INTRODUCTION

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0.1 RELEASE 00/2001-11 UPDATE

Issue date of original release (Release 00) and subsequent releases:

Original release (Release 00).....November 2001

0.1.1 MANUAL UPDATES

Always keep manual updated to the latest release you have received.

Add the latest release pages to the manual and destroy all superseded pages (even if they belong to the release before last).

⚠ CAUTION

Failure to keep the manual up-to-date or to eliminate superseded pages will make the manual more difficult to consult and creates a risk of improper servicing.

This manual is made up of 10 sections for a total of 376 pages (listed below).

NOTE Please see 0.2 (REFERENCE GUIDE) for details of standard page nomenclature and page numbering.

0.1.2 LIST OF MANUAL PAGES AND UPDATE NUMBERS

page#	Release	page#	Release
0-1 *-00*	00	1-8 *-00*	00
0-2 *-00*	00	1-9 *-00*	00
0-3 *-00*	00	1-10 *-00*	00
0-4 *-00*	00	1-11 *-00*	00
0-5 *-00*	00	1-12 *-00*	00
0-6 *-00*	00	1-13 *-00*	00
0-7 *-00*	00	1-14 *-00*	00
0-8 *-00*	00	1-15 *-00*	00
0-9 *-00*	00	1-16 *-00*	00
0-10 *-00*	00	1-17 *-00*	00
0-11 *-00*	00	1-18 *-00*	00
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2-22 *-00*	00	2-66 *-00*	00
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2-30 *-00*	00	3-6 *-00*	00
2-31 *-00*	00	3-7 *-00*	00
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2-33 *-00*	00	3-9 *-00*	00
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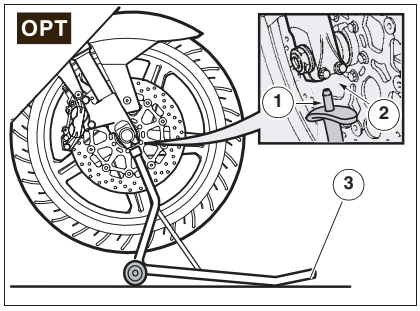
0.2 REFERENCE GUIDE

8 **1.9 PLACING THE MOTORCYCLE ON THE SERVICE STAND**

9 **1.9.1 PLACING THE MOTORCYCLE ON THE FRONT WHEEL STAND** OPT

- Place the motorcycle on the centre stand.
- Slide both pins (1) of the front wheel stand into the holes (2) at front fork bottom end of the same time.

10
- Put one foot on the front end of the stand (3).
- Press down on stand (3) until it rests fully on the ground.



1.9.2 PLACING THE MOTORCYCLE ON THE CENTRE STAND OPT

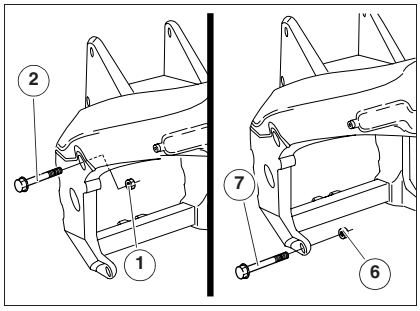
Read paragraph 0.2.1 (GENERAL PRECAUTIONS AND INFORMATION) carefully.

Part no. 8140176 (complete stand).

- Remove the lower fairing, see 7.1.33 (REMOVING THE LOWER FAIRING).
- Place the motorcycle on the front wheel stand OPT, see 1.9.1 (PLACING THE MOTORCYCLE ON THE FRONT WHEEL STAND).
- ★ Hold the nut (1) steady on the inside.

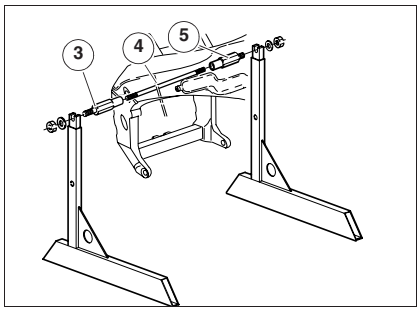
11
- ★ Release and remove the rear upper right-hand engine mounting bolt (2).

Torque wrench setting for nut (1) / bolt (2):50 Nm (5,0 kgm).



NOTE The bolt (2) on the left-hand side is longer

- ★ Collect the nut (1).
- Slide the upper right-hand mounting boss (3) into the upper hole on the right-hand side.
- Fit the stud bolt (4) into the upper hole on the left-hand side and screw it fully into the mounting boss (3).
- Screw the upper left-hand mounting boss (5) fully onto stud bolt (4) and tighten.
- ★ Hold the nut (6) on the inside steady.
- ★ Release and remove the rear lower engine mounting bolt (7).



1) Motorcycle model (or engine type)
2) Section title
3) Release progressive number ("00" identifies the original release)
4) Year and month of issue of relevant release
5) Section number
6) Page number (pages are numbered sequentially, numbering begins anew in each section)
7) Page update number (progressive number)
8) Subsection number (progressive number)
9) Paragraph number (progressive number)
10) Description of operation (always preceded by the lozenge symbol)
11) Description of operation: the star means that the operation must be repeated on the opposite side of the motorcycle

0.3 FOREWORD

- This manual provides the information required for normal servicing.
- The information and illustrations contained in this manual are updated through subsequent releases, see 0.1 (RELEASE 00/2001-11 UPDATE).
- This manual is intended for use by **aprilia** Dealers and their qualified mechanics. Certain information has been omitted intentionally, as this manual does not purport to provide a comprehensive treatise on mechanics. The persons who will use this manual must be fully conversant with the basics of mechanics and with the basic procedures of motorcycle repair. Repairing or inspecting a motorcycle when one does not possess such basic knowledge or training could result in improper servicing and make the motorcycle unsafe to ride. For the same reason, certain basic precautions have been omitted in the descriptions of repair and inspection procedures. Take special care to avoid damage to motorcycle components or injury to persons. **aprilia s.p.a.**'s mission is to constantly enhance the riding pleasure of final users through the on-going improvement of its products as well as of the relevant technical literature.
  All aprilia Points of Sale and Subsidiaries worldwide are kept updated on major engineering changes and modifications to repair procedures. Such changes and modifications are then reflected in the next release of the relevant manual. When in doubt about an inspection or repair procedure, please contact the **aprilia** Consumer Service (A.C.S.) Department, who will be glad to provide full information on the procedure in question as well as on any updates or engineering changes affecting the motorcycle under consideration.

aprilia s.p.a. reserves the right to make changes to its products at any time, barring any such changes as may alter the essential features of a product as specified in the relevant manual.

Any reference to products or services provided by outside suppliers is for information only and by no means binding, and implies no warranties or responsibilities as to the performance or use of any such products and/or services.

Please read 0.4 (REFERENCE MANUALS) for more detailed information.

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0.4 REFERENCE MANUALS

0.4.1 ENGINE WORKSHOP MANUALS

aprilia part# (description)
8140582 (1051-1) I
8140584 (1053-1) F
8140585 (1054-1) D
8140583 (1052-1) E
8140586 (1055-1) UK
8140587 (1056-1) USA

0.4.2 PARTS CATALOGUES

aprilia part# (description)
390W..... I UK
390Y..... I UK
3901..... I UK

RSV01

0.4.3 SPECIAL TOOLS CATALOGUES

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

0.4.4 OWNER'S MANUALS

aprilia part# (description)
Model years 1998 -1999
8102623 I F D
8102857 P E UK
8102858 NL DK SF
8102859 GR J UK
8104128 AUS
8104099 USA
Model years 2000
8104089 I F D
8104142 P E UK
8104143 NL DK SF
8104141 GR J UK
8104164 AUS
8104171 USA
RSV01
8104152 I F D
8104269 P E UK
8104267 NL DK SF
8104268 GR J UK
8104270 AUS
8104264 USA

0.5 SAFETY INFORMATION

The following conventions are used to identify safety information throughout the manual.

⚠ This symbol identifies safety-related information. Whenever you see this symbol in the manual or attached to the motorcycle, use utmost care to avoid the risk of injury. Disregarding the instructions identified by this symbol may put your safety, as well as that of other persons or of the motorcycle at risk!

⚠ CAUTION

Disregarding these indications may lead to severe injury or death.

⚠ WARNING

Disregarding these indications may lead to minor injury or motorcycle damage.

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

0.5.1 GENERAL PRECAUTIONS AND INFORMATION

Follow these instructions closely when repairing, disassembling or reassembling the motorcycle or its components.

⚠ CAUTION

Using bare flames is strictly forbidden when working on the motorcycle. Before servicing or inspecting the motorcycle: stop the engine and remove the key from the ignition switch; allow for the engine and exhaust system to cool down; where possible, lift the motorcycle using adequate equipment placed on firm and level ground. Be careful of any parts of the engine or exhaust system which may still be hot to the touch to avoid scalds or burns.

⚠ CAUTION

Never put any mechanical parts or other vehicle components in your mouth when you have both hands busy. None of the motorcycle components is edible. Some components are harmful to the human body or toxic.

Unless expressly specified otherwise, motorcycle assemblies are refitted or re-assembled by reversing the removal or dismantling procedure. Where a procedure is cross-referred to relevant sections in the manual, proceed sensibly to avoid disturbing any parts unless strictly necessary. Never attempt to polish matte-finished surfaces with lapping compounds.

Never use fuel instead of solvent to clean the motorcycle.

Do not clean any rubber or plastic parts or the seat with alcohol, petrol or solvents. Clean with water and neutral detergent.

Always disconnect the battery negative (–) lead before soldering any electrical components.

When two or more persons service the same motorcycle together, special care must be taken to avoid personal injury.

Read 1.2 (WARNINGS CONCERNING FUEL, LUBRICANTS, COOLANT AND OTHER COMPONENT PARTS) carefully.

0.5.2 BEFORE DISASSEMBLING ANY COMPONENTS

- Clean off all dirt, mud, and dust and clear any foreign objects from the vehicle before disassembling any components.
- Use the model-specific special tools where specified.

0.5.3 DISASSEMBLING THE COMPONENTS

- Never use pliers or similar tools to slacken and/or tighten nuts and bolts. Always use a suitable spanner.
- Mark all connections (hoses, wiring, etc.) with their positions before disconnecting them. Identify each connection using a distinctive symbol or convention.
- Mark each part clearly to avoid confusion when refitting.
- Thoroughly clean and wash any components you have removed using a detergent with low flash point.
- Mated parts should always be refitted together. These parts will have seated themselves against one another in service as a result of normal wear and tear and should never be mixed up with other similar parts on refitting.
- Certain components are matched-pair parts and should always be replaced as a set.
- Keep the motorcycle and its components well away from heat sources.

0.5.4 REASSEMBLING THE COMPONENTS

⚠ WARNING

Never reuse a circlip or snap ring. These parts must always be renewed once they have been disturbed.
When fitting a new circlip or snap ring, take care to move the open ends apart just enough to allow fitment to the shaft.
Make a rule to check that a newly –fitted circlip or snap ring has located fully into its groove.

Never clean a bearing with compressed air.

NOTE All bearings must rotate freely with no hardness or noise. Replace any bearings that do not meet these requirements.

- Use ORIGINAL **aprilia** SPARE PARTS only.
- Use the specified lubricants and consumables.
- Where possible, lubricate a part before assembly.
- When tightening nuts and bolts, start with the largest or innermost nut/bolt and observe a cross pattern. Tighten evenly in subsequent steps until achieving the specified torque.
- Replace any self-locking nuts, gaskets, seals, circlips or snap rings, O-rings, split pins, bolts and screws which have a damaged thread.
- Clean all joint surfaces, oil seal edges and gaskets before assembly.
- Apply a light coat of lithium grease along the edges of oil seals. Fit oil seals and bearings with the brand or serial number facing outwards (in view).
- Lubricate the bearings abundantly before assembly.
- Make a rule to check that all components you have fitted are correctly in place.

- After repairing the motorcycle and after each service inspection, perform the preliminary checks, and then operate the motorcycle in a private estate area or in a safe area away from traffic

0.6 SAFETY INFORMATION

0.6.1 CONVENTIONS USED IN THE MANUAL

- This manual is divided in sections and subsections, each covering a set of the most significant components.
  For quick reference, see the summary of sections on page 0-1.
- Unless expressly specified otherwise, assemblies are reassembled by reversing the dismantling procedure.
- The terms “left” and “right” are referred to the motorcycle when viewed from the riding position.
- Motorcycle operation and basic maintenance are covered in the “OWNER'S MANUAL”.

★ **Any operations preceded by the star symbol must be repeated on the opposite side of the motorcycle.**

In this manual any variants are identified with these symbols:

Frame # ZD4DW.....(STARTING FROM MODEL YEAR 2001).

ASD **AUTOMATIC SWITCH-ON DEVICE**

OPT **Option**

✿ **Catalysed version**

VERSION:

I Italy	GR Greece	Mal Malaysia
UK United Kingdom	NL Netherlands	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 Republic of South Africa
F France	IL Israel	NZ New Zealand
E Spain	ROK South Korea	CDN Canada

0.7 ABBREVIATIONS/SYMBOLS/ CONVENTIONS

= Number
< = is less than
> = is more than
≤ = is less than or equal to
≥ = is more than or equal to
~ = approximately
∞ = infinite
°C = degrees Celsius (centigrade)
°F = degrees Fahrenheit
± = plus or minus
A = Ampere
AC =Alternated Current
Ah =Ampere per hour
API = American Petroleum Institute
AV/DC = Anti-Vibration Double Countershaft
bar = pressure measurement (1 bar =100 kPa)
BDC = Bottom Dead Centre
CO = carbon oxide
CPU = Central Processing Unit
cu cm = cubic centimetres
DC = Direct Current
DIN = German industrial standards (Deutsche Industrie Norm)
DOHC = Double Overhead Camshaft
ECU = Electronic Control Unit
HC = unburnt hydrocarbons
HT = High Tension
ID = inner diameter
ISC = Idle Speed Control
ISO = International Standardization Organization
kg = kilograms
kgm = kilograms per metre (1 kgm =10 Nm)
km = kilometres
km/h = kilometres per hour
kPa = kiloPascal (1 kPa =0.01 bar)
KS = clutch side (from the German "Kupplung seite")
kW = kiloWatt
kΩ = kiloOhm
l = litres
LAP = racetrack lap
LED = Light Emitting Diode
m/s = metres per second
max = maximum
mbar = millibar (1 mbar =0.1 kPa)
mi = miles
MIN = minimum
MPH = miles per hour
MS = flywheel side (from the German "Magnetoseite")
MΩ = megaOhm
N.A. = Not Available
N.O.M.M. = Motor Octane Number
N.O.R.M. = Research Octane Number
Nm = Newton per metre (1 Nm =0.1 kgm)
Ø = Diameter
OD = outer diameter
Ω = ohm
PPC = Pneumatic Power Clutch
rpm = revolutions per minute
SAE = Society of Automotive Engineers
T.B.E.I. = crowned-head Allen screw
T.C.E.I. = cheese-headed Allen screw
T.E. =hexagonal head
T.P. =flat head screw
TDC = Top Dead Centre
TEST = diagnostic check
TSI = Twin Spark Ignition
UPSIDE-DOWN = inverted fork
V = Volt
W = Watt

NOTES

NOTES

GENERAL INFORMATION 1

GENERAL INFORMATION

CONTENTS

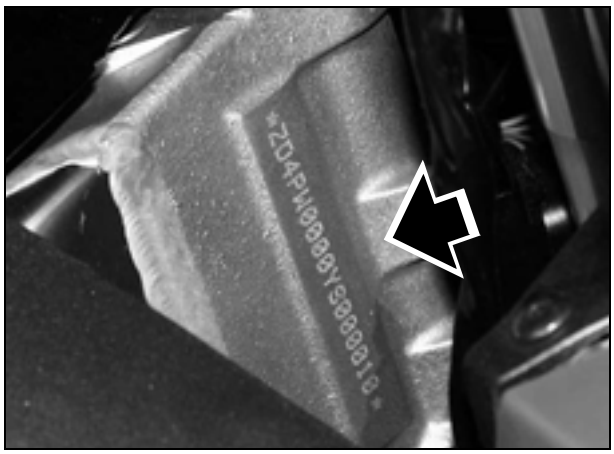
1.1 LOCATION OF SERIAL NUMBERS

These numbers are necessary for vehicle registration.

NOTE Altering the identification numbers of vehicle or engine is a legal offence punishable by heavy fines and penalties. In addition, altering the frame number (VIN) results in immediate warranty invalidation.

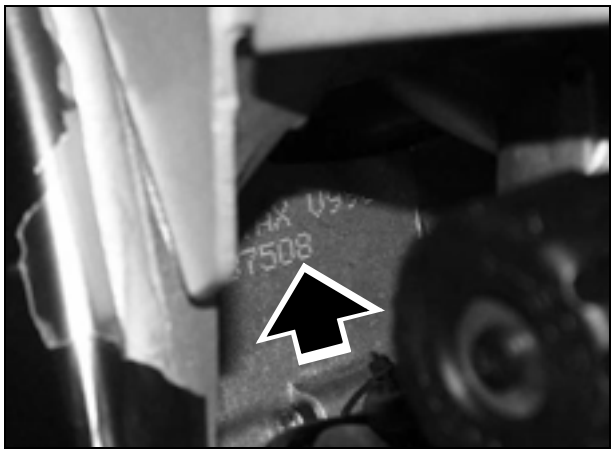
1.1.1 FRAME NUMBER

The frame number (Vehicle Identification Number) is etched on the right-hand side of the headstock.



1.1.2 ENGINE NUMBER

The engine number is etched at the rear end of engine, in the area near the sprocket.



1.2 WARNINGS CONCERNING FUEL, LUBRICANTS, COOLANT AND OTHER COMPONENT PARTS

1.2.1 FUEL

⚠ CAUTION

The fuel used to operate engines is highly flammable and becomes explosive under particular conditions. Refuelling and engine service should take place in a well-ventilated area with the engine stopped.
Do not smoke when refuelling or in the proximity of sources of fuel vapours.
Avoid contact with bare flames, sources of sparks or any other source which may ignite the fuel or lead to explosion.
Take care not to spill fuel out of the filler, or it may ignite when in contact with hot engine parts.
In the event of accidental fuel spillage, make sure the affected area is fully dry before starting the engine. Fuel expands from heat and when left under direct sunlight. Never fill the fuel tank up to the rim.
Tighten the filler cap securely after each refuelling. Avoid contact with skin. Do not inhale vapours. Do not swallow fuel. Do not transfer fuel between different containers using a hose.

DO NOT RELEASE FUEL INTO THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

Use only premium-grade unleaded fuel with a minimum octane rating of 95 (N.O.R.M.) and 85 (N.O.M.M.).

1.2.2 ENGINE OIL

⚠ CAUTION

Prolonged or repeated contact with engine oil may cause severe skin damage. Wash your hands thoroughly after handling engine oil.
Do not release into the environment.
Dispose of engine oil through the nearest waste oil reclamation firm or through the supplier.
Wear latex gloves during servicing.

Change engine oil after the first 1000 km (625 mi) and every 7500 km (4687mi) (*), see 2.13 (ENGINE OIL AND FILTER CHANGE) afterwards.

(*) = On motorcycles used in competition trials, oil should be changed every 3750 km (2343 mi).

(Recommended) engine oil, see 1.6 (LUBRICANT CHART)Front fork fluid

⚠ CAUTION

Prolonged or repeated contact with front fork fluid may cause severe skin damage. Wash your hands thoroughly after handling front fork fluid. Dispose of front fork fluid through the nearest waste oil reclamation firm or through the supplier.
Wear latex gloves during servicing.
Front suspension response can be modified to a certain extent by changing damping settings and/or selecting a particular grade of oil. Standard oil grade is SAE 20 W. Different oil grades can be selected to obtain a particular suspension response. (Choose SAE 5W for a softer suspension, 20W for a stiffer suspension). The two grades can also be mixed in varying solutions to obtain the desired response.
F.A. or Agip Fork have special properties, which enable them to retain virtually the same viscosity regardless of temperature to give constant damping response.

(Recommended) front fork oil, see 1.6 (LUBRICANT CHART).

1.2.3 BRAKE FLUID

NOTE This vehicle is fitted with front and rear disc brakes. Each braking system is operated by an independent hydraulic circuit. The information provided below applies to both braking systems.

⚠ CAUTION

Brake fluid is an irritant. Avoid contact with eyes or skin.
In the event of accidental contact, wash affected body parts thoroughly. In the event of accidental contact with eyes, contact an eye specialist or seek medical advice.

DO NOT RELEASE BRAKE FLUID INTO THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

When handling brake fluid, take care not to spill it onto plastic or paint-finished parts or they will damage.
Check brake fluid level every 7,500 km (4687 mi), see 2.16 (CHECKING AND TOPPING UP FRONT BRAKE FLUID LEVEL). See also 2.17 (CHECKING AND TOPPING UP REAR BRAKE FLUID LEVEL). Change brake fluid every two years, see 2.21 (CHANGING THE FRONT BRAKE FLUID) and 2.22 (CHANGING THE REAR BRAKE FLUID).

(Recommended) brake fluid, see 1.6 (LUBRICANT CHART).

⚠ CAUTION

Do not use any brake fluids other than the specified type. Never mix different types of fluids to top up level, as this will damage the braking system.
Do not use brake fluid from containers which have been kept open or in storage for long periods.
Any sudden changes in play or hardness in the brake levers are warning signs of problems with the hydraulic circuits.
Ensure that the brake discs and brake linings have not become contaminated with oil or grease. This is particularly important after servicing or inspections.
Make sure the brake lines are not twisted or worn.
Prevent accidental ingress of water or dust into the circuit. Wear latex gloves when servicing the hydraulic circuit.

1.2.4 COOLANT

⚠ CAUTION

Coolant is toxic when ingested and is an irritant, contact with eyes or skin may cause irritation.
In the event of contact with eyes, rinse repeatedly with abundant water and seek medical advice. In the event of ingestion, induce vomiting, rinse mouth and throat with abundant water and seek medical advice immediately.

DO NOT RELEASE INTO THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

⚠ CAUTION

Take care not to spill coolant onto hot engine parts. It may ignite and produce invisible flames. Wear latex gloves when servicing.
Do not ride when coolant is below the minimum level.

Check coolant level before each ride and every 15000 km (9375 mi), see 2.14 (CHECKING AND TOPPING UP COOLANT LEVEL) as part of routine maintenance. Change coolant every two years, see 2.15 (COOLANT CHANGE).
Coolant mixture is a 50% solution of water and anti-freeze. This is the ideal solution for most operating temperatures and provides good corrosion protection.
This solution is also suited to the warm season, as it is less prone to evaporative loss and will reduce the need for top-ups. In addition, less water evaporation means fewer minerals salts depositing in the radiator, which helps preserve the efficiency of the cooling system.
When temperature drops below zero degrees centigrade, check the cooling system frequently and add more anti-freeze (up to 60% maximum) to the solution.
Use distilled water in the coolant mixture. Tap water will damage the engine.

(Recommended) engine anti-freeze, see 1.6 (LUBRICANT CHART).
Refer to the chart given below and add water with the quantity of anti-freeze to obtain a solution with the desired freezing point:

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

NOTE The different brands of anti-freeze available on the market have varying specifications. Always read product label to determine the degree of protection afforded.

⚠ WARNING

Use only nitrite-free anti-freeze and corrosion inhibitors with a freezing point of –35°C as a minimum.

1.2.5 CLUTCH FLUID

NOTE This vehicle is fitted with a hydraulically operated clutch.

⚠ CAUTION

Clutch fluid is an irritant. Avoid contact with eyes or skin.
In the event of accidental contact, wash affected body parts thoroughly. In the event of accidental contact with eyes, contact an eye specialist or seek medical advice.

DO NOT RELEASE CLUTCH FLUID INTO THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

When handling clutch fluid, take care not to spill it onto plastic or paint-finished parts or they will damage.
Check clutch fluid level every 7,500 km (4687 mi), see 2.18 (CHECKING AND TOPPING UP CLUTCH FLUID LEVEL). Change clutch fluid every two years, see 2.23 (CHANGING THE CLUTCH FLUID).

(Recommended) clutch fluid, see 1.6 (LUBRICANT CHART).

⚠ WARNING

Do not use any clutch fluids other than the specified type. Never mix different types of fluids to top up level, as this will damage the clutch system. Do not use clutch fluid from containers which have been open or kept in storage for long periods. Any sudden changes in play or hardness in the clutch lever are warning signs of problems with the hydraulic circuit.
Make sure the clutch hose is not twisted or worn.
Avoid accidental ingress of water or dust into the circuit.
Wear latex gloves when servicing the hydraulic circuit.

1.2.6 CARBON OXIDE

When an operation must be performed with the engine running, position the motorcycle out of doors or in a well-ventilated area. Never operate the engine in an enclosed place.
Use an exhaust emission extraction plant when working indoors.

⚠ CAUTION

Exhaust emissions contain carbon oxide, which is a poisonous gas and may lead to loss of conscience or even death.
Operate the engine out of doors or, if working indoors, use an exhaust emission extraction plant.

1.2.7 HOT COMPONENT PARTS

⚠ CAUTION

The engine and exhaust component parts become hot when the engine is running and will stay hot for some time after the engine has been stopped.
Wear heat gloves before handling these components or allow for the engine and exhaust system to cool down before proceeding.

1.3 RUNNING-IN RECOMMENDATIONS

Proper engine running-in is essential to preserving engine life and performance over time.
Twisty roads and gradients are ideal to break in engine, suspension and brakes effectively.
Varying speed frequently is also recommended. This will vary the amount of stress placed on vehicle components continuously, allowing engine parts to cool down when less stressed. While it is important to put a certain amount of stress to engine components during the running-in period, it is equally important to spare the engine at this stage in vehicle's life.

⚠ WARNING

Top acceleration performance is only obtained after covering the first 1500 km (937 mi).

Observe the following instructions:

- Avoid harsh accelerations and do not flip the throttle open abruptly when the engine is running at low speed, both during and after the running-in period.
- Apply the brakes gently and avoid hard, prolonged braking until covering the first 100 km (62 mi).
- This will allow the brake pad lining to wear in properly rubbing on the brake discs.
- Never exceed 6000 rpm (see chart) during the first 1000 km (625 mi).

⚠ WARNING

After covering the first 1000 km (625 mi), perform the checks listed in the "post running-in" column of the PERIODIC MAINTENANCE CHART (see 2.1.1). Failure to perform these checks may lead to personal injury to yourself or third persons, or vehicle damage.

- After the first 1000 km (625 mi) and until covering the first 1500 km (937 mi), a somewhat brisker riding style is acceptable. Vary your speed and use peak acceleration for just a few instants, to allow the different components to become properly seated against one another.
- Never exceed 7500-rpm engine speed (see table).
- After 1500 km (937 mi), the engine will be ready for a more demanding use. However, never exceed the maximum engine speed allowed (10500 rpm).

Recommended maximum engine speed	
Distance covered in Km(mi)	**rpm**
0-1000 (0-625)	6000
1000-1500 (625-937)	7500
over 1500 (937)	10500

1.4 SPARE PARTS

Use original **aprilia** spare parts only to replace original components. Original **aprilia** spare parts are high-quality components designed and built expressly for **aprilia** motorcycles.

⚠ WARNING

Using any parts OTHER THAN original aprilia parts may lead to loss of performance and damage.

1.5 SPECIFICATIONS

DIMENSIONS	
Overall length	2170 mm
Overall width	740 mm
Overall height (front fairing)	1240 mm
Seat height	820 mm
Wheelbase	1435 mm
Minimum ground clearance	135 mm
Weight in running order (including fuel, coolants and	235 kg
ENGINE	
Type	4-stroke longitudinal 60° V twin-cylinder engine fitted with 4 valves per cylinder and 2 overhead camshafts
Number of cylinders	2
Total displacement	997.6 2cm³
Max rated crankshaft power	86,5 kW (118 HP) at 9250 rpm
Max rated crankshaft power (F)	77 kW (104 HP) at 9250 rpm
Max torque	96.5 Nm (9.78 kgm) at 7250 rpm
Max torque (F)	90 Nm (9.17 kgm) at 7000 rpm
Bore/stroke	97 mm / 67.5 mm
Compression ratio	11.8 ± 0.5: 1
Average piston speed	22,5 m/s at 10000 rpm
Camshaft during intake stroke	262°, valve lift = 10.6 mm
Camshaft during exhaust stroke	259°, valve lift = 10.6 mm
Timing advance (with 1-mm valve clearance) intake valve opens intake valve closes exhaust valve opens exhaust valve closes	20° before TDC 59°after BDC 64° before TDC 15° after BDC
Valve clearance, intake	0.12-0.17 mm
Valve clearance, exhaust	0.23-0.28 mm
# Idling rpm	1250 ± 100 rpm
# Top speed rpm	10500 ± 100 rpm
Ignition	computer ignition management
Starter	electric starter
Spark advance:	5° before TDC upon starting, advance is further increased to suit specific consumption.
Starter motor	12 V / 0.9 kW
Transmission ratio of starter motor	i= 49/9 * 30/11 * 64/30 = 31.677
Clutch	hydraulically operated wet multi-plate clutch with control lever on left-hand handlebar and PPC device - # 9 friction plates, 3.5 mm thick - # 9 clutch plates, 1.5 mm thick

CONTINUED ➤

ENGINE	
Transmission	Mechanical 6-speed transmission with foot control on left-hand side of engine
Lubrication system	Dry-sump lubrication system with remote oil tank, # 2 trochoidal pumps and cooler
Lubrication pressure	min 500 kPa (5 bar) 80 °C (176 °F) max. and 6000 rpm
Air cleaner	with dry filter cartridge
Cooling system	liquid cooling
Transmission ratio of coolant pump	i wp = 28/27 * 28/28 = 1.037
Coolant pump delivery rate (when thermal expansion valve is open)	90 l/min at 9000 rpm
Thermal expansion valve starts to open at	65 ± 2 °C (149 ± 5 °F)
Dry engine weight	~ 67 kg
CAPACITIES	
Fuel (including reserve)	20.5 l
Fuel reserve	4 ± 1 l
Engine oil	oil change 3700 cu cm oil and filter change 3900 cu cm
Front fork oil (each leg)	553 ± 2,5 cu cm
Coolant	2.5 l (50% water + 50% ethylene glycol anti-freeze)
Seat twin-seat	2
Max carrying load (rider + pillion rider + luggage)	182 kg

DRIVE					
DRIVE RATIOS	Gear 1st 2nd 3rd 4th 5th 6th	Primary drive ratio 31/60 = 1: 1.935	Secondary drive ratio 14/35 = 1: 2.500 16/28 = 1: 1.750 19/26 = 1: 1.368 22/24 = 1: 1.091 23/22 = 1: 1.957 27/23 = 1: 0.852	Final drive ratio 16/43 = 1: 2.687	Total drive ratio 13.000 9.102 7.117 5.674 4.975 4.431
# Sprocket			16 teeth		
Chain drive			Endless O-ring chain, type 525, size 5/8" x 5/16"		

FUEL SYSTEM	
Type	Electronic fuel injection
Venturi	Ø 51 mm
INDUCTION	
Type	Indirect (MULTIPOINT) injection
Fuel	Premium-grade unleaded petrol, minimum octane rating 95 (N.O.R.M.) and 85 (N.O.M.M.)
FRAME	
Type	Dual-beam design made from light alloy cast members and extruded members
Rake	25.7°
Trail	97 mm
SUSPENSION	
Front	Adjustable telescopic UPSIDE-DOWN hydraulic fork with Ø 43-mm legs
Travel	120 mm

CONTINUED ➤

Rear	Light-alloy single-sided swinging arm and adjustable oil/ air-sprung mono-shock absorber
Wheel travel	120 mm
BRAKES	
Front	Twin-disc brake with Ø 300-mm floating discs, four-piston calipers with Ø 30-mm/ Ø 34-mm diameter
Rear	Disc brake - Ø 255 mm, dual-piston caliper - Ø 28
WHEELS	
Type	Light-alloy wheel rim
Front	3.50 x 17"
Rear	5.50 x 17"

TYRES					
Wheel	Brand	Type	Size	Recommended	**Pressure in kPa (bar)**
					♦
					solo riding
Front (standard)	METZELER	ME Z4 B	120/70ZR17”	♦	250 (2.5)
Rear (standard)	METZELER	ME Z4	180/55ZR17”	♦	290 (2.8)
Front (standard)	MICHELIN	PILOT SPORT	120/70ZR17”	❖	250 (2.5)
Rear (standard)	MICHELIN	PILOT SPORT	180/55ZR17”	❖	290 (2.8)
Front (option)	METZELER	ME Z3	120/70ZR17”	❖	250 (2.5)
Rear (option)	METZELER	ME Z3	180/55ZR17”	❖	290 (2.8)
Front (option)	PIRELLI	MTR21A	120/70ZR17”	♦	250 (2.5)
Rear (option)	PIRELLI	MTR22	180/55ZR17”	♦	280 (2.8)

♦ = Road use ; ❖ = Competition

SPARK PLUGS	
Standard	NGK R DCPR9E
Electrode gap	0.6 -0.7 mm
Resistance	5KΩ
ELECTRIC SYSTEM	
Battery rating	12 V - 12 Amps
Main fuses	30A
Auxiliary fuses	15A
Generator (permanent-wound magnet type) rating	12 V - 400 W
Starter motor rating	12 V / 0.9 kW

CONTINUED ➤

BULBS	
Low beam (halogen lamp)	12 V - 55 / 55 W H4
High beam (halogen lamp)	12 V - 60 W H3
Front parking light	12 V - 5 W
Direction indicators	12 V - 10 W
Rear parking light / plate / stop light	12 V - 5/21 W
Rev. counter light	LED
Right-hand multi-purpose display light	LED
Left-hand multi-purpose display light	LED
WARNING LIGHTS	
Neutral light	LED
Direction indicators	LED
Low fuel	LED
High beam	LED
Stand light	LED
Engine oil pressure	LED
Red line	LED

1.6 LUBRICANT CHART

(Recommended) engine oil: IP EXTRA RAID 4, SAE 15W - 50 or Agip TEC 4T SAE 15W - 50. As an alternative to recommended oils, top brand oils meeting or exceeding CCMC G-4, A.P.I. SG. specifications can be used.

(Recommended) fork oil: front fork oil IP F. A . 5 W or Agip F.A. 20W.

As an alternative, use IP FORK 5W or Agip FORK 20W. When you wish to obtain an intermediate response between those offered by IP F.A. 5W and IP F.A. 20W oils or Agip FORK 5W and Agip FORK 20W oils, you may mix the different products as follows:

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

Agip FORK 5W 67% of volume, + Agip FORK 20W 33% of volume.

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

Agip FORK 5W 33% of volume, + Agip FORK 20W 67% of volume.

Bearings and other lubrication points (recommended):

IP AUTOGREASE MP or Agip GREASE 30.

As an alternative to recommended grease, use top brand rolling bearing grease that will resist a temperature range of -30°C…+140°C, with dropping point 150°C…230°C, high corrosion protection, good resistance to water and oxidisation.

Battery lead protection: use neutral grease or vaseline.

(Recommended) aerosol chain lubricant: IP CHAIN SPRAY or Agip CHAIN LUBE.

⚠ CAUTION

Use new brake fluid only.

(Recommended) brake fluid: IP F.F., DOT 5 (DOT 4 compatible) or Agip BRAKE 5.1, DOT 5 (DOT 4 compatible).

⚠ CAUTION

Use new clutch fluid only.

(Recommended) clutch fluid: IP F.F., DOT 5 (DOT 4 compatible) or Agip BRAKE 5.1, DOT 5 (DOT 4 compatible).

⚠ CAUTION

Use only nitrite-free anti-freeze and corrosion inhibitors with a freezing point of -35°C as a minimum.

(Recommended) engine coolant: IP ECO-BLU - 40°C or Agip COOL.

1.7 CONSUMABLES

Use only the products specified below for motorcycle maintenance.
These products have demonstrated suitability for all usage conditions specified by the manufacturer after long-.time testing.

NOTE The products for which a part number is given are available at request, see 1.7.2 (PRODUCT APPLICATIONS).

1.7.1 PRODUCT FEATURES

Product	Usage and features
Blue LOCTITE® 243 	Threadlocking adhesive for nuts and bolts up to M36, provides medium-strength fit. Suitable for use on less than perfectly degreased parts. Cure time varies with temperature and substrate up to one hour maximum. Withstands temperatures in the – 55 to 150 °C range (– 99 to 302 °F).
Green LOCTITE® 648 	High-strength retaining compound for bolts. Cure time varies with temperature and substrate up to twelve hours maximum. Withstands temperatures in the – 55 to 175 °C range (– 99 to 347 °F). Mated parts must be heated up to 250 °C (482 °F) before they can be disassembled.
Orange LOCTITE® 574 	Solvent-free sealant. Eliminates the need for gaskets in joints exposed to high friction and where a specified gap needs to be maintained between parts. Liquid sealant, cures within a few hours after assembly when in contact with metal to form a gasket whose surface structure matches mating surfaces. Resists temperatures from – 55 to 200 °C (– 99 to 392 °F), inhibits corrosion of sealed surfaces.
LOCTITE® 8150 	High-temperature assembly paste.
LOCTITE® Anti Seize 15378 	Lubricant and corrosion inhibitor, resists high temperatures. When sprayed on both parts, provides long-term maintenance-free operation of contact surfaces. Inhibits corrosion.
MOLYKOTE® G-n 	Lubricating compound for use on heavy-duty stressed parts, for base lubrication and on fits under pressure to avoid corrosion and sticking. Apply on both contact surfaces.
SILASTIC 732 RTV 	Sealant, prevents ingress of water into flywheel casing.

1.7.2 PRODUCT APPLICATIONS

Product	Part number	Applications
Engine oil (*)	8116050	- Swinging arm rivets, instrument panel/front fairing mount, seat subframe and frame (on assembly). - Frame-to-engine and frame-to-swinging arm adjusting bushes (on assembly). - Cable guide screws to frame (on assembly). - Headstock bearings. - Headstock top bush. - Roller bearings of timing idler gear. - Thrust washer of lower balancing shaft. - Clutch disengagement shaft. - Valve stems and buckets. - Valve guide seals. - Casing location of camshafts. - Timing chain tensioner. - Compound starter gear and idler gear pins. - Freewheeling clutch-to-gear contact surfaces. - Inner contact surface of freewheeling clutch.
LOCTITE® 243 (**)	0897651	- Steering retaining bush. - Rear brake caliper detent. - Front sprocket. - Rear brake pedal spindle. - Cooling fans to support. - Fuel return line fitting. - Fuel filler cap. - Throttle cable pulley nut. - Throttle cable bracket screws. - Throttle valve spindle nut. - Throttle position sensor screws. - Coolant pump central screw. - Cylinder connecting bracket screws. - Engine casing bearing screws. - Cylinder stud bolts. - Crankshaft position sensor screws. - Index lever and plate screws. - Crankshaft nut. - Timing gear screws. - Nut securing counterweight to upper balancing shaft. - Lower screw of timing idler gear bearing mount.
LOCTITE® 648 (**)	0899788	- Coolant pump idler gear shaft. - Engine oil pump plug. - Clutch gear metal plate screws. - Freewheeling clutch to magnet wheel (on assembly). - Freewheeling clutch screws. - Clutch housing nut. - Screw securing counterweight to lower balancing shaft. - Flywheel rotor inner cone. - Flywheel retaining screw.

Product	Part number	Applications
Orange LOCTITE® 574 (**)	0899784	- Coolant thermal switch. - Coolant thermistors. - Contact screw of neutral switch. - Outer surface of engine oil pump motor. - Cylinder footprint on crankcase.
LOCTITE® Anti Seize 15378 (**)	0297434	- Transmission primary and secondary shaft. - Crankcase locations of transmission primary and secondary shafts. - Crankshaft and balancing shaft. - Crankcase location and spline of transmission primary shaft.
MOLYKOTE® G-n (**)	0297433	- Crankcase locations of main bearing sleeves. - Main bearing sleeves. - Crankcase bearing locations. - Coolant pump shaft. - Valve guide seats in cylinder head. - Valve guide edges. - Crankcase locations of crankshaft and balancing shaft bearing sleeves. - Crankcase locations of crankshaft and balancing shaft. - Bores accommodating piston pins. - Camshaft cams. - Starter motor mount.
SILASTIC 732 RTV (**)	0297386	- Cable bracket on flywheel cover. - Camshaft sensor cable.
Bimol Grease	481 8116053	- Front and rear wheel seals (on assembly). - Swinging arm shaft bearings (on assembly). - Clutch master cylinder actuating rod (on assembly). - Rear wheel shaft thread. - Steering head bearings. - Rear brake master cylinder actuating rod (on assembly). - Rear brake pedal spindle. - Thrust washer of timing idler gear. - Upper balancing shaft seal. - Starter motor gear.
LUBERING Grease ST	8116038	- Choke control (on assembly).
AP-LUBE temporary lubricant	-	- Handlebar counterweight rubber (on assembly). - Throttle cable adjuster rubbers (on assembly). - Gearshift lever rubber (on assembly). - Lower retaining pins of radiators to rubber mounts (on assembly). - Breather hose to radiator and three-way manifold (on assembly). - Coolant hose couplings to radiators (on assembly). - Water and fuel drain hoses to fuel flange (on assembly). - Throttle body torsion springs (on assembly).
DID CHAIN LUBE Grease		- Drive chain.
“Biosolvent” frame detergent	8116031	- For washing the engine oil tank.
Cyanoacrilic paste “ACRILON 28”	8116945	- Airbox gasket (on assembly).
MOTUL MOTOWASH Degreaser	-	- For cleaning frame and swinging arm.

Product	Part number	Applications
Anti-seize compound ANTI-SEIZE MOTAGEPASTE AS 1800	8116043	- Plugs of exhaust take-up points.
Alcohol	-	- For cleaning left-hand handlebar before fitting twistgrip. - Radiator breather hoses into T union. - Ignition coil mount rubber (on assembly). - Side body panel rubbers (on assembly). - For cleaning bottom part of engine. - Starter relay rubber (on assembly). - Cush drive to rear wheel sprocket (on assembly). - Engine oil cooler rubbers (on assembly). - Hose coupling to coolant filler cap (on assembly). - For cleaning engine oil tank before decal application. - Instrument panel/front fairing rubbers (on assembly). - Rear brake pedal rubber (on assembly). - Hoses to fuel filter (inside fuel tank) (on assembly). - Coupling connecting coolant radiators (on assembly). - Fuel lines to fuel tank (on assembly). - For cleaning fuel tank before decal application.

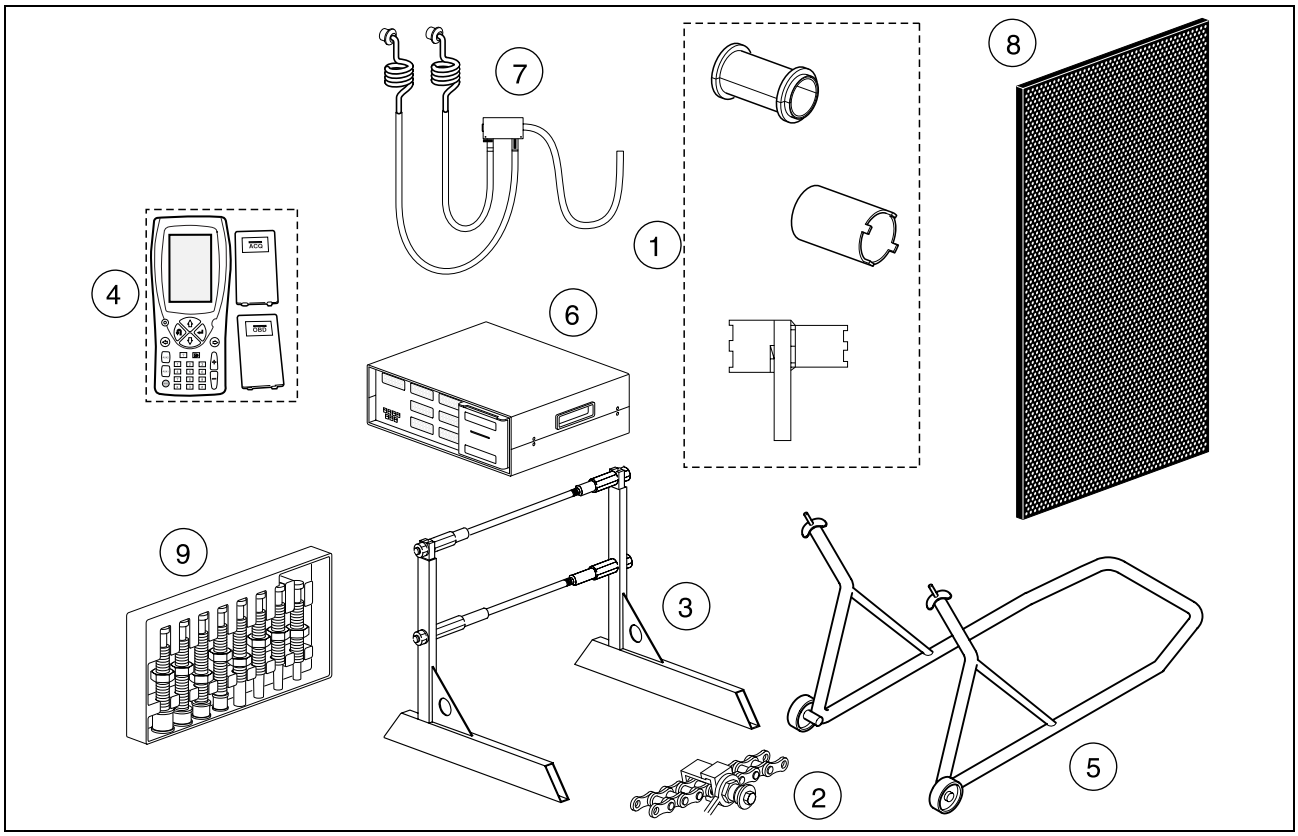
(*) = see 1.6 (LUBRICANT CHART).
(**) =see 1.7.1 (PRODUCT FEATURES).

1.8 SPECIAL TOOLS

Special tools have been developed to ensure proper disassembly, re-assembly and adjustment without the risk of damaging any components. Using inadequate tools and/or improvised procedures may lead to irreparable damage. Model-specific special tools for this vehicle are listed below. If needed, order the brand-specific special tools (see Special Tools Catalogue).

⚠ WARNING

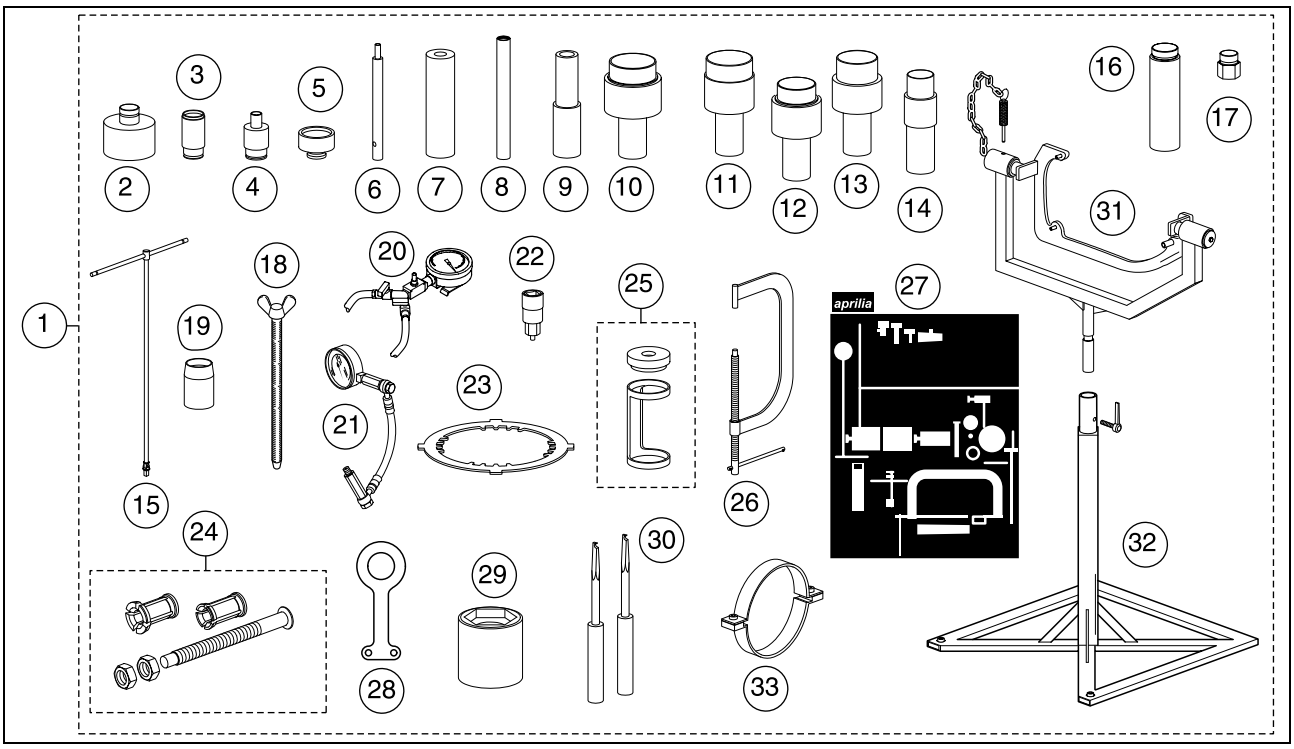
Always read the instructions supplied with the special tools before use.



1.8.1 SUNDRY TOOLS

Ref.	Tool designation and application	Part number
1	Full frame kit including: – split sleeve for fork seal fitment – socket for steering adjustment – socket for swinging arm spindle – engine mount adjustment	8140203
2	Tool for chain removal/fitment	8140192
3	Centre stand	8140176
4	Axone 2000	8140595
5	Front wheel stand	8140195
6	Exhaust emission tester	8140196
7	Emission tester tube kit	8140202
8	Tool board	8140199
9	Bearing extractor kit 10 - 30 mm Ø	8140180

1.8.2 ENGINE TOOLS

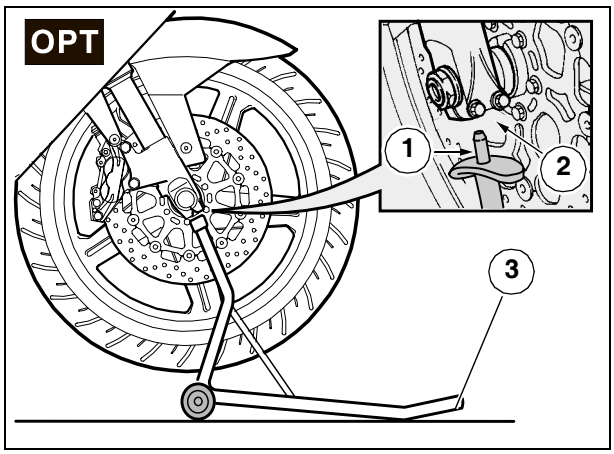


Ref.	Tool designation and application	Part number
1	Full engine tool kit	**8140175**
2	Drift to fit transmission secondary shaft seal	0277680
3	Drift to fit seal into secondary balancing shaft location	0277660
4	Drift to fit seal into coolant pump shaft location	0277670
5	Drift to fit sliding ring into coolant pump shaft location	0877257
6	Valve guide extractor	0277510
7	Drift for valve guide seal fitment	0277695
8	Drift for valve guide fitment	0277210
9	Drift to fit transmission shaft and clutch shaft seals	8140155
10	Drift to fit main balancing shaft bearing sleeves	0277729
11	Crankshaft bearing sleeve extractor	0277720
12-14	Drifts to fit crankshaft bearing sleeves	0277725
13	Drift to fit clutch cover – crankshaft bearing sleeves	0277727
15	Spark plug tool	8140177
16	Flywheel cover puller	0277252
17	Hexagon nut for flywheel removal	0277780
18	Threaded rod to hold crankshaft in TDC position	0240880
19	Transmission secondary shaft guide sleeve	0277308
20	Vacuum gauge	8140256
21	Fuel/oil pressure gauge	8140181
22	Rotor bolt extractor	8140182
23	Clutch anti-rotation tool	0277881
24	Extractors for clutch cover bearing sleeves	8140156 + 8140157 + 0276377
25	Tool to compress valve springs	0276479
26	Tool for valve removal/fitment	8140179
27	Adhesive template for tool board	8157143
28	Engine lifting eyebolt	8140183
29	Primary drive nut extractor	8140184
30	Clutch plate extractors	8140185
31	Engine stand	8140188
32	Engine stand pedestal	8140187
33	Tool to compress piston rings	8140186

1.9 PLACING THE MOTORCYCLE ON THE SERVICE STANDS

1.9.1 PLACING THE MOTORCYCLE ON THE FRONT WHEEL STAND OPT

- Place the motorcycle on the centre stand.
- Slide both pins (1) of the front wheel stand (3) into the holes (2) at front fork bottom end at the same time.
- Put one foot on the front end of the stand (3).
- Press down on stand (3) until it rests fully on the ground.

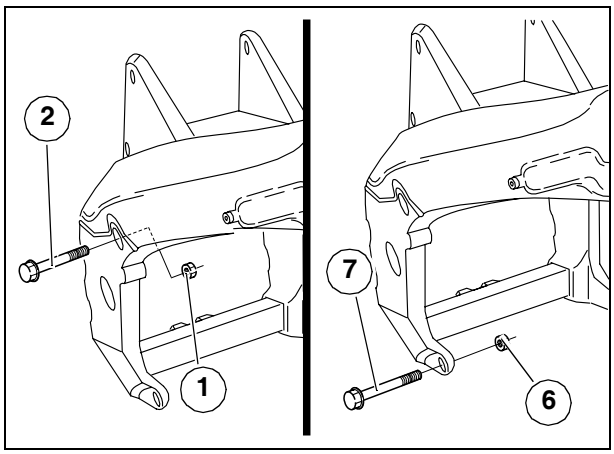


1.9.2 PLACING THE MOTORCYCLE ON THE CENTRE STAND OPT

Read 0.5.1 (GENERAL PRECAUTIONS AND INFORMATION) carefully.

Part no. 8140176 (complete stand).

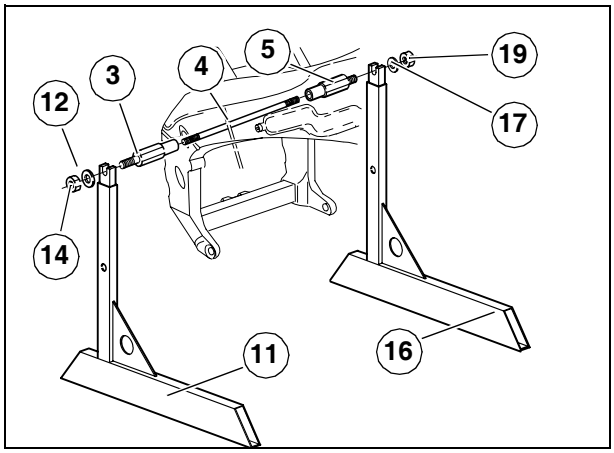
- Remove the lower fairing, see 7.1.33 (REMOVING THE LOWER FAIRING).
- Place the motorcycle on the front wheel stand OPT, see 1.9.1 (PLACING THE MOTORCYCLE ON THE FRONT WHEEL STAND).
- ★Hold the nut (1) steady on the inside.
- ★Release and remove the rear upper right-hand engine mounting bolt (2).



Torque wrench setting for nut (1) / bolt (2): 50 Nm (5.0 kgm).

NOTE The bolt (2) on the left-hand side is longer.

- ★Collect the nut (1).
- Slide the upper right-hand mounting boss (3) into the upper hole on the right-hand side.
- Fit the stud bolt (4) into the upper hole on the left-hand side and screw it fully into the mounting boss (3).
- Screw the upper left-hand mounting boss (5) fully onto stud bolt (4) and tighten.
- ★Hold the nut (6) on the inside steady.
- ★Release and remove the rear lower engine mounting bolt (7).



Torque wrench setting for nut (6) / bolt (7): 50 Nm (5.0 kgm).

NOTE The bolt (7) on the right-hand side is longer.

- Slide the lower right-hand mounting boss (8) into the lower hole on the right-hand side.
- Fit the stud bolt (9) into the lower hole on the left-hand side and screw it fully into the mounting boss (8).
- Screw the lower left-hand mounting boss (10) fully onto stud bolt (9) and tighten.
- Fit the bracket (11) onto the mounting bosses (3-8). The longer portion of the bracket base must be facing forward.
- Snug the two washers (12 - 13) and nuts (14 - 15) finger-tight.
- Tighten both nuts (14 - 15).
- Fit the bracket (16) onto the mounting bosses (5-10) with the longer portion of the base facing forward.
- Snug the two washers (17 - 18) and nuts (19 - 20) finger-tight.
- Tighten both nuts (19 - 20).
- Remove the wheel stands.