SHOP MANUAL

Bombardier Snowmobiles

1986

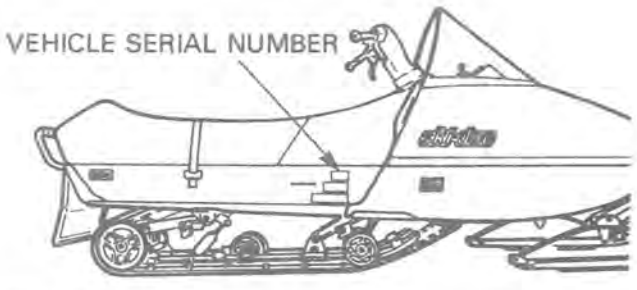
INTRODUCTION

This Shop Manual covers the following Bombardier made 1986 snowmobiles.

MODELS	MODEL NUMBER
ELAN 250	3043
CITATION LS	3210
CITATION LSE	3211
TUNDRA	3212
TUNDRA LT	3213
SKANDIC 377	3214
SKANDIC 377 R	3215
SAFARI 377	3615
SAFARI 377 E	3616
SAFARI 447	3617
SAFARI GRAND LUXE LC	3618
FORMULA SP	3619
FORMULA MX	3725
FORMULA MX (High altitude)	3727
FORMULA PLUS	3726
ALPINE 503	3342

Furthermore, each vehicle has its particular vehicle serial number.

Serial number: 0000 (model number) 00001 (vehicule serial number)



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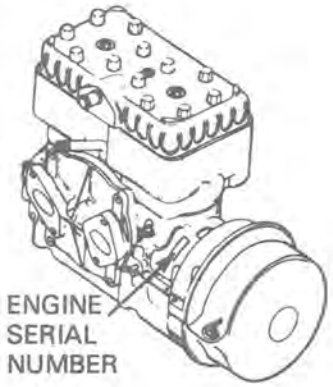
The engine also has a serial number.

Liquid cooled engines



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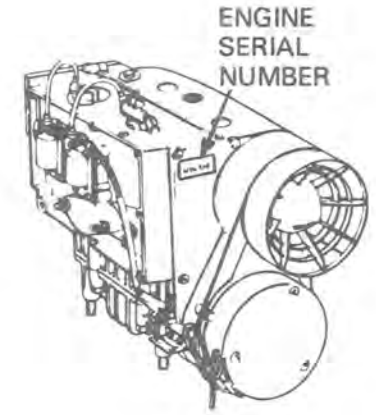
Fan cooled engines



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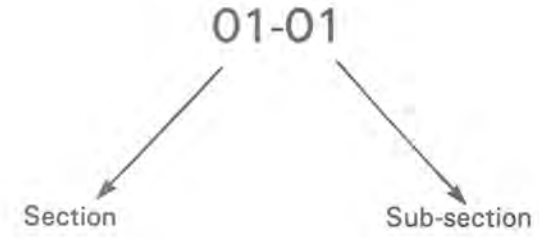
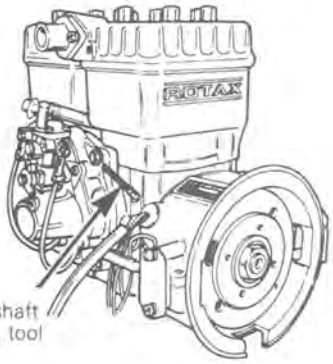
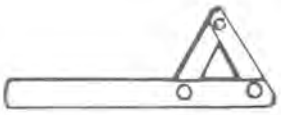
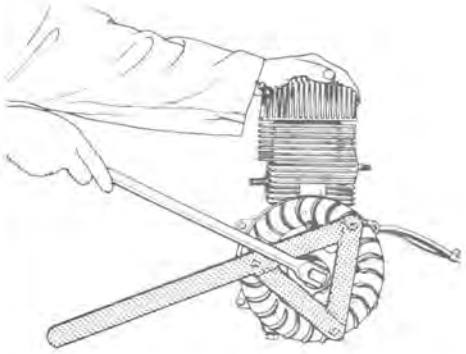
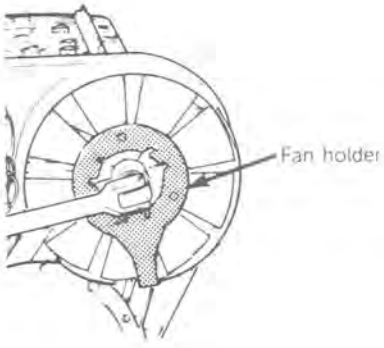
DEFINITION OF NUMBERING SYSTEMS

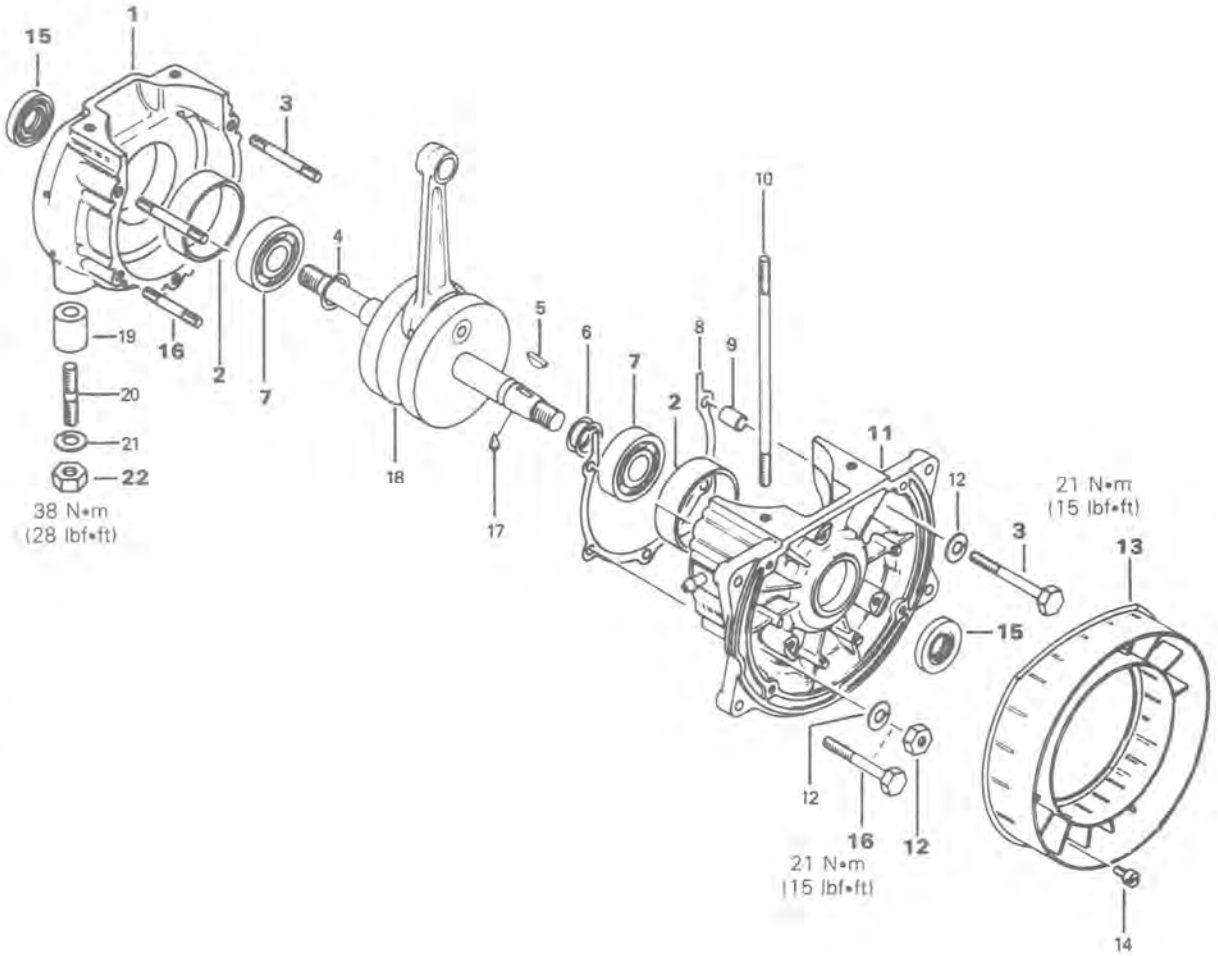
Sections and sub-sections system

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



SERVICE TOOL	PURPOSE	APPLICATION
Crankshaft locking tool 420 876 640 A000002039	To lock crankshaft when removing drive pulley or flywheel  Crankshaft locking tool A000002040	All engine types
Magneto housing holder 420 976 550  A000002011	 A000002012	247 engine type
Fan holder 503 engine 420 876 355 253, 377 & 447 engines 420 876 357  A000002026	 A000002027	Axial fan cooled engine types

BOTTOM END



1. *Crankcase half (P.T.O. side)*
2. *Polyamid ring (2)*
3. *Stud M8 x 56 (crankcase with studs) (2)*
   Hexagonal cap screw M8 x 64 (crankcase with screws) (2)
4. *Shim 1.0 mm*
5. *Woodruff key 5 x 6,5*
6. *Shim 0,1, 0,2, 0,3, 0,5, 1,0 mm*
7. *Ball bearing 6305 (2)*
8. *Crankcase gasket*
9. *Dowel tube 10 mm x 15 (2)*
10. *Stud M8 x 171 (4)*
11. *Crankcase half (mag side)*
12. *Lock washer 8 mm (5)*
    Hexagonal nut 8 mm (crankcase with studs) (5)
13. *Labyrinth ring*
14. *Slotted head screw M6 x 10 (4)*
15. *Seal (2)*
16. *Stud M8 x 46 (crankcase with studs) (3)*
    Hexagonal cap screw M8 x 55 (crankcase with screws) (3)
17. *Loctite 242*
18. *Crankshaft*
19. *Distance sleeve 22 mm (4)*
20. *Stud M10 x 42 (4)*
21. *Lock washer 10 mm (4)*
22. *Hexagonal nut 10 mm (4)*

1. *Cap nut M8 (12)*
2. *Cylinder head*
3. *Stud M6 x 15 (2)*
4. *Coolant outlet collar*
5. *Loctite 242 blue (medium strength)*
6. *Lock washer 6 mm (4)*
7. *Nut M6 (4)*
8. *Gasket (O ring) (2)*
9. *Gasket (2)*
10. *Cap nut M8 (8)*
11. *Flat washer 8.4 (8)*
12. *Cylinder (2)*
13. *Cylinder/crankcase gasket (2)*
14. *L-ring*
15. *Rectangular-ring*
16. *Piston*
17. *Gudgeon pin*
18. *Circlip (4)*
19. *Needle bearing*
20. *Cylinder stud M8 x 79 (8)*
21. *Stud (head) M8 x 50 (12)*
22. *Gasket*
23. *Water outlet socket*

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

DISASSEMBLY

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

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

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

INSPECTION

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

MEASUREMENTS	TOLERANCES		
	FITTING (MIN.)	NEW PARTS (MAX.)	WEAR LIMIT
Cylinder taper	N.A.	N.A.	.08 mm (.0031")
Cylinder out of round	N.A.	N.A.	.05 mm (.0020")
Cylinder/piston clearance	.11 mm (.0043")	.13 mm (.0051")	.20 mm (.0079")
Ring/piston groove clearance	.04 mm (.0016")	.10 mm (.0039")	.20 mm (.0079")
Ring end gap	.20 mm (.0079")	.35 mm (.0138")	1.0 mm (.0394")

NOTE: For the measurement procedures, refer to "Engine dimensions measurement", section 02-10.

ASSEMBLY

16, Piston

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

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POWER TRAIN

MODEL			ÉLAN® 250	ALPINE® 503	CITATION® LS	CITATION® LSE	TUNDRA®	TUNDRA LT®	SKANDIC 377®	SKANDIC 377 R®
Gear ratio (driven pulley to drive axle)			10/25	19/42	15/27	15/27	12/27	12/27	14/35	17/40
Chain pitch			1/2" single	3/8" triple	1/2" single	1/2" single	1/2" single	1/2" single	3/8" double	3/8" silent
Drive pulley	Type of drive pulley		R.R.S.	R.S.S.R.	R.R.S.	R.R.S.	R.R.S.	R.R.S.	2R.S.S.	2R.S.S.
	Drive pulley retaining screw torque	N•m (lbf•ft)	62 (46)	85 (63)	85 (63)	85 (63)	85 (63)	85 (63)	80 (59)	80 (59)
	Pressure lever identification		E4	A3S (double)	C4LS	C4LS	C4LS	C4LS	B3KSH	B3KSH
	Spring color		Bronze	Purple	Light Blue	Light Blue	Light Blue	Light Blue	Yellow	Yellow
	Spring length	mm ± 1.5 (in ± .060)	81.3 (3.20)	73.7 (2.90)	119.1 (4.69)	119.1 (4.69)	119.1 (4.69)	119.1 (4.69)	100 (3.94)	100 (3.94)
	Clutch engagement R.P.M.		2000-2200	2000-2200	3500-3700	3500-3700	3500-3700	3500-3700	3700-3900	3700-3900
Driven pulley spring preload		kg ± 0.4 (lb ± 1)	3.6 (8)	5.9 (13)	4.1 (9)	4.1 (9)	4.1 (9)	4.1 (9)	5.4 (12)	5.4 (12)
Pulley distance		mm (inch)	44.45 $^{0}_{1.5}$ (1 3/4 $^{0}_{1/16}$)	44.45 $^{0}_{1.5}$ (1 3/4 $^{0}_{1/16}$)	36.6 $^{1.5}_{0}$ (1 7/16 $^{1/16}_{0}$)	36.6 $^{1.5}_{0}$ (1 7/16 $^{1/16}_{0}$)	36.6 $^{1.5}_{0}$ (1 7/16 $^{1/16}_{0}$)	36.6 $^{1.5}_{0}$ (1 7/16 $^{1/16}_{0}$)	41.27 $^{3.17}_{0}$ (1 5/8 $^{1/8}_{0}$)	41.27 $^{3.17}_{0}$ (1 5/8 $^{1/8}_{0}$)
Offset (dimension X & Y)		mm (inch)	34.5 ± 0.40 (1 23/64 ± 1/64)	34.5 ± 0.40 (1 23/64 ± 1/64)	34.03 ± 0.38 (1 11/32 ± 1/64)	45.30 ± 0.38 ② (1 25/32 ± 1/64)	34.03 ± 0.38 (1 11/32 ± 1/64)	34.03 ± 0.38 (1 11/32 ± 1/64)	34.03 ± 0.38 (1 11/32 ± 1/64)	34.03 ± 0.38 (1 11/32 ± 1/64)
Drive belt number			570 0411 00	414 5233 00	414 3758 00	414 3758 00	414 3758 00	414 3758 00	414 3758 00	414 3758 00
Drive belt width		mm (inch)	30.2 (1 3/16)	34.9 (1 3/8)	33.3 (1 5/16)	33.3 (1 5/16)	33.3 (1 5/16)	33.3 (1 5/16)	33.3 (1 5/16)	33.3 (1 5/16)
Drive belt tension & deflection	Force		67 N (15lbF) Force on belt between pulleys must produce the deflection							
	mm (inch)		32 (1 1/4)	32 (1 1/4)	30.2 - 38.1 (1 3/16 - 1 1/2)	30.2 - 38.1 (1 3/16 - 1 1/2)	30.2 - 38.1 (1 3/16 - 1 1/2)	30.2 - 38.1 (1 3/16 - 1 1/2)	32 (1 1/4)	32 (1 1/4)
Track	Track width	cm (inch)	38.1 (15)	2 × 38.1 (2 × 15)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)	38.1 (15)
	Track length	cm (inch)	289.5 (114)	2 × 353 (2 × 139)	260 (102)	260 (102)	315 (124)	353 (139)	353 (139)	353 (139)
Suspension type			Bogie	Bogie	Slide	Slide	Slide	Slide	Slide	Slide
Bogie suspension	Track tension	mm (inch)	ÉLAN®: 35 mm (1 3/8") distance between top inside edge of track and the bottom of the footboard.							
	Track alignment		Equal distance between edges of track guides and slider							
Slide suspension	Track tension	mm (inch)	13 mm (1/2") gap should exist between slider shoe and the bottom inside of track.							
	Track alignment		Equal distance between edges of track guides and slider							

Alu.: Aluminum
Fib.: Fiberglass
Poly.: Polycarbonate

R.I.M.: Reaction injection molding
Hal.: Halogen
N.A.: Not applicable

R.S.S.: Roller square shaft (2 rollers)
R.R.S.: Roller round shaft
R.S.S.R.: Roller square shaft with 3 ramps
TRA.: Total range adjustable

① Formula MX (3727 Model) has high altitude calibration from factory to operate at 1800 m (6000 ft) above sea level.

② Including ring gear measurement.