

# TANGO 125

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Chassis workshop manual



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# *Introduction*

This workshop manual contains the main electromechanical checks, as well as the essential general checks and the fitting of components supplied separately, designed to prepare the factory-new moped for delivery.

It is very important to adhere strictly to the instructions set out in the manual. Interventions carried out superficially, or worse still, omitted entirely, may result in personal injury to the user, damage to the machine, etc., or may simply result in disagreeable complaints.

N.B.: **Rieju, S.A.** reserves the right to make changes at any time, without prior notification. For any enquiry, or for further complimentary information, please call the **Rieju S.A.** After-sales Service.

## **MANUAL UPDATES**

Updates will be sent within a reasonable period of time. Each new CD-Rom will update previous information.

The contents list will be updated if the modifications and/or variations in the pages affect the ability to consult the manual.

**IMPORTANT!** This series of workshop manuals should be considered as work instruments in themselves and can only maintain their “value” over time if they are kept constantly up to date.

**SYMBOLYLOGY USED IN THE MANUAL**

**CAUTION!** Recommendations and precautions regarding rider safety and motor vehicle integrity.



**WARNING!** Situations entailing the risk of personal injury to maintenance or repair mechanics, other workshop personnel or third parties, or damage to environment, vehicle or equipment.



**FIRE HAZARD**  
Indicates operations which may constitute a fire hazard.



**RISK OF EXPLOSION**  
Indicates operations which may constitute a risk of explosion.



**TOXIC**  
Indicates a possibility of intoxication or inflammation of the upper respiratory tract.



**MECHANICAL MAINTENANCE**  
Operations to be performed only by an expert mechanic.



**ELECTRICAL MAINTENANCE**  
Operations be performed only by an expert electrical / electronic technician.



**NO!**  
Operations to be absolutely avoided.



**SERVICE MANUAL**  
Indicates information which may be obtained by referring to said manual.



**SPARE PARTS CATALOGUE**  
Indicates information which may be obtained by referring to said catalogue.



## ABBREVIATIONS USED IN THE MANUAL

F	Figure
Pr Tr	Tightening torque
P	Page
Ap	Paragraph
S	Section
Es	Diagram
T	Table
Tr	Screw

**Note:**

*The letter Tr in the illustrations refers to retaining or adjusting screws. The number following this letter refers to the number of the same type of screw in the unit or component described and illustrated. Letters not followed by a number indicate a single screw. In case of different screws being referred to in the illustration, the letter Tr is followed by a number and a small letter, for instance: (Tr4a).*

*Unless otherwise specified, units and components are reassembled by proceeding in the reverse order of removal.*



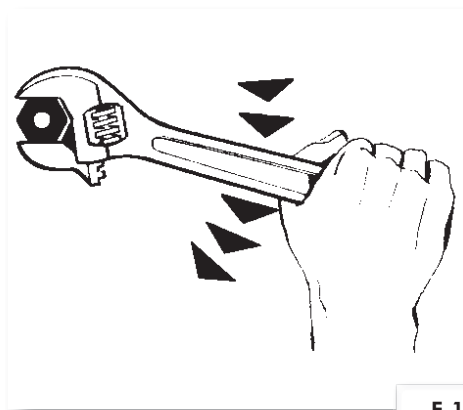


## GENERAL WORK RULES

- The **advice**, **recommendations** and **warnings** given hereafter are aimed at ensuring maximum work safety as well as at considerably reducing the risk of accidents, personal injury, equipment damage and idle times. They should therefore be strictly adhered to.

### ADVICE:

- Only use quality tools and equipment.
- Only use equipment conforming to EU Directives for lifting the vehicle.
- During operations, always keep tools and equipment at hand, possibly laying them out according to the sequence in which they are to be used. Absolutely avoid putting them on the vehicle itself, out-of-sight or in poorly accessible places.
- Always keep the work area clean and tidy.
- When tightening screws or nuts, start with the **larger diameter** or inner fasteners, and tighten them in progressive “**pulls**” in accordance to a “**criss-cross**” pattern.
- Preferably use open-end box wrenches by “**pulling**” and not “pushing”.
- Adjustable wrenches (F-1) should only be used in case of emergency, i.e. when a properly sized wrench is not available. They should preferably not be used as the movable jaw tends to open thus risking damaging or not properly tightening the bolt to the correct torque. In any case, when using an adjustable wrench, take care to proceed as shown in Figure 1.
- Except for occasional customers, always make out and deliver to the customer a **work sheet** specifying the operations performed, with notes as to any future checks eventually required.

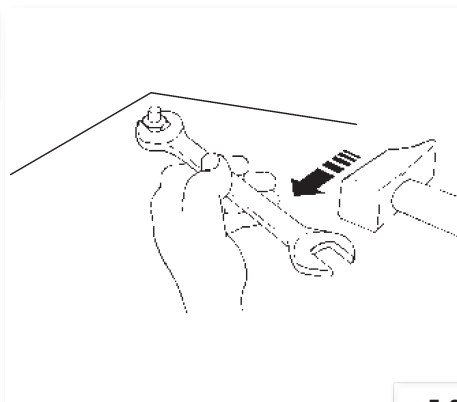


F-1

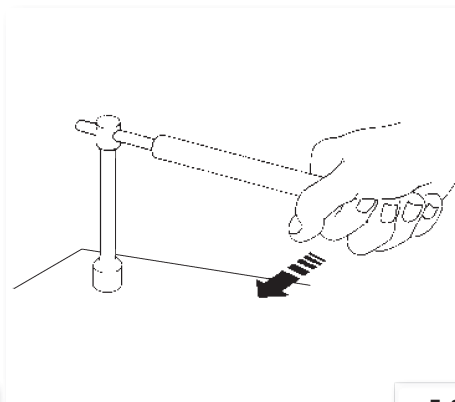


## RECOMMENDATIONS

- **Before** carrying out any operation on the vehicle, wait for all parts to **cool** down.
- For operations requiring two mechanics, make sure that the various steps to be performed by each of them are clearly defined and coordinated beforehand.
- Make sure that each component has been properly fitted before proceeding with the next one.
- Lubricate all parts (where applicable) before reinstalling them.
- Gaskets, O-rings, circlips and split pins **must be replaced** at every refitting.
- The torque settings specified in the manuals refer to the “**final torque**”, which must be attained progressively by steps.
- Loosen and tighten aluminium alloy parts (covers) only after the **engine has fully cooled down**.
- Only use screwdrivers with sizes suitable to the screws to be loosened or tightened.
- **Work in a comfortable position and ensure that the vehicle is stable.**
- **Never use a screwdriver as a lever or chisel.**
- **Never use pincers to loosen or tighten screws or nuts because, in addition to not providing a sufficient clamping force, they may also damage the screw head or nut hexagon.**
- **Never tap the wrench with a hammer or other similar tools to loosen or tighten screws and nuts (F. 2).**
- **Never attempt to increase the lever arm by fitting a tube into the wrench (F-3).**



F-2



F-3



**Never use open flames for any reason.**

**Never leave** open containers or containers not suitable for holding fuel in passageways, close to heat sources, etc



**Never use** petrol to clean the vehicle or the floor of the workshop. Always use low flash point solvents to clean the vehicle components.



**Never suck** from or blow into the fuel pipe.

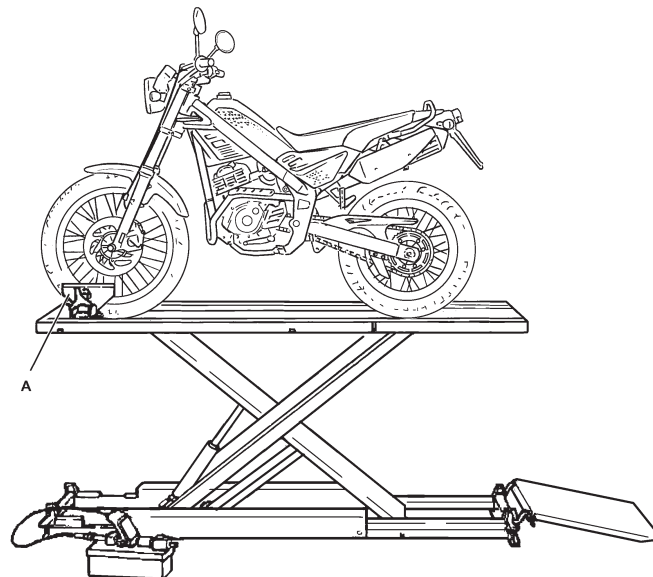
**When welding**, make sure that there are no flammable liquids in the vicinity. Always remove the tank, even if completely empty, and disconnect the negative cable (-) from the battery.

**Never leave the engine running in closed or poorly ventilated areas.**



Before any servicing, make sure that the motorbike is perfectly stable.

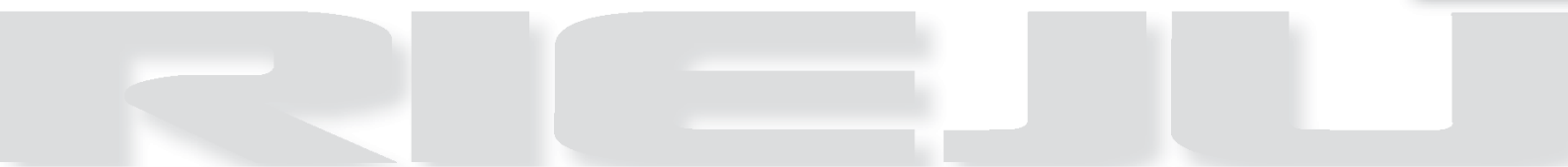
The front wheel should preferably be anchored to the equipment (A/F-4) integral with the lifting board.



F-4



*To know the motorcycle*





MAINTENANCE OPERATIONS	1ST SERVICE AT 1.000 KM.	2ND SERVICE AT 3.000 KM.	SERVICE EACH 5.000 KM
Brake system checking	•	•	•
Transmission oil level checking	Change	•	Change
Chain tension and wear inspection	•	•	•
Suspension control	•		•
Controls and cables checking, adjustment and grease	•	•	•
Wheel spoke tension and wheel off-centre inspection	•		•
Air filter cleaning and grease	•	•	•
Carburettor checking and adjustment	•		•
Spark plug checking and adjustment or change	•	•	•
Screws and chassis nut control – plastics	•		•
Electrical system checking	•		•
Segments wear control			•
Exhaust system checking			•
Terminals and battery conditions checking	•	•	•

**SPECIFICATIONS AND TECHNICAL CHARACTERISTICS**

<b>Dimensions</b>	
Overall length	1995 mm.
Overall width	800 mm.
Overall height	1130 mm.
Seat height	790 mm.
Wheelbase	1305 mm.
Minimum ground clearance	250 mm.
<b>Weight</b>	
Dry	101 kg.
<b>Engine</b>	
Type	4-stroke SOHC
Transmission	5 speeds
Make	YAMAHA
Cylinder arrangement	Monocylindrical, forward-inclined cylinder
Cylinder capacity	123,7 c.c.
Bore x stroke	54 x 54 mm.
Compression ratio	10:1
Starting system type	Kick-starter and electric starter
Lubrication system	Wet sump



Transmission Oil	
Type Quantity	CASTROL SAE 20W-50 API, "SH" or high-grade
Air Filter	
	Wet type foam rubber cartridge
Fuel	
Type Fuel tank capacity	Unleaded petrol 5,5 L.
Carburettor	
	Mikuni / VM 20
Spark plug	
Type Electrodes gap	CR7HSA / NGK or U22FSR-U / THICK 0,6 - 0,7 mm.
Clutch type	
	Wet, multiple-disc
Primary transmission	
Clutch crown Stroke pinion Transmission ratio	Z = 19 Z = 69 I: 3,57
Secondary transmission	
Start engine pinion Pulling plate Transmission ratio Chain	Z = 14 Z = 48 I: 3,42 428 RN8 x 126 steps

GEAR CHANGE				
Speed	Primary shaft	Secondary shaft	Gear ratio	Start ratio
1 <sup>a</sup>	Z = 14	Z = 37	I: 2,64	I: 9,42
2 <sup>a</sup>	Z = 18	Z = 32	I: 1,78	I: 6,35
3 <sup>a</sup>	Z = 19	Z = 25	I: 1,32	I: 4,71
4 <sup>a</sup>	Z = 22	Z = 23	I: 1,05	I: 3,74
5 <sup>a</sup>	Z = 24	Z = 21	I: 0,88	I: 3,14





Suspension	
Front	Telescopic fork Bar Ø 37 mm 340 cc CASTROL SAE 15Wper bar
Rear	Gas damper
Brakes	
Front	Disc Ø 260 mm.
Rear	Disc Ø 200 mm.
Tyres	
Front	Bridgestone 90/100-19" 55P with tube
Rear	Bridgestone 120/90-16" 63P with tube
Electric equipment	
Ignition system	C.D.I.
Generator	Magneto generator AC 120 w
Battery	12 V - 5,5 Ah
Fuse	10 Amp
Bulb voltage and wattage	
Headlight	12V 55/60W H4
Taillight	12V 21/10W
Dashboard	12V 1,2W
Indicators	12V 10W
Odometer lighting	Led





## UNPACKING

- Unpack the motorcycle following the indications appearing on the same packaging, after that it should be thrown according to current regulations.

## “AESTHETIC” CONTROL

Control visually that all the components of plastic material are correctly assembled and that the motorcycle does not show any scratch, mark, etc.

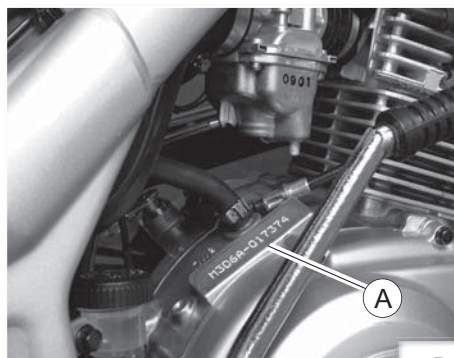
## IDENTIFICATION DATA

### Engine identification number

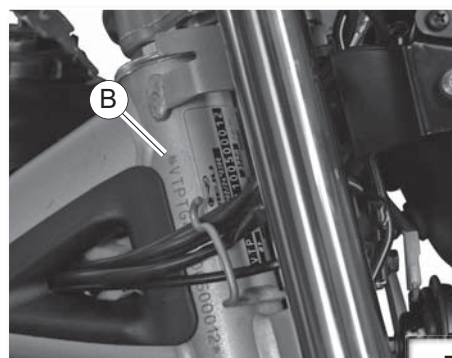
- The data for identifying the engine (A/F -1) are on the right sump.

### Vehicle identification number

- The identification number of the motorcycle (B/F -2) is stamped on the steering pipe.



F-1



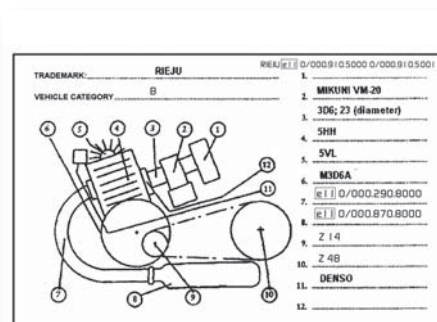
F-2

## SAFETY TAG

It contains the identification data of the motorcycle according to the 97/24/CE guidelines.

It is absolutely essential to indicate the identification data of the motorcycle when ordering spare parts.

This tag should not be substituted either modified.



F-3

### IDENTIFICATION OF THE MAIN PARTS (Left side)



F-4

- 1. Headlight
- 2. Rear-view mirror
- 3. Fuel tank
- 4. Battery
- 5. Rear direct. indicators
- 6. Side stand
- 7. Gear pedal
- 8. Front direct. indicators

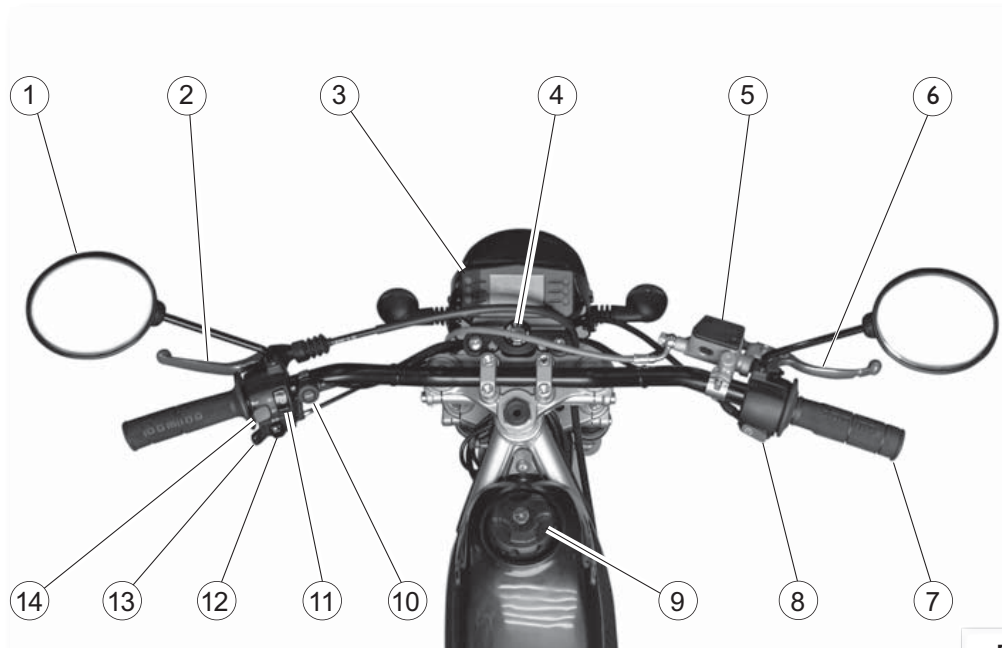
### IDENTIFICATION OF THE MAIN PARTS (Right side)



F-5

- 9. Grab bar
- 10. Air filter box
- 11. Fuel tank cap
- 12. Rear brake pedal
- 13. Passenger footrest
- 14. Number plate light and plate holder

## CONTROLS AND INSTRUMENTS



F-6

- |                        |   |                      |
|------------------------|---|----------------------|
| 1. Rear-view           | 7. Accelerator grip                                 | 12. Indicator switch |
| 2. Clutch lever        | 8. Start switch                                     | 13. Start lever      |
| 3. Dashboard           | 9. Fuel tank cap                                    | 14. Horn switch      |
| 4. Main switch         | 10. Stop switch                                     |                      |
| 5. Front brake pump    | 11. Lights switch (dipped and full-beam headlights) |                      |
| 6. Front brake control |   |                      |

## KEYS

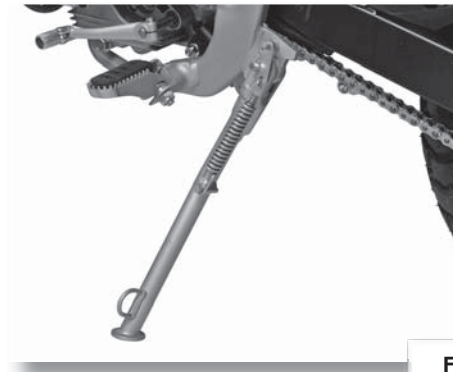
- The motorcycle is provided with two numeric code keys which allow:
  - To establish start ignition
  - To turn on the lights
  - To lock the steering

## STEERING LOCK

- **Activate:** With the handlebar turned to the left, get the key thorough into the lock and then turn it to the left.
- **Deactivate:** Turn the key to the right.

### SIDE STAND

• Make sure the lateral rest is well fixed and it moves correctly likewise it is advisable to check frequently the hold-up system, made up of drive springs.



### DASHBOARD

#### 1- "N" neutral gear warning light

This warning light lites when the transmission is in the neutral gear position.

#### 2- Oil level warning light

This warning light lites when the oil level is low.

#### 3- Coolant temperature warning light

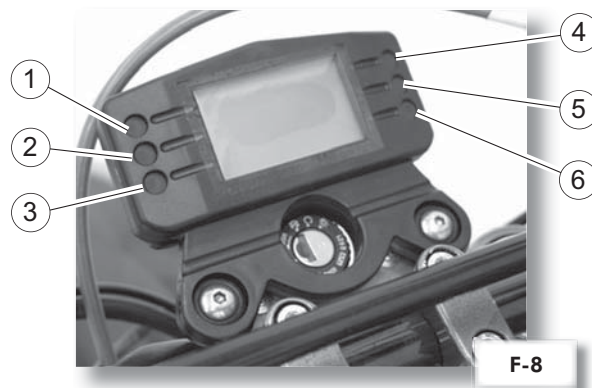
This warning light lites when the temperature of the coolant is too much high. If this happens, stop the engine immediately.

#### 4- Steering warning light

This warning light twinkles when the steering switch moves towards the left or the right.

#### 5- Warning light of the full-beam headlights

This indicator lites when the full-beam headlights are in use.




**TYRES****Dimensions**

Front: 90/100-19" 55P with tube

Rear: 120/90-16" 63P with tube

**PRESSURE CONTROL**

The pressure of the tyres must be controlled and regulated with the "tyres at room temperature".



Position	Bar
FRONT	1,7 kg / cm <sup>2</sup>
REAR	2,0 kg / cm <sup>2</sup>

**F-9****FUEL TANK**

Unscrew the cap and refuel the tank paying attention not to pass the limit; if after filling some petrol residues are showed on the motorcycle, wipe them off immediately. Use normal unleaded petrol.

**Fuel tank capacity:** Total: 5,5 litres

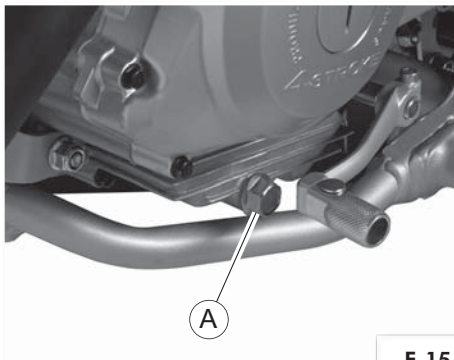
**F-10**

**TRANSMISSION OIL****Change**

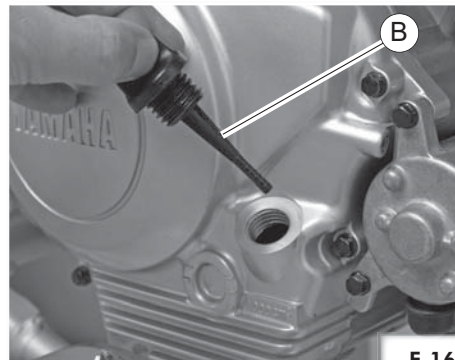
1. Place the motorcycle in a flat surface.
2. Warm the engine up for some minutes.
3. Pull the engine up. Place a tray for the oil under the engine.
4. Unscrew the emptying nut (A/F -15) and the loading cap (B/F -16) to allow the oil to flow.
5. When it is completely emptied, screw tightly the emptying nut (A/F -15).
6. Fill the engine with oil. The loading cap has a control of maximum and minimum loading of oil. Place the loading cap (B/F -16) and tighten it.

It is advisable to use CASTROL oil SAE 20W-50 API, "SH" or high-grade.

7. Get the engine started and warm it up for some minutes. During the warming, check any possible leak of oil. If so, pull the engine up immediately and find out the cause.



F-15



F-16

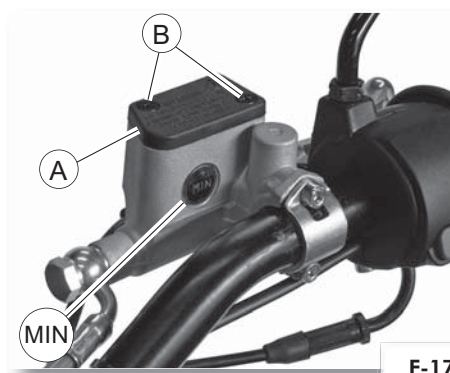


## BRAKE OIL

### Control

When the oil level is going to be checked, turn the handlebar to verify that the upper part of the main cylinder is levelled out.

Check the oil level is above the mark of the minimum level in the tray of the rear brake. And control there is enough oil for the front brake observing by the peephole placed in the pump.

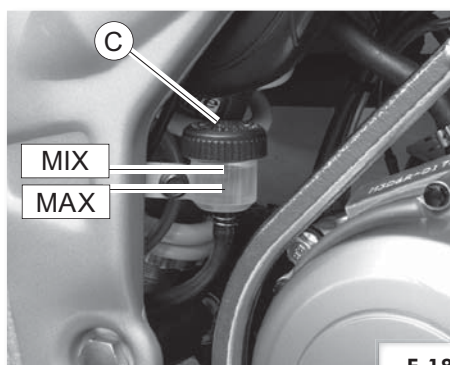


F-17

### Change

For the front brake, remove the cover (A/F -17) after taking the screws out (B/F -17). For the back brake, remove the cap (C/F -18).

The quality of the used liquid should comply with the specified regulations; since otherwise the rubber gaskets can wear, causing leaks and reducing the effectiveness of the brake.



F-18

**Recommended brake liquid:** DOT 4



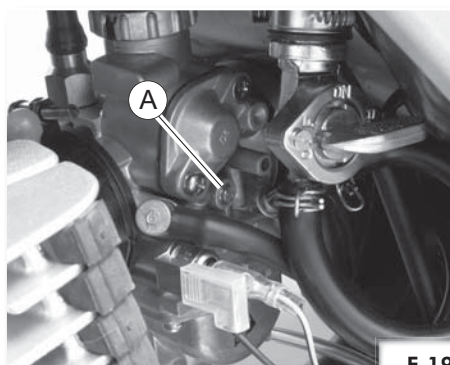
**ATTENTION:** Brake liquid is abrasive.

## ADJUSTMENT OF THE MINIMAL INTERVAL OF TURN

Start the engine and warm it up for some minutes in the 1000 to 2000 rpm interval speeding up till the 4000 to 5000 rpm. When the engine responds quickly to the acceleration, that means it is hot.

Adjust the minimal zone of the engine turning the screw for gas adjustment (A/F -19). Screw to the right to speed up and to the left to slow down.

Control the ideal interval of the engine with an electronic tachometer connected to the spark plug cable.



F-19

## TENSION ADJUSTMENT OF THE TRANSMISSION CHAIN

The adjustment of the chain carries out loosening the rear axle of the wheel and screw in or unscrew the adjacent bolts and nuts (A/F-20), always getting the same distance on both sides of the axle.



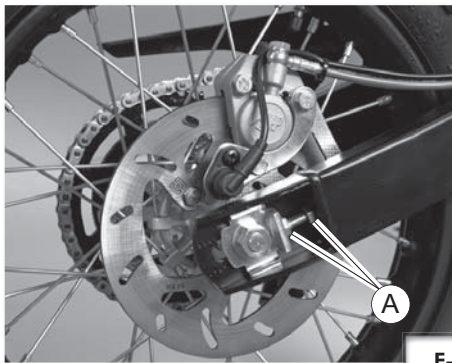
**ATTENTION:** A wrong alignment of the chain and the wheel can make the chain comes out, as well as give stability problems in the motorcycle.

To control and adjust the chain you should operate on the rear axle of the wheel, always working in the maximum tension point of the chain.

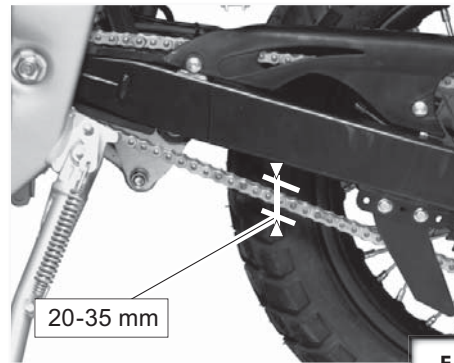
To control the play, turn the rear wheel on several times and check the tension in different places to meet the tensest point.

The motorcycle should be placed vertically with the two wheels on the floor and the looseness of the chain ought to be from 20 to 35 mm (F-21).

Try not to tighten the chain excessively since it could damage the engine and the transmission; keep the chain tension within the specified limits in the following sketches:



F-20



F-21

It is necessary a periodically cleaning and greasing of the chain. The chain is composed of lots of pieces that work together. A correct maintenance of the chain is required to avoid a quickly wear, so therefore, it is convenient to grease the chain periodically, with a special oil for this purpose.

Before lubricating it is necessary to clean the chain in order to get the dirt off. Clean with a brush or a cloth and then apply the lubricant between the lateral plates and in all the central rollers.

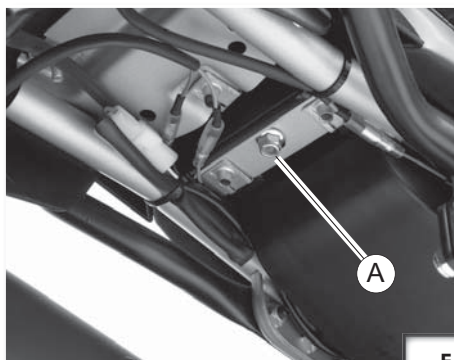


# *Disassembly*



## I. SEAT

Unscrew the nut (A/F-1) located inside the cavity of the rear wheel. After, lift the seat off the back and pull it backwards to remove it from the front catch (B/F-2).



F-1



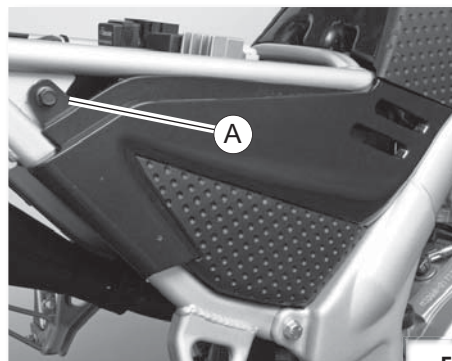
F-2

## 2. LATERAL COVER

\* Remove the seat.

Unscrew the bolt from the back (A/F-3).

Following, pull the part to remove it.

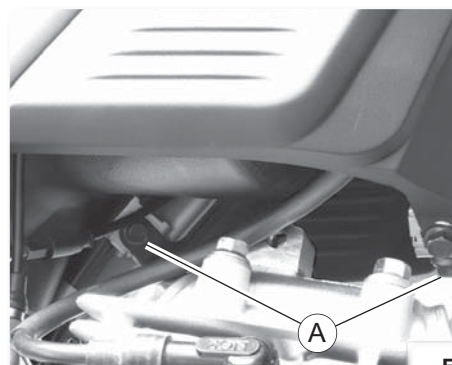


F-3

## 3. FRONT LATERAL COVER

Unscrew the two bolts (A - /F-4) of each plate, located in the lower part of the plates.

After, pull the part to remove it.



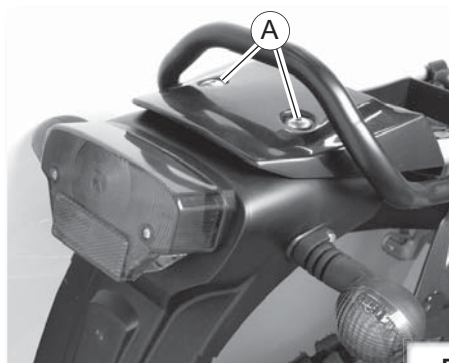
F-4



### 4. PILLION SEAT

\* Remove the seat.

Unscrew the 2 bolts (A/F -5) and remove it by the front.



F-5

### 5. MUFFLER

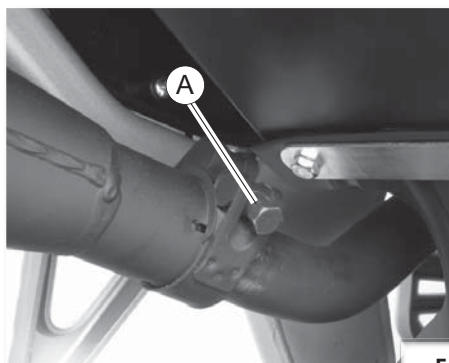
Loosen the clamp (A/F -6) of the exhaust which holds the muffler.

Following, unscrew the bolt (B/F-7) which holds the muffler on to the chassis.

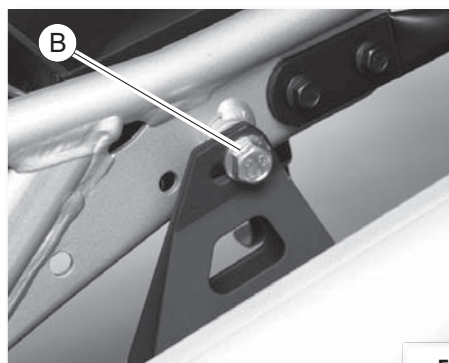
To extract it, pull the muffler backwards.



**ATTENTION:** Before proceeding to the muffler disassembly, make sure that it is cooled down.



F-6



F-7





## 6. EXHAUST

\* Remove the left lateral cover and the left front lateral cover.

To facilitate the extraction of the exhaust, remove the go-faster stripes (A/F -8).

Loosen the clamp (B/F -9) of the exhaust, which holds the muffler.

Remove the 2 bolts (C/F -10) that hold the exhaust on to the engine in the front part.

Remove the bolt (D/F -11) that holds the exhaust in the front part of the motorcycle.

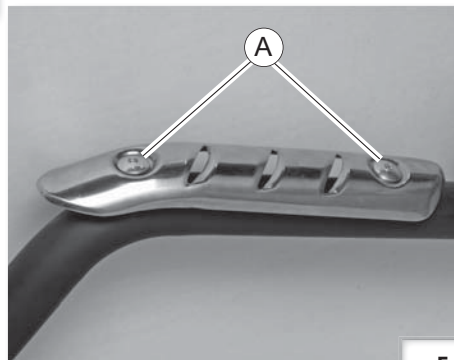
### To remove the exhaust from its position:

Pull it to be able to extract it from the engine and from the clamp of the muffler.

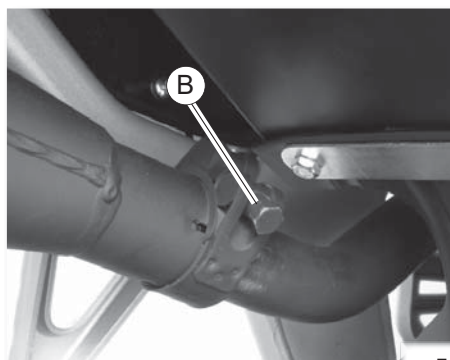
Place the exhaust in parallel with the chassis (E/F -12) and after turn it (F/F -13) and pull to remove it from its position.



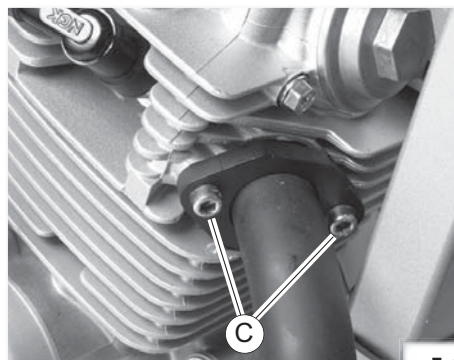
**ATTENTION:** Before proceeding to the muffler disassembly, make sure that it is cooled down.



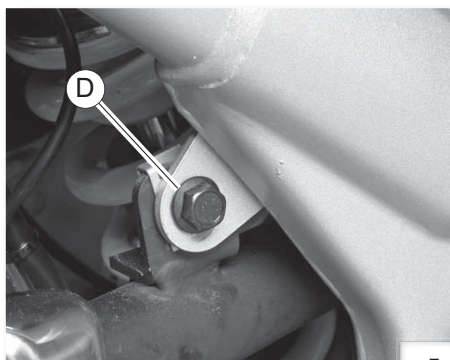
F-8



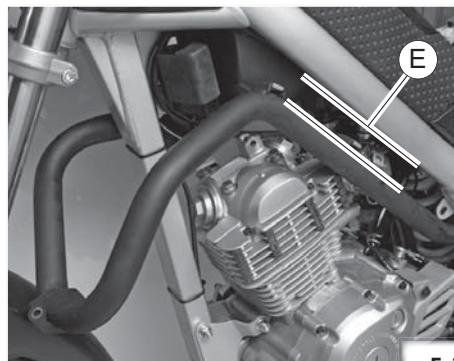
F-9



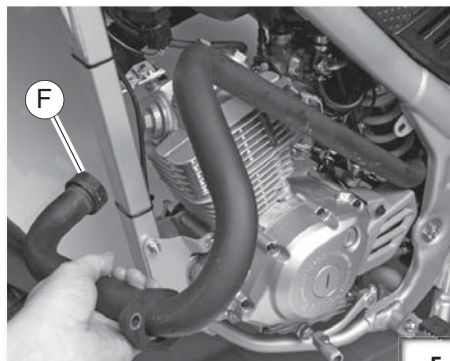
F-10



F-11



F-12



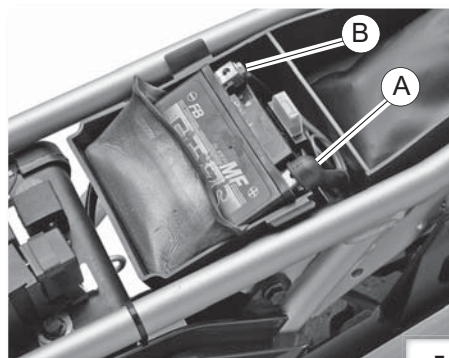
F-13



### 7. BATTERY

\* Remove the seat.

Disconnect the two cables (positive red (A/F -14) and negative (B/F -14) black).



F-14

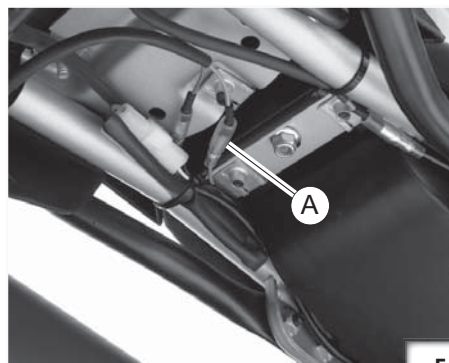
### 8. REAR DIRECTION INDICATORS

Cut the clamp that hold the cables (A/F -15) and disconnect them from the general wiring.

Following, loosen the screw (B/F -16) and pull the cable to remove the light.



**ATTENTION:** Before proceeding to the lights disassembly, pay attention to the sequence of the terminals for the later assembly (see electric diagram).



F-15



F-16



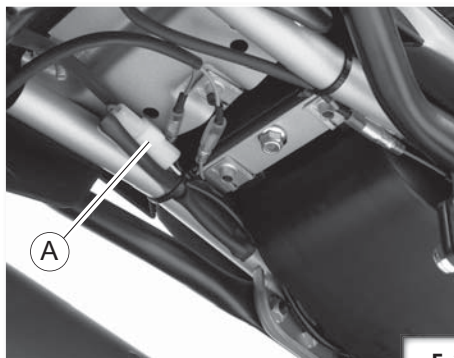


## 9. TAILLIGHT

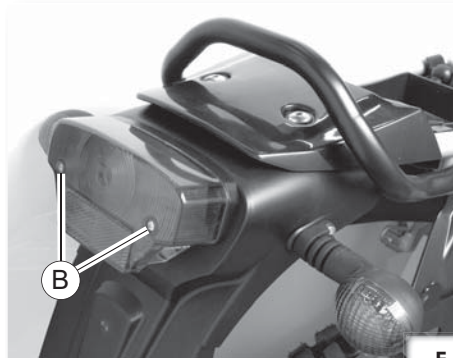
Disconnect the terminal (A/F -17) from the wiring.  
After, loosen the 2 screws (B/F -18) that hold the cover of the taillight.  
To extract it, pull the cable (C/F -19) to remove the light.



**ATTENTION:** Before proceeding to the lights disassembly, pay attention to the sequence of the terminals for the later assembly (see electric diagram).



F-17



F-18

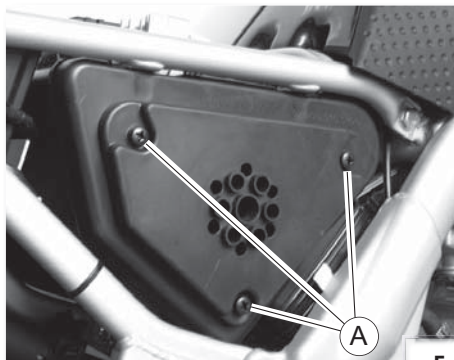


F-19

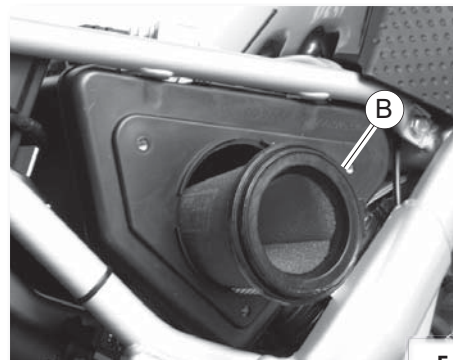
## 10. AIR FILTER

\* Remove the seat and the right lateral cover.

Unscrew the 3 bolts (A/F -20) of the filter cover.  
After, remove the filter (B/F -21).



F-20



F-21



### 11. REGULATOR

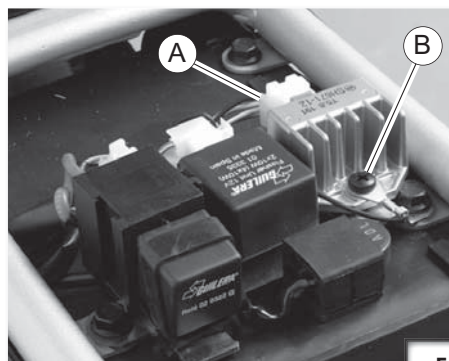
\* Remove the seat.

Disconnect the regulator from the wiring (A/F -22).

Following, unscrew the bolt (B/F -22) to remove it.



**ATTENTION:** Connect the earth cable again during the assembly.



F-22

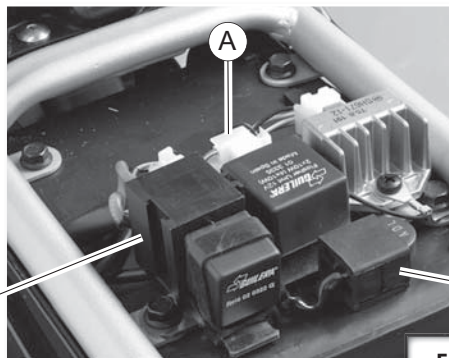
### 12. COMPONENTES ELÉCTRICOS

\* Remove the seat.

Disconnect the intermittence station (A/F -23) from the general wiring.

After, extract it from the rubber.

starter relay



environmental sensor

F-23

### 13. CDI UNIT

\* Remove the left front lateral cover.

Disconnect the CDI unit (A/F -24) from the general wiring.

Following, extract it from the rubber.



F-24



#### 14. FILTER BOX

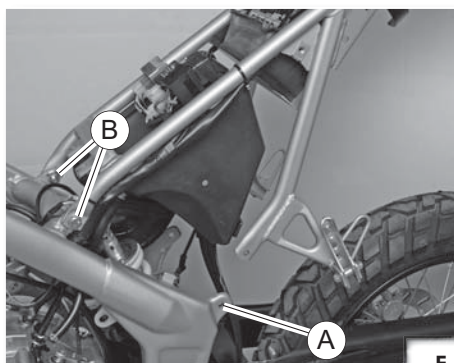
\* Remove the seat, the fuel tank and the muffler.

To make the task easier, unscrew the 2 bolts (A/F -24) of the rear chassis and loosen the precedent 2 (B/F -24).

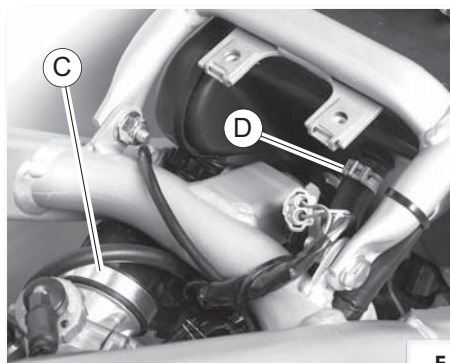
Loosen the nozzle (C/F -25) of the carburettor and the ventilation tube (D/F -25).

After, unscrew the 4 bolts (E/F -26) at the top.

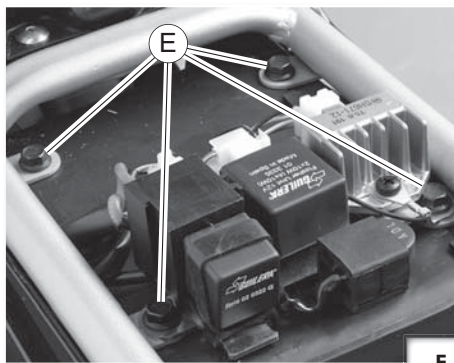
To extract it, lift the rear chassis and remove the filter box.



F-24



F-25



F-26



### 15. SHOCK ABSORBER

\* Remove the seat and the filter box.

To make the task easier, unscrew the 2 bolts (A/F -27) of the rear chassis and loosen the precedent 2 (B/F -27).

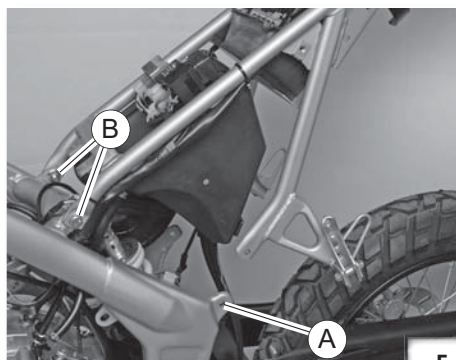
Unscrew the 2 bolts (A/F -28) that hold the shock absorber on to the chassis and remove it from the back.



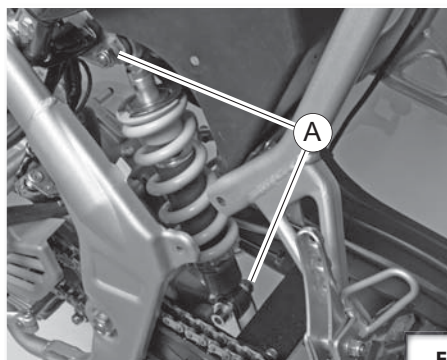
**ATTENTION:** Before disassembly, hold the chassis by the lower part in order to avoid the fall of the swing arm and the wheel.



**ATTENTION:** Pay attention to the shock absorber position for the later assembly.



F-27



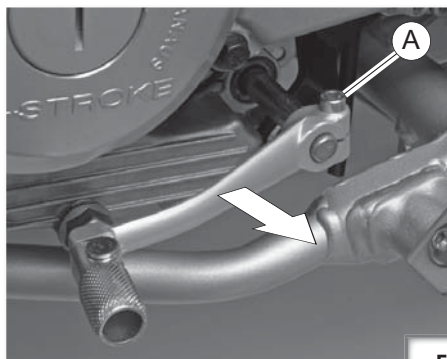
F-28

### 16. GEAR LEVER

Unscrew the fixing (A/F -29) bolt.



Following, pull carefully the lever in order not to damage the grooved shaft.



F-29





## 17. FUEL TANK

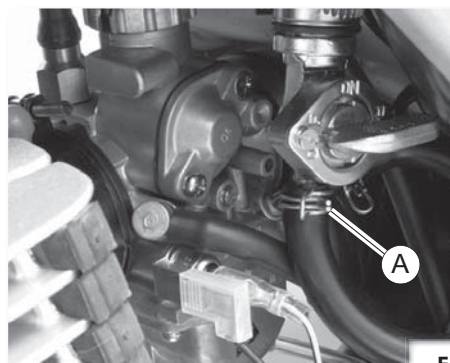
\* Remove the seat.



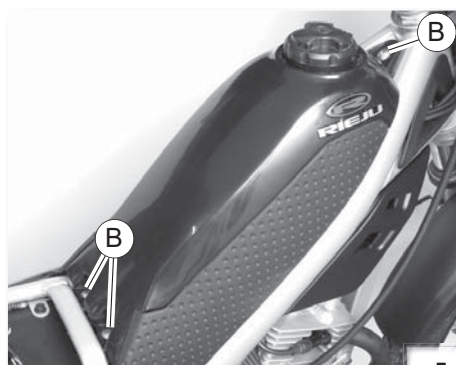
**ATTENTION:** before proceeding to the disassembly, turn off the tap of the tank.

Remove the clamp of the tap (A/F -30), after unscrew the 3 bolts (B/F -31) that hold the tank on to the chassis.

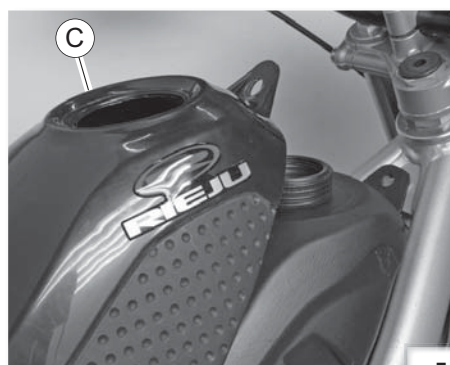
Following, remove the cap and separate the cover from the Tank (C/F -32).



F-30



F-31



F-32

## 18. CARBURETTOR

\* Remove the seat and the fuel tank.

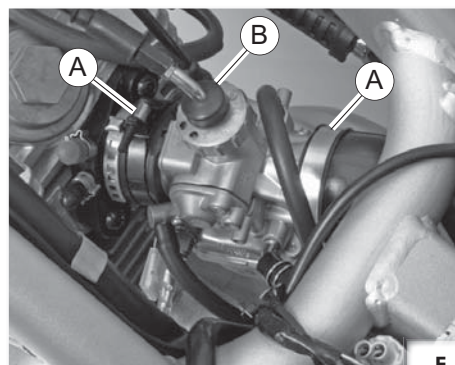
Loosen the 2 clamps (A/F -33) that hold the carburettor on to the filter box and to the engine.

Unscrew the top cover of the carburettor (B / -F 33) and disconnect the cable of the gas.

After, disconnect the air intake sleeve and the rest of tubes.



**ATTENTION:** Pay attention to the position of the tubes for the later assembly.



F-33

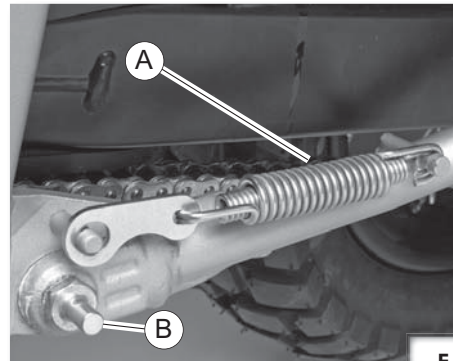


### 19. SIDE STAND

**ATTENTION:** Hold the motorcycle before carrying out this operation.

Remove the tensioning spring (A/F -34).

After, unscrew the bolt (B/F -34).



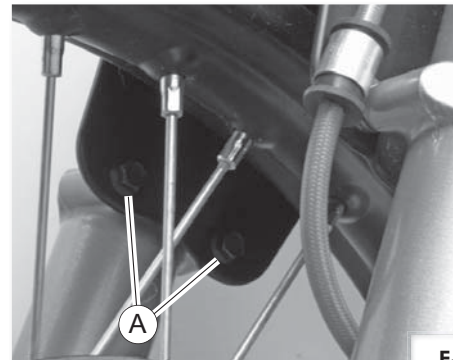
F-34



### 20. FRONT MUDGUARDS

Unscrew the 4 bolts (A/F -35), two in each side which hold the mudguards on to the fork.

Remove it by the front part.



F-35





## 21. ENGINE

\*Remove the front lateral plates, the carburettor and the exhaust.  
To make the task easier, remove the rear brake lever.

Disconnect the spark plug (A/F -36), the clutch cable (B/F -36) and the ventilation tube of the engine (C/F -36).

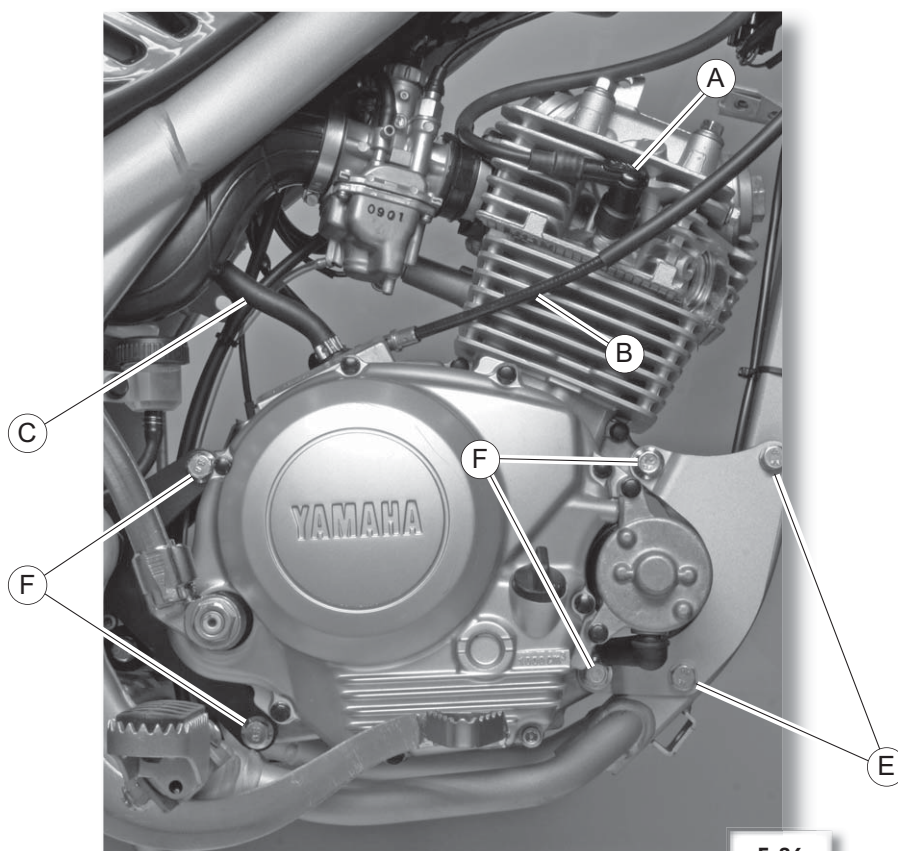
To gain access to the top part disconnect the 2 terminals of the engine (D/F -37).

Unscrew the 2 bolts (E/F -36) of the engine front support.

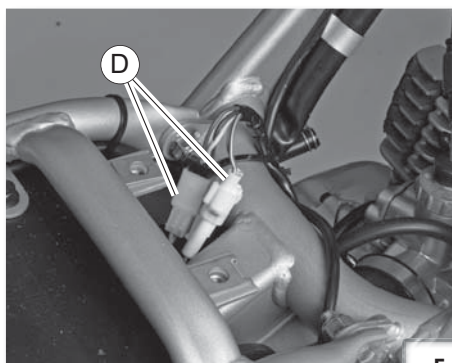
After, unscrew the 4 bolts (F/F -36) that hold the engine.



**ATTENTION:** Extract the engine from the chassis cavity by the right side.



F-36



F-37



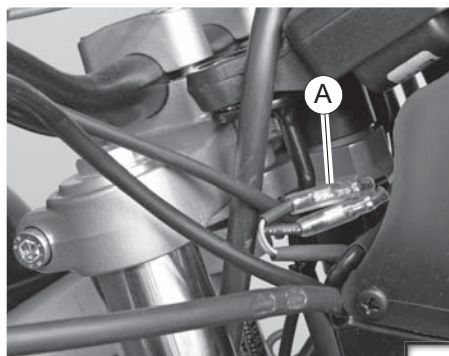
### 22. FRONT DIRECTION INDICATORS

Disconnect the light from the general wiring (A/F -38).

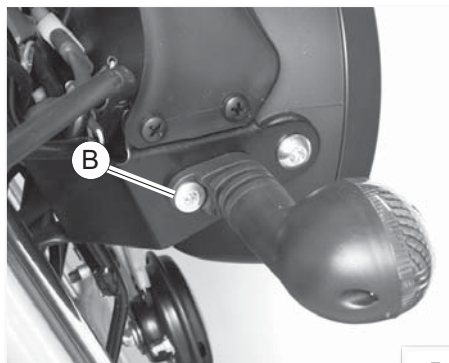
After, unscrew the bolt (B/F -39).



**ATTENTION:** Pay attention to the position of the cables for the later assembly.



F-38



F-39

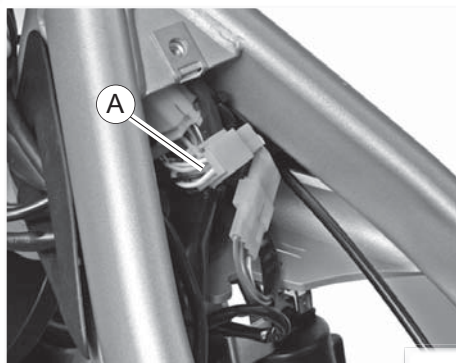
### 23. HEADLIGHT

\*To facilitate the task, unscrew the 3 bolts of the fuel tank and push it aside to gain access to the headlight connection.

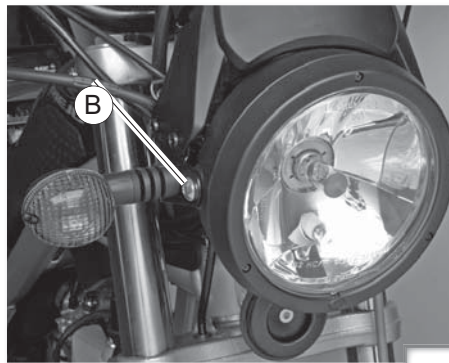
Disconnect the terminal of the headlight from the wiring (A/F -40).  
After, unscrew the 2 bolts (B/F -41), which hold the headlight.



**ATTENTION:** Pay attention to the cable position for the later assembly.



F-40



F-41



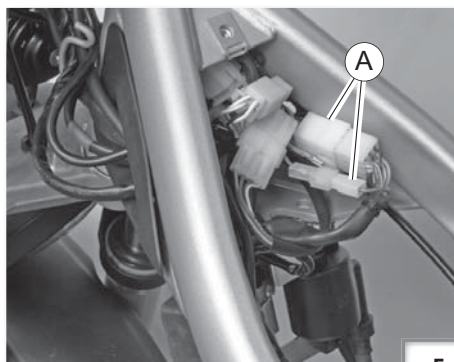


## 24. DASHBOARD

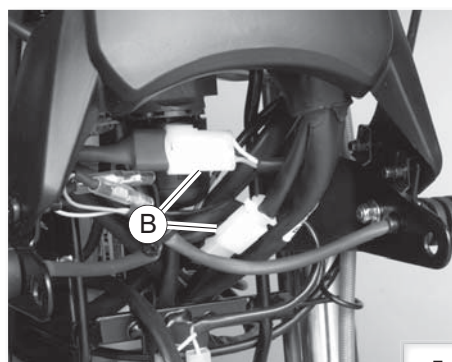
\* To make the task easier, put the fuel tank and the headlight aside, to gain access to the odometer connections.

Disconnect the 2 terminals of the odometer (A/F -42) and the other both of the front part (B/-F43).

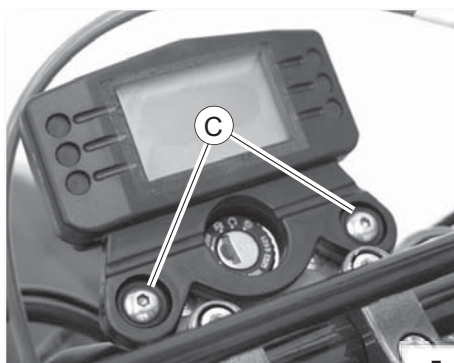
Following, unscrew the 2 top bolts (C/F -44) that hold the screen on to the chassis.



F-42



F-43



F-44



### 25. FRONT BRAKE PUMP

Disconnect the micro-switch terminals of the brake light (A/F -45).

Unscrew the join (B/F -45) that holds the tube on to the pump.

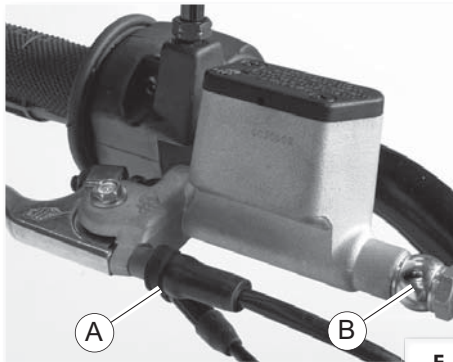
After, unscrew the 2 bolts (C/F -46) and remove the front brake pump.



**ATTENTION:** For the later assembly, it is advisable to replace the copper gaskets and drain the circuit.



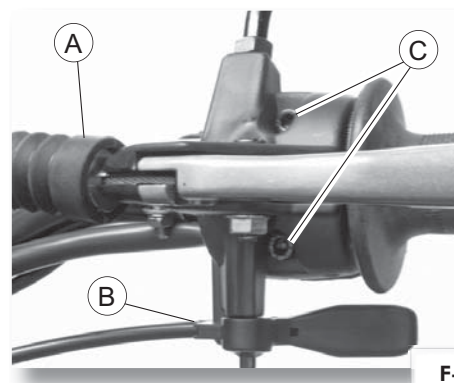
**ATTENTION:** Brake Liquid is abrasive.



### 26. CLUTCH LEVER

Disconnect the transmission from the clutch (A/F -47) and from the starter (B/F -47).

After, unscrew the 2 bolts (C/F -47) and remove the lever.

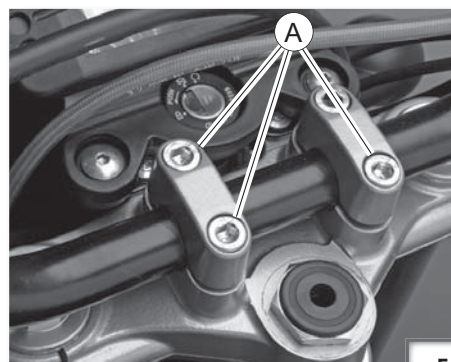




## 27. HANDLEBAR

\* Remove the controls from each end.

Unscrew the 4 bolts (A/F -48) and remove the handlebar.



F-48

## 28. FRONT BRAKE PIN

Unscrew the join through the screw (A/F - 49).

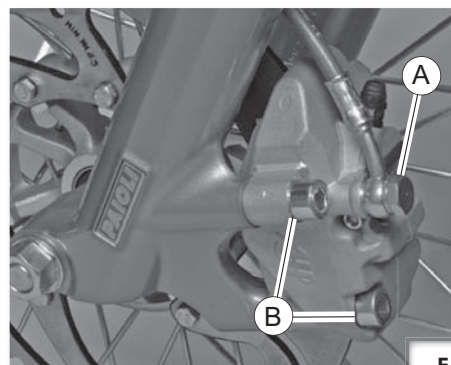
Following, unscrew the 2 bolts (B/F -49) that hold the pin on to the pin support.



**ATTENTION:** For the later assembly it is advisable to replace the copper gaskets and drain the circuit.



**ATTENTION:** Brake liquid is abrasive.



F-49

## 29. REAR BRAKE PIN

Unscrew the join through the screw (A/F - 50).

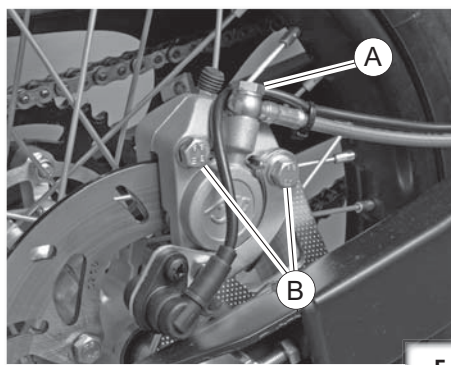
Following, unscrew the 2 bolts (B/F -50) that hold the pin on to the pin support.



**ATTENTION:** For the later assembly it is advisable to replace. The copper gaskets and drain the circuit.



**ATTENTION:** Brake liquid is abrasive.



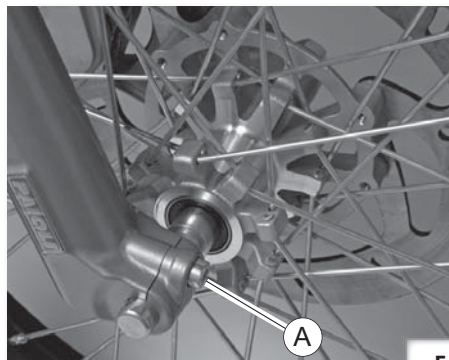
F-50

### 30. FRONT WHEEL



**ATTENTION:** Loosen the fixing bolt (A/F -51) of the axle located at the fork.

Unscrew the axle of the wheel and remove it.



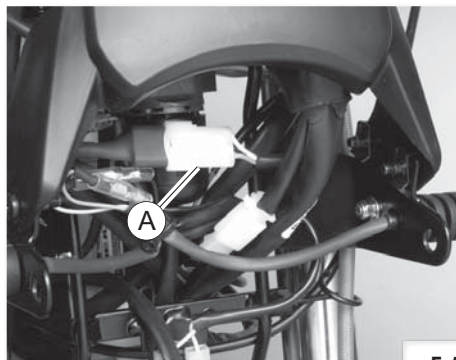
F-51



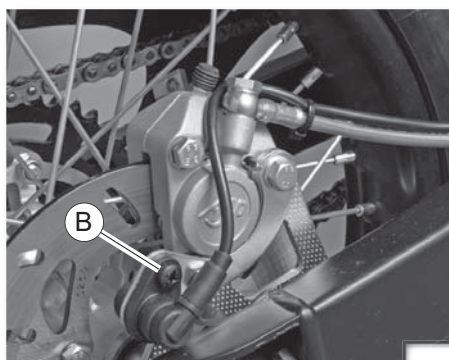
### 31. ODOMETER SENSOR

\* Remove the headlight.

Disconnect the sensor (A/F -52) from the wiring and remove the screw that holds it on to the support.



F-52

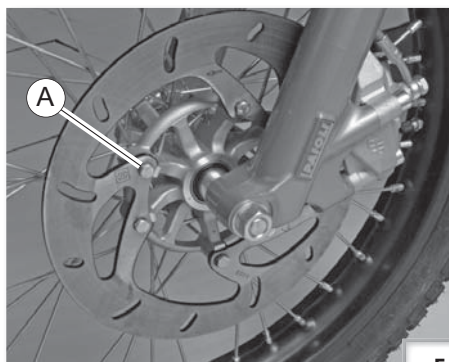


F-53

### 32. FRONT BRAKE DISC

\* Remove the front wheel.

Unscrew the bolts (A/F -54) that hold the disc.



F-54



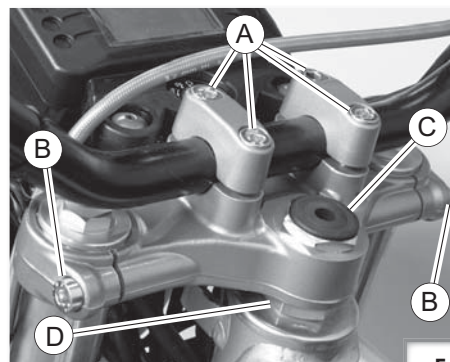
### 33. STEERING

Unscrew the 4 bolts (A/F -55) of the handlebar.

Loosen the 2 lateral screws (B/F -55) to facilitate its removal.

Extract the top nut (C/F -55) and remove the top plate.

To extract the axle, unscrew the nut (D/F -55).



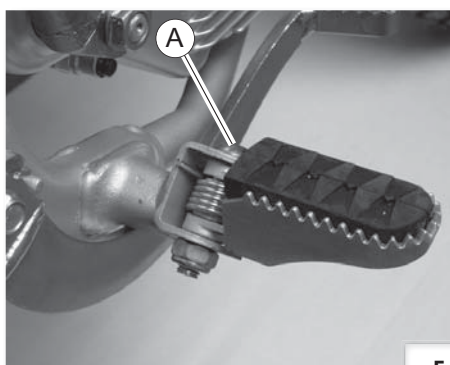
F-55

### 34. FRONT FOOTREST

Unscrew the bolt (A/F -56) that hold on to the lower nut.



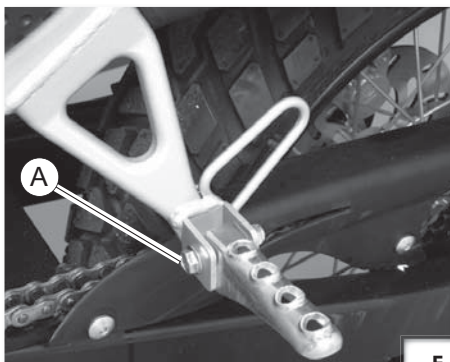
**ATTENTION:** Take into account the position of the spring for the later assembly.



F-56

### 35. REAR FOOTREST

Unscrew the bolt (A/F -57) that holds on to the lower nut.

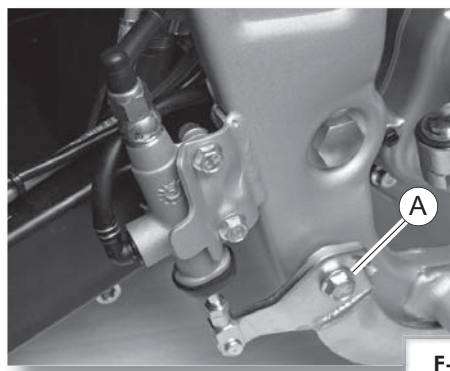


F-57



### 36. REAR BRAKE LEVER

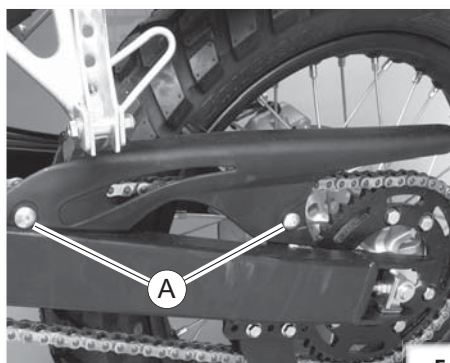
Unscrew the bolt (A/F -58) and remove it.



F-58

### 37. DRIVE CHAIN GUARD

Unscrew the 2 bolts (A/F -59) and remove the guard.



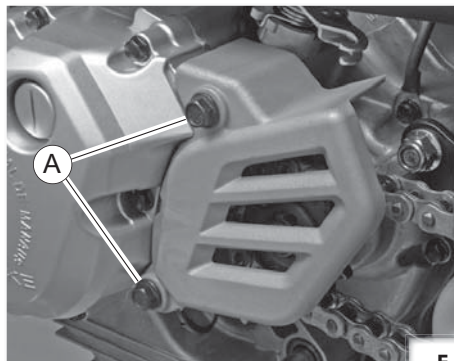
F-59

### 38. TRANSMISSION CHAIN

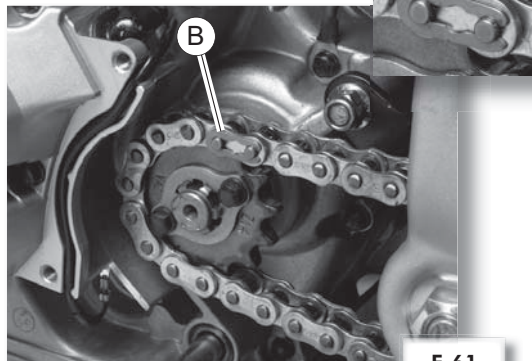
Remove the 2 fixing screws (A/F -60) from the guard and take it out.  
Extract the securing clip (B/F -61) of the link and remove it.  
Chain tensioning ( see page 25).



**ATTENTION:** Place the clip in the direction of the chain turn.



F-60



F-61

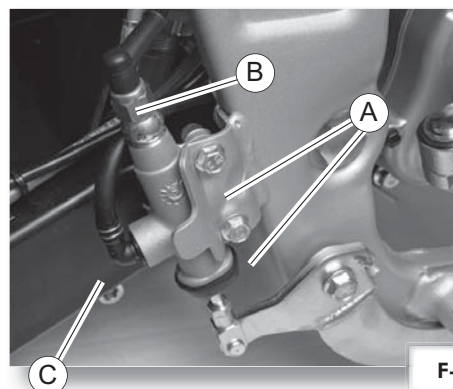


### 39. REAR BRAKE PUMP

Unscrew the 2 bolts (A/F -62) that hold. The brake pump on to the chassis.

To remove the pump it is necessary to disconnect the cable of the STOP switch (B/F -62) and unscrew it.

Remove the clamp (C/F -62) of the brake liquid feeding tube and empty it in a tray.



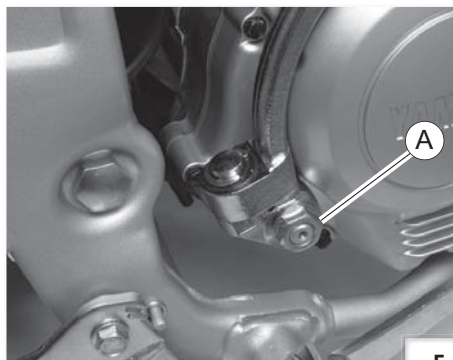
**ATTENTION:** Brake liquid is abrasive.

### 40. KICK-STARTER

Unscrew the nut (A/F -63) and pull the lever to remove it.



**ATTENTION:** The assembly in a different position from the original one, can reduce the stroke when starting.

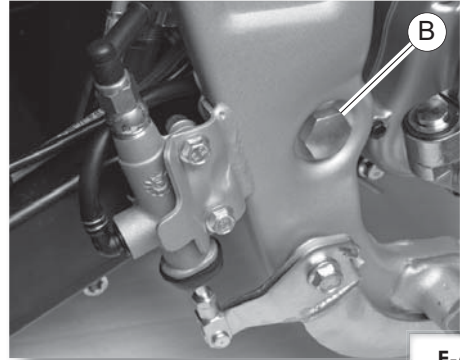
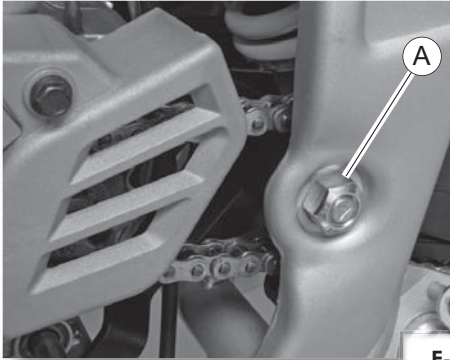




### 41. SWING ARM

\* Remove the chain, the rear brake pin, the rear wheel and the shock absorber.

Unscrew the nut (A/F -64) and remove the axle (B/F -65).



### 42. TORQUE

TORQUE TABLE			
Element	N*m	Kg*m	Notes
Front wheel bolt	38 - 52	3,8 - 5,2	
Front wheel bolt block	17 - 23	1,7 - 2,3	
Rear front bolt	72 - 98	7,2 - 9,8	
Front/Rear brake pin	24 - 36	2,4 - 3,6	
Muffler	6 - 10	0,6 - 1,0	
Lateral coupling of the exhaust muffler	6 - 10	0,6 - 1,0	
Engine fixing screws	32 - 36	3,2 - 3,6	
Handlebar control screw	2 - 4	0,2 - 0,4	
Shock absorber screws	38 - 52	3,8 - 5,2	
Fork bolt	51 - 69	5,1 - 6,9	
Handlebar fixing bolt	18 - 24	1,8 - 2,4	
Steering top nut	18 - 24	1,8 - 2,4	
Steering middle nut	25 - 34	2,5 - 3,4	
Swing arm bolt	60 - 75	9,0 - 7,5	

Grease



# TANGO 125

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Electric system



**1. ELECTRIC SYSTEM**

1.1 CAUTIONS	3
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1.5 IGNITION SYSTEM	7
1.6 ELECTRIC START SYSTEM	10
1.7 LIGHTING SYSTEM	12
1.8 INSTRUMENT CONTROL	15
1.9 SENSOR SYSTEM	16
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1.11 ELECTRIC DIAGRAM	19





### 1.1 CAUTIONS

There are some important cautions before beginning to inspect or repair the electric system.

- Pay particular attention to the polarity of the battery.
- Always check the condition of the battery before beginning any repair.
- Charge the battery out of the vehicle to avoid possible acid leaks or failures in contact with the battery charger which could damage some electronic component.
- Do not use the battery either other connections with the engine running since you could damage some electronic components.
- Do not use different lamps to the specified ones either in the lights nor in the dashboard.
- Do not weld either operate with machines which can produce electric sparks if CDI is not disconnected otherwise it could be damaged.
- Before taking measures of electric element make sure that the part is not hot.
- All the electric connections should be clean and well tight.

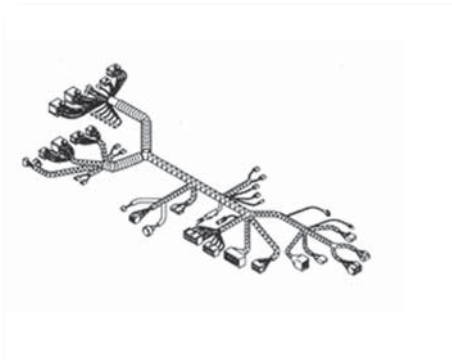
### 1.2 GENERAL WIRING HARNESS

#### Checking in the wiring harness:

- Check visually that the wiring is not worn and the connectors and terminals not much tight or dirty.  
If so, they should be replaced.
- In the event of any fault is observed visually, the continuation with the tester should be checked between wires of the same colour and section.

To be able to check this, the installation should be disconnected.

- The wires of the same colour and section should have continuation among them.



TESTER SCALE  $\Omega \times 1$

### I.3 BATTERY

#### CONTROL OF THE BATTERY CONDITIONS

- To be able to check the battery it is advisable to take it out of the vehicle.
- When disassembling, unplug the first negative terminal to avoid possible short-circuits.
- The condition of the hermetic batteries can be controlled measuring the voltage in the terminal with a digital tester which can measure even tenth of volt.
- In case that the voltage is below the specified one, the battery should be recharged.

**The standard voltage in the terminals of the battery should be 12.5V or more.**

#### METHOD OF RECHARGE

- To recharge hermetic batteries it is necessary a battery charger with a stabilized outlet special for this type of batteries.
- These batteries are sealed, do not add fluids either open the caps, since the characteristics will be altered, damaging the battery.

**Charges up 1/10 of its capacity should not take place.**

#### SYSTEM TO DETERMINE TIME OF RECHARGE

To determine the necessary time to load the battery, the voltage in terminals should be measured with the tester.

Next, observing in the chart the axis of voltage and draw a vertical line till crossing the slope of charge and the horizontal line till the axis of time in hours.

##### Example:

Observing the chart.

If the measure in terminals is 12V, draw a vertical line up from the 12V till crossing the slope and a horizontal line until 8h approx.

The time to charge this battery would be of 8 hours approx.

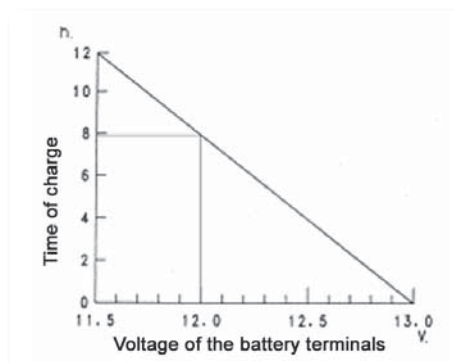


Chart of time to charge in function of the voltage in terminals.

**HOW TO DETERMINE BATTERY CONDITIONS**

- To be able to determine if the battery is good, first it should be charged according to the aforementioned standard method.
- Next, leave the battery at rest during 1 hour and take the measurements according to this chart.

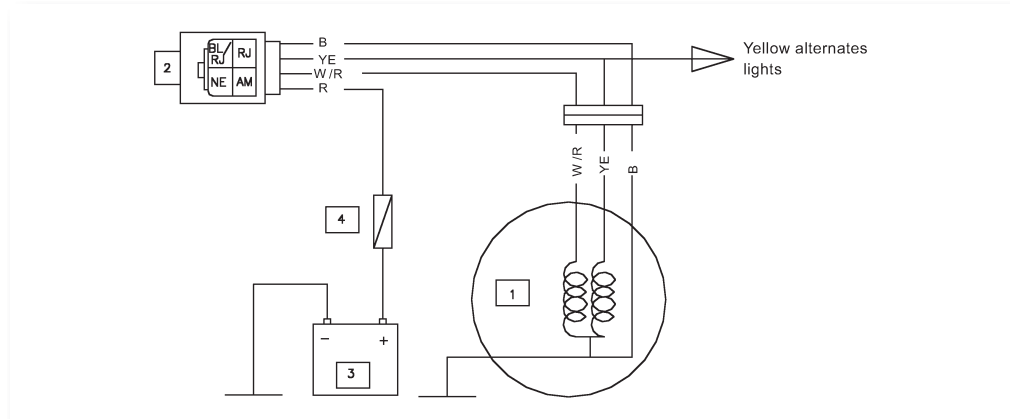


VOLTAGE IN TERMINALS	BATTERY CONDITION
12,5 V or more	Good battery
Between 12 V and 12,5 V	Standard recharge
Less 12 V	Change the battery



**I.4 RECHARGE SYSTEM AND LIGHTS**

- Diagram of the charge circuit and lights supply



1. Alternator
2. Regulator AC-AD
3. Battery
4. Fuse

**FAILURE LOCATION**

To control if the charge and outlet system work correctly, check the voltage with the tester.

**Outlet data of the regulator:**

- The battery voltage (red and black cable) should be between 13.8V to 14.8 with the vehicle running at 4000 R.P.M. (tester in direct current).
- The voltage of alternating (yellow and black cable) should be between 13.8V to 14.5V. at 4000 R.P.M. (tester in alternating position).
- The voltage of alternating (white cable / red and black cable) should be between 13.8V to 14.5V. at 4000 R.P.M. (tester in alternating position).

If the previous parameters are not fulfilled, check the alternator.

**Check of the alternator:**

It should be made with the 4 ways connector of the unplugged magnetic flywheel and with the engine in cold.

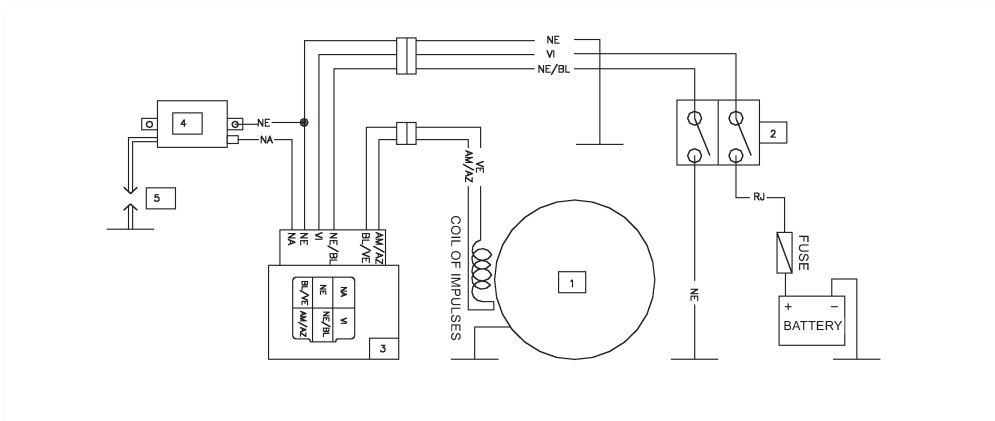
TESTER SCALE	TESTER CONNECTIONS		READING
$\Omega \times 1$	Red clip +	Black clip -	
	White/red cable	Black cable	0,4 $\Omega$
	Yellow cable	Black cable	0,35 $\Omega$

**In the event of getting the values of the chart correctly, the regulator should be replaced.**



### 1.5 IGNITION SYSTEM

- Ignition diagram



1. Magnetic flywheel
2. Ignition Key
3. CDI unit
4. High tension coil
5. Spark plug

### FAILURE LOCATION

If the vehicle doesn't sparkle or the ignition is misfired, the following checking should be carried out:



**Firstly, the black / white wire should be disconnected or connected directly to earth to neutralize the stopping system of the vehicle.**

If the problem persists, check each component of the ignition system.

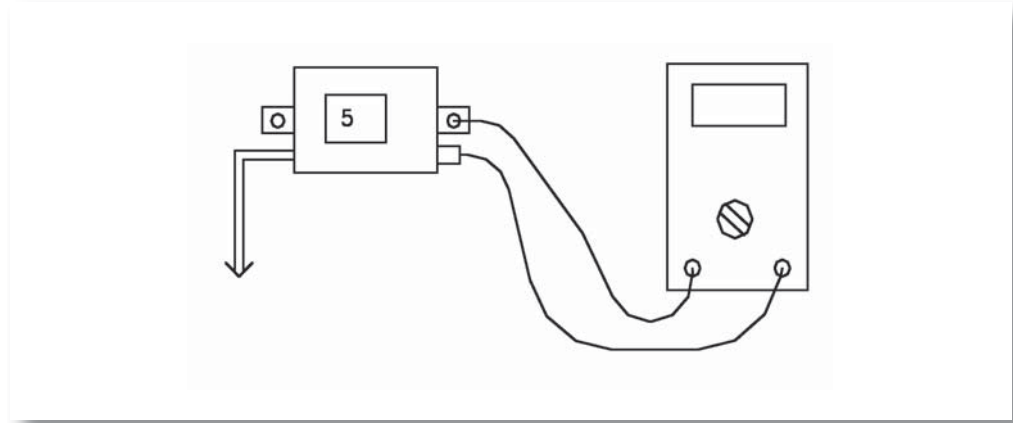
Before beginning checking the components, verify that the connections are clean and well connected and the wiring is in good conditions.

The resistance control of the components must take place when the engine is cold.



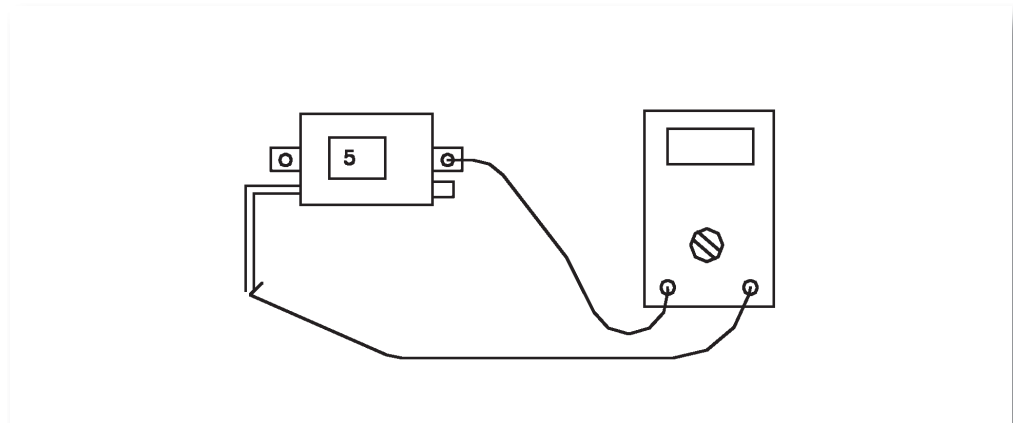
**CHECKING OF THE HIGH TENSION COIL:**

Before beginning the verifications assure that the ground of the high tension coil is correct, and its fixing is free of rust and clean.

**Resistance of the primary winding**

Measure the resistance between the terminal and ground

$0.3\Omega \quad \pm 10\% \quad 20^\circ \text{C}$

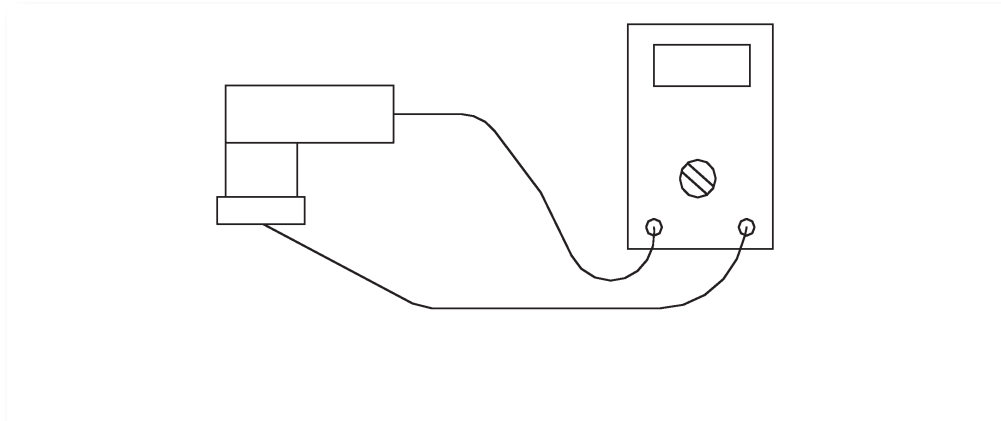
**Resistance of the secondary winding**

Measure the resistance between the high wire and ground

$3.16\text{K}\Omega \quad \pm 10\% \quad 20^\circ \text{C}$



### CHECKING OF THE ANTIPARASITIC PIPE



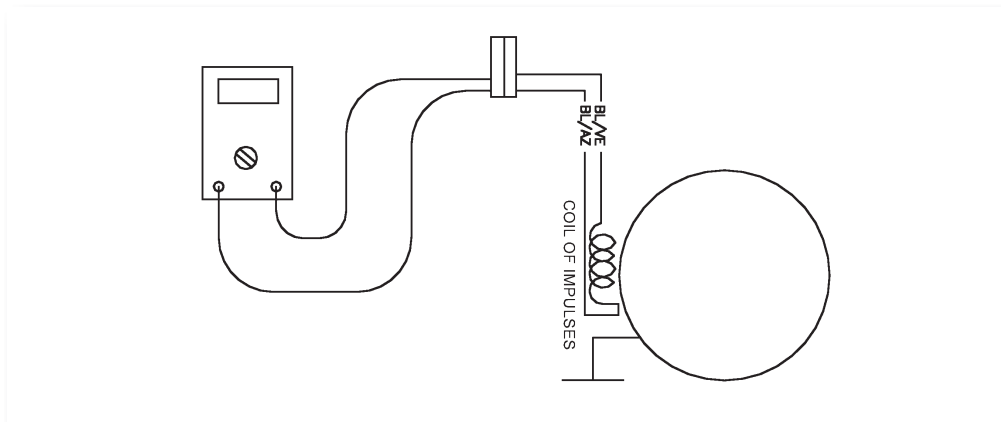
Take the spark plug pipe apart rotating it anticlockwise.

Check that the copper wire sticks out the HT wire.

**Resistance:**  $5K\Omega \pm 20\%$   $20^{\circ}C$

If the values of the coil and the spark plug pipe are correct then check the magnetic flywheel.

### SENSOR CHECKING (PICK UP)



#### Resistance of the coil sensor of impulses

Connect the tester between the wires:

white / green and white / blue

**Resistance:**  $290\Omega \pm 20\%$   $20^{\circ}C$ .

If all the devices give the correct values and the problem persists, check that the black and violet wires of the CDI switch come up to 12 V when ignition is in the ON position. In case all the values are fulfilled, CDI should be replaced.

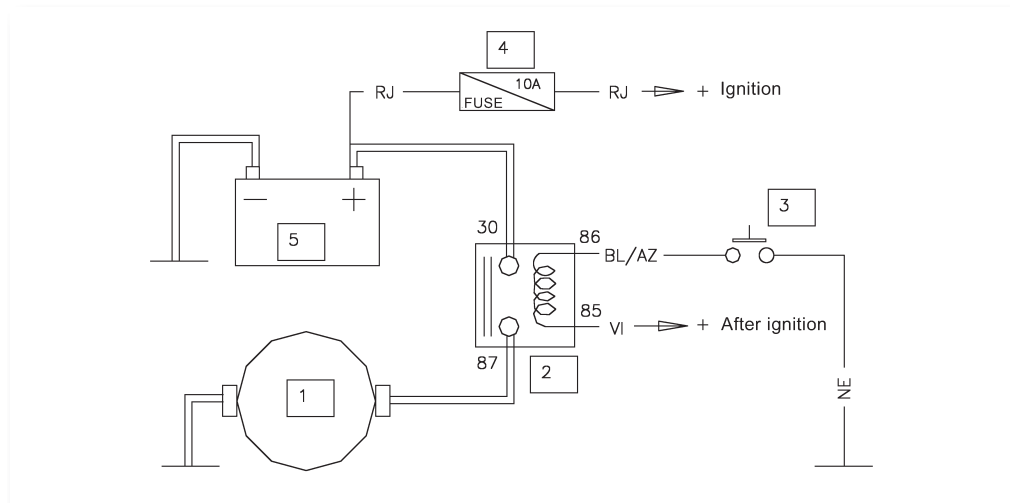
#### Important cautions:

- Do not connect either disconnect wires or connections with the engine running.
- Do not electric weld either spark off with CDI connected.
- Before replacing CDI, check that the connections and the wiring are in good conditions.



## 1.6 ELECTRIC START SYSTEM

### Start system diagram



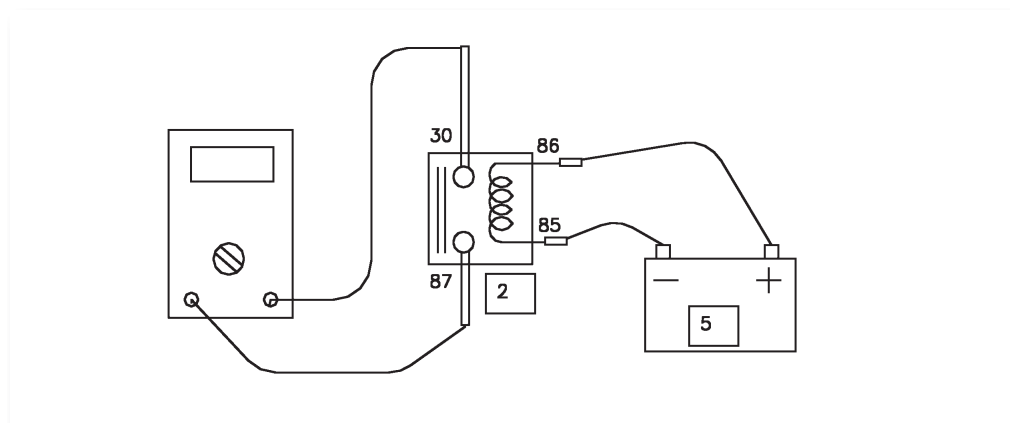
1. Starter
2. Start relay
3. Start switch
4. Fuse 10 A
5. Battery

### ELECTRIC START SYSTEM CHECKING

Check with the tester the continuation of the 10 A fuse. If the fuse is correct check the battery according to the section about it.

Minimum voltage of the battery 12.5 V.

#### Checking of the start relay



With the terminals 85 and 86 of the connected relay to a battery, check the continuation between the terminals 30 and 87.

**The tester should read 0  $\Omega$**

When disconnecting the battery, it should read infinite.

**The tester should read  $\infty$  (infinite).**

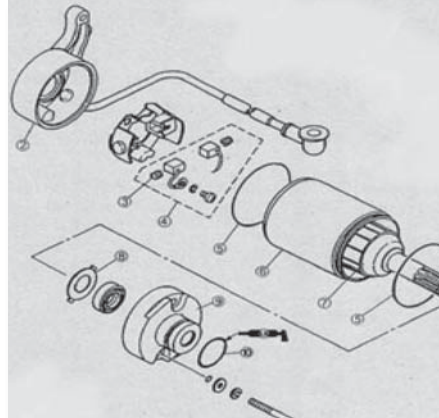
**Connect the engine to a charged battery and check it turns vigorously.**

Connect the engine to a charged battery and check it turns vigorously.

In case that it doesn't rotate correctly you should disassemble the engine and make the following verifications:



A	Correct operation limit of dynamo brushes <b>3.5mm.</b>
B	Wear limit of the brush collector <b>21mm.</b>
C	Depth of the collector insulation <b>1.5mm.</b>
D	Resistance of the rotor coils <b>0.017Ω - 0.021Ω 20°C.</b> <b>IMPORTANT</b> Check the insulation between the sheets of the collector and the ground



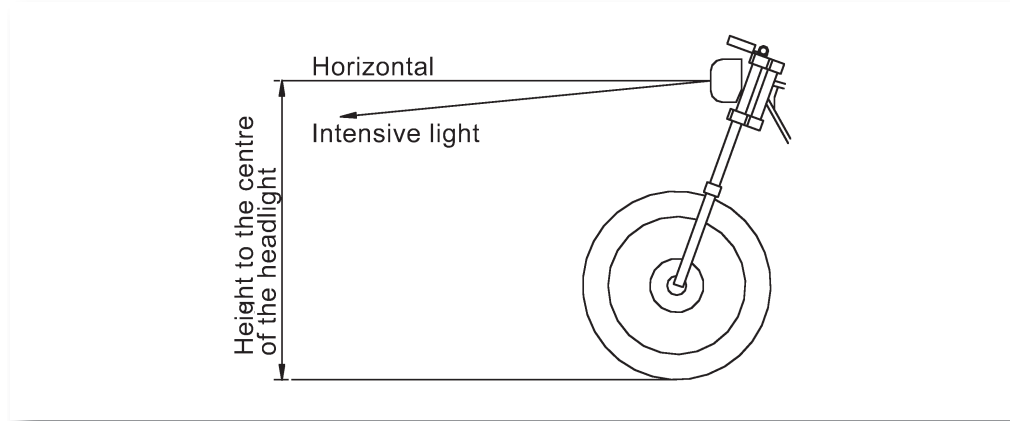
**If the engine has the suitable values, the following operations must be carried out:**

- Polish the surface of the collector and revise the depth of the insulation.
- Reduce the insulation between the sheets of the collector with a saw till reaching 1.5mm.
- Check the pressure of the springs of the brushes.
- Check that the plate of brushes is not connected to earth.
- See the bearings set and that the armature doesn't graze the stator.
- Do not grease excessively since in rotation the brush collector would dirty.



**I.7 LIGHTING SYSTEM**

**Adjustment of the beam light height of the headlight**

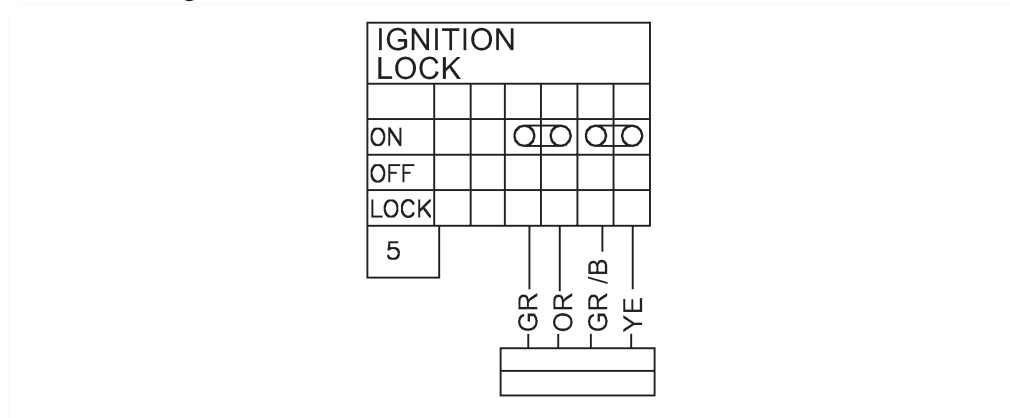


With the driver seated on the vehicle, the headlight should be adjusted so the intensive beam of light is underneath the horizontal of the headlight.

In the event of changing a lamp do not handle the internal part of the headlight and take the new lamp with a clean cloth.

**Checking of the switches:**

Control of the ignition lock.

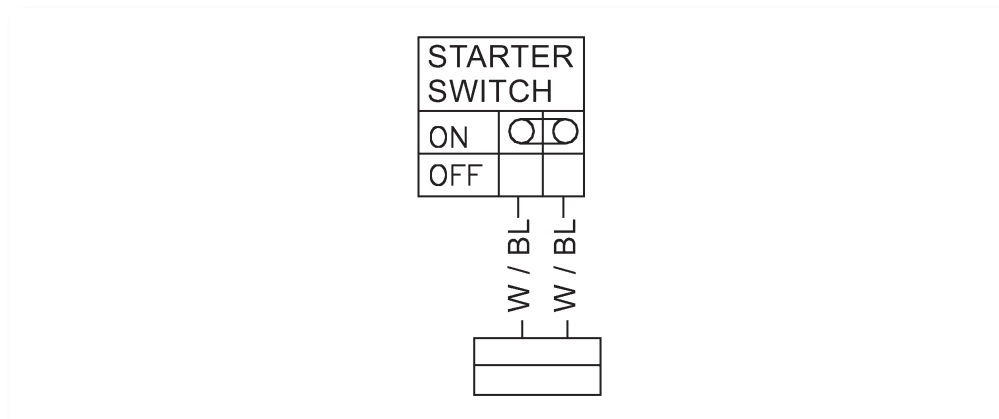


With the tester check the continuation between the wires of the ignition lock.

In the ON position, continuation between wires **Colour: GR AND OR GR/B AND YE**



### Control of the right-hand drive, lights switch and starter switch.

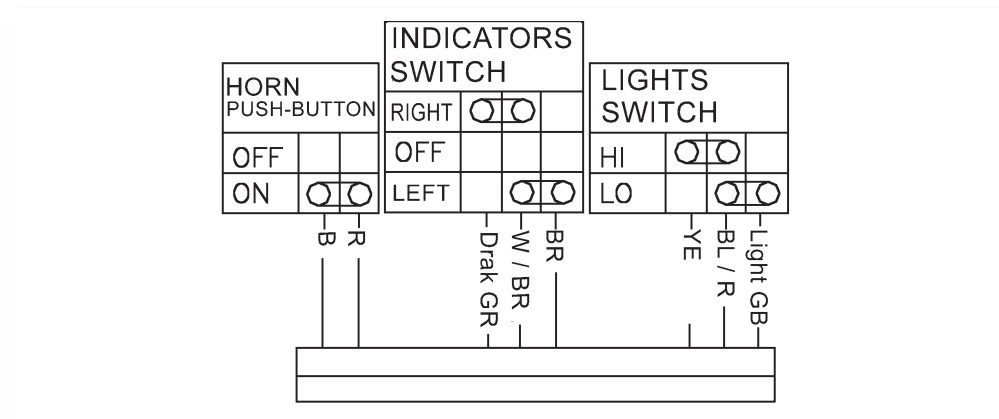


Check the continuation among the wires of the connector.

In the ON position of the starter switch, check the continuation among the wires

**Colour: W/BL AND W/BL**

### Control of the right-hand drive: Lights switch, indicators switch and horn push-button.



Check the continuation between the wires of the connector.

#### Horn push-button

In the ON position. Continuation between the wires

**Colour: R/B**

#### Indicator switch

In the RIGHT position. Continuation between the wires

**Colour: Dark GR and W/BR**

In the LEFT position. Continuation between the wires

**Colour: W/BR and BR**

#### Lights switch

In the Hi position. Continuation between the wires

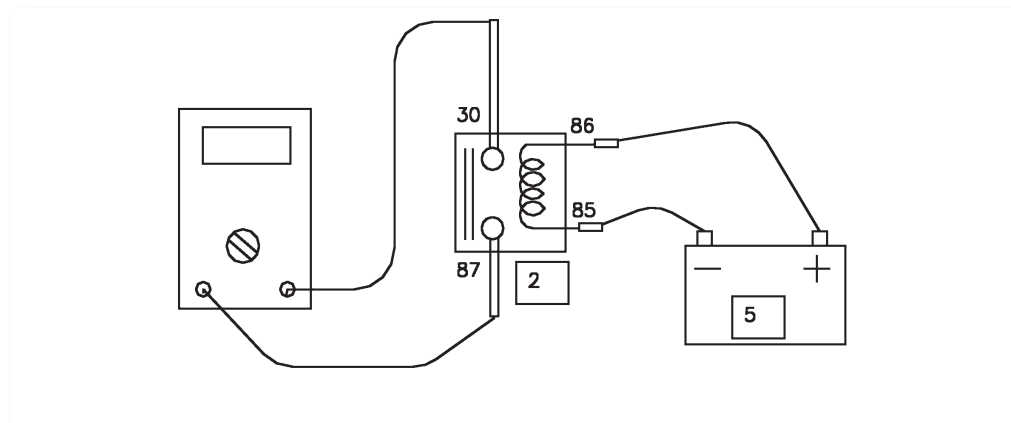
**Colour: YE and BL/R**

In the HIM position. Continuation between the wires

**Colour: BL/R and Light GR**



### Checking of the ignition relay



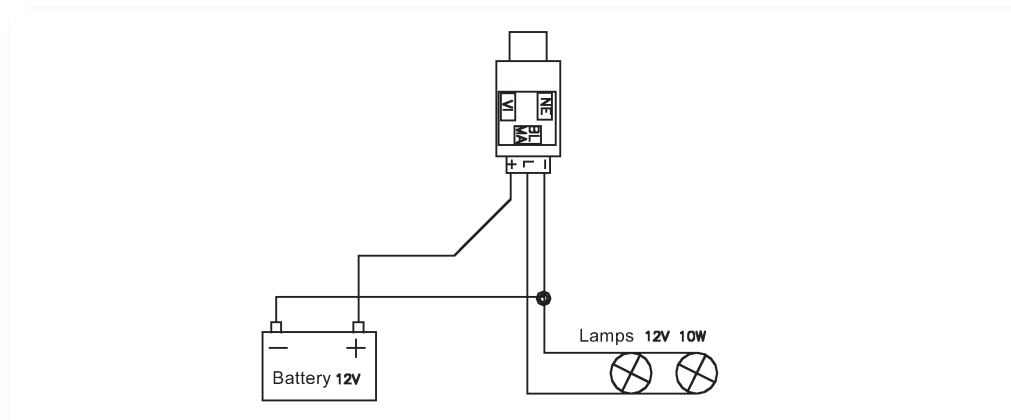
With the relay terminals 85 and 86 connected to a battery check the continuation between the terminals 30 and 87.

The tester should read  $0\Omega$

When disconnecting the battery it should read infinite.

The tester should read  $\infty$  (infinite)

### Checking the indicator relay



Connect the indicator relay according to the sketch to verify if it sparkles, the lamps can be replaced by one of 12V and 21W.

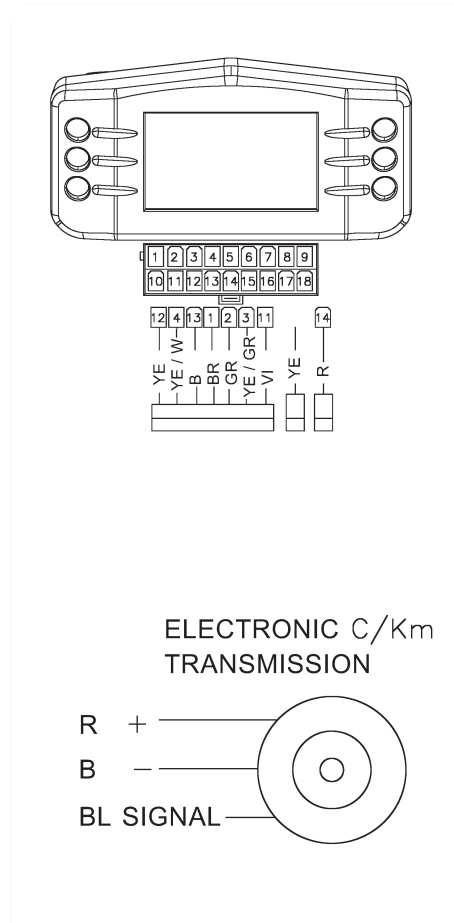


### I.8 INSTRUMENT CONTROL

#### DASHBOARD DIAGRAM

To control the dashboard functions, all the functions of the wires arriving to the dashboard must be checked. In accordance with the following chart.

CONNECTOR PIN	FUNCTIONS
1	Indicator
2	Indicator
3	Neutral
4	Intensive
5	Transmission Sensor entry
6	Functions switch
7	Free
8	Free
9	Free
10	Free
11	+ Ignition
12	R.P.M. input
13	GND earth
14	+ Direct to Battery
15	Transmission Sensor earth
16	+ Transmission Sensor
17	Free
18	Free







## 1.9 SENSOR SYSTEM

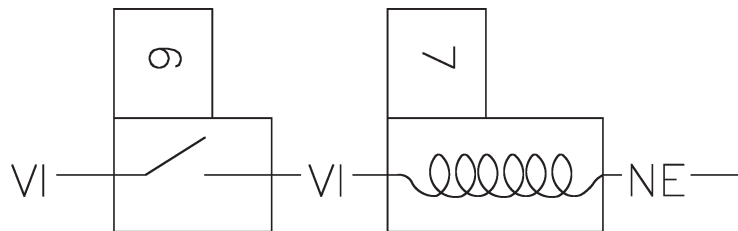
### Neuter sensor

To check this sensor, the continuation between the terminal and the ground should be controlled.

With the neuter in the On position, it should read  $0\Omega$

When start the tester reads  $\infty$  (infinite).

### Carburettor heater



6. Room temperature sensor.

7. Carburettor thermal resistance.

### Checking of the room temperature sensor

Check the resistance with the tester between the ends of the sensor, below  $11^{\circ}\text{C}$  + /- 3 the resistance value is  $0\Omega$

When the temperature is increased you should disconnect at  $16^{\circ}\text{C}$  and the  $\Omega$  value is infinite.

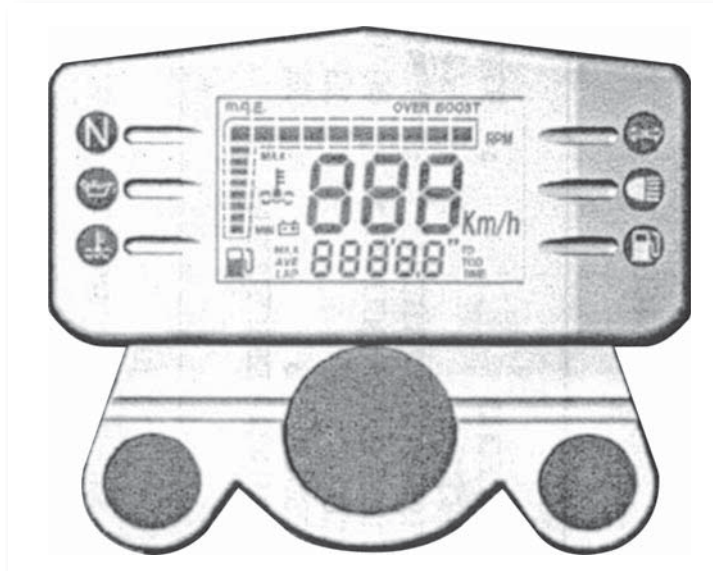
### Checking of the thermal resistance

To check if the thermal resistance works correctly you should supply of a battery at 12V and in a few seconds it should warm up.



### 1.10 DASHBOARD PROGRAMMING

#### DASHBOARD



The insertion of Values in the Display is carried out through the button “Trip” placed in the left side of the Handlebar.

In the Model TANGO the Battery is connected and loaded, so it can be carried out with the key in the ignition position and also with the engine running.

#### INSERTION OF THE VALUES OF CALCULATION IN THE ODOMETER MEMORY

- Development of the wheel that sets the signal sensor.
- Pulses of the signal sensor.
- Pulses of Revolutions.

Put the key in the ignition position and start the engine.

- Wait some seconds till the INITIAL screen appears on the DISPLAY.
- Press the button “TRIP” for 6 seconds and the Screen will show the digits to insert the value of the development of the wheel, (the flickering digits are the selected ones) following the sequence of pressing the button, we will choose the number and keeping the button pressed for 3 seconds we will pass to the next digit, and so forth until set the value.



- Pressing the button “TRIP” for 3 seconds, we will pass to the next screen of the Display where the word “PULSE” will appear, following the sequence pressing the button “TRIP”, we will insert the value corresponding to the pulses of the sensor of the wheel.
- Going on pressing the button “TRIP”, the option “MILES”, (mph) and kilometres hour (km / h) will be displayed and with the button “TRIP” we will choose km/h.
- Keeping it pressed for 3 seconds, the word “PULSE” will appear on the screen and above it in the right part of the screen RPM will be displayed, then we will insert the value corresponding to the RPM, picking the fixed value pressing the button “TRIP”.

Keeping the button “TRIP” pressed for 3 seconds more, we will turn back to the INITIAL screen.

The return to the initial screen becomes effective Automatically after 6 seconds without operating the button “TRIP.”

TO CHECK IF THE INPUT DATA IS THE RIGHT ONE, WE SHOULD TURN ON THE IGNITION, START THE ENGINE AND IN TWO SECONDS THE ENTERED DATA WILL BE DISPLAYED ON THE SCREEN DURING TWO SECONDS, VERIFYING THAT IT IS CORRECT, IMMEDIATELY AFTER THE INITIAL SCREEN WILL APPEAR.

The dashboard is ready to be used giving the right information.

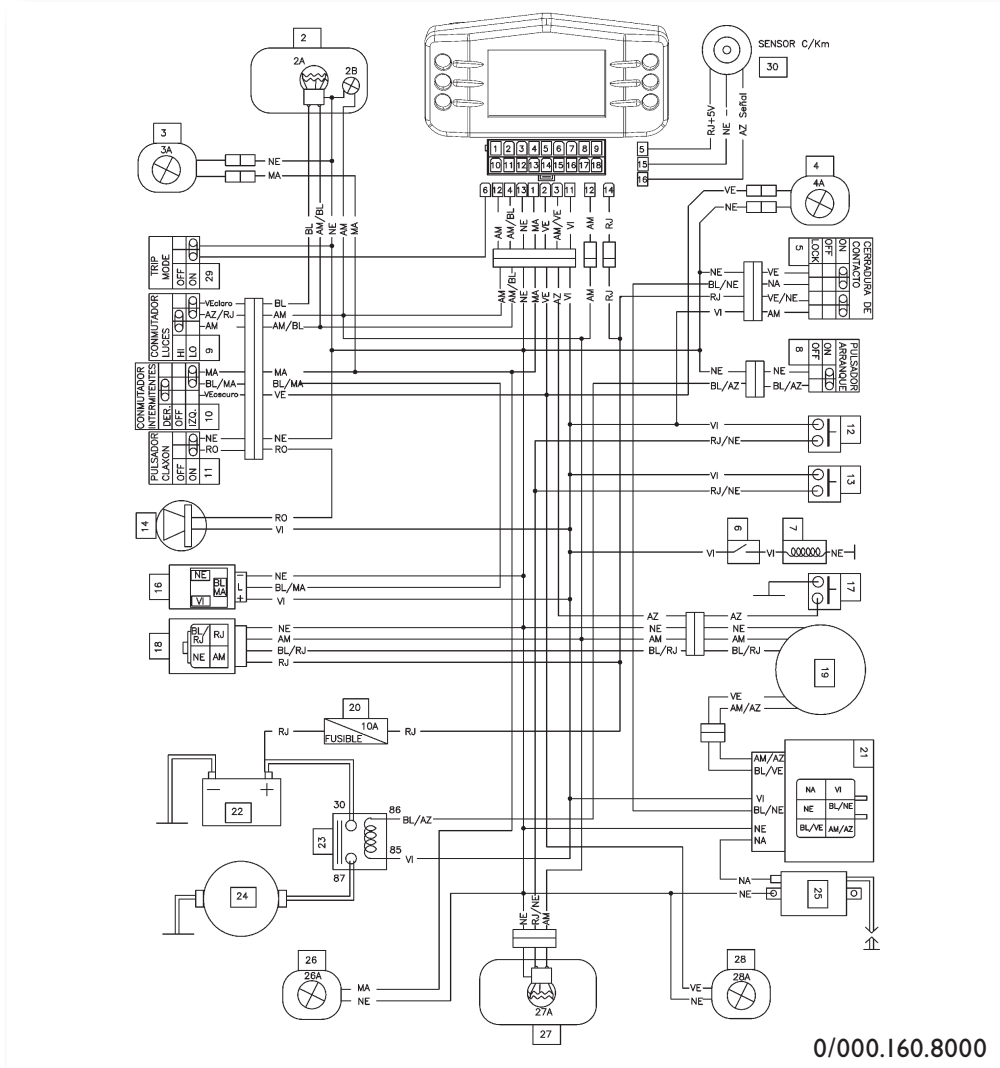
#### MAE DASHBOARD

#### SET OF VALUES

#### VALUES TO BE INSERTED IN THE DISPLAY CONFIGURATION

	<b>Tango 125cc.</b>
<b>Rear Tyre</b>	120/80-18
<b>Development of the wheel</b>	1880
<b>Pulses of the Sensor (screws)</b>	3
<b>Pulses of RPM</b>	6

## I.II ELECTRIC DIAGRAM



0/000.160.8000

NOMENCLATURA DE COMPONENTES	
1	TABLER DE INSTRUMENTOS 1A LAMPARA ILUMINACION TABLIER 12V 1,2W 1B LAMPARA ILUMINACION TABLIER 12V 1,2W 1C LAMPARA CONTROL LUZ INTENSIVA 12V 1,2W 1D LAMPARA CONTROL INTERMITENTES 12V1,2W 1E LAMPARA CONTROL NEUTRAL 12V1,2W 1F LAMPARA ILUMINACION CUENTA R.P.M.12V1,2W
2	FARO DELANTERO 2A LAMPARA PRINCIPAL 12V 35/35W 2B LAMPARA POSICION 12V 5W
3	FARO INTERMITENTE DELANTERO IZQUIERDO 3A LAMPARA INTERMITENTE 12V 10W
4	FARO INTERMITENTE DELANTERO DERECHO 4A LAMPARA INTERMITENTE 12V 10W
5	CERRADURA DE CONTACTO
6	SENSOR TERMICO
7	RESISTENCIA
8	PULSADOR DE ARRANQUE
9	CONMUTADOR LUZ CORTA E INTENSIVA
10	COMUTADOR INTERMITENTES
11	PULSADOR DEL CLAXON
12	PULSADOR DE STOP DELANTERO
13	PULSADOR DE STOP TRASERO
14	CLAXON DC 12V
15	RELE DE CONTACTO
16	CENTRAL INTERMITENTE 12V 2X10W
17	INTERRUPTOR NEUTRAL
18	REGULADOR DE TENSION AC-DC 12 V
19	VOLANTE MAGNETICO
20	FUSIBLE DE 10 A
21	CENTRAL ENCENDIDO CDI
22	BATERIA 12V
23	RELE DE ARRANQUE ELECTRICO 12V 70A
24	MOTOR DE ARRANQUE
25	BOBINA A.T.
26	FARO INTERMITENTE TRASERO DERECHO 26A LAMPARA INTERMITENTE 12V 10W
27	FARO PILOTO STOP 27A LAMPARA 12V 21/5W
28	FARO INTERMITENTE TRASERO IZQUIERDO 28A LAMPARA INTERMITENTE 12V 10W
29	TRIP MODE
30	SENSOR C/Km

CODIGO DE COLORES			
AM	AMARILLO	RJ	ROJO
NE	NEGRO	VE	VERDE
MA	MARRON	RO	ROSA
BL	BLANCO	VI	VIOLETA
AZ	AZUL	NA	NARANJA

# TANGO 125

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Engine workshop manual



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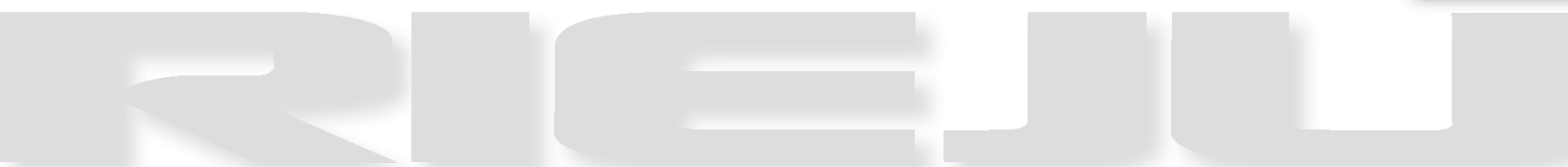
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# *Introduction*



## I.1 ENQUIRY NOTES

The intervention in control, maintenance, repairs, replacement parts, etc. in the whole range of our motor vehicle, means not only the competence and experience of the responsible technicians in this task, in the modern technologies, but also the knowledge of the quick and rational procedures, of the technical characteristics, of the calibrated values, of the torque, that only manufacturer is in a condition to lay down for certain.

The present series of WORKSHOP GUIDES for two-stroke engine, provide the main information for the technicians of the sector (Authorized Dealer, etc...) to operate harmoniously on the modern concepts of "good technique" and "safety at work".

The aim of these guides, is about the standard technical interventions in the whole range of engine (two-stroke engine) for RIEJU motor vehicles in the production phase at the spreading time of these manuals. This information refers to the "ENGINES" of the motor vehicles. Some information has been deliberately omitted, since (according to us) it is an essential part of the basic technical knowledge.

Another possible information, can be deduced from the SPARE PARTS CATALOGUES (of each particular model).

Before reading the motor vehicle manual you are interested in, it is important that you examine the first general pages, where you will find the basic information for a good item enquiry and the general nature technical concepts.

**REMARK:**

*The manual provides you with the essential information for the standard intervention procedures. This information is supplied by the engine manufacturers, so therefore, this frees us to be responsible for any eventual error, omissions, etc. The RIEJU company reserves the right to contribute modifications at any time, without any previous notice. For any request or further information please call to Rieju Technical Assistance Service.*

## I.2 UPDATING GUIDE

- **The updating** will be send (in a reasonable period). Each new CD-ROM will replace the one you have already got.
- **The index** will be updated in case modifications and changes of the pages inside no longer guarantee a rational enquiry of the manual.
- **IMPORTANT!** The series of Workshop Guides has to be considered as a **work tool**, strictly speaking, and it can remain in "value" through time, only if it is constantly updating.



## I.3 WRITING SIMBOLOGY



**ATTENTION!** Some caution advice and information as regards to the safety of the motorcyclist (vehicle user) and the safeguard of the whole vehicle.



**ATTENTION!** Descriptions relating to some dangerous interventions for the maintenance engineer, the repair technician, the workshop staff or strangers, for the atmosphere, for the vehicle and for the equipments.



**FIRE RISK**  
Operations which could cause fire.



**DANGER OF EXPLOSION**  
Operations which could cause explosion.



**TOXIC**  
Evident danger of poisoning or inflammation of the first respiratory track.



**MECHANICAL MAINTENANCE**  
Operations to be performed only by an expert mechanic.



**ELECTRICAL MAINTENANCE**  
Operations be performed only by an expert electrical / electronic technician.



**NO!**  
Operations which must be avoided.



**ENGINE WOKSHOP GUIDE**  
Information derived from this documentation.



**SPARE PARTS CATALOGUES**  
Information derived from this documentation.

F	Figure
Pr Tr	Torque
P	Page
Ap	Sub-section
S	Section
Es	Diagram
T	Table
Tr	Bolt

**Remark:**

*Illustrations frequently shown fixing or regulator screws, specified with the letter **Tr**. The **number** besides this letter indicates the quantity of identical **Tr** existing in the group or object component of the description and its corresponding illustration. The letter **without number**, indicates **quantity 1**. In case of different screws shown in the same figure, a **number** and a **small letter** will follow the letter **Tr** (example: (Tr4a)).*

*The re-assembly of groups and components is usually carried out in **opposite way** to the disassembly interventions (excepting specified description).*

**I.4 OPERATIVE SIMBOLOGY**

L) Loctite



O) Lubrication (oil)



G) Greasing (grease)



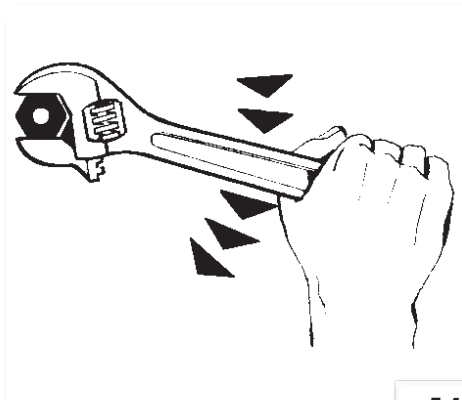


## I.5 WORK GENERAL RULES

• **The following advice, recommendations, and warnings,** guarantee rational interventions in the maximum operative safety, ruling out considerably the probabilities of accidents, all kind of damage and time-out. Therefore, we advise you to observe them scrupulously.

### ADVICE:

- Always use high quality equipments.
- For raising the motor vehicle, use manufactured equipment on purpose and subject the European regulations.
- During the operations, tools must be within arm's reach, as far as possible, according to a predetermined sequence, and anyway, never on the vehicle or in a hiding or inaccessible place.
- Keep your workplace duly clean and tidy.
- To tighten bolts and nuts, begin with those of **bigger diameter** or the interior ones, proceeding in "**cross**" in one go and so on.
- The most proper use of the spanner (the fork one), is **in one go** never pushing.
- The rolling monkey wrench (F-1) have to be used in emergency conditions, this is to say, when the suitable size tool is not available. During the effort, the mobile clamp tend to open and this could damage the bolt as well as lead to obtain a torsion moment of an unreliable tightness. Anyway, use tools like the illustration (figure I).
- Excluding some exceptional assistance cases, prepare a **record card** for the Customers, where all the interventions done and notes for possible controls in future will be entered.

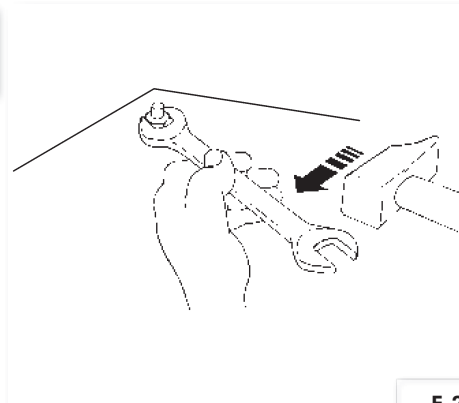


F-1

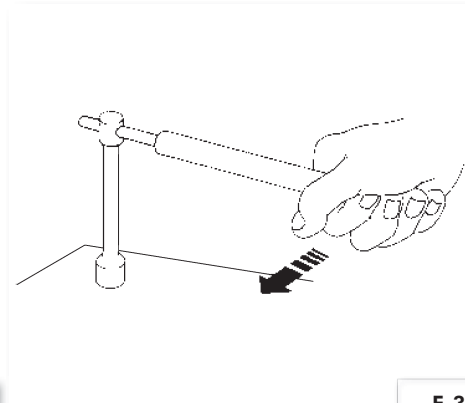


## 1.6 RECOMMENDATIONS

- **Before beginning** any intervention in the motor vehicle, wait till all and each one of the components of the same vehicle are **completely cool down**.
- If the operations need two technicians work, it is necessary that they previously come to an agreement on tasks and synergies.
- Always check the correct assembly of each component, before assemble another one.
- Lubricate the need spare parts, before re-assembly.
- The linings, the watertight and elastic rings and the pins must be replaced when disassembly takes place.
- The torque values indicated in the manuals, refer to the “**final tight**”, and they have to be progressively reached, in consecutive goes.
- The loosen and tighten operations of the parts in aluminium alloy (sump) must be carried out when the **motor cools down**.
- Always use screwdrivers of suitable size for the bolts in use.
- **Never work in awkward conditions neither in an unstable situation of the motor vehicle.**
- **Never use a lining or an elastic ring again.**
- **Never unscrew or screw down bolts and nuts with clips since, besides it does not exert enough blockade force, the bolt cap or the nut hexagon can be damaged.**
- **Do not hit with the hammer (or another tool) on the spanner to loosen or tighten bolts and nuts (F-2).**
- **Do not use the extension bar for the spanner (F-3).**



F-2



F-3



**Never use, under no circumstances, free flames.**



**Never leave** open and not suitable **containers** with fuel, blocking the pass, near to heat sources, etc.



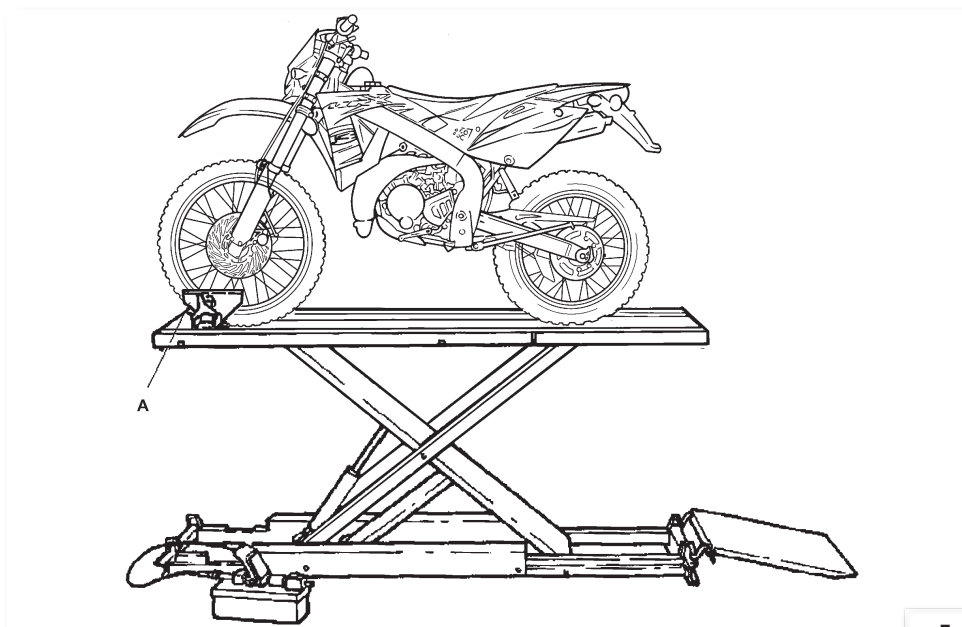
**Never suck in or blow in the fuel pipe.**

**Never carry out welds** in the presence of fuel. Remove the tank although it is totally empty and disconnected the negative (-) lead of the battery.

**Never leave the motor running in closed premises or without air vent.**



Before each intervention, make sure of the motor vehicle is perfectly steady. The front wheel should be anchored, preferably, to the integrated tool (A/F-4) in the running board .

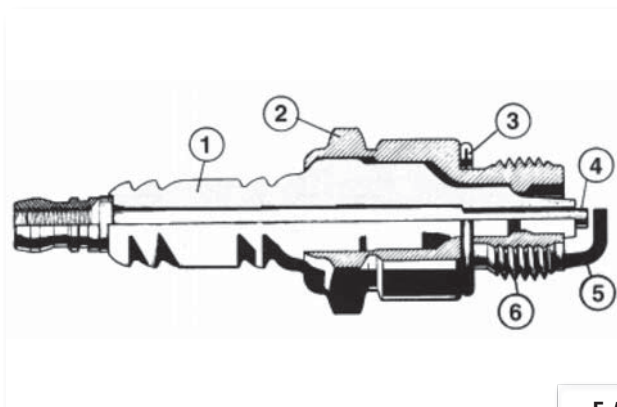


F-4





## I.7 SPARK PLUGS

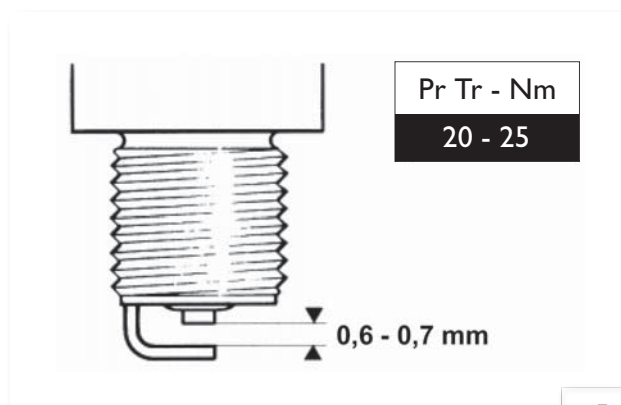


1. Insulator
2. Body
3. Lining
4. Electrode
5. Earth electrode
6. Thread

F-5

### SPARK PLUGS CONTROL AT 1.000 Km

- Do not touch the spark plug if the **motor is hot**.
- The color tip and the insulator coloration (around the central electrode) provide with useful information about the **thermic degree** of the spark plug, the **carburation**, the **lubrication** and the overall condition of the engine.
- A **light brown** (insulator) coloration indicates the correct general operation.
- Black sooty tips, dry (to the touch), opaque, indicate that the operation temperature is too low (spark plug thermic degree is too high), too rich carburation or faulty ignition.
- Off-white insulator indicates: a mixture too weak or spark plug thermic degree too low (spark plug too hot).
- Verify the distance between the electrodes (F.6) (although the spark plug is new) using a calibrated calibre of thickness, and eventually, register it working only on the earth electrode.



F-6



## I.8 SPARK PLUG MAINTENANCE

- The spark plug maintenance consists in removing it periodically from the motor to check (visually) the conditions and the distance between the electrodes.
- Proceed to clean the electrodes and the insulator carefully, using a wire brush.
- Eliminate possible waste with a strong jet of compressed air.
- Lubricate the thread of the spark plug with motor oil or grease, that conducts electricity, then screw it by hand until the bottom.  
Then press it moderately with the respective spanner (see torque in F.6).



**It is necessary to replace all spark plug with fissures in the insulator or corroded electrodes.**

## I.9 SPARK PLUG REPLACEMENT AT 5000 Km

- At the foreseen kilometres, replace always the spark plug with a new one, choosing one of those that the Company RIEJU, S.A. recommends.
- When the discharged spark plug is being eliminated, inspect always its general look (as previously stated) to check the good state of the engine.

## I.10 MOTOR REMOVAL

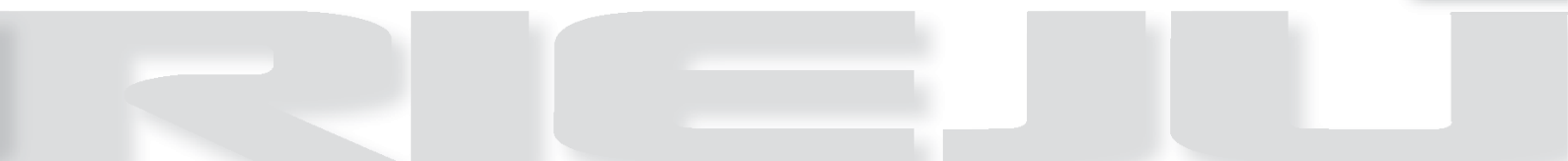
- To remove the motor from the frame, look up in the Workshop Guide, in “Cyclist” section, where you will find all the steps to follow.

## I.11 MOTOR DISASSEMBLY

**The manufacturer is exempt from any responsibility caused by damages of any nature in a disassembly and a new assembly of the engine and each of its parts, owing to the use of unsuitable tools for this kind of interventions.**



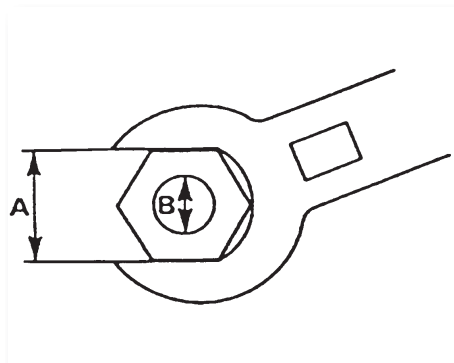
**Exclusively use ORIGINAL RIEJU SPARE PARTS.**





## 2.1 TORQUE GENERAL SPECIFICATIONS

- The following table specifies the fixed torques with ISO standard thread. The torque specifications for components or special units are indicated in the chapters of this guide referring to ISO. To avoid strains, screw the units gradually and cross them in one or alternative goes, to obtain the specified torque..

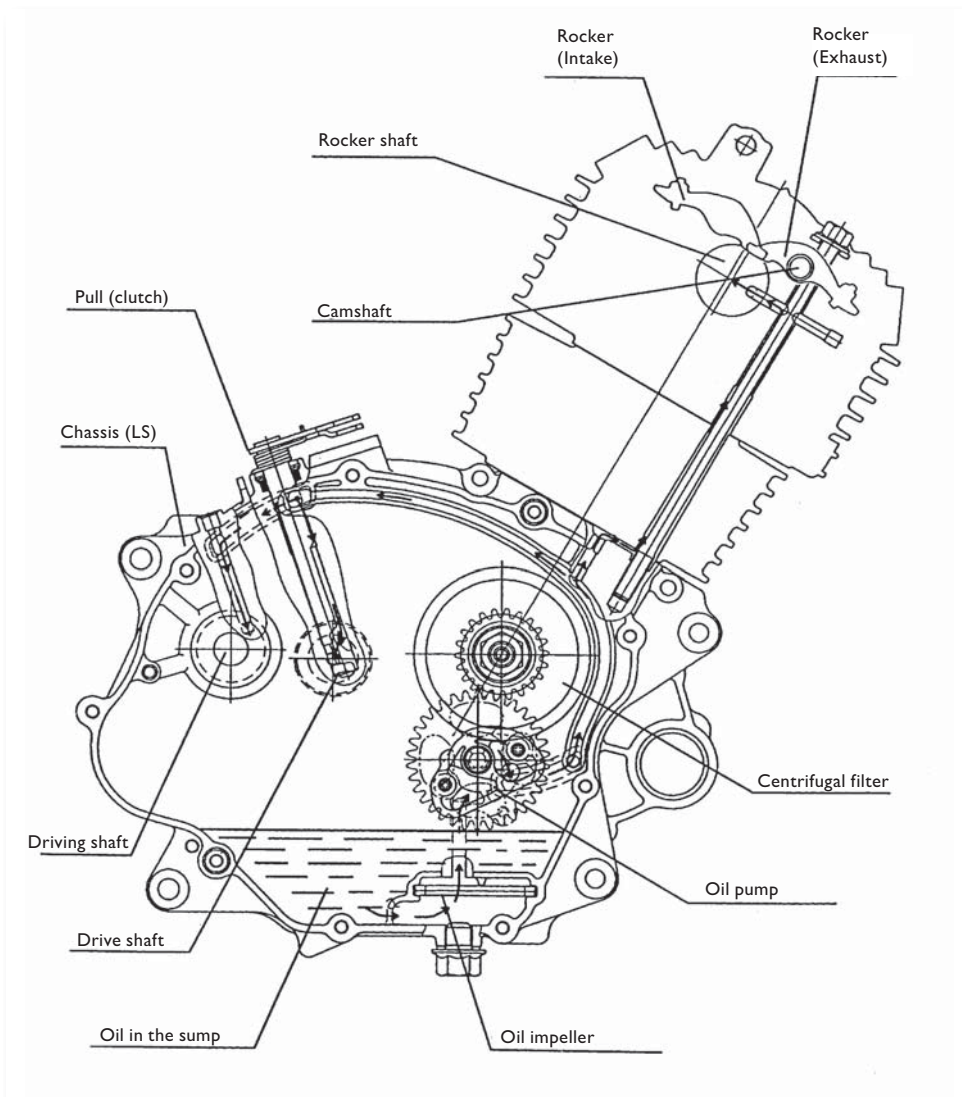


**A**= Distances among the planes.

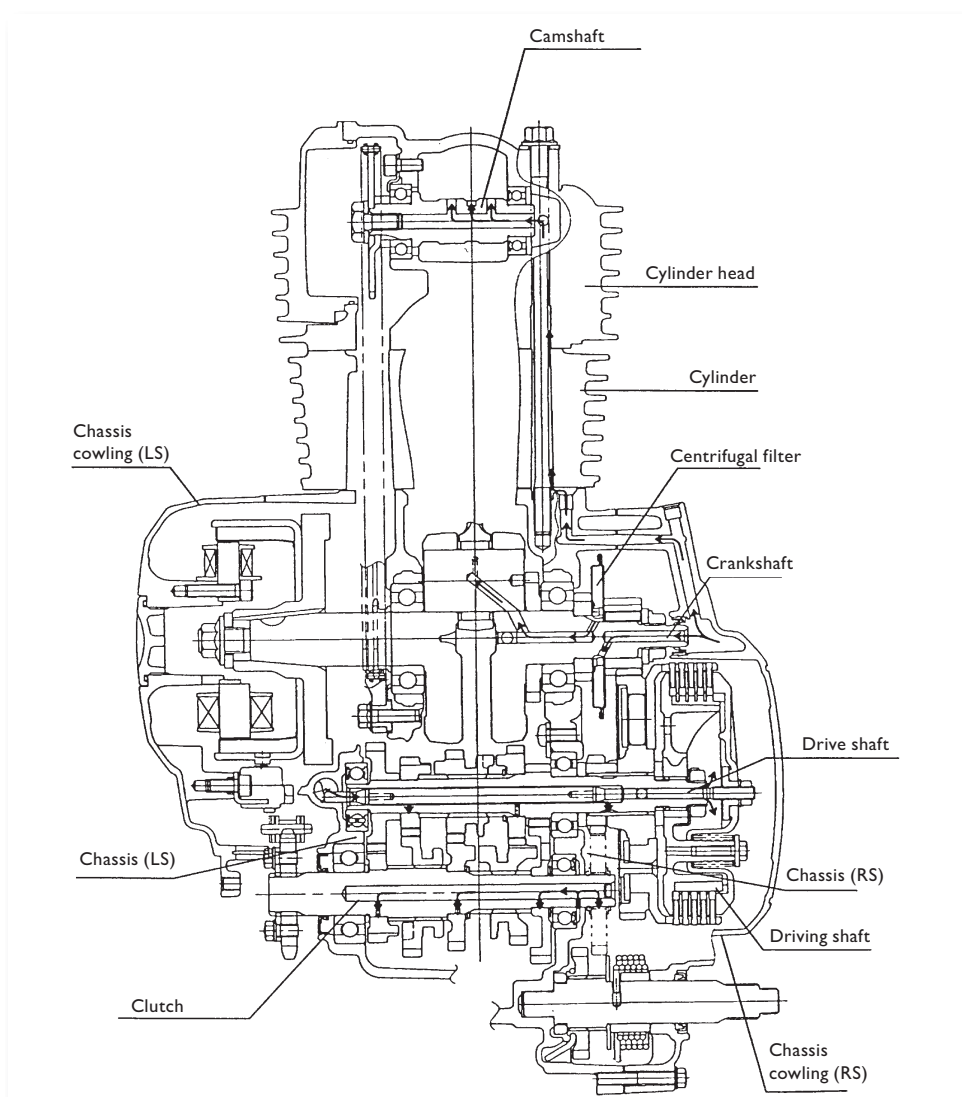
**B**= External Diameter of the thread.

A (Nut)	B (Nut)	Torque general specifications		
		N.m	Kgf.m	ft.lb
10mm	6mm	6	0,6	4,3
12mm	8mm	15	1,5	11
14mm	10mm	30	3,0	22
17mm	12mm	55	5,5	40
19mm	14mm	85	8,5	61
22mm	16mm	130	13,0	94

### 2.2 LUBRICATION DIAGRAM



**Don't damage the chassis surface, otherwise there will be oil leaks.**



*For a better performance, use always oil and "amalibe".*

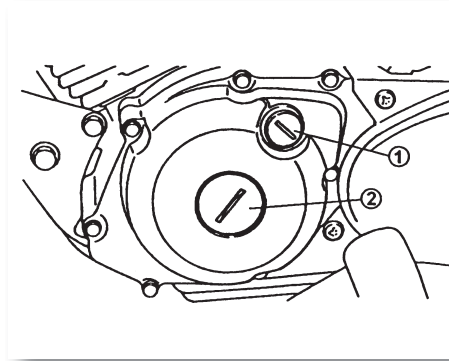
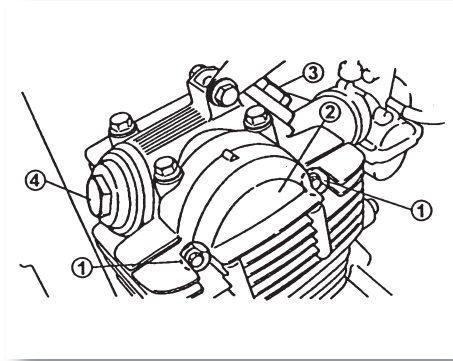


### 2.3 VALVES SET ADJUSTMENT

**Remark:**

The valves set should be adjust when the motor is cool down and at room temperature.

When adjusting or measuring the valves set, the piston should be in the top dead centre (TDC) at the compression moment.

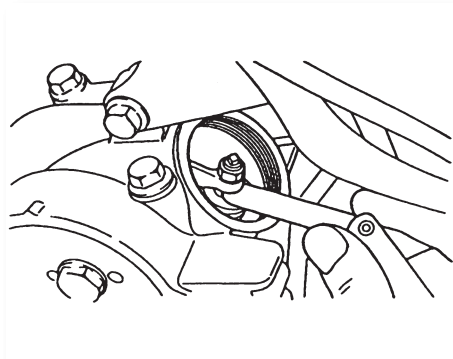


**1) REMOVE:**

- Spark plug
- Screws (1).
- Lateral cover of the cylinder head (2).
- Valves lining (intake) (3).
- Valves lining (exhaust) (4).

**2) REMOVE:**

- Top of the point control (with the gasket) (1).
- Central cap (with the gasket) (2)



**3) MEASURE:**

- Set of valves.

Unspecified => **Adjustment**



**Set of valves (cold):**

Intake:

0,08 ~ 0,12 mm

Exhaust:

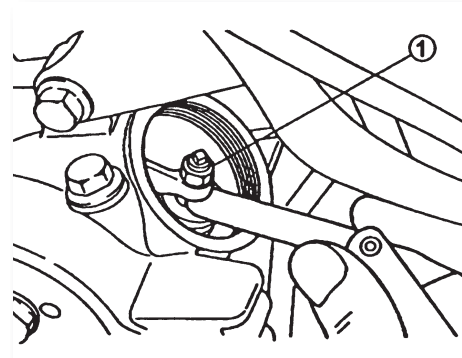
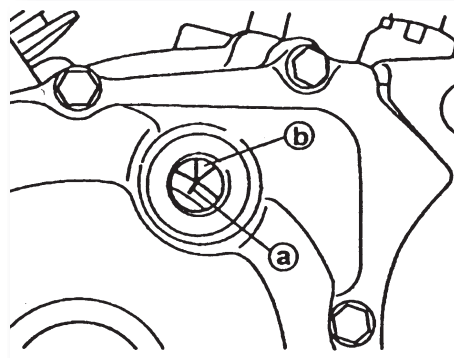
0,10 ~ 0,14 mm

**Steps for measuring:**

- Rotate the crankshaft anticlockwise aligning the mark (a) of the rotor with the stationary point (b) of the chassis cover (1), with the piston in the top dead centre (TDC), and when the mark of the control gear is aligned with the mark of the cylinder head.

- Measure the set of valves with a calibre of thickness.

Unspecified => **Set adjustment**

**4) ADJUST:**

- Set of valves.

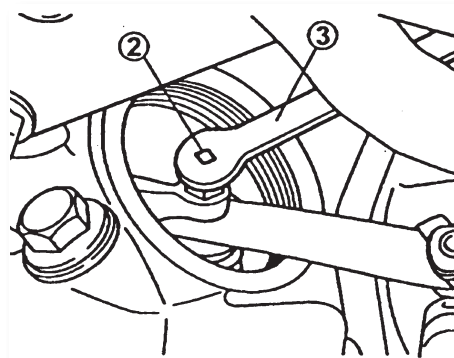
**Steps for measuring:**

- Loosen the locknut (1).

- Rotate the adjuster (2) towards the inside or outside with the fixed adjustable spanner (3) to obtain the specified play.

**Turn towards the inside:** Play diminishes

**Turn towards the outside:** Play increases



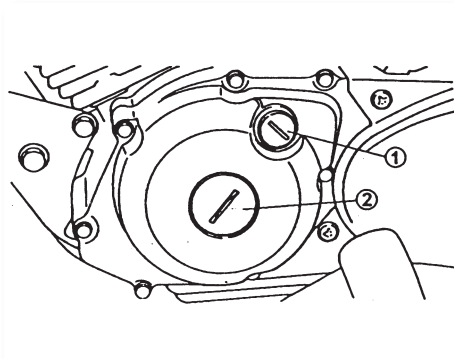
- Install the adjuster to impede it turns and tighten the locknut.



### Locknut:

0,8Kgf.m (0,8N.m).

- Measure the set of valves.
- If the play is incorrect, repeat the aforementioned steps until the correct play is achieved.



### 5) INSTALL:

- Top of the point control (with the gasket) (1).
- Central cap (with the gasket) (2).

### SPARK PLUG CONTROL

#### 1) REMOVE:

- Spark plug connector.
- Spark plug.



*Before removing the spark plug, blow on the area with compressed air to eliminate any piece of dirt, in order to avoid it falls inside the engine.*

#### 2) CHECK:

- Spark plug Type.



Incorrect => **Replace.**

#### Standard spark plug:

CR7HSA (NGK) / U22 FSR-U (DENSO)



**3) CHECK:**

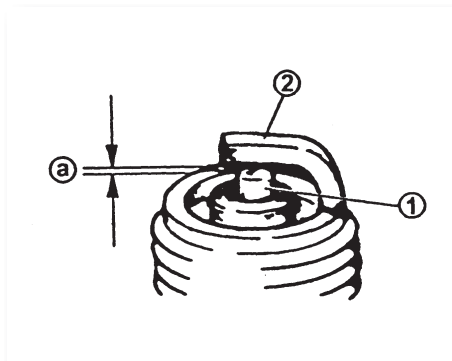
- Electrodes (1).

Damages/Wear => **Replacement.**

- Insulator (2).

Standard colour => **Replacement.**

The standard colour is light brown.

**4) CLEAN:**

- Spark plug.

(Clean the spark plug with a spark plug cleansing or a wire brush).

**5) MEASURE:**

- Play between the electrodes (a)  
(with a calibre of thickness).

Unspecified => **Adjustment to play.**



**Play between the electrodes:**

0,7 mm

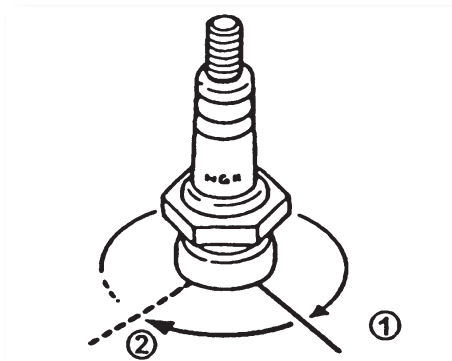
**6) INSTALL:**

- Spark plug.



**Spark plug:**

1,25 Kgf.m (12,5 N.m)





**Remark:**

- Before installing the spark plug, clean the surface of its seating and its gasket.
- In case you do not have a torque gauge, a good evaluation for the correct torque is to tighten (1) the spark plug by hand and then tighten from 1/4 to 1/2 turn to (2).
- Use always a new gasket.

### 2.4 IGNITION POINT CONTROL

**Remark:**

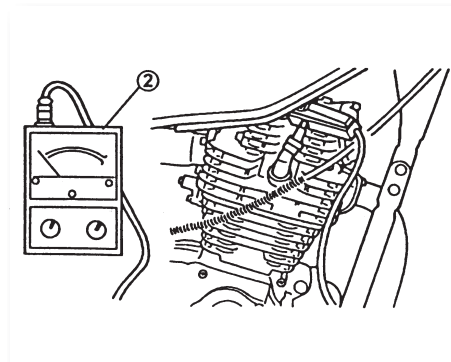
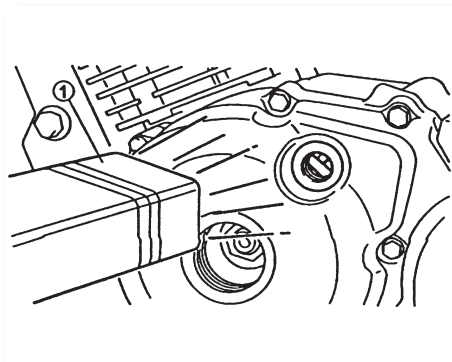
- Before controlling the ignition point, check all the electric connections linked into the ignition system. Make sure that the connections are tightly and without rusty and also the earth connections must be very tight.

**1) REMOVE:**

- Top of the point control

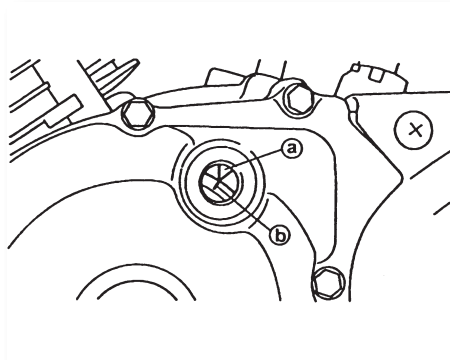
**2) INSTALL:**

- Stroboscope lamp (1).
- Inductive Tachometer (2) (in the spark plug cable).



**3) CHECK:**

- Ignition Point.

**Steps for checking:**

- Get the engine started and let it warming up for some minutes. Leave it working in the specified rotation.

**Idling speed:**

1.300 - 1.400 rpm

- Check visually if the stationary point (a) is inside the band (b) in the magneto flywheel.

Outside the band => **Check the ignition system.**

**Remark:**

- *The ignition point is not adjustable.*

**4) INSTALL:**

- Top of the point control (with the gasket).

**2.5 COMPRESSION PRESSURE ADJUSTMENT****Remark:**

- *Insufficient compression pressure results in loss of power.*

**1)CHECK:**

- Set of valves

Unspecified => **Adjust.**

See section "**VALVES SET ADJUSTMENT**".

- 2) Get the engine started and let it warming up for some minutes.

- 3) Pull the engine up.



### 4) REMOVE

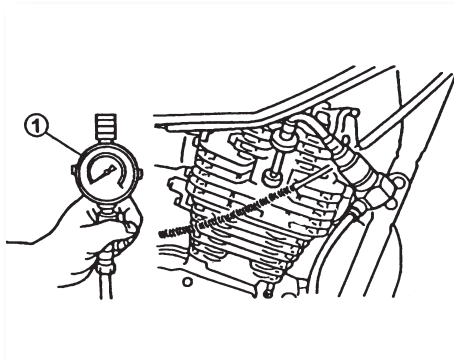
- Spark plug.



*Before removing the spark plug, blow on the area with compressed air to eliminate any piece of dirt, in order to avoid it falls inside the engine.*

### 5) INSTALL:

- Compressor gauge (I).



### 6) MEASURE:

- Compression Pressure

If it exceeds the permitted maximum pressure => **the cylinder head, the valves surface and the piston head in relation to carbon.**

If it is under the minimum pressure => **Inject some drops of oil into the cylinder and measure again.**

**Follow the table below:**

COMPRESSION PRESSURE (With oil injected into the cylinder)	
Higher measure than without oil	Worn or damaged piston
The same measure as without oil	Possible defect in rings, valves, cylinder head gasket or piston => <b>REPAIR</b>

**Compression pressure (at the sea level):**

**Standard:**

1.200 KPa (12 Kg/cm<sup>2</sup>)

**Minimum:**

1.040 KPa (10.4 Kg/cm<sup>2</sup>)



**Steps for measuring:**

- Get the engine started with the throttle totally opened, until the compression reading becomes stabilized.



*Before getting the engine up, connect the cable from the spark plug to earth to avoid sparks.*

**7) INSTALL:**

- Spark plug.

**2.6 CHECKING OF THE MOTOR OIL LEVEL**

- 1) Place the motorcycle in a flat surface.

**Remark:**

- *Make sure that the motorcycle is in vertical line when checking the oil level.*

- 2) Get the engine started and let it warming up for some minutes.

- 3) Pull the engine up.

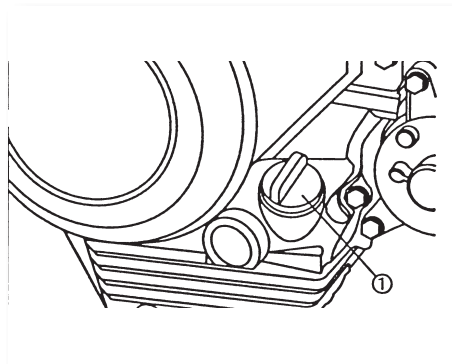
- 4) Move the oil level dipstick (1). Clean it with a cloth and place it in the orifice of oil supply without threading it. Immediately, move it again.

**5) CHECK:**

- Level of motor oil.

The level of oil should be between the maximum (1) and minimum (2) marks.

Oil underneath the minimum level => **Add oil up to the appropriate level.**

**2.7 RECOMMENDED MOTOR OIL****Recommended motor oil:**

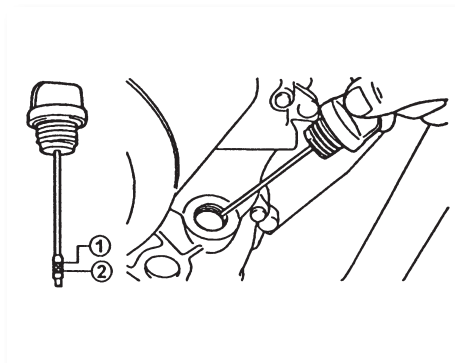
YAMALUBE 4 or similar.

6) Get the engine started and let it warming up for some minutes.

7) Pull the engine up.

**Remark:**

*Wait some minutes till the oil goes down, before checking the oil level.*



## 2.8 MOTOR OIL CHANGE

1) Get the engine started and let it warming up for some minutes.

2) Pull the engine up and place a tray under the motor.

**3) REMOVE:**

- Oil level dipstick.
- Drainage cap (I).
- Gasket.

Drain the oil in the sump.

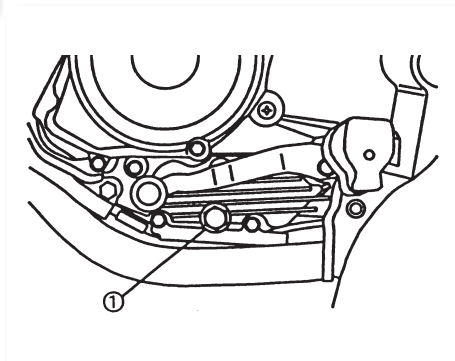
**4) INSTALL:**

- Drainage cap (I).
- Oil level dipstick.



**Drainage cap:**

2,0 Kgf.m (20 N.m)



**5) SUPPLY:**

- Oil in the sump.

**Quantity of oil:**

1,0 L

**6) CHECK:**

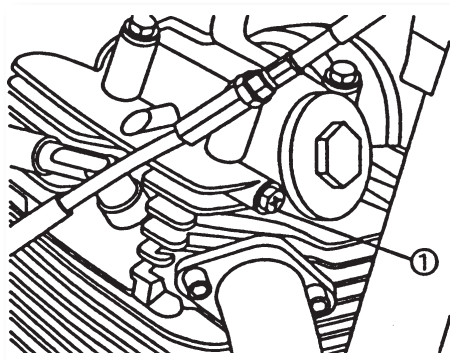
- Level of motor oil.

See section “CHECKING THE LEVEL OF MOTOR OIL” “OIL FLOW CHECKING”.

**2.9 OIL FLOW CHECKING****1) REMOVE:**

- Control screw of the oil flow (1).

- 2) Get the engine started and keep it in the idling speed till the oil drips from the drain orifice.



Oil flows => **Oil pressure is good.**

Oil doesn't flow => **Oil pressure isn't not good.**



*If oil doesn't come out after some seconds, Pull the engine up immediately and Check the oil pump section.*

**3) TIGHTEN:**

- Control screw of the oil flow.

**Screw of the oil flow:**

0,7 Kgf.m (7N.m)



### 2.10 EXHAUST SYSTEM CHECKING

#### 1) CHECK:

- Screws (1) (exhaust pipe).

Loose / damages => **Tighten / replace.**

- Gasket (exhaust pipe).

Leak of exhaust fumes => **Tighten / replace.**

#### Screw:

0,7 Kgf.m (7N.m)

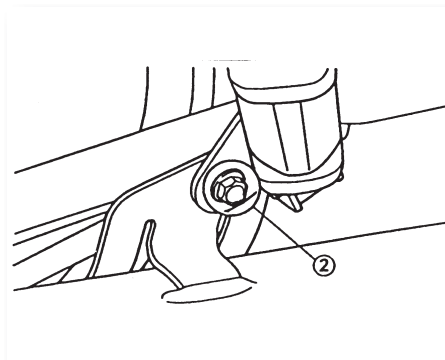
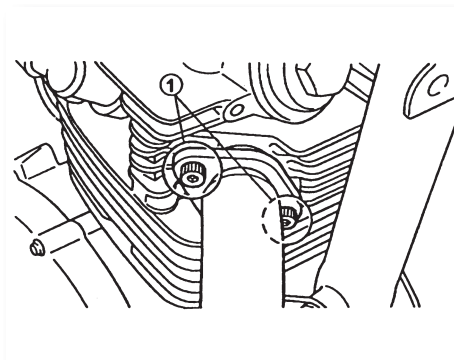
#### 2) CHECK:

- Screws (2).

Loose / damages => **Tighten / replace.**

#### Screw:

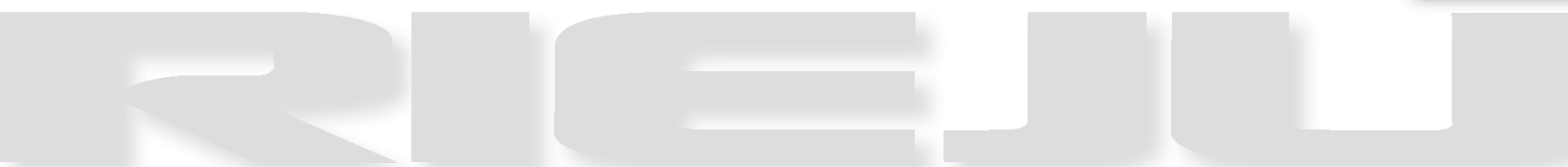
1,5 Kgf.m (15N.m)







# *Engine RIEJU*





### 3.1 MOTOR DISASSEMBLY

#### CYLINDER HEAD, CYLINDER AND PISTON

**REMARK:**

*With the assembled motor in the frame, the cylinder head, camshaft and cylinder can be checked, replace the following parts:*

- Seat
- Side cowling
- Fuel tank
- Exhaust pipe
- Carburettor
- Clutch cable
- Spark plug Cable
- Securing base of the engine

**1) REMOVE:**

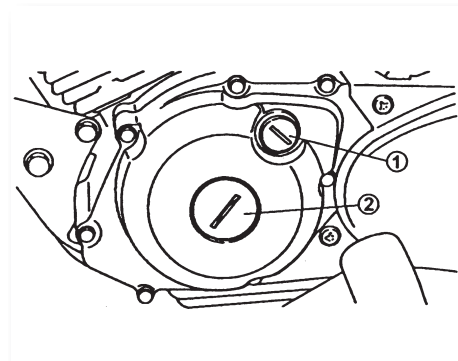
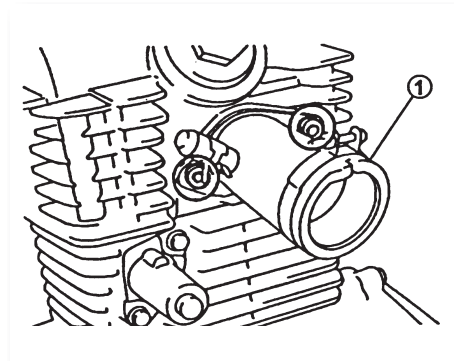
- Spark plug.
- Inlet manifold (1).

**2) REMOVE:**

- Top of the point control (with the gasket) (1).
- Central cap (with the gasket).

**3) REMOVE:**

- Valves lining (with the gasket).
- Side covers of the cylinder head (with the gasket).





### 4) ALIGN:

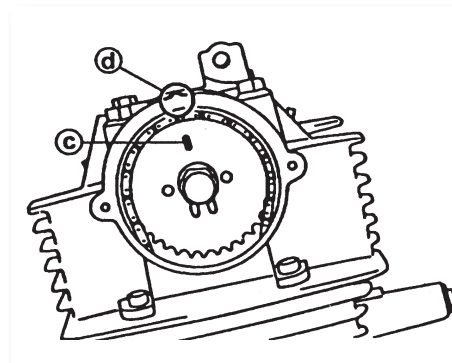
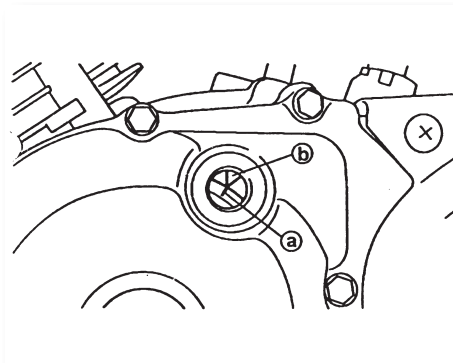
- Magneto mark (a) (with the stationery point (b) of the chassis cowling).

**Remark:**

*Rotate the crankshaft anticlockwise with a spanner.*

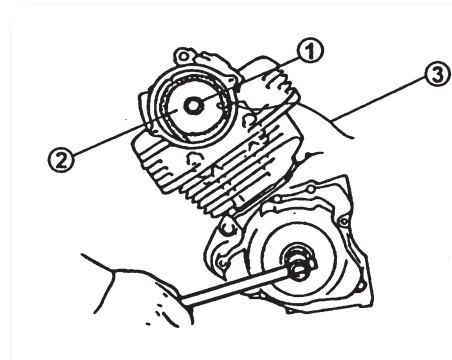
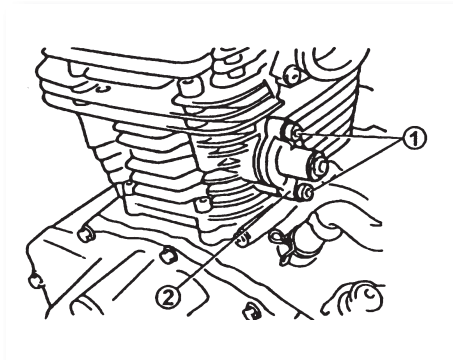
### Steps for alignment with TDC:

- Rotate the crankshaft anticlockwise aligning the mark (a) with the top dead centre (TDC) (b).
- Align the mark I (c) of the control gear with the stationary point (d) of the cylinder head. So, the piston will remain in top dead centre (TDC).



**Remark:**

- Check if the piston is in the TDC of the compression time.
- If it is not, rotate the crankshaft anticlockwise completely once again.



### 5) REMOVE:

- Screw (adjuster of the timing chain) (1).
- Adjuster unit of the timing chain (2).

### 6) REMOVE:

- Screw (control gear) (1).
- Particular washer (control gear) (2).

**7) REMOVE:**

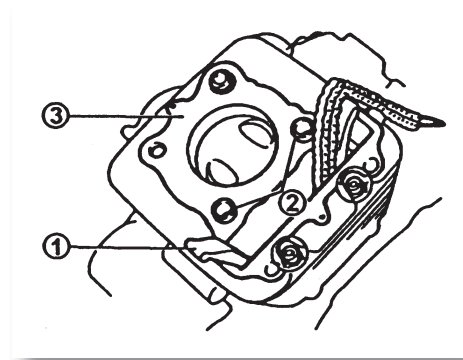
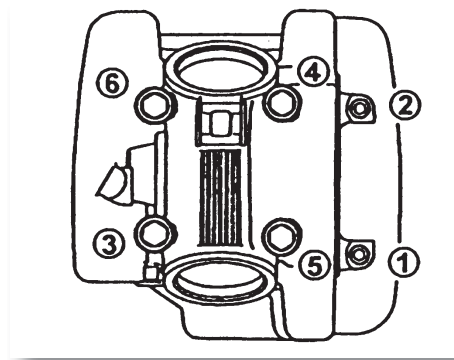
- Screws (cylinder head).
- Cylinder head.

**Remark:**

- Loosen each one of the screws 1/4 turn and remove them when they are completely loose.
- Loosen the screws, beginning with the smaller number.
- The stamped numbers on the cylinder head indicated the torque sequence.

**8) REMOVE:**

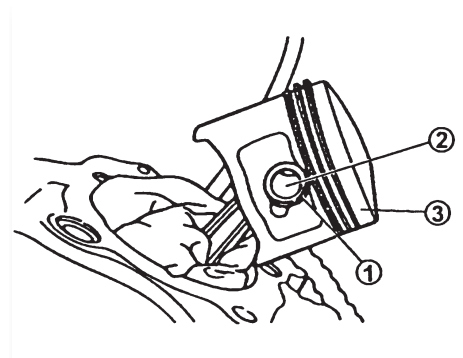
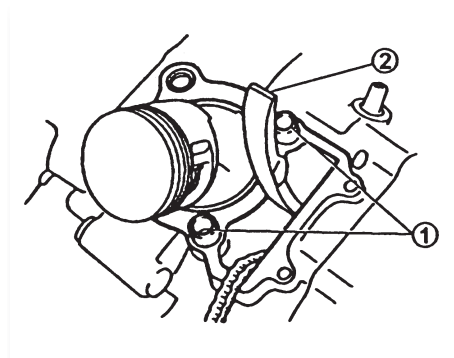
- Guide of the timing chain (exhaust) (1).
- Tangs guide (2).
- Gasket (cylinder head) (3).
- Screws (cylinder head).
- Clutch cable hold.
- Cylinder.

**9) REMOVE:**

- Tangs guide (1).
- Gasket (cylinder) (2).

**10) REMOVE:**

- Clamp rings of the bolt (1).
- Bolt (2).
- Piston (3).





**Remark:**

• Before removing the clamp rings of the bolt, cover the cylinder with a clean cloth to avoid that something falls inside the engine.

• Before removing the bolt, take the slot flanges out of the clamp rings and the orifice rim. Once the flanges are removed, it there are still difficulties for getting the bolt out, use the corresponding tool.

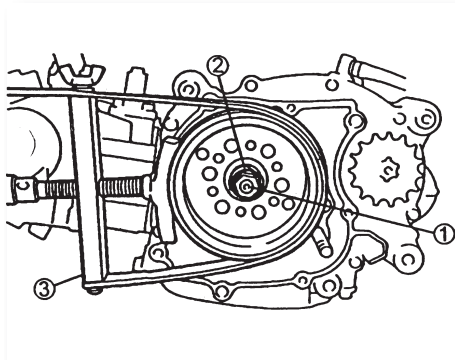
### 3.2 MAGNETO FLYWHEEL

**Remark:**

The magneto flywheel can be removed while the engine is assembled in the frame, releasing the change pedal.

**1) EXTRAER:**

- Chassis cowling (LS).
- Drive of the neuter switch.
- Nut (magneto) (1).
- Flat Washer(2).



**Remark:**

Loosen the nut of the magneto while hold the magneto with the rotor support (magneto) (3).

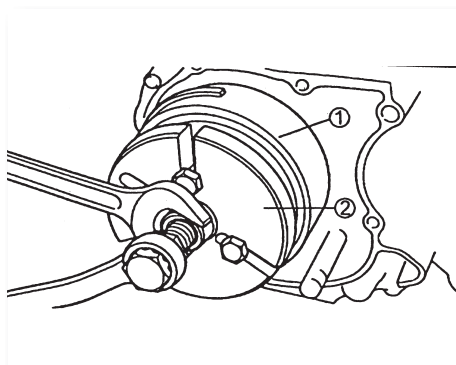
**2) REMOVE:**

- Magneto flywheel (1).
- Cotter.

**Remark:**

- Remove the flywheel magneto with the rotor extractor (2).

• Centre the rotor extractor of the magneto flywheel. Make sure that the play between the extractor and the flywheel is the same in all the points, after installing the securing screws. If it is necessary, loosen one of the screws lightly in order to tighten the extractor position.



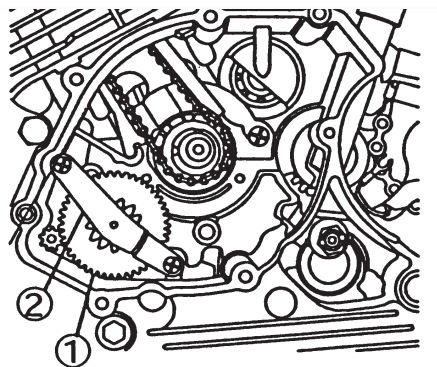
Cover the point of the crankshaft with the spanner to avoid damages.

**3) REMOVE:**

- Start gear.
- Washer.

**4) REMOVE:**

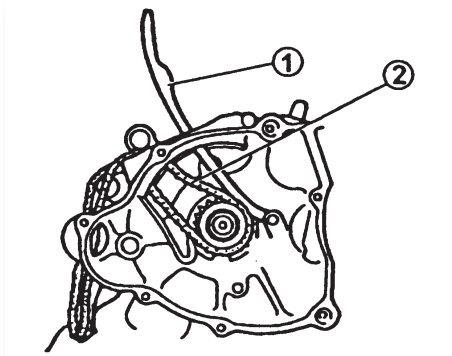
- Plate (2).
- Start gear (1).





### 5) REMOVE:

- Guides of the timing chain (1).
- Timing chain (2).



## 3.3 CLUTCH

### **Remark:**

*The clutch unit can be removed with the assembled motor in the frame. To be able to do it take the following parts out:*

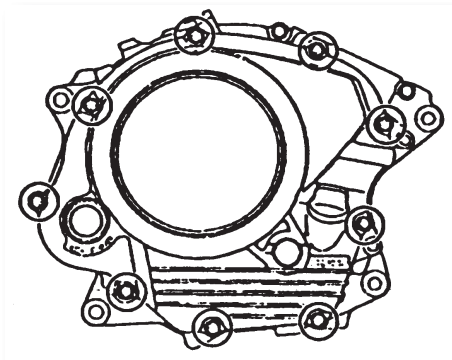
- Exhaust
- Foot rest
- Brakes pedal
- Start Pedal

### 1) REMOVE:

- Chassis cowlings (RS).

### **Remark:**

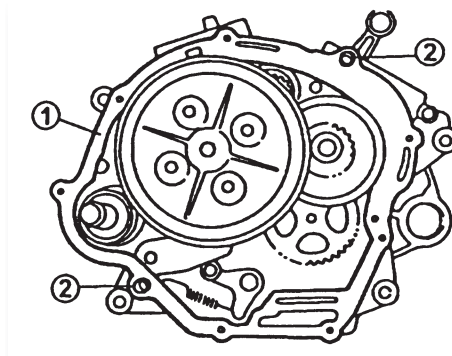
*Loosen screws diagonally.*





**2) REMOVE:**

- Gasket (1).
- Tangs guide (2).

**3) EXTRAER:**

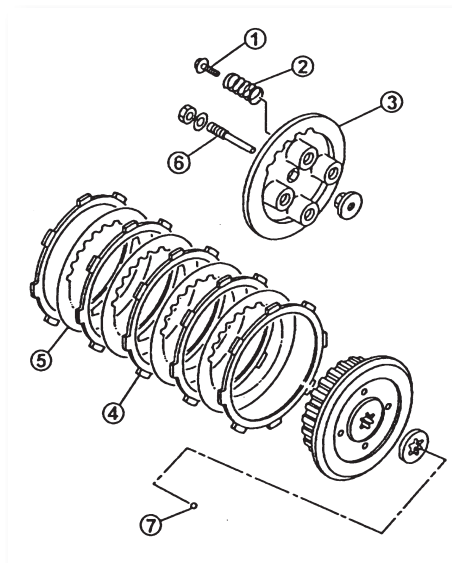
- Screws of the pressure plate (1).
- Clutch springs (2).
- Pressure plate (3).
- Friction plates (4).
- Separators (5)

**Remark:**

*Loosen the screws of the pressure plate diagonally.*

**4) REMOVE:**

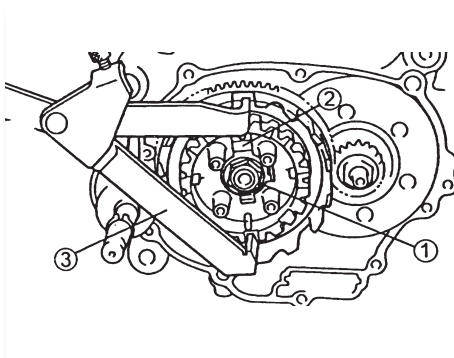
- Operation rod N° 6.
- Ball (7).





### 5) LOOSE:

- Nut (clutch drum) (1).

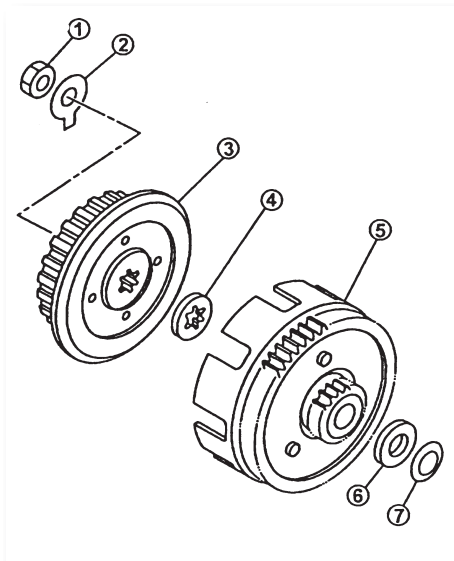


### Remark:

- Smooth the rim of the clamp rings (2).
- Loosen the nut (1) from the clutch drum while the drum is hold with the universal clutch support (3).

### 6) REMOVE:

- Nut of the clutch drum (1).
- Clamp rings (2).
- Clutch drum (3).
- Pressure Washer (4).
- Clutch hood (5).
- Space washer (6).
- Washer (7).



**7) LOOSE:**

- Nut (1).

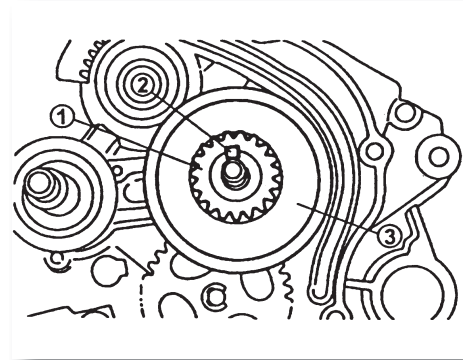
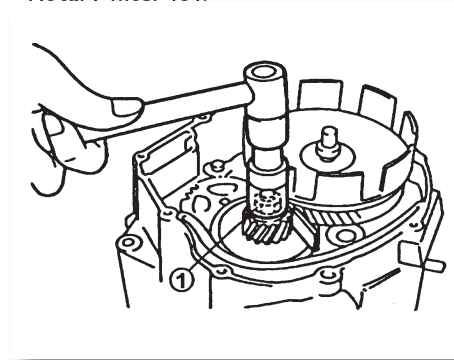
**Remark:**

• Place a folded aluminium sheet between the teeth of the primary gear and those of the hood.

• Take care not to damage the gear teeth.

**8) REMOVE:**

- Nut.
- Particular washer.
- Primary gear (1).
- Cotter (2).
- Rotary filter (3).

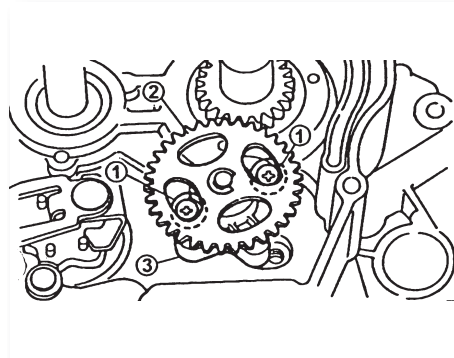
**3.4 OIL PUMP****Remark:**

• The oil pump can be removed with the assembled engine in the frame. To be able to do it take the following parts out:

- Clutch
- Rotary filter

**1) REMOVE:**

- Screw with washer (oil pump) (1).
- Oil pump unit (2).
- Oil impeller.





### 3.5 START PEDAL SHAFT

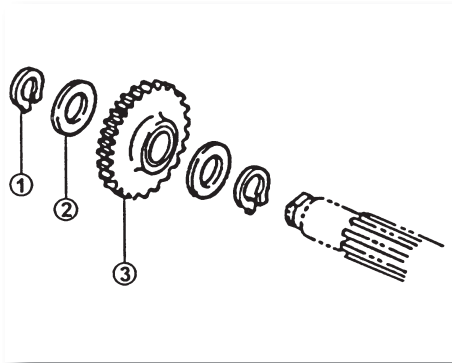
**Remark:**

• The start pedal can be removed with the assembled motor in the frame. To be able to do it, take the following parts out:

- Exhaust.
- Foot rest
- Brakes pedal
- Change pedal.
- Clutch.

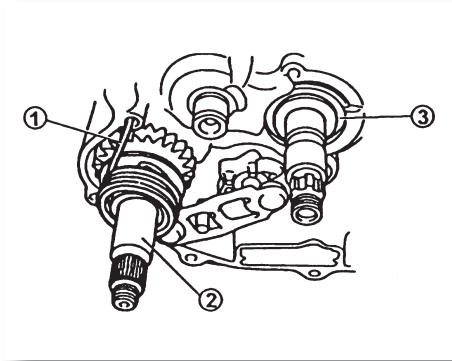
**1) REMOVE:**

- Clamp ring (1).
- Particular washer (2).
- Star system gear (3).
- Particular washer.
- Clamp ring.



**2) EXTRAER:**

- Torque spring (1).
- Star shaft unit (2).
- Particular washer (3).
- Clamp ring.

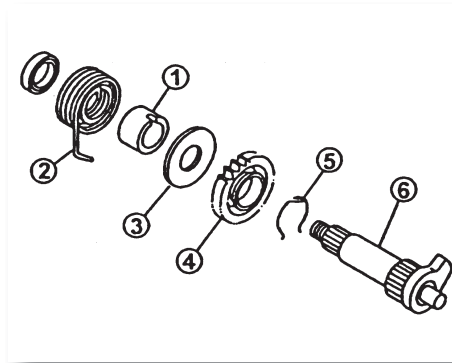




### 3.6 DISASSEMBLY OF THE START SYSTEM SHAFT WITH PEDAL

#### 1) REMOVE:

- Space washer (1).
- Torque spring (2).
- Washer (3).
- Start system gear (4).
- Clamp ring (5).
- Start system shaft (6).



### 3.7 CHANGE SHAFT

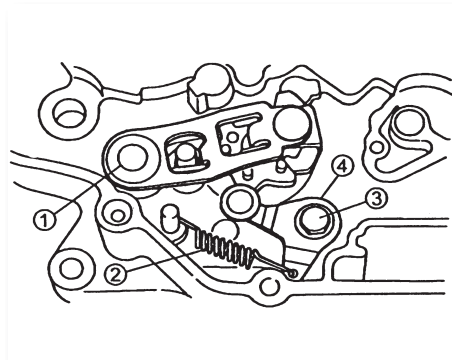
#### **Remark:**

• The change shaft can be removed with the assembled motor in the frame. To be able to do it take the following parts out:

- Exhaust.
- Foot rest.
- Change pedal.
- Clutch.
- Start system with pedal unit

#### 1) REMOVE:

- Change shaft (1).
- Torque spring (2).
- Screw (constrained rod) (3).
- Constrained rod (4).

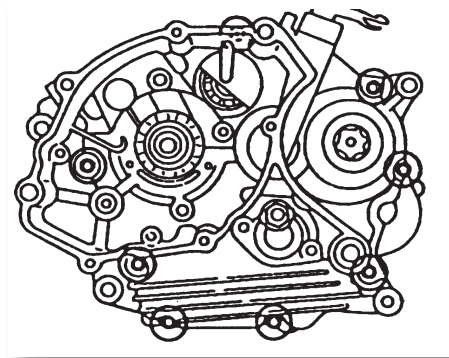
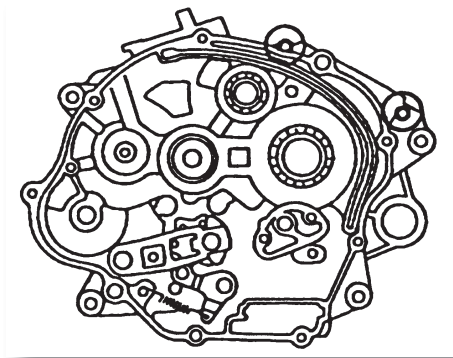




### 3.8 CHASSIS

#### 1) REMOVE:

- Screws (chassis).
- Battery cable supports.



#### **Remark:**

- Loosen the screws diagonally.
- Loosen each one of the screws 1/4 turn and remove them when they are completely loose.

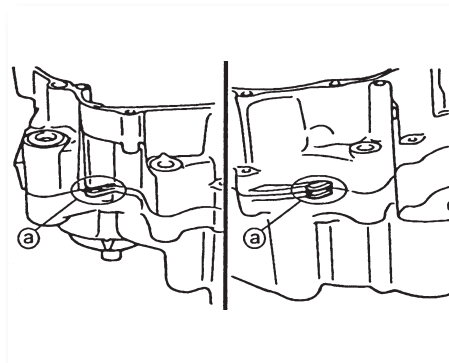
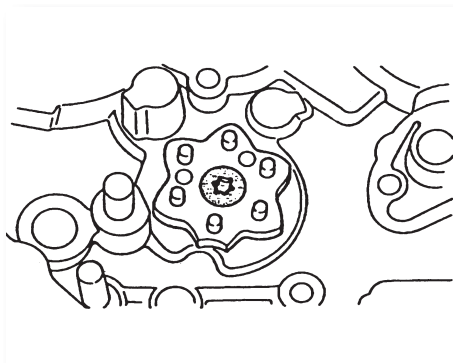
#### 2) REMOVE:

- Screw of the change selector ring.

Use an Alien spanner of 4 mm.

#### 3) REMOVE:

- Chassis (LD).



#### **Remark:**

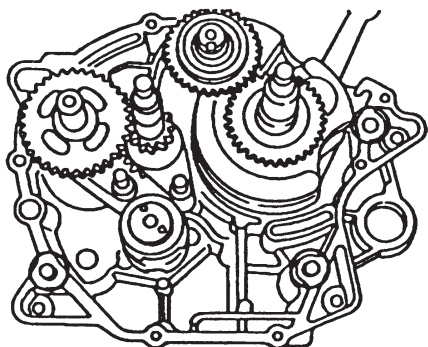
- Place the motor with the chassis (LS) downwards and then put a screwdriver in the division slots (a) of the chassis.



- Use the screwdriver only in the indicated points.
- The chassis (LS) should remain downwards.
- Separate the chassis after checking if the change selector ring and the clamp ring shaft have been removed.
- Do not damage the contact surfaces of the chassis.

### 3) REMOVE:

- Tangs guide.



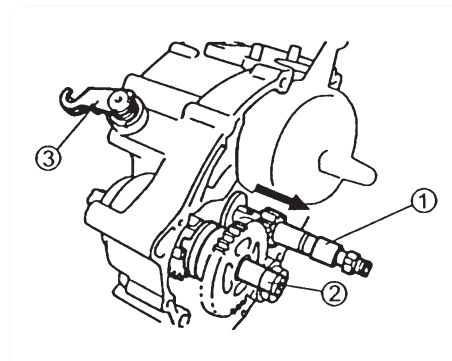
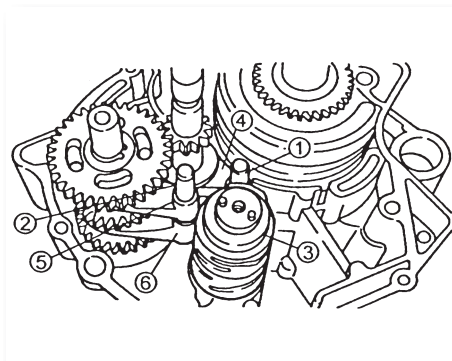
## 3.9 ROCKER ARM, TRANSMISSION AND CHANGE SELECTOR

### 1) REMOVE:

- Guide bar of the change fork (1) (short).
- Guide bar of the change fork (2) (long).
- Change selector (3).
- Change fork (1) (4).
- Change fork (2) (5).
- Change fork (3) (6).

### 2) REMOVE:

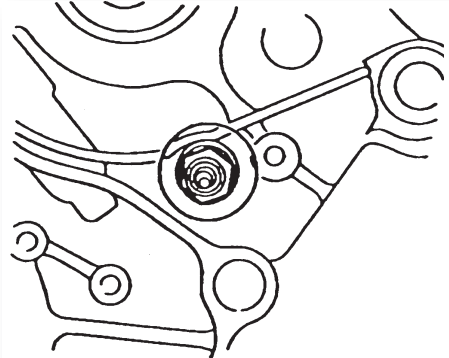
- Drive shaft unit (1).
- Operation rod (n°2).
- Driven shaft unit (2).
- Washer.
- Operation lever unit (3).





### 3) REMOVE:

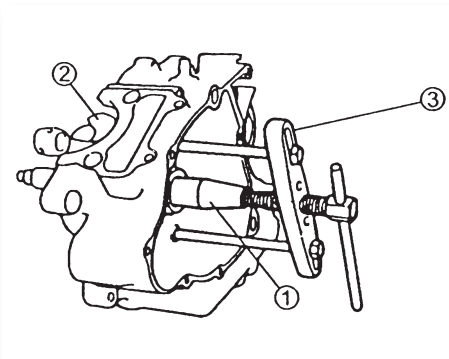
- Neuter switch.



## 3.10 CRANKSHAFT

### 1) REMOVE:

- Crankshaft (1) with the rocker arm shaft. (2).



#### **Remark:**

- Remove the crankshaft with the crankshaft extractor (1).

• Tighten the screws of the crankshaft extractor till the end, but make sure that the body of the tool is in parallel with the chassis. If it is necessary, loosen one of the screws to adjust the position of the crankshaft extractor.





### 3.II ROCKERS, CAMSHAFT AND VALVES

#### 1) LOOSEN:

- Locknut of the valve adjusters.
- Valve adjusters.

#### 2) REMOVE:

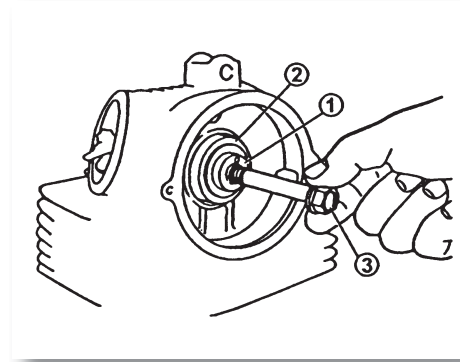
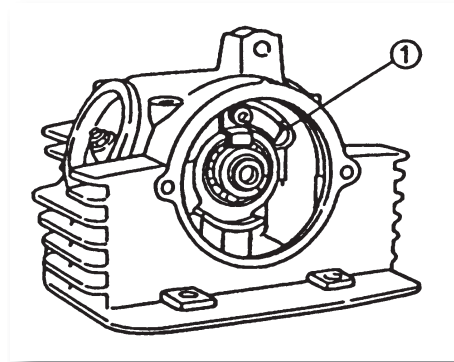
- Clamp plate (1).

#### 3) REMOVE:

- Camshaft (1).
- Space washer (2).

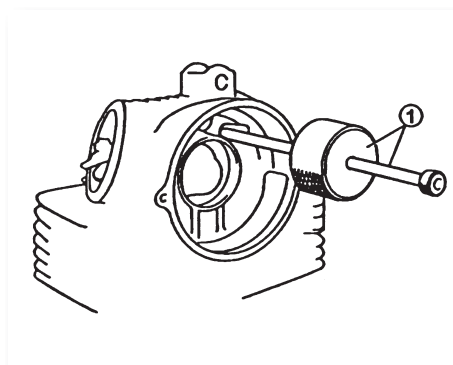
#### 4) REMOVE:

- Rockers shafts.
- Rockers (intake and exhaust).



#### **Remark:**

- Install the special tool (1) in the rocker shaft to take it out.



#### **Remark:**

- Before removing the internal parts (valves, springs, valve seating, etc) of the cylinder head, check the valves are closed.



### 5) CHECK:

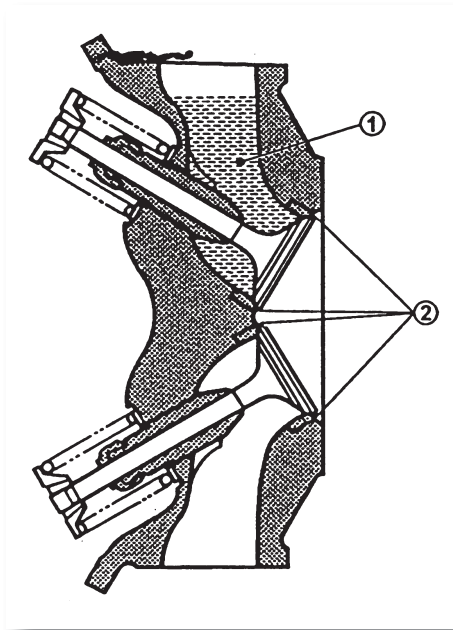
- Valve closing.

Leaks in the valve seating => **Check the valve , valve seating and width of the valve seating.**

See section: **“CHECK AND REPAIR – VALVE SEATING”**.

### Steps for checking:

- Fill up the intake chamber and then the exhaust chamber with petrol (1).
- Check the closing of both valves. The valve seating (2) cannot have any leak.

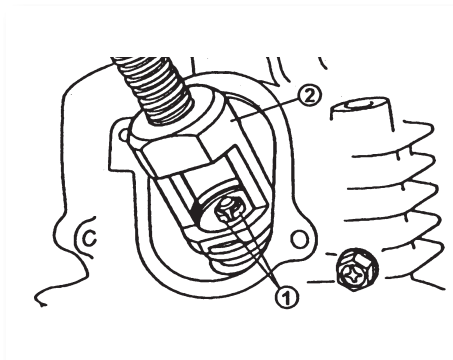


### 6) REMOVE:

- Valve clasp (1).

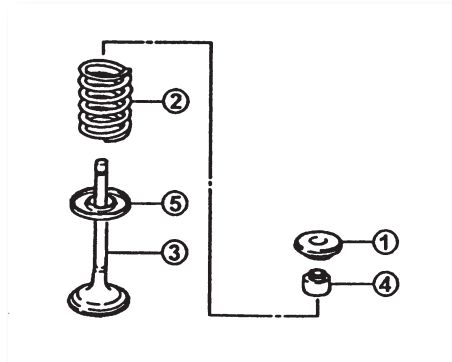
#### **Remark:**

- *Install the valve spring compressor (2) between the seating of the clasp and the cylinder head, to loosen the valve clasp.*



**7) REMOVE:**

- Clasp seating (1).
- Spring (2).
- Valve (3).
- Constraint ring (4).
- Spring seating (5).

**Remark:**

- Identify the position of each piece carefully, so that they can be reinstalled in their original positions.

**3.12 CYLINDER HEAD CHECK AND REPAIR****1) ELIMINATE:**

- Carbon sediment (of the compression chamber).
- Use a rounded spatula.

**Remark:**

- Do not use an instrument with sharp edges to avoid damages and scratches.
- In the thread of the spark plug.
- In the valve seating.



### 2) CHECK:

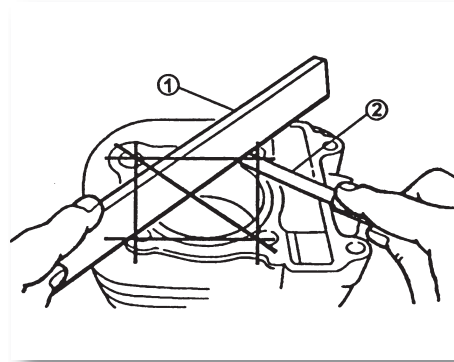
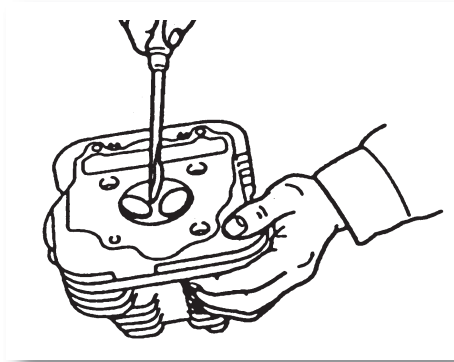
- Cylinder head.

Scratches / damages => **Replace.**

### 3) MEASURE:

- Strain.

Unspecified => **Rectify.**



### Strain of the cylinder head:

Below 0,03 mm

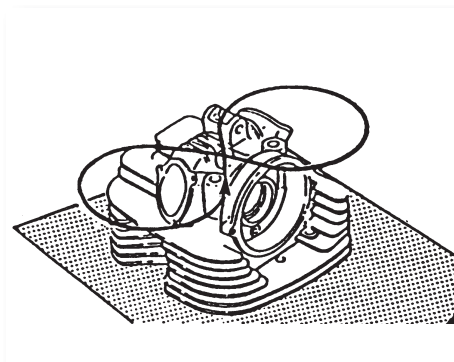
### Steps for measuring the strain and correction:

- Place a rule (1) and a calibre of thickness (2) on the surface of the cylinder head as it is illustrated above.

- Measure the strain.

- If the strain is unspecified, correct the cylinder head.

- Put a sandpaper of 400 ~ 600 on a flat surface and correct the cylinder head surface with 8-shaped movements.



### Remark:

- Rotate the cylinder head several times to avoid excessive removal of material only in one side.



### 3.13 VALVE SEATING

#### 1) ELIMINATE:

- Carbon sediment..  
(in the face and in the valve seating).

#### 2) CHECK:

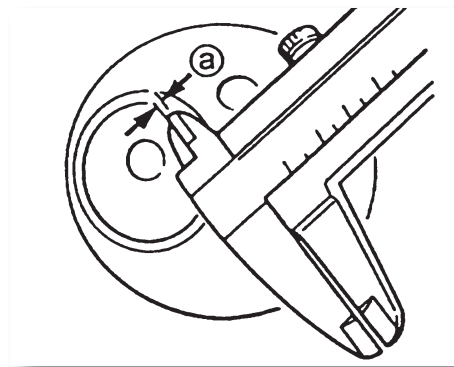
- Valve seating.

Groove / Wear => **Polish the valve with emery.**

#### 3) MEASURE:

- Width of the valve seating (a).

Unspecified => **Polish the valve with emery.**



#### **Width of the valve seating:**

##### **Inlet:**

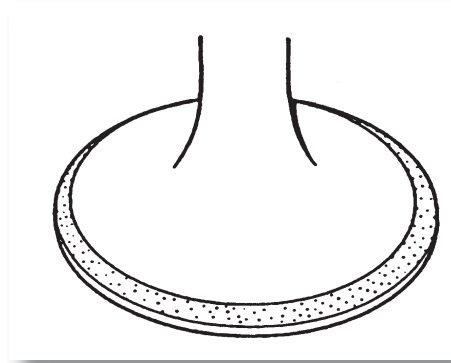
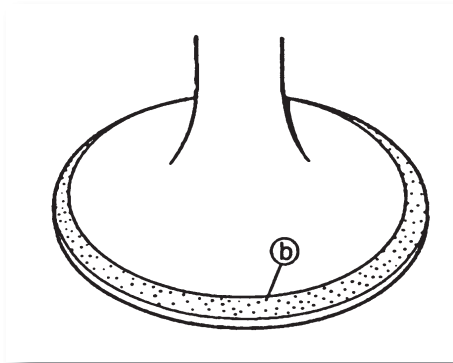
0,9 -1,1 mm  
< Limit: 1,6 mm >

##### **Exhaust:**

0,9 -1,1 mm  
< Limit: 1,6 mm >

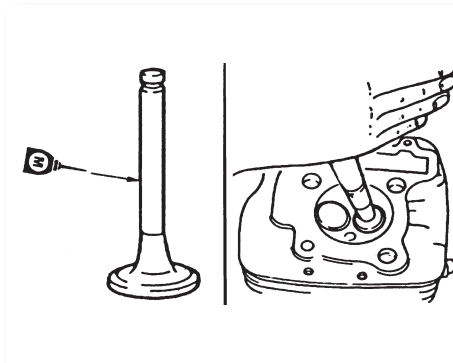
#### **Steps for measuring:**

- Apply blue ink of mechanics (Dykem) (b) in the face of the valve.
- Install the valve in the cylinder head.
- Press the valve against the guide and against its seating to make a visible mark.
- Measure the width of the valve seating.
- Where there was a contact between the seating and the front of the valve, the ink will be removed.
- If the seating width of the valve is big, small or it is not centred, it has to be redone.



#### 4) POLISH WITH EMERY:

- Front of the valve.
- Valve seating.



#### **Remark:**

- After correcting the valve seating or replacing the valve and its guide, the seating and the front should be polished with emery.

#### **Steps for fixing the valves:**

- Apply an abrasive thickness paste on the front of the valve.



**Not to allow to enter the paste in the space between the rod and the valve guide.**

- Apply oil with disulphide molybdenum in the valve rod.
- Install the valve in the cylinder head.
- Rotate the valve until its front and its seating are uniformly polished, at once eliminate the whole paste.

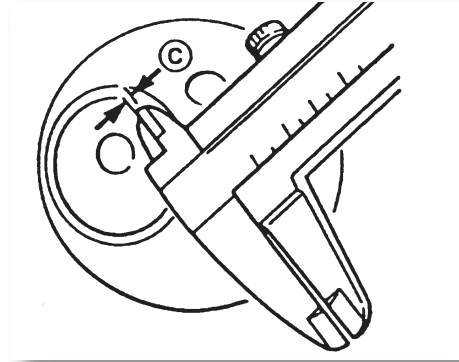
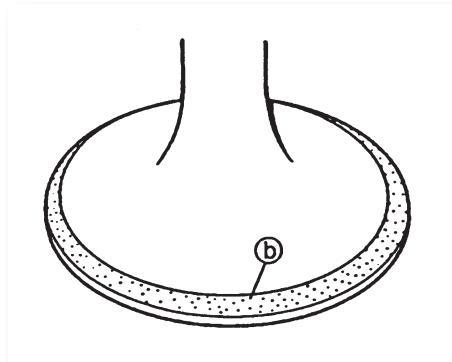
#### **Remark:**

- To obtain the best results in fixing the valves, flap smoothly in the valve seating while you turn it forwards and backwards by hand.
- Apply an abrasive thin paste on the front of the valve and repeat the steps aforementioned.

**Remark:**

• Make sure that the front and the seating are completely free from the abrasive paste after each fixing of valves.

- Apply blue ink of mechanics (Dykem) on the front of the valve (b).
- Install the valve in the cylinder head.
- Press the valve through the valve guide and against its seating to get a good contact.
- Measure the width of the valve fixing (c) again. If it is unspecified, correct and polish the valve seating with emery.

**3.14 VALVES AND VALVE SPRINGS****1) MEASURE:**

- Free length(a) of the spring.
- Unspecified = > Replace.*



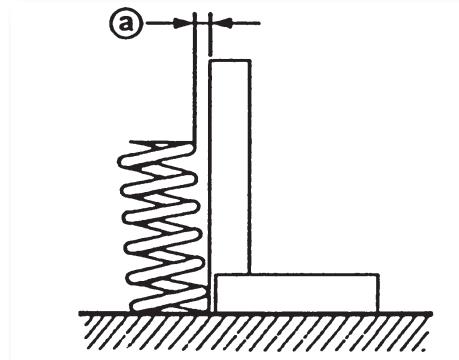
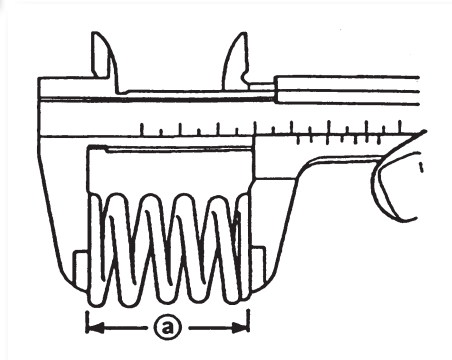
**Free length of the valve spring:**  
39,62 mm < Limit: 38,0 mm >

**2) MEASURE:**

- Inclination of the spring (a).
- Unspecified = > Replace.*



**Inclination limit of the spring:**  
1,7mm





### 3) MEASURE:

- Contact front of the spring.
- Wear / damages / scratches => **Replace.**

### 4) MEASURE:

- Internal Diameter of the valve guide.
- Unspecified => **Replace.**



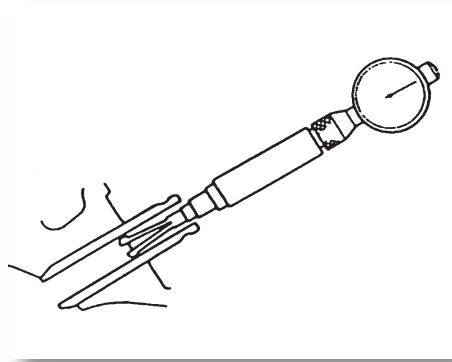
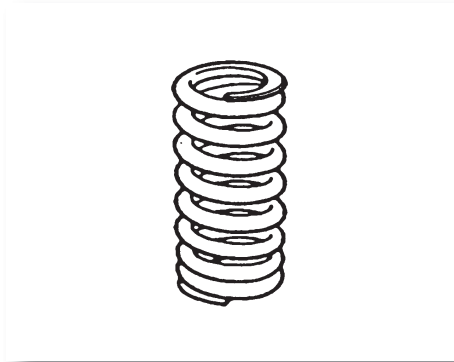
#### **Internal diameter of the valve guide:**

##### **Inlet:**

5,000 - 5,012 mm  
< Limit: 5,042 mm >

##### **Exhaust:**

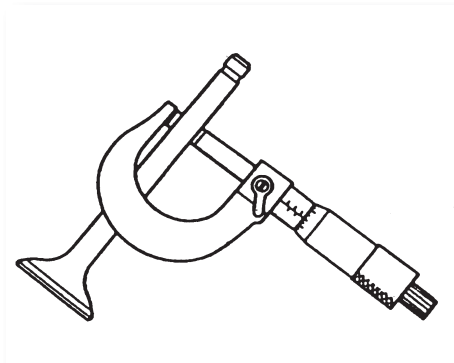
5,000 - 5,012 mm  
< Limit: 5,042 mm >



### 5) MEASURE:

#### **Rod-guide set:**

Internal diameter of the guide.  
Diameter of the rod valve.



#### **Limit of rod-guide set:**

##### **Inlet:**

0,010 ~ 0,037 mm  
< Limit: 0,08 mm >

##### **Exhaust:**

0.025 ~ 0,052 mm  
< Limit: 0,10 mm >

Unspecified => **Replace the valve guide.**

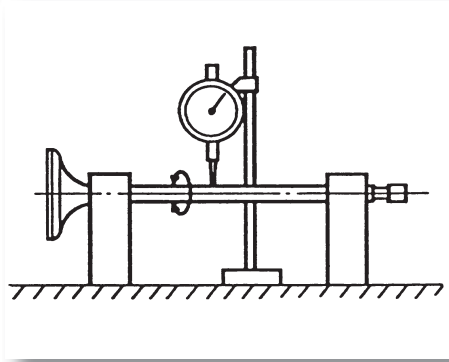


**6) MEASURE:**

- Warping (valve rod).
- Unspecified => **Replace.**

**Warping limit:**

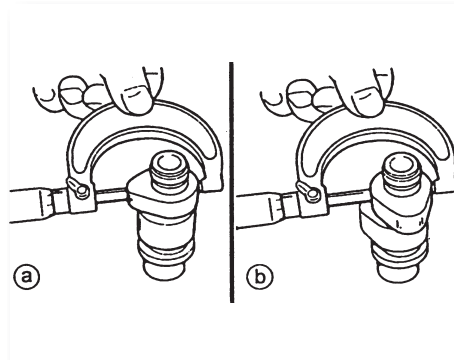
0,01 mm

**3.15 CAMSHAFT CHECKING****1) CHECK:**

- Cam salient.
- Groove / scratches / blue coloration => **Replace.**

**2) MEASURE:**

- Cam measurements (a) and (b).
- Unspecified => **Replace.**

**Cam measurements:****Inlet:**

(a) 25,881 ~ 25,981 mm

&lt; Limit: 25,851 mm &gt;

(b) 21,195 - 21,295 mm

&lt; Limit: 21,165 mm &gt;

**Exhaust:**

(a) 25,841 - 25,941 mm

&lt; Limit: 25,811 mm &gt;

(b) 21,05 - 21,15 mm

&lt; Limit: 21,02 mm &gt;



### 3) CHECK:

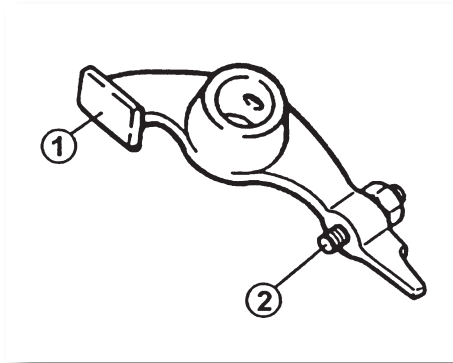
- Oil leak in the camshaft.
- Obstruction => **Compressed air blowing.**

### 3.16 ROCKERS AND THEIR SHAFTS CHECKING

#### 1) CHECK:

- Cam contact surface (1).
- Adjuster surface (2).

Wear / grooves / scratches / blue coloration => **Replace.**



#### Steps for checking:

- Check if the two contact areas of the rockers have signs of abnormal wear.

- Orifice of the rocker shaft.

- Cam contact surface.

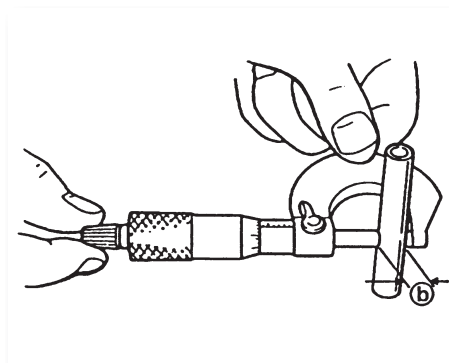
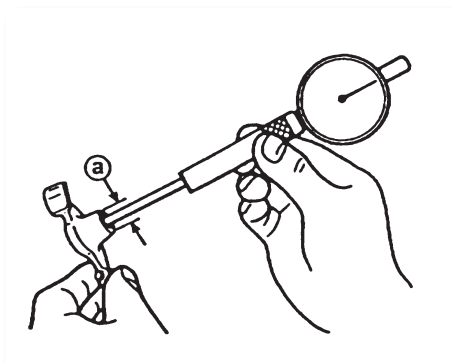
Excessive wear => **Replace.**

- Check the surface conditions of the rockers shaft.

Grooves / scratches / blue coloration => **Replace or check the lubrication system.**

- Measure the internal diameter of the rockers orifice.

Unspecified => **Replace.**



**Internal diameter (rocker) :**

10,000 ~ 10,015 mm  
< Limit: 10,03 mm >

• Measure the external diameter (b) of the rockers.  
Unspecified => **Replace.**

**External diameter (rocker shaft):**

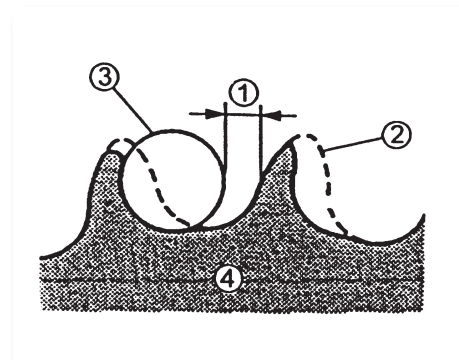
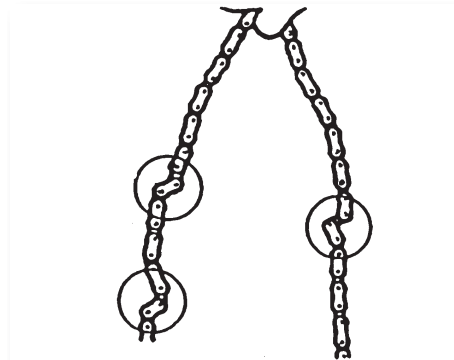
9,981 ~ 9,991 mm  
< Limit: 9.95 mm >

**3.17 CAMSHAFT CHECKING****1) CHECK:**

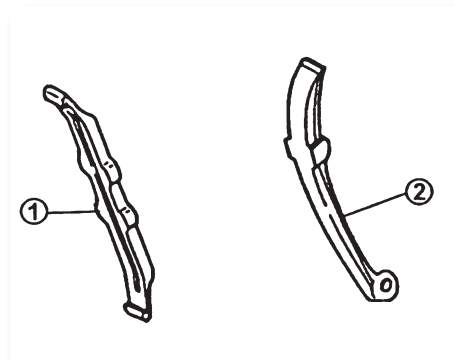
• Timing Chain.  
Rigidity / damages => **Replace the chain and the gear.**

**2) CHECK:**

• Control gear.  
Damages / wear => **Replace the gear and the timing chain.**  
• 1/4 tooth (1).  
• Correct (2)  
• Roller (3).  
• Gear (4).

**3) CHECK:**

• Timing chain guides (exhaust) (1).  
• Timing chain guides (intake) (2).  
Damages / wear => **Replace.**





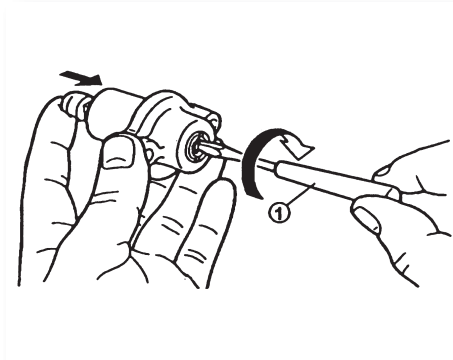
### 3.18 TIMING CHAIN STRUT

#### 1) CHECK:

- Ratchet brace operation.
- Irregular operation => **Replace.**

#### Steps for checking:

- While the adjuster rod is lightly pressed by hand, use a screwdriver to turn totally the adjuster rod clockwise.
- When get the screwdriver out, press lightly by hand, and make sure that the adjuster rod moves forwards smoothly.
- On the contrary, replace the adjuster chain unit.



### 3.19 CYLINDER AND PISTON

#### 1) CHECK:

- Cylinder and piston walls.
- Vertical scratches => **Rectify or replace the cylinder and the piston.**

#### 2) MEASURE:

- Cylinder-piston play.

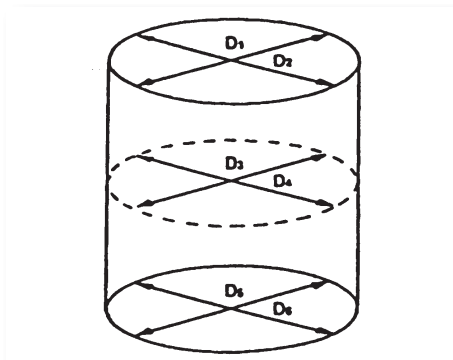
#### Steps for measuring:

##### 1st Step:

- Measure the "C" diameter of the cylinder.

#### Remark:

- Measure the "C" diameter of the cylinder in a cross-shape and right-angled to the the crankshaft. Then, calculate the average of the measurements.





"c" Diameter of the cylinder	54,000 ~ 54,018mm
"T" conical limit	0,05mm
Ovalidad "R"	0,01mm

"C" = maximum D
"T" = (maximum D <sub>1</sub> or D <sub>2</sub> ) - (maximum D <sub>5</sub> or D <sub>6</sub> )
"R" = (maximum D <sub>1</sub> , or D <sub>3</sub> or D <sub>5</sub> ) - (maximum D <sub>2</sub> , or D <sub>4</sub> or D <sub>6</sub> )

- If it is unspecified, rectify or replace the cylinder and replace the piston and the rings altogether.

### 2nd Step:

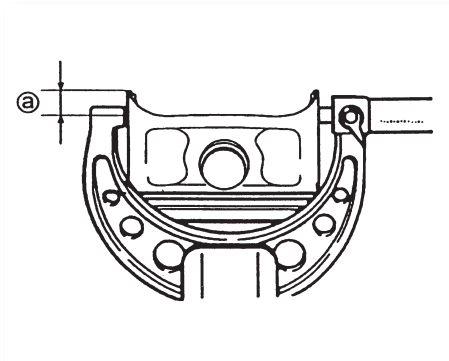
- Measure the "brim" of the "P" piston with a micrometer.

(a) 4,5 mm from "brim" of the piston.

	"P" Piston diameter
Standard	53,977 ~ 53,996mm

Over measure	I°
	II°

- It is unspecified, replace the piston and the rings altogether.



### 3rd Step:

- Calculate the cylinder – piston play, using the following formula:

#### Cylinder – piston set:

Diameter of the "C" cylinder.

Diameter of the "P" piston brim.



#### Set (cylinder - piston):

0,020 - 0,028 mm

< Limit >: 0,15 mm

- If it is unspecified, rectify or replace the cylinder, the piston and its rings altogether.



### 3.20 RINGS CHECKING

#### 1) MEASURE:

- Lateral play.

Unspecified = > **Replace the piston and its rings altogether.**

**Remark:**

- *Eliminate the carbon sediments from the grooves of the piston rings before measuring the lateral play.*



#### Lateral play (rings of the piston):

**Top ring - Limit**

0.03 ~ 0.07 <0,12 mm>

#### Secondary ring (scraper):

< Limit >

0.02 - 0.06 <0,1 2 mm >

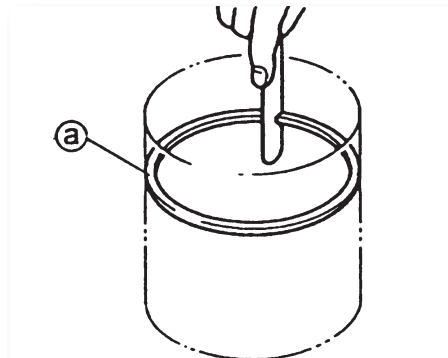
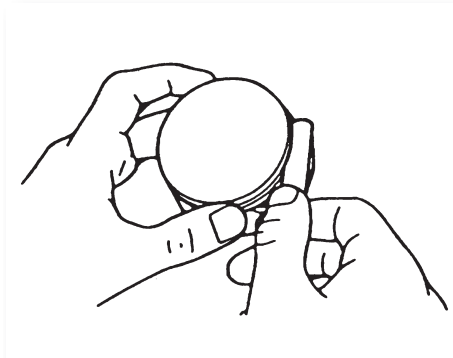
#### 2) PLACE:

- Piston rings (in the cylinder).

**Remark:**

- *Push the ring with the piston top, in order that it is in parallel with the cylinder base.*

(a) 5 mm



#### 3) MEASURE:

- Play among tips

Unspecified = > Replace.

**Remark:**

- *You cannot measure the play among tips in the extension ring of the oil ring. If the oil ring has a excessive play, replace the three rings.*



#### Play among tips:

**Top ring - Limit:**

0,15 - 0,30 mm <0,40 mm>

#### Secondary ring (scraper) - Limit:

0,30 ~ 0,45 mm <0,55 mm>

#### Oil ring:

0,2 ~ 0,7 mm



### 3.21 BOLT CHECKING

#### 1) CHECK:

- Bolt.

Blue coloration / grooves => Replace and immediately control the lubrication system.

#### 2) MEASURE:

- Play piston - bolt.

#### Steps for measuring:

- Measure the external diameter of the bolt (a).
- Unspecified => Replace the bolt.



#### External diameter (bolt):

14,991 - 15,000 mm  
< Limit: 14,975 mm >

- Measure the diameter of the bolt place in the piston (b).
- Calculate the piston – bolt play, using the following formula:

#### Piston – bolt play:

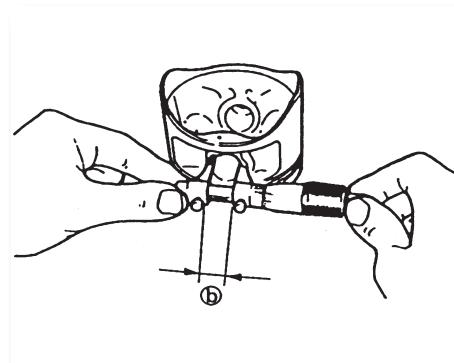
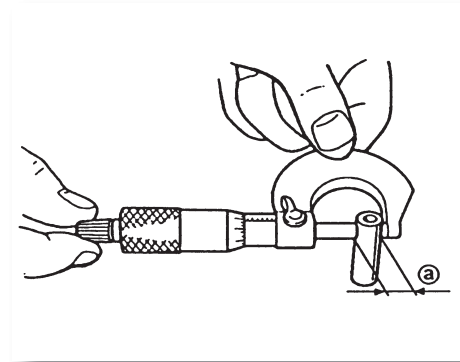
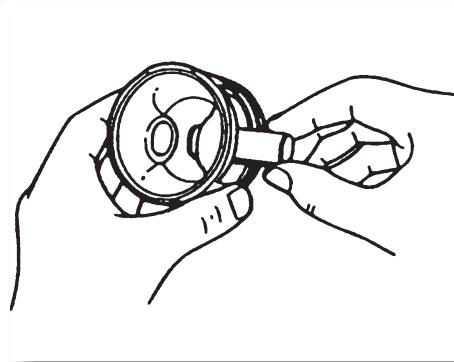
Internal diameter (bolt place) (b).  
External diameter (bolt) (a).

- If it is unspecified, replace the piston.



#### Play (piston - bolt):

0,009 - 0,013 mm





### 3.22 CRANKSHAFT

#### 1) MEASURE:

- Non-alignment crankshaft.

Unspecified => **Replace the crankshaft and/or ball bearings.**

#### *Remark:*

- *Measure the non-alignment crankshaft Rotate the crankshaft unit slowly.*



#### **Non-alignment limit:**

0.03 mm

#### 2) MEASURE:

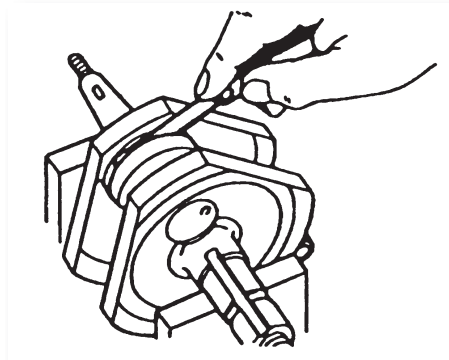
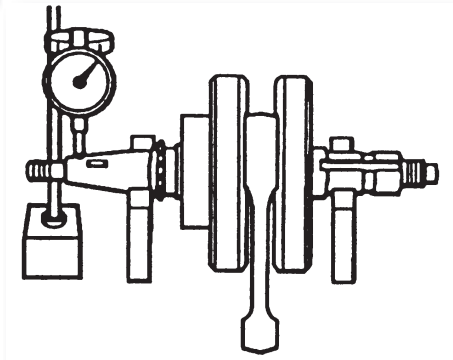
- Lateral play of the connecting rod.

Unspecified => **Replace the connecting rod ball bearing, the crankshaft elbow and/or the connecting rod.**



#### **Lateral play of the connecting rod:**

0,15 - 0.45 mm



#### 3) MEASURE:

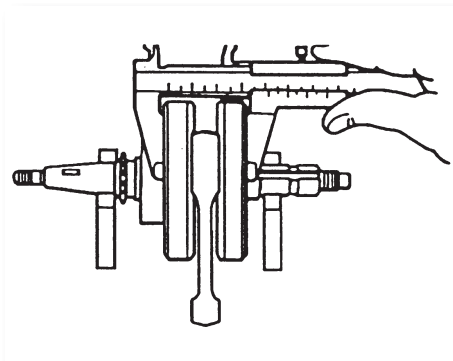
- Width of the crankshaft

Unspecified => **Replace the crankshaft.**



#### **Width of the crankshaft:**

46,95 - 47,00 mm





**4) CHECK:**

- Crankshaft gear (1).

Damages / wear => **Replace the crankshaft.**

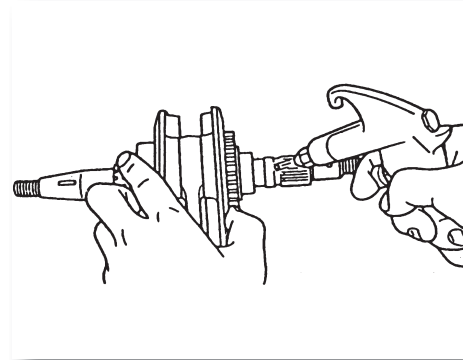
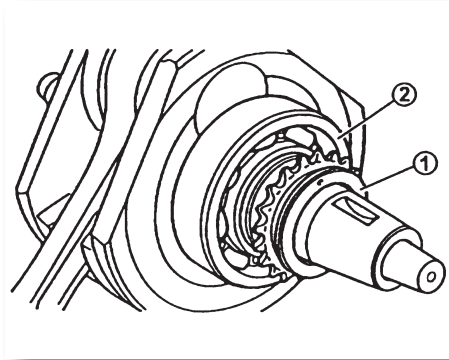
- Ball bearing (2).

Wear / fissures / damages => **Replace the crankshaft.**

**5) CONTROL:**

- Oil leak in the crankshaft.

Obstruction => **Compressed air blowing.**

**3.23 ROCKER ARM CHECKING****1) CHECK:**

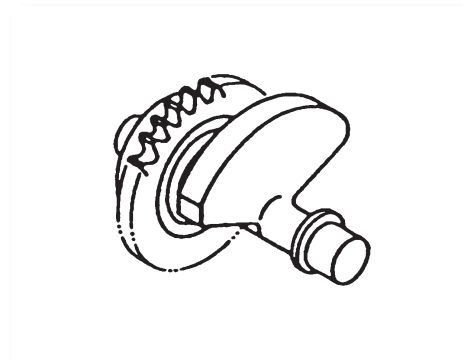
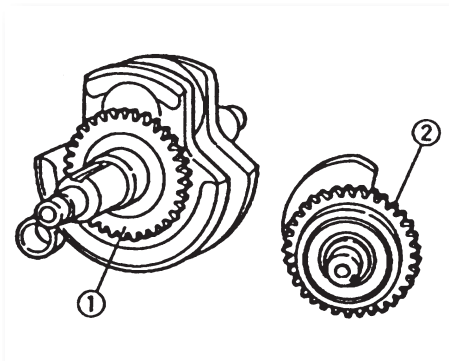
- Teeth of the rocker arm drive gear (1).
- Teeth of the rocker arm driven gear (2).

Wear / damages => **Replace the unit.**

**2) CHECK:**

- Rocker arm shaft.

Wear / crack / damages => **Replace.**





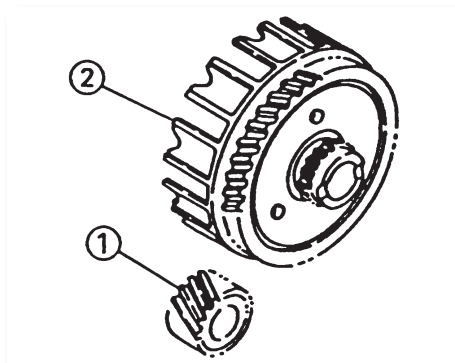
### 3.24 CLUTCH HOOD CHECKING

#### 1) CHECK:

- Teeth of the primary gear (1).
- Teeth of the hood gear (2).

Wear / damages => **Replace both gears.**

Excessive noise during the operation => **Replace both gears.**



### 3.25 CLUTCH CHECKING

#### 1) CHECK:

- Friction plates.

Wear / damages => **Replace the friction plates unit.**

#### 2) MEASURE:

- Thickness of the friction plates.

Unspecified => **Replace the friction plates unit.**

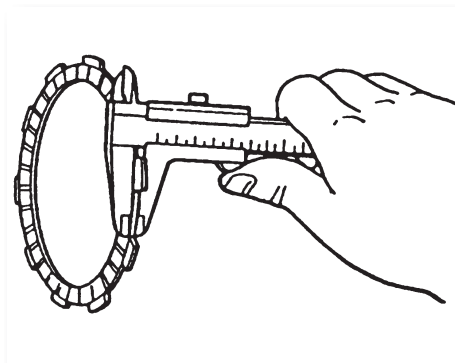
Measure in 4 different positions.



#### **Thickness (friction plates):**

3,0 mm

< Limit: 2,8 mm >



**3) CHECK:**

- Separators.

Damages => **Replace the separators unit.**

**4) MEASURE:**

- Separators strain.

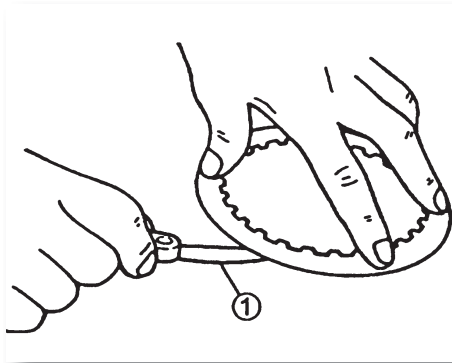
Unspecified => **Replace the separators unit.**

Take the measurements on a plane table with the help of a thickness calibre (1).

**Strain limit**

**(separators):**

Lower than 0,05 mm

**5) CHECK:**

- Clutch springs.

Damages => **Replace the springs units.**

**6) MEASURE:**

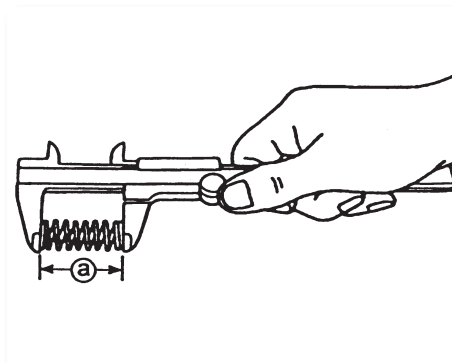
- Free length (springs) (a).

Unspecified => **Replace the springs unit.**

**Free length (springs):**

33.0 mm

< Limit: 31,0 mm >





### 7) CHECK:

- Nails (of the hood) (1).

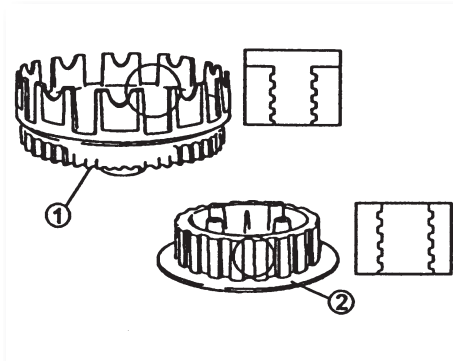
Rims / wear / damages => **Eliminate the rims or replace the hood.**

- Grooves in the clutch drum (2).

Rims / wear / damages => **Replace the clutch drum.**

#### Remarks:

- Rims in the nails of the hood and in the grooves of the clutch drum results in an irregular operation.

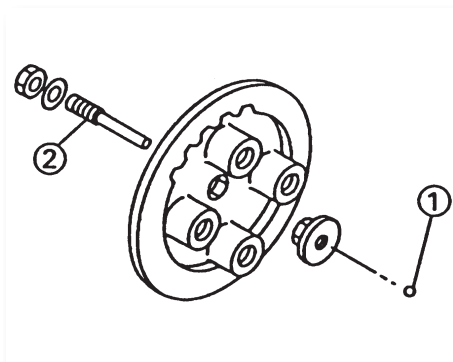


## 3.26 ROD OPERATION CHECKING

### 1) CHECK:

- Ball bearing(1).
- Rod operation (2).

Wear / cracks / damages => **Replace.**





### 3.27 FORKS AND CHANGE SELECTOR CHECKING

#### 1) CHECK:

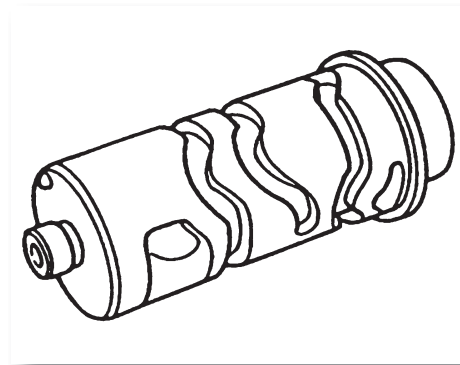
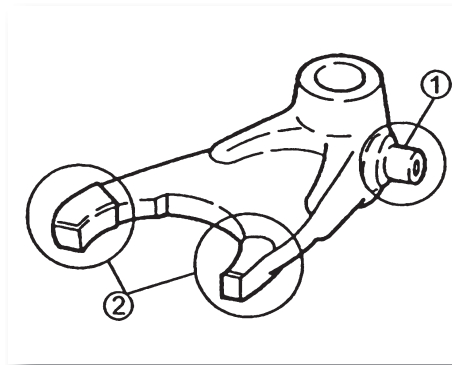
- Fork extension (1).
- Extremities of the change forks (2).

Scratches / warping / wear / damages => **Replace.**

#### 2) CHECK:

- Grooves in the change selector.
- Wear / damages / scratches => **Replace.**
- Extension of the change selector.

Wear / damages => **Replace.**



#### CHECK:

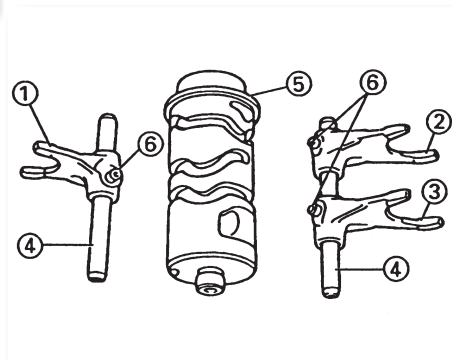
- Change fork 1 in the right centre (1).
- Change fork 2 in the top left (2).
- Change fork 3 in the bottom left (3).
- Guide bar (4).
- Change selector (5).
- Tang guide (6).

Roll the guide bar on a flat surface.

Warping => **Replace.**



**Do not try to straighten up a warping guide bar.**





### 4) CHECK:

- Movement of the change forks (in the guide bar).

Irregular movement => **Replace the fork and the bar.**

#### *Remark:*

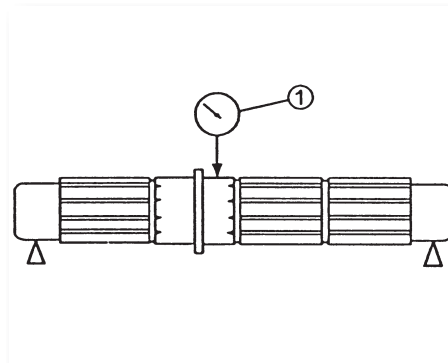
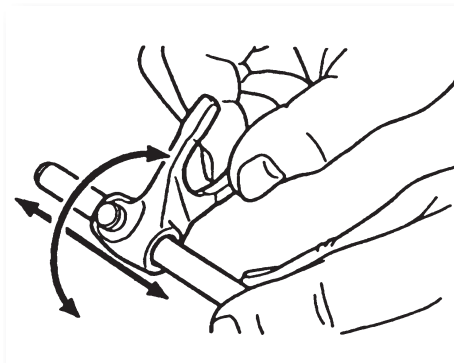
- *If the change fork and the transmission gear are damaged, replace the gears which are side by side of the unit.*

### 5) MEASURE:

- Warping of the Shafts (driver and driven one).

Use a tip support and a clock to compare (1).

Unspecified => **Replace the warped shaft.**



### 6) CHECK:

- Teeth of the gears.

Blue coloration / grooves / wear => **Replace.**

- Nails of the gears.

Rounded brim / cracks / missing parts => **Replace.**

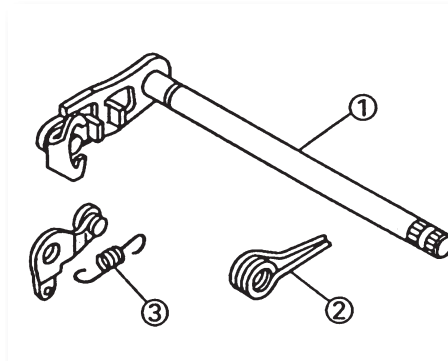
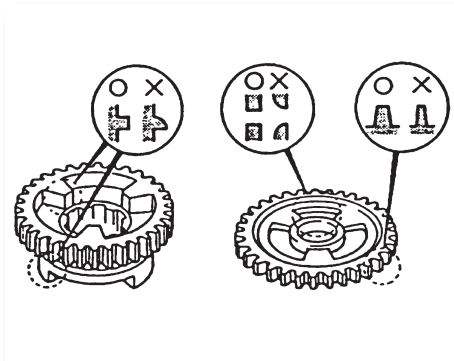
### 7) CHECK:

- Change shaft (1).

Damages / warping / wear => **Replace.**

- Spring of return (change shaft) (2).
- Spring of return (constrained rod) (3).

- Wear / damages => **Replace.**





### 3.28 START SYSTEM WITH PEDAL CHECKING

#### 1) 3.28 START SYSTEM WITH PEDAL CHECKING

- Teeth of the gear (start gear) (1).
- Teeth of the gear (ratchet brace) (2).

Damages / wear => **Replace.**

#### 2) MEASURE:

- Friction force of the ring of the start gear (torque spring) (1).

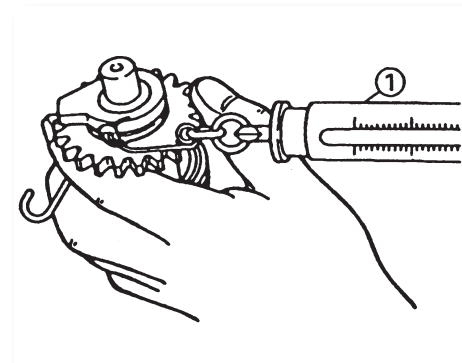
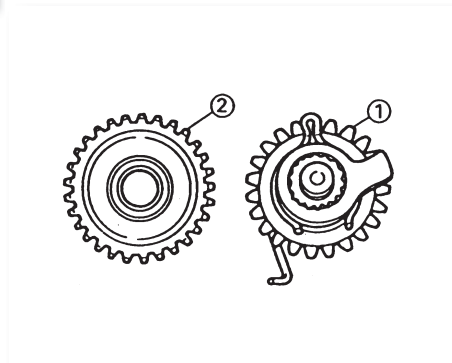
Unspecified => **Replace.**

Use a dynamometer.



**Friction force of the ring of the start system:**

0,8 - 1,2 Kgf



### 3.29 OIL PUMP CHECKING

#### 1) MEASURE:

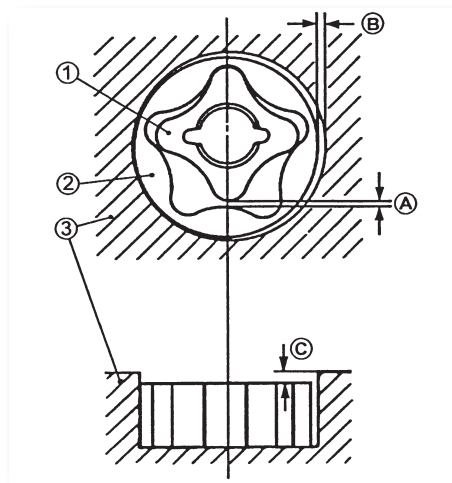
- Play among tips (TO).  
(between internal rotor (1) and external rotor (2)).

- Lateral play (B).  
(between external rotor (2) and the pump casing (3)).

Unspecified => **Replace the oil pump unit.**

- Play between the casing and the rotor (C).  
(between the pump casing (3) and the rotors (1) and (2)).

Unspecified => **Replace the pump oil unit.**





### **Play among tips (A):**

0,15 mm <Limit: 0,20 mm>

### **Lateral play (B):**

0,06 ~ 0,10 mm <Limit: 0,15 mm>

### **Play between the casing and the rotor (C):**

0,06 ~ 0,10 mm <Limit: 0,15 mm>

### **2) CHECK:**

- Rotary filter.

Cracks / damages => **Replace.**

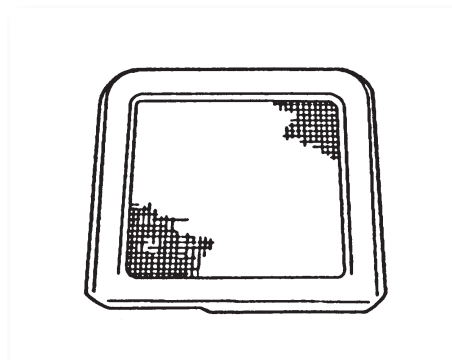
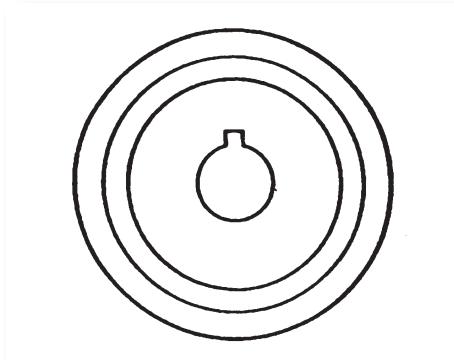
Contamination => **Clean.**

### **3) CHECK:**

- Oil impeller.

Cracks / damages => **Replace.**

Contamination => **Clean.**



## **3.30 OIL LEAKS CHECKING (COVER OF THE CASSING IN THE RIGHT SIDE)**

### **1) CHECK:**

- Oil leak.

Obstruction => **Blow with compressed air.**







### 3.31 CHASSIS

- 1) Wash the chassis properly with kerosene.
- 2) Clean the surfaces which bear the gaskets and the surfaces in contact with the chassis properly.

#### 1) CHECK:

- Chassis.

Cracks / damages => **Replace.**

- Oil leaks.

Obstruction => **Blow the leaks with compressed air.**

### 3.32 CLAMP RINGS AND WASHERS

#### 1) CHECK:

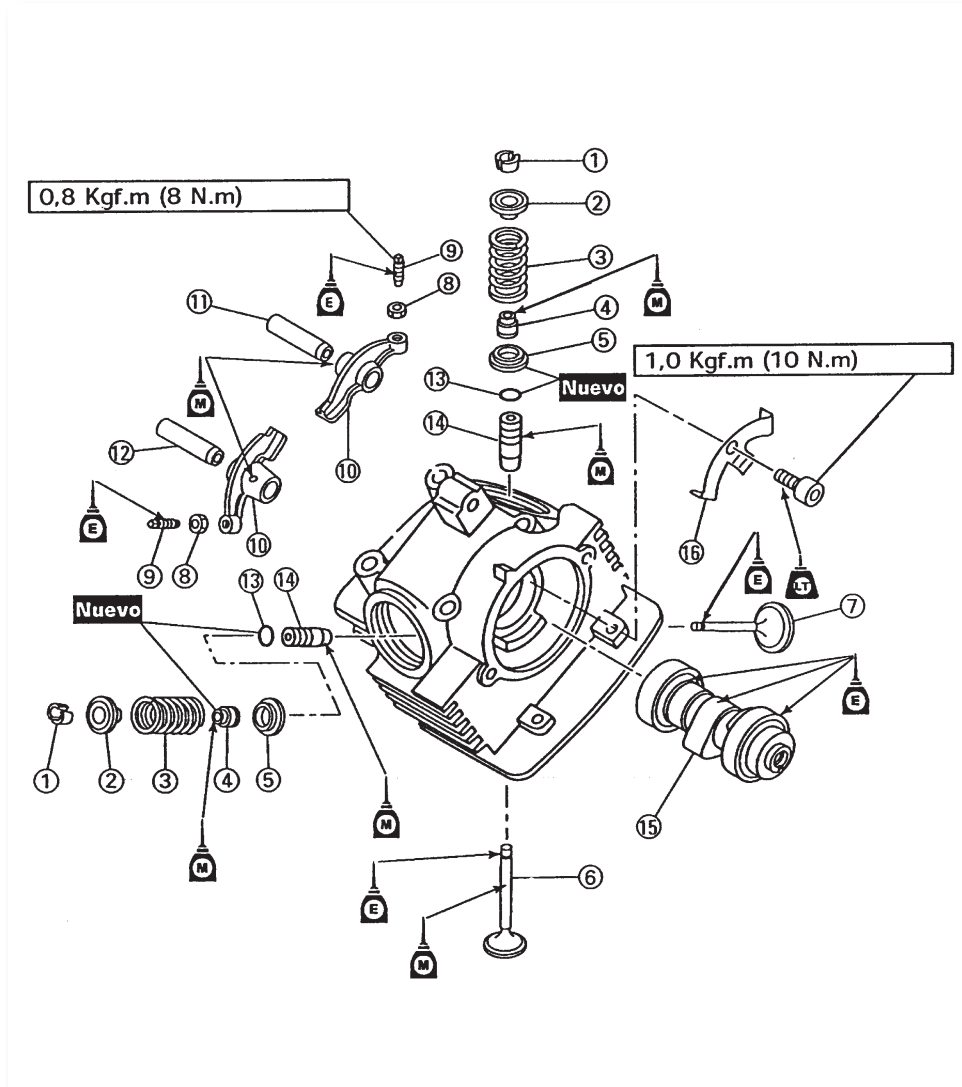
- Clamp rings.
- Washers.

Damages / loose / deformed => **Replace.**



### 3.33 MOTOR ASSEMBLY AND ADJUSTMENTS

#### 1) VALVES, ROCKERS AND CAMSHAFT



- 1) Clamp valves
- 2) Clamp seating
- 3) Spring
- 4) Constrained ring
- 5) Spring seating
- 6) Valve (inlet)
- 7) Valve (exhaust)
- 8) Locknut
- 9) Adjuster
- 10) Rocker
- 11) Rocker shaft (intake)
- 12) Rocker shaft (exhaust)
- 13) Clamp ring
- 14) Valve guide
- 15) Camshaft
- 16) Clamp plate CD



To assemble the motor, replace the following parts with other new ones:

- Particular ring.
- Gaskets.
- Constrained rings.
- Copper washers.
- Clamp washers.
- Clamp rings.

### 3.34 VALVES AND VALVE SPRINGS CHECKING

#### 1) ELIMINATE THE RIMS:

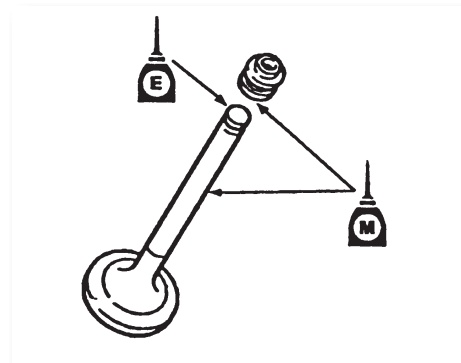
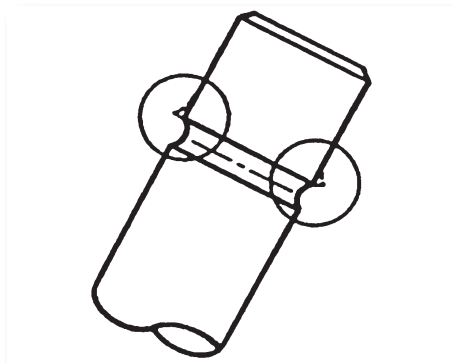
- From the extremity of the valve rod.
- Use an emery stone to eliminate the rims.

#### 2) APPLY:

- Oil of disulphide molybdenum.
- (In the valve rod and in the constrained ring).



Oil of disulphide molybdenum.



#### 3) INSTALL:

- Spring seating (1).
- New constrained ring (2).
- Valve (3) (In the cylinder head).
- Valve (4) Spring.
- Clamp seating (5).

**Remark:**

Install the valve springs with the biggest passage upwards (a).

- (b) smaller passage

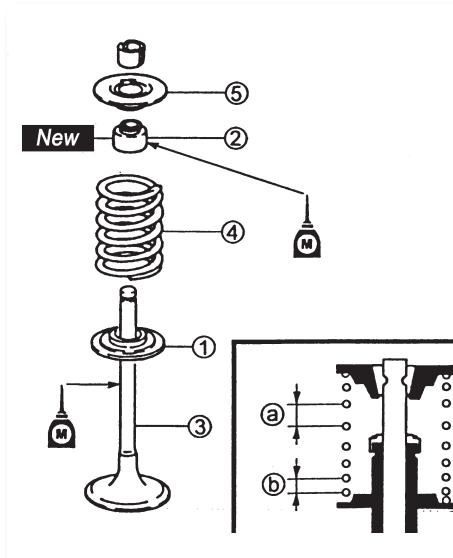


**Inlet:**

Mark "IN"

**Exhaust:**

Mark "EX"



**4) INSTALL:**

- Valve clamp (1).

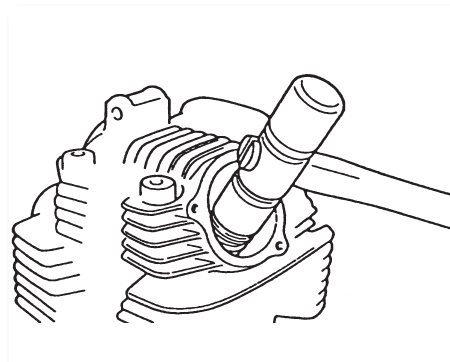
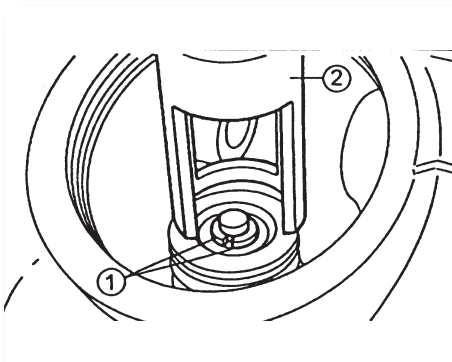
**Remark:**

*Install the valve clamp while the spring valve is compressed with the compressor of the valve spring (2).*

- 5) Fix the clamp valves in the rod, pound lightly with a rubber hammer.



**Do not hit, because valve can be damaged.**





### 3.35 ROCKERS AND CAMSHAFT INSTALLATION

#### 1) LUBRICATE:

- Camshaft (1).



#### **Camshaft:**

Oil of disulphide molybdenum.

#### **Ball bearing of the camshaft:**

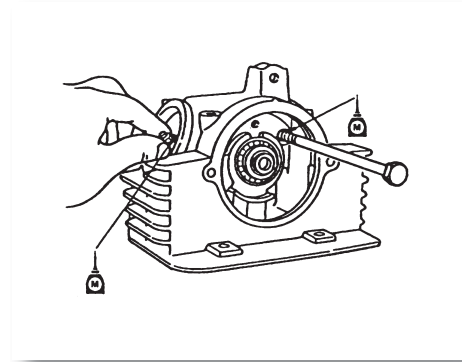
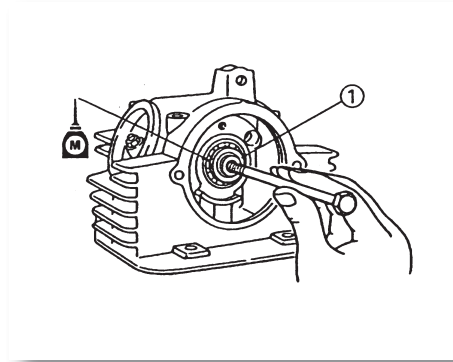
Motor oil.

#### 2) APPLY:

- Oil of disulphide molybdenum (in the rocker and its shaft).



Oil of disulphide molybdenum.

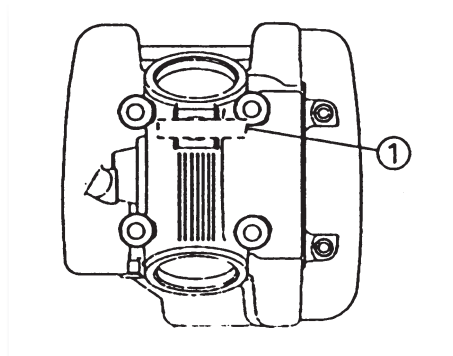


#### 3) INSTALL:

- Rocker.
- Rocker shaft (1).

#### **Remark:**

*Install completely the shaft of the rocker (exhaust).*

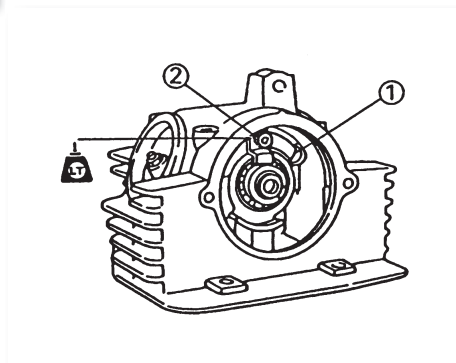


### 4) INSTALL:

- Clamp plate (1).
- Screw (2).

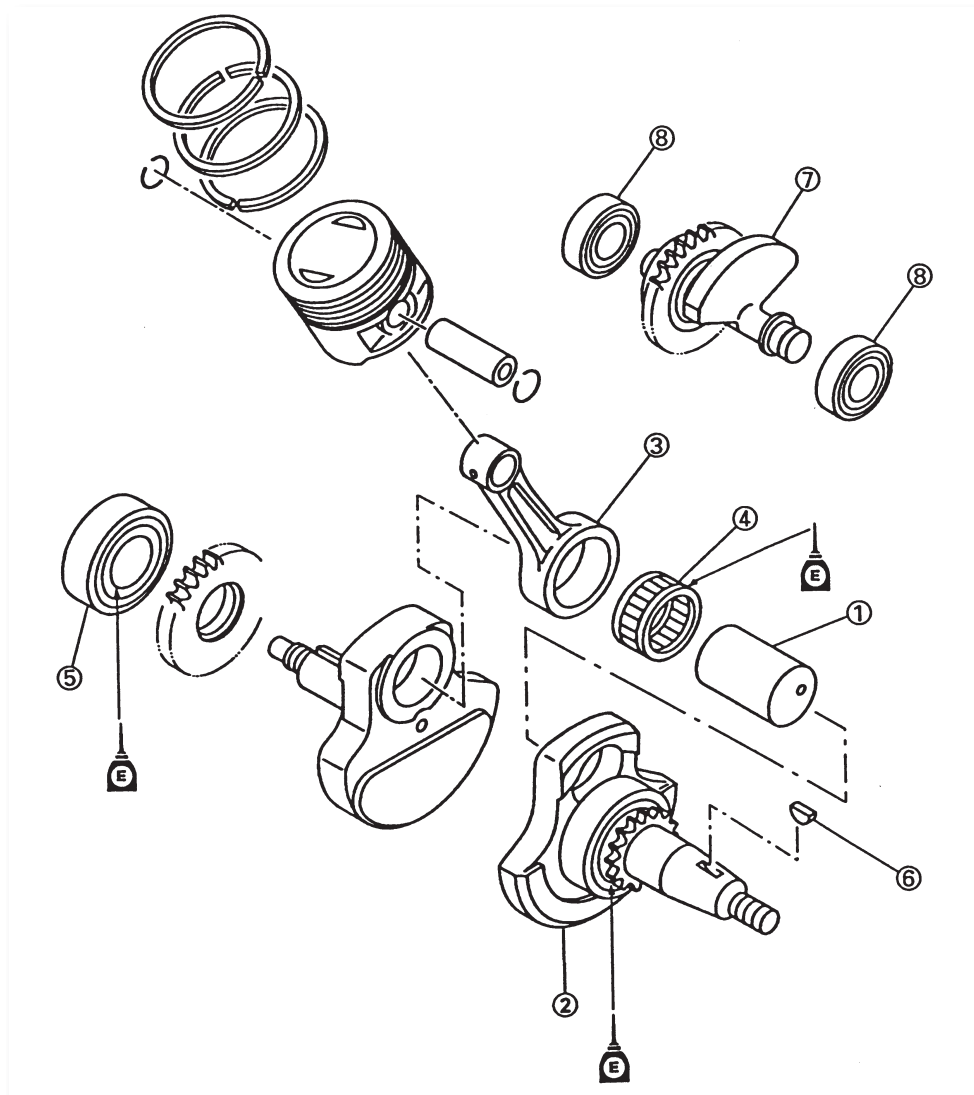


**Screw (clamp plate):**  
1,0 Kgf.m (10 N.m.)





## 3.36 CRANKSHAFT AND ROCKER ARM SHAFT



- 1) Elbow of the crankshaft
- 2) Crankshaft
- 3) Connecting rod
- 4) Lower ball bearing of the connecting rod
- 5) Ball bearing of the crankshaft
- 6) Cotter
- 7) Rocker arm
- 8) Ball bearing



### 1) INSTALL:

- Extractor of the crankshaft

### 2) INSTALL:

- Crankshaft.

#### **Remark:**

Hold the connecting rod with one hand while the nut of the special tool turns with the other one. Use the tool until realizing that the crankshaft adjusts in the ball bearing.



To avoid scratches in the crankshaft and to facilitate the installation, apply grease in the rims of the constrained ring and motor oil in the ball bearing.

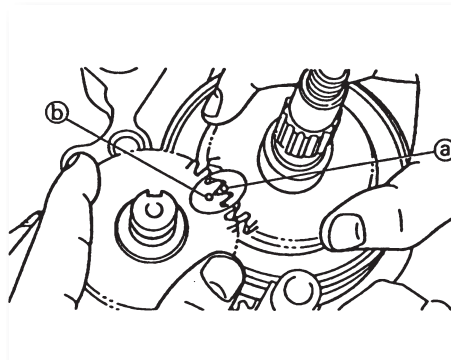
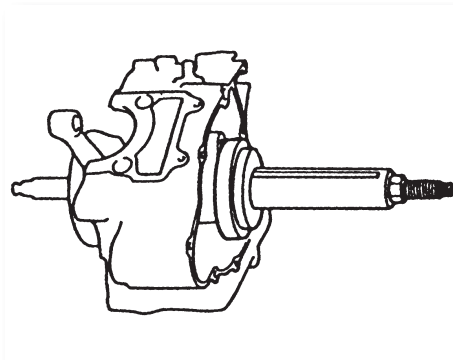
### 3) INSTALL:

- Rocker arm shaft.

Always use rubber new rings.

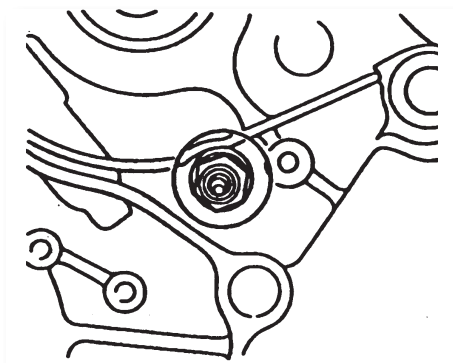
#### **Remark:**

When installing the shaft of the rocker arm, align the puncture mark (a) of the crankshaft gear with the puncture mark (b) of the rocker arm gear.



### 4) INSTALL:

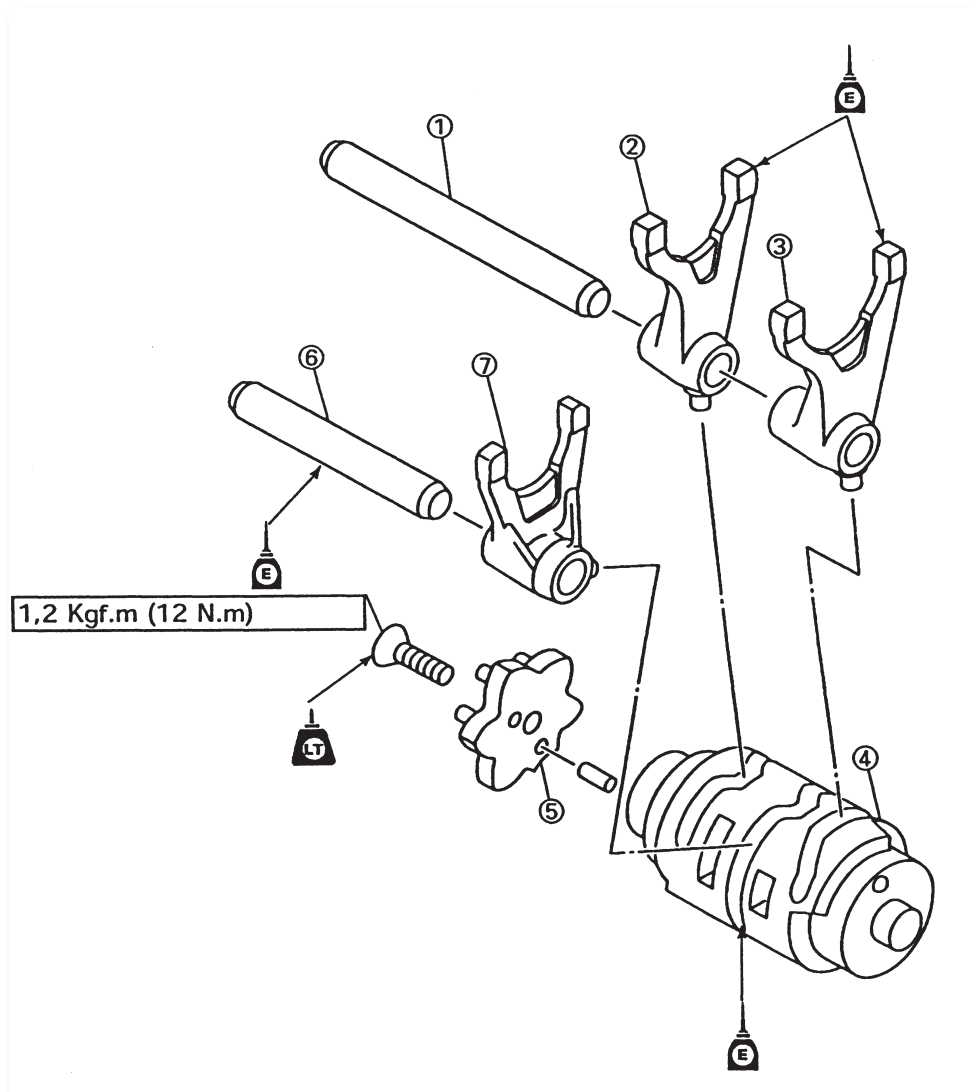
- Neuter Switch.







## 3.37 CHANGE SELECTOR



- 1) Guide bar (long).
- 2) Change fork n° 3
- 3) Change fork n° 1
- 4) Change selector
- 5) Segment
- 6) Guide bar (short)
- 7) Change fork n° 2

### 3.38 TRANSMISSION, FORKS AND CHANGE SELECTOR INSTALLATION



#### 1) MEASURE:

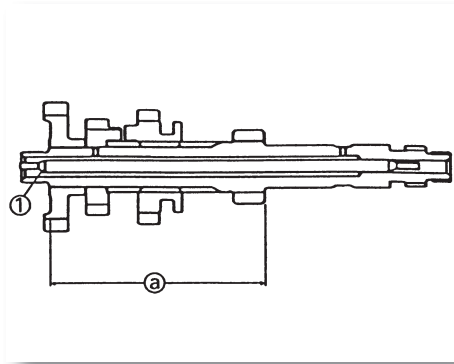
- Length of the drive shaft (a).



**Length of the shaft (drive):**  
82,25 - 83,45 mm

#### 2) INSTALL:

- Operating rod n° 2 (1).
- In the orifice of the drive shaft.

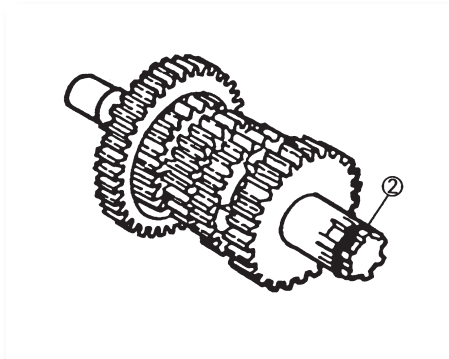
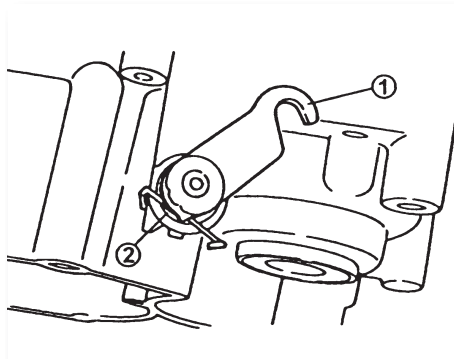


#### 3) INSTALL:

- Shaft of the operation rod (1).
- New gasket (2).

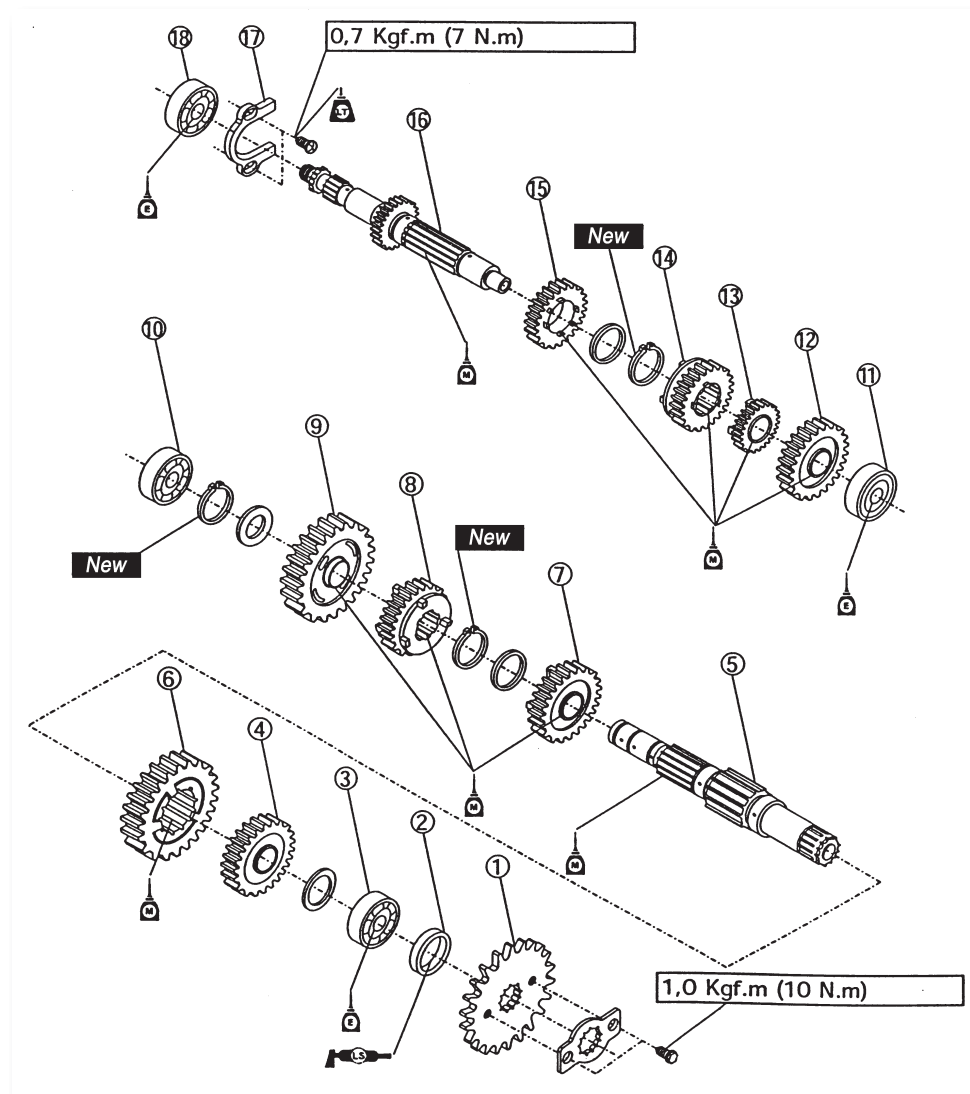
#### 4) INSTALL:

- Special gasket (2).
- In the groove of the drive shaft.





## 3.39 TRANSMISSION



- |                           |                  |
|---------------------------|------------------|
| 1) Pinion                 | 17) Clamp plate  |
| 2) Constrained ring       | 18) Ball bearing |
| 3) Ball bearing           |                  |
| 4) Driven gear of the 5th |                  |
| 5) Drive shaft            |                  |
| 6) Driven gear of the 2nd |                  |
| 7) Driven gear of the 3rd |                  |
| 8) Driven gear of the 4th |                  |
| 9) Driven gear of the 1st |                  |
| 10) Ball bearing          |                  |
| 11) Ball bearing          |                  |
| 12) Drive gear of the 5th |                  |
| 13) Drive gear of the 2nd |                  |
| 14) Drive gear of the 3rd |                  |
| 15) Drive gear of the 4th |                  |
| 16) Drive shaft           |                  |



### 5) INSTALL:

- Bottom left fork of change (L) (1).
- Top left fork of change (R) (2).
- Right central fork of change (C) (3).
- Guide bar 1 (short) (4).
- Guide bar 2 (long) (5).

**Remark:**

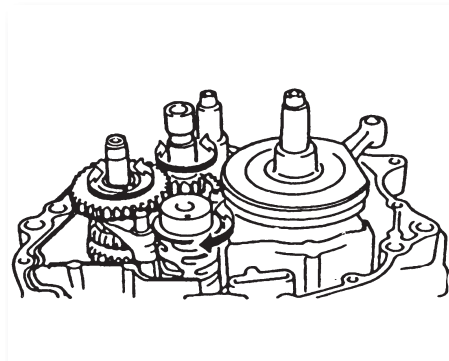
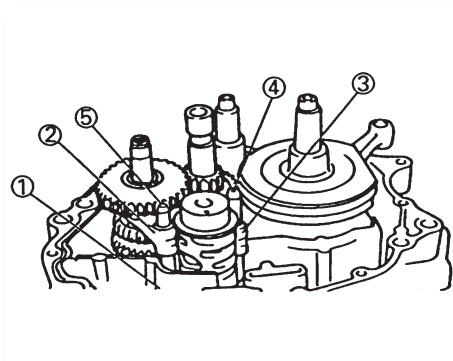
Install the change forks with the stamping mark in the sequence (L, R, C), beginning with the right.

### 6) CHECK:

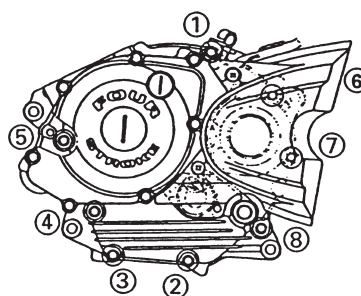
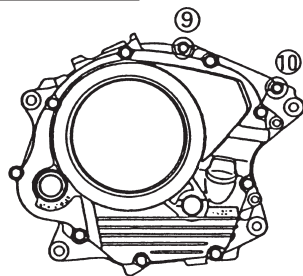
- Operation of the change selector.
- Irregular operation => **Adjust.**

**Remark:**

Check if the operation of the transmission and the forks is normal, turning the change selector by hand.

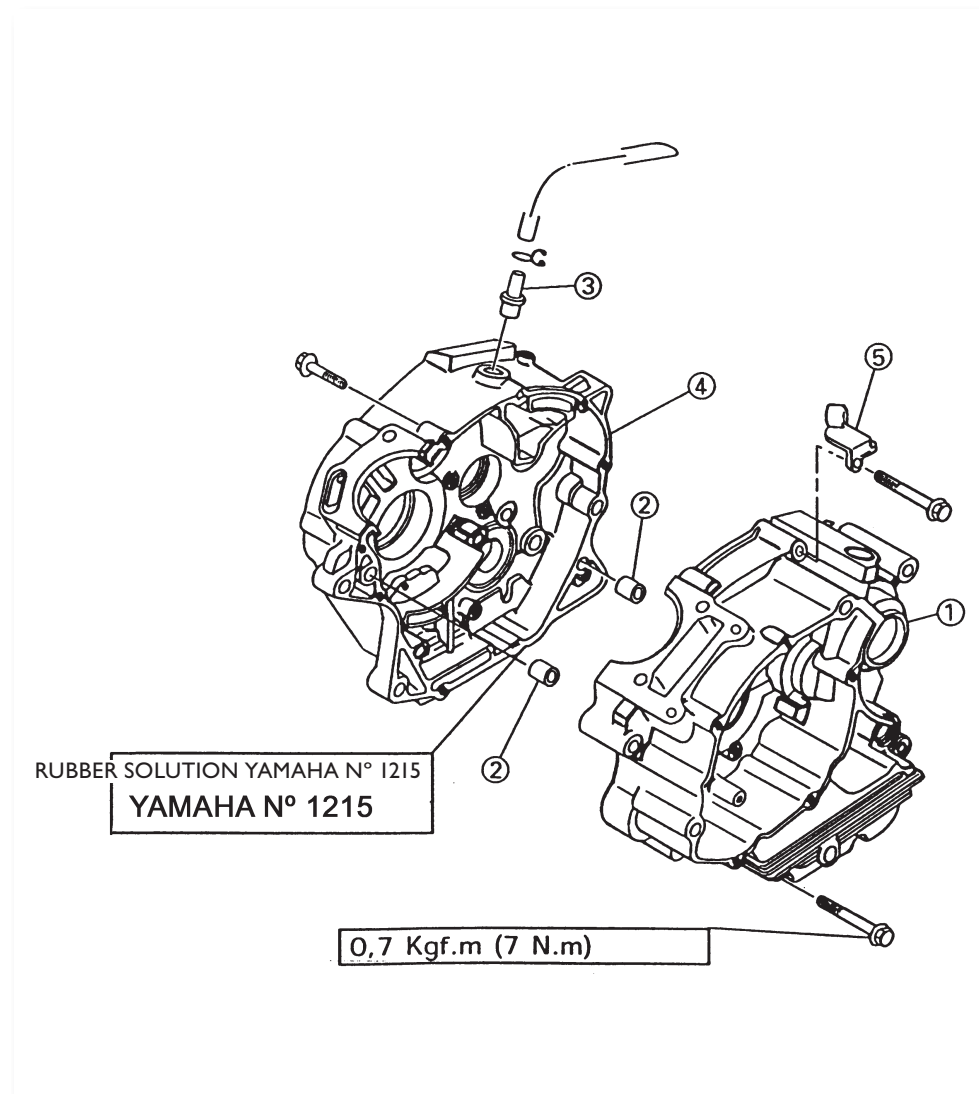


Tighten sequence





## 2.40 CHASSIS



- 1) Chassis (RS)
- 2) Tang guide
- 3) Hose of the sump vent
- 4) Chassis (LS)
- 5) Securing part



### 3.41 CHASSIS (RIGHT SIDE))

#### 1) APPLY:

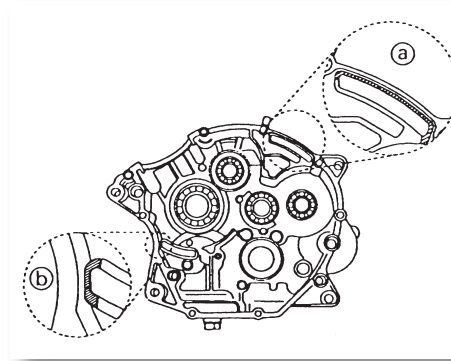
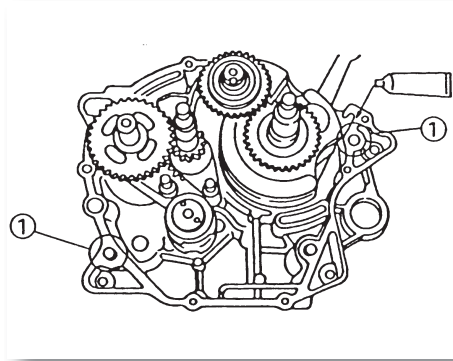
- Rubber solution.  
(on the surfaces in contact with the chassis).

**Remark:**

Not ALLOW that the rubber solution come into contact with the oil leaks (a) and (B) as it is illustrated in the following figure.

#### 2) INSTALL:

- Tang guide (I).



#### 3) INSTALL:

- Chassis (LS).  
(in the chassis (RS)).

**Remark:**

Pound lightly in the chassis with a rubber hammer.

#### 4) PRESS:

- Screws (chassis).



**Screws (chassis):**

82,25 - 83,45 mm

**Remark:**

Press the screws in numerical decreasing order (see the numbers in the figure).

**5) APPLY:**

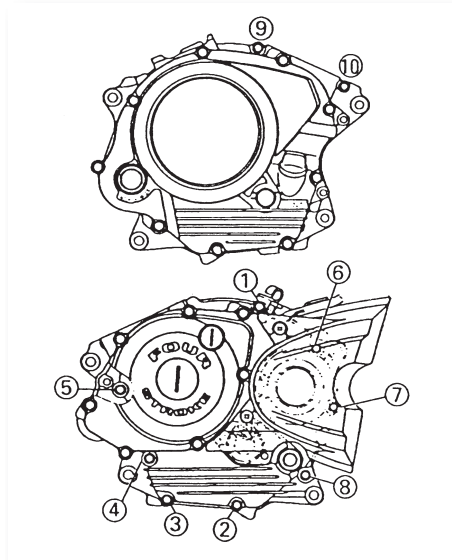
- Oil motor 4T.

(in the elbows of the crankshaft, ball bearings, orifices of oil supply).

**6) CHECK:**

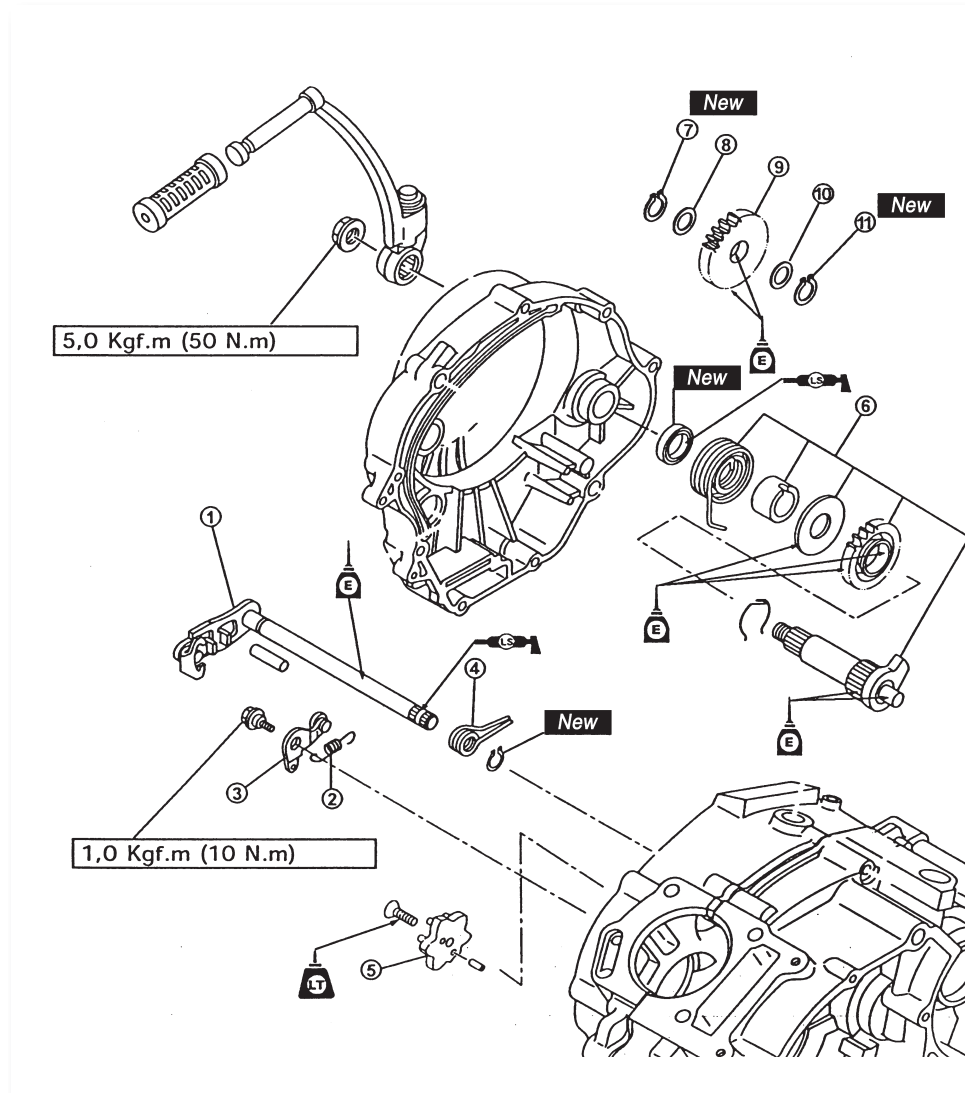
- Operation of the crankshaft and the transmission

Irregular operation => **Repair.**





### 3.42 CHANGE SHAFT AND START SYSTEM WITH PEDAL



- 1) Change shaft
- 2) Torque spring
- 3) Constrained rod
- 4) Return spring
- 5) Segment
- 6) Start system unit
- 7) Clamp ring
- 8) Washer
- 9) Start gear
- 10) Washer
- 11) Clamp ring





### 3.43 CHANGE SELECTOR SEGMENT AND CHANGE SHAFT

#### 1) INSTALL:

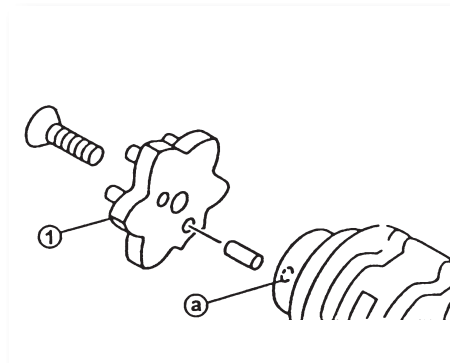
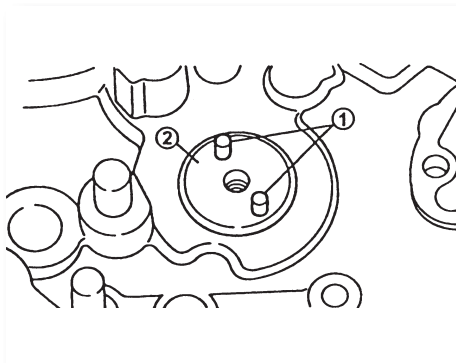
- Tang guide (1).
- (in the supporter (2)).

#### 2) INSTALL:

- Segment (1).
- Using an Allen spanner of 4 mm.

#### **Remark:**

Install the tang guide of the segment in the positioning orifice (a) of the change selector and install the segment.



#### 3) INSTALL:

- Rod limiter (1).
- Spring (2).

#### **Remark:**

Couple the spring on the rod limiter (1) and in chassis drum.  
Couple the rod limiter (1) on the limiter of the change selector.



#### **Screw (Rod limiter):**

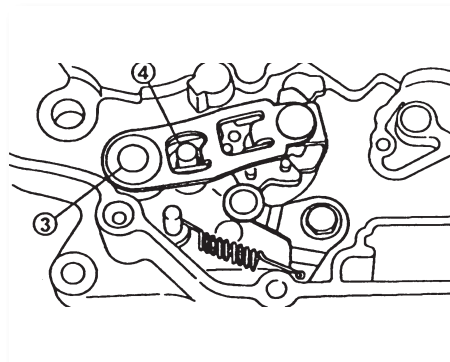
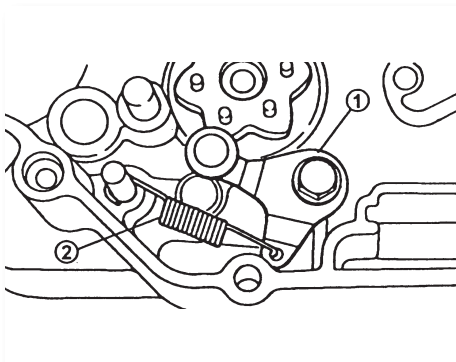
1,0 Kgf.m (10 N.m)

#### 4) INSTALL:

- Change shaft unit (3).

#### **Remark:**

Apply grease on the tangs of the constrained rings. Fit the tips of the spring into the limiter (4).





### 3.44 START SYSTEM WITH PEDAL INSTALLATION

#### 1) INSTALL:

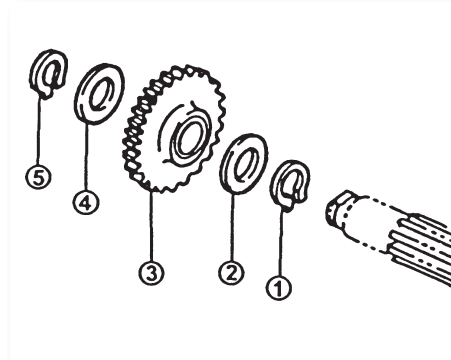
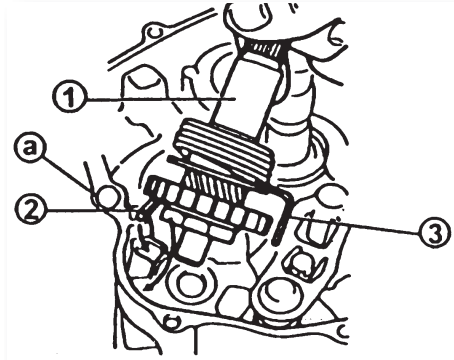
- Unit of the start system shaft (1).
- Clamp ring of the start gear (2).

**Remark:**

*Rotate the torque spring clockwise and couple it into the chassis orifice (a).*

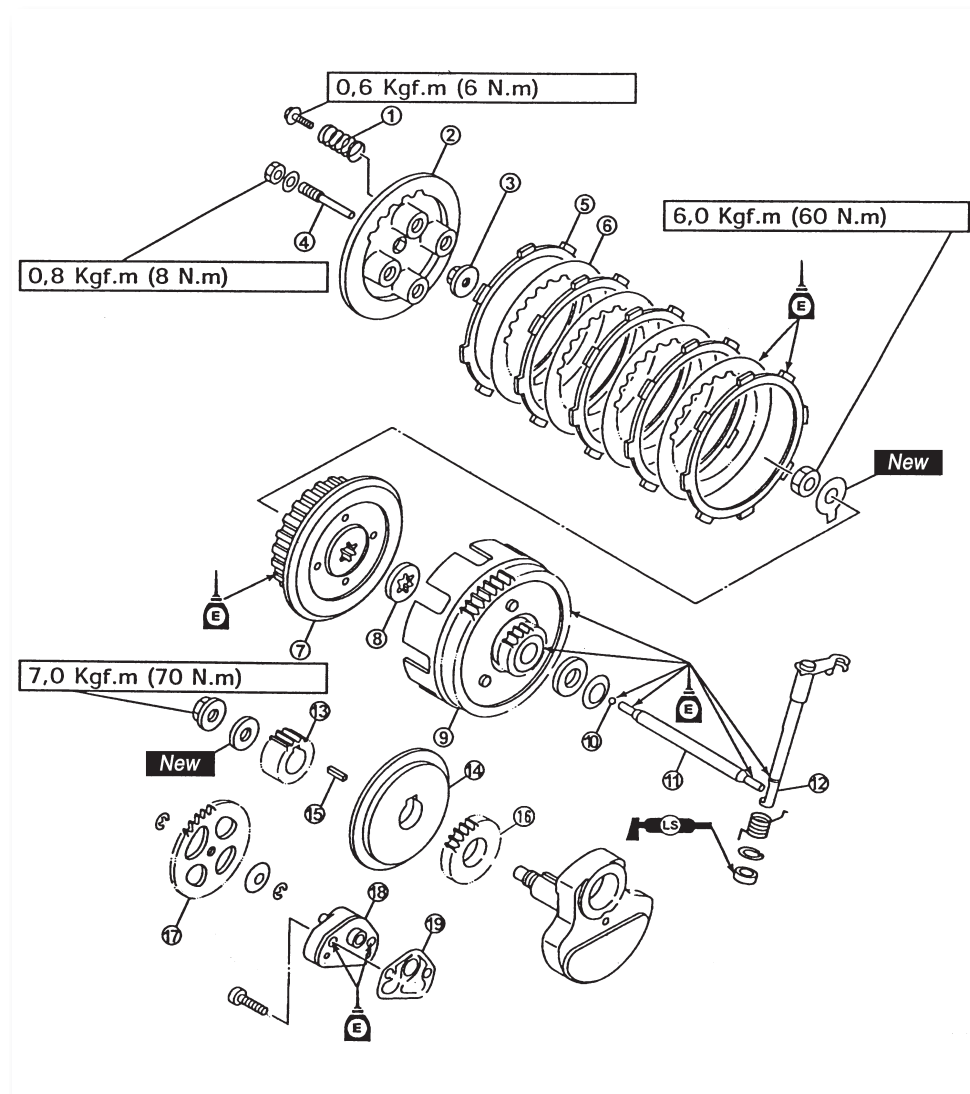
#### 2) INSTALL:

- Clamp ring (1).
- Washer (2).
- Start gear (3).
- Washer (4).
- Clamp ring (5).





## 3.45 CLUTCH, HOOD AND OIL PUMP



- |                                  |                                 |
|----------------------------------|---------------------------------|
| 1) Clutch spring                 | 16) Drive gear of the oil pump  |
| 2) Pressure plate                | 17) Driven gear of the oil pump |
| 3) Operation plate               | 18) Oil pump                    |
| 4) Operation rod I               | 19) Gasket                      |
| 5) Friction plate                |                                 |
| 6) Separator                     |                                 |
| 7) Clutch drum                   |                                 |
| 8) Pressure washer               |                                 |
| 9) Clutch hood                   |                                 |
| 10) Ball                         |                                 |
| 11) Operation rod 2              |                                 |
| 12) Shaft of the operation lever |                                 |
| 13) Primary gear                 |                                 |
| 14) Rotary filter                |                                 |
| 15) Cotter                       |                                 |



### 3.46 OIL PUMP INSTALLATION

#### 1) LUBRICATE:

- Leak of oil supply (chassis (RS)).
- Oil pump unit.



#### Recommended Lubricant:

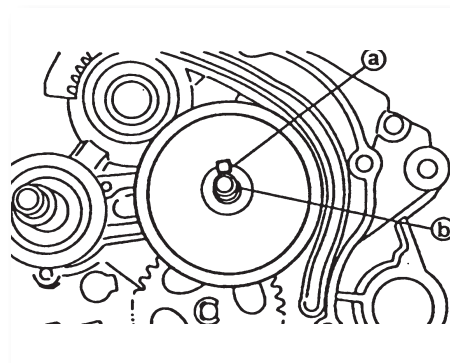
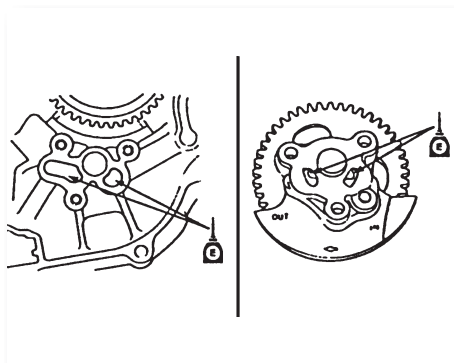
Motor oil.

#### 2) INSTALL:

- Drive gear of the oil pump.
- Cotter.

#### Remark:

1. Assemble the gear of the oil pump with the pipe towards inside.
2. Assemble the rotary filter with the side of the larger salient towards inside, fitting the fluke in the pipe of the crankshaft.



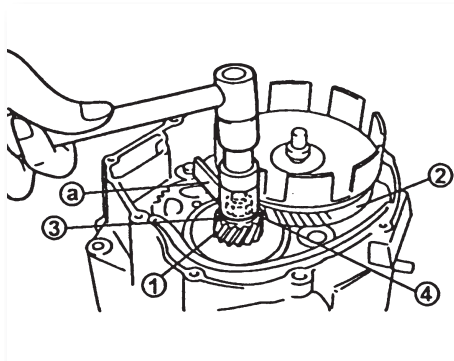
### 3.47 CLUTCH HOOD INSTALLATION

#### 1) INSTALL:

- Primary gear (1).
- Clutch hood (2).
- Washer (3).
- Nut of the primary gear (4).

#### Remark:

- Assemble the primary gear with the letter out.  
Place a folded aluminium or copper sheet (a) among the teeth of the primary gear (1) and the teeth of the hood gear (2).





### 3.48 CLUTCH INSTALLATION

#### 1) INSTALL:

- Clutch hood (1).
- Pressure washer (2).
- Clutch drum (3).
- Clamp washer (4).
- Nut of the clutch drum (5).



#### 2) PRESS:

- Nut of the clutch drum.

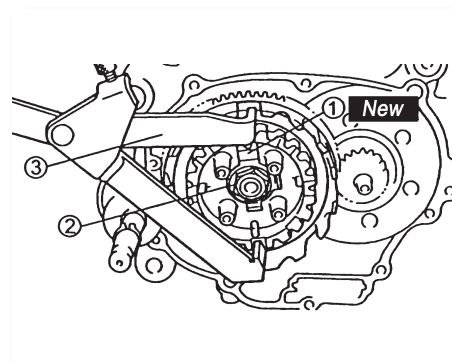
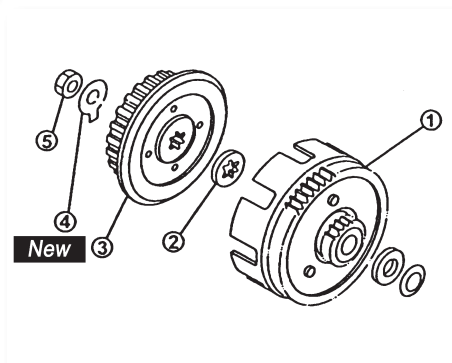
#### Remark:

Press the nut of the clutch drum (2) while hold the clutch drum with the universal support of the clutch (3).



#### Nut of the clutch drum:

6,0 Kgf.m (60 N.m)

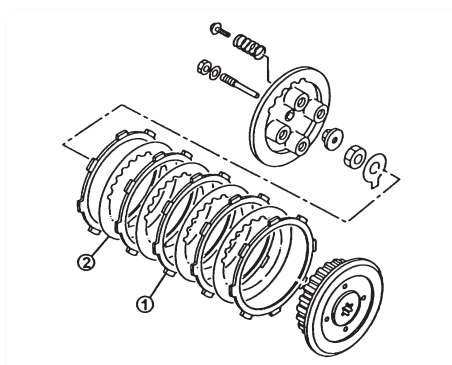


#### 3) BEND:

- Rim of the clamp washer (1).
- ( on a top flat side of the nut).

#### 4) INSTALL:

- Friction plate (1).
- Separators (2).





**Remark:**

• Install the plates and the separators alternately in the clutch drum, beginning and finishing with a friction plate.

• Lubricate all the plates and separators with motor oil before the installation.

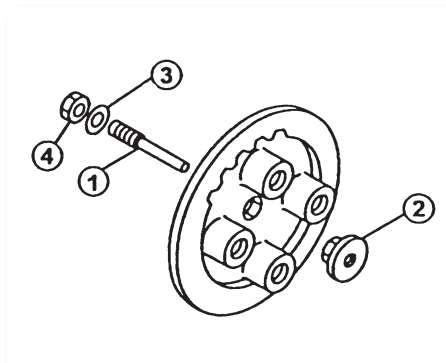
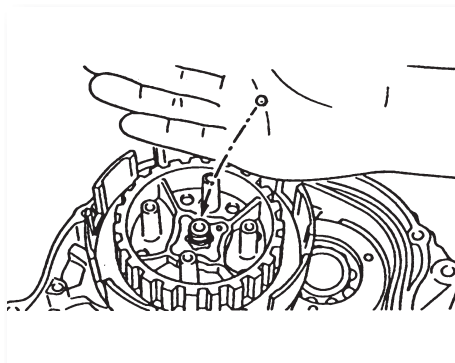
• Make sure that each separator with its 90° dislocated projections is installed with regard to the previous one. Continue with this procedure till all the separators have been installed.

**5) INSTALL:**

- Ball.

**6) INSTALL:**

- Operation rod N° 1 (1).
- Operation plate (2).
- Washer (3).
- Nut of the operation rod N° 1 (4).



**7) INSTALL:**

- Pressure plate (1).
- Compression springs (2).
- Screws (3).

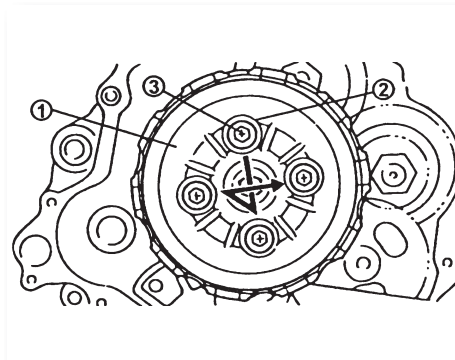


**Screws (Clutch spring):**

0.6 Kgf.m (6 N.m)

**Remark:**

Press the screws of the springs gradually and diagonally.



**8) CHECK:**

- Position of the operation lever.

Push the lever unit following the indicator and make sure that the alignment marks are aligned.

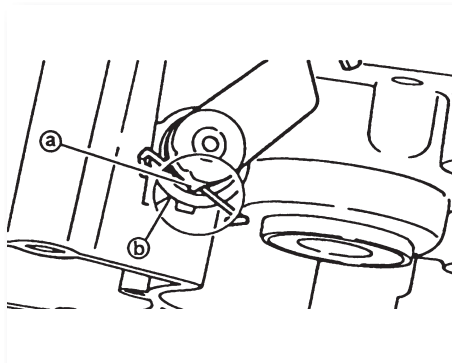
- (a) Marks of the lever.
- (b) Mark of the chassis.

**9) ADJUST:**

- Position of the operation lever.

**Steps for the adjustment:**

- Loose the locknut (1).
- Rotate the adjuster (2) clockwise or anticlockwise to align the marks.



- Hold the adjuster to avoid its movement and press the locknut.



**Be careful not to press the adjuster (2) excessively since the play between operation rods can be eliminated.**

- Press the locknut (1):

**Locknut:**

0.8 Kgf.m (8 N.m)



### 10) INSTALL:

- Tang guide.
- Gasket of the chassis - New
- Chassis cover (RS).



### Screws of the chassis cover:

1,0 Kgf.m (10 N.m)

#### **Remark:**

*Press the screws in decreasing numerical order (see the numbers in the figure).*

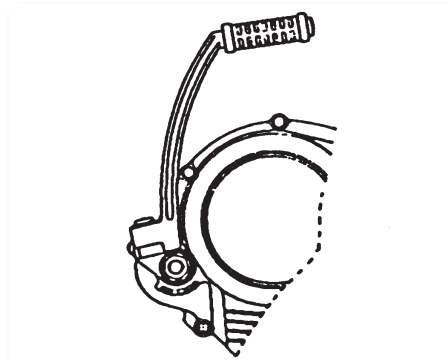
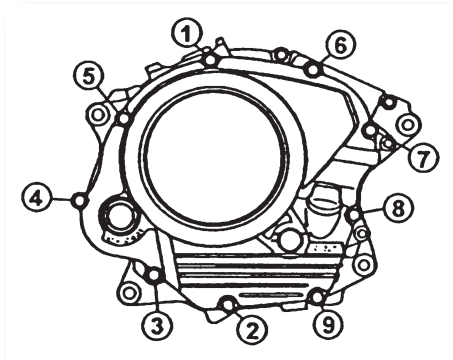
### 11) INSTALL:

- Start pedal.



### Nut of the start pedal:

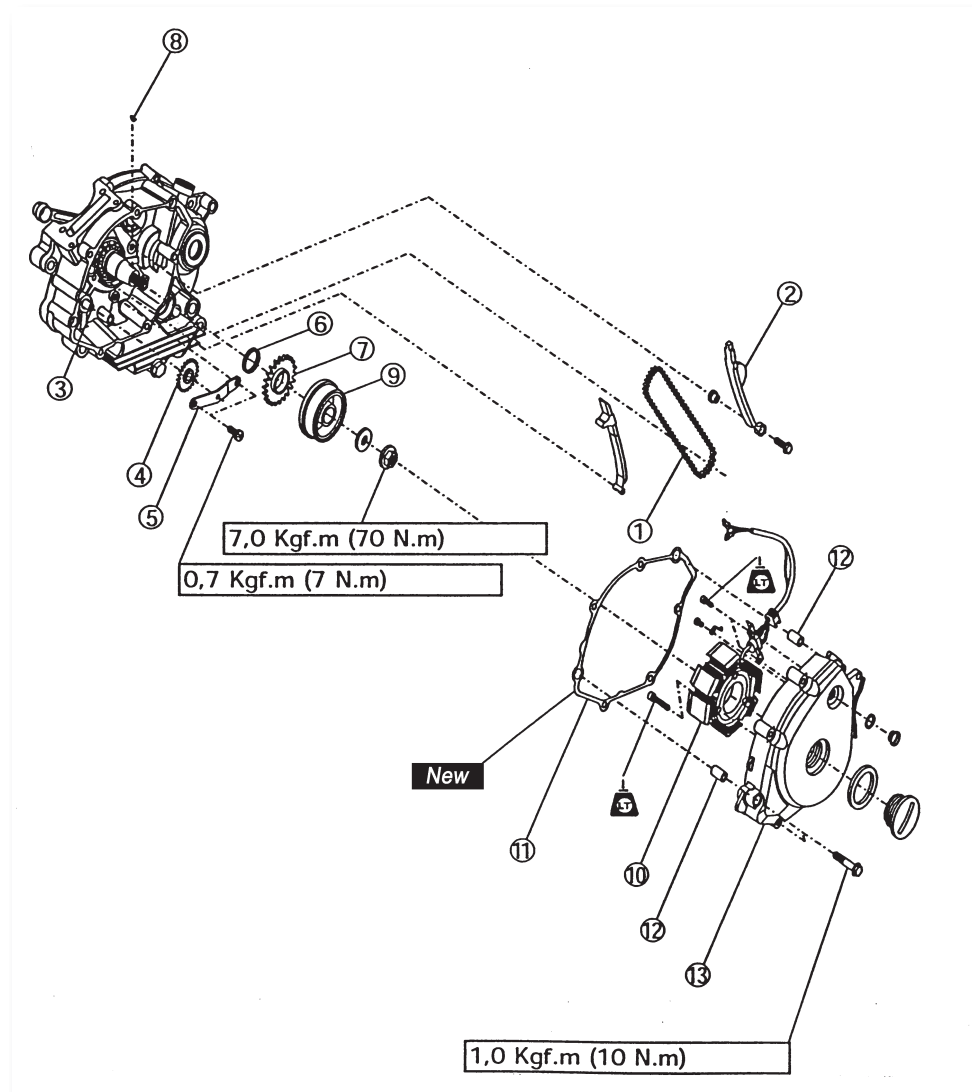
5,0 Kgf.m (50 N.m)







## 3.49 MAGNETO FLYWHEEL



- 1) Timing chain
- 2) Guide of the chain (intake)
- 3) Tang guide
- 4) Start gear 1
- 5) Plate
- 6) Washer
- 7) Start gear 2
- 8) Cotter
- 9) Magneto rotor
- 10) Stator
- 11) Gasket
- 12) Tang guide
- 13) Chassis cowling



### 3.50 START GEAR CHECKING

#### 1) INSPECT:

- Teeth of the start gear system (a) (b) (c).

Rims / filings / roughness / wear => **Replace.**

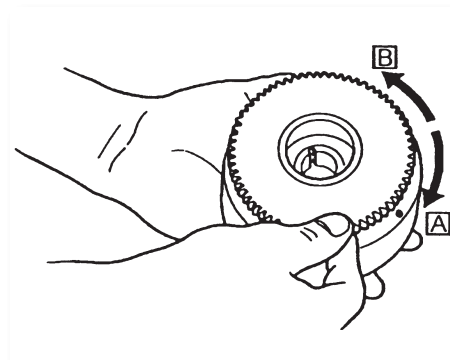
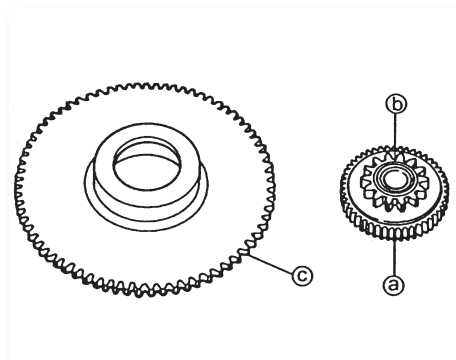
#### 2) CHECK:

- Operation of the start clutch.
- Push the tang guide following the indicator.

Stiff operation => **Replace.**

#### Steps for checking:

- Loose the start clutch.
- When rotating the start gear (the big one) clockwise (A), the start clutch and the start gear should be coupled.
- On the contrary, the start clutch is damaged. Replace.
- When rotating the start gear anticlockwise (B), it should turn freely.
- On the contrary, the start clutch is damaged. Replace.



### 3.51 MAGNETO ROTOR AND STAR GEAR

#### 1) INSTALL:

- Timing chain.
- Guide of the chain.



**Screw (guide of the chain):**  
1.0 Kgf.m (10 N.m)

#### **Remark:**

*Fasten a wire on the timing chain to avoid this falls inside the chassis.*

**2) INSTALL:**

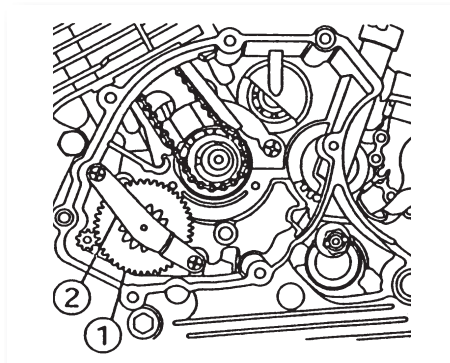
- Start gear (1).
- Plate (2).

**Screw of the plate:**

0,7 Kgf.m (7 N.m)

**3) INSTALL:**

- Motor Oil 4T.  
(in the start gears).

**4) INSTALL:**

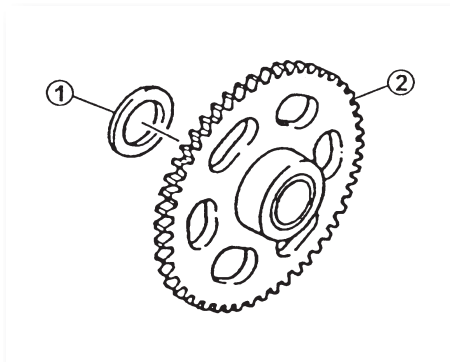
- Washer (1).
- Start gear (2).

**5) INSTALL:**

- Cotter.
- Magneto rotor.

**Remark:**

*Install the rotor provisionally, aligning the groove of the cotter with the cotter.  
Rotate the start gear clockwise and install the rotor in the start gear.*



### 6) PRESS:

- Nut (magneto flywheel).

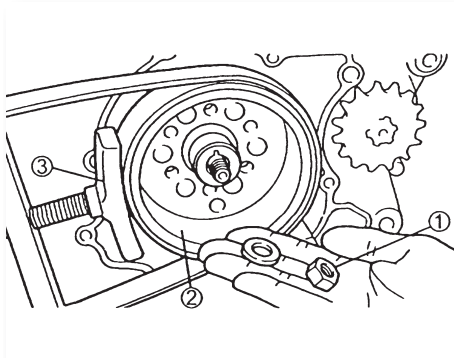


#### **Nut of the magneto flywheel:**

7,0 Kgf.m (70 N.m)

#### **Remark:**

*Press the nut (1) while holding the steering wheel (2) with the supporter of the rotor (3).  
Be careful not to let the supporter of the rotor touches the rotor salient.*



#### **Rotor support:**

90890-01701

### 7) INSTALL:

- Tang guide.
- Gasket of the chassis cover - New.
- Chassis cowling (LS).



#### **Screws of the chassis cover:**

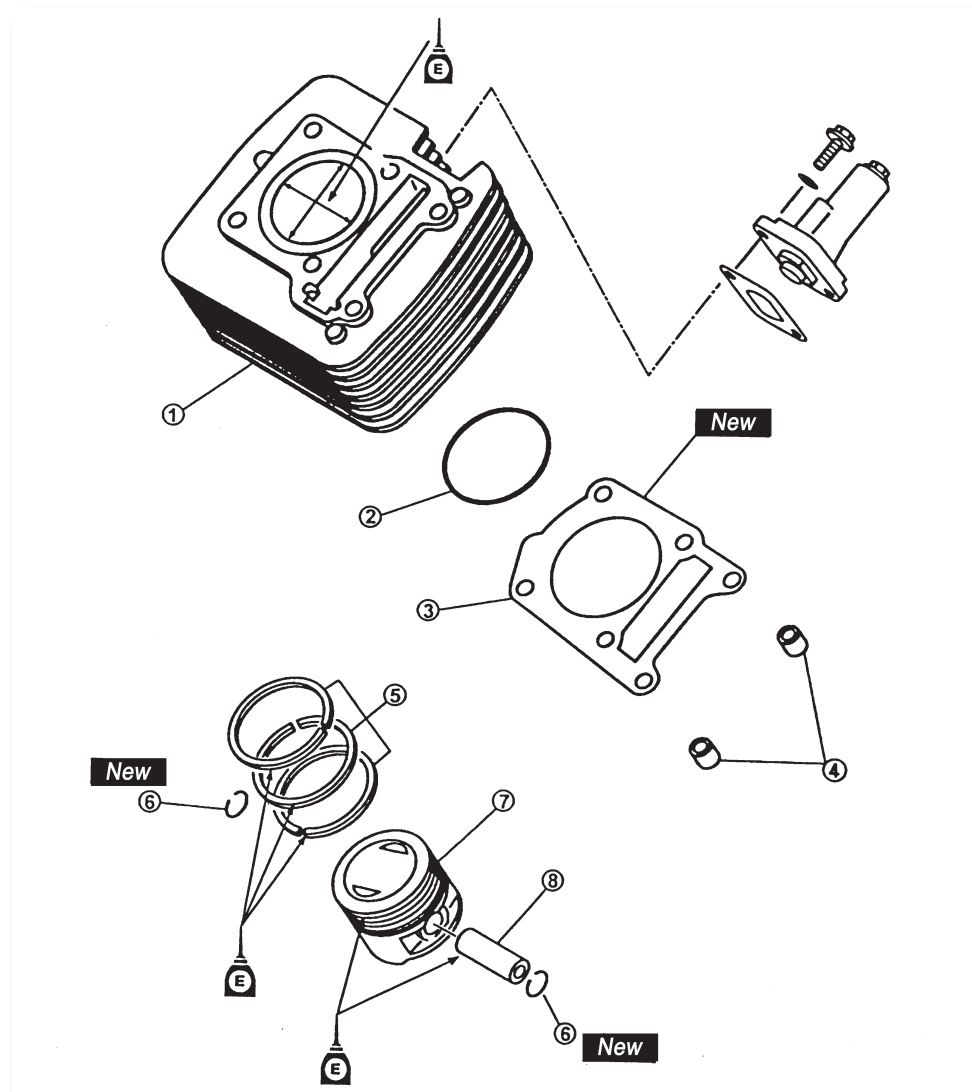
1,0 Kgf.m (10 N.m)

### 8) CONNECT:

- Drive of the neuter switch.



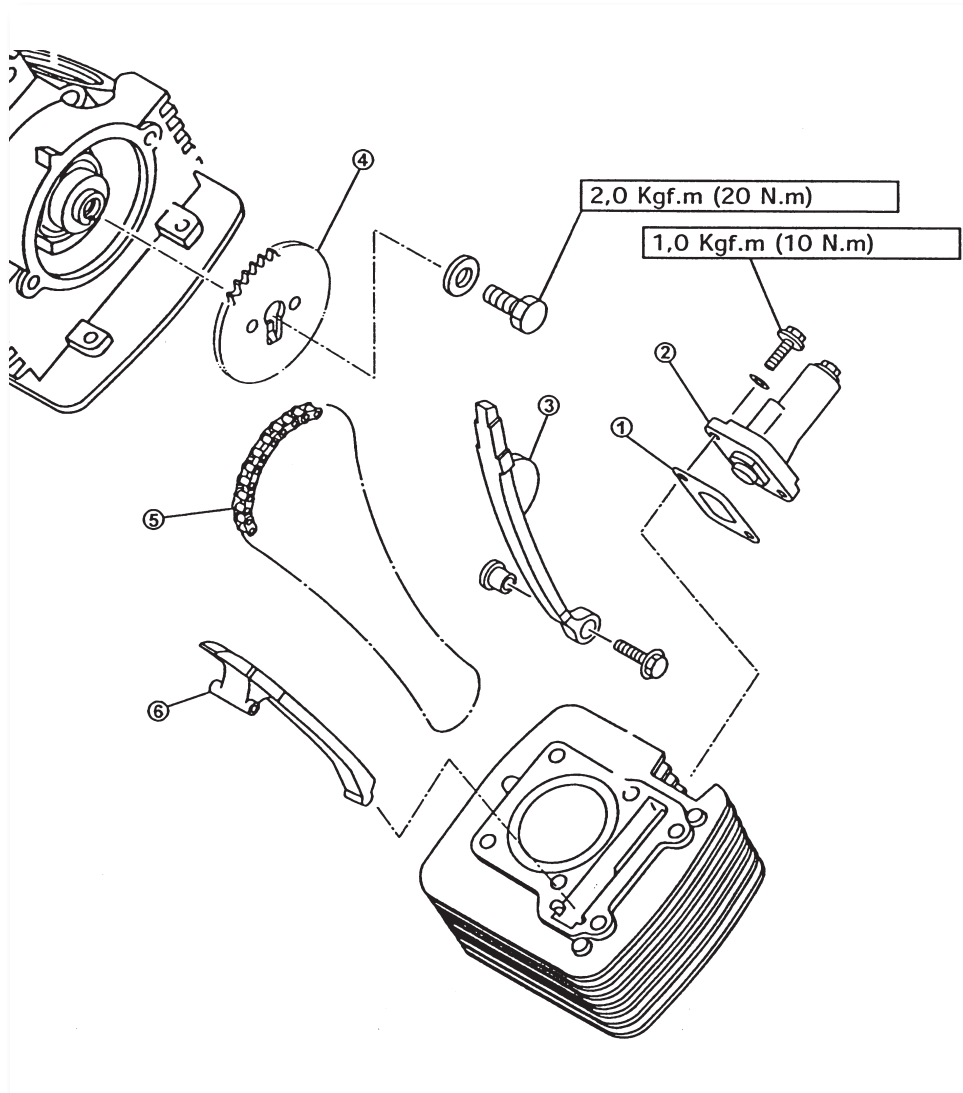
## 3.52 CYLINDER AND PISTON



- 1) Cylinder
- 2) Special gasket
- 3) Cylinder gasket
- 4) Greed tang
- 5) Group of rings
- 6) Clamp bolt
- 7) Piston
- 8) Bolt



### 3.53 CONTROL GEAR AND TIMING CHAIN



- 1) Gasket
- 2) Strut unit of the timing chain
- 3) Guide of the timing chain (intake)
- 4) Control gear
- 5) Timing chain
- 6) Guide of the timing chain (exhaust)



### 3.54 RINGS, PISTON AND CYLINDERS INSTALLATION

#### 1) Install according to the following sequence:

- Expander (oil ring) (1).
- Separator rings (oil ring) (2).
- Secondary ring (scraper) (3).
- Top ring (compression) (4).

#### **Remark:**

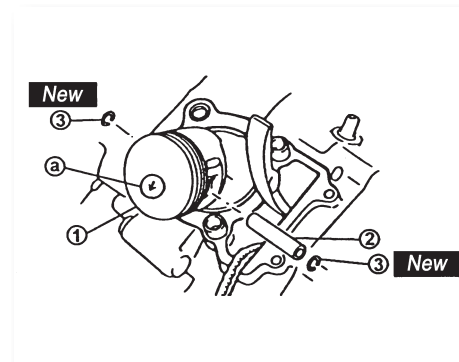
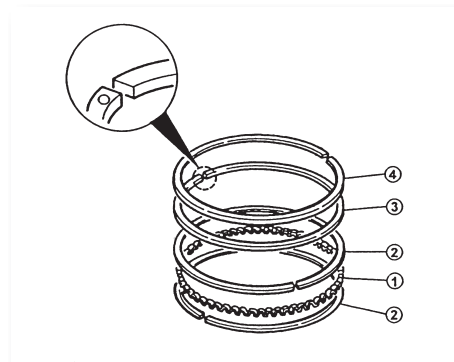
- Install the rings with the manufacturer trademark upwards.
- Lubricate the piston and the rings properly with motor oil.

#### 2) INSTALL:

- Piston (1).
- Bolt (2).
- Clamp bolt New (3).

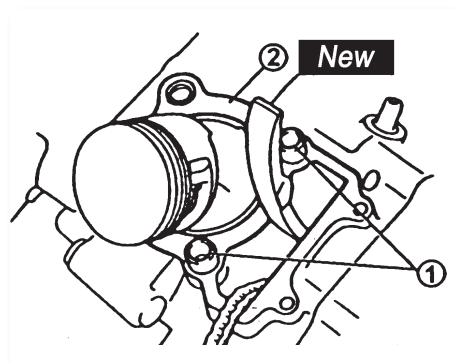
#### **Remark:**

- Apply motor oil on the bolt.
- This mark "=>" in the piston should be towards the exhaust side.
- Before installing the clamp bolt, cover the opening of the chassis with a clean cloth.



#### 3) TO INSTALL:

- Tan guide (1)
- Gasket of the cylinder - New (2).





### 4) POSITION:

- Rings (1).

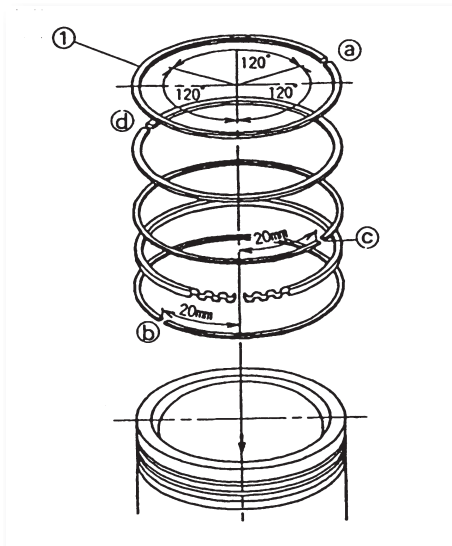
**Remark:**

- Position the tips of rings in accordance with the figure.

- (a) Top ring.
- (b) Oil ring (bottom).
- (c) Oil ring (top).
- (d) Secondary ring.

### 5) LUBRICATE:

- External surface of the piston.
- Rings.
- Internal Surface of the cylinder.

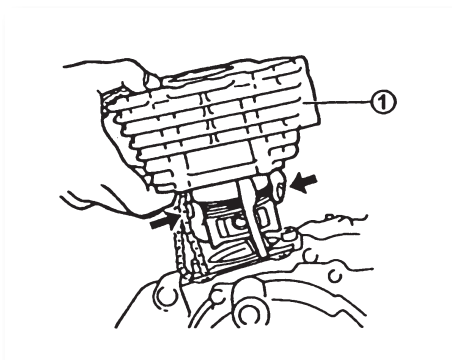


### 6) INSTALL:

- Special gasket New.
- Cylinder (1).

**Remark:**

- Install the cylinder with one of the hands, while compressing the rings with the other one.
- Goes the guide of the timing chain (exhaust side) to the cavity of the timing chain.







### 3.55 CYLINDER HEAD INSTALLATION

#### 1) INSTALL:

- Tang guide New (1).
- Cylinder head gasket New (2).
- Guides of the timing chain (exhaust) (3).

#### 2) INSTALL:

- Cylinder head
- Screw with washer (cylinder head).



#### Screws (cylinder head):

##### M8 (1-4):

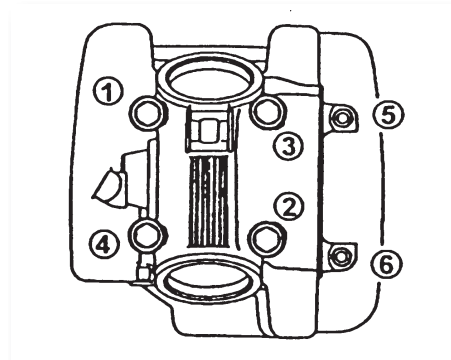
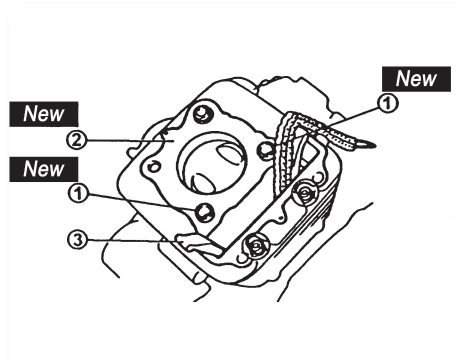
2,2Kgf.m (22 N.m)

##### M6 (5-6):

1.0 Kgf.m (10 N.m)

#### Remark:

- Apply motor oil on the threads of the screws.
- Press the screws in increasing order.

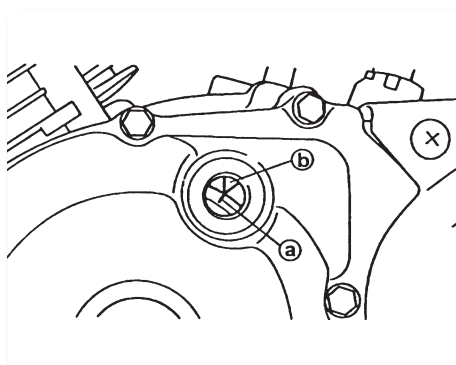


#### 3) INSTALL:

- Control gear.
- Timing Chain.

#### Steps for the installation:

- Rotate the crankshaft anticlockwise till the mark (a) is aligned with the stationary point (b).
- Align the mark "I" (c) of the control gear with the stationary point (d) of the cylinder head.
- Install the timing (1) chain in the control gear (2) and install the gear in the camshaft.





**Remark:**

When installing the control gear, keep the timing chain as much tense as possible in the exhaust side.



**Do not rotate the crankshaft during the installation of the camshaft. Damages can occur or the motor can be out of point.**

- Extract the cable from the timing chain.

**4) INSTALL:**

- Clamp plate.

**5) INSTALL:**

- Screw (gear).

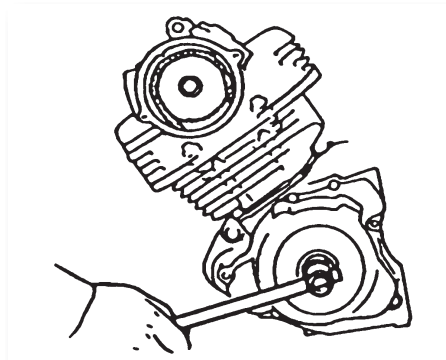
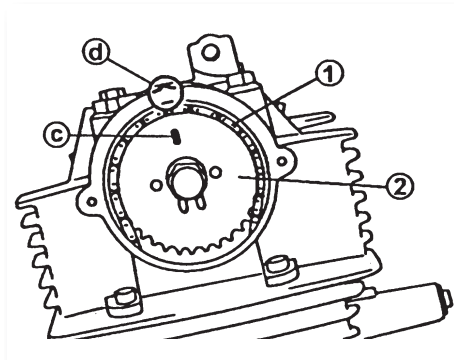


**Screw (gear of the timing chain):**

2.0 Kgf.m (20 N.m)

**Remark:**

Install the screw, while fastening the nut of the flywheel magneto with a spanner.

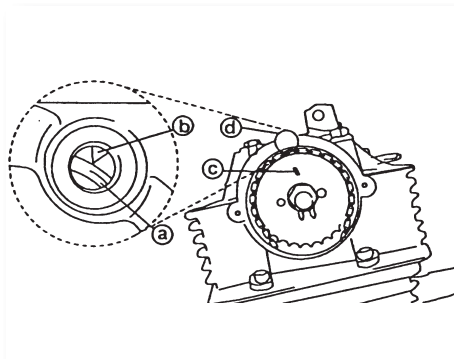


**6) CONTROL:**

- Marks of the flywheel (a).
- Align the stationary point (b) with the cover of the chassis (LI).

- Marks of the control gear "I" (d).
- Align the stationary point (c) with the cylinder head.

Non-aligned => **Adjust.**



**7) INSTALL:**

- Strut of the timing chain.

**Steps for the installation:**

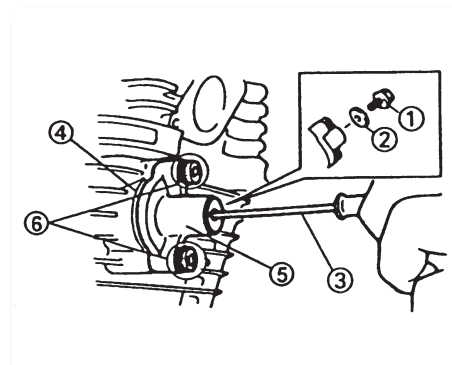
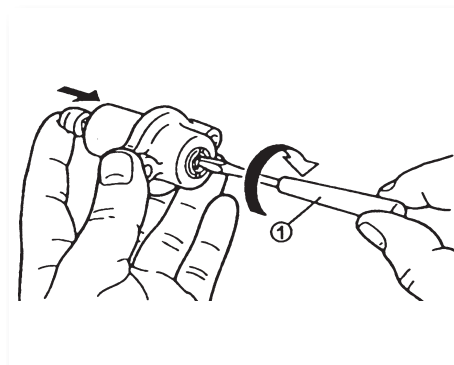
- Extract the screw from the cover of the strut.
- While the bolt of the strut is pressed lightly with the hand, use a screwdriver to turn the bolt of the strut clockwise completely.
- With the bolt completely tight, install the gasket (4) and the strut of the chain (5) and press the screw (6) with the specified torque.
- Loose the screwdriver. If all is correct with the gasket, press the screw of the cover (1) with the specified torque.

**Screws (strut of the timing chain):**

1,0 Kgf.m (10 N.m)

**Screw of the cover (strut of the timing chain):**

0,75 Kgf.m (7,5 N.m)

**8) CHECK:**

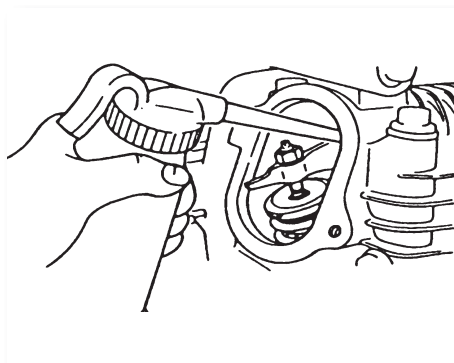
- Play of valves

Unspecified => **Adjust.**

See section: “**ADJUSTMENT OF THE VALVES SET**” in the **CHAPTER 3.**

**9) LUBRICATE:**

- With motor oil.





### 10) INSTALL:

- Valves cover (with the special gasket).
- Lateral cover of the cylinder head (with the special gasket).
- Screws (with washers).



#### Valve cover:

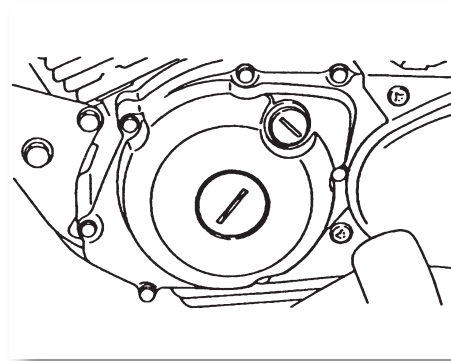
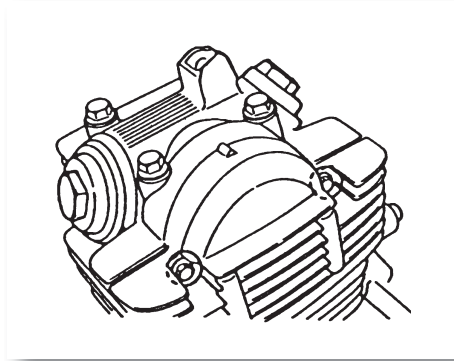
1,75 Kgf.m (17,5 N.m)

#### Screws (lateral cover of the cylinder head):

1,0 Kgf.m (10 N.m)

### 11) INSTALL:

- Cap of checking point (with the special gasket).
- Central cap (with O-ring).



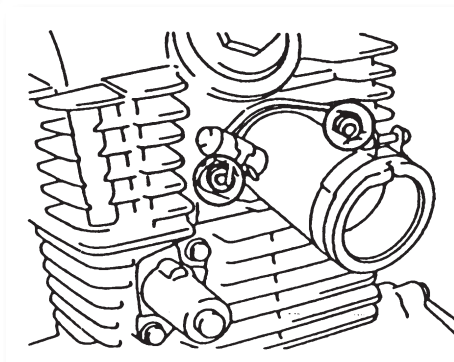
### 12) INSTALL:

- Gaskets (inlet collector).
- Inlet collector.



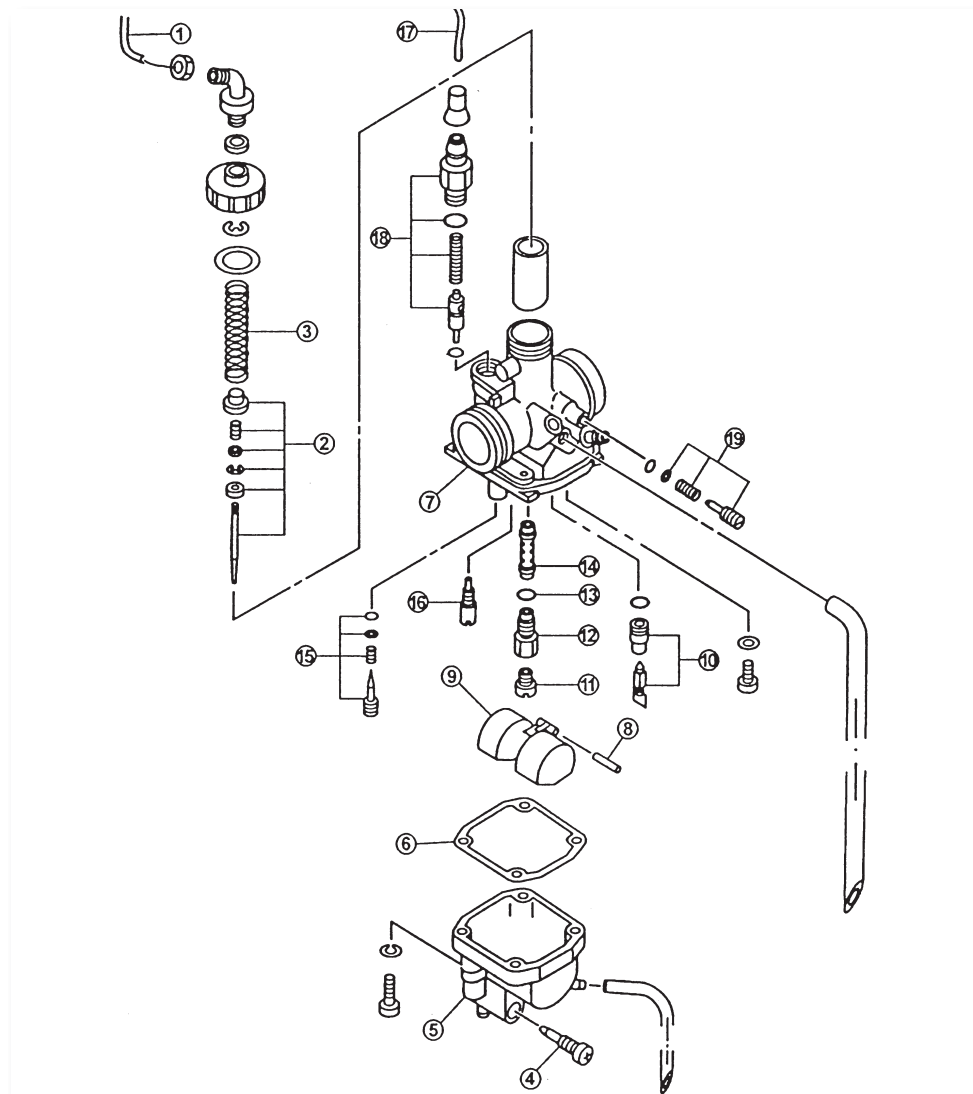
#### Screws (inlet collector):

1,0 Kgf.m (10 N.m)





## 3.56 CARBURETTOR



- |                               |                               |
|-------------------------------|-------------------------------|
| 1) Cable of the accelerator   | 16) Low spout                 |
| 2) Lock valve unit            | 17) Cable of the choke        |
| 3) Spring of the lock valve   | 18) Choke unit                |
| 4) Drainage screw             | 19) Screw of the idling speed |
| 5) Carburettor tank           |                               |
| 6) Gasket of the tank         |                               |
| 7) Body of the carburettor    |                               |
| 8) Tang of the float          |                               |
| 9) Float                      |                               |
| 10) Needle valve unit         |                               |
| 11) High spout                |                               |
| 12) Diffuser 1                |                               |
| 13) Special gasket            |                               |
| 14) Diffuser 2                |                               |
| 15) Pilot screw unit (of air) |                               |



### 3.57 DISASSEMBLY

**Remark:**

• All the parts here below can be cleaned and inspected without disassembling the carburettor. (All the internal parts, excepting the choke).

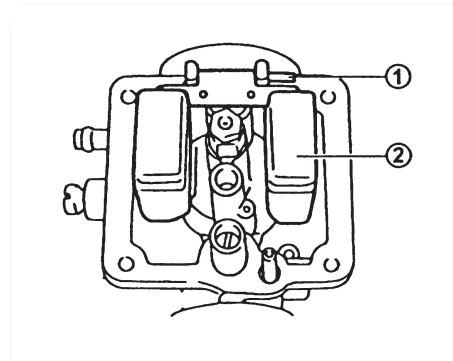
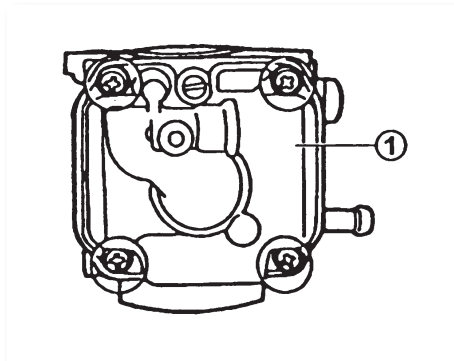
- Lock valve
- Needle of the lock valve
- All the spouts
- Float
- Needle valve
- Seating of the needle valve
- Diffuser
- Needle of the lock valve

**1) EXTRACT:**

- Carburettor tank (1).
- Gasket of the tank.

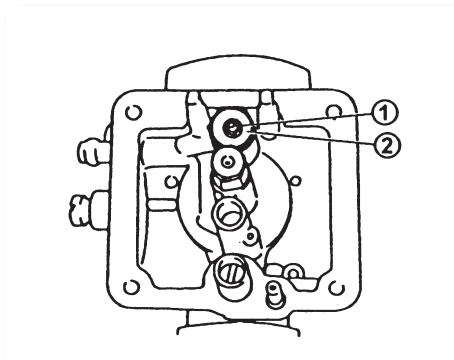
**2) EXTRACT:**

- Tang of the float (1).
- Float (2).



**3) EXTRACT:**

- Needle valve (1).
- Seating of the needle valve (2).

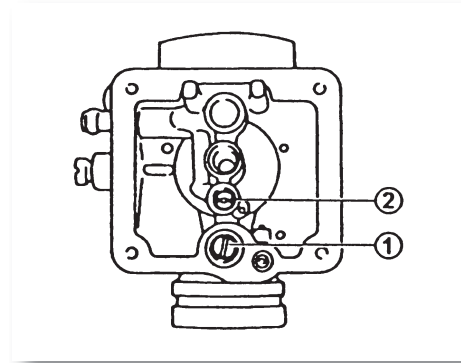
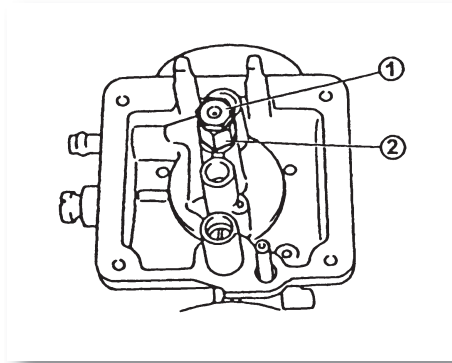


**4) EXTRACT:**

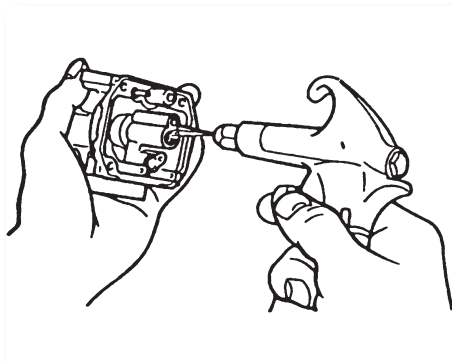
- High spout (1).
- Diffuser (2).
- Special gasket.

**5) EXTRACT:**

- Pilot screw unit (of air) (1).
- Low spout (2).

**3.58 CHECKING****1) CHECK:**

- Body of the carburettor
- Carburettor tank
- Place of the spouts  
Cracks / damages => **Replace.**
- Fuel leaks  
Obstruction => **Clean as mentioned before..**
- Body of the carburettor tank
- Contamination => **Clean.**





### Steps for the cleaning:

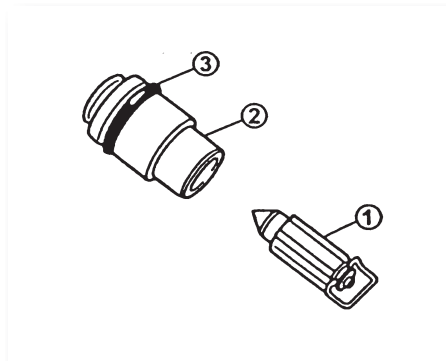
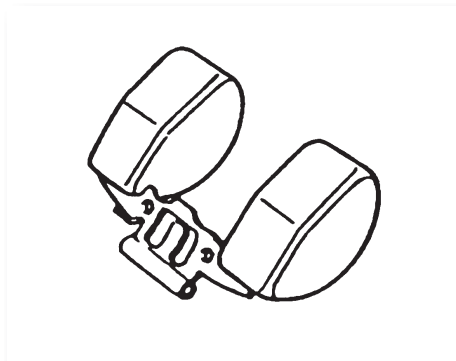
- Wash the whole carburettor with kerosene or petrol. (Do not use solutions with a chemical products base for cleaning the carburettor).
- Blow all the leaks and spouts with compressed air.

### 2) INSPECT:

- Float
- Damages => **Replace.**

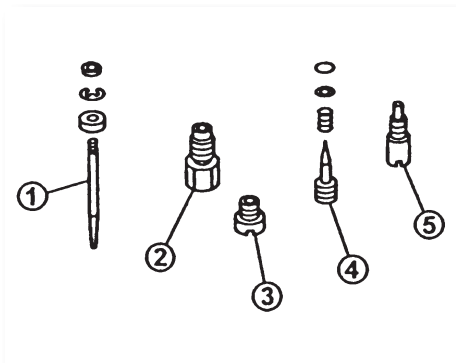
### 3) INSPECT:

- Needle valve (1).
  - Seating of the needle valve (2).
  - Special gasket (3).
- Damages / wear / obstruction => **Replace the unit.**



### 4) INSPECT:

- Needle of the lock valve (1).
  - Diffuser I (2).
  - High spout (3).
  - Low spout (4).
  - Pilot screw (of air) (5).
- Warping / wear / damages => **Replace.**
- Obstruction => **Blow the spouts with compressed air.**



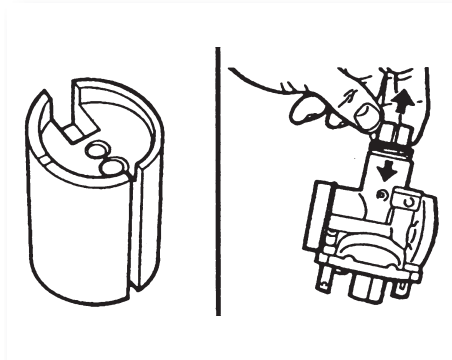


**5) CONTROL:**

- Free movement

Place the lock valve in the body of the carburettor and control if this moves freely.

Obstruction = > **Replace.**

**3.59 ASSEMBLY**

Invert the procedure of “**DISASSEMBLY**”.

**Pay attention to the following points:**



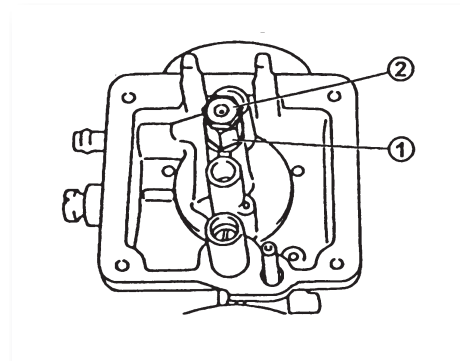
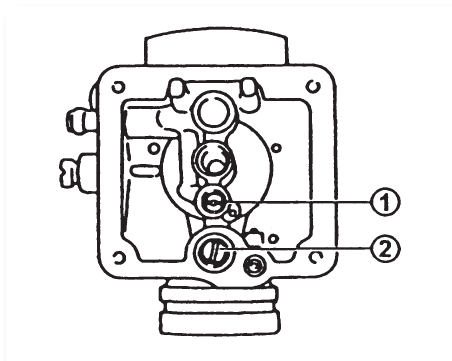
- **Before the assembly, wash all the parts with kerosene.**
- **Always use new gaskets.**

**1) INSTALL:**

- Low spout (1).
- Pilot screw unit (of air) (2).

**2) INSTALL:**

- Special gasket New
- Diffuser (1).
- High spout (2).



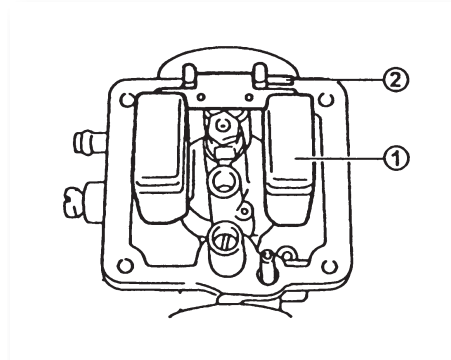
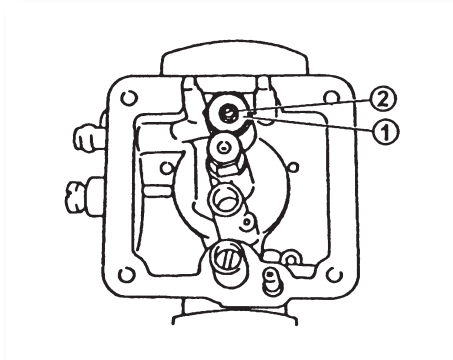


### 3) INSTALL:

- Seating of the needle valve (1).
- Needle valve (2).

### 4) INSTALL:

- Float (1).
- Tang of float (2).



### 5) MEASURE:

- Height of the float (a) without the gasket.

Incorrect = > **Adjust.**

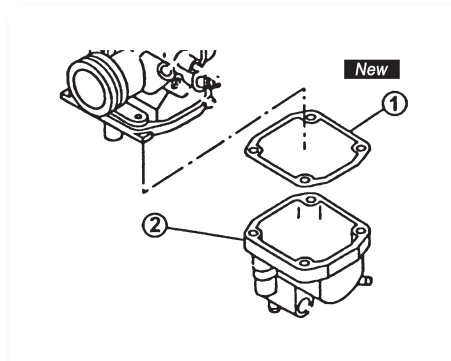
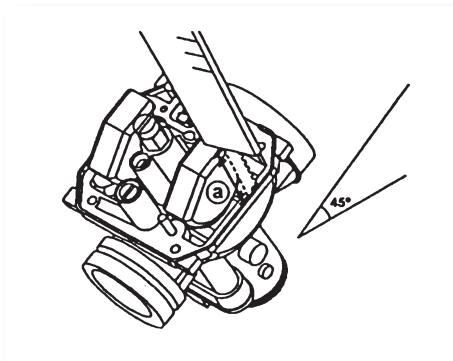


#### **Height of the float:**

18,9 mm

### 6) INSTALL:

- Gasket of the carburettor tank (1) - New
- Carburettor tank (2).





### 3.60 FUEL LEVEL ADJUSTMENT

#### I) MEASURE:

- Level of fuel (a).

Unspecified => **Adjust.**

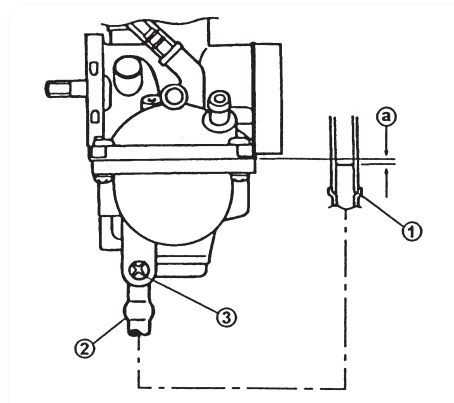


#### Level of fuel:

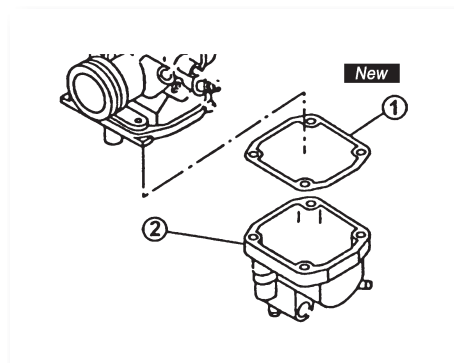
6—7 mm under the line of the tank.

#### Steps for adjustment:

- Place the motorcycle in a flat surface.
- Place a jack or a support under the engine to guarantee the carburettor in the vertical position.
- Connect the gauge of fuel level (1) in the drainage pipe (2).



- Loosen the drainage screw (3).
- Hold the gauge vertically near the line of the carburettor tank.
- Measure the level of fuel (a) with the gauge.
- If the level is incorrect, adjust it.
- Extract the carburettor.
- Inspect the valve seating and the needle valve.
- If those pieces are worn, replace both.
- If they are normal, adjust the float level by bending the needle support on the float slightly.
- Install the carburettor.
- Control the level of fuel again.





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