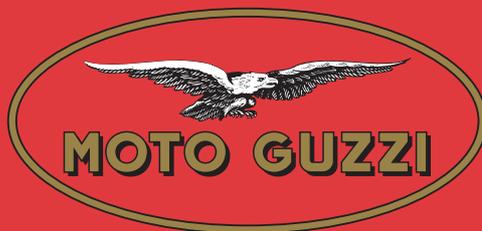


00/2004-05



V750 IE



UK



workshop manual



Cod. 32 92 02 14

INTRODUCTION

SUMMARY

0.1. INTRODUCTION 3
0.1.1. INTRODUCTION 3
0.1.2. REFERENCE MANUALS 4
0.1.3. ABBREVIATIONS/SYMBOLS/CONVENTIONS 5



0.1. INTRODUCTION

0.1.1. INTRODUCTION

- This manual provides the information required for normal servicing.
- This publication is intended for use by **Moto Guzzi** 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, **Moto Guzzi spa** continuously improves its products and their documentation. The main technical modifications and changes in repair procedures are communicated to all **Moto Guzzi** 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 **Moto Guzzi 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.

Moto Guzzi 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.

All rights of storage using electronic means, reproduction and total or partial adaptation, whatever the means adopted, are reserved in all countries.

The mention of third parties' products is only made for information purposes, and constitutes no engagement.

Moto Guzzi spa is not liable in any way for the performance or use of its products.

For more details see (REFERENCE MANUALS)

First edition: May 2004

Designed and printed by:

DECA s.r.l.

via Risorgimento, 23/1 - 48022 Lugo (RA) - Italy

Tel. +39 - 0545 35235

Fax +39 - 0545 32844

E-mail: deca@decaweb.it

www.decaweb.it

On behalf of:

Moto Guzzi s.p.a.

via E.V. Parodi, 57- 23826 Mandello del Lario (Lecco) - Italy

Tel. +39 – (0)341 - 709111

Fax +39 – (0)341 - 709220

www.motoguzzi.it

www.servicemotoguzzi.com

0.1.2. REFERENCE MANUALS

PARTS CATALOGUES

guzzi part# (description)
GU07500     

OWNER'S MANUALS

guzzi part# (description)
32.90.00.60   
32.90.00.61   
32.90.00.62  

CYCLE PARTS TECHNICAL MANUAL

guzzi part# (description)
32.92.01.60 
32.92.01.61 
32.92.01.62 
32.92.01.63 
32.92.01.64 
32.92.01.65 

ENGINE TECHNICAL MANUAL

guzzi part# (description)
32.92.02.10 
32.92.02.11 
32.92.02.12 
32.92.02.13 
32.92.02.14 
32.92.02.15 

0.1.3. ABBREVIATIONS/SYMBOLS/CONVENTIONS

#	= number
<	= less than
>	= greater than
≤	= less than or equal to
≥	= more than or equal to
~	= approximately
∞	= infinity
°C	= degrees Celsius (centigrade)
°F	= degrees Fahrenheit
±	= plus or minus
AC	= alternating current
A	= Ampere
Ah	= Ampere per hour
API	= American Petroleum Institute
HV	= high voltage
AV/DC	= Anti-Vibration Double Countershaft
bar	= pressure measurement (1 bar =100 kPa)
DC.	= Direct Current
cc	= cubic centimetres
CO	= carbon monoxide
CPU	= Central Processing Unit
DIN	= German industrial standards (Deutsche Industrie Norm)
DOHC	= Double Overhead Camshaft
ECU	= Electronic Control Unit
rpm	= revolutions per minute
HC	= unburnt hydrocarbons
ISC	= Idle Speed Control
ISO	= International Standardization Organization
Kg	= kilograms
Kgm	= kilogram metre (1 kgm =10 Nm)
km	= kilometres
kph	= kilometres per hour
kΩ	= kilo Ohm
kPa	= kiloPascal (1 kPa =0.01 bar)
KS	= clutch side (from the German "Kupplungseite")
kW	= kiloWatt
/	= litres
LAP	= racetrack lap
LED	= Light Emitting Diode
LEFT SIDE	= left side
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 metre (1 Nm =0.1 kgm)
Ω	= ohm
PICK-UP	= pick-up
BDC	= Bottom Dead Centre
TDC	= Top Dead Centre
PPC	= Pneumatic Power Clutch
RIGHT SIDE	= right side
SAE	= Society of Automotive Engineers
TEST	= diagnostic check
T.B.E.I.	= crown-head Allen screw

T.C.E.I.	= cheese-head Allen screw
T.E.	= hexagonal head
TP	= flat head screw
TSI	= Twin Spark Ignition
UPSIDE- DOWN	= inverted fork
V	= Volt
W	= Watt
Ø	= Diameter

GENERAL INFORMATION

1

SUMMARY

1.1. STRUCTURE OF THE MANUAL..... 3
1.1.1. CONVENTIONS USED IN THE MANUAL 3
1.1.2. SAFETY WARNINGS..... 4
1.2. GENERAL RULES..... 5
1.2.1. BASIC SAFETY RULES..... 5
1.3. DANGEROUS ELEMENTS 8
1.3.1. WARNINGS 8
1.4. RUNNING-IN 12
1.4.1. RUNNING-IN RECOMMENDATIONS..... 12
1.5. LOCATION OF SERIAL NUMBERS..... 13
1.5.1. LOCATION OF SERIAL NUMBERS 13



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

CARBON MONOXIDE

Should it be necessary to perform some operations with the vehicle running, make sure to work outdoors or in a well-aerated room.

Avoid starting the engine in closed or badly-ventilated rooms.

In case you are working indoors, make use of an exhaust gases scavenging system.



DANGER

Exhaust gases contain carbon monoxide, which is extremely toxic if inhaled and may cause loss of consciousness or even lead to death by asphyxia.

FUEL



DANGER

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 flames, sparks and any element that could ignite fuel or provoke explosions.

DO NOT DISPOSE OF FUEL IN THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

HIGH-TEMPERATURE COMPONENTS

The engine and the exhaust system parts become hot and continue to be hot even for some time after the engine has been stopped.

Before handling these parts, wear insulating gloves or wait for the engine and the exhaust system to cool completely down.

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.

BRAKE FLUID



WARNING

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

When carrying out the maintenance operations on the braking system, use a clean cloth to cover these parts.

Always wear safety goggles when working on the braking system.

The brake fluid is highly irritant. Avoid contact with your eyes.

If the brake fluid gets in contact with the skin or the eyes, carefully wash the parts of your body that get in contact with the fluid and consult a doctor.

KEEP AWAY FROM CHILDREN.

HYDROGEN GAS AND BATTERY ELECTROLYTE

**DANGER**

The battery electrolyte is a toxic, caustic substance containing sulphuric acid and thus able to cause severe burns in case of contact.

Always wear tight gloves and protective clothes when handling this fluid.

If the electrolyte gets in contact with the skin, carefully wash the parts of your body that get in contact with the fluid with abundant fresh water.

Always use a protection for your eyes since also a very small amount of the battery fluid can cause blindness. In the event of contact with your eyes, carefully wash them with water for fifteen minutes and then consult immediately an eye specialist.

Should you accidentally drink some fluid, drink abundant water or milk, then drink magnesia milk or vegetable oil and consult immediately a doctor. Battery releases explosive gases. Keep flames, sparks, cigarettes and any other heat source away from the battery. Make sure the room is well-aerated when servicing or recharging the battery.

KEEP AWAY FROM CHILDREN.

The battery fluid is corrosive

Do not pour it on the plastic parts.

Make sure that the electrolyte acid is suitable for the type of battery used.

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.

Read (DANGEROUS ELEMENTS).

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 **Moto Guzzi** 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.

- 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

FUEL



DANGER

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 petrol, min. O.N. 95 (N.O.R.M.) and 85 (N.O.M.M.).

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

FRONT FORK FLUID



DANGER

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.

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.

**DANGER**

Do not use the vehicle in case brakes are worn out or do not work properly! The brakes are the parts that most ensure your safety and for this reason they must always be perfectly working. Failure to comply with these recommendations will probably lead to a crash or an accident, with a consequent risk of personal injury or death.

A wet surface reduces brakes efficiency.

**DANGER**

In case of wet ground the braking distance will be doubled, since both brakes and tyres drives on the road surface are extremely reduced by the water present on the road surface.

Any water on brakes, after washing the vehicle or driving on a wet road surface or crossing puddles or gips, can wet brakes so as to greatly reduce their efficiency.

Failure to comply with these recommendations may lead to serious accidents, with a consequent risk of severe personal injuries or death.

Brakes are critical safety components. Do not ride the vehicle in case brakes are not working at their best.

Check for brakes proper operation before every trip.

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.

**DANGER**

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.

DISC BRAKES**DANGER**

The brakes are the parts that most ensure your safety and for this reason they must always be perfectly working; check them before every trip.

A dirty disc soils the pads.

Dirty pads must be replaced, while dirty discs must be cleaned with a high-quality degreaser.

Perform the maintenance operations with half the indicated frequency if the vehicle is used in rainy or dusty areas, on uneven surfaces or on racetracks.

When the disc pads wear out, the level of the fluid decreases to automatically compensate for their wear.

The front brake fluid reservoir is located on the right handlebar, near the front brake lever.

The rear brake fluid reservoir is located under the right fairing.

Do not use the vehicle if the braking system leaks fluid.

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.

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.

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 (-F°)	Coolant % of volume
-20° (-4)	35
-30° (-22)	45
-40° (-40)	55

NOTE Coolants have different specifications. The protection degree is written on the label.

**WARNING**

Use nitrate-free coolant only, with a protection until at least -35°C (-31°F).

TYRES

**WARNING**

If tyres are excessively inflated, the vehicle will be hard and uneasy to ride, thus making you feel not at your ease.

In addition the roadworthiness, mainly on wet surfaces and during cornering, will be impaired.

Flat tyres (insufficient pressure) can slip on the rim and make you lose the control of the vehicle.

In this case too, both vehicle roadworthiness, maneuverability and brake efficiency will be impaired.

Tyres changing, repair, maintenance and balancing must be carried out by specialized technicians using suitable equipment.

When new, tyres can have a thin slippery protective coating. Drive carefully for the first kilometers (miles). Never use rubber treating substances on tyres.

In particular, avoid contact with fluid fuels, leading to a rapid wear.

In case of contact with oil or fuel, do not clean but change tyres.

**DANGER**

Some of the factory-assembled tyres of this vehicle are provided with wear indicators.

There are several kinds of wear indicators.

For more information on how to check the wear, contact your Dealer.

Visually check if the tyres are worn and in this case have them changed.

If a tyre deflates while driving, stop immediately.

Avoid hard brakings or moves and do not close throttles too abruptly.

Slowly close throttle grip, move to the edge of the road and make use of the engine brake to slow down until coming to a halt.

Failure to comply with these recommendations can lead to serious accidents and consequent personal injuries or death.

Do not install tyres with air tube on rims for tubeless tyres and viceversa.

1.4. RUNNING-IN

1.4.1. RUNNING-IN RECOMMENDATIONS

The running-in of the engine is essential to ensure its duration and correct functioning.

If possible, drive on hilly roads and/or roads with many bends, so that the engine, the suspensions and the brakes undergo a more effective running-in.

During running-in, change speed.

In this way the components are first "loaded" and then "relieved" and the engine parts can thus cool down.

Even if it is important to stress the engine components during running-in, take care not to exceed.



WARNING

Only after the first 2000 km (1243 mi) of running-in you can expect the best performance levels from the vehicle.

Keep to the following indications:

- Do not open the throttle completely if the speed is low, both during and after the running-in.
- During the first 100 km (62 mi) pull the brakes with caution, avoiding sharp and prolonged brakings. This ensures a correct bedding-in of the pads on the brake disc.
- During the first 1000 km (621 mi) never exceed 5000 rpm (see table).



WARNING

After the first 1000 km (621 mi), Dealer carry out the checks indicated in the column "After running-in", see (REGULAR SERVICE INTERVALS CHART), in order to avoid hurting yourself or other people and/or damaging the vehicle.

- Between the first 1000 km (621 mi) and 2000 km (1243 mi) drive more briskly, change speed and use the maximum acceleration only for a few seconds, in order to ensure better coupling of the components; never exceed 6000 rpm (see table).
- After the first 2000 km (1243 mi) you can expect better performance from the engine, however, without exceeding the maximum allowed [7600 rpm].

Engine maximum rpm recommended	
Mileage km (mi)	rpm
0÷1000 (621)	5000
1000÷2000 (621÷1243)	6000
over 2000 (1243)	7600

1.5. LOCATION OF SERIAL NUMBERS

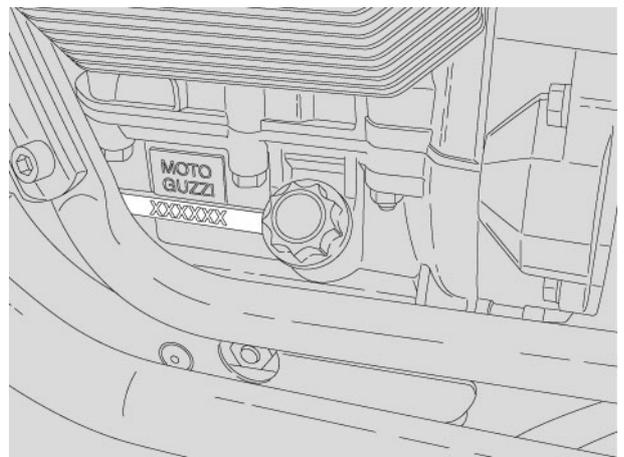
1.5.1. LOCATION OF SERIAL NUMBERS

These numbers are necessary for vehicle registration.

IMPORTANT: *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.*

ENGINE NUMBER

The engine number is punched on the right hand side of the engine next to the oil level plug.



PERIODIC MAINTENANCE

2

SUMMARY

2.1.	GENERAL TECHNICAL INFORMATION	3
2.1.1.	TECHNICAL DATA	3
2.1.2.	TABLE OF LUBRICANTS	4
2.1.3.	TIGHTENING TORQUES	5
2.1.4.	SPECIAL TOOLS	6

2.1. GENERAL TECHNICAL INFORMATION

2.1.1. TECHNICAL DATA

ENGINE – TRANSMISSION

ENGINE	
Type	two-cylinder 4-stroke
Number of cylinders	two
Cylinder layout:	90° V
Pistons	forged, two compression rings, one oil control ring
Bore	80 mm (3.15 in)
Stroke	74 mm (2.91 in)
Total displacement	744 cm ³ (45.4 cuin)
Cooling	air
Air cleaner	dry cartridge type
Compression ratio	9.6:1
Maximum horsepower (CE correction)	35.5 kW at 6800 rpm
Maximum torque (CE correction)	54.7 Nm at 3600 rpm
Engine idling speed	1100 ± 100 rpm
TIMING	
Timing diagram:	2 valves with push-rods and rockers
intake valve opens	18° B.T.D.C.
intake valve closes	50° A.B.D.C
exhaust valve opens	53° B.T.D.C.
exhaust valve closes	15° A.B.D.C
Values valid with clearance between rockers and valve of	0,15 mm (0.0059 in) opens 0,20 mm (0.00787 in) closes
FUEL SUPPLY	
Type	Electronic injection (Weber – Marelli)
Choke	Ø 36 mm (1.417 in)
Fuel	Premium grade unleaded petrol, min. O.N. 95 (N.O.R.M.) and 85 (N.O.M.M.).
STARTING	
	electric
EXHAUST	
	Three-way manifold with catalyser
DRIVE	
- clutch	dry single disc with cush drive
- primary drive	gear-type, ratio: 16/21 = 1:1.3125
- transmission	5 gears
- gear ratios:	
1st	11/26 = 1:2.3636
2nd	14/23 = 1:1.6429
3rd	18/23 = 1:1.2778
4th	18/19 = 1:1.0556
5th	20/18 = 1:0.9
- final drive	cardan shaft type
- ratio	8/33 = 1:4.825
Lubrication	Pressure system, valve adjustment, lobe pump
SPARK PLUGS	
Standard	NGK BR8ES
Gap	0,6 – 0,7 mm (0.024 – 0.028 in)
Resistance	5 KΩ
CAPACITIES	
Engine oil	Oil and filter change 1.78 litres (0.47 gal)
Transmission oil	170 cm ³ (10.37 in ³)
Gearbox oil	1000 cm ³ (61 in ³)

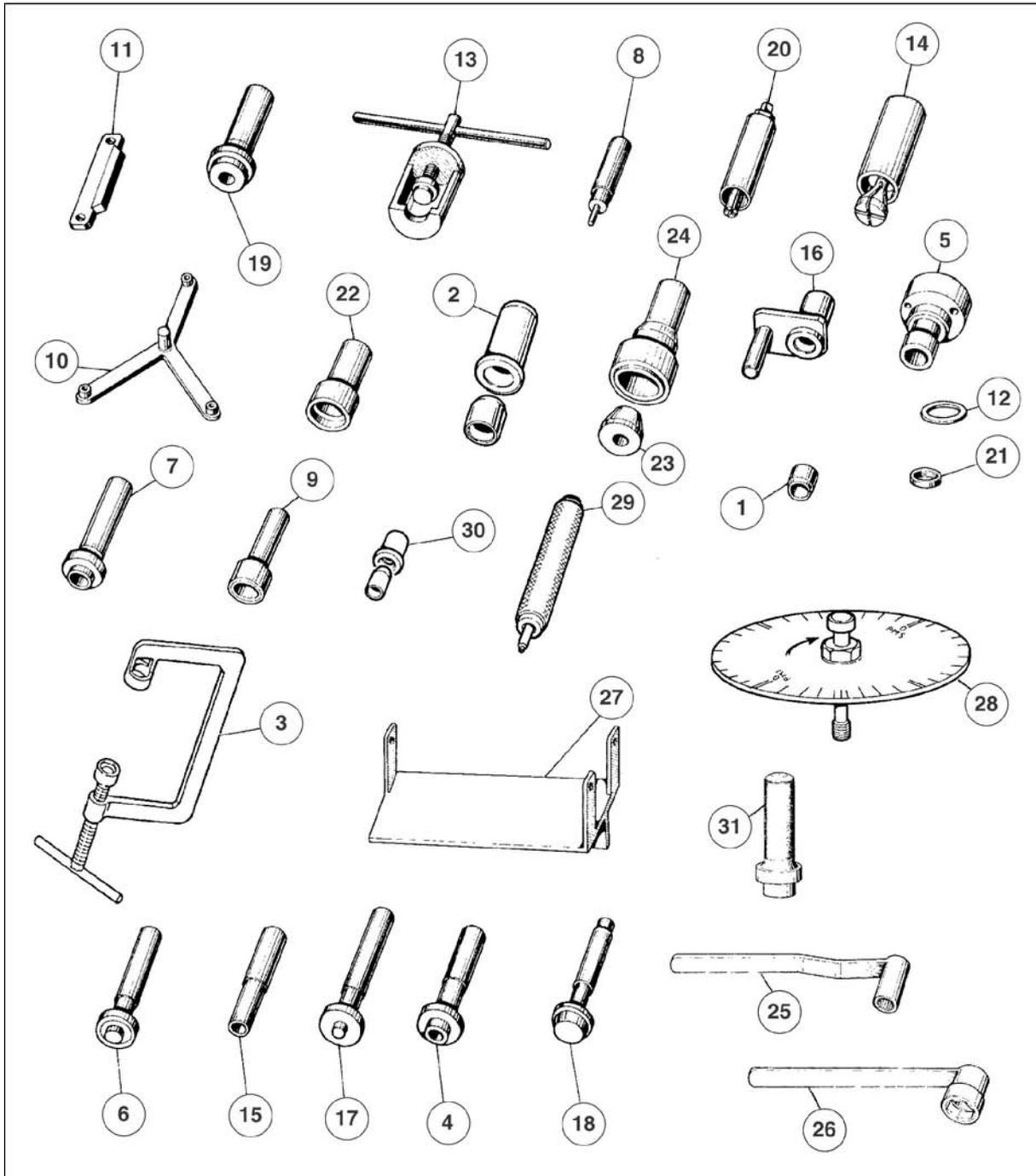
2.1.2. TABLE OF LUBRICANTS

LUBRICANT	PRODUCT
Engine oil	RECOMMENDED:  Agip RACING 4T Alternatively, use brand name oil complying with or exceeding CCMC G-4 A.P.I. S.G. specifications.
Transmission oil	RECOMMENDED:  Agip TRUCK GEAR 85 W 140
Gearbox oil	RECOMMENDED:  Agip ROTRA MP/S 80 W 90
Bearings and other lubrication points	RECOMMENDED:  BIMOL GREASE 481,  AUTOGREASE MP or  Agip GREASE SM2. 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 oxidation.

2.1.3. TIGHTENING TORQUES

DESIGNATION	TIGHTENING TORQUES (Nm)
CYLINDER HEADS	
Cylinder head covers fixing screws	10
Spark plugs	25
CRANKCASE AND COVERS	
Cylinder heads-barrels to crankcase fixing nut (M10)	40÷42
Cylinder heads-barrels to crankcase fixing nut (M8)	28÷30
Crankcases joining nuts (M8)	22÷25
Crankcases joining nuts (M10)	40÷42
Timing cover fixing screws	10
Sump fixing screws	10
Valves cover insert fixing screw	5
CONNECTING ROD GROUP	
Rods fixing screws	30÷32
Flywheel to crankshaft fixing screws	40
Ring gear fixing screws	10
TIMING	
Camshaft to crankcase fixing connection	30
Timing gear to camshaft fixing screws	25
Phonic wheel fixing screw	25
ELECTRIC STARTING	
Starter motor fixing screws	25
FUEL SUPPLY	
Injector cap fixing screws (M5)	4
Intake manifolds to heads fixing screws	10
LUBRICATION	
Oil pressure sensor	8÷10
Oil pump to crankcase fixing screws	10
Filter cartridge sealing cover fixing screws	25
IGNITION	
Alternator stator fixing screws	5
Alternator rotor fixing nut	80
CLUTCH	
Clutch shaft fixing nut	100
GEARBOX	
Primary shaft fixing nuts	65
Cover to gearbox fixing screws	10
Gearbox to clutch housing cover fixing screws	10
Index lever fixing screw nut.	6

2.1.4. SPECIAL TOOLS



Key:

Position	Tool designation and application	Part number
1	Bush for fitting oil seal on secondary shaft	19 92 73 00
2	Tool for fitting oil seal on timing cover (crankshaft)	19 92 72 20
3	Valves disassembly / assembly tool	10 90 72 00
4	Punch for bevel gear pair pinion oil seal	19 92 61 00
5	Bevel gear pair alignment preassembly tool	19 92 88 00
6	Punch for clutch shaft bearing on case	19 92 94 00
7	Punch for transmission case oil seal	19 92 60 00
8	Punch for clutch shaft oil seal	19 90 59 00
9	Punch for assembling oil seal on gearbox cover for secondary shaft	19 92 72 00
10	Clutch disk assembly and centring tool	19 90 65 00
11	Flywheel holder tool	19 91 18 00
12	Spacer for installation of ring on secondary shaft	19 92 72 02
13	Puller for internal ring on hollow shaft	19 90 70 00
14	Puller for transmission case bearing external ring	19 92 75 00
15	Punch for bearing on bevel gear pair pinion	19 92 62 00
16	Intermediate gear holding tool for removal of gearbox	19 92 77 00
17	Punch for primary shaft bearing on gearbox	19 92 63 00
18	Punch for taper bearing outer race on bevel gear pair pinion holder body	19 92 64 00
19	Punch for transmission case bearing outer race	19 92 65 00
20	Puller for swing arm holder bearing on gearbox cover	19 92 76 00
21	Reducer bush for valve disassembly tool (this tool is marked with No. 10 90 72 00)	19 92 78 00
22	Punch for driving bearing inner race onto hollow shaft	19 92 79 00
23	Tool for assembling oil seal on crankshaft - flywheel side	12 91 20 00
24	Punch for driving oil seal onto flange and crankshaft – flywheel side	19 92 71 00
25	Clutch shaft holding tool	19 90 71 60
26	Clutch shaft nut holding wrench	19 90 54 60
27	Gearbox support	19 90 25 00
28	Graduated disk	19 92 96 00
29	Punch for mounting cap on valve guide	19 92 60 20
30	Tool for assembling oil seal to timing cover (camshaft)	19 92 73 20
31	Secondary shaft bearing outer race inserter tool	19 92 64 60

GEARBOX

3

SUMMARY

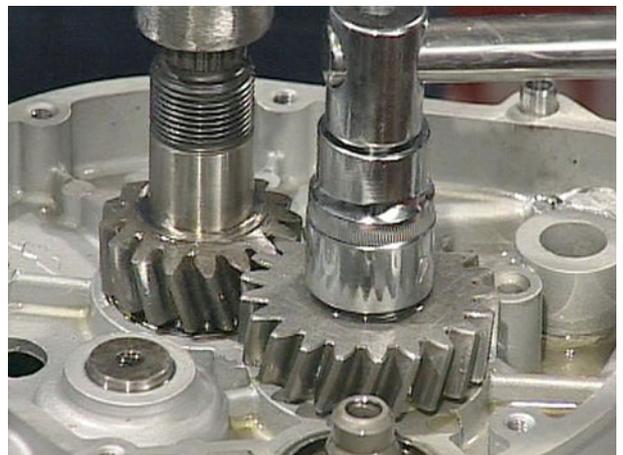
3.1. GEARBOX HOUSING 3
3.1.1. DISASSEMBLY 3
3.1.2. REASSEMBLY 7
3.1.3. TIGHTENING TORQUES 11
3.2. CLUTCH HOUSING..... 12
3.2.1. DISASSEMBLY 12
3.2.2. REASSEMBLY 15
3.2.3. TIGHTENING TORQUES 19
3.3. GEARBOX 20
3.3.1. GEAR..... 20



3.1. GEARBOX HOUSING

3.1.1. DISASSEMBLY

- Mount clutch shaft on housing so that the gear engages the main shaft gear.
- Insert the prescribed holding tool in the clutch shaft grooves
- Remove the intermediate gear blocking nut and take out the washer.

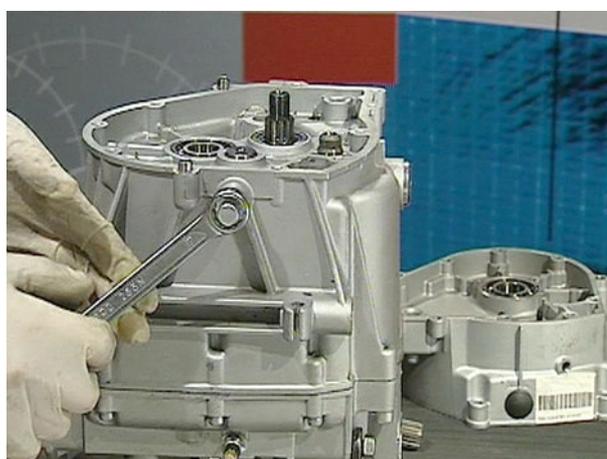




- Remove gear and clutch shaft.



- Unscrew breather plug with its pawl.



V750 IE

- Unscrew and remove idle gear indicator.

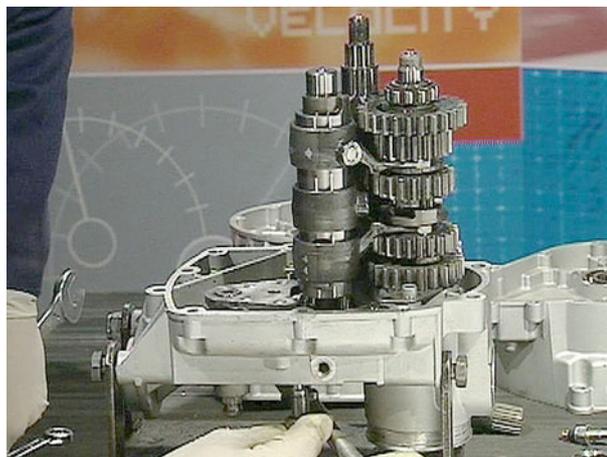


- Unscrew gearbox cover bolts and remove it with the help of a mallet.



- Loosen counternut and remove the eccentric screw to position preselector.





- Slide preselector out and remove preselector blocking ring.



- After loosening securing screws of blocking plates carry on with unit removal complete with gear, shafts and forks.

3.1.2. REASSEMBLY

Preselector reassembly

- After remounting the unit complete with shafts on gearbox cover, insert the spring and insert the two tangs on the preselector peg making sure the distance between the two tangs is equal both on the peg and at tangs ends.



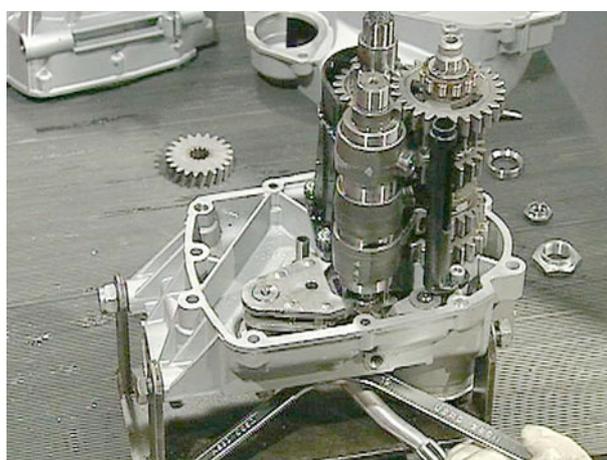
- Remount eccentric screw and counternut on cover taking care that the eccentric part of the screw is oriented towards the preselector nut.



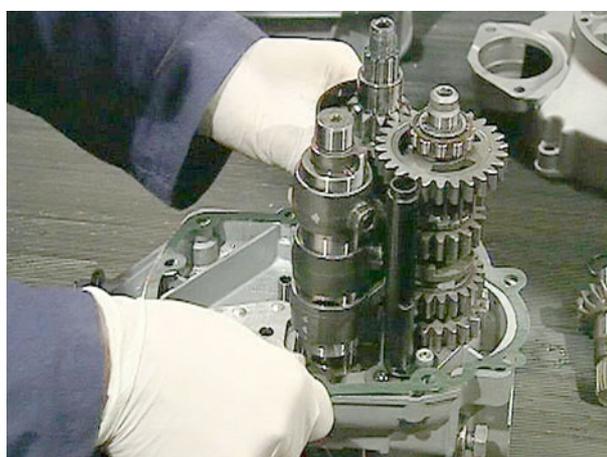
- Reassemble preselector spacer.



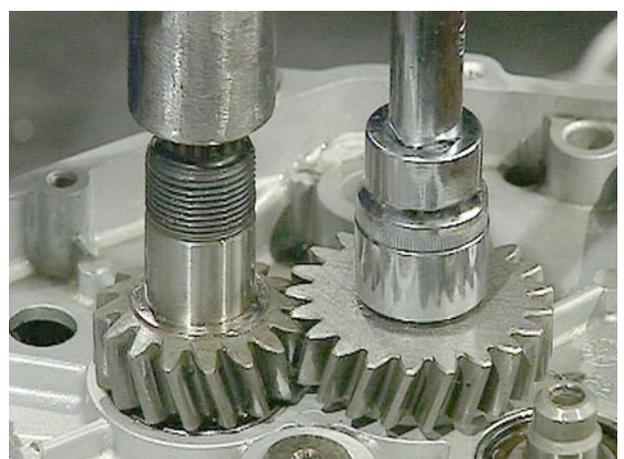
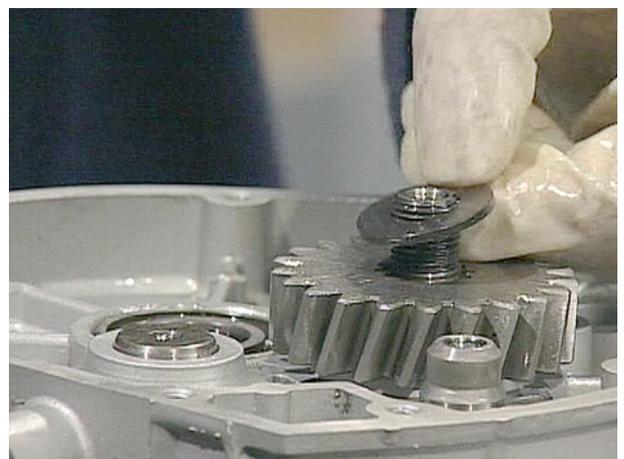
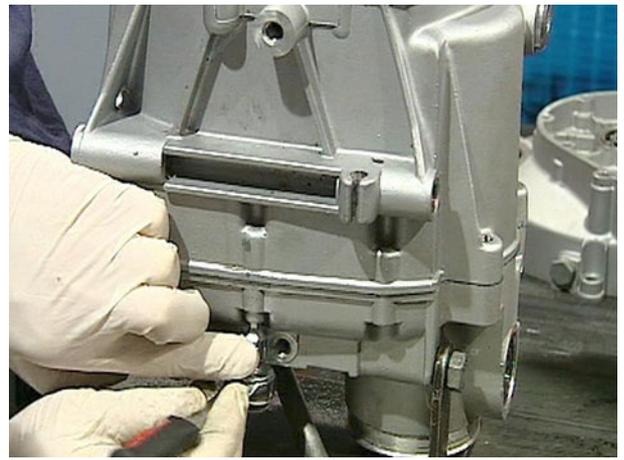
- Place preselector on the cover making sure that the two spring tangs are inserted in the hollow of the adjustment screw, then rotate the screw by 90° and tighten counternut.



- Remount gasket, tighten securing screws of gearbox housing cover to prescribed torque.



- Insert gear with relative washer on main shaft of gear and tighten securing nut to prescribed torque and stake with punch.





3.1.3. TIGHTENING TORQUES

GEARBOX	
Primary shaft fixing nuts	65 Nm
Cover to gearbox fixing screws	10 Nm
Gearbox to clutch housing cover fixing screws	10 Nm
Index lever fixing screw nut.	6 Nm

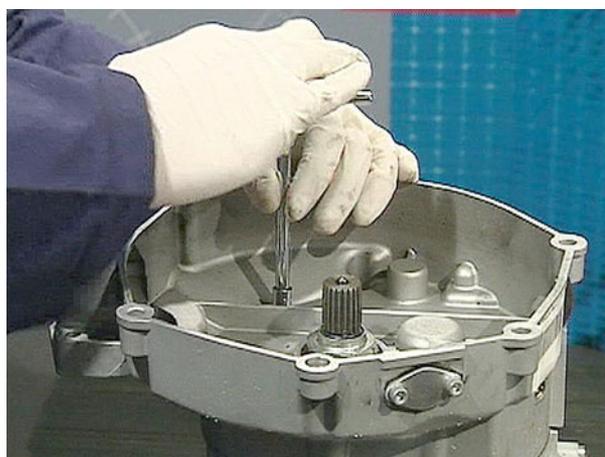
3.2. CLUTCH HOUSING

3.2.1. DISASSEMBLY

- Once the gearbox/clutch housing has been fixed to the vice-held support, use the nut holding tool to loosen the nut by turning the shaft with the appropriate tool.



- Remove the Allen screws locking the clutch housing to gearbox.

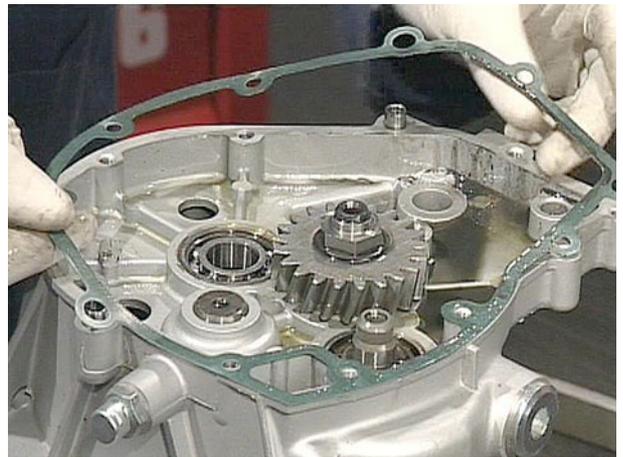


V750 IE

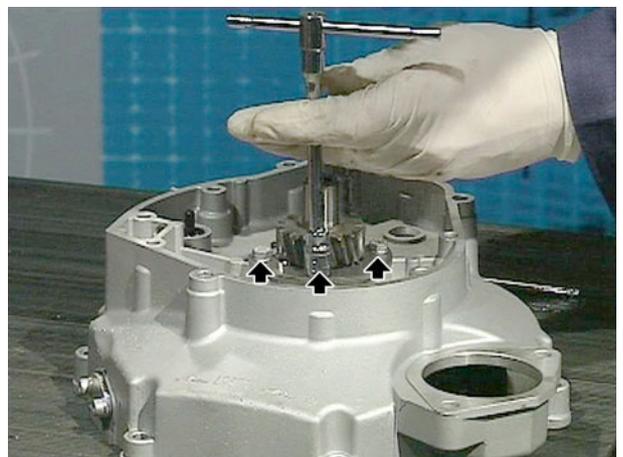
- Disconnect and remove housing, complete with clutch shaft, by lightly hitting housing sides..



- Remove gasket.

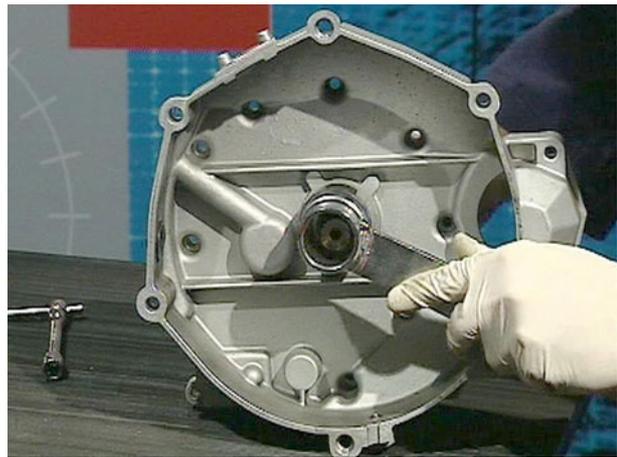


- Remove the three screws with washers and take off bearing blocking plate.

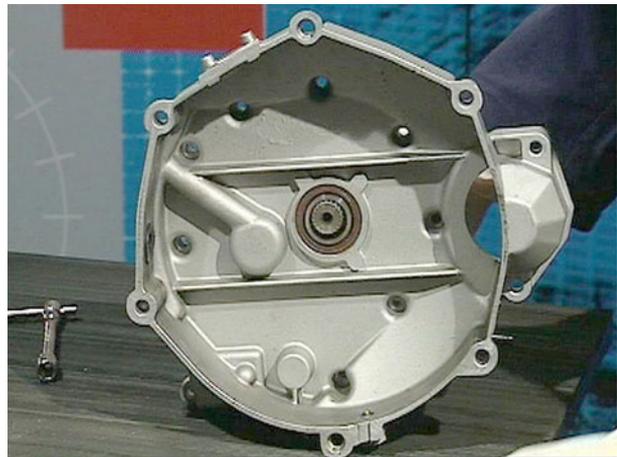




- Unscrew clutch shaft securing nut.

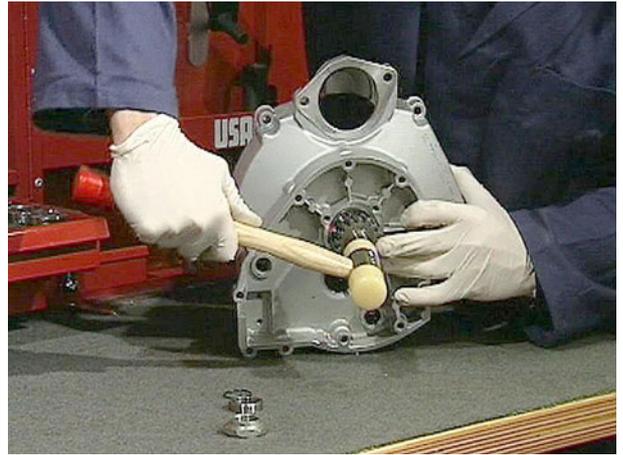


- Take out clutch shaft, remove clutch and blocking ring.

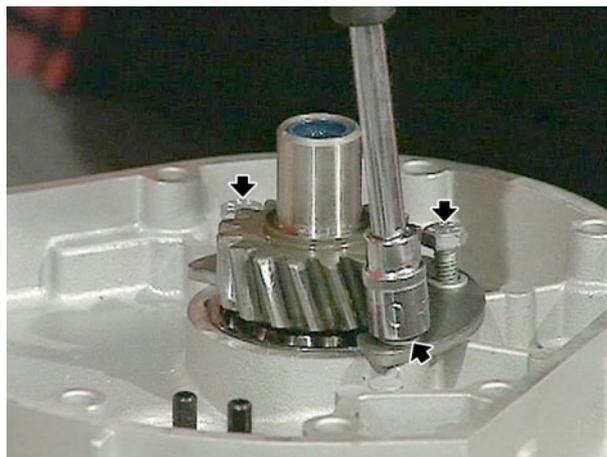


3.2.2. REASSEMBLY

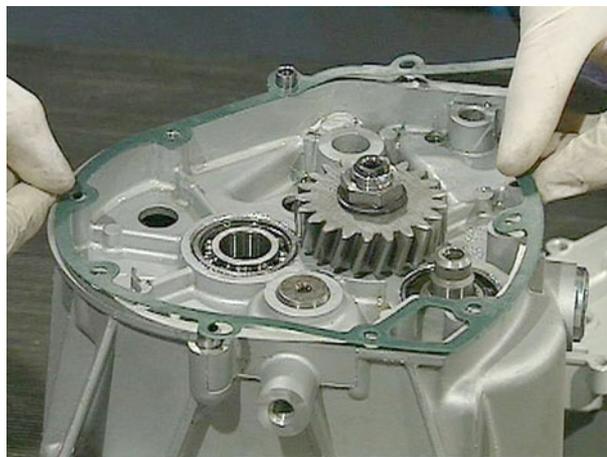
- Insert clutch shaft with the help of a plastic mallet, remount sieger and then blocking ring.



- Position blocking plate and tighten screws with washer after covering them with thread locking paste.



- Position clutch housing gasket and place clutch housing in its seat.



V750 IE

- Tighten Allen screws, external screws and tighten to prescribed torque.



- Tighten clutch shaft nut using the appropriate tool and stake.



- Insert breather plug.



- Screw in gear in idle indicator.



- Insert clutch push rod in shaft with the greater diameter towards the control lever.

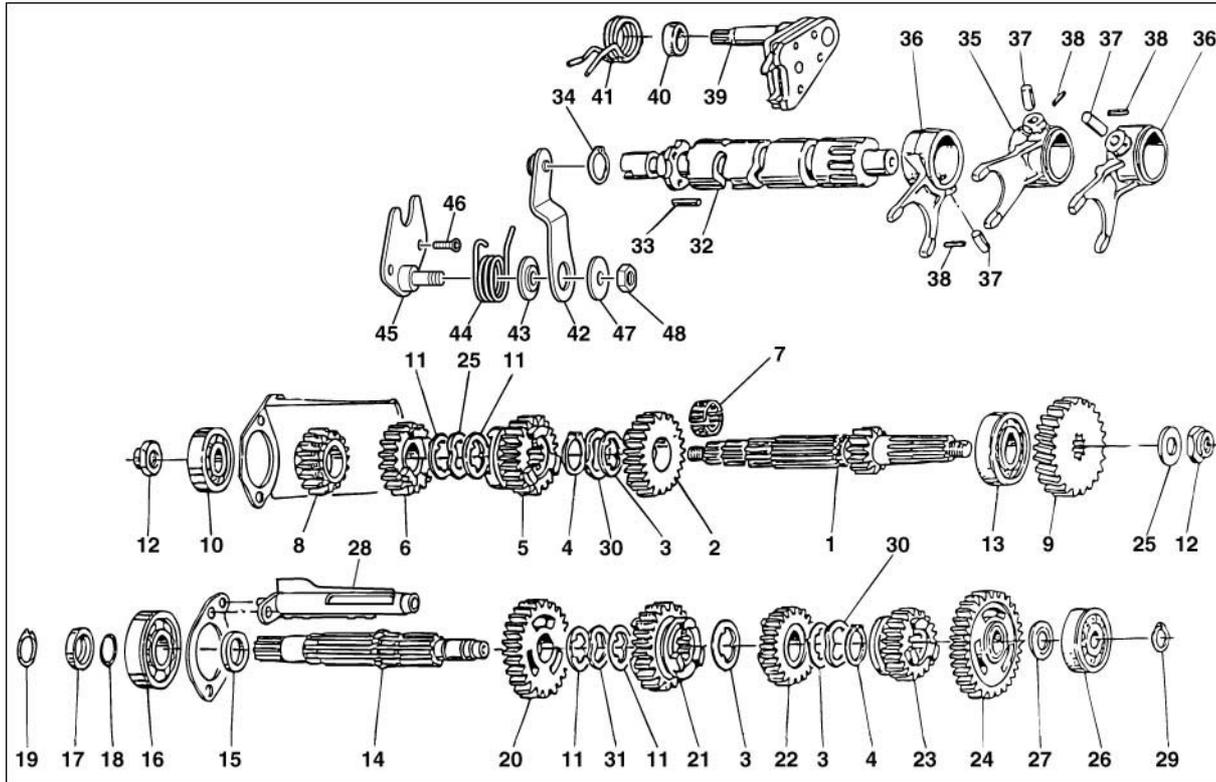


3.2.3. TIGHTENING TORQUES

CLUTCH	
Clutch shaft fixing nut	100 Nm

3.3. GEARBOX

3.3.1. GEAR



- | | |
|-----------------------|---------------------------|
| 1. Primary gear shaft | 25. Clearance washer |
| 2. Gear | 26. Bearing |
| 3. Thrust washer | 27. Spacer |
| 4. Circlip | 28. Gutter |
| 5. Gear | 29. Circlip |
| 6. Gear | 30. Washer |
| 7. Roller cage | 31. Washer |
| 8. Gear | 32. Shift cam |
| 9. Idle gear | 33. Pin |
| 10. Bearing | 34. Snap ring |
| 11. Clearance washer | 35. Fork |
| 12. Nut | 36. Fork |
| 13. Bearing | 37. Roller |
| 14. Driven shaft | 38. Pin |
| 15. Spacer | 39. Preselection complete |
| 16. Bearing | 40. Spacer |
| 17. Spacer | 41. Spring |
| 18. Gasket ring | 42. Lever |
| 19. Circlip | 43. Washer |
| 20. Gear | 44. Spring |
| 21. Gear | 45. Plate |
| 22. Gear | 46. Screw |
| 23. Gear | 47. Washer |
| 24. Gear | 48. Nut |

ENGINE

4

SUMMARY

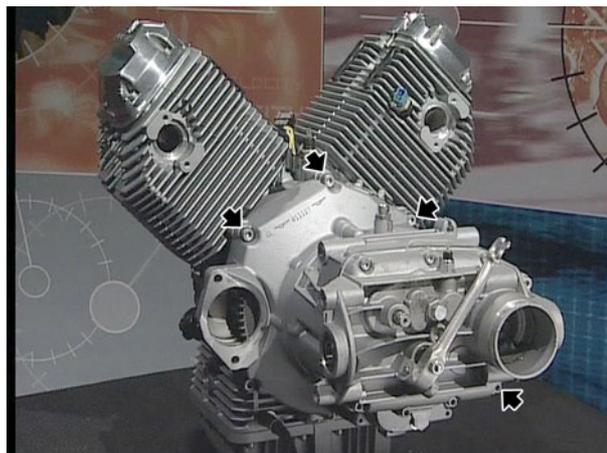
4.1.	GEARBOX AND STARTER MOTOR REMOVAL	4
4.1.1.	GEARBOX REMOVAL FROM ENGINE	4
4.1.2.	STARTER MOTOR REMOVAL	5
4.1.3.	OIL SUCTION PIPE DETACHMENT FROM BLOCK	6
4.1.4.	TIGHTENING TORQUES	7
4.2.	CYLINDER HEAD COVERS	8
4.2.1.	CYLINDER HEAD COVERS REMOVAL	8
4.2.2.	CHECK	9
4.2.3.	REASSEMBLY	10
4.2.4.	TIGHTENING TORQUES	11
4.3.	TIMING	12
4.3.1.	ENGINE FRONT COVER DISASSEMBLY	12
4.3.2.	ALTERNATOR DISASSEMBLY	13
4.3.3.	REV AND STROKE SENSOR REMOVAL	15
4.3.4.	TIMING COVER REMOVAL	16
4.3.5.	TIMING CHECK	18
4.3.6.	TIMING REASSEMBLY	21
4.3.7.	TIMING CHECK	24
4.3.8.	SOUND WHEEL ASSEMBLY	26
4.3.9.	AIR GAP MEASUREMENT AND SENSOR REASSEMBLY	27
4.3.10.	ALTERNATOR REASSEMBLY	29
4.3.11.	TIMING DATA	31
4.3.12.	TIGHTENING TORQUES	32
4.4.	CLUTCH	33
4.4.1.	DISASSEMBLY OF CLUTCH PLATE AND DISK	33
4.4.2.	CHECK	35
4.4.3.	CLUTCH PLATE AND DISK ASSEMBLY	36
4.4.4.	TIGHTENING TORQUES	38
4.5.	ENGINE THRUST PLATE FLYWHEEL	39
4.5.1.	FLYWHEEL DISASSEMBLY	39
4.5.2.	CHECK	41
4.5.3.	FLYWHEEL THRUST PLATE REASSEMBLY	42
4.5.4.	TIGHTENING TORQUES	44
4.6.	ENGINE HEAD	45
4.6.1.	ENGINE HEAD DISASSEMBLY	45
4.6.2.	DISASSEMBLY OF HEAD VALVES	47
4.6.3.	VALVE GUIDE FROM HEADS DISASSEMBLY	49
4.6.4.	VALVE SEAT REASSEMBLY AND CHECK	50
4.6.5.	VALVE SEAT RECTIFICATION	52
4.6.6.	SPRING PACK INSPECTION	55
4.6.7.	ENGINE HEAD REASSEMBLY	57
4.6.8.	TIGHTENING TORQUES	59
4.7.	CYLINDERS	60
4.7.1.	CYLINDERS DISASSEMBLY	60
4.7.2.	CHECK	61
4.7.3.	CYLINDER ASSEMBLY	62
4.7.4.	TIGHTENING TORQUES	64
4.8.	PISTONS	65
4.8.1.	PISTONS DISASSEMBLY	65
4.8.2.	CHECK	66
4.8.3.	PISTON REASSEMBLY	68
4.9.	COMPRESSION RINGS AND SCRAPER RING	70
4.9.1.	DISASSEMBLY	70
4.9.2.	COMPRESSION RING CHECK	71
4.9.3.	COMPRESSION RING AND SCRAPER RING REASSEMBLY	72
4.10.	ENGINE BLOCK	73
4.10.1.	ENGINE BLOCK DISASSEMBLY	73
4.10.2.	CHECK	76
4.10.3.	ENGINE BLOCK REASSEMBLY	77
4.10.4.	TIGHTENING TORQUES	81
4.11.	CON RODS	82
4.11.1.	CON RODS DISASSEMBLY	82
4.11.2.	CON ROD CLEARANCE CHECK	83
4.11.3.	CON ROD REASSEMBLY	84
4.11.4.	TIGHTENING TORQUES	85
4.12.	DRIVING SHAFT	86
4.12.1.	DRIVING SHAFT DISASSEMBLY	86
4.12.2.	DRIVING SHAFT CHECK	88
4.12.3.	TIGHTENING TORQUES	90

4.13.	OIL SUMP	91
4.13.1.	OIL SUMP DISASSEMBLY	91
4.13.2.	OIL SUMP CHECK	94
4.13.3.	REASSEMBLY	95
4.13.4.	OIL PUMP DISASSEMBLY	97
4.13.5.	OIL PUMP INSPECTION	99
4.13.6.	OIL PUMP REASSEMBLY	101
4.13.7.	OIL PRESSURE ADJUSTMENT VALVE DISASSEMBLY	102
4.13.8.	OIL PRESSURE ADJUSTMENT VALVE ASSEMBLY	103
4.13.9.	OIL TRANSMITTER REASSEMBLY	104
4.13.10.	TIGHTENING TORQUES	105

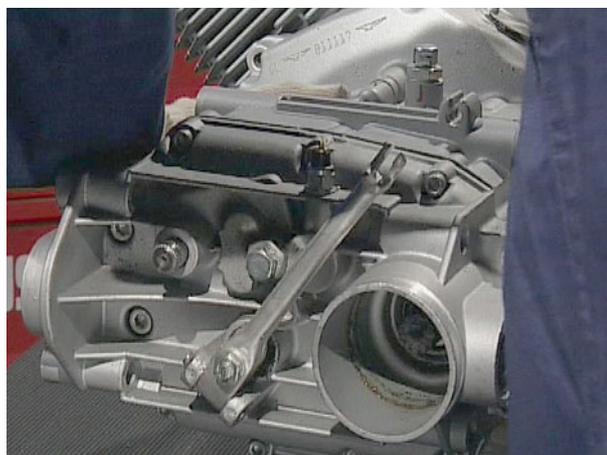
4.1. GEARBOX AND STARTER MOTOR REMOVAL

4.1.1. GEARBOX REMOVAL FROM ENGINE

- Remove gearbox securing screws from engine.



- Remove gearbox.



4.1.2. STARTER MOTOR REMOVAL

- Remove starter motor securing screws.

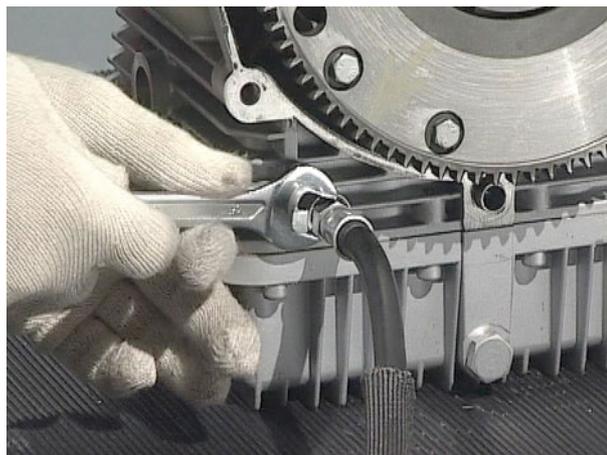


- Remove starter motor.



4.1.3. OIL SUCTION PIPE DETACHMENT FROM BLOCK

- Remove oil fume suction pipe from block.



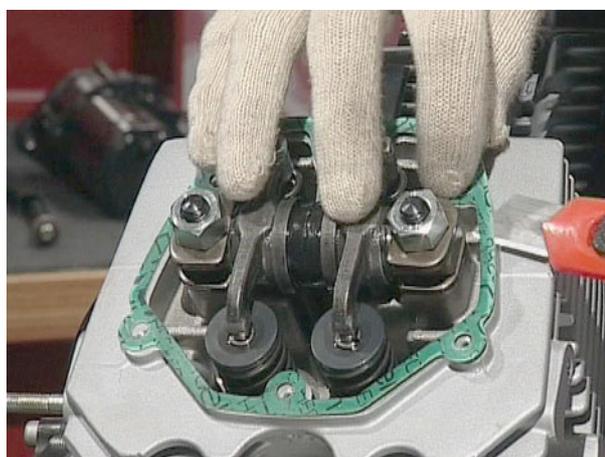
4.1.4. TIGHTENING TORQUES

ELECTRIC STARTING	
Starter motor fixing screws	25 Nm

4.2. CYLINDER HEAD COVERS

4.2.1. CYLINDER HEAD COVERS REMOVAL

- Remove screws and take off head covers and head gaskets.



4.2.2. CHECK

- Check for damage to contact surfaces to heads and for blowholes.



4.2.3. REASSEMBLY

- Change cover gaskets, reassemble covers on heads.



- Lock screws crosswise with dynamometric spanner to the prescribed torque value.



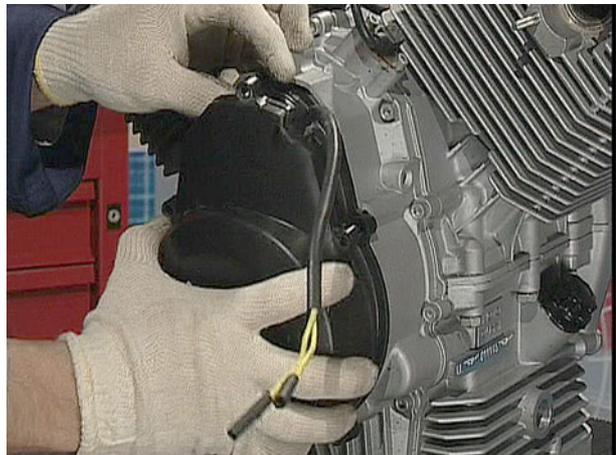
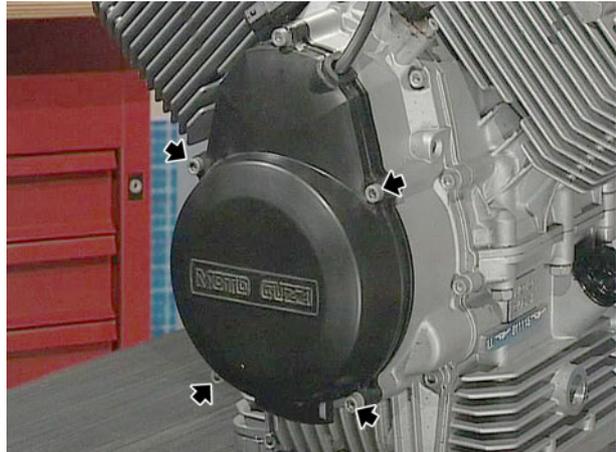
4.2.4. TIGHTENING TORQUES

CYLINDER HEADS	
Cylinder head covers fixing screws	10 Nm
Spark plugs	25 Nm

4.3. TIMING

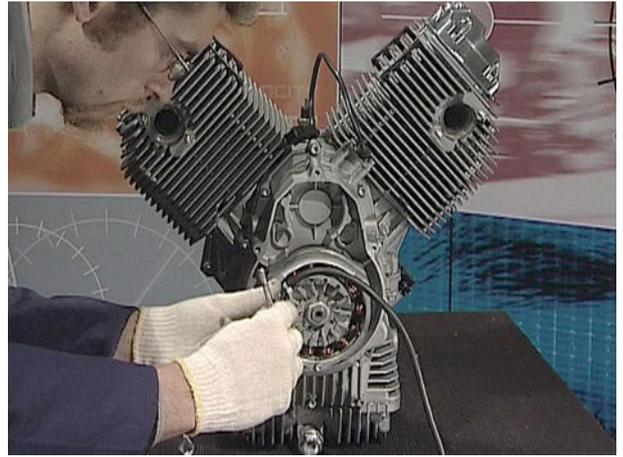
4.3.1. ENGINE FRONT COVER DISASSEMBLY

- Remove securing screws and take protective covers off alternator unit.

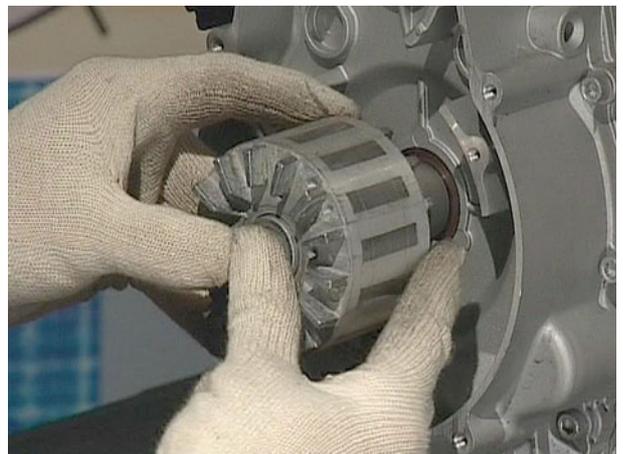
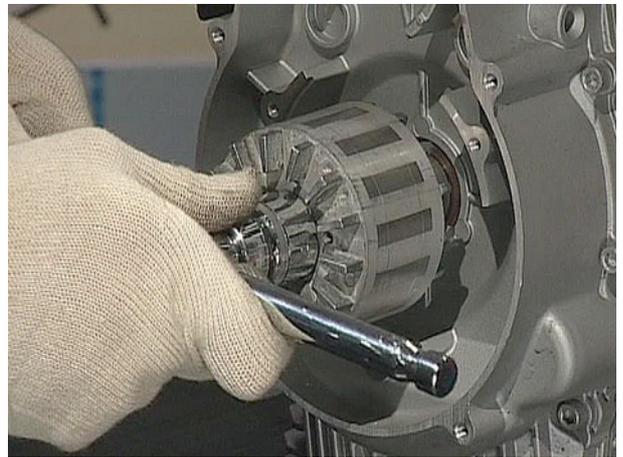


4.3.2. ALTERNATOR DISASSEMBLY

- Remove screws securing stator to timing cover and slide stator out.



- Unscrew the rotor to crankshaft fixing nut, withdraw the rotor and remove the key.





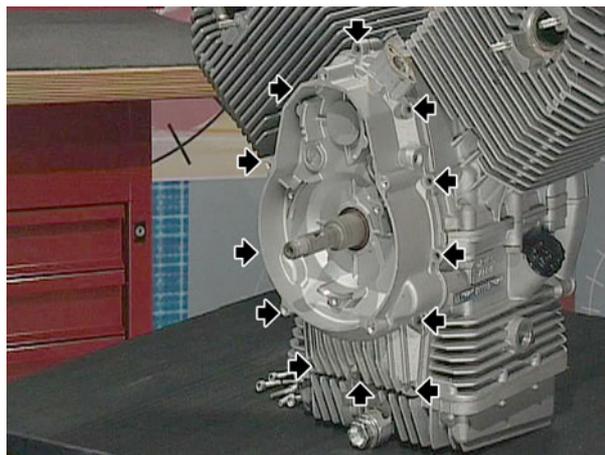
4.3.3. REV AND STROKE SENSOR REMOVAL

- Remove the two securing screws and slip stroke sensor out.



4.3.4. TIMING COVER REMOVAL

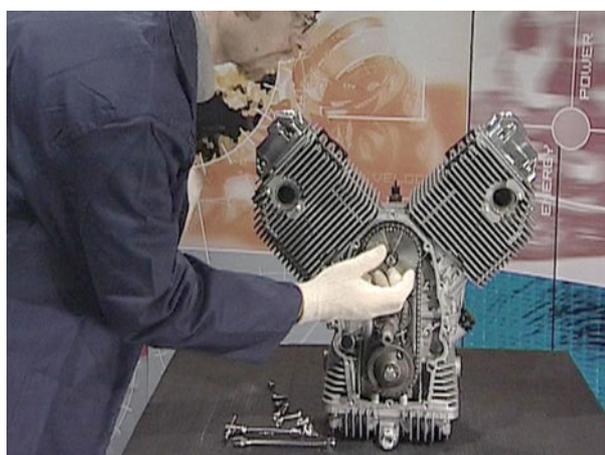
- Remove securing screws and take off timing cover with its gasket.

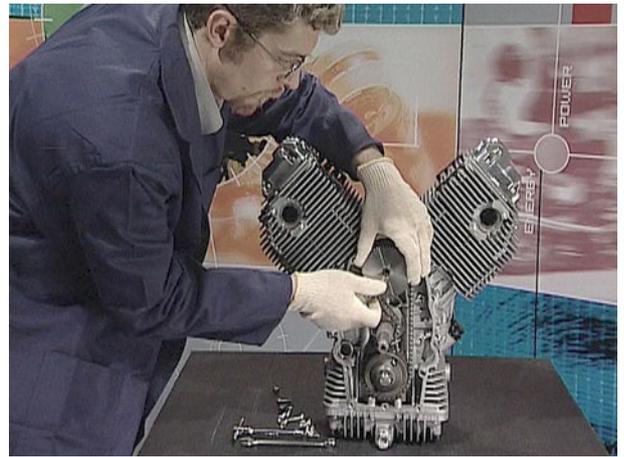


- Remove chain stretcher.

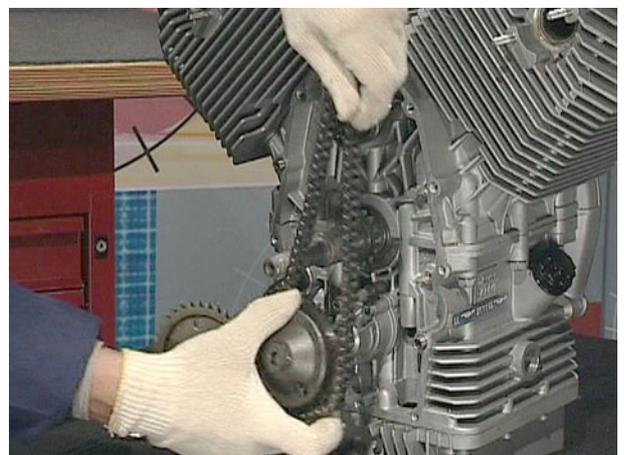
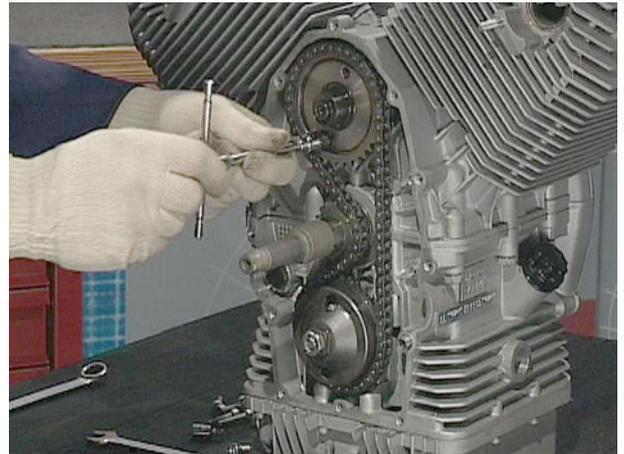


- Remove securing screw of sound wheel and take it out.





- Remove the two screws, timing gear to shaft, chain and oil pump gear.



4.3.5. TIMING CHECK**ROCKER ARM DISASSEMBLY**

- Remove piston rings and slip the two rocker arms and the oil delivery union out.



V750 IE

- Check that pin surface in contact with rocker arms is not overworn.
- Check contact surfaces of both valve rocker arm and rocker arm rod.

**ROCKER ARM REASSEMBLY**

- Check that longitudinal milling is set towards oil delivery duct.

IMPORTANT Pay special attention to the correct orientation of the washers at the time of reassembly.

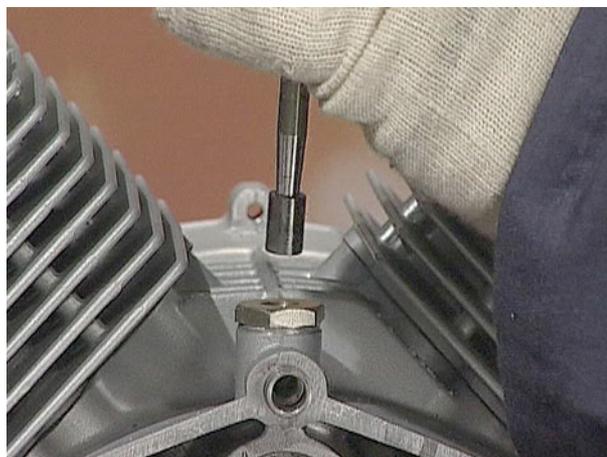


- Insert oil delivery union and rocker arms on the axes locking them in place with the piston rings.



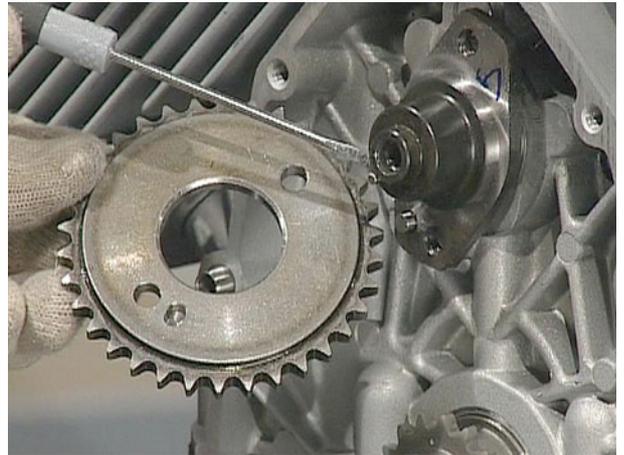
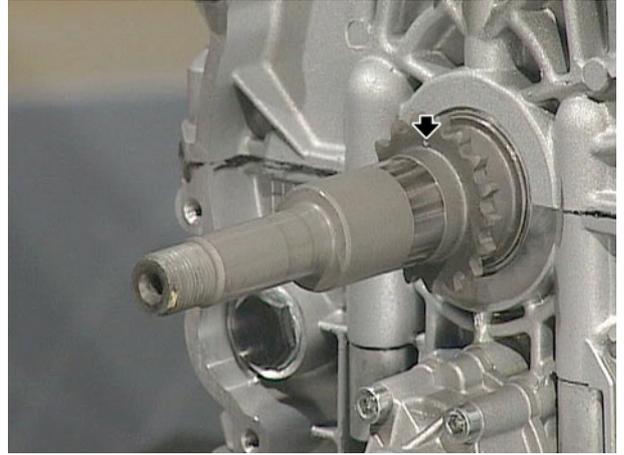


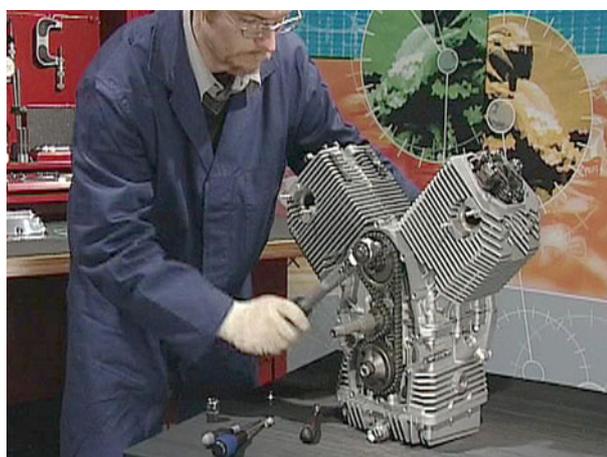
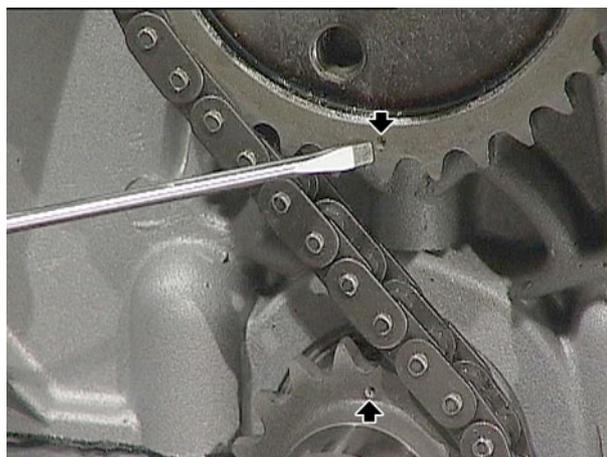
- Check that rocker arm push rods are straight, and that end contact surfaces do not show signs of seizing. If so, replace them.
- An easy way to check if the pressed ends on the rods (pads) have become slack is to drop them from a short distance onto a flat surface; on impact rods should produce a high-pitched metallic sound: this indicates that the pad has no slack.



4.3.6. TIMING REASSEMBLY

- Put left cylinder at top dead centre by checking that reference on driving shaft gear is at top of its perpendicular axis.
- Position timing shaft with gear reference pin pointing downwards.
- Insert oil pump shaft locking spline.
- Insert the two gears with the timing belt; once assembled check position of indicator notches and tighten screws with dynamometric spanner to prescribed torque.

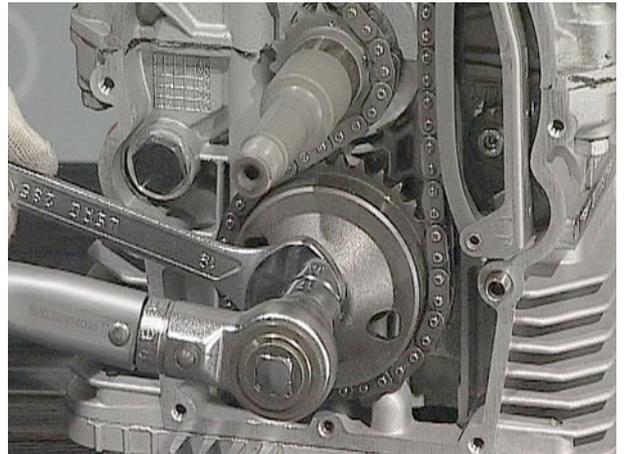
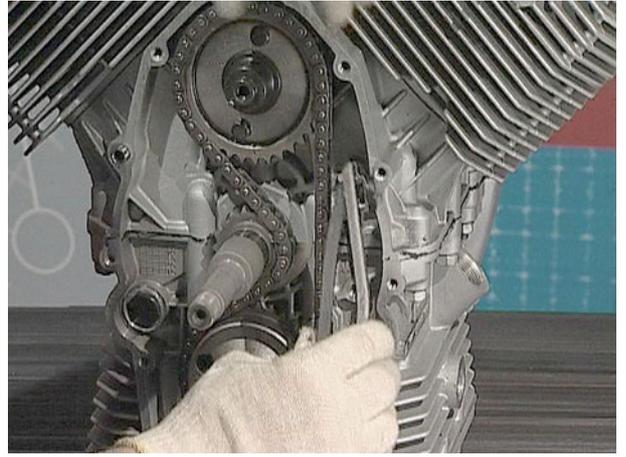




- Tighten oil pump nut with oil pump shaft held still.

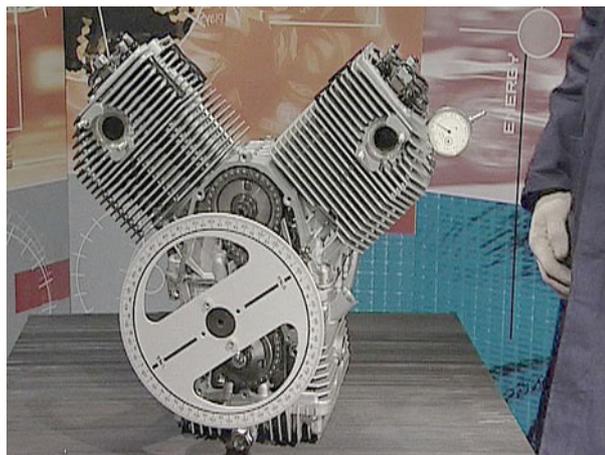


- Insert belt stretcher and tighten with dynamometric spanner to prescribed torque.

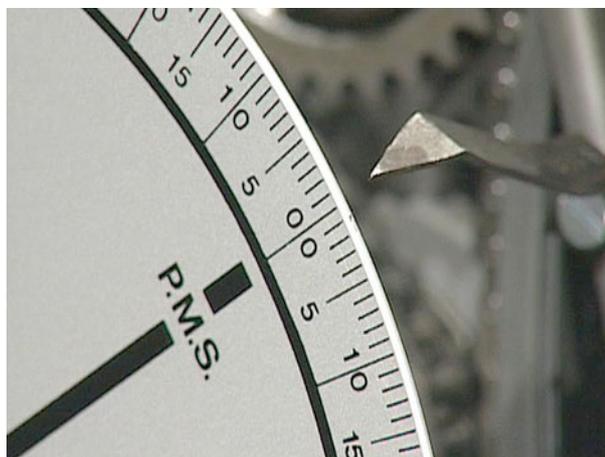


4.3.7. TIMING CHECK

- After positioning the goniometer and centesimal comparator: put the cylinder at top dead centre in compression phase and check exact positioning by following the centesimal comparator readings.



- Zero goniometer using top dead centre on indicator as reference.

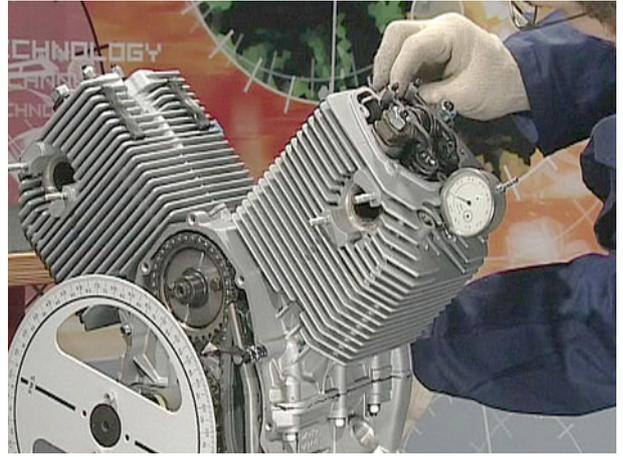


- Adjust tappets to theoretical clearance prescribed.

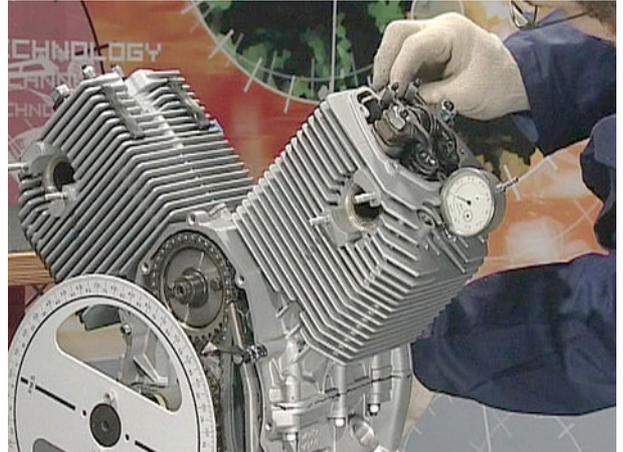


V750 IE

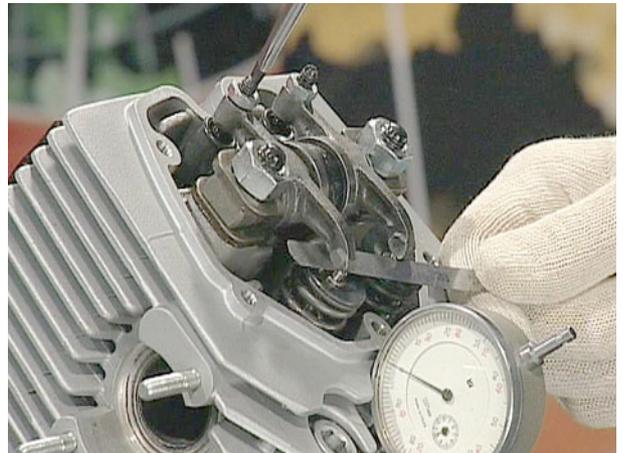
- Turn clockwise until contact between rod and rocker arm is reached and on goniometer check intake valve advance with respect to top dead centre.



- Continue to turn until rod is free, read the value representing retard of the valve closing with respect to bottom dead centre.

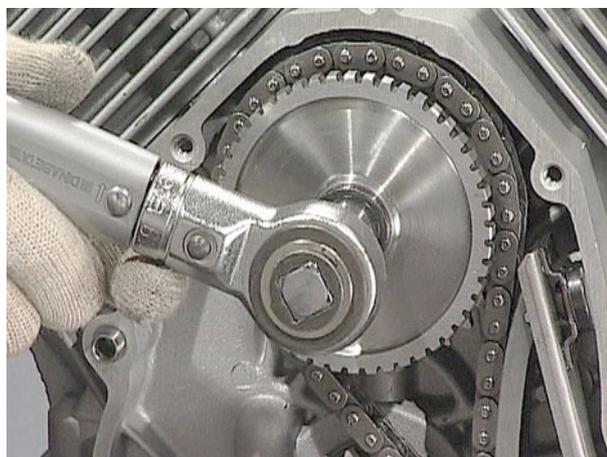
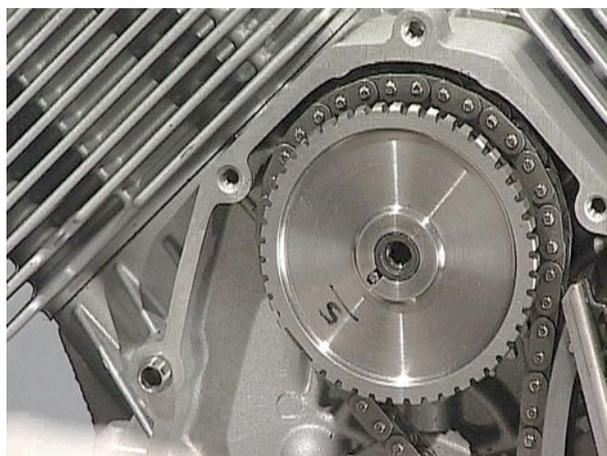
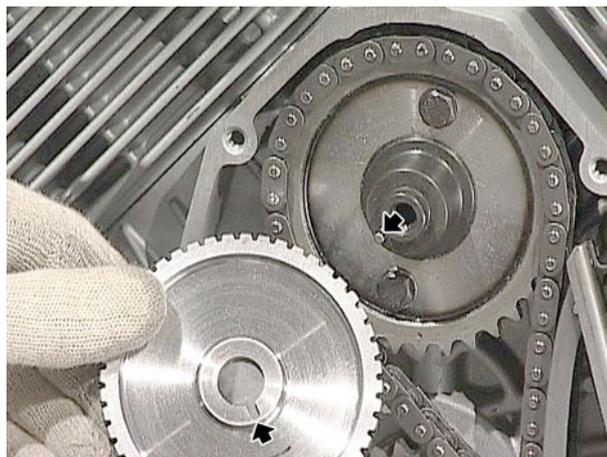


- Repeat operation for the other valves.
- Adjust tappet clearance to clearance prescribed.



4.3.8. SOUND WHEEL ASSEMBLY

- Sound wheel position is given by the dowel on timing shaft.
- Position sound wheel by checking correct insertion on timing shaft (see notch) and tighten using dynamometric spanner to prescribed torque.



- Once the gasket is inserted remount cover on timing and tighten with dynamometric spanner to prescribed torque.

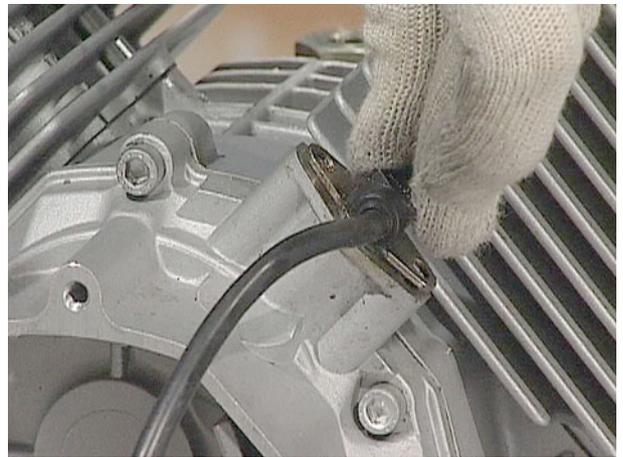


4.3.9. AIR GAP MEASUREMENT AND SENSOR REASSEMBLY

- Insert a flat washer on the sensor to measure thickness.



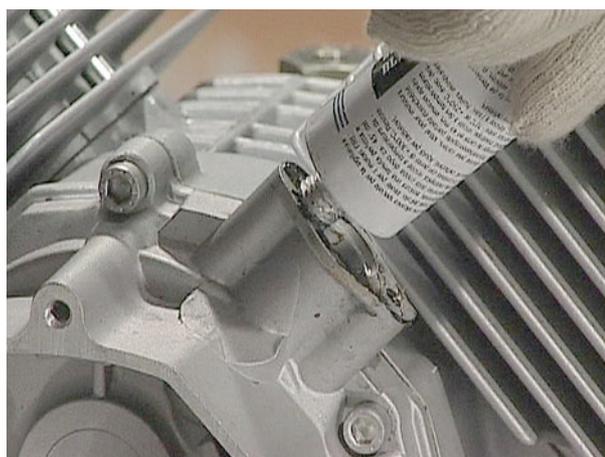
- Position the sensor on timing cover and contact it with the sound wheel.



- Use a thickness gauge to measure clearance between securing plate and cover. Subtraction of flat washer thickness from the found value gives the clearance between sensor and sound wheel.

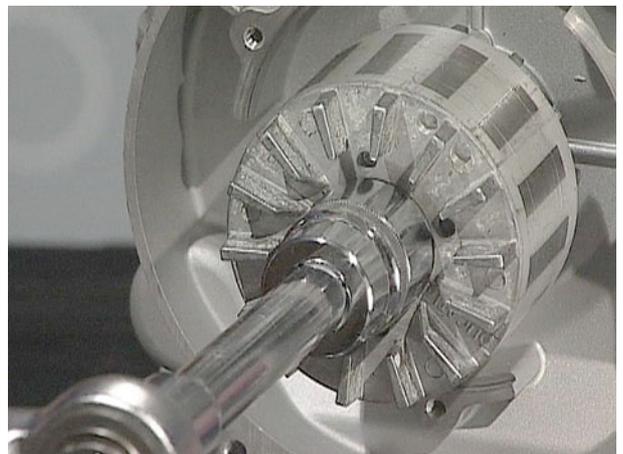
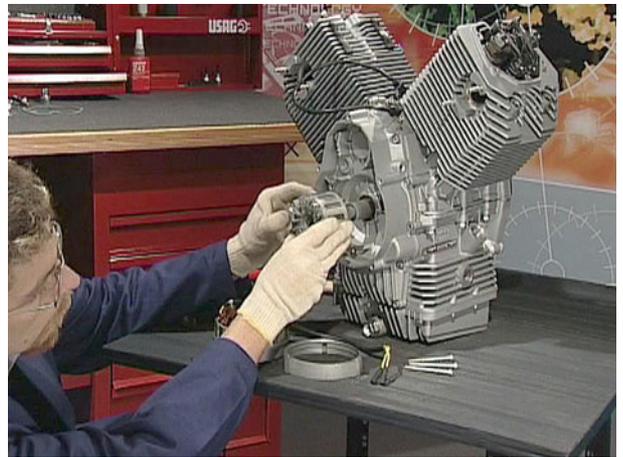


- Remove the washer and insert the sensor after covering securing plate surface with sealant paste and tighten the screws to torque.

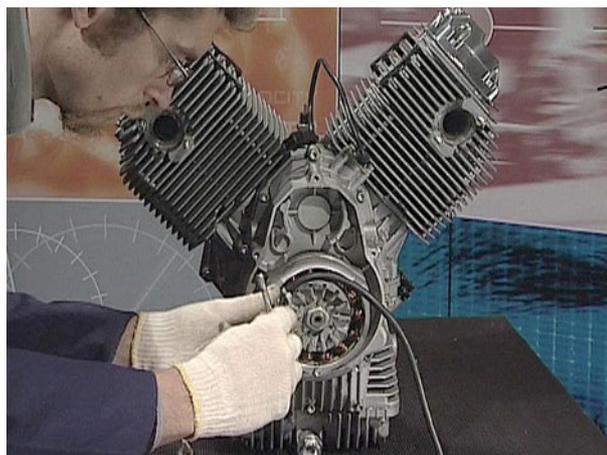


4.3.10. ALTERNATOR REASSEMBLY

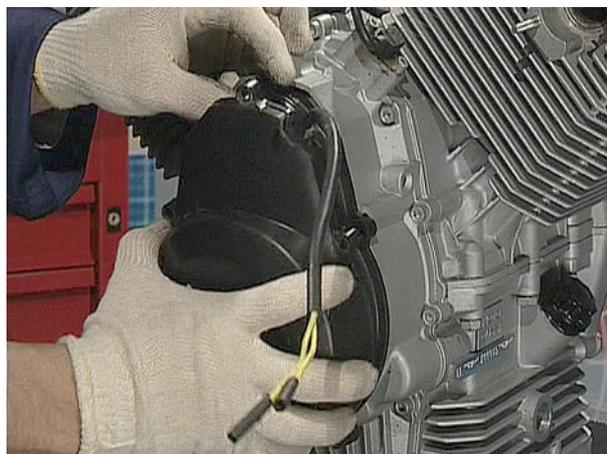
- Insert the contact washer, locking spline and rotor, and tighten the screw nut with the dynamometric spanner to torque.



- Insert stator and its cover and tighten the three screws.



- Insert stator cover.



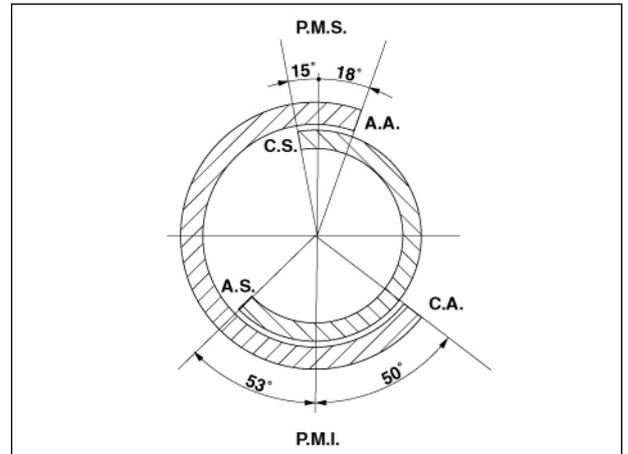
4.3.11. TIMING DATA

Intake:

- opens 18° before T.D.C.;
- closes 50° after B.D.C.

Exhaust:

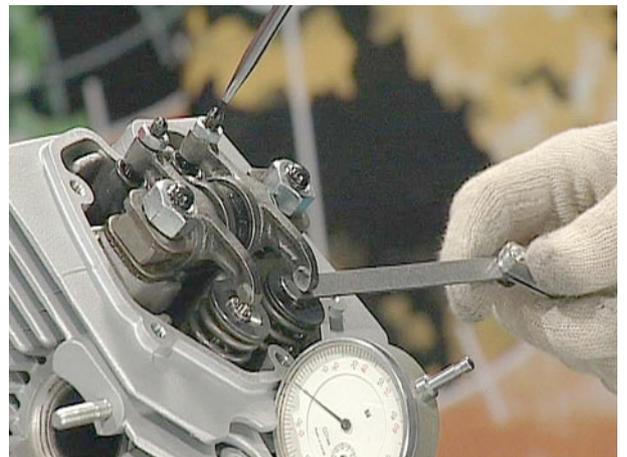
- opens 53° before B.D.C.;
- closes 15° after T.D.C.



Valves clearance for timing check 1 mm (0,039).

Valves clearance for operation:

- intake 0.15 mm (0,0059);;
- exhaust 0.20 mm (0,0079);.



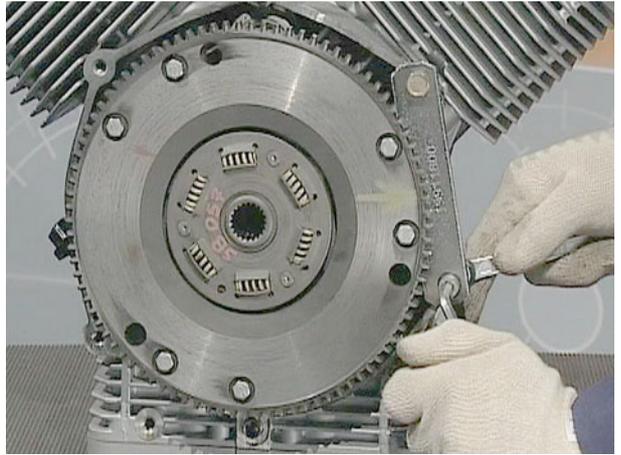
4.3.12. TIGHTENING TORQUES

TIMING	
Camshaft to crankcase fixing connection	30 Nm
Timing gear to camshaft fixing screws	25 Nm
Phonic wheel fixing screw	25 Nm

4.4. CLUTCH

4.4.1. DISASSEMBLY OF CLUTCH PLATE AND DISK

- Mount prescribed engine flywheel stopping tool on block.



- Unscrew clutch plate securing screws and remove it complete with starter ring.



- Remove clutch disk.



4.4.2. CHECK

- Check clutch disk for scratches or overwear.
- Check antijerk rings and that clutch disk thickness is not less than value prescribed: if so, clutch disk must be replaced.
- Check clutch disk ring gears of rim and contact surface for wear.



4.4.3. CLUTCH PLATE AND DISK ASSEMBLY

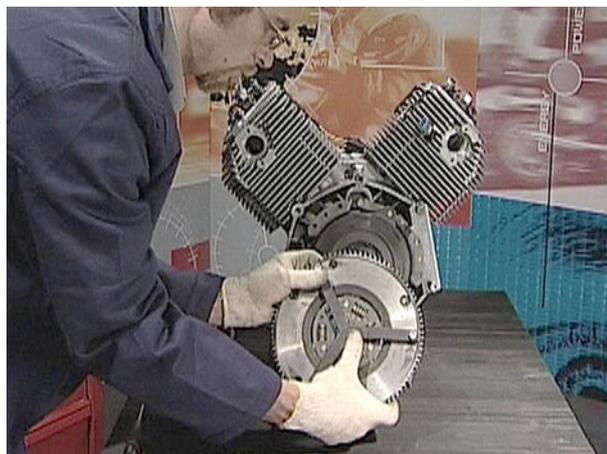
- Once the flywheel stopping tool has been inserted.



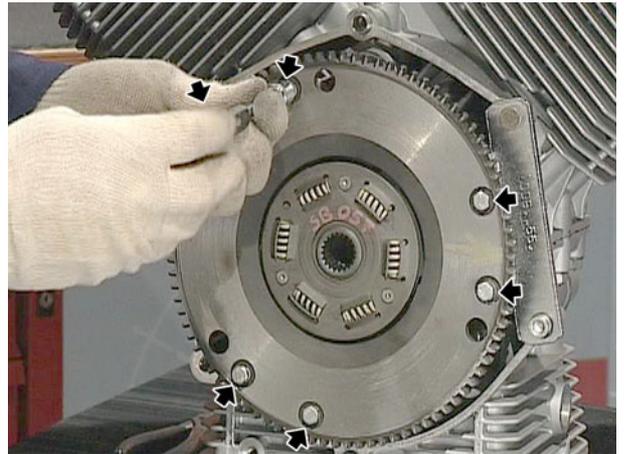
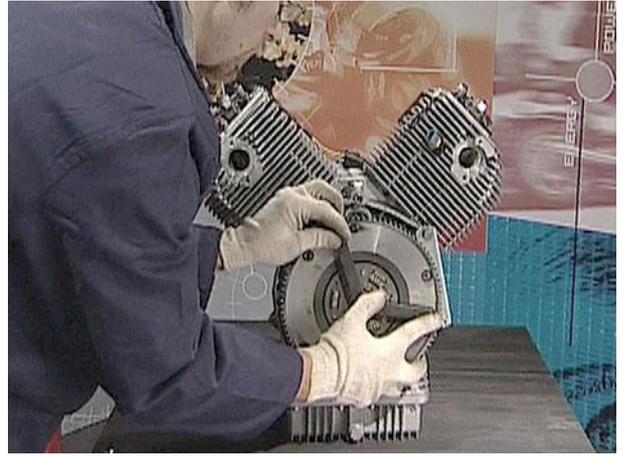
- insert cup with relative blocking ring.



- Position appropriate tool to centre clutch disk on plate and position disk in seat.



- Fix the assembly on flywheel thrust plate by tightening screws to torque.



4.4.4. TIGHTENING TORQUES

CLUTCH	
Clutch shaft fixing nut	100 Nm

4.5. ENGINE THRUST PLATE FLYWHEEL

4.5.1. FLYWHEEL DISASSEMBLY

- Remove stop ring and engage-disengage cup.



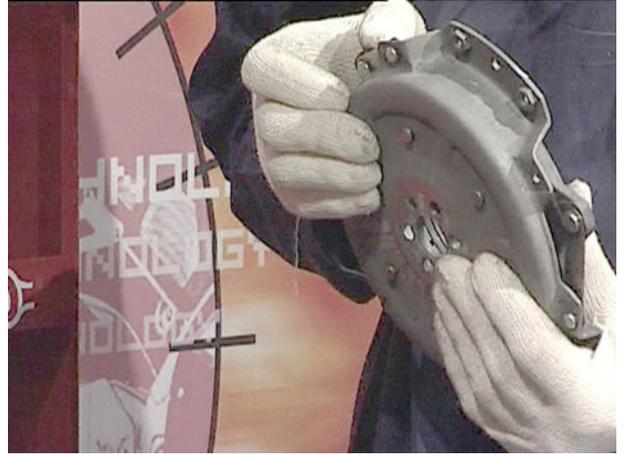
- Remove screws securing thrust plate flywheel to driving shaft, then take it out.





4.5.2. CHECK

- Check that flywheel surfaces in contact with disk are not scratched.
- Check that driving shaft contact surfaces are not deformed. If so, flywheel must be replaced.



4.5.3. FLYWHEEL THRUST PLATE REASSEMBLY

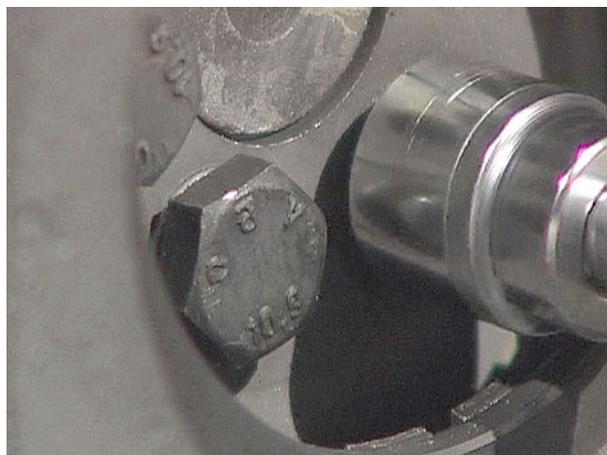
- When reassembling flywheel thrust plate on driving shaft make sure that "yellow" mark on driving shaft is perfectly in line with groove on engine flywheel.



- Tighten the screws and insert the appropriate flywheel stopping tool.



- Crosswise lock screws with dynamometric spanner to prescribed torque. It is advisable to replace flywheel securing screws to driving shaft.



- Insert clutch engage-disengage cup and relative blocking ring.





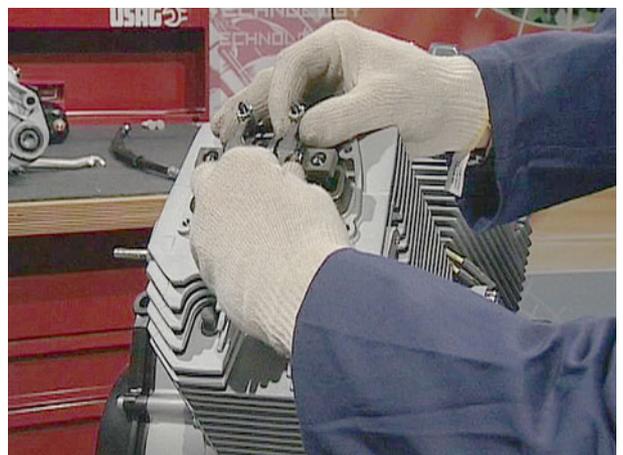
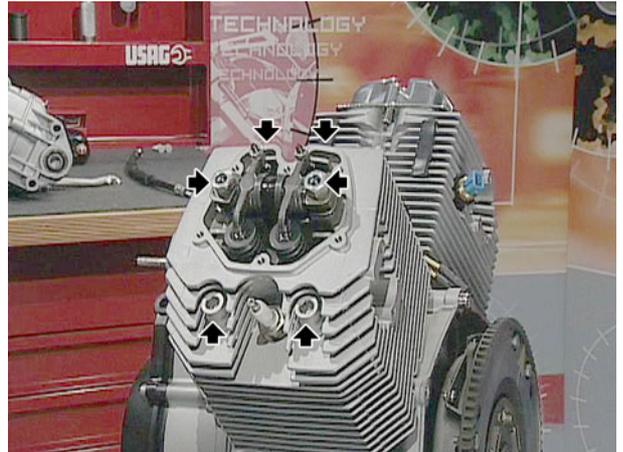
4.5.4. TIGHTENING TORQUES

CONNECTING ROD GROUP	
Rods fixing screws	30÷32 Nm
Flywheel to crankshaft fixing screws	40 Nm
Ring gear fixing screws	10 Nm

4.6. ENGINE HEAD

4.6.1. ENGINE HEAD DISASSEMBLY

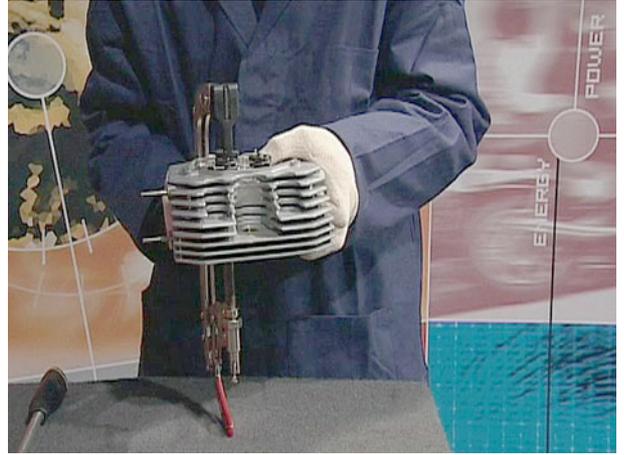
- Crosswise unscrew nuts at block securing heads, cylinders and rocker arm pins.
- Remove top spacers, rocker arms complete with pins, bottom spacers, rocker arm control push rods and slide heads out of stud bolts.



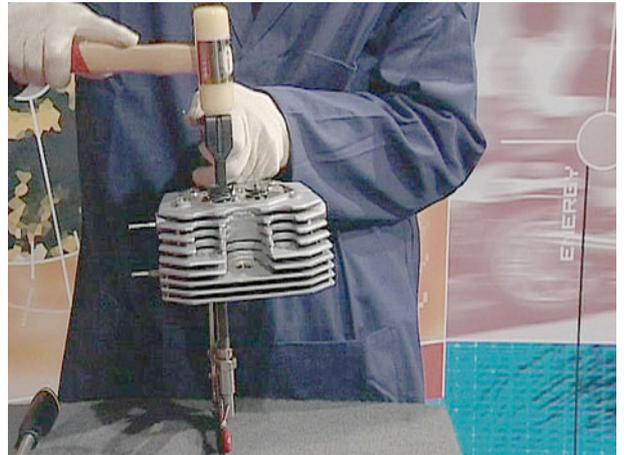


4.6.2. DISASSEMBLY OF HEAD VALVES

- Place the prescribed tool on the top cap of the valve to be removed and at the centre of valve mushroom.



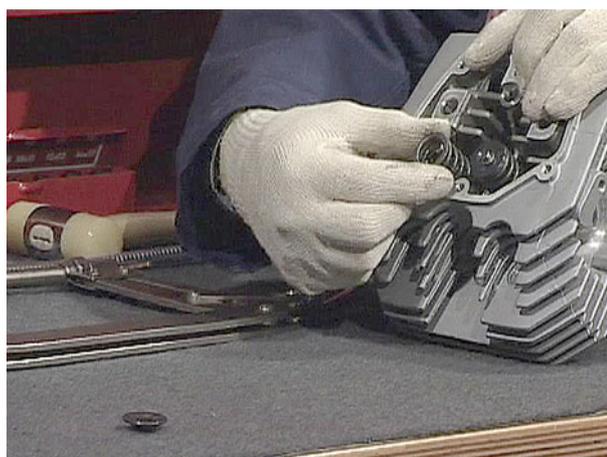
- Close tool by compressing the spring and hit the head of the tool with a mallet to remove the two cotters from top cap.



- Unscrew the tool and remove it from the head.



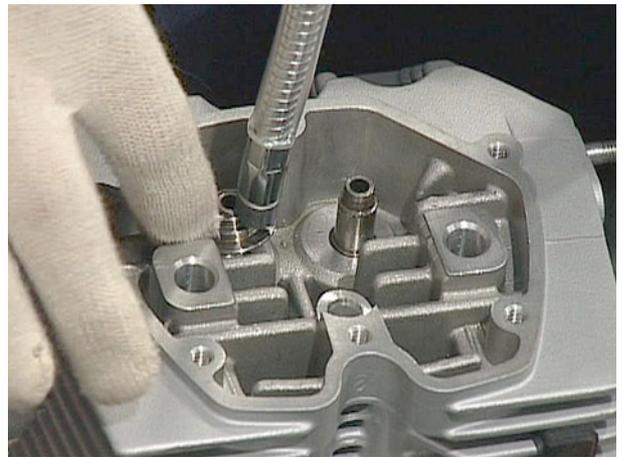
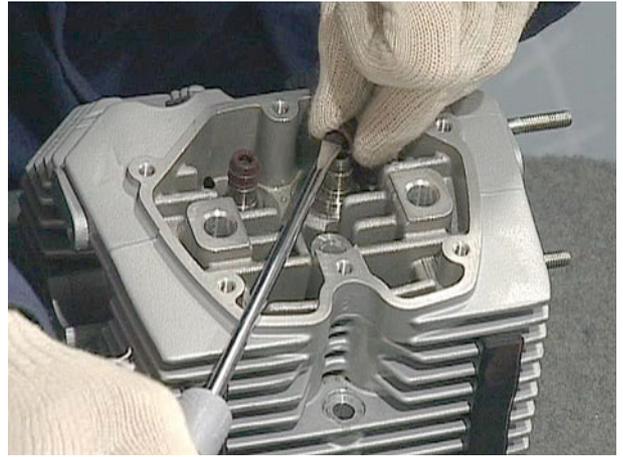
- Slip out top cap, spring and then valve.



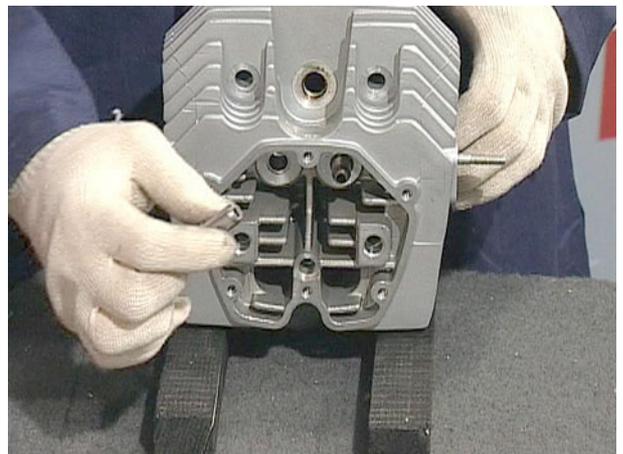
4.6.3. VALVE GUIDE FROM HEADS DISASSEMBLY

- Remove valve guide gaskets and take out bottom spring cap.

NOTE Valve guides must be replaced when wear is such that valve replacement alone is insufficient to eliminate clearance between valve stem and internal hole of valve guide.



- Valve guides are removed with an appropriate punch and mallet by hitting from the inside towards the outside; this operation is made easier by preheating the head to about 50-60°C (122-140°F).

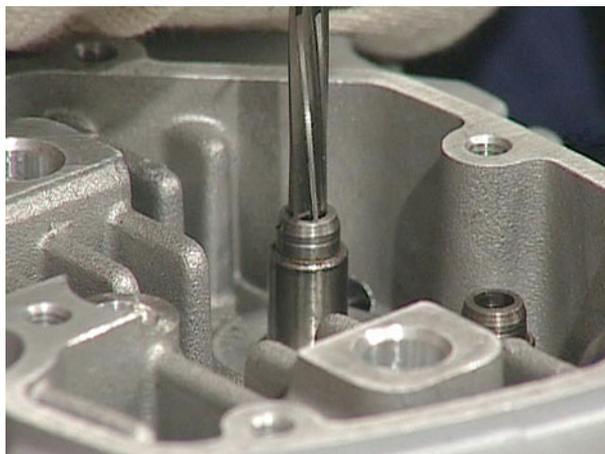


4.6.4. VALVE SEAT REASSEMBLY AND CHECK

- Hit the valve guides back into place with punch and mallet from the outside towards the inside; it is advisable to preheat the head to around 60°C.

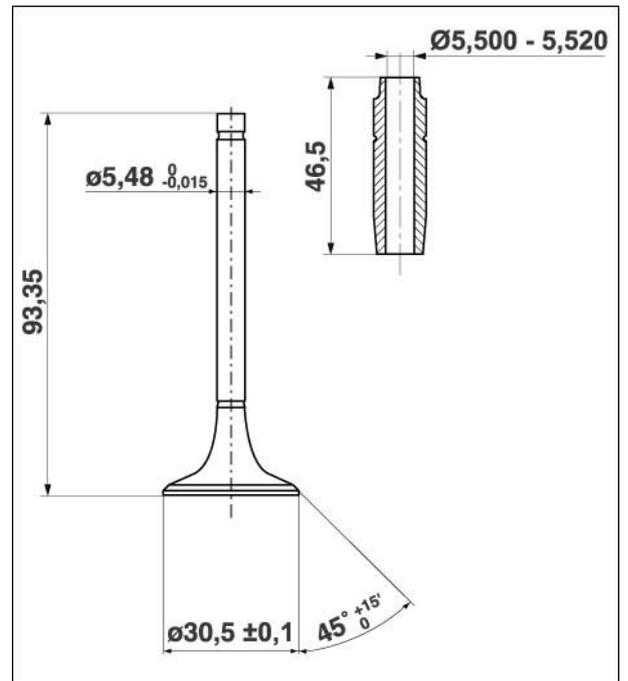
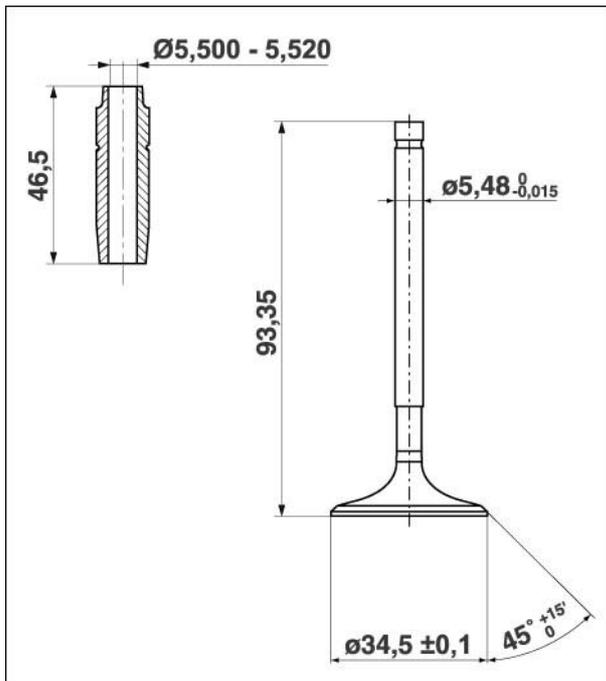


- Once the valve guides are back in place rectify them with a reamer to obtain internal diameter measurement given in table.



Valves and valve guides assembly data

	VALVE GUIDE INSIDE DIAMETER mm (in)	VALVE STEM DIAMETER mm (in)	ASSEMBLY CLEARANCE mm (in)
Intake	5,500÷5,520 (0.2165÷0.2173)	5,480÷5,465 (0.2157÷0.2151)	0,020÷0,055
Exhaust	5,500÷5,520 (0.2165÷0.2173)	5,480÷5,465 (0.2157÷0.2151)	(0.0008÷0.0021)

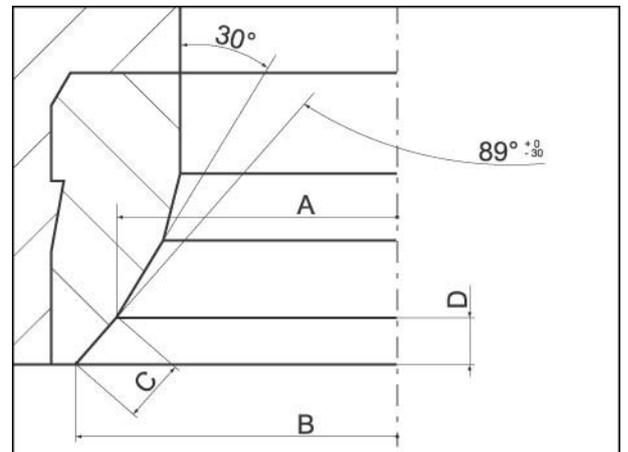


INTAKE

A \varnothing mm (in)	B (theoretical) \varnothing mm (in)	C (theoretical) mm (in)	D mm (in)
32,0÷32,25 (1.2598÷1.2697)	34 (1.3386)	1,42 (0.0559)	1 (0.0394)

EXHAUST

A \varnothing mm (in)	B (theoretical) \varnothing mm (in)	C (theoretical) mm (in)	D mm (in)
27,72÷27,97 (1.0913÷1.1012)	30 (1.1811)	1,6 (0.0630)	1,14 (0.0448)



4.6.5. VALVE SEAT RECTIFICATION

NOTE Valve seat rectification after valve guide replacement or when valve seat is not tight rectification must be carried out.

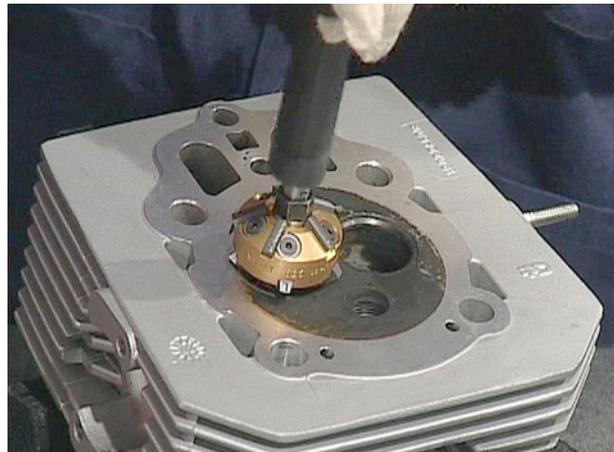
- Once the pilot tool has been closed put it in the valve guide and lock in place.

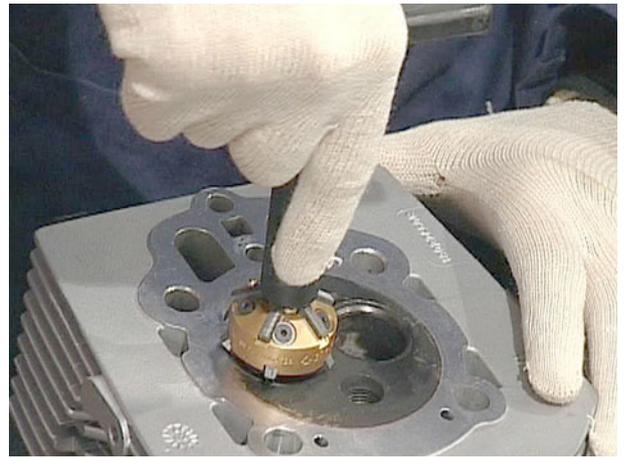


- Choose mill according to diameter and valve seat inclination.
- Insert the mill in pilot tool and carefully push it down to valve seat level.



- Put the mill in the T spanner and turn clockwise applying pressure lightly until uniform valve contact surface is obtained.





- Repeat operation with appropriate mill to restore valve blocking seat width.



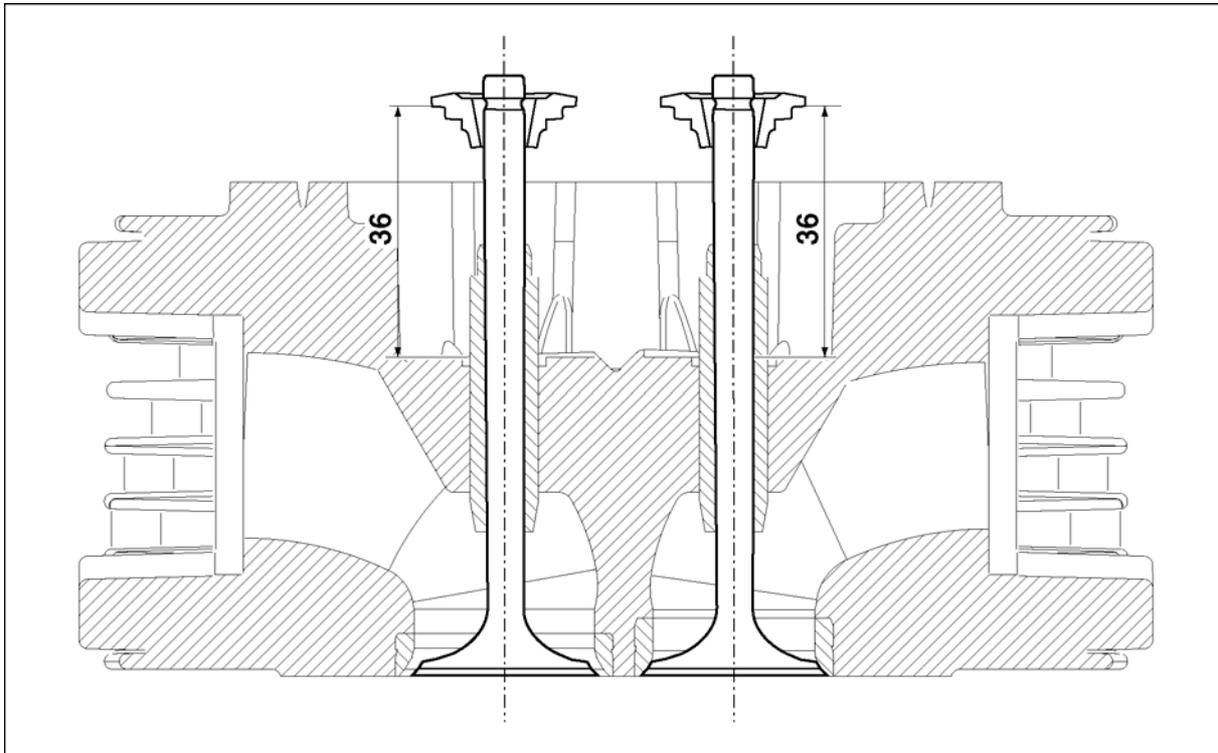
- Remove all tools used when operation is completed.
- Put back spring bottom seats and use the prescribed tool to insert blocking gaskets on valve guide.



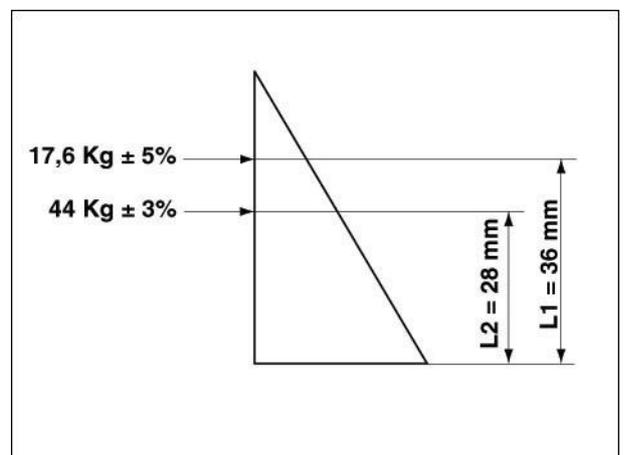
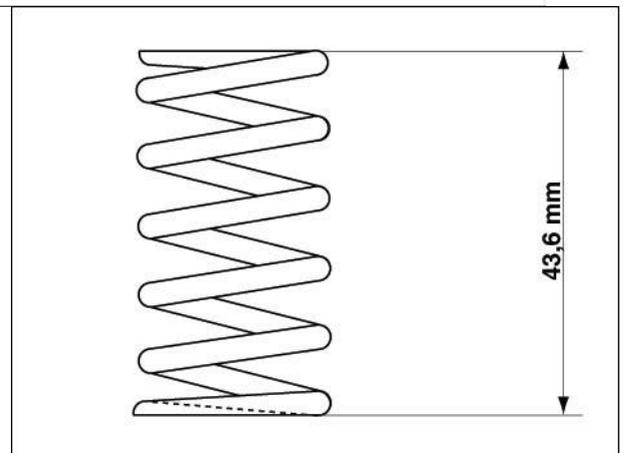


4.6.6. SPRING PACK INSPECTION

With the assembly (cups, springs, valves and half-cones) installed on the heads, the external springs must be compressed by 36 mm (1.4173 in). Note that at their fully open position the valves must have an additional 1 mm (0.039 in) excursion before the internal spring is completely compressed. If necessary add or remove shims until the above dimension is obtained.



Free length

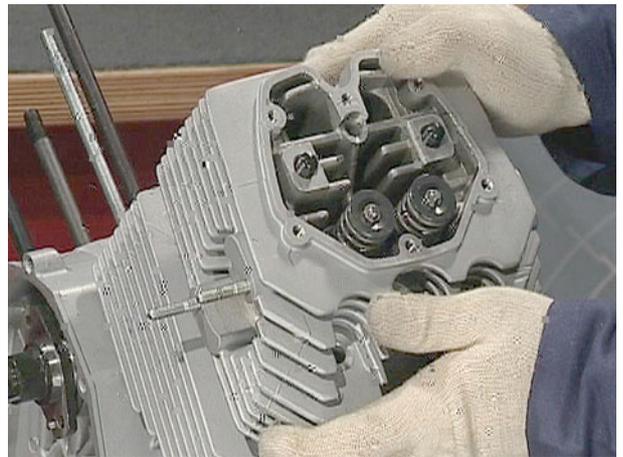


SPRING CHARACTERISTICS

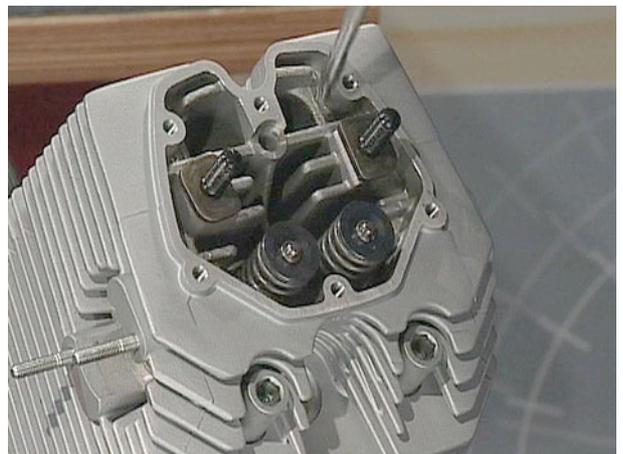
DESCRIPTION	UNIT	VALUE
External diameter	mm (in)	/
Internal diameter	mm (in)	17,8 ± 0,2 (0.7007 ± 0.0079)
Wire diameter	mm (in)	3,4 ± 0,03 (0.1338 ± 0.0012)
Free length	mm (in)	43,6 (1.7165)
Solid length	mm (in)	27,5 (1.0827)
Test length L1	mm (in)	36 (1.4173)
Test length L2	mm (in)	28 (1.1024)
Measured test load P1	Kg (lb)	17,6 ± 5 % (38.8013 ± 5 %)
Measured test load P2	Kg (lb)	44 ± 3 % (97.0033 ± 3 %)
Coil direction	/	right-hand
Spring class to UNI 7900/4	/	CC

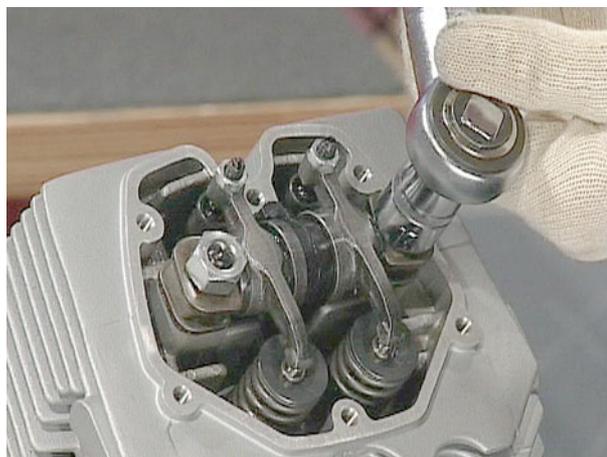
4.6.7. ENGINE HEAD REASSEMBLY

- Position new gasket and put engine head in seat.



- Insert bottom spacers of rocker arms, rocker arm push rods, rocker arms and top spacers with all relative nuts.





- Crosswise lock the nuts to prescribed torque.



4.6.8. TIGHTENING TORQUES

CYLINDER HEADS	
Cylinder head covers fixing screws	10 Nm
Spark plugs	25 Nm

4.7. CYLINDERS

4.7.1. CYLINDERS DISASSEMBLY

- Slip cylinders with their gaskets out of stud bolts.

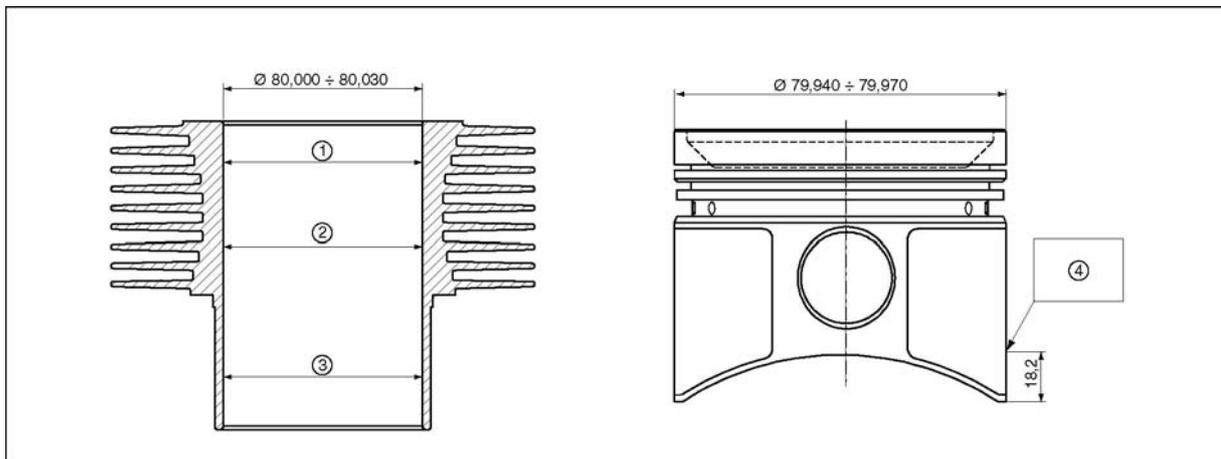


- Remove the O ring between block and cylinder.



4.7.2. CHECK

- After checking scoring, use a centesimal comparator to check for cylinder surface wear.
- Measure inside cylinder diameter at three heights (insert legend) by revolving centesimal comparator by 90° and repeat measurements; Centesimal comparator must be previously zeroed on a ring gauge.

**Key:**

1. 1st measurement
2. 2nd measurement
3. 3rd measurement
4. control dimension for selection

Cylinders selection \varnothing

GRADE "D"	GRADE "E"	GRADE "F"
80,000 \div 80,010 (3.1496 \div 3.1500)	80,010 \div 80,020 (3.1500 \div 3.1504)	80,020 \div 80,030 (3.1504 \div 3.1508)

When fitting new units, cylinder categories "D-E-F" must be paired with the corresponding pistons selected in categories "D-E-F".

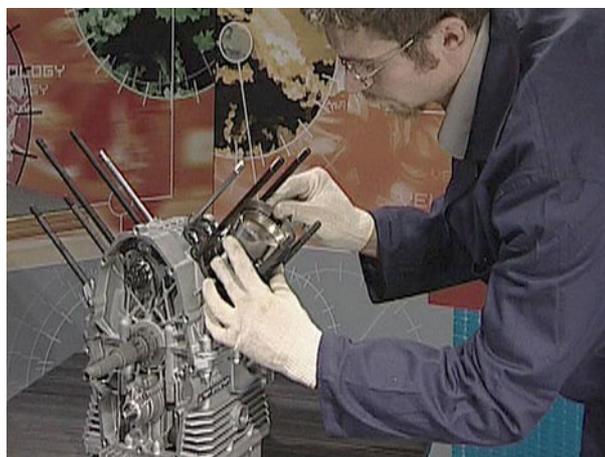
Assembly clearance between piston and cylinder: 0.050 \div 0.070 mm (in 0.0020 \div 0.0027).

4.7.3. CYLINDER ASSEMBLY

- Check that compression ring notches are staggered at angles of about 120 degrees between each other.



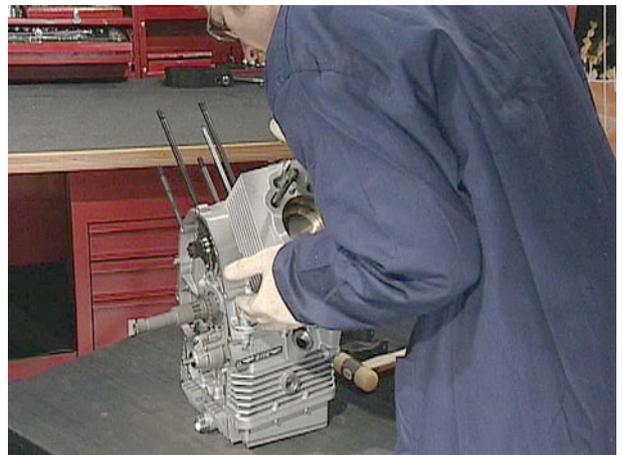
- Once the new gasket is in place and the ring is inserted in its seat on the block, put an adequate market available ring-tightener on the piston.



- Lubricate inside cylinder wall and piston. Start fitting the piston in the cylinder seat using a mallet.



- Once past the segment area remove ring-tightener from piston and insert cylinder in its seat.



4.7.4. TIGHTENING TORQUES

CRANKCASE AND COVERS	
Cylinder heads-barrels to crankcase fixing nut (M10)	40÷42 Nm
Cylinder heads-barrels to crankcase fixing nut (M8)	28÷30 Nm
Crankcases joining nuts (M8)	22÷25 Nm
Crankcases joining nuts (M10)	40÷42 Nm
Timing cover fixing screws	10 Nm
Sump fixing screws	10 Nm
Valves cover insert fixing screw	5 Nm

4.8. PISTONS

4.8.1. PISTONS DISASSEMBLY

- After protecting cylinder seat, remove the two gudgeon retaining springs.



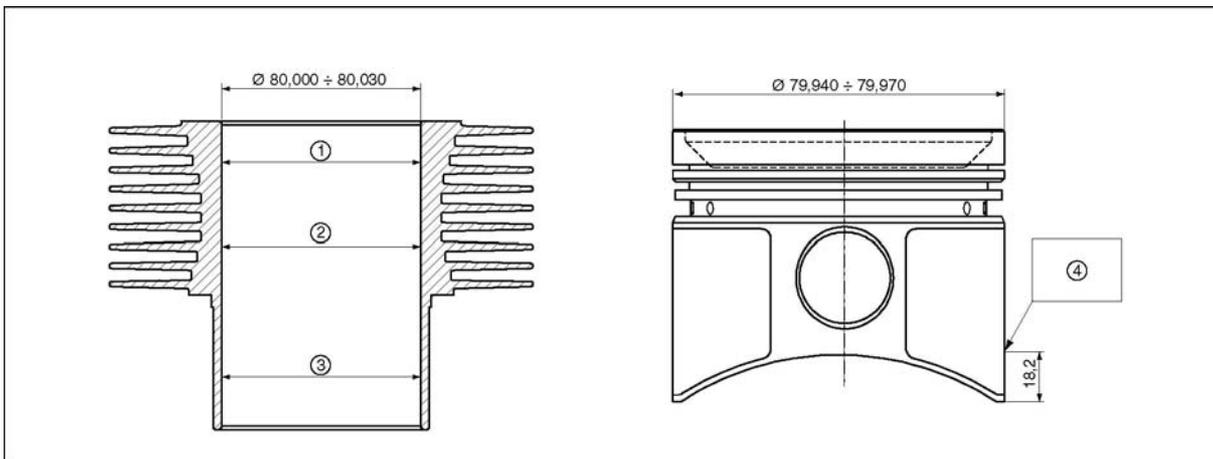
- Use the screw of the prescribed tool to slip gudgeon out and remove piston.

NOTE When overhauling carry out decarbonization of piston crown and piston ring housings.



4.8.2. CHECK

- First check for superficial scoring and then check wear of the cylinder bore surfaces using a dial gauge
- Measure the inside diameter of the cylinder bore at three different heights then turn the dial gauge through 90° and repeat the measurements; the dial gauge must be first zero set on a ring gauge.

**Key:**

1. 1st measurement
2. 2nd measurement
3. 3rd measurement
4. control dimension for selection

- Check the piston diameter at the specified height and on an axis perpendicular to the gudgeon pin.
- Selection values refer to the bare piston (without graphite facing).



- Check that the selection mark and assembly arrows are punch marked on the piston.



Piston diameter selection

GRADE "D" mm (in)	GRADE "E" mm (in)	GRADE "F" mm (in)
79,940 ÷ 79,950 (3.1472 ÷ 3.1476)	79,950 ÷ 79,960 (3.1476 ÷ 3.1480)	79,960 ÷ 79,970 (3.1480 ÷ 3.1484)

IMPORTANT Graphite facing thickness when new: 0.015 ± 0.005 mm

Gudgeon pin to piston bore assembly data

GUDGEON PIN EXTERNAL DIAMETER mm (in)	DIAMETER OF BORES IN PISTON mm (in)	ASSEMBLY CLEARANCE mm (in)
19,996 ÷ 20,000 (0.7872 ÷ 0.7874)	22,000 ÷ 22,006 (0.8661 ÷ 0.8664)	From mm 0.006 (in 0.00024) clearance to mm 0,002 (in 0.0008) interference

4.8.3. PISTON REASSEMBLY

- In reassembling piston to con rod eye, heat piston in oil bath to about 60°C (140°F), to slightly dilate it so gudgeon is easier to put back.
- Insert blocking spring in piston and fit appropriate tool on piston to insert gudgeon.



- Position piston with tool attached on the con rod and screw to insert gudgeon.



- Remove tool when operation is completed and insert the second blocking spring of gudgeon seat after protecting cylinder seat.

NOTE Assembly position is indicated by an arrow to be set according to rotation direction.





4.9. COMPRESSION RINGS AND SCRAPER RING

4.9.1. DISASSEMBLY

- Remove compression rings and scraper ring.

NOTE to avoid breaking, rings must not be stretched more than is necessary to slip them off piston.



4.9.2. COMPRESSION RING CHECK

- Use a feeler gauge to check that the assembly clearance between ring and ring groove on the piston is as specified.

top compression ring mm $0.030 \div 0.062$ (in $0.0012 \div 0.0024$);

second compression ring mm $0.030 \div 0.062$ (in $0.0012 \div 0.0024$);

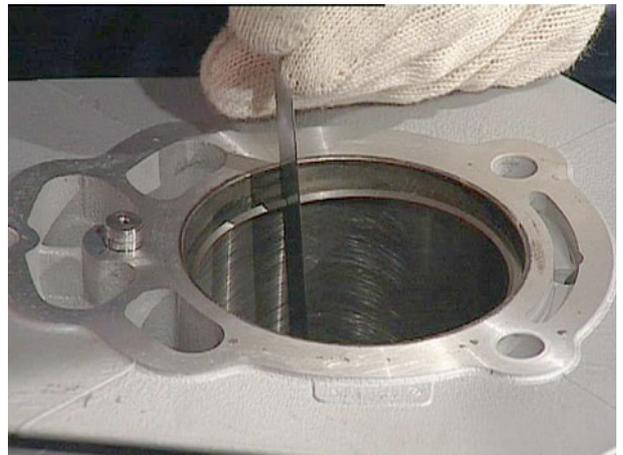
oil control ring mm $0.030 \div 0.062$ (in $0.0012 \div 0.0024$).



- Insert the piston rings one at a time into the cylinder square to the cylinder wall and use a feeler gauge to check the end gap.

top compression and second compression and scraper ring:
mm $0.25 \div 0.45$ (in $0.0098 \div 0.0177$);

oil control ring: mm $0.20 \div 0.45$ (in $0.0079 \div 0.0177$).



4.9.3. COMPRESSION RING AND SCRAPER RING REASSEMBLY

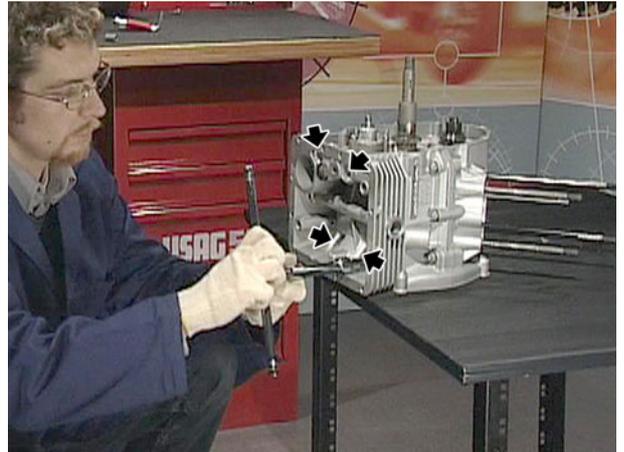
- Insert compression rings according to notches and ring assembly direction; rings must be staggered at angles of about 120 degrees between each other.



4.10. ENGINE BLOCK

4.10.1. ENGINE BLOCK DISASSEMBLY

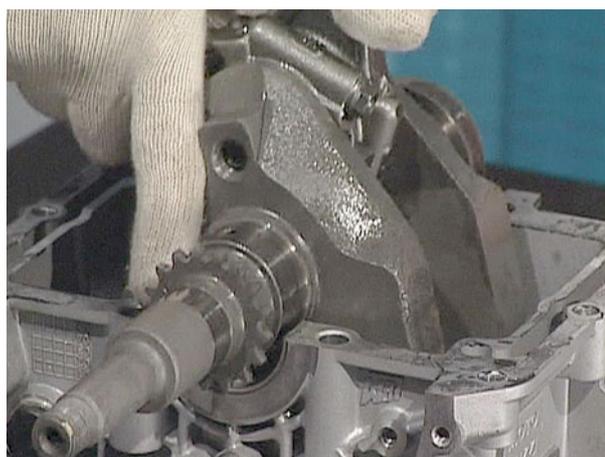
- Remove the four column nuts from inside the block and the six nuts outside.



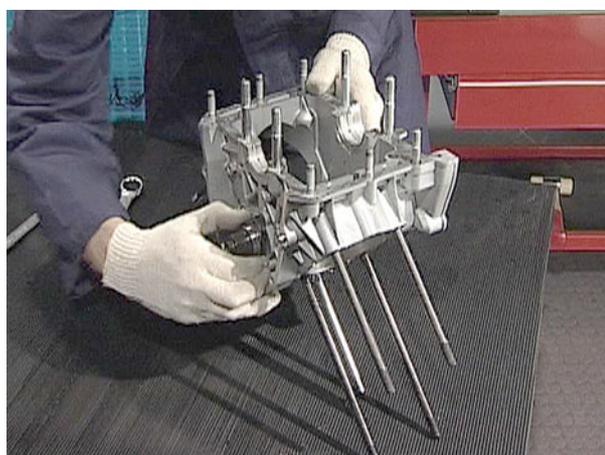
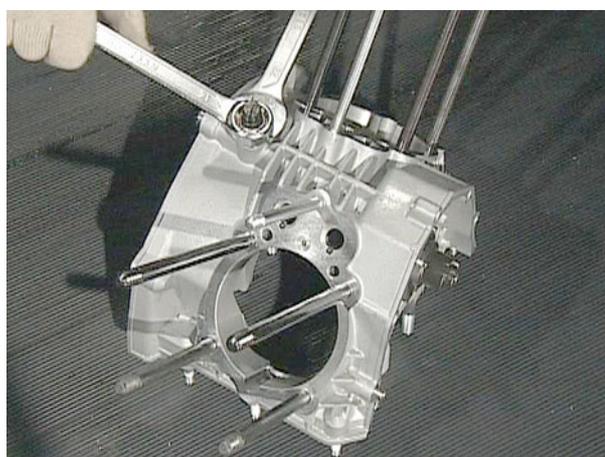
- Insert a bar in engine union tie rod seat to chassis, then use a plastic mallet to lightly hit the rod to get the two halfblocks to separate.

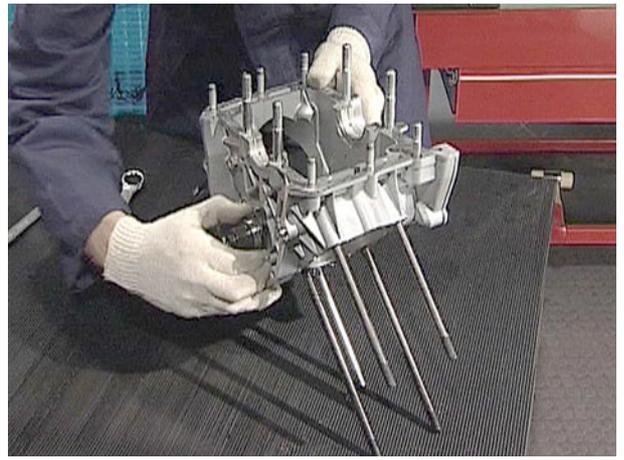


- Remove top block taking care not to damage contact surface.
- Remove driving shaft complete with connecting rods and halfbearings.



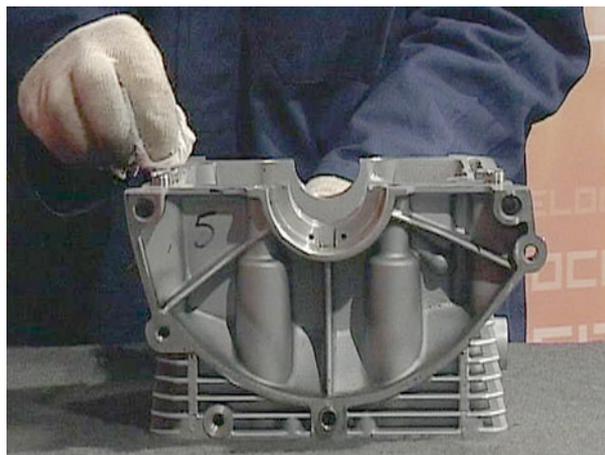
- Unscrew oil pressure sensor from top block and remove timing shaft check bushing and then slip out the shaft and tappets and classify them.





4.10.2. CHECK

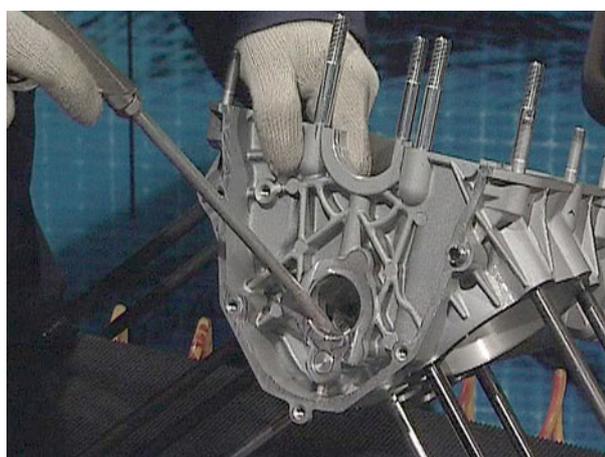
- Check that junction surfaces are whole, not either dented or scratched. Remove liquid sealant with trichloroethylene.



- Check that stud bolt threading is not dented or stripped. If so, replace stud bolts.

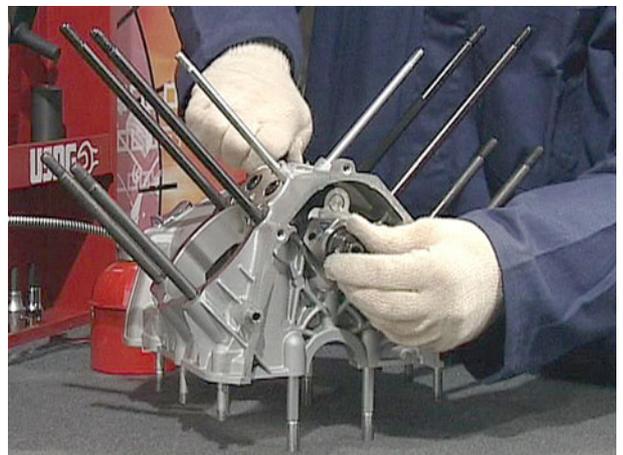
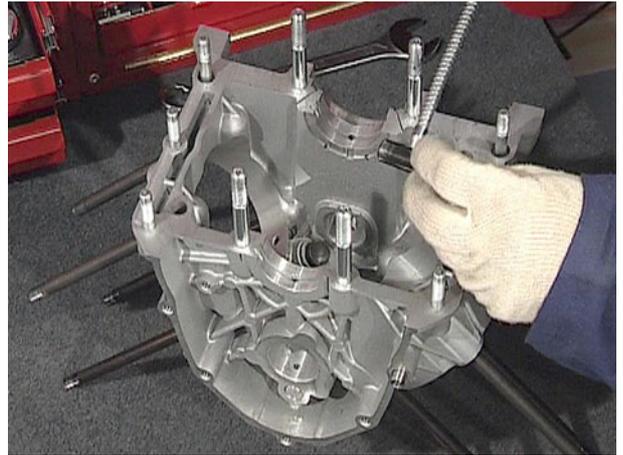


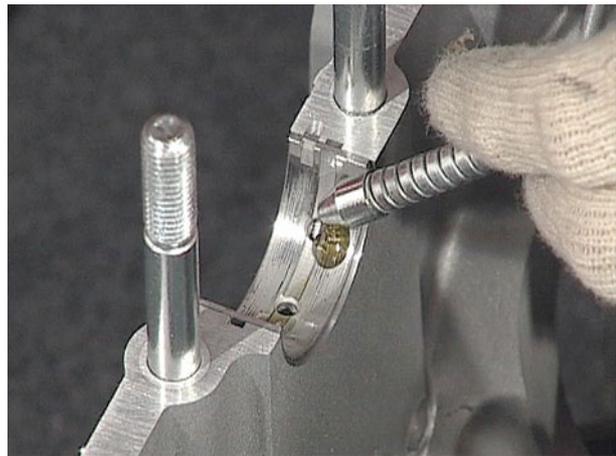
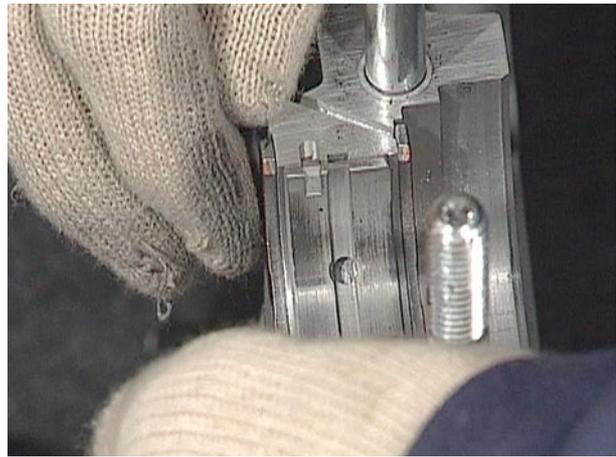
- Clean all lubricant channels of the two blocks with compressed air.



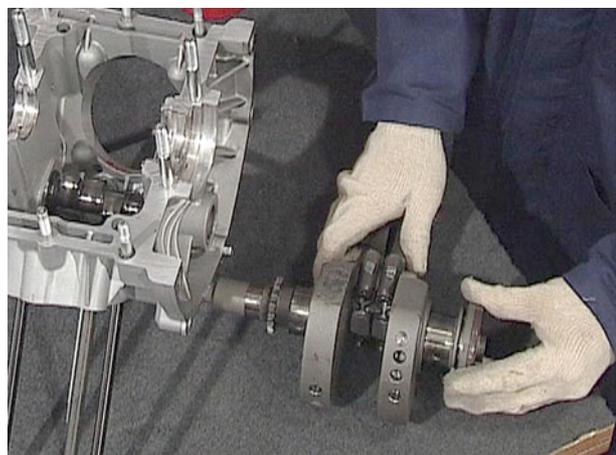
4.10.3. ENGINE BLOCK REASSEMBLY

- Lubricate and reinsert tappets.
- Reposition timing shaft in top block seat and lubricate and lock timing shaft-stopper union into place.
- Insert halfbearing on timing and flywheel sides with shoulders on top block and lubricate parts assembled.





- Insert lubricated blocking ring on driving shaft and reposition the assembly on engine block making sure con rods are correctly inserted in their seats.

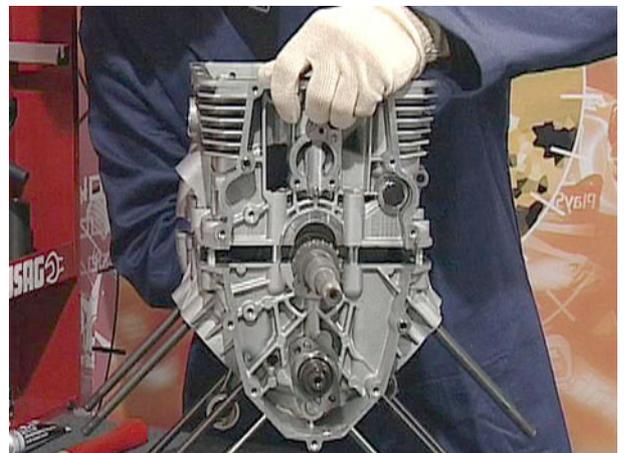


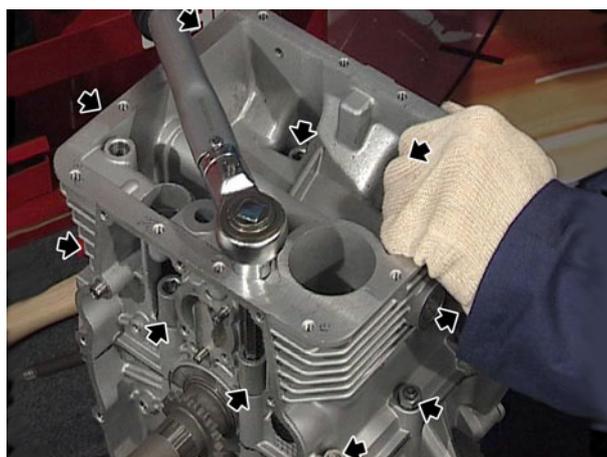
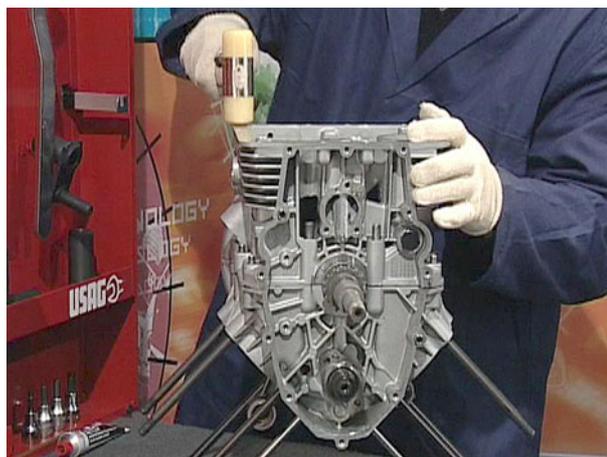


- Put lubricated halfbearings back in their housings in bottom block, cover block junction surfaces with prescribed fluid sealant.



- Couple the two blocks making sure the two surfaces adhere perfectly by lightly hitting them with a mallet and crosswise tighten the four centre stud bolts and external nuts to the prescribed torque.





4.10.4. TIGHTENING TORQUES

BASAMENTO E COPERCHI	
Dado fissaggio teste -cilindri al basamento (M10)	40÷42 Nm
Dado fissaggio teste-cilindri al basamento (M8)	28÷30 Nm
Dadi unione basamenti (M8)	22÷25 Nm
Dadi unione basamenti (M10)	40÷42 Nm
Viti di fissaggio coperchio distribuzione	10 Nm
Viti fissaggio coppa olio	10 Nm
Vite fissaggio inserto copertura valvole	5 Nm

4.11. CON RODS

4.11.1. CON RODS DISASSEMBLY

- Once the driving shaft, complete with con rods, has been removed from the top block, remove screws and separate con rod from small end making sure reference marks and assembly direction are followed.



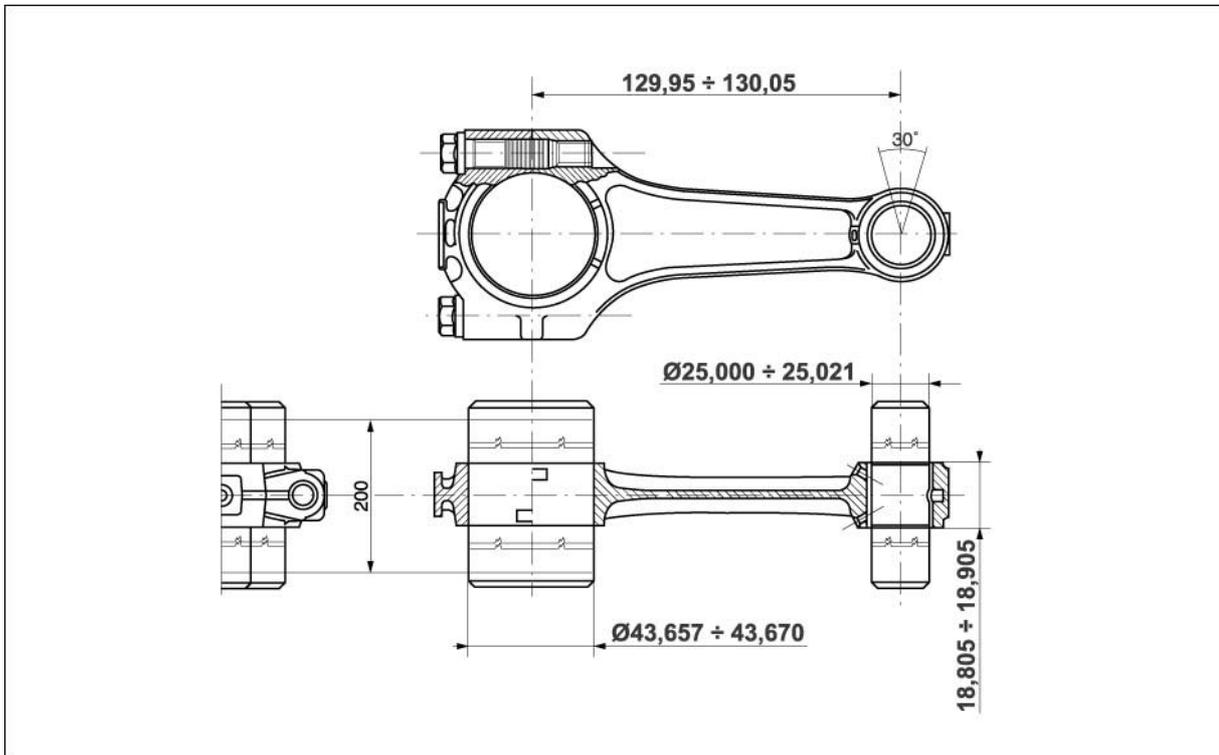
- Remove halfbearings from con rods and small ends.

NOTE repeat for other con rod.



4.11.2. CON ROD CLEARANCE CHECK

- With a micrometer check con rod pin diameter measurement on the orthogonal axes and in the working area of the halfbearings. Check bearing housing measurement on both timing and flywheel sides.
- After replacing screws to prescribed torque in the con rod without halfbearings, use centesimal comparator to measure the external diameter of halfbearing housing. Use round-tipped micrometer to measure thickness of the two halfbearings.
- Check that bushings in con rod eye do not show signs of seizing pits or deep scratching. If so, they must be replaced.



Big end diameter $43.657 \div 43.670$ mm (in $1.7188 \div 1.7193$).

Crank pin diameter $39.995 \div 40.001$ mm (in $1.5746 \div 1.5748$).

Clearance between crank pin and connecting rod big end bearing at 90° from the mating faces: min. 0.020 (in 0.0008), max. 0.061 (in 0.0024).

Connecting rod bearing thicknesses

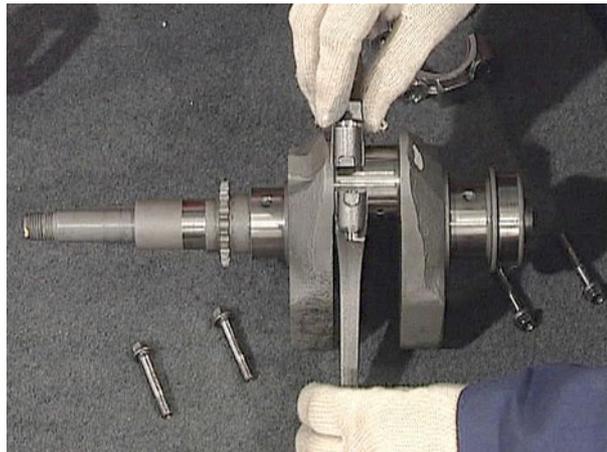
NORMAL (production)	
A	B
mm (in)	mm (in)
$1.537 \div 1.543$ (0.0605 \div 0.0607)	$1.527 \div 1.533$ (0.0601 \div 0.0603)

Diameter of bush driven into connecting rod small end and gudgeon pin

INSIDE DIAMETER FOR BUSHING DRIVEN INTO CONNECTING ROD SMALL END mm (in)	DIAMETER OF GUDGEON PIN mm (in)	SMALL END BUSHING TO GUDGEON PIN ASSEMBLY CLEARANCE mm (in)
$18,010 \div 18,020$ (0.7090 \div 0.7094)	$17,996 \div 18,000$ (0.7085 \div 0.7087)	$0,010 \div 0,024$ (0.0004 \div 0.0009)

4.11.3. CON ROD REASSEMBLY

- Before assembling check reference marks and assembly direction.
- Reassemble con rods in driving shaft seat on con rod pin by tightening the screws to the prescribed torque.

**CON ROD SHIM CHECK**

Make sure that assembly clearance of con rods and driving shaft shoulders complies with prescribed values:

mm 0,265±0,515 (in 0.0104 ÷ 0.0203).



4.11.4. TIGHTENING TORQUES

CONNECTING ROD GROUP	
Rods fixing screws	30÷32 Nm
Flywheel to crankshaft fixing screws	40 Nm
Ring gear fixing screws	10 Nm

4.12. DRIVING SHAFT

4.12.1. DRIVING SHAFT DISASSEMBLY

- Disassemble driving shaft con rods.
- Unscrew oil plug and thoroughly clean oil ducts and passages to con rods and main journals.





4.12.2. DRIVING SHAFT CHECK

- Apply thread locking paste to plug thread and screw it firmly back into place.
- Clean lubricant passages with compressed air.

NOTE Driving shaft is nitrided therefore cannot be ground; if wear, ovalization or deep scratching has occurred driving shaft must be replaced.



Diameter of timing side crankshaft journal

Normal (production) mm (in)
40,023 ÷ 43,007 (1.5757 ÷ 1.6932)

Diameter of flywheel side main bearing seat

Normal (production) mm (in)
47,130 ÷ 47,142 (1.8555 ÷ 1.8560)

Total thickness for flywheel side main bearing

Normal (production) mm (in)
2,044 ÷ 2,050 (0.0805 ÷ 0.0807)

Clearance between crankshaft and flywheel side main bearing

Normal (production) mm (in)
0,007 ÷ 0,047 (0.0003 ÷ 0.0018)



Diameter of flywheel side crankshaft journal

Normal (production) mm (in)
39,995÷40,011 (1.5746 ÷ 1.5752)

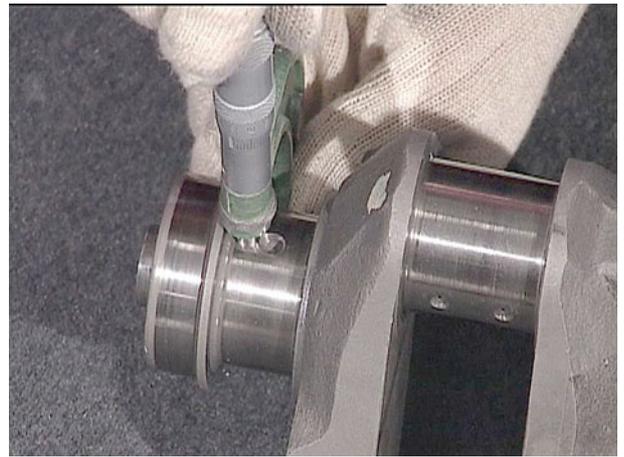
Thickness of thrust half washer on flywheel side main bearing

Normal (production) mm (in)
2,310÷2,360 (0.0909 ÷ 0.0929)

Main bearing journal to shell clearance

Normal (production) mm (in)
0,35÷0,40 (0.0138 ÷ 0.0157)

maximum parallelism error of the two crankshaft axes (crankpin and flywheel / timing side main journals) must be no greater than 0.02 mm (in 0.0009), at a distance of 40 mm (in 1.5748).



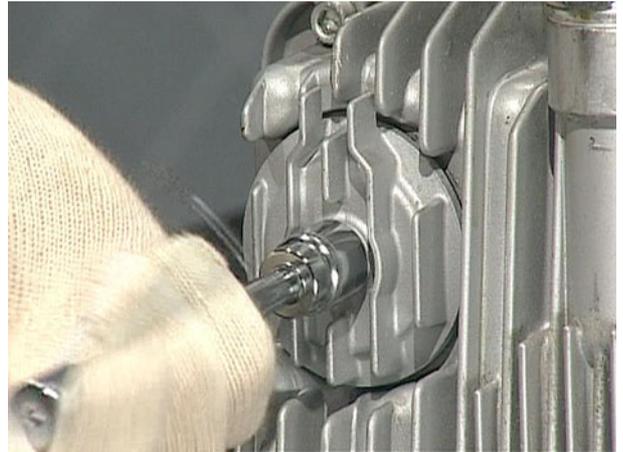
4.12.3. TIGHTENING TORQUES

CONNECTING ROD GROUP	
Rods fixing screws	30÷32 Nm
Flywheel to crankshaft fixing screws	40 Nm
Ring gear fixing screws	10 Nm

4.13. OIL SUMP

4.13.1. OIL SUMP DISASSEMBLY

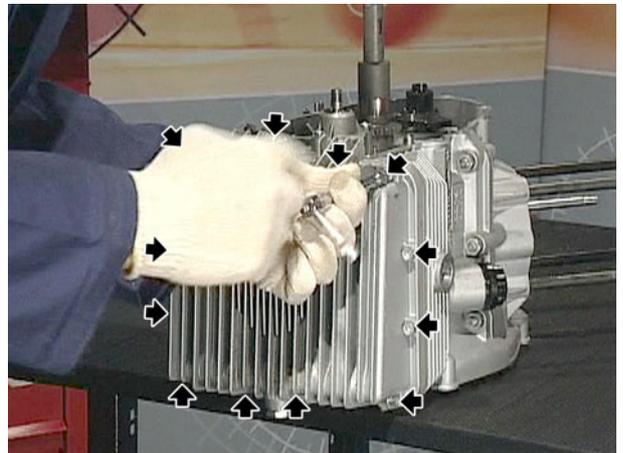
- Remove oil filter securing screw to sump.

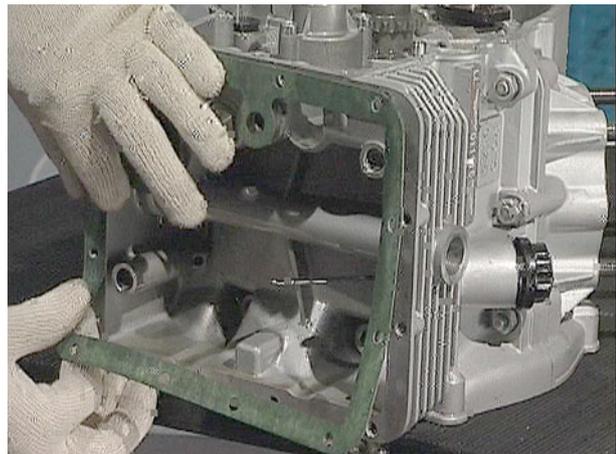


- Remove cartridge filter.

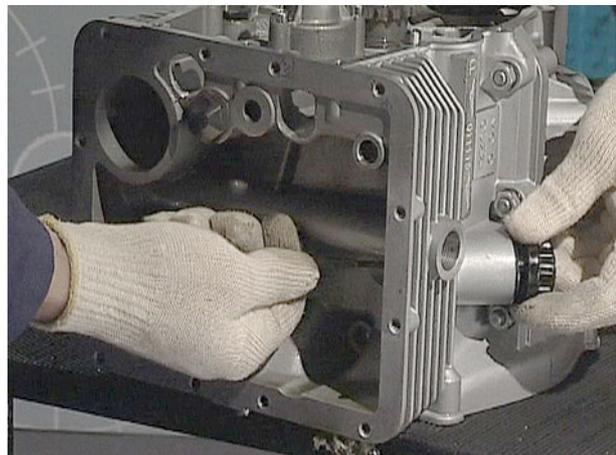


- Remove screws securing oil sump to engine block and take sump out and slide gasket off.

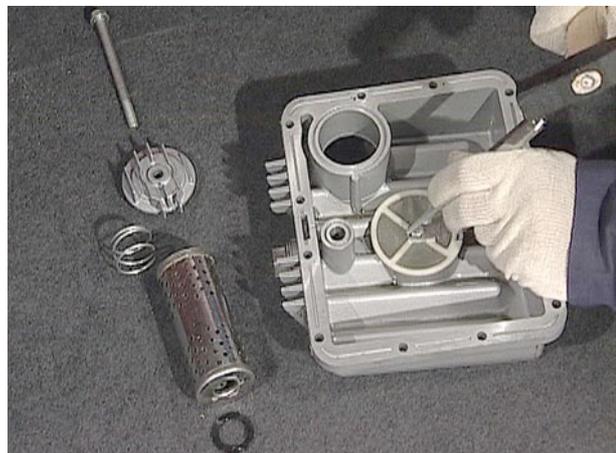




- Remove oil level indicator.



- Flatten safety plate, remove mesh filter blocking screw and filter from oil sump.





4.13.2. OIL SUMP CHECK

- Check mesh filter for dirt. If so, wash and clean with compressed air.

4.13.3. REASSEMBLY

- Insert filter, safety plate and tighten securing screw.



- Bend safety plate.



- Position gasket between oil sump and block (Always replace gasket). Take care to position gasket correctly since incorrect assembly causes anomalous oil circulation.



- Crosswise tighten sump screws and lock them with dynamometric spanner to prescribed torque.

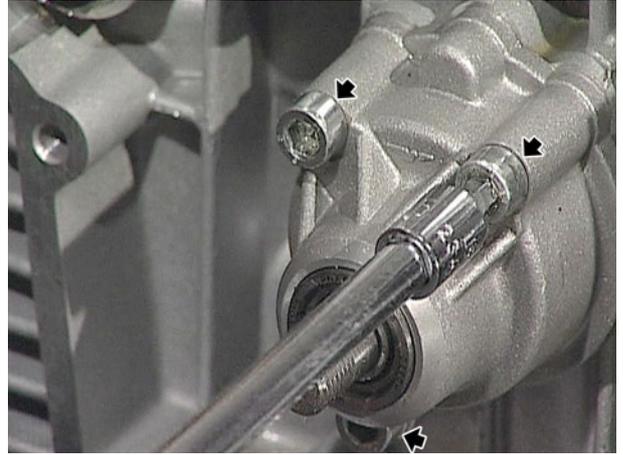


- Insert filter cartridge and tighten screw to prescribed torque.



4.13.4. OIL PUMP DISASSEMBLY

- After disassembling timing, unscrew Allen screws and remove oil pump from engine block. Disassemble pump as follows:



- Remove locking spline.
- Take pump drive shaft out with inside rotor attached.
- Remove external rotor.

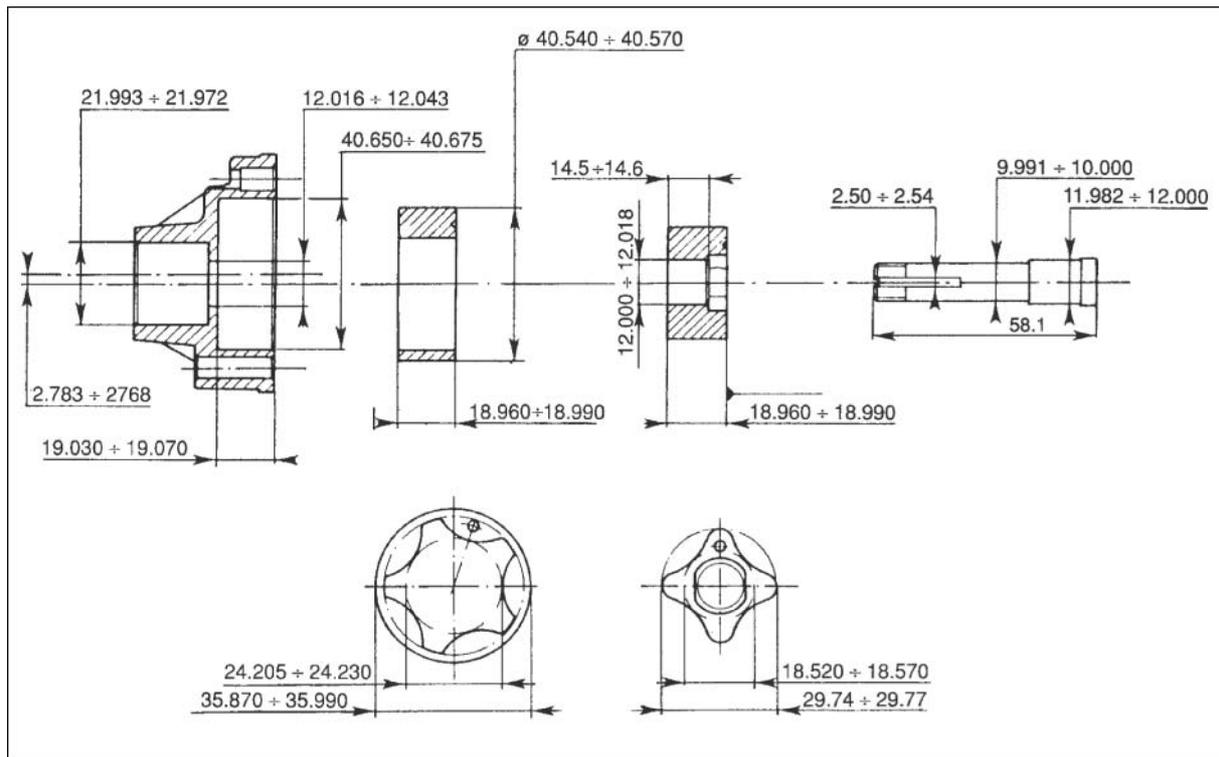


- Slip bearings and their internal housing out of pump body.





4.13.5. OIL PUMP INSPECTION

**OIL PUMP BODY**

Check that the faces and internal seats of the pump body are not scored, damaged or dented.

Oil pump data:

- \varnothing of seat for external rotor
40.650 + 40.675 mm (in 1.6004 + 1.6014);
- \varnothing of bore for pump drive shaft
12.016 + 12.043 mm (in 0.4730 + 0.4741);
- \varnothing of seat for roller bearings
21.972 + 21.993 mm (in 0.8650 + 0.8659);
- thickness of seat for external rotor
15.030 + 15.070 mm (in 0.5917 + 0.5933).

**EXTERNAL ROTOR**

Check that the internal and external surfaces and the faces are not scored or damaged, otherwise renew both rotors.

External rotor data:

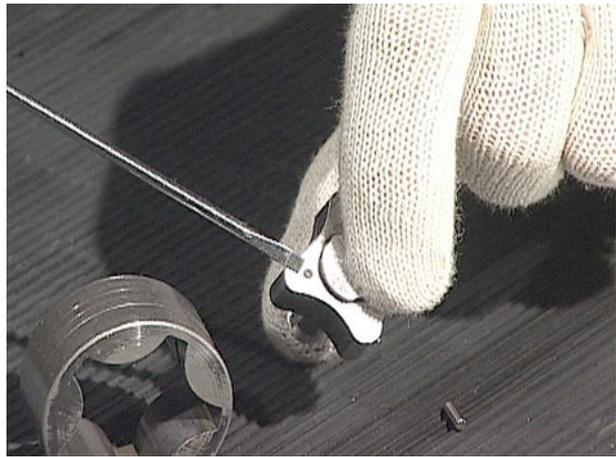
- external \varnothing 40.540 + 40.570 mm (in 1.5960 + 1.5972);
- internal \varnothing 24.205 + 24.230 mm (in 0.9529 + 0.9539);
- thickness 14.960 + 14.990 mm (in 0.5890 + 0.5902).



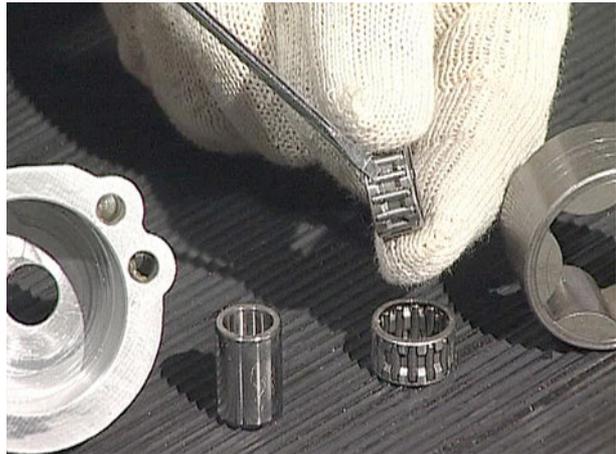
INTERNAL ROTOR

Check that the internal and external surfaces and the faces are not scored or damaged, otherwise renew both rotors. Internal rotor data:

- external \varnothing
29.745÷29.770 mm (in 1.1711 ÷ 1.1720);
- \varnothing of bore for pump drive shaft
12.000÷12.018 mm (in 0.4724 ÷ 0.4731);
- thickness
14.960÷14.990 mm (in 0.5890 ÷ 0.5902).

**ROLLER BEARINGS**

Check that the bearing rollers are not damaged, otherwise renew the bearings.

**OIL PUMP DRIVE SHAFT**

Check that the drive shaft is not damaged and that the threads are in good condition, that the keyway is not burred and that the end that operates in the internal rotor is not damaged, otherwise renew the shaft.

Shaft data:

- \varnothing for pump body bore
11.982÷12.000 mm (in 0.4717 ÷ 0.4724);
- \varnothing for roller bearings
9.991÷10.000 mm (in 0.3933 ÷ 0.3937).

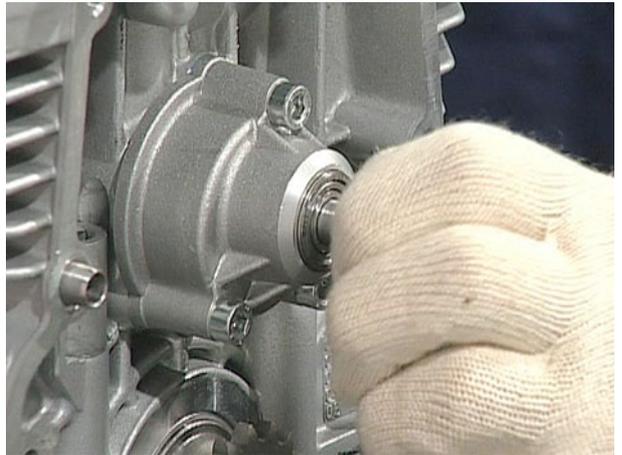
**ASSEMBLY CLEARANCES**

- between pump body and external rotor
0.080÷0.135 mm (in 0.0031 ÷ 0.0053);
- between bore on internal rotor and pump drive shaft
0.016÷0.061 mm (in 0.0006 ÷ 0.0024);
- between bore on pump body and pump drive shaft
0.016÷0.061 mm (in 0.0006 ÷ 0.0024).



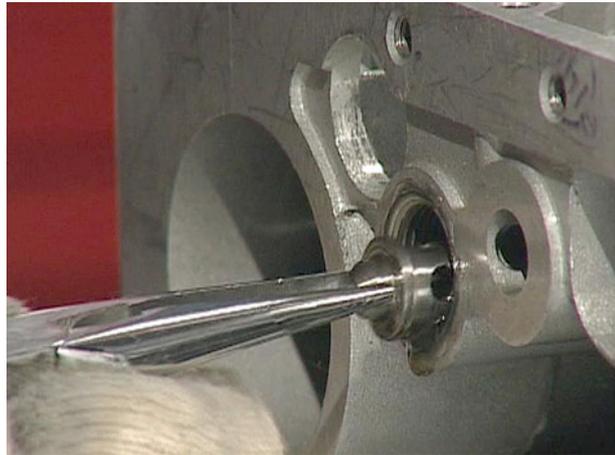
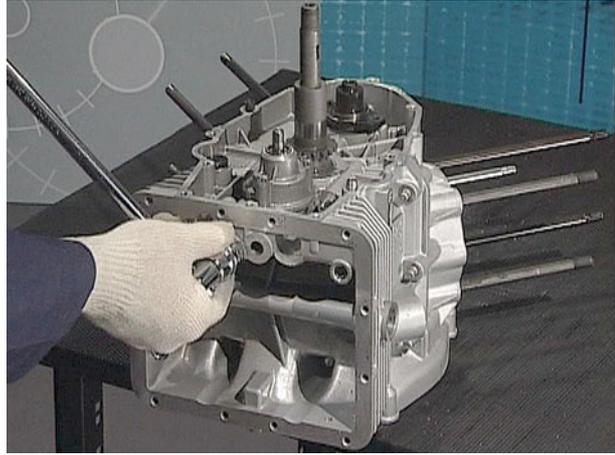
4.13.6. OIL PUMP REASSEMBLY

- Assemble oil pump and reposition on block according to the two centering dowels.
- Lock Allen screws to the prescribed torque and make sure the draw shaft revolves freely.



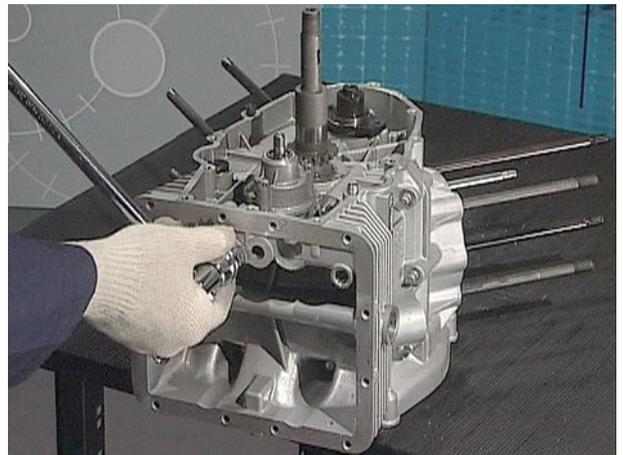
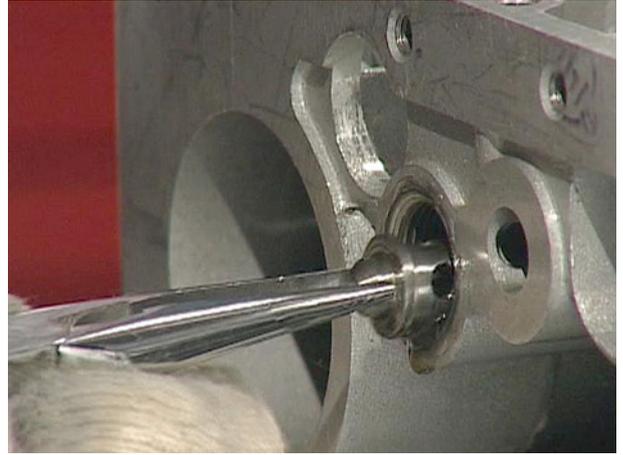
4.13.7. OIL PRESSURE ADJUSTMENT VALVE DISASSEMBLY

- Use appropriate spanner to unscrew adjustment valve fitted to threaded hole of block.



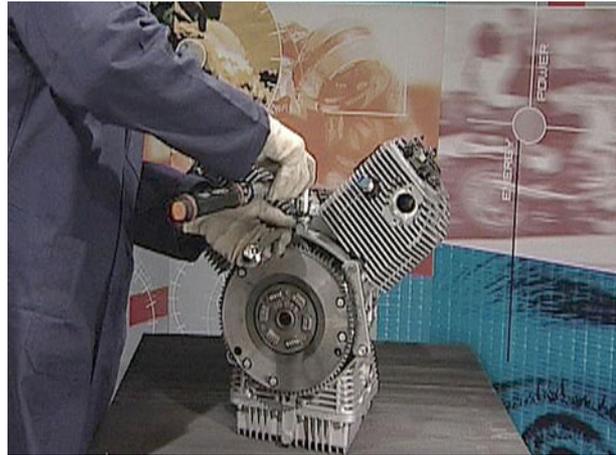
4.13.8. OIL PRESSURE ADJUSTMENT VALVE ASSEMBLY

- Insert valve and spring and use dynamometric spanner to tighten the screw covered with thread locking paste to prescribed torque.



4.13.9. OIL TRANSMITTER REASSEMBLY

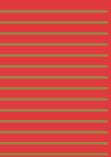
- Insert oil sensor transmitter telltale on bushing and tighten to torque.



4.13.10. TIGHTENING TORQUES

CRANKCASE AND COVERS	
Cylinder heads-barrels to crankcase fixing nut (M10)	40÷42 Nm
Cylinder heads-barrels to crankcase fixing nut (M8)	28÷30 Nm
Crankcases joining nuts (M8)	22÷25 Nm
Crankcases joining nuts (M10)	40÷42 Nm
Timing cover fixing screws	10 Nm
Sump fixing screws	10 Nm
Valves cover insert fixing screw	5 Nm

LUBRICATION	
Oil pressure sensor	8÷10 Nm
Oil pump to crankcase fixing screws	10 Nm
Filter cartridge sealing cover fixing screws	25 Nm



Moto Guzzi S.p.a.

Via E.V. Parodi, 57
23826 Mandello del Lario (LECCO) Italy
Tel. +39 0341 709111
Fax +39 0341 709220
www.motoguzzi.it
www.servicemotoguzzi.com