

**aprilia**

**1234 4 Engines C361M /C364M / C216M**

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www.serviceaprilia.com

**workshop** manual



8140822

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## 0.1. INTRODUCTION

### 0.1.1. INTRODUCTION

- This manual provides the information required for normal servicing.
- This publication is intended for use by **aprilia** dealerships and their qualified mechanics; many concepts have been omitted inasmuch as their inclusion would be superfluous for such an audience. Since complete mechanical explanations have not been included in this manual, the reader must be familiar with basic notions of mechanics, as well as with basic repair procedures. Without such familiarity, repairs and checks could be ineffective and even hazardous. Since the repair and vehicle check instructions are not exhaustive, special care must be taken to avoid damage and injury. To ensure maximum customer satisfaction with the vehicle, **aprilia spa** continuously improves its products and their documentation. The main technical modifications and changes in repair procedures are communicated to all **aprilia** dealerships and agencies worldwide. Such modifications will be entered in subsequent editions of the manual. In case of doubt regarding specific repairs or checks, contact the **aprilia** SERVICE DEPARTMENT; we will be pleased to provide all necessary information and assistance as well as keeping you updated on changes and modifications to the vehicle.

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0.1.2. REFERENCE MANUALS

ENGINE WORKSHOP MANUALS

aprilia part#	(description)
8140731	I
8140732	E
8140733	F
8140734	D
8140735	UK
8140736	USA

SPECIAL TOOLS MANUALS

aprilia part#	(description)
H001	I E F D UK USA

**0.1.3. ABBREVIATIONS/SYMBOLS/CONVENTIONS**

<b>#</b>	= number
<b>&lt;</b>	= less than
<b>&gt;</b>	= greater than
<b>≤</b>	= less than or equal to
<b>≥</b>	= more than or equal to
<b>~</b>	= approximately
<b>∞</b>	= infinity
<b>°C</b>	= degrees Celsius (centigrade)
<b>°F</b>	= degrees Fahrenheit
<b>±</b>	= plus or minus
<b>AC</b>	= alternating current
<b>A</b>	= Ampere
<b>Ah</b>	=Ampere per hour
<b>API</b>	= American Petroleum Institute
<b>HV</b>	= high voltage
<b>AV/DC</b>	= Anti-Vibration Double Countershaft
<b>bar</b>	= pressure measurement (1 bar =100 kPa)
<b>DC.</b>	= Direct Current
<b>cc</b>	= cubic centimetres
<b>CO</b>	= carbon monoxide
<b>CPU</b>	= Central Processing Unit
<b>DIN</b>	= German industrial standards (Deutsche Industrie Norm)
<b>DOHC</b>	= Double Overhead Camshaft
<b>ECU</b>	= Electronic Control Unit
<b>rpm</b>	= revolutions per minute
<b>HC</b>	= unburnt hydrocarbons
<b>ISC</b>	= Idle Speed Control
<b>ISO</b>	= International Standardization Organization
<b>Kg</b>	= kilograms
<b>Kgm</b>	= kilogram metre (1 kgm =10 Nm)
<b>km</b>	= kilometres
<b>kph</b>	= kilometres per hour
<b>kΩ</b>	= kilo Ohm
<b>kPa</b>	= kiloPascal (1 kPa =0.01 bar)
<b>KS</b>	= clutch side (from the German "Kupplungseite")
<b>kW</b>	= kiloWatt
<b>/</b>	= litres
<b>LAP</b>	= racetrack lap
<b>LED</b>	= Light Emitting Diode
<b>LEFT</b>	
<b>SIDE</b>	= left side
<b>m/s</b>	= metres per second
<b>max</b>	= maximum
<b>mbar</b>	= millibar (1 mbar =0.1 kPa)
<b>mi</b>	= miles
<b>MIN</b>	= minimum
<b>MPH</b>	= miles per hour
<b>MS</b>	= flywheel side (from the German "Magnetoseite")
<b>MΩ</b>	= megaOhm
<b>N.A.</b>	= Not Available
<b>N.O.M.M.</b>	= Motor Octane Number
<b>N.O.R.M.</b>	= Research Octane Number
<b>Nm</b>	= Newton metre (1 Nm =0.1 kgm)
<b>Ω</b>	= ohm
<b>PICK-UP</b>	= pick-up
<b>BDC</b>	= Bottom Dead Centre
<b>TDC</b>	= Top Dead Centre
<b>PPC</b>	= Pneumatic Power Clutch

<b>RIGHT</b>	
<b>SIDE</b>	= right side
<b>SAE</b>	= Society of Automotive Engineers
<b>TEST</b>	= diagnostic check
<b>T.B.E.I.</b>	= crown-head Allen screw
<b>T.C.E.I.</b>	= cheese-head Allen screw
<b>T.E.</b>	=hexagonal head
<b>TP</b>	= flat head screw
<b>TSI</b>	= Twin Spark Ignition
<b>UPSIDE-</b>	
<b>DOWN</b>	= inverted fork
<b>V</b>	= Volt
<b>W</b>	= Watt
<b>Ø</b>	= Diameter

GENERAL INFORMATION

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1.1. STRUCTURE OF THE MANUAL

1.1.1. CONVENTIONS USED IN THE MANUAL

- This manual is divided in sections and subsections, each covering a set of the most significant components. Refer to the index of sections when consulting the manual.
- Unless expressly specified otherwise, assemblies are reassembled by reversing the dismantling procedure.
- The terms "right" and "left" are referred to the rider seated on the vehicle in the normal riding position.
- Motorcycle operation and basic maintenance are covered in the «OWNER'S MANUAL».

In this manual any variants are identified with these symbols:

-  optional
-  catalytic version
- all versions
- MP national certification
- SF European certification (EURO 1 limits)

VERSION:

- |  |   |  |
|--|---|--|
|  Italy          |  Greece        |  Malaysia                 |
|  United Kingdom |  Holland       |  Chile                    |
|  Austria        |  Switzerland   |  Croatia                  |
|  Portugal       |  Denmark       |  Australia                |
|  Finland        |  Japan         |  United States of America |
|  Belgium        |  Singapore     |  Brazil                   |
|  Germany       |  Slovenia     |  South Africa            |
|  France       |  Israel      |  New Zealand            |
|  Spain        |  South Korea |  Canada                 |

**1.1.2. SAFETY WARNINGS**

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



**Safety warning.** This symbol appears, whether in the manual or on the vehicle itself, to indicate a personal injury hazard. 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.

**IMPORTANT:** *The word "IMPORTANT" in this manual precedes important information or instructions.*

## 1.2. GENERAL RULES

### 1.2.1. BASIC SAFETY RULES

#### USED GEARBOX AND FORK OILS

**DANGER**

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

Gear oil may cause serious damage to the skin if handled daily and for long periods.

Wash your hands carefully after use.

Put it in a sealed container and take it to the filling station where you usually buy it or to an oil salvage center.

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

#### DO NOT DISPOSE OF OIL IN THE ENVIRONMENT

#### KEEP AWAY FROM CHILDREN.

#### COOLANT

The coolant is composed of ethylene glycol that, under certain conditions, can become inflammable and send out invisible flames causing severe burns.

#### GENERAL PRECAUTIONS AND INFORMATION

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

**DANGER**

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.

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.

#### 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.

#### 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.

## REASSEMBLING THE COMPONENTS

**DANGER**

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.
- 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.
- 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 marking or serial number facing outwards (in view).

**ELECTRICAL CONNECTORS**

To disconnect the electrical connector, follow the procedures below. Failure to comply with these procedures may lead to irreparable damages to the connector and the wiring as well. If present, press the special safety hooks.

**WARNING**

Do not pull cables to disconnect the two connectors.

**ATTENZIONE**  
Per disinserire i

- Grasp the two connectors and disconnect them by pulling them in the two opposite directions.
- In case of dirt, rust, moisture, etc., thoroughly clean the inside of the connectors with compressed air.
- Make sure that the cables are correctly fitted inside the connectors terminals.

**NOTE** The two connectors have just one correct positioning. Make sure to position them in the right direction.

- Then fit the two connectors. Make sure they are correctly coupled (a click will be heard).

**TIGHTENING TORQUE SETTINGS****DANGER**

Always remember that the tightening torque settings of all wheel, brake, wheel shaft and other suspension parts play a fundamental role to ensure vehicle safety. Make sure that these values are always within the specified limits.

Check fastening parts tightening torque settings at regular intervals. Upon reassembly, always use a torque wrench.

Failure to comply with these recommendations could lead to the loosening and detachment of one of these parts with a consequent locking of the wheel or other serious troubles affecting the vehicle maneuverability, and thus the risk of falls and serious injuries or death.

### 1.3. DANGEROUS ELEMENTS

#### 1.3.1. WARNINGS

##### LUBRICANTS

**DANGER**

A good lubrication ensures the vehicle safety.

Failure to keep the lubricants at the recommended level or the use of a non-suitable new and clean type of lubricant can lead to the engine or gearbox seizure, thus leading to serious accidents, personal injury or even death.

Gear 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 oil into the environment.

Take it to the filling station where you usually buy it or to an oil salvage center.

**WARNING**

When filling the vehicle with this oil, take care not to spill it out since it could damage the vehicle paintwork.

In case of contact with oil, the tyres surface will become very slippery, thus becoming a serious danger for your safety.

In case of leaks, do not use the vehicle. Check and trace the cause of leaks and proceed to repair.

##### ENGINE OIL

**DANGER**

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

##### COOLANT

**DANGER**

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.**

**DANGER**

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.

## 1.4. RUNNING-IN

### 1.4.1. RUNNING-IN RECOMMENDATIONS

The running-in of the engine is primary to ensure its correct functioning and long life.

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.

For the first 500 km (312 mi), keep to the following indications:

- **0 -100 km (0- 62 mi).**

During the first 100 km (62 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.

- **0- 300 km (0- 187 mi).**

Do not keep the throttle grip open more than one half for long stretches.

- **300- 500 km (187- 312 mi).**

Do not keep the throttle grip open more than three-fourths for long stretches.



#### **WARNING**

After the first 500 km (312 mi), carry out the checking operations indicated in the column “After running-in” of the **REGULAR SERVICE INTERVALS CHART**, see p. 45, in order to avoid hurting yourself or other people and/or damaging the vehicle.

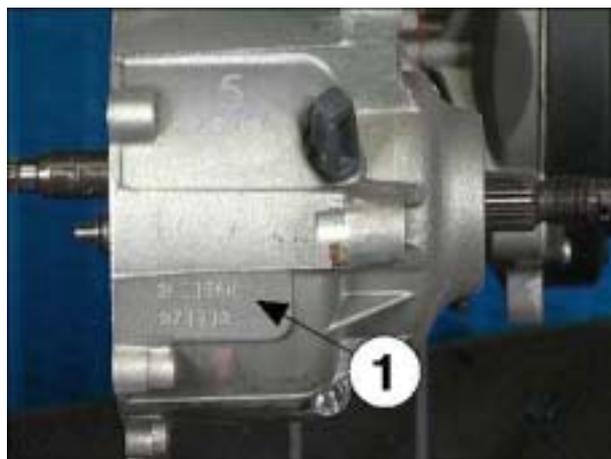
## ENGINES C361M / C364M

## 1.5. IDENTIFICATION DATA

## 1.5.1. ENGINE NUMBER

- The engine number (1) is stamped on the rear side of the engine.

**NOTE** 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 warranty.



TECHNICAL INFORMATION

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## 2.1. GENERAL TECHNICAL INFORMATION

## 2.1.1. TECHNICAL DATA

<b>ENGINE</b>	
Model	C361M
Type	2 temps
Number of cylinders	Single-cylinder, horizontal
Total displacement	49,38 cm <sup>3</sup>
Bore / stroke	40 mm / 39,3 mm
Compression ratio	12,4 ± 0,5 : 1
Starting	electrical
Engine idle rpm	2000 ± 50 rpm
Clutch	automatic, centrifugal, dry clutch
Lubrification system	Dry crank case with oil tank removed and radiator
Cooling	liquid cooled
<b>CHANGE GEAR</b>	
Type	automatic stepless variator
<b>CAPACITY</b>	
Fuel (reserve included)	8 l
Fuel reserve	2 l
Transmission oil	130 cm <sup>3</sup>
Mixer oil (reserve included)	1.6 l
Mixer oil reserve	0,5 l
<b>TRANSMISSION</b>	
Speed change gear	automatic and stepless
Primary	V-belt
<b>RATIOS</b>	
– minimum for stepless change	3,07
– maximum for stepless change	0,78
Secondary	gears
<b>FUEL SYSTEM</b>	
Type	ELECTRONIC FUEL INJECTION
Injector gasoline	SIEMENS DEKA II
Injector air	SINERJECT
Choke	Ø 20 mm
<b>FUEL SUPPLY</b>	
Fuel	unleaded petrol according to the DIN 51607 standard, min. O.N. 95 (N.O.R.M.) and 85 (N.O.M.M.)
<b>IGNITION</b>	
Type	ELECTRONICS
Ignition advanced	Revs / α gunction graph (α =throttle opening)
Resistance	5 KW
<b>SPARK PLUG</b>	
Standard	CHAMPION RG6YC
Spark plug gap	0,6 – 0,7 mm
<b>ELECTRIC SYSTEM</b>	
Battery	Without maintenance 12 V - 5 Ah
Fuses	7,5 A - 15 A
Generator (with permanent magnet))	12 V – 165 W

## 2.1.2. TABLE OF LUBRICANTS

LUBRIFICANT	PRODUCT
Transmission oil	recommended:  F.C., SAE 75W - 90 As an alternative to the recommended oil, it is possible to use high-quality oils with characteristics in compliance with or superior to the A.P.I. GL-4 specifications.
Mixer oil	recommended:  GREEN HIT 2. As an alternative to the recommended oil, use high-quality oils with characteristics in compliance with or superior to the ISO-L-ETC++, A.P.I. TC++ specifications.
Bearings and other lubrication points	recommended:  AUTOGREASE MP. 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.

## 2.1.3. TIGHTENING TORQUE SETTINGS

NAME	QUANTITY	TIGHTENING TORQUE (Nm)
<b>ENGINE</b>		
<b>TRANSMISSION COVER</b>		
TRANSMISSION COVER BOLT	12	12 ÷ 13
<b>DRIVING PULLEY</b>		
DRIVING PULLEY NUT	1	40 ÷ 44
CLUTCH CASE NUT	1	40 ÷ 44
<b>CLUTCH</b>		
CLUTCH NUT	1	55 ÷ 60
<b>ENGINE HEAD</b>		
ENGINE HEAD BOLT	4	10 ÷ 11
COOLANT OUTLET UNION ATTACHMENT BOLT	2	3 ÷ 4
TEMPERATURE SENSOR	1	18 ÷ 22
PLUG ATTACHMENT	1	11 ÷ 14
ATTACHMENT BOLT INJECTION HEAD	2	3 ÷ 4
<b>FLYWHEEL</b>		
FLYWHEEL NUT	1	40 ÷ 44
<b>ENGINE CASE</b>		
CASE CLOSING BOLT	8	12 ÷ 13
<b>REAR HUB</b>		
HUB COVER BOLT	5	11 ÷ 13
<b>FUEL SUPPLY SYSTEM</b>		
THROTTLE BODY MANIFOLD BOLT	2	7 ÷ 8
AIR COMPRESSOR BOLT	4	3 ÷ 4

### 2.1.4. SPECIAL TOOLS

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.

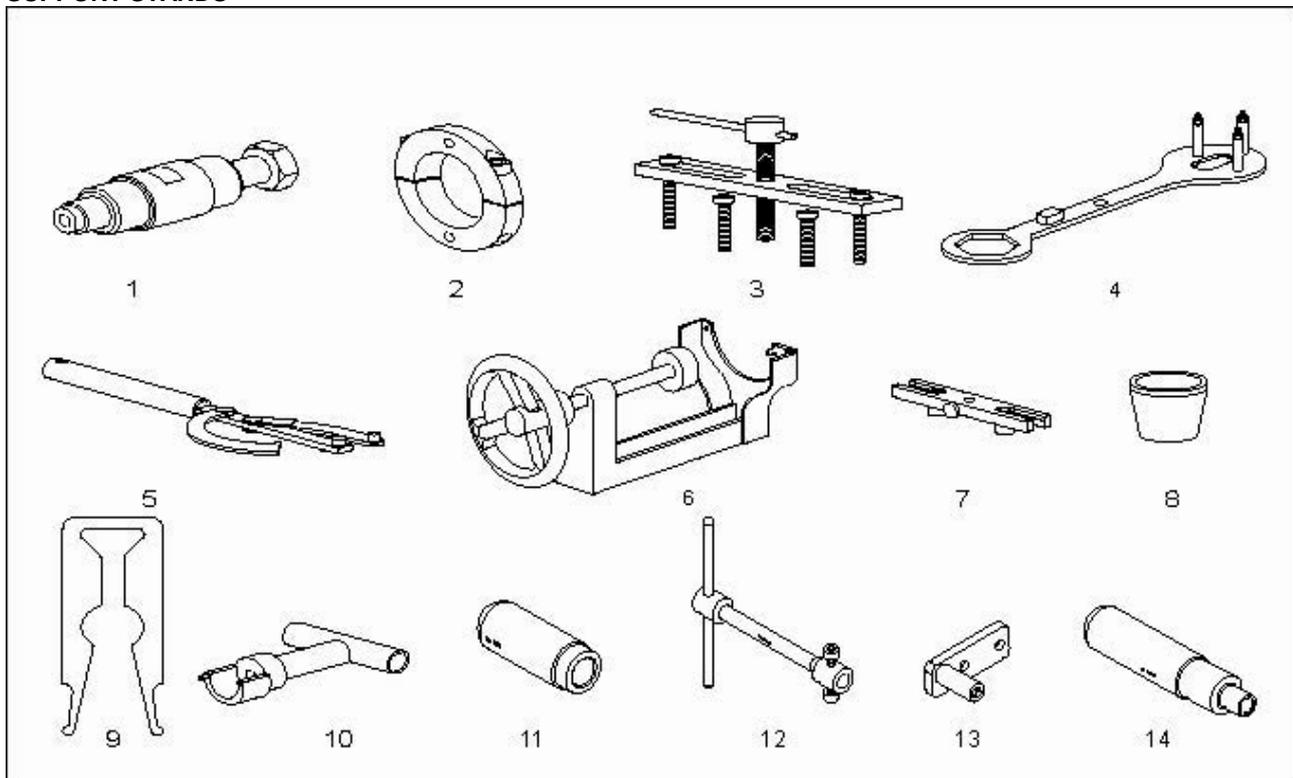
If necessary, request the multi-purpose special tools.



#### CAUTION

**Before using the special tools, consult any documents attached.**

### SUPPORT STANDS



### LÉGENDA

POSITION	TOOLS NAME	CODE
1	Flywheel extractor	8140276
2	Crankcase bearing extractor	8140715
3	Separator guard (in kit 8140399)	8106698
4	Multiuse tool for engines	8140252
5	Flywheel and clutchdrum stop	8106702
6	Clutch assembly and disassembly tool	8140259
7	Comparator holder	8140266
8	Assembly tool Inj. group gasket	8140430
9	Assembly tool Inj. group gasket	8140429
10	Spring compression key	8140264
11	Oil seal crankcase flywheel side	8140717
12	Water pump shaft disassembly	8140712
13	Water pump stop	8140713
14	Water pump assembly fitting jig.	8140714

ENGINE

3

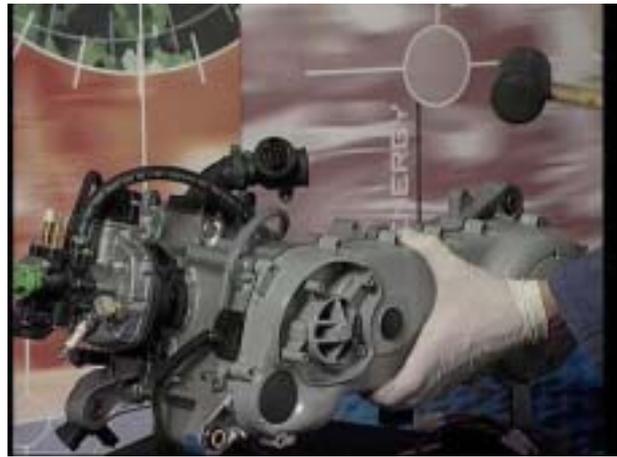
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**3.1. TRANSMISSION COVER****3.1.1. REMOVAL OF TRANSMISSION COVER**

- Take out the mounting bolts and ease off the cover by means of light taps with a mallet.



**3.1.2. REPLACEMENT OF TRANSMISSION COVER**

- Position the transmission cover and tighten the mounting bolts.



## 3.1.3. TIGHTENING TORQUE SETTINGS

NAME	QUANTITY	TIGHTENING TORQUE (Nm)
TRANSMISSION COVER		
TRANSMISSION COVER BOLT	12	12 ÷ 13

### 3.2. DRIVING PULLEY

#### 3.2.1. REMOVAL OF DRIVING PULLEY

- Hold the pulley firm with the specific tool.
- Unscrew the central nut plus washer, remove the drive take-off and the plastic fan.
- Remove the fixed half-pulley.
- Remove the belt and stop washer and slip off the moving half-pulley with its bush. Make sure the free rollers do not come out.



- Remove the starter motor pinion.



- Remove the rollers lock plate and guide shoes. Take off the rollers.



**3.2.2. REPLACEMENT OF DRIVING PULLEY**

- Pre-assemble the moving half-pulley and rollers lock plate.



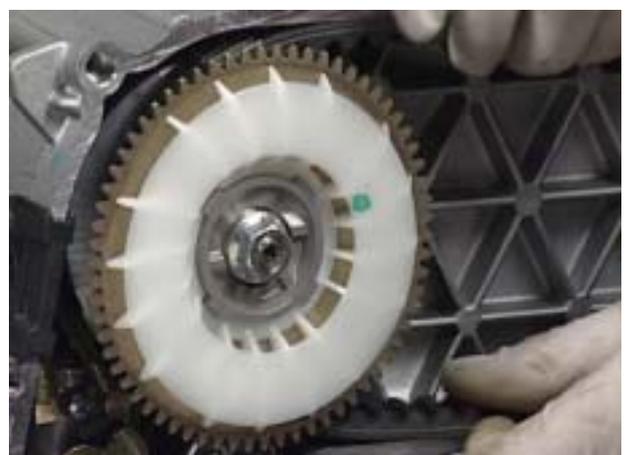
- Position the assembly complete with bush on the drive shaft.



- Remount the stop washer, insert the starter motor pinion in its seat and position the transmission belt.



- Remount the half-pulley and cooling fan with their spacers and the nut.



- Prevent the pulley from turning with the specific tool and tighten the lock nut to the correct torque value with a torque spanner.

N.B. Use a new nut every time the pulley is remounted.



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**3.2.3. DRIVING PULLEY CHECK**

- Check the inside bearing for abnormal wear and measure its diameter. Do not lubricate or clean the bearing.
  - Minimum permitted diameter: 20.12 mm
  - Standard diameter: 20.021 mm
- 
- Measure the outside diameter of the pulley running bush.
  - Minimum permitted diameter: 19.95 mm
  - Standard diameter: 19.959 mm
- 
- Check the state of wear of the belt contact surfaces and the roller recesses.
  - Make sure the rollers are not damaged or worn.
  - Minimum permitted diameter: 18.5 mm
  - Standard diameter: 18.9 mm
- 
- Make sure the driving belt is not damaged and check its width.
  - Minimum width: 17.5 mm



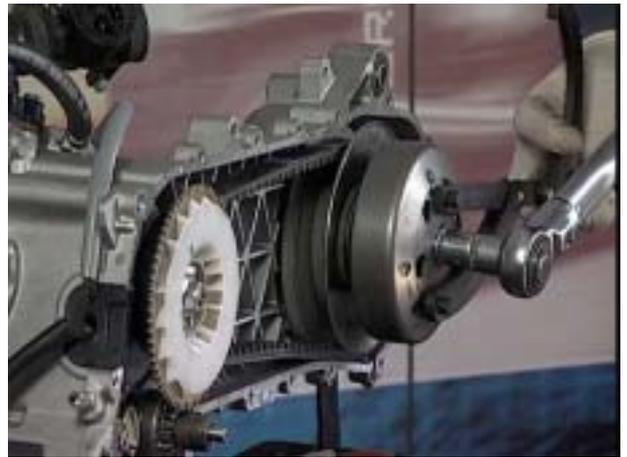
## 3.2.4. TIGHTENING TORQUE SETTINGS

NAME	QUANTITY	TIGHTENING TORQUE (Nm)
<b>DRIVING PULLEY</b>		
DRIVING PULLEY NUT	1	40 ÷ 44
CLUTCH CASE NUT	1	40 ÷ 44

### 3.3. DRIVEN PULLEY

#### 3.3.1. REMOVAL OF DRIVEN PULLEY - CLUTCH

- Hold the clutch cover firm with the specific tool.



- Remove the nut and clutch cover.



- Slip the complete driven pulley - clutch assembly off the driving belt.

N.B. The assembly can also be removed with the driving pulley mounted.



### 3.3.2. DISMANTLING THE DRIVEN PULLEY

- Use the specific tools to slip off the pulley pins retaining collar.



- Remove the three retaining pins.



- Separate the moving from the fixed half-pulley.



- Remove the two outer O-rings and the two inner sealing rings of the moving half-pulley.



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- Remove the roller bearing with a mallet and an appropriately sized punch. Support the half-pulley suitably to prevent deformation of its driving belt running surface.



- Remove the ball bearing snap ring.



- Use a 20 mm guide punch handle to drive out the ball bearing.



### 3.3.3. RECOMPOSITION OF THE DRIVEN PULLEY

- Use the specific tooling to mount a new ball bearing on the fixed driven half-pulley.



- Insert the ball bearing snap rings.



- Mount the roller bearing with its outside writing visible. Support the half-pulley suitably to prevent damage to its threaded end when mounting the bearings.



- Change and insert the two outer O-rings and the two inner sealing rings of the moving half-pulley.



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- Carefully lubricate the moving driven half-pulley.
- Fit the half-pulley on the bush. Make sure no damage is done to the oil shields.



- Remount the three retaining pins.



- Reinsert the collar.



### 3.3.4. REPLACEMENT OF THE DRIVEN PULLEY - CLUTCH

- Bring the moving driven half-pulley up to the clutch and set it at the correct distance by hand. Insert the driving belt in the right assembly direction.



N.B. When the complete driven pulley assembly is attached, check that the belt is free so as to prevent the risk of false tightening that might cause damage to the drive shaft knurling. It is also a good idea to always mount the belt with its writing visible if no assembly direction is indicated.



- Insert the clutch cover and the corresponding nut.
- Insert the clutch cover locking tool and tighten the nut to the prescribed torque value.



### 3.4. CLUTCH ON THE BENCH

#### 3.4.1. SEPARATION CLUTH - DRIVING PULLEY

- Use the specific tool to position the clutch - moving pulley assembly.
- Apply force to the central bolt. Do not overtighten it as this could damage the tool.
- Remove the clutch locking nut.
- Slacken the central bolt. Take the strain off the driven pulleys assembly and separate its components.



### 3.4.2. CLUTCH - DRIVEN PULLEY CHECK

- Measure the outside diameter of the fixed driven half-pulley bush.
- Minimum permitted diameter: 33.96 mm
- Standard diameter: 33,965 -33.985 mm



- Measure the inside diameter of the fixed driven half-pulley bush.
- Maximum permitted diameter: 34.08 mm
- Standard diameter: 19.959 mm
- Make sure the half-pulley is not warped or scored and check the pins.



- Measure the free length of the moving driven half-pulley spring.
- Standard length 110 mm



- Check the thickness of the friction material of the clutch pads and that the pads are free from traces of lubricants.
- Minimum permitted thickness 1 mm
- During the running-in period the clutch pads must have a central contact surface and not differ from each other. If this is not the case, the clutch may tear.



- Measure the inside diameter of the clutch cover and check its state of wear.
- Standard value  $107^{+0,2}_{+0}$  mm
- Max. value 0,20 mm



### 3.4.3. ASSEMBLY OF THE CLUTCH DRIVEN PULLEY UNIT

- Pre-assemble the pulley unit with the pressure spring, sheath and centrifugal clutch.
- Place the components in the tool and load the spring. Make sure no damage is caused to the plastic sheath and the threaded end of the tang.
- To position and to stop the hexagonal nut of the clutch.
- Use a socket key with a reduced bevel to prevent damage to the clutch nut.



## 3.4.4. TIGHTENING TORQUE SETTINGS

NAME	QUANTITY	TIGHTENING TORQUE (Nm)
CLUTCH		
CLUTCH NUT	1	55 ÷ 60

### 3.5. HEAD COVER - INJECTION ASSEMBLY

#### 3.5.1. REMOVAL OF HEAD COVER INJECTION ASSEMBLY

- Unscrew the bolt attaching the air delivery pipe to the injection head and remove the pipe.
- Unscrew the head attachment bolts and remove the assembly, including the petrol injector and pressure regulator.
- Remove the plug and carefully unscrew the temperature sensor.
- Slip off the dust cover. Use the specific tool to remove the injector, taking care not to damage its plastic support.



- Unscrew and remove the coolant outlet union with its O-ring from the head.



- Disconnect the pipe holding clamp and remove the inside recirculation duct.



- Undo the four bolts and remove the head cover along with its gasket.



**3.5.2. RIMONTAGGIO TESTA - GRUPPO INIEZIONE**

- Clean the head thoroughly and check the soundness of its mating surface.
- Make sure the ring seals are not damaged and replace if necessary.



- Position the head and cross-tighten its nuts to the correct torque value.



- Replace the dust cover on the air injector and replace the injector in the head.



- Replace the temperature sensor and tighten it to the correct torque value.



- Replace the coolant outlet union with its O-ring and tighten its bolts to the correct torque value.



- Remount the inside recirculation duct and replace the clamp.



- Replace the injector assembly and tighten its bolts to the correct torque value.



- Mount the plug and tighten it to the correct torque value.
- Remount the air piping union on the injection head.



### 3.5.3. CHANGING THE INJECTOR RING SEAL

- Remove the feed assembly.
- The injector ring seal must be broken to remove it.
- Make sure the ring seals are not worn and replace if necessary.
- Clean the air injector and its seat thoroughly and remove any carbon residues.
- Use the specific tool to insert the ring seal in several stages to make sure it spreads out correctly.



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- Use the specific tool to tighten the ring seal in its seat.
- Replace the injector on the head quickly to make sure the seal does not dilate again.



## 3.5.4. TIGHTENING TORQUE SETTINGS

NAME	QUANTITY	TIGHTENING TORQUE (Nm)
<b>ENGINE HEAD</b>		
ENGINE HEAD BOLT	4	10 ÷ 11
COOLANT OUTLET UNION ATTACHMENT BOLT	2	3 ÷ 4
TEMPERATURE SENSOR	1	18 ÷ 22
PLUG ATTACHMENT	1	11 ÷ 14
ATTACHMENT BOLT INJECTION HEAD	2	3 ÷ 4

3.6. CYLINDER AND PISTON

3.6.1. REMOVAL OF THE CYLINDER AND PISTON

- Remove the cylinder with its gasket. Support the piston to make sure it is not damaged.



- Protect the cylinder seat and then use the specific tool to remove the two pin retainers from the cavities in the piston.



- Use an appropriate punch to push out the pin. Remove the piston.



- Next remove the roller lane from the small end of the con rod.



- Remove the piston circlips. Make sure they do not get damaged when reassembled.

N.B. Make a note of the position of the segments so that they are not inverted when reassembled.



**3.6.2. REPLACEMENT OF THE CYLINDER AND PISTON**

- Insert the circlips on the piston. Make sure their notches are in the right position.



- Insert the roller lane in the foot of the con rod.



- Mount the piston and the pin on the small end of the con rod. Position the piston with the arrow pointing towards the exhaust aperture.



- Insert the pin retaining ring in the specific tool with the opening indicated on the tool.



- Use a punch to position the pin retaining ring.
- Mount the ring with the peg.



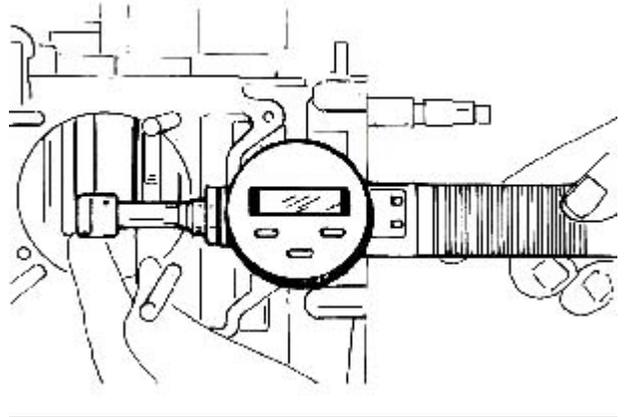
- Fit a new gasket. Lubricate the cylinder and replace it.



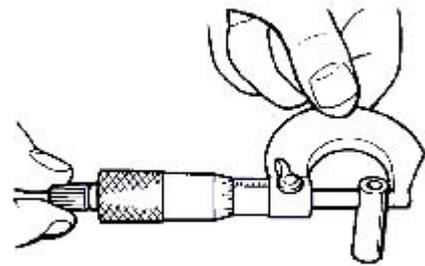
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## 3.6.3. CHECKING THE CYLINDER AND PISTON

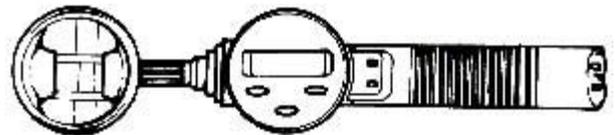
- Make sure the roller lane of the small end of the con rod is not abnormally worn.
- Measure the inside diameter of the small end with a bore gauge.
- Standard diameter  $17 \pm 0.001$  mm



- Use a micrometer to measure the outside diameter of the pin.
- Standard diameter  $12 + 0.005 - 0.001$  mm.
- Measure the diameter of the contacts on the piston with a bore gauge.
- Standard diameter  $12 + 0.007 - 0.012$  mm.
- Calculate the pin-piston coupling play
- Standard play  $0.002 - 0.011$  mm



- Check that the surface of the cylinder is not scored and check its wear with a centesimal comparator.
- Zero the comparator on a ring gauge and use it to measure the inside diameter of the cylinder.



- Use the piston to fit the circlip at right angles to the axis of the cylinder.
- Check the clearance at the end of the circlip with a feeler gauge.



## 3.6.4. CYLINDER/PISTON MATING CATEGORIES

PART	SIZE	MATING CATEGORIES			ASSEMBLY PLAY "A"
		SYMBOL	CYLINDER "E"	PISTON "C"	
Cylinder	Ø 40 $_{-0,01}^{+0,018}$	M	39,990÷39,997	39,943÷39,950	0,040 0,054
		N	39,997÷40,004	39,950÷39,957	
Piston	Ø 40 $_{-0,02}^{-0,057}$	O	40,004÷40,011	39,957÷39,964	
		P	40,011÷40,018	39,964÷39,971	
Cylinder 1a Over-size	Ø 40,2 $_{-0,01}^{+0,018}$	M1	40,19÷40,197	40,143 ÷ 40,15	
		N1	40,197÷40,204	40,15 ÷ 40,157	
Piston 1a Oversize	Ø 40,2 $_{-0,029}^{-0,057}$	O1	40,204÷40,211	40,157 ÷ 40,164	
		P1	40,211÷40,218	40,164 ÷ 40,171	
Cylinder 2a Over-size	Ø 40,4 $_{-0,01}^{+0,018}$	M2	40,39÷40,397	40,343 ÷ 40,35	
		N2	40,397÷40,404	40,35 ÷ 40,357	
Piston 2a Oversize	Ø 40,4 $_{-0,029}^{-0,057}$	O2	40,404÷40,411	40,357 ÷ 40,364	
		P2	40,411÷40,418	40,364 ÷ 40,371	

**3.6.5. SELECTION OF THE CYLINDER GASKET**

- Lubricate the cylinder and fit it temporarily on the piston without a gasket.
- Fit the comparator on the specific tool, zero it on a reference surface and mount the assembly on the cylinder without altering the position of the comparator.
- Block the tool with the original head attachment nuts.
- Turn the drive shaft to the top dead centre and measure the shift "S" from the bedding value.
- Identify the thickness of the cylinder gasket to be used when reassembling. Identification of the exact thickness will result in maintenance of the correct compression ratio.



SHIFT "S"	GASKET THICKNESS
2,85 ÷ 3,10	0,4
3,10 ÷ 3,25	0,5
3,25 ÷ 3,45	0,75

### 3.7. STARTER MOTOR

#### 3.7.1. DISASSEMBLY

- Remove the attachment bolts and take off the motor.
- Use an appropriate tool to remove the ring seal.



#### 3.7.2. REPLACEMENT

- Insert the gasket.
- Position the motor and tighten its attachment bolts.



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**3.8. MIXER****3.8.1. DISASSEMBLY**

- Take off the clamp and disconnect the pipe from the pump housing oil inlet union.
  
- Undo the bolts and extract the mixer with the housing pipes gasket.



### 3.8.2. REPLACEMENT MIXER

- Replace the pump housing oil inlet union.
- Insert the pipes gasket in the housing.
- Position the mixer and tighten its bolts.
- It is advisable to bleed the reassembled mixer through the central bolt.



### 3.9. COOLANT PUMP

#### 3.9.1. DISASSEMBLY COOLANT PUMP

- Position the specific thread retaining tool. Be careful not to overload the plastic impeller during the locking stages.
- Remove the drive belt together with the two toothed crown wheels.
- Remove the pump bearing retaining ring and its washer.
- Removal of the pump shaft is easier if the area around the coolant pump bearings is heated.



- Use this specific tool to unscrew the shaft by turning the spanner clockwise (left-hand thread). Take out the shaft with the appropriate tool.



- Use an appropriate tool to remove the pump shaft seat ring seal.



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## 3.9.2. REPLACEMENT COOLANT PUMP

- Check the shaft for abnormal wear and bearing noise. If necessary, change the shaft and the bearings.
- Clean the housings.



- Position the new, lubricated oil seal on the specific tool and bring it into contact with the specific tool.



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- Use a stream of hot air to heat the seat of the pump bearings. Keep the stream away from the oil seal.



- Remount the shaft and bearings by pushing and at the same time turning the spanner anticlockwise. Be careful not to damage the thread of the bronze insert or separate the insert of the plastic impeller.



- Fit the collar and the ring retainer.



- Position the two toothed crown wheels and the drive belt.



### 3.10. REAR HUB

#### 3.10.1. DISASSEMBLY OF REAR HUB AND WHEEL BEARING

- Drain the oil from the hub and remove the mounting bolts.



- Remove the hub cover complete with the driven pulley shaft by means of light taps with a mallet.



- Remove the idler and the wheel shaft complete with the gearing. Pay attention to the shim adjustments when removing the idler.



- Remove the oil seal and circlip.
- Remove the bearing by driving it in from the outside with an appropriate punch.



**3.10.2. DISASSEMBLY OF DRIVEN PULLEY SHAFT**

- Remove the circlip from inside the cover.
- Position the specific pipe on the inner race of the bearing and on the side of the pulley shaft tooting. Use a press to force out the driven pulley shaft.



- Remove the outer oil shield.



- Remove the two centring pins and place the cover on a flat surface.
- Position the specific tool on the inner race of the bearing and force the bearing out with a press.



**3.10.3. CHECKING THE WHEEL SHAFT**

- Make sure that the three shafts are free from wear or deformation on the toothed surfaces and the bearing and oil shield contacts.
- Make sure the mating surfaces are free from abnormalities and deformation.
- Replace any damaged parts.



**3.10.4. REPLACEMENT OF THE DRIVEN PULLEY SHAFT**

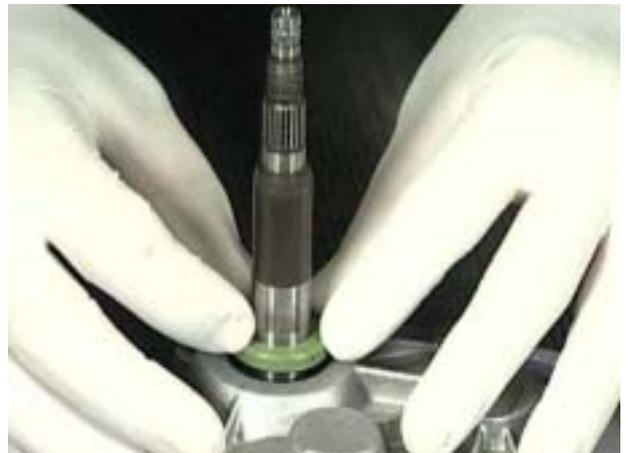
- Heat the hub cover and use the specific tool to insert a new bearing with its screen facing the oil shield.



- Mount the circlip with its concave or radiate part on the bearing side.



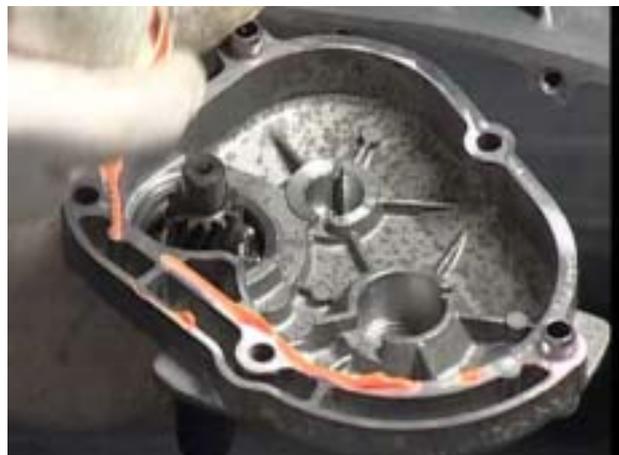
- Support the inner race of the bearing from the outside of the hub cover with the specific tool positioned under the press and insert the driven pulley shaft.
- Refit the oil shield flush with the cover



### 3.10.5. REPLACEMENT OF REAR HUB AND WHEEL BEARING

- Use a heat gun to heat the half-casing on the transmission side.
  - Lubricate the outer plate. Use a mallet to insert the bearing with the special adapter.
  - Use the adapter and its handle to replace the circlip and oil shield.
- 
- Replace the idler. Pay attention to the two shim adjustments.
- 
- Apply Loctite for surfaces on the hub cover. Replace the hub complete with the driven pulley shaft. Insert the bolts and tighten them to the correct torque value.

**N.B.** Remove the residues of the previous gasket from the hub cover and half-casing contact surfaces before fitting the new gasket.



## 3.10.6. TIGHTENING TORQUE SETTINGS

NAME	QUANTITY	TIGHTENING TORQUE (Nm)
REAR HUB		
HUB COVER BOLT	5	11 ÷ 13

### 3.11. CRANKCASE

#### 3.11.1. SEPARATION OF CASE AND DRIVE SHAFT

- Remove the attachment bolts of the half-case on the flywheel side.



- Place the guard on the drive shaft and correctly centre the specific tool for removal of the half-case on the fly-wheel side.



- Use a hex spanner to remove the half-case on the fly-wheel side.
- If the separation proves difficult, use a heat gun to heat the case in the area of the main bearings.



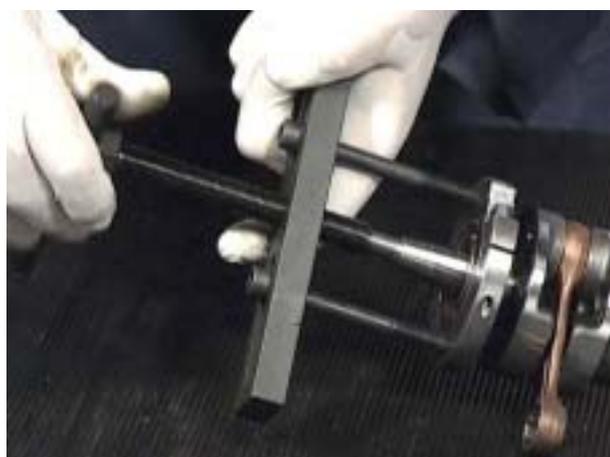
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- Install the specific tool with its guard on the half-case on the transmission side.
- Use the hex spanner to separate the drive shaft from the half-case on the transmission side.



### 3.11.2. DISASSEMBLY OF THE DRIVE SHAFT BEARINGS

- Mesh the half-rings on the bearings with the respective bolts.
- Position the specific tool and tighten the attachment bolts.
- Work on the bolt to dismount the bearing.



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- Repeat this operation on the second bearing using the tool bolts.



### 3.11.3. REPLACEMENT OF THE DRIVE SHAFT BEARINGS

- Place the bearings in a cold oil bath and heat them to about 150°C.
- Set the drive shaft in the special holder.



- Insert the bearings alternately. Use the specific tool to ensure their proper abutment.



**3.11.4. DISASSEMBLY OF THE CRANKCASE OIL SHIELDS**

- Use the specific tool and light taps with a mallet to remove the oil shield on the flywheel side.
  
- Repeat this operation on the transmission side.



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### 3.11.5. REPLACEMENT OF THE CRANKCASE OIL SHIELDS

- Correctly lubricate a new oil shield. Fit it on the fly-wheel side (smaller diameter) solely with the punch of the specific tool to ensure its proper axial alignment.



- Repeat this operation on the transmission side. Take care not to force the oil shield since would bring its lip into contact with the inner thrust block of the main bearing and result in its rapid overheating and damage.



- Lubricate the bearings and big end.



**3.11.6. CHECKING THE HALFCASE**

- Clean the mating surfaces. Remove the remains of the Loctite and the paper gasket of the cylinder.
- Check the mating surfaces and the contacts of the bearings and oil shields.
- Thoroughly clean and check the efficiency of the one-way valve supplying oil to the pump case.

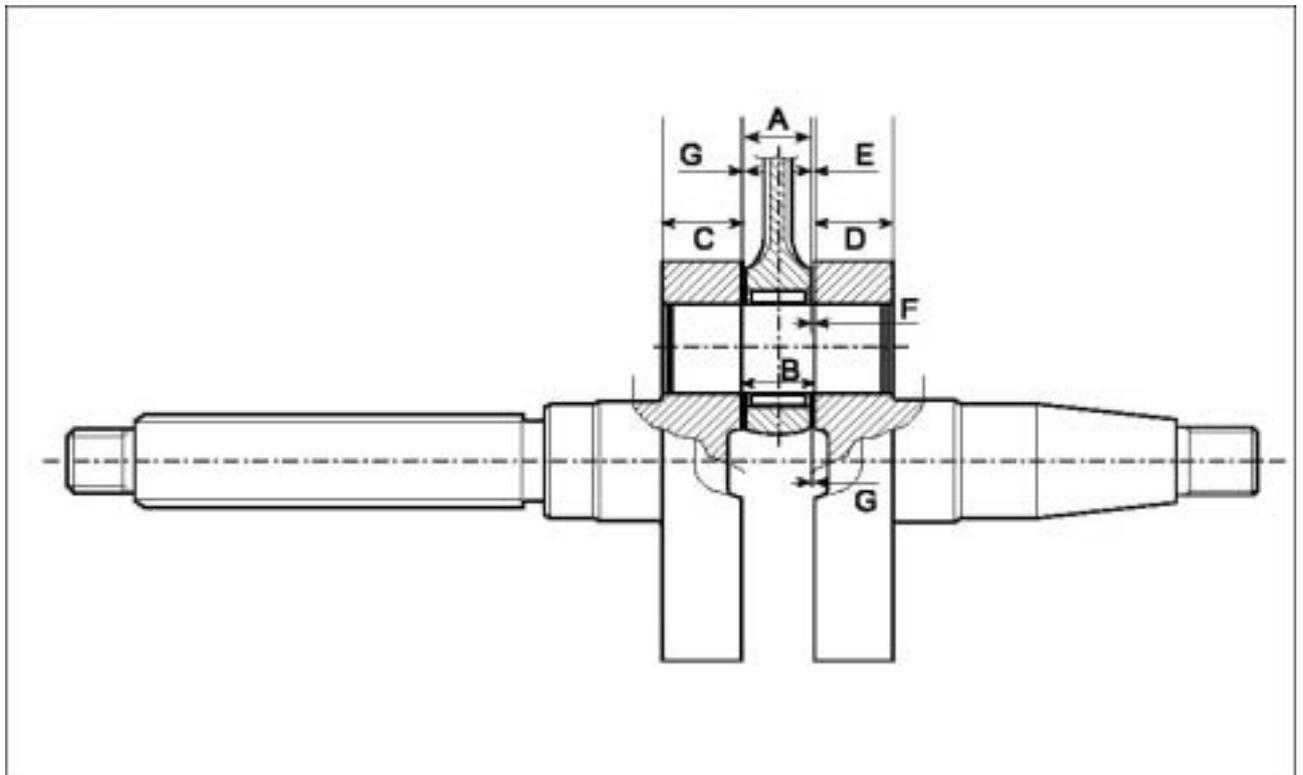


3.11.7. CHECKING THE DRIVE SHAFT

- Check the cam track for wear. Make sure there is no scoring on the axial play surfaces.



3.11.8. DRIVE SHAFT - CON ROD AXIAL PLAY CHECK.



PART	SIZE	PLAY	ASSEMBLY PLAY
Con rod	$A = 11,75^0_{-0,05}$		
Shoulder washer	$G = 0,5^{\pm 0,03}$		
Transmission side half-shaft	$C = 13,75^{+0,04}_0$	E	$0,25 \pm 0,50$
Flywheel side half-shaft	$D = 13,75^{+0,04}_0$		
Spacer tool	$H = 40,64$		
Cage	$B = 11,8^0_{-0,35}$	F	$0,20 \pm 0,75$
Shoulder washer	$G = 0,5^{\pm 0,03}$		
Transmission side half-shaft	$C = 13,75^{+0,04}_0$		
Flywheel side half-shaft	$D = 13,75^{+0,04}_0$		
Spacer tool	$H = 40,64$		

### 3.11.9. RECOMPOSITION OF THE CRANKCASE AND DRIVE SHAFT

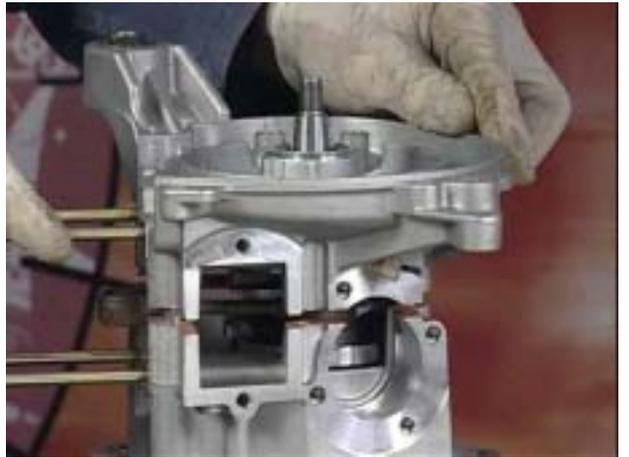
- Position the half-case on two suitable supports. Use a heat gun to heat the seat of the bearing to about 120°C.
- Insert the drive shaft until the bearing reaches its end of travel stops. Make sure the con rod is aligned with the axis of the cylinder.
- Reinstall the specific crankcase separation plate. Do not install the drive shaft guard.
- Slacken the central thrust bolt during the reassembly operations. Bring the attachment bolts of the end of their travel and then slacken them to the same angle.
- When the temperature is steady, preload the thrust bolt of the tool just enough to cancel the play of the balls of the bearing.
- Degrease the surface with an appropriate solvent and apply a thin layer of Loctite.



- Use a heat gun to heat the half-case on the flywheel side in the same way as on the transmission side.



- Mate the surfaces of the flywheel side and transmission side half-cases.
- Do not use alcohol during this operation.



- Insert three or more attachment bolts and tighten them quickly. Insert the remaining bolts and tighten them to the correct torque value.



- Insert the remaining bolts and tighten them to the correct torque value.



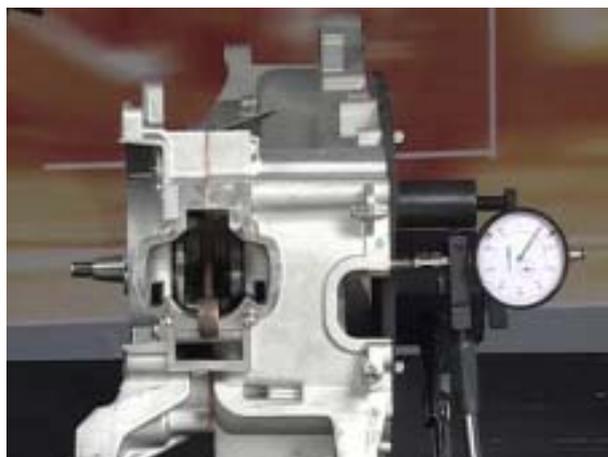
**3.11.10. CHECKING THE PLAY OF THE BEARINGS**

- Fit the specific magnetic support with comparator on the end of the drive shaft.
- Check the axial play of the drive shaft. It should be:

0.10 - 0.12 mm when the case is hot.

0.06 - 0.08 mm when the case is cold.

The limit value is 0.02 to 0.03 mm when the case is cold.  
If this limit is not met, the case must be taken to pieces and reassembled.



## 3.11.11. TIGHTENING TORQUE SETTINGS

NAME	QUANTITY	TIGHTENING TORQUE (Nm)
ENGINE CASE		
CASE CLOSING BOLT	8	12 ÷ 13

### 3.12. FLYWHEEL

#### 3.12.1. DISMOUNTING THE FLYWHEEL

- Unscrew the bolts and take off the flywheel cover. Pay attention to the connector. Hold the flywheel firm with the specific compass wrench and remove the flywheel attachment hex nut.



- Insert the specific extractor and work the wrenches to remove the flywheel.



- Take out the screws of the rev sensor and coolant inlet pipe.



- Remove the coolant inlet pipe.



- Unscrew the attachment bolts and remove the stator complete with the cables and rev sensor.



**3.12.2. REPLACEMENT OF THE FLYWHEEL**

- Insert the stator complete with cables and rev sensor and tighten the bolts to the correct torque value.



- Reposition the coolant inlet pipe and rev sensor and tighten their screws.



- Position the flywheel, insert the specific flywheel blocking tool and tighten the attachment nut to the correct torque value.



- Fit the flywheel cover and connector and tighten the bolts.



## 3.12.3. TIGHTENING TORQUE SETTINGS

NAME	QUANTITY	TIGHTENING TORQUE (Nm)
FLYWHEEL		
FLYWHEEL NUT	1	40 ÷ 44

### 3.13. FUEL FEED SYSTEM

#### 3.13.1. DISASSEMBLY OF THE CARBURETTOR BODY

- Use a Torx spanner to loosen the manifold bolts and remove the carburettor body complete with the induction manifold from the case.



- Loosen the clamp bolt and separate the carburettor body from the manifold.



- Remove the diaphragm and its paper gasket.

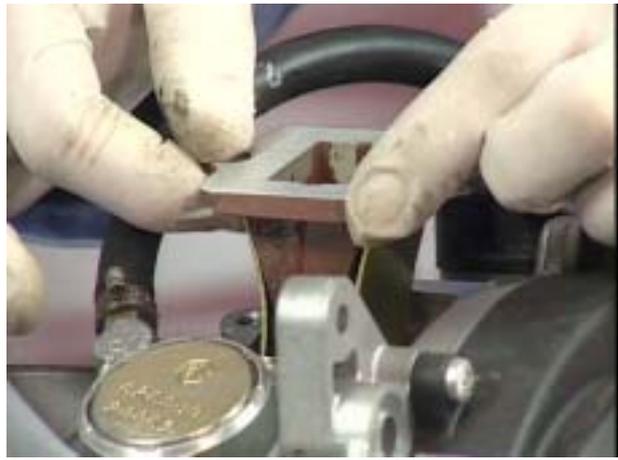


- Remove the fins support.



### 3.13.2. REPLACEMENT OF THE CARBURETTOR BODY

- Insert the fins support on the case.
- Insert the diaphragm and paper gasket with the rims turned towards the fins support.
- Mount the carburettor body on the induction manifold. Make sure the two reference notches of the two seats meet and then tighten the clamp.



**ENGINE C361M**

- Replace the manifold complete with the carburettor body and tighten the bolts to the correct torque value.

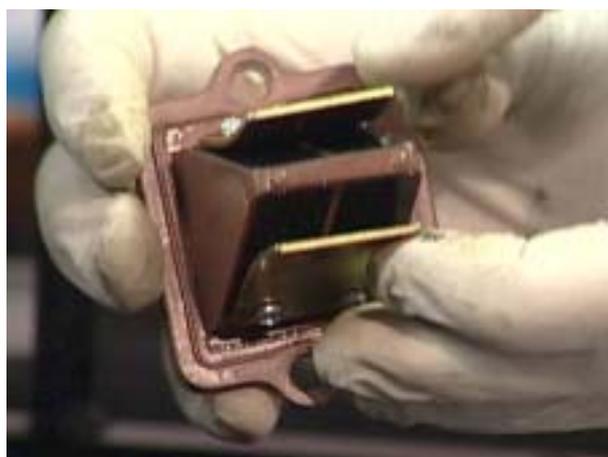


**3.13.3. CHECKING THE FUEL FEED SYSTEM**

- Check that the movement of the gas valve does not show abnormal play or slackening.



- Make sure the fins support is not worn and that the support surfaces of the petals are not warped.



- Make sure there is nothing wrong with the diaphragm.



## 3.13.4. TIGHTENING TORQUE SETTINGS

NAME	QUANTITY	TIGHTENING TORQUE (Nm)
<b>FUEL SUPPLY SYSTEM</b>		
THROTTLE BODY MANIFOLD BOLT	2	7 ÷ 8
AIR COMPRESSOR BOLT	4	3 ÷ 4

### 3.14. POSITIVE DISPLACEMENT BLOWER

#### 3.14.1. DISASSEMBLY OF THE POSITIVE DISPLACEMENT BLOWER

- Remove the manifold. Use an appropriate spanner to remove the air piping union from the injection head.
- Unscrew the blower attachment bolts from the housing and take out the blower.
- Remove the O-ring gasket.



### 3.14.2. REPLACEMENT OF THE POSITIVE DIS- PLACEMENT BLOWER

- Remove the flywheel cover and set the shaft with the cam at its bottom dead centre point.
- Fit the O-ring gasket and insert the blower in the housing. Check that the reference pins are in the correct positions.
- Tighten the blower attachment bolts to the correct torque value.
- Replace the air piping union on the injection head.



**3.14.3. CHECKING THE BLOWER**

- Check the contact roller for signs of abnormal wear or overheating.
- Use a feeler gauge to measure the axial play of the driver roller. Place its blade between the roller and one of the two shim adjustments.
- Make sure the ring seal is not broken or crushed.



UPDATES ENGINE C364M

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## 4.1. GENERAL TECHNICAL INFORMATION

## 4.1.1. TECHNICAL DATA

<b>ENGINE</b>	
Model	C364M
Type	2 temps
Number of cylinders	Single-cylinder, horizontal
Total displacement	49,38 cm <sup>3</sup>
Bore / stroke	40 mm / 39,3 mm
Compression ratio	12,1 ± 0,5 : 1
Starting	electrical + kick starter
Engine idle rpm	1700 ± 100 rpm
Clutch	automatic, centrifugal, dry clutch
Lubrication system	Dry crank case with oil tank removed and radiator
Cooling	liquid cooled

<b>CHANGE GEAR</b>	
Type	automatic stepless variator

<b>CAPACITY</b>	
Fuel (reserve included)	8 l
Fuel reserve	2 l
Transmission oil	130 cm <sup>3</sup>
Mixer oil (reserve included)	1.6 l
Mixer oil reserve	0,5 l

<b>TRANSMISSION</b>	
Speed change gear	automatic and stepless
Primary	V-belt
<b>RATIOS</b>	
– minimum for stepless change	3,07
– maximum for stepless change	0,78
Secondary	gears

<b>CARBURETTOR</b>	
Type	Dell'Orto PHVA17,5
Choke tube	Ø 17,5 mm
Max. jet	56
Max. air hole	150/100
Min. secondary air hole	250
Diffuser type	209 HA
Taper needle type	A22
Position of needle: notches from above	1
Gas valve type	14730.30.64
Choke jet	50
Progression hole (1)	80
Min. revs. air open adjustment screw	1+1/2
Slow-running jet	32
Petrol inlet hole	
Min. air hole	libero
Choke air diffuser	150

<b>FUEL SUPPLY</b>	
Fuel	unleaded petrol according to the DIN 51607 standard, min. O.N. 95 (N.O.R.M.) and 85 (N.O.M.M.)

<b>IGNITION</b>	
Type	C.D.I.
Spark advance	20° ± 3° before TDC
Resistance	5 KW
<b>SPARK PLUG</b>	
Standard	CHAMPION RG6YC
Spark plug gap	0,6 – 0,7 mm

## 4.2. ENGINE HEAD

### 4.2.1. DISMOUNTING THE HEAD

- Unscrew and take out the plug.
- Slacken the clamp and remove the inside recirculation duct.
- Unscrew and carefully remove the temperature sensor.
- Unscrew the four nuts and take off the head with its two gaskets.



**4.2.2. REPLACEMENT OF THE HEAD**

- Clean the gasket beds and make sure they are not damaged.
- Insert the head with its gaskets and cross-tighten the four bolts to the correct torque value.



- Spread sealant over the seat of the temperature sensor and tighten it to the correct torque value.
- Insert the plug and tighten it to the correct torque value.



- Replace the recirculation duct in the head and close the clamp.



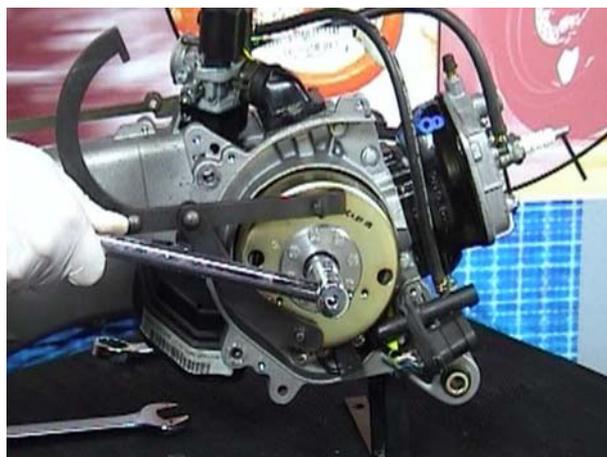
## 4.2.3. TIGHTENING TORQUE SETTINGS

NAME	QUANTITY	TIGHTENING TORQUE (Nm)
<b>ENGINE HEAD</b>		
ENGINE HEAD BOLT	4	10 ÷ 11
COOLANT OUTLET UNION ATTACHMENT BOLT	2	3 ÷ 4
TEMPERATURE SENSOR	1	18 ÷ 22
PLUG ATTACHMENT	1	11 ÷ 14
ATTACHMENT BOLT INJECTION HEAD	2	3 ÷ 4

### 4.3. FLYWHEEL

#### 4.3.1. DISMOUNTING THE FLYWHEEL

- Remove the cover, hold the flywheel firm with the specific compass wrench and remove the flywheel attachment hex nut.
- Insert the specific extractor and work the wrenches to remove the flywheel.
- Take out the screws of the rev sensor and coolant inlet pipe.
- Remove the coolant inlet pipe.



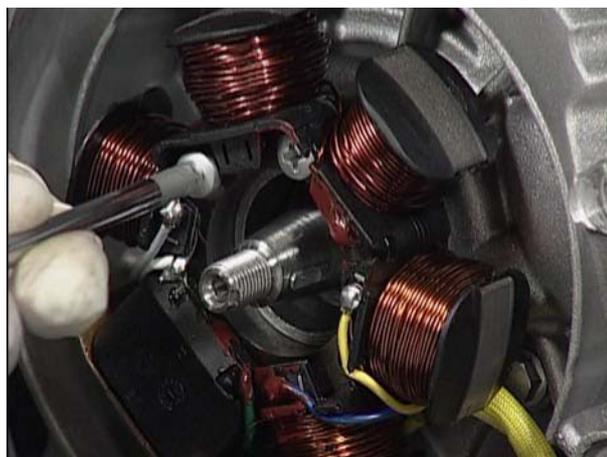
**ENGINE C364M**

- Unscrew the attachment bolts and remove the stator complete with the cables and rev sensor.



4.3.2. REPLACEMENT OF THE FLYWHEEL

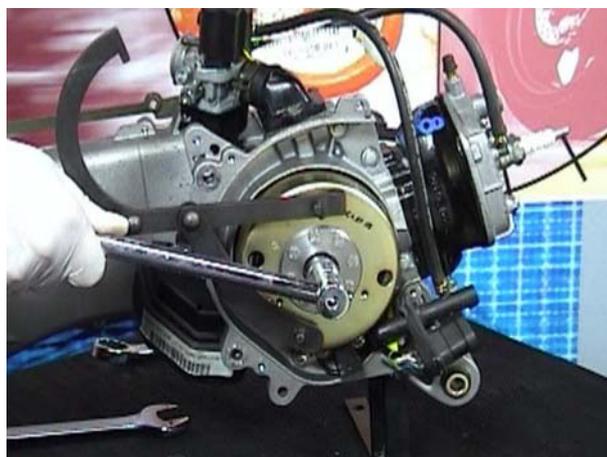
- Insert the stator complete with cables and rev sensor and tighten the bolts to the correct torque value.



- Reposition the coolant inlet pipe and rev sensor and tighten their screws.



- Position the flywheel, insert the specific flywheel blocking tool and tighten the attachment nut to the correct torque value.



- Fit the flywheel cover and tighten its bolts.



#### 4.4. SECTOR GEAR

##### 4.4.1. DISASSEMBLY OF THE SECTOR GEAR AND PINION

- Remove the pedal starter pinion.



- Remove the pedal starter lever, then remove the circlip and ring seal. Ease off the sector gear and spring with a mallet.



**N.B.**

The spring is kept loaded by the sector gear. Be careful, since this could cause an accident.



4.4.2. REPLACEMENT OF THE SECTOR GEAR

- Lubricate and load the spring with the specific tool, then replace the sector gear.



- Replace the pedal starter return pinion.



- Insert the ring seal and circlip.



- Replace the pedal starter lever and tighten its screw.



#### 4.5. AIR CLEANER

##### 4.5.1. REMOVAL OF AIR CLEANER BOX

- Loosen the air cleaner manifold clamp screw.
- Take out the attachment bolts.
- Cut the outside air intake sleeve clamp.
- Separate the air cleaner box from the carburettor body and intake sleeve.



#### 4.5.2. REMOVAL OF AIR CLEANER

- Take out the attachment bolts.
- Open the air cleaner box, remove the grille and the filtering part.



**4.5.3. RECOMPOSITION OF THE AIR CLEANER**

- Change the filtering part and reinsert the grille.
- Tighten the air cleaner box attachment bolts.



**4.5.4. REPLACEMENT OF THE AIR CLEANER BOX**

- Position the air cleaner box and connect it to the carburettor body and air intake sleeve.
- Tighten the air cleaner box attachment bolts and the carburettor body and air intake sleeve clamps.



## 4.6. SECONDARY AIR SYSTEM

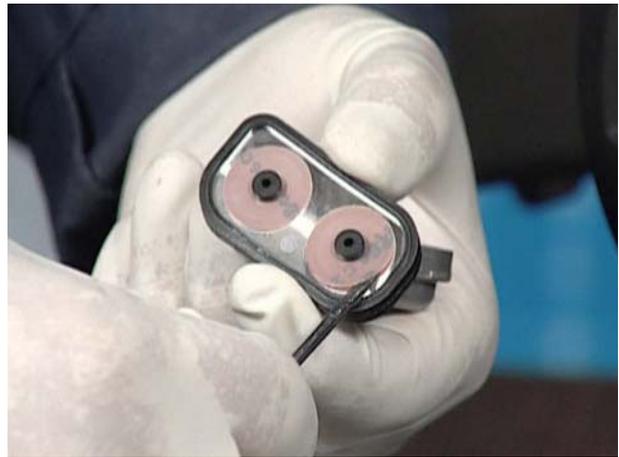
### 4.6.1. REMOVAL OF THE SECONDARY AIR SYSTEM

- Unscrew the two attachment bolts and remove the aluminium secondary air system cover.
- Remove the plastic cover and sponge cleaner.



- Remove the seat of the one-way valves. Check the soundness of the valves and replace them in their seat.
- Wash the sponge filter and blow it with compressed air.





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**4.6.2. REPLACEMENT OF THE SECONDARY AIR SYSTEM**

- Replace the sponge filter and insert the plastic cover.



- Insert the aluminium cover and tighten the attachment bolts.



## 4.7. CARBURETTOR BODY

### 4.7.1. 1 REMOVAL OF CARBURETTOR

- Slacken the clamps and detach the coolant pipes and the mixer-carburettor union pipe from the carburettor.
- Stopper the three pipes.



- Use a Torx spanner to loosen the manifold bolts and remove the carburettor body complete with the induction manifold.



- Remove the fins support.



#### 4.7.2. DISMANTLING THE CARBURETTOR

- Loosen the clamp bolt and separate the carburettor from the manifold.



- Unscrew the bolts and remove the protection, the bracket and the choke.



- Unscrew the air-petrol dispenser cover and remove it. Remove the spring and its cable retaining cup.



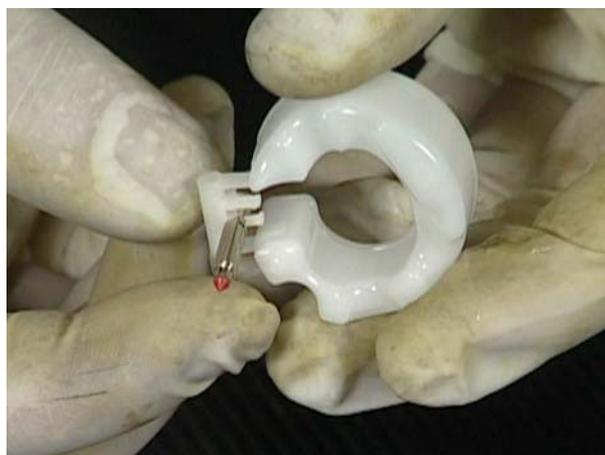
- Unscrew the two bolts and remove the bowl of the carburettor.



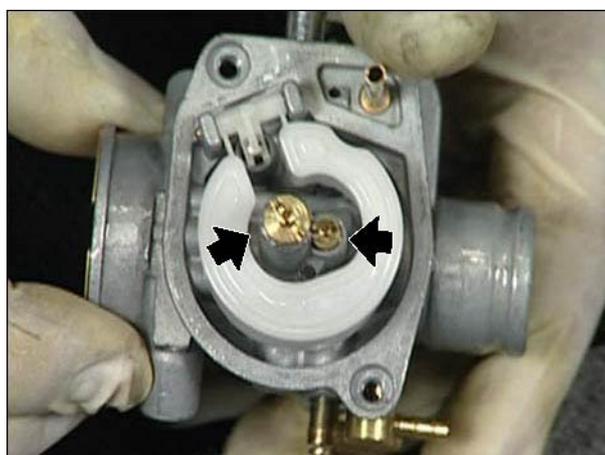
- Make sure the carburettor is properly supported and remove the float complete with the needle valve by sliding out the float retaining pin.



- Separate the needle valve from the float.

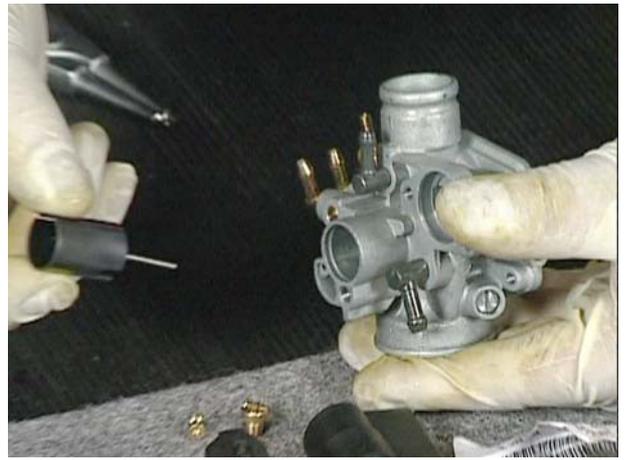


- Remove the main jet and the slow-running jet.



ENGINE C364M

- Remove the dispenser complete with needle and then the diffuser.



- Remove the idling adjustment screw and the mixture adjusting screw.



- Remove the idling adjustment screw and the mixture adjusting screw.



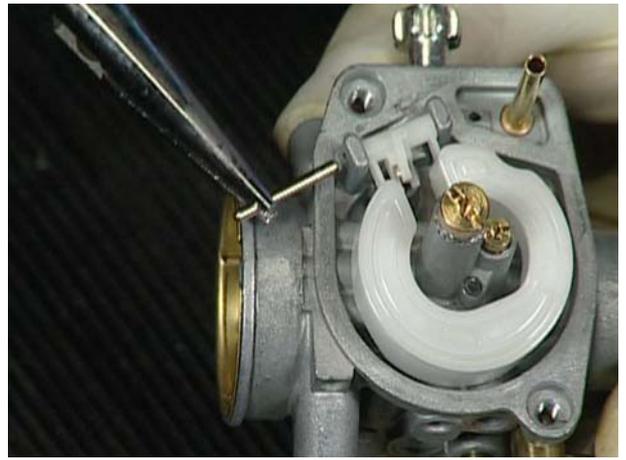
**4.7.3. REASSEMBLY AND CHECKING OF THE CARBURETTOR**

- Check that all the passages are free from dirt and then clean the jets and the diffuser.
- Replace the idling adjustment screw and the mixture adjusting screw.
- Insert the diffuser and screw in the main jet and the slow-running jet.



ENGINE C364M

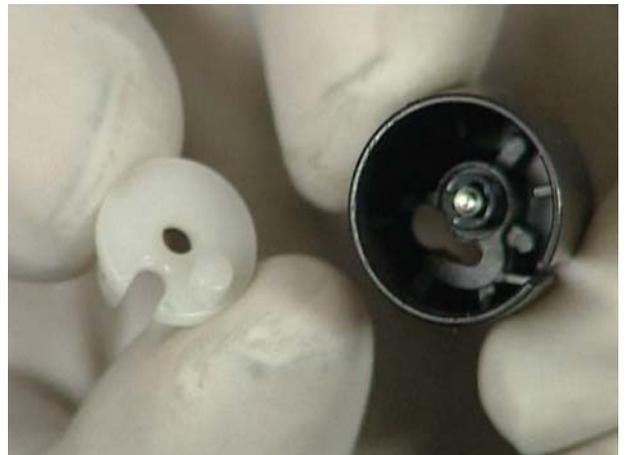
- Remount the float with its needle valve and insert the retaining pin in the float. Check that coupling plane of the float is parallel to the plane of the bowl with the carburettor upside down.



- Clean the bowl and fix it in place with its two bolts.



- Insert the metering device on the groove.
- Insert the cable retaining cup.
- Position the spring then replace the air-petrol dispenser cover and tighten its bolts.



**N.B.** Make sure the clip of the dispenser is on the last notch and that the retaining cup is in the right place.



- Check that the plunger of the automatic choke is free from scratches and rust and slides freely in the seat of the bearing.
- Use a gauge to measure the protrusion of the plunger and check that the value is correct.
- Check that the plunger seal is not warped.



- Remount the choke on the carburettor, insert the mounting bracket, tighten the two bolts and attach the cover.



- Join the manifold to the carburettor by matching the two reference notches and tighten the clamp screw.



#### 4.7.4. REPLACEMENT OF THE CARBURETTOR

- Check that fins bearing is not worn and the support surfaces of the petals are not deformed<sup>4</sup>
- Position the fins support and the carburettor body complete with manifold and tighten the respective bolts.



- Connect the mixer-carburettor union pipe and the two coolant pipes, and position the respective clamps.



UPDATES ENGINE C216M

5

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ENGINE C216M

5.1. INTRODUCTION

5.1.1. REFERENCE MANUALS

ENGINE WORKSHOP MANUALS

aprilia part# (description)	
8140818	I
8140821	E
8140819	F
8140820	D
8140822	UK
8CM0067	I E F D UK

SPECIAL TOOLS MANUALS

aprilia part# (description)	
H001	I E F D UK USA

**5.2. GENERAL TECHNICAL INFORMATION**

**5.2.1. TECHNICAL DATA**

<b>ENGINE</b>	
Model	C216M
Type	2 strokes - controlled ignition
Number of cylinders	horizontal single-cylinder
Total displacement	49.38 cu. cm.
Bore/stroke	40 mm / 39.3 mm
Compression ratio	10.3 : 1
Starting	electric + kick starter
Engine idling speed	1800 ± 200 rpm
Clutch	centrifugal
Automatic mixer	With wet sump, forced circulation with mechanical pump; level check by means of plug/dipstick
Cooling system	with forced air

<b>TRANSMISSION SYSTEM</b>	
Converter	automatic, stepless
Primary	V-belt
<b>Ratios</b>	
- minimum for stepless gearbox	3.07
- maximum for stepless gearbox	0.78
Final	gears

<b>CAPACITIES</b>	
Gearbox oil	85 cu. cm.
Mixer oil (reserve included)	1.2 l

<b>CARBURETTOR</b>	
Type	Dell'Orto PHVA17.5 RD
Throttle	Ø 17.5 mm
Maximum jet	53
Maximum air jet (on the body)	Ø 1.5 mm
Emulsifier type	209 HA
Tapered needle type	A22
Needle position, marks from the top	1
Choke jet	50
Idle speed mixture screw starting opening	1 1/2
Minimum jet	32
Fuel inlet opening	Ø 1.5 mm
Minimum air hole	free
Choke air jet (on the body)	Ø 1.5 mm
Choke needle stroke	11 mm

<b>FUEL SYSTEM</b>	
Fuel	unleaded fuel in conformity with DIN 51607, minimum octane rating 95 (ROM) and 85 (MON).

<b>IGNITION</b>	
Type	Capacity discharge electronic ignition, with built-in H.T. coil
Spark advance	Fixed at 17° ± 1° before Top Dead Center

<b>SPARK PLUG</b>	
Standard	CHAMPION RGN2C
Spark plug gap	0.6 - 0.7 mm

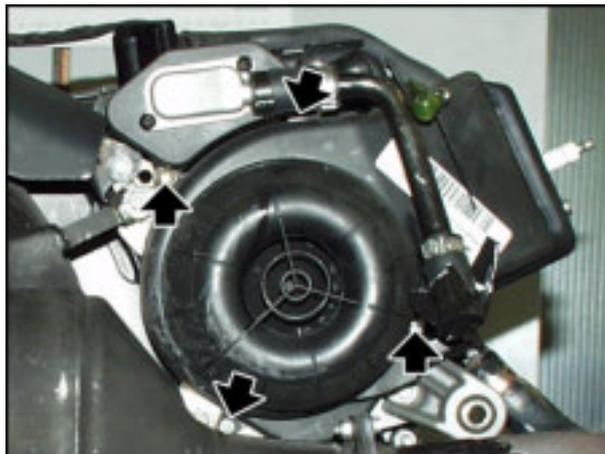
## 5.2.2. TIGHTENING TORQUE TABLE

DESCRIPTION	QUANTITY	TIGHTENING TORQUE (Nm)
<b>ENGINE</b>		
<b>TRANSMISSION COVER</b>		
Transmission cover screw	12	12 ÷ 13
<b>DRIVE PULLEY</b>		
Drive pulley nut	1	40 ÷ 44
Clutch housing nut	1	40 ÷ 44
<b>CLUTCH</b>		
Clutch nut	1	55 ÷ 60
<b>CYLINDER HEAD</b>		
Cylinder head nuts	4	10 ÷ 11
Spark plug fastener	1	11 ÷ 14
Injection head securing screw	2	3 ÷ 4
<b>FLYWHEEL</b>		
Flywheel nut	1	40 ÷ 44
<b>CRANKCASE</b>		
Case fastening screw	8	12 ÷ 13
<b>REAR HUB</b>		
Hub cover screw	5	11 ÷ 13
<b>FUEL SYSTEM</b>		
Throttle body manifold screw	2	7 ÷ 8
Air compressor screw	4	3 ÷ 4

### 5.3. ENGINE

#### 5.3.1. REMOVING COOLING CASE

- Release and remove the four screws.



- Move secondary air valve and remove fan cover



- Release and remove the two screws.

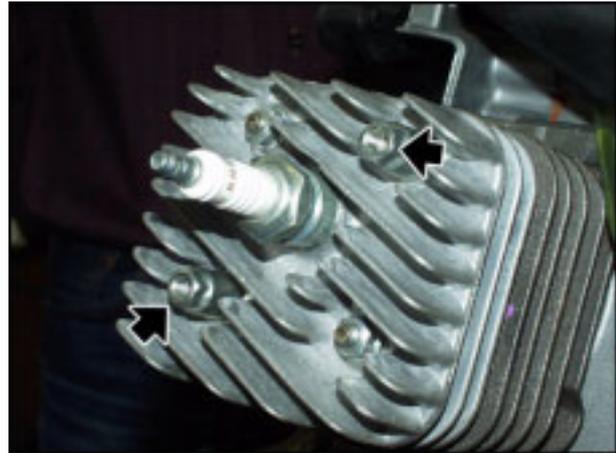


- Slide the oil hose to remove the cooling case.



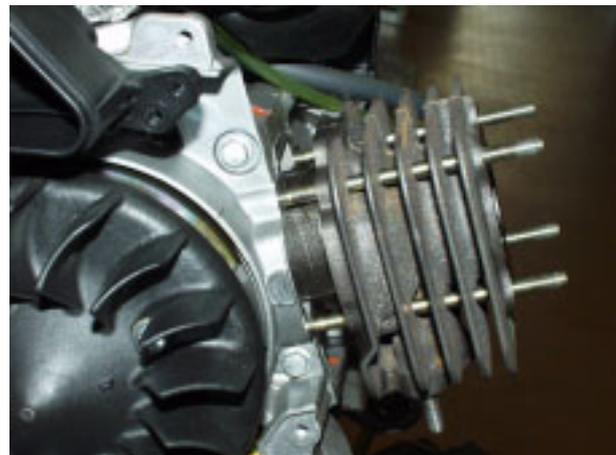
### 5.3.2. REMOVING THE HEAD

- Remove the cooling case.
- Remove the exhaust system.
- Unscrew and remove the spark plug.
- Loosen and remove the two nuts, collect the two studs.
- Remove the head.



- Remove the cylinder.

**CAUTION** When reassembling replace the seals with new ones of the same kind, lubricate the cylinder and fit it in its place.



**5.3.3. FLYWHEEL DISASSEMBLY**

- Remove the cooling case.
- Release and remove the three screws.



- Remove the cooling fan.



- Lock flywheel by means of the specific wrench and remove flywheel hexagonal securing nut.



- Fit the suitable puller and remove the flywheel by means of the wrenches.



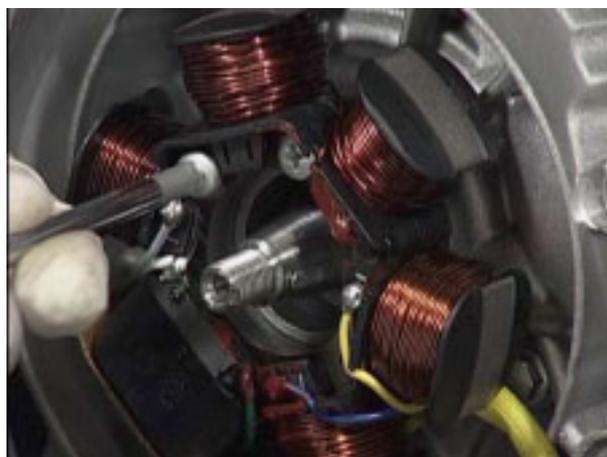
- Loosen and remove rpm-sensor screws - coolant inlet hose.



- Remove the coolant inlet duct from its housing.



- Loosen the screws and remove stator with wiring and rpm-sensor



## 5.3.4. TIGHTENING TORQUE SETTINGS

CYLINDER HEAD		
Cylinder head nuts	4	10 ÷ 11
Spark plug fastener	1	11 ÷ 14
Injection head securing screw	2	3 ÷ 4



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