Pegaso 650 UK **1079**-1

workshop manual

aprilia part# 8140638

0

INTRODUCTION

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0.1 UPDATE OF RELEASE 00/2002-02

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

First edition (Release 00) ..... february 2002

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 vehicle, with serious consequences for the safety of the vehicle and of persons and property.

The manual consists of # 10 sections, for a total amount of # 320 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
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0 - 4 - 00	00
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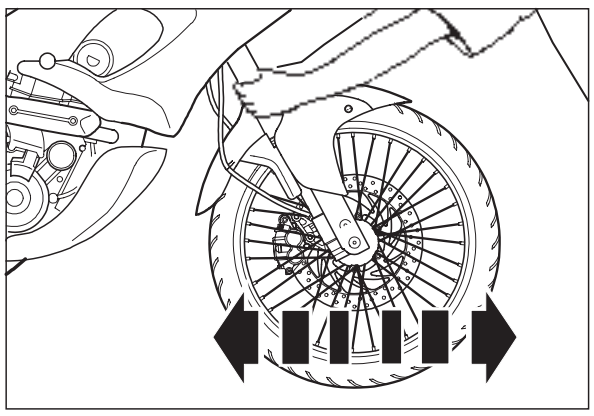
0.2 HOW TO CONSULT THE MANUAL

8 — **2.22 STEERING**

Carefully read 0.5.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

For the maintenance intervals, see 2.1.1 (REGULAR SERVICE INTERVALS CHART) under:
– Steering bearings and steering clearance.

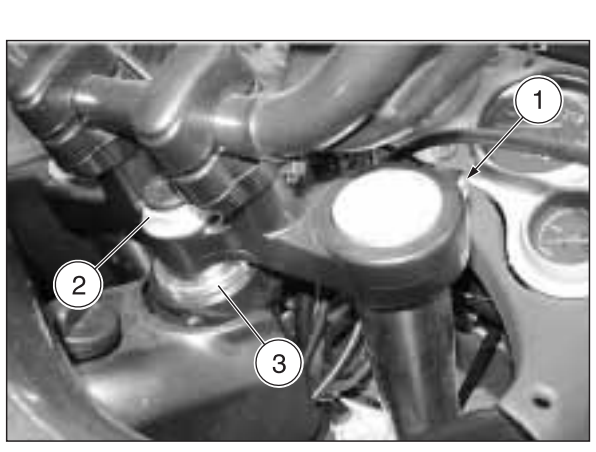
To assure improved handling, the steering is equipped with rolling bearings.
The steering must be adjusted correctly to provide smooth rotation of the handlebar and safe driving.
Tight steering hinders the smooth rotation of the handlebar whereas slack steering implies inadequate stability.



9 — **2.22.1 CHECKING THE BEARING SLACK STEERING**

◆ Position the vehicle on the centre stand OPT.
◆ Shake the fork in the direction of travel.

10 — ◆ In the event any slack is encountered, adjust the steering, see 2.22.2 (ADJUSTING THE BEARING SLACK STEERING).



2.22.2 ADJUSTING THE BEARING SLACK STEERING

Carefully read 0.5.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

11 — ◆ Position the vehicle on the centre stand OPT.
◆ ★ Loosen the screw (1).
◆ Loosen the upper nut (2).
◆ Adjust the metal ring (3) with the appropriate spanner to take up the slack.
◆ Repeat the check until the problem appears to be solved.
◆ Tighten the upper nut (2) thoroughly.

Steering tube nut driving torque: 100 Nm (10 kgm).

◆ ★ Tighten the screw (1).

Upper plate screw driving torque: 50 Nm (5 kgm).

⚠ WARNING

Once the operation is complete, make sure that the rotation of the handlebar is smooth in order to avoid damage to the balls and the loss of manoeuvrability of the vehicle.

1) Vehicle (or engine) model
2) Section
3) Release consecutive number (“00” indicates the first edition)
4) Year and month of publication of the Release
5) Section number
6) Section page consecutive number
7) Updated page consecutive number
8) Chapter title (numbered consecutively)
9) Paragraph title (numbered consecutively)
10) Description of the operation (always preceded by a rhombus)
11) Description of the operation: the star means that the operation must be repeated on the other side of the vehicle

0.3 FOREWORD

– This manual supplies the main information for normal servicing procedures.
– In the future, the information and illustrations that make up this manual will be updated by means of “Releases”, see 0.1 (UPDATE OF RELEASE 00/2002-02).
– This publication is intended for the **aprilia** Dealers and their qualified engineers; many notions were voluntarily omitted, because they were considered superfluous. Since it is not possible to include complete mechanical information in this publication, the persons using this manual must have a basic mechanical training and a basic knowledge of the procedures regarding motor vehicles repair systems.
Without this knowledge, the repair or servicing of the vehicle may be ineffective or even dangerous.
The manual does not describe all the procedures for the repair and servicing of the vehicle in detail, therefore it is important to be particularly careful, in order to avoid any damage to components and persons.
In order to grant its customers more and more satisfaction in the use of the vehicle, **aprilia s.p.a.** will keep improving its products and the relevant documentation.
The main technical modifications and the modifications in the vehicle repair procedures are communicated to all **aprilia** Outlets and Branches the world over.
These modifications will be described in the successive editions of this manual.
In case of need or in case there are any doubts regarding the repair and servicing procedures, contact the **aprilia** Consumer Service (A.C.S.), which will give you any information required and will also inform you about any updating and technical modifications of the vehicle.

aprilia s.p.a. reserves the right to modify its models at any time, without prejudice to the main characteristics here described.

The mention to products or services supplied by third parties is made only for information purposes and it isn’t binding in any case.
aprilia takes no responsibility as to the performance or use of said products.

For further information, see 0.4 (REFERENCE MANUALS).

0.4 REFERENCE MANUALS

0.4.1 ENGINE SERVICE AND REPAIR MANUALS

aprilia part# (description)
8140138 (I) (E) (F)
8140139 (I) (D) (UK)

0.4.2 SPARE PARTS CATALOGUES

aprilia part# (description)
2611 (I) (UK)

0.4.3 SPECIAL TOOL MANUALS

aprilia part# (description)
8202278 (I) (F) (D) (E) (UK)

0.4.4 USE AND MAINTENANCE MANUALS

aprilia part# (description)
8104311 (I) (F) (D)
8104312 (P) (E) (UK)
8104313 (NL) (DK) (GR)

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0.5 SAFETY WARNINGS

The following precautionary warnings are used throughout this manual in order to convey the following messages:

⚠ Safety warning. When you find this symbol on the vehicle or in the manual, be careful to the potential risk of personal injury. Non-compliance with the indications given in the messages preceded by this symbol may result in grave risks for your and other people's safety and for the vehicle!

⚠ WARNING

Indicates a potential hazard which may result in serious injury or even death.

⚠ CAUTION

Indicates a potential hazard which may result in minor personal injury or damage to the vehicle.

NOTE The word "NOTE" in this manual precedes important information or instructions.

0.5.1 PRECAUTIONS AND GENERAL INFORMATIONS

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

⚠ WARNING

The use of naked flames is forbidden for any type of operation.
Before beginning any maintenance operation or any inspection of the vehicle, stop the engine, extract the key from the ignition block, wait until the engine and the exhaust system have cooled down and if possible lift the vehicle by means of the proper equipment, on firm and flat ground.
Keep away from the red-hot parts of the engine and of the exhaust system, in order to avoid burns.

⚠ WARNING

Do not hold any mechanical piece or other parts of the vehicle with your mouth: the components are not edible and some of them are noxious or even toxic.

If not expressly indicated otherwise, for the reassembly of the units repeat the disassembly operations in reverse order.
Any reference to operations from other chapters must be interpreted logically in order to avoid components being removed unnecessarily.
Do not use polishing pastes on matt paints.

Never use fuel as a solvent for cleaning the vehicle.

Do not use alcohol, petrol or solvents to clean the rubber and plastic parts and the saddle: use only water and mild soap.

Disconnect the negative cable (–) from the battery when electric welding.

When two or more persons are working together, make sure that each is working in safe conditions.

Carefully read 1.2 (INSTRUCTIONS FOR USE OF FUEL, LUBRICANTS, COOLANT AND OTHER COMPONENTS).

0.5.2 BEFORE THE DISASSEMBLY OF THE COMPONENTS

– Remove any dirt, mud, dust and foreign matters from the vehicle before disassembling the components.
– Use, when necessary, the special tools designed for this vehicle.

0.5.3 DISASSEMBLING THE COMPONENTS

– Do not loosen and/or tighten the screws and nuts using pliers or other tools: instead, always use the proper spanner.
– Before disconnecting the joints (pipes, cables, etc.), mark the positions on all of them and mark them with different distinguishing signs.
  Each piece must be marked clearly, in order not to have problems during installation.
– Clean and wash carefully any disassembled parts with low inflammability detergents.
– Keep the parts that are used in pairs together, since they have adapted to each other following the normal wear.
  Some components must be used together or replaced completely.
– Keep away from heat sources.

0.5.4 REASSEMBLING THE COMPONENTS

⚠ CAUTION

Never use a seeger ring twice. When a seeger ring is removed, it must be replaced with a new one. When assembling a new seeger ring be careful not to stretch its ends more than strictly necessary to put it on the shaft.
After installing a seeger ring, make sure 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 a/o noise otherwise they must be replaced.

– Use only original **aprilia** SPARE PARTS.
– Use the recommended lubricants.
– Whenever possible, lubricate the parts before reassembly.
– When tightening screws and nuts, begin with those having greater diameters or with inner ones, proceeding diagonally.
  Tighten screws or nuts in successive passages before applying driving torque.
– Always replace lock nuts, seals, sealing rings, snap rings, O-rings, split pins and screws, whenever the thread appears damaged, with new ones.
– Before the assembly, clean all the connection surfaces, the oil seal edges and the gaskets.
  Apply a thin layer of lithium-based grease on the oil seal edges.
  Put back the oil seals and the bearings with the mark or serial number facing towards the outside (visible side).

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– When installing the bearings, lubricate them abundantly.
– Make sure that each component has been reassembled correctly.
– After a repair or periodic maintenance operation, carry out the preliminary checks and test the vehicle in a private area or, in any case, in a low-traffic area.

0.6 HOW TO USE YOUR SERVICE AND REPAIR MANUAL

0.6.1 ADVICE FOR CONSULTATION

– This manual is divided into section and chapters, each one of which corresponds to a category of main components.
To consult them, see the sections' index, see page 0-1.
– 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 rider seated on the vehicle in the normal riding position.
– For normal maintenance operations and for the use of the vehicle, consult the "USE AND MAINTENANCE" manual.

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

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

ASD automatic light switching version (Automatic Switch-on Device)

OPT optional

catalytic version

VERSION:

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

0.7 ABBREVIATIONS / SYMBOLS / INITIALS

= number
< = is less than
> = is greater than
≤ = is equal to or less than
≥ = is equal to or greater than
~ = approximately
∞ = infinity
°C = degrees Celsius (centigrade)
°F = degrees Fahrenheit
± = plus or minus
a.c. = alternating current
A = ampère
Ah = ampere per hour
API = American Petroleum Institute
HV = high voltage
AV/DC = AntiVibration Double Countershaft
bar = unit of pressure (1 bar = 100 kPa)
d.c. = direct current
cm^3 = cubic centimetres
CO = carbon monoxide
CPU = Central Processing Unit
DIN = German industrial normative (Deutsche Industrie Norm)
DOHC = Double Overhead Camshaft
ECU = Engine Control Unit
rpm = revolutions per minute
HC = unburnt hydrocarbons
ISC = idle speed control
ISO = International Standardization Organization
kg = kilograms
kgm = kilograms per metre (1 kgm = 10 Nm)
km = kilometres
km/h = kilometres an hour
kΩ = kilo-ohms
kPa = kiloPascal (1 kPa = 0.01 bar)
KS = clutch side (Kupplungseite)
kW = kilowatt
ℓ = litres
LAP = lap (race course)
LED = Light Emitting Diode
LEFT SIDE = left side
m/s = metres an second
MAX = maximum
mbar = millibar (1mbar = 0.1 kPa)
mi = mile
MIN = minimum
MPH = miles per hour
MS = flywheel side (Magnetoseite)
MΩ = megaohm
N.A. = not available (Not Available)
N.O.M.M. = “Motor” method octane number
N.O.R.M. = “Research” method octane number
Nm = newton per meter (1 Nm = 0.1 kgm)
Ω = ohm
PICK-UP = pick-up
BDC = bottom dead centre
TDC = top dead centre
PPC = Pneumatic Power Clutch
RIGHT SIDE = right side
SAE = Society of Automotive Engineers
TEST = diagnostics test
T.B.E.I. = convex socket head
T.C.E.I. = hexagonal socket head
T.E. = hex-head
T.P. = flat head
TSI = Twin Spark Ignition
UPSIDE-DOWN = upside-down rods
V = volt
W = watt
Ø = diameter

NOTE

GENERAL INFORMATION

1

GENERAL INFORMATION

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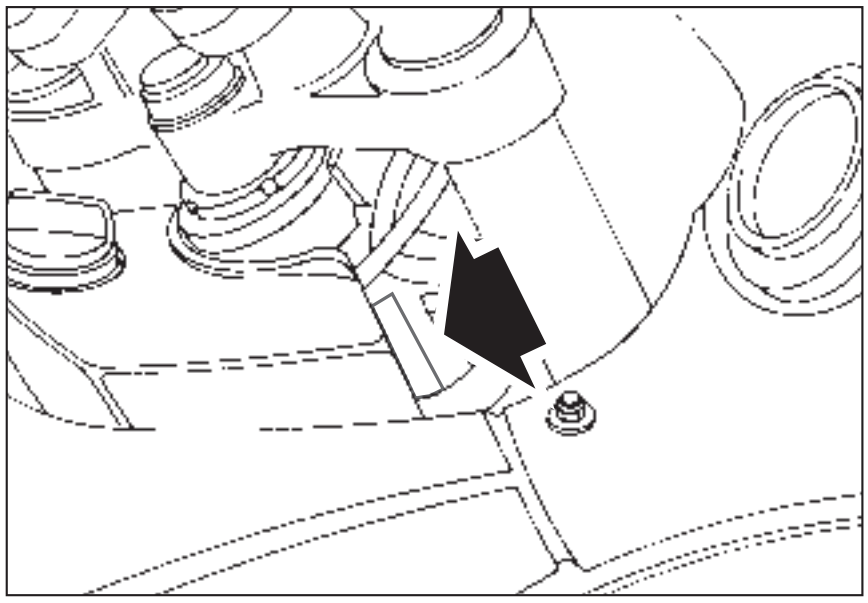
1.1 POSITION OF THE SERIAL NUMBERS

These numbers are necessary for the registration of the vehicle.

Do not alter the identification numbers if you do not want to incur severe penal and administrative sanctions. In particular, the alteration of the frame number results in the immediate invalidity of the guarantee.

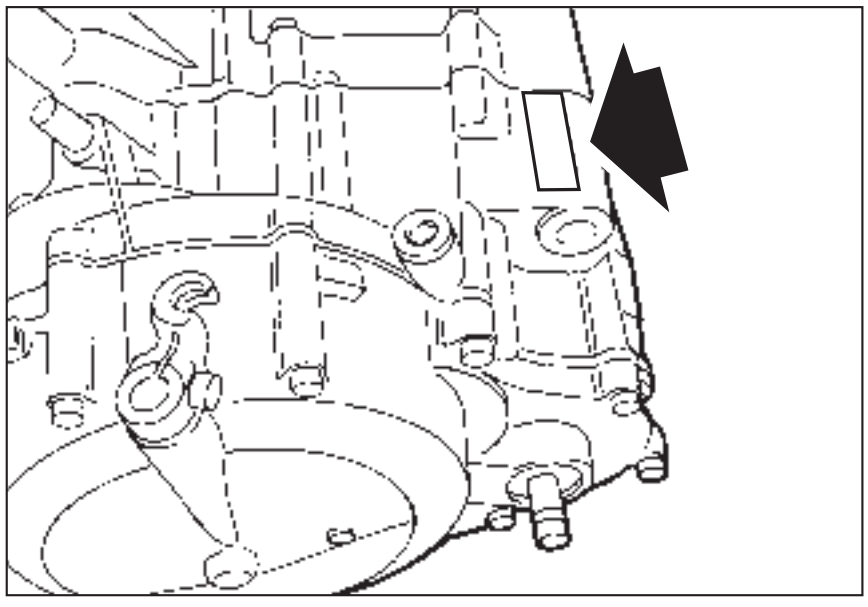
1.1.1 FRAME NUMBER

The frame number is stamped on the right side of the steering column.



1.1.2 ENGINE NUMBER

The engine number is stamped on the rear part of the engine, near the pinion.



1.2 INSTRUCTIONS FOR USE OF FUEL, LUBRICANTS, COOLANT AND OTHER COMPONENTS

1.2.1 FUEL

⚠ WARNING

The fuel used for internal combustion engines is extremely inflammable and in particular conditions it can become explosive.
It is important to carry out the refuelling and the maintenance operations in a well-ventilated area, with the engine off.
Do not smoke while refuelling or near fuel vapours, in any case avoid any contact with naked flames, sparks and any other heat source to prevent the fuel from catching fire or from exploding.

Further, prevent fuel from flowing out of the fuel filler, as it could catch fire when getting in contact with the red-hot surfaces of the engine.
In case some fuel has accidentally been spilt, make sure that the area has completely dried and before starting the vehicle verify that there is no fuel inside the fuel filler neck.
Since petrol expands under the heat of the sun and due to the effects of sun radiation.
Never fill the tank to the brim.
Screw the plug up carefully after refuelling.
Avoid any contact of the fuel with the skin and the inhalation of vapours; do not swallow fuel or pour it from a receptacle into another by means of a tube.

DO NOT DISPOSE OF FUEL IN THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

Use only premium grade unleaded petrol, min. O.N. 95 (N.O.R.M.) and 85 (N.O.M.M.).

1.2.2 ENGINE OIL

⚠ WARNING

Engine oil may cause serious damage to the skin if handled daily and for long periods.
Wash your hands carefully after use.
Do not dispose of the oil in the environment.
Deliver it to or have it collected by the nearest oil salvage center or by the supplier.

In case any maintenance operation has to be carried out, it is advisable to use latex gloves.

For the maintenance intervals, see 2.1.1 (REGULAR SERVICE INTERVALS CHART) under:
– Motor oil.

For the kind of engine oil to be used, see 1.6 (LUBRICANT CHART) under the heading:
– Motor oil.

1.2.3 FORK OIL

⚠ WARNING

Fork oil may cause serious damage to the skin if handled daily and for long periods.
Wash your hands carefully after use.
Do not dispose of the oil in the environment.
Deliver it to or have it collected by the nearest oil salvage center or by the supplier.

In case any maintenance operation has to be carried out, it is advisable to use latex gloves.

By changing the damper settings and/or the viscosity of the oil contained in them, the suspension response may be altered partially.

Standard oil viscosity: SAE 20 W.

The viscosity ratings which can be chosen based on the type of fork stiffness desired (SAE 5W soft, 20W stiff).

The two products can be used in different percentages until the desired response is obtained.

F.A. is that your viscosity alters little with changes in temperature and their damping response therefore remains constant.

For the maintenance intervals, see 2.1.1 (REGULAR SERVICE INTERVALS CHART) under:
– Fork oil.

For the kind of fork oil to be used, see 1.6 (LUBRICANT CHART) under the heading:
– Fork oil.

1.2.4 BRAKE FLUID

NOTE This vehicle is provided with front and rear disc brakes, with separate hydraulic circuits. The following information refers to a single braking system, but is valid for both.

⚠ WARNING

If the brake fluid gets in contact with the skin or the eyes, it can cause serious irritations.
Carefully wash the parts of your body that get in contact with the liquid. Consult a doctor or an oculist if the liquid gets in contact with your eyes.

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

When using the brake fluid, take care not to spill it on the plastic or painted parts, since it can damage them.

For the maintenance intervals, see 2.1.1 (REGULAR SERVICE INTERVALS CHART) under:
– Brake fluid.

For the kind of brake fluid to be used, see 1.6 (LUBRICANT CHART) under the heading:
– Brake fluid.

⚠ CAUTION

To avoid serious damage to the braking system, do not use fluids other than the recommended ones nor mix different fluids for topping up.
Do not use brake fluid taken from old or already opened containers.
Sudden variations in clearance or an elastic resistance in the brake levers may be due to trouble in the hydraulic circuits.
Make sure that the brake discs and the friction pads are completely free of grease or oil, especially after maintenance or checking operations.
Check that the brake cables are neither twisted nor worn out.
Prevent water or dust from accidentally getting into the circuit.

In case maintenance operations are to be performed on the hydraulic circuit, it is advisable to use latex gloves.

1.2.5 COOLANT

⚠ WARNING

The coolant is noxious: do not swallow it; if the coolant gets in contact with the skin or the eyes, it can cause serious irritations. If the coolant gets in contact with your skin or eyes, rinse with plenty of water and consult a doctor.
If it is swallowed, induce vomit, rinse mouth and throat with plenty of water and consult a doctor without delay.

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

⚠ WARNING

Be careful not to spill the coolant on the red-hot parts of the engine: it may catch fire and send out invisible flames.

In case any maintenance operation should be required, it is advisable to use latex gloves.

Do not use the vehicle if the coolant is below the minimum prescribed level.

For the maintenance intervals, see 2.1.1 (REGULAR SERVICE INTERVALS CHART) under:
– Coolant.

The coolant is composed of 50% water and 50% antifreeze. This mixture is ideal for most running temperatures and ensures good protection against corrosion.

It is advisable to keep the same mixture in the hot season as well, since in this way losses due to evaporation are reduced and it is not necessary to top up so frequently.
The mineral salt deposits left in the radiator by evaporated water are thus lessened and the efficiency of the cooling system remains unaltered.

If the outdoor temperature is below 0°, check th cooling circuit frequently and inf necessary increase the antifreeze concentration (up to maximum 60%).

For the cooling solution use distilled water, in order not to damage the engine.

For the kind of coolant to be used, see 1.6 (LUBRICANT CHART) under the heading:
– Engine coolant.

On the basis of the desired freezing temperature of the coolant mixture, add to the water the percentage of coolant indicated in the following table:

Freezing point °C	Coolant of the volume %
-20	35
-30	45
-40	55

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.

1.2.6 CLUTCH FLUID

NOTE This vehicle is provided with hydraulic clutch control.

⚠ WARNING

If the clutch fluid gets in contact with the skin or the eyes, it can cause serious irritations.
Carefully wash the parts of your body that get in contact with the liquid. Consult a doctor or an oculist if the liquid gets in contact with your eyes.

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

When using the clutch fluid, take care not to spill it on the plastic and painted parts, since it damages them.

For the maintenance intervals, see 2.1.1 (REGULAR SERVICE INTERVALS CHART) under:
– Clutch wear.

⚠ CAUTION

To avoid serious damage to the system, do not use fluids other than the recommended ones nor mix different fluids for topping up.
Do not use clutch fluid taken from old or already opened containers.

Sudden variations in clearance or an elastic resistance in the clutch levers may be due to trouble in the hydraulic circuits.
Check that the clutch hoses are not twisted or worn.
Prevent water or dust from accidentally getting into the circuit.

In case maintenance operations are to be performed on the hydraulic circuit, it is advisable to use latex gloves.

1.2.7 CARBON MONOXIDE

If it is necessary to let the engine run in order to carry out some work, make sure 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.

Run the engine in an open area or, if it is necessary to work indoors, use an exhaust evacuation system.

1.2.8 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 RUNNING-IN RULES

The running-in of the engine is essential to ensure its duration and correct functioning.
If possible, drive on hilly roads and/or roads with many bends, so that the engine, the suspensions and the brakes undergo a more effective running-in.

During running-in, change speed.
In this way the components are first “loaded” and then “relieved” and the engine parts can thus cool down.
Even if it is important to stress the engine components during running-in, take care not to exceed.

⚠ CAUTION

Only after the first 2000 km (1250 mi) of running-in is it possible to obtain the best performance.

Keep to the following indications:

- Do not open the throttle completely if the speed is low, both during and after the running-in.
- During the first 500 km (312 mi) put on the brakes with caution, avoiding sharp and prolonged brakings.
  This ensures a correct bedding-in of the pads on the brake disc.
- During the first 500 km (312 mi) never exceed 4000 rpm. (see table).

⚠ CAUTION

After the first 2000 km (1250 mi) perform the checking operations indicated in the “after running-in” column, see 2.1.1 (REGULAR SERVICE INTERVALS CHART) in order to avoid injuring yourself or others a/o damaging the vehicle.

- Between the first 1000 km (625 mi) and 2000 km (1250 mi) drive more briskly, change speed and use the maximum acceleration only for a few seconds, in order to ensure better coupling of the components; never exceed 7500 rpm (see table).
- After the first 2000 km (1250 mi) you can expect better performance from the engine, however, without exceeding the maximum allowed (6250 rpm).

Engine maximum rpm recommended	
Mileage km (mi)	**rpm**
0 – 500 (0 – 312)	4000
500 – 1000 (312 – 625)	5000
1000 – 2000 (625 – 1250)	5500
over 2000 (1250)	6250

1.4 SPARE PARTS

For any replacement, use **aprilia** Genuine Spare Parts only.
aprilia Genuine Spare Parts are high-quality parts, expressly designed and manufactured for **aprilia** vehicles.

⚠ CAUTION

Failure to use aprilia Genuine Spare Parts may result in incorrect performance and damages.

1.5 TECHNICAL SPECIFICATIONS

DIMENSIONS	
Max. length	2214 mm
Max. width	910 mm
Max. height (front part of the fairing included)	1253 mm
Seat height	815 mm
Distance between centres	1466 mm
Min. ground clearance	200 mm
Weight ready for starting (fuel and fluid included)	200 kg

ENGINE	
Model	655 EFI
Type	one-cylinder, 4-stroke with 5 valves, 2 camshafts at the head
Number of cylinders	1
Total displacement	652 cm^3
Max. rated power (to driving shaft)	34 kW at 6750 rpm
Max. torque	56 Nm (9.3 kgm) at 5550 rpm
Bore/stroke	100 mm/83 mm
Compression ratio	9 ± 0.5: 1
Camshaft during intake stroke	225°, with valve clearance 1 mm
Camshaft during exhaust stroke	234°, with valve clearance 1 mm
Valve advance (with valve clearance 1mm) opening during intake stroke closing during intake stroke opening during exhaust stroke closing during exhaust stroke	 5° before TDC 40° after BDC 47° before TDC 7° after BDC
Valve clearance during intake stroke	0.10 – 0.19 mm
Centre inlet valve clearance:	0.07 – 0.10 mm measured between roller and camshaft
Valve clearance during exhaust stroke	0.10 – 0.19 mm
# Engine revolutions at minimum rpm	1350 ± 100 rpm
Ignition	SAGEM - inductive ignition system
Starting	electric
Spark advance	At start: 10° before TDC, additional advance depending on specific consumption levels
Starter motor gear ratio	i= 49/9 * 30/11 * 64/30 = 31.677
Clutch	multidisc in oil bath - # 7 steel discs; thickness 1.5 mm - # 7 friction discs; thickness 3.5 mm
Transmission	Mechanical, 5 gears with foot control on the left side of the engine
Lubrication system	dry pan with separate oil tank
Air cleaner	with dry filter cartridge
Cooling	liquid-cooled
Thermal expansion valve opening start temperature	60 °C
Engine dry weight	~ 49 kg

Follow ▶

Follow ▶

CAPACITY	
Fuel (reserve included)	21 ℓ
Fuel reserve	5 ℓ
Engine oil	oil change 2150 cm^3 - oil and oil filter change 2200 cm^3
Fork oil (per rod)	570 cm^3
Coolant	1.4 ℓ (50% water + 50% antifreeze with ethylene glycol)
Seats	2
Vehicle max. load (driver + passenger + luggage)	180 kg

DRIVE					
GEAR RATIOS	Ratio	Primary	Secondary	Final ratio	Total ratio
	1ª	37/72 = 1: 1.946	12/33 = 1: 2.750	16/46 = 1: 2.875	15.385
	2ª		16/28 = 1: 1.750		9.791
	3ª		16/21 = 1: 1.312		7.34
	4ª		22/23 = 1: 1.045		5.846
	5ª		24/21 = 1: 0.875		4.895
# sprocket teeth			16		
Drive chain			Endless type (with no connection link) with sealed links, model 525, dimensions 5/8" x 5/16"		

FUEL SUPPLY SYSTEM	
Type	electronic injection
Choke	Ø 34 mm

FUEL SUPPLY	
Type	indirect injection (MULTIPOINT)
Fuel	Unleaded petrol according to the DIN 51 607 standard, min. O.N. 95 (N.O.R.M.) and 85 (N.O.M.M.)

FRAME	
Type	composite structure in steel and light alloy, with removable cradle and saddle pillar
Steering inclination angle	28°
Fore stroke	109 mm

SUSPENSIONS	
Front	telescopic adjustable fork with hydraulic operation, rod Ø 45 mm
Stroke	170 mm
Rear	oscillating rear fork with differentiated profile arms and hydraulic adjustable mono-shock absorber
Wheel stroke	165 mm

BRAKES	
Front	disc brake – Ø 300 mm – with hydraulic transmission
Rear	disc brake – Ø 240 mm – with hydraulic transmission

WHEEL RIMS	
Type	light alloy with spokes
Front	2.50 x 19"
Rear	3.00 x 17"

Follow ▶

Follow ▶

TYRES	
FRONT	100/90 – 19 57 H
alternative	100/90 – R19 57 H; 100/90 – 19 57 S; 100/90 – 19 57 T
Inflation pressure - solo rider	
off-road driving	190 kPa (1.9 bar)
asphalted road	190 kPa (1.9 bar)
Inflation pressure rider with passenger	
off-road driving	190 kPa (1.9 bar)
asphalted road	190 kPa (1.9 bar)

REAR	130/80 – R17 65 H
alternative	140/70 – 17 66 H; 130/80 – 17 65 S; 130/80 – 17 65 T; 130/80 – 17 65 H
Inflation pressure - solo rider	
off-road driving	210 kPa (2.1 bar)
asphalted road	210 kPa (2.1 bar)
Inflation pressure rider with passenger	
off-road driving	210 kPa (2.1 bar)
asphalted road	230 kPa (2.3 bar)

SPARK PLUGS	
Standard	NGK R DR8EB
Spark plug gap	0.6 – 0.7 mm
Resistance	5 kΩ

ELECTRIC SYSTEM	
Battery	12 V – 12 Ah
Fuses	7.5 A – 15 A – 20 A
Generator (with permanent magnet)	12 V – 400 W

BULBS	
Low beam bulb/high beam	12 V – 55/60 W
High beam	12 V – 60 W
Front parking light	12 V – 3 W
Direction indicators	12 V – 10 W
Rear parking lights/Stoplight	12 V – 5/21 W
Number plate light	12 V – 3 W
Revolution counter	12 V – 2 W
Speedometer	12 V – 2 W
Coolant temperature indicator	12 V – 2 W

WARNING LIGHTS	
Neutral	12 V – 3 W
Direction indicators	12 V – 3 W
Fuel reserve	12 V – 3 W
High beam	12 V – 2 W
Engine oil pressure	12 V – 3 W
Red line	12 V – 3 W

1.6 LUBRICANT CHART

Engine oil (recommended): IP SUPERBIKE 4, SAE 5W-40 or Agip 4T FORMULA RACING, SAE 5W-40.
As an alternative to the recommended oil, it is possible to use high-quality oils with characteristics in compliance with or superior to the CCMC G-4, A.P.I. SG specifications.

Fork oil (recommended): IP F.A. 5W or IP F.A. 20 W fork oil;
an alternative Agip FORK 5W or Agip FORK 20W fork oil.
If you need an oil with intermediate characteristics in comparison with the IP F.A. 5W and IP F.A. 20 W or Agip FORK 5W and Agip FORK 20W, these can be mixed as indicated below:

SAE 10W = IP F.A. 5W 67% of the volume, + IP F.A. 20W 33% of the volume or
Agip FORK 5W 67% of the volume + Agip FORK 20W 33% of the volume.

SAE 15W = IP F.A. 5W 33% of the volume, + IP F.A. 20W 67% of the volume or
Agip FORK 5W 33% of the volume + Agip FORK 20W 67% of the volume.

Bearings and other lubrication points (recommended): IP AUTOGREASE MP or Agip GREASE 30.
As an alternative to the recommended product, use high-quality grease for rolling bearings, working temperature range -30 °C…+140 °C, dripping point 150 °C…230 °C, high protection against corrosion, good resistance to water and oxidation.

Protection of the battery poles: neutral grease or Vaseline.

Spray grease for chains (recommended): IP CHAIN SPRAY or Agip CHAIN LUBE.

⚠ WARNING

Use new brake fluid only.

Brake fluid (recommended): IP F.F., DOT 5 (compatible with DOT 4) or Agip BRAKE 5.1, DOT 5 (compatible with DOT 4).

⚠ WARNING

Use only antifreeze and anticorrosive without nitrite, ensuring protection at -35 °C at least.

Engine coolant (recommended): IP ECOBLU -40 °C or Agip COOL.

1.7 SPECIAL TOOLS OPT

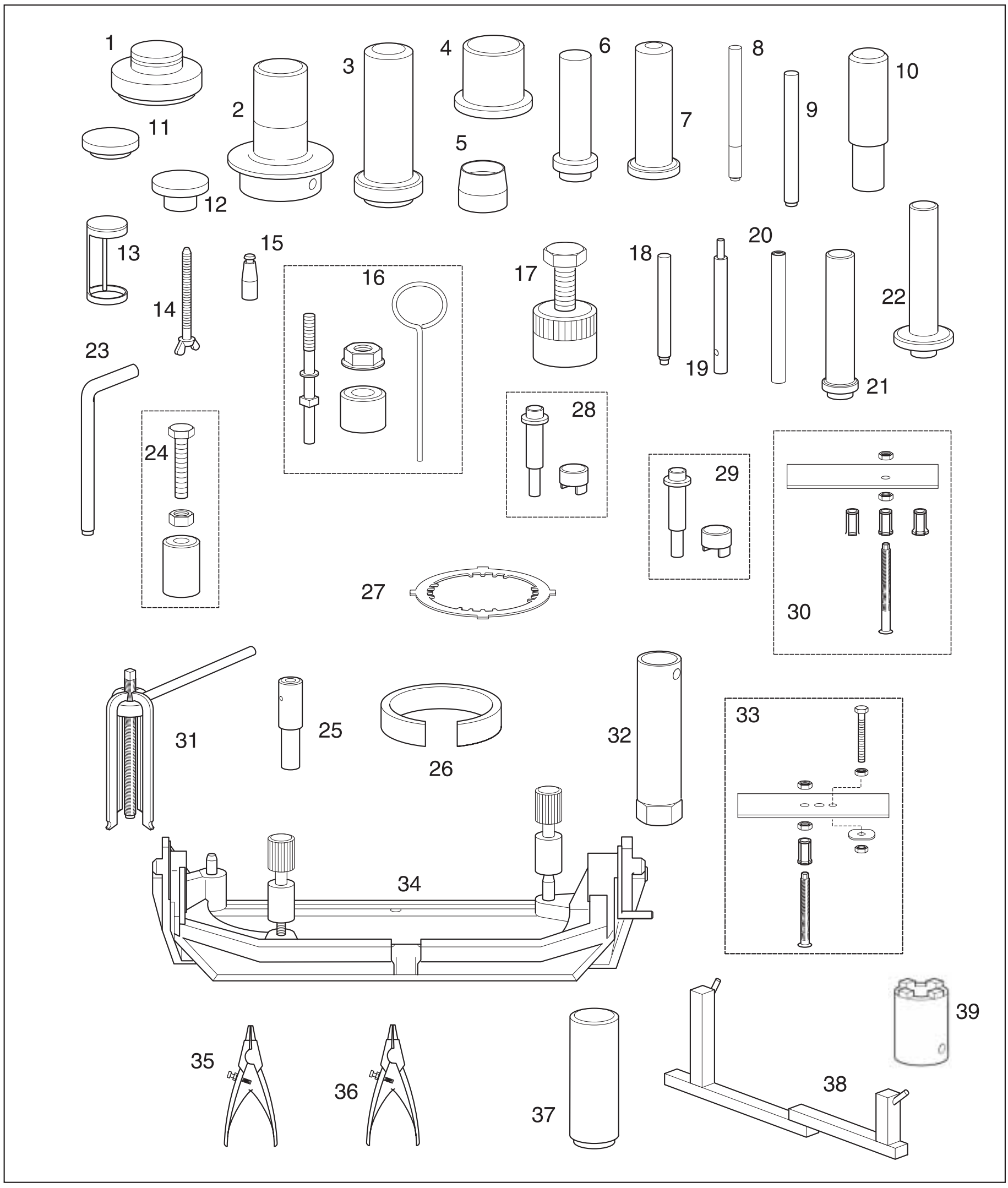
In order to perform assembly, reassembly and settings correctly, special tools suitable for the task must be used. The use of special tools avoids the potential risk of damage as a result of inappropriate tools and/or improvised methods.
Below is a list of the special tools designed especially for this specific vehicle.

If necessary, request the special tools, see **aprilia** part# 8202278 (I) (F) (D) (E) (UK).

⚠ CAUTION

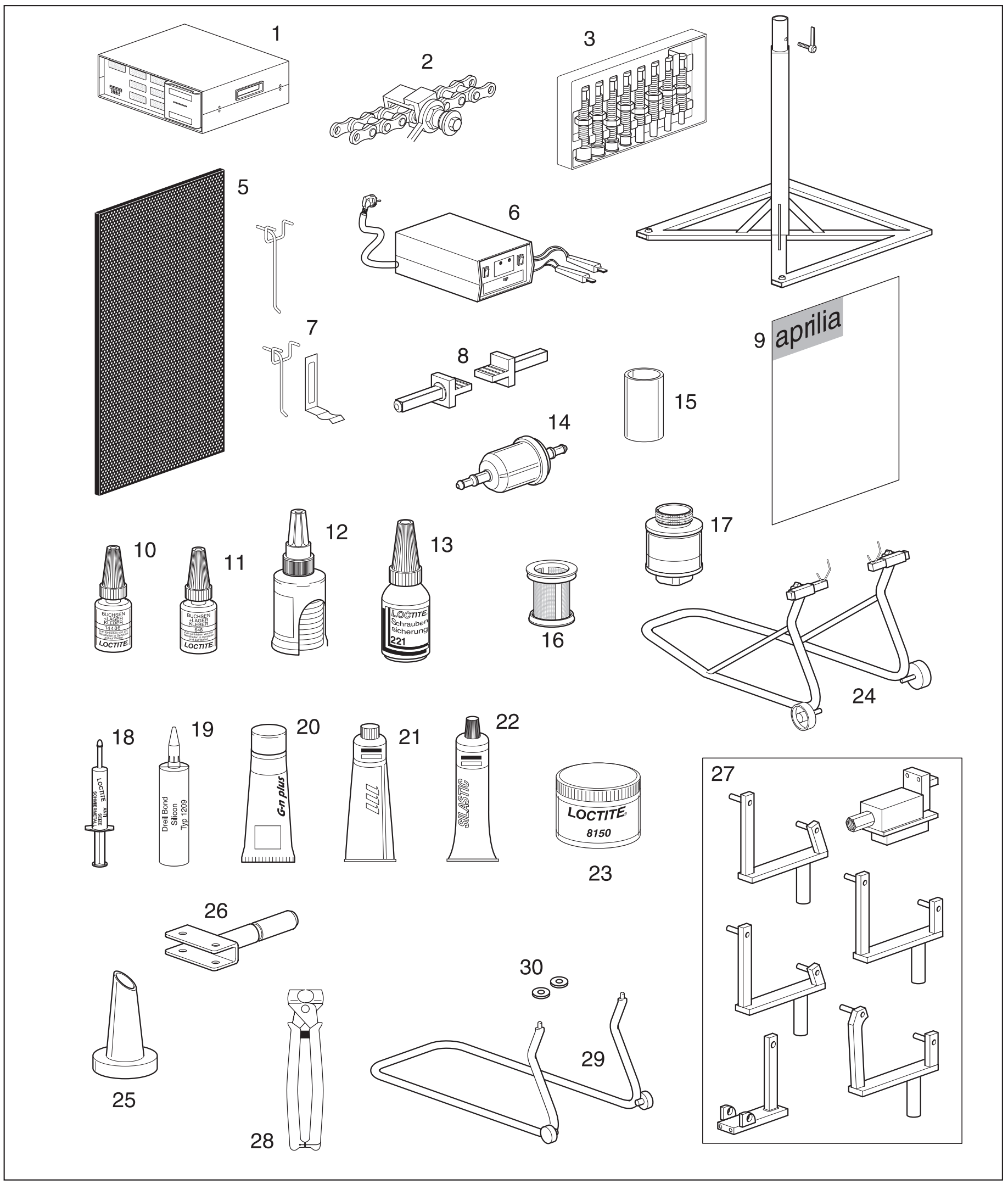
Before using the special tools, consult any documents attached.

1.7.1 SPECIFIC TOOLS



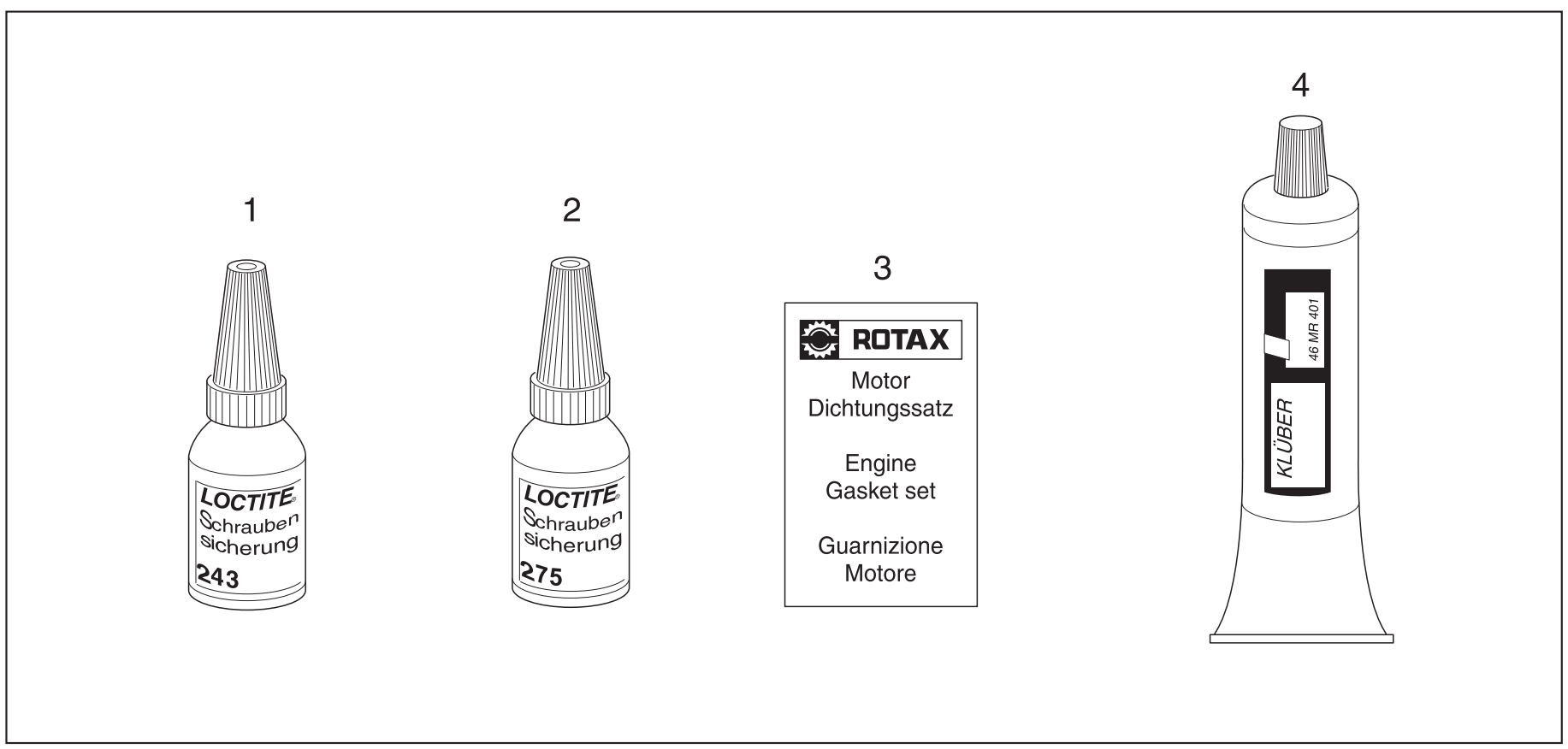
Pos.	**aprilia** part# (tool description)
1	**0277520** (pad)
2	**0277525** (pad)
3	**0277861** (pad per retén de aceite)
4	**0277304** [oil seal pad (secondary shaft)]
5	**0277970** (secondary shaft guide bush)
6	**0277222** [oil seal pad (countershaft)]
7	**0276770** [oil seal pad (water pump shaft)]
8	**0277235** [roller cage pad (disengaging shaft)]
9	**0277230** [roller cage pad (disengaging shaft)]
10	**0276307** (guide pad for piston pin)
11	**0876557** (protection cap for drive shaft with bushes)
12	**0877410** (protection cap for drive shaft with bearings - flywheel side)
13	**0276477** (valve spring compression tool)
14	**0240880** (threaded bolt to lock the drive shaft at the TDC.)
15	**0277300** [oil seal bush (disengaging shaft)]
16	**0277280** (extractor for clutch disengagement rod bearing)
17	**0976235** (flywheel extractor)
18	**0277090** [oil seal pad (revolution counter shaft)]
19	**0277510** (valve guide pad)
20	**0277210** (pad for valve guide oil seal)
21	**0277850** [oil seal pad (countershaft)]
22	**0277227** [oil seal pad (transmission selector shaft)]
23	**0277270** (balance shaft split gear centering pin)
24	**0277205** (extractor for idler gear pin)
25	**0277302** [oil seal pad (disengaging shaft)]
26	**0276357** (ring compressor)
27	**0277881** (clutch blocking tool)
28	**0277242** (pad with 22 mm piston pin snap ring assembly bush)
29	**0277240** (pad with 24 mm piston pin snap ring assembly bush)
30	**0277265** (extractor for balance shaft, gearbox input and output shaft)
31	**0277180** (transmission sleeve puller)
32	**0276280** (18 mm plug socket spanner)
33	**0276360** + **0242206** + **0277260** + **0240520** (extractor for output shaft bearing)
34	**0277919** (type 655 engine support unit)
35	**0277290** (bearing engine gearbox snap ring assembly nippers)
36	**0277292** (bush engine gearbox snap ring assembly nippers)
37	**0277250** (tool for disassembly flywheel cover)
38	**8140427** {engine support to be used with: **aprilia** part# 8140187 (engine support stand), **aprilia** part# 8140428 (engine support kit), **aprilia** part# 8104101 [clamp support, to be applied to: aprilia part# 8140428 (engine support kit) + aprilia part# 8140187 (engine support stand)]}
39	**8101945** (rear fork pin metal ring spanner)

1.7.2 GENERIC TOOLS



Pos.	**aprilia** part# (tool description)
1	**8140196** (exhaust fume analyser)
2	**8140192** (chain disassembly/reassembly tool)
3	**8140180** (Kit for bearings in the range Ø10 mm to Ø 30 mm)
4	**8140187** (engine support stand)
5	**8140199** (tool holder panel)
6	**8124838** (battery charger M.F.)
7	**8140426** (panel hooks)
8	**8140204** (support pins)
9	**8202222** (panel adhesive sheet)
10	**0897431** (LOCTITE® 14486)
11	**0899788** [LOCTITE® 648 green (5 g)]
12	**0899784** (LOCTITE® 574 orange)
13	**0899785** [LOCTITE® 221 violet (10 cm³)]
14	**8140398** [inlet screen filter, spare part: **aprilia** part# 8140196 (exhaust fume analyser)]
15	**8140395** [tubular screen filter, spare part: **aprilia** part# 8140196 (exhaust fume analyser)]
16	**8140396** [tubular screen filter, spare part: **aprilia** part# 8140196 (exhaust fume analyser)]
17	**8140397** [oxygen sensor, spare part: **aprilia** part# 8140196 (exhaust fume analyser)]
18	**0297431** (LOCTITE® Anti-Seize 76710)
19	**0297900** [Gasket paste (310 ml)]
20	**0297433** [MOLYKOTE® G-N (50 g)]
21	**0897161** (MOLYKOTE® 111)
22	**0297386** [SILASTIC® 732 RTV (100 g)]
23	**8116067** (LOCTITE® 8150 for screws)
24	**8705021** (rear support stand)
25	**8140394** [tapered rubber sensor, spare part for: **aprilia** part# 8140196 (exhaust fume analyser)]
26	**8104101** [clamp support, to be applied to: **aprilia** part# 8140428 (engine support kit) + **aprilia** part# 8140187 (engine support stand)]
27	**8140428** (engine support kit)
28	**0277295** (hose clamp installation pliers)
29	**8146486** (front support stand)
30	**8140590** (washers for front support stand)

1.7.3 TOOLS USED FOR OTHER VEHICLES

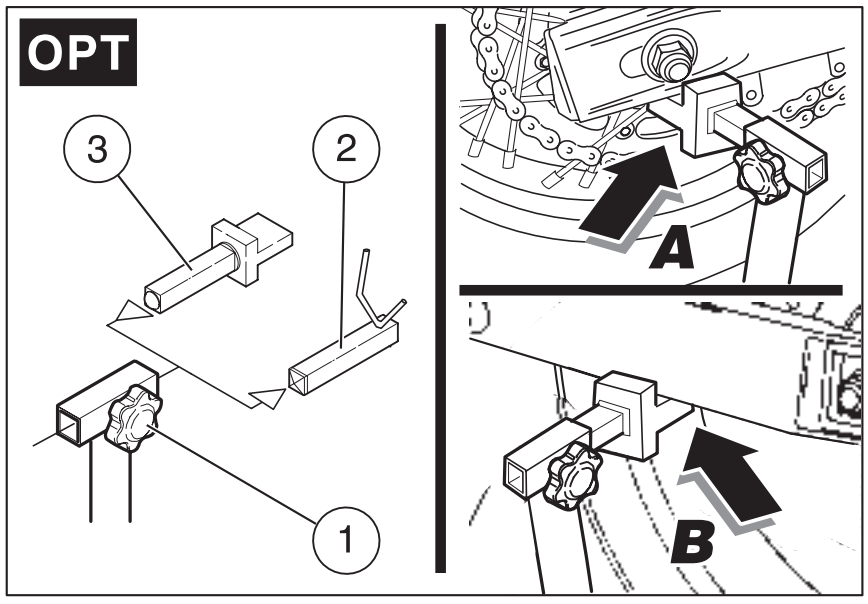


Pos.	**aprilia** part# (tool description)
1	**0897651** [LOCTITE® 243 Blue (10 cm³)]
2	**0898011** (fluorescent green LOCTITE® 275)
3	**0294762** (Gaskets-set)
4	**0297616** [Paste Klueber (60 gr)]
5	**0297434** (LOCTITE® 767 Anti-Seize 15378)
6	**8116050** (engine oil)
7	**xxxxxxx N.A.** (LOCTITE® 572)
8	**8116053** (grease TIP Bimol Grease 481)
9	**8116038** (grease LUBERING ST)
10	**xxxxxxx N.A.** (AP-LUBE temporary lubricant)
11	**xxxxxxx N.A.** (DID CHAIN LUBE grease)
12	**8116031** (“Biosolvent” frame detergent)
13	**8116945** (“ACRILON 28” cyanoacrylic glue)
14	**xxxxxxx N.A.** (MOTUL MOTOWASH degreaser)
15	**xxxxxxx N.A.** (Alcohol)

1.8 POSITIONING THE VEHICLE ON THE SUPPORT STAND

1.8.1 POSITIONING THE VEHICLE ON THE REAR SUPPORT STAND OPT

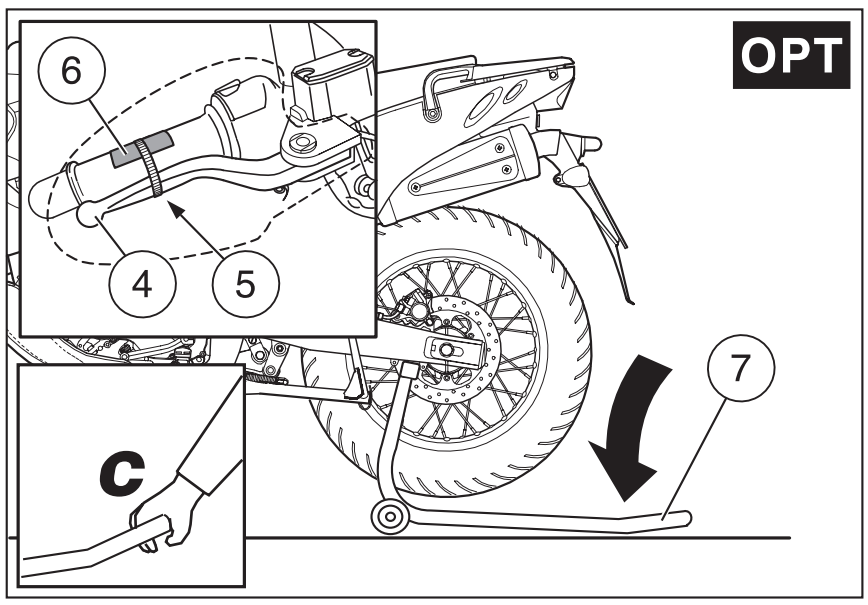
NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8705021 (rear support stand);
– **aprilia** part# 8140204 (support pins).



◆ Loosen the knob (1).
◆ Withdraw the fork support (2) and extract it from the stand seat.
◆ Insert the support pin (3).
◆ Repeat the previous operations on the opposite side of the stand.
◆ Remove the two drive chain guards, see 7.1.29 (REMOVING THE DRIVE CHAIN GUARDS).
◆ Pull the front brake lever (4) thoroughly, and position a plastic clamp (6), interposing a small piece of cardboard (5), in such a way as to keep the front brake lever pulled.

⚠ WARNING

Raise the vehicle by means of the two rear fork arms only.



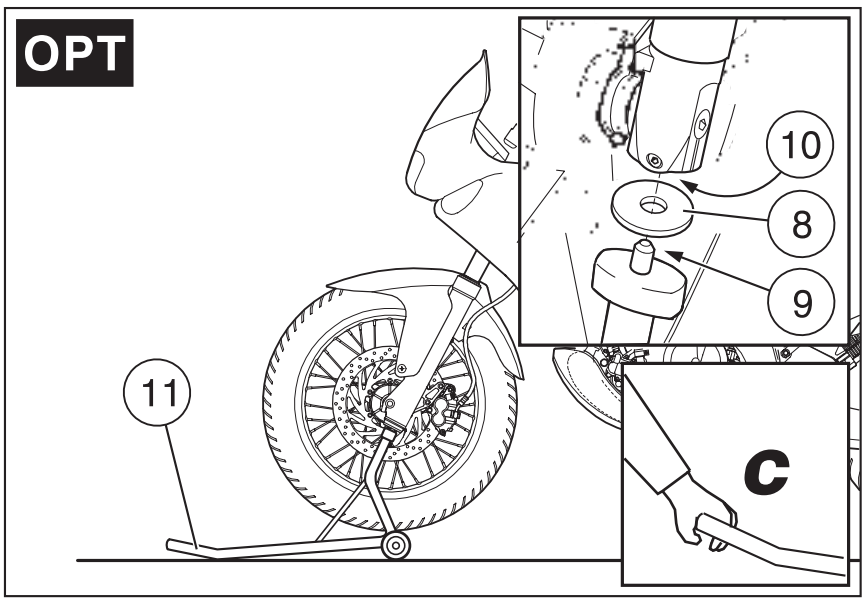
◆ Insert the stand from the rear side of the vehicle and position it so that the two support pins (3) rest on the lower part of the rear fork rods:
– the right support (**Pos.A**);
– the left support (**Pos.B**).
◆ Withdraw the support pins (3) and make them hit against the rear fork.
◆ Tighten the two knobs (1).
◆ Push the stand forward (7) until the support pin (3) rests, on the right side, against the rear fastening plate of the lower chain guard.

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

⚠ WARNING

Grasping the stand in another way than indicated in the figure may cause your fingers to be crushed between the stand and the ground.

◆ Grasp the terminal central part of the stand (7) (**Pos.C**).
◆ Push the stand (7) downwards until it reaches the end of its stroke (see figure).



1.8.2 POSITIONING THE VEHICLE ON THE FRONT SUPPORT STAND OPT

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8146486 (front support stand);
– **aprilia** part# 8140590 (washers for front support stand).

◆ Position the vehicle on the appropriate rear support stand, see 1.8.1 (POSITIONING THE VEHICLE ON THE REAR SUPPORT STAND OPT).
◆ Position the two special washers (8) on the upper ends (9) of the stand.
◆ Insert the two ends of the stand (9) in the two holes (10) positioned on the lower ends of the front fork.

⚠ WARNING

Grasping the stand in another way than indicated in the figure may cause your fingers to be crushed between the stand and the ground.

◆ Grasp the terminal central part of the stand (11) (**Pos.C**).
◆ Push the stand (11) downwards until it reaches the end of its stroke.

1.9 CONSUMABLES

Only use the products given below for any maintenance work.
The materials mentioned have been tested for many years and are suitable for all the application conditions indicated by the manufacturer.

1.9.1 PRODUCT PROPERTIES

aprilia part# (product)	Use and properties
aprilia part# 0897651 [LOCTITE® 243 Blue (10 cm³)] 	Adhesive in paste for screws and nuts up to M36 and for couplings with medium hold. It can be used on parts which have not been completely degreased. The hardening time depends on the temperature and the material (maximum one hour). Resistance to temperatures in the range – 55 to 150 °C (– 99 to 302 °F).
aprilia part# 0898011 (fluorescent green LOCTITE® 275) 	It prevents the loosening of the threaded components and the fluid leakages due to vibrations. It must be used on clean, degreased and non-oxidized components. Apply a quantity sufficient to cover all the threaded part.
aprilia part# 0899788 [LOCTITE® 648 green (5 g)] 	Paste for strong fastening of screws. The hardening time depends on the temperature and the material (maximum twelve hours). Resistance to temperatures in the range -55 to 175 °C (– 99 to 347 °F). In order to release the part glued, it may be necessary to heat the coupled parts to a temperature of 250 °C (482 °F).
aprilia part# 0899784 (LOCTITE® 574 orange) 	Solvent-free seal in paste, to be used instead of seals where there is a high friction factor and where a precise distance is required between the two components. Applied in its liquid state, it hardens after assembly on contact with the metal within a few hours. A seal is created whose surface structure adapts to the surfaces to be sealed. Resistance to temperatures in the range – 55 to 200 °C (– 99 to 392 °F); where applied, it seals the surfaces against corrosion.
aprilia part# 8116067 (LOCTITE® 8150 for screws) 	Paste to be used on components subjected to high temperature.
aprilia part# 0297434 (LOCTITE® 767 Anti-Seize 15378) 	Lubricant and anticorodal resistant to high temperatures. It must be sprayed on both components and makes sure the sliding surfaces remain maintenance free for a long time. It prevents corrosion.
aprilia part# 0297433 [MOLYKOTE® G-N (50 g)]] 	Lubricating paste to be used on support points subjected to heavy loads, for standard lubrication and on couplings under pressure, in order to prevent corrosion which would prevent subsequent disassembly. To apply on the two surfaces.
aprilia part# 0297386 [SILASTIC® 732 RTV (100 g)] 	It is used as a sealant, preventing water from getting inside the flywheel cover.

1.10 FASTENING ELEMENTS

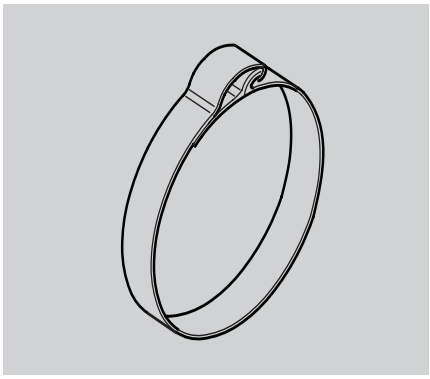
1.10.1 JOINTS WITH HOSE CLAMPS AND SCREW CLAMPS

Carefully read 1.2 (INSTRUCTIONS FOR USE OF FUEL, LUBRICANTS, COOLANT AND OTHER COMPONENTS).

⚠ CAUTION

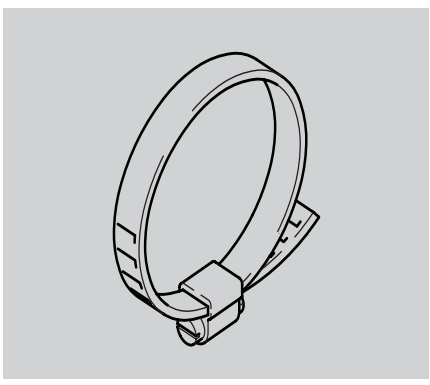
Remove ONLY the clamps indicated in the maintenance procedures.

This text is not to be intended as an authorization to arbitrarily remove the clamps present on the vehicle.



⚠ WARNING

Before removing a clamp, make sure that the removal does not involve any fluid leakage; if so, provide for preventing such leakages and protect the components positioned near the joint.



HOSE CLAMPS

For the removal it is sufficient to use simple pliers, while for the installation it is necessary to use a special tool (see below).
Before removing a clamp, prepare the material necessary for the correct reassembly.

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 0277295 (hose clamp installation pliers).

⚠ CAUTION

Upon installation, replace the hose clamp that has been removed with a new one having the same dimensions, see 0.4.2 (SPARE PARTS CATALOGUES).

Do not attempt to reinstall the removed hose clamp, since it is unusable.

Do not replace the removed hose clamp with a screw clamp or with other types of clamp.

⚠ CAUTION

Proceed with care, in order not to damage the joint components.

◆ Work with the pliers on the head of the hose clamp, forcing until you release it.

SCREW CLAMPS

For the removal and installation it is sufficient to use a simple screwdriver.

⚠ CAUTION

Check the conditions of the screw clamp and if necessary replace it with a new one of the same type and dimensions, see 0.4.2 (SPARE PARTS CATALOGUES).

When fastening the clamp, make sure that the joint is sufficiently stable.

1.10.2 GENERAL SPECIFICATIONS OF THE DRIVING TORQUES

The following table indicates the standard driving torques for screws and bolts with metric ISO thread.

Screw or bolt thread	Spanner	Driving torque	
		Nm	kgm
M 6	10	6	0.6
M 8	12	15	1.5
M 10	14	30	3.0
M 12	17	55	5.5
M 14	19	85	8.5
M 16	22	130	13.0

For specific joints or couplings of the vehicle, see 1.10.3 (DRIVING TORQUES).

If not specified otherwise, the indicated driving torques are valid for clean and dry threads, at room temperature.

NOTE In order to avoid any deformation and/or imperfect coupling, tighten the screws or bolts by proceeding as described below:

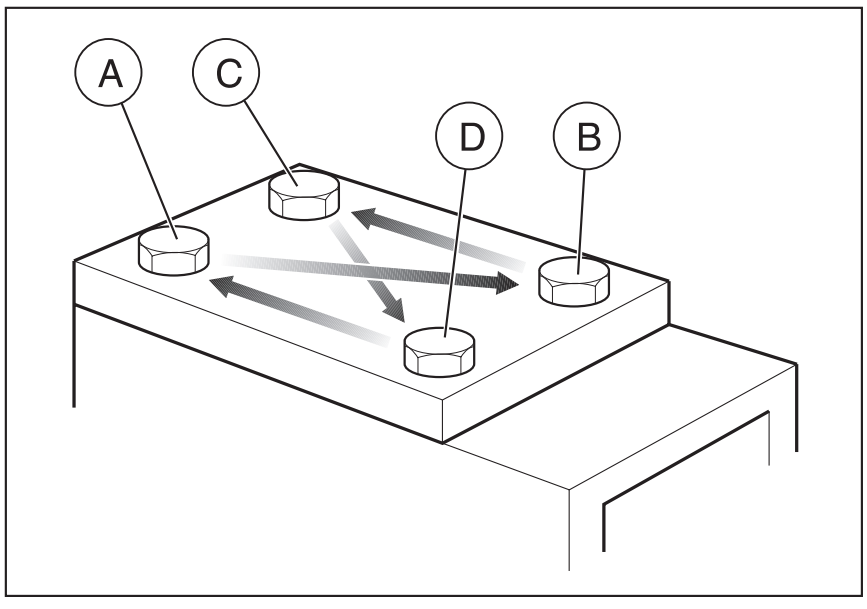
- Manually screw all the fastening elements.
- Applying half the prescribed driving torque, tighten the elements that are diametrically opposite each other: (A) and (B); (C) and (D).
- Repeat the previous operation by applying the prescribed driving torque.

NOTE In this way the pressure exerted by the fastening elements will be uniformly distributed on the joint surface.

For the maintenance intervals, see 2.1.1 (REGULAR SERVICE INTERVALS CHART) under:
– Nut, bolt, screw tightening.

⚠ CAUTION

The fastening elements featured in the table must be torqued to specification using a torque spanner and LOCTITE® applied, where indicated.



1.10.3 DRIVING TORQUES

NOTE
L243 = fasten with LOCTITE® 243
L572 = fasten with LOCTITE® 572
L8150 = fasten with LOCTITE® 8150
man. = fasten by hand

Steel/aluminium fastening screws with similar coefficient of elasticity

SCREW	Nm	kgm
M4	3	0.3
M5	6	0.6
M6	10	1.0
M8	25	2.5
M10	50	5.0
M12	86	8.6