



# *ski-doo*®

## SHOP MANUAL T999

484 200 001

## Volume 1

TUNDRA /R  
TOURING E/LE/SLE  
FORMULA S/SL  
FORMULA DELUXE 380/500  
SKANDIC 380/500

# **1999** ***Shop Manual***

**VOLUME 1**

TUNDRA/R  
TOURING E/LE/SLE  
FORMULA S/SL  
FORMULA DELUXE 380/500  
SKANDIC 380/500

**BOMBARDIER**  
*RECREATIONAL PRODUCTS*





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# SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair some 1999 Ski-Doo snowmobiles. See model list on next page.

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

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

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

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

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

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

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

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

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

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

 <b>WARNING</b>
--

<b>Identifies an instruction which, if not followed, could cause serious personal injury including possibility of death.</b>
--

 <b>CAUTION</b>
--

<b>Denotes an instruction which, if not followed, could severely damage vehicle components.</b>
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**NOTE:** Indicates supplementary information needed to fully complete an instruction.

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

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

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## WHAT'S NEW

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# WHAT'S NEW

## SERVICE TOOLS AND SERVICE PRODUCTS 01

- Complete list of SKI-DOO service tools.

## 277 ENGINE TYPE 04-02

- Procedure for piston removal and installation using new piston puller and sleeve kit.

## 377, 443 AND 503 ENGINE TYPES 04-03

- Procedure for piston removal and installation using new piston puller and sleeve kit.

## OIL INJECTION SYSTEM 04-06

- Procedure for leak test.

## AXIAL FAN COOLING SYSTEM 04-07

- Procedures for checking belt deflection and to replace it.

## CARBURETOR AND FUEL PUMP 04-09

- New adjustment sequence.

## FUEL TANK AND THROTTLE CABLE 04-10

- Procedure for leak test.

## DRIVE AXLE 07-07

- New sprocket mounting measurements.
- Drive axle bearing shield is now facing chaincase on right side and facing sprocket on left side for S-Series.

# INTRODUCTION

This *Shop Manual Volume 1* covers the following  
Bombardier made 1999 snowmobiles:

MODELS	MODEL NUMBER
TUNDRA* .....	3274
TUNDRA* R .....	3272
TUNDRA* R (Europe).....	3273
SKANDIC* 380 (Canada).....	1364
SKANDIC* 380 (U.S.) .....	1365
SKANDIC* 500 (Canada).....	1361
SKANDIC* 500 (U.S.) .....	1362
SKANDIC* 500 (Europe) .....	1363
TOURING* E (Canada).....	1359
TOURING* E (U.S.) .....	1434
TOURING* E (Europe) .....	1360
TOURING* LE (Canada).....	1357
TOURING* LE (U.S.) .....	1358
TOURING* SLE (Canada) .....	1354
TOURING* SLE (U.S.).....	1355
TOURING* SLE (Europe) .....	1356
FORMULA* S (Canada) .....	1351
FORMULA* S (Europe).....	1353
FORMULA* SL (Canada) .....	1348
FORMULA* SL (U.S.) .....	1349
FORMULA* SL (Europe).....	1350
FORMULA* DELUXE 380 (Canada)	1384
FORMULA* DELUXE 380 (U.S.) ....	1385
FORMULA* DELUXE 500 (Canada)	1386
FORMULA* DELUXE 500 (U.S.) ....	1387

\*Trademark of Bombardier Inc.

## ***Tundra/R***



A03A09A

## ***Touring E/LE/SLE***

### ***Skandic 380/500***

### ***Formula S/SL***

### ***Formula Deluxe 377/503***

These are S-Series models



A03A0AA

TYPICAL — S-SERIES



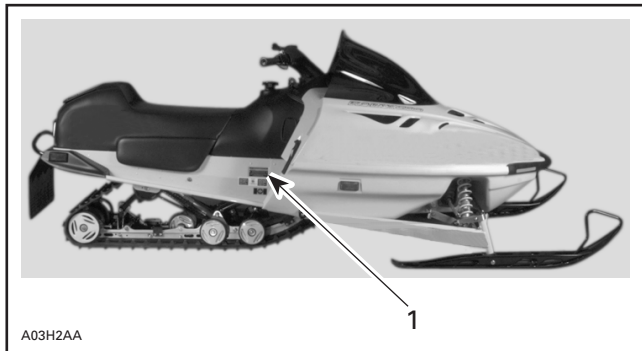
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# INTRODUCTION

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## VEHICLE SERIAL NUMBER

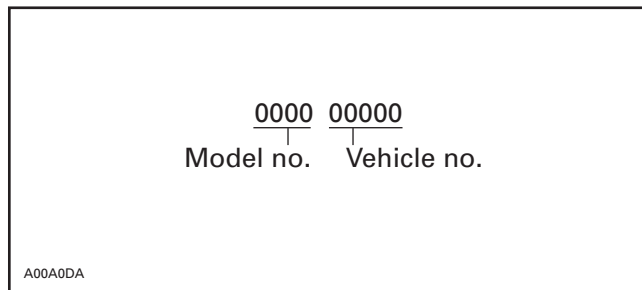
### Vehicle Serial Number Location



TYPICAL

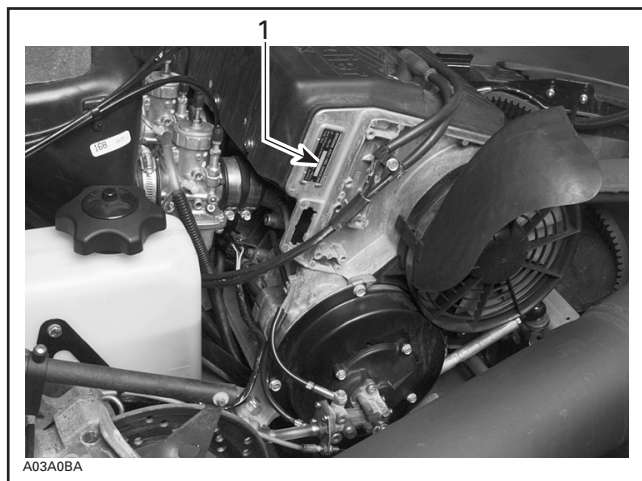
1. Vehicle serial number

### Serial Number Meaning



## ENGINE SERIAL NUMBER

### Engine Serial Number Location



TYPICAL — FAN-COOLED ENGINES

1. Engine serial number

## ARRANGEMENT OF THE MANUAL

The manual is divided into 11 major sections:

- 01 SERVICE TOOLS AND SERVICE PRODUCTS
- 02 LUBRICATION AND MAINTENANCE
- 03 TROUBLESHOOTING
- 04 ENGINE
- 05 TRANSMISSION
- 06 ELECTRICAL
- 07 REAR SUSPENSION
- 08 STEERING/FRONT SUSPENSION
- 09 BODY/FRAME
- 10 TECHNICAL DATA
- 11 WIRING DIAGRAMS

Each section is divided in various subsections, and again, each subsection has one or more division.

## LIST OF ABBREVIATIONS USED IN THIS MANUAL

A	ampere
amp	ampere
A•h	ampere-hour
AC	alternate current
BDC	bottom dead center
BTDC	before top dead center
°C	degree Celsius
CDI	capacitor discharge ignition
cm	centimeter
cm <sup>2</sup>	square centimeter
cm <sup>3</sup>	cubic centimeter
DC	direct current
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
imp. oz	imperial ounce
in	inch
in <sup>2</sup>	square inch
in <sup>3</sup>	cubic inch
k	kilo (thousand)
kg	kilogram
km/h	kilometer per hour
kPa	kilopascal
L	liter
lb	pound
lbf	pound (force)
lbf/in <sup>2</sup>	pound per square inch
LH	left hand
m	meter
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
0.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
RAVE	Rotax adjustable variable exhaust
RER	Rotax electronic reverse
RPM	revolution per minute
RRIM	reinforced reaction injection molding
Sp. Gr.	specific gravity
ST	semi-trapeze
TDC	top dead center
TRA	total range adjustable
U.S. oz	ounce (United States)
V	volt
Vac	volt (alternative current)

# 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.

**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*

Italic subtitle above exploded view indicate pertaining models.

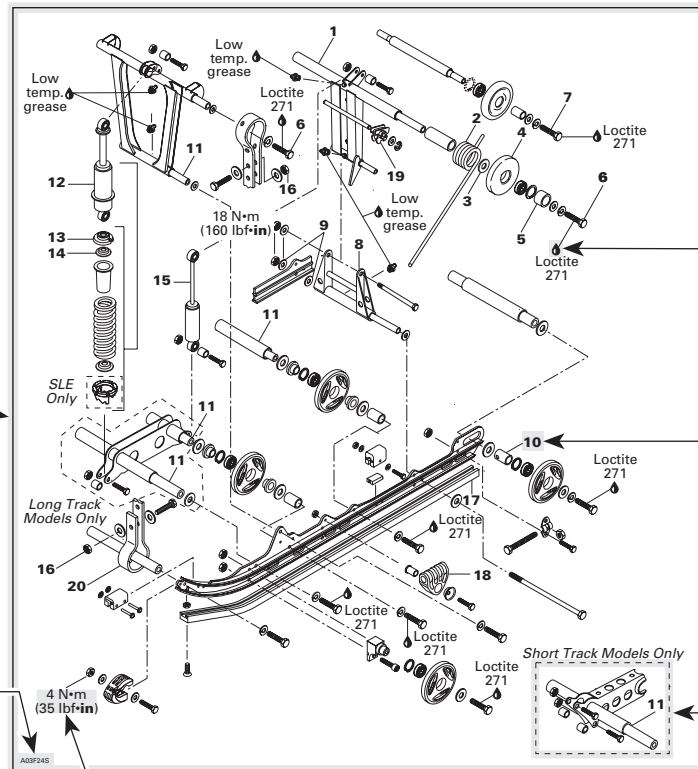
Drop represents a liquid product to be applied to a surface. In this case Loctite 271 to screw threads.

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.



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

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

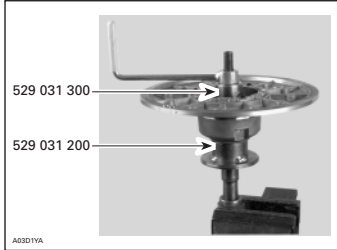
#### ▼ CAUTION

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

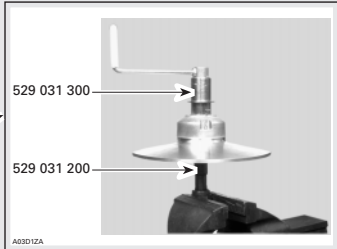
## TYPICAL PAGE

**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**  
**Cam 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.

**INSTALLATION**  
 Countershaft

**CAUTION**

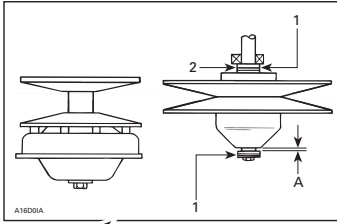
Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

*F-Series and S-Series Only*

Should installation procedure be required, refer to BRAKE 05-05 then look for **Brake Disc and Countershaft Bearing Adjustment**.  
 Reinstall the pulley on the countershaft by reversing the removal procedure.

**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.



**TYPICAL — TOP VIEW**  
 1 Shim (P/N 504 108 200) (as required)  
 2 Contact  
 A, 0 to 1 mm (0 to 3/64 in)

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

**ADJUSTMENT**  
 Refer to **PULLEY DISTANCE AND ALIGNMENT 05-04** to adjust pulley distance. Adjust drive belt height between pulley halves to obtain specified belt deflection.

05-03-5

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.

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 F and S-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.

# 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.

## USEFUL PUBLICATIONS

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

PARTS CATALOG	
MODELS	P/N
Tundra/R	484 400 016
Skandic 380/500	484 400 008
Touring E/LE/SLE	484 400 014
Formula S/SL	484 400 005
Formula Deluxe 380/500	484 400 001

Use *Specification Booklet* to find rapidly the right specs.

1995-1999 *Specification Booklet* (P/N 484 300 002).

## 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

## 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	<b>M4</b>	18
3	M4	27
4	<b>M5</b>	35
8	M6	71
9	M6	80
10	<b>M6</b>	89
11	M6	97
12	M6	106

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•ft
21	M8	15
22	M8	16
23	<b>M8</b>	17
24	M8	18
25	M8	18
43	M10	32
44	M10	32
45	M10	33
46	M10	34
47	M10	35
48	<b>M10</b>	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
80	<b>M12</b>	59
81	M12	60
82	M12	60
83	M12	61
84	M12	62
121	M14	89
122	M14	90

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•ft
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	<b>M14</b>	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

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

## Bombardier SERVICE PUBLICATIONS REPORT

Publication title and year \_\_\_\_\_ Page \_\_\_\_\_

Machine \_\_\_\_\_ Report of error  Suggestion

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