

Ski-doo 2004[®]

Shop Manual



Tundra[™]
Skandic[™] *Series*



2004 Shop Manual

TUNDRA

SKANDIC LT/LT E/WT/SWT/WT LC/SUV 550/SUV 600

BOMBARDIER
RECREATIONAL PRODUCTS



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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair some 2004 Ski-Doo snowmobiles. See model list below.

This edition was primarily published to be used by snowmobile mechanic technicians who are already familiar with all service procedures relating to Bombardier made snowmobiles. Mechanic technicians should attend continuous training courses given by Bombardier Training Dept.

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 the *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 time of writing. *Service* and *Warranty Bulletins* may be published to update the content of this manual. Make sure to read and understand them.

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, self-locking fasteners, etc.) must be installed or replaced with new ones. 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.

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.

WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (ex.: locking tab, self-locking fasteners, etc.) must be installed or replaced with new ones. If the efficiency of a locking device is impaired, it must be renewed.

INTRODUCTION

INTRODUCTION

This *Shop Manual* covers the following Bombardier made 2004 snowmobiles:

MODEL	PACKAGE	ENGINE	COLOR	MARKET	MODEL NUMBER
TUNDRA	N.A.	280F (R)	YELLOW	CANADA USA	3282
TUNDRA	N.A.	280F (R)	BLACK	CANADA USA	3283
SKANDIC	LT	440F (R)	YELLOW	CANADA	2250
SKANDIC	LT	440F (R)	YELLOW	USA	2680
SKANDIC (E)	LT	440F (R)	YELLOW	CANADA	2681
SKANDIC (E)	LT	440F (R)	YELLOW	USA	2684
SKANDIC (E)	WT	550F (R)	YELLOW	CANADA	2233
SKANDIC (E)	WT	550F (R)	YELLOW	USA	2234
SKANDIC (E)	SWT	550F (R)	YELLOW	CANADA	2240
SKANDIC (E)	SWT	550F (R)	YELLOW	USA	2241
SKANDIC (E)	WT LC	600 (R)	YELLOW	CANADA	2236
SKANDIC (E)	WT LC	600 (R)	YELLOW	USA	2237
SKANDIC (E)	SUV	550F (R)	YELLOW	CANADA	2687
SKANDIC (E)	SUV	550F (R)	YELLOW	USA	2688
SKANDIC (E)	SUV	600 (R)	YELLOW	CANADA	2242
SKANDIC (E)	SUV	600 (R)	YELLOW	USA	2247
SKANDIC (E)	SUV	600 (R)	BLACK	CANADA	4171
SKANDIC (E)	SUV	600 (R)	BLACK	USA	4172

Tundra



A05A0EA

TYPICAL — TUNDRA

- Skandic LT**
- Skandic LT E**
- Skandic WT**
- Skandic SWT**
- Skandic WT LC**
- Skandic SUV 550**
- Skandic SUV 600**

These are Skandic series models.



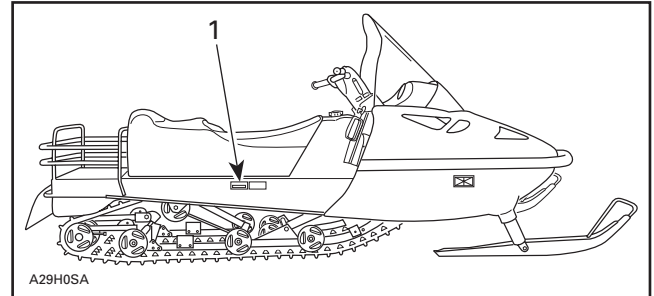
A29A03A

TYPICAL — SKANDIC SERIES

VEHICLE DESCRIPTION DECAL

Vehicle Description Decal Location

Vehicle description decal is located on right hand side of tunnel.

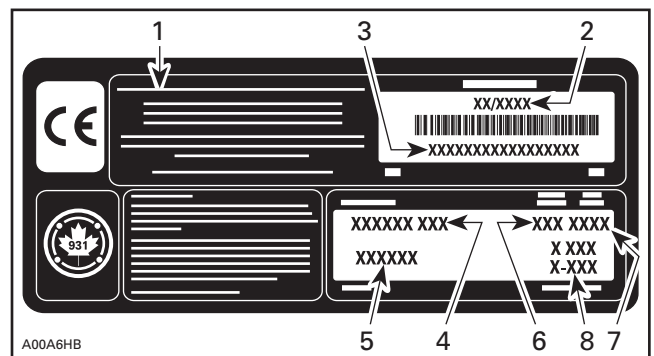


A29H0SA

TYPICAL

1. Vehicle description decal

Vehicle Description Decal Meaning



A00A6HB

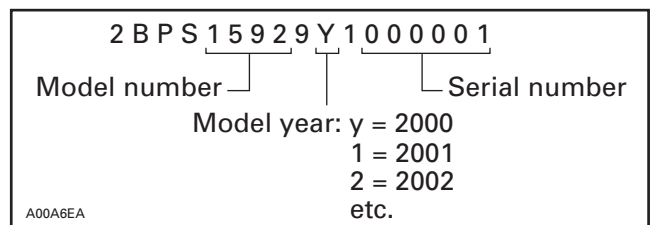
VEHICLE DESCRIPTION DECAL

1. Manufacturer name and address
2. Manufacturing date
3. Vehicle identification number (VIN)
4. Model name
5. Option package
6. Engine type
7. Model year
8. Color codes

Vehicle Identification Number (VIN) Location

VIN is scribed on vehicle description decal. See above. It is also embossed on tunnel near vehicle description decal.

Vehicle Identification Number Meaning



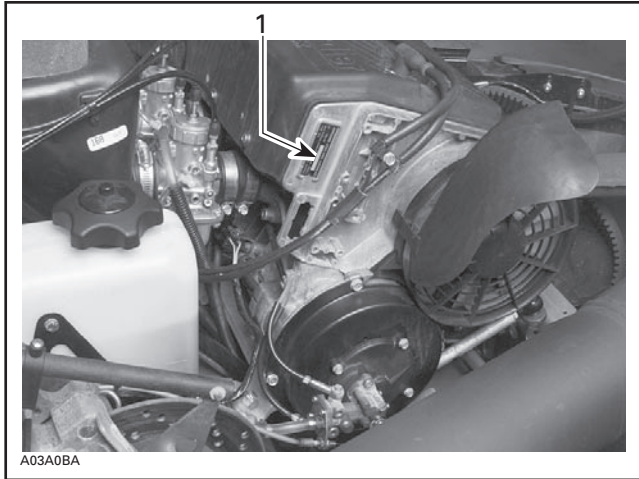
A00A6EA

INTRODUCTION

ENGINE SERIAL NUMBER

Engine Serial Number Location

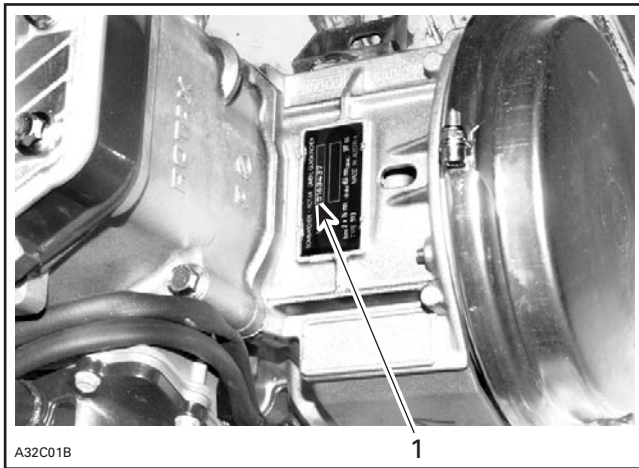
Fan-Cooled Engines



TYPICAL — FAN-COOLED ENGINES

1. Engine serial number

Liquid-Cooled Engines



TYPICAL — LIQUID-COOLED ENGINES

1. Engine serial number

LIST OF ABBREVIATIONS USED IN THIS MANUAL

A	ampere
amp	ampere
A•h	ampere-hour
AC	alternate current
ACM	acceleration and control modulator
ARM	advance ride management
BDC	bottom dead center
BTDC	before top dead center
°C	degree Celsius
cc	cubic centimeter
CDI	capacitor discharge ignition
CTR	center
cm	centimeter
cm ²	square centimeter
cm ³	cubic centimeter
DC	direct current
DPM	digital performance management
DSA	direct shock action
°F	degree Fahrenheit
FC	fan cooled
fl. oz	fluid ounce
ft	foot
GRD	ground
H.A.C.	high altitude compensator
hal.	halogen
HI	high
imp. oz	imperial ounce
in	inch
in ²	square inch
in ³	cubic inch
k	kilo (thousand)
kg	kilogram
km/h	kilometer per hour
kPa	Kilopascal
L	liter
lb	pound
lbf	pound (force)
LH	left hand

LO	low
LT	long track
m	meter
m.	mile
MAG	magneto
Max.	maximum
Min.	minimum
mL	milliliter
mm	millimeter
MPEM	multi-purpose electronic module
MPH	mile per hour
N	newton
N.A.	not applicable
no.	number
00.0	continuity
O.L	overload (open circuit)
O.D.	outside diameter
OPT	optional
oz	ounce
P/N	part number
PSI	pound per square inch
PTO	power take off
R	rectangular
RH	right hand
RAVE	rotax adjustable variable exhaust
RPM	revolution per minute
RMS	root mean square
RRIM	reinforced reaction injection molding
Sp. Gr.	specific gravity
ST	semi-trapezoidal
TDC	top dead center
TRA	total range adjustable
U.S. oz	ounce (United States)
V	volt
Vac	volt (alternative current)

ARRANGEMENT OF THE MANUAL

The manual is divided into major sections. Each section is divided in various subsections, and again, each subsection has one or more division.

INTRODUCTION

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 subsection detailed.

Subsection title indicates beginning of the subsection.

Italic subtitle above exploded view indicate 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.

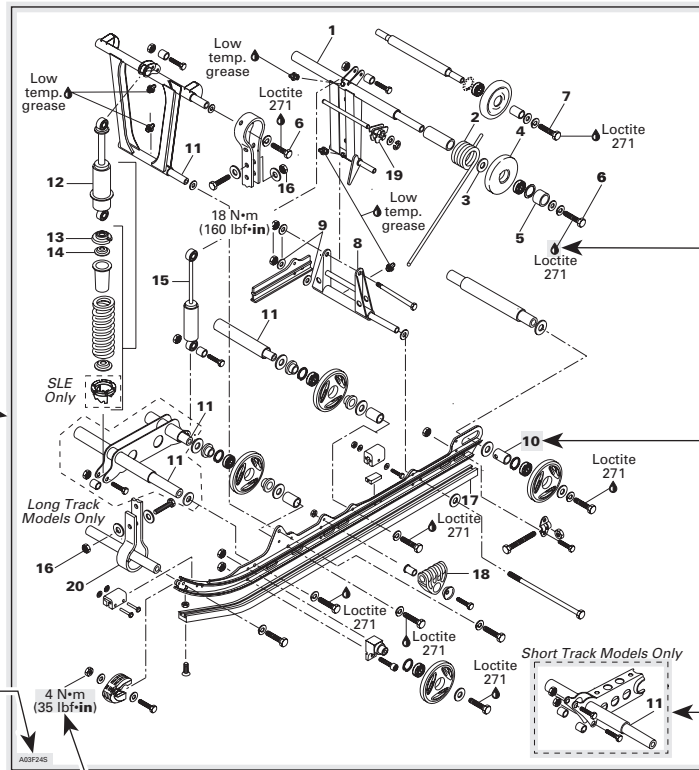
Exploded view assists you in identifying parts and related positions.

Illustration number for publishing process.

Section 07 REAR SUSPENSION
Subsection 01 (SUSPENSION SC-10 SPORT, TOURING AND MOUNTAIN)

SUSPENSION SC-10 SPORT, TOURING AND MOUNTAIN

Grand Touring 500/580, Formula 500/583 and Summit 500



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

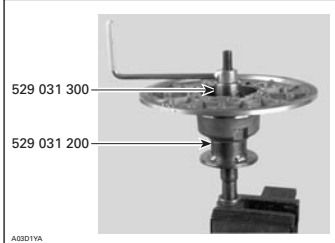
CAUTION: Pay attention to torque specifications. Some of these are in lbf•in instead of lbf•ft. Use appropriate torque wrench.

Page numbering system:
07: REAR SUSPENSION section
01: SUSPENSION SC-10 SPORT, TOURING AND MOUNTAIN subsection
1: First page of this subsection

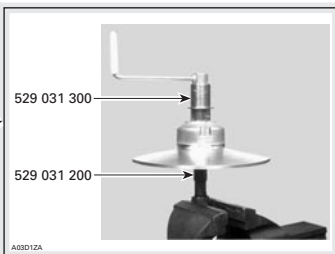
TYPICAL PAGE

Section 05 TRANSMISSION
 Subsection 03 (DRIVEN PULLEY)

Turn puller handle and sliding half at once to extract the bushing.



IMPORTANT: Large bushing retaining screws and washers must be removed before small bushing installation.
Coat bushing outside diameter with Loctite 609 (P/N 413 703 100).
Install bushing as following photo.

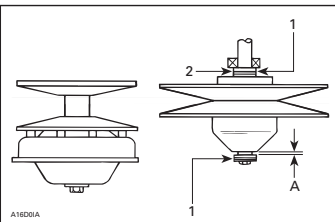


ASSEMBLY
Came Slider Shoe
 When replacing slider shoes no. 4, always install a new set (3 shoes) to maintain equal pressure on the cam.
 Assemble driven pulley components by reversing the disassembly procedure.

Cam
 Coat cam no. 18 interior with anti-seize lubricant.

MMR2000_042_00-02A.FM

INSTALLATION
Countershaft
CAUTION: Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.
A-Series and B-Series Only
 Should installation procedure be required, refer to BRAKE then look for Brake Disc and Countershaft Bearing Adjustment.
 Reinstall the pulley on the countershaft by reversing the removal procedure.
All Models
 Check end play of driven pulley on countershaft by pushing pulley towards outer housing so that the inner shims (P/N 504 108 200) contact it. Measure end play at the mounting screw end between shim(s) and pulley. See illustration.



ADJUSTMENT
 Refer to PULLEY DISTANCE AND ALIGNMENT to adjust pulley distance. Adjust drive belt height between pulley halves to obtain specified belt deflection.

Torque retaining screw no. 13 to 25 N•m (18 lbf•ft).

05-03-5

A01A2BS

Title indicates main procedure to be carried-out.

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

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

"TYPICAL" caption indicates a general view which does not represent full detail.
 "TOP VIEW" caption helps you in understanding illustration.

Call-outs for above illustration.

Reference to look up a certain section and subsection. In this case it concerns pulleys adjustment.

Illustration always follows text to which it pertains.

Subtitle indicates a particular procedure for the named part.

Bold face number following part name refers to exploded view at beginning of subsection.

INTRODUCTION

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.

ILLUSTRATIONS AND PROCEDURES

Illustrations and photos 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 subsection 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.

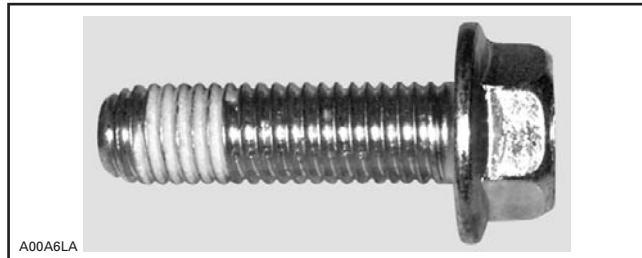
The use of RIGHT and LEFT indications in the text, always refers to driving position (when sitting on vehicle).



TYPICAL

1. Left
2. Right

SELF-LOCKING FASTENERS PROCEDURE



TYPICAL — SELF-LOCKING FASTENER

The following describes the most common application procedures when working with self-locking fasteners.

Use a metal brush or a screwtap to clean the hole properly then use a solvent (Methyl-Chloride), let act during 30 minutes and wipe off. The solvent utilization is to ensure the adhesive works properly.

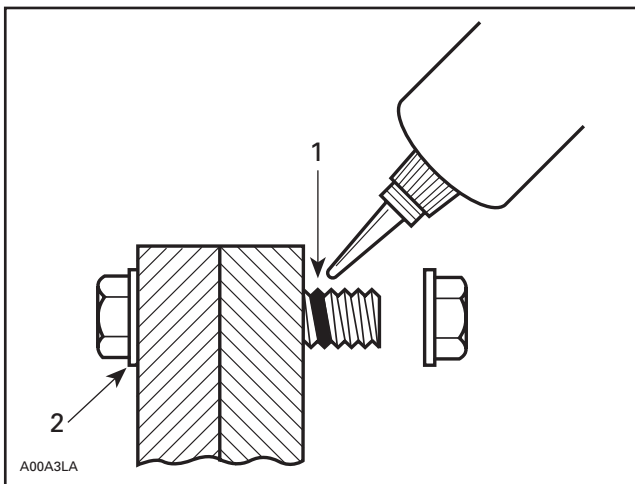
LOCTITE APPLICATION PROCEDURE

The following describes the most common application procedures when working with Loctite products.

NOTE: Always use proper strength Loctite product as recommended in this *Shop Manual*.

THREADLOCKER

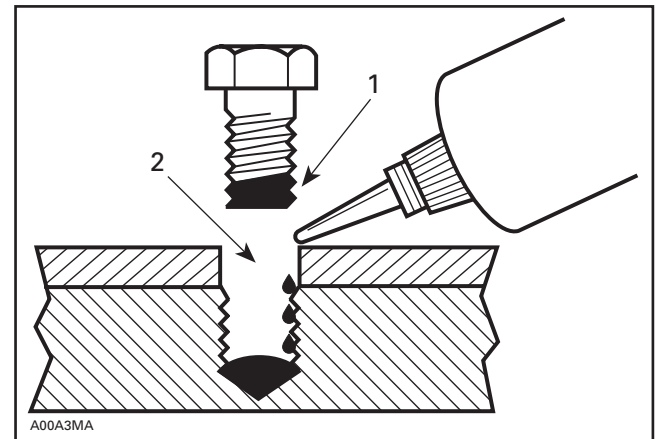
Uncovered Holes (bolts and nuts)



1. Apply here
2. Do not apply

1. Clean threads (bolt and nut) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
3. Choose proper strength Loctite threadlocker.
4. Fit bolt in the hole.
5. Apply a few drops of threadlocker at proposed tightened nut engagement area.
6. Position nut and tighten as required.

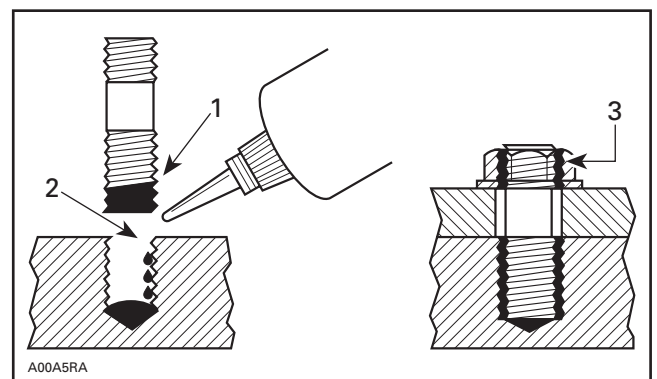
Blind Holes



1. On threads
2. On threads and at the bottom of hole

1. Clean threads (bolt and hole) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads (bolt and nut) and allow to dry for 30 seconds.
3. Choose proper strength Loctite threadlocker.
4. Apply several drops along the threaded hole and at the bottom of the hole.
5. Apply several drops on bolt threads.
6. Tighten as required.

Stud in Blind Holes

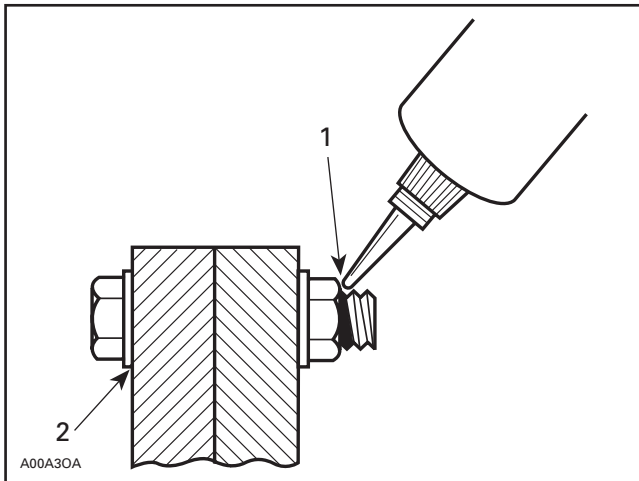


1. On threads
2. On threads and in the hole
3. Onto nut threads

INTRODUCTION

1. Clean threads (stud and hole) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
3. Put several drops of proper strength Loctite threadlocker on female threads and in hole.
4. Apply several drops of proper strength Loctite on stud threads.
5. Install stud.
6. Install cover, etc.
7. Apply drops of proper strength Loctite on uncovered threads.
8. Tighten nuts as required.

Preassembled Parts

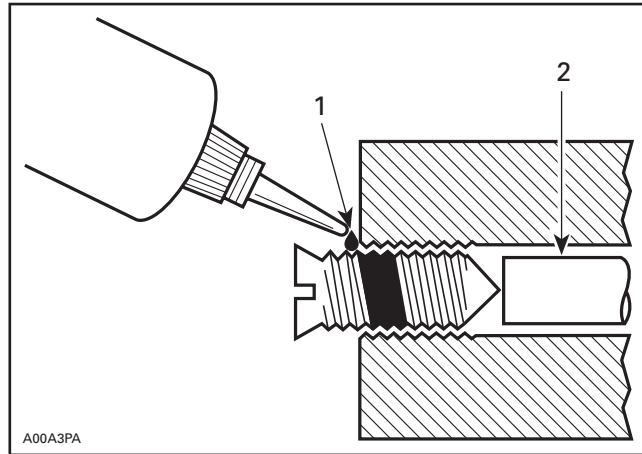


1. Apply here
2. Do not apply

1. Clean bolts and nuts with solvent.
2. Assemble components.
3. Tighten nuts.
4. Apply drops of proper strength Loctite on bolt/nut contact surfaces.
5. Avoid touching metal with tip of flask.

NOTE: For preventive maintenance on existing equipment, retighten nuts and apply proper strength Loctite on bolt/nut contact surfaces.

Adjusting Screw



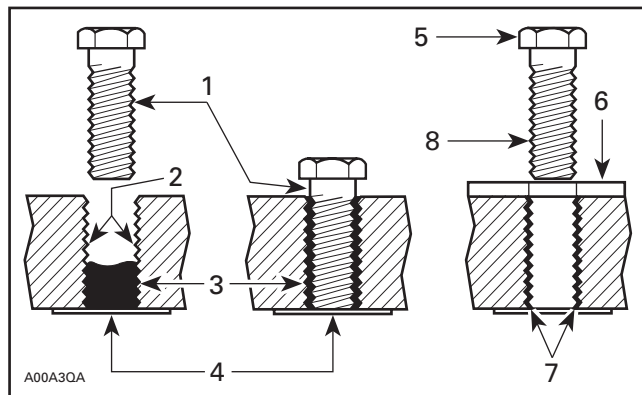
1. Apply here
2. Plunger

1. Adjust screw to proper setting.
2. Apply drops of proper strength Loctite threadlocker on screw/body contact surfaces.
3. Avoid touching metal with tip of flask.

NOTE: If it is difficult to readjust, heat screw with a soldering iron (232°C (450°F)).

STRIPPED THREAD REPAIR

Stripped Threads



1. Release agent
2. Stripped threads
3. Form-A-Thread
4. Tape
5. Cleaned bolt
6. Plate
7. New threads
8. Threadlocker

Standard Thread Repair

1. Follow instructions on Loctite FORM-A-THREAD (P/N 413 708 600) package.
2. If a plate is used to align bolt:
 - a. Apply release agent on mating surfaces.
 - b. Put waxed paper or similar film on the surfaces.
3. Twist bolt when inserting it to improve thread conformation.

NOTE: NOT intended for engine stud repairs.

Repair of Small Holes/Fine Threads

Option 1: Enlarge damaged hole, then follow STANDARD THREAD REPAIR procedure.

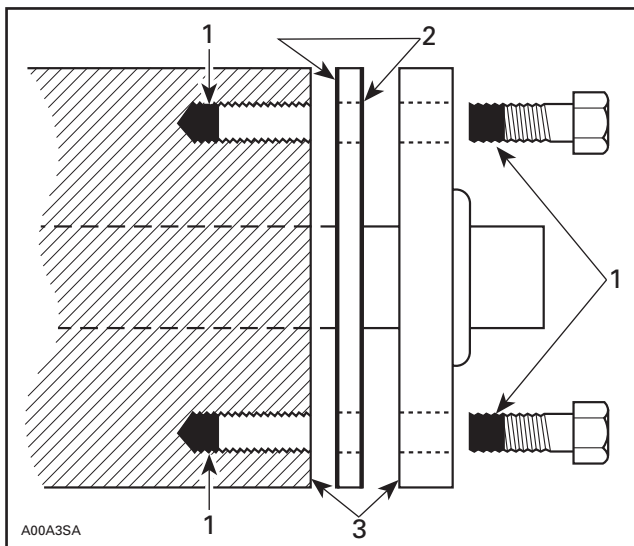
Option 2: Apply FORM-A-THREAD on the screw and insert in damaged hole.

Permanent Stud Installation (light duty)

1. Use a stud or thread on desired length.
2. DO NOT apply release agent on stud.
3. Do a STANDARD THREAD REPAIR.
4. Allow to cure for 30 minutes.
5. Assemble.

GASKET COMPOUND

All Parts



1. Proper strength Loctite
2. Loctite Primer N (P/N 413 708 100) and Gasket Eliminator 515 (P/N 413 702 700) on both sides of gasket
3. Loctite Primer N only

1. Remove old gasket and other contaminants with Loctite Chisel remover (P/N 413 708 500). Use a mechanical mean if necessary.

NOTE: Avoid grinding.

2. Clean both mating surfaces with solvent.
3. Spray Loctite Primer N on both mating surfaces and on both sides of gasket. Allow to dry 1 or 2 minutes.
4. Apply GASKET ELIMINATOR 515 (P/N 413 702 700) on both sides of gasket, using a clean applicator.
5. Place gasket on mating surfaces and assemble immediately.

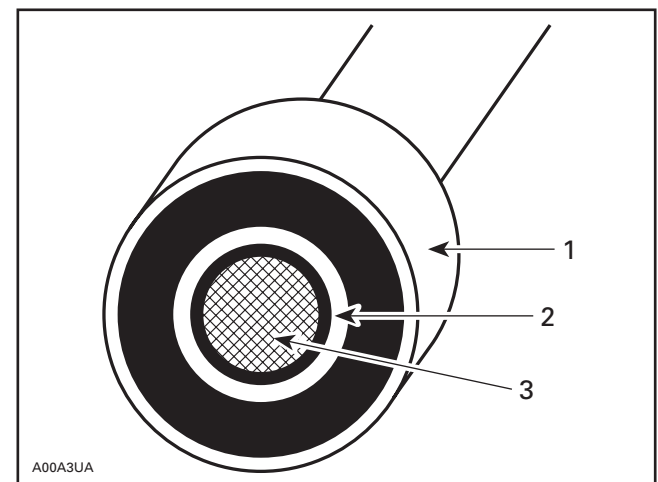
NOTE: If the cover is bolted to blind holes (above), apply proper strength Loctite in the hole and on threads. Tighten.

If holes are sunken, apply proper strength Loctite on bolt threads.

6. Tighten as usual.

MOUNTING ON SHAFT

Mounting with a Press



1. Bearing
2. Proper strength Loctite
3. Shaft

INTRODUCTION

Standard

1. Clean shaft external part and element internal part.
2. Apply a strip of proper strength Loctite on shaft circumference at insert or engagement point.

NOTE: Retaining compound is always forced out when applied on shaft.

3. DO NOT use anti-seize Loctite or any similar product.
4. No curing period is required.

Mounting in Tandem

1. Apply retaining compound on internal element bore.
2. Continue to assemble as shown above.

CASE-IN COMPONENTS

Metallic Gaskets

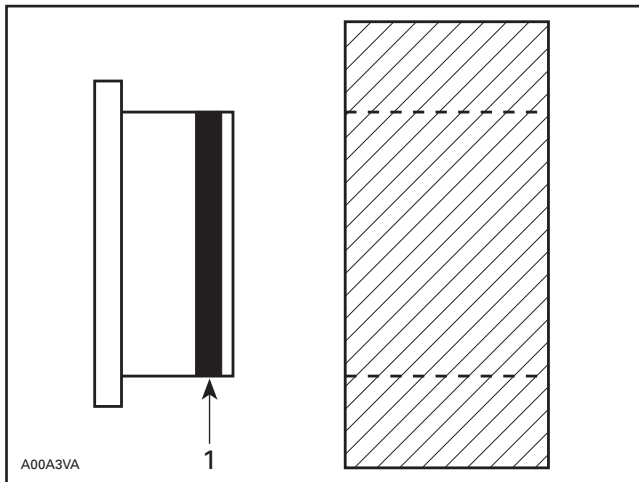
1. Clean inner housing diameter and outer gasket diameter.
2. Spray housing and gasket with Loctite Primer N (P/N 293 800 041).
3. Apply a strip of proper strength Loctite on leading edge of outer metallic gasket diameter.

NOTE: Any Loctite product can be used here. A low strength liquid is recommended as normal strength and gap are required.

4. Install according to standard procedure.
5. Wipe off surplus.
6. Allow it to cure for 30 minutes.

NOTE: Normally used on worn-out housings to prevent leaking or sliding.

It is generally not necessary to remove gasket compound applied on outer gasket diameter.



1. Proper strength Loctite

TIGHTENING TORQUES

Tighten fasteners to torque mentioned in exploded views and text. When they are not specified refer to following table. All torques apply to 8.8 grade fasteners. Bold face size (e.g. **M4**) indicates nominal value (mean value).

N•m	FASTENER SIZE (8.8 grade)	Lbf•in
2	M4	18
3	M4	27
4	M5	35
8	M6	71
9	M6	80
10	M6	89
11	M6	97
12	M6	106

N•m	FASTENER SIZE (8.8 grade)	Lbf•ft
21	M8	15
22	M8	16
23	M8	17
24	M8	18
25	M8	18
43	M10	32
44	M10	32
45	M10	33
46	M10	34
47	M10	35
48	M10	35
49	M10	36
50	M10	37
51	M10	38
52	M10	38
53	M10	39
76	M12	56
77	M12	57
78	M12	58
79	M12	58

N•m	FASTENER SIZE (8.8 grade)	Lbf•ft
80	M12	59
81	M12	60
82	M12	60
83	M12	61
84	M12	62
121	M14	89
122	M14	90
123	M14	91
124	M14	91
125	M14	92
126	M14	93
127	M14	94
128	M14	94
129	M14	95
130	M14	96
131	M14	97
132	M14	97
133	M14	98
134	M14	99
135	M14	100
136	M14	100
137	M14	101
138	M14	102
139	M14	103
140	M14	103
141	M14	104
142	M14	105
143	M14	105
144	M14	106
145	M14	107
146	M14	108
147	M14	108
148	M14	109
149	M14	110
150	M14	111

TIGHTENING TORQUES FOR 8.8 GRADE BOLTS AND NUTS

Bombardier SERVICE PUBLICATIONS REPORT

Publication title and year _____ Page _____

Machine _____ Report of error Suggestion

We would be pleased if you could communicate to Bombardier any suggestions you may have concerning our publications.

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City and State/Prov. _____ Date _____

Zip code/Postal code _____

Bombardier SERVICE PUBLICATIONS REPORT

Publication title and year _____ Page _____

Machine _____ Report of error Suggestion

Name _____

Address _____

City and State/Prov. _____ Date _____

Zip code/Postal code _____

Bombardier SERVICE PUBLICATIONS REPORT

Publication title and year _____ Page _____

Machine _____ Report of error Suggestion

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SERVICE TOOLS

This is a list of tools to properly service Ski-Doo snowmobiles. The list includes both the mandatory tools and the recommended tools. If you need to replace or add to your tool inventory these items can be ordered through the regular parts channel.

Following mention points out new tool and product:

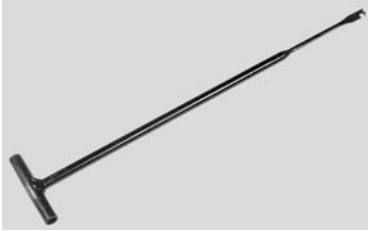


Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

ENGINE — MANDATORY SERVICE TOOLS

Exhaust spring installer/remover
(P/N 529 035 401)



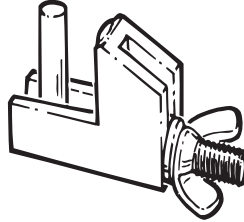
A01B584

APPLICATION

All models.

NOTE: This tool replaces exhaust spring installer/remover (P/N 529 035 400).

Hose pincher (2)
(P/N 295 000 076)



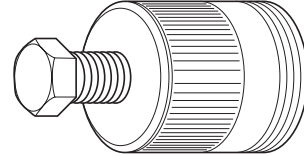
A01B214

APPLICATION

All vehicles.

NOTE: Only the P/N has been changed. This hose pincher is identical to the P/N 529 009 900.

Magneto puller
(P/N 529 035 547)



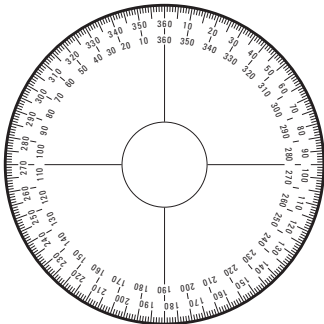
A00C1A4

APPLICATION

All engines except 247.

NOTE: The previous extractor (P/N 529 022 500) can be upgraded by replacing the screw with the new one (P/N 529 035 549).

Degree wheel
(P/N 529 035 607)



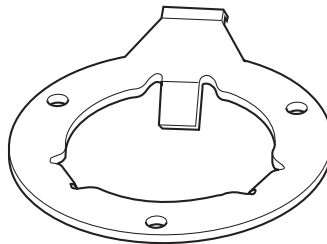
A00B514

APPLICATION

All rotary valve engines.

NOTE: This tool replaces degree wheel (P/N 295 000 007).

Holder wrench
(P/N 420 876 357)



A00C0Q4

APPLICATION

All axial fan cooled engines.

Rotary valve shaft pusher
(P/N 420 876 612)

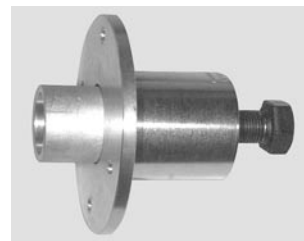


A00C0F4

APPLICATION

Rotary valve engines with a 10 mm impeller shaft.

Ceramic seal pusher
(P/N 420 877 820)

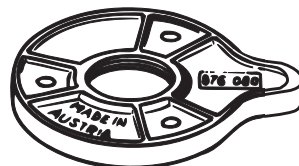


A00B524

APPLICATION

494 and 670 engines with ceramic seal on water pump side.

Magneto puller ring
(P/N 420 876 080)



A00C1R4

APPLICATION

All axial fan cooled engines.


Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

ENGINE (continued) — MANDATORY SERVICE TOOLS

NEW

Bearing heater
(P/N 529 035 969)




A00B6I4

APPLICATION
All models.

NEW

Temperature indicator
(P/N 529 035 970)



A00B6J4

APPLICATION
All models.

Fuel and oil system leak tester kit
(P/N 529 033 100)




A01B5E4

APPLICATION
All models.

Engine leak tester kit
(P/N 861 749 100)

NOTE: Should be used with hand pump (P/N 529 021 800).



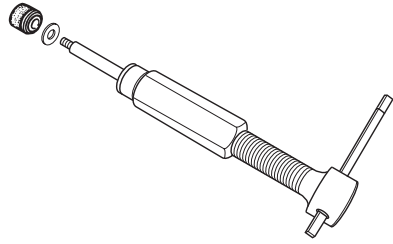
A00B6C4

- 1) Fitting (P/N 408 201 100) (2)
- 2) Clamp (P/N 408 803 500)
- 3) Adapter (P/N 517 234 900) (2)
- 4) Intake plug (P/N 529 011 000) (2)
- 5) Intake plug (P/N 529 030 500)
- 6) Intake plug (P/N 529 035 963) (2)
- 7) RAVE plate (P/N 529 011 200) (2)
- 8) RAVE plate (P/N 529 035 971) (2)
- 9) RAVE plate (P/N 529 035 972) (2)
- 10) Manifold plug 57 mm (2-1/4 in) (P/N 529 021 100)
- 11) Manifold plug 63 mm (2-1/2 in) (P/N 529 035 961)
- 12) Manifold plug 70 mm (2-3/4 in) (P/N 529 021 200)
- 13) Exhaust plate (P/N 529 021 300) (2)
- 14) Exhaust plate (P/N 529 024 600) (2)
- 15) Exhaust plate (P/N 529 035 962) (2)
- 16) Radiator cap (P/N 529 021 400)
- 17) Resonator plug (P/N 529 035 973) (2)

APPLICATION
All engines.

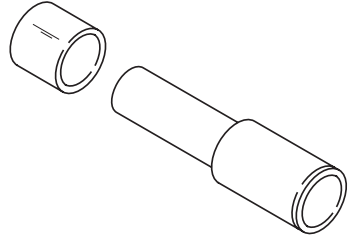
NOTE: To prevent leak in manifold plug, use Loctite Black Max (P/N 413 408 300).

- 1) Piston pin puller
(P/N 529 035 503)



A02B094

- 2) Sleeve kit 18 mm
(P/N 529 035 541)
- 3) Sleeve kit 20 mm
(P/N 529 035 542)




A01B5A4

NOTE: 18 mm sleeve kit contains 1 shouldered sleeve and 3 sleeves. 20 mm sleeve kit contains 1 shouldered sleeve and 2 sleeves.

APPLICATION

- 1) All engines.
- 2) 277, 443, 503 and 809 engine.
- 3) 552, 593, 670, 693 and 793 engines.

Piston circlip installer
(P/N 529 035 686) 20 mm



A32B0C4

APPLICATION
Engines with tab type circlip.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

ENGINE (continued) — MANDATORY SERVICE TOOLS

9-volt adaptor
(P/N 529 035 675)



A00B5G4

APPLICATION

All models equipped with a DESS.

Supply harness
(P/N 529 035 869)



A00B674

APPLICATION

All DESS equipped models.

Vehicle Communication Kit
(P/N 529 035 844)



F12H0A4

APPLICATION

All models equipped with a DESS.

Engine removal hook
(P/N 529 035 829)



A33B054

APPLICATION

REV Series.

Lifting ring (2)
(P/N 529 035 830)



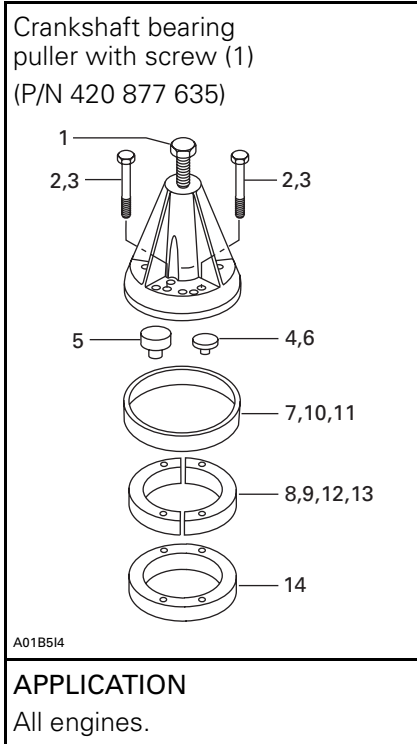
A33B064

APPLICATION

Liquid cooled engines except 4-TEC.

ENGINE — RECOMMENDED SERVICE TOOLS

The following tools are highly recommended to optimize your basic tool kit and reduce repair time.



1) Screw M16 x 1.5 x 150	(P/N 420 940 755)
2) Screw M8 x 40 (4)	(P/N 420 840 681)
3) Screw M8 x 70 (4)	(P/N 420 841 201)
4) Crankshaft protector 247 engine.	(P/N 420 976 890)
5) Crankshaft protector PTO All engines except 247.	(P/N 420 876 552)
6) Crankshaft protector MAG All engines except 247.	(P/N 420 876 557)
7) Puller ring Use with half rings (P/N 420 977 475 or 420 276 025).	(P/N 420 977 490)
8) Half ring (2) For 72 mm O.D. bearings.	(P/N 420 977 475)
9) Half ring (2) For 62 mm O.D. bearings.	(P/N 420 276 025)
10) Puller ring	(P/N 420 977 480)
11) Puller ring For half rings (P/N 420 977 479).	(P/N 420 977 494)
12) Half ring (2) For 80 mm O.D. bearings.	(P/N 420 977 479)
13) Half ring (2) For 52 mm O.D. bearings.	(P/N 420 876 330)
14) Distance ring For MAG side bearing.	NEW (P/N 529 035 964)


Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

NEW

Support plate
(P/N 529 035 976)




A00B6K4

APPLICATION
3-series engines and 552 engine type.

NEW

Crankshaft distance gauge
A) (P/N 529 035 965)
B) (P/N 529 035 966)
C) (P/N 529 035 967)
D) (P/N 529 035 968)



A00B6H4

APPLICATION
A) 552 engine type.
B) 493 and 593 engine type.
C) 593 HO, 593 SDI, 693 and 793.
D) 793 HO and 793 HO SDI.

Hand pump
(P/N 529 021 800)



V00B084

APPLICATION
All models.

NEW


Leak down tester
(P/N 529 035 661)



V00B0C4

APPLICATION
1004 and 1503 engines.

Crankshaft locking tool
(P/N 529 035 900)



A32B0U4

APPLICATION
1004 engine.

NEW

Crankshaft locking tool
(P/N 529 035 821)



F18B064

APPLICATION
Elite.

NEW

Engine support bearing installer
(P/N 529 035 952)



A34B014

APPLICATION
Elite.

NEW

Engine support bearing support
(P/N 529 035 953)



A34B024

APPLICATION
Elite.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

NEW

4-Tooth socket
(P/N 529 035 960)



A34B034

APPLICATION
Elite.

NEW


Torque flange remover
(P/N 529 035 958)



A34B044

APPLICATION
Elite.


Piston circlip installer
(P/N 529 035 765)



V04B0B4

APPLICATION
1004 and 1503 engines.

Piston circlip installer
A) (P/N 529 035 561) 18 mm
B) (P/N 529 035 562) 20 mm

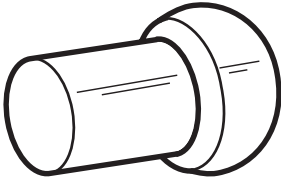


A00B4Y4

APPLICATION
A) All engines except 593, 670, 693 and 793.
NOTE: This tool replaces circlip installer (P/N 529 016 900).
B) 2001 and older 593, 670 and 693 engines.
NOTE: This tool replaces circlip installer (P/N 290 877 016).

Piston pin/connecting rod bearing centering tool
(P/N 529 009 100)

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



A01B1R4

APPLICATION
All engines except cageless and 670 engines.

Pusher (55/59 mm)
(P/N 529 035 913)



A32B134

APPLICATION
1004 engine.

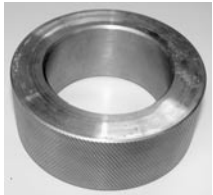
Pusher (38/42 mm)
(P/N 529 035 914)



A32B0V4

APPLICATION
1004 engine.

Support sleeve
(P/N 529 035 944)



A32B0W4

APPLICATION
1004 engine.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

NEW

Water pump ceramic seal installer
(P/N 529 035 766)



A32CAN4

APPLICATION
1004 engine.

NEW

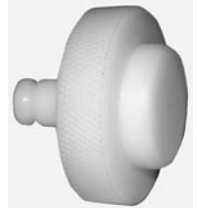
Water pump oil seal installer
(P/N 529 035 757)



A32CAM4

APPLICATION
1004 engine.


PTO cover oil seal installer
(P/N 529 035 910)



A32BOX4

APPLICATION
1004 engine.

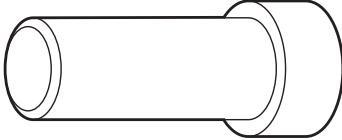
Rotary valve shaft seal pusher
(inner, water pump side)
(P/N 420 876 512)



A00C374

APPLICATION
Rotary valve engines, 1991 and newer with a 10 mm impeller shaft.

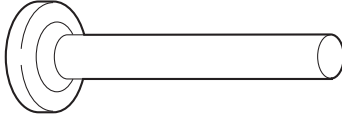
Rotary valve seal pusher
(valve side)
(P/N 420 876 607)



A00C0Y4

APPLICATION
Rotary valve engines.

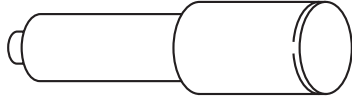
Pusher
(washer behind the impeller)
(P/N 529 020 700)



A00C3H4

APPLICATION
Rotary valve engines.

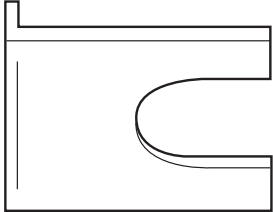
Bearing pusher
(rotary valve)
(P/N 420 876 500)



A00B2J4

APPLICATION
Rotary valve engines.

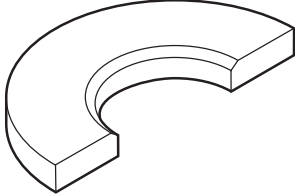
Crankshaft feeler gauge
(P/N 420 876 620)



A00C114

APPLICATION
377, 443, 447 and 503 engines.

Crankshaft distance gauge
(5.7 mm)
(P/N 420 876 822)



A00C294

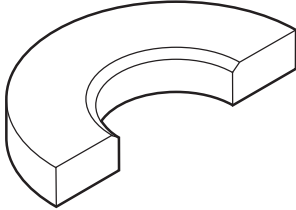
APPLICATION
377, 443 and 447 engines.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

Crankshaft distance gauge
(12.7 mm)
(P/N 420 876 824)



A00C3A4

APPLICATION

503 engine.

NEW
Camshaft locking tool
(P/N 529 035 839)



F18B074

APPLICATION

1004 and 1503 engines.

Valve spring compressor cup
A) (P/N 529 035 764)

NEW
B) (P/N 529 035 725)



V04B094

APPLICATION

A) 1004 engine.
B) 1503 engine.

Ring compressor
Not sold by Bombardier
Snap-on RC980



V04B084

APPLICATION

1503 engine.

Special pliers for valve stem seal
removal

Not sold by Bombardier
Snap-on YA 8230



V02B064

APPLICATION

1503 engine.

Valve stem seal installer
(P/N 529 035 687)



V04B0H4

APPLICATION

1004 and 1503 engines.

Oil VAC
(P/N 529 035 880)



F18B0B4

APPLICATION

1503 engine.

Spring compressor clamp
(P/N 529 035 724)

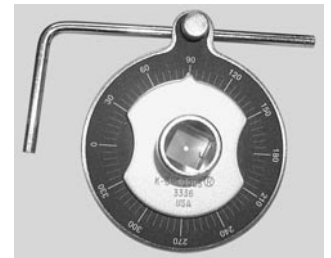


V04B044

APPLICATION

1004 and 1503 engines.

Torque angle gauge
Not sold by Bombardier
Snap-on TA362



V04B014

APPLICATION

1004 and 1503 engines.

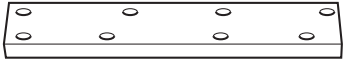
Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

Cylinder aligning tool

- A) (P/N 420 876 904)
(on exhaust side)
- B) (P/N 420 876 171)
(on intake side)



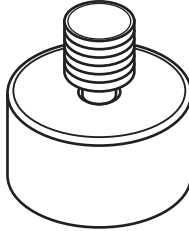
A00B084

APPLICATION

- A) 2-cylinder liquid cooled engines.
- B) 2-cylinder fan cooled engines.

Pilot 22 mm

(P/N 529 035 523)



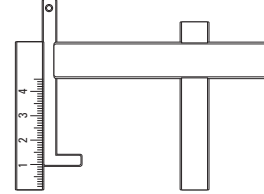
A00B4Q4

APPLICATION

Mini Z.

Float level gauge

(P/N 529 035 520)



A00B4N4

APPLICATION

All models.

Driver tool

(P/N 529 035 521)



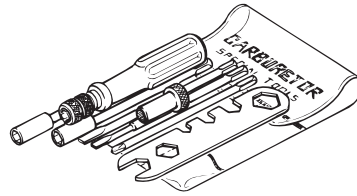
A00B4O4

APPLICATION

Mini Z.

Carburetor tool kit

(P/N 404 112 000)



A00B2F4

APPLICATION

All models.

Bypass wires

(P/N 529 033 300)



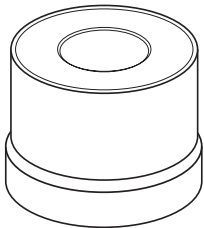
A00I094

APPLICATION

F and CK3 Grand Touring 700/SE
with 360 W magneto.

Attachment

(P/N 529 035 522)



A00B4P4

APPLICATION

Mini Z.

Adaptor

(P/N 529 033 800)

(TYPICAL)



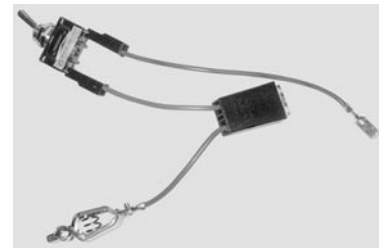
A00B4H4

APPLICATION

1997 and 1998 Grand Touring SE
1998 Summit x 670.

Bypass wire kit

(P/N 861 780 600)



A32B0F4

APPLICATION

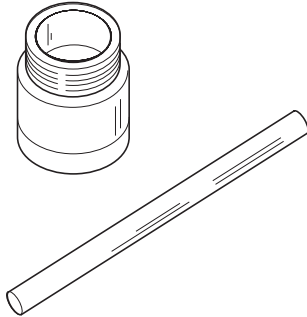
2002 ZX with 360 W magneto.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

RAVE movement indicator
(P/N 861 725 800)



A18B014

APPLICATION

All RAVE equipped engines.

Magneto puller
(P/N 420 976 235)



F01B294

APPLICATION

247 engine.

Multimeter
(P/N 529 035 868)



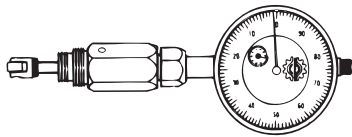
V00B0H4

APPLICATION

All models.

NOTE: This tool replaces multimeter (P/N 529 035 788).

Dial indicator (TDC gauge)
(P/N 414 104 700)

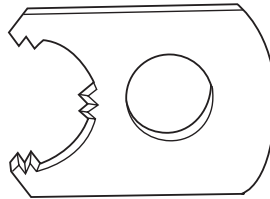


A00B4E4

APPLICATION

All engines.

Injection pump gear holder
(P/N 420 876 695)

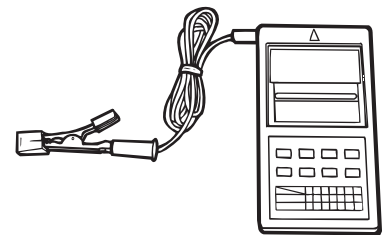


A00B314

APPLICATION

253, 377, 447 and 503 engines.

Digital/induction type tachometer
(P/N 529 014 500)

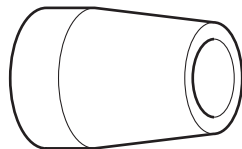


F01B1G4

APPLICATION

All engines.

Seal protector sleeve
A) (P/N 420 876 980)
B) (P/N 420 876 490)



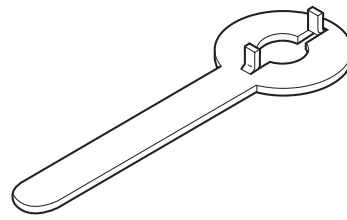
A00C0D4

APPLICATION

A) Rotary valve engines with 10 mm shaft.

B) Rotary valve engines with 12 mm shaft.

Injection pump gear holder
(P/N 420 277 905)

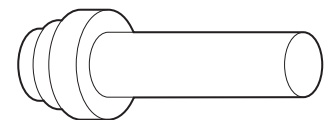


A00C164

APPLICATION

All liquid cooled engines.

MAG seal pusher
(P/N 420 277 875)



A00C0V4

APPLICATION

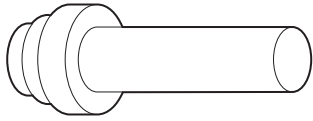
277 engine.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

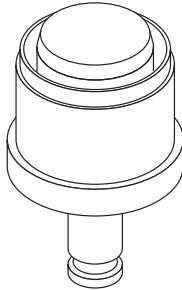
PTO seal pusher
(P/N 420 876 660)



A00C0V4

APPLICATION
277 engine.

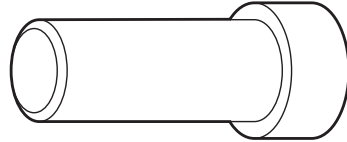
Insertion jig
(magneto seal)
(P/N 420 876 514)



A00C3U4

APPLICATION
454, 494, 599, 670, 699 and 809 engines.

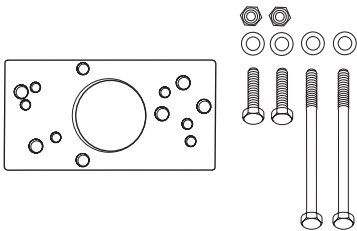
Rotary valve seal and shaft pusher
(P/N 420 876 605)



A00C0Y4

APPLICATION
Rotary valve engines 1990 models and older.

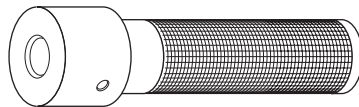
Base puller plate kit
(P/N 529 024 900)



A05C0M4

APPLICATION
277 engine.

Handle for insertion jig
(P/N 420 877 650)



A00C3V4

APPLICATION
454, 494, 599, 670, 699, 779 and 809 engines.

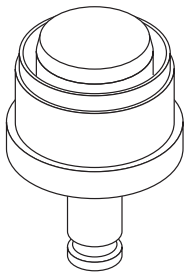
Seal pusher (rotary valve)
(P/N 420 876 510)



A00C374

APPLICATION
All rotary valve shaft seals with a 12 mm I.D.

Insertion jig (magneto side seal)
(P/N 420 876 516)



A00C3T4

APPLICATION
779 engine.

Oil pump seal installer
(P/N 529 035 911)



A32B0T4

APPLICATION
1004 engine.

Rotary valve shaft pusher
(P/N 420 876 610)



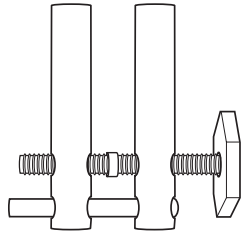
A00C0F4

APPLICATION
All rotary valve engines with 12 mm shaft.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

Large hose pincher
(P/N 529 032 500)

(TYPICAL)



F01B234

APPLICATION

All vehicles.

Homemade adaptor



A00B5J4

Required parts:

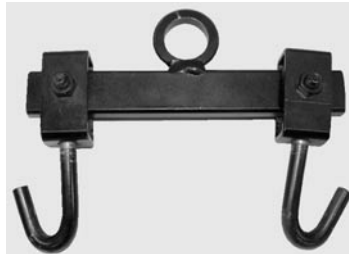
- 1) Female housing
(P/N 515 175 245)
- 2) Female terminal (2)
(P/N 409 015 100)
- 3) Female lock
(P/N 515 175 246)
- 4) Male housing
(P/N 409 207 000)
- 5) Male terminal (2)
(P/N 278 000 631)
- 6) Male lock
(P/N 409 207 600)
- 7) RED wire in position 1
(4-wire connector) and B
(3-wire connector)
- 8) BLACK wire in position 2
(4-wire connector) and C
(3-wire connector)

APPLICATION

2001 and 2002 Mach Z TECH PLUS.



2-Stroke engine lifting tool
(P/N 529 035 940)

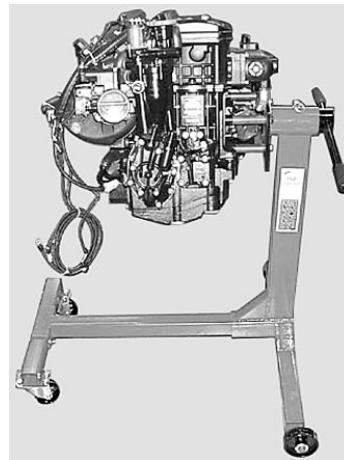


A00B6B4

APPLICATION

2-Stroke engines.

Engine stand
Not sold by Bombardier



F00B1X4

APPLICATION

1503 engine.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

TRANSMISSION — MANDATORY SERVICE TOOLS

Drive pulley retainer
(P/N 529 035 674)

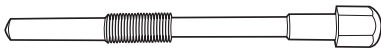


A32B0Z4

APPLICATION

All TRA, TRA III, TRA IV and TRA IV HD drive pulleys.

Drive pulley puller
(P/N 529 022 400)



A06B014

APPLICATION

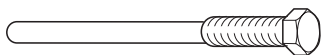
2003 and up Bombardier Lite drive pulley.

Most TRA drive pulleys.

TRA III.

TRA IV.

TRA drive pulley puller
(P/N 529 007 900) (25 mm)

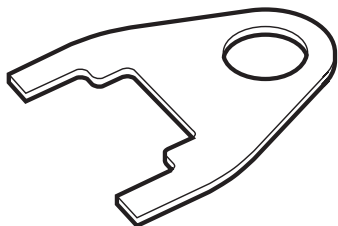


A18B044

APPLICATION

TRA drive pulley for 443, 467, 503, 536 and 537 engines.

Forks (3)
(P/N 529 005 500)



A16B014

APPLICATION

All vehicles equipped with a TRA drive pulley.

Alignment bar

A) (P/N 529 035 530)

B) (P/N 529 035 831)



A01B4D4

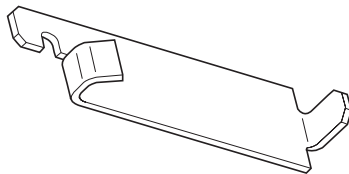
APPLICATION

A) S-Series and ZX series with TRA and RER.

B) All models except CK3 and Elite.

Spring scale hook (long)
(P/N 529 035 557)

(TYPICAL)

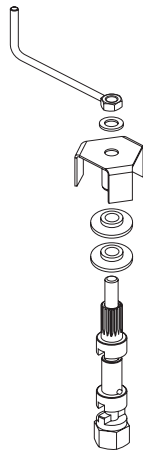


A00B4A4

APPLICATION

CK3 without RER.

Pulley spring compressor
(P/N 529 035 524)



A02D1P4

APPLICATION

All models.

NOTE: This tool has Acme threads and replaces spring compressor (P/N 529 018 600).

Tension tester
(P/N 414 348 200)

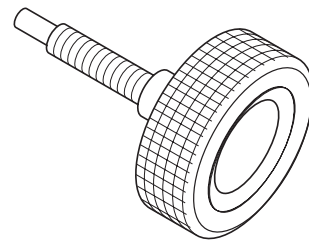


A00C074

APPLICATION

All models.

Driven pulley opening tool
(P/N 529 017 200)

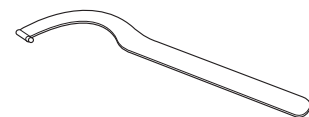


A00A1A4

APPLICATION

Most models.

Clutch holder
(P/N 529 027 600)



A02B034

APPLICATION

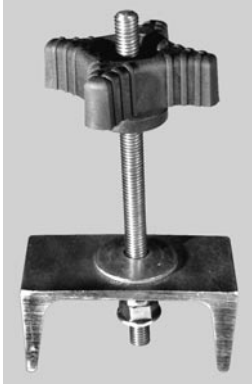
Bombardier Lite drive pulley.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

TRANSMISSION (continued) — MANDATORY SERVICE TOOLS

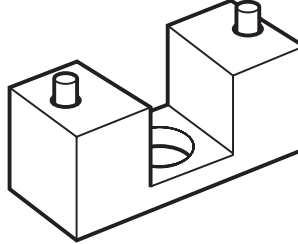
Driven pulley spring compressor
(P/N 529 035 300)



A05B034

APPLICATION
Tundra R.

Spring cover tool
(P/N 529 027 300)



A01B4M4

APPLICATION
Bombardier Lite drive pulley.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

TRANSMISSION — RECOMMENDED SERVICE TOOLS

The following tools are highly recommended to optimize your basic tool kit and reduce repair time.

NEW

Drive pulley puller
(P/N 529 035 959)
(TYPICAL)

A06B014

APPLICATION
Elite.

Drive pulley puller
(P/N 529 031 400)

A18B044

APPLICATION
2002 and older Bombardier Lite drive pulley, except Élan.

TRA drive pulley puller (27 mm)
(P/N 529 010 100)

A18B044

APPLICATION
TRA drive pulley (27 mm) shaft except 454, 670 and 779 engines.

Tapered tool
(P/N 529 035 826)

A32B0M4

APPLICATION
Skandic LT.

Spider tool
(P/N 529 025 200)

A32B0N4

APPLICATION
Skandic LT.

Drive pulley puller
(P/N 529 025 000)

A29B034

APPLICATION
Skandic LT.

Drive pulley puller
(P/N 529 002 100)
(standard threads)

A00C084

APPLICATION
Square shaft, standard (SAE) threads.

Drive pulley puller
(P/N 860 414 200)
(square shaft metric)

Consists of:

529 003 000 529 002 800

A00C095

APPLICATION
Square shaft, metric threads drive pulley.

Governor cup extractor
(P/N 529 035 894)

A32B104

APPLICATION
TRA IV.

NEW

TRA IV dial indicator kit
(P/N 529 035 939)

A00B6D4

APPLICATION
TRA IV and TRA IV HD.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

NEW


Short dial indicator
(P/N 295 000 143)



A00B6E4

APPLICATION
TRA IV and TRA IV HD.

TRA IV drive pulley support
(P/N 529 035 942)



A32B124

APPLICATION
TRA IV and TRA IV HD.


Driven pulley opening tool
(P/N 529 035 501)



A03D2P4

APPLICATION
S and CK3 series with RER.
NOTE: This tool replaces driven pulley opening tool (P/N 529 019 500).

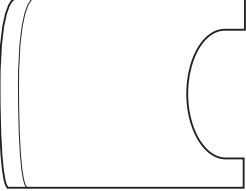
Driven pulley opening tool
(P/N 529 034 200)



A05B044

APPLICATION
Tundra R.


Alignment tool
(P/N 420 476 010)



A00C1D4

APPLICATION
Skandic WT and Alpine II gearbox.

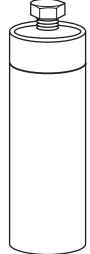
Transmission ball mounting pin
(P/N 420 476 020)



A00C1C4

APPLICATION
Alpine II 3-speed gearbox.

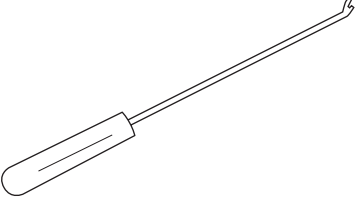
Countershaft bearing installer
(P/N 529 018 800)



A00A194

APPLICATION
PRS chassis.

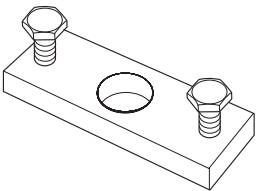
Transmission adjuster
(P/N 529 028 500)



A00D0X4

APPLICATION
F-Series equipped with "twist shifter" reverse transmission.

Cam pusher
(P/N 529 012 900)



A18B064

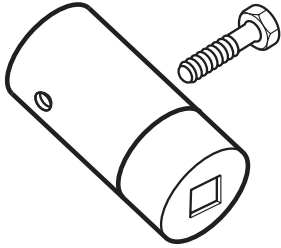
APPLICATION
Tundra II LT.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

Drive pulley puller
(P/N 529 023 100)



A00C3J4

APPLICATION
Élan.

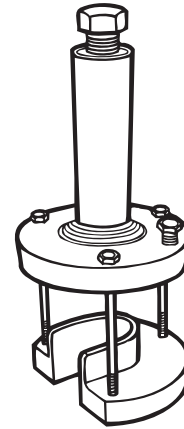
Countershaft bearing installer
(P/N 529 030 200)



A00A194

APPLICATION
S-Series and F-Series.

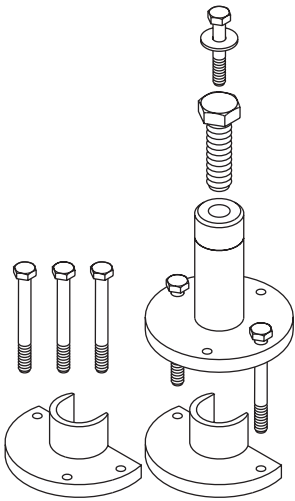
Countershaft bearing remover
(P/N 529 018 700)



A00A164

APPLICATION
PRS chassis.

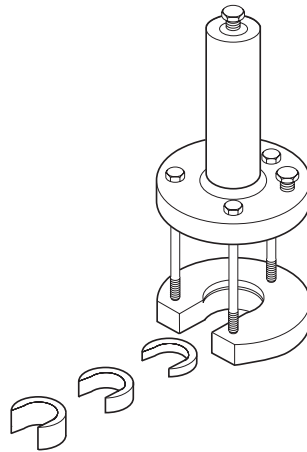
Countershaft bearing
remover/installer
(P/N 529 035 699)



A00B5K4

APPLICATION
ZX and CK3 Series.
NOTE: This tool replaces CK3 series countershaft bearing remover/installer (P/N 529 035 554).

Countershaft bearing remover
(P/N 529 030 100)



A00A274

APPLICATION
S-Series and F-Series.

Countershaft bearing remover
(P/N 529 035 812)



A29B024

APPLICATION
Skandic LT.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

Countershaft bearing installer
(P/N 529 035 815)

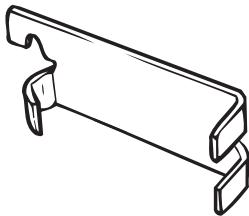


A00A194

APPLICATION
Skandic LT.

Spring scale hook (long)

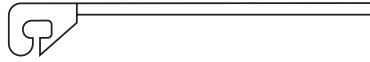
- A) (P/N 529 015 200)
- B) (P/N 529 006 500)
- C) (P/N 529 030 900)



A01B514

APPLICATION
A) 1994 models and older except Alpine II.
B) Tundra II LT.
C) F-Series and S-Series (1995 and newer).

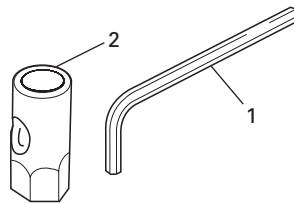
Transmission adjuster
(P/N 529 030 300)



A03D1T4

APPLICATION
Vehicles equipped with "push-pull shifter" reverse transmission.

Drive belt tension adjuster tool
(P/N 529 008 700)



A15B044

Parts included:

- 1) Hexagonal wrench (P/N 420 876 730)
- 2) Socket wrench (P/N 529 015 000)

APPLICATION
All vehicles except Élan, Tundra II and Skandic WT.

Alignment bar

- A) (P/N 529 025 600)
- B) (P/N 529 028 200)
- C) (P/N 529 028 300)
- D) (P/N 529 026 800)
- E) (P/N 529 031 000)
- F) (P/N 529 035 808)
- G) (P/N 529 035 586)
- H) (P/N 529 031 000)
- I) (P/N 529 035 594)
- J) (P/N 529 035 832)
- K) (P/N 529 026 900)
- L) (P/N 529 030 000)
- M) (P/N 529 026 700)
- N) (P/N 529 035 545)
- O) (P/N 529 035 527)
- P) (P/N 529 035 572)
- Q) (P/N 529 035 545)

NEW

- R) (P/N 529 035 974)



A01B4D4

APPLICATION

- A) PRS chassis.
- B) Alpine II.
- C) Élan.
- D) Safari L.
- E) Skandic WT 1996.
- F) Skandic LT.
- G) S-Series and ZX series with Bombardier Lite and RER.
- H) Skandic WT LC/SWT.
- I) CK3 series with RER and Elite model.

NOTE: The alignment bar (P/N 529 035 594) must be modified to fit on Elite. Refer to PULLEY DISTANCE AND ALIGNMENT.

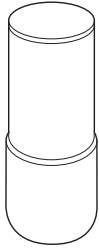
- J) ZX series.
- K) Tundra II LT/R.
- L) S-Series with Bombardier Lite.
- M) F-Series, S-Series and ZX series with TRA.
- N) 1997 and on Skandic WT/WT LC/SWT.
- O) CK3 series except 1998 Mach Z series.
- P) 1998 Mach Z series.
- Q) 1998 Skandic WT.
- R) 2004 Skandic WT/SWT/SUV 550.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

Burnishing bar
(P/N 529 026 402)

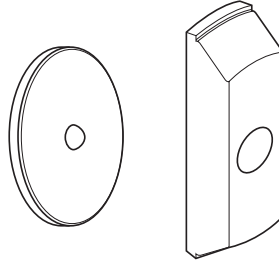


A00B464

APPLICATION

Tundra II LT, Safari L and Skandic.

Large bushing extractor
(P/N 529 031 100)



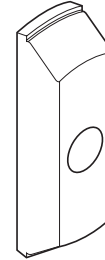
A00B414

APPLICATION

Formula type driven pulley.

NOTE: Use this tool only with former puller (P/N 529 018 600) that has regular threads.

Large bushing extractor
(P/N 529 035 575)



A02D1Q4

APPLICATION

LPV 27 driven pulley.

NOTE: Use this tool only with new puller (P/N 529 035 524) that has Acme threads and support plate included with extractor (P/N 529 031 100).

Bushing extractor/installer
A) (P/N 529 031 300)
(TYPICAL)

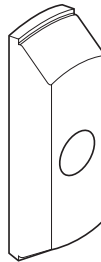


A01B5G4

APPLICATION

A) TRA drive pulley spring cover with replaceable bushing.

Large bushing extractor
(P/N 529 035 576)



A02D1Q4

APPLICATION

Formula type driven pulley.

NOTE: Use this tool only with new puller (P/N 529 035 524) that has Acme threads and support plate included with extractor (P/N 529 031 100).

Sliding half bushing remover/
installer
(P/N 529 035 931)



A00B6L4

APPLICATION

TRA III and TRA IV.

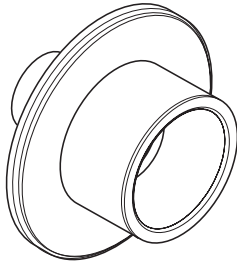
TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

Large bushing installer and
small bushing extractor

A) (P/N 529 031 200)

B) (P/N 529 035 931)

(TYPICAL)



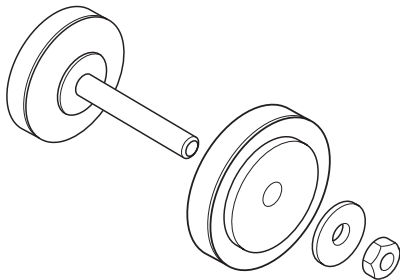
A00B4J4

APPLICATION

A) All models except Tundra/R,
Skandic WT/SWT/WT LC and
S-Series with RER.

B) TRA III drive pulley spring cover.

Chaincase seal pusher
(P/N 529 035 584)



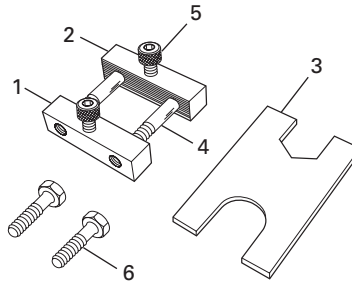
A00B504

APPLICATION

S, F, CK3 and ZX series.

NOTE: This tool replaces chain-
case upper seal pusher (P/N 529
032 300).

Drive axle sprocket adjuster
(P/N 861 725 700)



A01B204

Parts included in the kit:

- 1) Block with threads
(P/N 529 010 700)
- 2) Block without threads
(P/N 529 010 800)
- 3) Plate
(P/N 529 010 600)
- 4) Bolt M10 (2)
(P/N 222 007 565)
- 5) Allen screw M8 (2)
(P/N 222 983 065)
- 6) Screw M8 (2)
(P/N 222 082 565)

NOTE: When the tool is to be used
between tunnel and sprocket use
screws M8.

APPLICATION

All vehicles except Élan.

Belt tension tool
(P/N 529 035 957)



A00B6F4

APPLICATION

Elite.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

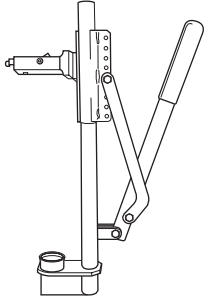
SUSPENSION — MANDATORY SERVICE TOOLS

Shock spring removal kit

(P/N 529 035 504)

Replacement clevis pin

(P/N 414 528 400)



A01B404

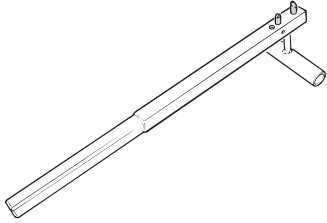
APPLICATION

All suspensions with coil spring.

NOTE: The previous shock spring removal kit (P/N 529 027 100) can be upgraded by replacing the stopper with a wider stopper (P/N 529 035 551).

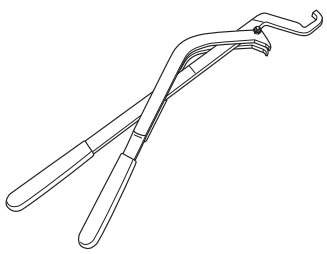
SUSPENSION — RECOMMENDED SERVICE TOOLS

A) Track cleat remover
(P/N 529 008 200)
Pins
(P/N 529 008 204)
NOTE: Pins can be rotated 180° depending on whether the tool is used by a left-hander or right-hander.



A01B1J4

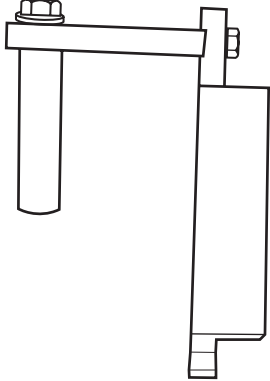
B) Track cleat remover
(P/N 529 028 700)



A01F224

APPLICATION
A) 1993 and older.
B) 1994 and newer except Élan and Tundra II.

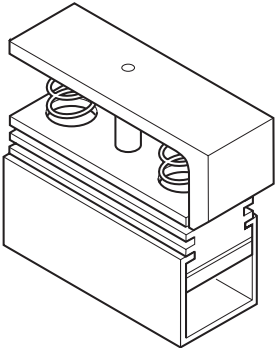
Camber angle tool
(P/N 529 021 600)
NOTE: Angle finder with a magnetic base must be used.
Suggestion: K-D tool no. 2968



A06B024

APPLICATION
All DSA front suspensions.

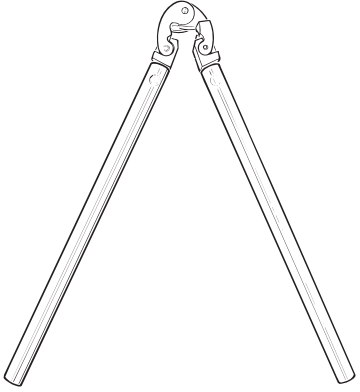
Track tension gauge
(P/N 529 021 500)



A00B3X4

APPLICATION
All models except Élan.

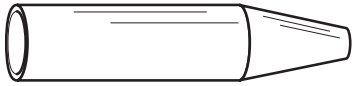
Track cleat installer
A) (P/N 529 008 500)
Narrow
B) (P/N 529 028 800)
Narrow
C) (P/N 529 007 700)
Wide



A01B1M4

APPLICATION
A) 1993 and older.
B) 1994 and newer.
C) 1992 and older with wide cleat opening.

Dome guide
A) (P/N 529 026 500)
B) (P/N 529 035 728)
NEW
C) (P/N 529 035 902)



A06F1B4

APPLICATION
A) C-36 T/A shocks.
B) C-46 T/A shocks.
C) 2003 MX Z x 440 LC.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

NEW

Floating piston puller
(P/N 529 035 901)



A32F3S4

APPLICATION
T/A shock with external gas reservoir.

NEW

Floating piston holder
(P/N 529 035 903)



A32F3U4

APPLICATION
2003 MX Z x 440 LC.

NEW


Floating piston remover
(P/N 529 035 907)



A32F3V4

APPLICATION
2002 and 2003 MX Z x 440 LC.

Shock wrench
(P/N 529 035 727)



A00F224

APPLICATION
All T/A shocks.

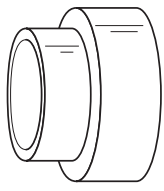
HPG shock holding tool
(P/N 529 035 769)



A01B5H4

APPLICATION
All HPG shocks.

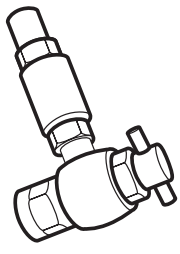
Piston guide
A) (P/N 529 026 600)
B) (P/N 529 035 608)



A06F1C4

APPLICATION
A) C-36 T/A shocks.
B) C-46 T/A shocks.

Gas shock valve tool
(tire valve type)
(P/N 529 035 570)



A02F134

APPLICATION
1999 and older T/A shocks and some 2000 and up T/A shocks.

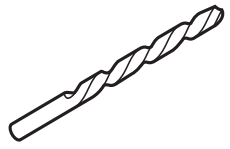
Gas fill tool kit (needle type)
(P/N 503 190 102)



A00B684

APPLICATION
2003 T/A shocks.

Drill bit
(P/N 529 031 800)



A01B564

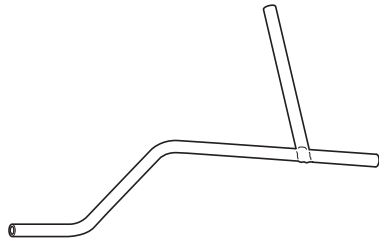
APPLICATION
All 3/16 inch rivets.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

Spring installer (bar)
(P/N 529 005 000)

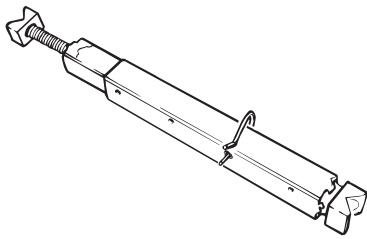


A00C114

APPLICATION

Tundra II LT, Scout and all SC-10 suspensions.

Drive axle holder
(P/N 529 007 200)

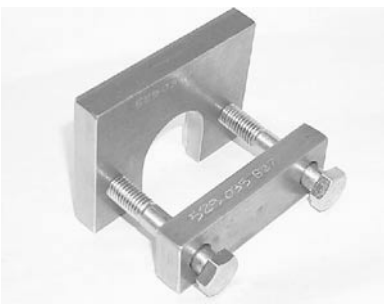


A01B1E4

APPLICATION

All models.

Ball joint extractor
(P/N 529 035 827)

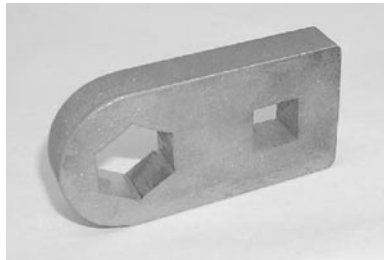


A33B074

APPLICATION

REV Series.

NEW
Extension to torque ball joint nut
(P/N 529 035 876)



A33B024

APPLICATION

REV Series.

NEW
REV ball joint lock
(P/N 529 035 945)



A32F2W4

APPLICATION

REV Series.

Ball joint remover support
(P/N 529 035 873)



V00B1J4

APPLICATION

REV Series.

Ball joint installer
A) (P/N 529 035 874)

NEW

B) (P/N 529 035 975)



V00B1K4

APPLICATION

A) 2003 REV Series.
B) 2004 REV Series

Ball joint installer support
(P/N 529 035 875)

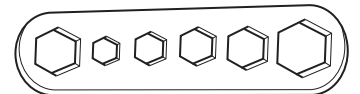


V00B1L4

APPLICATION

REV Series.

Hexagonal wrench
(P/N 529 014 700)



A19B024

APPLICATION

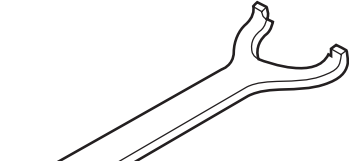
All SC-10 suspensions, Safari and Skandic prior to 1995.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

Kayaba shock adjustment tool
(P/N 529 035 582)



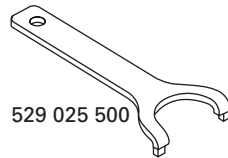
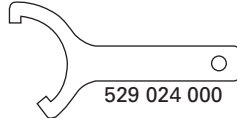
A00A1K4

APPLICATION
C-7 suspension.

Adjustment wrench

(P/N 861 743 900)

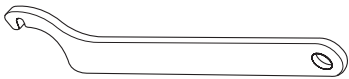
Consists of:



A00B4B4

APPLICATION
1998 and older models with T/A shock.

Suspension adjustment wrench
(P/N 529 017 100)



A15B094

APPLICATION
1992 and old Formula C-7.

Adjustment wrench

(P/N 520 000 126)



A00B5H4

APPLICATION
SC-10 II and III (coupling blocks).

Suspension adjustment wrench
(P/N 529 032 900)



A02F114

APPLICATION
ARM and SC 10 II suspensions.

Suspension adjustment wrench
(P/N 529 034 100)



A02F124

APPLICATION
CK3 series.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

VEHICLES — RECOMMENDED SERVICE TOOLS

Protective mat
(P/N 529 030 600)

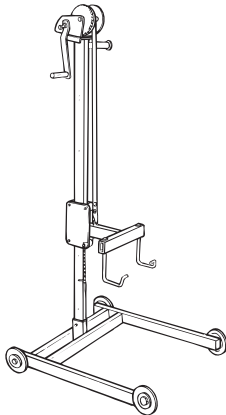


A01B454

APPLICATION

All vehicles.

Snowmobile jack
(P/N 529 020 000)



A01A1J4

APPLICATION

All models.

Template for hood drilling
(P/N 529 034 400)



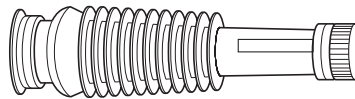
A02H154

APPLICATION

S-Series.

NOTE: To drill new hood prior to install meters.

Flexible spout for oil container
(P/N 414 837 300)



F04B044

APPLICATION

All models.

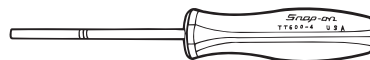
Adjustment wrench
(P/N 529 035 603)

APPLICATION

To remove and install fuel tank nut on ZX series.

Terminal (Packard) remover
Not sold by Bombardier

Snap-on
TT 600-4



F01B1J4

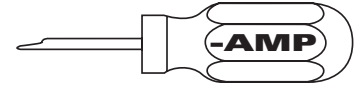
APPLICATION

Models with Packard connectors.

Multilock-terminal housing
connector extraction tool

Not sold by Bombardier

AMP
755430-2



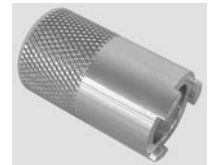
A00B654

APPLICATION

For AMP multilock-terminals.

NEW

DESS socket
(P/N 529 035 943)



A32E3K4

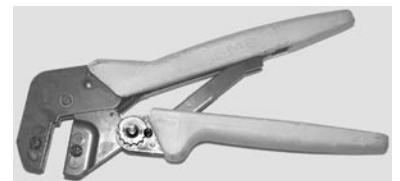
APPLICATION

All DESS equipped models.

Crimping tool
(Dies sold separately)

NEW

(P/N 529 035 909)



A00B6M4

APPLICATION

To crimp specific terminals.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

VEHICLES (continued) — RECOMMENDED SERVICE TOOLS

Crimper die

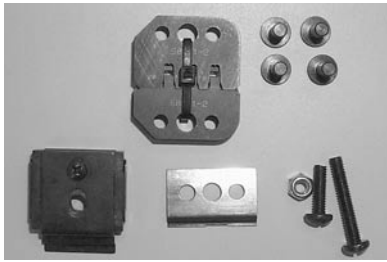
A) (P/N 529 035 828)

B) (P/N 529 035 906)



C) (P/N 529 035 908)

(TYPICAL)



A00B6942

APPLICATION

A) AMP multilock-connectors.

B) ECM connectors A and B.

C) Some Deutsch connectors

NOTE: These dies fit on crimping tool P/N 529 035 909.

Fuel pump nut wrench

(P/N 529 035 899)



A32B0Y4

APPLICATION

2-TEC and 1004 engine equipped models.

Oil pressure gauge

(P/N 529 035 709)



V00B064

APPLICATION

1004 and 1503 engine equipped models.

Pressure gauge

(P/N 529 035 591)

1) Clip

(P/N 529 021 800)



F02B0B5

APPLICATION

2-TEC, 1004 and 1503 engine equipped models.

Oil pressure adaptor

(P/N 529 035 652)



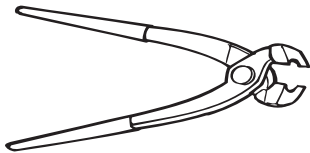
V00B074

APPLICATION

1004 and 1503 engine equipped models.

Hose clamp pliers

(P/N 295 000 070)



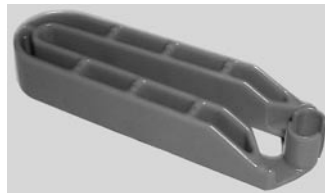
F01D174

APPLICATION

Some models.

Fuel line remover

(P/N 529 035 714)



F12B0G4

APPLICATION

2-TEC and 1004 engine equipped models.

Adjustment wrench

(P/N 529 035 891)



A33B084

APPLICATION

REV series.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 01 (SERVICE TOOLS)

VEHICLES (continued) — RECOMMENDED SERVICE TOOLS

Heated grips insertion tool

A) (P/N 529 035 897)

B) (P/N 529 035 936)



A32G2B4

APPLICATION

A) ZX liquid-cooled models with straight grips.

B) Models with J-hook type grips.

NEW

Insert pliers

(P/N 295 000 162)



A00B6N4

APPLICATION

6 mm insert equipped models.

Crimp pliers

(P/N 529 035 730)



A00B6A4

APPLICATION

All models with a battery.

SERVICE PRODUCTS

MANDATORY SERVICE PRODUCTS

Retaining compound
(P/N 413 703 100)
Loctite® RC/609:
Retaining compound (10 mL)
(green)



A00B2S4

APPLICATION

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

High strength threadlocker
(P/N 293 800 005)
Loctite® 271: Threadlocker (10 mL)
(red, high strength)



A00B2U4

APPLICATION

Fasteners and studs up to 25 mm (1 in) diameter.

Paste gasket
(P/N 413 702 700)
Loctite® 515:
Gasket eliminator (50 mL)



A00B2T4

APPLICATION

Crankcase halves and gearbox mating surfaces.

Medium-strength threadlocker
(P/N 293 800 060)
Loctite® 243: Threadlocker (10 mL)
(blue, medium strength)



F00A004

APPLICATION

Flywheel nut, crankcase studs, etc.
NOTE: This product replaces Loctite 242 (P/N 293 800 015).

Sealing compound
(P/N 420 297 906)
(30 mL)



A00B564

APPLICATION

To seal crankcase on all ZX series engines.

NOTE: This product replaces the larger tube (P/N 420 297 905).

Paste gasket
(P/N 293 800 038)
Loctite® 518:
Gasket eliminator (50 mL)



F01B124

APPLICATION

Crankcase halves and gearbox mating surfaces.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE PRODUCTS)

MANDATORY SERVICE PRODUCTS (continued)

Loctite® primer
(P/N 293 800 041)
Primer N 128 g (5 oz)



A00B3N4

APPLICATION

To prepare mating surfaces before applying paste gasket, retaining compound or threadlockers.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 708 100.

Gasket/paint remover
(P/N 413 708 500)
Loctite® Chisel 510 g (18 oz)



A00B574

APPLICATION

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

Molykote PG 54
(P/N 420 899 763)
(10 g)



A00B5F4

APPLICATION

To lubricate pawl and pawl lock of rewind starter.

Molykote G-n paste
(P/N 711 297 433)
(50 g)

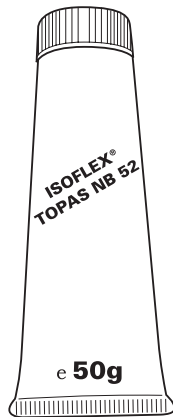


A00B5P4

APPLICATION

To lubricate RAVE valve stem on engine with oil seal in RAVE housing.

Isoflex grease
(P/N 293 550 021)
(50 g)



A00B554

APPLICATION

To lubricate some crankshaft bearings on some engines.

Petamo grease
(P/N 420 899 271)



A00B584

APPLICATION

To lubricate lip of all ZX series engine crankshaft seals and plain bearings on 4-TEC.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE PRODUCTS)

RECOMMENDED SERVICE PRODUCTS

NEW

SYNTHETIC BOMBARDIER
4-STROKE engine oil 0W-40
(P/N 293 600 054)
(12 x 1 L)



A32B144

APPLICATION
4-TEC.


Pre-mix oil
(P/N 413 803 100)
(12 x 500 mL)



A00B5L4


APPLICATION
All pre-mix models.

BOMBARDIER FORMULA XP-S II
synthetic injection oil
(P/N 293 600 045)
(12 x 1 liter)



A00B5T4

(P/N 293 600 046)
(3 x 4 liter)




A00B5U4

(P/N 293 600 047)
(205 liter)

APPLICATION
All engines.
NOTE: This synthetic injection oil replaces XP-S and XP-S DI injection oils.


BOMBARDIER injection oil
(P/N 413 802 900)
(12 x 1 liter)
(P/N 413 803 000)
(3 x 4 liter)
(P/N 413 803 200)
(205 liter)



F01B2H4

APPLICATION
All engines.

Premixed coolant 50/50
- 37°C (- 35°F)
(P/N 293 600 038)
(16 x 1 L)



A00B5X4

APPLICATION
All liquid cooled models.
NOTE: This product replaces pre-mixed coolant (P/N 413 711 802).

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE PRODUCTS)

RECOMMENDED SERVICE PRODUCTS (continued)

Fuel stabilizer
(P/N 413 408 600)
(12 x 8 oz)



A00B604

APPLICATION

All models.

Storage oil
CANADA (P/N 413 711 600)
U.S.A. (P/N 413 711 900)
(350 g spray can) (12 x 350 g)



A00B634

APPLICATION

All models.

NOTE: Only the P/N has been changed. This product is identical to the P/N 496 014 100.

Chaincase oil
(P/N 413 801 900)
(16 x 250 mL)



A00B5Y4

APPLICATION

Chaincase lubricant on all fan-cooled models except Skandic WT series.

Synthetic chaincase oil
(P/N 413 803 300)
(12 x 355 mL)



A00B5Z4

APPLICATION

Chaincase lubricant on all liquid-cooled models and Skandic WT series.

Grease LMZ no. 1
(P/N 413 707 500)
(400 g)



A00B1Y4

APPLICATION

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

Synthetic grease
(P/N 413 711 500)
(400 g)



A01B574

APPLICATION

Drive axle bearing.



Suspension synthetic grease
(P/N 293 550 033)
(10 tubes of 400 g each)

APPLICATION

For front and rear suspension components and drive axle bearing.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE PRODUCTS)

RECOMMENDED SERVICE PRODUCTS (continued)

BOMBARDIER LUBE
(P/N 293 600 016)
(12 x 14 oz)



A00B624

APPLICATION
Steering ball joints on all models.

NEW

Brake fluid SRF (DOT 4)
(P/N 293 600 063)
(1 L)



A33A0T4

APPLICATION
All models with hydraulic brake.

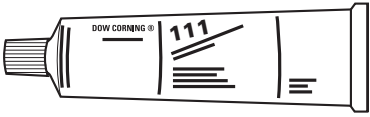
Shock oil
(P/N 293 600 035)
(32 oz)



A00B644

APPLICATION
T/A shocks.

Molykote 111
(P/N 413 707 000)



A00B3W4

APPLICATION
Crankshaft seals on all engines except ZX series ones.

NEW

Brake fluid GTLMA (DOT 4)
(P/N 293 600 062)



A33A0U4

APPLICATION
All models with hydraulic brake.

Anti-seize lubricant
(P/N 293 800 070)
Loctite anti-seize lubricant 236 mL (8 oz)



A00B594

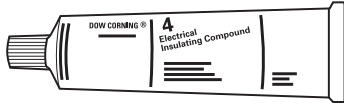
APPLICATION
Mounting surfaces of driven pulley and brake disc on countershaft.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE PRODUCTS)

RECOMMENDED SERVICE PRODUCTS (continued)

Silicone dielectric grease
(P/N 293 550 004)
(3 oz)



A00B1X4

APPLICATION

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

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 701 700.

Pulley flange cleaner
(P/N 413 711 809)
(320 g)



A00B5V4

APPLICATION

Engine crankcase joining surfaces, pulleys and any greasy surfaces.

Heavy duty cleaner
(P/N 293 110 001)
(400 g)
(P/N 293 110 002)
(4 L)



A00B614

APPLICATION

All models.

Plastic & vinyl cleaner
(P/N 413 711 200)
(6 x 1 L)



A00B5W4

APPLICATION

Hood, bottom pan and seat.

High temperature and strength retaining compound
(P/N 413 711 400)
Loctite 648 (5 mL) (green)



A00B3D4

APPLICATION

To fasten oil injection nozzle to crankcase.

NOTE: Only the P/N has been changed. This product is identical to the P/N 420 899 788.

Pipe sealant
(P/N 293 800 018)
Loctite 592 (50 mL)



A00B2W4

APPLICATION

Engine plugs and senders.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 702 300.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE PRODUCTS)

RECOMMENDED SERVICE PRODUCTS (continued)

Loctite 5150
(P/N 293 800 086)



A00B5S4

APPLICATION

All models to seal bottom pan.

Gel instant adhesive
(P/N 413 708 300)

Loctite 454-40 20 g (.70 oz)



A00B3O4

APPLICATION

Isolating foam and rubber strip.

High temperature RTV sealant
(P/N 293 800 090)

Ultra Copper (80 mL)



A00B5A4

APPLICATION

All models.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 710 300.

Instant gasket
(P/N 293 800 088)
(7 oz)



A02B0C4

APPLICATION

All models.

General purpose instant adhesive
(P/N 293 800 021)

Loctite 495 (3 g)



A00B2V4

APPLICATION

Rubber to metal bonding and most hard plastic.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 703 200.

RTV silicone sealant
(P/N 293 800 066)
Loctite 5900 (300 mL)



A02B0B4

APPLICATION

Tundra R chaincase cover.

Tough adhesive
(P/N 413 408 300)

Loctite Black Max 3 mL (.10 oz)



A00B3P4

APPLICATION

Shifter boot or grip.

Paint for frame touch-up
(P/N 413 401 000)

Black semi-gloss (spray can)



A00B3H4

APPLICATION

All models with a black frame.

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE PRODUCTS)

RECOMMENDED SERVICE PRODUCTS (continued)

Scratch remover
(P/N 861 774 800)



A00B6G4









APPLICATION

All models.

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MAINTENANCE CHART

SYSTEM	PART/TASK	10-HOUR OR 500 km (300 m.) INSPECTION (to be performed by dealer)	WEEKLY OR EVERY 240 km (150 m.)	MONTHLY OR EVERY 800 km (500 m.)	ONCE A YEAR OR EVERY 3200 km (2000 m.)	STORAGE (to be performed by dealer)	PRESEASON PREPARATION (to be performed by dealer)	REFER TO
	Rewind Starter and Rope					I,L,C	I	Subsection 04-10
	Engine Nuts and Screws	I			I	I		Section 4, see the appropriate subsection
	Exhaust System	I		I		I		Subsections 04-02, 04-03 or 04-04 See REMOVAL FROM VEHICLE
	Engine Lubrication					L		Subsection 02-03
	Cooling System	I			I		I	Subsection 04-08 or 04-09
	Coolant	I					R	Subsection 04-08 or 04-09
	Condition of Seals						I	I
	Injection Oil Filter			I		R		Subsection 04-07
	Oil Injection Pump	A			A		A	Subsection 04-07
	Fuel Stabilizer					R		Subsection 02-03
	Fuel Filter						R	Subsection 02-04
	Fuel Lines and Connections	I				I	I	Subsection 04-12
	Carburetor	A			A		A,C	Subsection 04-11
	Throttle Cable	I			I	I	I	Subsection 04-12
	Air Filter			C			C	Subsection 02-04
	Drive Belt	I	I				I	Subsection 05-02
	Drive and Driven Pulleys	I		I	C	I	C	Subsections 05-03 and 05-04
	Tightening Torque of Drive Pulley Screw	I			I		I	Subsection 05-03
	Driven Pulley Preload	I			I	I		Subsection 05-04
	Brake Fluid	I	I			R	I	Subsection 05-06
	Brake	I	I	A		I,A	I	Subsection 05-06
	Drive Chain Tension	A		A		A		Subsection 05-07
	Chaincase Oil	R		I	R***	R	I	Subsection 05-07
	Drive Axle End Bearing**	L		L		L		Subsection 07-05
	Countershaft	L		L		L		Subsection 07-05
	Steering and Front Suspension Mechanism Lubrication**	A,I,L		A,I	L	A,I,L		Subsections 08-02 and 08-03
	Wear and Condition of Skis and Runners	I	I			I		Subsection 08-03

Section 02 MAINTENANCE

Subsection 02 (MAINTENANCE CHART)

SYSTEM	PART/TASK	10-HOUR OR 500 km (300 m.) INSPECTION (to be performed by dealer)	WEEKLY OR EVERY 240 km (150 m.)	MONTHLY OR EVERY 800 km (500 m.)	ONCE A YEAR OR EVERY 3200 km (2000 m.)	STORAGE (to be performed by dealer)	PRESEASON PREPARATION (to be performed by dealer)	REFER TO
	Suspension **	I		I,L		I,L		Subsections 07-02, 07-03 or 07-04
	Suspension Stopper Strap				I	I		Subsections 07-02, 07-03 or 07-04
	Track	I		I		I		Subsection 07-06
	Track Tension and Alignment	A	AS REQUIRED					
	Spark Plugs*	I		I			R	Subsection 06-03
	Battery (if so equipped)	I		I		I	I	Subsection 06-04
	Headlamp Beam Aiming				A		A	Subsection 09-02
	Wiring Harnesses, Cables and Lines	I		I		I		Subsection 09-02
	Operation of Lighting System (HI/LO beam, brake light, etc.) Test Operation of Engine Cut-Out Switch and Tether Cut-Out Switch	I	I				I	<i>Operator's Guide</i>
	Rags in Air Intake and Exhaust System					R	C	Subsections 02-03 and 02-04
	Engine Compartment	C		C		C		Subsection 02-03
	Vehicle Cleaning and Protection	C		C		C		Subsection 02-03

A = ADJUST

I = INSPECT (clean, inspect, repair, adjust and lubricate)

L = LUBRICATE

R = REPLACE

C = CLEAN

*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.

**Lubricate whenever the vehicle is used in wet conditions (wet snow, rain, puddles).

***Change oil every 3200 km (2000 mi.).

STORAGE

GENERAL

Proper snowmobile storage is a necessity during the summer months or when a vehicle is not being used for more than one month.

Refer to storage column from MAINTENANCE CHART jointly with the present storage procedure in order to cover each and every aspect of the snowmobile storage procedure. Any worn, broken or damaged parts should be replaced.

WARNING

Unless otherwise specified, engine should be turned off for storage procedure.

VEHICLE CLEANING

To facilitate the inspection and ensure adequate lubrication of components, it is recommended to clean the entire vehicle.

Remove any dirt or rust.

To clean the entire vehicle, use only flannel cloths or equivalent.

CAUTION: It is necessary to use flannel cloths or equivalent on windshield and hood to avoid damaging further surfaces to clean.

To clean the entire vehicle, including bottom pan and metallic parts use Heavy duty cleaner (P/N 293 110 001 (spray can 400 g) and P/N 293 110 002 (4 L)).

CAUTION: Do not use Heavy duty cleaner on decals or vinyl.

For vinyl and plastic parts, use Vinyl & Plastic Cleaner (P/N 413 711 200 (6 x 1 L)).

To remove scratches on windshield or hood use BOMBARDIER Scratch Remover Kit (P/N 861 774 800).

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

Inspect the hood and repair any damage.

Touch up all metal spots with touch-up paint where paint has been scratched off.

Spray all bare metal parts including shock chromed rods with BOMBARDIER LUBE (P/N 293 600 016).

Wax the hood and the painted portion of the frame for better protection.

NOTE: Apply a non-abrasive wax on glossy finish only.

ENGINE COMPARTMENT

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

BATTERY

Remove battery, clean its tray and its exterior surface. Charge battery as explained in BATTERY section.

FUEL STABILIZER

With the new fuel additives, it is critical to use the fuel stabilizer (P/N 413 408 600) (250 mL) to prevent fuel deterioration, gum formation and fuel system components corrosion. Follow manufacturer's instructions for proper use.

Pour fuel stabilizer in fuel tank prior to starting engine for internal parts lubrication so that stabilizer flows everywhere in fuel system.

After engine starting, use primer several times so that stabilizer flows inside it (on so equipped models).

Do not drain fuel system.

CAUTION: Fuel stabilizer should be added prior to engine lubrication to ensure carburetor protection against varnish deposit.

ENGINE LUBRICATION

Engine internal parts must be lubricated to protect them from possible rust formation during the storage period. To protect appropriately the engine use storage oil (P/N 413 711 600 (Canada) or P/N 413 711 900 (United States)).

Section 02 MAINTENANCE

Subsection 03 (STORAGE)

Proceed as follows:

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

WARNING

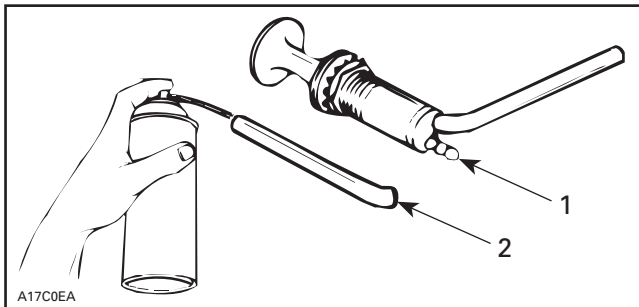
Ensure the track is free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.

Stop the engine.

Models with a Primer

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 nozzle into primer outlet hose.

Models with a Choke

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 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.

COUNTERSHAFT LUBRICATION

Driven pulley and brake disc must be floating on the countershaft for efficient operation. Lubricate with anti-seize lubricant (P/N 293 800 070).

CAUTION: Do not lubricate excessively as lubricant could contact and soil brake pads and/or drive belt.

PULLEY PROTECTION

After inspection and interior cleaning of pulleys, spray BOMBARDIER LUBE (P/N 293 600 016) on sheaves. Do not reinstall drive belt.

VEHICLE PROTECTION

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 but ventilated tarpaulin. This will prevent sun rays and grime from affecting plastic components and vehicle finish.

Lift rear of vehicle until track is clear of the ground. Install on a snowmobile mechanical stand.

NOTE: Do not release track tension.

RAGS IN AIR INTAKE AND EXHAUST SYSTEM

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

PRESEASON PREPARATION

Proper vehicle preparation is necessary after the summer months or when a vehicle has not been used for more than one month.

Refer to preseason preparation column from MAINTENANCE CHART jointly with the present preseason preparation procedure in order to cover each and every aspect of the snowmobile preseason preparation procedure.

Any worn, broken or damaged parts found during the storage procedure should have been replaced. If not, proceed with the replacement.

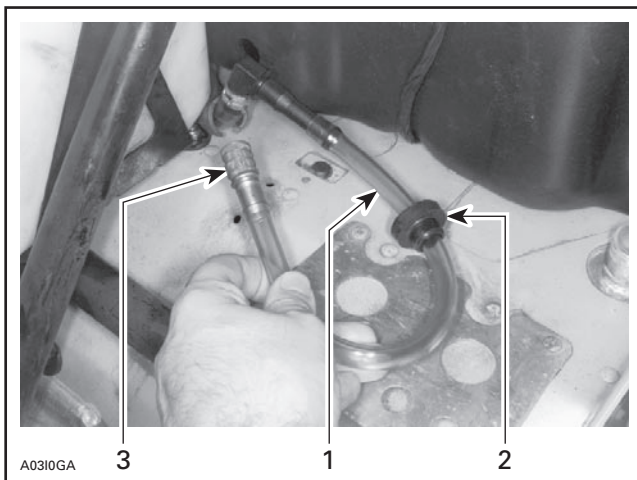
WARNING

Unless otherwise specified, engine should be turned off for preparation procedure.

FUEL FILTER REPLACEMENT

Drain fuel tank.

Remove fuel line grommet from fuel tank and pull out inlet fuel line from tank.



TYPICAL

1. Inlet fuel line
2. Position of grommet when installing
3. Fuel filter

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.

CARBURETOR CLEANING

Disassemble carburetor(s) in order to clean all internal parts. Do not hesitate to replace any jets having gum or varnish on their surfaces.

AIR FILTER CLEANING

Check that inside of air silencer 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.

RAGS IN AIR INTAKE AND EXHAUST SYSTEM

Remove rags that were installed during STORAGE preparation.

ENGINE LUBRICATION

Add 500 mL (17 U.S. oz) of recommended injection oil to the first full filled fuel tank.

CLEANING OF DRIVE AND DRIVEN PULLEYS

Clean drive and driven pulleys sheaves with Pulley flange cleaner (P/N 413 711 809).

CLEANING OF BRAKE DISK

Remove any rust built-up on braking surfaces. Clean brake disk braking surfaces with Pulley flange cleaner (P/N 413 711 809).

DRIVE BELT CONDITION

Inspect belt for cracks, fraying or abnormal wear. Replace if necessary. Make sure to install the proper belt with arrow printed on belt pointing front of vehicle.

SPARK PLUGS

Once preseason preparation is done, start engine with the old spark plug(s) to burn excess storage oil. Then, install new properly gapped spark plug(s).

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ENGINE

The following chart is provided to help diagnose 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	<p>1. Check spark plugs.</p> <p>a. Carbon accumulation caused by defective spark plug(s). <i>Clean carbon accumulation from piston and cylinder head and install dry properly gapped spark plug(s).</i></p>
	<p>2. Check ignition timing.</p> <p>a. Timing is too advanced. <i>Set timing according to specifications (refer to TECHNICAL DATA).</i></p>
	<p>3. Check carburetor.</p> <p>a. Fuel passages obstructed. <i>Clean carburetor and install new filter(s).</i></p> <p>b. Fuel level too low. <i>Adjust float level according to specifications.</i></p>
	<p>4. Check cooling system.</p> <p>Fan-Cooled Engines</p> <p>a. Loose fan belt. <i>Adjust or replace fan belt (refer to AXIAL FAN COOLING SYSTEM).</i></p> <p>b. Dirty cooling fins or blocked air ducts. <i>Clean.</i></p> <p>Liquid-Cooled Engines</p> <p>a. Low antifreeze level. <i>Adjust antifreeze level. Proceed with a leakage test (refer to LIQUID COOLING SYSTEM) and repair as required.</i></p> <p>b. Defective tank cap. <i>Replace cap.</i></p> <p>c. Defective thermostat. <i>Replace thermostat.</i></p> <p>d. Air in system. <i>Bleed system.</i></p>

SYMPTOM	ENGINE SUDDENLY TURNS OFF AT HIGH RPM AND/OR WITH LIGHT LOAD.
CONDITION	NORMAL USE.
Test/Inspection	1. Check that all ground wires are well connected.

Section 03 TROUBLESHOOTING

Subsection 02 (ENGINE)

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
Test/Inspection	1. Perform engine leak test. Refer to ENGINE LEAK VERIFICATION FLOW CHART. Check possible piston seizure. a. Damaged gasket and/or seal. <i>Replace defective parts.</i>
	2. "Four-corner" seizure of piston(s). a. High acceleration when engine is cold. Piston expands faster than cylinder. <i>Replace piston(s). Ask driver to refer to the warm-up procedure in the Operator's Guide.</i>
	3. Piston(s) seizure on exhaust side (color on piston dome is correct). a. Kinked fuel tank vent tube. <i>Relocate fuel tank vent tube.</i> b. Leaks at fuel line connections or damaged fuel lines. <i>Replace defective lines.</i> c. Fuel does not flow through carburetor(s) (foreign particles in needle area and/or varnish formation in carburetor(s)). <i>Clean carburetor(s) and install new filter(s).</i> d. Spark plug heat range is too warm. <i>Install spark plugs with appropriate heat range (refer to TECHNICAL DATA).</i> e. Improper ignition timing. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i> f. Restriction in exhaust system. <i>Replace.</i> g. Compression ratio is too high. <i>Install genuine parts.</i> h. Carburetor calibration is too lean. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i> i. Improper reed valve adjustment or damage. <i>Adjust according to specifications (refer to appropriate ENGINES TYPES) and/or install Bombardier's recommended reed valve.</i> j. Poor quality oil. <i>Use BOMBARDIER injection oil.</i> k. Leaks at air intake silencer. <i>Replace air intake silencer grommets.</i>

Section 03 TROUBLESHOOTING**Subsection 02 (ENGINE)**

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
	<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 is due to an incomplete combustion of a poor quality oil. <i>Clean residue accumulation in combustion chamber and replace piston(s). Use BOMBARDIER injection oil.</i></p> <p>b. Spark plug heat range is too high. <i>Install recommended dry properly gapped spark plugs (refer to TECHNICAL DATA).</i></p> <p>c. Ignition timing is too advanced. <i>Adjust according to specifications (refer to TECHNICAL DATA).</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).</i></p>
	<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>
	<p>6. Grooves on intake side of piston only.</p> <p>a. Oil film eliminated by water (snow infiltration in engine). This can also be caused by running engine on choke for too long. Excessive fuel will remove the oil film on the piston and make marks. <i>Replace piston(s) and check if intake system leaks.</i></p>
	<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 and/or adjust its tension (refer to TECHNICAL DATA).</i></p> <p>b. Cooling system leaks and lowers coolant level. <i>Proceed with a leakage test (refer to LIQUID COOLING SYSTEM) and repair as required. Add coolant in cooling system until appropriate level is reached.</i></p> <p>c. Accumulation of foreign particles in needle valve and/or main jet area. <i>Clean carburetor(s).</i></p>
	<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). Adjust drive pulley according to specifications (refer to TECHNICAL DATA) and/or clean pulley sheaves if they are contaminated with greasy particles.</i></p>
	<p>9. DPM manifold air vent is obstructed.</p> <p>a. Carburetion is too lean. <i>Ensure proper air vent.</i></p>

Section 03 TROUBLESHOOTING

Subsection 02 (ENGINE)

SYMPTOM	PISTON RING AND CYLINDER SURFACES ARE SCRATCHED.
CONDITION	NORMAL USE.
Test/Inspection	1. Check oil quality. a. Poor quality oil. <i>Use BOMBARDIER injection oil.</i>
	2. Check injection pump and its hoses. a. Inadequate injection pump adjustment and/or defective hoses. <i>Adjust pump according to specifications (refer to ENGINE) and/or replace hoses.</i>

SYMPTOM	ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM.
CONDITION	NORMAL USE.
Test/Inspection	1. Check spark plug condition and gap. a. Fouled spark plugs or wrong spark plug gap. <i>Replace or readjust gap.</i>
	2. Check if there is water in fuel. a. There is water in fuel. <i>Drain fuel system, then fill with appropriate fuel.</i>
	3. Check items listed in ENGINE RUNS OUT OF FUEL (refer to FUEL AND OIL SYSTEMS subsection).
	4. Check carburetor adjustments and cleanliness. a. Inadequate carburetor adjustments or dirt accumulation. <i>Adjust according to specifications (refer to TECHNICAL DATA) or clean.</i>
	5. Check drive belt. a. Worn belt. <i>Replace belt if width is 3 mm (1/8 in) less than nominal dimension (refer to TECHNICAL DATA).</i>
	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).</i>
	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) and/or replace bushing(s).</i>
	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).</i>

Section 03 TROUBLESHOOTING

Subsection 02 (ENGINE)

SYMPTOM	ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM.
CONDITION	NORMAL USE.
	<p>9. Check exhaust system.</p> <p>a. Restriction or exhaust system leakage. <i>Replace or reseal with Ultra Copper.</i></p>
	<p>10. Check ignition timing.</p> <p>a. Decrease in power due to delayed ignition. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i></p>
	<p>11. Check engine compression.</p> <p>a. Worn piston(s) and ring(s). <i>Replace (refer to TECHNICAL DATA for specifications).</i></p>
	<p>12. Check engine cooling system.</p> <p>a. Improper fan belt tension. <i>Adjust fan belt (refer to TECHNICAL DATA).</i></p> <p>b. Coolant level is low, cap fails to pressurize system or air circulates through lines. <i>Adjust level, replace cap or bleed cooling system.</i></p>
	<p>13. Check reed valve.</p> <p>a. Improper tightness and/or opening. <i>Replace or adjust. Refer to proper engine subsection.</i></p>

SYMPTOM	ENGINE DETONATION AT MAXIMUM RPM.
CONDITION	NORMAL USE.
Test/Inspection	<p>1. Check which type of fuel is used.</p> <p>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.</p> <p>a. Improper spark plug heat range. <i>Install recommended spark plugs (refer to TECHNICAL DATA).</i></p>
	<p>3. Check exhaust system.</p> <p>a. Too much restriction. <i>Replace.</i></p>
	<p>4. Check ignition timing.</p> <p>a. Timing is too advanced. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i></p>
	<p>5. Check carburetion.</p> <p>a. Fouled and/or improper carburetor components. <i>Clean or replace according to specifications (refer to TECHNICAL DATA).</i></p>
	<p>6. Check compression ratio and combustion chamber volume.</p> <p>a. Compression ratio is too high. <i>Install genuine parts.</i></p>

Section 03 TROUBLESHOOTING

Subsection 02 (ENGINE)

SYMPTOM	ENGINE TURNS OVER BUT FAILS TO START.
CONDITION	NORMAL USE.
Test/Inspection	1. Check switches. a. Ignition switch, emergency cut-out switch or tether switch is OFF. <i>Place all switches in the RUN or ON position. If it still does not work, connect DESS switch BK/GN and BK/WH wires together (harness side).</i>
	2. Check fuel valve. a. Fuel valve is OFF or not fully open. <i>Fully open fuel valve.</i>
	3. Check fuel level. a. Mixture too lean to start cold engine. <i>Check fuel tank level and use choke or primer.</i>
	4. Check spark plug. a. Defective spark plug (no spark) or wrong spark plug gap. <i>Replace spark plugs or readjust gap.</i>
	5. Check amount of fuel on spark plug. a. Flooded engine (spark plug wet when removed). <i>Do not overprime or overchoke. Remove wet spark plugs, turn ignition switch to OFF and crank engine several times. Install clean dry properly gapped spark plugs. Start engine following usual starting procedure.</i>
	6. Check fuel lines. a. No fuel to the engine (spark plugs 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>
	7. Check engine compression. a. Insufficient engine compression. <i>Replace defective part(s) (ex.: piston(s), ring(s), etc.).</i>

Section 03 TROUBLESHOOTING
Subsection 02 (ENGINE)

SYMPTOM	IRREGULAR ENGINE IDLE.
CONDITION	NORMAL USE AFTER ENGINE WARM UP.
Test/Inspection	<p>1. Check choke.</p> <p>a. Choke plunger may be partially opened. <i>Readjust.</i></p>
	<p>2. Check carburetor adapter.</p> <p>a. Air enters through a crack. <i>Replace.</i></p>
	<p>3. Check air screw position.</p> <p>a. Inadequate fuel/air mixture. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i></p>
	<p>4. Check dimension of pilot jet.</p> <p>a. Inadequate fuel/air mixture. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i></p>
	<p>5. Check reed valve.</p> <p>a. Improper tightness and/or opening. <i>Replace or adjust. Refer to proper ENGINE subsection.</i></p>
	<p>6. Perform engine leak test.</p> <p>a. Leaking gaskets allow air to enter in engine. <i>Replace defective parts.</i></p>
	<p>7. DPM manifold air vent is obstructed.</p> <p>a. Carburetion is too lean. <i>Ensure proper air vent.</i></p>
	<p>8. Check ignition system trigger coil air gap.</p> <p>a. Air gap is too large. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i></p>

Section 03 TROUBLESHOOTING

Subsection 02 (ENGINE)

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
Test/Inspection	<i>Fan-Cooled Engines</i> 1. Check cooling system. a. Loose fan belt. <i>Adjust or replace fan belt (refer to AXIAL FAN COOLING SYSTEM).</i> b. Dirty cooling fins or blocked air ducts. <i>Clean.</i>
	2. Check carburetion. a. Improperly adjusted or inadequate carburetor components. <i>Adjust according to specifications (refer to TECHNICAL DATA) or replace inadequate component(s).</i>
	3. Check cylinder head gaskets. a. Worn gaskets. <i>Replace.</i>
	4. Check ignition timing. a. Ignition timing is too advanced. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i>
	5. Check if there are leaks at air intake silencer and/or engine crankcase. a. Leak(s). <i>Repair or replace.</i>
	6. Check condition and heat range of spark plugs. a. Melted spark plug tip or inadequate heat range. <i>Replace.</i>
	<i>Liquid-Cooled Engines</i> 1. Check temperature gauge sensor. a. False reading. <i>Check terminal connections. If problem persists, replace sensor.</i>
	2. Check coolant level and check if there is air infiltration in the system or if there are leaks in gasket areas. a. Low coolant level or air in system. <i>Add coolant until recommended level is reached, bleed system and/or tighten clamps.</i>
	3. Check if coolant flows through system properly. a. Foreign particles and/or broken coolant pump impeller. <i>Clean cooling system and/or replace coolant pump impeller.</i>
	4. Check thermostat. a. Thermostat reacts slowly or not at all. <i>Replace.</i>

Section 03 TROUBLESHOOTING

Subsection 02 (ENGINE)

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
	5. Check antifreeze concentration. a. Antifreeze concentration is too high. <i>Adjust concentration according to Bombardier's recommendations.</i>
	6. Check tank cap. a. Cap does not hold pressure. <i>Replace.</i>
	7. Check carburetion. a. Improperly adjusted or inadequate carburetor components. <i>Adjust according to specifications (refer to TECHNICAL DATA) or replace inadequate component(s).</i>
	8. Check cylinder head gaskets. a. Worn gaskets. <i>Replace.</i>
	9. Check ignition timing. a. Ignition timing is too advanced. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i>
	10. Check if there are leaks at air intake silencer and/or engine crankcase. a. Leak(s). <i>Repair or replace.</i>
	11. Check condition and heat range of spark plugs. a. Melted spark plug tip or inadequate heat range. <i>Replace.</i>

Section 03 TROUBLESHOOTING

Subsection 02 (ENGINE)

SYMPTOM	ENGINE EQUIPPED WITH RAVE VALVE DOES NOT REACH ITS FULL OPERATING RPM (500 TO 1000 RPM SLOWER).
CONDITION	NORMAL USE.
Test/Inspection	1. Check RAVE valve pistons. a. Valve piston(s) is (are) not screwed to the bottom. <i>Screw valve piston(s) to bottom.</i>
	2. Check that valve moves freely. a. Valve stuck in closed position. <i>Clean.</i>
	3. Check RAVE valve stems. a. Bent RAVE valve stem(s). <i>Replace.</i>
	4. Check RAVE valves. a. Jammed valve(s). <i>Clean.</i>
	5. Check tension of RAVE springs. a. Inadequate spring tension. <i>Replace.</i>
	6. Check RAVE pressure holes. a. Clogged holes. <i>Clean.</i>
	7. Check clamps or sleeves. a. Damaged clamp(s) or sleeve(s). <i>Replace.</i>
	8. Check exhaust tightness. a. Exhaust system is leaking leading to a too low back pressure. <i>Replaces parts and reseal.</i>

SYMPTOM	ENGINE EQUIPPED WITH RAVE. ENGINE HESITATES AT LOW OR 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 low 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>Adjust according to ASSEMBLY PROCEDURE in appropriate engine subsections.</i>
	3. Check RAVE valve movement (RAVE movement indicator P/N 861 725 800). a. Valve(s) is (are) stuck in open position. <i>Clean.</i>

Section 03 TROUBLESHOOTING

Subsection 02 (ENGINE)

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>

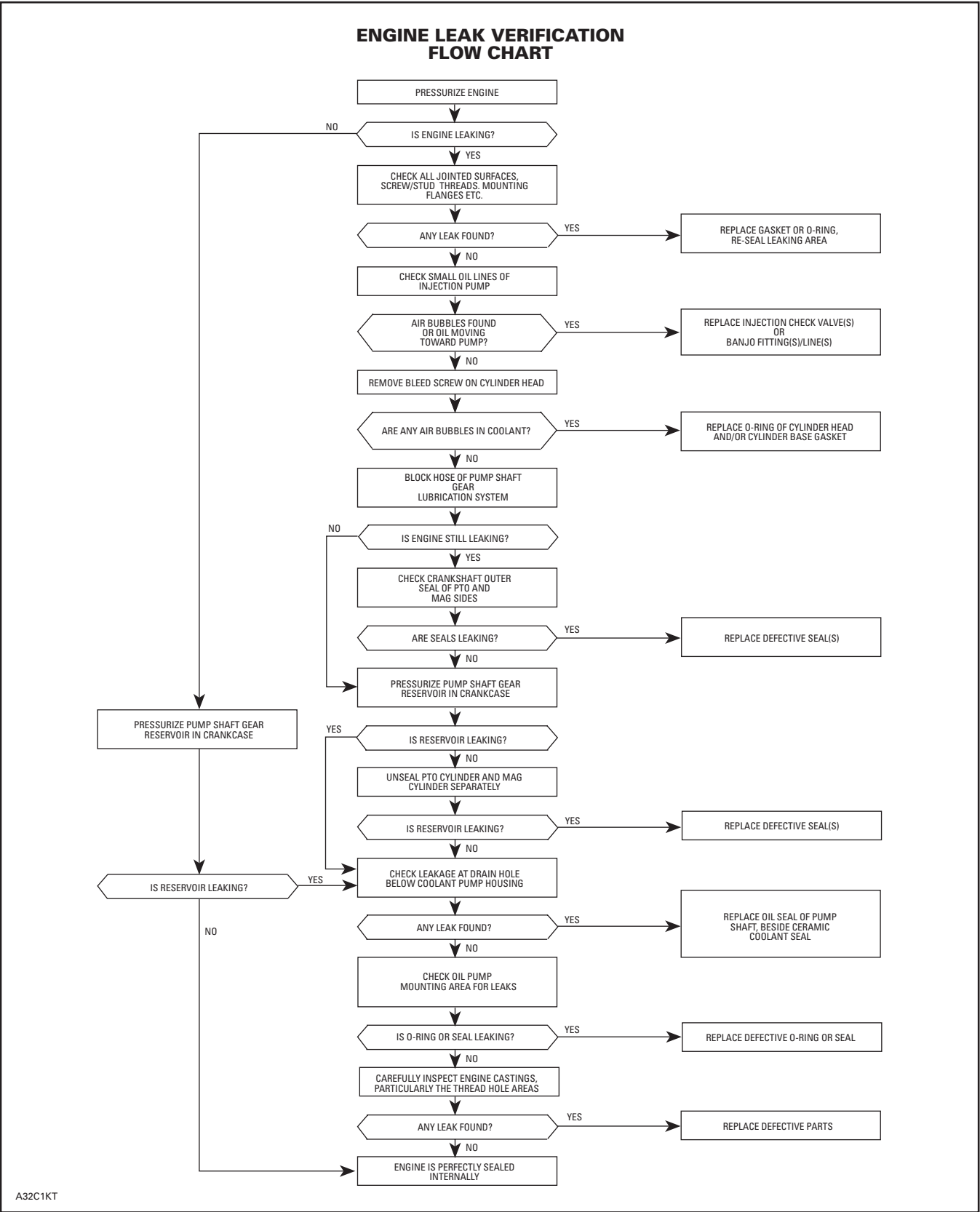
SYMPTOM	ENGINE PINGING.
CONDITION	NORMAL USE.
Test/Inspection	1. Check fuel lines. a. Bent fuel lines (preventing fuel from flowing through). <i>Relocate or replace fuel lines.</i>
	2. Check if carburetor(s) is (are) clean. a. Dirt prevents fuel from flowing through. <i>Clean.</i>
	3. Check ignition timing. a. Timing is too advanced. <i>Adjust according to specifications (refer to TECHNICAL DATA).</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>

Section 03 TROUBLESHOOTING

Subsection 02 (ENGINE)

SYMPTOM	ENGINE GENERATES A LOT OF VIBRATIONS.
CONDITION	NORMAL USE.
Test/Inspection	1. Check engine supports and stopper. a. Loose and/or broken supports or interference between support(s) and chassis. <i>Retighten to specification (refer to TECHNICAL DATA) or replace.</i>
	2. Check drive pulley (refer to VIBRATIONS ORIGINATING FROM DRIVE PULLEY).
	3. Check carburetors synchronization. a. Throttle slide height is not the same on each carburetor and/or throttle slides opening is unsynchronized. <i>Adjust throttle slide heights and throttle cable.</i>
	4. Check for steering, crankshaft and bearings. a. Loose nut behind the steering, loose crankshaft bearings or uneven crankshaft. <i>Retighten or replace the parts.</i>

ENGINE LEAK VERIFICATION FLOW CHART



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	1. Check fuel tank. a. Perforated fuel tank. <i>Replace fuel tank.</i>
	2. Check fittings on fuel pump, fuel tank and carburetor(s). a. Leaking fittings. <i>Replace defective part.</i>
	3. Check choke adjustment. a. Fuel flows through choke circuit while engine runs. <i>Readjust choke.</i>
	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).</i>
	5. Check needle valve of carburetor(s). 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>

SYMPTOM	FUEL LEAKS IN ENGINE BASE WHEN ENGINE IS STOPPED.
CONDITION	NORMAL USE.
Test/Inspection	1. Check items 3, 4 and 5 of HIGH FUEL CONSUMPTION.
	2. Check fuel pump diaphragm. a. Cracked diaphragm. <i>Replace.</i>

Section 03 TROUBLESHOOTING

Subsection 03 (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 vent 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. Leaking impulse hose. <i>Replace.</i> b. 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 pump identification. a. Wrong pump installed. <i>Replace with the appropriate pump. Refer to OIL INJECTION SYSTEM.</i>
	3. Check injection oil lines and their fitting. a. Leaking lines. <i>Replace defective part(s).</i>
	4. Check injection pump cover gasket. a. Worn gasket. <i>Replace.</i>
	5. Check pump check valve(s). a. Check valve(s) stuck open. <i>Replace.</i>

Section 03 TROUBLESHOOTING
Subsection 03 (FUEL AND OIL SYSTEMS)

SYMPTOM	HIGH INJECTION OIL CONSUMPTION.
CONDITION	NORMAL USE.
	<p>6. Check pump.</p> <p>a. Leaking pump. <i>Replace.</i></p>
	<p>7. Check oil pump cable.</p> <p>a. Cable stuck in open position. <i>Replace cable.</i></p>
	<p>8. On liquid-cooled models, test pump shaft gear reservoir for leaks.</p> <p>a. Leaking seals. <i>Replace seals.</i></p>

SYMPTOM	ENGINE LACKS FUEL (or lean mixture).
CONDITION	NORMAL USE.
Test/Inspection	<p>1. Check fuel filter ball located in fuel tank. Ball must move freely.</p> <p>a. Corrosion due to oxidation at installation. <i>Replace fuel filter.</i></p>
	<p>2. Check if lines are perforated or kinked or if they leak at fittings.</p> <p>a. Lines are too big for their fittings or are improperly routed. <i>Replace or properly relocate lines.</i></p>
	<p>3. Check fuel pump outlet flow.</p> <p>a. Dirt clogging fuel pump lines or torn membrane. <i>Clean or replace fuel pump.</i></p>
	<p>4. Check needle valve of carburetor(s).</p> <p>a. Dirt (varnish, foreign particle) clogging fuel line inlets. <i>Clean.</i></p>
	<p>5. Check main jet.</p> <p>a. Dirt (varnish, foreign particle) accumulation at main jet. <i>Clean.</i></p>
	<p>6. Check float height in carburetor bowl(s).</p> <p>a. Running out of fuel at high speed because float height is too low. <i>Adjust float height according to specifications.</i></p>

Section 03 TROUBLESHOOTING

Subsection 03 (FUEL AND OIL SYSTEMS)

SYMPTOM	DPM SEEMS TO BE DEFECTIVE.
CONDITION	NORMAL USE.
Test/Inspection	1. Check electrical connections. a. Corroded terminals. <i>Clean or replace.</i>
	2. Fuel mixture is too rich or too poor. a. Possible damage to DPM. <i>If DPM does not operate properly, unplug compensation solenoid connector while engine is running. The carburetion is now identical to that of carburetors without a DPM, provided that all pipe fittings are tight and that solenoid is in good condition, (it must not be half-open). If problem is resolved with this procedure, DPM is faulty.</i>
	3. Check for DPM manifold leaking. a. DPM manifold is leaking. <i>Repair or replace.</i>

TRANSMISSION AND BRAKE SYSTEMS

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.</p> <p>a. Belt is too narrow (drive belt engagement is higher in drive pulley). <i>Replace belt if width is less than specified in DRIVE BELT.</i></p> <p>2. Check distance between pulleys and/or drive belt deflection.</p> <p>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).</i></p> <p>3. Check driven pulley sliding half play.</p> <p>a. Jammed sliding half. <i>Replace.</i></p> <p>4. Check spring tension of driven pulley sliding half.</p> <p>a. Sliding half rotation is accelerated when spring tension is too weak. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i></p> <p>5. Refer to VIBRATIONS ORIGINATING FROM DRIVE PULLEY and VIBRATIONS ORIGINATING FROM DRIVEN PULLEY and check items listed.</p> <p>6. Check drive pulley spring tension.</p> <p>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.</p> <p>a. Spring tension is too stiff. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i></p> <p>3. Check position of the calibration screws (TRA drive pulley).</p> <p>a. Selected numbers are too high. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i></p> <p>4. Refer to VIBRATIONS ORIGINATING FROM DRIVEN PULLEY and check items listed.</p> <p>5. Check the driven pulley.</p> <p>a. Driven pulley does not open completely. <i>Clean, readjust or replace driven pulley.</i></p> <p>6. Check if levers of drive pulley move freely.</p> <p>a. Stuck levers. <i>Replace lever bushings.</i></p>

Section 03 TROUBLESHOOTING

Subsection 04 (TRANSMISSION AND BRAKE SYSTEMS)

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 radial play of driven pulley. a. Worn key, keyway or splines. <i>Replace.</i>


SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVE PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	1. Check drive belt. a. Belt width is uneven at many places. <i>Replace.</i>
	2. Check tightening torque of drive pulley screw. a. Moving governor cup. <i>Retighten screw.</i>
	3. Spring cover screws. a. Spring cover moves and restrains sliding half movement. <i>Retighten screws.</i>
	4. Check spring cover (TRA type) and/or sliding half bushings. a. Excessive gap between bushings and fixed half shaft, thus restraining sliding half movements. <i>Replace bushing(s).</i>
	5. Check governor cup splines. a. Excessive radial play. <i>Replace governor cup.</i>
	6. Check lever assembly. a. Lever assembly is damaged (worn bushing, bent lever, etc.). <i>Replace damaged part.</i>

SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVEN PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	1. Check sliding half side play. a. Sliding half bushing worn out. <i>Replace sliding half bushing.</i>
	2. Check sliding half and fixed half straightness. a. Sliding half/ fixed half warped. <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
Subsection 04 (TRANSMISSION AND BRAKE SYSTEMS)

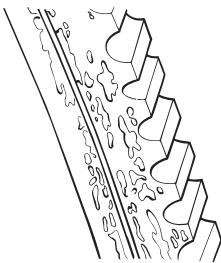
SYMPTOM	PULLEYS DO NOT DOWN SHIFT PROPERLY.
CONDITION	NORMAL USE.
Test/Inspection	1. Check driven pulley spring tension. a. Spring tension is too weak. <i>Adjust according to specifications (refer to TECHNICAL DATA).</i>
	2. Refer to VIBRATIONS COMING FROM DRIVEN PULLEY and check items listed.
	3. Check drive pulley bushings (cleanliness, wear, etc.). a. Bushings stick to fixed half pulley shaft. <i>Clean or replace.</i>

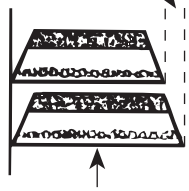
SYMPTOM	IN REVERSE ENGINE FAILS AND DRIVEN PULLEY OPENS TOO FAST (DRIVE BELT IS LOW IN DRIVEN PULLEY).
CONDITION	NORMAL USE.
Test/Inspection	1. Check pulley distance and alignment. a. Improper adjustment. <i>Adjust according to specifications (refer to PULLEY DISTANCE AND ALIGNMENT) and make sure that torque rod is resting against engine. Check engine mounts.</i>
	2. Check for reverse sliding shoes. a. Sliding shoes are worn or missing. <i>Replace sliding shoes.</i>
	3. Check spring. a. Spring is weak or insufficient tension. <i>Replace spring.</i>

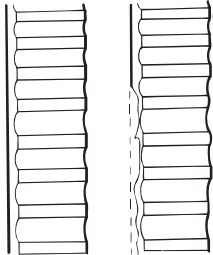
SYMPTOM	UNEVEN BELT WEAR ON ONE SIDE ONLY.
CONDITION	NORMAL USE.
 <p>A00D09Y</p>	1. Check tightening torque of engine mount bolts. a. Loose engine mount. <i>Tighten engine mount nuts/bolts equally.</i>
	2. Check pulley alignment. a. Pulley misalignment. <i>Align pulleys.</i>
	3. Check drive belt contact area on pulleys. a. Rough or scratched pulley surfaces. <i>Repair or replace pulley half.</i>
	4. Check driven pulley sliding half play. a. Driven pulley bushing worn. <i>Replace bushing.</i>

Section 03 TROUBLESHOOTING

Subsection 04 (TRANSMISSION AND BRAKE SYSTEMS)


SYMPTOM	BELT GLAZED EXCESSIVELY OR HAVING BAKED APPEARANCE.
CONDITION	NORMAL USE.
Test/Inspection  <small>A00D0AY</small>	1. Check if drive pulley bushings are worn. a. Slipping due to insufficient pressure on belt sides. <i>Replace bushing.</i>
	2. Check condition of drive pulley fixed half shaft. a. Slipping due to rusted drive or driven pulley shafts. <i>Clean shaft with fine steel wool.</i>
	3. Check if pulley halves are clean. a. Slipping due to oily pulley surfaces. <i>Clean pulley halves.</i>
	4. Check pulley calibration. a. Slipping due to improper pulley calibration. <i>Calibrate according to specifications.</i>


SYMPTOM	BELT WORN EXCESSIVELY IN TOP WIDTH.
CONDITION	NORMAL USE.
Test/Inspection Considerable use  New belt <small>A00D0BY</small>	1. Check drive pulley. a. Excessive slippage due to jammed of drive pulley. <i>Inspect drive pulley.</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 width is less than specified in DRIVE BELT.</i>

SYMPTOM	BELT TOO NARROW ON ONE SECTION.
CONDITION	NORMAL USE.
Test/Inspection  <small>A00D0CY</small>	1. Check for frozen track. a. Frozen track. <i>Free track from ice.</i>
	2. Check parking brake. a. Parking brake is engaged. <i>Release parking brake.</i>
	3. Check track tension/alignment. a. Track too tight. <i>Adjust track tension and alignment.</i>
	4. Check drive pulley. a. Drive pulley does not operate properly. <i>Repair or replace drive pulley.</i>

Section 03 TROUBLESHOOTING
Subsection 04 (TRANSMISSION AND BRAKE SYSTEMS)

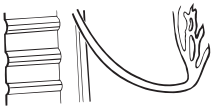
SYMPTOM	BELT TOO NARROW ON ONE SECTION.
CONDITION	NORMAL USE.
Test/Inspection	5. Check idle speed. a. Engine idle speed is too high. <i>Adjust according to specifications.</i>
	6. Check drive belt length. a. Incorrect belt length. <i>Replace with an appropriate drive belt (refer to TECHNICAL DATA).</i>
	7. Check distance between pulleys. a. Incorrect pulley distance. <i>Readjust according to specifications.</i>
	8. Check belt height. a. Belt height is incorrect. <i>Adjust according to specifications.</i>


SYMPTOM	BELT SIDES WORN CONCAVE.
CONDITION	NORMAL USE.
Test/Inspection  <small>A00D0DY</small>	1. Check pulley half surfaces. a. Rough or scratched pulley half surfaces. <i>Repair or replace.</i>
	2. Check drive belt identification number. a. Wrong type of belt. <i>Replace belt with an appropriate drive belt (refer to TECHNICAL DATA).</i>

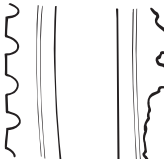
SYMPTOM	BELT DISINTEGRATION.
CONDITION	NORMAL USE.
Test/Inspection  <small>A00D0EY</small>	1. Check drive belt identification number. a. Excessive belt speed. <i>Wrong type of belt. Replace belt with proper type of belt. (refer to TECHNICAL DATA).</i>
	2. Check if pulley halves are clean. a. Oil on pulley surfaces. <i>Clean pulley surfaces with fine emery cloth and wipe clean using Parts Cleaner (P/N 413 711 809) and a cloth.</i>

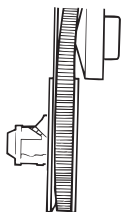
Section 03 TROUBLESHOOTING

Subsection 04 (TRANSMISSION AND BRAKE SYSTEMS)

SYMPTOM	BELTCORD POPPED OUT.
CONDITION	NORMAL USE.
Test/Inspection  A00D0FY	1. Check pulley alignment. <ol style="list-style-type: none"> Pulley misalignment. <i>Align pulley according to specifications (refer to TECHNICAL DATA).</i>

SYMPTOM	FLEX CRACKS BETWEEN COGS.
CONDITION	NORMAL USE.
Test/Inspection  A00D0GY	1. Check drive belt condition. <ol style="list-style-type: none"> Belt considerably worn, worn out. <i>Replace.</i> Distortion of natural belt shape due to improper storage. <i>Store properly.</i>

SYMPTOM	TOOTH CHUNK OUT.
CONDITION	NORMAL USE.
Test/Inspection  A00D0HY	1. Check drive belt rotational direction. <ol style="list-style-type: none"> Improper belt installation. <i>Replace.</i>
	2. Check if drive belt rubs against components. <ol style="list-style-type: none"> Belt rubs against fixed components. <i>Relocate components.</i>
	3. Check drive pulley. <ol style="list-style-type: none"> 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  A00D0IY	1. Check pulley alignment. <ol style="list-style-type: none"> Pulley misalignment. <i>Align pulley according to specifications (refer to TECHNICAL DATA).</i>
	2. Check drive belt identification number. <ol style="list-style-type: none"> Wrong type of belt. <i>Replace 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 spring tab. <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).</i>

HYDRAULIC BRAKE

SYMPTOM	SPONGY BRAKE CONDITION.
CONDITION	NORMAL USE.
Test/Inspection	1. Contaminated brake fluid. <i>Replace brake fluid and bleed system. If the problem persists, replace master cylinder.</i>

SYMPTOM	BRAKE FLUID LEAKING.
CONDITION	NORMAL USE.
Test/Inspection	1. Check for loosen hose connectors. <i>Replace copper washers and retighten.</i>
	2. Check for damaged hose, master cylinder and caliper. <i>Replace part(s) and check for proper mounting.</i>

Section 03 TROUBLESHOOTING

Subsection 04 (TRANSMISSION AND BRAKE SYSTEMS)

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>
	2. Check key/keyway or splines. a. Key/keyway or splines are worn out. <i>Replace parts.</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 30 A fuse located near battery. a. Burnt fuse. <i>Check wiring condition and replace 30 A 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 starter relay. a. Open circuit between starter switch and starter relay. <i>Repair.</i>

Section 03 TROUBLESHOOTING

Subsection 05 (ELECTRICAL SYSTEM)

SYMPTOM	STARTER TURNS BUT DOES NOT CRANK THE ENGINE.
CONDITION	NORMAL USE.
Test/Inspection	1. Check engine. a. Engine seized. <i>Rebuild engine.</i>
	2. Check wire connection. a. Inadequate connection (too much resistance). <i>Clean and reconnect.</i>
	3. Check battery charge. a. Weak battery. <i>Recharge battery and verify recharge system and wires.</i>
	4. Check battery capacity. a. Shorted battery cell(s). <i>Replace.</i>
	5. Check starter relay contact disc. a. Burnt or poor contact of starter relay contact disc. <i>Replace starter relay.</i>
	6. Check continuity of starter relay pull-in winding. a. Open circuit of starter relay pull-in winding. <i>Replace starter relay.</i>
	7. Check continuity of starter relay hold-in winding. a. Open circuit of starter relay hold-in winding. <i>Replace starter relay.</i>
	8. Check brushes. a. Poor contact of brushes or worn. <i>Replace brushes.</i>
	9. Check commutator. a. Burnt commutator. <i>Turn commutator on a lathe. Respect outer diameter wear limit. Refer to ELECTRIC STARTER.</i>
	10. Check height of commutator mica. a. Commutator mica too high. <i>Undercut mica.</i>
	11. Check field coil resistance. a. Shorted field coil. <i>Repair or replace yoke.</i>
	12. Check armature resistance. a. Shorted armature. <i>Repair or replace armature.</i>
	13. Check tension of brush springs. a. Weak brush spring tension. <i>Replace springs.</i>
	14. Check yoke assembly magnets. a. Weak magnets. <i>Replace yoke assembly.</i>
	15. Check if bushings are worn. a. Worn bushings. <i>Replace bushings.</i>

Section 03 TROUBLESHOOTING
Subsection 05 (ELECTRICAL SYSTEM)

SYMPTOM	STARTER TURNS, BUT OVERRUNNING CLUTCH PINION DOES NOT MESH WITH RING GEAR.
CONDITION	NORMAL USE.
Test/Inspection	1. Check clutch pinion gear and small return spring. a. Worn clutch pinion gear or damaged small return spring. <i>Replace damaged part(s).</i>
	2. Check clutch. a. Defective clutch. <i>Replace clutch.</i>
	3. Check brackets. a. Worn or broken brackets. <i>Replace brackets.</i>
	4. Check movement of clutch on splines. a. Poor movement of clutch on splines. <i>Clean and correct.</i>
	5. Check clutch bushing. a. Worn clutch bushing. <i>Replace clutch.</i>
	6. Check starter bushings. a. Worn starter bushing(s). <i>Replace bushing(s).</i>
	7. Check ring gear. a. Worn ring gear. <i>Replace ring gear.</i>
	8. Check for proper starter rotation direction. a. Starter turns in wrong direction, incorrectly installed brushes, wrong polarity or wrong starter. <i>Replace starter or reconnect properly.</i>

Section 03 TROUBLESHOOTING

Subsection 05 (ELECTRICAL SYSTEM)

SYMPTOM	ELECTRIC STARTER KEEPS TURNING WHEN ENGINE IS STARTED.
CONDITION	NORMAL USE.
Test/Inspection	<ol style="list-style-type: none">1. Check clutch.<ol style="list-style-type: none">a. Jammed clutch pinion gear. <i>Replace or clean.</i>2. Check movement of clutch on splines.<ol style="list-style-type: none">a. Clutch is stuck on splines. <i>Clean.</i>3. Check starter brackets.<ol style="list-style-type: none">a. Broken bracket(s). <i>Replace bracket(s).</i>4. Check ignition switch.<ol style="list-style-type: none">a. Ignition switch does not return to its ON position or is short-circuited. <i>Adjust retaining screw or replace switch.</i>5. Check starter relay.<ol style="list-style-type: none">a. Shorted starter relay winding(s). <i>Replace starter relay.</i>6. Check starter relay contacts.<ol style="list-style-type: none">a. Melted starter relay contacts. <i>Replace starter relay.</i>7. Check starter switch.<ol style="list-style-type: none">a. Starter switch returns poorly. <i>Replace ignition switch.</i>

SYMPTOM	NOISE OCCURENCE WHEN STARTING ENGINE.
CONDITION	NORMAL USE.
Test/Inspection	<ol style="list-style-type: none">1. Check if ring gear is well-mounted to drive pulley fixed half.<ol style="list-style-type: none">a. Loose and/or broken bolts. <i>Retighten bolts using threads-locker or replace ring gear and drive pulley fixed half.</i>

SYMPTOM	REGULATOR BLACK WIRE IS MELTED (harness side).
CONDITION	NORMAL USE.
Test/Inspection	<ol style="list-style-type: none">1. Check that big ground wire at battery is well connected to chassis.<ol style="list-style-type: none">a. Corroded and/or loose connection(s). <i>Clean and/or retighten.</i>

Section 03 TROUBLESHOOTING
Subsection 05 (ELECTRICAL SYSTEM)

SYMPTOM	OPTIONAL ELECTRIC STARTER DOES NOT WORK WHEN TURNING IGNITION SWITCH.
CONDITION	NORMAL USE.
Test/Inspection	<p>1. Check connection of BLACK wire (starter relay ground) in 3-wire housing coming from magneto (white housing).</p> <p>a. Corroded and/or loose connection(s). <i>Clean and/or retighten.</i></p>

SYMPTOM	ELECTRIC STARTER SOMETIMES DOES NOT WORK WHEN ACTIVATED.
CONDITION	NORMAL USE.
Test/Inspection	<p>1. Check battery cables and starter wires.</p> <p>a. Corroded and/or loose connection(s). <i>Clean and/or retighten.</i></p>
Test/Inspection	<p>2. Check fuse(s).</p> <p>a. Oxidized or burnt fuse(s). <i>Clean or replace.</i></p>
Test/Inspection	<p>3. Check wiring harness connections.</p> <p>a. Oxidized connections. <i>Clean or replace defective terminals.</i></p>
Test/Inspection	<p>4. Check ignition switch.</p> <p>a. Defective contacts in ignition switch. <i>Replace.</i></p>
Test/Inspection	<p>5. Check starter relay.</p> <p>a. Shorted starter relay wiring harness or eroded contact washer. <i>Replace.</i></p>

Section 03 TROUBLESHOOTING

Subsection 05 (ELECTRICAL SYSTEM)

SYMPTOM	ENGINE DOES NOT START — NO SPARK AT SPARK PLUG.
CONDITION	AT ENGINE CRANKING.
Test/Inspection	1. Verify spark plug condition. a. Defective, improperly set, worn-out, fouled. <i>Identify source of problem and correct. Replace spark plugs.</i>
	2. Verify spark plug cap resistance with an ohmmeter. a. Defective part. <i>Replace cap.</i>
	3. Verify if problem originated from electrical system wiring harness and/or accessories and/or ignition cut-out switches by unplugging the 3-wire connectors between the magneto/generator and the vehicle wiring harness. Check condition of connectors. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. Defective switch(es). Corroded connector terminals. <i>Replace or repair damaged wires. Reroute where necessary. Replace defective switch(es). Clean terminals and apply silicone dielectric grease.</i>
	4. Verify trigger coil resistance with an ohmmeter and connector condition. a. Defective coil. Corroded connector terminals. <i>Replace defective coil. Clean terminals and apply silicone dielectric grease.</i>
	5. Verify condition of ignition coil. a. Mechanically damaged part. Vibration problem. Electrically damaged part. <i>Tighten mounting screws. Replace ignition coil.</i>
	6. Verify condition of ignition generator coils. a. Mechanically damaged part. Vibration problem. Electrically damaged part. <i>Tighten mounting screws. Replace coils.</i>
	7. Verify MPEM. a. Mechanically damaged part. Vibration problem. Electrically damaged part. <i>Tighten mounting screws. Replace MPEM, retest and verify ignition timing.</i>

SYMPTOM	CDI MODULE DOES NOT WORK.
CONDITION	NORMAL USE.
Test/Inspection	1. Check that high tension coil wires do not touch any metal parts. a. Short circuit. <i>Isolate and reroute wires.</i>

SYMPTOM	ENGINE STALLS.
CONDITION	AT LOW SPEED.
Test/Inspection	1. Verify items 4, 5 and 6 above.

Section 03 TROUBLESHOOTING
Subsection 05 (ELECTRICAL SYSTEM)

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(s) and/or cable(s)/cap(s). 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(es). 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 plugs. 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

Subsection 05 (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).</i>
	2. Check injection oil consumption. a. Injection pump flow is too high. <i>Adjust according to specifications or replace.</i>
	3. Check oil quality. a. Poor quality oil. <i>Use BOMBARDIER injection 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 spark plug (refer to TECHNICAL DATA).</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>

Section 03 TROUBLESHOOTING
Subsection 05 (ELECTRICAL SYSTEM)

SYMPTOM	RER (ROTAX ELECTRONIC REVERSE) DOES NOT WORK.
CONDITION	NORMAL USE.
Test/Inspection	1. Check idle speed. a. Wrong idle speed. <i>Adjust according to specification (refer to TECHNICAL DATA).</i>
	2. Check spark plug. a. Faulty spark plug. <i>Replace.</i>
	3. Check drive belt deflection. a. Wrong deflection. <i>Adjust according to specification (refer to TECHNICAL DATA).</i>
	4. Check carburetor synchronization and air screw adjustment. a. Wrong adjustment. <i>Adjust according to specification (refer to TECHNICAL DATA) and read carburetor subsection.</i>
	5. Check electrical connections. a. Bad electrical connections or damaged wires. <i>Clean or replace.</i>
	6. Check MPEM. a. Faulty MPEM. <i>Replace.</i>
CONDITION	AT HIGH ALTITUDE.
Test/Inspection	1. Check high altitude cap continuity. a. Broken jumper inside high altitude cap. <i>Replace high altitude cap.</i>

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 proper voltage regulator is installed. a. Excessive voltage in lighting circuit. <i>Replace voltage regulator and ensure proper grounding. Retest.</i>

Section 03 TROUBLESHOOTING

Subsection 05 (ELECTRICAL SYSTEM)

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. 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/BU). Disconnect and reconnect to AC current (YL and YL/BK wires).</i>
	4. Verify if 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>
	5. 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>
	6. 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>
	7. Verify if heating grips installation overloads the magneto/generator capacity. a. Excessive electrical load to magneto/generator. <i>Reduce the electrical load by removing accessories.</i>

Section 03 TROUBLESHOOTING
Subsection 05 (ELECTRICAL SYSTEM)

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/BU). Disconnect and reconnect to AC current (YL and YL/BK wires).</i></p> <p>2. Verify sender unit for resistance variation when moving float arm.</p> <p>a. Defective or damage part. <i>Replace sender unit.</i></p> <p>3. 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>4. 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	WITH ENGINE IDLING NO ELECTRICAL ACCESSORIES WORK.
CONDITION	NORMAL USE.
Test/Inspection	<p>1. Check idle speed.</p> <p>a. Too low idle speed. <i>Readjust to specifications.</i></p> <p>2. Verify regulator.</p> <p>a. Faulty regulator. <i>Replace.</i></p>

SYMPTOM	BRAKE LIGHT REMAINS ON.
CONDITION	NORMAL USE.
Test/Inspection	<p>1. Check if bulb is properly installed.</p> <p>a. Bulb is not installed correctly (contact elements are reversed). <i>Install bulb correctly.</i></p> <p>2. Check brake switch.</p> <p>a. Switch contact remains closed. <i>On mechanical brake if brake switch is in good condition, adjust brake cable or brake switch. On hydraulic brake, replace brake switch.</i></p>

Section 03 TROUBLESHOOTING

Subsection 05 (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 continuity of wires. a. Corroded terminals and/or broken wires. <i>Replace terminal(s) or crimp defective wires.</i>

SYMPTOM	HIGH BEAM PILOT LAMP LIGHTS UP WHEN LOW BEAM IS SELECTED.
CONDITION	NORMAL USE.
Test/Inspection	1. Check proper connections. a. YELLOW wire connected to pilot lamp. Mixed-up connections with heating element pilot lamps. <i>Reconnect a YELLOW/BLACK wire to pilot lamp. YELLOW wires are connected to heating element pilot lamps.</i>

SUSPENSION AND TRACK

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

SYMPTOM	SUSPENSION IS TOO LOW.
CONDITION	NORMAL USE.
Test/Inspection	1. Check condition of springs. a. Springs are broken. <i>Replace springs.</i>
	2. Check springs preload. a. Too low spring preload. <i>Increase preload to the recommended position.</i>
	3. Check springs. a. Installed springs are too soft. <i>Install optional stiffer springs, refer to Service Bulletin SPRING REFERENCE ACCORDING TO LOAD.</i>

SYMPTOM	REAR SUSPENSION BOTTOMS OUT.
CONDITION	NORMAL USE.
Test/Inspection	1. Check condition of springs. a. Springs are broken. <i>Replace springs.</i>
	2. Check springs preload. a. Too low spring preload. <i>Increase preload to the recommended position.</i>
	3. Check springs. a. Springs installed are too soft. <i>Install optional stiffer springs, refer to Service Bulletin SPRING REFERENCE ACCORDING TO LOAD.</i>
	4. Check the rear shock motion ratio position. a. It is adjusted in soft position. <i>Adjust rear shock motion ratio to firm position.</i>

Section 03 TROUBLESHOOTING

Subsection 06 (SUSPENSION AND TRACK)

SYMPTOM	REAR SUSPENSION IS TOO STIFF.
CONDITION	NORMAL USE.
Test/Inspection	1. Check rear spring preload. a. Too much preload. <i>Adjust to a softer position.</i>
	2. Check springs. a. Springs installed are too stiff. <i>Install optional softer springs, refer to Service Bulletin SPRING REFERENCE ACCORDING TO LOAD.</i>
	3. Check the rear shock motion ratio position. a. It is adjusted in firm position. <i>Adjust rear shock motion ratio to soft position.</i>
	4. Check track tension. a. Track is too tight. <i>Adjust.</i>
	5. Check if axles are properly lubricated. a. Improper lubrication and/or contaminated grease (sticky oil sludge). <i>Clean and/or lubricate.</i>

SYMPTOM	WHEN HANDLEBAR IS TURNED, SNOWMOBILE UNDERSTEERS.
CONDITION	NORMAL USE.
Test/Inspection	1. Check ski runner condition. a. Worn ski runners. <i>Replace.</i>
	2. Check ski spring preload. 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 preload. a. Insufficient ski pressure on the ground. <i>Loosen spring tension.</i>

Section 03 TROUBLESHOOTING
Subsection 06 (SUSPENSION AND TRACK)

SYMPTOM	HANDLEBAR IS DIFFICULT TO TURN.
CONDITION	NORMAL USE.
Test/Inspection	<p>1. Check if the handle bar turns freely when skis are off the ground.</p> <p>a. Ball joints corrosion restrains movement. <i>Lubricate or replace the ball joint.</i></p> <p>b. Component need proper lubrication. <i>Lubricate. Refer to MAINTENANCE.</i></p> <p>c. Bent parts. <i>Replace parts.</i></p>
	<p>2. Check ski spring preload.</p> <p>a. Too much preload. <i>Reduce ski spring preload.</i></p>
	<p>3. Check position of stopper strap.</p> <p>a. Too much weight when stopper strap is short. <i>Lengthen front arm stopper strap.</i></p>
	<p>4. Check position of front arm spring adjustment cam(s).</p> <p>a. When spring tension is weak, more weight is transferred to the skis. <i>Increase spring preload.</i></p>

SYMPTOM	THE SNOWMOBILE ZIGZAGS.
CONDITION	NORMAL USE.
Test/Inspection	<p>1. Check ski runner condition.</p> <p>a. Worn or bent ski runners. <i>Replace ski runners.</i></p>
	<p>2. Check ski alignment.</p> <p>a. Improper ski alignment. <i>Align skis in order to obtain proper toe-out (opening) (to adjust, refer to STEERING SYSTEM).</i></p>
	<p>3. Check if bushings are too loose in steering system.</p> <p>a. Bushings are too loose. <i>Replace.</i></p>
	<p>4. Check ski pressure.</p> <p>a. Too much pressure on skis. <i>Reduce ski spring preload and/or increase center spring preload.</i></p>

Section 03 TROUBLESHOOTING

Subsection 06 (SUSPENSION AND TRACK)

SYMPTOM	SLIDER SHOES WEAR OUT PREMATURELY/OR TRACK CLEATS BECOME BLUE.
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).</i> <i>Replace defective parts.</i>
	2. Check idler wheel condition. a. Stuck bearing, flat spot on wheel or damaged wheel. <i>Replace defective parts.</i>
	3. Check snow conditions or lack of snow. a. Lack of lubrication of slider shoes. <i>Ask driver to ride in appropriate snow conditions (see Operator's Guide).</i>
	4. Check slider shoes and/or suspension retaining screws. a. Twisted slider shoes or loose retaining screws. <i>Replace defective parts and/or tighten loose screws.</i>

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	NOISE OR VIBRATION COMING FROM THE TRACK.
CONDITION	NORMAL USE.
Test/Inspection	1. Check slide suspension retaining bolts. a. Missing bolt(s) (some components interfere with track rotation). <i>Replace missing bolt(s).</i>
	2. Check condition of idler wheel(s). a. Idler 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 several teeth of drive shaft sprockets are broken. <i>Replace sprocket(s).</i>
	5. Check track tension. a. Track is too loose. <i>Adjust to recommended tension.</i>
	6. Check track rods and/or internal traction teeth. a. One or several track rods and/or teeth are broken. <i>Replace track.</i>

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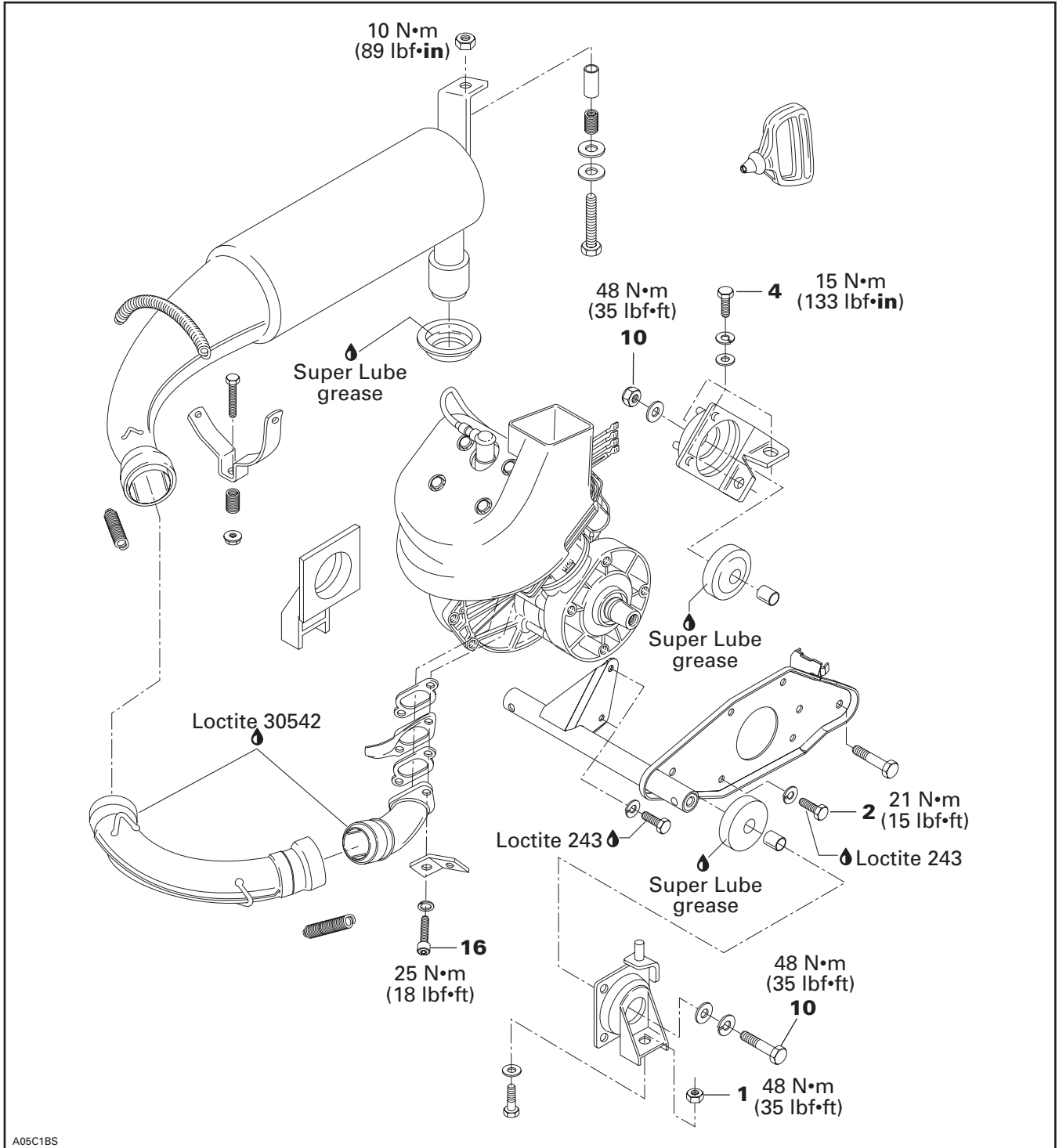
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277 ENGINE TYPE

ENGINE REMOVAL AND INSTALLATION



Section 04 ENGINE

Subsection 02 (277 ENGINE TYPE)

REMOVAL FROM VEHICLE

Remove or disconnect the following then lift engine from vehicle:

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

ENGINE SUPPORT AND MUFFLER DISASSEMBLY AND ASSEMBLY

Torque the manifold screws **no. 16** to 25 N•m (18 lbf•ft).

Torque the support screws **no. 4** to 15 N•m (133 lbf•in) and nuts **no. 1** to 48 N•m (35 lbf•ft).

Torque the engine support screws and nut **no. 10** to 48 N•m (35 lbf•ft).

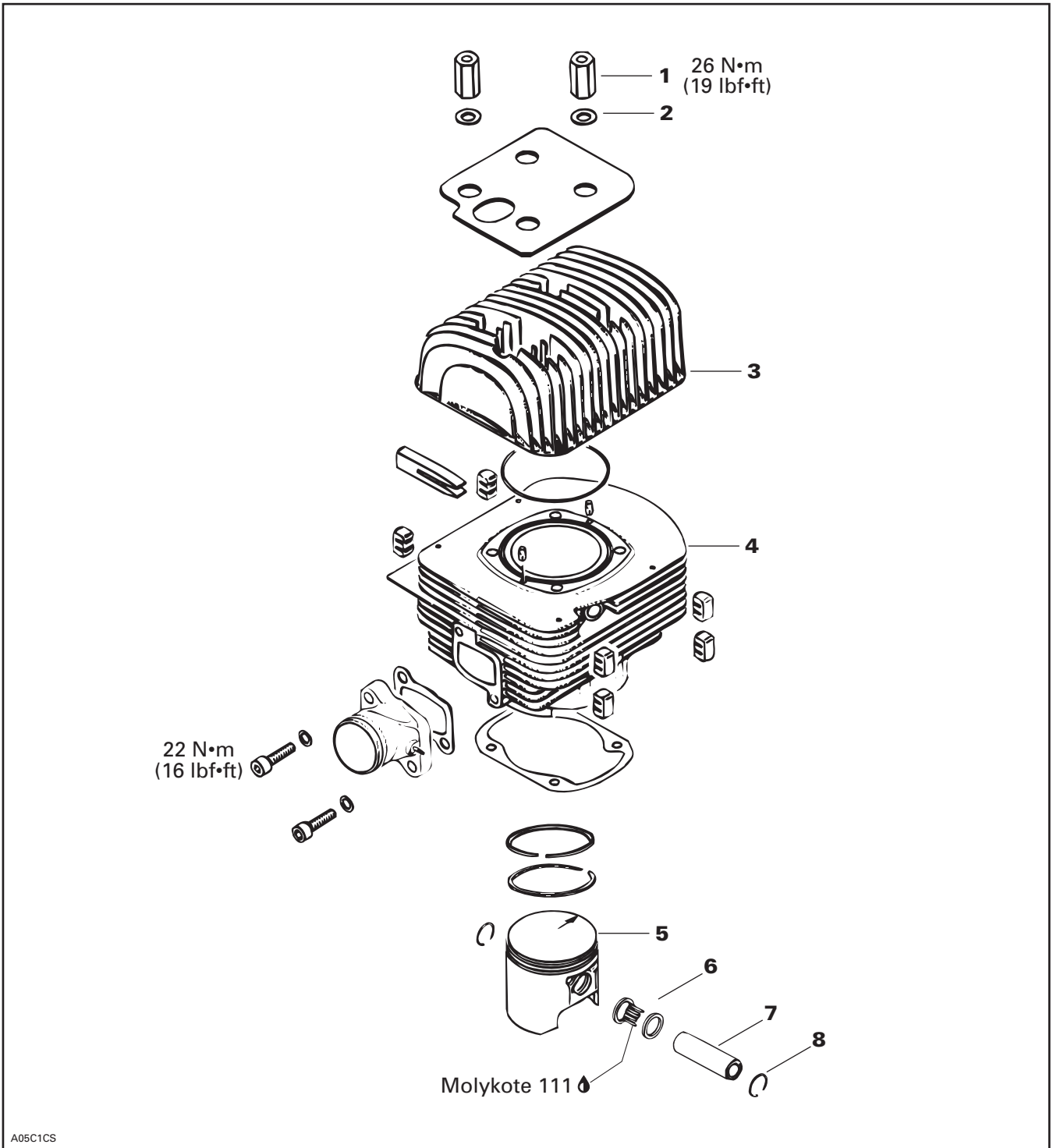
Apply Loctite 243 (P/N 293 800 060) on threads of screw **no. 2**. Torque screws **no. 2** retaining the engine support to engine crankcase to 21 N•m (15 lbf•ft).

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.
- Seal exhaust ball joints with Loctite 30542 (P/N 293 800 090).

TOP END



Section 04 ENGINE

Subsection 02 (277 ENGINE TYPE)

TROUBLESHOOTING

Before completely disassembling the engine, check airtightness. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT.

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

TOP END REMOVAL (without removing engine from chassis)

Remove the following then lift cylinder head **no. 3** and cylinder **no. 4**:

- belt guard
- carburetor
- exhaust system
- spark plug
- oil injection inlet
- fan cowl and hood cable
- cylinder head nuts **no. 1** and washers **no. 2**.

CLEANING

Discard all gaskets.

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

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

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

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

DISASSEMBLY

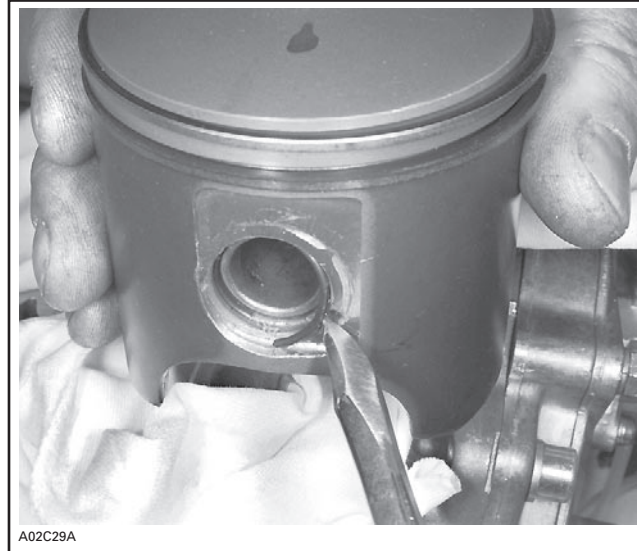
5, Piston

On this engine, piston pin needle bearing **no. 6** is mounted without a cage.

Use piston pin puller (P/N 529 035 503) along with 18 mm sleeve kit (P/N 529 035 541) and locating sleeve (P/N 529 023 800).

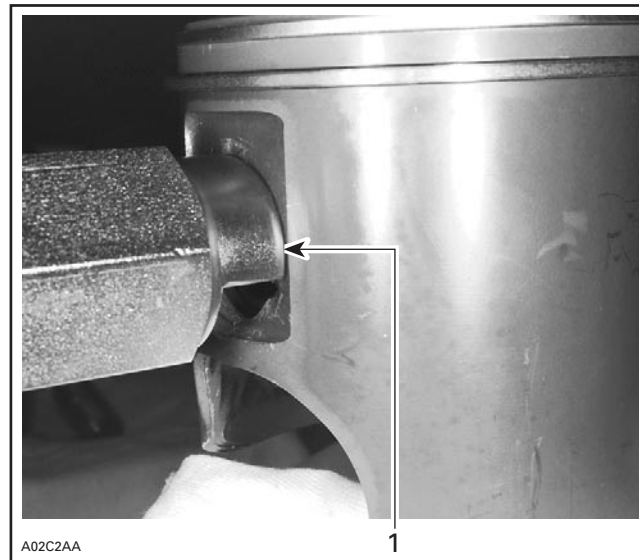
NOTE: The locating sleeve is the same that contains new cageless bearing.

Place a clean cloth or rubber pad (P/N 529 023 400) over crankcase to prevent circlips **no. 8** from falling into crankcase. Then with a pointed tool inserted in piston notch, remove both circlips from piston **no. 5**.



TYPICAL

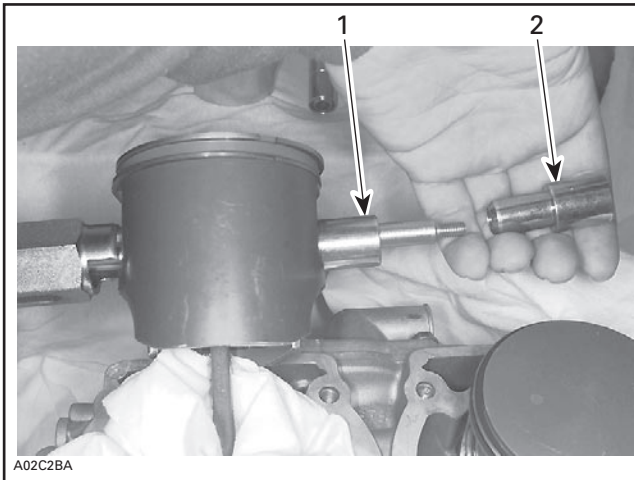
Insert piston pin puller (P/N 529 035 503) making sure it sits squarely against piston.



TYPICAL

1. Properly seated all around

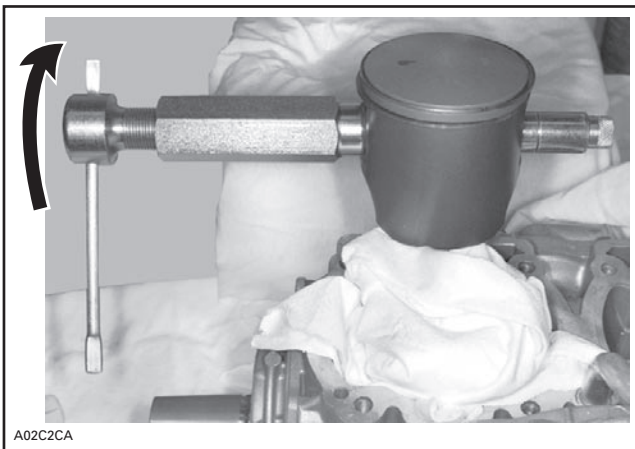
Install sleeve then shouldered sleeve over puller rod.



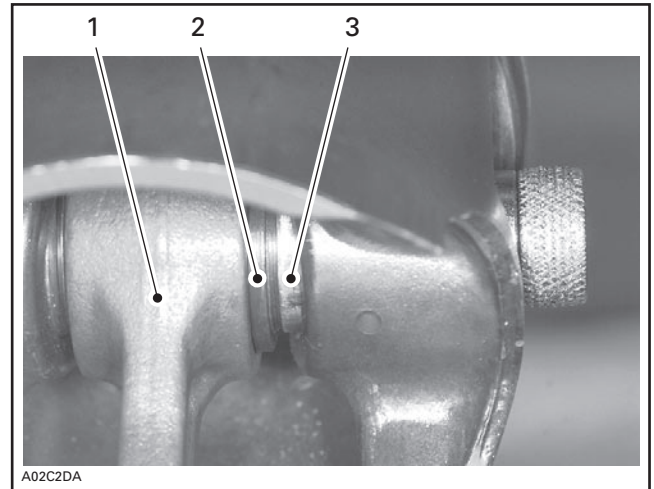
TYPICAL — INSTALLATION OF SLEEVE KIT

1. Sleeve
2. Shouldered sleeve

Pull out piston pin **no. 7** by unscrewing puller until shouldered sleeve end is flush with thrust washer of piston pin bearing.



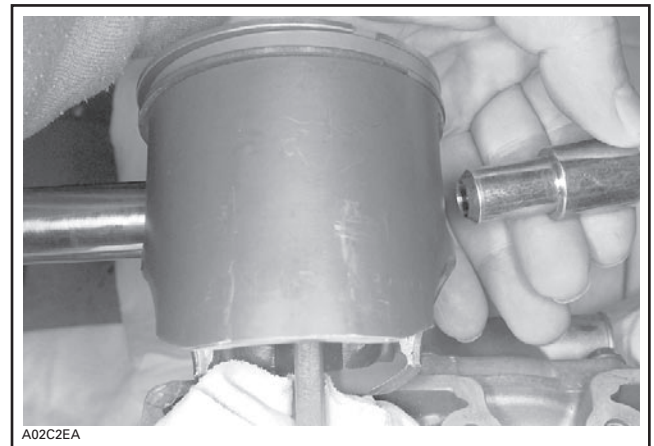
TYPICAL — PISTON PIN EXTRACTION



TYPICAL

1. Sleeve inside bearing
2. Thrust washer
3. Shouldered sleeve end

Remove puller. Pull out shouldered sleeve carefully.



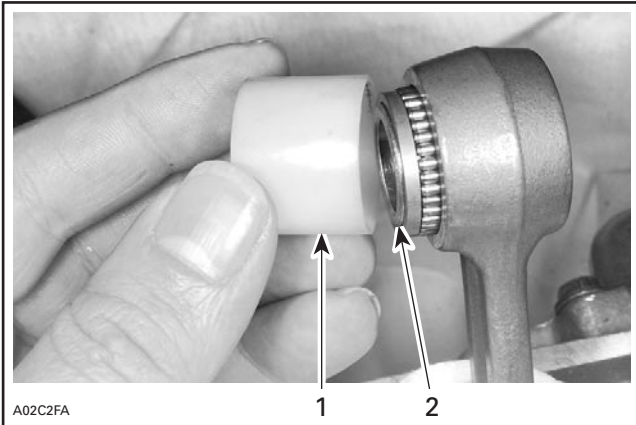
TYPICAL

Remove piston from connecting rod.

Section 04 ENGINE

Subsection 02 (277 ENGINE TYPE)

Install locating sleeve. Then push needle bearings along with thrust washers and sleeve.



TYPICAL

1. Locating sleeve
2. Sleeve

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 locating sleeve.

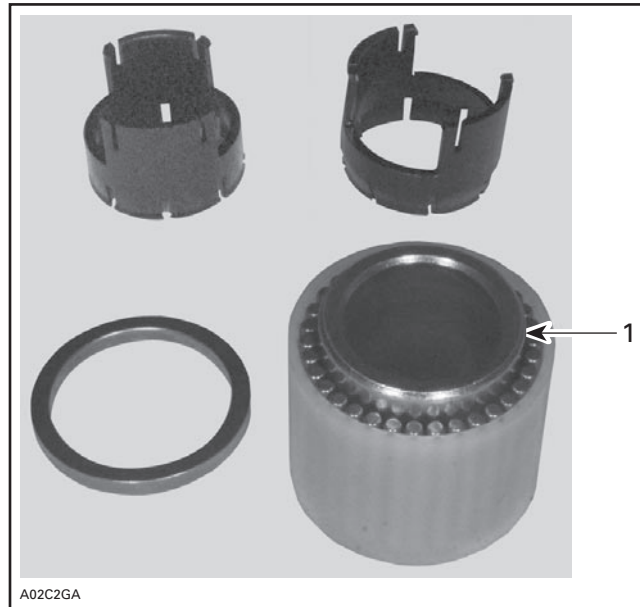
INSPECTION

Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT.

ASSEMBLY

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

When installing a new cageless bearing, replace half plastic cages by sleeve.



TYPICAL

1. Sleeve

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

Insert cageless bearing into connecting rod.



TYPICAL — CAGELESS BEARING AND SLEEVE INSTALLED

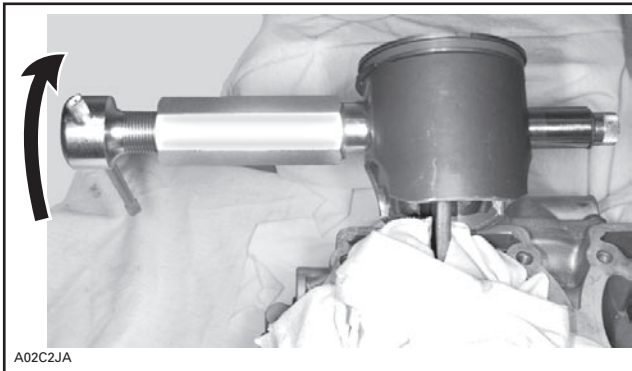
Mount piston over connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in the direction of exhaust port.

Install shouldered sleeve.



TYPICAL — SHOULDERED SLEEVE INSTALLATION

Install piston pin puller and turn handle until piston pin is correctly positioned in piston.

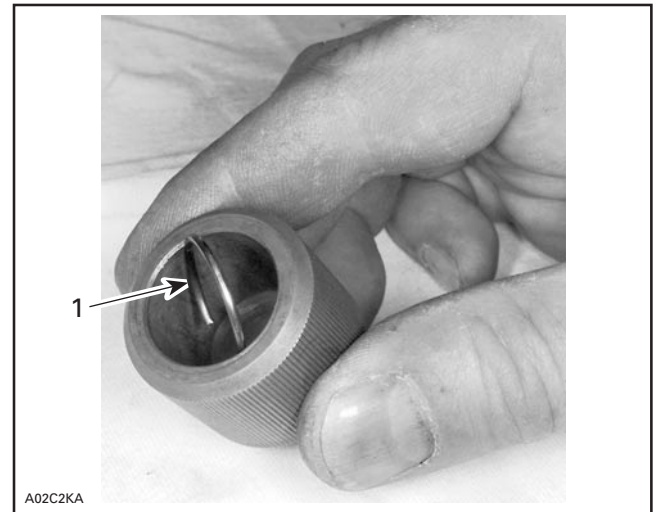


TYPICAL

Remove piston pin puller and sleeve kit.

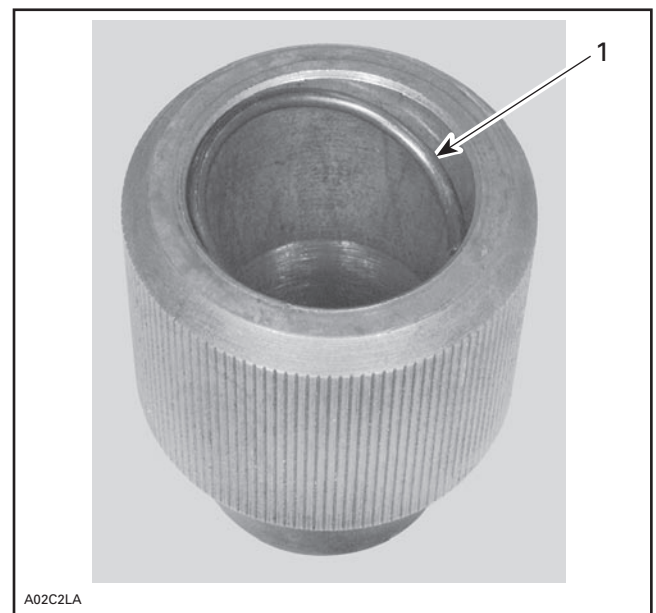
To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Use piston circlip installer (P/N 529 035 561).

Insert circlip in tool at an angle.



1. Circlip

Square it up using a finger.

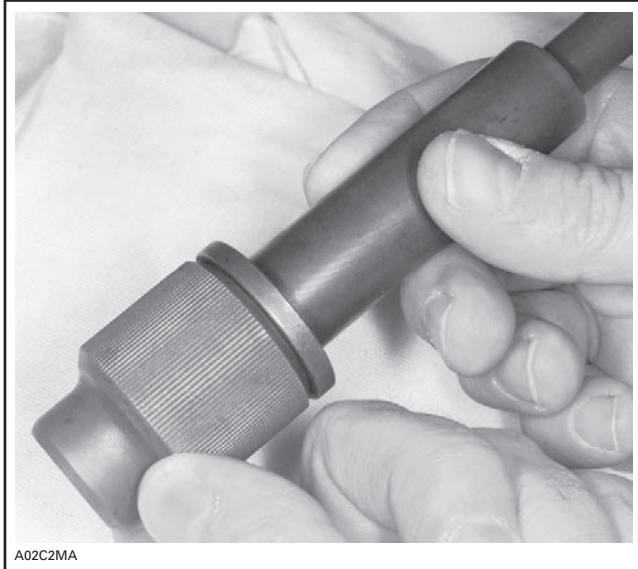


1. Circlip

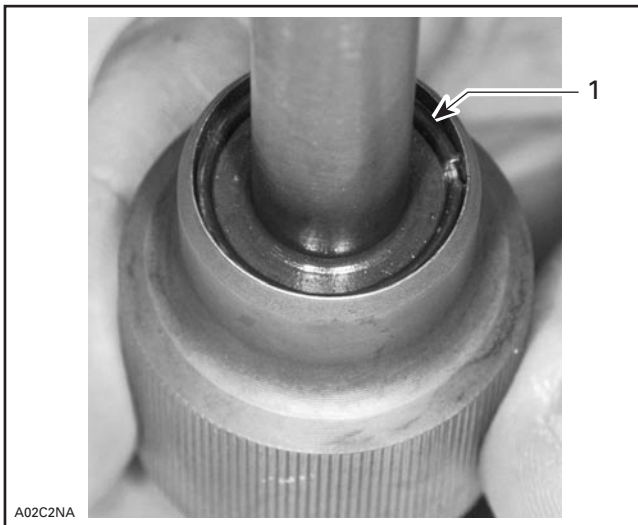
Section 04 ENGINE

Subsection 02 (277 ENGINE TYPE)

Continue to square it up using round end of circlip installer.

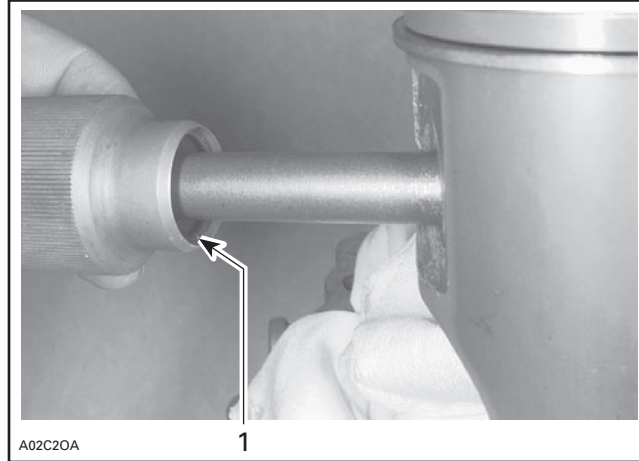


Using square end of tool, push circlip in until it rests in groove.



1. Circlip in groove

Mount tool in piston making sure that circlip break is facing down.



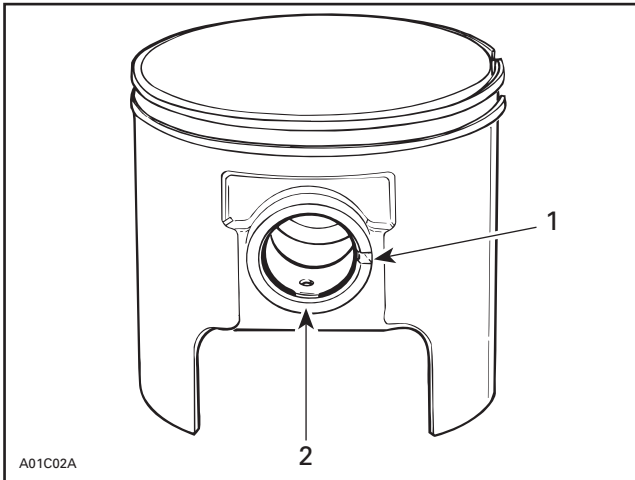
TYPICAL

1. Circlip break facing down

Hold tool firmly against piston then strike on round end of tool. Circlip will move from tool groove to piston groove.



TYPICAL



1. *Piston notch*
2. *Circlip break*

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

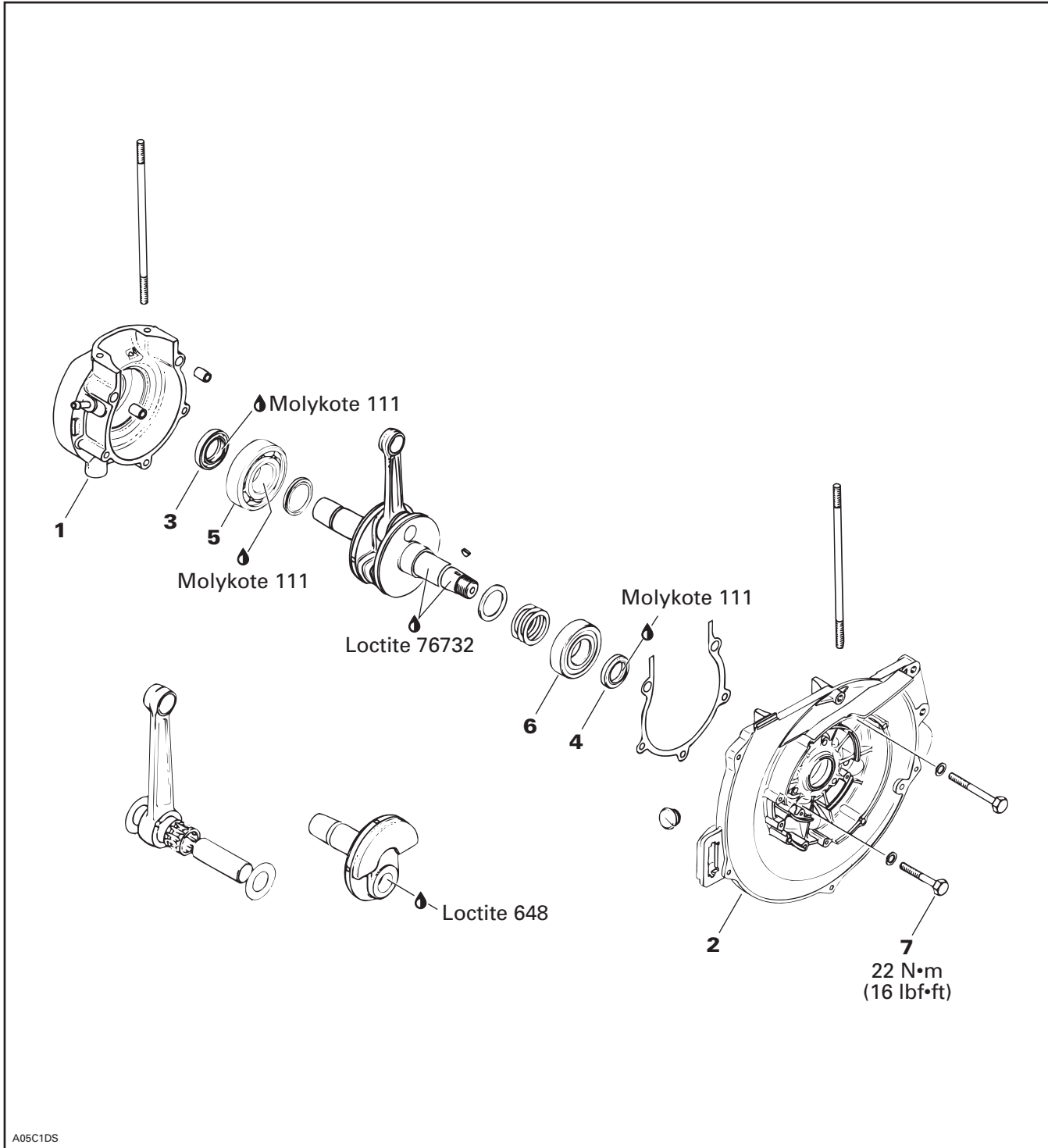
Before inserting piston in the cylinder, lubricate the cylinder with new injection oil or equivalent.

Position cylinder head on cylinder with fins in line with crankshaft center line. Cross torque retaining nuts to 26 N•m (19 lbf•ft).

Section 04 ENGINE

Subsection 02 (277 ENGINE TYPE)

BOTTOM END



A05C1DS

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.

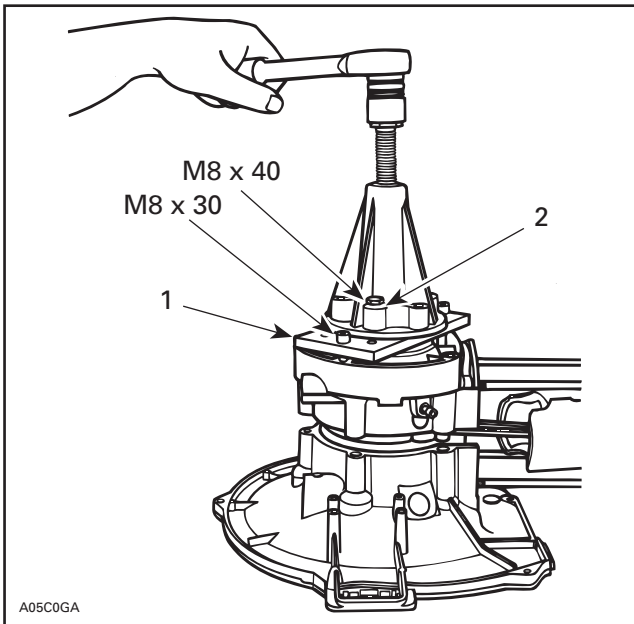
DISASSEMBLY

General

To remove drive pulley, refer to DRIVE PULLEY.
 To remove magneto, refer to MAGNETO.

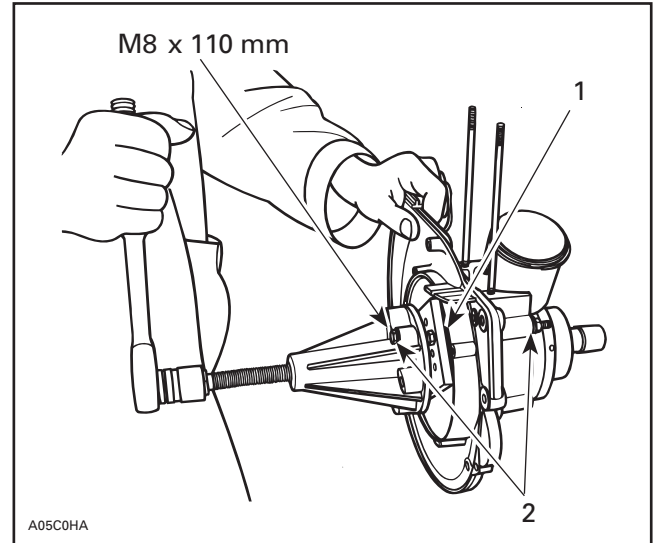
2,6, Crankcase Half

Heat to 110 - 120°C (230 - 248°F) all around bearing seat on PTO side. Install puller (P/N 420 876 298) to plate (P/N 529 024 900) with flat washer under screw heads and extract PTO side crankcase half **no. 1**.



1. Plate
2. Flat washer

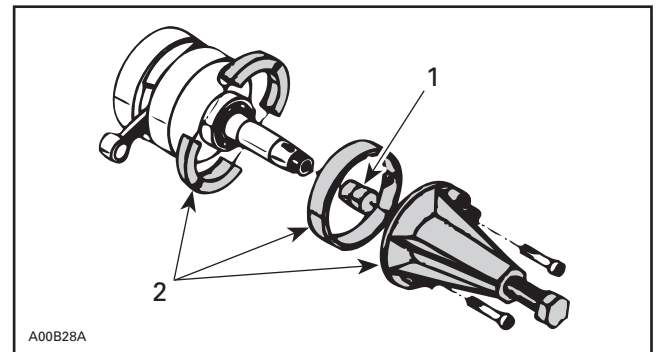
Heat to 110 - 120°C (230 - 248°F) all around bearing seat on MAG side. Install puller with plate, long bolts M8 x 110 mm and flat washers. Extract MAG side crankcase half **no. 2**.



1. Plate
2. Flat washers

To remove seals **nos. 3 and 4**, push from outside the crankcase towards the inside.

To remove bearings **nos. 5 and 6** from crankshaft use a protective cap and special puller as illustrated.



1. Protective cap
2. Special puller

INSPECTION

Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT.

Section 04 ENGINE

Subsection 02 (277 ENGINE TYPE)

ASSEMBLY

Install connecting rod with its lubrication slot on big end facing exhaust side.

Smear anti-seize lubricant (P/N 293 800 070) 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.

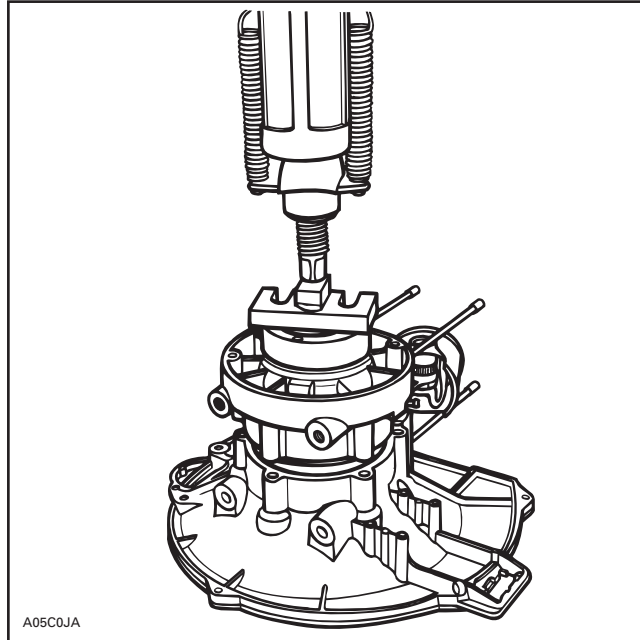
Prior to crankcase adjoining, install a protector sleeve on each crankshaft extension to prevent oil seal damage. Apply a light coat of lithium grease on seal lip. Spray some new injection oil on all moving parts of the crankshaft.

Install crankshaft seals with pusher (P/N 420 277 875) for MAG side seal no. 4 and (P/N 420 876 660) for PTO side seal no. 3.

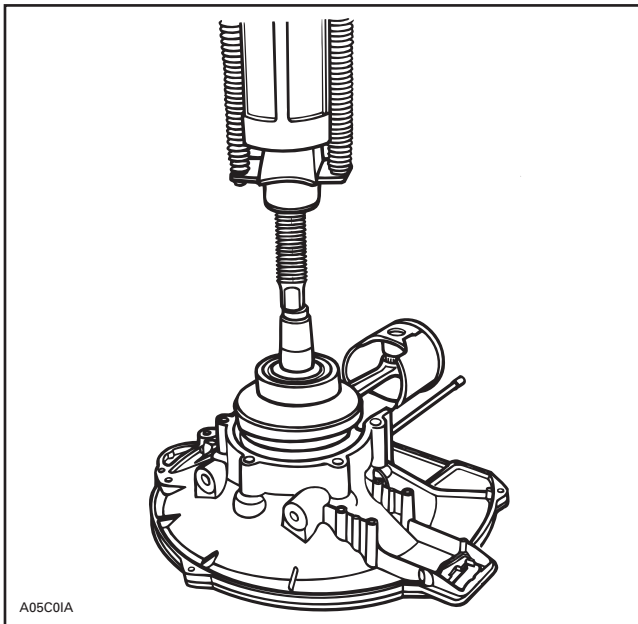
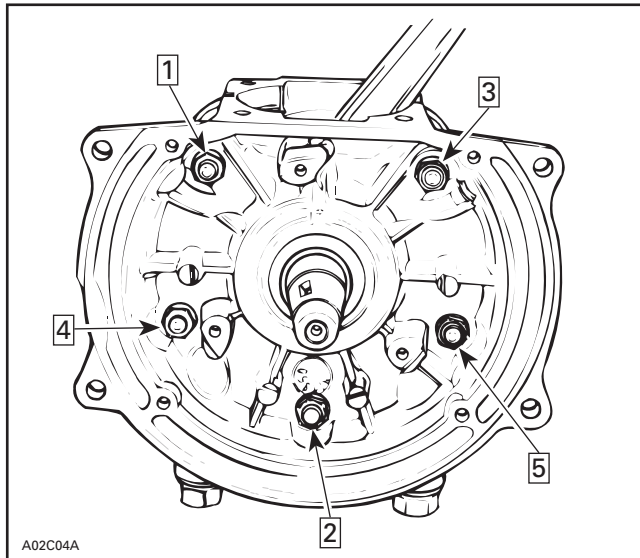
CAUTION: To ensure appropriate crankshaft bearing lubrication, seal outer surface must be pressed against seal crankcase shoulder.

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

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



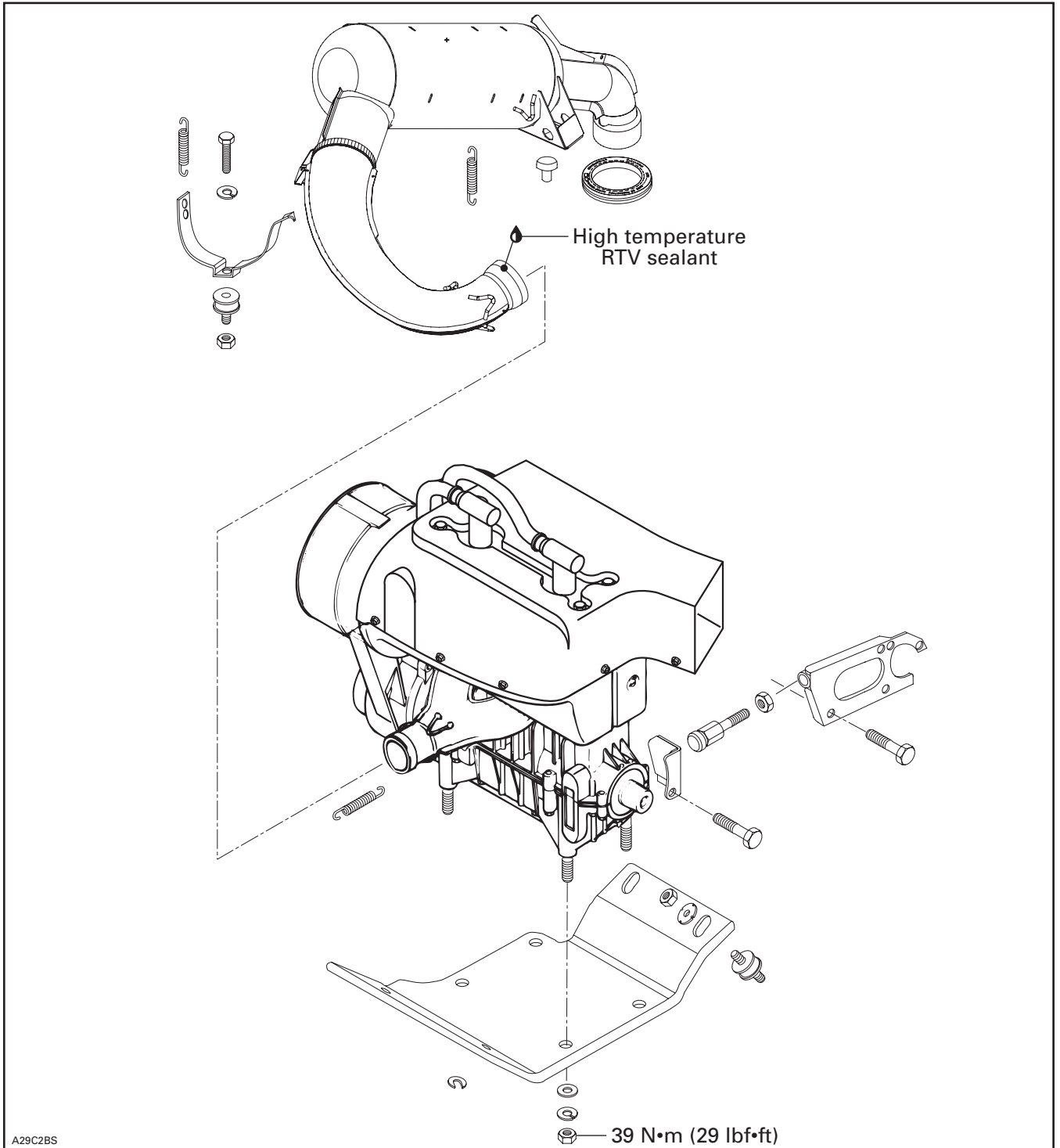
Torque the screws no. 7 to 22 N•m (16 lbf•ft) following illustrated sequence.



443 AND 552 ENGINE TYPES

ENGINE REMOVAL AND INSTALLATION

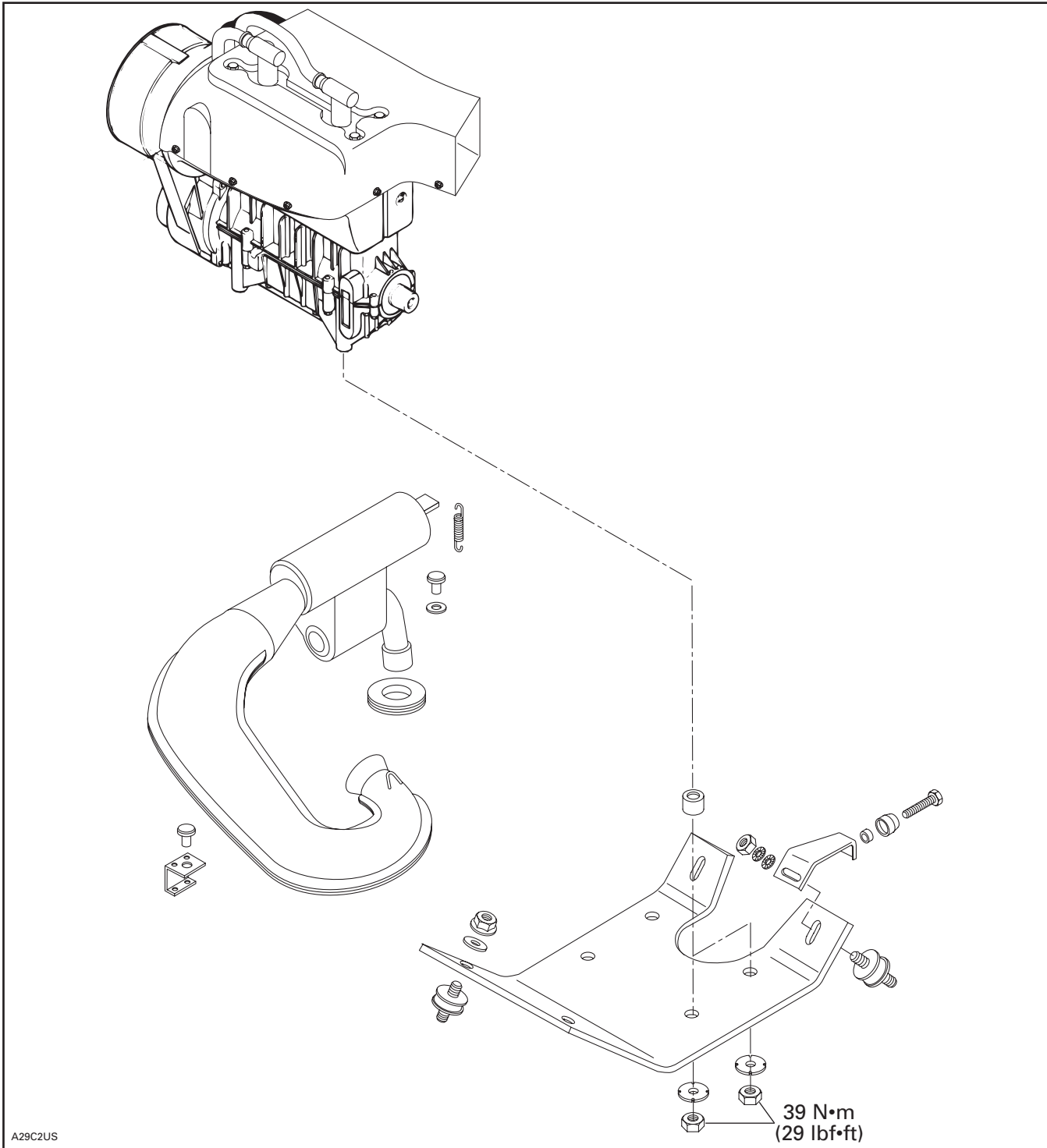
Skandic LT 443 Engine Type



Section 04 ENGINE

Subsection 03 (443 AND 552 ENGINE TYPES)

Skandic WT/SWT/SUV 552 Engine Type



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)
- guard
- drive belt
- drive pulley using appropriate puller, refer to
DRIVE PULLEY
- air silencer and carburetors
- impulse line from engine crankcase
- electrical connector housings
- exhaust pipe
- oil pump inlet line and plug it
- oil pump cable
- rewind cable: tie a knot near rewind housing
and remove starting grip.

Tighten fasteners to recommended torque in appropriate exploded view.

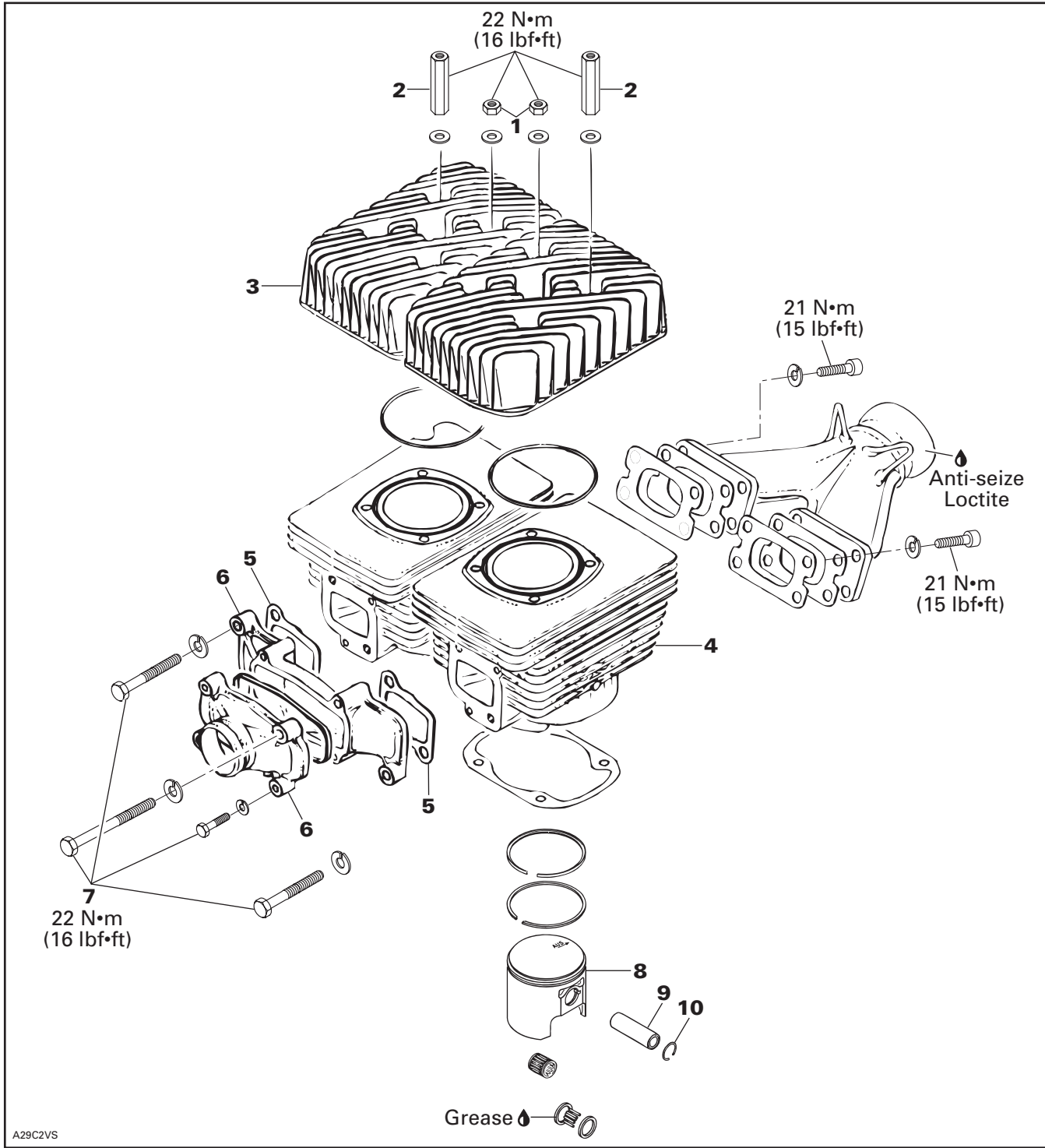
Apply high temperature RTV sealant (P/N 293 800 090) on metal-to-metal exhaust joints.

Section 04 ENGINE

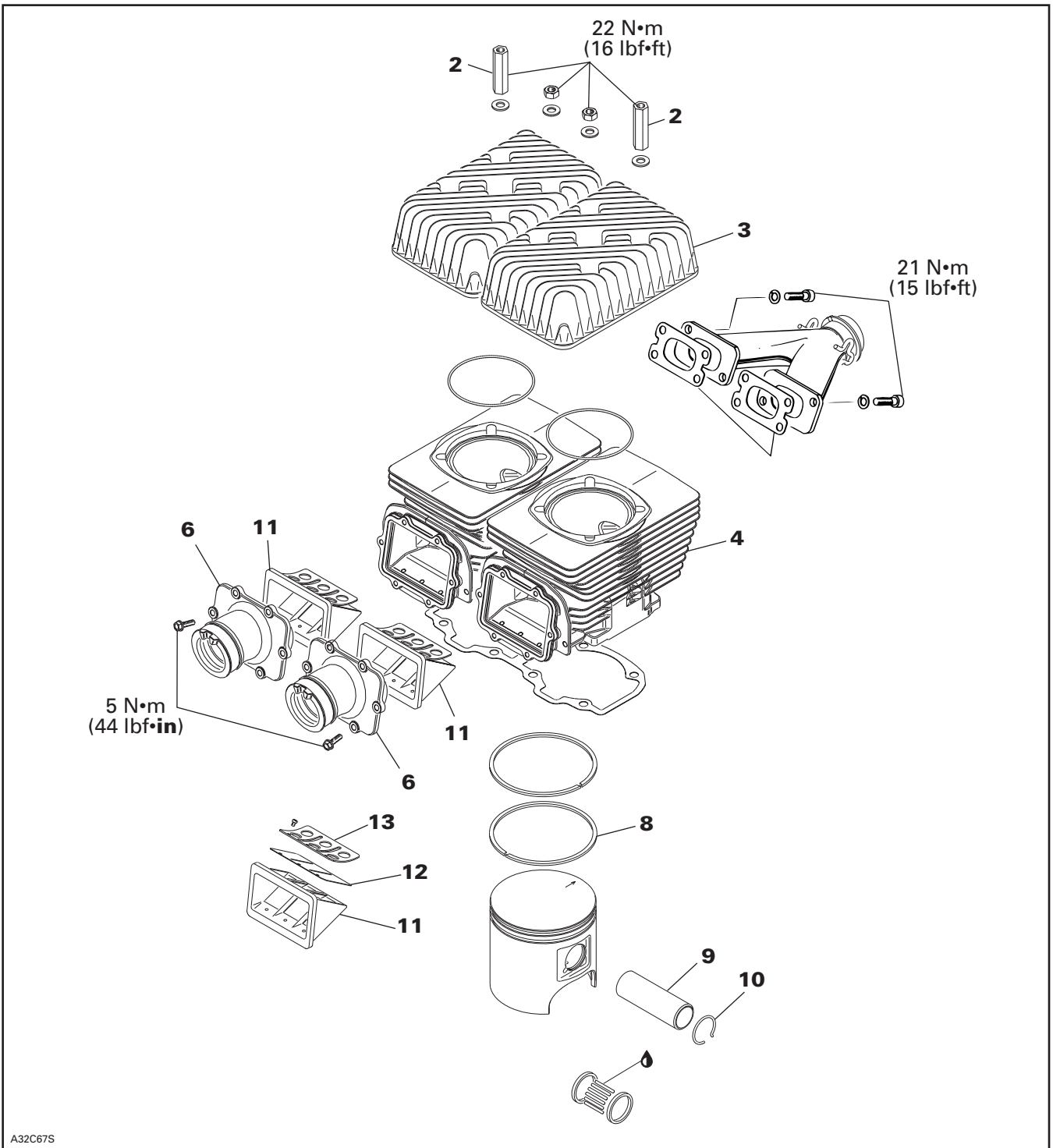
Subsection 03 (443 AND 552 ENGINE TYPES)

TOP END

Skandic LT 443 Engine Type



Skandic WT/SWT/SUV 552 Engine Type



A32C67S

Section 04 ENGINE

Subsection 03 (443 AND 552 ENGINE TYPES)

GENERAL

CAUTION: While performing any engine related procedure, always make sure that the working area is clean and free from dust or particles to reduce the risk of damaging the engine.

TROUBLESHOOTING

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

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

CLEANING

Discard all gaskets. Use gasket remover (P/N 413 708 500) 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.

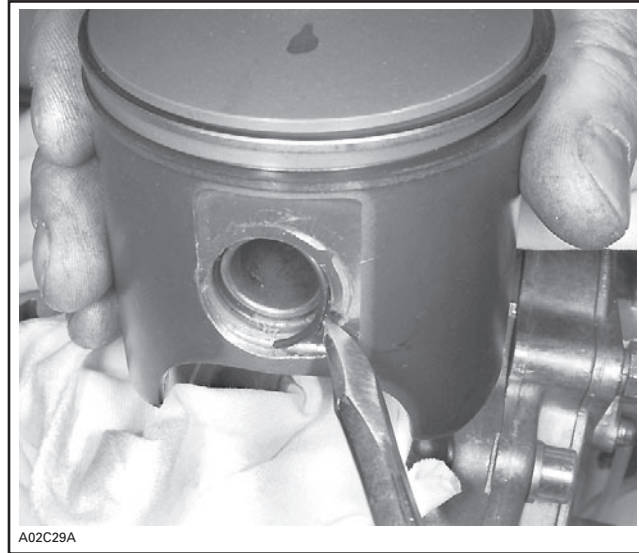
Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

DISASSEMBLY

Remove top fan cowl, intake sockets and lower fan cowl.

Remove cylinder heads.

Place a clean cloth or rubber pad (P/N 529 023 400) over crankcase to prevent circlips **no. 10** from falling into crankcase. Then with a pointed tool inserted in piston notch, remove both circlips from piston **no. 8**.



TYPICAL

443 and 552 Engines

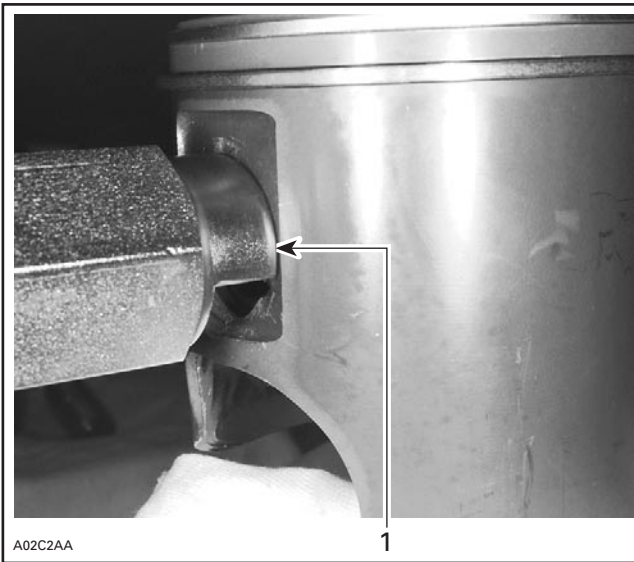
On these engines, piston pin needle bearing is mounted without a cage.

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

Use piston pin puller (P/N 529 035 503) along with 18 mm sleeve kit (P/N 529 035 541) for 443 or 20 mm sleeve kit (P/N 529 035 542) for 552 and locating sleeve (P/N 529 023 800).

NOTE: The locating sleeve is the same that contains new cageless bearing.

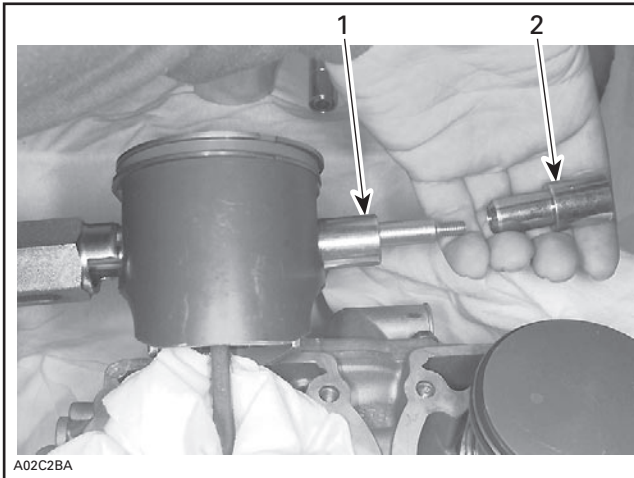
Insert piston pin puller (P/N 529 035 503) making sure it sits squarely against piston.



TYPICAL

1. Properly seated all around

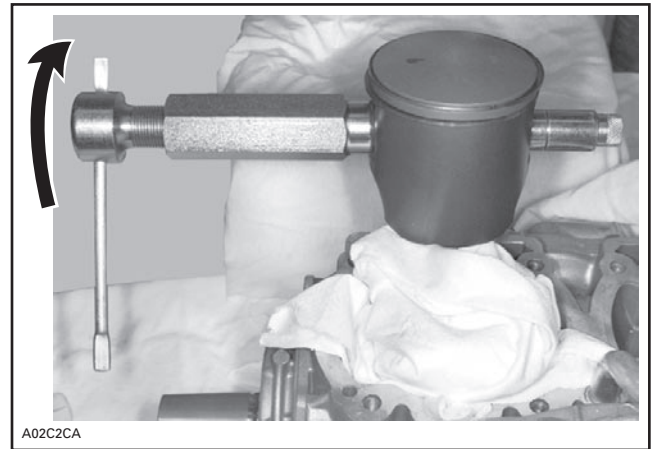
Install sleeve then shouldered sleeve over puller rod.



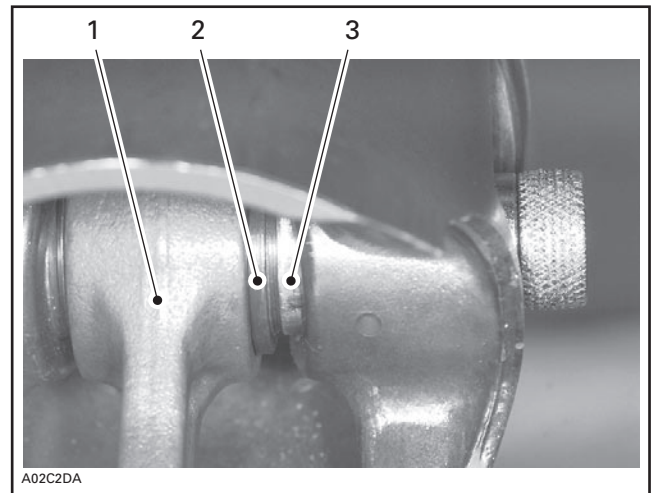
TYPICAL — INSTALLATION OF SLEEVE KIT

1. Sleeve
2. Shouldered sleeve

Pull out piston pin **no. 10** by unscrewing puller until shouldered sleeve end is flush with thrust washer of piston pin bearing.



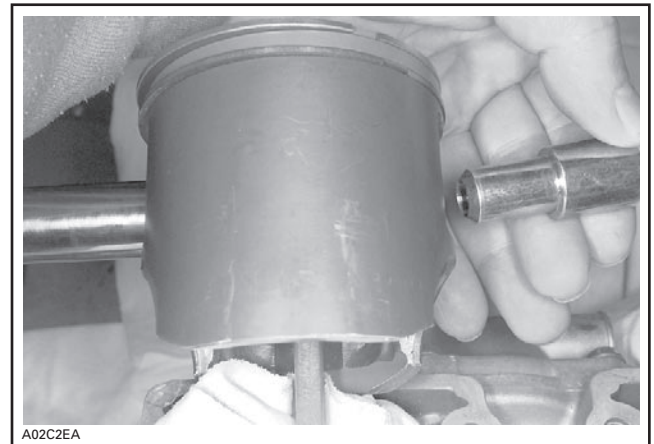
TYPICAL — PISTON PIN EXTRACTION



TYPICAL

1. Sleeve inside bearing
2. Thrust washer
3. Shouldered sleeve end

Remove puller. Pull out shouldered sleeve carefully.



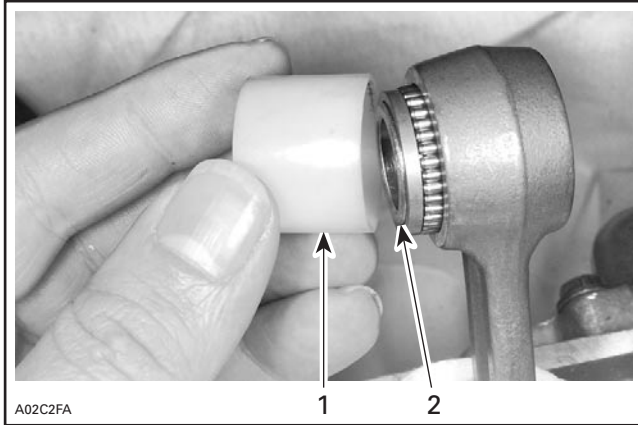
TYPICAL

Section 04 ENGINE

Subsection 03 (443 AND 552 ENGINE TYPES)

Remove piston from connecting rod.

Install locating sleeve. Then push needle bearings along with thrust washers and sleeve.



TYPICAL

1. Locating sleeve
2. Sleeve

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 locating sleeve.

INSPECTION

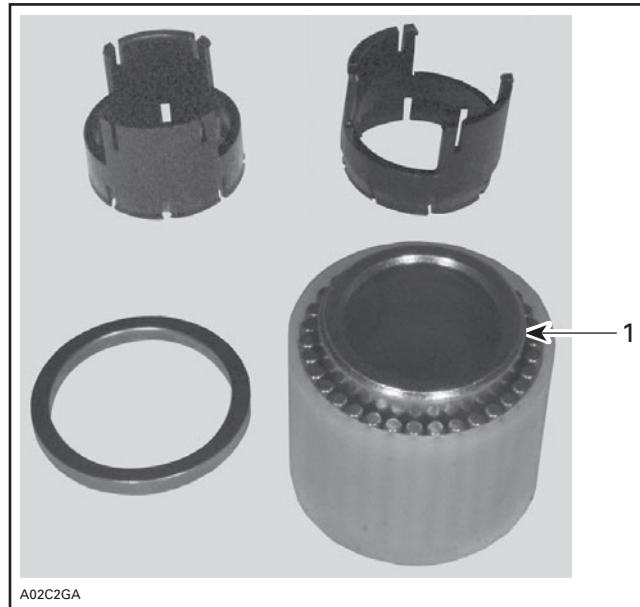
Refer to ENGINE DIMENSION MEASUREMENT.

ASSEMBLY

443 and 552 Engines

When reinstalling original needle bearings, make sure that 31 needles (in case of 443 engine) or 34 (in case of 552 engine) are inserted between sleeve and locating sleeve.

When installing a new cageless bearing, replace half plastic cages by sleeve.



TYPICAL

1. Sleeve

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

Insert cageless bearing into connecting rod.



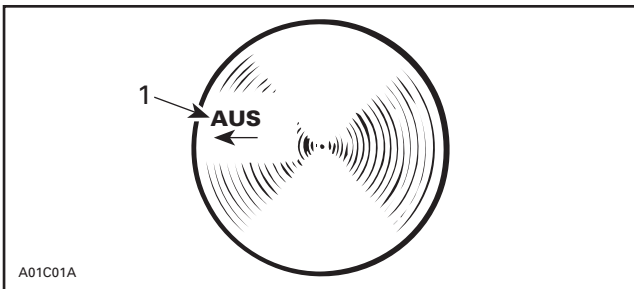
TYPICAL — CAGELESS BEARING AND SLEEVE INSTALLED

Heat piston using bearing heater (P/N 529 035 969).



CAUTION: Piston temperature must not exceed 46°C (115°F). Never use direct flame to heat the piston and never freeze the pin. Inappropriate heating procedure(s) may damage the piston.

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



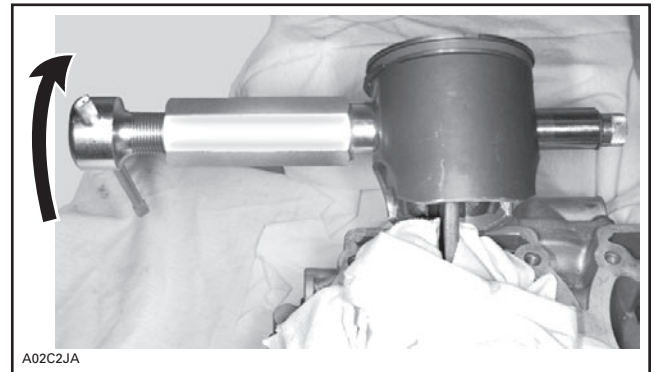
1. Exhaust

Install shouldered sleeve.



TYPICAL — SHOULDERED SLEEVE INSTALLATION

Install piston pin puller and turn handle until piston pin is correctly positioned in piston.



TYPICAL

Remove piston pin puller and sleeve kit.

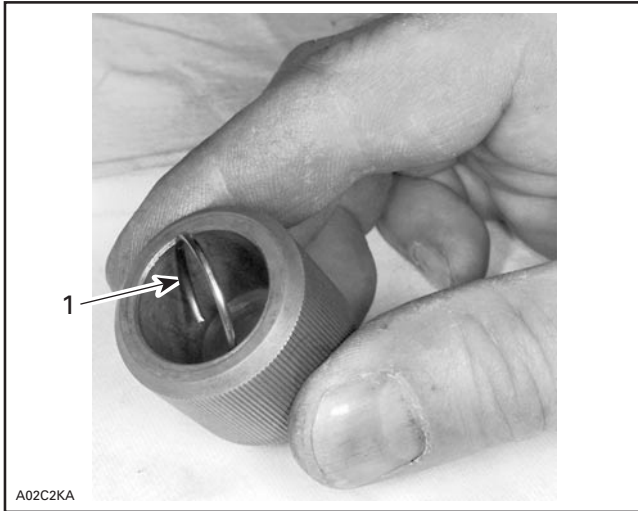
Section 04 ENGINE

Subsection 03 (443 AND 552 ENGINE TYPES)

443 Engine

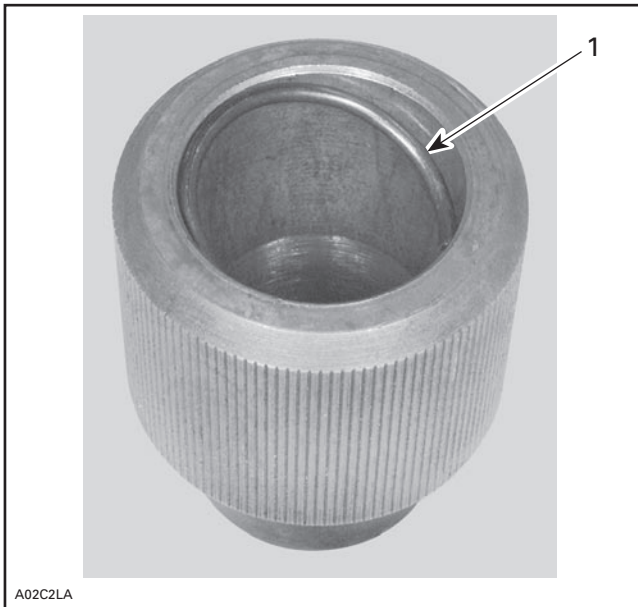
To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Use piston circlip installer (P/N 529 035 561).

Insert circlip in tool at an angle.



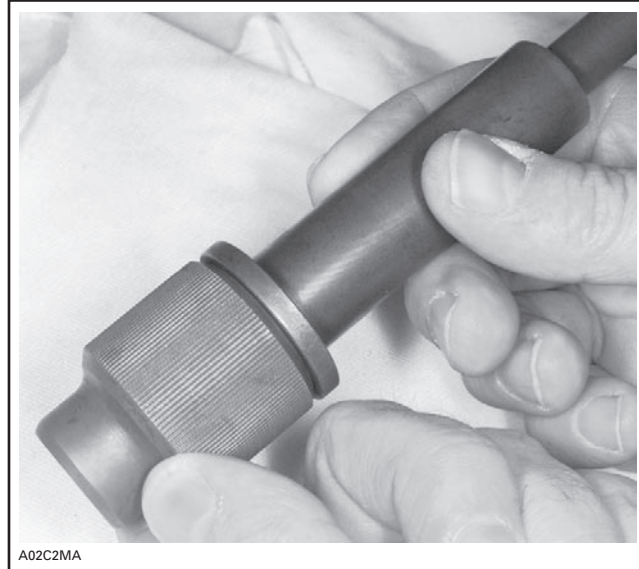
1. Circlip

Square it up using a finger.

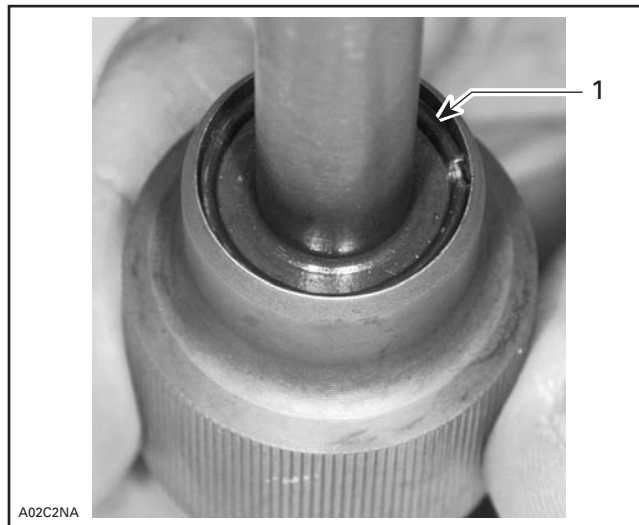


1. Circlip

Continue to square it up using round end of circlip installer.

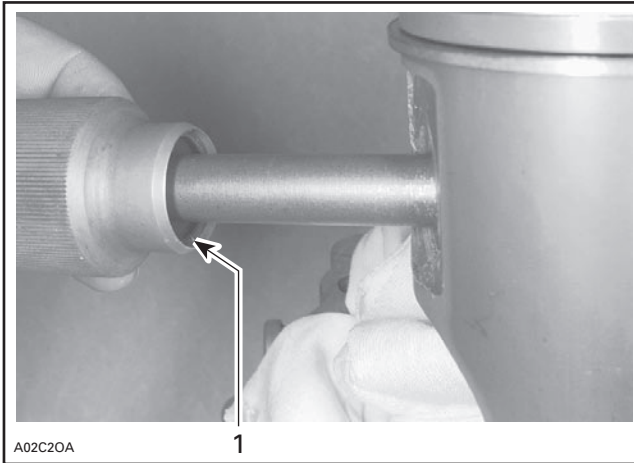


Using square end of tool, push circlip in until it rests in groove.



1. Circlip in groove

Mount tool in piston making sure that circlip break is facing down.

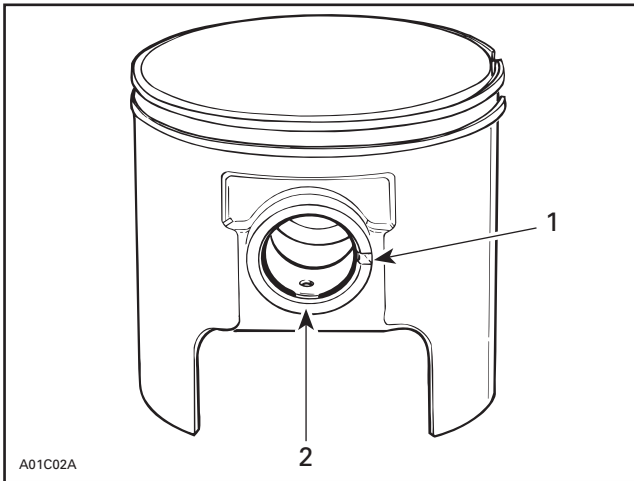


A02C20A

TYPICAL

1. Circlip break facing down

Hold tool firmly against piston then strike on round end of tool with a plastic hammer. Circlip will move from tool groove to piston groove.



A01C02A

1. Piston notch
2. Circlip break at 6 o'clock

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

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

552 Engine

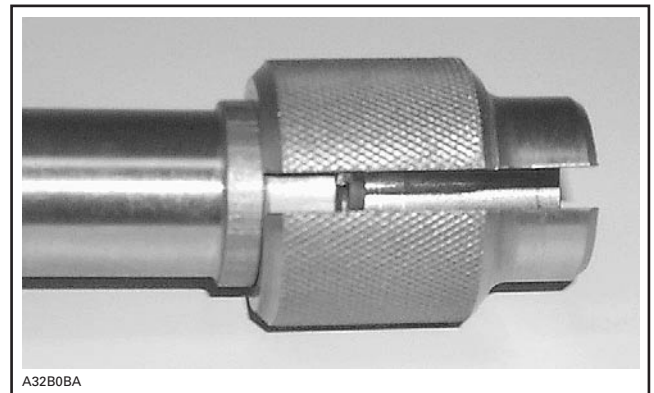
Use circlip installer (P/N 529 035 686) to install new mono-hook circlips **no. 10**.

Insert circlip into support in such a way that when installed in piston groove, the tab will face upward.



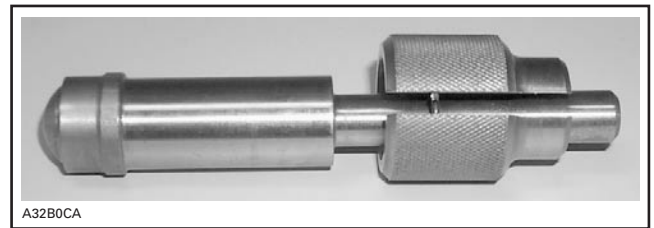
A32B0AA

With round end of pusher, position circlip perpendicular to the support axis.

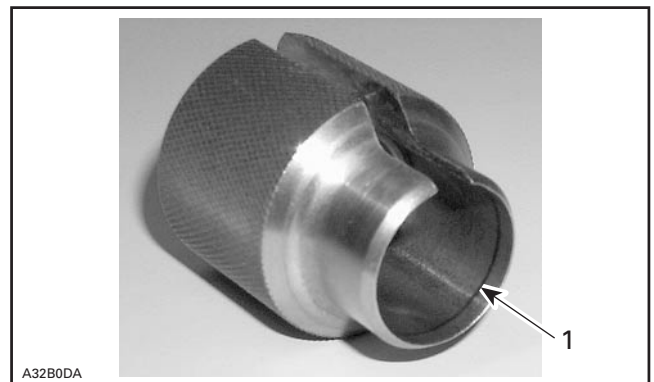


A32B0BA

With the other end of the pusher, push circlip into the support groove.



A32B0CA



A32B0DA

1. Groove

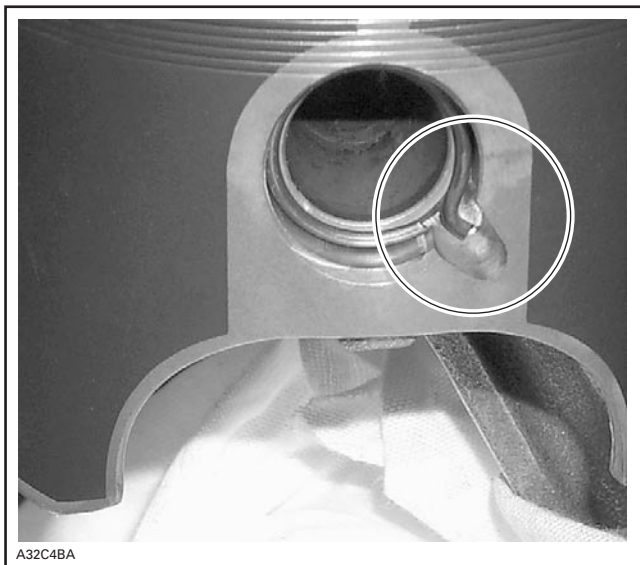
Section 04 ENGINE

Subsection 03 (443 AND 552 ENGINE TYPES)



CIRCLIP READY TO BE INSTALLED ON PISTON

Using a plastic hammer, tap pusher to insert circlip in place. Take care to install new circlips with tab toward top as per following photo.



TAB TOWARD TOP

CAUTION: Always install new mono-hook circlips. If circlip installation fails at the first attempt, always retry with a new one as on a second attempt circlip will lose its normal retaining capabilities.

CAUTION: Circlips must not move freely after installation; if so, replace them.

Clean cylinders and crankcase mating surfaces with Loctite Chisel (P/N 413 708 500).

Coat crankcase mating surface with Loctite 518 (P/N 293 800 038). Choose the right gasket thickness according to combustion chamber volume. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT. Install it on crankcase. Coat gasket with Loctite 518.

CAUTION: Always install a gasket of the proper thickness. Failure to do so may cause detonation and severe engine damage.

All Models

Before inserting piston in cylinder no. 4, lubricate the cylinder with new injection oil or equivalent.

Install proper ring compressor on piston assembly.

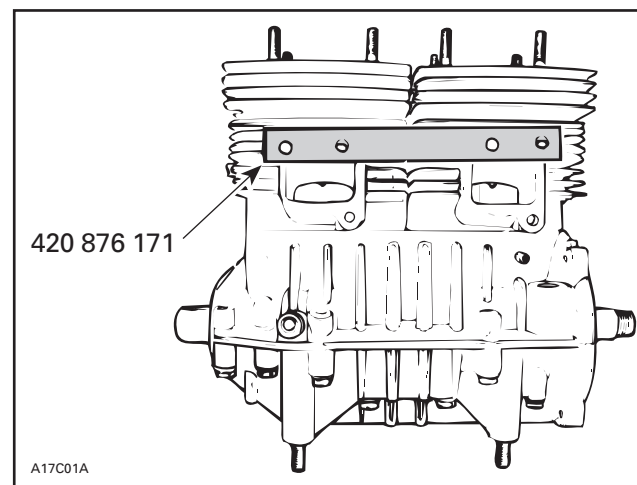
ENGINE TYPE	RING COMPRESSOR P/N
443	420 876 090
552	420 876 972

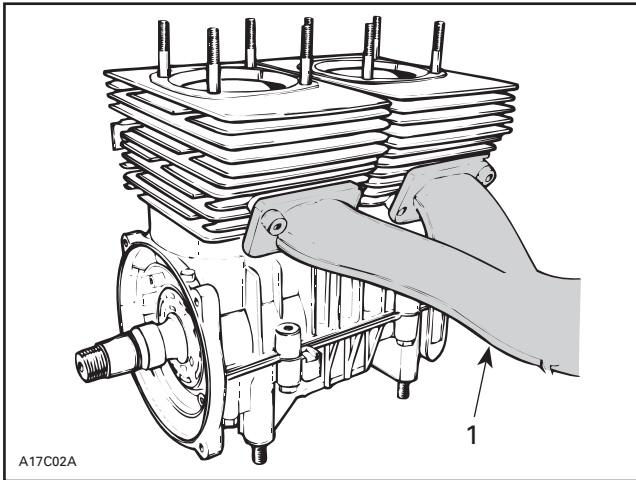
NOTE: The ring compressor will not fit on over size pistons.

Check flatness of intake sockets no. 6. Refer to ENGINE DIMENSION MEASUREMENT and look for CHECKING SURFACE FLATNESS.

At cylinder no. 4 and/or cylinder head no. 3 installation, use aligning tool or exhaust manifold itself to ensure sealing of intake manifold and exhaust before tightening cylinder head nuts.

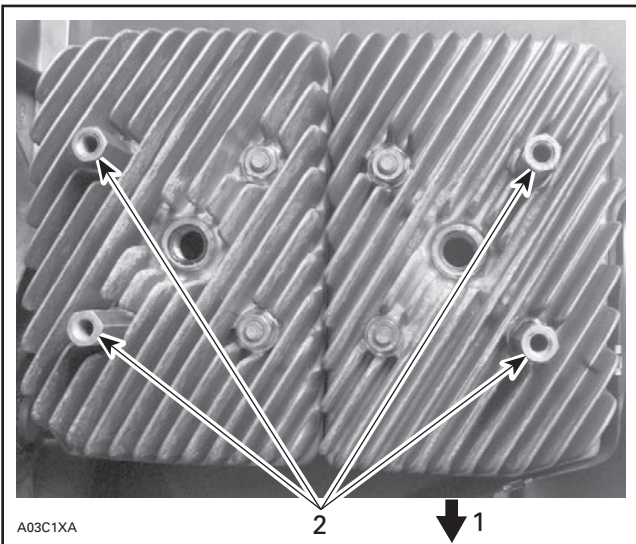
ENGINE TYPE	ALIGNING TOOL P/N
443 and 552	420 876 171





1. Or use exhaust manifold to align cylinders

Position distance nuts **no. 2** as shown below.



1. Exhaust
2. Distance nuts

Cross torque cylinder head nuts **nos. 1 and 2** to 22 N•m (16 lbf•ft); torque each cylinder head individually.

Install armature plate, fan housing and then air deflector.

Install a gasket on each side of the air deflector.

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

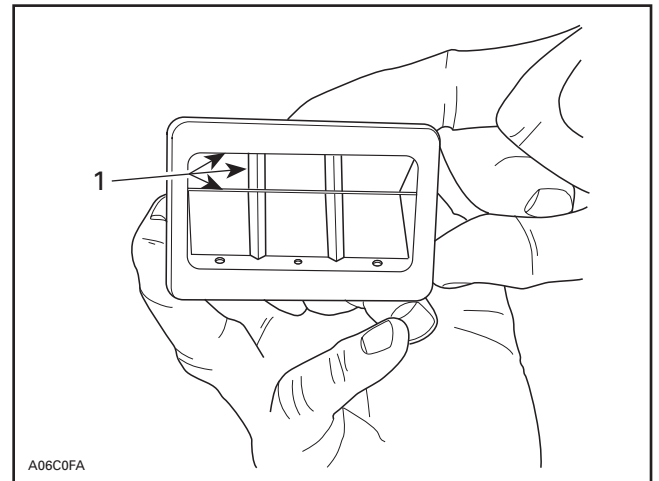
Skandic WT/SWT/SUV 552 Engine Type

12, Reed Valve

Blades have a curved shape. Install with their curve facing reed block.

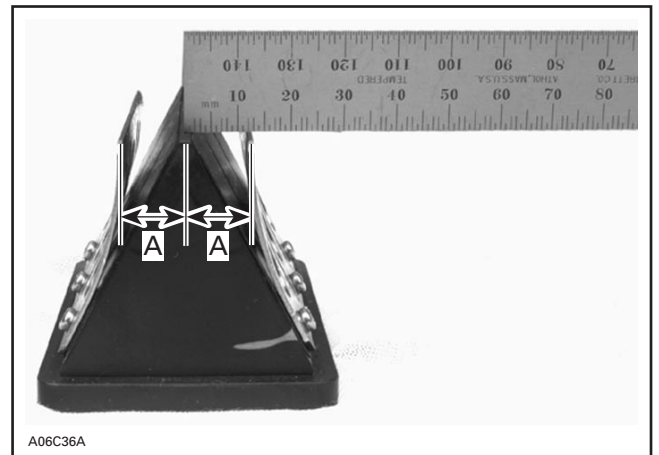
With blade stopper **no. 13** removed, check reed valve for proper tightness. There must be no play between blade and valve body when exerting a finger pressure on blade at blade stopper location.

In case of a play, turn blade upside down and recheck. If there is still a play, replace blade and/or valve body.



1. No play

Check distance from blade stopper inner edge and distance from center of reed valve block.



TYPICAL

A. 14.75 - 0, + 0.75 mm (.580 - 0, + .030 in)

Bent blade stopper as required to obtain the proper distance.

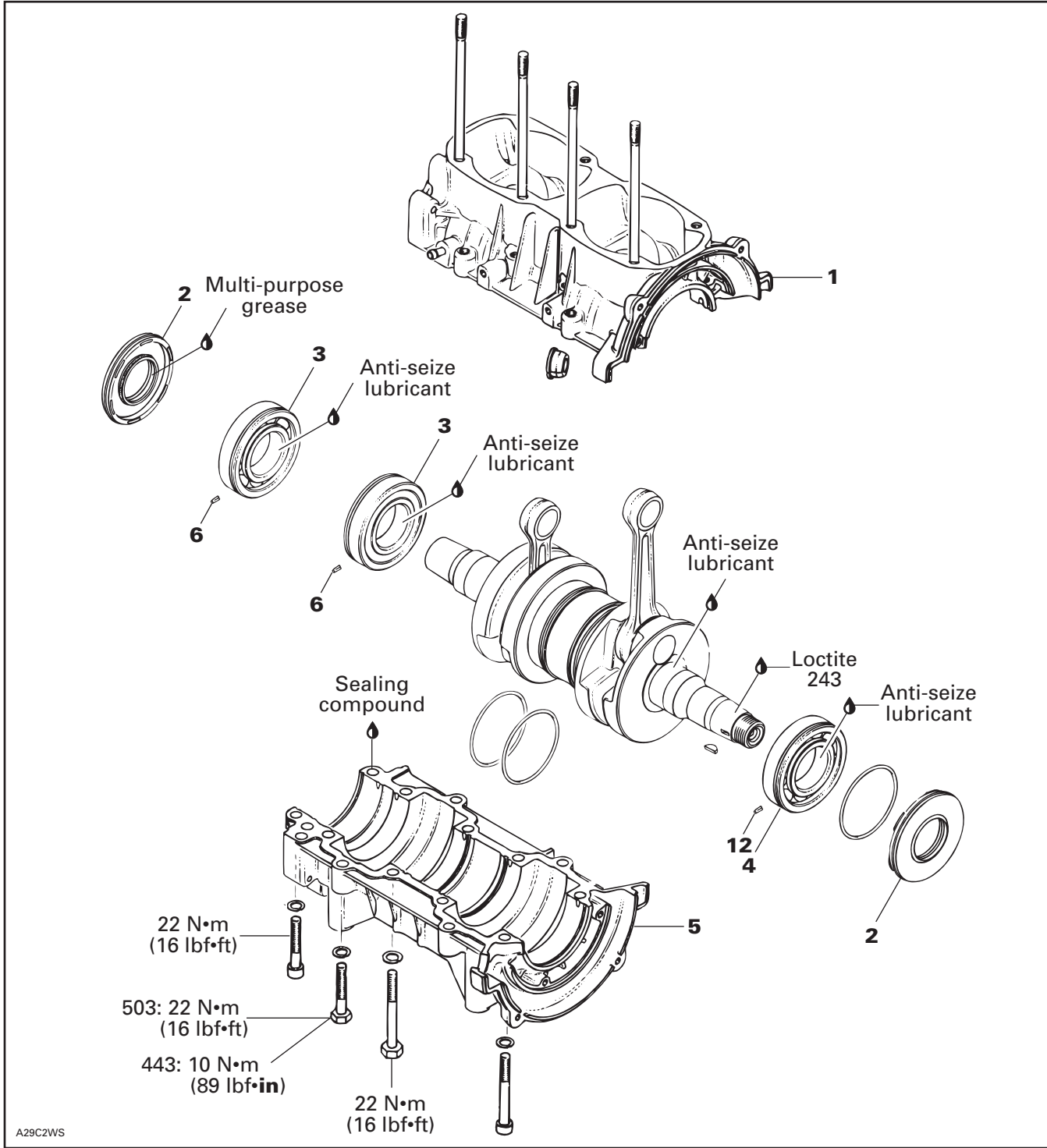
Blade stoppers may slightly interfere with cylinder during installation. Adjusted distance will be reduced automatically upon installation.

Section 04 ENGINE

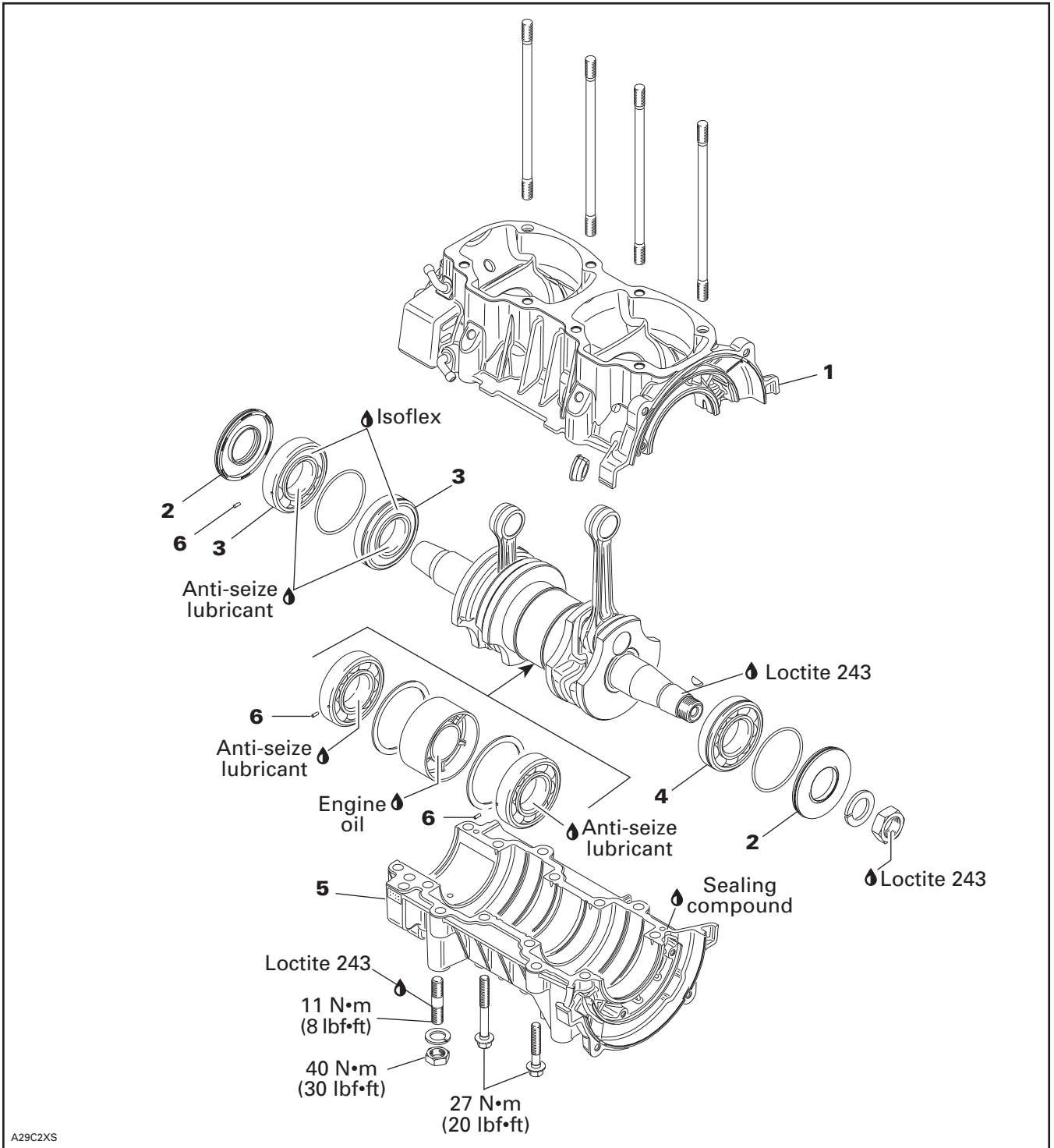
Subsection 03 (443 AND 552 ENGINE TYPES)

BOTTOM END

Skandic LT 443 Engine Type



Skandic WT/SWT/SUV 552 Engine Type



Section 04 ENGINE

Subsection 03 (443 AND 552 ENGINE TYPES)

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

Remove engine from chassis.

Remove fan guard, rewind starter, starting pulley, trigger coil wire from 4-connector housing, magneto flywheel then fan housing.

Remove stator plate.

CLEANING

Discard all seals, gaskets and O-rings.

Clean all metal components in a non-ferrous metal cleaner. Use gasket remover (P/N 413 708 500) accordingly.

Remove all trace of Loctite from crankshaft taper.

Remove old sealant from crankcase mating surfaces with Bombardier gasket remover (P/N 413 708 500).

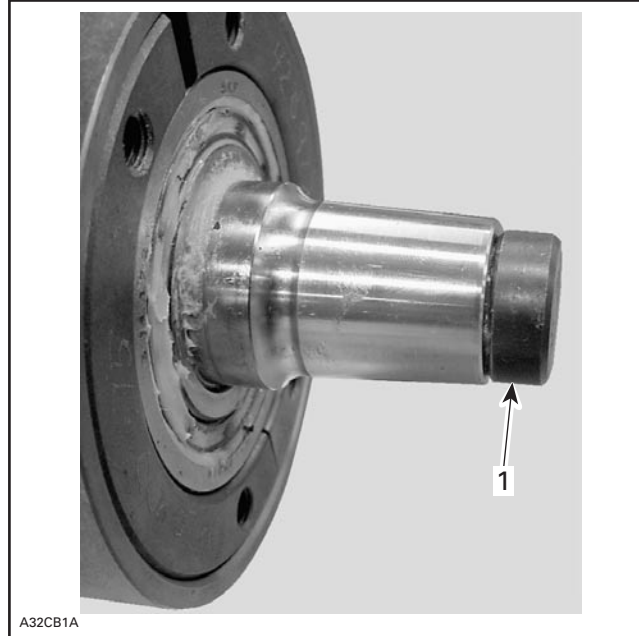
CAUTION: Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

To remove PTO side bearing no. 3 from crankshaft, install half rings on the bearing.

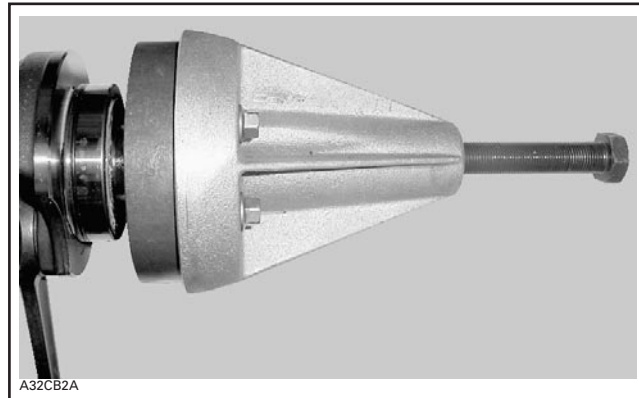
NOTE: Remove the bearing O-ring prior to installation of half ring.

Apply synthetic grease (P/N 413 711 500) on the crankshaft end and install protective cap (P/N 420 876 552).

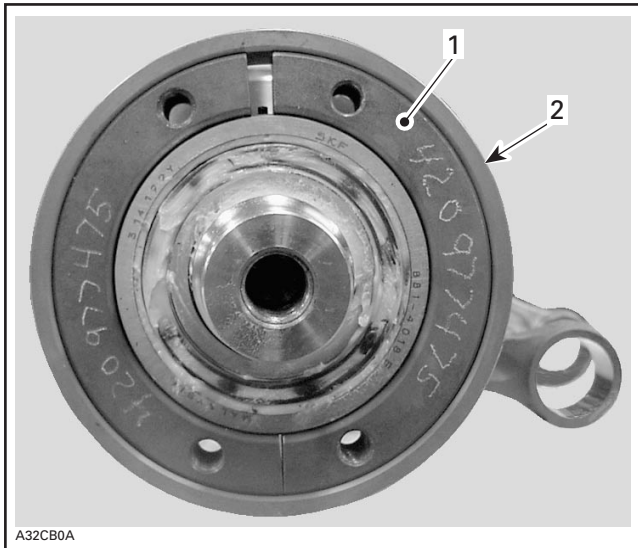


1. Protective cap

Using screws (P/N 420 840 681), install bearing puller on the half rings.



PULLER INSTALLED ON THE HALF RINGS



1. Half ring
2. Puller ring

Secure the bearing puller in a vise by one of its rib.



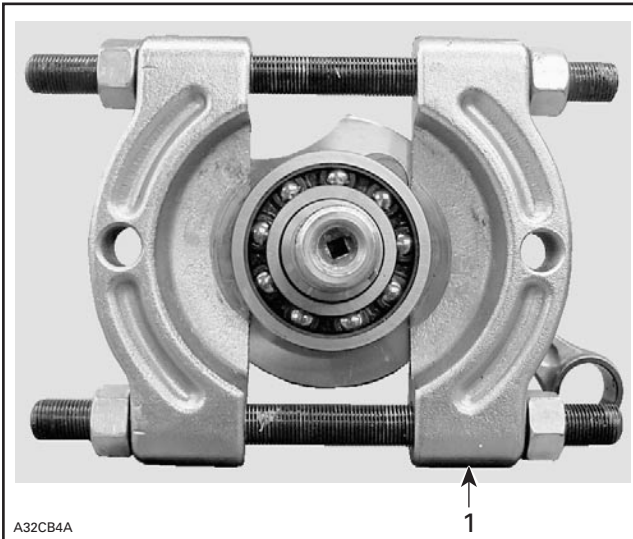
BEARING PULLER SECURED IN THE VISE

CAUTION: Never use any air impact tool to tighten the puller bolt.

Lubricate the puller bolt and then proceed with tightening the puller bolt until the bearing comes out.

Follow the same procedure for the inner bearing.

NOTE: In the case of damaged bearing or less clearance between crankshaft counterbalance and the bearing, use bearing separator (Snap-On tool P/N CJ951 or SPX/OTC tool P/N 1124) to facilitate the removal.



1. Bearing separator

Procedure for MAG side bearings **no. 4** is same as of PTO side with the exception of protective cap (P/N 420 876 557).

INSPECTION

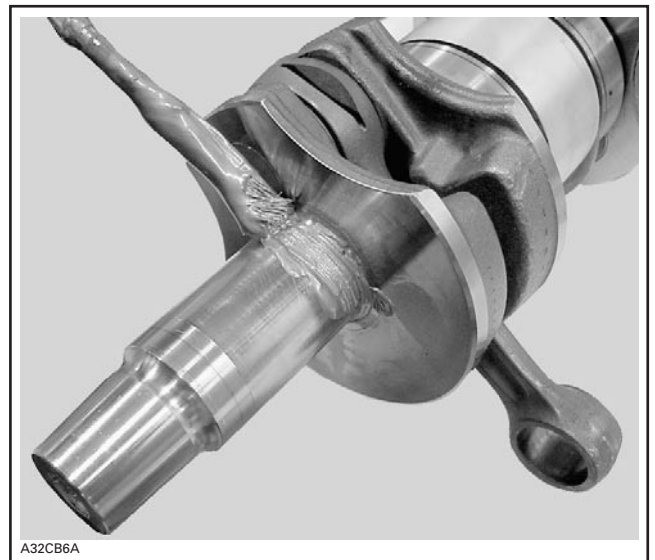
Refer to ENGINE DIMENSIONS MEASUREMENT.

ASSEMBLY

Clean crankshaft end with sand paper no. 180 and remove all residue using pulley flange cleaner (P/N 413 711 809).



Smear anti-seize lubricant (P/N 413 701 000) on part of crankshaft where bearing fits.



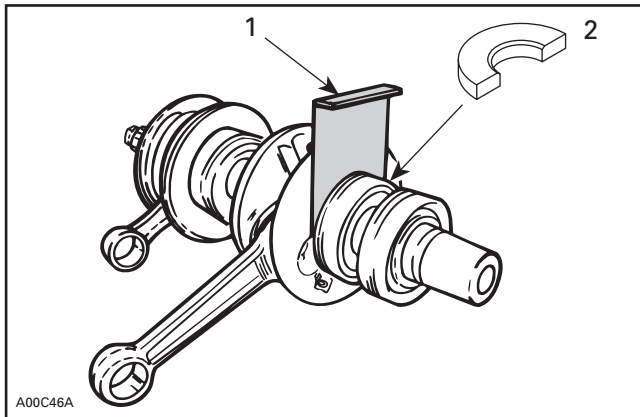
Section 04 ENGINE

Subsection 03 (443 AND 552 ENGINE TYPES)

Skandic LT 443 Engine Type

To check proper clearance between bearing no. 3 and crankshaft counterbalance, use feeler gauge (P/N 420 876 620).

Mount second bearing with distance gauge (P/N 420 876 822) for 443 for proper positioning.



1. Feeler gauge
2. Distance gauge

Prior to installation, heat the bearing as per the procedure given further in this subsection.

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

Skandic WT/SWT/SUV 552 Engine Type

Heat up the bearing(s) using bearing heater (P/N 529 035 969). This will expand bearings and ease installation. If required, put a suitable plate or shim to avoid the direct contact between integrated seal and the heating surface.



CAUTION: Bearing should not be heated to more than 80°C (176°F). Do not heat bearing with direct flame or heat gun or heated oil. Inappropriate heating procedure(s) may cause inner seal failure.

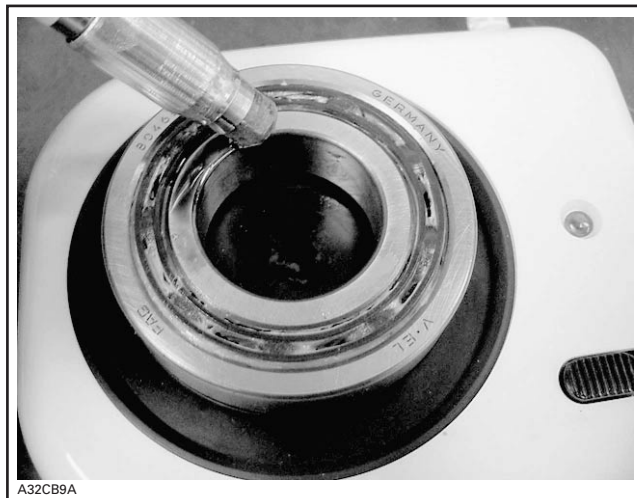
Turn bearing(s) several times during heating process for heating it/them properly.

NOTE: Normally it takes approximately 10 minutes to heat up a bearing. So in the event of replacing a bearing, it is recommended to start heating it prior to removal. Two bearings can be heated at the same time on one bearing heater.



1. Bearings

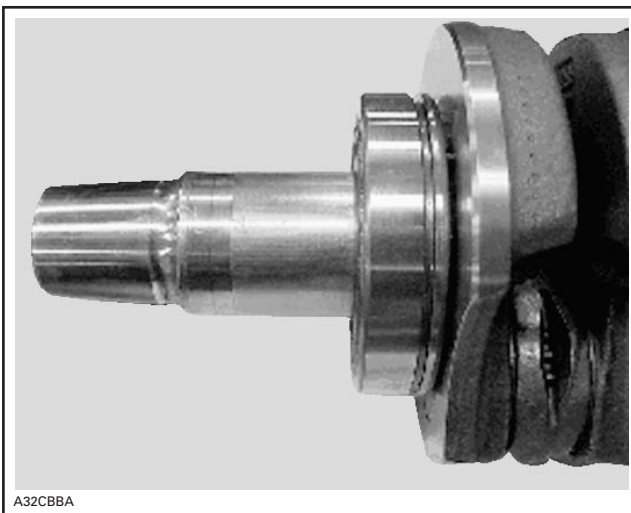
Touch the inner race of the bearing with the temperature indicator stick (P/N 529 035 970). Stick will liquefy when the bearing reaches the proper temperature.



⚠ WARNING

Do not touch heated bearing with bare hands. Wear heat resisting gloves before handling the heated bearing(s).

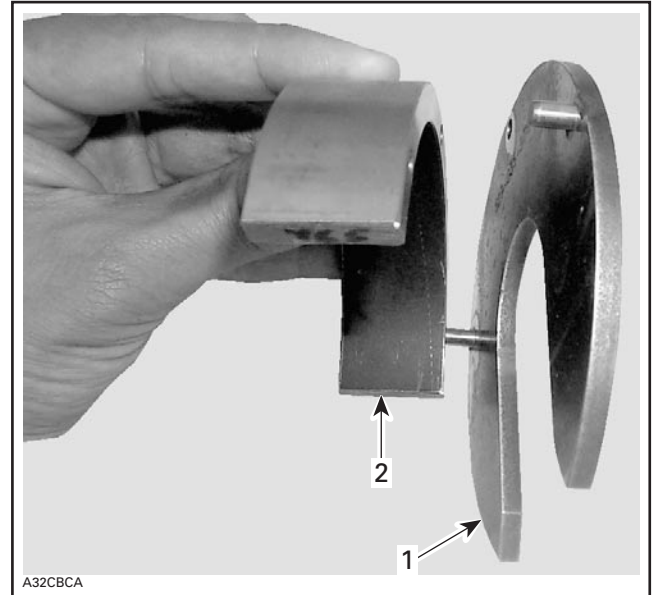
Slide in the inner PTO bearing with the integrated seal facing crankshaft. Push bearing to end position.



BEARING TO END POSITION

Install the O-ring.

Make a bearing locator tool using support plate (P/N 529 035 976) and distance gauge (P/N 529 035 965).



- 1. Support plate
- 2. Distance gauge

Install bearing locator tool.



Section 04 ENGINE

Subsection 03 (443 AND 552 ENGINE TYPES)

Slide in the heated outer PTO bearing onto the crankshaft.



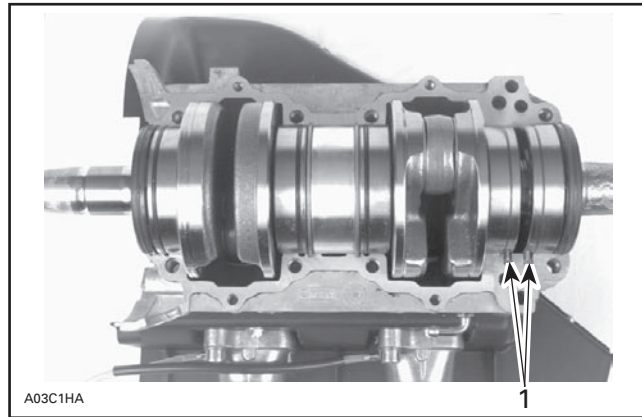
Install the MAG side heated bearing.



All Models

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

When installing crankshaft, position drive pins no. 6 as illustrated.



TYPICAL

1. Drive pins

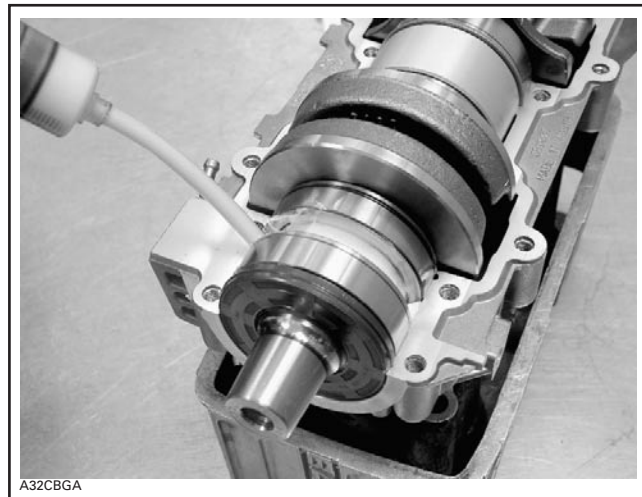
Skandic WT/SWT/SUV 552 Engine Type

CAUTION: Use only the recommended Isoflex grease (P/N 293 550 021). Make sure not to push Isoflex grease between outside bearing race and half crankcase.

NOTE: The 50 g tube corresponds to 50 cc of grease.

Put 27 to 32 mL of grease in a syringe.

With the syringe, fill the PTO side ball bearings with 27 to 32 mL of Isoflex grease as shown below.

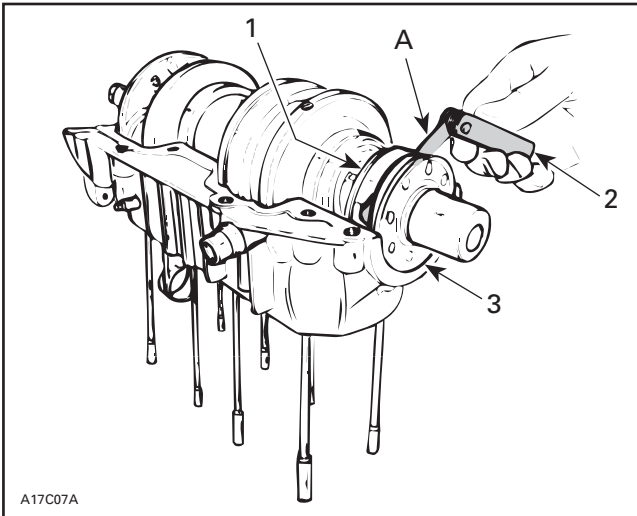


All Models

At seal **no. 2** 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.



- 1. Bearing
- 2. Feeler gauge
- 3. Plain oil seal
- A. 1 mm (.040 in)

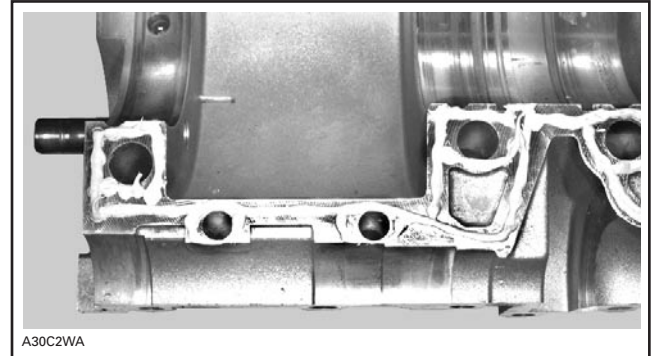
Crankcase halves **nos. 1** and **5** are factory matched and therefore, are not interchangeable as single halves.

Crankcase Assembly

IMPORTANT: The total assembly sequence, including sealing compound spreading, screwing and torquing of bolts according to the proper sequence must be performed within 10 minutes.

Before screwing both parts of crankcase, seal it with a sealing compound (P/N 420 297 906). Make sure surfaces are clean and degreased before applying sealing compound.

Spread a seam of 1.2 mm (1/16 in) maximum in diameter on surface of lower crankcase half.



TYPICAL

As far as possible, sealing compound must be applied in one run to avoid any risks of leaking through the crankcase.

Align both crankcase halves before tightening screws.

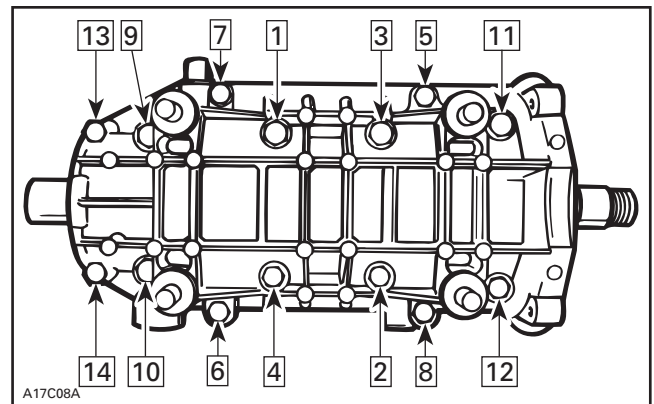
Position the crankcase halves together and tighten bolts by hand then install and tighten armature plate on magneto side to correctly align the crankcase halves.

Screw the 4 central bolts (bolts **nos. 1** to **4** in the torquing sequence) to squeeze compound between crankcase halves before it starts to dry.

NOTE: Sealing compound spreading plus screwing of engine four central bolts must be performed within 2 minutes to ensure a good sealing and avoid linking.

Screw all crankcase bolts in place in the following sequence and to the appropriate torque through a two steps torquing: first, screw bolts up to 60% of the final torque (13 N•m (115 lbf•in) for M8 bolts), then, tighten to the required torque (i.e. 22 N•m (16 lbf•ft)).

552 Engine Type

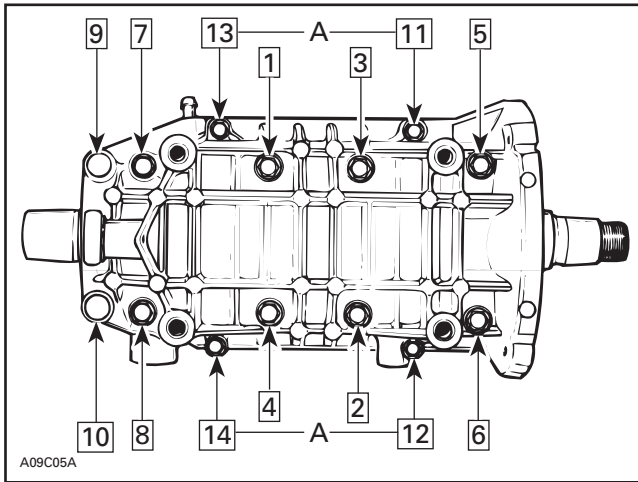


TIGHTENING SEQUENCE FOR 552 ENGINE TYPE

Section 04 ENGINE

Subsection 03 (443 AND 552 ENGINE TYPES)

443 Engine Type



TIGHTENING SEQUENCE FOR 443 ENGINE TYPE

A. 10 N•m (89 lbf•in)

All the other screws are torqued to 22 N•m (16 lbf•ft)

All Engines

To install magneto, refer to CDI MAGNETO.

BREAK-IN

After rebuilding an engine always observe a break-in period as described in *Operator's Guide*.

593 ENGINE TYPE

Skandic WT LC/SUV 600

REMOVAL FROM VEHICLE

Open hood.

Remove tuned pipe and muffler.

Drain engine coolant.

Remove or unplug the following then lift off engine from engine compartment.

NOTE: Use of a hoist is recommended.

- guard
- air silencer
- drive belt
- rewind starter handle
- drive pulley (not necessary if engine has not to be disassemble)
- hood
- carburetors
- impulse hose and electrical connectors
- oil injection inlet line at oil injection pump, install hose pincher
- oil pump cable
- coolant hoses between cylinder head and radiator
- coolant by-pass hose
- coolant hose at front of coolant reservoir
- engine support screws
- engine stopper (left rear of engine).

INSTALLATION ON VEHICLE

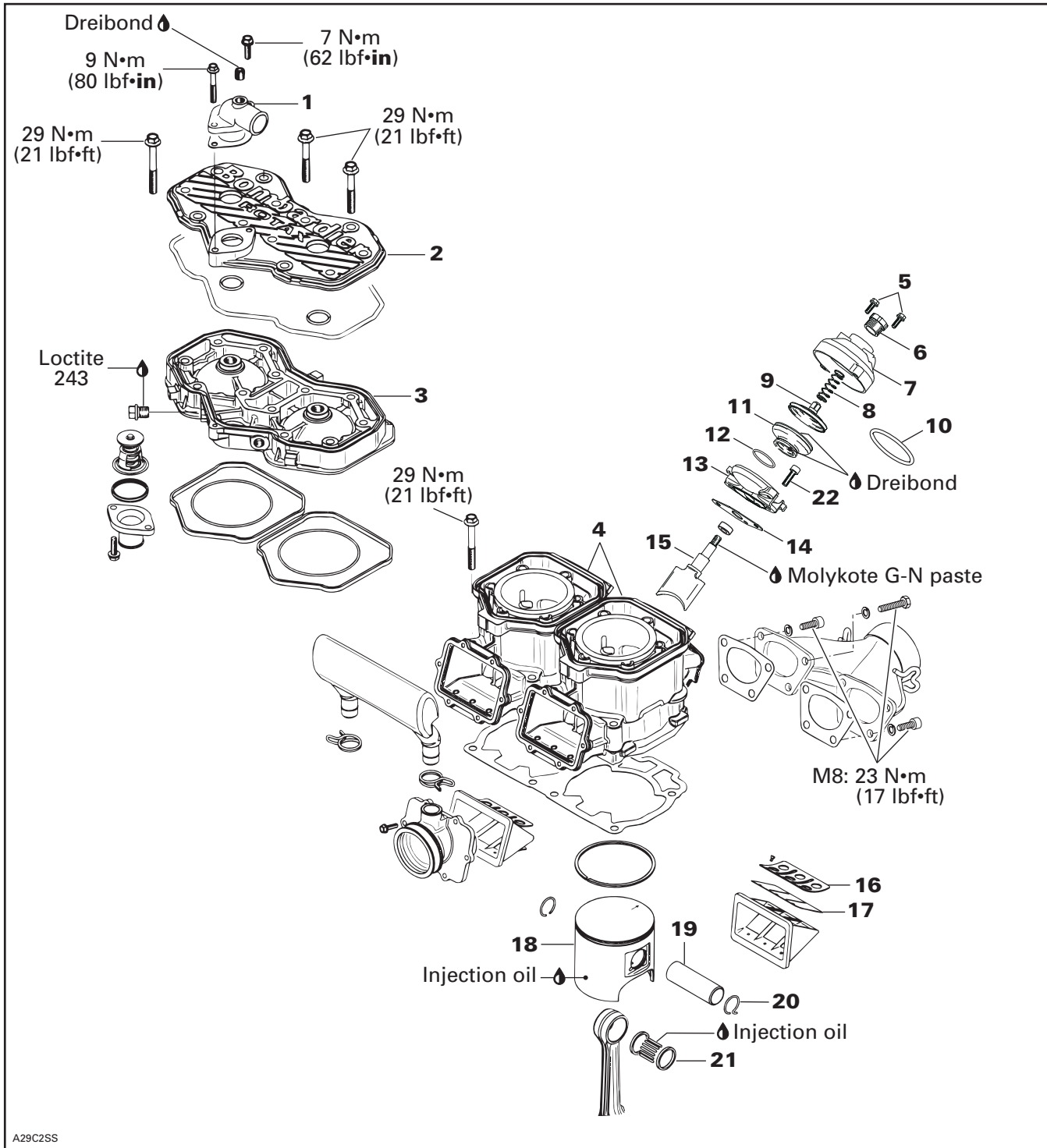
To install engine on vehicle, reverse removal procedure. However, pay attention, to all appropriate component/system reinstallation procedures described throughout this *Shop Manual* and to the following:

- After throttle cable installation, check carburetor maximum throttle opening and oil injection pump adjustment.
- Check pulley alignment and drive belt tension.
- Seal exhaust ball joints with Ultra Copper (P/N 413 710 300).

Section 04 ENGINE

Subsection 04 (593 ENGINE TYPE)

TOP END



GENERAL

CAUTION: While performing any engine related procedure, always make sure that the working area is clean and free from dust or particles to reduce the risk of damaging the engine.

COMPONENT REMOVAL

Most engine components can be removed with engine on vehicle such as:

- cylinder head
- piston(s)
- cylinder(s)
- rewind starter
- oil pump
- water pump
- magneto flywheel
- RAVE valve(s)
- reed valve(s).

CLEANING

Discard all gaskets and O-rings.

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

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

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

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

DISASSEMBLY

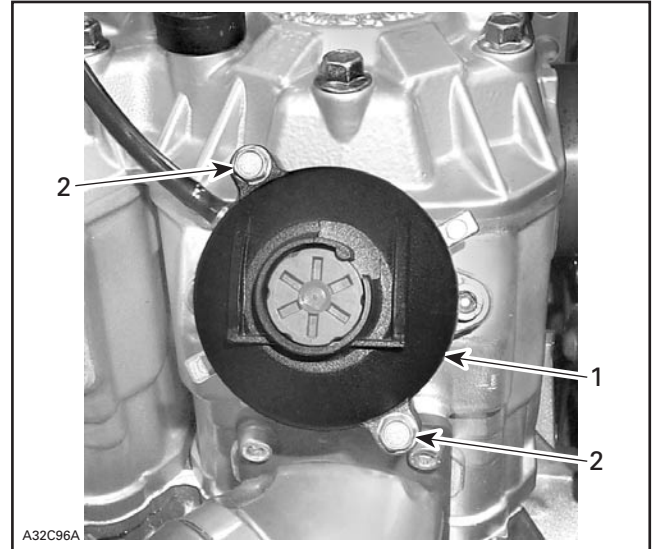
RAVE System

NOTE: RAVE stands for Rotax Adjustable Variable Exhaust.

Remove RAVE valve cover **no. 7** by removing screws **no. 5**.

WARNING

Firmly hold cover to valve base. The compression spring inside the valve is applying pressure against the cover.



TYPICAL

1. RAVE valve cover
2. Screws

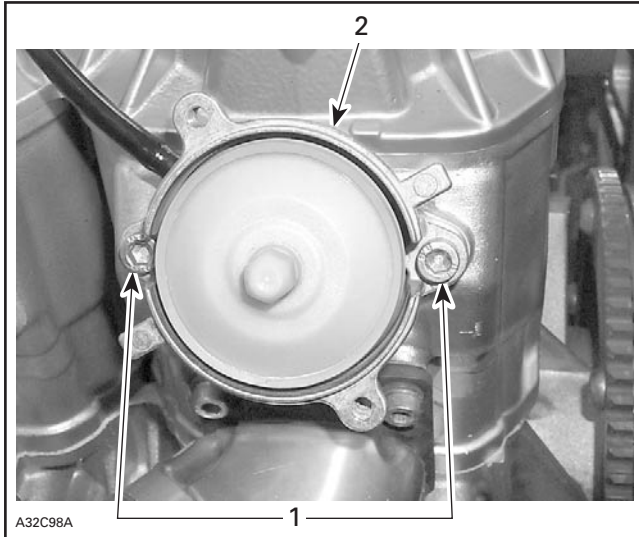
Remove the compression spring **no. 8**.



Section 04 ENGINE

Subsection 04 (593 ENGINE TYPE)

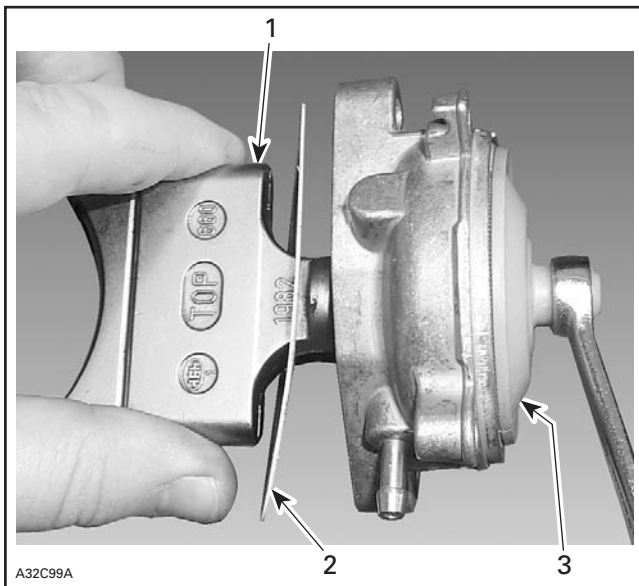
Unscrew the Allen socket screws no. 22 then remove the RAVE valve base no. 13.



TYPICAL

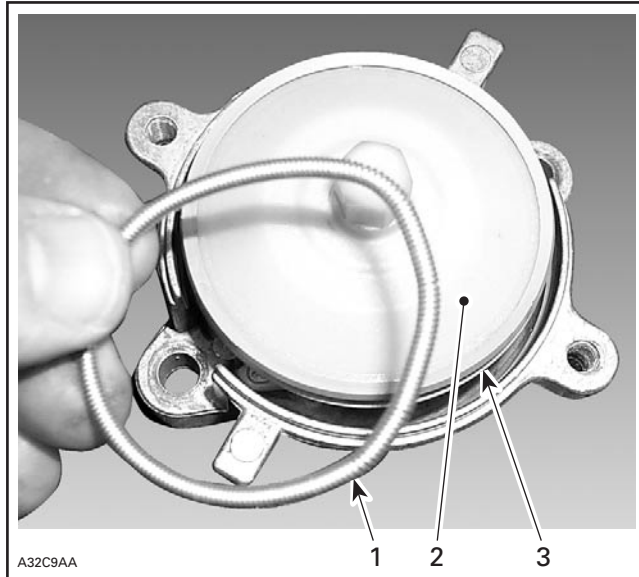
1. Allen socket screws
2. RAVE valve base

Unscrew and remove the guillotine no. 15 from the valve piston no. 9 then remove the gasket no. 14.



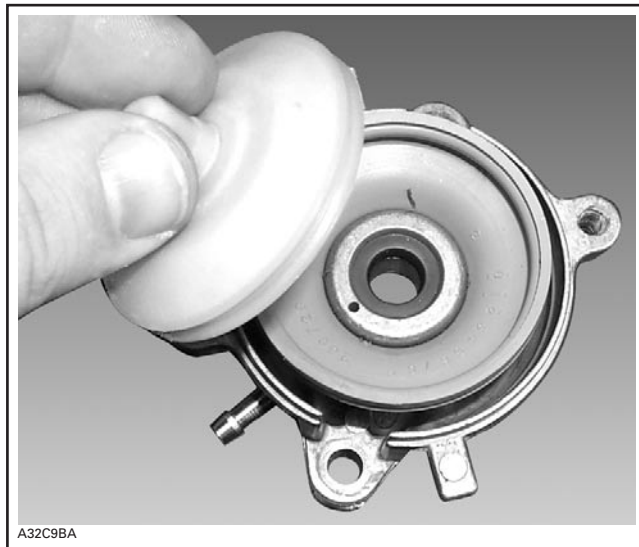
1. Guillotine
2. Gasket
3. Valve piston

Remove spring no. 10 retaining bellows no. 11 to valve piston.

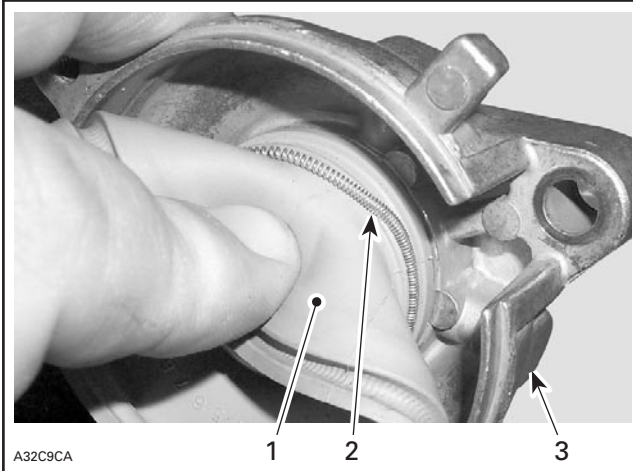


1. Spring
2. Valve piston
3. Bellows

Remove the valve piston.

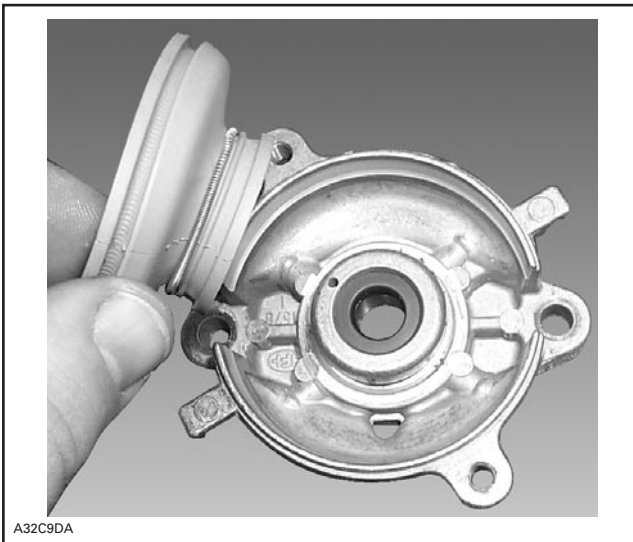


Remove the small spring no. 12 retaining bellows to valve base.



- 1. Bellows
- 2. Small spring
- 3. Valve base

Remove bellows from valve base.

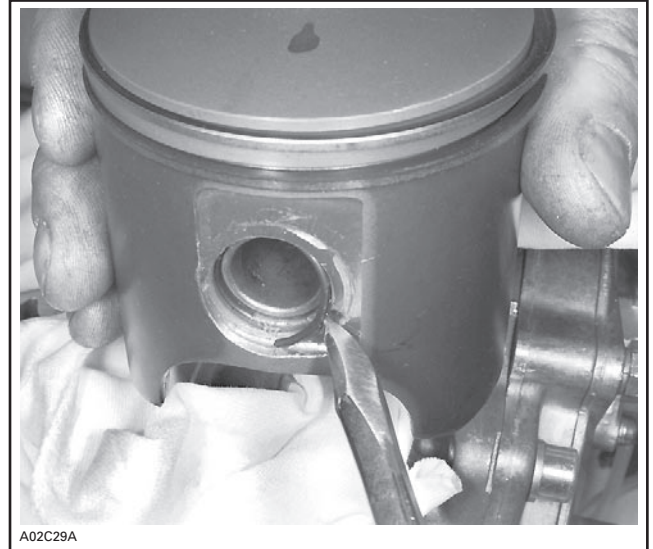


2, Cylinder

Remove spark plugs, coolant outlet no. 30. Unscrew cylinder head cover no. 2 then cylinder head no. 3.

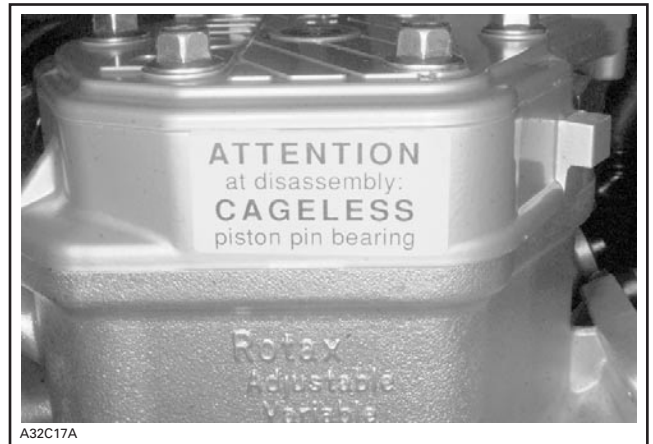
18, Piston

Place a clean cloth or rubber pad (P/N 529 023 400) over crankcase. Then with a pointed tool inserted in piston notch, remove both circlips no. 20 from piston no. 18.



TYPICAL

This engine is equipped with cageless piston pin bearings.



Use piston pin puller (P/N 529 035 503) along with 20 mm sleeve kit (P/N 529 035 542) and locating sleeve.

NOTE: The locating sleeve is the same that contains new cageless bearing.

Section 04 ENGINE

Subsection 04 (593 ENGINE TYPE)

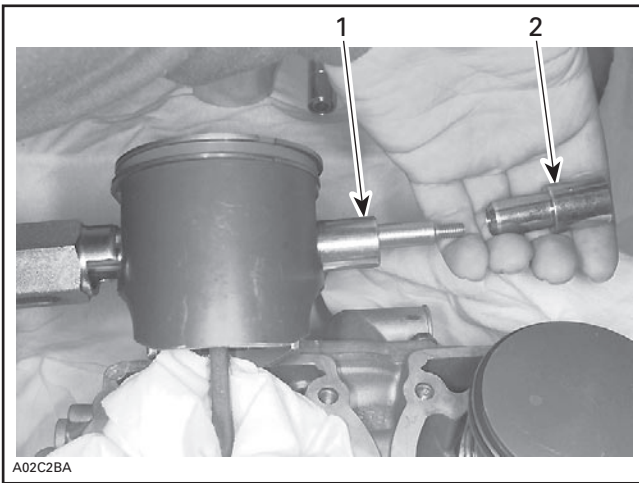
Insert piston pin puller (P/N 529 035 503) making sure it sits squarely against piston.



TYPICAL

1. Properly seated all around

Install sleeve then shouldered sleeve over puller rod.

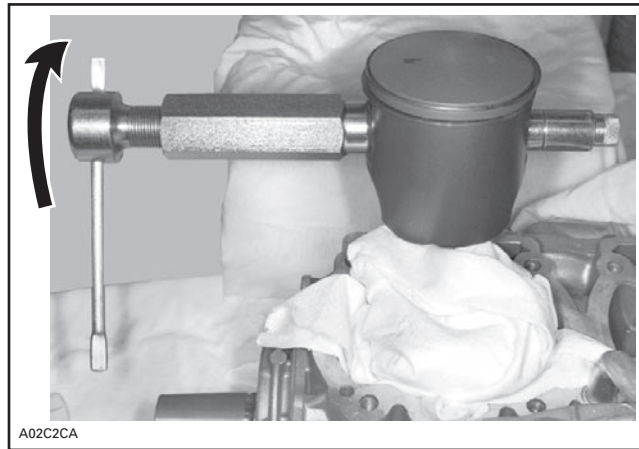


TYPICAL — INSTALLATION OF SLEEVE KIT

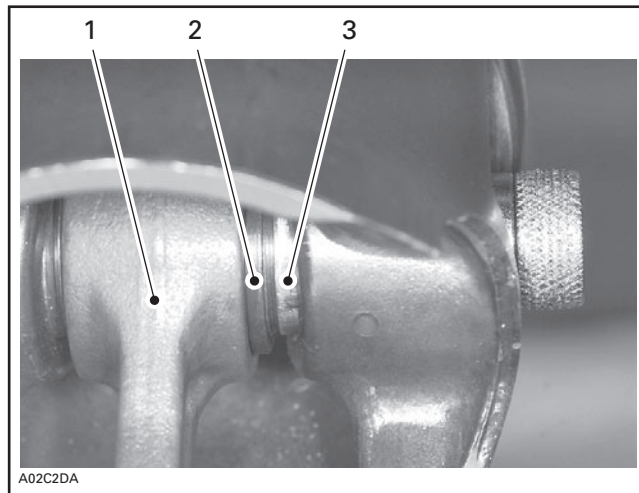
1. Sleeve
2. Shouldered sleeve

Screw (LH threads) extracting nut.

Pull out piston pin **no. 19** by unscrewing puller until shouldered sleeve end is flush with thrust washer of piston pin bearing.



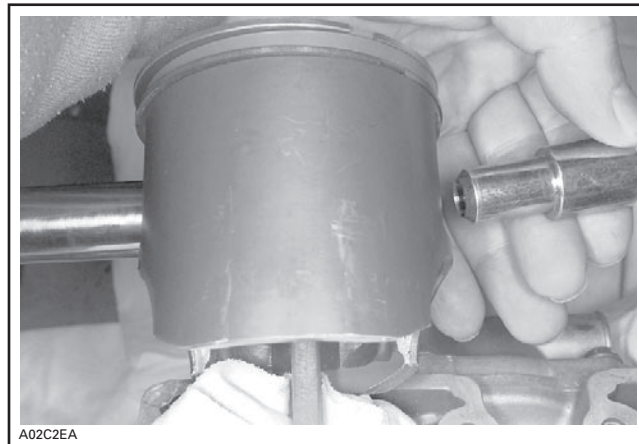
TYPICAL — PISTON PIN EXTRACTION



TYPICAL

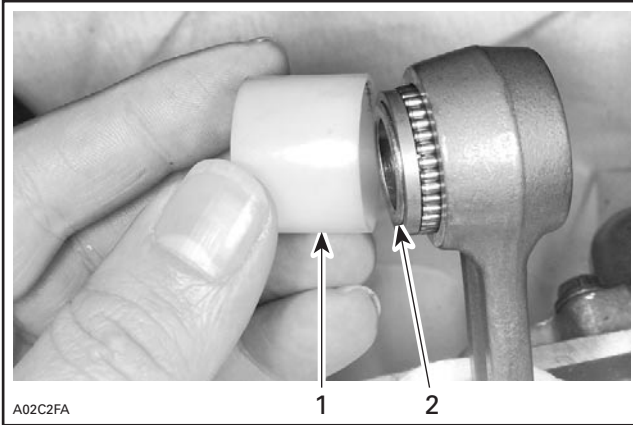
1. Sleeve inside bearing
2. Thrust washer
3. Shouldered sleeve end

Remove puller. Pull out shouldered sleeve carefully.



TYPICAL

Remove piston from connecting rod.
Install locating sleeve. Then push needle bearings along with thrust washers and sleeve.



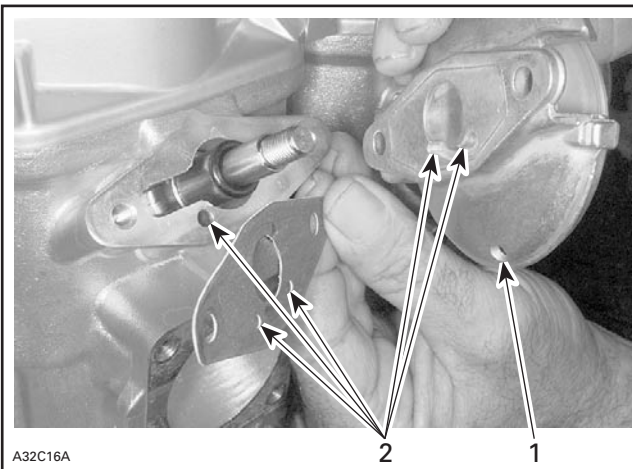
TYPICAL
1. Locating sleeve
2. Sleeve

INSPECTION

NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT.

RAVE System

Check valve rod housing and cylinder for clogged passages.



1. Draining hole
2. Passages

NOTE: Oil dripping from draining hole indicates a loosen spring or damaged bellows.

11, Bellows

Check for cracked, dried or perforated bellows.

8, Spring

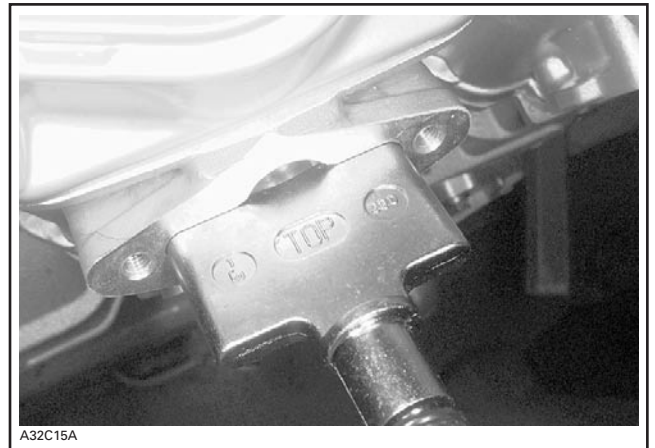
Engine type		593
Spring	P/N	420 239 948
Wire diameter	mm (in)	1.0 (.039)
Free length	mm (in)	38.0 (1.50)
Preload in N (lbf) at compressed length of 14 mm (.551 in)		19.5 (4.38)

ASSEMBLY

RAVE System

Apply sealing compound Dreibond (P/N 420 297 906) in the groove of valve base and in the piston valve groove, then install bellows.

Install RAVE valve with its mention top as illustrated in the following photo.



RAVE VALVE PARTIALLY INSERTED

Tighten red cap no. 6 screw to bottom.

4,18, Cylinder and Piston

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.

Section 04 ENGINE

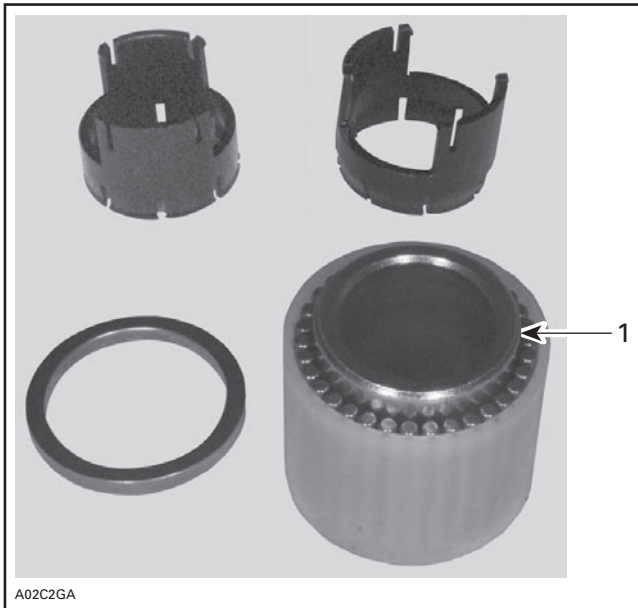
Subsection 04 (593 ENGINE TYPE)

2,3,4, Cylinder Head Cover, Cylinder Head and Cylinder

Check flatness of part sealing surfaces. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT and look for CHECKING SURFACE FLATNESS.

When installing a new cageless bearing, replace half plastic cages with sleeve.

NOTE: 593 engine cageless bearings have 28 needles.



TYPICAL

1. Sleeve

Oil needle bearing with injection oil. Grease thrust washers and install them on each end of needles. Insert cageless bearing into connecting rod.



TYPICAL — CAGELESS BEARING AND SLEEVE INSTALLED

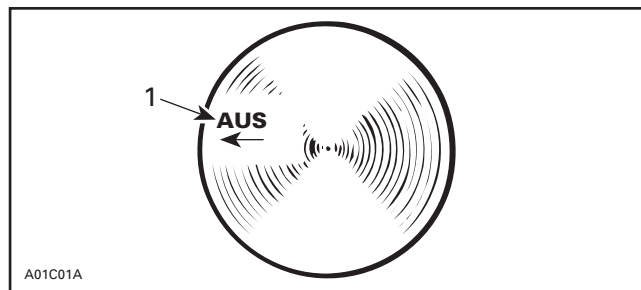
Heat piston using bearing heater (P/N 529 035 969).



TYPICAL

CAUTION: Piston temperature must not exceed 46°C (115°F). Never use direct flame to heat the piston and never freeze the pin. Inappropriate heating procedure/s may damage the piston.

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



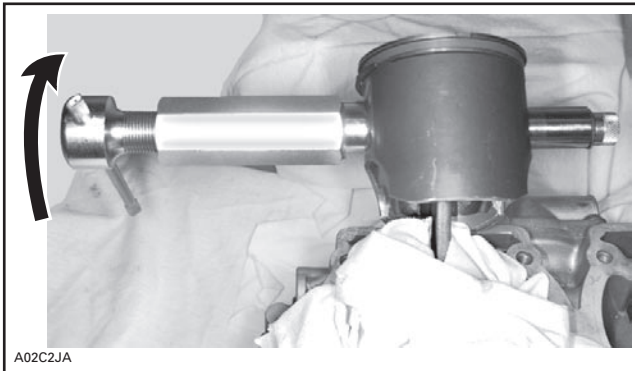
1. Exhaust

Install shouldered sleeve.



TYPICAL — SHOULDERED SLEEVE INSTALLATION

Install piston pin puller and turn handle until piston pin is correctly positioned in piston.



TYPICAL

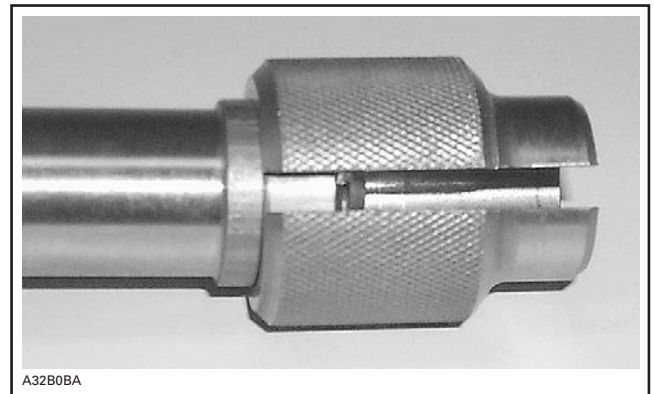
ENGINE TYPE	PISTON CIRCLIP INSTALLER (P/N)
593	529 035 686

Use circlip installer (P/N 529 035 686) to install new mono-hook circlips no. 20.

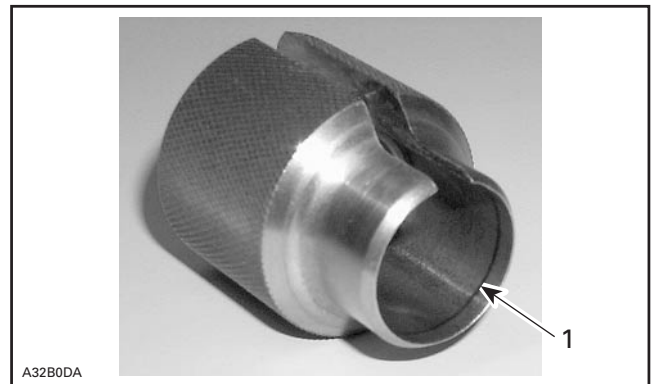
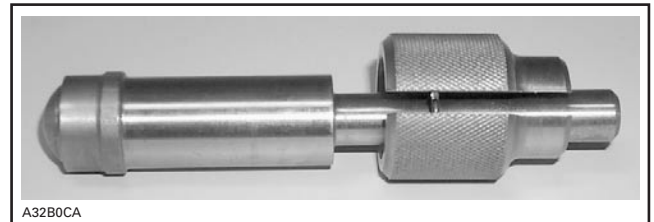
Insert circlip into support in such a way that when installed in piston groove, the tab will face upward.



With round end of pusher, position circlip perpendicular to the support axis.



With the other end of the pusher, push circlip into the support groove.



1. Groove

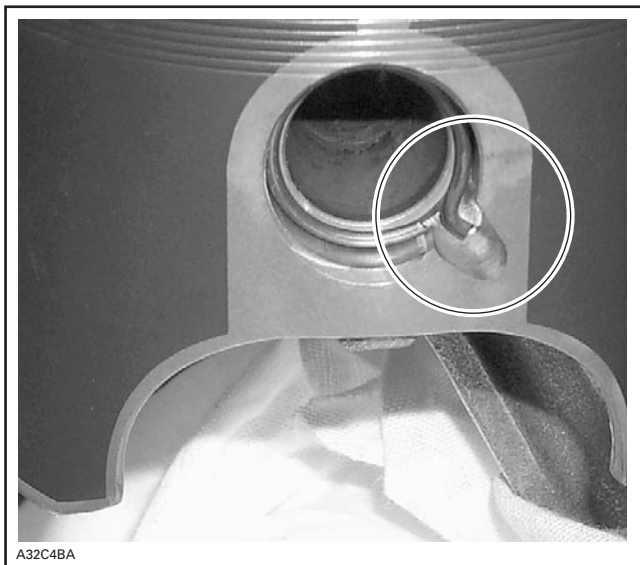
Section 04 ENGINE

Subsection 04 (593 ENGINE TYPE)



CIRCLIP READY TO BE INSTALLED ON PISTON

Using a plastic hammer, tap pusher to insert circlip in place. Take care to install new circlips with tab toward top as per following photo.



TAB TOWARD TOP

CAUTION: Always install new mono-hook circlips. If circlip installation fails at the first attempt, always retry with a new one as on a second attempt circlip will lose its normal retaining capabilities.

CAUTION: Circlips must not move freely after installation; if so, replace them.

Clean cylinders and crankcase mating surfaces with Loctite Chisel (P/N 413 708 500).

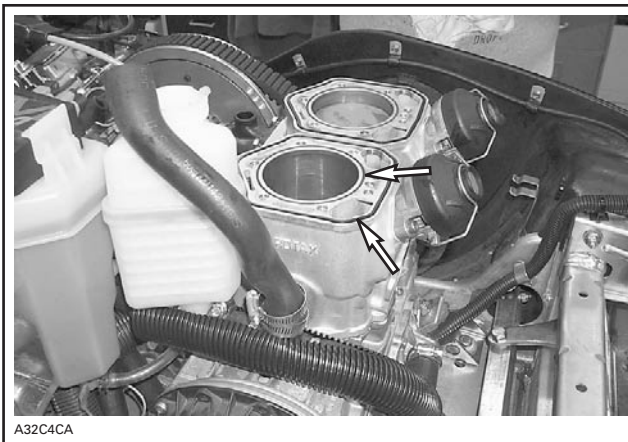
Coat crankcase mating surface with Loctite 518 (P/N 293 800 038). Choose the right gasket thickness according to combustion chamber volume. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT. Install it on crankcase. Coat gasket with Loctite 518.

CAUTION: Always install a gasket of the proper thickness. Failure to do so may cause detonation and severe engine damage.

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

Install cylinders. Do not tighten.

Install new rubber ring and round O-rings on each cylinder.



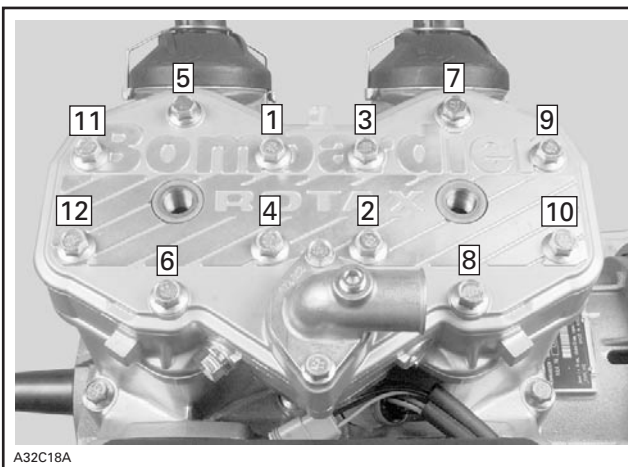
TYPICAL

NOTE: Carefully clean screws before reinstallation, specifically under screw head.

Install exhaust manifold with gaskets. Do not tighten yet.

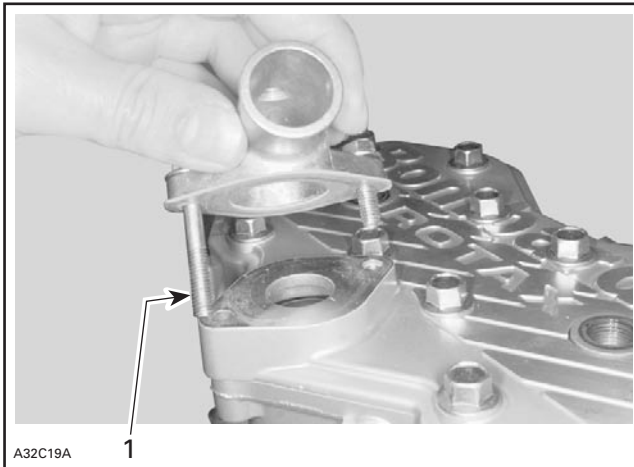
At assembly, torque cylinder head screws to 29 N•m (21 lbf•ft) in the following illustrated sequence.

Tighten exhaust manifold bolts to 23 N•m (17 lbf•ft) in a criss-cross sequence.



TYPICAL

Apply Loctite 243 (P/N 293 800 060) on screws threads. Install outlet socket and tighten screws to 12 N•m (106 lbf•in). Note position of longer screw.



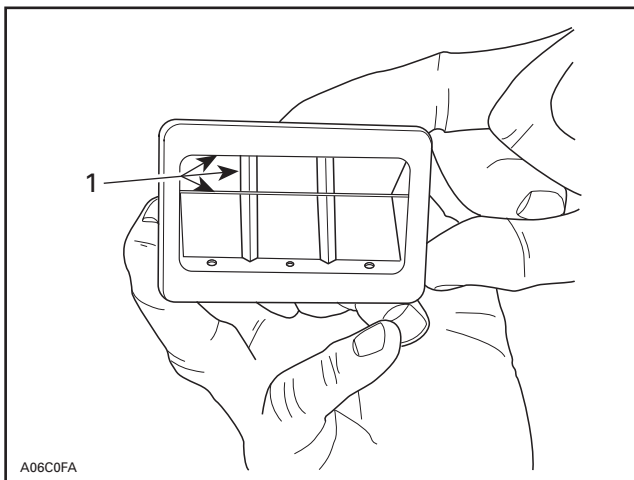
1. Longer screw

17, Reed Valve

Blades have a curved shape. Install with their curve facing reed block.

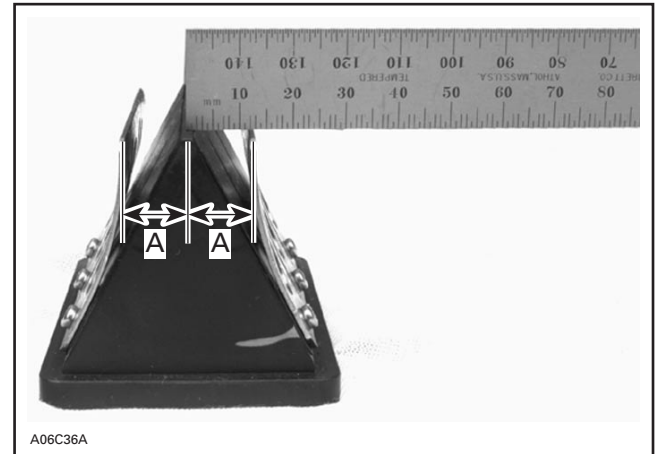
With blade stopper **no. 16** removed, check reed valve for proper tightness. There must be no play between blade and valve body when exerting a finger pressure on blade at blade stopper location.

In case of a play, turn blade upside down and re-check. If there is still a play, replace blade and/or valve body.



1. No play

Check distance from blade stopper inner edge and distance from center of reed valve block.



TYPICAL

A. 14.75 - 0, + 0.75 mm (.580 - 0, + .030 in)

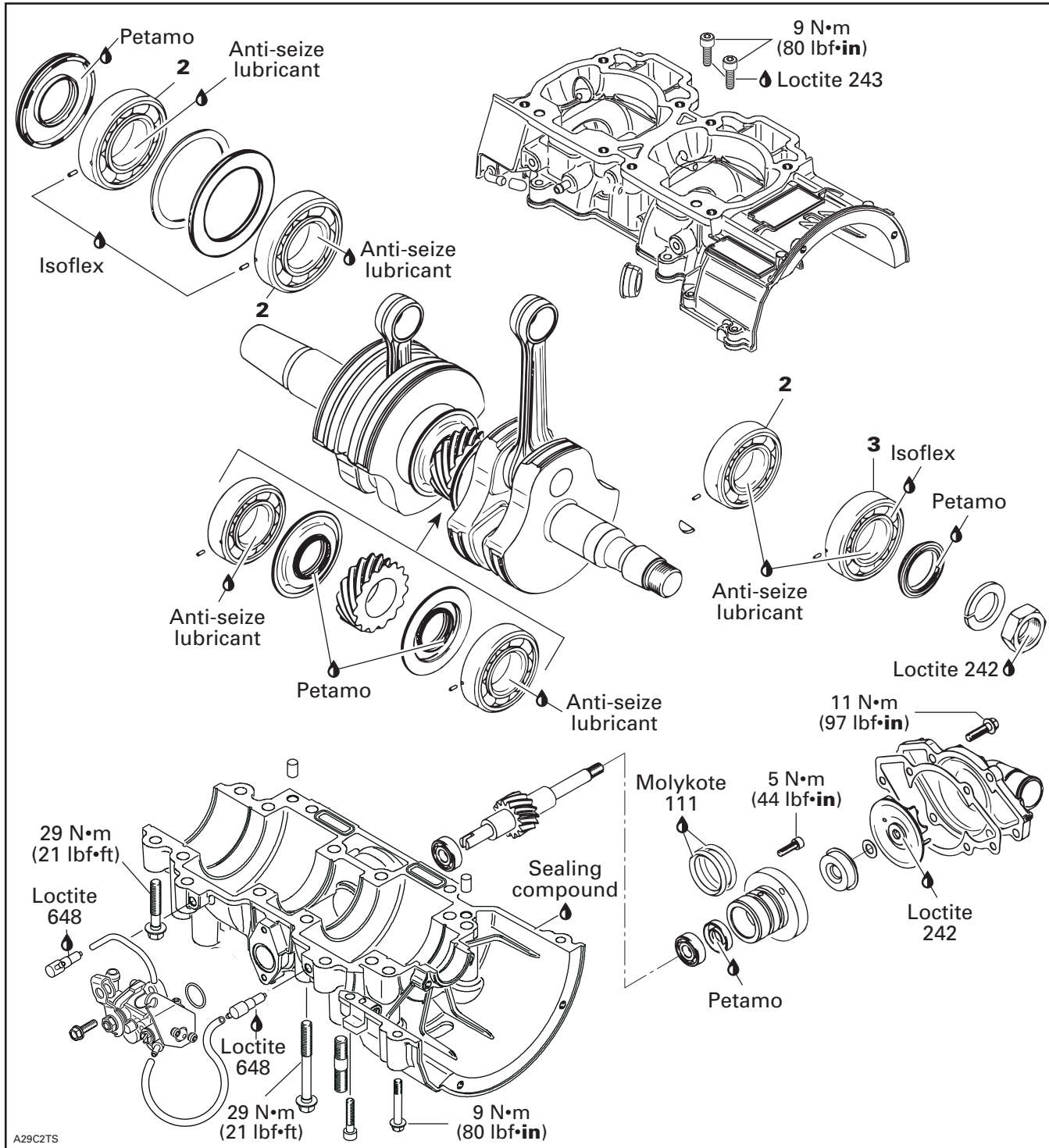
Bent blade stopper as required to obtain the proper distance.

Blade stoppers may slightly interfere with cylinder during installation. Adjusted distance will be reduced automatically upon installation.

Section 04 ENGINE

Subsection 04 (593 ENGINE TYPE)

BOTTOM END



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

CLEANING

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

Clean all metal components in a non-ferrous metal cleaner. Use gasket remover (P/N 413 708 500) accordingly.

Remove old paste gasket from crankcase mating surfaces with gasket remover (P/N 413 708 500).

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

DISASSEMBLY

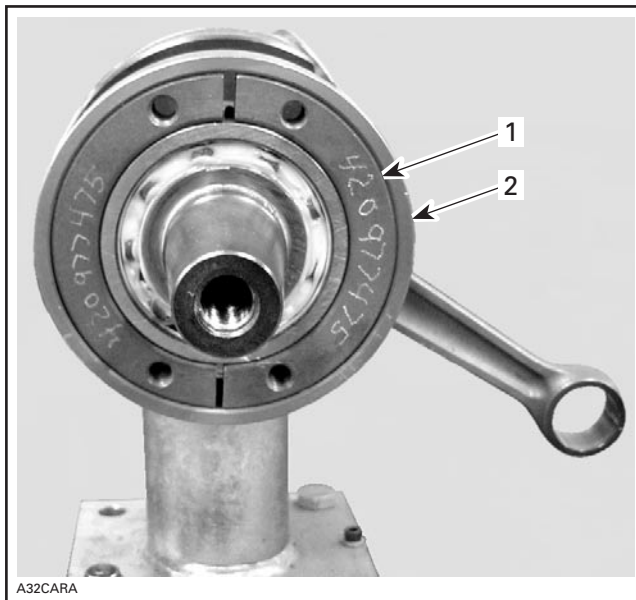
General

To remove drive pulley, refer to DRIVE PULLEY.

To remove magneto, refer to CDI SYSTEM.

2,3, Crankshaft Bearing

To remove PTO side bearings **no. 3** from crankshaft, install half rings (P/N 420 977 475) and puller ring (P/N 420 977 490) on the bearing.



1. Half ring
2. Puller ring

Apply synthetic grease (P/N 413 711 500) on the crankshaft end and install protective cap (P/N 420 876 552).

Using screws (P/N 420 840 681) Install bearing puller (P/N 420 877 635) on the half rings.

Secure the bearing puller in a vise by one of its rib.



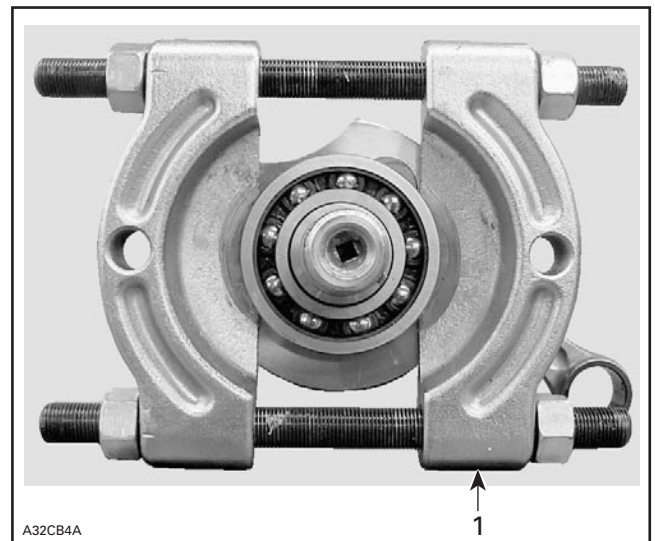
BEARING PULLER SECURED IN THE VISE

CAUTION: Never use any air impact tool for tightening the puller bolt.

Lubricate the puller bolt and then proceed with tightening the puller bolt until the bearing comes out.

Follow the same procedure for the inner PTO side bearing.

NOTE: In the case of damaged bearing or less clearance between crankshaft counterbalance and the bearing or on the MAG side bearing, use bearing separator (Snap-On tool P/N CJ951 or SPX/OTC tool P/N 1124) to facilitate the removal.



1. Bearing separator

Procedure for MAG side bearings **nos. 2 and 3** is same as of PTO side with the exception of protective cap (P/N 420 876 557).

Section 04 ENGINE

Subsection 04 (593 ENGINE TYPE)

INSPECTION

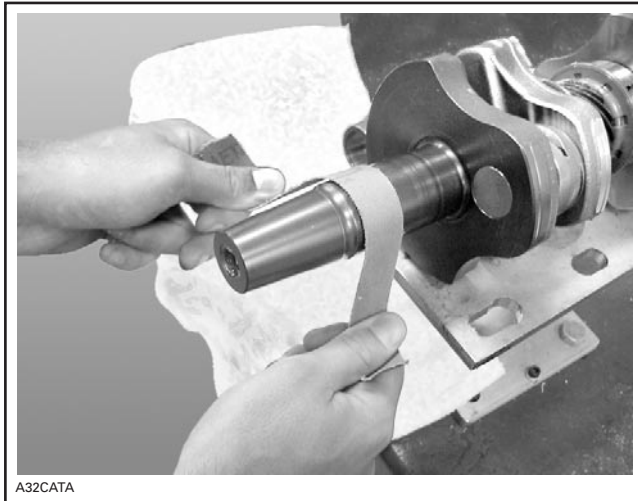
NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT.

ASSEMBLY

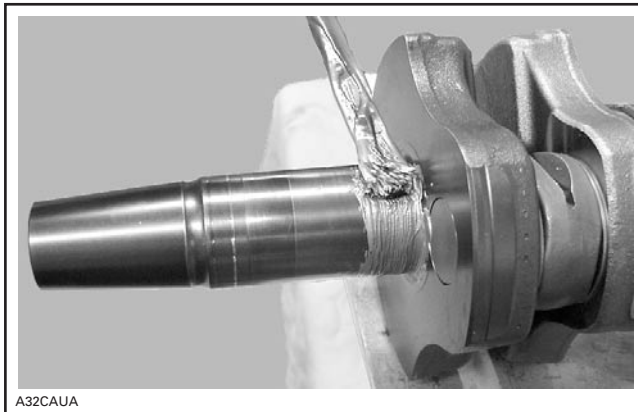
Coat lip of all seals with Petamo grease (P/N 420 899 271).

2, Crankshaft Bearing

Clean crankshaft end with sand paper no. 180 and remove all residue using pulley flange cleaner (P/N 413 711 809).



Smear anti-seize lubricant (P/N 413 701 000) on part of crankshaft where bearing fits.



Heat up the bearing(s) using bearing heater (P/N 529 035 969). This will expand bearings and ease installation. If required, put a suitable plate or shim to avoid the direct contact between integrated seal and the heating surface.



CAUTION: Bearing should not be heated to more than 80°C (176°F). Do not heat bearing with direct flame or heat gun or heated oil. Inappropriate heating procedure(s) may cause inner seal failure.

Turn bearing(s) several times during heating process for heating it/them properly.

NOTE: Normally it takes approximately 10 minutes to heat up a bearing. So, in the event of replacing a bearing, it is recommended to start heating it prior to removal. Two bearings can be heated at the same time on one bearing heater.



1. Bearings

Probe the inner race of the bearing with the temperature indicator stick (P/N 529 035 970). Stick will liquefy when the bearing reach the proper temperature.



⚠ WARNING

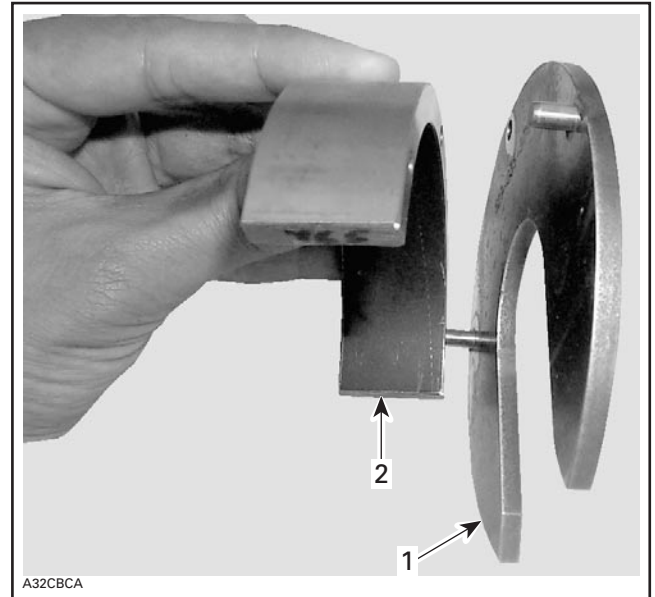
Do not touch heated bearing with bare hands. Wear heat resisting gloves before handling the heated bearing(s).

Slide in the inner PTO bearing with the integrated seal facing crankshaft. Push bearing to end position.



Install the O-rings.

Make a bearing locator tool using support plate (P/N 529 035 976) and distance gauge (P/N 529 035 966).



1. Support plate
2. Distance gauge

Install bearing locator tool.



Slide in the heated outer PTO bearing onto the crankshaft.



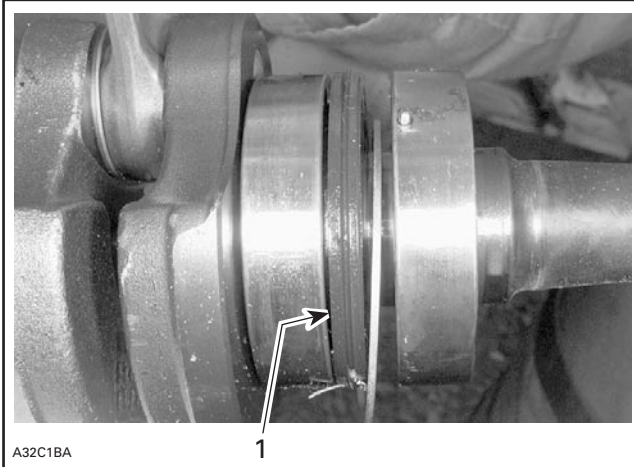
Section 04 ENGINE

Subsection 04 (593 ENGINE TYPE)

Install the MAG side heated bearing.

CAUTION: Use only the recommended Isoflex grease. Make sure not to push Isoflex grease between outside bearing race and half crankcase.

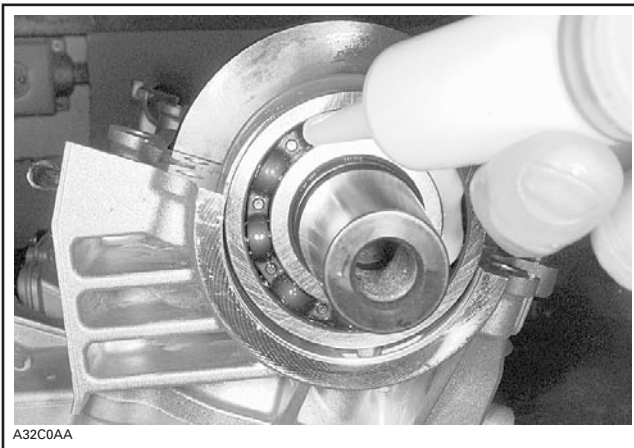
NOTE: The 50 g tube corresponds to 50 cc of grease. Fill PTO side inner seal with Isoflex grease.



1. PTO side inner seal filled with Isoflex grease

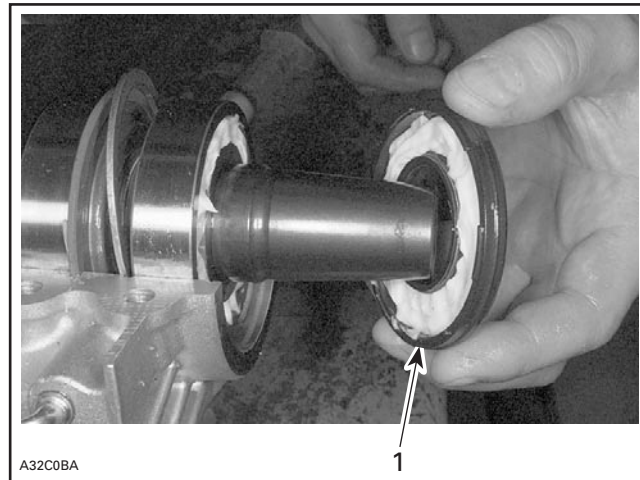
Put 43 to 47 mL of grease in a syringe.

With the syringe, fill the outer ball bearing with grease.



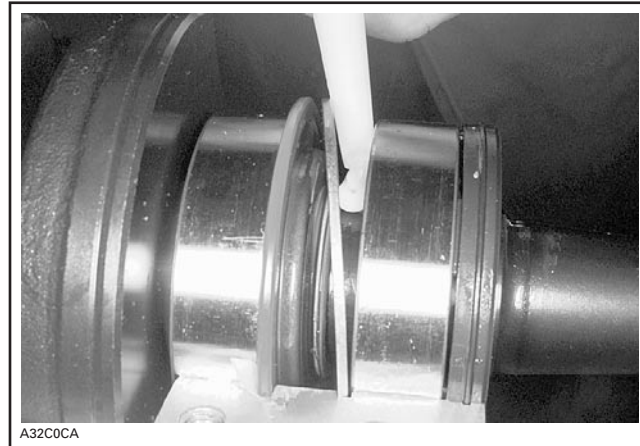
BALLS COATED WITH A SEAM OF GREASE

Coat inner side of seal and set it in place.

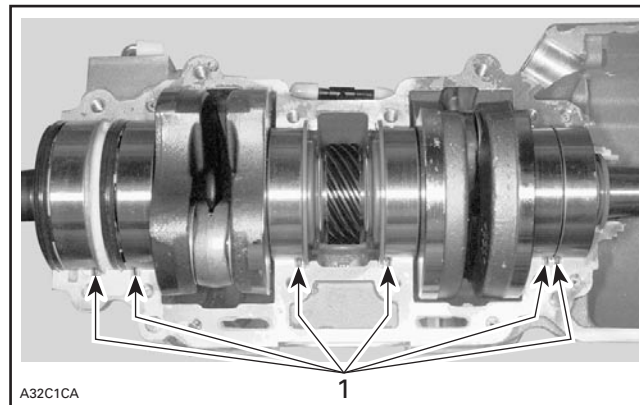


1. Fill with grease and set in place

Use the remaining grease to coat the inner side of the ball bearing.

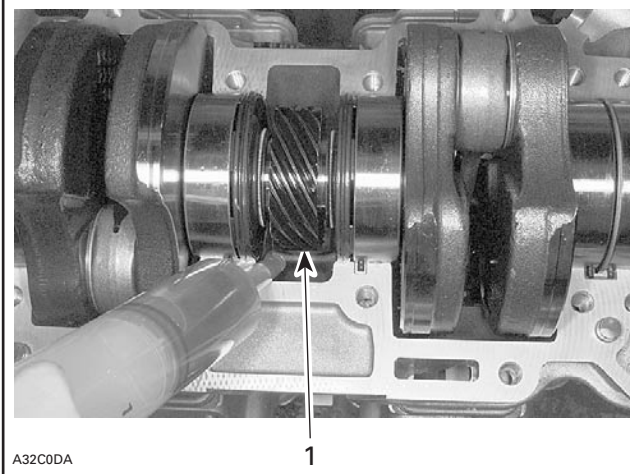


Apply 6 mL of grease to MAG side outer bearing. At crankshaft installation, position drive pins as illustrated.



1. Position pins

Drop 50 mL (2 U.S. oz) of injection oil in the pan under central gear to lubricate pump gearing as per photo.



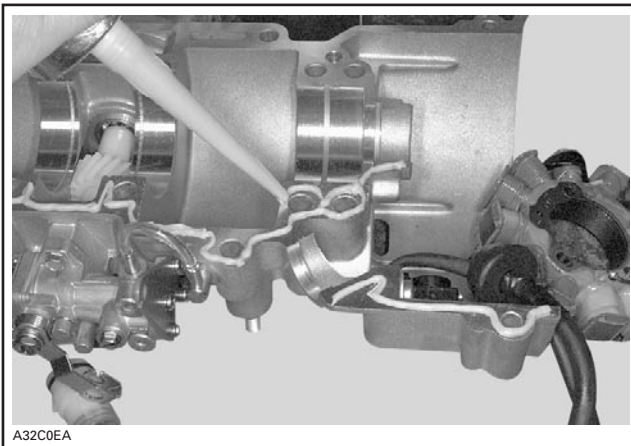
1. Oil bath

Crankcase Assembly

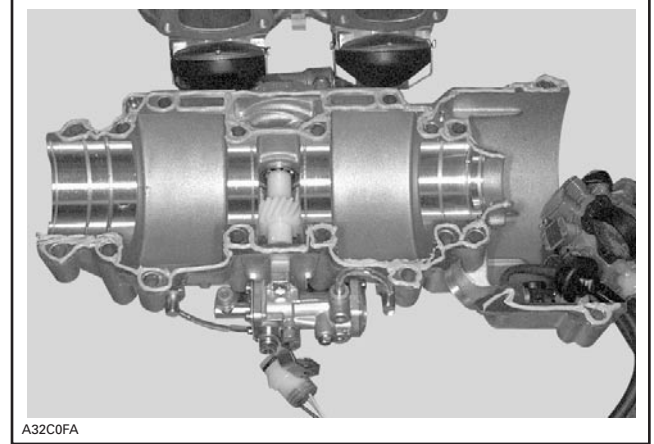
IMPORTANT: The total assembly sequence, including sealing compound spreading, screwing and torquing of bolts according to the proper sequence must be performed within 10 minutes.

Before screwing both parts of crankcase, seal it with a sealing compound (P/N 420 297 905). Make sure surfaces are clean and degreased before applying sealing compound.

Spread a seam of 1.2 mm (1/16 in) maximum in diameter on surface of lower crankcase half.



As far as possible, sealing compound must be applied in one run to avoid any risks of leaking through the crankcase.



SEAMING COMPLETED — CONTACT SURFACES COVERED AND SCREW HOLES SURROUNDED

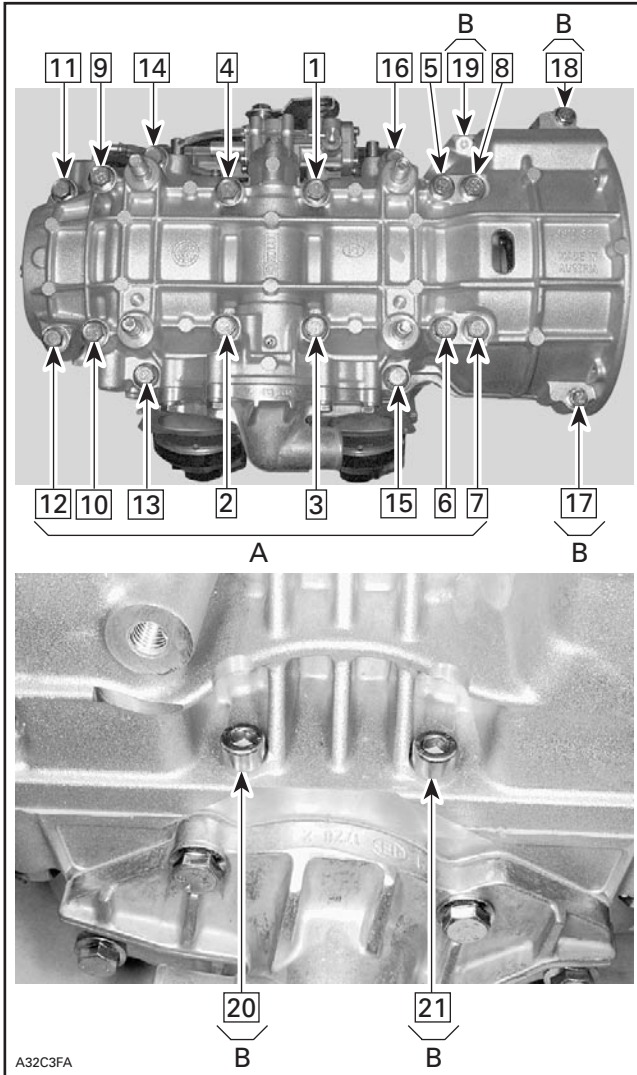
Screw the 4 central bolts to squeeze compound between crankcase halves before it starts to dry.

NOTE: Sealing compound spreading plus screwing of engine central four bolts must be performed within 2 minutes to ensure a good sealing and avoid linking.

Section 04 ENGINE

Subsection 04 (593 ENGINE TYPE)

Screw all crankcase bolts in place in the following sequence and to the appropriate torque through a two steps torquing: first, screw bolts up to 60% of the final torque (18 N•m (13.5 lbf•ft) for most of the bolts), then, tighten to the required torque (i.e. 29 N•m (21 lbf•ft)).



- A. Torque bolts 1 through 16 to 29 N•m (21 lbf•ft)
B. Torque bolts 17 through 21 to 9 N•m (80 lbf•in)

BREAK-IN

After rebuilding an engine always observe a break-in period as described in *Operator's Guide*.

LEAK TEST AND ENGINE DIMENSION MEASUREMENT

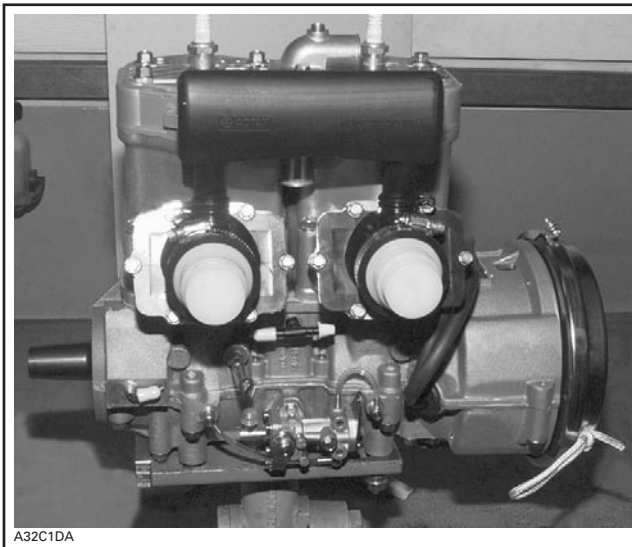
LEAK TEST

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 pump shaft oil gear reservoir.

On FC twin-cylinder engines, each cylinder cannot be verified individually due to leakage from one cylinder to the other through labyrinth sleeve in center of crankshaft.

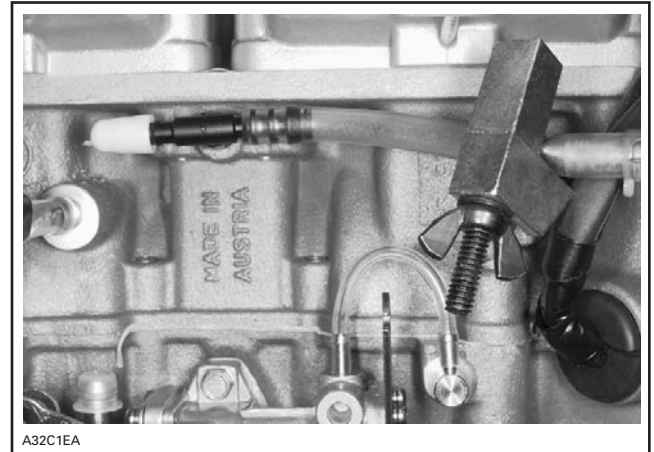
PREPARATION

1. Remove tuned pipe.
2. Install plug over exhaust manifold.
3. Remove carburetors.
4. Insert plugs in intake rubber boots. Tighten with clamps already there.



5. Using a hose pincher (P/N 295 000 076), block impulse hose.

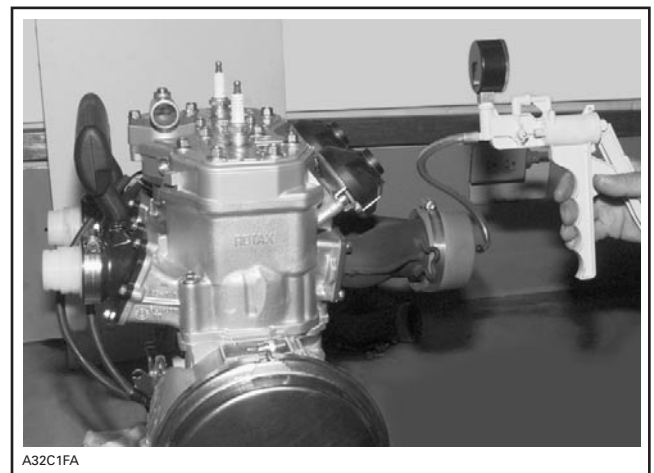
6. Using hose pinchers (P/N 295 000 076), block pump shaft oil hose and lubrication nipple on PTO side.



7. Install air pump on 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.



Section 04 ENGINE

Subsection 05 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

8. Activate pump and pressurize engine to 34 kPa (5 PSI). Do not exceed this pressure.
9. Engine must stand this pressure during 3 minutes. If pressure drops before 3 minutes, check tester kit by spraying a soapy solution on pump cylinder, 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 this chapter.

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

**TEST PRESSURE: 34 kPa (5 PSI)
FOR 3 MINUTES**

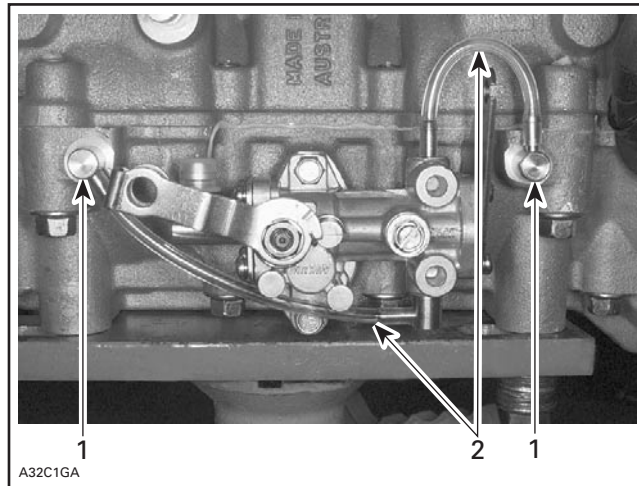
- If there is a leak at the tested location, it is recommended to continue testing next items before overhauling engine. There is a possibility of more than one leak.
- If there is no leak at the tested location, continue pumping to maintain pressure and continue with next items until leak is found.

Engine

Check the following:

1. All jointed surfaces and screw/stud threads of engine:
 - spark plug base, insulator
 - cylinder head
 - RAVE valve bellows, piston and housing
 - cylinder
 - crankcase halves (joint)
 - oil injection pump mounting flange (O-ring, seal)
 - coolant pump housing
 - bleed screws/plugs.

2. Small injection oil lines coming from pump.



1. Injection nipples
2. Small injection oil lines

Check for air bubbles or oil column going toward pump. It indicates defective check valve in injection nipples.

3. Remove cooling system cap.

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

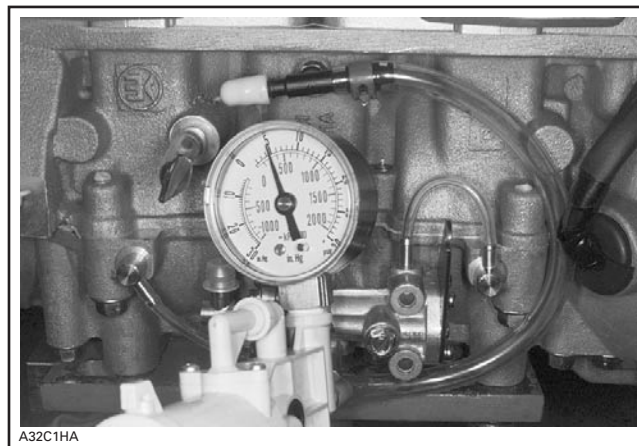
4. Remove drive pulley then check crankshaft outer seal.

5. Remove rewind starter and magneto system then check crankshaft outer seal.

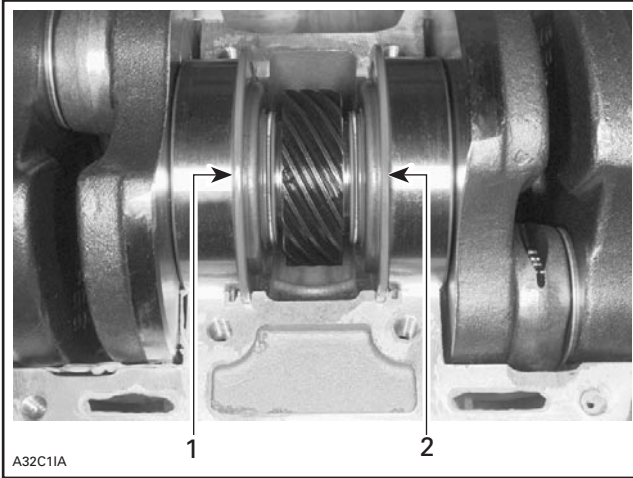
6. Check pump shaft gear oil reservoir.

Pump Shaft Oil Gear Reservoir

Install air pump on adapter and pressurize as before.



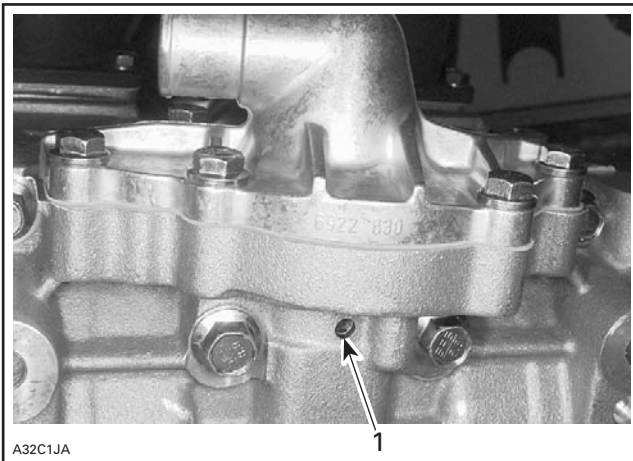
If pressure drops, it indicates a defective crankshaft inner seal.



CRANKSHAFT INSTALLED IN UPPER HALF CRANKCASE

- 1. Crankshaft inner seal on PTO side
- 2. Crankshaft inner seal on MAG side

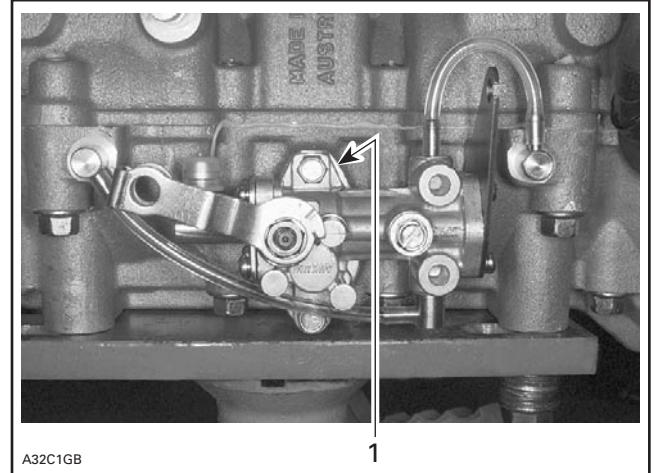
- 1. Check leak indicator hole below coolant pump housing with soapy water.



- 1. Leak indicator hole

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

- 2. Leaks can be also on oil pump side. Check mounting area for leaks.



- 1. Check mounting area

- 3. 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 lead to leakage.

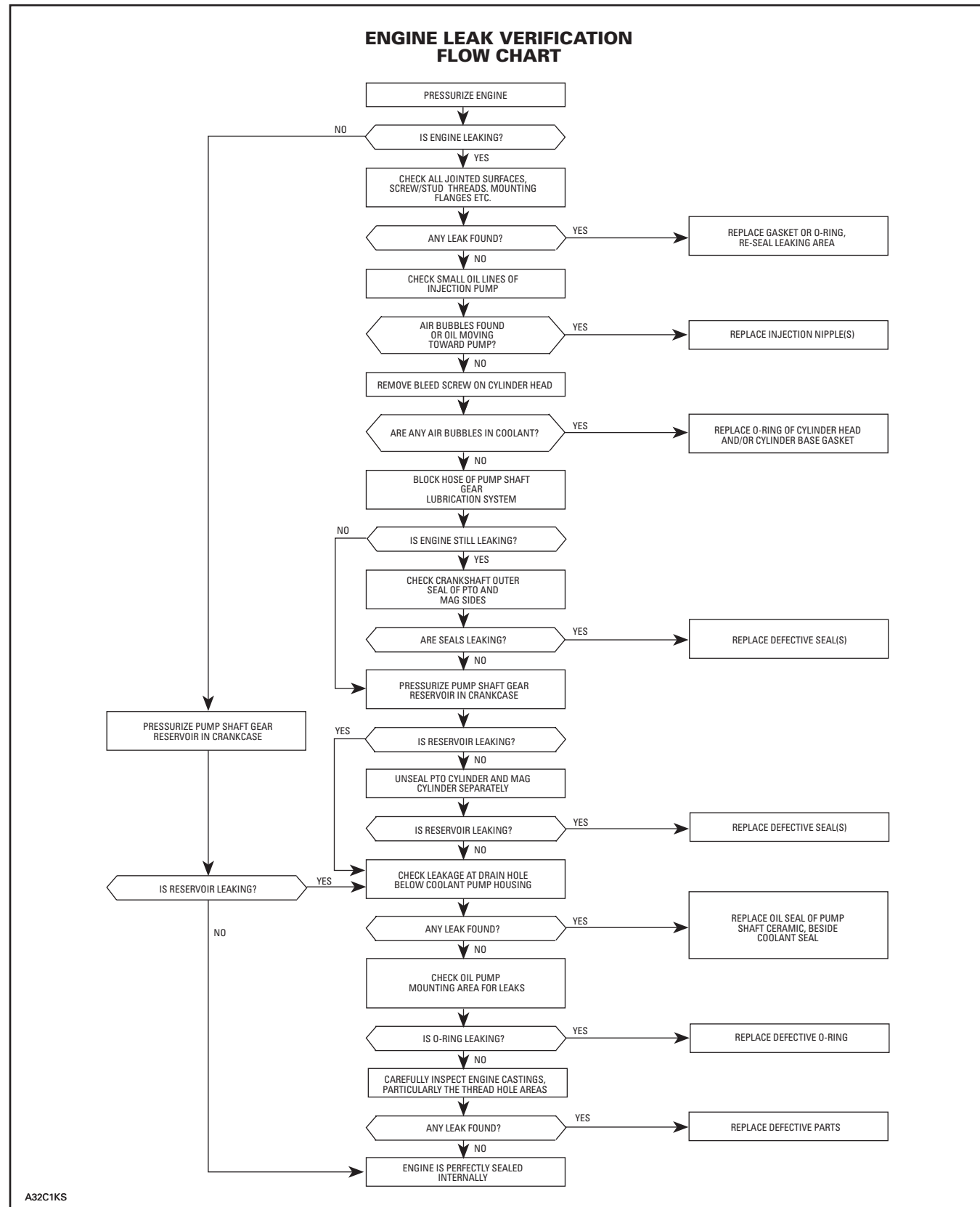
FINALIZING REASSEMBLY

After reassembling engine, always recheck for leakage.

Section 04 ENGINE

Subsection 05 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

ENGINE LEAK VERIFICATION FLOW CHART



ENGINE DIMENSION MEASUREMENT

This section covers all engine types.

CYLINDER HEAD WARPAGE

ENGINE TYPE	MAXIMUM
All	0.05 mm (.002 in) per 50 mm (2 in) of surface
	0.5 mm (.020 in) for total length of cylinder head

Check gasketed surface of the cylinder head with a straightedge and a feeler gauge.

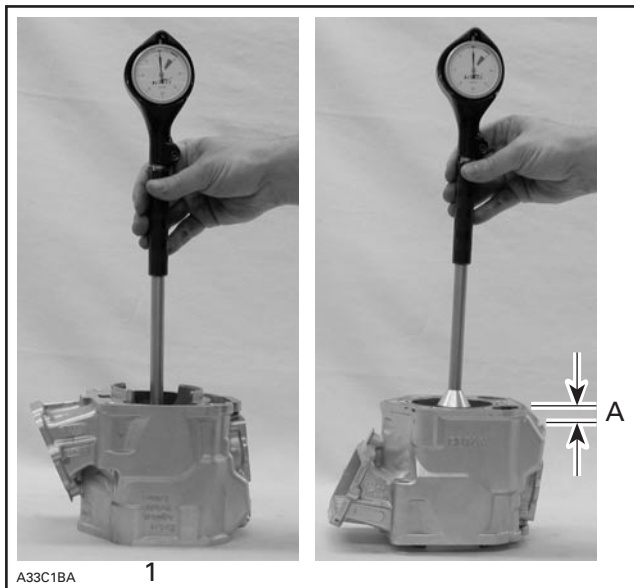
CYLINDER TAPER

ENGINE TYPE	MAXIMUM
All	0.10 mm (.004 in)

Compare cylinder diameter 16 mm (5/8 in) from top of cylinder to just below its intake port area.

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.



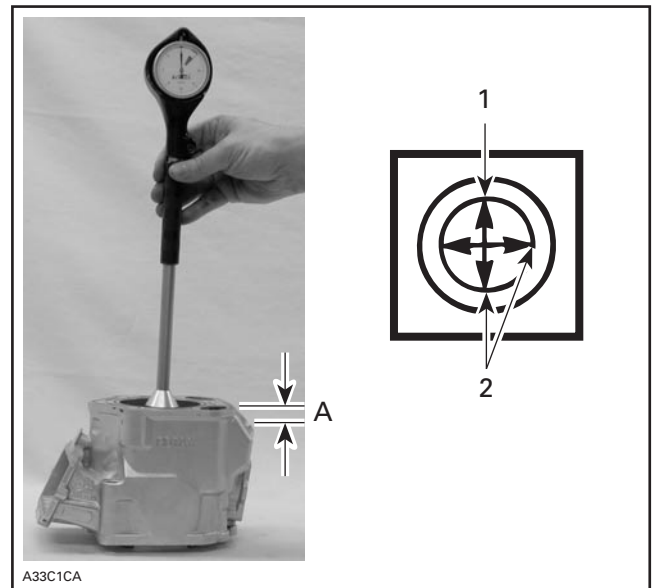
1. Below the intake port
A. 16 mm (5/8 in) from top

CYLINDER OUT OF ROUND

ENGINE TYPE	MAXIMUM
All	0.08 mm (.003 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.

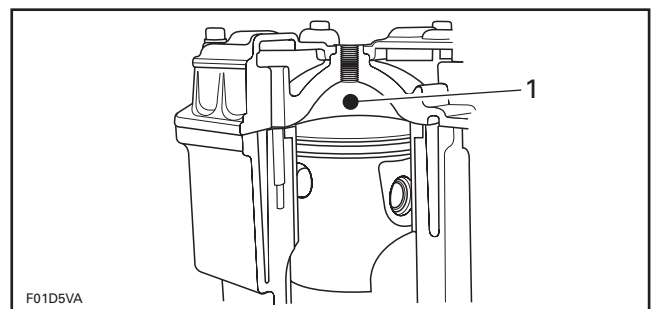
NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.



1. Piston pin position
2. Measures to be compared
A. 16 mm (5/8 in)

COMBUSTION CHAMBER VOLUME MEASUREMENT

The combustion chamber volume is the region in the cylinder head above the piston at Top Dead Center. It is measured with the cylinder head installed on the engine.



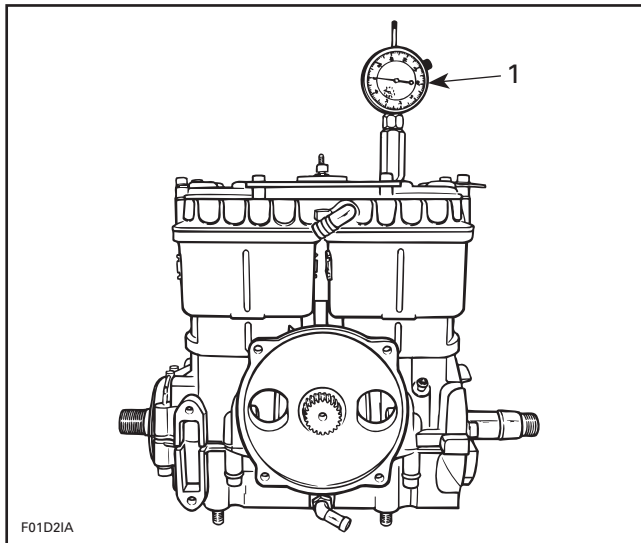
1. Combustion chamber

Section 04 ENGINE

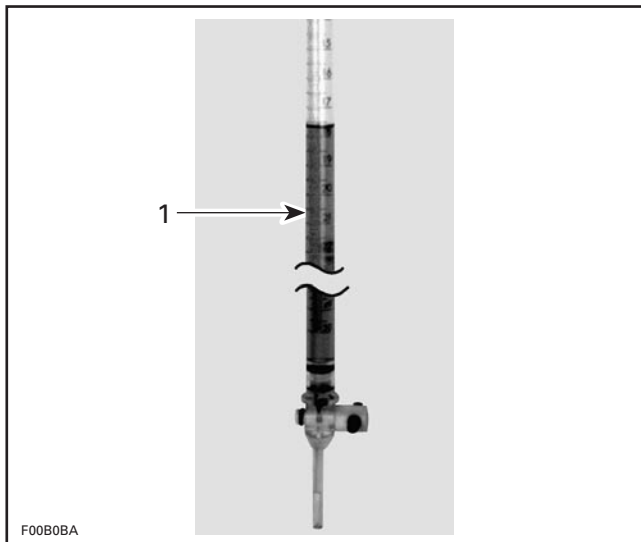
Subsection 05 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

NOTE: When checking the combustion chamber volume, engine must be cold, piston must be free of carbon deposit and cylinder head must be leveled.

1. Remove both spark plugs and bring one piston to Top Dead Center using a TDC gauge.

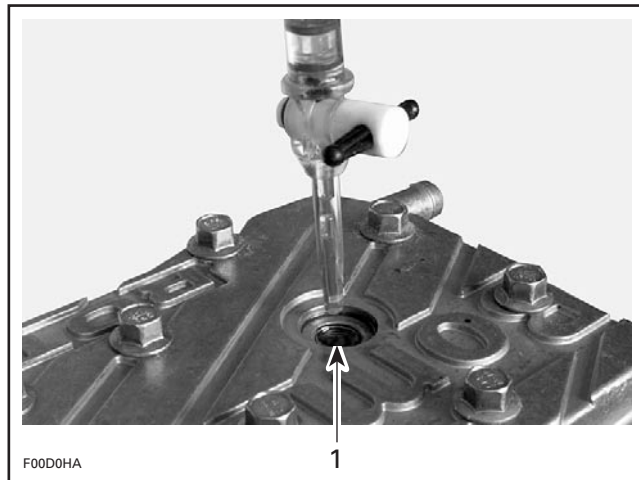


1. Bring piston to TDC
2. Remove cylinder head.
3. Seal piston ring gap with a small amount of grease.
4. Reinstall cylinder head.
5. Obtain a graduated burette (capacity 0-50 cc) and fill with an equal part (50/50) of gasoline and injection oil.



1. Graduated burette (0-50 cc)

6. Open burette valve to fill its tip. Add liquid in burette until level reaches 0 cc.
7. Inject the burette content through the spark plug hole until liquid touches the top of the spark plug hole.



1. Top of spark plug hole

NOTE: The liquid level in cylinder must not drop for a few seconds after filling. If so, there is a leak between piston and cylinder. The recorded volume would be false.

8. Let burette stand upward for about 10 minutes, until liquid level is stabilized.
9. Read the burette scale to obtain the quantity of liquid injected in the combustion chamber.

NOTE: When the combustion chamber is filled to top of spark plug hole, it includes an amount of 2.25 cc corresponding to the spark plug well.

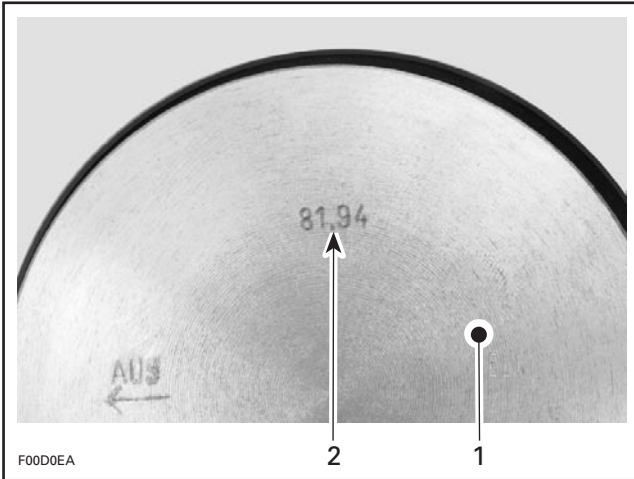
10. Repeat the procedure for the other cylinder.

ENGINE TYPE	COMBUSTION CHAMBER VOLUME (cc) (up to top thread of spark plug hole)
443	24.0 ± 1.0
552	34.43 ± 1.2
593	28.97 ± 1.2

Install a thicker or thinner cylinder/crankcase gasket (refer to *Parts Catalogs*) in order to obtain the specified combustion chamber volume.

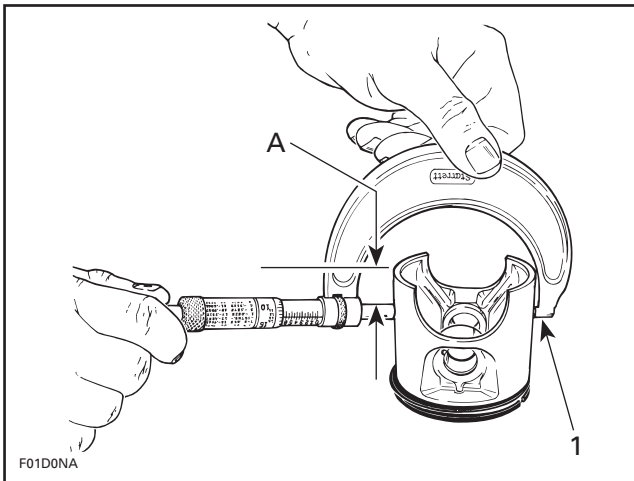
USED PISTON MEASUREMENT

Note the measurement on the piston dome.



- 1. Piston dome
- 2. Piston measurement

Using a micrometer, measure piston at A perpendicularly (90°) to piston pin.



- 1. Measuring perpendicularly (90°) to piston pin axis
- A. 15 mm (.590 in)

ENGINE TYPE	MAXIMUM PISTON SKIRT WEAR mm (in)
All	0.15 (.006)

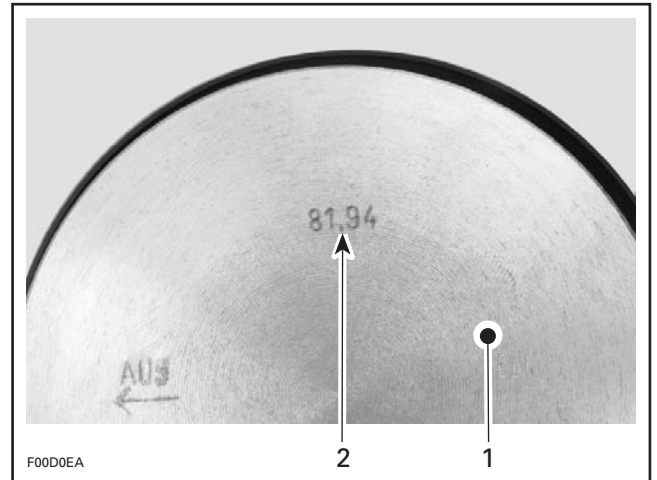
The measured dimension must not be less than 0.15 mm (.006 in) of the one scribed on piston dome. Otherwise, install a new piston.

CYLINDER/PISTON CLEARANCE

Used and New Pistons

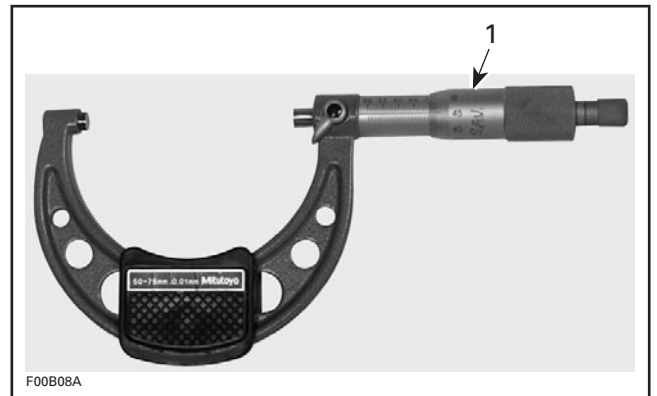
NOTE: Make sure used piston is not worn more than specified. See USED PISTON MEASUREMENT above.

Take the measurement on the piston dome.



- 1. Piston dome
- 2. Piston measurement

Adjust and lock a micrometer to the specified value on the piston dome.

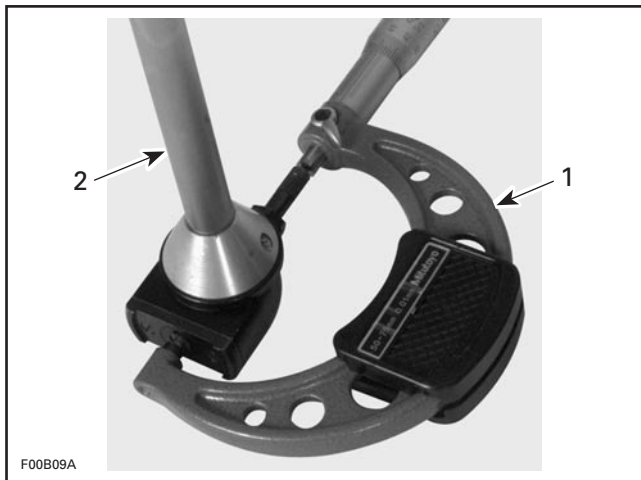


- 1. Micrometer set to the piston dimension

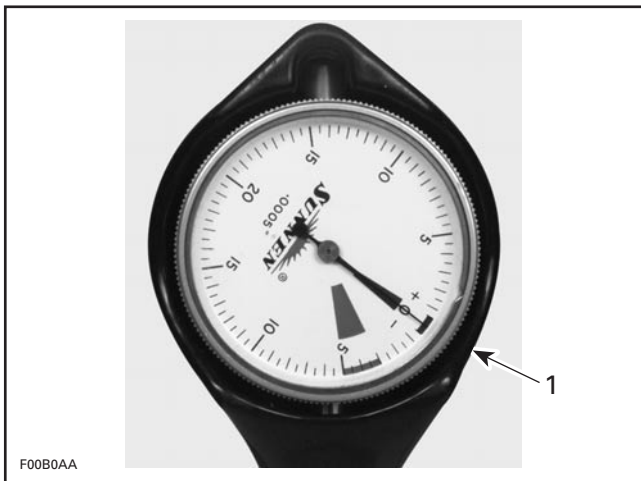
With the micrometer set to the piston dimension, adjust a cylinder bore gauge to the micrometer dimension and set the indicator to 0.

Section 04 ENGINE

Subsection 05 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

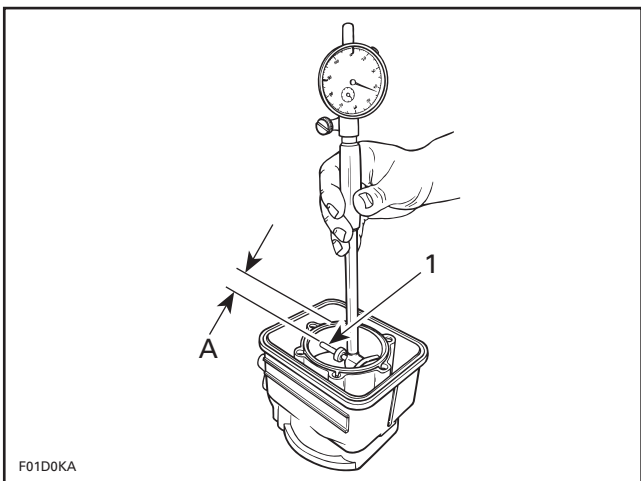


1. Use the micrometer to set the cylinder bore gauge
2. Dial bore gauge



1. Indicator set to 0 (zero)

Position the dial bore gauge at 16 mm (5/8 in) below cylinder top edge.



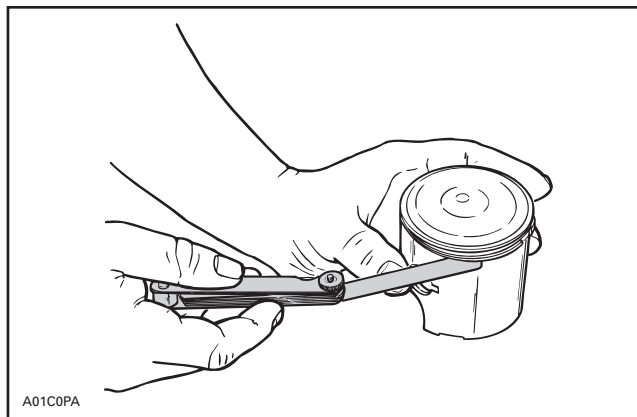
1. Measuring perpendicularly (90°) to piston pin axis
- A. 16 mm (5/8 in)

Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance. If clearance exceeds specified tolerance, replace cylinder or rebore. Refer to TECHNICAL DATA.

NOTE: Make sure the cylinder bore gauge indicator is set exactly at the same position as with the micrometer, otherwise the reading will be false.

RING/PISTON GROOVE CLEARANCE

Using a feeler gauge check clearance between upper compression ring and groove. Replace piston if clearance exceeds specified tolerance. Refer to TECHNICAL DATA.

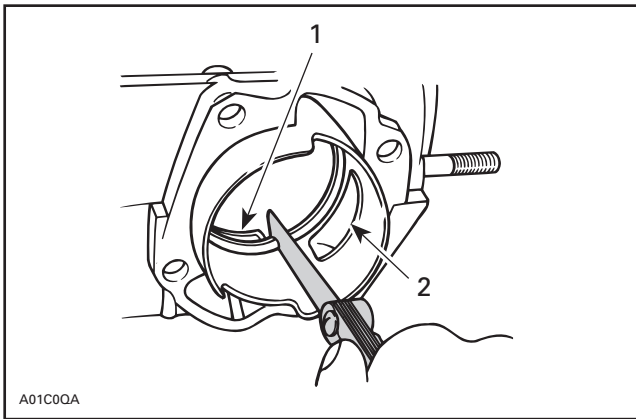


RING END GAP

Position ring half-way between transfer port and intake port.

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.



- 1. Transfer port
- 2. Intake port

CRANKSHAFT DEFLECTION

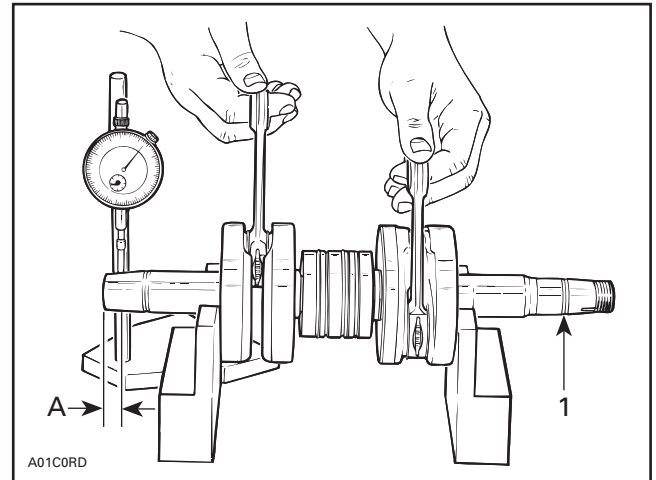
Crankshaft deflection is measured with a dial indicator.

Measuring (in engine)

First, check deflection with crankshaft in engine. If deflection exceeds the specified tolerance, re-check deflection using V-shaped blocks to determine the defective part(s). See below.

Measuring (on bench)

Once engine is disassembled, check crankshaft deflection on V-shaped blocks. If deflection exceeds the specified tolerance, it can be worn bearings or a bent crankshaft. Remove crankshaft bearings and check deflection again on V-shaped blocks to determine the defective part(s). See measurement A in following illustration.



TYPICAL

- 1. Measure at mid point between the key and the first thread
- A. 3 mm (1/8 in)

Crankshaft Deflection on PTO Side

ENGINE TYPE	MAXIMUM ON PTO SIDE mm (in)
All	0.06 (.0024)

Crankshaft Deflection on MAG Side

ENGINE TYPE	MAXIMUM ON MAG SIDE mm (in)
277, 443 and 552	0.03 (.0012)
593	0.05 (.0020)

Crankshaft Deflection in Center of Crankshaft

ENGINE TYPE	MAXIMUM IN CENTER OF CRANKSHAFT mm (in)
All	0.08 (.0031)

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

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

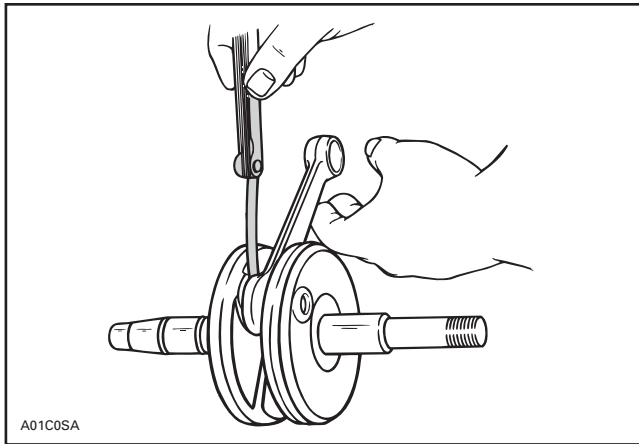
Section 04 ENGINE

Subsection 05 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

CONNECTING ROD BIG END AXIAL PLAY

ENGINE TYPE	NEW PARTS (min. - max.)	WEAR LIMIT
277, 443 and 552	0.20 - 0.53 mm (.008 - .021 in)	1.0 mm (.039 in)
593	0.39 - 0.74 mm (.015 - .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.



TYPICAL

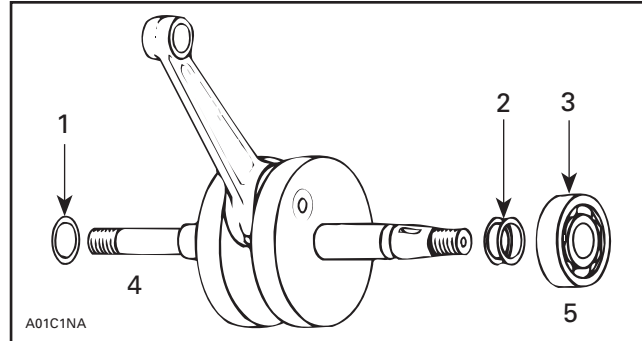
CRANKSHAFT END-PLAY

277 Engine Type

ENGINE TYPE	MINIMUM	MAXIMUM
277	0.10 mm (.004 in)	.030 mm (.012 in)

Adjustment

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



1. Distance ring
2. Shim location
3. Bearing
4. PTO
5. MAG

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

The following is required for the adjustment procedure:

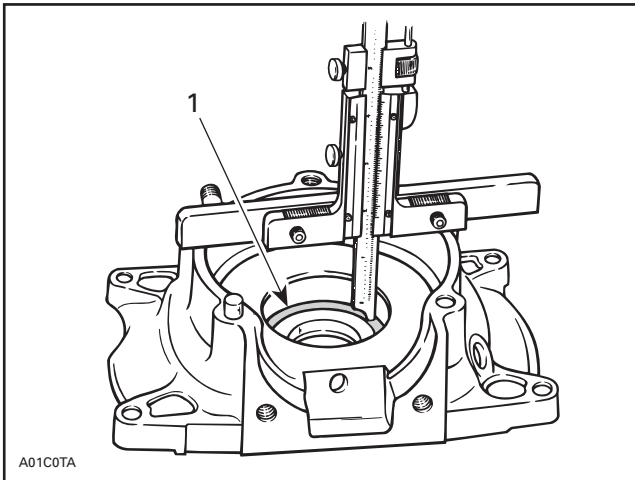
- adjustment shims (refer to *Parts Catalog*)
thicknesses available: 0.10 mm (.004 in)
0.20 mm (.008 in)
0.30 mm (.012 in)
0.50 mm (.020 in)

- micrometer
- caliper.

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).

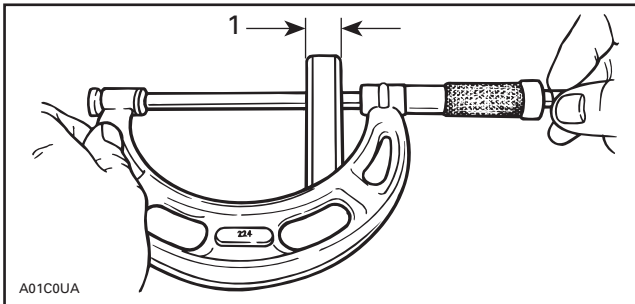
A standard compressed crankcase gasket will have a 0.30 mm (.012 in) thickness (M_3). **Add these measurements to obtain dimension A.**



MEASURING M_1 AND M_2

1. Bearing seat

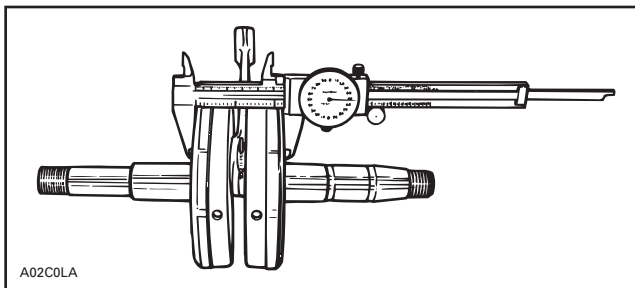
b. Measure the thickness of each bearing (M_4 and M_5).



MEASURING M_4 AND M_5

1. Bearing thickness

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



MEASURING M_6

d. Measure the distance ring (M_7) 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.

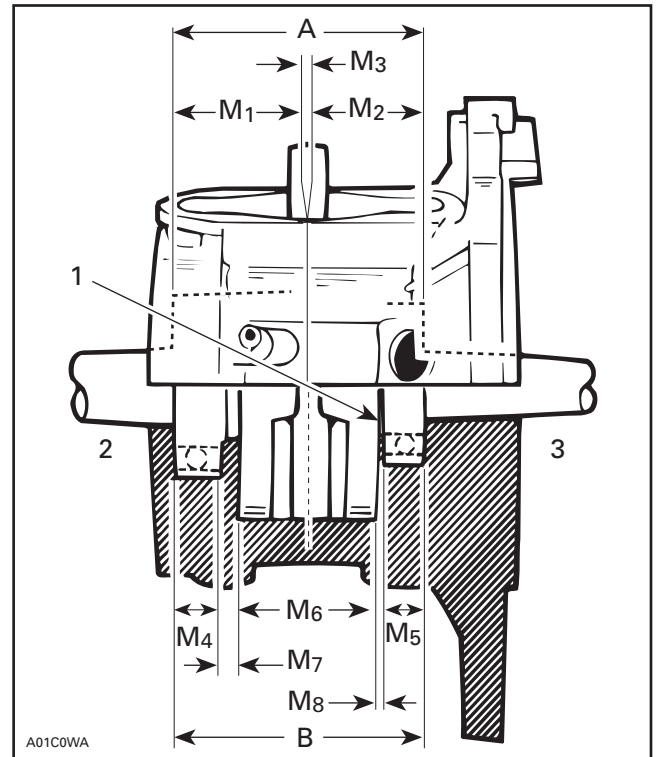
If the result is over specification, add adjustment shim(s) to reach this specification.

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_8 is the dimension that must be adjusted to obtain the specified crankshaft end-play.



- 1. End-play is adjusted with shims
- 2. PTO
- 3. MAG

443, 552 and 593 Engine Types

End-play is not adjustable but it should be between 0.10 - 0.30 mm (.004 - .012 in).

Section 04 ENGINE

Subsection 05 (LEAK TEST AND ENGINE DIMENSION MEASUREMENT)

CHECKING SURFACE FLATNESS

Intake manifold, intake manifold 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.

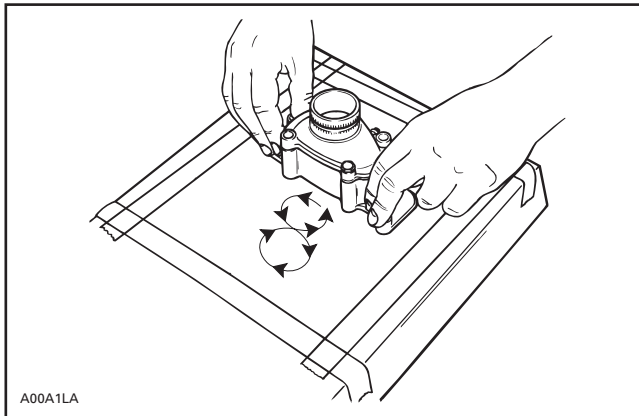
If any play is felt, part must be rectified.

RECTIFYING SURFACES

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

Rub part 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 414 352 900) on crankshaft end.

Remove both spark plugs.

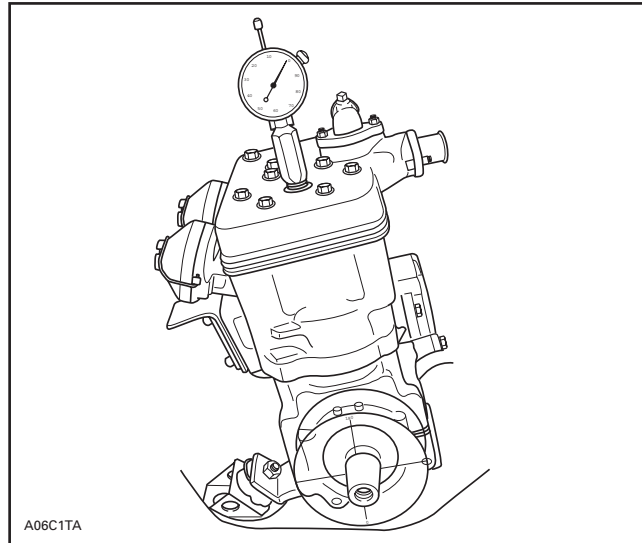
Install a TDC gauge (P/N 414 104 700) in spark plug hole on MAG side.

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 cylinder.

Bring PTO piston to top dead center. Degree wheel must rotate with crankshaft.



TYPICAL

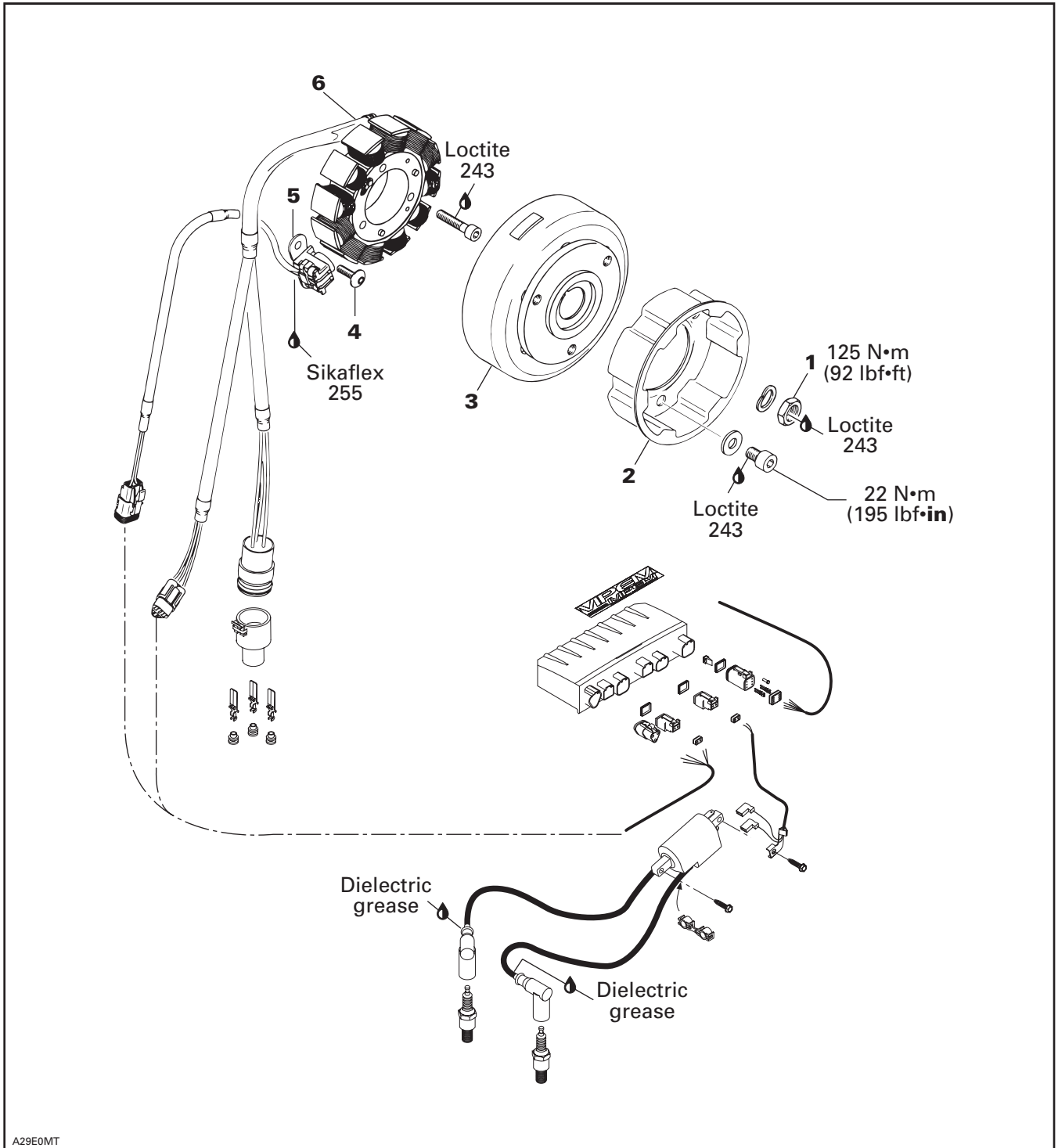
Interval between cylinders must be $180^\circ \pm 0.5$.

Any other reading indicates a misaligned (twisted) crankshaft.

CDI SYSTEM

NIPPONDENSO TRIGGER COIL IGNITION SYSTEM

290 W on Skandic WT LC/SUV 600



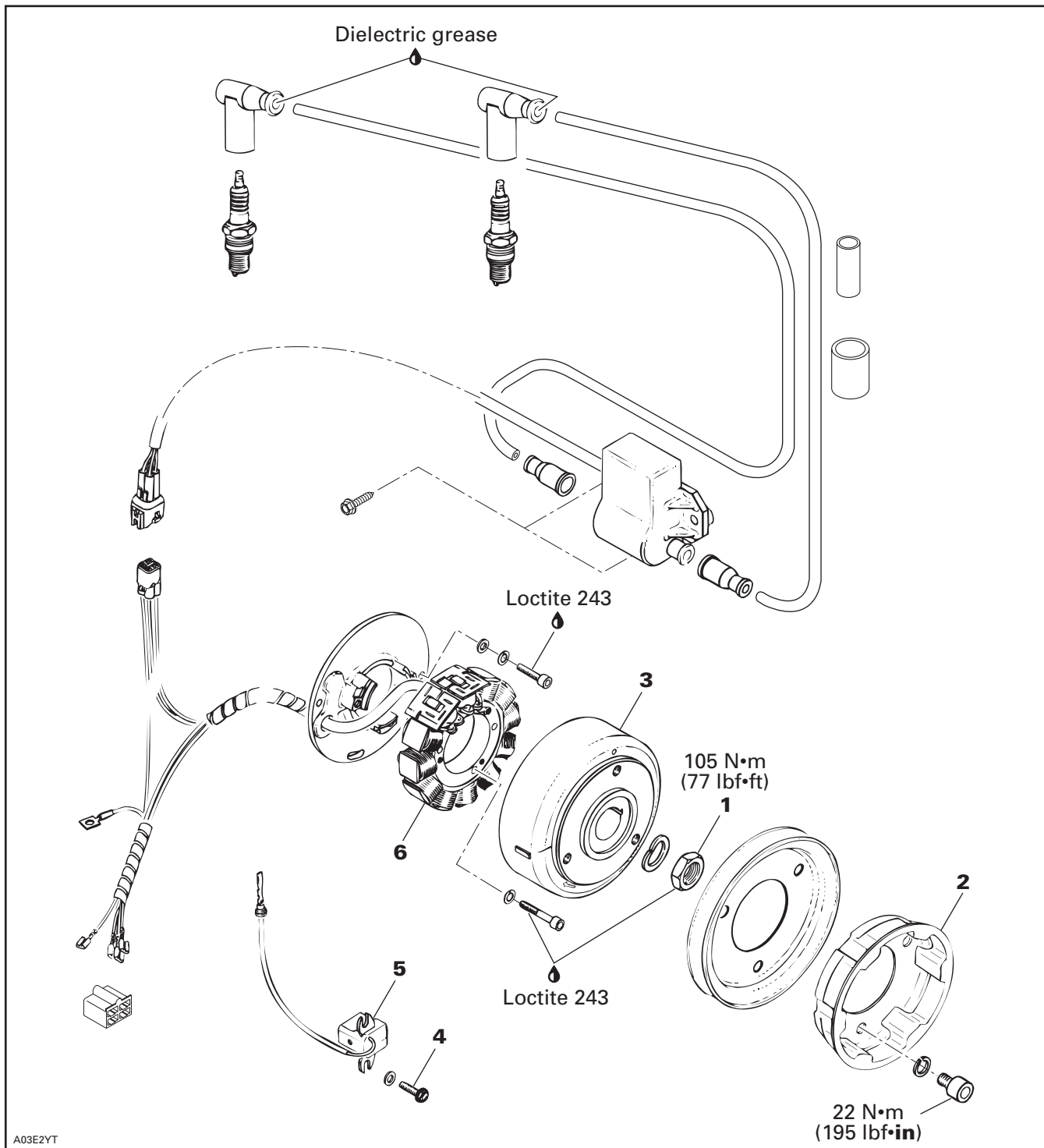
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Section 04 ENGINE

Subsection 06 (CDI SYSTEM)

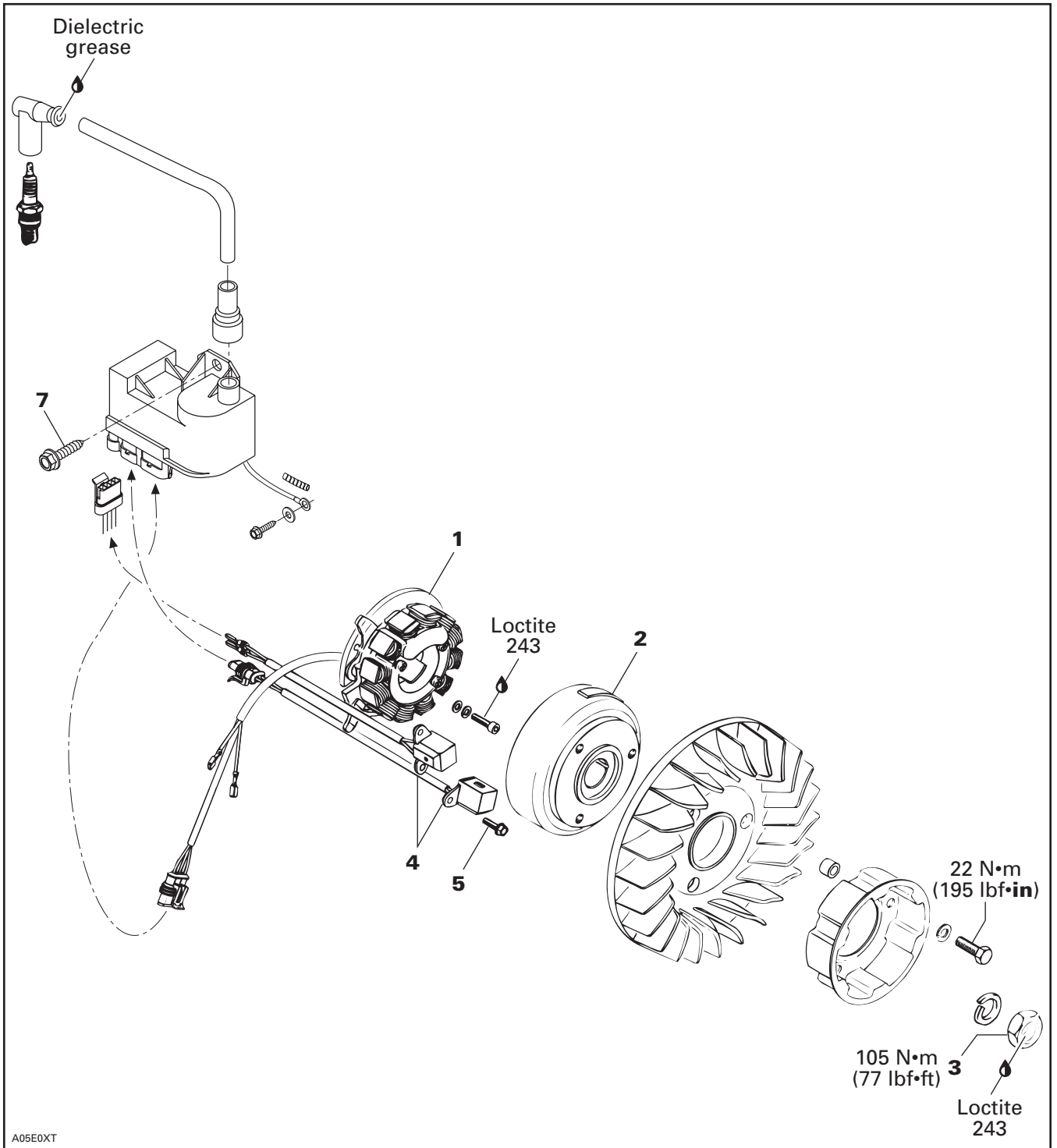
DUCATI IGNITION SYSTEM

340 W on Skandic WT/SWT/SUV 550



RER IGNITION SYSTEM

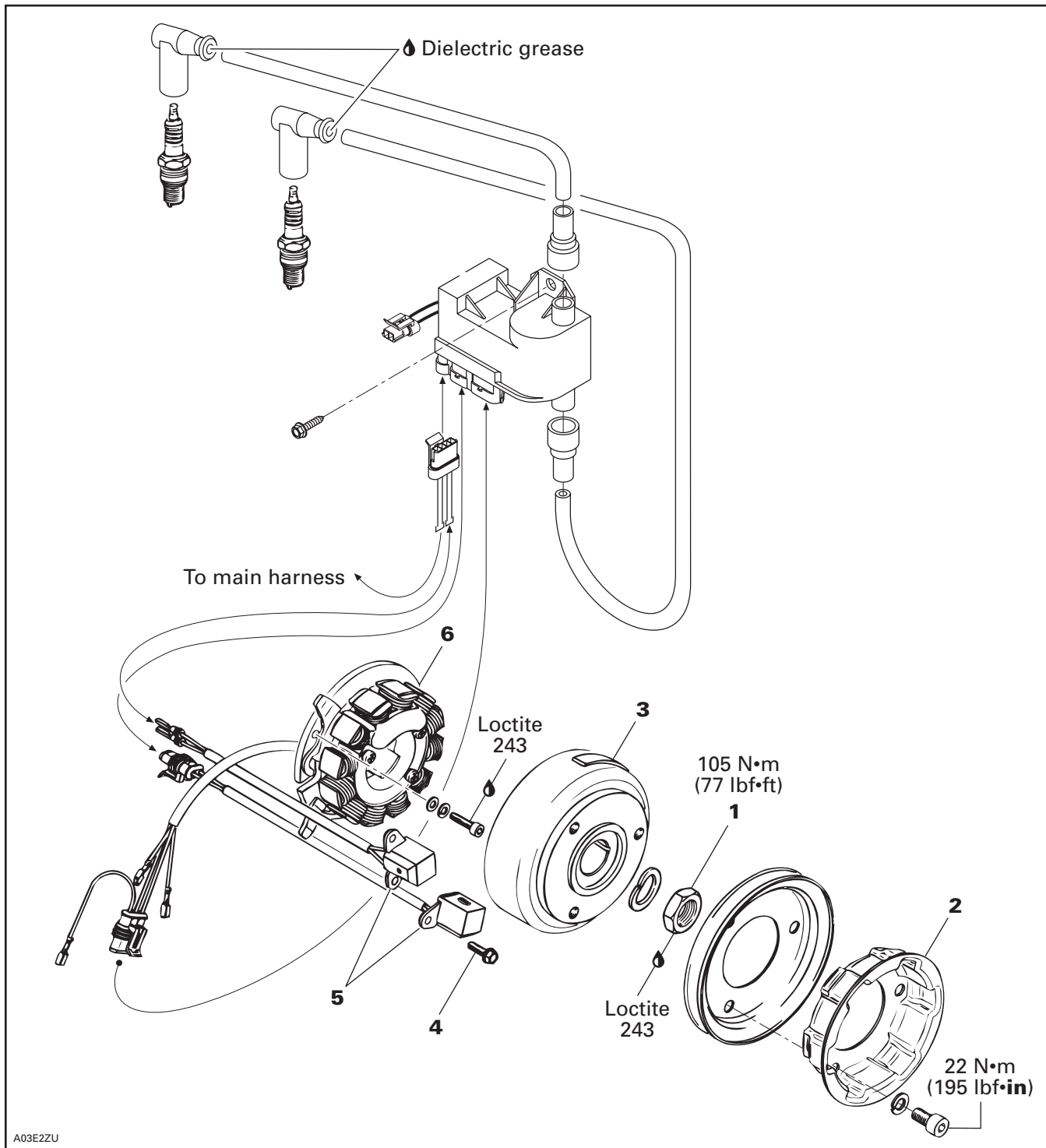
240 W on Tundra R



Section 04 ENGINE

Subsection 06 (CDI SYSTEM)

240 W on Skandic LT



NOTE: The following procedures can be done without removing the engine from chassis. To facilitate magneto removal, hold drive pulley with proper holding tool.

CDI means Capacitor Discharge System.

CLEANING

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

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

DISASSEMBLY

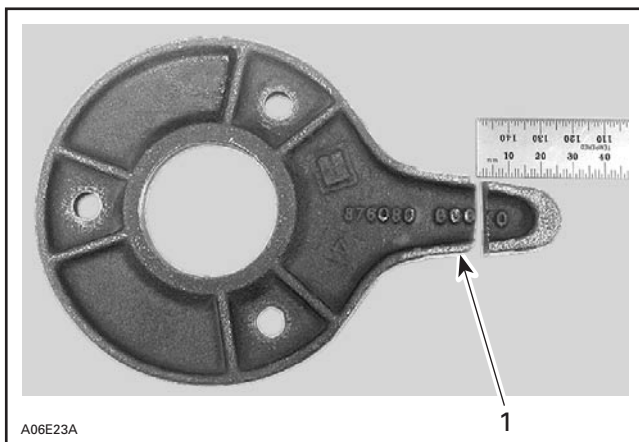
3, Magneto Flywheel

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

- tuned pipe and muffler
- rewind starter
- starting pulley **no. 2**.

To remove magneto flywheel retaining nut **no. 1**:

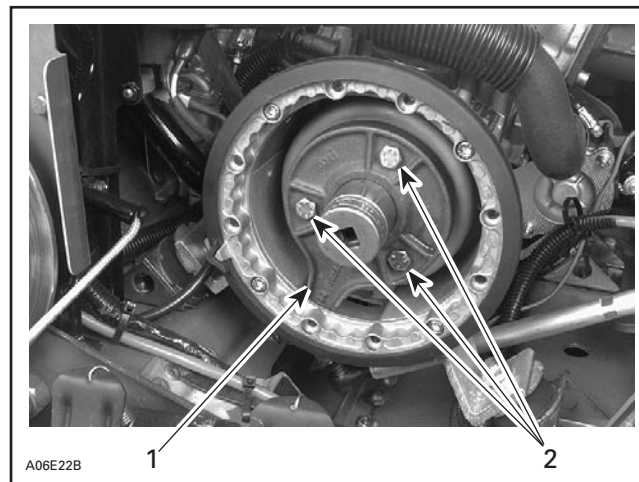
- Use magneto puller ring (P/N 420 876 080). Former puller has to be modified as shown.



1. Cut by 25 mm (1 in)

- Install puller with its tab in magneto housing opening.

CAUTION: Use only M8 x 20 mm screws to bolt puller to magneto.

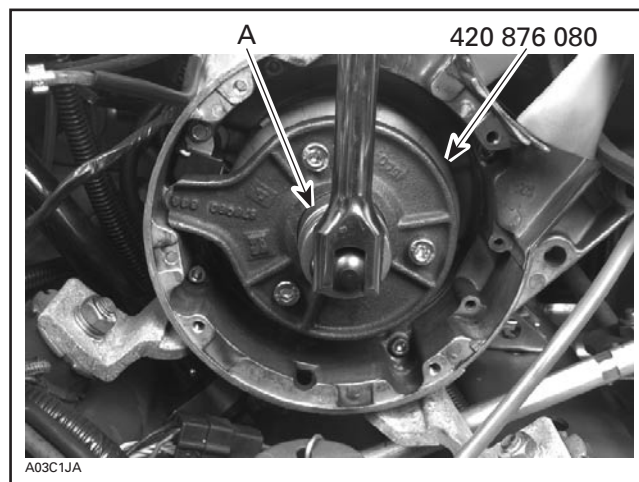


TYPICAL

1. Tab in magneto housing opening
2. M8 x 20 mm 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.



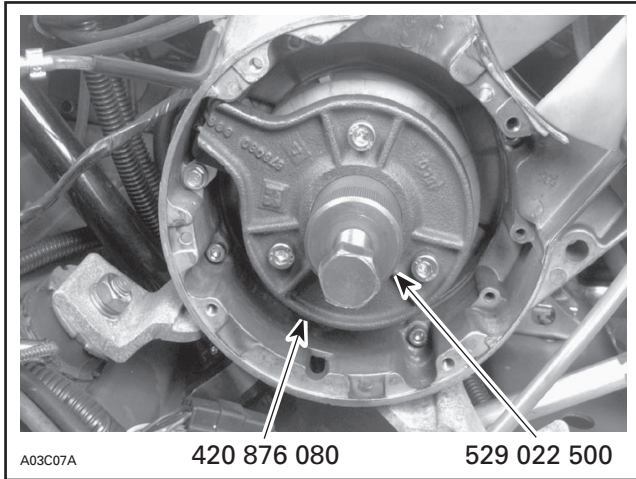
TYPICAL

- A. 30 mm socket

Section 04 ENGINE

Subsection 06 (CDI SYSTEM)

To remove magneto flywheel, install appropriate protective cap included in crankshaft bearing puller on crankshaft end. Screw puller (P/N 529 022 500) into puller ring.



TYPICAL

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

5, Trigger Coil

Magneto and stator **no. 6** must be removed before trigger coil removal.

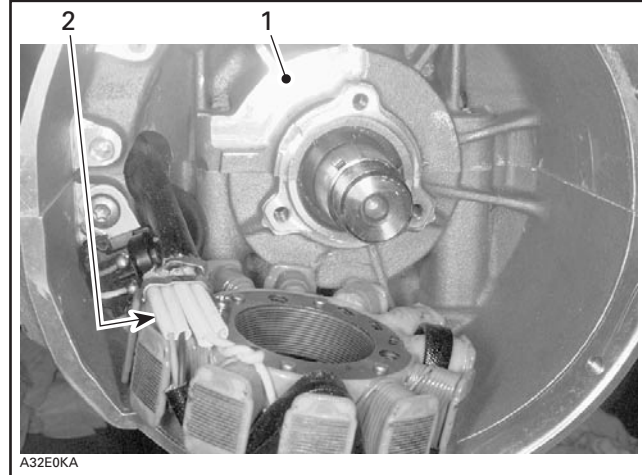
To replace trigger coil **no. 5**:

- Disconnect trigger coil connector housing.
- Remove grommet from crankcase where trigger coil wire exits magneto housing.
- Remove retaining screws **no. 4**.
- Remove trigger coil and carefully pull wires.
- Install new trigger coil and other parts removed.

ASSEMBLY

6, Stator

Make sure to position stator in a way that its wire protectors are over recess of crankcase.



1. Crankcase recess
2. Wire protectors

3, Magneto Flywheel

Clean crankshaft extension (taper) and apply Loctite 243 (blue) on taper, then position Woodruff key, flywheel and lock washer on crankshaft.

Clean nut threads and apply Loctite 243 (blue) then tighten nut to 105 N•m (77 lbf•ft) for fan-cooled engines and to 125 N•m (92 lbf•ft) for 593 engine.

At reassembly coat all electric connections except Deutsch housings (waterproof gray housing) with silicone dielectric grease (P/N 293 550 004) to prevent corrosion or moisture penetration.

CAUTION: Do not use silicone “sealant”, this product will corrode contacts. Do not apply silicone dielectric grease on any Deutsch (gray) housing otherwise housing seal will be damaged.

Ignition Timing

Check as described in IGNITION TIMING.

ADJUSTMENT

Skandic WT/SWT Only

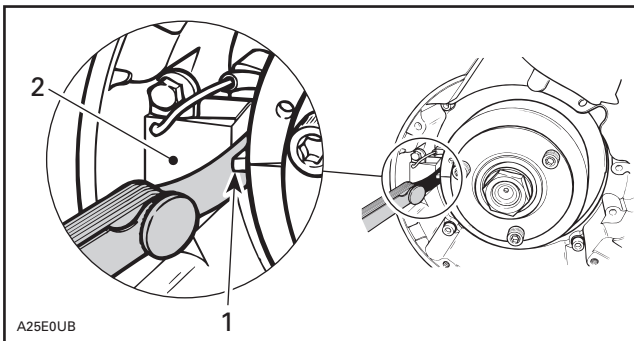
Whenever the trigger coil or the magneto flywheel is removed or replaced, the air-gap between the trigger coil and the flywheel protrusion must be checked and adjusted. The purpose of this adjustment is to obtain the minimum clearance between these parts — without touching at any RPM — so that the trigger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

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.

NOTE: A non-ferrous feeler gauge, such as a stainless steel one, would be useful because it will not be attracted by flywheel magnets.

3. If necessary, adjust by slackening retaining screws and moving trigger coil toward or away of protrusion.
4. Retighten screws and recheck air-gap.



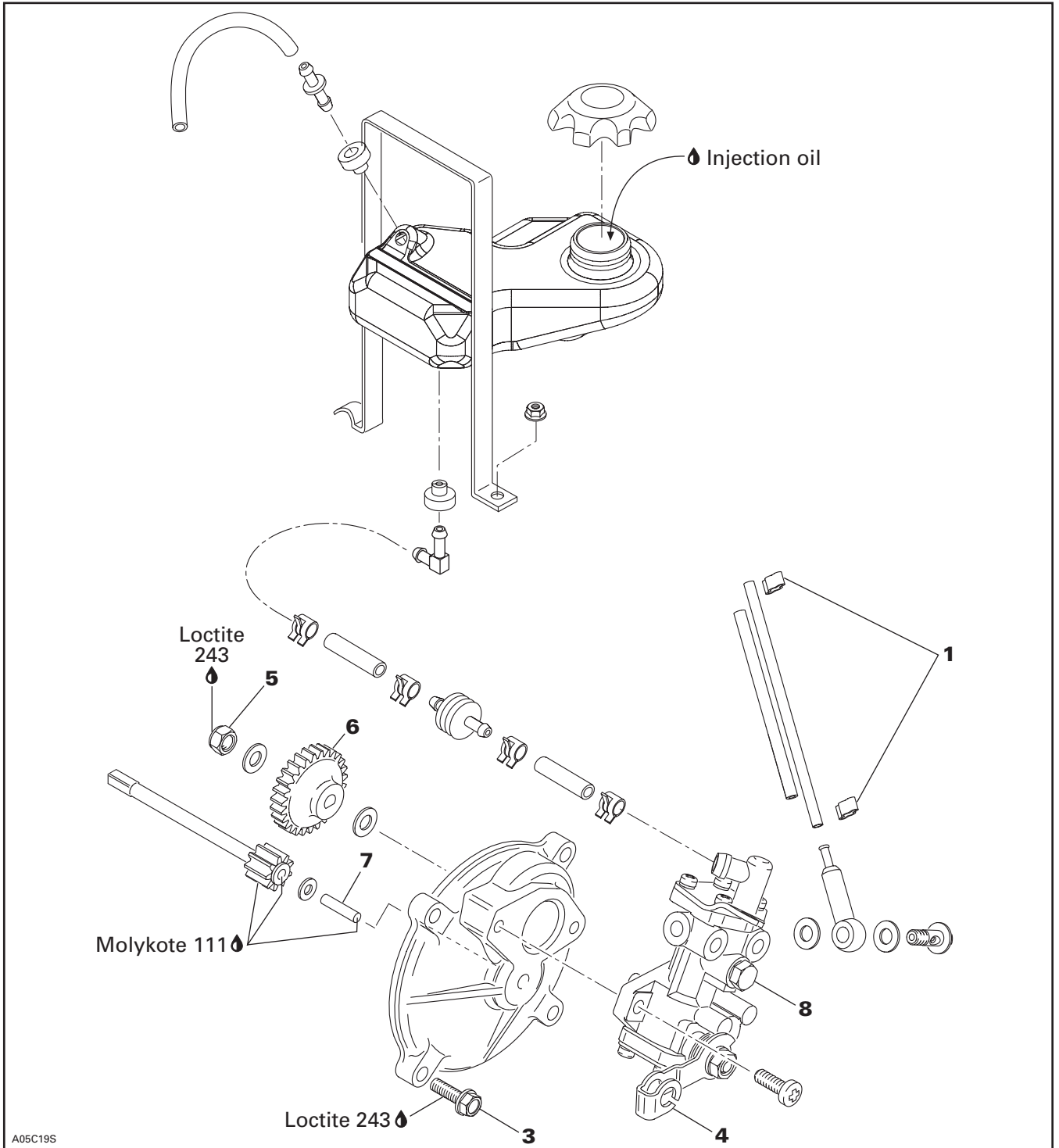
ADJUSTING TRIGGER COIL AIR-GAP

1. Flywheel protrusion
2. Trigger coil

OIL INJECTION SYSTEM

OIL INJECTION PUMP

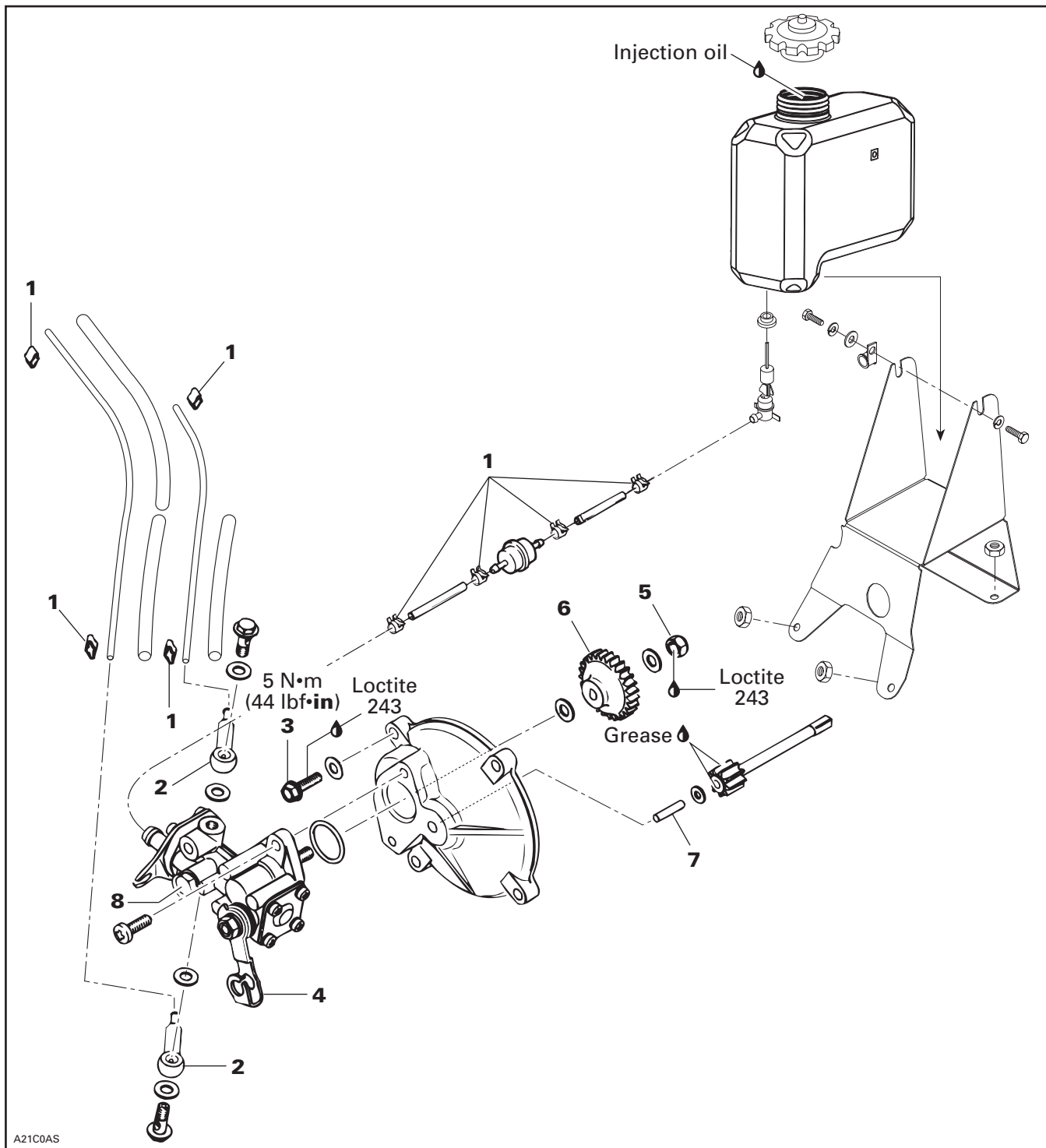
277 Engine



Section 04 ENGINE

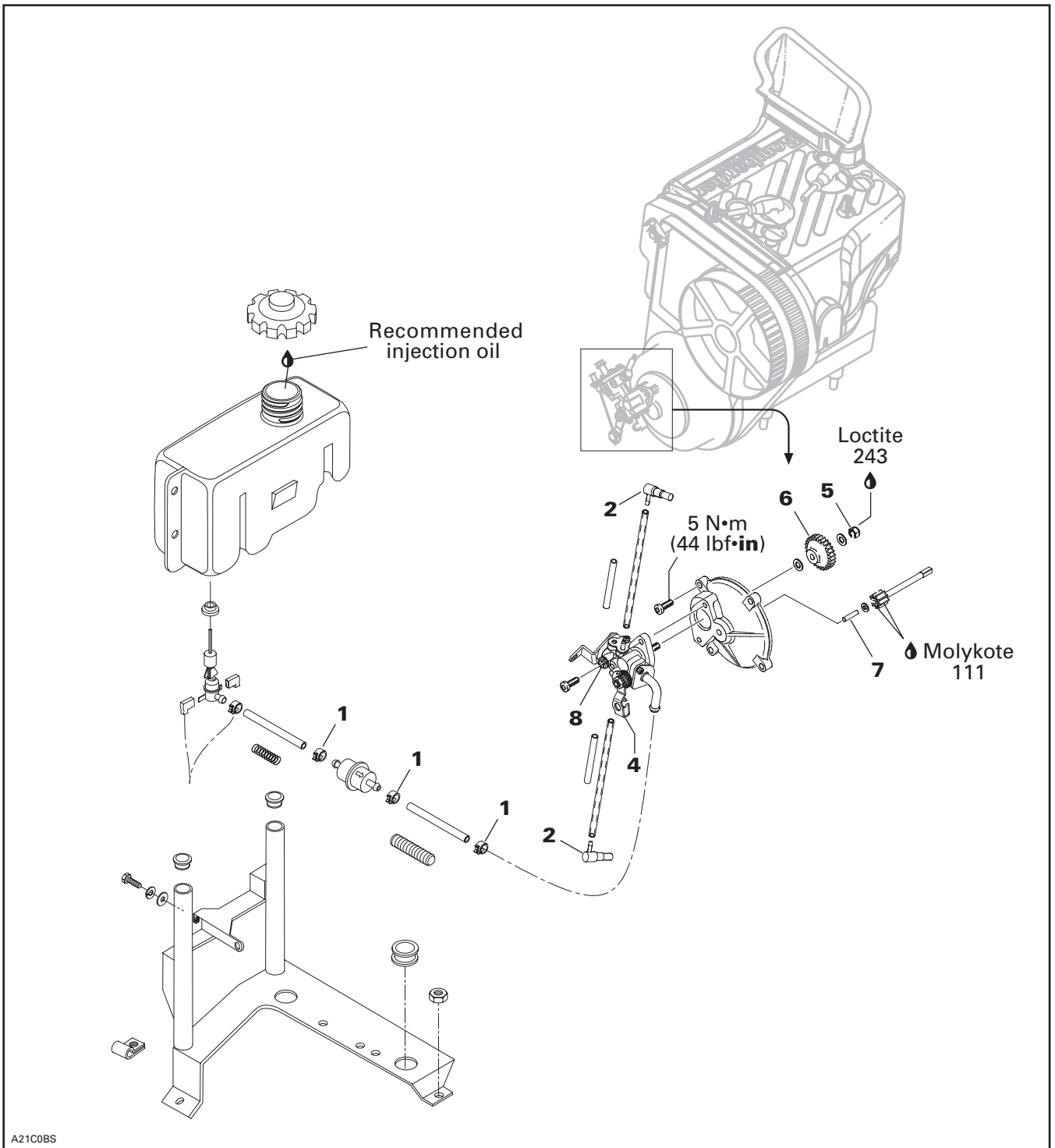
Subsection 07 (OIL INJECTION SYSTEM)

443 Engine on Skandic LT/LT E



Section 04 ENGINE
Subsection 07 (OIL INJECTION SYSTEM)

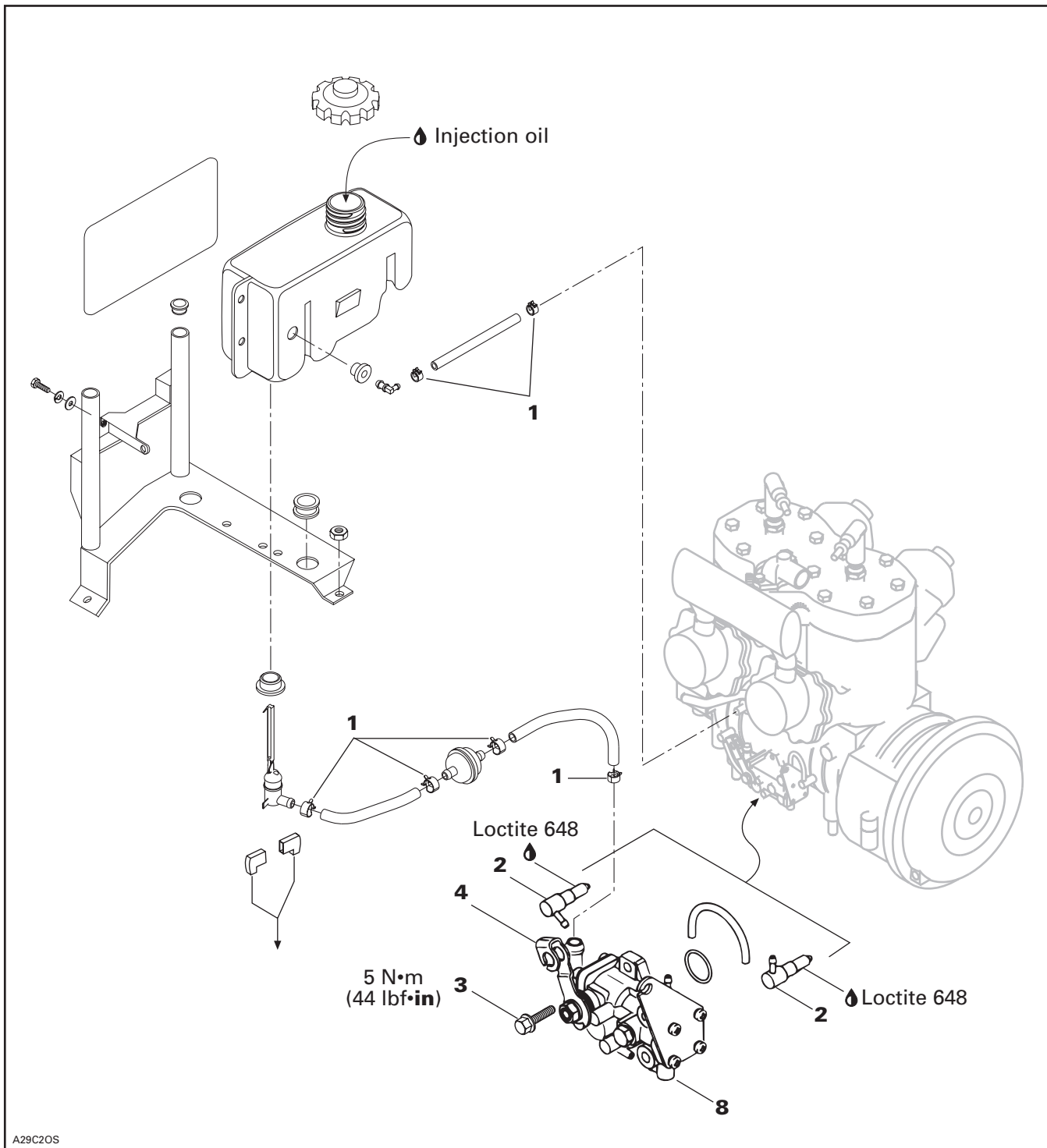
552 Engine on Skandic WT/SWT/SUV 550



Section 04 ENGINE

Subsection 07 (OIL INJECTION SYSTEM)

593 Engine on Skandic WT LC/SUV 600



⚠ WARNING
Wipe off any oil spills. Oil is highly flammable.

OIL TYPE

All Models

Use recommended injection oil as per vehicle *Operator's Guide*.

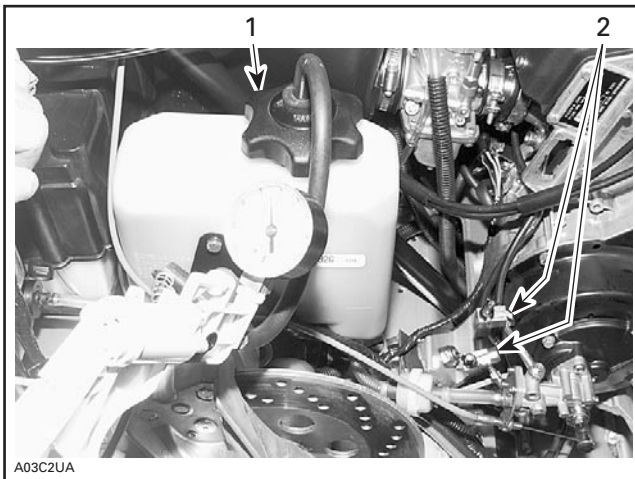
OIL SYSTEM LEAK TEST

All Models

The following test will indicate any leak from oil reservoir to the banjo fitting(s).

Install on oil reservoir special cap of leak testing kit (P/N 529 033 100).

Install hose pinchers (P/N 295 000 076) on outlet hoses.



TYPICAL

1. Special cap on reservoir
2. Hose pinchers on outlet hoses

Connect leak testing kit pump to special cap.

Pressurize oil system to 21 kPa (3 PSI). Pressure must not drop during 3 minutes.

If pressure drops, locate leak(s) and repair/replace leaking component(s).

OIL PUMP IDENTIFICATION

All Models

4, Pump Lever

Different engines need different pumps. See identification on lever no. 4.

CAUTION: Always mount proper pump on engine.

ENGINE TYPE	OIL PUMP IDENTIFICATION
277	132K
443	E8
552	03
593	L7

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

CLEANING

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

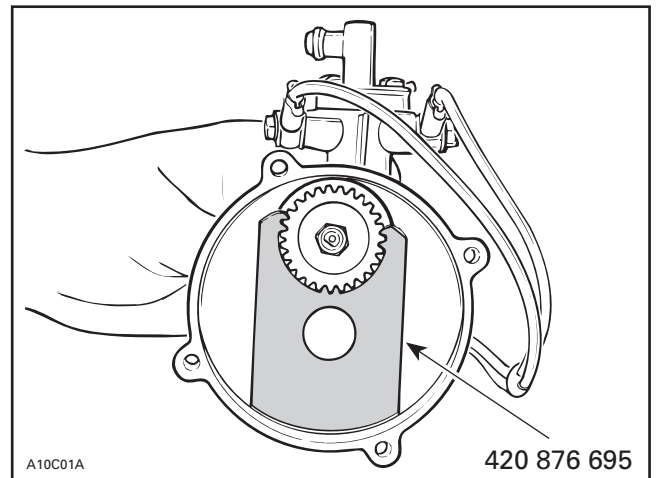
DISASSEMBLY

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

5,6, 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 the following gear holder.

ENGINE TYPE	TOOL P/N
277/443/552	420 876 695



Section 04 ENGINE

Subsection 07 (OIL INJECTION SYSTEM)

ASSEMBLY

1, Spring Clip

Always check for spring clips tightness.

6, Oil Pump Gear

At gear assembly, apply a light coat of Molykote 111 (P/N 413 707 000) on gear teeth.

7, Needle Roller (fan cooled engine only)

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

3, Screw

Torque to 5 N•m (44 lbf•in).

Cable plastic elbow must be fastened and fully inserted.

Make sure cable barrel is well seated in oil pump lever. Secure barrel with plastic washer and circlip.

Install cable lock washer on lever side.

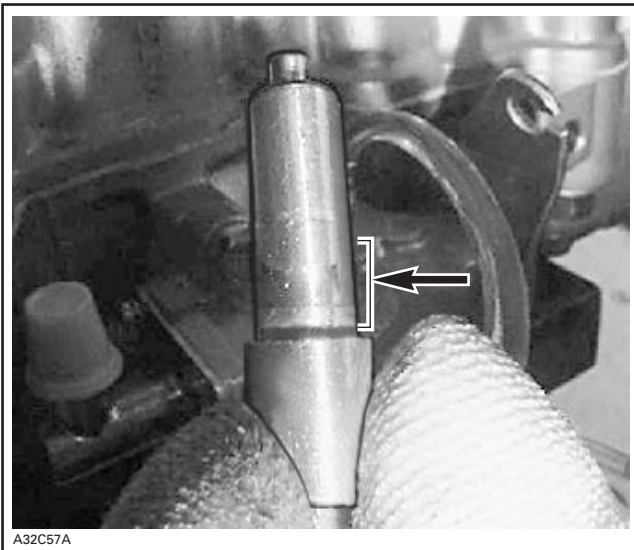
Verify cable and oil pump lever operation.

2, Check Valve

593 Engine

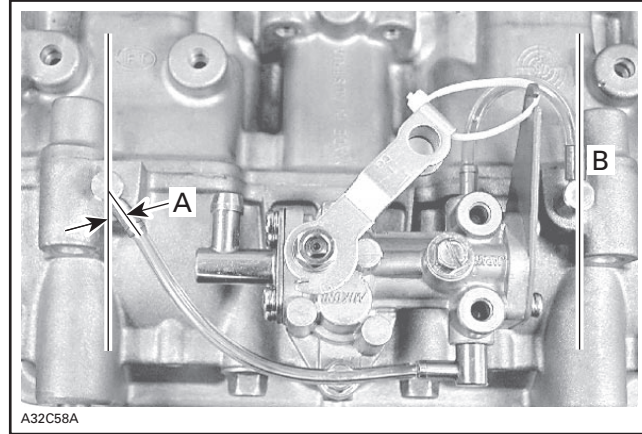
Apply Loctite 648 (green) (P/N 413 711 400) on the outer diameter of the check valve (machined section). Take care that Loctite is ONLY in this area.

NOTE: Prior to coating it with Loctite, make sure check valve body is clean and dry. Clean from dirt or oil, if any, with Pulley flange cleaner (P/N 413 711 809).



APPLY LOCTITE ON THIS AREA ONLY

Install the check valve in the correct position as described on next photo into the crankcase lower side.



POSITION FOR 593 ENGINE ON SKANDIC WT LC/SUV

A. PTO side: $30^{\circ} \pm 10^{\circ}$ from cylinder axis to the bottom

B. MAG side: 0° from cylinder axis to the top

Punch in the check valve carefully with a plastic hammer.

Clean the crankcase from surplus of Loctite 648 with a rag.

ADJUSTMENT

All Models

Prior to adjusting the pump, make sure all carburetor adjustments are completed and engine is stopped.

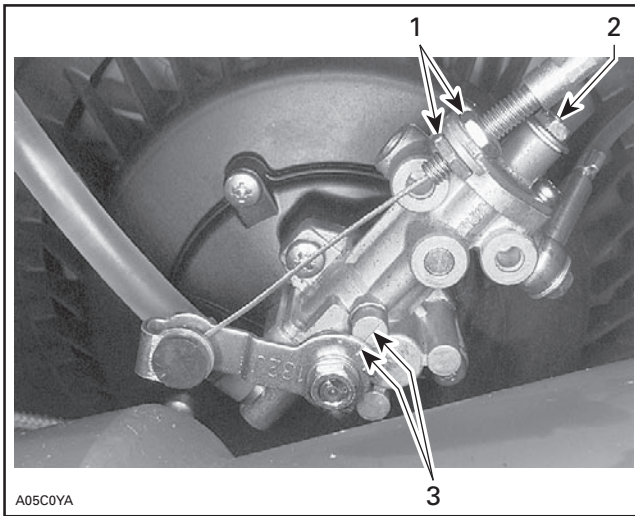
Pumps Identified E8, 03 and 132K

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

The mark on the pump casting and on the lever must align. Width of lever mark is the tolerance.

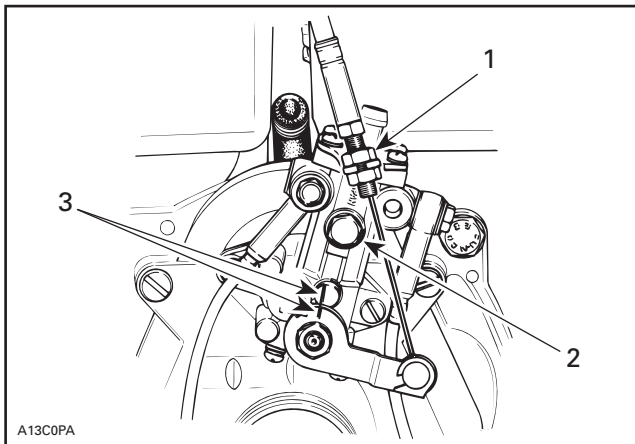
Loosen the adjuster nut and adjust accordingly.

Retighten the adjuster nut.



TYPICAL — TUNDRA R

1. Adjuster nuts
2. Bleeder screw
3. Marks



TYPICAL — SKANDIC LT/WT/SWT/SUV 550

1. Adjuster nut
2. Bleeder screw
3. Marks

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

Pump Identified L7

Do not touch throttle lever. The cable free-play must not be eliminated on this model.

Because the oil pump is mounted low on engine, it is very difficult to avoid parallax problem and set a good adjustment.

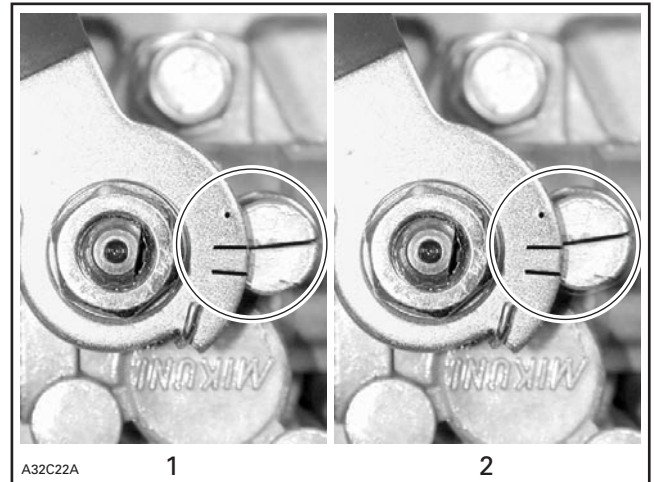
Parallax Problem

When adjusting pump lever, since the mechanic can not view the pump perpendicularly, the adjustment will not be accurate. Following photos show three different views of the same properly adjusted pump.



A32C1MA

VIEW TOO HIGH — ADJUSTMENT SEEMS TO BE TOO RICH WHEN TOP OF BODY'S PROTRUSION CAN BE SEEN



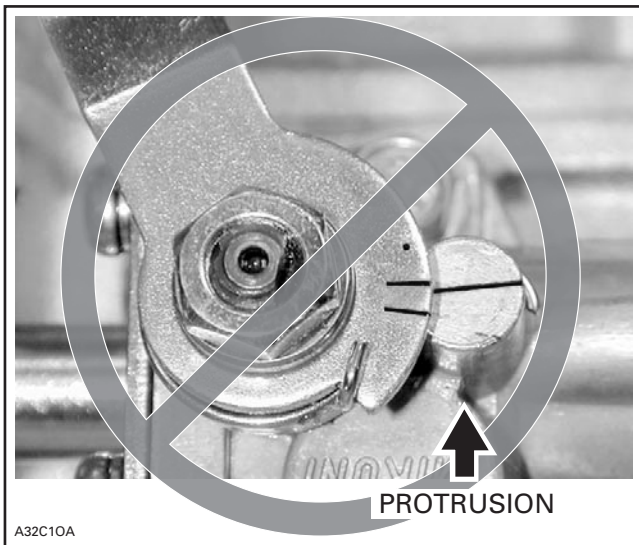
A32C22A

VIEW STRAIGHT AHEAD — BODY'S PROTRUSION LOOKS LIKE A CIRCLE, MARK ON PUMP ALIGN WITH SECOND MARK ON LEVER (MARK ON DOT SIDE)

1. Minimum setting
2. Maximum setting

Section 04 ENGINE

Subsection 07 (OIL INJECTION SYSTEM)



VIEW TOO LOW — ADJUSTMENT SEEMS TO BE TOO LEAN WHEN BOTTOM OF BODY'S PROTRUSION CAN BE SEEN

To avoid a bad adjustment, follow below procedure.

Procedure for Oil Pump Adjustment

Ensure carburetors are synchronized according to the technical specifications.

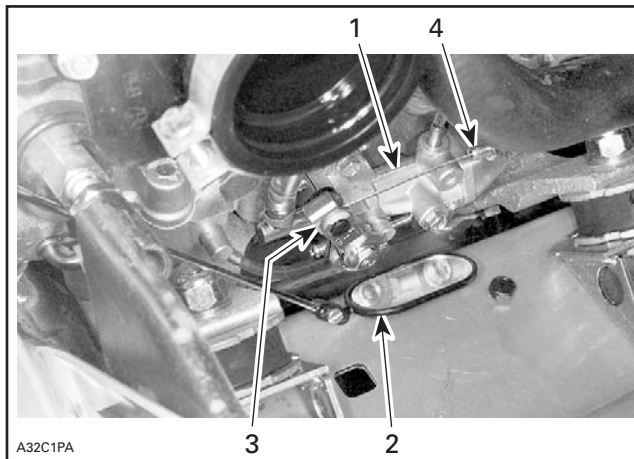
Remove air silencer. Carburetors may also be removed to improve visibility and ease adjustment of oil pump cable.

NOTE: Place carburetors on top of intake boots to keep cable routing near original location.

Use a small round or oblong mirror to see the marks.

The second mark on pump lever must be aligned or up to 1 mm (.039 in) below pump casting mark. If not, loosen the adjuster nut and adjust accordingly.

Retighten the adjuster nut.

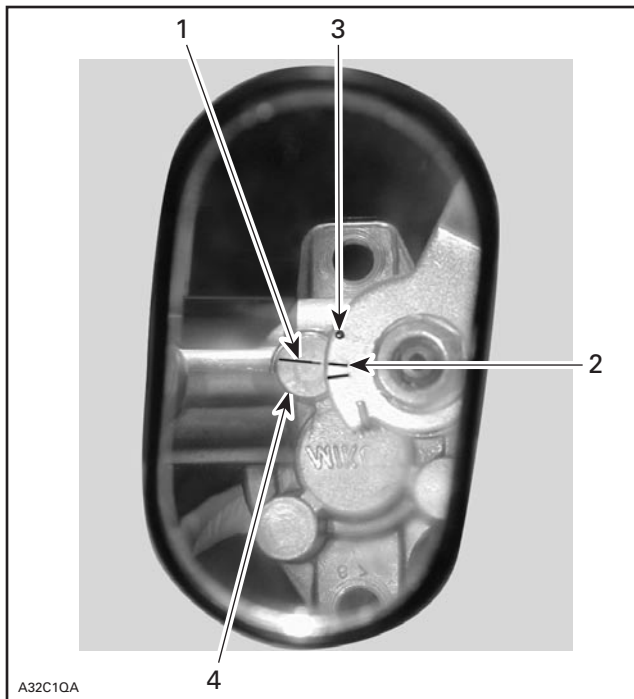


VIEW WITH AIR SILENCER, CARBURETORS AND FUEL PUMP REMOVED

1. Oil pump
2. Mirror
3. Lever
4. Adjustment screw

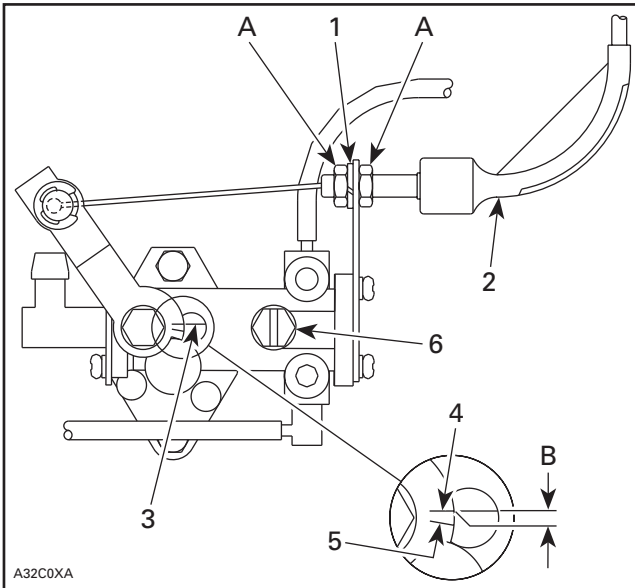
Make sure that view in mirror is straight ahead, without parallax problem.

Protrusion with fixed mark on pump must look like a full circle. See next photo.



VIEW FROM MIRROR SHOULD LOOK LIKE THIS

1. Mark on pump casting
2. Second mark on lever
3. Dot
4. Pump protrusion looks like a circle, not a cylinder



- 1. Lock washer
- 2. Plastic elbow fastened and fully inserted
- 3. Pump casting mark
- 4. Second mark aligned or below
- 5. First mark
- 6. Bleeder screw
- A. 5 N•m (44 lbf•in)
- B. 0 to 1 mm (0 to .039 in)

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

BLEEDING OIL LINES

Bleed main oil line (between tank and pump) by loosening the bleeder screw **no. 8** until air has escaped from the line. Add injection oil as required.

Reinstall all parts.

Bleed the small oil lines between pump and engine by running engine at idle while holding the pump lever in fully open position.

NOTE: Make a J hook out of mechanical wire to lift the lever.

⚠ WARNING

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

CHECKING OPERATION

Oil Pump

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. Disconnect small oil lines from pump. Start engine and stop it as soon as it fires.

Check that oil in small oil lines has been sucked up (this will be indicated by a clear section of small oil lines). Repeat the procedure until this condition is attained.

Reconnect small oil lines, 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 oil lines. If oil drops, verify check valve operation in injection nozzle. Replace as necessary.

Test Bench

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

2, Check Valve

For engine 593, check valve is part (built-in) of injection nozzle.

For engines 277, 443 and 552, check valve is part (built-in) of banjo fitting.

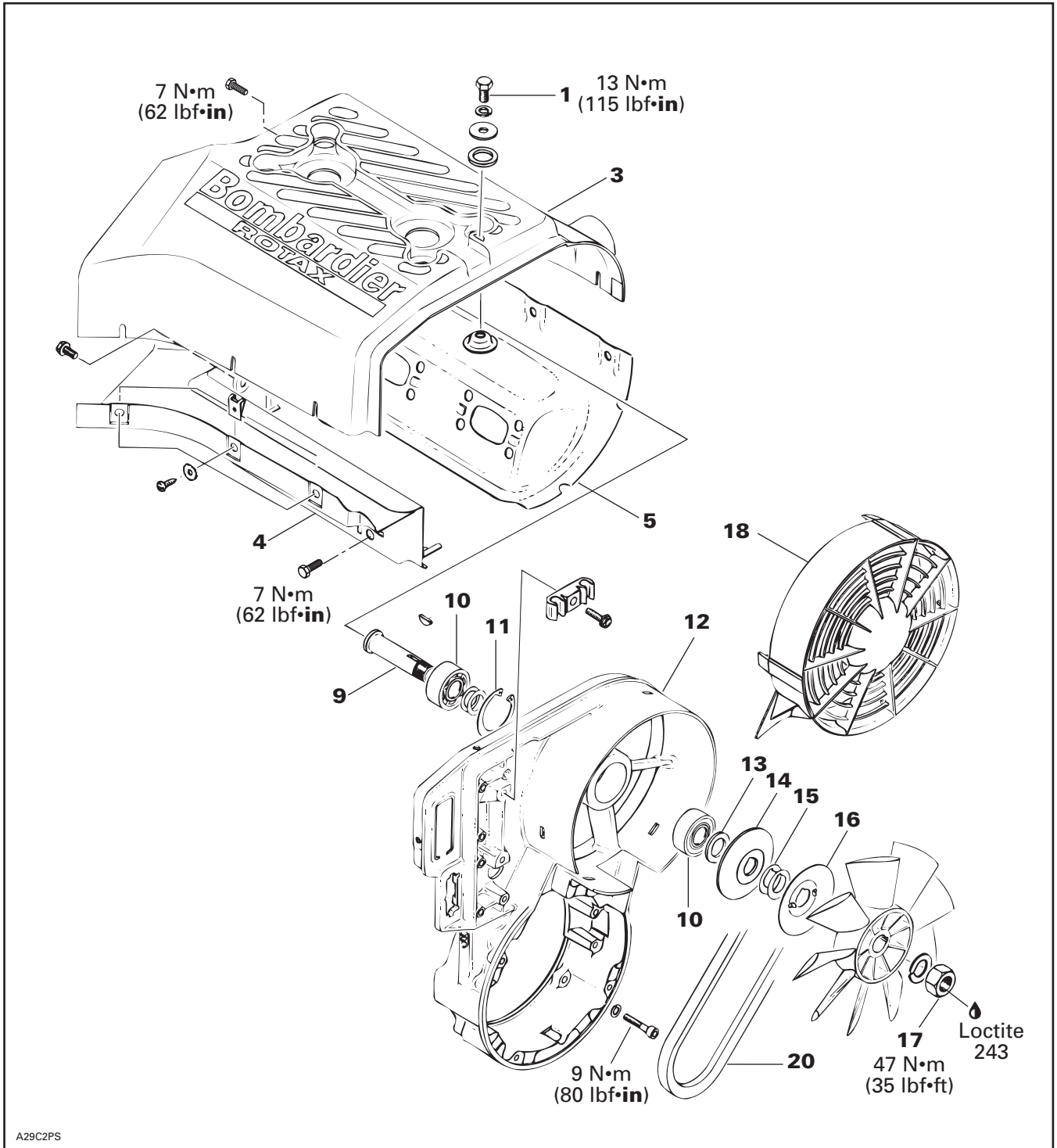
To verify this check valve, proceed the same as for checking pump operation on vehicle. First unplug oil line from injection nozzle. After restarting the engine, check that a clear section in small oil line is present. Reconnect oil line.

Run engine at idle. Oil column must advance. If the check valve is faulty, oil column will go back and forth. Replace if so.

AXIAL FAN COOLING SYSTEM

443 and 552 Engines

NOTE: For 277 engine radial fan cooling system, refer to CDI SYSTEM.



Section 04 ENGINE

Subsection 08 (AXIAL FAN COOLING SYSTEM)

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

REMOVAL

NOTE: To facilitate further disassembly, fan nut may be removed before removing fan housing.

Remove rewind starter, starting pulley, trigger coil wire from 4-connector housing then fan housing ass'y.

CLEANING

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

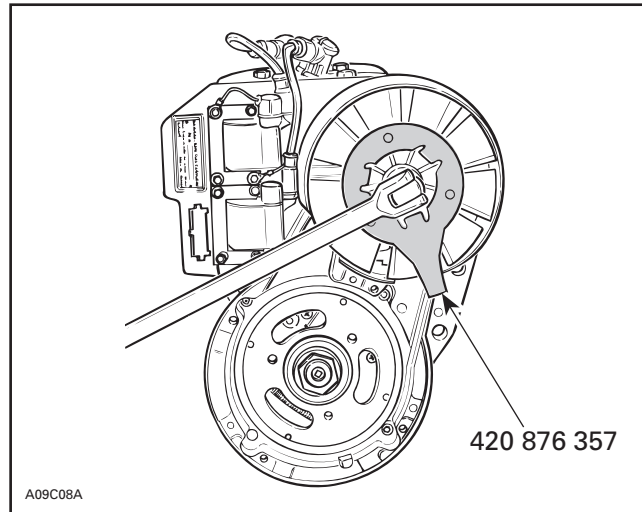
DISASSEMBLY AND ASSEMBLY

Using a flat screwdriver, lift fan protector tabs as shown in the following photo, then remove fan protector.



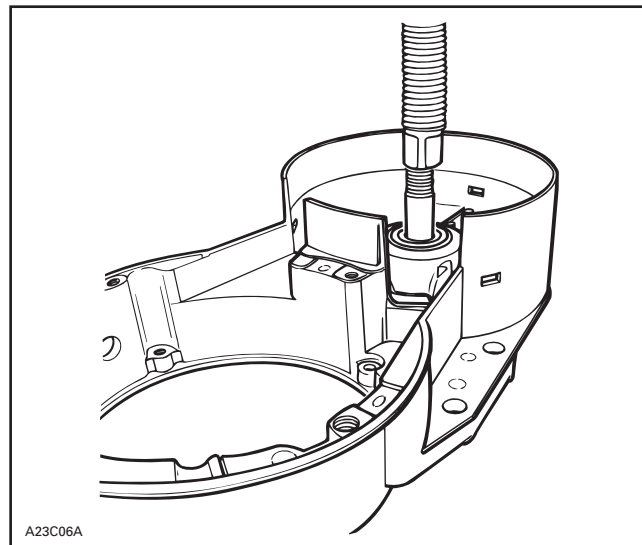
1. Lift tab and remove fan protector

To remove or install fan pulley retaining nut **no. 17**, lock fan pulley with special holder wrench (P/N 420 876 357). At assembly, torque nut to 48 N•m (35 lbf•ft).

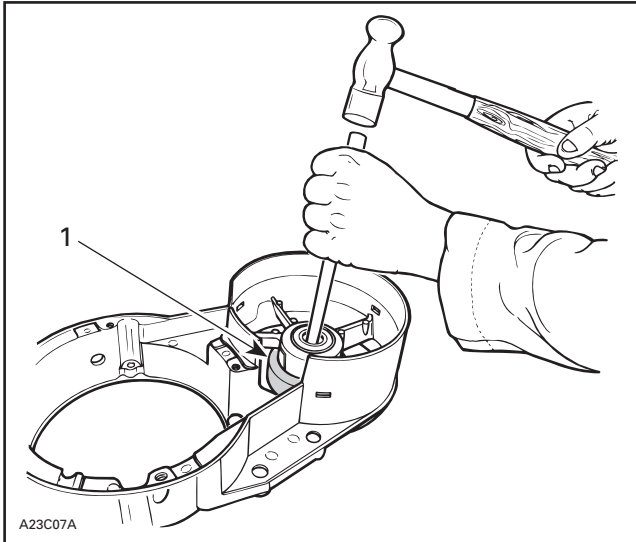


TYPICAL

Using a press, drive the fan shaft **no. 9** out.



Support fan housing no. 12 with a ring. With a punch, working all around bearing no. 10 inner race, drive bearing out of fan housing. Keep shims for installation.



1. Ring supporting fan housing

Remove circlip no. 11 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.

INSTALLATION

At assembly, apply a light coat of Loctite 243 (blue) on screw no. 1 threads.

A gasket must be placed on both sides (inner and outer) of intake and exhaust holes of cylinder cowl nos. 4 and 5.

Reinstall fan protector no. 18 properly.

⚠ WARNING

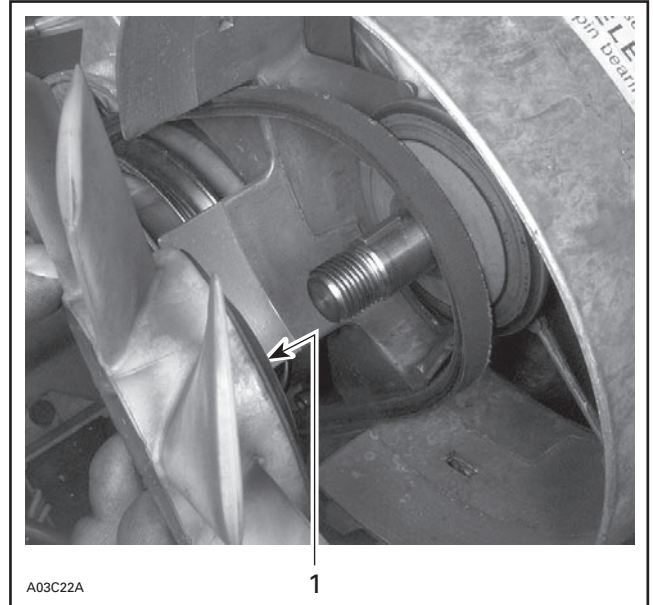
Always reinstall fan protector after servicing.

FAN BELT REPLACEMENT AND DEFLECTION ADJUSTMENT

Remove muffler, rewind starter and on so equipped models connecting flange. Following procedure described above.

Using fan holder tool (P/N 420 876 357), remove fan nut.

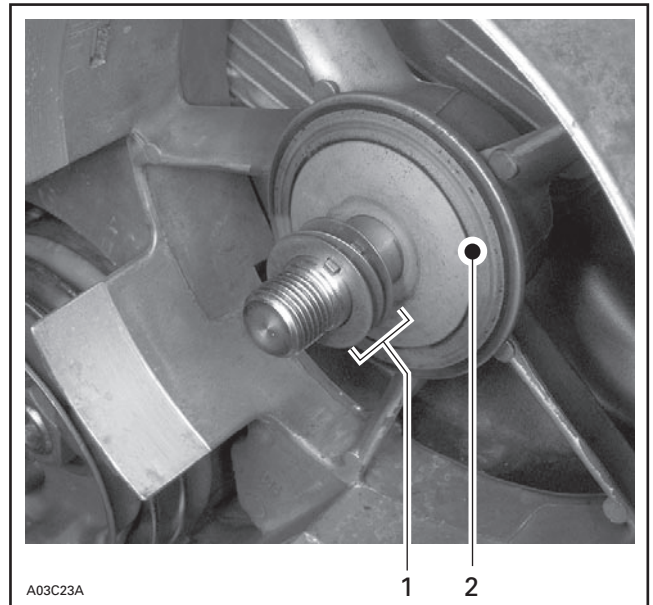
Remove fan with pulley half.



1. Remove fan with pulley half

Remove fan belt.

Leave shims and second half pulley in place. Refer to the following photo.



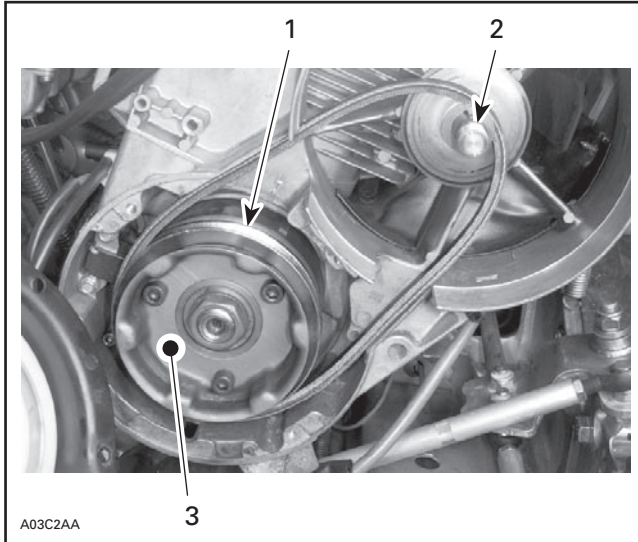
1. Keep shims
2. Leave second half pulley in place

Section 04 ENGINE

Subsection 08 (AXIAL FAN COOLING SYSTEM)

Reassembly

Install fan belt on bottom pulley first then position onto fan shaft, as shown in the next photo.



FAN BELT PROPERLY INSTALLED ON BOTTOM PULLEY AND FAN SHAFT

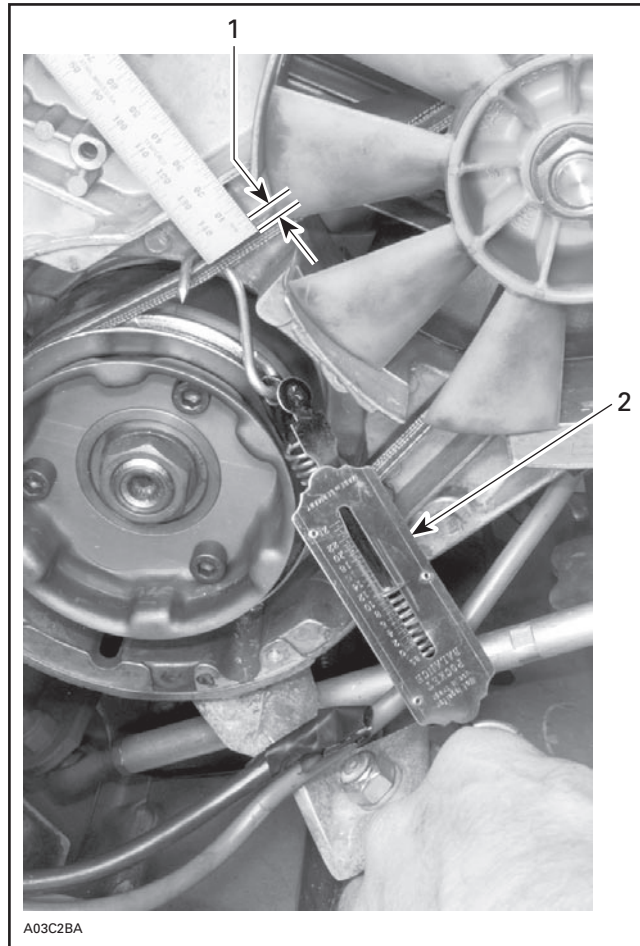
1. Bottom pulley
2. Fan shaft
3. Starting pulley

Reinstall fan assembly on fan shaft. Temporarily tighten fan nut.

CAUTION: When reinstalling fan assembly, ensure that key is properly positioned into fan shaft keyway.

Fan Belt Deflection Adjustment

Check fan belt deflection using a ruler and a fish scale positioned midway between pulleys as per following photo.



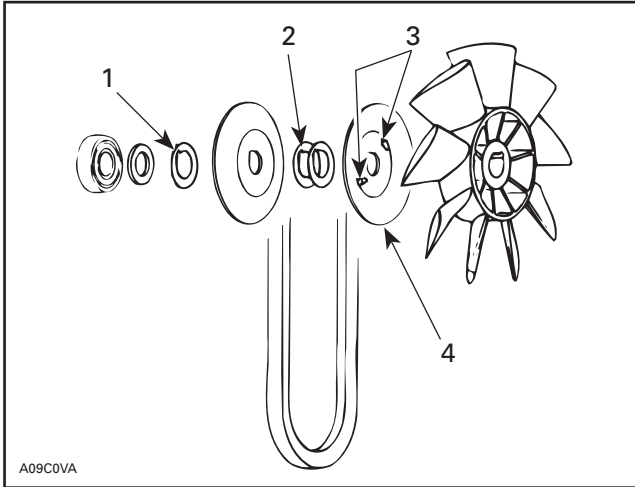
TYPICAL

1. Measure deflection here
2. Fish scale

Belt deflection must be according to the following specifications:

ENGINE TYPE	BELT DEFLECTION	FORCE APPLIED
443 and 552	9.5 mm (3/8 in)	5 kg (11 lb)

To adjust deflection tension, add or remove shim(s) no. 15 between pulley halves nos. 14 and 16. Install excess shim(s) between distance sleeve no. 13 and pulley half no. 14 (housing side).



1. Unused shim(s) here
2. Adjust here
3. Positioning noses
4. Some engines only

Select pulley halves so that the one with 2 positioning noses will be on fan side. Ensure to insert these noses into fan notches.

Once fan belt is properly adjusted, torque fan nut to 48 N•m (35 lbf•ft) using holder wrench (P/N 420 876 357), as shown in the following photo.

NOTE: Apply Loctite 243 (blue) on fan nut threads.



TORQUE FAN NUT USING HOLDER WRENCH

Finalizing Reassembly

Reinstall rewind starter.

CAUTION: When installing rewind starter, ensure that oil pump shaft is properly positioned. Do not force shaft insertion. Turn fan until oil pump shaft slides in place, as shown in the following photo.



TURN FAN TO SLIDE OIL PUMP SHAFT IN PLACE

Secure rewind starter with original screws.

Reinstall fan protector no. 18 properly.

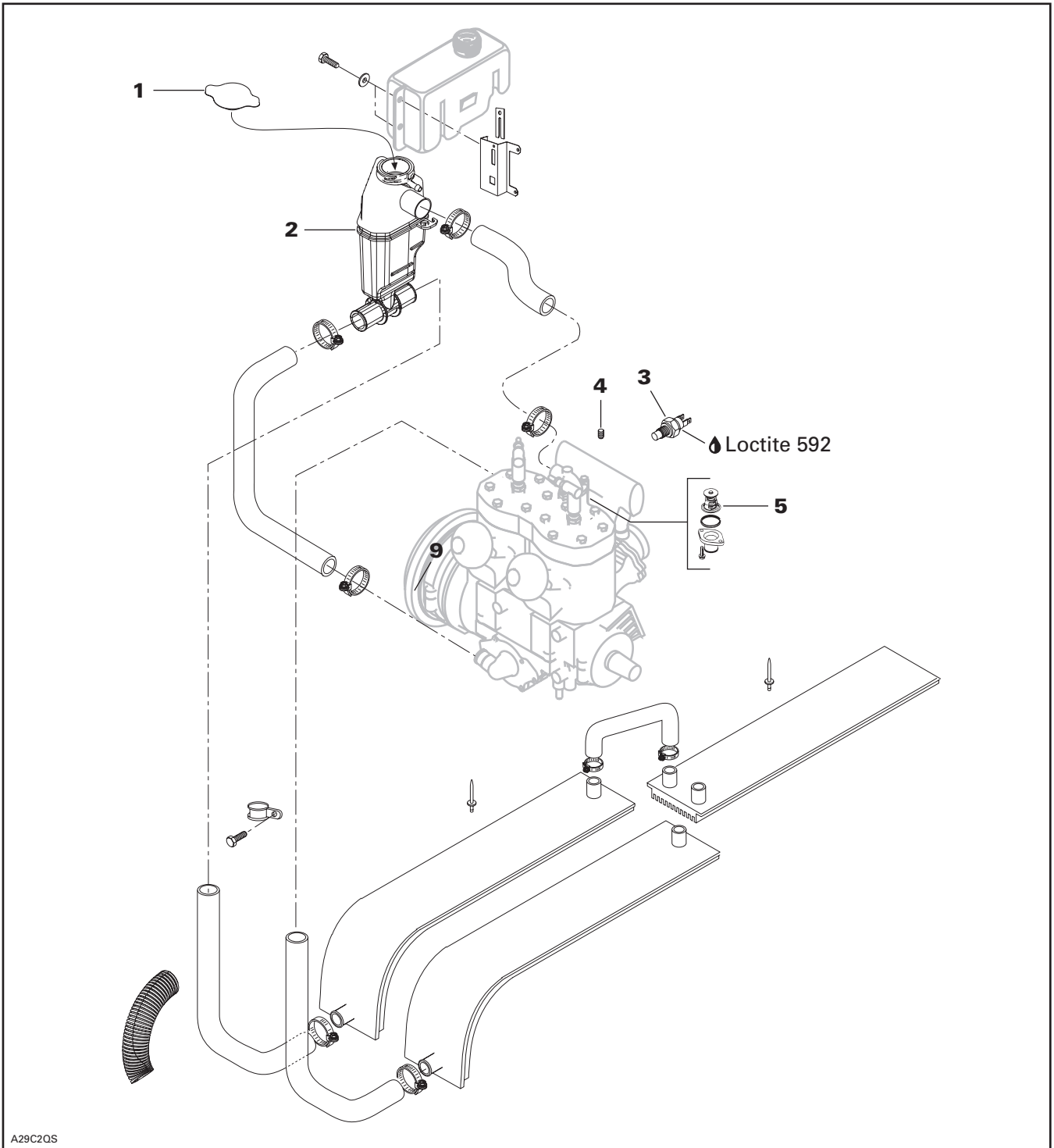
WARNING

Always reinstall fan protector after servicing.

Reinstall muffler.

LIQUID COOLING SYSTEM

593 Engine



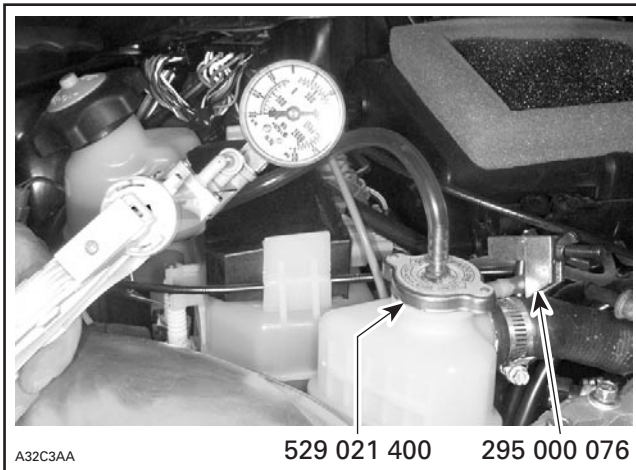
Section 04 ENGINE

Subsection 09 (LIQUID COOLING SYSTEM)

COOLING SYSTEM LEAK TEST

Install special radiator cap (P/N 529 021 400) included in engine leak tester kit (P/N 861 749 100) on coolant tank. Install hose pincher (P/N 295 000 076) on overflow hose. Using pump also included in kit pressurize all system through coolant reservoir to 100 kPa (15 PSI).

Check all hoses and cylinder/base for coolant leaks. Spray a soap/water solution and look for air bubbles.



INSPECTION

Check general condition of hoses and clamp tightness.

DRAINING THE SYSTEM

WARNING

Never drain or refill the cooling system when engine is hot.

To drain the cooling system, siphon the coolant mixture from the coolant tank. Disconnect hose at water pump to drain coolant from engine.

DISASSEMBLY AND ASSEMBLY

3,4, Sender and Plug

Apply Loctite 592 (P/N 413 702 300) thread sealant on sender and plug to avoid leaks.

1, Pressure Cap

Check if the cap pressurizes the system. If not, install a new 90 kPa (13 PSI) cap (do not exceed this pressure).

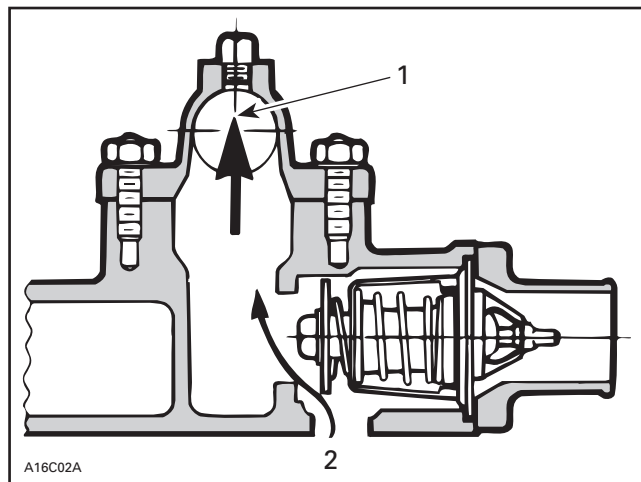
5, Thermostat

To check thermostat, put in water and heat water. Thermostat should start to open when water temperature reaches the following degree. It will be almost fully open at 50°C (122°F).

ENGINE	TEMPERATURE
593	42°C (108°F)

Thermostat is a double action type.

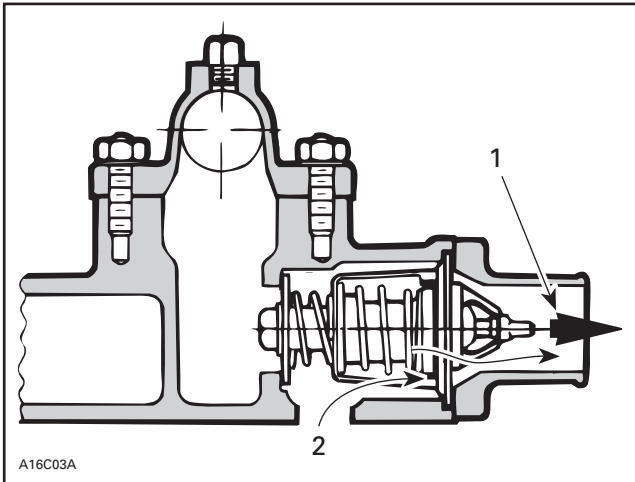
- Its function is to give faster warm up of the engine by controlling a circuit; water pump — engine — coolant tank. This is done by bypassing the radiator circuit.



TYPICAL — CLOSED THERMOSTAT, COLD ENGINE

- To reservoir
- From cylinders

- When the liquid is warmed enough, the thermostat opens progressively the circuit, water pump — engine — radiators — coolant tank to keep the liquid at the desired temperature. (See the diagram of the exploded view).



TYPICAL — OPEN THERMOSTAT, WARM ENGINE

1. To radiators
2. From cylinders

These 2 functions have the advantage of preventing a massive entry of cold water into the engine.

COOLING SYSTEM REFILLING PROCEDURE

CAUTION: To prevent rust formation or freezing condition, always replenish the system with recommended premixed coolant.

System Capacity

Refer to TECHNICAL DATA.

Refilling Procedure

IMPORTANT: USE THE 50/50 PREMIXED COOLANT - 37°C (- 35°F) (P/N 293 600 038).

Do not reinstall pressure cap.

Lift front of vehicle until the tunnel is horizontal. With engine cold, refill coolant tank **no. 2** up to cold level line. Wait a few minutes then refill to line. Start engine. Refill up to line while engine is idling until all air bubbles have escaped from system (about 4 to 5 minutes). Install pressure cap.

To make sure coolant flows through radiators, touch them by hand. They must feel warm.

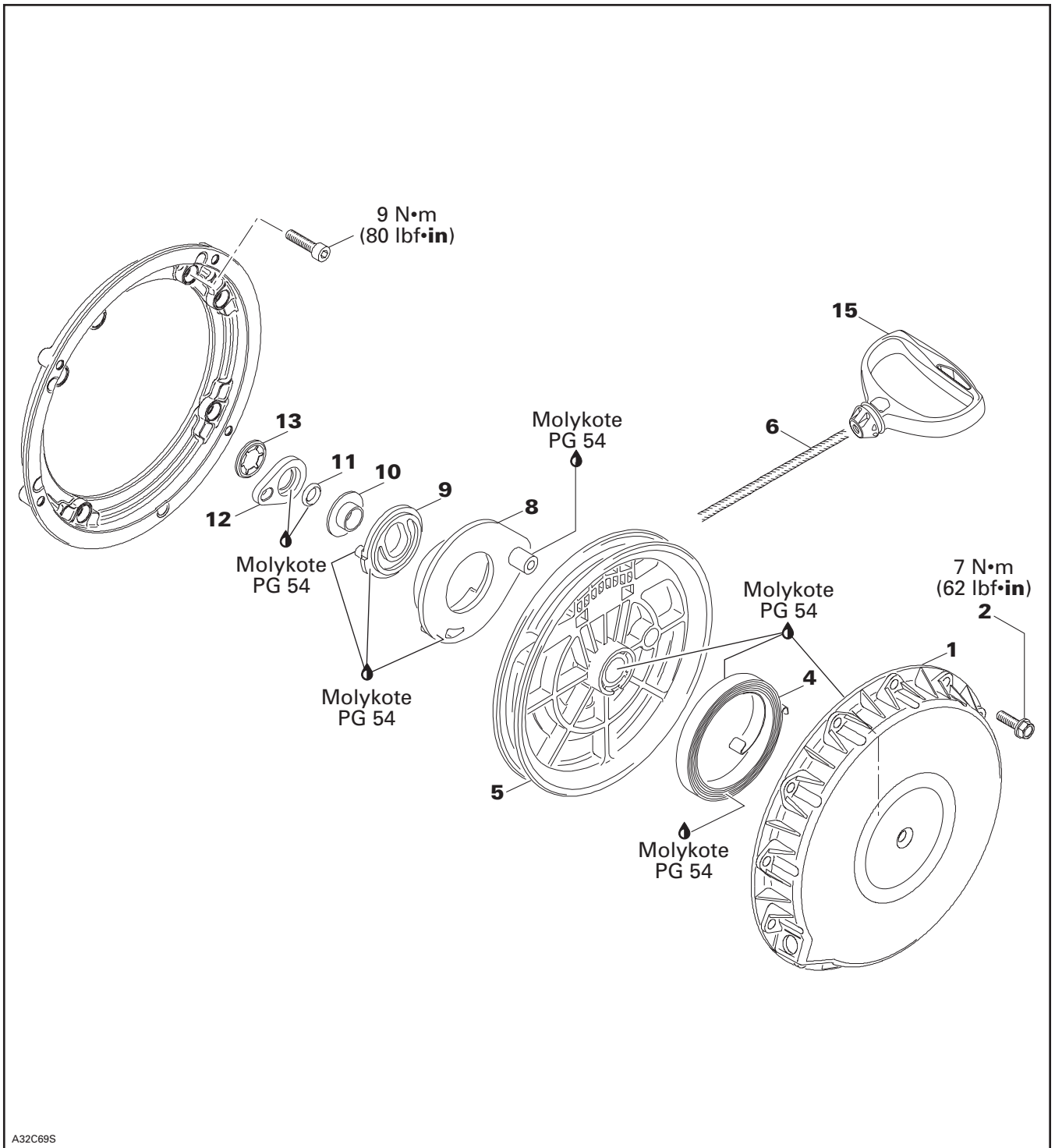
Put back front of vehicle on the ground.

When engine has completely cooled down, re-check coolant level in coolant tank and refill up to line.

Check coolant concentration (freezing point) with proper tester.

REWIND STARTER

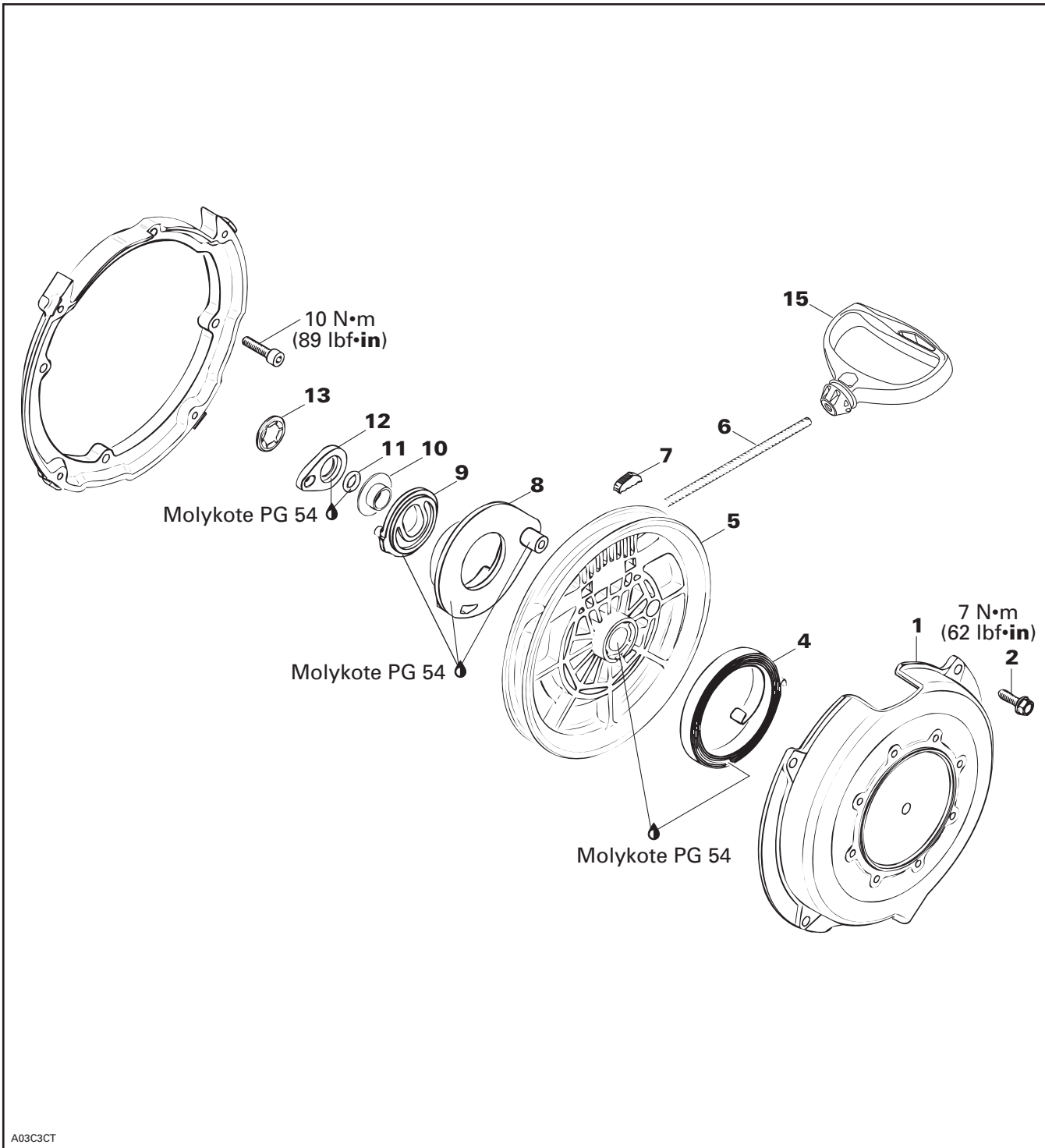
Plastic Rewind Starter on Liquid Cooled Models



Section 04 ENGINE

Subsection 10 (REWIND STARTER)

Plastic Rewind Starter on Fan Cooled Models



TYPICAL

INSPECTION

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

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

Check if rope no. 6 is fraying, replace if so.

When pulling starter grip, mechanism must engage within 30 cm (1 ft) of rope pulled. If not, disassemble rewind starter, clean and check for damaged plastic parts. Replace as required, lubricate, reassemble and recheck. Always replace O-ring no. 11 every time rewind starter is disassemble.

When releasing starter grip, it must return to its stopper and stay against it. If not, check for proper spring preload or damages. Readjust or replace as required.

When pulling starter grip 10 times in a row, it must return freely. If not, check for damaged parts or lack of lubrication. Replace parts or lubricate accordingly.

REMOVAL

Using a small screwdriver, extract rope knot from starter grip no. 15. Cut rope close to knot. Tie a knot near starter.

Remove screws no. 2 securing rewind starter no. 1 to engine then remove rewind starter.

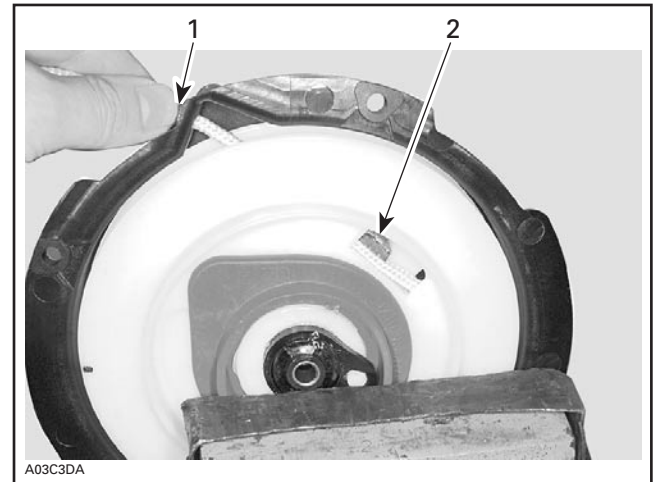
Fan Cooled Models Only

Remove pump from rewind starter cover.

ROPE REPLACEMENT

Fan Cooled Models Only

Completely pull out rope. Hold rewind starter in a vise.



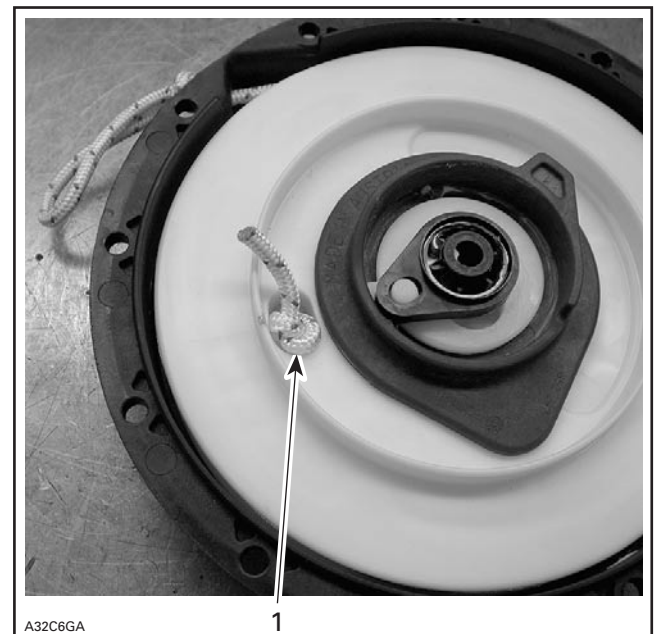
1. Rope exit hole
2. Key to be removed

With a long thin pin punch inserted through rope exit hole, push key no. 7. Remove key and rope. Install a new rope and lock it using key no. 7.

NOTE: When rope is completely pulled out, spring preload is 4-1/2 turns.

Liquid Cooled Models Only

Pull out rope. Hold rewind starter in a vise. Slide rope and untie the knot. Pull out the rope completely.



1. Knot to be untied.

NOTE: When rope is completely pulled out, spring preload is 4-1/2 turns.

Section 04 ENGINE

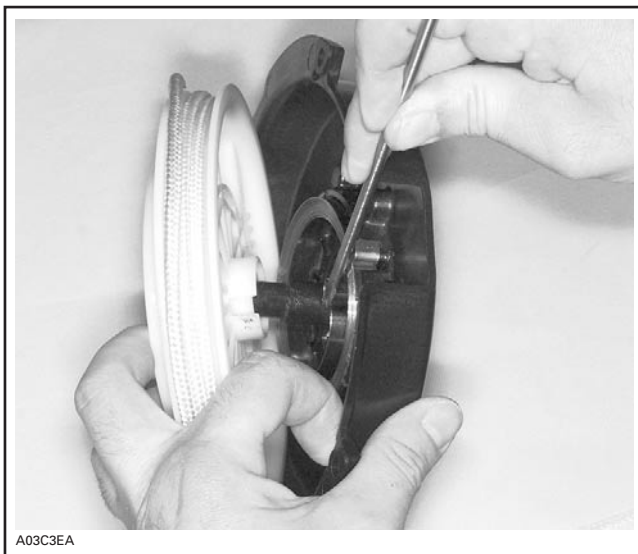
Subsection 10 (REWIND STARTER)

DISASSEMBLY

Undo knot previously tied at removal. Let sheave get free to release spring preload.

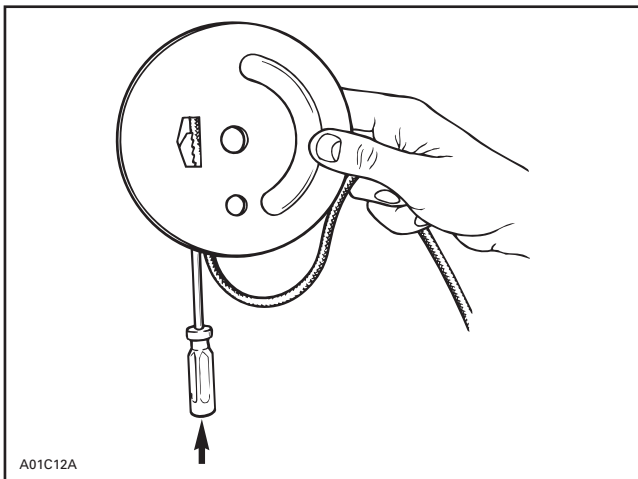
Cut push nut **no. 13** and discard. Remove locking element **no. 12**, O-ring **no. 11**, step collar **no. 10**, pawl lock **no. 9** and pawl **no. 8**.

Remove sheave **no. 5** from starter housing **no. 1**. Hold spring with a screwdriver.



Fan Cooled Models Only

– Disengage key **no. 7** and pull out rope **no. 6**.



GENTLY TAP ON KEY

Liquid Cooled Models Only

Take out the knot and then rope **no. 6**.

ASSEMBLY

At assembly, position spring **no. 4** outer end into spring guide notch then wind the spring counter-clockwise into guide.

⚠ WARNING

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

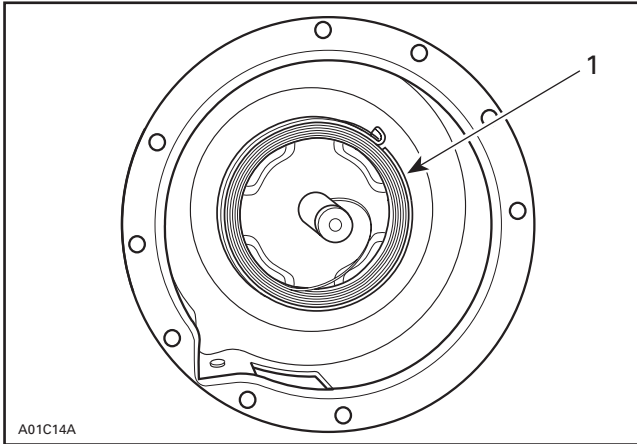


1. Outer end into guide notch

CAUTION: It is of the utmost importance that the rewind starter spring be lubricated periodically using Molykote PG 54 (P/N 420 899 763). Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.

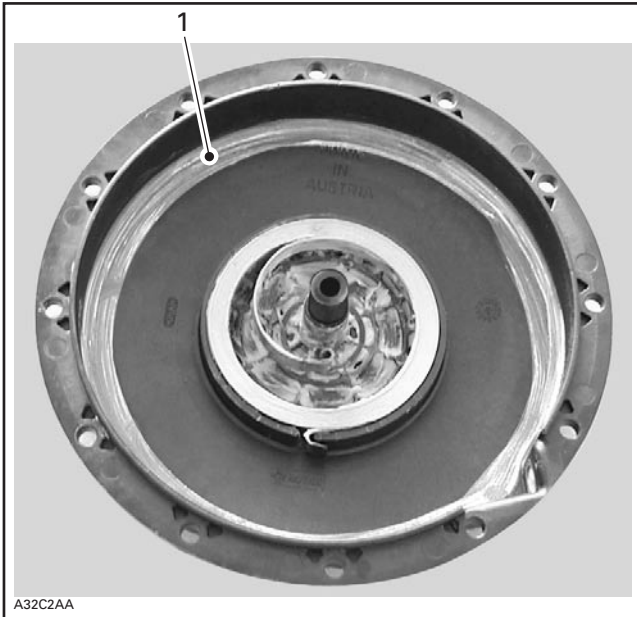
Lubricate spring assembly and 1 cm (1/2 in) wide on bottom of housing with Molykote PG 54 (P/N 420 899 763).

Section 04 ENGINE
Subsection 10 (REWIND STARTER)



TYPICAL

1. Molykote PG 54 inside spring guide

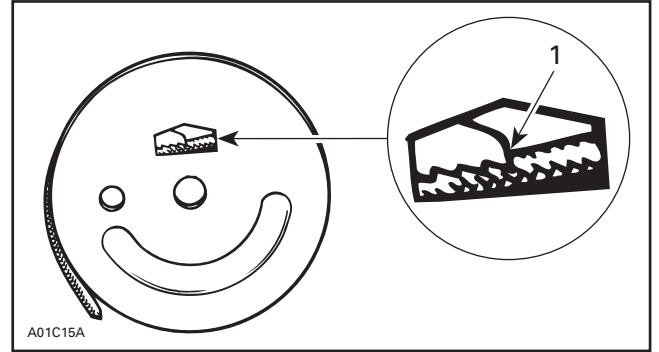


1. Molykote PG 54 applied 1 cm (1/2 in) wide on bottom of housing

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

Fan Cooled Models Only

To install rope no. 6, insert rope into sheave no. 5 orifice and lock it with the key no. 7 as illustrated.

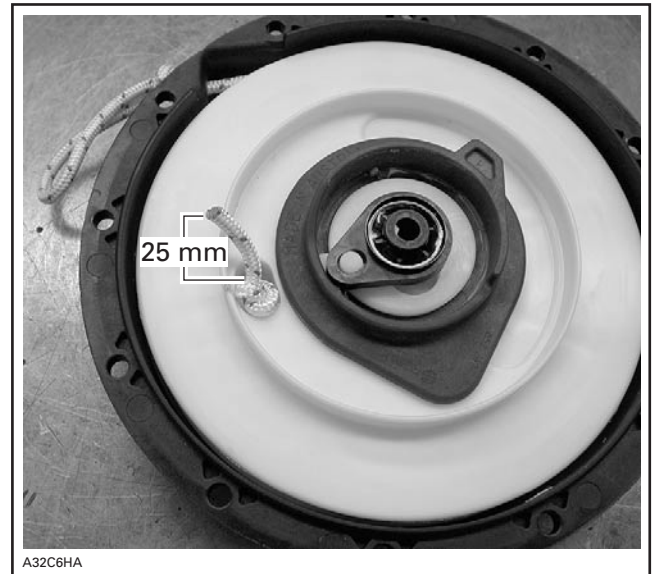


1. Push to lock

Lubricate housing post with silicone compound grease. Install sheave.

Liquid Cooled Models Only

To install rope no. 6, insert rope into sheave no. 5 orifice and lock it by making a knot, leaving behind a free portion of about 25 mm in length. Fuse rope end with a lit match and insert it into sheave.



FREE PORTION

Section 04 ENGINE

Subsection 10 (REWIND STARTER)



FREE PORTION INSERTED INTO SHEAVE

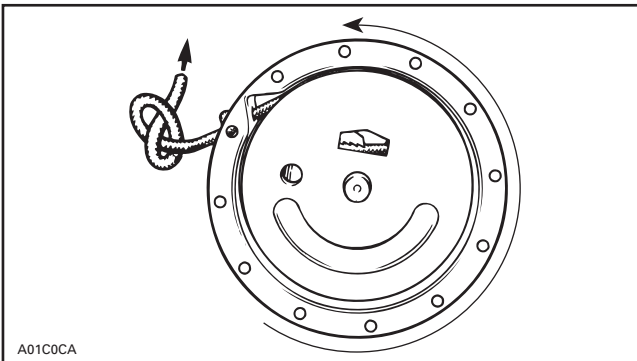
Lubricate housing post with silicone compound grease. Install sheave.

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 rope exit hole. This will give 1/2 turn of preload.

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



TYPICAL

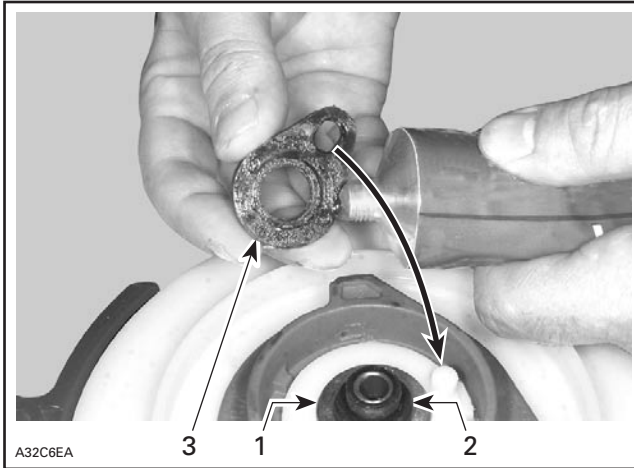
Lubricate pawl no. 8 with Molykote PG 54 (P/N 420 899 763) then install over rope sheave.



Lubricate pawl lock no. 9 with Molykote PG 54 (P/N 420 899 763). Install over pawl.



Install step collar no. 10 with its sleeve first. Lubricate a new O-ring no. 11 and locking element no. 9 with Molykote PG 54 (P/N 420 899 763). Install over pawl lock.



1. Step collar
2. O-ring
3. Locking element

Position a new push nut no. 13.

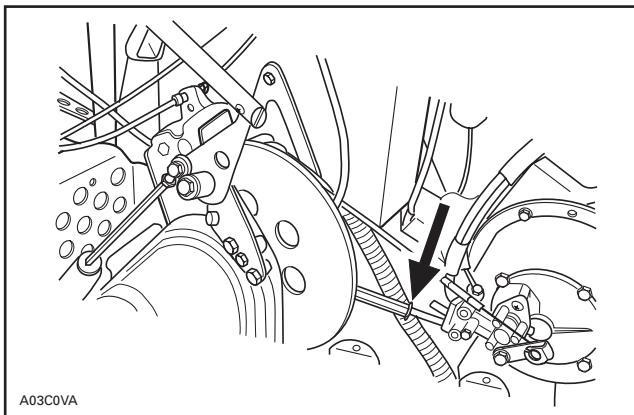
INSTALLATION

Fan Cooled Models Only

Reinstall oil pump on rewind starter assembly.

All Models

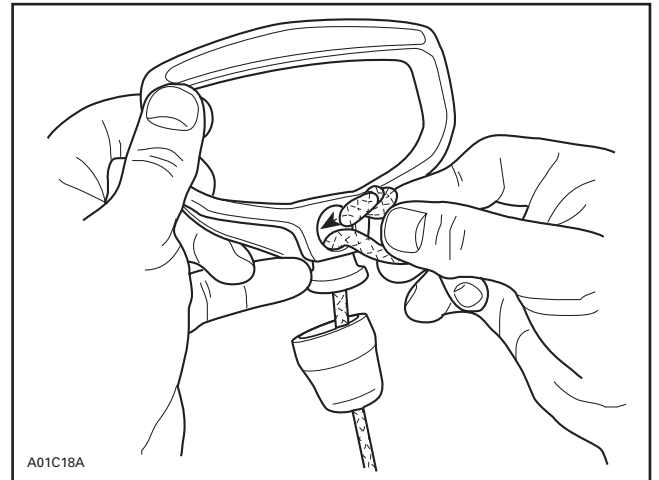
Thread starter rope no. 6 through rope guide when applicable.



TYPICAL

Reinstall rewind starter assembly on engine.

Prior to installing starter grip no. 15 on new rope, it is first necessary to fuse the rope end with a lit match. Pass rope through 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.

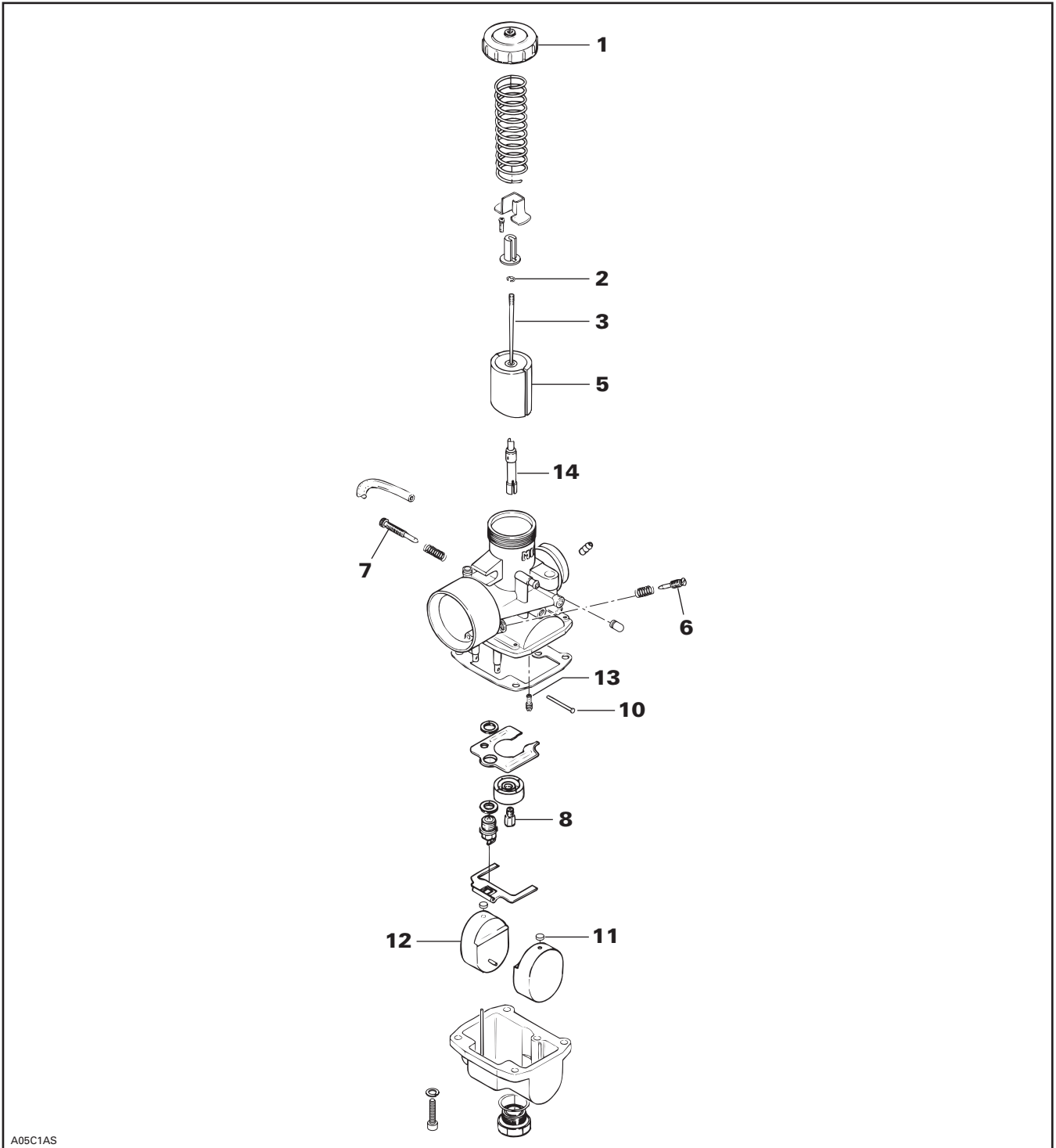


TYPICAL

CARBURETOR AND FUEL PUMP

CARBURETOR

Tundra

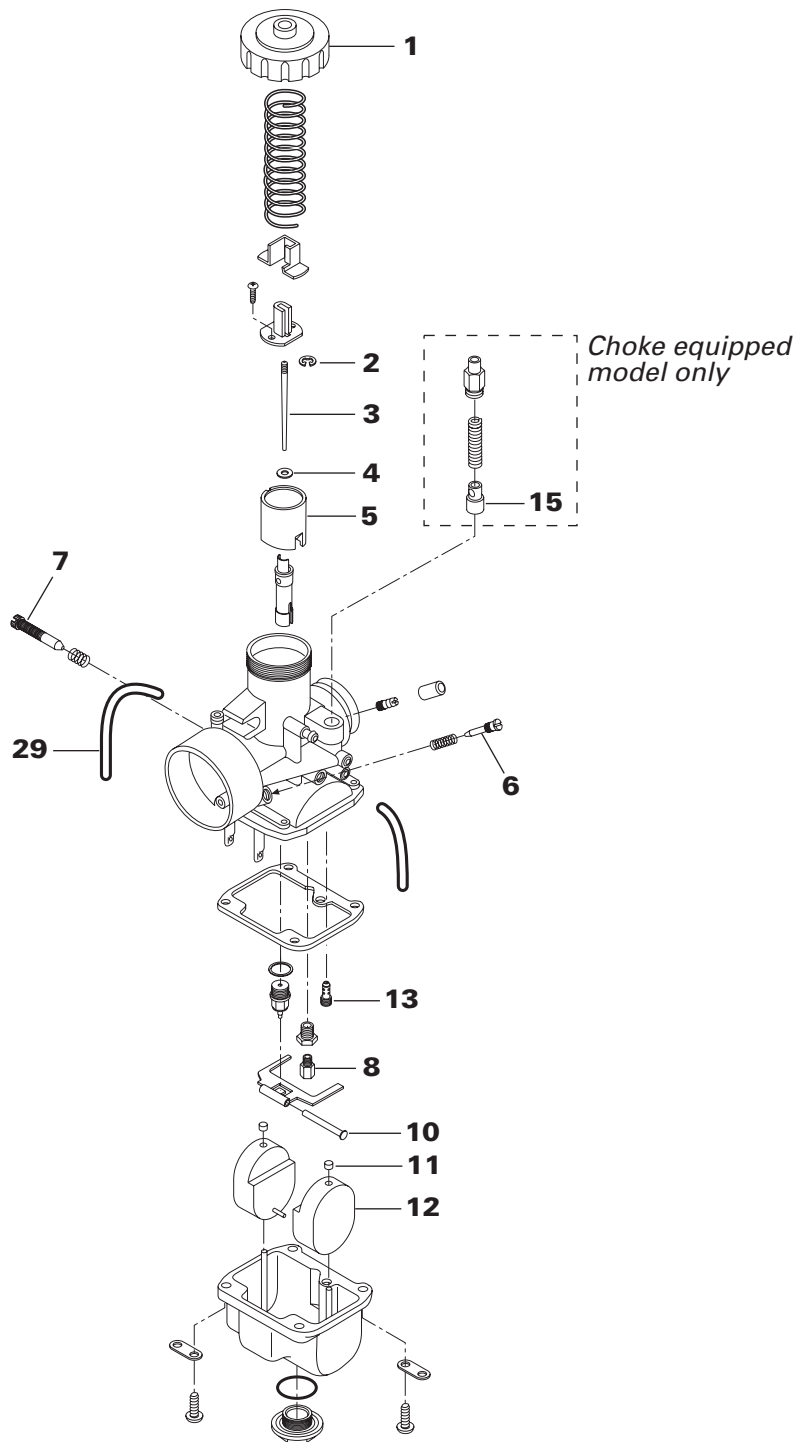


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Section 04 ENGINE

Subsection 11 (CARBURETOR AND FUEL PUMP)

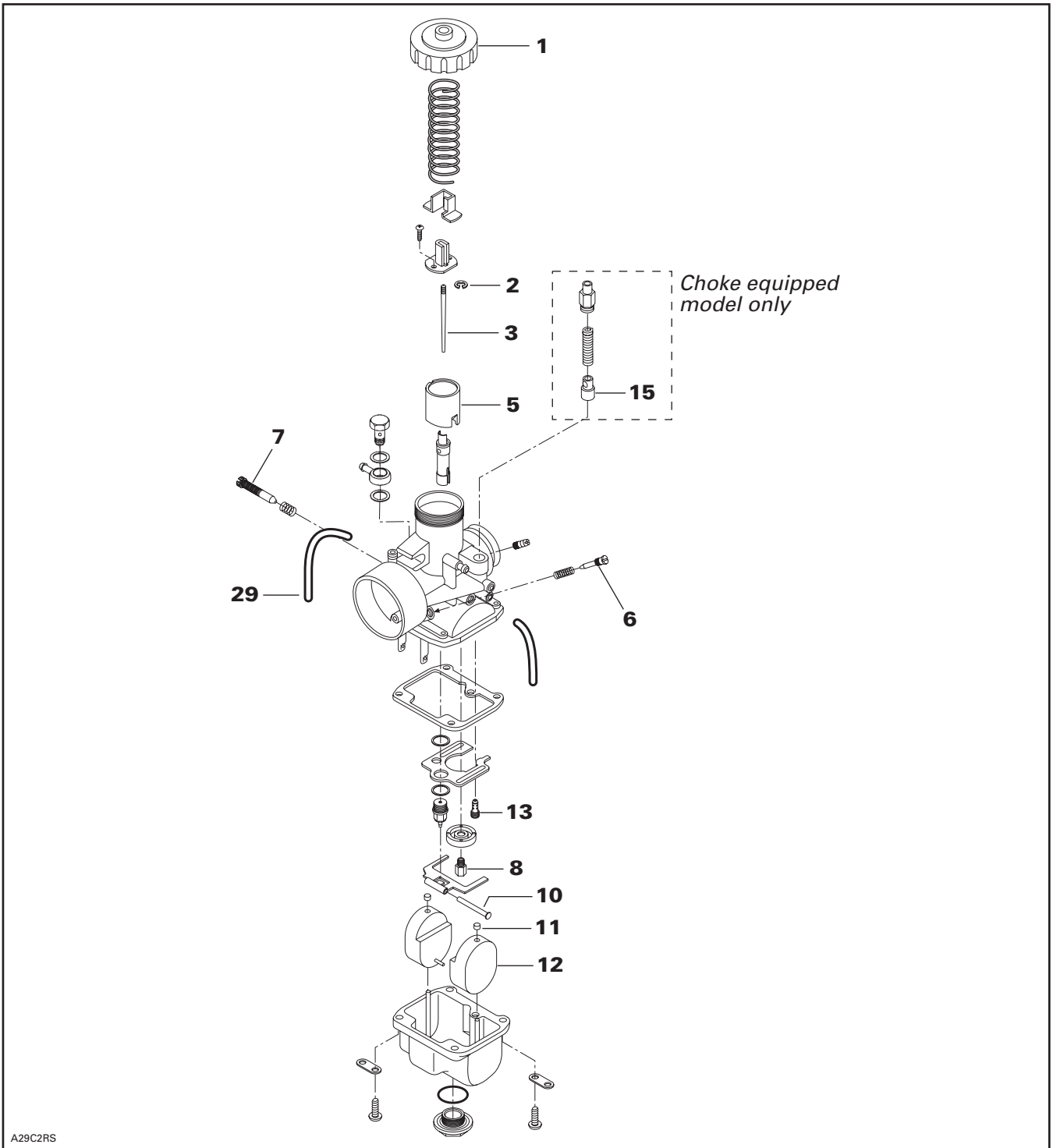
Skandic LT/LT E



A21C0CS

Section 04 ENGINE
Subsection 11 (CARBURETOR AND FUEL PUMP)

Skandic WT/SWT/SUV 550/SUV 600



A29C2RS

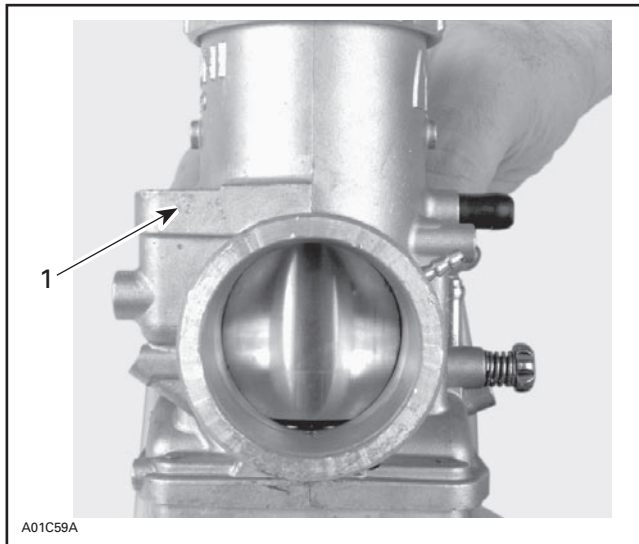
TYPICAL

Section 04 ENGINE

Subsection 11 (CARBURETOR AND FUEL PUMP)

IDENTIFICATION

All carburetors are identified on their body.

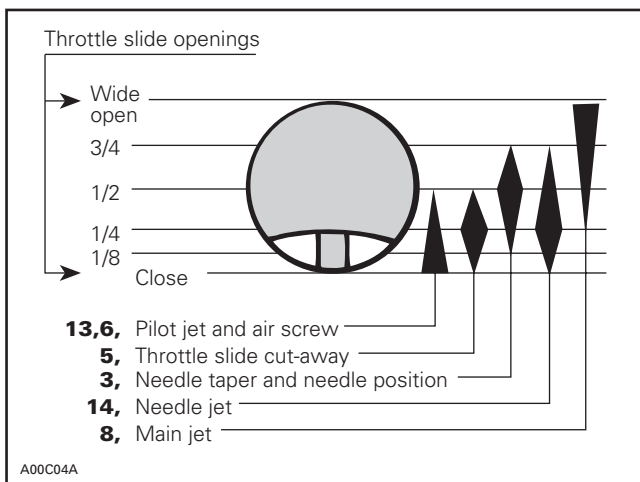


1. Identification: 34-482

CARBURETOR CIRCUIT OPERATION VERSUS THROTTLE OPENING

The following illustration shows the part of the carburetor which begins and 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 begins to function at closed position but it is most effective at 1/4 opening and decreases up to 1/2 opening.



VIEW FROM AIR INTAKE OPENING

NOTE: For proper calibration refer to TECHNICAL DATA and to SPARK PLUG.

NOTE: For high altitude regions, a Service Bulletin will give information about calibration according to altitude and temperature.

REMOVAL

Tundra and Skandic LT/WT/SWT

Remove air silencer.

All Models

Disconnect fuel inlet line.

Disconnect primer line from carburetor on some models.

Disconnect choke cable on some models.

Unscrew carburetor cover no. 1 then pull out throttle slide no. 5 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. Replace any jets having gum or varnish on their surfaces.

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 **no. 5** for wear. Replace as necessary.

Check idle speed screw **no. 7** for straightness. Replace as necessary.

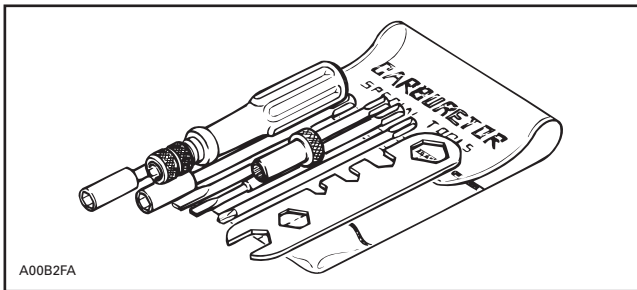
Check for fuel soaked into float **no. 12**; replace as necessary.

Check float **no. 12** for cracks or other damages affecting free movement; replace as necessary.

Inspect throttle cable and housing for any damages. 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 404 112 000).

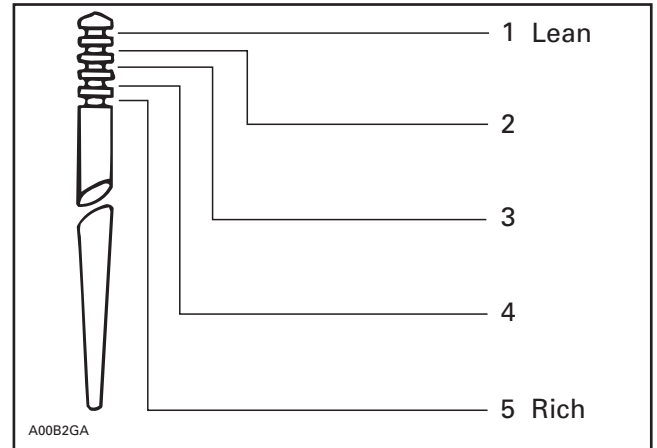
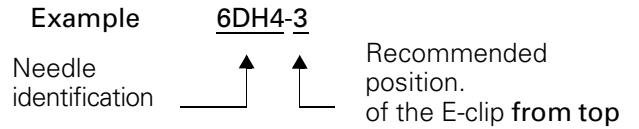


2,3, E-Clip and Needle

Remove screws from needle retaining plate to withdraw the needle.

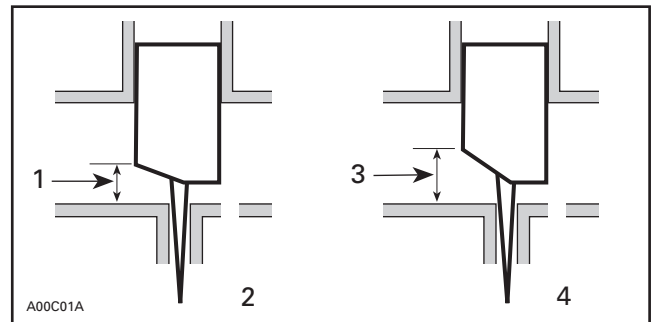
The position of the needle in the throttle slide is adjustable by means of an E-clip inserted into 1 of 5 grooves located on the upper part of the needle.

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



CLIP POSITIONS

The size of the throttle slide cut-away affects the fuel mixture between 1/8 to 1/2 throttle opening.



- 1. Low cut-away low
- 2. Rich mixture
- 3. High cut-away high
- 4. Lean mixture

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. A service bulletin will give information about calibration according to altitude and temperature.

Section 04 ENGINE

Subsection 11 (CARBURETOR AND FUEL PUMP)

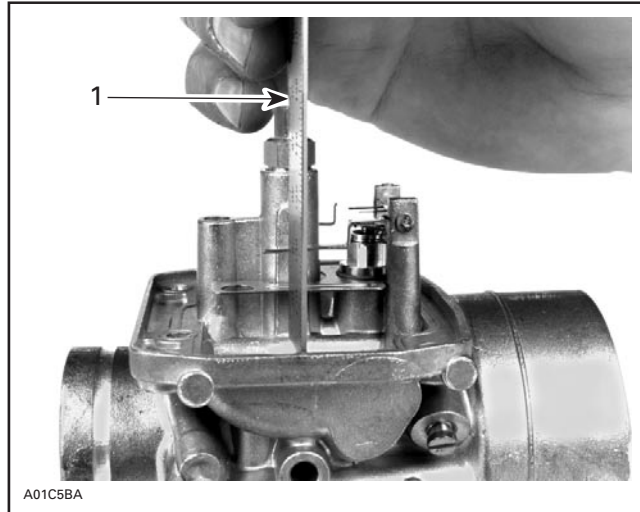
CARBURETOR FLOAT LEVEL ADJUSTMENT

CAUTION: Spark plugs will foul if float is adjusted too low. Engine may be damaged if float is adjusted too high.

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:

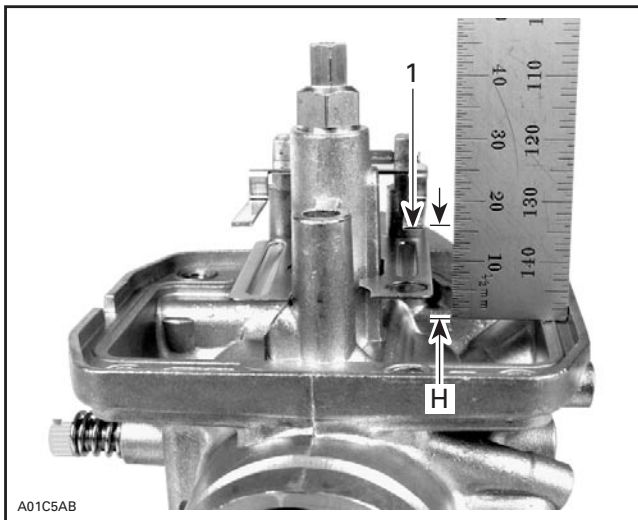
- Make sure that float arm is symmetrical — not distorted.
- Remove float bowl and gasket from carburetor.
- With carburetor chamber upside-down on a level surface, measure height H between bowl seat and top edge of float arm. Keep ruler perfectly vertical and in line with main jet hole.



A01C5BA

1. Ruler vertical and in line with main jet

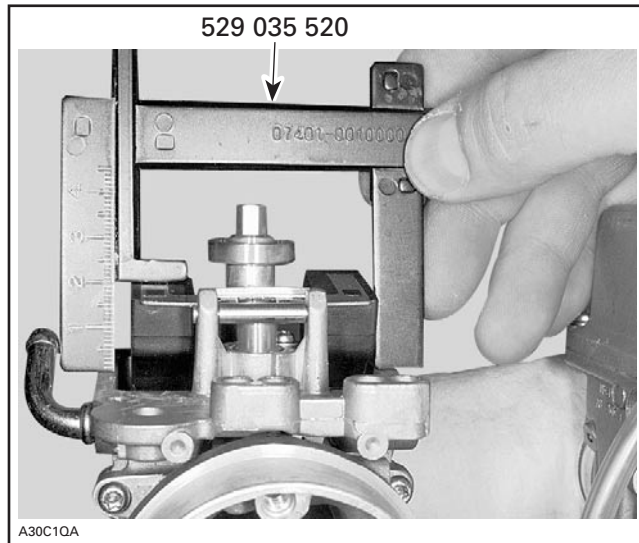
Float level height can be checked using tool (P/N 529 035 520). Keep tool in line with main jet as explained above.



A01C5AB

TYPICAL

1. Measure from top of float arm
H: Float height (including float arm thickness)

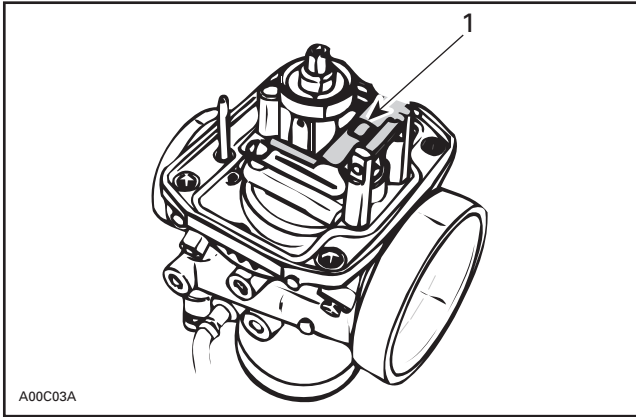


A30C1QA

MODELS	FLOAT HEIGHT H ± 1 mm(± .040 in)
Tundra Skandic LT/WT/SWT/SUV 550	23.9 (.941)
Skandic WT LC/SUV 600	18.1 (.713)

To Adjust Height H

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

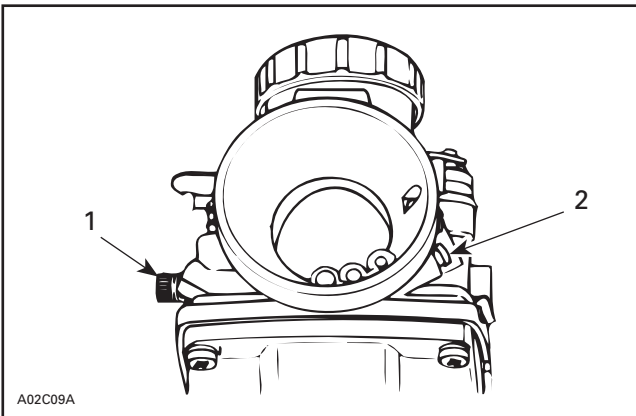


1. Contact tab

CARBURETOR ADJUSTMENTS

Adjustments should be performed following this sequence:

- air screw adjustment
- throttle slide height (preliminary idle speed adjustment)
- throttle cable adjustment
- carburetor synchronization (dual carburetor models)
- final idle speed adjustment (engine running)
- oil pump and carburetor synchronization.



1. Idle speed screw
2. Air screw

6, Air Screw

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.

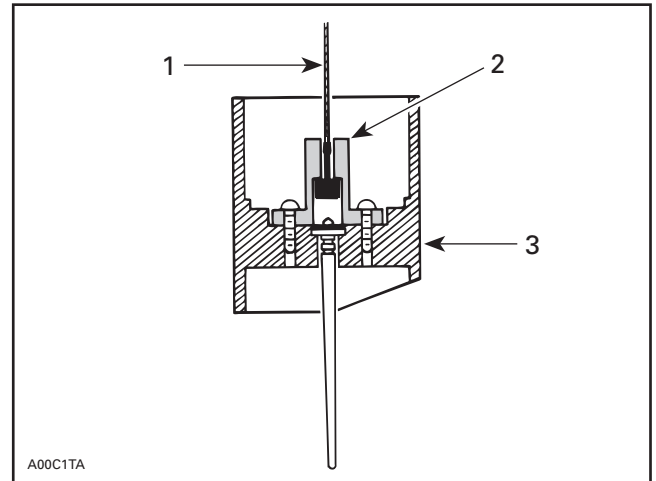
Refer to TECHNICAL DATA for the specifications.

Throttle Slide Height

Preliminary Idle Speed Adjustment

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 let air escape through and thus allow a quick response.



CENTER POST TYPE

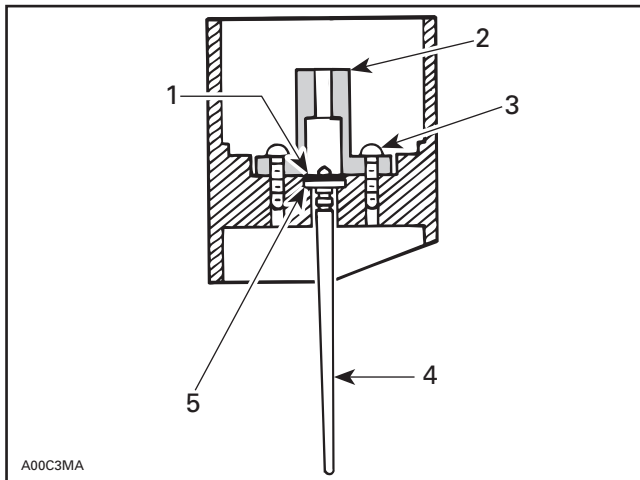
- 1. Throttle cable
- 2. Needle retaining plate
- 3. Throttle slide

Make sure the nylon packing **no. 4** is installed on all applicable throttle slides.

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

Section 04 ENGINE

Subsection 11 (CARBURETOR AND FUEL PUMP)



CENTER POST TYPE

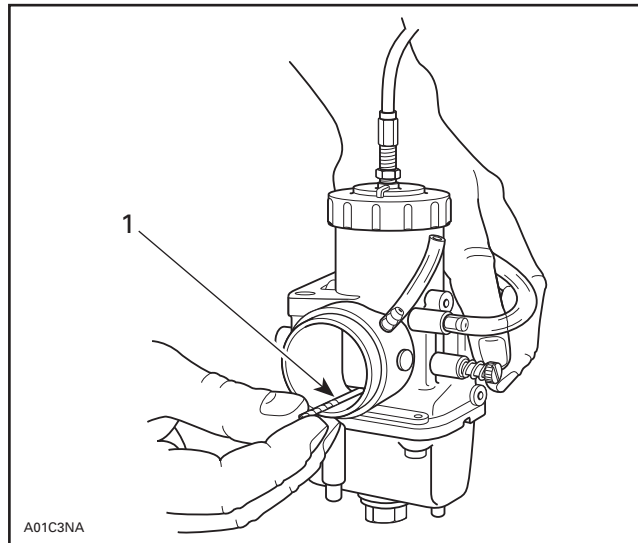
1. E-clip
2. Needle retaining plate
3. Screw
4. Needle
5. Nylon packing

Using a drill bit as a gauge, adjust throttle slide height (see following table) by turning idle speed screw **no. 7**. Throttle slide height is measured on **outlet** side of carburetor (engine side).

NOTE: Make sure that throttle cable does not hold throttle slide. Loosen cable adjuster accordingly. Throttle cable adjustment will be done during adjustment of throttle-slide-to-cover free play.

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

MODELS	THROTTLE SLIDE HEIGHT ± 0.1 mm (± .004 in)
Tundra Skandic WT/SWT/WT LC/ SUV 550/SUV 600	1.5 (.059)
Skandic LT	1.3 (.051)



TYPICAL

1. Drill bit used as gauge for throttle slide height

INSTALLATION

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

Prior to installing carburetor, adjust air screw and preliminary idle speed as described above.

To install carburetor on engine, inverse removal procedure.

However, pay attention to the following:

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.

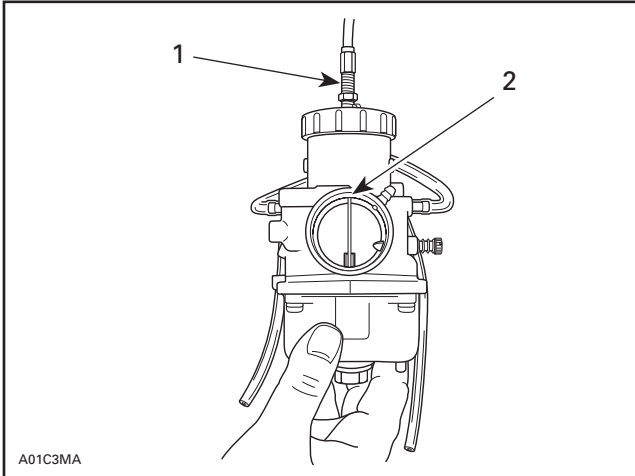
Throttle Cable Adjustment

⚠ WARNING

Ensure the engine is turned OFF, prior to performing the throttle cable adjustment.

For maximum performance, correct cable adjustment is critical.

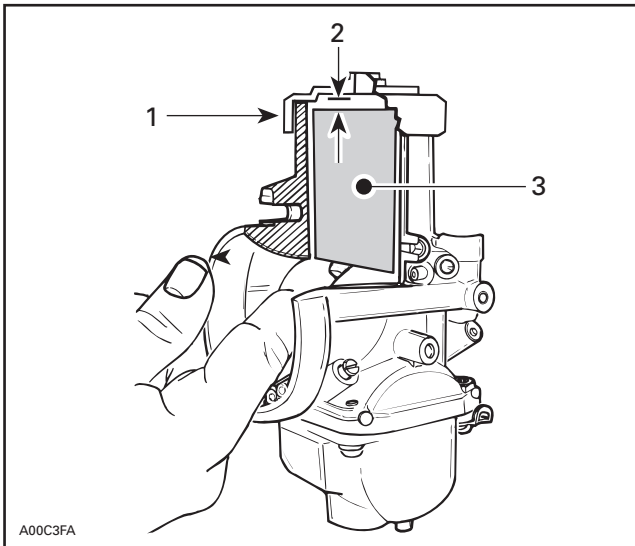
At full opening, throttle slide must be flush or 1.0 mm (.040 in) lower than the top of carburetor **outlet** bore (engine side). Use a mirror to look through inlet bore. First loosen adjuster nut then turn throttle cable adjuster accordingly.



FULL OPENING (THROTTLE LEVER AGAINST HANDLE GRIP)

1. Throttle cable adjuster
2. Throttle slide flush or 1.0 mm (.040 in) lower than carburetor outlet bore (engine side)

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



FULL OPENING (THROTTLE LEVER AGAINST HANDLE GRIP)

1. Cover
2. Free play
3. Throttle slide

⚠ WARNING

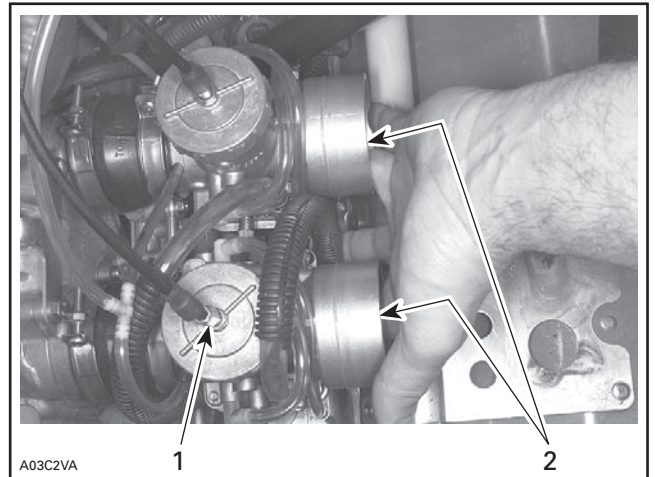
This gap is very important. If the throttle slide rests against the carburetor cover at full throttle opening, this will create too much strain and may damage the throttle cable or other components in throttle mechanism.

Carburetor Synchronization

Dual Carburetor Models Only

When depressing throttle lever, both carburetor slides must start to open at the same time.

Unlock cable adjustment lock nut on one carburetor. Screw or unscrew cable adjuster until both carburetor slides start to open at same time. Cable play will be identical on both carburetors. Retighten jam nut.



TYPICAL

1. Screw or unscrew adjuster
2. Check that both slides start to open at the same time

Check throttle slide position at wide open throttle. Throttle slide must be flush or 1 mm (.040 in) lower than carburetor **outlet** bore. At that same position, check that throttle slide does not contact carburetor cover. Turn cable adjuster and recheck synchronization.

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.

Section 04 ENGINE

Subsection 11 (CARBURETOR AND FUEL PUMP)

CAUTION: On dual carburetor models, make sure both carburetors start to operate simultaneously. Do not interchange carburetors as 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: The oil injection pump adjustment must be checked each time carburetor is adjusted. Refer to OIL INJECTION SYSTEM.

IDLE SPEED FINAL ADJUSTMENT

7, Idle Speed Screw

CAUTION: Before starting engine for the final idle adjustment, make sure that oil pump is adjusted. The oil injection pump adjustment must be checked each time carburetor is adjusted. Refer to OIL INJECTION SYSTEM.

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 for the specifications.

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

CHOKE

Skandic LT/WT/SWT/WT LC

Choke Plunger Adjustment

Set choke lever to fully open position.



CHOKE LEVER — FULLY OPEN POSITION

Skandic LT/WT/SWT

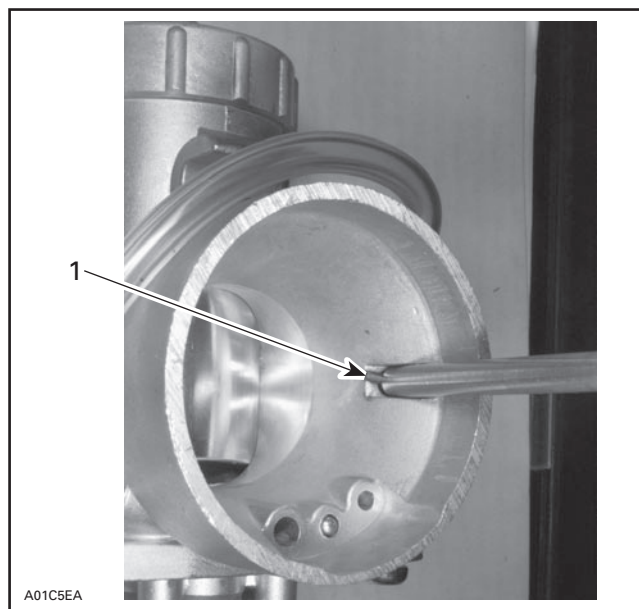
Use small diameter (for VM 30, VM 32 and VM 34 carburetors) of choke plunger tool (P/N 529 032 100).

Skandic WT LC/SUV 600

Use big diameter (for VM 38) of choke plunger tool (P/N 529 032 100).

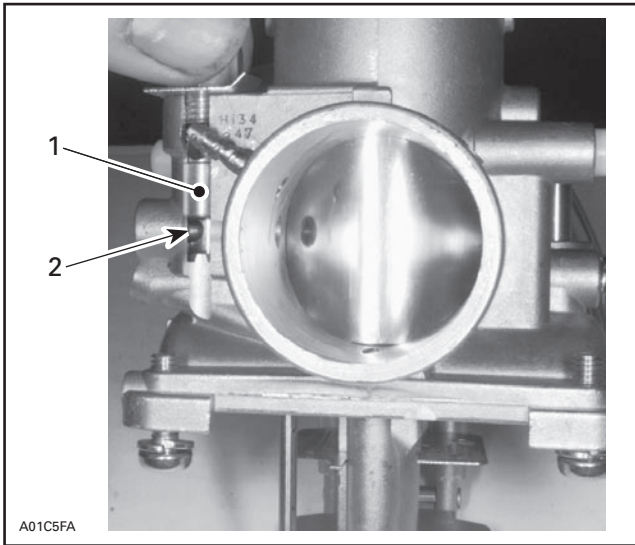
All Models

Insert proper diameter of choke plunger tool into choke air inlet of each carburetor. Tool stopper may not lean against recess wall. Though it must be within 1 mm (.040 in) of recess wall.



AIR SILENCER SIDE SHOWN

1. Tool stopper within 1 mm (.040 in) of recess wall



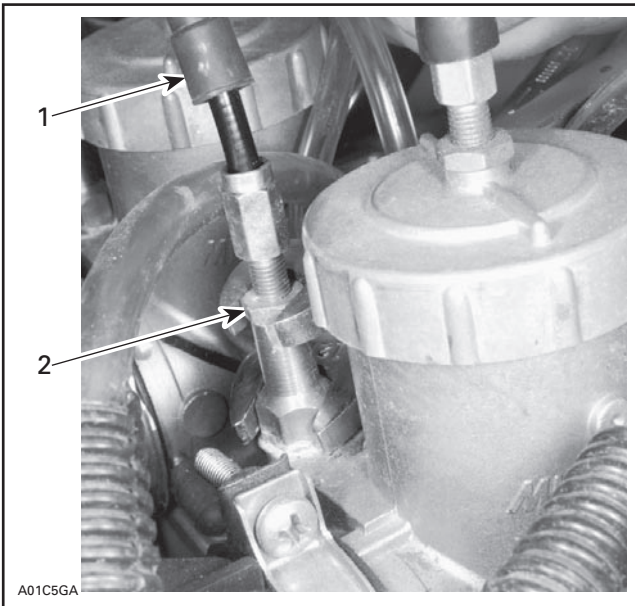
CUT-AWAY (ENGINE SIDE SHOWN)

1. Choke plunger
2. Tool properly seated under choke plunger

If tool tip does not sit under choke plunger **no. 15**, adjust as follows:

Make sure choke lever is at fully open position.

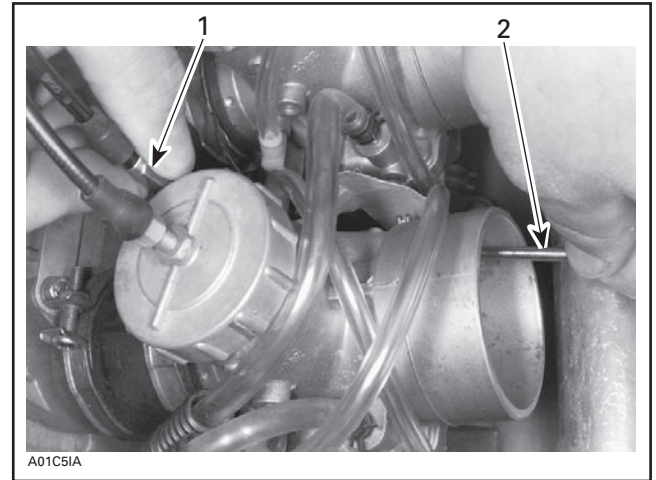
Lift up protector cap and loosen choke cable lock nut, as shown in the next photo.



1. Lift up protector cap
2. Loosen lock nut

Turn choke cable adjustment nut by hand until tool properly sits under choke plunger.

NOTE: A light pressure is be needed to position tool under plunger.

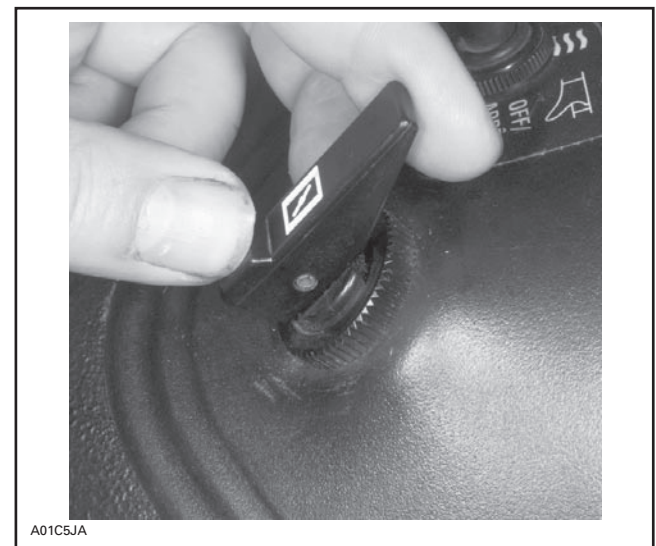


1. Choke cable adjustment nut
2. Choke plunger tool

Tighten choke cable lock nut and reinstall protector cap.

Set choke lever to close and open positions and ensure that tool properly seats under plunger **only** when lever is set to fully open position.

Set choke lever to close position and, by pulling and pushing choke lever, make sure there is no tension on cable (free play).



CHOKE LEVER — CLOSED POSITION

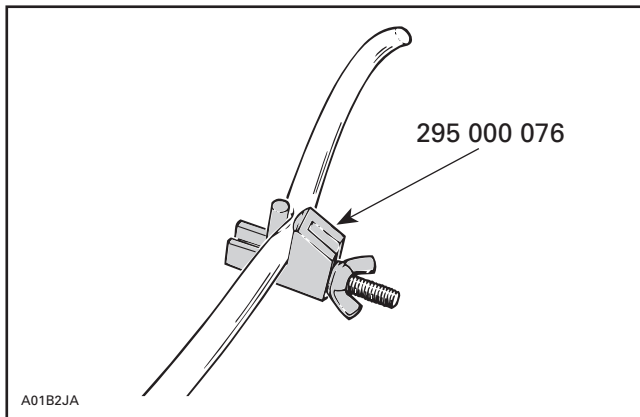
Section 04 ENGINE

Subsection 11 (CARBURETOR AND FUEL PUMP)

FUEL PUMP

REMOVAL

Install a hose pincer (P/N 295 000 076) on fuel supply line close to pump inlet.



Disconnect fuel outlet line(s).

Disconnect impulse line.

Remove screws 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 pump of leak test kit. 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.

To check impulse diaphragm and gasket on high-supply fuel pump equipped with twin outlets, proceed as follows:

Connect a clean plastic tubing to the impulse nipple and plug vent hole on top cover. Either apply pressure or vacuum using the pump (P/N 529 021 800) from the engine leak tester kit. The diaphragm/gasket must not leak.

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 pump if too dirty.

INSTALLATION

To install, inverse removal procedure.

⚠ WARNING

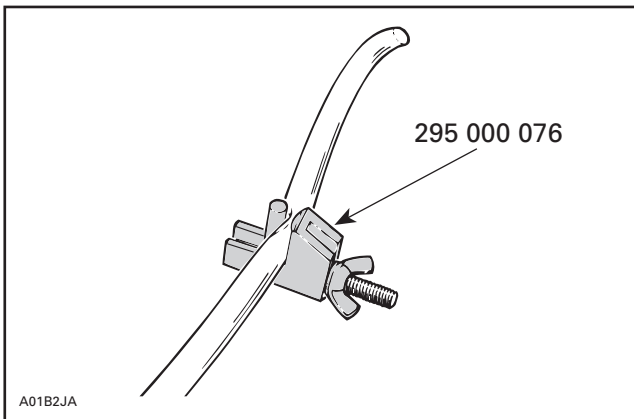
Pressure test to ensure there is no leak in fuel system.

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 295 000 076) 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.

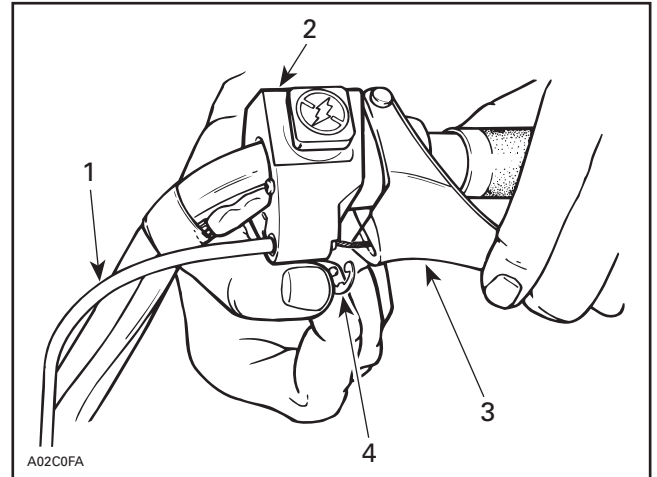
Throttle Cable Circlip at Handlebar

All Models

Put silicone grease (P/N 293 550 004) around cable barrel. Locate circlip as per illustration.

⚠ WARNING

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



TYPICAL

1. Throttle cable housing
2. Throttle lever housing
3. Throttle lever
4. Circlip

Adjust throttle cable as specified in CARBURETOR AND FUEL PUMP.

Throttle Cable Routing

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

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DRIVE BELT

APPLICATION CHART

MODEL	PART NUMBER	MINIMUM WIDTH (wear limit)
Tundra	414 827 600	30.0 mm (1.181 in)
Skandic LT/LT E/WT/SWT/WT LC/SUV 550	414 633 800	32.0 mm (1.260 in)
Skandic WT LC/SUV 600	414 300 155	34.7 mm (1.366 in)

CHECKING NEUTRAL FUNCTION

⚠ WARNING

Always check neutral function when servicing.

Apply parking brake. Vehicle must be on the ground and on a plane level surface. No one should be in front of vehicle.

Attach vehicle tether cord to your clothing. Stand aside of vehicle then, start engine.

⚠ WARNING

Do not sit on vehicle.

Release parking brake. Vehicle must not creep when engine is idling. Otherwise, make sure that:

- idle speed is as specified
- proper belt is installed
- pulley center-to-center is as specified
- belt deflection is as specified.

CLEANING

Before drive belt installation, clean drive and driven pulley sheaves with Pulley flange cleaner (P/N 413 711 809).

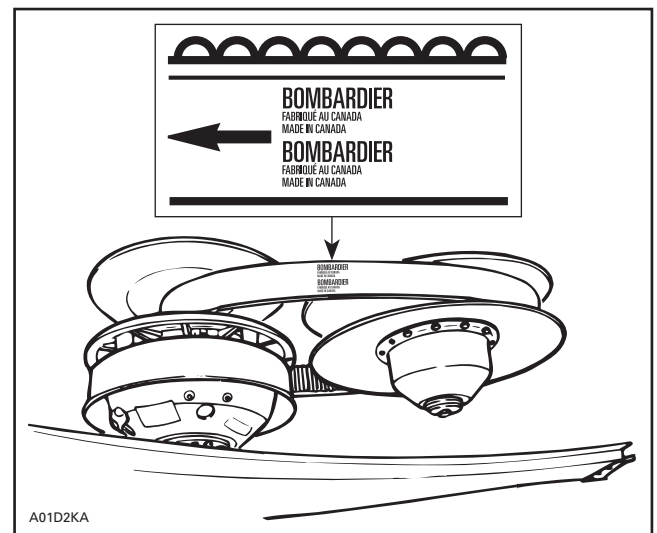
INSPECTION

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 (see table above).

ROTATION DIRECTION

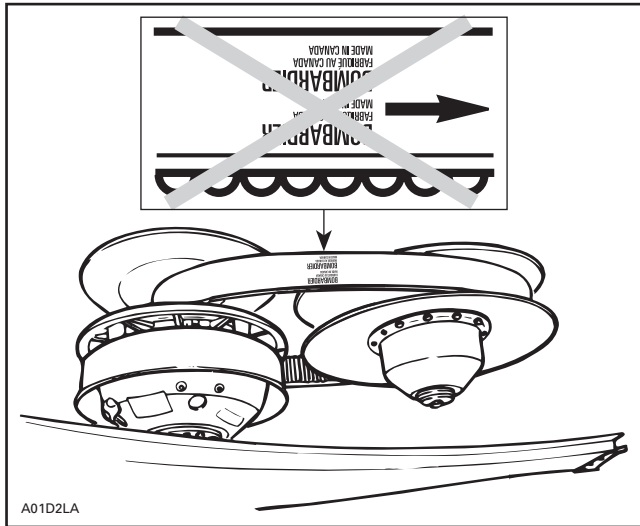
The maximum drive belt life span is obtained when the drive belt is installed as shown. This will ensure that correct direction of rotation is respected.



CORRECT

Section 05 TRANSMISSION

Subsection 02 (DRIVE BELT)



INCORRECT

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

DRIVE BELT HEIGHT MEASUREMENT AND ADJUSTMENT

NOTE: The drive belt height measurement and adjustment must be performed each time a new drive belt is installed.

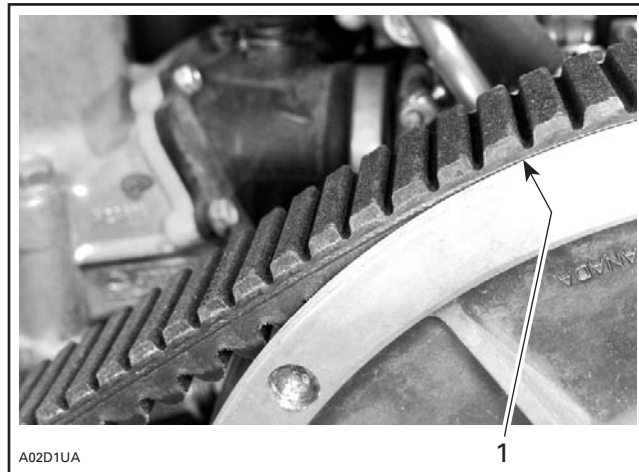
Measurement

Before checking the belt height, ensure that a good-condition proper belt (refer to the APPLICATION CHART) is installed.

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

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

MODEL	BELT HEIGHT mm (in)
All models	Top edge of drive belt cord should be flush with driven pulley edge



1. Flush

Adjustment

Before adjusting the belt height, ensure that a good-condition proper belt (refer to the APPLICATION CHART) is installed.

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

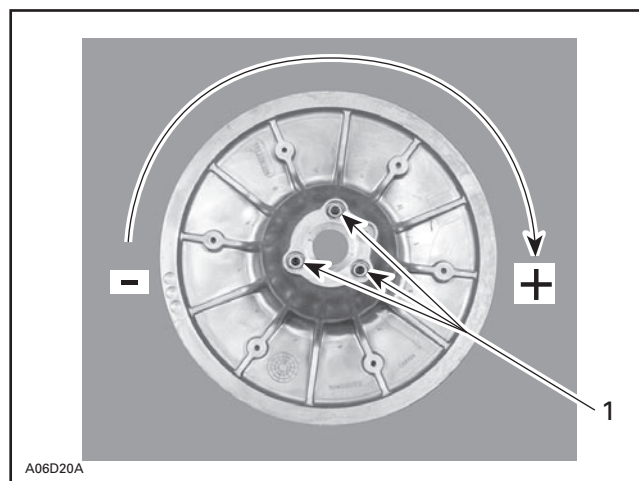
Models Equipped with Formula VSA Type Driven Pulley

Adjust drive belt height using Allen screws, as shown.

To lower belt in driven pulley: turn Allen screws clockwise.

To raise belt in driven pulley: turn Allen screws counterclockwise.

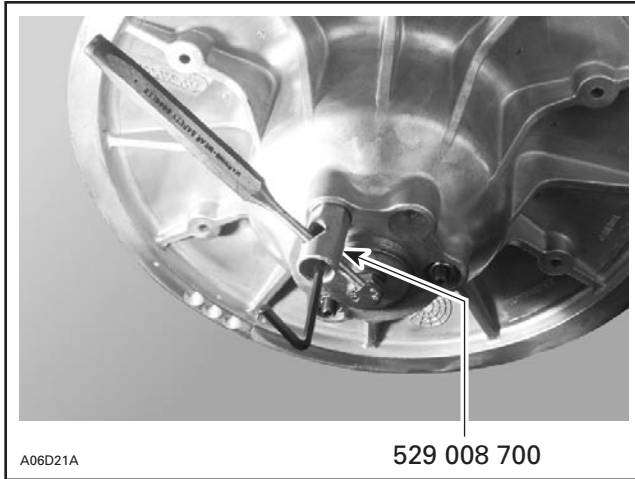
NOTE: Turn Allen screws 1/4 turn at a time, then rotate driven pulley to allow drive belt to settle in pulley. Check height, repeat as required.



TYPICAL

1. Allen screws with jam nuts

Allen screws must be restrained while tightening jam nut to prevent throwing adjustment out. Use drive belt tension adjuster (P/N 529 008 700).



TYPICAL

All Models

Vary pulley distance — within tolerances — to obtain proper drive belt height.

DRIVE BELT DEFLECTION MEASUREMENT (reference only)

IMPORTANT: The drive belt deflection will be automatically set after performing the pulley distance and belt height adjustments. The following procedure will confirm proper pulley distance and belt height adjustment.

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 that a good-condition proper belt (Refer to the APPLICATION CHART) is installed.

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

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

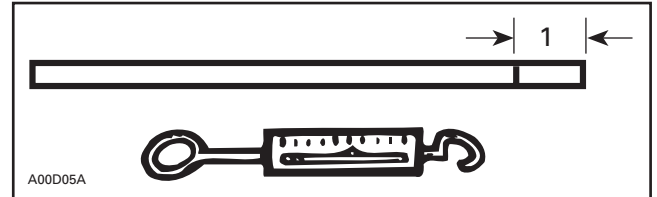
MODEL	DEFLECTION† mm (in)	FORCE kg (lb)
Tundra	32 ± 5 (1.260 ± .197)	6.8 (15)
All Skandic	32 ± 5 (1.260 ± .197)	11.5 (25)

† FOR REFERENCE ONLY

To Check Tension

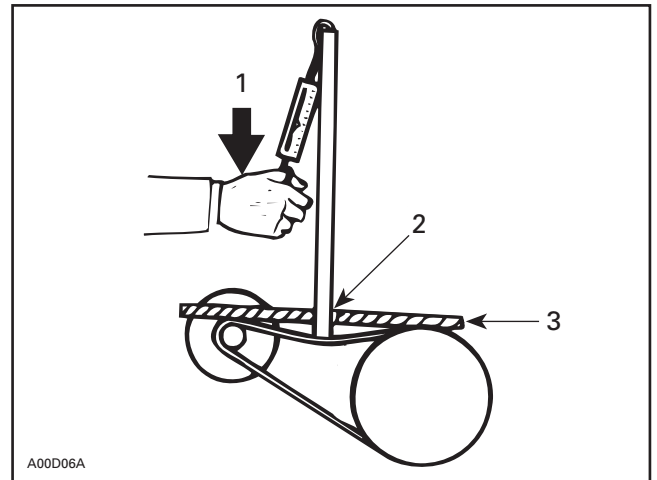
Position a reference rule on drive belt.

Wooden Stick and Spring Scale Method



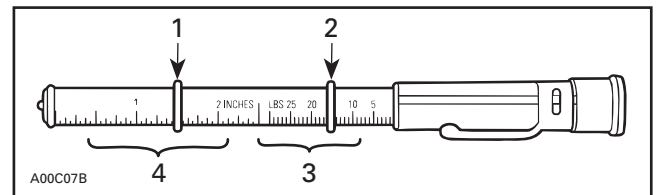
1. Mark specified deflection

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



- 1. Force
- 2. Read deflection here
- 3. Reference rule

Or use the belt tension tester (P/N 414 348 200).

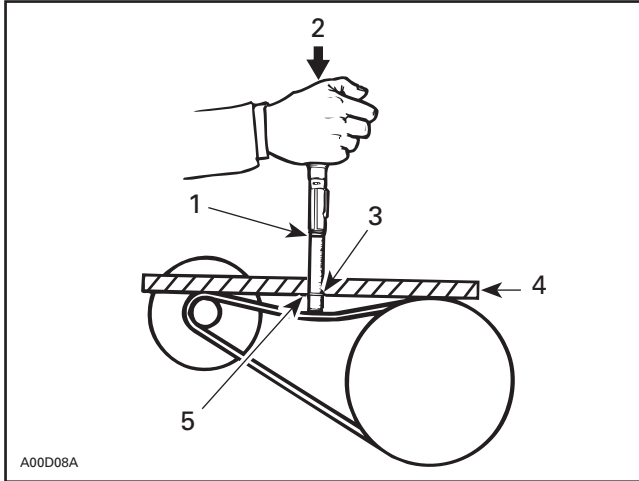


- 1. Lower O-ring
- 2. Upper O-ring
- 3. Force (read down)
- 4. Deflection (read up)

Section 05 TRANSMISSION

Subsection 02 (DRIVE BELT)

1. Slide lower O-ring of tester to specified deflection.
2. Slide upper O-ring of tester until reaching mark 0 (zero).
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.



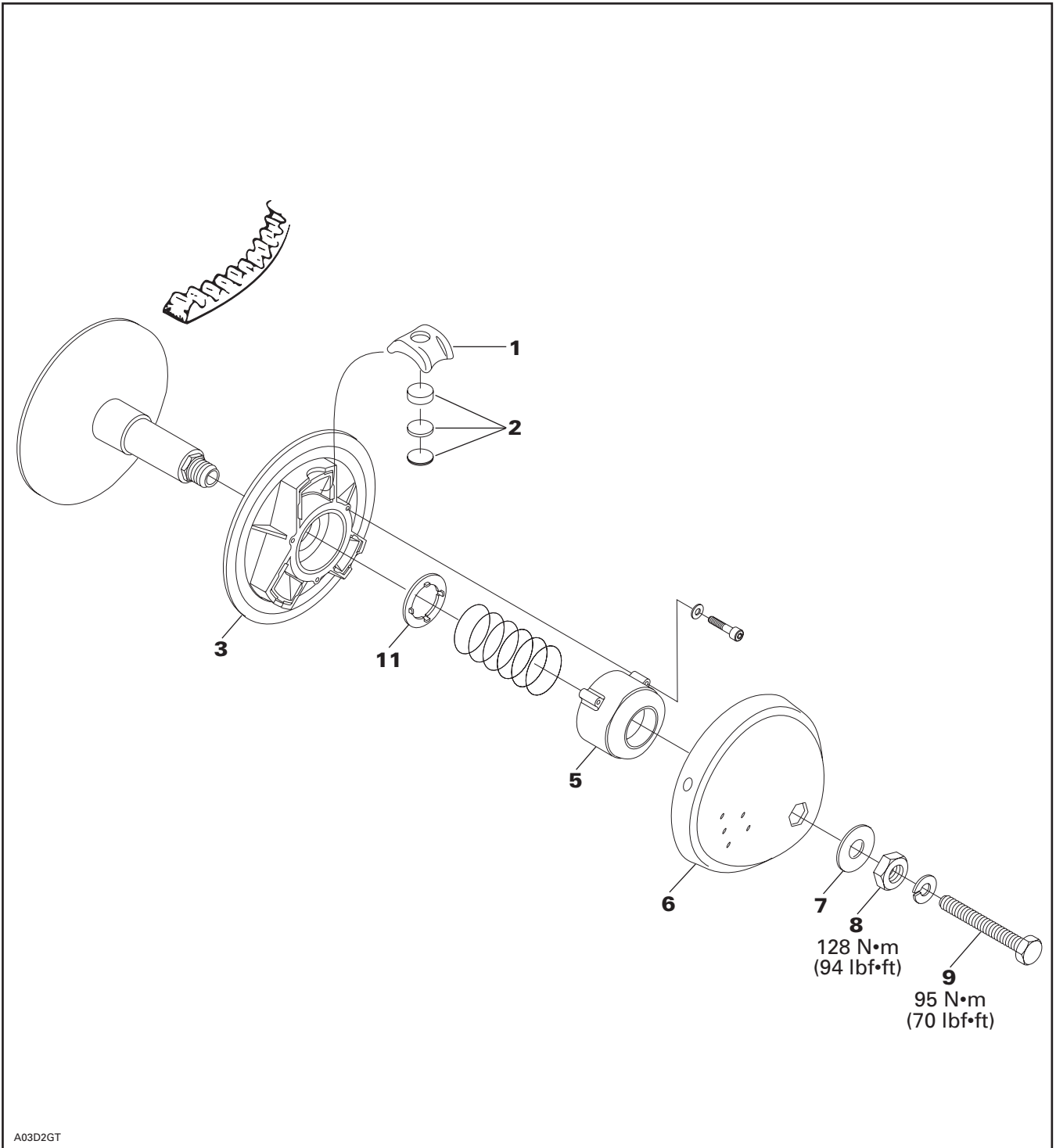
1. Upper O-ring — force
2. Force applied
3. Lower O-ring — deflection
4. Reference rule
5. Deflection

DRIVE PULLEY

BOMBARDIER LITE

NOTE: This is a lubrication free drive pulley.

Tundra/Skandic WT 550/SWT/SUV 550



Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)

GENERAL

Some drive pulley components (return spring, calibration disk) can be changed to improve vehicle performance in high altitude regions. A *Service Bulletin* will give information about calibration according to altitude.

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

⚠ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

NOTE: If disassembling drive pulley, first straighten tab washer no. 7 then untighten nut no. 8.

⚠ WARNING

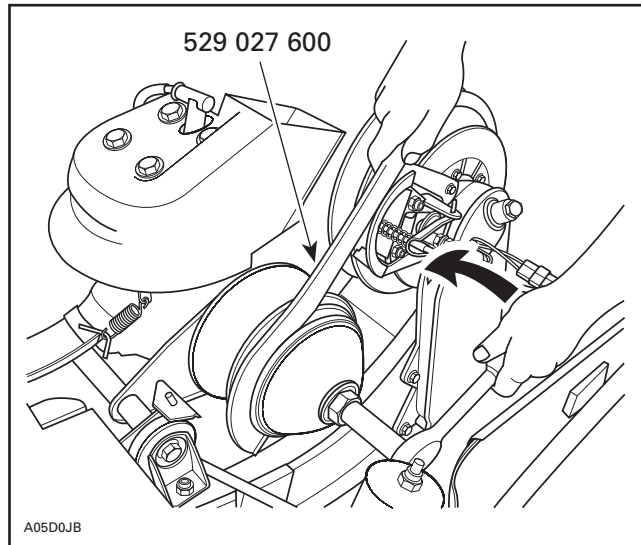
Never use an impact wrench to remove or install the drive pulley.

⚠ WARNING

The drive pulley assembly is a precisely balanced unit. Never replace parts with used parts from another drive pulley assembly.

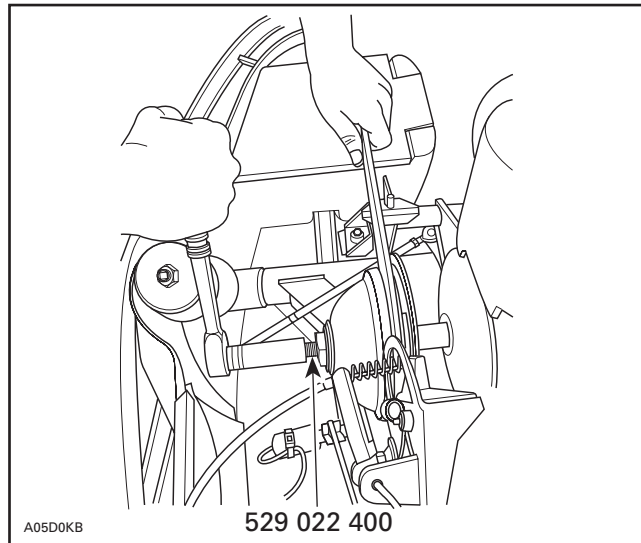
Use holder (P/N 529 027 600).

Remove retaining screw no. 9.



TYPICAL

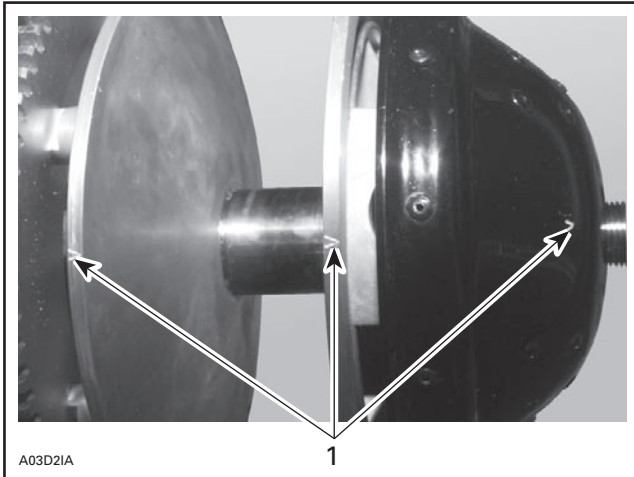
Insert drive pulley puller (P/N 529 022 400) then remove drive pulley.



TYPICAL

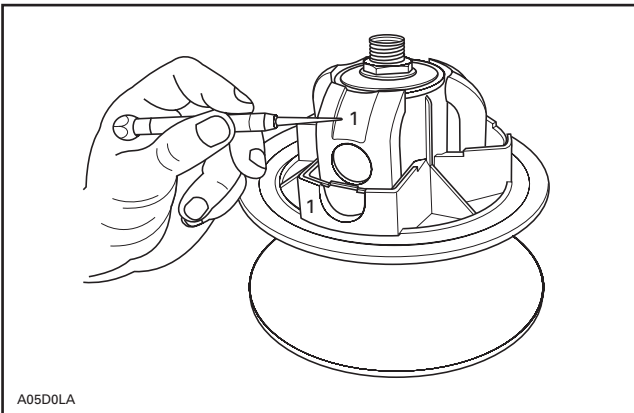
DISASSEMBLY

Unscrew nut. Remove tab washer.
Check for alignment marks for proper indexing at reassembly.



1. Alignment marks

Identify blocks no. 1 and their respective positive positions for reassembly.

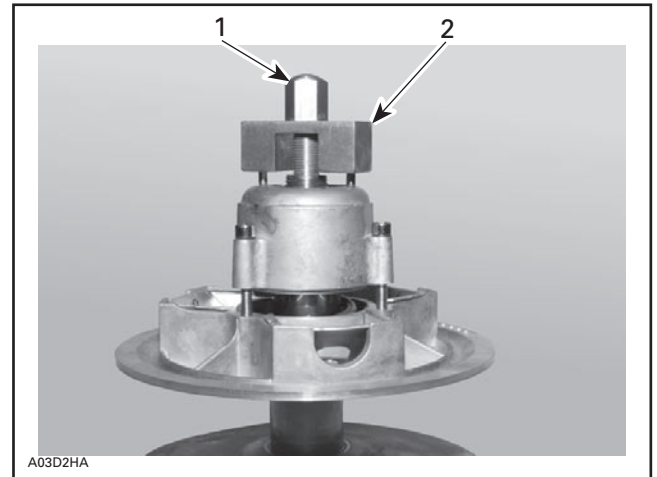


1. Identify

2, Cap, Washer and Disk

These are calibration parts. Refer to TECHNICAL DATA.

Install spring cover tool (P/N 529 027 300) with puller (P/N 529 022 400) on spring cover.



1. Puller tool
2. Spring cover tool

Screw puller (hand tight) to hold spring cover and remove screws holding spring cover.

Slowly unscrew puller to release spring pressure.
Remove spring cover no. 5, spring and spring seat no. 11.

CLEANING

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

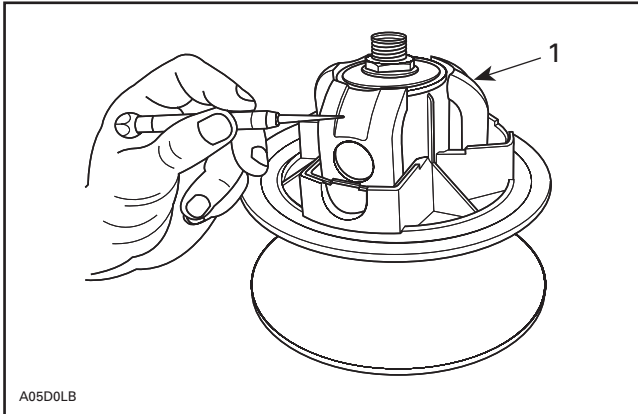
Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)

ASSEMBLY

Install spring seat no. 11 then the spring and its cover no. 5.

Make sure to install blocks in their original position and with their curved end toward governor cup. See following illustration.



1. Curved end

Tighten nut no. 8 to 128 N•m (94 lbf•ft).

INSTALLATION

Torque screw to 80 to 100 N•m (59 to 74 lbf•ft).

Install drive belt and belt guard.

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

⚠ WARNING

Make sure the track is free of particles that 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 low speed (maximum 30 km/h (20 MPH)) and apply the brake, repeat 5 times.

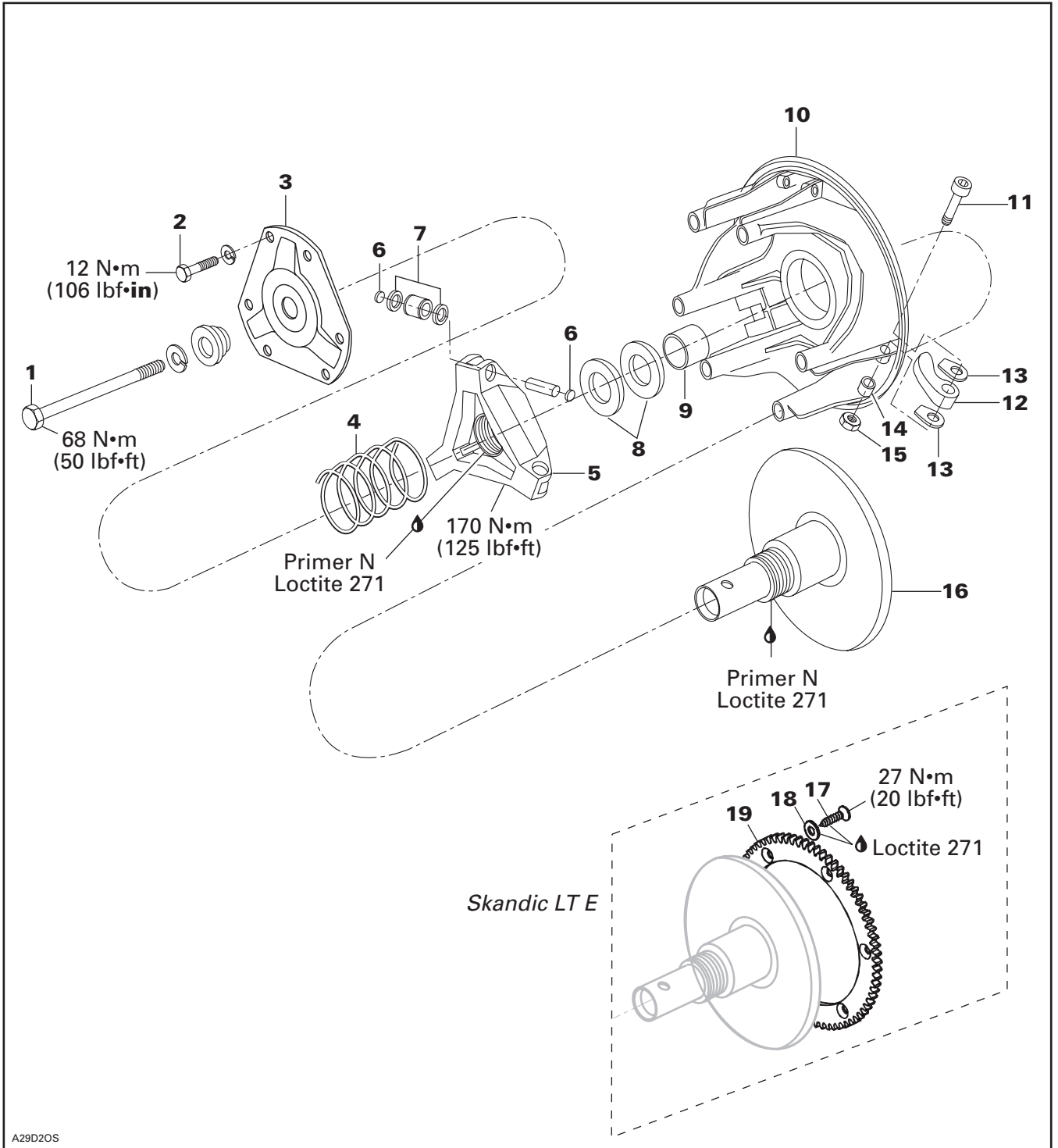
Re-torque screw to 90 to 100 N•m (66 to 74 lbf•ft).

⚠ WARNING

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

COMET® 102C

Skandic LT/LT E



Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)

GENERAL

Some drive pulley components can be changed to improve vehicle performance in high altitude regions. A *Service Bulletin* will give 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. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

MAINTENANCE

Cam Arm Pivot Nut

At first 10-hour (500 km) cam arm pivot nuts **no. 15** have to be retighten.

To do so, loosen one turn all cover screws **no. 2**.

Retighten to 5.6 N•m (50 lbf•in) maximum all three pivot nuts **no. 15**. Make sure cam arms **no. 12** can still move on their pivot bolts **no. 11**.

Retighten cover screws **no. 2** to 12 N•m (106 lbf•in). Proceed with one screw per tower in a criss-cross sequence then, remaining three screws.

Cam Arm Bushing

Cam arm bushings **no. 14** have to be replaced every 3000 km (2000 m.).

With drive pulley still installed on crankshaft, remove one cam arm **no. 12** at a time. Install parts included in Cam Arm Kit. Proceed with remaining cam arms.

Loosen one turn all cover screws **no. 2**.

Retighten to 5.6 N•m (50 lbf•in) maximum all three pivot nuts **no. 15**. Make sure cam arms **no. 12** can still move on their pivot bolts **no. 11**.

Retighten cover screws **no. 2** to 12 N•m (106 lbf•in). Proceed with one screw per tower in a criss-cross sequence then, remaining three screws.

REMOVAL

⚠ WARNING

Never use an impact wrench to remove or install the drive pulley.

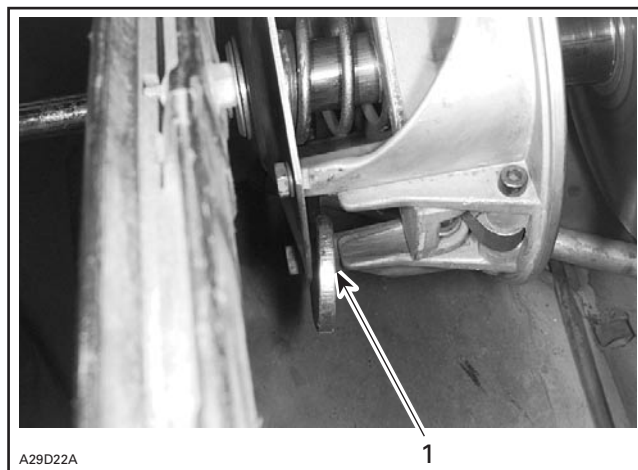
Unfasten center and rear bottom pan attachments on left hand side. Remove belt guard.

Open driven pulley using driven pulley opening tool (P/N 529 017 200). Remove drive belt.

Use holder (P/N 529 006 400). Make sure holder hook is positioned on top of tower.



AZ9D21A



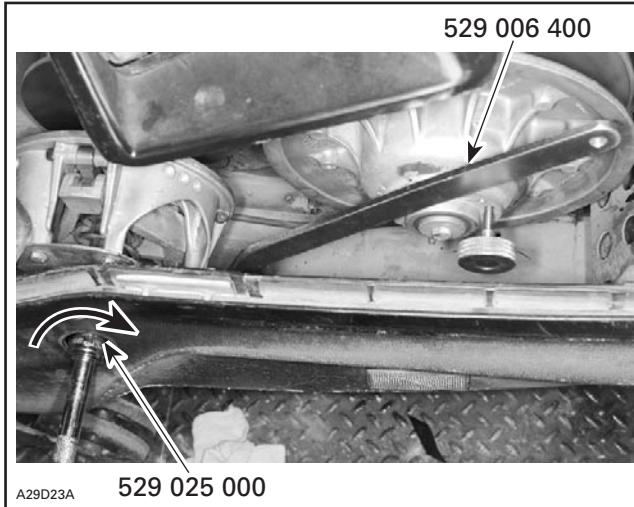
AZ9D22A

1. Holder hook on top of tower

Remove retaining screw **no. 1**.

Install holder (P/N 529 006 400) in a way to limit pulley clockwise rotation.

Insert drive pulley puller (P/N 529 025 000) then turn puller clockwise to free drive pulley from crankshaft taper.



Remove driven pulley to make room for drive pulley removal.

Remove drive pulley.

DISASSEMBLY

Skandic LT E Only

Remove retaining screws no. 17 and washers no. 18 from ring gear no. 19.

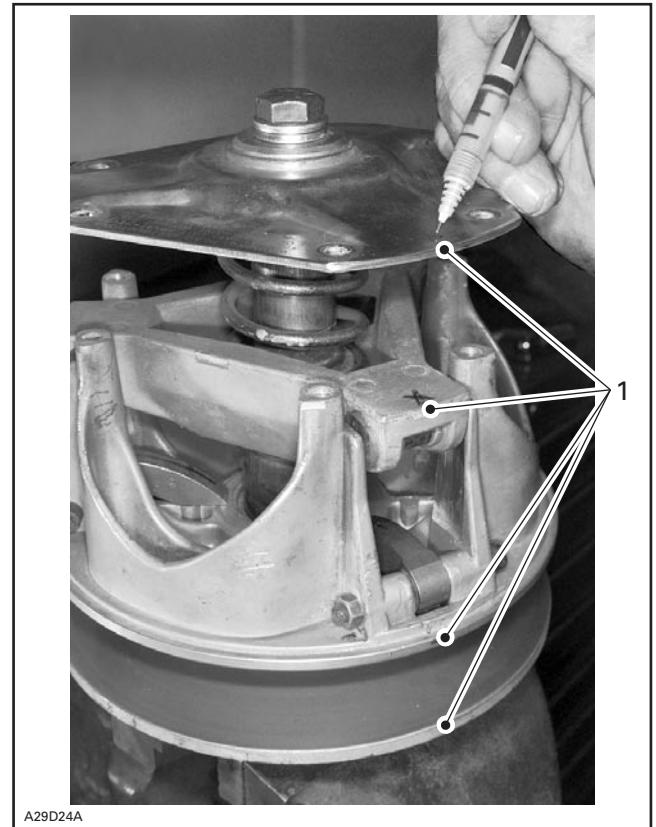
CAUTION: Retaining screws must be heated before disassembly. Heating temperature must not exceed 150°C (300°F).

Skandic LT and Skandic LT E

Mount tapered tool (P/N 529 035 826) in a vise.

Install drive pulley over retainer then, fasten retaining screw no. 1 and torque to 68 N•m (50 lbf•ft). Now drive pulley is locked on retainer.

Scribe pen marks on fixed half no. 16, sliding half no. 10, spider no. 5 and cover no. 3 for proper indexing at reassembly.



1. Scribe marks

Remove cover screws no. 2.

Hold cover no. 3 by hand then, unscrew retaining screw no. 1.



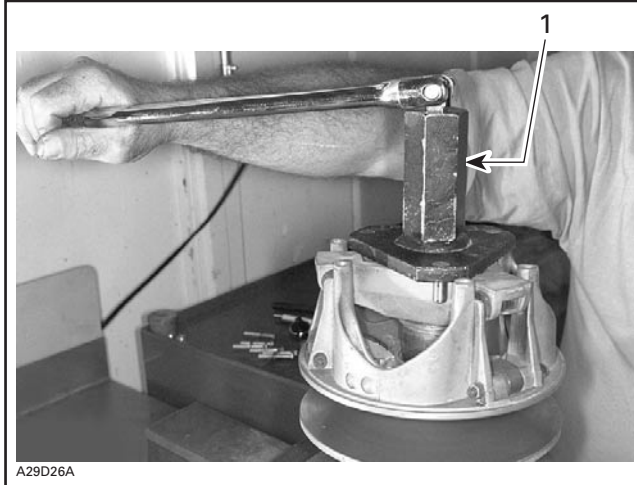
Remove cover no. 3.

Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)

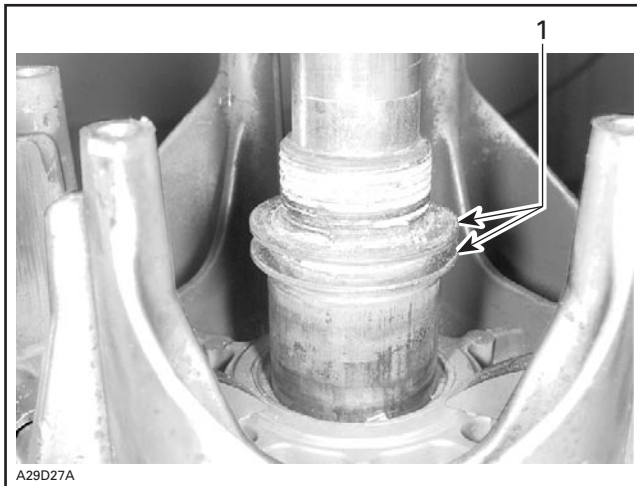
Heat spider no. 5 to melt threadlocker.

Install spider tool (P/N 529 025 200) then, unscrew spider no. 5.



1. Spider wrench

Note shim no. 8 quantity.



1. Shims

Remove cam arms no. 12.

CLEANING

Clean pulley faces and shaft with fine steel wool and clean dry cloth. Clean sliding half bushing no. 9 and cover bushing with clean dry cloth.

Thoroughly clean spider threads and fixed half post threads.

INSPECTION

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

Check cover bushing interior. Replace cover if bushing is completely bronze instead of the original teflon coating.

Check spider thrust buttons no. 6 for proper sliding action. Replace as required.

Check rollers no. 7 for free action. Replace as required.

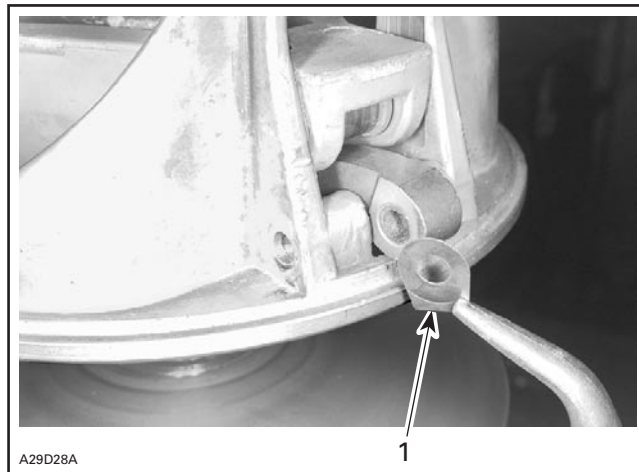
ASSEMBLY

Install shims no. 8 on fixed half post.

Apply Primer N (P/N 293 800 041) to both post and spider threads, allow to dry for 10 minutes. Apply Loctite 271 (P/N 293 800 005) to threads.

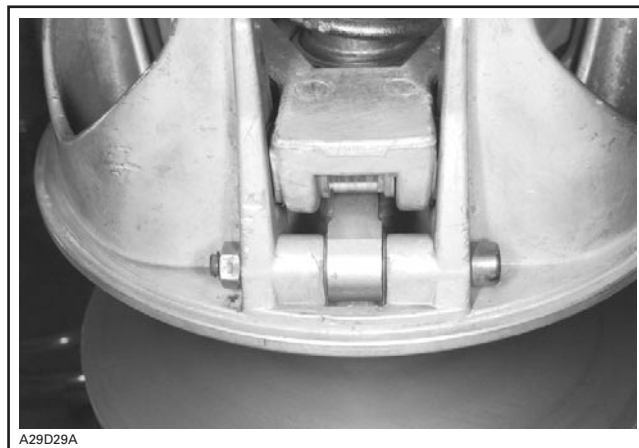
Using spider wrench from tool kit (P/N 529 025 400) torque spider no. 5 to 170 N•m (125 lbf•ft).

With square end facing sliding half, install a washer no. 13 on each side of cam arm no. 12.



1. Square end facing sliding half

Tighten to 5.6 N•m (50 lbf•in) maximum all three pivot nuts no. 15. Make sure cam arms no. 12 can still move on their pivot bolts no. 11.



Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)

Install spring no. 4, cover no. 3.

Tighten cover screws no. 2 to 12 N•m (106 lbf•in). Proceed with one screw per tower in a criss-cross sequence then, remaining three screws.

Use puller (P/N 529 025 000) to unlock drive pulley from retainer.



Skandic LT E Only

Secure ring gear no. 19 on inner fixed half using self-tapping screws no. 17 and **thick M8 flat washers no. 18**. Apply Loctite 271 (red) (P/N 293 800 005) on screw threads and between screw heads and thick flat washers.

NOTE: It is of the utmost importance to use thick flat washers no. 18 with self-tapping screws no. 17 in order not to pierce inner fixed half with the screws.

CAUTION: Loctite 271 (red) (P/N 293 800 005) must be applied to safely assemble ring gear.

Torque screws in a criss-cross sequence to 27 N•m (20 lbf•ft).

INSTALLATION

Install drive pulley on crankshaft.

Install a new lock washer.

Torque retaining screw to 68 N•m (50 lbf•ft).

Reinstall driven pulley, drive belt and belt guard. Refasten bottom pan center and rear attachments on left hand side.

Raise 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 low speed (maximum 30 km/h (20 MPH)) and apply the brake, repeat 5 times.

Recheck the torque of 68 N•m (50 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.

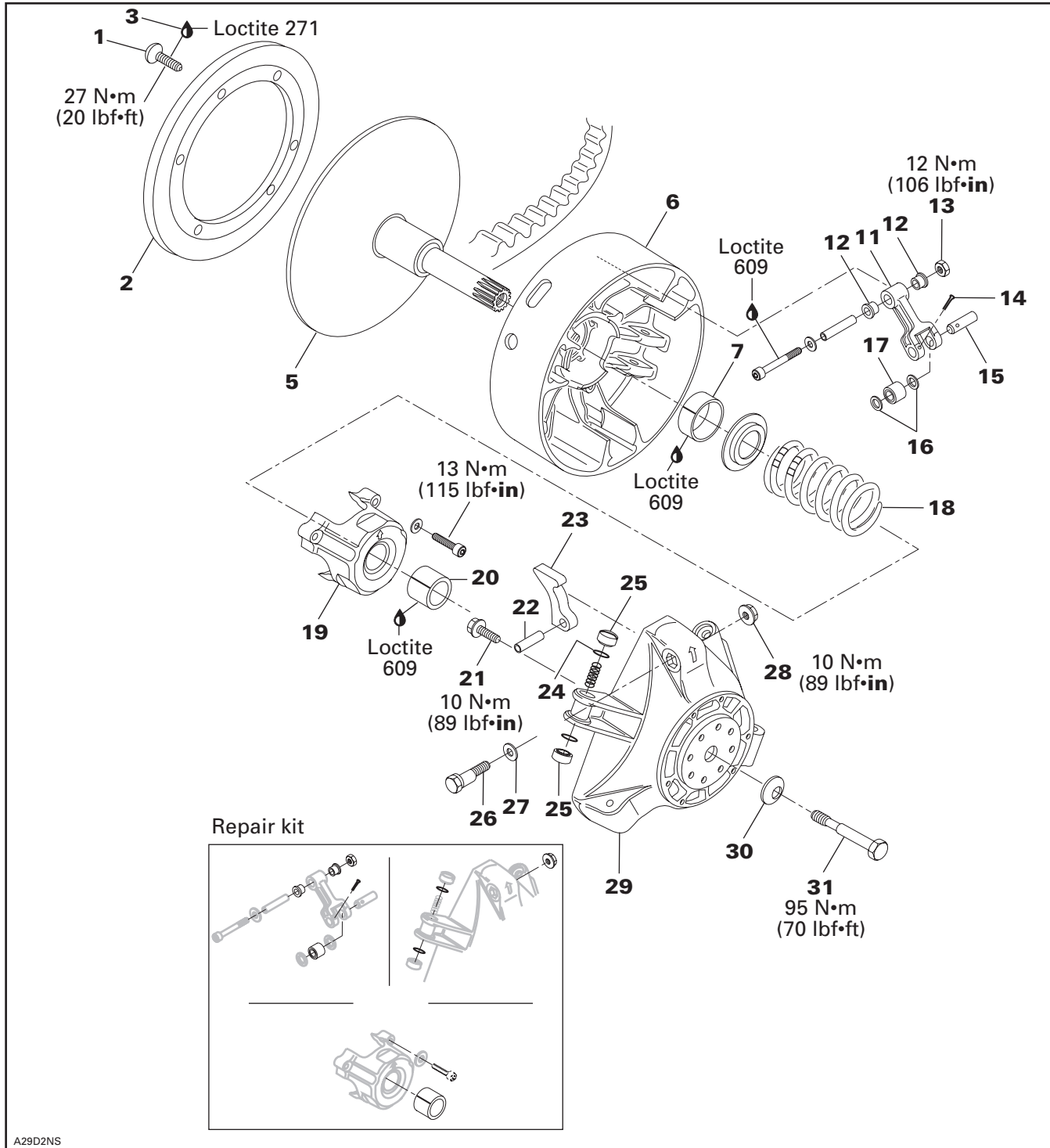
Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)

TRA III

Skandic WT 600/WT LC/SUV 600

NOTE: This is a lubrication free drive pulley. Always refer to appropriate parts catalog for replacement parts. Most parts of TRA III are not interchangeable with those of the TRA.



A29D2NS

GENERAL

Some drive pulley components (return spring, ramp) can be changed to improve vehicle performance in high altitude regions. A *Service Bulletin* will give information about calibration according to altitude.

CAUTION: Such modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance. Verify spring specifications before installation. Do not only refer to the spring color code.

NOTE: TRA drive pulley stands for Total Range Adjustable drive pulley.

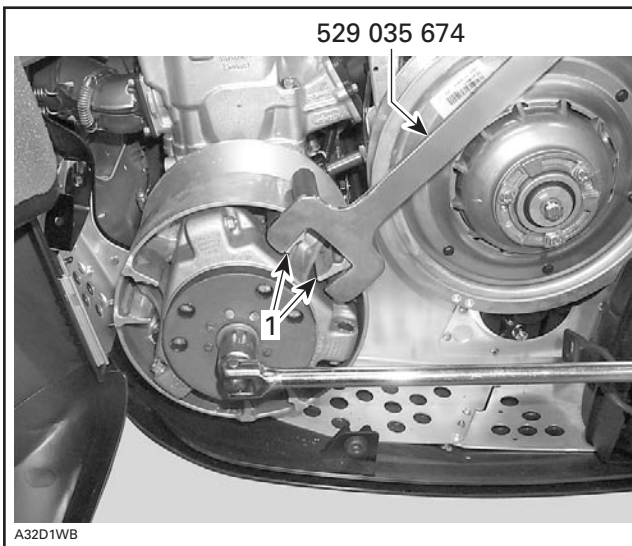
⚠ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

30,31, Conical Spring Washer and Screw

Secure holder (P/N 529 035 674) over a sliding half tower.



TYPICAL

1. Sliding half tower

⚠ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

⚠ WARNING

The drive pulley assembly is a precisely balanced unit. Never replace parts with used parts from another drive pulley assembly.

Remove retaining screw. Discard conical spring washer.

To remove drive pulley ass'y and/or fixed half from engine, use puller (P/N 529 022 400).

CAUTION: This pulley has metric threads. Do not use imperial threads puller. Always tighten puller by hand to ensure that the drive pulley has the same type of threads (metric vs imperial) prior to fully tightening.

To Remove Drive Pulley Ass'y

Retain drive pulley with clutch holder.

Install puller in pulley shaft then tighten.

DISASSEMBLY

1,2, Screw and Ring Gear

CAUTION: Retaining screws must be heated before disassembly. Heating temperature must not exceed 150°C (300°F).

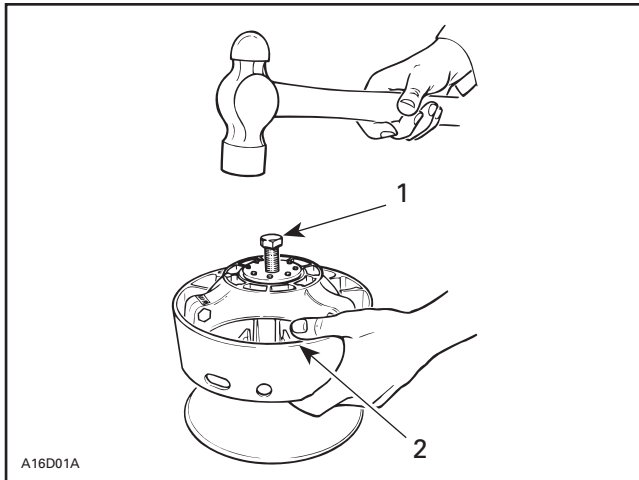
Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)

5,6, Fixed and Sliding Half

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.



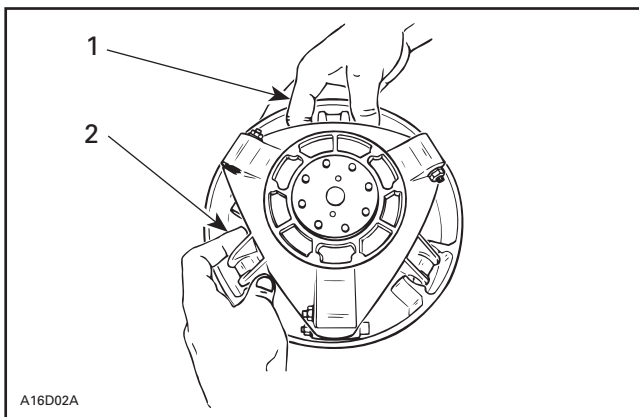
1. Puller
2. Holding sliding half

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

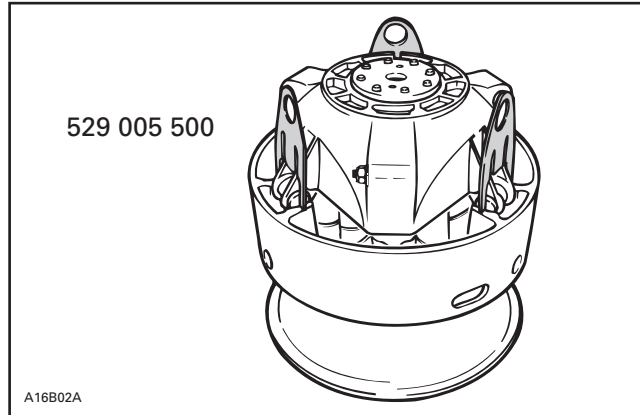
Carefully lift governor cup until slider shoes come at their highest position into guides.

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



1. Hold slider shoes
2. Lift one housing at a time

NOTE: To ease disassembly, forks (P/N 529 005 500) should be used to hold slider shoes prior to removing governor cup.



19, Spring Cover Ass'y

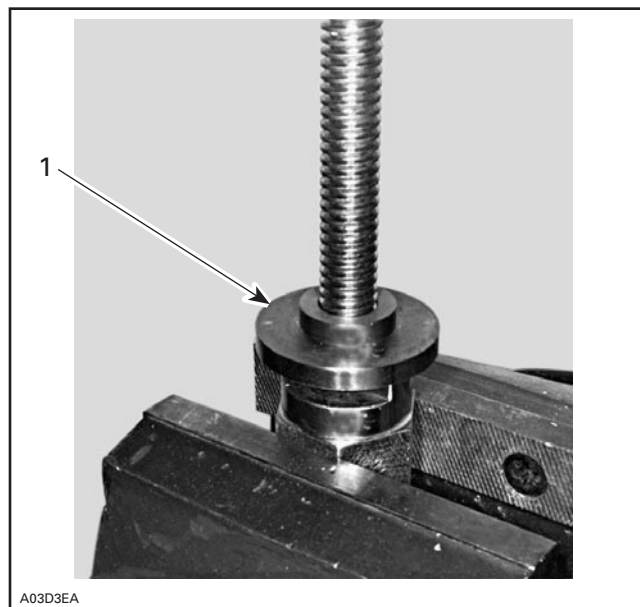
It is pushed by clutch spring pressure.

WARNING

Clutch spring is very strong. Never attempt to remove spring cover without the recommended tools.

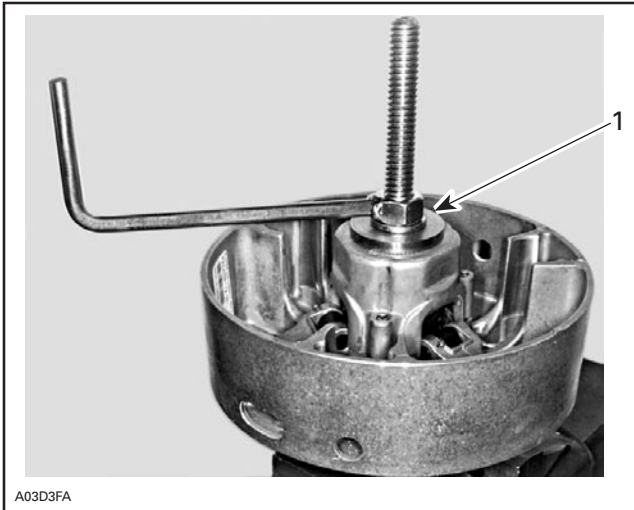
Use spring compressor (P/N 529 035 524).

Install support guide.



1. Support guide

Install sliding half then a second support guide. These support guides will prevent bushing damages.



1. Support guide

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, 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. Reclean mounting surfaces with paper towel and cleaning solvent.

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

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

7,20, Bushing

Only use petrol base cleaner when cleaning bushings.

CAUTION: Do not use acetone to clean bushing.

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.

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 Bushing

Visually inspect coating. Replace if worn.

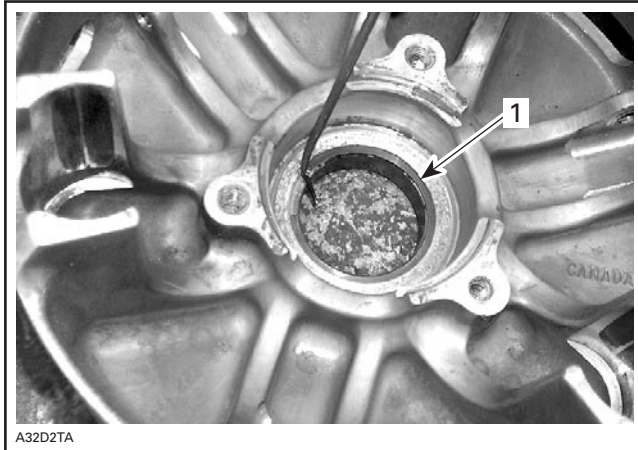
Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)

Sliding Half Bushing Replacement

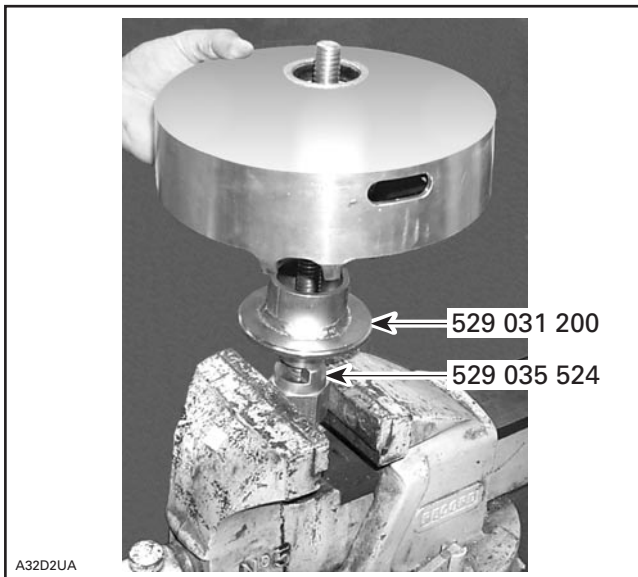
NOTE: If the bushing is worn out, it is recommended to replace the whole sliding half ass'y, as replacing the bushing only may reduce the drive pulley performance.

Remove circlip from the sliding half.



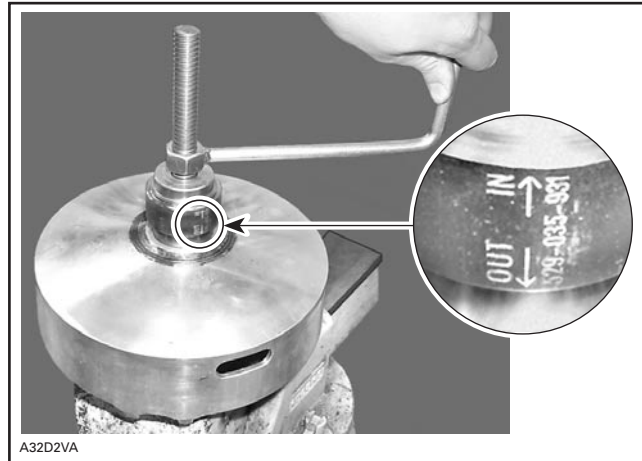
1. Circlip

Secure the spring compressor (P/N 529 035 524) in a vise. Mount tool (P/N 529 031 200) and the sliding half ass'y on it.



Use tool (P/N 529 035 931) to press out old bushing.

NOTE: Make sure to use the tool (P/N 529 035 931) as marked; to remove the bushing press using the side marked "OUT", as shown below in the picture.



Use a soft sand paper to clean sliding half bushing mounting surface.



Clean sliding half bushing mounting surface with pulley flange cleaner (P/N 413 711 809).

To install a new bushing, secure the spring compressor (P/N 529 035 524) in a vise and mount the sliding half ass'y. Insert the bushing from inner side of sliding half ass'y.

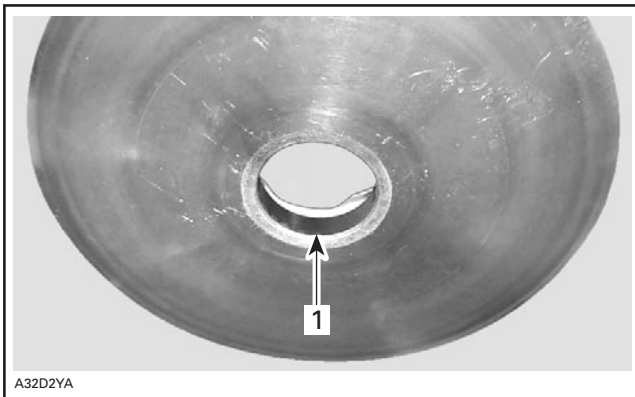
Mount tool (P/N 529 035 931) with side marked "IN" to press in a new bushing.

Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)



NOTE: Make sure that the bushing is well seated on the sliding half ass'y.



1. Bushing

Install the circlip.



1. Circlip

Spring Cover Bushing Replacement

Under normal use there is no need to replace this bushing.

If it must be replaced, it is recommended to replace the spring cover ass'y.

ASSEMBLY

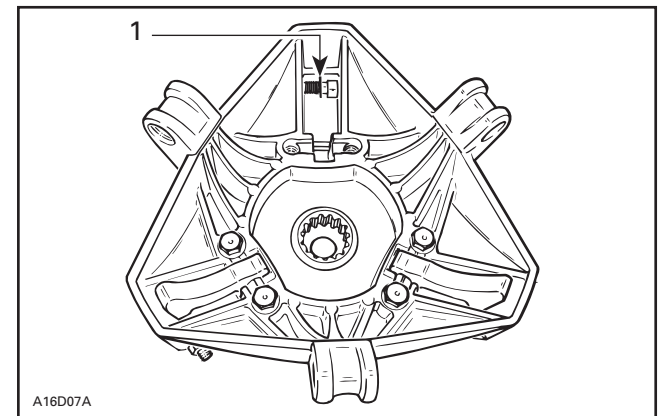
NOTE: This drive pulley is lubrication free. Do not lubricate any component.

1,2,3, Screw, Ring Gear and Loctite 271

Apply Loctite 271 (P/N 413 702 900) on threads and then torque to 27 N•m (20 lbf•ft).

26,27,28, Calibration Screw, Washer and Locking Nut

When installing calibration screw, make sure to install washer as shown.



1. Washer

Torque locking nut to 10 N•m (89 lbf•in).

15, Pin

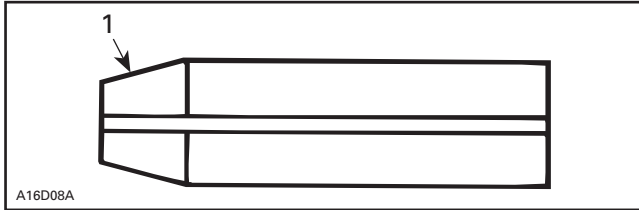
Always use the same type of pin as originally installed when servicing. Different types have different weights for calibration purpose. Refer to TECHNICAL DATA.

Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)

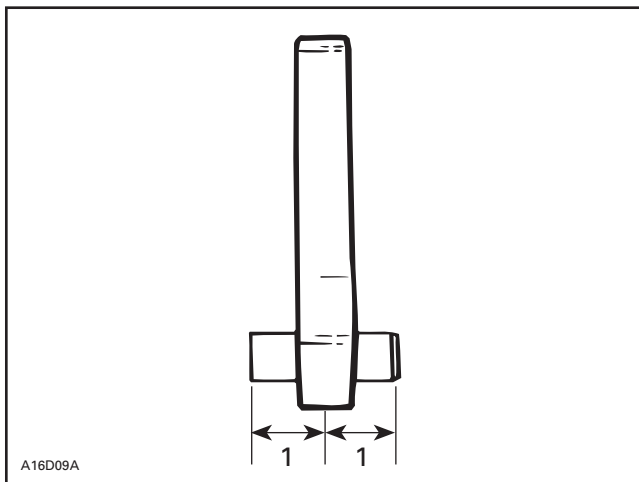
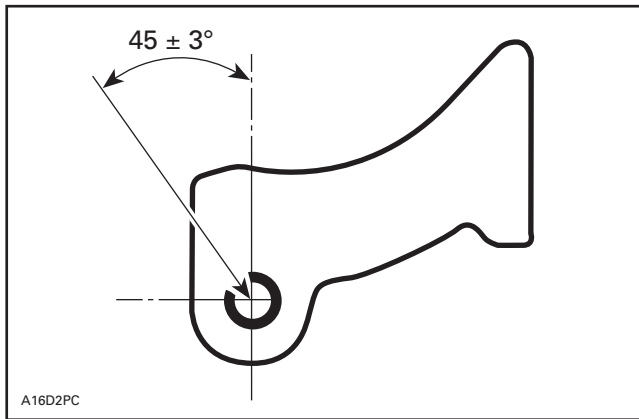
21,22,23, Screw, Dowel Tube and Ramp

Insert dowel tube from chamfered side. Make sure ramp is centered on dowel tube.



1. Chamfered side

Position dowel tube split at the illustrated angle.



1. Equal distance

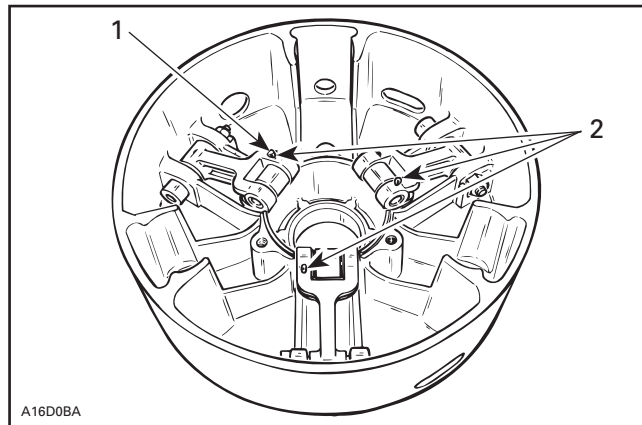
Torque screws to 10 N•m (89 lbf•in).

9,11,13,14, Screw, Lever Ass'y, Nut and Cotter Pin

Always install lever assemblies so that cotter pins are on the shown side. 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, drive pulley misbalancing will occur because of levers difference.



1. Head on top
2. All on the same side

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.

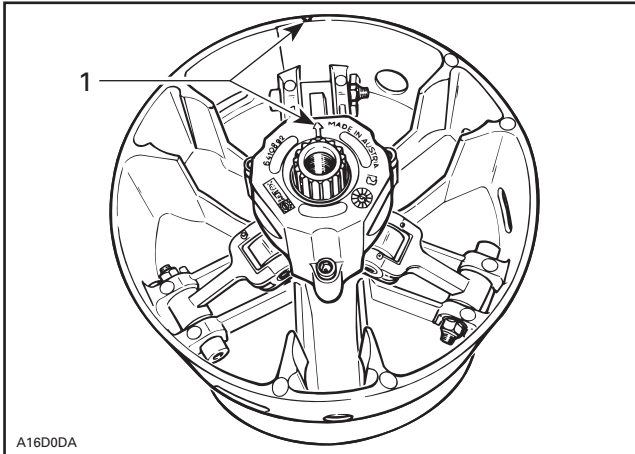
5,6,18,19, Fixed Half, Sliding Half, Spring, Spring Cover and Screw

To install spring cover, use spring compressor (P/N 529 035 524).

Assemble fixed and sliding halves. Note that fixed halves have different cone angle. Match cone angle with crankshaft.

Section 05 TRANSMISSION
Subsection 03 (DRIVE PULLEY)

Lift sliding half against spring cover and align spring cover arrow with sliding half mark.

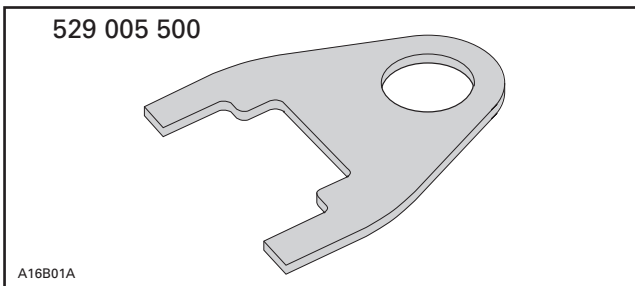


1. Align

Install and torque screws to 13 N•m (115 lbf•in).

6,25,29, Sliding Half, Slider Shoe and Governor Cup

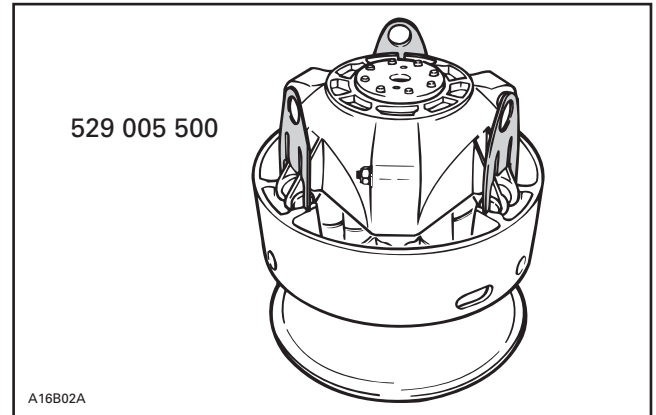
To install governor cup, use following tool:



Insert spring and slider shoes into governor cup so that groove in each slider shoe is vertical to properly slide in guides.

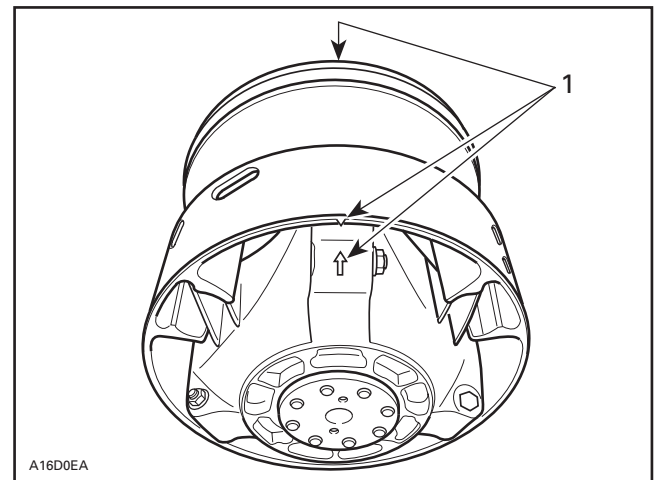
CAUTION: Make sure O-rings are installed on slider shoes and that grooves are positioned vertically.

Install fork (P/N 529 005 500) 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.



1. Align

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.

Section 05 TRANSMISSION

Subsection 03 (DRIVE PULLEY)

INSTALLATION

⚠ WARNING

Do not apply anti-seize 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 Ass'y

The following installation procedure must be strictly adhered to.

Install drive pulley on crankshaft extension.

Install a new conical spring washer with its concave side towards drive pulley then install screw.

⚠ WARNING

Never substitute conical spring washer and/or screw with jobber ones. Always use Bombardier genuine parts for this particular case.

Use holder. See removal procedure.

Torque screw to 90 to 100 N•m (66 to 74 lbf•ft).

Install drive belt and guard.

Raise 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 low speed (maximum 30 km/h (20 MPH) and apply the brake, repeat 5 times.

Recheck the torque of 90 to 100 N•m (66 to 74 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.

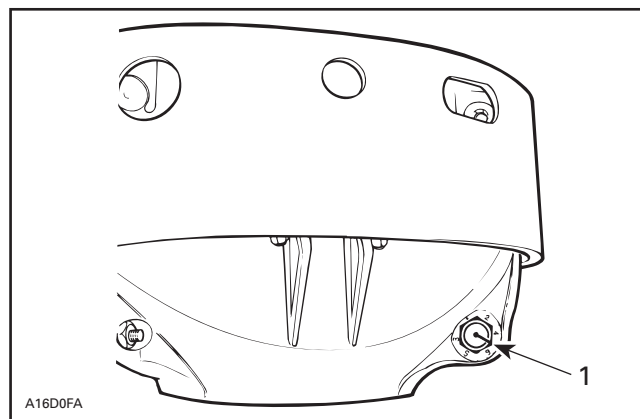
NOTE: Use precision digital tachometer for engine RPM adjustment.

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

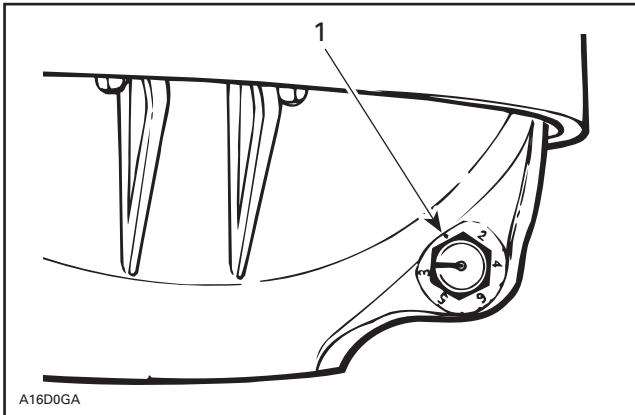
Calibration screw has a notch on top of its head.



1. Notch

Governor cup has 6 positions numbered 2 to 6. Note that in position 1 there is no stamped number (due to its location on casting).

See TECHNICAL DATA for original setting.



1. Position 1 (not numbered)

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:

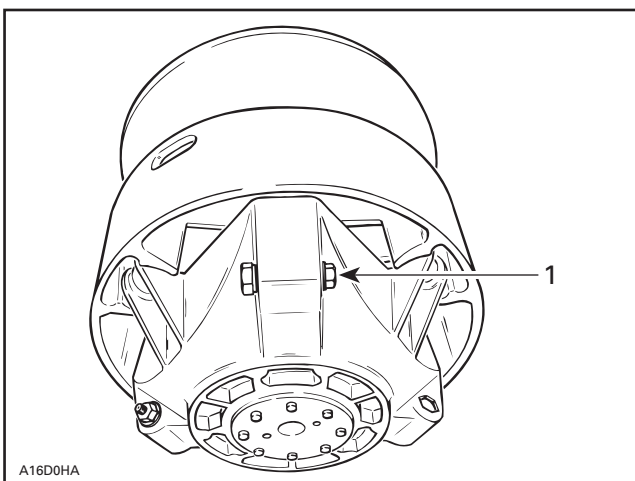
Calibration screw is set at position 3 and is changed to position 5. So maximum engine RPM is increased by about 400 RPM.

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 otherwise its inside washer will fall off.

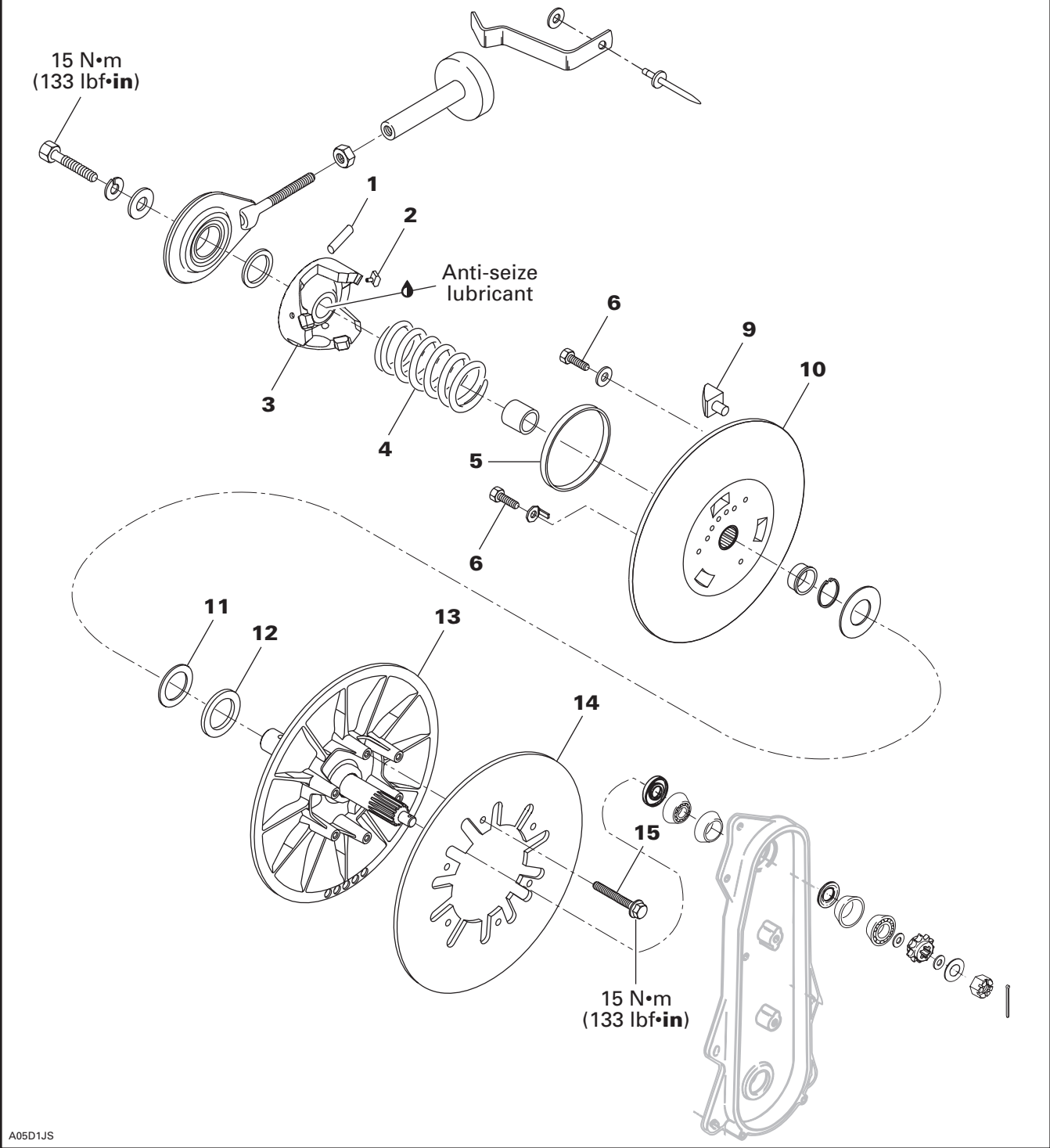
CAUTION: Always adjust all 3 calibration screws and make sure they are all set at the same number.



1. Loosen just enough to permit rotating of calibration screw

DRIVEN PULLEY

Tundra



A05D1JS

Section 05 TRANSMISSION

Subsection 04 (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.

Remove guard and drive belt from vehicle.

Remove brake support from chaincase with brake ass'y.

Free countershaft support from support clamp.

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:

Loosen steering column upper retaining screws.

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 loosened to allow pivoting of chaincase. In this case, note position of alignment shims. In addition, air intake silencer and oil injection reservoir might have to be slightly moved to get enough space to pull driven pulley.

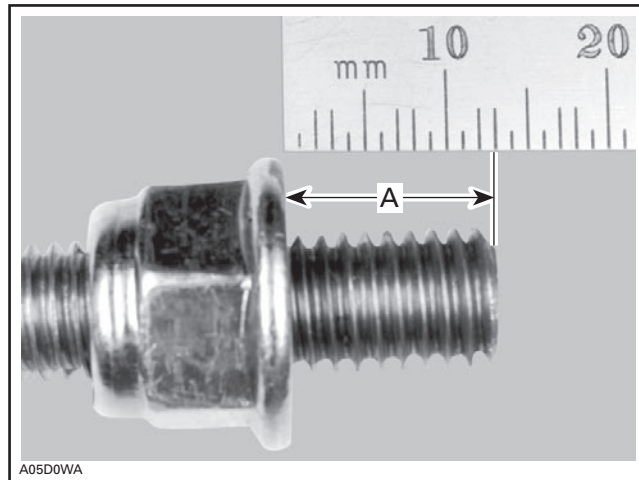
Remove bearing cone.

Knock driven pulley shaft with a plastic hammer and pull driven pulley out.

DISASSEMBLY

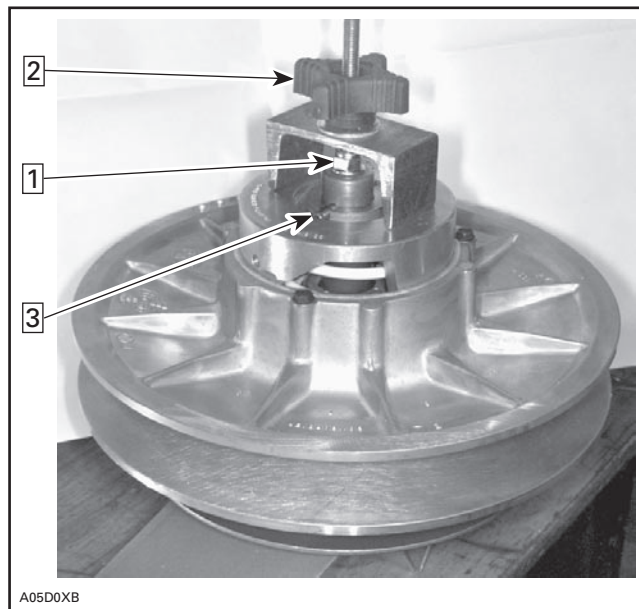
To disassemble driven pulley, driven pulley spring compressor (P/N 529 035 300) must be used. See following procedure.

Position stop nut 13 mm (1/2 in) from threaded rod end, as shown in the next photo.



A. 13 mm (1/2 in)

Install driven pulley spring compressor (P/N 529 035 300). Fully tighten the 13 mm (1/2 in) exposed threads in driven pulley. Tighten stop nut. Tighten tool knob to compress spring then remove roll pin **no. 2**.



Step **1**: Tighten stop nut

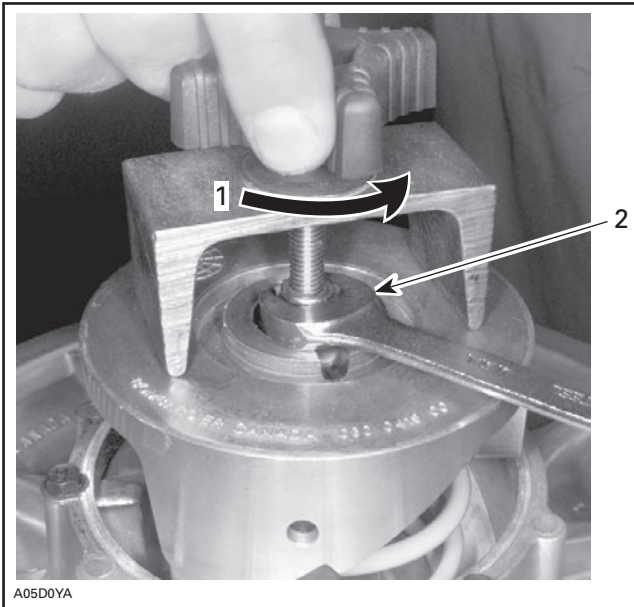
Step **2**: Tighten knob to compress spring

Step **3**: Remove roll pin

Once roll pin has been removed, loosen knob until spring pressure is completely released.

⚠ WARNING

To avoid injuries always hold stop nut with a key when loosening knob, as shown in the next photo.



1. When loosening knob
2. Hold stop nut with a key

Remove tool and cam no. 3. Remove spring no. 4 and sliding half no. 10.

5, Large Bushing

Remove 3 screws no. 6 with washers and pry bushing no. 5 out.

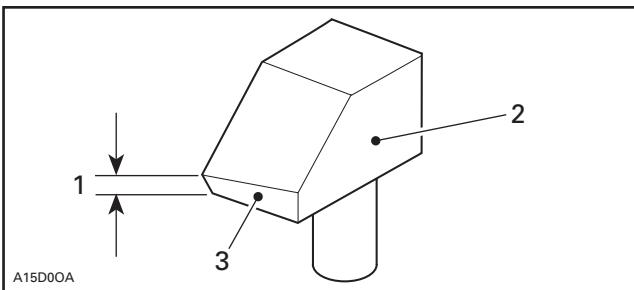
INSPECTION

2,9, Slider Shoe

Black slider shoe = forward

Red slider shoe = reverse

Check cam slider shoes for wear. Replace when inside edge thickness of cam slider shoe slope base is 1 mm (.039 in) or less.



1. Measure thickness of slope base here
2. Sliding pulley side
3. Slop base

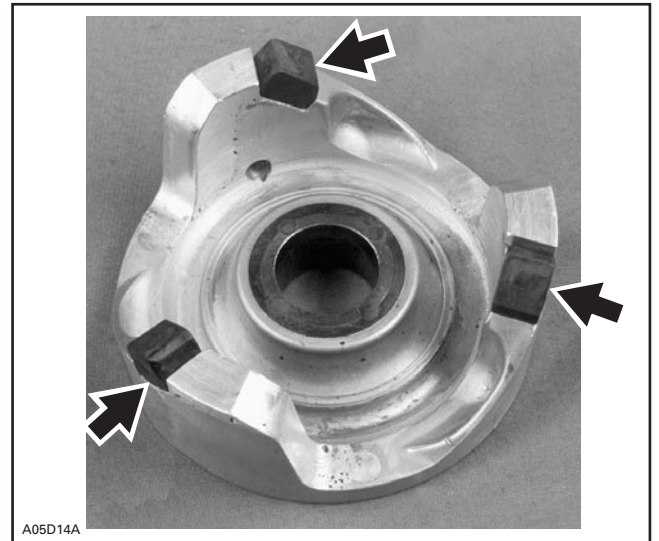
ASSEMBLY

Assemble driven pulley components by reversing the disassembly procedure except for the following.

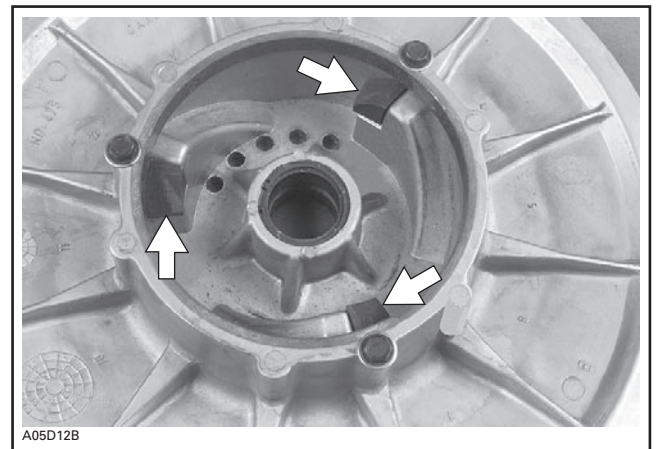
2,9, Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam.

Install slider shoes as per following photo. Red slider shoes are being used for reverse and black ones for forward.



BLACK SLIDER SHOES ON CAM



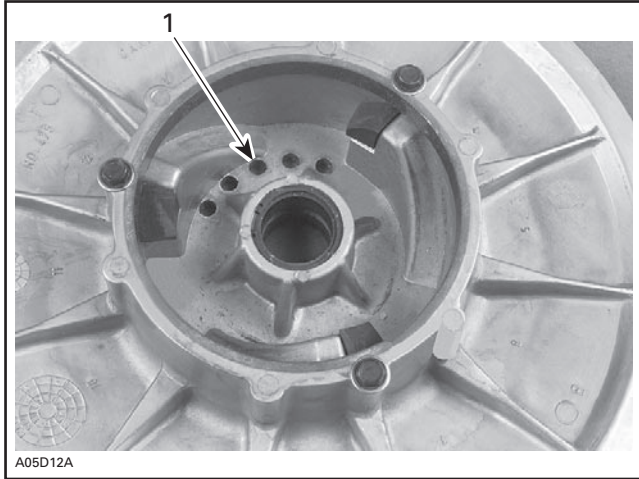
RED SLIDER SHOES ON PULLEY HALF

Section 05 TRANSMISSION

Subsection 04 (DRIVEN PULLEY)

2,4,5, Roller Pin, Outer Cam and Spring

Insert spring in adjusting hole no. 3 into sliding half, as illustrated.



1. Adjusting hole no. 3

Insert other spring end in cam. Mount driven pulley spring compressor (P/N 529 035 300) as in DISASSEMBLY procedure.

Push cam all the way in then install roll pin coated with anti-seize lubricant (P/N 413 701 000).

13,14,15, Fixed Pulley Half, Brake Disc and Screw

Install brake disc on fixed pulley half and torque screws to 15 N•m (133 lbf•in).

INSTALLATION

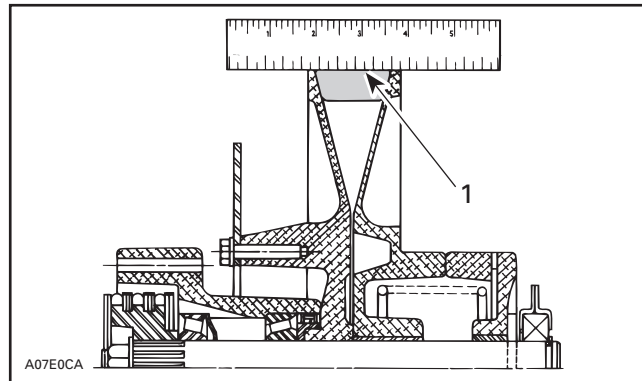
Follow installation procedure for Tundra driven pulley at beginning of this subsection.

ADJUSTMENT

11,12, 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.



TYPICAL

1. Belt flush with the top of the pulley halves

Shim(s) **no. 11** and **no. 12** provide belt height adjustment between pulley halves. Adding shims will lower the belt in driven pulley, while removing shims will raise the belt. Adjust properly.

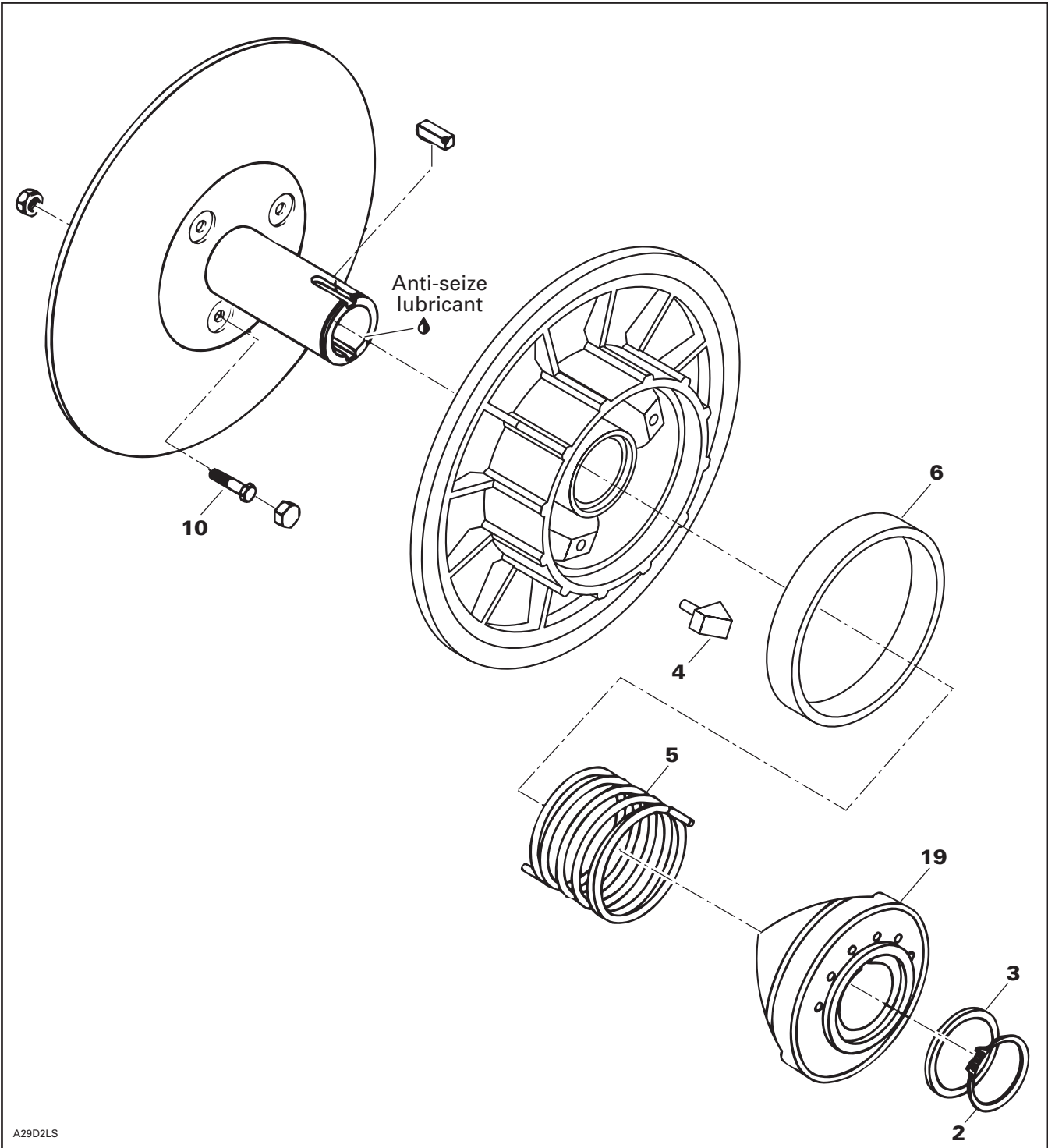
Pulley Alignment and Drive Belt Deflection

Refer to PULLEY DISTANCE AND ALIGNMENT and DRIVE BELT to perform adjustments.

CAUTION: Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

THRUST BUSHING

Skandic WT/SWT



Section 05 TRANSMISSION

Subsection 04 (DRIVEN PULLEY)

REMOVAL

Remove guard and drive belt from vehicle.
Remove the screw, and washer then pull the driven pulley from the shaft.

DISASSEMBLY

Use spring compressor (P/N 529 035 524).
Remove snap ring **no. 2** and washer **no. 3** to disassemble the outer cam and the 2 pulley halves.

WARNING

Driven pulley cam is spring loaded, use above-mentioned tool.

CLEANING

6, Bushing

During break-in period (about 10 hours of use), teflon from bushing moves to cam or shaft surface. A teflon over teflon running condition occurs, leading to low friction. So it is normal to see gray teflon deposit on cam or shaft. Do not remove that deposit, it is not dust.

When a dust deposit has to be removed from the cam or the shaft, use dry cloth to avoid removing transferred teflon.

Pulley Half Cleaning

Use Pulley flange cleaner (P/N 413 711 809).

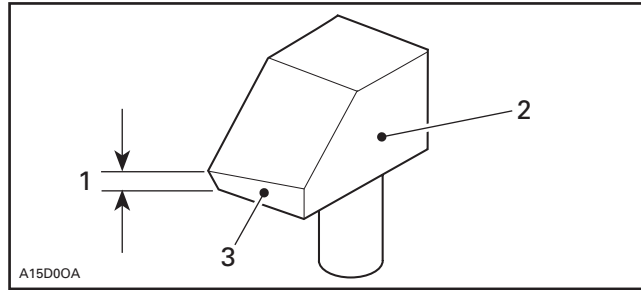
INSPECTION

6, Bushing

Check for cracks, scratch and for free movement when assembled to fixed half.

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.



1. Measure thickness of slope base here
2. Sliding pulley side
3. Slope base

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.

19, Cam

Coat cam interior with anti-seize lubricant.

INSTALLATION

CAUTION: Always apply anti-seize lubricant (P/N 413 701 000) on the shaft before final pulley installation.

ADJUSTMENT

Refer to PULLEY DISTANCE AND ALIGNMENT to adjust pulley distance. Adjust drive belt height in driven pulley. Turn screws **no. 10** equally accordingly.

5, Spring

General

It is usual to experience spring setting during breaking period of a new spring. The factory spring preload is slightly higher (about 1 kg (2 lb)) to compensate for spring setting. Specifications in TECHNICAL DATA are applicable after break-in period (about 10 hours of use).

Spring Torsional Pre-Load

To check spring pre-load adjustment, use spring scale hook (P/N 529 006 500) and a spring scale.

Remove drive belt.

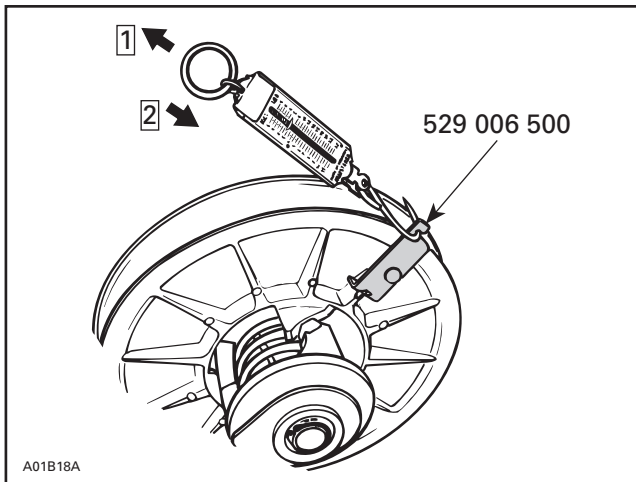
Install the hook on the sliding half. Preventing fixed half from turning, pull sliding half with the spring scale perpendicularly with pulley axle.

Take 1st measurement when sliding half begins to turn. Rotate sliding half to 10 mm (3/8 in) of rotation. Hold fish scale at this position. Slowly release tension from fish scale and take 2nd measurement when sliding half begins to return. Spring pre-load is the average measurement between these 2.

$$\frac{\begin{matrix} 1^{st} \\ \text{measurement} \\ \text{(when} \\ \text{opening)} \end{matrix} + \begin{matrix} 2^{nd} \\ \text{measurement} \\ \text{(when} \\ \text{closing)} \end{matrix}}{2} = \text{Spring pre-load}$$

Example:

$$\frac{\begin{matrix} 3.8 \text{ kg} \\ (8.4 \text{ lb}) \\ \text{(when} \\ \text{opening)} \end{matrix} + \begin{matrix} 3.4 \text{ kg} \\ (7.5 \text{ lb}) \\ \text{(when} \\ \text{closing)} \end{matrix}}{2} = \begin{matrix} 3.6 \text{ kg} (8 \text{ lb}) \\ \text{Actual} \\ \text{spring} \\ \text{pre-load} \end{matrix}$$



TYPICAL

- Step 1: 1st measurement
- Step 2: 2nd measurement

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 TECHNICAL DATA.

NOTE: Always recheck torsional pre-load after adjusting.

Pulley Alignment and Drive Belt Deflection

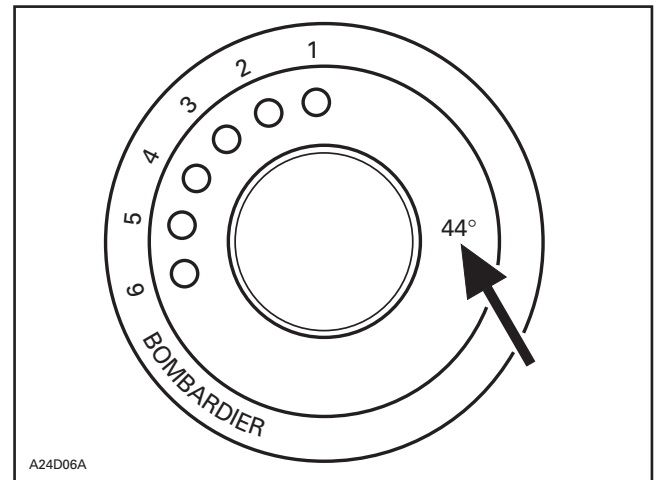
Refer to PULLEY DISTANCE AND ALIGNMENT and DRIVE BELT to perform adjustments.

CAUTION: Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

19, Cam

Make sure to install proper cam. Refer to TECHNICAL DATA.

Cam angle is identified on cam.

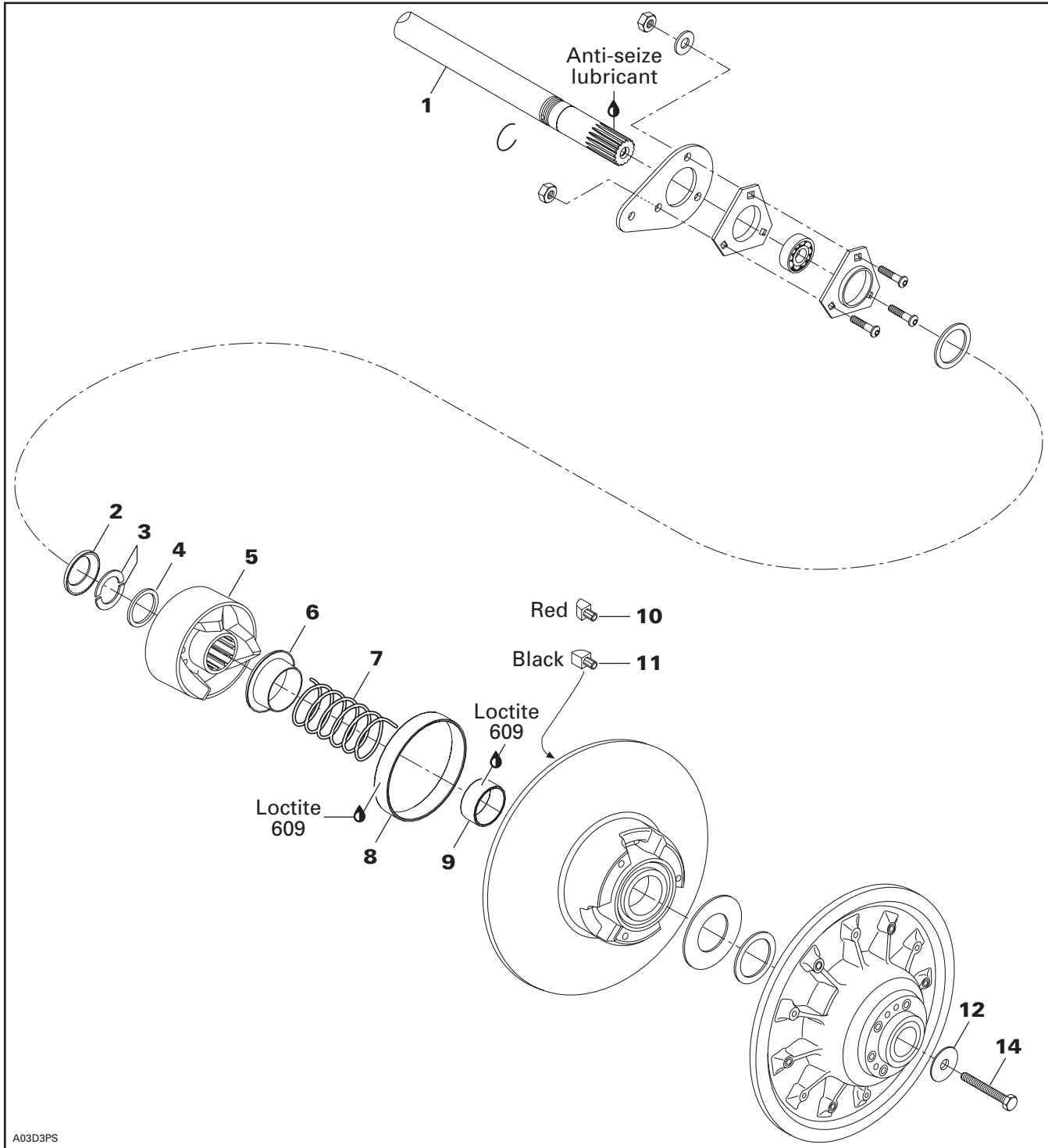


NOTE: For high altitude regions, a service bulletin will give information about calibration according to altitude.

Section 05 TRANSMISSION
Subsection 04 (DRIVEN PULLEY)

LPV 27

Skandic LT/LT E



DISASSEMBLY

Use spring compressor (P/N 529 035 524).



A15D36B

TYPICAL

Remove half keys **no. 3** and spacer **no. 4** to disassemble the outer cam and the 2 pulley halves.

⚠ WARNING

Driven pulley cam is spring loaded, use above mentioned tool.

INSPECTION

Replace bushing(s) if worn more than specified.

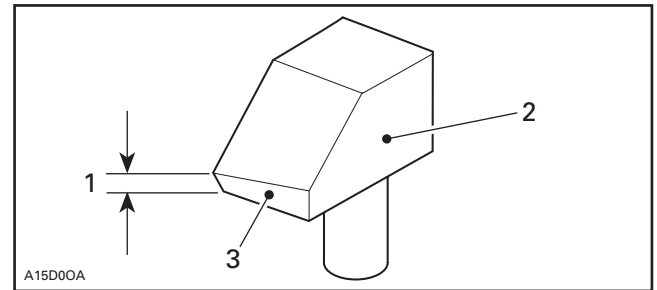
DRIVEN PULLEY BUSHING WEAR LIMIT mm (in)	
Small bushing	38.30 (1.508)
Large bushing	108.2 (4.260)

10,11, Slider Shoe

Black slider shoe = forward

Red slider shoe = reverse

Check cam slider shoes for wear. Replace when inside edge thickness of cam slider shoe slope base is 1 mm (.039 in) or less.



A15D00A

1. Measure thickness of slope base here
2. Sliding pulley side
3. Slope base

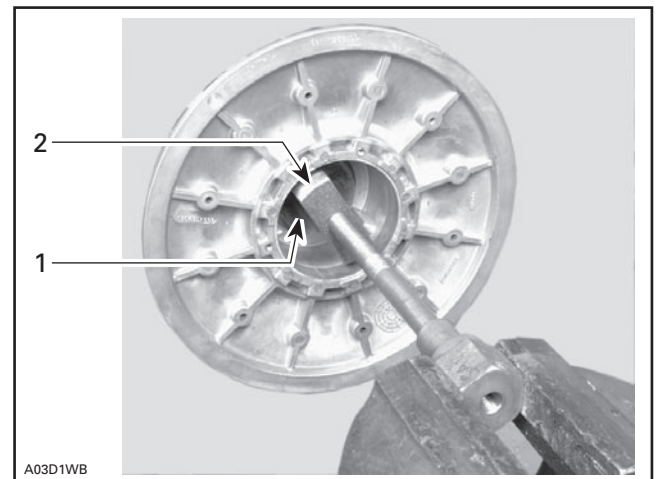
Bushing Replacement

Large Bushing

Remove Allen screws if applicable. Heat to break Loctite bond.

Install support plate included in tool (P/N 529 031 100) inside sliding half.

Place extractor (P/N 529 035 575) below bushing.



A03D1WB

TYPICAL

1. Support plate
2. Extractor

Mount screw head of new puller (P/N 529 035 524) in a vise.

Turn pulley half by hand to extract old bushing.

Before bushing installation, file sliding half bore to remove burrs from crimping areas.

Coat bushing outside diameter with Loctite 609 (P/N 413 703 100). Place new bushing on sliding half and slightly tap to engage squarely the bushing in the sliding.

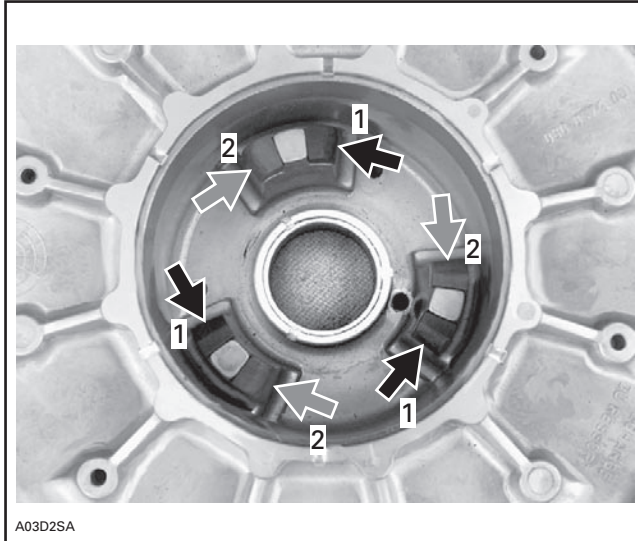
Section 05 TRANSMISSION

Subsection 04 (DRIVEN PULLEY)

ASSEMBLY

10,11, Cam Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam. Install slider shoes as per following photo. Red slider shoes are being used for reverse and black ones for forward.



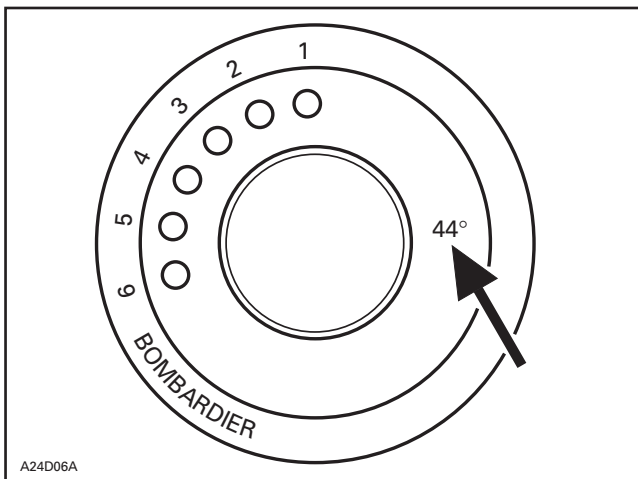
1. BLACK slider shoe
2. RED slider shoe

Assemble driven pulley components by reversing the disassembly procedure.

5,6,7, Cam, Guard and Spring

Make sure to install proper cam. Refer to TECHNICAL DATA.

Cam angle is identified on cam.

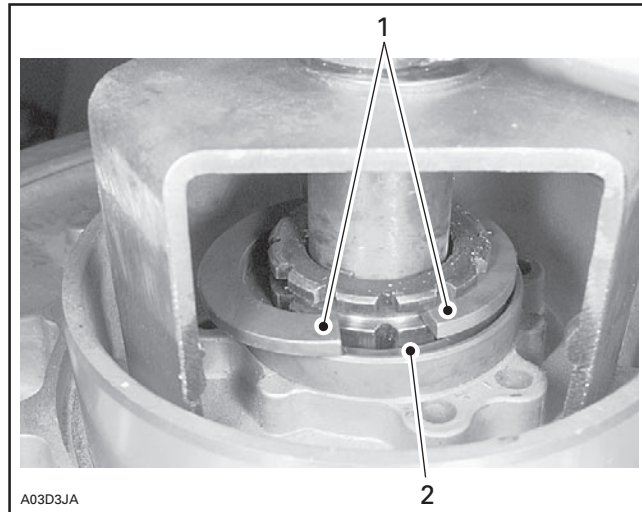


Position guard no. 6 in cam no. 5 then insert spring in adjusting hole no. 3 (mid-hole) into outer cam.

Compress outer cam using spring compressor (P/N 529 035 524).

Install spacer no. 4 then secure outer cam with half keys no. 3, as shown in the next photo.

CAUTION: Ensure that half keys are properly inserted into shaft groove and that spacer recess is facing half keys.



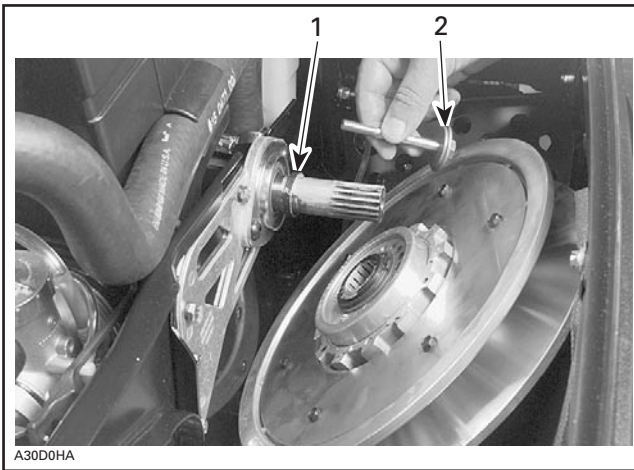
1. Half keys inserted into shaft groove
2. Spacer recess facing half keys

INSTALLATION

1, Countershaft

CAUTION: Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

Make sure that spacer no. 2 is on countershaft before installing driven pulley. Note also that washer shoulder is facing driven pulley.



TYPICAL

1. Spacer
2. Shoulder on this side

Should installation procedure be required, refer to BRAKE then look for BRAKE DISC and COUNTER-SHAFT BEARING ADJUSTMENT.

Reinstall the pulley on the countershaft by reversing the removal procedure.

14, Pulley Retaining Screw

Torque to 25 N•m (18 lbf•ft).

ADJUSTMENT

Pulley Alignment and Drive Belt Deflection

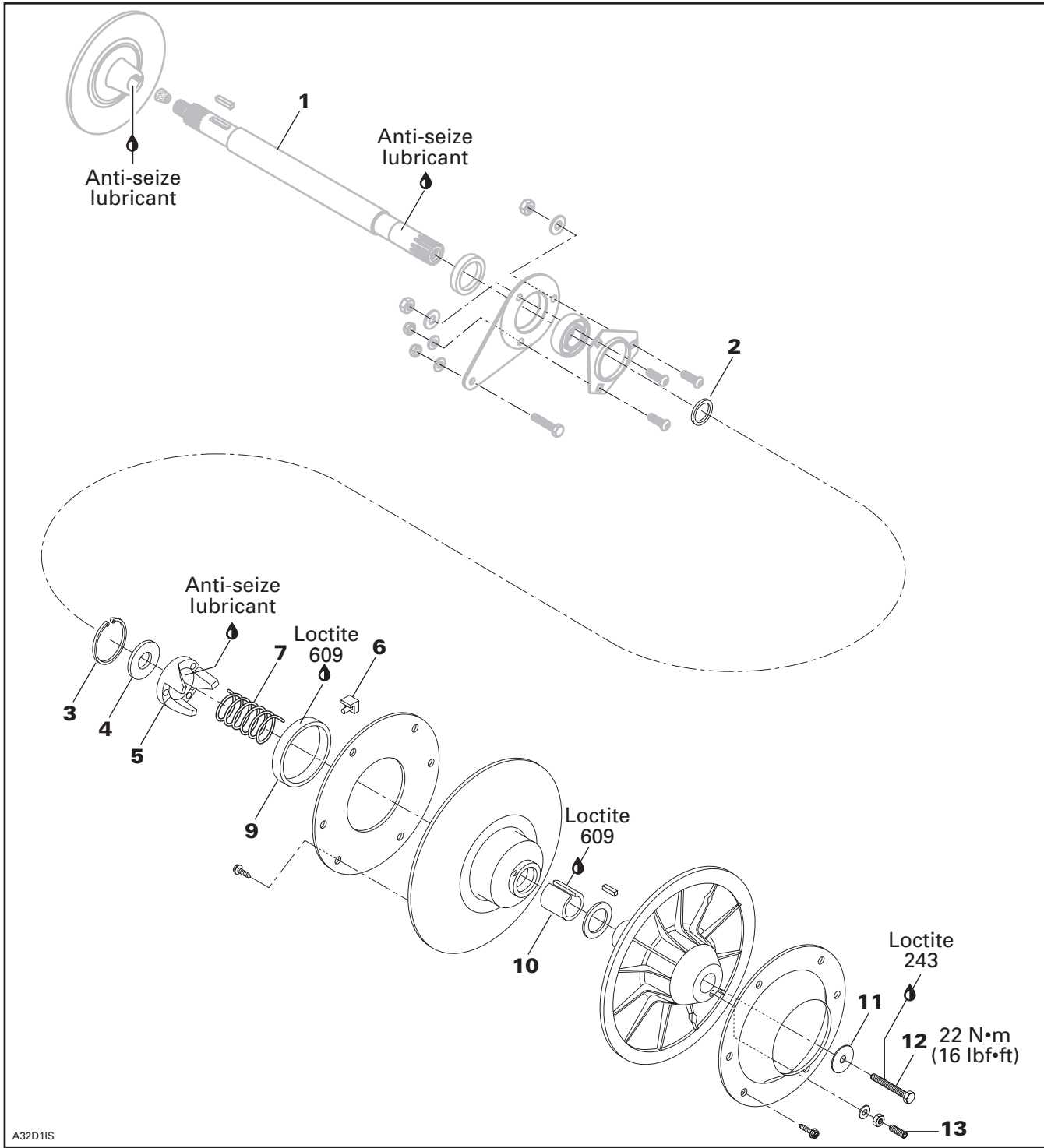
Refer to PULLEY DISTANCE AND ALIGNMENT and DRIVE BELT to perform adjustments.

CAUTION: Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

Section 05 TRANSMISSION
Subsection 04 (DRIVEN PULLEY)

FORMULA VSA

Skandic WT LC/SUV



A32D11S

REMOVAL

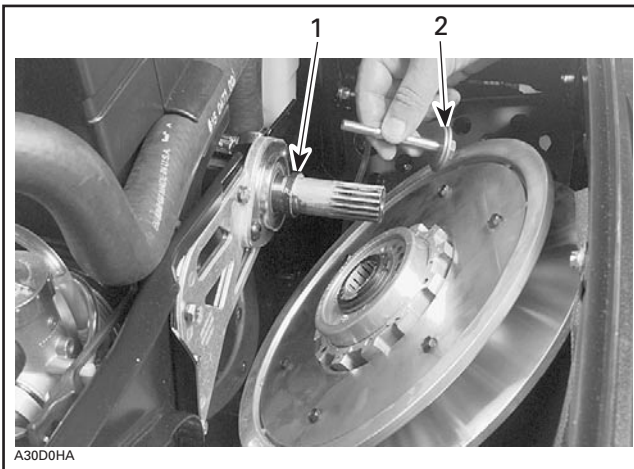
Remove guard and drive belt from vehicle.

Remove cap screw **no. 12** and shouldered washer **no. 11** then pull the driven pulley from the countershaft.

Note shouldered washer position for reinstallation.

Take care not to lose spacer **no. 2**.

NOTE: Make sure that the smaller diameter spacer is against the bearing to avoid damage to the bearing seal.



TYPICAL

1. Spacer
2. Shoulder on this side

1, Countershaft

Should countershaft **no. 1** removal be required, refer to BRAKE then look for COUNTERSHAFT AND BRAKE DISC REMOVAL.

DISASSEMBLY

Use spring compressor (P/N 529 018 600).



Remove snap ring **no. 3** and washer **no. 4** to disassemble the cam and the 2 pulley halves.

⚠ WARNING

Driven pulley cam is spring and/or torsion loaded, use above mentioned tool.

CLEANING

9, Large Bushing

During break-in period (about 10 hours of use), bushing teflon moves toward cam or shaft surface. A teflon over teflon running condition occurs, leading to low friction. So it is normal to see gray teflon deposit on cam or shaft. Do not remove that deposit, it is not dust.

When a dust deposit has to be removed from the cam or the shaft, use dry cloth to avoid removing transferred teflon.

Pulley Half Cleaning

Use Pulley Flange Cleaner (P/N 413 711 809).

Section 05 TRANSMISSION

Subsection 04 (DRIVEN PULLEY)

INSPECTION

9,10, Bushings

Check for cracks, scratch and for free movement when assembled to fixed half.

Using a dial bore gauge measure bushing diameter. Measuring point must be at least 5 mm (1/4 in) from bushing edge.

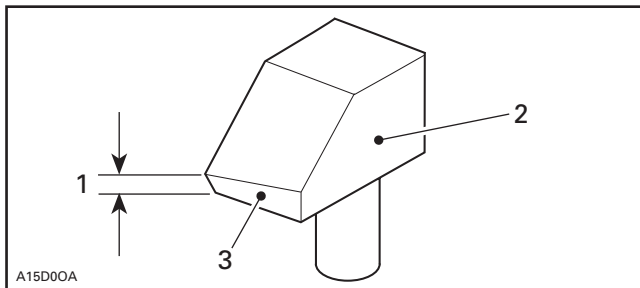


Replace bushing(s) if worn more than specified.

DRIVEN PULLEY BUSHING WEAR LIMIT	
mm (in)	
Large bushing	89.15 (3.510)

6, Slider Shoe

Check cam slider shoes for wear. Replace when inside edge thickness of cam slider shoe slope base is worn to 1 mm (.039 in) or less.



1. Measure thickness of slope base here
2. Sliding pulley side
3. Slope base

ASSEMBLY

6, 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.

5, Cam

Coat cam interior with anti-seize lubricant.

INSTALLATION

1, Countershaft

CAUTION: Always apply anti-seize lubricant (P/N 293 800 070) on the countershaft before final pulley installation.

Should installation procedure be required, refer to BRAKE then look for BRAKE DISC AND COUNTERSHAFT BEARING ADJUSTMENT.

Reinstall the pulley on the countershaft by reversing the removal procedure.

Driven pulley end-play is 0 (zero).

12, Pulley Retaining Screw

Torque to 22 N•m (16 lbf•ft).

ADJUSTMENT

7, Spring

General

It is usual to experience spring setting during breaking period of a new spring. The factory spring preload is slightly higher (about 1 kg (2 lb)) to compensate for spring setting. Specifications in TECHNICAL DATA are applicable after break-in period (about 10 hours of use).

Spring Torsional Pre-Load

To check spring pre-load adjustment, use spring scale hook (P/N 529 006 500) 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 perpendicularly with pulley axle.

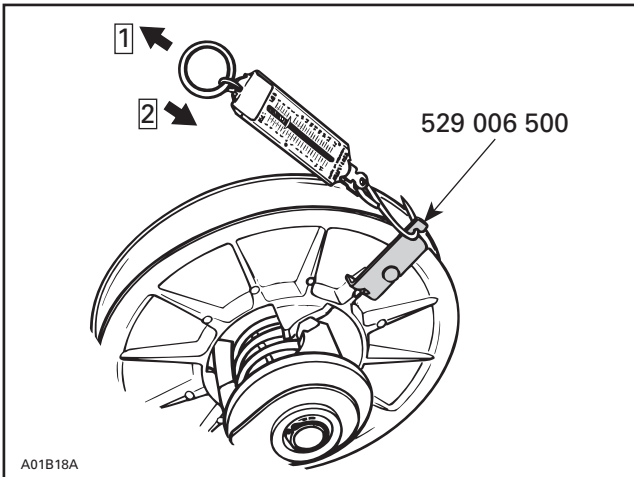
Section 05 TRANSMISSION
Subsection 04 (DRIVEN PULLEY)

Take 1st measurement when sliding half begins to turn. Rotate sliding half to 10 mm (3/8 in) of rotation. Hold spring scale at this position. Slowly release tension from spring scale and take 2nd measurement when sliding half begins to return. Spring pre-load is the average measurement between these 2.

$$\frac{\begin{array}{l} 1^{\text{st}} \\ \text{measurement} \\ \text{(when} \\ \text{opening)} \end{array} + \begin{array}{l} 2^{\text{nd}} \\ \text{measurement} \\ \text{(when} \\ \text{closing)} \end{array}}{2} = \text{Spring pre-load}$$

Example:

$$\frac{\begin{array}{l} 3.8 \text{ kg} \\ (8.4 \text{ lb}) \\ \text{(when} \\ \text{opening)} \end{array} + \begin{array}{l} 3.4 \text{ kg} \\ (7.5 \text{ lb}) \\ \text{(when} \\ \text{closing)} \end{array}}{2} = 3.6 \text{ kg (8 lb)} = \text{Actual spring pre-load}$$



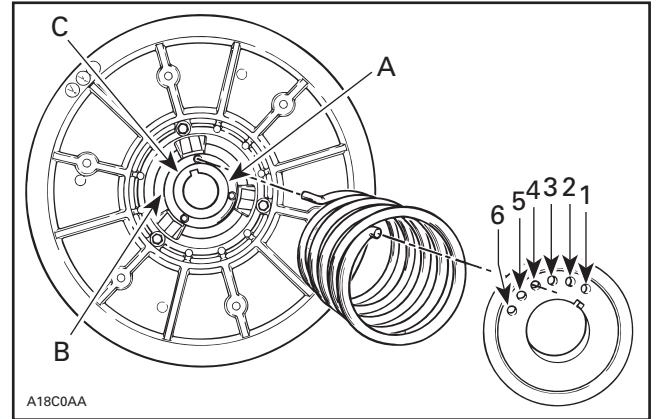
TYPICAL

Step 1: 1st measurement

Step 2: 2nd measurement

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 TECHNICAL DATA.

NOTE: If spring pre-load can not be adjusted, try to relocate the other end of spring in sliding pulley (holes A, B and C).



TYPICAL

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 Height

Refer to PULLEY DISTANCE AND ALIGNMENT and DRIVE BELT to perform adjustments.

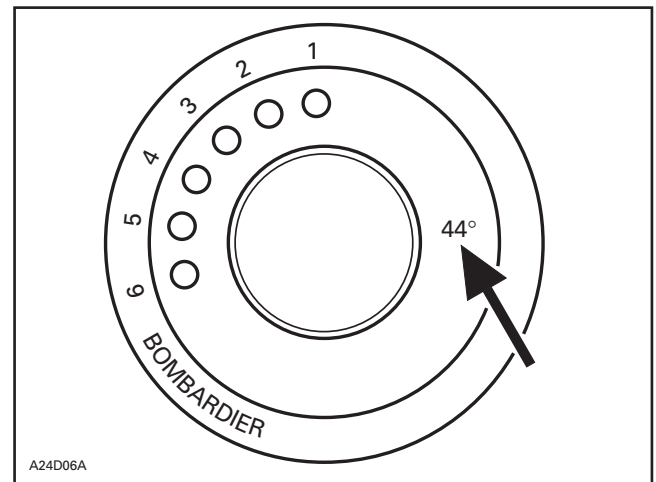
Drive belt height is adjusted by turning Allen screws no. 13 equally and accordingly.

CAUTION: Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

5, Cam

Make sure to install proper cam. Refer to TECHNICAL DATA.

Cam angle is identified on cam.



NOTE: For high altitude regions, a service bulletin will give 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.

GENERAL PROCEDURE

Remove guard.

Tundra

Use driven pulley opening tool (P/N 529 034 200).

Skandic LT/LT E

Use driven pulley opening tool (P/N 529 035 501).

All Models

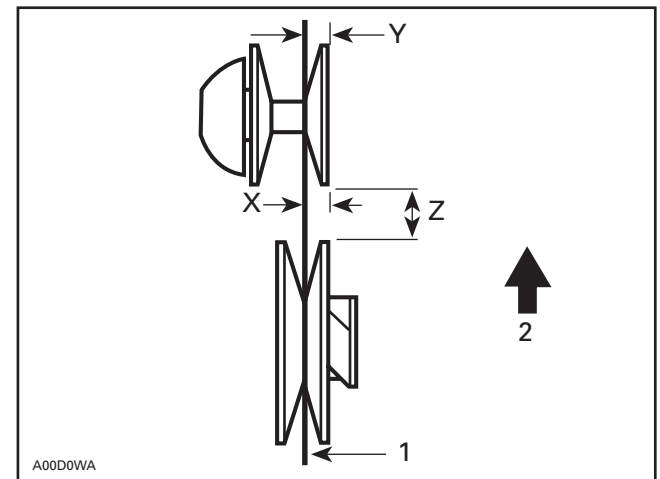
Remove drive belt.

Insert a straight bar 9.5 mm (.375 in) square, 48 cm (19 in) long or the proper alignment bar 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).



1. Straight bar
2. Front of vehicle

The distance Y **must** exceed distance X to compensate for the twist due to the engine torque.

Section 05 TRANSMISSION

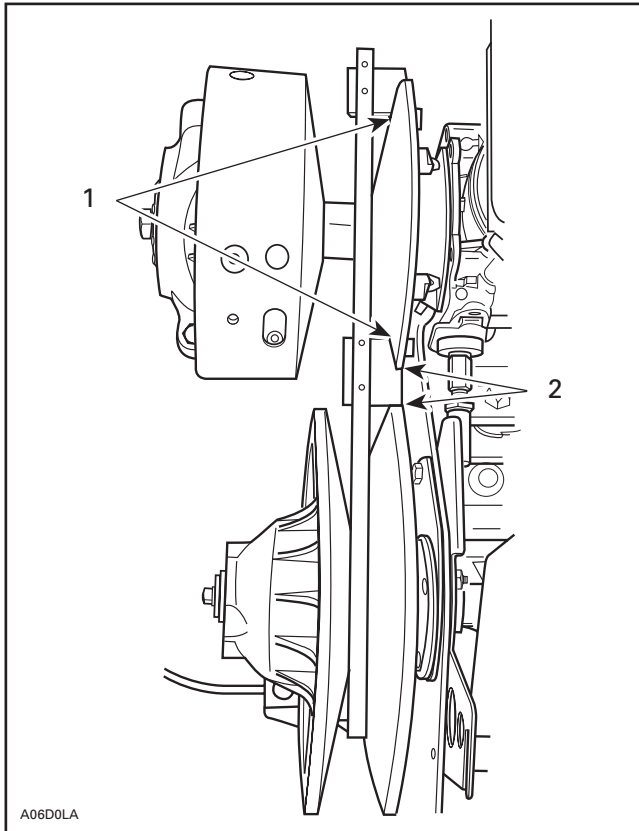
Subsection 05 (PULLEY DISTANCE AND ALIGNMENT)

Mean Value Procedure and Quick Alignment and Distance Check

Alignment bar tabs must fully contact fixed half of drive pulley.

Pulley distance is correct when tab contacts both pulley halves.

Refer to chart on next page for proper alignment bar.

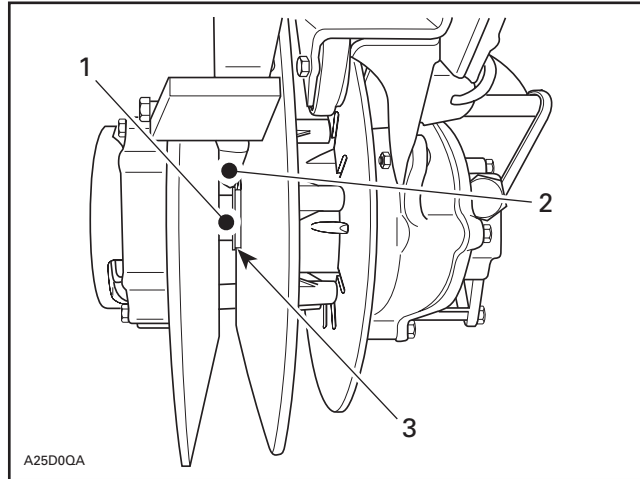


TYPICAL

1. Contact (alignment)
2. Contact (distance)

Tundra Only

Bottom of alignment bar must not seat on shaft nor fixed half shoulder and shim(s).



TYPICAL

1. Shaft
2. Alignment bar
3. Fixed half shoulder and shim(s)

Drive Belt Height

NOTE: When pulley distance and alignment are adjusted to specifications, refer to DRIVE BELT to adjust drive belt height.

CAUTION: This section deals mainly with adjustment procedures. For complete assembly requirements, refer to the proper ENGINE or TRANSMISSION installation section.

PULLEY ALIGNMENT AND DISTANCE SPECIFICATIONS CHART

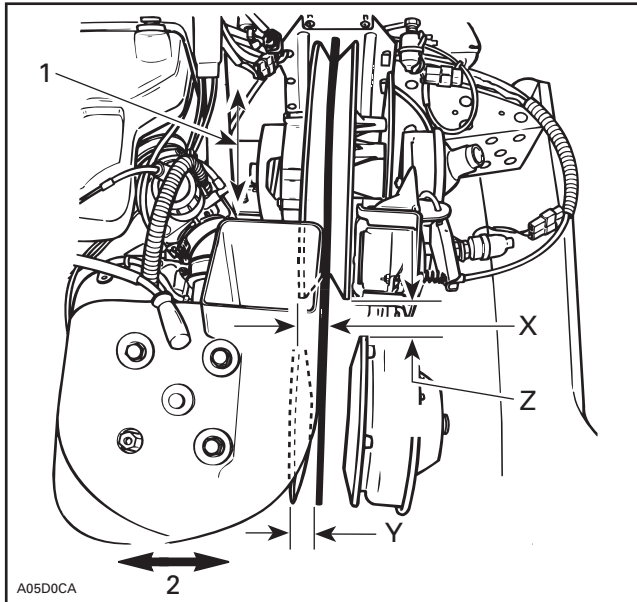
MODELS	PULLEY DISTANCE	OFFSET		ALIGNMENT BAR ① P/N
	Z	X	Y-X	
TUNDRA	37.0 ± 0.50 mm (1.457 ± .020 in)	36.0 ± 0.50 mm (1.417 ± .020 in)	0 to 1.5 mm (0 to .060 in)	529 026 900
SKANDIC LT/LT E	39.0 + 0 - 1.0 mm (1.535 + 0 - .039 in)	37.0 ± 0.75 mm (1.457 ± .030 in)	0.75 to 1.5 mm (.030 to .060 in)	529 035 808
SKANDIC WT/SWT/ SUV 550	41.8 + 0 - 1.0 mm (1.645 + 0 - .039 in)	35.0 ± 0.75 mm (1.380 ± .030 in)	0.75 to 2.25mm (.030 to .086 in)	529 035 974
SKANDIC WT LC/SUV 600	35.5 + 0 - 1.0 mm (1.400 + 0 - .039 in)	37.0 ± 0.50 mm (1.456 ± .020 in)	0.75 to 2.25 mm (.030 to .086 in)	529 035 545

① Alignment bars have been made according to pulley alignment mean values. However, they do not take into account allowed tolerances for alignment specifications. They are used as GO/NOGO gauges for quick alignment and pulley distance check and as reference to reach alignment nominal values.

Pulley Distance Adjustment Method

Tundra

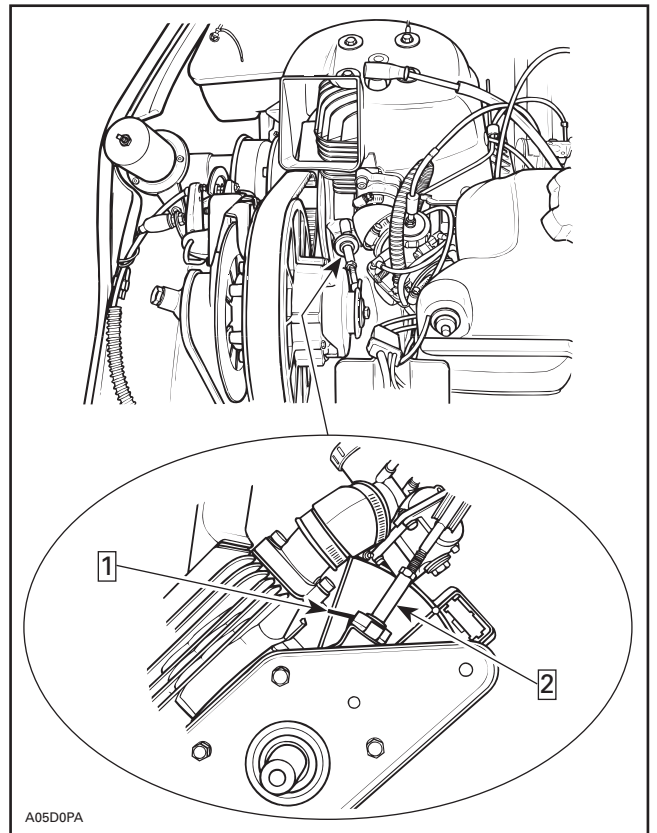
Move chaincase to obtain specific adjustment and adjust driven pulley support length accordingly (light contact).



- 1. Driven pulley movement
- 2. Engine movement

CAUTION: The rear suspension must be mounted on the vehicle and track tension and alignment must be done to provide the right frame width.

Loosen the 4 chaincase retaining bolts, unlock and raise pulley support.

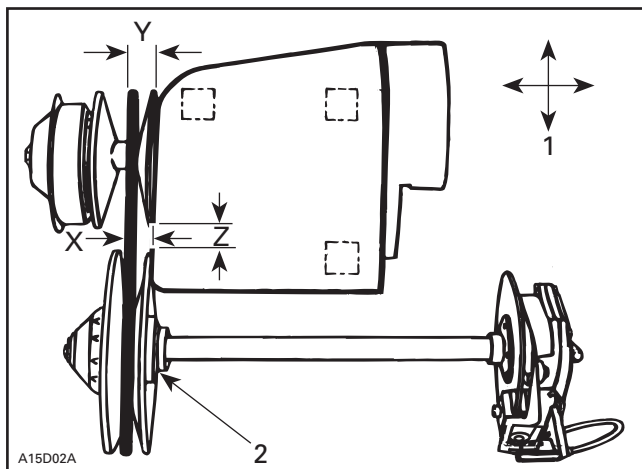


- Step ①: Push and hold
- Step ②: Raise support

Section 05 TRANSMISSION

Subsection 05 (PULLEY DISTANCE AND ALIGNMENT)

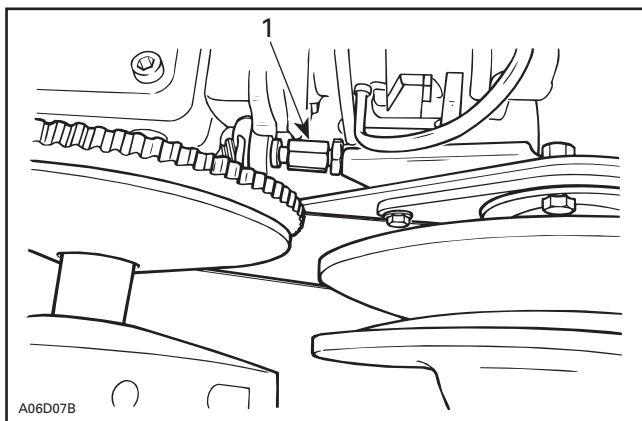
Skandic LT/LT E



TYPICAL

1. Engine movement
2. Contact

NOTE: Prior to performing pulley adjustment, loosen torque rod nut to allow engine movement. Engine supports have tendency to stick to frame, work engine loose prior to aligning.



1. Loosen

Engine Movement

The engine support has slotted mounting holes. Move engine to obtain specified distance between pulleys.

Skandic WT/SWT/WT LC/SUV 550/SUV 600

Driven Pulley Movement

Loosen gearbox retaining screws and move gearbox accordingly.

Retighten screws.

Pulley Alignment Method

Tundra

Engine Movement

Loosen the support retaining bolts.

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 504 039 800), 0.53 mm (.021 in) thick.

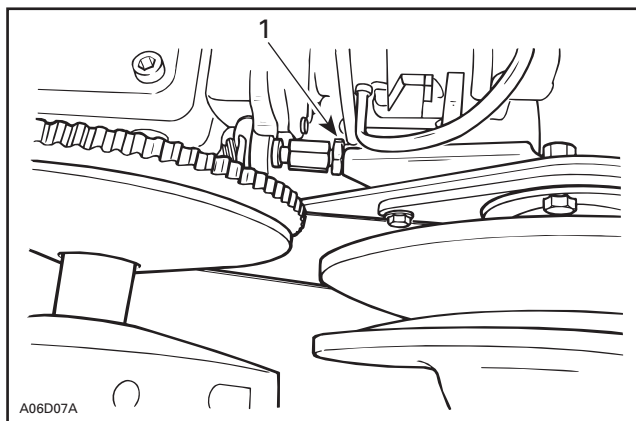
Skandic LT/LT E

When engine slotted mounting holes do not allow to set proper pulley offset X, adjust with shims (P/N 504 108 200) between pulley and countershaft bearing support (pulley pushed toward brake disc).

Engine Movement

Loosen the 4 bolts retaining engine support to the frame. Position engine to obtain the specified alignment.

NOTE: After alignment, adjust torque rod so it slightly contacts stopper plate. Do not over tighten, it will disalign pulleys.



1. Retighten

Skandic WT/SWT/WT LC/SUV 550/SUV 600

Driven Pulley Movement

Loosen gearbox retaining screws.

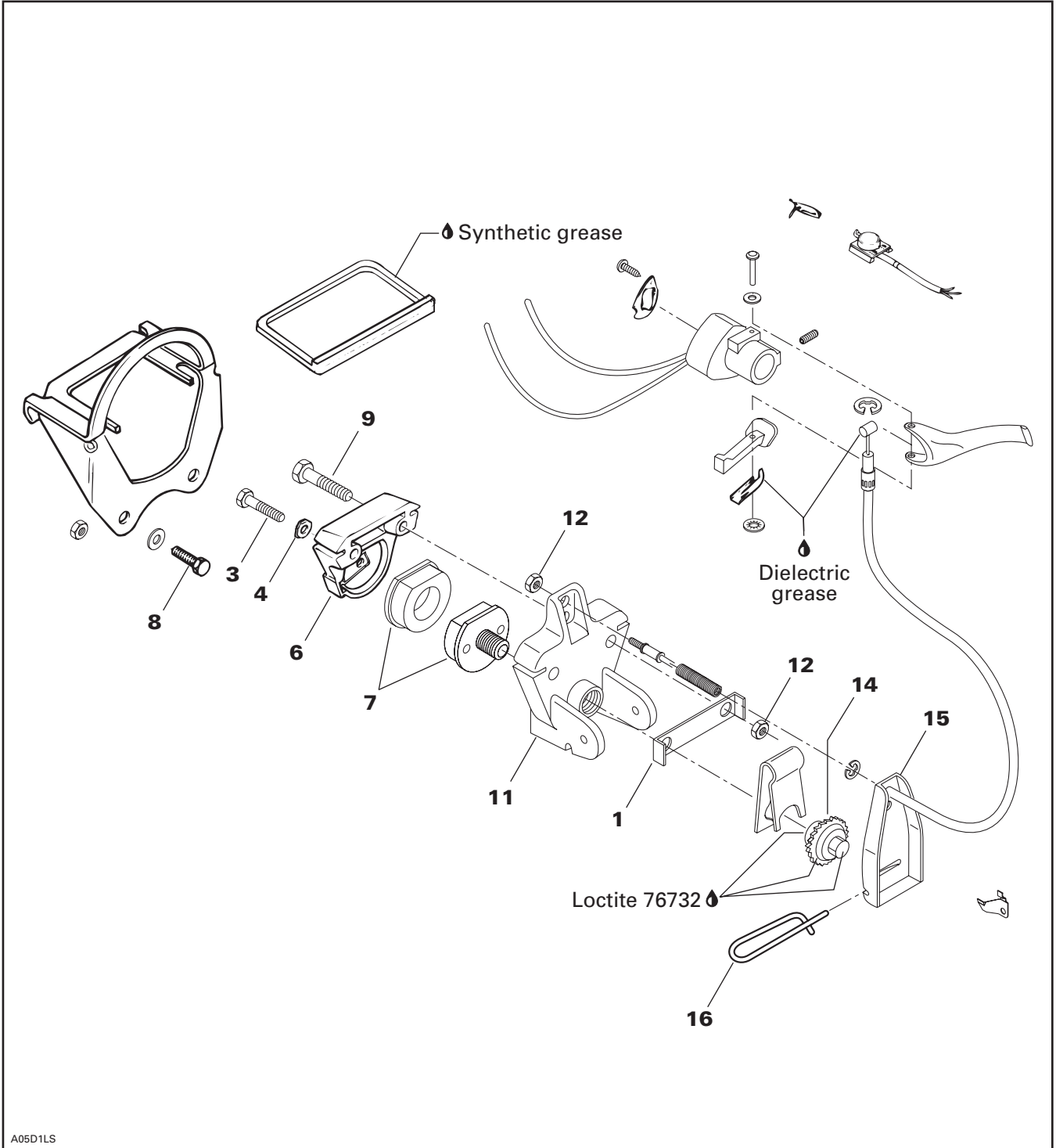
Install or remove shims accordingly.

Retighten screws.

BRAKE

MECHANICAL BRAKE

Tundra

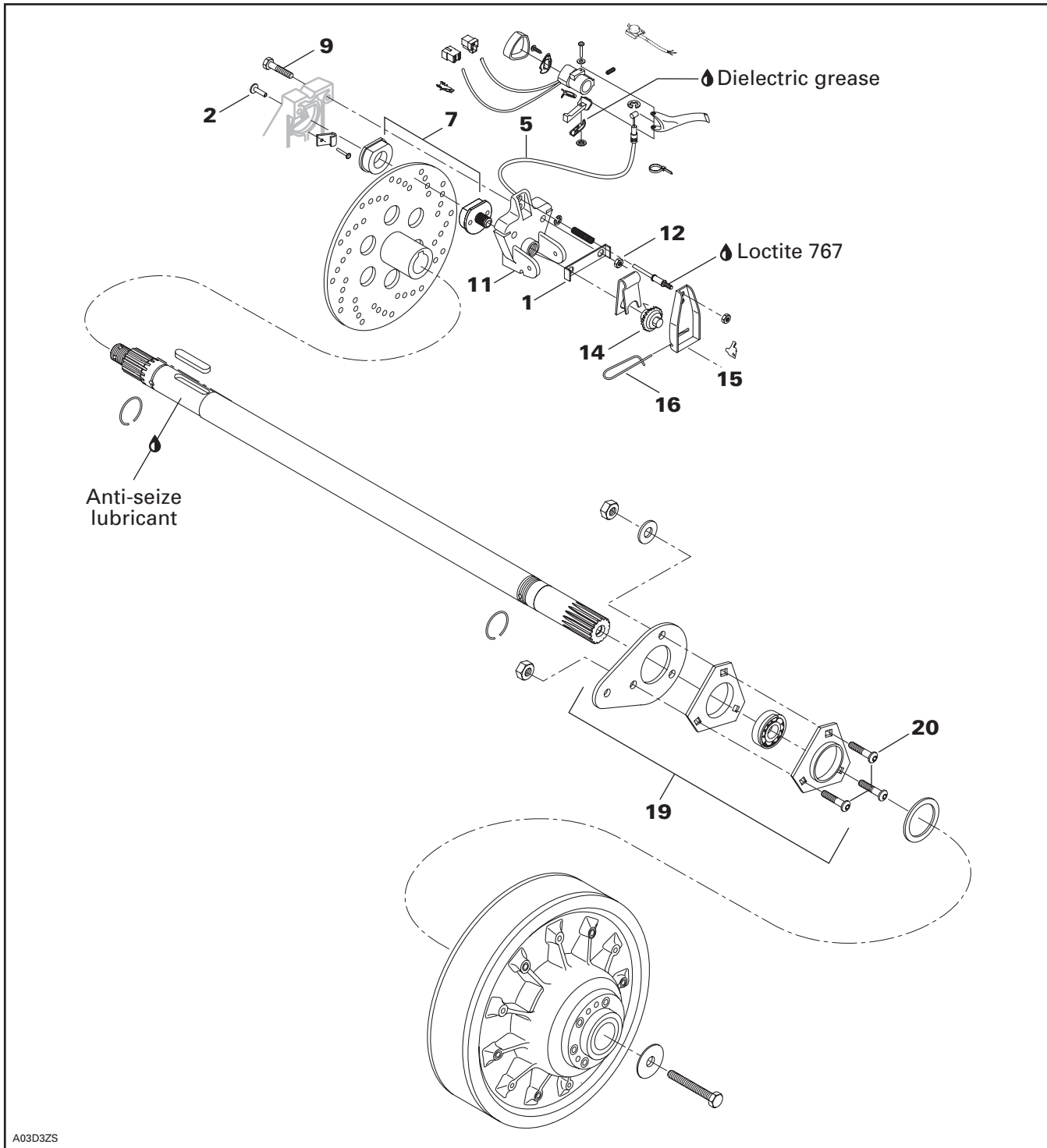


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Section 05 TRANSMISSION

Subsection 06 (BRAKE)

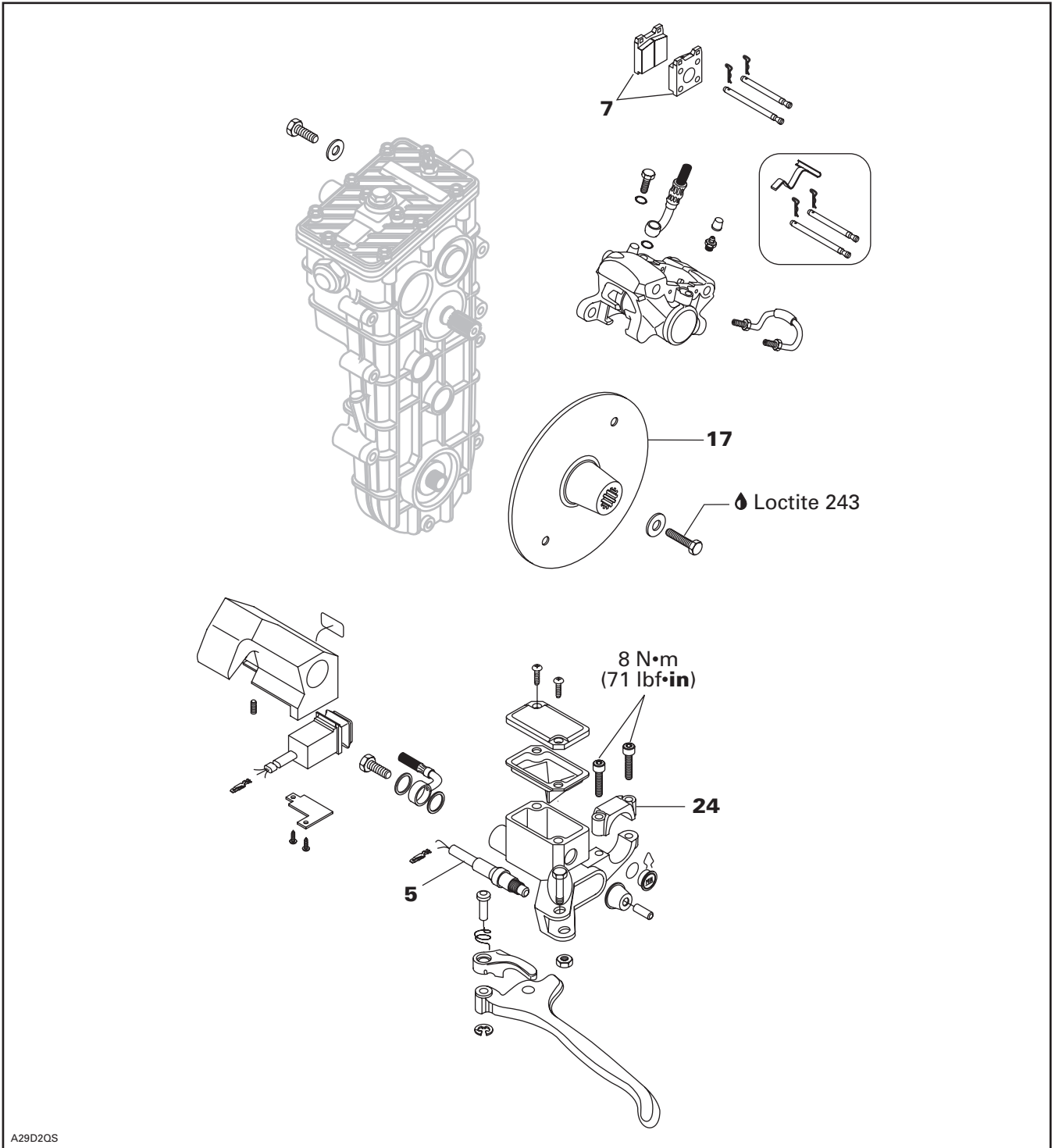
Skandic LT



A03D3ZS

HYDRAULIC BRAKE

Skandic WT/SWT/WT LC/SUV 550/SUV 600



A29D2QS

Section 05 TRANSMISSION

Subsection 06 (BRAKE)

BRAKE FLUID TYPE

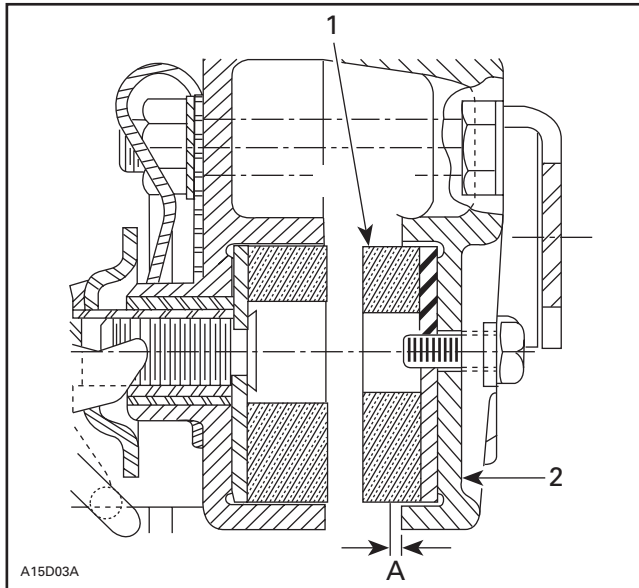
Use recommended brake fluid SRF (DOT 4) (P/N 293 600 063) or GTLMA (DOT 4) (P/N 293 600 062).

BRAKE PADS REPLACEMENT

Models with Mechanical Brake

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.



TYPICAL

1. Fixed pad
 2. Inner caliper
- A. 1 mm (1/32 in) minimum

Removal

Pull pin no. 16 out of caliper and remove lever no. 15.

Fixed pad is riveted to chaincase on these models. Caliper must be split to remove moving pad. To remove fixed pad, drill out its rivet no. 2 then pry disc in order to free fixed pad.

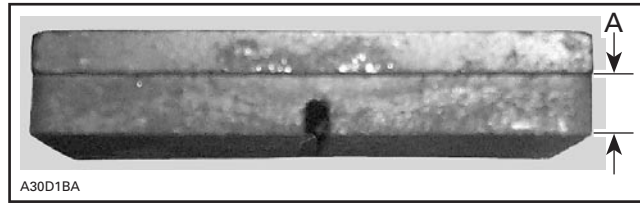
Installation

Reverse removal procedure.

All Models with Hydraulic Brake

Brake pads must be replaced when lining is 1 mm (1/32 in) thick or less.

CAUTION: Brake pads must always be replaced in pairs.

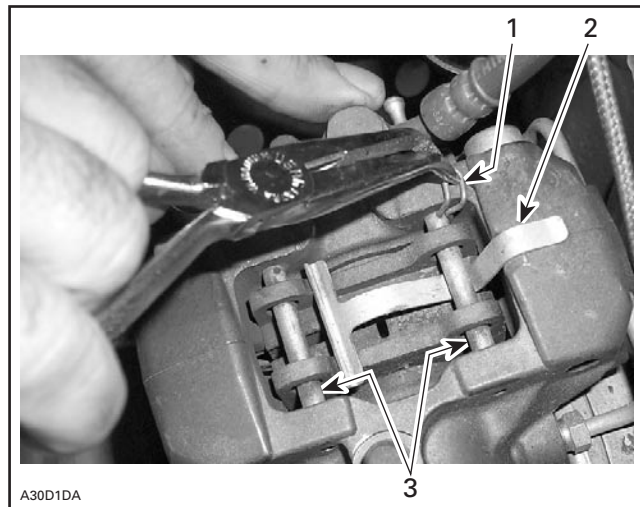


A. 1 mm (1/32 in) minimum

Removal

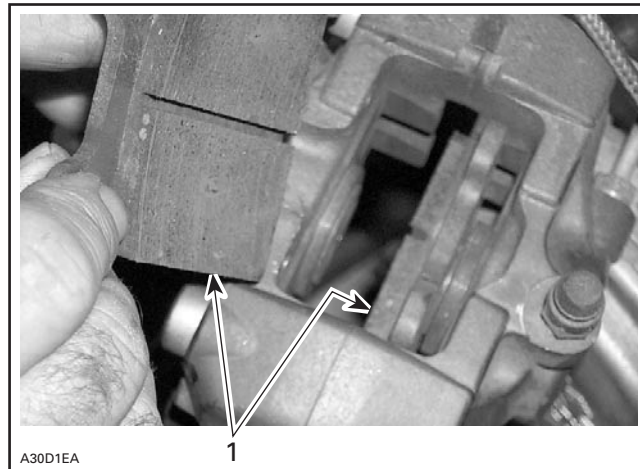
Brake pads removal procedure is as follows:

- Remove 2 retainers from the pins.
- Pull out 2 pins which releases the spring.
- Remove the brake pads.



TYPICAL

1. Retainer
2. Spring
3. Pin



TYPICAL

1. Brake pad

Installation

- Install new brake pads.
- Install spring and push 2 pins to lock the brake pads.
- Install 2 retainers in the pin holes.

To install brake, reverse removal procedure pay attention to the following.

WARNING

Avoid getting oil on brake pads.

Each time a new caliper or new brake pads are installed, proceed with the following:

- With caliper not bolted to chaincase, apply brake few times until both new pads are touching each other.
- Push back pads and repeat above step.
- Push back pads then fasten caliper to chaincase.
- Proceed with bleeding as described in this subsection.

REMOVAL

Brake Disc Removal

Tundra R

The split caliper type brake should be removed from chaincase as an assembly. Proceed as follows:

- Remove 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, driven pulley has to be removed first. Refer to DRIVEN PULLEY.

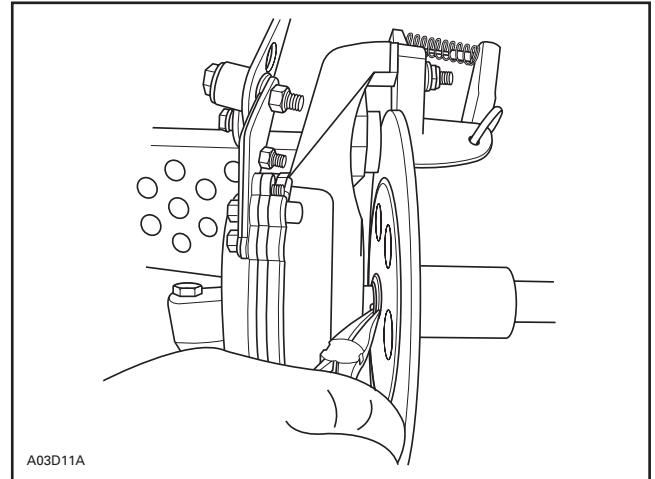
Skandic WT/SWT/WT LC/SUV 550/SUV 600

- Remove caliper by unscrewing M10 Allen screws.
- Unbolt disc.

Skandic LT

- Remove caliper.
- Remove guard, belt and driven pulley.
- Remove air silencer.
- Unbolt bearing support **no. 19** from chassis.
- Open chaincase and remove upper sprocket.

- Pull countershaft assembly toward driven pulley side to gain access to clip **no. 25**.
- Remove clip **no. 25** on countershaft.



- Pull countershaft toward driven pulley side to free from chaincase and disc.
- Remove disc.

DISASSEMBLY

7, 15, 16, 23, Brake Pad, Brake Lever, Pin and Screw

All Models with Mechanical Brake

Pull pin **no. 16** out of caliper and remove lever **no. 15**.

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 **no. 2** then pry disc in order to free fixed pad.

All Models with Hydraulic Brake

Only brake pads are available as spare parts. If caliper or master cylinder are damaged, replace each of them as an assembly.

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.

Section 05 TRANSMISSION

Subsection 06 (BRAKE)

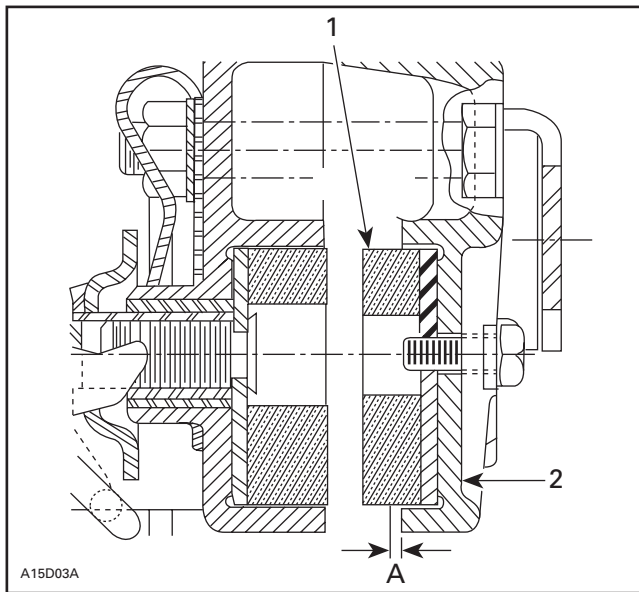
INSPECTION

7, Brake Pad

Models with Mechanical Brake

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.

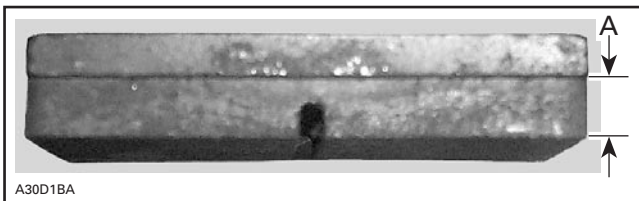


TYPICAL

1. Fixed pad
2. Inner caliper
- A. 1 mm (1/32 in) minimum

Models with Hydraulic Brake

Brake pads must be replaced when lining is 1 mm (1/32 in) thick.



- A. 1 mm (1/32 in) minimum

CAUTION: Brake pads must always be replaced in pairs.

Brake Disc

All Models

Check for scoring, cracking or heat discoloration, replace as required.

CAUTION: Brake disc should never be machined.

ASSEMBLY

14, Ratchet Wheel

Apply synthetic grease (P/N 413 711 500) 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.

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

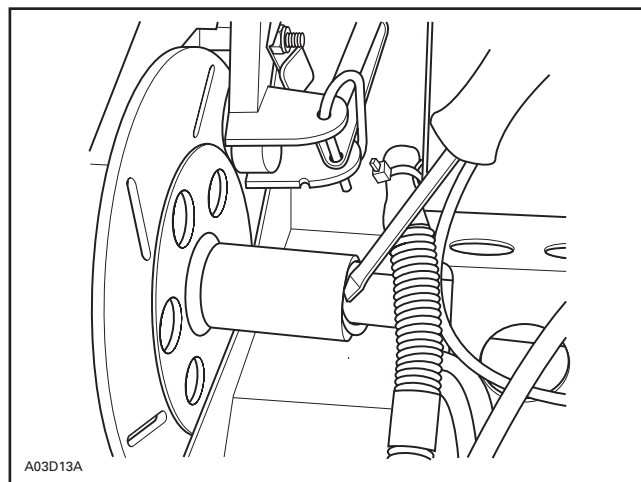
Skandic LT

The brake disc must be floating on countershaft for efficient operation of brake.

Apply anti-seize lubricant (P/N 413 701 000) 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.

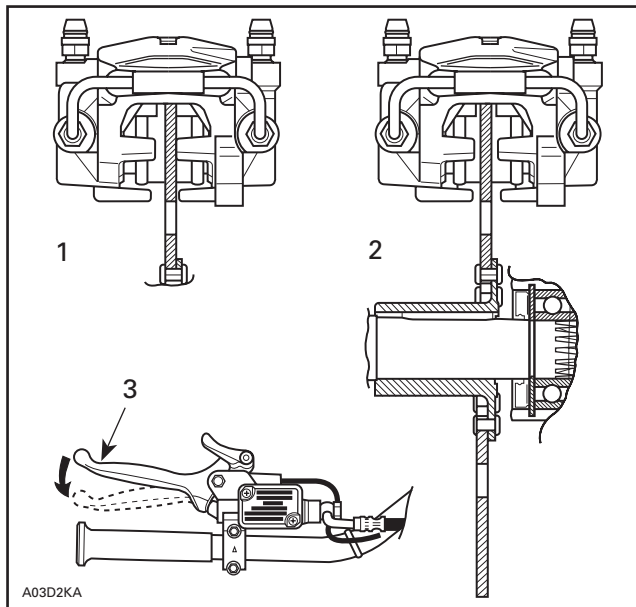


7, Brake Pad

Models with Hydraulic Brake

After brake pads installation, brake disc must be centered in caliper. Apply brake then check for proper brake disc positioning.

Push on appropriate caliper piston in order to move pad inward allowing proper brake disc positioning.



1. Brake disc not centered
2. Brake disc centered
3. Apply brake before checking

Apply brake then recheck.

1,11,12, Locking Tab, Outer Caliper and Nut

Skandic LT

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.

5,12, Brake Cable and Nut

Insert brake cable into upper hole in brake lever and caliper. Install nut and tighten until a few threads exceed.

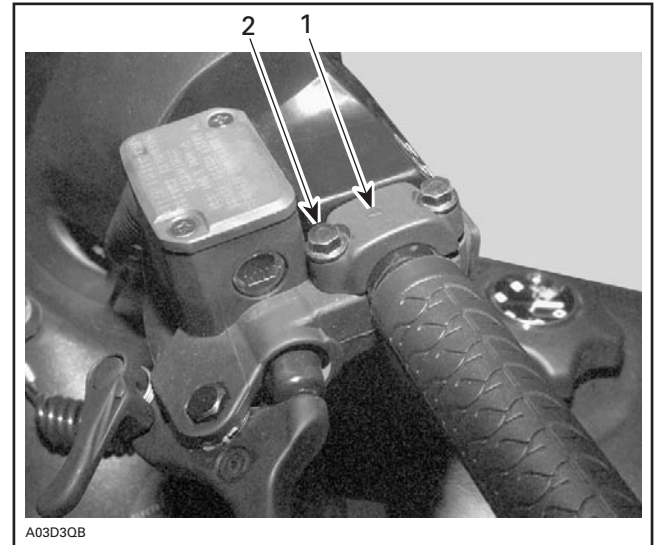
⚠ WARNING

At least 3 threads must exceed the elastic stop nut.

24, Upper Clamp

Models with Hydraulic Brake

Install upper clamp with its arrow pointing at front of vehicle. Tighten to 8 N•m (71 lbf•in) front screw before rear one.



TYPICAL

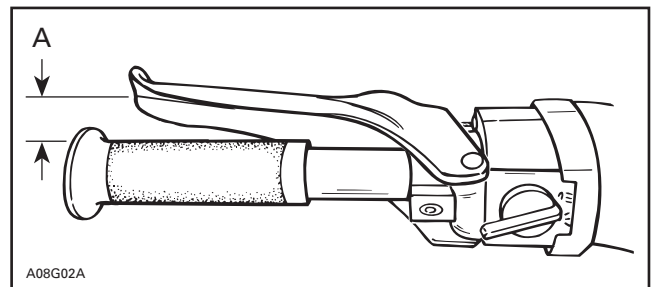
1. Arrow on upper clamp pointing at front of vehicle
2. Tighten front screw first

ADJUSTMENT

Brake

Models with Mechanical Brake

Fully depress brake handle several times to obtain 13 mm (1/2 in) between brake handle and handle-bar grip when brake is fully applied.



A. 13 mm (1/2 in)

Should this adjustment be unattainable, retighten nut no. 12 as needed.

Section 05 TRANSMISSION

Subsection 06 (BRAKE)

Models with Hydraulic Brake

Change brake fluid once a year.

Bleed brake system as follows:

Keep sufficient DOT 4 brake fluid in reservoir at all times.

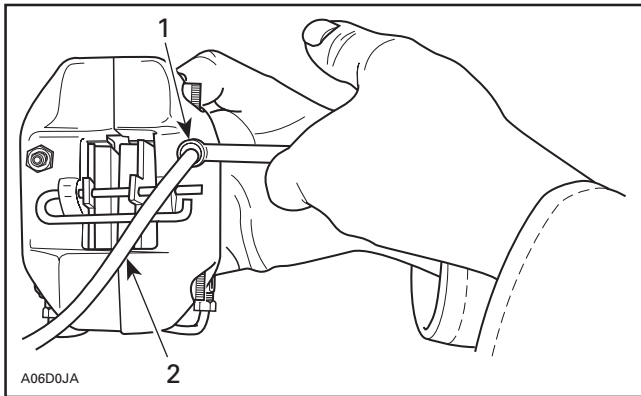
CAUTION: Use only DOT 4 brake fluid.

Install a hose on left side bleeder. Route this hose to a container.

Pump a few times brake lever and while holding brake lever depressed, open bleeder and check for air to escape.

Repeat with the same bleeder until no air appears in hose.

Proceed the same way with the right side bleeder.



TYPICAL

1. Open bleeder
2. Clear hose to catch used brake fluid

Brake Light

Skandic LT and Tundra Models only

Brake light should light up before brake pads touch brake disc. To adjust, unscrew nut no. 12 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.

Models with Hydraulic Brake

There is no adjustment on these models. Check that switch is securely installed.

BLEEDING

Change brake fluid once a year.

Bleed brake system as follows:

Keep sufficient SRF (DOT 4) (P/N 293 600 063) or GTLMA (DOT 4) (P/N 293 600 062) 4 brake fluid in reservoir at all times.

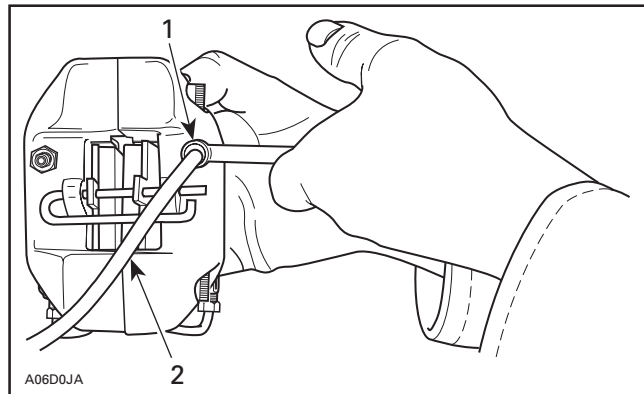
CAUTION: Use only SRF (DOT 4) (P/N 293 600 063) or GTLMA (DOT 4) (P/N 293 600 062) brake fluid.

Install a clear hose on left side bleeder. Route this hose to a container. Open bleeder.

Pump brake lever until no air escapes from hose.

Close bleeder.

Proceed the same way with the right side bleeder.



TYPICAL

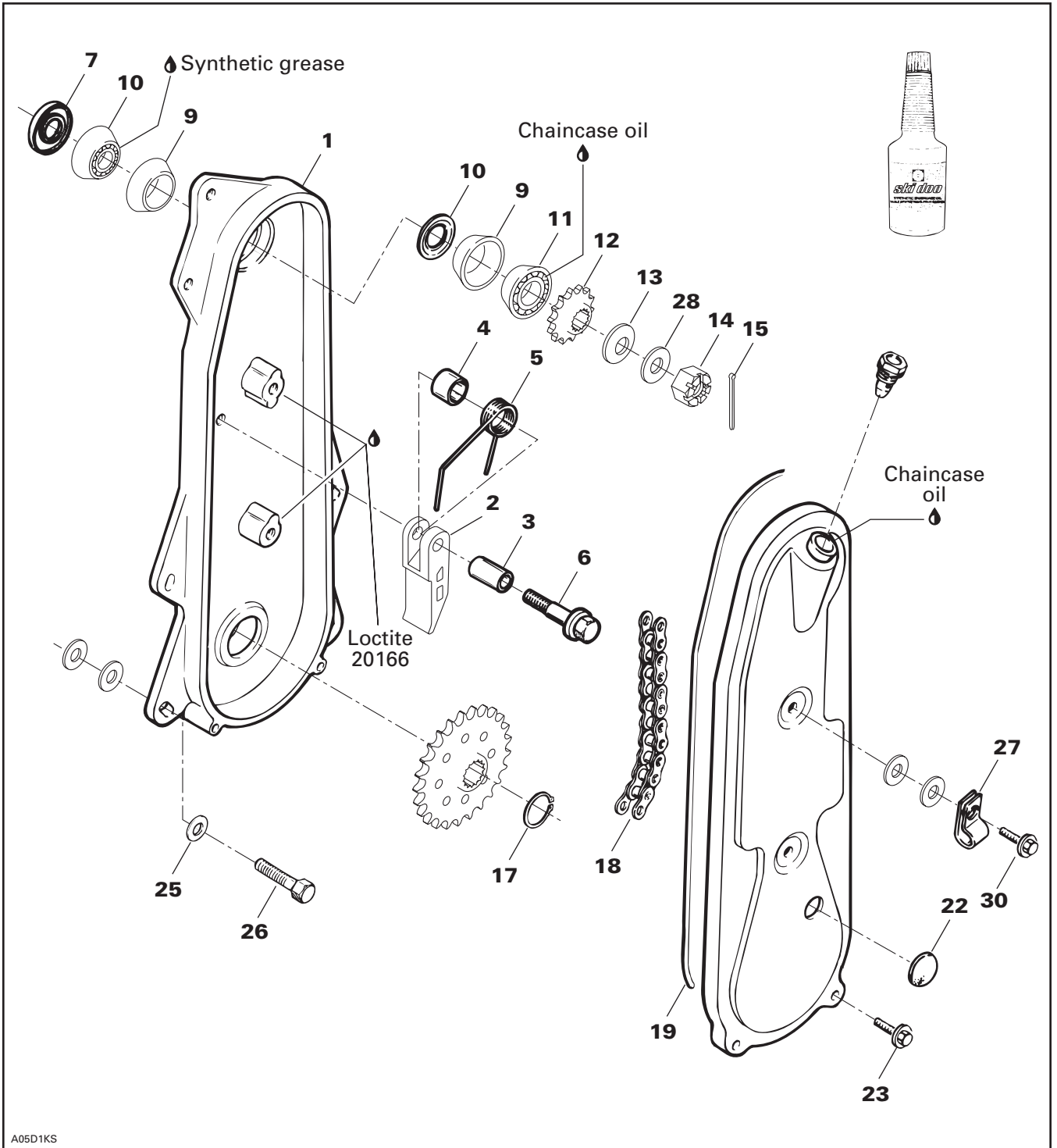
1. Open bleeder
2. Clear hose to catch used brake fluid

WARNING

Avoid getting oil on brake pads. Do not lubricate or apply antirust or antifreeze solution in brake cable.

CHAINCASE

Tundra



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Section 05 TRANSMISSION

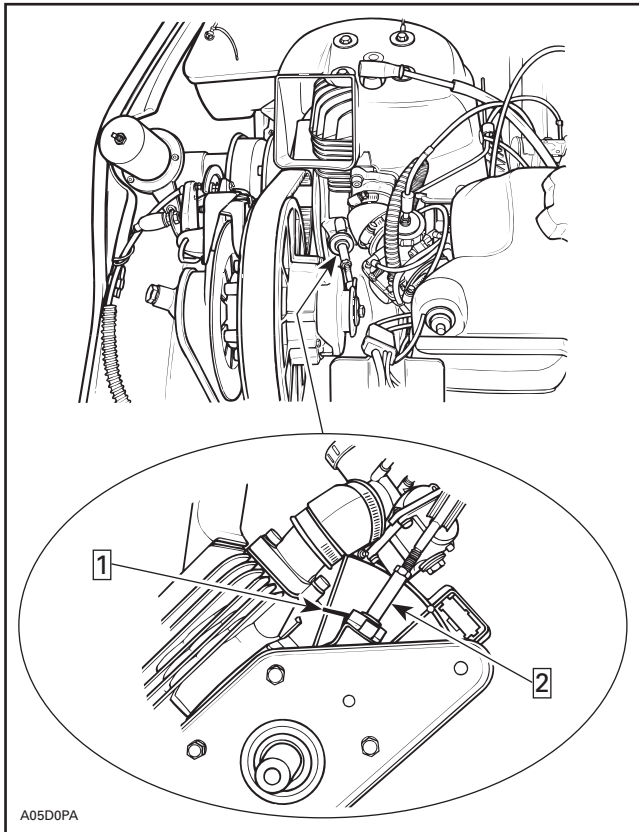
Subsection 07 (CHAINCASE)

REMOVAL

Chaincase and driven pulley can be removed from the vehicle as an assembly.

Remove guard and drive belt.

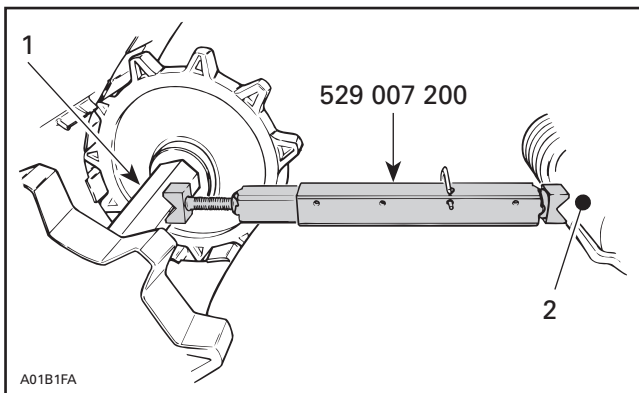
Unlock and raise driven pulley support.



Step **1**: Push and hold

Step **2**: Raise support

Release track tension. Install drive axle holder (P/N 529 007 200).



1. Drive axle

2. Suspension cross shaft

Remove chaincase cover no. 20 and drain oil.

Remove right side drive axle bearing cover.

Remove circlip no. 17.

Move drive axle and track together to the right side as far as possible.

Unscrew the nut no. 14 on the upper sprocket no. 12. Remove chain tensioner assembly nos. 2 to 6, then simultaneously remove chain no. 18 and both sprockets.

Remove the 4 cap screws no. 26 securing chaincase to frame.

Chaincase and Driven Pulley Assembly

Using 2 large prybars inserted between chaincase and frame, pry complete assembly from vehicle.

DISASSEMBLY

Disassemble driven pulley from chaincase. Refer to DRIVEN PULLEY.

INSPECTION

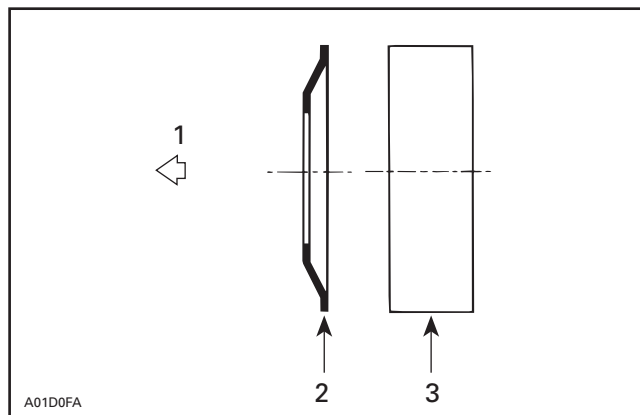
Visually inspect the chain for cracked, damaged or missing link rollers. Check for defective bearings, sprockets and worn chain tensioner components.

⚠ WARNING

If chain deflection is greater than 38 mm (1.5 in) (without chain tensioner), replace chain and check condition of sprockets.

ASSEMBLY

Position oil deflector ring no. 10 then sit bearing in chaincase aperture. Install spacer then the other bearing.



1. Toward chaincase

2. Oil deflector

3. Bearing

1, Oil Seal

Using an appropriate pusher, press new oil seal **no. 7** into chaincase hub. Oil seal must sit flush with case hub edge.

INSTALLATION

Reverse removal procedure. Pay particular attention to the following:

Torque castellated nut **no. 14** to 14 N•m (124 lbf•in), loosen then retorque to 0.5 - 2.5 N•m (5 - 22 lbf•in).

Apply Loctite 20166 (P/N 293 800 066) around both threaded holes of cover screws.

Grease new gasket **no. 19** with petroleum jelly, or other suitable product, and install it making sure it does not shift from its correct position. Tighten bolts evenly.

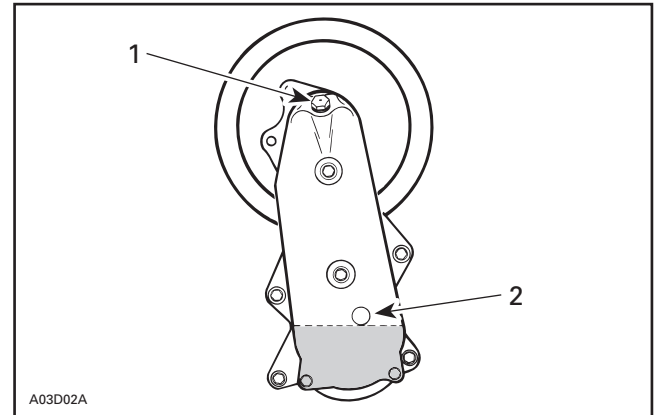
NOTE: Bottom pan has an emboss below chaincase housing to ease installation.

Chaincase Oil

Remove filler cap and pour 250 mL (8.5 fl. oz) of mineral chaincase oil (P/N 413 801 900) into chaincase.

NOTE: Chaincase oil capacity is 250 mL (8.5 fl. oz).

Check the oil level by removing the chaincase oil level plug.



1. Filler cap
2. Oil level plug

The oil should be leveled with the bottom of the oil level orifice.

Reinstall battery and connect cables on electric starting models.

CAUTION: Always connect positive RED cable first to prevent sparks.

ADJUSTMENT

Pulley Alignment

Refer to PULLEY DISTANCE AND ALIGNMENT.

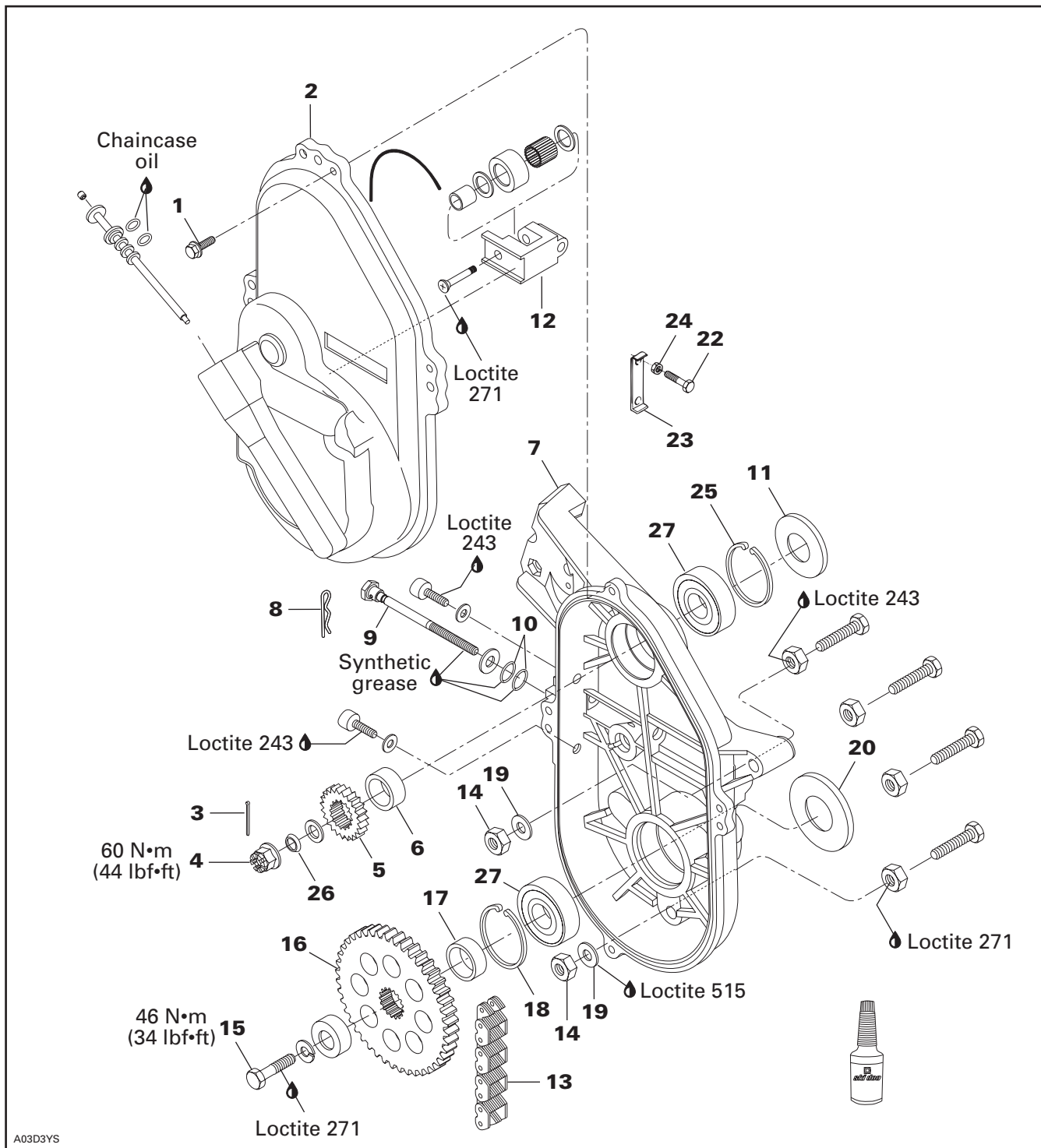
Track Tension and Alignment

Refer to TRACK.

Section 05 TRANSMISSION

Subsection 07 (CHAINCASE)

Skandic LT



A03D3YS

REMOVAL

To remove chaincase proceed as follows.

Remove tuned pipe and muffler.

⚠ WARNING

Never remove exhaust components when engine is hot.

Remove hair pin **no. 8**. Release drive chain tension by unscrewing tensioner adjustment screw.

Drain oil by removing chaincase cover **no. 2**.

Apply brakes.

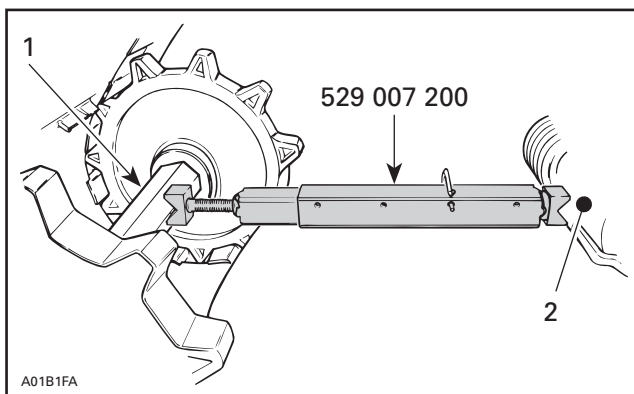
Remove cotter pin **no. 3**, nut **no. 4**, washer **no. 26** retaining upper sprocket **no. 5** and screw **no. 15** retaining lower sprocket **no. 16**. Pull sprockets and drive chain simultaneously. Remove shims **nos. 6 and 17**.

NOTE: Should countershaft removal be required, refer to BRAKE then look for BRAKE DISC.

Remove 5 nuts **no. 14**. Three nuts are behind the lower sprocket.

Unfold locking tab **no. 23**, then remove caliper retaining screws **no. 22**.

Release track tension, use drive axle holder (P/N 529 007 200).



TYPICAL

1. Drive axle
2. Suspension cross shaft

Pry out drive axle oil seal **no. 20** from chaincase.

Pull chaincase from drive axle and countershaft.

Using 2 prybars inserted between chaincase **no. 7** 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 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, a Service Bulletin will give information about calibration according to altitude.

INSTALLATION

Reverse removal procedure and pay attention to the following. Replace oil seals, gaskets and O-rings. Sealed side of bearing **no. 27** must face chaincase cover.

11, Oil Seal

Clean chaincase bore with cleaning solvent then apply Loctite 609 to oil seal mounting surface (outside).

Using pusher (P/N 529 035 584), 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 then look for BRAKE DISC AND COUNTERSHAFT BEARING ADJUSTMENT.

5,16, Sprockets

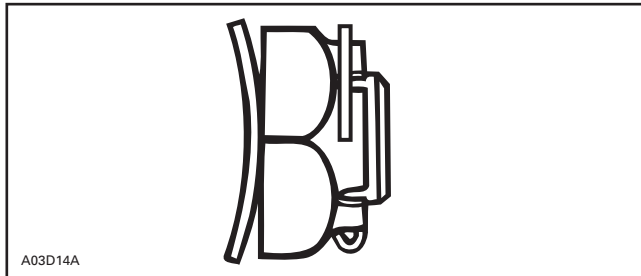
Position the sprockets with the writing facing the chaincase cover.

Section 05 TRANSMISSION

Subsection 07 (CHAINCASE)

26, Conical Spring Washer

Install washer with its concave side towards sprocket.



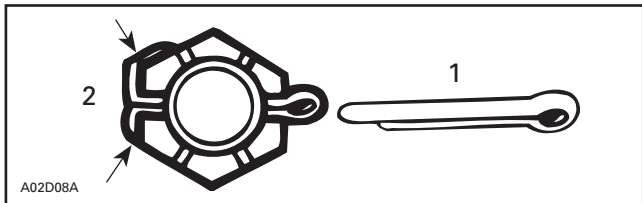
4, Upper Sprocket Castellated Nut

Torque to 60 N•m (44 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.



1. New
2. Fold cotter pin over castellated nut flats only

18, Circlip

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

DRIVE CHAIN ADJUSTMENT

NOTE: Brake disc key must be in good condition before checking chain free play.

10, O-Ring

Replace both O-rings **no. 10** 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 disc.

CAUTION: Free-play must not exceed 5 mm (13/64 in), readjust if necessary.

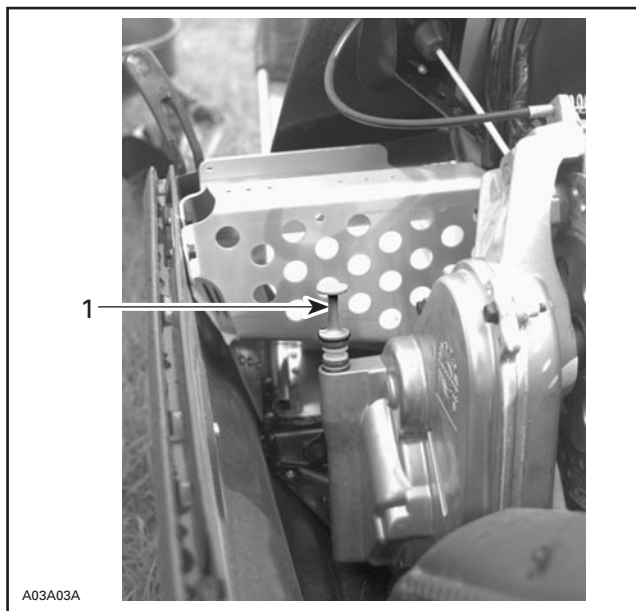
⚠ WARNING

If the specified free-play is not reached with the tensioner screw fully tightened, replace chain and check the condition of sprockets.

21, Chaincase Oil

Pour 250 mL (8.5 fl. oz) of synthetic chaincase oil (P/N 413 803 300) into chaincase.

Check oil level with the dipstick then add if required. Remove metal particles from magnet.



TYPICAL

1. Dipstick

NOTE: Chaincase must be in its proper position when checking oil level.

ADJUSTMENT

Pulley Alignment

Refer to PULLEY DISTANCE AND ALIGNMENT.

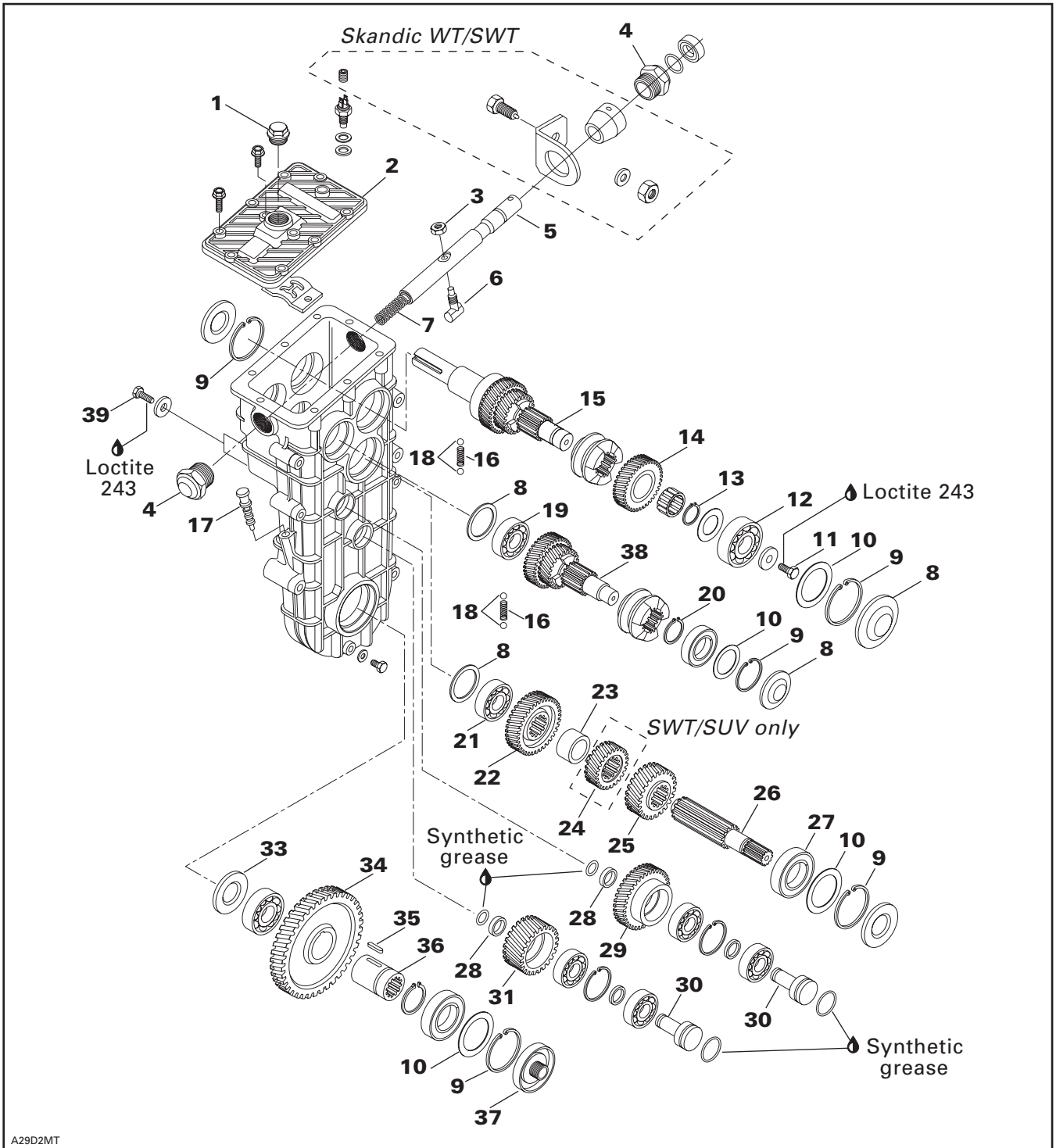
Track Tension and Alignment

Refer to TRACK.

GEARBOX

3-SPEED GEARBOX

Skandic WT/SWT/WT LC/SUV



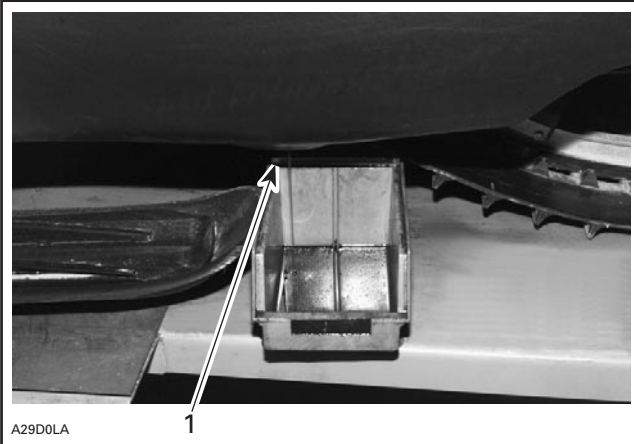
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Section 05 TRANSMISSION

Subsection 08 (GEARBOX)

REMOVAL

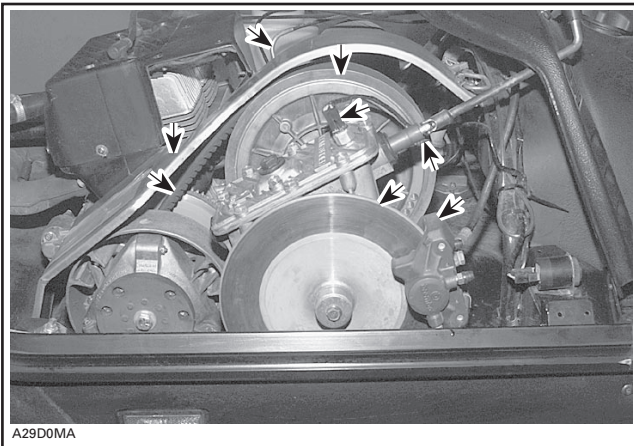
Drain gearbox oil.



1. Bottom pan drain hole nearby gearbox drain plug

Remove belt guard, drive belt. Remove air silencer and carburetor(s); then remove driven pulley.

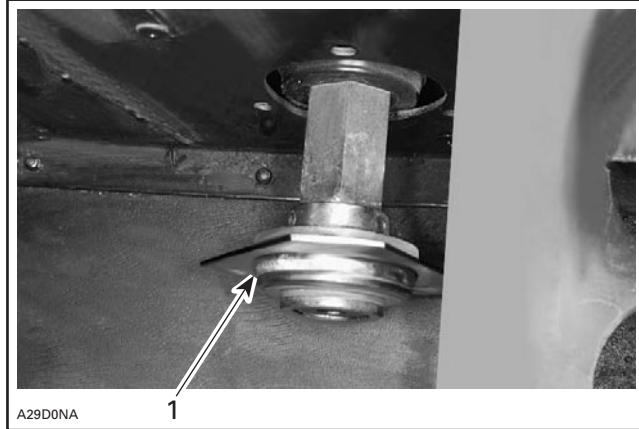
Remove brake caliper, brake disc. Unfasten shifting rod and unplug reverse switch.



Remove rear suspension.

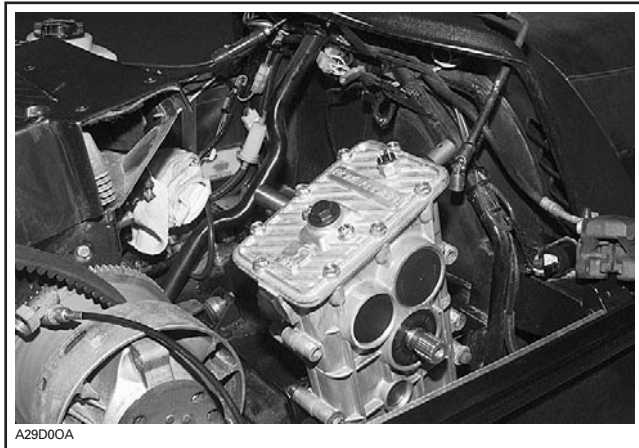
Remove angle drive and square pin from bottom of gearbox.

Remove muffler. Unbolt RH end bearing then pull drive axle toward right side.



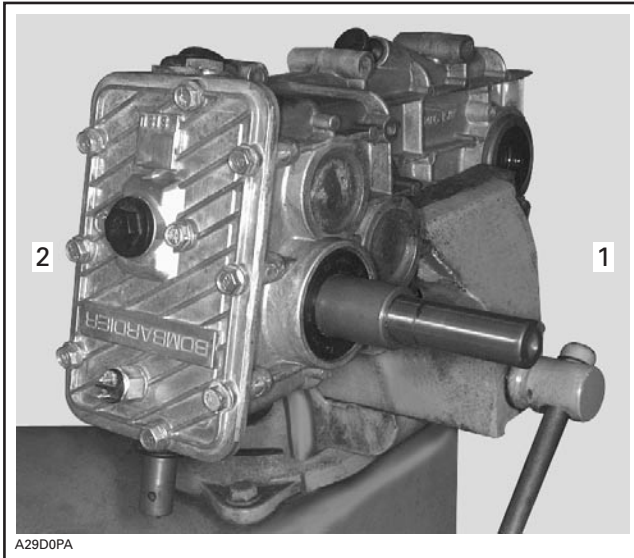
1. RH end bearing

Unbolt gearbox from chassis.



DISASSEMBLY

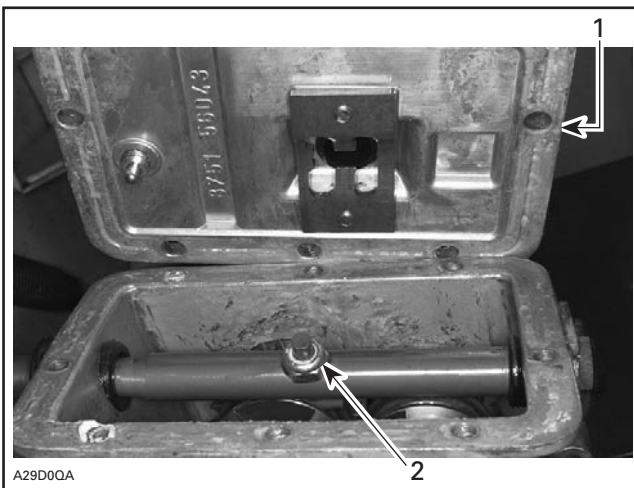
For the following procedure, right hand side refers to driven pulley side and left hand side to brake disc side.



- 1. RH side driven pulley side
- 2. LH side brake disc side

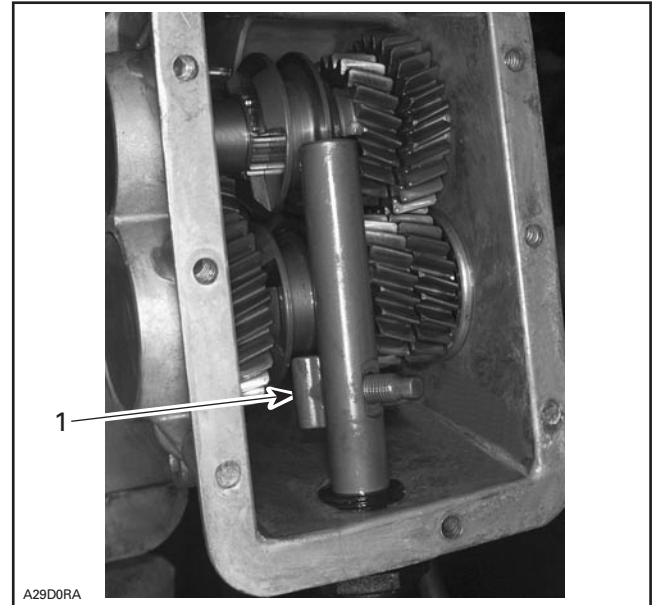
Remove dipstick **no. 17**. Unfasten cover **no. 2** from gearbox housing.

Remove nut **no. 3** retaining pin **no. 6**.



- 1. Cover
- 2. Nut

Unfasten sleeve nuts **no. 4**, remove spring **no. 7** then, partially pull shaft **no. 5** and remove pin **no. 6**.



- 1. Pin

Completely remove shaft **no. 5**.

Drill a 10 mm (3/8 in) diameter hole through all plugs **no. 8**.



Remove all plugs **no. 8** from gearbox.

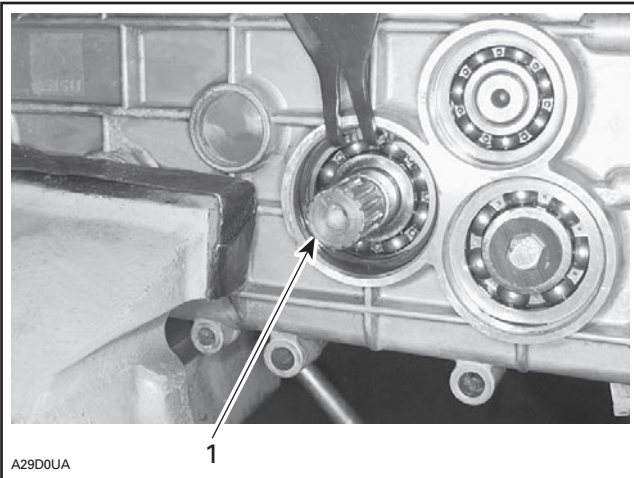
Section 05 TRANSMISSION

Subsection 08 (GEARBOX)

Remove all circlips no. 9.

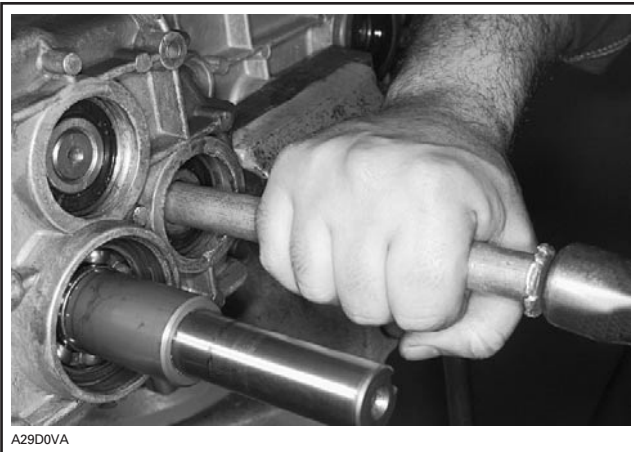


IMPORTANT: Note all shims quantity and location.
Remove brake shaft oil seal and then circlip.



1. Brake shaft

Proceeding from right side, drive brake shaft out of gearbox housing.



Remove sleeve no. 23.

NOTE: Brake shaft gears remain in gearbox housing.

Remove bearing no. 27 from brake shaft no. 26 using a press.

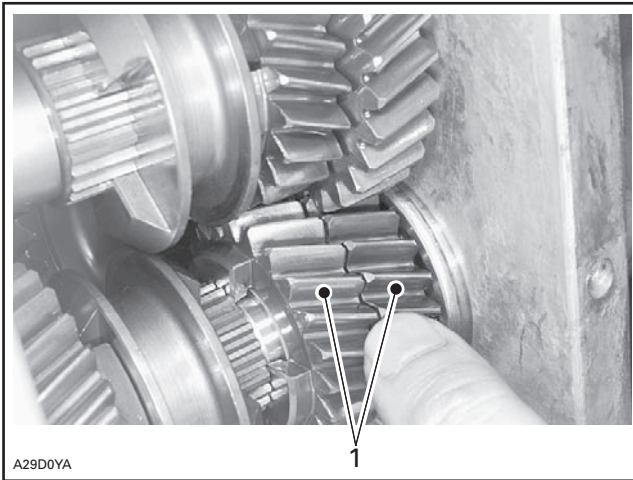


Drive reverse shaft no. 38 out until its LH side bearing is free.

Section 05 TRANSMISSION

Subsection 08 (GEARBOX)

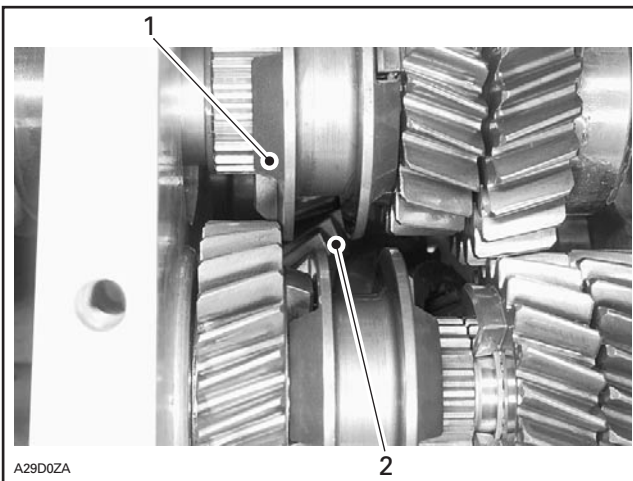
Make sure gears mesh.



1. These gears must mesh as reverse shaft is driven out

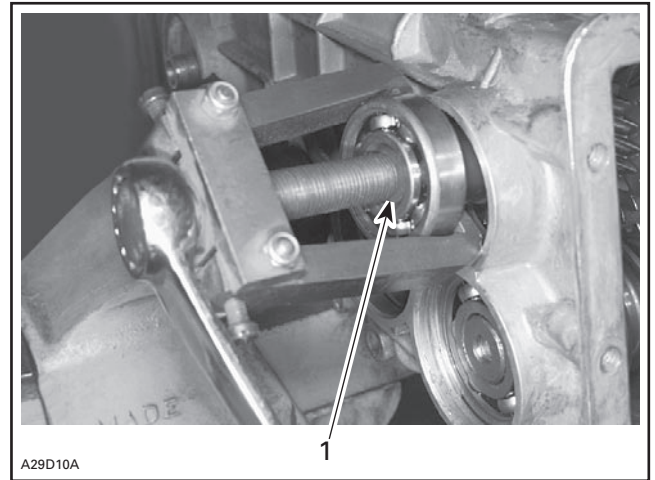
Shift in reverse gear.

Turn reverse shaft so its sliding sleeve dog will not touch the RH gear of driven pulley shaft no. 15. This will allow the driven pulley shaft to be pushed out enough for bearing removal.



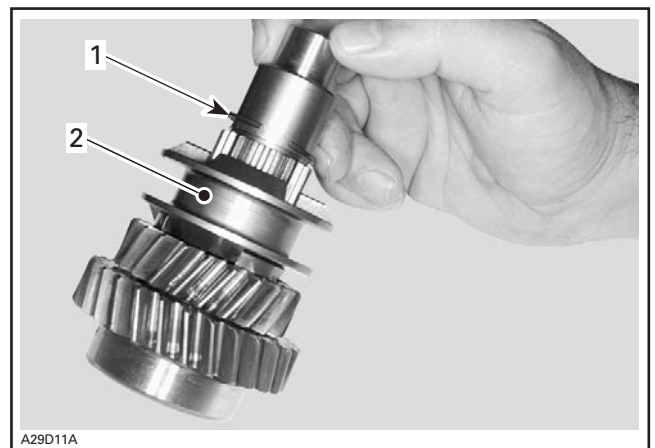
1. Sleeve dog not touching right gear
2. Brake shaft gears are still in gearbox

Use a puller to extract LH reverse shaft bearing.



1. Extract reverse shaft LH side bearing

To remove sliding sleeve from reverse shaft, first remove circlip.

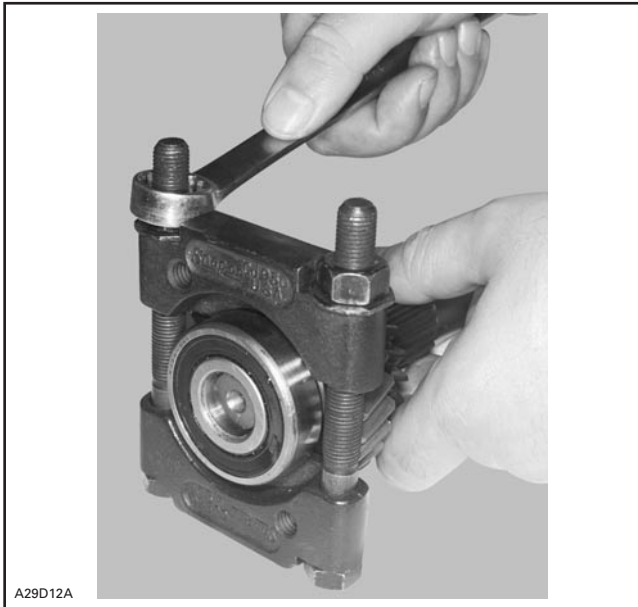


1. Circlip
2. Sliding sleeve

Section 05 TRANSMISSION

Subsection 08 (GEARBOX)

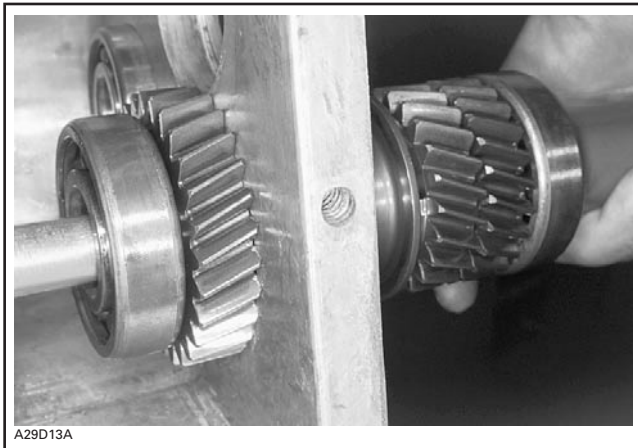
Use a puller to extract bearing no. 19.



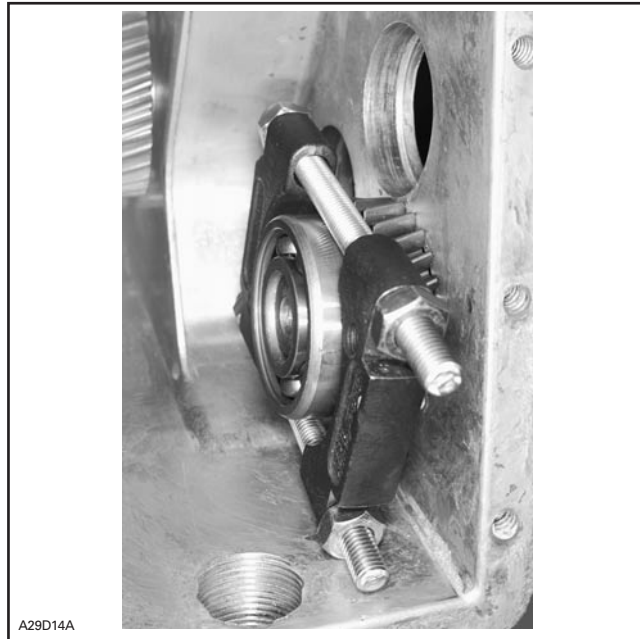
Remove brake shaft gears.

Unbolt driven pulley shaft screw no. 11 and remove washer.

Push driven pulley shaft no. 15 out of gearbox until its LH gear no. 14 is against gearbox inner wall.

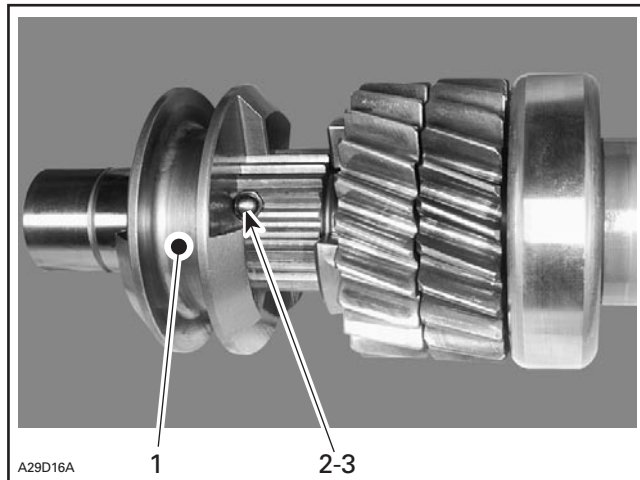


Use a puller to extract bearing no. 12.



Remove circlip then, gear no. 14. Now driven pulley shaft can be pulled out from gearbox.

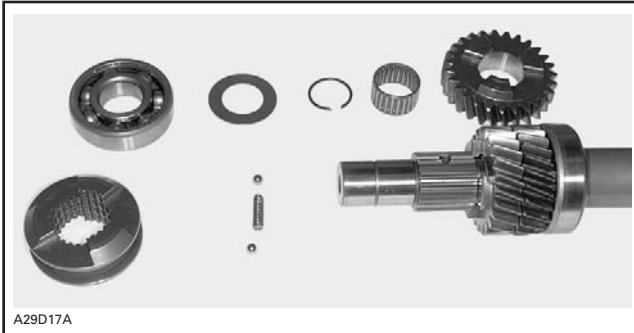
Remove sliding sleeve taking care not to lose balls no. 18 and spring no. 16.



1. Sliding sleeve
2. Spring
3. Balls

Section 05 TRANSMISSION

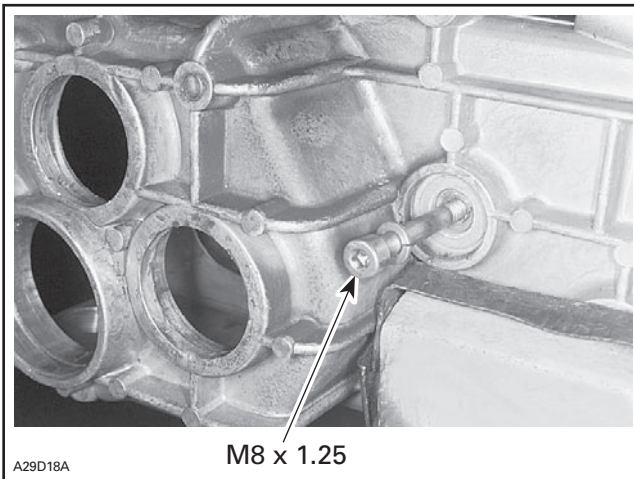
Subsection 08 (GEARBOX)



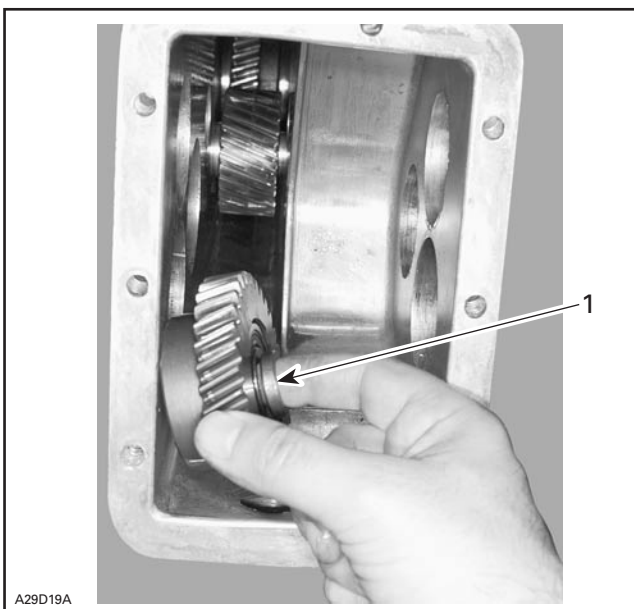
DRIVEN PULLEY SHAFT COMPONENTS

Remove screws no. 39 from intermediate shafts no. 30.

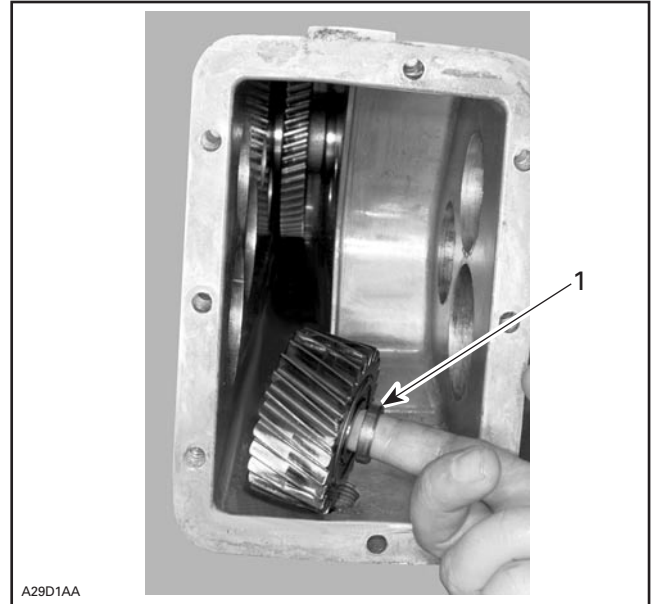
Fasten a long M8 x 1.25 screw in axle end then drive it out, beginning with top one.



Remove intermediate gears and spacers.



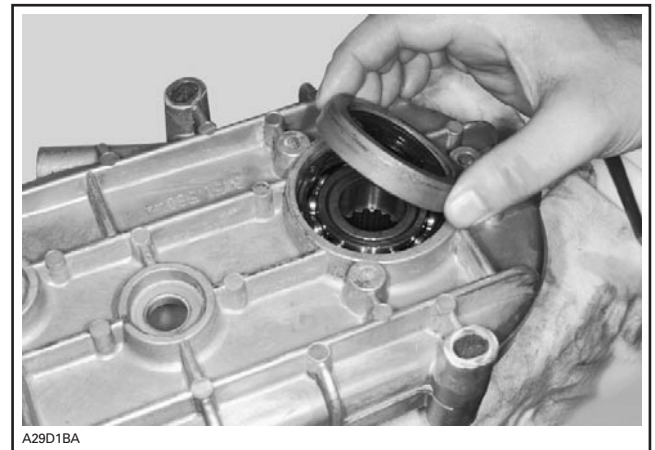
1. Spacer



1. Spacer

Do not disassemble bearings of intermediate gears needlessly.

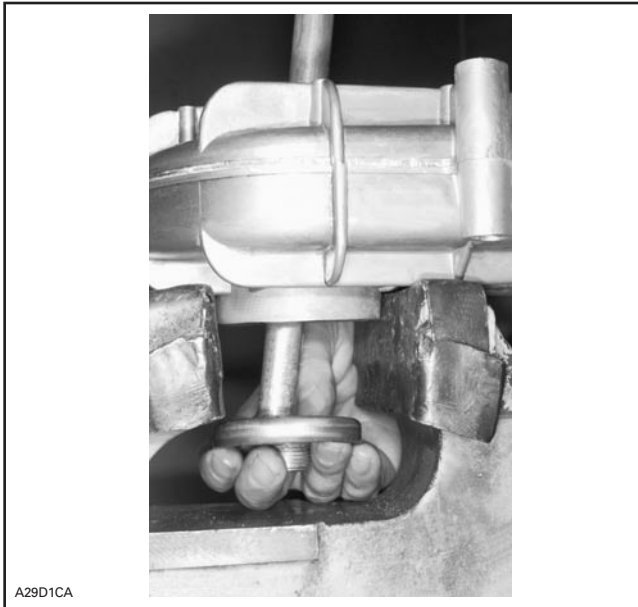
Pry out bottom seal no. 33 from gearbox housing. Remove circlip no. 9.



Section 05 TRANSMISSION

Subsection 08 (GEARBOX)

Drive out plug no. 37.

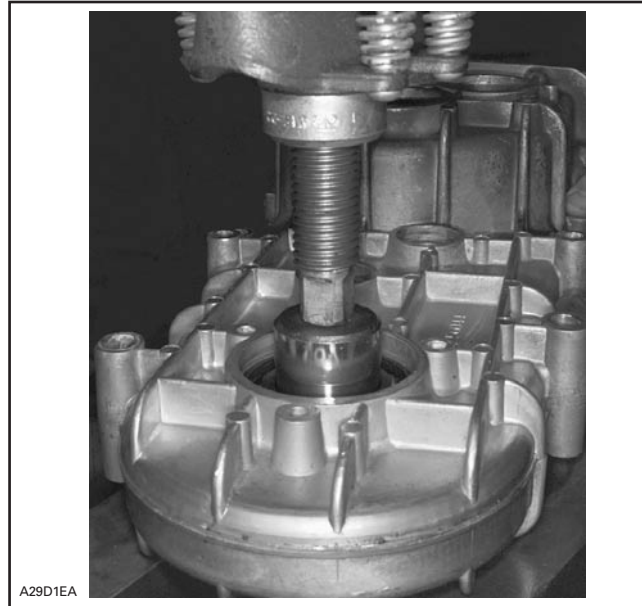


Remove circlip no. 9 from LH side.



Using a press, drive out lower shaft no. 36 from RH side.

CAUTION: Do not push against inner bearing race.

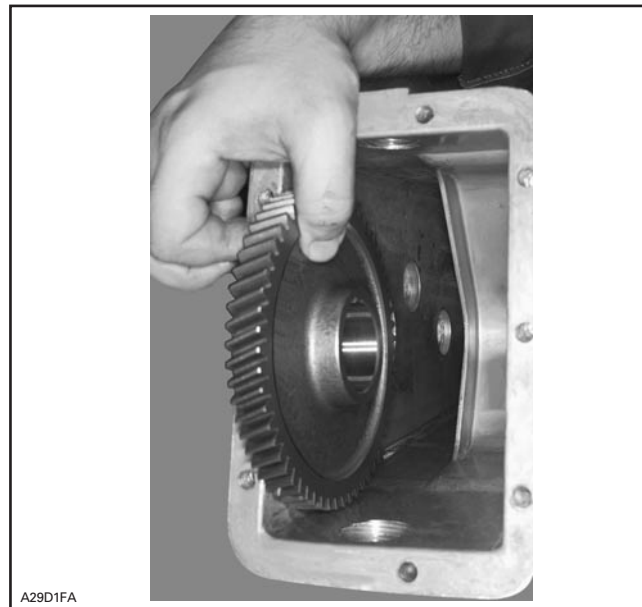


INSPECTION

Check bearing condition. There must be no discoloration, missing rollers or balls, broken cages, etc.
Check sprocket teeth.

ASSEMBLY

Install lower gear no. 34 with its shoulder facing RH side.



Section 05 TRANSMISSION

Subsection 08 (GEARBOX)

Install lower shaft **no. 36** with its hollow side (no splines) on RH side. Align key with lower gear **no. 34** keyway.



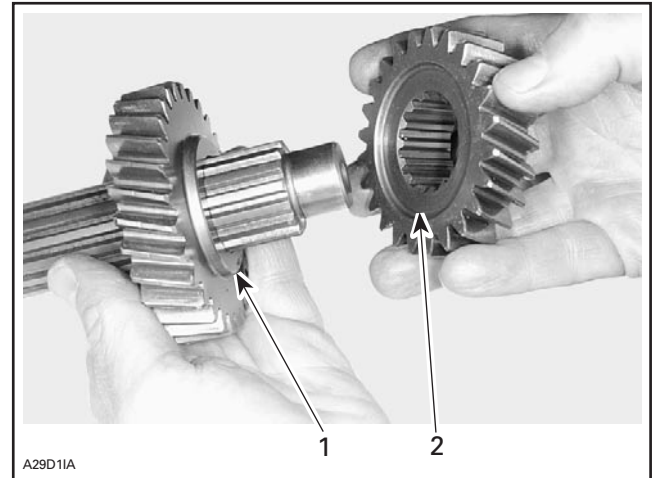
Apply synthetic grease (P/N 413 711 500) on intermediate shaft O-rings.

Install intermediate gears **no. 29** with their shoulder towards LH side. Position spacers **no. 28** as illustrated in removal procedure. Beveled side of spacers goes against gearbox wall.

Install RH side bearing of brake and reverse shafts.

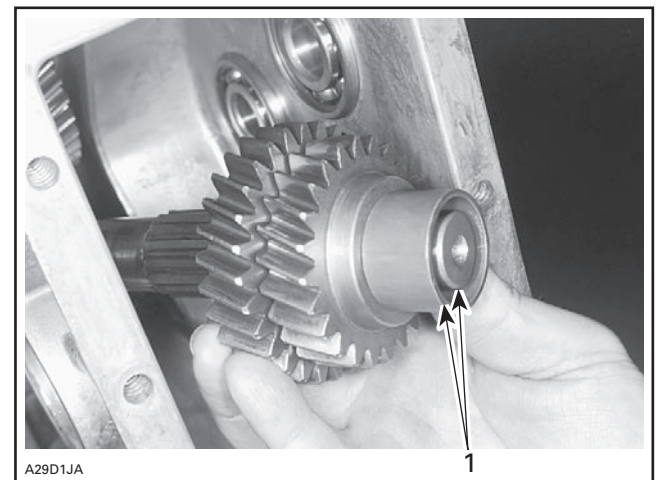


Partially assemble brake shaft gears **nos. 24** and **25** with shoulder facing recess.



1. Shoulder
2. Recess

Install sleeve **no. 23** on brake shaft **no. 26** then, slide gears and sleeve until end of sleeve is flush with shaft end.



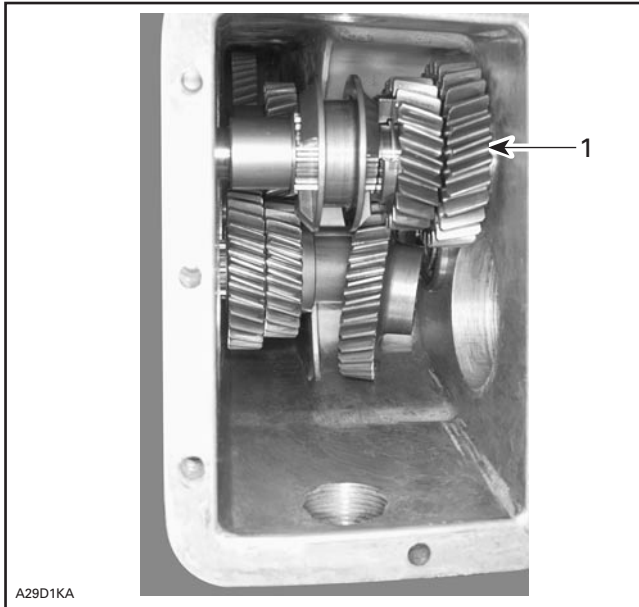
1. Flush

Install brake shaft **no. 26** into gearbox then, loosely install gear **no. 22** with its shoulder facing bearing **no. 21**. Do not push brake shaft into bearing **no. 21** at this time.

Section 05 TRANSMISSION

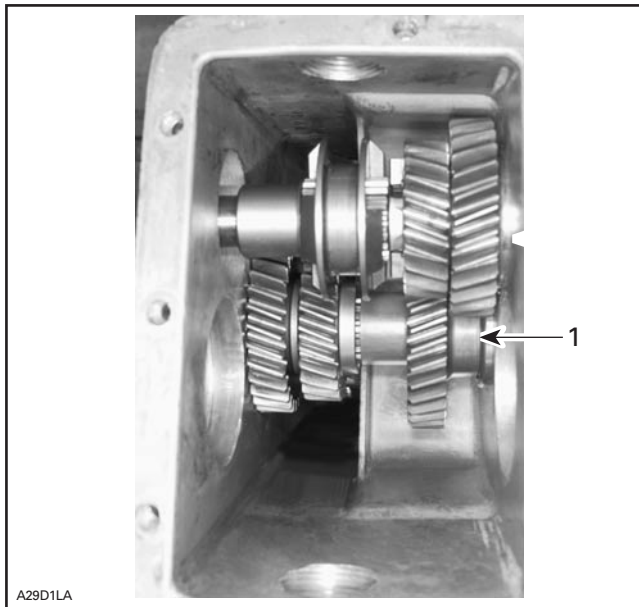
Subsection 08 (GEARBOX)

Install reverse shaft ass'y no. 38 into its RH side bearing no. 19.



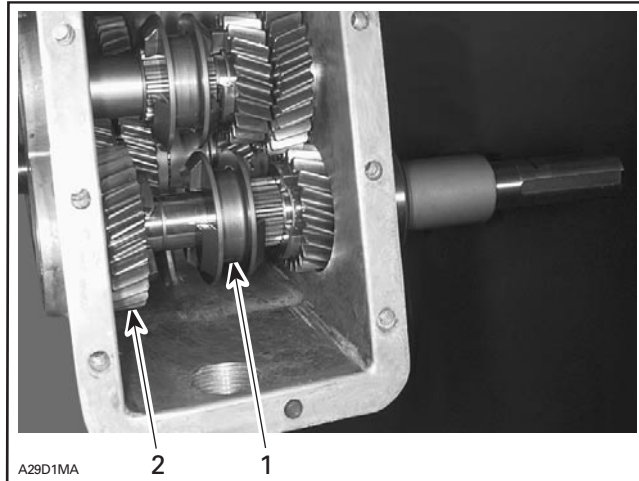
1. Reverse shaft installed in its RH bearing

Position gear no. 22 against RH side bearing no. 19 then, finalize brake shaft no. 26 insertion.



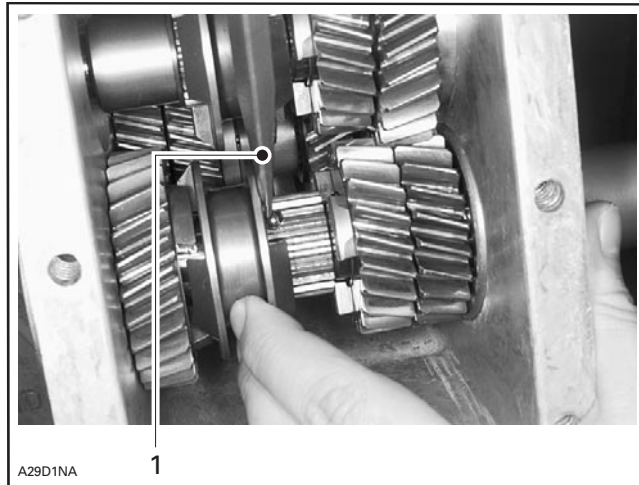
1. Finalizing brake shaft insertion

Install driven pulley shaft no. 15 with the sliding sleeve loosely inserted. Gear no. 14 must be at its place.



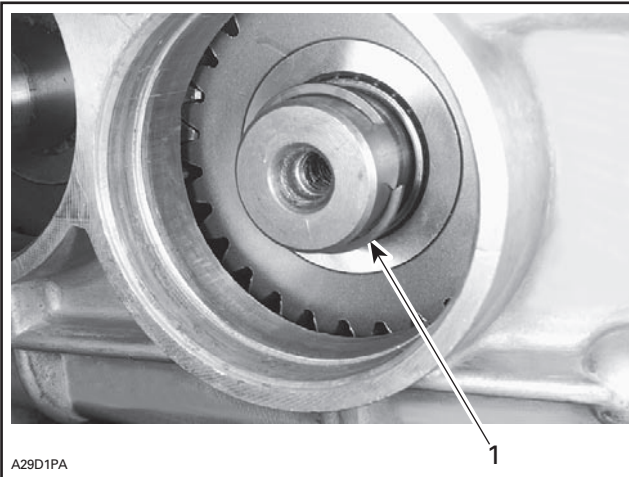
1. Sliding sleeve loosely inserted
2. Gear no. 14 in place

Install balls no. 18 and spring no. 16 into driven pulley shaft.



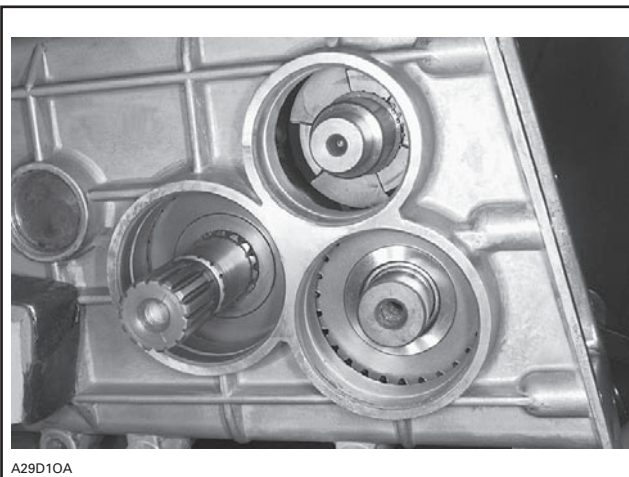
1. Push on ball with a screwdriver then move sliding sleeve to the right

Finalize driven pulley shaft insertion. Make sure that gears mesh during insertion. Install circlip no. 20.



1. Circlip

Install LH side bearings nos. 12, 19 and 21, shims no. 8, circlip no. 9 then, plugs no. 8.



READY TO INSTALL BEARINGS, SHIMS, CIRCLIPS AND PLUGS

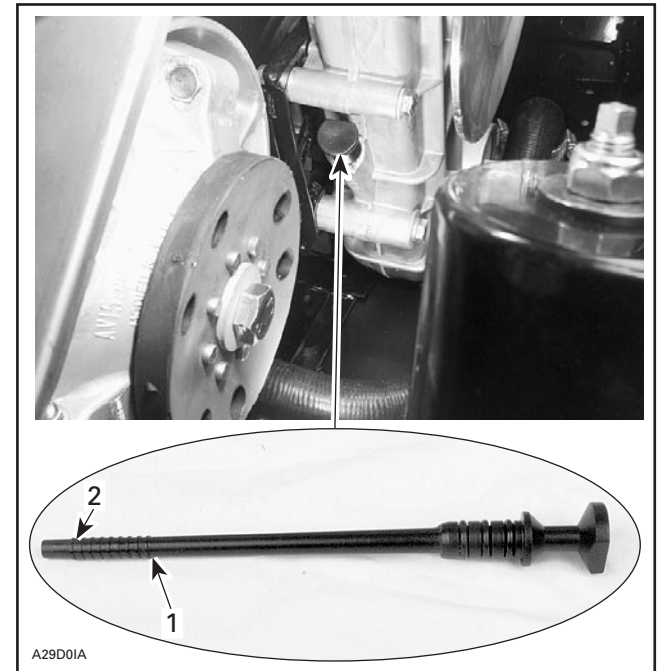
INSTALLATION

Reverse removal procedure. Check pulley alignment.

OIL LEVEL

To check, pull dipstick. Oil should reach level mark.

NOTE: After first outing, oil level will decrease as the upper oil cavity fills with oil. Recheck oil level and refill as required.



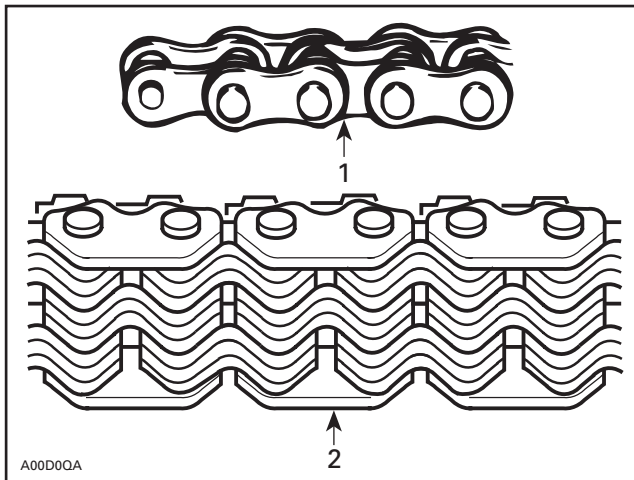
1. Full level mark
2. Lower level mark

To fill, remove filler plug from top of transmission. Refill as required using Bombardier synthetic chaincase oil (P/N 413 802 800 — 12 x 250 mL).

DRIVE CHAIN

GENERAL

Bombardier drive chains exist in 2 types, for proper use refer to TECHNICAL DATA.



1. 1/2 in single
2. 3/8 in silent chain

SILENT CHAIN

There are 2 types of silent chain. One is 11-plates wide and the other is 13-plates wide (stronger). Do not interchange sprockets. Fit chain on sprockets to make sure using right ones according to width. Refer to TECHNICAL DATA.

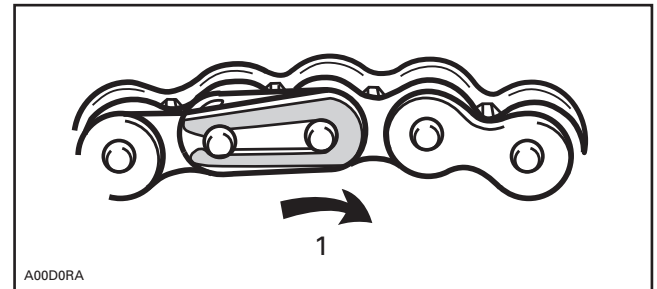
NOTE: No work (separation, lengthening) can be done on the silent chain type.

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.

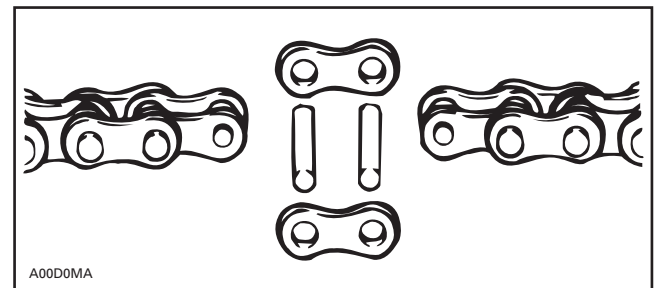


TYPICAL

1. Rotation

CHAIN SEPARATION

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

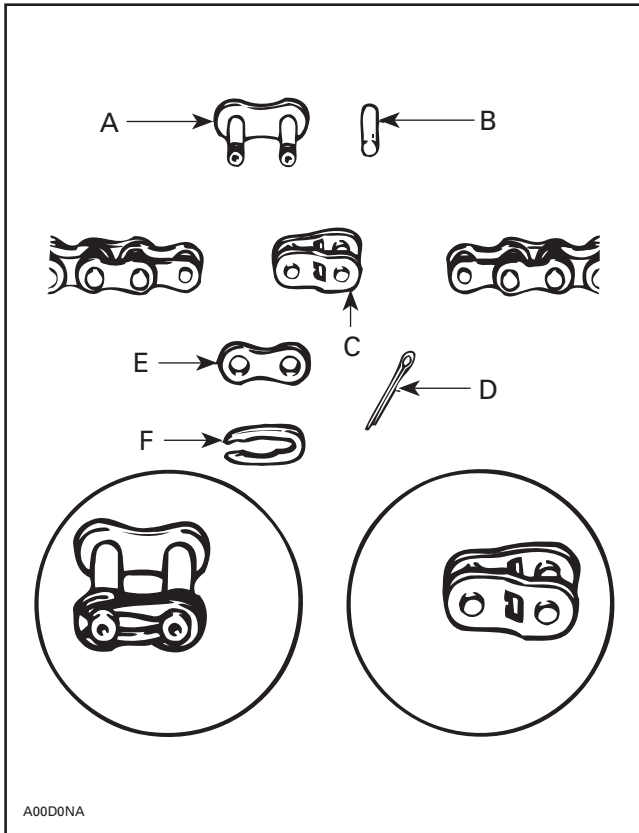


NOTE: Chain connecting link should only be used to lengthen or shorten a chain when changing the sprocket(s) for one(s) with a different number of teeth. A stretched chain must never be shortened because the chain pitch has changed (increased) and will not properly match the sprocket pitch, causing premature wear.

NOTE: Refer to TECHNICAL DATA, for chain length according to gear ratio of each specific vehicle.

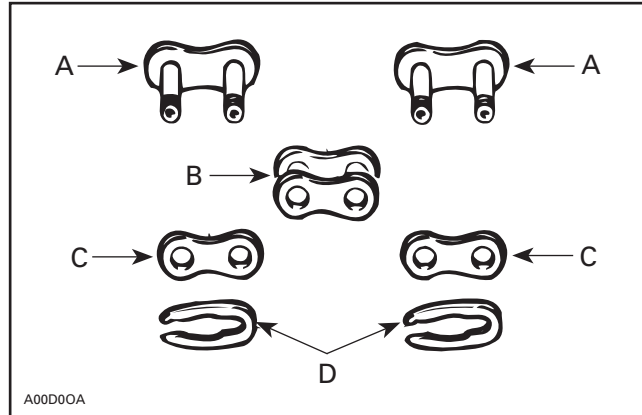
Section 05 TRANSMISSION

Subsection 09 (DRIVE CHAIN)



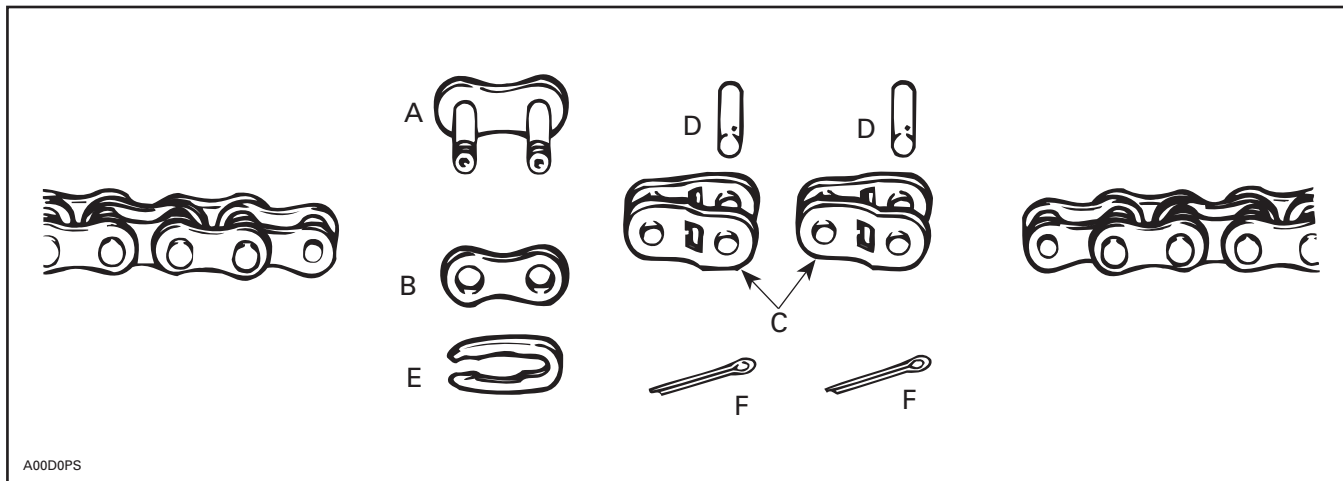
LENGTHENING 1/2 LINK

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



LENGTHENING 1 LINK

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



LENGTHENING 1-1/2 LINKS

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

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INSPECTION OF HEATING ELEMENTS	06-06-22

IGNITION TIMING

SINGLE CYLINDER RER CDI SYSTEM

Tundra 277 Engine Type

This 277 engine type is equipped with a Rotax Electronic Reverse system (RER). It uses a single coil ignition system and 2 trigger coils. Refer to CDI SYSTEM for more information.

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**.

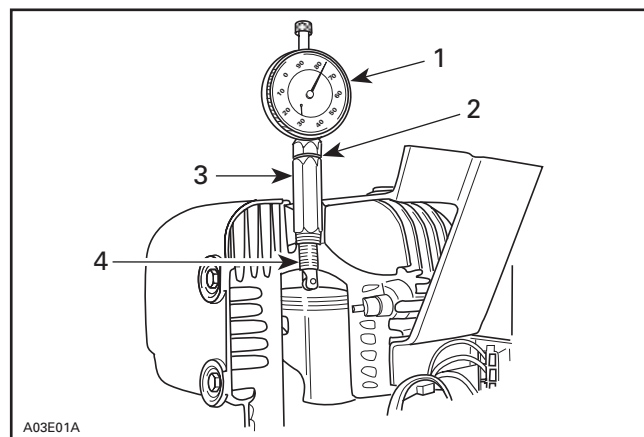
Flywheel timing mark position verification is required to:

1. To detect a missing or broken magneto flywheel Woodruff key which change the timing, 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 corresponding to a different engine type.

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.



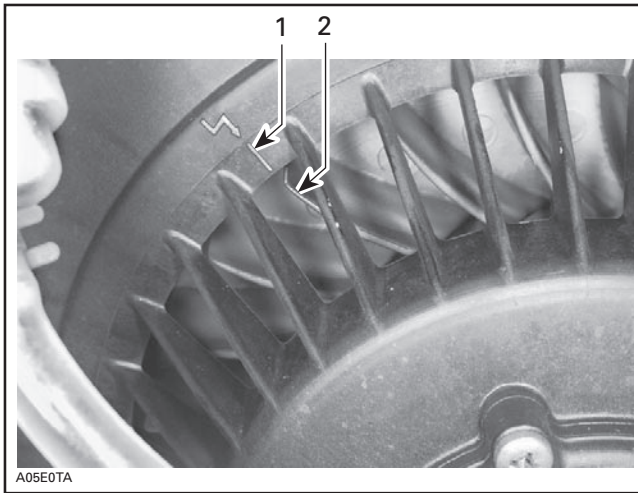
1. Outer ring
2. Adaptor lock nut
3. Roller lock nut
4. Adaptor

- 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 TECHNICAL DATA.

Section 06 ELECTRICAL

Subsection 02 (IGNITION TIMING)

Check if red fin aligns with mark on fan cowl.



1. Fan cowl timing mark
2. Red 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 3500 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 3500 RPM.

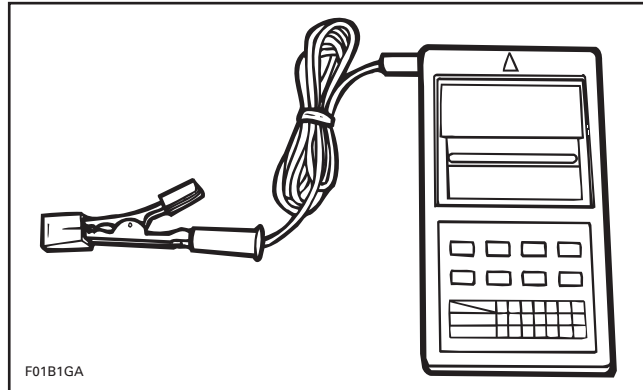
To check ignition timing, use a timing light (P/N 529 031 900).

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.



TIMING LIGHT (P/N 529 031 900)

1. Connect timing light pick-up to the spark plug lead. Use a digital induction type tachometer (P/N 529 014 500).



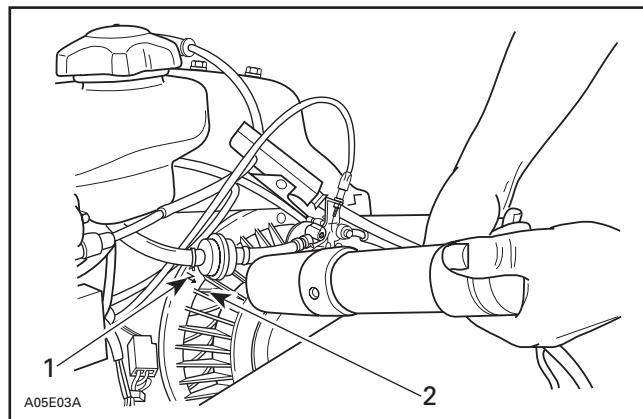
TACHOMETER (P/N 529 014 500)

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 3500 RPM (3000 to 4000 RPM) for a brief instant.



TYPICAL — TUNDRA

1. Fan cowl timing mark
2. Red fin

3. Check if the red fin aligns with the fan cowl timing mark. Tolerance is $\pm 1^\circ$.

If the red fin aligns with the fan cowl timing mark, timing is correct. If not the case, check for proper flywheel, trigger coil position or MPEM.

The RER ignition system is not adjustable. Only trigger coil air gap can be verified. Refer to CDI SYSTEM.

TWIN CYLINDER RER CDI SYSTEM

Skandic LT

If for any reason, ignition timing accuracy is suspected, it can be verified as follows.

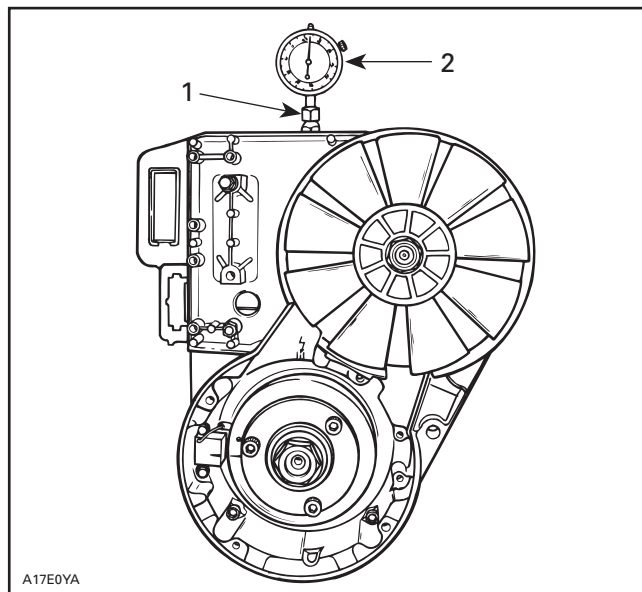
Verifying Magneto Flywheel Timing Mark Position

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 corresponding to a different engine type.

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.



TYPICAL — INSTALLATION OF TDC GAUGE

1. Gauge on MAG side cylinder
2. Adaptor lock nut

- 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 changes 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

Subsection 02 (IGNITION TIMING)

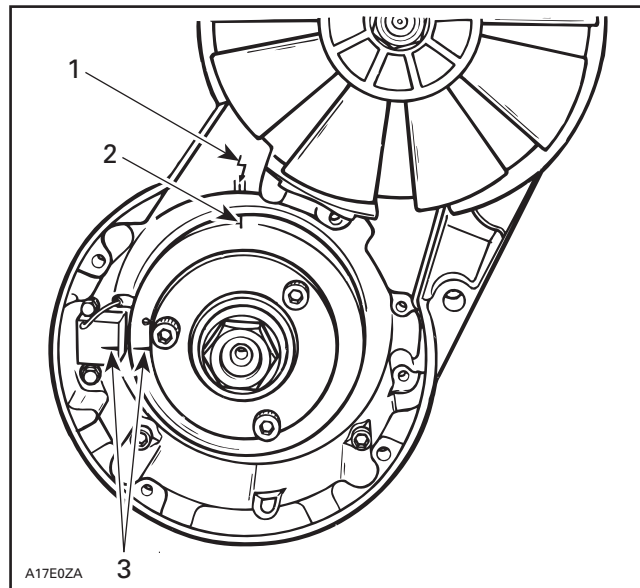
5. Verify the position of the timing mark on the magneto flywheel as follows:

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 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.

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.

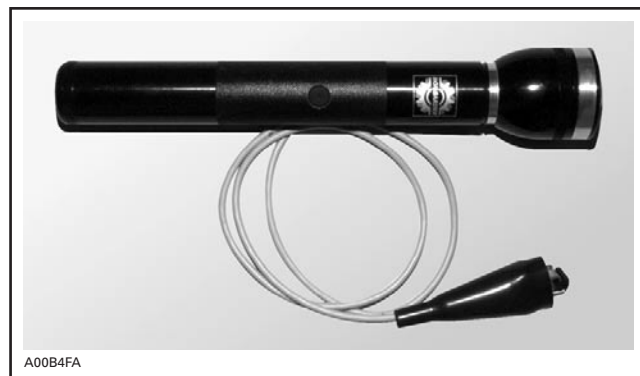


TYPICAL

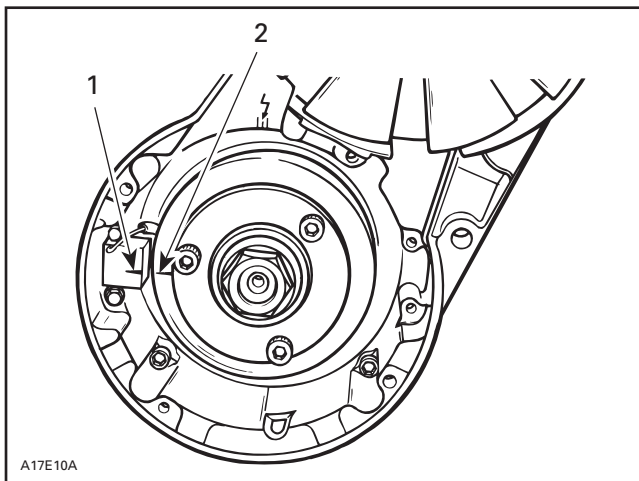
- Crankcase arrow
- Scribe a mark here
- Maintain verified timing marks aligned (static timing)

Checking Ignition Timing

Use timing light (P/N 529 031 900) and digital induction type tachometer (P/N 529 014 500).



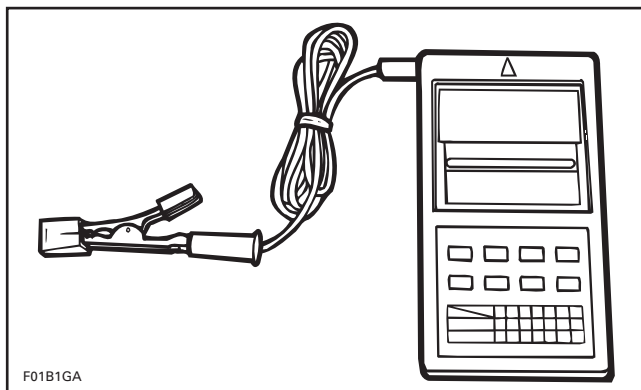
TIMING LIGHT (P/N 529 031 900)



TYPICAL

- Trigger coil mark
- Magneto flywheel mark

NOTE: These marks cannot 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.



TACHOMETER (P/N 529 014 500)

To check the ignition timing, refer to illustration and proceed as follows:

⚠ WARNING

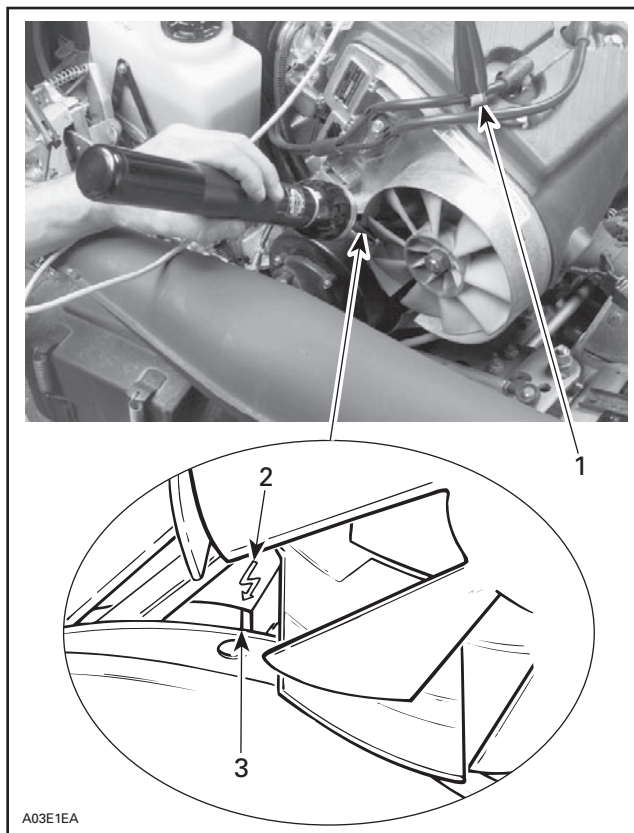
Place ski tips against a wall, raise rear of vehicle on a stand, so that track does not contact the ground. Do not allow anyone in front of or behind the vehicle while engine is running. Keep clear of track and do not wear loose clothing which can get caught in moving parts.

1. Connect the timing light pick-up to a spark plug cable.

NOTE: To avoid an incorrect reading due to parallax, view the magneto flywheel and the crankcase timing marks in a straight line.

2. Connect tachometer wire to spark plug wire or aim tachometer toward spark plug wire without using any connection wire.
3. Start the engine and raise the engine speed at least to 3500 RPM (3000 to 4000 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), a faulty flywheel, a faulty Woodruff key, a misaligned (twisted) crankshaft 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 3000 - 4000 RPM.



1. Timing light pick-up on MAG side
2. Crankcase arrow
3. Magneto flywheel mark

4. Install parts which were removed.

DUCATI CDI SYSTEM

552 Engine Types on Skandic WT/SWT/SUV 550

Proper ignition timing is determined by trigger coil position.

If for any reason, ignition timing accuracy is suspected, it can be checked 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.

Section 06 ELECTRICAL

Subsection 02 (IGNITION TIMING)

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.

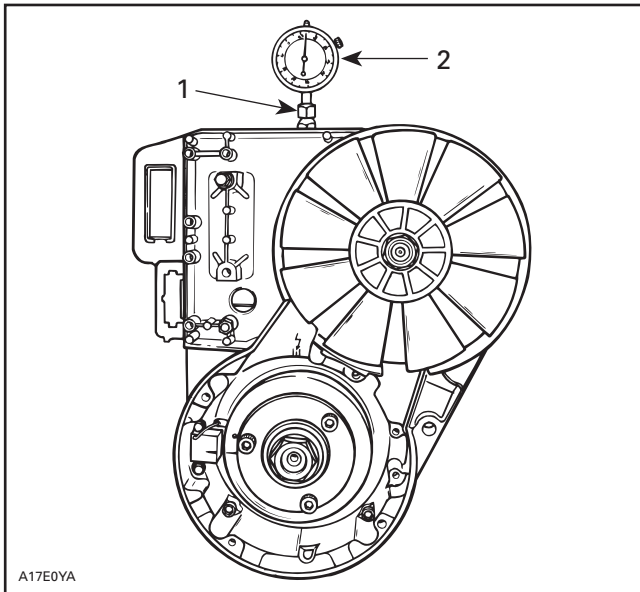
To verify the position of the timing mark on the magneto flywheel, proceed as follows:

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.

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 (zero) 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 (zero), until the needle always stops exactly at 0 (zero) before changing direction.
 - d. 0 (zero) now indicates exact TDC.
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 1/4 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.

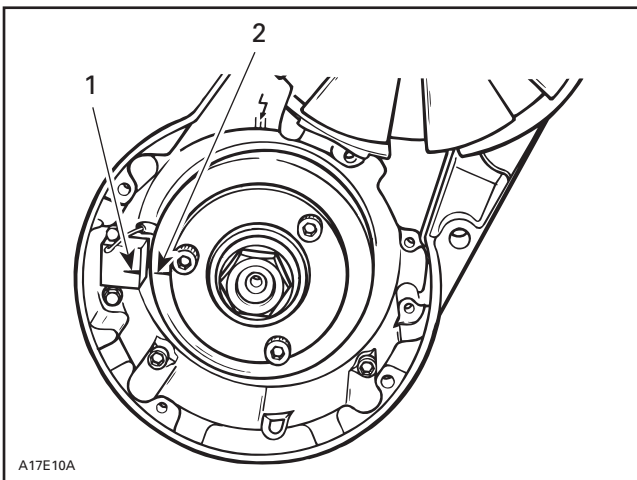
- a. Rotate the magneto flywheel 1/4 turn counterclockwise, 1/4 turn then carefully rotate it clockwise until the needle indicates the specified measurement. Refer to TECHNICAL DATA.
- b. Verify that the magneto flywheel mark perfectly aligns with the mark on the trigger coil, refer to illustration.
- c. 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.



INSTALLATION OF TDC GAUGE

1. Adapter lock nut
 2. Gauge on MAG side cylinder
- b. Assemble the gauge to the adapter and tighten the roller lock nut. Do not tighten the adapter lock nut.
 - c. Screw the adapter 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 adapter lock nut by hand.

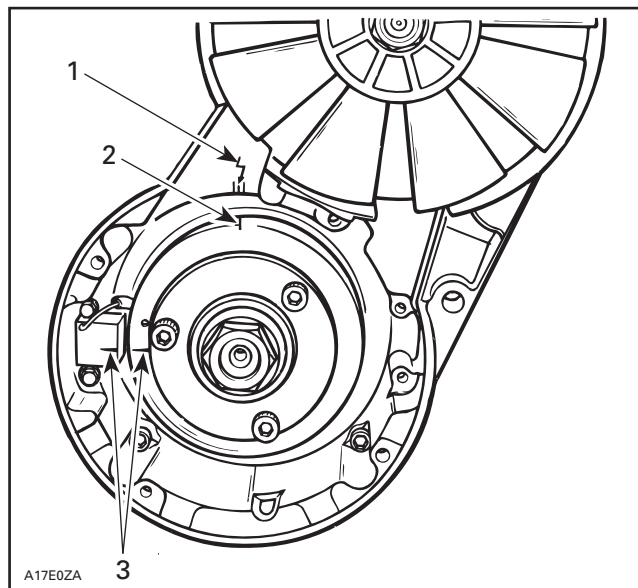
Section 06 ELECTRICAL
Subsection 02 (IGNITION TIMING)



1. Trigger coil mark
2. Magneto flywheel mark

NOTE: These marks cannot 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:
 - a. Remove the fan cover from the engine.
 - b. Maintain magneto flywheel so that previous marks remain aligned.
 - c. Scribe or punch a mark on magneto flywheel so that it aligns perfectly with the arrow on crankcase, refer to illustration. This new timing mark should be used for future timing checks (dynamic timing).
 - d. Reinstall rewind starter.
 - e. Check the timing with a timing light (P/N 529 031 900).



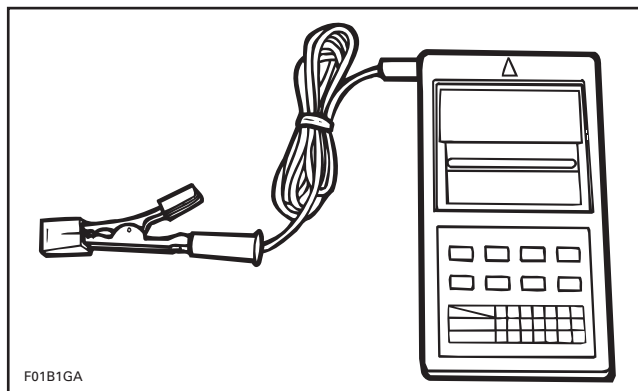
1. Crankcase arrow
2. Scribe a mark here
3. Maintain verified timing marks aligned (static timing)

Checking Ignition Timing

Use timing light (P/N 529 031 900) and digital induction type tachometer (P/N 529 014 500).



TIMING LIGHT (P/N 529 031 900)



TACHOMETER (P/N 529 014 500)

Section 06 ELECTRICAL

Subsection 02 (IGNITION TIMING)

To check the ignition timing, refer to illustration and proceed as follows:

⚠ 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.

1. Connect the timing light pick-up to a spark plug cable.

NOTE: To avoid an incorrect reading due to parallax, view the magneto flywheel and the crankcase timing marks in a straight line.

2. Connect tachometer wire to spark plug wire or aim tachometer toward spark plug wire without using any connection wire.
3. Start the engine and raise the engine speed at least to 3500 RPM (3000 to 4000 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), a faulty flywheel, a faulty Woodruff key, a misaligned (twisted) crankshaft 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 3000 - 4000 RPM.



TYPICAL

4. Install parts which were removed.

NIPPONDENSO TRIGGER COIL SYSTEM

Skandic WT LC/SUV 600

Normally ignition timing adjustment should not be required. It has been set at factory and it should remain correctly adjusted since every part is fixed and not adjustable. The only time the ignition timing might have to be changed would be when removing and reinstalling the magneto housing, replacing the crankshaft, the magneto flywheel, the trigger coil or the MPEM. If the ignition timing is found incorrect, first check for proper crankshaft alignment. This might be the indication of a twisted crankshaft. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT. The ignition timing can be checked with either the engine hot or cold. Also, the ignition timing is to be checked at 3500 RPM with a timing light.

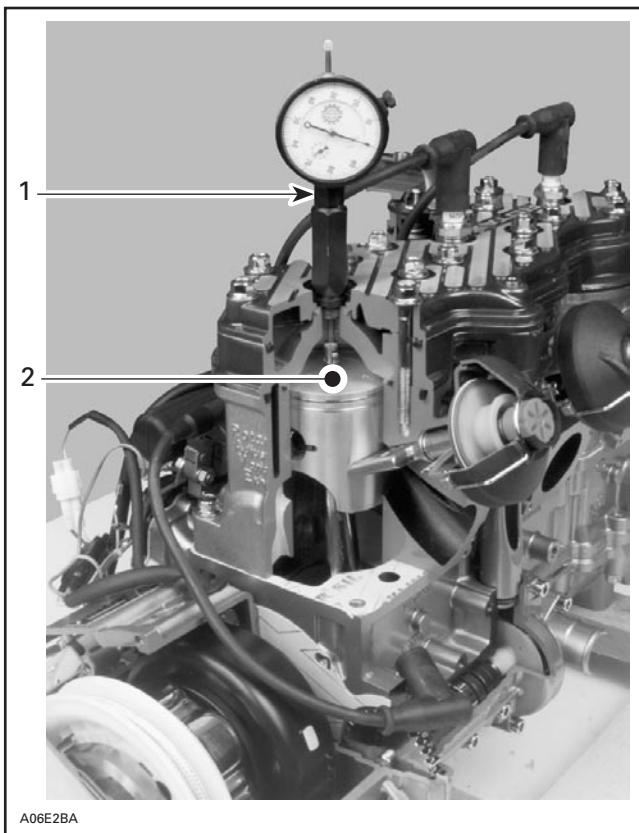
NOTE: Between 3000 and 4000 RPM, the spark advance does not change. So when checking ignition timing at 3500 RPM, a change in engine speed within ± 500 RPM will not affect the timing mark when checked with the timing light.

Scribing a Timing Mark

1. Clean the area around the MAG spark plug, and remove it.
2. Install the TDC gauge in the spark plug hole, (magneto side) and adjust as follows:
 - a. Position the MAG piston at approximately TDC.

Section 06 ELECTRICAL

Subsection 02 (IGNITION TIMING)

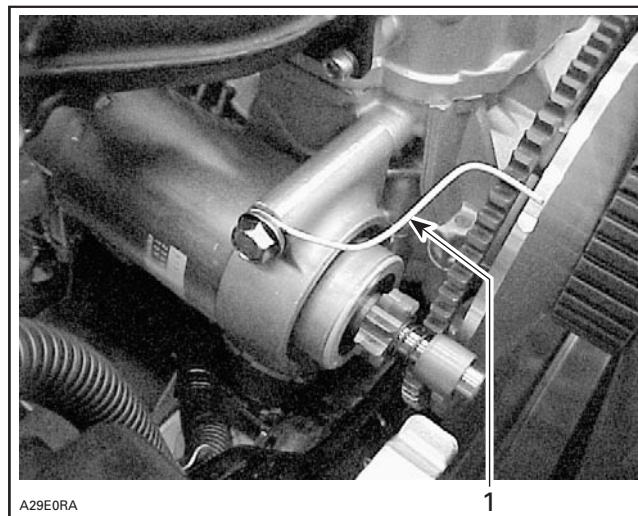


TYPICAL

1. TDC gauge on MAG side
2. MAG side piston at 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 PTO. 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.
3. Locate the piston TDC position as follows:
 - a. Slowly rotate the drive pulley 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 drive pulley back and forth across TDC and adjust the dial face to "0", until the needle always stops exactly at "0" before changing direction.

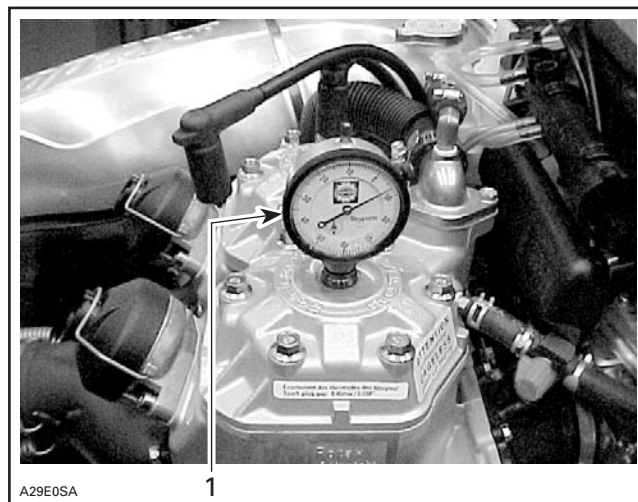
- d. "0" now indicates exact TDC.
4. Rotate the drive pulley clockwise, one-quarter turn then carefully rotate it counterclockwise until the needle indicates the specified measurement, indicated in TECHNICAL DATA.
 5. Twist a wire as shown and use it as a pointer. Install the wire on upper starter bolt.



TYPICAL

1. Pointer

6. With the TDC gauge indicating specified timing, scribe a mark on drive pulley fixed half in line with pointer end.

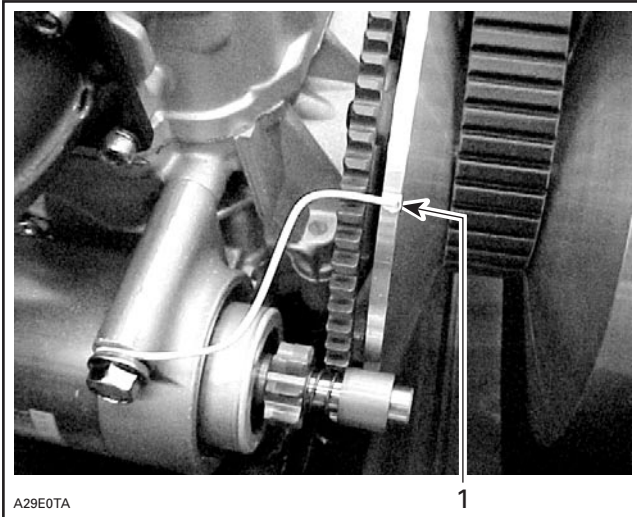


TYPICAL

1. TDC gauge indicating specified timing

Section 06 ELECTRICAL

Subsection 02 (IGNITION TIMING)



TYPICAL

1. Timing mark in line with pointer end

Checking Ignition Timing

Use timing light (P/N 529 031 900).



TIMING LIGHT (P/N 529 031 900)

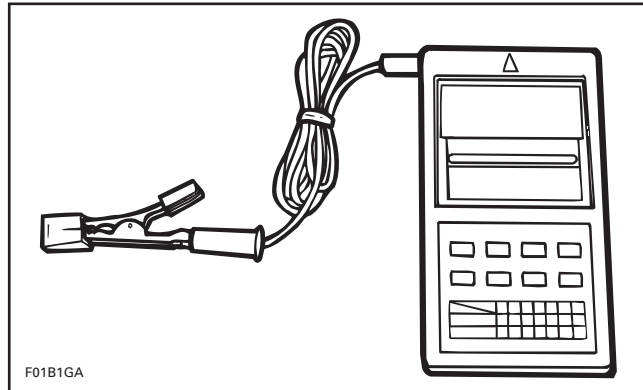
To check the ignition timing, refer to illustration and proceed as follows:

⚠ 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.

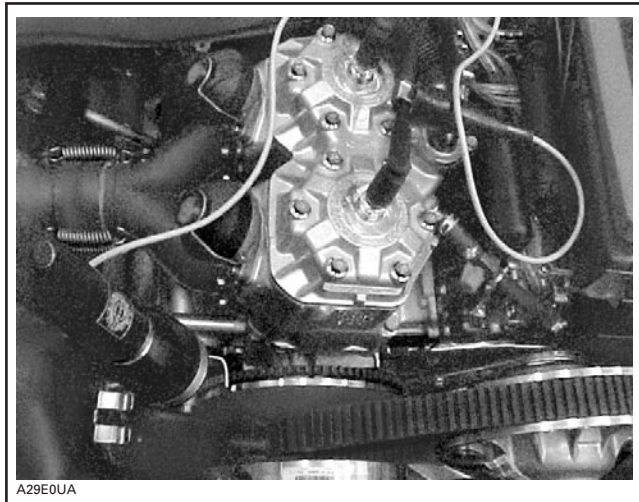
1. Connect the timing light pick-up to a spark plug cable.

Connect a digital induction type tachometer (P/N 529 014 500).



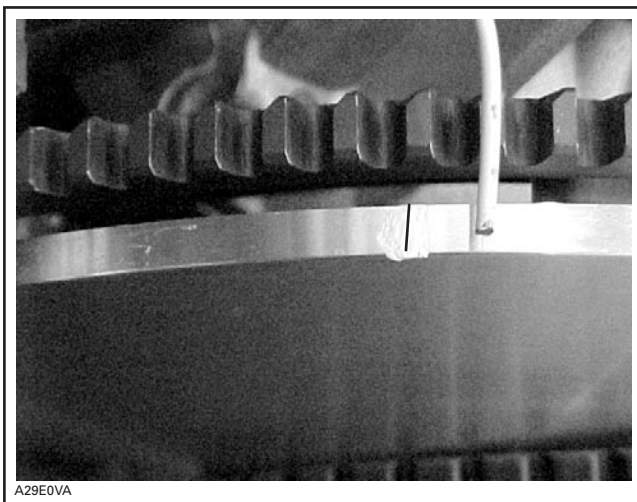
TACHOMETER (P/N 529 014 500)

2. Start the engine and point timing light on timing mark. Bring engine to 3500 RPM for a brief instant.

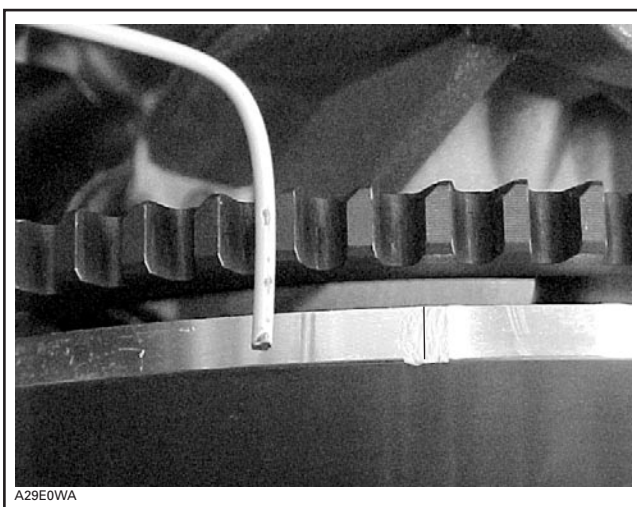


Section 06 ELECTRICAL
Subsection 02 (IGNITION TIMING)

The timing mark must be aligned with pointer end. If such is not the case, note if timing is retarded or advanced. Tolerance is $\pm 1^\circ$.



TIMING RETARDED BY ABOUT 2°

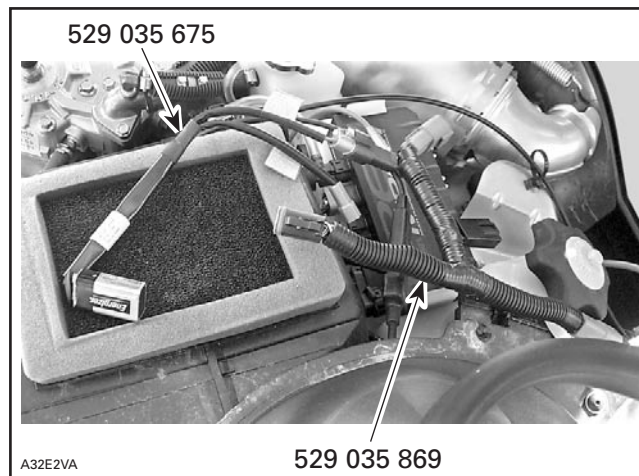


TIMING ADVANCED BY ABOUT 2°

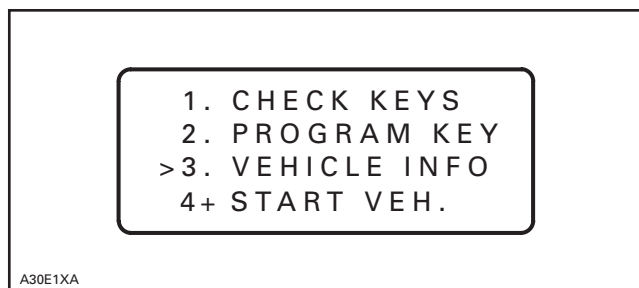
Changing Timing

Timing can only be changed using the MPEM programmer (P/N 529 035 878).

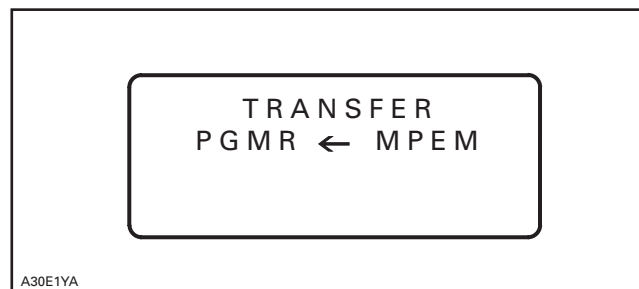
Connect 9-volt adaptor (P/N 529 035 675) to supply cable (P/N 529 035 869) and supply cable to diagnostic connector.



Connect MPEM programmer to DESS post. Turn on programmer then enter password. From main menu select no. 3. INFO VEHICLE.



Vehicle information is transferred from MPEM to programmer.



NOTE: In fact the programmer takes a **copy** of all vehicle parameters scribed in MPEM. This copy will be modified within the programmer then transferred to the MPEM.

Section 06 ELECTRICAL

Subsection 02 (IGNITION TIMING)

Select no. 4. ENGINE PARAMETER.

A30E1ZA

1. CUSTOMER NAME
2. DELIVERY DATE
3. VEH. SERIAL#
>4+ ENGINE PARAM.

Press ENTER.

A30E23A

TIMING < 1-8 > :

Select no. 1 TIMING ADJUSTMENT.

A30E2GA

> 1. TIMING ADJUST
2. ENGINE SERIAL#
3. CALIBRATION

Select a timing correction factor corresponding to correction needed.

Example: Timing mark as verified with a timing light at 3500 RPM was too early by 2°. The correction factor programmed is no. 4.

Select correction factor no. 5. This will retard the timing by 2° because the difference between correction factor no. 4 and no. 5 is - 2° (passing from 1° to - 1°).

Press ENTER.

Now the display shows the engine timing correction factor that is programmed in the MPEM. In the following example timing correction factor is no. 4.

A30E21A

TIMING < 1-8 > : 4
PRESS ANY KEY...

A30E2HA

TIMING < 1-8 > : 5

Press any key.

Select YES using the key ↔.

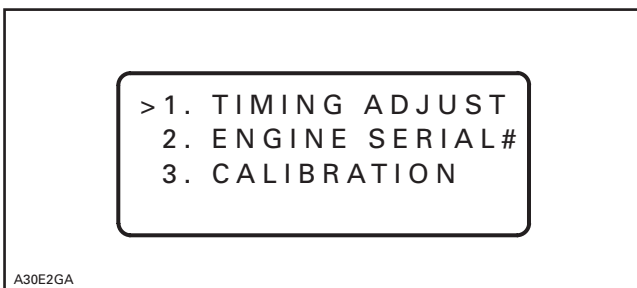
A00A3DA

MODIFY?
→ YES NO

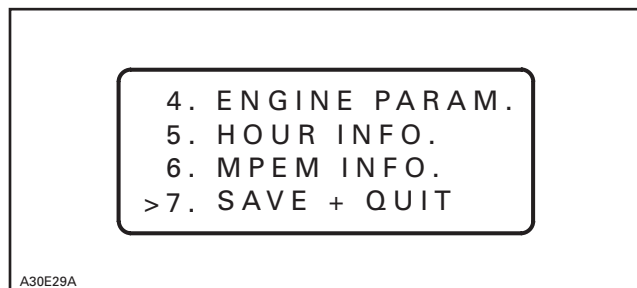
IGNITION CORRECTION FACTOR	
CORRECTION FACTOR PROGRAMMED IN MPEM	IGNITION TIMING CORRECTION
2	3°
3	2°
4	1°
1	0°
5	- 1°
6	- 2°
7	- 3°
8	- 4°

Section 06 ELECTRICAL
Subsection 02 (IGNITION TIMING)

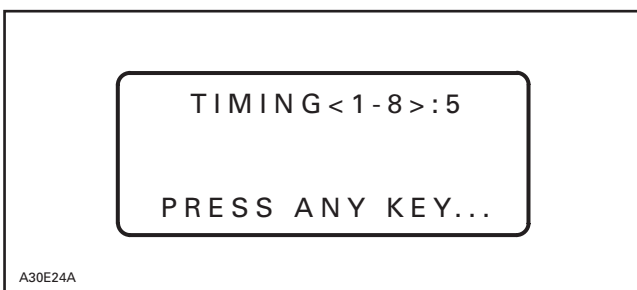
Press ENTER.



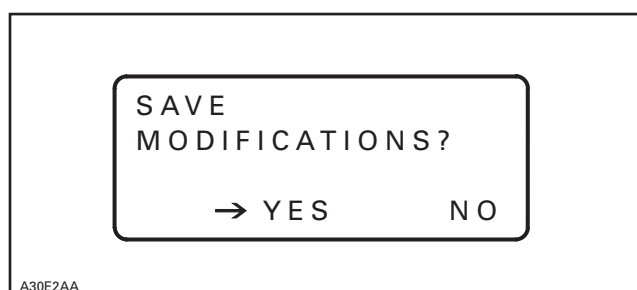
Scroll to no. 7 SAVE AND QUIT.



Press ENTER.

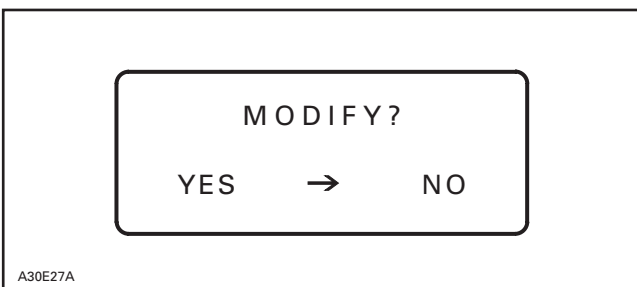


Press ENTER.

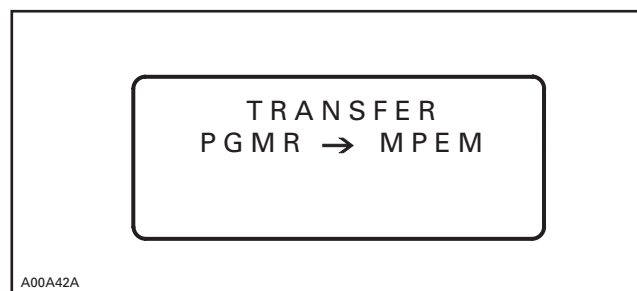


The display confirms that correction factor has been changed to no. 5.

Press any key.

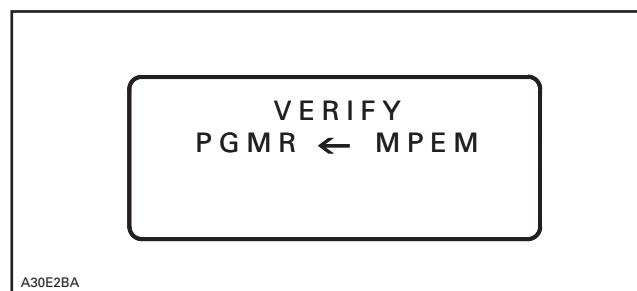
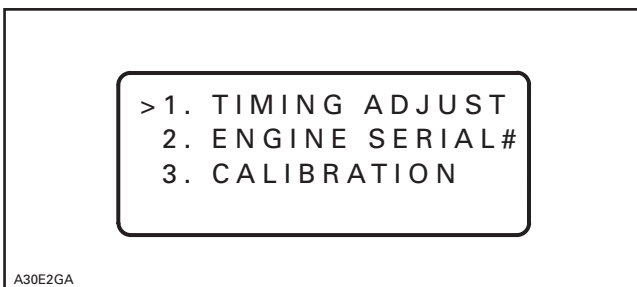


Press ENTER.



If the new correction factor selected above is the good one select NO and press ENTER. Otherwise select YES to choose another correction factor.

During a very short period of time the following message will appear.



Press MENU.

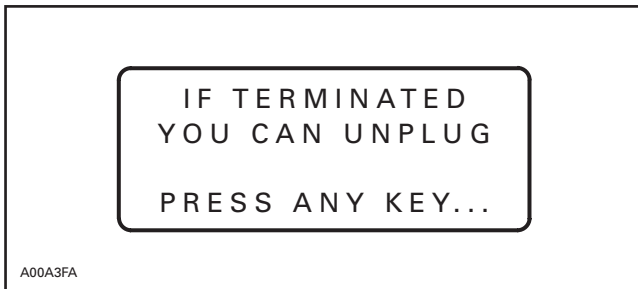
Section 06 ELECTRICAL

Subsection 02 (IGNITION TIMING)

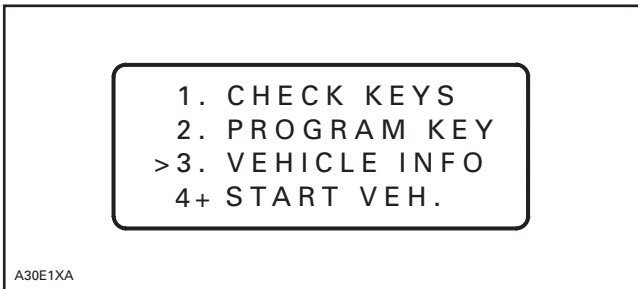
After the programmer has verified, following message will appear.



Press any key.



Press any key.



Unplug supply cable and 9-volt adaptor.

SPARK PLUGS

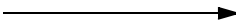
NGK SPARK PLUG

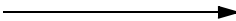
All Models

NGK SPARK PLUG NUMBERING SYSTEM

Bombardier uses NGK brand spark plugs on all its snowmobile models.

The heat range identification system is:

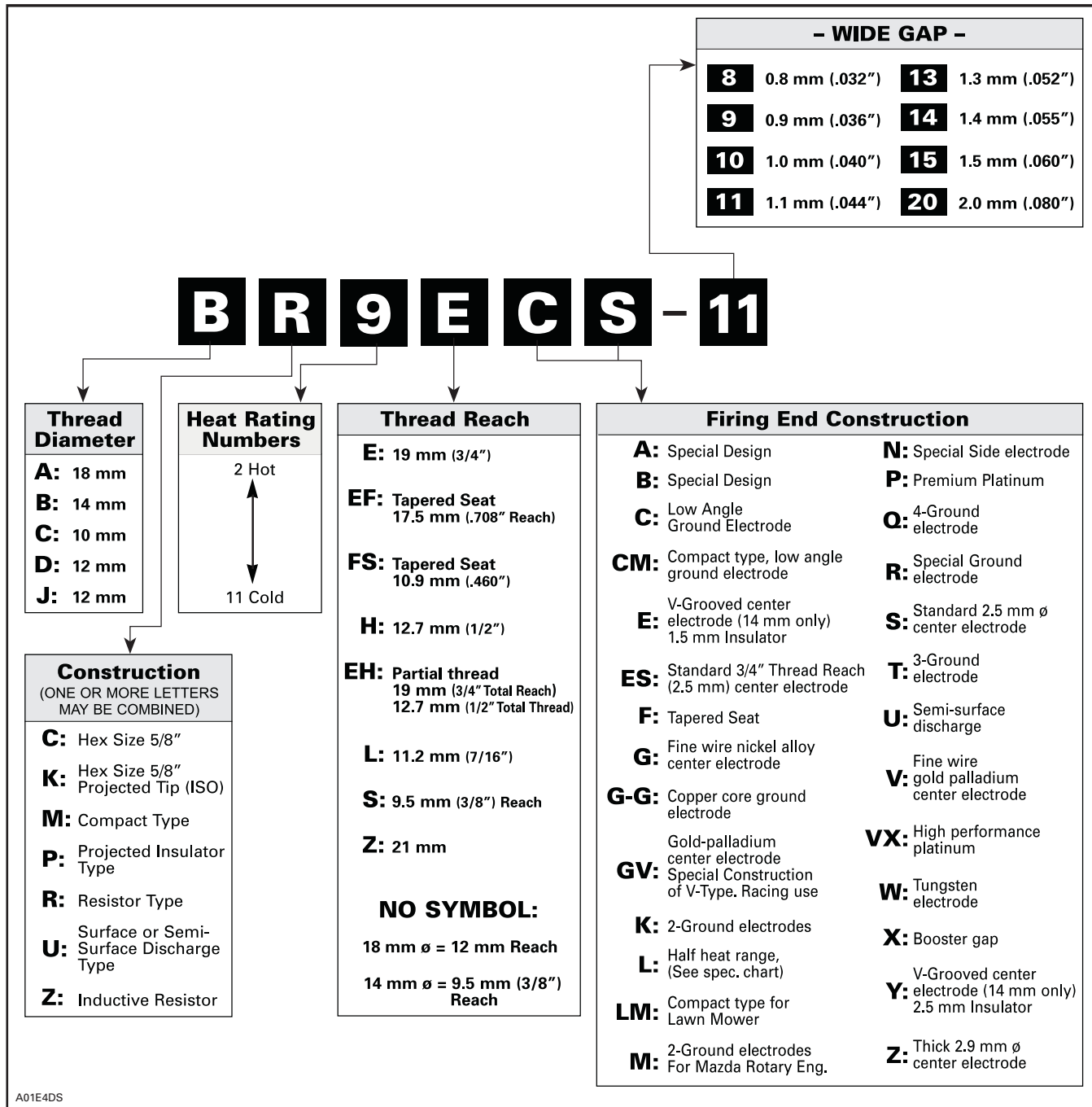
Low number  hot plug

High number  cold plug

Section 06 ELECTRICAL

Subsection 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 pressurized air, then completely unscrew.

WARNING

Whenever using compressed air, always wear protective eye wear.

HEAT RANGE

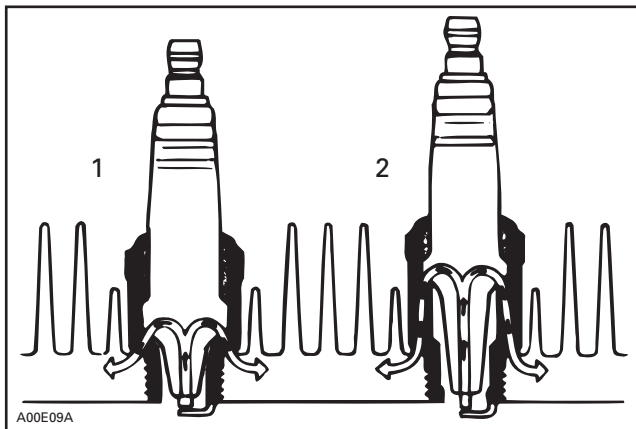
The proper operating temperature or heat range of the spark plugs is determined by the spark plug ability to dissipate the heat generated by combustion.

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.



1. Cold
2. Hot

CAUTION: Severe engine damage might occur if a wrong heat range plug is used.

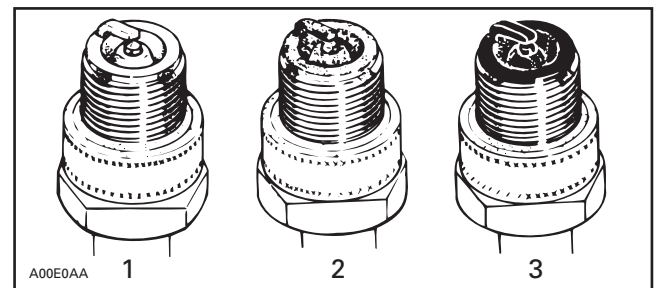
A **too hot** plug will result in overheating and pre-ignition, etc.

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



1. Overheated (light grey)
2. Normal (brownish)
3. Fouled (black)

The plug electrode and piston dome reveal 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 electrode and the piston dome.

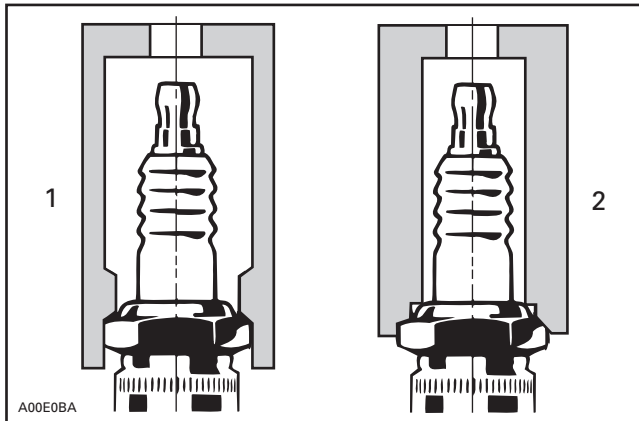
Section 06 ELECTRICAL

Subsection 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 TECHNICAL DATA.
2. Apply anti-seize lubricant (P/N 293 800 070) 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.



1. Proper socket
2. Improper socket

SPARK PLUG TIGHTENING TORQUE

MODELS	SPARK PLUGS	TORQUE N•m (lbf•ft)
All models	NGK	27 (20)

BATTERY

GENERAL

Skandic WT/SWT/SUV 550/SUV 600

Absorbed Glass Mat (AGM) battery is used for these SKI-DOO snowmobiles. AGM battery is sealed, non-spillable and maintenance free.

REMOVAL

All Models

⚠ WARNING

Battery **BLACK** negative cable must always be disconnected first and connected last.

⚠ WARNING

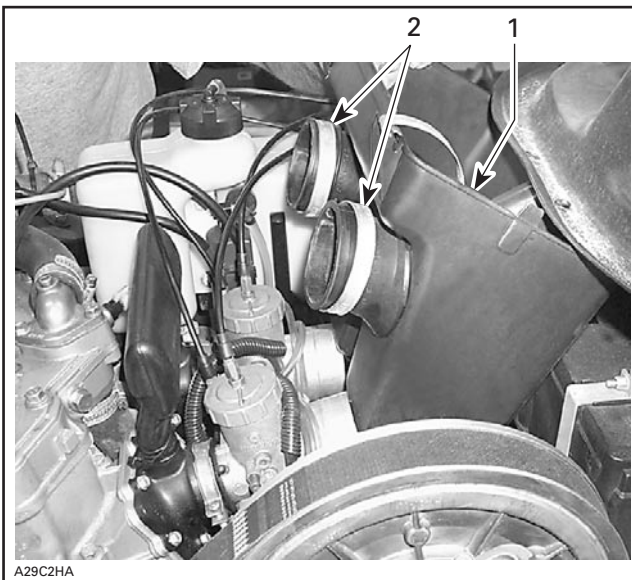
Never charge or boost battery while installed on vehicle.

Before removing battery, remove air silencer to get access to the battery.

Unlock the spring lock and remove intake cover and tube plate from the air silencer.

Remove pulley guard to get access to air intake adaptor collars clamps of air silencer.

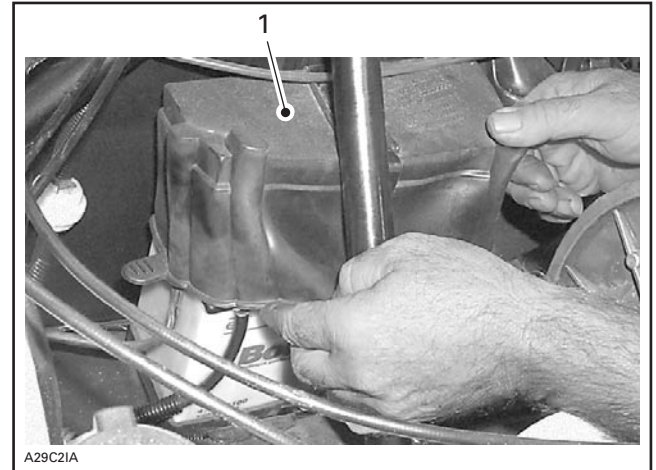
Loose clamps and remove air silencer.



TYPICAL

1. Air silencer (cover and tube plate removed)
2. Collars loosened

Unbolt battery cover steel strip and remove battery cover.

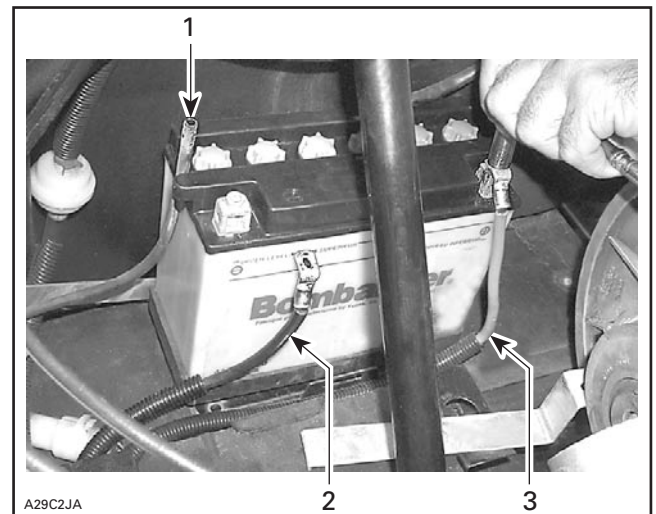


TYPICAL

1. Battery cover

Unplug vent tube from battery vent nipple.

Disconnect the black negative cable first followed by red cable and remove battery.



TYPICAL

1. Vent tube
2. Black negative cable
3. Red cable

Remove 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.

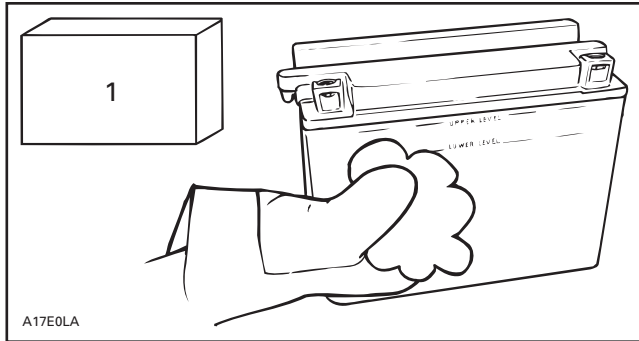
Section 06 ELECTRICAL

Subsection 04 (BATTERY)

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.



1. Baking soda

Remove corrosion from battery cable terminals and battery posts using a firm wire brush. Battery top should be cleaned by soft brush and any grease-cutting soap or baking soda solution

INSPECTION

Visually inspect battery casing for cracks or other possible damage. Discoloration, warping or raised top, indicates that battery has overheated or been overcharged. If casting 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.

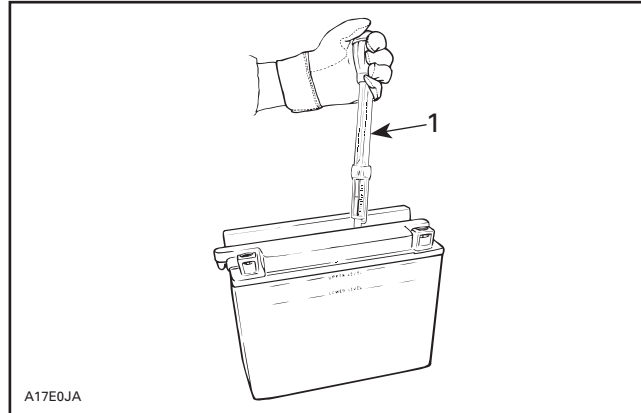
⚠ WARNING

Battery caps do not have vent holes. Make sure that vent tube is not obstructed.

BATTERY CHARGE TESTING

Skandic LT E

Hydrometer Test



1. Specific gravity 1.265

A hydrometer measures the charge of a battery in terms of specific gravity of the electrolyte. Most hydrometers give a true reading at 25°C (77°F).

In order to obtain correct readings, adjust the initial reading by **adding** .001 to the hydrometer readings for each 2°C (3°F) **above** 25°C (77°F) and by **subtracting** .001 for every 2°C (3°F) **below** 25°C (77°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 .003
32	90	
25	77	correct reading
21	70	subtract .002 from the reading .005 .009 .012 .016 .019 .022 .026 .029 .032 .036 .039
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 25°C (77°F):
Hydrometer Reading: 1.250
Electrolyte temperature: - 7°C (20°F)
Subtract .019 Sp. Gr.
Corrected Sp. Gr. is 1.231

EXAMPLE NO. 2

Temperature above 25°C (77°F):
Hydrometer Reading: 1.235
Electrolyte temperature: 38°C (100°F)
Add .008 Sp. Gr.
Corrected Sp. Gr. is 1.243

TEMPERATURE CORRECTED SPECIFIC GRAVITY	BATTERY CHARGE
1.265	Fully charged
1.215	3/4 charged
1.165	1/2 charged
1.125	1/4 charged
1.110	Discharged

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 temperature corrected specific gravity.

TEMPERATURE CORRECTED SPECIFIC GRAVITY	FREEZING POINT OF ELECTROLYTE
1.265	- 59°C (- 75°F)
1.225	- 37°C (- 35°F)
1.200	- 27°C (- 17°F)
1.150	- 15°C (+ 5°F)
1.110	- 3°C (+ 27°F)

Voltmeter Test

Skandic WT/SWT/SUV 550/SUV 600

The sealed and maintenance free battery has to be tested with a voltmeter.

Battery testing requires a voltmeter that can measure DC voltage. Connect a voltmeter parallel to the circuit being tested, observing polarity; otherwise, wrong voltmeter reading will appear.

There are two types of battery tests: unload and load.

An unload test is made on a battery without discharging current. It is the simplest and most commonly used method.

An load test is more accurate.

Unload Test

Skandic WT/SWT/SUV 550/SUV 600

Check charge condition by using voltmeter. Voltmeter readings appear instantly to show the state of charge.

⚠ WARNING

Connect the positive lead to the battery's positive terminal, and the negative lead to the negative terminal.

STATE OF CHARGE	VOLTAGE READING
100%	12.8 - 13.0 V
75% - 100%	12.5 - 12.8 V
50% - 75%	12.0 - 12.5 V
25% - 50%	11.5 - 12.0 V
0% - 25%	11.5 V or less

Load Test

All Models

This is the best test of battery condition under a starting load. Use a load testing device that has an adjustable load.

Apply a load of 3 times the ampere-hour rating of the battery. At 14 seconds into the test, check battery voltage; if battery is in good condition, it will have at least 10.5 Vdc.

BATTERY STORAGE

Skandic LT E

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 1.265 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 293 550 004) or petroleum jelly on terminals.

Section 06 ELECTRICAL

Subsection 04 (BATTERY)

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 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).

Skandic WT/SWT/SUV 550/SUV 600

Disconnect and remove battery from the vehicle.

The battery must always be stored in fully charged condition.

Clean battery terminals and cable connections using a wire brush. Apply a light coat of dielectric grease (P/N 293 550 004) or petroleum jelly on terminals.

Clean battery casing using a solution of baking soda and water. Rinse battery with clear water and dry well using a clean cloth.

Charge the battery every month if stored at a temperature **below** 15°C (60°F).

Charge the battery every two weeks if stored at a temperature **above** 15°C (60°F).

ACTIVATION OF NEW BATTERY

Skandic WT/SWT/SUV 550/SUV 600

Refer to the instructions provided with the battery.

Skandic LT E

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.

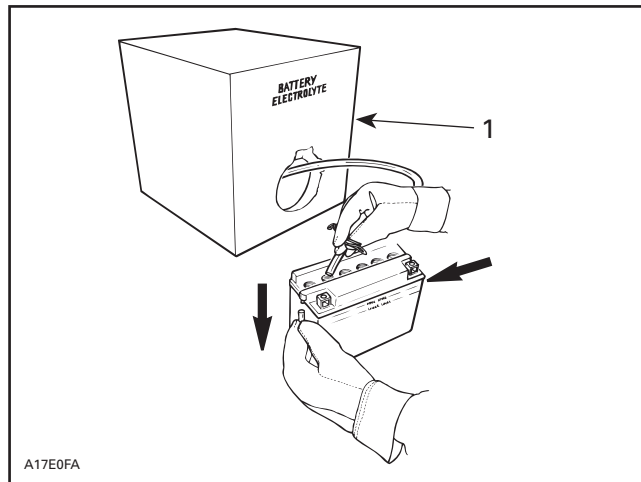
In case of accidental premature removal of caps or sealing tube, battery should be given a full charge.

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.

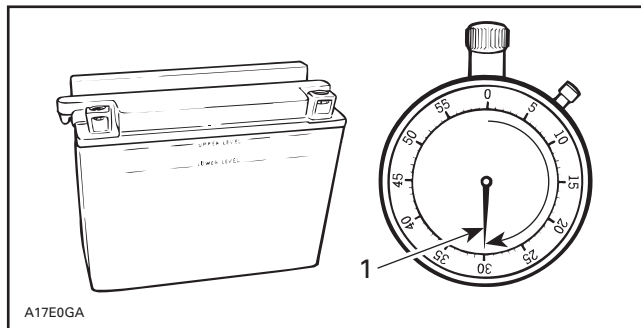
WARNING

Failure to remove the sealing tube could result in an explosion.



1. Battery electrolyte

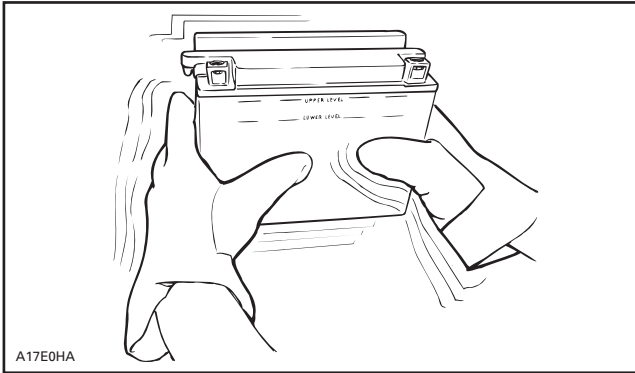
2. Remove caps and fill battery to UPPER LEVEL line with electrolyte (specific gravity: 1.265 at 20°C (68°F)).
3. Allow the battery to stand for 30 minutes MINIMUM (1 hour MAXIMUM) so that electrolyte soaks through battery cells.



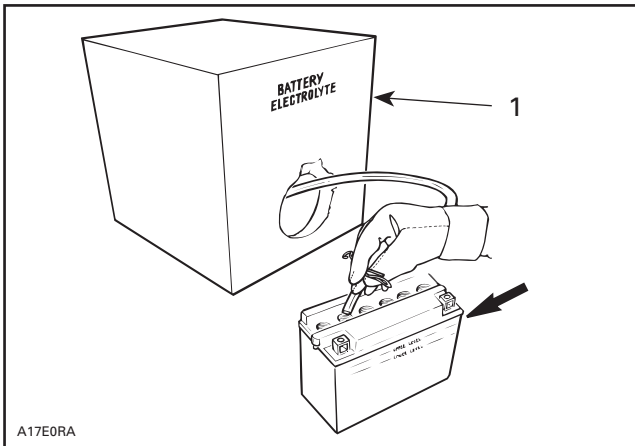
1. 30 minutes

Section 06 ELECTRICAL
Subsection 04 (BATTERY)

4. Allow gas bubbles to escape by lightly shaking battery by hand.

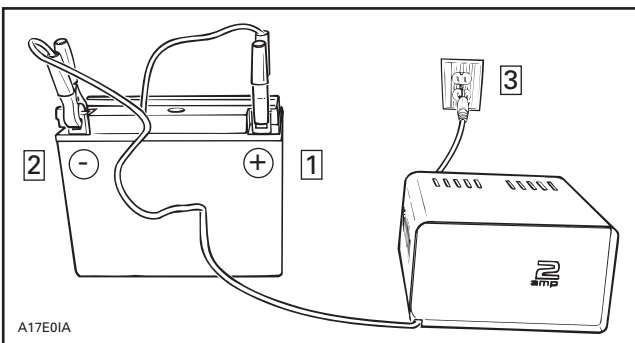


5. Readjust the electrolyte level to the UPPER LEVEL line.



1. Battery electrolyte

6. Connect a 2 A battery charger for 10 to 20 hours.

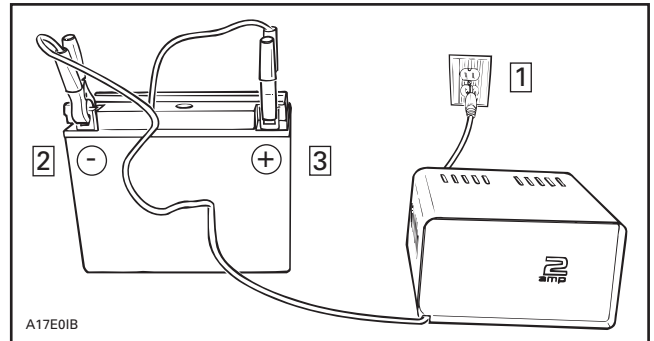


CAUTION: If charging rate raises higher than 2.4 A reduce it immediately. If cell temperature rises higher than 50°C (122°F) (if the casing feels hot) discontinue charging temporarily or reduce the charging rate.

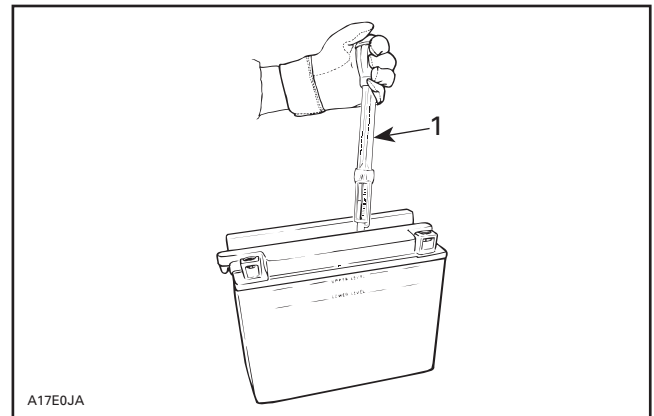
⚠ WARNING

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.

7. Disconnect battery charger.

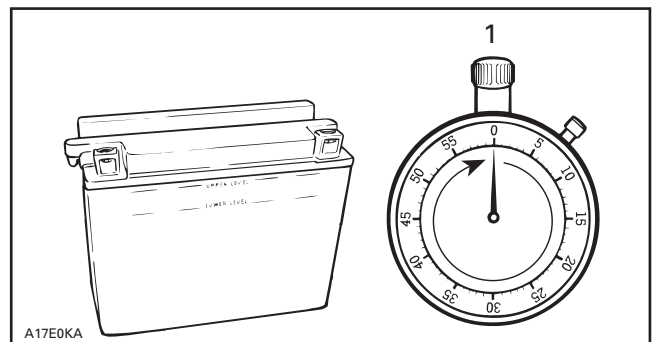


8. Test battery state of charge. Use a hydrometer.



1. Specific gravity 1.265

9. Let battery settle for 1 hour.

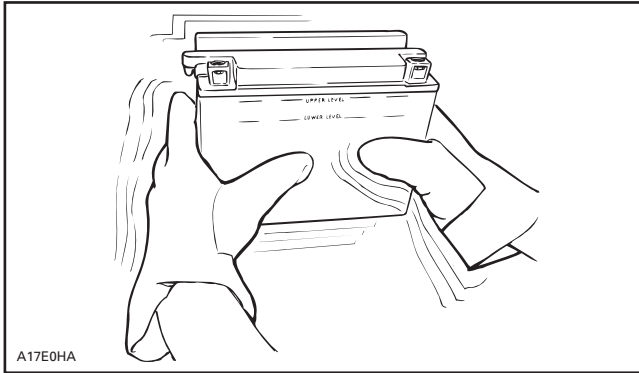


1. 60 minutes

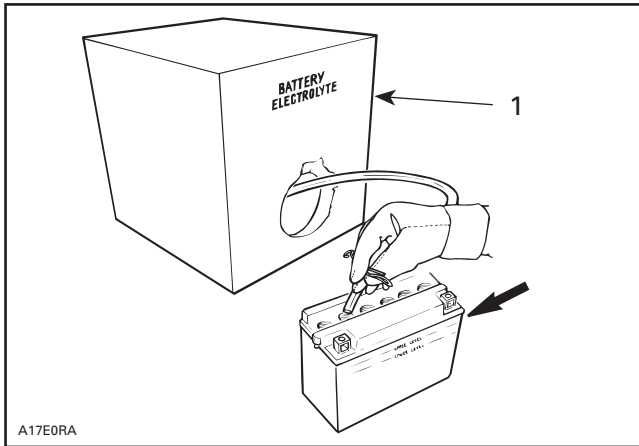
Section 06 ELECTRICAL

Subsection 04 (BATTERY)

10. Allow gas bubbles to escape by lightly shake battery.

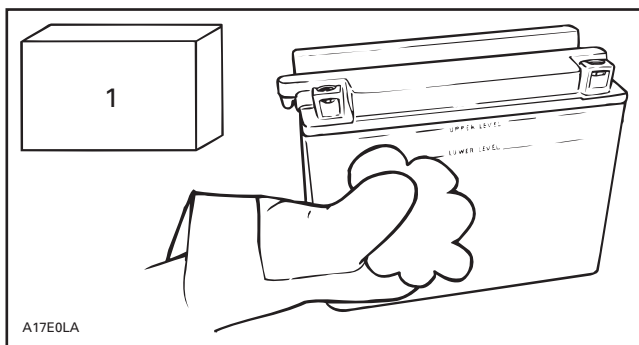


11. Readjust electrolyte level.



1. Battery electrolyte

12. Reinstall caps and clean any electrolyte spillage using a solution of baking soda and water.



1. Baking soda

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 2 hours before charging.

⚠ WARNING

Do not place battery near open flame.

Time required to charge a battery will vary depending some factors such as:

- **Battery temperature:** 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, time required for the battery to begin accepting measurable current will also vary.

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 term 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.

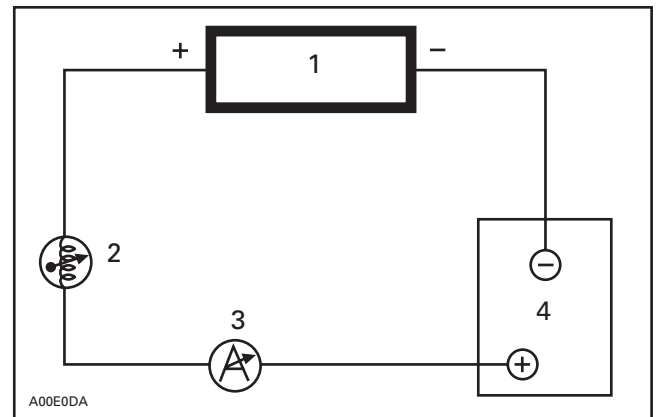
BATTERY CHARGING EQUIPMENT

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 rheostat, such as OHMITE — 0314 or MALLORY 50K 12P, are available from electronic parts supply shops and they are suitable for use with most chargers if the peak current is to be held below 2 A.

If you need an accurate ammeter, we recommend the use of: SHURITE — 5202 (0 to 3 A) or — 5203 (0 to 5 A) available from electronic parts supply shops.



1. Charger
2. Rheostat 12 Ω 50 W
3. Ammeter
4. Battery

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.

INSTALLATION OF BATTERY

All Models

Ensure vent tube is properly installed on battery elbow.

Connect vent tube to vehicle fitting on front frame. Route RED positive cable behind retaining strip and connect it to positive battery terminal. Connect RED wire (coming from ignition switch).

Section 06 ELECTRICAL

Subsection 04 (BATTERY)

Connect BLACK negative cable LAST.

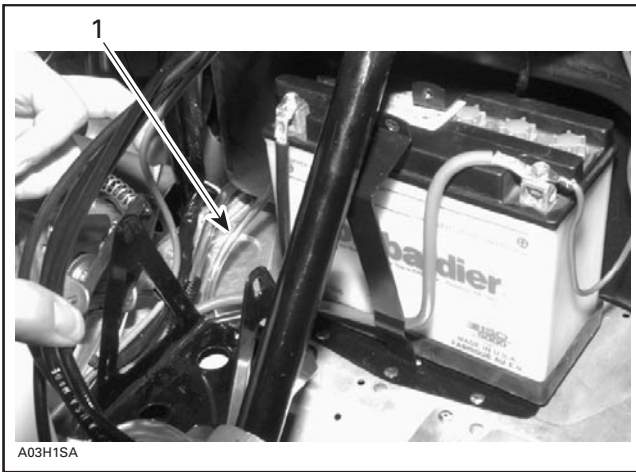
⚠ WARNING

Battery BLACK negative cable must always be disconnected first and connected last.

⚠ WARNING

Never charge or boost battery while installed on vehicle.

Apply silicone dielectric grease (P/N 293 550 004) on battery posts and connectors.



TYPICAL — BATTERY CONNECTION

1. Vent tube on fitting

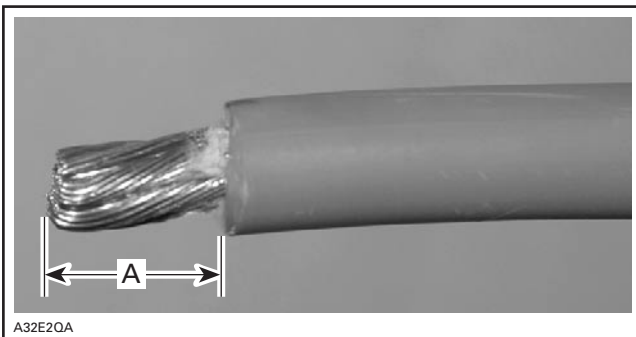
Ensure that vent tube is not kinked or blocked then install battery cover over battery.

Close and fasten retaining strips.

Reinstall air silencer and pulley guard.

CABLE TERMINAL INSTALLATION

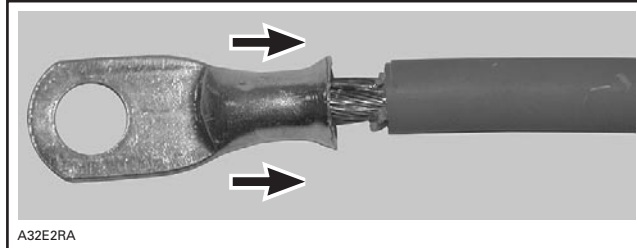
Carefully strip the wire approximately to 10 mm (1/2 in) in length, using a wire stripping tool or sharp blade/knife.



A. 10 mm (1/2 in)

NOTE: Make sure not to cut wire strands while stripping the wire.

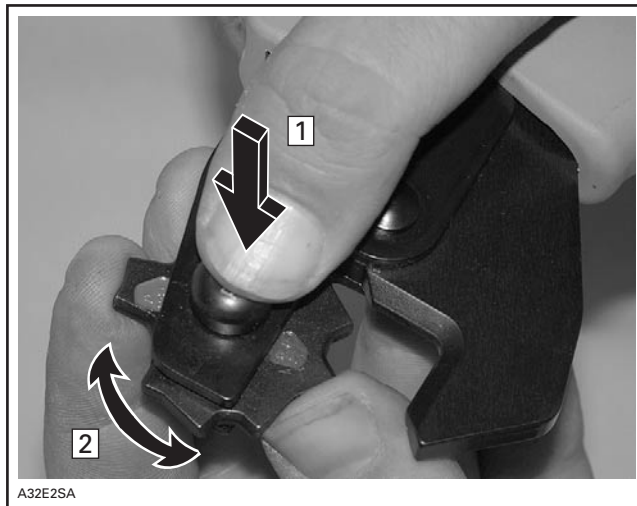
Install the appropriate terminal on the wire according to the requirement. Refer to appropriate parts catalog.



INSTALLATION OF TERMINAL

Follow the instructions provided with the crimp plier (P/N 529 035 730) to select the proper position of the tool.

NOTE: Different wires require different crimp plier settings, so make sure to follow the instruction supplied with the tool.



POSITIONING THE CRIMP PLIER

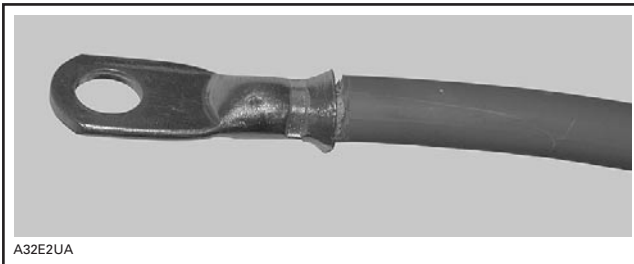
Step **1**: Press

Step **2**: Rotate

After positioning the crimp plier, crimp the terminal already installed on wire.



CRIMPING OF WIRE



PROPERLY CRIMPED WIRE

To verify, if the wire is properly crimped, apply some pulling force on wire and the terminal at the same time from both directions.

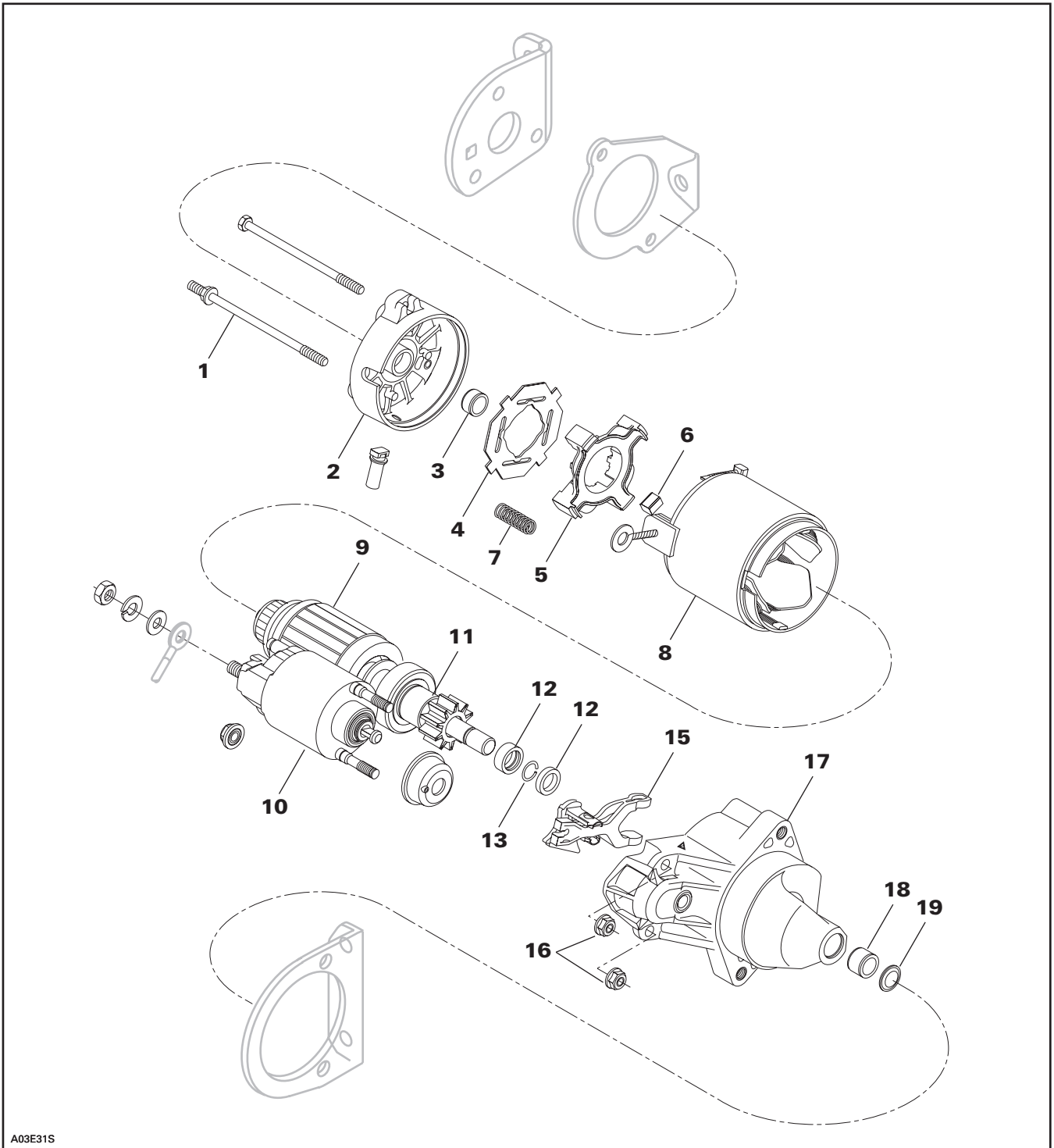
CAUTION: Never weld the wire to the terminal. Welding can change the property of the wire and it can become brittle and break.

Install the protective heat shrink rubber tube (P/N 278 001 692) on the terminal. Heat the heat shrink rubber tube using the heat gun so that it grasps the wire and the terminal.

CAUTION: Make sure that the protective heat shrink rubber tube has been properly installed and no part of wire is exposed.

ELECTRIC STARTER

Skandic WT/SWT/LT E/SUV 550

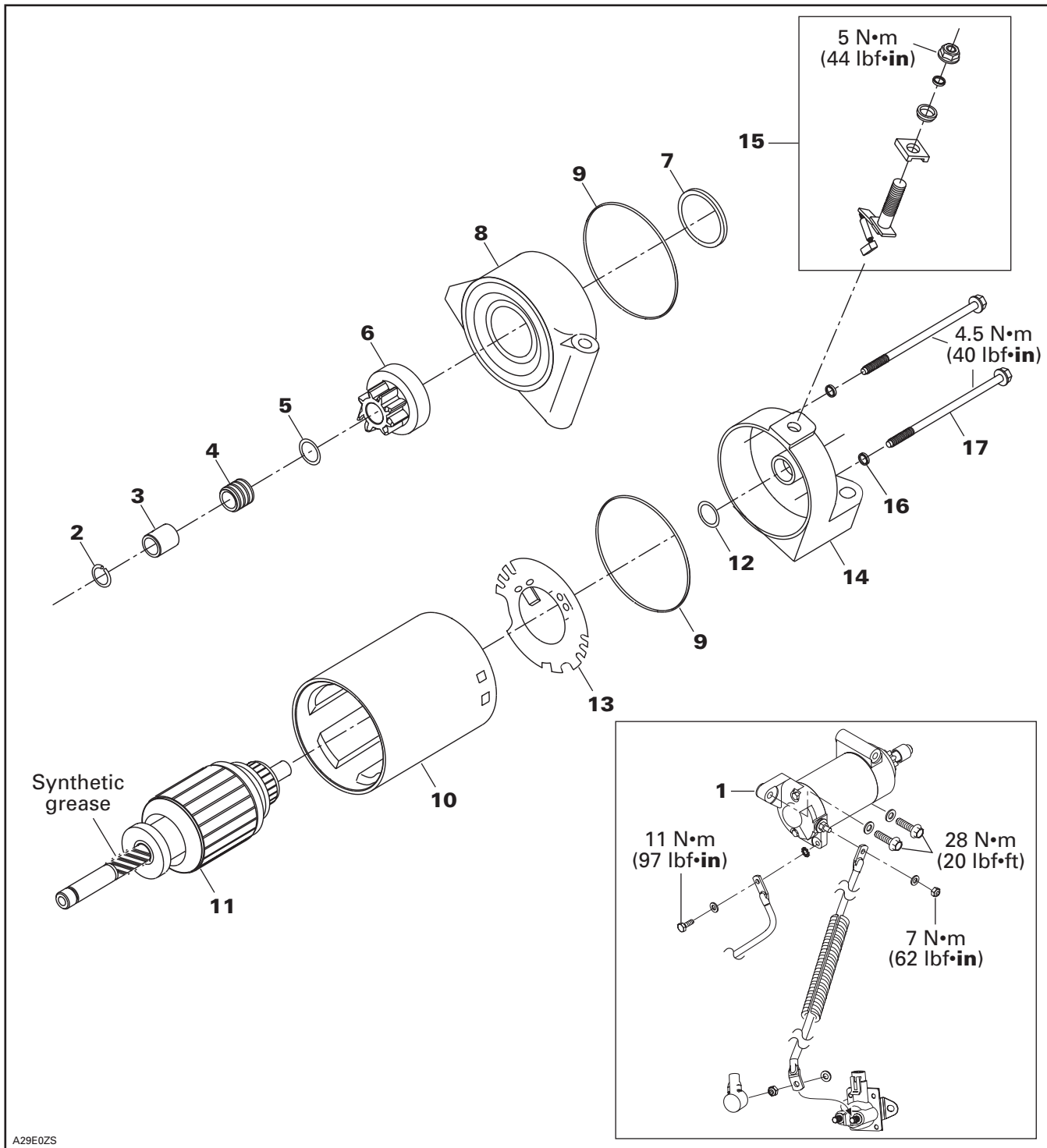


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Section 06 ELECTRICAL

Subsection 05 (ELECTRIC STARTER)

Skandic WT LC/SUV 600



REMOVAL

Skandic WT/SWT/LT E

- 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 relay.
- Unbolt starter from PTO side bracket.
- Unbolt MAG side bracket from engine.
- Remove starter from engine.

Skandic WT LC/SUV

- Disconnect BLACK ground cable from battery.
- Disconnect RED positive cable from battery.

⚠ WARNING

Always disconnect ground cable first and connect last.

- Remove tuned pipe.
- Disconnect RED cable from starter.
- Disconnect ground cable from starter.
- Unbolt and remove starter from engine.

DISASSEMBLY

Skandic WT/SWT/LT E

Disconnect bare wire linking starter and relay.

Remove nuts **no. 16** then relay **no. 10** by lifting and pulling to disengage from drive lever **no. 15**.

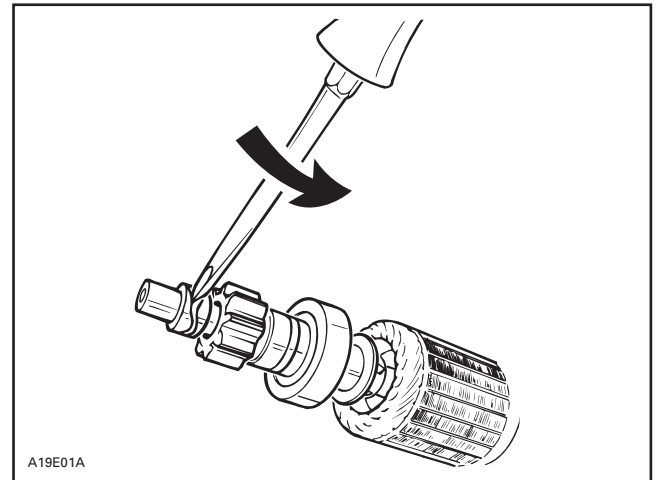
Unscrew starter screws (long) **no. 1** then pull yoke **no. 8** with end frame **no. 2** to separate from drive housing **no. 17**.

Pull armature **no. 9** with drive lever **no. 15**.

Remove insulator **no. 4** then brush springs **no. 7** being careful not to lose them since they will be projected out.

Pull brush holder **no. 5** from yoke **no. 8**.

Insert blade of a small screwdriver between stop collars.



Twist screwdriver to separate stop collars **no. 12** thus giving access to circlip **no. 13**.

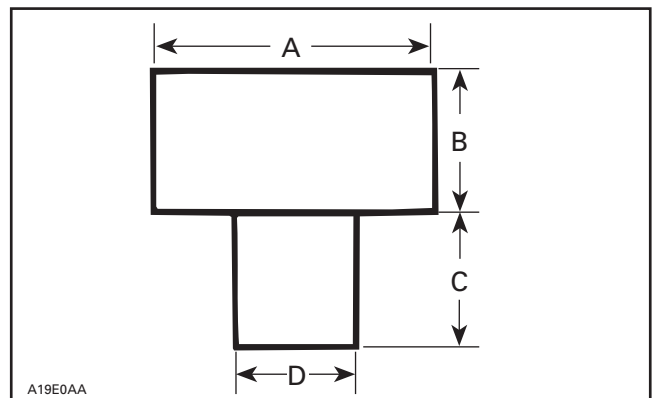
Remove outer collar, circlip then inner collar.

Remove overrunning clutch **no. 11**.

Check the wear on bushing **no. 18** 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 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.

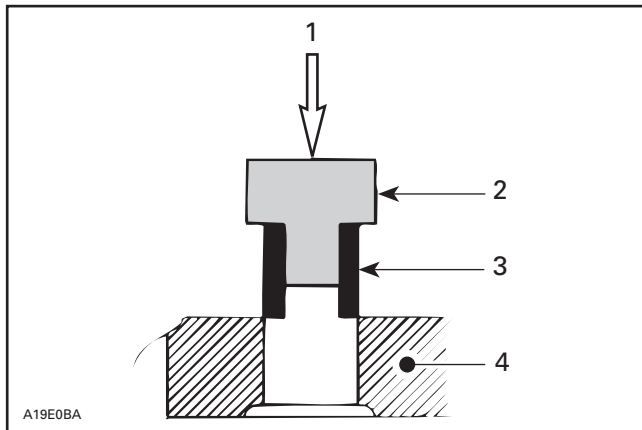


BUSHING PUSHER

- A. 16 mm (5/8 in) diameter
- B. 13 mm (1/2 in)
- C. 11 mm (7/16 in)
- D. 11.0 mm (.433 in)

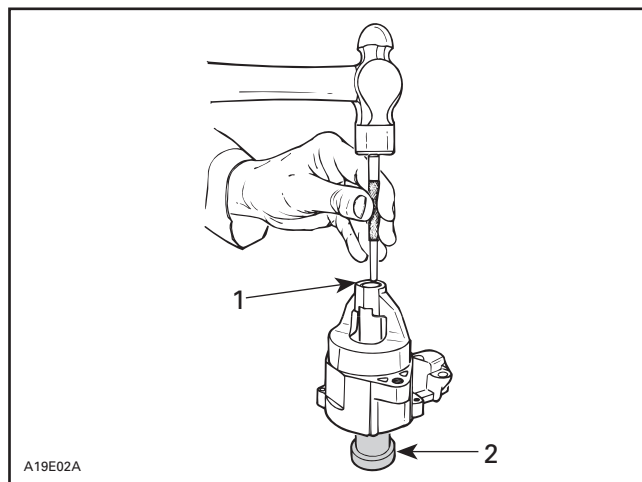
Section 06 ELECTRICAL

Subsection 05 (ELECTRIC STARTER)



1. Press-in
2. Bushing pusher
3. Bushing
4. Drive housing

Install bushing cover no. 19 then, using a punch, stake bushing cover in place.



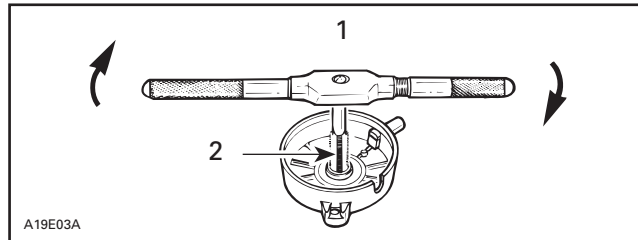
1. Stake bushing cover
2. Support

3, Bushing (end frame)

Check the wear on bushing no. 3 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.



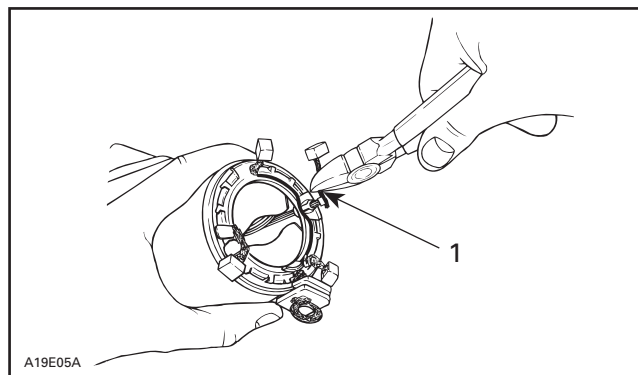
1. Turn until bushing goes out
2. 12 mm tap

To install new bushing, use the same bushing pusher as for drive housing bushing installation.

6, Brush

To replace brush no. 6, proceed as follows:

Cut brush wire close to connector at the welded portion.



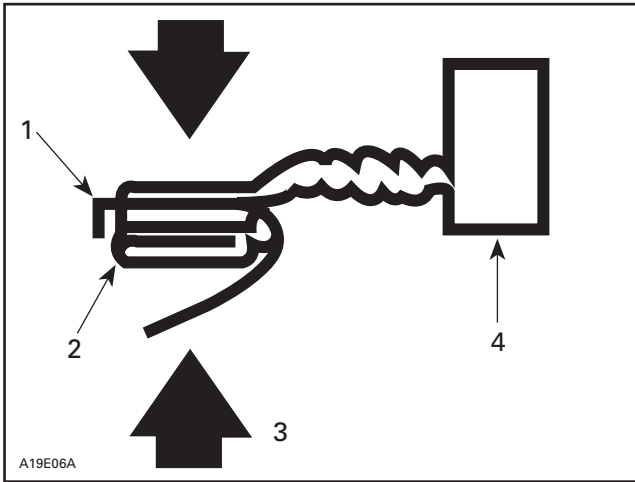
1. Cut close to connector

Remove burrs with a file on the remaining welded portion.

CAUTION: Be careful not to damage plastic portion of starter housing.

Place spare brush plate edge against housing connector edge (welded portion).

Crimp plate over housing connector with a pair of pliers.



1. Plate edge
2. Housing connector
3. Crimp
4. Spare brush

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.

Skandic WT LC/SUV 600

Before disassembling, trace index marks on starter housing **no. 10** and starter housing assembly **no. 8** to ease later assembly.

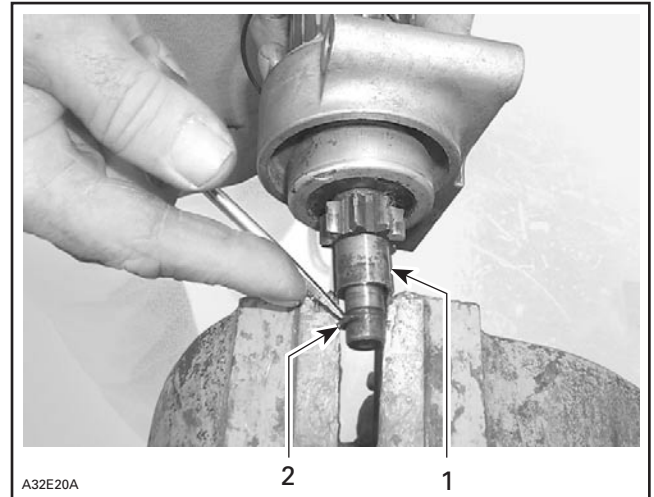
Remove starter through bolts **no. 17**. Separate end frame housing **no. 14** from starter housing **no. 10**. Withdraw starter housing from armature **no. 11**.

Brush holder **no. 13** can be removed from end frame housing **no. 14** by disconnecting the end frame attached brush from brush holder **no. 13**.

Check the radial play between the armature shaft and end frame bearing. Replace the end frame bearing or replace starter. If parts are in good condition then coat with synthetic grease (P/N 413 711 500) before reinstalling them.

Push back the collar **no. 3** using a screwdriver.

Remove snap ring **no. 2**. Remove collar **no. 3** and spring **no. 4**.



1. Collar
2. Snap ring

Turn starter clutch **no. 6** clockwise to remove it from armature assembly **no. 11**.

Pull housing from armature.

CLEANING AND INSPECTION

CLEANING

All Models

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 and dry cloth.

Clean engine ring 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 and dry cloth.

Section 06 ELECTRICAL

Subsection 05 (ELECTRIC STARTER)

INSPECTION

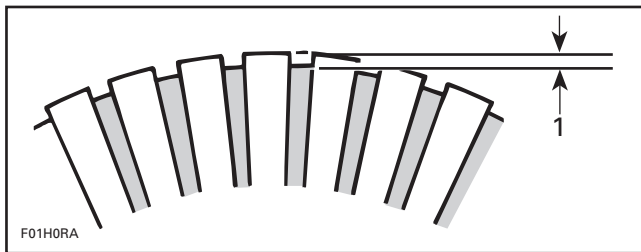
Armature

All Models

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.

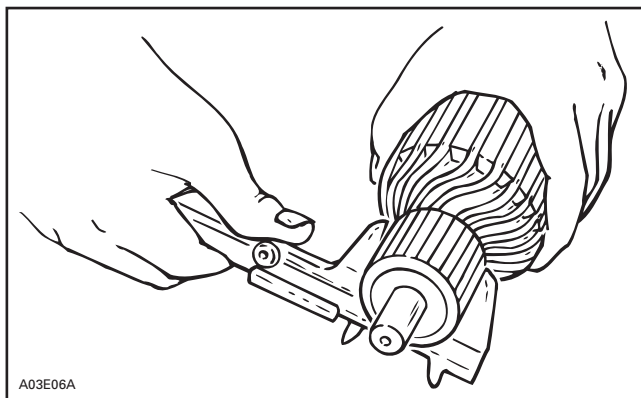
Check the commutator for mica depth. If the depth is less than 0.20 mm (.008 in), undercut the mica. Be sure that no burrs are left and no copper dust remains between the segments after the undercutting operation is completed.



1. Commutator undercut 0.20 mm (.008 in)

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.

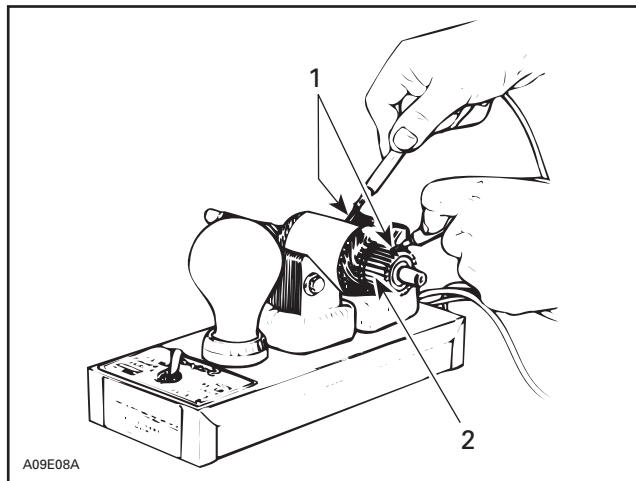
Check commutator outer diameter. If less than specified value, replace.



MODEL	WEAR LIMIT
All	27 mm (1.063 in)

Test for Ground Circuit in the Armature

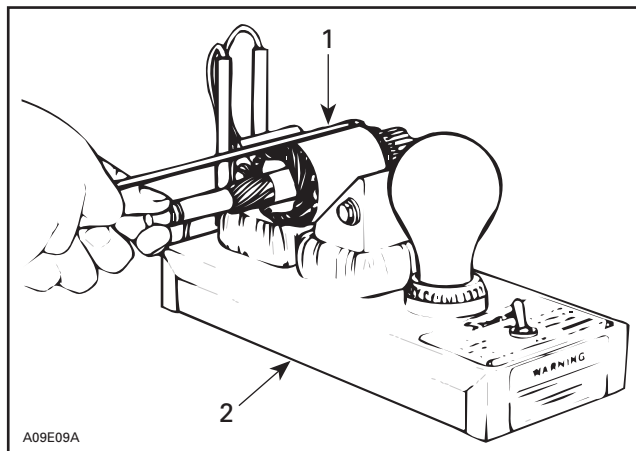
Use growler test probes. Check between armature core and the commutator bars. If growler lamp turns on, bars are grounded. If so, replace armature.



1. Test probes
2. Commutator bars

Test Armature for Shorted Winding

When the armature is rotated in the growler with a steel strip (hacksaw blade) held above it, the strip will vibrate over that area of the armature which has short circuit. Replace armature if so.



1. Steel strip (hack-saw blade)
2. Growler

Test the Armature for Open Circuit

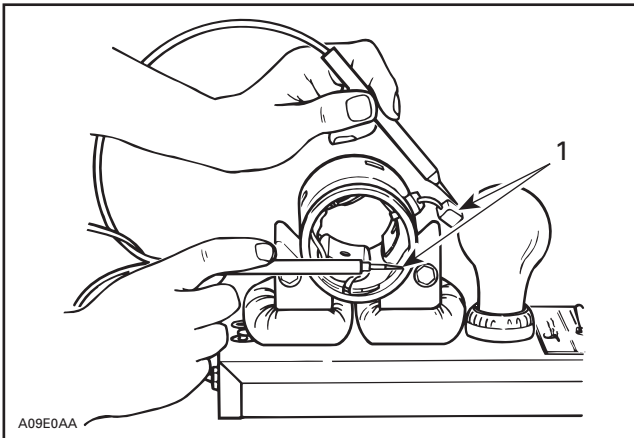
Use growler test probes. Place one test probe on a commutator bar and the other test probe on the neighboring bar. Repeat this operation for all bars, moving one test probe at a time. If the growler lamp does not turn on, the armature circuit between these 2 bars is opened. The armature should be replaced 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-circuit armature coil).

Field Windings and Brushes

Skandic WT/SWT/LT E/SUV 550

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.



1. Test probes

Check the dynamic brake winding for open circuit by placing one test probe on the positive brush and the other probe on the negative brush.

If growler lamp does not turn on, the winding circuit is open-circuit and the starter housing has to be repaired or replaced.

Brush Holder

All Models

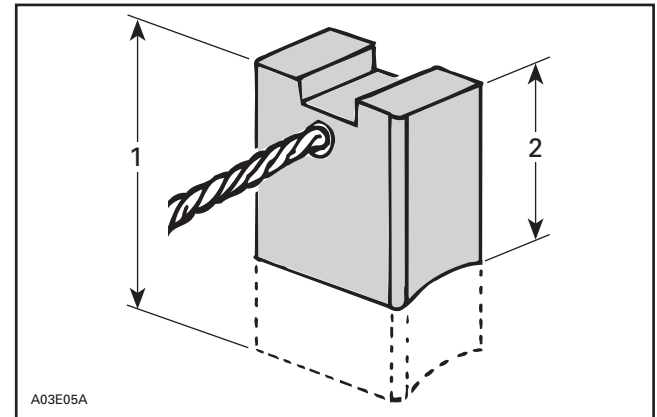
Check the brush holder for insulation using growler test probes. Place one test probe on the insulated brush holder and the other test probe on the brush holder plate. If the growler lamp turns on, the brush holder has to be repaired or replaced.

Brush Length

All Models

Measure brush length. If less than the specified value, replace them.

MODEL	LENGTH	
	NEW	WEAR LIMIT
All	10 mm (.400 in)	6 mm (.236 in)



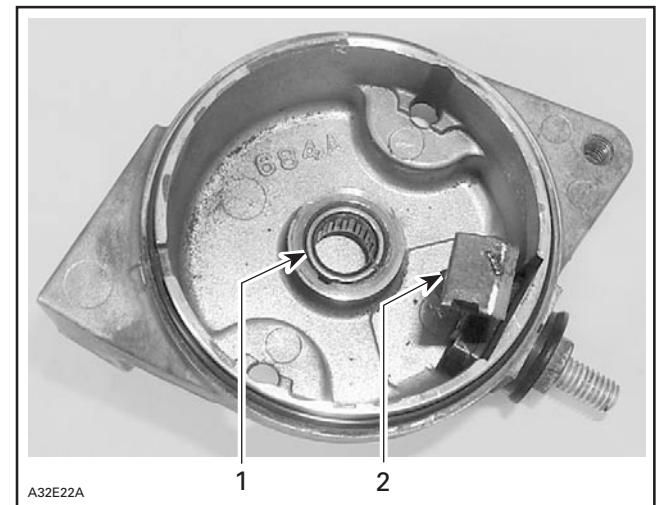
TYPICAL

1. New
2. Wear limit

End Housing

Skandic WT LC/SUV 600

Check the mica insulation of the positive brush and also the roller bearing condition. Replace, if required.



1. Roller bearing
2. Positive brush

Section 06 ELECTRICAL

Subsection 05 (ELECTRIC STARTER)

Overrunning Clutch

All Models

The pinion of the overrunning clutch should turn smoothly in a clockwise direction, and should not slip in a counterclockwise direction. If defective, replace.

Check the pinion teeth for wear and damage. If defective, replace.

RELAY

Inspect connections and clean as necessary. Relay condition can be checked with an ohmmeter. Install test probes on **large** connectors of relay when it is activated (+ on RED/GREEN wire and – on relay body for the fan cooled models and – on the black wire for liquid cooled models).

IMPORTANT: No current must be present on large cables when using ohmmeter, otherwise meter could be damaged.

ASSEMBLY

Skandic WT/SWT/LT E/SUV 550

Prior to assembling, coat sliding surfaces and moving parts on armature shaft splines, overrunning clutch, relay plunger, drive lever and bushings with synthetic grease (P/N 413 711 500).

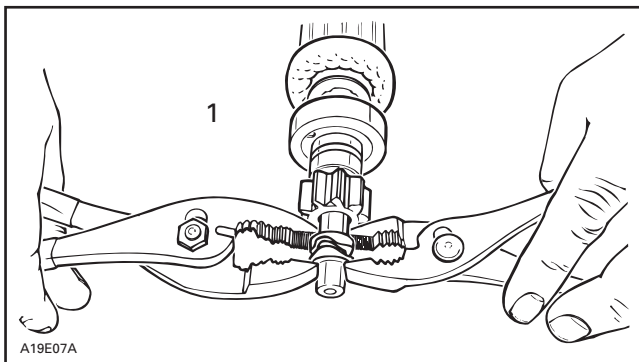
Proceed as follows for assembly.

Install overrunning clutch onto armature shaft. Insert **inner** collar onto shaft. Install a new circlip.

CAUTION: Always install a new circlip when servicing.

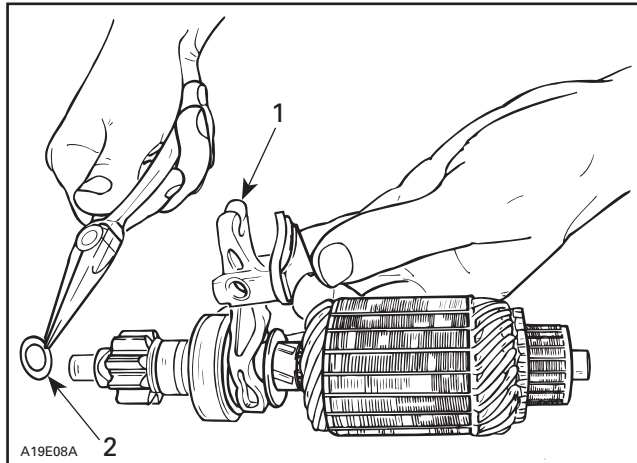
Insert **outer** collar being careful to match protrusions with notches of collars.

Using a pair of pliers on each side of stop collars, squeeze evenly until collars sit over circlip.



1. Squeeze evenly

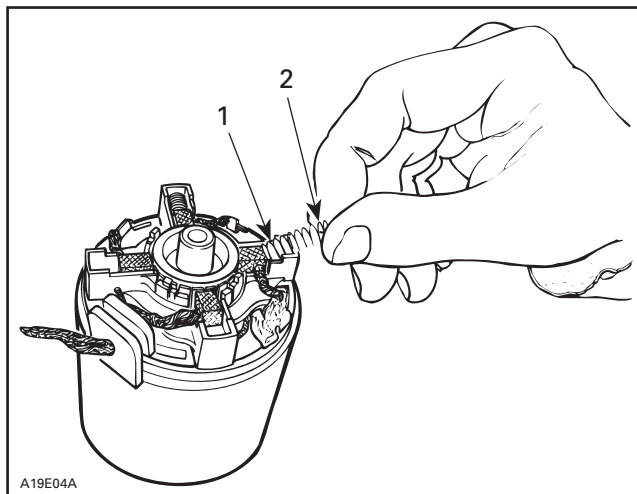
Install thrust washer against outer stop collar. Place drive lever onto overrunning clutch then insert into drive housing.



1. Install on overrunning clutch
2. Install thrust washer

Slide starter housing 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. This end first
2. Push this end to complete

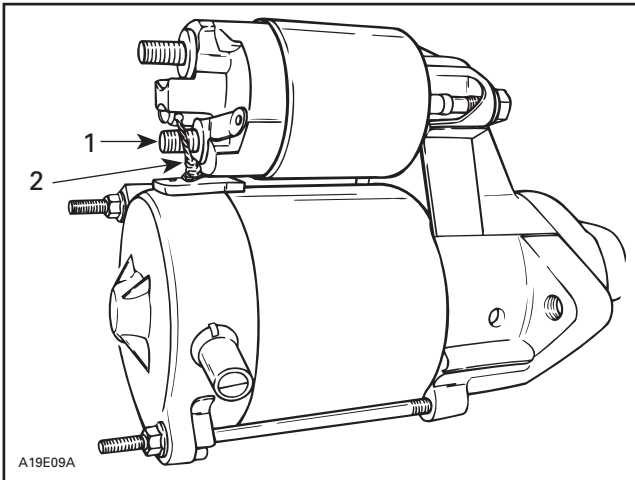
Secure insulator over brushes and springs. Properly install end frame and tighten screws.

Insert relay plunger inside of drive lever fork and secure to drive housing.

Connect starter bare wire to relay.

NOTE: Connect this wire on the **shorter** relay stud.

Section 06 ELECTRICAL
Subsection 05 (ELECTRIC STARTER)



1. Shorter stud
2. Bare wire

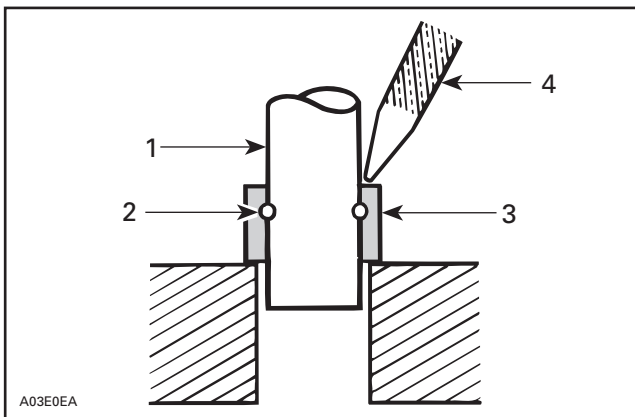
Skandic WT LC/SUV 600

Reverse the order of disassembly to reassemble starter. However, attention should be paid to the following operations.

Prior to assembling, coat sliding surfaces on armature shaft splines, overrunning clutch, bushing and roller bearing with synthetic grease (P/N 413 711 500).

After placing collar no. 3 on armature shaft no. 11, fit new snap ring no. 2 on armature shaft, then make sure that it is properly secured.

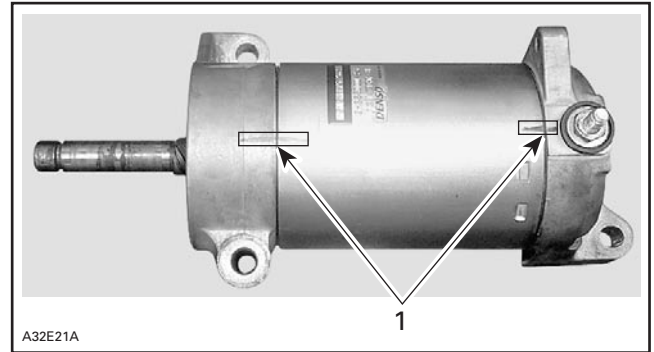
Slide collar no. 3 over snap ring no. 2 and secure in place by punching it at two or three places.



1. Armature shaft
2. Snap ring
3. Collar
4. Punch

Starter Housing Assembly and Starter Housing

Align previously traced indexing marks.

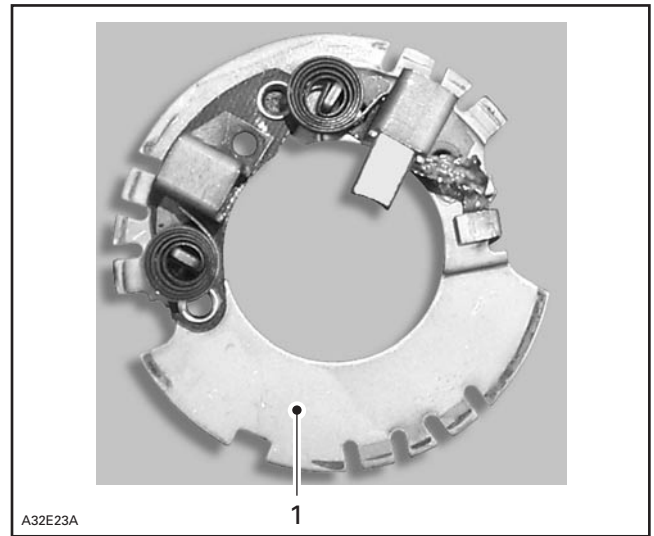


TYPICAL

1. Aligned indexing marks

Open brushes and slide over commutator.

Align end frame locating notch with yoke protrusion and properly sit brush holder no. 13 into housing no. 14.



1. Brush holder

To ease end frame installation, retain brush holder with a small screwdriver while installing armature assembly.

CAUTION: Make sure to place two end housings on a flat surface before tightening the through bolts.

CAUTION: Make sure end frame fits perfectly on yoke.

Section 06 ELECTRICAL

Subsection 05 (ELECTRIC STARTER)

INSTALLATION

Skandic WT/SWT/LT E/SUV 550

Make sure that starter and engine mating surfaces are free of grime. Serious trouble may arise if starter is not properly aligned.

CAUTION: Make sure that both starter brackets are well seated against engine crankcase and starter before torquing all retaining bolts.

Torque all M8 bolts to $24 \pm 4 \text{ N}\cdot\text{m}$ ($18 \pm 3 \text{ lbf}\cdot\text{ft}$).

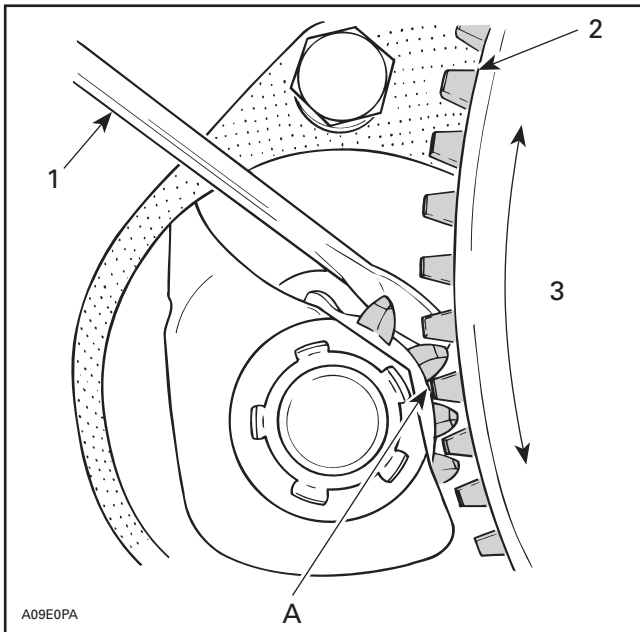
Torque all M5 bolts to $5 \pm 0.5 \text{ N}\cdot\text{m}$ ($44 \pm 5 \text{ lbf}\cdot\text{in}$).

CAUTION: Before checking engaging depth of starter pinion teeth, make sure that battery cables are disconnected.

Install starter.

NOTE: Check proper engaging depth of starter pinion teeth to ring gear teeth (see illustration). Install hardened washers (P/N 503 007 900) between engine and starter supports accordingly.

CAUTION: All starter bracket fasteners must be secured with Loctite 271 (P/N 293 800 005). Always install new self-locking fasteners.



1. Screwdriver pulling starter pinion
2. Ring gear
3. No excessive backlash
- A. 0.5 to 1.5 mm (.020 to .060 in)

Connect the RED battery cable and the RED wire to the large terminal of the relay. Connect RED/GREEN wire to small terminal of relay.

Connect BLACK cable to battery.

⚠ WARNING

Always disconnect ground cable first and connect last.

Skandic WT LC/SUV 600

- Use new teflon washers on the 3 bolts retaining starter to engine.
- Torque the bolts to $28 \pm 1 \text{ N}\cdot\text{m}$ ($21 \pm 1 \text{ lbf}\cdot\text{ft}$).
- Make sure that starter and engine mating surfaces are free of grime. Serious trouble may arise if starter is not properly aligned.
- Connect the RED battery cable and the RED wire to the large terminal of the starter.
- Torque large terminal nut to $7 \text{ N}\cdot\text{m}$ ($62 \text{ lbf}\cdot\text{in}$).

⚠ WARNING

Always disconnect ground cable first and connect last.

- Connect ground cable to the starter with star washer in between.
- Torque ground cable connecting bolt to $11 \text{ N}\cdot\text{m}$ ($97 \text{ lbf}\cdot\text{in}$).

TESTING PROCEDURE

GENERAL

The following chart gives the engine types with their implemented system.

ENGINE TYPE	IGNITION SYSTEM	CHARGING SYSTEM OUTPUT
277 on Tundra	① RER dual trigger coil CDI (single cylinder)	240
552 on Skandic WT/SWT/SUV 550	② Ducati trigger coil CDI	340
443 on Skandic LT/LT E	③ RER dual trigger coil CDI (twin cylinder)	240
593 on Skandic WT LC/SUV 600	④ Nippondenso trigger coil CDI	290

CDI System Identification

① RER Dual Trigger Coil CDI (single cylinder)

The RER dual trigger coil CDI system has an ignition coil integrated to the MPEM which is mounted on air silencer.

MPEM is connected to a single ignition generator coil via a 3-connector housing (BLACK and RED wires).

MPEM is programmed to recognize a signal sent by the switch located on snowmobile console.

When switch is activated, MPEM cuts off ignition and engine rev drops at approximately 700 RPM for 277 engine (Tundra).

MPEM fires a spark at a great advance creating a thrust which reverses engine rotation.

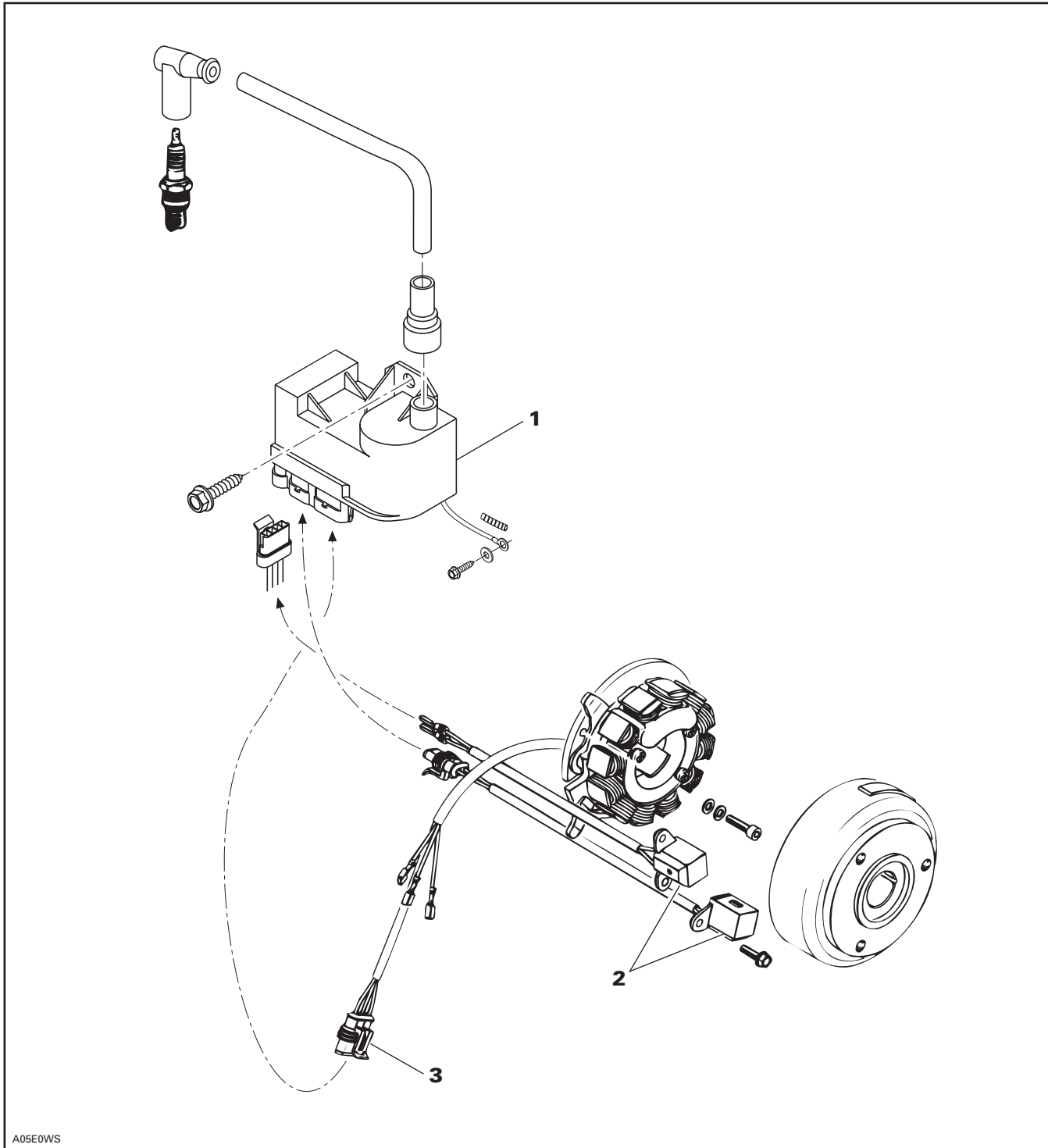
Second trigger coil located on crankcase takes over to produce spark in reverse rotation.

A safety device is incorporated to MPEM preventing it from reading any signal coming from reverse switch at following engine revs.

Below 800 RPM and above 3500 RPM = no reverse signal.

Section 06 ELECTRICAL

Subsection 06 (TESTING PROCEDURE)



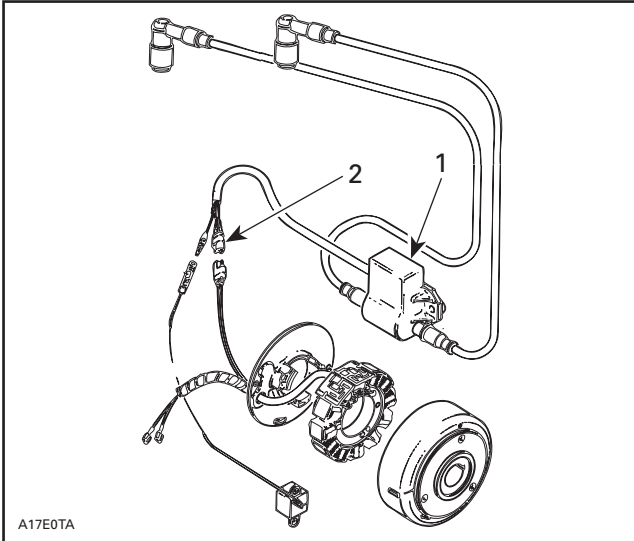
① RER DUAL TRIGGER COIL CDI SYSTEM (SINGLE CYLINDER)

- 1. MPKM
- 2. Trigger coils
- 3. 4-DB housing (BLACK and RED wires)

② **Ducati Trigger Coil CDI**

The DUCATI trigger coil CDI system has a combined ignition module/ignition coil which is mounted on air silencer, below carburetors.

Ignition module is connected to the ignition generator coil via a 4-connector housing (GREEN and WHITE wires).



② **DUCATI TRIGGER COIL CDI SYSTEM**

1. Combined ignition module/ignition coil mounted on air silencer below carburetors
2. 4-connector housing (GREEN and WHITE wires)

③ **RER Dual Trigger Coil CDI (twin cylinder)**

The RER dual trigger coil CDI system has an ignition coil integrated to the MPEM which is mounted on oil reservoir.

MPEM is connected to a single ignition generator coil via a 3-connector housing (BLACK and RED wires).

MPEM is programmed to recognize a signal sent by the switch located on snowmobile console.

When switch is activated, MPEM cuts off ignition and engine rev drops at approximately 450 RPM.

MPEM fires a spark at a great advance creating a thrust which reverses engine rotation.

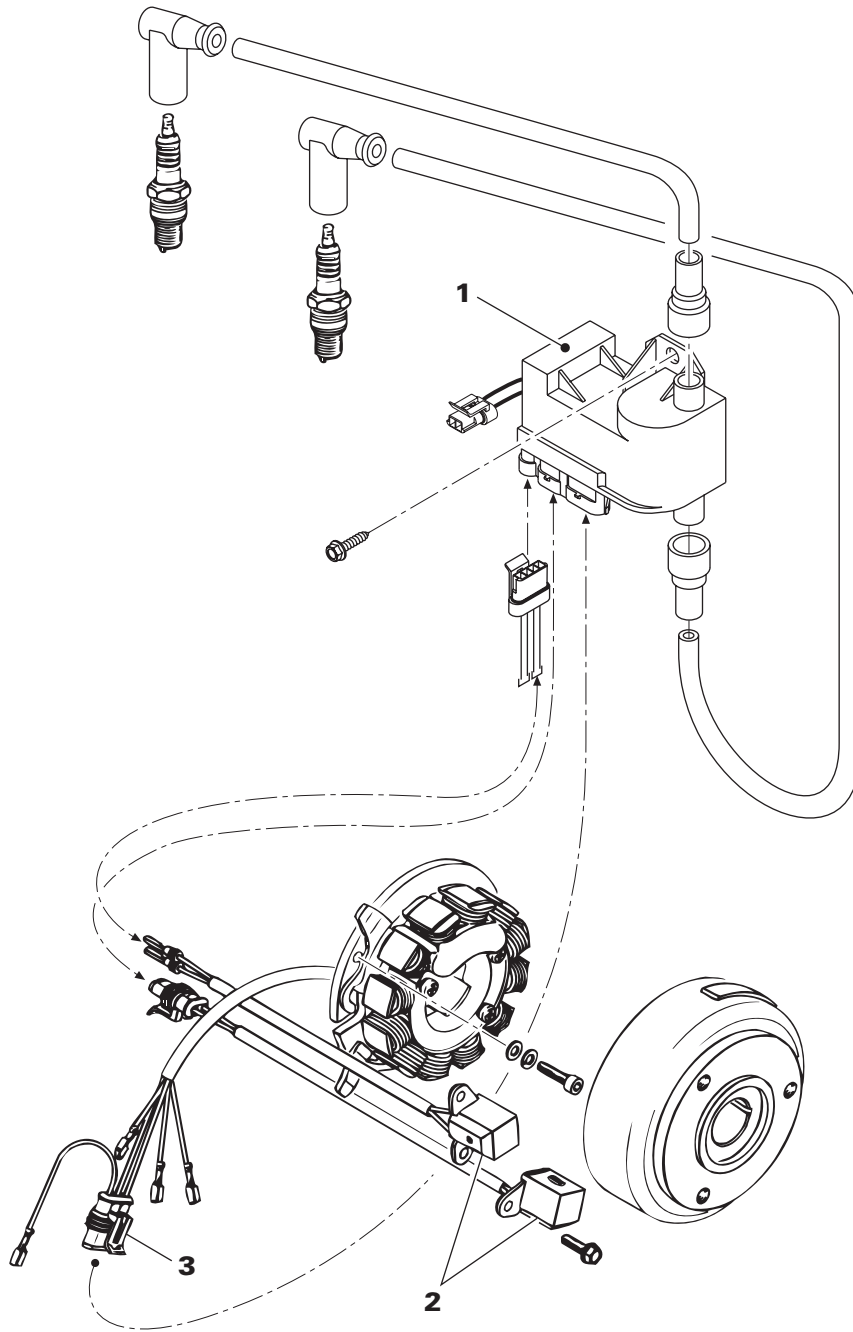
Second trigger coil located on crankcase takes over to produce spark in reverse rotation.

A safety device is incorporated to MPEM preventing it from reading any signal coming from reverse switch at following engine revs.

Below 1000 RPM and above 3500 RPM = no reverse signal.

Section 06 ELECTRICAL

Subsection 06 (TESTING PROCEDURE)



A03E2WS

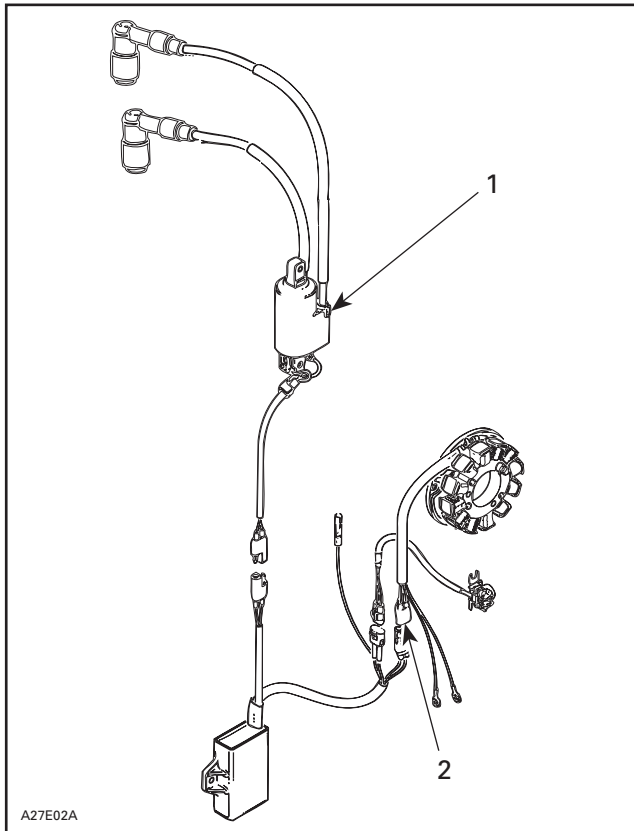
③ RER DUAL TRIGGER COIL CDI SYSTEM (TWIN CYLINDER)

1. MPEM
2. Trigger coils
3. 3-connector housing (BLACK and RED wires)

④ Nippondenso Trigger Coil CDI

The NIPPONDENSO CDI system has a separate ignition coil which is mounted on the reservoir support.

Ignition module is connected to the ignition generator coil via a 3-wire connector (RED, BLACK/RED and BLACK wires).



④ NIPPONDENSO TRIGGER COIL CDI SYSTEM

1. Separate ignition coil mounted on reservoir support
2. Three-wire connector (RED, BLACK/RED and BLACK)

Checking Calibration Program

Skandic WT LC/SUV 600 Only

CAUTION: Do not interchange MPEM from a model to another. Even if the P/N stamped on the MPEM is the same, calibration program may be different. When ordering a new MPEM always refer to appropriate model *Parts Catalog*. The service P/N published in *Parts Catalogs* are the ones with the good calibration program according to model.

With Engine Running

If the below mentioned tool is not available start engine. Turn on programmer then enter password. Increase engine speed to 2000 - 2500 RPM then follow the same procedure as WITH ENGINE STOPPED.

CAUTION: Engine must run till the end of the procedure.

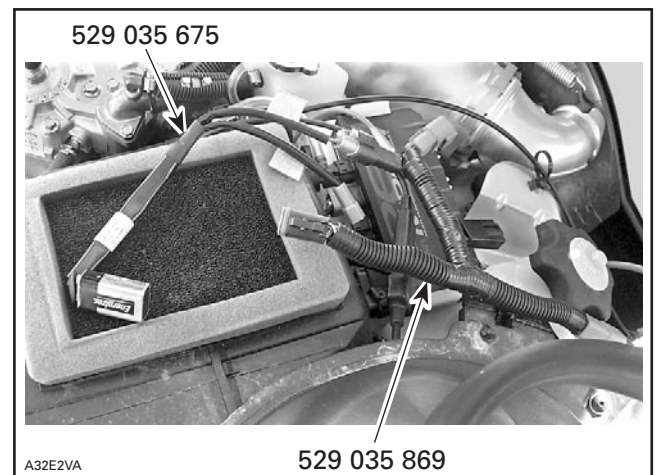
When data is being transferred, you must rev the engine at 2000 - 2500 RPM and make sure connection between programmer and vehicle is good.

IMPORTANT: In following procedure each time ← **Trs** symbol appears, make sure to rev engine between 2000 and 2500 RPM.

Engine will misfire while vehicle information is being transferred from MPEM to programmer. If engine stalls, restart it, keep engine speed at 2000 - 2500 RPM and select no. 3 VEHICLE INFO again.

With Engine Stopped

Connect 9-volt adaptor (P/N 529 035 675) to supply cable (P/N 529 035 869) and supply cable to diagnostic connector.



TYPICAL

When cables are connected a beeping signal from the reverse buzzer will be heard (if vehicle is so equipped). This indicates that the MPEM is now ready to transfer programming operations.

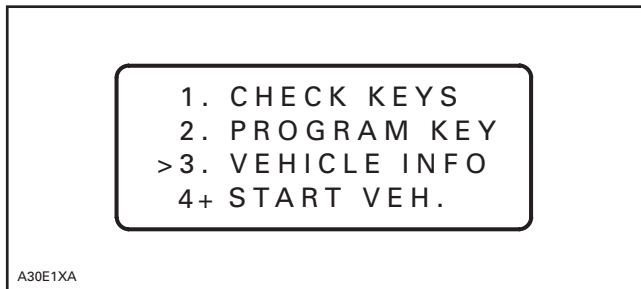
Once MPEM calibration program checking is done, unplug 9 volt adaptor and supply cable.

Section 06 ELECTRICAL

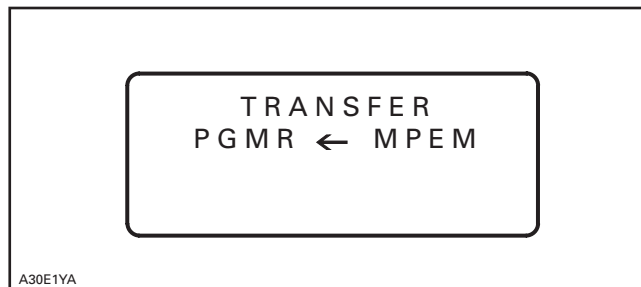
Subsection 06 (TESTING PROCEDURE)

Turn on programmer then enter password.

From main menu select no. 3. VEHICLE INFO; ← **Trs**.

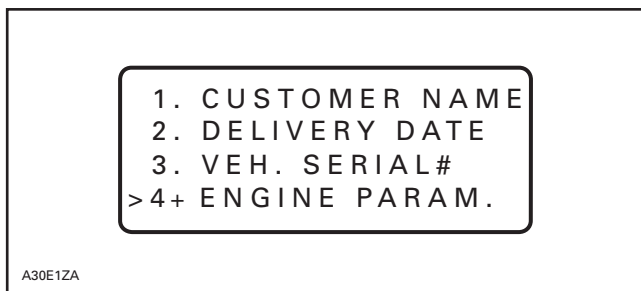


Vehicle information is transferred from MPEM to programmer.

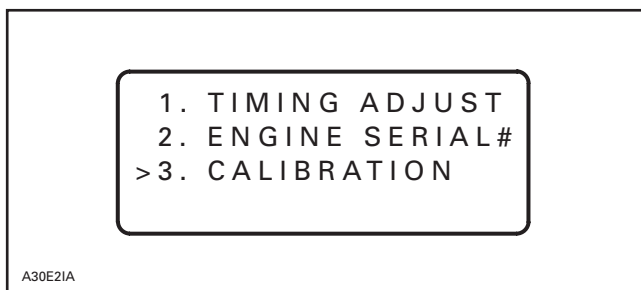


NOTE: In fact the programmer takes a **copy** of all vehicle parameters scribed in MPEM. This copy will be modified within the programmer then transferred to the MPEM.

Select no. 4. ENGINE PARAMETER.

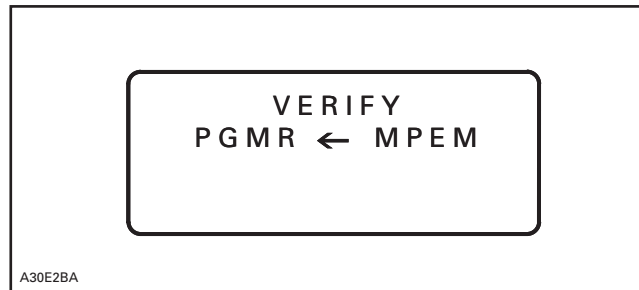


Select no. 3 CALIBRATION.

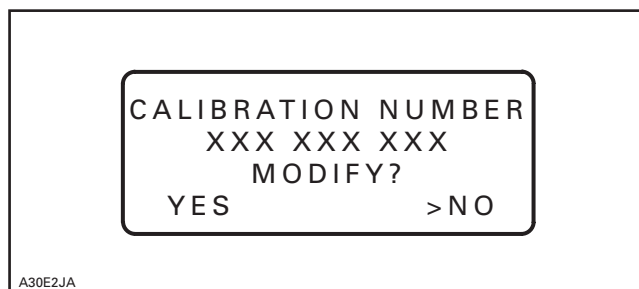


Press ENTER ← **Trs**.

Following screen appears temporarily:



And then following screen showing the actual calibration number in the MPEM.



Check for proper calibration number. See table below.

Select NO and press ENTER.

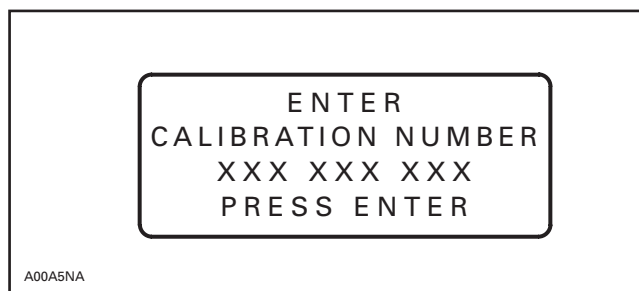
Press MENU twice; ← **Trs** then turn off programmer, unplug it from MPEM. Remove 9-volt adaptor.

Stop engine when using WITH ENGINE RUNNING procedure.

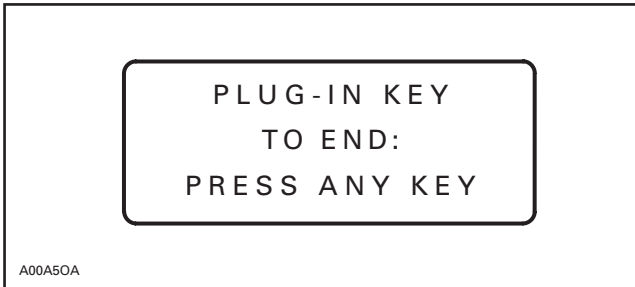
MODEL	CALIBRATED MPEM P/N (hardware and software)	CALIBRATION PROGRAM NUMBER (software)	MPEM P/N (hardware)
Skandic WT LC/SUV	524 7879	524 7878	512 059 239

Changing MPEM Calibration Program

Proceed the same as for checking MPEM calibration but select YES to MODIFY? and press ENTER following screen appears:

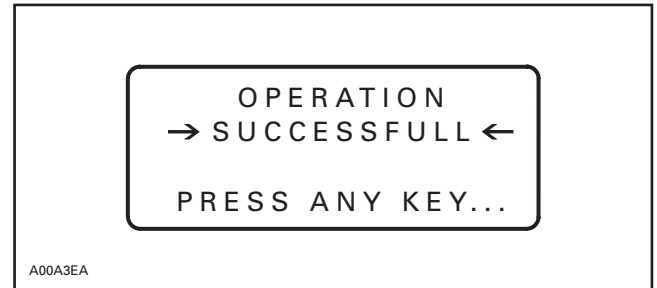
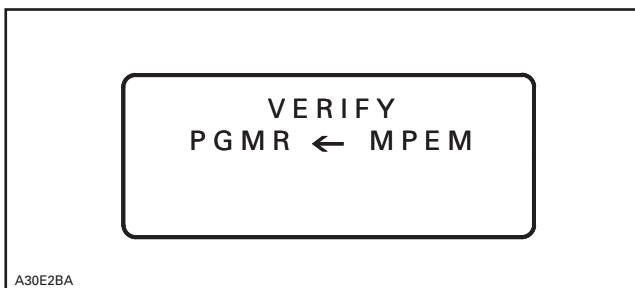
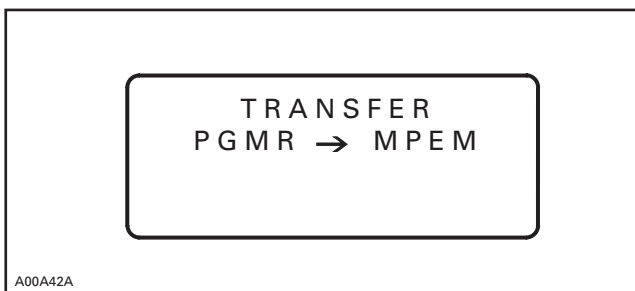
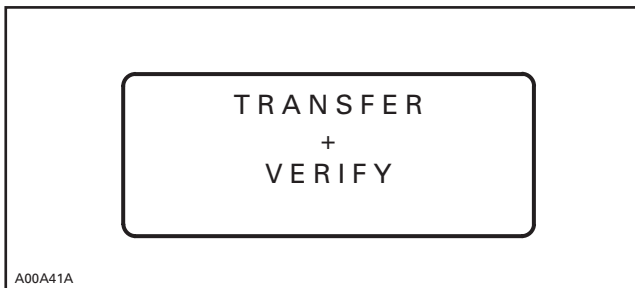


Enter new calibration number and press ENTER, following screen appears:

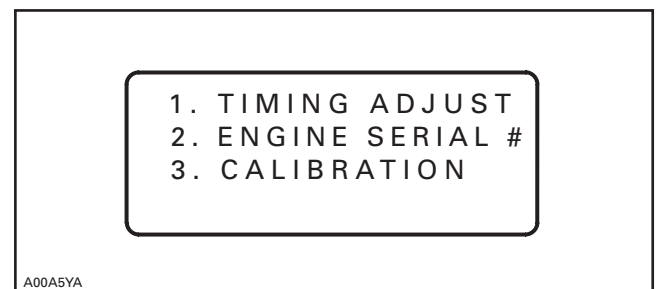


Simultaneously with the following operation a transfer will occur; ← **Trs**. At this point, be ready to rev the engine so it won't fall below the 2000 RPM mark when not using 9-volt adaptor.

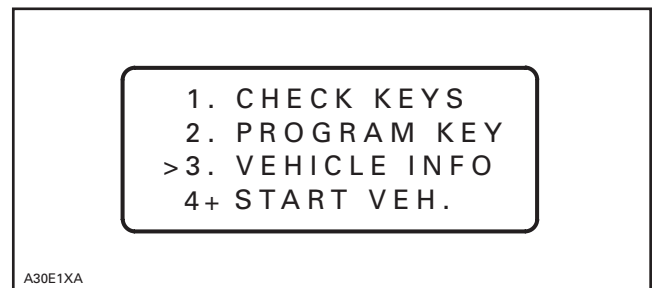
Plug-in the desired calibration cartridge (special red key) onto the programmer post, the following screens will appear temporarily:



Press any key, display will show followed by next screen:



Press MENU twice, following screen will show:



After procedure is completed, ensure engine idle speed with engine hot is 1700 - 2100 RPM.

Stop the engine.

DUCATI TRIGGER COIL CDI SYSTEM TESTING

Skandic WT/SWT/SUV 550

IGNITION SYSTEM TESTING SEQUENCE

In case of ignition problems, check the following in the prescribed order until the problem can be solved.

1. Sparking/spark plug condition.
2. Electrical connectors.

Section 06 ELECTRICAL

Subsection 06 (TESTING PROCEDURE)

3. Ignition switch, DESS switch or tether cord switch and engine cut-out switch.
4. Ignition generator coil.
5. Trigger coil.

LIGHTING SYSTEM TESTING SEQUENCE

1. Electrical connectors.
2. Magneto output (lighting generator coil).

Testing Conditions

Voltage measurements are always taken upon starting the vehicle. Readings taken when the engine is running will be higher than indicated range. Part temperature must be approximately 20°C (68°F) (room temperature), otherwise readings could be distorted.

Analysis of Readings

Voltage Readings

When testing the different magneto components, it is important to take into consideration that readings vary according to the force applied onto the manual starter. It is therefore important to use enough force upon each trial.

Doing 3 trials, the readings must each time be within or above the range indicated in the corresponding table. If the reading is too low, the part is considered to be defective and it must be replaced.

Resistance Readings

Place multimeter selector switch to Ω in order to measure resistance. Readings must be within the indicated range. Otherwise, the part is considered to be defective and must be replaced.

CAUTION: When taking measurements, it is useless to try to start the vehicle since readings would then be distorted.

Intermittent Ignition Problems

It is difficult to make a diagnostic in the case of intermittent ignition problems. Thus, problems occurring only when the engine operating temperature is normal must be checked in similar conditions.

In most cases when problems are caused by temperature or vibrations, these can only be solved by replacing parts. Most problems cannot be detected when the engine is stopped.

Multiple Problems

As a matter of fact, more than one component can be defective. As a result, if the problem remains although a part was replaced, start over the whole verification from the beginning in order to identify the other defective component.

1. SPARKING

During this operation, it is important to use the snowmobile spark plug and not a new one. Bring the plug in contact with the engine. If no spark is produced, replace the spark plug with a new one and do the test again.

2. ELECTRICAL CONNECTOR TESTING

Make sure that none of the connectors are disconnected.

3. IGNITION SWITCH, TETHER CORD SWITCH AND ENGINE CUT-OUT SWITCH TESTING

Disconnect connector housing 2-01 from engine, and using a multimeter, check resistance as indicated in IGNITION table.

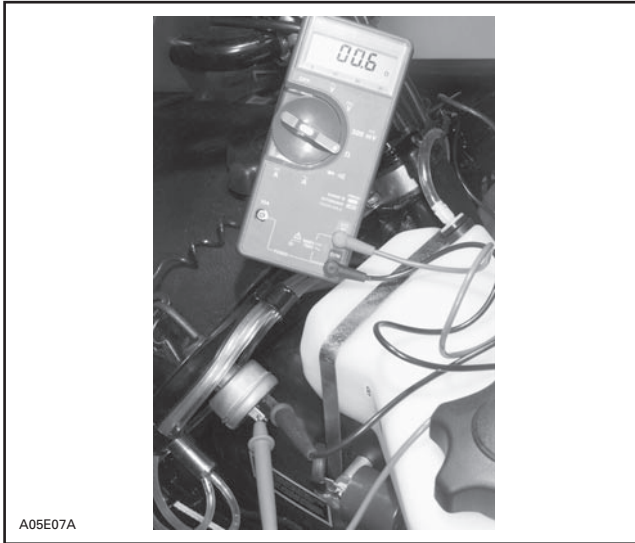


If readings are acceptable, go on to next step.

If readings are inadequate, individually check each switch as follows.

Ignition Switch (key)

Disconnect switch housing. Using a multimeter, check between **MAG** and **GRD** terminals if the circuit is open ($0.L_{M\Omega}$) in operating position and if the circuit is closed (0_{Ω}) in off position.



TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

Engine Cut-Out Switch

Unplug switch block connected to main wiring harness. Check using a multimeter. Connect probes to 6-02-C-M and 6-02-D-M terminals. The multimeter should indicate an open circuit ($0.L_{M\Omega}$) in operating position and a closed circuit (0_{Ω}) in off position.



TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

Tether Cord Switch

Unplug switch block connected to main wiring harness. Check using a multimeter by connecting probes to 6-03-B-M and 6-03-A-M wires. The multimeter should indicate an open circuit ($0.L_{M\Omega}$) in operating position and a closed circuit (0_{Ω}) in off position.



TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

If none of these verifications are conclusive, the problem finds its source in the main wiring harness. Proceed as follows:

NOTE: For this next step, no stop switch must be connected to the main wiring harness.

Disconnect all stop switches from the main wiring harness and check the continuity of each wire by connecting probes to the end of wires of the same color. Repeat with all other wires. It is important to mention that all wires of the same color within a given harness are connected together. These wires should therefore have a closed circuit. On the other hand, **BLACK** and **BLACK/YELLOW** wires must have an open circuit ($0.L_{M\Omega}$).

Repair or replace if necessary.

Section 06 ELECTRICAL

Subsection 06 (TESTING PROCEDURE)

4. IGNITION GENERATOR COIL VOLTAGE TESTING

General

When manually starting the engine while the spark plug is installed, the engine will tend to accelerate beyond the compression point. This will result in higher magneto output power.

1. Disconnect the 4-wire housing between the ignition module and the magneto wiring harness (4-02).
2. Connect multimeter probes to GREEN and WHITE wires (female end), then bring selector to \checkmark and scale to 00.0^{VAC}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.



5. Compare readings with those appearing in the IGNITION table.

5. TRIGGER COIL VOLTAGE TESTING

1. Disconnect 4-wire housing between the ignition module and the engine (4-02).
2. Connect multimeter probes to RED/WHITE wire (female side) and to the engine, then bring selector switch to \checkmark and scale to 00.0^{VAC}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

CONCLUSION

If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance column of the IGNITION table.

Set the multimeter as indicated.

LIGHTING GENERATOR COIL VOLTAGE TESTING

NOTE: The lighting generator coil is not part of the ignition system. It is a self-contained system used to supply current to the lighting system and to other devices working on alternating current. However, this system can be tested using a multimeter.

1. Disconnect housing from engine (2-01).
2. Connect multimeter wires to YELLOW and YELLOW/BLACK wires (female side), then place selector switch to \checkmark and scale to 0.00^{VAC}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.



5. Compare readings with those appearing in the LIGHTING table.

CONCLUSION

If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance column of the LIGHTING table.

Set the multimeter as indicated.

Section 06 ELECTRICAL
Subsection 06 (TESTING PROCEDURE)

IGNITION SYSTEM TESTING (Skandic WT/SWT)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (ohms)	MULTIMETER SCALE	VALUE (volts)	MULTIMETER SCALE	
Stop switch	Running insulation	BK and BK/YL	0.L	00.0 $M\Omega$	—	—	All switches must be in run position.
	Continuity in stop position	BK and BK/YL	00.0 - 00.5	00.0 Ω	—	—	At least one stop switch must be operational.
Ignition generator coil	Output	WH and GN	230.0 - 330.0	00.0 Ω	30.0 - 60.0	00.0 ^{VAC}	All switches must be in run position.
	Ground continuity	WH and engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil	Continuity	RD/WH and engine	140.0 - 180.0	00.0 Ω	2.0 - 9.0	00.0 ^{VAC}	
Ignition module and high voltage coil	Secondary winding resistance with caps	—	13.1 K - 18.3 K	00.0 $K\Omega$	CAUTION: Do not measure high voltage coil output voltage.		
High voltage coil	Secondary winding resistance with caps	Spark plug cap Spark plug cap	8.90 K - 13.1 K	00.0 $K\Omega$	CAUTION: Do not measure high voltage coil output voltage.		
	Secondary winding resistance without caps	BK BK	0.90 K - 1.10 K	00.0 $K\Omega$	CAUTION: Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK engine	—	—	.100 - .250	0.00 ^{VAC}	The measurement must be taken on the spark plug cable (without the spark plug).
Spark plug cap	Cap resistance	—	4.0 K - 6.0 K	00.0 $K\Omega$	—	—	—

NOTE: Stop switches include the ignition switch, the tether cord switch and the engine cut-out switch. It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications. It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

Section 06 ELECTRICAL

Subsection 06 (TESTING PROCEDURE)

LIGHTING SYSTEM TESTING (Skandic WT/SWT)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (ohms)	MULTIMETER SCALE	VALUE (volts)	MULTIMETER SCALE	
Lighting generator coil	Power	YL and YL/BK	0.05 - 0.6	00.0 Ω	2.5 - 7.0	00.0 ^{VAC}	—
	Insulation	YL and engine	0.L	00.0 $M\Omega$	—	—	—
	Ground continuity	BK engine	00.0 - 00.5	00.0 $M\Omega$	—	—	—

NOTE: Stop switches include the ignition switch, the tether cord switch and the engine cut-out switch. It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

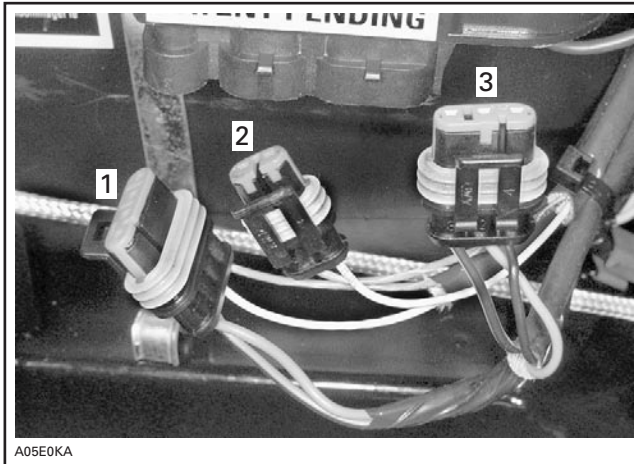
Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

RER DUAL TRIGGER COIL CDI SYSTEM TESTING

Tundra R and Skandic LT/LT E



MPEM

1. Reverse switch, reverse indicator and trigger coil
2. Trigger coil
3. Generator output and cut-off switches

IGNITION SYSTEM TESTING SEQUENCE

In case of ignition problems, check the following in the prescribed order until the problem can be solved.

1. Sparking/spark plug condition.
2. Electrical connectors.
3. Ignition switch, tether cord cap and engine cut-out switch.
4. Ignition coil output.
5. Trigger coil output.

NOTE: Refer to DUCATI CDI SYSTEM TESTING and appropriate model IGNITION SYSTEM TESTING TABLE at the end of this chapter for complete detailed testing procedure.

LIGHTING SYSTEM TESTING SEQUENCE

1. Electrical connectors.
2. Magneto output (lighting generator coil).

NOTE: Refer to DUCATI CDI SYSTEM TESTING and appropriate model LIGHTING SYSTEM TESTING TABLE at the end of this chapter for complete detailed testing procedure.

Testing Conditions

Voltage measurements are always taken upon starting the vehicle. Readings taken when the engine is running will be higher than indicated range.

Part temperature must be approximately 21°C (70°F) (room temperature), otherwise readings could be distorted.

Analysis of Readings

Voltage Readings

When testing the different magneto components, it is important to take into consideration that readings vary according to the force applied onto the manual starter. It is therefore important to employ enough force upon each trial.

Doing 3 trials, the readings must each time be within or above the range indicated in the corresponding table. If the reading is too low, the part is considered to be defective and it must be replaced.

Resistance Readings

Place multimeter selector switch to Ω in order to measure resistance. Readings must be within the indicated range. Otherwise, the part is considered to be defective and must be replaced.

CAUTION: When taking measurements, it is useless to try to start the vehicle since readings would then be distorted.

Intermittent Ignition Problems

It is difficult to make a diagnostic in the case of intermittent ignition problems. Thus, problems occurring only when the engine operating temperature is normal must be checked in similar conditions.

In most cases when problems are caused by temperature or vibrations, these can only be solved by replacing parts. Most problems cannot be detected when the engine is stopped.

Multiple Problems

As a matter of fact, more than one component can be defective. As a result, if the problem remains although a part was replaced, start over the whole verification from the beginning in order to identify the other defective component.

Section 06 ELECTRICAL

Subsection 06 (TESTING PROCEDURE)

1. SPARKING

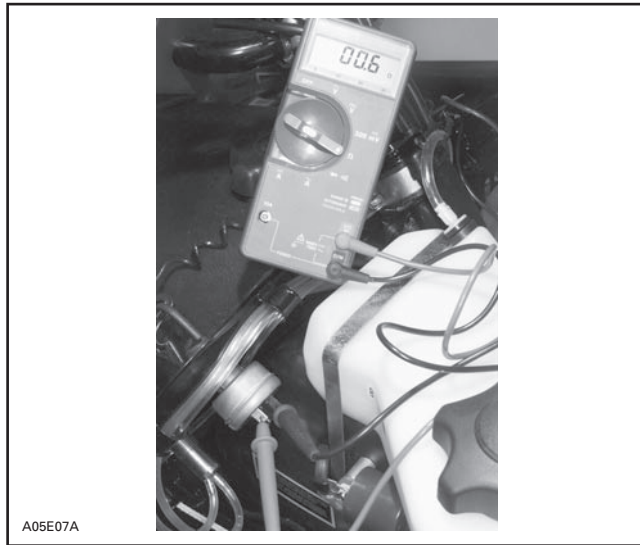
During this operation, it is important to use the snowmobile spark plug and not a new one. Bring the plug in contact with the engine. If no spark is produced, replace the spark plug with a new one and do the test again.

2. ELECTRICAL CONNECTOR TESTING

Make sure that none of the connectors are disconnected.

3. IGNITION SWITCH, TETHER CORD SWITCH AND ENGINE CUT-OUT SWITCH TESTING

Disconnect connector housing from engine, and using a multimeter, check resistance as indicated in IGNITION table.



A05E07A

TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

Engine Cut-Out Switch

Unplug switch block connected to main wiring harness. Check using a multimeter. Connect probes to terminals. The multimeter should indicate an open circuit ($0.L_{M\Omega}$) in operating position and a closed circuit (0_{Ω}) in off position.



A05E08A

TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.



A03E11A

If readings are acceptable, go on to next step.

If readings are inadequate, individually check each switch as follows.

Ignition Switch (key)

Disconnect switch housing. Using a multimeter, check between **MAG** and **GRD** terminals if the circuit is open ($0.L_{M\Omega}$) in operating position and if the circuit is closed (0_{Ω}) in off position.

Tether Cord Switch

Unplug switch block connected to main wiring harness. Check using a multimeter by connecting probes to wires. The multimeter should indicate an open circuit ($0.L_{M\Omega}$) in operating position and a closed circuit (0_{Ω}) in off position.



TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

If none of these verifications are conclusive, the problem finds its source in the main wiring harness. Proceed as follows:

NOTE: For this next step, no stop switch must be connected to the main wiring harness.

Disconnect all stop switches from the main wiring harness and check the continuity of each wire by connecting probes to the end of wires of the same color. Repeat with all other wires. It is important to mention that all wires of the same color within a given harness are connected together. These wires should therefore have a closed circuit. On the other hand, BLACK and BLACK/YELLOW wires must have an open circuit ($0.L_{M\Omega}$).

Repair or replace if necessary.

4. IGNITION GENERATOR COIL VOLTAGE TESTING

General

When manually starting the engine while the spark plug is installed, the engine will tend to accelerate beyond the compression point. This will result in higher magneto output power.

1. Disconnect the 3-wire housing between the ignition module and the magneto wiring harness (4-DB).
2. Connect multimeter probes to RED and BLACK wires (female end), then bring selector to \checkmark and scale to 00.0^{VAC} .
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

5. TRIGGER COIL VOLTAGE TESTING

1. Disconnect 4-wire housing (4-DA) and 2-wire housing (4-DC) between the ignition module and the engine.
2. Connect multimeter probes to BLUE/YELLOW wire and to WHITE/YELLOW wire, then bring selector switch to \checkmark and scale to 00.0^{VAC} .
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

Section 06 ELECTRICAL

Subsection 06 (TESTING PROCEDURE)

BUZZER TESTING

Using jumper wires, connect battery positive post to buzzer positive tab.

Connect battery negative post to buzzer negative tab.

CAUTION: To avoid buzzer damage, ensure that polarity is respected.

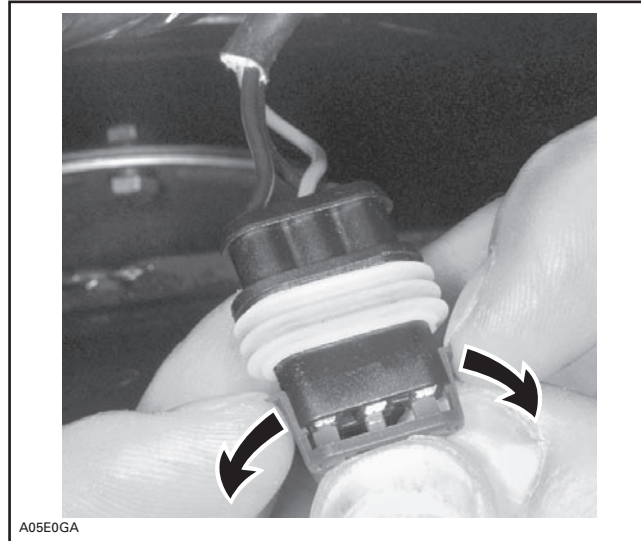


12-VOLT BATTERY PLUGGED TO BUZZER

MPEM CONNECTORS

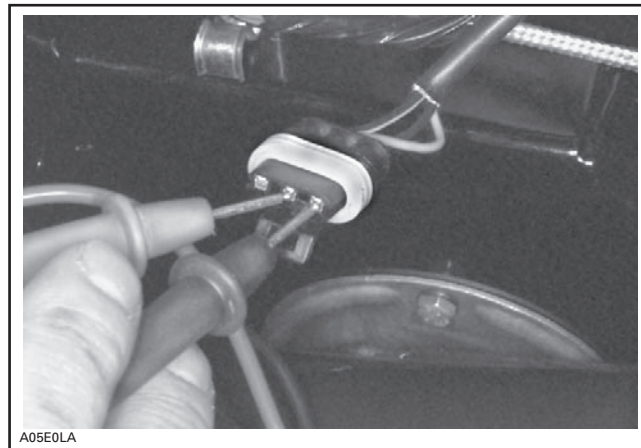
To ease electrical readings on MPEM connectors, connector cap must be removed.

Hold connector in hands then lift both tabs to remove connector cap.



LIFT TABS TO REMOVE CAP

Insert multimeter probes into connector.



TEST USING MULTIMETER PROBES

Section 06 ELECTRICAL
Subsection 06 (TESTING PROCEDURE)

IGNITION SYSTEM TESTING (Tundra R 240 W)								
PART	TEST TO BE PERFORMED	WIRE COLOR	MULTIMETER PROBE CONNECTION	RESISTANCE Ω		VOLTAGE V		NOTE
				VALUE (ohms)	MULTIMETER SCALE	VALUE (volts)	MULTIMETER SCALE	
Stop switch	Running insulation	BK BK/YL	4-MOC-M 4-MOA-M	0.L	00.0 _{MΩ}	—	—	No stop switch must be operational.
	Continuity in STOP position	BK BK/YL	4-MOC-M 4-MOA-M	00.0 - 00.5	00.0 _Ω	—	—	Only one stop switch must be operational. Test them one after the other.
Ignition generator coil	Output	RD BK	4-DB-1-F 4-DB-2-F	4.5 - 6.5	00.0 _Ω	7.0 - 15.0	00.0 _{VAC}	—
	Ground continuity	BK engine	4-DB-2-F engine	00.0 - 00.5	00.0 _Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil	Front	WH/YL BU/YL	4-DC-2-F 4-DC-1-F	160 -180	00.0 _Ω	.100 - .300	.000 _{VAC}	—
	Rear	WH/YL BU/YL	4-DA-4-F 4-DA-3-F	160 -180	00.0 _Ω	.100 - .300	.000 _{VAC}	—
MPEM and high voltage coil	Secondary winding resistance with caps	Spark plugcap engine	In spark plug cap and on the engine	4.90 K - 7.10 K	0.00 _{KΩ}	CAUTION: Do not measure high voltage coil output voltage.		
	Secondary winding resistance without caps	BK engine	Inside spark plug cable and on the engine	0.90 K - 1.10 K	0.00 _{KΩ}	CAUTION: Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK engine	On spark plug cable housing and on the engine	—	—	.150 - .350	.000 _{VAC}	The measurement must be taken on the spark plug cable (without the spark plug).
Spark plug cap	Cap resistance	—	Spark plug side and cable side	4.0 K - 6.0 K	00.0 _{KΩ}	—	—	—

NOTE: Stop switches include the ignition switch, the tether cord switch and the engine cut-out switch. It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications. It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

Section 06 ELECTRICAL

Subsection 06 (TESTING PROCEDURE)

LIGHTING SYSTEM TESTING (Tundra R 240 W)								
PART	TEST TO BE PERFORMED	WIRE COLOR	MULTIMETER PROBE CONNECTION	RESISTANCE Ω		VOLTAGE V		NOTE
				VALUE (ohms)	MULTIMETER SCALE	VALUE (volts)	MULTIMETER SCALE	
Lighting generator coil	Power	YL YL	4-MOB-F 4-MOA-F	00.0 - 00.6	00.0 Ω	3.0 - 7.0	00.0 ^{VAC}	—
	Insulation	YL engine	4-MO (A,B)-F engine	0.L	00.0 $M\Omega$	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
	Ground continuity	BK engine	4-MOC-F engine	00.0 - 00.5	00.0 Ω	—	—	—

NOTE: It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications. It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

Section 06 ELECTRICAL
Subsection 06 (TESTING PROCEDURE)

IGNITION SYSTEM TESTING (Skandic LT/LT E with RER 240 W)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (ohms)	MULTIMETER SCALE	VALUE (volts)	MULTIMETER SCALE	
Stop switch	Running insulation	BK BK/YL	0.L	00.0 $M\Omega$	—	—	All switches must be in run position.
	Continuity in STOP position	BK BK/YL	00.0 - 00.5	00.0 Ω	—	—	Only one stop switch must be in stop position. Test them one after the other.
Ignition generator coil	Output	RD BK	4.5 - 6.5	00.0 Ω	7.0 - 15.0	00.0 V_{AC}	—
	Ground continuity	BK engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Front trigger coil	Resistance and output	WH/YL BL/YL	160 - 180	00.0 Ω	.150 - .350	.000 V_{AC}	—
Rear trigger coil	Resistance and output	WH/YL BL/YL	160 - 180	00.0 Ω	.150 - .350	.000 V_{AC}	—
MPEM and high voltage coil	Secondary winding resistance with caps	Sparkplug cap Sparkplug cap	8.90 K - 13.1 K	00.0 $k\Omega$	CAUTION: Do not measure high voltage coil output voltage.		
	Secondary winding resistance without caps	BK BK	0.90 K - 1.10 K	00.0 $k\Omega$	CAUTION: Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK engine	—	—	.100 - .250	0.00 V_{AC}	The measurement must be taken on the spark plug cable (without the spark plug).
Spark plug cap	Cap resistance	—	4.0 K - 6.0 K	00.0 $k\Omega$	—	—	—

NOTE: Stop switches include the ignition switch, the tether cord switch and the engine cut-out switch. It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

Section 06 ELECTRICAL

Subsection 06 (TESTING PROCEDURE)

LIGHTING SYSTEM TESTING (Skandic LT/LT E with RER 240 W)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (ohms)	MULTIMETER SCALE	VALUE (volts)	MULTIMETER SCALE	
Lighting generator coil	Power	YL YL/BK	00.0 - 00.6	00.0 Ω	3.0 - 7.0	00.0 ^{VAC}	—
	Insulation	YL engine	0.L	00.0 $M\Omega$	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
	Ground continuity	BK engine	00.0 - 00.5	00.0 Ω	—	—	

NOTE: It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

NIPPONDENSO CDI SYSTEM TESTING

593 on Skandic WT LC/SUV

IGNITION SYSTEM TESTING (Skandic WT LC/SUV 290 W)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (ohms)	MULTIMETER SCALE	VALUE (volts)	MULTIMETER SCALE	
Stop switches	Running insulation	BK and BK/YL	0.L	00.0 $M\Omega$	—	—	All switches must be in run position.
	Continuity in stop position	BK and BK/YL	00.0 - 00.5	00.0 Ω	—	—	Only one stop switch must be in stop position. Test one at a time.
	Insulation in stop position	BK/GN and BK/WH	0.L	00.0 $M\Omega$	—	—	Tether cord cap must be off.
	Running continuity	BK/GN and BK/WH	00.0 - 00.5	00.0 Ω	—	—	Tether cord cap must be in place.
Ignition generator coil	Output	RD and BK/RD	11.6 - 21.6	00.0 Ω	15.0 - 30.0	00.0 ^{VAC}	—
	Coil insulation	RD and BK	0.L	00.0 $M\Omega$	—	—	—
	Ground continuity	BK and engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil	Resistance and output	WH/YL and BL/YL	190 - 300	00.0 Ω	.200 - .350	.000 ^{VAC}	—
MPEM	Output voltage	WH/BL and BK	—	—	25.0 - 100.0	00.0 ^{VAC}	All switches must be in run position.
High voltage coil	Primary winding resistance	WH/BL and BK	00.0 - 00.9	00.0 Ω	—	—	—
	Secondary winding resistance (spark plug cap and Spark plug cap included)	Spark plug cap and Spark plug cap	19.5 K - 26.5 K	00.0 $K\Omega$	CAUTION: Do not measure high voltage coil output voltage.		
	Secondary winding resistance (without spark plug cap)	BK and BK	9.6 K - 14.4 K	00.0 $K\Omega$	CAUTION: Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK and engine	—	—	0.1 - 1.4	0.00 ^{VAC}	The measurement must be taken on the spark plug wire (without the spark plug).
	Insulation	Spark plug cap and BK	0.L	00.0 $M\Omega$	—	—	—
Spark plug cap	Cap resistance	—	4.0 K - 6.0 K	00.0 $K\Omega$	—	—	—

NOTE: Stop switches include the ignition switch and the engine cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications. It is important to resume all test when replacing a component.

If not specified, the probe connecting sequence is not important.

Section 06 ELECTRICAL

Subsection 06 (TESTING PROCEDURE)

LIGHTING SYSTEM TESTING (Skandic WT LC/SUV 290 W)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (ohms)	MULTIMETER SCALE	VALUE (volts)	MULTIMETER SCALE	
Lighting generator coil	Output	YL and YL	00.1 - 00.4	00.0 Ω	0.5 - 2.0	00.0 ^{VAC}	—
	Coil insulation	YL and engine	0.L	00.0 $M\Omega$	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
	Ground continuity	BK and engine	00.0 - 00.5	00.0 Ω	—	—	

NOTE: Stop switches include the ignition switch and the engine cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications. It is important to resume all test when replacing a component.

If not specified, the probe connecting sequence is not important.

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.

On models with hydraulic brake, pull off the rubber boot from brake light microswitch assembly.

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.

INSPECTION OF HEATING ELEMENTS

All Skandic Models

All measurements must be performed at 21°C (70°F).

Throttle Lever Heating Element

Current Measurement

HIGH INTENSITY	BROWN wire	0.23 A minimum
LOW INTENSITY	BROWN/YELLOW wire	0.13 A minimum

Handlebar Grip Heating Element

Resistance Measurement

LOW INTENSITY	YELLOW/BLACK wire ORANGE/VIOLET wire	17.7 to ① 20.7 ohms
HIGH INTENSITY	YELLOW/BLACK wire ORANGE wire	8.73 to ① 10.67 ohms

① When measuring resistance at terminals the actual value will be half the measurement in table. The reason for that is the elements are connected in parallel. Therefore the total resistance is half the resistance of one element.

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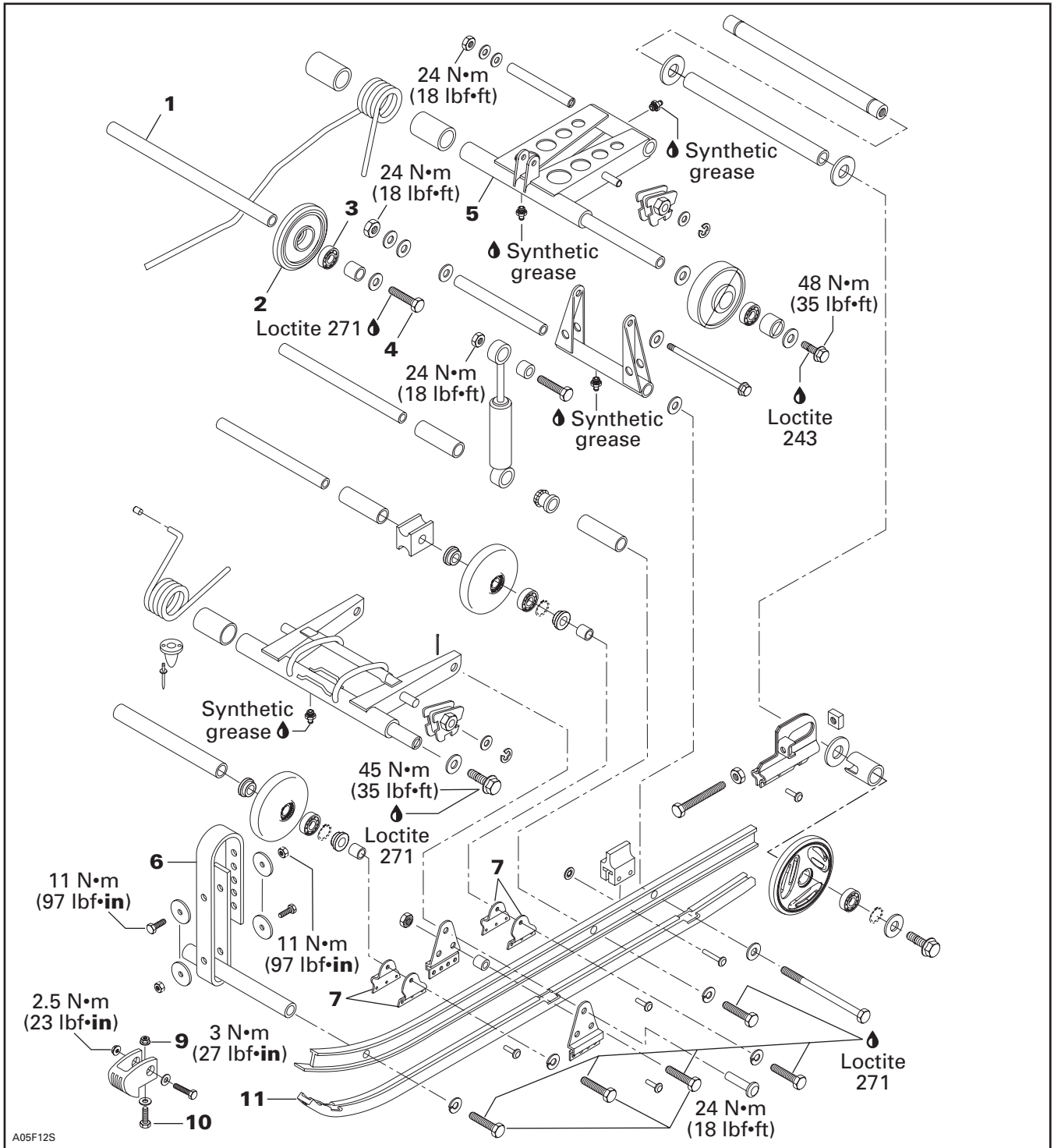
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TORQUE REACTION SUSPENSION

Tundra



Section 07 REAR SUSPENSION

Subsection 02 (TORQUE REACTION SUSPENSION)

COMPONENT REMOVAL

Lift rear of vehicle and support it off the ground.

5, Rear Arm

Release track tension.

Release spring tension. Unfasten shock from rear arm. Remove 3 screws retaining rear arm.

SUSPENSION ASS'Y REMOVAL

Release track tension.

NOTE: To prevent cross shaft from turning when unscrewing screws assembled with threadlocker, 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.

Suspension Ass'y

Lift rear of vehicle and support it off the ground.

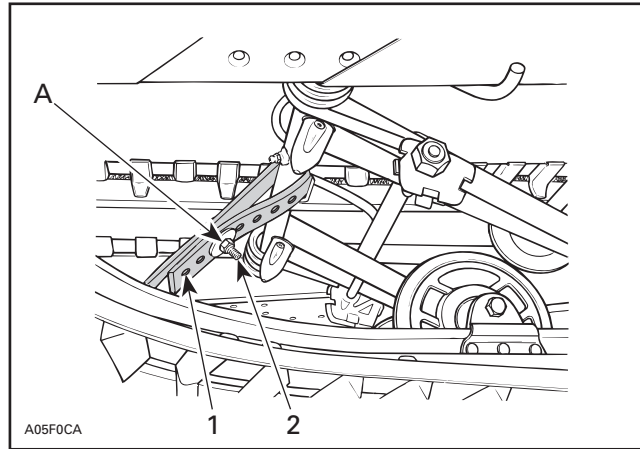
Unscrew 4 screws retaining front arm and rear arm to frame.

Remove suspension.

DISASSEMBLY AND ASSEMBLY

6, Stopper Strap

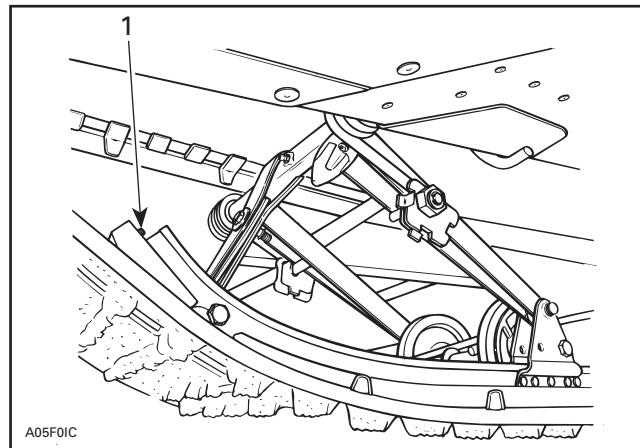
When assembling make sure it is attached through the 3rd hole from the end. Torque nut to 11 N•m (97 lbf•in).



1. 1st hole
2. 3rd hole
- A. 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.



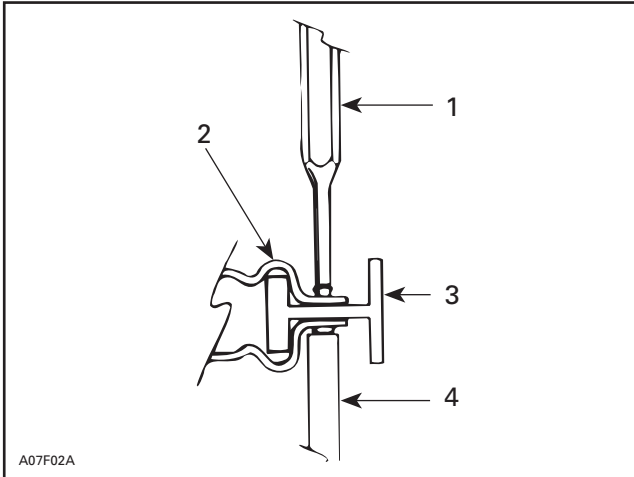
1. Front screw and nut

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.



- 1. Flat head punch
- 2. Support
- 3. Runner
- 4. Metal block

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.

INSPECTION

6, Stopper Strap

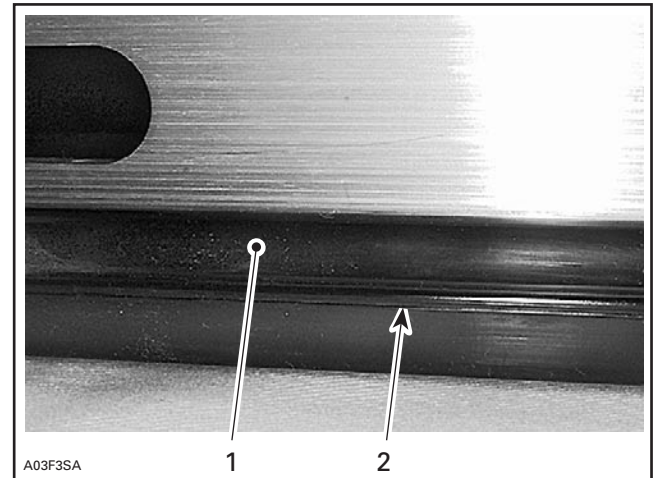
Inspect strap for wear or cracks, bolt and nut for tightness. If loose, inspect hole for deformation. Replace as required.

Shock Absorber

Refer to SUSPENSION AND SKI SYSTEM for shock inspection.

11, Slider Shoe

Molding line is the wear limit indicator.



TYPICAL

- 1. Slider shoe
- 2. Molding line (wear limit indicator)

Replace slider shoes when wear limit is reached.

CAUTION: Slider shoes must always be replaced in pairs.

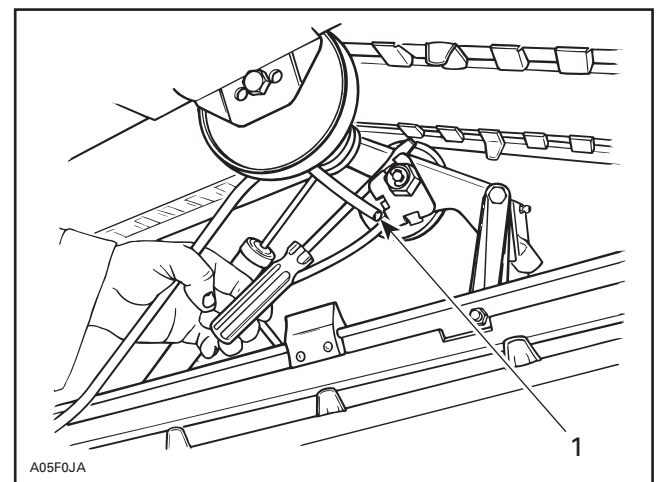
SUSPENSION ASS'Y INSTALLATION

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.



- 1. Spring end

Adjust track tension/alignment. Refer to TRACK.

Section 07 REAR SUSPENSION

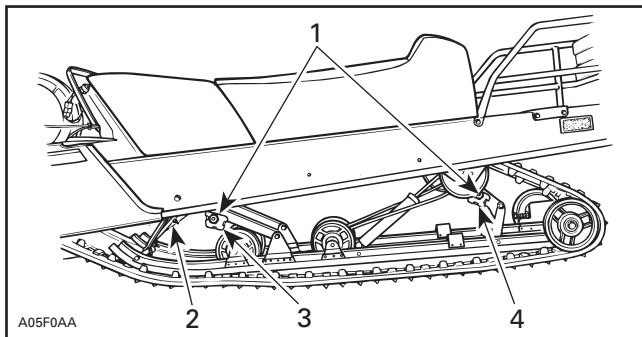
Subsection 02 (TORQUE REACTION SUSPENSION)

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.



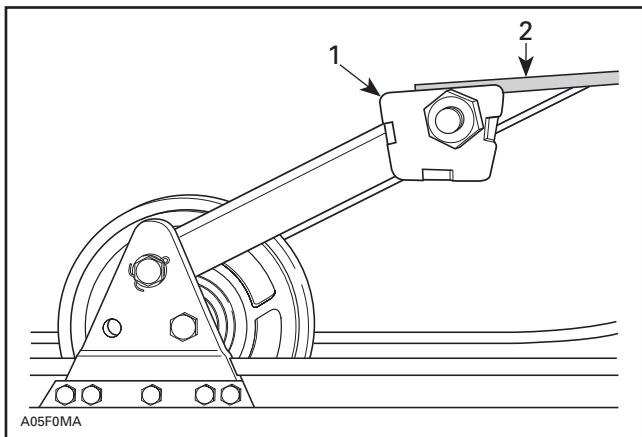
1. Driver's weight
2. Stopper strap for weight transfer
3. Steering effect/surface condition
4. Adjustment cams

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 with the adjustment cams, use special key supplied in vehicle tool box.

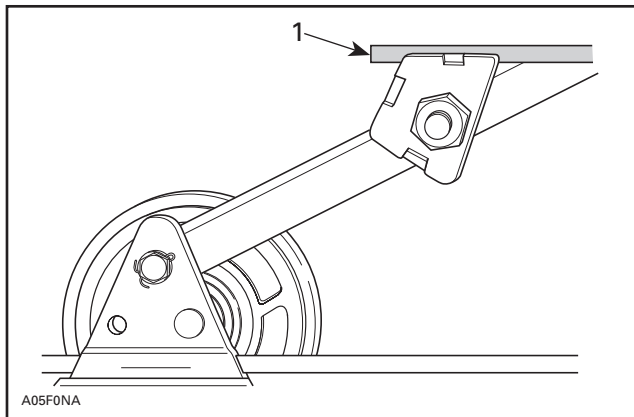
Turning adjustment cam moves edges of cam supporting spring rod. The softest adjustment is reached when the supporting edge of cam is the closest to hexagonal portion of cam.



SOFTEST ADJUSTMENT

1. Supporting edge closest to hexagonal
2. Spring

The stiffest adjustment is reached when the supporting edge of cam is the farthest to hexagonal portion of cam.

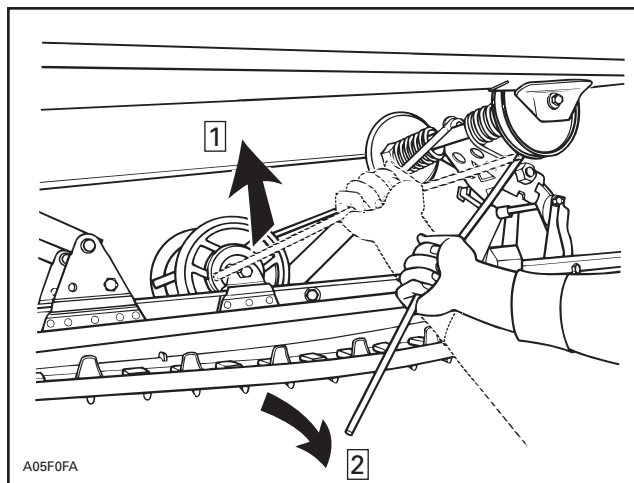


STIFFEST ADJUSTMENT

1. Supporting edge farthest to hexagonal

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.



- Turn adjustment cam by hand to the desired position.
- Reinstall spring on its support making sure that it sits in the groove of support.

Section 07 REAR SUSPENSION

Subsection 02 (TORQUE REACTION SUSPENSION)

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.

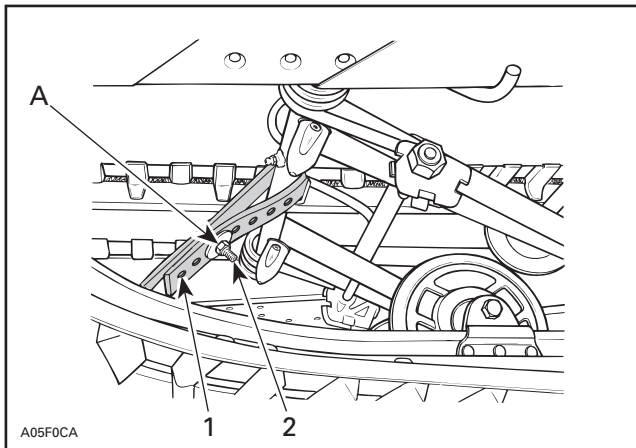
Adjusting holes on the stopper strap allow to adjust it according to driver's requirements, field and/or snow conditions.

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.



1. 1st hole
 2. 3rd hole
- A. 11 N•m (97 lbf•in)

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.

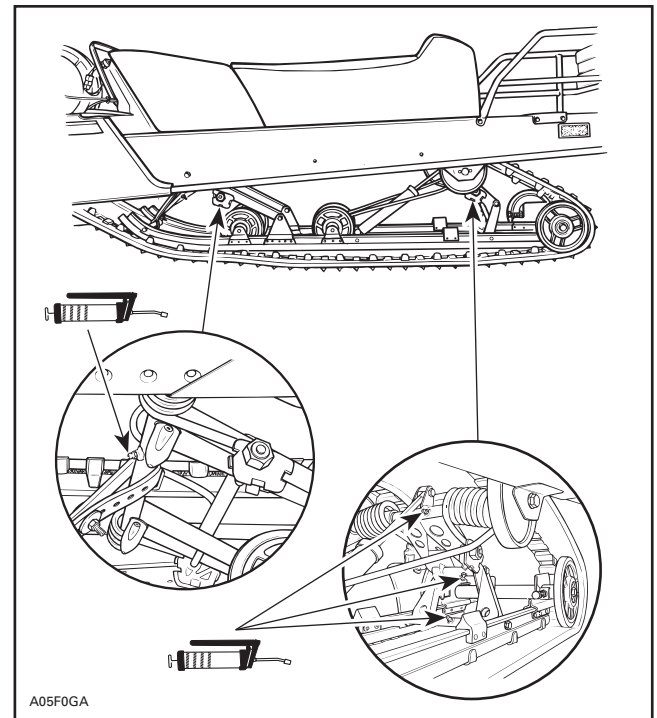
Deep Snow Operation

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

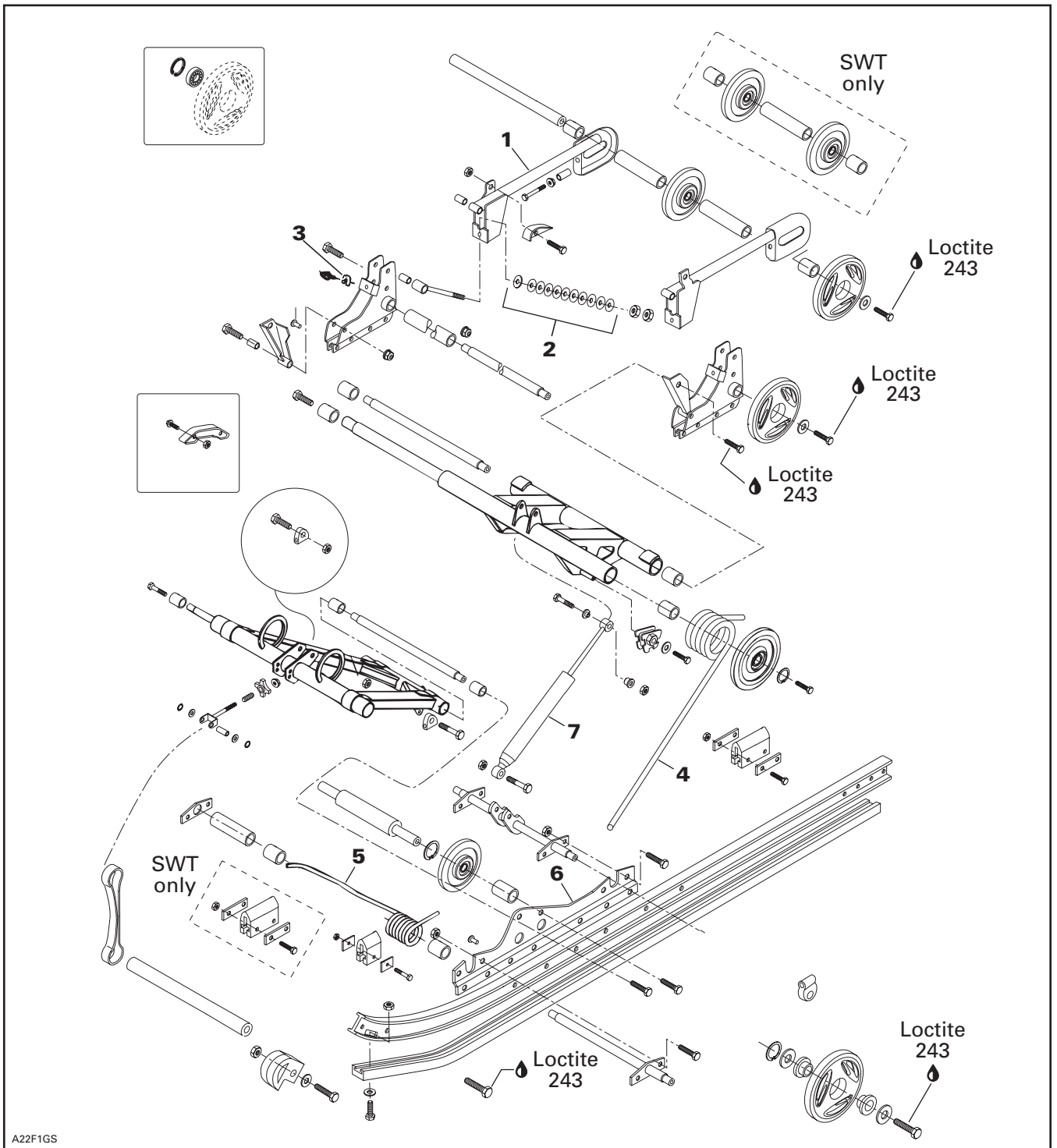
Lubricate front and rear arms at grease fittings using suspension synthetic grease (P/N 293 550 033).

NOTE: There are 4 grease fittings.



SKANDIC WT SUSPENSION

Skandic LT/WT/SWT/WT LC



TYPICAL

Section 07 REAR SUSPENSION

Subsection 03 (SKANDIC WT SUSPENSION)

REMOVAL

Release track tension.

Lift rear of vehicle and support it off the ground.

Unbolt front arm then rear arm.

Self-Locking Screws

CAUTION: These self-locking screws must always be replaced by new ones everytime they are removed.

NOTE: To prevent axle from turning when unscrewing self-locking screws, proceed as follows:

- Remove one self-locking screw then install a 10 mm shorter non-self-locking one in place. Torque as specified in exploded view.
- Remove the opposite self-locking screw.
- Remove the temporary installed non-self-locking screw.
- If it doesn't work, heat bolt head to melt thread-locker.

Remove suspension assembly.



DISASSEMBLY AND ASSEMBLY

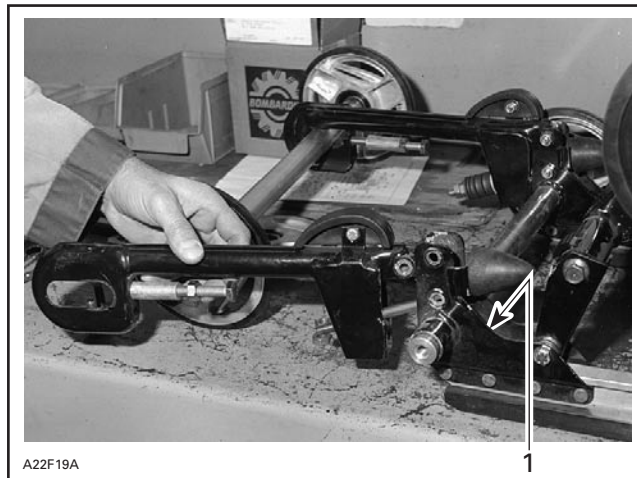
1, Extension

Remove nuts and conical washers from the eye bolt adjuster. Remove bolt retaining eye bolt adjuster to support.

Remove rear idler wheel on appropriate side.

Remove idler wheel from support.

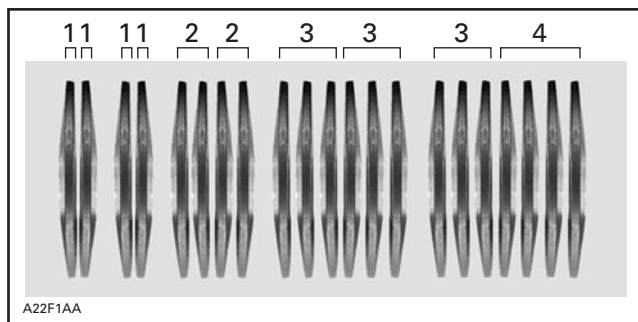
Unbolt extension from its support.



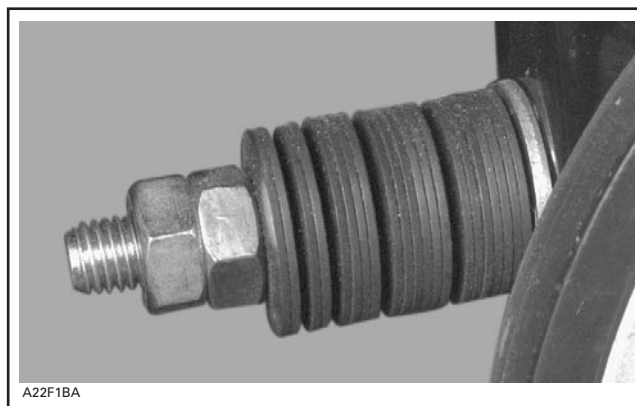
1. Support

2, Conical Washer

At installation, position conical washers as shown.



WASHER QUANTITY AND MOUNTING POSITION



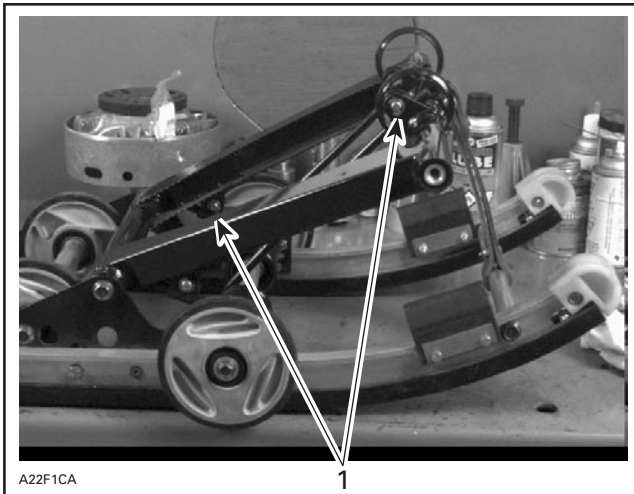
Tighten nut 3/4 turn after contacting washers for better deep snow performance. Maximum pre-load is 3 turns after nut touching washers. This last adjustment is for trail riding with or without a load and for pulling a load.

4, Rear Spring

Remove top idler wheels.
Unscrew one end of shock.
Remove spring.

5, Front Spring

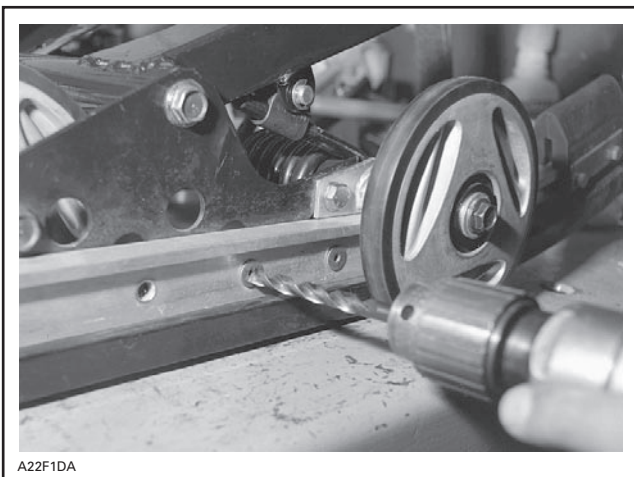
Remove circlips retaining spring support to top and bottom of front arm.
Holding spring end, remove lock pin of top spring support then bottom support lock pin.
Unbolt front idler wheel axle.
Remove idler wheel on side where axle retaining plate is not welded.
Remove springs.



1. Circlips

6, Support Plate

Drill rivets to remove support plate. Use a 8 mm (21/64 in) drill bit.



A22F1DA

Rivets can be substituted by M8 x 20 bolts and nuts.

3, Horse-Shoe Washer

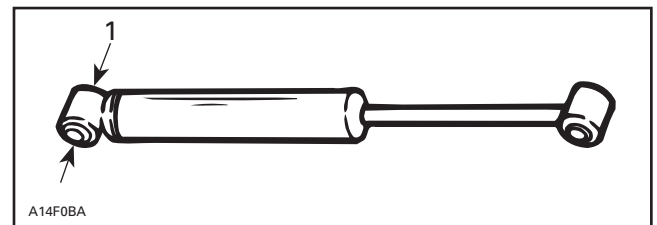
For deep snow riding, do not install washer.
For trail riding with passenger and/or weight, install 1 washer under each rubber stoppers.
For trail riding with heavy load and/or pulling a load, use 2 washers under each rubber stoppers.

7, Shock

Install shock with its rod upward.

SHOCK ABSORBER SERVICING

Secure the shock body end in a vise.



TYPICAL

1. Clamp

CAUTION: Do not clamp directly on shock body.

Examine each shock for leaks. Extend and compress the piston several times over its entire stroke then check that it moves smoothly and with uniform resistance.

Pay attention to the following conditions that will denote a faulty shock:

- A skip or a hang back when reversing stroke at mid travel.
- Seizing or binding condition except at extreme ends of stroke.
- Oil leakage.
- A gurgling noise, after completing one full compression and extension stroke.

Renew if any fault is present.

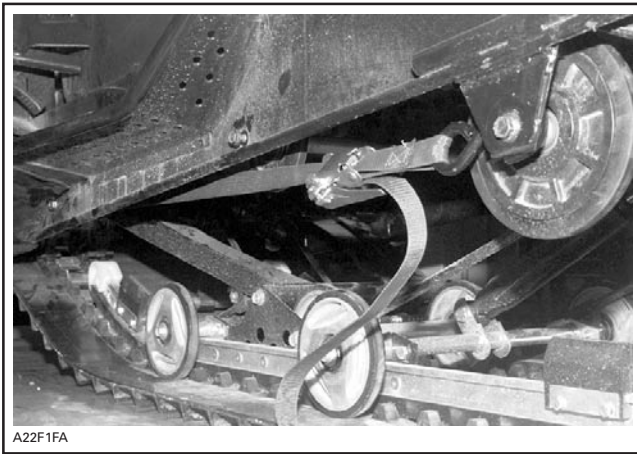
Section 07 REAR SUSPENSION

Subsection 03 (SKANDIC WT SUSPENSION)

INSTALLATION

Threaded holes must be cleaned before a self-locking screw is installed. Use a metal brush or a screwtap to clean the hole properly then use a solvent (Methyl-Chloride), let act during 30 minutes and wipe off. The solvent utilization is to ensure the adhesive works properly.

Use a tie-down between front arm and spring axle to ease installation of front arm screws.

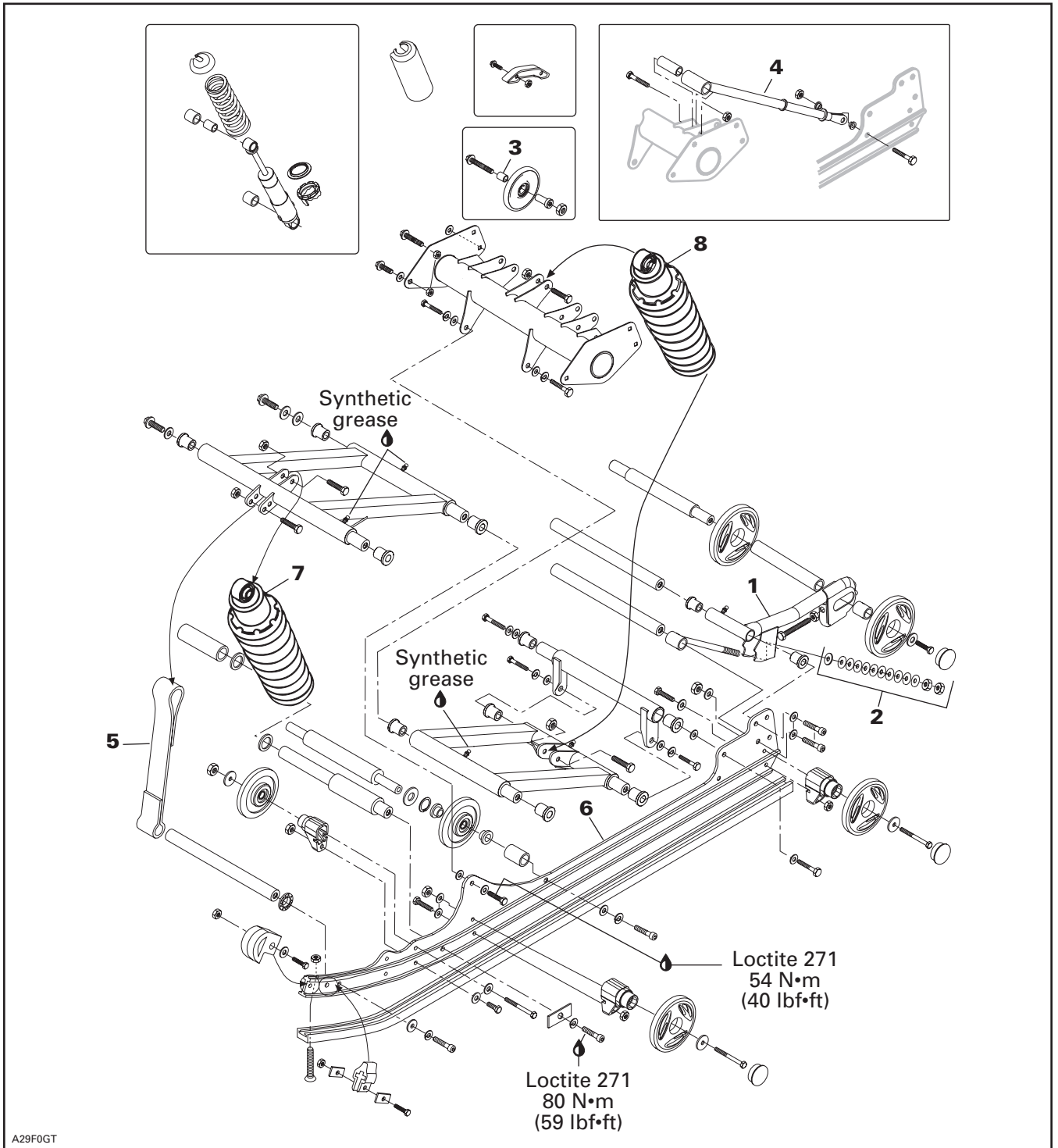


RIDE ADJUSTMENT

Refer to *Operator's Guide*.

SKANDIC SUV SUSPENSION

Skandic SUV



TYPICAL

Section 07 REAR SUSPENSION

Subsection 04 (SKANDIC SUV SUSPENSION)

REMOVAL

Release track tension.

Lift rear of vehicle and support it off the ground.

Unbolt front arm then rear arm.

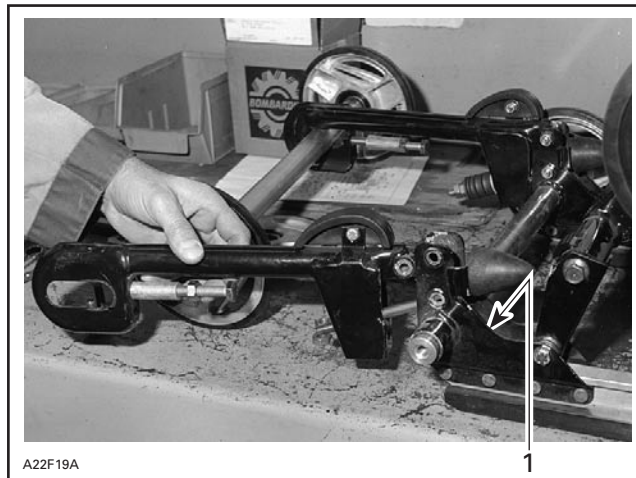
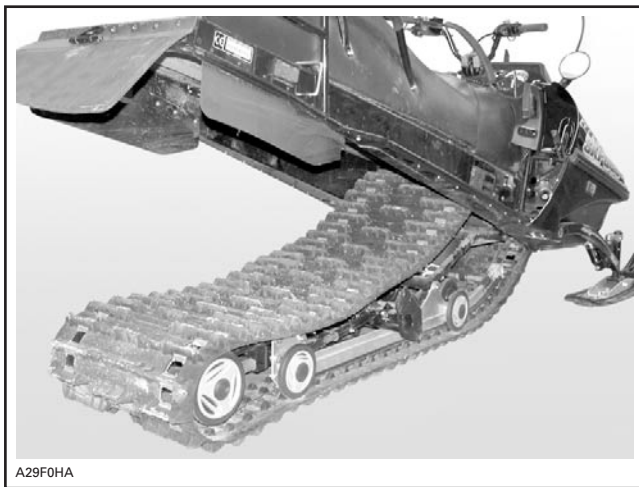
Self-Locking Screws

CAUTION: These self-locking screws must always be replaced by new ones every time they are removed.

NOTE: To prevent axle from turning when unscrewing self-locking screws, proceed as follows:

- Remove one self-locking screw then install a 10 mm shorter non-self-locking one in place. Torque as specified in exploded view.
- Remove the opposite self-locking screw.
- Remove the temporary installed non-self-locking screw.
- If it doesn't work, heat bolt head to melt thread-locker.

Remove suspension assembly.

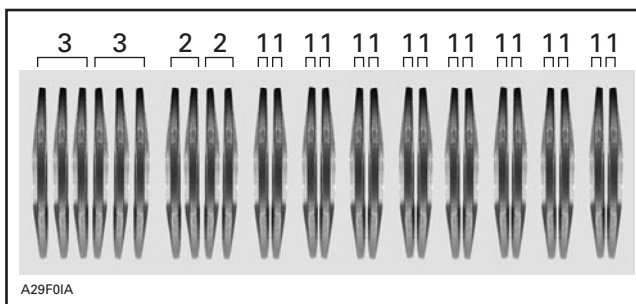


TYPICAL

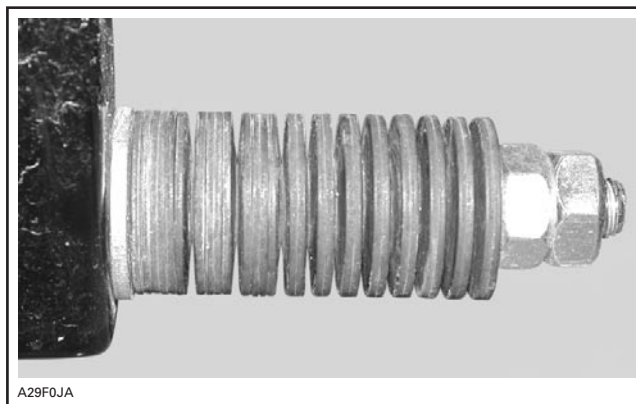
1. Support

2, Conical Washer

At installation, position conical washers as shown.



WASHER QUANTITY AND MOUNTING POSITION



Tighten nut 3/4 turn after contacting washers for better deep snow performance. Maximum pre-load is 3 turns after nut touching washers. This last adjustment is for trail riding with or without a load and for pulling a load.

DISASSEMBLY AND ASSEMBLY

1, Extension

Remove nuts and conical washers from the eye bolt adjuster. Remove bolt retaining eye bolt adjuster to support.

Remove rear idler wheel on appropriate side.

Remove idler wheel from support.

Unbolt extension from its support.

8, Rear Spring

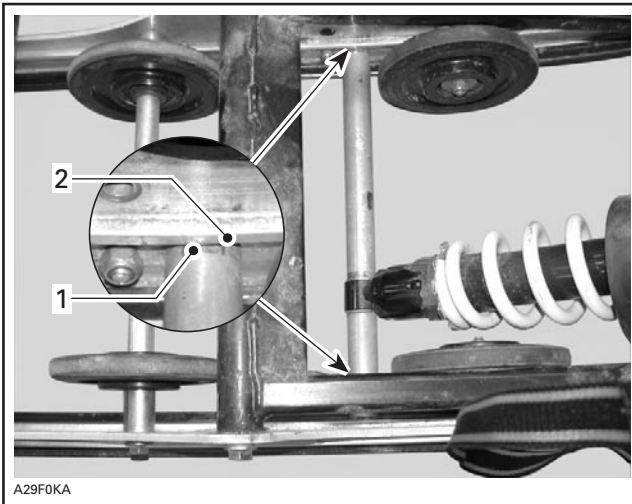
Unbolt top and bottom ends of shock.

7, Front Spring

Unbolt top end of shock.

Unbolt axle retaining bottom end of shock.

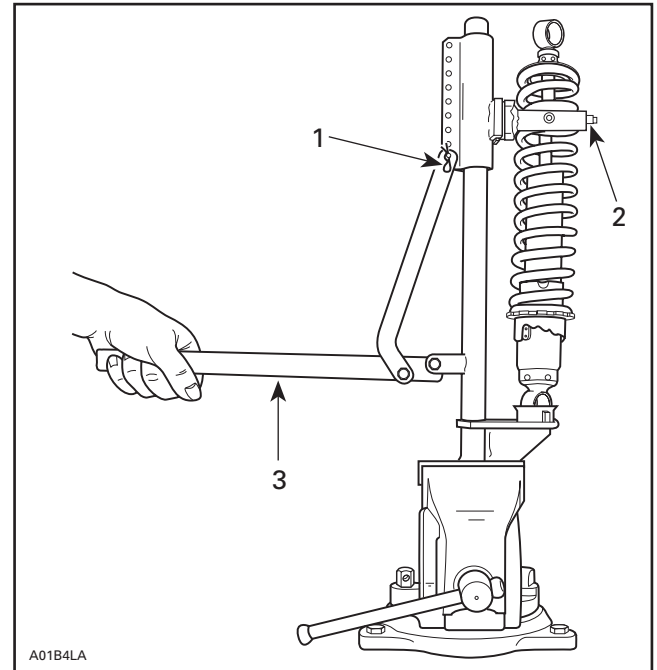
At assembly, make sure that notch on both axle sleeves match rail rib.



1. Notch
2. Rail rib

For shock spring disassembly use shock spring remover (P/N 529 035 504) in a vise. Mount shock in it and turn shock so that spring coils rests against spring compressor jaw.

Close and lock the bar. Place handle horizontally by changing the position of the clevis pin.

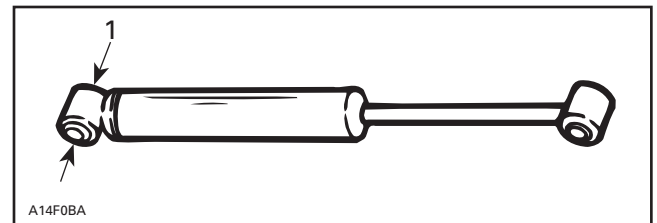


1. Clevis pin
2. Bar
3. Handle horizontal

Push down on the handle until it locks. Remove spring stopper then release handle.

SHOCK ABSORBER INSPECTION

Secure the shock body end in a vise.



TYPICAL

1. Clamp

CAUTION: Do not clamp directly on shock body.

Examine each shock for leaks. Extend and compress the piston several times over its entire stroke then check that it moves smoothly and with uniform resistance.

Pay attention to the following conditions that will denote a faulty shock:

Section 07 REAR SUSPENSION

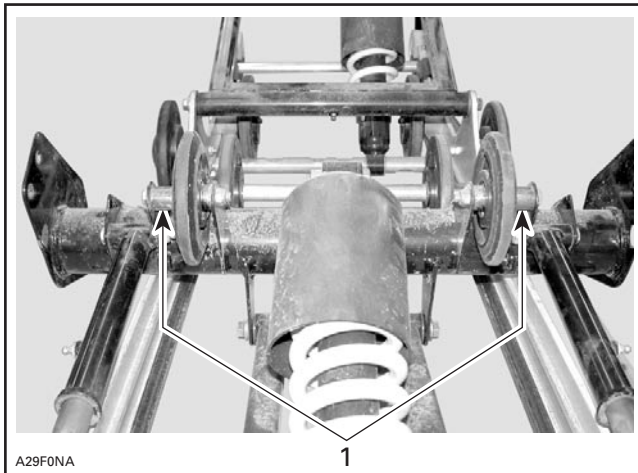
Subsection 04 (SKANDIC SUV SUSPENSION)

- A skip or a hang back when reversing stroke at mid travel.
- Seizing or binding condition except at extreme ends of stroke.
- Oil leakage.
- A gurgling noise, after completing one full compression and extension stroke.

Renew if any fault is present.

3, Spacer

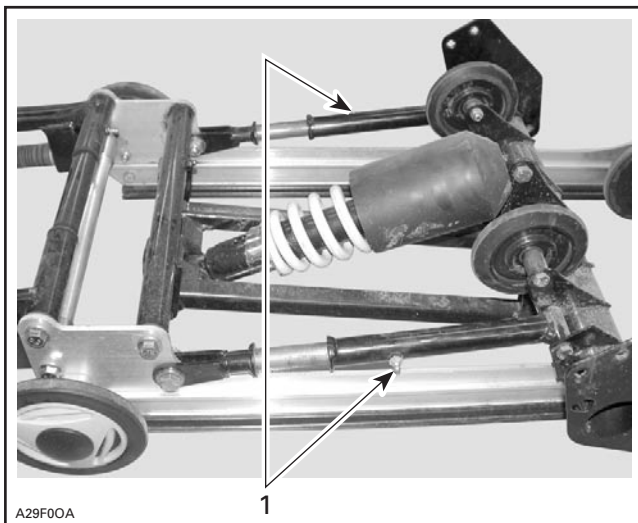
At assembly, install spacer on outer side of top idler wheel.



1. Spacers

4, Coupling Tube

At assembly, install coupling tube with its grease fitting facing outward.



1. Grease fitting facing outward

5, Stopper Strap

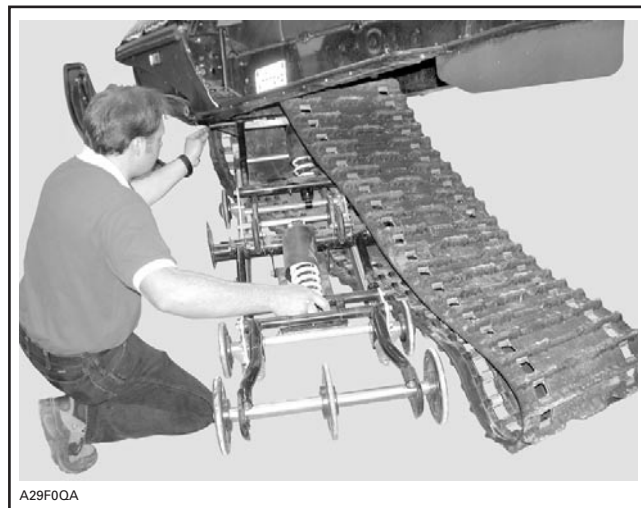
Fasten stopper strap to lower bracket hole.



INSTALLATION

Threaded holes must be cleaned before a self-locking screw is installed. Use a metal brush or a screwtap to clean the hole properly then use a solvent (Methyl-Chloride), let act during 30 minutes and wipe off. The solvent utilization is to ensure the adhesive works properly.

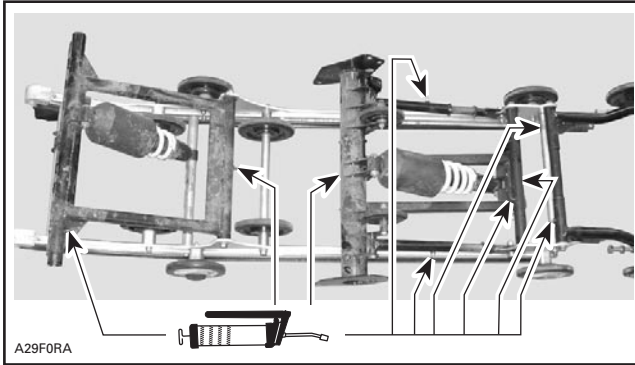
Install front portion of suspension first.



LUBRICATION

Lubricate front and rear arms at grease fittings using synthetic grease (P/N 413 711 500).

NOTE: There is 9 grease fittings.

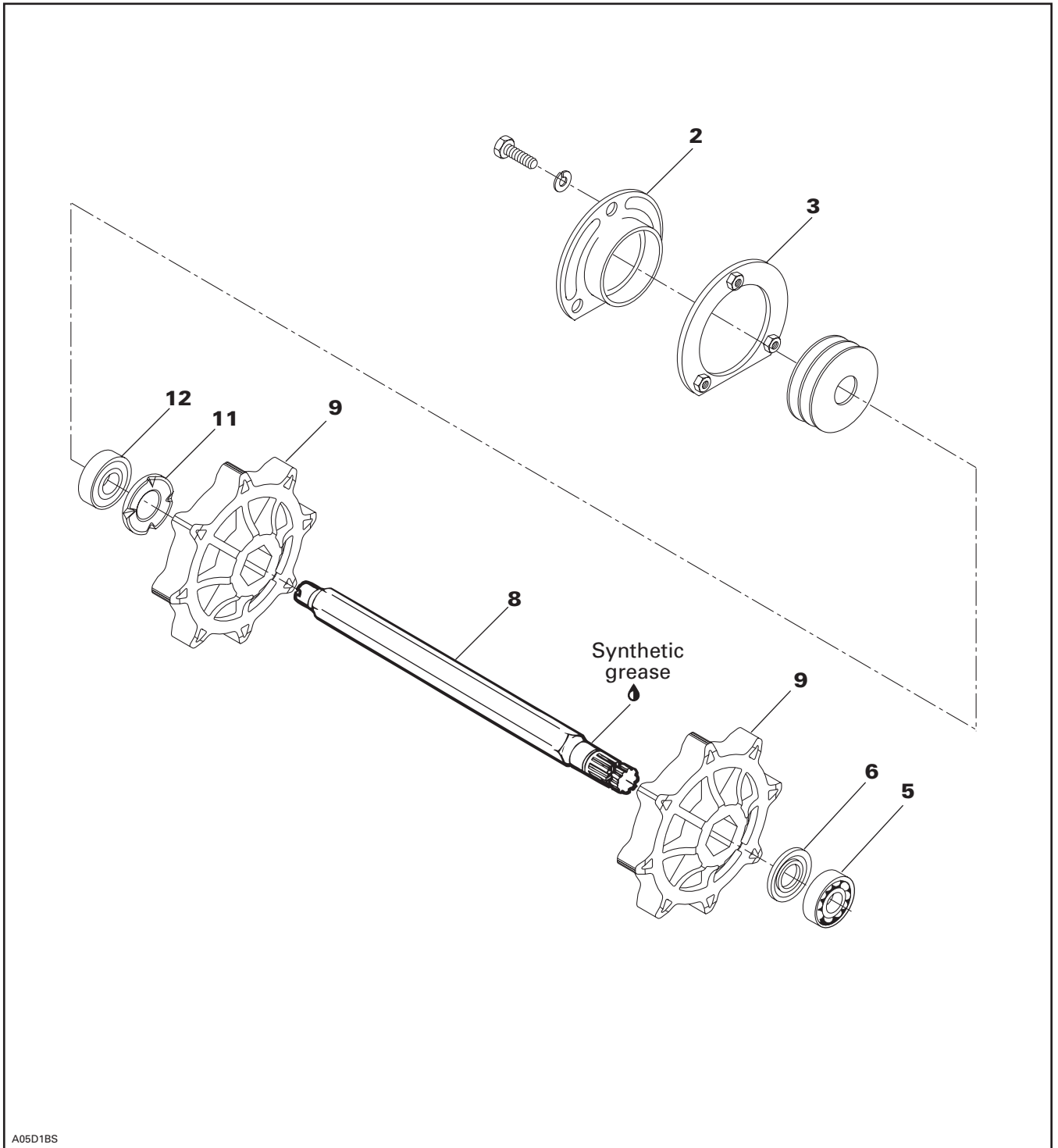


RIDE ADJUSTMENT

Refer to *Operator's Guide*.

DRIVE AXLE

Tundra

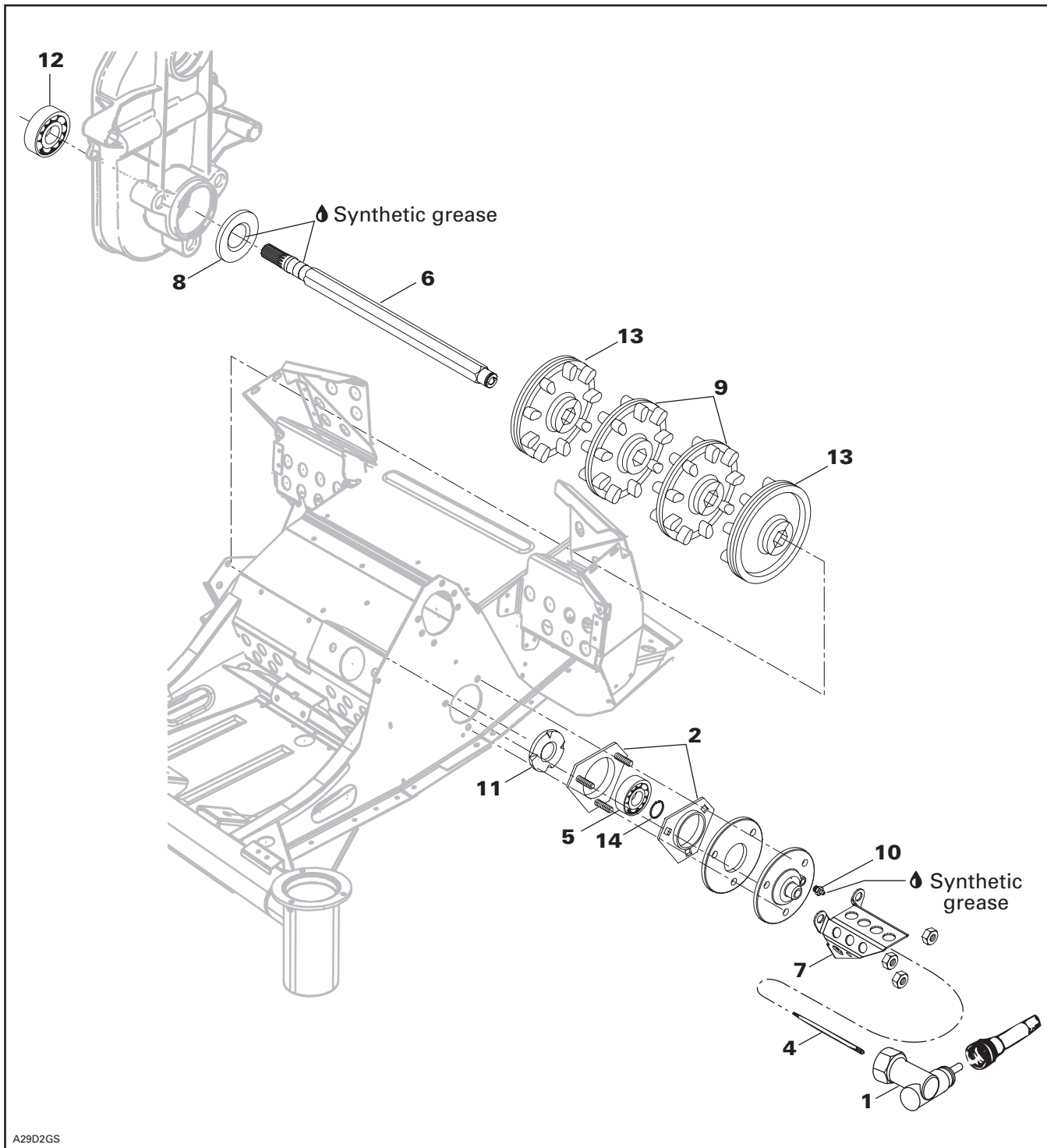


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Section 07 REAR SUSPENSION

Subsection 05 (DRIVE AXLE)

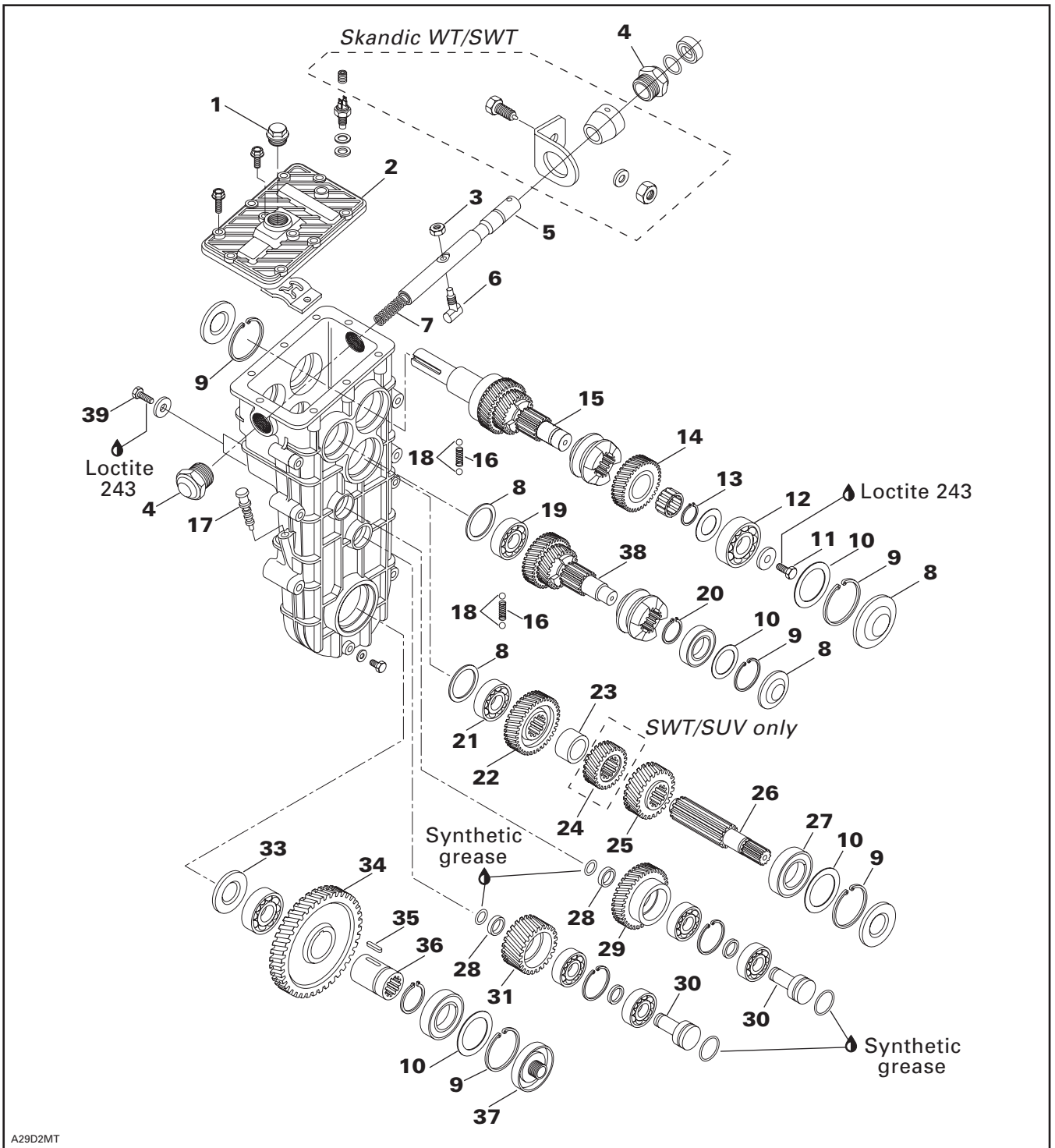
Skandic LT/LT E



Section 07 REAR SUSPENSION

Subsection 05 (DRIVE AXLE)

Skandic WT/SWT/WT LC/SUV



Section 07 REAR SUSPENSION

Subsection 05 (DRIVE AXLE)

REMOVAL

Tundra R and Skandic LT/LT E

Drain oil from chaincase. Release drive chain tension. Remove chaincase cover.

Raise and block rear of vehicle off the ground.

Remove suspension. Refer to SUSPENSION.

2,8, End Bearing Housing and Seal

Remove cable protector **no. 7**, and plastic bearing cover. Remove circlip **no. 14** from drive axle.

Remove chain and sprocket then circlip and bearing **no. 12** from drive axle.

Pry oil seals from chaincase and end bearing housing.

6,9,13, 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.

Skandic WT/SWT/WT LC/SUV 550/SUV 600

Drain gearbox.

Remove angle drive **no. 1** and square pin **no. 4**.

Raise and block rear of vehicle off the ground.

Remove suspension. Refer to SKANDIC WT SUSPENSION.

Remove muffler. Unfasten screw from drive axle end. Loosen Allen screw on bearing race.

Remove 3 screws retaining ball bearing housing then, remove inner plate **no. 3**.

Remove drive axle.

DISASSEMBLY

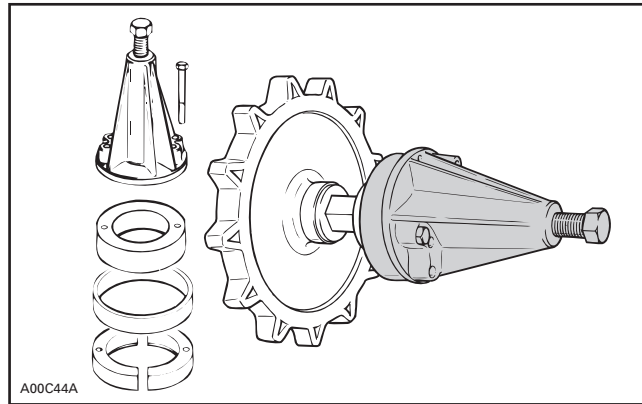
4, Speedometer Drive Insert

Remove speedometer drive insert.

5,12, Bearing

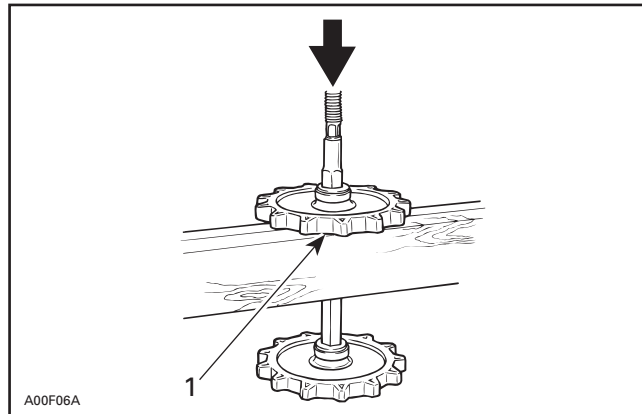
Tundra Only

To remove bearings, use puller assembly, ring and half rings as illustrated.



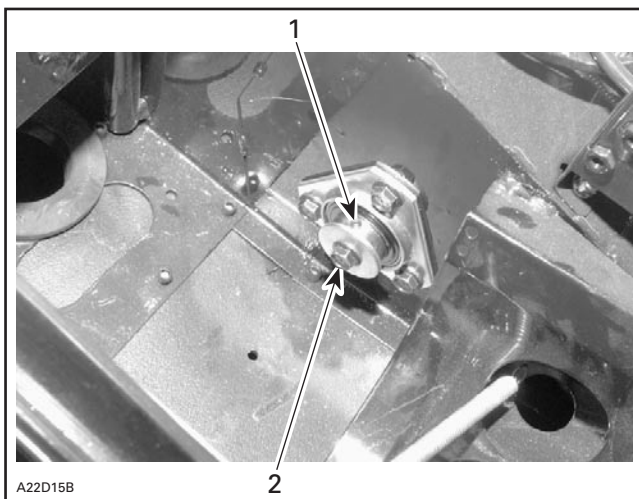
9,13, Sprocket and Half-Sprocket

To remove press fit sprockets, use a press and a suitable support as illustrated.



TYPICAL — TUNDRA

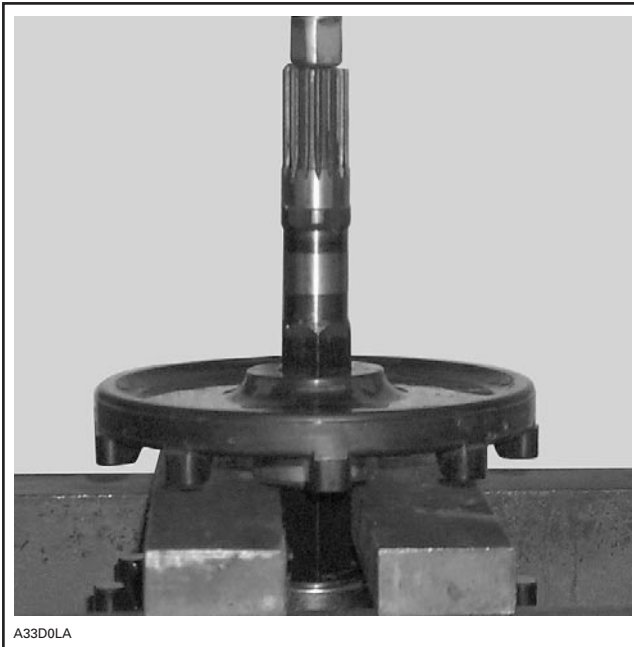
1. Support sprocket near hub



1. Allen screw
2. Screw

Section 07 REAR SUSPENSION

Subsection 05 (DRIVE AXLE)



A33D0LA

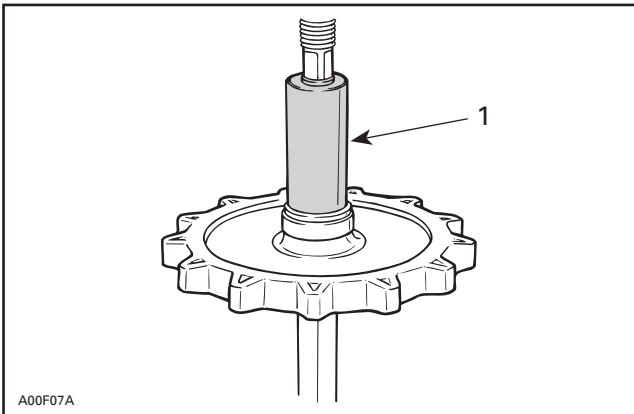
TYPICAL — ALL SKANDIC MODELS

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

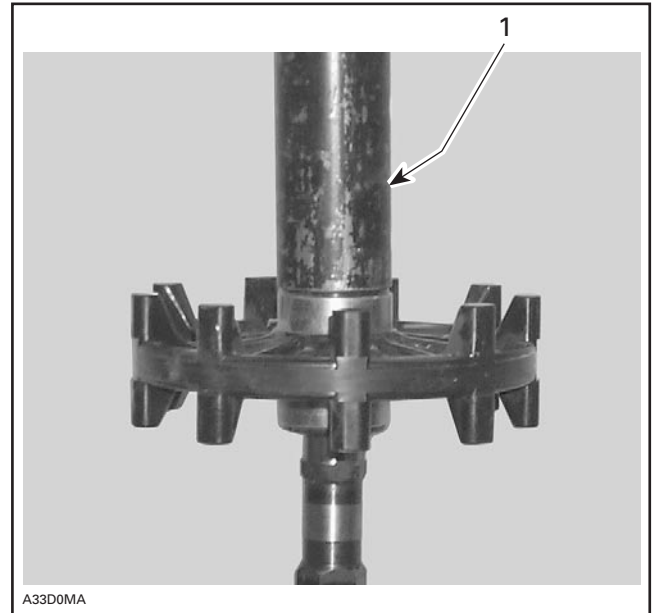
To assemble press fit sprockets, use a press and a suitable pipe as illustrated. Sprockets must be assembled according to the following dimensions.



A00F07A

TYPICAL — TUNDRA

1. Pipe

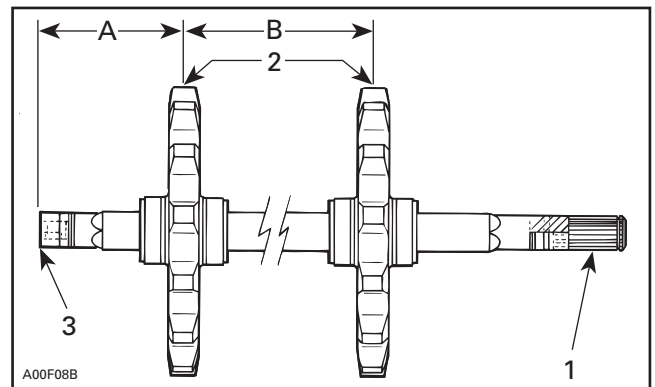


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TYPICAL — ALL SKANDIC MODELS

1. Pipe

Tundra



A00F08B

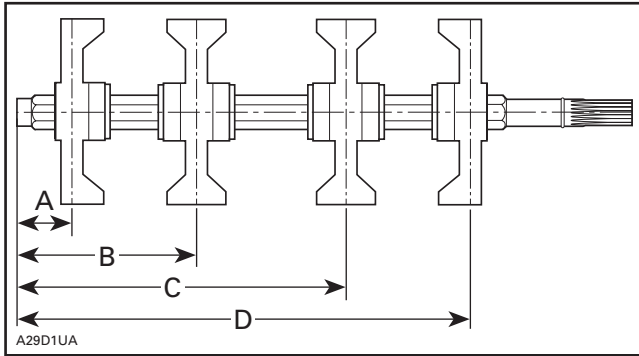
TYPICAL

1. Chaincase side
 2. Center line of sprocket
 3. Drive axle end
- A. 83.0 mm (3-17/64 in)
B. 237 mm (9-21/64 in)

Section 07 REAR SUSPENSION

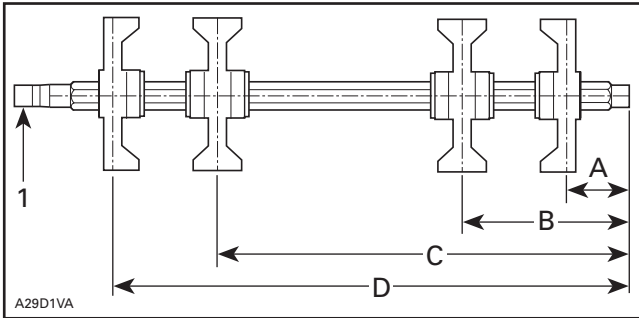
Subsection 05 (DRIVE AXLE)

Skandic LT/LT E



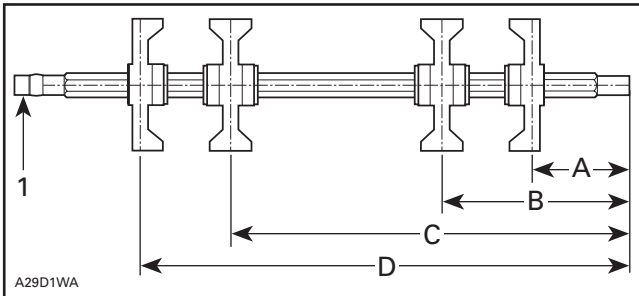
- A29D1UA
- A. 47.0 mm (1.850 in)
 - B. 148.0 mm (5.827 in)
 - C. 271.0 mm (10.669 in)
 - D. 372.0 mm (14.646 in)

Skandic WT/WT LC/SUV 550/SUV 600



- A29D1VA
- 1. Gearbox side
 - A. 55.0 mm (2.165 in)
 - B. 157.0 mm (6.181 in)
 - C. 399.0 mm (15.709 in)
 - D. 501.0 mm (19.724 in)

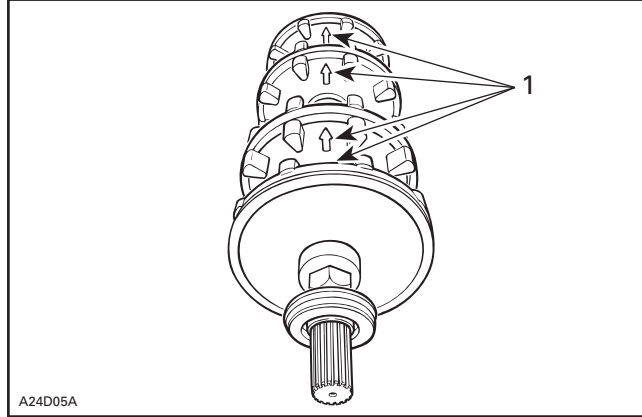
Skandic SWT



- A29D1WA
- 1. Gearbox side
 - A. 105.0 mm (4.016 in)
 - B. 207.0 mm (8.150 in)
 - C. 449.0 mm (17.677 in)
 - D. 551.0 mm (21.693 in)

All Models

Ensure to align indexing marks of each sprocket when assembling.



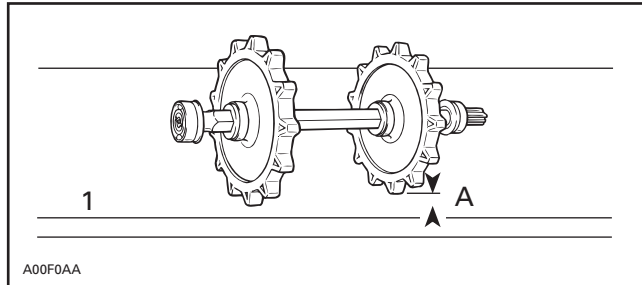
A24D05A

TYPICAL

- 1. Indexing marks aligned

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.



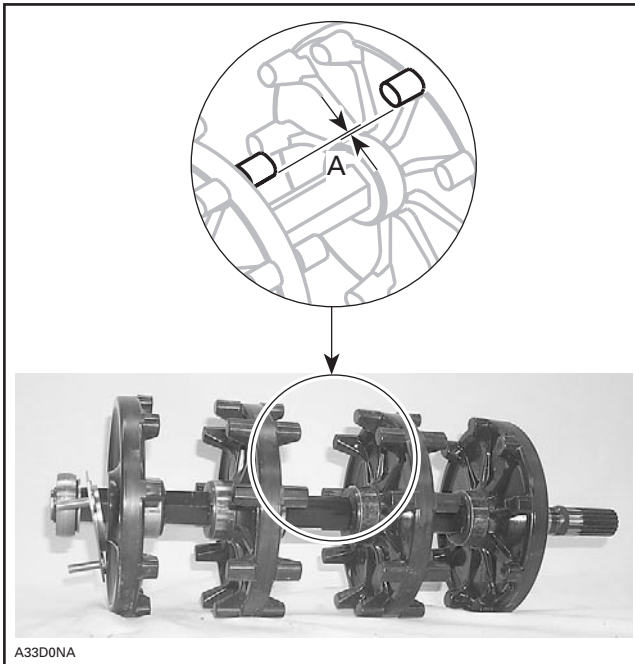
A00F0AA

TYPICAL — TUNDRA

- 1. Plane surface
- A. 1.5 mm (1/16 in) MAXIMUM

Section 07 REAR SUSPENSION

Subsection 05 (DRIVE AXLE)



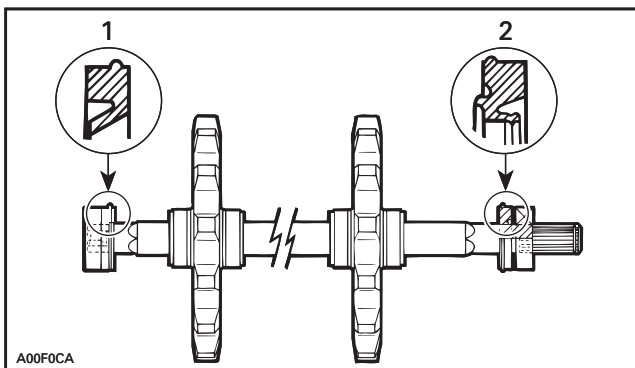
TYPICAL — ALL SKANDIC MODELS

A. 1.5 mm (1/16 in) MAXIMUM

CAUTION: The same sprocket must not be pressed twice on the axle. If synchronization is found to be defective, use a new sprocket.

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.



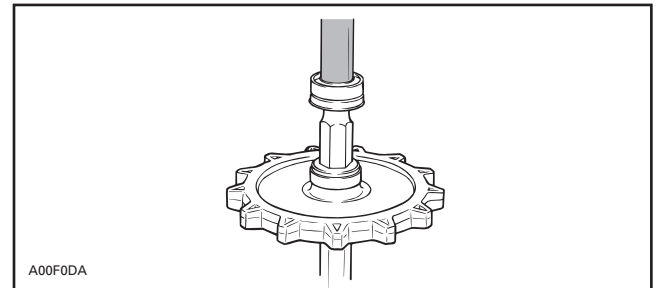
1. Grease seal type
2. Oil seal type

11, Bearing Protector

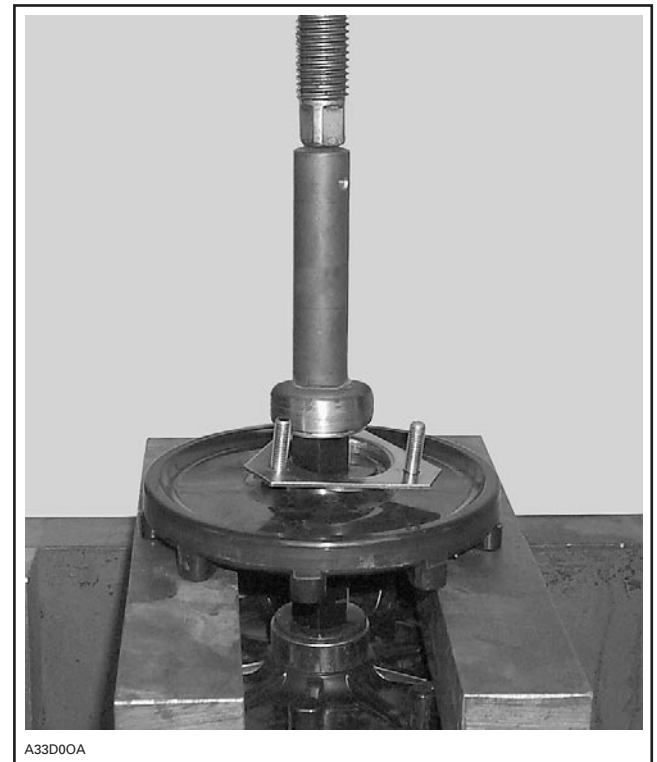
At assembly, flat side of bearing protector must be against bearing.

5,12, Bearing

Always push bearing by inner race.



TYPICAL — TUNDRA

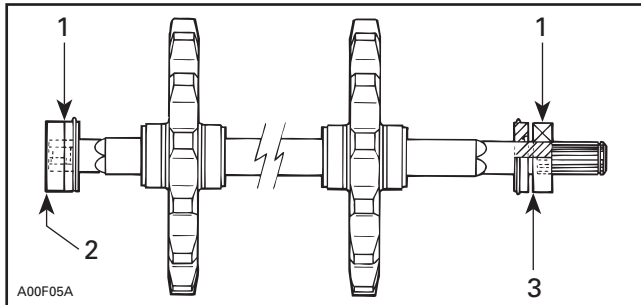


TYPICAL — ALL SKANDIC MODELS

Section 07 REAR SUSPENSION

Subsection 05 (DRIVE AXLE)

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.

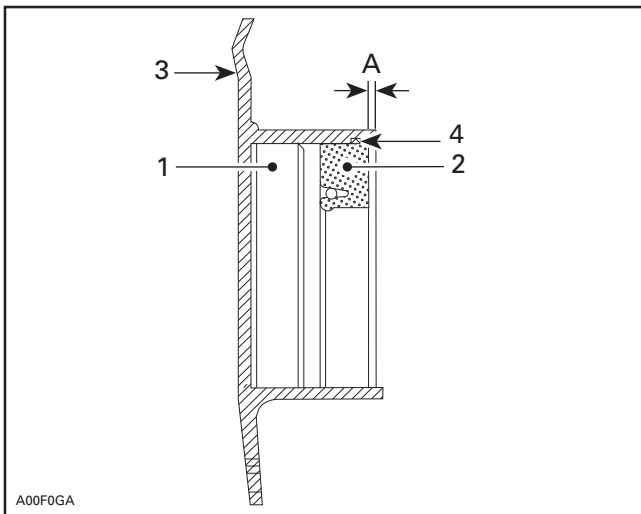


1. Bearing shield on this side
2. Flush with drive axle
3. Seated on shaft shoulder

INSTALLATION

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.



SIDE VIEW

1. Bearing
 2. Seal
 3. Housing
 4. Seal lip
- A. 2 mm (.080 in) approximately

3, Retainer Ring

Make sure that welded nuts are toward inside of tunnel.

Lock drive axle sprocket with a circlip.

Reinstall the chaincase cover.

Refill with chaincase oil. Refer to TECHNICAL DATA.

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

LUBRICATION

15, Grease Fitting

Lubricate end housing bearing with suspension synthetic grease (P/N 293 550 033).

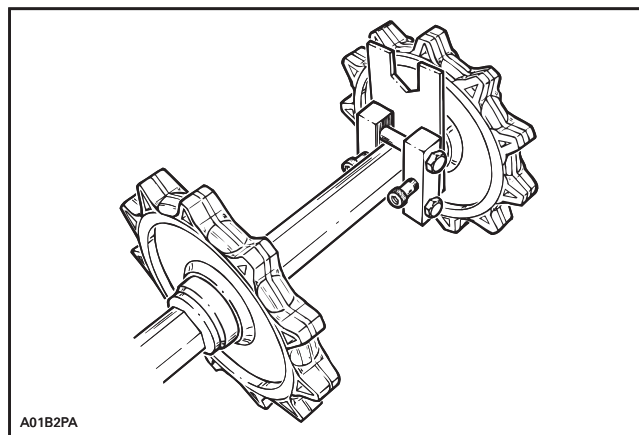
ADJUSTMENT

Sprocket/Track Alignment

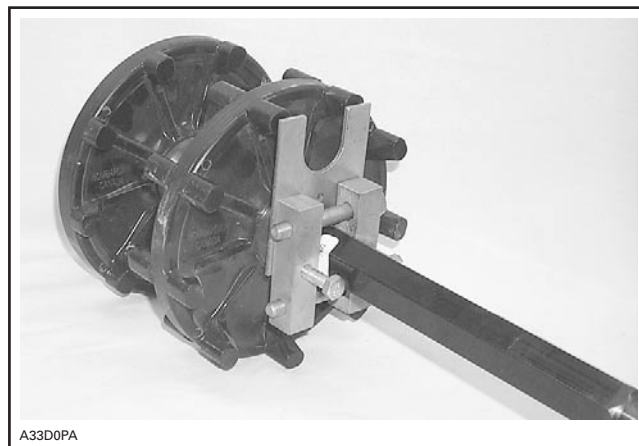
CAUTION: Do not tamper with sprocket/track alignment if frame or suspension is damaged.

Sprockets might be repositioned to fit lugs without removing drive axle.

Use drive axle sprocket adjuster kit (P/N 861 725 700).



TYPICAL — TUNDRA



TYPICAL — ALL SKANDIC MODELS

TRACK

TRACK TYPE APPLICATION

Refer to TECHNICAL DATA section.

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 529 028 700). Use narrow-cleat installer (P/N 529 008 500).

WARNING

Do not operate a snowmobile with a cut, torn or damaged track.

REMOVAL

Tundra

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.

Skandic LT/LT E

Remove the following parts:

- speedometer cable
- muffler
- chaincase cover
- suspension
- drive axle seal
- end bearing housing
- sprockets and chain
- drive axle (toward end bearing housing)
- track.

Skandic WT/SWT/WT LC/SUV 550/SUV 600

Remove the following parts:

- rear suspension
- muffler.

Drain gearbox.

Remove drive axle then 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.

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

NOTE: Ride the snowmobile in snow about 15 to 20 minutes prior to adjusting track tension.

Remove the tether cord cap.

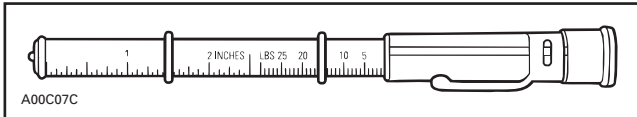
Lift rear of snowmobile and support it with a wide-base snowmobile mechanical stand (P/N 529 020 000).

Section 07 REAR SUSPENSION

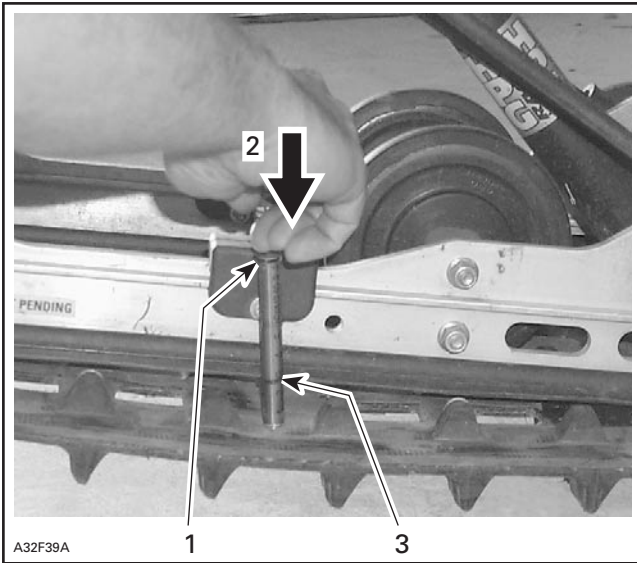
Subsection 06 (TRACK)

Allow the suspension to extend normally and check gap half-way between front and rear idler wheels. Measure between slider shoe bottom and inside of track. The gap should be as given in SPECIFICATIONS at the end of this guide. If the track tension is too loose, track will have a tendency to thump.

NOTE: A belt tension tester (P/N 414 348 200) may be used to measure deflection as well as force applied.



BELT TENSION TESTER



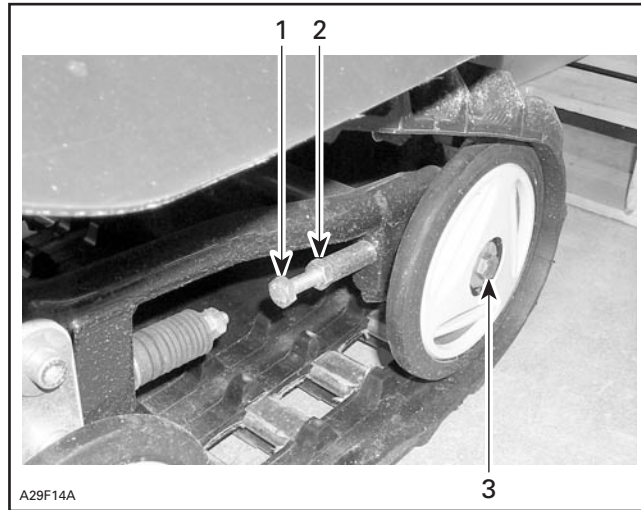
TYPICAL

1. Top tool O-ring positioned at 7.3 kg (16 lb)
2. Push on top portion of tool until it contacts the top O-ring
3. Measured track deflection

CAUTION: Too much tension will result in power loss and excessive stresses on suspension components.

To adjust track tension:

- Remove the tether cord cap.
- Loosen the rear idler wheel retaining screws.
- Loosen the lock nuts (on so equipped models) then turn adjustment screws to adjust.



TYPICAL

1. Adjustment screw
2. Loosen lock nut (on so equipped models)
3. Loosen screw

- Retighten retaining screws and lock nuts (on so equipped models).
- Check track alignment as described below.

Alignment

WARNING

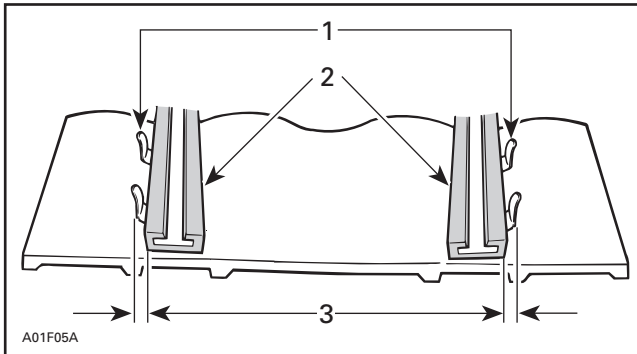
Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the snowmobile. Never rotate track at high speed.

Start the engine and accelerate slightly so that track barely turns. This must be done in a short period of time (15 to 20 seconds).

Section 07 REAR SUSPENSION

Subsection 06 (TRACK)

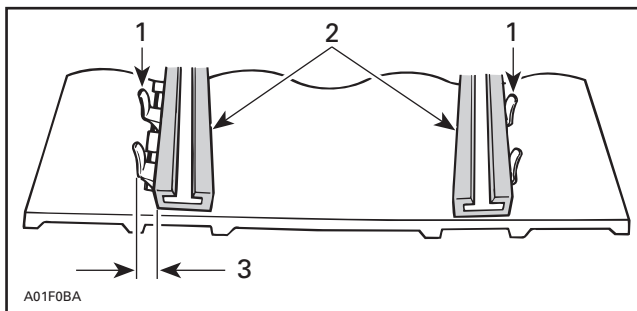
Check that the track is well centered; equal distance on both sides between edges of track guides and slider shoes.



1. Guides
2. Slider shoes
3. Equal distance

To adjust track alignment:

- Remove the tether cord cap.
- Loosen rear idler wheel retaining screws.
- Loosen the lock nuts (on so equipped models).
- Tighten the adjustment screw on side where the slider shoe is the farthest from the track insert guides.

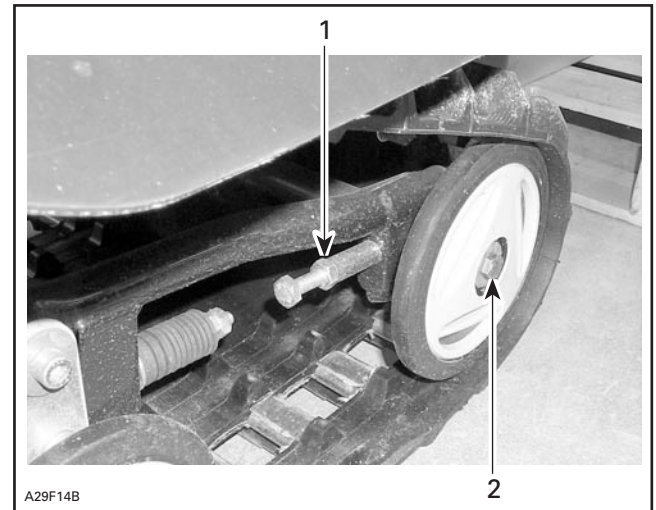


1. Guides
2. Slider shoes
3. Tighten on this side

Tighten lock nuts (some models only) and retaining screws.

⚠ WARNING

If lock nuts are not tightened properly, the adjusting screws could loosen causing the track to become extremely loose and, under some operating conditions, allow the idler wheels to climb over the track lugs forcing the track against the tunnel causing the track to "lock". Properly tighten wheel retaining screws, otherwise wheel may come off and cause track to "lock".



TYPICAL

1. Retighten (so equipped models)
2. Retighten to 48 N•m (35 lbf•ft)

Restart engine and rotate track slowly to recheck alignment.

Reposition snowmobile on ground.

Track Cleat

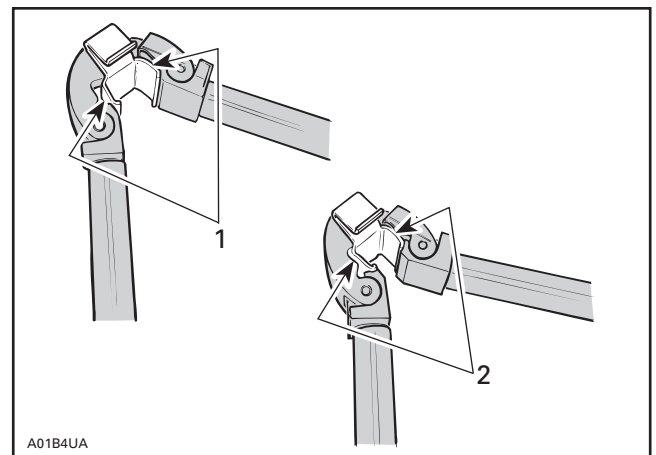
Removal

- 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 529 028 700) for all models.

Installation

NOTE: Keep the same pitch between guide cleats.

- Place new cleat in position and using small track cleat installer (P/N 529 028 800) bend cleat then push tabs into rubber.



TYPICAL

1. First step
2. Second step (to push tabs into rubber)

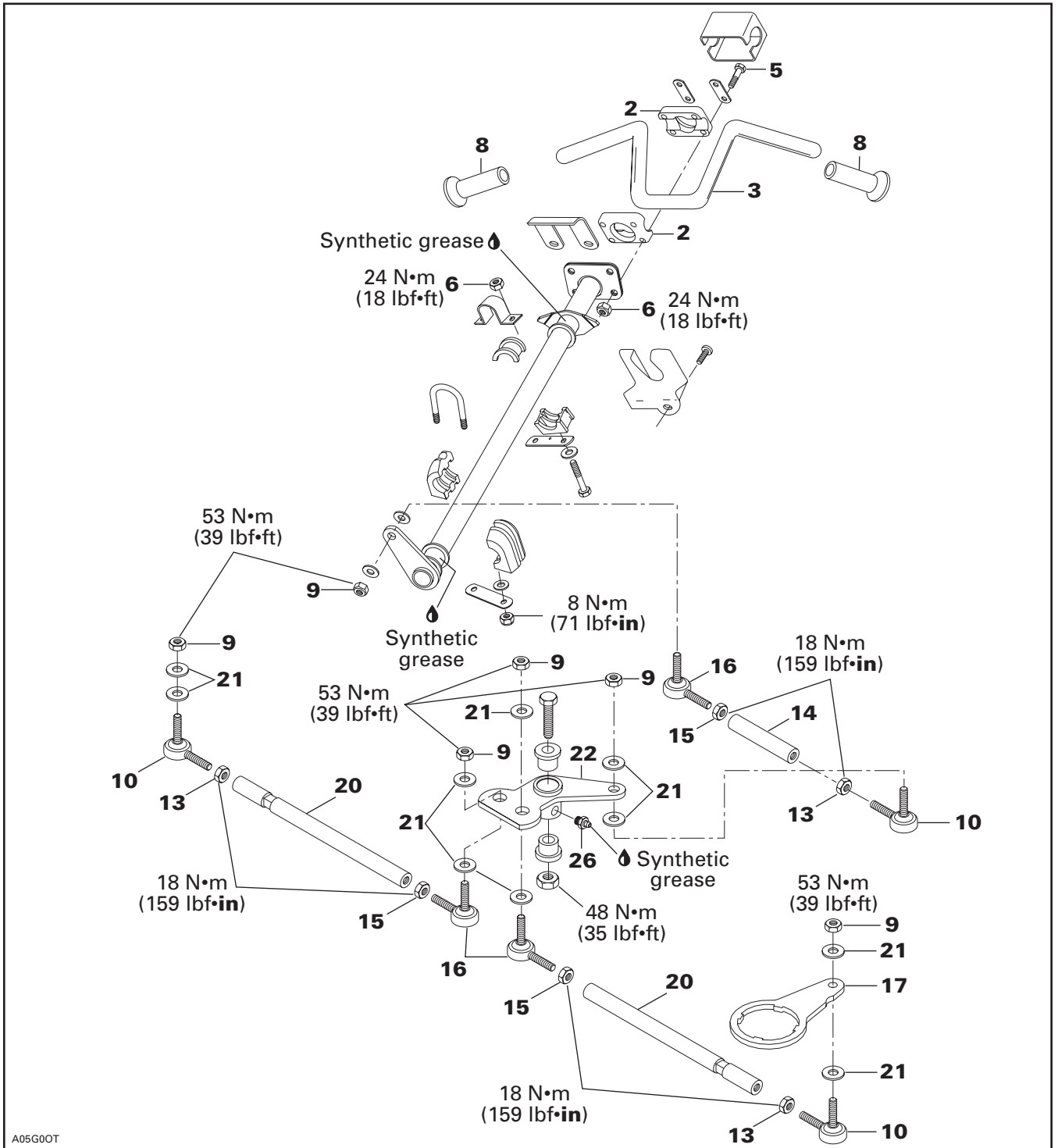
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STEERING SYSTEM

Tundra

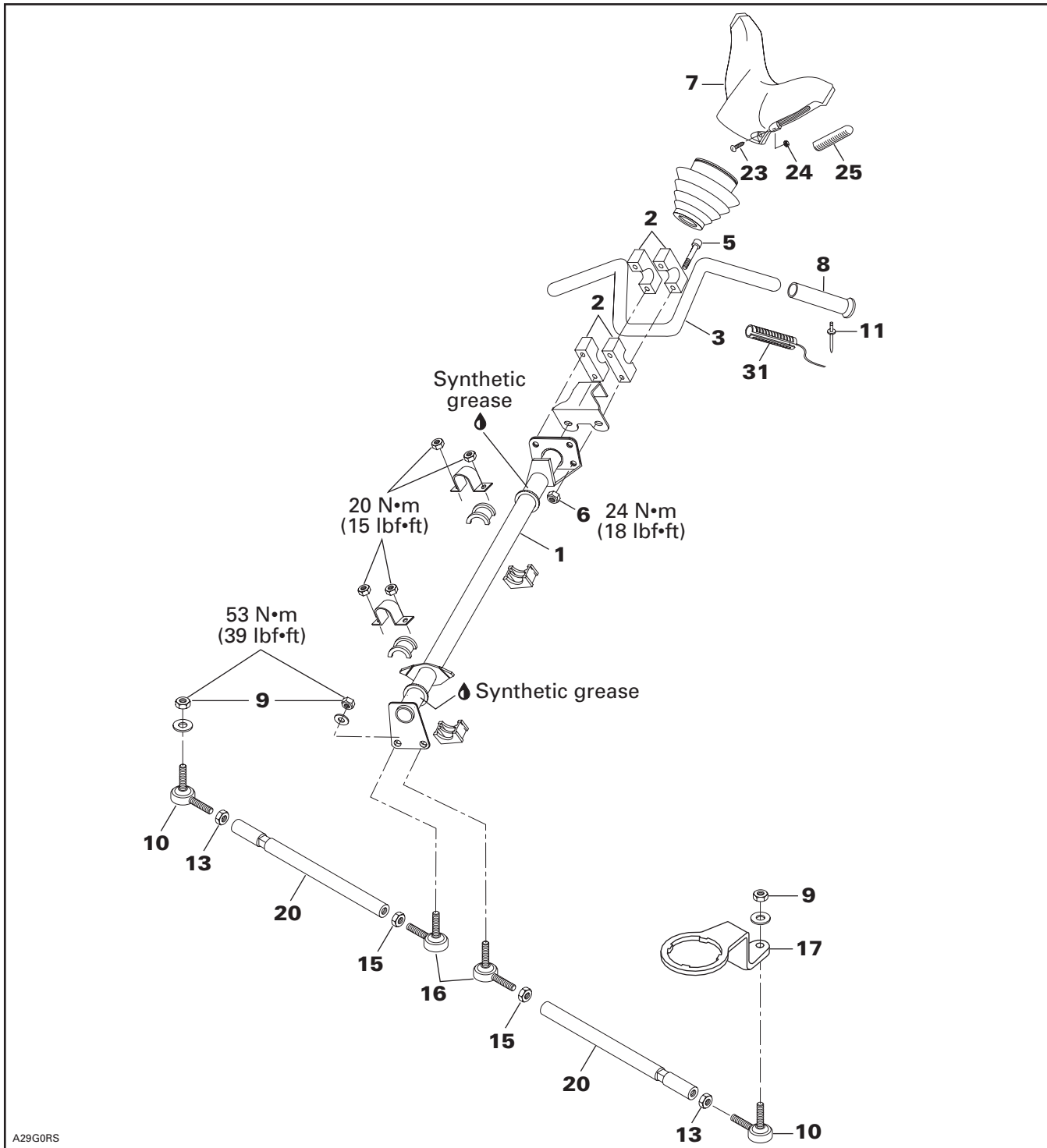


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Section 08 STEERING/FRONT SUSPENSION

Subsection 02 (STEERING SYSTEM)

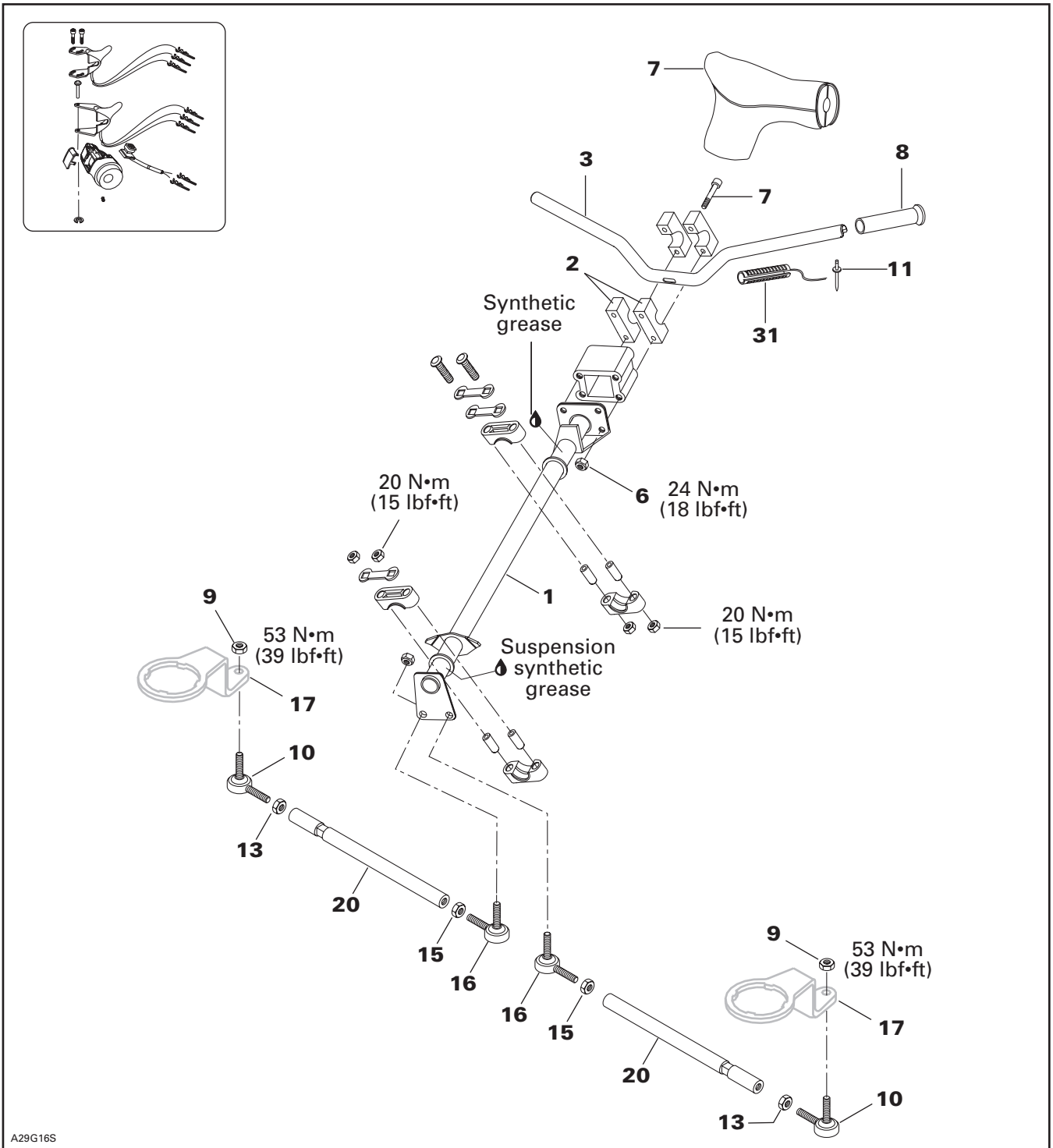
Skandic LT/LT E



Section 08 STEERING/FRONT SUSPENSION

Subsection 02 (STEERING SYSTEM)

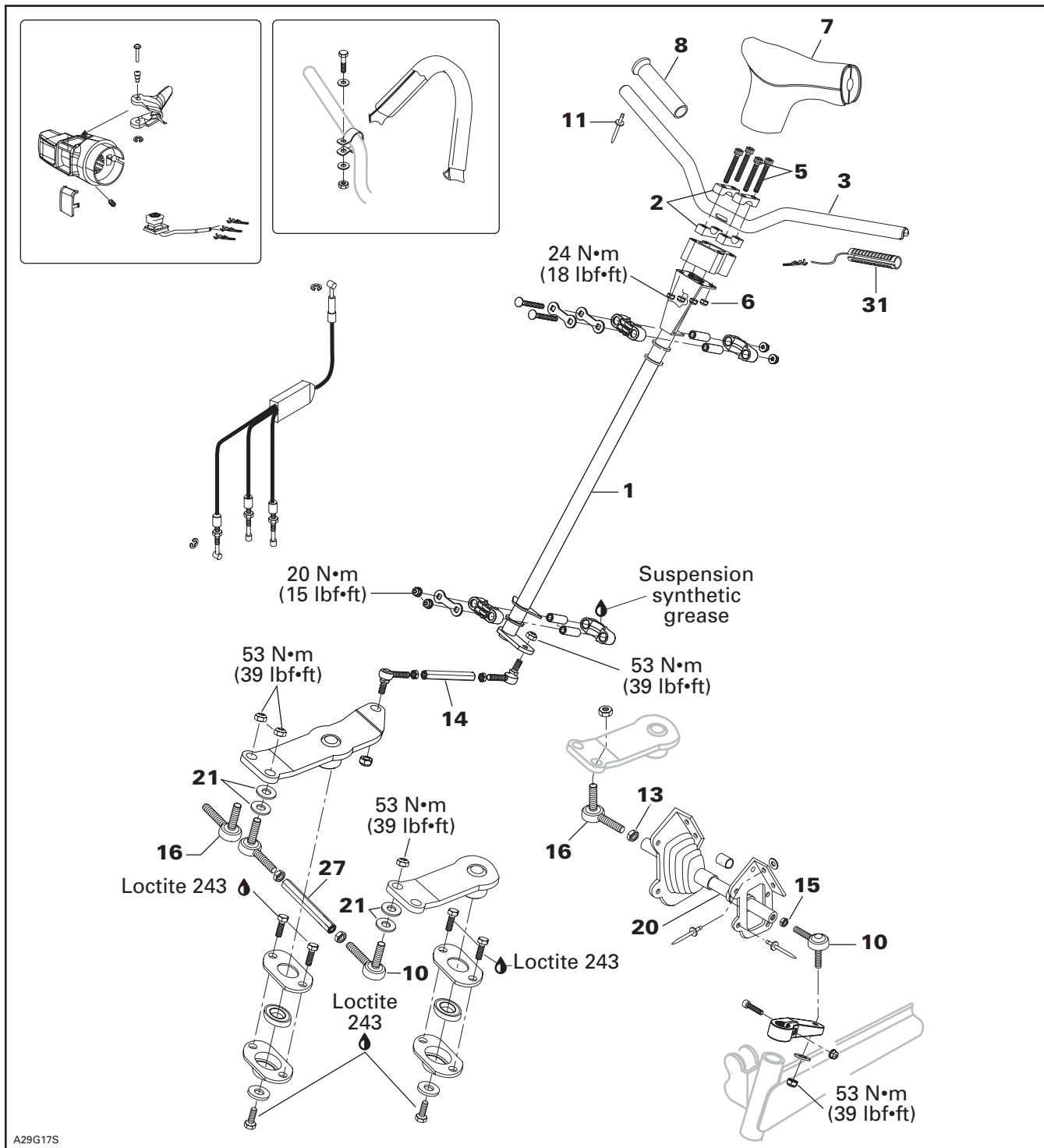
Skandic WT/SWT/WT LC



Section 08 STEERING/FRONT SUSPENSION

Subsection 02 (STEERING SYSTEM)

Skandic SUV 550/SUV 600



A29G17S

INSPECTION

Check skis and ski runner for wear, replace as necessary. Refer to STEERING SYSTEM.

17, Steering Arm and Ski Leg

Make sure steering arm and ski leg splines interlock without excessive play.

⚠ WARNING

Any parts having worn splines have to be replaced with new ones.

Check steering system components for wear. Replace if necessary.

31, Heating Grip Element

To test heating elements, refer to TESTING PROCEDURE.

10,16, Ball Joint (left hand and right hand threads)

Inspect ball joint ends for wear or looseness, if excessive, replace them.

DISASSEMBLY AND ASSEMBLY

8, Grip

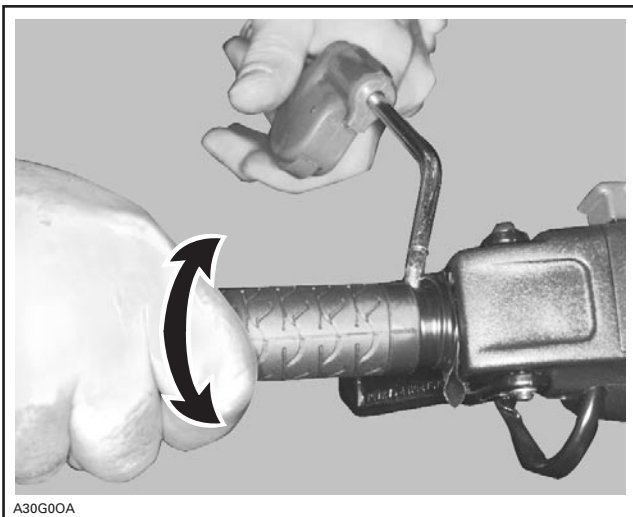
Grips must be carefully removed to prevent damaging the heating elements.

Remove rivet no. 11 if applicable.

Heat grip with a heat gun.

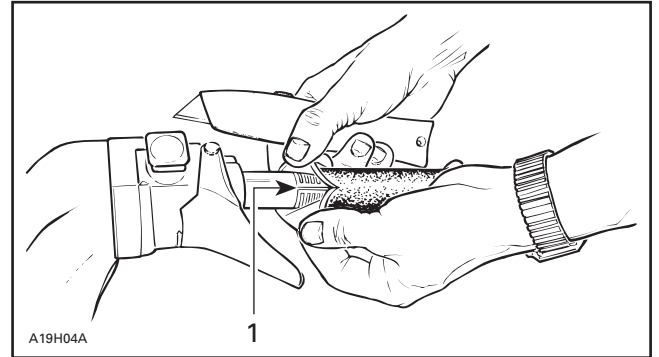
Apply tape to handlebar near the grip to protect paint.

Inject compressed air into the handlebar and twist grip while pulling it out.



The grips might not be removable as explained above; in this case, carefully proceed as follows to prevent damaging the heating elements.

Start cutting and immediately peel it open to locate the gap in the heating element, as shown.



TYPICAL

1. Gap in the heating element opposite the wires

Continue cutting along the gap and remove the grip. If required, slowly peel heating element no. 31 from handlebar and remove it.

To install, stick the heating element to the handlebar making sure the wires do not interfere with operation of the accelerator or brake handle.

⚠ WARNING

Never use lubricants (e.g. oil, grease, etc.) to install the handlebar grip. Only use a mix of soap and water. Mix 40 parts of water with one part of dish washing soap (recommended: Ultra Joy, Sunlight or Palmolive).

Heat the grip with a heater gun or a spot light to ease installation. Insert new grip with compressed air.



Section 08 STEERING/FRONT SUSPENSION

Subsection 02 (STEERING SYSTEM)

Install rivet no. 11 if applicable.

1, Steering Column

Remove steering pad then handlebar ass'y.

Detach tie rod(s) from the steering column.

To gain access to lower U-clamp or half bushing (as applicable), remove the air intake silencer and carburetor(s).

Skandic Models Only

Loosen rear engine fastening screws.

Skandic WT/WT LC/SWT/WT/SUV 550/ SUV 600 Models

Remove half bushing then steering column.

Tundra and Skandic LT/LT E Models

Remove U-clamps then steering column.

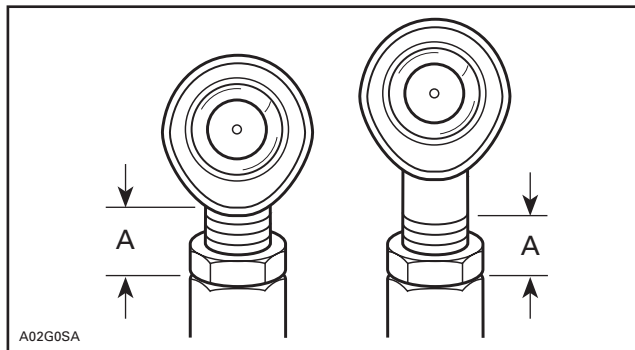


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1. U-clamp

10,16, Ball Joint (left hand and right hand threads)

Screw threaded end of the ball joint into the tie rod. The maximum external threaded length not engaged in the tie rod must not exceed 20 mm (25/32 in).

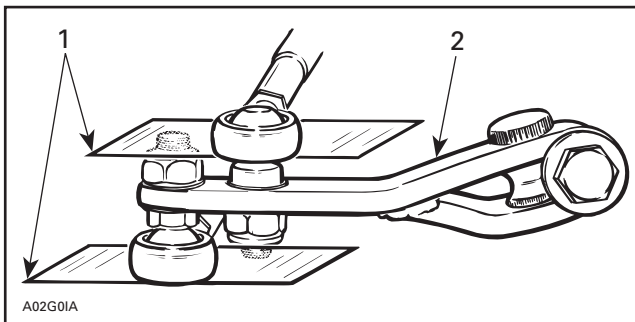


TYPICAL

A. 20 mm (25/32 in) maximum

The ball joint should be restrained when tightening the tie rod end lock nut. Align it so the tie rod end is parallel to the steering arm when assembled on the vehicle, refer to the following illustration.

For proper torque specifications refer to the specific exploded view for the vehicle being serviced.



TYPICAL

1. Parallel with steering arm
2. Steering arm

⚠ 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. The maximum external threaded length not engaged in the tie rod must not exceed 20 mm (25/32 in).

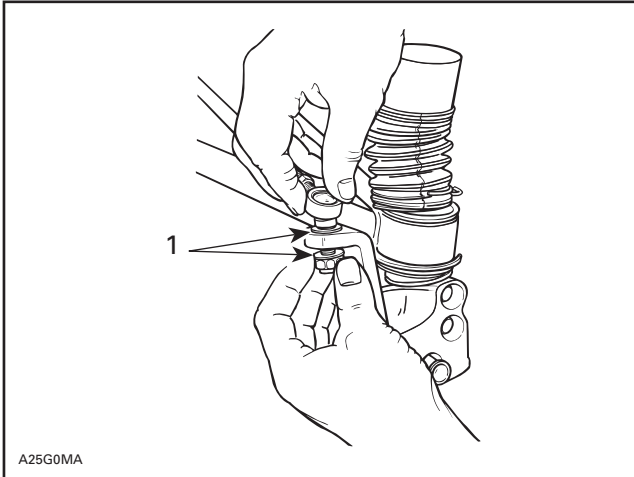
Section 08 STEERING/FRONT SUSPENSION

Subsection 02 (STEERING SYSTEM)

21, Hardened Washer on Ball Joint Stud

Tundra and Skandic SUV 550/SUV 600

Install a hardened washer on each side of the arm.



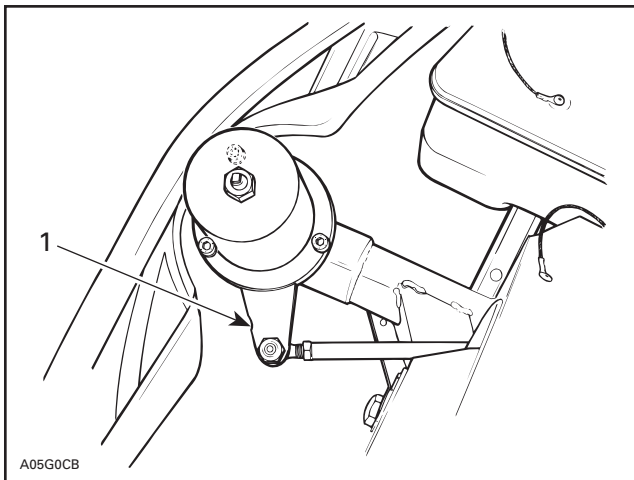
TYPICAL

1. Hardened washers

17, Steering Arm

Tundra

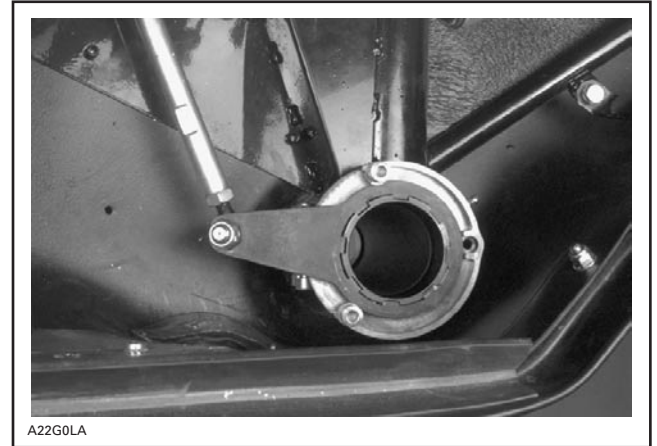
Steering arm notch must face outside of vehicle.



1. Notch facing outside

Skandic LT/LT E/WT/SWT/WT LC

Install steering arm at mid-travel position when handlebar and skis are facing straight ahead.



TYPICAL

Skandic SUV 550/SUV 600

Steering arm must be installed parallel to ski.

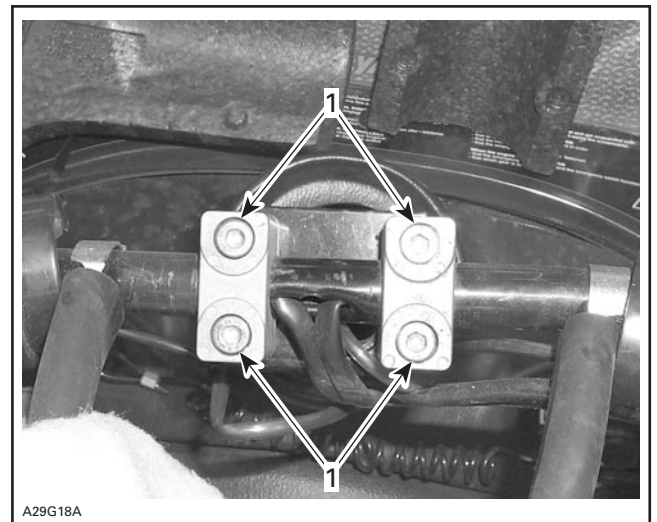
9,13,15, Ball Joint Nut and Jam Nut

Tighten ball joint nuts and jam nuts to specified torque (see exploded view).

HANDLEBAR POSITION ADJUSTMENT

All Models

Remove steering cover and paddings. Loosen 4 nuts on steering clamps **no. 2**.



1. Nuts to be removed

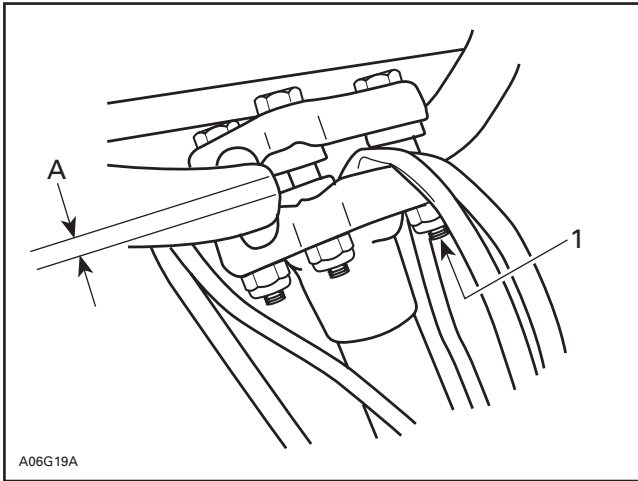
Adjust the steering handlebar to the desired position.

Lock the handlebar in place by tightening the 4 nuts as specified in the illustrations.

Section 08 STEERING/FRONT SUSPENSION

Subsection 02 (STEERING SYSTEM)

CAUTION: Tighten the nuts equally in a criss-cross sequence and ensure there is an equal gap on each side of the clamps **no. 2**.



TYPICAL

1. Torque to 24 N•m (18 lbf•ft)
- A. Equal gap all around

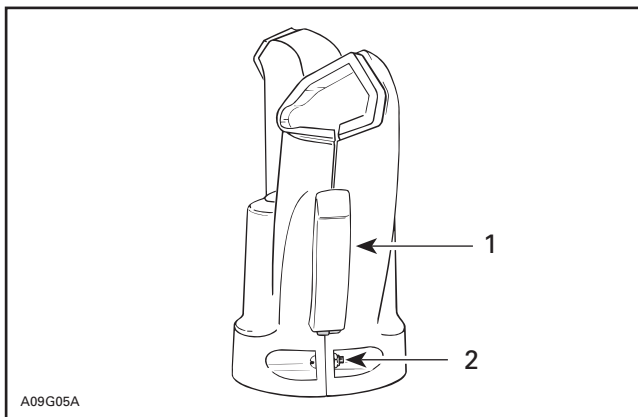
⚠ WARNING

Avoid contact between the brake handle and the windshield by **NOT** adjusting the handlebar too high.

Properly fit the steering pad to the handlebar. Assemble using the 2 rubber attachments, nuts and bolts where applicable.

⚠ WARNING

Make sure that the steering pad and all controls are properly fixed to their normal location on the handlebar.



TYPICAL

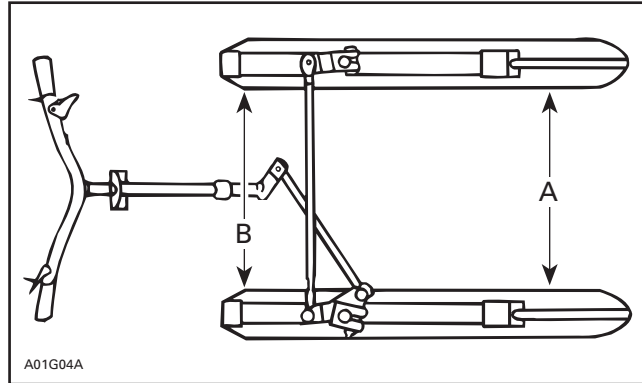
1. Rubber attachment
2. Nut and bolt (where applicable)

STEERING ADJUSTMENT (skis)

Definitions

TOE-OUT:

A difference measured between the front edge of the skis **A** and rear edge **B** as viewed from the top. It is adjustable.



CAMBER:

A specific inward or outward tilt angle of ski leg compared to a vertical line when viewing the vehicle from front. **This angle is not adjustable on any models.**

Adjustments

Tundra

Adjustments should be performed following this sequence:

- Handlebar/pivot arm centering.
- Set toe-out adjustment.

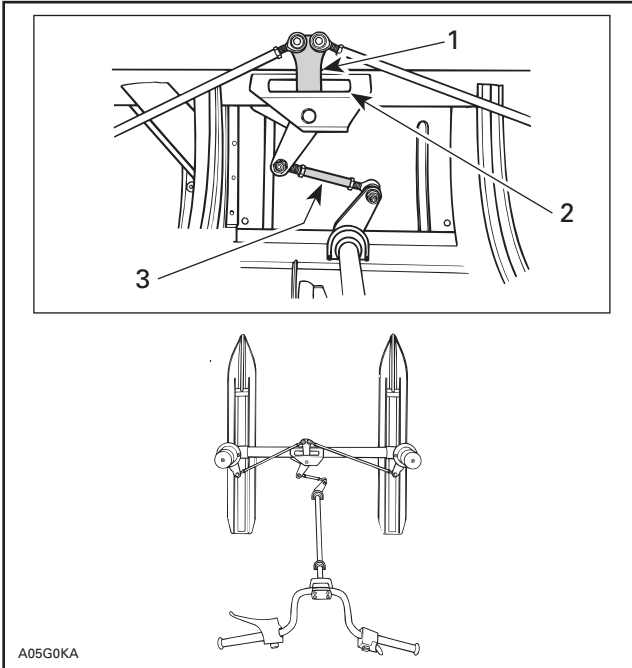
HANDLEBAR/PIVOT ARM CENTERING

Turn handlebar until pivot arm is well centered in slot of its bracket.

Section 08 STEERING/FRONT SUSPENSION

Subsection 02 (STEERING SYSTEM)

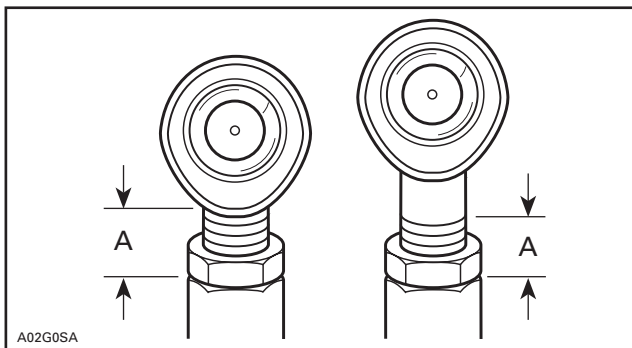
Check if handlebar is horizontal. To adjust, loosen lock nuts of short tie rod and turn it accordingly.



1. Pivot arm centered in slot
2. Slot
3. Turn to adjust

WARNING

Maximum ball joint external threaded length not engaged in the tie rod end must not exceed 20 mm (25/32 in). Torque lock nut to 18 N•m (159 lbf•in).



- A. 20 mm (25/32 in) maximum

Restrain short tie rod while torquing nuts so that ball joint sockets run parallel with steering arm and pivot arm.

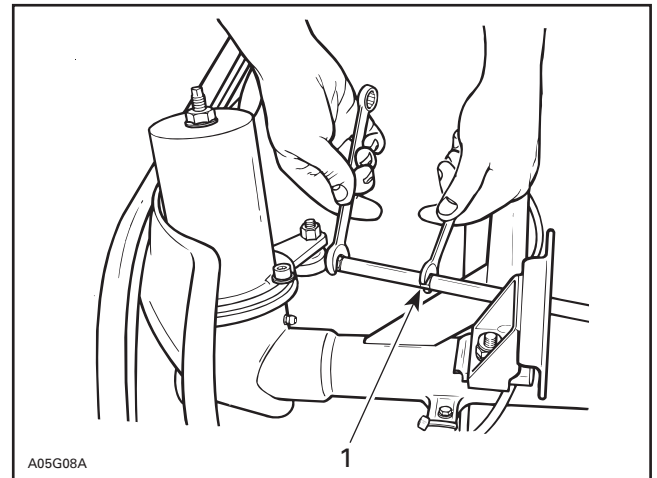
Ensure that pivot arm is still centered and check ski toe-out.

TOE-OUT ADJUSTMENT

Raise front of vehicle so that skis are off the ground.

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.

Make sure external threaded length not engaged is not too long and torque nuts as specified above.

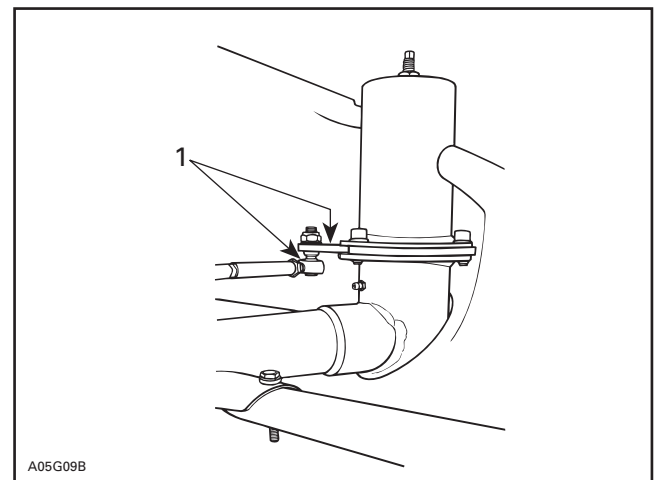


LONG TIE ROD SHOWN

1. Restrain tie rod to tighten lock nuts

WARNING

Ball joint sockets must run parallel with steering arm and pivot arm. Tie rod must be restrained when tightening lock nuts.



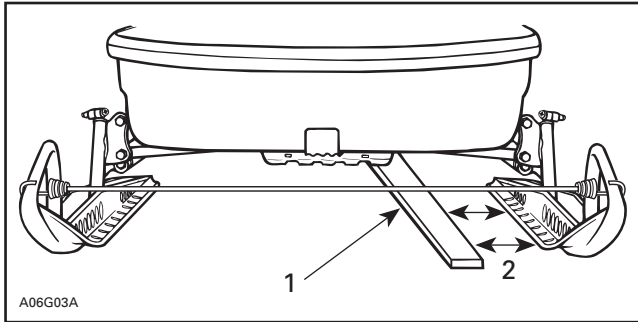
LONG TIE ROD SHOWN

1. Ball joint parallel with arm

Section 08 STEERING/FRONT SUSPENSION

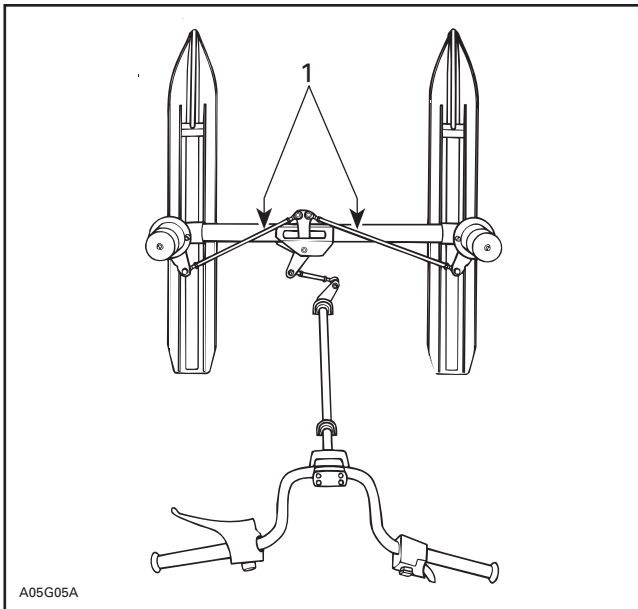
Subsection 02 (STEERING SYSTEM)

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. Measurements are taken 200 mm (8 in) at rear and front of ski pivot bolt. 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).



TYPICAL

1. Straight edge
2. 3.0 mm (1/8 in) more at front than at rear



1. Turn to adjust

WARNING

Do not attempt to adjust skis straight-ahead position by turning ball joint on tie rod **no. 14**.

Skandic SUV 550/SUV 600

Adjustments should be performed following this sequence:

- Handlebar/pivot arm positioning.
- Idler arm positioning.
- Set toe-out adjustment.

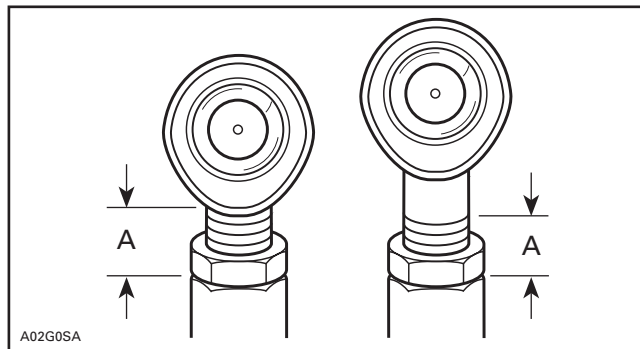
HANDLEBAR/PIVOT ARM POSITIONING

Turn handlebar until pivot arm is pointing straight forward.

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 20 mm (25/32 in). Torque lock nut to 18 N•m (159 lbf•in).



- A. 20 mm (25/32 in) maximum

Restrain short tie rod while torquing nuts so that ball joint sockets run parallel with steering arm and pivot arm.

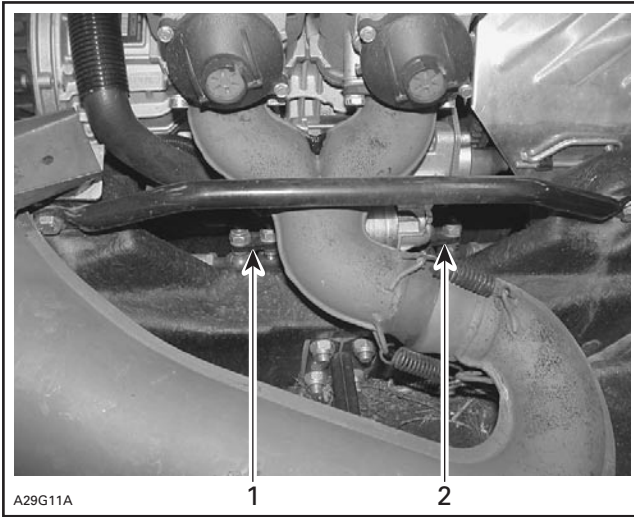
Ensure that pivot arm is still pointing straight forward and check ski toe-out.

IDLER ARM POSITIONING

With the pivot arm pointing straight forward, loosen lock nuts of idler arm tie rod and turn tie rod until idler arm is pointing straight forward too. With this adjustment properly done, turning radius will be the same on both sides.

Section 08 STEERING/FRONT SUSPENSION

Subsection 02 (STEERING SYSTEM)



1. Pivot arm pointing straight forward
2. Idler arm pointing straight forward too

TOE-OUT ADJUSTMENT

With the handlebar in straight ahead position, turn left and right tie rods no. 20 to obtain specified toe-out.

Procedure:

- Loosen jam nuts no. 13 and no. 15 of both tie rods no. 20.

⚠ WARNING

Never lengthen tie rod making threaded portion of ball joint exceed 20 mm (25/32 in).

- Close front of skis manually to take all free-play from steering mechanism.

NOTE: A rubber cord must be hooked in front of skis to keep them closed.

Skis should have a toe-out of 5 mm (3/16 in) when they are in a straight-ahead position and the vehicle is resting on the ground.

Measurements are taken 250 mm (10 in) at front and rear of ski pivot bolt.

NOTE: To make sure skis are in a straight-ahead position, place a straight edge against pre-adjusted track and measure the distance between front and rear of skis and straight edge. Distances should be equal. After the ski toe-out adjustment, distance at front of ski must be 2.5 mm (3/32 in) more than at rear on both sides for a total toe-out of 5 mm (3/16 in).

Skandic LT/LT E/WT/SWT/WT LC

Toe-out adjustment is performed by adjusting length of left and right tie rods no. 20. Handlebar centering is done at same time by turning tie rods accordingly.

Procedure:

- Loosen jam nuts no. 13 and no. 15 of both tie rods no. 20.

⚠ WARNING

Never lengthen tie rod making threaded portion of ball joint exceed 20 mm (25/32 in).

- Close front of skis manually to take all free-play from steering mechanism.

NOTE: A rubber cord must be hooked in front of skis to keep them closed.

Skis should have a toe-out of 5 mm (3/16 in) when they are in a straight-ahead position and the vehicle is resting on the ground.

Measurements are taken 250 mm (10 in) at front and rear of ski pivot bolt.

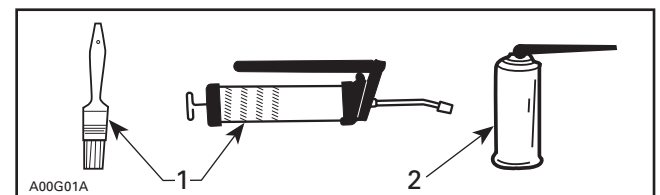
NOTE: To make sure skis are in a straight-ahead position, place a straight edge against pre-adjusted track and measure the distance between front and rear of skis and straight edge. Distances should be equal. After the ski toe-out adjustment, distance at front of ski must be 2.5 mm (3/32 in) more than at rear on both sides for a total toe-out of 5 mm (3/16 in).

LUBRICATION

⚠ WARNING

Do not lubricate throttle and/or brake cable nor their housing.

The following symbols will be used to show what type of lubricant should be used at the suitable locations.



1. Synthetic grease (P/N 413 711 500)
2. Penetrating lubricant (P/N 293 600 016)

Section 08 STEERING/FRONT SUSPENSION

Subsection 02 (STEERING SYSTEM)

Tundra

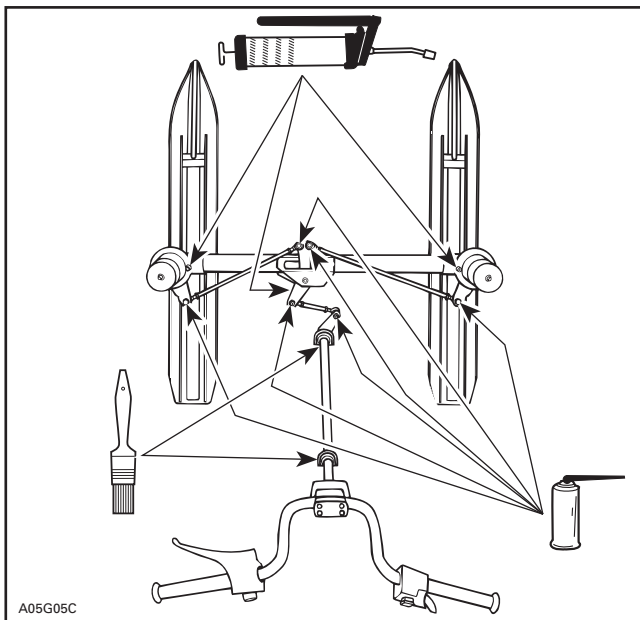
Lubricate front suspension posts and pivot arm at grease fittings. Pump five strokes of grease gun on each post. Use suspension synthetic grease (P/N 293 550 033).

NOTE: There are 3 grease fittings.

Apply BOMBARDIER LUBE (P/N 293 600 016) to ball joints.

NOTE: There are 6 lubrication points.

Apply suspension synthetic grease (P/N 293 550 033) to both steering column bushings.



TUNDRA

Skandic LT/LT E/WT/SWT/WT LC

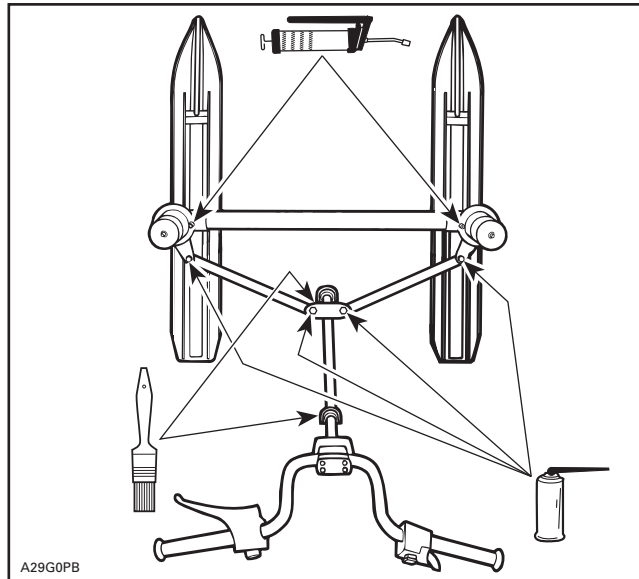
Lubricate front suspension posts. Pump five strokes of grease gun on each post. Use synthetic grease (P/N 413 711 500).

NOTE: There are 2 grease fittings.

Apply BOMBARDIER LUBE (P/N 293 600 016) to ball joints.

NOTE: There are 4 lubrication points.

Apply synthetic grease (P/N 413 711 500) to both steering column bushings.



SKANDIC LT/LT E/WT/SWT/WT LC

Skandic SUV 550/SUV 600

Lubricate ski legs. Pump five strokes of grease gun on each ski leg. Use synthetic grease (P/N 413 711 500).

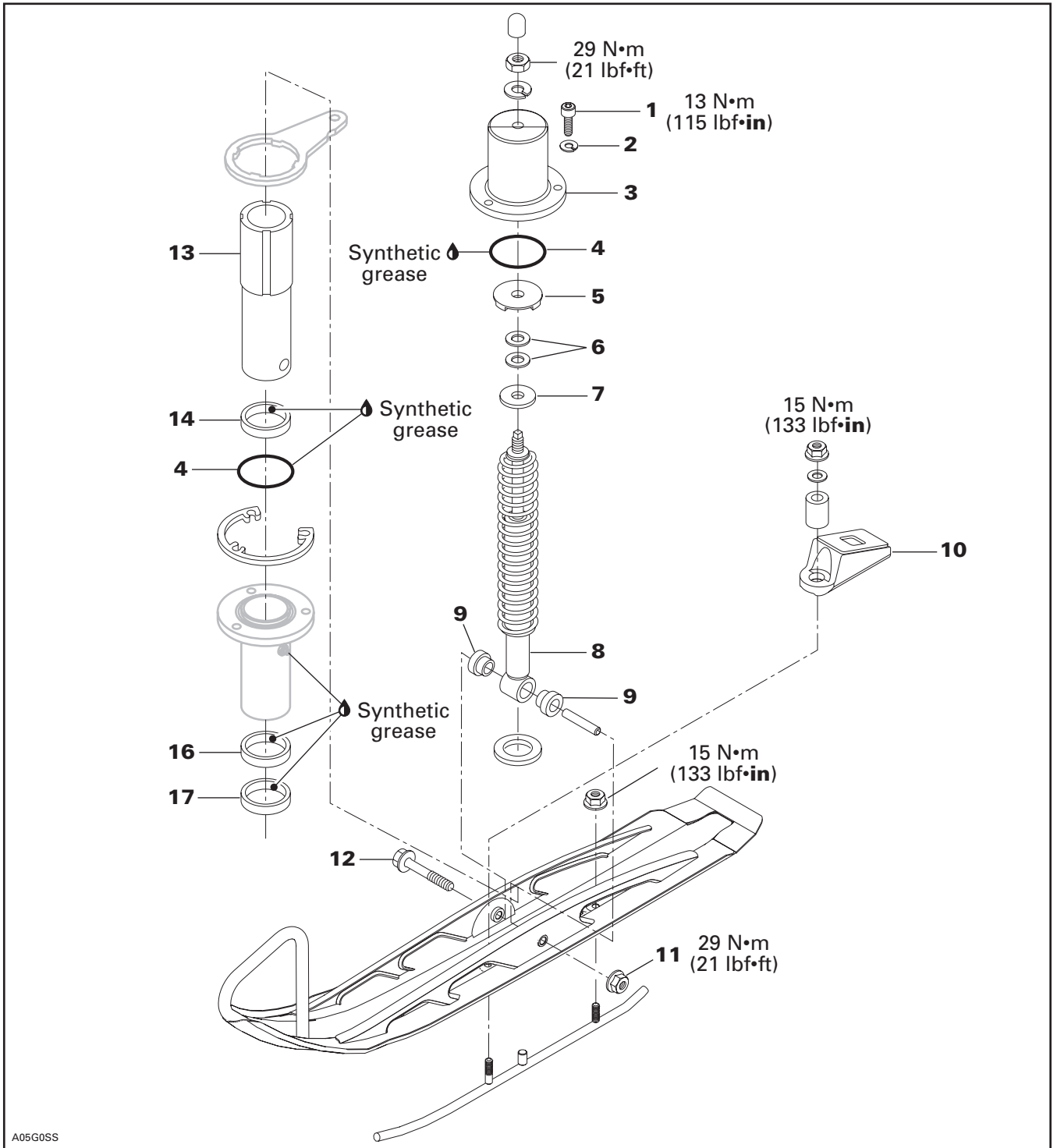
NOTE: There are 2 grease fittings.

Apply BOMBARDIER LUBE (P/N 293 600 016) to all ball joints.

Apply synthetic grease (P/N 413 711 500) to both steering column bushings.

SUSPENSION AND SKI SYSTEM

Tundra



A05G0SS

Section 08 STEERING/FRONT SUSPENSION

Subsection 03 (SUSPENSION AND SKI SYSTEM)

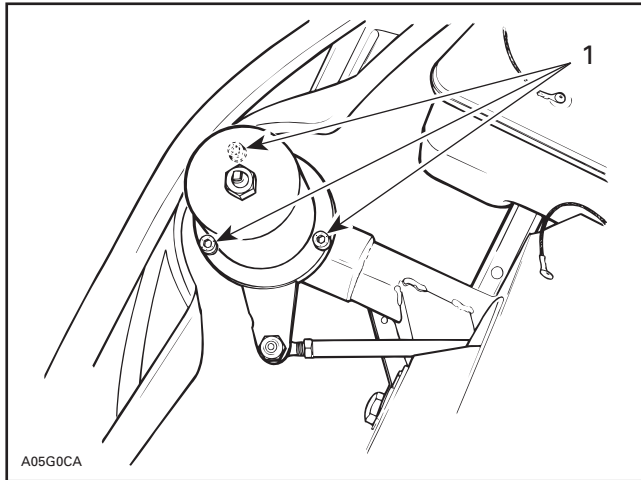
ON-VEHICLE COMPONENT REMOVAL

8, Shock

Lift front of vehicle and support off the ground.

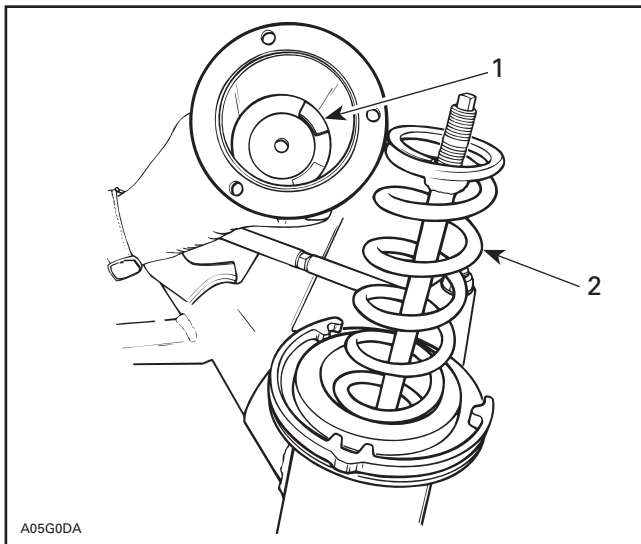
Remove ski.

Unscrew shock rod 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.



1. Allen screws

NOTE: These washers and stopper can be wedged in cover.



1. Washers and stopper wedged in cover
2. Spring

Pull out spring then check shock as described below in INSPECTION.

DISASSEMBLY

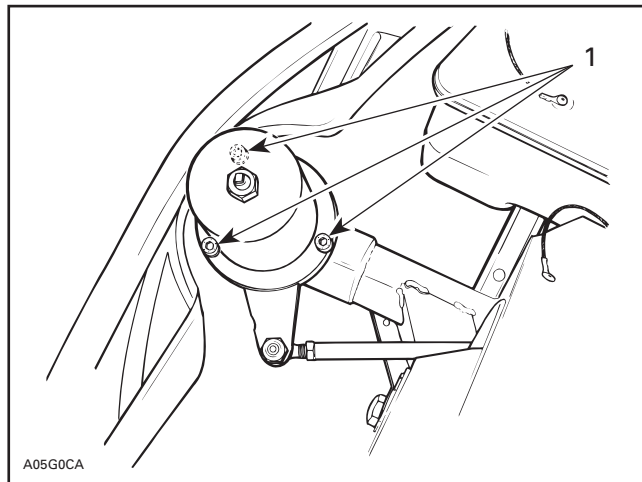
Lift front of vehicle and support off the ground.

1,2,3,5,6,7,9,11, Bolt, Lock Washer, Cover, Stopper, Bushing, Cushion and Nut

Remove ski bolt, nut, bushings and ski.

Unscrew shock rod nut then remove washer. Shock will fall off the ski leg.

Unscrew 3 Allen screws retaining cover, then remove stopper and washers.

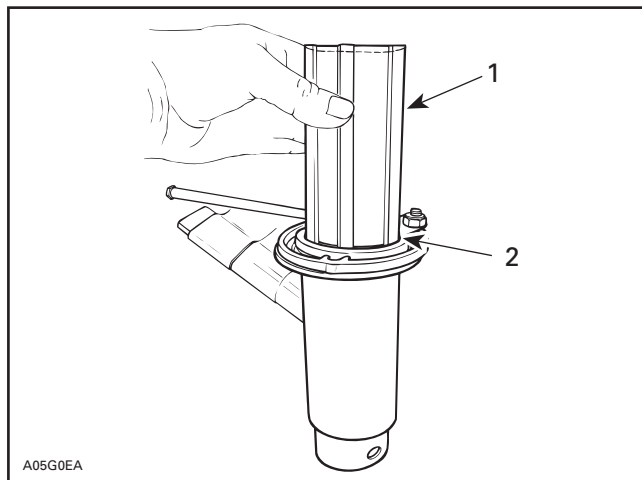


1. Allen screws

NOTE: These washers nos. 6 and 7 and stopper no. 5 can be wedged in cover.

4,13,14,16,17, O-Ring, Ski Leg, Upper Cushion, Lower Cushion and Seal

Pull up ski leg. Steering arm will not interfere.



1. Pull up ski leg
2. Steering arm in place

Section 08 STEERING/FRONT SUSPENSION

Subsection 03 (SUSPENSION AND SKI SYSTEM)

Remove seal and O-rings. Drive out upper and lower cushions if worn out.

INSPECTION

Suspension Free Operation

Remove cover and check for free movement of ski leg by lifting end of ski.

13, Ski Leg

Check straightness of ski leg. Check for scored or scratched surface. Replace as required. Check that splines on ski leg and steering arm interlock properly without excessive free play. Replace as necessary.

5, Stopper

Check condition of stopper. Replace it when deteriorated.

Grease Fitting

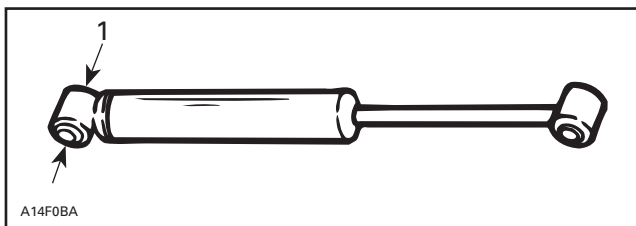
Ensure that grease fittings are not clogged.

10, Stopper

Check stopper for crack or deterioration. Replace as required.

8, Shock Absorber

Secure the shock body end in a vise with its rod upward.



1. Clamp

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.

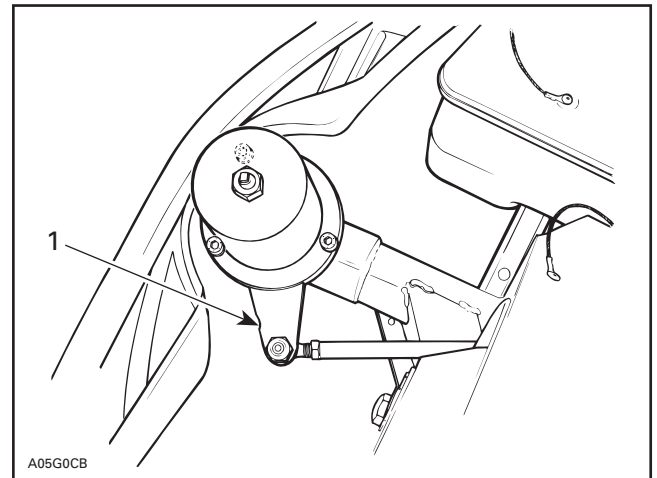
INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Apply suspension synthetic grease (P/N 293 550 033) 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.



1. Recess facing outside

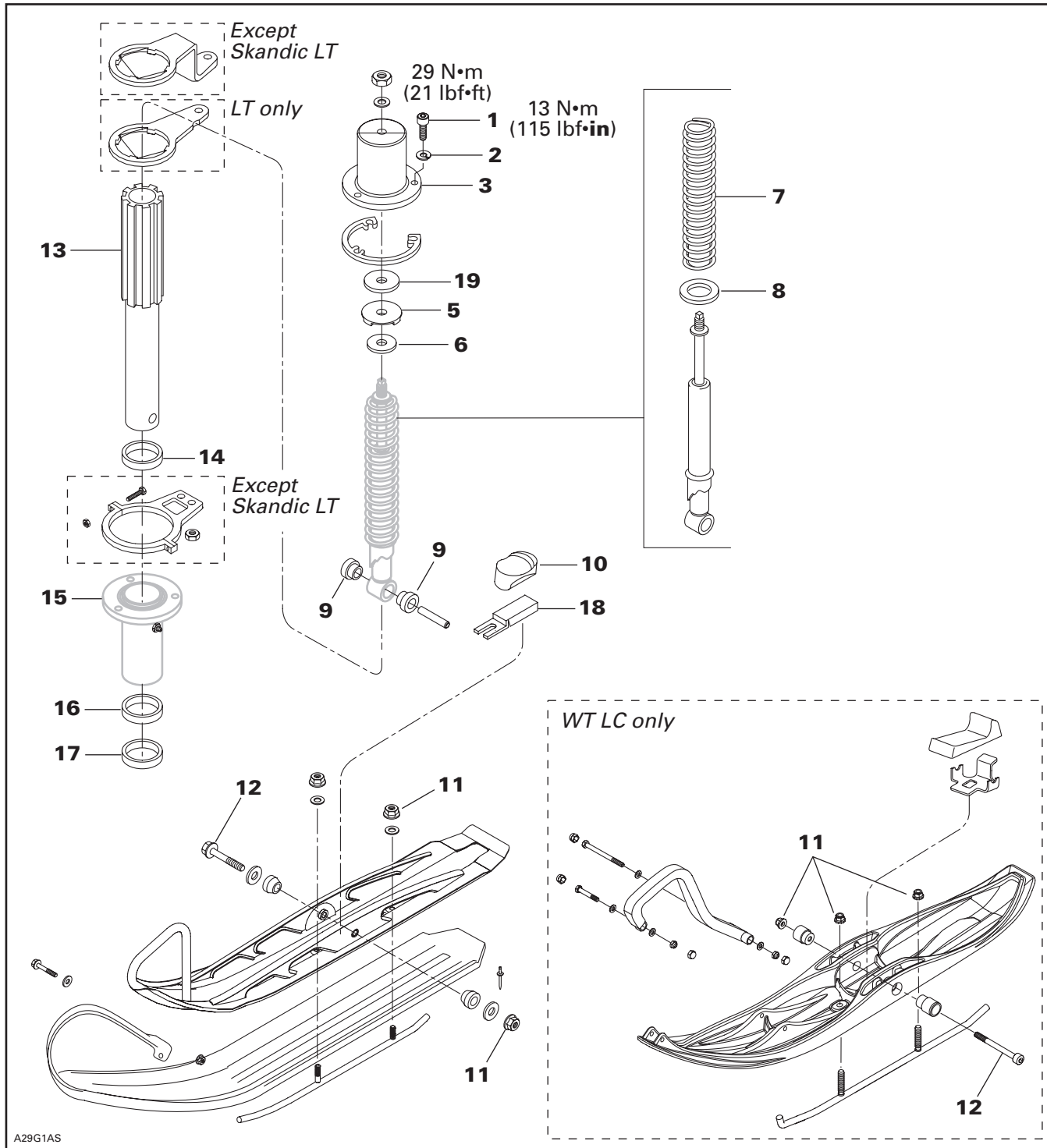
16,17, Seal

Install seal before reinstalling ski leg.

Section 08 STEERING/FRONT SUSPENSION

Subsection 03 (SUSPENSION AND SKI SYSTEM)

Skandic LT/LT E/WT/SWT/WT LC



TYPICAL

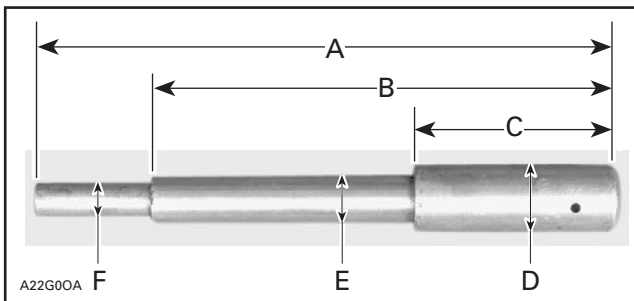
ON-VEHICLE COMPONENT VERIFICATION

8, Shock

Lift front of vehicle and support off the ground.

Remove ski bolt and nut.

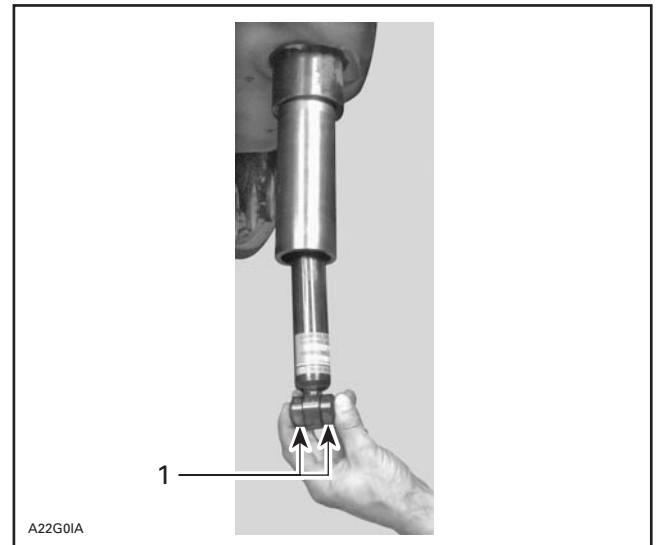
Remove steel bushing from ski using a pusher. See pusher dimensions below.



- A. 220 mm (8.66 in)
- B. 180 mm (7.09 in)
- C. 70 mm (2.75 in)
- D. 25 mm (1.0 in)
- E. 15 mm (0.59 in)
- F. 9 mm (0.35 in)



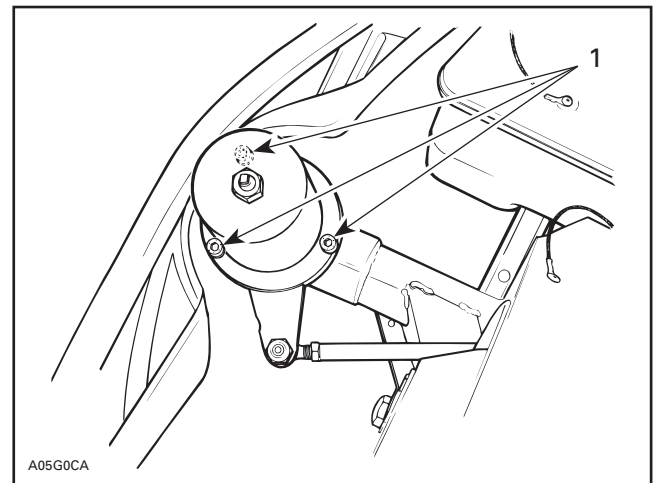
Unfasten rod nut then pull out shock from bottom. Check shock as described below in INSPECTION. At installation, make sure bushings are in place.



1. Bushings

7, Spring

Unscrew shock rod nut then remove washer. Unscrew 3 Allen screws retaining cover no. 3, then remove stopper no. 5, washers no. 6, washer no. 19.

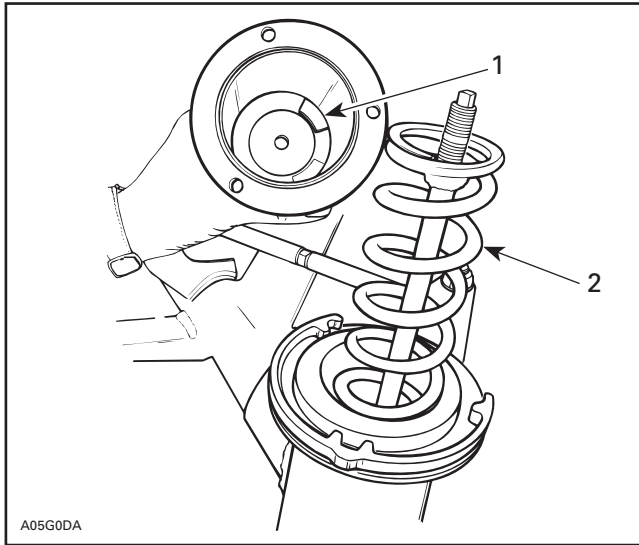


1. Allen screws

NOTE: These washers and stopper can be wedged in cover.

Section 08 STEERING/FRONT SUSPENSION

Subsection 03 (SUSPENSION AND SKI SYSTEM)



1. Washers and stopper wedged in cover
2. Spring

Pull out spring.

DISASSEMBLY

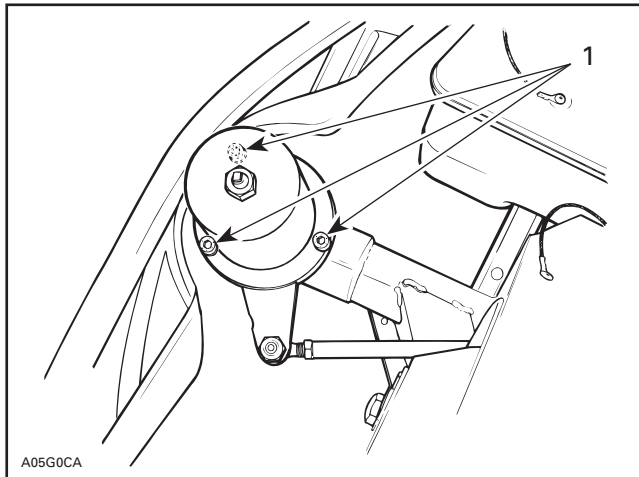
Lift front of vehicle and support off the ground.

1,2,3,5,6,9,11,12, Bolt, Lock Washer, Cover, Stopper, Bushing and Nut

Remove ski bolt, nut, bushings and ski.

Unscrew shock rod nut then remove washer. Shock will fall off the ski leg.

Unscrew 3 Allen screws retaining cover, then remove stopper and washers.

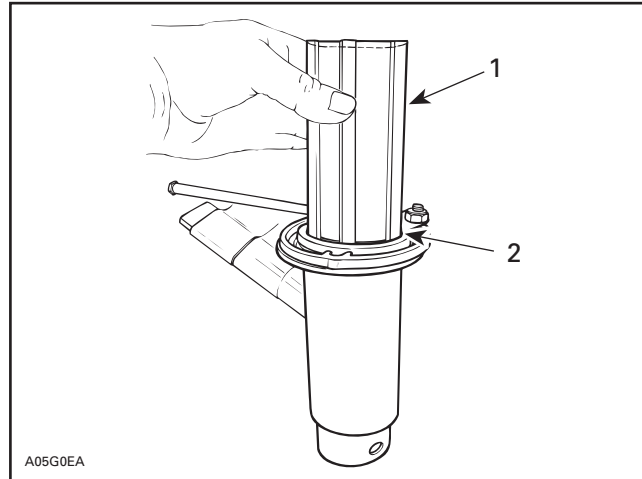


1. Allen screws

NOTE: These washers and stopper can be wedged in cap.

13,14,16,17, Ski Leg, Bushing and Seal

Pull up ski leg. Steering arm will not interfere.



1. Pull up ski leg
2. Steering arm in place

Remove seal. Drive out bushing if worn out.

INSPECTION

All Models

Suspension Free Operation

Remove cover and check for free movement of ski leg by lifting end of ski.

13, Ski Leg

Check straightness of ski leg. Check for scored or scratched surface. Replace as required.

Check that splines on ski leg and steering arm interlock properly with no excessive free play. Renew as necessary.

5, Stopper

Check condition of stopper. Replace it when deteriorated.

Grease Fitting

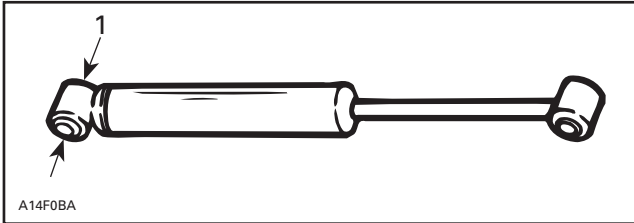
Ensure that grease fittings are not clogged.

10, Ski Stopper

Check stopper for crack or deterioration. Replace as required.

8, Shock Absorber

Secure the shock body end in a vise with its rod upward.



1. Clamp

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.

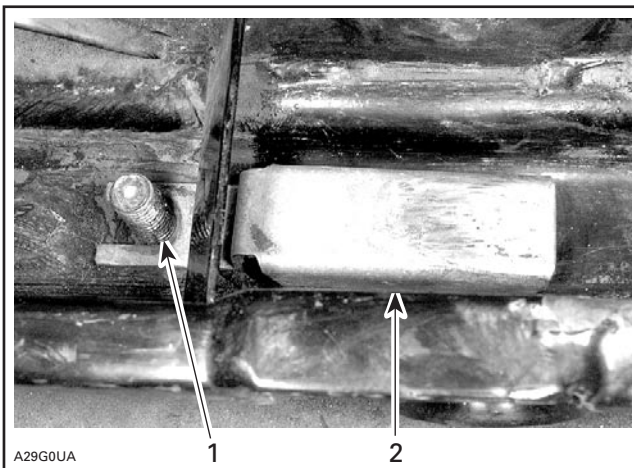
Pay attention to the following conditions that will denote a defective shock:

- 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.

18, Support Plate

Position support plate against runner stud.



1. Runner stud
2. Support plate

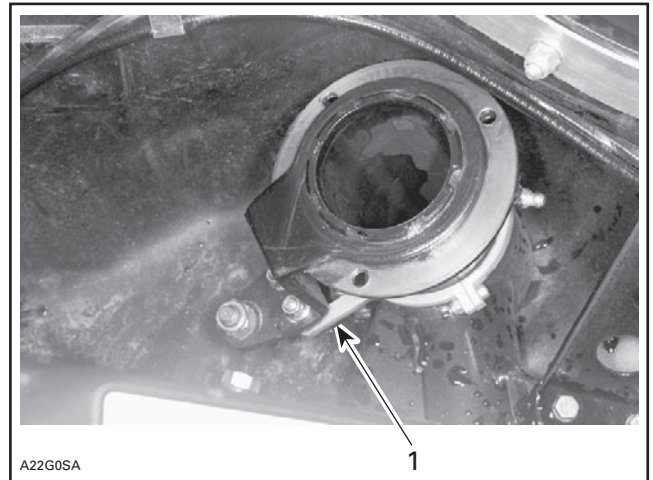
INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Apply suspension synthetic grease (P/N 293 550 033) as illustrated in exploded view above.

Tighten nuts and screws to proper torque as mentioned in exploded view.

Reinstall steering arm reinforcement when removed.



1. Reinforcement

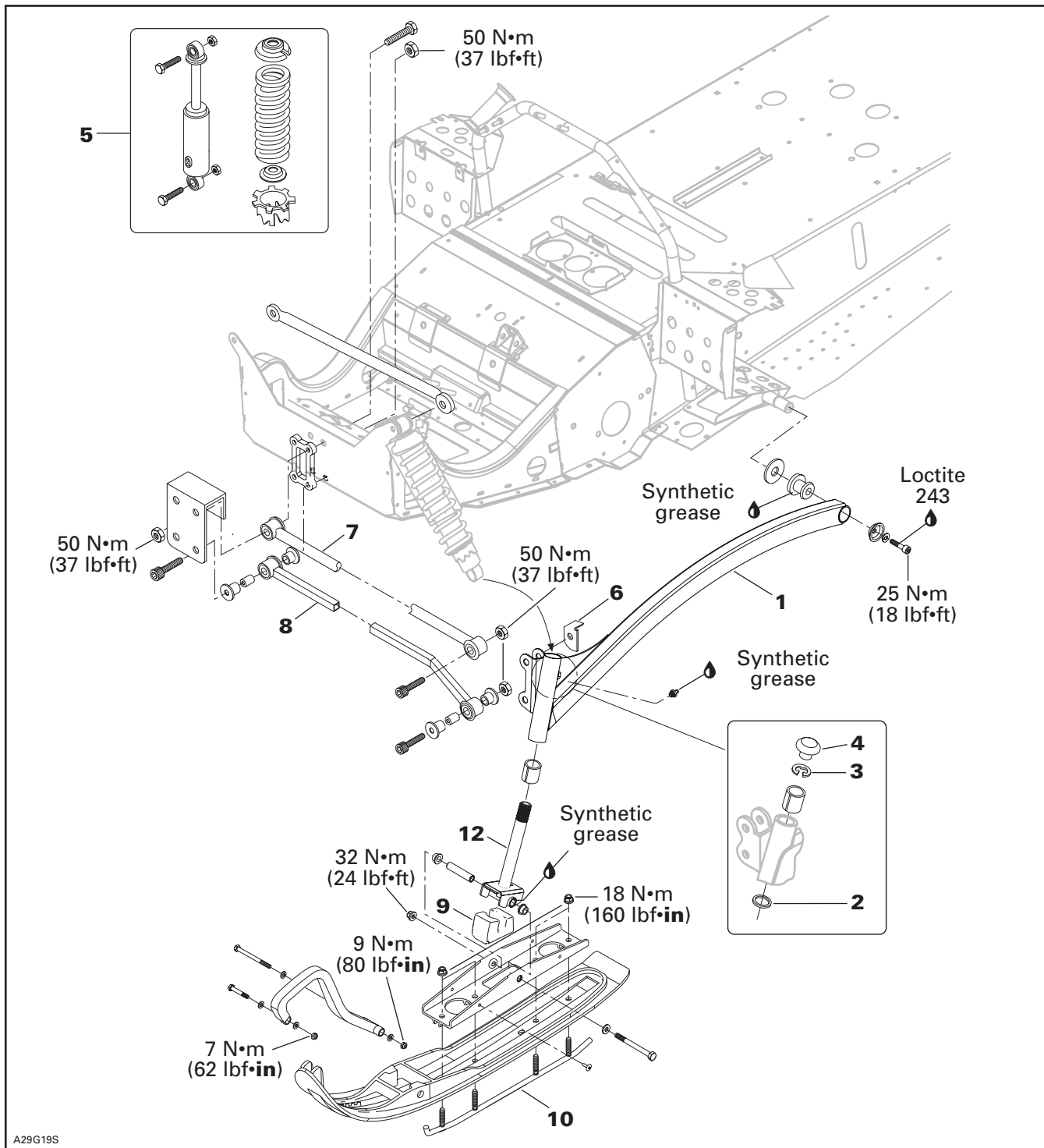
16,17, Seal

Install seal before reinstalling ski leg.

Section 08 STEERING/FRONT SUSPENSION

Subsection 03 (SUSPENSION AND SKI SYSTEM)

Skandic SUV 550/600



A29G19S

TYPICAL

DISASSEMBLY

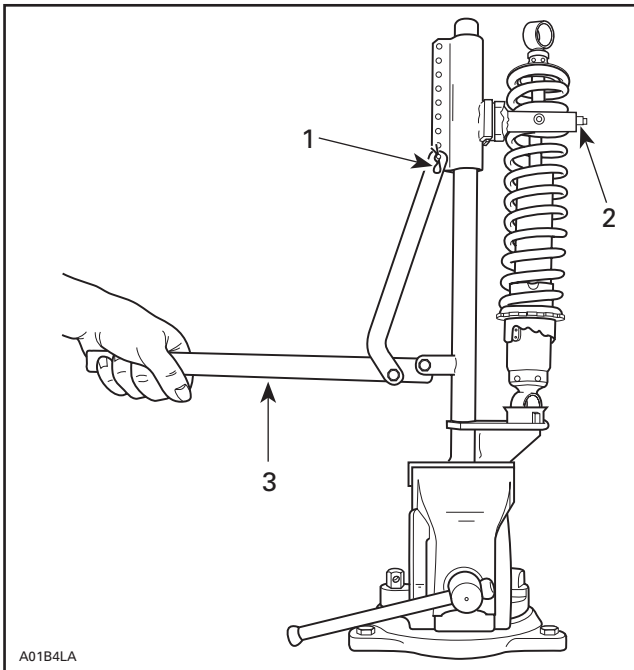
5, Shock

Lift front of vehicle and support it off the ground. Reduce spring preload by turning adjusting ring accordingly.

Remove lower bolt then upper bolt of shock.

For shock spring disassembly use shock spring remover (P/N 529 035 504) in a vise. Mount shock in it and turn shock so that spring coils matched spring compressor.

Close and lock the bar. Adjust the handle at horizontal position by changing the position of the clevis pin.



1. Clevis pin
2. Bar
3. Handle horizontal

Push down on the handle until it locks. Remove spring stopper then release handle.

1, Swing Arm

Lift front of vehicle and support it off the ground. Remove cap no. 4, circlip no. 3.

Scribe mark the steering arm and ski leg before disassembly.



Then loosen steering arm bolt and pull up steering arm. Ski leg may fall off from swing arm.

Unbolt lower end of shock from swing arm.

Unbolt upper and lower arms.

Unbolt rear of swing arm from frame.

Pull swing arm off the vehicle.

INSPECTION

Check all rubber cushions for crack and wear. Replace as required.

Check straightness of ski leg **no. 12** and make sure that splines are properly interlocking with steering arm. Replace as required.

Check for straightness of swing arm. Replace as required.

Check for clogged grease fittings. Clean or replace as required.

Check skis and runners **no. 10** for wear, replace as necessary.

Check condition of ski stopper **no. 9**. Replace it when deteriorated.

To check condition of shock, refer to SHOCK ABSORBER in INSPECTION CHAPTER.

Section 08 STEERING/FRONT SUSPENSION

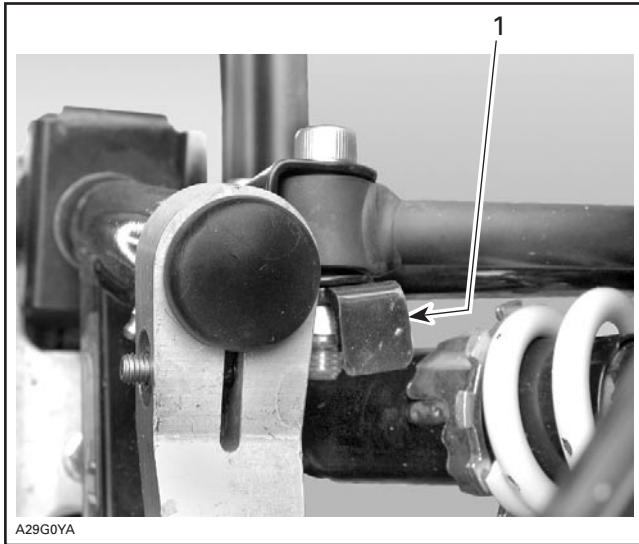
Subsection 03 (SUSPENSION AND SKI SYSTEM)

INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Apply suspension synthetic grease (P/N 293 550 033) to ski leg components.

Install steering stopper **no. 6** as per following photo.



TYPICAL

1. Steering stopper

Longer bolts for shock and swing arm go on upper attachments.

Tighten nuts and screws to proper torque as mentioned in exploded view.

7,8, Upper and Lower Arms

Position arms and tie rods horizontally before tightening nuts.

Bent portion of lower arm **no. 6** must face down.

Steering arm must be installed parallel to ski.



1. Parallel

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FRAME CLEANING.....	09-03-1
FRAME WELDING	09-03-1

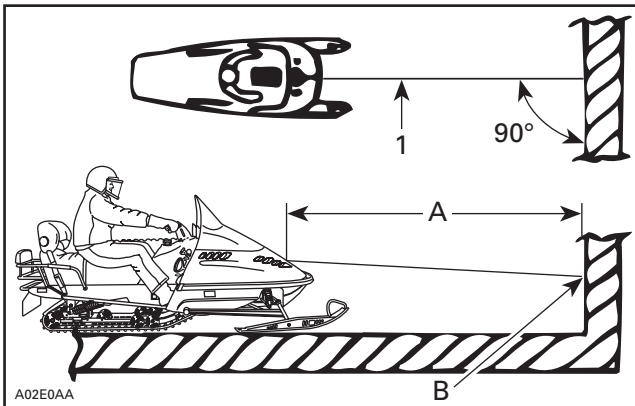
BODY

INSTALLATION AND ADJUSTMENT

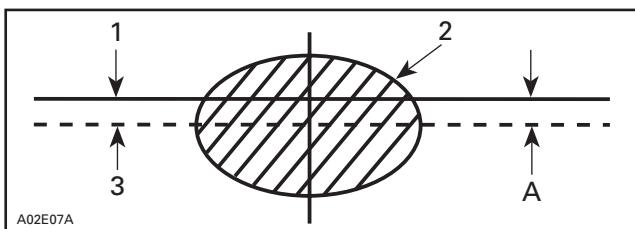
HEADLAMP BEAM AIMING

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.



- 1. Headlamp center line
- A. 381 cm (12 ft 6 in)
- B. 25 mm (1 in) below center line



- 1. Headlamp horizontal
- 2. Light beam (high beam) (projected on the wall)
- 3. Light beam center
- A. 25 mm (1 in)

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.

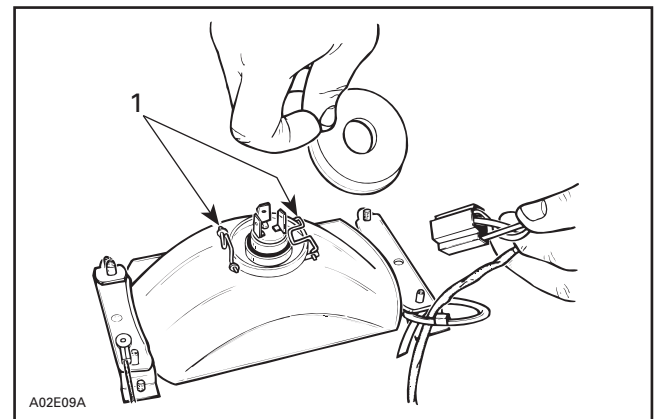
Rider or equivalent weight must be on the vehicle.

Select high beam.

BULB REPLACEMENT

Tundra

If headlamp is burnt, tilt hood. Unplug connector from headlamp. Remove protector cap and unfasten bulb retainer clips. Detach bulb and replace.

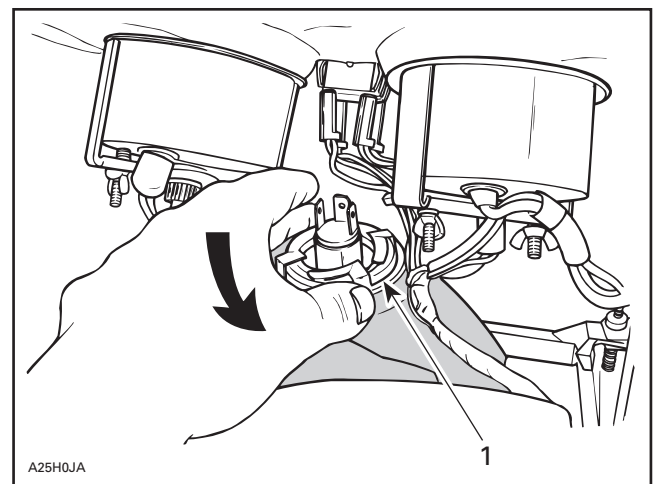


TYPICAL

- 1. Retainers clips

Skandic LT/LT E

If headlamp bulb is burnt, tilt cab and unplug the connector from the headlamp. Remove the rubber boot and unfasten the bulb retainer ring. Detach the bulb and replace it with a new one. Properly reinstall parts.



TYPICAL

- 1. Locking ring

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.

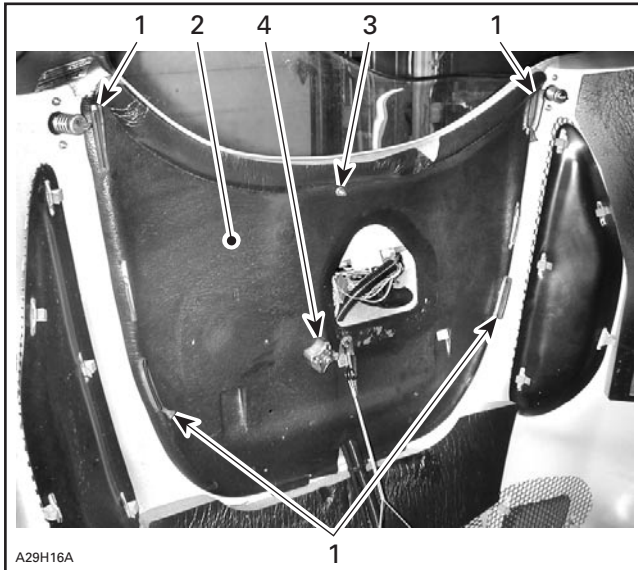
Section 09 BODY/FRAME

Subsection 02 (BODY)

Skandic LT/SWT/WT LC/SUV 550/SUV 600

If headlamp bulb is burnt, tilt hood.

Remove latches retaining plastic cover. Temporary reinstall the top two latches to retain windshield during bulb replacement.



1. Latches
2. Plastic cover
3. Retaining nut and screw
4. Headlamp height adjustment knob

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.

BELT GUARD

Disassembly and Assembly

NOTE: For additional information (ex.: exploded view) refer to the corresponding *Parts Catalog*.

⚠ WARNING

Engine should be running only with belt guard well-secured in place.

Inspection

All Models

Check belt guard mounting bosses, clips and retainers for wear.

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.

TUBING

⚠ 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.

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.

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	IRREPAIRABLE	REPAIRABLE
		HIGH DENSITY POLYETHYLENE	R.I.M. URETHANE
 <small>A06H194</small>	Tundra		
	Skandic LT/ WT/SWT/ WT LC/ SUV 550/ SUV 600		
BOTTOM PAN	Tundra		
	Skandic LT/ WT/SWT/ WT LC/ SUV 550/ SUV 600		

Section 09 BODY/FRAME

Subsection 02 (BODY)

REPAIR PROCEDURE FOR R.I.M. URETHANE

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 over-heat material and liberate agents in it thus causing a bad adhesion.

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 surface 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 surface 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: R.I.M. materials are high static plastics, painting must be done in a dust free area such as a paint booth.

Crest products used in R.I.M. repair procedure are available from following locations:

CREST MAIN OFFICE AND MANUFACTURING PLANT	
CREST INDUSTRIES INC. 1337 KING ROAD TRENTON, MICHIGAN, U.S.A. 48183	Phone: 734-479-4141 Toll free: 1 800 822-4100 Fax: 734-479-4040 E-Mail: info@crestauto.com www.crestauto.com

FRAME

FRAME CLEANING

NOTE: For bare 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.

CAUTION: Never direct high-pressure water jet towards decals. They would peel off.

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 recommended to clean the seat with a solution of **warm soapy water**, using a soft clean cloth.

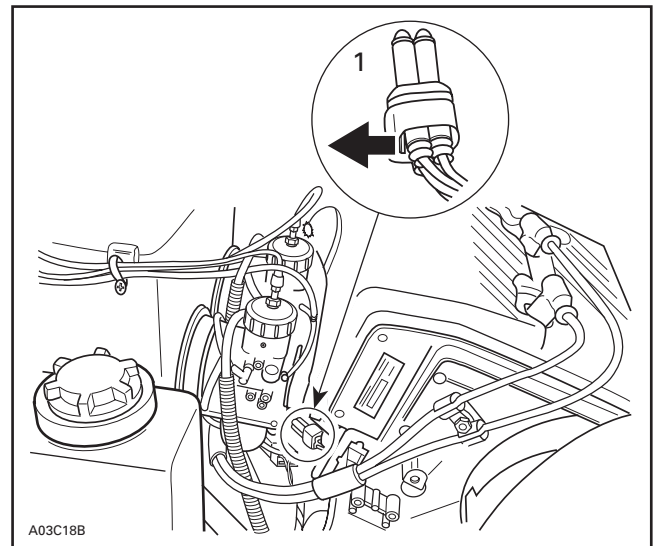
CAUTION: Avoid use of harsh detergents such as strong soaps, degreasing solvents, abrasive cleaners, paint thinners, etc. that may cause damage to the seat cover.

FRAME WELDING

Steel Frame:

- electric welding
- amperage: 70-110 A
- voltage: 20-24 V
- electrode: E-7014 (3/32 in).

CAUTION: Before performing electrical welding anywhere on the vehicle, unplug the multiple connector at the electronic box. On models equipped with a battery, also unplug the negative cable. This will protect the electronic box and battery against damage caused by flowing current when welding.



TYPICAL — FAN COOLED MODELS

1. Unplug before electrical welding



TYPICAL — LIQUID COOLED MODELS
MPEM UNPLUGGED

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.

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	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 × 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 **millimeters** to **inches**, divide by 25.4.

NOTE: Conversion factors are rounded off to 2 decimals for easier use.






Section 10 TECHNICAL DATA

Subsection 02 (ENGINES)





	VEHICLE MODEL	TUNDRA	SKANDIC LT/LT E		
	ENGINE TYPE	277	443		
	Number of Cylinders	1	2		
	Bore	mm (in) 72.00 (2.835)	67.5 (2.6575)		
	Stroke	mm (in) 66.00 (2.598)	61.0 (2.402)		
	Displacement	cm ³ (in ³) 268.7 (16.40)	436.6 (26.64)		
	Maximum Power Engine Speed ①	± 100 RPM	6900		
	Piston Ring Type	1 st /2 nd	ST/R		
	Ring End Gap	(new) mm (in) (wear limit) mm (in)	ST ring 0.25 (.010) R ring 0.20 (.008) 1.0 (.039)	0.2 (.008) 1.0 (.039)	
	Ring/Piston Groove Clearance	(new) mm (in) (wear limit) mm (in)	0.025 (.001) 0.2 (.008)	0.04 (.0016) 0.2 (.0079)	
	Piston/Cylinder Wall Clearance	(new) ± 0.016 mm (± .0006 in) (wear limit) mm (in)	0.080 (.0031) 0.2 (.008)	0.080 (.0031) 0.2 (.008)	
	Connecting Rod Big End Axial Play	(new) mm (in) (wear limit) mm (in)	0.20 (.0079) 1.0 (.0394)		
	Max. Crankshaft End-Play ②	mm (in)	0.3 (.012)		
	Max. Crankshaft Deflection Measured at PTO	mm (in)	0.08 (.0031)		
		Magneto Generator Output	W	240	
Ignition Type		CDI			
Spark Plug Make and Type		NGK BR9ES			
Spark Plug Gap		± 0.05 mm (± .002 in)	0.45 (.018)		
Ignition Timing BTDC ③ ⑦		mm (in)	3.61 (.142)	2.79 (.110)	
Trigger Coil Air Gap		mm (in)	0.50 – 0.70 (.020 – .028)	0.45 – 0.55 (.018 – .022)	
Trigger Coil ④		Ω	160 – 180		
Generating Coil ④		Low Speed	N.A.	N.A.	
		High Speed	Ω 5.1 – 6.2	Ω 6.3 - 7.7	
Lighting Coil ④		Ω	0.17 – 0.21	0.145 - .175	
High Tension Coil ④	Primary	Ω N.A.			
	Secondary	kΩ 0.9 – 1.1			
	Carburetor Type	PTO/MAG	1 x VM 34-585	1 x VM 32-19121	
	Main Jet	PTO/MAG	200	180	
	Needle Jet		159 0-8	159 0-0	
	Pilot Jet		40	50	
	Needle Identification — Clip Position		6DH4-3	6DGY12-3	
	Slide Cut-Away		2.5	3	
	Float Adjustment	± 1 mm (± .040 in)	23.9 (.94)	35.5 (1.392)	
	Air Screw Adjustment	± 1/16 Turn	1	1-1/2	
	Idle Speed RPM	± 200 RPM	1650		
	Gas Type/Pump Octane Number		Unleaded/87		
Gas/Oil Ratio		Injection			
	Type		Radial Fan	Axial Fan	
	Axial Fan Belt Adjustment	Deflection	mm (in) N.A.	9 – 10 (.35 – .39)	
		Force ⑤	kg (lbf) N.A.	5 (11)	
	Thermostat Opening Temperature	°C (°F)	N.A.		
Radiator Cap Opening Pressure	kPa (PSI)	N.A.			
	ENGINE COLD N _m (lbf·ft)	Drive Pulley Retaining Screw	⑥	⑧	
		Exhaust Manifold Nuts or Bolts	25 (18)	22 (16)	
		Magneto Ring Nut	100 (73.34)	105 (77)	
		Crankcase Nuts or Screws	M6 M8 — 22 (16)	9 (6.5) 22 (16)	
		Crankcase/Engine Support Nuts or Screws	21 (15)	39 (29)	
		Cylinder Head Nuts	27 (20)	22 (16)	
		Crankcase/Cylinder Nuts or Screws		N.A.	
		Axial Fan Shaft Nut		N.A.	50 (37)

Section 10 TECHNICAL DATA

Subsection 02 (ENGINES)





VEHICLE MODEL		SKANDIC WT/SWT/SUV 550	SKANDIC WT LC/SUV 600		
ENGINE TYPE		552	593		
	Number of Cylinders	2			
	Bore	76.00 (2.992)			
	Stroke	61.0 (2.402)	65.8 (2.591)		
	Displacement	553.4 (33.78)	597.0 (36.43)		
	Maximum Power Engine Speed ①	± 100 RPM			
	Piston Ring Type	ST/R	ST		
	Ring End Gap	(new) mm (in) (wear limit) mm (in)	0.4 (.0157) 1.0 (.0394)		
	Ring/Piston Groove Clearance	(new) mm (in) (wear limit) mm (in)	0.037 (.0015) 0.2 (.0079)	0.04 (.0016) 0.2 (.0079)	
	Piston/Cylinder Wall Clearance	(new) ± 0.016 mm (± .0006 in) (wear limit) mm (in)	0.037 (.0015) 0.2 (.0079)	0.12 (.0047) 0.2 (.0079)	
	Connecting Rod Big End Axial Play	(new) mm (in) (wear limit) mm (in)	0.2 (.0079) 1.2 (.0472)	0.39 (.0154) 1.2 (.0472)	
	Max. Crankshaft End-Play ②	mm (in)			
	Max. Crankshaft Deflection Measured at PTO	mm (in)			
		Magneto Generator Output	W		
		Ignition Type	CDI		
Spark Plug Make and Type		NGK BR9ES	NGK BR9ECS ⑩		
Spark Plug Gap		± 0.05 mm (± .002 in)			
Ignition Timing BTDC ③ ⑦		mm (in)			
Trigger Coil Air Gap		mm (in)			
Trigger Coil ④		Ω			
Generating Coil ④		Low Speed	N.A.	17.5 - 42.5	
		High Speed	Ω	6.3 (7.7)	2.4 - 5.8
Lighting Coil ④		Ω			
High Tension Coil ④		Primary	Ω	N.A.	0.3 - 0.7
	Secondary	kΩ	5.1 - 6.3	8 - 16	
	Carburetor Type	PTO/MAG			
	Main Jet	PTO/MAG			
	Needle Jet	159 P-0			
	Pilot Jet	40			
	Needle Identification — Clip Position	6DH4-2			
	Slide Cut-Away	2.5			
	Float Adjustment	± 1 mm (± .040 in)			
	Air Screw Adjustment	± 1/16 Turn			
	Idle Speed RPM	± 200 RPM			
	Gas Type/Pump Octane Number	Unleaded/87			
	Gas/Oil Ratio	Injection			
	Type	Axial fan			
	Axial Fan Belt Adjustment	Deflection	mm (in)	9 - 10 (.35 - .39)	
		Force ⑤	kg (lbf)	5 (11)	
	Thermostat Opening Temperature	°C (°F)			
Radiator Cap Opening Pressure	kPa (PSI)				
	ENGINE COLD N•m (lbf•ft)	Drive Pulley Retaining Screw	⑥		
		Exhaust Manifold Nuts or Bolts	22 (16)		
		Magneto Ring Nut	105 (77)		
		Crankcase Nuts or Screws	M6	—	
			M8	22 (16)	
		Crankcase/Engine Support Nuts or Screws	40 (30)		
		Cylinder Head Nuts	22 (16)		
		Crankcase/Cylinder Nuts or Screws	N.A.		
Axial Fan Shaft Nut	48 (35)				

Section 10 TECHNICAL DATA
Subsection 03 (VEHICLES)

VEHICLE MODEL		TUNDRA	SKANDIC LT	
ENGINE TYPE		277	443	
	Chain Drive Ratio	14/25	17/44	
	Chain	Pitch in	1/2	3/8
		Type/Links Qty/Plates Qty	Single/62	Silent 70/11
	Drive Pulley	Type of Drive Pulley	Bombardier Lite	Comet
		Ramp Identification	N.A.	218311C
		Calibration Screw Position or Calibration Part ①	1143 – 1 x C, 5 x S3.4	–
		Spring Color	Red/Yellow	Silver/Black
		Spring Length ± 1.5 mm (± .060 in)	87.9 (3.461)	78.99 (3.110)
	Driven Pulley	Clutch Engagement ± 100 RPM	3000	3200
		Type of Driven Pulley	Tundra Reverse	LPV27
		Spring Preload ± 0.7 kg (± 1.5 lb)	N.A.	
	Cam Angle degree	37.8	40	
	Pulley Distance Z mm (in)	37.0 +0, -0.75 (1.457 +0, -.030)	39 ± 0.75 (1.535 ± .030)	
	Offset	X mm (in)	36.0 ± 1.0 (1.417 ± .040)	37 ± 0.75 (1.457 ± .030)
		Y – X MIN. MAX.	0 – 1.51 (0 – .060)	0.75 – 1.50 (.030 – .060)
	Drive Belt Part Number (P/N)	414 827 600	414 633 800	
	Drive Belt Width Wear Limit mm (in)	30.3 (1-3/16)	32.0 (1-1/4)	
	Drive Belt Adjustment	Deflection ± 5 mm (± 13/64 in)	32 (1-1/4)	
		Force ② kg (lbf)	6.8 (15)	11.3 (25)
	Track	Width mm (in)	381 (15.0)	
		Length mm (in)	3540 (139)	3968 (156.2)
		Profile Height mm (in)	18.4 (.724)	25 (1)
		Adjustment	Deflection mm (in)	35 – 40 (1-3/8 – 1-9/16)
Force ③ kg (lbf)			7.3 (16)	
Suspension Type	Track	Torque Reaction Slide	Skandic WT	
	Ski	Telescopic Strut		
	Length mm (in)	2845 (112)	3020 (118.9)	
	Width mm (in)	953 (37.5)	960 (37.8)	
	Height mm (in)	1140 (44.9)	1295 (51)	
	Ski Stance mm (in)	813 (32.0)	820 (32.3)	
	Toe-Out and Camber mm (in) degree	6 (1/4) 0	5 (3/16) -2	
	Mass (dry) kg (lb)	173 (380)	217 (478)	
	Ground Contact Area cm ² (in ²)	7570 (1173)	8811.3 (1365.8)	
	Ground Contact Pressure kPa (PSI)	2.24 (.325)	2.46 (.357)	
	Frame Material	Steel		
	Bottom Pan Material	Polyethylene High Density		
	Hood Material	Polyethylene High Density	RRIM	
		Battery V (A•h)	N.A.	
Headlight W		H4 60/55		
Taillight and Stoplight W		8/27		
Tachometer and Speedometer Bulb W		N.A.	3	
Fuel and Temperature Gauge Bulb W		N.A.		
Fuse		Starter Solenoid A	N.A.	
		Tachometer A	N.A.	
	Fuel Tank L (U.S. gal)	26 (6.9)	37 (9.8)	
	Chaincase Gearbox mL (U.S.oz)	250 (8.5)		
	Cooling System ⑤ L (U.S. oz)	N.A.		
	Injection Oil Reservoir L (U.S. oz)	1.9 (64)	2.5 (84.5)	




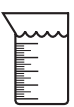
Section 10 TECHNICAL DATA

Subsection 03 (VEHICLES)

	VEHICLE MODEL	SKANDIC LT E	SKANDIC WT		
	ENGINE TYPE	443	552		
	Chain Drive Ratio	17/44	N.A.		
	Chain	Pitch in	3/8	N.A.	
		Type/Links Qty/Plates Qty	Silent 70/11	N.A.	
	Drive Pulley	Type of Drive Pulley	Comet	Bombardier Lite	
		Ramp Identification	218311C	-	
		Calibration Screw Position or Calibration Part ①	-	1 x S21, 4 x S3.4	
		Spring Color	Silver/Black	Yellow/Green	
		Spring Length ± 1.5 mm (± .060 in)	78.99 (3.110)	94.61 (3.725)	
	Driven Pulley	Clutch Engagement ± 100 RPM	3200	2500	
		Type of Driven Pulley	LPV27	Cam	
		Spring Preload ± 0.7 kg (± 1.5 lb)	N.A.	7.0 (15.4)	
		Cam Angle degree	40	40/35	
		Pulley Distance Z mm (in)	39 ± 0.75 (1.535 ± .030)	41.8 ± 0.75 (1.647 ± .030)	
	Offset	X mm (in)	37 ± 0.75 (1.457 ± .030)	35 ± 0.75 (1.380 ± .030)	
		Y - X MIN. MAX.	0.75 - 1.50 (.030 - .060)	0.75 - 1.50 (.030 - .060)	
		Drive Belt Part Number (P/N)	414 633 800	414 633 800	
		Drive Belt Width Wear Limit mm (in)	32.0 (1-1/4)	32.0 (1-1/4)	
	Drive Belt Adjustment	Deflection ± 5 mm (± 13/64 in)	32 (1-1/4)	32 (1-1/4)	
			Force ② kg (lbf)	11.3 (25)	11.3 (25)
	Track	Width mm (in)	381 (15.0)	500 (19.7)	
		Length mm (in)	3968 (156.2)	3968 (156.2)	
		Profile Height mm (in)	25 (1)	23.5 (.925)	
		Adjustment	Deflection mm (in)	40 - 50 (1-9/16 - 1-31/32)	40 - 50 (1-9/16 - 1-31/32)
			Force ③ kg (lbf)	7.3 (16)	7.3 (16)
Suspension Type	Track	Skandic WT	Skandic WT		
	Ski	Telescopic Strut	Telescopic Strut		
	Length mm (in)	3020 (118.9)	3020 (118.9)		
	Width mm (in)	960 (37.8)	1045 (41.1)		
	Height mm (in)	1295 (51)	1295 (50.98)		
	Ski Stance mm (in)	820 (32.3)	900 (35.4)		
	Toe-Out and Camber mm (in) degree	5 (3/16) - 2	5 (3/16) - 2		
	Mass (dry) kg (lb)	225 (496)	266 (586)		
	Ground Contact Area cm ² (in ²)	8811.3 (1365.8)	10793 (1672.9)		
	Ground Contact Pressure kPa (PSI)	2.55 (.370)	2.46 (.357)		
	Frame Material	Steel	Steel		
	Bottom Pan Material	Polyethylene High Density	Polyethylene High Density		
	Hood Material	RRIM	RRIM		
		Battery V (A•h)	12 (14)	12 (18)	
Headlight W		H4 60/55	H4 60/55		
Taillight and Stoplight W		8/27	8/27		
Tachometer and Speedometer Bulb W		3	3		
Fuel and Temperature Gauge Bulb W		N.A.	N.A.		
Fuse		Starter Solenoid A	15	20	
		Tachometer A	N.A.	N.A.	
	Fuel Tank L (U.S. gal)	37 (9.8)	42 (11.1)		
	Chaincase Gearbox mL (U.S. oz)	250 (8.5)	400 (13.5)		
	Cooling System ⑤ L (U.S. oz)	N.A.	N.A.		
	Injection Oil Reservoir L (U.S. oz)	2.5 (84.5)	2.5 (84.5)		



Section 10 TECHNICAL DATA

Subsection 03 (VEHICLES)

	VEHICLE MODEL		SKANDIC SWT	SKANDIC WT LC	SKANDIC SUV 550		
	ENGINE TYPE		552	593	552		
	Chain Drive Ratio		N.A.	N.A.	N.A.		
	Chain	Pitch	in	N.A.	N.A.	N.A.	
		Type/Links Qty/Plates Qty		N.A.	N.A.	N.A.	
	Drive Pulley	Type of Drive Pulley		Bombardier Lite	TRA III	Bombardier Lite	
		Ramp Identification		–	600 ④	–	
		Calibration Screw Position or Calibration Part ①		1 x S21, 4 x S3.4	3	1 x S21, 4 x S3.4	
		Spring Color		Yellow/Green	Yellow/Red	Yellow/Green	
		Spring Length ± 1.5 mm (± .060 in)		94.61 (3.725)	128 (5.039)	94.61 (3.725)	
	Driven Pulley	Clutch Engagement ± 100 RPM		2500	2700	2500	
		Type of Driven Pulley		Cam	Cam	Cam	
		Spring Preload ± 0.7 kg (± 1.5 lb)		7.0 (15.4)	7.0 (15.4)	7.0 (15.4)	
	Cam Angle		degree	40/35	35/30	40/35	
	Pulley Distance Z		mm (in)	41.8 ± 0.75 (1.647 ± .030)	35.5 ± 0.75 (1.398 ± .030)	41.8 ± 0.75 (1.647 ± .030)	
	Offset	X	mm (in)	35 ± 0.75 (1.380 ± .030)	35.0 ± 0.75 (1.380 ± .030)	35.0 ± 0.75 (1.380 ± .030)	
		Y – X	MIN. MAX.	0.75 – 1.50 (.030 – .060)	0.75 – 1.50 (.030 – .060)	0.75 – 1.50 (.030 – .060)	
	Drive Belt Part Number (P/N)			414 633 800	414 633 800	414 633 800	
	Drive Belt Width Wear Limit		mm (in)	32.0 (1-1/4)	32.0 (1-1/4)	32.0 (1-1/4)	
	Drive Belt Adjustment	Deflection	± 5 mm (± 13/64 in)	32 (1-1/4)	32 (1-1/4)	32 (1-1/4)	
		Force ②	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)	
	Track	Width		mm (in)	600 (23.6)	500 (19.7)	500 (19.7)
		Length		mm (in)	3968 (156.2)	3968 (156.2)	3968 (156.2)
		Profile Height		mm (in)	23.5 (.925)	31.8 (1.250)	23.5 (.925)
		Adjustment	Deflection	mm (in)	40 – 50 (1-9/16 – 1-31/32)	40 – 50 (1-9/16 – 1-31/32)	40 – 50 (1-9/16 – 1-31/32)
			Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track	Skandic WT	Skandic WT	Skandic SUV	
			Ski	Telescopic Strut	Telescopic Strut	SUV	
		Length		mm (in)	3150 (124.0)	3150 (124.0)	3040 (119.7)
		Width		mm (in)	1100 (43.3)	1100 (43.3)	1089 (42.9)
Height		mm (in)	1330 (52.4)	122 (48)	1295 (51)		
Ski Stance		mm (in)	900 (35.4)	90.0 (35.4)	900 (35.4)		
Toe-Out and Camber		mm (in) degree	5 (3/16) - 2	5 (3/16) - 2	5 (3/16) - 2		
Mass (dry)		kg (lb)	286 (631)	287 (633)	277 (611)		
Ground Contact Area		cm ² (in ²)	13986 (2167.8)	12335 (1912)	12335 (1912)		
Ground Contact Pressure		kPa (PSI)	2.04 (.296)	2.33 (.338)	2.25 (.320)		
Frame Material			Steel	Steel	Steel		
Bottom Pan Material			Polyethylene High Density	Polyethylene High Density	Polyethylene High Density		
Hood Material			RRIM	RRIM	RRIM		
		Battery		V (A•h)	12 (18)	12 (20)	12 (18)
	Headlight		W	H4 60/55	H4 60/55	H4 60/55	
	Taillight and Stoplight		W	8/27	8/27	8/27	
	Tachometer and Speedometer Bulb		W	3	3	3	
	Fuel and Temperature Gauge Bulb		W	N.A.	N.A.	N.A.	
	Fuse	Starter Solenoid	A	20	15	20	
		Tachometer	A	N.A.	N.A.	N.A.	
	Fuel Tank		L (U.S. gal)	42 (11.1)	42 (11.1)	42 (11.1)	
	Chaincase Gearbox		mL (U.S. oz)	400 (13.5)	400 (13.5)	400 (13.5)	
	Cooling System ⑤		L (U.S. oz)	N.A.	4.5 (152)	N.A.	
	Injection Oil Reservoir		L (U.S. oz)	2.5 (84.5)	2.5 (84.5)	2.5 (84.5)	

Section 10 TECHNICAL DATA

Subsection 03 (VEHICLES)

VEHICLE MODEL		SKANDIC SUV 600			
ENGINE TYPE		593			
Chain Drive Ratio		N.A.			
Chain	Pitch	in			
	Type/Links Qty/Plates Qty	N.A.			
Drive Pulley	Type of Drive Pulley	TRA III			
	Ramp Identification	600 ④			
	Calibration Screw Position or Calibration Part ①	3			
	Spring Color	Yellow/Red			
	Spring Length	± 1.5 mm (± .060 in)	128 (5.039)		
	Clutch Engagement	±100 RPM	2700		
Driven Pulley	Type of Driven Pulley	Cam			
	Spring Preload	± 0.7 kg (± 1.5 lb)	7.0 (15.4)		
	Cam Angle	degree	35/30		
Pulley Distance Z		mm (in)	35.5 ± 0.75 (1.398 ± .030)		
Offset	X	mm (in)	35.0 ± 0.75 (1.380 ± .030)		
	Y - X	MIN. MAX.	0.75 - 1.5 (.030 - .060)		
Drive Belt Part Number (P/N)		414 633 800			
Drive Belt Width Wear Limit		mm (in)	32.0 (1-1/4)		
Drive Belt Adjustment	Deflection	± 5 mm (± 13/64 in)	32 (1-1/4)		
	Force ②	kg (lbf)	11.3 (25)		
Track	Width	mm (in)	500 (19.7)		
	Length	mm (in)	3968 (156.2)		
	Profile Height	mm (in)	31.8 (1.250)		
	Adjustment	Deflection	mm (in)	40 - 50 (1-9/16 - 1-31/32)	
		Force ③	kg (lbf)	7.3 (16)	
Suspension Type	Track	Skandic SUV			
	Ski	SUV			
Length		mm (in)	3040 (119.7)		
Width		mm (in)	1089 (42.9)		
Height		mm (in)	1295 (51)		
Ski Stance		mm (in)	900 (35.4)		
Toe-Out and Camber		mm (in) degree	5 (3/16) - 2		
Mass (dry)		kg (lb)	291 (642)		
Ground Contact Area		cm² (in²)	12335 (1912)		
Ground Contact Pressure		kPa (PSI)	2.36 (.342)		
Frame Material		Steel			
Bottom Pan Material		Polyethylene high density			
Hood Material		RRIM			
	Battery	V (A•h)	12 (20)		
	Headlight	W	H4 60/55		
	Taillight and Stoplight	W	8/27		
	Tachometer and Speedometer Bulb	W	3		
	Fuel and Temperature Gauge Bulb	W	N.A.		
	Fuse	Starter Solenoid	A	15	
		Tachometer	A	N.A.	
	Fuel Tank	L (U.S. gal)	42 (11.1)		
	Chaincase Gearbox	mL (U.S. oz)	400 (13.5)		
	Cooling System ⑤	L (U.S. oz)	4.5 (152)		
	Injection Oil Reservoir	L (U.S. oz)	2.5 (84.5)		

ENGINE TECHNICAL DATA LEGEND

BTDC: Before Top Dead Center
CDI: Capacitor Discharge Ignition
K: Kilo (x 1000)
MAG: Magneto Side
N.A.: Not Applicable
PTO: Power Take Off Side
R: Rectangular
ST: Semi-Trapezoidal

- ① The maximum power engine speed is applicable on the vehicle. It may be different under certain circumstances and BOMBARDIER INC. reserves the right to modify it without obligation.
- ② Crankshaft end-play is not adjustable on these models except Tundra. Specification is given for verification purposes only.
- ③ For all non-RER models timing is verified at 6000 RPM (engine cold) with headlamp turned on.
- ④ All resistance measurements must be performed with parts at room temperature (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.
- ⑤ Force applied midway between pulleys to obtain specified deflection.
- ⑥ Drive pulley retaining screw: torque to 80 to 100 N•m (59 to 74 lbf•ft), install drive belt, accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake; repeat 5 times. Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).
- ⑦ For all RER models timing is verified at 3500 RPM (engine cold) with headlamp turned on.
- ⑧ Tightening torques for Skandic LT/LT E Comet drive pulley.
Retaining screw: 60 to 68 N•m (44 to 50 lbf•ft).
Spider: 170 N•m (125 lbf•ft).
Cover screws: 12.5 N•m (110 lbf•in).
Pivot bolts and nuts: 5.6 N•m (50 lbf•in).
- ⑨ Drive pulley retaining screw: torque to 90 to 100 N•m (66 to 74 lbf•ft), install drive belt, accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake; repeat 5 times. Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).
- ⑩ **CAUTION:** Do not attempt to adjust gap on spark plug BR 9 ECS. The specification is given for verification purpose only. If found out of specification, replace with a new one.

VEHICLE TECHNICAL DATA LEGEND

RRIM: Reinforced Reaction Injection Molding
TRA: Total Range Adjustable drive pulley
N.A.: Not Applicable

- ① For Bombardier Lite drive pulleys:
1157 = Red block, push type 38 g (P/N 417 115 700).
1181 = Black block, screw type 39.6 g (P/N 417 118 100).
1143 = Red block, screw type 41.8 g (P/N 417 114 300).
W = Washer 1.8 g (P/N 417 115 800).
C = Cap 1.65 g (P/N 417 114 500).
S3.4 = Weight, screw type 3.4 g (P/N 417 114 400).
S21 = Weight, screw type 21 g (P/N 417 120 400).
- 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 417 222 594) (long and solid).
- ⑤ Ethylene-glycol antifreeze for aluminum engines mixed with distilled water (1 parts of antifreeze for 1 parts of distilled water). Bombardier premixed coolant - 37°C (- 35°F) (16 x 1 L) (P/N 293 600 038).

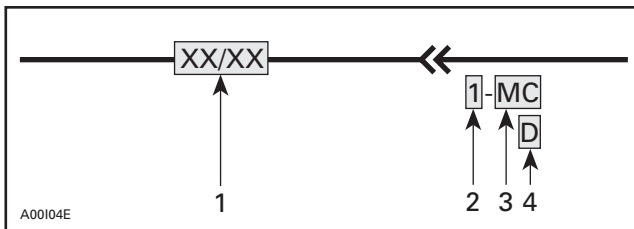
WIRING DIAGRAMS

Wiring diagrams can be found at the end of this sub-section.

WIRING DIAGRAM LEGEND

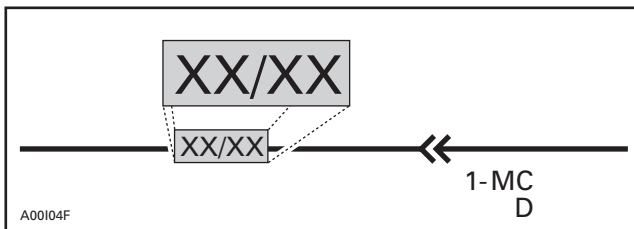
⚠ WARNING

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



1. Wire colors
2. Housing area (Tundra only)
3. Housing number per area (Tundra only)
4. Wire connector location in housing (Tundra only)

WIRE COLORS AND CIRCUIT



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			
BE	BEIGE	OR	ORANGE
BK	BLACK	RD.....	RED
BL or BU	BLUE	VI or VL	VIOLET
BR.....	BROWN	WH	WHITE
GN.....	GREEN	YL	YELLOW
GY or GN.....	GREY		

Section 11 WIRING DIAGRAMS

Subsection 01 (WIRING DIAGRAMS)

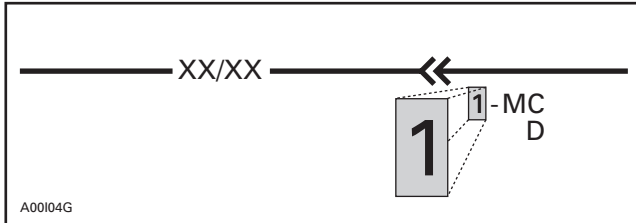
Following table shows wire colors related to electrical circuits.

WIRE COLOR	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, RER pilot lamp, beeper and beeper switch	
BLACK (big)	Ground for starter (-)	
BEIGE	RER switch	Must be grounded to activate RER.
BEIGE/BLACK	Reverse alarm and pilot lamp	Current returns by BLACK wire.
YELLOW YELLOW/BLACK YELLOW/GREEN (Skandic series)	12 volts (AC)	If shorted, magneto stops producing electricity.
RED	12 volts (DC) (+) For starter motor	
RED/GREEN	12 volts (DC) (+) For starter solenoid	
RED/BLUE	12 volts (DC) (+) Rectifier output	
GREY	12 volts (AC) High beam	Current returns by YELLOW/BLACK wire connected to headlamp.
VIOLET/GREY	12 volts (AC) Low beam	
WHITE	12 volts (AC) Brake light	Current returns by YELLOW/BLACK wire connected to taillight.
WHITE/RED	12 volts (AC) Low oil level	Current returns by YELLOW/BLACK wire connected to oil level sensor.
BLUE	12 volts (AC) Fuel level indicator	Current returns by YELLOW wire connected to fuel level sensor.
ORANGE	12 volts (AC) Heated grips (max.)	Current returns by YELLOW/BLACK wire connected to heating elements.
ORANGE/VIOLET	12 volts (AC) Heated grips (min.)	
BROWN	12 volts (AC) Heated throttle lever (max.)	
BROWN/YELLOW	12 volts (AC) Heated throttle lever (min.)	
GREEN	12 volts (AC) Temperature gauge	Current returns by YELLOW wire connected to sensor.
VIOLET	12 volts (AC) Engine overheating light	

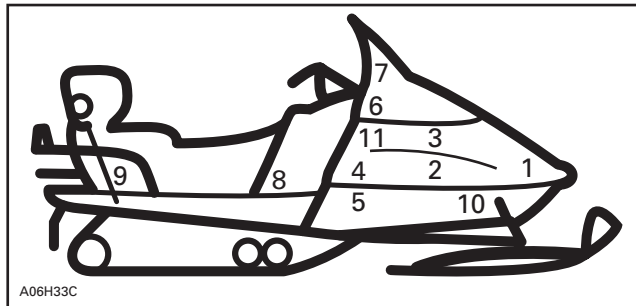
CONNECTOR HOUSING AREA

Tundra Only

The first digit of the connector identification number presents the location of the connector on the vehicle.



The following illustration shows the snowmobile with number on it. These numbers will correspond with the locations of the connector on the vehicle along with a brief description.



AREA	LOCATION
1	Front of engine compartment
2	Magneto
3	Carburetors
4	Near of intake silencer
5	Near driven pulley
6	Under console
7	Under hood
8	Near fuel tank
9	Rear of seat
10	Under engine
11	On injection oil reservoir

HOUSING REFERENCE PER AREA

Tundra Only

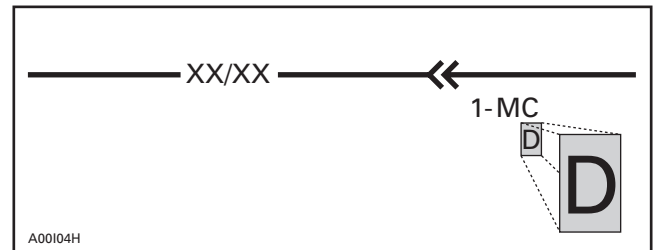
The next two letters of the connector identification number represent a connector reference. If there are many connectors in the same area this helps identify which wire is in which connector.



WIRE CONNECTOR LOCATION IN HOUSING

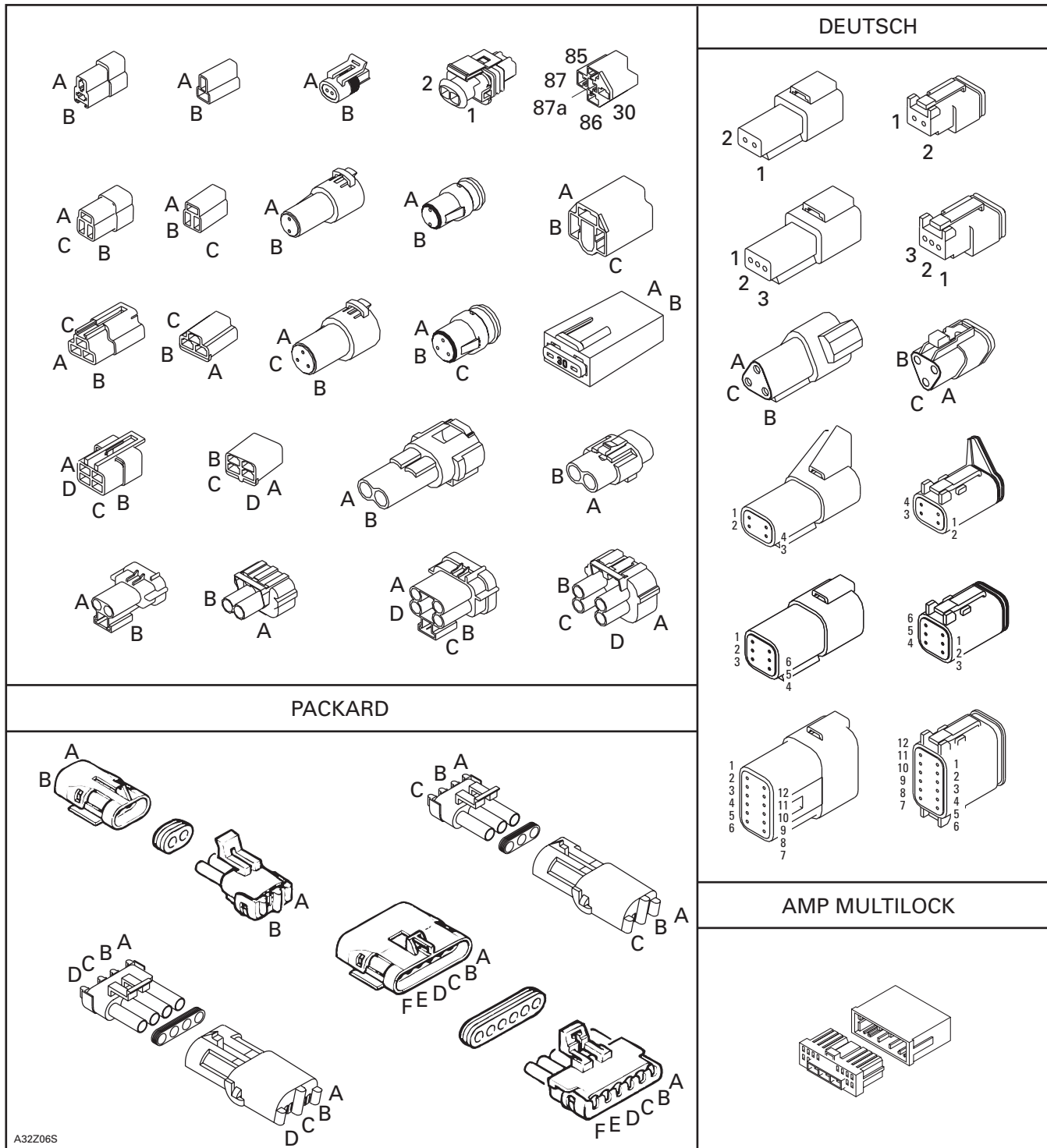
Tundra Only

The third portion of the connector identification number represents the location of the wire in the connector housing. This could be identified by either a number such as 1, 2, 3 or by a letter such as A, B, C depending on the type of connector used.



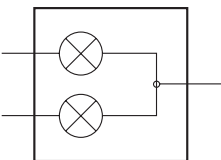
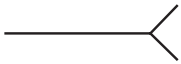
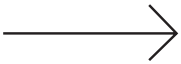
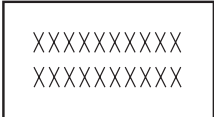
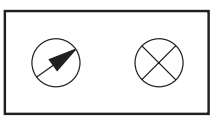

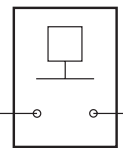
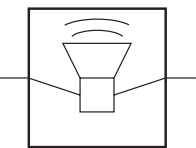
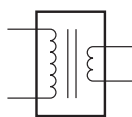
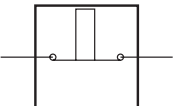
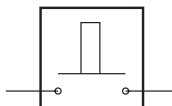


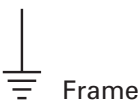


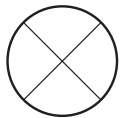
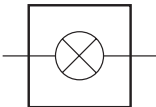
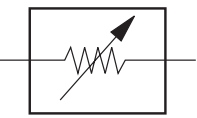
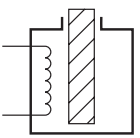

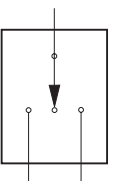
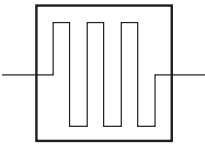
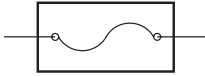

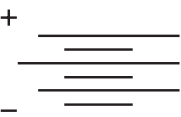
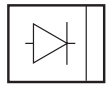

Section 11 WIRING DIAGRAMS

Subsection 01 (WIRING DIAGRAMS)



A32Z06S

SYMBOLS DESCRIPTION

<p>Beam and tail light</p> 	<p>Female terminal</p> 	<p>Male terminal</p> 	<p>Electronic module</p> 
<p>Meter</p> 	<p>Electric motor</p> 	<p>Low level sensor</p> 	<p>Buzzer</p> 
<p>Ignition coil</p> 	<p>Normally close switch</p> 	<p>Normally open switch</p> 	<p>Male terminal on instrument</p> 
<p>Engine ground</p> 	<p>Frame ground</p> 	<p>Spark plug</p> 	<p>Meter movement</p> 
<p>Bulb</p> 	<p>Pilot</p> 	<p>Analog sensor</p> 	<p>Solenoid valve</p> 
<p>Magneto (Delta)</p> 	<p>3 position switch</p> 	<p>Heating element</p> 	<p>Fuse</p> 
<p>Trigger coil</p> 	<p>Battery</p> 	<p>Diode</p> 	<p>Partially illustrated component</p> 

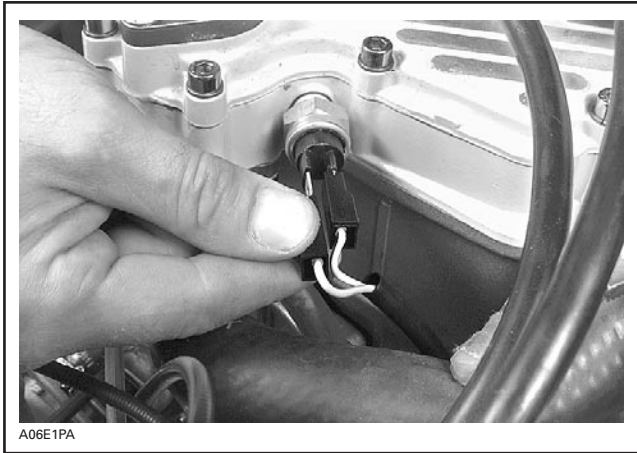
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Section 11 WIRING DIAGRAMS

Subsection 01 (WIRING DIAGRAMS)

UNPLUGGING CONNECTORS

Always unplug connectors by pulling on housing not on wire.



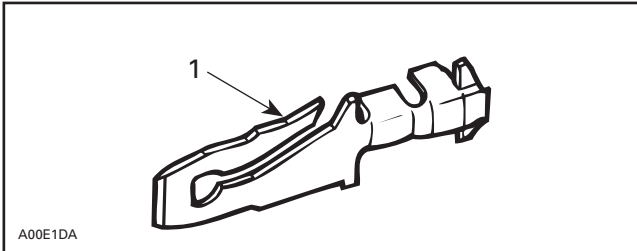
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TYPICAL

TAB AND RECEPTACLE CONNECTOR REMOVAL

Tab Connector

It is locked in its housing by a spring tab on its side. Removal is done by squeezing this tab.



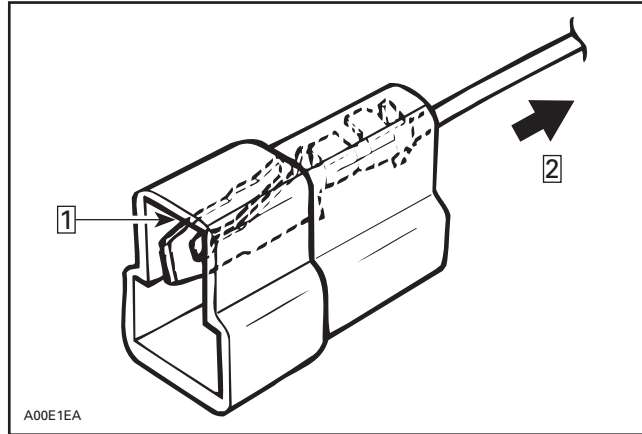
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TAB CONNECTOR

1. Locking tab

To remove:

- Insert a screwdriver or Snap-on TT 600-5 from opposite side of wire and pry locking tab.
- While holding locking tab pried, pull connector toward wire side.



A00E1EA

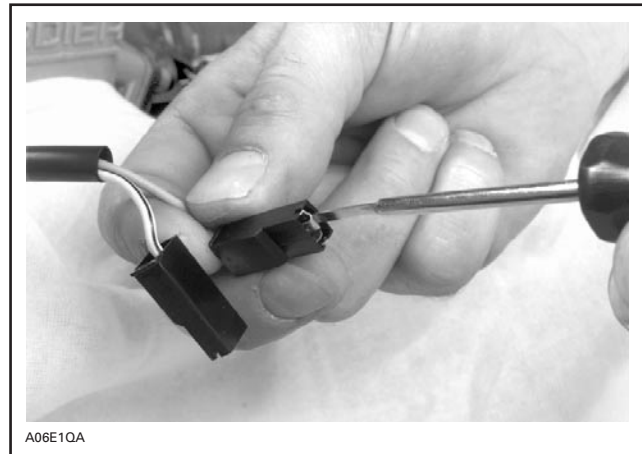
Step 1: Insert screwdriver here

Step 2: Pull this side

Locking Receptacle Connector

To remove:

- Insert tool Snap-on TT 600-5 in access opening then pull housing toward wire side.



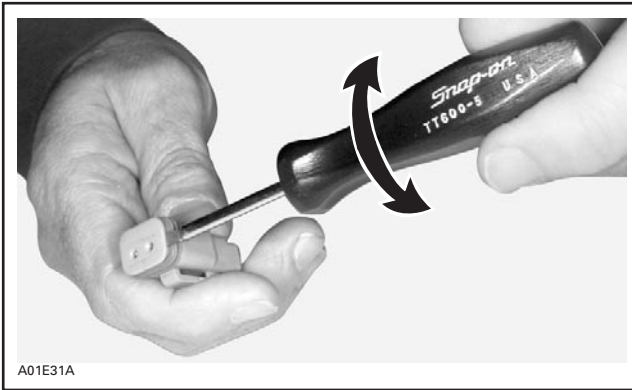
A06E1QA

Waterproof Connector Housing

Female Connector Housing

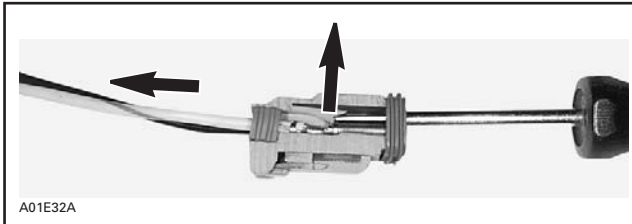
To remove:

- Insert tool Snap-on TT 600-5 under lock and twist to lift it.



A01E31A

- Pry tab to free connector then pull wire out of housing.



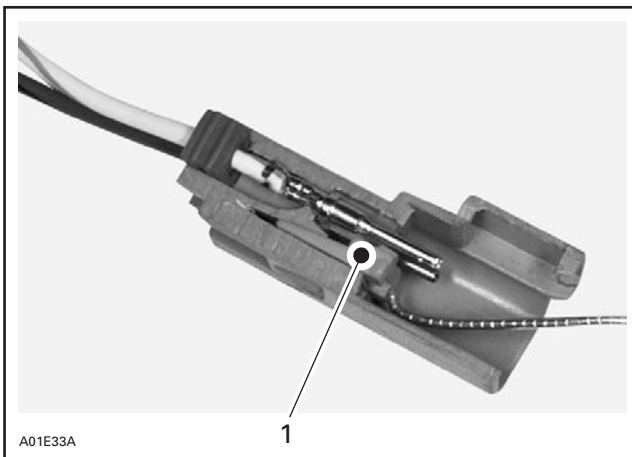
A01E32A

FEMALE CONNECTOR HOUSING — CUT-AWAY

Male Connector Housing

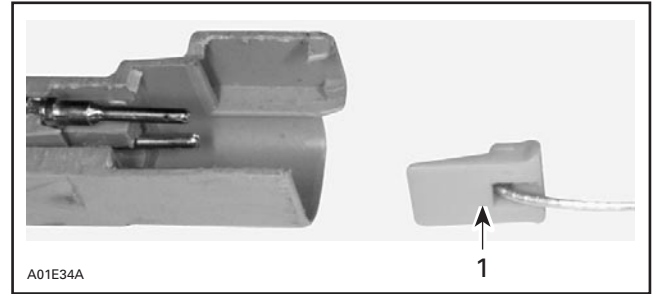
To remove:

- Using a small hook, pull out the lock.



A01E33A

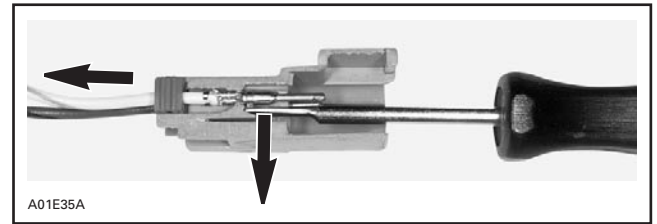
1. Lock



A01E34A

1. Lock

- Pry tab to free connector then pull wire out of housing.



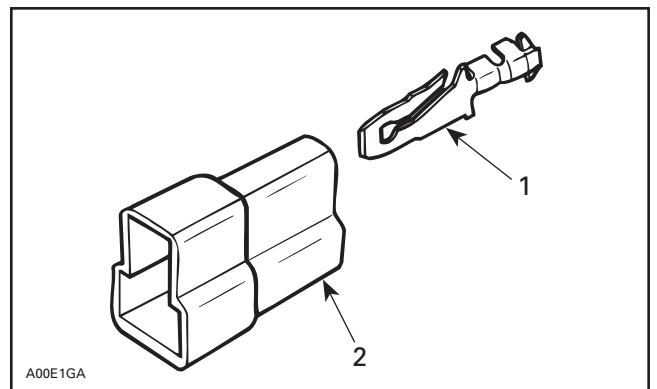
A01E35A

MALE CONNECTOR HOUSING — CUT-AWAY

TAB AND RECEPTACLE CONNECTOR INSTALLATION

Prior to installing a connector, 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.

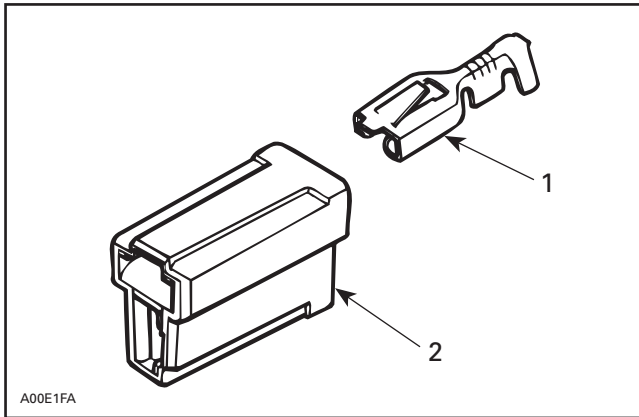


A00E1GA

1. Tab
 2. Housing

Section 11 WIRING DIAGRAMS

Subsection 01 (WIRING DIAGRAMS)



TYPICAL

1. Receptacle
2. Housing

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.

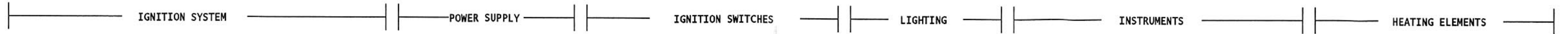
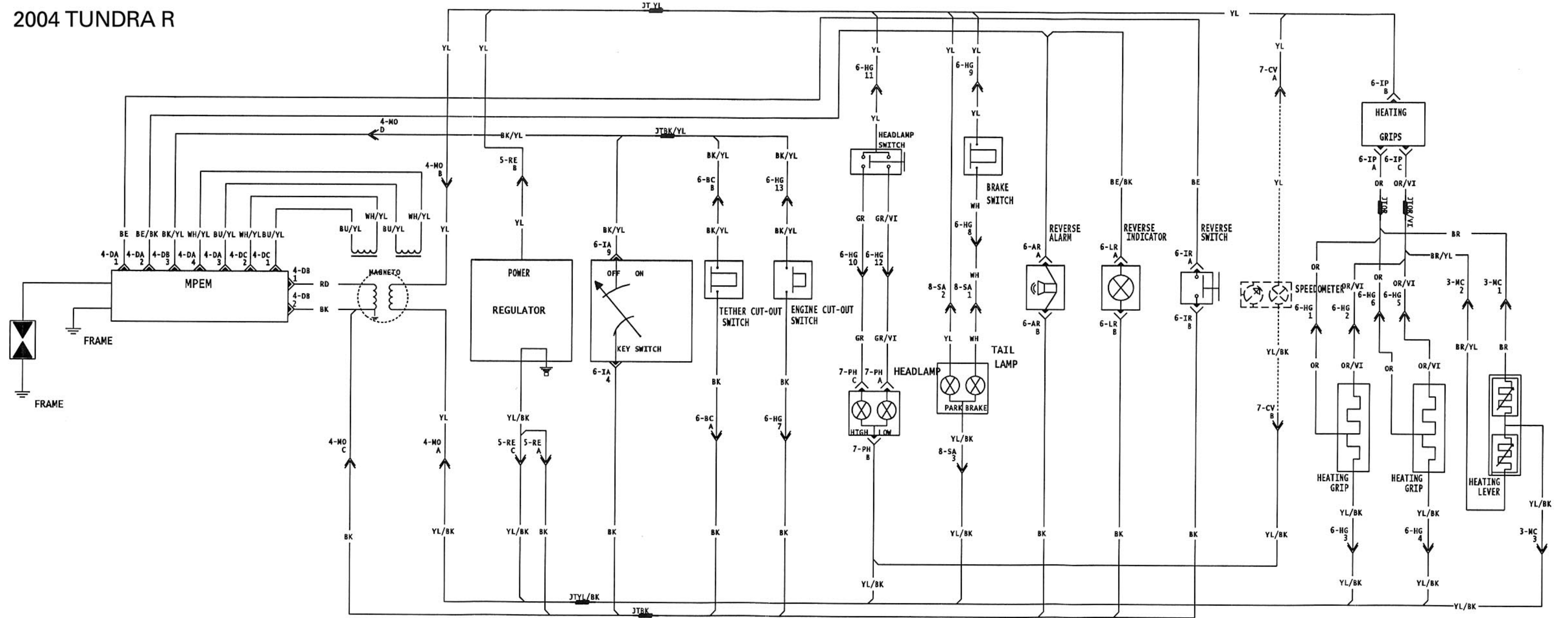
Never interconnect AC and DC grounds as an AC voltage drop will result. When installing accessories on **any** snowmobile, connect their wires directly to the both YELLOW lighting coil wires.

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.

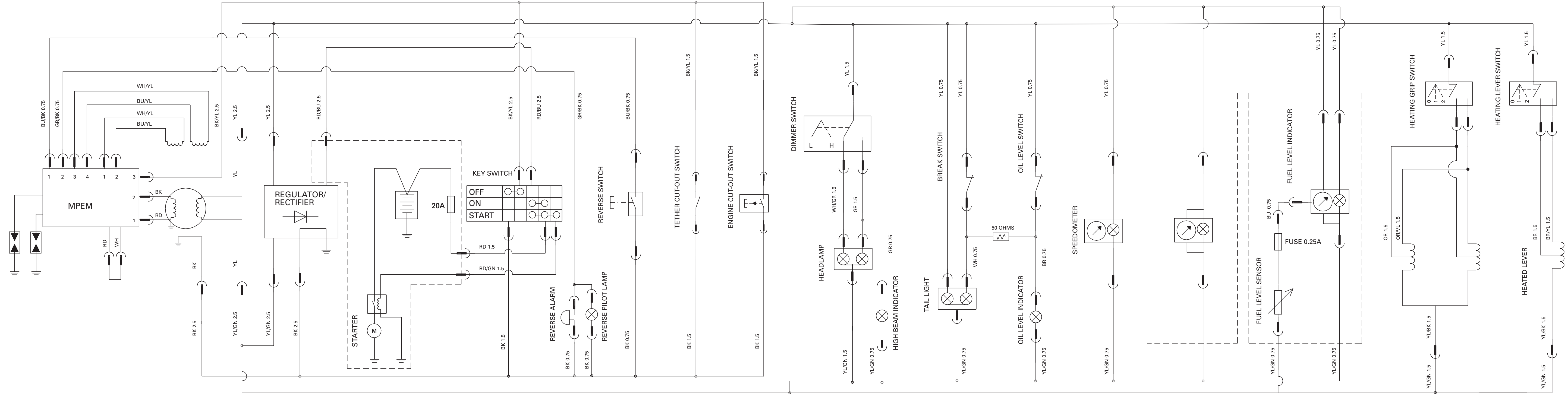
WARNING

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.

2004 TUNDRA R



2004 SKANDIC LT 440



IGNITION SYSTEM

POWER SUPPLY

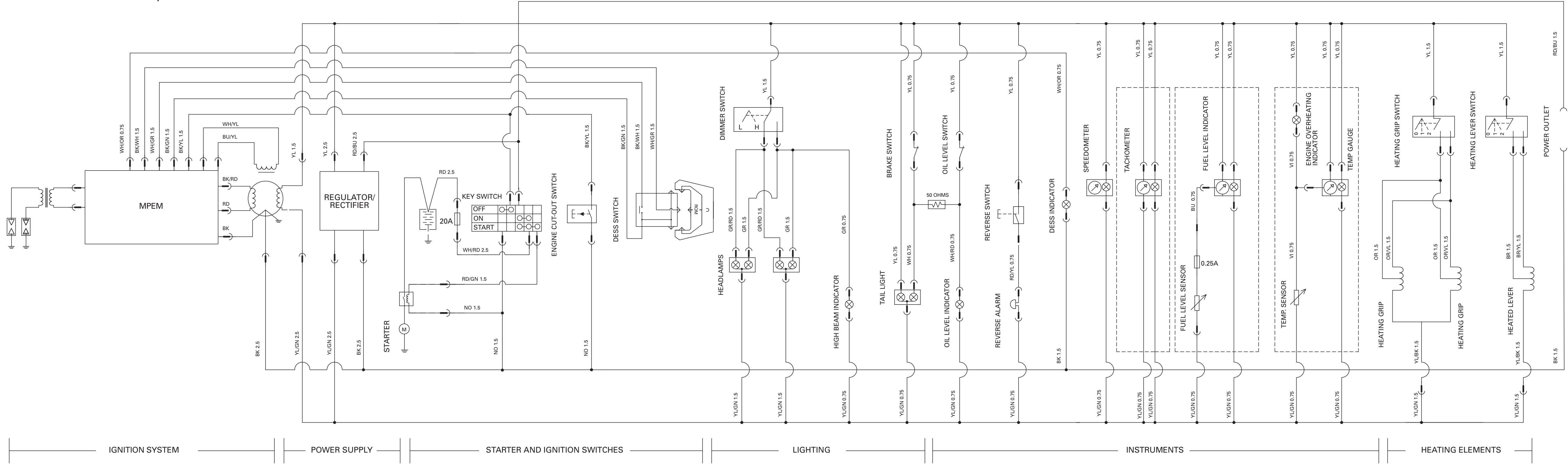
STARTER AND IGNITION SWITCHES

LIGHTING

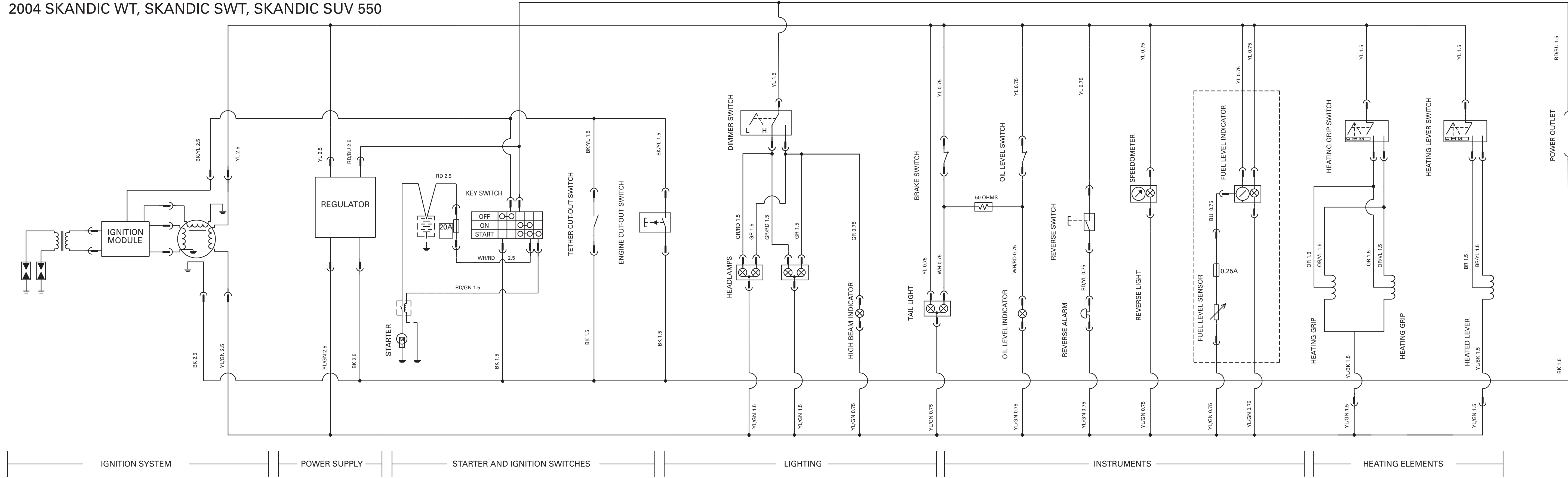
INSTRUMENTS

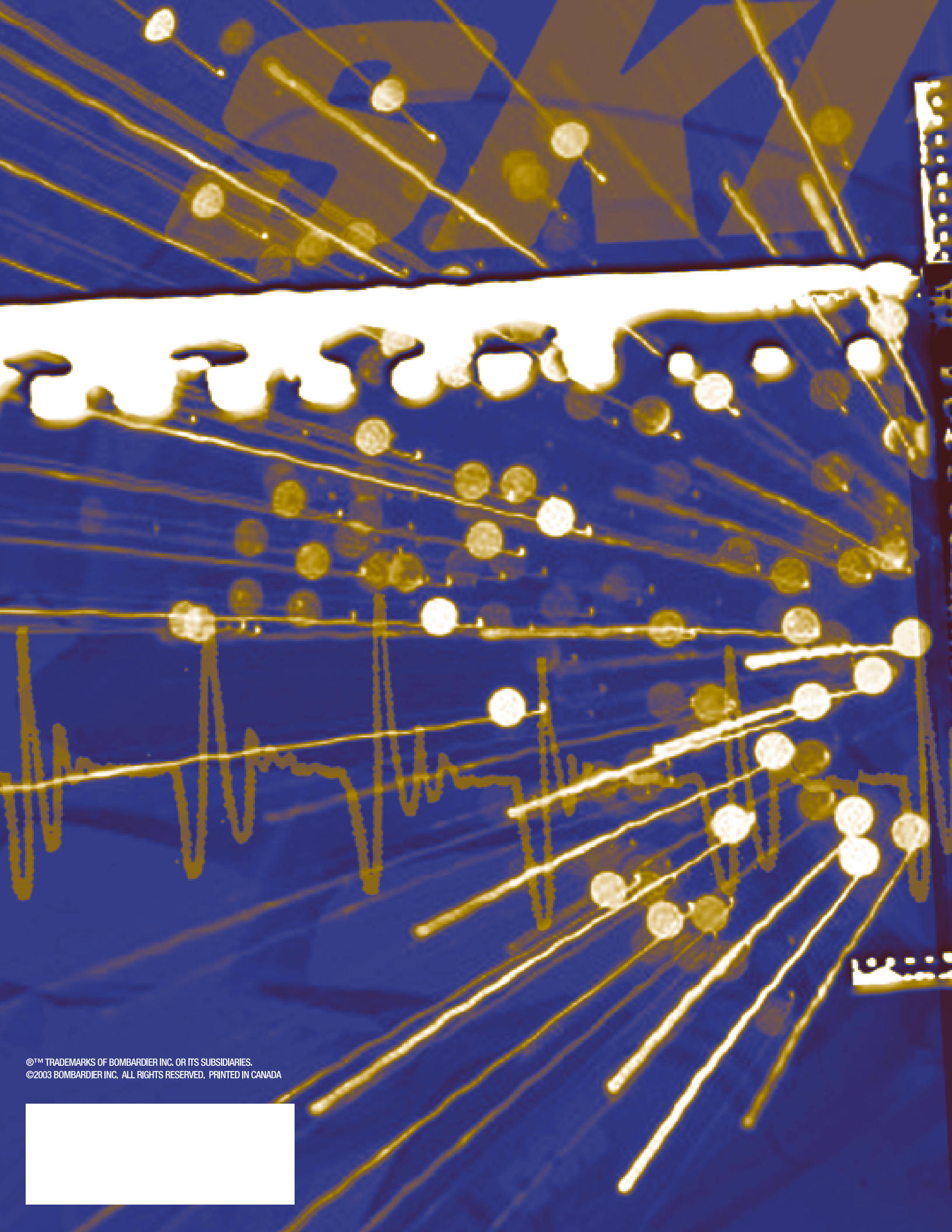
HEATING ELEMENTS

2004 SKANDIC WT LC, SKANDIC SUV 600



2004 SKANDIC WT, SKANDIC SWT, SKANDIC SUV 550





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