

aprilia

1056-1

01/2001-12

V990 engine 

www.serviceaprilia.com

workshop manual






8140587



INTRODUCTION	0
GENERAL INFORMATION	1
TECHNICAL INFORMATION	2
REMOVING/REFITTING THE COMPLETE ENGINE FROM/TO THE VEHICLE FRAME	3
DISASSEMBLING THE ENGINE	4
WORK ON THE ENGINE INDIVIDUAL PARTS	5
REASSEMBLING THE ENGINE	6
FUEL SYSTEM, COOLING SYSTEM, ELECTRICAL SYSTEM	7
TROUBLESHOOTING	8
ANALYTICAL INDEX	<i>i</i>



V990 engine 1056-1 



workshop manual



aprilia part# 8140587

0 INTRODUCTION**TABLE OF CONTENTS**

0.1 UPDATE OF RELEASE 01/2001-12	0-3-00
0.1.1 INFORMATION ON THE UPDATING OF THE MANUAL	0-3-00
0.1.2 UPDATED MANUAL GENERAL LIST ...	0-3-00
0.2 HOW TO CONSULT THE MANUAL	0-5-00
0.3 FOREWORD	0-6-00
0.4 REFERENCE aprilia SERVICE LITERATURE	0-6-00
0.4.1 VEHICLE WORKSHOP MANUAL	0-6-00
0.4.2 SPARE PARTS CATALOGUE	0-6-00
0.4.3 SPECIAL TOOLS CATALOGUE	0-6-00
0.4.4 USE AND MAINTENANCE BOOK	0-6-00
0.5 ABBREVIATIONS/ SYMBOLS/INITIALS	0-7-00

0.1 UPDATE OF RELEASE 01/2001-12

Date of the first edition (Release 00) and of the following Releases:

First edition (Release 00) November 2001
 Release 01 December 2001

0.1.1 INFORMATION ON THE UPDATING OF THE MANUAL

The manual must be updated every time a new "Release" is received.

Insert the pages of the last Release in the manual and eliminate the corresponding obsolete pages (even if belonging to a previous Release).

⚠ WARNING

The failure to update the manual and to eliminate the obsolete pages makes it more difficult to consult the manual and may lead to the performance of incorrect operations on the engine, with serious consequences for the safety of the engine, the vehicle and of persons and property.

The manual consists of # 10 sections, for a total amount of # 184 pages, as listed below.

NOTE For the nomenclature of the standard page of the manual (and specifically for the definition of the page number), see 0.2 (HOW TO CONSULT THE MANUAL).

0.1.2 UPDATED MANUAL GENERAL LIST

page#	Release	page#	Release
0 - 1	- 00	2 - 14	- 00
0 - 2	- 00	2 - 15	- 00
0 - 3	- 00	2 - 16	- 00
0 - 4	- 00	2 - 17	- 00
0 - 5	- 00	2 - 18	- 00
0 - 6	- 00	2 - 19	- 00
0 - 7	- 00	2 - 20	- 00
0 - 8	- 00	2 - 21	- 00
1 - 1	- 00	2 - 22	- 00
1 - 2	- 00	3 - 1	- 00
1 - 3	- 00	3 - 2	- 00
1 - 4	- 00	4 - 1	- 00
1 - 5	- 00	4 - 2	- 01
1 - 6	- 00	4 - 3	- 00
1 - 7	- 00	4 - 4	- 00
1 - 8	- 00	4 - 5	- 01
1 - 9	- 00	4 - 6	- 01
1 - 10	- 00	4 - 7	- 01
2 - 1	- 00	4 - 8	- 01
2 - 2	- 00	4 - 9	- 01
2 - 3	- 00	4 - 10	- 00
2 - 4	- 00	4 - 11	- 01
2 - 5	- 00	4 - 12	- 00
2 - 6	- 00	4 - 13	- 01
2 - 6	- 01	4 - 14	- 01
2 - 6	- 02	4 - 14	- 01
2 - 7	- 00	4 - 14	- 02
2 - 8	- 00	4 - 15	- 00
2 - 9	- 00	4 - 16	- 01
2 - 10	- 00	4 - 17	- 01
2 - 11	- 00	4 - 18	- 01
2 - 12	- 00	4 - 19	- 00
2 - 13	- 00	4 - 20	- 01

page#	Release	page#	Release
4 - 21	- 00	5 - 53	- 00
4 - 22	- 00	5 - 53	- 01
4 - 23	- 00	5 - 53	- 02
4 - 24	- 00	5 - 53	- 03
5 - 1	- 00	5 - 53	- 04
5 - 2	- 00	5 - 54	- 00
5 - 3	- 00	6 - 1	- 00
5 - 4	- 00	6 - 2	- 00
5 - 5	- 00	6 - 3	- 00
5 - 6	- 00	6 - 4	- 00
5 - 7	- 00	6 - 5	- 00
5 - 8	- 00	6 - 6	- 00
5 - 9	- 00	6 - 7	- 00
5 - 10	- 00	6 - 8	- 00
5 - 11	- 00	6 - 9	- 00
5 - 12	- 00	6 - 10	- 00
5 - 13	- 00	6 - 11	- 00
5 - 14	- 00	6 - 12	- 00
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5 - 19	- 00	6 - 17	- 00
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5 - 26	- 00	6 - 24	- 00
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5 - 28	- 01	6 - 27	- 00
5 - 28	- 02	6 - 28	- 00
5 - 29	- 00	6 - 29	- 00
5 - 29	- 01	6 - 30	- 00
5 - 29	- 02	6 - 31	- 00
5 - 29	- 03	6 - 32	- 00
5 - 29	- 04	6 - 33	- 00
5 - 30	- 00	6 - 34	- 00
5 - 31	- 00	7 - 1	- 00
5 - 32	- 00	7 - 2	- 00
5 - 33	- 00	8 - 1	- 00
5 - 34	- 00	8 - 2	- 00
5 - 35	- 00	7 - 1	- 00
5 - 36	- 00	7 - 2	- 00
5 - 37	- 00	8 - 1	- 00
5 - 38	- 00	8 - 2	- 00
5 - 39	- 00	7 - 1	- 00
5 - 40	- 00	7 - 2	- 00
5 - 41	- 00	8 - 1	- 00
5 - 42	- 00	8 - 2	- 00
5 - 43	- 00	7 - 1	- 00
5 - 44	- 00	7 - 2	- 00
5 - 45	- 00	8 - 1	- 00
5 - 46	- 00	8 - 2	- 00
5 - 47	- 00	7 - 1	- 00
5 - 48	- 00	7 - 2	- 00
5 - 49	- 00	8 - 1	- 00
5 - 49	- 01	8 - 2	- 00
5 - 49	- 02	7 - 1	- 00
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5 - 51	- 00	8 - 1	- 00
5 - 52	- 00	8 - 2	- 00

NOTE

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0.2 HOW TO CONSULT THE MANUAL

GENERAL INFORMATION

8 — **1.15 PLACING THE VEHICLE ON THE SUPPORT STAND**

9 — **1.15.1 ASSEMBLING THE PINS FOR THE REAR SUPPORT STAND OPT**

NOTE Have the special tool OPT available:
 – **aprilia** part# 8705021 (rear support stand with appropriate pins).

- ◆ Place the vehicle on the stand.
- ◆ ★ Place the pin (1) on the appropriate seat on the swinging arm.
- ◆ ★ Screw and tighten the screw (2) in the appropriate threaded hole (3) in the swinging arm.

10 —

11 —

1.15.2 PLACING THE VEHICLE ON THE REAR SUPPORT STAND OPT

NOTE Have the special tool OPT available:
 – **aprilia** part# 8705021 (rear support stand with appropriate pins).

- ◆ Assemble the pins for the rear support stand, see 1.15.1 (ASSEMBLING THE PINS FOR THE REAR SUPPORT STAND OPT).

NOTE Have someone help you keep the vehicle in vertical position with the two wheels on the ground.

▲ WARNING

When using the rear support stand, allow the yoke to engage only the pins (1). Do not attempt to support the rear of the vehicle in any other manner.

- ◆ Lift (**Pos. A**) the rear part of the stand (4), insert it from the back of the vehicle and place it so that the two yokes (5) of the support pins (6) hook the two pins (1) provided on the vehicle.

If the yokes (5) do not align with the two pins (1):

- ◆ Loosen the two knobs (7).
- ◆ Slide the two support pins (6) so that the two yokes (5) of the support pins (6) coincide with the two pins (1).
- ◆ Tighten the two knobs (7).
- ◆ Lift (**Pos. A**) the rear part of the stand (4), insert it from the back of the vehicle and place it so that the two yokes (5) of the support pins (6) hook the two pins (1) provided on the vehicle.
- ◆ Rest one foot on the rear part of the stand (4).
- ◆ Push (**Pos. B**) the stand (4) downwards until it reaches the end of its stroke (see figure).

1.15.3 PLACING THE VEHICLE ON THE FRONT SUPPORT STAND OPT

NOTE Have the special tool OPT available:
 – **aprilia** part# 8140176 (complete support stand kit).

- ◆ Place the vehicle on the appropriate rear support stand, see 1.15.2 (PLACING THE VEHICLE ON THE REAR SUPPORT STAND OPT).
- ◆ Lift (**Pos. C**) the front part of the stand (8) and insert each of its ends (9) into holes (10) in the bottom of the front fork.
- ◆ Rest one foot on the front part of the stand (8).
- ◆ Push (**Pos. D**) the stand (8) downwards until it reaches the end of its stroke (see figure).

7 —

6 —

5 —

1 - 34 - 00

3 —

4 —

aprilia Release 00/2001-04

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1) Engine model.</p> <p>2) Section.</p> <p>3) Release consecutive number ("00" indicates the first edition).</p> <p>4) Year and month of publication of the Release.</p> <p>5) Section number.</p> <p>6) Section page consecutive number.</p> | <p>7) Updated page consecutive number.</p> <p>8) Chapter title (numbered consecutively).</p> <p>9) Paragraph title (numbered consecutively).</p> <p>10) Description of the operation (always preceded by a rhombus).</p> <p>11) Description of the operation: the star means that the operation must be repeated on the other side of the engine.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

0.3 FOREWORD

This manual contains information covering normal servicing procedures.

In the future, the information and illustrations contained in this manual will be updated by means of "Releases", see 0.1 (UPDATE OF RELEASE 01/2001-12).

Since **aprilia s.p.a.** strives to always improve the quality and usefulness of its engines, changes may be made to the engines at any time.

Thus, it is imperative that users of this manual understand that some information may be out of date for some engines.

Be sure that the information in this manual applies to the engine that you are servicing before you begin any service operations.

Before consulting the manual, check the engine and vehicle model.

This publication is intended for **aprilia** dealers and their trained and qualified mechanics.

The description of many service and repair operations is intentionally omitted, as it is assumed that the users of this manual have basic mechanical training, basic knowledge of the procedures regarding engine and motor vehicle repair, and have available to them all current information published by **aprilia** concerning the engine and vehicle.

Without these things, the repair or servicing of the engine could be affected and could lead to a dangerous condition or accident for the servicing mechanic or the operator.

This manual does not describe all of the procedures necessary to repair and service the engine in detail.

Therefore, it is important to be particularly careful in order to avoid any damage to the engine, its parts, or to cause injury to the mechanic or the rider.

Changes in the technical specifications and servicing procedures that become necessary as a result of changes to **aprilia** engines and vehicles will be documented and distributed to all **aprilia** dealers.

Therefore, it is necessary that the latest **aprilia** information be kept available to the servicing mechanics.

If you have questions regarding repair and servicing procedures, contact the **aprilia** Consumer Service (A.C.S.). A.C.S. technical counselors will be able to assist you with any problems that you might face.

aprilia s.p.a. reserves the right to modify any of its models in any manner at any time.

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0.4 REFERENCE **aprilia** SERVICE LITERATURE

For further information, refer to the follows chapter.

0.4.1 VEHICLE WORKSHOP MANUAL

aprilia part# (description)
8140248 (Workshop manual RSV mille  978Y)
8140273 (Workshop manual SL mille  994Y)
8140542 (Workshop manual RST mille Futura  1043-1)
8140548 (Workshop manual ETV mille Caponord  1049-1)

0.4.2 SPARE PARTS CATALOGUE

Consult the corresponding chapter of specific vehicle workshop manual, see 0.4.1 (VEHICLE WORKSHOP MANUAL).

0.4.3 SPECIAL TOOLS CATALOGUE

Consult the corresponding chapter of specific vehicle workshop manual, see 0.4.1 (VEHICLE WORKSHOP MANUAL).

0.4.4 USE AND MAINTENANCE BOOK

Consult the corresponding chapter of specific vehicle workshop manual, see 0.4.1 (VEHICLE WORKSHOP MANUAL).

0.5 ABBREVIATIONS/SYMBOLS/INITIALS

#	= number	kg	= kilograms (1 kg = 2.2046224 lb)
<	= is less than	km	= kilometers (1 km = 0.62137119 mi)
>	= is greater than	km/h	= kilometers an hour
≤	= is equal to or less than	kΩ	= kilohms
≥	= is equal to or greater than	kPa	= kiloPascal (1 kPa = 0.145 psi – 0.01 bar)
~	= approximately	kW	= kilowatt
∞	= infinity	KS	= clutch side (Kupplungseite)
°C	= Celsius degree (centigrade)	ℓ	= liter (1 ℓ = 0.2641721 US gal)
°F	= Fahrenheit degree	LAP	= lap (for competition use)
±	= plus or minus	LED	= Light Emitting Diode
a.c.	= alternating current	m/s	= meters an second
A	= ampere	mbar	= millibar (1 mbar = 0.0145 psi – 0.1 kPa)
Ah	= ampere per hour	MAX	= maximum
API	= American Petroleum Institute	mi	= mile
HV	= high voltage	MIN	= minimum
AV/DC	= AntiVibration Double Countershaft	MPH	= miles per hour
bar	= unit of pressure (1 bar = 14.50 psi – 100 kPa)	MS	= alternator side (Magnetoseite)
BDC	= Bottom Dead Center	MΩ	= megaohm
cm³	= cubic centimeters (1 cm ³ = 0.0338139 US fl oz)	Nm	= newton-meter (1 Nm = 0.723300129 ftlb)
CO	= carbon monoxide	oz	= ounce
CPU	= Central Processing Unit	Ω	= ohm
cu in	= cubic inch	PICK-UP	= pick-up
d.c.	= direct current	PPC	= Pneumatic Power Clutch
DIN	= German industrial normative (Deutsche Industrie Norm)	SAE	= Society of Automotive Engineers
DOHC	= Double Overhead Camshaft	sq in	= square inch
ECU	= Electronic Control Unit	TEST	= diagnostics test
ftlb	= foot pound	TDC	= Top Dead Center
ft	= foot	TSI	= Twin Spark Ignition
g	= gram	US gal	= Usa gallon
rpm	= revolutions per minute	US qt	= USA quart
HC	= unburned hydrocarbons	US fl oz	= USA fluid ounce
in	= inch	UPSIDE-	
ISC	= Idle Speed Control	DOWN	= upside-down fork
ISO	= International Standardization Organization	V	= volt
		W	= watt
		xxxxxxx N.A.	= not available
		∅	= diameter
		Cylinder "1"	= front cylinder
		Cylinder "2"	= rear cylinder

NOTE

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GENERAL INFORMATION

1

GENERAL INFORMATION

1 TABLE OF CONTENTS

1.1 INTRODUCTION	1-3-00
1.2 SAFETY WARNINGS	1-3-00
1.3 GENERAL SAFETY RULES	1-4-00
1.3.1 CARBON MONOXIDE	1-4-00
1.3.2 GASOLINE	1-4-00
1.3.3 HOT COMPONENTS	1-4-00
1.3.4 ENGINE OIL	1-4-00
1.3.5 CLUTCH CONTROL FLUID	1-4-00
1.3.6 COOLANT	1-4-00
1.3.7 ENGINE GENERAL SAFETY RULES	1-4-00
1.3.8 PRECAUTIONS AND GENERAL INFORMATION	1-5-00
1.3.9 ELECTRICAL CONNECTORS	1-6-00
1.3.10 FASTENERS TIGHTENING TORQUES ...	1-6-00
1.4 SPECIFIC SAFETY RULES	1-7-00
1.4.1 FUEL	1-7-00
1.4.2 CLUTCH CONTROL FLUID	1-7-00
1.4.3 COOLANT	1-7-00
1.4.4 ENGINE SAFETY RULES	1-8-00
1.4.5 REQUIREMENTS FOR ENGINE OPERATIONS WORK	1-8-00
1.5 HOW TO USE YOUR SERVICE AND REPAIR MANUAL	1-9-00
1.5.1 ADVICE FOR CONSULTATION	1-9-00
1.5.2 ADVICE FOR SPARE PARTS REQUEST	1-9-00

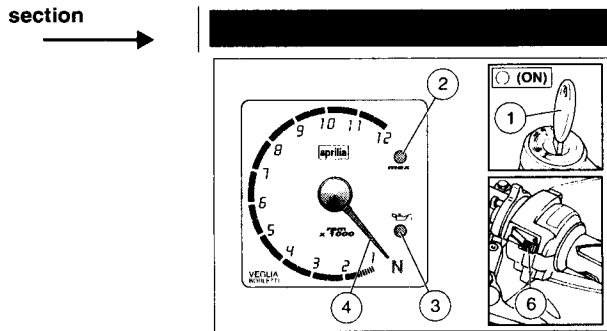
1.1 INTRODUCTION

This manual is divided into sections, chapters and paragraphs, by subject.

The procedures described are laid out in single operation, and each operation is indicated by a ♦.

The numbered parts shown in the figures are identified in the text with the number in parentheses or with the symbol representing them.

Example (the following text is generic and does not refer to this specific engine):



chapter → **2.4 MULTIFUNCTION COMPUTER**

safety warning → **CAUTION**
 After the first 600 mi (1,000 km) and successively every 4,650 mi (7,500 km), the word "SERVICE" appears on the right display.

paragraph → **2.4.1 SEGMENT OPERATION CHECK**

operation → ♦ Rotate the ignition key to position "O" (ON).

position (1) → ♦ The segment (1) will remain on.

symbol "O" → ♦ Rotate the ignition key from position "O" (OFF).

1.2 SAFETY WARNINGS

Throughout this manual, you will see the following symbols:

WARNING

When you find this symbol on the engine or in the manual, this indicates that a potential for serious personal injury or death exists.

Failure to follow this warning may result in serious risk of personal injury or death, of the mechanic working on the engine, the operator of the engine, or the general public.

It also indicates that serious and permanent damage to the engine is possible.

CAUTION

This statement indicates a potential hazard which may result in some personal injury, or damage to the engine.

NOTE The word "NOTE" in this manual precedes important information or instructions to which special attention must be given.

1.3 GENERAL SAFETY RULES

This chapter contains the general safety rules, further and specific safety rules are described in the chapter 1.4 (SPECIFIC SAFETY RULES). Carefully read both these chapters.

The safety rules here described refer to the engine removed from the vehicle frame. For further safety rules refer to the vehicle, consult the corresponding chapter of specific vehicle workshop manual, see 0.4.1 (VEHICLE WORKSHOP MANUAL).

1.3.1 CARBON MONOXIDE

If it is necessary to run the engine in order to carry out a maintenance operation, ensure that the area in which you are operating is properly ventilated.

Never run the engine in enclosed spaces.

If it is necessary to work indoors, use an exhaust evacuation system.

⚠ WARNING

The exhaust fumes contain carbon monoxide, a poisonous gas that can cause loss of consciousness and even death.

1.3.2 GASOLINE

Work in a well ventilated area.

Keep cigarettes, flames or sparks away from the work area and from the place where gasoline is stored.

⚠ WARNING

Gasoline is extremely flammable and becomes explosive under certain conditions.

Use latex gloves for the maintenance operations that require contact with gasoline.

ALWAYS KEEP GASOLINE AWAY FROM CHILDREN AND PETS.

DISPOSE OF UNWANTED, DRAINED OR USED GASOLINE PROPERLY, DO NOT DUMP IT INTO STORM SEWERS OR INTO A SINK OR TOILET.

1.3.3 HOT COMPONENTS**⚠ WARNING**

The engine and the components of the exhaust system become very hot and remain hot for some time after the engine has been stopped.

Before handling these components, wear insulating gloves or wait until the engine and the exhaust system have cooled down.

1.3.4 ENGINE OIL**⚠ WARNING**

Use latex gloves for the maintenance operations that require contact with used oil.

Used oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods.

Although this is unlikely unless you handle used oil on a daily basis, it is advisable to thoroughly wash your hands with soap and water after handling used oil.

ALWAYS KEEP ENGINE OIL AWAY FROM CHILDREN AND PETS.

DISPOSE OF UNWANTED OR DRAINED ENGINE OIL PROPERLY, DO NOT DUMP IT INTO STORM SEWERS OR INTO A SINK OR TOILET.

1.3.5 CLUTCH CONTROL FLUID**⚠ CAUTION**

The clutch control fluid can damage painted, plastic or rubber parts.

When performing maintenance operations on the clutch control system, place a clean shop towel on these parts, and take care not to spill the clutch control fluid.

Always wear goggles when servicing the clutch control system with clutch control fluid.

Clutch control fluid is extremely destructive to your eyes.

If you should accidentally get clutch control fluid in your eyes, flush immediately with a large quantity of cool clear water and seek professional medical assistance immediately.

Use latex gloves for the maintenance operations that require contact with clutch control fluid.

ALWAYS KEEP CLUTCH CONTROL FLUID AWAY FROM CHILDREN AND PETS.

DISPOSE OF UNWANTED OR DRAINED CLUTCH CONTROL FLUID PROPERLY, DO NOT DUMP IT INTO STORM SEWERS OR INTO A SINK OR TOILET.

1.3.6 COOLANT

In certain conditions, the ethylene glycol contained in the engine coolant is flammable: its flame is invisible, but you can be burned anyway.

⚠ WARNING

Avoid spilling the engine coolant on the exhaust system or on the engine components.

They may be hot enough to cause the coolant to ignite and burn without a visible flame.

The coolant (ethylene glycol) can cause skin irritation and is poisonous if swallowed.

Use latex gloves for the maintenance operations that require contact with coolant.

ALWAYS BE SURE TO KEEP THE COOLANT AWAY FROM CHILDREN AND PETS. IT IS SWEET TASTING, AS WELL AS EXTREMELY POISONOUS, AND IS VERY ATTRACTIVE TO CHILDREN AND PETS.

DISPOSE OF UNWANTED OR DRAINED COOLANT PROPERLY, DO NOT DUMP IT INTO STORM SEWERS OR INTO A SINK OR TOILET.

Do not leave coolant in an open container where pets or other animals may be able to drink it.

1.3.7 ENGINE GENERAL SAFETY RULES**⚠ CAUTION**

Careful adherence to the maintenance operation intervals and the technical documents provided is essential for long life and efficient operation of the engine.

⚠ WARNING

Repair any small problems immediately upon their discovery.

Small problems in the engine will inevitably grow to major problems, which can cause serious irreparable engine damage, and even an accident, with subsequent upset, serious injury, and even death.

Engine seizure will certainly result in a serious accident, and improper maintenance can lead to engine seizure.

If you have any questions about any maintenance operation, do not permit the vehicle to be ridden, and contact the **aprilia** factory immediately.

CAUTION

Maintenance and repair operations carried out on the engine while it is installed in the vehicle must be performed only after turning the engine off and setting the ignition switch to the "⊗" (OFF) position.

Do not attempt to start the engine if all electrical wiring is not completely connected and all ignition and other electrical components are not installed and connected.

CAUTION

Start the engine and let it run **ONLY** for the time necessary for the checking.

WARNING

Exhaust gases contain carbon monoxide, which is extremely poisonous if inhaled. Do not start the engine in closed or badly-ventilated rooms.

Failure to observe this warning may cause loss of consciousness or even lead to death by asphyxia.

WARNING

During maintenance and repair work, observe all general safety rules, and the safety notes provided by **aprilia**.

Pay careful attention and obey all safety rules and suggestions contained in this manual.

Observe all environmental regulations, do not dispose of used engine fluids or defective parts improperly.

1.3.8 PRECAUTIONS AND GENERAL INFORMATION

Follow with care these recommendations when repairing, disassembling and reassembling the engine.

WARNING

The use of open flames is forbidden for any type of operation.

Before commencing any service or inspection operation on the engine wait until the engine has cooled down.

In order to avoid burns, be careful not to touch any parts of the engine which has not cooled down completely.

Avoid the temptation to hold any hardware or other part of the engine in your mouth while working on the engine.

No part of the engine (and vehicle) is edible and some of the coatings, plastics, and platings, etc. are noxious if not outright toxic.

If not expressly described, the reassembly of the units is carried out by reversing the order of operations.

Handle fuel with the greatest caution.

Never use fuel as a solvent for cleaning the engine.

When two or more persons are working together, ensure that each is working in safe condition.

Be sure that all the mechanics working on any one engine are thoroughly briefed as what each will be doing, and insure that one mechanic is responsible for insuring that all safety related items, such as tightening torques, are properly considered.

BEFORE DISASSEMBLY

- Remove any dirt, mud, dust and foreign matter from the engine before disassembling the components.
- Use, when necessary, the special tools designed for this engine.

WARNING

Do not use makeshift tools for any operation which calls for a special tool.

Failure to heed this warning can lead to serious personal injury such as when an ill-fitting wrench slips, and you slam your hand into the workbench or a part of the engine.

DISASSEMBLING THE COMPONENTS

- Before disconnecting any line, cable, etc., mark each part with a number or distinguishing mark. Each disconnected part must be marked clearly in order that it may be reassembled in the same position as it was before disassembly.
- Clean and carefully wash all disassembled parts with fire-proof solvent such as Stoddard solvent or a non-flammable detergent.
- Keep mating parts together, since they have worn in during normal use. There are some sets of parts, such as front sprocket, chain, and rear wheel sprocket, which all must be replaced as a set.
- Be careful not to place plastic or painted parts close to heat sources, where they might be damaged.

REASSEMBLING THE COMPONENTS

CAUTION

Never use a circlip twice. When a circlip is removed, it must be replaced with a new one.

When assembling a new circlip be careful not to stretch its ends more than strictly necessary to place it on the shaft.

After installing a circlip, ensure that it is completely and firmly inserted in its seat.

Do not use compressed air to clean the bearings.

NOTE The bearings must rotate freely, without halting or noise otherwise they must be replaced.

- Use only original **aprilia** SPARE PARTS.
- Use the recommended lubricants.
- Always lubricate parts before reassembly.
- When tightening screws, nuts, and bolts, start with the largest diameter fasteners. When several fasteners are arranged in a pattern, start with the innermost fasteners, and tighten diagonally across the pattern. Tighten each fastener successively before applying the final tightening torque.
- Always replace gaskets, grommets, circlips, O-rings and split pins (cotter pins) with new ones. Before assembling, clean all mating surfaces carefully, removing all traces of the old gasket and gasket sealing compound. Also carefully clean any oil seal you plan to reuse. It is recommended that all oil seals be replaced each time they are disassembled. Gaskets should never be reused. Apply a thin film of lithium based grease to all oil seals before assembling. Install oil seals and bearings with the identification mark or serial number facing outward (visible).

Copiously lubricate bearings before installation and before assembly.

- Ensure that each component has been reassembled correctly.
- After any repair or periodic maintenance operation is carried out, the vehicle must be test ridden in an area away from traffic and other hazards.

1.3.9 ELECTRICAL CONNECTORS

The electrical connectors must be disconnected as follows. Failure to follow these procedures will irreparably damage the connector and wiring.

- ◆ Press in the click tab.

CAUTION

Do not pull the cables to disconnect the two connectors.

- ◆ Grasp the two connectors and disconnect them by pulling in opposite directions.
- ◆ If dirt, rust, dust, or moisture is seen on the connector, blow out the connector with air.
- ◆ Ensure that the cables are correctly crimped to the terminals placed inside the connectors.

NOTE The two halves of the connector fit together properly in only one orientation. Ensure that the connector is properly aligned before attempting to assemble it.

- ◆ Press the connectors firmly together, listening for the typical "click" sound for those connectors provided with a click tab. Ensure that both halves of the connectors are firmly pressed together.

1.3.10 FASTENERS TIGHTENING TORQUES

WARNING

Remember that the tightening torque of all fasteners on the engine is very important to ensure the safety of the engine, and must be kept at the prescribed values.

Check the tightening torque of the fasteners regularly, and always use a torque wrench when reinstalling them.

Failure to comply with this warning could allow one of these components to be lost which could lock a wheel or cause other handling problems with consequent overturning and risk of serious injury or even death.

1.4 SPECIFIC SAFETY RULES

This chapter contains the specific safety rules, further and general safety rules are described in the chapter 1.3 (GENERAL SAFETY RULES). Carefully read both these chapters.

The safety rules here described refer to the engine removed from the vehicle frame. For further safety rules refer to the vehicle, consult the corresponding chapter of specific vehicle workshop manual, see 0.4.1 (VEHICLE WORKSHOP MANUAL).

1.4.1 FUEL

▲ WARNING

Gasoline is extremely flammable and in some conditions can become explosive.

Spilled fuel could ignite when it contacts hot engine or exhaust system surfaces.

Avoid any contact of the fuel with your skin, and avoid inhalation of fuel vapors.

Do not ever attempt to siphon fuel from one container to another using your mouth as suction for a siphon hose.

Gasoline is poisonous and carcinogenic and contains chemical substances that cause birth defects and other reproductive problems.

If gasoline should be accidentally spilled on the skin or clothes, immediately wash it off with soap and water and change clothes.

Should you accidentally spill gasoline in your eyes, flush with a large quantity of water and immediately contact a health professional.

Should you accidentally get gasoline into your mouth, do not induce vomiting. Drink a large quantity of milk or clear water and immediately contact a health professional.

Never try to siphon gasoline by sucking it with your mouth. Use a manual pump or a similar system.

Use latex gloves for the maintenance operations that require contact with gasoline.

ALWAYS KEEP GASOLINE AWAY FROM CHILDREN AND PETS.

DISPOSE OF UNWANTED, DRAINED OR USED GASOLINE PROPERLY, DO NOT DUMP IT INTO STORM SEWERS OR INTO A SINK OR TOILET.

1.4.2 CLUTCH CONTROL FLUID

▲ CAUTION

To avoid serious damage to the system, do not use fluids other than the recommended ones nor mix different fluids.

Do not use clutch fluid taken from old or already opened containers.

1.4.3 COOLANT

▲ WARNING

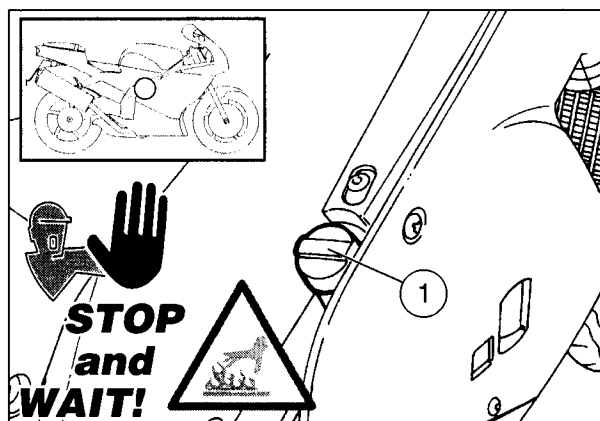
Coolant is poisonous! Do not ingest coolant under any circumstance.

Should you get coolant in your mouth, rinse with cool water and immediately seek medical attention.

Coolant is also very dangerous to your skin and eyes.

Should you accidentally get coolant on your clothing or skin, change clothes immediately.

Wash coolant from your skin with hot water and soap.



Should you get coolant in your eyes, flush with plenty of cool water and seek professional medical help at once.

Should someone swallow coolant accidentally, induce vomiting, rinse mouth with water, and immediately seek professional medical attention.

Use latex gloves for the maintenance operations that require contact with coolant.

ALWAYS BE SURE TO KEEP THE COOLANT AWAY FROM CHILDREN AND PETS. IT IS SWEET TASTING, AS WELL AS EXTREMELY POISONOUS, AND IS VERY ATTRACTIVE TO CHILDREN AND PETS.

DISPOSE OF UNWANTED OR DRAINED COOLANT PROPERLY, DO NOT DUMP IT INTO STORM SEWERS OR INTO A SINK OR TOILET.

NOTE The characteristics of the various antifreeze liquids are different.

Be sure to read the label on the product to learn the degree of protection it guarantees.

▲ CAUTION

Use only antifreeze and anticorrosive without nitrite in order to ensure protection at at least -35 °C (-95 °F).

1.4.4 ENGINE SAFETY RULES

▲ WARNING

This **aprilia** engine is designed solely for use this specific **aprilia** vehicle.
Any other use is inappropriate.
Manufacturer will not be liable for any damage which results to the engine or to any other party as a result of this misuse.

▲ CAUTION

The information contained in this manual is based on **aprilia's** experience with vehicle that have been properly maintained, and are unmodified.
The information in this manual is useful and necessary, but it cannot substitute for proper theoretical and practical training.

▲ WARNING

Since the **aprilia** engine is built of the highest quality materials, manufactured to exacting tolerances, any spare parts used must meet all of the requirements defined by **aprilia**.
The only spare parts which you can be assured meet these requirements are Genuine **aprilia** Spare Parts and/or accessories, see 0.4.2 (SPARE PARTS CATALOGUE).
The use of spare parts or accessories which do not meet **aprilia's** specifications invalidates the warranty coverage.

▲ CAUTION

Modifications to the engine and associated system (intake silencer, carburetor, exhaust system, engine fasteners, transmission, etc.) not approved by **aprilia** are likely to degrade the performance and durability of the engine.
Therefore, any such modifications which are found to effect the operation of the engine void the warranty.

1.4.5 REQUIREMENTS FOR ENGINE OPERATIONS WORK

▲ WARNING

Maintenance of engines and systems requires specific know-how and special tools.

All maintenance and repair work must be performed only by technicians with specific training for **aprilia** engines.

We remind you that parts and equipment that are not Genuine **aprilia** Spare Parts and are not supplied by **aprilia** are neither tested nor approved by **aprilia**. The installation and use of such products can adversely affect the engine's life and performance.
Any damage to the engine caused by the use of such products is not covered under warranty, and **aprilia** will not be responsible for any damage, direct or consequential, as a result of use of such products.

In addition to the advice given in this manual, also observe the general safety and accident prevention regulations and local laws.

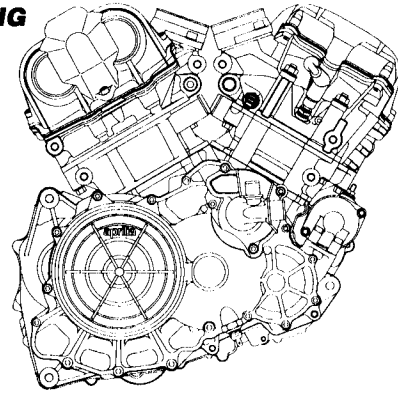
During the assembly phase, bear in mind the engine's weight [approx. 143 lb (65 kg)] and center of gravity: support accordingly.

Take care around any potentially hazardous points where you might be squashed or cut.

NOTE Comply with the instructions furnished by the manufacturer of the vehicle.

▲ WARNING

Engine weight
143 lb
(65 kg)

**▲ WARNING**

Do not use highly inflammable or caustic cleaning agents.

The use of the special tools, fixtures and lubricants specified is required for correct repair.

Never tighten screws and nuts with a pair of pliers: always use the correct wrench.

Use only screws and nuts in good condition. Inspect the contact face and thread for damage, and renew in case of doubt.

Never reuse a self-locking (nylock) nut. Self-locking nuts should always be replaced with new nuts once removed.

Scrupulously observe the tightening torques and upon reassembly of the gasket of the engine renew all sealing.

Never reuse these parts.

Overtightening or loose connections may cause serious engine damage.

Upon reassembly of the engine, renew all sealing rings, gaskets, snap rings, O-rings and oil seals removed.

Use only the securing agents, sealing and adhesive compounds, lubricants, cleaning agents and solvents specified in the corresponding chapter.
Non-compliance can lead to damage.

Clean and check the parts removed before re-use and refit them according to the instructions.

Check for missing or defective parts prior to reassembly.

After reassembly, check all components for tight fit and flawless operation.

1.5 HOW TO USE YOUR SERVICE AND REPAIR MANUAL

1.5.1 ADVICE FOR CONSULTATION

This manual is divided into sections, chapters and paragraphs, each one of which corresponds to a category of main components.

If not expressly indicated otherwise, for the reassembly of the units repeat the disassembly operations in reverse order.

The terms "right" and "left" are referred to the engine mounted on the vehicle in the normal riding position.

For normal maintenance operations and for the use of the vehicle, consult the specific use and maintenance book, see 0.4.4 (USE AND MAINTENANCE BOOK).

For further maintenance operations consult the specific vehicle workshop manual, see 0.4.1 (VEHICLE WORKSHOP MANUAL).

- ★ The operations preceded by this symbol must be repeated on the opposite side of the engine.

1.5.2 ADVICE FOR SPARE PARTS REQUEST

NOTE When asking your Dealer for spare parts, specify:

- the spare parts code indicated on the SPARE PARTS IDENTIFICATION LABEL (see the figure);
- the frame number, see 2.1.1 (FRAME NUMBER);
- all the other data request in the instructions contained in the specific spare parts catalogue, see 0.4.2 (SPARE PARTS CATALOGUE).

aprilia		N° 390Y		YEAR		T	V	W	X	Y
SPARE P ARTS		CODE NUMBER		I.M.		A	B	C	D	E
I	UK	A	P	SF	B	D	F	E	GR	
NL	CH	DK	J	SGP	PL	IL	ROK	MAL	RCH	
BM	AUS	USA	BR	RSA	NZ	CDN	HR	SLO		

This label is placed on the vehicle, to know its position consult the corresponding chapter of specific vehicle workshop manual, see 0.4.1 (VEHICLE WORKSHOP MANUAL) or the specific use and maintenance book, see 0.4.4 (USE AND MAINTENANCE BOOK).

In this manual the various versions are indicated by the following symbols:

- catalytic version
- EES** evaporative emission system
- OPT** optional
- RSV** RSV mille
- RSV R** RSV mille R
- SL** SL mille
- RST** RST mille Futura
- ETV** ETV mille Caponord

VERSION:

- I** Italy
- UK** United Kingdom
- A** Austria
- P** Portugal
- SF** Finland
- B** Belgium
- D** Germany
- F** France
- E** Spain
- GR** Greece
- NL** Holland
- CH** Switzerland
- DK** Denmark
- J** Japan
- SGP** Singapore
- PL** Poland
- IL** Israel
- ROK** South Korea
- MAL** Malaysia
- RCH** Chile
- BM** Bermuda
- USA** United States of America
- AUS** Australia
- BR** Brazil
- RSA** South Africa
- NZ** New Zealand
- CDN** Canada
- HR** Croatia
- SLO** Slovenia

