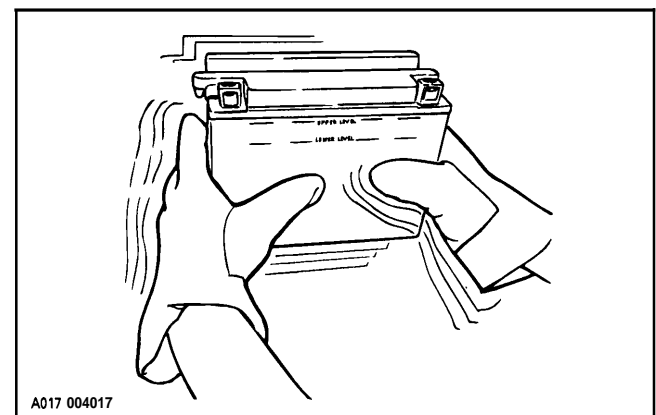
● **WARNING** : Failure to remove the sealing tube could result in an explosion.



2. Remove caps and fill battery to 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 soak through battery cells.

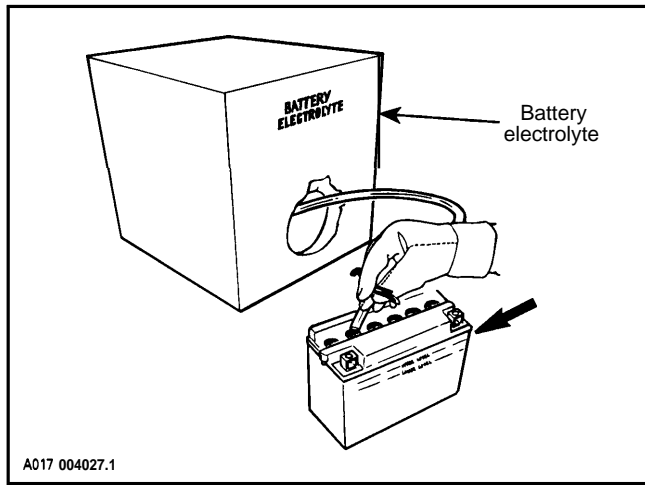


4. Allow gas bubbles to escape by lightly shaking battery by hand.

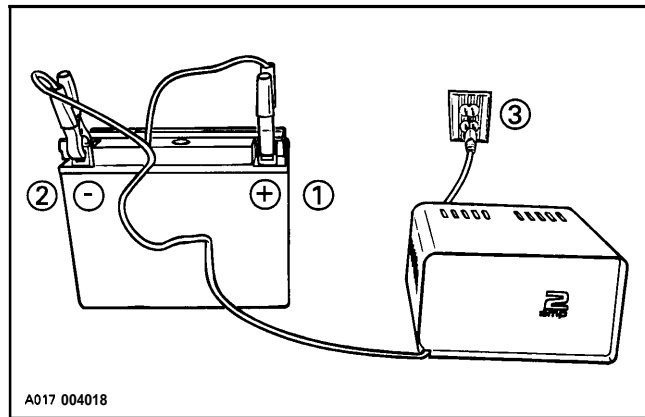


Section 06 ELECTRICAL
 Sub-Section 04 (BATTERY)

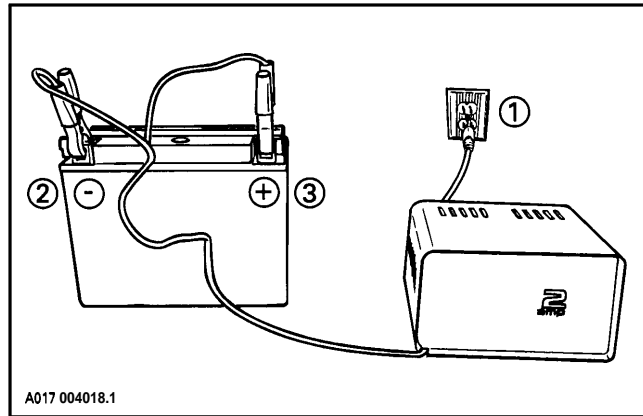
5. Readjust the electrolyte level to the UPPER LEVEL line.



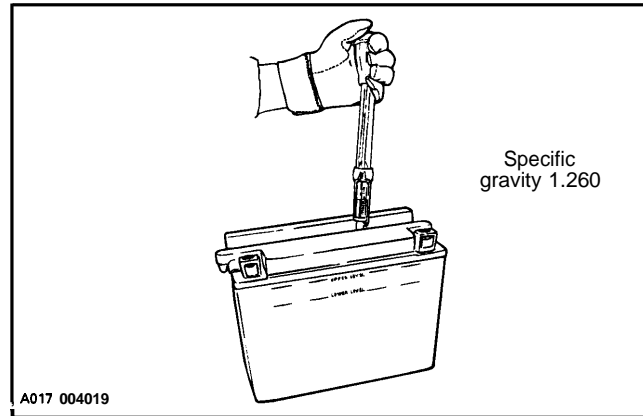
6. Connect a 2 A battery charger for 10 to 20 hours.



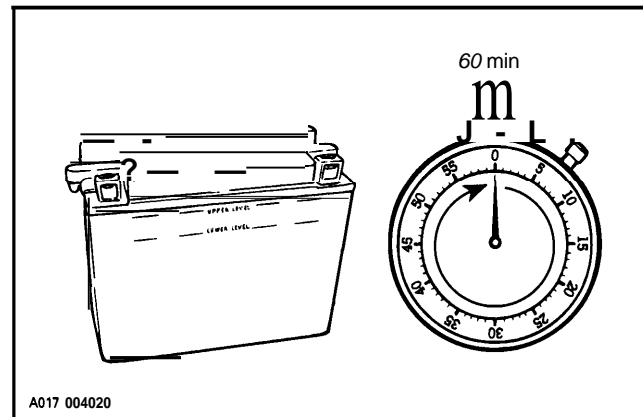
7. Disconnect battery charger.



8. Test battery state of charge. Use a hydrometer.



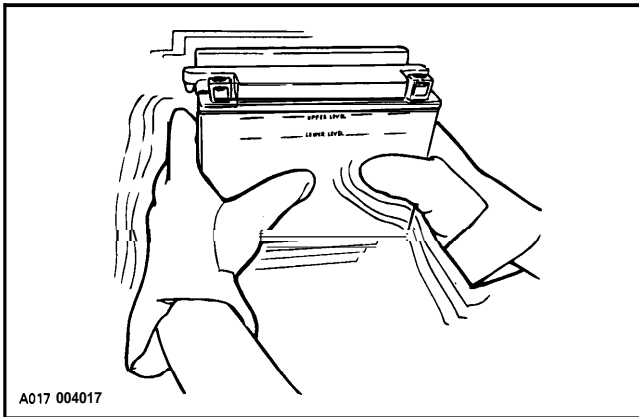
9. Let battery settles for one hour.



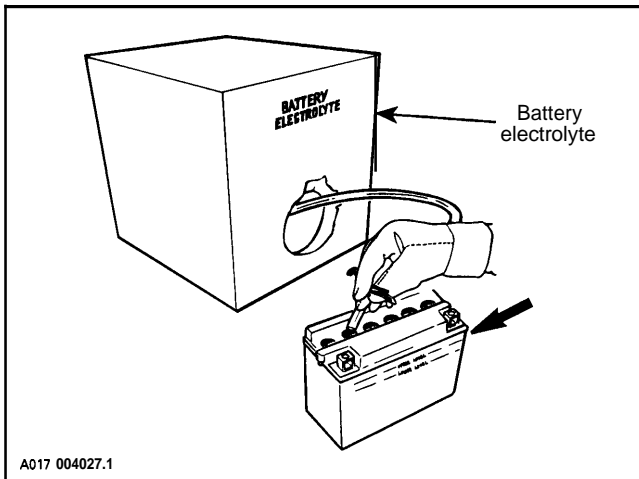
▼ **CAUTION** : If charging rate raises higher than 2.4 A reduce it immediately. If cell temperature rises higher than 50°C (122°F) (if the casing feels hot) discontinue charging temporarily or reduce the charging rate.

◆ **WARNING** : Gases given off by a battery being charged are highly explosive. Always charge in a well ventilated area. Keep battery away from cigarettes or open flames. Always turn battery charger off prior to disconnecting cables. Otherwise a spark will occur and battery might explode.

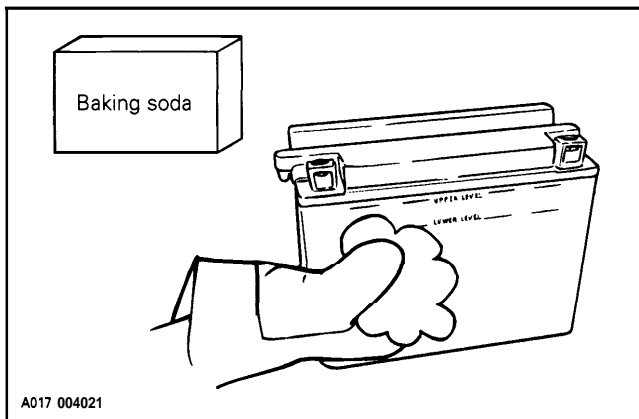
10. Allow gas bubbles to escape by lightly shake battery.



1. Readjust electrolyte level.



12. Reinstall caps and clean any electrolyte spillage using a solution of baking soda and water.



▼ CAUTION : Do not allow cleaning solution to enter battery interior since it will destroy the electrolyte.

○ NOTE : It is recommended to verify the battery charge once a month. If necessary, fully charge battery.

SERVICING

Electrolyte Level

Since a battery has been activated (see above), add distilled water to top up electrolyte.

TIPS FOR CHARGING A USED BATTERY

▼ CAUTION : Prior to charging the battery, always remove it from the vehicle to prevent electrolyte spillage.

For best results, battery should be charged when the electrolyte and the plates are at room temperature. A battery that is cold may not accept current for several hours after charging begun.

Do not charge frozen battery. If the battery charge is very low, the battery may freeze. If it is suspected to be frozen, keep it in a heated area for about two hours before charging.

◆ WARNING : Do not place battery near open flame.

The time required to charge a battery will vary depending some factors such as :

- Battery temperature : The charging time is increased as the temperature goes down. The current accepted by a cold battery will remain low. As the battery warms up, it will accept a higher rate of charge.
- State of charge : Because the electrolyte is nearly pure water in a completely discharged battery, it cannot accept current as well as electrolyte. This is the reason the battery will not accept current when the charging cycle first begins. As the battery remains on the charger, the current from the charger causes the electrolytic acid content to rise which makes the electrolyte a better conductor and then, the battery will accept a higher charging rate.
- Type of charger: Battery chargers vary in the amount of voltage and current that they can supply. Therefore, the time required for the battery to begin accepting measurable current will also vary.

Section 06 ELECTRICAL

Sub-Section 04 (BATTERY)

Charging a Very Flat or Completely Discharged Battery :

Unless this procedure is properly followed, a good battery may be needlessly replaced.

- Measure the voltage at the battery posts with an accurate voltmeter. If it is below 10 volts, the battery will accept current at very low rate, in terms of milliamperes, because electrolyte is nearly pure water as explained above. It could be some time before the charging rate increases. Such low current flow may not be detectable on some charger ammeters and the battery will seem not to accept any charge.
- Only for this particular case, set the charger to a high rate.

NOTE : Some chargers have a polarity protection feature which prevents charging unless the charger leads are connected to the correct battery terminals. A completely discharged battery may not have enough voltage to activate this circuitry, even though the leads are connected properly. This will make it appear that the battery will not accept a charge. Follow the charger manufacturer's instruction telling how to bypass or override this circuitry so that the charger will turn on and charge a low-voltage battery.

- Since the battery chargers vary in the amount of voltage and current they provide, the time required for the battery to accept measurable charger current might be up to approximately 10 hours or more.
- If the charging current is not up to a measurable amount at the end of about 10 hours, the battery should be replaced.
- If the charging current is measurable before the end or at the end of about 10 hours, the battery is good and charging should be completed in the normal manner as specified in Activation of a new battery.
- It is recommended that any battery recharged by this procedure be load tested prior to returning it to service.

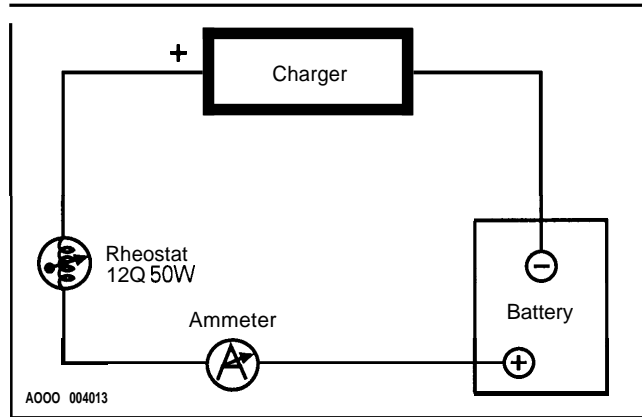
BATTERY CHARGING EQUIPMENT

The battery charger should 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 the 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 OH MITE -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 to be 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 pa& supply shops.



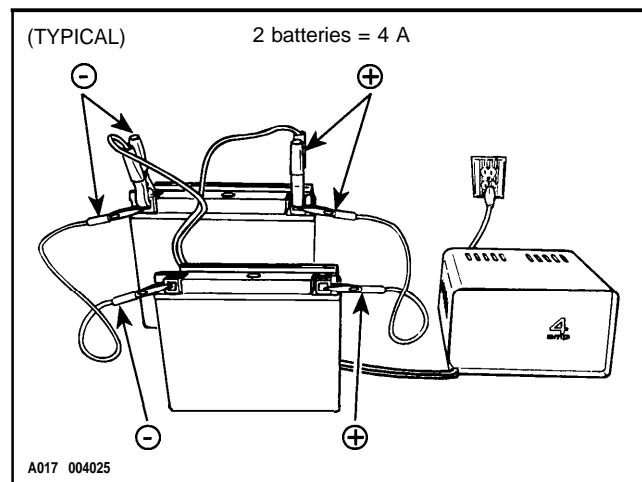
For a service application and a permanent installation, both ammeter and rheostat can be built into a small box adjacent to your charger.

CAUTION : Adequate ventilation **MUST** be provided to cool the rheostat.

Charging 2 or More Batteries at a Time

Connect all positives together and use a charger with a capacities (rated) equal to : number of battery to be charged multiply by 2A.

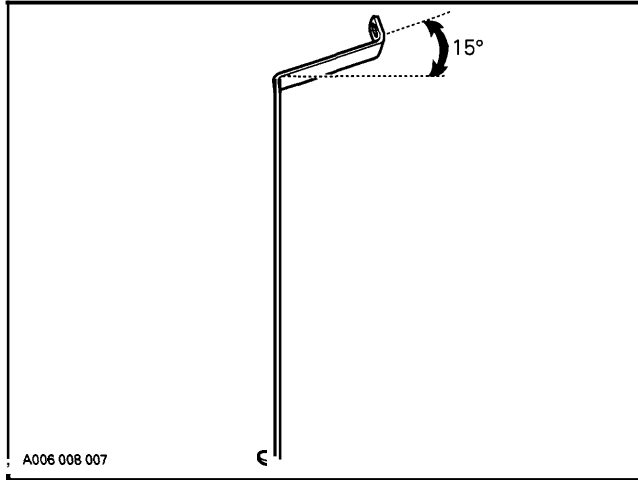
For example : charging five batteries at a time requires a 10 A rated charger ($5 \times 2 \text{ A} = 10 \text{ A}$).



INSTALLATION OF BATTERY

Ensure vent tube is properly installed on battery elbow, then install protective boot over battery.

Bent rear strip by 15° to facilitate installation. That strip can also be taped on its hook portion so it stays in place.



Close and fasten retaining strips.

Connect vent tube to vehicle fitting on front frame.

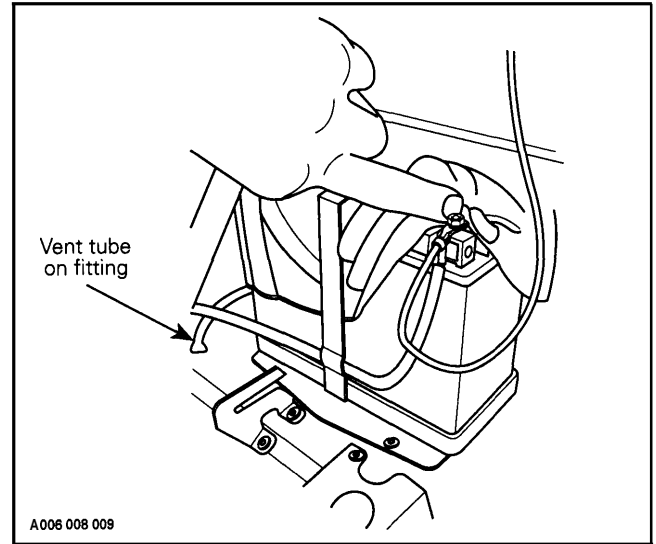
Route RED positive cable behind retaining strip and connect it to positive battery terminal.

Connect BLACK negative cable LAST.

▼ CAUTION : Negative battery terminal should always be disconnected FIRST and reconnected LAST.

Apply silicone dielectric grease (P/ N 4137017 00) on battery posts and connectors.

Connect vent tube to vehicle fitting on front frame.



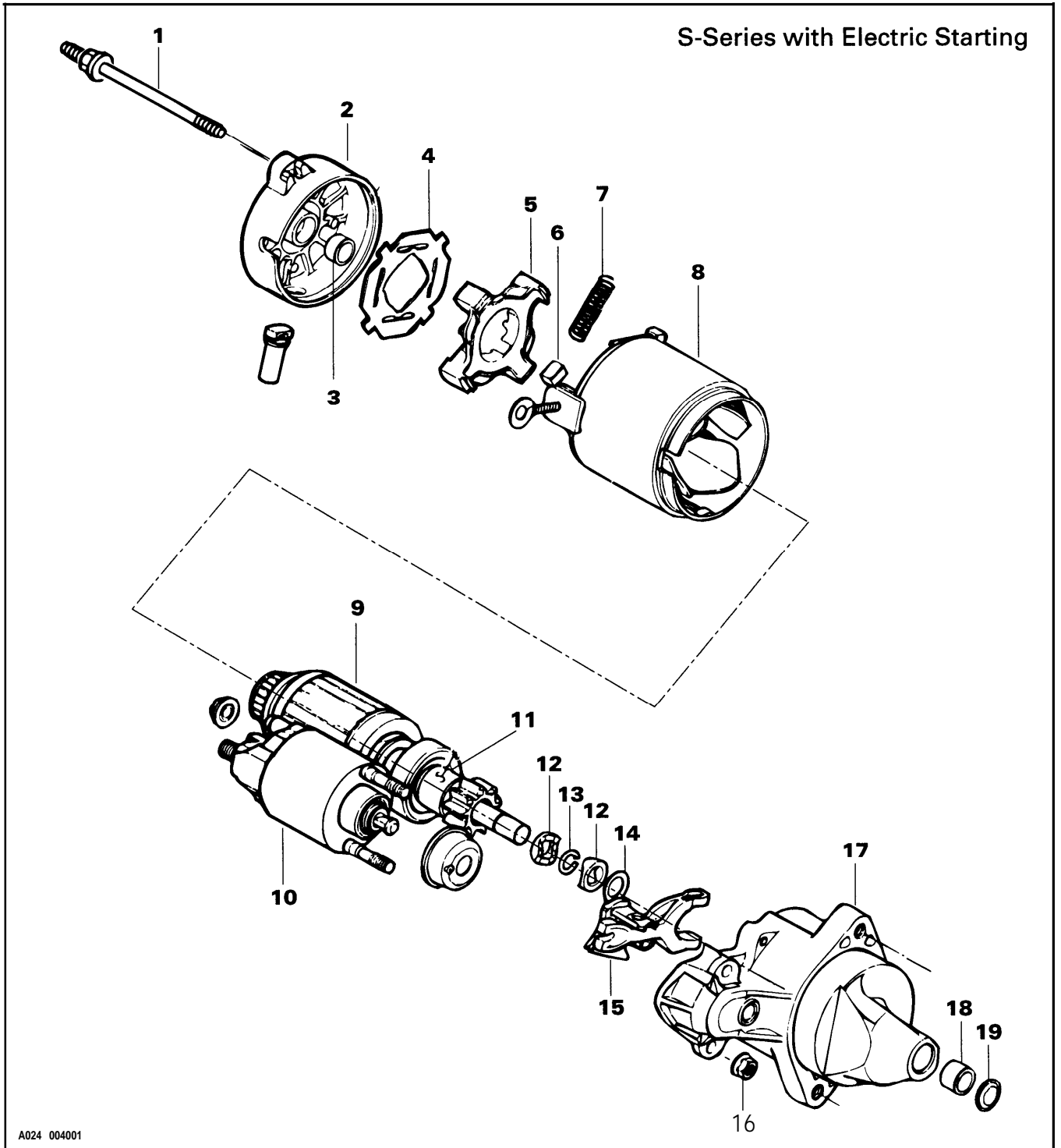
Ensure that vent tube is not kinked or blocked.

Reinstall air silencer.

Fasten spark plug cables to fan housing.

Reinstall throttle cable and primer hose attachment to air silencer. See removal illustration.

ELECTRIC STARTER



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Section 06 ELECTRICAL

Sub-Section 05 (ELECTRIC STARTER)

REMOVAL

- Disconnect BLACK ground cable from battery.
- Disconnect RED positive cable from battery.
- ◆ **WARNING** : Always disconnect ground cable first and connect last.
- Disconnect RED cable and RED/ GREEN wire from starter solenoid switch.
- Remove starter from engine.

DISASSEMBLY

Disconnect bare wire linking starter and solenoid.

10,15,16, Solenoid Switch, Drive Lever and Nut

Remove nuts then solenoid switch by lifting and pulling to disengage from drive lever.

1,2,8,17, Screw, End Frame, Yoke and Drive Housing

Unscrew starter longer screws then pull yoke with end frame to separate from drive housing.

9,14,15, Armature, Thrust Washer and Drive Lever

Pull armature with drive lever being careful not to lose thrust washer at shaft end.

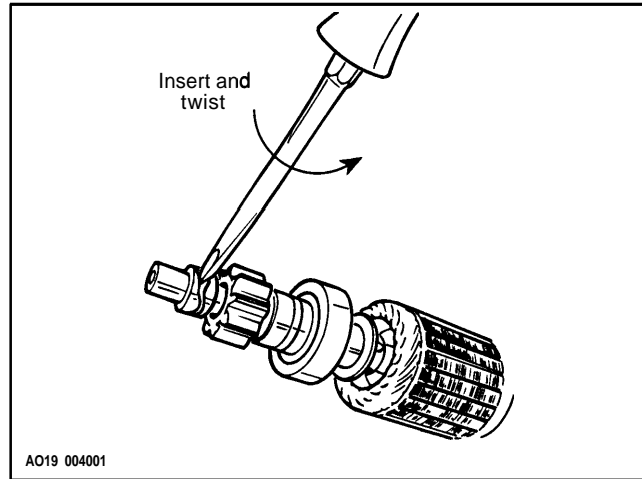
4,5,7, Insulator, Brush Holder and Spring

Remove insulator then brush springs being careful not to lose them since they will be projected out.

Pull brush holder from yoke.

11,12,13, Overrunning Clutch, Circlip and Stop Collar

Insert blade of a small screwdriver between stop collars.



Twist screwdriver to separate stop collars thus giving access to circlip.

Remove outer collar, circlip then inner collar.

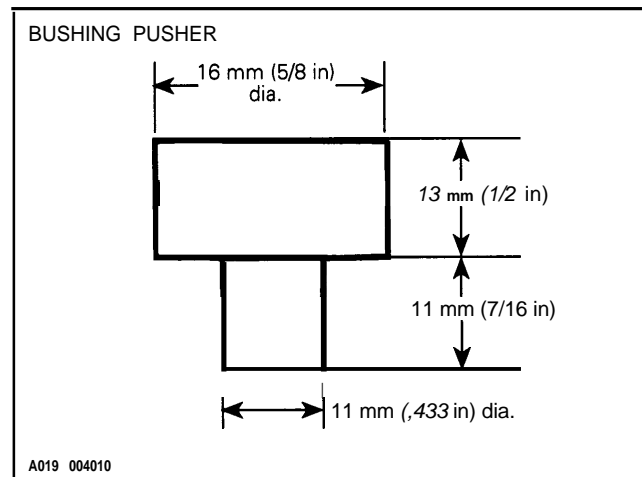
Remove overrunning clutch.

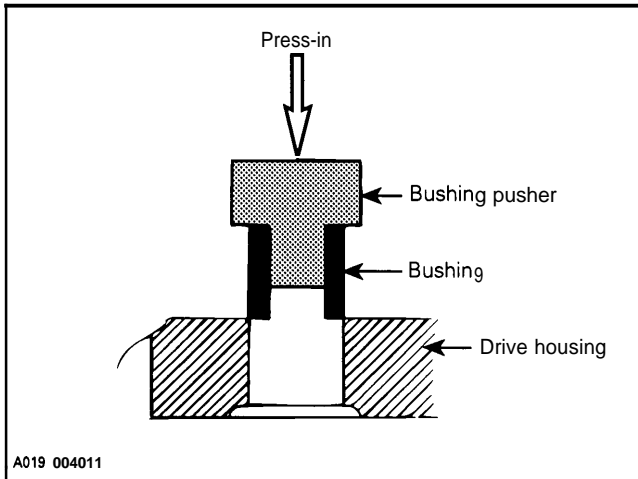
18,19, Bushing (drive housing) and Cover

Check the wear on bushing by measuring the amount of radial play between the armature shaft and the bushing.

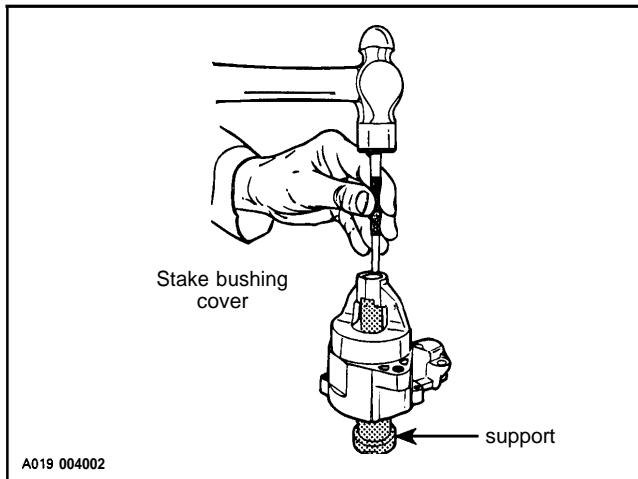
The radial play should not exceed 0.20 mm (0.008 in). If greater, replace the bushing. To replace, press out the old one toward bushing cover and press in a new one with a bushing pusher. The correct size of the bushing pusher to use is given on next illustration.

▼ **CAUTION** : Support drive housing adequately to prevent damage when pressing bushing.





Install bushing cover then, using a punch, stake bushing cover in place.

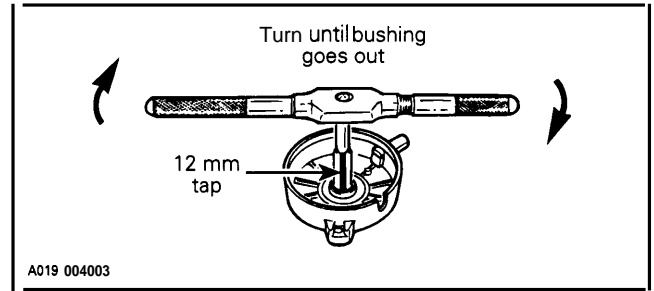


3, Bushing (end frame)

Check the wear on bushing by measuring the amount of radial play between the armature shaft and the bushing.

The radial play should not exceed 0.20 mm (.008 in). If greater, replace bushing as follows :

Using a 12 mm tap, cut threads into bushing so that the tap contacts the end frame. Continue to rotate tap until the bushing comes free.

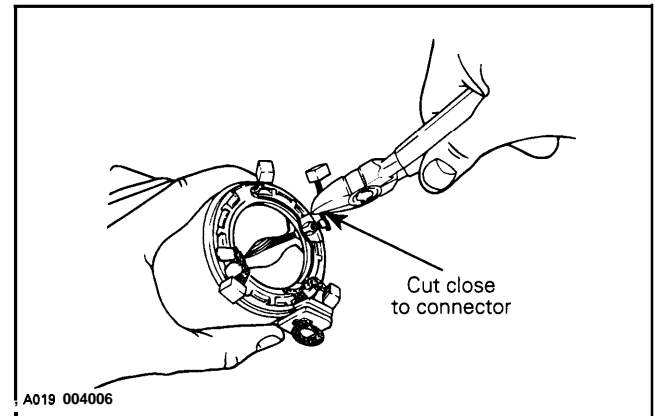


To install new bushing, use the same bushing pusher as for drive housing bushing installation.

6, Brush

To replace, proceed as follows :

Cut brush wire close to connector at the welded portion.



Remove burrs with a file on the remaining welded portion.

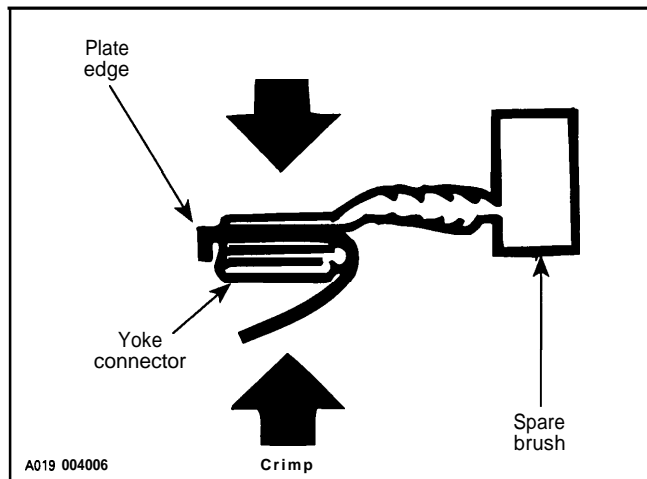
▼ CAUTION : Be careful not to damage plastic portion of yoke.

Place spare brush plate edge against yoke connector edge (welded portion).

Crimp plate over yoke connector with a pair of pliers.

Section 06 ELECTRICAL

Sub-Section 05 (ELECTRIC STARTER)



Solder the crimped portion.

▼ **CAUTION** : Do not overheat and quickly perform soldering to prevent solder from flowing to the brush through the wire. Preferably use a heat sink.

CLEANING AND INSPECTION

Refer to the end of this sub-section.

ASSEMBLY

Prior to assembling, coat sliding surfaces and moving parts on armature shaft splines, overrunning clutch, solenoid switch plunger, drive lever and bushings with G.E. Versilube G 321 (P/N 4137040 00) lubricant.

Proceed as follows for assembling.

Secure drive housing in a vise.

▼ **CAUTION** : Do not overtighten since housing might be damaged.

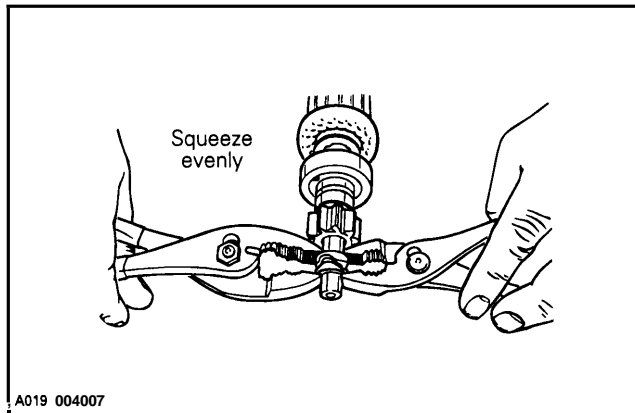
12,13, Stop Collar and Circlip

Install overrunning clutch onto armature shaft. Insert inner collar onto shaft. Install a new circlip.

▼ **CAUTION** : Always install a new circlip when servicing.

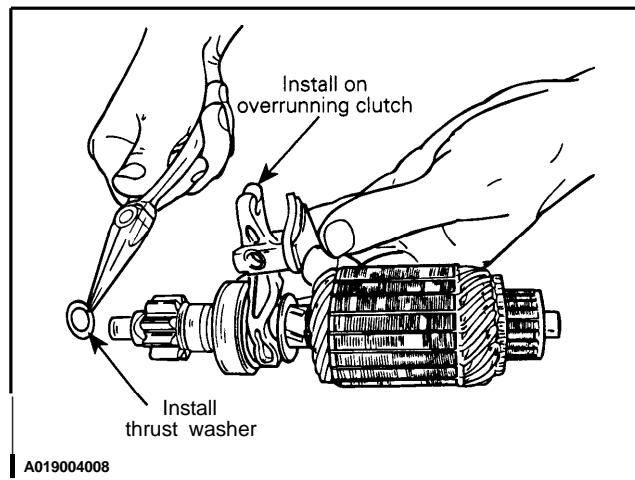
Insert outer collar being careful to match protrusions with notches of collars,

Using a pair of pliers on each side of stop collars, squeeze evenly until collars sit over circlip.



12,14,15,17, Stop Collar, Thrust Washer, Drive Lever and Drive Housing

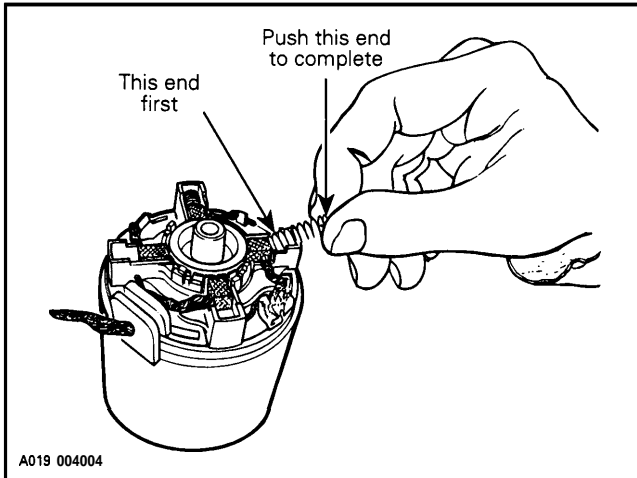
Install thrust washer against outer stop collar. Place drive lever onto overrunning clutch then insert into drive housing.



5,6,7,8,9, Brush Holder, Brush, Spring, Yoke and Armature

Slide yoke over armature.

Install brush holder then brushes in their housings. Insert springs as follows : place one end of spring against brush, compress, then push the other end of spring onto its housing. Repeat for remaining springs.



1,2,4, Screw, End Frame and Insulator

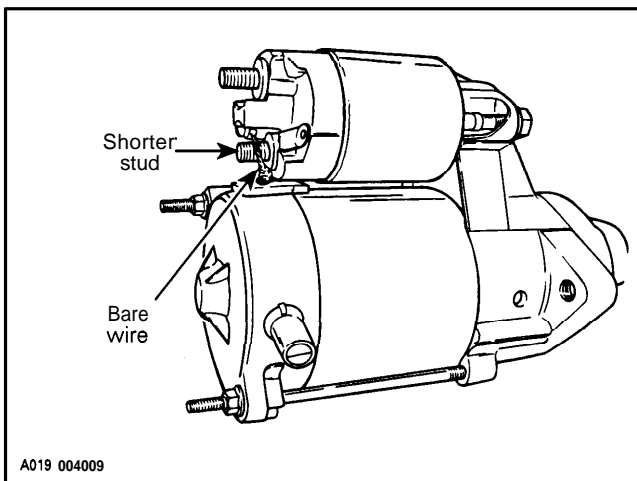
Secure insulator over brushes and springs. Properly install end frame and tighten screws.

10,15,17, Solenoid, Drive Lever and Drive Housing

Insert solenoid plunger inside of drive lever fork and secure to drive housing.

Connect starter bare wire to solenoid.

NOTE : Connect this wire on the shorter solenoid stud.



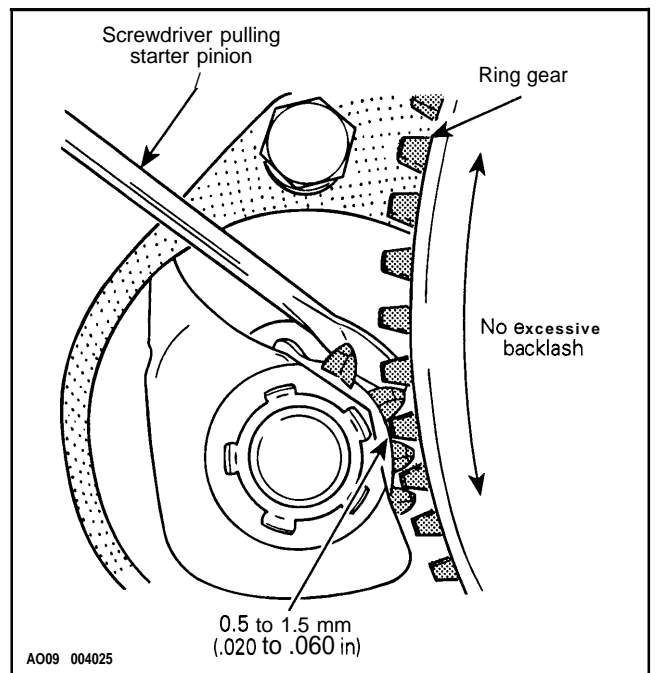
INSTALLATION

Make sure that starter and engine mating surfaces are free of grime. Serious trouble may arise if starter is not properly aligned.

Install starter.

NOTE : Check proper engaging depth of starter pinion teeth to ring gear teeth (see illustration). Install hardened washers (P/ N 5030079 00) between engine and starter support and / or starter bracket accordingly.

CAUTION : All starter and starter bracket fasteners must be secured with Loctite 271 (P/N 4137074 00).



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.

WARNING : Always disconnect ground cable first and connect last.

Section 06 ELECTRICAL
Sub-Section 05 (ELECTRIC STARTER)

CLEANING AND INSPECTION

CLEANING

▼ **CAUTION** : Armature starter yoke ass'y and drive unit assembly must not be immersed in cleaning solvent.

Clean brushes and holder with a clean cloth soaked in solvent. Brushes must be dried thoroughly with a clean cloth.

Blow brush holder clean using compressed air,

● **WARNING** : Always wear safety goggles when 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** : Bushings must not be cleaned with grease dissolving agents.

Immerse all metal components in cleaning solution. Dry using a clean, dry cloth.

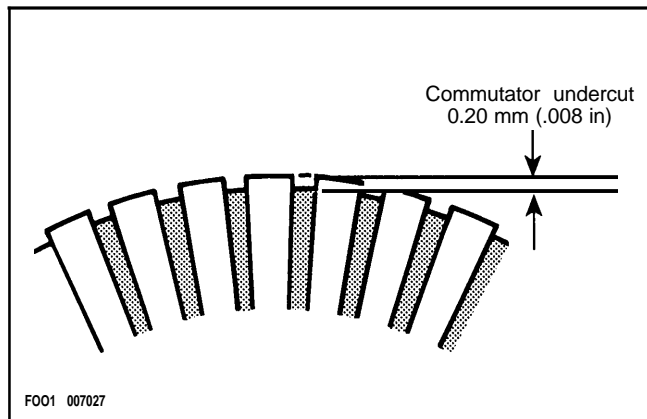
INSPECTION

Armature

○ **NOTE** : An ohmmeter may be used for the following testing procedures, except for the one concerning the shorted windings in the armature.

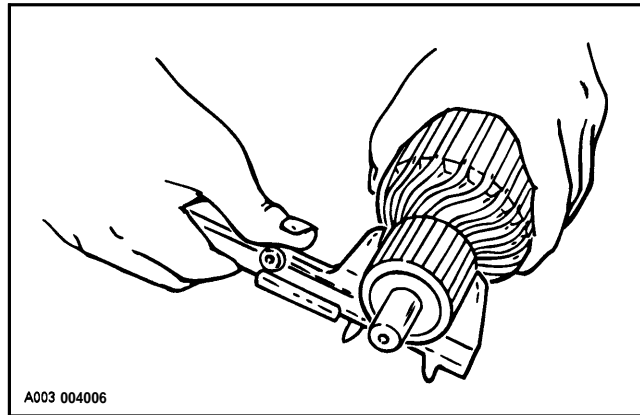
Check the commutator for roughness, burnt or scored surface. If necessary, turn the commutator on a lathe, enough to remove grime only.

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



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 in), the commutator should be turned on a lathe.

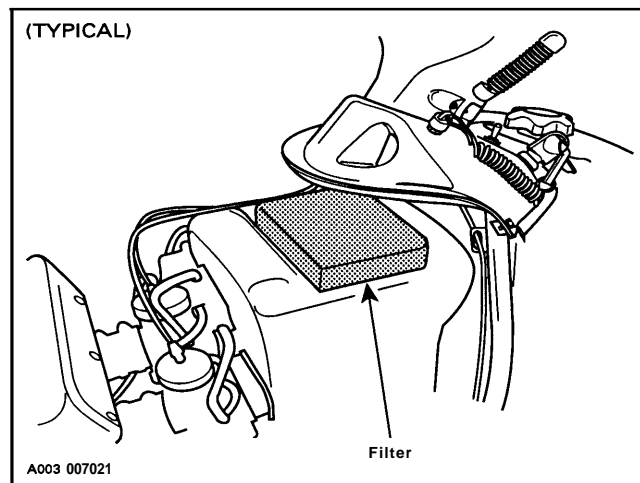
Check commutator outer diameter. If less than specified value, replace.



MODEL	WEAR LIMIT
S- Series	27 mm (1 .063 in)

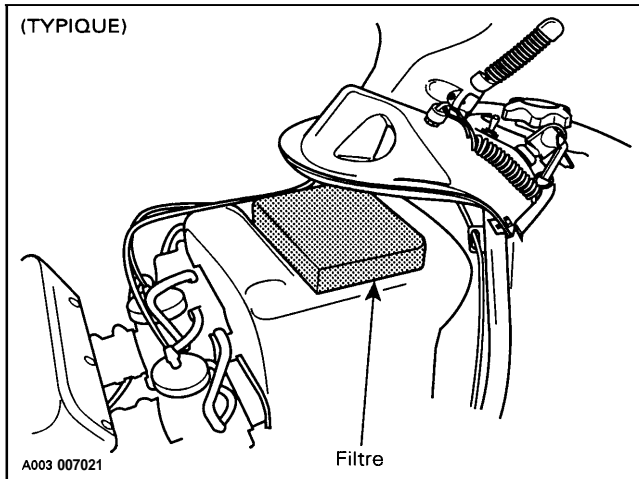
Test for Ground Circuit in the Armature :

Use growler test probes. Check between armature core and the commutator bars. If growler lamp turns on, bars are grounded.



Test Armature for Shorted Winding :

When the armature is rotated in the growler with a steel strip (hack-saw blade) held above it, the strip will vibrate over that area of the armature which has short circuited.



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 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 to be repaired or replaced.

Brush Length

Measure brush length. If less than the specified value, replace them,

Test the Armature for Open Circuit:

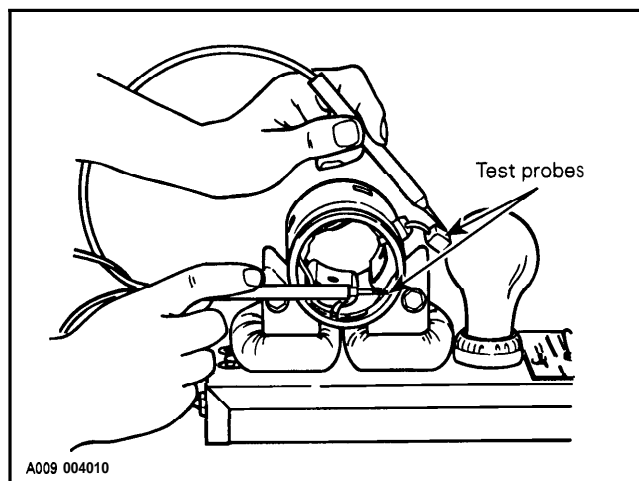
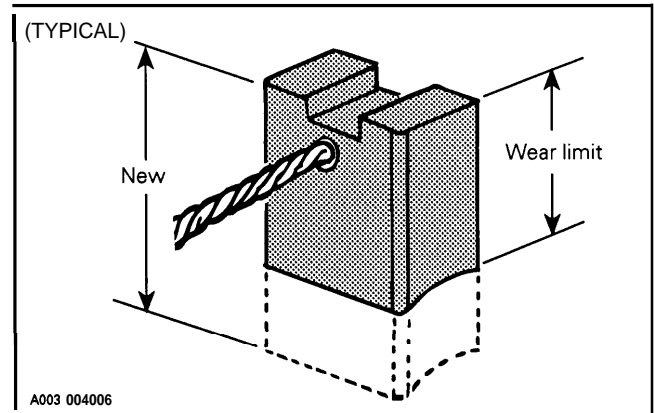
Use growler test probes. Place one test probe on a commutator bar and the other test probe on the neighboring bar. Repeat this operation for all bars, moving one test probe at a time. If the growler lamp does not turn on, the armature circuit between these two bars is opened. The armature should be replaced 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.)

MODEL	LENGTH	
	New	Wear limit
S-Series	10 mm (.400 in)	6 mm (.236 in)

Field Windings and Brushes

Test the Field Winding for Open Circuit

Use 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.

Overrunning Clutch

The pinion of the overrunning clutch should turn smoothly in the clockwise direction, and should not slip in a counterclockwise direction. If defective, replace.

Check the pinion teeth for wear and damage. If defective, replace.

SOLENOID SWITCH

Inspect connections and clean as necessary. Solenoid switch condition can be checked with an ohmmeter. Install test probes on large connectors of solenoid when it is activated (+ on RED / GREEN wire and - on solenoid body).

IMPORTANT: No current must be present on large cables when using ohmmeter, otherwise meter could be damaged.

TESTING PROCEDURE

GENERAL

Three types of ignition systems are found on ROTAX engines covered by this manual ; one breaker-point ignition system and 2 Capacitor Discharge Ignition (CDI) systems. The following chart gives the engine types with their implemented system.

ENGINE TYPE	IGNITION SYSTEM	CHARGING SYSTEM OUTPUT
247	BOSCH (Breaker-point)	75/ 23
277	① NIPPONDENSO (CDI) SINGLE COIL	160
377, 443 and 503	② DUCATI (ADC)	240

CDI System Identification

Nippondenso

The NIPPONDENSO CDI system has a separate ignition coil which is mounted on fan housing.

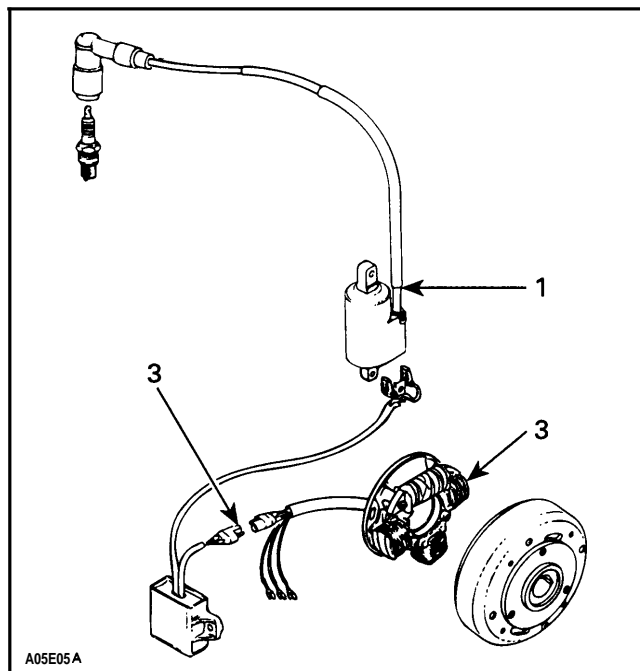
Ignition module is connected to a single ignition generator coil via a 2-wire connector (BLACK and BLACK/RED wires).

277 Engine

Ignition module stamped P / N : 070000-1960

Ignition coil stamped P / N : 129700-2480

Flywheel stamped P / N : 032700-4380



① NIPPONDENSO CDI SINGLE COIL SYSTEM

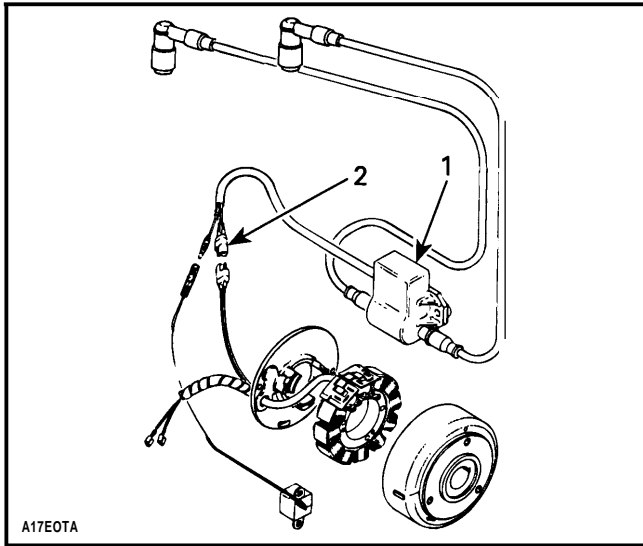
1. Separate ignition coil mounted on fan housing
2. Two-wire connector (BLACK and BLACK/RED wires)
3. Single ignition generator coil

Ducati

The DUCATI CDI system has a combined ignition module / ignition coil which are mounted on air silencer, below carburetor(s).

Ignition module is connected to the ignition generator coils via a 2-wire connector (GREEN and WHITE wires).

Section 06 ELECTRICAL
Sub-Section 06 (TESTING PROCEDURE)



© DUCATI CDI SYSTEM

1. Combined ignition module / ignition coil mounted on air silencer below carburetor(s)
2. Two-wire connector (GREEN/WHITE wires)

Ignition System Testing Sequence

When dealing with ignition problems, the following items should be verified in this order.

Nippondenso and Bosch

1. Spark occurrence / spark plug condition.
2. Electrical connections.
3. Engine stop / tether cord switches.
4. Ignition coil output.
5. Ignition module output (not applicable to 247 engine type).
6. Magneto output (ignition generator coil).

▼ **CAUTION** : Whenever replacing a component in ignition system, check ignition timing.

Ducati

1. Spark occurrence / spark plug condition.
2. Electrical connections.
3. Engine stop / tether cord switches.
4. Trigger coil output.
5. Magneto output (ignition generator coil).
6. Ignition coil output.
7. Ignition module.

All Systems

The first 2 items can be checked with known automotive equipment and other items as follows.

Engine Stop / Tether Cut-Out Switches Verification

Engine Stop Switch

Unplug stop switch connector from main harness then using an ohmmeter, connect test probes to BLACK/YELLOW and BLACK wires.

Measure resistance, it must be an open circuit in its operating position and close to 0 ohm when depressed.

Tether Cut-Out Switch

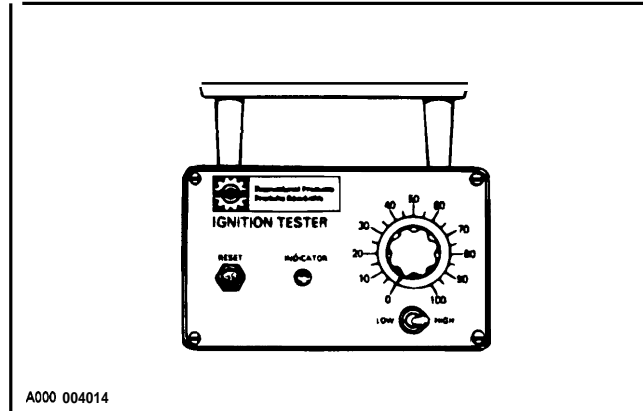
Unplug tether cut-out switch connector from main harness then using an ohmmeter, connect test probes to BLACK / YELLOW and BLACK wires.

Measure resistance, it must be an open circuit when cap is over switch and close to 0 ohm when removed.

Magneto System Verification

System verification can be performed using the Bombardier ignition tester (P/ N 4190033 00), a digital ohmmeter or by substituting parts.

USE OF BOMBARDIER IGNITION TESTER



○ **NOTE** : For more information about operating and maintenance of the tester, refer to its instruction manual.

Test Condition

All tests are performed on the vehicle at cranking speed.

Vigorous manual 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.

Always proceed in the following order :

1. Connect tester P and N clip leads as illustrated for each specific test.
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 3 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 tested part.

Indicator Lamp Does Not Light

One component is defective. Proceed as instructed to find defective component.

Intermittent Ignition Problems

In dealing with intermittent problems there is no easy diagnosis. For example, problems that occur only at normal engine operating temperature have to be tested under similar conditions.

In most cases of temperature and/or vibration failure, only parts replacement can solve the problem as most of these failures return to normal when engine is not running.

Multiple Problems

There is always the possibility of more than one faulty part. If after a component has been replaced, the problem still persists, carefully repeat the complete test procedure to find the other faulty part.

Section **06** ELECTRICAL
Sub-Section 06 (TESTING PROCEDURE)

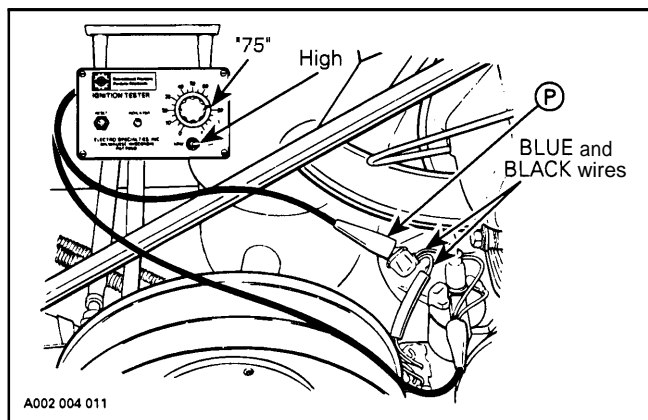
BOSCH BREAKER-POINT IGNITION SYSTEM TESTING
(Applicable to 247 Engine Type)

○ NOTE : Ensure ignition cut-out switches are properly working and they are in the ON position prior to performing the following tests.

MAGNETO OUTPUT
(Ignition Generator Coil)

- 1) Disconnect BLUE and BLACK wires terminal no. 15 of ignition coil.
- 2) Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	Engine ground	HIGH	75
P	BLACK and BLUE wires of magneto harness		



- 3) Crank engine and observe indicator.

Results :

a) Indicator lamp lights : Generator coil output is up to specifications. Repeat test at least three times to verify reading.

b) Indicator lamp does not light: Generator coil output is below specifications. This could be caused by a faulty generator coil or breaker points. Check breaker points condition and adjustment, and correct as necessary. Repeat test. If lamp still does not light, the generator coil is defective and should be replaced.

LIGHTING GENERATOR COIL OUTPUT

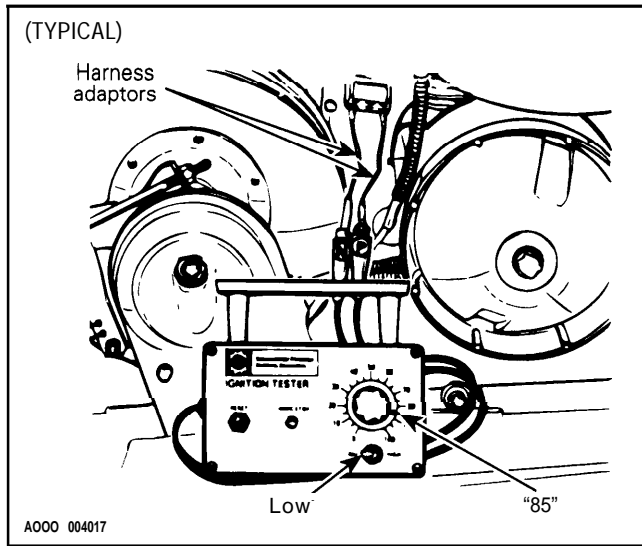
○ NOTE : The lighting generator coil is not part of the ignition system. It is a separate system that supplies current to the lighting system and AC-powered devices. However, it can be tested with the same tester.

○ NOTE : There are 2 independent lighting generator coils ; main (large) coil wires are YELLOW and YELLOW / BLACK while auxiliary lighting generator coil (small) wires are GREEN and GREEN / BLACK.

- 1) Disconnect wiring harness junction block at engine.
- 2) Connect tester leads as illustrated using 2 harness adaptors then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	YELLOW / BLACK wire of magneto harness	LOW	85
P	YELLOW wire of magneto harness		

Tester wires	Component wires	Tester switch position	Tester dial position
N	GREEN / BLACK wire of magneto harness	LOW	85
P	GREEN wire of magneto harness		



3) Crank engine and observe indicator.

Results :

- a) Indicator lamp lights: Lighting generator coil output is up to specifications Repeat test at least 3 times to verify reading.
- b) Indicator lamp does not ight : Lighting generator coil is faulty.

Section 06 ELECTRICAL
Sub-Section 06 (TESTING PROCEDURE)

RESISTANCE MEASUREMENTS

As an alternate method, magneto system components can be checked with a digital ohmmeter.

0 NOTE : All resistance measurements must be performed with parts at room temperature (approx. 20°C (68 °F)). Temperature greatly affects resistance measurements.

Disconnect connector at ignition coil and magneto junction. Measure resistance between each terminal. Refer to the following table for values and wire colors.

0 NOTE : An ignition coil with good resistance measurement can still be faulty. Voltage leak can occur at high voltage level which is not detectable with an ohmmeter.

PART NAME		WIRE COLOR*	RESISTANCE OHM	REMARKS
MAGNETO	Ignition generator coil	BL with BR	3-3.7	No display change means open circuit.
	Large lighting generator coil	YL / BK with YL	0.38-0.58	
	Small lighting generator coil	GN / BK with GN	1.85-2.35	
IGNITION COIL	Primary winding	BL no. 14 with BL no. 15	1.8-2.00	Display showing zero (0) means short circuit.
	Secondary winding (spark plug cap removed)	BL no. 15 with high tension wire	7.6- 11.4 K (7600 - 11400)	
SPARK PLUG CAP	Spark plug cap	—	4.5- 5.5 K	

* COLOR CODE

BK - BLACK	GN - GREEN
WH - WHITE	GY - GRAY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN

NIPPONDENSO **CDI** SYSTEM TESTING

(Applicable to 277 Engine Type)

NOTE : Ensure ignition cut-out switches are properly working and they are in the ON position prior to performing the following tests.

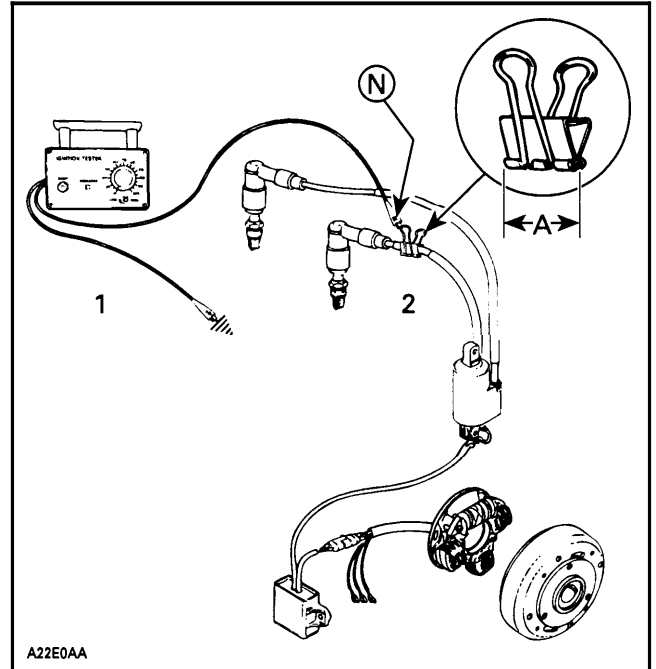
WARNING : To prevent **powerful** electric shocks while cranking engine, do not touch neither electronic ignition components (ignition coil, high tension wire, wire harness, etc.) nor tester leads.

IGNITION COIL OUTPUT

A paper clip of approximately 20 mm (3/4 in) will be used as a test adapter for the following test.

- 1) Clip the test adapter around spark plug cable close to the spark plug.
- 2) Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	Tester adapter (paper clip) on spark plug cable	LOW	45
P	Engine ground		



TYPICAL

1. Engine ground
2. MAG side
- A. 20 mm (3/4 in)

- 3) Crank engine and observe indicator.

NOTE : If engine starts, allow it to idle while observing indicator. Then, shut engine off.

- 4) Push reset button and repeat step 3 twice.

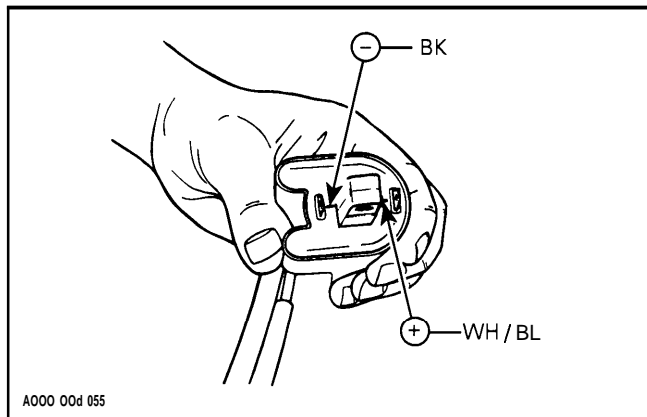
Results :

- a) Indicator lamp lights : Ignition system is OK.
- b) Indicator lamp does not light on one or both cylinder: Proceed to following tests.

IGNITION MODULE OUTPUT

- 1) Disconnect both connectors at ignition coil.
At installation, secure with new locking ties.
- 2) Connect an ignition coil (known as being in good condition) to the spark plug.
- 3) Connect CDI module to replacement ignition coil paying attention to connect the **WHITE/ BLUE** wire to the positive (+) terminal and the **BLACK** wire to the negative (-) terminal.

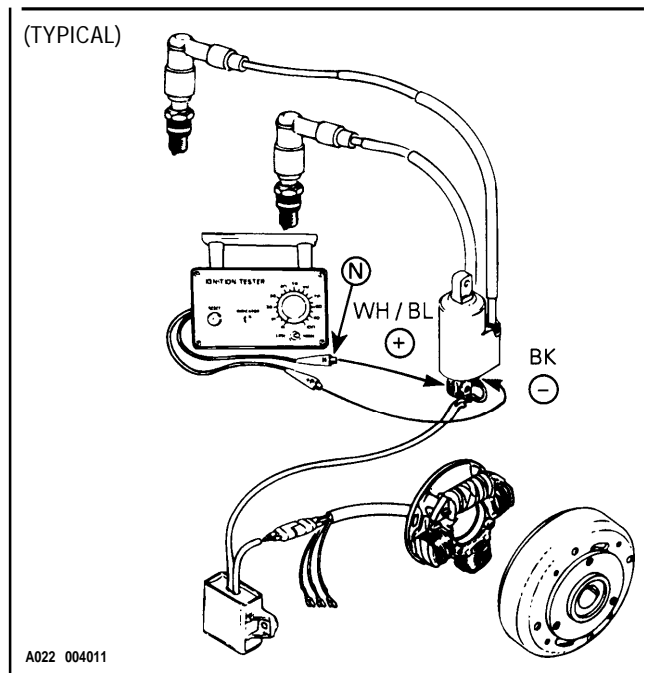
Section 06 ELECTRICAL
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- 4) Slip plastic protectors out of coil terminals,
- 5) Connect tester wires to coil terminals then set switch and dial as follows :

NOTE : If necessary use jumper wires from coil terminals to tester wires.

Tester wires	Component wires	Tester switch position	Tester dial position
N	WHITE / BLUE wire (+) of ignition coil	HIGH	55
P	BLACK wire (-) of ignition coil		



- 6) Crank engine and observe indicator.
- 7) Push reset button and repeat step 6 twice.

Results :

- a) Indicator lamp lights : Ignition module output is up to specifications. The problem is a faulty ignition coil.
- b) Indicator lamp does not light: Proceed to following test. If magneto output tests good, the problem is a faulty ignition module.

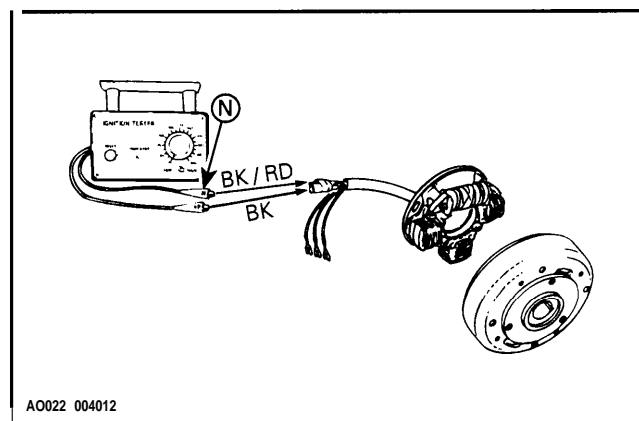
**MAGNETO OUTPUT
 (Ignition Generator Coil)**

- 1) Disconnect the 2-wire connector between ignition module and magneto harness.

At installation, secure with new locking ties.

- 2) Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	BLACK / RED wire of magneto harness	LOW	85
P	BLACK wire of magneto harness		



- 3) Crank engine and observe indicator.
- 4) Push reset button and repeat step 3 twice.

Results :

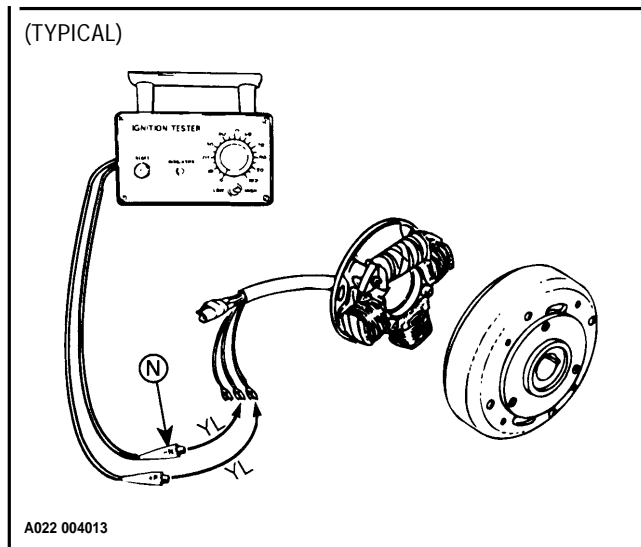
- a) Indicator lamp lights : Ignition generator coil output is up to specifications.
- b) Indicator lamp does not light : The problem is a faulty ignition generator coil.

LIGHTING GENERATOR COIL OUTPUT

NOTE : The lighting generator coil is not part of the ignition system. It is a separate system that supplies current to the lighting system and AC-powered devices. However it can be tested with the same tester.

- 1) Disconnect wiring harness junction block at **engine** (the one with **YELLOW** and **YELLOW** wires).
- 2) Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	YELLOW wire of magneto harness	LOW	70
P	YELLOW wire of magneto harness		



- 3) Crank engine and observe indicator,
- 4) Push reset button and repeat step 3 twice.

Results :

- a) Indicator lamp lights : Lighting generator coil output is up to specifications.
- b) Indicator lamp does not light: Lighting generator coil is faulty.

SUMMARY TABLE

Test to perform	Tester wires	Component wires	Switch	Dial
Ignition coil output	N	Test adapter on MAG spark plug cable	LOW	45
	P	Engine ground		
Ignition module output	N	WHITE / BLUE wire (+) of ignition coil	HIGH	55
	P	BLACK wire (-) of ignition coil		
Magneto output (ignition generator coil)	N	BLACK / RED wire of magneto harness	LOW	85
	P	BLACK wire of magneto harness		
Lighting generator coil output	N	YELLOW wire of magneto harness	LOW	70
	P	YELLOW wire of magneto harness		

Section **06** ELECTRICAL
Sub-Section **06** (TESTING PROCEDURE)

RESISTANCE MEASUREMENTS

As an alternate method, magneto system components can be checked with a digital ohmmeter.

○ NOTE : All resistance measurements must be performed with parts at **room temperature** (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.

Disconnect connectors at ignition coil and magneto junction. Measure resistance between each terminal. Refer to the following table for values and wire colors.

○ NOTE : An ignition coil with good resistance measurement can still be faulty. Voltage leak can occur at high voltage level which is not detectable with an ohmmeter.

Section **06** ELECTRICAL
Sub-Section 06 (TESTING PROCEDURE)

PART NAME		WIRE COLOR*	RESISTANCE OHM	REMARKS
MAGNETO	Ignition generator coil	BK with BK/ RD	40-76	No display change means open circuit. Display showing zero (0) means short circuit.
	Lighting generator coil	YL with YL	0.05 -0.6	
IGNITION COIL	Primary winding	BK with WH / BL	0.11-0.21 (applicable to 277 engine type only)	
			0.34-0,62 (applicable to 503 Alpine II engine only)	
	Secondary winding (spark plug cap removed)	BR with high tension wire (applicable to 277 engine type only)	4.9- 7.5 K (4900 - 7500)	
			9-15 K (9000 - 15000)	
	Insulation	WH / BL with core	$\infty \Omega$	
WH / BL with high tension wire				
SPARK PLUG CAP	Spark plug cap		4.5- 5.5 K	

∞ : Infinity (extremely large number)

*

COLOR CODE	
BK - BLACK	GN - GREEN
WH - WHITE	GR - GRAY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN

DUCATI CDI SYSTEM TESTING (Applicable to 377,443 and 503 Engine Types)

NOTE : Ensure ignition cut-out switches are properly working and they are in the ON position prior to performing the following tests.

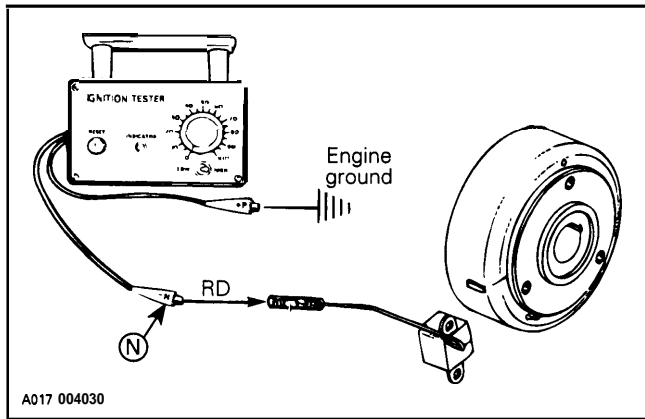
WARNING : To prevent powerful electric shocks while cranking engine, do not touch neither electronic ignition components (ignition coil, high tension wire, wire harness, etc.) nor tester leads.

TRIGGER COIL OUTPUT

- 1) Disconnect the connector of RED wire at ignition module.
- 2) Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	RED wire of trigger coil	LOW	45
P	Engine ground		

- 3) Crank engine and observe indicator,
- 4) Push reset button and repeat step 3 twice.



Results :

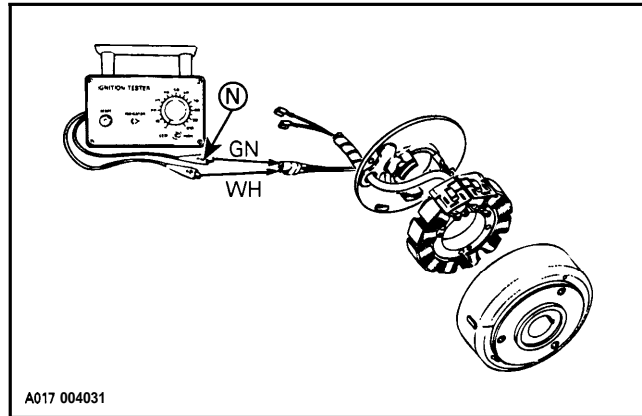
- a) indicator lamp lights : Trigger coil output is up to specifications.
- b) Indicator lamp does not light : The problem is a faulty trigger coil or bad grounding.

MAGNETO OUTPUT

(Ignition Generator Coil)

- 1) Disconnect the 2-wire connector between ignition module and magneto harness.
- 2) Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	GREEN wire of magneto harness	LOW	80
P	WHITE wire of magneto harness		



- 3) Crank engine and observe indicator.
- 4) Push reset button and repeat step 3 twice.

Results :

- a) Indicator lamp lights : Ignition generator coil output up to specifications.
- b) Indicator lamp does not light : The problem is a faulty ignition generator.

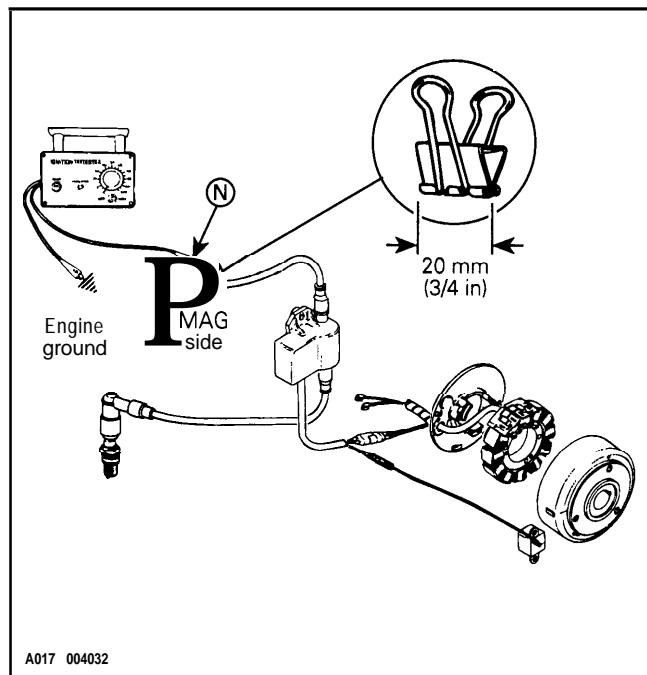
IGNITION COIL OUTPUT

A paper clip of approximately 20 mm (3/4 in) will be used as a test adapter for the following test.

- 1) Clip the test adapter around spark plug cable close to MAG side spark plug.
- 2) Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	Test adapter (paper clip) on spark plug cable	LOW	70
P	Engine ground		

O NOTE : Different reading occurs if N tester wire is connected to PTO side spark plug cable.



A017 004032

- 3) Crank engine and observe indicator.

O NOTE : If engine starts, allow it to idle while observing indicator, Then, shut engine off.

- 4) Push reset button and repeat step 3 twice.

Results :

- a) Indicator lamp lights : Ignition system is OK.
- b) Indicator lamp does not light on one or both cylinder : The problem is a faulty ignition coil/module.

IGNITION MODULE

Ignition module can not be tested with the Bombardier ignition tester. When other components test good, the module is probably faulty. Try a new module.

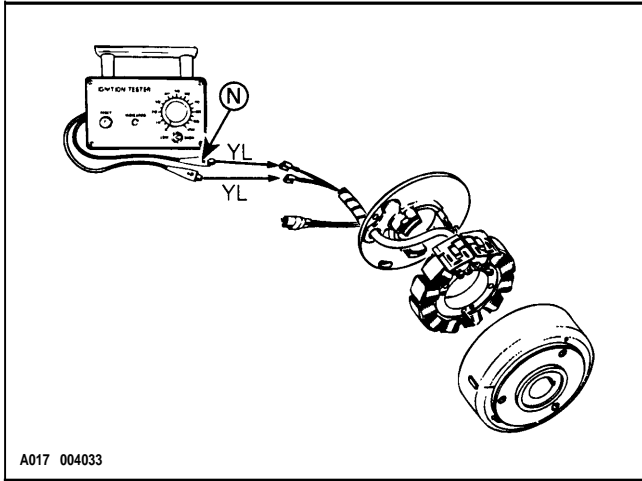
LIGHTING GENERATOR COIL OUTPUT

O NOTE : The lighting generator coil is not part of the ignition system. It is a separate system that supplies current to the lighting system and AC-powered devices, However it can be tested with the same tester.

- 1) Disconnect wiring harness junction block at engine (the one with YELLOW and YELLOW wires).
- 2) Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	YELLOW wire of magneto harness	LOW	80
P	YELLOW wire of magneto harness		

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Sub-Section 06 (TESTING PROCEDURE)



- 3) Crank engine and observe indicator.
- 4) Push reset button and repeat step 3 twice.

Results :

- a) Indicator lamp lights : Lighting generator coil output is up to specifications.
- b) Indicator lamp does not light: Lighting generator coil is faulty.

SUMMARY TABLE

Test to perform	Tester wires	Component wires	Switch	Dial
Trigger coil output	N	RED wire of trigger coil	LOW	45
	P	Engine ground		
Magneto output (ignition generator coil)	N	GREEN wire of magneto harness	LOW	80
	P	WHITE wire of magneto harness		
Ignition coil output	N	Test adapter on MAG spark plug cable	LOW	70
	P	Engine ground		
Lighting generator coil output	N	YELLOW wire of magneto harness	LOW	80
	P	YELLOW wire of magneto harness		

RESISTANCE MEASUREMENTS

As an alternate method, magneto system components can be checked with a digital ohmmeter.

○ NOTE : All resistance measurements must be performed with parts at room temperature (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.

Disconnect connector at ignition coil and magneto junction. Measure resistance between each terminal. Refer to the following table for values and wire colors.

○ NOTE : An ignition coil with good resistance measurement can still be faulty. Voltage leak can occur at high voltage level which is not detectable with an ohmmeter.

PART NAME		WIRE COLOR*	RESISTANCE OHM	REMARKS
MAGNETO	Trigger coil	RD with engine ground	140-180	No display change means open circuit.
	Ignition generator coil	WH with GN	230-330	
	Lighting generator coil	YL with YL	0.23-0.28	
SPARK PLUG IGNITION COIL	Secondary winding ① (spark plug cap removed)	End of each high tension wire	9.3- 10.5 K (9300 -10500)	Display showing zero (0) means short circuit.
	Spark plug cap	—	4.5- 5.5 K	

① The primary winding of ignition coil can not be measured because there is no external connection.

COLOR CODE	
BK - BLACK	GN - GREEN
WH - WHITE	GY - GRAY
RD - RED	VI - VIOLET
BL - BLUE	OR - ORANGE
YL - YELLOW	BR - BROWN

VOLTAGE REGULATOR INSPECTION

A faulty voltage regulator is often responsible for frequent burned bulbs.

▼ **CAUTION** : Never run an engine with a faulty or inoperative voltage regulator. This could damage the DUCATICDI module.

TESTING PROCEDURE

The regulator ground must be checked to ensure the circuit is complete. If necessary, connect a good ground wire from the regulator to the engine.

A) Quick Test Without Voltmeter

▼ **CAUTION** : Do not perform this test on engines that have a DUCATICDI system.

If a voltmeter is not available, a visual test can be performed with satisfactory results,

Disconnect all lights and electric equipment.

While engine is running, disconnect and connect regulator connector several times checking for a spark.

A spark on regulator terminal indicates a good and working regulator.

B) Voltmeter **Test**

○ **NOTE** : Use a voltmeter able to read alternating current (AC). For accurate reading, use a RMS voltmeter.

Connect a wire of the voltmeter to a BLACK/YELLOW wire.

Connect the other wire of the voltmeter to a YELLOW wire.

Lift the rear of vehicle and support with a mechanical stand.

Start the engine at an idle without opening the throttle.

◆ **WARNING** : Ensure the track is free of particles which might be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no-one is standing in close proximity to the vehicle.

Slowly open the throttle and accelerate the engine to increase the RPM.

If the meter reads over 15 volts, the regulator is defective and must be replaced.

▼ **CAUTION** : Do not increase the RPM so the voltage exceeds 15 V as the bulb(s) will burn.

○ **NOTE** : Whatever the voltmeter type used (peak voltage or RMS) the voltage must not exceed 15 V (a defective regulator will allow voltage to exceed 15 V as engine RPM is increased).

INSPECTION OF AC CIRCUIT ISOLATION

All Electric Start Models

If AC circuit is not isolated from frame, headlamp beam will weaken.

INSPECTION

Disconnect regulator / rectifier.

Connect one digital ohmmeter probe (needle ohmmeter will not offer enough precision) to frame and other probe to one of 2 yellow magneto wires.

Measured resistance must be infinite. If such is not the case, it means there is a connection between AC circuit and DC circuit.

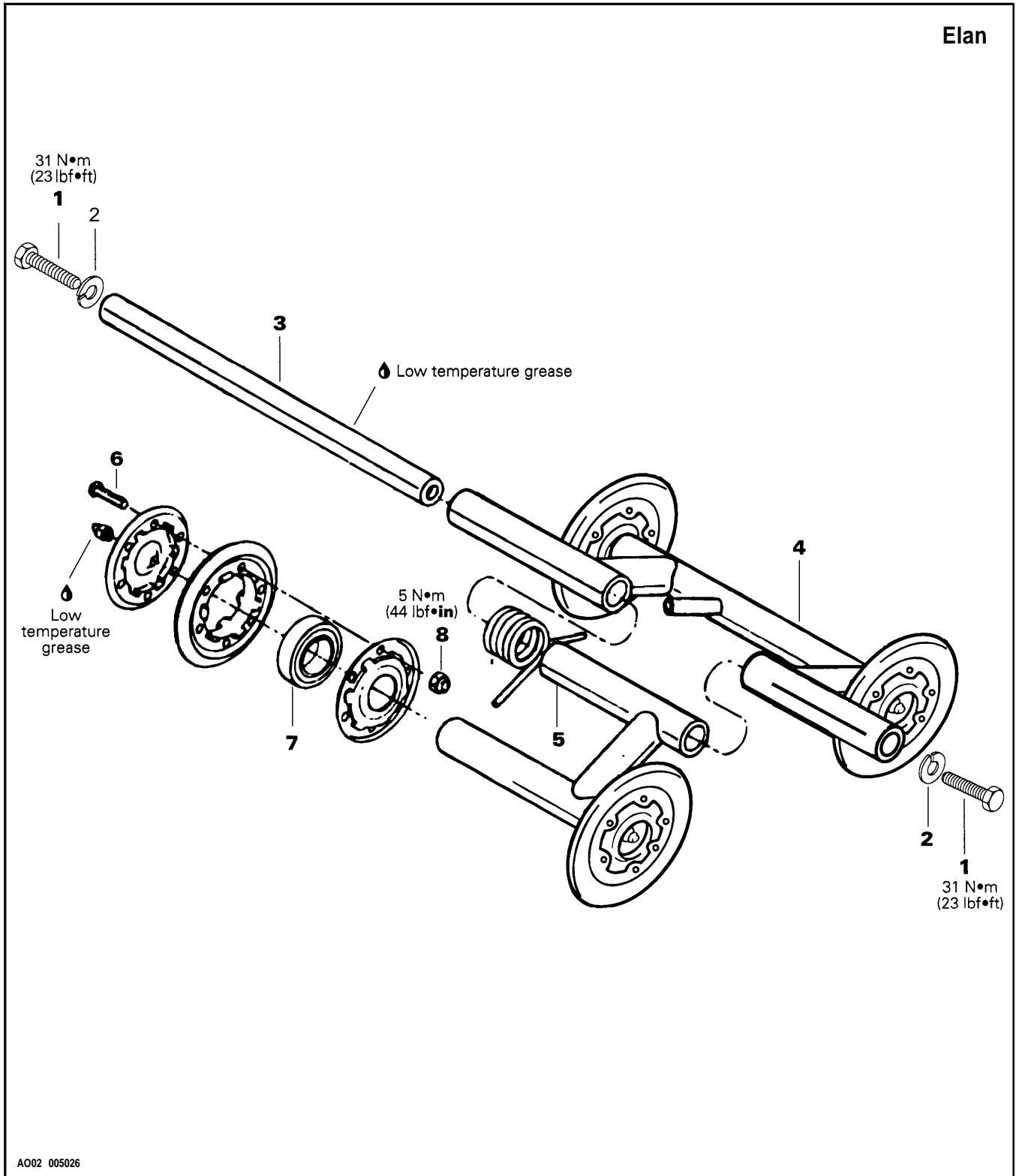
Disconnect one accessory at the time to identify the faulty circuit.

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BOGIE WHEELS

Elan



A002 005026

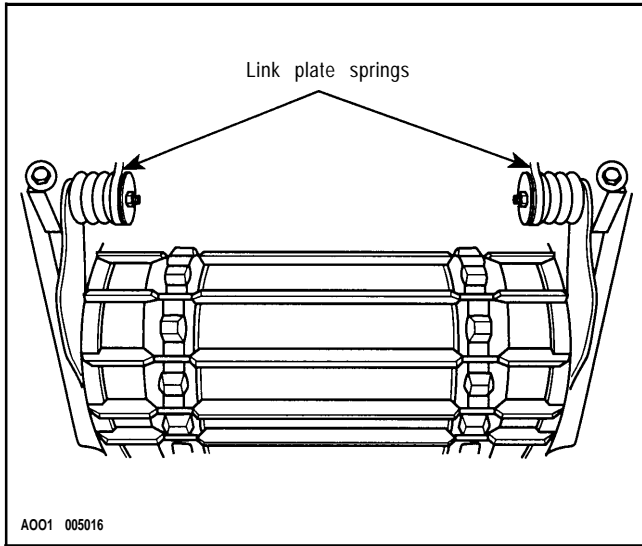
Section 07 REAR SUSPENSION

Sub-Section 01 (BOGIE WHEELS)

REMOVAL

Raise and block rear of vehicle off the ground.

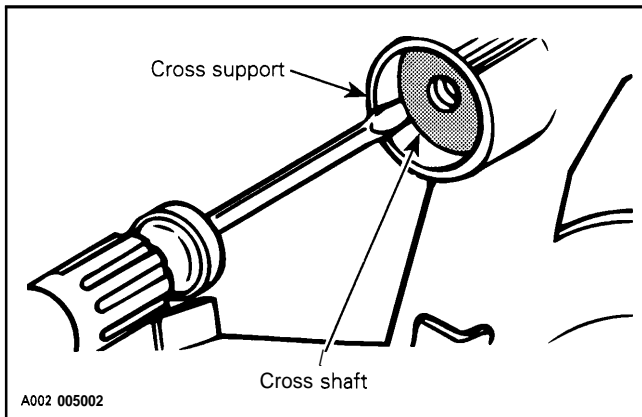
Release track tension by unlocking the link plate springs using an appropriate tool.



1,2,3, Screw, Lock Washer and Cross Shaft

Starting at center bogie wheel set, remove screws 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 on 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 AND ASSEMBLY

4,5, Side and Center Wheel Supports

Heat spring anchor on wheel support before attempting to open or close anchor.

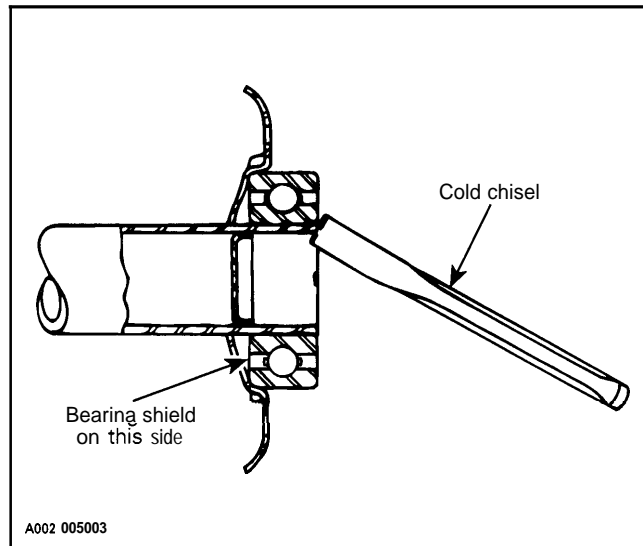
3, Cross Shaft

Clean then lubricate cross shaft with low temperature grease (P/ N 4137061 00) before installation.

4,5,7, Wheel Support and Bearing

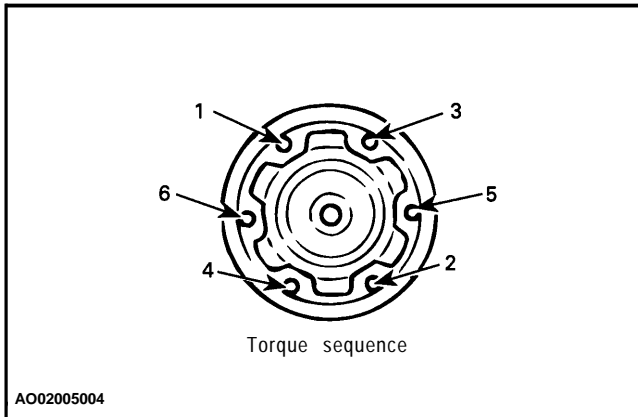
Always pull or push bearing by inner race. When installing bearing on wheel support, position bearing shield towards inner flange, then press down until bearing is sitting flush with support end.

Then notch (3 notches) wheel support with a cold chisel to secure the bearing in place.



6,8, Bolt and Nut

Bogie wheels are factory riveted. When separation is necessary, remove rivets securing wheel tire and flanges using a 3/16 in dia. drill. Secure flanges and tire using bolts (1/4-20 x 3/4 in) and nuts. Tighten in the following sequence to 5 N•m (44 lbf•in).

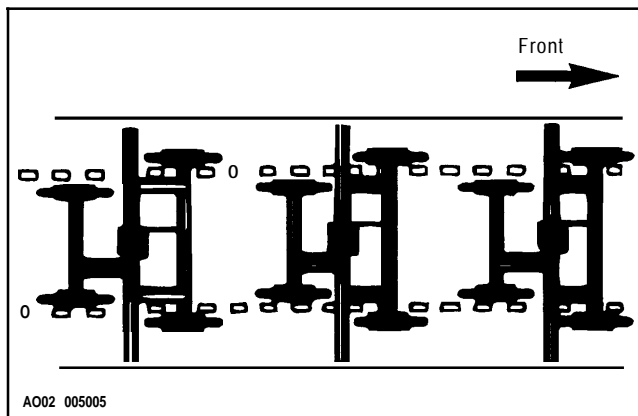


INSTALLATION

1,2,3, Screw, Lock Washer and Cross Shaft

With rear of vehicle supported off the ground, position front bogie wheel set and secure to frame using lock washers and screws, Secure rear set then remaining set to frame.

○ NOTE : The side wheel supports should be towards the front of the vehicle.

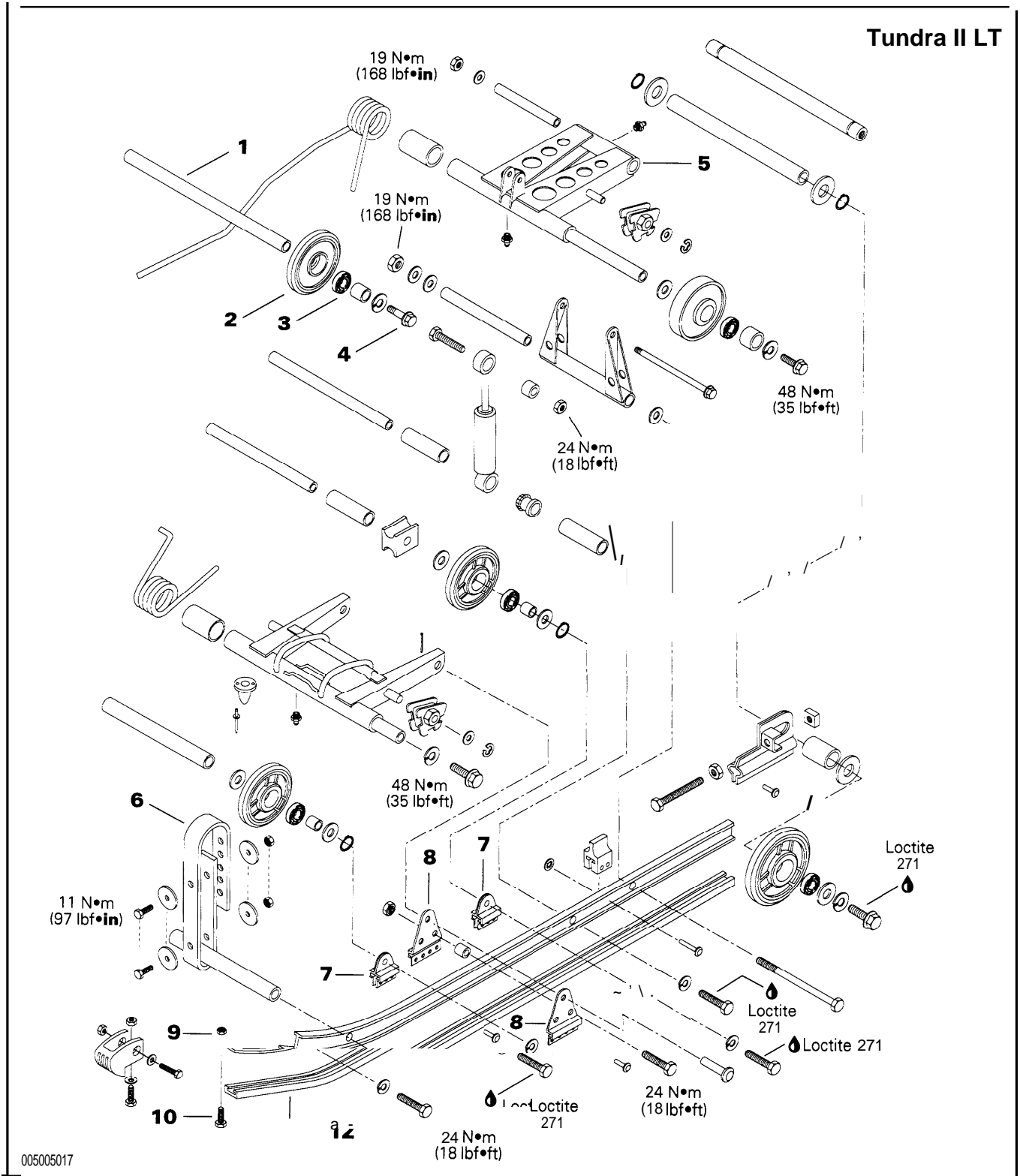


Using an appropriate tool, apply track tension by hooking the link plate springs into the anchors.

Lubricate each bogie wheel until new grease appears at joint. Wipe off excess of grease (grease P / N 413 7061 00).

○ NOTE : To adjust the track tension and alignment refer to TRACK 07-09.

TORQUE REACTION SUSPENSION



Section 07 REAR SUSPENSION

Sub-Section 02 (TORQUE REACTION SUSPENSION)

COMPONENT REMOVAL

Lift rear of vehicle and support it off the ground.

5, Rear Arm

Release spring tension. Unfasten shock from rear arm. Remove 3 screws retaining rear arm.

REMOVAL

NOTE : To prevent cross shaft from turning when unscrewing screws assembled with thread locker, proceed as follows :

- Loosen one screw then retighten.
- Remove the other screw.
- Remove the first one.

1,2,3,4, Cross Shaft, Idler Wheel, Spacer and Screw

Remove idler wheel ass'y.

Lift rear of vehicle and support it off the ground.

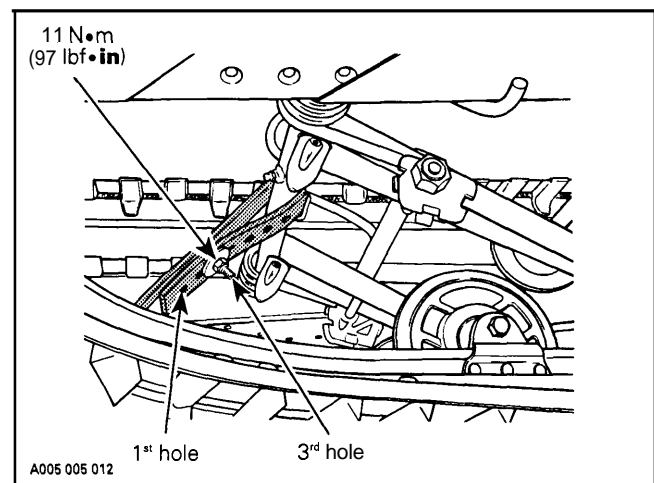
Unscrew 4 screws retaining front arm and rear arm to frame.

Remove suspension.

DISASSEMBLY AND ASSEMBLY

6, Stopper Strap

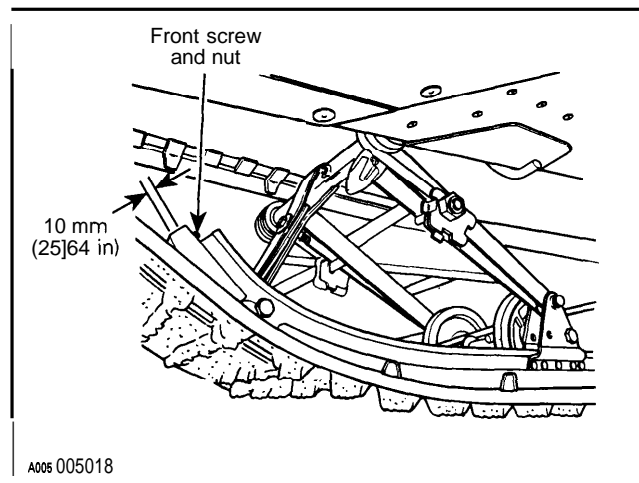
Inspect strap for wear or cracks, bolt and nut for tightness. If loose, inspect hole for deformation. Replace as required. Make sure it is attached through the 3rd hole from the end. Torque nut to 11 N•m (97 lbf•in).



9,10,12, Nut, Slotted Screw and Slider Shoe

To replace a worn shoe, remove the front screw and stop nut, then slide the shoe rearward out of the runner.

NOTE : Slider shoe minimum thickness : 10 mm (25/64 in).

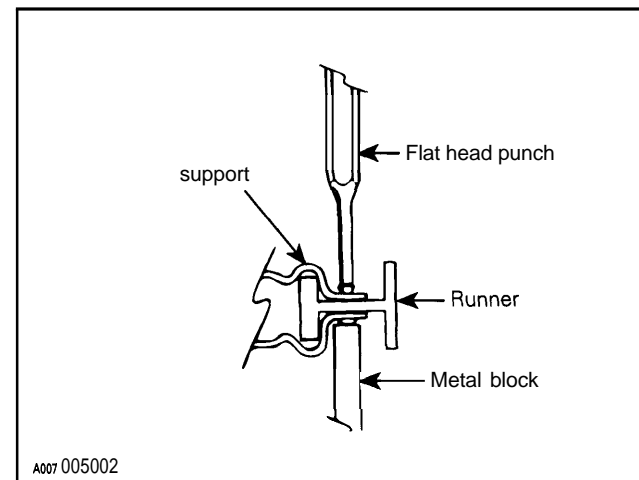


CAUTION : Slider shoes must always be replaced in pairs.

7,8, Support and Front Arm Support

To remove rivets securing the supports, cut rivet heads off using a cold chisel.

At assembly, position the rivet head toward the outside of the assembly. Support the rivet head against a metal block, as shown, and use a flat head punch to secure the rivet in place.



Section 07 REAR SUSPENSION
Sub-Section 02 (TORQUE REACTION SUSPENSION)

NOTE : Rivets can be substituted with 3/16 in x 3/4 in long screws and flanged elastic stop nuts. Always position screw head outside the assembly.

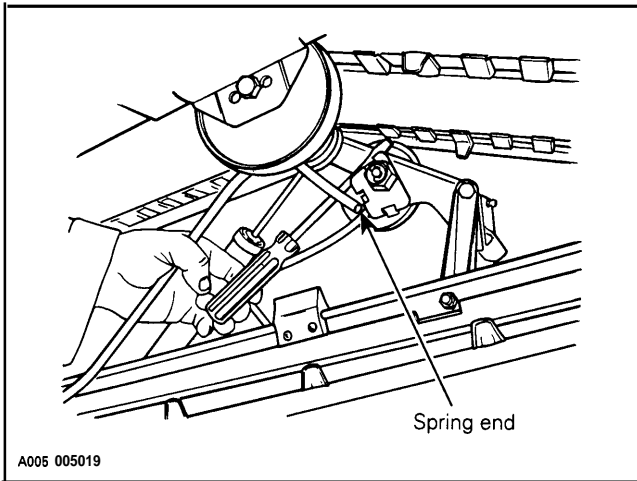
INSTALLATION

Release rear spring tension then install assembled suspension into track with front portion first.

Insert rear portion of suspension into track,

Bolt suspension to tunnel.

Pry rear spring end onto cam,



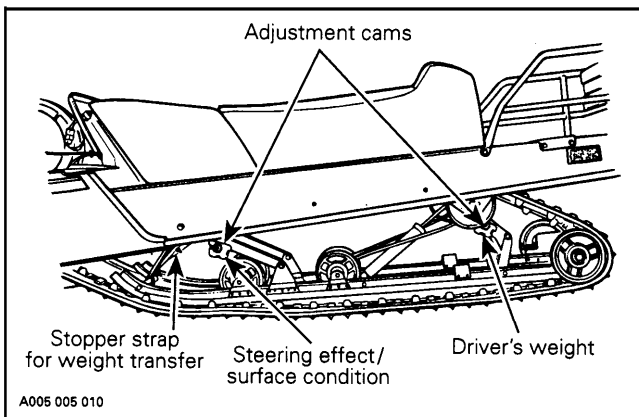
Adjust track tension / alignment. Refer to TRACK 07 06.

RIDE ADJUSTMENT

The front portion of rear suspension is adjustable for surface condition and steering effects.

The stopper strap is adjustable for vehicle weight transfer control.

The rear portion of rear suspension is adjustable for driver's weight.

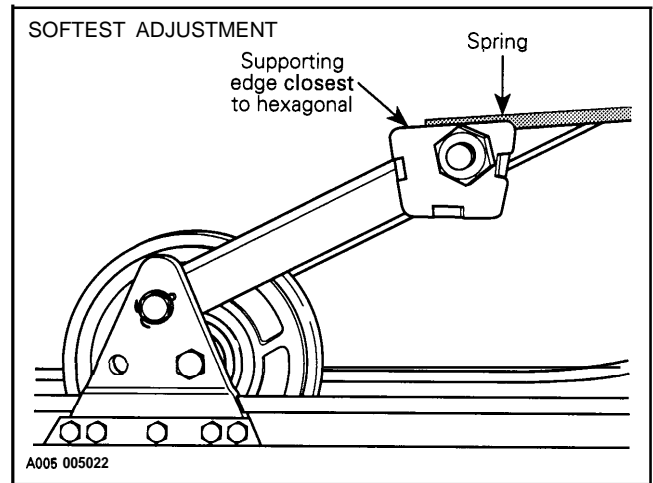


Choice of suspension adjustments depends on carrying load, driver's weight, personal preference, riding speed and field condition.

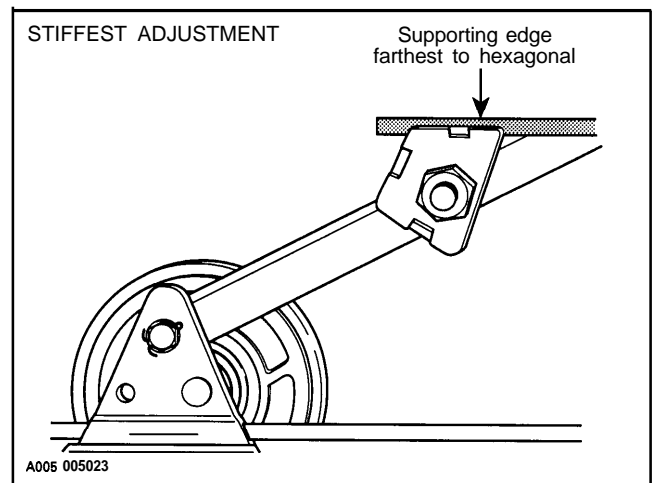
Slight suspension bottoming occurring under the worst riding conditions indicates a good choice of spring preload.

To adjust rear suspension adjustment cams, use special key supplied in vehicle tool box.

Turning adjustment cam moves edges of cam supporting spring rod. The softest adjustment is reached when the supporting edge of cam is the closest to hexagonal portion of cam.

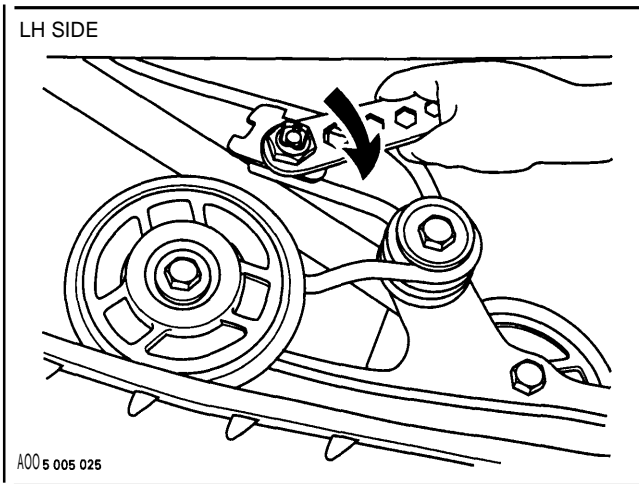
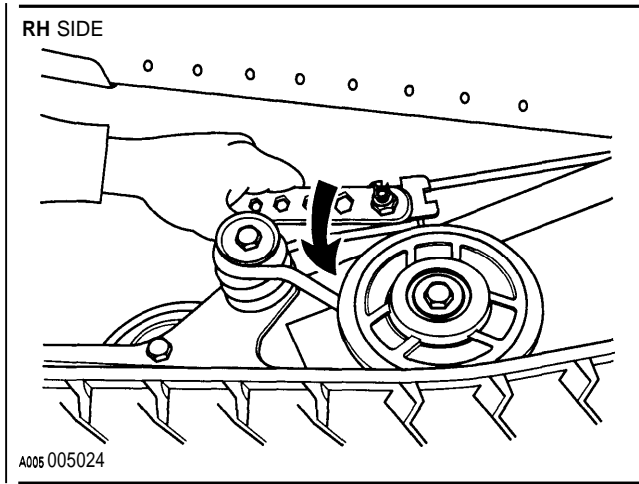


The stiffest adjustment is reached when the supporting edge of cam is the farthest to hexagonal portion of cam.



CAUTION : Always turn the left side adjustment cams in a clockwise direction and the right side cams in a counterclockwise direction. Left and right adjustment cams must always be set at the same position.

Section 07 REAR SUSPENSION
 Sub-Section 02 (TORQUE REACTION SUSPENSION)



- Turn adjustment cam by hand to the desired position.
- Reinstall spring on its support making sure that it sits in the groove of support.

Stopper Strap

The function of the stopper strap is to control the transfer of vehicle weight during acceleration and to control track lead angle.

The longer the belt, the more the weight will be transferred to the track to provide a better traction. The shorter the belt, the lesser the weight transferred to the track, thus maintaining a more positive steering.

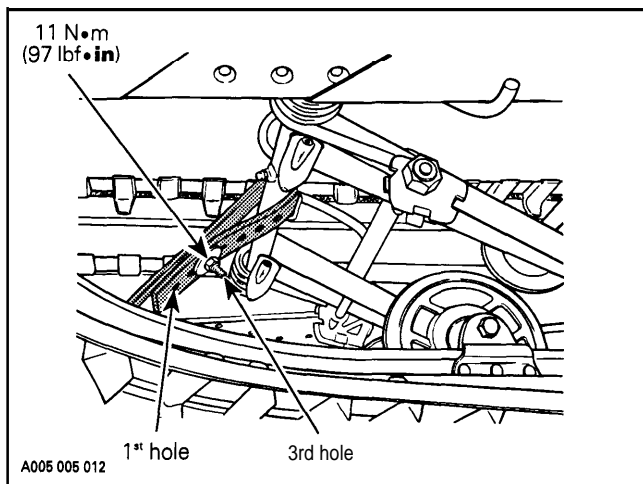
The longer the belt, the greater will be the track lead angle. A shorter belt will reduce track lead angle which may help when negotiating a particular snow condition.

Adjusting holes on the stopper strap allow to adjust it according to driver's requirements, field and /or snow conditions.

CAUTION : Whenever stopper strap length is changed, track tension must be readjusted to prevent any possibility of operating vehicle with a too loose or too tight track tension.

For normal use, locate bolt through 3rd hole from strap end.

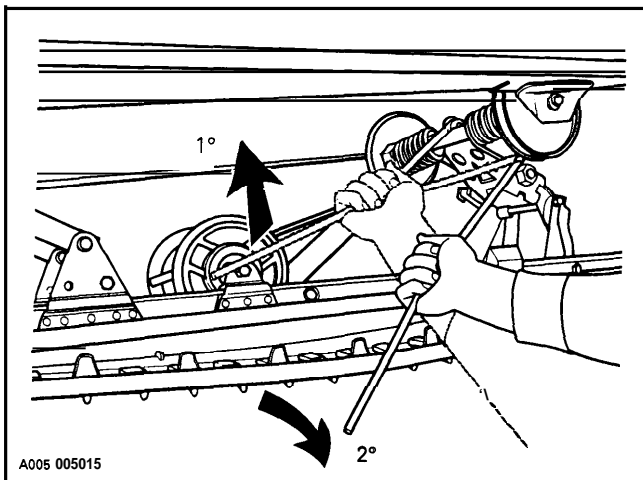
WARNING : Always torque the nut to 11 N•m (97 lbf•in). Replace strap if worn or torn.



NOTE : When towing a load, it is suggested to adjust stopper strap to its shortest length, soften front springs of rear suspension and stiffen rear springs. These adjustment will improve steering ability.

NOTE : To quickly change rear cam position without using any tool :

- Lay vehicle on its side.
- Unhook rear spring by hand from lower idler wheel.



Deep Snow Operation

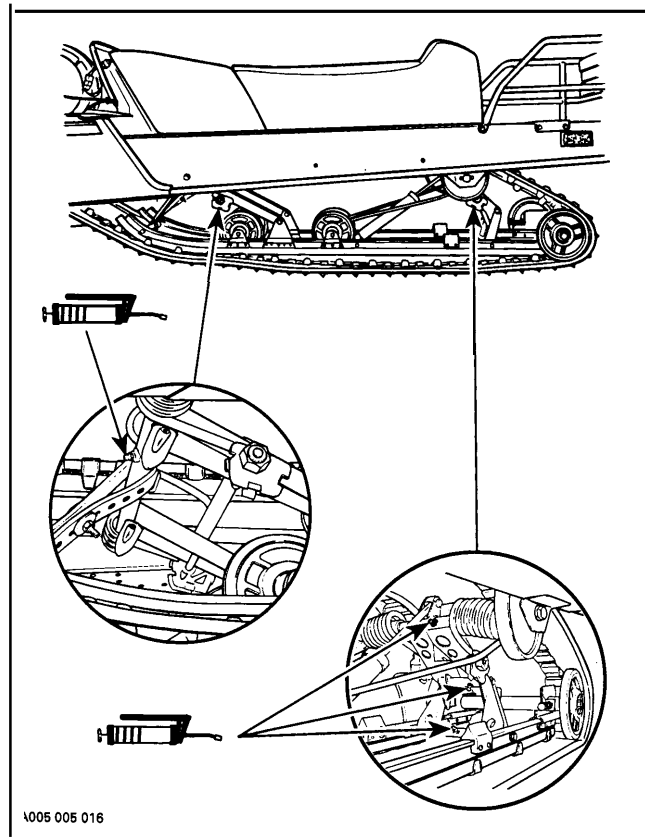
When operating the vehicle in deep snow, it may be necessary to change position of adjustment cams, stopper strap and /or driver's riding position, to change the angle at which the track rides on the snow. Operator's familiarity with the various adjustments as well as snow conditions will dictate the most efficient combination.

LUBRICATION

Lubricate front and rear arms at grease fittings using low temperature grease (P/ N 4137061 00).

NOTE : There are 4 grease fittings.

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Section **07** REAR SUSPENSION
Sub-Section **03 (SC-IO SPORT AND TOURING SUSPENSION)**

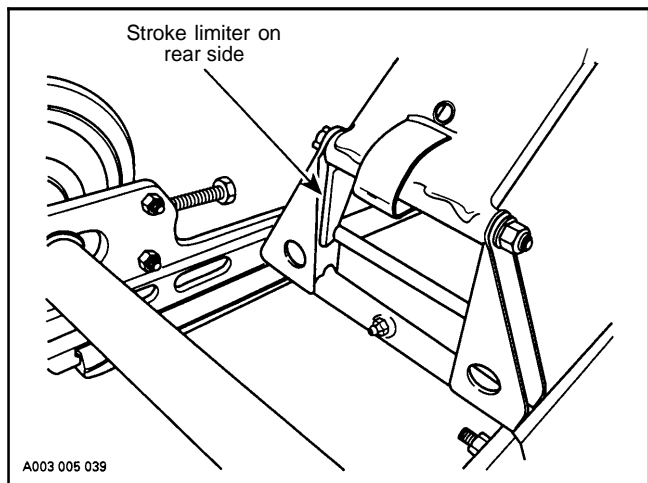
COMPONENT REMOVAL AND INSTALLATION

Lift rear of vehicle and support it off the ground.

1, Rear Arm

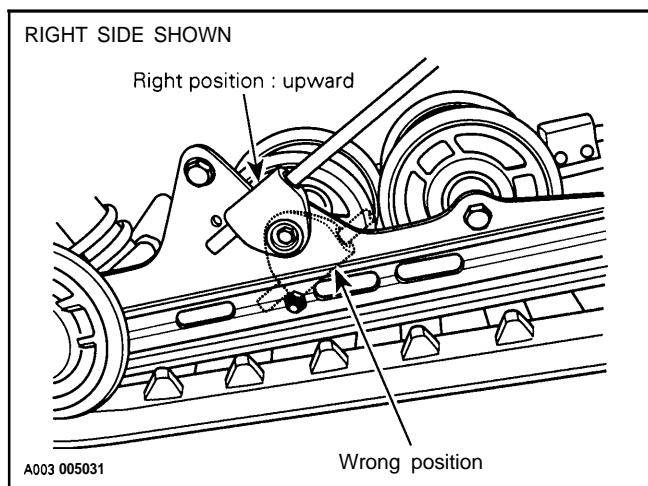
Release spring tension by unfastening spring support. Unfasten shock from rear arm. Remove 3 screws retaining rear arm.

At installation, rear arm stroke limiter must be behind shackle.



18, Spring Support

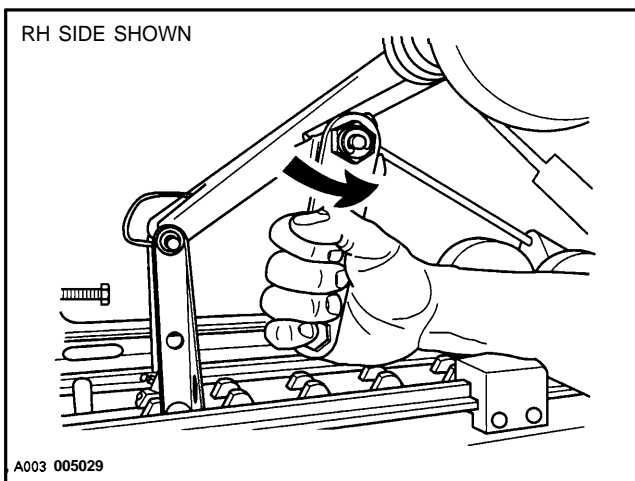
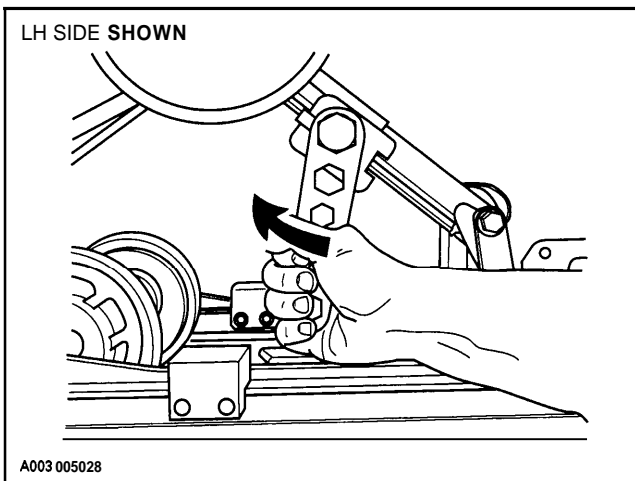
CAUTION : To avoid track damage, spring supports must be mounted upward.



REMOVAL

19, Cam

Decrease spring preload by turning LH cam clockwise and RH cam counterclockwise.



Lift rear of vehicle and support it off the ground. Block suspension in place.

2,3,4,5,6,18, Spring, Washer, Idler Wheel, Spacer, Screw and Spring Support

Unbolt spring support from runner while retaining spring end. Move spring end rearward to completely release spring preload. Proceed with the other side.

Unscrew both rear arm screws.

Section **07** REAR SUSPENSION
Sub-Section **03** (SC-IO SPORT AND TOURING SUSPENSION)

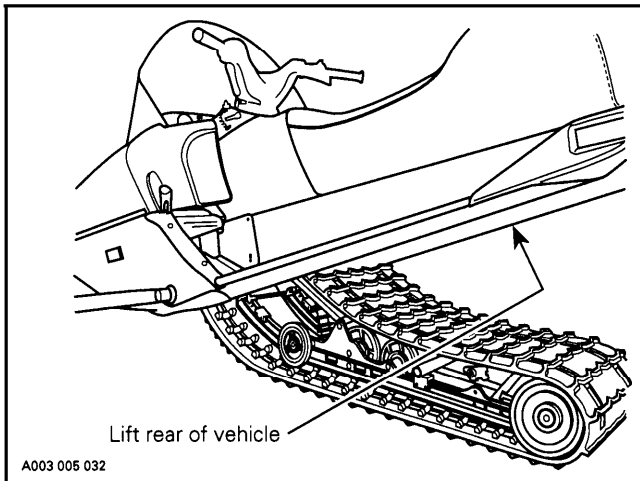
NOTE : To prevent cross shaft from turning when unscrewing screws assembled with thread locker, proceed as follows :

- Knock on screw head and/or heat to break thread-locker bond.
- Loosen one screw then retighten.
- Remove the opposite screw.
- Remove the first one.

7, Screw

Unscrew center idler wheel axle from tunnel then remove.

Lift rear of vehicle until spacers, idler wheels, washers and springs can be removed.



6, Screw

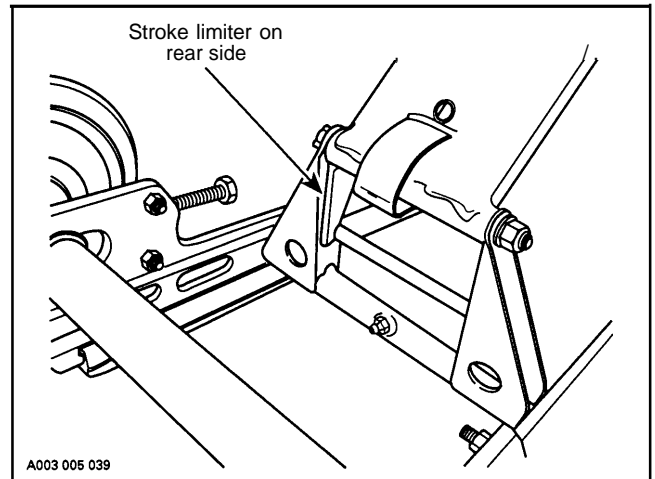
Remove both screws retaining front arm to tunnel.
Remove suspension.

DISASSEMBLY AND ASSEMBLY

Inspect track thoroughly before reinstalling suspension.
Refer to 07-06 TRACK.

1, Rear Arm

At installation, rear arm stroke limiter must be on rear side.

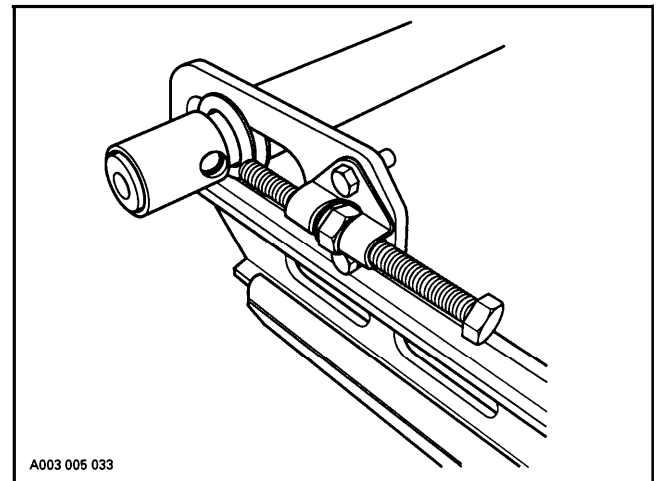


8,9, Pivot Arm and Flat Washer

At installation pivot arm grease fitting must face rearward. Small washer must be against-nut. Large washers must be inside rails on both side.

10, Outer Bushing

At installation, hole must face adjustment screw.



11, Axle

Note position of axles at disassembly. Axles with a paint stripe serve as idler wheel axles. These are more precise than those used as pivot axles. Idler wheel axles can be used as pivot axles but the opposite is not true.

Section 07 REAR SUSPENSION

Sub-Section 03 (SC-IO SPORT AND TOURING SUSPENSION)

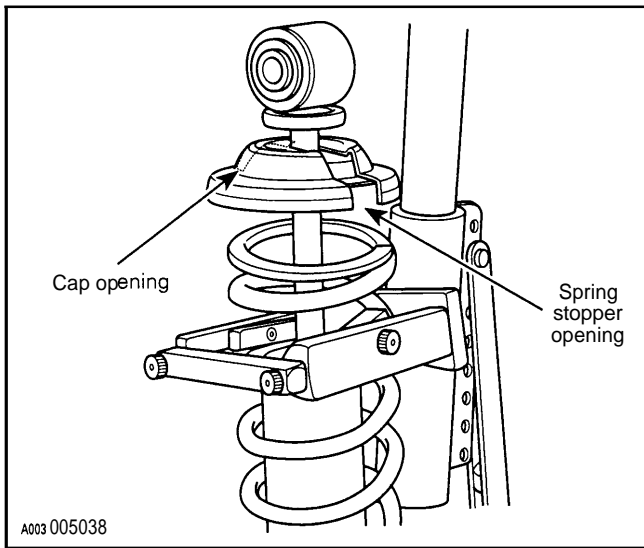
12,13,14, Front Shock, Spring Stopper and Cap

Use shock spring remover (P/ N 5290271 00) in a vise, Mount shock in it and turn shock so that spring coils matched spring compressor.

Close and lock bar. Adjust handle horizontal by changing position of clevis pin.

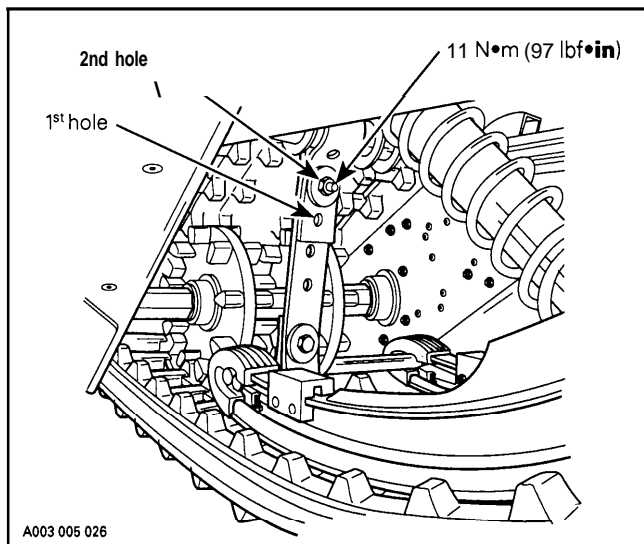
Push down on handle until it locks. Remove spring stopper and cap then release handle.

At installation, cap opening must be 180° from spring stopper opening.



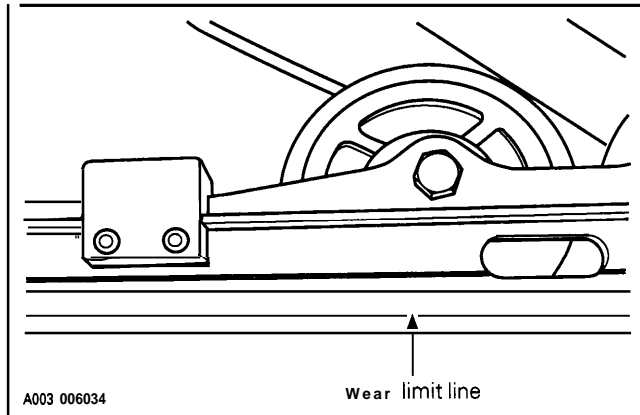
20, Stopper Strap

Inspect strap for wear or cracks, bolt and nut for tightness. If loose, inspect hole for deformation. Replace as required. Make sure it is attached through the 2nd hole from the end. Torque nut to 11 N•m (97 lbf•in).



17, Slider Shoe

Replace slider shoes when it is worn to the line.



CAUTION : Slider shoes must always be replaced in pairs.

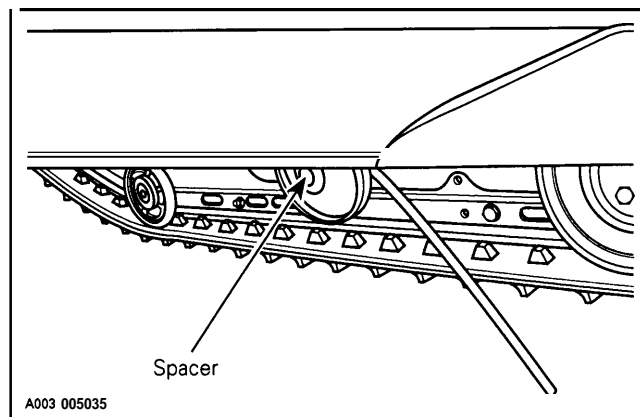
INSTALLATION

Do not install rear spring yet. Install assembled suspension into track with front portion first.

Insert rear portion of suspension into track.

2,3,4,5,6 Spring, washer, idler wheel, spacer and screw

On each side, install rear spring, washer, idler wheel, spacer then bolt that axle to tunnel.

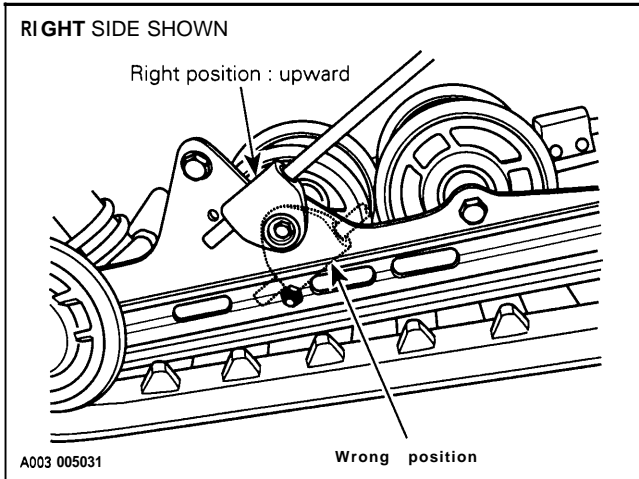


18, Spring Support

Install spring supports to rails.

CAUTION : To avoid track damage, spring supports must be mounted upward.

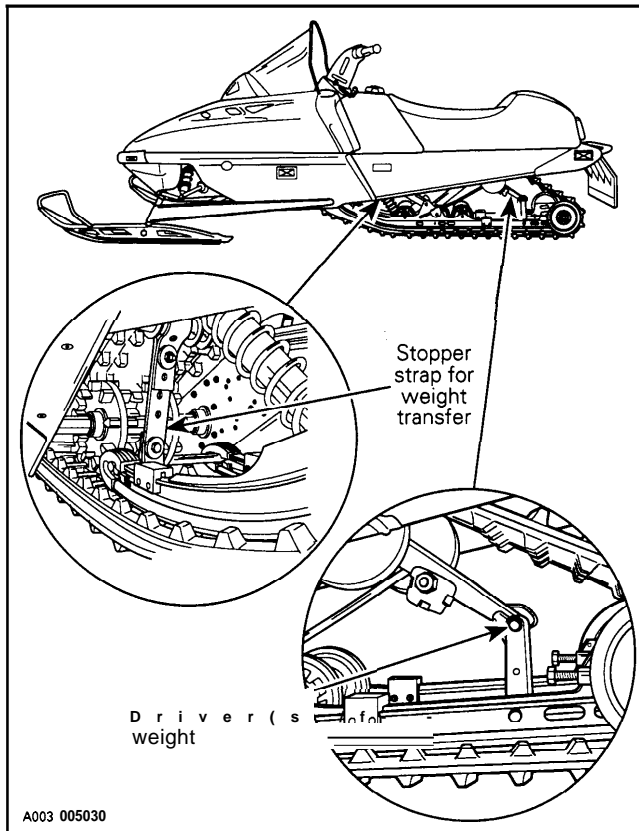
Section 07 REAR SUSPENSION
Sub-Section 03 (SC-IO SPORT AND TOURING Suspension)



RIDE ADJUSTMENT

The stopper strap is adjustable for vehicle weight transfer control.

The rear portion of rear suspension is adjustable for driver's weight.



Choice of suspension adjustments depends on carrying load, driver's weight, personal preference, riding speed and field condition.

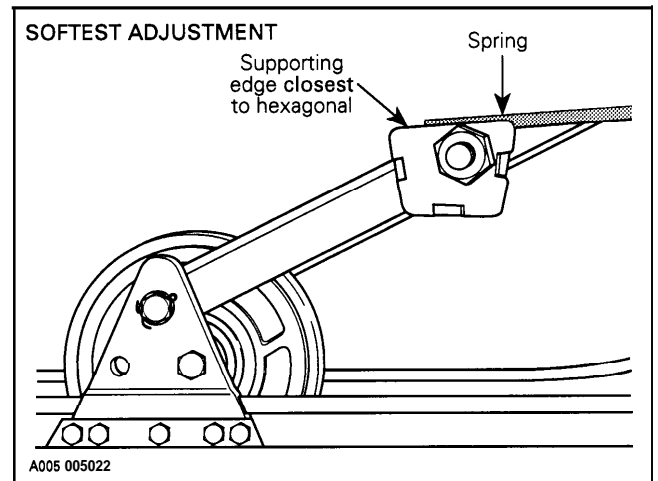
Rear Suspension Setting Table

Cam position	Soft —————> Stiff
Operator's weight	Light —————> Heavy
Riding speed	Low —————> High
Field condition	Flat —————> Bumpy

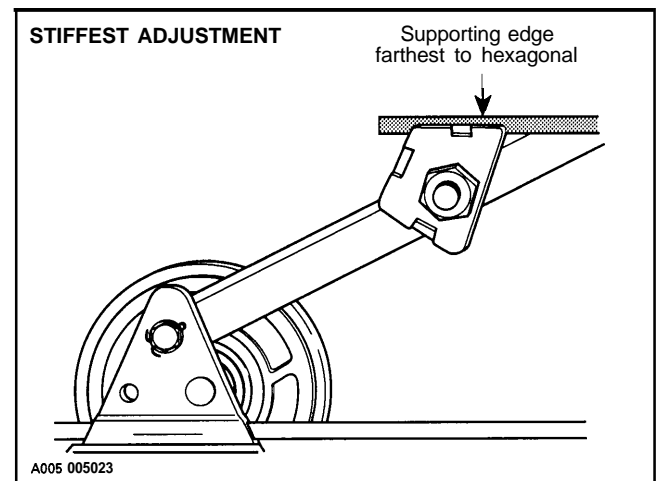
Slight suspension bottoming occurring under the worst riding conditions indicates a good choice of springs preload.

To adjust rear suspension adjustment cams, use multi wrench supplied in vehicle tool box.

Turning adjustment cam moves edges of cam supporting spring rod. The softest adjustment is reached when the supporting edge of cam is the closest to hexagonal portion of cam.



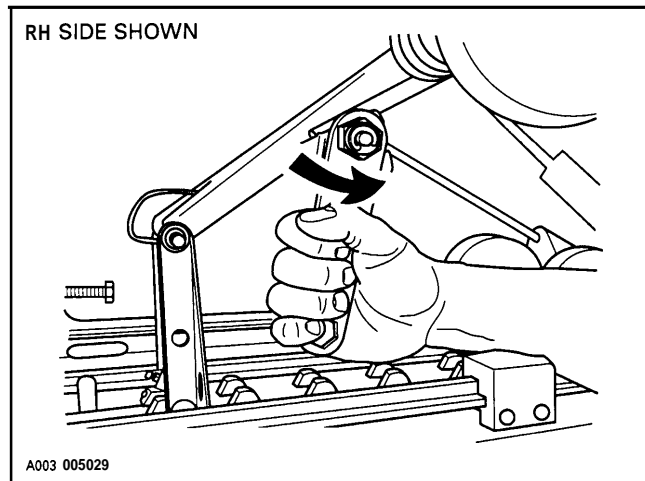
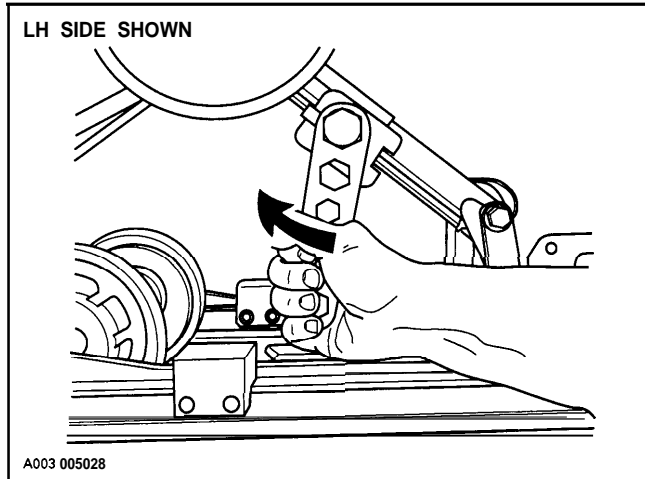
The stiffest adjustment is reached when the supporting edge of cam is the farthest to hexagonal portion of cam.



Section 07 REAR SUSPENSION

Sub-Section 03 (SC-IO SPORT AND TOURING SUSPENSION)

▼ **CAUTION :** Always turn the left side adjustment cams in a clockwise direction and the right side cams in a counterclockwise direction. Left and right adjustment cams must always be set at the same position.



Stopper Strap

The function of the stopper strap is to control the transfer of vehicle weight during acceleration and to control track lead angle.

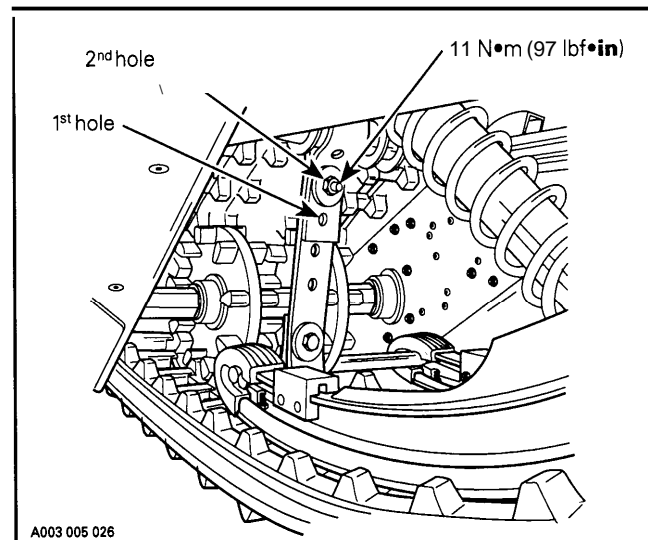
The longer the belt, the more the weight will be transferred to the track to provide a better traction. The shorter the belt, the lesser the weight transferred to the track, thus maintaining a more positive steering.

The longer the belt, the greater will be the track lead angle. A shorter belt will reduce track lead angle which may help when negotiating a particular snow condition.

Adjusting holes on the stopper strap allow to adjust it according to driver's requirements, field and /or snow conditions.

▼ **CAUTION :** Whenever stopper strap length is changed, track tension must be readjusted to prevent any possibility of operating vehicle with a too loose or too tight track tension.

For normal use, locate bolt through 2nd hole from strap end.



◆ **WARNING:** Always torque the nut to 11 N•m (97 lbf•in). Replace strap if worn or torn.

○ **NOTE :** When towing a load, it is suggested to adjust stopper strap to a shorter length and stiffen rear springs. These adjustment will improve steering ability.

Deep Snow Operation

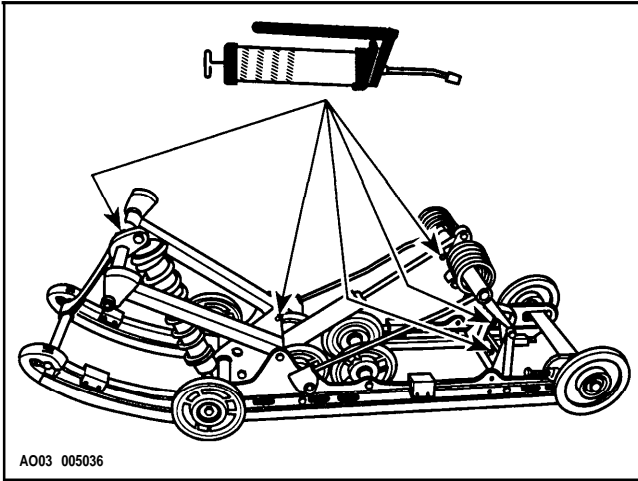
When operating the vehicle in deep snow, it may be necessary to change position of adjustment cams, stopper strap and /or driver's riding position, to change the angle at which the track rides on the snow. Operator's familiarly with the various adjustments as well as snow conditions will dictate the most efficient combination.

Section 07 REAR SUSPENSION
Sub-Section 03 (SC-IO SPORT AND TOURING SUSPENSION)

LUBRICATION

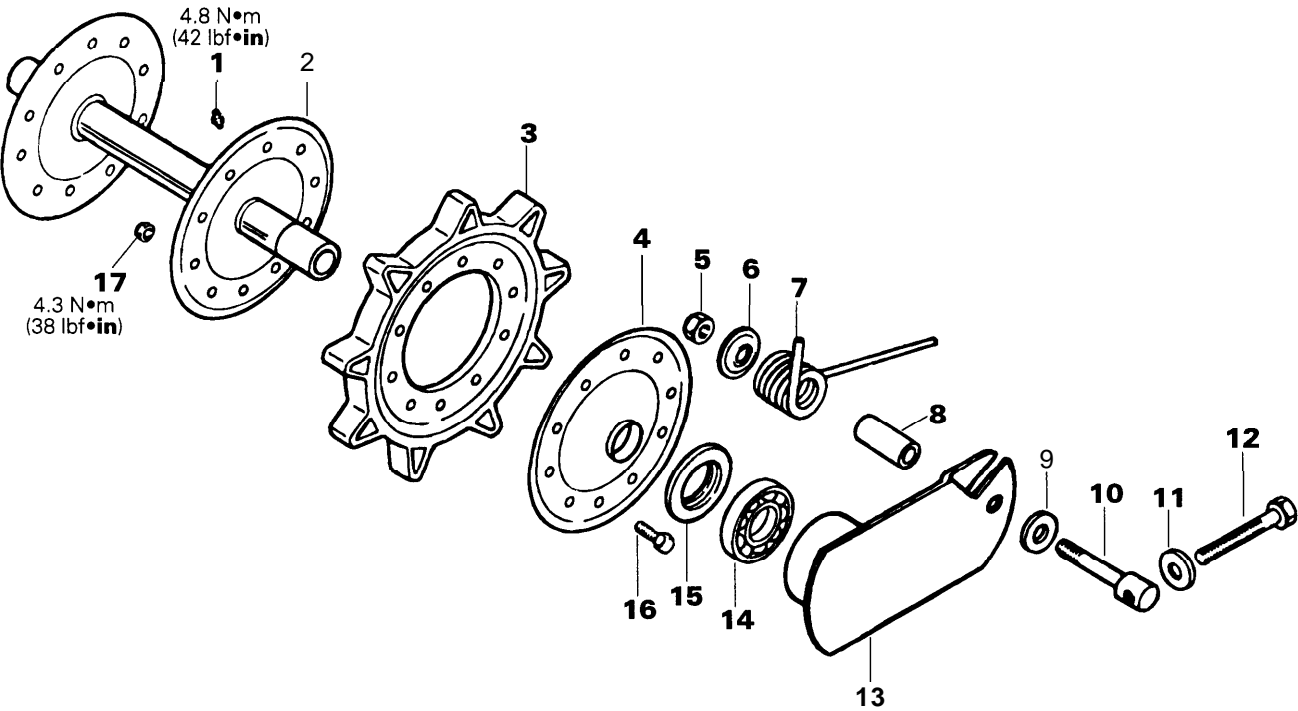
Lubricate front and rear arms at grease fittings using low temperature grease (P/ N 4137061 00).

○ NOTE :Thereare5 grease fittings.



REAR AXLE

Elan



Section 07 REAR SUSPENSION

Sub-Section 04 (REAR AXLE)

REMOVAL

Lift and support rear of vehicle.

7, Link Plate Spring

Using an appropriate tool, unlock link plate springs,

5,6, Retaining Washer and Locking Nut

Remove spring locking nut and retaining washer from both link plates.

8,9,10,11,12, Sleeve, Hardened Washer, Eye Bolt, Washer and Adjusting Bolt

Remove track adjusting bolts, eye bolts, hardened washers and adjusting sleeves.

Withdraw rear axle from vehicle.

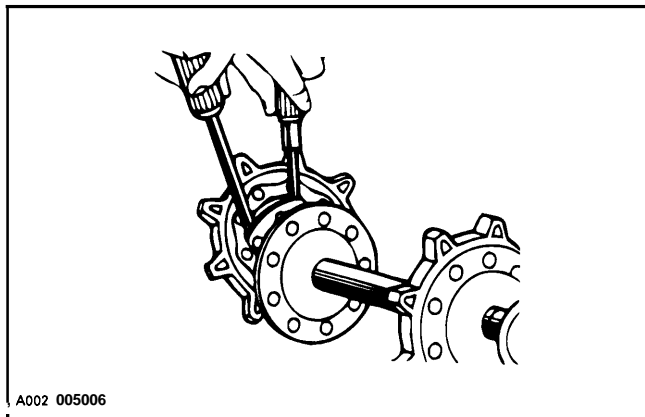
DISASSEMBLY AND ASSEMBLY

3, Sprocket

Sprockets are factory riveted. When separation is necessary, remove rivets securing sprocket with a 1/4 in diameter drill bit.

To remove sprocket without removing bearing, apply liquid soap or petroleum jelly on sprocket bead and flange. Using 2 screwdrivers or tire irons, carefully pry sprocket over the flange as shown.

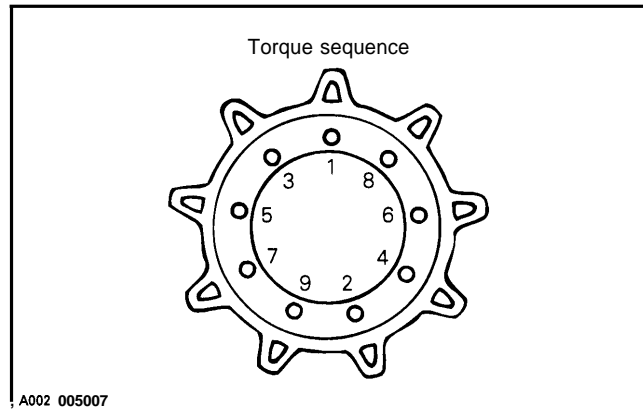
Reverse procedure to install sprocket.



2,3,4,16,17, Rear Axle, Sprocket, Flange, Bolt and Nut

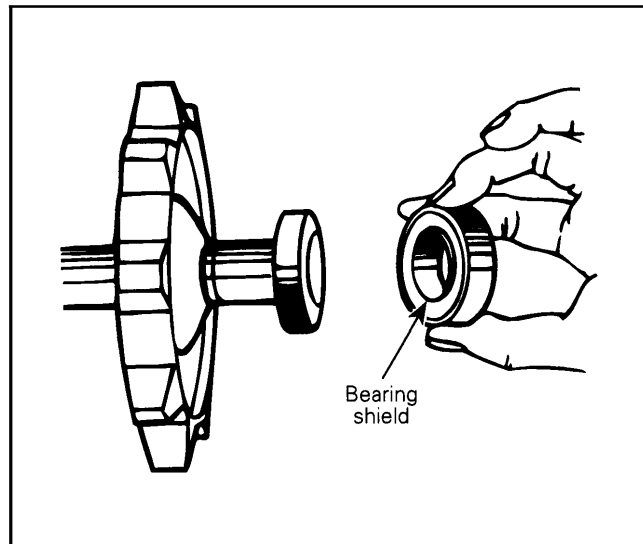
At assembly, replace the rivets securing flange to sprocket with 1/4-20 x 3/4 in long screws and elastic stop nuts.

Torque to 4.3 N•m (38 lbf•in) in the following sequence.



14, Bearing

Always pull or push the bearing by the inner race. Install bearing with shield facing the sprocket.



13,15, Link Plate and Seal

When reassembling, always use a new seal. When inserting seal into link plate ensure that seal sits correctly in link plate groove. After lubricating the rear axle, ensure that seal remains in position.

INSTALLATION

2, Rear Axle

With rear of vehicle off the ground, position the rear axle within the track.

8,9,10, Sleeve, Hardened Washer and Eye Bolt

Install sleeves, hardened washers and eye bolts.

12, Adjusting Bolt

Partially screw-in the track adjusting bolts.

5,6, Locking Nut and Retaining Washer

Install retaining washers and partially tighten the link plate spring locking nuts.

Carry out track tension and alignment.


- NOTE :** To adjust track tension and alignment,
O refer to TRACK 07-06.

7, Link Plate Spring

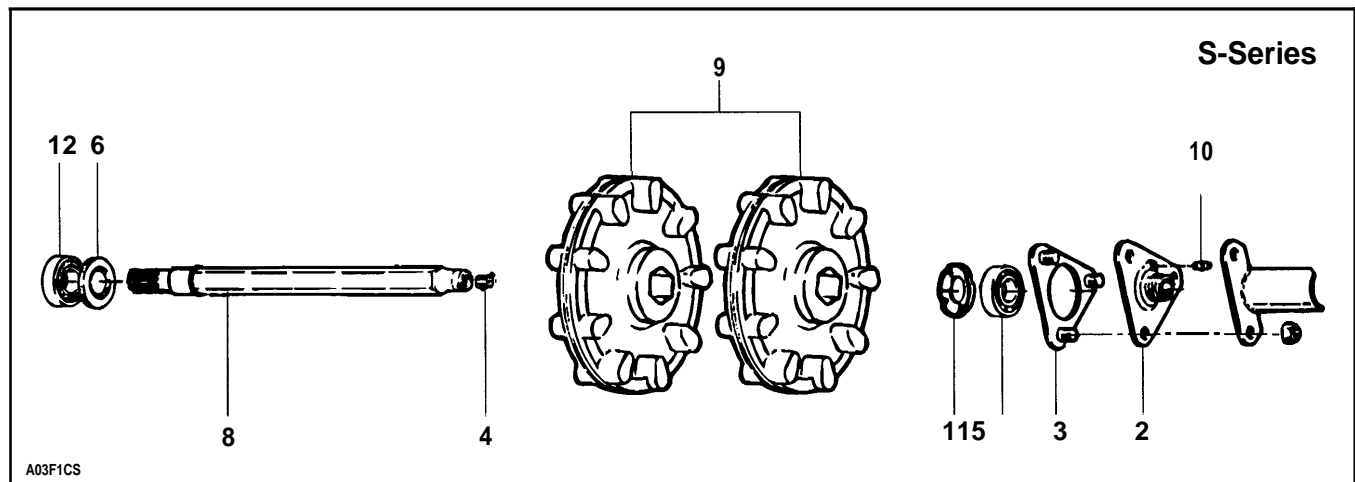
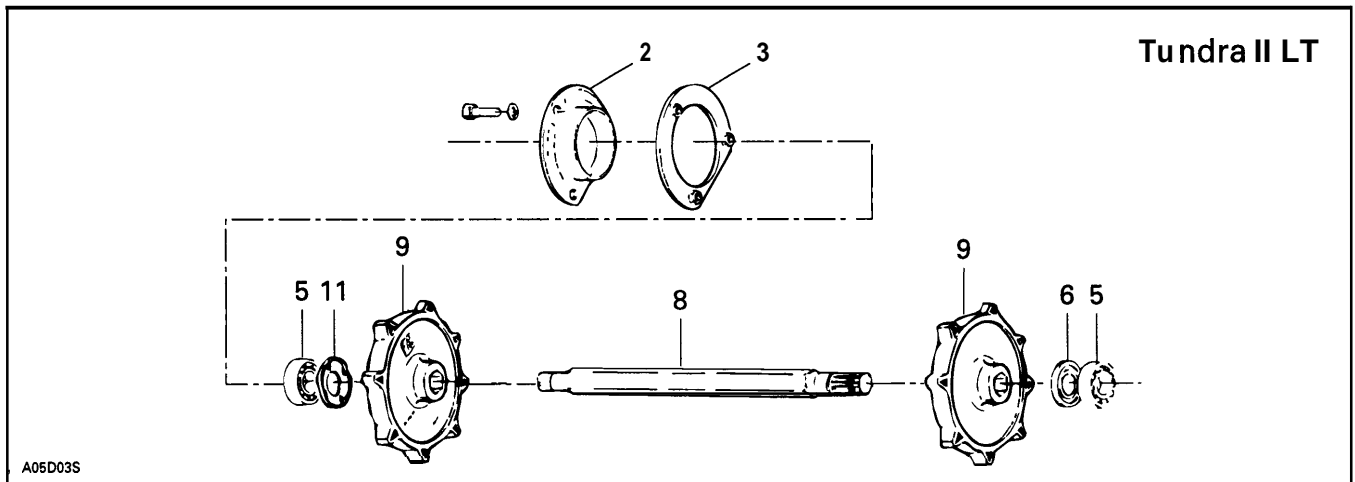
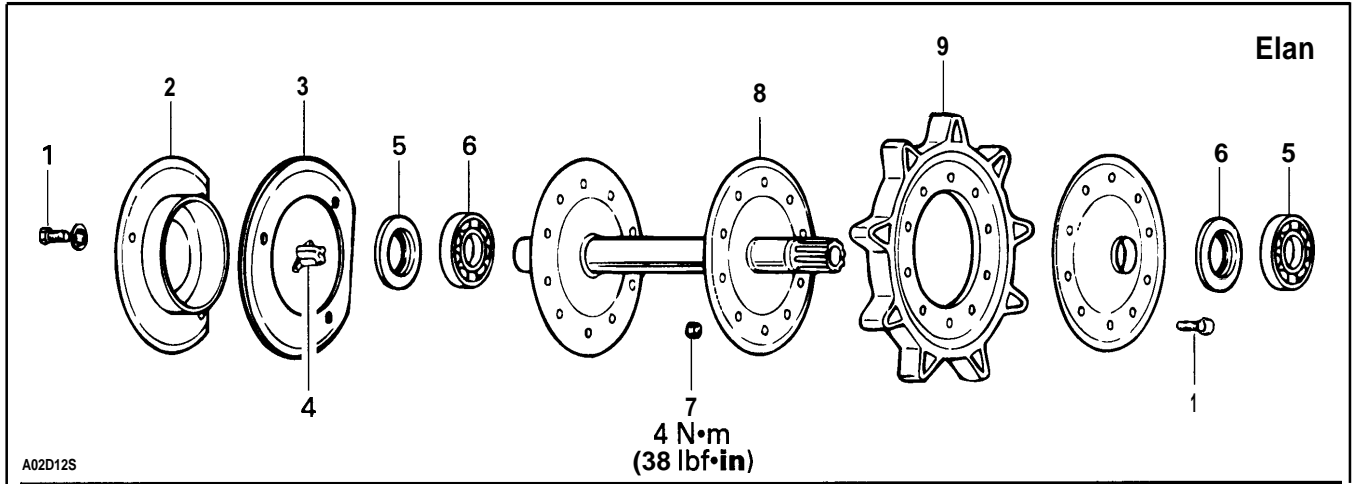
Using a suitable tool hook up link plate springs.

1, Grease Fitting

If necessary, lubricate idler wheels through grease fittings until grease appears at joints. Use low temperature grease only (P/ N 4137061 **00**).

 **CAUTION :** After lubricating rear axle, always check that seal is in position in link plate groove.

DRIVE AXLE



Section 07 REAR SUSPENSION

Sub-Section 05 (DRIVE AXLE)

REMOVAL

All Models

Drain oil from chaincase or gearbox. Remove chaincase cover and release drive chain tension (if applicable).

Raise and block rear of vehicle off the ground.

Remove suspension. (Refer to REAR SUSPENSION 07).

2,6, End Bearing Housing and Seal

NOTE : If applicable, remove muffler, battery and its support. If vehicle is equipped with a speedometer, remove angle drive unit and coupling cable if necessary.

On all S-Series, remove chaincase cover, chain and sprocket then circlip and bearing on drive axle.

Pry oil seals from chaincase and end bearing housing (if applicable).

Unlock sprocket from drive axle and remove with its spacer (if applicable).

8,9, Drive Axle and Sprocket

Release drive axle sprocket from track and at the same time, pulling the drive axle towards the end bearing housing side.

Remove drive axle from vehicle.

DISASSEMBLY

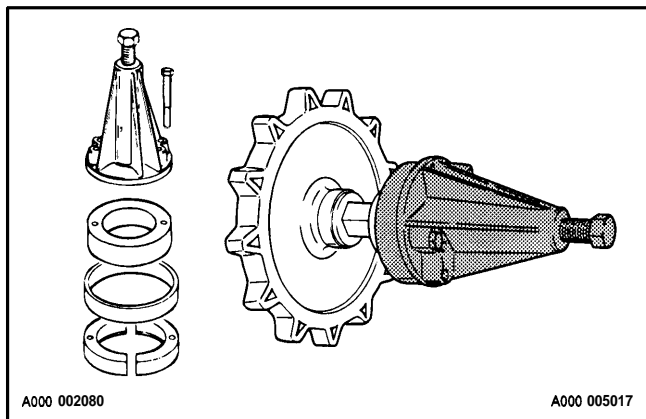
4, Speedometer Drive Insert

All Models

Remove speedometer drive insert (if applicable).

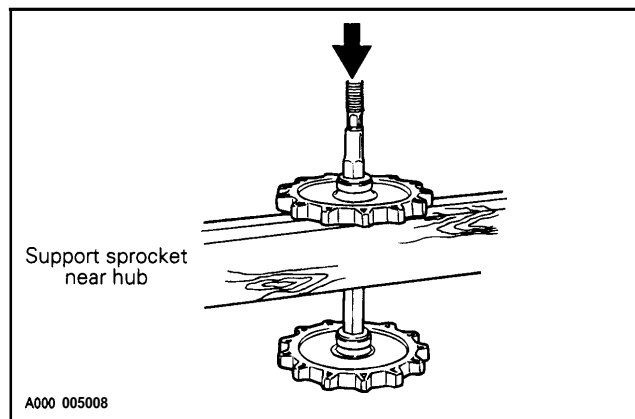
5,12, Bearing

To remove bearings, use puller assembly, ring and half rings as illustrated. (Refer to tools section).



9,13, Sprocket and Half-Sprocket

To remove press fit sprockets (except Elan), use a press and a suitable support as illustrated.

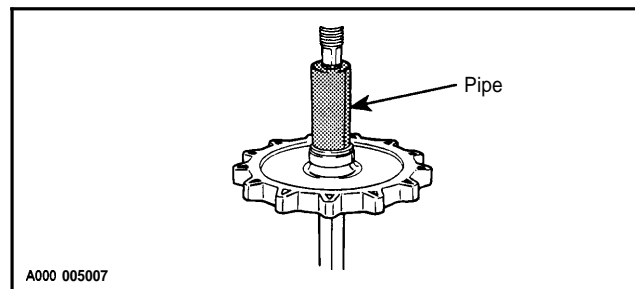


NOTE : Two different types of sprocket press fit can be found. Ensure to replace ring reinforced sprockets with the same type.

ASSEMBLY

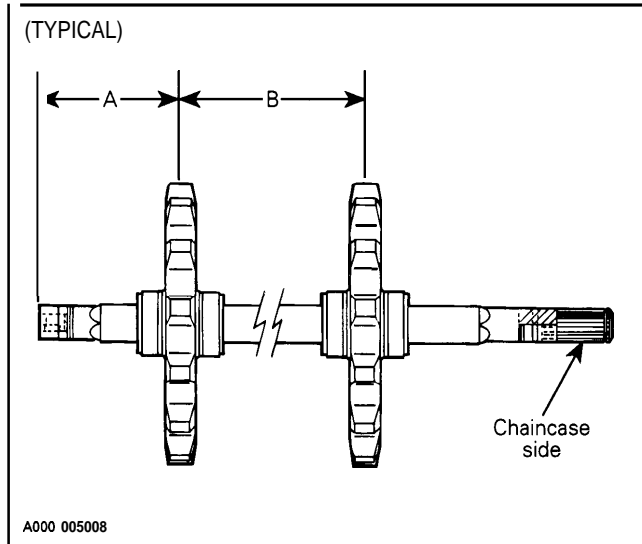
8,9,13, Drive Axle and Sprocket

To assemble press fit sprockets, use a press and a suitable pipe as illustrated. Sprockets must be assembled according to the following dimensions.



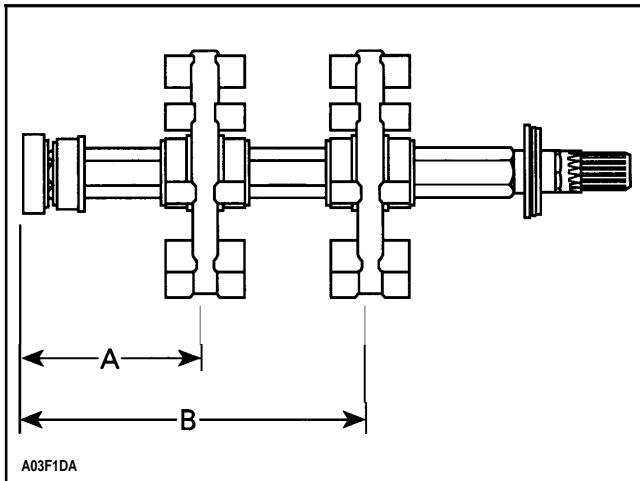
Section 07 REAR SUSPENSION
Sub-Section 05 (DRIVE AXLE)

Tundra II LT



APPLICABLE MODEL	A mm (in)	B mm (in)
Tundra II LT	83 (3-17/64)	242 (9-17/32)

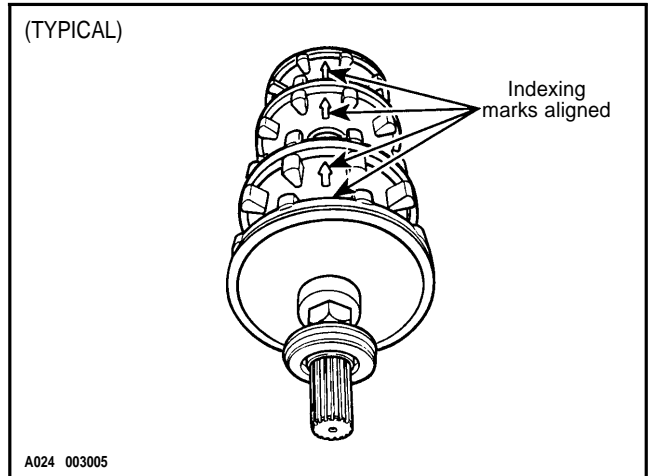
S-Series



A. 155.4 mm (6-1/8 in)
B. 278.4 mm (10-31/32 in)

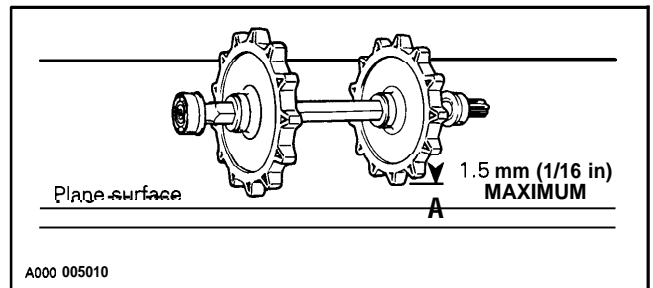
All Models

Ensure to align indexing marks of each sprocket when assembling.



The maximum desynchronization for the sprockets is **1.5 mm (1/16 in)**.

To check this tolerance, place axle assembly on a plane surface and measure the gap between sprocket tooth and surface.



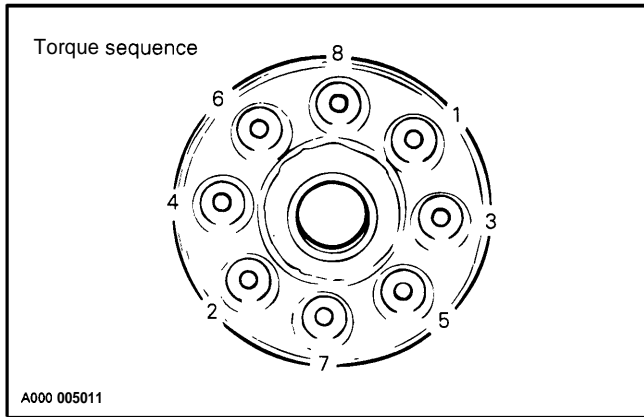
CAUTION : The same sprocket must not be pressed twice on the axle. If synchronization is found to be defective, use a new sprocket.

1,7, Cap Screw and Elastic Stop Nut

On Elan, torque nuts of axle flanges to 4 N•m (38 lbf•in).

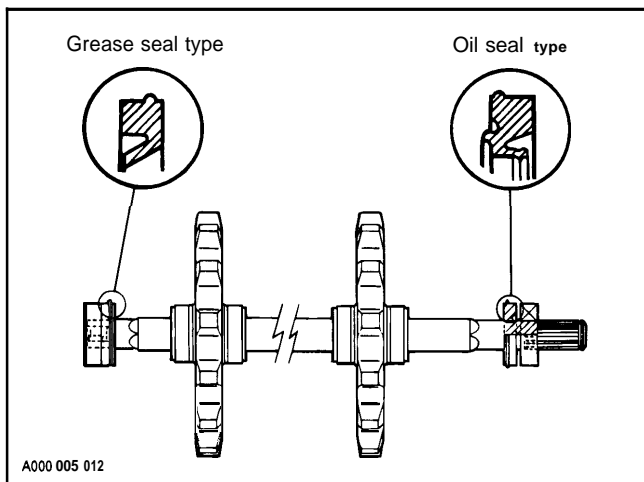
When reassembling, install a new nut or apply Loctite 242 (P/ N 4137030 00) on old threads. Tighten in the following sequence.

Section 07 REAR SUSPENSION
 Sub-Section 05 (DRIVE AXLE)



6,8, Drive Axle and Seal

When assembling drive axle, always position a new seal on each end of drive axle (if applicable). Locate seal lip as illustrated.

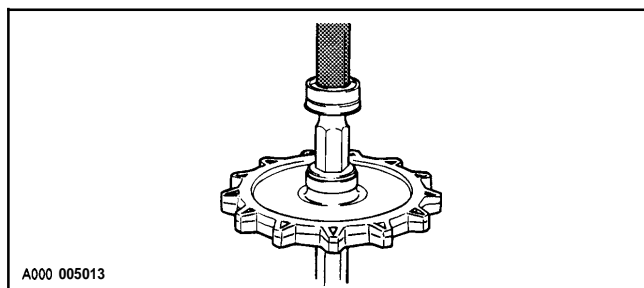


11, Bearing Protector

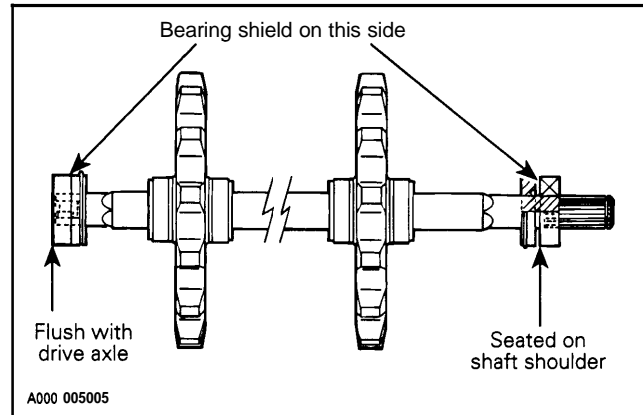
At assembly, flat side of bearing protector must be against bearing.

5,12, Bearing

Always push bearing by inner race.



The bearing on the splined side of axle must be pushed until it is seated on shaft shoulder. The end bearing housing bearing must be flush with end of drive axle. Each bearing must have its shield facing the sprocket.



AXIAL PLAY

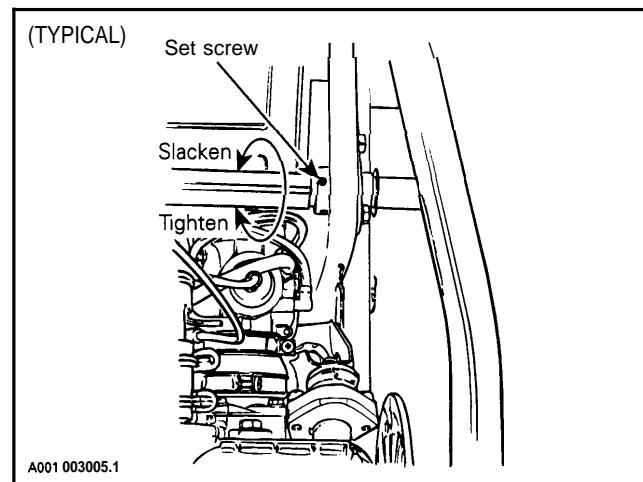
S-Series

Ensure there is no deformation of the sheet metal around the end bearing housing. Straighten as required.

Before attempting to adjust the drive axle axial play, check the chaincase perpendicularity as follows :

CHAINCASE PERPENDICULARITY ADJUSTMENT

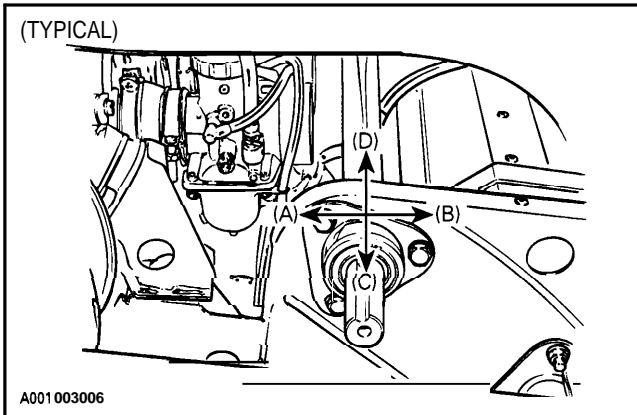
- Remove driven pulley.
- Slacken bearing collar set screw and working from the driven pulley side, turn bearing collar clockwise.



- Extract bearing from its support.

Wrong chaincase perpendicularity will make it difficult to correctly install the bearing in its support due to the countershaft and support misalignment.

Section 07 REAR SUSPENSION
Sub-Section 05 (DRIVE AXLE)

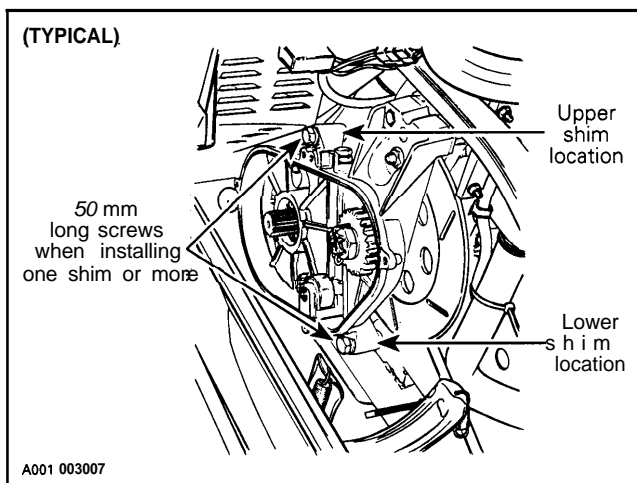


— Add shim(s) (P/ N 5040398 00) between chaincase and frame to obtain easy bearing installation.

CAUTION : When installing one shim or more between chaincase and frame, secure with 50 mm long screws.

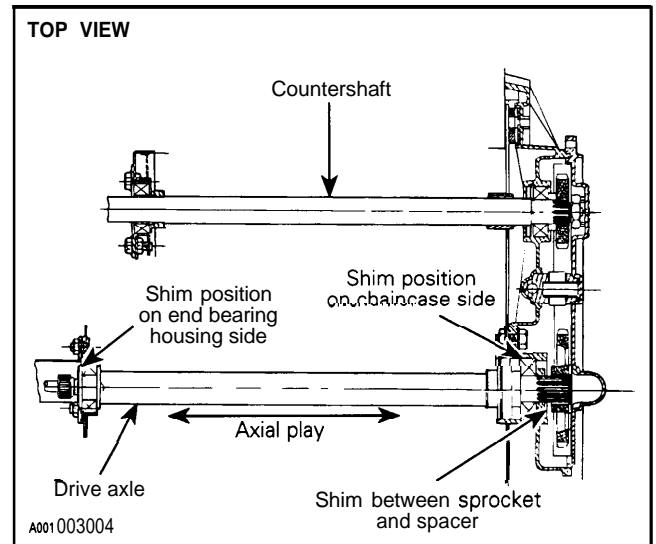
SHIM LOCATION	BEARING POSITION			
	(A) TOWARD FRONT OF VEHICLE	(B) TOWARD REAR OF VEHICLE	(C) TOWARD BOTTOM OF VEHICLE	(D) TOWARD TOP OF VEHICLE
LOWER	LOWER	UPPER	UPPER	LOWER

This chart can be use as a “starting point” to correct the chaincase perpendicularity.

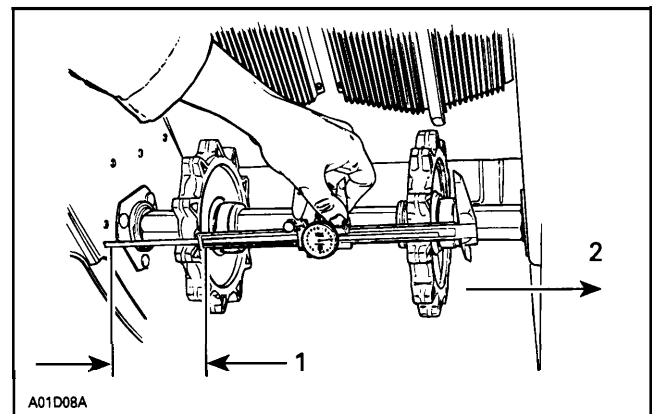


— Do not reinstall the driven pulley at this time.

AXIAL PLAY ADJUSTMENT



– Push the drive axle toward chaincase and take note of the distance between the sprocket and tunnel.



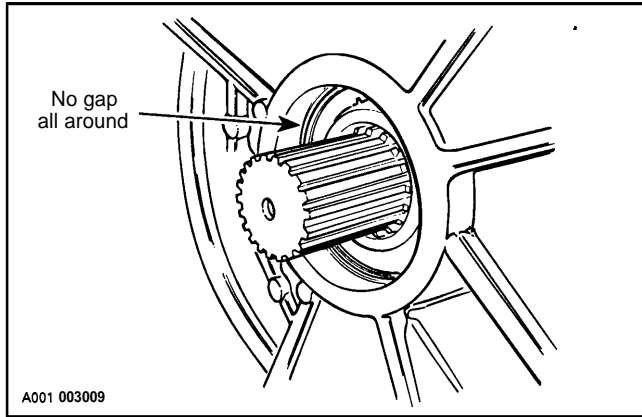
TYPICAL

1. Distance between sprocket and tunnel
2. Drive axle pushed toward chaincase

CAUTION : Be sure drive axle bearing makes full contact all around the shoulder of the bearing bore.

Section 07 REAR SUSPENSION

Sub-Section 05 (DRIVE AXLE)



- Pull drive axle toward the end bearing housing and take note of the measurement between sprocket and tunnel.

The drive axle axial play is the difference between these 2 measurements.

- Repeat this procedure 2 or 3 times to obtain an accurate measurement.

The allowable drive axle axial play is 0 to 1.5 mm (0 to .060 in).

The drive axle axial play, as calculated above, should be within the allowable axial play, add shim(s) accordingly,

- Remove drive axle, install required shim(s) as per the **shim position** chart, reinstall drive axle without the suspension and track.

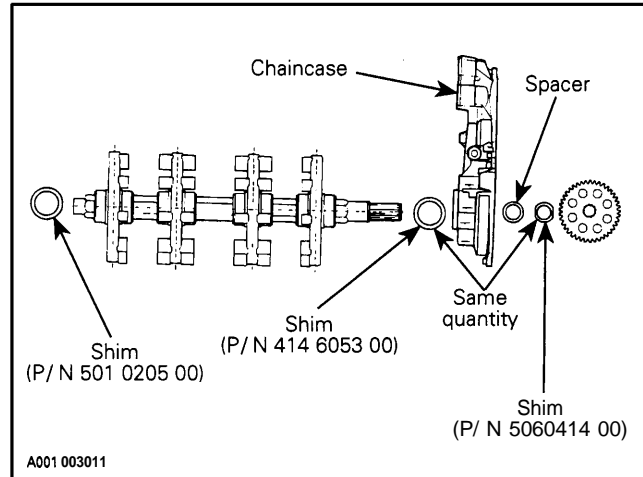
SHIM POSITION

Shim position is important to maintain proper sprocket alignment.

- ▼ **CAUTION** : Install shim(s) following the **pattern shown in the chart**.

SHIM POSITION AND QUANTITY		
SHIM(S) REQUIRED	END BEARING HOUSING SIDE	CHAINCASE SIDE
1	1	
2	1	1
3	2	

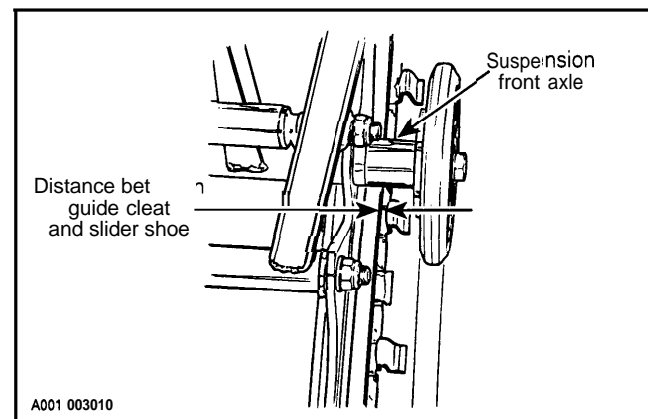
When installing shims between the chaincase and the drive axle bearing, there must be same quantity of shims between the drive chain sprocket and spacer.



- Doublecheck drive axle axial play as described above.
- Modify total shim thickness as required.
- Reinstall track and suspension. Adjust track tension and alignment.

NOTE : Center the track suspension to ensure **O** that the alignment check made in the next step is accurate.

- To center, grasp the track suspension and move it sideways, left and right. Position the track suspension at the midpoint of its sideways movement.
- Check track front alignment by measuring the gap, on each side between guide cleat and the slider shoe, behind the suspension front axle as shown.



If the difference between each side exceeds 3 mm (1/8 in), redistribute drive axle shims as follows:

DIFFERENCE BETWEEN EACH SIDE	DRIVE AXLE SHIM REDISTRIBUTION
3 to 4.5 mm (1/8 to 3/16 in)	Remove 1 shim from larger gap side. Add 1 shim on smaller gap side.
4.5 to 6 mm (3/16 to 1/4 in)	Remove 2 shims from larger gap side. Add 2 shims on smaller gap side.

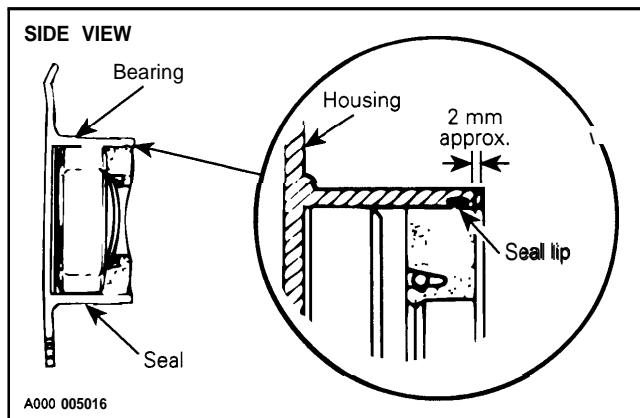
INSTALLATION

4, Speedometer Drive Insert

If the drive axle to be installed is a new part 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 end bearing housing, Install spacer (if applicable) between bearing and lower chaincase sprocket.

Install chaincase and position seals (if applicable), making sure that a gap of approximately 2 mm (1/16 in) exists between end of bearing housing and each seal.



3, Retainer Ring

Make sure that welded nuts are toward inside of tunnel. Lock drive axle sprocket with a circlip (use new cotter pin on Élan).

Reinstall the chaincase cover (if applicable).

Refill with chaincase oil. Refer to TECHNICAL DATA 10.

Install the suspension. Refer to TRACK 07-06 and adjust track tension and carry out track alignment procedure.

LUBRICATION

15, Grease Fitting

Lubricate end housing bearing with low temperature grease (P/ N 4137061 00).

ADJUSTMENT

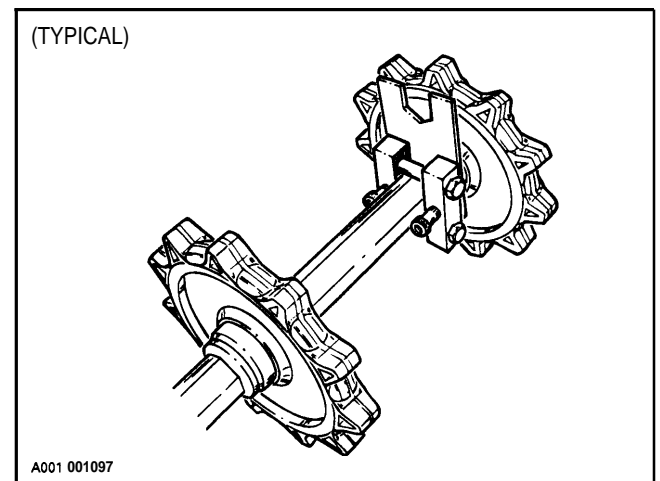
Sprocket / Track Alignment

CAUTION : Do not temper with sprocket/track alignment if frame or suspension is damaged.

All Models Except Élan

Sprockets might be repositioned to fit track holes (lugs on S-Series without removing drive axle).

Use drive axle sprocket adjuster kit (P/ N 861 7257 00).



TRACK

TRACK TYPE APPLICATION

Refer to TECHNICAL DATA section 10.

GENERAL

This section gives guidelines for track removal. Some components require more detailed disassembly procedures. In these particular cases, refer to the pertaining section in this manual.

INSPECTION

Visually inspect track for :

- cuts and abnormal wear
- broken rods
- broken or missing track cleats

If track is damaged or rods are broken, replace track. For damaged or missing cleats, replace by new ones, using cleat remover (P/ N 5290082 00) for Elan and Tundra II LT (P/N 5290287 00) for all other models. Use large-cleat installer (P/ N 5290288 00) or small-cleat installer (P/ N 5290085 00).

 **WARNING : Do not operate a snowmobile with a cut, torn or damaged track.**

REMOVAL

Elan

Remove the following items :

- tool box
- chaincase access plug
- drive axle cotter pin and washer
- suspension
- rear axle
- both drive axle seals
- end bearing housing
- drive axle
- track

Tundra II LT

Remove the following items :

- chaincase cover, sprockets, chain
- muffler
- upper center idler ass'y
- suspension
- end bearing housing
- drive axle seal
- drive axle (outwards from end bearing housing)
- track

S-Series

Remove the following items :

- speedometer cable
- muffler
- chaincase cover
- suspension
- drive axle seal
- end bearing housing
- sprockets and chain
- drive axle (toward end bearing housing)
- track

INSTALLATION

All Models

Reverse the removal procedure.

NOTE : When installing the track, respect rotation direction indicated by an arrow on track thread.

Check sprocket /track alignment as described in DRIVE AXLE 07-05.

Track Tension and 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.

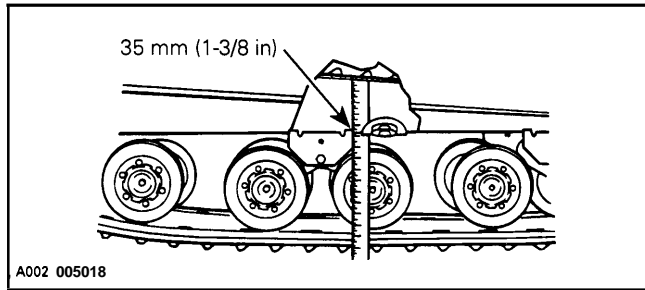
Tension (bogie wheel)

Élan

With rear of vehicle blocked off the ground, check the track tension at middle set of bogie wheels.

Section 07 REAR SUSPENSION
Sub-Section 06 (TRACK)

35 mm (1-3/8 in) between top inside edge of track and bottom of foot board as shown.



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 counterclockwise to slacken.

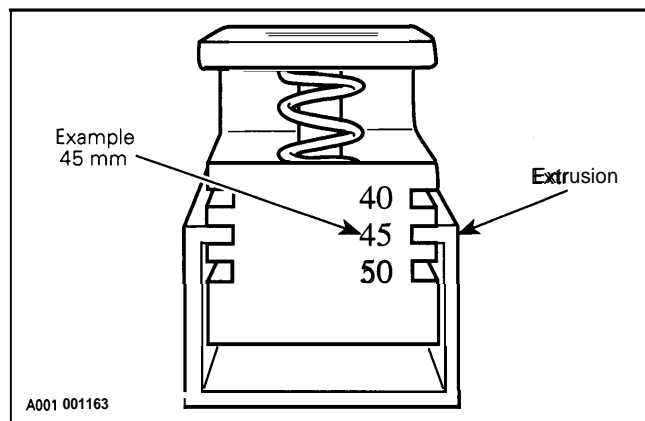
Tighten link plate spring **lock nuts**.

CAUTION : Too much tension will result in power loss and excessive stress on suspension components. If too loose, the track will have a tendency to thump.

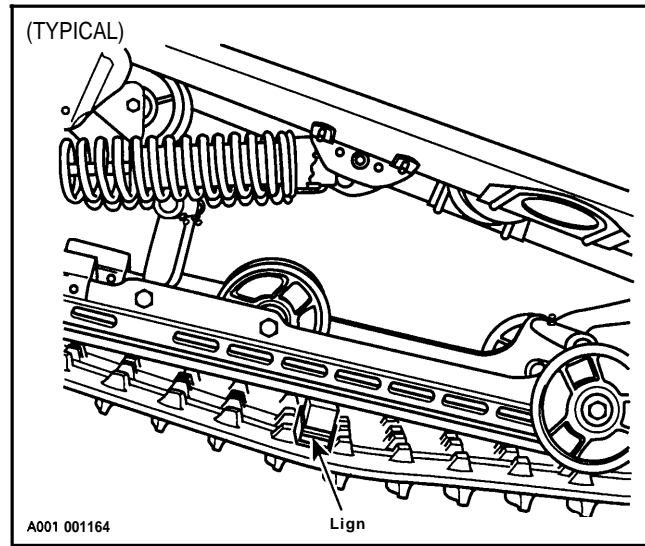
Tension (slide suspension)

Lift the rear of vehicle and support with a mechanical stand. Allow the slide to extend normally. Check the gap half-way between front and rear idler wheels. Measure between slider shoe and bottom inside of track.

When using the track tension gauge (P/ N 5290215 00), slide U shape extrusion to proper deflection.



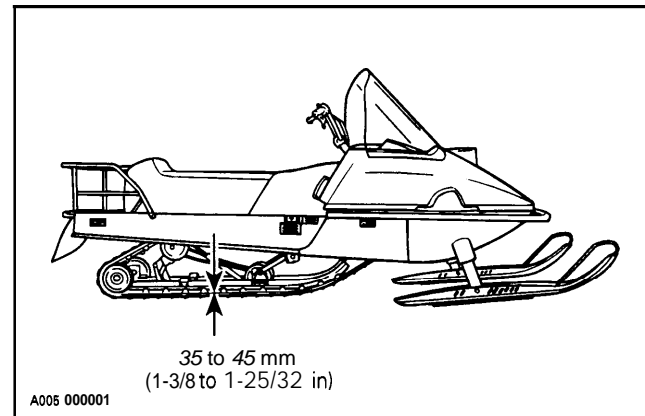
Insert pre-settled gauge between slider shoe and track. Allow gauge to settle by forcing track up and down. Track tension is as specified when edge of gauge reaches lign.



NOTE : Lightly oil track tension gauge center pin to avoid sticking.

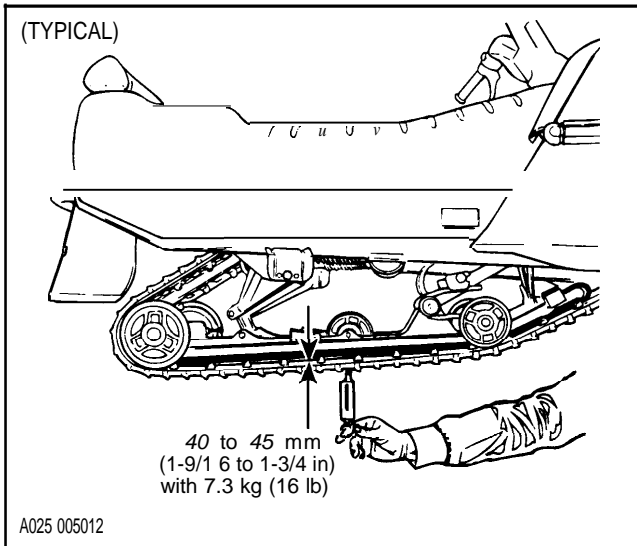
Tundra II LT

35 to 45 mm (1-3/8 to 1-25/32 in) when exerting a downward pull of 7.3 kg (16 lb).



S-Series

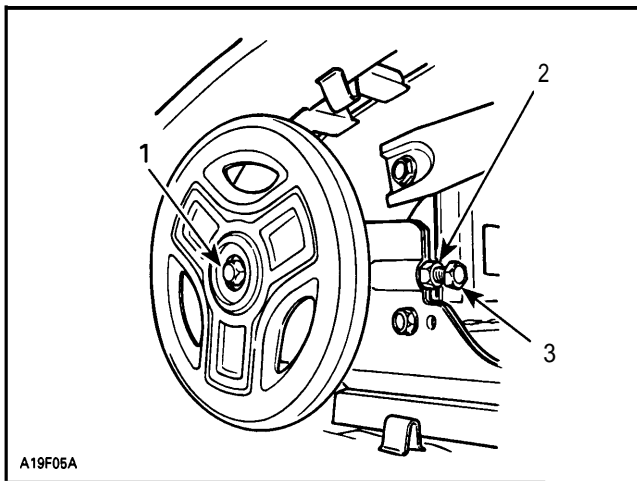
40 to 45 mm (1-9/16 to 1-3/4 in) when exerting a downward pull of 7.3 kg (16 lb).



All Models

CAUTION : Too much tension will result in power loss and excessive stress on suspension components. If too loose, the track will have a tendency to thump.

To adjust, loosen the rear idler wheel retaining screws (one side only on Tundra II LT and S-Series) and the adjuster bolt lock nut ; then loosen or tighten the adjuster bolts located on the inner side of the rear idler wheels.



TYPICAL

1. Retaining screw
2. Lock nut (except S-series)
3. Adjuster bolt

Alignment (bogie wheel)

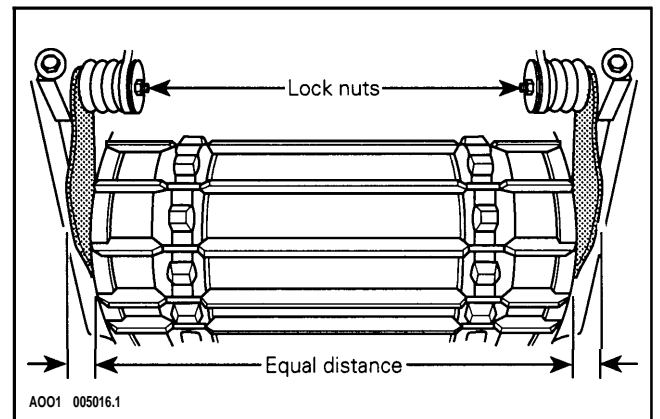
#/an

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.

NOTE : Sometimes, after reinstalling, sprocket teeth seem to skip out of track notches. Apply liquid soap on sprocket teeth to correct.

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.

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 realigns.

Tighten link plate spring lock nut.

Alignment (slide suspension)

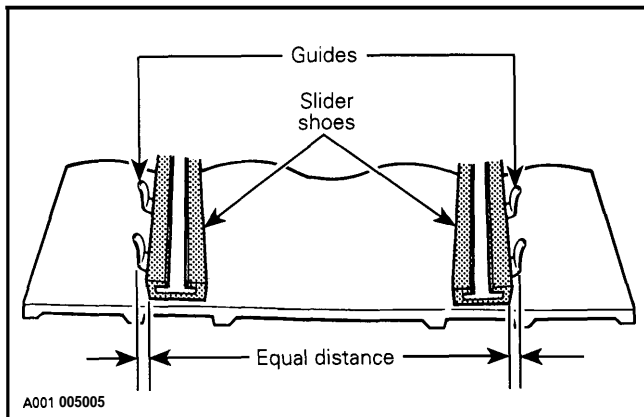
WARNING : Before checking track tension, ensure that the track is free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.

All Models

With rear of vehicle supported off the ground, start engine and allow the track to rotate **slowly**.

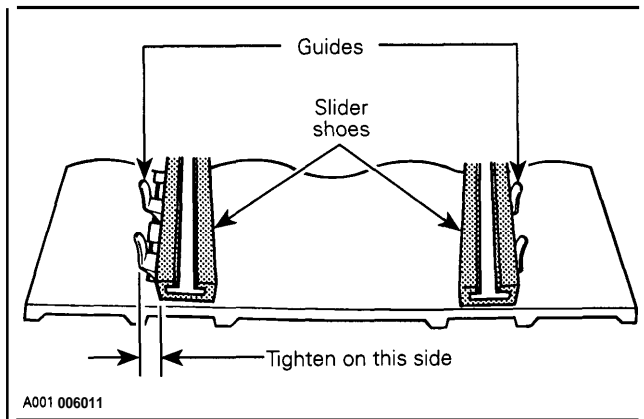
Check that the track is well centered ; equal distance on both sides between edges of track guides and slider shoes.

Section 07 REAR SUSPENSION
Sub-Section 06 (TRACK)

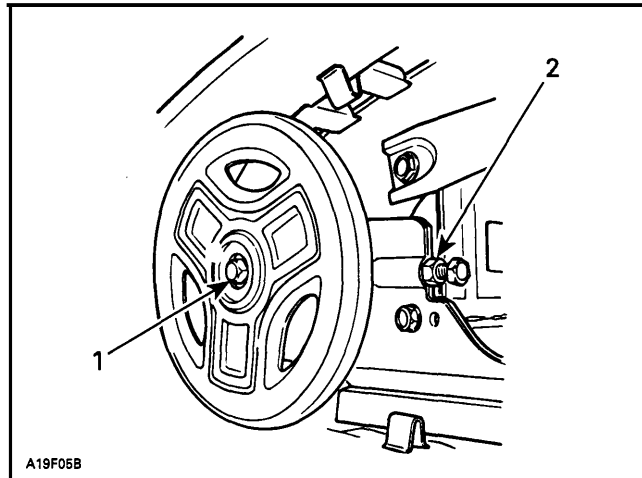


WARNING : Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. **Keep hands, tools, feet and clothing clear of track.**

To correct, stop engine then loosen the lock nuts and tighten the adjuster bolt on side where guides are farthest to slide. Tighten lock nuts and recheck alignment.



Tighten lock nuts and the idler wheel retaining screws.



TYPICAL

1. Retighten
2. Retighten (except S-series)

Restart engine, rotate track slowly and recheck alignment.

TRACK CLEAT

Removal

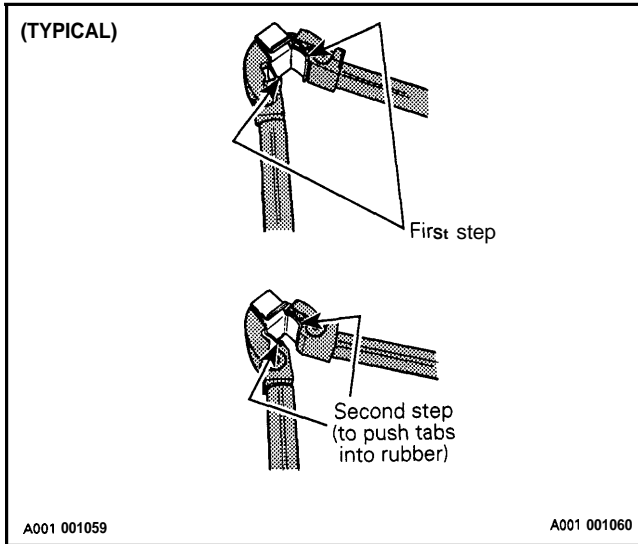
- Raise rear of vehicle off the ground and lift snow guard then rotate track to expose a cleat to be replaced.
- Using track cleat remover (P/N 5290082 00) for Elan and Tundra II LT. Use (P/N 5290087 00) for all other models.

Installation

- NOTE : Keep the same pitch between guide cleats.

Section 07 REAR SUSPENSION
Sub-Section 06 (TRACK)

— Place new cleat in position and using small track cleat installer (P/ N 529 0085 00) o-r large cleat installer (P/ N529028800) bend cleat then Push tabs into rubber.



Section 08 STEERING/ FRONT SUSPENSION
Sub-Section 00 (TABLE OF CONTENTS)

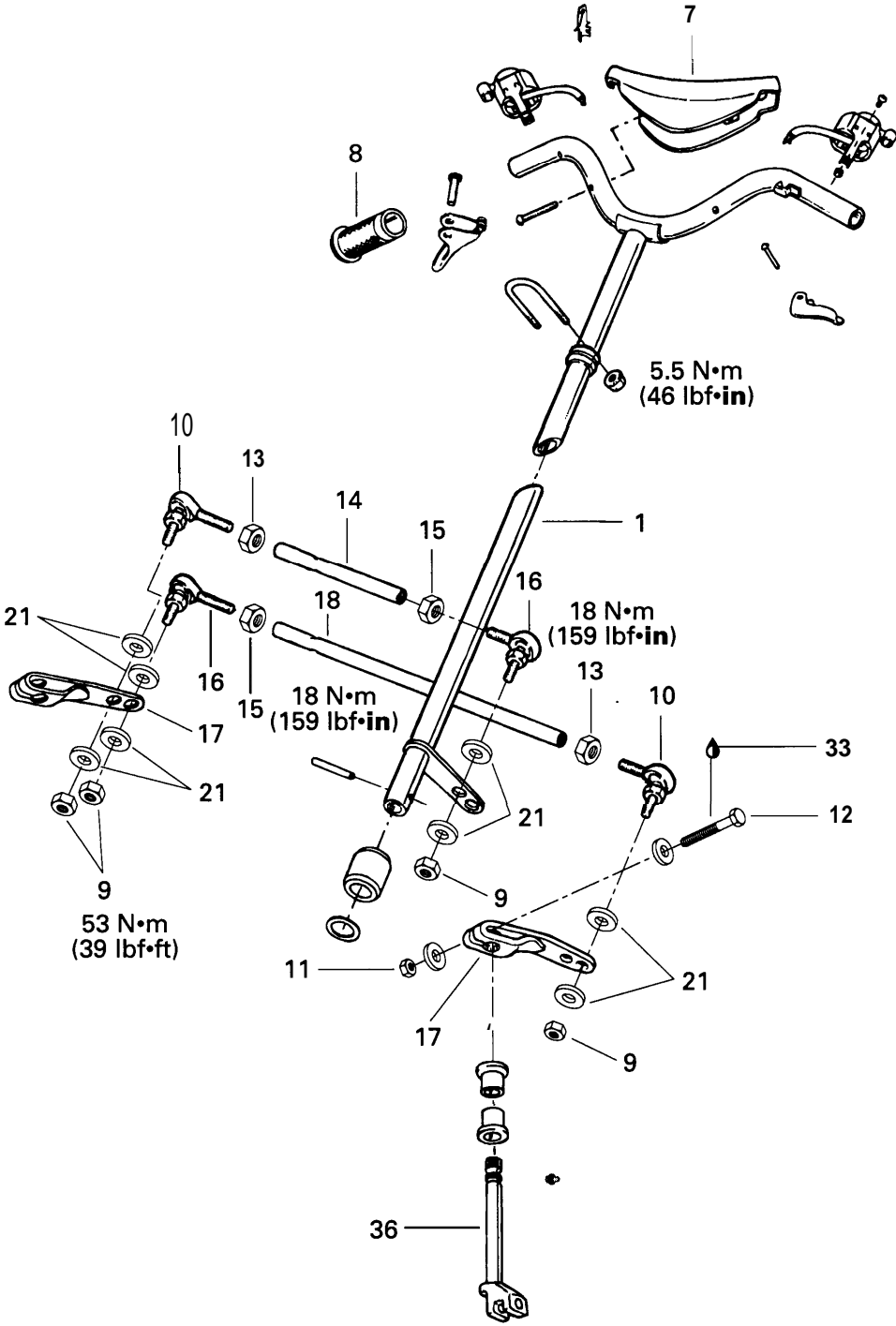
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STEERING SYSTEM

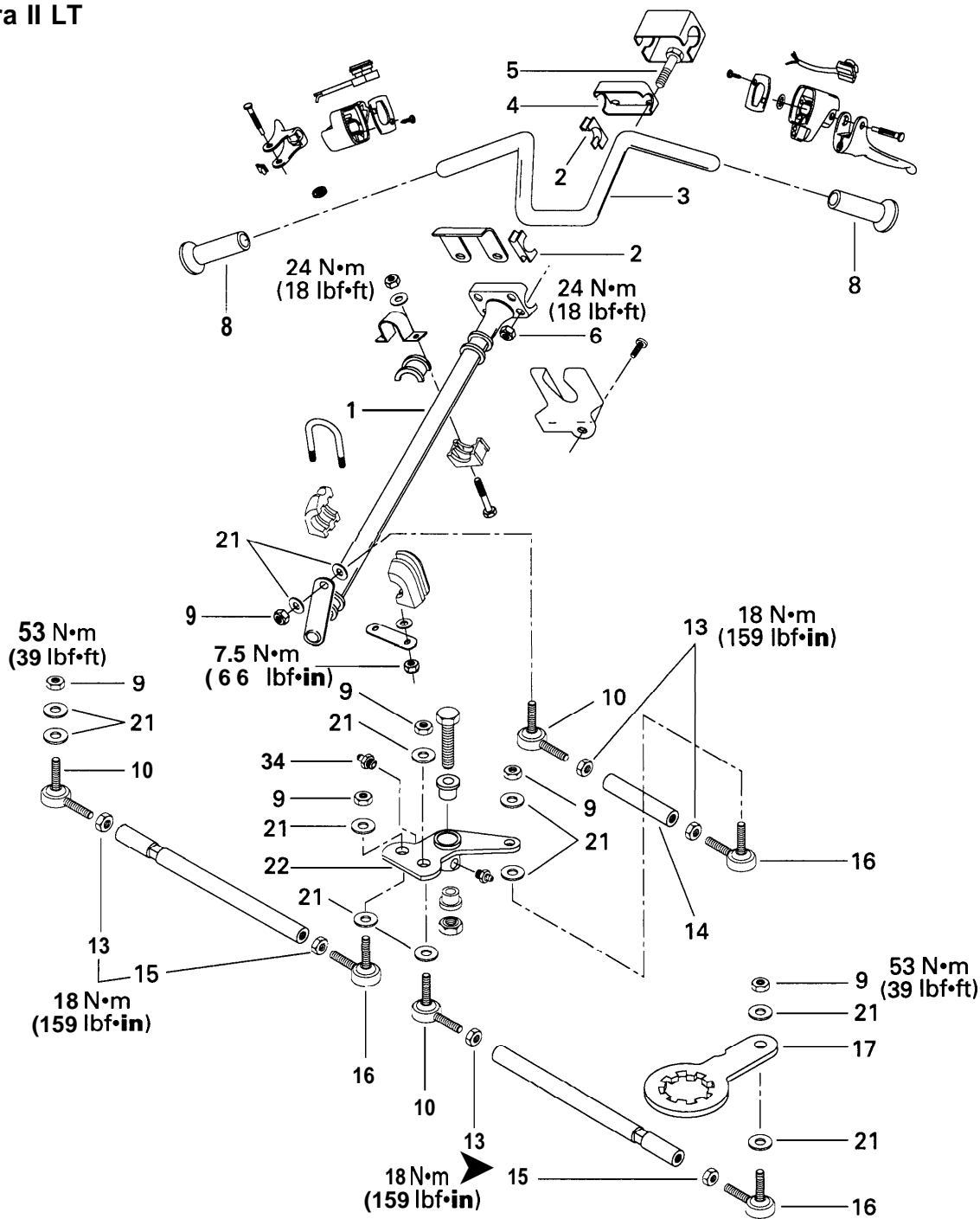
Elan



A02G0GS

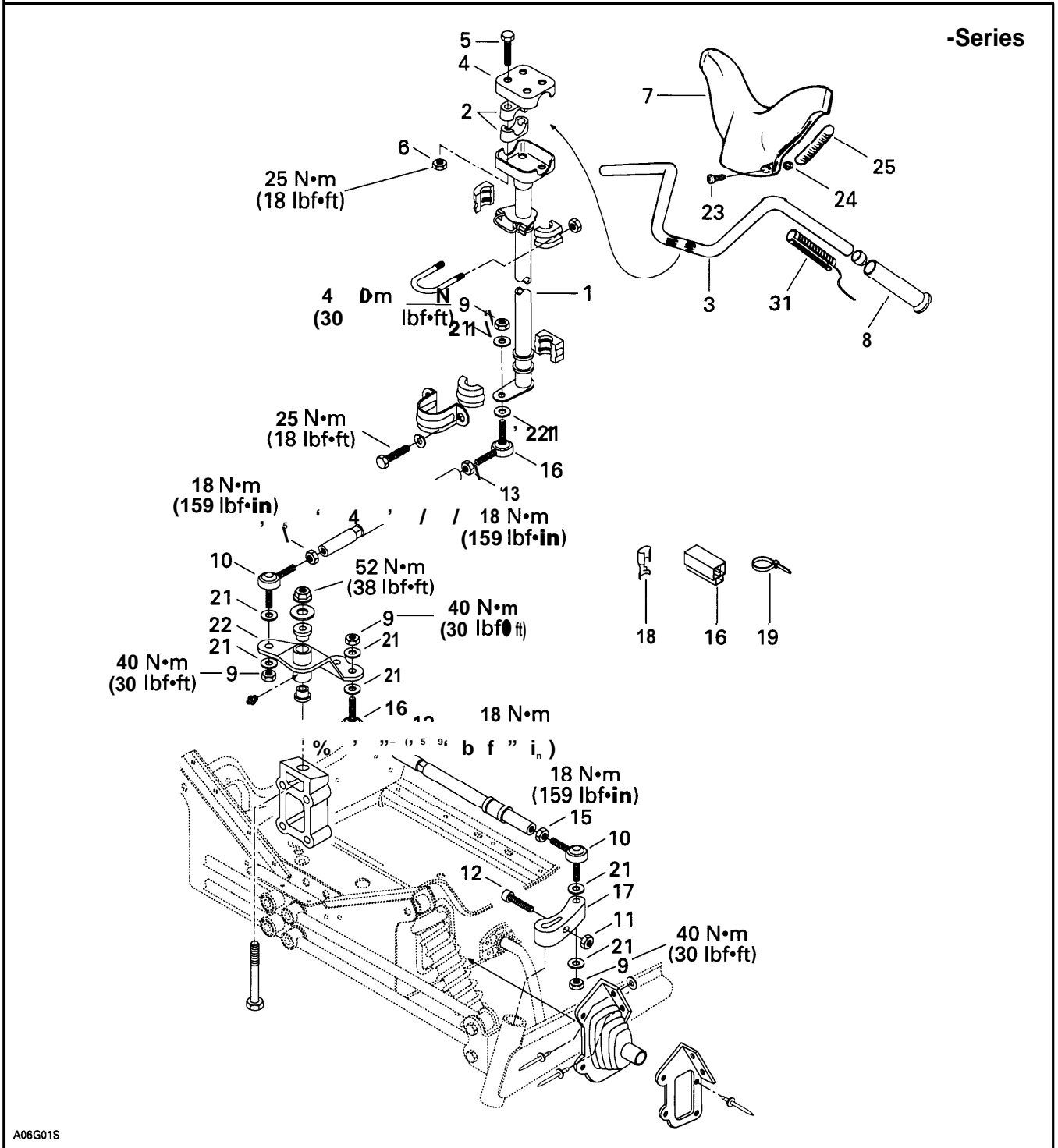
Section 08 STEERING/FRONT SUSPENSION
 Sub-Section 01 (STEERING SYSTEM)

Tundra II LT



A05GOAS

Section 08 STEERING/FRONT SUSPENSION
 Sub-Section 01 (STEERING SYSTEM)



Section 08 STEERING/FRONT SUSPENSION

Sub-Section 01 (STEERING SYSTEM)

INSPECTION

Check skis and runner shoes for wear, replace as necessary. (See section 08-02).

17,36, Steering Arm and Ski Leg

Make sure steering arm and ski leg splines interlock (if applicable).

◆ **WARNING** : All parts having **worn splines have to be changed by new ones.**

Check general condition of steering system.

Check general condition of steering system components for wear and replace if necessary.

DISASSEMBLY AND ASSEMBLY

8, Grip

Grips can be removed and installed without any damage by injecting compressed air into the handlebar or by heating them with a heat gun.

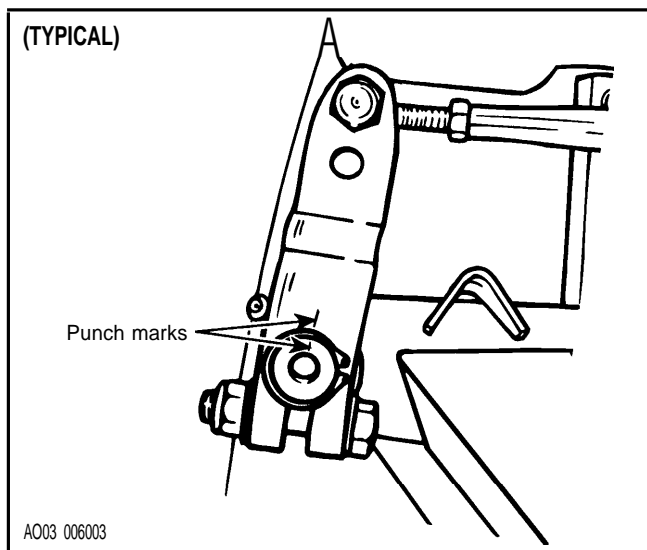
1, Steering Column

Remove steering pad then handlebar ass'y.

Detach short tie rod from steering column working under engine. On S-Series remove air intake silencer and carburetor(s) to gain access.

17, Steering Arm

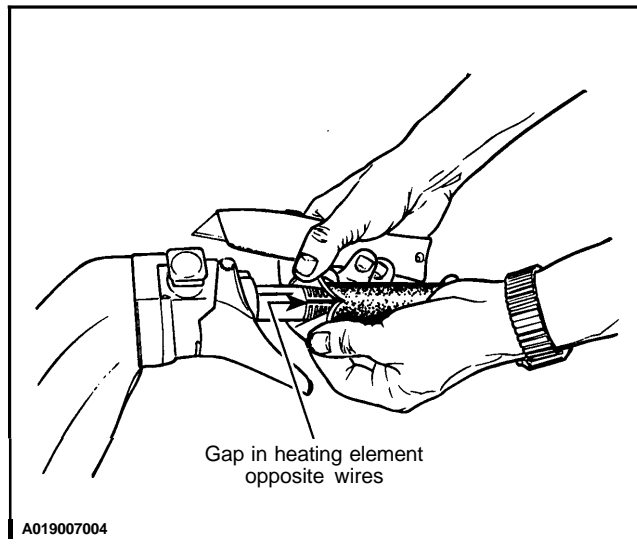
To maintain correct steering geometry when reassembling, punch mark the steering arm and ski leg before removal.



31, Heating Grip Element

On vehicle equipped with heating grips, grips might be unremovable as explained earlier, in this case, carefully proceed as follows to prevent damaging heating elements.

Locate the grip heater wires inside handlebar; look through end of grip. Start cutting grip exactly opposite heater wires and immediately peel open to locate gap in heating element, as shown.



Continue cutting along gap and remove grip. If required, slowly peel heating element from handlebar and remove.

To install, stick heating element to handlebar making sure wires do not interfere with operation of accelerator or brake handle.

● **WARNING** : **Never use lubricants (e.g. soap, grease, etc.) to install handlebar grip, use instead a mix of soap and water. Mix 40 parts of water with one part of dish washing soap (recommended: Ultra Joy, Sunlight or Palmolive).**

Insert new grip with a rubber mallet. Heat grip with a heater gun or a spot light to facilitate installation.

INSPECTION

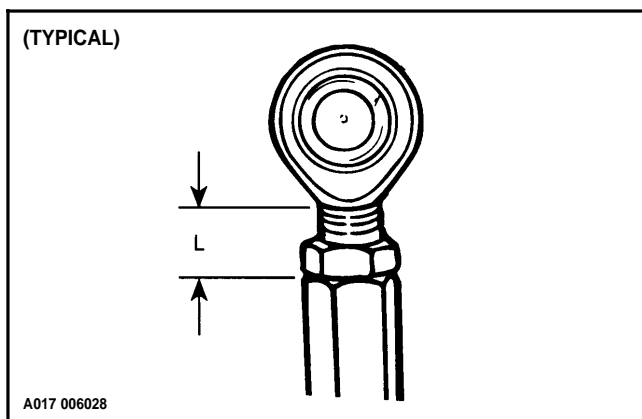
The resistance tolerance on heating element should be on high power between 2.2 and 3.2 ohms, on low power 9.2 to 13.8 ohms.

10,16, Ball Joint (Left Hand and Right Hand Treads)

Inspect ball joint ends for wear or looseness, if excessive, replace.

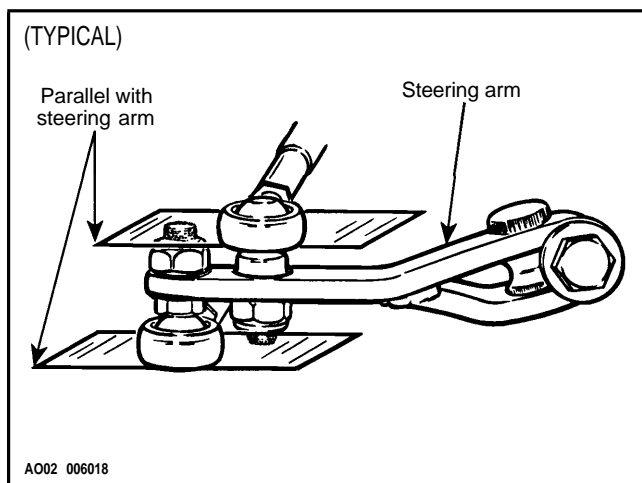
Section 08 STEERING/FRONT SUSPENSION Sub-section 01 (STEERING SYSTEM)

Screw threaded end of ball joint into tie rod. The maximum external threaded length not engaged in tie rod must not exceed the value L in the following chart :



MODEL	L	
	mm	(in)
I All models	20	(25/32)

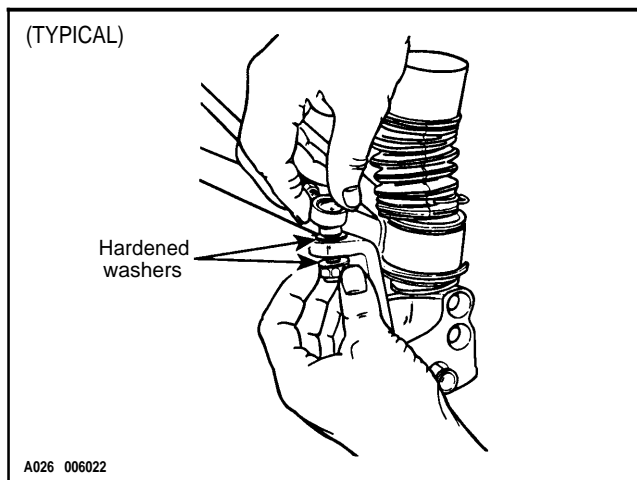
The cut-off section of the tie rod end must run parallel with the horizontal line of the steering arm when assembled on vehicle. The ball joint should be restrained when tightening tie rod end lock nut. For torque specifications see specific exploded view.



WARNING : The cut off section of the ball joint must run parallel with the steering arm. When tightening lock nuts, restrain ball joint with appropriate size wrench. Ensure not too many threads are kept outside of the tie rod according to the thread length chart.

21, Hardened Washer

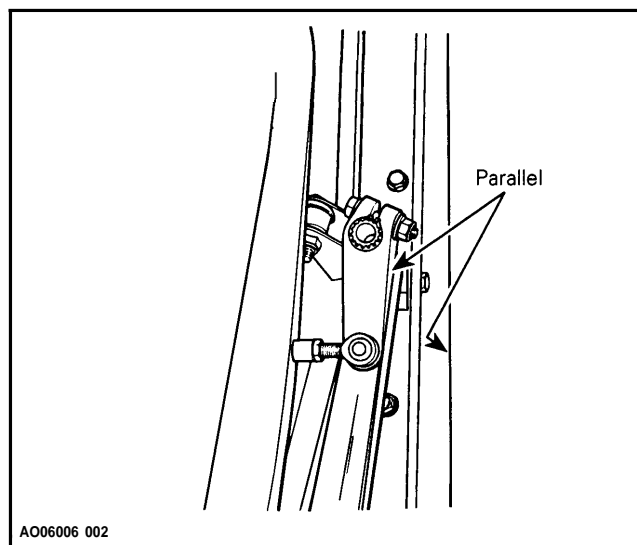
Install a hardened washer on each side.



17,36, Steering Arm

The steering arm angles should be equal on both sides when skis are parallel with vehicle.

Steering arm must run parallel to ski.



9,13,15, Ball Joint Nut and jam nut

Tighten ball joint jam nuts to specified torque (see illustration).

11,12, Steering Arm Nut and bolt

Tighten steering arm nuts to specified torque (see illustration).

ADJUSTABLE HANDLEBAR

1,3, Steering Column and Handlebar

If applicable, remove the steering clamp and nuts holding the handlebar to the steering column. Tighten nuts to the specified torque (see illustration).

2,4,5,6, Handlebar Support, Steering Clamp, Bolt and Nut

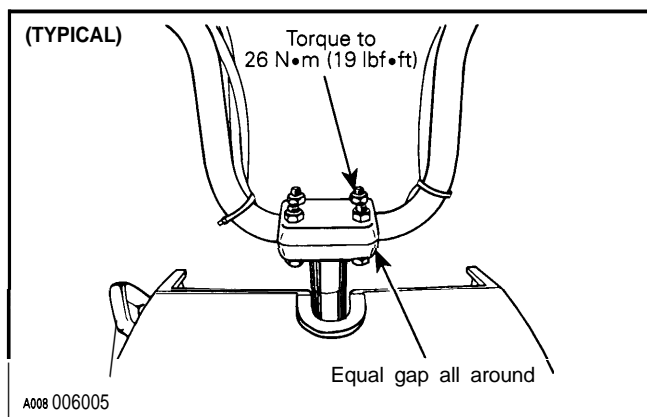
Install the four handlebar support, steering clamp, the four screws and nuts to the column, as illustrated.

See applicable exploded view for each model,

Adjust the steering handle to the desired position.

Lock the handle in place by tightening the four nuts to 26 N•m (19 lbf•ft).

CAUTION : Tighten the nuts equally in a criss-cross sequence and ensure there is an equal gap on each side of the clamps.



WARNING : Avoid contact between the brake handle and the windshield by NOT adjusting the handlebar too high.

WARNING : Make sure that the steering pad and all controls are properly fixed to their normal location on the handlebar.

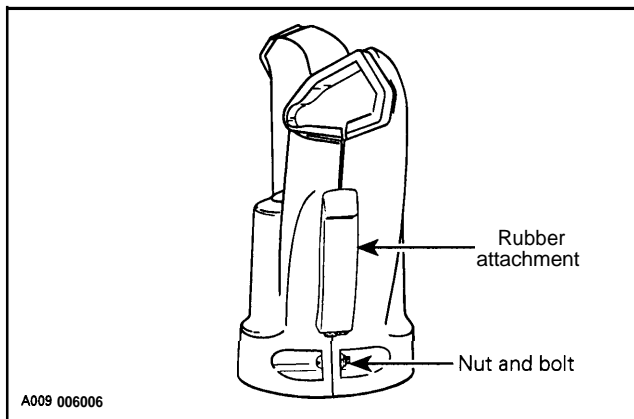
CAUTION : Plastic alloy components such as fuel tank, windshield, controls, etc. can be cleaned using mild detergents or isopropyl alcohol and a soft clean cloth. Never clean plastic parts with strong detergent, decreasing agent, paint thinner, acetone, etc. Do not apply isopropyl alcohol directly on decals.

7,23,24,25, Steering Pad, Bolt, Nut and Rubber Attachment

CAUTION : Prior to installation, perform handlebar adjustment.

Properly fit the steering pad to the handlebar. Assemble using the two rubber attachments, nuts and bolts.

WARNING : Make sure that the steering pad and all controls are properly fixed to their normal location on the handlebar.

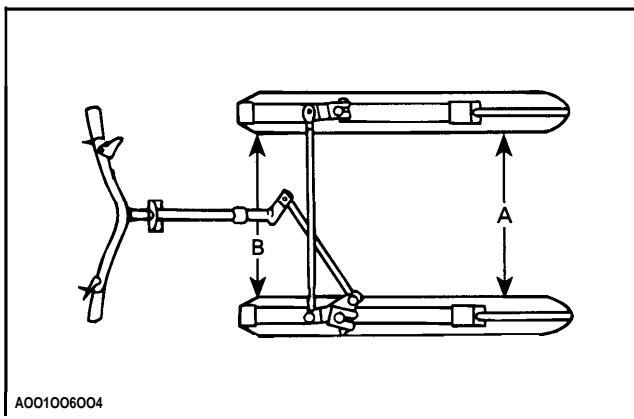


STEERING ADJUSTMENT (SKIS)

Definitions

TOE-OUT :

A difference measurement between front edge A and rear edge B of skis as viewed from top side of suspension system. It is adjustable.



CAMBER :

A specific inward or outward tilt angle of ski leg compared to a vertical line when viewing vehicle from front. This angle is not adjustable **on these models.**

Adjustments

TOE-OUT

l b

Skis should have a total toe-out of 6.6 mm (1/4 in). When they are in straight-ahead position. If adjustment is required, proceed as follows :

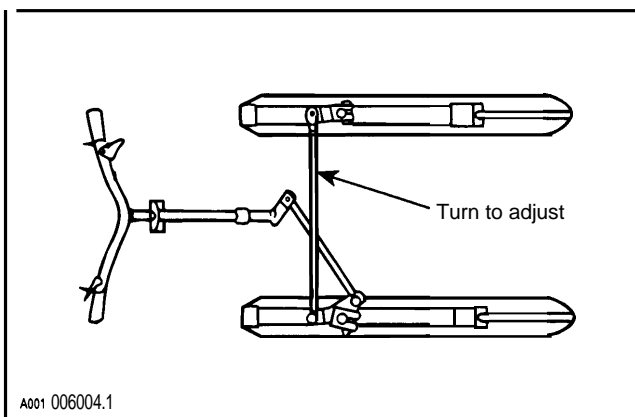
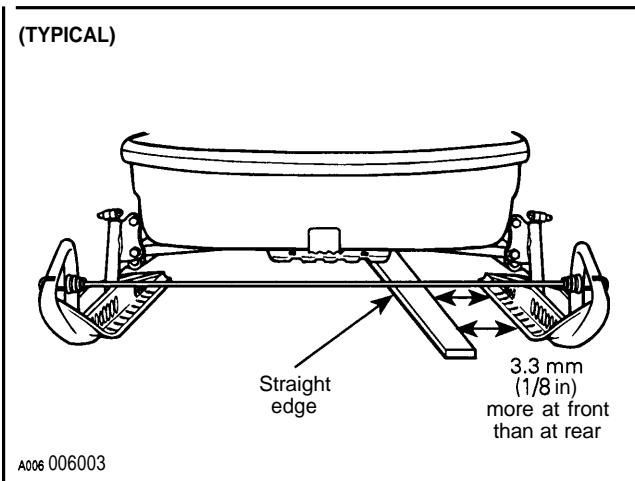
13,15, Tie Rod Jam Nut (LH and RH)

Loosen the jam nuts locking the tie rod in place. Turn tie rod manually until alignment is correct. Torque jam nuts as specified in the applicable illustration.

IMPORTANT: Close front of skis manually to take all slack from steering mechanism.

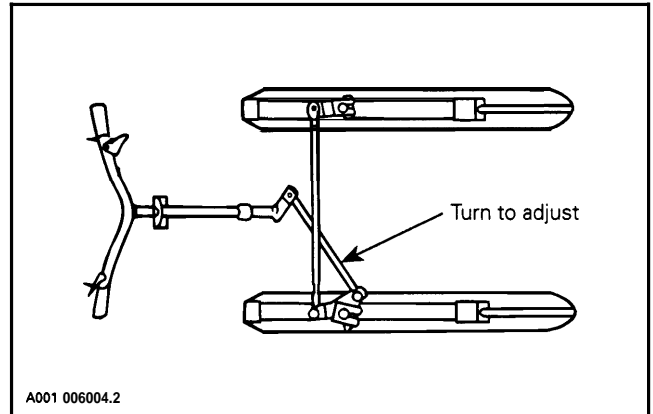
NOTE : A rubber band can be hooked in front of skis to keep them closed.

NOTE : To make sure skis are in straight-ahead position, place a straight edge against pre-adjusted track and measure distance between front and rear of skis and straight edge. Distances should be equal. After ski toe-out adjustment, distance at front of ski must be 3.3 mm (1/8 in) more than at rear on both sides for a total toe-out of 6.6 mm (1/4 in).



Check that handlebar is horizontal when skis are in straight ahead position. To adjust :

- Loosen shorter tie rod jam nuts.
- Turn tie rod manually until handlebar is horizontal.
- Torque jam nuts as specified in the applicable illustration.



Tundra II LT

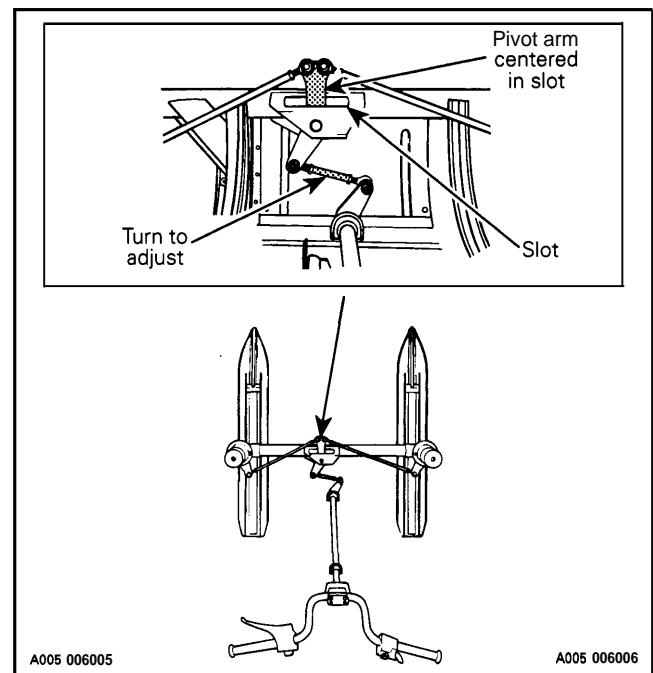
Adjustments should be performed following this sequence :

- Pivot arm centering/ horizontal handlebar.
- Set toe-out.

PIVOT ARM CENTERING/ HORIZONTAL HANDLEBAR

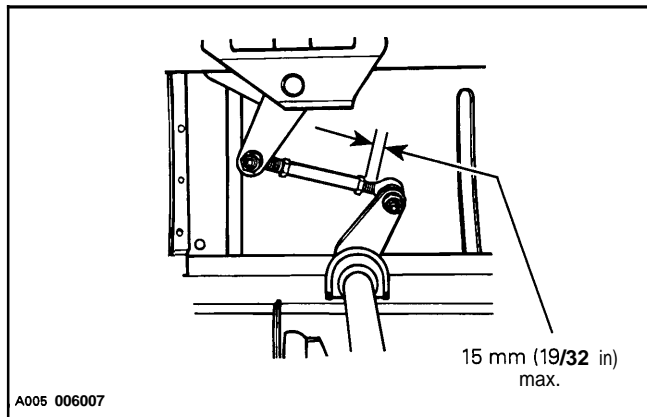
Turn handlebar until pivot arm is well centered in slot of its bracket.

Check if handlebar is horizontal. To adjust, loosen lock nuts of short tie rod and turn it accordingly.

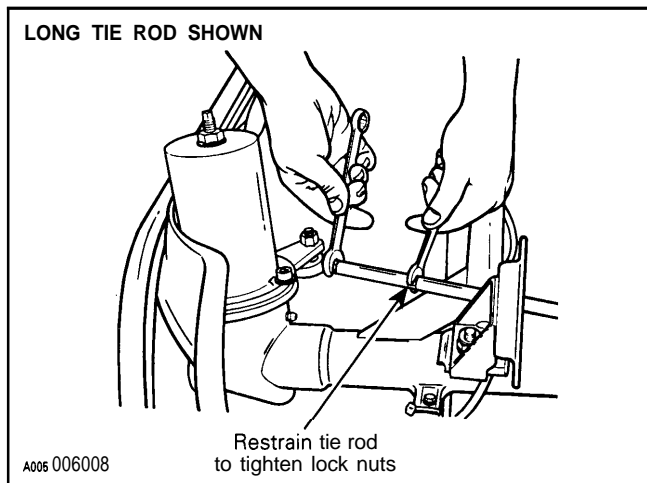


WARNING : Maximum ball joint external threaded length not engaged in the tie rod end must not exceed 15 mm (19/32 in). Torque lock nut to 20 N•m (15 lbf•ft).

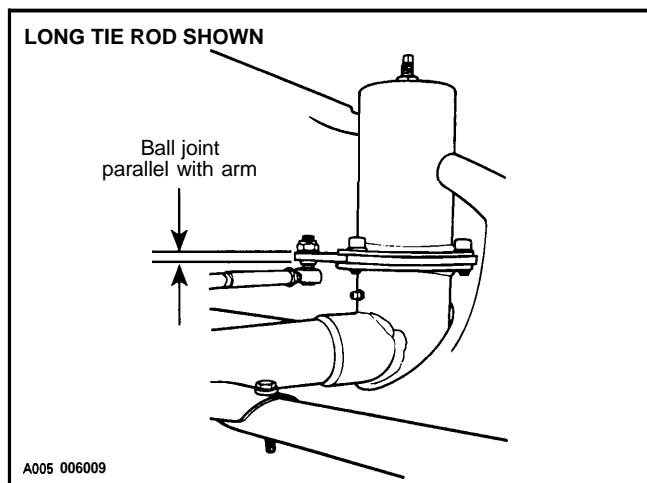
Section 08 STEERING/FRONT SUSPENSION
 Sub-Section 01 (STEERING SYSTEM)



Restrain tie rod while firmly retighten nuts so that ball joint sockets run parallel with steering arm and pivot arm.



WARNING : Ball joint sockets must run parallel with steering arm and pivot arm. Tie rod must be restrained when tightening lock nuts.



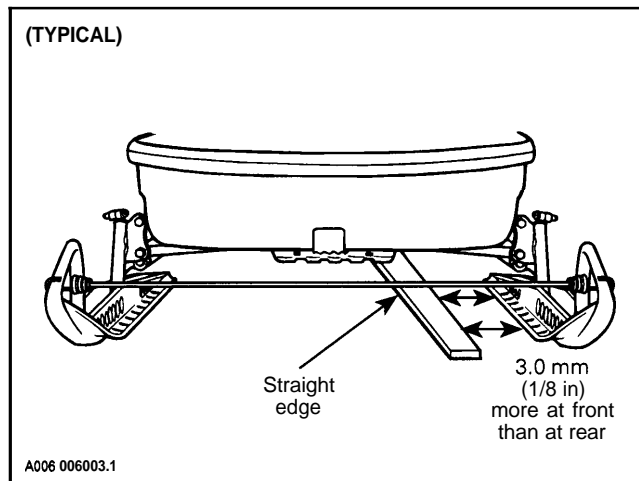
Ensure that pivot arm is still centered and check ski toe-out.

TOE-OUT

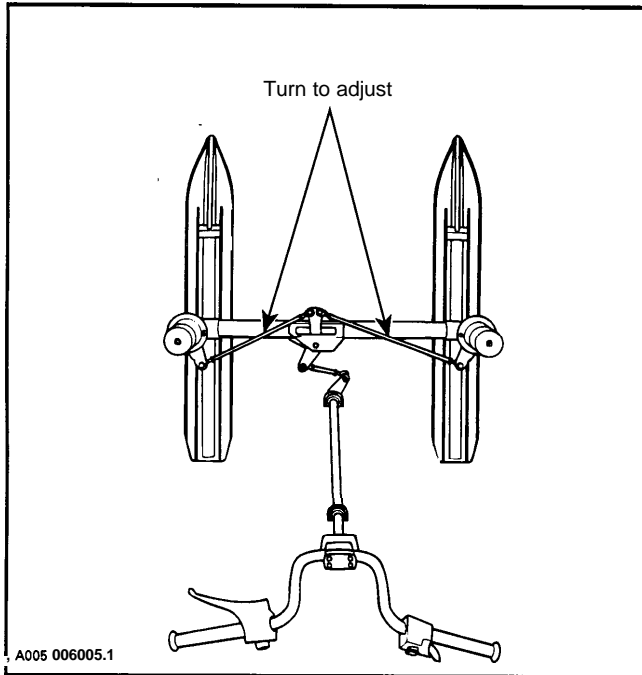
Loosen lock nuts of long tie rods and turn each tie rod so that skis are in a straight ahead position. To adjust toe-out, slightly turn both tie rods exactly the same amount.

Check external threaded length not engaged and firmly retighten nuts as specified above.

NOTE : To make sure skis are in straight-ahead position, place a straight edge against pre-adjusted track and measure distance between front and rear of skis and straight edge. Distances should be equal. After ski toe-out adjustment, distance at front of ski must be 3.0 mm (1/8 in) more than at rear on both sides for a total toe-out of 6 mm (1/4 in).



Section 08 STEERING/FRONT SUSPENSION
Sub-Section 01 (STEERING SYSTEM)



DSA S-Series

Adjustments should be performed following this sequence :

- Pivot arm centering.
- Set camber angle (except for S-Series).
- Check for horizontal handlebar.
- Set toe-out,

DSA System

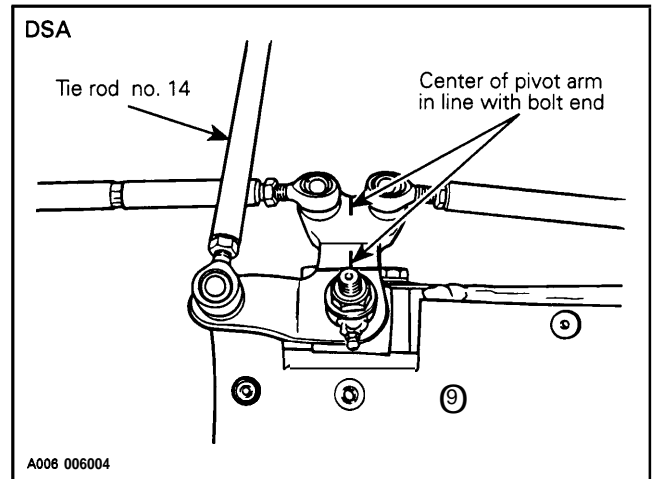
PIVOT ARM CENTERING

◆ **WARNING** : Do not attempt to adjust skis straight ahead position by turning ball joint on tie rod no. 14.

13,14, stat,22, Jam Nut, Tie Rod and Pivot Arm

With handlebar in straight position, center of pivot arm must be in line with end of bolt. Loosen jam nuts on tie rod no. 14 (LH threads on steering column end) and turn tie rod accordingly. Tighten jam nuts to 18 N•m (159 lbf•in).

◆ **WARNING** : Never lengthen tie rod so that threaded portion of ball joint exceeds 20 mm (25/32 in).



LUBRICATION

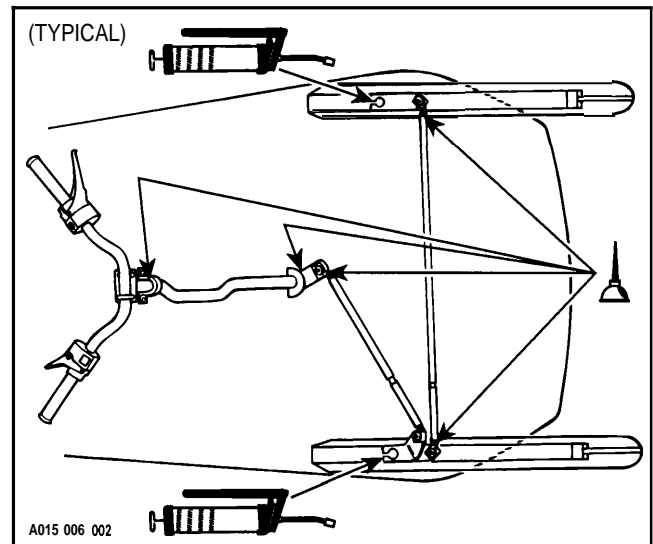
◆ **WARNING** : Do not lubricate throttle and/or brake cable, housing and spring coupler bolts.

Grease Fitting and Ski Leg

Use low temperature grease only (P/ N 4137061 00).

Élan

Lubricate the ski legs at grease fittings until new grease appears at joints. Lubricate steel on steel ball joints and steering column bushings.



Section 08 STEERING/FRONT SUSPENSION
Sub-Section 01 (STEERING SYSTEM)

Tundra II LT

Lubricate front suspension posts and pivot arm at grease fittings. Pump five strokes of grease gun on each post.

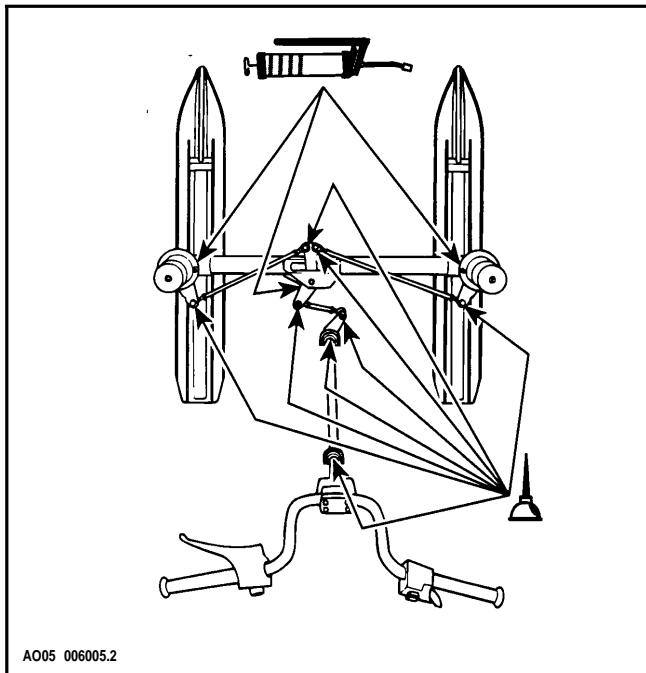
NOTE : There are three grease fittings.

○

Oil ball joints and steering column bushings.

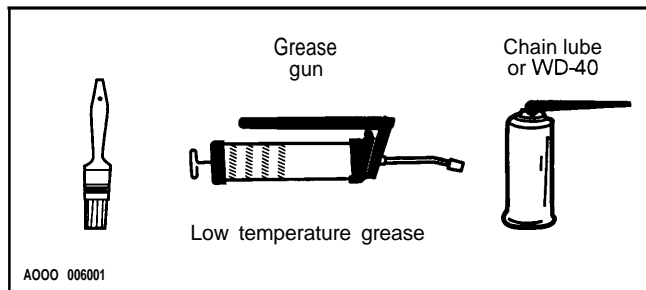
NOTE : There are eight lubrication points.

○



Other grease fittings require low temperature grease (P/ N 4137061 00) injected with a grease gun.

The following symbols will be used to show what type of lubricant should be used at the suitable locations.



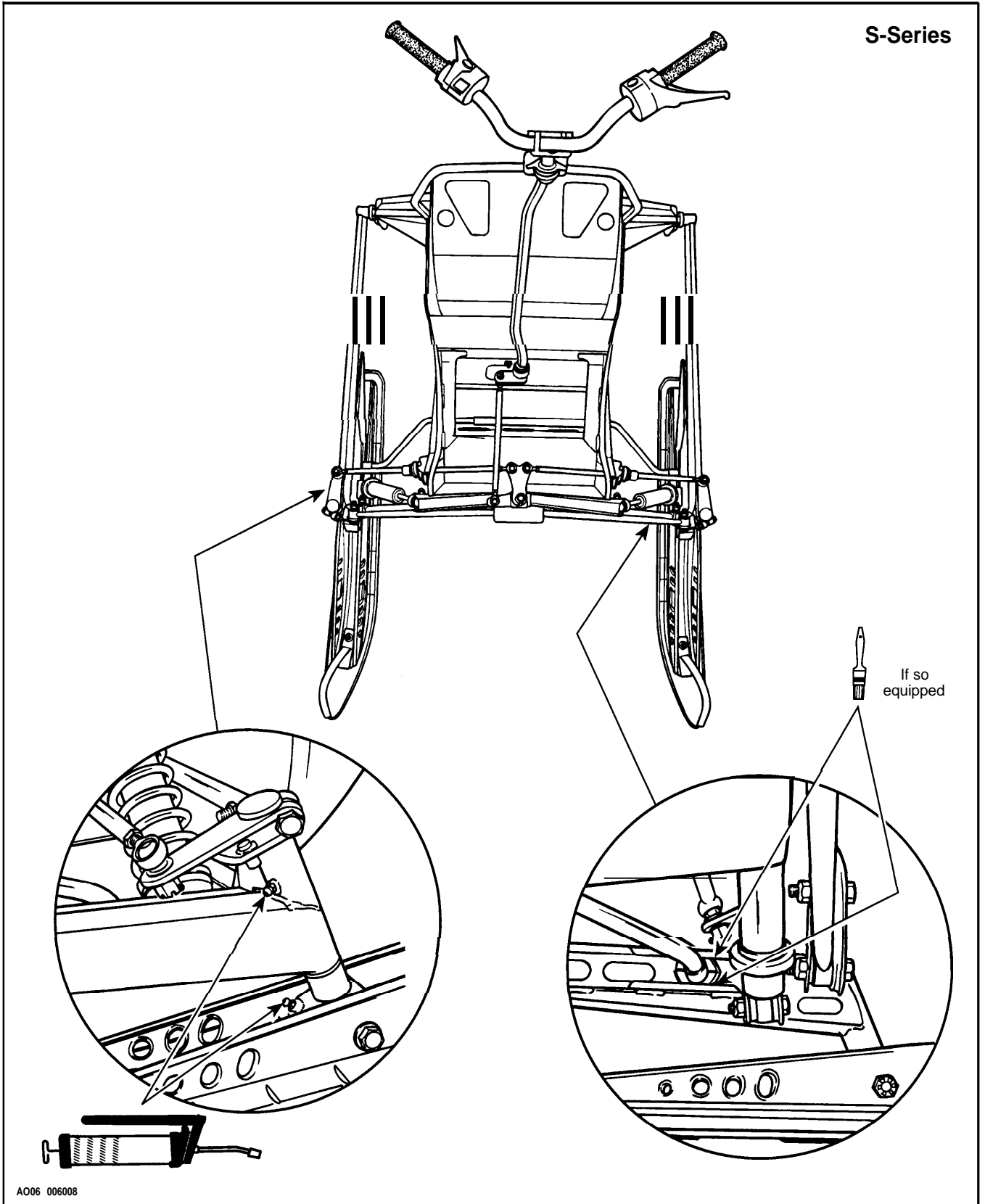
Lubricate :

S-Series

- Steering column.
- Upper and lower control arms drop link and tie rod ends.
- Grease ski legs, ski pivots and idler arm.
- Coat stabilizer sliders with grease, and oil their ball joints if so equipped.

Section 08 STEERING/FRONT SUSPENSION
Sub-Section 01 (STEERING SYSTEM)

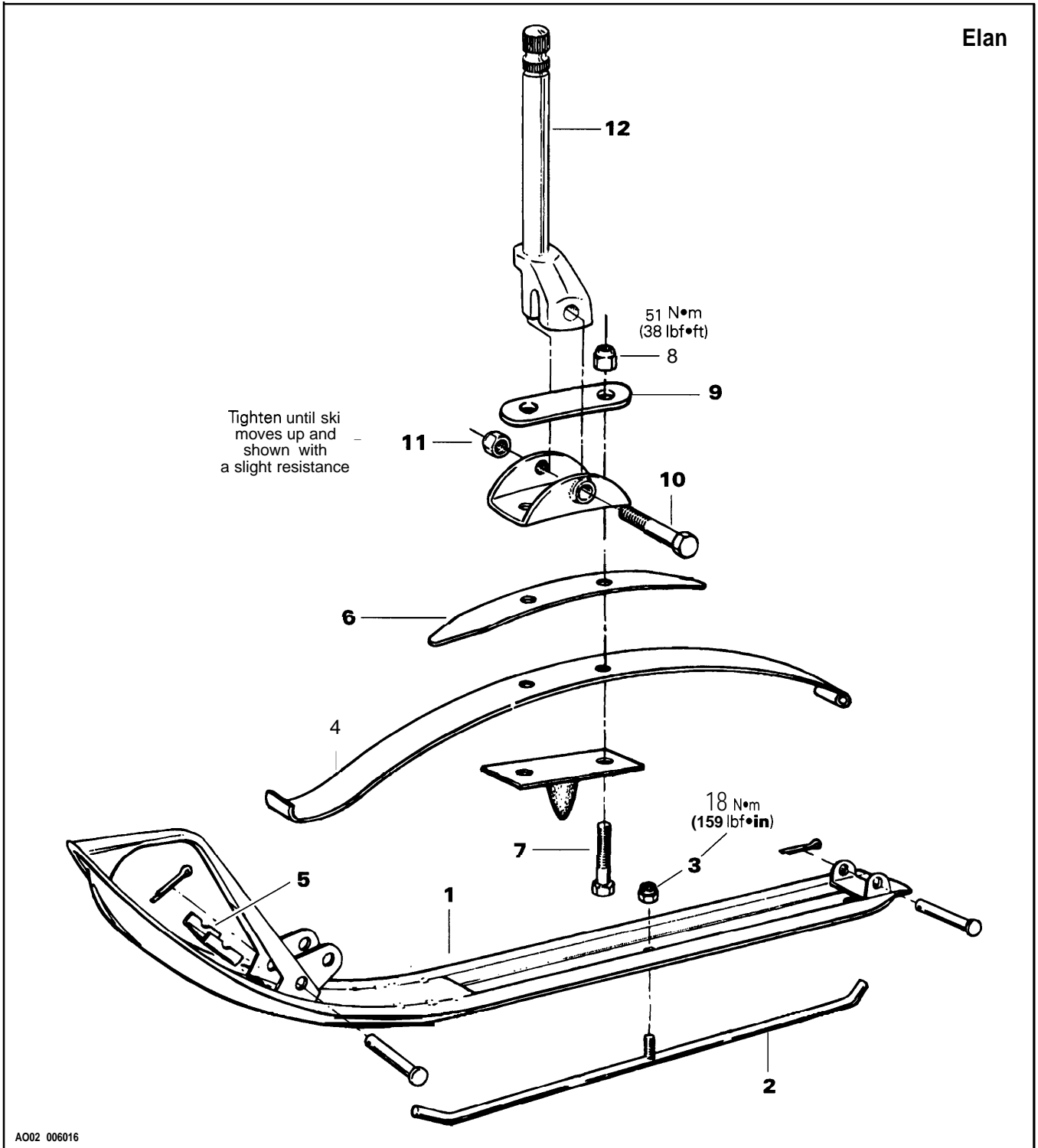
S-Series



AO06 006008

SUSPENSION AND SKI SYSTEM

SUSPENSION



Section 08 STEERING/ FRONT SUSPENSION
Sub-Section 02 (SUSPENSION AND SKI SYSTEM)

INSPECTION

1,2, Ski and Ski Runner

Check skis and ski runners for wear, replace as necessary.

12, Ski Leg

Make sure steering arm and ski leg splines interlock.

◆ **WARNING** : All parts having worn splines have to be changed by new ones.

Check general condition of steering system components for wear and replace if necessary.

DISASSEMBLY AND ASSEMBLY

2, Runner

◆ **WARNING** : Observe caution while prying or removing steel ski runners from ski slots as they are under tension and may spring out. Check that ski runners are not worn more than half of their original thickness.

Replace ski runner when half worn.

3, Nut

Torque to 18 N•m (159 lbf•in).

4,6, Main and Auxiliary Spring Leaf

▼ **CAUTION** : When disassembling leaf coupler from spring leaves, be careful of leaf tension.

7,8,9, Bolt, Nut and Locking Tab

When assembling spring leaves, cross each and temporarily insert one nut, locking tab and bolt. Position them parallel to each other and install the remaining bolt and nut, Tighten nuts to specified torque and bend tab from the locking tab, over the nuts.

◆ **WARNING** : Should removal of a nylon lock nut or cotter pin be required **when undergoing repairs / disassembly, always replace by new ones. Tighten as specified.**

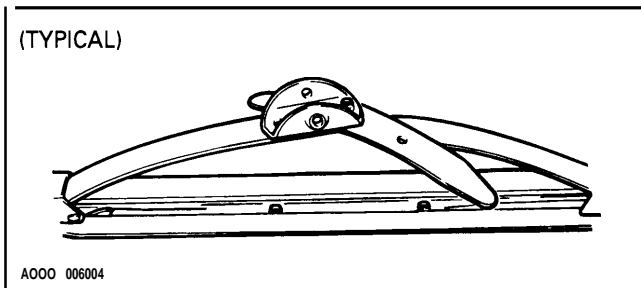
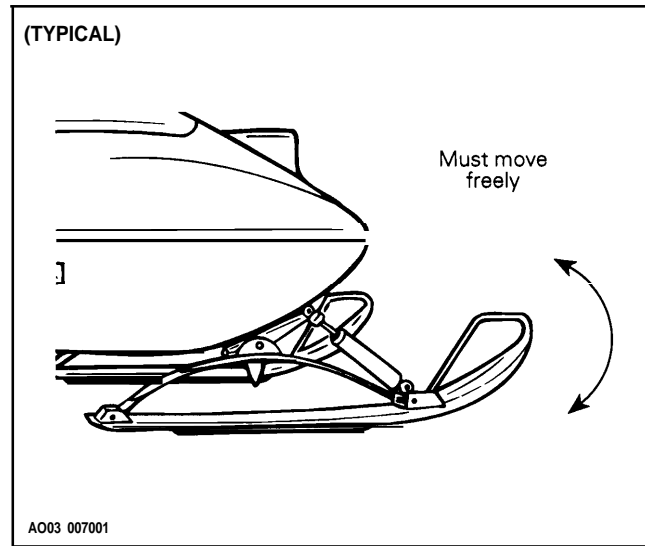
5, Spring Slider Cushion

Apply lithium grease on spring slider cushions at least once a year.

10,11, Spring Coupler Bolt and Nut

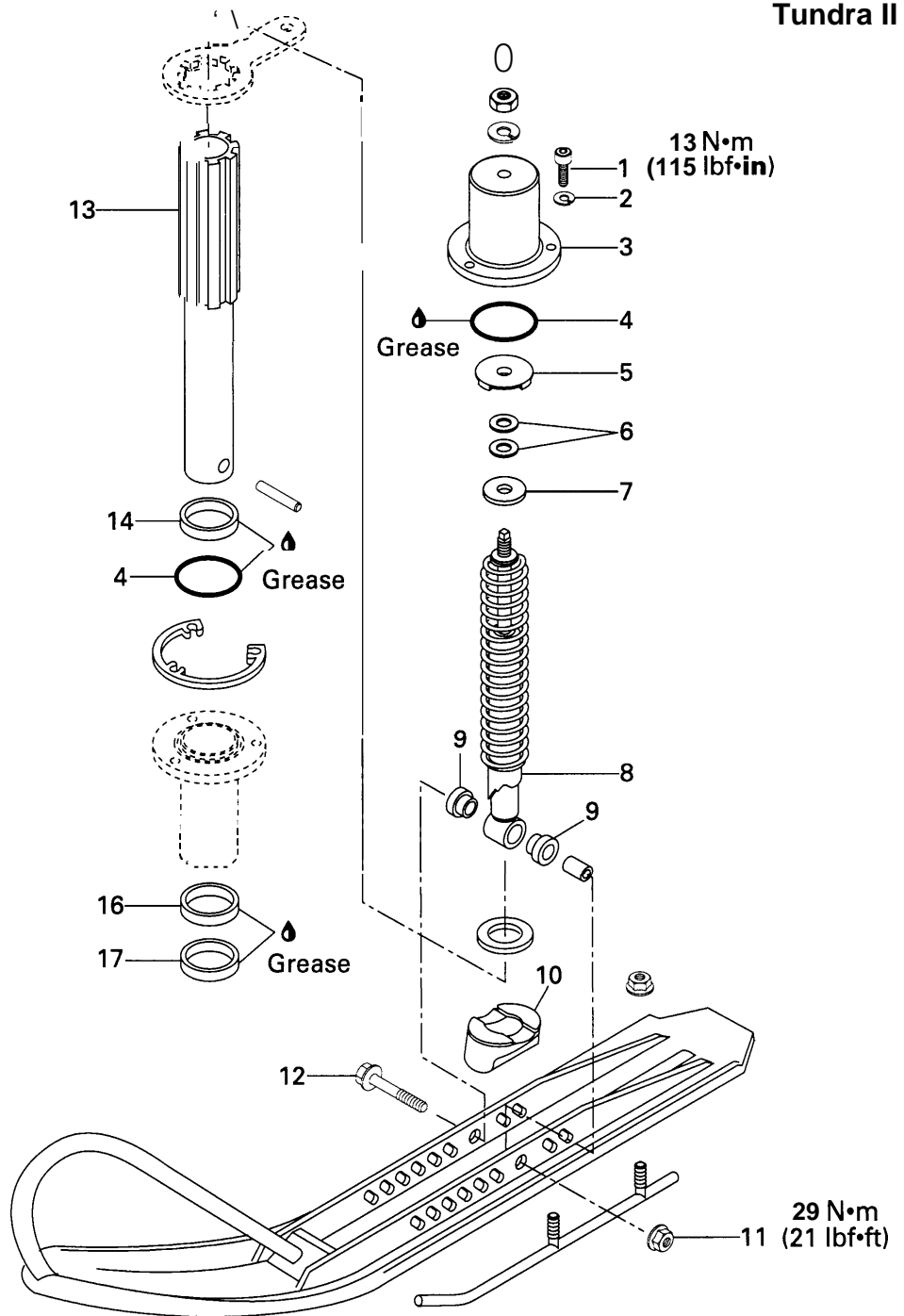
Tighten nut and move ski by hand to check that it pivots on ski leg.

▼ **CAUTION** : Ski must move easily by hand.



Section 08 STEERING/ FRONT SUSPENSION
Sub-Section 02 (SUSPENSION AND SKI SYSTEM)

Tundra II LT



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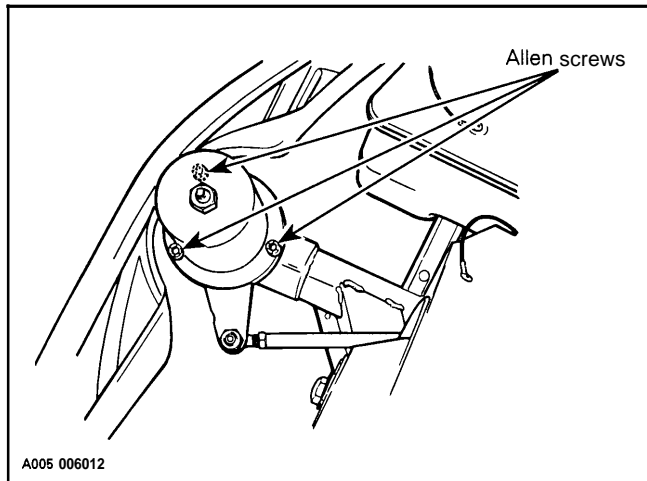
Section 08 STEERING/ FRONT SUSPENSION
Sub-Section 02 (SUSPENSION AND SKI SYSTEM)

ON-VEHICLE COMPONENT
VERIFICATION

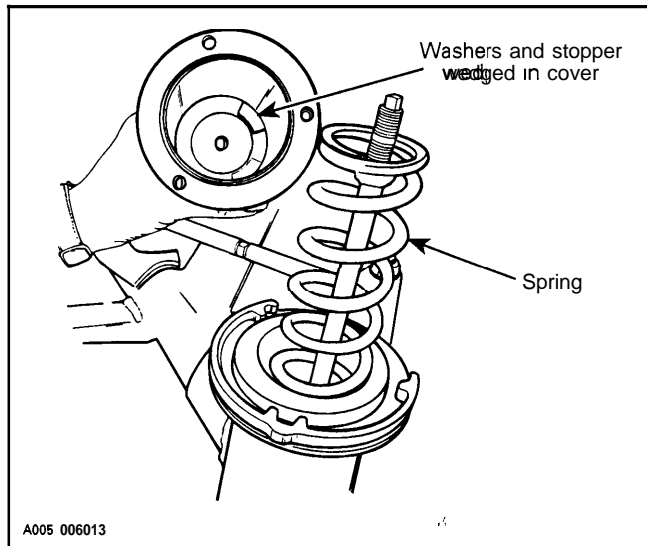
8, Shock

Lift front of vehicle and support off the ground.

Unscrew shock piston pin nut then remove washer.
Unscrew 3 Allen screws retaining cover no. 3, then
remove stopper no. 5, washers no. 6, washer no. 7.



O NOTE : These washers and stopper can be wedged in cover.



Pull out spring then check shock as described below in inspection.

Suspension Free Operation

Remove cover and check for free movement of ski leg by lifting end of ski.

DISASSEMBLY

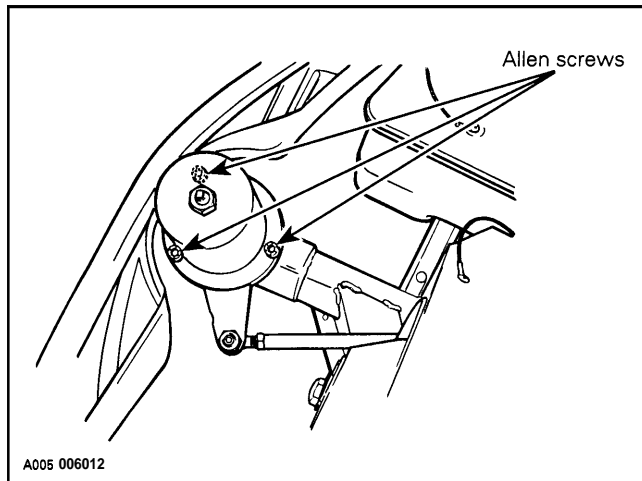
Lift front of vehicle and support off the ground.

1,2,3,5,6,7,9,11,12, Bolt, Lock Washer, Cover, Stopper, Bushing and Nut

Remove ski bolt, nut, bushings and ski.

Unscrew shock piston pin nut then remove washer. Shock with spring will fall off the ski leg.

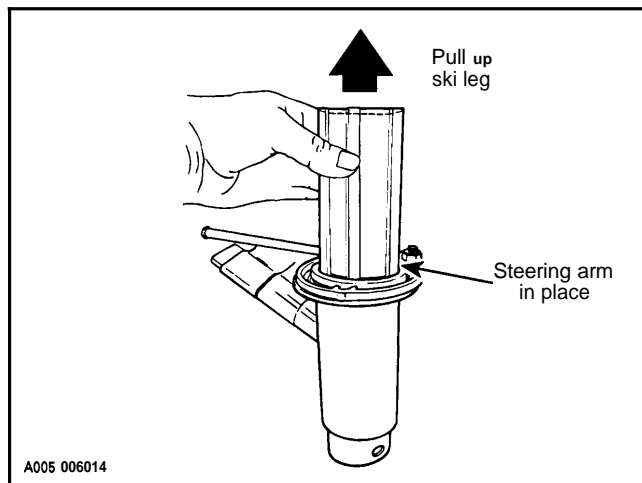
Unscrew 3 Allen screws retaining cover, then remove stopper and washers.



O NOTE : These washers and stopper can be wedged in cap.

4,13,14,16,17, O-ring, Ski Leg, Bushing and Seal

Pull up ski leg. Steering arm will not interfere.



Remove seal and O-rings. Drive out bushing if worn Out.

INSPECTION

13, Ski Leg

Check straightness of ski leg. Check for scored or scratched surface. Replace as required.

5, Stopper

Check condition of stopper. Replace it when deteriorated.

Grease fitting

Ensure that grease fittings are not clogged.

10, Stopper

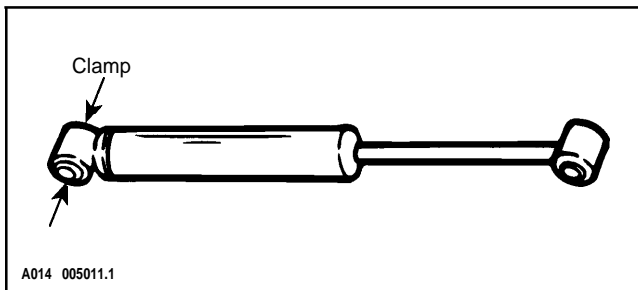
Check stopper for crack or deterioration. Replace as required.

13, Ski Leg

Check that splines on ski leg and steering arm interlock properly with no excessive free play. Renew as necessary.

8, Shock Absorber

Secure the shock body end in a vise.



CAUTION : Do not clamp directly on shock body.

Examine each shock for leaks. Extend and compress the piston several times over its entire stroke checking that it moves smoothly and with uniform 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.

Renew if any faults are present.

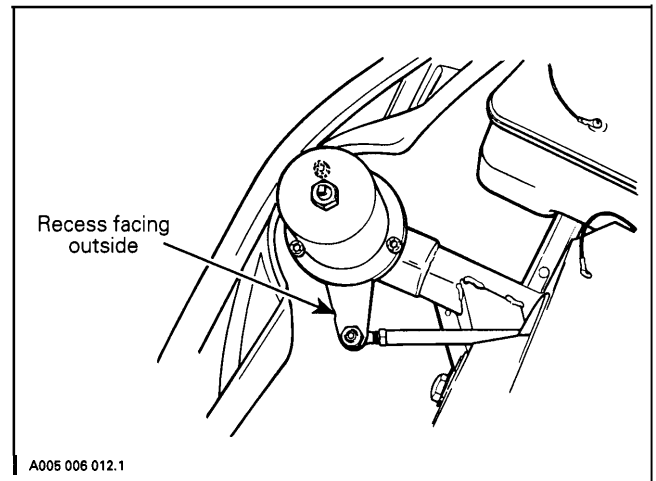
INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Apply low temperature grease (P/ N 4137061 00) as illustrated in exploded view above.

Tighten nuts and screws to proper torque as mentioned in exploded view,

Steering arm notch must face outside of vehicle.

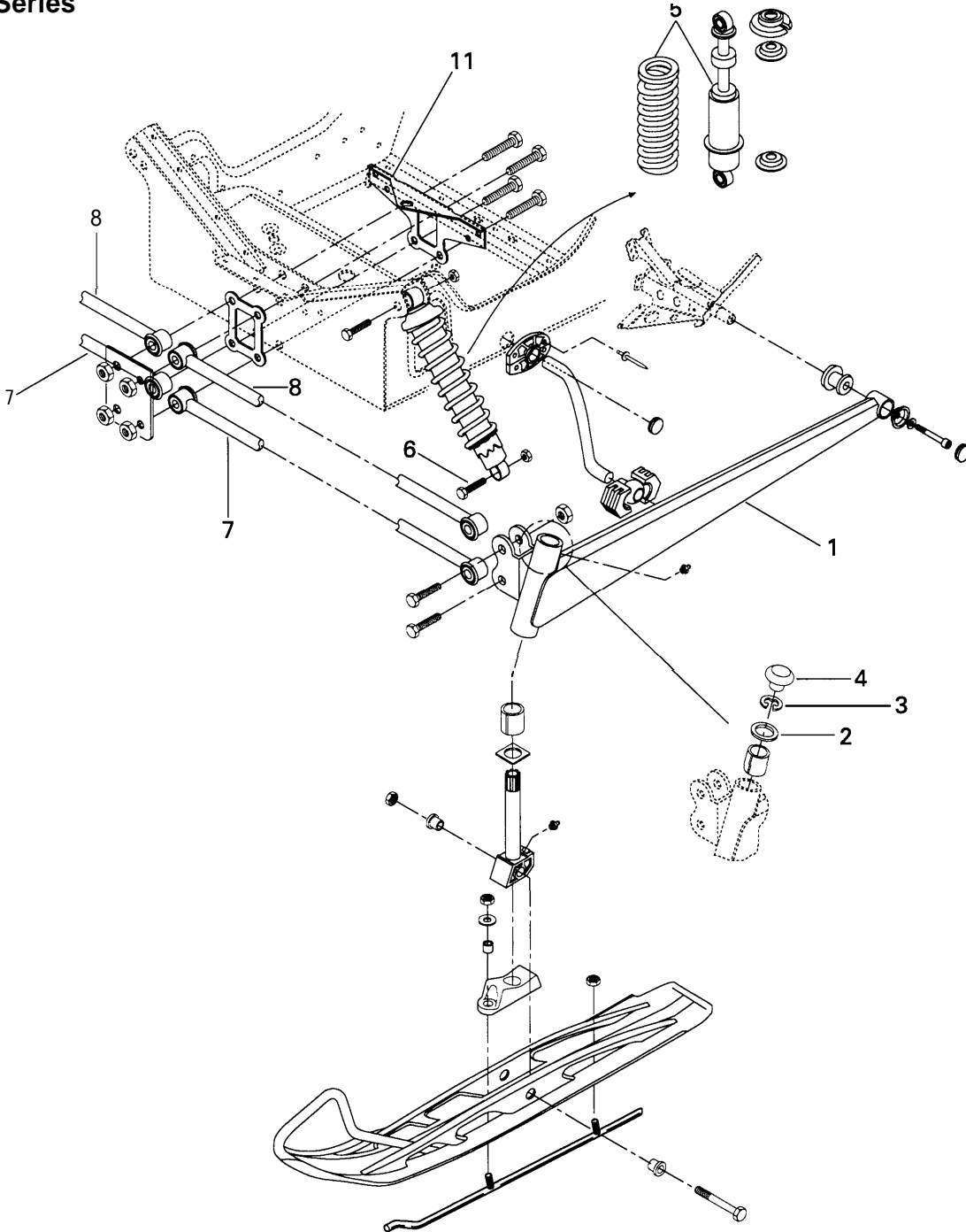


16,17, Seal

Install seal before reinstalling ski leg.

Section 08 STEERING/ FRONT SUSPENSION
Sub-Section 02 (SUSPENSION AND SKI SYSTEM)

S-Series



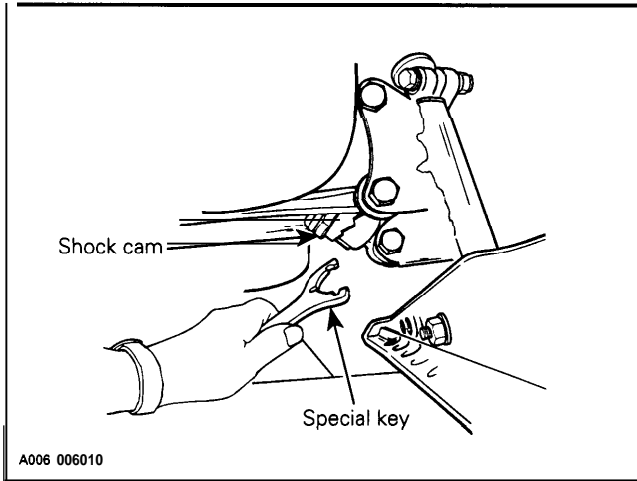
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DISASSEMBLY

5, Shock

Lift front of vehicle and support it off the ground.

Reduce spring preload by turning adjusting ring accordingly with special key in vehicle tool box.



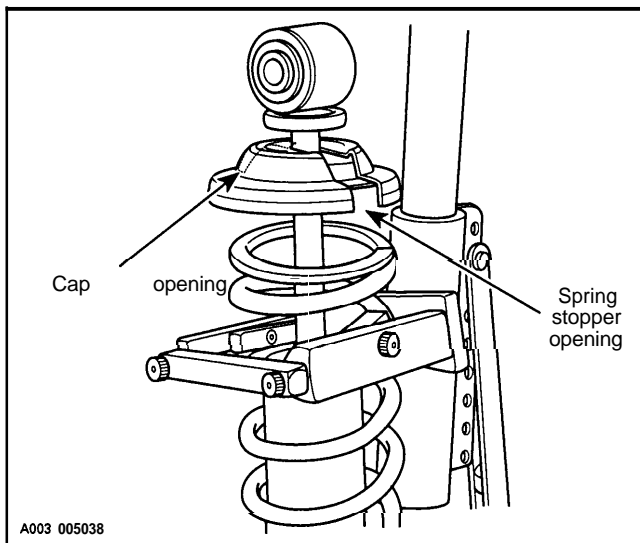
Remove lower bolt then upper bolt of shock.

For shock spring disassembly, use shock spring remover (P / N 5290271 00) in a vise. Mount shock in it and turn shock so that spring coils matched spring compressor.

Close and lock bar. Adjust handle horizontal by changing position of clevis pin.

Push down on handle until it locks. Remove spring stopper and cap then release handle.

At installation, cap opening must be 180° from spring stopper opening.



1, Swing Arm

Lift front of vehicle and support it off the ground.

Unbolt ski.

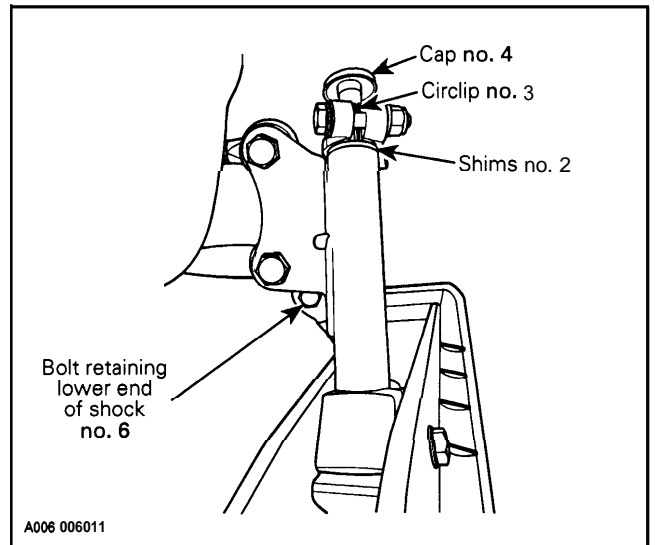
Remove cap, circlip then slacken steering arm bolt and pull up steering arm. Note shim positions. Ski leg may fall off from swing arm.

Unbolt lower end of shock from swing arm.

Unbolt half arms and tie rods.

Unbolt rear of swing arm from frame.

Pull swing arm off the vehicle. Stabilizer bar will disengage ball joint at swing arm inside rails.



INSPECTION

Check all rubber cushions for crack and wear. Replace as required.

Check straightness of splines and proper interlocking with steering arm. Replace as required.

Check for straightness of swing arm. Replace as required.

Check if grease fittings are not clogged.

Check proper action of sliding blocks in swing arm.

Check skis and runners for wear, replace as necessary.

Check condition of ski stopper. Replace it when deteriorated.

To check condition of shock, refer to 07-05 IMPROVED C-7 SUSPENSION then look for **Shock Servicing**.

Section 08 STEERING / FRONT SUSPENSION

Sub-Section 02 (SUSPENSION AND SKI SYSTEM)

INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Apply low temperature grease (P/ N 4137061 00) to ski leg components.

Tighten nuts and screws to proper torque as mentioned in exploded view.

7,8, Upper Half Arm and Tie Rod

Position half arms and tie rods horizontally before tightening nuts.

9,10,11, Bolt, Nut and Link Plate

Attach link plate to frame with additional nuts and bolts, if applicable.

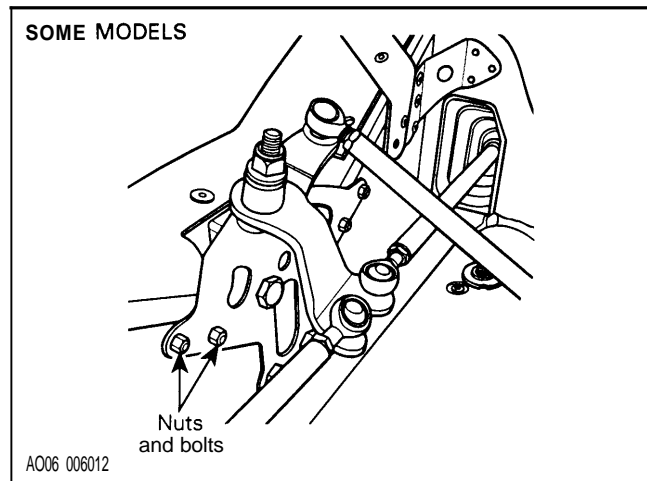


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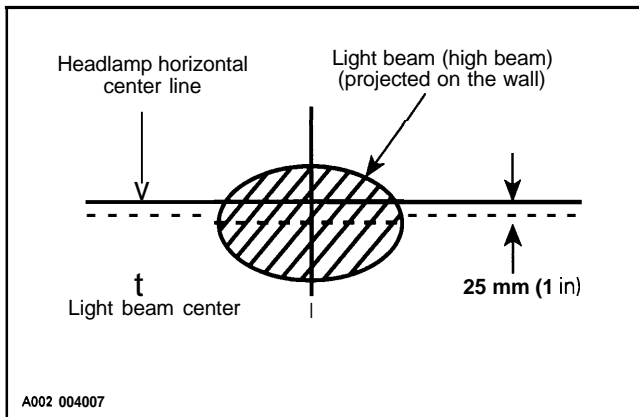
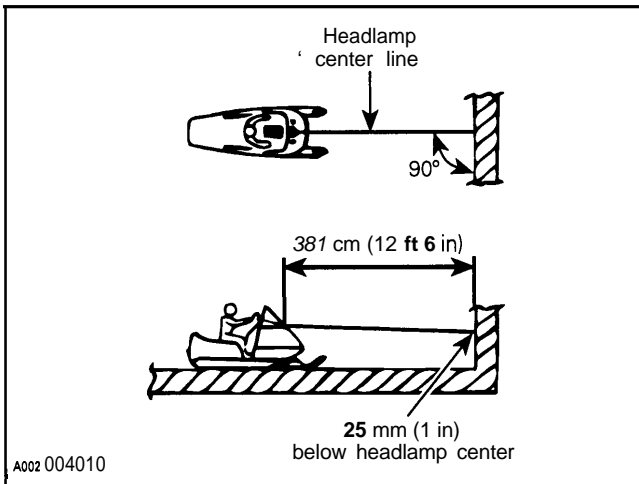
BODY

INSTALLATION AND ADJUSTMENT

HEADLAMP BEAM AIMING

Beam aiming is correct when center of high beam is 25 mm (1 in) below the headlamp horizontal center line, scribed on a test surface, 381 cm (12 ft 6 in) away.

Measure headlamp center distance from ground. Scribe a line at this height on test surface (wall or screen). Light beam center should be 25 mm (1 in) below scribed line.



Required Conditions

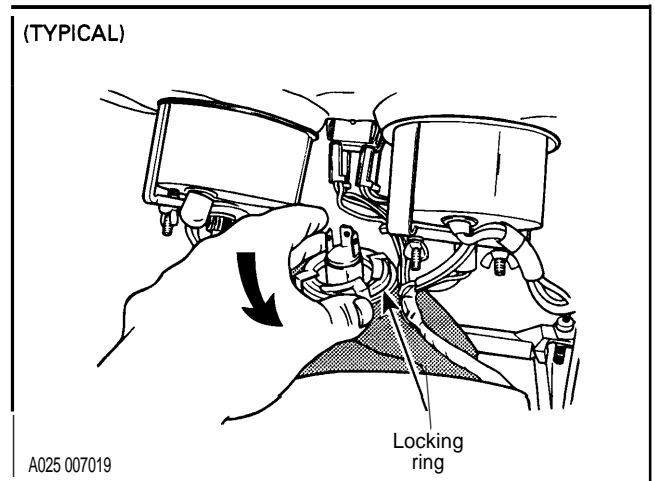
Place the vehicle on a flat surface perpendicular to test surface (wall or screen) and 381 cm (12 ft 6 in) away from it.

Rider or equivalent weight must be on the vehicle.

Select **high** beam.

BULB REPLACEMENT

If headlamp bulb is burnt, tilt cab and unplug the connector from the headlamp. Remove the rubber boot and unfasten the bulb retainer clips or locking ring.



Detach the bulb and replace. If the taillight bulb is burnt, expose the bulb by removing red plastic lens. To remove, unscrew the 2 retaining screws. Verify all lights after replacement.

CAUTION : Never touch glass portion of an halogen bulb with bare fingers, as it shortens its operating life. If by mistake glass is touched, clean it with isopropyl alcohol which will not leave a film on the bulb.

DECAL

To remove a decal ; heat old decal with a heat gun and peel off slowly.

Using isopropyl alcohol, clean the surface and dry thoroughly.

Apply liquid soap to new decal and carefully position the decal. Using a sponge or a squeegee, remove the air bubbles and surplus water working from the center toward the edges. Allow to air dry.

CAUTION : Do not apply isopropyl alcohol or solvent directly on decals.

Section 09 BODY / FRAME

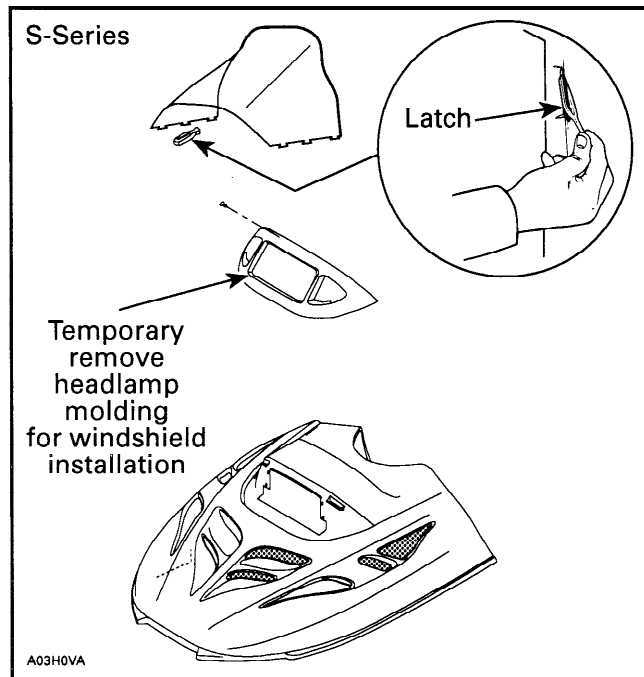
Sub-Section 01 (BODY)

WINDSHIELD INSTALLATION

When peeling off the protective film some polyethylene particles may remain on the windshield. A soft clean cloth moistened with naphtha (camping equipment fuel) will easily remove the remaining particles.

◆ **WARNING** : Naphtha is flammable and explosive under certain conditions. Always manipulate in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity.

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 latches as shown.



BELT GUARD

Disassembly and Assembly

○ **NOTE** : For additional information (ex. : exploded view) refer to the correspondent parts catalog.

◆ **WARNING** : Engine should be running only with belt guard and / or pulley guard well secured in place.

Inspection

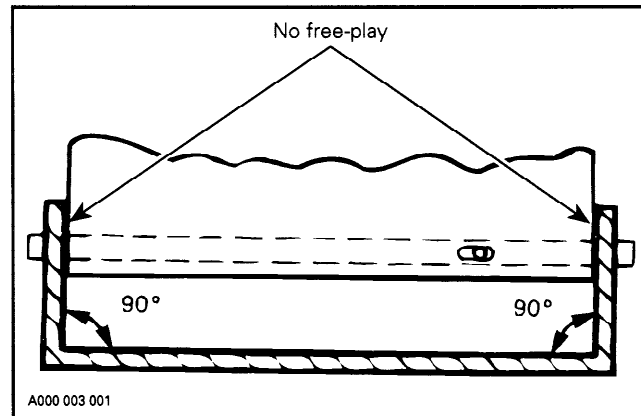
All Models

Check belt guard and / or pulley guard mounting bosses, clips and retainers for wear.

Élan

Check the spring-loaded retaining pin for free operation. Replace any damaged parts.

Prior to installation, ensure that pulley guard and frame bracket are 90° with frame.



◆ **WARNING** : No lateral free-play should exist between drive pulley guard and frame bracket.

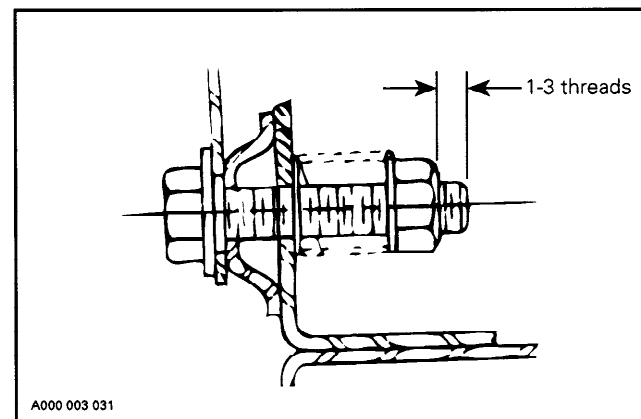
○ **NOTE** : Belt guards are purposely made slightly oversize to maintain tension on their clips and retainers preventing undue noise and vibration. It is important that this tension be maintained when reassembling.

Adjustment

Élan

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

An uncompressed front guard spring should not be less than 20 mm (13/16 in). When assembling adjust length as illustrated below.



WIRING HARNESS

◆ **WARNING** : Ensure all terminals are properly crimped on the wires and that all connector housings are properly fastened. Keep wires away from any rotating, moving, heating and vibrating parts. Use proper fastening devices as required.

CABLES

◆ **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 from any rotating, moving, heating, or vibrating parts.

PIPING

● **WARNING** : Always ensure that the fuel, vent, primer, impulse, injection oil and rotary valve oil lines are properly fixed to their connectors, that they are not perforated or kinked and that they are properly routed away from any rotating, moving, heating or vibrating parts. Also check for leaks. Replace if required.

○ **NOTE** : Refer to proper *Parts Catalog* to find suitable clip part numbers.

Section 09 BODY/ FRAME

Sub-Section 01 (BODY)

PLASTIC MAINTENANCE AND REPAIR

MAINTENANCE

Clean the vehicle thoroughly, removing all dirt and grease accumulation.

To clean use a soft clean cloth and either soapy water or isopropyl alcohol.

To remove grease, oil or glue use isopropyl alcohol.

▼ **CAUTION** : Do not apply isopropyl alcohol or acetone directly on decals.

▼ **CAUTION** : The following products must not be used to clean or wax any of the plastic components used on the vehicles :

- gasoline
- brake fluid
- kerosene
- diesel fuel
- lighter fluid
- varsol
- naphtha
- acetone
- strong detergents
- abrasive cleaners
- waxes containing an abrasive or a cleaning agent in their formula

▼ **CAUTION** : Clean R.I.M. Metton® with isopropyl alcohol only. Never use cleaners or products containing chlorine.

Apply wax on glossy finish only. Protect the vehicle with a cover to prevent dust accumulation during storage.

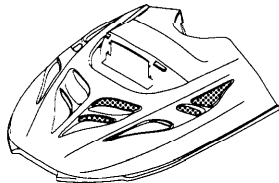
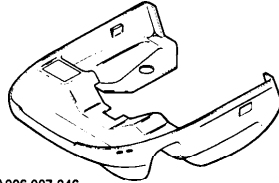
▼ **CAUTION** : If for some reason the snowmobile has to be stored outside it is preferable to cover it with an opaque tarpaulin. This will prevent the sun rays from affecting the plastic components and the vehicle finish.

REPAIR

The very first step before repairing plastic materials is to find out exactly which type of material is involved. Refer to following chart.

▼ **CAUTION** : Consult chart and repair kit instructions carefully, some repair products are not compatible with certain plastics.

◆ **WARNING** : Polycarbonate windshields must never be repaired by welding or otherwise.

PART	MODEL	REPAIRABLE	IRREPARABLE
		R.I.M. URETHANE	POLYETHYLENE
HOOD  <small>A03H104</small>	Elan		
	Tundra II LT		
	S-Series		
BOTTOM PAN  <small>A006 007 046</small>	Tundra II LT		
	S-Series		

MATERIAL REPAIR PROCEDURE

R.I. M. Urethane is light colored (tan) on the inside with a smooth surface,

◆ **WARNING** : Material should be repaired and repainted in a well ventilated area only.

▼ **CAUTION** : Clean R.I.M. with isopropyl alcohol or Crest Hi-Solv product. Never use cleaners or products that contain chlorine.

▼ **CAUTION** : R.I.M. should never be exposed to temperatures exceeding 93°C (200°F).

○ **NOTE** : When working on a R.I. M. surface, never use a grinder or a high revolution tool such as an air or electric buffer. Use of such tools could overheat material and liberate agents in it thus causing a bad adhesion.

REPAIR PROCEDURE FOR BOTH R.I.M. URETHANE

Small Scratches

- Sand and scuff area.
- Feather out edges.
- Paint with a matching acrylic auto touch-up paint.

Deep Scratches

- Sand and scuff area.
- Make a V groove using a knife or a rough round file.
- Clean surface with isopropyl alcohol or Crest Hi-Solv stock no. AH-S product.
- Cover with TP-E epoxy mixed in equal quantities.
- Heat the surface with a heater lamp placed at 38 cm (15 in) for a period of 15 minutes.
- Sand the repair using a smooth dry sand paper.
- Use the same product if a final finish is required.
- Clean surface with Crest Hi-Solv product,
- Apply a flexible primer such as Crest Prima Flex stock no. AP-F.
- Wait 10 minutes.
- Repaint (air dry during 72 hours (approximately)).

Large Crack

- Sand and scuff outside and inside area by exceeding it 31.7 mm (1-1/4 in) on each side and 12.7 mm (1/2 in) at each end.
- Make a V groove (appr. 90°) on both sides of hood using a knife or a rough round file.
- Enlarge the crack to 2.4 mm (3/32 in) -3.2 mm (1/8 in) using a sharp knife.
- Clean outside and inside surface with isopropyl alcohol or Crest Hi-Solv product.
- Repair inside surface first.
- Cover inside area with Crest TP-E epoxy.
- Apply a 50 mm x 30 mm (2 in x 1-1/4 in) patch. If no room for the patch, use tape.
- Cover exterior surface with same product. Damaged area should be slightly higher.
- Heat surface with a heater lamp placed at 38 mm (15 in) for a period of 15 minutes.
- Sand outside repair using a smooth dry sand paper.
- Use same product if a final finish is required.
- Apply a flexible primer.
- Wait 10 minutes.
- Repaint (air dry during 72 hours approximately).

○ **NOTE** : Both R.I.M. materials are high static plastics, painting must be done in a dust free area such as a paint booth.

Section 09 **BODY/ FRAME**

Sub-Section 01 (BODY)

CREST MAIN OFFICE AND MANUFACTURING PLANT

CREST INDUSTRIES, INC.

3841 13th Street
Wyandotte, Michigan
48192

Phone : **313-283-4100**
Toll Free : 1-800-822-4100
Fax : 1-800-344-4461
Fax : 313-283-4461

Crest products used in R.I. M. repair procedure are available from following locations :

DISTRIBUTOR WAREHOUSE LOCATIONS

UNITED STATES

CANADA

CREST EAST COAST, INC.

P.O. Box 550
1109 Industrial Parkway
Brick, New Jersey 08723
Phone : 908-458-9000
Fax : 908-458-5753

CREST PRODUCTS, INC.

Shipping Address:
125 Production Drive
Yorktown, Virginia 23693
Phone : 804-599-6572
Virginia : 1-800-572-5025
Outstate : 1-800-368-5033
Fax : 804-599-6630

Mailing Address:
P.O. Box 2018
Grafton, Virginia 23692

CREST INDUSTRIES SOUTHEAST, INC.

Shipping Address :
4300 Glen Haven Drive
Decatur, Georgia 30035
Phone : 404-288-4658
Toll Free : 1-800-552-0876
Fax : 404-288-4658

Mailing Address :
P.O. Box 254
Decatur, Georgia 30031

CREST INDUSTRIES, INC. (CREST MID-WEST)

231 Larkin Williams Ind. Court
St. Louis, Missouri 63026
Phone : 314-349-4800
Toll Free : 1-800-733-2737
Fax : 314-349-4888
Toll Free Fax: 1-800-776-2737

CREST MID WEST
Regional Branch Warehouses

CREST INDUSTRIES, INC.

P.O. Box 635
Mountain Home, Arkansas 72653
Phone : 501-491-5583
Toll Free : 1-800-733-2737

CREST INDUSTRIES, INC.

4200 Jackson Street, Unit 9
Denver, Colorado 80216
Phone : 303-320-3900
Toll Free : 1-800-733-2737
Fax : 303-320-6509

REM-CO DISTRIBUTING, INC.

5625 S. Adams
Tacoma, Washington 98409
Phone : 206-474-5414
Toll Free : 1-800-735-7224
Fax : 206-474-7339

J2 PRODUCTS
A Division of Sawill Ltd.

54 Audia Court, Unit 2A
Concord, Ontario, L4K 3N4

Phone:
Toronto : 416-665-1404
Concord : 905-669-9410
Montréal : 514-655-6505

Fax:
Concord : **905-669-9419**
Montréal : **514-655-6505**

WHEEL-IN AUTOMOTIVE SUPPLY

Shipping Address:
1, 3911A Brandon St. S.E.
Calgary, Alberta, T2G 4A7

Office : 403-287-0775

Mailing Address :
P.O. Box 40036
929-42nd Avenue S.E.
Calgary, Alberta, T2G 5G5

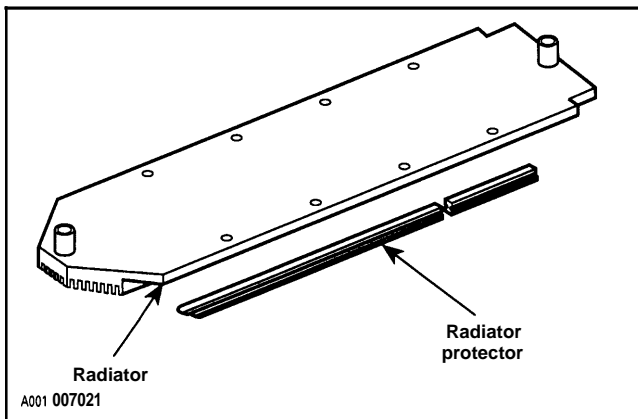
FRAME

FRAME CLEANING

NOTE : For aluminum frames use only aluminum cleaner and follow instructions on container. (Dursol cleaner **or** equivalent).

Clean frame and tunnel with appropriate cleaners and rinse with high pressure hose.

On liquid cooled models carefully clean radiators and check condition of radiator protectors. The protectors should extend far enough to keep the track from rubbing on the radiators.



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 models, it is recommend to clean the seat with a solution of **warm soapy water**, using a **soft clean cloth**.

CAUTION : Avoid use of harsh detergents such as strong soaps, decreasing solvents, abrasive cleaners, paint thinners, etc. that may cause damage to the seat cover.

FRAME WELDING

Steel Frame :

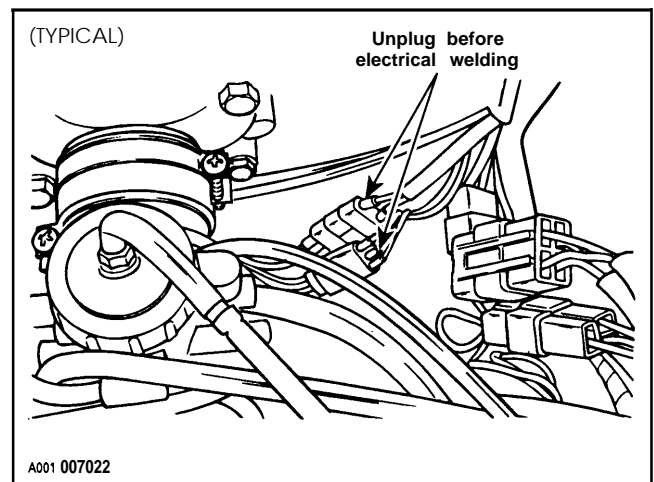
- electric welding
- amperage : 70-110 A
- voltage : 20-24 V
- rod : E-7014 (3/32 in)

Aluminum Frame :

- (refer to specialized welding shop)
- argon-oxygen / acetylene welding
- rod : ER-4043 (3/32 in)

CAUTION : Before performing electrical welding anywhere on the vehicle, unplug the multiple connector at the electronic box for models equipped with a battery, unplug the negative cable. This will protect the electronic box and battery against damage caused by flowing current when welding.

NOTE : This procedure applies to all electronic ignition systems.



CAUTION : If welding is to be done near plastic material, it is recommended to either remove the part from the area or to protect it with aluminum foil to prevent damage.

Section 09 **BODY/FRAME**
Sub-Section 02 (FRAME)

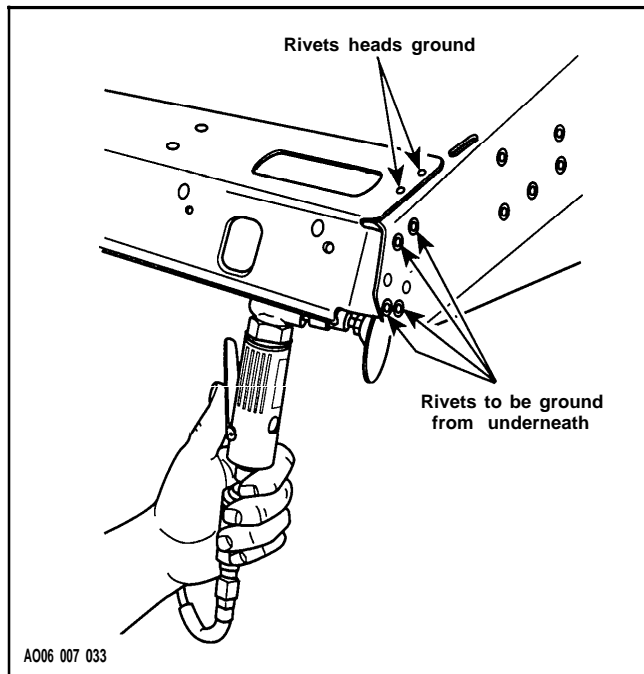
FRAME COMPONENT REPLACEMENT

S-series

▼ **CAUTION** : Do not attempt to drill hardened self-piercing rivets. Always grind rivet heads for removal.

Rear Cap

Grind rivet heads from top of rear cap and underneath for side retaining rivets.



To remove rivet, strike with a punch from rivet head side.

Make a chamfer from underneath on all 4 corner holes.

TECHNICAL DATA

SI* METRIC INFORMATION GUIDE

BASE UNITS			
DESCRIPTION	UNIT	SYMBOL	
length	meter	m	
mass	kilogram	kg	
force	newton	N	
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	0.01
milli	m	one thousandth	0.001
micro	μ	one millionth	0.000001

CONVERSION FACTORS			
TO CONVERT	TO †	MULTIPLY BY	
in	mm	25.4	
in	cm	2.54	
in ²	cm ²	6.45	
in ³	cm ³	16.39	
ft	m	0.3	
Oz	g	28.35	
lb	kg	0.45	
lbf	N	4.4	
lbf•in	N•m	0.11	
lbf•ft	N•m	1.36	
lbf•ft	lbf•in	12	
PSI (lbf/in ²)	kPa	6.89	
imp. oz	U.S. Oz	0.96	
imp. oz	mL	28.41	
imp. gal	U.S. gal	1.2	
imp. gal	L	4.55	
U.S. Oz	mL	29.57	
U.S. gal	L	3.79	
MPH	km/h	1.61	
Fahrenheit	Celsius	("F - 32) + 1.8	
Celsius	Fahrenheit	("C x 1.8) + 32	

* The international system of units abbreviates SI in all languages.


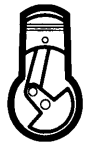

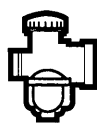


† To obtain the inverse sequence, divide by the given factor. To convert "mm" to "in", divide by 25.4.




NOTE : Conversion factors are rounded off to 2 decimals for easier use.





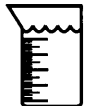
Section 10 TECHNICAL DATA
Sub-Section 02 (ENGINES)

NOTE : These specifications cover all vehicles except swedish models.

		VEHICLE MODEL	ÉLAN	TUNDRA II LT	TOURING E, TOURING E LT, SKANDIC 380, FORMULA S	TOURING LE	TOURING SLE, SKANDIC 500, FORMULA SL	
		ENGINE TYPE	247	277	377	443	503	
	Number of Cylinders		1	1	2	2	2	
	Bore	mm (in)	69.50 (2.736)	72.00 (2.835)	62.00 (2.441)	67.5 (2.66)	72.00 (2.835)	
	Stroke	mm (in)	66.00 (2.598)	66.00 (2.598)	61.00 (2.402)	61.00 (2.402)	61.00 (2.402)	
	Displacement	cm ³ (in ³)	250.40 (15.28)	268.70 (16.40)	368.30 (22.48)	436.6 (26.64)	496.70 (30.31)	
	Compression Ratio (corrected)		5.70	6.70	6.80	6.4	6.20	
	Maximum Power Engine Speed Φ	RPM	5100 – 5300	6800 – 7000	6800 – 7000	7000 – 7200	7000 – 7200	
	Piston Ring Type	1 st / 2 nd	R / R	ST / R	ST / R	ST / R	ST / R	
	Ring End Gap	(new)	mm (in)	0.2 (.008)	0.2 (.008)	0.2 (.008)	0.2 (.008)	0.2 (.008)
		(wear limit)	mm (in)	1.0 (.039)	1.0 (.039)	1.0 (.039)	1.0 (.039)	1.0 (.039)
	Ring / Piston Groove Clearance	(new)	mm (in)	0.04 (.0016)	0.04 (.0016)	0.04 (.0016)	0.04 (.0016)	0.04 (.0016)
		(wear limit)	mm (in)	0.2 (.008)	0.2 (.008)	0.2 (.008)	0.2 (.008)	0.2 (.008)
	Piston / Cylinder Wall Clearance	(new)	mm (in)	0.085 (.0034)	0.070 (.0028)	0.050 (.0020)	0.050 (.0020)	0.080 (.0031)
		(wear limit)	mm (in)	0.2 (.008)	0.2 (.008)	0.2 (.008)	0.2 (.008)	0.2 (.008)
	Connecting Rod Big End Axial Play	(new)	mm (in)	0.21 (.0083)	0.20 (.0079)	0.20 (.0079)	0.20 (.0079)	0.2 (.0079)
		(wear limit)	mm (in)	1.0 (.0394)	1.0 (.0394)	1.0 (.0394)	1.0 (.0394)	1.0 (.0394)
	Maximum Crankshaft End-play Φ	mm (in)	0.3 (.0118)	0.3 (.0118)	0.3 (.0118)	0.3 (.0118)	0.3 (.0118)	
	Maximum Crankshaft Deflection	mm (in)	0.08 (.0031)	0.08 (.0031)	0.08 (.0031)	0.08 (.0031)	0.08 (.0031)	
	Rotary Valve Timing Φ	Opening Closing	N.A.	N.A.	N.A.	N.A.	N.A.	
		Magneto Generator Output		W	75 / 23	160	240	240
		Ignition Type			BP	CDI	CDI	CDI
Spark Plug Make and Type			Bosch M7A	NGK BR9ES	NGK BR9ES	NGK BR9ES		
Spark Plug Gap		mm (in)	0.55 (.022)	0.45 (.018)	0.45 (.018)	0.45 (.018)	0.45 (.018)	
Ignition Timing BTDC Φ		mm (in)	3.75 – 4.23 (.148 – .167) Φ	2.52 (.099)	1.68 (.066)	1.68 (.066)	1.66 (.065)	
Generating Coil Φ		Low Speed : Ω		3.0 – 3.7	40 – 76	N.A.	N.A.	
		High Speed : Ω		N.A.	N.A.	230 – 330	230 – 330	
Lighting Coil Φ		Ω		0.38 – 0.58 Φ	0.05 – 0.6	0.23 – 0.28	0.23 – 0.28	
High Tension Coil Φ		Primary	Ω	1.805 – 1.995	0.11 – 0.21	N.A.	N.A.	
		Secondary	k Ω	7.6 – 11.4	4.9 – 7.5	5.1 – 6.3	5.1 – 6.3	
	Carburetor Type		PTO / MAG	VM 28-470	VM 34-433	2 x VM 30-186	2 x VM 34-467	
	Main Jet		PTO / MAG	160	190	140 / 140	180 / 180	
	Needle Jet			182 O-8	159 O-8	159 P-0	159 P-1	
	Pilot Jet			30	40	40	40	
	Needle Identification – Clip Position			6DP1-3	6DH4-2	6DP9-3	6DH2-3	
	Slide Cut-away			2	2.5	2.5	2.5	
	Float Adjustment	\pm 1 mm (\pm 0.40 in)		17.3 (.68)	23.9 (.94)	23.9 (.94)	23.9 (.94)	
	Air Screw Adjustment	\pm 1/8 Turn		1.5	1	1.25	2.25	
	Idle Speed RPM	RPM		1100 – 1300	1100 – 1300	1500 – 1800	1500 – 1800	
	Gas Type / Pump Octane number			Unleaded / 87	Unleaded / 87	Unleaded / 87	Unleaded / 87	
Gas / Oil Ratio			50 : 1	Injection	Injection	Injection		
	Type			Radial Fan	Radial Fan	Axial Fan	Axial Fan	
	Axial Fan Belt Adjustment	Deflection	mm (in)	N.A.	N.A.	8 – 9 (.31 – .35)	8 – 9 (.31 – .35)	
		Force Φ	kg (lbf)	N.A.	N.A.	5 (11)	5 (11)	
	Thermostat Opening Temperature		$^{\circ}$ C ($^{\circ}$ F)	N.A.	N.A.	N.A.	N.A.	
Radiator Cap Opening Pressure		kPa (PSI)	N.A.	N.A.	N.A.	N.A.		
	ENGINE COLD							
	Drive Pulley Retaining Screw Φ		N-m (lbf-ft)	95 – 108 (70 – 80)	85 (63)	95 (70)	95 (70)	
	Exhaust Manifold Nuts or Bolts			22 (16)	22 (16)	22 (16)	22 (16)	
	Magneto Ring Nut			80 (59)	90 (66)	105 (77)	105 (77)	
	Crankcase Nuts or Screws	M6		10 (7)	10 (7)	10 (7)	—	
		M8		22 (16)	22 (16)	22 (16)	22 (16)	
	Crankcase / Engine Support Nuts or Screws			38 (28)	20 (15)	38 (28)	38 (28)	
Cylinder Head Nuts			22 (16)	26 (19)	22 (16)	22 (16)		
Crankcase / Cylinder Nuts or Screws			N.A.	N.A.	N.A.	N.A.		
Axial Fan Shaft Nut			N.A.	N.A.	50 (37)	50 (37)		


Section 10 TECHNICAL DATA
Sub-Section 03 (VEHICLES)




 NOTE : These specifications cover all vehicles except Swedish models.

		VEHICLE MODEL	ÉLAN	TUNDRA II LT	TOURING E, FORMULA S	TOURING E LT
		ENGINE TYPE	247	277	377	377
		Chain Drive Ratio	10/25	14/25	21/44	21/44
Chain	Pitch (in)	1/2	1/2	3/8	3/8	
	Type / Links Qty / Plates Qty	Single / 62	Single / 62	Silent / 72 / 11	Silent / 74 / 11	
Drive Pulley	Type of Drive Pulley	Bombardier Lite	Bombardier Lite	Bombardier Lite	Bombardier Lite	
	Ramp Identification	N.A.	N.A.	N.A.	N.A.	
	Calibration Screw Position or Calibration Disc Quantity	N.A.	N.A.	6	6	
	Spring Color	Blue	Turquoise	Violet	Violet	
	Spring Length ± 1.5 mm (± 0.060 in)	N.A.	N.A.	102 (4.02)	82 (3.23)	
		Clutch Engagement RPM	2000 – 2200	3000 – 3200	3000 – 3200	2800 – 3000
		Driven Pulley Spring Preload kg (lb)	2.6 – 4.3 (4.6 – 9.5)	2.6 – 4.6 (5.7 – 10.1)	4.1 – 5.5 (9.0 – 12.1)	4.1 – 5.5 (9.0 – 12.1)
		Cam Angle degree	40.4°	37.8°	44°	44°
		Pulley Distance Z $(+0, -1)$ mm $((+0, -1/32)$ in)	45.8 (1-13/16)	37 (1-29/64)	25.5 (1)	25.5 (1)
Offset	X ± 0.4 mm ($\pm 1/64$ in)	34.4 (1-23/64)	36 (1-27/64)	33.4 (1-5/16)	33.4 (1-5/16)	
	Y - X MIN. MAX.	-.75 (- 0.300) +.75 (+ 0.300)	- 0 (- 0.000) + 1.5 (+ 0.059)	+ 0.5 (+ 0.020) + 1.5 (+ 0.059)	+ 0.5 (+ 0.020) + 1.5 (+ 0.059)	
		Drive Belt Part Number (P / N)	570 0411 00	414 8276 00	414 8833 00	414 8833 00
		Drive Belt Width (new) \varnothing mm (in)	30.2 (1-3/16)	33.3 (1-5/16)	34.3 (1-3/8)	34.3 (1-3/8)
Drive Belt Adjustment	Deflection mm (in)	33 \pm 3 (3/4)	32 \pm 5 (1-1/4 \pm 13/64)	32 \pm 5 (1-1/4 \pm 13/64)	32 \pm 5 (1-1/4 \pm 13/64)	
	Force \varnothing kg (lbf)	5 (11)	6.8 (15)	6.8 (15)	6.8 (15)	
Track	Width cm (in)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)	
		Length cm (in)	290 (114.17)	354 (139)	307 (121)	345 (136)
	Adjustment	Deflection mm (in)	35 (1-3/8)	35 – 45 (1-3/8 – 1-3/4)	40 – 55 (1-9/16 – 2-5/32)	40 – 55 (1-9/16 – 2-5/32)
		Force \varnothing kg (lbf)	N.A.	N.A.	7.3 (16)	7.3 (16)
Suspension Type	Track	Bogie Wheels	Torque Reaction Slide	Slide	Slide	
	Ski	Multi Leafs	Telescopic Strut	DSA	DSA	
	Length cm (in)	224.8 (88.5)	284.5 (112)	272.5 (107.3)	292 (115)	
	Width cm (in)	76.8 (30.3)	95.3 (37.5)	115.6 (45.5)	115.6 (45.5)	
	Height cm (in)	109.5 (43.1)	114 (44.9)	122 (48.0)	122 (48.0)	
	Ski Stance cm (in)	64.8 (25.5)	81.3 (32.0)	101.6 (40)	101.6 (40)	
	Mass (dry) kg (lb)	129 (284)	171 (377)	Touring : 204 (449) Formula : 195 (430)	205 (452)	
	Ground Contact Area cm ² (in ²)	6494 (1007)	7864 (1219)	6503 (1008)	7227 (1120)	
	Ground Contact Pressure kPa (PSI)	1.95 (.283)	2.13 (.309)	Touring : 3.08 (.447) Formula : 2.94 (.426)	2.78 (.403)	
	Frame Material	Steel	Steel	Aluminum	Aluminum	
	Bottom Pan Material	Steel	Polyethylene High Density	Polyethylene	Polyethylene	
	Cab Material	Polyethylene	Polyethylene High Density	RRIM Polyurethane	RRIM Polyurethane	
		Battery V (A*h)	N.A.	N.A.	Touring : 12 (22) Formula : N.A.	12 (22)
Headlight W		H4 60/55	H4 60/55	H4 60/55	H4 60/55	
Taillight and Stoplight W		8/27	8/27	8/27	8/27	
Tachometer and Speedometer Bulb W		N.A.	N.A.	Touring : 5 Formula : 2 x 3	5	
Fuel and Temperature Gauge Bulb W		N.A.	N.A.	N.A.	N.A.	
Fuse		Starter Solenoid A	N.A.	N.A.	Touring : 30 Formula : N.A.	30
	Tachometer A	N.A.	N.A.	N.A.	N.A.	
	Fuel Tank L (U.S. gal)	13.6 (3.6)	26 (6.9)	40 (10.6)	40 (10.6)	
	Chaincase / Gearbox mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)	250 (8.5)	
	Cooling System L (U.S. oz)	N.A.	N.A.	N.A.	N.A.	
	Injection Oil Reservoir L (U.S. oz)	N.A.	1.9 (64)	2.55 (86)	2.55 (86)	

Section 10 TECHNICAL DATA

Sub-Section 03 (VEHICLES)

 NOTE : These specifications cover all vehicles except Swedish models.

		VEHICLE MODEL	TOURING LE	SKANDIC 380	TOURING SLE, SKANDIC 500	FORMULA SL	
		ENGINE TYPE	443	377	503	503	
		Chain Drive Ratio	21/44	21/44	21/44	22/44	
	Chain	Pitch (in)	3/8	3/8	3/8	3/8	
		Type / Links Qty / Plates Qty	Silent / 72 / 11	Silent / 72 / 11	Silent / 72 / 11	Silent / 72 / 11	
	Drive Pulley	Type of Drive Pulley	TRA	Bombardier Lite	TRAC	TRAC	
		Ramp Identification	227 Ø	N.A.	284 Ø	284 Ø	
		Calibration Screw Position or Calibration Disc Quantity	4	6	4	3	
		Spring Color	Yellow / Violet	Violet	Red / Orange	Blue / Yellow	
		Spring Length ± 1.5 mm (± 0.060 in)	88.4 (3.48)	82 (3.23)	91.2 (3.59)	115.1 (4.53)	
		Clutch Engagement RPM	3000 – 3200	2800 – 3000	2900 – 3100	3500 – 3700	
		Driven Pulley Spring Preload kg (lb)	4.1 – 5.5 (9.0 – 12.1)	4.1 – 5.5 (9.0 – 12.1)	4.1 – 5.5 (9.0 – 12.1)	4.1 – 5.5 (9.0 – 12.1)	
		Cam Angle degree	44°	44°	44°	44°	
		Pulley Distance Z (+0, -1) mm ((+0, -1/32) in)	16.5 (21/32)	25.5 (1)	16.5 (21/32)	16.5 (21/32)	
	Offset	X ± 0.4 mm (± 1/64 in)	35.0 (1-3/8)	33.4 (1-5/16)	35.0 (1-3/8)	35.0 (1-3/8)	
		Y - X MIN. MAX.	+ 1 (+ 0.039) + 2 (+ 0.079)	+ 0.5 (+ 0.020) + 1.5 (+ 0.059)	+ 1 (+ 0.039) + 2 (+ 0.079)	+ 1 (+ 0.039) + 2 (+ 0.079)	
		Drive Belt Part Number (P / N)	414 8833 00	414 8833 00	414 8833 00	414 8833 00	
		Drive Belt Width (new) Ø mm (in)	34.3 (1-3/8)	34.3 (1-3/8)	34.3 (1-3/8)	34.3 (1-3/8)	
	Drive Belt Adjustment	Deflection mm (in)	32 ± 5 (1-1/4 ± 13/64)	32 ± 5 (1-1/4 ± 13/64)	32 ± 5 (1-1/4 ± 13/64)	32 ± 5 (1-1/4 ± 13/64)	
		Force Ø kg (lbf)	6.8 (15)	6.8 (15)	6.8 (15)	6.8 (15)	
	Track	Width cm (in)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)	
			Length cm (in)	345 (136)	345 (136)	345 (136)	345 (136)
		Adjustment	Deflection mm (in)	40 – 55 (1-9/16 – 2-5/32)	40 – 55 (1-9/16 – 2-5/32)	40 – 55 (1-9/16 – 2-5/32)	40 – 55 (1-9/16 – 2-5/32)
			Force Ø kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)	7.3 (16)
Suspension Type		Track	Slide	Slide	Slide	Slide	
		Ski	DSA	DSA	DSA	DSA	
	Length cm (in)		292 (115)	294 (115.7)	Touring : 292 (115) Skandic : 294 (115.7)	272.5 (107.3)	
	Width cm (in)		115.6 (45.5)	108 (42.5)	Touring : 115.6 (45.5) Skandic : 108 (42.5)	115.6 (45.5)	
	Height cm (in)		122 (48.0)	122 (48.0)	122 (48.0)	112 (44.1)	
	Ski Stance cm (in)		101.6 (40)	94 (37)	Touring : 101.6 (40) Skandic : 94 (37)	101.6 (40)	
	Mass (dry) kg (lb)		208 (457)	209 (459)	Touring : 224 (493) Skandic : 216 (475)	199 (438)	
	Ground Contact Area cm ² (in ²)		7227 (1120)	7227 (1120)	7227 (1120)	6503 (1008)	
	Ground Contact Pressure kPa (PSI)		2.82 (4.09)	2.84 (4.12)	Touring : 3.04 (4.41) Skandic : 2.93 (4.25)	3 (4.35)	
	Frame Material		Aluminum	Aluminum	Aluminum	Aluminum	
	Bottom Pan Material		Polyethylene	Polyethylene	Polyethylene	Polyethylene	
	Cab Material		RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane	
		Battery V (A•h)		12 (22)	N.A.	Touring : 12 (22) Skandic : N.A.	N.A.
Headlight W		H4 60/55	H4 60/55	H4 60/55	H4 60/55		
Taillight and Stoplight W		8/27	8/27	8/27	8/27		
Tachometer and Speedometer Bulb W		5	2 x 3	2 x 3	2 x 3		
Fuel and Temperature Gauge Bulb W		N.A.	N.A.	N.A.	N.A.		
Fuse		Starter Solenoid A	30	N.A.	Touring : 30 Skandic : N.A.	N.A.	
		Tachometer A	N.A.	N.A.	N.A.	N.A.	
Fuel Tank L (U.S. gal)		40 (10.6)	40 (10.6)	40 (10.6)	40 (10.6)		
Chaincase / Gearbox mL (U.S. oz)		250 (8.5)	250 (8.5)	250 (8.5)	250 (8.5)		
Cooling System L (U.S. oz)		N.A.	N.A.	N.A.	N.A.		
Injection Oil Reservoir L (U.S. oz)		2.55 (86)	2.55 (86)	2.55 (86)	2.55 (86)		

ENGINE TECHNICAL DATA LEGEND

BP : Breaker Points
BTDC : Before Top Dead Center
CDI : Capacitor Discharge Ignition
CTR : Center
K : Kilo (x 1000)
MAG : Magneto Side
N.A. : Not Applicable
PTO : Power Take Off Side
R : Rectangular
ST : Semi-trapez
 μ : **Micro** (\div 1000 000)

- ① The maximum horsepower RPM is applicable on the vehicle. It may be different under certain circumstances and BOMBARDIER INC. reserves the right to modify it without obligation.
- ② Rotary valve to crankcase clearance : 0.27 - 0.48 mm (.011 - .019 in).
- ③ At 6000 RPM (engine cold) with headlamp turned on. Except ÉLAN model.
- ④ With centrifugal weight in fully advanced position.
Dynamic edge gap : 8.5 mm (.335 in).
Breaker point gap : 0.30-0.40 mm (.012 - .016 in).
Condenser capacity: 0.27 μ F.
- ⑤ Small lighting coil : 1.85-2.35 Ω .
- ⑥ Force applied midway between pulleys to obtain specified deflection.
- ⑦ Crankshaft end-play is not adjustable on these models, specification is given for verification purposes only.
- ⑧ TRA drive pulley retaining screw : torque to 105 N•m (77 lbf•ft), install drive belt, accelerate the vehicle to moderate speed and apply the brake ; repeat 5 times. Reduce torque to 85 N•m (62.5 lbf•ft), then retorque to 95 N•m (70 lbf•ft).
- ⑨ All resistance measurements must be performed with parts at room temperature (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.

VEHICLE TECHNICAL DATA LEGEND

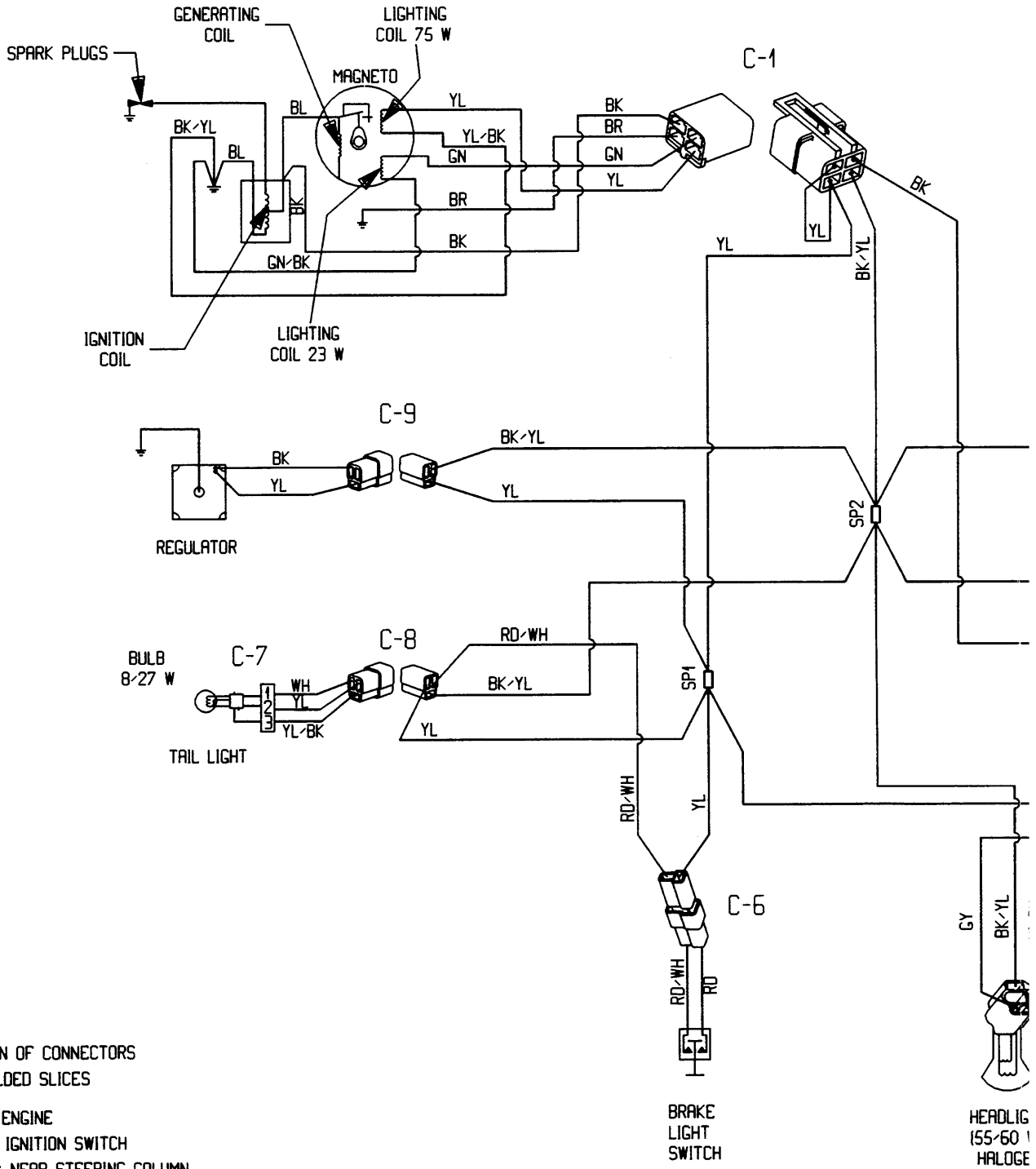
DSA : Direct Shock Action
RRIM : Reinforced Reaction Injection Molding
TRA : Total Range Adjustable drive pulley
N.A. : Not Applicable

- ① Minimum allowable width may not be less than 3.0 mm (1/8 in) of new **drive** belt.
- ② Force applied midway between pulleys to obtain specified deflection.
- ③ Force or downward pull applied to track to obtain specified tension deflection.
- ④ Lever with roller pin P / N 420429140 (Hollow).

ANNEX 1

ÉLAN

ELAN '96



LOCATION OF CONNECTORS AND WELDED SLICES

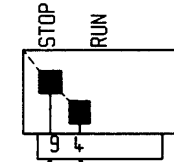
- C-1: ON ENGINE
- C-2: ON IGNITION SWITCH
- C-3,C-4: NEAR STEERING COLUMN
- C-5: NEAR HEADLIGHT
- C-6: NEAR DRIVEN PULLEY
- C-7: ON TRAILLIGHT
- SP1,C-8: UNDER CONSOLE
- SP2,C-9: RIGHT SIDE OF STEERING BRACKET

◆ WARNING :

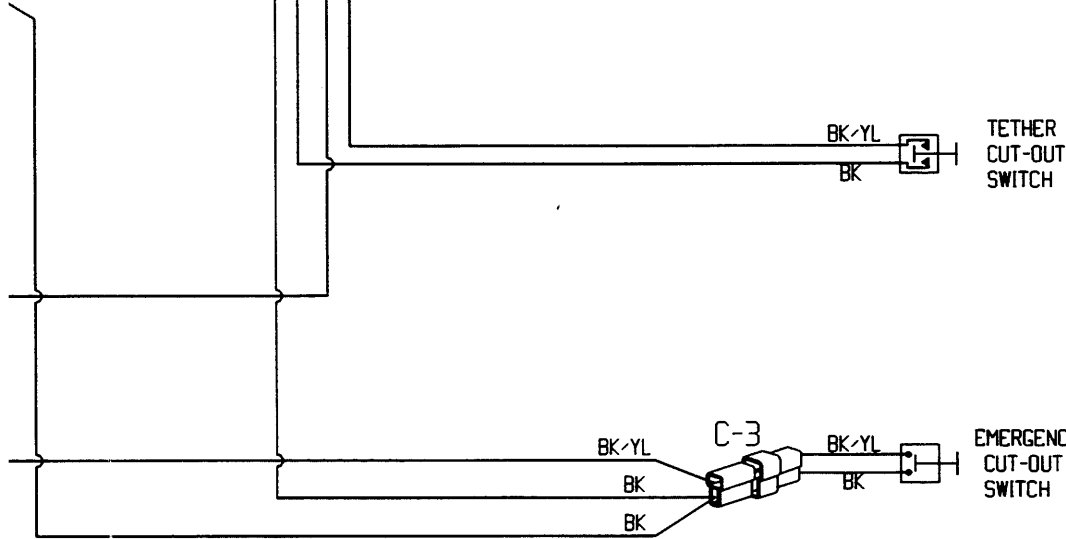
ENSURE ALL TEMINALS ARE PROPERLY CRIMPED ON THE WIRES AND ALL CONNECTOR HOUSINGS ARE PROPERLY FASTENED.

IGNITION SWITCH

C-2

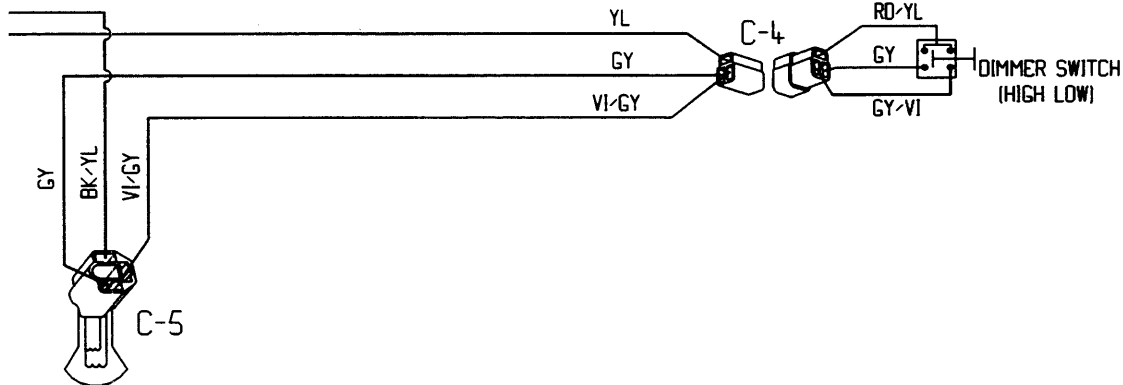


BK
BK
BK-YL
BK-YL



TETHER
CUT-OUT
SWITCH

EMERGENCY
CUT-OUT
SWITCH



HEADLIGHT
(55-60 W)
HALOGEN

DIMMER SWITCH
(HIGH LOW)

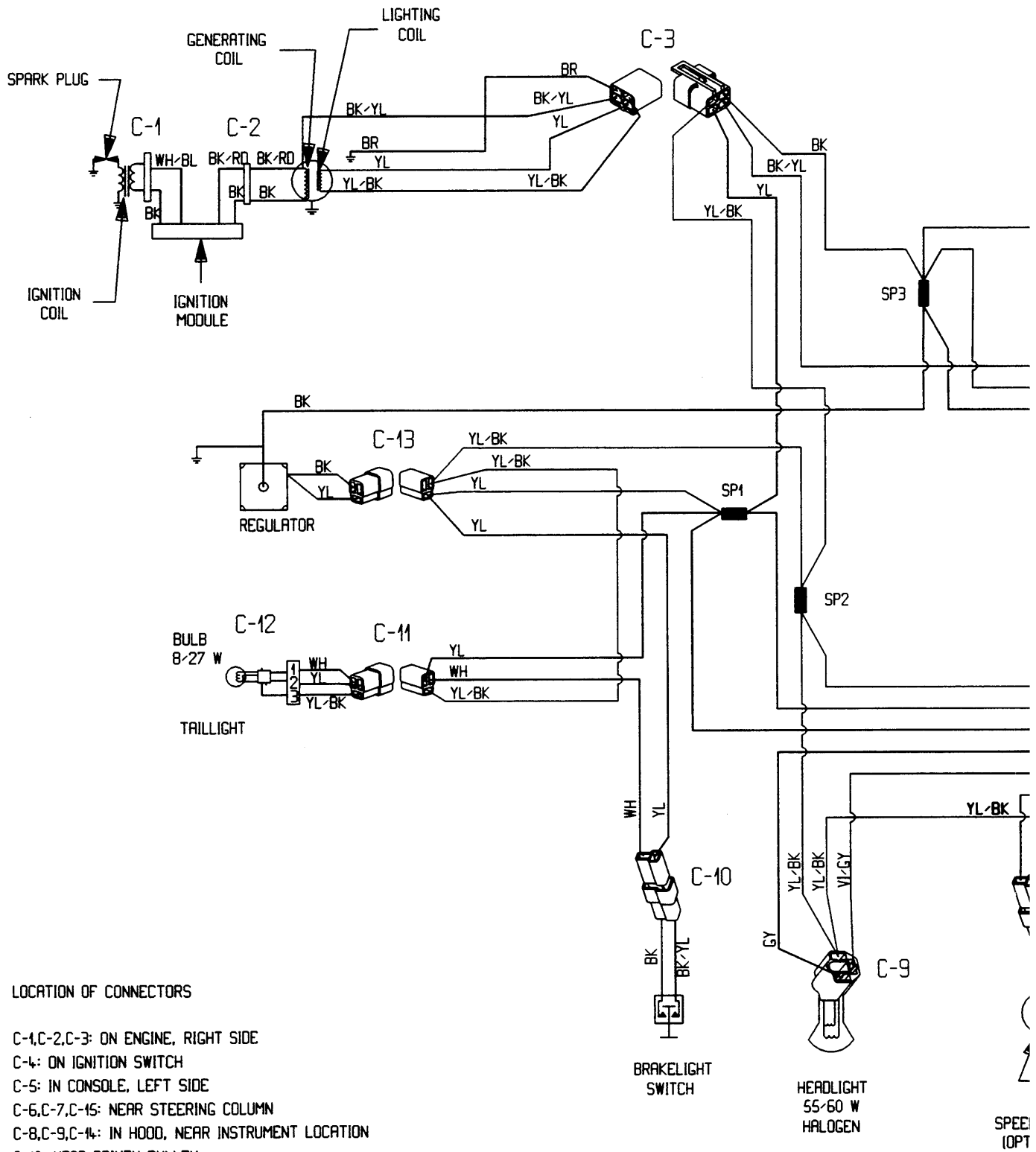
COLOR CODE

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

ANNEX 2

TUNDRA II LT

TUNDRA '96
TUNDRA LT



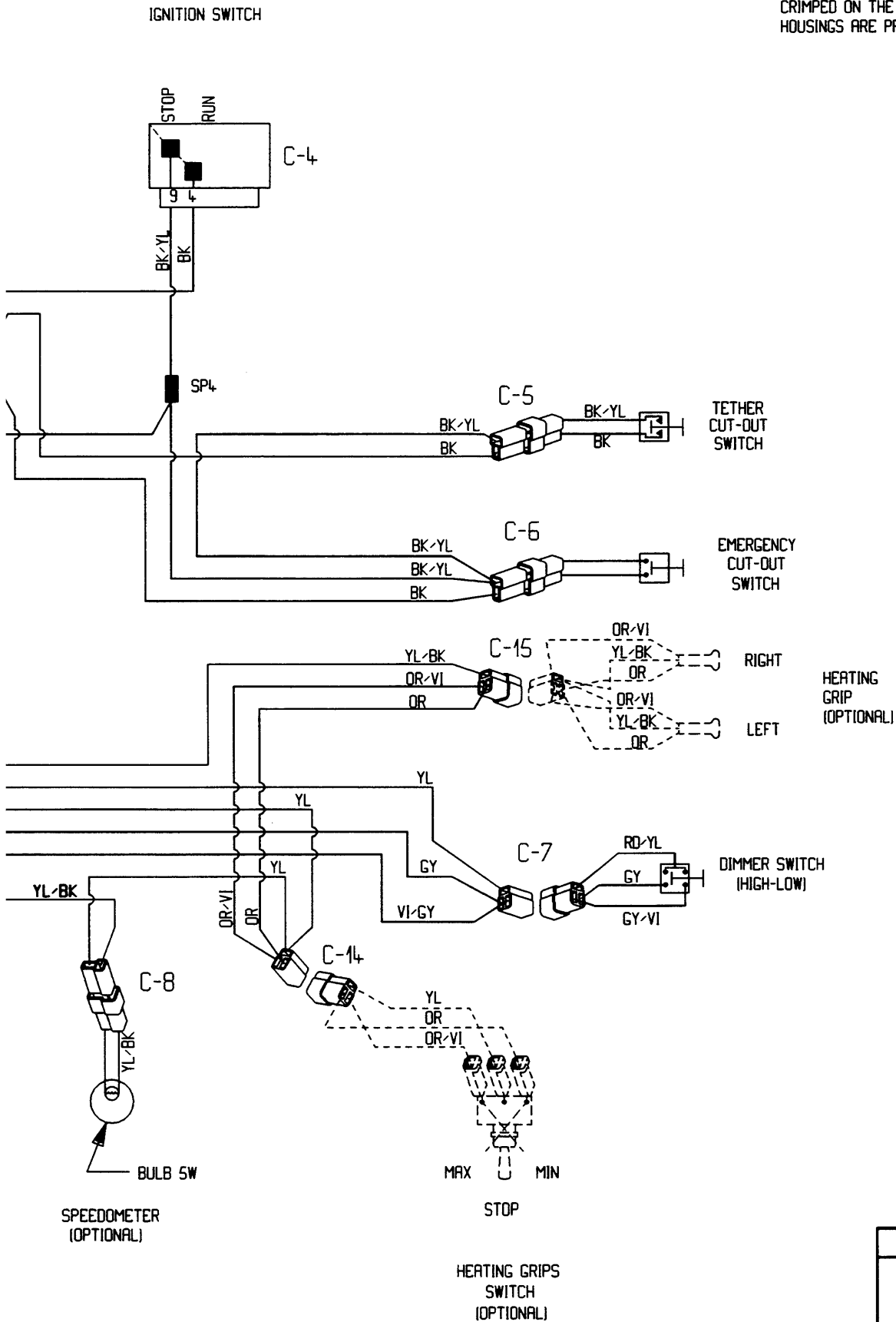
LOCATION OF CONNECTORS

- C-1, C-2, C-3: ON ENGINE, RIGHT SIDE
- C-4: ON IGNITION SWITCH
- C-5: IN CONSOLE, LEFT SIDE
- C-6, C-7, C-15: NEAR STEERING COLUMN
- C-8, C-9, C-14: IN HOOD, NEAR INSTRUMENT LOCATION
- C-10: NEAR DRIVEN PULLEY
- C-11: BETWEEN SEAT AND FUEL TANK
- C-12: ON TRAILLIGHT
- C-13: NEAR REGULATOR

SPEED
OPT

WARNING :

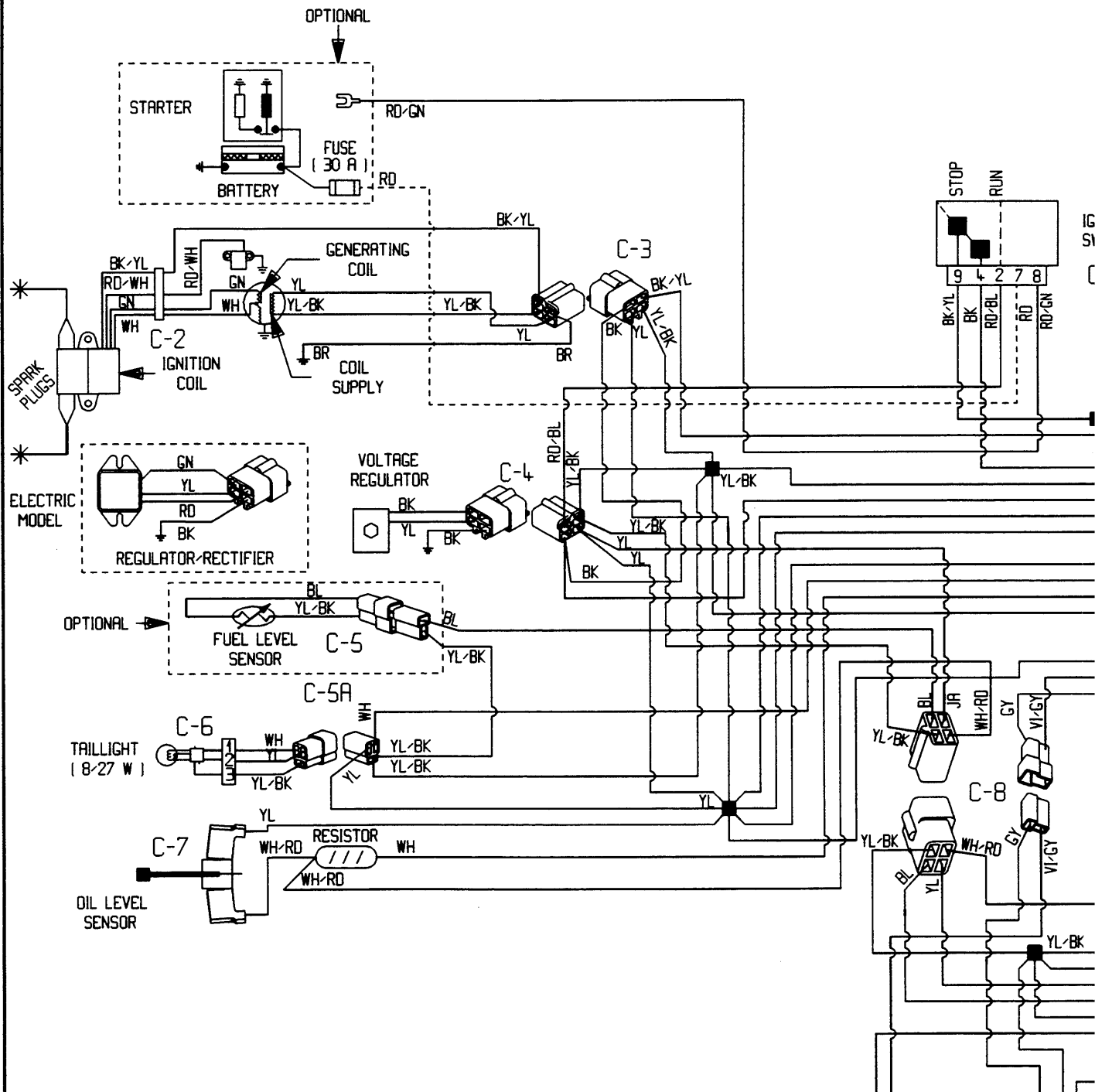
ENSURE ALL TERMINALS ARE PROPERLY CRIMPED ON THE WIRES AND ALL CONNECTOR HOUSINGS ARE PROPERLY FASTENED.



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

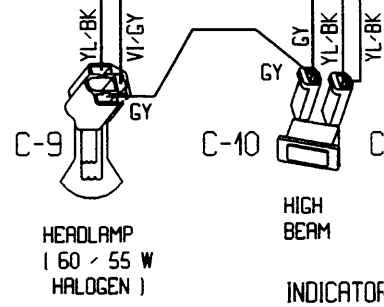
ANNEX 3

**FORMULA S / SL
SKANDIC 380 / 500**



LOCATION OF CONNECTORS

- C-2, C-3, NEAR ENGINE
- C-4 : NEAR REGULATOR UNDER ENGINE
- C-5, C-5A, BETWEEN SEAT AND FUEL TANK
- C-6 : ON TAILLIGHT
- C-7 : UNDER OIL INJECTION RESERVOIR
- C-8 : JUNCTION BETWEEN HOOD AND FRAME
- C-9 @ C-14 : IN HOOD, NEAR INSTRUMENT LOCATION
- C-15 @ C-21 : NEAR STEERING COLUMN
- C-22 : ABOVE CHAINCASE
- C-23 : ON IGNITION SWITCH

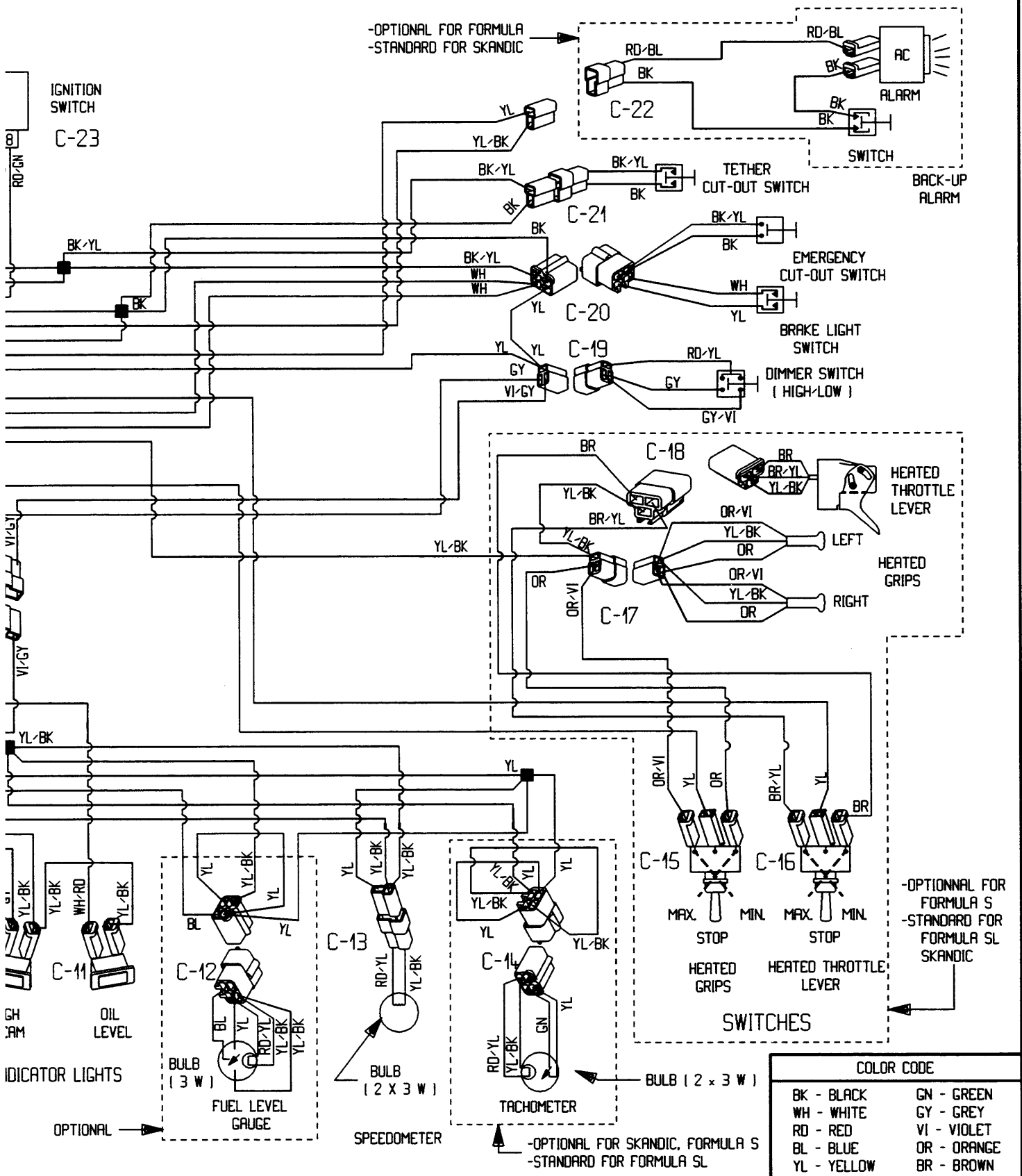


FORMULA S '96
 FORMULA SL
 SKANDIC 380
 SKANDIC 500

■ = WELDED SPLICE

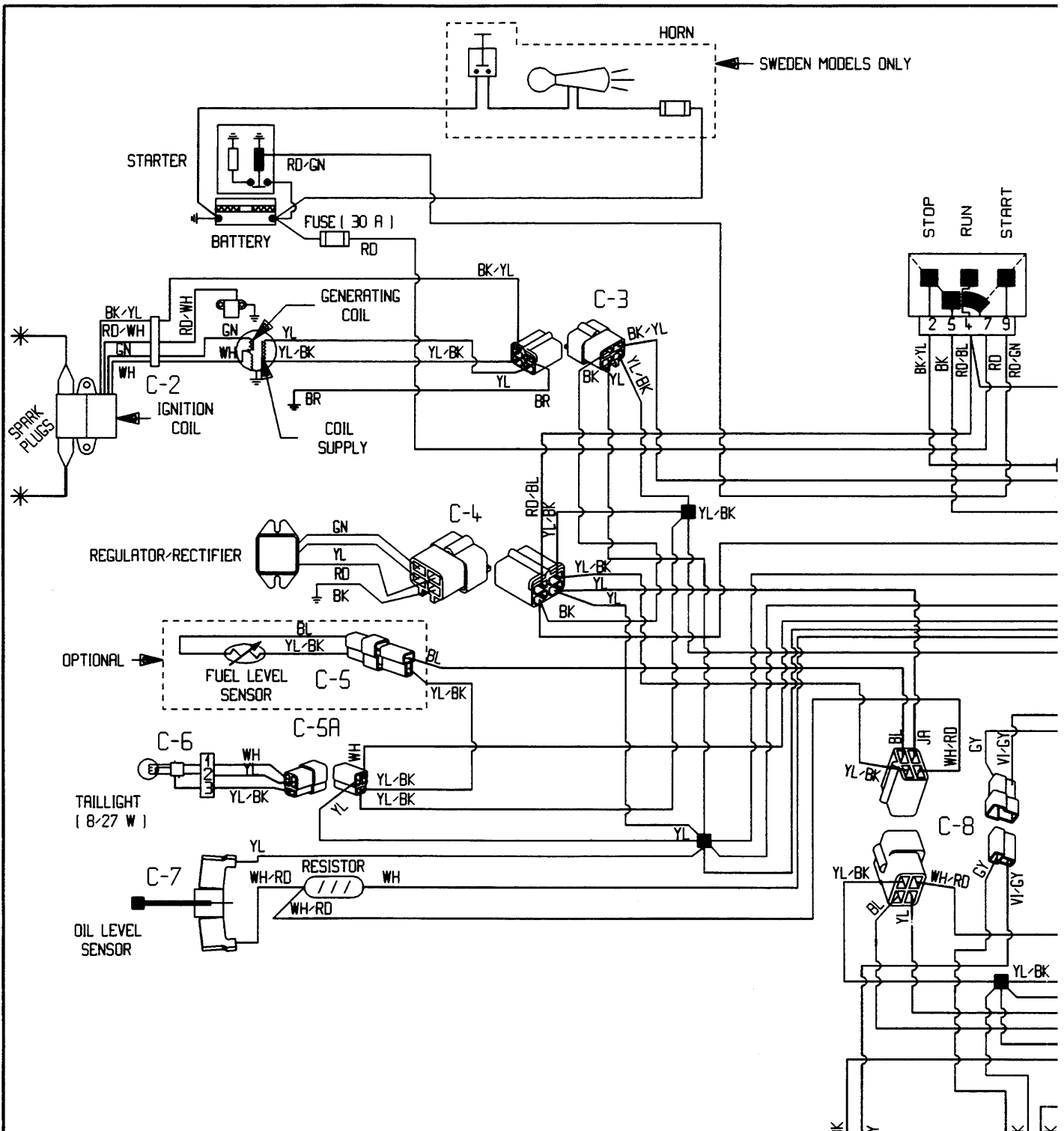
WARNING

- ENSURE ALL TERMINALS ARE PROPERLY CRIMPED ON THE WIRES AND ALL CONNECTOR HOUSINGS ARE PROPERLY FASTENED



ANNEX 4

**TOURING E / ELT
TOURING LE / SLE**



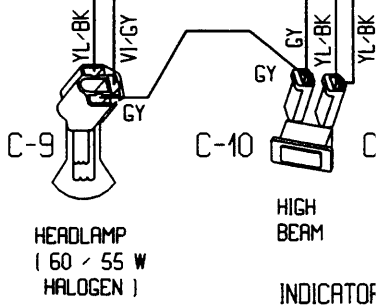
SWEDEN MODELS ONLY

LOCATION OF CONNECTORS

- C-2, C-3, NEAR ENGINE
- C-4 : NEAR REGULATOR UNDER ENGINE
- C-5, C5A, BETWEEN SEAT AND FUEL TANK
- C-6 : ON TAILLIGHT
- C-7 : UNDER OIL INJECTION RESERVOIR
- C-8 : JUNCTION BETWEEN HOOD AND FRAME
- C-9 @ C-14 : IN HOOD, NEAR INSTRUMENT LOCATION
- C-15 @ C-21 : NEAR STEERING COLUMN
- C-22 : ABOVE CHAIRCASE
- C-23 : ON IGNITION SWITCH

■ = WELDED SPLICE

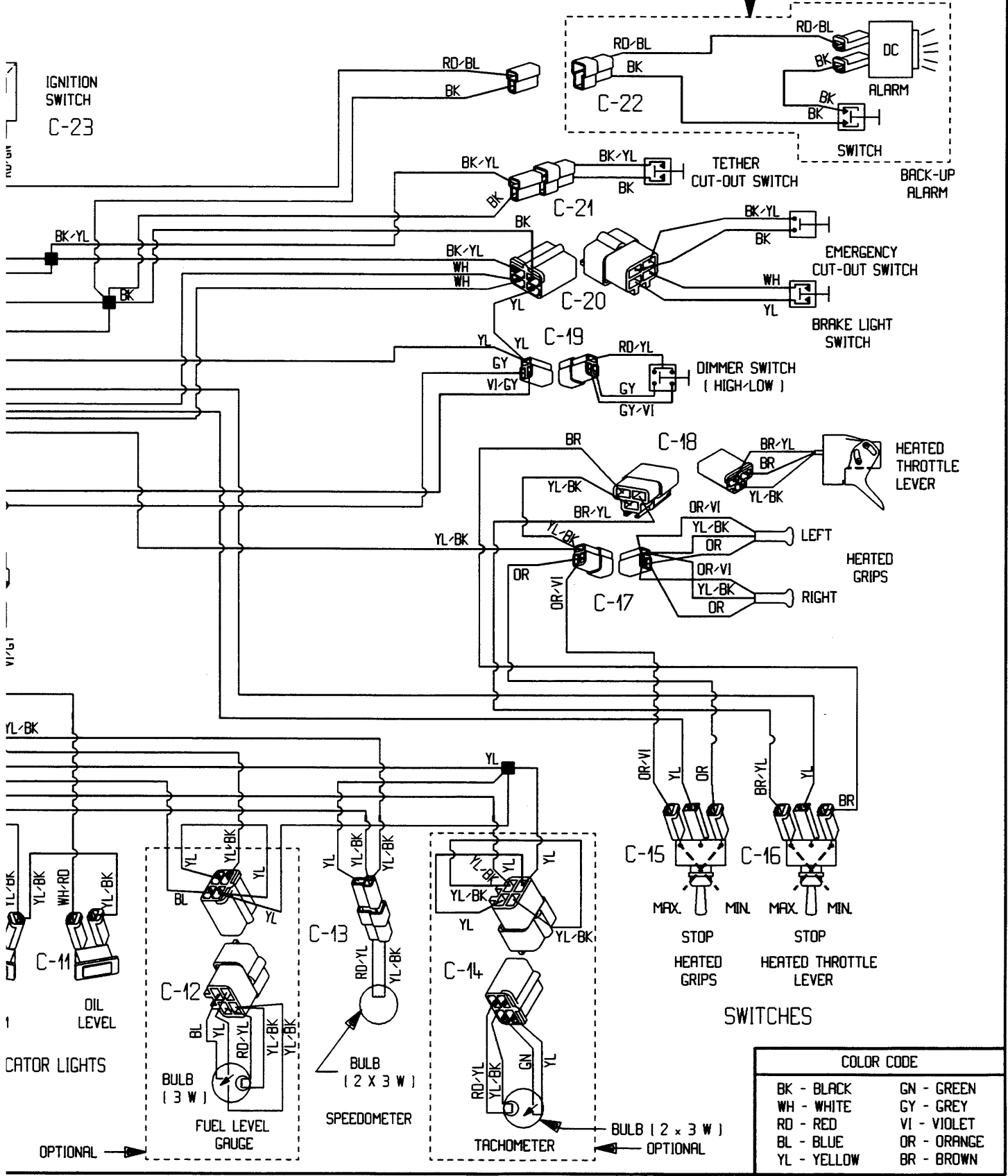
TOURING E '96
TOURING LE
TOURING SLE
TOURING E LT



WARNING

- ENSURE ALL TERMINALS ARE PROPERLY CRIMPED ON THE WIRES AND ALL CONNECTOR HOUSINGS ARE PROPERLY FASTENED

-OPTIONAL FOR TOURING E
TOURING LE
-STANDARD FOR TOURING SLE



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



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