

SERVICE STATION MANUAL



Pure Passion since 1911



Leoncino
Benelli

Code: B000094195000

Translation of original instructions

WARNINGS:

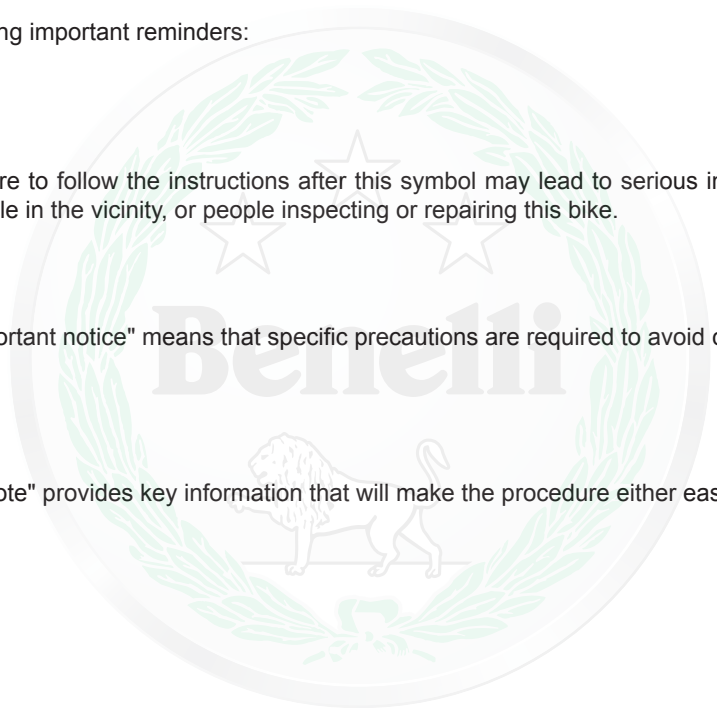
This manual has been written by Benelli Q.J. s.r.l., mainly for use by Benelli dealers and their specially trained mechanics. It is not possible to give a mechanic all of the information they require in a single manual. It is therefore presumed that the persons using this manual for the maintenance and repairs of Benelli bikes have a basic knowledge of mechanics and the procedures necessary for repairs and maintenance of this type of vehicle. Without this experience, any repairs or maintenance to this type of vehicle may be dangerous or ineffective.

It is company policy at Benelli Q.J. s.r.l. to continuously upgrade and improve its models. Any changes or significant modifications to technical data or procedures will be made known to all authorised Benelli Dealers and will be published in future editions of this manual.

NOTE: _____
Drawings and specifications are subject to change without prior notice.

IMPORTANT INFORMATION ABOUT THE MANUAL

This manual contains the following important reminders:

The Benelli logo is a large, faint watermark in the background of the page. It features a circular emblem with a laurel wreath. Inside the wreath, there are three stars at the top and a lion standing on a pedestal at the bottom. The word "Benelli" is written in a large, serif font across the center of the emblem.

WARNING

Failure to follow the instructions after this symbol may lead to serious injury or even death for the rider, people in the vicinity, or people inspecting or repairing this bike.

IMPORTANT NOTICE

"Important notice" means that specific precautions are required to avoid causing damage to the bike.

NOTE

A "Note" provides key information that will make the procedure either easier or clearer.

HOW TO USE THIS MANUAL

This manual is a practical reference guide that is both easy to handle and use for mechanics. The explanations of all of the procedures for installing, removing, disassembling, assembly, repairing, and checking are organised in sequence, one step at a time.

1. Each chapter is divided into sections. The top part of each page contains the title of the current section.
2. To help with the identification of parts and to make the different processes clearer, exploded drawings are provided at the start of each section dealing with the removal or disassembly of parts.
3. Parts needed lubricating or replacing are marked by symbols. See the "SYMBOLS" section.
4. The exploded drawings is accompanied by a table showing the position on the spare part catalogue, its description, intervention sequence, symbols used, intervention description, and any notes for the operator.
5. Interventions requiring any other information (e.g., special tools and technical data) are described in sequence.



SYMBOLS

SUBJECT SYMBOLS

GEN. INFO		<u>General Information</u>
SPEC.		<u>Specifications</u>
PERIOD. INSP. & ADJ.		<u>Inspections and Periodic Adjustments</u>
FRAME		<u>Frame</u>
ENG.		<u>Engine</u>
COOL. SYSTEM		<u>Cooling system</u>
ELEC		<u>Electrical system</u>

EXPLANATORY SYMBOLS

	<u>Wear limits, Backlash</u>		<u>Thread locker application</u>
	<u>Special tool</u>		<u>Recommended fuel</u>
	<u>Locking torque</u>		<u>Brake fluid</u>
	<u>Grease application</u>		<u>Lubricant</u>
	<u>Sealant paste application</u>		

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CHAPTER 1

GENERAL INFORMATION

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IDENTIFICATION

MOTORCYCLE IDENTIFICATION

The identification data are:

1. Serial number of the frame (on the steering sleeve).
2. Serial number of the motor (on the bottom base).
3. Type-approval data (on the frame).



FEATURES

INSTRUMENTATION AND INDICATOR LIGHTS

The instruments and lights will switch on when the ignition key is turned to "ON".

After an initial check-up, the information will correspond to the overall condition of the bike at that time.

The dashboard has the following instruments:

1. TACHOMETER.

The tachometer shows the running turnover of the engine so that the rider can keep it within the ideal power range.

2. SELECT BUTTON.

Buttons to set vehicle data. Press the "SELECT" button to see the partial or total kilometres.

3. RESET BUTTON.

When viewing partial kilometres (TRIP A/TRIP B), it is possible to reset them by holding down the "RESET" button.

4. COOLING FLUID TEMPERATURE GAUGE.

Shows the cooling fluid temperature in °F (Fahrenheit) or C° (Celsius).

5. SELF-DIAGNOSIS LIGHT.

The light warns the driver of failures of the power supply and ignition systems, by switching on the engine yellow light (LED) when their parts are faulty and the protective function is activated. In the event of serious problems, the control unit stops the injection/ignition function and it is necessary to contact an authorized service centre Benelli at soonest.

6. LEFT DIRECTION INDICATOR LIGHT (GREEN).

It goes on when the left direction indicator light is activated.

7. HIGH BEAM INDICATOR LIGHT (BLUE).

This switches on when the high beam is switched on.

8. NEUTRAL POSITION INDICATOR LIGHT (GREEN).

This switches on when the gear is in "Neutral".

9. OIL PRESSURE WARNING LIGHT (RED).

It goes on when the oil pressure value is too low. The electrical circuit of the light can be checked by turning the key to "ON". Once the engine is running, the light should switch off. If the light does not switch on when the key is turned to "ON" or if the light stays on, get the electrical circuit checked by an authorised Benelli centre.

10. DIGITAL CLOCK / SETTING.

Shows the time in hours and minutes.

Push and hold the menu switch "SELECT" for 3 seconds to enter the setting mode "TOTAL KM".

Press and hold down the "SELECT" button for 3 seconds until the reading begins to lash. Set the hour by pressing the "RESET" button.

Press the "SELECT" button to pass on to adjust the minutes. Set the minutes by pressing the "RESET" button. Press the "SELECT" button again to exit.

11. NEUTRAL GEAR INDICATOR LIGHT.

The engaged gear display shows the selected gear.

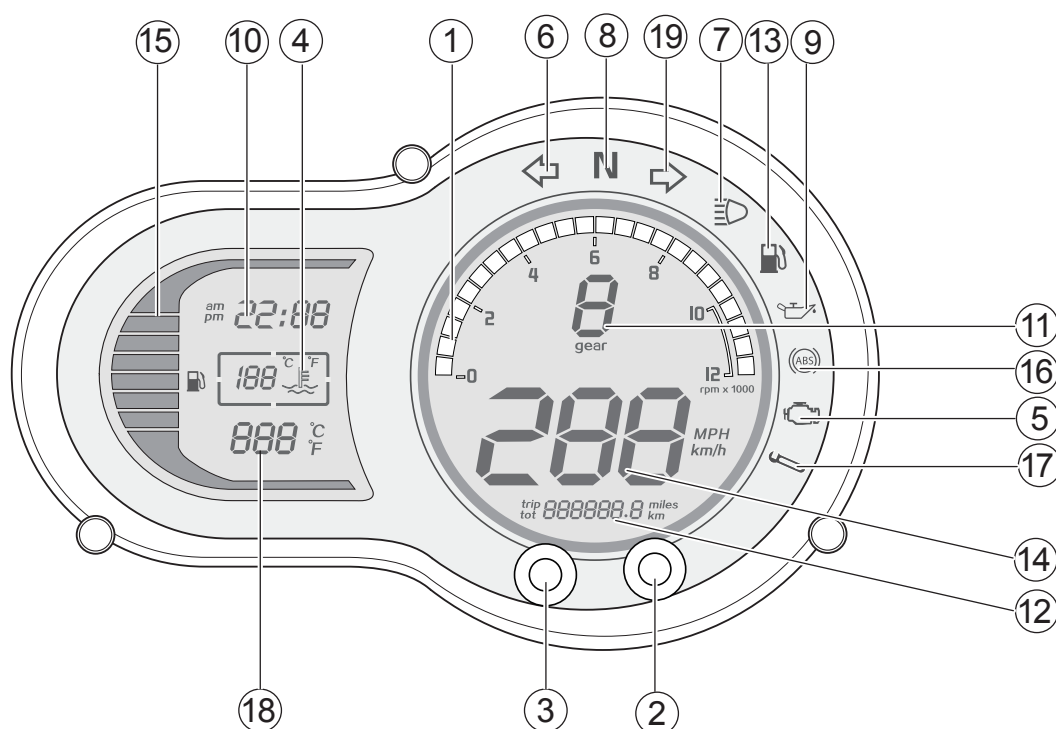
It is a 6-speed gearbox model.

12. TOTAL/PARTIAL KILOMETRE COUNTER.

The total kilometre counter shows the total distance covered in kilometres. Set the mode "TRIP A/TRIP B" in the instrument using the "SELECT" button. The partial kilometre counter (TRIP A/TRIP B) shows the distance covered since the last reset. The partial kilometre counter can be used to estimate the possible distance to cover with a full tank of fuel. This information may make it possible to schedule future fuelling stops.

13. FUEL RESERVE LIGHT

The light on shows that the vehicle has a fuel range of about 1.3 litres.



FEATURES

MULTIFUNCTION DISPLAY

14. SPEEDOMETER.

Push and hold the menu switch "SELECT" for 3 seconds to enter the setting mode "TOTAL KM". The Speedometer indicates the vehicle's speed in km/h or mph. To pass from one to the other, press the "RESET" button.

15. RESERVE FUEL GAUGE.

The digital fuel gauge shows the capacity of the fuel tank. As the fuel level drops, the lines on the gauge will become closer and closer to the "E" reserve area. As soon as the final line starts to blink.

16. LIGHT (ABS).

The anti-lock braking system of brakes goes on when starting to check the system and turns off few metres after the setting off.

17. SERVICE LIGHT.

It goes on after 1000 km (621 mi) the first time, and then every 10,000 km (6213 mi).

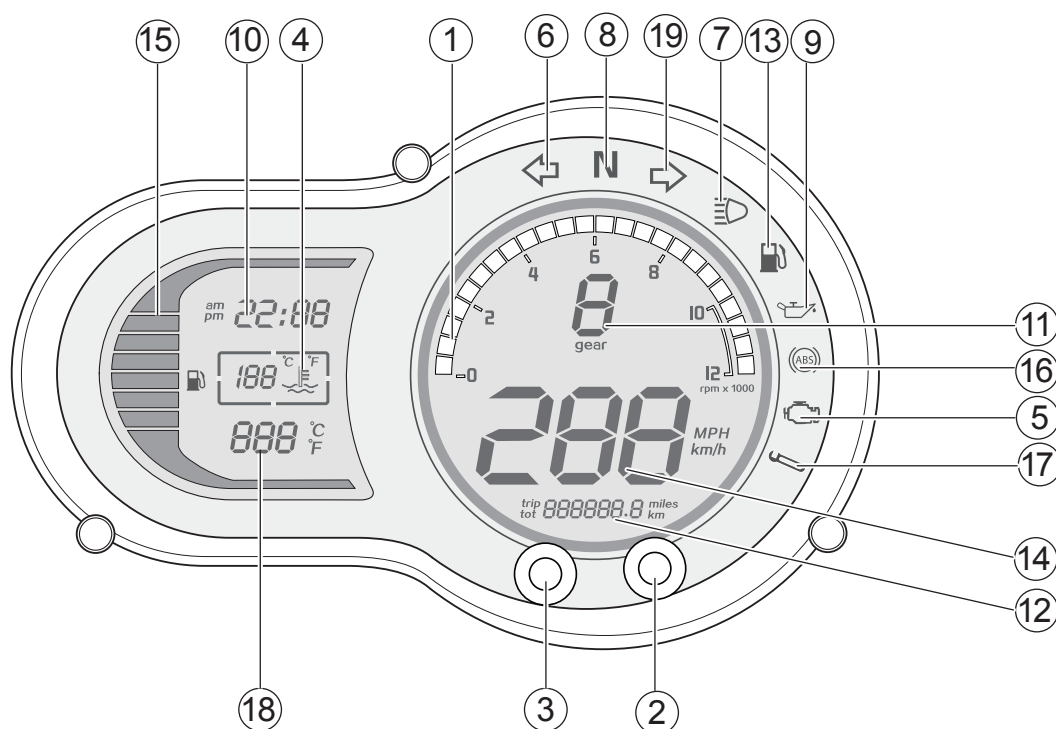
Contact an authorized service centre at soonest and strictly follow the instructions of the maintenance and check tables contained in this manual. Press and hold the button (SELECT) for 15/20 secs. to turn the light off.

18. AMBIENT TEMPERATURE INDICATOR.

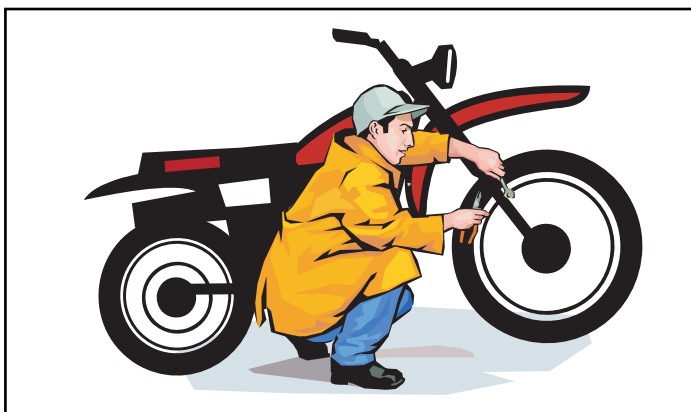
It shows the ambient temperature. The value can be shown in degrees centigrade (°C) or in Fahrenheit (°F). The indication field ranges from -30 and +50 (°C) or -22 e +122 (°F).

19. RIGHT DIRECTION INDICATOR LIGHT (GREEN).

It goes on when the right direction indicator light is activated.

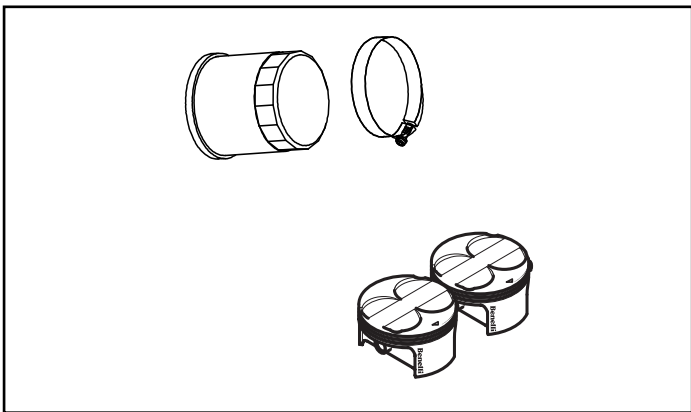
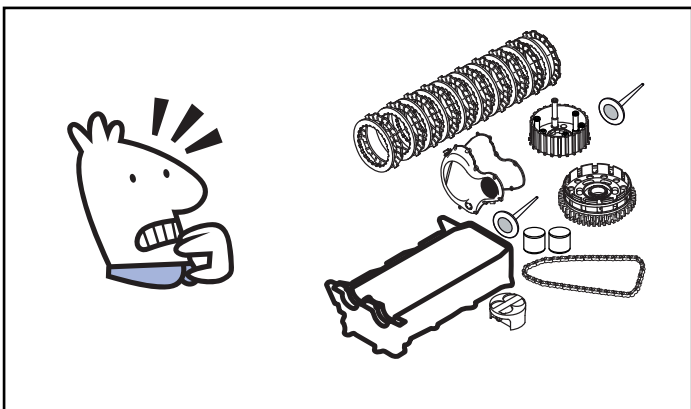


IMPORTANT INFORMATION



GETTING READY FOR REMOVAL AND DISASSEMBLY OPERATIONS

- Before carrying out any removal and disassembly operations, remove any dirt, mud, dust or foreign bodies.
- Use only suitable cleaning tools and products. See the paragraph "SPECIAL TOOLS".
- While disassembling the vehicle, we recommend keeping coupled parts together at all times. These parts include gears, cylinders, pistons and other parts, whose surfaces will be "coupled" during the normal wear and tear of work. Coupled pieces must always be re-used or replaced in groups. During the disassembly operation, clean all parts and place them in a bowl, using the same order as for disassembly. This will make reassembly operations easier and allows for the correct installation of all parts.
- Keep all parts away from any source of heat.

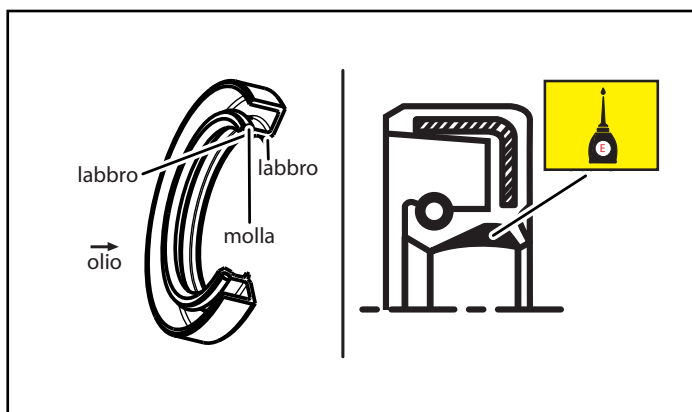


SPARE PARTS

Use only Benelli original replacement parts. Use only oils and grease recommended by Benelli to lubricate parts. Other brands may look similar and operate in a similar manner, but will be of lower quality.

IMPORTANT INFORMATION

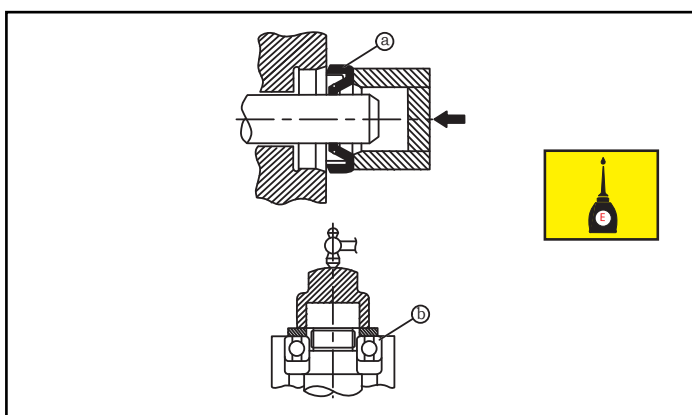
SEALS, O-RINGS, OIL SEALS, AND BEARINGS



Always replace all seals, oil seals and O-rings when carrying out repairs to the engine.

The seal surfaces, oil seal lips and O-rings must always be clean.

During installation, always oil the coupled parts and bearings, and lubricate the oil seal lips with engine oil.



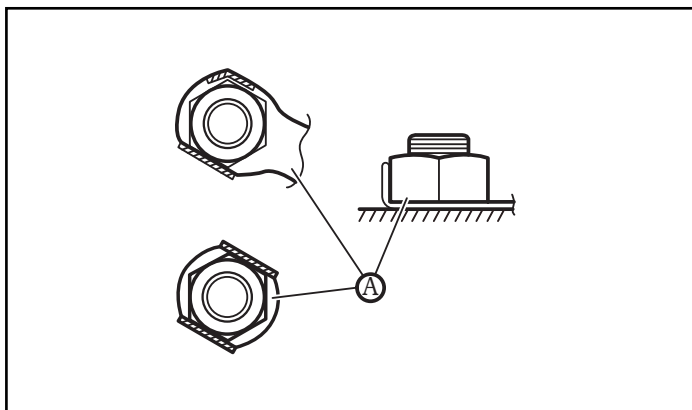
Insert the bearings and oil seals so that the brand or manufacturer's number is facing outwards and visible. To install the oil seal, lubricate the lips with a fine layer of engine oil.

Always apply plenty of oil to bearings when installing them.

- a. Oil seal
- b. Bearing

IMPORTANT NOTICE

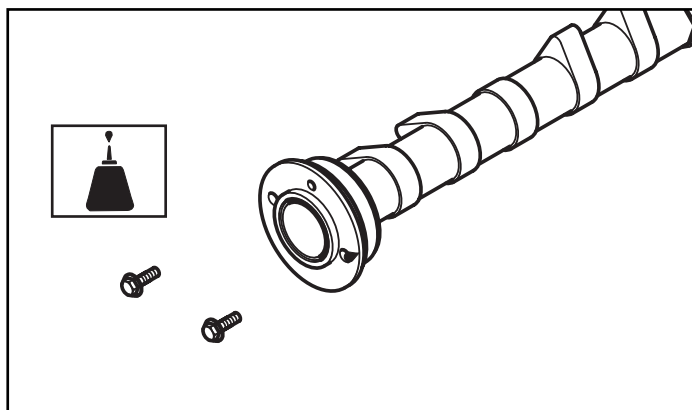
Never use compressed air to dry bearings, allowing them to turn, as this will damage the surfaces.



SAFETY WASHERS/PLATES, COTTER PINS, AND THREAD LOCKER

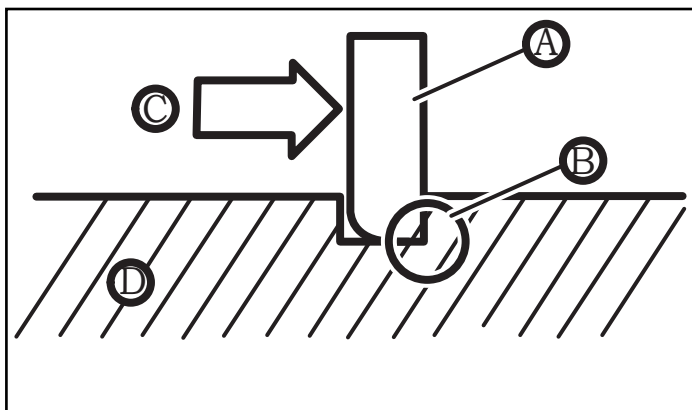
After removing, replace all of the safety washers "A", the safety plates and cotters.

After tightening the bolt or nut according to specification, bend the locking tabs and the ends of the cotter against the flat sides of the nut.



Before applying the thread locker, always degrease both parts with solvent.

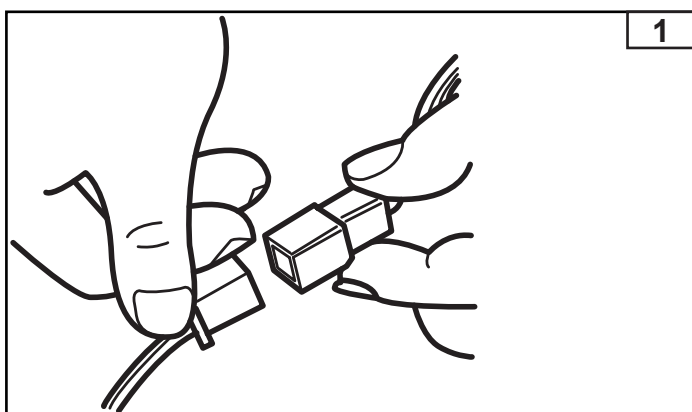
IMPORTANT INFORMATION



SAFETY SNAP RINGS

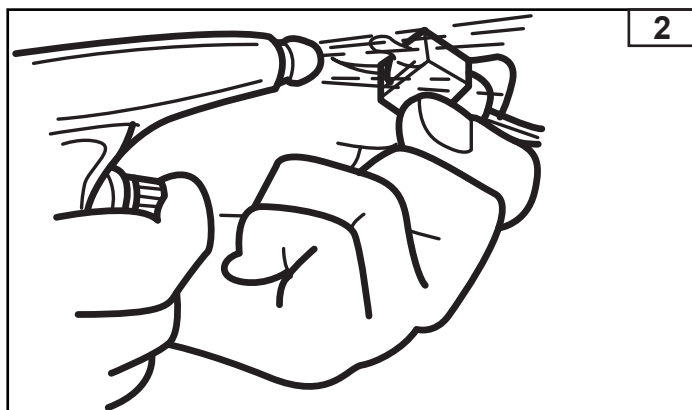
Before reassembling them, check all of the snap rings and replace any that have become damaged or are out of shape. Always replace the snap rings on the pin after using them once. When installing a snap ring "A", make sure the sharp edge "B" is positioned on the other side compared to the thrust "C" that it receives.

"D" Shaft



Make sure that there are no marks, rust, moisture, etc. on wiring, couplers, or connectors.

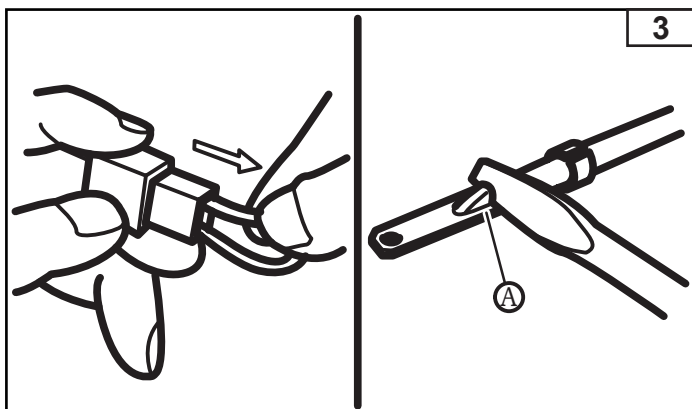
1. Disconnect:
 - the wire
 - the coupler
 - the connector



2. Check:
 - the wire
 - the coupler
 - the connector

If there are traces of moisture → Use a fan to dry.

If there is any rust/marks → Connect and disconnect the parts several times.



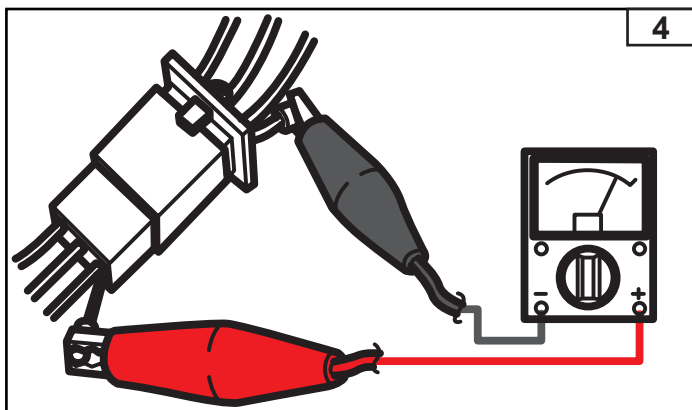
3. Check:
 - all connections

If there are any loose connections → Reconnect them properly.

NOTE:

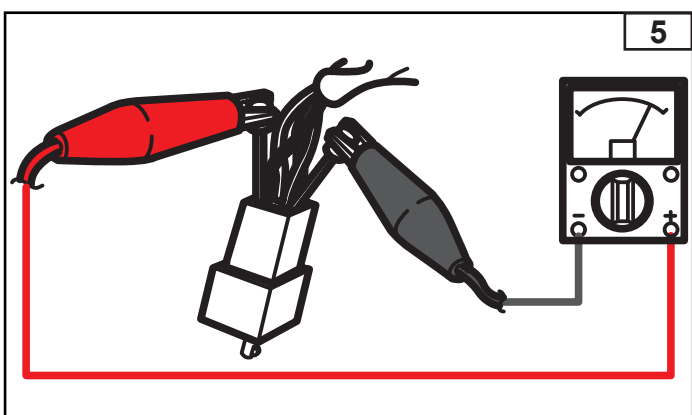
If the foot of the terminal "A" is bent, raise it.

IMPORTANT INFORMATION



4. Connect:
- the wire
 - the coupler
 - the connector

NOTE: _____
Make sure all connections are installed tightly.

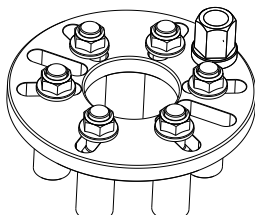
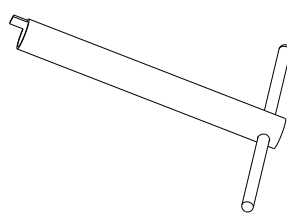
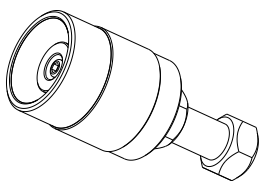


5. Check:
- **continuity** (using a pocket tester)

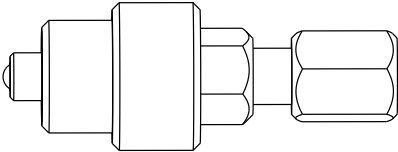
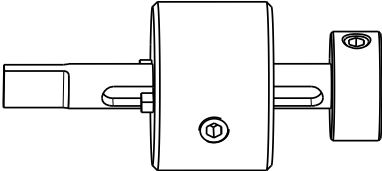
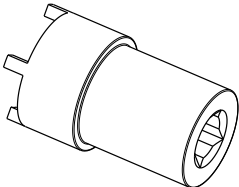
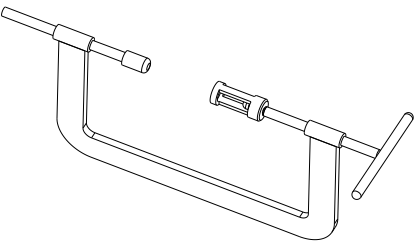
NOTE: _____
If there is no continuity, clean the terminals.
For checking wiring, follow the procedure of points from "1" to "3".
As quick remedy, it is advisable to use a specific product for the contacts, which is available in the spare part shops.

SPECIAL TOOLS

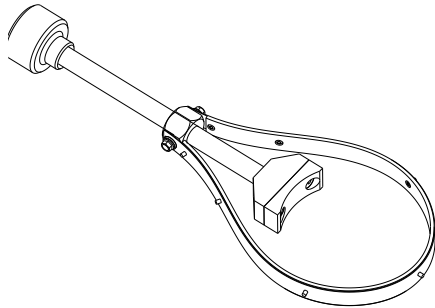
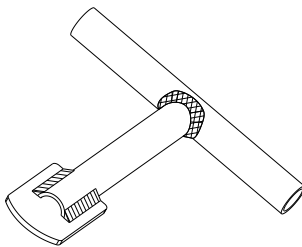
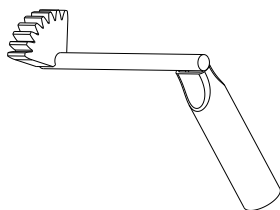
The special equipment listed here serves for the complete, thorough performance of fine tuning and assembly operations. The use of this equipment will help to prevent damage caused through using unsuitable tools or makeshift techniques. When completing an order, please check the list below to avoid any errors.

ENGINE SPECIAL TOOLS		
Tool Code	Tool Name-Function	Image
R180197025000	Pad for valve oil seal This serves to insert the valve oil seal in situ.	
0320097047000	Clutch disassembly wrench This serves to block the clutch drum and loosen the nut.	
Standard tool commonly found	Pad for piston pin removal This tool serves to extract the piston pin.	
Standard tool commonly found	Tool for valve oil seal removal This tool serves to extract the valve oil seal.	
Standard tool commonly found	Ring clamp tool This tool serves to assemble the piston rings and for the subsequent insertion into the cylinder.	
0320097051000	Gear selection drum assembly tool This tool serves to assemble the gear selection drum.	
0320097045000	Flywheel extractor This tool serves to extract the flywheel from the engine shaft.	

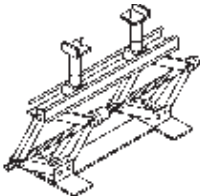
SPECIAL TOOLS

ENGINE SPECIAL TOOLS		
Tool Code	Tool Name-Function	Image
0320097045000	Flywheel cover extractor This tool serves to extract the flywheel housing cover.	
R180197022000	Engine phasing tool This tool serves to determine the position of the top dead centre.	
Standard tool commonly found	Oil filter tool This tool serves to tighten or remove the engine oil filter.	
0320097046001	Chain tensioner lock tool This tool serves to lock the tensioner piston while installing the chain tensioner.	
03200097052000	Tool to remove/assemble the clutch bell ring nut This tool is used to disassemble/assemble of the notched ring nut, which clamps the clutch bell.	
0320097050000	Valve spring compressor tool This tool is used to remove the valve springs.	
Standard tool commonly found	Measuring tool commonly found This tool is used to measure the inner dimensions of bores.	

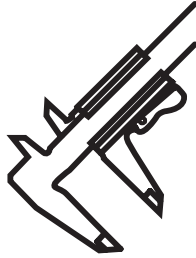
SPECIAL TOOLS

ENGINE SPECIAL TOOLS		
Tool Code	Tool Name-Function	Image
Standard tool commonly found	Measuring tool commonly found This tool is used to measure the external dimensions of parts.	
Standard tool commonly found	Measuring tool commonly found This tool is used to measure thicknesses.	
0320097044000	Flywheel assembly tool This tool serves to tighten the engine shaft flywheel.	
0320097043000	Tool to remove the magnetic cap from the alternator cover This tool serves to unscrew the magnetic cap of the alternator cover.	
03200097053000	Toothed wrench for clutch bell lock This tool is used to disassemble the clutch bell.	

SPECIAL TOOLS

SPECIAL FRAME TOOLS		
Tool Code	Tool Name-Function	Image
R180297129000	Tool to tighten the steering sleeve lock nut This assembled tool is used to tighten the lock nut securing the steering head.	
Standard tool commonly found	Tool to tighten the front wheel axle pin This tool serves to tighten the front wheel axle pin.	
Standard tool commonly found	Tool to extract the rear swing arm bearings This tool serves to extract bearings.	
Standard tool commonly found	Jack It allows to lift the frame and the engine.	

A large, faint, circular watermark of the Benelli logo is centered on the page. The logo features a green laurel wreath encircling a central emblem. The emblem consists of three stars at the top and a lion standing on a pedestal at the bottom. The word "Benelli" is written in a bold, sans-serif font across the middle of the wreath.

**2****SPEC.**

CHAPTER 2

SPECIFICATIONS

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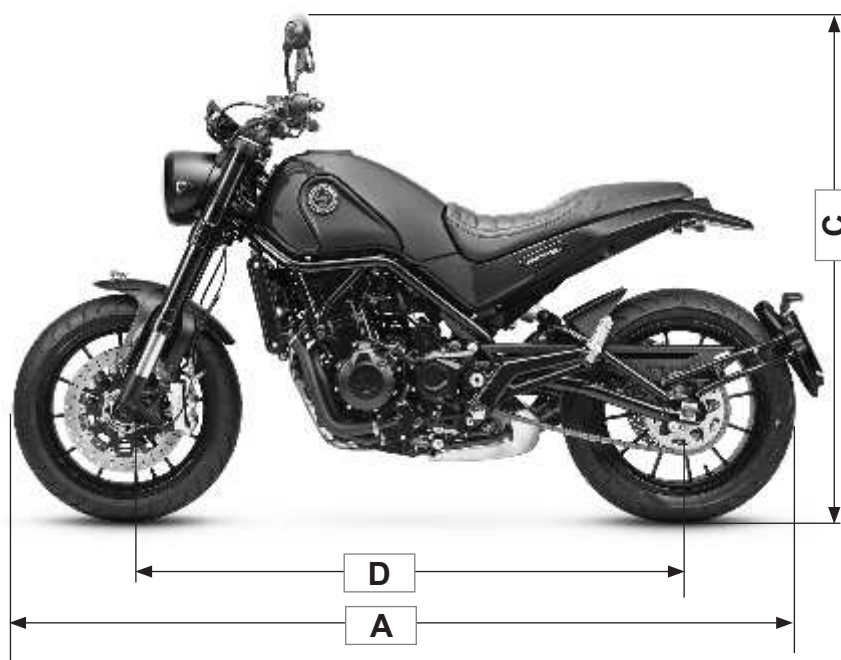
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GENERAL SPECIFICATIONS

SIZE	STANDARD
Overall length (A)	2160 mm
Overall width (B)	875 mm
Overall height (C)	1160 mm
Wheelbase (D)	1460 mm
WEIGHT	STANDARD
Kerb weight (with oil and fuel tank full)	207 kg
Maximum permissible load capacity (with rider and load)	397 kg





TECHNICAL DATA

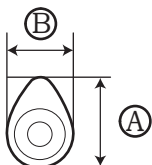
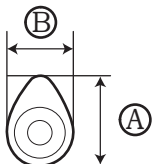
ENGINE SPECIFICATIONS

ENGINE	STANDARD
Type of engine	4 stroke, 2 cylinders in line, liquid cooling, 8 valves
Cubic capacity	499.6 cc
Number of cylinders	2
Cylinder layout	In line
Inside diameter × stroke	69x66.8 mm
Compression ratio	11.5:1
Idle speed	1400-1600
Distribution	Double overhead camshaft, chain control, with 4 valves per cylinder
Maximum net power	35 k/850 rpm (47.6 C.)
Max. net torque	45 N.m (4.58 Kgm) /6000 rpm
FUEL	STANDARD
Recommended fuel	premium unleaded petrol RON 95 min
ENGINE OIL	STANDARD
Lubrication system	forced, wet sump
Total amount	3 l
Amount without oil filter cartridge replacement	2.8 l
Amount with oil filter cartridge replacement	3 l
Recommended oil:	SAE 10W-50 API SJ-JASO
OIL FILTER	STANDARD
Oil filter type	Cartridge
OIL PUMP	STANDARD
Oil pump type	Lobe
Clearance between the inner and outer rotor tips	0.25 mm max
Clearance between outer rotor and oil pump	0.2 mm max
STARTING	STANDARD
Ignition system type	electrical



TECHNICAL DATA

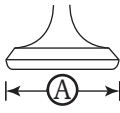
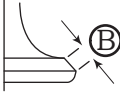
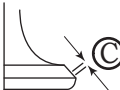
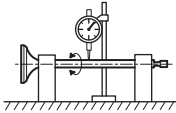
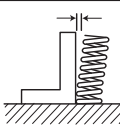
ENGINE SPECIFICATIONS

SPARK PLUGS	STANDARD
Model (make) x quantity	NGKCR8E
Spark plug gap	0.7 ÷ 0.8 mm
CYLINDER HEAD	STANDARD
Head gasket maximum warping	0.03 mm
CAMSHAFTS	STANDARD
Control system	chain transmission
Camshaft diameter	Ø 22.957-22.97 mm (Limit 22.94 mm)
Clearance between support and camshaft follower	0.03 - 0.060
Clearance between camshaft and camshaft seat	0.02-0.050mm
Camshaft radial clearance	0.01mm (Limit 0.02mm)
Camshaft lobe dimensions, intake side 	Size "A"= 31.95 mm Size "B"= 25.05 mm
Camshaft lobe dimensions, exhaust side 	Size "A"= 31.95 mm Size "B"= 25.05 mm
Maximum camshaft eccentricity 	0.05 mm (0.0019 in)
FUEL	STANDARD
Recommended fuel	premium unleaded petrol RON 95 min
DISTRIBUTION CHAIN	STANDARD
Automatic tensioning	system



TECHNICAL DATA

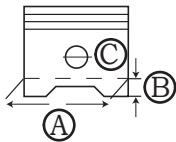
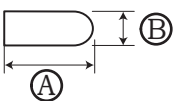
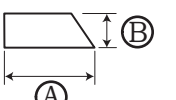
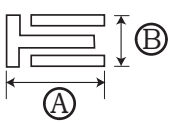
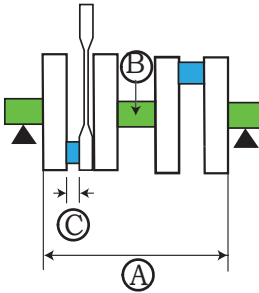
ENGINE SPECIFICATIONS

VALVES, VALVE SEATS, VALVE GUIDES		STANDARD
Intake valve clearance (cold)		0.15 ~ 0.20 mm
Exhaust valve clearance (cold)		0.20 ~ 0.25 mm
VALVE SIZE		
 Head "A" diameter	Intake	Ø 25 mm
	Exhaust	Ø 22 mm
 Ground surface width "B"	Intake	1.9 ~ 2.1 mm
	Exhaust	1.75 ~ 1.95 mm
 Contact bands width "C"	Intake	1 ~ 1.1 mm
	Exhaust	1 ~ 1.1 mm
Valve stem diameter	Intake	3.965 ~ 3.98 mm
	Exhaust	3.965 ~ 3.98 mm
Clearance between valve stem and valve guide	Intake	0.03 ~ 0.045 mm
	Exhaust	0.035 ~ 0.05 mm
 Valve stem eccentricity		0.01 mm
VALVE SPRINGS		STANDARD
Intake/exhaust effective length	Intake	38.8 mm
	Exhaust	41.6 mm
	Intake	1.2 mm
	Exhaust	1.2 mm
CYLINDERS		STANDARD
Cylinder layout		parallel inline
Bore		69.00-69.01mm (limit 69.02mm)
Compression ratio		11.5:1
Maximum ovalization		0.05
Maximum taper		0.05



TECHNICAL DATA

ENGINE SPECIFICATIONS

PISTON		STANDARD
Clearance between piston and cylinder		0.03 ~ 0.05 mm
	Piston diameter "A"	$\varnothing 69 \begin{smallmatrix} - 0.002 \\ - 0.003 \end{smallmatrix}$ mm
	Piston height "B"	25 mm
	Pin seat diameter "C"	$\varnothing 17 \begin{smallmatrix} + 0.002 \\ + 0.003 \end{smallmatrix}$ mm
Piston pin outside diameter		$\varnothing 17 \begin{smallmatrix} 0 \\ - 0.008 \end{smallmatrix}$ mm
Top band		
	Band type	elastic
	Overall dimensions "B" X "A"	1 x 2.45 mm
2nd band		
	Band type	elastic
	Overall dimensions "B" X "A"	1 x 2.50 mm
Oil scraper ring		
	Overall dimensions "B" X "A"	0.30X1.70 mm 1,30X1,90 mm
CONNECTING RODS		STANDARD
Bearing colour codes		A = Red B = Blue C = Yellow
Rod weight code		K1 = Black K2 = Green K3 = White K4 = Brown K5 = Orange
DRIVE SHAFT		STANDARD
		
Width "A"		133.10 mm
Diameter "B"		37.99 - 37.95 mm
Side clearance of connecting rod big end "C"		0.1 - 0.25
Main bearing colour code		A = Red B = Blue C = Yellow



TECHNICAL DATA

ENGINE SPECIFICATIONS

CLUTCH	STANDARD
Clutch type	oil bath clutch, multiple discs
Clutch release method	wire cable and spring
Clutch release action	wire cable action
Operation	with left handlebar lever
Clutch cable clearance (at the ends of the clutch lever)	2 ~ 3 mm
Friction plate thickness	2.8 ± 0.05 mm - 3 (0. - 0.1) mm
Number of friction plates	8
Steel disc thickness	1.6 (0. - 0.05) mm
Steel disc thickness	7
Disc pack thickness	11.2 mm
Max. warping	0.05 mm
Friction spring effective length	40 ± 0.01 mm
Spring quantity	4
TRANSMISSION	STANDARD
Transmission type	Straight tooth gear
Main reduction ratio	41/71
Secondary reduction system	
Transmission ratio	Chain, ratio 14:43
1st	13-37
2nd	19-37
3rd	18-28
4th	24-32
5th	21-25
6th	24-26
GEAR CONTROL MECHANISM	STANDARD
Type of gear control mechanism	sequential with desmodronic drive and pre-selector
Maximum warp on gear control rod	Straightness 0.02 Roundness 0.005
AIR FILTER	STANDARD
Air filter type	PAPER
FUEL PUMP	STANDARD
Pump type	electric pump
Model (make)	Delphi
Output pressure	250 KPa
THROTTLED BODIES	STANDARD
Diameter	37 mm
Accelerator cable clearance (at the accelerator handgrip flange)	2-3 mm



TECHNICAL DATA

FRAME SPECIFICATIONS

FRAME		STANDARD
Frame type		Front one with steel pipe truss and rear one with steel pipes
FRONT WHEEL		STANDARD
Wheel type		Aluminium alloy
Rim	Size	17 M/C x MT 3.50 DOT-D
	Material	aluminium
Wheel travel		125 mm
REAR WHEEL		STANDARD
Wheel type		Aluminium alloy
Rim	Size	17 M/C x MT4.50 Dot -D
	Material	aluminium
Wheel travel		128 mm
FRONT TYRE		STANDARD
Tyre type		tubeless
Size		120/70ZR17 M/C(58W)
Model (manufacturer)		N/A
Cold tyre pressure		2.20 KPa
REAR TYRE		STANDARD
Tyre type		tubeless
Size		160/60ZR17 M/C (69) W
Model (manufacturer)		N/A
Cold tyre pressure		2.50 KPa



TECHNICAL DATA

FRAME SPECIFICATIONS

FRONT BRAKE		STANDARD	LIMIT
Brake type		half-floating double disc brake	
Activation		use right hand	
Recommended liquid		DOT 4	
Brake discs 	Diameter × Thickness	320 x 5 mm (12.5 x 0.15in)	
	Minimum thickness		4.5mm (0.17in)
	Maximum deformation		0.15mm
	Thickness of worn brake pads	4 mm (0.15 in)	1 mm (0.039 in)
Inside diameter of pump cylinder		16 mm (0.62in)	
Inside diameter of calliper cylinder		34 and 34 mm (1.33 and 1.33 in)	
REAR BRAKE		STANDARD	LIMIT
Brake type		1 single disc brake	
Activation		use right foot	
Recommended liquid		DOT 4	
Brake discs 	Diameter × Thickness	260 x 5 mm	
	Minimum thickness		4.5mm (0.17 in)
	Maximum deformation		0.15mm (0,006 in)
	Thickness of worn brake pads	4 mm (0.15 in)	1 mm (0.039 in)
Inside diameter of pump cylinder		12 mm -12.7 mm	
Inside diameter of calliper cylinder		34 mm	



TECHNICAL DATA

FRAME SPECIFICATIONS

FRONT SUSPENSION		STANDARD
Suspension type		Upside-down fork with 50 mm diameter tubes
Wheel travel		125 mm
Spring	Free length	295 mm
	Shim length	137 mm
	Flexibility (K1)	8.6 Nm
	Spring stroke (K1)	0 ~ 120mm (0 ~ 4.72in)
Fork oil	Recommended oil	SAE 7.5 Marzocchi 19
	Quantity for tube	770cc.
	Level (from the top of the external tube, with the external tube totally compressed and without the fork spring)	95 mm
STEERING		STANDARD
Steering bearings type		ball bearing
Angle from one end of stroke to the other (left)		30°
Angle from one end of stroke to the other (right)		30°



TECHNICAL DATA

FRAME SPECIFICATIONS

REAR SUSPENSION		STANDARD
Suspension type		Steel-alloy swing arm, GAS shock absorber with adjustable hydraulic extended and preloaded spring
Shock absorber travel		45 mm
Spring	Free length	178+/- 1.5 mm
	Shim length	167+/- 1.5 mm
	Flexibility (K1)	16 Nm
	Spring stroke (K1)	42+/- 1 mm
Gas standard pressure		1200 kPa (12 bar)
Spring preload adjustment positions	Minimum	0
	Standard	0
	Maximum	5 mm (0.19in)
Rebound damping adjustment positions	Minimum*	0
	Standard*	4 clicks from fully closed
	Maximum*	- 30
* from the fully retracted position		
TRANSMISSION CHAIN		STANDARD
Model (manufacturer)		Benelli
Number of links		N/A
Slackness of transmission chain		N/A



TECHNICAL DATA

ELECTRICAL SPECIFICATIONS

SYSTEM VOLTAGE	STANDARD
System voltage	12 V
IGNITION COILS	STANDARD
Wheel type	Aluminium alloy
Wheel travel	125 mm
REAR WHEEL	STANDARD
Model (manufacturer)	QJ
Resistance of primary coil	0.65 ± 0.07 Ohm
Resistance of secondary coil	4 ± 0.5 kOhm
Inductance of primary coil	1.8 mH
Inductance of secondary coil	4.7 H
Max. permissible current value	10 A
CHARGING SYSTEM	STANDARD
System type	AC Magnetic
Model (manufacturer)	QJ
Rated Power	12 V at 4000 rpm
Voltage adjustment	$13.5 + 0.5$ V (3000 rpm 25 C°)
STARTING RELAY	STANDARD
Model (manufacturer)	QJ
Amperage	100 A
Coil resistance	4.4 Ohm at 20°C
BATTERY	STANDARD
Model (manufacturer)	YTX9-BS
Voltage of battery capacity	12 V 8 Ah
CCA inrush current	120A
HEADLAMP	STANDARD
Type of headlamp	LED
LAMPS (VOLTAGE WATT x QTY)	STANDARD
Headlamps (High/Dipped beam)	LED
Front position indicator light	LED
Rear position indicator light/brake light	LED
Indicator lights	LED
License plate light	12 V 5 W x 1
Instrument panel light	LED x 1
LIGHTS (VOLTAGE WATT x QTY)	STANDARD
Neutral indicator light	LED x 1
High beam indicator light	LED x 1
Oil level warning light	LED x 1
Indicator light	LED x 1
Engine fault signal light	LED x 1



TECHNICAL DATA

ELECTRICAL SPECIFICATIONS

ELECTRIC IGNITION SYSTEM	STANDARD
Model (manufacturer)	QJ
Power output	0.7kw
HORN	STANDARD
Horn type	low
Model (manufacturer)	QJ
Maximum amperage	3 A
Performance	105~ 118db (A)
FLASHERS RELAY	STANDARD
Relay type	Electronic Flasher
Model (manufacturer)	QJ 600 45 Flasher
Flashing frequency of indicator lights	80 ~160cycle/min
Watt	130 mA x4
OIL PRESSURE SENSOR	STANDARD
Model (manufacturer)/Setting	0.05 ± 0.015MPa



TECHNICAL DATA

ELECTRICAL SPECIFICATIONS

FUSES (amperage×quantity)	STANDARD
Fuse CD1 (ECU)	15 A (Blue)
Fuse lights	15 A (Blue)
Service fuse	15 A (red)
Fuse of the radiator fan	15 A (Blue)
Ignition coil fuse	10 A (Blue)
Fuel pump fuse	15 A (Blue)
ABS motor fuse	40 A (Blue)
THROTTLED BODY SENSOR	STANDARD
Model (manufacturer)	TGKEYAIR
Resistance	2 KOhm ± 20%
FUEL PUMP	STANDARD
Max. amperage/Pressure	2 ± 0.5 A /3 bar
Level sensor	external
Min./Max. resistance	90-95 Ω (empty) - (full) 0-18Ω
SAFETY SWITCHES	STANDARD
Stand switch	N/A
Neutral switch	QJ
Tilt	QJ 250T-3(QJ)
AIRBOX AIR TEMPERATURE SENSOR	STANDARD
Model (manufacturer)	12160244 (PACKARD)
Resistance	181±8 Ohm 100°C
THROTTLED BODY AIR PRES-SURE SENSOR	STANDARD
MODEL (manufacturer)/Power supply voltage	240600695(DELPHI) /5V



TECHNICAL DATA

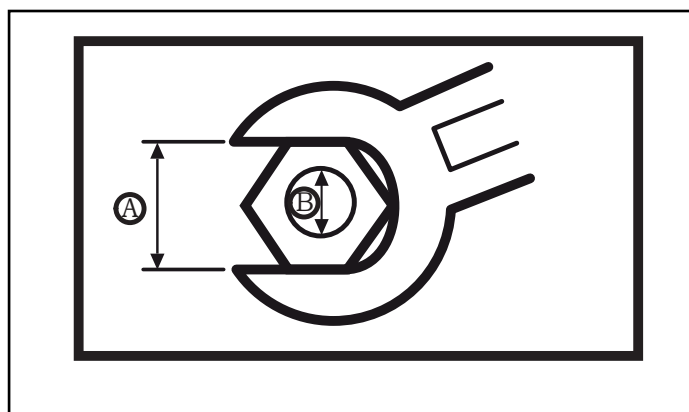
ELECTRICAL SPECIFICATIONS

FLUID TEMPERATURE SENSOR	STANDARD
Model (manufacturer)	WC -12A (QJ)
Resistance	100 °C 178 Ohm
SPEED SENSOR	STANDARD
Model (manufacturer)/GAP	1.1 mm - 2.2 mm
OXYGEN SENSOR	STANDARD
Model (manufacturer)	OSM (Delphi)
INJECTOR	STANDARD
Model (manufacturer)	Mini (Delphi) 12±1 Ω
RELAY ASSEMBLY	STANDARD
Model (manufacturer)	CM1 NAIS
IGNITION SYSTEM	STANDARD
Ignition system type	BOSCH MSE6.0
Ignition timing	10° before TDC from 900 at 1800 r/min
Phonic wheel sensor (Pick-up)	550±50Ω
Model (manufacturer)	DELPHI
STEPPER	STANDARD
Model (manufacturer)	LOREADA
Stepper type	Dual-phase
RADIATOR FAN	STANDARD
Model (manufacturer)/Electric consumption	Panasonic SSW7109/ 2.76A @ 12V



TECHNICAL DATA

GENERAL TIGHTENING SPECIFICATIONS



The tightness torques for parts or special assemblies are provided in each chapter of this manual.

As far as concerns assemblies with multiple fastening elements, in order to avoid the risk of warping, cross-tighten the parts in successive stages until the required torque is achieved.

Unless otherwise stated, tightness torques refer to parts with clean, dry threads.

Parts must be at ambient temperature.

“B” NUT	GENERAL TIGHTENING TORQUES	
	N.m	Kgf.m
4 mm	2.3	0.23
5 mm	4.5	0.45
6 mm	10	1.01
8 mm	25	2.54
10 mm	45	4.58
12 mm	80	8.15
14 mm	130	13.25
16 mm	200	20.39
18 mm	240	24.47



TECHNICAL DATA

TIGHTENING TORQUES

TIGHTENING TORQUES AND RELEVANT PRELOADS FOR STANDARD CONNECTIONS

The values given in the following table refer to standard tightness, i.e., for metric screws coupled with the relevant nut, or with screw nut in metal.

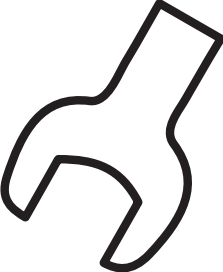
The bodies to be tightened must be metal or sufficiently rigid not to require the insertion of bushing or shims.

Coupling is always made with the thread slightly oiled or greased; alternatively, the type of thread locker required must be stated.

Axial preloads related to tightening torque have increased by 10% compared to the value calculated, to take into account the tolerance on the nominal torque and the variation that the friction coefficient may undergo from tightening to tightening.

SCREW	CLASS 8.8		CLASS 10.9		CLASS 12.9	
	TIGHTENING TORQUE [Nm]	AXIAL PRELOAD [N]	TIGHTENING TORQUE [Nm]	AXIAL PRELOAD [N]	TIGHTENING TORQUE [Nm]	AXIAL PRELOAD [N]
M4 X 0.7	3	3.870	4.2	5.420	5.2	6.710
M5 X 0.8	6	6.350	7.5	7.930	9	9.520
M6 X 1	10	8.860	13	11.520	16	14.180
M8 X 1.25	22	14.900	30	20.330	40	27.100
M8 X 1 (*)	25	17.280	36	24.890	45	31.110
M10 X 1.5	45	24.680	65	35.640	80	43.870
M10 X 1.25 (*)	50	27.870	70	39.013	85	47.380
M12 X 1.75	80	37.640	110	51.750	135	63.510
M12 X 1.5 (*)	85	40.547	120	57.250	145	69.170
M12 X 1.25 (*)	90	43.550	130	62.900	150	72.580
M14 X 2	130	52.670	185	74.800	220	88.950
M14 X 1.5 (*)	150	62.900	205	85.960	245	102.780
M16 X 2	200	74.070	280	103.690	335	124.060
M16 X 1.5 (*)	225	86.140	310	118.680	360	137.820
M18 X 2.5	265	83.650	370	116.790	450	142.040
M18 X 1.5 (*)	320	104.900	450	147.520	550	180.300
M20 X 2.5	390	111.870	550	257.770	650	186.450
M20 X 1.5 (*)	440	130.620	630	187.020	750	222.650
M22 X 2.5	540	141.950	750	197.150	900	236.580
M22 X 1.5 (*)	600	162.750	850	230.560	1.000	271.240
M24 X 3	670	160.238	950	227.203	1.130	270.252
M24 X 2 (*)	750	184.566	1.050	258.392	1.250	307.610

(*) The metric screw named has a fine pitch.

3	PERIOD. INSP. & ADJ.	
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CHAPTER 3

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PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

NOTE:

In general, maintenance needs to be carried out with the motorcycle on the rear stand, engine off and switch set to OFF. While checking fluid levels, it is preferable to keep the motorcycle upright without using the rear stand. Checks need to be made every year, except in cases where maintenance inspections are carried out as part of services linked to mileage. Once at 40,000 (24,854 mi), repeat services, commencing from the 13,000 service (8,077 mi). For interventions relating the items marked, it is advisable to contact a Benelli dealer, given that it is necessary to have specific equipment, information, and technical skills.

The following section shows all of the maintenance operations.

NOTE:

AIR FILTER

- The air filter needs to be replaced more often when using the vehicle in particularly damp or dusty environments.

HYDRAULIC BRAKE MAINTENANCE

- Check brake fluid levels on a regular basis and top up as necessary.
- Every two years, replace the parts inside the brake pump and callipers. Change the brake fluid.
- Replace brake hoses every 4 years, or before if cracked or damaged.

KEY: PERIODIC MAINTENANCE AND LUBRICATION INTERVALS	
I	Inspection and adjustment, cleaning, lubrication or replacement, as needed.
R	Replacement
T	Tighten
☐	Dealer



PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

MAINTENANCE INTERVALS

NO.	Part	Checks or maintenance interventions	0 Km (0 mi) Pre-delivery	1000 Km (621 mi) 1st Service	7,000 Km (3,726 mi) 2nd Service	13,000 Km (7,452 mi) 3rd Service	19,000 Km (11,178 mi) 4th Service	25,000 Km (14,904 mi) 5th Service	Annual inspec- tion
1	Engine oil	Check/Top up/Change	I	R	R	R	R	R	R
			Check every 500 km (310 mi).						
2	Oil filter	Replacement		R	R	R	R	R	
			Or at any engine oil change						
3	Fuel filter	Check/Replacement			I	I	R	I	
4	Air filter	Check/Replacement			R	R	R	R	
5	Cooling fluid	Check/Top up	I	I	I	I	R	I	I
		Replace	Every 2 years or 13,000 km (8,078 mi)						
6	Cooling system	Check the level of the cooling fluid.	I	I	I	I	I	I	I
		make sure there are no leaks							
		of fluid from the vehicle.							
7	Spark plugs	Check/Replacement			I	I	R	I	I
			Check the conditions, clean and restore the spark plug gap.						
8	Transmission chain	Check chain tension. Make sure that the rear wheel is correctly aligned. Clean and grease.		I	I	I	I	I	I
			Every 500 km (310 mi) and after every wash or if the motorcycle was used in the rain.						
9	Chain wheel	Check/Lubricate		I	I	I	I	I	I
			Replace every time the chain is replaced.						
10	Pinion/Retaining washer	Check/Replacement		I	I	I	I	I	I
			Replace every time the chain is replaced.						
11	Fuel circuit hoses	Check for faults and leaks.			I	I	I	R	
			Replace in any case every 3 years.						
12	Brake fluid	Check/Top up	I	I	I	I	I	I	I
	* clutch	Replace	Replace every 2 years.						
13	Front brake/ Rear brake	Check function and fluid level and make sure there are no leaks from the vehicle.	I	I	I	I	I	I	I
14	Brake pads	Check/Replacement		I	I	I	I	I	
			Replace if worn up to limit.						
15	Swing arm chain slide	Check/Replacement		I	I	I	I	I	
			Replace if worn up to limit.						
16	Swing arm chain guide slide	Check/Replacement		I	I	I	I	I	
			Replace if worn up to limit.						
17	Throttle handgrip	Check operation and if necessary, adjust the throttle cable clearance. Lubricate the throttle grip housing and the cable.	I	I	I	I	I	I	I
18	Throttled body	Check operation/Adjust clearance		I	I	I	I	I	
19	Clutch control	Check/Adjustment	I	I	I	I	I	I	I
20	Throttled body	Check/Adjustment		I	I	I	I	I	



PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

MAINTENANCE INTERVALS

NO.	Part	Checks or maintenance interventions	0 Km (0 mi) Pre-delivery	1000 Km (621 mi) 1st Service	7,000 Km (3,726 mi) 2nd Service	13,000 Km (7,452 mi) 3rd Service	19,000 Km (11,178 mi) 4th Service	25,000 Km (14,904 mi) 5th Service	Annual inspec- tion
21	Valve clear- ance	Check operation/Adjust clearance						I	
			Check clearance every 25,000 km.						
22	Distribution chain	Check/Replacement						R	
			Every 25,000 Km (15,534 m)						
23	Distribution chain slides	Check/Replacement						R	
			Each distribution chain replacement, every 22,000 km (13671 mi)						
24	Distribution chain tensioner	Check/Replacement						R	
			Each distribution chain replacement, every 22,000 km (13671 mi)						
25	Steering ring nut and sleeve	Check/Adjustment	T	T	T	T	T	T	T
26	Steering bearings	Check/Replacement				T		T	
			Lubricate with a lithium-based grease every 19,000 km.						
27	Front/rear wheel bear- ings	Check/Replacement				I		I	
			Every 40,000 km (24900 mi)						
28	Swing arm bearings	Check/Replacement			I	I	I	R	
			Every 25,000 km (14904 mi)						
29	Swing arm	Check operation and make sure there is no excessive is no exces- sive clearance. Lubricate.			I	I	I	I	
30	Front sus- pension	Check function and make sure there are no leaks.		I	I	I	I	I	I
31	Front sus- pension oil	Replacement				R	R		
32	Rear suspen- sion	Check/adjust, make sure that there are no leaks.			I	I	I	I	
			Before every use of the vehicle.						
33	Wheels	Make sure they are not off centre or damaged.				I	I	I	
			Every 19,000 Km (11,806 m)						
34	Tyres	Check the depth of tread and make sure they are not damaged. Replace, if necessary. Check inflation pres- sure. Adjust, if necessary.		I	I	I	I	I	I
			Replace if worn to the limit.						
35	Side stand	Check/Operation	I	I	I	I	I	I	I
36	Switch Side stand	Check/Operation	I	I	I	I	I	I	I
37	Instruments, lights, indica- tor lights, and switches	Check/Operation	I	I	I	I	I	I	I
38	Headlamp	Check/Operation Adjustment	I	I	I	I	I	I	
			At every change in vehicle set-up						
39	Horn	Check/Operation	I	I	I	I	I	I	I
40	Instrumen- tation	Check/Operation	I	I	I	I	I	I	I
41	Battery connections	Check/Operation	I	I	I	I	I	I	I



PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

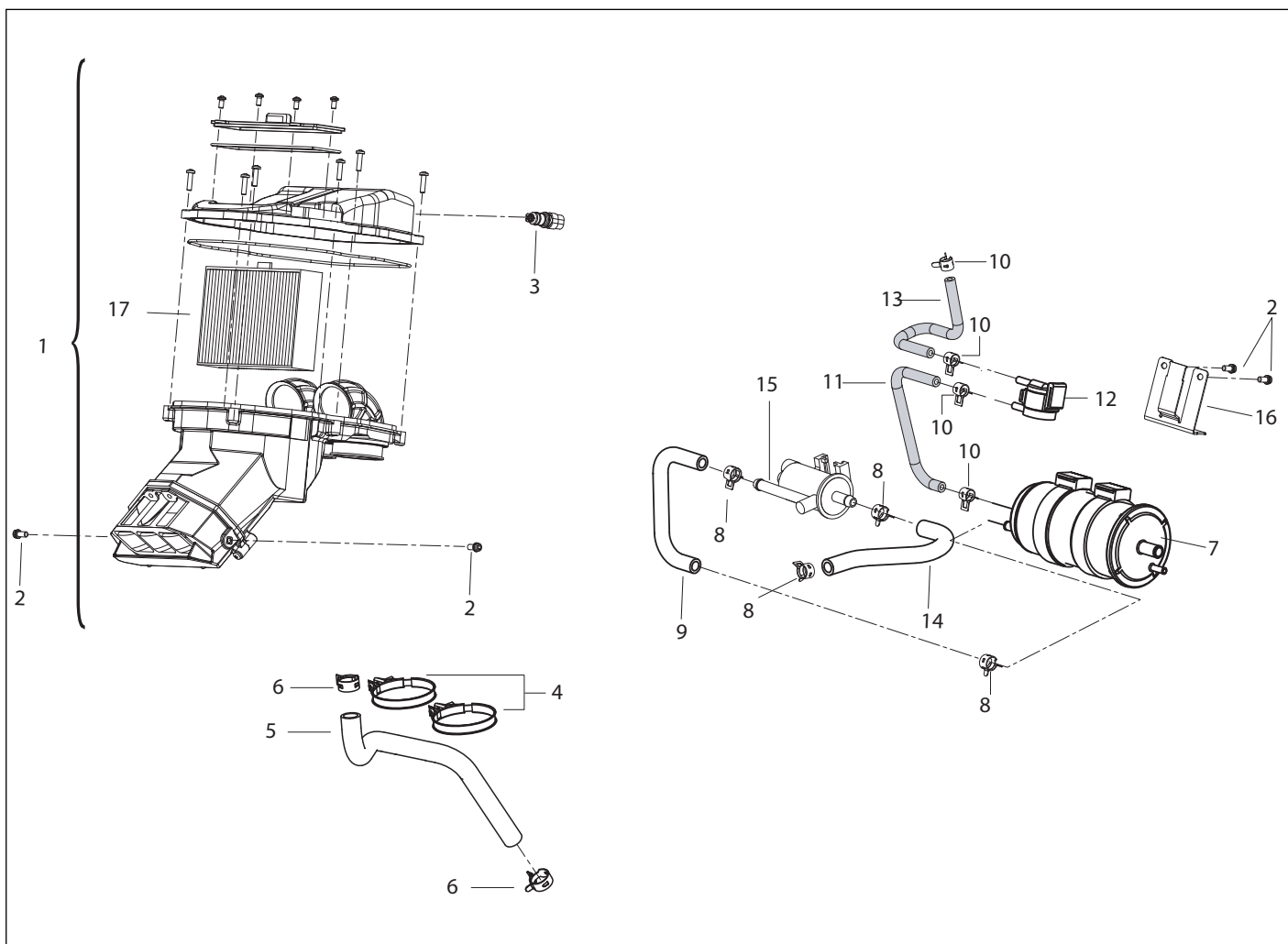
MAINTENANCE INTERVALS

NO.	Part	Checks or maintenance interventions	0 Km (0 mi) Pre-delivery	1000 Km (621 mi) 1st Service	7,000 Km (3,726 mi) 2nd Service	13,000 Km (7,452 mi) 3rd Service	19,000 Km (11,178 mi) 4th Service	25,000 Km (14,904 mi) 5th Service	Annual inspec- tion
42	Electrical System	Check/Operation	I	I	I	I	I	I	I
43	Ignition switch	Check/Operation	I	I	I	I	I	I	I
44	Electric fans	Check/Operation	I	I	I	I	I	I	I
45	Fuel /CO*	Check	I	I	I	I	I	I	I
46	Chassis fasteners	Make sure all nuts, bolts and screws are correctly tightened.		T	T	T	T	T	T
47	Oil sump screws	Replacement		T	T	T	T	T	
48	Clutch cover screws	Replacement		T	T	T	T	T	
49	Catalytic converter	Check for faults and leaks.		I	I	I	I	I	
50	Canister USA version	Check for faults and leaks.		I	I	I	I	R	
51	Brake/clutch hoses	Check for faults and leaks.		I	I	I	I	I	I
52	Parts and wires subject to movement	Check/Replacement	I	I	I	I	I	I	I
53	Oil intake filter	Check/Replacement			I	I	I	I	



ENGINE/AIR BOX

AIR BOX REMOVAL /INSTALLATION



Pos.	Description	Qty	Sq.	SYMBOLS	CONTENTS DESCRIPTION	REMARKS
1	COMPLETE AIR FILTER BOX					
2	SCREW					
3	AIR TEMPERATURE SENSOR					
4	SCREW BAND					
5	HOSE					
6	HOSE HOLDER CLIP					
7	CARTRIDGE FILTER					
8	SPRING BAND					
9	HOSE					
10	SPRING BAND					
11	HOSE					
12	NON-RETURN VALVE					
13	HOSE					
14	HOSE					
15	VALVE					
16	PLATE					
17	AIR FILTER					



ENGINE/AIR FILTER

AIR FILTER REMOVAL/INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

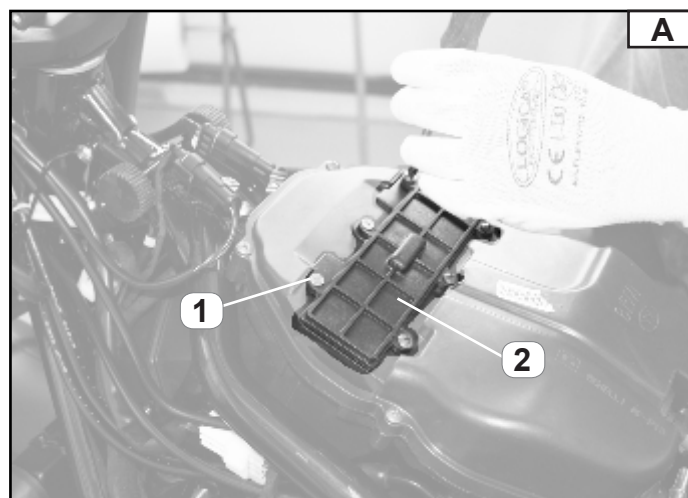
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Fuel tank, refer to the section “**Fuel tank removal, Chapter 4**”.
- The screws (1) Fig. A.
- The cover (2) Fig. A.

Remove:

- The protection mesh (3) Fig. B.
- The filter element (4) Fig. B.



IMPORTANT NOTICE

Replace filter element every 6,000 km. If the vehicle is used in particularly humid climates or in very dusty areas, the air filter must be substituted more often.

Check:

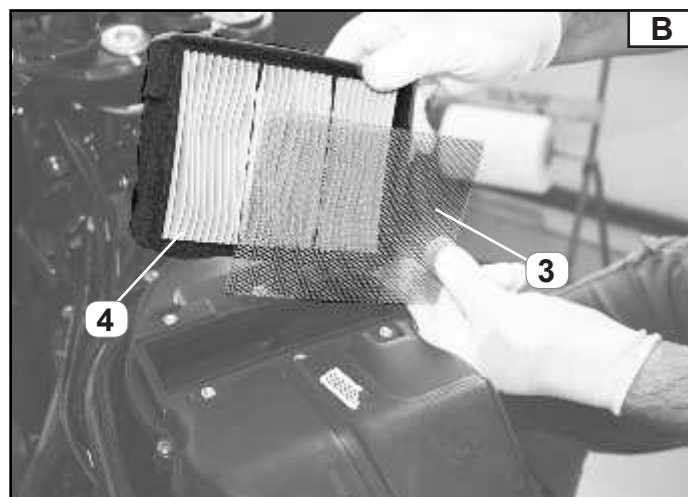
If the filter element is damaged, replace.

Installation:

1. During the installation stage, follow the steps for removing the filter, as described above, only this time in reverse order.

IMPORTANT NOTICE

During the installation stage, be careful to assemble the filter and mesh in the direction show in Fig. B.



WARNING

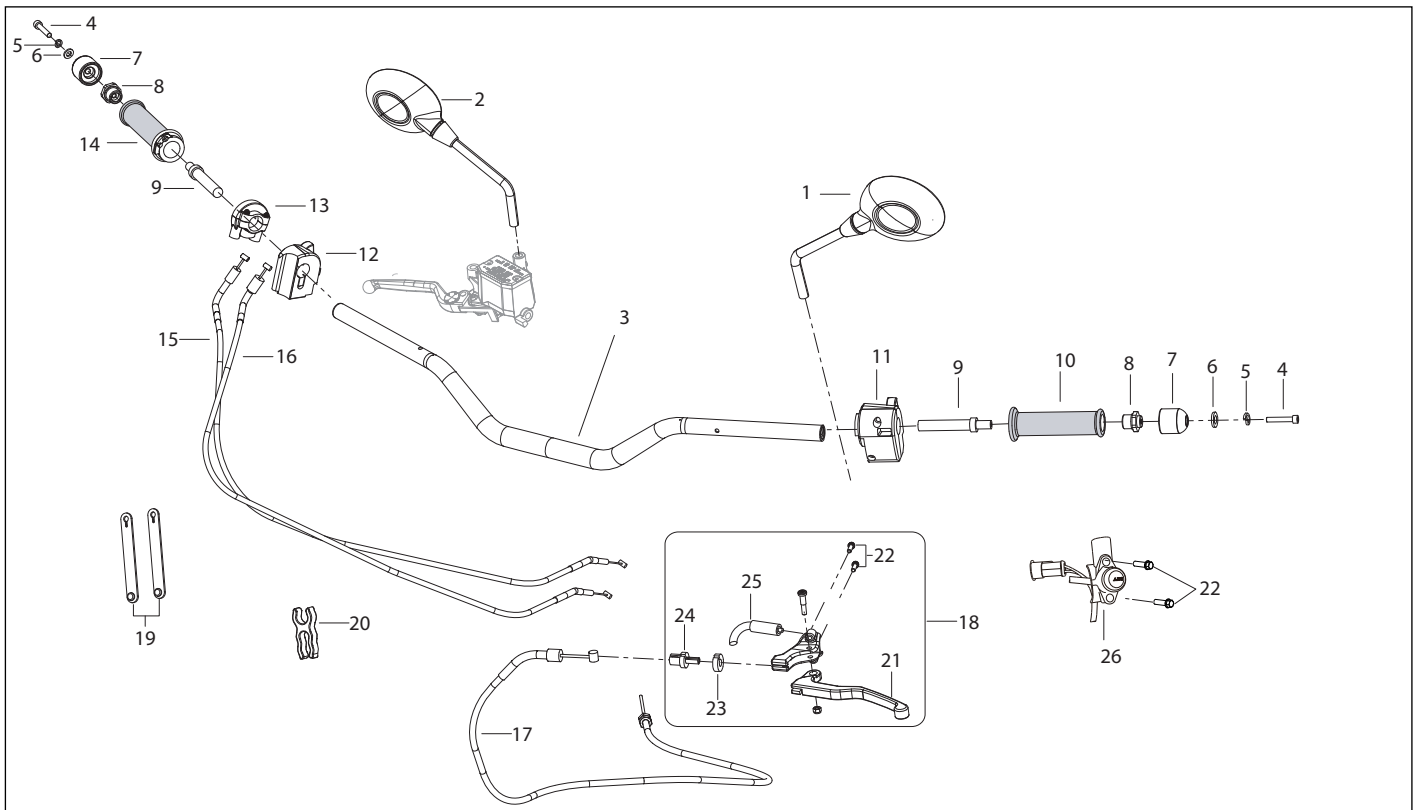
Never start the engine if the air filter is not mounted. Unfiltered air causes rapid wear to engine parts and might damage the engine. Furthermore, using the engine without air filter has a negative impact on the fine tuning of the throttles and this will worsen of engine performance, as well as causing engine overheating.

Therefore ensure that the air filter is always in a good condition.

The engine life depends mainly on this part.

ENGINE/THROTTLE CABLE CLEARANCE

THROTTLE CABLE CLEARANCE ADJUSTMENT



Pos.	Description	Qty	Sq.	SYMBOLS	CONTENTS DESCRIPTION	REMARKS
1	REAR-VIEW MIRROR (LEFT)					
2	REAR-VIEW MIRROR (RIGHT)					
3	HANDLEBAR					
4	SCREW					
5	ELASTIC WASHER					
6	WASHER					
7	BALANCE BLOCK					
8	HANDGRIP CAP					
9	HANDGRIP END					
10	LEFT HANDGRIP					
11	LEFT LIGHTS SWITCH					
12	RIGHT LIGHTS SWITCH					
13	ACCELERATOR CONTROL					
14	RIGHT HANDGRIP					
15	ACCELERATOR OPENING CABLE					
16	ACCELERATOR CLOSURE CABLE					
17	CLUTCH CABLE					
18	CLUTCH CONTROL					
19	RUBBER BAND					
20	CABLE GLAND					
21	CLUTCH CONTROL LEVER					
22	SCREW					
23	SPECIAL NUT					
24	SPECIAL SCREW					

ENGINE/THROTTLE CABLE CLEARANCE

THROTTLE CABLE CLEARANCE ADJUSTMENT

Pos.	Description	Qty	Sq.	SYMBOLS	CONTENTS DESCRIPTION	REMARKS
25	CLUTCH SWITCH					
26	ABS SWITCH					

ENGINE/THROTTLE CABLE CLEARANCE

THROTTLE CABLE CLEARANCE ADJUSTMENT

NOTE:
 Before adjusting the throttle cable clearance, it is necessary to set the idle state of the engine.
 Check initially at 1000 km (621 mi) and then every 600 km (6,213 mi).

Check:

- The throttle cable clearance (1)**
 Make sure the throttle handgrip works smoothly. Furthermore, check that the max opening position and the automatic closing one can be reached in any steering position. If outside range, adjust, Fig. A.



Throttle cable clearance (A)	Dimensions
Throttle cable	2 - 3 mm

Adjust:

- throttle cable clearance.

Handlebar side

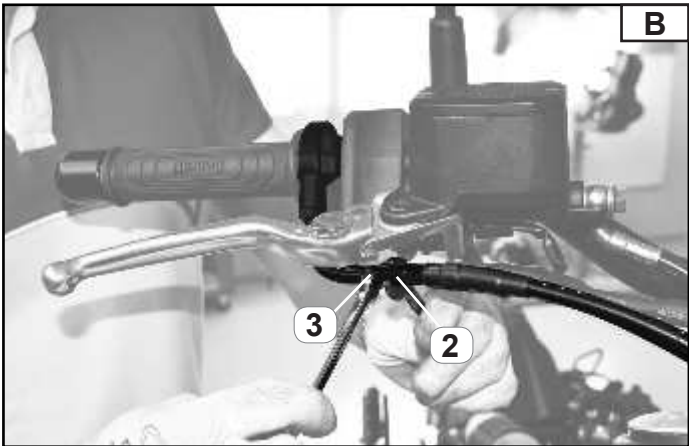
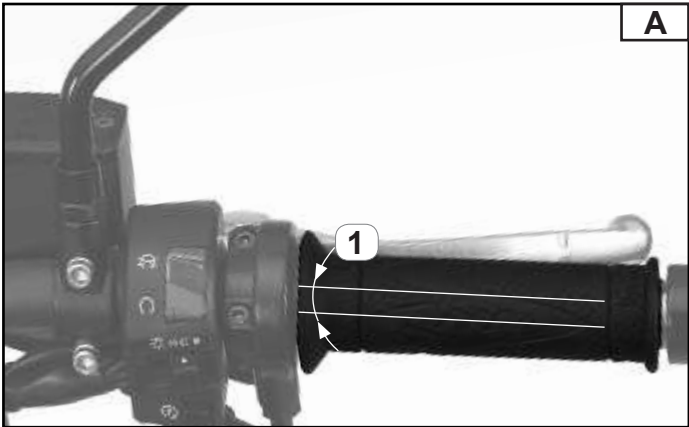
- Loosen the locknut "2".
- Turn the adjustment nut "3" clockwise or anticlockwise until the throttle cable clearance meets specifications, Fig. B.

Throttle cable clearance	Clearance
Clockwise	Increases clearances
Counter-clockwise	Reduces clearance

3. Tighten the lock nut "2".
 Make the adjustment to both acceleration controls.

WARNING

After adjusting the throttle cable clearance, start the engine and turn the handlebar right and left, making sure that the minimum idle speed of the engine does not change.

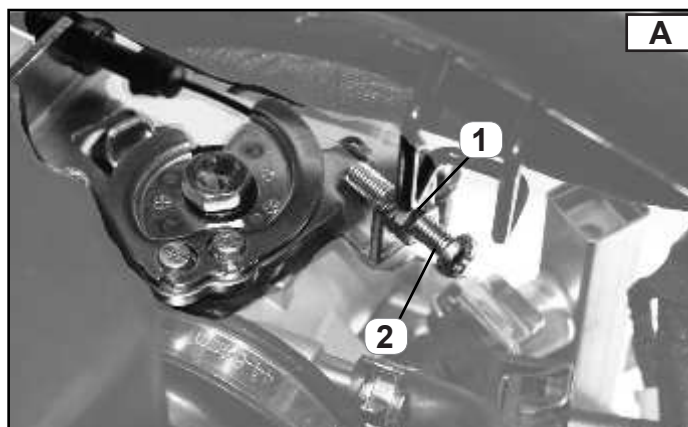


ENGINE/THROTTLE CABLE CLEARANCE

ADJUSTMENT OF IDLE SPEED

Check:

- Start the engine and let it warm up.
- Loosen the lock nut "1" and turn the adjustment screw "2" until the engine turns over at the right idle speed. Fig. A
- Accelerate and decelerate a few times to make sure the idle speed is within the indicated range. Adjust again, if necessary.



Throttle cable clearance	mm
Throttle cable clearance (at throttle handgrip flange).	3 ~ 5 mm (0.11 ~ 0.19 in)



Idle speed	rpm
STANDARD	1,400 -1,600

WARNING

If the handlebar movement leads to variations in the idle speed, the throttle cables may be adjusted or routed improperly or be damaged.

Correct these anomalies before use.

IMPORTANT NOTICE

The use of the vehicle with damaged or improperly adjusted/ routed cables may jeopardize driving safety.

ENGINE/CLUTCH CABLE

CLUTCH CABLE CLEARANCE ADJUSTMENT

Check:

- The clutch cable clearance (1) Fig. A.
- If outside range, adjust.



Clutch cable clearance	Clearance distance
Clutch lever (1)	3 - 4 mm

Adjust:

- Clutch cable clearance.

Handlebar side

- Move the clutch cable cowl.
- Loosen the ring nut "2".
- Turn the adjustment nut "3" clockwise or anticlockwise until the clutch cable clearance meets specifications, Fig. B.

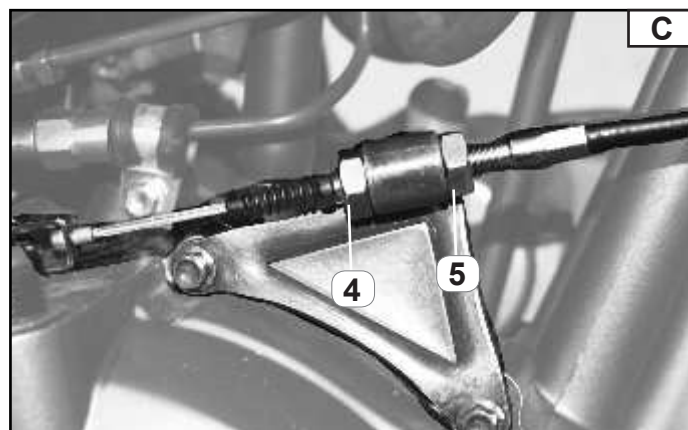
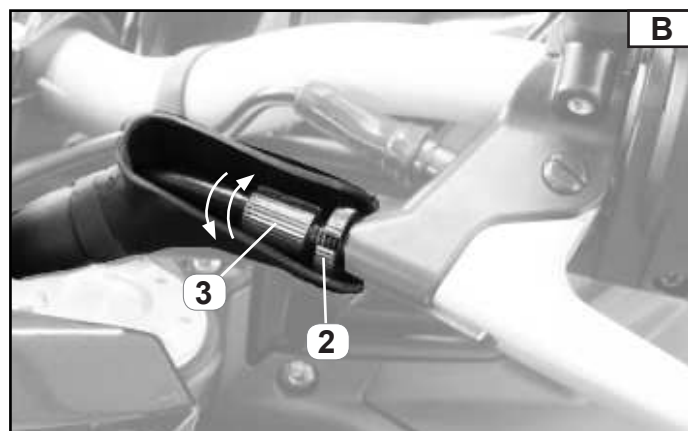
Clutch cable clearance	Clearance
Clockwise	Increases clearances
Counter-clockwise	Reduces clearance

- Tightening the ring nut "2" Fig. B.

NOTE:

If the specified clearance of the clutch cable cannot be obtained on the handlebar side, use the adjusting nut on the engine side "E" Fig. C.

- Prise the dust seal in the middle of the clutch cable.
- Loosen the lock nut "4" in the middle of the clutch cable.
- Turn the adjustment nut "5" until the clearance is correct.





FRAME/HANDLEBAR

REAR-VIEW MIRROR ADJUSTMENT

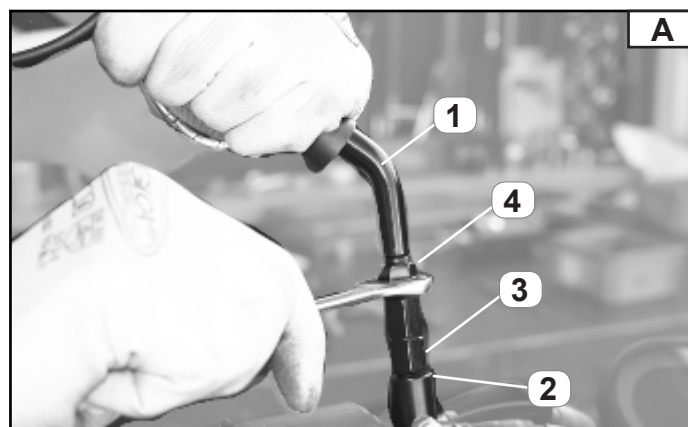
The following procedure refer to both rear-view mirrors.

Install:

1. Screw the mirror (1) on the lever body (2).
2. Move the nut to the end of its travel (3).
3. Adjust the mirror position by turning it to the required position.
4. Tighten the lock nut "4."

NOTE:

Carry out the same procedure also with the right mirror.



ENGINE/ENGINE OIL

ENGINE OIL LEVEL CHECK

Park:

- the motorcycle on a level surface.

NOTE:

- Place the motorcycle on a suitable support.
- Make sure it is in upright position.

Start:

- The engine.

Leave it to warm up for a few minutes and then turn it off.

IMPORTANT NOTICE

Do not start the engine if the oil level is below the MIN level shown on the gauge "1".

Check:

- The engine oil level.

The engine oil level must be within the references of the minimum (MIN) and maximum (MAX) level marks.

If below the minimum level mark, top up to the correct level with the recommended engine oil.



Recommended oil

SAE 10 W-50 API SJ - JASO MA

Adjust:

To top up with engine oil:

- loosen the oil cap with the engine turned off.
- Pour some oil of the recommended type so that the oil level rises to somewhere between the MAX and MIN level marks. Fig. A.

NOTE:

The engine contains approx.ly 3.5 l of oil.
Use oil rated API-SJ SAE 10W/50.

IMPORTANT NOTICE

Owing to the fact that the engine oil lubricates also the clutch, it may cause the clutch slipping if it is not suitable or contains additives. Therefore, it is advisable not to add chemical additives and not to use types of oil other than the one indicated in the table of the engine technical specifications.

The engine oil, whether new or waste, can be hazardous. In case of swallowing, it can be noxious for people and pets. In the event of swallowing, seek medical aid immediately; do not induce vomiting to avoid aspiration of the product into the lungs. Short contacts with the engine oil may irritate skin.

- Keep the engine oil out of reach of children and pets.
- Wear long-sleeve clothing and waterproof gloves when topping up the engine oil.
- Wash with water and soap in the event the engine oil comes into contact with skin.
- Recycle or dispose the waste oil properly.



- Turn the oil cover back to its original position.

NOTE:

To check the engine oil level again, restart the engine, warm it up for some minutes and then turn it off. Wait some minutes to allow the oil to flow downwards.



ENGINE/ENGINE OIL

ENGINE OIL CHANGE

Start:

- the engine and leave it to warm up for a few minutes before switching it off.

Remove:

- the oil filler cap "1" Fig. A.

Position:

- a suitable container underneath the drainage for oil recovery Fig. B.

NOTE:

Oil should first be replaced at 1000 km (621 mi) and then every 6000 km (3,726 mi).

IMPORTANT NOTICE

Waste oil are environmentally unfriendly.

Dispose waste oil according to applicable law.

Remove:

- The magnetic cap "2" (together with the copper seal).

Drain:

- The engine oil from the crankcase.

NOTE:

Replace also the oil filter cartridge.

Replace:

- The magnetic cap seal.

Install:

- The new seal.
- The magnetic cap.

Tighten the magnetic cap to the following torque:



Torque 22 N*m

Fill:

- The crankcase with the recommended engine oil with the specified amount.

Install:

- The oil cap "1" Fig. A.

Start:

- The engine.
- Leave it to warm up for a few minutes and then turn it off.

NOTE:

Always make sure that the level is halfway between the MIN and MAX marks on the gauge "3", Fig. C.

Top up the engine oil, if necessary.

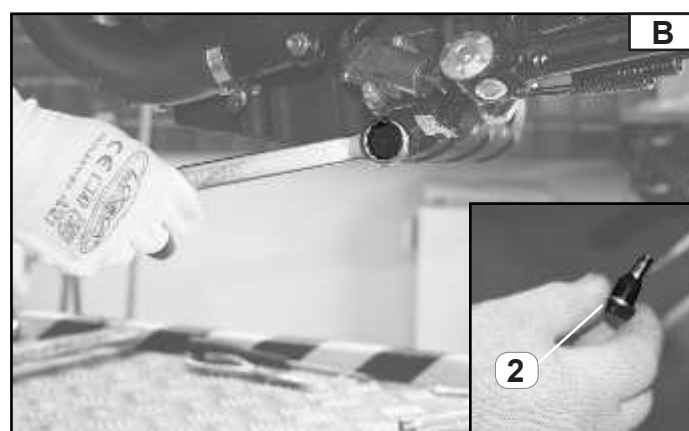
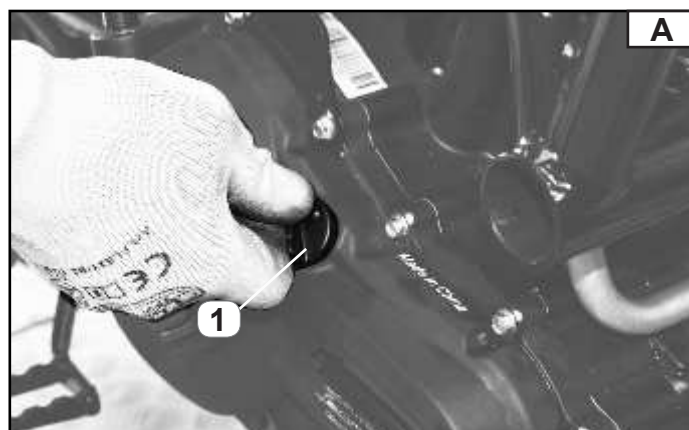
Recommended engine oil:

Rating: API SJ-JASO MA2

Viscosity: 10W50

Capacity: 3 l (without removing the filter)

3.2 l (removing the filter)



D

SAE GRADING

FOR ENGINE OILS RECOMMENDED ACCORDING TO OUTSIDE TEMPERATURES

-35 -30 -25 -20 -15 -10 -5 0 +5 +10 +15 +20 +25 +30 +35 +40 +45 +50

The chart displays the recommended SAE grades for engine oils based on the minimum outside temperature. The temperature scale ranges from -35°C to +50°C in 5°C increments. The oil grades are represented by horizontal bars indicating the temperature range for which each grade is suitable.

SAE Grade	Temperature Range (°C)	Oil Type
SAE 10W	-35 to -5	Standard
SAE 20W	-25 to +5	Standard
SAE 30W	-15 to +15	Standard
SAE 40W	-5 to +25	Standard
SAE 10W - 30	-35 to +15	Multigrade
SAE 10W - 40	-35 to +25	Multigrade
SAE 15W - 60	-20 to +35	Multigrade
SAE 15W - 40 (mineral base)	-10 to +25	Synthetic
SAE 15W - 40 (semi-synthetic base)	-15 to +30	Synthetic
SAE 20W - 60 (semi-synthetic base)	-10 to +35	Synthetic
SAE 5W - 30 (synthetic base)	-35 to +25	Synthetic
SAE 10W - 30 (synthetic base)	-35 to +25	Synthetic



ENGINE/ENGINE OIL

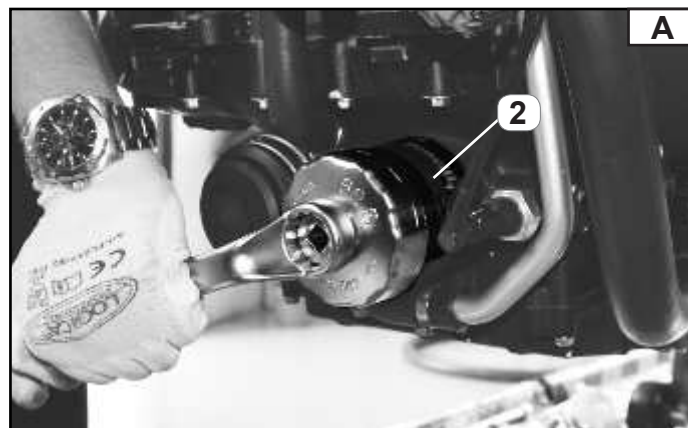
OIL FILTER REMOVAL/INSTALLATION

Removal:

NOTE:

Before removing the oil filter, it is necessary to drain the oil from the engine.

1. Place a suitable container underneath the engine.
2. Use the specific tool (**) to turn the oil filter (2) counter-clockwise and remove it Fig. A.



Installation:

NOTE:

Before installing a new oil filter, apply a small amount of engine oil to the contact surfaces of same to lubricate it Fig. B.

1. Proceed using the opposite order to removal.
Tighten the filter (2) to the following torque:



Torque 22 N*m

IMPORTANT NOTICE

Always use original Benelli oil filters.

Other brands of oil filters can be different in terms of thread (diameter and pitch).

The use of other types of filter may affect the filter performance and duration, which will cause possible damage to the engine or oil leaks.





ENGINE/SPARK PLUGS

REMOVAL OF SPARK PLUGS FROM VEHICLE

The following procedure applies to all spark plugs.

WARNING

Replace and check the spark plugs when the engine is cold.
Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Fuel tank, refer to the section “**Fuel tank removal, Chapter 4**”.
- Airbox, refer to the section “**Airbox removal, Chapter 4**”.

IMPORTANT NOTICE

Before disassembly of spark plug, remove any dirt from the groove of the seats with a stream of compressed air to prevent it from falling into cylinders.

Remove:

- The screw “1.” Fig. A.
- The bracket “2” Fig. A.

Disconnect:

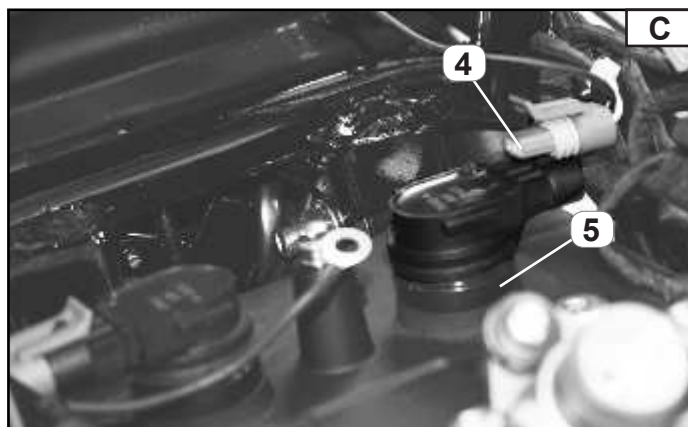
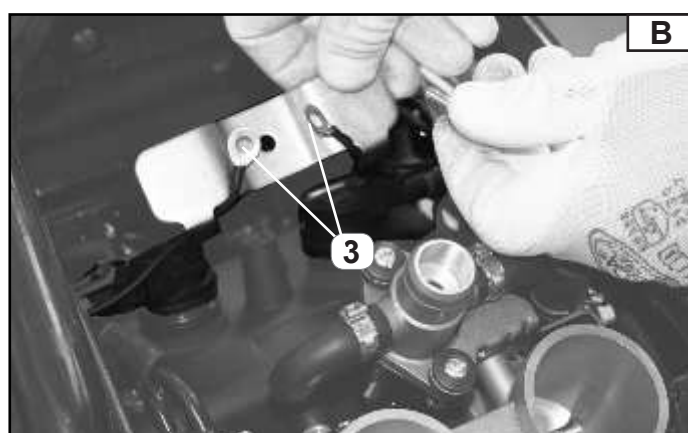
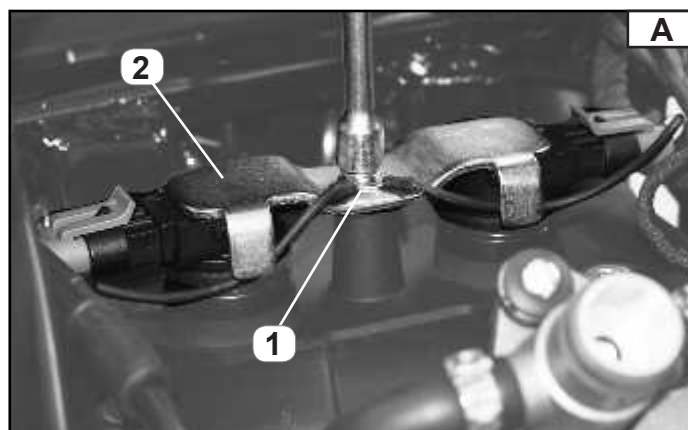
- The ground cables “3” Fig. B.
- The coil connectors “4” Fig. C.
- The rubber tips “5” and the two O-rings.

Slide out:

- The coil.

Screw off:

- The spark plug below Fig. D.



ENGINE/SPARK PLUGS

SPARK PLUG CHECK

The following procedure applies to all spark plugs.

- Check:

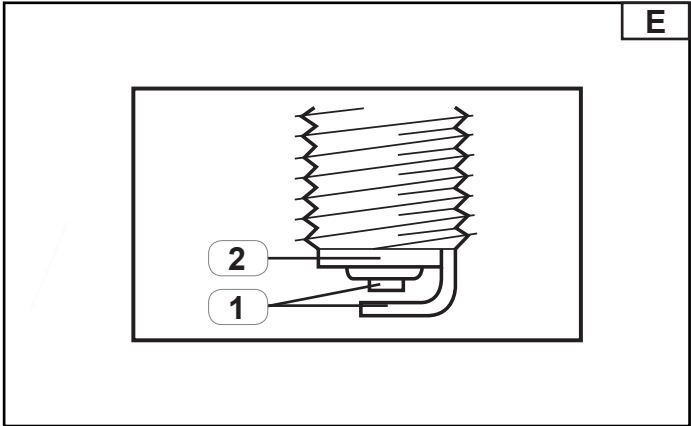
 - The type of spark plug.
- Check:

 - Electrodes (1) Fig. E.
 - If there is any damage, wear or rounding.
- Replace the spark plug.

 - The insulating part (2) Fig. E.
- Abnormal colour.

Replace the spark plug.

Generally, the colour is a light, medium brown.



- Check:

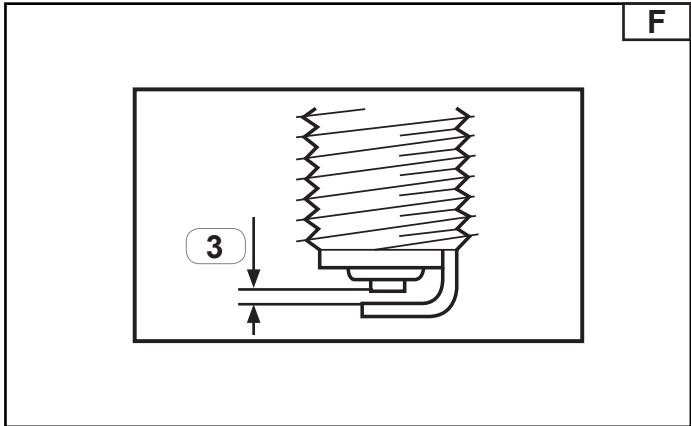
Measure the spark plug gap [D] using a thickness gauge.

If the spark plug gap is not correct, replace the spark plug.

Spark plug gap	(mm)
3	0.8-0.9



Spark plug type
NGK CR8E



ENGINE/SPARK PLUGS

SPARK PLUG CHECK

The following section contains a table with the typical conditions of spark plugs with the different causes of damage and any remedies.

 SOILED SPARK PLUG		 OVERHEATED SPARK PLUG	
Cause	Solutions	Cause	Solutions
Over rich mix of air/fuel -Wrong setting of the carburetion.	The fuel/carburettor system needs to be fine tuned	Ignition too advanced	Adjust advanced ignition
Electrical system fault -Imperfect coil connection	Check the coil connections and relevant impedance	Insuffi cient air/fuel mix	Adjust air/fuel ratio
Specifi c riding conditions -Prolonged periods at "minimum" -Long sections at low speed	Every so often, the bike needs to be taken to speeds of about 80 km/h	Insuffi cient coolant and/or lubricant	Add coolant and/or lubricant
Spark plug too cold	Use a warmer spark plug, as per specifications	Spark plug torque too low	Tighten to the correct torque
		The spark plug used is too hot	Use cooler spark plugs as per specifi cations



ENGINE/SPARK PLUGS

SPARK PLUG INSTALLATION

The following procedure applies to all spark plugs Fig. D.

WARNING

Lubricate the spark plug threads with copper grease.



NOTE:

Before installing it, clean the spark plug and surface in contact with the seal.

Install:

- the spark plug on the head, tightening it by hand until you can feel it come into contact with the base of the head. Tighten to the correct torque.



Torque 12 N*m

Install:

- The coil (1).
- The rubber tips (2) and the O-rings (3) Fig. D.

Connect:

- The coil connector

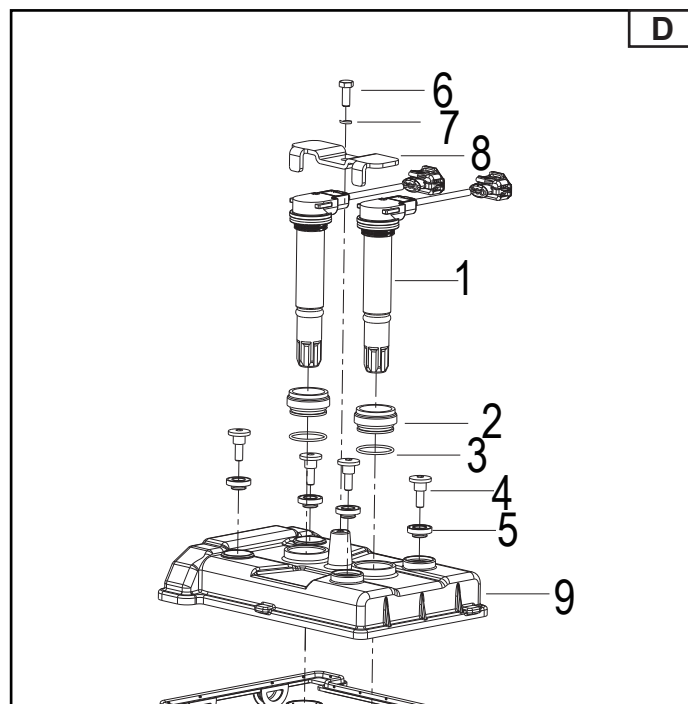
Install:

- The screw (6).
- The washer (7)
- The bracket (8)

Tighten to the torque.



Torque 10 N*m





ENGINE/VALVE CLEARANCE CHECK

VALVE CLEARANCE ADJUSTMENT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Fuel tank, refer to the section “**Fuel tank removal, Chapter 4**”.
- Air filter box, refer to the section “**Air filter box removal, Chapter 4**”.
- Spark plugs, refer to the section “**Spark plug removal, Chapter 4**”.

Disconnect:

- The throttled body control cables “1”, Fig. A.

Remove:

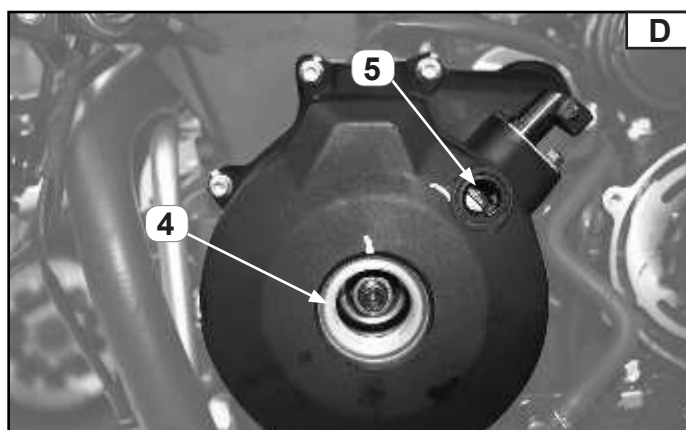
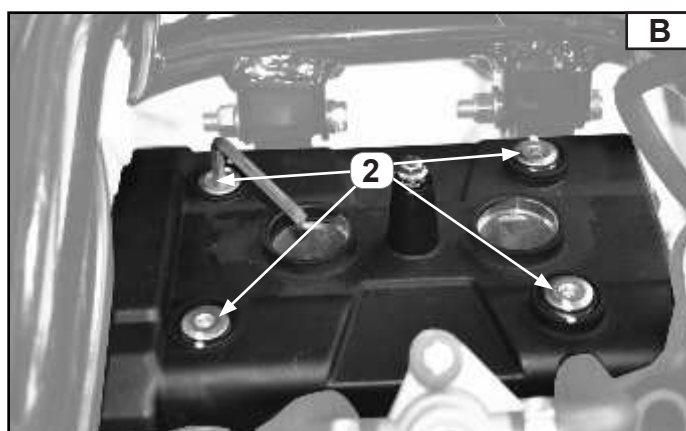
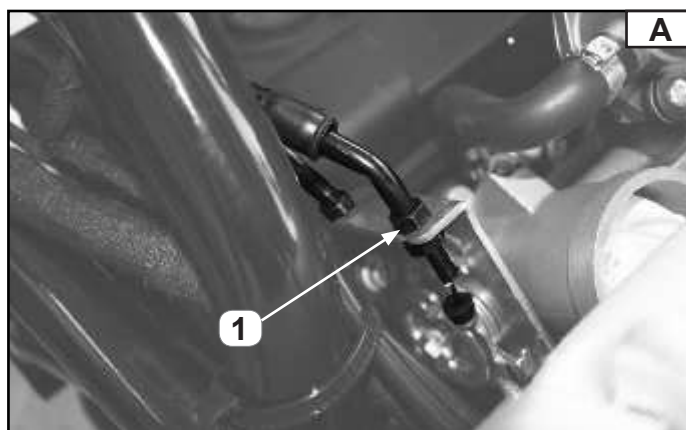
- Throttled body, refer to the section “**Throttled body removal, Chapter 5**”.
- The screws “2” Fig. B.

- The distribution cap “3” Fig. C.

NOTE:

To make it easier to remove the distribution cap, it is necessary to lift it and turn it anticlockwise, as shown in Fig. C.

- The cap of the alternator cover “4” Fig. D.
- The cap “5” Fig. D.



ENGINE/VALVE CLEARANCE CHECK

VALVE CLEARANCE ADJUSTMENT

Align:

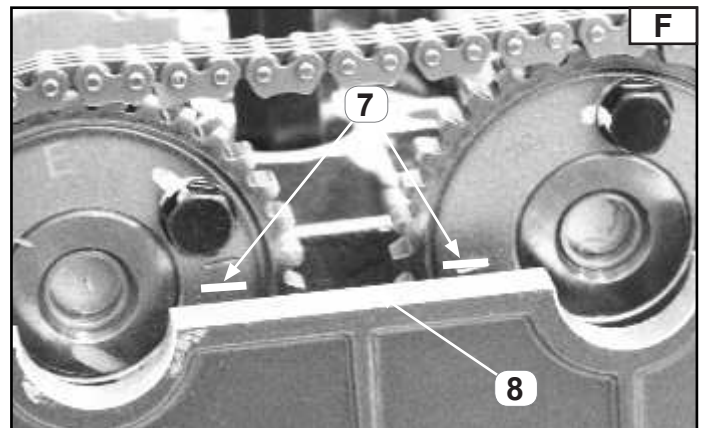
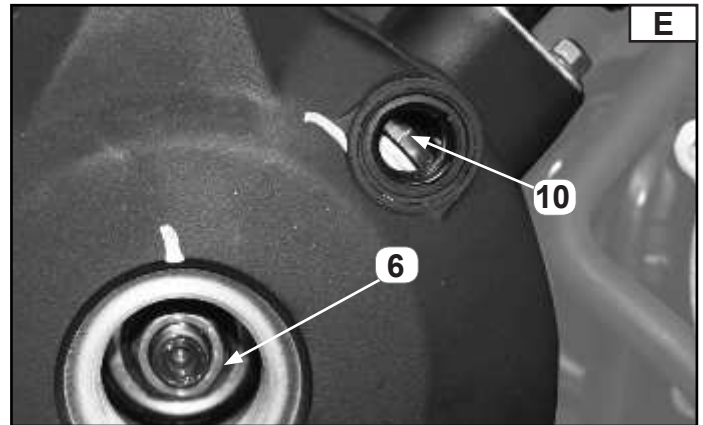
- Turn the drive shaft counter-clockwise, using the nut fastening the flywheel "6" Fig. E.
- Move the piston 2 to the aligned TDC with the reference marks "7" and the head top "8" Fig. F and the reference mark on the magnet flywheel "10" Fig. E.

NOTE:

The valve clearance must be controlled and regulated while the engine is cold (ambient temperature).

NOTE:

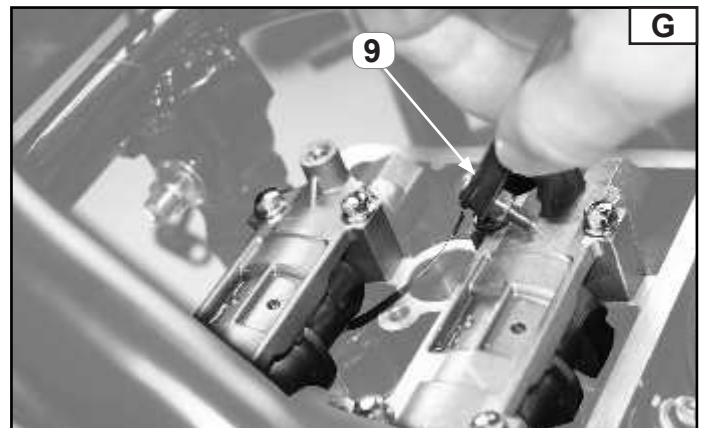
This procedure is only valid in the case of valve clearance adjustment with the engine assembled to the frame.



Measure:

- Valve clearance via thickness gauge "9" Fig. G.

Camshaft	Tappet-cam clearance
Camshaft on exhaust side	0.20 ~ 0.25 mm
Camshaft inlet side	0.15 ~ 0.20 mm





ENGINE/COOLING SYSTEM

COOLING FLUID LEVEL CHECK

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

NOTE:

**Make sure it is in upright position.
Inspect the level while the engine is cool.**

Check:

- The level of the cooling fluid "1" Fig. A.

The level of the coolant must be between the maximum level (MAX) and the minimum one (MIN) if below the minimum level mark, top up to the correct level with the recommended engine oil. Fig. B.

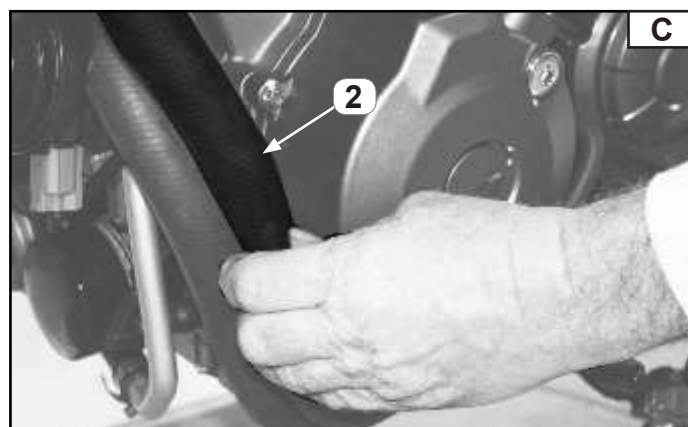
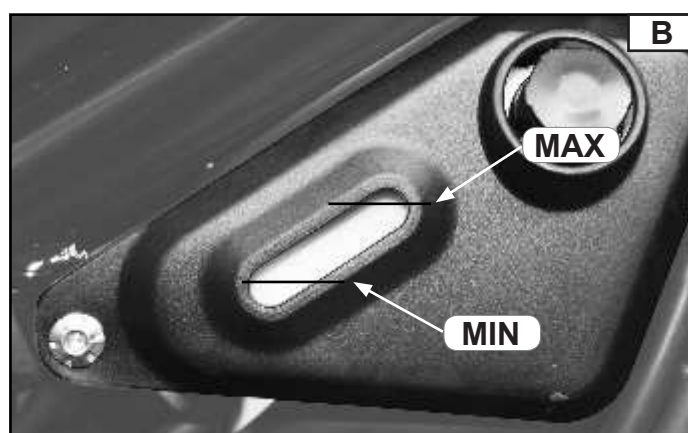
Remove:

- The expansion tank cap.
- Add cooling fluid up to the level line (MAX) Fig. B.

Press the hose "2" between the water pump to the expansion tank, several times to remove any possible air bubbles Fig. C.

Position:

- The expansion tank cap.



FRAME/BRAKE ADJUSTMENT

FRONT BRAKE ADJUSTMENT

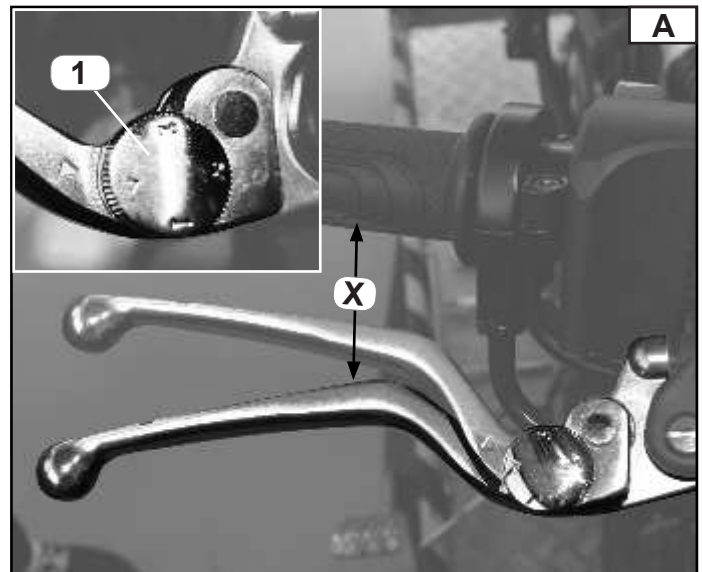
Adjust:

- The position of the brake lever Fig. A.
(the distance "x" between the throttle handgrip and the brake lever).

NOTE:

Push the brake lever forward to neutralise the spring thrust and at the same time, adjust the position turning the ring nut "1" clockwise or counter-clockwise until the brake lever reaches the required position.

Ring nut position	Gap
Position 1	The distance is further from the handlebar.
Position 4	The distance is nearer to the handlebars.



WARNING

If the brake lever is soft or spongy to the touch, there might be air in the braking system. Before using the vehicle, it is necessary to exhaust air by bleeding the braking system. The presence of air in the braking system significantly reduces the system performance and ultimately may cause a loss of control of the motorcycle and accidents. Therefore, check and if necessary, bleed the brake system.

IMPORTANT NOTICE

After adjusting position of the brake handle, make sure that there is no brake drag.



FRAME/BRAKE ADJUSTMENT

ADJUSTMENT OF THE REAR BRAKE

Adjust:

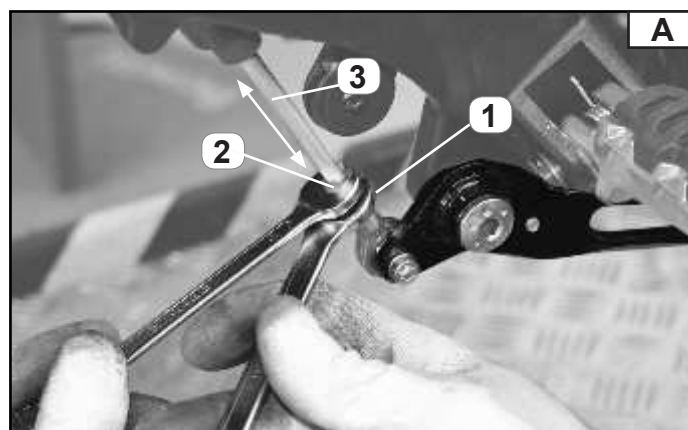
- The brake pedal position Fig. A.
- Loosen the locknut "1".
- Unscrew the locknut "2".
- Tighten or loose the threaded pin "3" to increase or reduce clearance on the rear brake Fig. A.

Tighten:

- The nut "1".
- Tighten the lock nut "2".

Adjust:

- The position of the brake lever Fig. A.
- Turn the eccentric "4" clockwise or counter-clockwise.



WARNING

If the brake lever is soft or spongy to the touch, there might be air in the braking system. Before using the vehicle, it is necessary to exhaust air by bleeding the braking system. The presence of air in the braking system significantly reduces the system performance and ultimately may cause a loss of control of the motorcycle and accidents.

Therefore, check and if necessary, bleed the brake system.

IMPORTANT NOTICE

After adjusting position of the brake pedal, make sure that there is no brake sticking.





FRAME/BRAKE FLUID LEVEL CHECK

FRONT BRAKE FLUID LEVEL CHECK/TOP UP

Park:

- The motorcycle on a level surface.

NOTE:

Place the motorcycle on a stand and make sure it is in up-right position.

Check:

- The brake fluid level.

If the level is below the minimum notch "1" Fig. A, top up with the recommended brake fluid until it is at the correct level.

Fluid top up procedure:

- Place the motorcycle on a level surface.
- Loosen the screws "2" Fig. B.

Check:

- the seal on the cap.
- If there is any damage/wear,
Replace the seal.

IMPORTANT NOTICE

Brake fluid can damage painted surfaces and plastic parts. Therefore, wrap the absorbent paper around the pump and always clean up any brake fluid spills immediately.

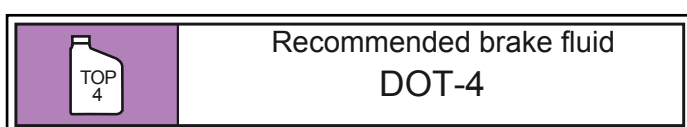
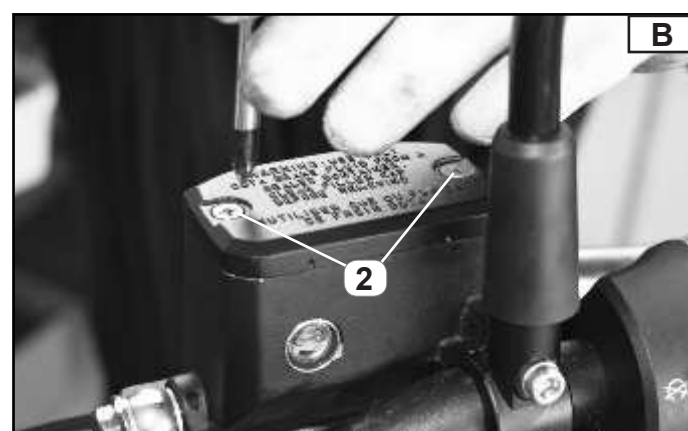
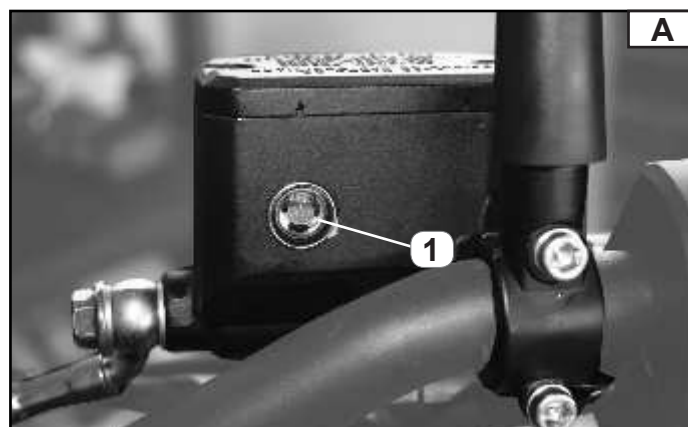
- Apply the vacuum device to the drain screw "3" Fig. C.
- Top up the fluid as far as the level in the gauge on the pump Fig. A.
- Pump the brake fluid until the brake lever moves.
- Once the top up is complete (4) Fig. D, insert the cap and tighten the two screws fastening the cap.

WARNING

Only use the prescribed fluid. Other brake fluids may cause the deterioration of the rubber seals, causing leakages and malfunctioning of the braking system.

Top up with the same type of brake fluid already in the system. Mixing different types of brake fluid may cause a noxious chemical reaction, which may affect the braking system operation.

While topping up brake fluid, take care not to let any water enter the container. Water would lower the boiling point of the brake fluid significantly, causing steam bubbles.



Recommended brake fluid
DOT-4



FRAME/BRAKE FLUID LEVEL CHECK

CHECK REAR BRAKE FLUID LEVEL/TOP UP

Park:

- The motorcycle on a level surface.

NOTE:

Place the motorcycle on a stand and make sure it is in up-right position.

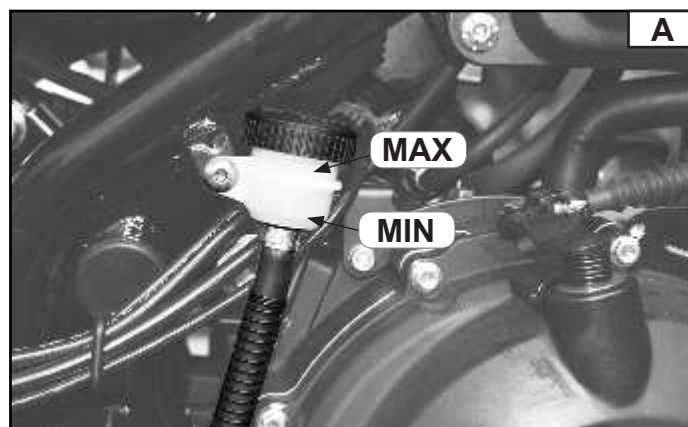
Check:

- The brake fluid level.

If below the minimum notch "A" Fig. A, top up with the recommended brake fluid until it is at the correct level.

Fluid top up procedure:

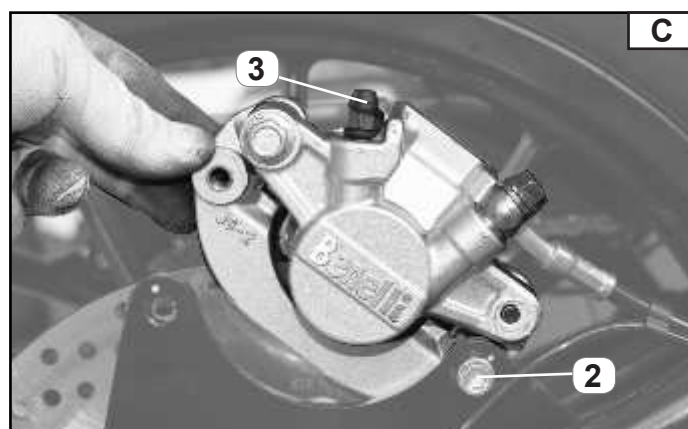
- Once the bike is positioned on a level surface, loosen the top cap "1" on the brake pump tank Fig. B.



IMPORTANT NOTICE

Brake fluid can damage painted surfaces and plastic parts. Therefore, wrap the absorbent paper around the pump and always clean up any brake fluid spills immediately.

- Take out the fastening screw from the brake calliper and loosen the internal fastening screw "2" Fig. C so as to be able to lift the brake calliper. This will completely bleed the circuit, removing all air bubbles.
- Apply the vacuum device to the drain screw "3" and loosen the screw.
- Top the liquid up to the MAX level indicated on the graduated container "D". Pump the brake fluid by moving the brake lever.
- Once the top up process is complete, lower the calliper and tighten the two fastening screws to the following torque:



Torque 22. N*m.

- Close the pump cover.

WARNING

Only use the prescribed fluid. Other brake fluids may cause the deterioration of the rubber seals, causing leakages and malfunctioning of the braking system.

Top up with the same type of brake fluid already in the system. Mixing different types of brake fluid may cause a noxious chemical reaction, which may affect the braking system operation.

While topping up brake fluid, take care not to let any water enter the container. Water would lower the boiling point of the brake fluid significantly, causing steam bubbles.



FRAME/ABS PIPE CHECK

CHECK FOR ANY LEAKS FROM ABS TUBES

Park:

- The motorcycle on a level surface.

NOTE:

Place the motorcycle on a stand and make sure it is in up-right position.

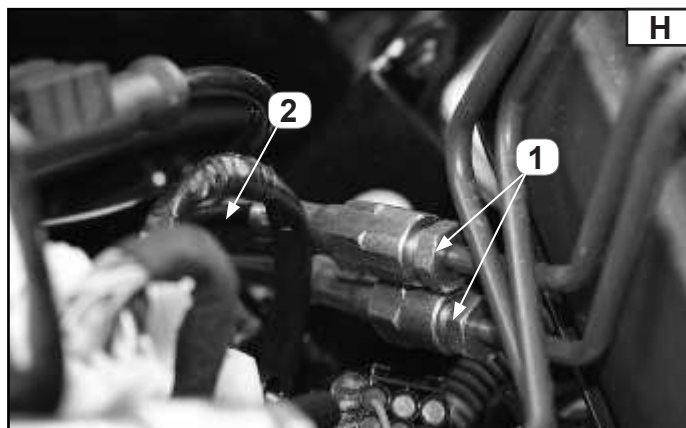
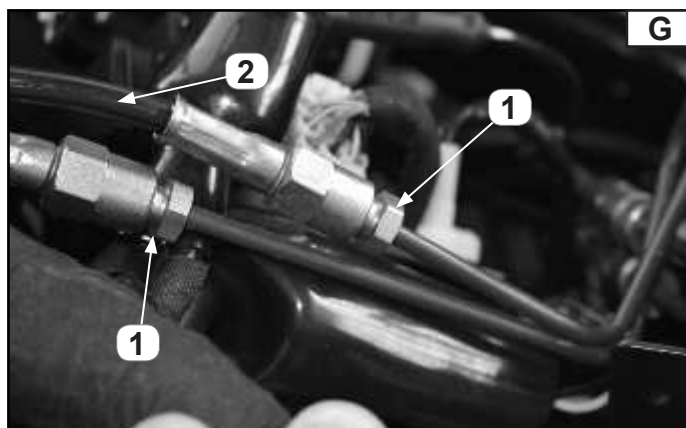
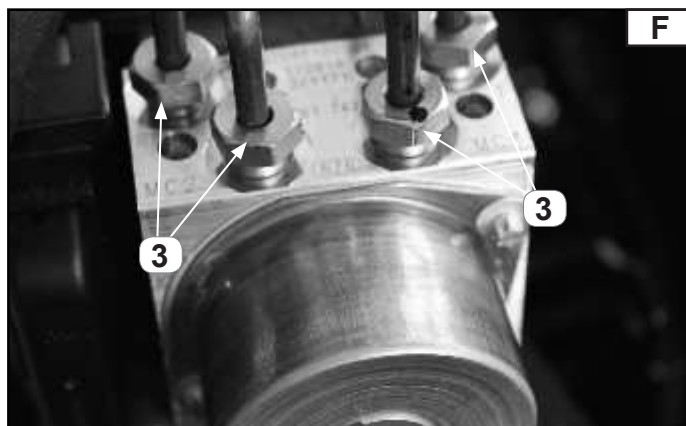
For the motorcycle models equipped with ABS, it is necessary to check for leakages in the braking system and especially in the ABS circuit.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- By means of the brake lever/pedal check for brake fluid leakages from the hoses “2”, the tubes (models equipped with ABS) “3” and the fittings “1”.
- In case of leaks in any point, check or replace the broken part.

Check:

- The fittings on the ABS control unit “3” Fig. F.
- The hoses and fittings connecting the ABS control unit to the front brake calliper Fig. G.
- The hoses and fittings connecting the ABS control unit to the rear brake calliper Fig. H.



CHECK FRONT AND REAR BRAKE PADS FOR WEAR

Activate:

- The brake.

Check:

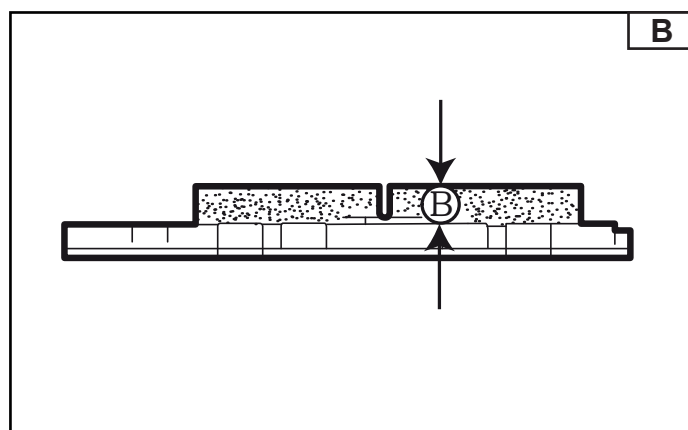
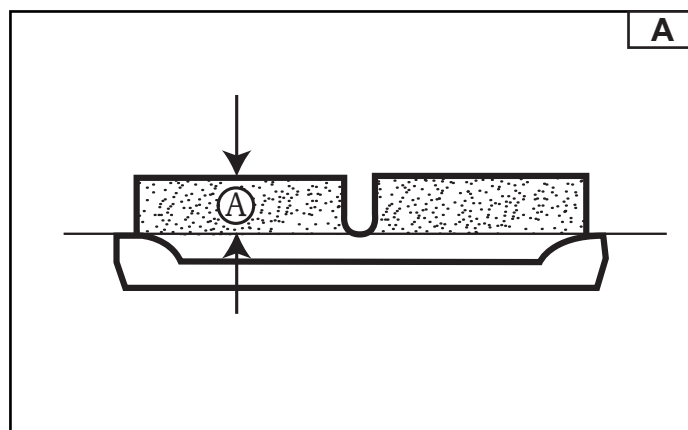
- The front brake pads Fig. A.
- The rear brake pads rear Fig. B.
- The wear limit for the front and back brake pads.

In case of wear limits, replace the pads while the brake is locked.



Pads	Wear limit (A)
Front	1 mm
Rear	1 mm

NOTE: _____
To replace the pads, refer to the “Frame” chapter, “Front brake pad removal and installation”.





FRAME/BRAKE SYSTEM HOSE CHECK

HOSE CHECK

Park:

- The motorcycle on a level surface.

NOTE:

Place the motorcycle on a stand and make sure it is in upright position.

The following procedure applies to all brake hoses and brake hose clamps.

Check:

- The route of the front and rear brake hoses.
- If there are any cracks/signs of wear or damage, replace.

Check:

- The fitting and the hose of the front brake pump Fig. A.
- The fitting and the hose of the rear brake calliper Fig. B.
- The fitting and the hose of the right and left front brake calliper Fig. C.
- The fitting and the hose of the rear brake calliper pump Fig. D.

Check:

- the fitting screws to make sure they are sufficiently tight.

Tighten:

- The fitting screws to the following torque.



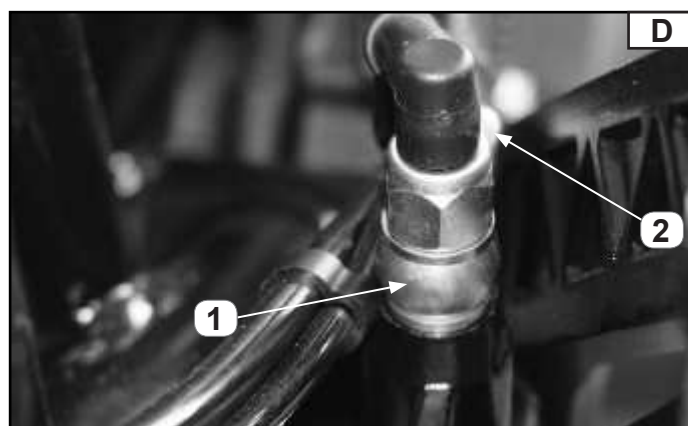
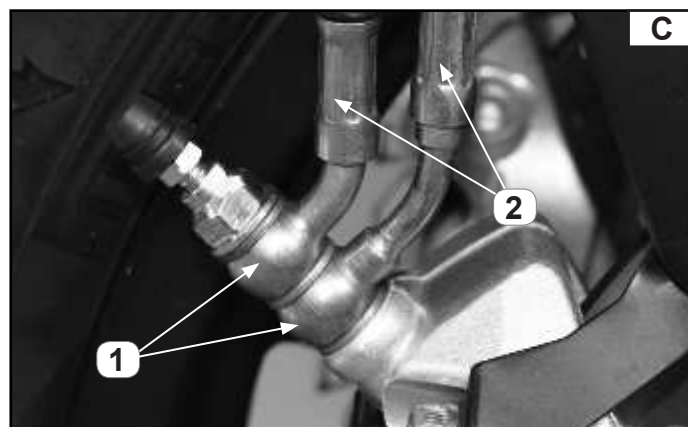
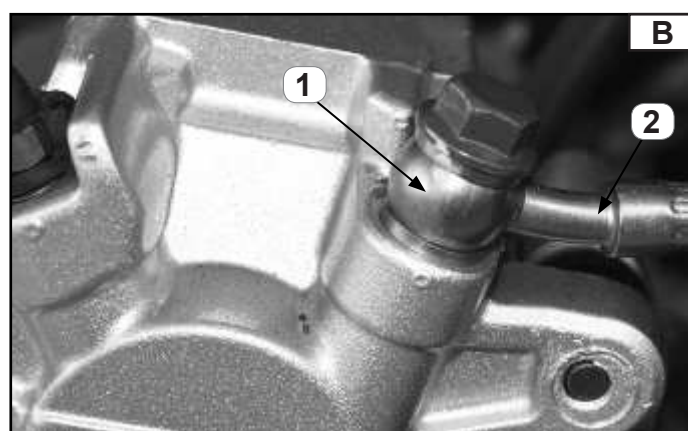
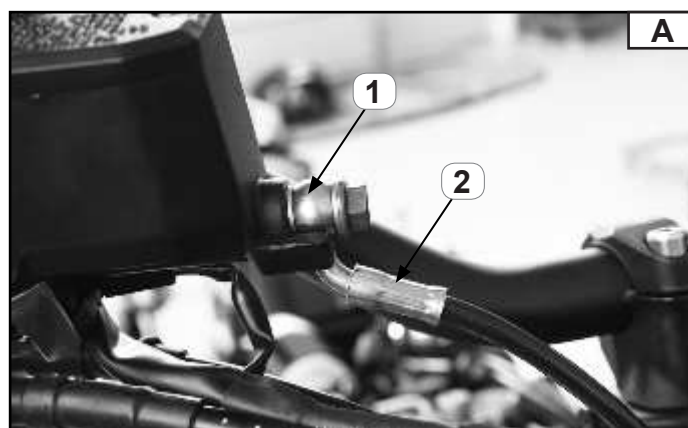
Torque 25. N*m.

Activate:

- The brake several times.

Recheck:

- The brake hose. If there is any brake fluid leakage, replace the damaged hose.





FRAME/TRANSMISSION CHAIN

TRANSMISSION CHAIN CLEARANCE ADJUSTMENT

NOTE:

Never inspect or adjust the transmission chain with the engine running.

Check the transmission chain slackness in the most taut point.

WARNING

If the chain is too taut, there may be an overload of the engine or other vital parts, while, if it is too slack, it may jump out and damage the swing arm bracket or cause an accident. Therefore, it is advisable to keep the chain slackness within the specified range.

Park:

- the motorcycle on a level surface.

WARNING

Support the motorbike correctly, so that it cannot fall over and so that the rear wheel is raised.

- Rotate the rear wheel several times and determine the tightest position of the chain.

Check:

- If the chain slackness is outside the range, adjust, Fig. A.



Transmission chain slackening

25-30 mm

Adjust:

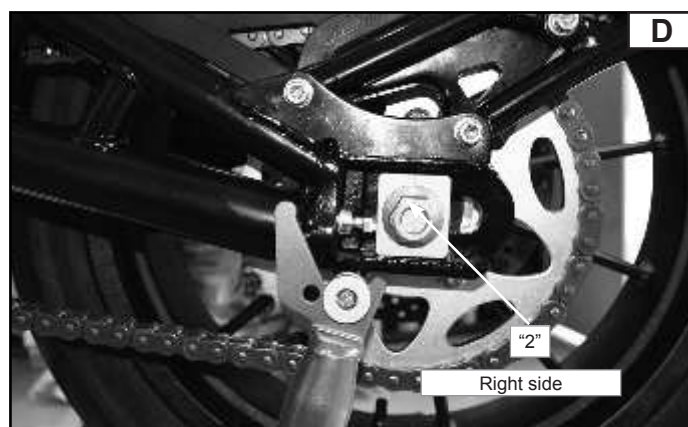
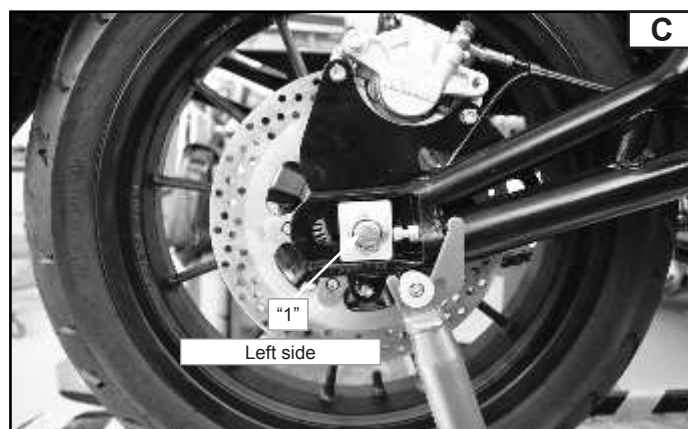
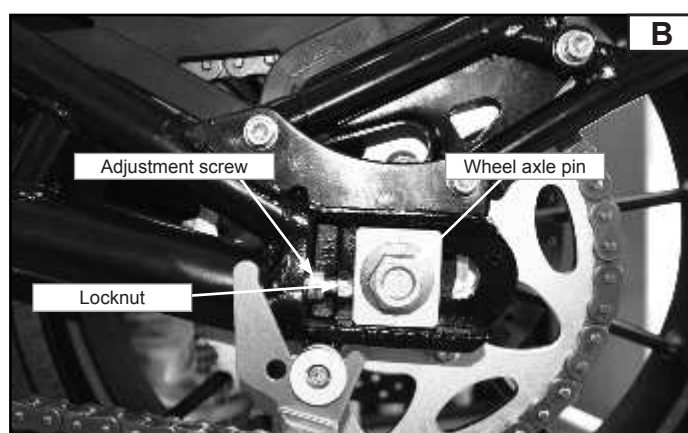
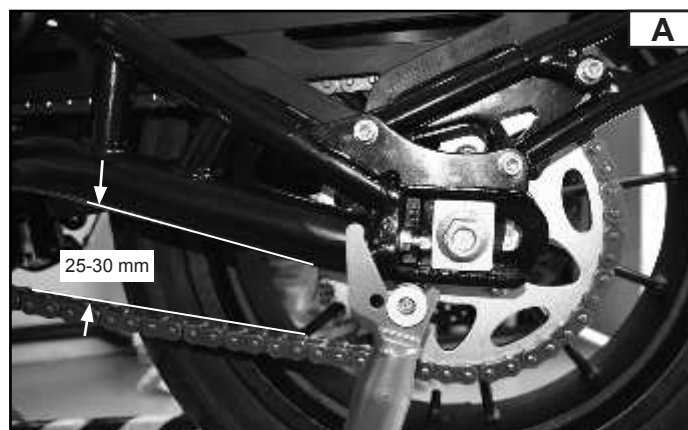
- The slackness of the chain Fig. B.
- Loosen the wheel axle pin nut on the left "1" Fig. C and right "2" Fig. D.
- To tension the transmission chain, turn the tension adjustment screw on each side of the swing arm (counter-clockwise).
- To loosen the transmission chain, turn the tension adjustment bolt clockwise and push the rear wheel forwards.
- At the end of adjustment, tighten the wheel axle pin nut to the following torque:



Torque 80 N*m.

WARNING

If the chain is too taut, there may be an overload of the engine or other vital parts, while, if it is too slack, it may jump out and damage the suspension arm or cause an accident. Therefore, it is advisable to keep the chain slackness within the specified range.



FRAME/TRANSMISSION CHAIN

TRANSMISSION CHAIN LUBRICATION

Introduction:

The transmission chain consists of several parts that interact with each other.
 The chain must be properly maintained to prevent its early wear. Therefore, it is advisable to maintain the transmission chain, especially if it is used in very dusty areas.
 This motorcycle is equipped with a transmission chain complete with small rubber O-rings inserted between one side plate and another.
 Do not use steam jets, high-pressure water jets, aggressive solvents or brushes with too rough bristles to prevent damaging these O-rings.
 Therefore, we recommend exclusive use of recommended products to clean the transmission chain.
 Wipe the chain and lubricate it thoroughly using engine oil or specific lubricant for chains with O-rings.
 Do not use other kinds of lubricants on the transmission chain as they might contain solvents that would damage the O-rings.

Apply:

- A fine, even layer of lubricant to the whole chain, taking care not to reach the parts around it, especially the tyres.



CHAIN GUIDE CHECK

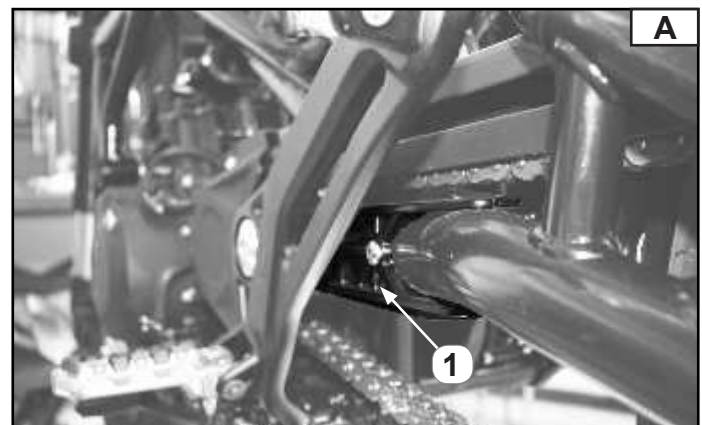
Visually check the chain guide slide (1) Fig. A.

Replace:

The chain guide if faulty or damaged.

See:

- Chain slide removal, refer to the section “**Chain slide removal, Chapter 4.**”.





FRAME/TRANSMISSION CHAIN

TRANSMISSION CHAIN WEAR CHECK

Check:

- The transmission chain.
- Clean and grease, or replace.

Clean:

- The transmission chain.

Clean the transmission chain with a clean rag.

Soak the transmission chain in kerosene and remove any remaining dirt.

Remove the transmission chain from the kerosene and leave it to dry completely.

IMPORTANT NOTICE

This motorbike is equipped with a transmission chain complete with small rubber O-rings (1) Fig. B, inserted between one side plate and another.

To clean the transmission chain, do not use high-pressure jets of water or air, do not use steam, petrol, aggressive solvents (such as petroleum petrol), or brushes with overly stiff bristles.

Using high-pressure items could force dirt into the cavities inside the transmission chain, while solvents could cause the O-rings to deteriorate.

The O-rings could also be damaged by the use of brushes of overly stiff bristles.

Therefore, we recommend exclusive use of white oil to clean the transmission chain.

Check:

- The O-Rings (B).

In the event of damage, replace the transmission chain.

- The transmission chain rollers (2) Fig. B.

In the event of damage/wear, replace the transmission chain.

- The side plates of the chain (3) Fig. B.

In the event of damage/wear, replace the transmission chain.

If there are any cracks, replace the transmission chain and make sure that the bleeder pipe from the battery is correct and sufficiently distant from the transmission chain and below the swing arm.

Lubricate:

- The transmission chain.

NOTE:

Use specific grease.

Check:

- Driving gear
- Rear toothed wheel.

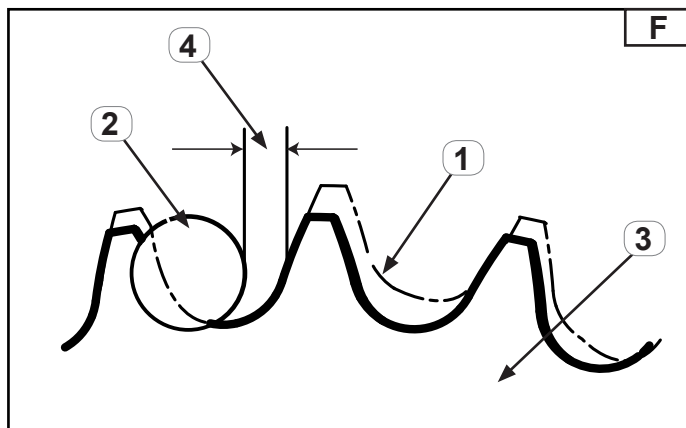
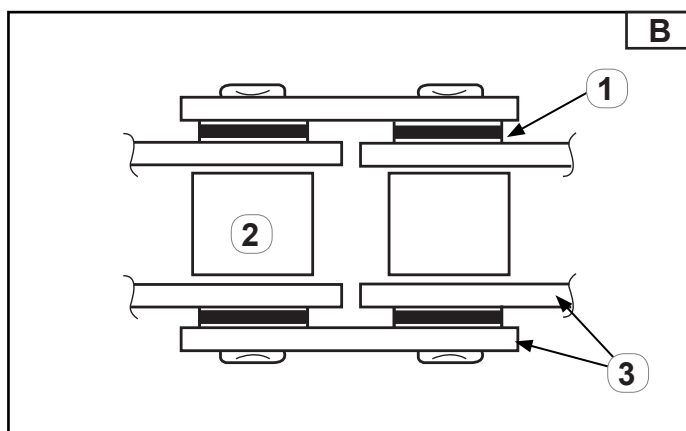
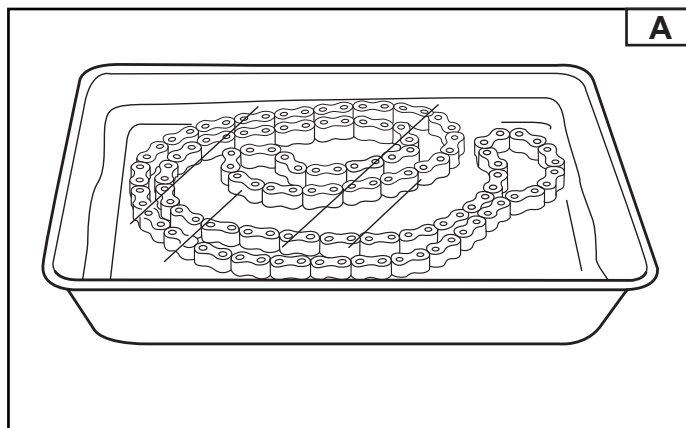
If more than 1/4 for each tooth (4) Fig. F. is worn, replace all of the chain sprockets.

If the teeth are bent, replace the all of the chain sprockets.

NOTE:

Never install a new chain with worn sprockets.

Both the chain and sprockets need to be in good condition or the new chain will become quickly worn.





FRAME/CHAIN PINION

TRANSMISSION CHAIN PINION CHECK

Check:

- The chain pinion.

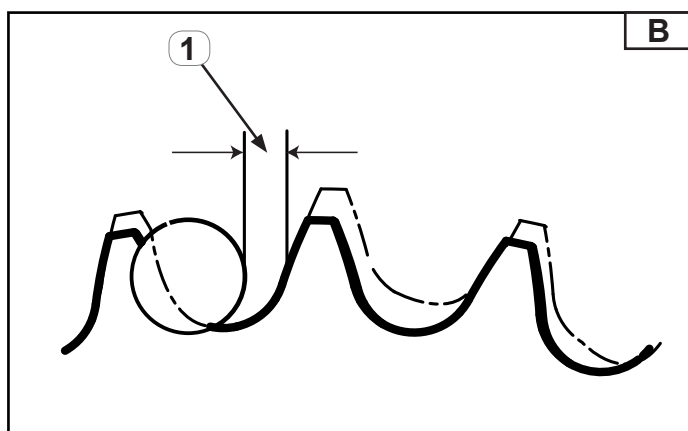
Remove:

- The gear lever, refer to the section “**Gear lever removal, Chapter 4**”.
- The pinion cover, refer to the section “**Pinion cover removal, Chapter 4**”.

Check:

If more than 1/4 on each tooth (1) Fig. B. is worn, replace all of the chain sprockets.

If the teeth are bent, replace the all of the chain sprockets.





FRAME/CHECK AND ADJUSTMENT OF STEERING SLEEVE

CHECK/ADJUSTMENT OF STEERING CLEARANCE

Park:

- The motorcycle on a level surface.

NOTE:

Place the motorcycle on a suitable support so that the front wheel is raised.

Check:

- The steering sleeve.

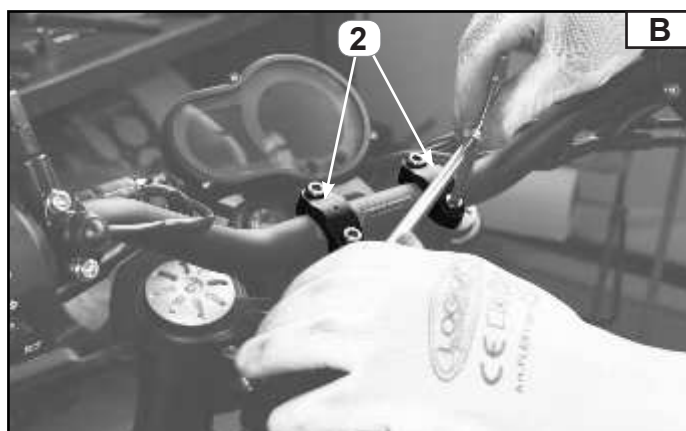
Gently oscillate the front fork, holding it by the ends of the tubes Fig. A.

If there is any jamming/loosening, adjust the steering sleeve.

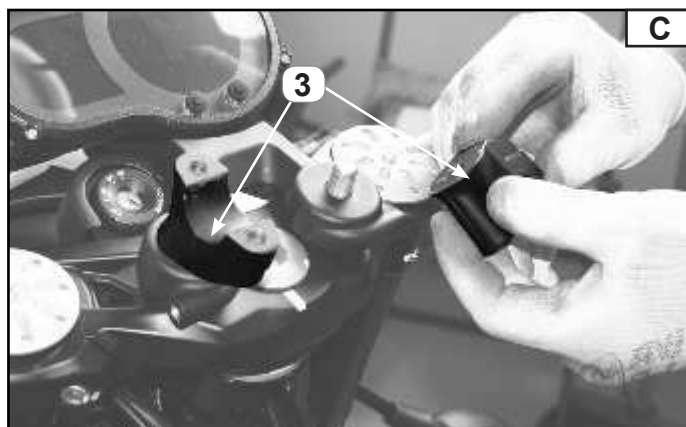


Remove:

- The upper u-clamps (2) Fig. B.



- The u-clamp supports (3) Fig. C.



- The instrument support (4) Fig. D.

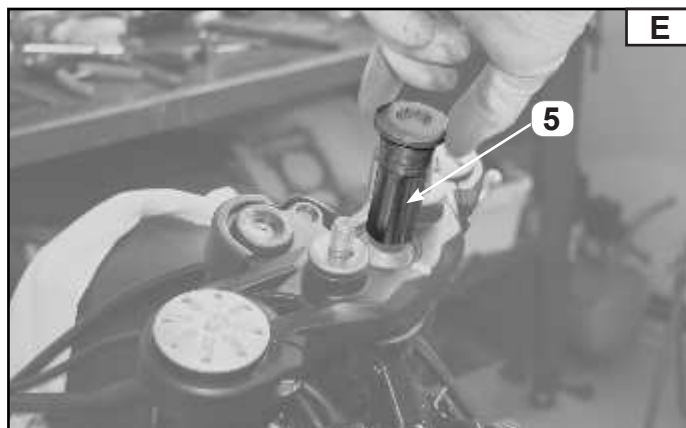




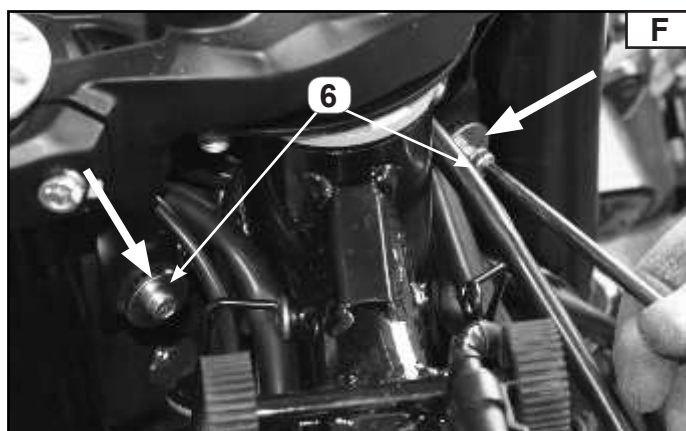
FRAME/CHECK AND ADJUSTMENT OF STEERING SLEEVE

STEERING SLEEVE BEARING LUBRICATION

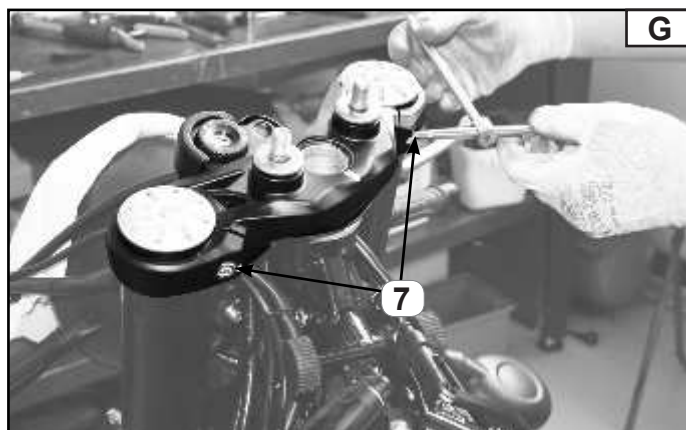
- The bolt cap of the steering head (5) Fig. E.



- The support screws of the headlamp (6) Fig. F.



- The fastening screws of the steering head (7) Fig. G.



Loosen:

- the steering ring nut (6) with the relevant wrench (7).



(**) Steering sleeve lock ring nut tightening tool
Code: R180297129000





FRAME/CHECK AND ADJUSTMENT OF STEERING SLEEVE

STEERING SLEEVE BEARING LUBRICATION

Remove:

- the steering pin ring nut (1) with the relevant wrench (2) and remove the steering ring nut (3). Fig. I.



Steering sleeve lock ring nut tightening tool

Code: R180297129000

Using a solvent with a high flash point, wash the top/bottom ball bearings in the retainers, then wipe up the upper and lower outer races that are installed for interference on the frame pipe, remove the grease and dirt.

Check:

- Visually check the outer races and the balls. Replace if worn or damaged Fig. L.
- Insert the balls with some grease, then apply a thin layer of grease on the outer top/bottom races.

Assemble:

Once assembled, tighten the steering ring nut to the following torque:

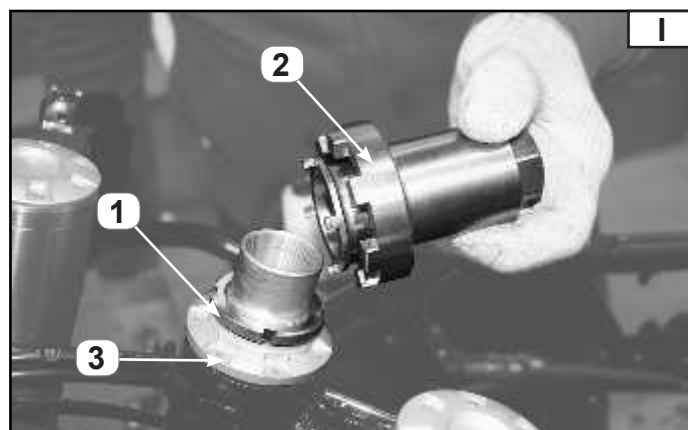


Steering sleeve lock ring nut tightening tool

Code: R180297129000



Torque 60 N*m



	Specific grease
---	------------------------

Assemble:

- the steering pin ring nut with the relevant tool, with the following torque:



Steering sleeve lock ring nut tightening tool

Code: R180297129000



Torque: 15. N*m



FRAME/FRONT FORK CHECK

FRONT FORK CHECK

Park:

- The motorcycle on a level surface.

NOTE:

Prop the motorcycle on suitable supports so that it cannot fall.

Check:

- The fork stem "1" Fig. A.
- The fork sleeve "2" Fig. A.

In case of damage/scuffing, replace.

- The oil seal.

If there are any leaks, replace

Keep:

- The motorcycle in a upright position.

Activate:

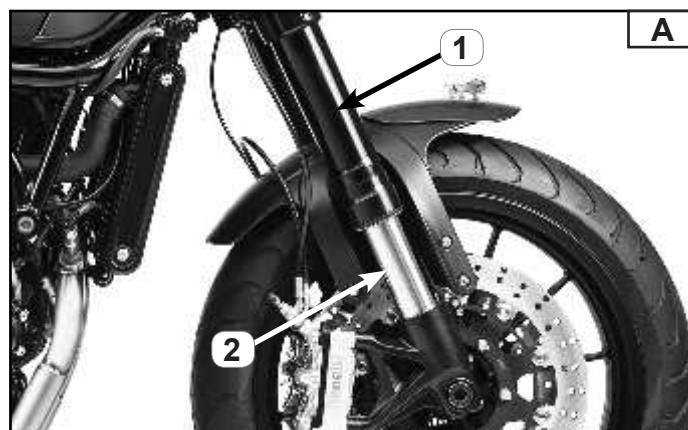
- The front brake.

Check:

- The fork operation.

Push hard on the handlebars several times and make sure that the front fork slides easily back into place.

If the movement is not smooth, replace (see the chapter FRAME/CHECK AND ADJUSTMENT OF THE STEERING SLEEVE, section STEERING SLEEVE BEARING LUBRICATION).



FRAME/FRONT FORK CHECK

FRONT FORK EXTENSION BRAKE ADJUSTMENT

NOTE:
Prop the motorcycle on suitable supports so that it cannot fall.

NOTE:
The following procedure applies to all pistons.

IMPORTANT NOTICE

Always adjust the front fork rods by the same amount. Uneven adjustment may lead to difficult manoeuvres and loss of stability.

Adjustment

- To **increase** rebound damping and therefore, increase the rigidity of the suspension, turn the adjustment screw clockwise.
- To **decrease** rebound damping and therefore, increase the softness of the suspension, turn the adjustment screw counter-clockwise.

IMPORTANT NOTICE

To avoid damaging the mechanism, do not try turning over the maximum or minimum setting.



FRAME/REAR SHOCK ABSORBER CHECK

SHOCK ABSORBER ADJUSTMENT

NOTE:
 Prop the motorcycle on suitable supports so that it cannot fall.

- Preload adjustment**
- Adjust the spring preload Fig. A.
 - The rear shock absorber has a spring preload adjustment knob “1”.
 - To **increase** spring reload and therefore, increase the rigidity of the suspension, turn the adjustment ring nut clockwise.
 - To **decrease** spring reload and therefore, increase the rigidity of the suspension, turn the adjustment ring nut counter-clockwise.



IMPORTANT NOTICE
 To avoid damaging the mechanism, do not try turning over the maximum or minimum setting.

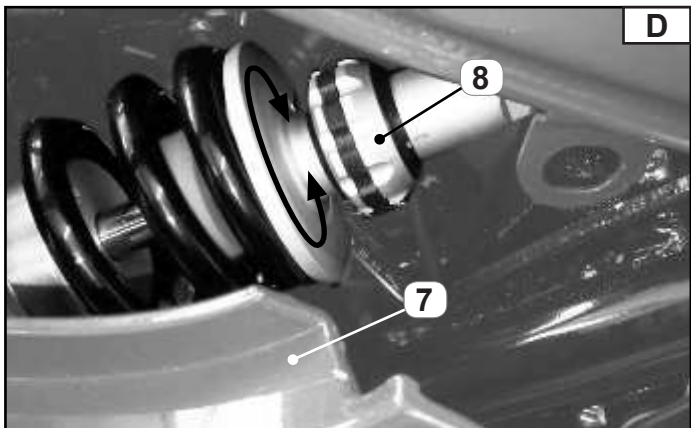
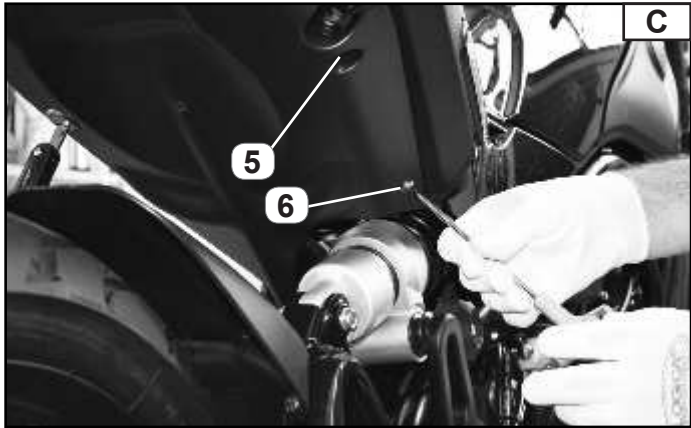
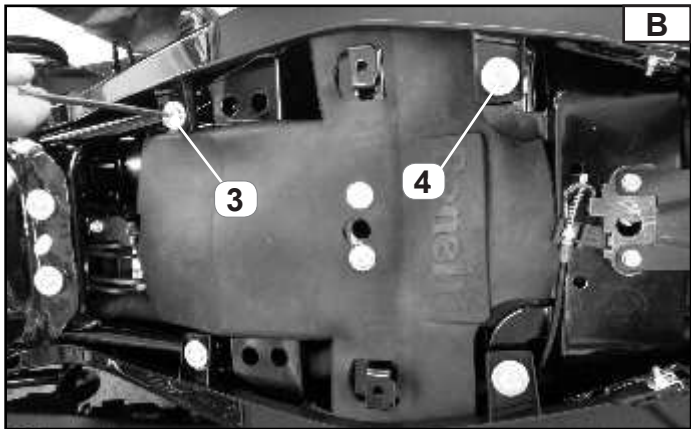
Position	Gap
MIN	0 mm
MAX	10mm

Extension adjustment
 To make hydraulic adjustment to the shock extension, it is necessary to

- Remove:**
- Rider seat, refer to the section “Removal of rider seat, Chapter 4”.
 - The screw “3” and “4” Fig. B.
 - The screws “5” and “6” Fig. C.

- Move:**
- The right panel “7” to access the adjustment ring nut Fig. D.
 - It is possible to adjust the hydraulic brake device using the adjustment ring nut “8” Fig. D.
 - Turn it clockwise to increase the braking action. Turn it counter-clockwise to reduce the braking action.

IMPORTANT NOTICE
 To avoid damaging the mechanism, do not try turning over the maximum or minimum setting.



FRAME/FRONT/REAR TYRE CHECK

TYRE CHECK

The following procedure applies to both tyres.

Check:

- If tyre pressure is outside the range, adjust it Fig. A.

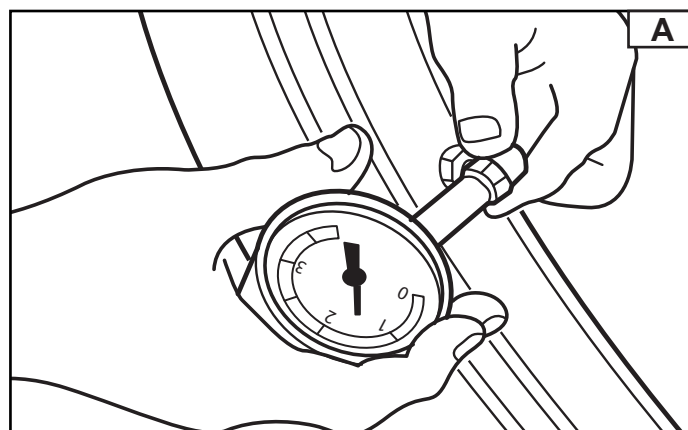
WARNING

The tyre pressure must be checked and adjusted only when the wheel temperature corresponds to the ambient temperature.

The tyre pressure and the suspension must be adjusted according to the total weight, including baggage, driver, passenger and accessories, and considering the expected driving speed.

The use of the overloaded vehicle may cause damages to tyres, with the risk of an accident or injuries for people.

NEVER OVERLOAD THE VEHICLE IN ANY CASE.



Position	Wear limit (A)	
Net weight (with oil and fuel tank full)	See general specifications	
Max. load*	See general specifications	
COLD TYRE PRES-SURE	FRONT	REAR
Up to 90 kg load*	2.20 bar	2.50 bar
90 kg ~ max. load*	2.20 bar	2.50 bar

* Including baggage, driver, passenger, and accessories.

WARNING

It is dangerous to drive with the worn tread.

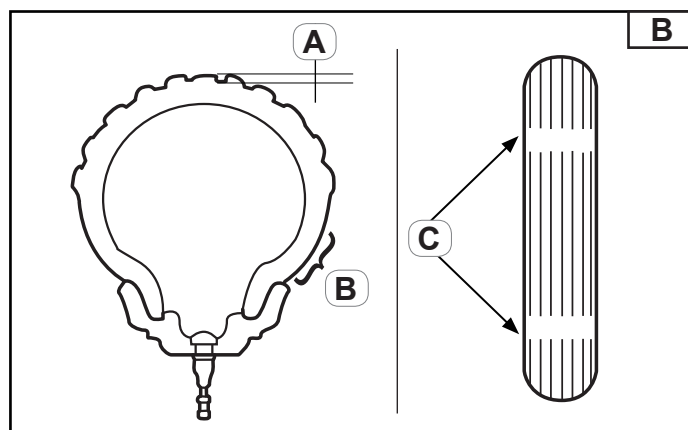
If the tread reaches the wear limit, replace the tyre immediately.

Check:

- The tyre surface Fig. B.

If there is any damage/wear, replace the tyre.

- A. Tread pattern depth.
- B. Sidewall.
- C. Wear signaller.



WARNING

If tyres are new, the grip on the road is relatively weak until they are slightly used. Therefore, it is advisable to drive at normal speed for the first 100 km (62 mi) before driving at higher speeds.

WARNING

Most countries have their own regulations that prescribe a minimum depth of the tread. Always remain within the limits set forth.

Check and balance the wheel when replacing the tyre.

ELECTRICAL SYSTEM

BATTERY CHECK AND CHARGE

WARNING

The batteries produce a nitrogen-based explosive gas and contain electrolyte, which is composed of sulfuric acid, a poisonous substance and highly caustic.

The following precautions should be always observed:

Wear protective goggles when handling a battery or while working nearby.

Recharge the batteries in a suitably ventilated area.

Battery must be far away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes, etc.).

DO NOT SMOKE during recharging or handling of the battery.

PUT BATTERIES AND ELECTROLYTE BEYOND THE REACH OF CHILDREN.

Do not allow electrolyte to come into contact with body parts to prevent severe burns or permanent injury to eyes.

FIRST AID IN THE EVENT OF CONTACT:

EXTERNAL CONTACT

- Skin: wash with water.
- Eyes: Wash with water jets for 15 minutes and seek immediate medical attention.

SWALLOWING

- Drink large quantities of water or milk, milk of magnesia, beaten egg or vegetal oil. Seek immediate medical attention.

IMPORTANT NOTICE

This battery is sealed. Do not remove the sealing caps in any case, to preserve the equilibrium between the cells and not to affect the battery performance.

The time, the amperage, and the voltage for recharging the battery differ from the standard ones. Recharge the battery as shown in the figures. If the battery is overcharged, the electrolyte level drops significantly. Therefore, during recharging, pay the utmost attention.

NOTE: _____

As the battery is sealed, the recharging state cannot be checked by measuring the electrolyte density.

Therefore, check battery charging by measuring the voltage on the battery terminals.

Remove:

- Rider and passenger seats, refer to the section “Rider seat and passenger seat removal, Chapter 4”.



ELECTRICAL SYSTEM

BATTERY CHECK AND CHARGE

Disconnect:

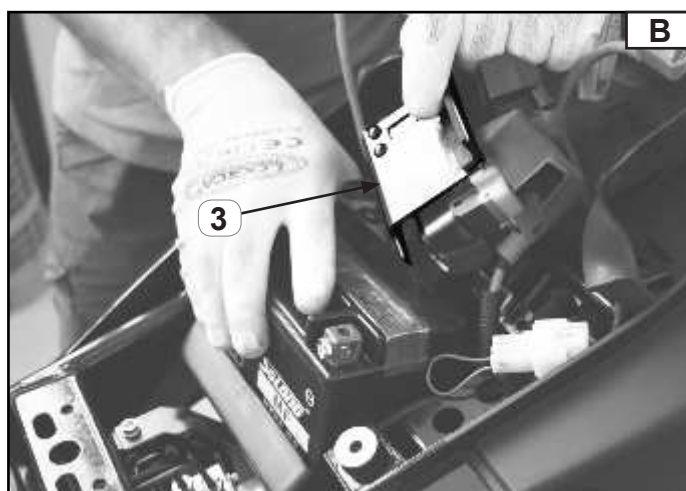
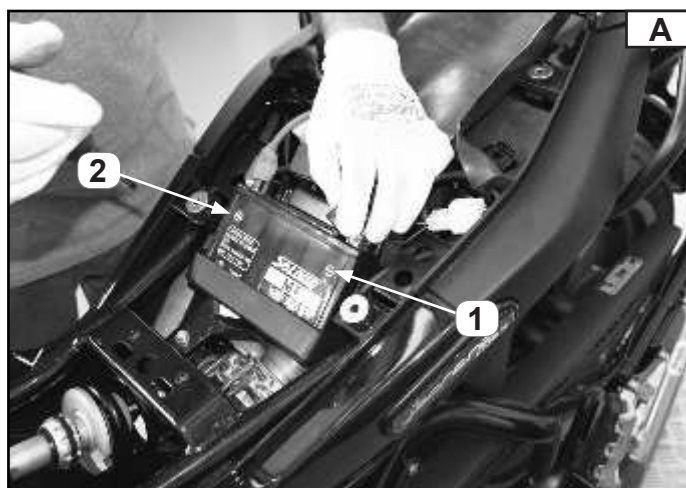
- The battery cables from the terminals Fig. A.

IMPORTANT NOTICE

Disconnect the negative wire "1" of the battery first, then the positive wire "2" Fig. A.

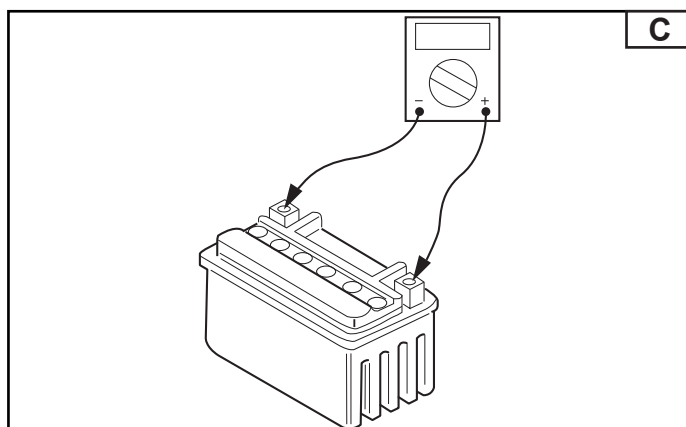
Remove:

- The battery bracket (3) Fig. B.
- The battery.
- Remove the battery rubber tip and take out the battery "1".



Check:

- The battery charge.
- Connect a pocket tester to the battery terminals Fig. C.





ELECTRICAL SYSTEM

BATTERY CHECK AND CHARGE

Check the battery level as shown in the tables of the following example Fig. D.

NOTE:

The charge status of a battery can be checked by measuring its open-circuit voltage (that is the voltage when the positive terminal is disconnected).
If the open-circuit voltage is equal to/above 12.8 V, recharging is not necessary.

EXAMPLE:

- Open-circuit voltage = 12.0 V
- Charge time = 6.5 hours
- Battery charge = 20 ~ 30 %

Charge:

- Battery (see figure with the appropriate charge method) Fig. E.

IMPORTANT NOTICE

Do not subject the battery to a quick charge.

WARNING

- Never remove the caps that seal the battery.
- Do not use fast battery charger as these devices transfer a high-amperage current to the battery at high speed, therefore the battery may overheat and its parts may be damaged.

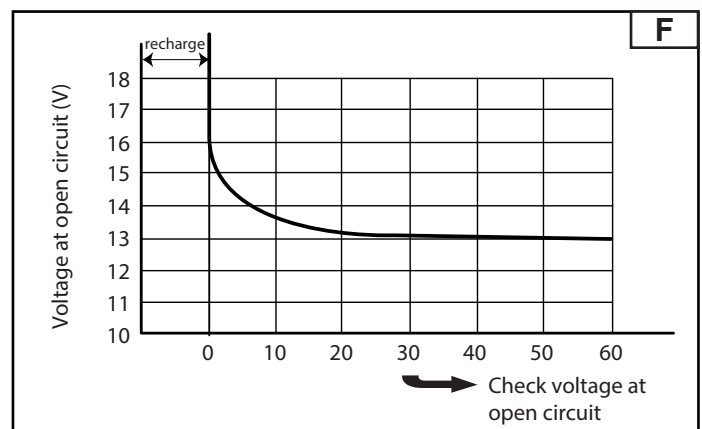
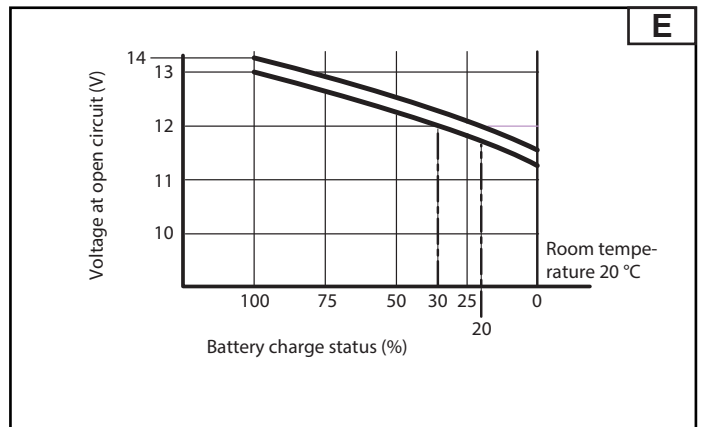
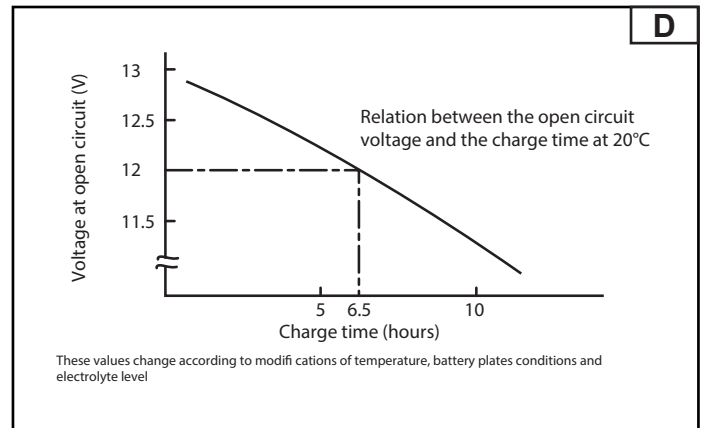
If it is not possible to adjust the charging current of the battery charger, be careful to prevent the battery overcharge.
For charging, disconnect the battery from the vehicle.
(Should it be necessary to recharge with the battery mounted on the vehicle, disconnect the negative cable from the battery terminal).

To reduce the risk of sparks, connect the battery charger to the power supply only after having connected the cables to the battery.

Before disconnecting the clamps from the battery cables from the battery terminals, remember to switch off the battery charger.

Make sure the battery charger cable clamps are completely in contact with the battery terminals and are not short circuited. A corroded clamp may generate heat in the contact area and an ineffective clamp spring may cause sparks.

If the battery overheats during the charging process, disconnect the battery charger and allow it to cool down before proceeding again. The batteries that overheat may explode!!
As shown in Fig. F, the open-circuit voltage of a battery stabilises 30 minutes after the charging end, before measuring the open-circuit voltage.





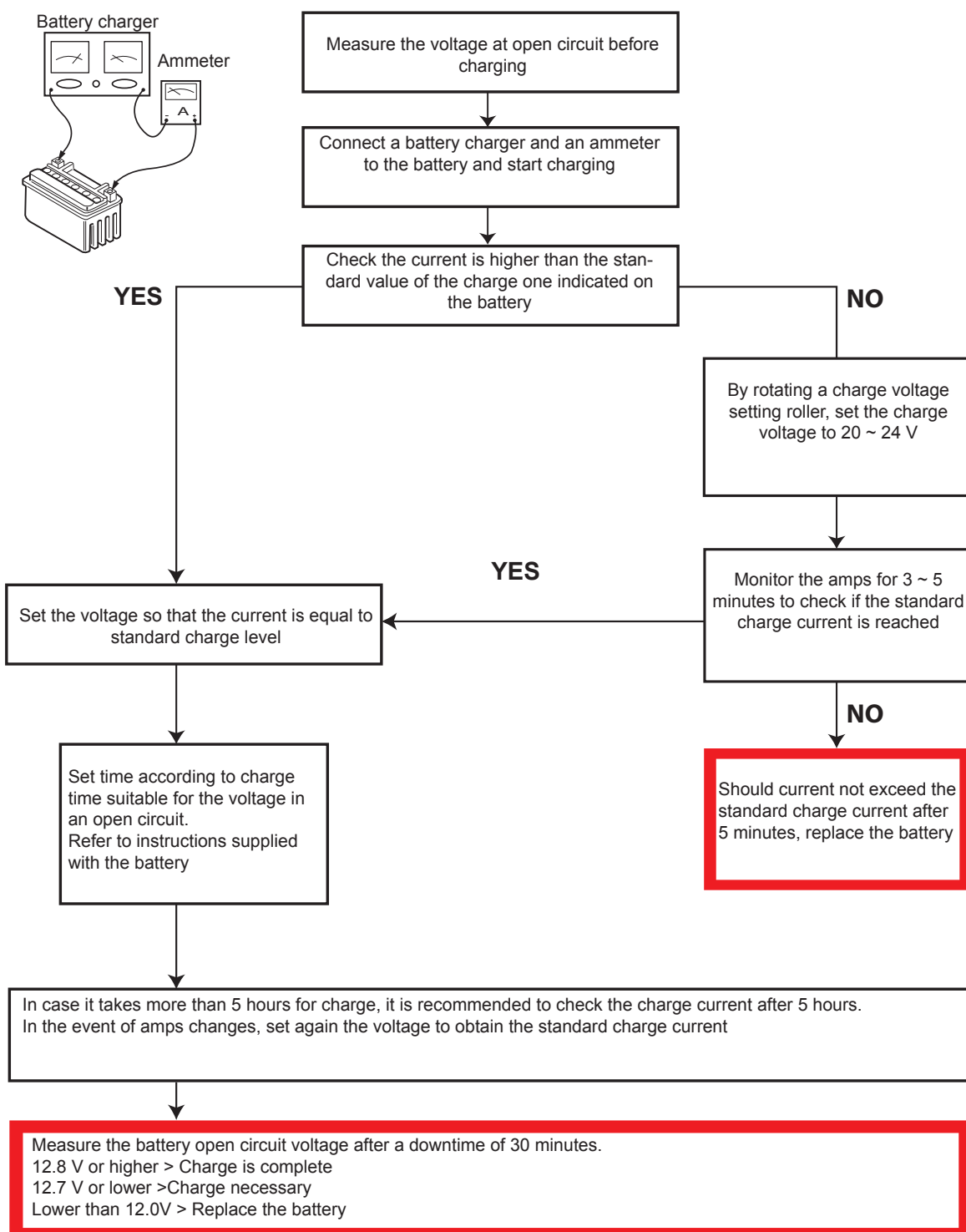
ELECTRICAL SYSTEM

BATTERY CHECK AND CHARGE

CHARGE METHOD WITH VARIABLE CURRENT (VOLTAGE) CHARGER

NOTE:

- Measure the voltage after 30 minutes from switching off of the appliance.
- Set the charge voltage to 16 ~ 17 V. (A lower setting will not give sufficient charge; an excessively high setting will overload the battery).



ELECTRICAL SYSTEM

BATTERY CHECK AND CHARGE

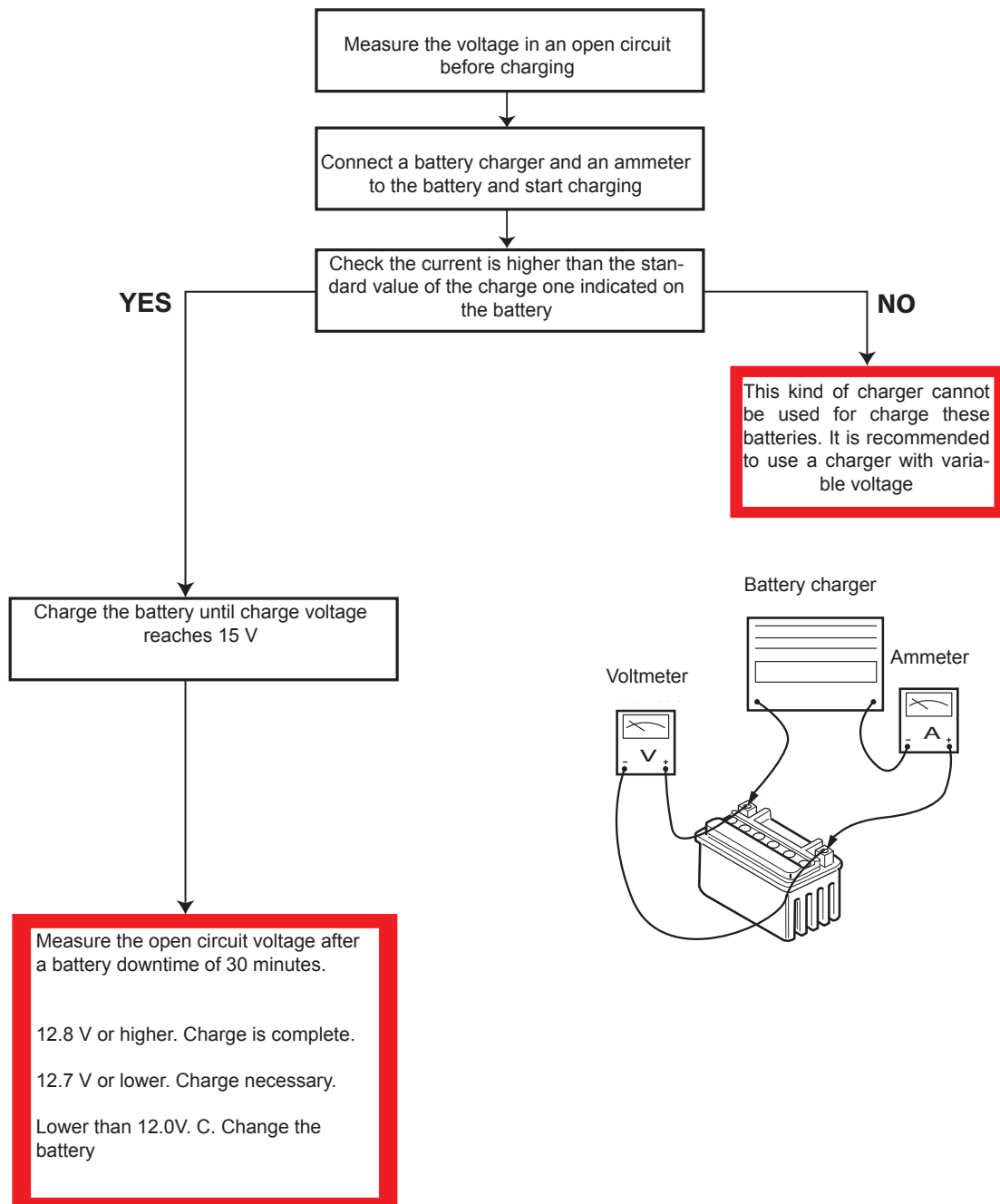
CHARGE METHOD WITH CONSTANT CURRENT (VOLTAGE) CHARGER

NOTE: _____

- Measure the voltage after 30 minutes from switching off of the appliance.
- Set the maximum charging time to max. 20 hours.

NOTE: _____

- To guarantee maximum battery performance and durability, use electronic chargers able to supply charge currents or voltages based on the specific requirement of the sealed battery technology.





ELECTRICAL SYSTEM

BATTERY CHECK AND CHARGE

Battery activation:

Filling Electrolyte

Make sure that the model [A] marked on the electrolyte bottle matches with the model [B] of the battery. The denominations must be the same.

Battery model name: YTX9-BS.

WARNING

Every battery is supplied with a bottle of its own electrolyte. The use of an unsuitable container may cause the leakage with the wrong electrolyte, thus shortening the battery life and jeopardizing performance.

Use the electrolyte bottle having the same battery model name, as the volume and specific gravity of the electrolyte change according to the type of battery.

WARNING

Tear the aluminium sealing film [A] of the filling ports [B] only immediately before use. Use the apposite container to be sure to insert the correct amount of electrolyte.

IMPORTANT NOTICE

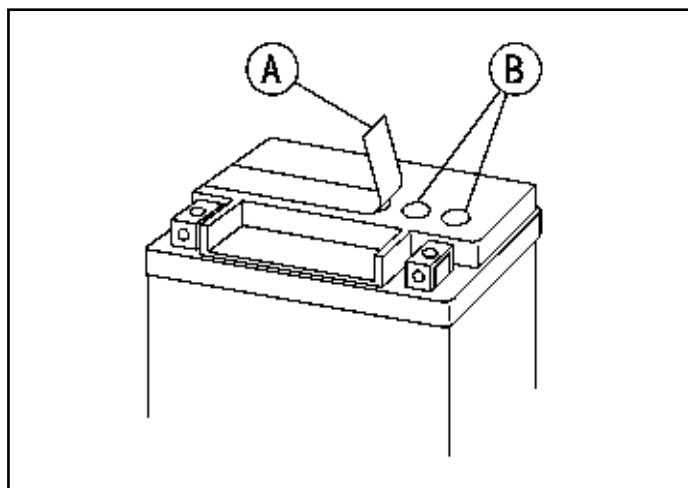
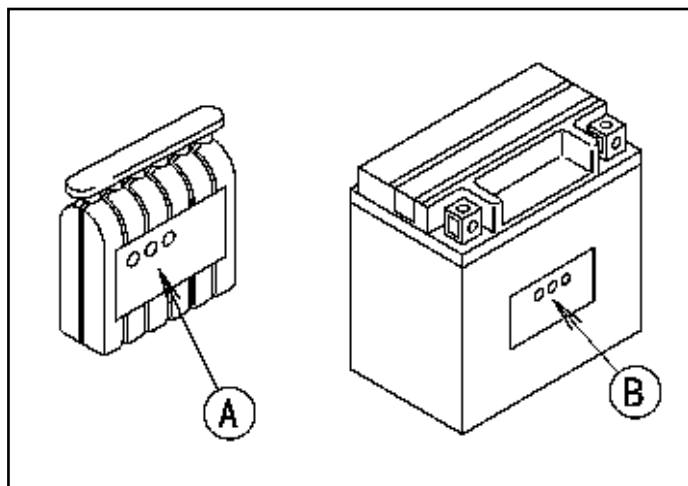
The sulfuric acid present in the battery electrolyte may cause severe burns. To prevent burns from sulfuric acid, before handling the electrolyte wear protective clothing and safety goggles.

If the electrolyte comes into contact with eyes, wash the area with plenty of water and contact a doctor in case of severe burns.

- Place the battery on a flat surface.
- Make sure the sealing film is not frayed, broken or perforated.
- Remove the sealing film.

NOTE:

The battery is vacuum sealed. If air come into the battery through the sealing film, the initial charging may require more time.





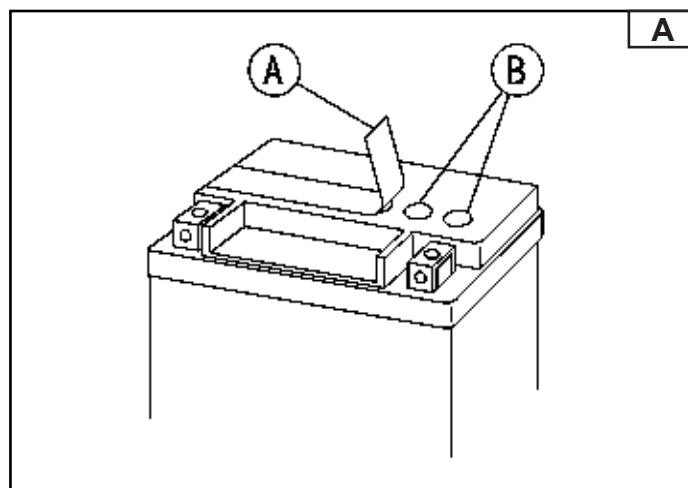
ELECTRICAL SYSTEM

BATTERY CHECK AND CHARGE

- Take the electrolyte bottle away from vinyl bag.
- Detach the strip of caps [A] from the bottle and store it for seal the battery subsequently, Fig. A.

NOTE:

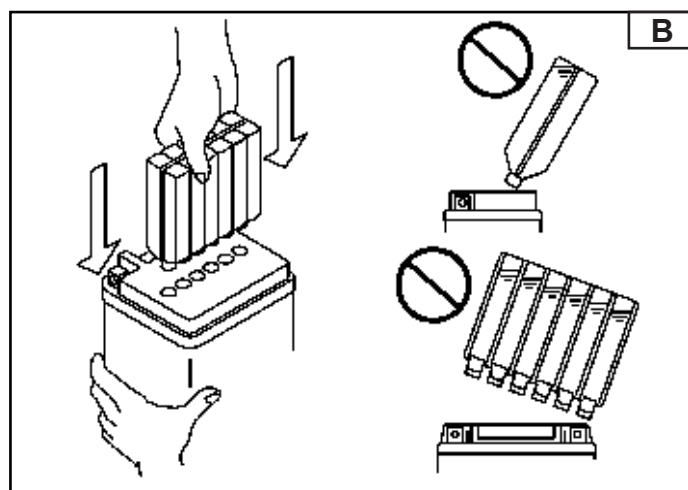
Do not puncture or open the sealed cells [B] of the electrolyte bottle. Do not try to divide the single cells.



- Topple the electrolyte bottle by aligning the six sealed cells to the filling ports of battery. By keeping the bottle in horizontal position, push downwards to break the seals of the six cells. During filling, some air bubbles will go up to each cells Fig. B.

NOTE:

Do not tilt the electrolyte bottle.



- Check the electrolyte flow.
- If there are no air bubbles [A](*) that go up through the filling ports or the cells do not fill completely, tap the bottle [B] some times, Fig. C.

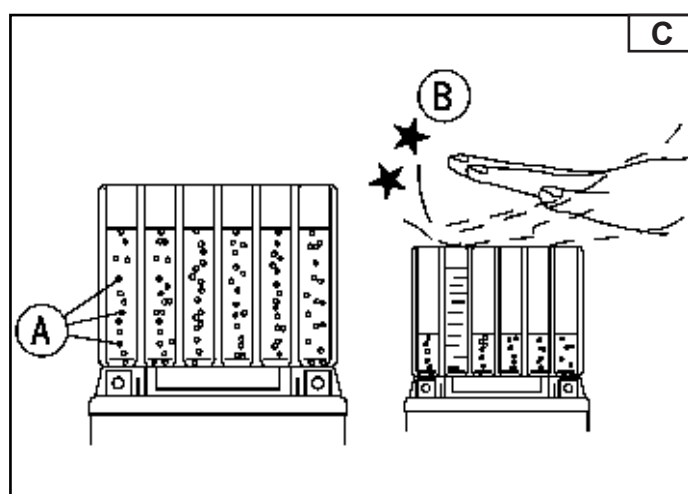
NOTE:

Take care not to drop the battery.

- Leave the bottle in its place. Do not remove the bottle from the battery, since it is necessary that all electrolyte passes into the battery for its proper operation.

WARNING

The removal of the bottle before it is completely empty may reduce the technical life of the battery.
Do not remove the container until it is completely empty.



- After filling, leave the battery to rest with the electrolyte bottle in its place for 20-60 minutes so that the electrolyte can permeate deeply into the plates.
- Check the bottle cells are completely empty and remove the bottle from the battery.



ELECTRICAL SYSTEM

BATTERY CHECK AND CHARGE

- Place the series of caps [A] over the filling ports and press firmly down with both hands to insert them into the battery, Fig. D (without hitting them) Fig. E. If correctly installed, the series of caps will be level on the top side of the battery.

WARNING

After installation of the cap strip, do not remove the caps and do not add water/electrolyte into battery.

NOTE:

Charging immediately after filling may reduce the technical life of the battery.

Initial Charge:

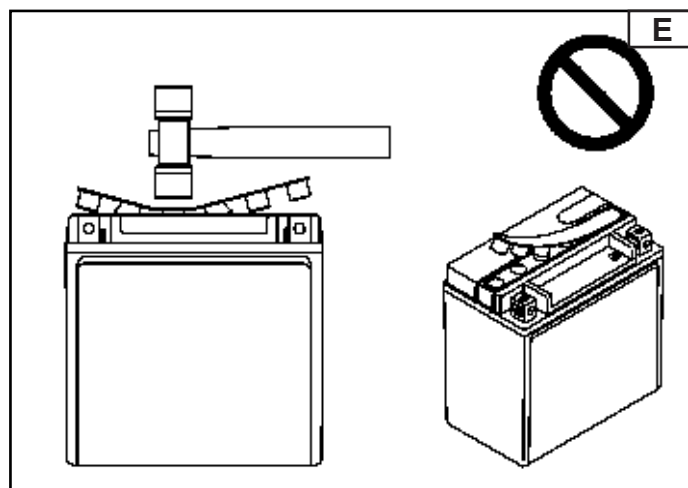
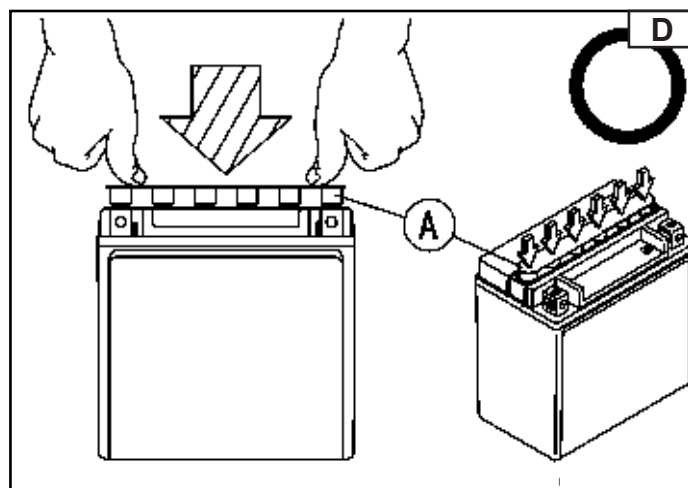
The sealed battery just supplied require initial charge. Use a constant voltage battery charger.

Standard charge: $0.9 \text{ A} \times 5 - 10$ hours.

- Leave the battery to settle for 30 minutes after the initial charge and then inspect the voltage using a voltmeter. (The voltage is temporarily high immediately after charge. For accurate measurement, leave the battery to rest for the time required).

NOTE:

- The charging values change according to the storage duration, the temperature and the type of battery charger used. If the voltage does not reach at least 12.6V, repeat the charging cycle.
- In order to ensure the biggest battery life and the utmost customer's satisfaction, it is suggested to perform 15s load testing under the three times of ampere hour rate. Check the voltage again and if it is lower than 12.6V, repeat the charge cycle and the charge test. If the voltage is still below 12.6V, the battery is faulty.





ELECTRICAL SYSTEM

FUSES

The following procedure applies to all fuses.

IMPORTANT NOTICE

Set the ignition switch to "OFF".

Remove:

- Rider and passenger seats, refer to the section "Rider seat and passenger seat removal, Chapter 4".

Access:

- The fuse box "1" Fig. A.

Check:

- The fuse.

Connect a tester to the fuse and check the continuity.

NOTE:

Move the pocket tester selector to " $\Omega \times 1$ ".

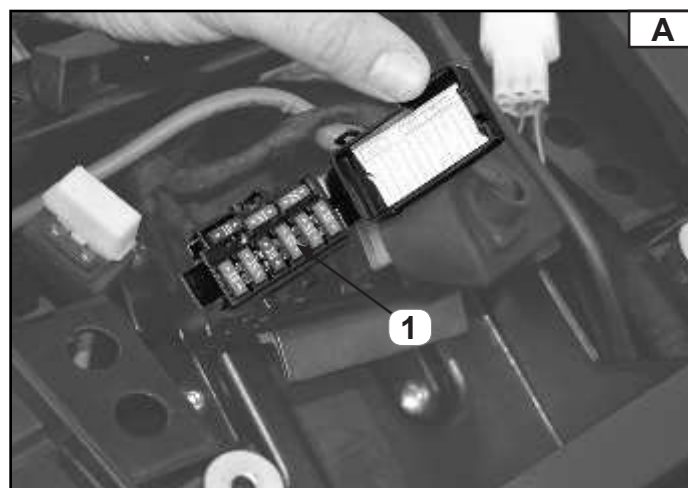
- If the pocket tester reads " ∞ ", replace the fuse.

Replace:

- The blown fuse.
- Turn the main switch to "OFF".
- Install a new fuse with the correct amperage.
- Switch on the switches to make sure that the electrical circuit is working.
- If the fuse burns out immediately, check the power circuit.

WARNING

Never use fuses with a amperage different from those specified. The use of improvised techniques or fuses with different amperages could cause irreversible damage to the electrical system, or cause functioning defects of the lighting system and the ignition system and eventually cause a fire.





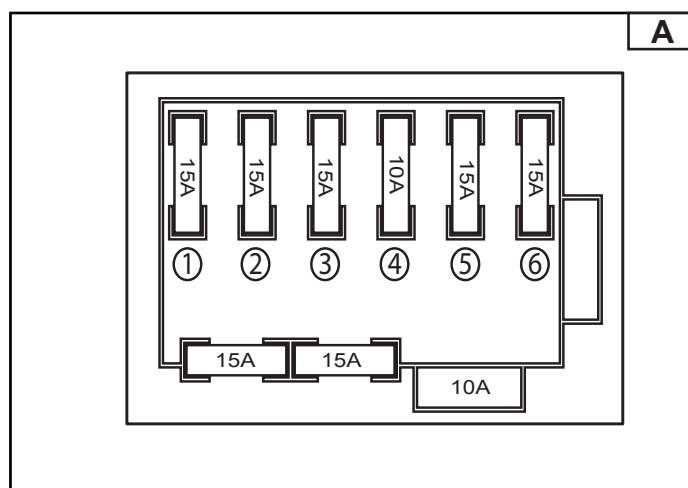
ELECTRICAL SYSTEM

FUSE CHECK

KEY: FUSES

Refer to Fig. A.

1. Fuel pump
2. Fan
3. lights
4. Ignition coil
5. ECU
6. Services



ELECTRICAL SYSTEM

HEADLIGHT REPLACEMENT

IMPORTANT NOTICE

The vehicle has a LED projector integrated into the headlight, and in case of anomaly, it is necessary to replace the whole light. Headlight removal, refer to the section “Front optical unit removal, Chapter 4”.

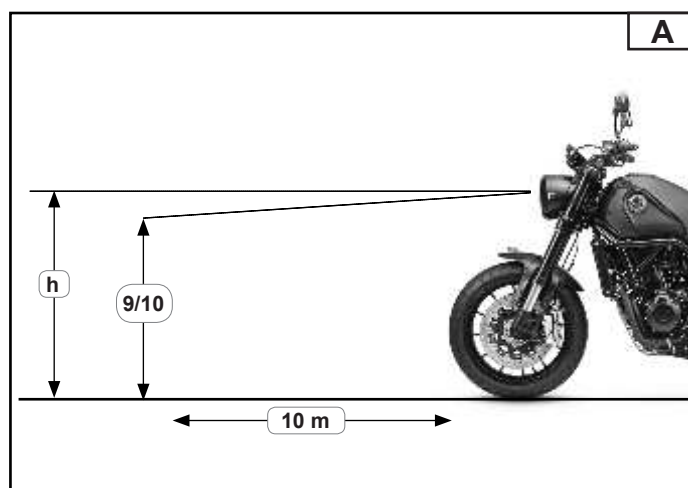


ELECTRICAL SYSTEM

HEADLIGHT ADJUSTMENT

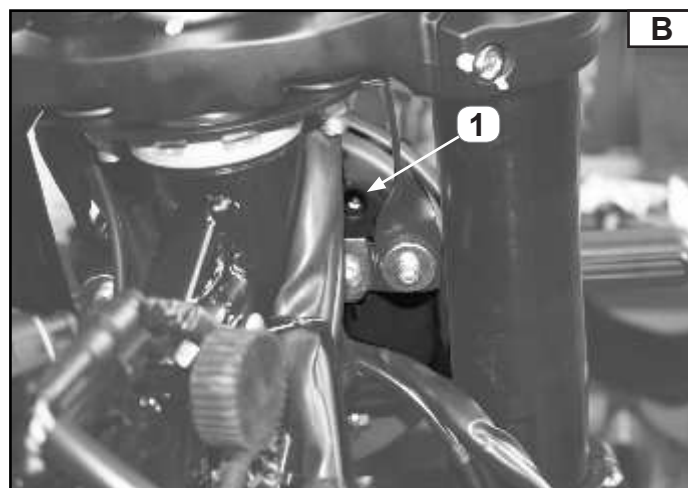
To carry out the correct adjustment of the two headlights' luminous beams:

- Position the vehicle approx. 10 metres distance from a vertical wall on a perfectly flat piece of ground Fig. A.
- Sit on the vehicle in the riding position.
- Make sure that the upper limit of the beam as shining on the wall, is lower than 1/10 of the horizontal axis of the headlamp.
- If the beam does not fall within these limits, make the adjustments to set it to the correct position.



Adjust:

- The beam from the headlight, using the adjustment screw "1" in the top right of the back of the projector, Fig. B.
- Turn counter-clockwise to raise the beam.
- Turn clockwise to lower the beam.



ELECTRICAL SYSTEM

LED REAR LIGHT REPLACEMENT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

To replace the LED rear light, refer to “Rear light removal, Chapter 4.”.



ELECTRICAL SYSTEM

REAR INDICATOR LIGHT REPLACEMENT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

NOTE:

The following procedure applies to both rear indicator lights.

Remove:

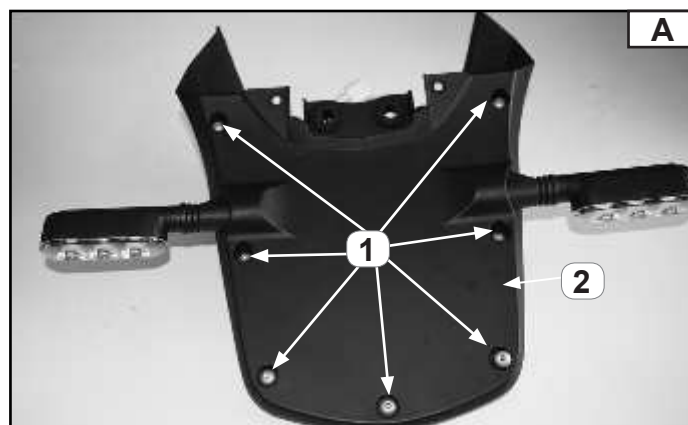
- The rear light, refer to the section “Rear light removal, Chapter 4.”.
- The screws “1” Fig. A.
- The cover “2” Fig. A.
- The left/right position indicator. Fig. B

Install:

- Proceed using the opposite order to removal.

IMPORTANT NOTICE

The vehicle has integrated LED indicators, and in case of anomaly, it is necessary to replace the whole light.





ELECTRICAL SYSTEM

FRONT INDICATOR LIGHT REPLACEMENT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

NOTE:

The following procedure is applicable to both front indicators.

Remove:

- The headlight, refer to the section “Front optical unit removal, Chapter 4.”.

Disconnect:

- The connections “1” and “2” of the right and left indicators, Fig. A.

Remove:

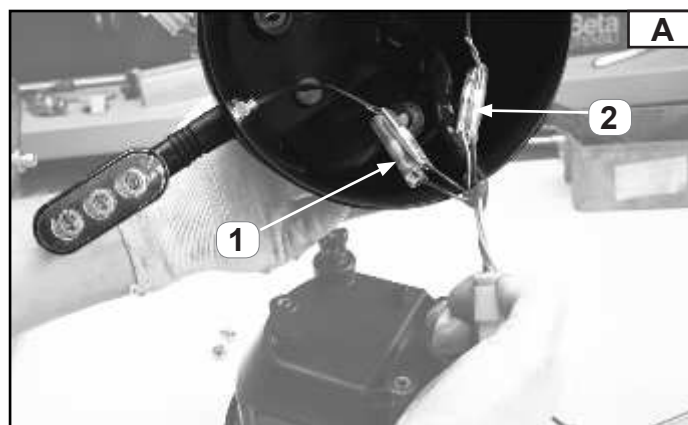
- The left/right position indicator. Fig. B

Install:

- Proceed using the opposite order to removal.

IMPORTANT NOTICE

The vehicle has integrated LED indicators, and in case of anomaly, it is necessary to replace the whole light.





ELECTRICAL SYSTEM

IGNITION BLOCK REPLACEMENT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The handlebar, refer to the section " **Handlebar removal, Chapter 4.** ".
- Base steering top, refer to the section " **Base steering top removal, Chapter 4.** ".

Disconnect:

- The connector "1" from the electrical distributor "2" Fig. A.

Remove:

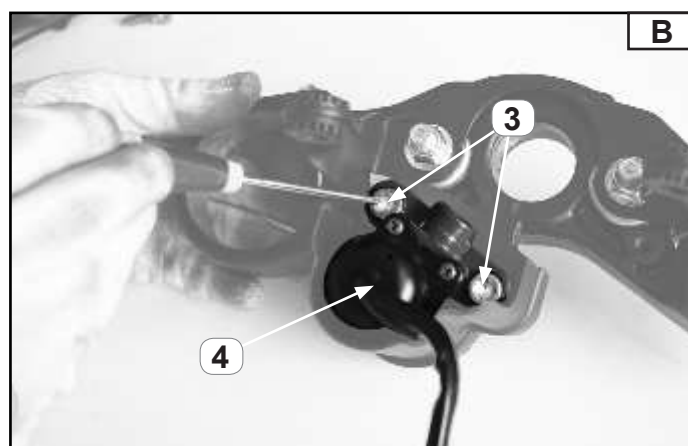
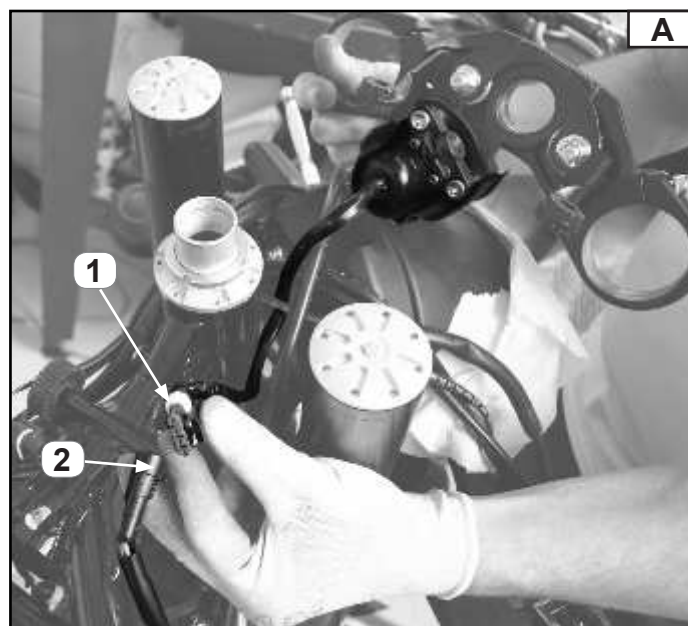
- The safety screws "3" Fig. B.
- The ignition block "4" Fig. B.

Install:

- Proceed using the opposite order to removal.

NOTE:

Each time a new ignition block is installed, it is necessary to carry out the mapping of the new block.





ELECTRICAL SYSTEM

INSTRUMENT PANEL REPLACEMENT

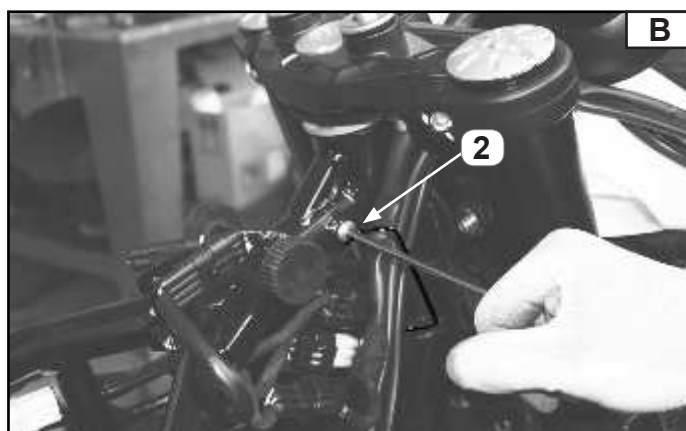
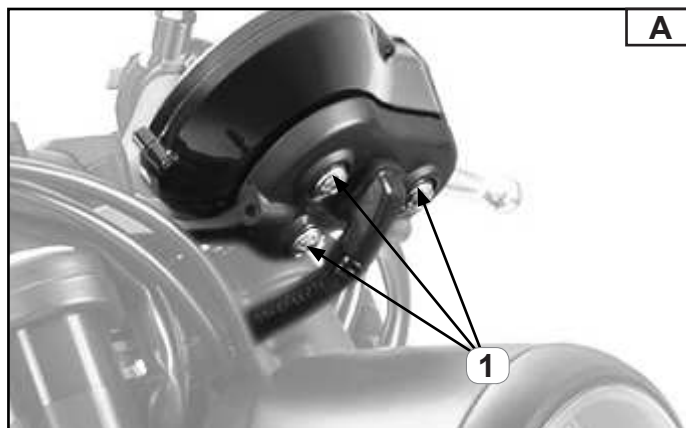
Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

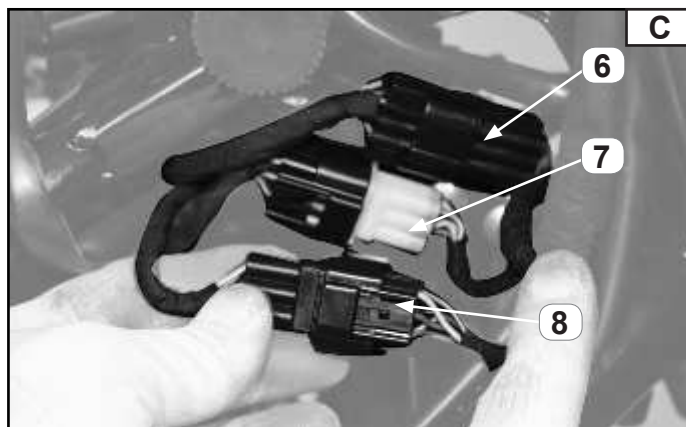
Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Fuel tank, refer to the section “**Fuel tank removal, Chapter 4**”.
- The screws (1) Fig. A.
- The screw (2) from the cable support bracket Fig. B.



Disconnect:

- The connector “6” Fig. C.
- The connector “7” Fig. C.
- The connector “8” Fig. C.



ELECTRICAL SYSTEM

INSTRUMENT PANEL INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screws (1) Fig. A
- To the following torque:

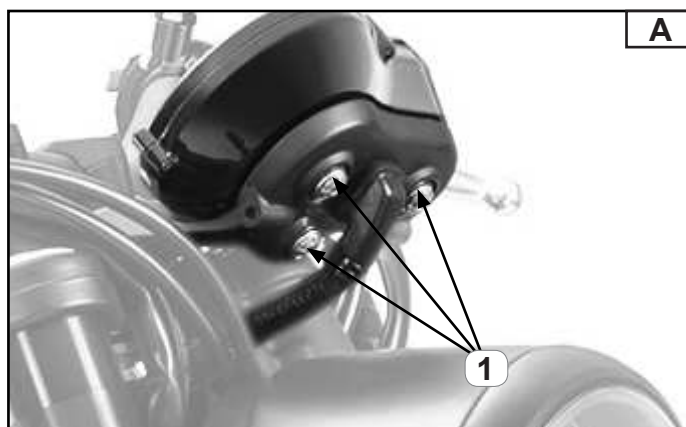


Torque 5-6 N*m

Use Loctite thread locker to secure.



Loctite 243







CHAPTER 4

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FRONT WHEEL AND BRAKE DISCS

FRONT WHEEL REMOVAL

Park:

- The motorcycle on a level surface.

NOTE:

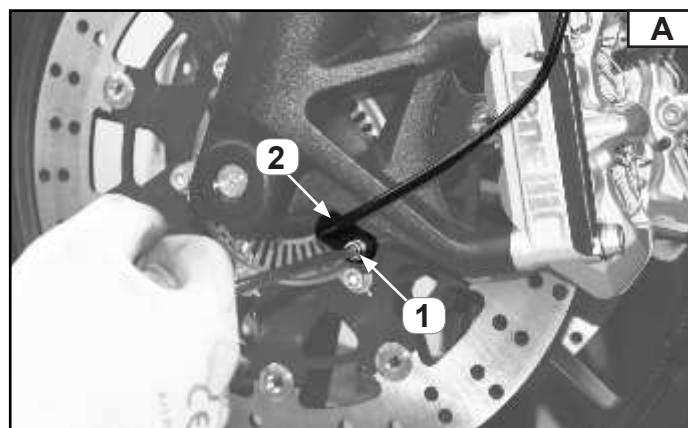
Place the bike on a suitable support so that the front wheel is raised.

Remove:

- Front mudguard, refer to the section “Removal of front mudguard, Chapter 4”.

Remove:

- The screw “1”.
- The ABS sensor “2” Fig. A.
- The screws “3” Fig. B.
- The tube guide bracket “4.” Fig. B.

**Detach:**

- The right brake calliper.

NOTE:

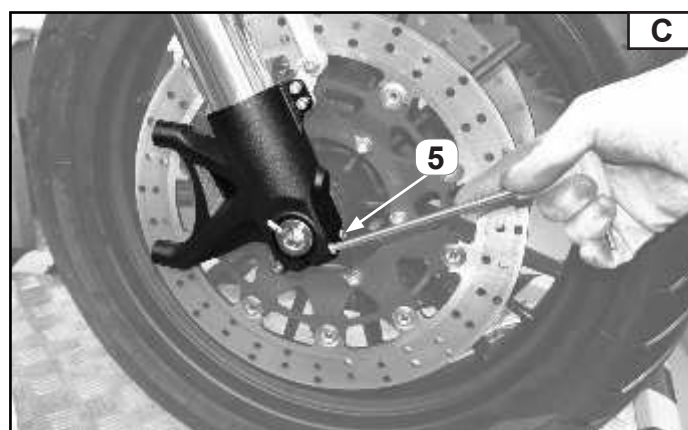
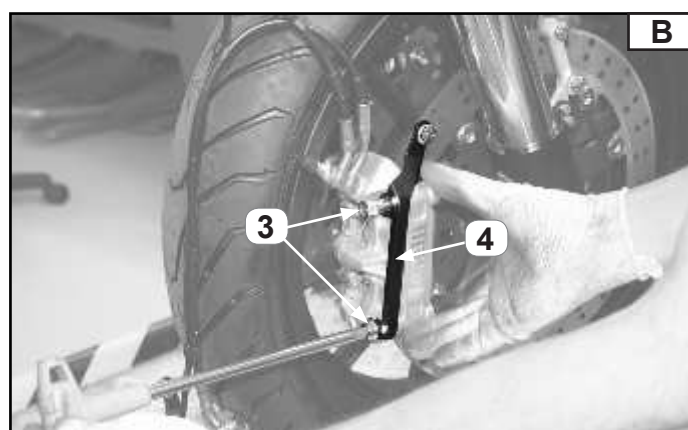
Repeat the above-mentioned procedure for the opposite front brake calliper.

NOTE:

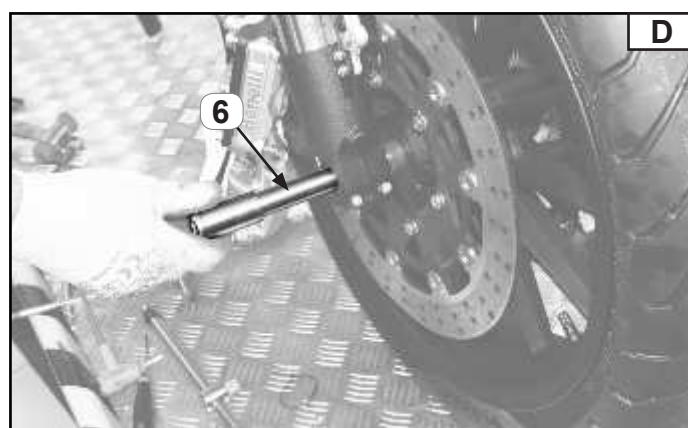
Do not pull the front brake lever while removing the callipers.

Loosen:

- The setscrews “5” Fig. C.

**Remove:**

- The front wheel axle pin “6” Fig. D.

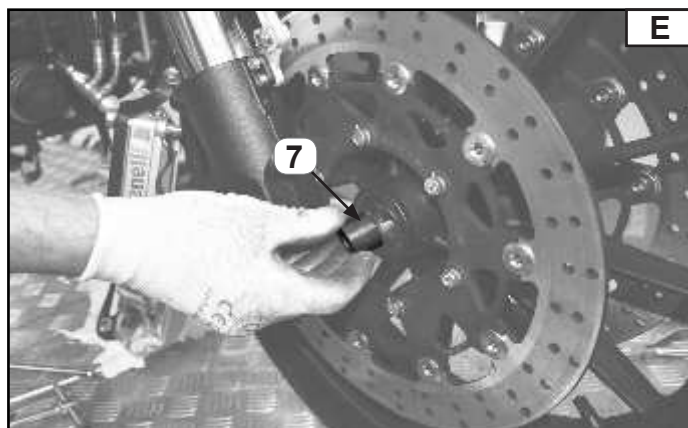




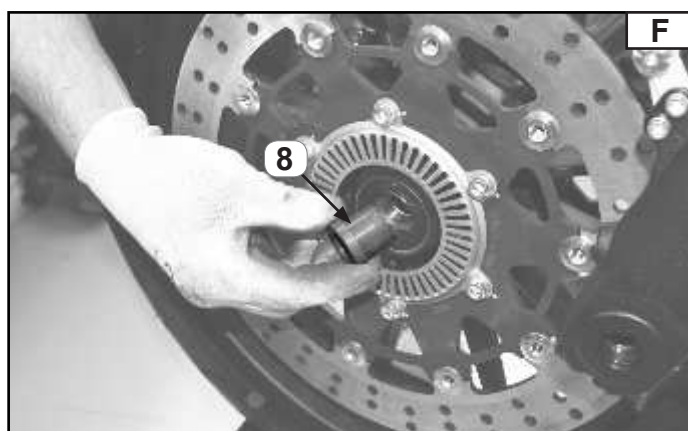
FRONT WHEEL AND BRAKE DISCS

FRONT WHEEL REMOVAL

- The front wheel.
- The right shim "7" Fig. E.



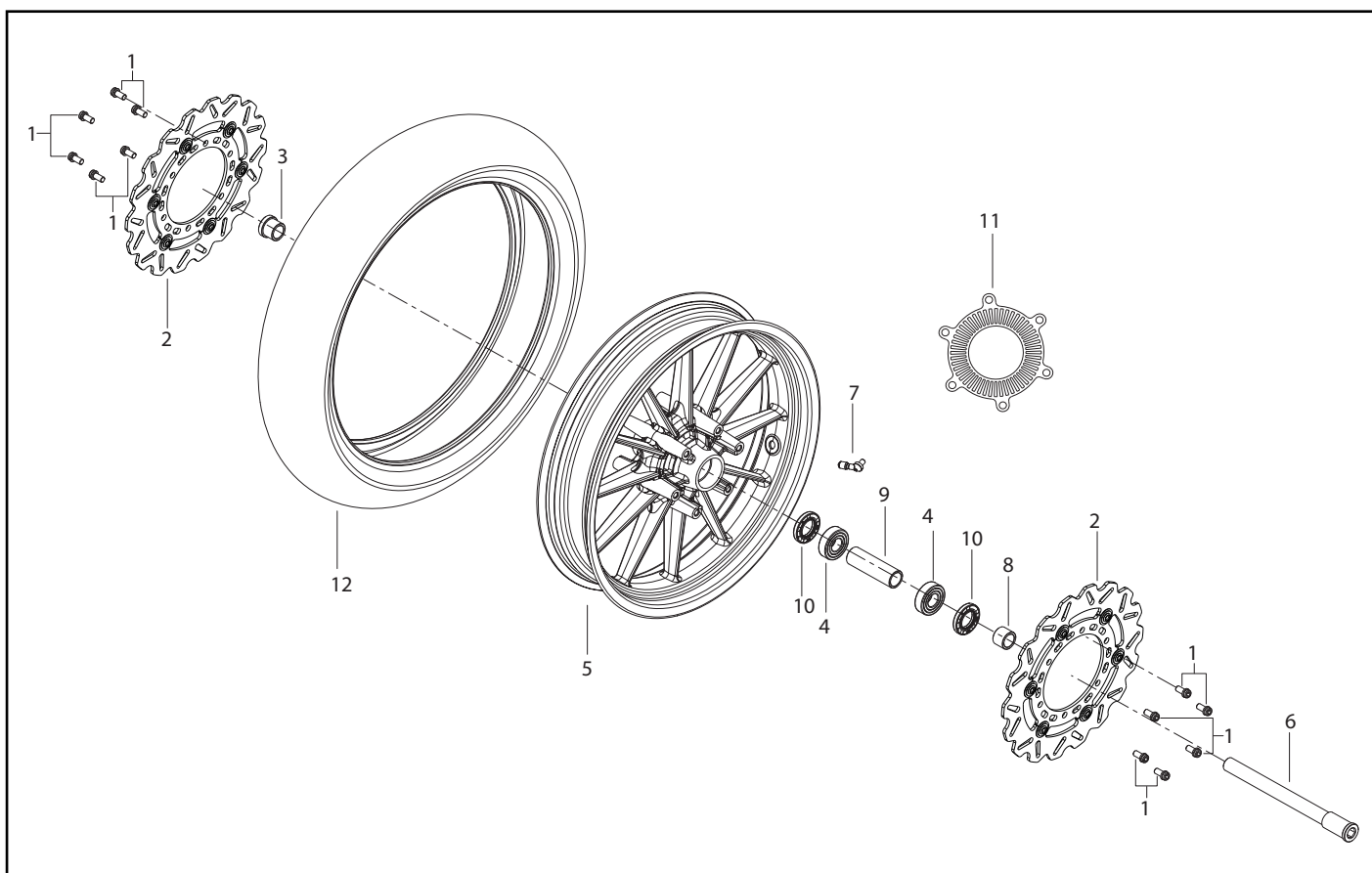
- The shim "8" Fig. F.





FRONT WHEEL AND BRAKE DISCS

REMOVAL/INSTALLATION OF BRAKE DISCS



Pos.	Description	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SCREW				
2	FRONT BRAKE DISC				
3	LEFT SHIM				
4	BEARING				
5	FRONT WHEEL RIM (GREY)				
6	FRONT WHEEL AXLE PIN				
7	VALVE				
8	SHIM				
9	INTERNAL SHIM				
10	OIL SEAL				
11	FRONT WHEEL ABS SENSOR				
12	FRONT TYRE 120/70-R17				



FRONT WHEEL AND BRAKE DISCS

REMOVAL/INSTALLATION OF BRAKE DISCS

Remove:

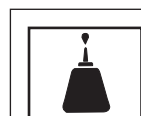
- Front wheel, refer to the section “Removal of the front wheel”.
- Brake callipers, refer to the section “Removal of the front brake callipers”.
- Screws “1” Fig. A.
- Brake disc “2” Fig. A.

Install:

- Left front brake disc.
- Screws “1”.

NOTE:

Repeat the above-mentioned procedure for the opposite front disc brake.



MEDIUM THREAD LOCK-ER

The procedure below applies to both brake discs.

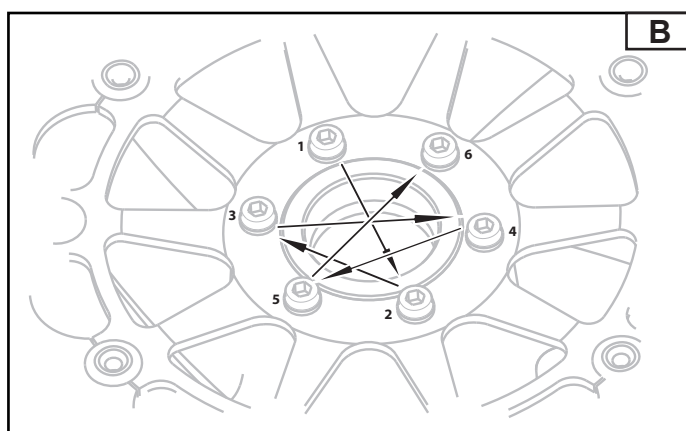
NOTE:

Tighten the bolts on the brake disc in successive steps and proceeding in a crossover manner Fig B.

- Tighten to the torque:



Torque 22 N*m





FRONT WHEEL AND BRAKE DISCS

CHECK OF BRAKE DISCS

The procedure below applies to all **brake** discs.

Check:

- The brake disc.

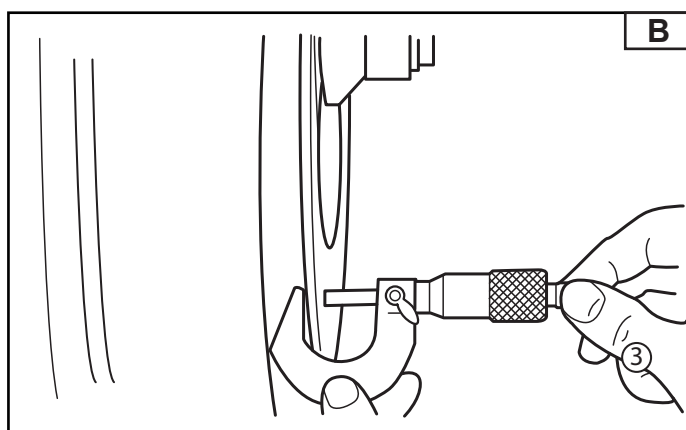
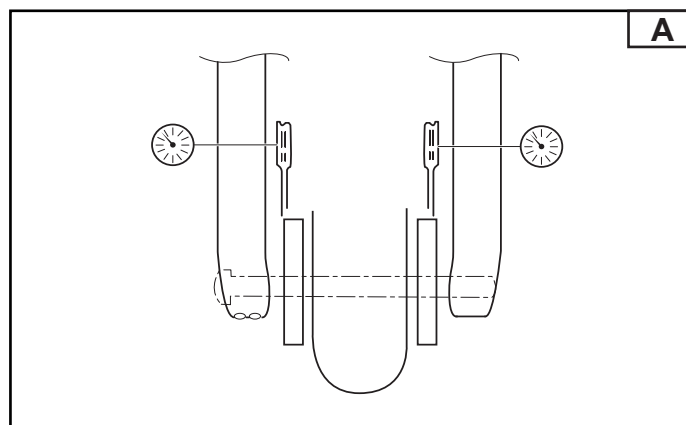
If there is any damage/abrasion, replace.

Measure:

- The deformation of the brake disc.

Substitute the brake disc if it is outside the specification.

- Place the motorcycle on a suitable support so that the wheel is raised.
- Before measuring the bending of the front brake disc, turn the handlebar right and then left to make sure that the front wheel does not move.
- To remove the brake calliper, refer to the section “**Removal of the brake calliper**”.
- Keep the gauge at a right angle to the surface of the brake disc.
- Measure the bending, which must be between 0.1 mm and 0.15 mm (0,03-0,059 in) under the edge of the brake disc Fig. A.



Brake disc	Deformation limit
Front	0.1 mm
Rear	0.15 mm
Disc (thickness 5 mm) Fig. B.	4.5 mm

Measure:

- Brake disc thickness.
- Measure the thickness of the brake disc at various different points - Fig. B.
- If outside specifications, replace.



FRONT WHEEL AND BRAKE DISCS

WHEEL AXLE CHECK

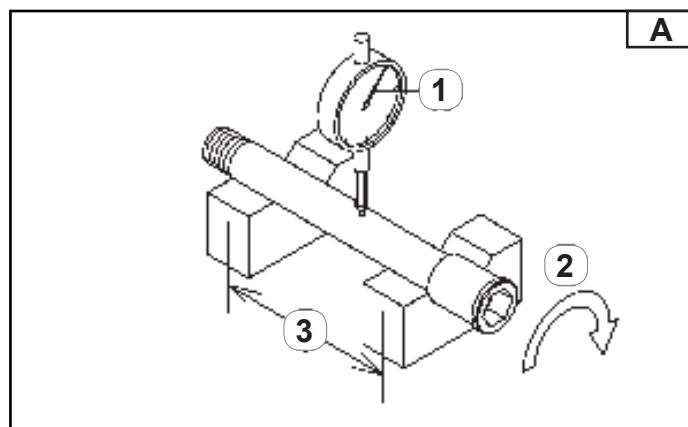
Carry out a visual check of the front wheel and rear wheel axle pin to check for damage.

Replace the wheel axle pin if it is damaged or bent.

Check:

- Wheel axle.
- Position the wheel axle on two V-shaped blocks approx. 100 mm apart (3) and position a comparator (1) on the wheel axle at a point halfway between the blocks – Fig. A.
- Rotate the wheel axle (2) to measure the lack of centring.

The difference between the upper and lower detections of the comparator represents the measurement of the misalignment. Substitute the wheel axle pin, if the misalignment exceeds the service limit.



Wheel axle pin runout /100 mm	
Standard	LIT 0.1 mm or less
Service limit	LIT 0.2 mm

IMPORTANT NOTICE

**Do not try to straighten the wheel axle if it is warped.
If there is any warping, replace.**

Check:

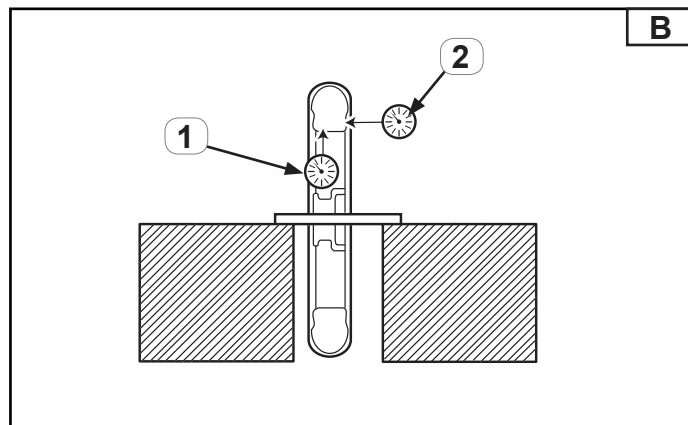
- The tyre.
- The front wheel.

If there is any damage/wear, replace.

Measure:

- The radial eccentricity of the wheel "1" Fig. B.
- The side eccentricity of the wheel "2" Fig. B.

If the specified limit is exceeded, replace.



Eccentricity	Limit
Radial(1)	1.5 mm
Side(2)	1.5 mm



FRONT WHEEL AND BRAKE DISCS

CHECK/REPLACEMENT OF WHEEL BEARINGS

Check:

- The wheel bearings.

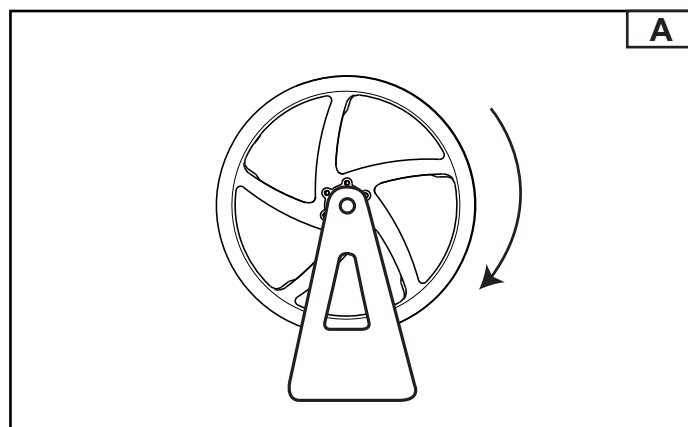
If the front wheel turns irregularly or is loose, replace the wheel bearings.

Replace:

- The wheel bearings.

Remove the wheel bearings "1" using a general bearing extractor Fig. B.

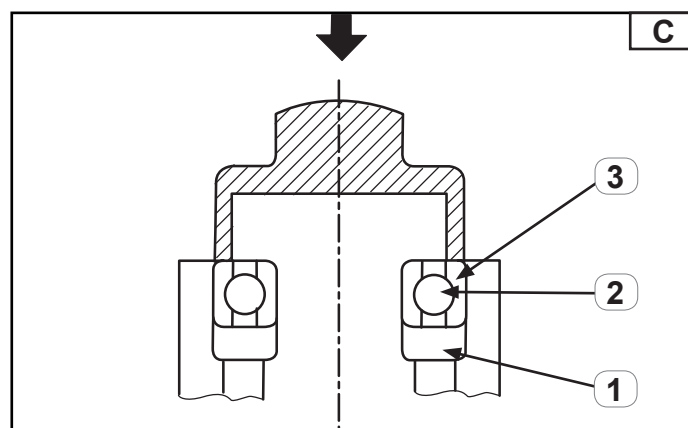
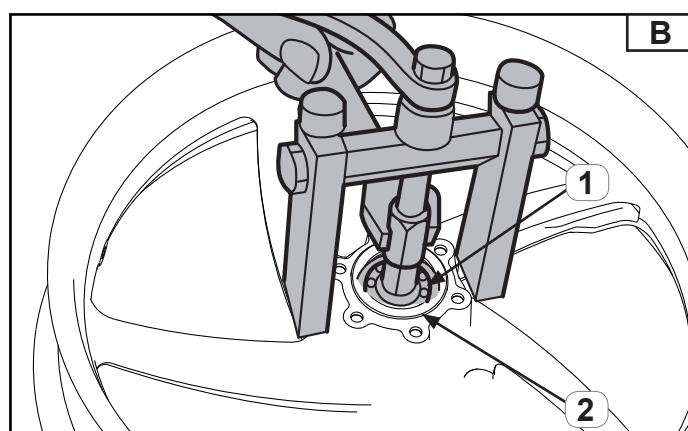
Insert the new wheel bearings, following the removal steps in reverse order.

**IMPORTANT NOTICE**

During the bearing insertion, do not touch the inner seat "1" or the ball bearings of the wheel "2". Contact must only occur with the outer seat of bearing "3" Fig. C.

NOTE:

Use a wrench that adapts to the diameter of the external edge of the wheel bearing.





FRONT WHEEL AND BRAKE DISCS

FRONT WHEEL INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

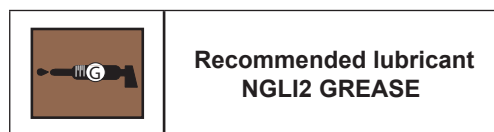
Prop the motorcycle on suitable supports so that it cannot fall.

Install:

Proceed using the opposite order to removal.

Tighten to the torque:

- Wheel axle pin "1" Fig. A.



Recommended lubricant
NGLI2 GREASE



Torque 60 N*m

- The setscrews "2" Fig. B.



Torque 10 N*m

IMPORTANT NOTICE

Before tightening the front wheel axle pin, push hard on the handlebars to check that the front fork returns to the stationary position in a smooth way.

Install:

- Right brake calliper Fig. C.
- Tube guide bracket "3" Fig. C.
- Screws (4) Fig. C.

Tighten to the torque:



Torque 50 N*m

Install:

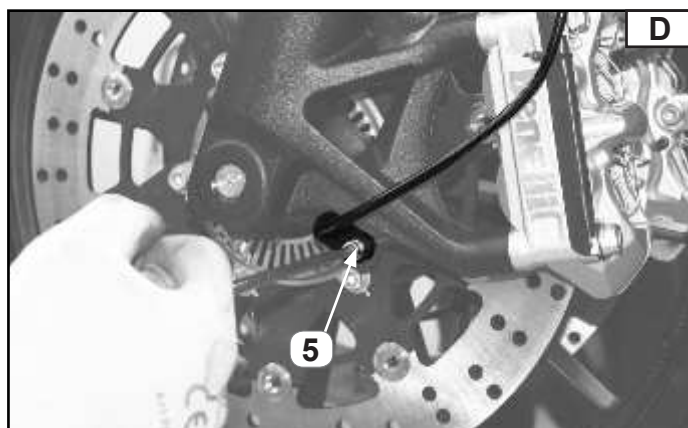
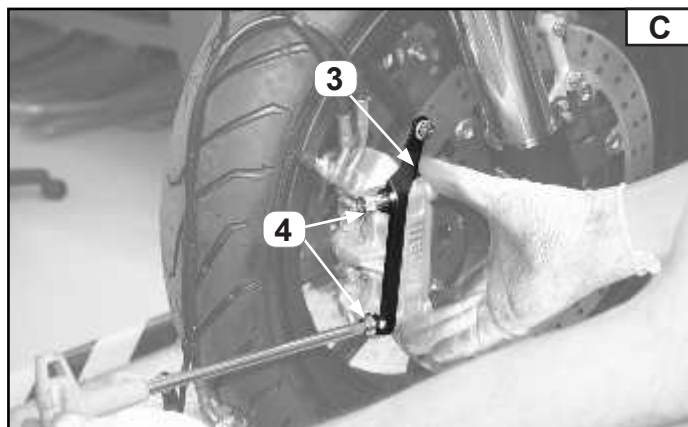
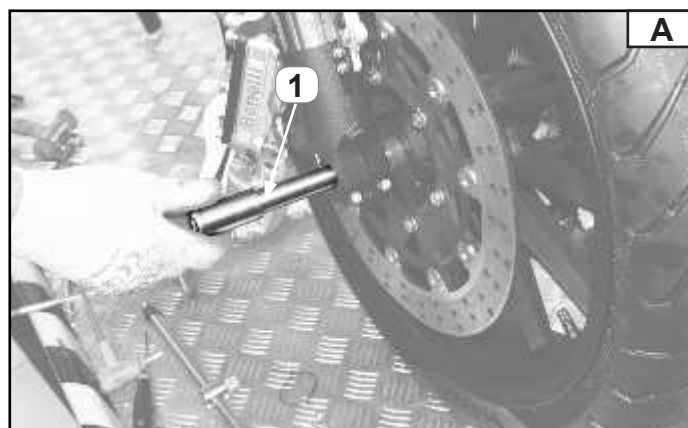
- ABS sensor Fig. D.
- Screw (5) Fig. D.

NOTE:

Repeat the above-mentioned procedure for the opposite brake calliper.

Ensure that there is enough space between the brake pads before fitting the callipers on the relative brake discs.

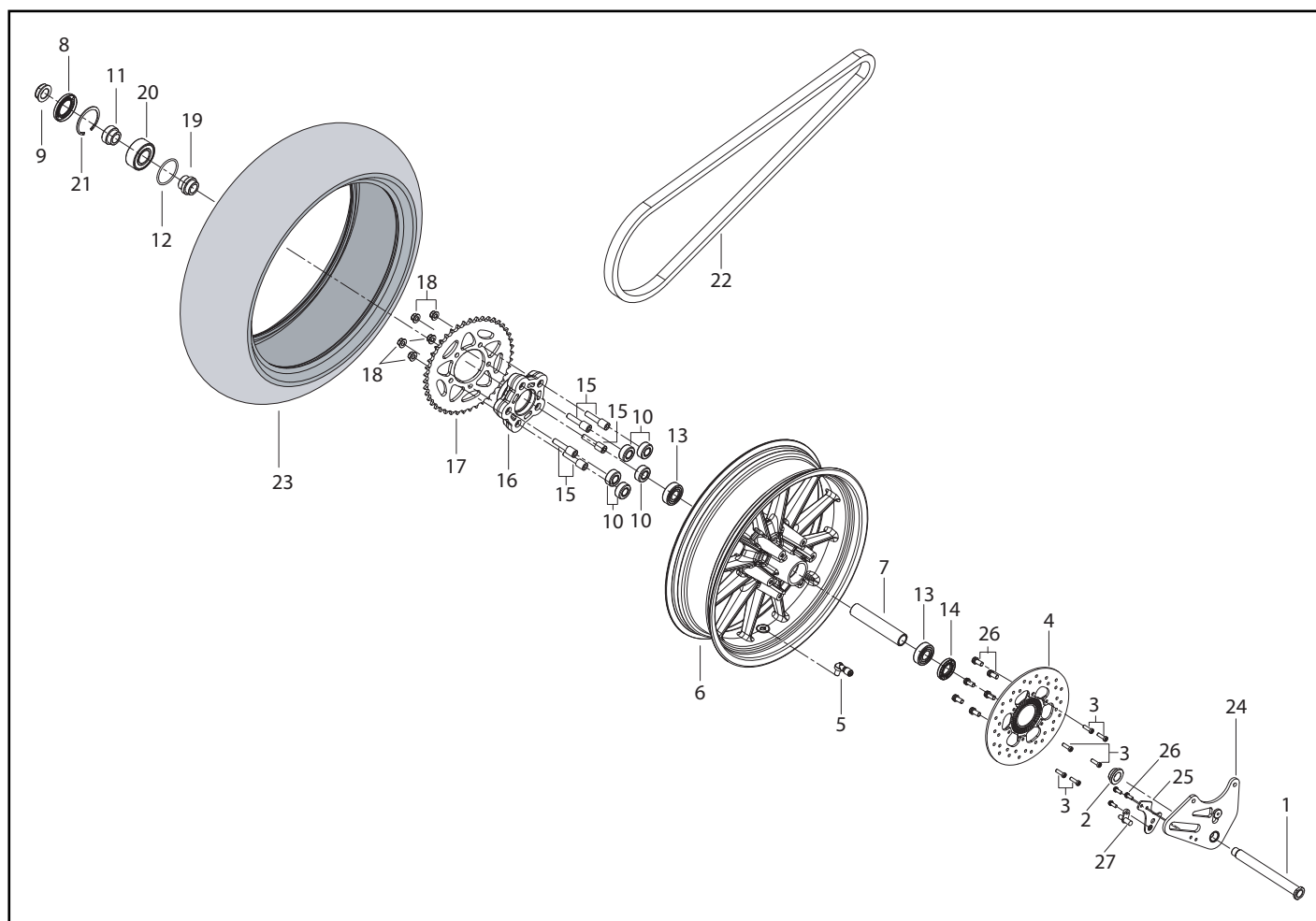
Check that the travel of the flexible brake hose is correct.





REAR WHEEL AND BRAKE DISC

REAR WHEEL REMOVAL



Pos.	Description	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	REAR WHEEL AXLE PIN				
2	BUSHING				
3	SCREW				
4	REAR BRAKE DISC				
5	VALVE				
6	REAR WHEEL RIM				
7	INTERNAL SHIM				
8	DUST COVER				
9	NUT				
10	FLEXIBLE COUPLING				
11	SHIM				
12	O-RING				
13	BEARING				
14	OIL SEAL				
15	SCREW				
16	SPROCKET FLANGE				
17	SPROCKET				
18	NUT				
19	SHIM				



REAR WHEEL AND BRAKE DISC

REAR WHEEL REMOVAL

Pos.	Description	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
20	BEARING				
21	ELASTIC RING				
22	TRANSMISSION CHAIN				
23	REAR TYRE				
24	CALLIPER HOLDER PLATE				
24	CALLIPER HOLDER PLATE				
25	SUPPORT PLATE				
26	SCREW				
27	REAR WHEEL ABS SENSOR				



REAR WHEEL AND BRAKE DISC

REAR WHEEL REMOVAL

Park:

- The motorcycle on a level surface.

NOTE:

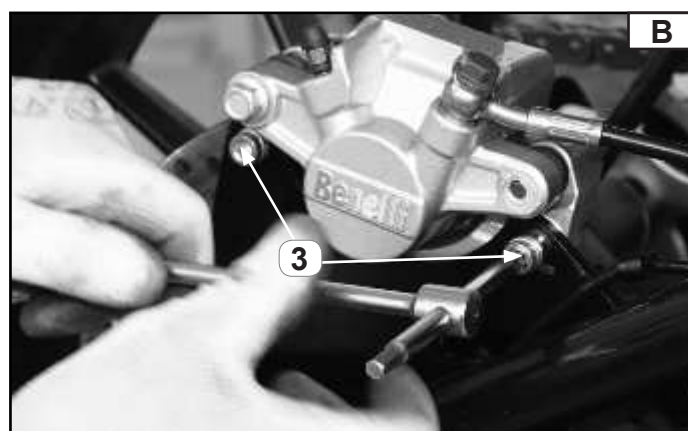
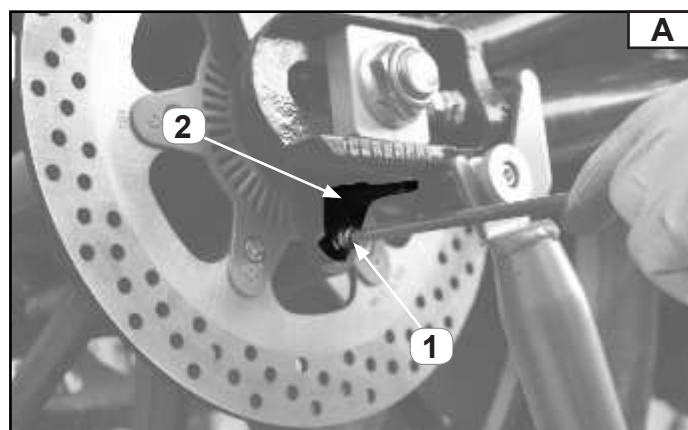
Place the bike on a suitable support so that the rear wheel is raised.

Remove:

- Licence plate holder support arm, refer to the section “Licence plate support arm removal”.
- The screw “1” Fig. A.
- The phonic wheel sensor “2” Fig. A.

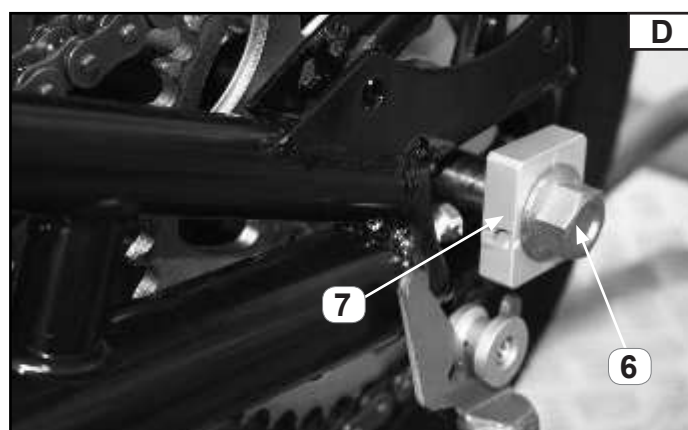
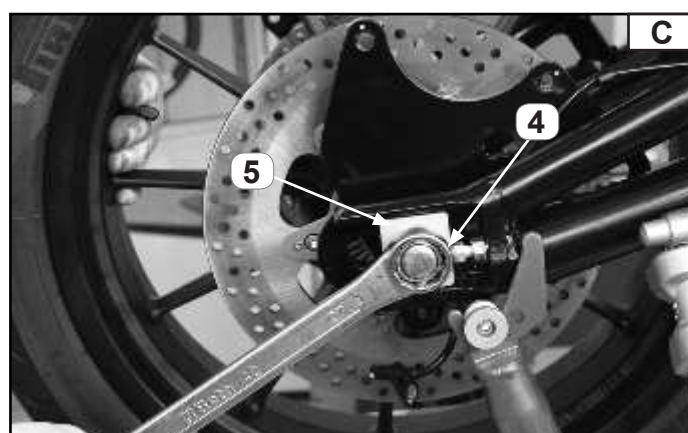
Remove:

- The screws “3” Fig. B.
- The brake calliper.



Remove:

- The nut “4” Fig. C.
- The register slide “5” Fig. C.
- The pin “6” Fig. D.
- The register slide “7” Fig. D.



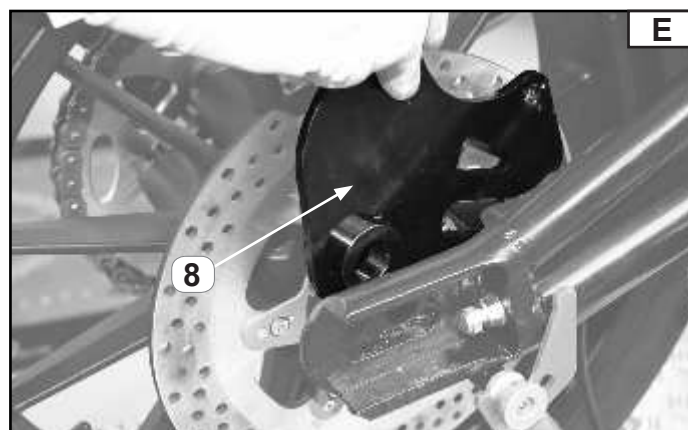


REAR WHEEL AND BRAKE DISC

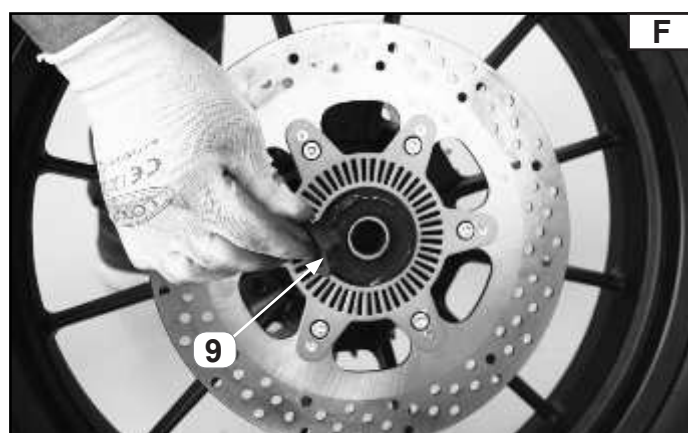
REAR WHEEL REMOVAL

NOTE:

During this phase, be careful in separating the components such as the chain tensioner register on the sprocket side and the brake disc side and brake calliper support plate "8" Fig. E.

**Remove:**

- The bushing "9" Fig. F.
- The shim "10" Fig. G.





REAR WHEEL AND BRAKE DISC

SPROCKET AND REAR BRAKE DISC REMOVAL

Remove:

- Rear wheel, refer to the section “Rear wheel removal, Chapter 4”.

Remove the brake disc:

- The screws (3*) Fig. A.
- The brake disc (4*) Fig. A.

Take out the sprocket:

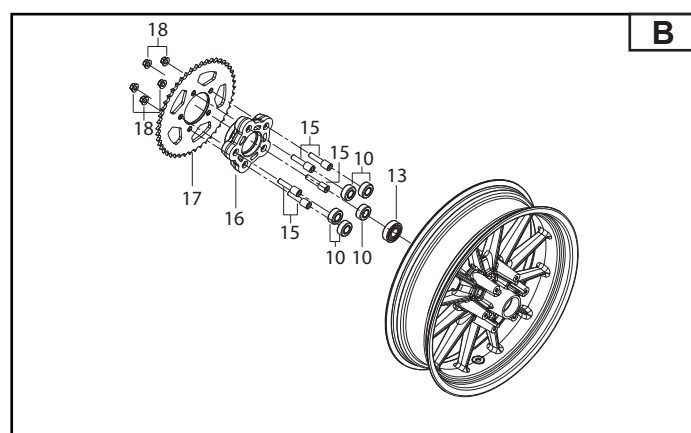
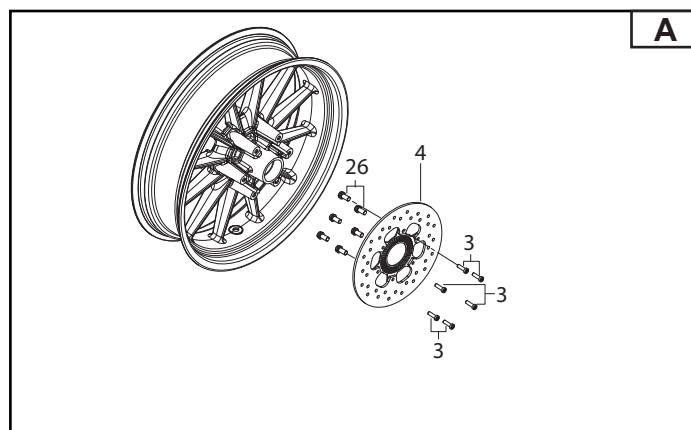
- The nuts (18*).
- The sprocket (17*).
- The flange (16*).
- The screws (15*).
- The flexible couplings (10*).

Check:

- The sprocket support flange (16*).
- If there is any cracking/damage, replace.
- The flexible couplings (10*).
- If there is any damage or wear, replace.

NOTE:

The numbers marked (*) are a part of the “Rear wheel and brake disc” table.





REAR WHEEL AND BRAKE DISC

WHEEL AXLE CHECK

Check:

- Wheel axle.
 - Roll the wheel axle "1" on a flat surface Fig. A.
- If there is any warping, replace.

WARNING

Do not try to straighten the wheel axle if it is warped.

Check:

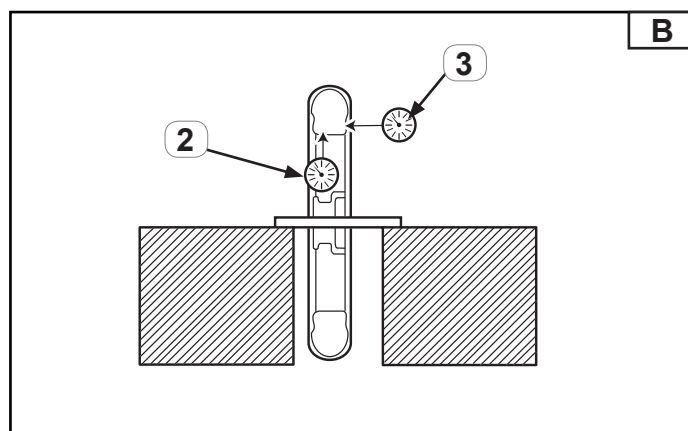
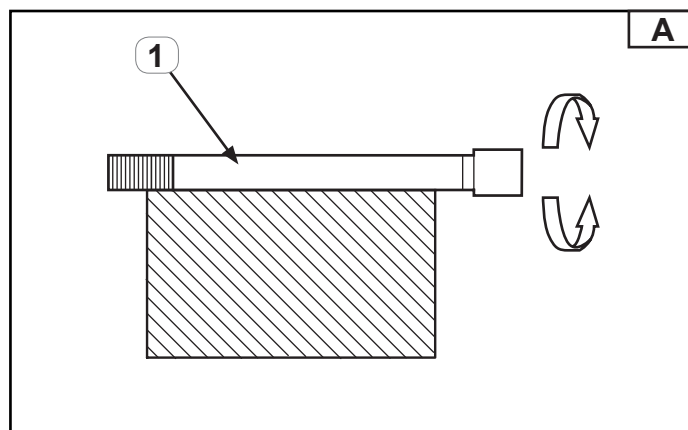
- The tyre.
 - The front wheel.
- If there is any damage or wear, replace.

Measure:

- The radial eccentricity of the wheel "2" Fig. B.
 - The lateral eccentricity of the wheel "3" Fig. B.
- If the specified limit is exceeded, replace.



Eccentricity	Limit
Radial(2)	1.5 mm
Side(3)	1.5 mm





REAR WHEEL AND BRAKE DISC

CHECK/REPLACEMENT OF WHEEL BEARINGS

Check:

- The wheel bearings.

If the front wheel turns irregularly or is loose, replace the wheel bearings.

Replace:

- The wheel bearings.

Remove the wheel bearings "1" using a general bearing extractor Fig. B.

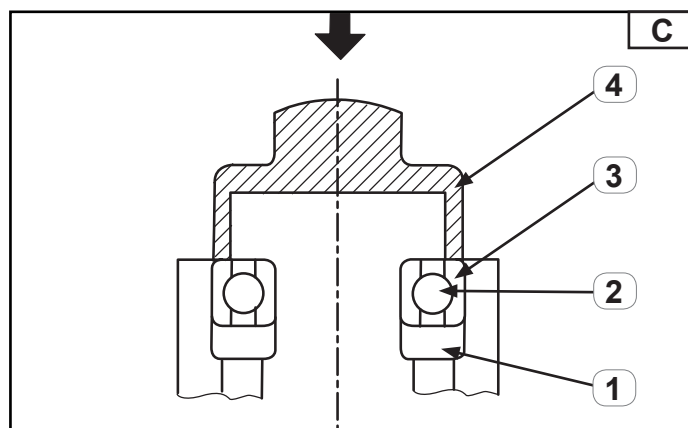
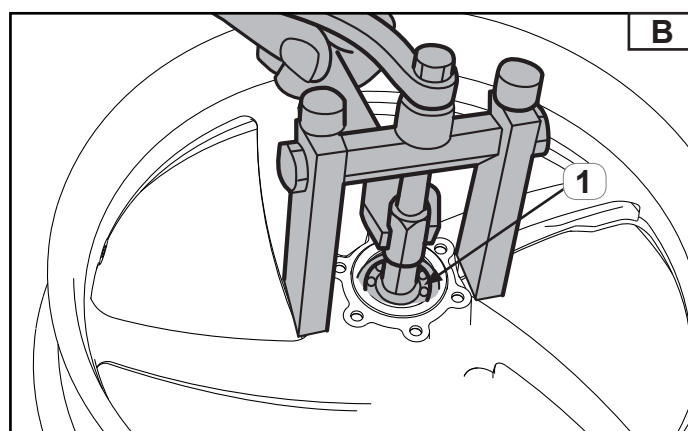
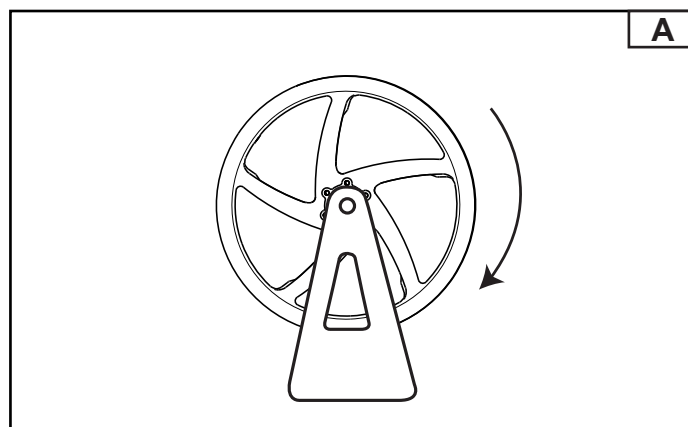
Insert the new wheel bearings, following the removal steps in reverse order.

IMPORTANT NOTICE

During the bearing insertion, do not touch the inner seat "1" or the ball bearings of the wheel "2". Contact must only occur with the outer seat of bearing "3" Fig. C.

NOTE:

Use a wrench that adapts to the diameter of the external edge "4" of the wheel bearing Fig. C.





REAR WHEEL AND BRAKE DISC

CHECK AND REPLACEMENT OF SPROCKET

Check:

- The sprocket.
- If more than 1/4 of each tooth is worn, replace the sprocket.
If the teeth are bent, replace the sprocket.

- 1/4 teeth.
- Correct.
- Transmission chain roller.
- Sprocket.

Replace:

- The sprocket**, refer to the section "Removal of the rear brake disc, sprocket and phonic wheel".
- Clean the sprocket holder flange (16*) using a clean cloth, especially the surfaces that touch the sprocket.



Solvent with high flash point.

Install:

- The new sprocket.
- The self-locking nuts (18*) and tighten to the following torque:



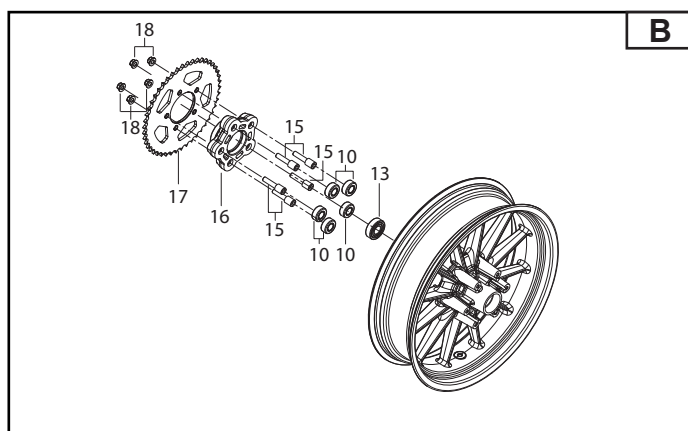
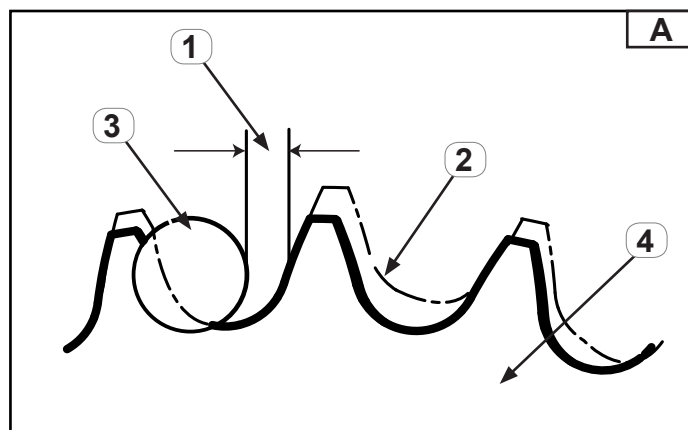
Torque 45 N*m

NOTE: _____

Tighten the self-locking nuts in several stages, proceeding with a crossover sequence.

NOTE: _____

The numbers marked (*) are a part of the "Rear wheel and brake disc" table.





REAR WHEEL AND BRAKE DISC

BRAKE DISC INSTALLATION

Install:

- The brake disc (4*) Fig. A.
- Lubricate the screws (26) Fig. A.

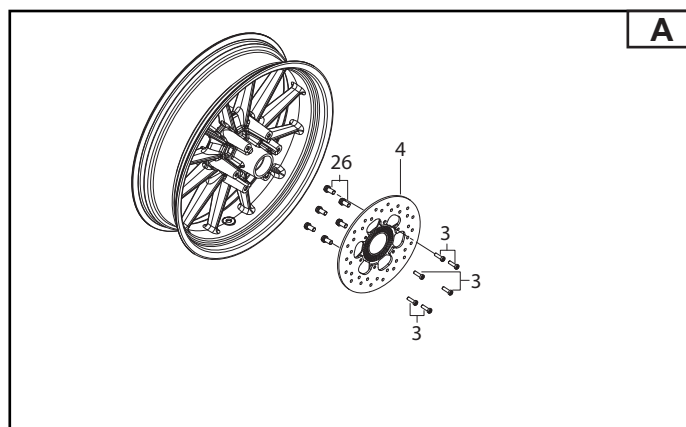


**MEDIUM THREAD
LOCKER**

- Tighten to the following torque:



Torque 10 N*m

**NOTE:** _____

Tighten the self-locking nuts in several stages, proceeding with a crossover sequence.

NOTE: _____

The numbers marked (*) are a part of the "Rear wheel and brake disc" table.

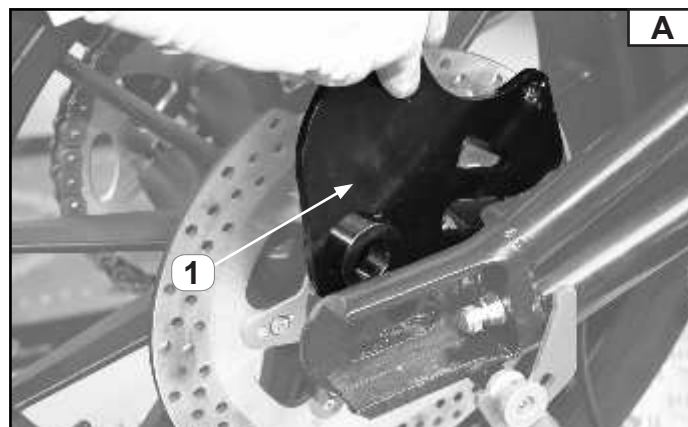


REAR WHEEL AND BRAKE DISC

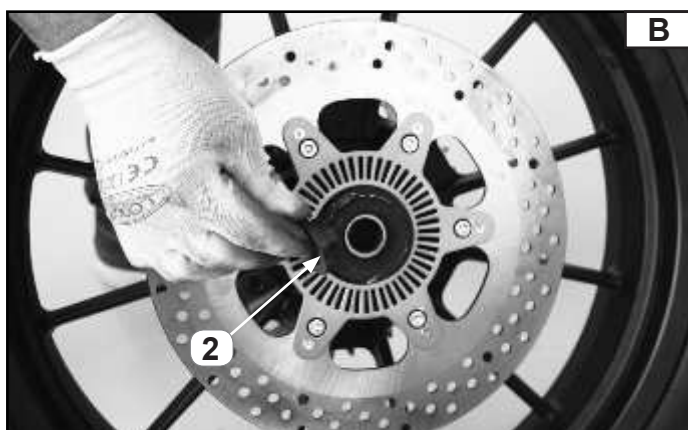
REAR WHEEL INSTALLATION

Install:

- Position the brake calliper support bracket (1) Fig. A.



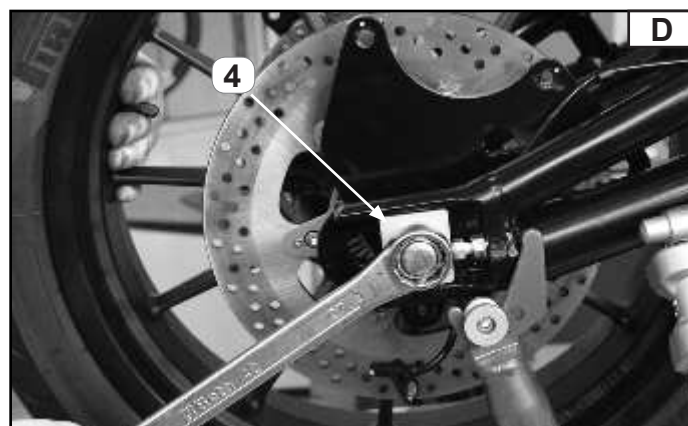
- Insert the bushing (2) right side Fig. B.



- Insert the bushings (3) left side Fig. C.



- Position the register slide (4) Fig. D.





REAR WHEEL AND BRAKE DISC

REAR WHEEL INSTALLATION

- Position the register slide (5) Fig. E.
- Position the rear wheel.

Lubricate and install:

- The pin (6) Fig. F.
- The nut (7) Fig. G.



**Recommended lubricant
NGLI2 GREASE**

- tighten to the following torque:



Torque 80 N*m

Install:

- The brake calliper (8) Fig. H.
- The screws (9) Fig. H.
- Tighten to the following torque:



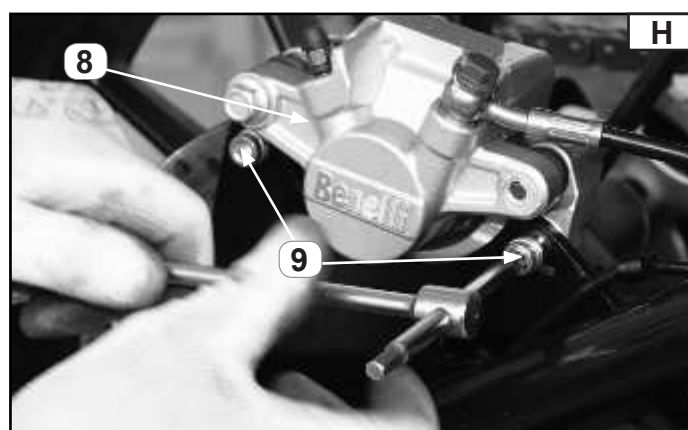
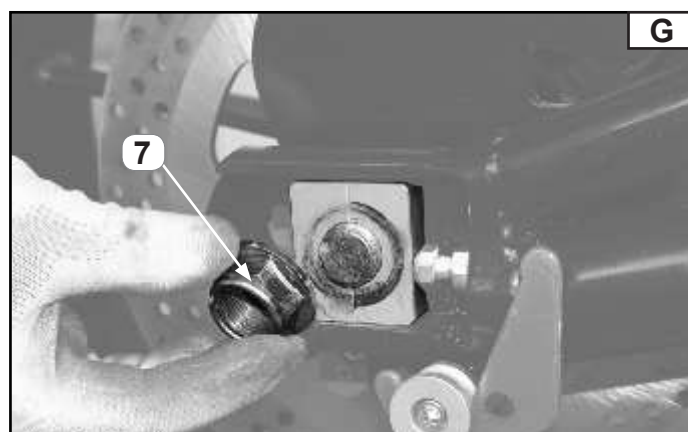
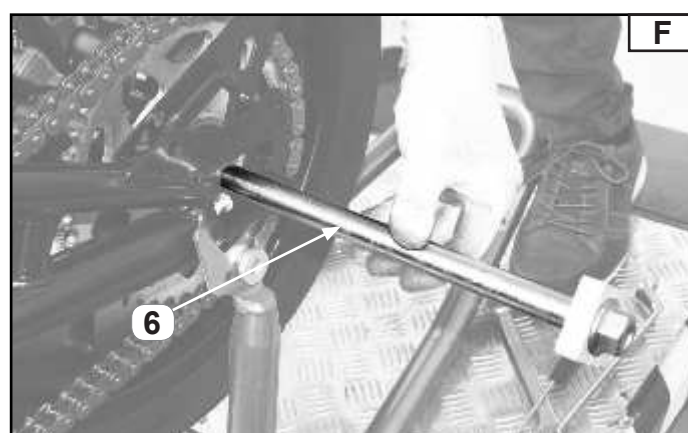
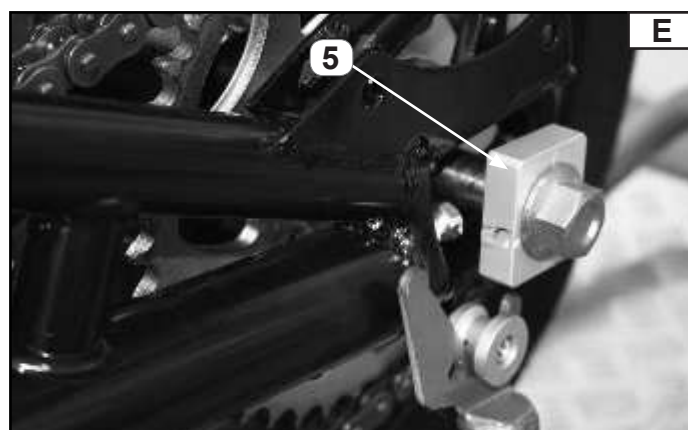
Torque 22 N*m

NOTE:

Make sure that there is enough space between the brake pad before fitting the calliper to the relevant brake disc.

IMPORTANT NOTICE

Check that the travel of the flexible brake hose is correct.





FRONT AND REAR BRAKES

REMOVAL AND INSTALLATION OF FRONT BRAKE PADS

The procedure that follows is applicable to both front brake callipers.

NOTE:

Substitute the brake pads always together to ensure a uniform pressure.

Remove:

- Pin springs (1) Fig. A.
- Fixing pin (2) Fig. B.
- Remove the brake pads (3) Fig. C.

Measure:

- The wear limit for the brake pads.
- If outside specifications, replace the brake pads as a block.



Pads	Wear limit
Front	1 mm

Clean:

- Press the pistons of the calliper inside to permit the installation of the new brake pads.

Install:

- The brake pads in reverse order of disassembly.
- The brake calliper.

Check:

The brake fluid level "4" Fig. D.

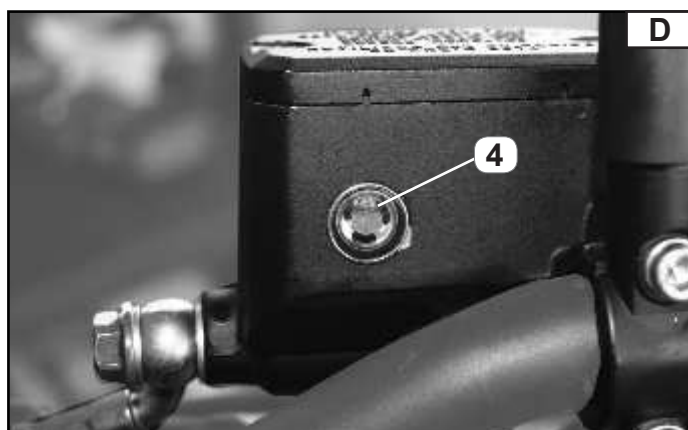
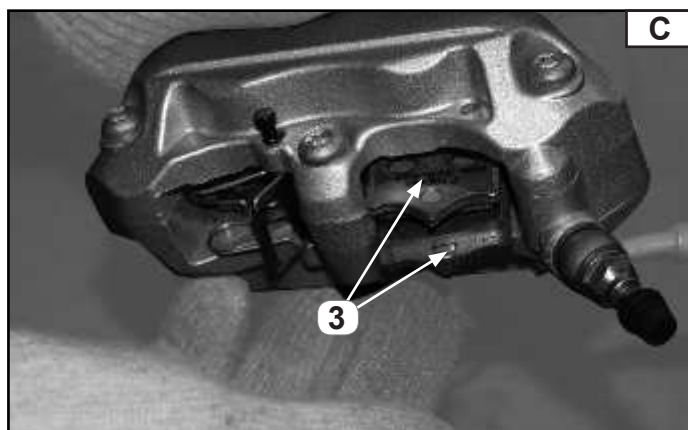
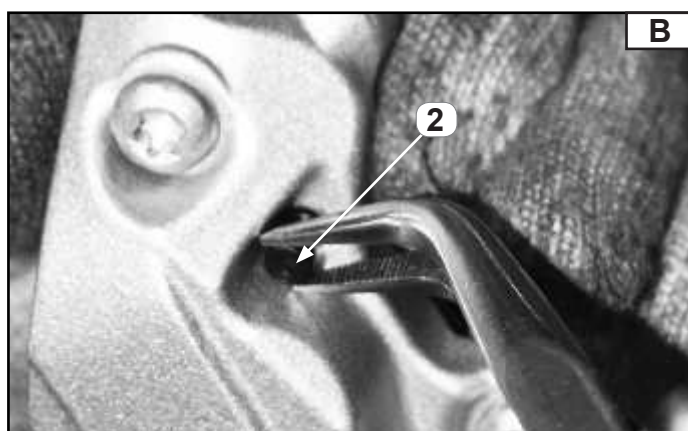
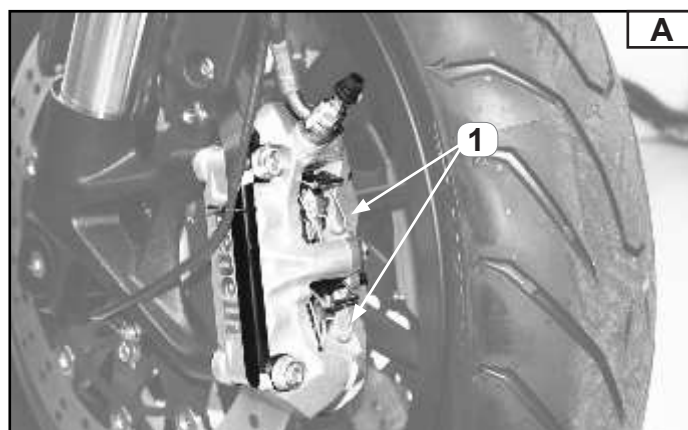
If below the minimum notch, top up with the recommended brake fluid until it is at the correct level.

Refer to the **Chapter 3, Periodic maintenance**, section "Checking and topping up the front brake fluid level".

Check:

- Brake lever operation.

If the brake lever is soft or spongy to the touch, bleed the brake circuit.





FRONT AND REAR BRAKES

REMOVAL AND INSTALLATION OF REAR BRAKE PADS

Remove:

- The screw "1" Fig. A.
- The calliper body Fig. B.

Take out:

- The brake pads "2" Fig. B.

Measure:

- The wear limit for the brake pads.

If outside specifications, replace the brake pads as a block.



Pads	Wear limit
Rear	1 mm

Clean:

- Inside the calliper.
- The pistons, then dry everything.

Press:

- Press the pistons of the calliper inside to permit the installation of the new brake pads.

Install:

- The brake pads in reverse order of disassembly.
- The brake calliper.
- The screws.
- Tighten to the following torque:



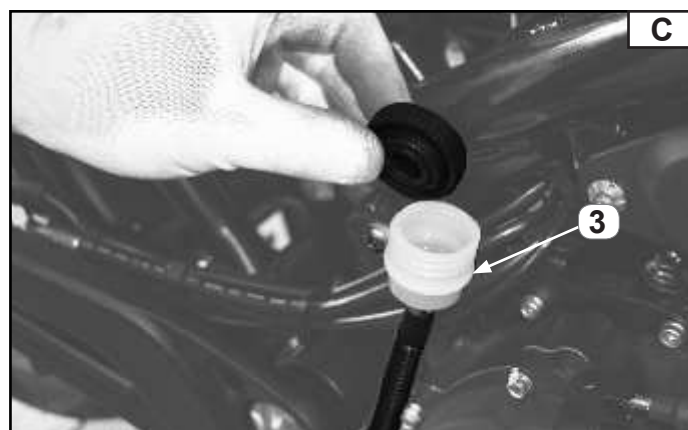
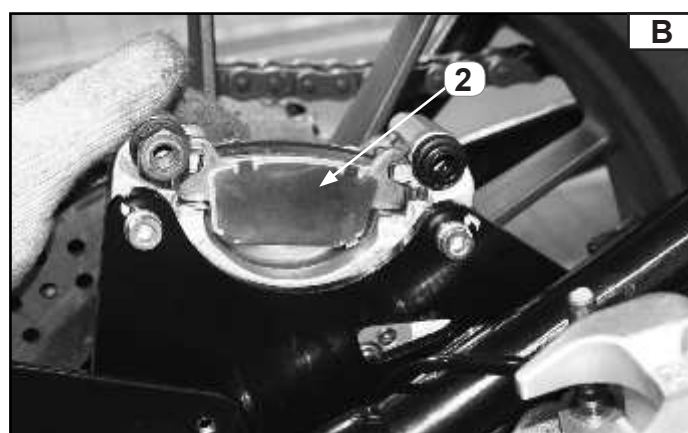
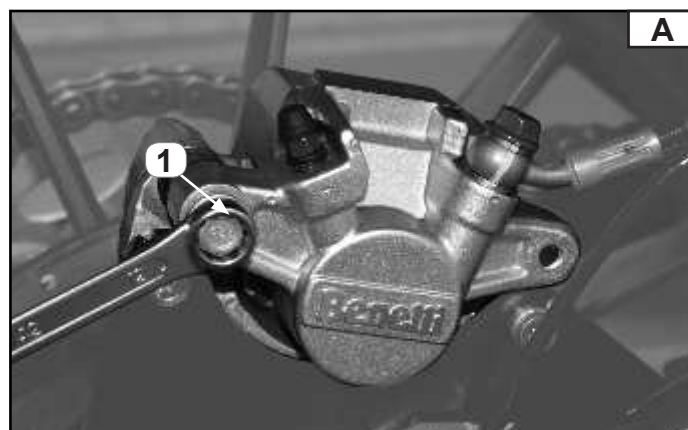
Torque 22 N*m

Check:

- The brake fluid level "3" Fig. C.
- Top up with brake fluid if the level is less than the minimum level mark.
- Brake pedal operation.

IMPORTANT NOTICE

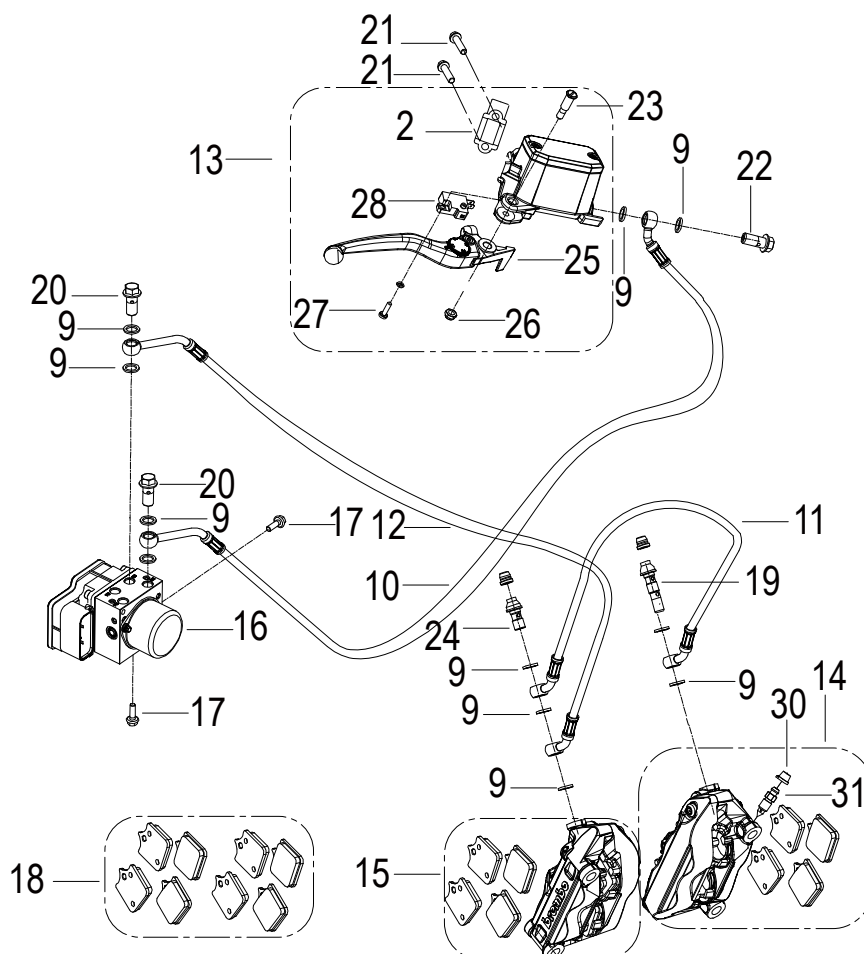
Do not utilise the motorcycle if full efficiency of the brake pedal cannot be obtained. Full efficiency is activated by operating the brake pedal several times so as to bring the pads into contact with the disc. If this operation is not carried out, the brakes will not operate the first time when the pedal is activated.





FRONT AND REAR BRAKES

FRONT BRAKE PUMP REMOVAL



Pos.	Description	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	BRAKE OIL TANK				
2	SCREW				
3	REAR BRAKE PUMP HOSE- ABS ECU				
4	REAR BRAKE CALLIPER HOSE – ABS ECU				
5	REAR BRAKE PUMP				
6	REAR BRAKE CALLIPER				
7	BRAKE PADS PAIR (REAR)				
8	REAR IDROSTOP				
9	SEAL				
10	FRONT BRAKE PUMP HOSE- ABS ECU				
11	FRONT BRAKE HOSE				
12	FRONT BRAKE CALLIPER PIPE - ECU ABS				
13	COMPLETE FRONT BRAKE PUMP				
14	LEFT BRAKE CALLIPER (RADIAL)				
15	RIGHT BRAKE CALLIPER (RADIAL)				



FRONT AND REAR BRAKES

FRONT BRAKE PUMP REMOVAL

Pos.	Description	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
16	ABS HYDRAULIC UNIT				
17	SPRING BAND				
18	BRAKE PADS PAIR (FRONT)				
19	SPECIAL SCREW				
20	SPECIAL SCREW				
21	SCREW				
22	SPECIAL SCREW				
23	SPECIAL SCREW				
24	SPECIAL SCREW				
25	FRONT BRAKE LEVER				
26	SELF-LOCKING NUT				
27	SCREW				
28	MICROSWITCH				
29	BRACKET				
30	RUBBER TIP				
31	SPECIAL SCREW				
32	ELASTIC WASHER				
33	SCREW				



FRONT AND REAR BRAKES

FRONT BRAKE PUMP REMOVAL

NOTE:

Drain out the brake fluid before proceeding with these operations.

Refer to Chapter 3, Periodic maintenance, section "Checking and topping up the front brake fluid level".

IMPORTANT NOTICE

When removing the pump, avoid spilling onto the surfaces of the motorcycle brake fluid that has remained in the system.

Remove:

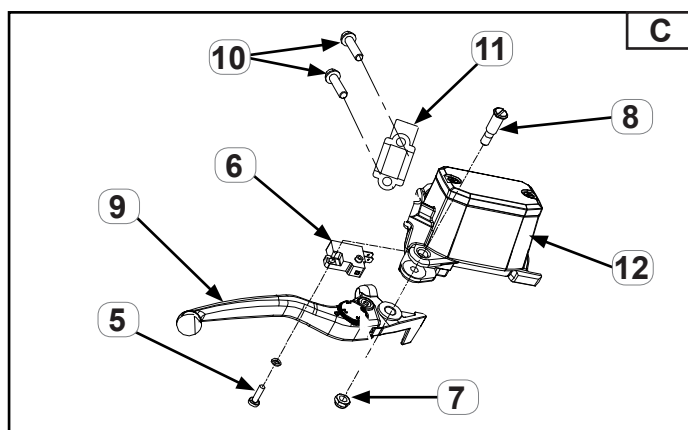
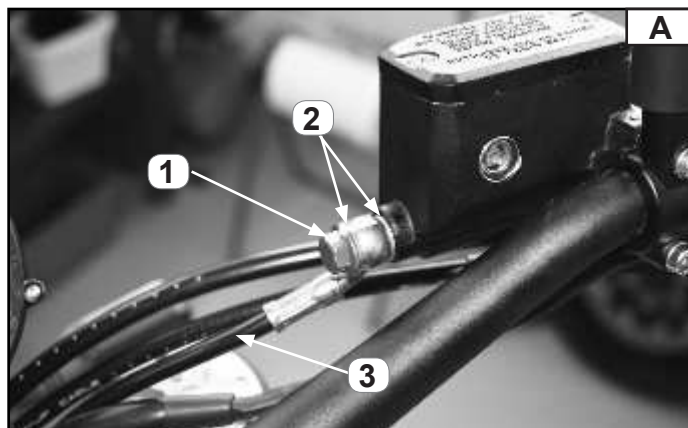
- The special screw (1) Fig. A.
- The sealing washer (2) Fig. A.
- Disconnect the front brake hose (3) Fig. A.

Disconnect:

- The connector of the front brake switch (4) Fig. B.
- The screw (5) Fig. C.
- The micro-switch (6) Fig. C.
- The nut (7) Fig. C.
- The screw (8) Fig. C.
- The front brake lever (9) Fig. C.
- The screws (10) Fig. C.
- The U-clamp (11) Fig. C.
- Remove the pump body (12) Fig. C.

IMPORTANT NOTICE

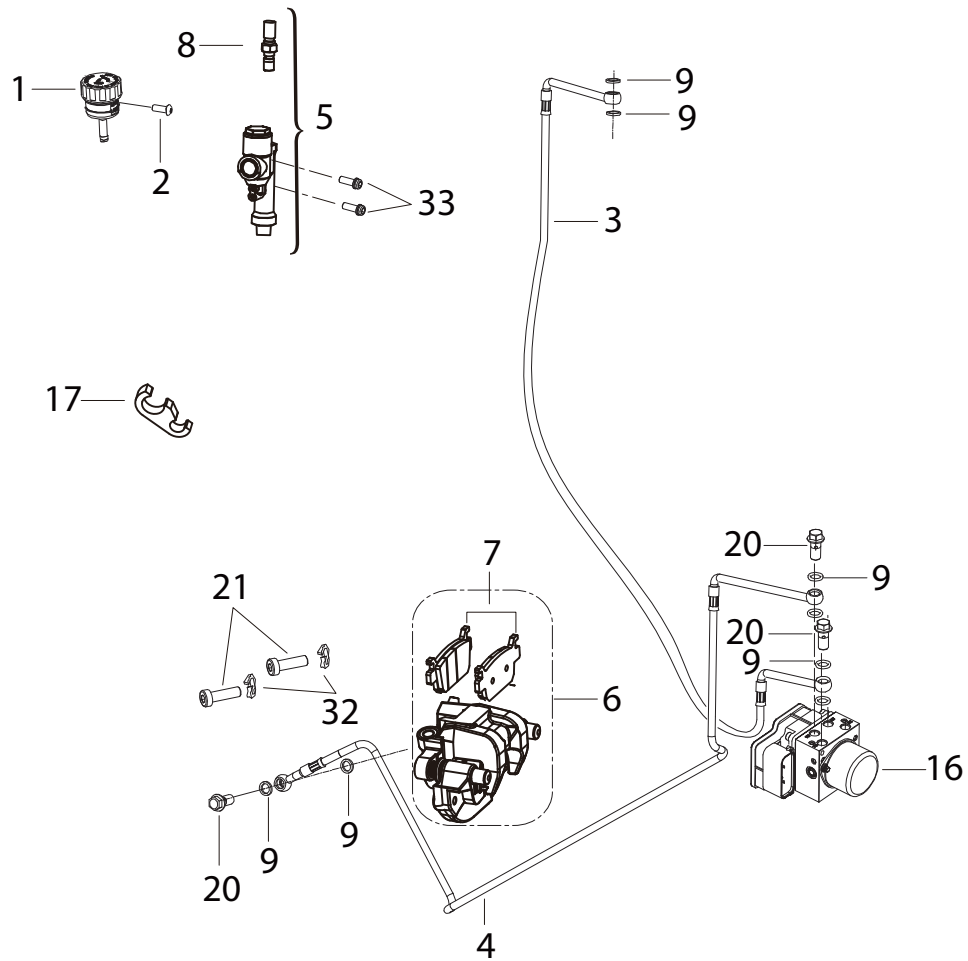
During the disassembly stage, do not allow any brake fluid remaining in the circuit to drip onto the vehicle surfaces.





FRONT AND REAR BRAKES

REMOVAL OF THE REAR BRAKE PUMP



NOTE:

The above exploded view is part of the spare parts table of the chapter "Front and rear brakes", section "Removal of the front brake pump".



FRONT AND REAR BRAKES

REMOVAL OF THE REAR BRAKE PUMP

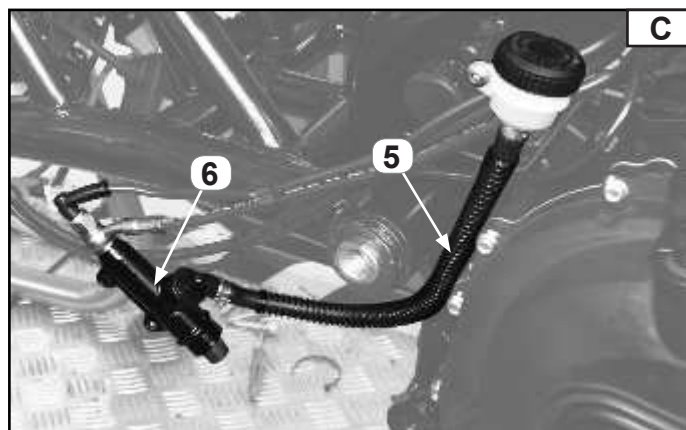
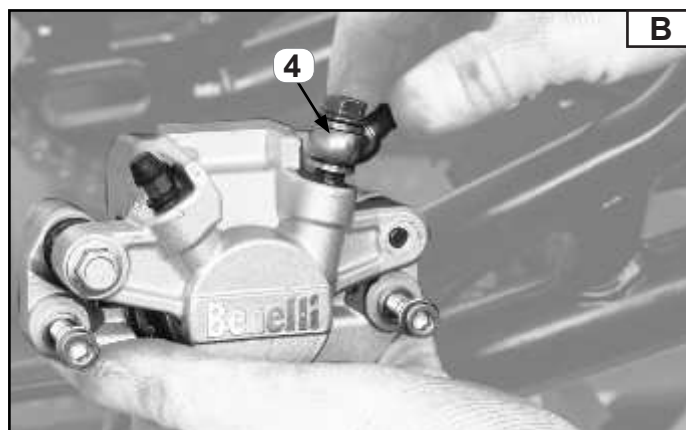
NOTE:

Drain out the brake fluid before proceeding with these operations.

Refer to the Chapter 3, Periodic maintenance, section "Checking and topping up the front brake fluid level".

Remove:

- Rear footrest support, refer to the section "Removal of the rear footrest support, Chapter 4".
- Screws (1) Fig. A.
- Idrostop (2) Fig. A.
- Sealing washer (3) Fig. A.
- Release the main brake hose (4) Fig. B.
- Release the brake reservoir hose (5) Fig. C.
- Remove the brake pump (6) Fig. C.

**IMPORTANT NOTICE**

During the disassembly stage, do not allow any brake fluid remaining in the circuit to drip onto the vehicle surfaces.



FRONT AND REAR BRAKES

FRONT BRAKE PUMP INSTALLATION

WARNING

Before installing, clean all of the internal parts of the brake, and lubricate them with clean or new brake fluid. Never use solvents on the internal parts of the brake.



Recommended brake fluid
DOT4

- Place the pump body (1) Fig. A.

Install:

- The U-clamp (2) Fig. A.
- The screws (3) Fig. A.

Tighten to the following torque:



Torque 8 N*m

Install:

- The micro-switch (4) Fig. B.
- The screw (5) Fig. B.

Tighten to the following torque:



Torque 1.5 N*m

Install:

- The front brake hose to the brake pump (6) Fig. C.
- The sealing washer (7) Fig. C.
- The special screw (8) Fig. C.

Tighten to the following torque:



Torque 26 N*m

Connect:

- The switch connector (4) Fig. D.
- Position the front brake lever (9) Fig. D.
- Nut (10) Fig. D.
- Screw (11) Fig. D.

Tighten to the following torque:



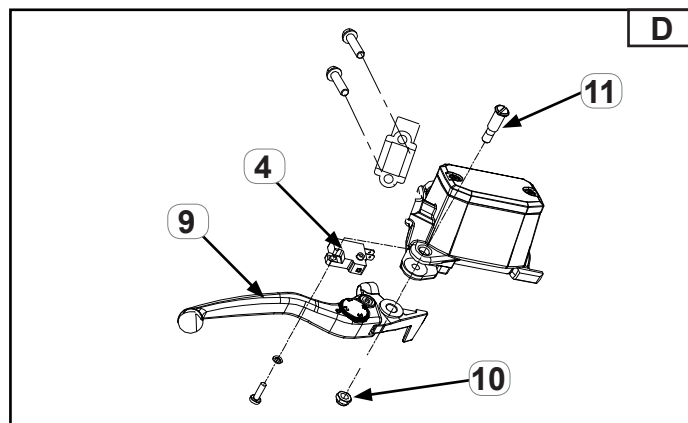
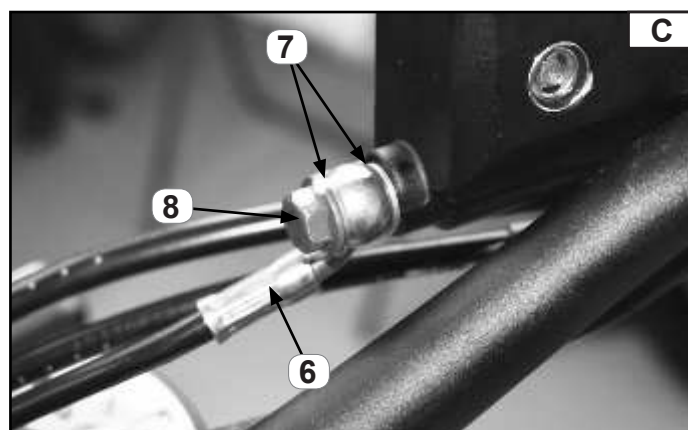
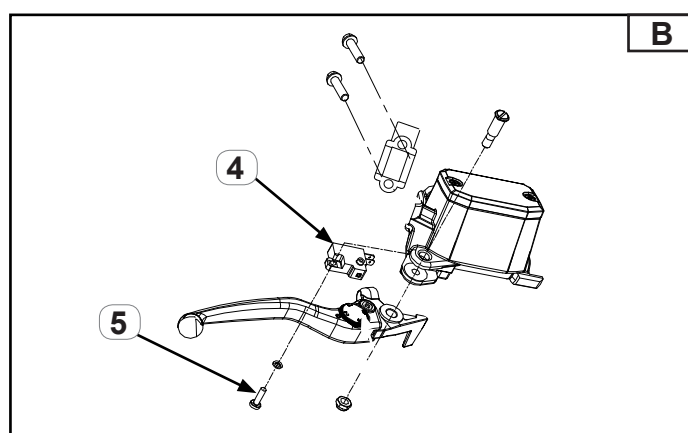
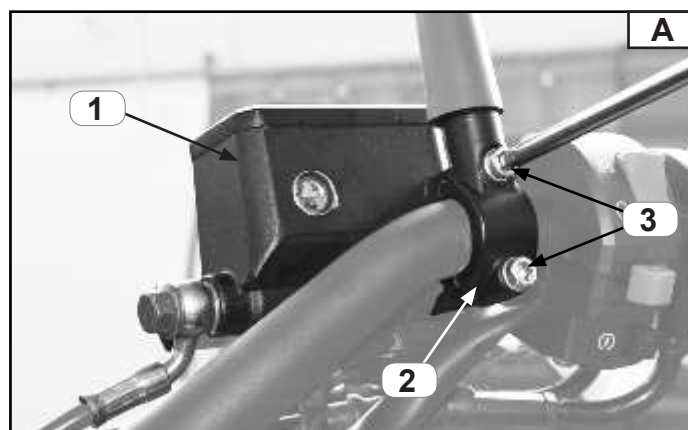
Torque 7 N*m

WARNING

To guarantee the safety of the motorcycle, it is essential for the path of the brake hose to be correct.

NOTE:

Once topping up operations of the brake fluid have finished, refer to Chapter 3, Periodic maintenance, section "Checking and topping up the front brake fluid level".





FRONT AND REAR BRAKES

REAR BRAKE PUMP INSTALLATION

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Proceed to install, following the steps for removal in reverse order, but taking care to observe the instructions below:

Install:

- the idrostop (1) and tighten to the following torque:



Torque 12 N*m

- Screws (2) Fig. A.
Tighten to the following torque:



Torque 12 N*m

IMPORTANT NOTICE

When assembling, avoid spilling of the brake fluid that has remained in the system onto the surfaces of the motorcycle.



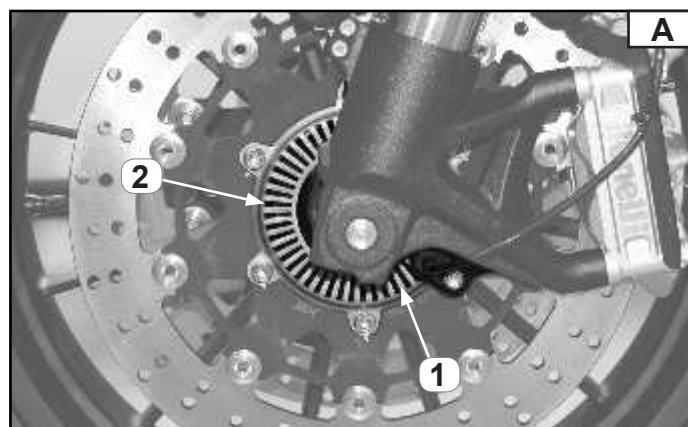


ABS ANTI-LOCK BRAKING SYSTEM

LOCATION OF THE COMPONENTS

The components that compose the anti-lock braking system are:

- Phonic wheel sensor (1) of the front wheel Fig. A.
- Phonic wheel (2) of the front wheel Fig. A.



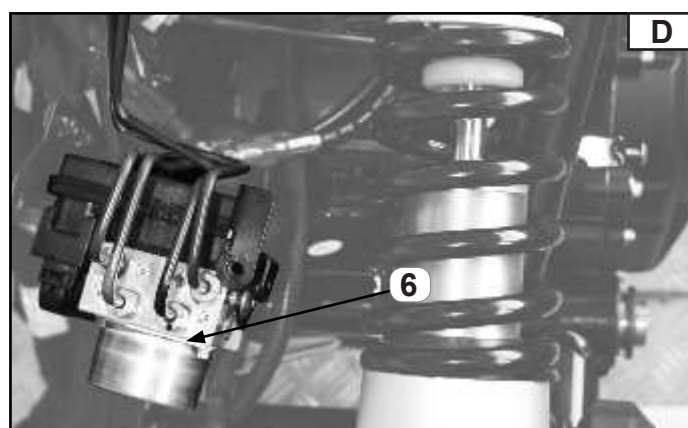
- Phonic wheel sensor (3) of the rear wheel Fig. B.
- Phonic wheel (4) of the rear wheel Fig. B.



- ABS yellow light (5) Fig. C.



- ABS hydraulic unit (6) Fig. D.



LOCATION OF THE COMPONENTS

-

-
- F**



ABS ANTI-LOCK BRAKING SYSTEM

ROTATION SENSOR CHECK

IMPORTANT NOTICE

The wheel rotation sensor must be handled with caution, must not receive knocks, e.g., with a hammer, or dropped on a hard surface.

Do not soak the wheel rotation sensor in water or mud.

Do not attempt to repair or disassemble the wheel rotation sensor.

Remove:

- The screw (1) Fig. A.
- The phonic wheel sensor (2) of the front wheel Fig. A.

Disconnect:

- The connector of the phonic wheel.

Carry out a visual check of the rotation sensor of the phonic wheel. Substitute the wheel rotation sensor if it is cracked, bent or damaged in anyway. If an electrical fault in the sensors is suspected, check the electrical circuit.

Remove:

- The screw (3) Fig. B.
- The phonic wheel sensor (4) of the rear wheel Fig. B.

Disconnect:

- The connector of the phonic wheel.

Carry out a visual check of the rotation sensor of the phonic wheel. Substitute the wheel rotation sensor if it is cracked, bent or damaged in anyway. If an electrical fault in the sensors is suspected, check the electrical circuit.

NOTE:

Place the motorcycle on a suitable support so that the front wheel is raised.

Check:

Lift the front/rear wheels off the ground and measure the distance at various points between the sensor and the phonic wheel.

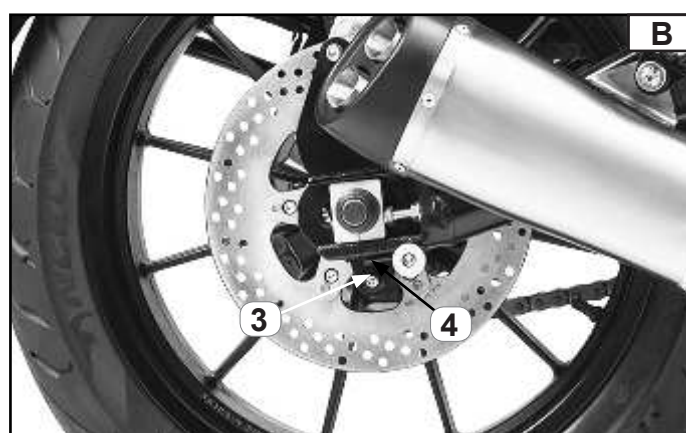
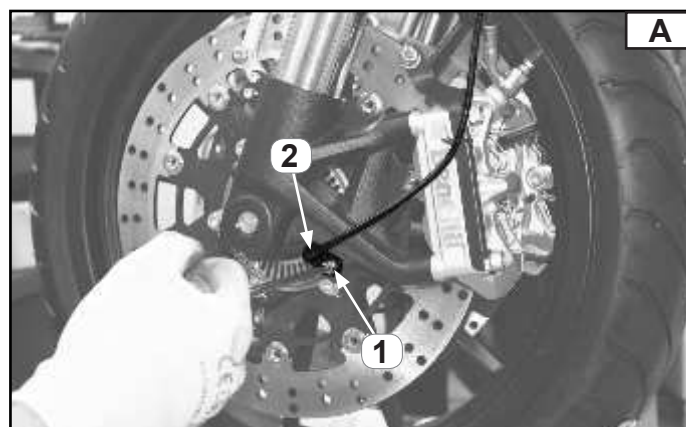


Air gap	
Front	Rear
1 – 1.5 mm	1.0 - 1.5 mm

NOTE:

It is not possible to adjust the distance of the sensor.

- If the distance does not come within the prescribed values, check the hub bearing (refer to paragraph Removal/Installation of the front/rear wheel), the sensor, the phonic wheel and the assembly conditions of the sensor.



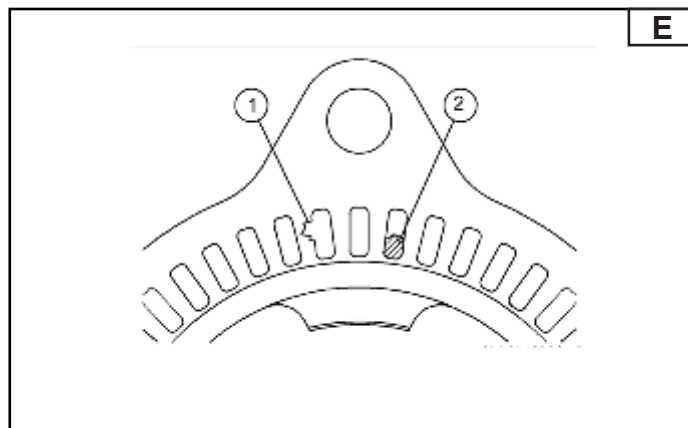


ABS ANTI-LOCK BRAKING SYSTEM

CHECK OF THE ABS PHONIC WHEEL OF THE FRONT AND REAR WHEEL

Check:

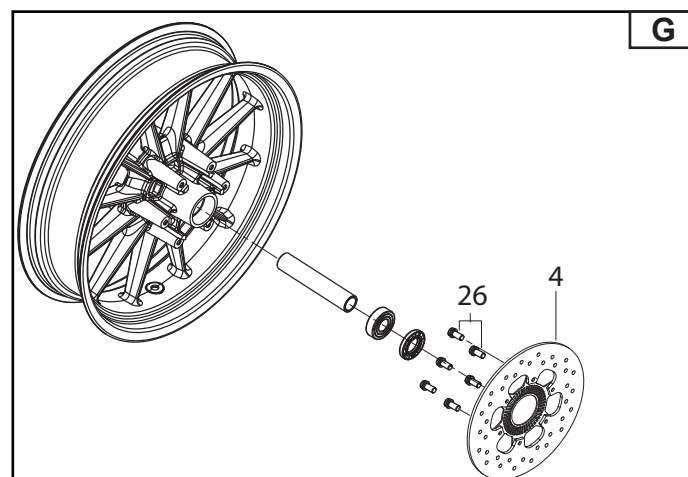
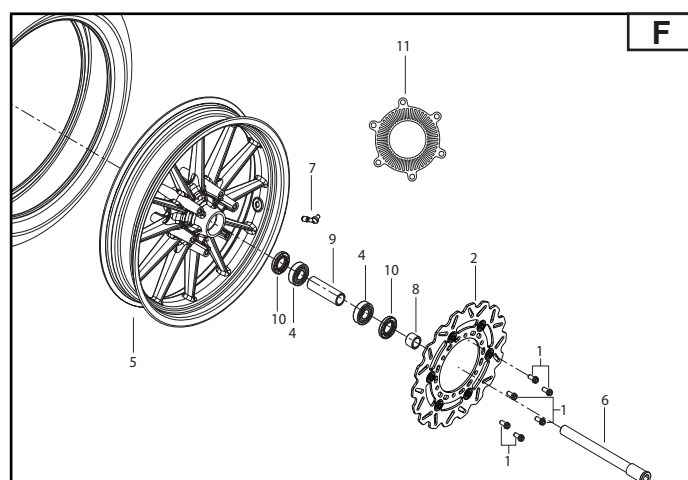
Carry out a visual check of the phonic wheel of the wheel. Substitute the phonic wheel if it is deformed or damaged, such as damaged teeth (1). Fig. E
Remove any deposits of metal or other magnetic material (2). If necessary, replace the phonic wheel.



REPLACEMENT OF THE ABS PHONIC WHEEL OF THE FRONT AND REAR WHEEL

Remove:

- Front wheel, refer to the section "Removal of the front wheel".
- The screws (1).
- The phonic wheel (11) Fig. F.
- Rear wheel, refer to the section "Removal of the rear wheel".
- The screws (26).
- The phonic wheel integrated in the brake disc (4) Fig. G.





ABS ANTI-LOCK BRAKING SYSTEM

PRECAUTIONS

PRECAUTIONS DURING THE MAINTENANCE OF THE ABS

A series of important precautions must be adopted during the maintenance of the ABS system.

- The ABS system has been designed to be fed by a 12V sealed battery. Do not use any other type of battery, only sealed 12V.
- Do not invert cable connections of the battery. It would damage the ABS hydraulic unit.
- To avoid damage to the ABS components, do not disconnect the battery cables or other electrical connections when the start switch is positioned at ON or when the engine is running.
- Be careful to not cause a short circuit between the cables directly connected to the positive terminal (+) of the battery and the ground of the frame.
- Do not position the start switch at ON whilst the ABS electrical connectors are disconnected. The hydraulic unit of the ABS memorises the maintenance codes.
- Do not spray water onto the electrical components, the components of the Abs, cables, connectors or the cabling.
- If there is a transmitter/receiver installed on the motorcycle, ensure that the functioning of the ABS system is not disturbed by electromagnetic waves irradiated by the antenna.
- Position the antenna as far away as possible from the ABS hydraulic unit.
- Position the start switch at OFF before disconnecting the electrical connections of the ABS.
- The components of the ABS must never be hit, for example by a hammer or must not be dropped onto a hard surface. These impacts could cause damage to the components.
- The ABS components cannot be disassembled. Even if there is a fault, substitute the ABS unit, do not try to disassemble and repair the components.
- The ABS system is made up of numerous circuits, tubes and cables of the brakes.
- Furthermore, the ABS system is not capable of detecting problems of the conventional braking system (abnormal wear of the brake discs, brake pads and other mechanical faults). To avoid inconveniences, check that the brake circuits and tubes are arranged and connected correctly, the cabling is opportunely laid out and the brakes are equipped with adequate braking power.
- Check that there are no leaks of fluid and then accurately bleed the brake circuits.

IMPORTANT NOTICE

Air in the brake tubes reduces the braking power that could cause a serious accident with severe injuries and even death. If any union of the brake circuit, including the nuts of the ABS hydraulic unit joint, or the bleed valve are opened, the air entered into the system must be completely bled from the brake circuit. If the brake lever is spongy when pressed, there could be air in the tubes of the brake circuit, or the brake could be defective. In that case, do not use the vehicle and immediately repair the brake system.

IMPORTANT NOTICE

Do not use the motorcycle if there is air in the brake circuit, otherwise the ABS system could function incorrectly.

IMPORTANT NOTICE

The use of tyres that are not recommended could cause malfunctioning of the ABS system and cause an increase in the braking distance thereby causing a serious accident with severe injuries and even death. Always use the recommended standard tyres for this motorcycle.



ABS ANTI-LOCK BRAKING SYSTEM

PRECAUTIONS

IMPORTANT NOTICE

The LED yellow warning light of the ABS (1) Fig. A could come on if the tyre pressure is not correct, if tyre not recommended has been fitted, or if the wheel is deformed. If the warning light comes on, solve the problem by cancelling the maintenance code.





ABS ANTI-LOCK BRAKING SYSTEM

REMOVAL OF THE ABS HYDRAULIC UNIT

IMPORTANT NOTICE

The ABS hydraulic unit (1) has been adjusted and set with precision by the manufacturer. Therefore it must be handled very carefully, must never be hit for example by a hammer, or dropped on a hard surface. Do not soak the ABS hydraulic unit in water or mud.

- Bring the start switch to the OFF position.

Remove:

- Rider seat, refer to the section “Removal of rider and passenger seats, Chapter 4”.
- Fuel tank, refer to the section “Removal of the fuel tank, Chapter 4”.
- Discharge the brake fluid from the front and rear brake circuit utilising the bleed valve and pumping the brake lever and the brake pedal.
- Do not forget to place a cloth underneath the ABS hydraulic unit.
- The nuts of the rigid tubing (2) Fig. B.
- The screw (3) Fig. C.

Disconnect:

- The connector of the ABS hydraulic unit (4) Fig. B by rotating the lever as indicated in the figure.

Remove:

- The ABS hydraulic unit.

NOTE:

Be careful to not bend the brake hose when removing the ABS hydraulic unit.

- Close the oil passage holes (A) of the ABS hydraulic unit (B) with a cloth to avoid dirt from entering into the unit Fig. D.

IMPORTANT NOTICE

Do not allow dirt to enter into the hydraulic system when the tubes are disconnected. Brake fluid rapidly damages painted plastic surfaces; completely wash the concerned zones immediately.

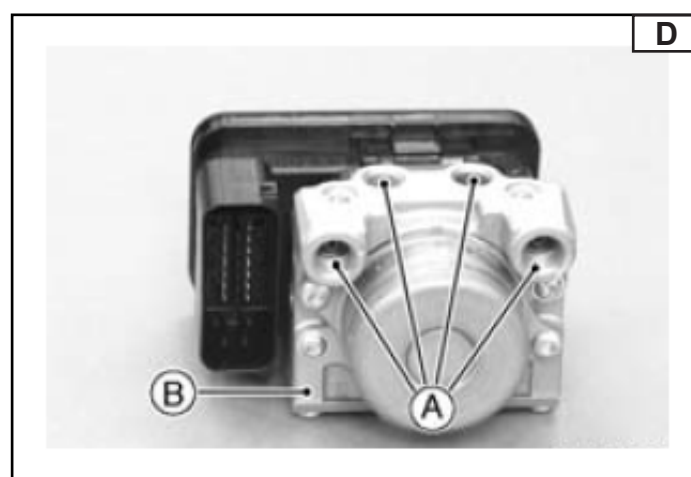
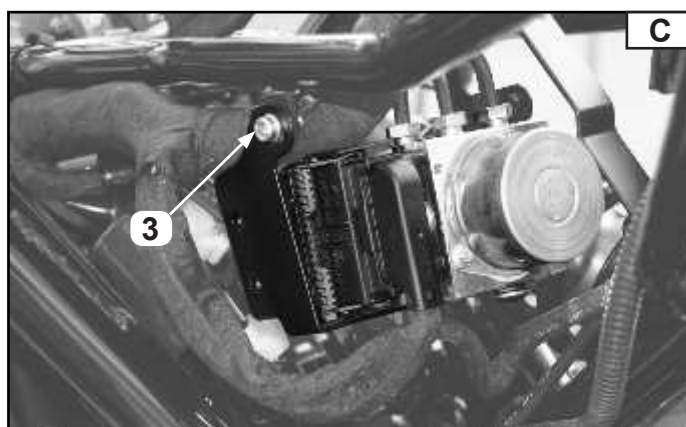
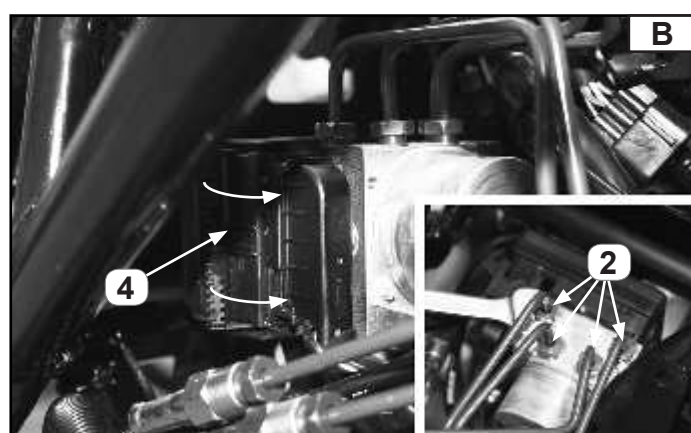
IMPORTANT NOTICE

The ABS hydraulic unit has been adjusted and set with precision by the manufacturer.

Do not attempt to repair or remove the ABS hydraulic unit.

Check:

- Carry out a visual check of the ABS hydraulic unit.
- Replace the ABS hydraulic unit if any component is cracked or damaged in any way.





ABS ANTI-LOCK BRAKING SYSTEM

INSTALLATION OF THE ABS HYDRAULIC UNIT

Position the ABS hydraulic unit on the frame.

Install:

- Install the rigid tubes of the brakes onto the ABS hydraulic unit and manually screw in the flare nuts without tightening.
- Front brake calliper hose (1) Fig. B.
- Front brake pump hose (2) Fig. B.
- Rear brake calliper hose (3) Fig. B.
- Rear brake pump hose (4) Fig. B.

Tighten the union nuts of the rigid tubing Fig. B to the following torque:



Torque 18. N*m

Install:

- The screw (5) Fig. A

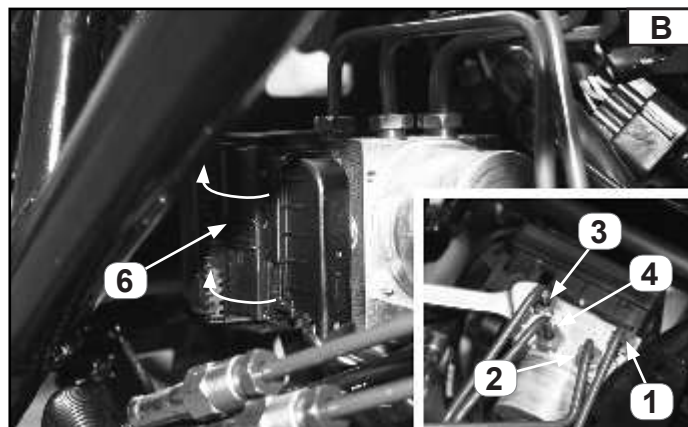
Connect:

- The connector of the ABS hydraulic unit (6) Fig. C.

Install:

To install, reverse the order of the removal operation.

- Bleed the air from the brake circuit, refer to the section “**Frame/brake fluid level check, Chapter 3**”.





ABS ANTI-LOCK BRAKING SYSTEM

REMOVAL OF THE ABS ROTATION SENSORS – FRONT/REAR WHEEL

IMPORTANT NOTICE

The wheel rotation sensor must be handled with caution, must not receive knocks, e.g., with a hammer, or dropped on a hard surface.

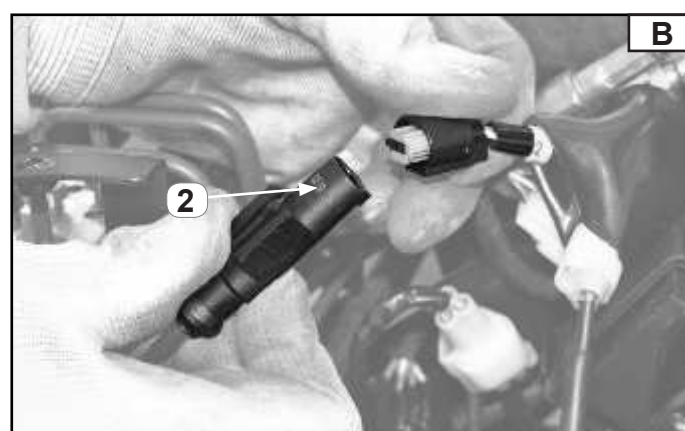
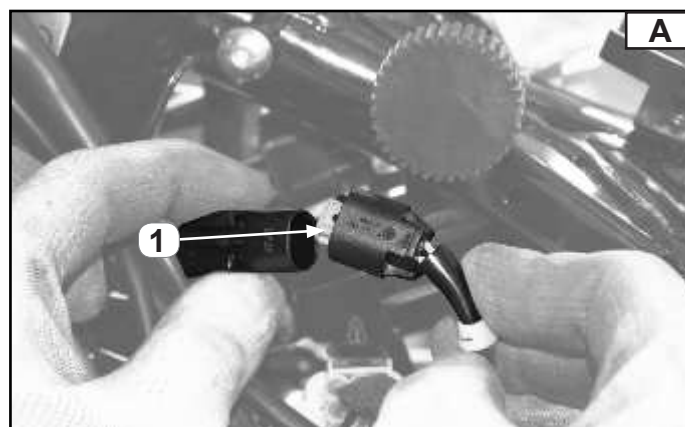
Do not soak the wheel rotation sensor in water or mud. Do not attempt to repair or disassemble the wheel rotation sensor.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Fuel tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- Front wheel rotation sensor, refer to the section “**ABS anti-lock braking system, Rotation sensor check**”.
- Disconnect the connector of the front wheel rotation sensor (1) Fig. A.
- Disconnect the connector of the rear wheel rotation sensor (2) Fig. B.

Install:

To install, reverse the order of the removal operation.
Place the cable correctly.





FRONT AND REAR BRAKES

FRONT BRAKE CALLIPER REMOVAL

The following procedure is applied to both brake callipers.

NOTE:

Before disassembling the brake calliper, discharge the brake fluid from the complete braking system, refer to the section "Frame/brake fluid level check, Chapter 3".

Remove:

- The special screw (24*) and (19*) Fig. A.
- The sealing washer (9*) Fig. A.
- The front brake hose (12) Fig. A.
- The screws (1) Fig. B.
- Remove both callipers.

NOTE:

Insert the end of the brake hose into a container and slowly pump out and drain the brake fluid.

IMPORTANT NOTICE

Brake fluid rapidly damages painted plastic surfaces; completely wash the concerned zones immediately.

Detach:

- The pistons (1) Fig. C.
- The seals (2) Fig. C (first the oil seals – the smallest seals, then the O-rings – the largest seals).

Secure:

- The pistons of the brake callipers with a block of wood Fig. D.
- Blow compressed air into the attachment of the flexible brake hose to push the left pistons outwards from the brake calliper.

IMPORTANT NOTICE

Never try to prise out the calliper pistons.

NOTE:

Repeat the above-mentioned procedure to force the pistons out from the opposite brake calliper.

Check:

The ring seal of the brake calliper.

The ring seal (piston seal) (2) Fig. C that are found inside the piston to maintain the clearance between the pads and the disc. If the seal is in bad condition, it can cause excessive wear of the pads or sticking of the brake, with a consequent increase of the temperature of the discs or the brake fluid.

Replace:

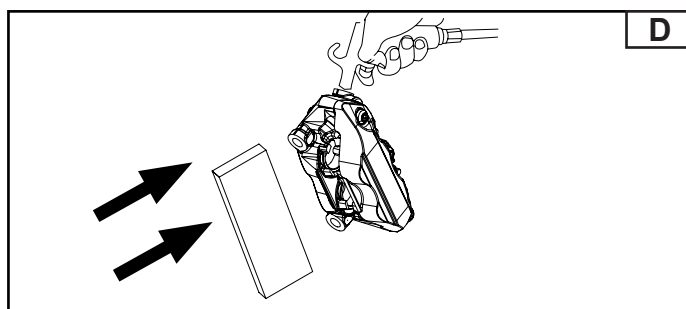
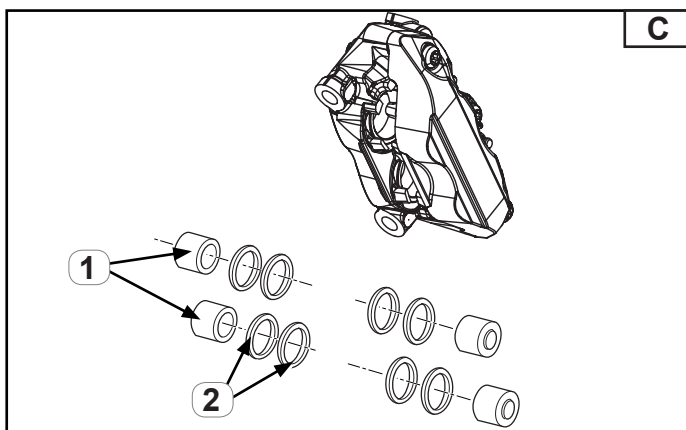
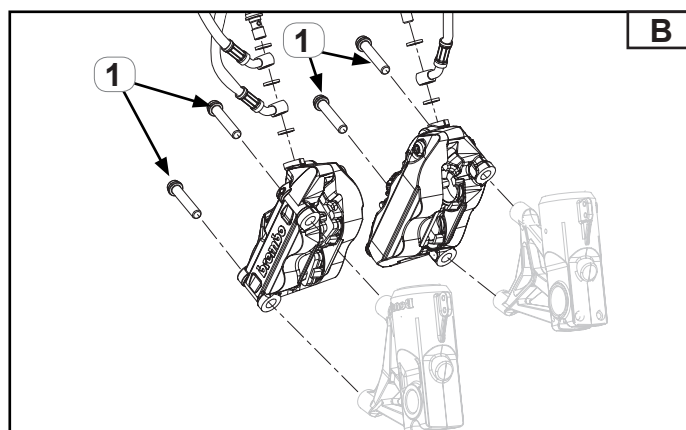
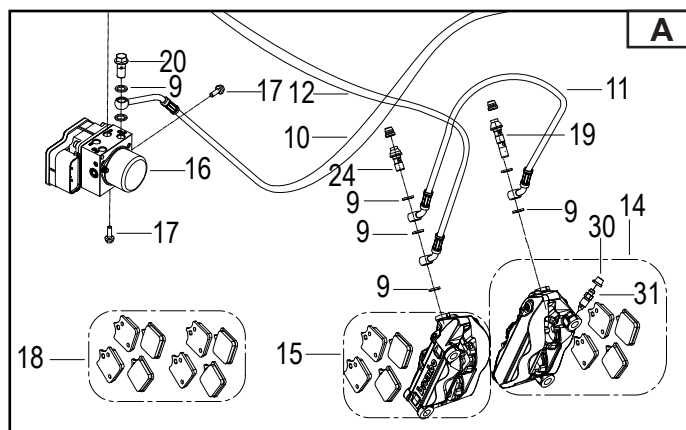
- The seals (2) Fig. C.

Replace the seal if it shows signs of the following:

- Brake fluid leak around the brake pad.
 - Brakes overheating.
 - Notable difference of wear between the internal and external brake pad.
 - If the seal and piston are stuck to each other.
- Replace the seals when replacing the brake pads.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Front and rear brakes", section "Removal of the front brake pump".





FRONT AND REAR BRAKES

REAR BRAKE CALLIPER REMOVAL

NOTE:

Before disassembling the brake calliper, discharge the brake fluid from the complete braking system, refer to the section "Frame/brake fluid level check, Chapter 3".

Remove:

- The screw (20*) Fig. A.
- The sealing washers (9*) Fig. A.
- The rear brake hose (4.) Fig. A.

Remove the calliper.

NOTE:

Insert the end of the brake hose into a container and slowly pump out and drain the brake fluid.

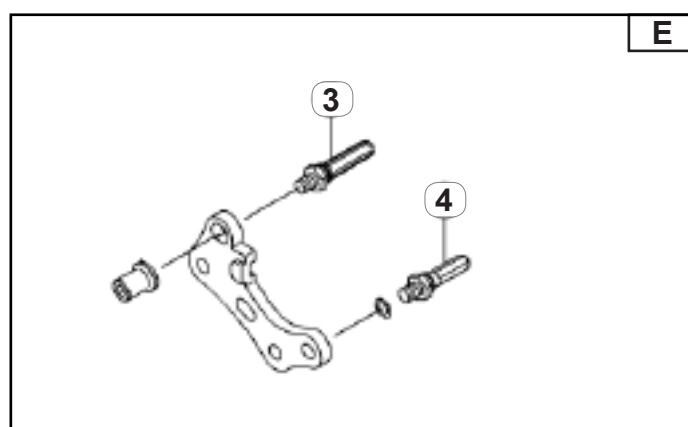
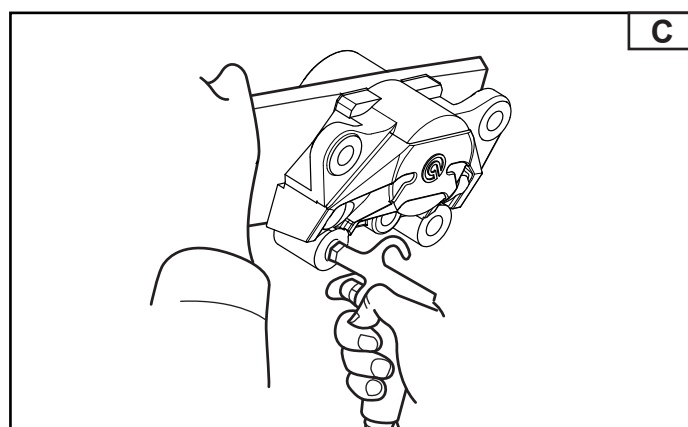
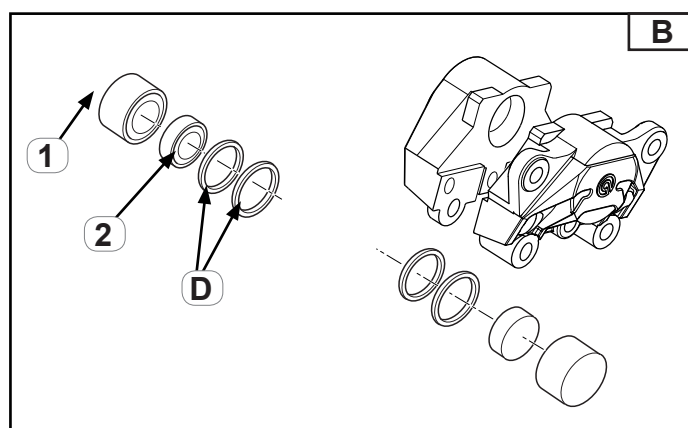
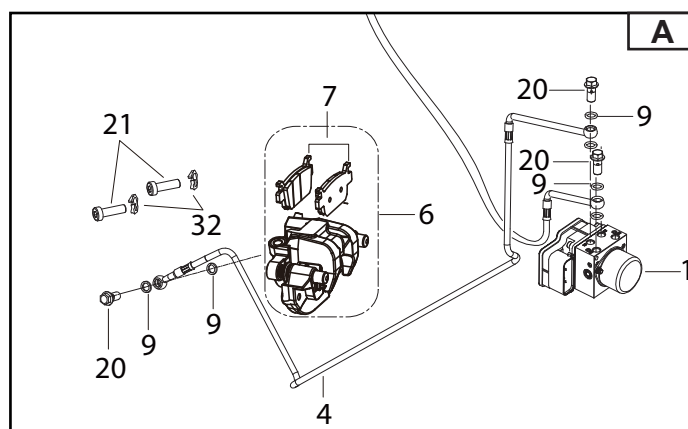
Disassemble:

- The pistons (1) Fig. B.
- The seals (2) Fig. B
- (first the oil seals – the smallest seals, then the O-rings – the largest seals).

- Fix the pistons of the brake calliper with a block of wood Fig. C.
- Blow compressed air into the attachment of the flexible brake hose to force the pistons from the brake calliper.

Disassemble:

- The sliding pins (3) and (4) Fig. E.
- Covers against dust (1) and (2) Fig. D.





FRONT AND REAR BRAKES

REAR BRAKE CALLIPER REMOVAL

IMPORTANT NOTICE

Never try to prise out the calliper pistons.

Replace:

- The seals (2) Fig. B.
- The seal if it shows signs of the following:
 - Brake fluid leak around the brake pad.
 - Brakes overheating.
 - Notable difference of wear between the internal and external brake pad.
 - If the seal and piston are stuck to each other.

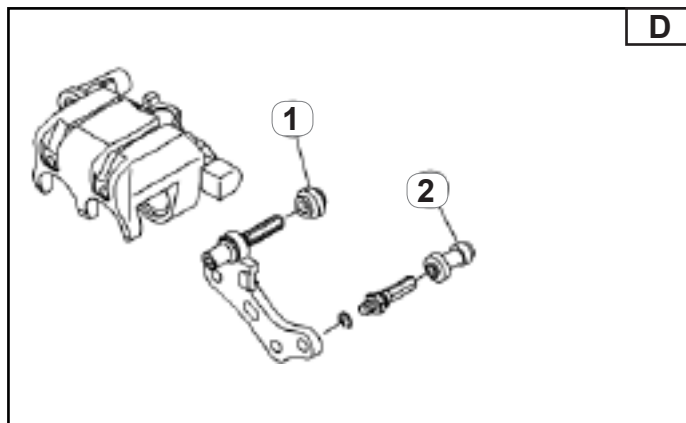
Replace the seals when replacing the brake pads.

IMPORTANT NOTICE

When the repair has finished, the brake lever and pedal must be pressed several times so that the pads come into contact with the brake discs, thereby causing a longer braking distance and an accident with serious injuries or death. Do not utilise the motorcycle if full efficiency of the brake pedal cannot be obtained. Full efficiency is activated by operating the brake pedal several times so as to bring the pads into contact with the disc.

NOTE:

The numbers marked (*) are a part of the table at the beginning of the chapter.





FRONT AND REAR BRAKES

FRONT AND REAR CALLIPERS CHECK

Check:

- The pistons (1) of the brake callipers Fig. A.

Replace the brake calliper pistons if there are signs of rust/scoring/traces of wear.

- The cylinders of the brake callipers.

If there are any lines/signs of wear, replace the whole brake calliper.

- The bodies of the brake callipers.

If there are any cracks/damage, replace the whole brake calliper.

- Brake fluid delivery passages (brake calliper body).

In the event of obstruction, clean with a jet of compressed air.

- The seals (2) and (3) Fig. A

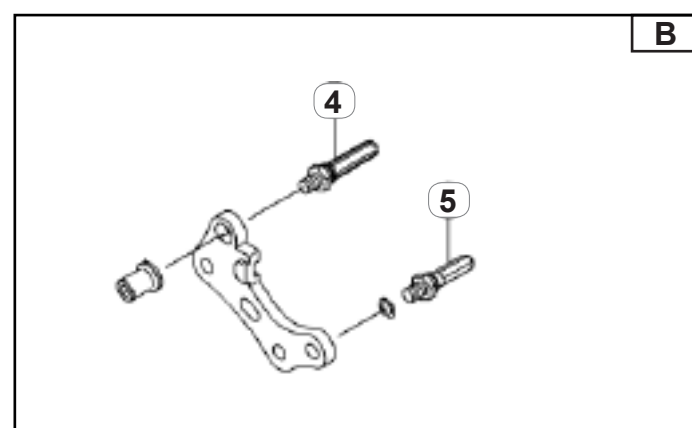
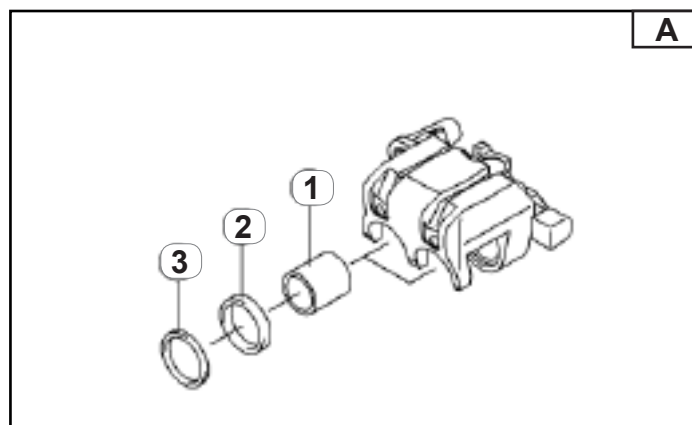
If there is any rust/lines/signs of wear, replace the brake calliper insulation.

- The sliding pins (4) and (5) of the rear calliper Fig. B.

If there are any lines/signs of wear, replace the whole brake calliper.

- The rear brake calliper bracket and the couplings on the front fork.

If there are any rust spots/signs of wear, replace.



IMPORTANT NOTICE

Every time the brake calliper is removed, replace the piston seals.



FRONT AND REAR BRAKES

FRONT BRAKE CALLIPER INSTALLATION

NOTE:

The procedure mentioned below is applicable to both callipers of the front brake.

IMPORTANT NOTICE

Before installing, clean all of the internal parts of the brake, and lubricate them with clean or new brake fluid.

Never use solvents on internal components of the brake, inasmuch that the seals of the pistons would tend to swell and deform.

Every time the brake calliper is removed, replace the piston seals.



Recommended brake fluid
DOT4

Install:

- The largest seals of the pistons (3) Fig. A.
- The smallest seals of the pistons (4) Fig. A.
- The pistons on the brake calliper (5) Fig. A.

Install:

- The brake calliper (1) Fig. B.
 - The screws (2) Fig. B.
- to the following torque:



Torque 50 N*m

Recommended lubricant.



Recommended lubricant
NGLI2 GREASE

Install:

- The brake hose (10*) Fig. C.
 - The sealing washer (9*) Fig. B.
 - The special screw (20*) Fig. B.
- to the following torque:



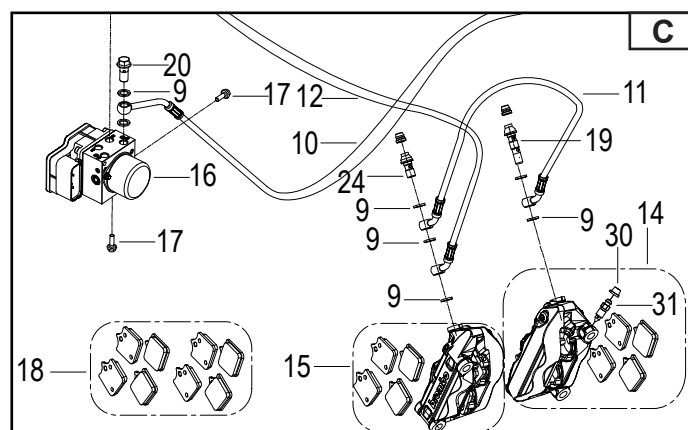
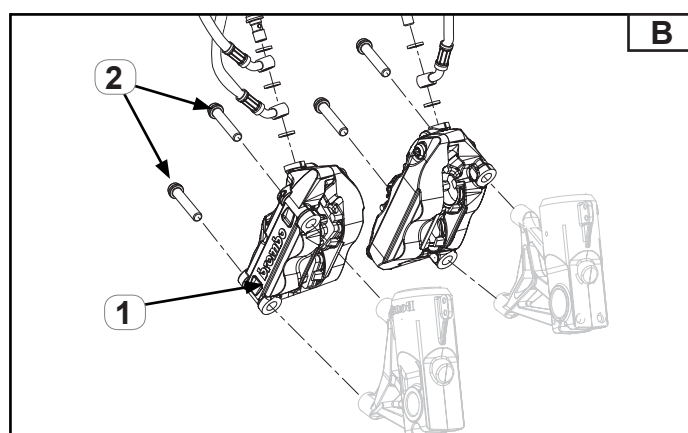
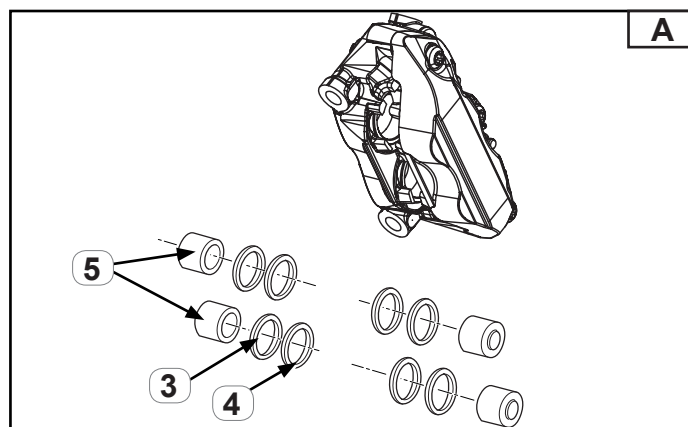
Torque 18 N*m

IMPORTANT NOTICE

To guarantee the safety of the motorcycle, it is essential for the path of the brake hose to be correct.

Check:

the level of the brake fluid and top up (refer to Chapter 3 **Frame/ Brake fluid level check**, section **Checking and topping up of the front brake fluid level**).





FRONT AND REAR BRAKES

REAR BRAKE CALLIPER INSTALLATION

IMPORTANT NOTICE

Before installing, clean all of the internal parts of the brake, and lubricate them with clean or new brake fluid. Never use solvents on internal components of the brake, inasmuch that the seals of the pistons would tend to swell and deform. Every time the brake calliper is removed, replace the piston seals.



Recommended brake fluid
DOT4

Install:

- The largest seals of the pistons (3) Fig. A.
- The smallest seals of the pistons (2) Fig. A.
- The pistons on the brake calliper (1) Fig. A.

Install:

- The brake calliper (6*) Fig. B.
- The screws (21*) Fig. B.

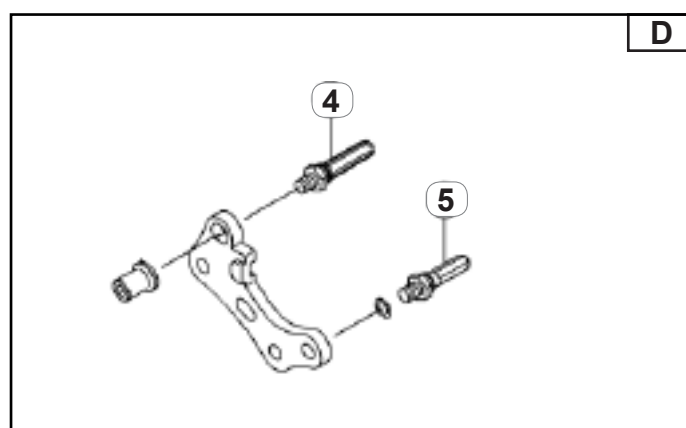
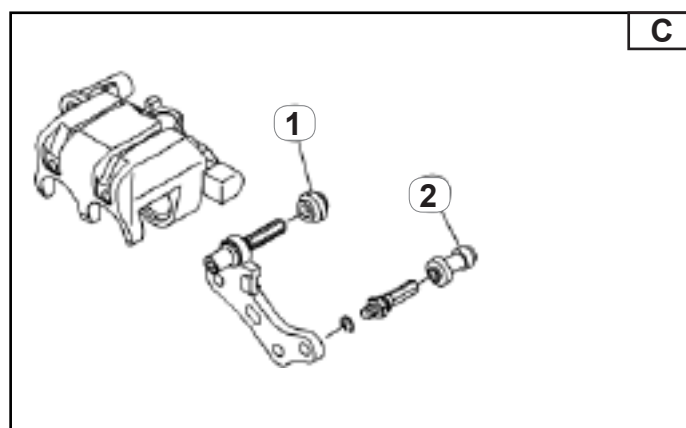
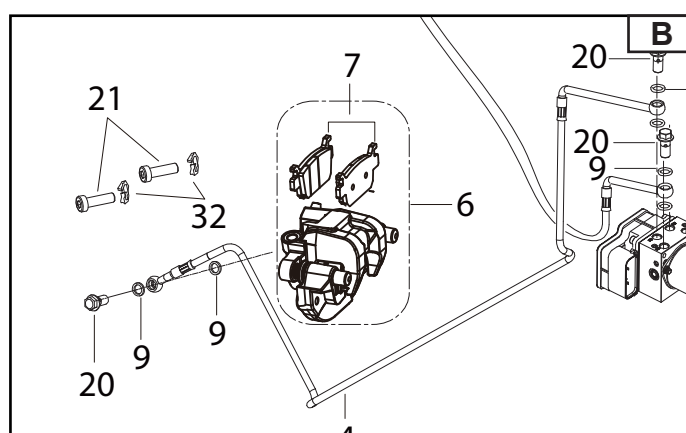
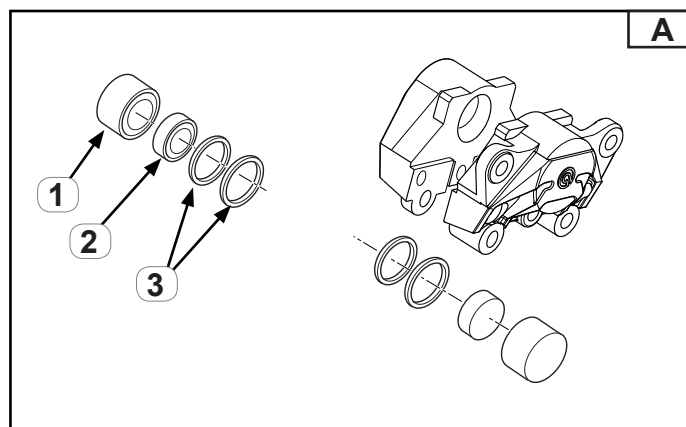
to the following torque:



Torque 22 N*m

Install:

- The sliding pins (4) and (5) Fig. D.
- The covers against dust (1) and (2) Fig. C.





FRONT AND REAR BRAKES

REAR BRAKE CALLIPER INSTALLATION

Install:

- The brake hose (4) Fig. E.
- The sealing washer (9*) Fig. E.
- The special screw (20*) Fig. E.

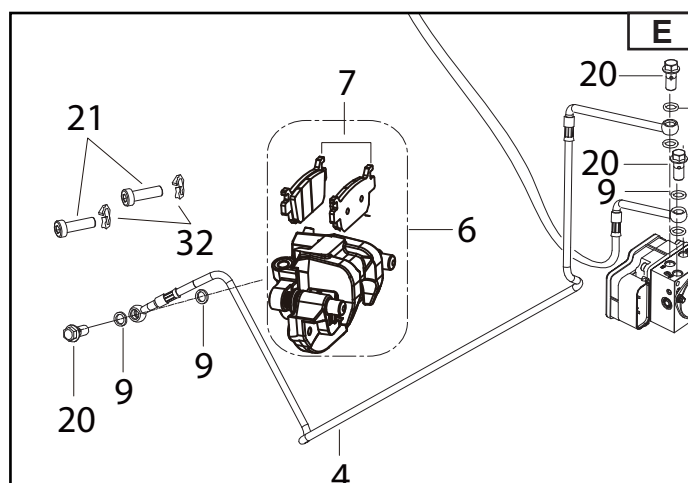
Tighten to the previous set torque twice after having loosened:



Torque 15 N*m

Check:

the level of the brake fluid (1) Fig. F and top up (refer to Chapter 3 **Frame/check brake fluid level**, section **Checking and topping up of the rear brake fluid level**)

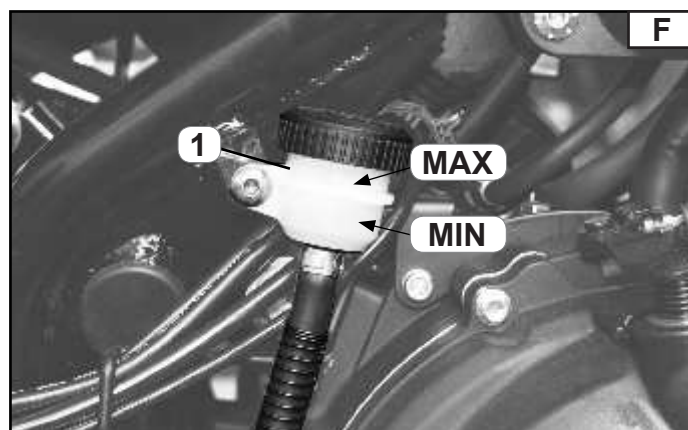


IMPORTANT NOTICE

Only use the prescribed fluid. The use of other types of brake fluid may cause damage to the rubber seals, leading to leaks and to a drop in brake performance. Top up with the same type of brake fluid in the system. The brake fluid must never be mixed with fluids of other brands, since this could cause a dangerous chemical reaction, with a drop in brake performance as a result.

While topping up brake fluid, take care not to let any water enter the container.

Water would considerably reduce the boiling point of the fluid and may lead to the formation of vapour bubbles.



Check:

If below the minimum notch, top up with the recommended brake fluid.

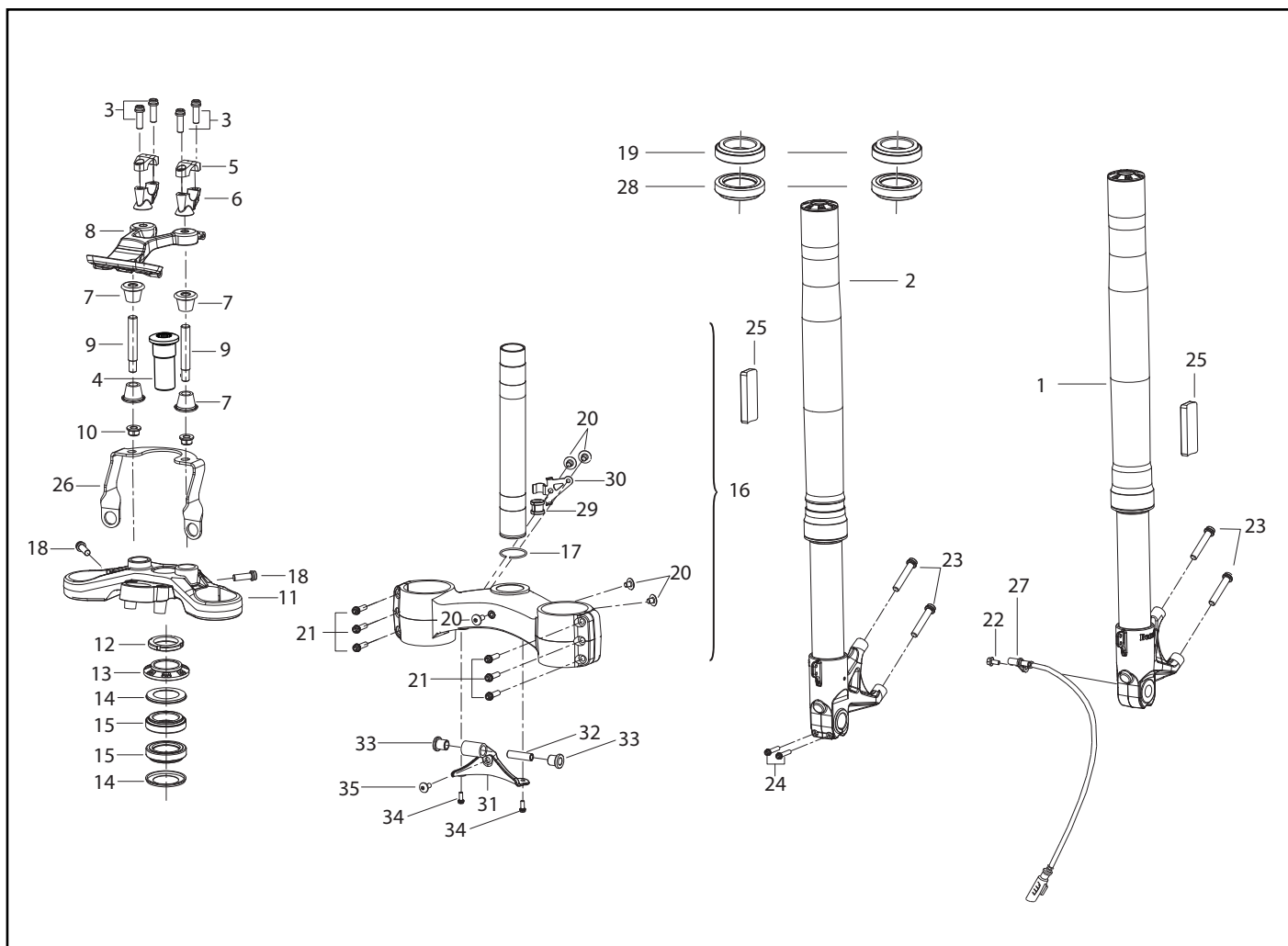
- Brake lever operation.

If the brake lever movement is spongy, bleed brake system. Refer to Chapter 3 **Frame/Brake fluid level check**, section **Checking and topping up of the front brake fluid level**).



FRONT FORK

FRONT FORK STEM REMOVAL



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	LEFT STEM ASSEMBLY					
2	RIGHT STEM ASSEMBLY					
3	SCREW					
4	SPECIAL SCREW					
5	UPPER U-CLAMP					
6	LOWER U-CLAMP					
7	BUSHING					
8	INSTRUMENT SUPPORT					
9	HANDLEBAR FIXING PIN					
10	NUT					
11	STEERING HEAD					
12	STEERING PIN RING NUT					
13	STEERING RING NUT					
14	DUST SEAL					
15	BEARING					



FRONT FORK

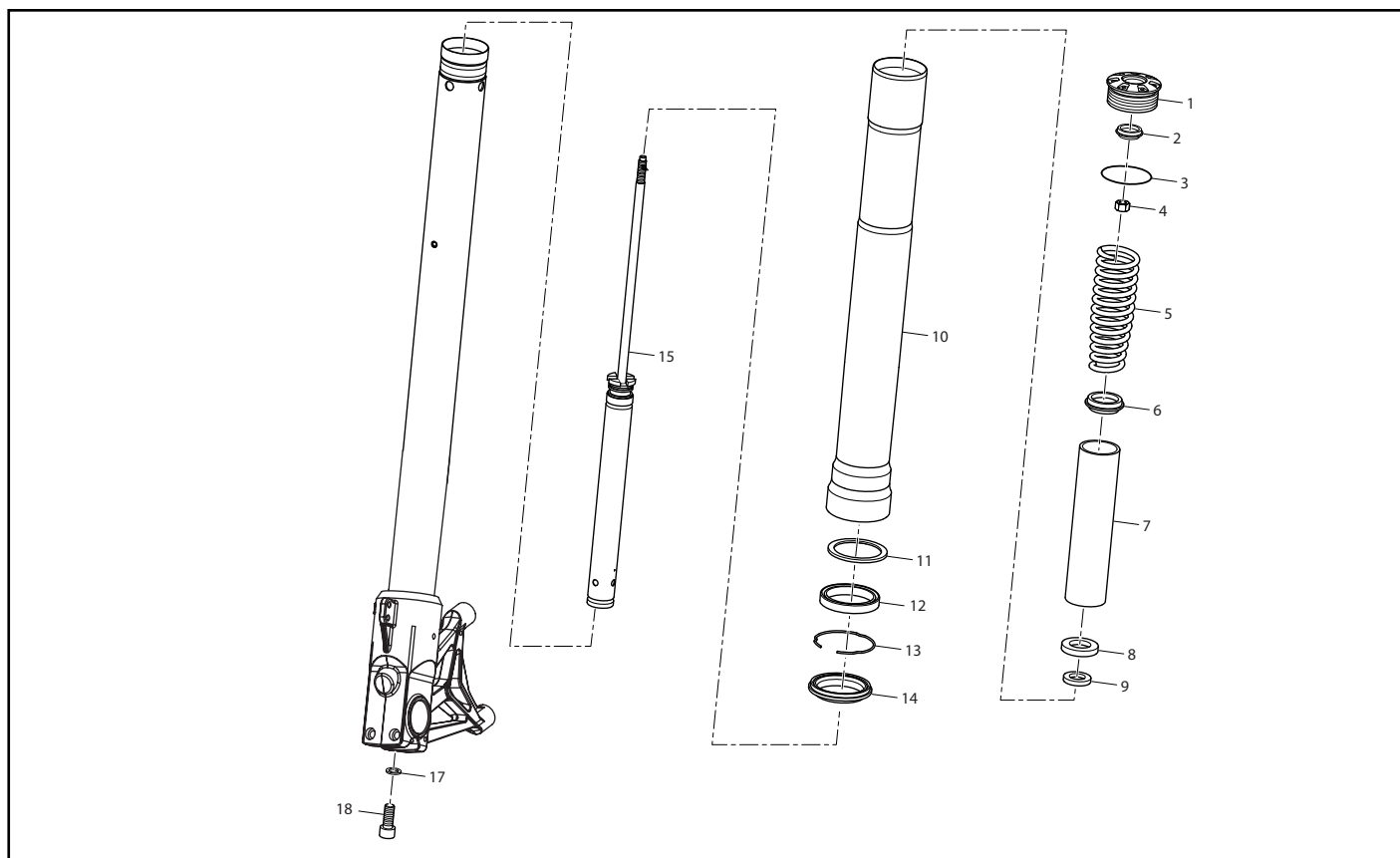
FRONT FORK STEM REMOVAL

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
16	LOWER STEERING BASE					
17	SEEGER					
18	SCREW					
19	DUST COVER					
20	SCREW					
21	SCREW					
22	SCREW					
23	SCREW					
24	SCREW					
25	REFLECTOR					
26	HEADLAMP SUPPORT					
27	ABS SPEED SENSOR – REAR WHEEL					
28	OIL SEAL					
29	TUBE GUIDE					
30	CABLE GLAND					
31	HEADLAMP SUPPORT					
32	SHIM					
33	BUSHING					
34	SCREW					
35	SCREW					



FRONT FORK

FRONT FORK STEM DISASSEMBLY



Disassemble the pieces in the order listed.

NOTE:
The following procedure is applied to both front fork stems.

Secure:

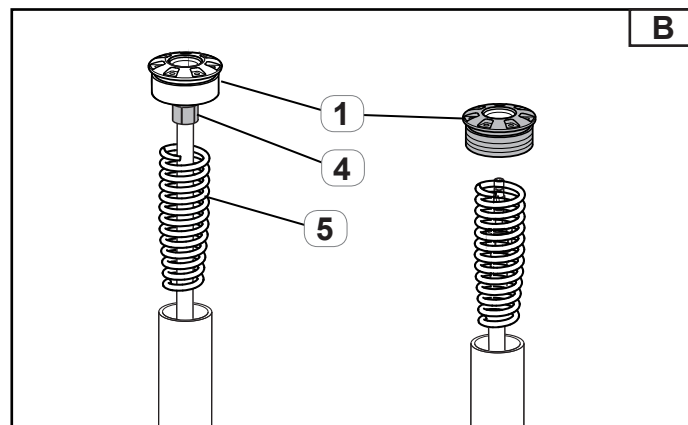
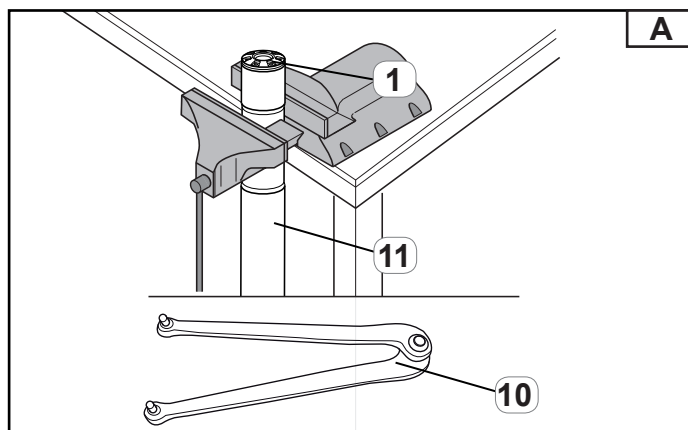
- The fork sleeve (10) in a clamp Fig. A.
- Completely unscrew the cap assembly (1) from the support tube, using a 4 mm wrench (10) Fig. A.
- Lower the fork sleeve (11) slowly.

IMPORTANT NOTICE

The fork spring is compressed.

Push down:

- The spring (5) Fig. B.
- The preload shim so as to be able to insert a 17 mm wrench in the nut (4).
- Hold the cap assembly (1) in place with a 4 mm wrench and use a 17 mm wrench to loosen the nut (4).
- Unscrew and remove the top cap assembly (1).





FRONT FORK

FRONT FORK STEM DISASSEMBLY

Slide out from inside the sleeve Fig. C:

- The tip (2).
- The spring (5).
- The bushing (6).
- The shim (7).
- The lower bushing (8).
- The tip (9).

Release:

- The stem from the clamp.
- Turn the stem towards a suitably sized container so as to allow the oil that it contains to flow out Fig. D.

NOTE:

To facilitate drainage, it is necessary to pump a few times by pushing the pump rod forwards and backwards (15) Fig. D.

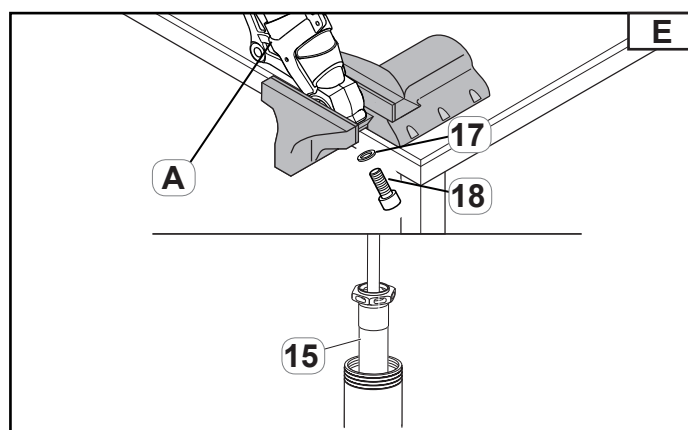
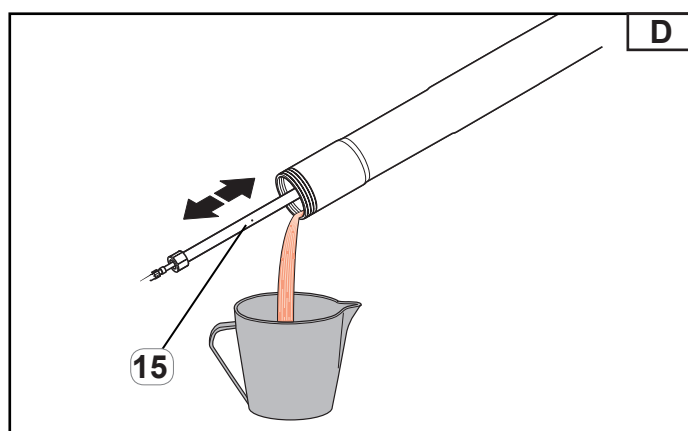
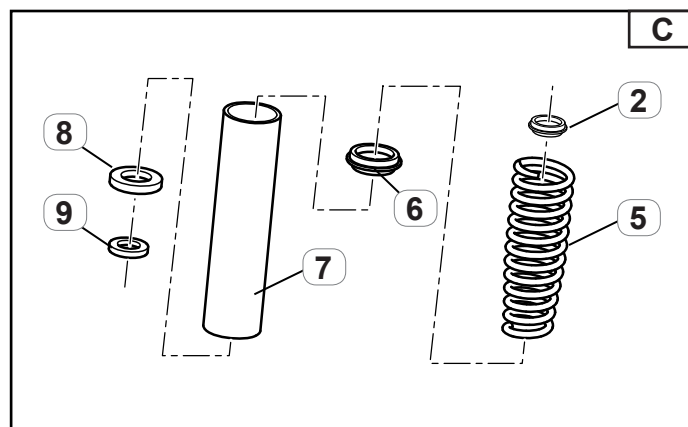
IMPORTANT NOTICE

This operation must be carried out only after draining the oil from inside the stem.

- Lock the wheel shoe (A) in a clamp Fig. E.

Remove:

- The screw (18) fastening the pump unit (15).
- The washer (17).
- The pump unit (15).





FRONT FORK

FRONT FORK STEM DISASSEMBLY

IMPORTANT NOTICE

This operation is only necessary after completely draining the oil from inside the sleeve.

Remove:

- The dust seal (14) from the seat using a small flat-blade screwdriver Fig. F.

Remove:

- The clip of the oil seal (13) using the small flat-blade screwdriver Fig. G.

Slide out:

- The fork stem (B) from the fork sleeve (10), Fig. H.

NOTE:

To separate these two elements, it is necessary to pull them apart with a little force.

- The oil seal (12).
- The retaining ring (11).
- The bottom guide bushing (8).

Manually remove:

- The top guide bushing (6).

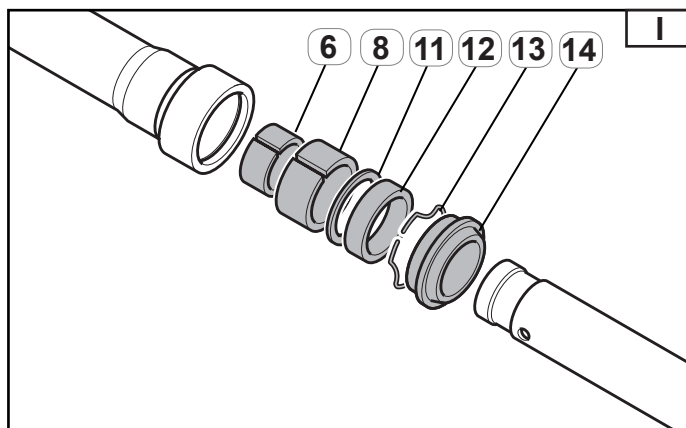
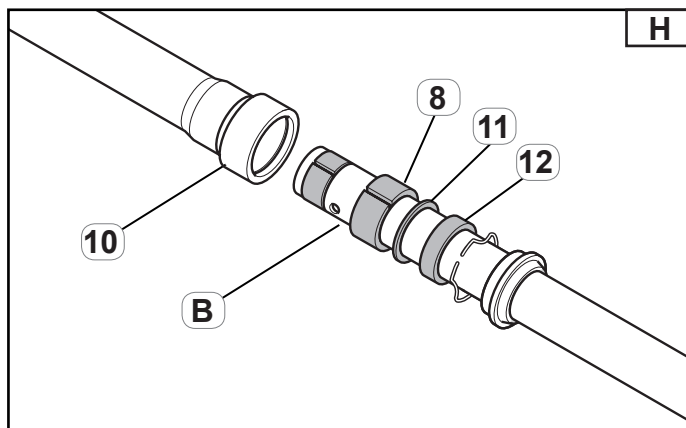
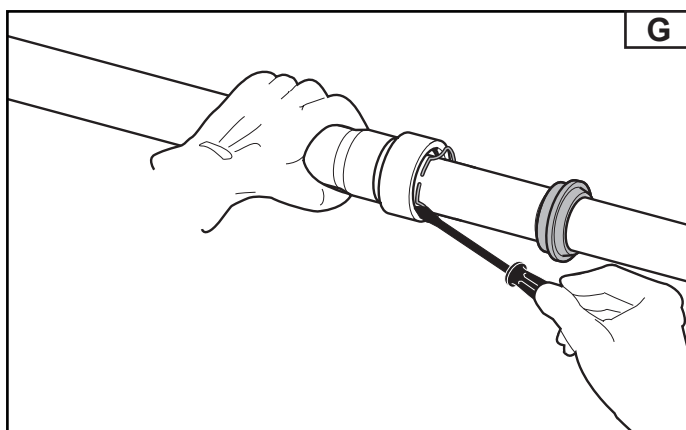
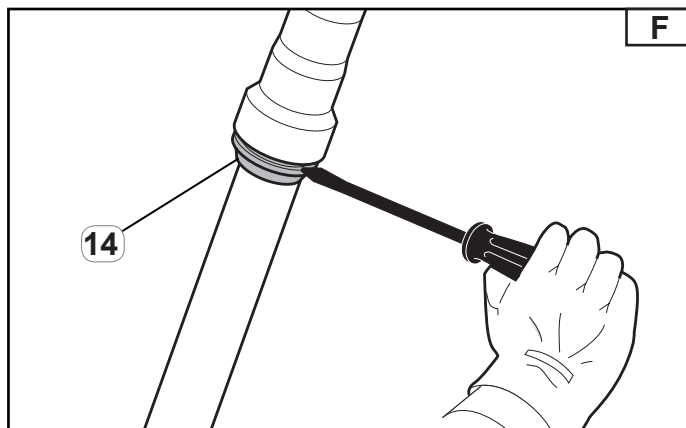
NOTE:

If this operation becomes difficult manually, it is possible to use a flathead screwdriver in the slot in the bushing, to make it easier.

- The bottom guide bushing (8).
- The retaining ring (11).
- The oil seal (12).
- The dust seal clip (13).
- The dust seal (14).

NOTE:

Once the oil and dust seals have been removed, they may not be re-used.





FRONT FORK

FRONT FORK STEM INSPECTION

The following procedure is applied to both front fork stems.

Check:

- The fork stem "A" Fig. A.
- The fork sleeve (10).

If there is any deformation/damage/wear, replace.

WARNING

Do not try to straighten the inner fork if bent, since it will become weaker with time and could be dangerous.

Measure:

- The full length (B) of the spring (5). If outside specifications, replace Fig B.



Detail	The full length of the spring.
Spring	295 mm

Check:

- The damper shaft (15) Fig. C.

If there is any damage or wear, replace.

If there are any obstructions, free all oil passages with compressed air.

IMPORTANT NOTICE

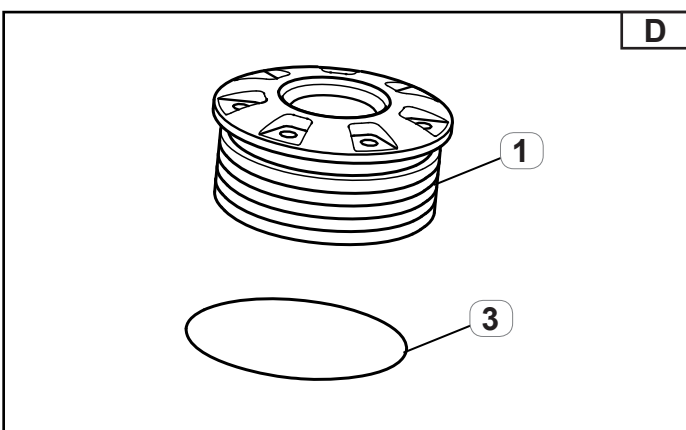
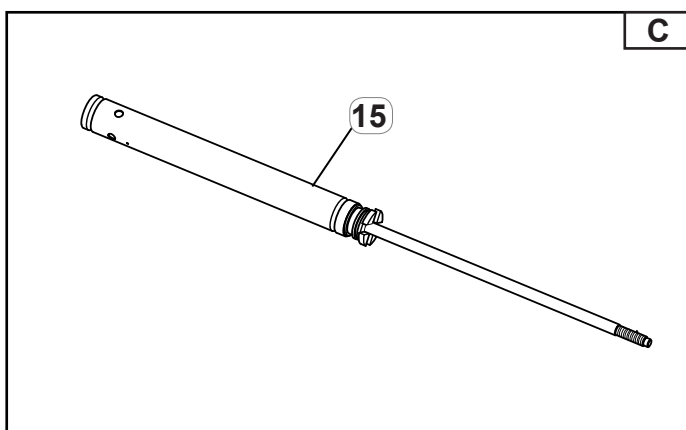
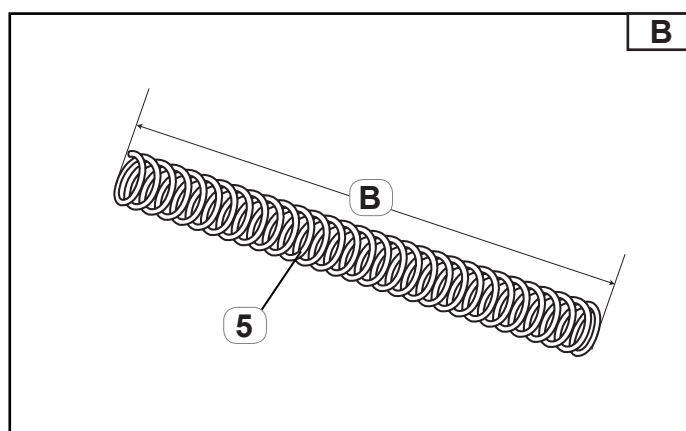
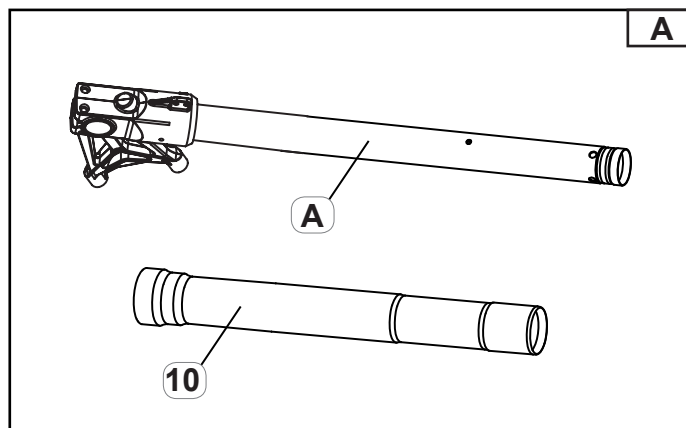
The pump unit contains elements that are very sensitive to foreign bodies.

While disassembling and refitting the front fork stem, never let foreign bodies enter the front fork.

Check:

- The O-Ring (3) of the cap (1) Fig. D.

If there is any damage or wear, replace.





FRONT FORK

FRONT FORK STEM ASSEMBLY

The following procedure is applied to both front fork stems.

IMPORTANT NOTICE

The oil and dust seals must not be reused after removal. Before refitting, check the condition of bushings and guides; check the guide bushings; if they are lined or scratch, replace them. Check the Teflon coating on the guide bushings as this must be integral.

Apply to the end of the supporting tube:

- Adhesive tape so as to cover the seat for the upper bushing Fig. A.
- Slightly lubricate the oil and dust seals with grease.

Insert into the dust seal Fig. B:

- The dust seal (14).
- The dust seal clip (13).
- The oil seal (12).
- The retaining ring (11).
- The bottom guide bushing (8).

IMPORTANT NOTICE

Take note of the direction in which the oil filter is facing (12) as it needs to be inserted with the hollow part facing the retaining ring (11).

- Remove the adhesive tape applied at the end of the fork stem, together with any traces of adhesive remaining.

Insert:

- The upper guide bushing (6) Fig. C using the appropriate tool "X" Fig. C:



(**) Tool for stem guide bushing insertion

NOTE:

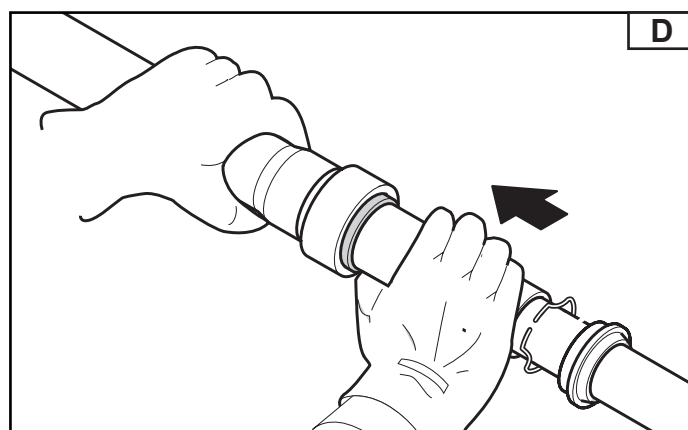
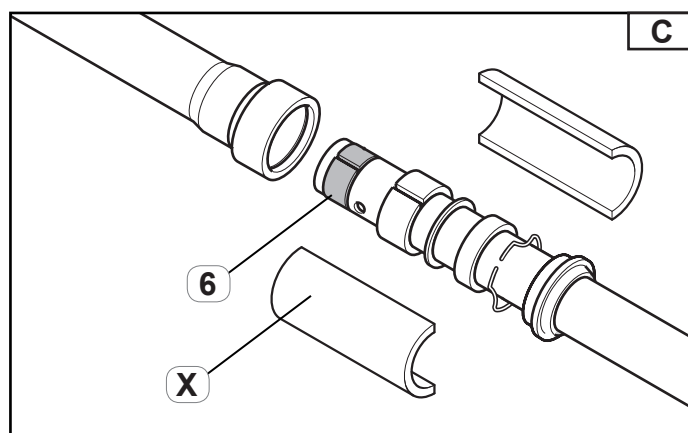
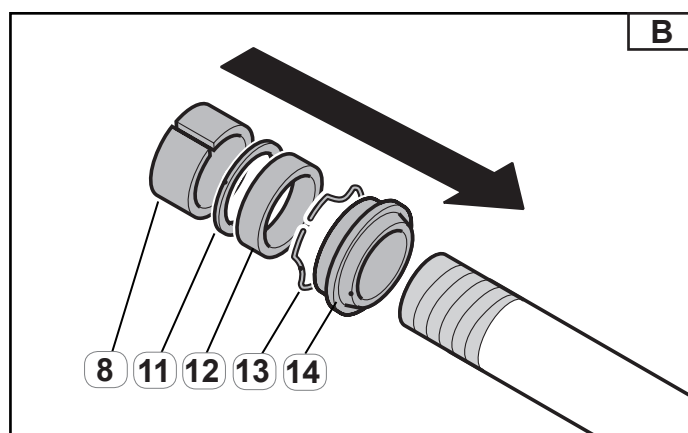
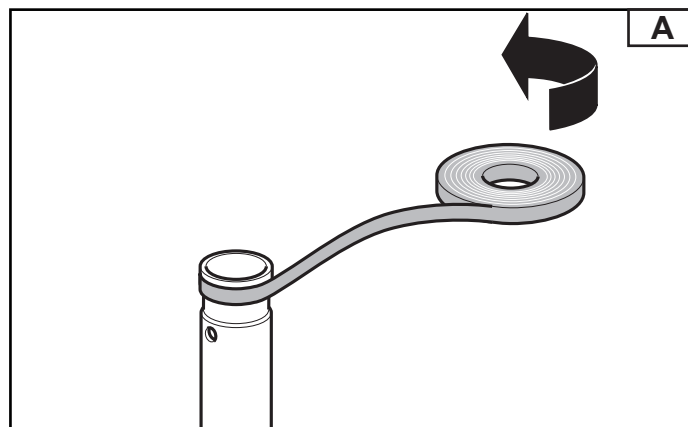
If this operation becomes difficult, it is possible to use a flat-head screwdriver in the slot in the bushing, to make it easier.

- Insert the fork stem into the sleeve, very gently to make sure it does not damage the top guide bushing.

Accompany:

- The bottom guide bushing (8) as far as sleeve contact with the fork Fig. D.
- The retaining ring (11).
- The oil seal (12).

Then place them into the seat.



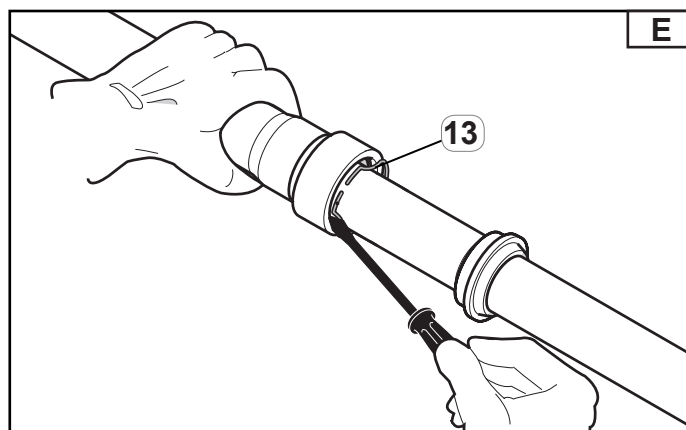


FRONT FORK

FRONT FORK STEM ASSEMBLY

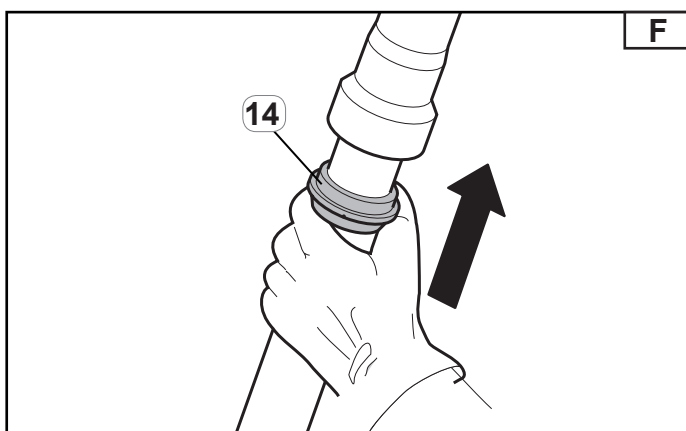
Assemble:

- The clip on the oil seal (13) using a small flathead screwdriver, making sure that it is perfectly inserted into the special raceway and taking care not to scratch the fork stem Fig. E.



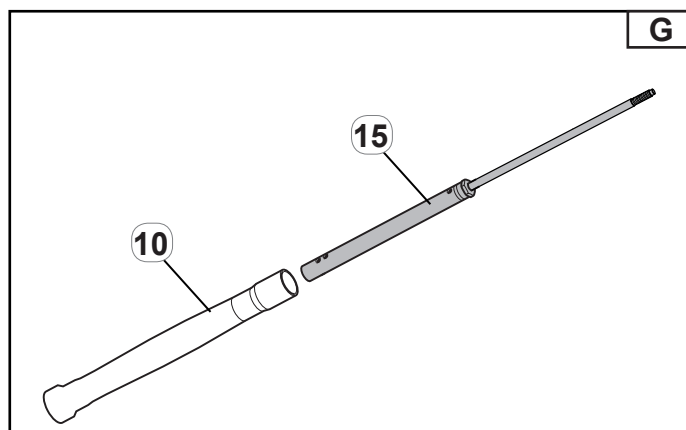
Then place the following in the seat:

- The dust seal (14) by pressing down manually Fig. F.



Insert:

- The assembled pump unit (15) into the fork sleeve (10) Fig. G.
- Mount the fork in a clamp by the wheel foot Fig. H.
- Lower the fork sleeve over the stem.



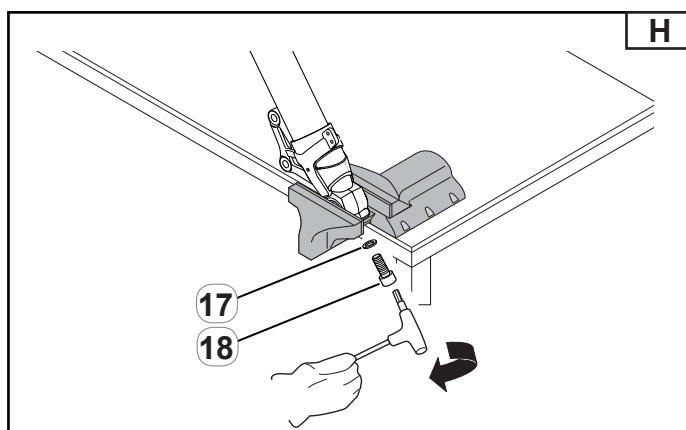
Insert:

- The washer (17).
- The screw (18) fastening the pump unit.

Use an 8 mm Allen key to tighten to the following torque:



Torque 50 N*m





FRONT FORK

FRONT FORK STEM ASSEMBLY

- Lift the fork sleeve completely Fig. I.
- Using a graduated measuring container, prepare the correct amount of oil to be poured into the stem Fig. I.
- Pour about 2/3 of the oil into the fork sleeve (A), then pump the fork to eliminate any air.
- Continue pouring up to the required amount.
- Lower the fork sleeve over the stem as far as the dust seal stop on the wheel foot.
- Wait a few minutes and check the air volume then top up if necessary.

IMPORTANT NOTICE

A lower or higher air volume or a different type of oil to that recommended may change the behaviour of the fork at every stage.

Insert the following into the fork sleeve:

- The spring tip (2).
- The fork spring (5).
- The top spring guide bushing (6).
- The shim (7).
- The bottom spring guide bushing (8).
- The spring tip (9).

IMPORTANT NOTICE

**In the same direction as spring insertion.
The narrowest section must be facing upwards.**

Screw the following fully:

- The closing cap (1) Fig. M.

Push down:

- The spring (5) Fig. N.
- The preload shim.
- Insert a 17 mm wrench in the nut (4).
- Hold the cap in place with a 4 mm wrench and use a 17 mm wrench to tighten the nut.
- Tighten to the following torque:



Torque 20 N*m

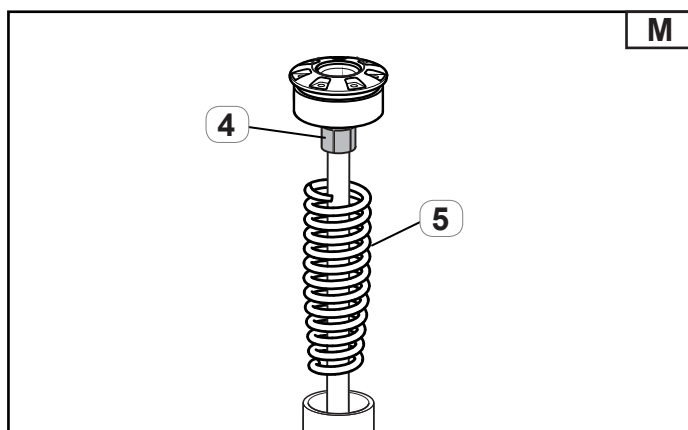
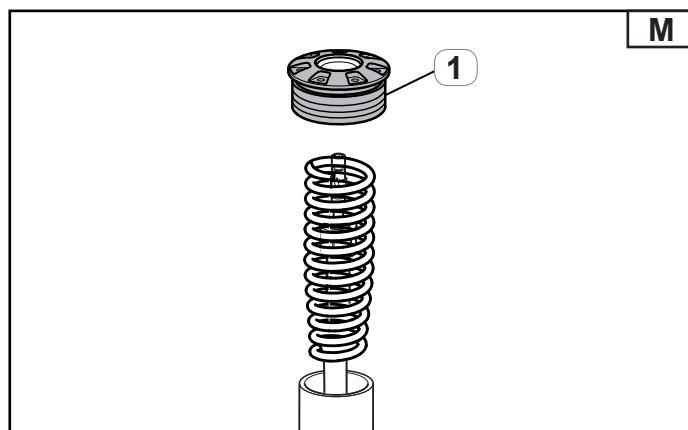
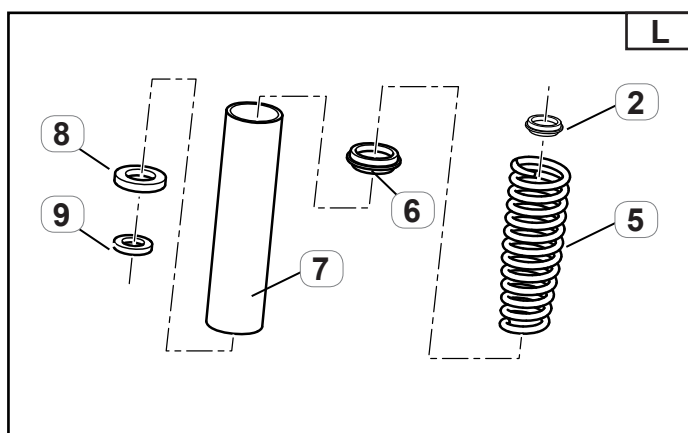
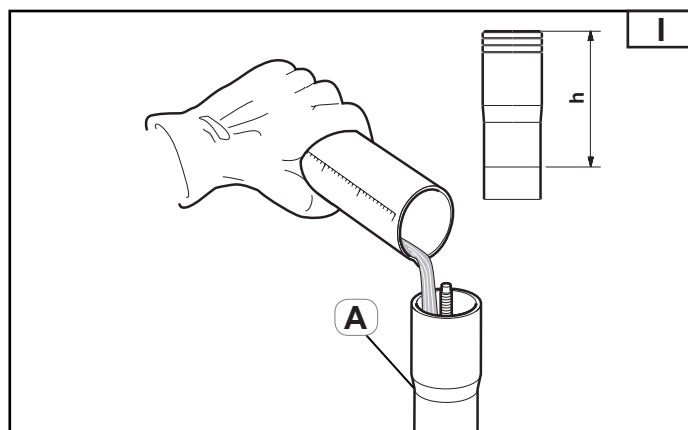
- Lift the fork sleeve over the stem.

Secure:

- The fork sleeve in a clamp.
- Hold the cap in place with a 4 mm wrench and tighten to the following torque:



Torque 20 N*m





FRONT FORK

FRONT FORK STEM INSTALLATION

The following procedure is applied to both front fork stems.

Install:

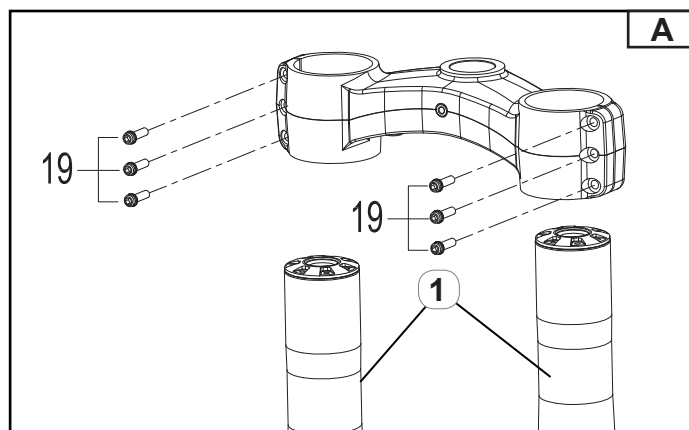
- The front fork stems (1) Fig. A.

tighten provisionally

- The stop screws (19) of the lower steering plate Fig. A.

NOTE:

Check the assembly position "x" Fig. B, which must be identified considering the bottom section of the steering base (18) and the end of the steering rod (excluding the dust seal shim).



Tighten:

- The setscrews (19) of the lower steering plate to the following torque:



Torque 10 N*m

NOTE:

Tighten in three steps.

Tighten:

- The setscrews (1) from the top steering plate (2) Fig. C to the following torque:

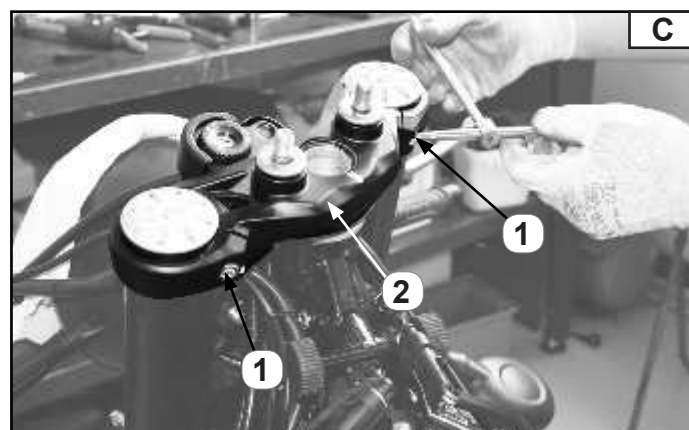
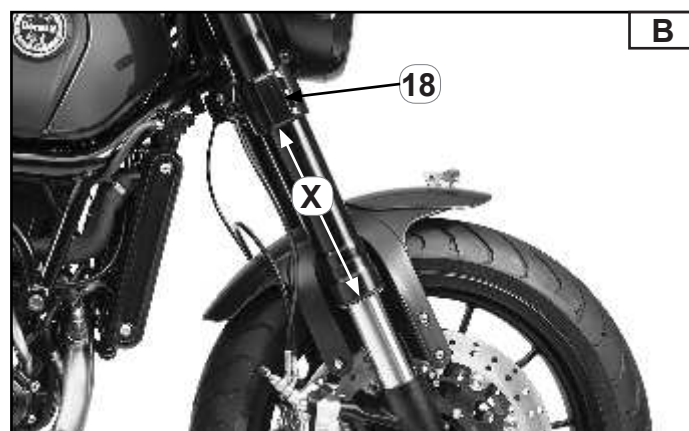


Torque 22 N*m

Use:



MEDIUM THREAD LOCK-
ER



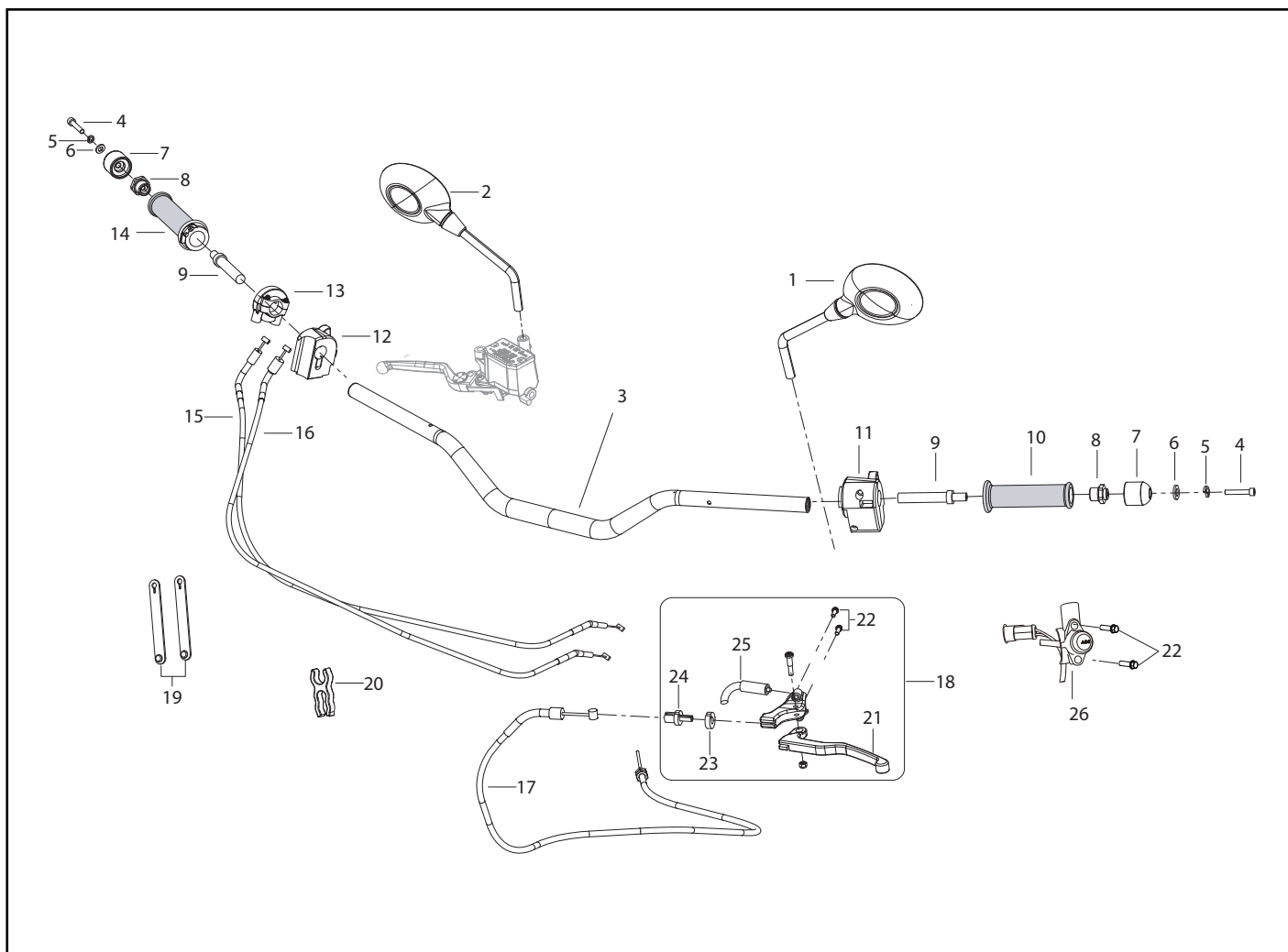
IMPORTANT NOTICE

Check that the path of the brake hoses is correct.



HANDLEBAR

HANDLEBAR REMOVAL



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	REAR-VIEW MIRROR (LEFT)					
2	REAR-VIEW MIRROR (RIGHT)					
3	HANDLEBAR					
4	SCREW					
5	ELASTIC WASHER					
6	WASHER					
7	ROCKER ARM					
8	HANDGRIP CAP					
9	HANDGRIP TERMINAL					
10	LEFT HANDGRIP					
11	LEFT LIGHT SWITCH					
12	RIGHT LIGHT CHANGE-OVER SWITCH					
13	ACCELERATOR CONTROL					
14	RIGHT HANDGRIP					
15	ACCELERATOR OPENING CABLE					



HANDLEBAR

HANDLEBAR REMOVAL

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
16	ACCELERATOR CLOSURE CABLE					
17	CLUTCH CABLE					
18	CLUTCH CONTROL					
19	RUBBER BAND					
20	CABLE GLAND					
21	CLUTCH CONTROL LEVER					
22	SCREW					
23	SPECIAL NUT					
24	SPECIAL SCREW					
25	CLUTCH SWITCH					
26	ABS SWITCH					



HANDLEBAR

REMOVAL OF HANDLEBAR AND ITS COMPONENTS

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

NOTE:

Direct a jet of compressed air between the left of the handlebar and the relevant handgrip, so that it can be slid off the handlebar gradually.

Remove:

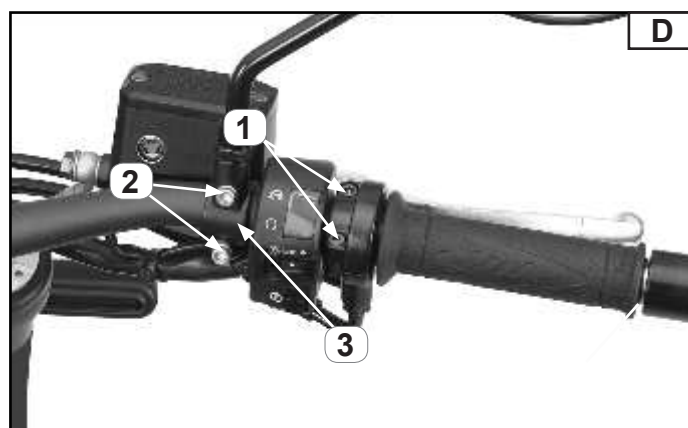
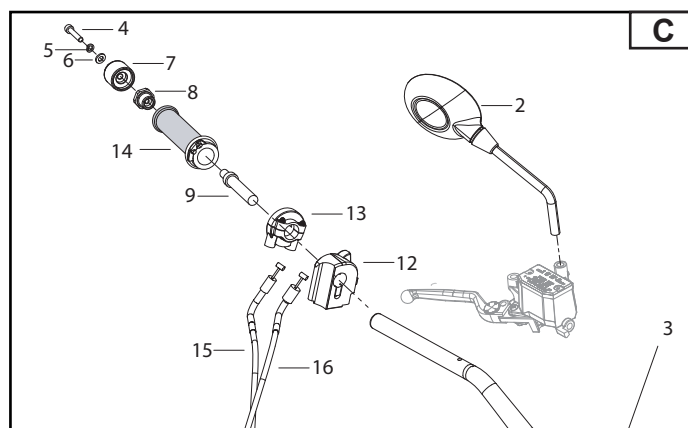
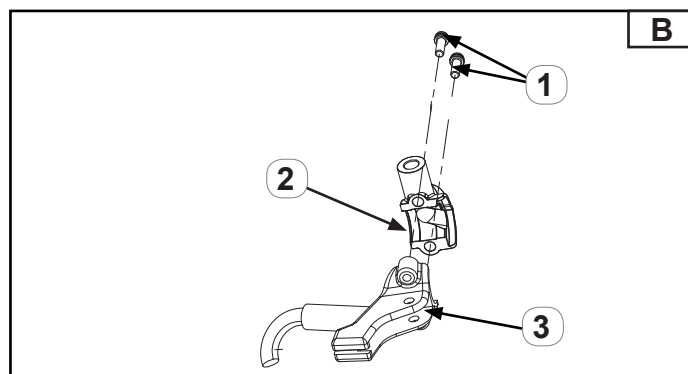
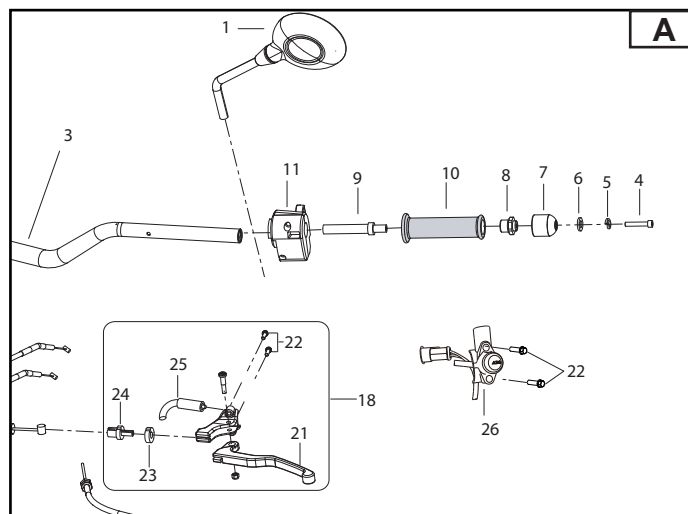
- Right rear-view mirror (2*) and left rear-view mirror (1*).
- Screws (4*) Fig. A.
- Elastic washer (5*) Fig. A.
- Washer (6*) Fig. A.
- Rocker arm (7*) Fig. A.
- Cap (8*) Fig. A.
- Handgrip terminal (9*) Fig. A.
- Left handgrip (10*) Fig. A.
- Left change-over switch screws Fig. B.
- Left change-over switch (11*) Fig. A.
- Clutch control screws (1) Fig. B.
- Clutch control (3) U-clamp (2) Fig. B.
- Complete clutch control (18*) Fig. A.

NOTE:

Disconnect the connector of the LEFT STOP light switch.

Remove:

- Right change-over switch screws Fig. D.
- Right change-over switch (12*) Fig. D.
- Screws (1) Fig. D accelerator control (13*).
- Accelerator control (13*)
- Accelerator handgrip (14*).
- Accelerator control cable (15*).
- Accelerator Closure Cable (16*).
- Screws (2) Fig. D. of the brake pump.
- Pump brake U-clamp (3) Fig. D.





HANDLEBAR

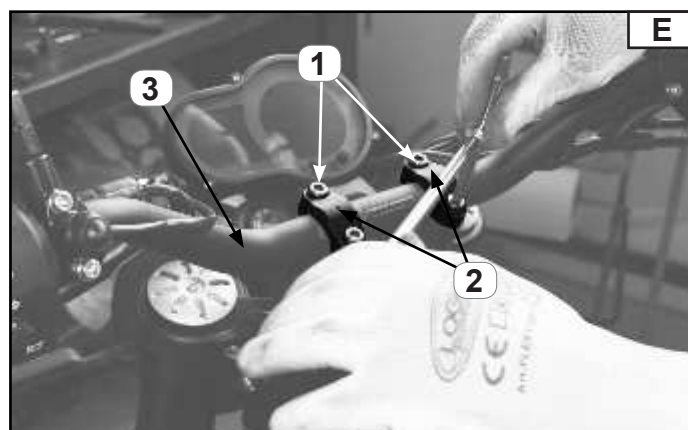
REMOVAL OF HANDLEBAR AND ITS COMPONENTS

Remove:

- Screws (1) Fig. E.
- Handlebar u-clamp (2) Fig. E.
- Handlebar (3*) Fig. E.

NOTE:

The numbers marked (*) are a part of the spare parts table chapter "Handlebar".





HANDLEBAR

HANDLEBAR INSPECTION

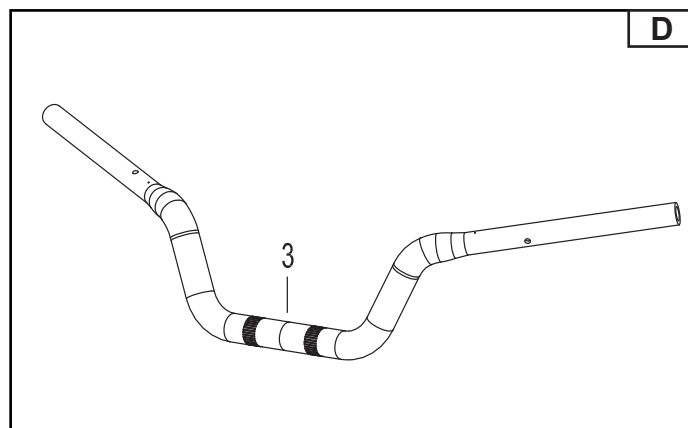
Check:

- The handlebar (3) Fig. D.

If there is any warping/cracking/damage, replace.

WARNING

Do not try to straighten the handlebar if bent, since it will become weaker and could be dangerous.





HANDLEBAR

HANDLEBAR INSTALLATION

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Proceed to install, following the steps for removal in reverse order, but taking care to observe the instructions below:

Install:

- Right change-over switch (11*).

NOTE:

Align the projections (1) of the switch with the hole (2) on the right side of the handlebar Fig. E.

- Front brake pump.
- Screws (1) Fig. F tighten to the following torque:



Torque 8 N*m

- Accelerator handgrip (14*).
- Accelerator control (13*).
- Accelerator control cable (15*).
- Accelerator Closure Cable (16*).
- Clutch control (18*).
- Screw clutch control tighten to the following torque:



Torque 8 N*m

- Left change-over switch (11*) Fig. G.
- Left handgrip (10*).
- Handgrip terminal (10*).
- Right rear-view mirror (2*) and left rear-view mirror (1*).

Position the handlebar:

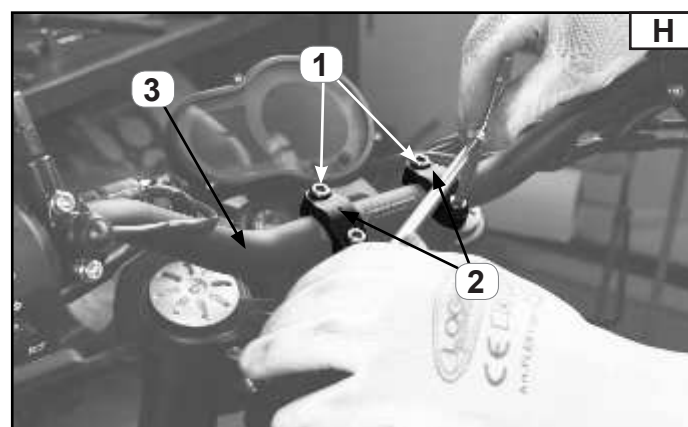
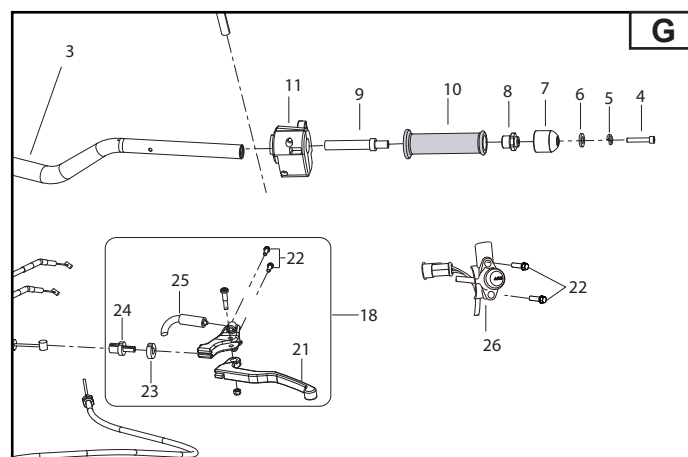
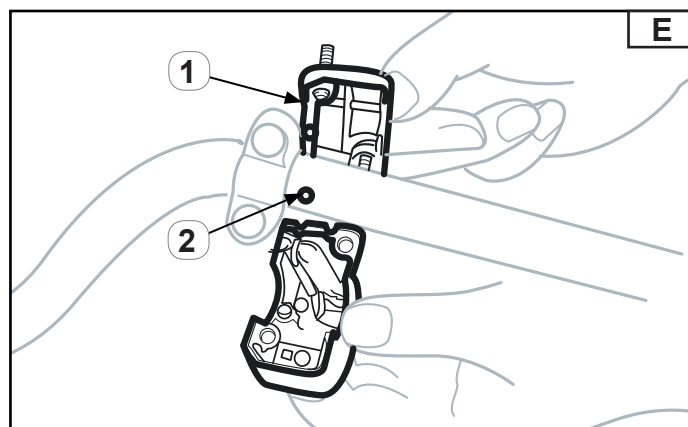
- Handlebar (3*).
- U-clamp (2) of the handlebar (3*).
- Screws (1), tighten to the following torque:



Torque 22 N*m

NOTE:

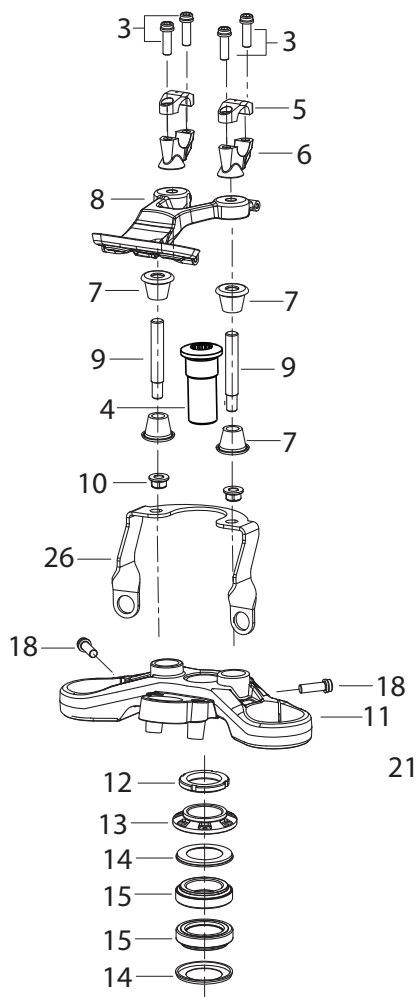
The numbers marked (*) are a part of the spare parts table chapter "Handlebar".





STEERING HEAD

STEERING HEAD REMOVAL



IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Handlebar, refer to the section “**Removal of handlebar and its components, Chapter 4**”.
- The two upper u-clamps (1) Fig. A.

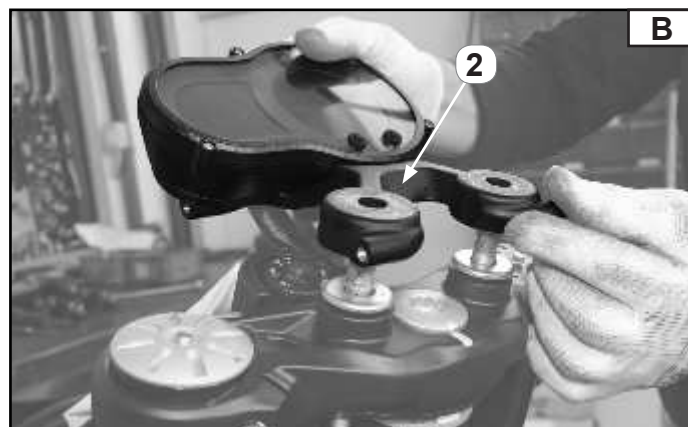




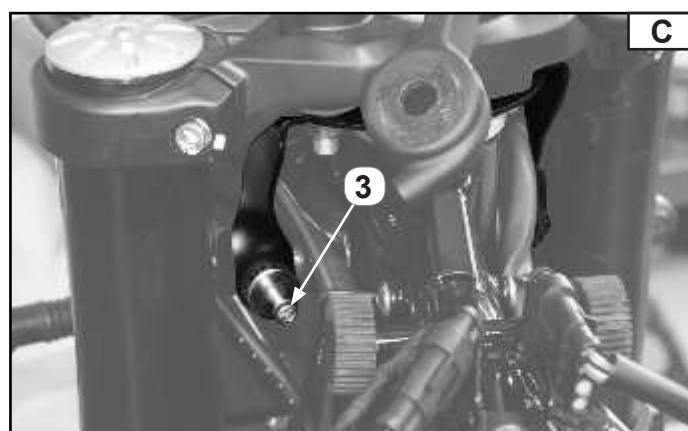
STEERING HEAD

STEERING HEAD REMOVAL

- The instrument support bracket (2) Fig. B.



- The screws of the instrument support (3) Fig. C.



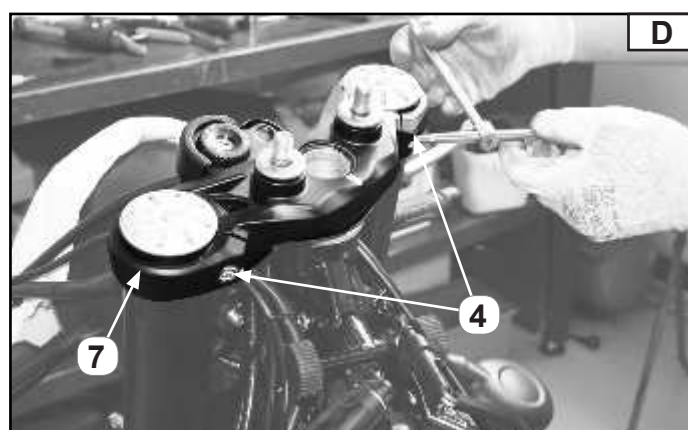
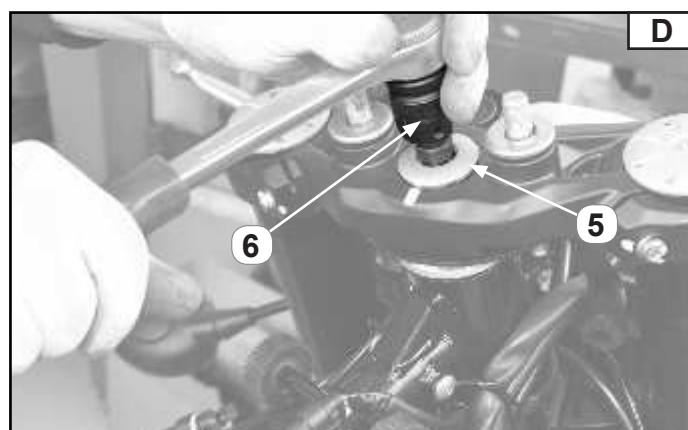
Remove:

- The cap (5) with the special tool (6) Fig. D.



(**) Steering head wrench
Code: R300097146000

- The fastening screws (4) of the steering head Fig. D.
- The steering base (7) Fig. D.



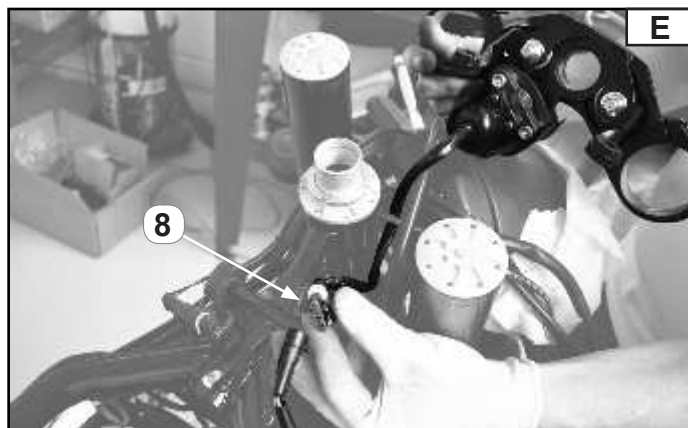


STEERING HEAD

STEERING HEAD REMOVAL

Disconnect:

- The connector (8) of the ignition block Fig. E.





STEERING BASE

STEERING HEAD BASE REMOVAL

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

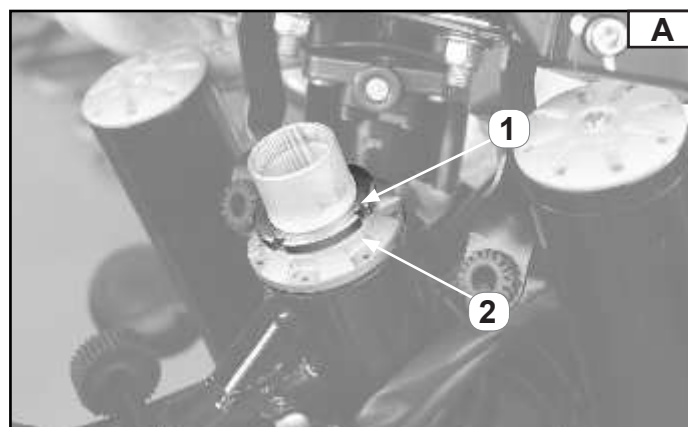
- Handlebar, refer to the section “**Removal of handlebar and its components, Chapter 4**”.
- Steering head, refer to the section “**Steering head removal, Chapter 4**”.
- The steering ring nut (1).
- The steering ring nut (2) Fig. A with the wrench for steering ring nut (3) Fig. B.



(**) Tool to tighten the steering sleeve lock nut
Code: R180297129000

WARNING

Firmly support the bottom steering base, so that it cannot fall.





STEERING HEAD

STEERING HEAD INSPECTION

Wash:

- The bearings.
- The bearing races.



Solvent with high flash point.

Check:

- The bearings (15) Fig. A.
 - The dust seal rings (14) Fig. A.
- If there is any spotting/damage, replace.

Replace:

- The bearings.
- The bearing races.
- Remove the bearing races (1) from the steering column tube, using a long rod and a hammer (2) Fig. B.
- Remove the outer race of the bearing (3) from the lower bracket using a chisel (4) and a hammer Fig. B.
- Mount a new rubber seal and new bearing races.

IMPORTANT NOTICE

If the bearing race is not correctly fitted, this could damage the steering head tube.

NOTE:

- **The bearings and the relative races must always be substituted together and greased as necessary Fig. C.**
- **Every time the steering sleeve is removed, a new rubber seal must be fitted.**

Check:

- The steering head.
- The bottom steering base (along with the sleeve).
- If there is any warping/cracking/damage, replace.

NOTE:

If necessary:

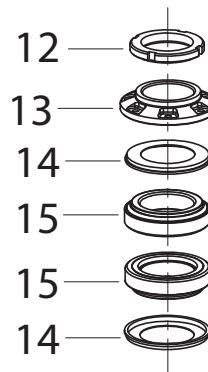
Lubricate:

- The bearings Fig. A.
- The dust seal rings Fig. A.
- The bearing races Fig. A.

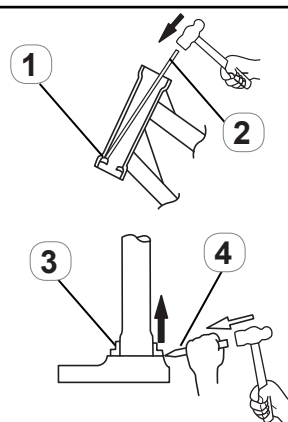


**Recommended lubricant
NGLI2 GREASE**

A



B



C





STEERING HEAD

STEERING HEAD INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Install:

Proceed using the opposite order to removal.

Tighten:

- The steering ring nut (2) Fig. B with the special tool to the following torque:



Torque 16 N*m



(**) Tool to tighten the steering sleeve lock nut

Code: R180297129000

IMPORTANT NOTICE

Do not overtighten the steering ring nut.

- The steering pin ring nut (1.) Fig. B with the special tool and tighten to the following torque:



Torque 22 N*m

- Place the top steering head (3) Fig. C.
- The cap (5) Fig. C with the special tool (6) and tighten to the following torque:



Torque 60 N*m



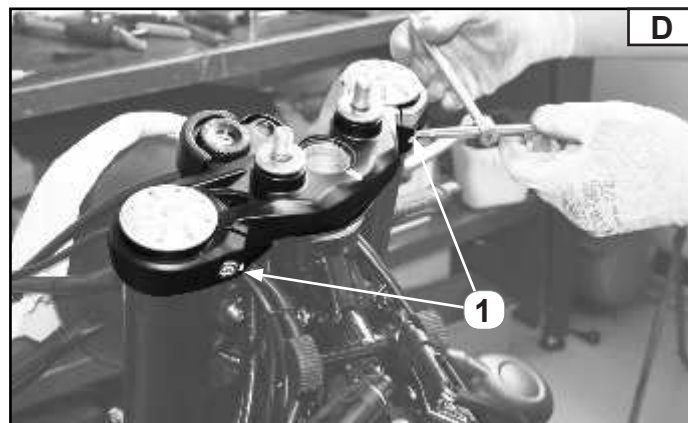
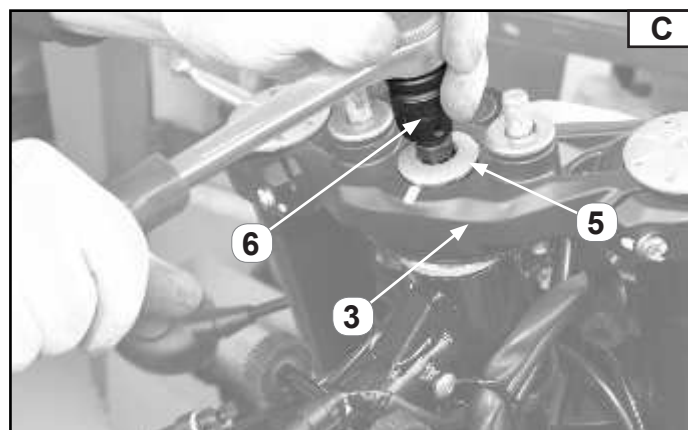
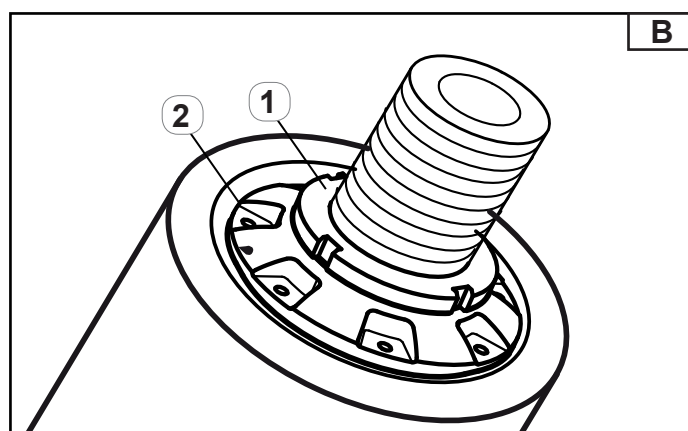
(**) Steering head wrench

Code: R300097146000

The setscrews (1) Fig. d to the following torque:



Torque 22 N*m





STEERING HEAD

INSTALLATION OF THE STEERING HEAD

Check:

- The steering sleeve Fig. E.

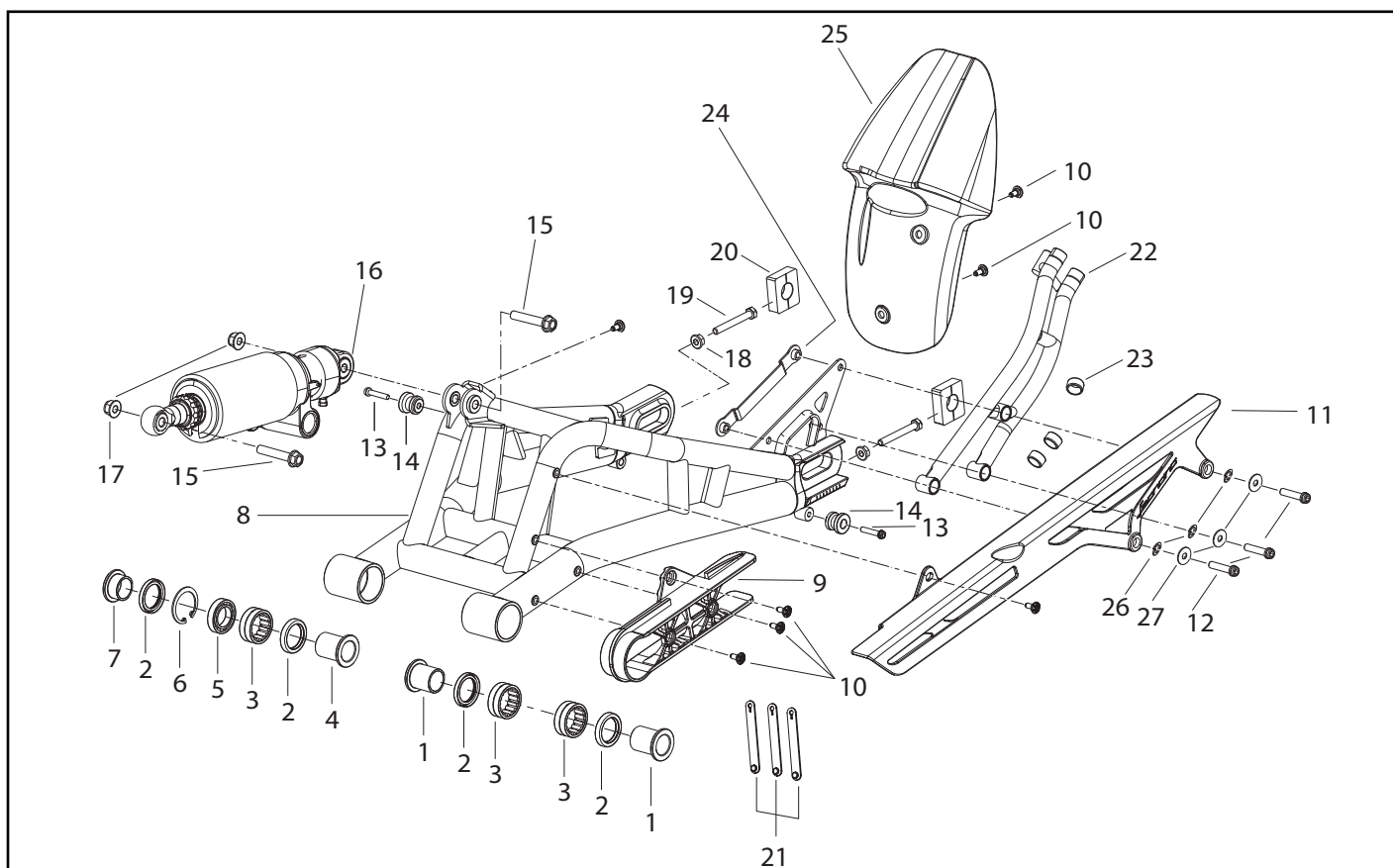
Gently oscillate the front fork, holding it by the ends of the tubes. If there are any sticking/slackening points, adjust the steering head.





REAR SHOCK ABSORBER

REAR SHOCK ABSORBER REMOVAL



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	BUSHING					
2	SEALING RING					
3	BEARING					
4	BUSHING					
5	BEARING					
6	SEEGER RING					
7	BUSHING					
8	SWINGING ARM					
9	TOP CHAIN SLIDE					
10	SCREW					
11	CHAIN COVER					
12	SCREW					
13	SCREW					
14	GUIDE BUSHING					
15	SCREW					
16	REAR SHOCK ABSORBER					
17	NUT					
18	NUT					
19	SCREW					



REAR SHOCK ABSORBER

REAR SHOCK ABSORBER REMOVAL

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
20	CHAIN TENSIONER SLIDE					
21	TUBE GUIDE					
22	REAR MUDGUARD SUPPORT					
23	RUBBER BAND					
24	BRACKET					
25	REAR MUDGUARD					
26	ELASTIC WASHER					
27	WASHER					



REAR SHOCK ABSORBER

REAR SHOCK ABSORBER REMOVAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “Removal of rider seat, Chapter 4”.
- Side fairings, refer to chapter “Removal of the side fairings, Chapter 4”.

IMPORTANT NOTICE

This rear shock absorber and the gas cylinder contain a highly-compressed gas (nitrogen).

Before handling the rear shock absorber and the gas cylinder, carefully read the following information and ensure that you understand it.

The manufacturer cannot be held responsible for any damage to property or personal injuries deriving from the improper use of the rear shock absorber and the gas cylinder.

- Do not tamper with the rear shock absorber or the gas cylinder nor try to open them.
- Do not expose the shock absorber or gas cylinder to open flames or other sources of extreme heat.
- Elevated overheating could cause an explosion due to the excessive pressure of the gas.
- Do not deform or damage the rear shock absorber or the gas cylinder in any way. If the rear shock absorber, gas cylinder or both are damaged, the damping performance will be prejudiced.

Remove:

- The lower screw (15*) of the rear shock absorber unit Fig. B.
- The relative nut.

NOTE:

To remove the lower fixing screws of the rear shock absorber unit, hold the swinging arm to stop it from falling.

- The upper screw (15*) of the rear shock absorber unit Fig. C.
- The relative nut.

NOTE:

Lift the swinging arm, then remove the rear shock absorber unit from the attachment point on the swinging arm.

NOTE:

The numbers marked (*) are a part of the spare parts table chapter “Rear swinging arm”, section “Removal of the rear shock absorber”.





REAR SHOCK ABSORBER

REAR SHOCK ABSORBER CHECK

Check:

- The rear shock absorber rod.

If there is any warping/damage, replace the rear shock absorber assembly.

- The rear shock absorber.

If there is any gas/oil leak, replace the rear shock absorber assembly.

- The spring.

If there is any damage/wear, replace the rear shock absorber assembly.

- The bushings.

If there is any damage or wear, replace.

- The dust seals.

If there is any damage or wear, replace.

- The screws.

If there is any warping/damage/signs of wear, replace.

**Adjust:**

To adjust the preload according to the default conditions, proceed as follows:

- Rotate the preload adjusting ring nut (1) clockwise until it stops.
- Rotate the preload adjusting ring nut (1) of 4 "Clicks" counter-clockwise.



REAR SHOCK ABSORBER

REAR SHOCK ABSORBER INSTALLATION

Clean:

- The rear shock absorber nuts.
- The rear shock absorber screws.



Solvent with high flash point.

Install:

- Proceed using the opposite order to removal, considering as follows.

NOTE:

**Lift the swinging arm to install the rear shock absorber unit.
Insert the lower screw (15*) of the rear shock absorber unit.**

Tighten:

- The lower nut (17*) of the rear shock absorber Fig. A to the following torque:



Torque 50 N*m

Install:

- The upper screw of the rear shock absorber.

Tighten:

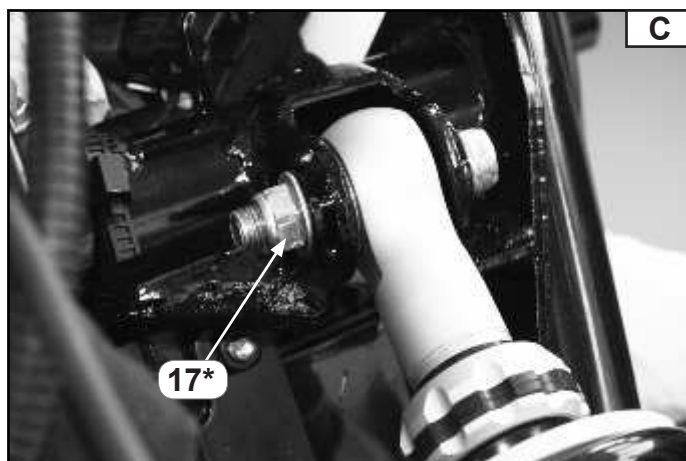
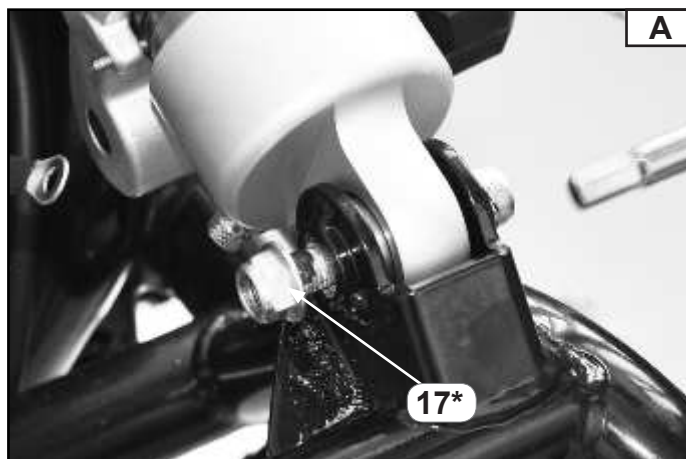
- The upper nut (17*) of the rear shock absorber unit to the following torque:



Torque 50 N*m

NOTE:

The numbers marked (*) are a part of the spare parts table chapter "Rear swinging arm", section "Removal of the rear shock absorber".





TRANSMISSION CHAIN AND SWINGING ARM

TRANSMISSION CHAIN REMOVAL

NOTE:

Prop the motorcycle on suitable supports so that it cannot fall.

Remove the parts in the indicated order.

- Chain pinion cover, refer to the section “Removal of the chain pinion cover, Chapter 4.”.

Detach:

- The transmission chain
(with a suitable tool for transmission chains (1) Fig. A, or with the dedicated tool according to the transmission chain manufacturer's specifications).





TRANSMISSION CHAIN AND SWINGING ARM

TRANSMISSION CHAIN REPLACEMENT

Loosen:

- The transmission chain.

This chain uses a transmission chain with master link with safety clip link.

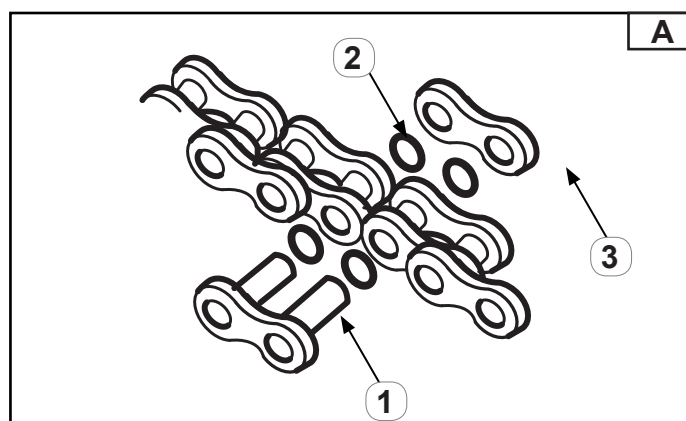
- Use the special tool, according to the chain manufacturer's specifications and the type of use required.

NOTE:

Follow the instructions of the manufacturer when using the special tool.

IMPORTANT NOTICE

Never reutilise the old transmission chain, the master link, the clip link of the master link and the O-rings.



Insert:

- The master link (1) Fig. A.
- The O-Ring (2) Fig. A.
- The clip link (3) Fig. A.

IMPORTANT NOTICE

Insert the master link from inside the transmission chain, then insert the clip link with the ID mark facing out.

- Mount and fix the set of tools for the transmission chain.
- Ensure that the pins of the master link are mounted correctly.
- Rivet the master link pins laterally.
- Ensure that the pins are tapped correctly.

Check:

- The surface affected by the clinched master link.

This must have no apertures.

If there are apertures, replace the master link, seal rings and clip link.

IMPORTANT NOTICE

Never use a transmission chain with a clip-type master link.



TRANSMISSION CHAIN AND SWINGING ARM

REMOVAL OF THE SWINGING ARM

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove the parts in the indicated order.

- Rear brake calliper, refer to the section “**Removal of the rear brake calliper, Chapter 4**”.
- Rear wheel, refer to the section “**Removal of the rear wheel, chapter 4**”.
- Rear shock absorber, refer to the section “**Removal of the rear shock absorber, Chapter 4**”.
- Right rear footrest plate, refer to the section “**Removal of the right rear footrest plate, Chapter 4**”.
- Left rear footrest plate, refer to the section “**Removal of the left rear footrest plate, Chapter 4**”.
- Rear mudguard, refer to the section “**Removal of the rear mudguard, Chapter 4**”.

Remove:

- The fastening pin (1) Fig. A.
- The bushing (2) Fig. B.

NOTE:

Repeat the removal procedure of the components also on the right side of the vehicle.

- The internal shim (3) Fig. A.

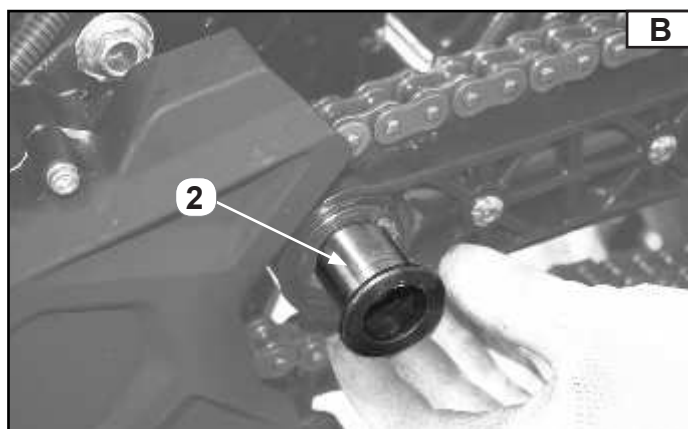
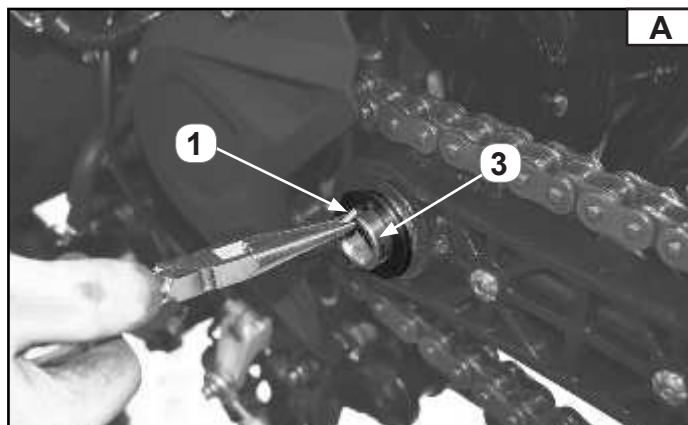
NOTE:

Position a stand (B) to support the rear swinging arm.

Utilise the appropriate tool for the removal of the internal components of the swinging arm:



() Tool for removing the rear swinging arm bearing**
Refer to Chapter 1 “Special tools for the frame”





TRANSMISSION CHAIN AND SWINGING ARM

SWINGING ARM INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Install:

- Proceed using the opposite order to removal, considering as follows.

Lubricate:

- The bearings.
- The bushings.

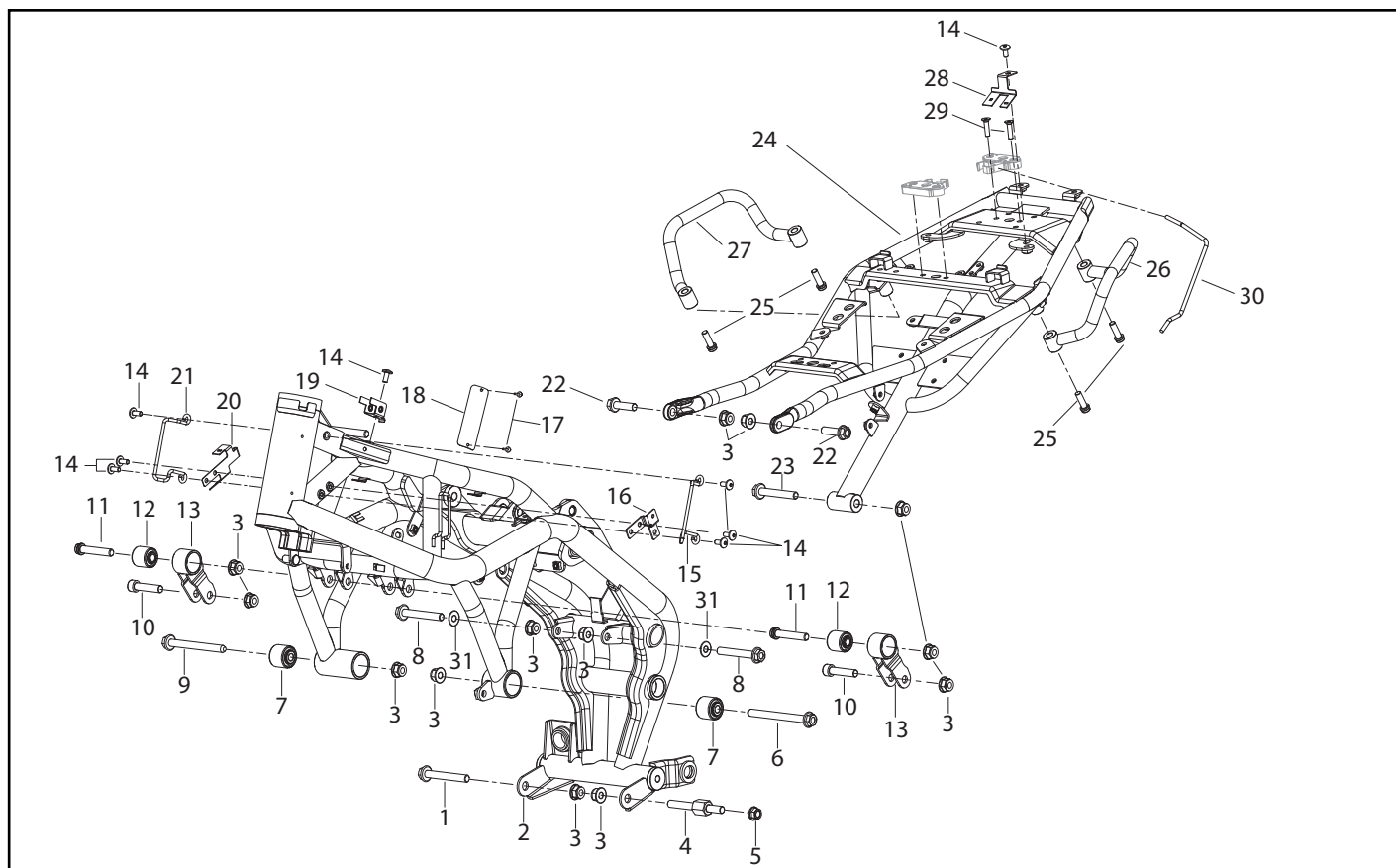


Recommended lubricant
NGLI2 GREASE



FRAME

REMOVAL/INSTALLATION OF FRAME PARTS



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SCREW					
2	FRAME					
3	NUT					
4	SPECIAL SCREW					
5	NUT					
6	SCREW					
7	SILENT-BLOCK					
8	SCREW					
9	SCREW					
10	SCREW					
11	SCREW					
12	RUBBER BUSHING					
13	FRAME BRACKET					
14	SCREW					
15	BRACKET					
16	BRACKET					
17	RIVET					
18	PLATE					
19	BRACKET					



FRAME

REMOVAL/INSTALLATION OF FRAME PARTS

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
20	BRACKET					
21	CABLE GLAND					
22	SCREW					
23	SCREW					
24	REAR FRAME					
25	SCREW					
26	LEFT REAR HANDLE					
27	RIGHT REAR HANDLE					
28	BRACKET					
29	SCREW					
30	SADDLE OPENING CABLE					
31	WASHER					



FRAME

REMOVAL OF THE REAR FRAME

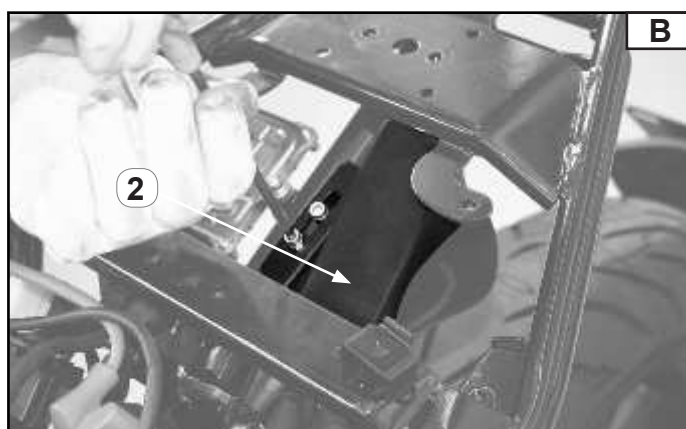
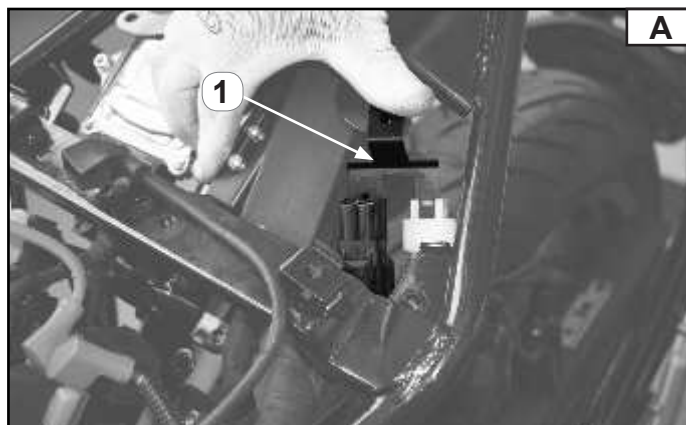
Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

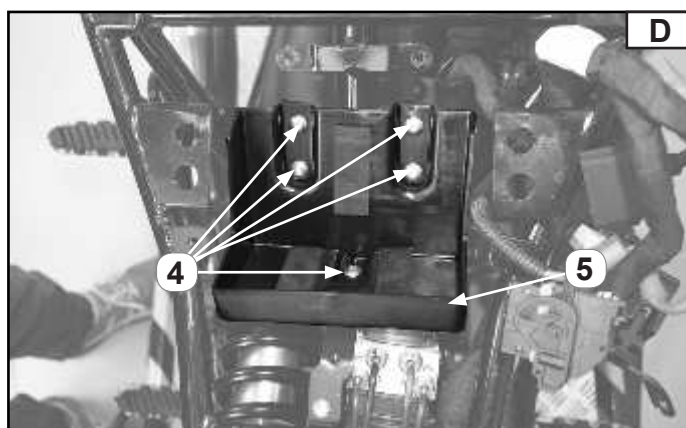
- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Fuel tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- Filter box, refer to section “**Filter box removal, Chapter 4**”.
- Battery, refer to section “**Battery removal, Chapter 4**”.
- Passenger handles, refer to the section “**Removal of the passenger handles, Chapter 4**”.
- Bottom cover, refer to the section “**Bottom cover removal, Chapter 4**”.
- Side fairings, refer to the section “**Removal of the side fairings, Chapter 4**”.
- Rear light, refer to the section “**Removal of the rear light, Chapter 4**”.
- Saddle opening lever, refer to the section “**Removal of the saddle opening lever, Chapter 4**”.
- Diagnostic connector plate (1) Fig. A.
- Relay box (2) Fig. B.



- ECU (3) Fig. C.



- Screws (4) Fig. D.
- Battery box (5) Fig. D.





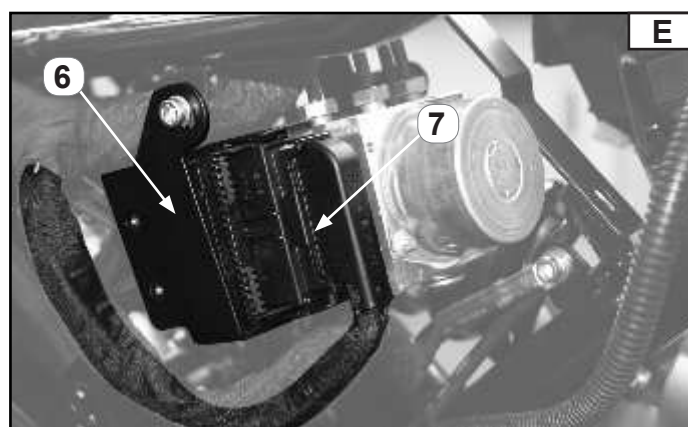
FRAME

REMOVAL OF THE REAR FRAME

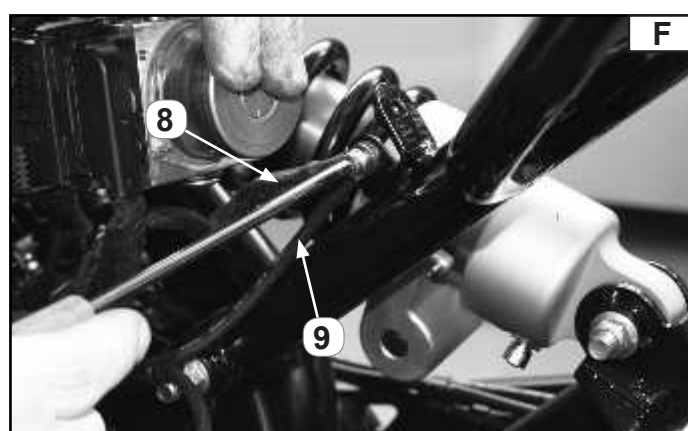
- ABS ECU support bracket (6) Fig. E.

Disconnect:

- The ABS ECU connector (7) Fig. E.



- The ground cable of the main electrical distributor (8) Fig. F.
- The starter ground cable (9) Fig. F.

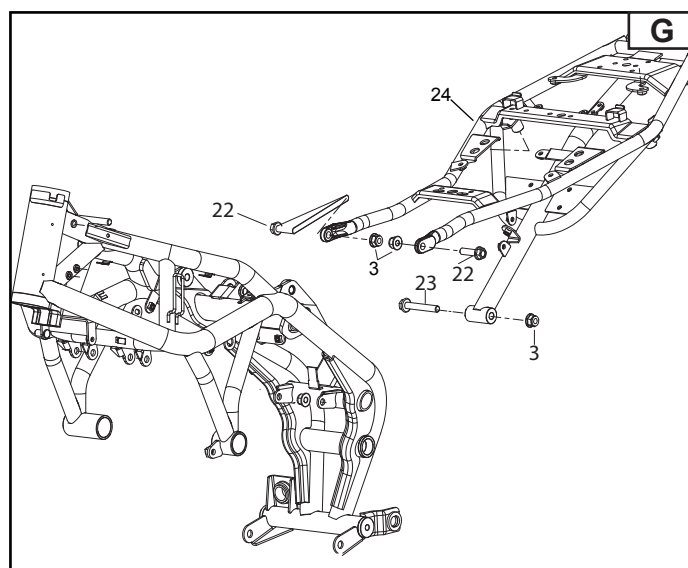


Remove:

- The screws (22*) Fig. G.
- The screws (23*) Fig. G.
- The nuts (3*) Fig. G.
- The rear frame (24*) Fig. G.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Frame", section "Installation/removal of frame parts".





FRAME

REAR FRAME INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

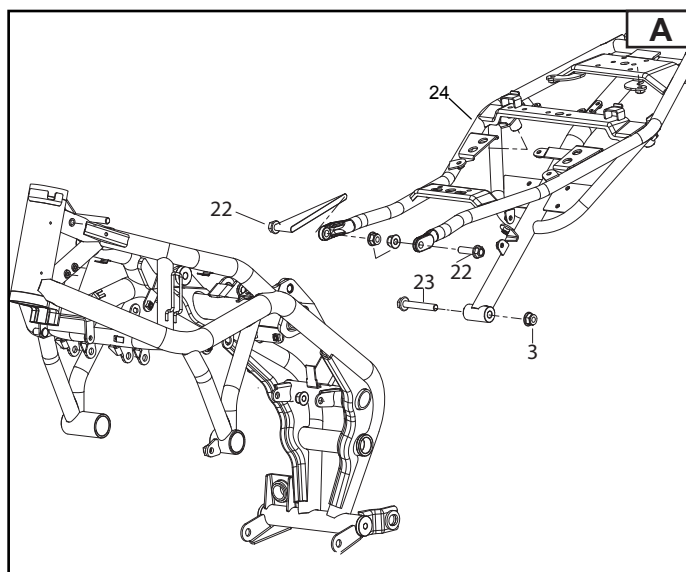
Install:

- The rear frame (24*) Fig. G.
- The screws (22*) Fig. A.
- The screws (23*) Fig. A.
- The nuts (3*) Fig. A.

to the following torque:



Torque: 25. N*m





FRAME

REMOVAL OF THE REAR PASSENGER HANDLES

Park the motorcycle on a level surface.

IMPORTANT NOTICE

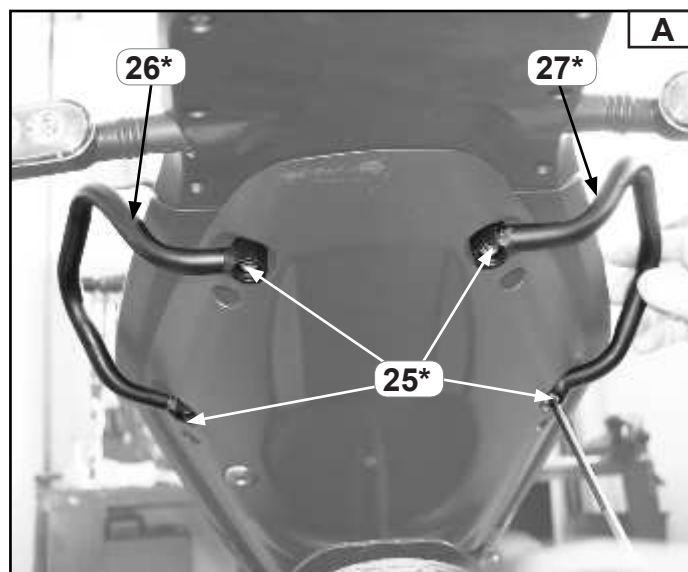
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The screws (25*) Fig. A.
- The rear handles (26-*27*) Fig. A.
-

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Frame", section "Installation/removal of frame parts".





FRAME

INSTALLATION OF THE REAR HANDLES

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screws (25) Fig. A.

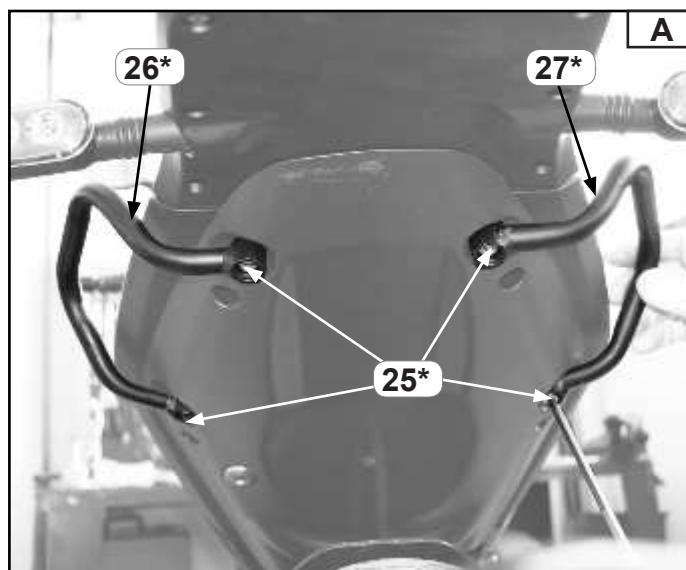
To the following torque:



Torque 22 N*m

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Frame", section "Installation/removal of frame parts".





FRAME

INSTALLATION OF THE REAR MUDGUARD SUPPORT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

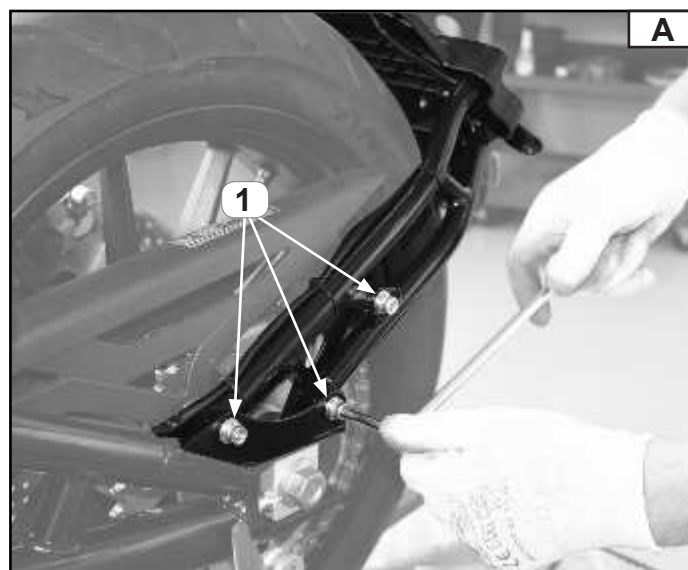
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The screws (1) Fig. A.

Disconnect:

- The licence plate light wire (2) Fig. B.





FRAME

INSTALLATION OF THE REAR MUDGUARD SUPPORT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screws (1) Fig. A.

To the following torque:

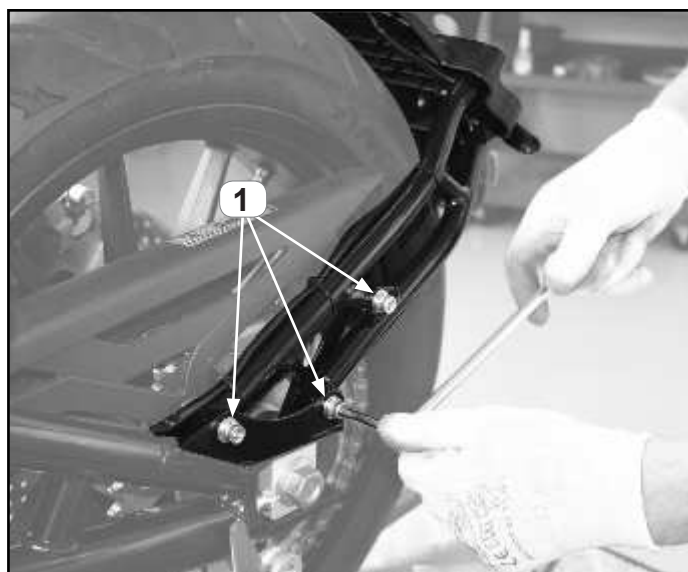


Torque 22 N*m

Use medium Loctite thread locker to secure.



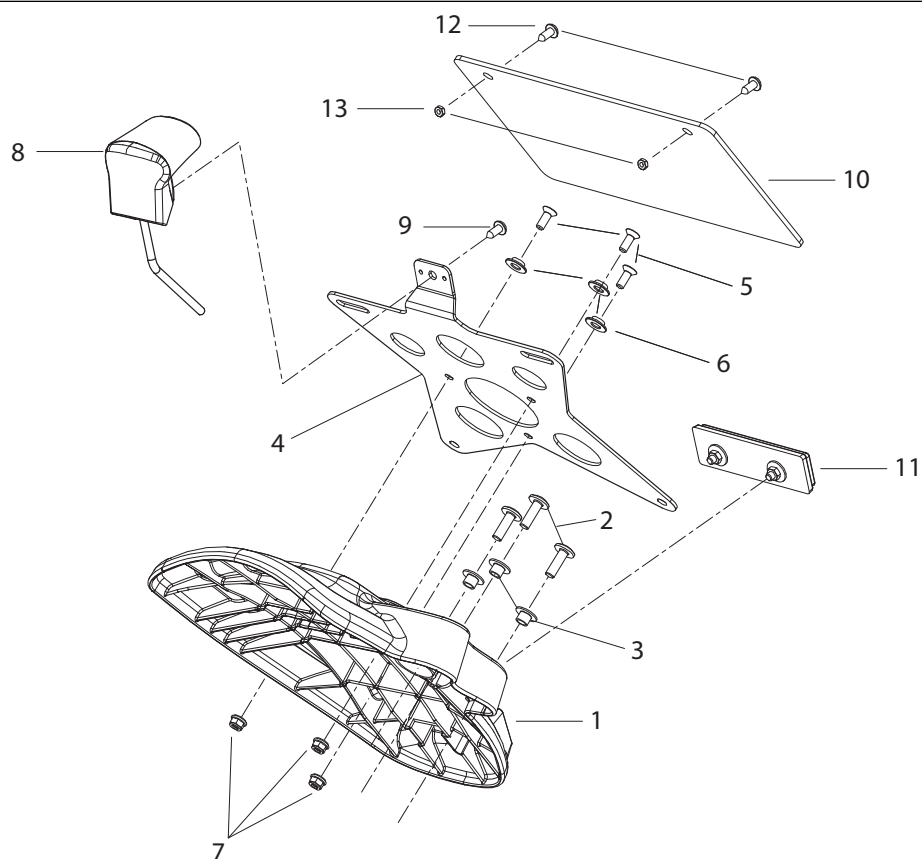
**MEDIUM THREAD LOCK-
ER**





FRAME

LICENCE PLATE HOLDER



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	FLAP GUARD					
2	SCREW					
3	BUSHING					
4	LICENCE PLATE HOLDER SUPPORT					
5	SCREW					
6	BUSHING					
7	NUT					
8	LICENCE PLATE LIGHT					
9	SCREW					
10	NUMBER PLATE HOLDER					
11	REFLECTOR					
12	SCREW					
13	NUT					



FRAME

REMOVAL OF THE LICENCE PLATE HOLDER

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Disconnect:

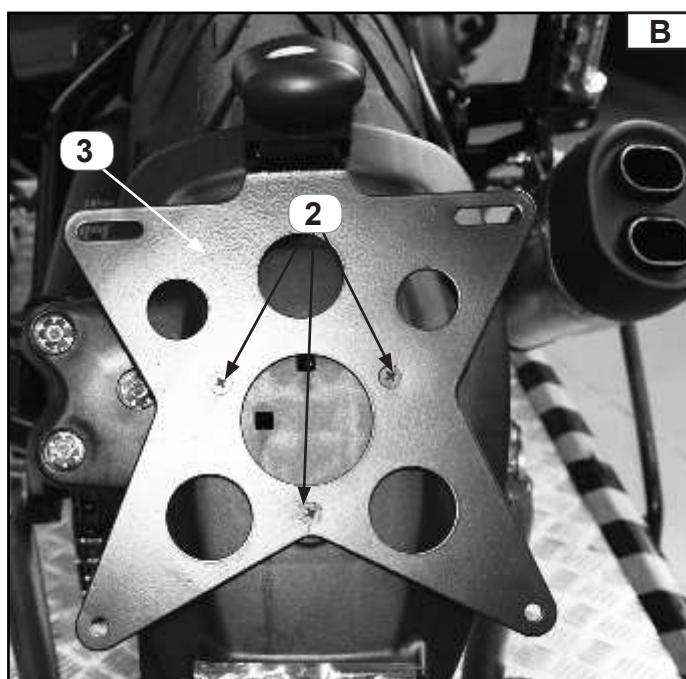
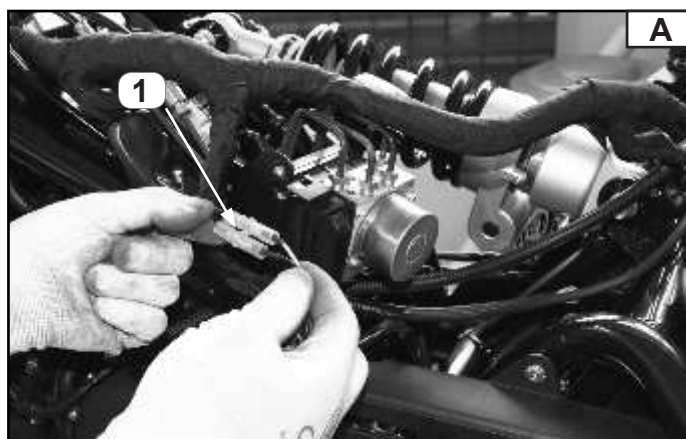
- The licence plate light wire (1) Fig. A.

Remove:

- The screws (2) Fig. B.
- The complete licence plate holder support (3) Fig. B.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Frame", paragraph "Licence plate holder".





FRAME

INSTALLATION OF THE LICENCE PLATE HOLDER

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

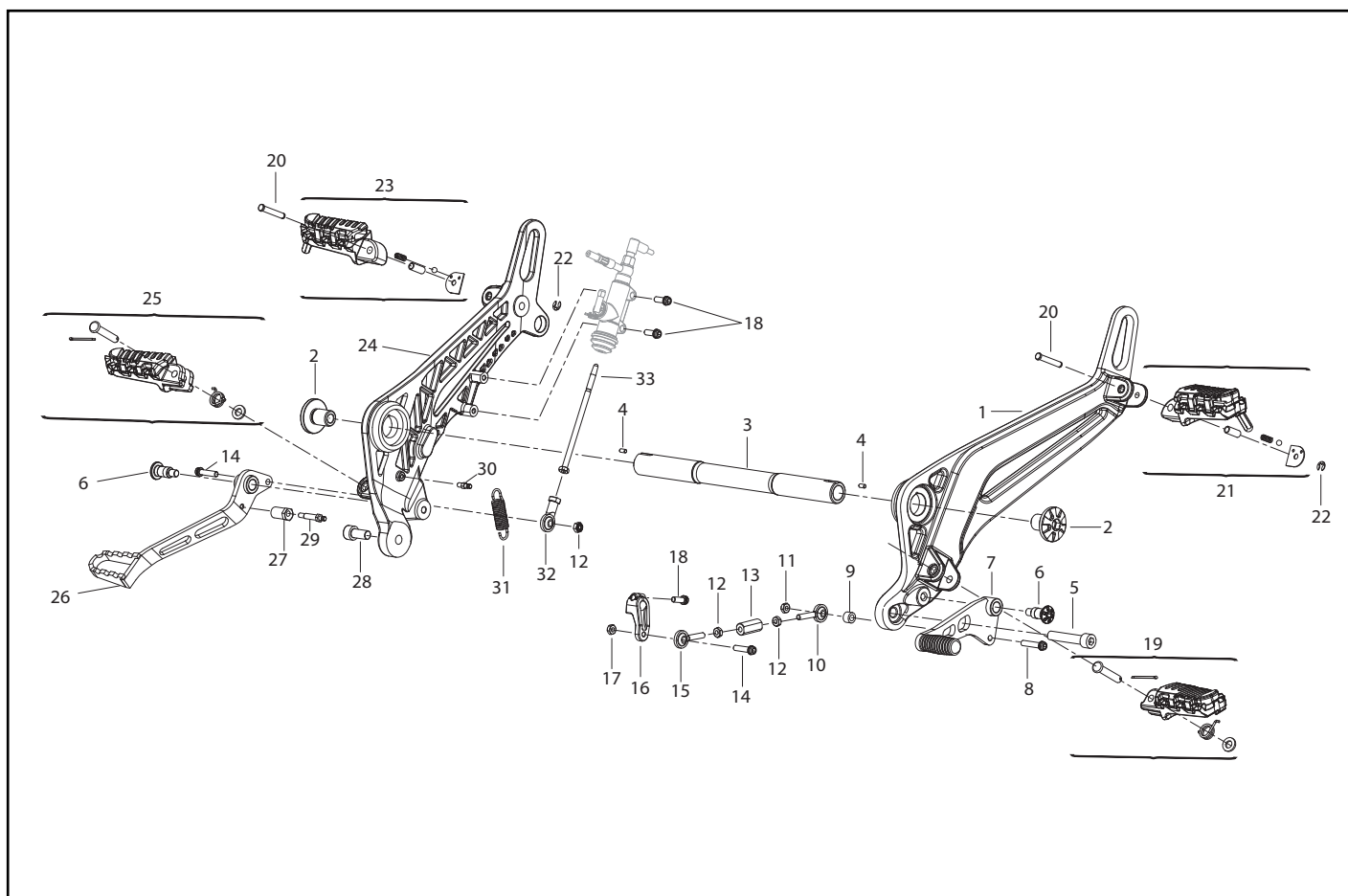
Installation:

- Proceed using the opposite order to removal.



CYCLING

FRONT FOOTRESTS



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	LH FRONT FOOTREST SUPPORT PLATE					
2	SPECIAL SCREW					
3	INTERNAL SHIM					
4	PIN					
5	SCREW					
6	SCREW					
7	GEAR PEDAL					
8	SCREW					
9	BUSHING					
10	BALL JOINT					
11	NUT					
12	NUT					
13	GEAR TRANSFER ROD ASSEMBLY					
14	SCREW					
15	BALL JOINT					
16	GEAR LEVER					
17	NUT					



CYCLING

STAND/FOOTRESTS

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
18	SCREW					
19	LEFT FRONT FOOTREST					
20	PIN					
21	LEFT REAR FOOTREST					
22	ELASTIC RING					
23	RIGHT REAR FOOTREST					
24	RIGHT FRONT FOOTREST SUPPORT PLATE					
25	RIGHT FRONT FOOTREST					
26	BRAKE PEDAL					
27	ECCENTRIC					
28	SCREW					
29	THREADED PIN					
30	THREADED PIN					
31	SPRING					
32	BALL JOINT					
33	ADJUSTMENT ROD					



CYCLING

REMOVAL OF THE RIGHT FRONT FOOTREST

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The spring (31*) Fig. A.

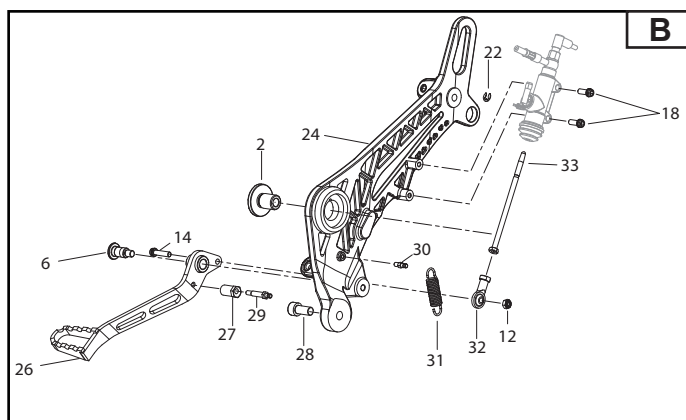
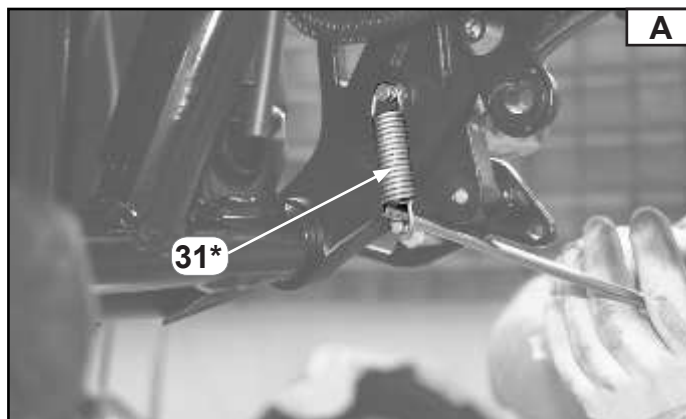
NOTE:

In order to access the screw (28*).

- The screw (28*) Fig. B.
- The special screw (2*) Fig. B.
- The right rear footrest support (24*) Fig. B.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".





CYCLING

INSTALLATION OF THE RIGHT FRONT FOOTREST

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

- Proceed using the opposite order to removal.

Tighten:

- The screw (28*) Fig. A.

To the following torque:



Torque 22 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD LOCK-
ER**

Tighten:

- The special screw (2*) Fig. A.

To the following torque:

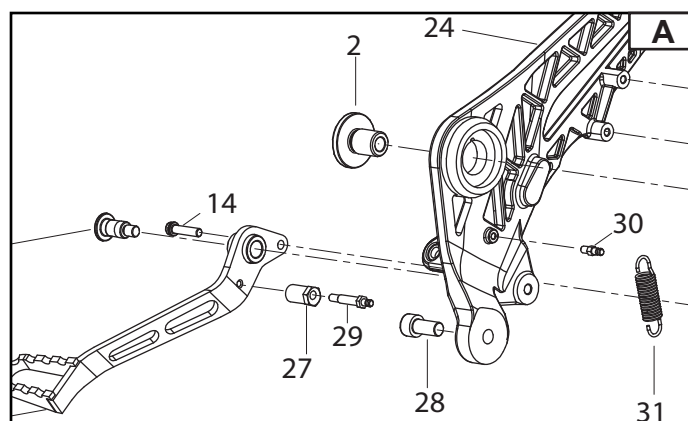


Torque 35 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD LOCK-
ER**



NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".



CYCLING

REMOVAL OF THE LEFT FRONT FOOTREST

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The screw (8*) Fig. A.
- The special screws (6*) Fig. A.
- The shift lever (7*) Fig. A.

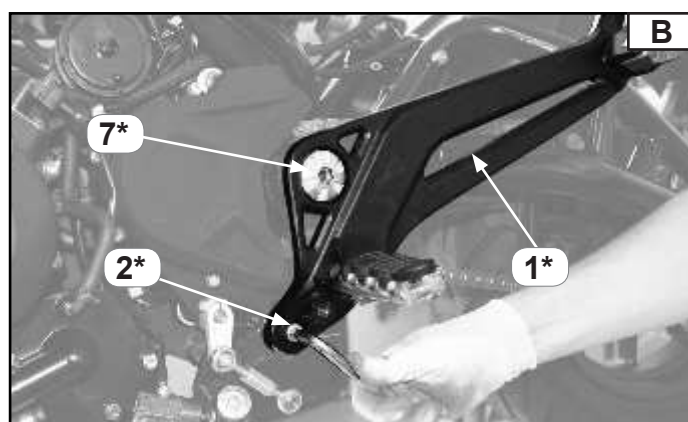
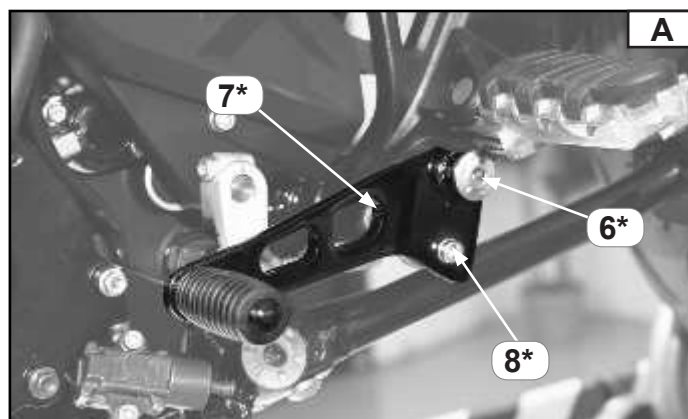
NOTE:

In order to access the screw (5*).

- The screw (5*) Fig. B.
- The special screw (2*) Fig. B.
- The left rear footrest support (1*) Fig. B.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".





CYCLING

INSTALLATION OF THE LEFT FRONT FOOTREST

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

- Proceed using the opposite order to removal.

Tighten:

- The screw (2*) Fig. A.

To the following torque:



Torque 35 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCK-ER

Tighten:

- The special screw (6*) Fig. A.

To the following torque:



Torque 22 N*m

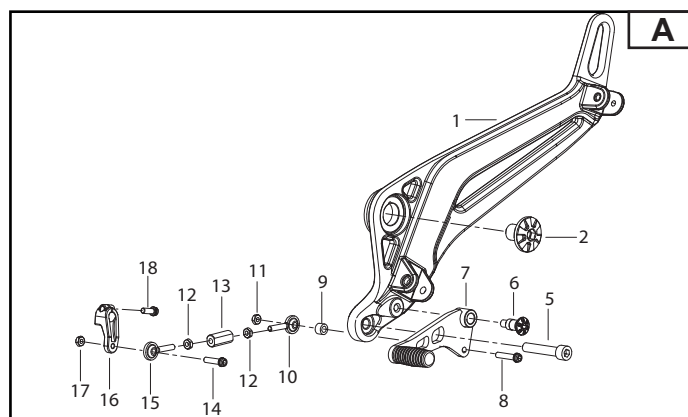
Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCK-ER

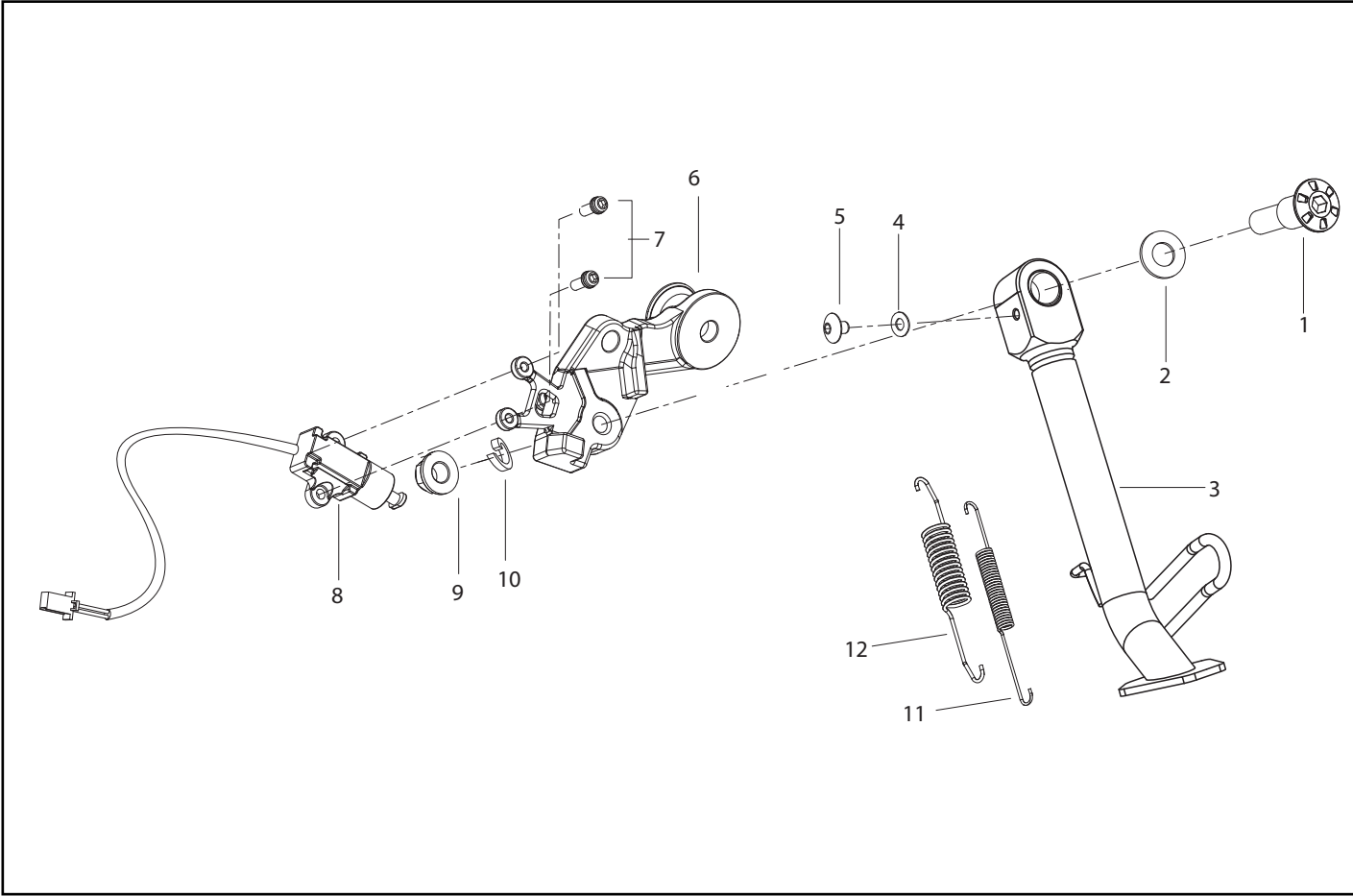
NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".



CYCLING

SIDE STAND



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SPECIAL SCREW					
2	WASHER					
3	SIDE STAND					
4	WASHER					
5	SCREW					
6	SIDE STAND SUPPORT PLATE					
7	SCREW					
8	SIDE STAND SENSOR					
9	NUT					
10	BELLEVILLE WASHER					
11	EXTERNAL SCREW					
12	INTERNAL SPRING					



CYCLING

REMOVAL OF THE SIDE STAND

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The left front footrest, refer to the section “Removal of the left front footrest, Chapter 4”.

Disconnect:

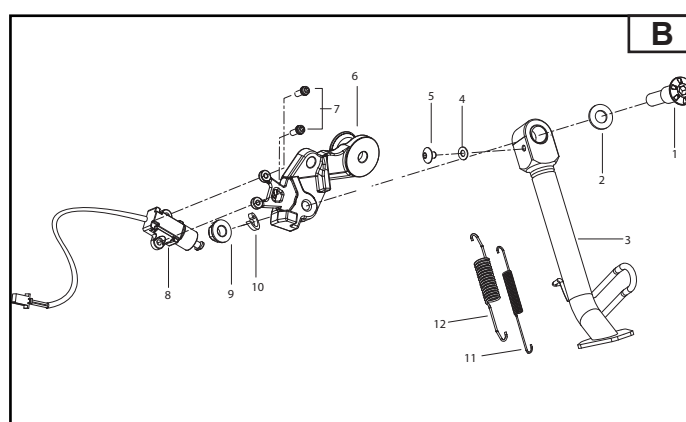
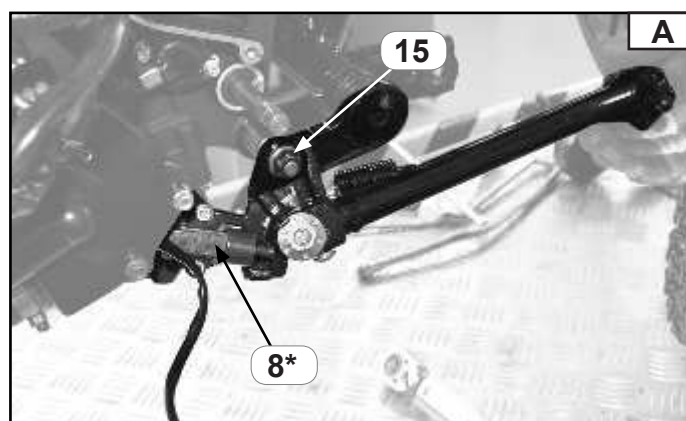
- The connector of the side stand sensor (8*) Fig. A.

Remove:

- The internal spring (11*) Fig. B.
- The external screw (12*) Fig. B.
- The safety nut (15*) Fig. A.
- The special screw (1*) Fig. B.
- The stand support plate (6*) Fig. B.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter “Cycling” section “Side stand”.





CYCLING

INSTALLATION OF THE SIDE STAND

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The safety nut (15*) Fig. A.
To the following torque:



Torque 45 N*m

Use Loctite



- The special screw (1*) Fig. A.
To the following torque:



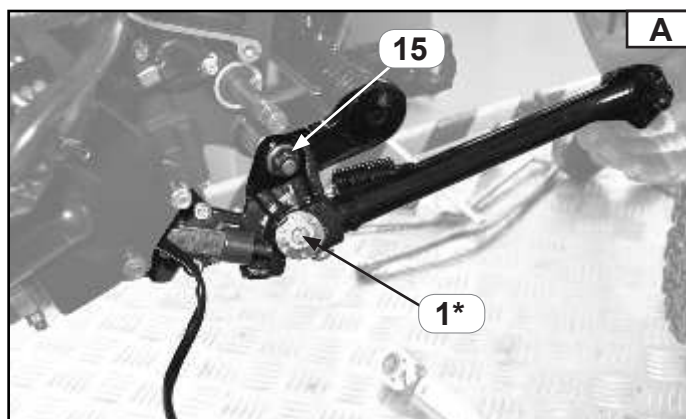
Torque 35 N*m

Use Loctite



NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Side stand".





CYCLING

REMOVAL OF THE RIGHT/LEFT REAR FOOTREST

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

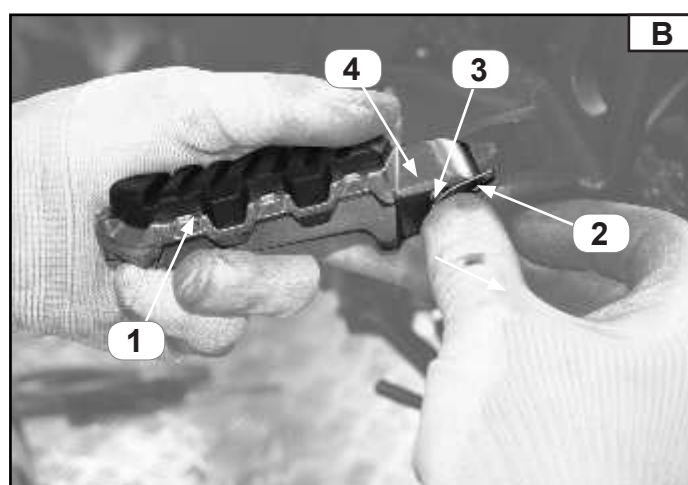
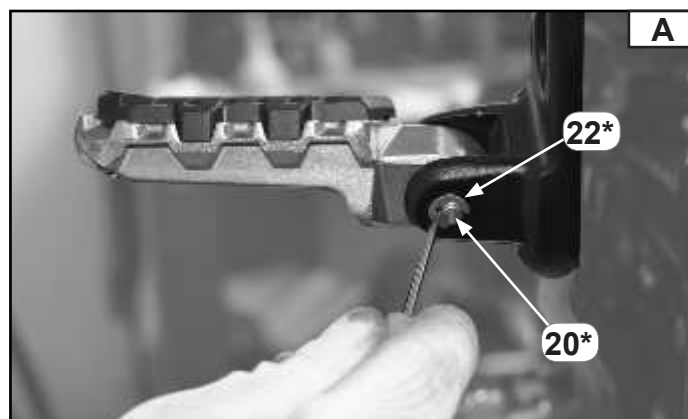
- The elastic ring (22*) Fig. A.
- The pin (20*) Fig. A.
- The footrest (1) Fig. B.
- The plate (2) Fig. B.
- The ball (3) Fig. B.
- The internal spring (4) Fig. B.

NOTE:

Carry out the following operation for the right rear footrest (23*).

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".





CYCLING

INSTALLATION OF THE LEFT/RIGHT REAR FOOTREST

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.



CYCLING

REMOVAL OF THE LEFT/RIGHT FRONT FOOTREST

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The cotter pin (1) Fig. A.
- The washer (2) Fig. A.
- The pin (3) Fig. B.
- The spring (4) Fig. B.
- The left front footrest (25*) Fig. A.

NOTE: _____

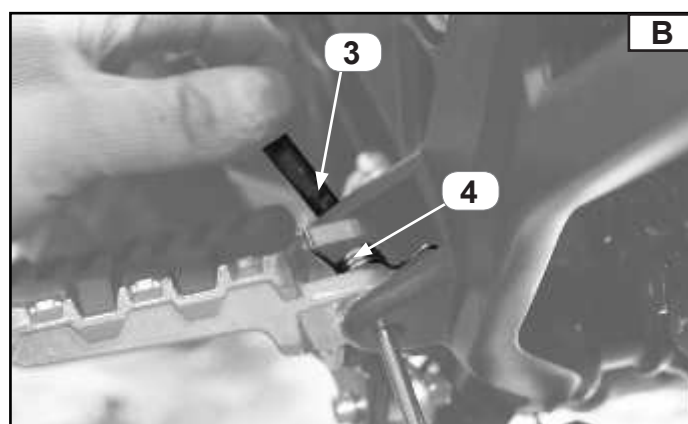
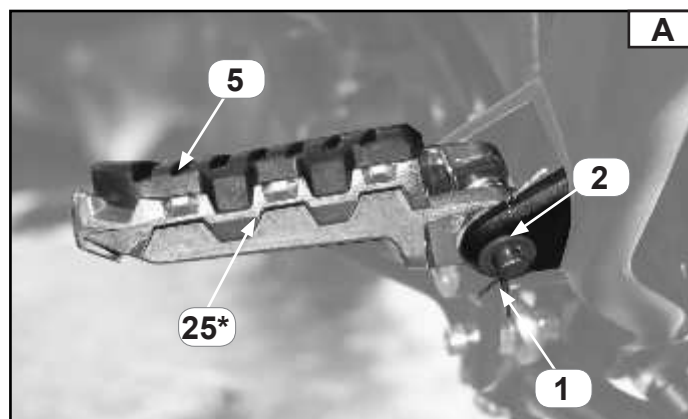
Replace the rubber cover of the right footrest (5) if it is worn.

NOTE: _____

Carry out the following operation for the right front footrest (19*).

NOTE: _____

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".





CYCLING

LEFT/RIGHT FRONT FOOTREST INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.



CYCLING

REMOVAL OF THE GEAR PEDAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

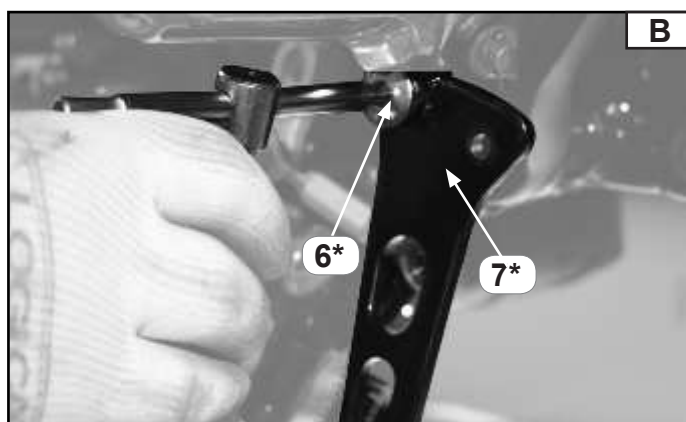
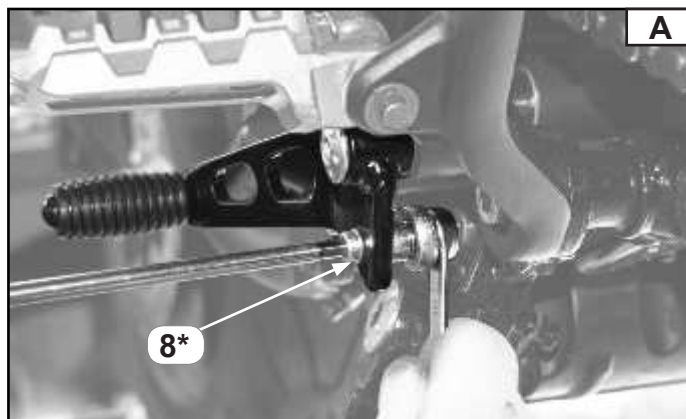
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The screw (8*) Fig. A.
- The special screw (6*) Fig. B.
- The gear pedal (7*) Fig. B.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".





CYCLING

INSTALLATION OF THE GEAR PEDAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screw (6*) Fig. A.

To the following torque:



Torque 22 N*m

NOTE:

Make use of grease around the unthreaded collar during the assembly Fig. B.



**Recommended lubricant
NGLI2 GREASE**

Tighten:

- The screw (8*) Fig. A.

To the following torque:



Torque 10 N*m

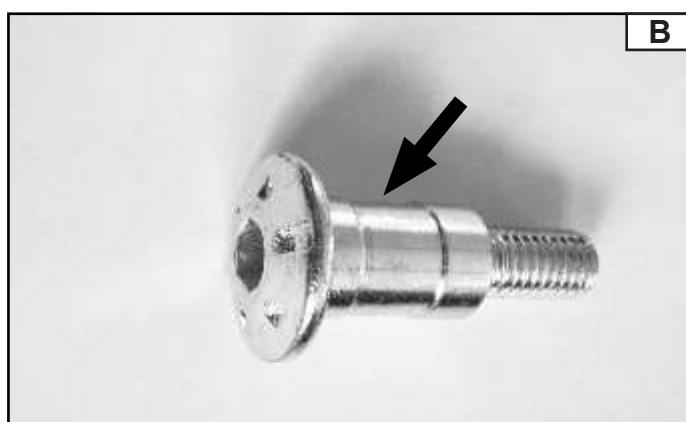
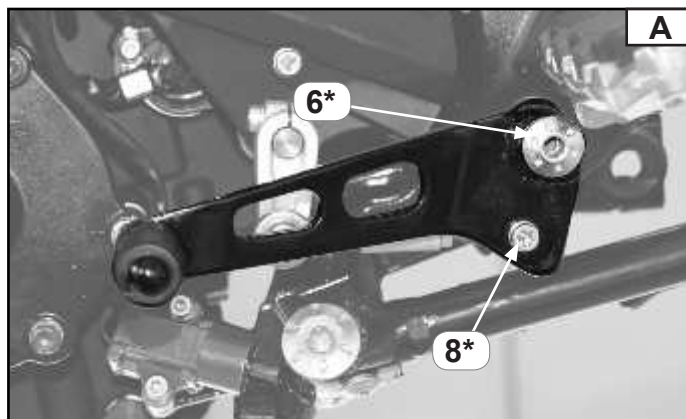
Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".





CYCLING

CHAIN SLIDE REMOVAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

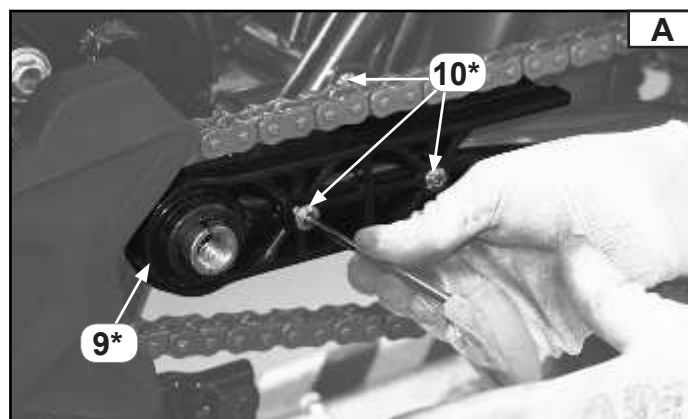
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The left front footrest, refer to the section “Removal of the left front footrest, Chapter 4”.
- The screws (10*) Fig. A.
- The chain slide (9*) Fig. A.

NOTE:

The numbers marked (*) are a part of the spare parts table chapter “Rear swinging arm”, section “Removal of the rear shock absorber”.





CYCLING

CHAIN SLIDE INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screws (10*) Fig. A
- To the following torque:

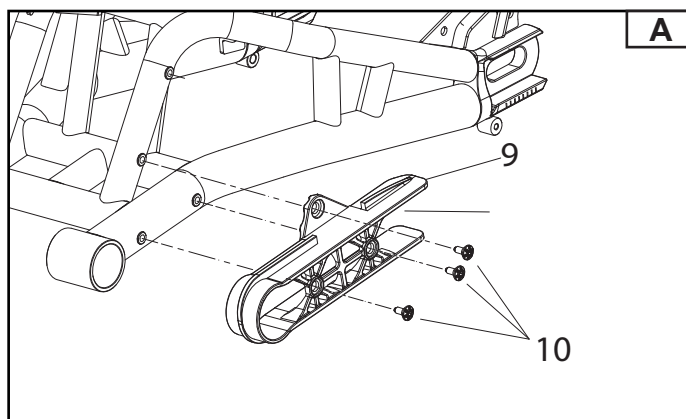


Torque 8 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**



NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".



CYCLING

REMOVAL OF THE BRAKE CONTROL PEDAL

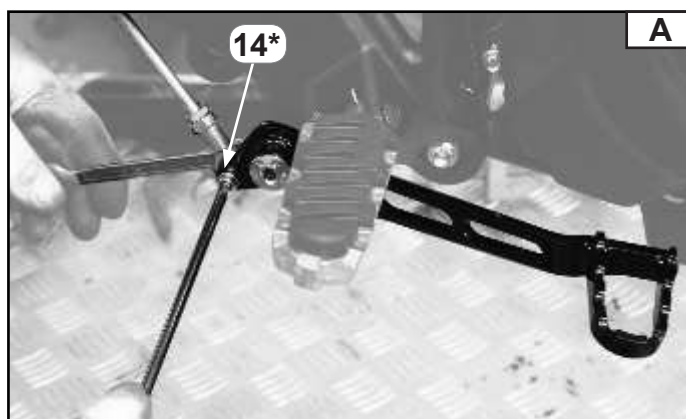
Park the motorcycle on a level surface.

IMPORTANT NOTICE

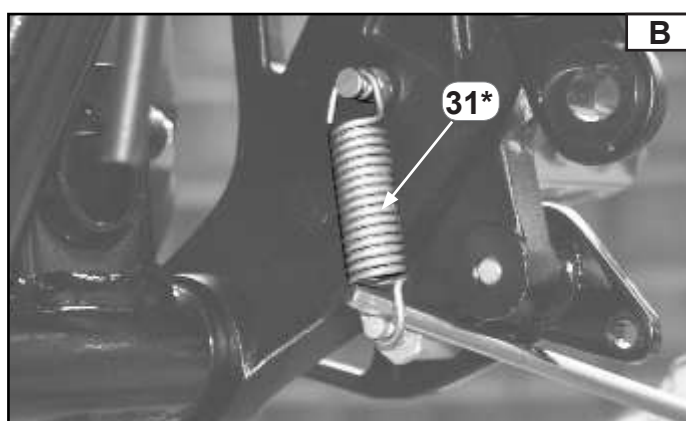
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The screw (14*) Fig. A.



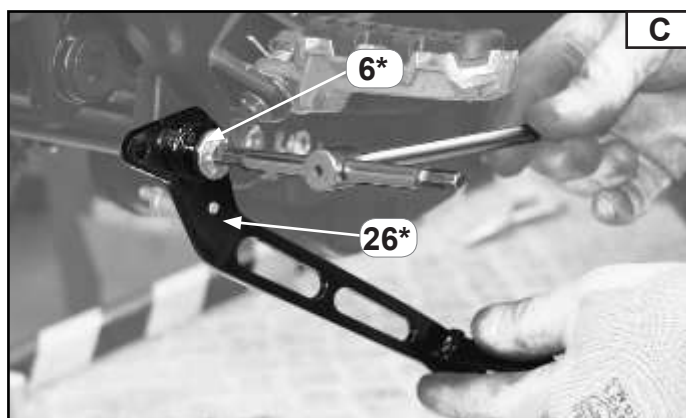
- The spring (31*) Fig. B.



- The screw (6*) Fig. C
- The pedal (26*) Fig. C.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".





CYCLING

INSTALLATION OF THE BRAKE CONTROL PEDAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screw (6*) Fig. A

To the following torque:



Torque: 25. N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

NOTE:

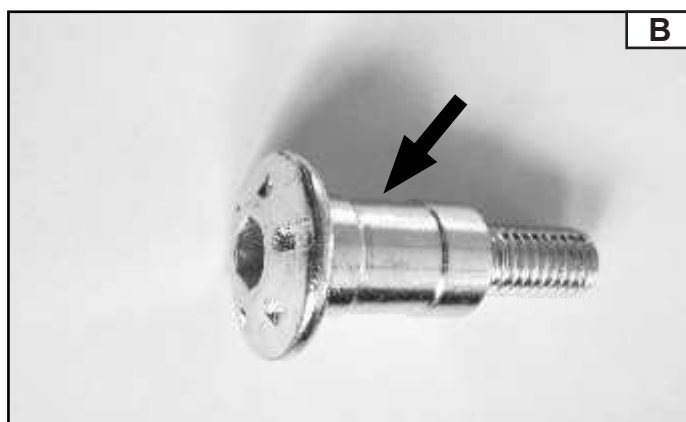
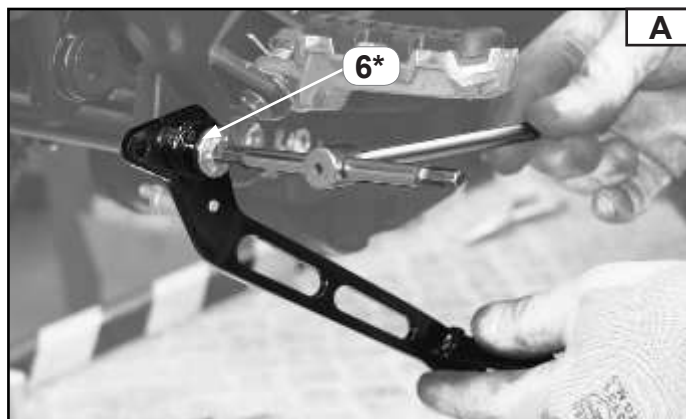
Make use of grease around the unthreaded collar during the assembly Fig. B.



**Recommended lubricant
NGLI2 GREASE**

NOTE:

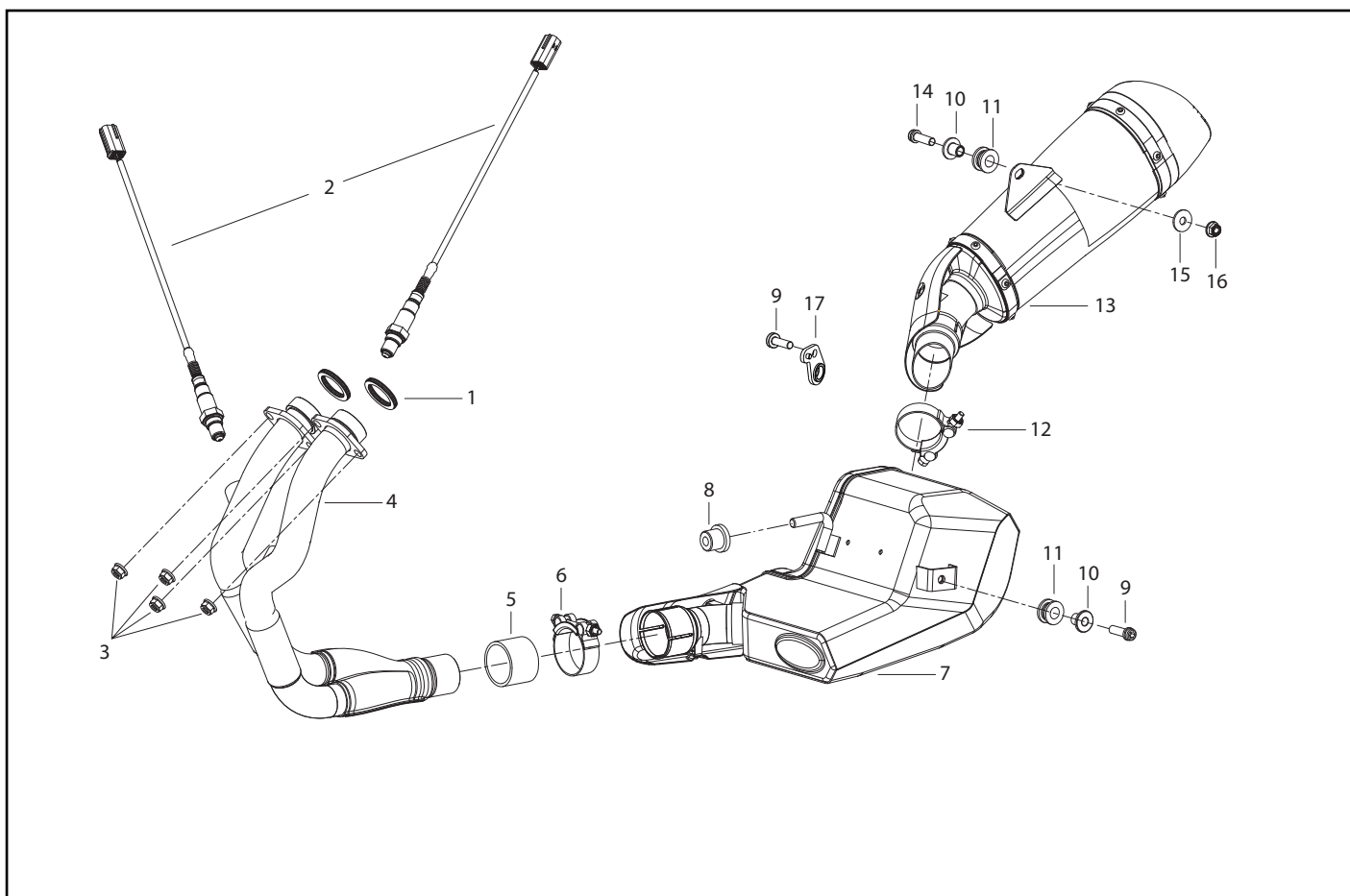
The numbers marked (*) are a part of the spare parts table, chapter "Cycling" section "Front footrests".





EXHAUST SYSTEM

EXHAUST ASSEMBLY



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	EXHAUST GASKET					
2	OXYGEN SENSOR					
3	NUT					
4	EXHAUST MANIFOLD					
5	GRAPHITE SEAL					
6	SCREW BAND					
7	MUFFLER					
8	RUBBER TIP					
9	SCREW					
10	BUSHING					
11	RUBBER TIP					
12	SCREW BAND					
13	SILENCER					
14	SCREW					
15	WASHER					
16	NUT					
17	RIGHT FLANGE					



EXHAUST SYSTEM

EXHAUST ASSEMBLY REMOVAL

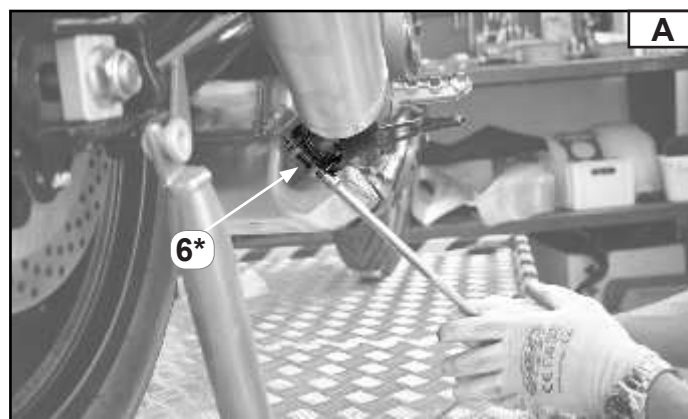
Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

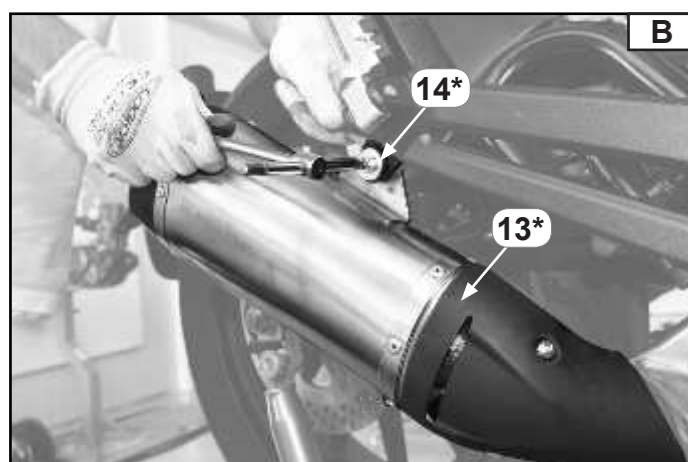
Loosen:

- The screw band (12*) Fig. A.



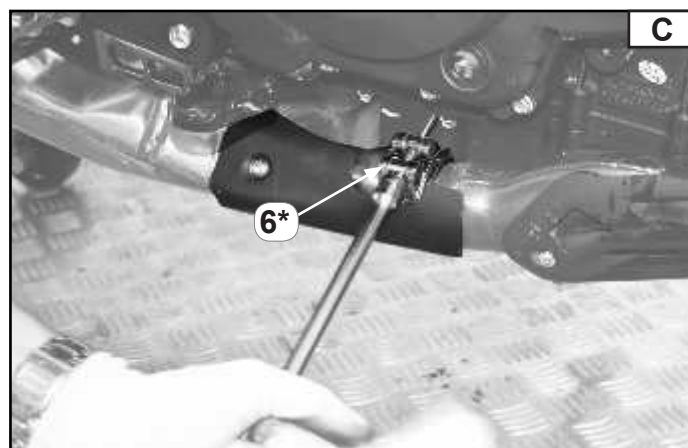
Remove:

- The screw (14*) Fig. A. B.
- The silencer (13*) Fig. B.



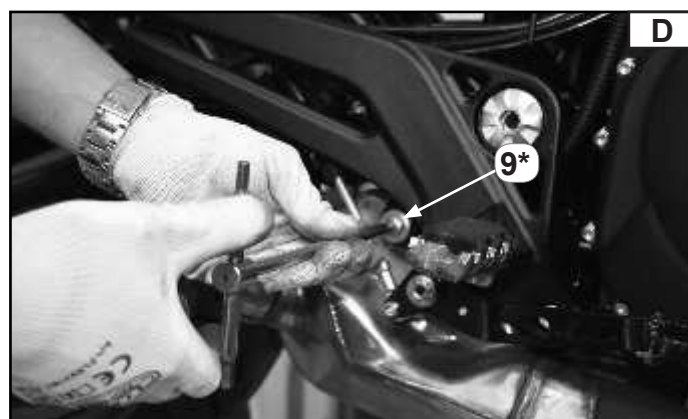
Loosen:

- The screw band (6*) Fig. C.



Remove:

- The screw (9*) Fig. D.

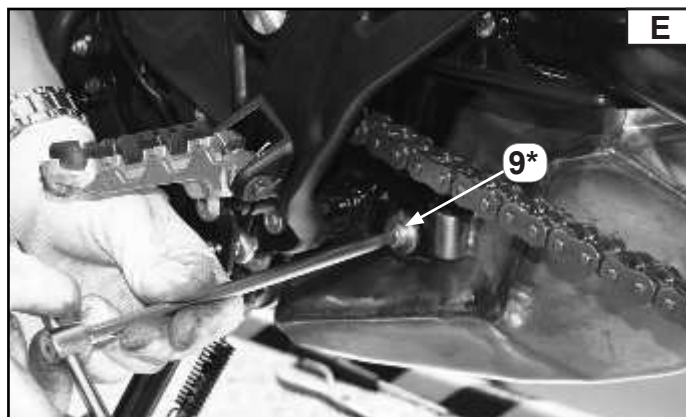




EXHAUST SYSTEM

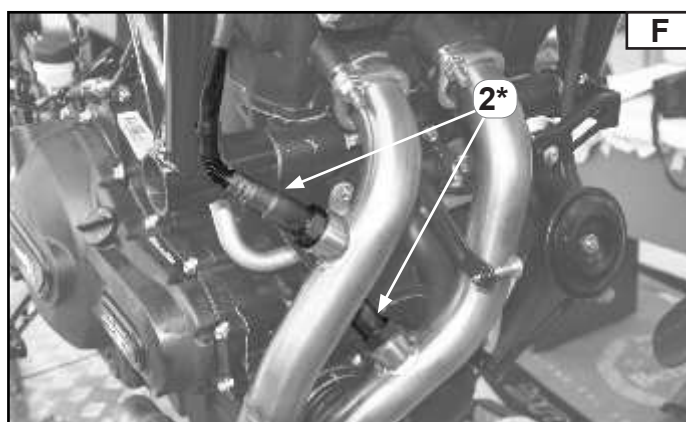
EXHAUST ASSEMBLY REMOVAL

- The screw (9*) on the left side of the vehicle Fig. E.



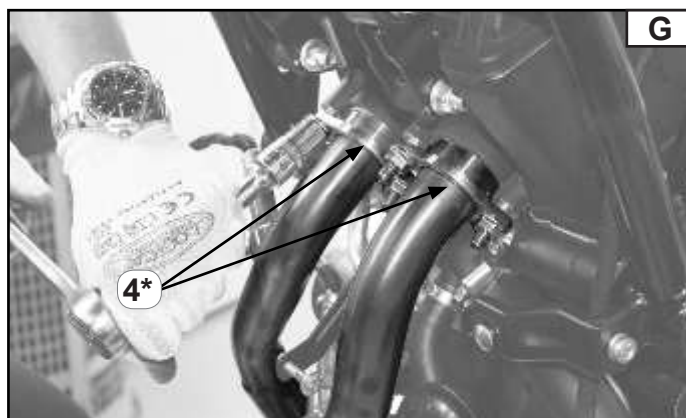
Disconnect:

- The Oxygen sensor (2*) Fig. F.



Remove:

- The exhaust manifolds (4*) Fig. G.



NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Exhaust system", section "exhaust system".



EXHAUST SYSTEM

EXHAUST INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The nuts (3*) Fig. A.

To the following torque:



Torque 22 N*m

NOTE:

Lubricate the nuts with copper grease during the assembly phase.



**Recommended lubricant
COPPER GREASE**

- The Oxygen sensor (2*) Fig. B.

To the following torque:



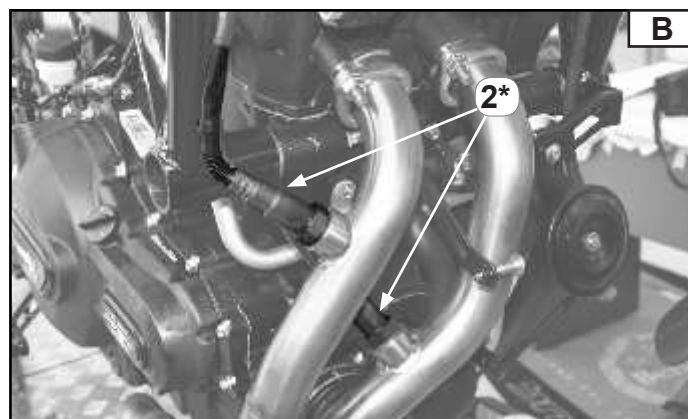
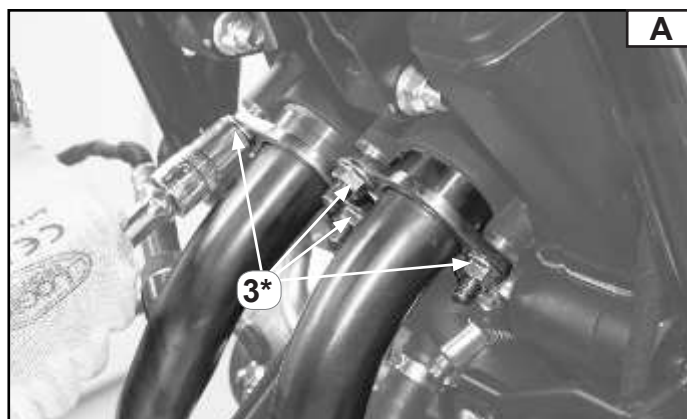
Torque 40 N*m

NOTE:

During the assembly phase of the oxygen sensor is necessary to lubricate the threads with copper grease for high temperatures.

NOTE:

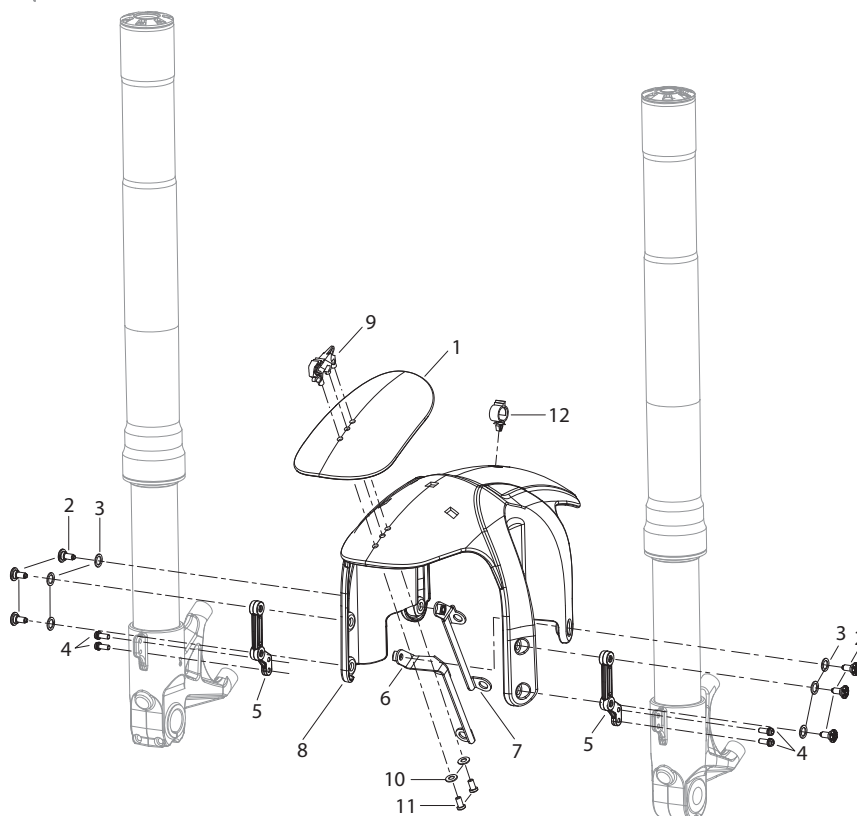
The numbers marked (*) are a part of the spare parts table, chapter "Exhaust system", section "exhaust system".





FAIRING

FRONT MUDGUARD



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	FRONT MUDGUARD COVER					
2	SCREW					
3	NYLON WASHER					
4	SCREW					
5	MUDGUARD SUPPORT PLATE					
6	LEFT BRACKET					
7	RIGHT BRACKET					
8	FRONT MUDGUARD					
9	LION FRIEZE					
10	WASHER					
11	SCREW					
12	CABLE GLAND					



FAIRING

FRONT MUDGUARD REMOVAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

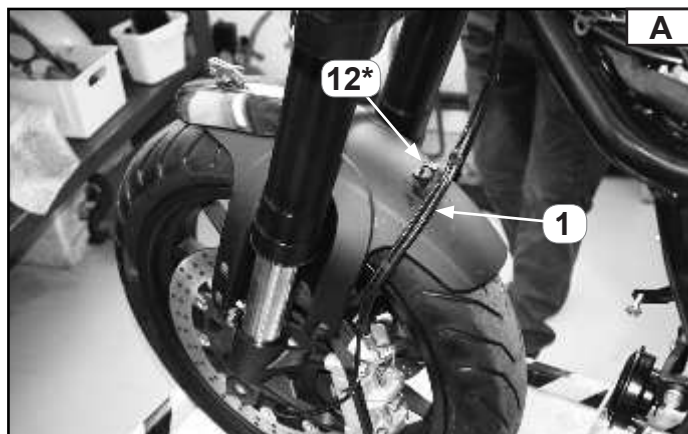
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The front brake pipes (1) from the cable gland (12*) Fig. A.
- The screws (2*) from both sides Fig. B.
- The lower mudguard (8*) Fig. C.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Fairing", section "Front mudguard".





FAIRING

FRONT MUDGUARD INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

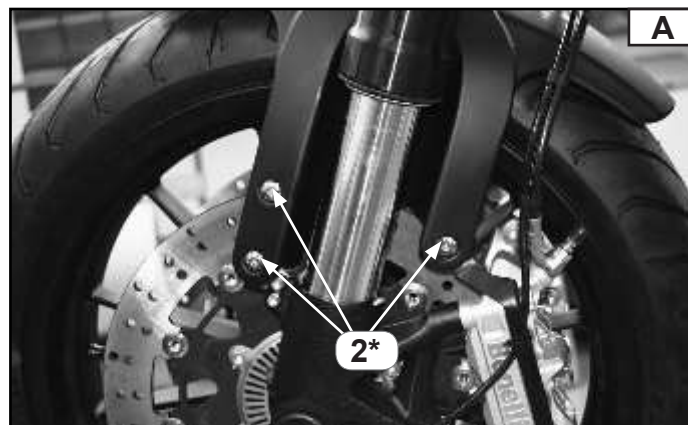
Tighten:

- the screws (2*) Fig. A

To the following torque:



Torque 10 N*m



Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**



FAIRING

REAR MUDGUARD REMOVAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

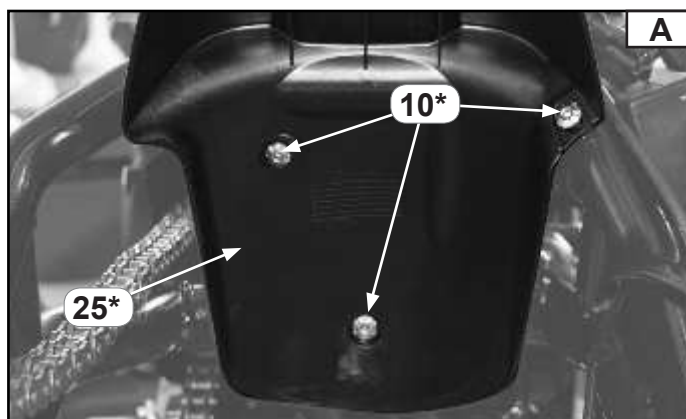
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rear wheel, refer to the section “Removal of the rear wheel and brake disc, Removal of rear wheel, Chapter 4”.
- The screws (10*) Fig. A.
- The rear mudguard (25*) Fig. A.

NOTE:

The numbers marked (*) are shown in the replacement parts table in the chapter “Rear shock absorber”, section “Rear shock absorber removal”.





FAIRING

REAR MUDGUARD INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

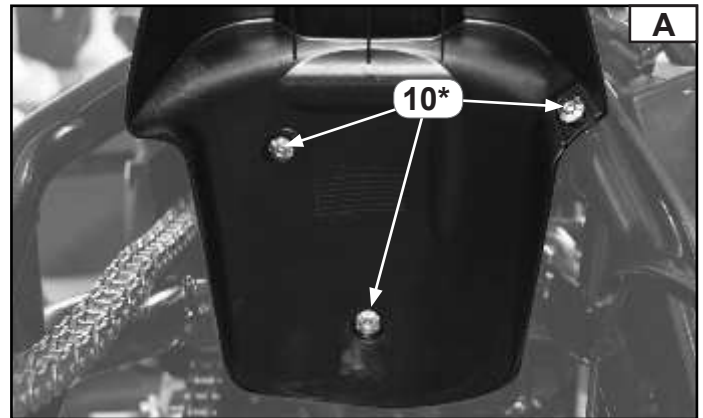
Tighten:

- The screws (10*) Fig. A.

To the following torque:



Torque 8 N*m





FAIRING

REMOVAL OF THE UPPER CHAIN GUARD

Park the motorcycle on a level surface.

IMPORTANT NOTICE

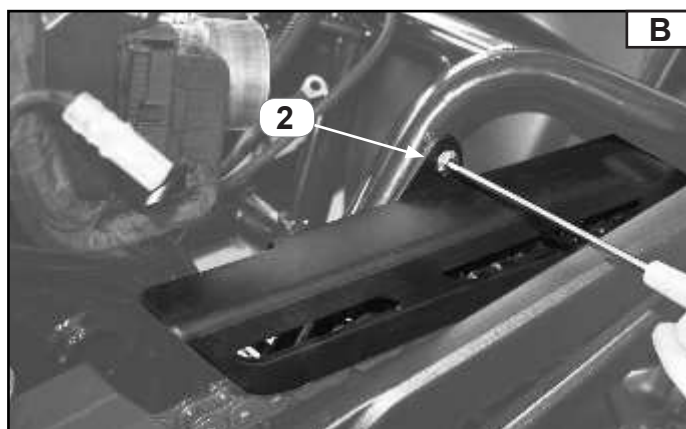
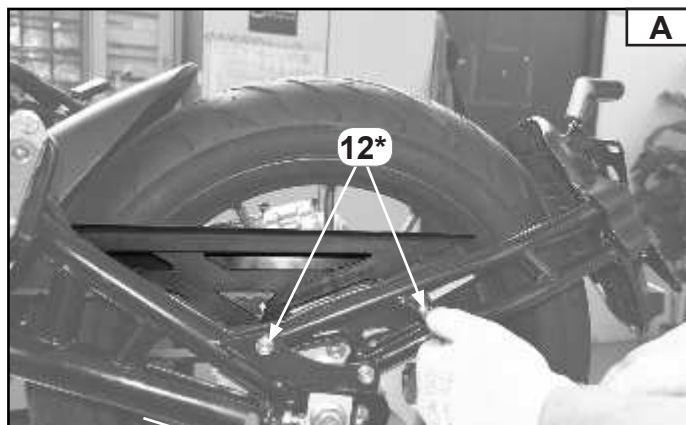
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The screws (12*) Fig. A.
- The screw (2) Fig. B.
- The chain guard (11*) Fig. B.

NOTE:

The numbers marked (*) are shown in the replacement parts table in the “Rear shock absorber” chapter, “Rear shock absorber removal” section.





FAIRING

INSTALLATION OF THE UPPER CHAIN GUARD

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screws (12*) Fig. A
- To the following torque:

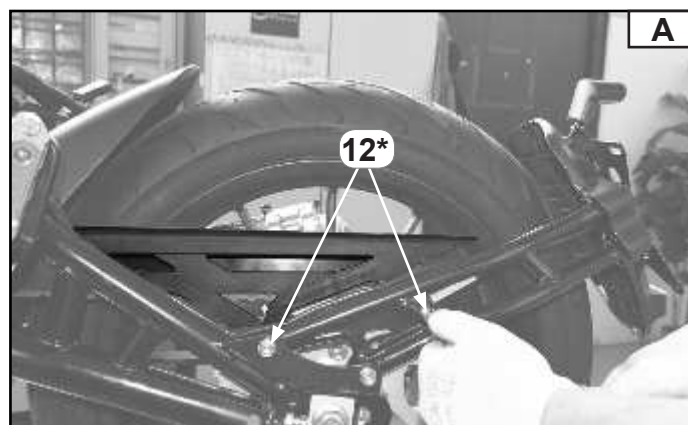


Torque 22 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**



NOTE:

The numbers marked (*) are shown in the replacement parts table in the “Rear shock absorber” chapter, “Rear shock absorber removal” section.



FAIRING

REMOVAL OF THE RIDER SEAT

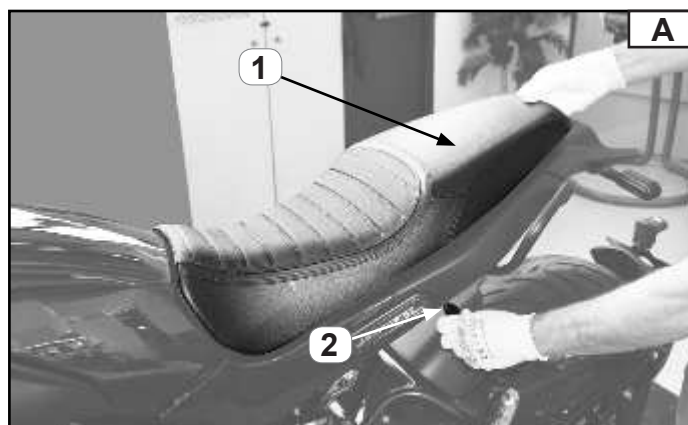
Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Disassemble:

- The rider seat (1) using the supplied spanner (2) Fig. A.





FAIRING

INSTALLATION OF THE RIDER SEAT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

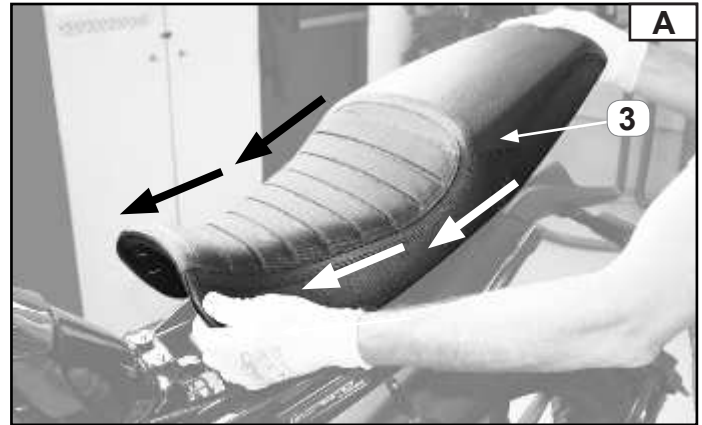
Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Insert:

- La rider seat (1) Fig. A.
following the specified arrows.





FAIRING

SADDLE OPENING LEVER REMOVAL

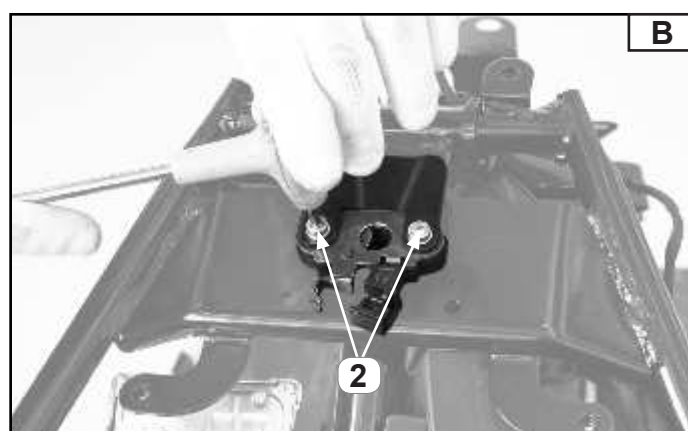
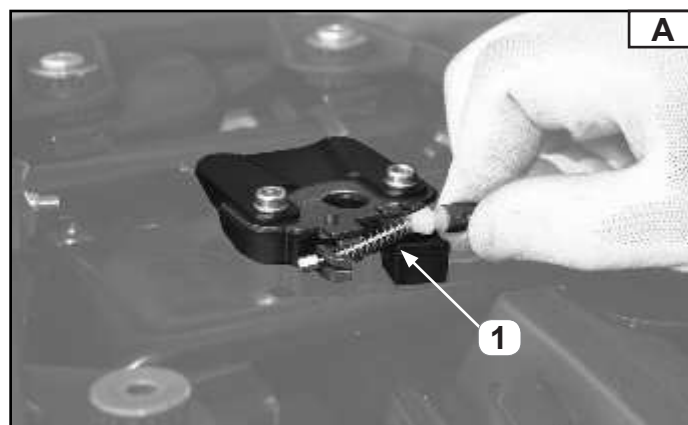
Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- The wire cable lug (1) Fig. A.
- The screws (2) Fig. B.





FAIRING

SADDLE OPENING LEVER INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screws (2) Fig. A.
- To the following torque:

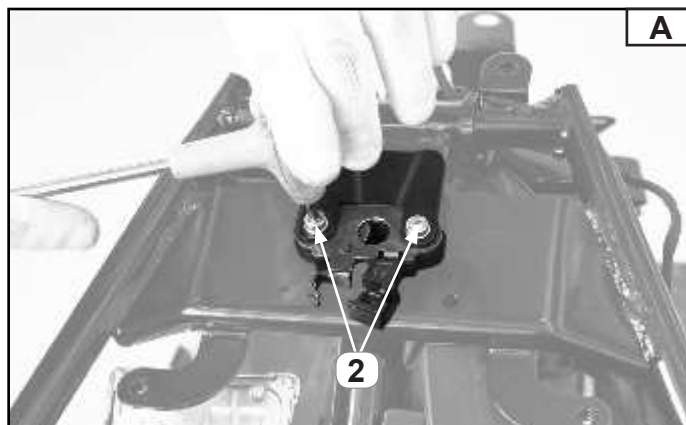


Torque 10 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**





FAIRING

REMOVAL OF INSTRUMENT SUPPORT PLATE

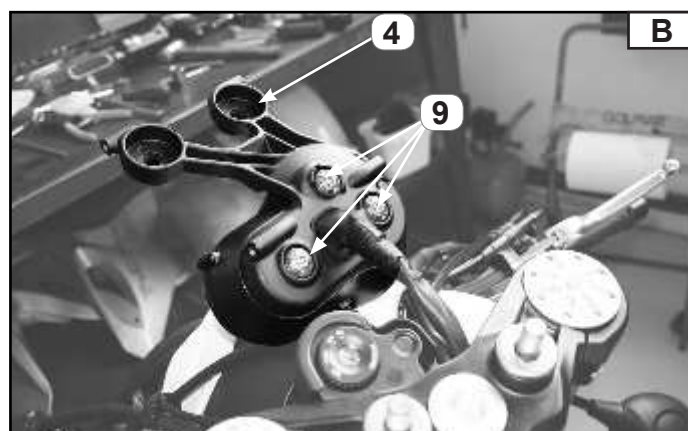
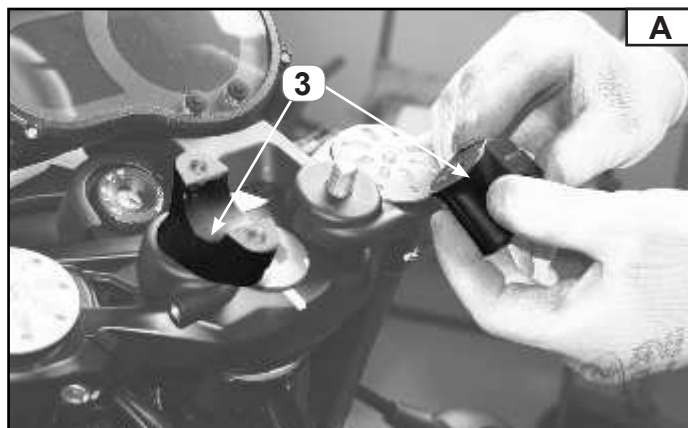
Park the motorcycle on a level surface.

IMPORTANT NOTICE

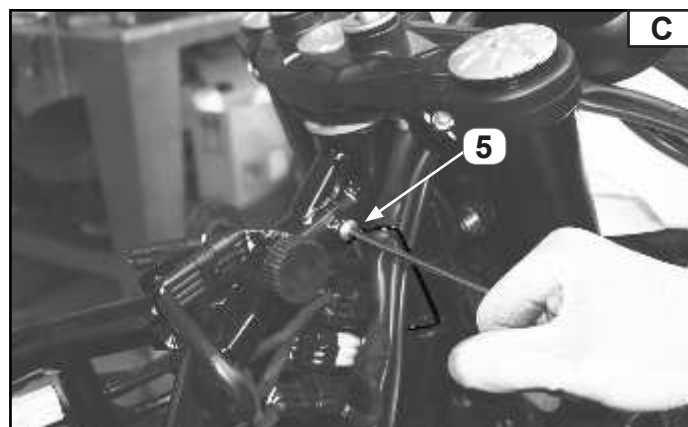
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Tank, refer to the section “**Fuel tank removal, Chapter 4**”.
- Handlebar, refer to the section “**Removal of handlebar, Chapter 4**”.
- The u-clamp supports (3) Fig. A.
- The instrument support (4) Fig. B.
- The screws “9” Fig. B.

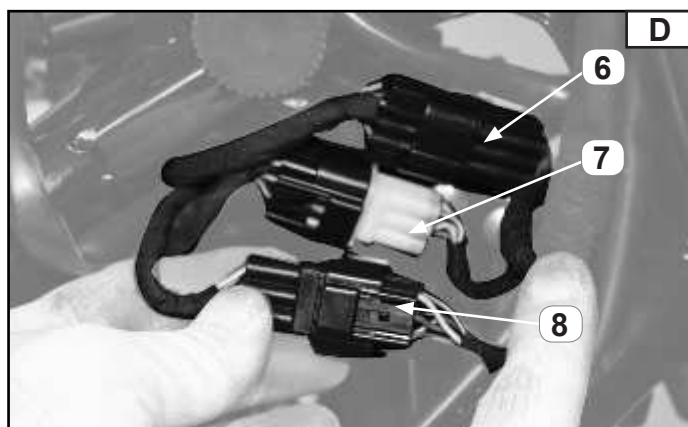


- The screw (5) of the wire support bracket Fig. C.



Disconnect:

- The connector “6” Fig. D.
- The connector “7” Fig. D.
- The connector “8” Fig. D.



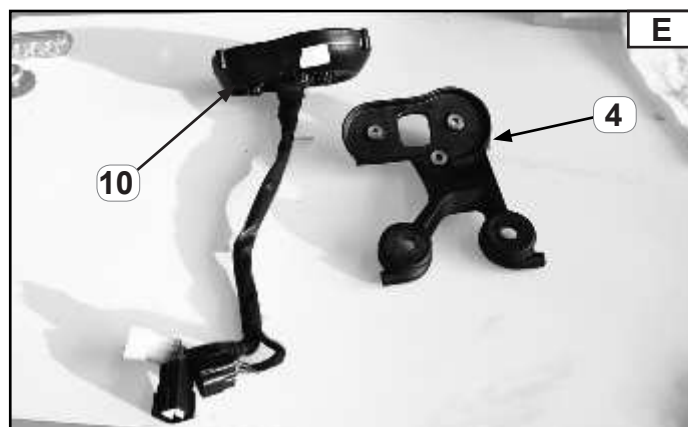


FAIRING

REMOVAL OF INSTRUMENT SUPPORT PLATE

Separate:

- The instrument board “10” from the instrument support “4”
Fig. E





FAIRING

INSTALLATION OF INSTRUMENT SUPPORT PLATE

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screws (9) Fig. A.
- To the following torque:



Torque 6 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

- the u-clamp support (3) Fig. B.
- To the following torque:

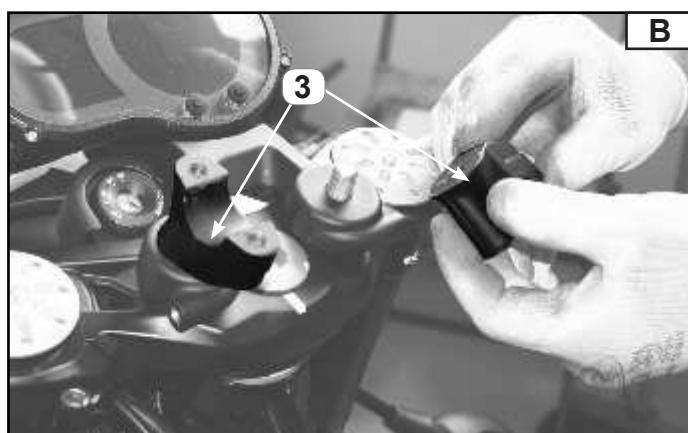
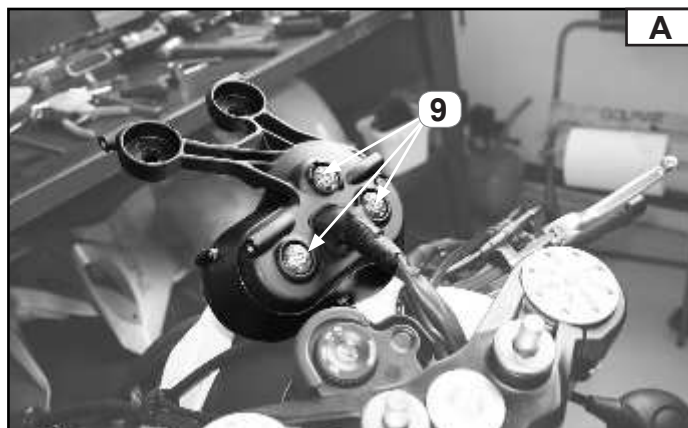


Torque 35 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**





FAIRING

REMOVAL OF THE FRONT HEADLAMP UNIT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

The vehicles' front headlight is a LED light. If it needs to be replaced, carry out the following procedure:

The following procedure applies to headlamps only.

Remove:

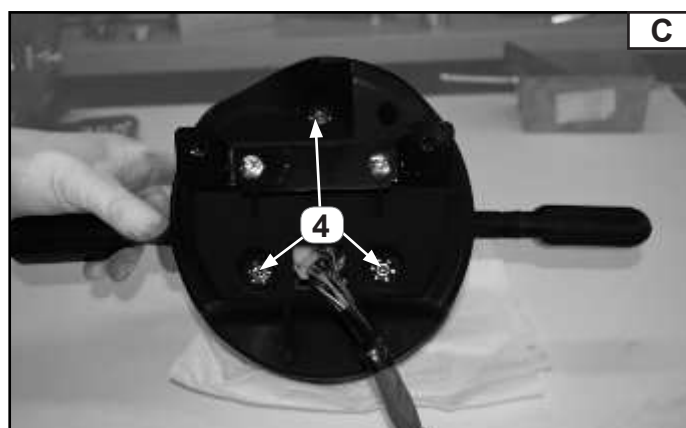
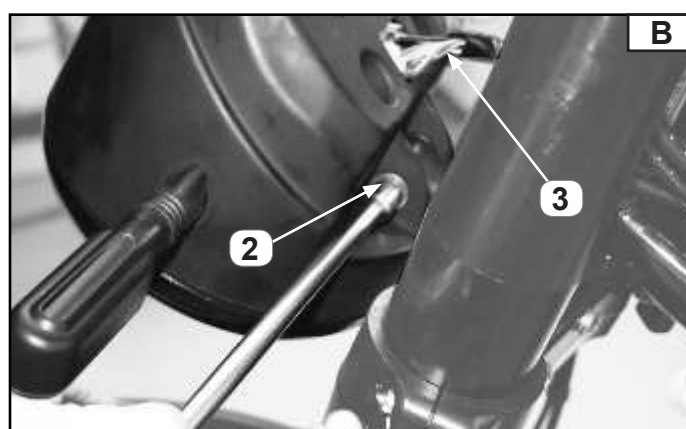
- The screws "1" Fig. A.
- The screw "2" Fig. B.

Disconnect:

- The headlamp from the electrical distributor "3" Fig. B.

Remove:

- The screws "4" Fig. C.
- The headlight "5" Fig. D.





FAIRING

INSTALLATION OF THE FRONT HEADLAMP UNIT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Install:

- The screws "1" Fig. A.
to the following torque:



Torque 8-10 N*m

Use medium Loctite thread locker to secure.

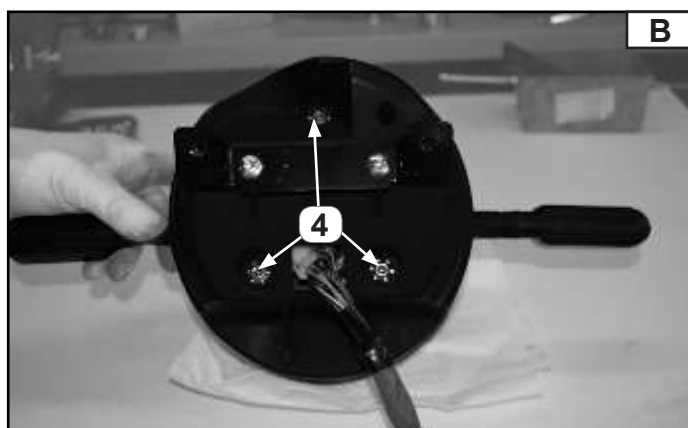


**MEDIUM THREAD
LOCKER**

- The screws "4" Fig. B.
to the following torque:



Torque 5-6 N*m





FAIRING

REMOVAL OF FUEL TANK

Park the motorcycle on a level surface.

IMPORTANT NOTICE

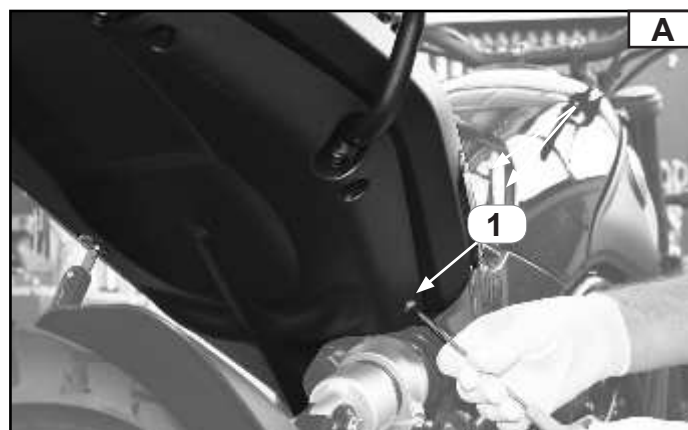
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

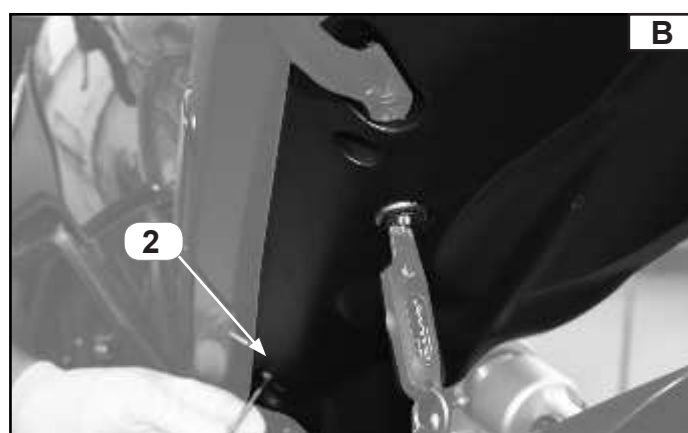
- Rider seat, refer to the section “Removal of rider seat, Chapter 4”.

Loosen:

- The screw (1) right side Fig. A.

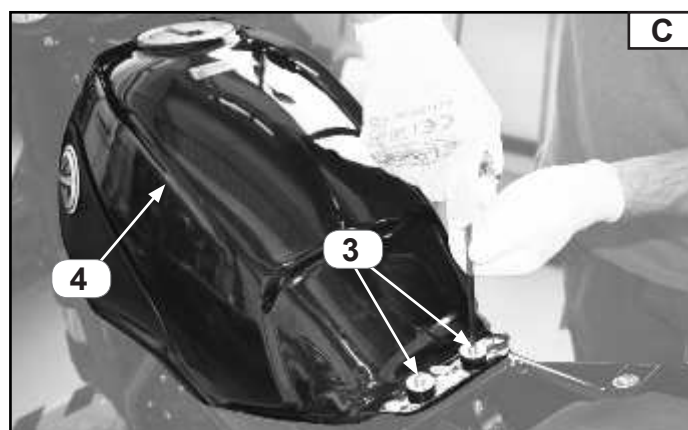


- The screw (2) left side Fig. B.



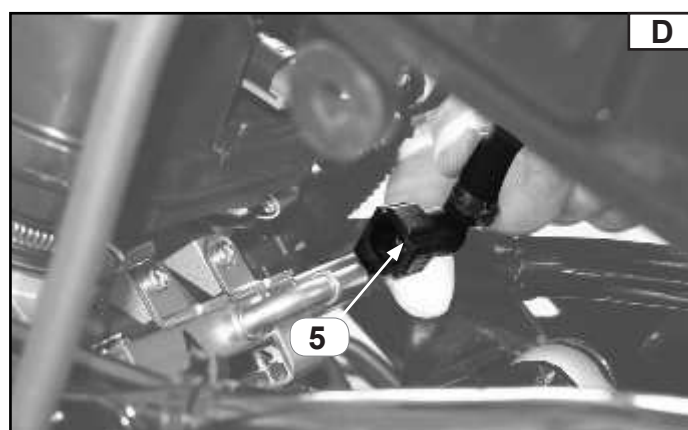
Remove:

- The screws (3) Fig. C.
- The tank (4) Fig. C.



Disconnect:

- The fuel pipe (5) Fig. D.





FAIRING

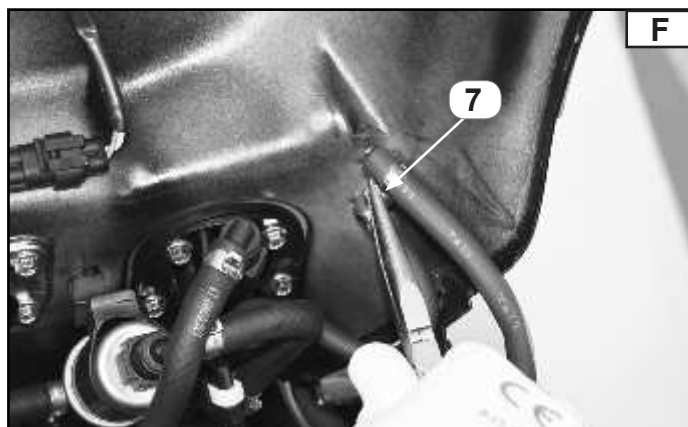
REMOVAL OF FUEL TANK

Disconnect:

- The connector of the level sensor (6) Fig. E.



- The tube of the non-return valve (7) Fig. F.





FAIRING

TANK FITTING

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

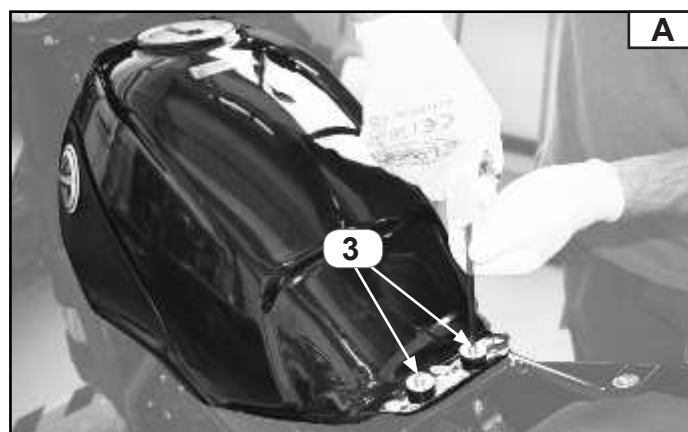
Proceed using the opposite order to removal.

Tighten:

- The screws (3) Fig. A.
- to the following torque:



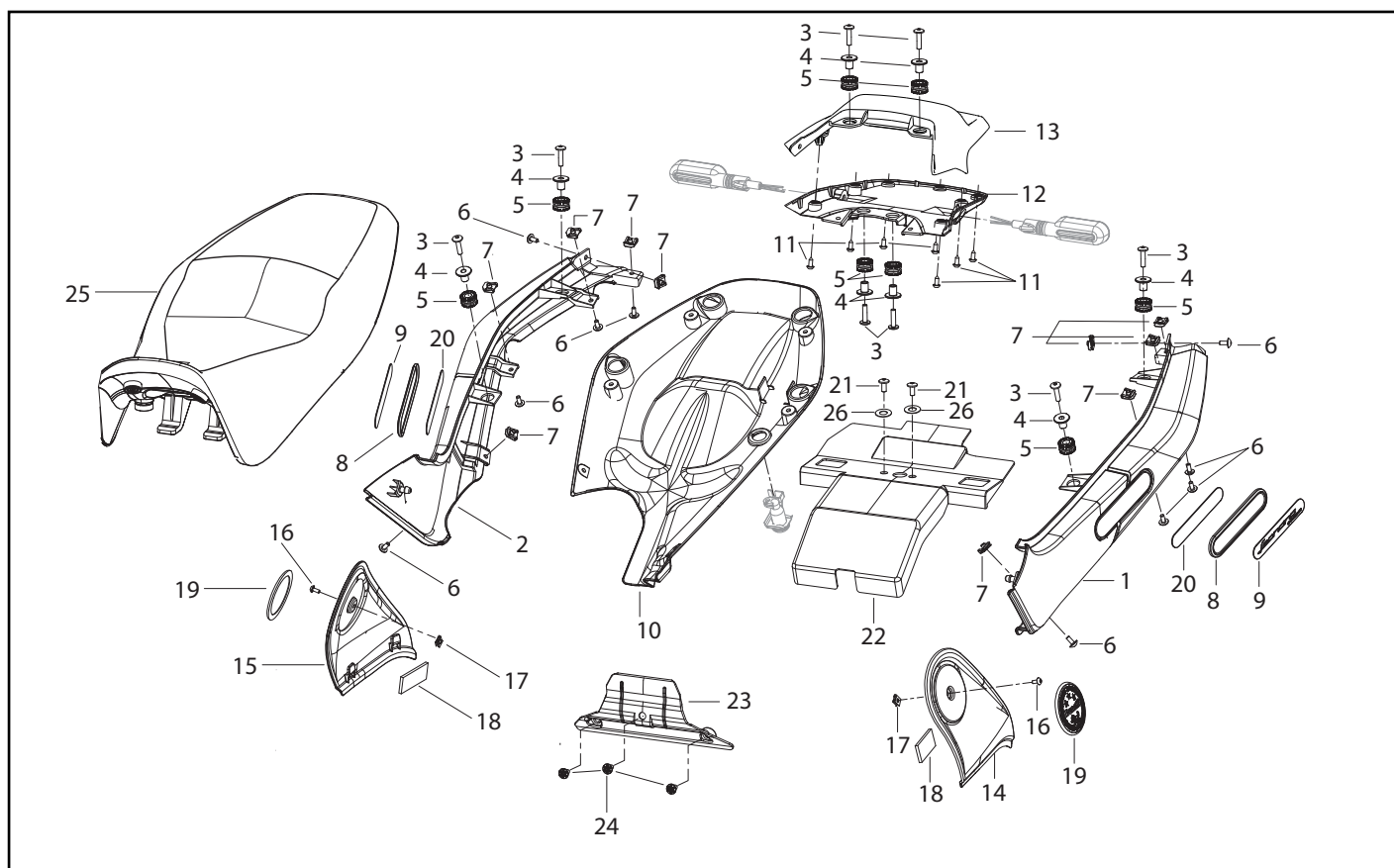
Torque 10 N*m





FAIRING

UPPER TAIL FAIRING



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	LEFT TAIL FAIRING					
2	RIGHT TAIL FAIRING					
3	SCREW					
4	BUSHING					
5	RUBBER TIP					
6	SCREW					
7	SNAP-ON CLIP					
8	ADHESIVE SUPPORT					
9	ADHESIVE					
10	BOTTOM COVER					
11	SCREW					
12	REAR CENTRAL FAIRING					
13	LOWER CENTRAL FAIRING					
14	LEFT EXTERNAL FAIRING					
15	RIGHT EXTERNAL FAIRING					
16	SCREW					
17	SNAP-ON CLIP					
18	PAD					
19	METAL LOGO					
20	BIADHESIVE					
21	SCREW					
22	LOWER CENTRAL FAIRING					



FAIRING

UPPER TAIL FAIRING

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
23	LOWER FAIRING					
24	SCREW					
25	SEAT					
26	WASHER					



FAIRING

BOTTOM COVER REMOVAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

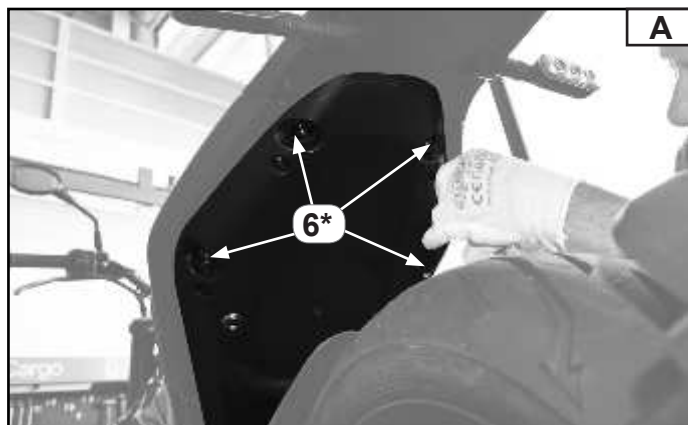
Remove:

- Rider seat, refer to the section “Removal of rider seat, Chapter 4”.
- Passenger handles, refer to the section “Removal of the passenger handles, Chapter 4”.
- The screws (6*) right/left side Fig. A

- The saddle opening cable (1) Fig. B.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter “Fairing”, section “Upper tail fairing”.





FAIRING

BOTTOM COVER INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.



FAIRING

SADDLE LOCK REMOVAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

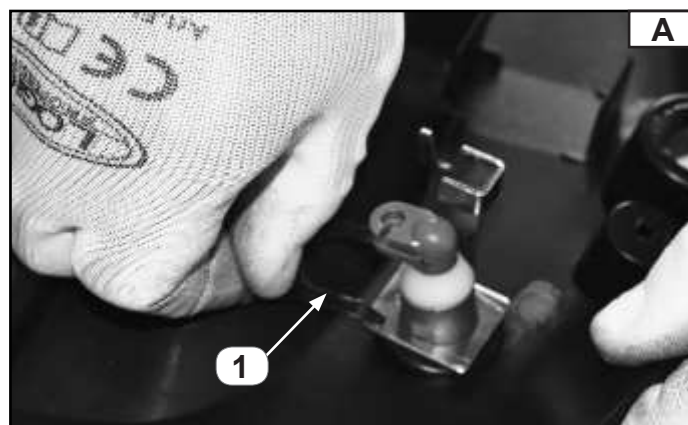
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Passenger handles, refer to the section “**Removal of the passenger handles, Chapter 4**”.
- Bottom cover, refer to the section “**Bottom cover removal, Chapter 4**”.
- The spring (1) Fig. A.

Take out:

- The complete lock block Fig. B.





FAIRING

SADDLE LOCK INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.



FAIRING

REMOVAL OF THE SIDE FAIRINGS

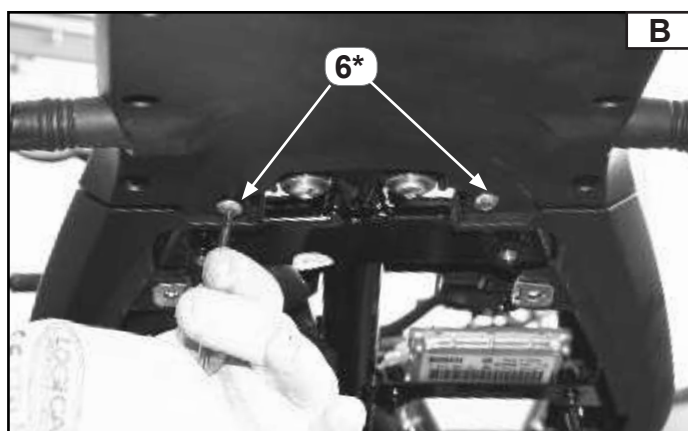
Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Passenger handles, refer to the section “**Removal of the passenger handles, Chapter 4**”.
- Bottom cover, refer to the section “**Bottom cover removal, Chapter 4**”.
- The screws (6*) right/left side Fig. A.
- The fixing screws (6*) right/left side Fig. B.



Remove:

- The left tail fairing (1*) Fig. C.

NOTE:

Repeat the same procedure on the right tail fairing.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter “Fairing”, section “Upper tail fairing”.





FAIRING

INSTALLATION OF THE SIDE FAIRINGS

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.



FAIRING

REMOVAL OF THE LOWER CENTRAL FAIRING

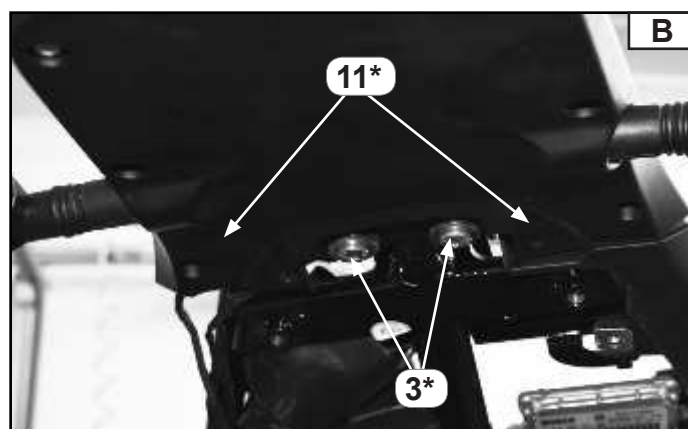
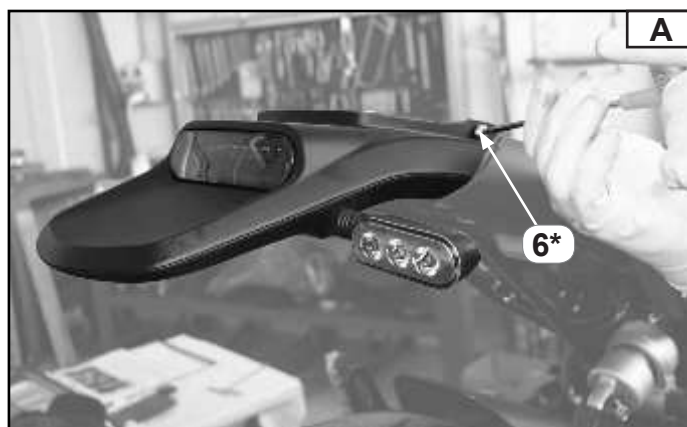
Park the motorcycle on a level surface.

IMPORTANT NOTICE

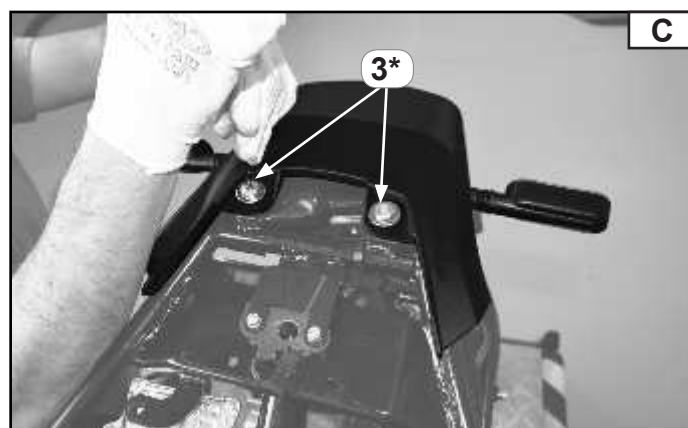
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Passenger handles, refer to the section “**Removal of the passenger handles, Chapter 4**”.
- Bottom cover, refer to the section “**Bottom cover removal, Chapter 4**”.
- Side fairings, refer to the section “**Removal of the side fairings, Chapter 4**”.
- The screws on the right/left side (6*) Fig. A.
- The screws on the right/left side (11*) Fig. B.
- The screws on the right/left side (3*) Fig. B.



- The screws on the right/left side (3*) Fig. C.



Disconnect:

- The rear light connector (1) Fig. D.





FAIRING

REMOVAL OF THE LOWER CENTRAL FAIRING

- The left/right indicator light wires (2) Fig. E.

NOTE:

During this phase, it is advisable to sign the correspondences of the connectors of the rear indicator light wires with the ones coming from the electrical distributor.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Fairing", section "Upper tail fairing".





FAIRING

REMOVAL OF THE REAR LIGHT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

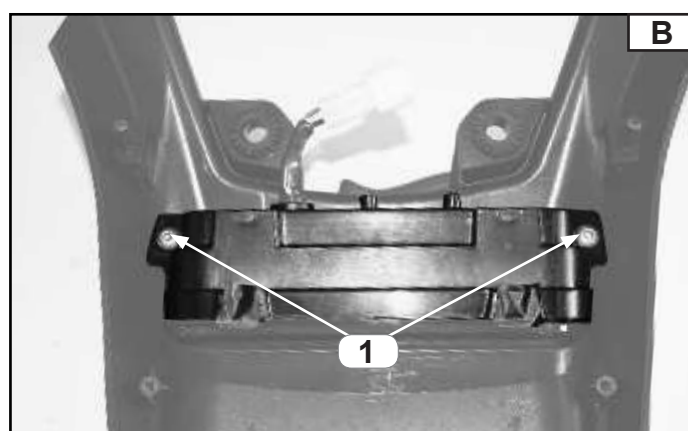
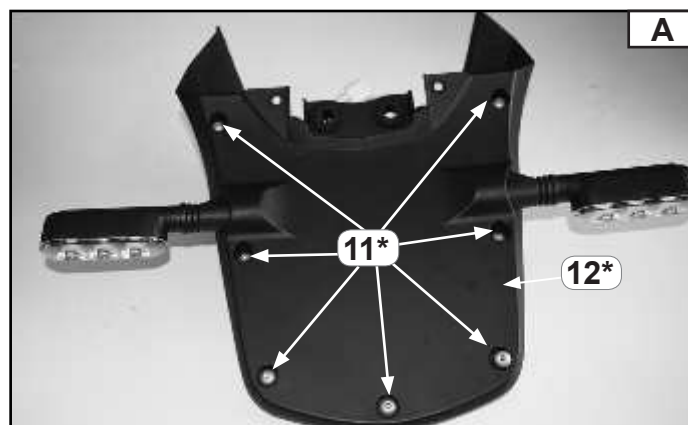
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Passenger handles, refer to the section “**Removal of the passenger handles, Chapter 4**”.
- Bottom cover, refer to the section “**Bottom cover removal, Chapter 4**”.
- Side fairings, refer to the section “**Removal of the side fairings, Chapter 4**”.
- Bottom central fairings, refer to the section “**Removal of the bottom central fairings, Chapter 4**”.
- The screws (11*) Fig. A.
- The fixing cover (12*) Fig. A.
- The screws (1) Fig. B.
- The rear light (2) Fig. C.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter “**Fairing**”, section “**Upper tail fairing**”.





FAIRING

INSTALLATION OF THE REAR LIGHTS

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

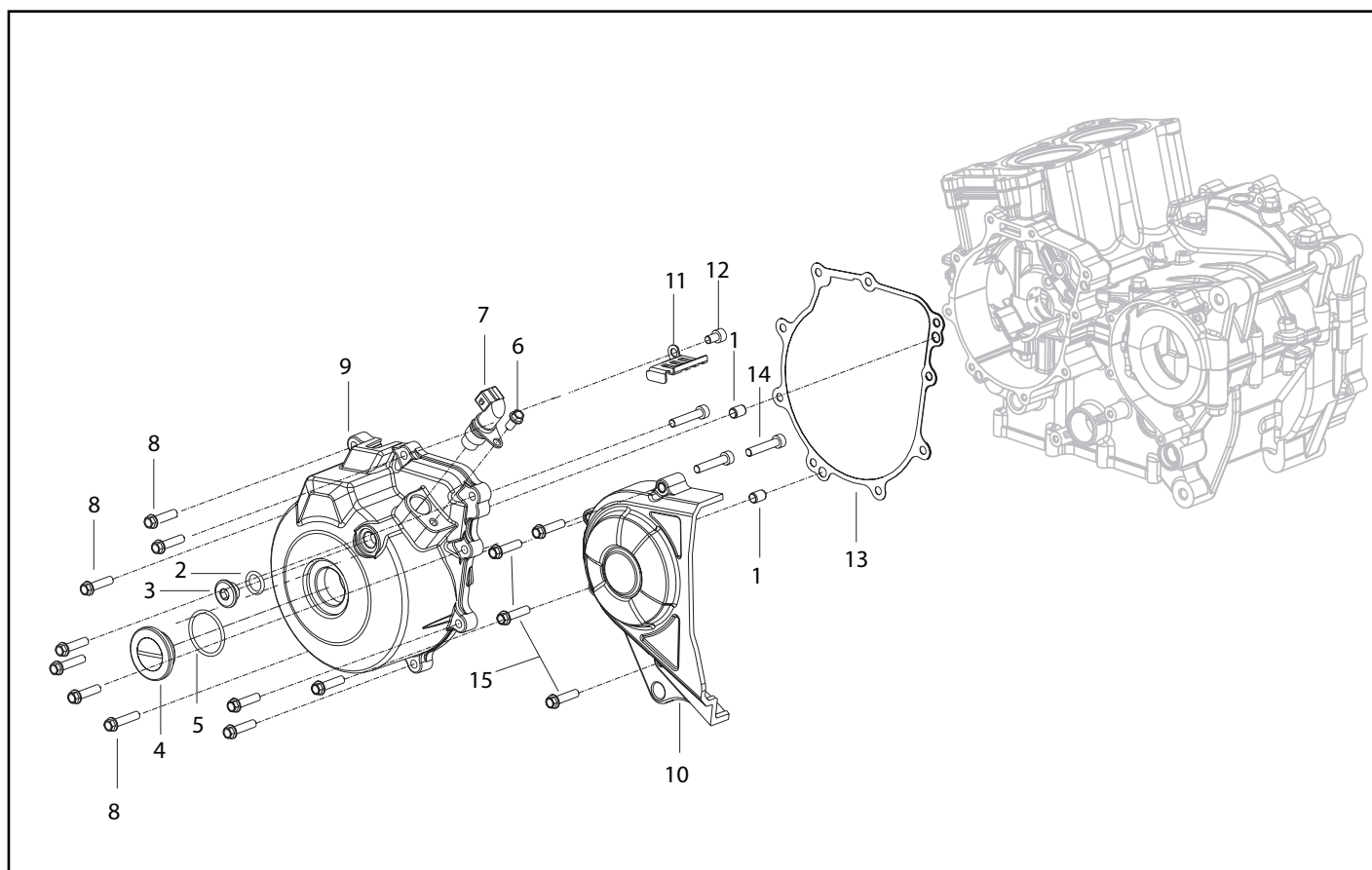
Installation:

Proceed using the opposite order to removal.



FAIRING

CHAIN PINION COVER



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	BUSHING					
2	O-RING					
3	THREADED CAP					
4	MAGNETIC CAP					
5	O-RING					
6	SCREW					
7	PHASE SENSOR					
8	SCREW					
9	ALTERNATOR COVER					
10	PINION COVER					
11	PLATE					
12	SCREW					
13	FLYWHEEL COVER SEAL					
14	SCREW					
15	SCREW					



FAIRING

REMOVAL OF THE CHAIN PINION COVER

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Gear pedal, refer to section “Gear pedal removal, Chapter 4”.
- The screw (1) Fig. C.
- The gear lever (2) Fig. A.

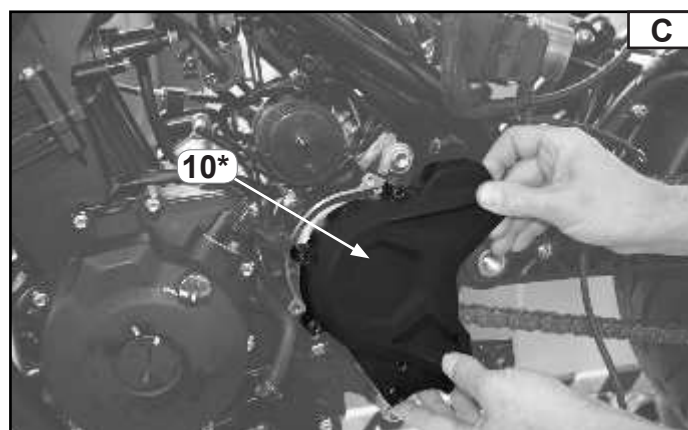
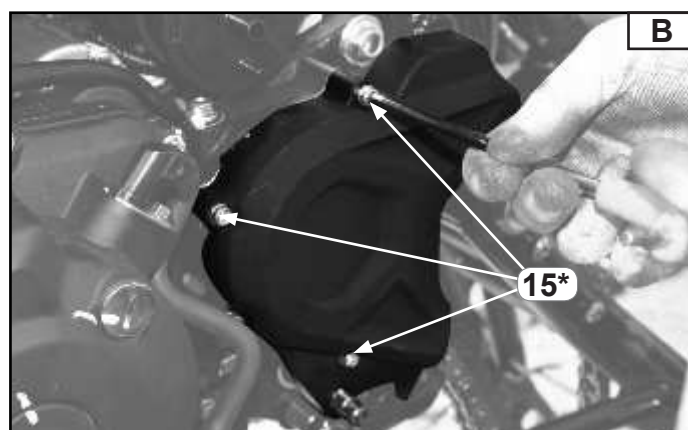
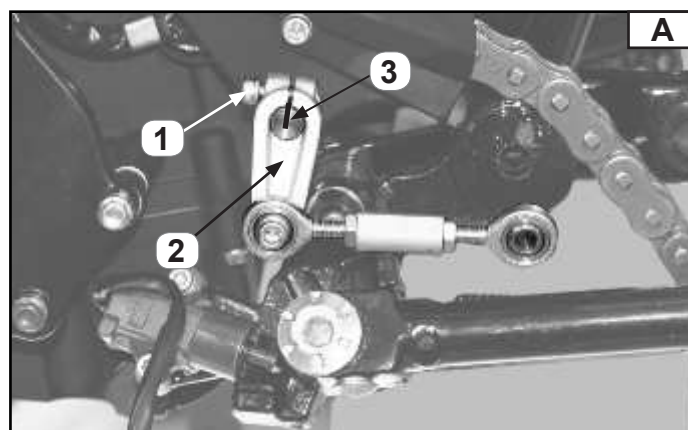
NOTE:

Before removing the gear lever (2), use a marker pen to mark the position of the lever compared to the gear hub (3) Fig. A.

- The screws (15*) Fig. B.
- The protective cover (10*) Fig. C.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter “Fairings”, section “Chain pinion cover”.





FAIRING

INSTALLATION OF THE CHAIN PINION COVER

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Install:

- The screw (1) Fig. A
- To the following torque:



Torque 10 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

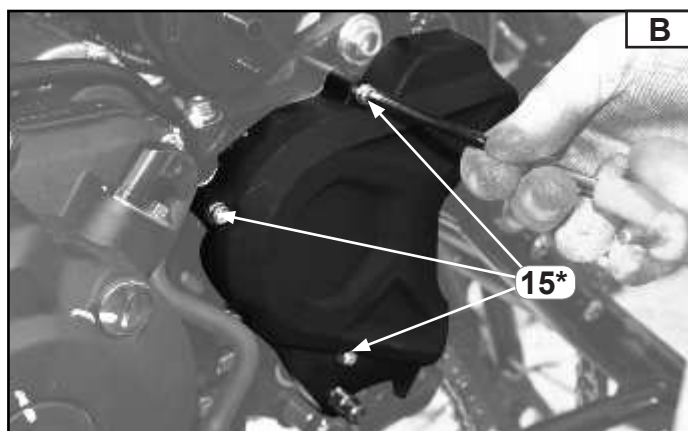
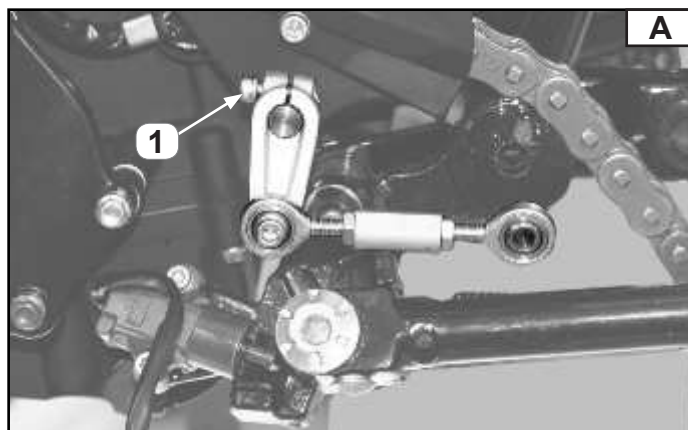
- The screws (15*).
- To the following torque:



Torque 8 N*m

NOTE: _____

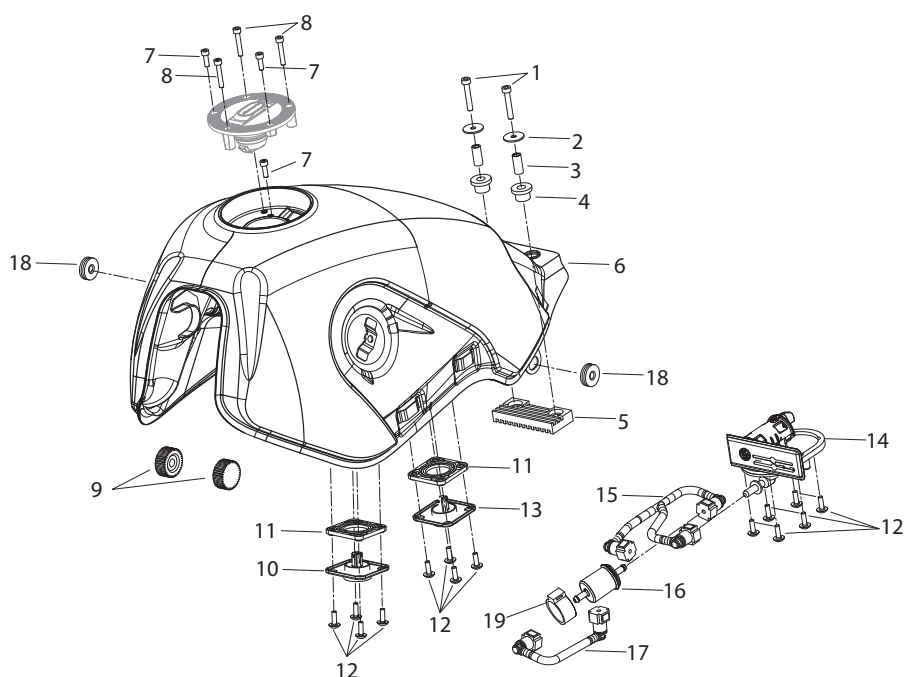
The numbers marked (*) are a part of the spare parts table, chapter "Fairings", section "Chain pinion cover".





TANK

TANK PARTS



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SCREW					
2	WASHER					
3	BUSHING					
4	BUSHING					
5	VIBRATION DAMPING RUBBER					
6	FUEL TANK					
7	SCREW					
8	SCREW					
9	RUBBER TIP					
10	FUEL TANK LEVEL PROBE (FRONT)					
11	SEAL					
12	SCREW					
13	FUEL TANK LEVEL PROBE (REAR)					
14	FUEL PUMP					
15	FUEL HOSE					
16	FUEL FILTER					
17	FUEL HOSE					
18	RUBBER TIP					
19	FILTER SUPPORT					



TANK

REMOVAL OF THE TANK CAP SUPPORT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

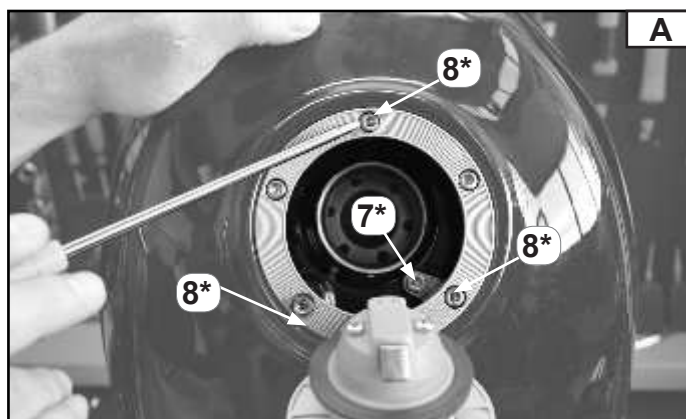
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The fixing screws (8*) Fig. A.
- The fixing screw (7*) Fig. A.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter “Tank”, section “Tank parts”.





TANK

INSTALLATION OF THE TANK CAP SUPPORT

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.



TANK

REMOVAL OF THE FUEL PUMP

Park the motorcycle on a level surface.

IMPORTANT NOTICE

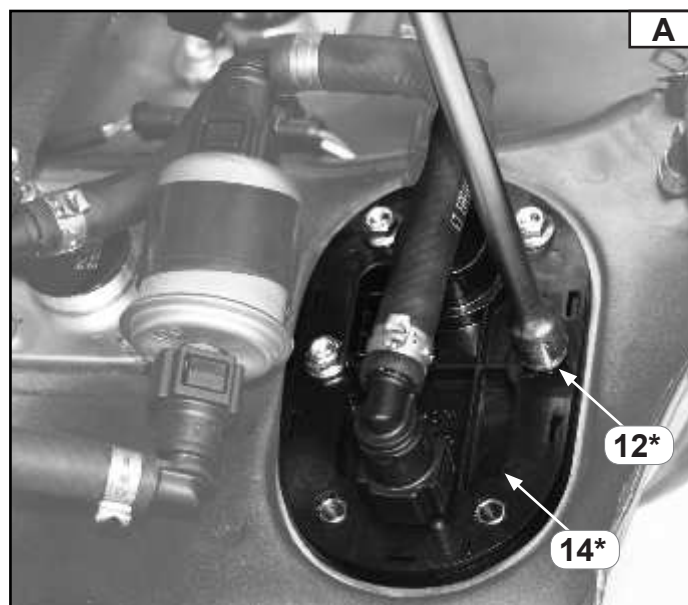
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “Removal of rider seat, Chapter 4”.
- Tank, refer to the section “Fuel tank removal, Chapter 4”.
- The screws (12*) Fig. A.
- The fuel pump (14*) Fig. A.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter “Tank”, section “Tank parts”.





TANK

INSTALLATION OF THE FUEL PUMP

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screws (12*) Fig. A.
- To the following torque:



Torque 10 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

NOTE:

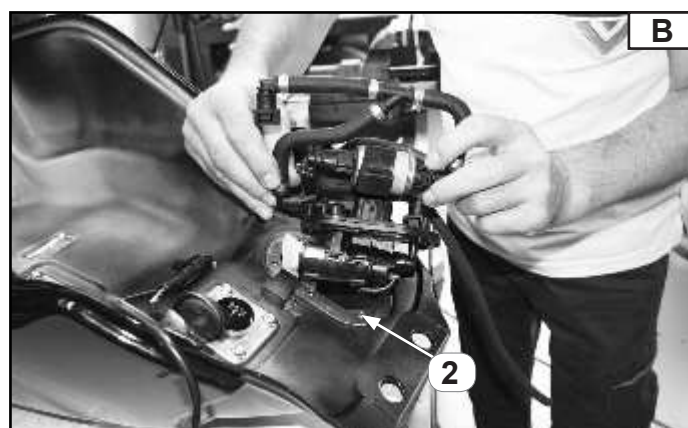
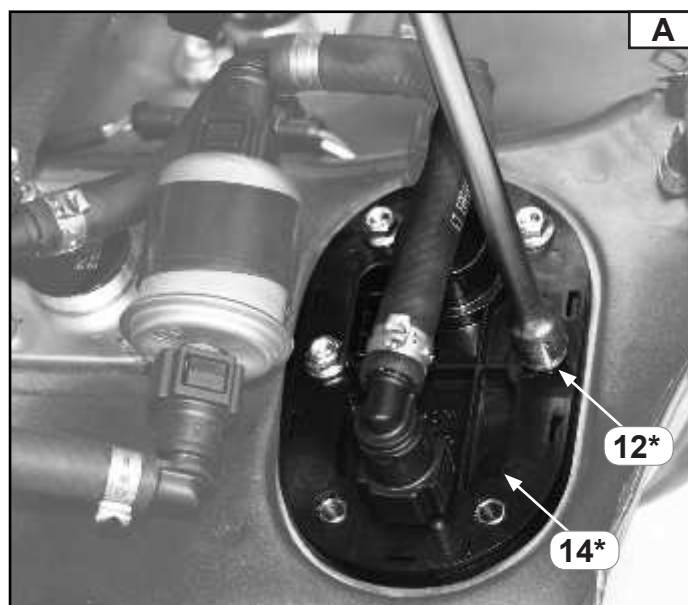
At the moment of reassembly of the pump, grease must be smeared around the base of the housing (2) of the pump (14*), which must be inserted in reverse order of removal Fig. B.



**Recommended lubricant
NGLI2 GREASE**

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter "Tank", section "Tank parts".





TANK

REMOVAL OF THE TANK FUEL LEVEL SENSOR

Park the motorcycle on a level surface.

IMPORTANT NOTICE

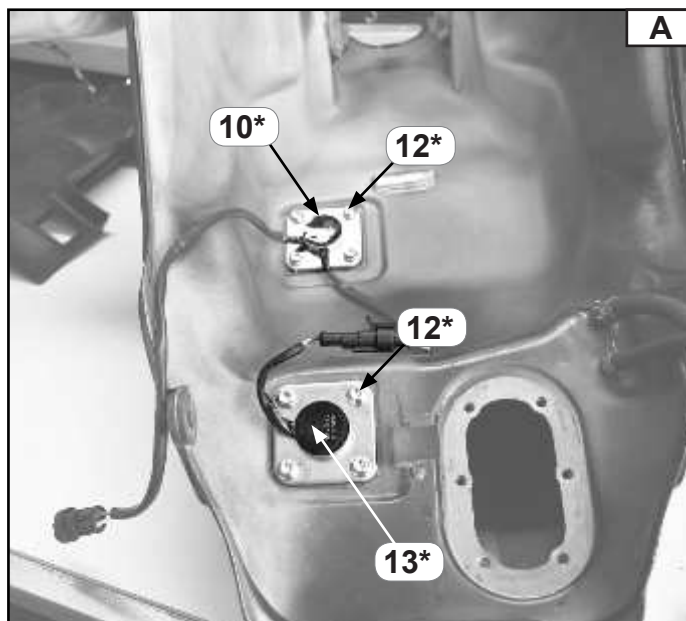
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “Removal of rider seat, Chapter 4”.
- Tank, refer to the section “Fuel tank removal, Chapter 4”.
- The fixing screws (12*) Fig. A.
- The rear fuel level sensor (13*) Fig. A.
- The front fuel level sensor (10*) Fig. A.

NOTE:

The numbers marked (*) are a part of the spare parts table, chapter “Tank”, section “Tank parts”.





TANK

INSTALLATION OF THE TANK FUEL LEVEL SENSOR

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screws (12*) Fig. A.
- to the following torque:

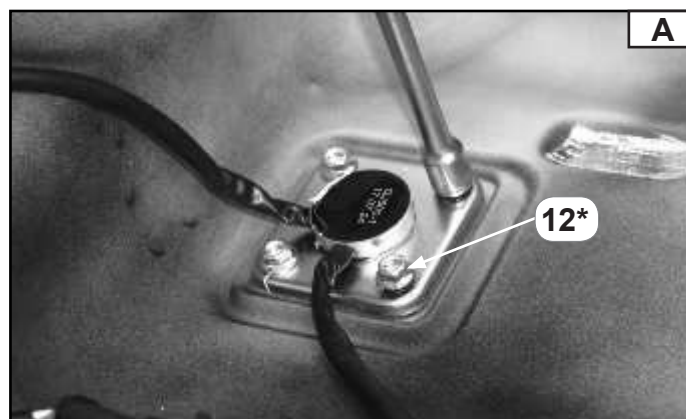


Torque 8 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCK-
ER



NOTE: _____

Such procedure can be applied to both level probes.

NOTE: _____

At the moment of reassembly, insert the probes sensor at the same direction of the connecting wires as the one of disassembly.

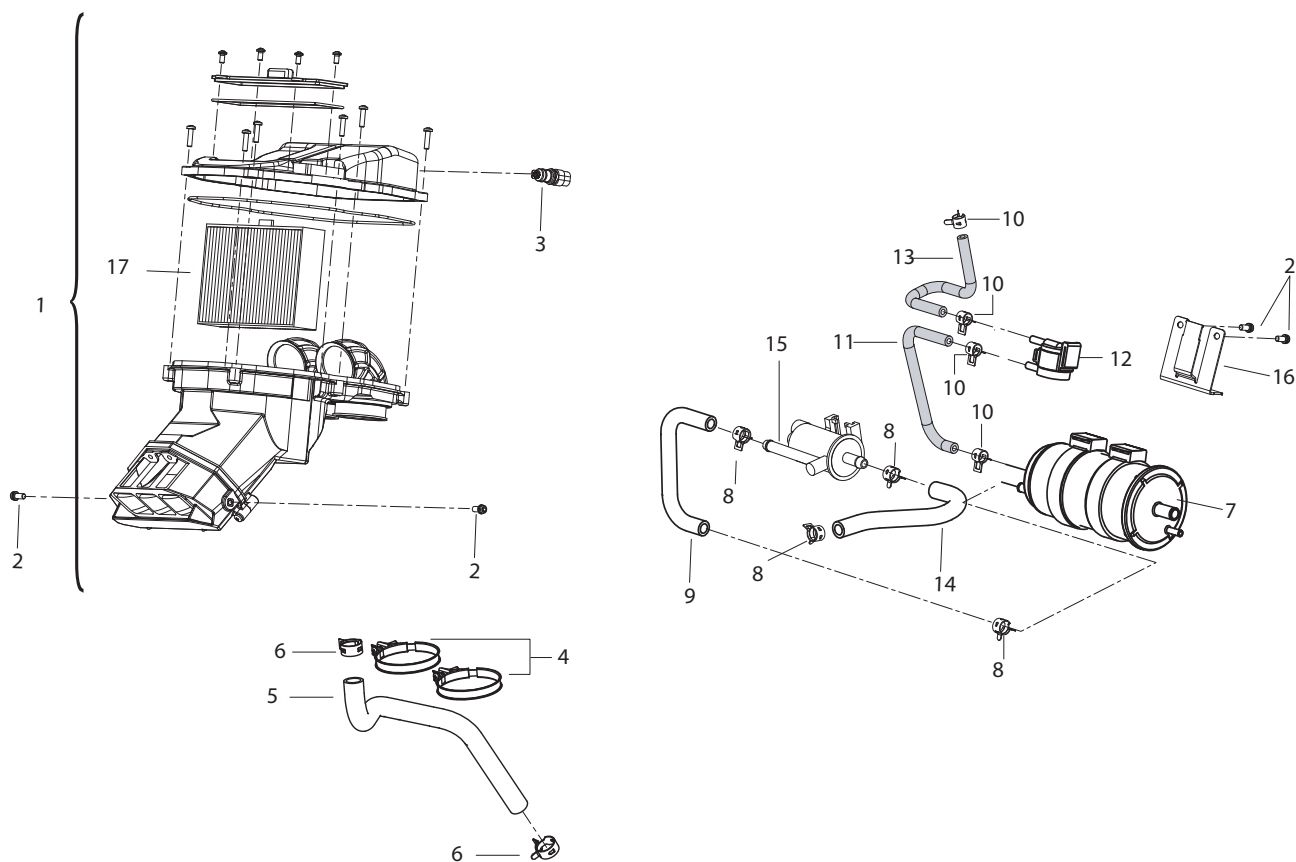
NOTE: _____

The numbers marked (*) are a part of the spare parts table, chapter "Tank", section "Tank parts".



AIR FILTER

AIR FILTER PARTS



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	COMPLETE AIR FILTER BOX					
2	SCREW					
3	AIR TEMPERATURE SENSOR					
4	SCREW BAND					
5	SLEEVE					
6	HOSE HOLDER CLIP					
7	CARTRIDGE FILTER					
8	SPRING BAND					
9	PIPE					
10	NON-RETURN VALVE					
11	PIPE					
12	VALVE					
13	SPRING BAND					
14	PIPE					
15	PIPE					
16	PLATE					
17	SCREW					
18	AIR FILTER					



AIR FILTER

REMOVAL OF THE AIR FILTER BOX

Park the motorcycle on a level surface.

IMPORTANT NOTICE

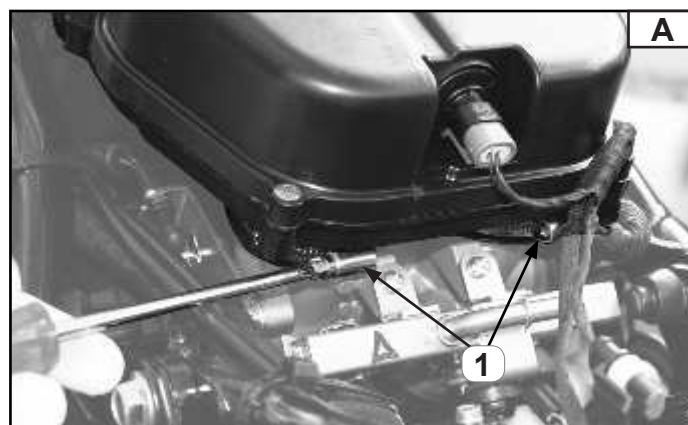
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Rider seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- Tank, refer to the section “**Fuel tank removal, Chapter 4**”.

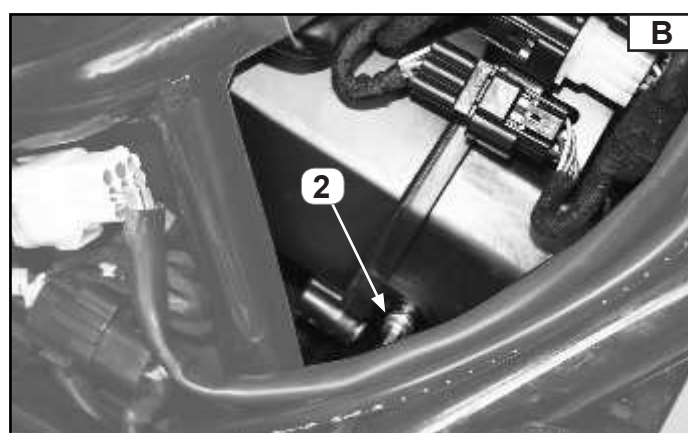
Loosen:

- The bands (1) Fig. A



Remove:

- The screws (2) right/left side Fig. B.



Disconnect:

- The breather hose (3) from the filter casing Fig. C.



- The connector (4) from the cover Fig. D.





AIR FILTER

REMOVAL OF THE AIR FILTER BOX

Remove:

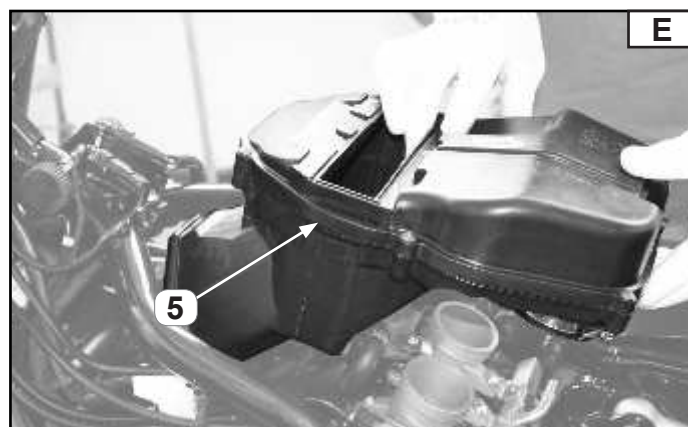
- The filter box (5) Fig. E.

IMPORTANT NOTICE

Never switch on the engine if the air filter is not installed. The unfiltered air causes a quick wear of the engine parts and might damage the engine. Furthermore, using the engine without air filter, setting of the throttle bodies is affected, causing a worsening of engine performance, as well as its overheating.

Therefore ensure that the air filter is always in a good condition.

The long life durability of the engine greatly depends on this component.





AIR FILTER

INSTALLATION OF THE AIR FILTER BOX

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

A large, faint, circular watermark of the Benelli logo is centered on the page. The logo features a green laurel wreath encircling a central emblem. The emblem consists of three stars at the top and a lion standing on a pedestal at the bottom. The word "Benelli" is written in a bold, sans-serif font across the middle of the wreath.



ENG.

5



CHAPTER 5

ENGINE

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ENGINE

REMOVAL OF THE ENGINE FROM THE FRAME

IMPORTANT NOTICE

Prop the bike on suitable supports so that it cannot fall.

- Prop the rear side of the swinging arm with a single stay.
- Activate the brake lever slowly and hold it.

IMPORTANT NOTICE

Make sure the front brake is activated when moving the engine to prevent the motorcycle from falling and avoid accidents and injury.

Drain:

- Engine oil, refer to section “**Change of engine oil, Periodic maintenance, Chapter 3**”.
- Coolant liquid, refer to section “**Change of cooling fluid, Cooling system, Chapter 6**”.

Remove:

- Radiator, refer to section “**Radiator removal, Chapter 6, Cooling system**”.
- Rider seat, refer to section “**Removal of rider seat, Chapter 4**”.
- Tank, refer to section “**Fuel tank removal, Chapter 4**”.
- Air filter box, refer to section “**Air filter box removal, Chapter 4**”.
- Throttle body, refer to section “**Throttle body removal**”.
- Expansion tank, refer to section “**Expansion tank removal, Chapter 6**”.
- Thermostat, refer to section “**Thermostat removal, Chapter 6**” and relevant pipes.
- Exhaust system, refer to section “**Exhaust assembly removal, Chapter 4**”.
- Driving gear, refer to section “**Driving gear removal**”.
- Gear pedal, refer to section “**Gear pedal removal, Chapter 4**”.
- Side stand, refer to section “**Removal of the side stand, Chapter 4**”.

- The screw (1) Fig. A.
- The rear brake oil circuit tank (2) Fig. A.

Disconnect:

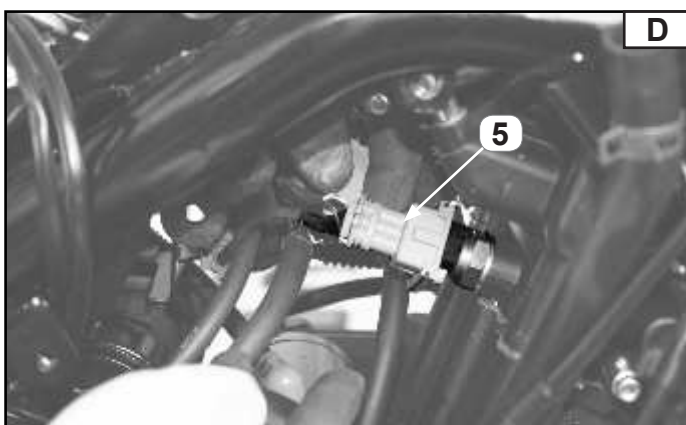
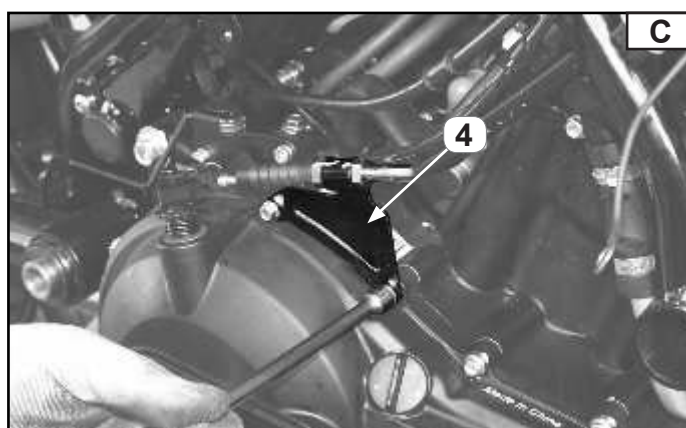
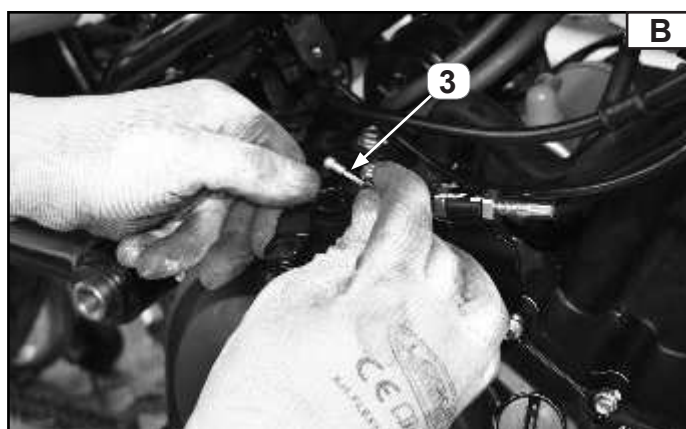
- The clutch control cable (3) Fig. B.

Remove:

- The clutch cable support plate (4) Fig. C.

Disconnect:

- The engine temperature connector (5) Fig. D.





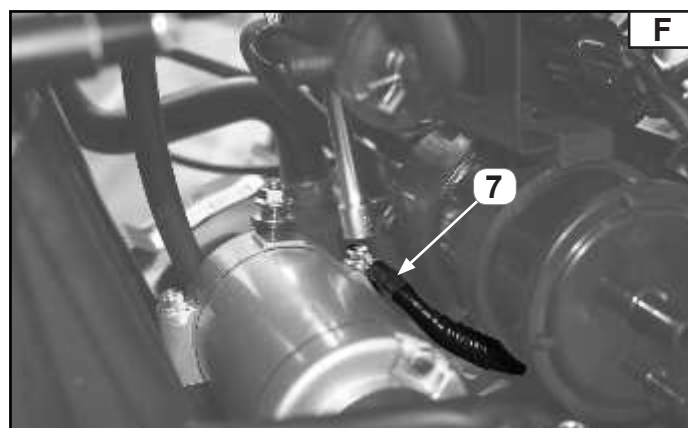
ENGINE

REMOVAL OF THE ENGINE FROM THE FRAME

- The starter positive cable (6) Fig. E.

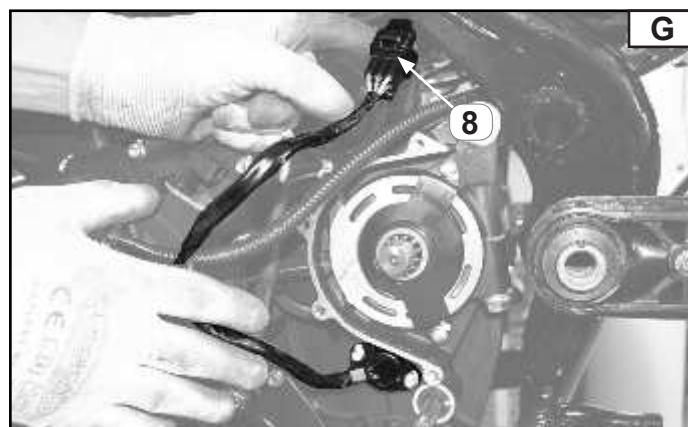


- The ground cable of the engine mass electrical system (7) Fig. F.



Disconnect:

- The gear shift sensor connector (8) Fig. G.



- Phase sensor connector (9) Fig. H.



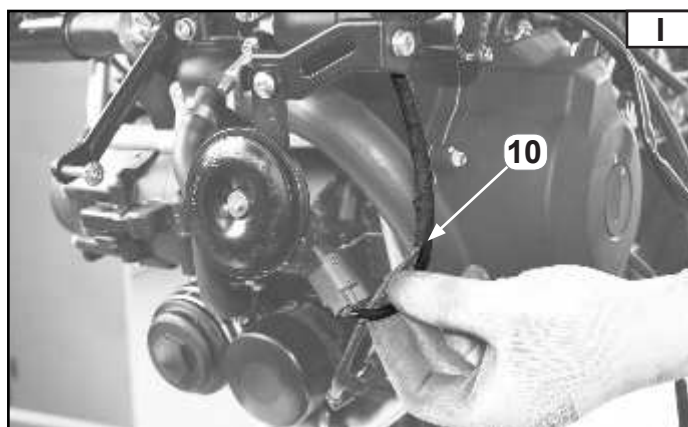


ENGINE

REMOVAL OF THE ENGINE FROM THE FRAME

Disconnect:

- The horn connector (10) Fig. I.



- The oil pressure sensor connector (11) Fig. L.



- The safety fall detection switch connector (12) Fig. M.



Remove:

- The horn support bracket (13) Fig. N.

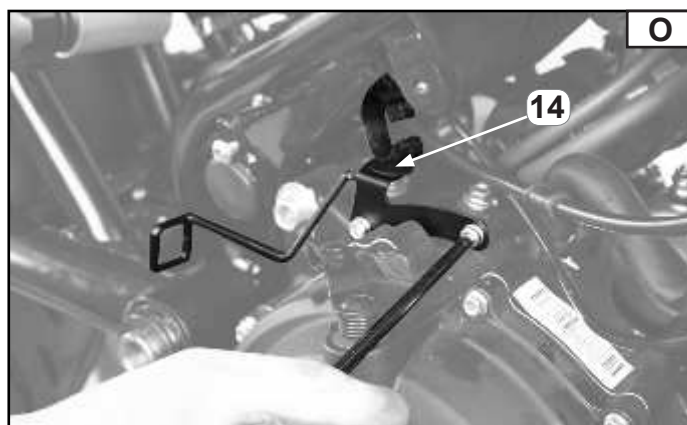




ENGINE

REMOVAL OF THE ENGINE FROM THE FRAME

- The brake hoses support bracket (14) Fig. O.

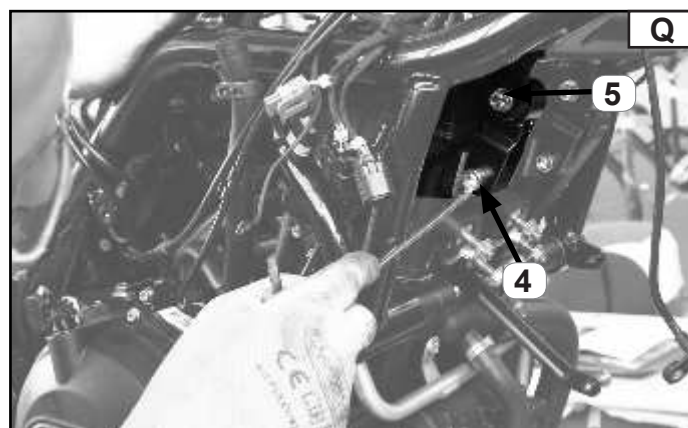


Remove:

- In sequence screws n. 1-2-3 Fig. P.



- In sequence screws n. 4-5 Fig. Q.



NOTE:
Repeat the same procedure on the engine left side.



ENGINE

INSTALLATION OF THE ENGINE ON THE FRAME

IMPORTANT NOTICE

Prop the bike on suitable supports so that it cannot fall.

Install:

Proceed using the opposite order to removal.

Tighten:

- The screws (1-2-3) Fig. A.

To the following torque:



Torque 45 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD LOCK-
ER**

- The screws (4-5) Fig. B.

To the following torque:



Torque 45 N*m

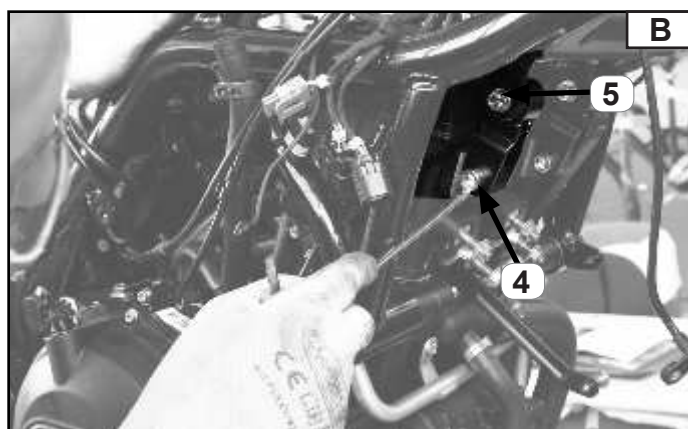
Use medium Loctite thread locker to secure.



**MEDIUM THREAD LOCK-
ER**

NOTE:

Repeat the same procedure on the engine left side.





ENGINE

DRIVING GEAR REMOVAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the bike on suitable supports so that it cannot fall.

Remove:

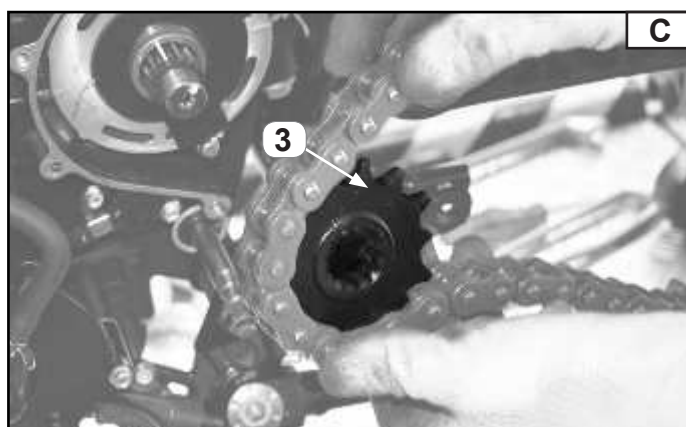
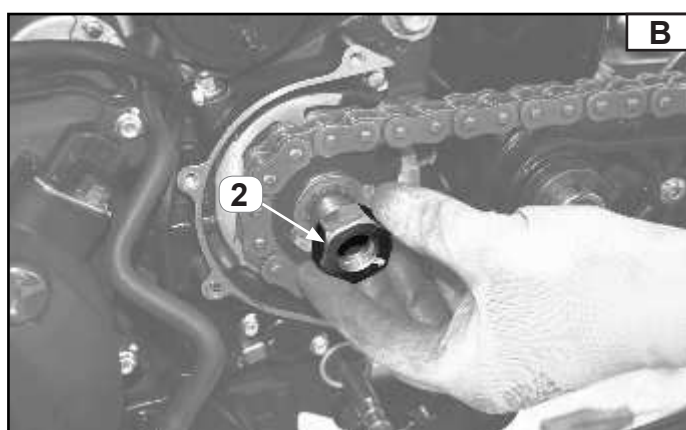
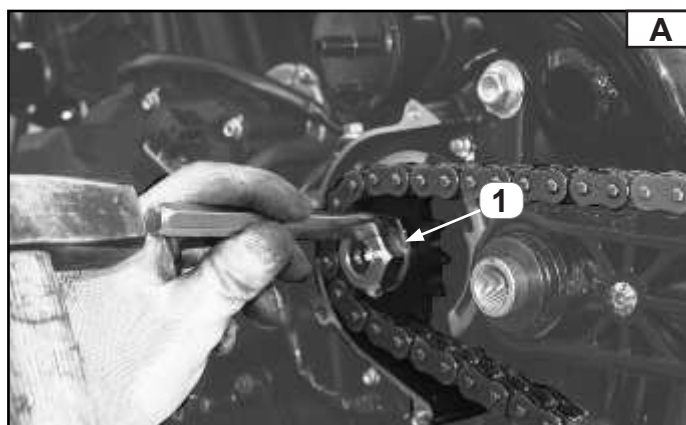
- Chain pinion cover, refer to section “**Removal of the chain pinion cover, Chapter 4**”.
- The spring washer (1) Fig. A.
- The nut (2) Fig. B.

NOTE:

When the driving gear loosen, lock the rear brake.

- Loosen the transmission chain clearance.
(refer to section “Adjustment of the transmission chain, Chapter 3”).

- The pinion (3) Fig. C.





ENGINE

DRIVING GEAR INSTALLATION

IMPORTANT NOTICE

Prop the bike on suitable supports so that it cannot fall.

Install:

Proceed using the opposite order to removal.

Tighten:

- The nut (1) Fig. A.

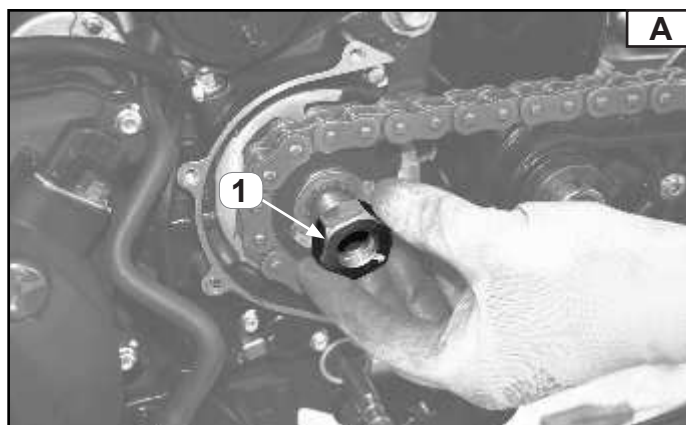
To the following torque:



Torque 85-95 N*m

IMPORTANT NOTICE

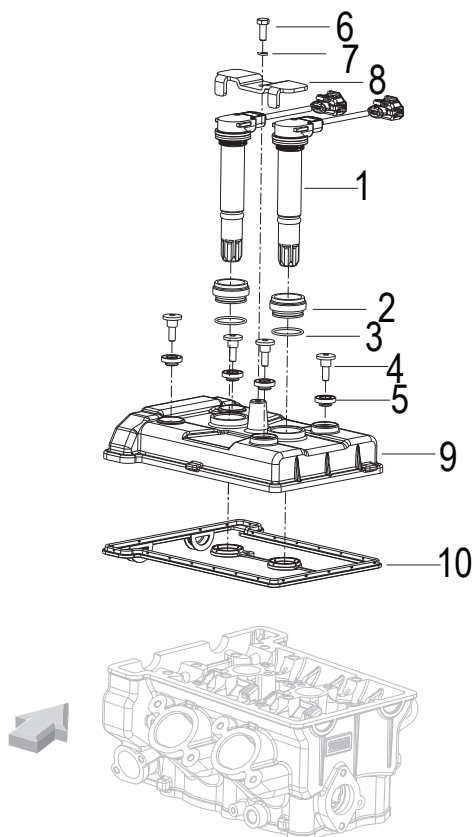
After tightening of the driving gear nut, fold the safety washer over the nut. If damaged, it must be replaced with a new one.





HEAD DISTRIBUTION

DISTRIBUTION COVER REMOVAL



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	COIL					
2	RUBBER TIP					
3	O-RING					
4	SCREW					
5	BUSHING					
6	SCREW					
7	SPECIAL WASHER					
8	BRACKET					
9	DISTRIBUTION COVER					
10	DISTRIBUTION COVER SEAL					



HEAD DISTRIBUTION

COILS AND SPARK PLUGS REMOVAL

Remove:

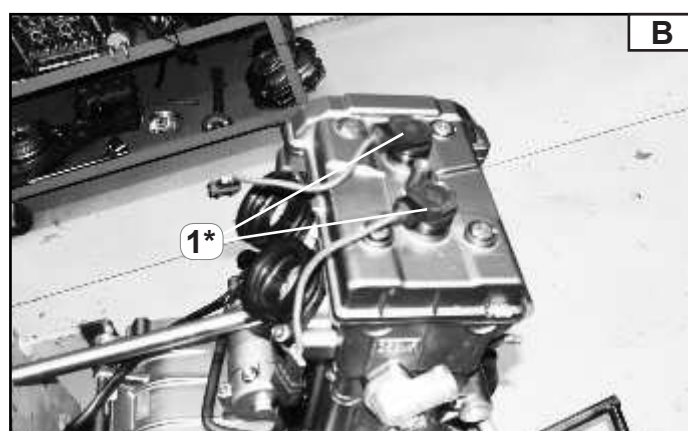
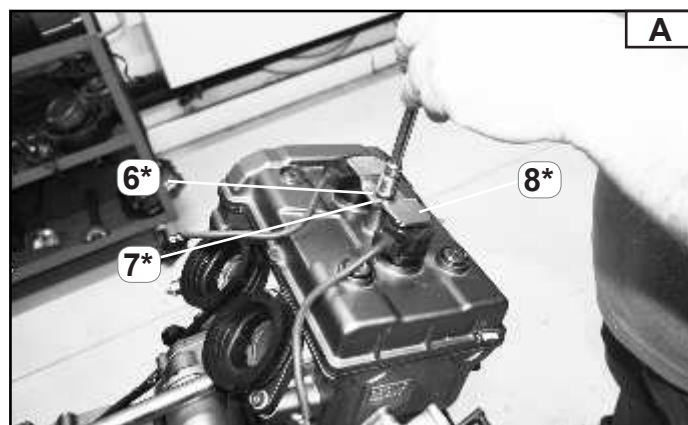
- The screw (6*) Fig. A.
- The washer (7*) Fig. A.
- The bracket (8*) Fig. A.
- The coils (1*) Fig. B.
- The spark plugs, using the special wrench.

NOTE:

Numbers marked (*) are part of the spare parts tables in Chapter 5 "Engine", section entitled "Distribution cover removal".

NOTE:

To check the spark plugs, refer to the chapter "Routine maintenance" in the section "Spark plugs removal".





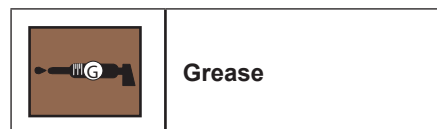
HEAD DISTRIBUTION

COILS AND SPARK PLUGS ASSEMBLY

The following procedure applies to all of the spark plugs (Fig. C).

WARNING

Lubricate the spark plug threads with copper grease.



NOTE:

Before installing it, clean the spark plug and surface in contact with the seal.

Install:

- The spark plug on the head, tightening it by hand until you can feel it comes into contact with the base of the head. Then tighten to the correct torque.



Torque 12 N*m

Install:

- The rubber tips (2*).
- The OR seals (3*) Fig. D.
- The coils (1*).
- The screws (6*).
- The washers (7*).
- The bracket (8*).

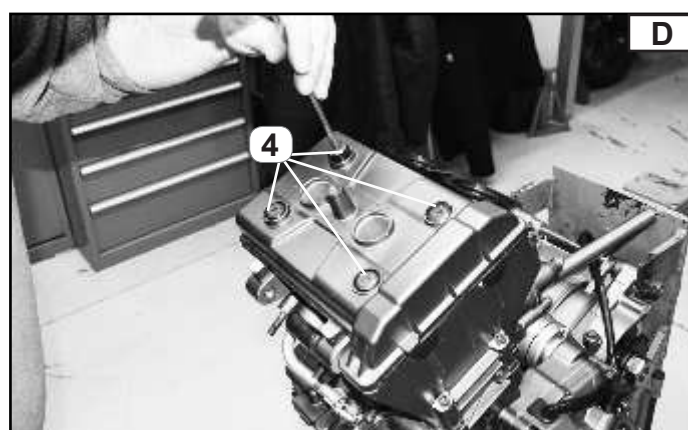
Tighten to torque.



Torque 10 N*m

NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 "Engine", section entitled "Distribution cover removal".





HEAD DISTRIBUTION

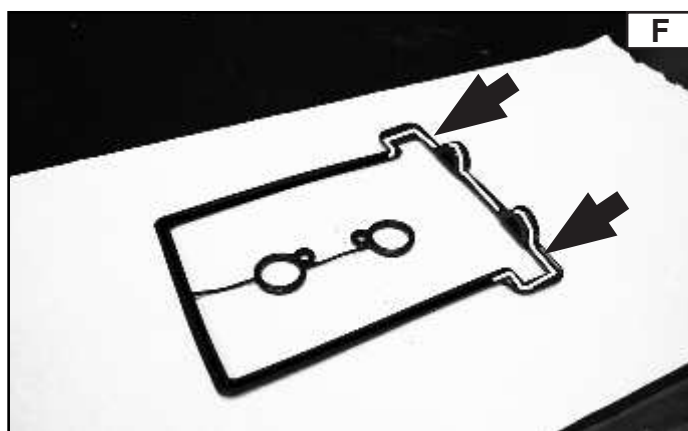
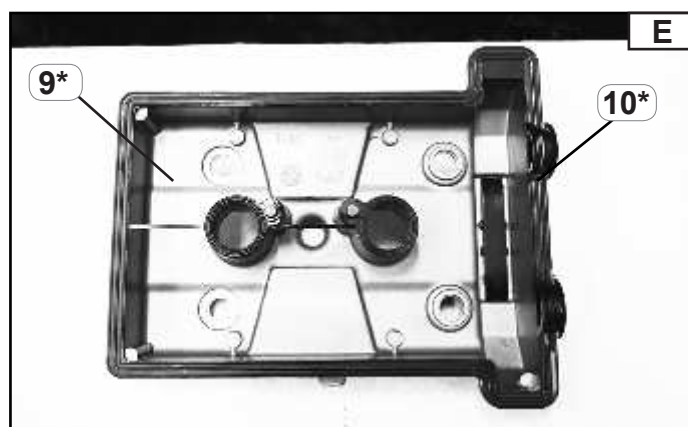
DISTRIBUTION COVER REMOVAL

Take care with the seal on the distribution cover (10*) Fig. E. during removal.

NOTE: _____
In case of seal breakage on the distribution cover (10), replace.

During the assembly of the cover, apply sealing paste type **THREE BOND 1104 /1207B** on the surface, as shown in Fig. F.

NOTE: _____
Numbers marked (*) are part of the spare parts table in Chapter 5 "Engine", section entitled "Distribution cover removal".





HEAD DISTRIBUTION

DISTRIBUTION COVER ASSEMBLY

Assemble:

Proceed in the opposite direction to removal.

NOTE:

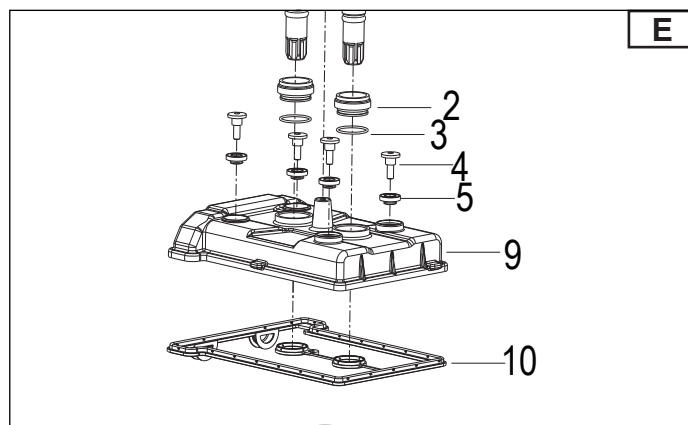
During the assembly stage of the distribution cover, replacement of the rubber tips (5*) is recommended.

Tighten:

Tighten the screws (4*) to the following torque:



Torque 10 N*m

**NOTE:**

Numbers marked (*) are part of the spare parts table in Chapter 5 “Engine”, section entitled “Distribution cover removal”.



HEAD DISTRIBUTION

DISTRIBUTION CHAIN TENSIONER REMOVAL

Remove:

- The screws (1).
- The screw (2).
- The washer.
- The seal.

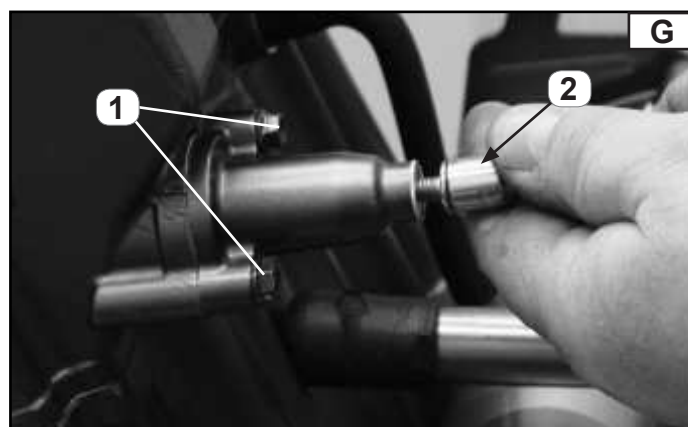
NOTE:

Operation to perform with the engine in TDC.

Using the special tool during the removal stage, keep the tensioner retracted, Fig. I., then remove the two screws "1" Fig. G.



(*) Tool: Chain tensioner lock tool
Code: 0320097046001





HEAD DISTRIBUTION

DISTRIBUTION CHAIN TENSIONER ASSEMBLY

During the assembly stage, take care to ensure that the seal (4) Fig. H is undamaged and unworn, otherwise replace.

Move:

The tensioner to the retracted position and insert it into its housing using the special equipment (*).



(*) **Tool: Chain tensioner lock tool**
Code: 0320097046001

Insert the tensioner into the seat and the seal.

Tighten:

- The fastening screws (1), Fig. I, to the following torque:

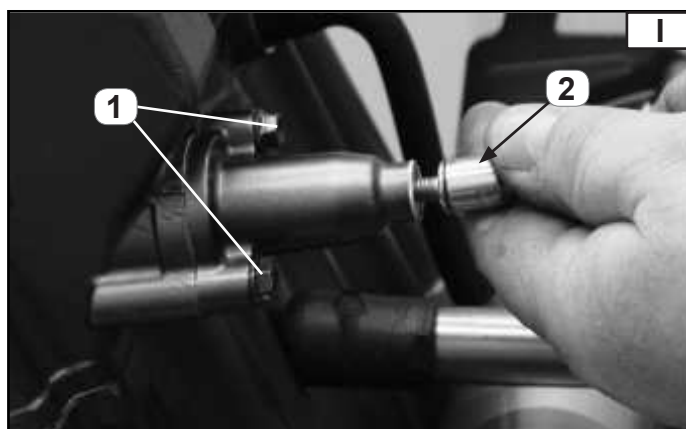
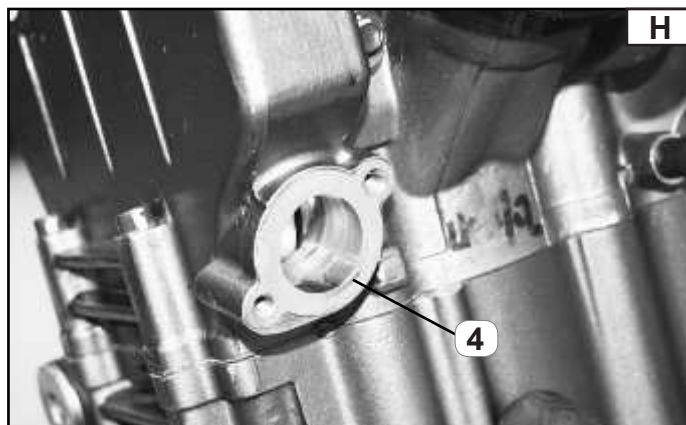


Torque 10 N*m

- The screw (2), Fig. I, to the following torque:



Torque 8 N*m





HEAD DISTRIBUTION

INTAKE AND EXHAUST CAMSHAFT REMOVAL

Remove:

- **Coils and Spark plugs**, see the section entitled “Coils and spark plugs removal”.
- **Distribution cover**, see section entitled “Distribution cover removal”.

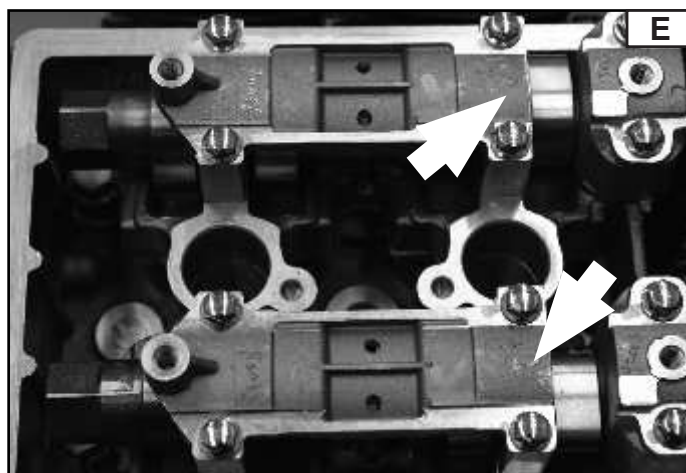
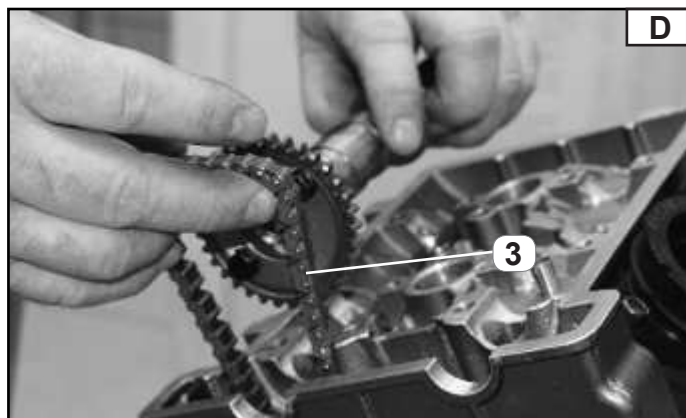
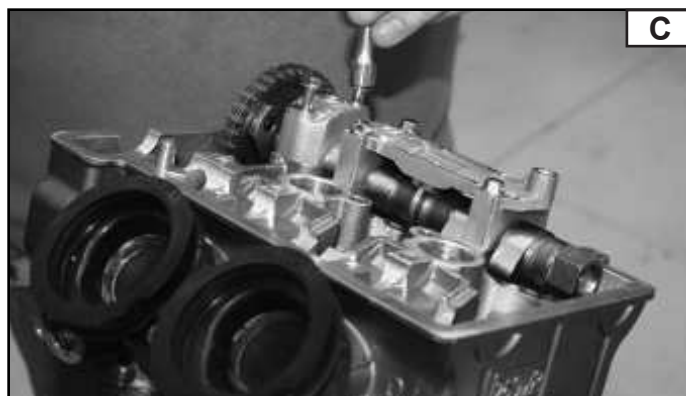
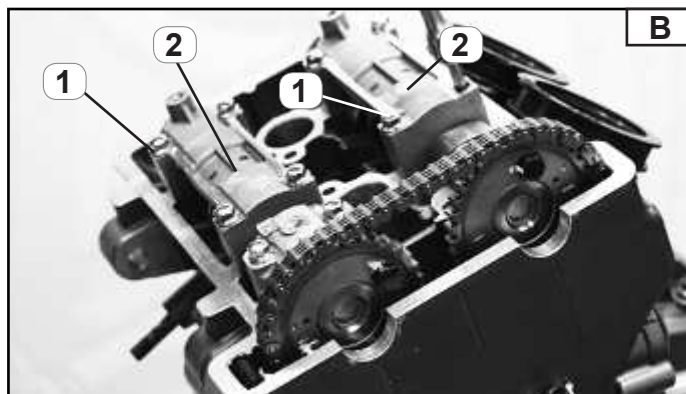
NOTE:

During the removal stage, use a marker pen to mark the position of the holders since, when reassembling, they need to be in their original positions, Fig. E.

The “arrows” pressed into the holders show the direction in which they need to be mounted towards the distribution.

Remove:

- The fastening screws of the holders (1) Fig. B.
- The holders (2).
- The intake camshaft Fig. C.
- The exhaust camshaft (3) Fig. D.





HEAD DISTRIBUTION

CAMSHAFT CHECK

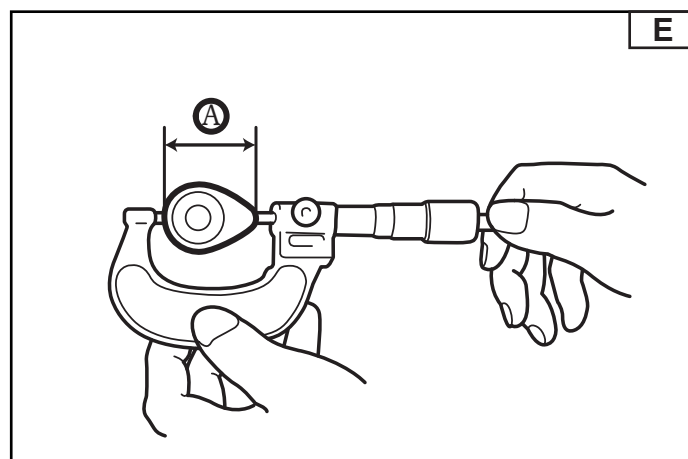
Make a visual check of the camshaft lobes and, if there is any blue discolouration/pitting or lines, replace.

- **Measure the size of the lobes.**

If the measures taken (Fig. E) are not compliant with specifications, replace the shaft.

Specifications Table:

Camshaft	Limit (A)	Limit (A)
Camshaft exhaust side	31.95 mm	31.90 mm
Camshaft intake side	31.95 mm	31.90 mm

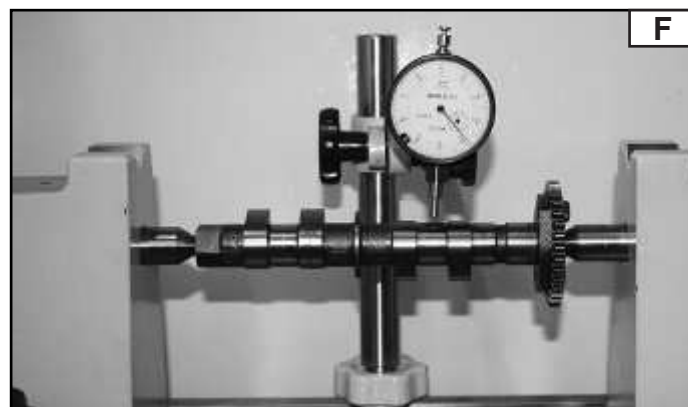


- **Measure the eccentricity of the camshaft**

If the measures taken (Fig. E) are not compliant with specifications, replace the shaft.

Specifications Table:

Camshaft	Eccentricity limit
Camshaft exhaust side	0.05 mm
Camshaft intake side	0.05 mm

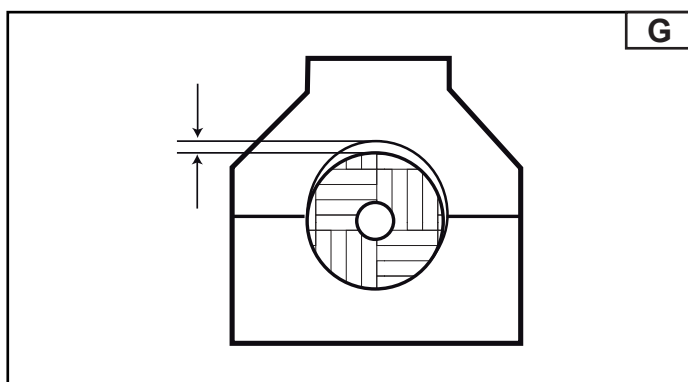


- **Measurement of clearance between bearing journals and holder**

If the measures taken (Fig. G) are not compliant with specifications, replace the head and holder block.

Specifications Table:

Camshaft	Clearance between bearing journal and holder
Camshaft exhaust side	0.03 - 0.06 mm
Camshaft intake side	0.02 - 0.05 mm

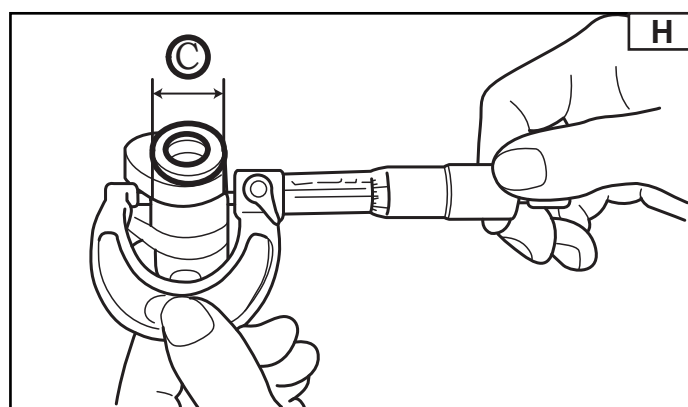


- **Measure the diameter of the camshaft support**

If the measurements taken (Fig. H) are not within the specifications, proceed with shaft replacement.

Specifications Table:

Camshaft	Measurement of main bearing (C)
Camshaft exhaust side	Ø 23 mm (-0.03/-0.045)
Camshaft intake side	





HEAD DISTRIBUTION

EXHAUST CAMSHAFT INSTALLATION

Insert:

Install the special tool (*) into the spark plug seat to check the top dead centre Fig. A.

(*) Tool: Engine tuning tool

Code: R180197022000

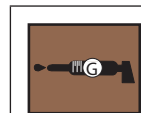
Once the TDC has been identified, proceed to assemble the camshaft, exhaust side.

NOTE:

During this assembly, it is important for the lobes of the cylinder shaft 1 (Y) to be positioned outwards, Fig. B., and the two reference notches "X" of the distribution gear are aligned as in Fig. B.

NOTE:

When assembling the holders, it is necessary to lubricate them with special grease to prevent the shafts from rotating dry during initial starting.



Teflon-based paste or
of other lubricants, as
graphite, ceramics.

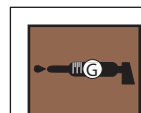
When installing the holders, proceed in the opposite direction to removal, tightening the screws to the following torque:



Torque 13 N*m

NOTE:

Lubricate the screws with copper grease.



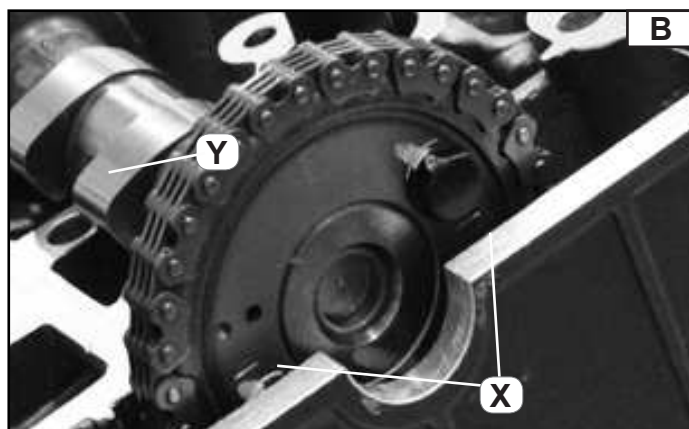
Copper grease

NOTE:

Check the correct alignment of the exhaust camshaft using the special tool (*).

(*) Tool: Engine tuning tool

Code: R180197022000





HEAD DISTRIBUTION

INTAKE CAMSHAFT INSTALLATION

Install the relevant tool (*) into the spark plug seat to check the top dead centre Fig. A.

(*) Tool: Engine tuning tool

Code: R180197022000

Once the drive shaft TDC has been identified, proceed to assemble the camshaft, exhaust side.

NOTE:

During assembly, it is important for the lobes of cylinder 1 shaft are positioned outwards, and the two reference notches "X" of the two distribution gears are aligned, as in Fig. B.

NOTE:

When assembling the holders, it is necessary to lubricate them with special grease to prevent the shafts from rotating dry during initial starting.



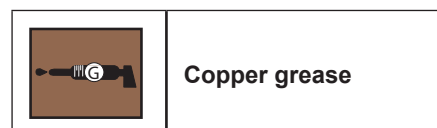
When installing the holders, proceed in the opposite direction to removal, tightening the screws to the following torque:



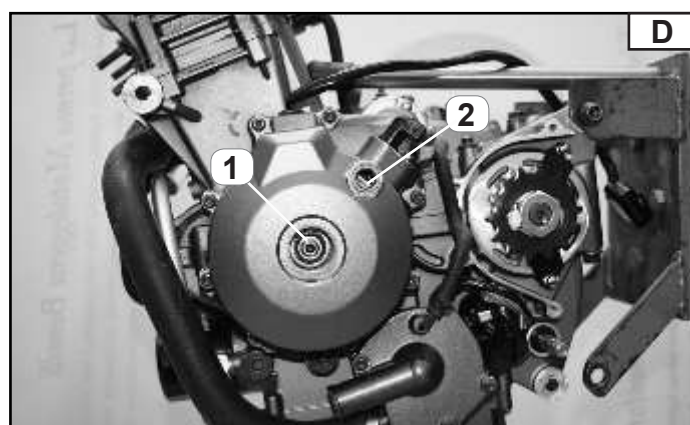
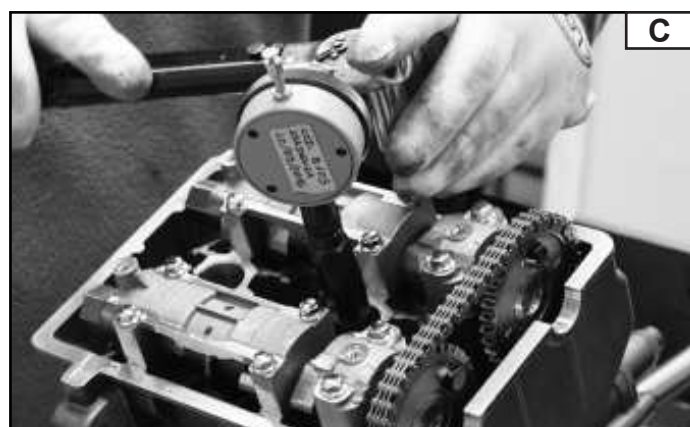
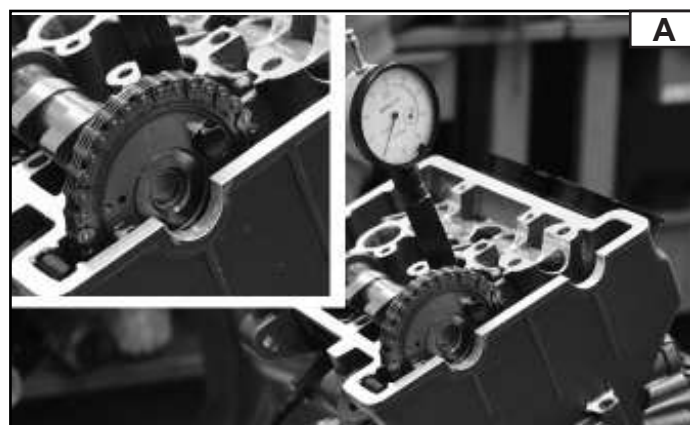
Torque 10-13 N*m

NOTE:

Lubricate the screws with copper grease.



Turn the camshaft clockwise, using the fastening nut to the flywheel, moving the TDC so it lines up with the reference markings "X" on the head surface, Fig. B, and the reference mark on the magnet flywheel (2) Fig. D. D.



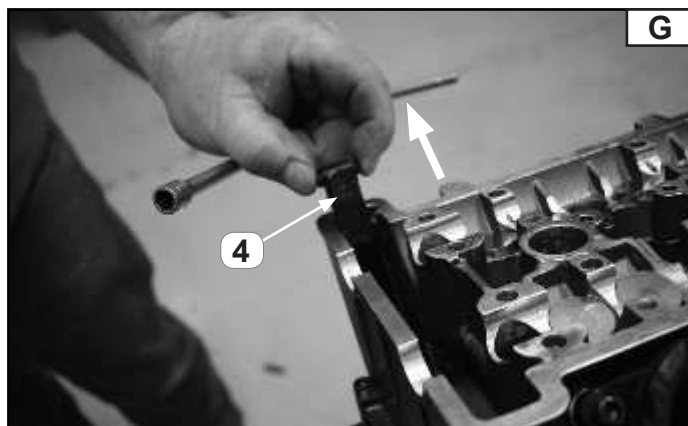


HEAD DISTRIBUTION

DISTRIBUTION CHAIN SLIDES REMOVAL

Remove:

- Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
- 1. Distribution gear, refer to the section “**Distribution cover removal**”.
- 2. Chain tensioner, refer to the section “**Chain tensioner removal**”.
- 3. Exhaust camshaft, refer to the section “**Exhaust camshaft removal**”.
- 4. Intake camshaft, refer to the section “**Intake camshaft removal**”.
- 5. Flywheel, refer to the section “**Flywheel removal**”.
- 6. Starter gear assembly, refer to the section “**Starter gear assembly removal**”.



Remove:

- The fixed chain slide (4) sliding it upwards.
- The safety plate (5) Fig. H.
- The mobile chain slide (6) Fig. I.
- The fixing pin (7) Fig. I.

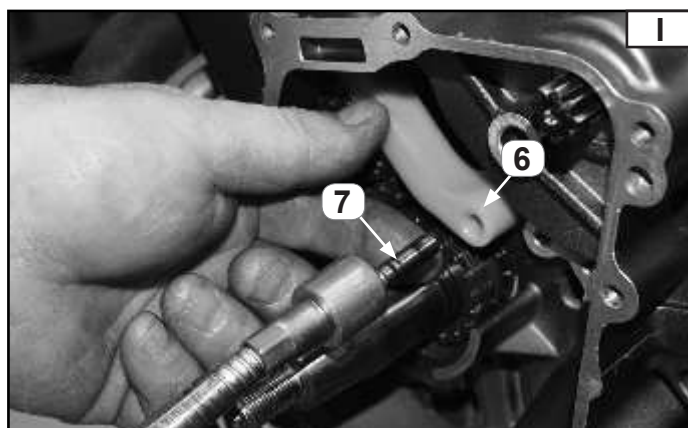


CHECK OF THE CHAIN SLIDES

Check:

- The contact surface of the fixed slide.
- The contact surface of the mobile slide.

If there is any damage or wear, replace.





HEAD DISTRIBUTION

DISTRIBUTION CHAIN SLIDE ASSEMBLY

To assemble the chain slides, follow the removal process in the opposite order.

NOTE: _____
Operation to perform with the engine in TDC.

At the end of assembly, proceed to load the distribution chain tensioner. Refer to the section “**Distribution chain tensioner fitting**”.



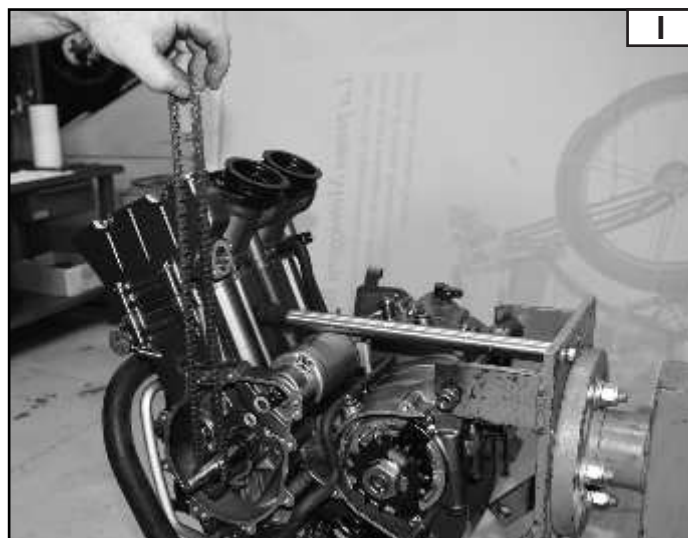
HEAD DISTRIBUTION

DISTRIBUTION CHAIN REMOVAL

Remove:

1. Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
2. Distribution cover, refer to the section “**Distribution cover removal**”.
3. Chain tensioner, refer to the section “**Chain tensioner removal**”.
4. Exhaust camshaft, refer to the section “**Exhaust camshaft removal**”.
5. Intake camshaft, refer to the section “**Intake camshaft removal**”.
6. Flywheel removal, refer to the section “**Flywheel removal**”.
7. Starter gear removal, refer to the section “**Starter gear removal**”.
8. Chain slides, refer to the section “**Chain slide removal**”.

- Once the parts listed above have been removed, proceed to take out the same Fig. I.



DISTRIBUTION CHAIN CHECK

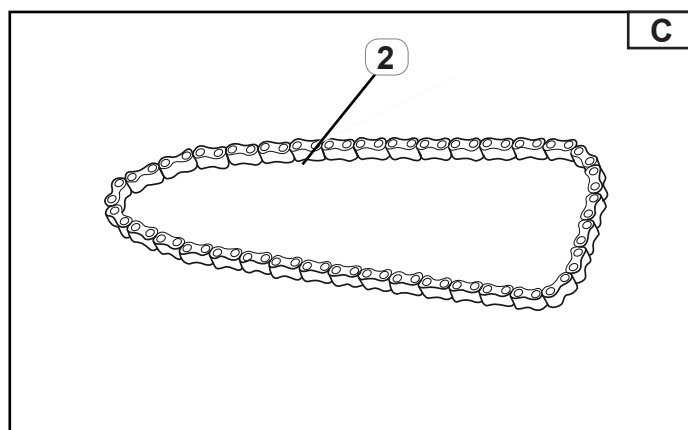
The following process applies to all of the toothed wheels on the camshafts and all of the distribution chain guides.

Check:

- The distribution chain (2) Fig. C.
- In case of damage/lack of flexibility/locked links, replace the distribution chain and camshaft gear block.

NOTE:

In any case the distribution chain needs to be replaced after 20,000 km.





HEAD DISTRIBUTION

DISTRIBUTION CHAIN INSTALLATION

Insert:

- The distribution chain (1) into the camshaft pinion, as in Fig. A.
- Insert the fixed and mobile chain tensioner slides, refer to the section “**Distribution chain assembly**”.
- The two camshafts, making sure that both are mounted with the phasing references “aligned” with the floor” as in Fig. B.

NOTE:

For the distribution chain assembly it is necessary always taking into account the fact that the engine needs to be in TDC condition (Fig. B), refer to the section “Intake camshaft installation”.

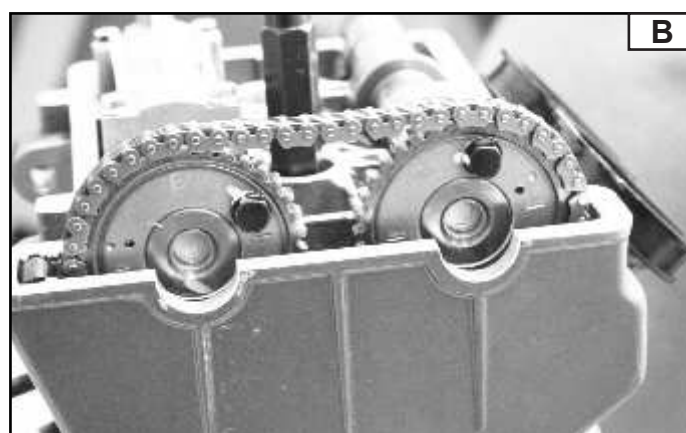
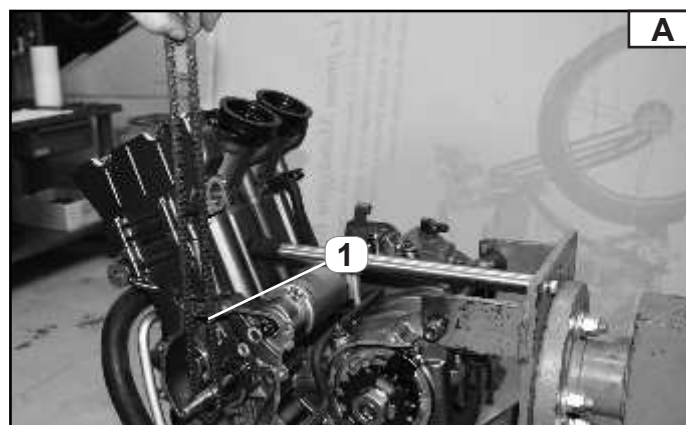
(*) Engine tuning tool
Code: R180197022000

NOTE:

During this operation, it is necessary to lubricate the chain and distribution gears with engine oil.

NOTE:

Every time that the chain is replaced, it is also necessary to replace the slides.





HEAD DISTRIBUTION

VALVE CLEARANCE ADJUSTMENT

Remove:

1. Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
2. Distribution cover, refer to the section “**Distribution cover removal**”.

NOTE:

Valve clearance must be checked and adjusted when the engine is cool (ambient temperature).

Check:

Use a feeler gauge to check the clearance between the cam and the tappet valve, as shown in Fig. A.

If the measurement is outside specifications, replace the calibrated pad.

**NOTE:**

The measurement must be taken on all cams and tappets.

Camshaft	Tappet-cam clearance
Camshaft exhaust side	0.20 ~ 0.25 mm
Camshaft intake side	0.15 ~ 0.20 mm

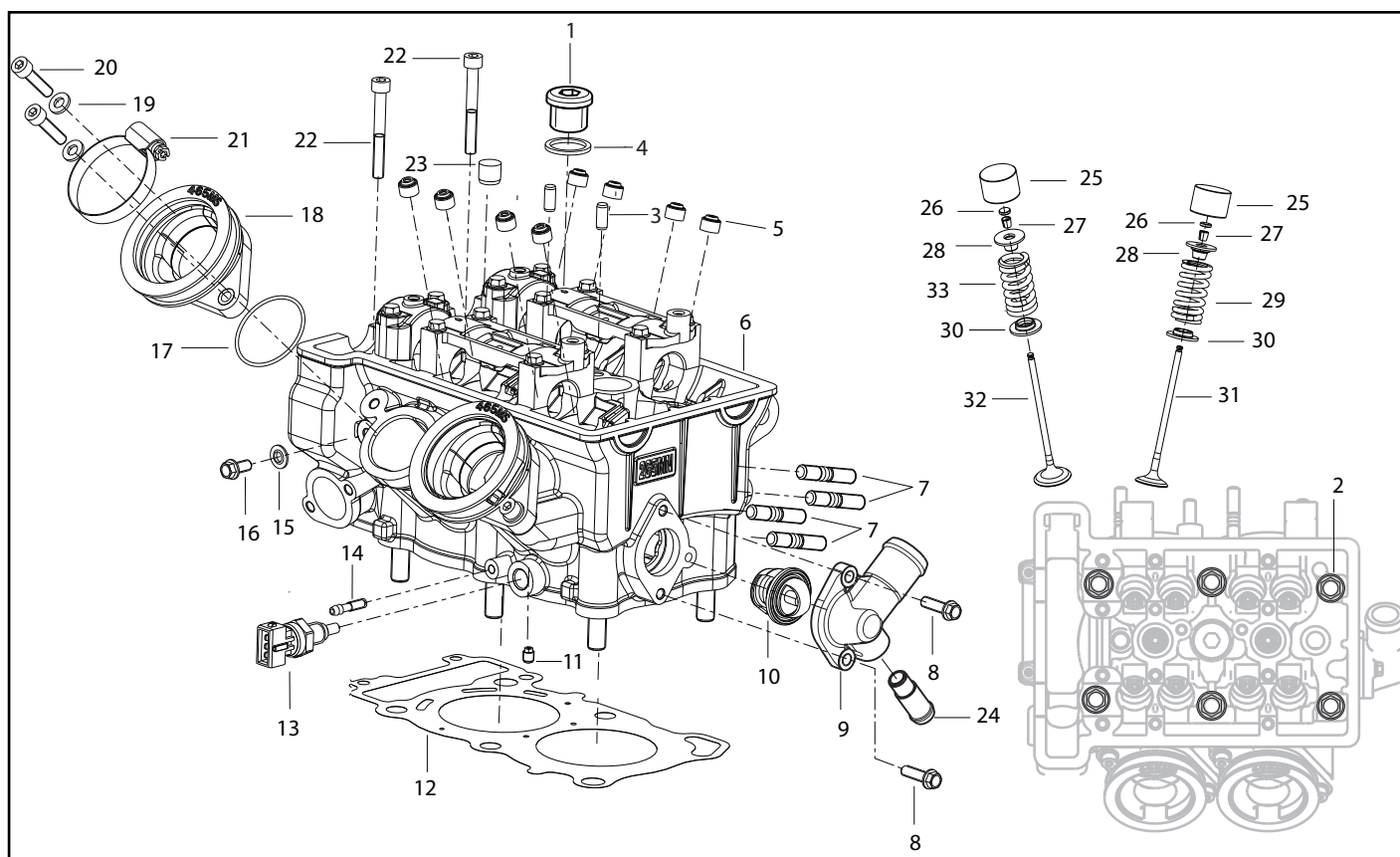
NOTE:

In case of valve clearance correction, replace the calibrated pads (see the following table).



HEAD DISTRIBUTION

TAPPET VALVE AND CALIBRATED PAD REMOVAL



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	BUSHING					
2	SCREW					
3	BUSHING					
4	WASHER					
5	VALVE RUBBER					
6	CYLINDER HEAD					
7	STUD BOLT					
8	SCREW					
9	THERMOSTAT CUP					
10	THERMOSTAT					
11	GRUB SCREW					
12	HEAD GASKET					
13	WATER TEMPERATURE SENSOR					
14	COUPLING					
15	RETAINING WASHER					
16	SCREW					
17	O-RING					
18	SUCTION PIPE					
19	WASHER					
20	SCREW					
21	SCREW BAND					
22	SCREW					
23	CAP					



HEAD DISTRIBUTION

TAPPET VALVE AND CALIBRATED PAD REMOVAL

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
24	PLUG					
25	TAPPET VALVE					
26	VALVE PAD					
27	VALVE RUBBER					
28	TOP SHIELDED BULB					
29	EXTERNAL VALVE SPRING					
30	BOTTOM SHIELDED BULB					
31	EXHAUST VALVE					
32	INTAKE VALVE					
33	INTERNAL VALVE SPRING					



HEAD DISTRIBUTION

TAPPET VALVE AND CALIBRATED PAD REMOVAL

Remove:

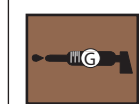
1. Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
2. Distribution cover, refer to the section “**Distribution cover removal**”.

To remove the intake and exhaust valve lifter, proceed as follows:

- Use a magnet to take out the tappet valve lifter (1) and then the calibrated pad (5) Fig. A.
- Make a visual check of the tappet valve lifter, ensuring that there is no damage or lines, and if not, replace.
- Check the outside diameter using a micrometre to exclude any deformation Fig. B.

NOTE:

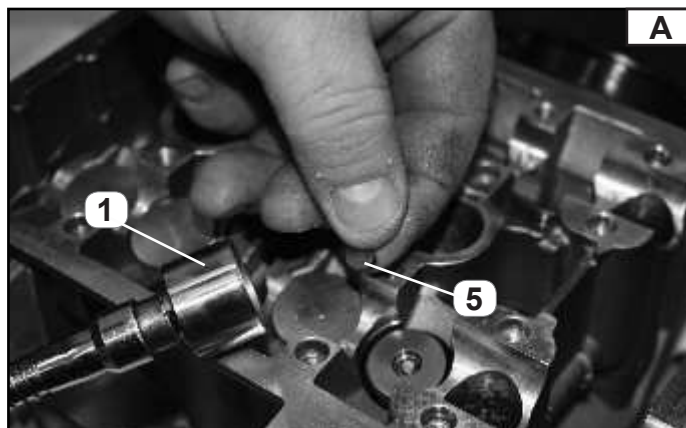
During installation, lubricate the tappet valve lifter, using:



Teflon-based paste or
of other lubricants, as
graphite, ceramics.

NOTE:

At the end of the check of the parts, check the valve clearance, as in the section “**Valve clearance removal**”.





HEAD DISTRIBUTION

HEAD REMOVAL

Remove:

1. Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
2. Distribution cover, refer to the section “**Distribution cover removal**”.
3. Chain tensioner, refer to the section “**Chain tensioner removal**”.
4. Exhaust camshaft, refer to the section “**Intake and exhaust camshaft removal**”.
5. Chain slides, refer to the section “**Chain slide removal**”.

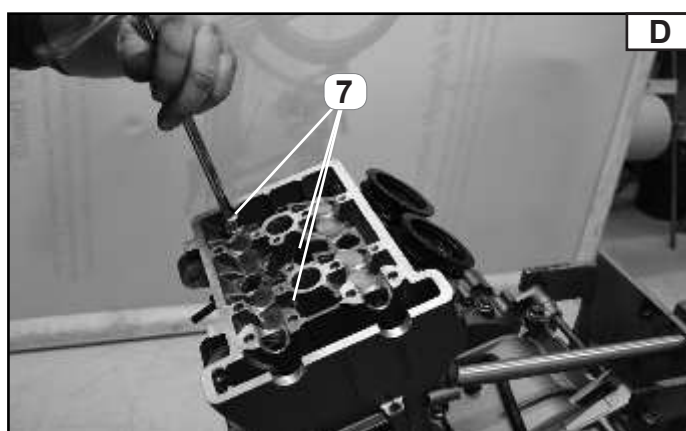
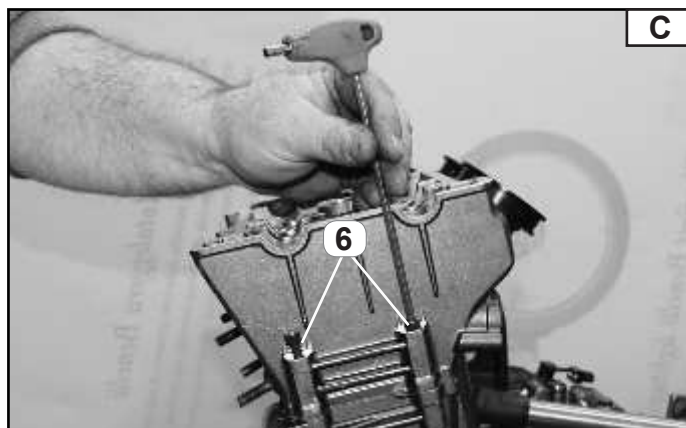
Remove:

- The screws (6) Fig. C.
- The fastening screws (7) Fig. D.

NOTE:

**Loosen each screw by 1/2 turn.
Then remove all screws.**

- Head gasket.





HEAD DISTRIBUTION

VALVE AND VALVE SPRING REMOVAL

Remove:

1. Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
2. Distribution cover, refer to the section “**Distribution cover removal**”.
3. Chain tensioner, refer to the section “**Chain tensioner removal**”.
4. Exhaust camshaft, refer to the section “**Exhaust camshaft removal**”.
5. Intake camshaft, refer to the section “**Intake camshaft removal**”.

Use the special tool to remove the valves (Fig. A).

(**) Valve removal tool

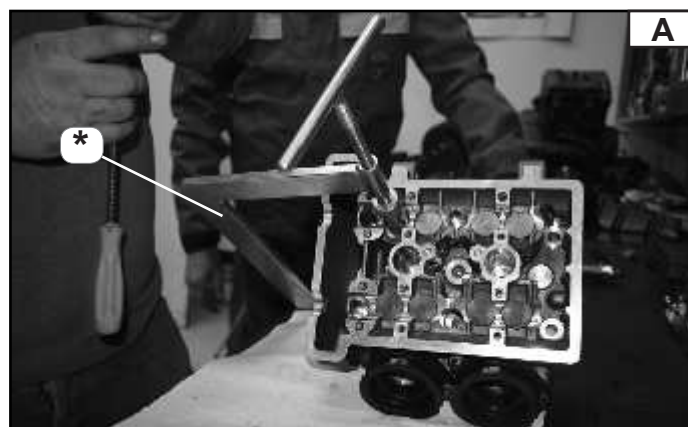
Code: 0320097050000

Remove:

- Tappet valve.
- Pad.
- Cotteners.
- Top door.
- Spring.
- Bottom plate.
- Oil seal.

NOTE:

During removal of the two cotteners to lock the valve, use a magnet (1) to recover them Fig. B.





HEAD DISTRIBUTION

CHECK OF VALVES AND GUIDES

The following process applies to all of the valves and valve guides.

Check:

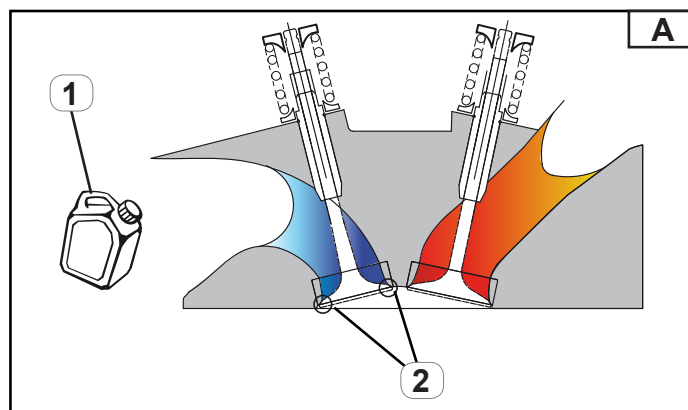
- **The valve seals.**

If there are leaks from the valve seats, check the contact surface, the seat and the width of the valve seat.

- Pour clean solvent (1) into the intake doors.
- Make sure the valves have a suitable seal.

NOTE:

There should not be any leaks from the valve seat (2) Fig. A.



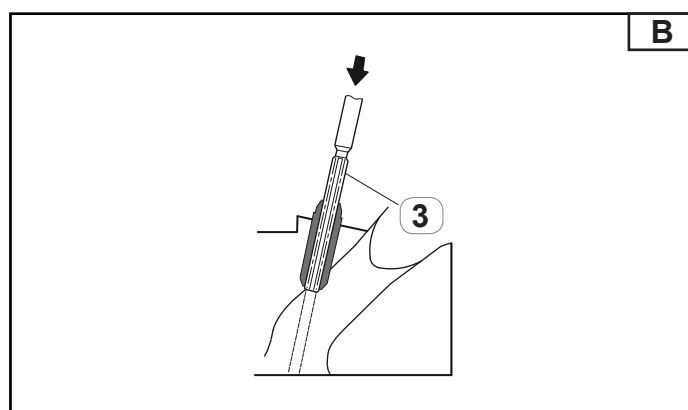
Replace:

- **The valve guide.**

NOTE:

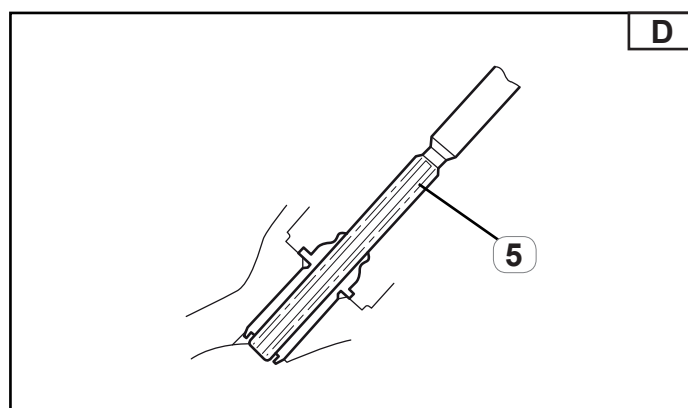
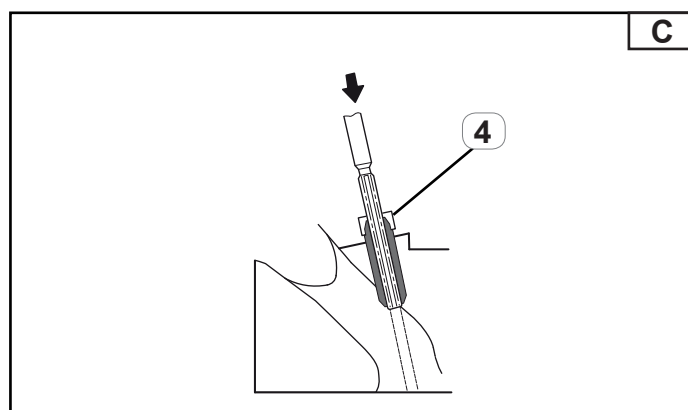
To make valve guide removal and installation operations easier and to maintain correct assembly, heat the head in an oven, taking it to 100° C (212° F).

- Remove the valve guide with a special extractor (3) Fig. B.
- Install the new valve guide with the special installer (4) and extractor (3) Fig. C.
- After inserting the valve guide, bore it with a reamer (5) to create the correct clearance between the valve guide and stem.



NOTE:

After reinserting the valve guide, pass over the seat.



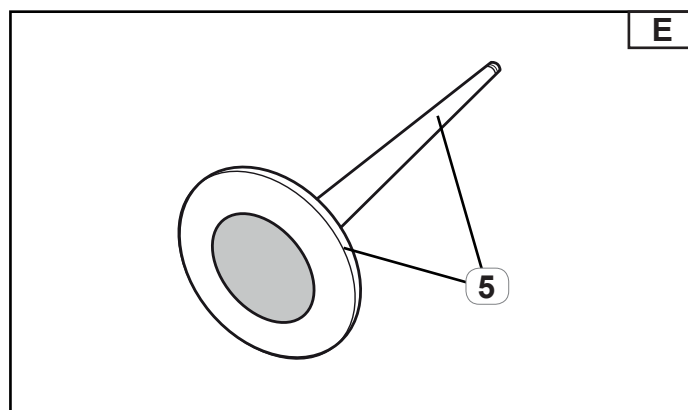


HEAD DISTRIBUTION

CHECK OF VALVES AND GUIDES

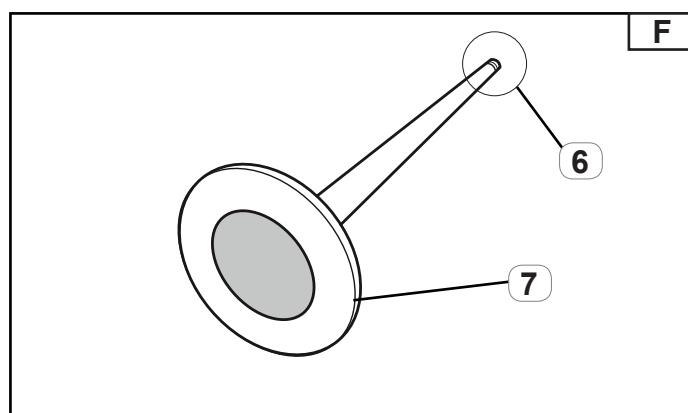
Eliminate:

- The carbon deposits (5) from the contact surface and the valve seat, Fig. E.



Check:

- The contact surface of the valve (7) Fig. F.
If there is any pitting/wear, grind the contact surface of the valve.
- The end of the valve stem (6) Fig. F.
If there is a shape or a diameter of the mushroom that is larger than the body of the valve stem, replace the valve.



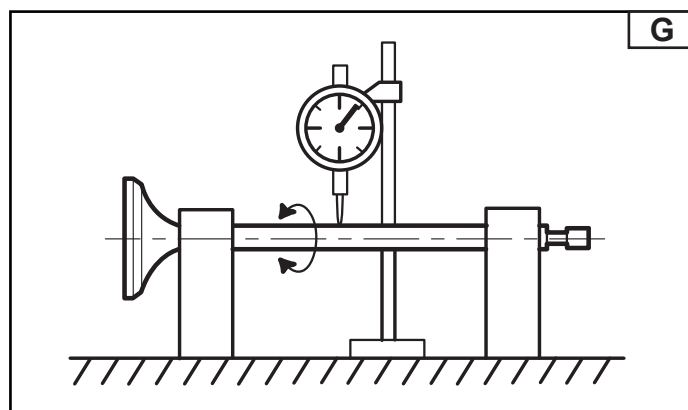
Measure:

- The eccentricity of the valve stem Fig. G.
If outside specifications, replace the valve.

NOTE:

If installing a new valve, always replace the relevant guide
If the valve is removed or reassembled, always replace the oil seal.

Valve	Valve stem eccentricity
Intake	0.01 mm
Exhaust	





HEAD DISTRIBUTION

VALVE SEAT CHECK

The following process is applied to all valves and valve seats
Fig. H.

Eliminate:

- The carbon deposits from the contact surface and the valve seat (A).

Check:

- The valve seat (A).

If there are marks/signs of wear, replace the head.

Measure:

- The width of the valve seat (A).

If outside specifications, replace the head.

Valve	Width of valve seat
Intake	1 ~ 1.1 mm
Exhaust	0.9 ~ 1.1 mm

- Apply some blue colorant (Dykem) for mechanics to the contact surface of the valve (B).
- Install the valve in the head.
- Push the valve into the guide and against its seat to leave a well-defined mark.
- Measure the valve seat width.

NOTE:

Where the valve seat and valve face are in contact with one another, the Prussian blue liquid will have been removed.

Lap:

- The valve contact surface.
- The valve seat Fig. L.

NOTE:

After replacing the head or the valve and the relevant guide, it is necessary to lap the seat and contact surface of the valve.

- Apply a paste for rough lapping of the valve contact surface (C). Fig. I.

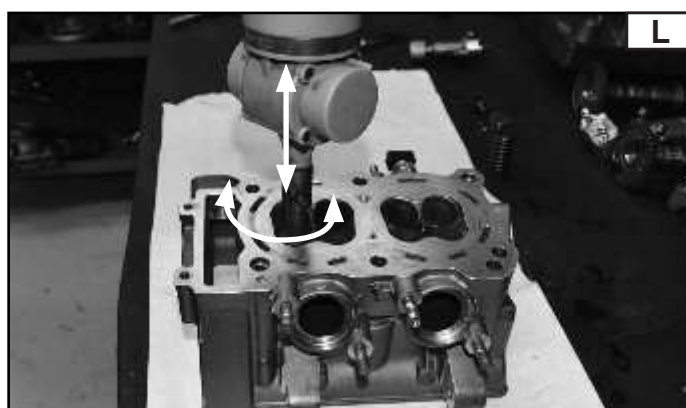
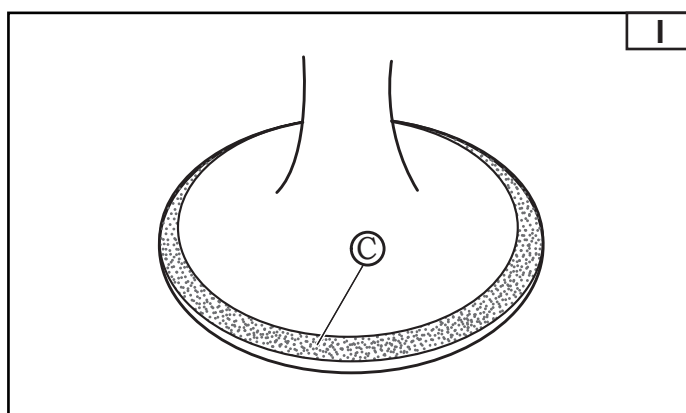
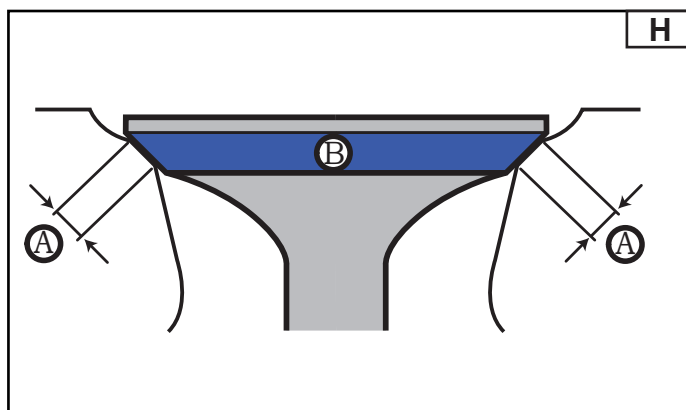
IMPORTANT NOTICE

Do not allow the lapping paste to enter the area between the valve stem and the guide.

- Apply molybdenum disulphide oil to the valve stem.
- Install the valve in the head.
- Turn the valve until the contact surface and the seat have been polished evenly, then remove all the lapping paste.

NOTE:

To get the best results from lapping, gently tap on the valve seat while turning it forwards and back manually Fig. L.





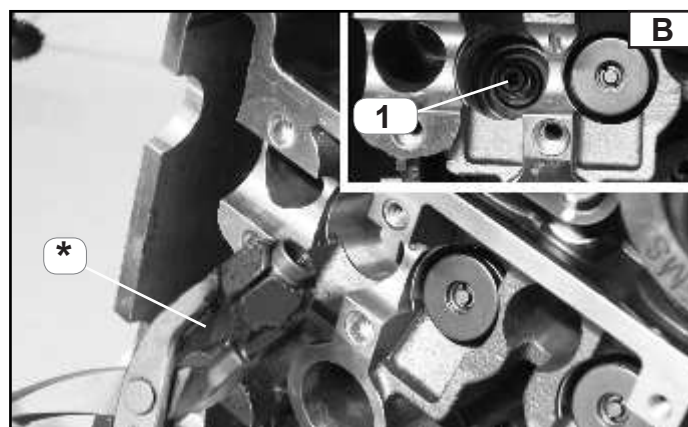
HEAD DISTRIBUTION

VALVE OIL SEAL REMOVAL-INSTALLATION

Remove:

Once the valve has been removed, using the special tool (*) to take out the oil seal (1) Fig. B.

(*) Tool for valve oil seal removal

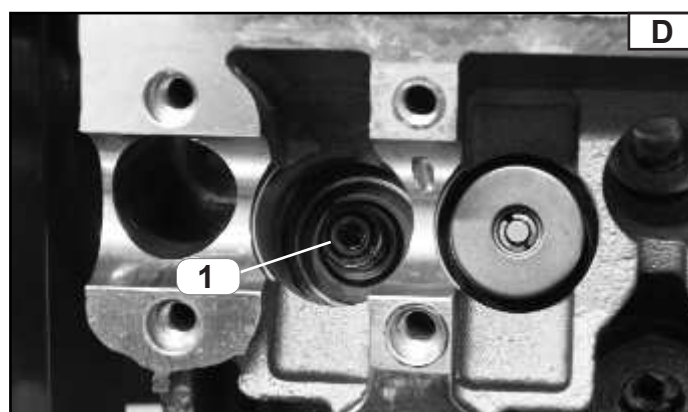
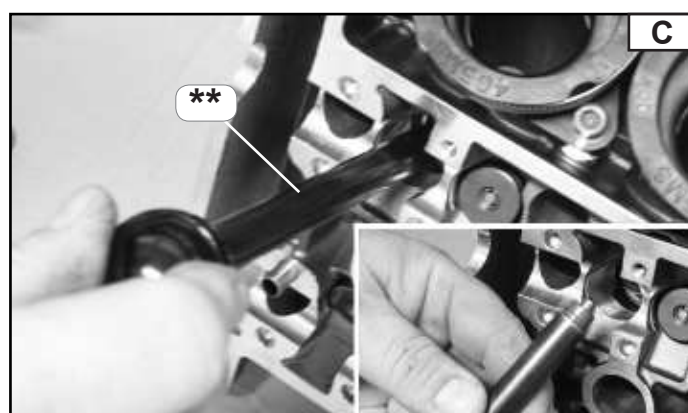


Install:

Proceed to mount the oil seal (1), Fig. D, using the special tool (**), Fig. C.

(**) Oil seal insertion tool

Code: R180197025000





HEAD DISTRIBUTION

VALVE SPRING TEST

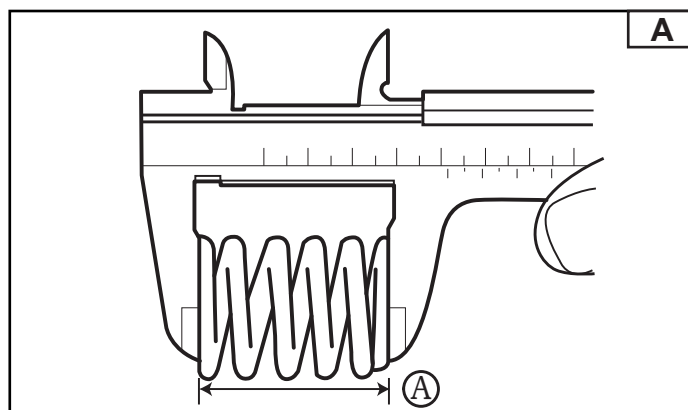
The following process is applied to all valve springs.

Measure:

- The free length of the valve springs (A) Fig. A.

Valve spring	Dimension (A)
Intake	38.8 mm - 36.60 mm
Exhaust	41.6 mm - 40.1 mm

NOTE: _____
If not compliant with specifications, replace the valve spring.



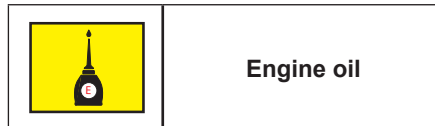


HEAD DISTRIBUTION

VALVE AND VALVE SPRING INSTALLATION

Install into the head:

NOTE: _____
Lubricate the valve stem and oil seal.



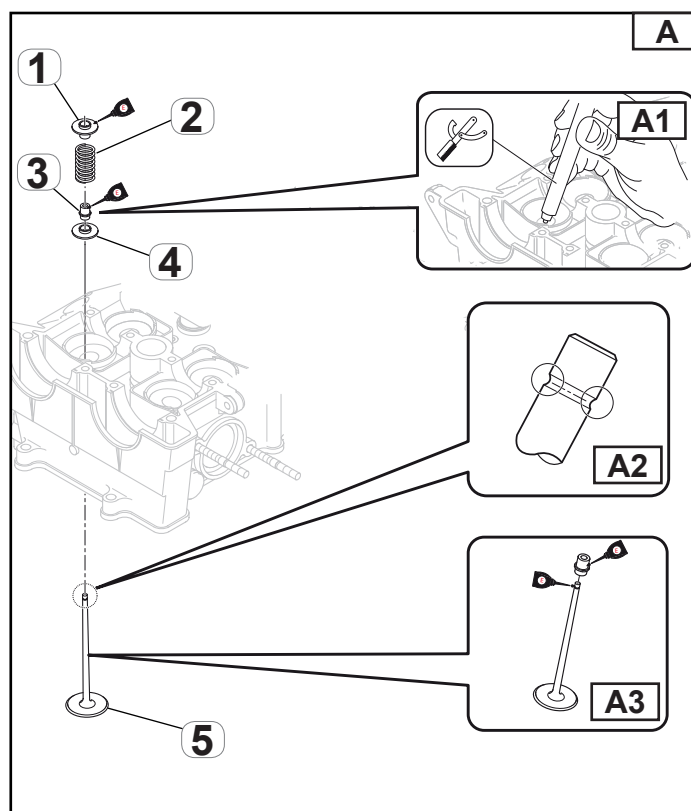
- Valve bottom spring plate (4).
- Valve oil seal (3) Fig. A1, refer to the section "**Valve oil seal removal-installation**".
- The valve (5).
- The valve spring (2).
- The valve top spring plate (1).
- The cotters.

NOTE: _____
Deburr the end of the valve stem with an oiling stone (A2).

NOTE: _____
Make sure that every valve has been remounted in its original position.

NOTE: _____
Reposition the valve cotter pin, pressing the spring on each valve with the special compression tool (*) Fig. B.

(*) Valve spring compressor tool
 Code: 0320097050000





HEAD DISTRIBUTION

VALVE AND VALVE SPRING INSTALLATION

Secure:

- The cotters on the valve stems.
- Gently tap on the valve tip with a soft hammer, Fig. C.

IMPORTANT NOTICE

Hitting the valve tip with too much force could damage the valve.

Install:

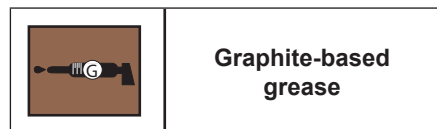
- The calibrated pad (1) Fig. D.
- The tappet valve (2) Fig. D.

NOTE:

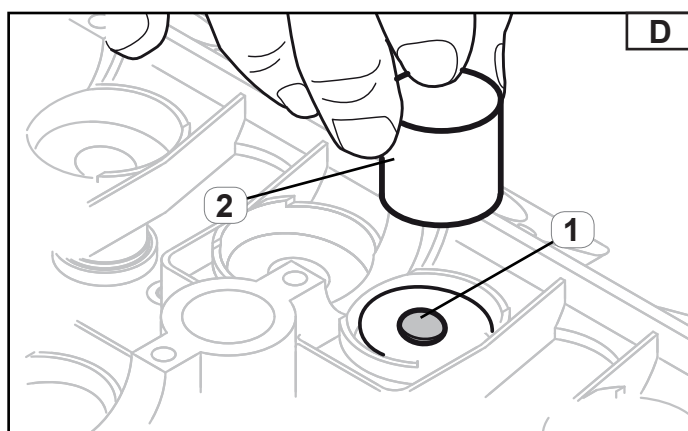
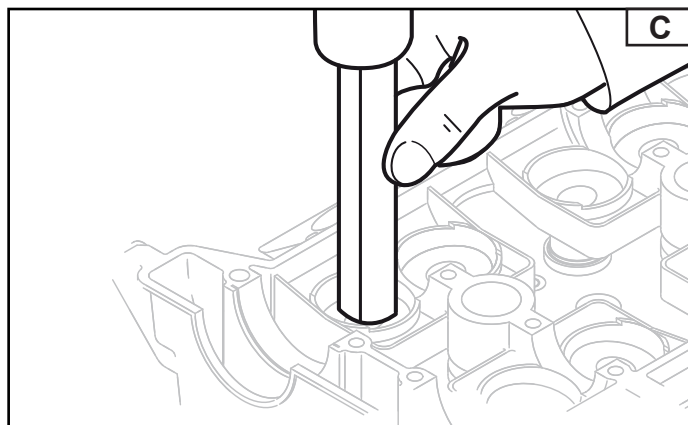
Lubricate the tappet valve with grease **MOLYKOTE** with graphite.

Manually turn the tappet valve, which must be able to slide smoothly.

Reassemble each tappet valve and pad to its original position.



The following process applies to all of the valves and relevant components.





HEAD DISTRIBUTION

CYLINDER CHECK

Remove:

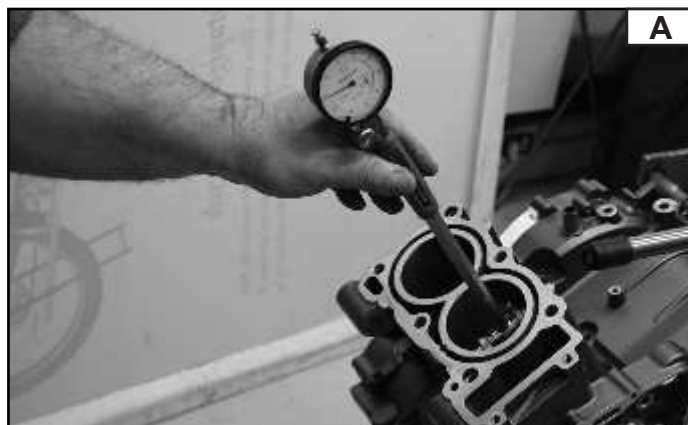
1. Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
2. Distribution cover, refer to the section “**Distribution cover removal**”.
3. Head, refer to the section “**Head removal**”.

The following procedure applies the whole cylinder group.

Check:

- The cylinder walls with a special tool Fig. A.

If there are any vertical lines, replace the cylinder and the piston all together and the relevant rings.



Measure:

- Cylinder stroke Fig. B.

Make different measurements at different distances of 10-43-90 mm from the head coupling surface.

The highest value is considered when calculating wear limits.

CYLINDER bore (C) = 69 (+0.01 , +0.02)

C=Max D1 or D2 $\begin{matrix} -0.002 \\ -0.003 \text{ mm} \end{matrix}$

Limit taper:

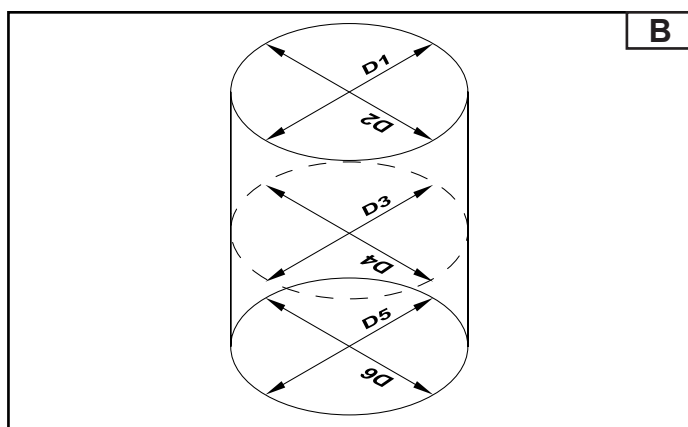
- Max D1= 0.05 mm
- Max D2= 0.05 mm
- Max D3= 0.05 mm
- Max D4= 0.05 mm
- Max D5= 0.05 mm

Limit eccentricity:

- Max D1= 0.05 mm
- Max D2= 0.05 mm
- Max D3= 0.05 mm
- Max D4= 0.05 mm
- Max D5= 0.05 mm

Max difference between the cam and the piston:

- Max= 0.1 mm

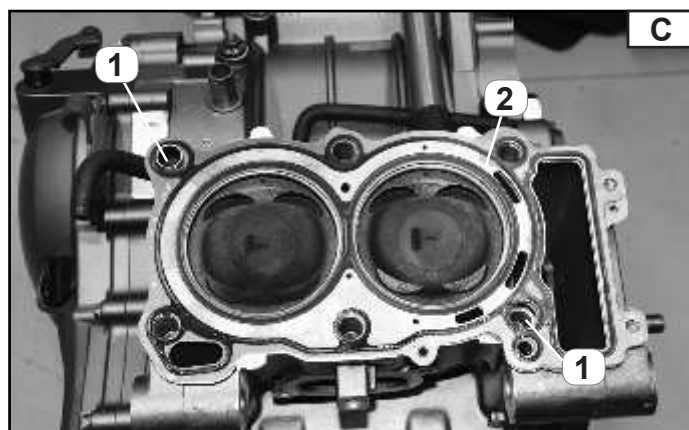




HEAD DISTRIBUTION

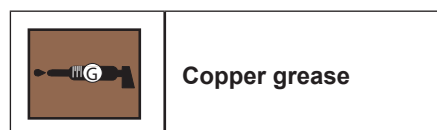
HEAD INSTALLATION

Before assembling the head, replace the seal (2).
Make sure that the alignment dowels (1) are in position Fig. C.



- Position the head and tighten the screws (3), following the sequence stated in Fig. D.
- Then the screws (4).

NOTE:
During assembly of the head, lubricate the head screws with copper grease.



Tighten:

- The screws (8) Fig. D to torque in three steps:



Step one:

Torque 12.5 N*m

Step two:

Torque 25 N*m

Step three:

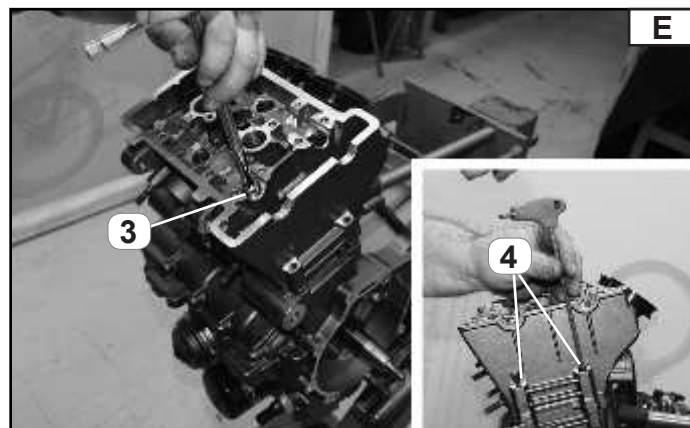
Torque 55 N*m

Tighten:

- The screws (4) Fig. E to torque.



Torque 12 N*m

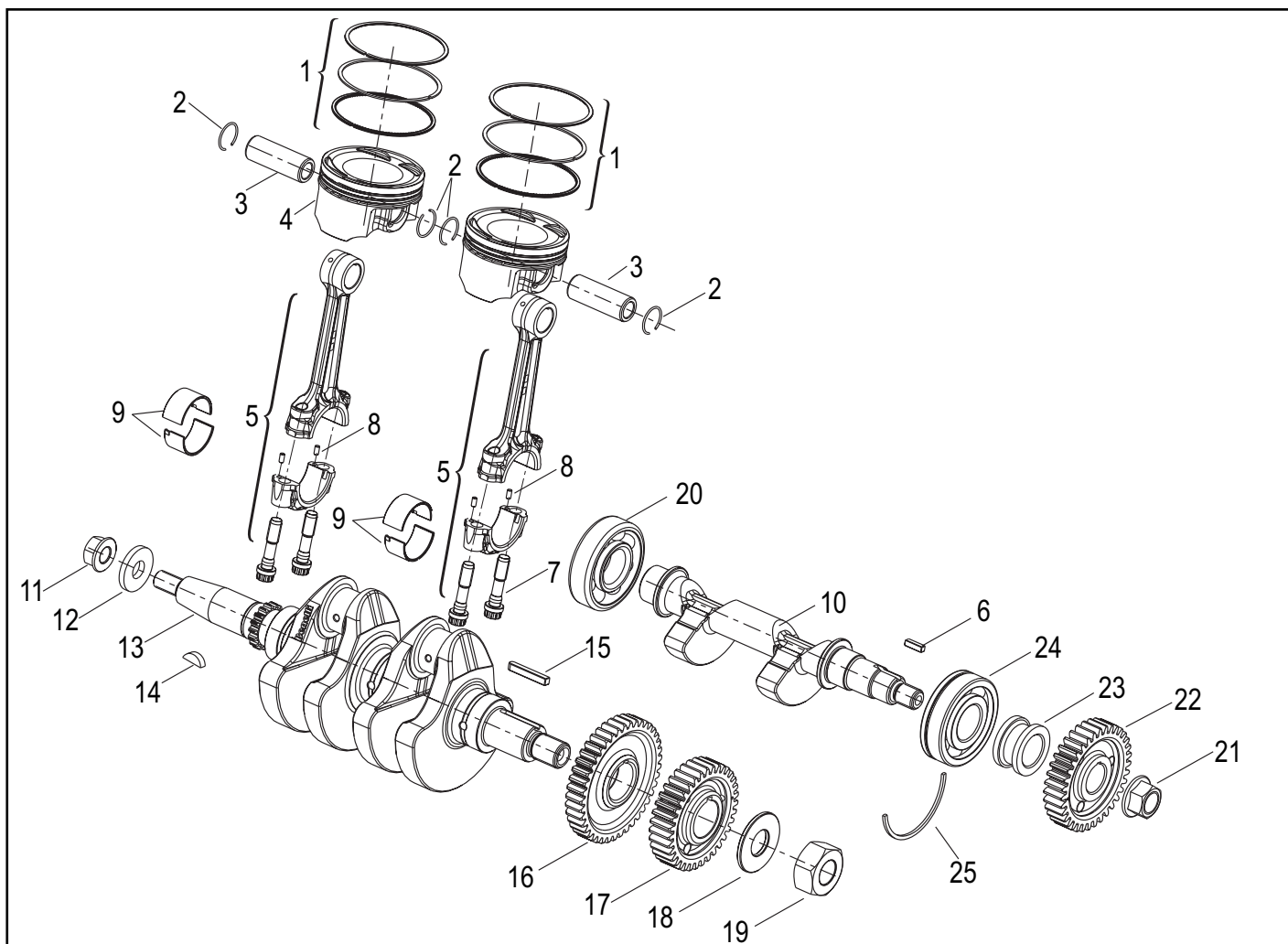


To assemble the head, tighten the fastening screws (3) Fig. E, after the screws (4).

NOTE:
During assembly of the head, lubricate the head screws with copper grease.



PISTONS



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	PISTON SEGMENT SERIES					
2	PIN RETAINING RING					
3	PISTON PIN					
4	PISTON					
5	CONNECTING ROD					
6	PLUG					
7	SCREW					
8	GUIDE BUSHING					
9	CONNECTING ROD HALF BEARING					
10	COUNTERSHAFT					
11	NUT					
12	WASHER					
13	FULL DRIVE SHAFT					
14	SPLINE					
15	PLUG					
16	GEAR					
17	DRIVE SHAFT GEAR					



PISTONS

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
18	WASHER					
19	NUT					
20	BEARING					
21	NUT					
22	COUNTERSHAFT GEAR					
23	GUIDE BUSHING					
24	BEARING					
25	BEARING RETAINER					



PISTONS

PISTON REMOVAL

The following removal process applies to all pistons.

Remove:

1. Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
2. Distribution cover, refer to the section “**Distribution cover removal**”.
3. Head, refer to the section “**Head removal**”.
4. Top base, refer to the section “**Connecting rod removal**”.

Remove:

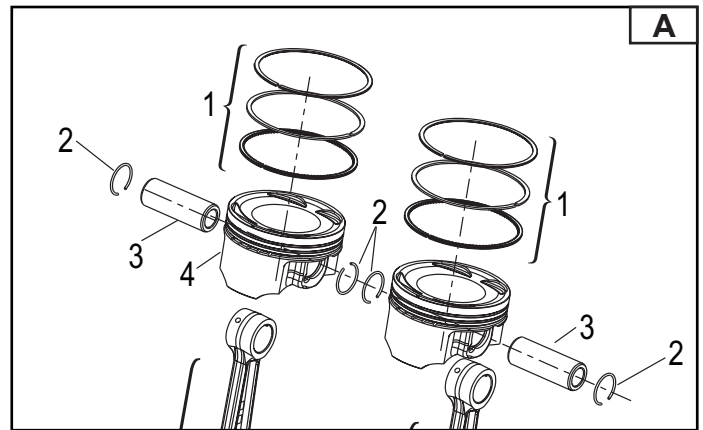
- The outer piston ring (2) Fig. A.
- The piston pin (3) Fig. A.
- The piston (4) Fig. A.
- The inner piston ring (2) Fig. A.

NOTE:

To remove the piston pin, use a “pad*” Fig. B.

NOTE:

Never use hammers to remove the pins.





PISTONS

PIN CHECK:

The following procedure applies to all piston pins.

Check:

- The piston pin.

If there is blue discolouration or grooves, replace the piston pin and check the lubrication system.

Measure:

- The outer diameter of the piston pin Fig. B.

If not compliant with specifications, replace the pin using the measuring tool (A).

Measure:

- The inner diameter of the piston pin bore Fig. C.

If outside specifications, replace the piston.



Internal bore (1)	Size
Pin bore	Ø17 mm +0.0/+0.006



PISTONS

PISTON RING CONTROL

The following procedure is applied to all piston rings (1).

Check:

- The absence of lines and traces of forcing on each ring Fig. A.

If outside specification, replace the relevant rings and pistons.

NOTE:

Before measuring side clearance between the piston rings, remove any carbon deposits from the piston rings and grooves.

Measure:

- The side clearance between piston rings, using a thickness gauge Fig. B.

If outside specifications, replace the piston and the relevant rings all together.

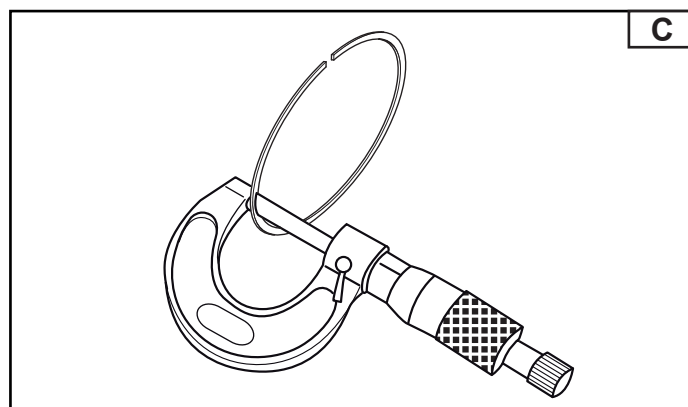
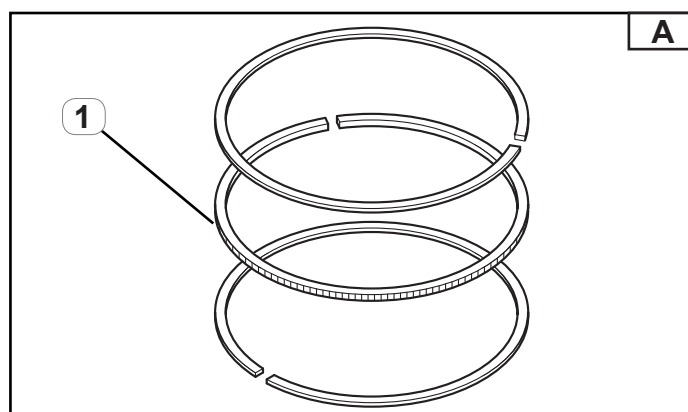
Ring	Piston ring side clearance.
Top ring	0.04±0.08 mm
Second ring	0.05±0.09 mm

Measure:

- The thickness of the top ring.
- The thickness of the second ring.

See Fig. C.

Ring	Piston ring thickness
Top ring	0.8 -0.01/-0.03 mm
Second ring	0.8 -0.02/-0.04 mm





PISTONS

PISTON CHECK

The following procedure applies to both pistons.

Check:

- The walls of the piston (1) Fig. D.
- If there are any vertical lines, replace the piston all together with the relevant rings.

Measure:

- The diameter of the piston skirt (2) with a micrometre, considering a distance from the bottom edge of around 10.5 mm Fig. E.

CLASS	Piston skirt
A	$\varnothing 69(-0.025/ -0.03)$
B	$\varnothing 69(-0.02/ -0.025)$

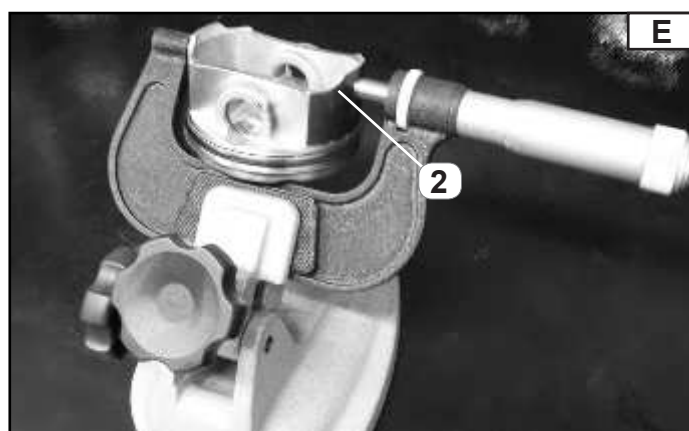
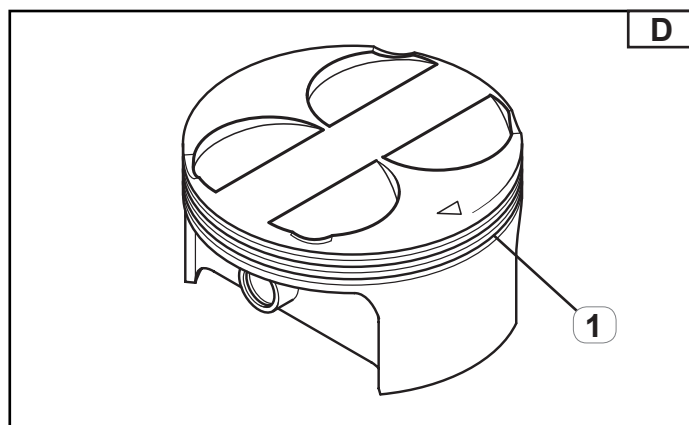
If outside specifications, replace the cylinder and the relevant rings all together.

If outside specifications:

Wrong tolerance (excessive) between the piston and the cam, limit max 0.1 mm.

IMPORTANT NOTICE

The piston is marked by a letter stating its class. The cylinder-piston coupling must be made between the same classes.





PISTONS

PISTON ASSEMBLY

The following procedure applies to all pistons.

Install:

in the following order:

1. Oil scraper clip
2. Second ring.
3. Top ring.

See Fig. A.

NOTE:

The first and second ring are marked with the letter D on the top side and PVD Fig. A.

Remember to install the piston rings so that the letters are facing upwards.

Lubricate the rings with engine oil during the insertion stage.

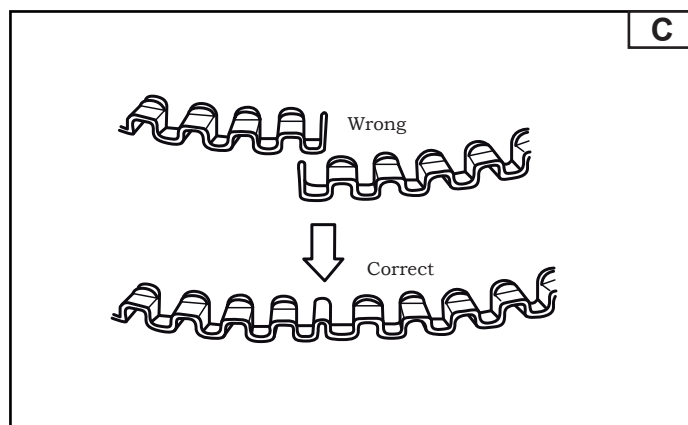
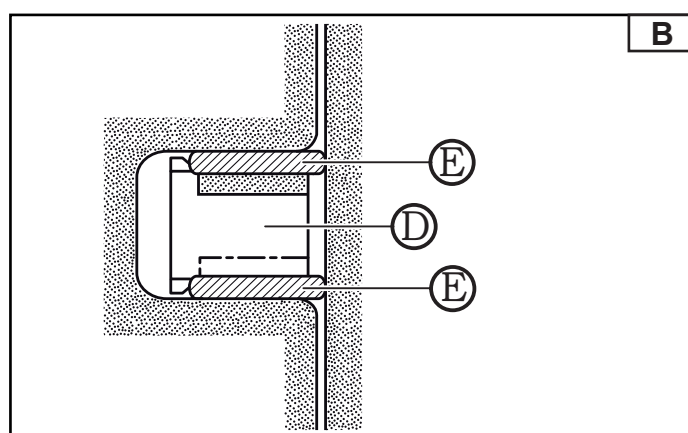
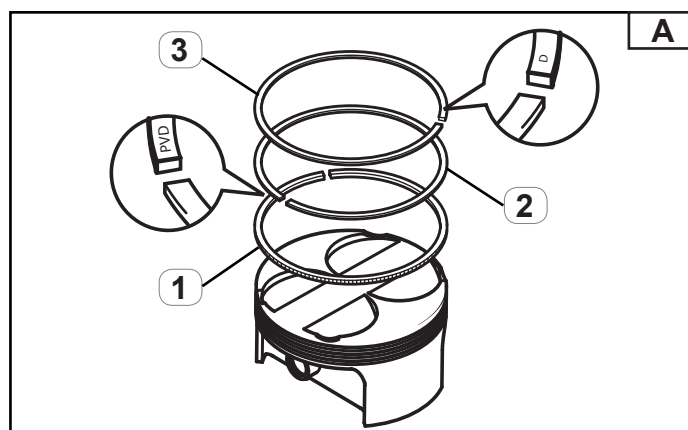
The first element to insert in the oil scraper slot is the shim (D). After positioning the shim, insert its side rings (E) Fig. B.

NOTE:

The shim and side rings have no top or bottom side, meaning they can be inserted in any way.

IMPORTANT NOTICE

When installing the shim (D), make sure that its ends do not overlap the slot Fig. C.





PISTONS

PISTON INSTALLATION

NOTE:

To assemble the pistons (1), first insert the inner rings (2), then the pins (4) and finally the outer rings (3) Fig. C.

To insert the pistons into the cylinders, it is necessary to use a specific piston clamp to hold the rings.

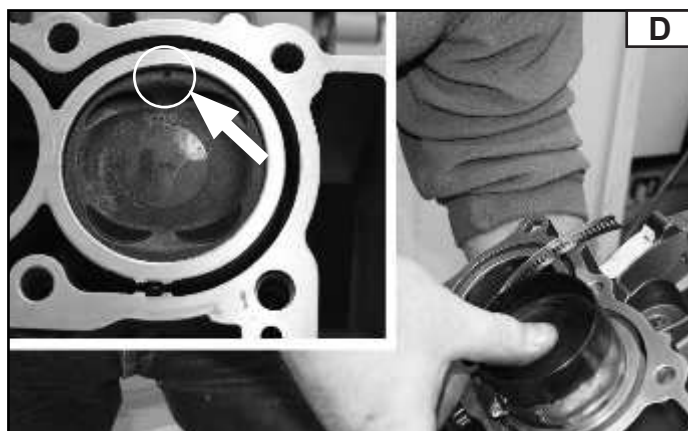
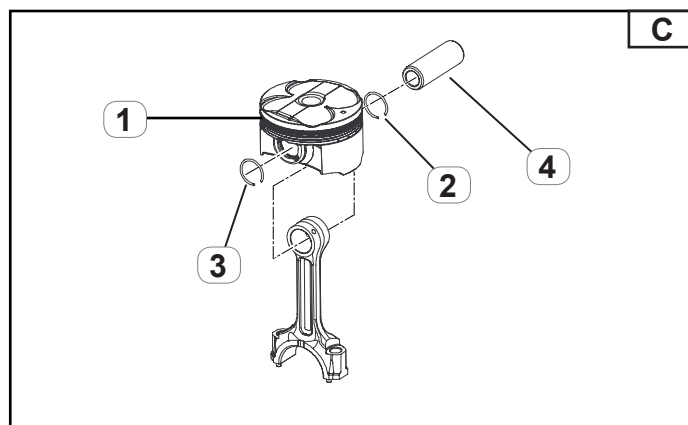
General piston clamp.

NOTE:

During this stage, lubricate parts with engine oil

IMPORTANT NOTICE

The pistons must be inserted in the sequence in which they were removed. Do not change the assembly order and above all, make sure that the mark on the piston Fig. D is facing the intake side.



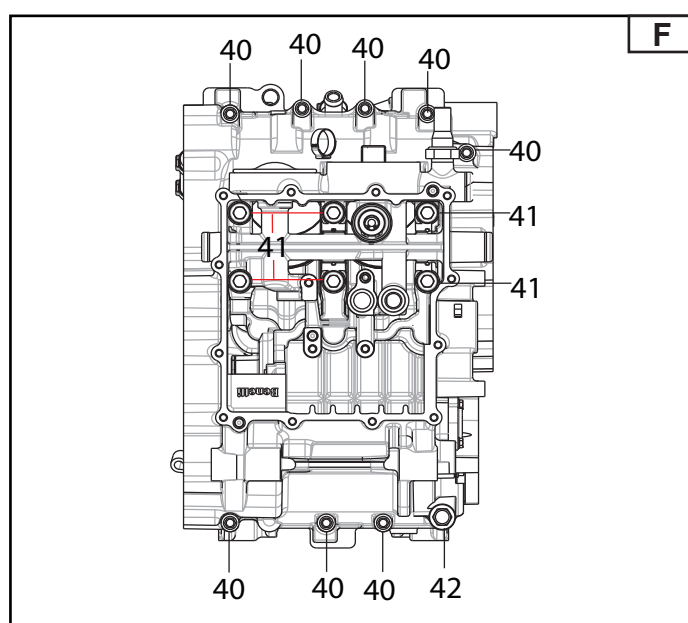
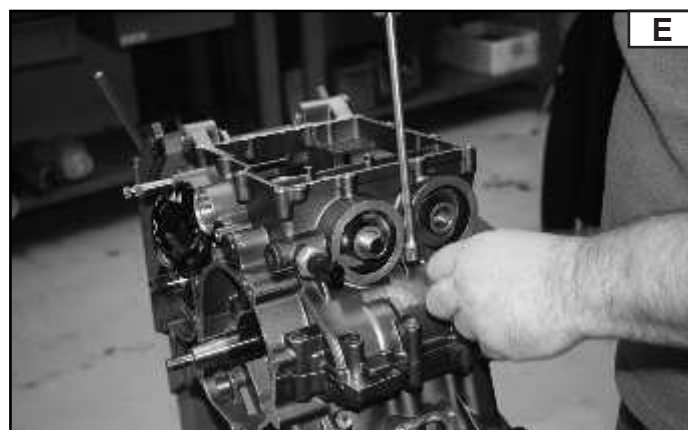


CRANKCASE

REMOVAL OF CONNECTING RODS

Remove:

1. Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
2. Distribution cover, refer to the section “**Distribution cover removal**”.
3. Chain tensioner, refer to the section “**Chain tensioner removal**”.
4. Exhaust camshaft, refer to the section “**Exhaust camshaft removal**”.
5. Intake camshaft, refer to the section “**Intake camshaft removal**”.
6. Head, refer to the section “**Head removal**”.
7. Flywheel, refer to the section “**Flywheel removal**”.
8. Mobile chain slides, refer to the section “**Mobile chain slides removal**”.
9. Clutch, refer to the section “**Clutch removal**”.
10. Oil sump, refer to the section “**Oil sump removal**”.
11. Oil pump, refer to the section “**Oil pump removal**”.

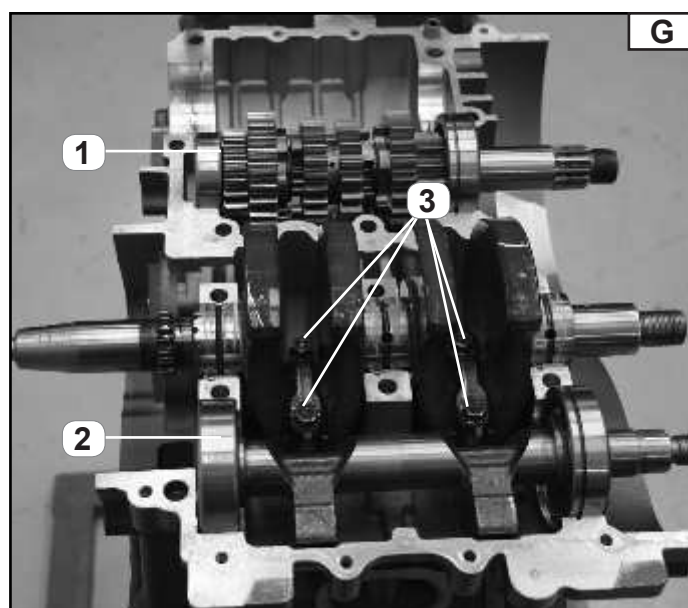


Remove:

- The base screws Fig. F.
- Raise the top base.

Remove:

- The gearbox output shaft (1) Fig. G.
- The gearbox intake shaft.
- The counter shaft (2) Fig. G.
- The connecting rod screws (3) Fig. G.





CRANKCASE

REMOVAL OF CONNECTING RODS

Remove:

- Take out the drive shaft, and slide out the connecting rod, including the pistons, from the cylinder group.
- Remove the pistons, refer to the section “**Piston removal**”.





CRANKCASE

CHECK OF CONNECTING RODS AND CONNECTING ROD HALF BEARING

Check:

- For any breakages or excessive clearance on the connecting rod (5) and half bearings of the connecting rod big end (8) Fig. A.

If replacing the connecting rod, check the class of origin marked on the big end.

Measure:

- Furthermore, it is necessary to measure the internal dimension of the connecting rod big end to check for any anomalies using the special gauge Fig. B. Before measuring, assemble the big end, tightening the fastening screws to the following torque:

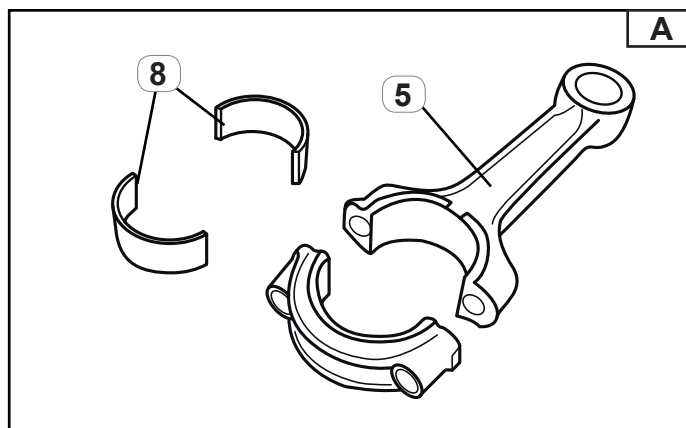


Torque 25 N*m

- It is also necessary to measure the dimensions of the small end and check for any anomalies with the relevant tool, commercially available Fig. B.

Item	Reference size
Connecting rod big end	Ø 33 mm (-0/+0.01)
Connecting rod small end	Ø17 mm -0/+0.01)

Before assembling the bushings (8) of the connecting rod big end, measure them with a specific micrometre, see Fig. C.





CRANKCASE

CONNECTING ROD AND CONNECTING ROD HALF BEARING INSTALLATION

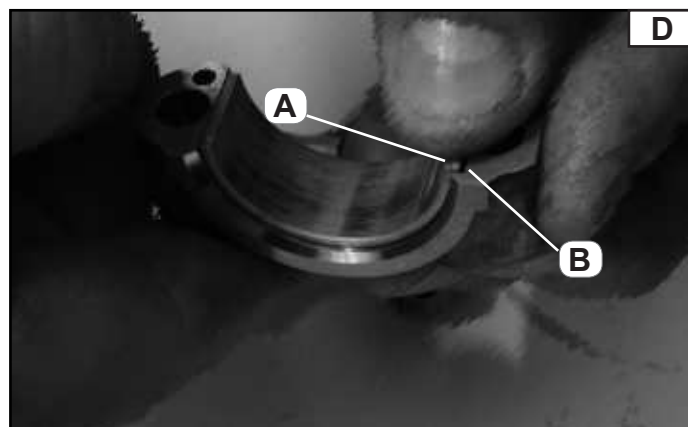
Install:

- The connecting rod half bearings:

Assemble the top and bottom half bearings into the big end in the connecting rod and the bottom bearing in the connecting rod big end of the connecting rod cap.

NOTE:

Align the projections “A” on the half bearings of the big end with the slots “B” in the connecting rod and the relevant cap Fig D.





CRANKCASE

CONNECTING ROD AND CONNECTING ROD HALF BEARING INSTALLATION

NOTE:

Do not mix up the connecting rod bushings and the connecting rods. To achieve the correct clearance between the connecting rod support and the big end half bearing and to prevent engine damage, the big end half bearings must be mounted in their original positions Fig. E.

According to the bushing type, make the envisaged couplings, see table:

CONNECTING ROD HALF BEARING		
STD	COLOUR	THICKNESS
A	Green	1,503~1,506 mm
B	Blue	1,506~1,509 mm
C	Yellow	1,500~1,503 mm
Ø std seat A green		Ø 33 mm (+0.008/0)
Ø std seat B blue		Ø 33 mm (+0.008/+0.016)
Ø std seat C yellow		Ø 33 mm (-0.034/-0.041)

According to the class shown on the side of the connecting rod Fig. F, combine the different types making reference to the table below:

SELECTION TABLE				
			Connecting rod internal Ø	
			1	2
			33,000 - 33,008	33,008 - 33,016
Crank pin external Ø	A	Ø 30 ^{-0.034} / _{-0.041}	A (yellow) ^{+0.003} / ₀	B (green) ^{-0.006} / _{-0.003}
	B	Ø 30 ^{-0.041} / _{-0.048}	B (green) ^{-0.006} / _{-0.003}	C (brown) ^{-0.009} / _{-0.006}

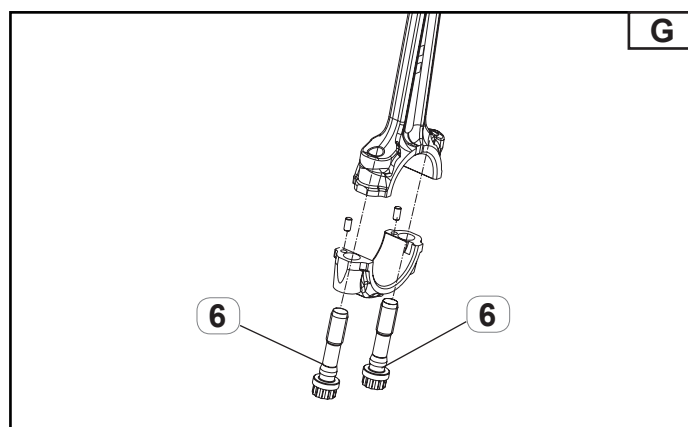
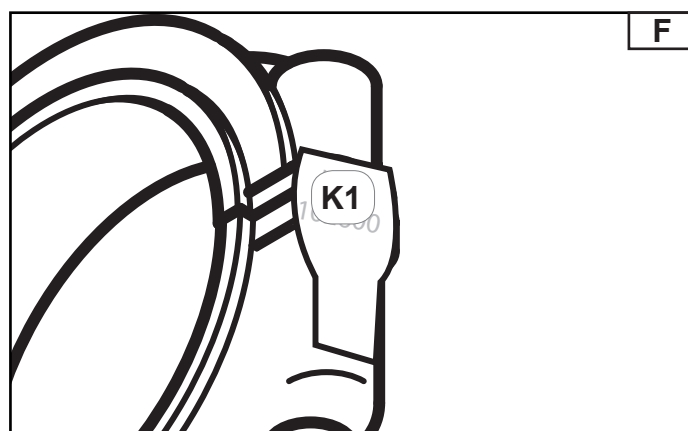
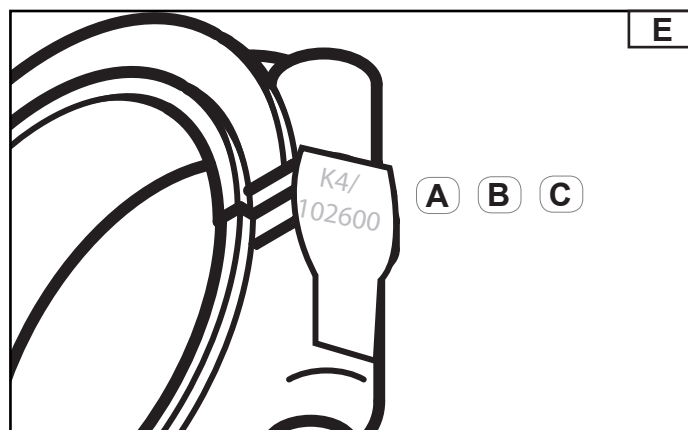
After all of these checks, install the fastening screws (6) Fig. G and tighten to the following torque:



Torque 25 N*m

NOTE:

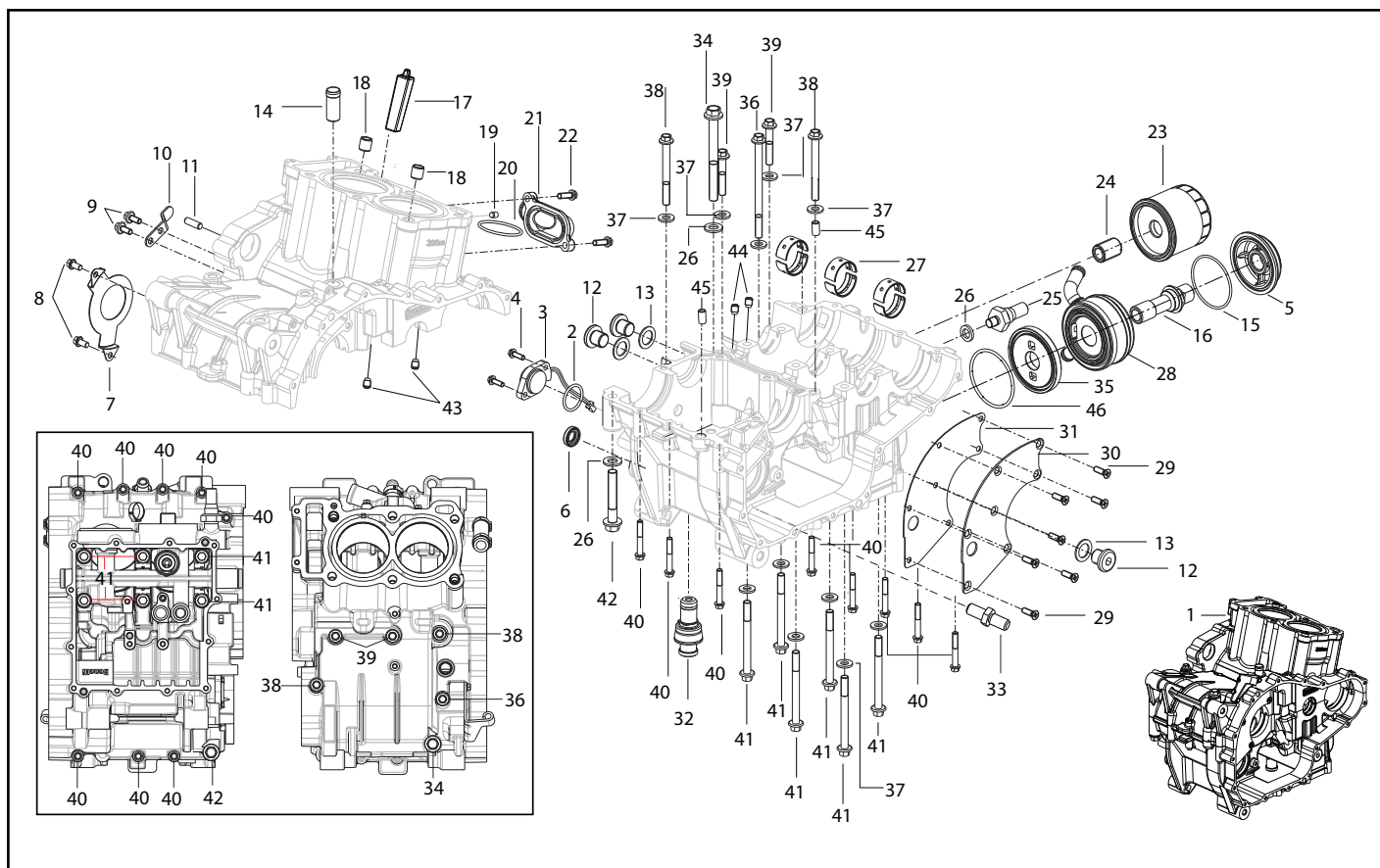
Every time that the big end is assembled, it is necessary to replace the fastening screws.





CRANKCASE

MAIN HALF BEARING AND DRIVE SHAFT INSTALLATION



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	ENGINE CASING					
2	O-RING					
3	NEUTRAL SENSOR					
4	SCREW					
5	CAP					
6	OIL SEAL					
7	PLATE					
8	SCREW					
9	SCREW					
10	PLATE					
11	PLUG					
12	SPECIAL SCREW					
13	RETAINING WASHER					
14	COUPLING					
15	O-RING					
16	SPECIAL SCREW					
17	RUBBER TIP					
18	CENTERING BUSHING					
19	BUSHING					
20	O-RING					
21	WATER FITTING					
22	SCREW					



CRANKCASE

MAIN HALF BEARING AND DRIVE SHAFT INSTALLATION

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
23	OIL FILTER					
24	JOINT					
25	OIL PRESSURE SENSOR					
26	WASHER					
27	BEARING					
27	BEARING					
27	BEARING					
27	BEARING					
28	DISTRIBUTOR					
29	SCREW					
30	FLANGE					
31	SEAL					
32	OIL PRESSURE VALVE					
33	SPECIAL SCREW					
34	SCREW					
35	JOINT					
36	SCREW					
37	WASHER					
38	SCREW					
39	SCREW					
40	SCREW					
41	SCREW					
42	SCREW					
43	GRUB SCREW					
44	INSERT					
45	CENTERING BUSHING					
46	O-RING					



CRANKCASE

MAIN HALF BEARING AND DRIVE SHAFT INSTALLATION

Install:

- Clean the main half bearing (6).
- The main half bearings.
- Install the main half bearings in the relevant seats from the top and bottom base.

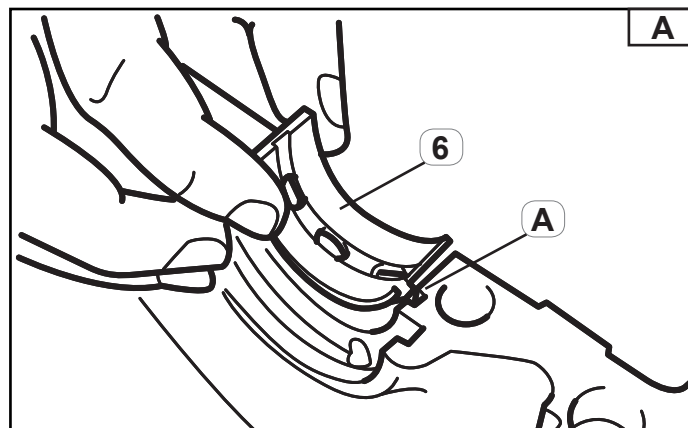
NOTE:

Align the projections of the main half bearings with the slots in the top base Fig. A.

Use copper grease for assembly.



Teflon-based paste or of other lubricants, as graphite, ceramics.



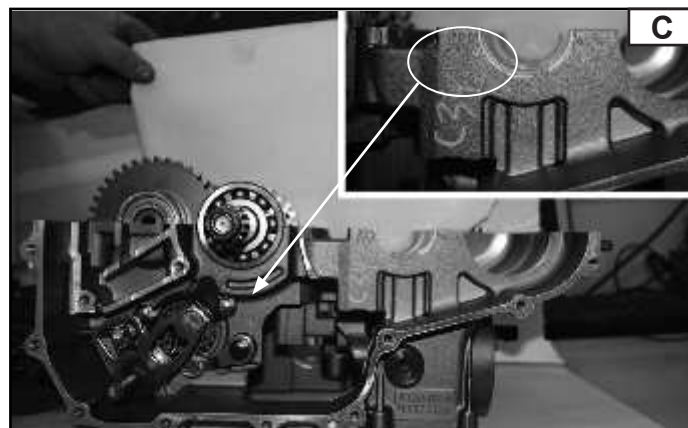
IMPORTANT NOTICE

Do not get the main half bearings mixed up.

To achieve the correct clearance between the connecting rod support and the main half bearings and to prevent engine damage, the half bearings must be reassembled in their original position.

- The main half bearings are in different sizes, marked with different letters and colours, as shown in the table.

MAIN HALF BEARINGS		
STD	COLOUR	THICKNESS
A	Green	1.5(0/0 + 0.003) mm
B	Blue	1.5(0/0 + 0.006) mm
C	Yellow	1.5(0/0 + 0.009) mm
Ø std seat A green		Ø 41(0.007+0.14)
Ø std seat B blue		Ø 41(0+0.007)
Ø std seat C yellow		Ø 41(0.014+0.021)
Ø std seat only		A Ø 41(0/+0.007) B Ø 41(0.007+0.014) C Ø 41(0.014+0.021)



- The main half bearing layout is shown on the bottom casing, as illustrated in Fig. C.

NOTE:

In case of replacement of the drive shaft, it is necessary to replace the main half bearings.



CRANKCASE

DRIVE SHAFT CHECK

Measure:

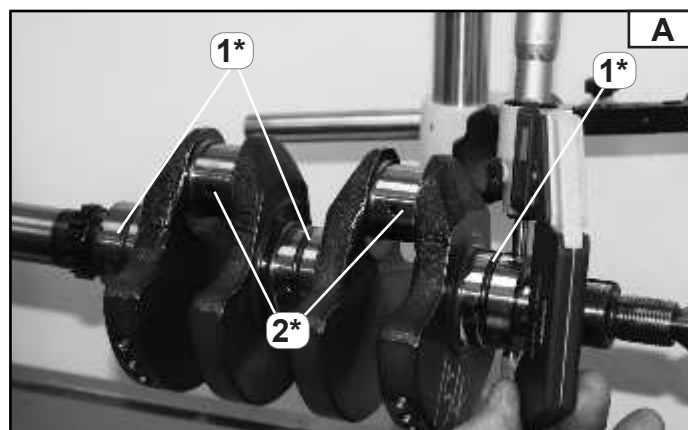
- The eccentricity of the drive shaft.

If outside specifications, replace the drive shaft.

Drive shaft eccentricity	Size
Drive shaft	1*: $\varnothing$ 38 (-0.01, -0.05) mm 2*: $\varnothing$ 30 (-0.028, -0.042) mm

Check:

- The main support surfaces (1*) Fig. A.
 - The connecting rod support surfaces (2*) Fig. A.
- If there is any rust/lines/signs of wear, replace the drive shaft.





CRANKCASE

DRIVE SHAFT INSTALLATION

Once the drive shaft has been inserted, proceed to assemble the big ends Fig. B.

Tighten the nuts to the following torque:



Torque 25 N*m

NOTE:
Lubricate the big end pins with copper grease.

Measure:

Once the big ends have been assembled, use a thickness gauge to measure the drive shaft-big end collar Fig. C.

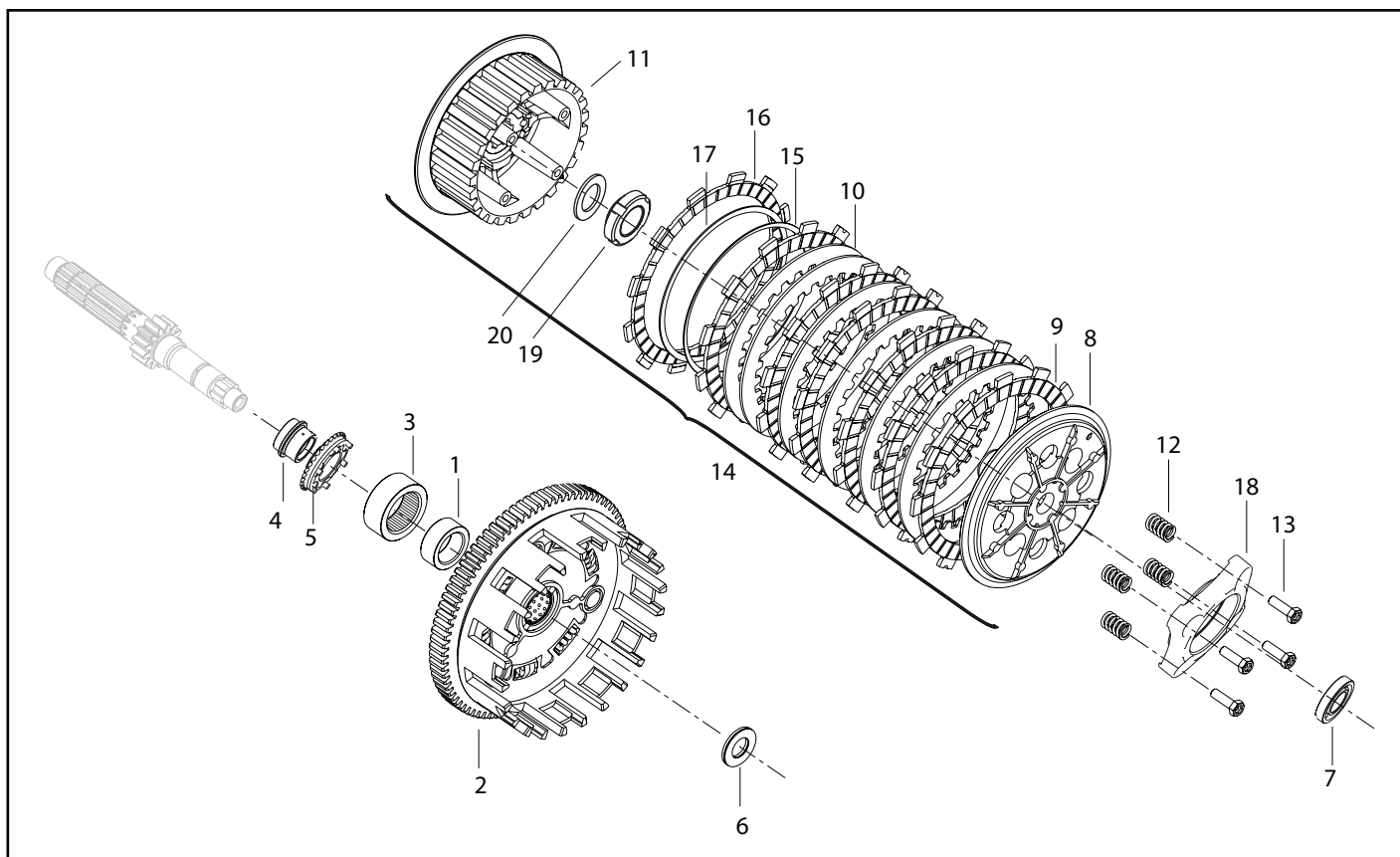
Measuring	Size
Drive shaft - connecting rod big end	0.1~0.25 mm

NOTE:
Measure both big ends.





CLUTCH



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	GUIDE BUSHING					
2	CLUTCH BELL					
3	ROLLER BEARING					
4	SHIM					
5	OIL PUMP PINION					
6	WASHER					
7	BEARING					
8	PRESSURE PLATE					
9	DRIVEN CLUTCH DISC					
10	STEEL CLUTCH DISC					
11	CLUTCH DRUM					
12	CLUTCH SPRING					
13	SCREW					
14	COMPLETE CLUTCH					
15	BELLEVILLE WASHER					
16	DRIVEN CLUTCH DISC 9					
17	SEAL					
18	FLANGE					
19	NOTCHED NUT					
20	WASHER					



CLUTCH

CLUTCH AND DISC REMOVAL

Remove:

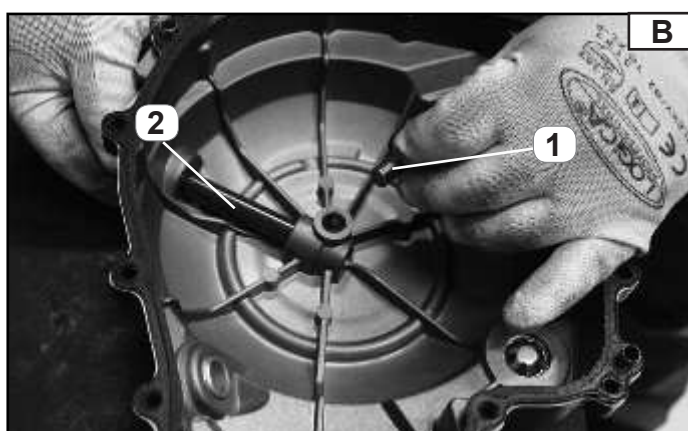
- The clutch cover screws Fig. A.
- Clutch cover.
- The seal.

NOTE:

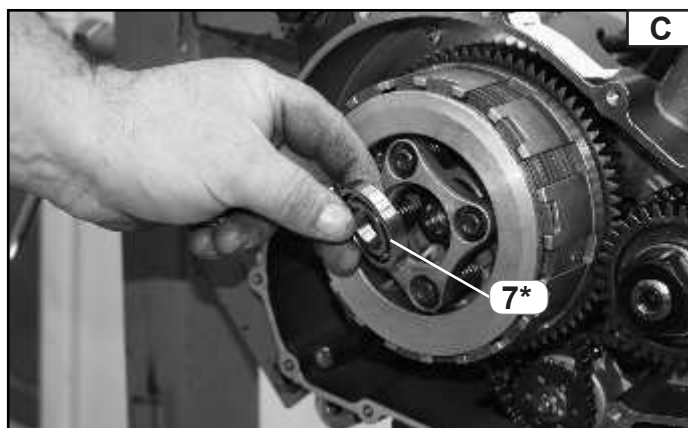
In case of seal anomalies, insert a new one.

Remove:

- The guide bushing (1) Fig. B.
- The clutch control shaft (2) Fig. B.



- Remove the bearing (11*) Fig. C.



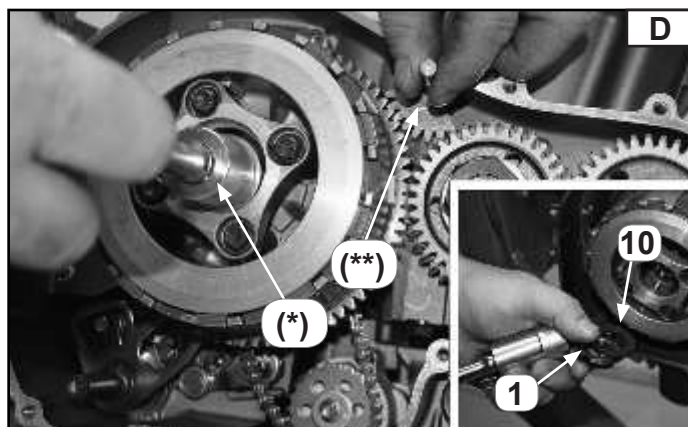
- Remove the fastening nut (1*) and ring (10*) as shown in the figure, Fig. D.



(*)Tool for clutch bell ring nut removal/assembly
Code: 03200097052000



(**)Toothed wrench to lock the clutch bell
Code: 03200097053000





CLUTCH

CLUTCH AND DISC REMOVAL

NOTE:

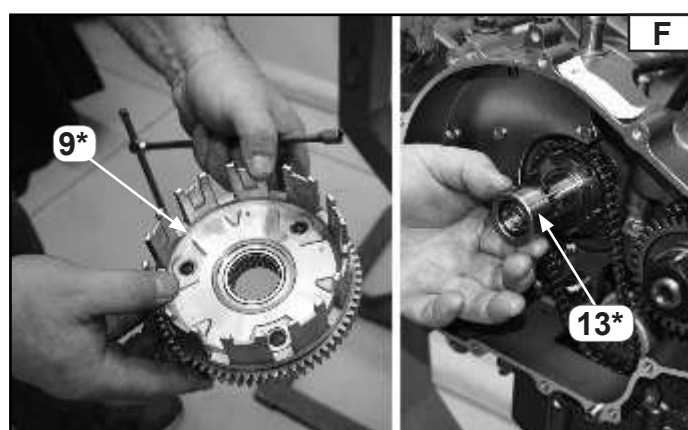
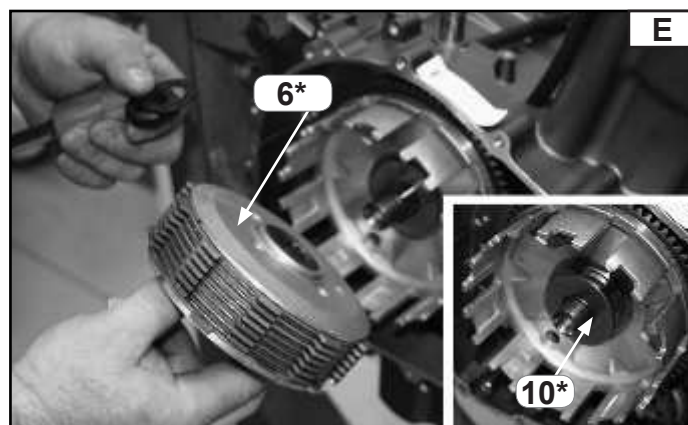
Part numbers marked (*) are part of the spare parts table in Chapter 5 "Clutch".

Remove:

- The disc pack (6*) Fig. E.
- The clutch drum washer (10*) Fig. E.
- The guide shim (13*) Fig. E.

NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 "Clutch".





CLUTCH

FRICTION DISC CHECK

The following procedure applies to all friction discs.

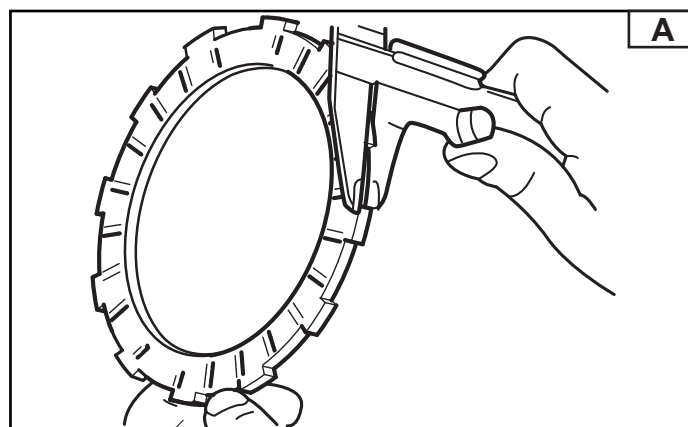
Check:

- The friction disc.
- If there is any damage/wear, replace the friction discs.

Measure:

- The thickness of the friction disc Fig. A.
- If not within specifications, replace the friction discs together.

Disc	Size
Friction disc	Thickness 2.7(± 0.05) mm

**NOTE:**

Measure the friction disc in four points.



CLUTCH

STEEL DISC CHECK

The following procedure applies to all steel discs.

Check:

- The steel disc.

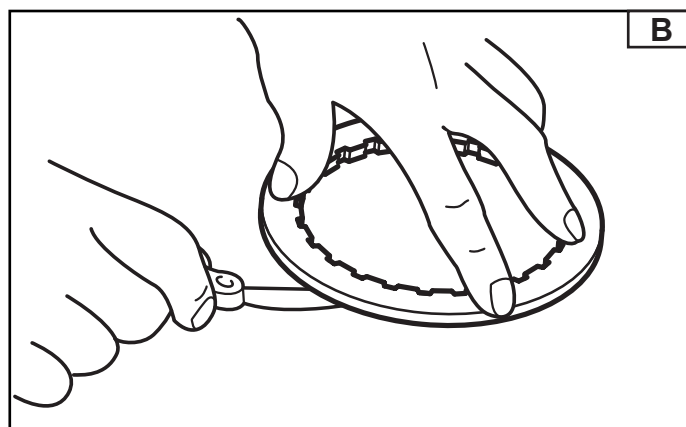
If there is any damage/wear, replace the steel discs all together.

Measure:

- The warping of the steel discs Fig. B.

If not within specifications, replace the steel discs together.

Disc	Warping limit
Steel disc	0.1 (0,-0.05) mm

**NOTE:**

Carry out the check, placing the disc on a reference surface and take the measurements using a thickness gauge.



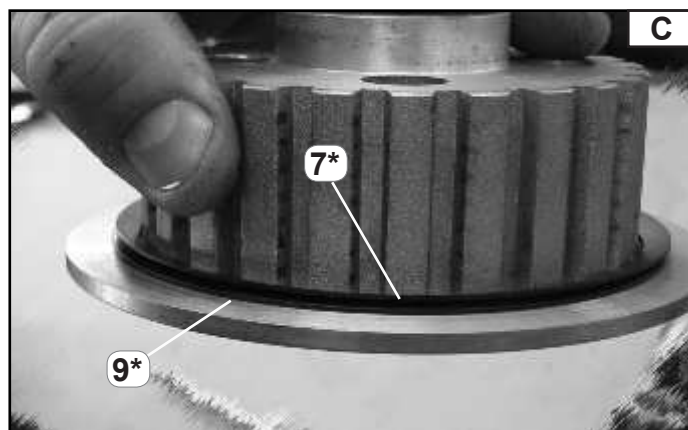
CLUTCH

DISC ASSEMBLY

Assemble the discs in the opposite order to their removal, starting with the ring (8*) and then the Belleville washer (7*) on the clutch drum (9*).

NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 “Clutch”.





CLUTCH

CLUTCH ASSEMBLY

Assemble:

- The oil pump pinion (complete with chain) (1).
- The guide shim (4*).
- The clutch bell (8*).
- The washer (6*).
- The clutch drum complete with discs (8*).
- The disc pusher plate (11*).
- Using a specific tool (**) assemble the fastening ring nut (18) and washer (6) as shown in the figure Fig. D.
- The clutch spring (12*).
- The flange (18*).
- The fastening screws (13*) to the following torque:



Torque 105 N*m



(**)Tool to remove/install the clutch bell ring nut.

Code: 03200097052000



(**)Toothed wrench to lock the clutch bell.

Code: 03200097053000

NOTE:

Use a punch driver to rebate the fastening ring nut Fig. E.

- Insert the bearing (7*).
- Reposition the guide bushing and the clutch control shaft (2) on the cover.
- Insert the seal.
- Place the clutch cover, inserting and tightening the cover fastening screws to the engine casing.



Torque 12 N*m

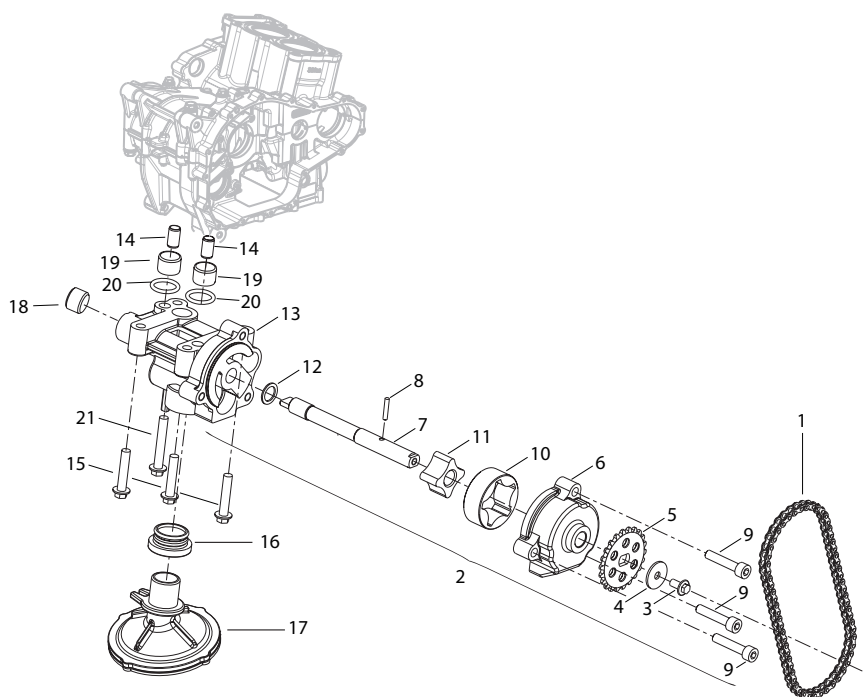
NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 "Clutch".





LUBRICATION SYSTEM



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	OIL PUMP CHAIN					
2	COMPLETE OIL PUMP					
3	SCREW					
4	WASHER					
5	OIL PUMP PINION					
6	OIL PUMP COVER					
7	OIL PUMP SHAFT					
8	ROLLER					
9	SCREW					
10	OUTER ROTOR					
11	INNER ROTOR					
12	WASHER					
13	OIL PUMP BODY					
14	BUSHING					
15	SCREW					
16	INTAKE FILTER FITTING					
17	INTAKE FILTER					
18	THREADED CAP					
19	PLUG					
20	O-RING					
21	SCREW					

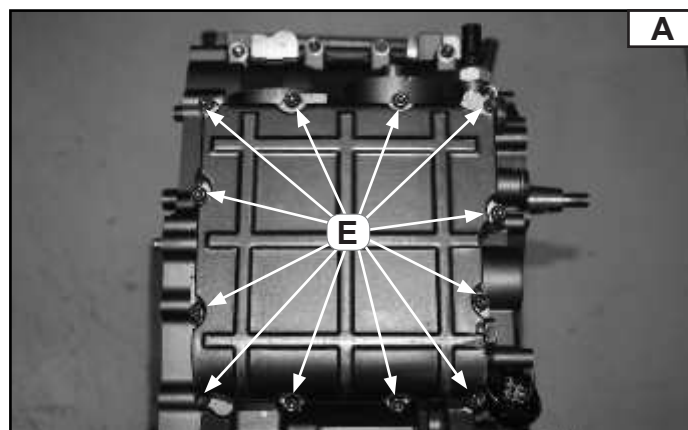


LUBRICATION SYSTEM

OIL SUMP AND INTAKE FILTER REMOVAL

Remove:

1. Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
2. Distribution cover, refer to the section “**Distribution cover removal**”.
3. Chain tensioner, refer to the section “**Chain tensioner removal**”.
4. Exhaust camshaft, refer to the section “**Exhaust camshaft removal**”.
5. Intake camshaft, refer to the section “**Intake camshaft removal**”.
6. Head, refer to the section “**Head removal**”.
7. Flywheel, refer to the section “**Flywheel removal**”.
8. Mobile chain slides, refer to the section “**Mobile chain slides removal**”.
9. Clutch, refer to the section “**Clutch removal**”.



NOTE:

Before removing the oil sump, first drain out any oil in the engine, removing the magnetic cap.

Remove:

- The oil sump fastening screws (E) Fig. A.

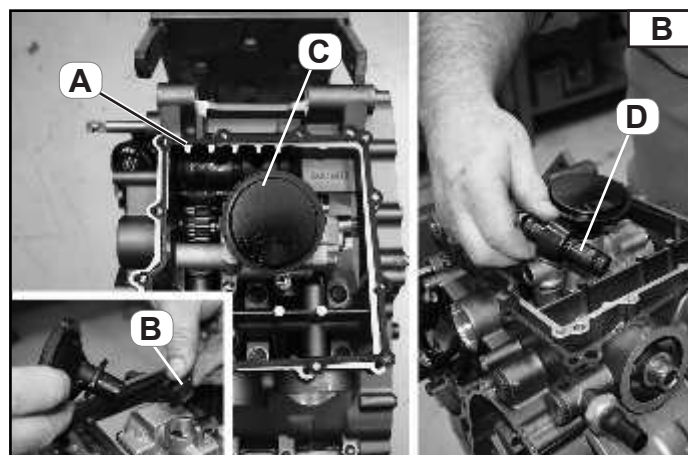
Check:

- The oil sump.

If there is any damage, replace.

Remove:

- The seal (A) Fig. B.
- The intake filter fitting (B.) Fig. B.
- The intake filter (C.) Fig. B.
- The pressure relief valve (D) Fig. B.



NOTE:

If there is any damage to the above parts, replace.

NOTE:

If there is any sediment or residue, clean the filtering area carefully with solvent.



LUBRICATION SYSTEM

OIL SUMP AND INTAKE FILTER INSTALLATION

Install:

Proceed using the opposite order to removal.

Tighten:

- The screws (2) Fig. C to the following torque:



Torque 10 N*m

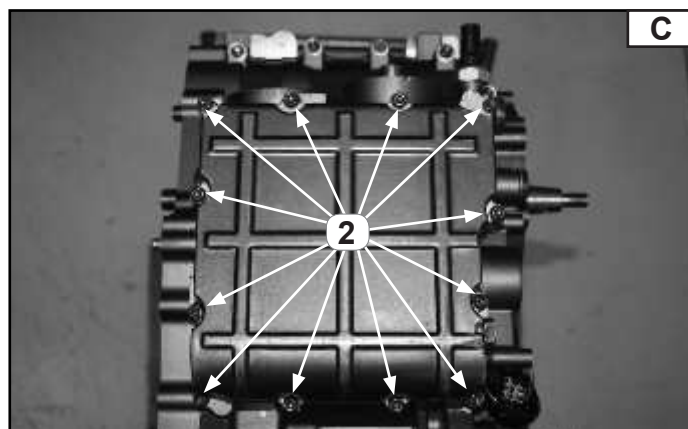
- The magnetic cap, complete with copper washer, to the following torque:



Torque 25 N*m

NOTE: _____

Add engine oil once these steps have been completed.





LUBRICATION SYSTEM

PRESSURE-RELIEF VALVE INSTALLATION

Remove:

- Oil sump, refer to the section “Oil sump and intake filter removal”.

Check:

Before installing the valve, make sure all the parts are free from anomalies Fig. A.

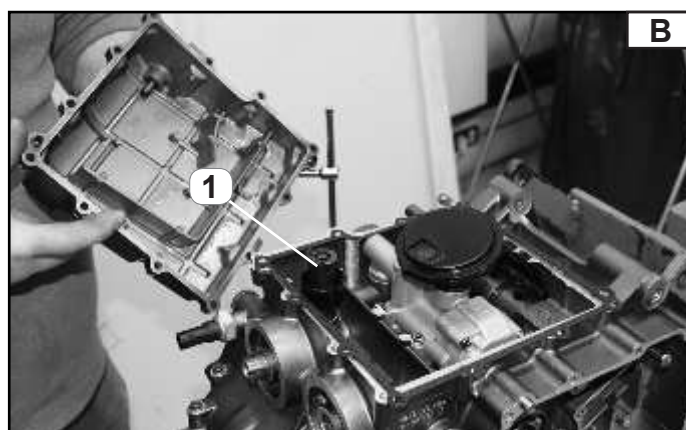
If there is any damage or wear, replace.

Install:

The pressure relief valve (1) with O-ring inside the bottom casing, by slotting it in Fig. B.

NOTE:

Lubricate the pressure relief valve during insertion.



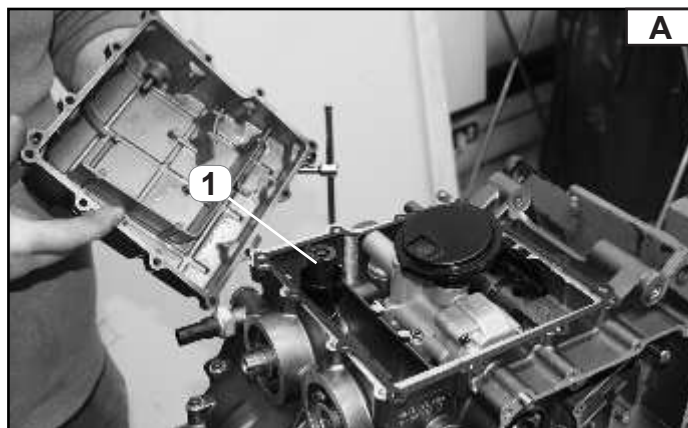


LUBRICATION SYSTEM

PRESSURE RELIEF VALVE REMOVAL

Remove:

- Oil sump, refer to the section “**Oil sump and intake filter removal**”.
- The pressure relief valve (1).



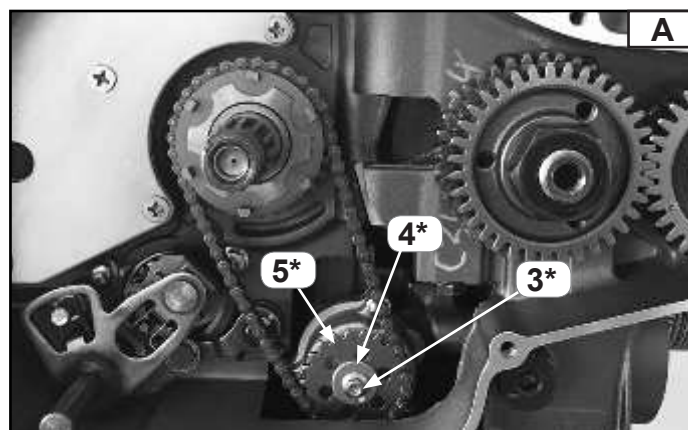


LUBRICATION SYSTEM

OIL PUMP REMOVAL

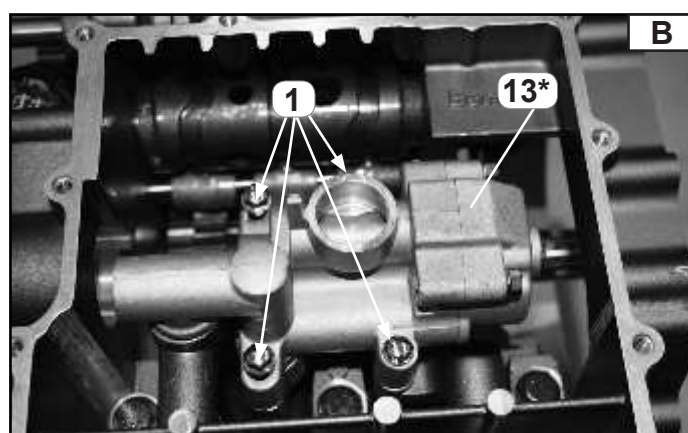
Remove:

1. Clutch, refer to the section “**Clutch removal**”.
 - Use a wrench to block the pump control gear (5*) .
 - Unscrew the screw (3*) .
 - Take out the washer (4*) Fig. A.
 - Take out the pump pinion (5*) .
2. Oil sump, refer to the section “**Oil sump and intake filter removal**”.



Remove:

- The screws (1) Fig. B.
- Slide out the pump body (13*) Fig. B.

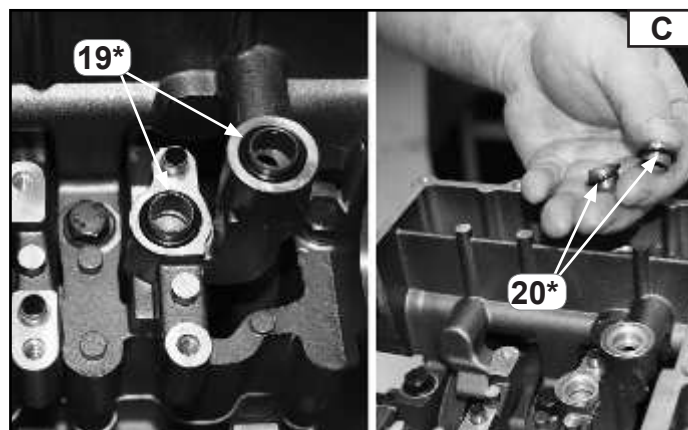


Check:

- The integrity of the two pins (19*).
- The two O-rings (20*) Fig. C.

NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 “**Lubrication circuit**”.





LUBRICATION SYSTEM

OIL PUMP REMOVAL

Remove:

- The screws (9*).
- The pump cover (6*).
- Outer rotor (10*).
- Inner rotor (11*).
- Roller (8*).
- Oil pump shaft (7*).

Check:

- The pump body (13*) Fig. D.
- If there are any lines/damage/wear, replace.

- The pump pinion (5*).

If there is any damage or wear to the gears, replace.

Measure:

- The tolerance between the inner rotor (11*) and the outer rotor (10*) "C". Fig. E and Fig. C. (A).
- The tolerance between the outer rotor (11*) and the oil pump housing (6*) "E". Fig. E and Fig. C (B).
- The flatness of both rotors compare to the oil pump housing (6*) "C". Fig. C.

Clearance	Tolerance
between the inner rotor and the outer rotor "A".	0.15 mm
between the outer rotor and the oil pump housing "B".	+0.06, +0.09 mm

Check:

- The oil pump operation.

Turn the pump pinion (5*) as shown in Fig. F.

If the movement is not smooth, check the inner/outer rotor seat.

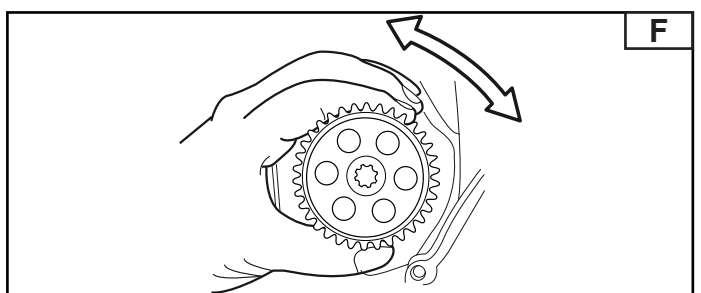
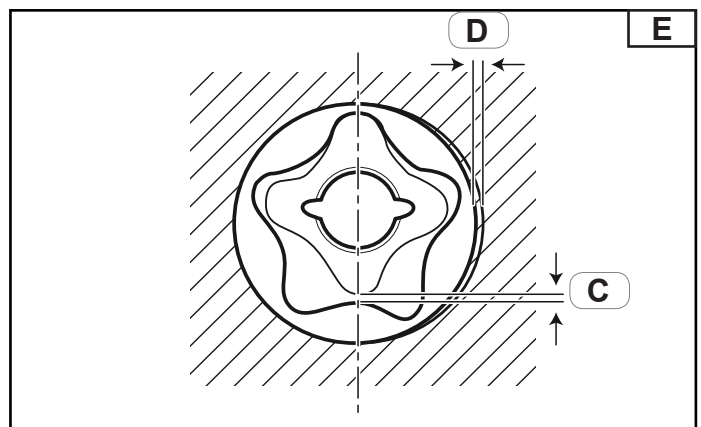
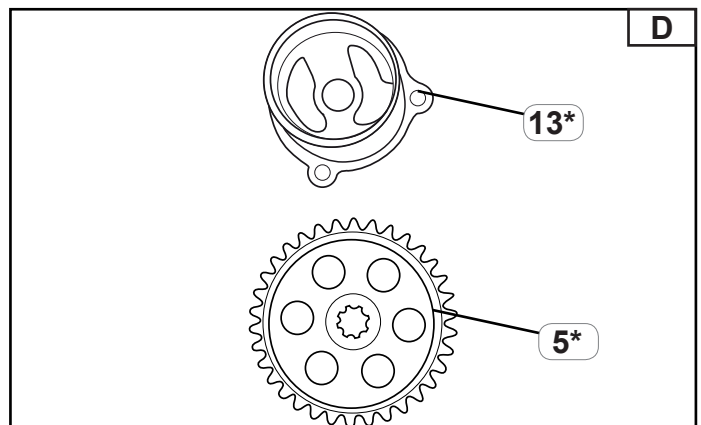
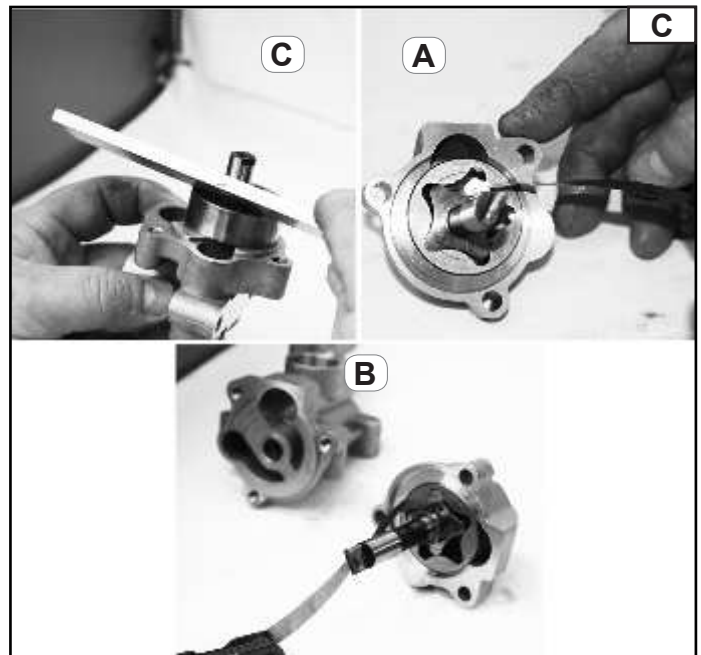
If there are any lines/damage, replace the faulty part/s.

NOTE:

This check is carried out after securing the oil pump in the engine body and inserting the pump pinion (5*) in its seat.

NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 "Lubrication circuit".





LUBRICATION SYSTEM

OIL PUMP ASSEMBLY

Install:

Proceed using the opposite order to removal.

Tighten the assembly screws (1) Fig. A to the following torque:



Torque 12 N*m

Tighten the assembly screws (3*) with the pump pinion (5*) Fig. B to the following torque:



Torque 7 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD LOCK-
ER**

NOTE: _____

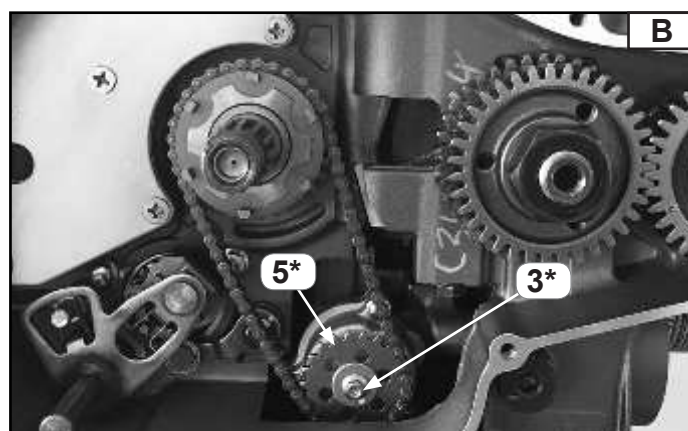
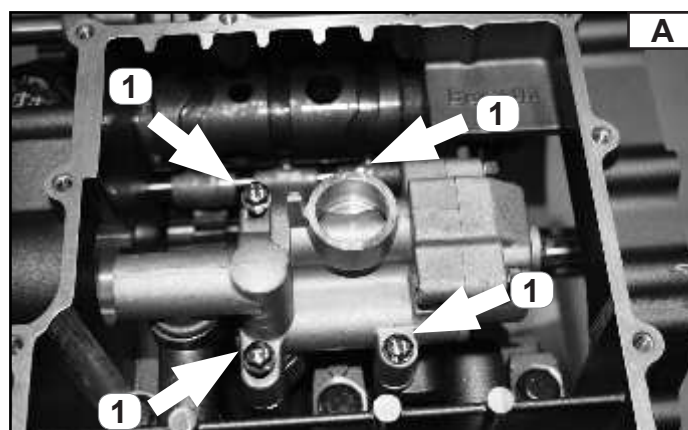
For tightening the pump pinion (5*), use an apposite wrench.

NOTE: _____

Add engine oil once the steps have been completed.

NOTE: _____

Numbers marked (*) are part of the spare parts table in Chapter 5 "Lubrication circuit".





GEAR

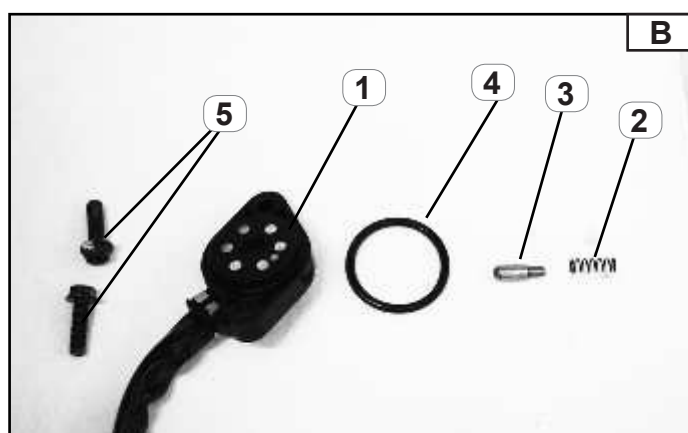
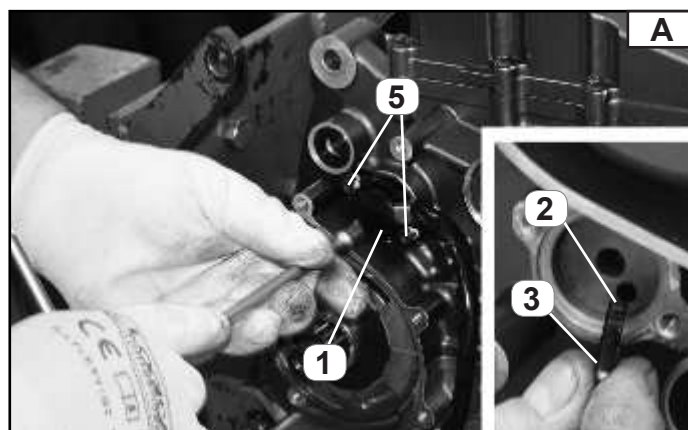
NEUTRAL POSITION/GEAR INDICATOR SENSOR REMOVAL

Remove:

- The screws (5).

Take out:

- The pin (3) Fig. A.
- The spring (2) Fig. A.
- The neutral position/gear indicator sensor (1) Fig. A.
- The seal (4) Fig. B.





GEAR

NEUTRAL POSITION/GEAR INDICATOR SENSOR INSTALLATION

Install:

- Insert the spring (2) Fig. A.
- The pin (3) Fig. A.
- The seal (4) Fig. B.
- The neutral position/gear indicator sensor (1).

NOTE:

Before assembly, check the continuity of the sensor (see the chapter entitled "Electrical system").

Tighten the two screws (5) of the sensor to the following torque:

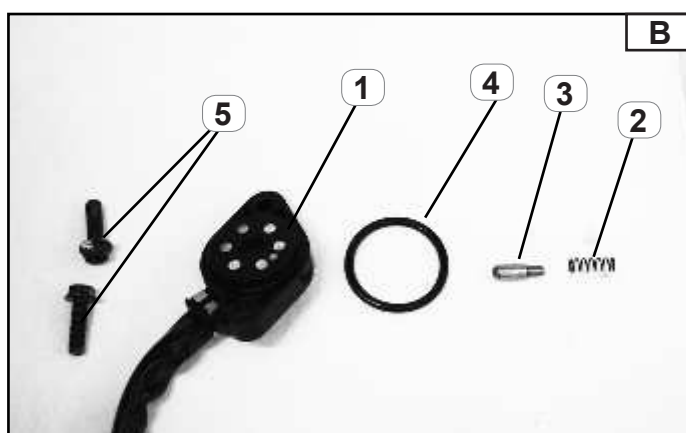
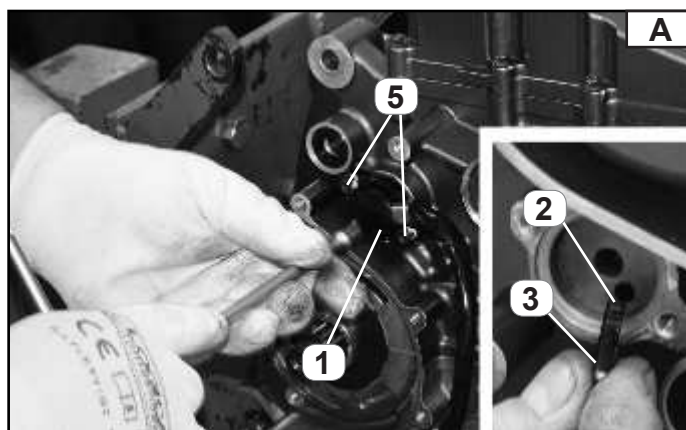


Torque 0.6 N*m

Use medium Loctite thread locker to secure.

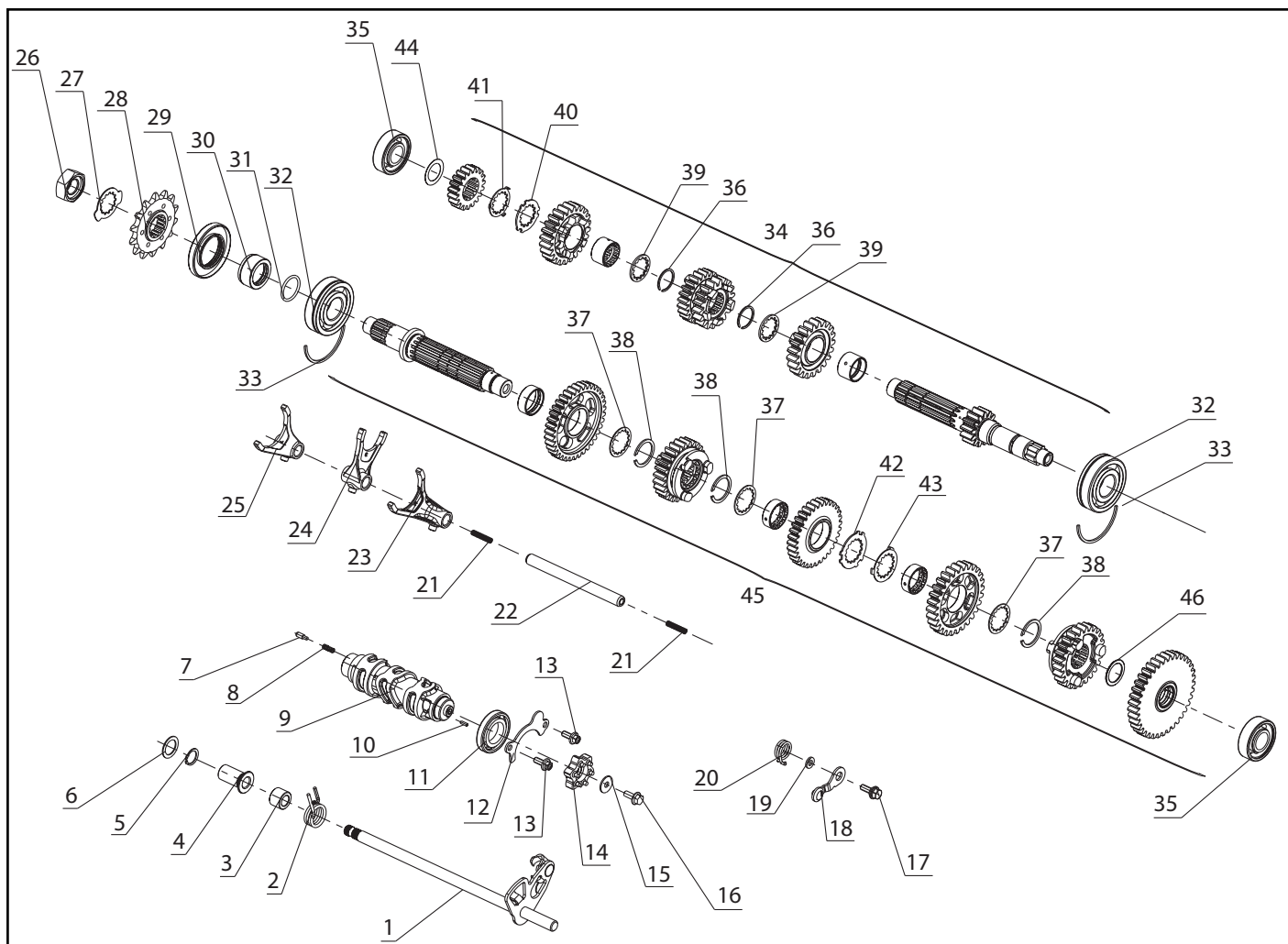


**MEDIUM THREAD
LOCKER**





GEAR



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SELECTOR SHAFT					
2	STOP SPRING					
3	SHIM					
4	BUSHING					
5	ELASTIC RING					
6	SCRAPING					
7	PLUG					
8	SPRING					
9	DESMODROMIC					
10	PIN					
11	BEARING					
12	PLATE					
13	SCREW					
14	GEAR DRUM					
15	WASHER					
16	SCREW					
17	SCREW					



GEAR

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
18	GEAR FIXING CLICK ASSEMBLY					
19	WASHER					
20	HAIRSPRING					
21	SPRING					
22	PIN					
23	GEAR SELECTION FORK 5th/6th					
24	GEAR SELECTION FORK 1st/4th - 2nd/3rd					
25	GEAR SELECTION FORK 5th/6th					
26	NUT					
27	WASHER					
28	PINION					
29	OIL SEAL					
30	BROACHED BUSHING					
31	O-RING					
32	BEARING					
33	BEARING RETAINER					
34	COMPLETE MAIN SHAFT					
35	BEARING					
36	ELASTIC RING					
37	SCRAPING					
38	ELASTIC RING					
39	NOTCHED WASHER					
40	NOTCHED WASHER					
41	NOTCHED WASHER					
42	NOTCHED WASHER					
43	NOTCHED WASHER					
44	SEAL					
45	COMPLETE SECONDARY SHAFT					
46	SCRAPING					



GEAR

GEAR DISASSEMBLY

Remove:

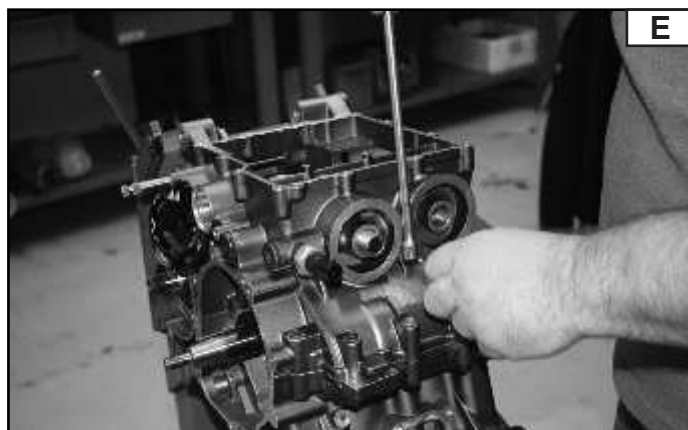
1. Coils and Spark plugs, refer to the section “**Coils and spark plugs removal**”.
2. Distribution cover, refer to the section “**Distribution cover removal**”.
3. Chain tensioner, refer to the section “**Chain tensioner removal**”.
4. Exhaust camshaft, refer to the section “**Exhaust camshaft removal**”.
5. Intake camshaft, refer to the section “**Intake camshaft removal**”.
6. Head, refer to the section “**Head removal**”.
7. Flywheel, refer to the section “**Flywheel removal**”.
8. Mobile chain slides, refer to the section “**Mobile chain slides removal**”.
9. Clutch, refer to the section “**Clutch removal**”.
10. Neutral position/gear indicator sensor, see chapter entitled “**Neutral position/gear indicator sensor removal**”.
11. Oil sump, refer to the section “**Oil sump removal**”.
12. Oil pump, refer to the section “**Oil pump removal**”.

Remove:

- The base screws Fig. E.
- Raise the lower base Fig. F.

Remove:

- The gearbox output shaft (1) Fig. F.
- The gearbox intake shaft (2) Fig. F.





GEAR

GEAR ASSEMBLY

Measure:

Use a specific gauge to check the size of the hole (1) in the top right casing Fig. A.

Housing port desmodronic	size: $\varnothing 47 (0, +0.022) \text{ mm}$
-----------------------------	---

If outside specifications, replace the bottom casing.

Check:

- The grooving on the desmodromic shaft (9) Fig. B.
- In the presence of damage/lines/signs of wear, replace the whole desmodromic shaft.

Assemble:

- The desmodromic (9*) inside the casing.
- Install the bearing (11*) Fig. C.

NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 "Gear".

Assemble:

- The gear drum (14*).
- Use the special tool(**) Fig. C.



(**) Gear selector drum assembly tool
Code: 0320097051000

- The washer (15*).
- The screw (16) Fig. C to the following torque:



Torque 12 N*m

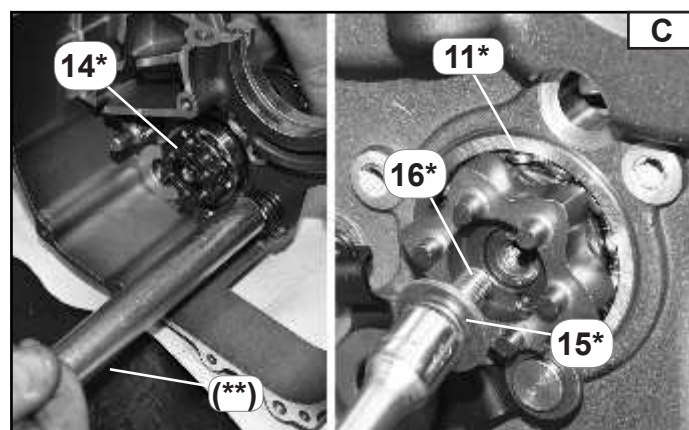
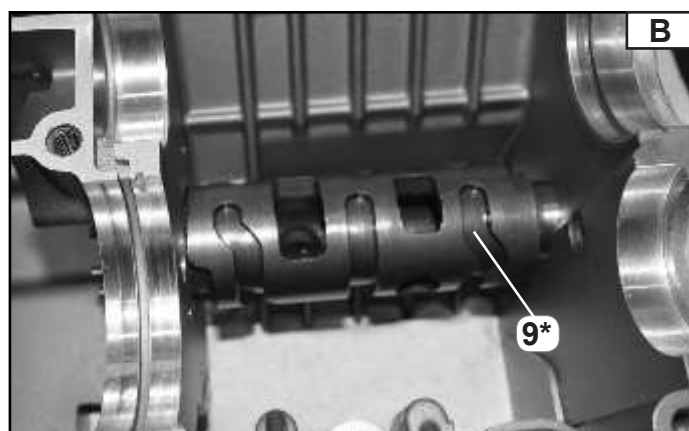
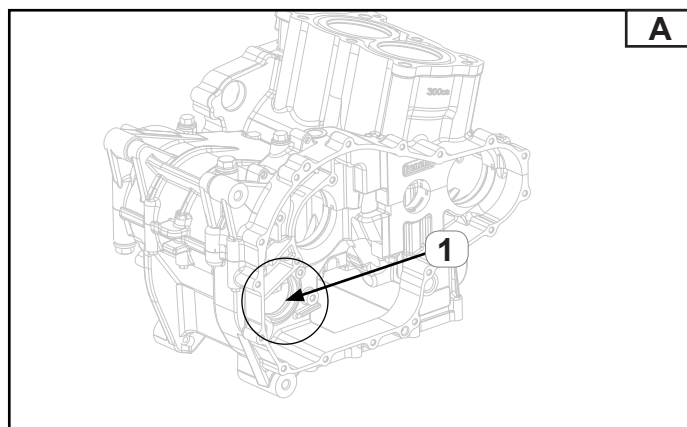
Use medium Loctite thread locker to secure.



MEDIUM THREAD
LOCKER

NOTE:

To tighten the screw (16*), use an aluminium pad (1) to keep the desmodromic in place Fig. D.





GEAR

GEAR ASSEMBLY

Assemble:

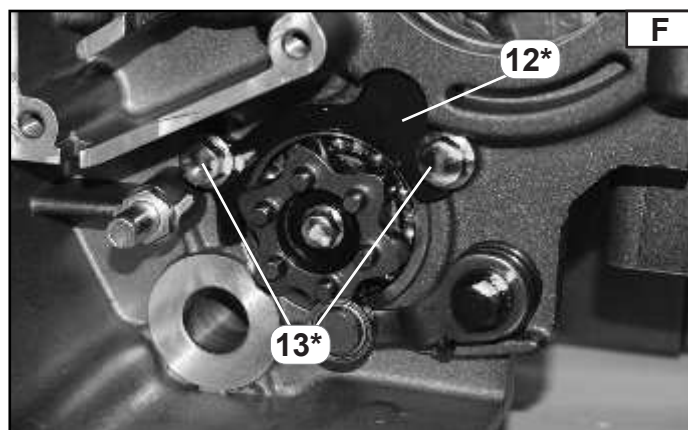
- The plate (12).
- The 2 screws (13*) Fig. F to the following torque:



Torque 12 N*m

NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 “Gear”.





GEAR

GEAR SHIFT CONTROL

Measure:

The following procedure is applied to all gear shift control rods, Fig. G.

Check:

- The follower of the gear shift control rod cam (A).
- The tooth of the gear shift control rod (B).

If there is warping/damage/lines/traces of wear, replace the shift control rod.

Measure:

- The thickness of the gear shift control rod, using a slide gauge.

Part	Size
Gear shift control rod	5.85 ± 0.05 mm

Check:

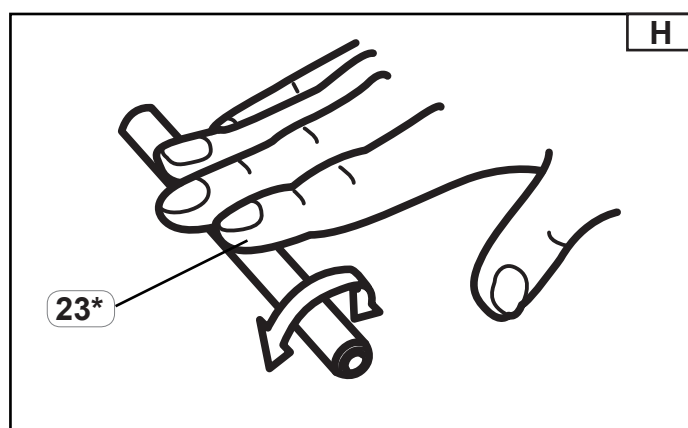
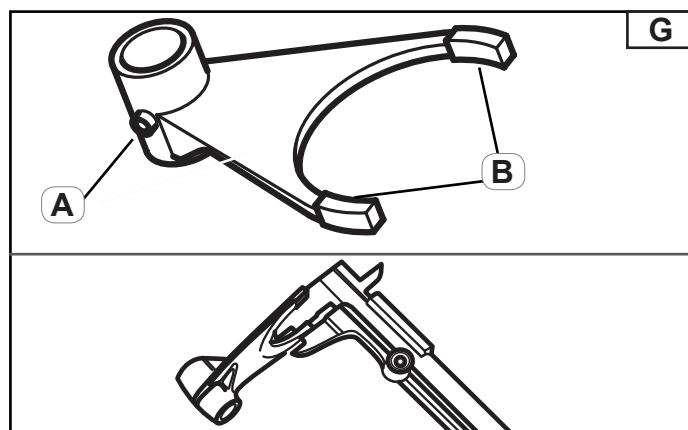
- The guide pin of the gear shift control rod (23*).

Roll the guide pin of the gear shift control rod on a flat surface Fig. H.

If there is any warping, replace.

NOTE: _____
Do not try to straighten the control rod guide if it is warped.

NOTE: _____
Numbers marked (*) are part of the spare parts table in Chapter 5 "Gear".





GEAR

GEAR ASSEMBLY

Assemble:

1. Spring (21*).
2. Gear selection fork 1st/4th - 2nd/3rd (25*).
3. Gear selection fork 5th/6th (24*).
4. Gear selection fork 5th/6th (23*).
5. Spring (21*).

NOTE:

Refer to the sequence in Fig. I.

Check:

- The two bearing stops (33) Fig. L.
- If there is any warping/damage/lines/signs of wear, replace.

Check:

- The seats for the two bearing stops (33) Fig. L.
- If there is any warping/damage/lines/signs of wear, replace.

Assemble:

For the assembly sequence of the full input shaft (47), see the exploded drawing at the beginning of the chapter.

For the assembly sequence of the full output shaft (34), see the exploded drawing at the beginning of the chapter.

Position:

- The full main shaft (47) Fig. M.
- The full secondary shaft (34) Fig. M.

NOTE:

Make sure the grooves on the two bearings (32) match correctly.

NOTE:

Before assembling the two half casings, top and bottom, it is necessary to apply sealant paste along the whole profile of the top casing, in order to achieve a good hold.



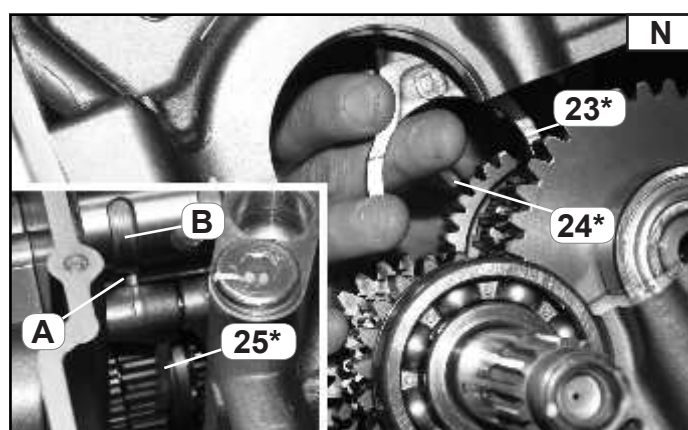
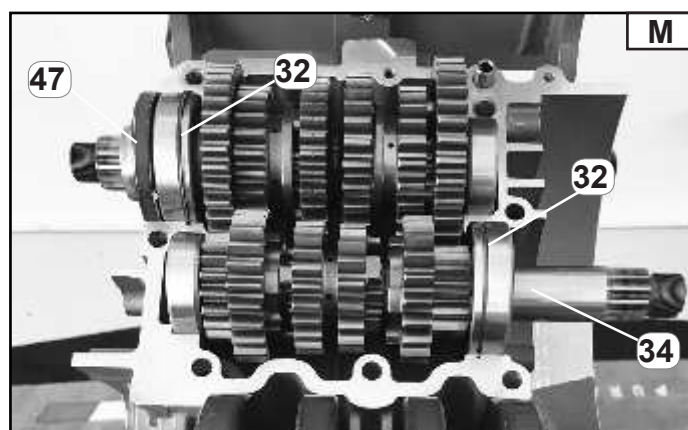
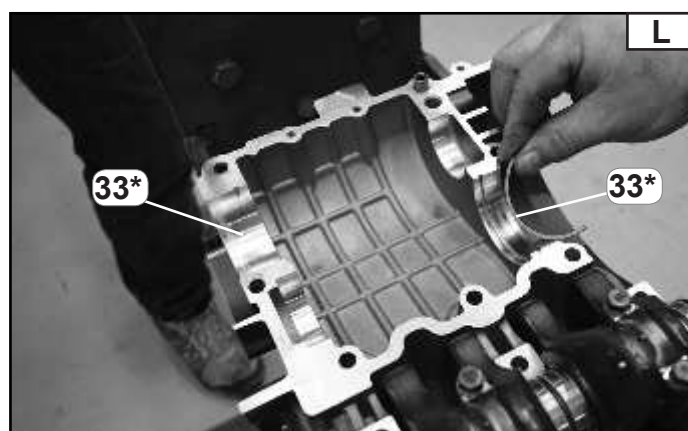
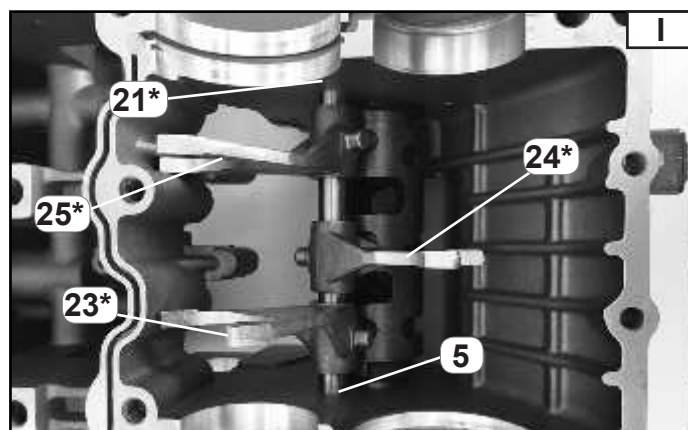
PASTE THREEBOND
1207B

Assemble:

Assemble the bottom casing over the top, taking care to insert the follower (A) correctly in the segment corresponding to the desmodronic shaft and the forks (23*-24*-25*) in their respective seats Fig. N.

NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 "Gear".





GEAR

GEAR ASSEMBLY

Check:

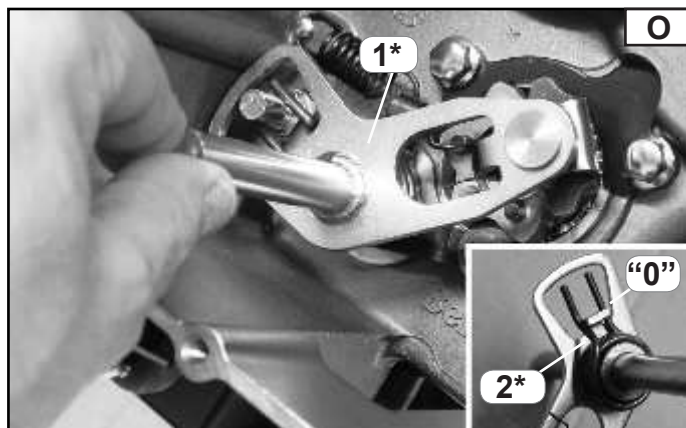
That the end of the gear lock spring (2*) is in its seat on the selector plate (1*).

Check:

That in the neutral position, the clearance between the two ends of the spring and the strike pin is "0" Fig. O.

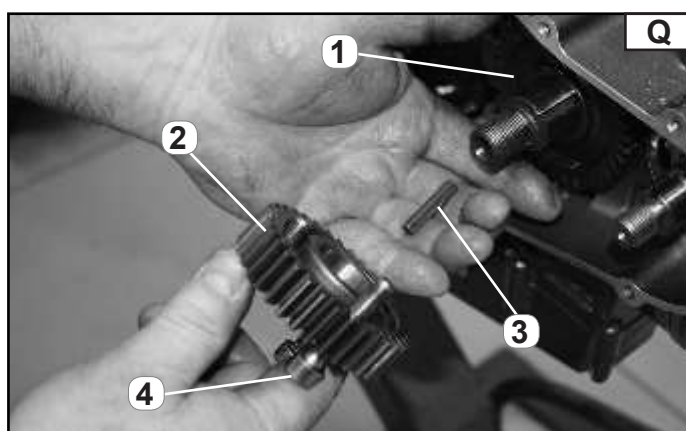
Assemble:

- The selector shaft as in Fig. O.



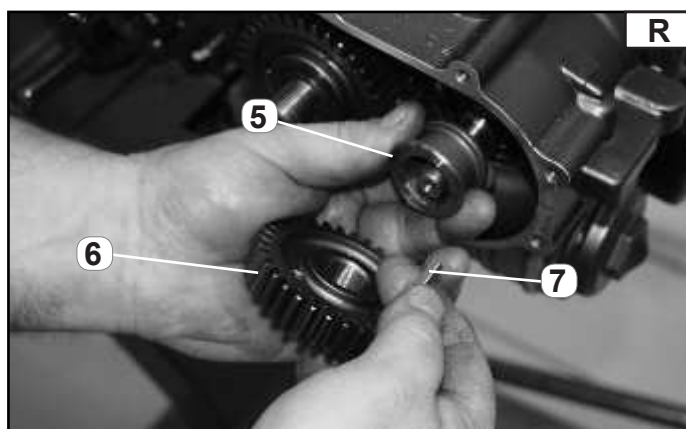
Position:

- The gear (2).
- The drive shaft gear (1), locking it into place with the spline (3) Fig. Q.



Install:

- The guide bushing (5).
- The counter shaft gear (6).
- The spline (7) Fig. R.



NOTE:

Bring the two points of shaft phasing and drive shaft check Fig. S.





GEAR

GEAR ASSEMBLY

Install:

- The washer.
- The counter shaft gear nut (6).



Torque 90-100 N*m

Install:

- The washer.
- The drive shaft gear nut (2).



Torque 115-125 N*m



NOTE:

To keep the two drive shafts still, it is necessary to use the tool (**) in Fig. S.

(**) Gear wrench

Code: 03200097053000

Assemble:

After assembling the two half casings, tighten the screws Fig. Q to the following torque:



Position screws (40): (M6)

Position screws (41): (M8)

Position screws (42): (M10)

Rotate the complete casing through 180° and tighten the screws Fig. R to the following torque:

Position screws (38): (M8)

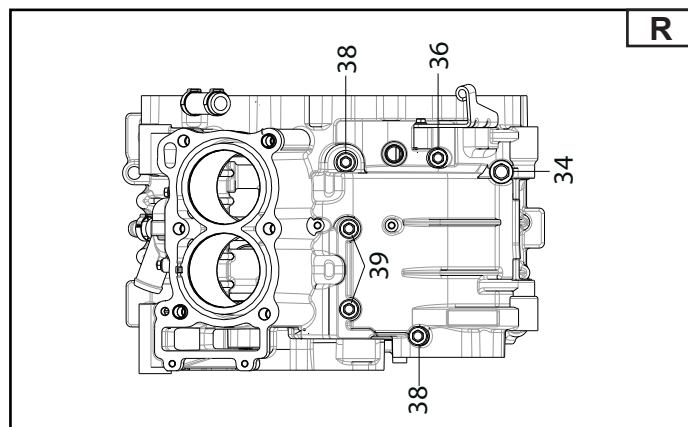
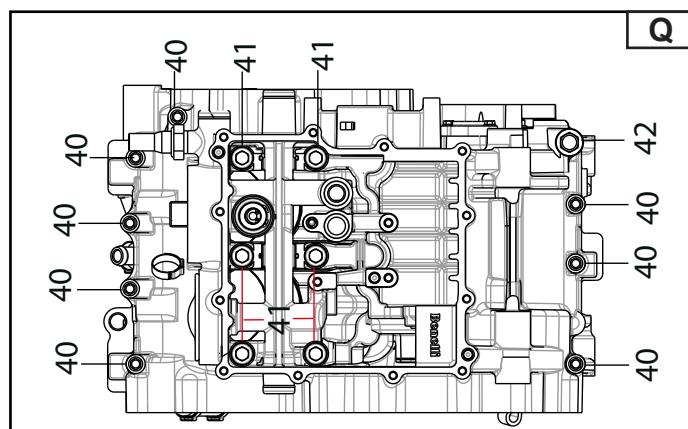
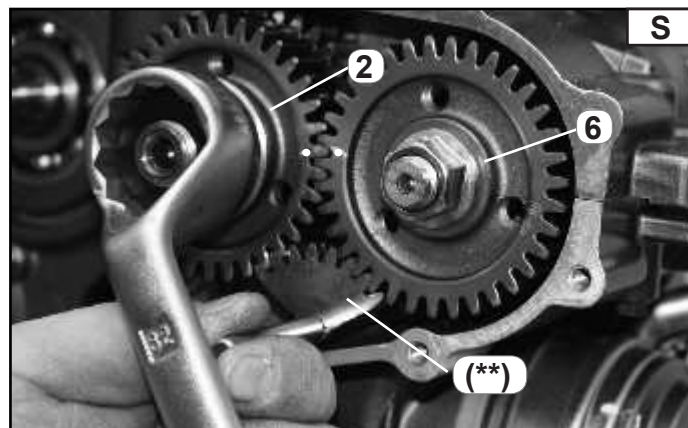
Position screws (36): (M8)

Position screws (34): (M10)

Use lubricant while tightening.



Lubricate

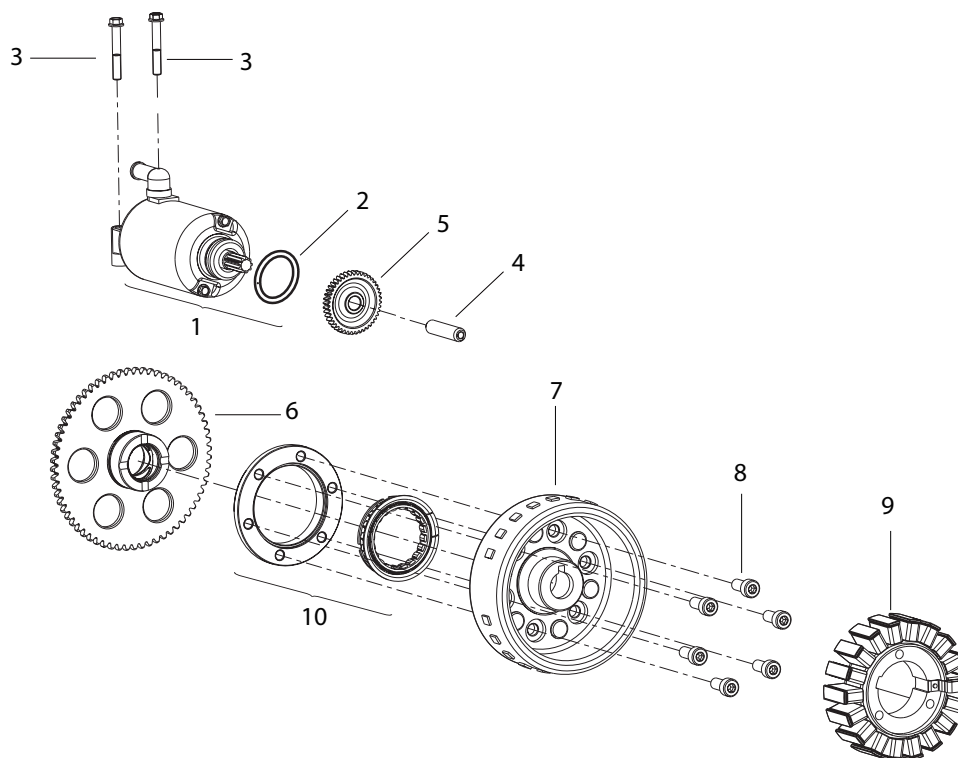


Casing closure tightening torque

Sequence	Size	Phases
1	M10:	1°Phase 12 N.m 2°Phase 24 N.m 3°Phase 45 N.m
2	M8	1°Phase 12 N.m 2°Phase 30 N.m
3	M6	1°Phase 10 N.m 2°Phase 12 N.m



STARTING STARTER



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	STARTER MOTOR					
2	O-RING					
3	SCREW					
4	IGNITION SHAFT					
5	DOUBLE GEAR					
6	START GEAR					
7	FLYWHEEL ROTOR					
8	SCREW					
9	MAGNET FLYWHEEL					
10	COMPLETE FREEWHEEL					



STARTING

STARTER REMOVAL

Remove:

1. The screws (3*) Fig. A.
2. The starter motor (1*) from the clutch side Fig. B.

Check:

- The starter motor operation.

NOTE:

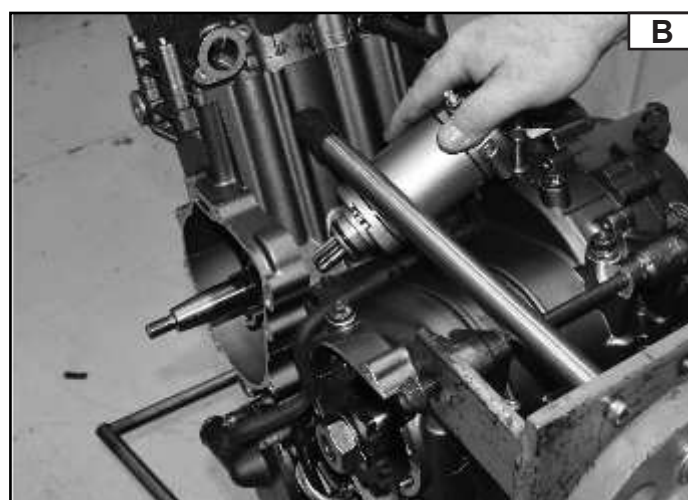
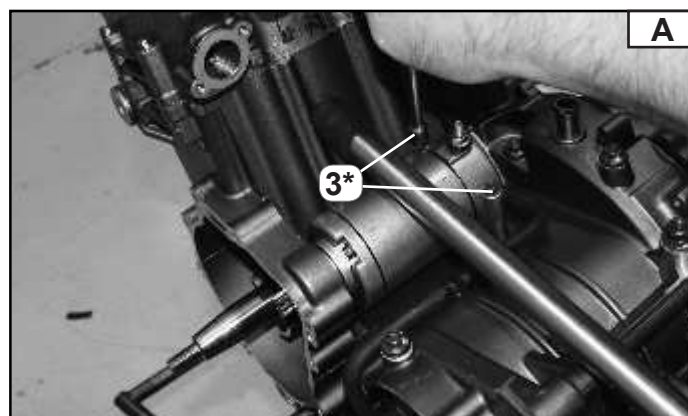
If the starter motor turns with force, replace the part.

- The O-ring.

If there is any damage/spotting/traces of wear, replace the O-ring.

NOTE:

Lubricate the O-ring and take care not to damage it.





STARTING

STARTER INSTALLATION

Install:

Proceed using the opposite order to removal.

Assemble:

- The screws (3*) Fig. A to the following torque.

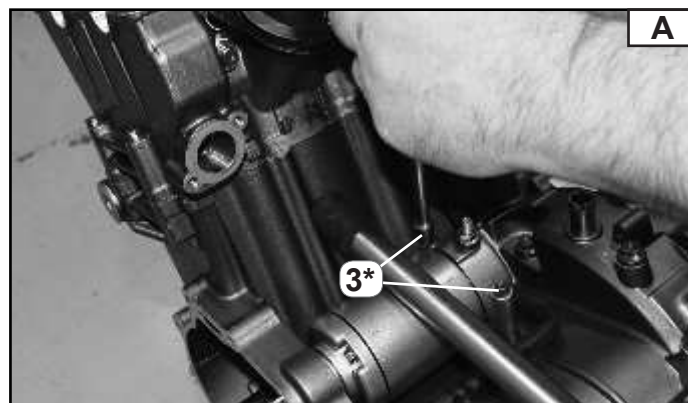


Torque 12 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD LOCK-
ER**

**NOTE:**

Once the starter motor is assembled, proceed with the current wire connection.

NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 "Starting".



STARTING

FLYWHEEL REMOVAL

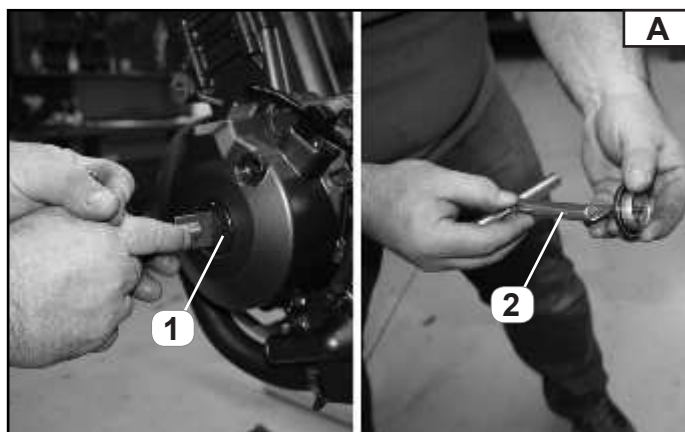
Remove:

- The cap (1).

Use the tool* (2) for this operation Fig. A.

(*) Tool to remove the magnetic cap from the alternator cover

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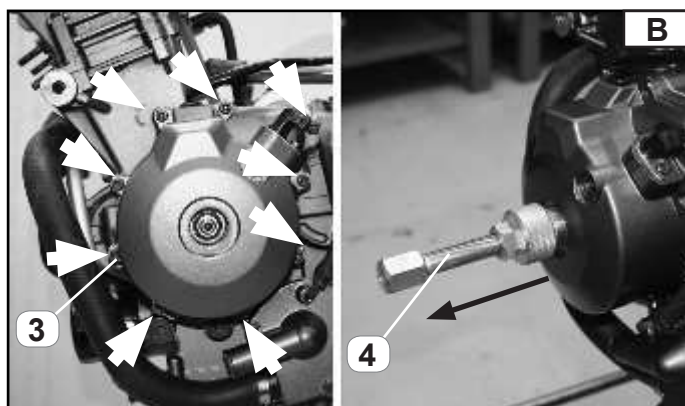


Remove:

- The screws (3) Fig. B.
 - Take out the magnet flywheel cover Fig. B.
- Use the tool* (4) for this operation Fig. B.

(*) Flywheel cover extractor

Code: 0320097042000



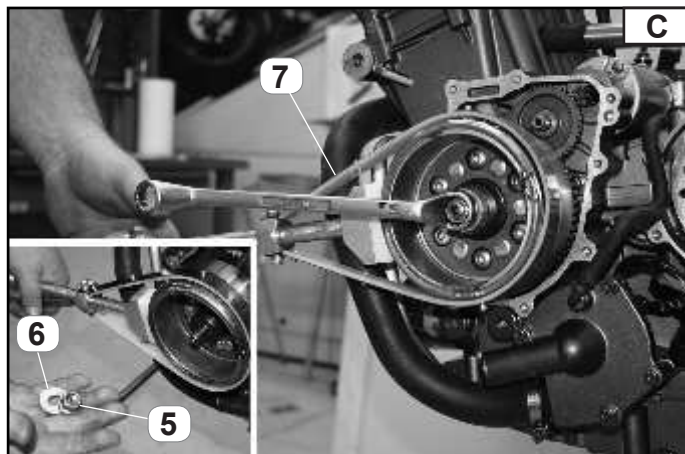
Remove:

- The nut (5) Fig. C.
- The washer (6) Fig. C.

Use the tool* (7) for this operation Fig. C.

(*) Tool to Tighten/Loosen the flywheel

Code: 0320097044000



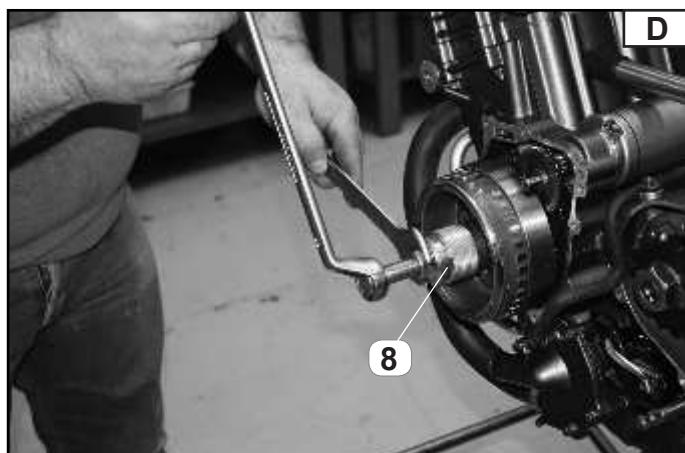
Remove:

- The flywheel rotor magnet (8).

Use the tool* (8) for this operation Fig. D.

(*) Flywheel cover extractor

Code: 0320097045000





STARTING

FREEWHEEL REMOVAL

Disassemble:

The assembled freewheel elements (6*) Fig. D.

- The 6 screws (8*).

Check:

- The roller cage and support.

If there are any anomalies or signs of wear, replace the whole freewheel (6*).

NOTE:

Numbers marked (*) are part of the spare parts table in Chapter 5 "Starting".





STARTING FREEWHEEL INSTALLATION

Install:

Proceed in the opposite order to removal.

Assemble:

- The screws (8*) Fig. A to the following torque:

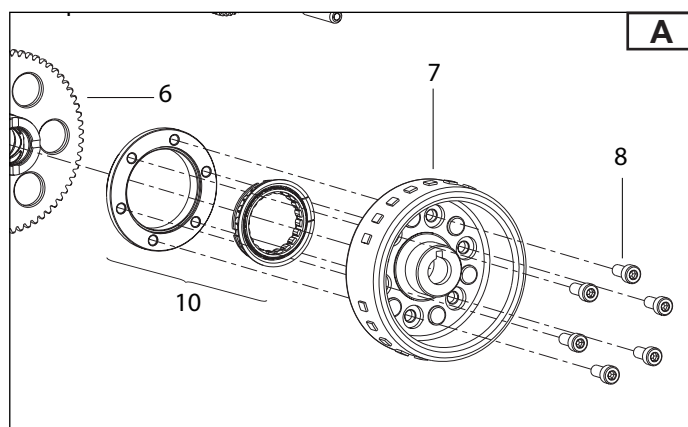


Torque 35 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD LOCK-
ER**





STARTING

FLYWHEEL INSTALLATION

Install:

proceed in the opposite order to removal.

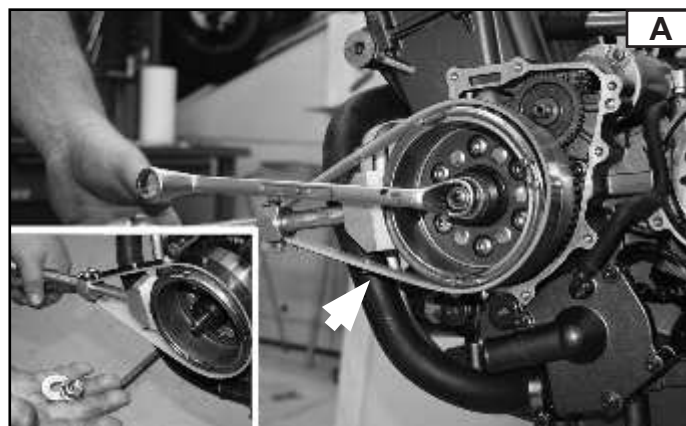
Assemble:

- The nut (5) Fig. A.
- The washer (6) Fig. A.

Tighten the nut (5) to the following torque:



Torque 90 N*m

**Assemble:**

- The flywheel magnet cover.
- The seal (7).

NOTE:

When closing the magnet flywheel cover Fig. B pay attention to the seal.

If the seal is damaged, it must be replaced with a new one.

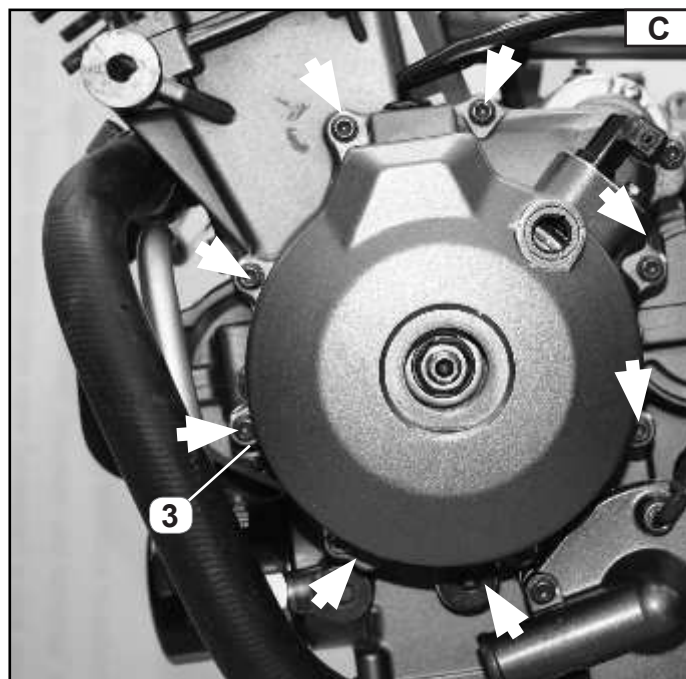
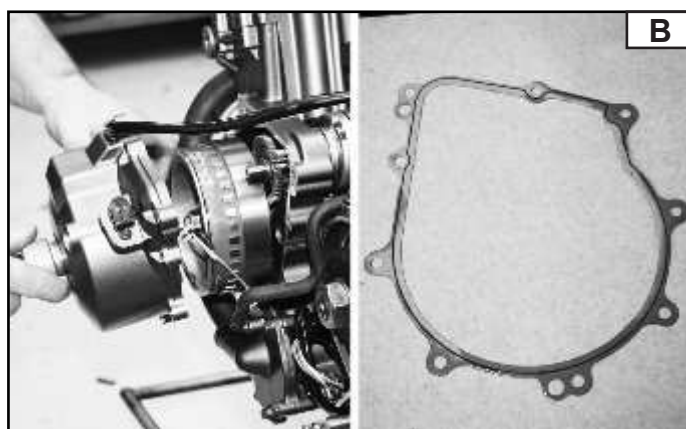
Assemble:

- The screws (3) Fig. C.

To the following torque:



Torque 12 N*m





STARTING

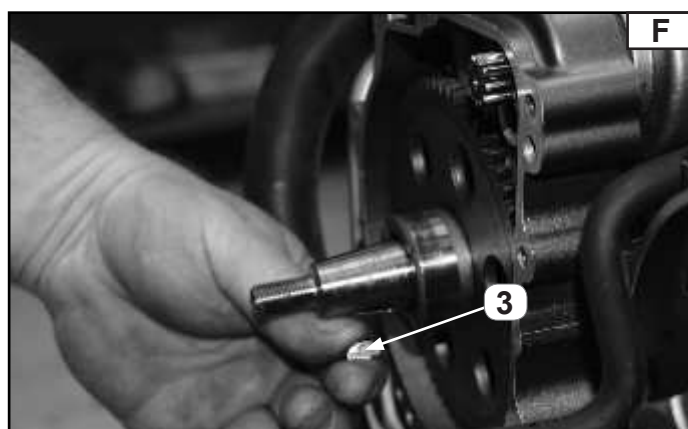
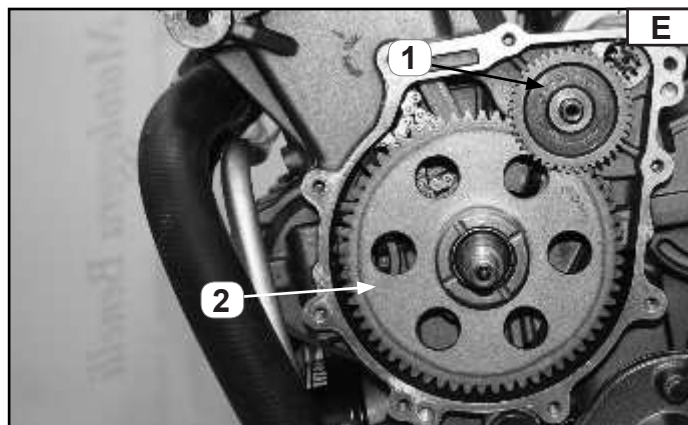
STARTER GEAR REMOVAL

Remove:

1. Flywheel, refer to the section “Flywheel removal”.

Remove:

- The satellite starter gear (1) Fig. E.
- The freewheel starter gear (2) Fig. F.
- The spline (3) Fig. F.





STARTING

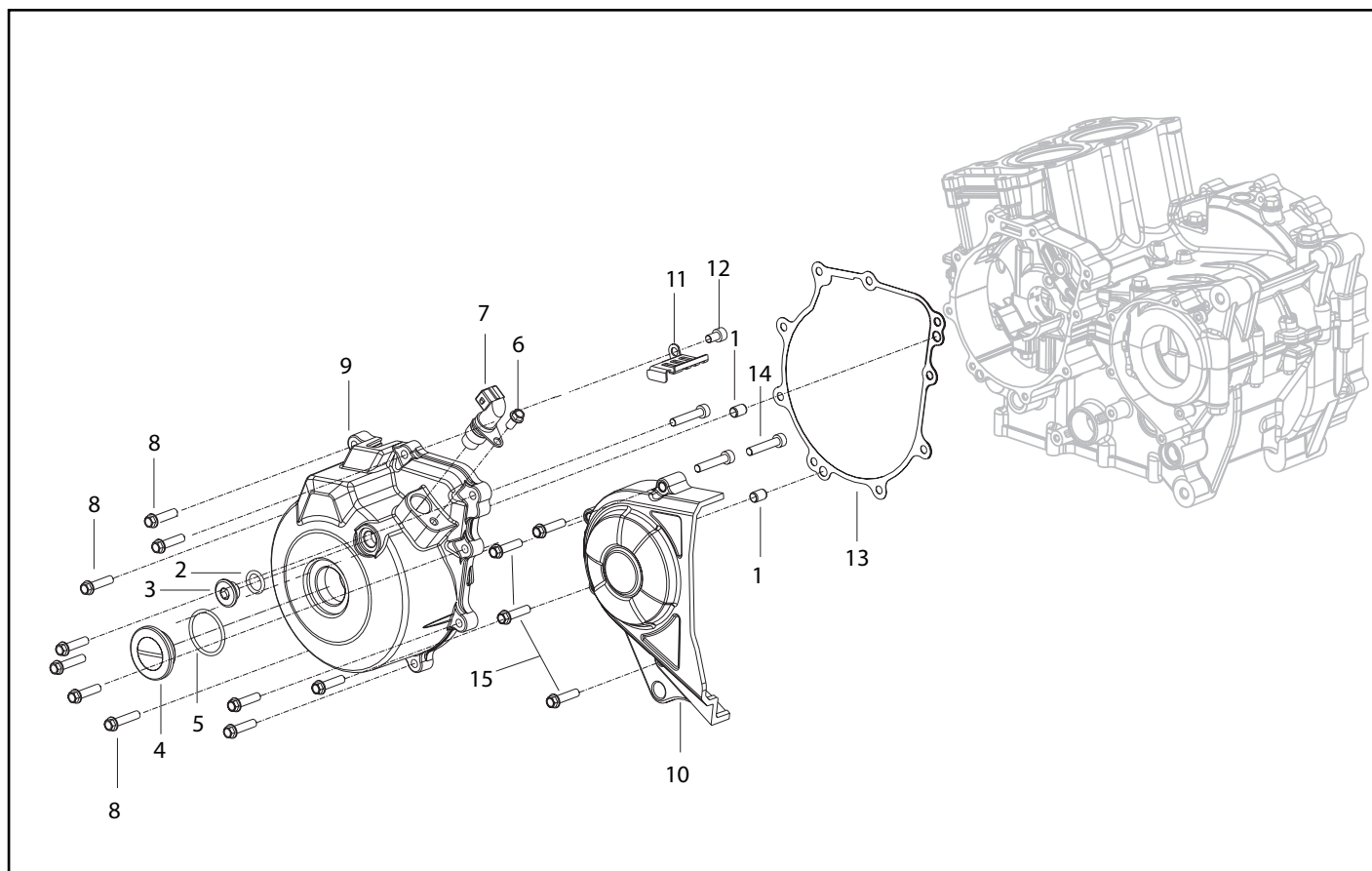
STARTER GEAR INSTALLATION

Install:

Proceed in the opposite order to removal.



STARTING PHASE SENSOR



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	BUSHING					
2	O-RING					
3	THREADED CAP					
4	MAGNETIC CAP					
5	O-RING					
6	SCREW					
7	PHASE SENSOR					
8	SCREW					
9	ALTERNATOR COVER					
10	PINION COVER					
11	PLATE					
12	SCREW					
13	FLYWHEEL COVER GASKET					
14	SCREW					
15	SCREW					



STARTING

PHASE SENSOR REMOVAL

Disconnect:

- The electric connector from the phase sensor (7*).

Remove:

- The screw (6*) Fig. A.
- The phase sensor (7*) Fig. A.

Check:

The integrity of the phase sensor.





STARTING

PHASE SENSOR INSTALLATION

Assemble:

- The phase sensor (7*).
- The fastening screw (6*) to the following torque Fig. B:



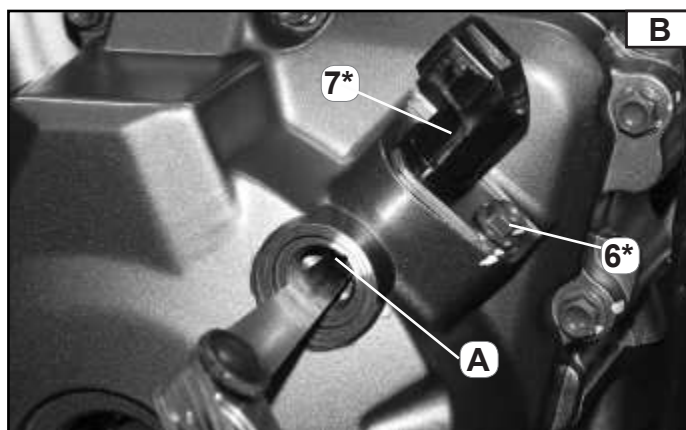
Torque 12 N*m

Measure:

- The distance (A) between the phase sensor (7*) and the pick-up on the flywheel magnet Fig. B.

NOTE:

Use a thickness gauge to take this measurement.

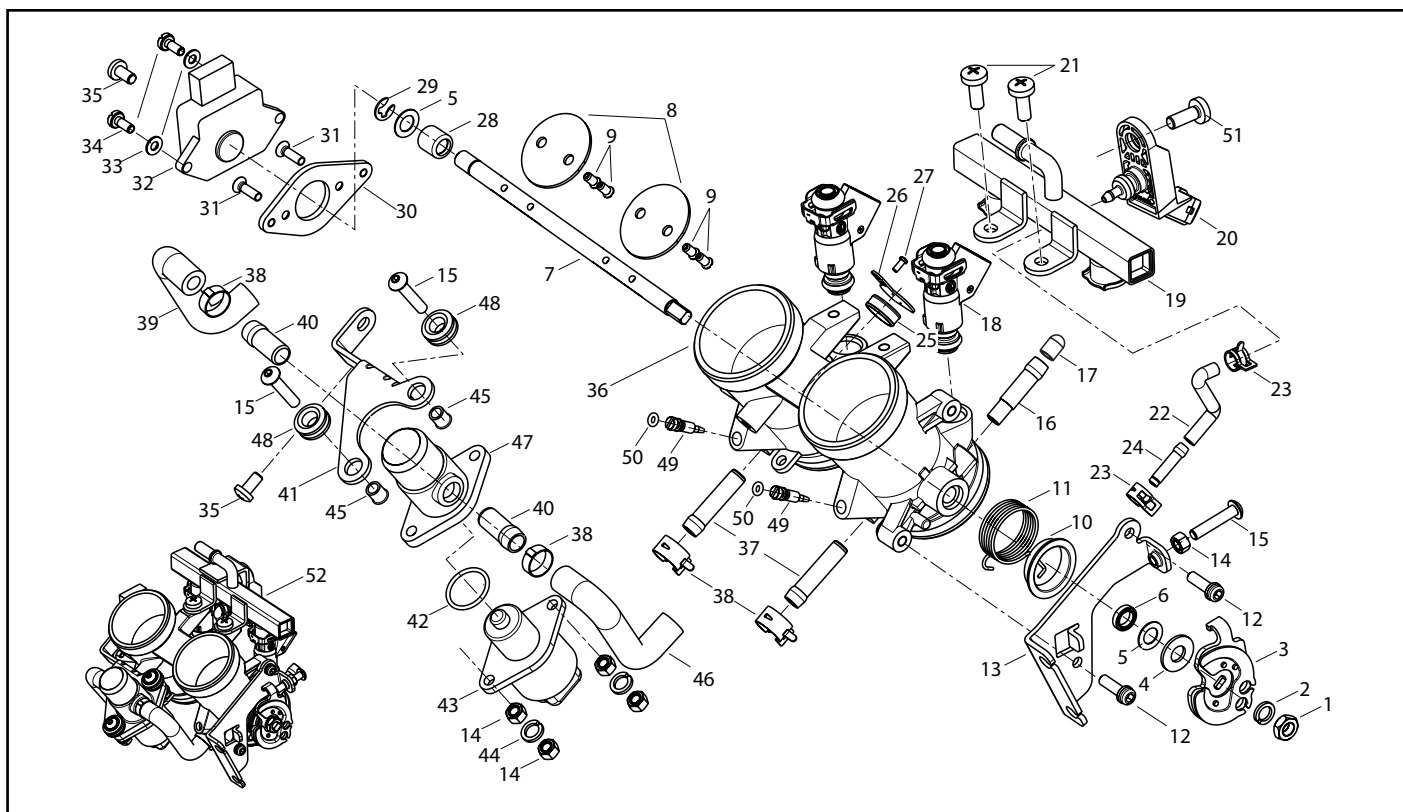


Gap	0.8-1.0 mm



POWER SYSTEM

THROTTLED BODY ASSEMBLY



Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	NUT					
2	SCRAPING					
3	FLANGE					
4	WASHER					
5	WASHER					
6	OIL SEAL					
7	SHAFT					
8	THROTTLED BODY FLANGE					
9	SCREW					
10	BUSHING					
11	SPRING					
12	SCREW					
13	BRACKET					
14	STEERING RING NUT					
15	SCREW					
16	INSERT					
17	CAP					
18	INJECTOR					
19	BRACKET					
20	MAP SENSOR					
21	SCREW					
22	PIPE					
23	PIPE GLAND CLIP					
24	INSERT					



POWER SYSTEM

Pos.	Description	Qty	SQ.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
25	SEALING RING					
26	PLATE					
27	SCREW					
28	ROLLER BEARING					
29	SEEGER					
30	PLATE					
31	SCREW					
32	POTENTIOMETER					
33	WASHER					
34	SCREW					
35	SCREW					
36	THROTTLED BODY					
37	PIPE					
38	BAND					
39	PIPE					
40	PIPE					
41	SPECIAL PLATE					
42	O-RING					
43	STEPPER MOTOR					
44	SPECIAL WASHER					
45	BUSHING					
46	PIPE					
47	DISTRIBUTOR					
48	VIBRATION DAMPING RUBBER					
49	SCREW					
50	O-RING					
51	SCREW					
52	THROTTLED BODY					



POWER SYSTEM

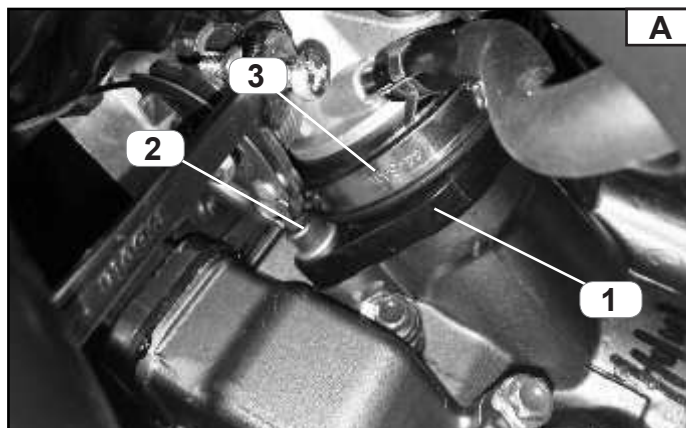
THROTTLED BODY REMOVAL

Remove:

- Rider and passenger seats, refer to the section “**Removal of rider and passenger seats, Chapter 4**”.
- Fuel tank, refer to the section “**Fuel tank removal, Chapter 4**”.
- Air filter, refer to the section “**Air filter removal, Chapter 4**”.

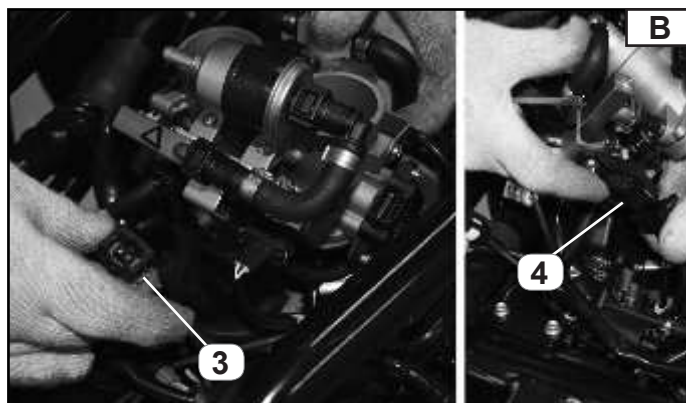
Remove:

- The 2 intake pipes (1) Fig. A.
- The seals.
- The screws (2) Fig. A.
- Loosen the screw bands (3) Fig. A.



Disconnect:

- The injector connections (3).
- The connections of the pressure sensor (4) from the electric backbone to the throttled body assembly, Fig. B.

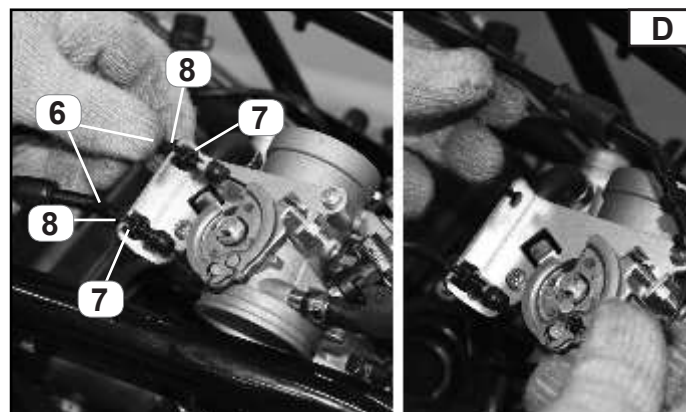


- The connection (5) of the distributor, Fig. C.



Disconnect:

- The bottom ends of the accelerator cable (6) before loosening the cable nut supports (7).
- The bottom nuts (8) Fig. D.
- Take out the throttled body.





POWER SYSTEM

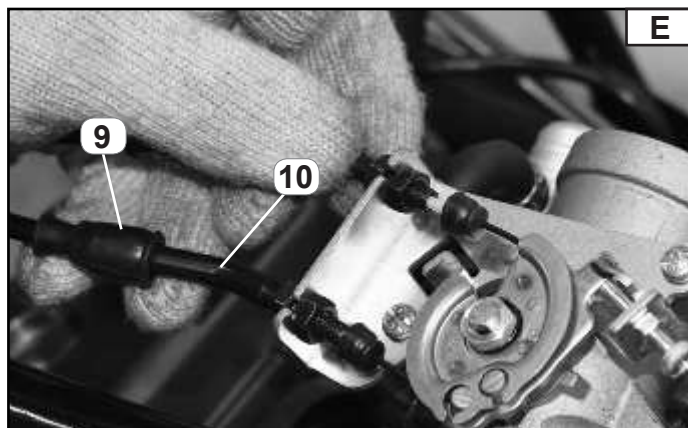
THROTTLED BODY INSTALLATION

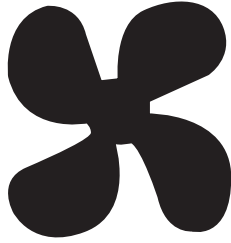
Install:

Proceed using the opposite order to removal.

IMPORTANT NOTICE

During assembly of the accelerator cables, take care to insert the hood (9) on the control line (10) Fig. E.





COOL.
SYSTEM

6



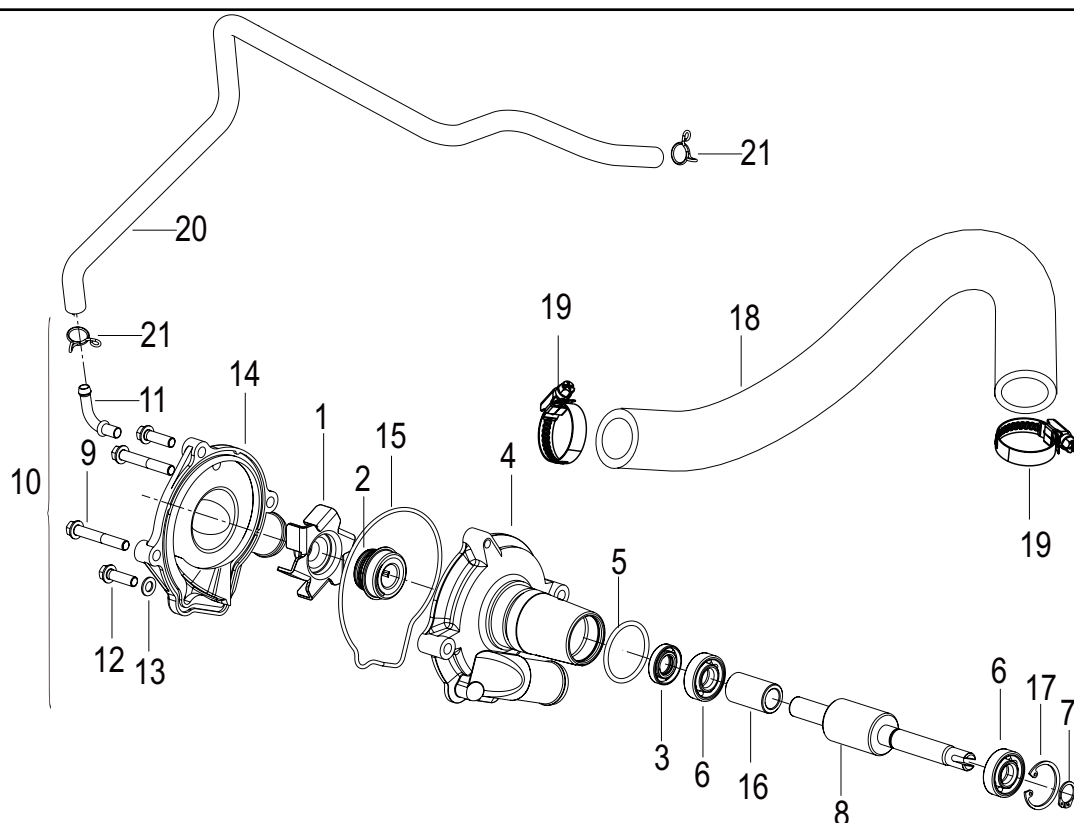
CHAPTER 6

COOLING SYSTEM

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WATER PUMP



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	WATER PUMP IMPELLER					
2	SEALING RING					
3	OIL SEAL					
4	WATER PUMP COVER					
5	O-RING					
6	BEARING					
7	SEEGER RING					
8	WATER PUMP SHAFT					
9	SCREW					
10	COMPLETE WATER PUMP					
11	L-SHAPED JOINT					
12	SCREW					
13	WASHER					
14	WATER PUMP BODY					
15	SCREW					
16	BUSHING					
17	SEEGER RING					
18	SLEEVE					
19	SCREW BAND					
20	PIPE					
21	SPRING					



WATER PUMP

WATER PUMP REMOVAL

Remove:

- **Gear lever**, refer to the Chapter 4, section “Gear lever installation”.
- The bands (19*) Fig. A.
- The water inlet manifold (2) Fig. A.
- The water return manifold (3) Fig. A.
- The screws (9*) Fig. A.

NOTE:

Drain out all cooling fluid by taking out the screw (12*) before proceeding with removal operations, as shown in Fig. A.

- Take out all of the parts in the order shown in the exploded drawings and check to ensure each part is intact.
- Parts showing signs of wear must be replaced.

IMPORTANT NOTICE

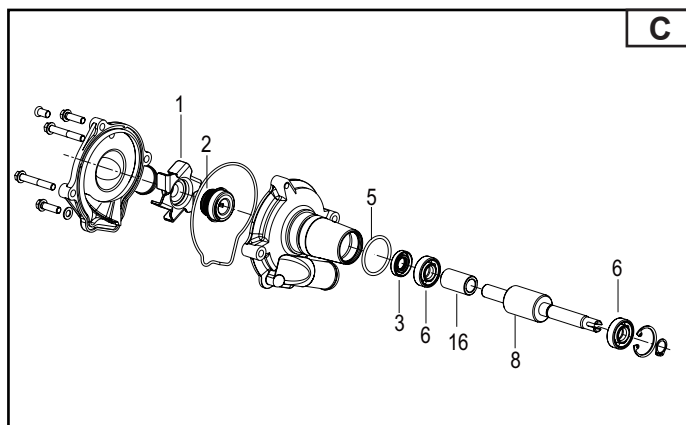
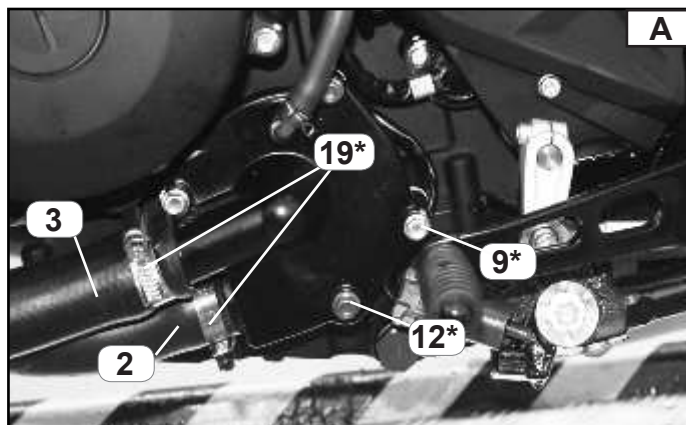
In case of faulty seals (2*), it is possible to notice leaks from the hole shown in Fig. B.

NOTE:

Numbers marked (*) are part of the spare parts table in the Chapter entitled “Cooling Circuit”, in the “radiator removal” section.

Check:

- Water pump impeller (1*) Fig. C.
- The sealing ring (2*) Fig. C.
- The O-ring (5*) Fig. C.
- The oil seal (3*) Fig. C.
- The bearing (6*) Fig. C.
- The bushing (16*) Fig. C.
- The water pump shaft (8*) Fig. C.





WATER PUMP

WATER PUMP INSTALLATION

Install:

Proceed to assemble the pump, lubricating it with engine oil:

- The pump shaft (8*)
- The bushing (16*).
- The bearings (6*).

NOTE:

When inserting the pump, take care to ensure that the groove on the water pump shaft (8*) is facing in the direction shown in Fig. A.

Install:

- The screws (9) and tighten to the following torque:



Torque 12 N*m

Use Loctite thread locker to secure.



Loctite 242/243





THERMOSTAT

THERMOSTAT REMOVAL

Remove:

- **Right side fairings**, refer to the Chapter 4, section "front fairing".
- The screws (3) Fig. A.
- The thermostat (4) Fig. B.

NOTE:

Drain out the cooling fluid before proceeding with these operations.

Check:

- The by-pass port (1) B.
- If there is any clogging, replace.
- The thermostat (4) Fig. B.

If this does not open at 75° ~ 90° C (167~ 194° F), replace.

Thermostat check:

1. Immerse the thermostat in a container full of water Fig. C
2. Slowly heat the water.
3. Immerse a thermometer in water.
4. Mixing the water, monitor the thermostat and the temperature reading on the thermometer.
5. When the temperature of 75°C is reached, the thermostat valve will start to open, reaching a temperature of 90°C. The thermostat valve will open to at least 7 mm.

Key Fig. C

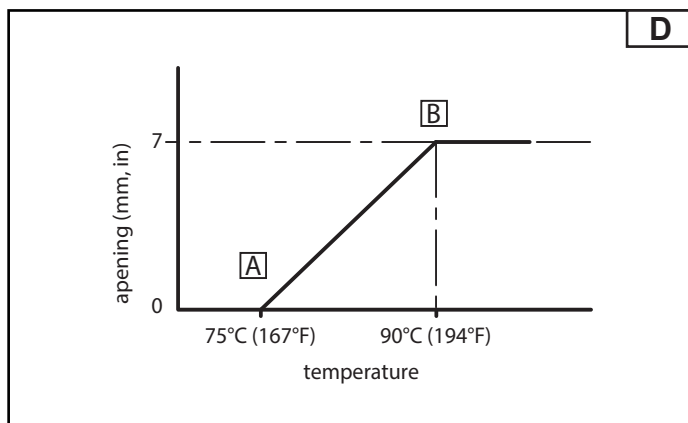
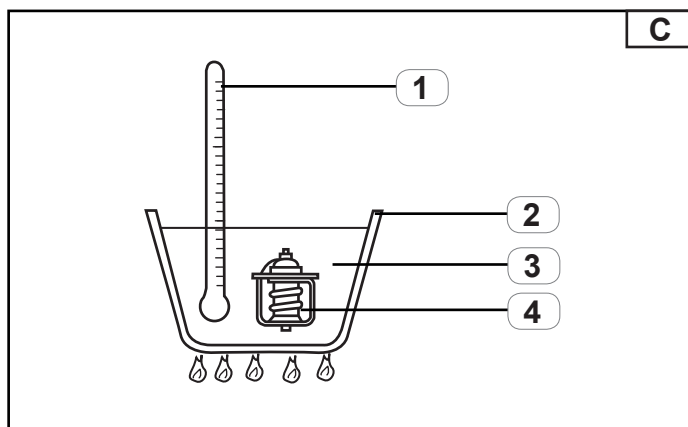
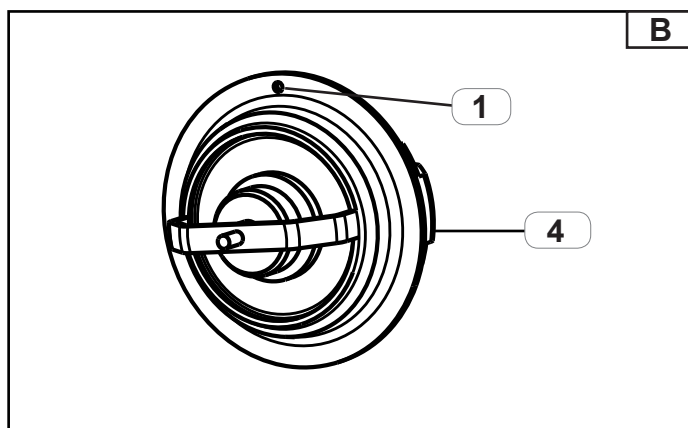
1. Thermometer
2. Container
3. Water
4. Thermostat

Thermostat opening/closure chart Fig. D.

- A. Fully closed
B. Fully open

IMPORTANT NOTICE

If there are any doubts as to thermostat precision, it is better to replace it. A faulty thermostat can cause serious overheating or overcooling.





THERMOSTAT

THERMOSTAT INSTALLATION

Install:

- Install the thermostat so that the bypass port (A) Fig. A is facing upwards.
- The screws (3) and tighten to the following torque:

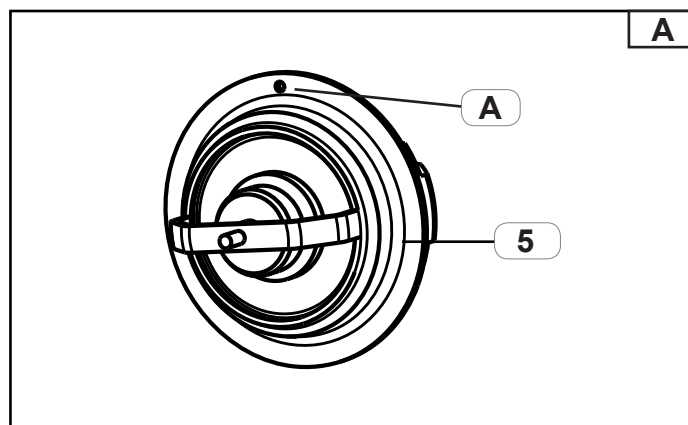


Torque 12 N*m

Use Loctite thread locker to secure the screws.



Loctite 242/243

**NOTE:**

Fill with cooling fluid after completing these operations.



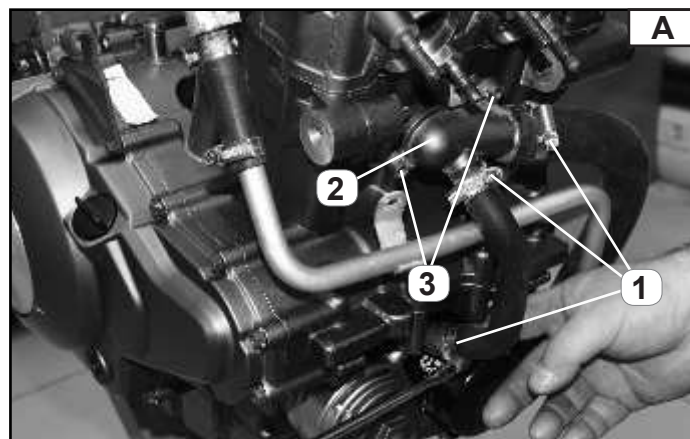
WATER MANIFOLD

WATER MANIFOLD REMOVAL

Remove:

- Cooling fluid
- **Manifolds drain**, refer to the section “Exhaust assembly removal” in Chapter 4.
- The bands (1) Fig. A.
- The screws (3) Fig. A.
- The water manifold (2) Fig. A.
- The seal (4) Fig. B.

If there is any damage/breakage, replace the above parts.





WATER MANIFOLD

WATER MANIFOLD INSTALLATION

Install:

Carry out the removal steps in reverse order.

- The screws (3) and tighten to the following torque:

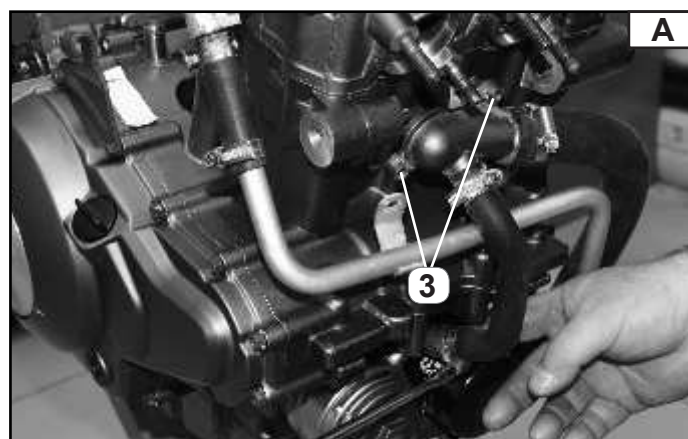


Torque 12 N*m

Use Loctite thread locker to secure the screws.



Loctite 242/243



NOTE: _____
Fill with cooling fluid after completing these operations.

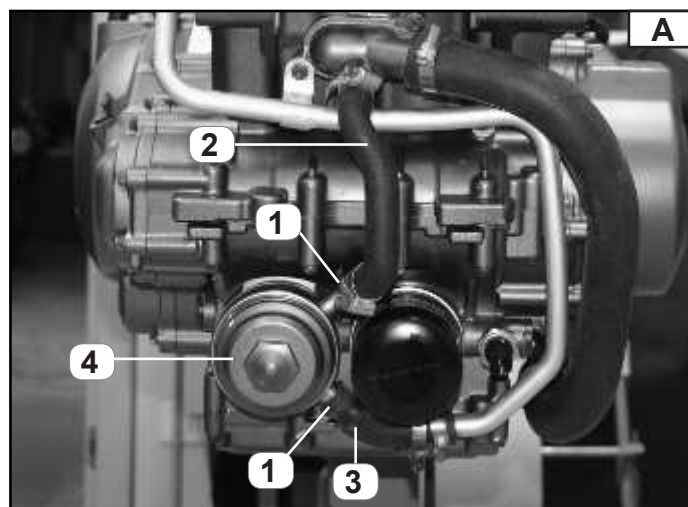


HEAT EXCHANGER

HEAT EXCHANGER REMOVAL

Remove:

- Cooling fluid
- **Manifolds drain**, refer to the section "Exhaust assembly removal" in Chapter 4.
- The bands (1) Fig. A.
- The bands (2) Fig. A.
- The hose (3) Fig. A.
- The distributor cap (4) Fig. A-B.
- The seal (6) Fig. B.



Check:

- Visually inspect the distributor cap for any build up or breakages.
- The seal (6) Fig. B.

NOTE:

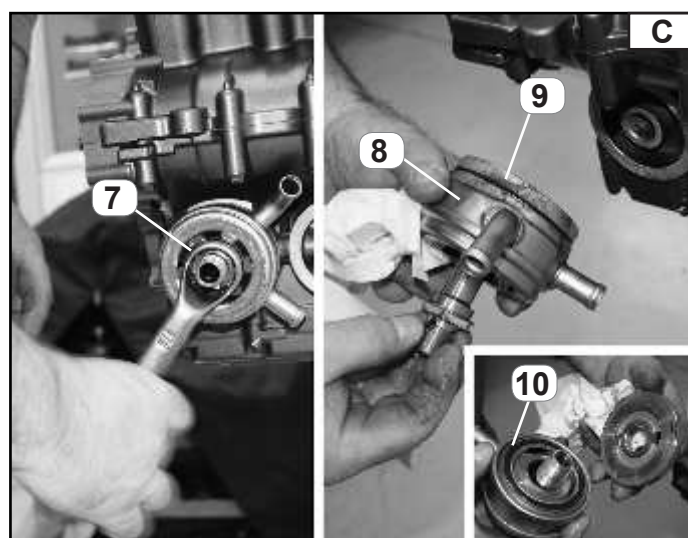
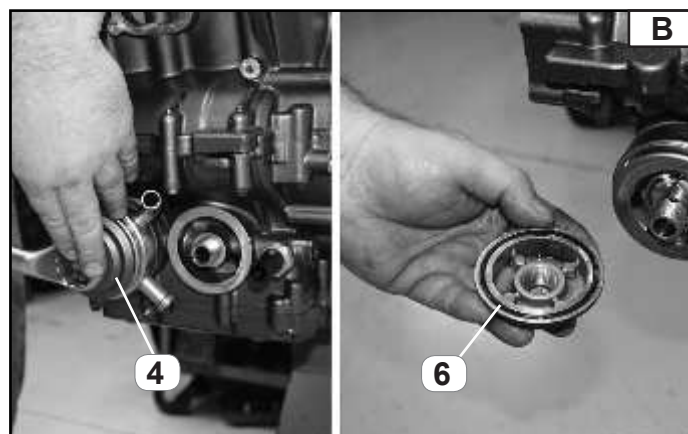
If any of the parts should show signs of damage/breakage, replace.

Remove:

- The special screw (7) Fig. C.
- The distributor (8) Fig. C.
- The fitting (9) Fig. C.
- The seal (10) Fig. C.

NOTE:

If any of the parts should show signs of damage/breakage, replace.





HEAT EXCHANGER

HEAT EXCHANGER INSTALLATION

Install:

Proceed to install the distributor following the removal steps in reverse order.

- The special screw (7) Fig. D to the following torque:



Torque 60 N*m

- The distributor cap (4) Fig. E to the following torque:



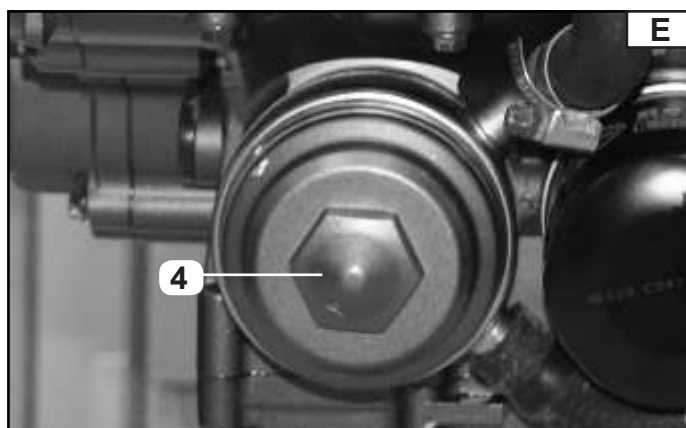
Torque 25. N*m

NOTE: _____

If not worn, re-use the previously removed bands; otherwise, fit new ones.

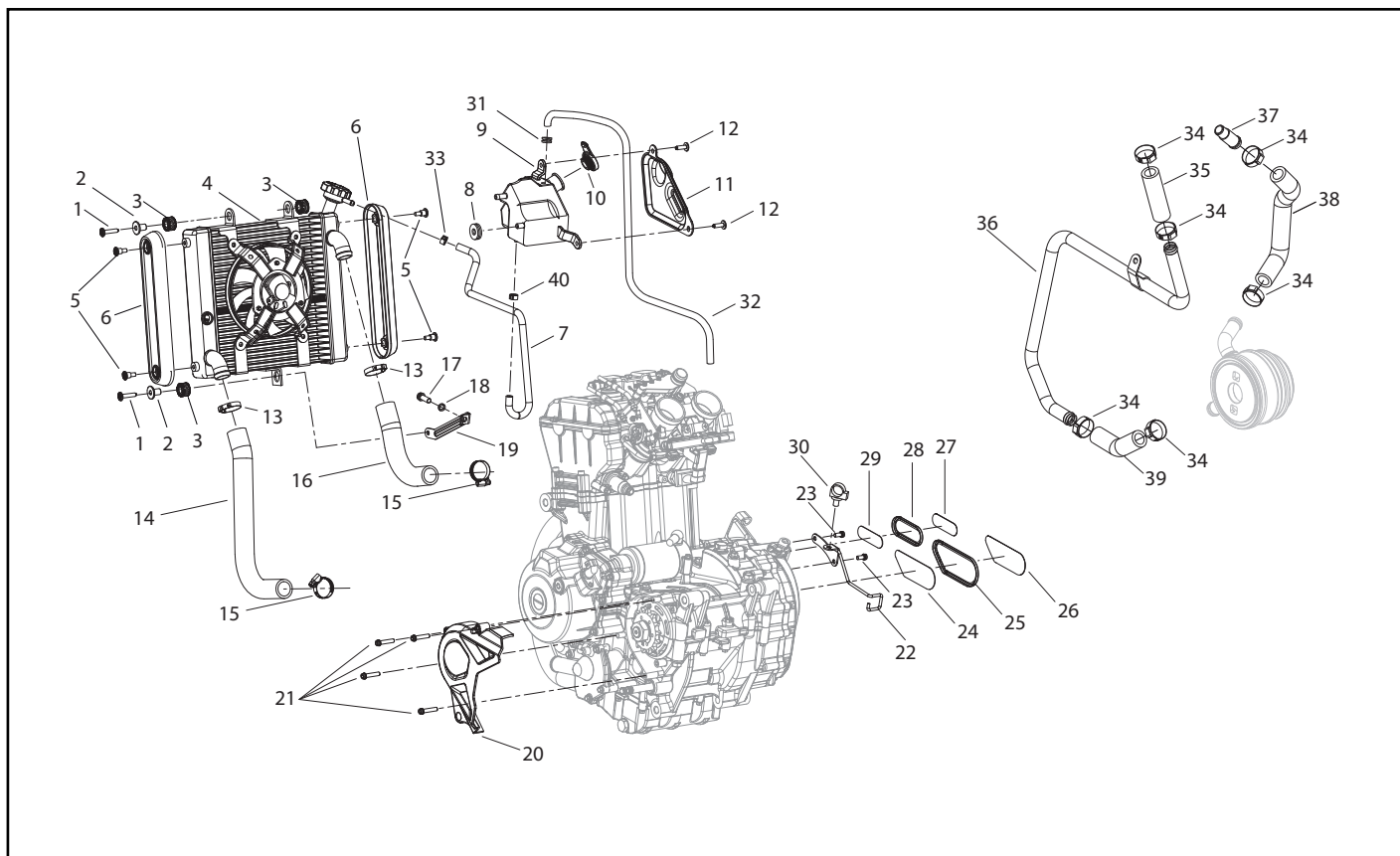
NOTE: _____

Fill with cooling fluid after completing these operations.





RADIATOR



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SPECIAL SCREW					
2	BUSHING					
3	RUBBER TIP					
4	WATER RADIATOR					
5	SCREW					
6	RADIATOR GUARD					
7	PIPE					
8	RUBBER TIP					
9	WATER TANK					
10	WATER TANK CAP					
11	EXPANSION TANK CAP					
12	SCREW					
13	BAND					
14	SLEEVE					
15	SCREW BAND					
16	SLEEVE					
17	SCREW					
18	ELASTIC WASHER					
19	BAND					
20	PINION COVER					
21	SCREW					
22	CABLE GLAND					



RADIATOR

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
23	SCREW (M6X12)					
24	BIADHESIVE					
25	ADHESIVE SUPPORT					
26	ADHESIVE					
27	ADHESIVE					
28	ADHESIVE SUPPORT					
29	BIADHESIVE					
30	CABLE GLAND					
31	VIBRATION RUBBER TIP					
32	PIPE					
33	PIPE GLAND CLIP					
34	BAND					
35	PIPE					
36	SLEEVE					
37	PLUG					
38	SLEEVE					
39	SLEEVE					
40	BAND					



RADIATOR

RADIATOR REMOVAL

Remove:

- Fuel tank, refer to the section “Removal of the fuel tank, Chapter 4”.

NOTE:

Drain out all cooling fluid by taking out the screw (12) before proceeding with removal operations, as shown in Fig. A.

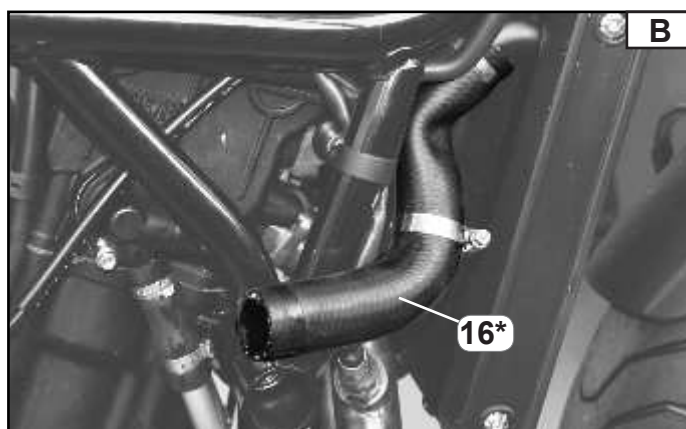
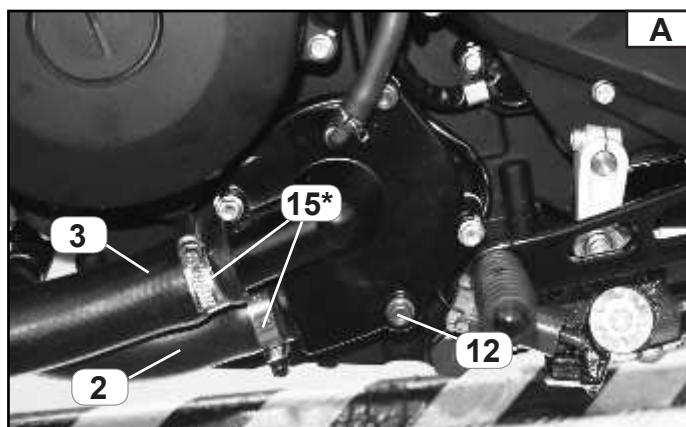
- The band (15*) Fig. A.
- The water inlet manifold (2) Fig. A.
- The water return manifold (3) Fig. A.

NOTE:

To make it easier to drain out cooling fluid, it is necessary to open also the radiator cap at the same time.

Disconnect:

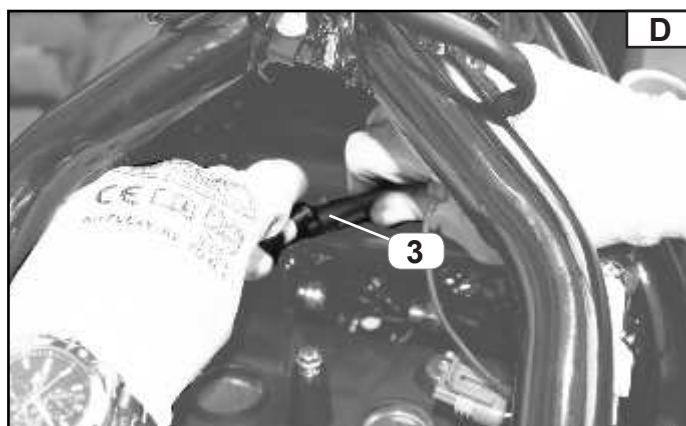
- The sleeve (16*) Fig. B.



- The pipe (7*) Fig. C.



- The fan connector (3) Fig. D.





RADIATOR

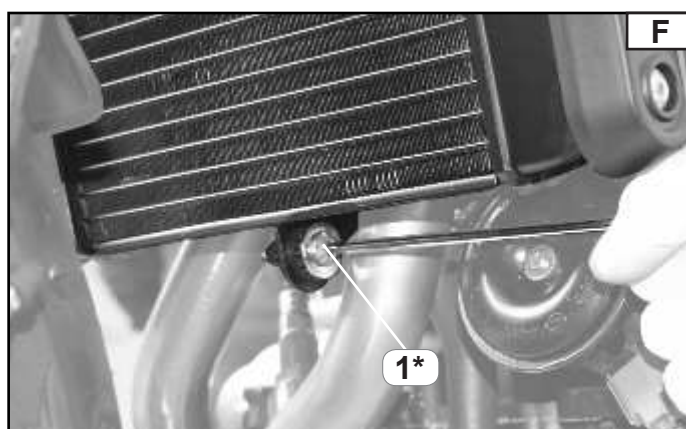
RADIATOR REMOVAL

Remove:

- The screws (1*) fastening the radiator bracket to the frame Fig. E.



- The screws (1*) fastening the lower bracket to the frame Fig. F.



- The complete radiator (4*) Fig. G.

**Check:**

- The radiator fins.

If clogged, clean.

Use a jet of compressed air on the back of the radiator.

NOTE:

Straighten any bent fins using a fine flathead screwdriver

Check:

- the radiator hoses.
- the radiator pipes.

If there is any cracking/damage, replace.

- The radiator fan

In the event of damage, replace.

In case of malfunction, check and repair.

NOTE:

The numbers marked (*) are a part of the spare parts table chapter "Radiator".



RADIATOR

RADIATOR INSTALLATION

Install:

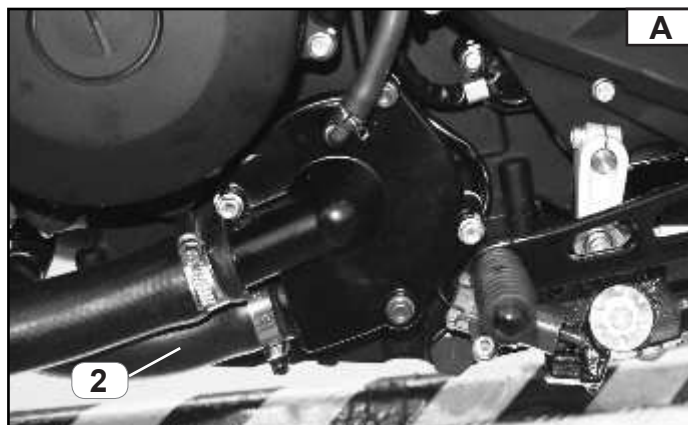
Once each individual part has been checked, proceed to install the radiator following the removal steps in reverse order.

- The screws to fasten the radiator to the bracket on the frame, tightening to the following torque:



Torque 10 N*m

- The bands must always be replaced once they have been opened.
- Once the parts have been assembled, connect the wiring to the radiator bulb and fan and proceed to fill the circuit.

**NOTE:**

While filling the circuit, pinch the sleeve as the fluid (2) is being delivered Fig. A, to remove any air bubbles.



RADIATOR

ELECTRIC FAN REMOVAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

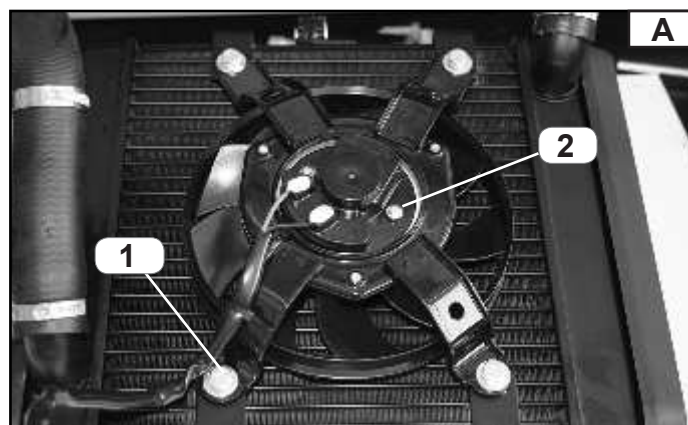
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Fuel tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- Radiator, refer to the chapter “**Radiator, section Radiator removal**”.
- The screws (1) Fig. A.
- The electric fan (2) Fig. A.

NOTE:

The numbers marked (*) are a part of the spare parts table chapter “**Radiator**”.





RADIATOR

ELECTRIC FAN INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screws (1) Fig. A

To the following torque:

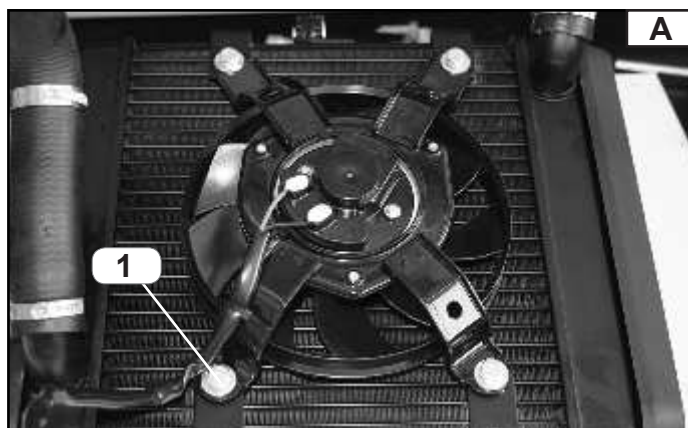


Torque 10 N*m

Use Loctite thread locker to secure.



Loctite 243



NOTE:

The numbers marked (*) are a part of the spare parts table chapter "Radiator".



EXPANSION TANK

EXPANSION TANK REMOVAL

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- Fuel tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The screws (12*) Fig. A.
- The cap (10*) Fig. A.

Disconnect:

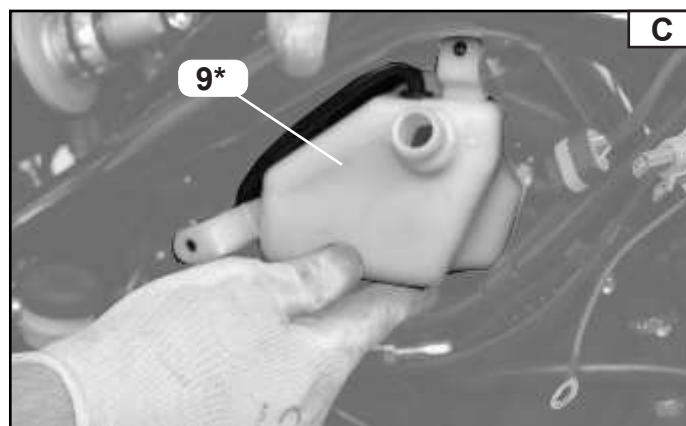
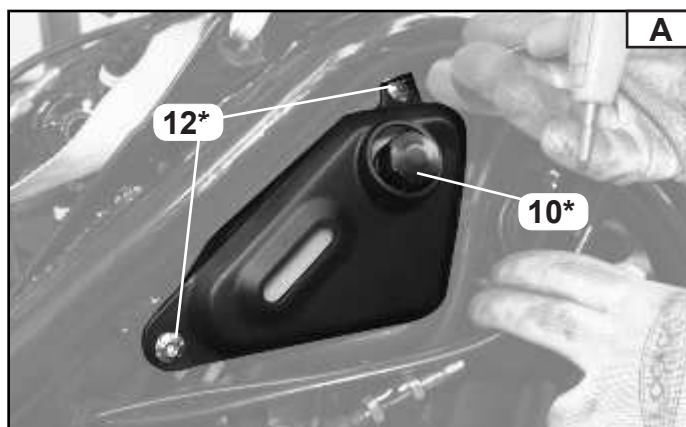
- The pipe (7*) Fig. B.

Remove:

- The tank (9*) Fig. C.

NOTE:

The numbers marked (*) are a part of the spare parts table chapter “**Radiator**”.





EXPANSION TANK

EXPANSION TANK INSTALLATION

Park the motorcycle on a level surface.

IMPORTANT NOTICE

Prop the motorcycle on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

NOTE:

If the fastening bands of the pipes are damaged, replace with new bands.





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SENSORS

DESCRIPTION OF THE ENGINE MANAGEMENT SYSTEM

Each model has an electronic control system for the engine, with a control including both ignition and fuel distribution.

The Electronic Control Module (ECM) uses information from the sensors around the engine, the cooling system and intake system, calculating with precision, the advance ignition time and fuel needs for all engine speeds and loads.

The system also has a hardware diagnostics system in line with the needs of the state of California USA for on-board diagnostics. This function makes sure that if a breakdown occurs in the system, the type of breakdown and engine data at the time of the problem are stored in the ECM memory.

The stored data can be recovered by means of an apposite service equipment available at any Benelli Dealer (see Texa instruction manual).

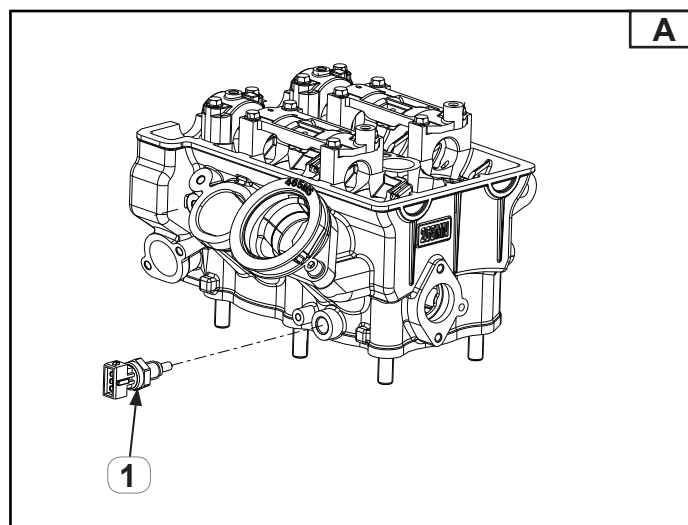
This way, there can be exact diagnosis of the breakdown and prompt, efficient repair of the fault.



SENSORS

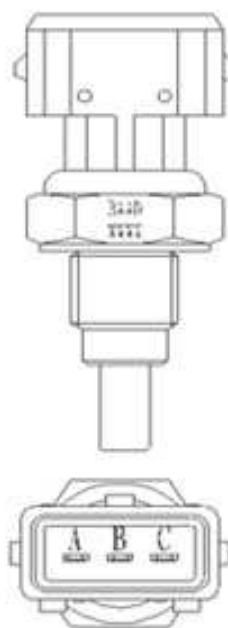
COOLING FLUID TEMPERATURE SENSOR

It is situated close to the cylinder head (1), Fig. A.
It calculates the cooling fluid temperature data received from the ECM and used to optimise supply at all engine temperatures to calculate the supply needs when starting up from hot and cold.



CHECKLIST

Resistance (A-C)			Resistance (A-C)		
Temp	Res Ω	Tolerance	Temp	Res Ω	Tolerance
-40°C	100.865	±4.87%	70°C	469	±2.11%
-35°C	72.437	±4.64%	75°C	359	±2.07%
-30°C	52.594	±4.43%	80°C	334	±2.04%
-25°C	38.583	±4.21%	85°C*	283	±2.0%
-20°C	28.582	±4.0%	90°C	241.8	±2.1%
-15°C	21.371	±3.8%	95°C	207.1	±2.21%
-10°C	16.120	±3.6%	100°C	178.0	±2.31%
-5°C	12.261	±3.4%	105°C	153.6	±2.42%
0°C	9.399	±3.21%	110°C	133.1	±2.52%
5°C	7.263	±3.06%	115°C	115.7	±2.61%
10°C	5.658	±2.92%	120°C	100.9	±2.68%
15°C	4.441	±2.78%	125°C	88.3	±2.75%
20°C	3.511	±2.64%	130°C	77.5	±2.8%
25°C*	2.795	±2.5%	135°C	68.3	±2.84%
30°C	2.240	±2.45%	140°C	60.3	±2.87%
35°C	1.806	±2.4%	145°C	53.4	±2.89%
40°C	1.465	±2.36%	150°C	47.5	±2.9%
45°C	1.195	±2.31%			
50°C	980	±2.27%			
55°C	809	±2.23%			
60°C	671	±2.19%			
65°C	559	±2.15%			



Resistance(B-Sensor shell)	
Temp	Resistance Ω
50°C*	205-231
70°C	93.5-113.1
90°C	45.5-54.95
110°C*	22.86-26.84
115°C	19.19-22.31
118°C	19.35-22.05
125°C	13.85-16.05



SENSORS

GEAR POSITION SENSOR

It is situated on the left side of the engine, close to the pinion, and detects the position of the gear.

Disconnect:

- The electrical coupling.

Remove:

- The gear position sensor from the half casing.

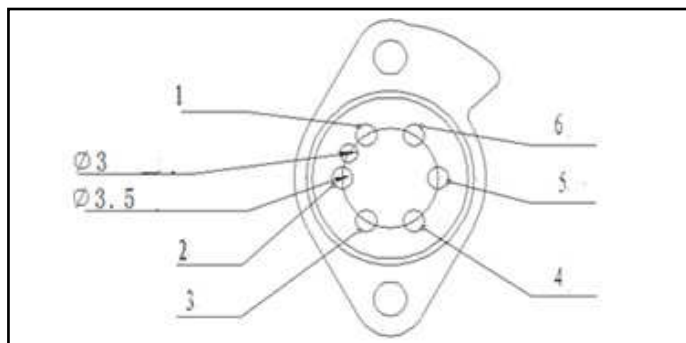
Check:

- The continuity.

Ø 3: Neutral

Ø 3.5: Grey for Neutral

1. brown/yellow first gear
2. green/black second gear
3. green/blue third gear
4. yellow/blue fourth gear
5. brown/red fifth gear
6. yellow/red sixth gear





SENSORS

PHASE SENSOR

It is situated close to the left engine casing (1), Fig. A.

A position sensor on the crankshaft detects the movement of a toothed wheel fixed at the right end of the drive shaft, by reading a specific wheel formed by 28 equidistant teeth alongside a triple length space.

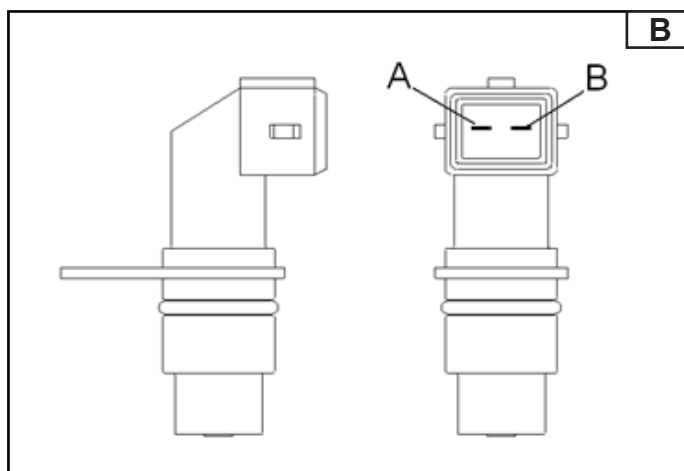
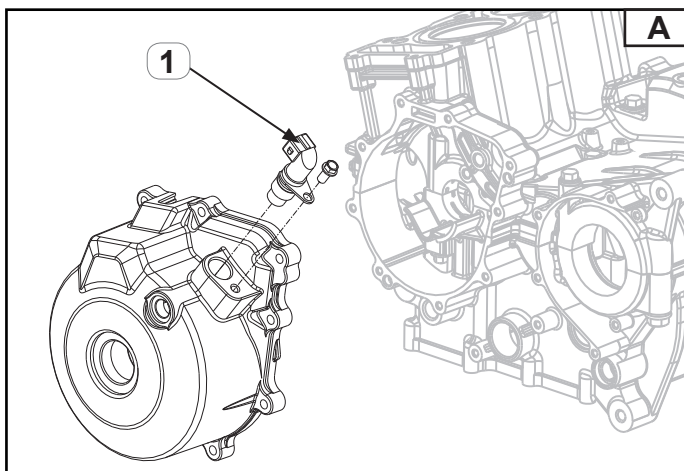
The interpreted reading is used by the ECM to identify the position of the drive shaft compared to the point in which the fuel is injected, and the need for the fuel ignition.

Disconnect:

- The main wiring connector.

Measure:

- The resistance value at points A and B of engine Fig. B



Standard	$550 \pm 50 \Omega$ (20°C)
----------	-------------------------------

NOTE:

If the measured resistance is lower than the stipulated value, the inner coil might be an open circuit or short-circuited, therefore it is necessary to replace it.

SENSORS

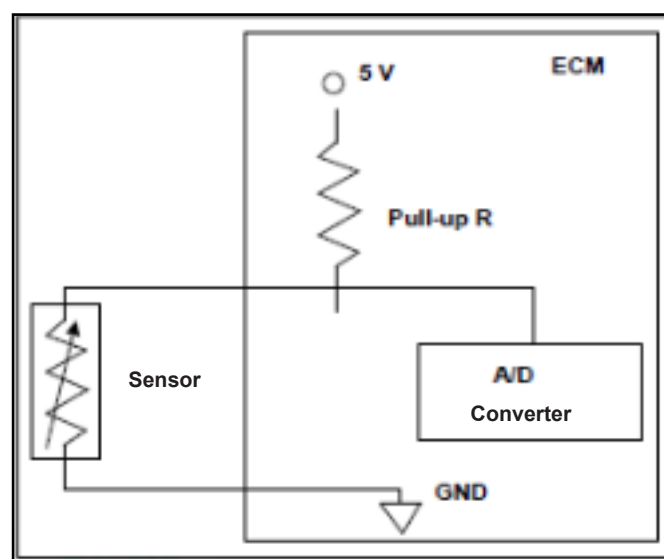
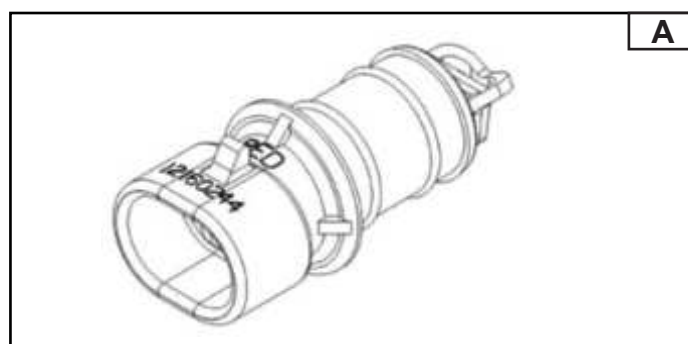
AIR TEMPERATURE SENSOR

Working principle of intake air temperature sensor

Within the sensor temperature range, the resistance varies according to the various temperature. It is distinguished by the negative temperature coefficient resistor. It is a part that can not be maintained.

Appearance of air temperature sensor (Fig. A):

Measured temperature (°C)	Resistance value (Ω)
0	9.399
5	7.263
10	5.658
15	4.441
20	3.511
25	2.795
30	2.240





SENSORS

SIDE STAND SWITCH

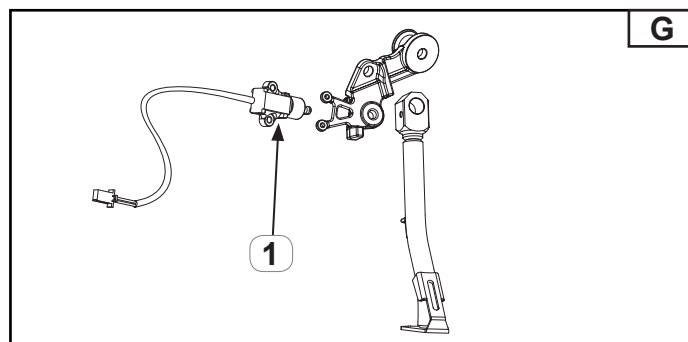
It is situated near the supporting plate of the side stand (1), Fig. G.

If the gear is engaged with the stand open, therefore with the circuit open, the control unit will prevent use and will switch off engine, if running.

Check:

- Continuity with a multimeter

CRUTCH	PIN 1	PIN 2
Raised	●	●
Lowered	●	●



NOTE: _____
When the above conditions are fulfilled, the sensor is working, otherwise replace the part.



SENSORS

OXYGEN SENSOR

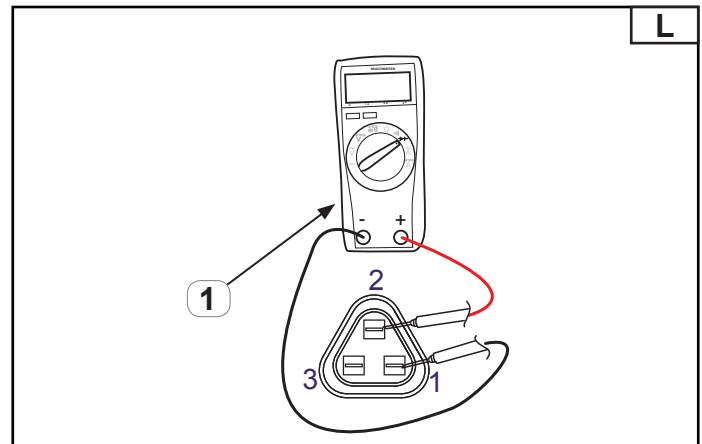
They are situated on the exhaust manifold (1), Fig. L.

The oxygen sensor serves to detect the oxygen concentration in the exhaust gases. More precisely, the lambda value indicates the air/petrol ratio, in which:

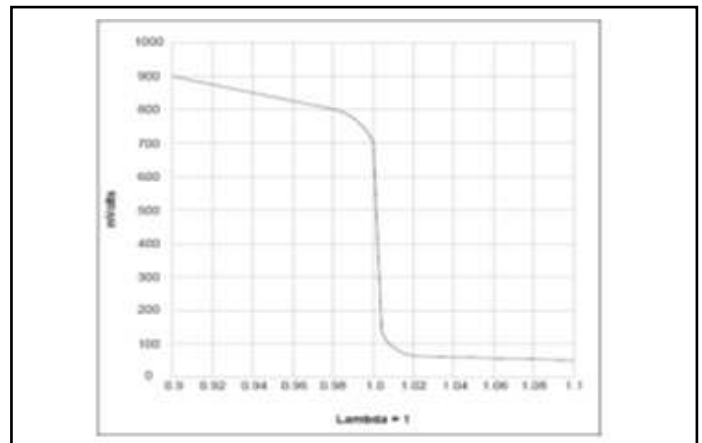
- Value 1, when combustion is stoichiometric
- <1 , in case of fuel excess
- >1 , in case of air excess

The sensor transmits the electric signal to the ECU, which controls the insertion of fuel and air into the combustion chamber.

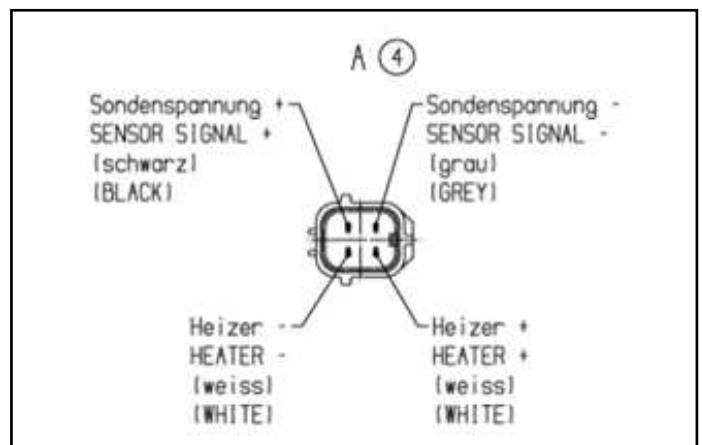
- Threshold value of air-fuel ratio: >750 mVcc.
- Dilute threshold of air-fuel ratio: <120 mVcc.
- Heating power of oxygen sensor: 7.0 W.
- 450°C exhausted gas temperature, 70% duty ratio, 10Hz, 13.5V voltage.
- Heating power: $9.6 \pm 1.5\Omega$ (measured at 21°C).
- Operating temperature range: $260\text{--}850^{\circ}\text{C}$.



CHARACTERISTIC OPERATING CURVE



CONNECTOR





SENSORS

OIL PRESSURE SENSOR

On the bottom half casing, measure the pressure of the oil in the bush gallery (1) Fig. M.

Shows sufficient oil pressure on the dashboard.

Disconnect:

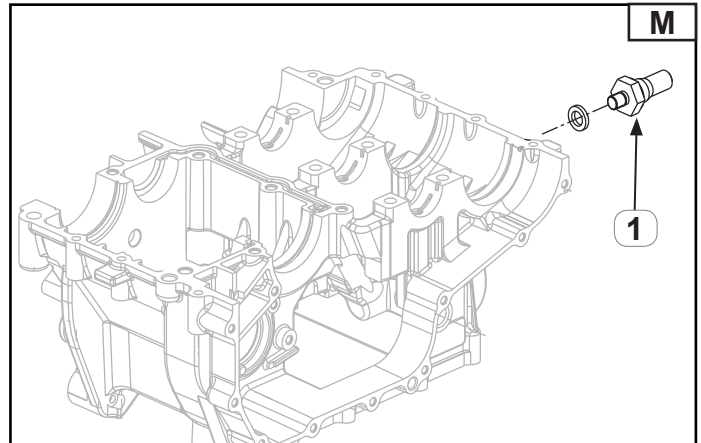
- The electrical coupling.

Remove:

- The oil pressure sensor from the half casing.

Check:

- The continuity between the PIN1 and the sensor ground by means of an air pressure regulator with insertion on the detection hole.
- Set the air pressure regulator at 2 bar.
- Reduce pressure gradually to reach 0.2 - 0.3 bar.



Continuity between PIN1 and ground

0.2 - 0.3 bar

NOTE: _____

If there is no continuity between PIN1 and engine ground, replace the part.



SENSORS

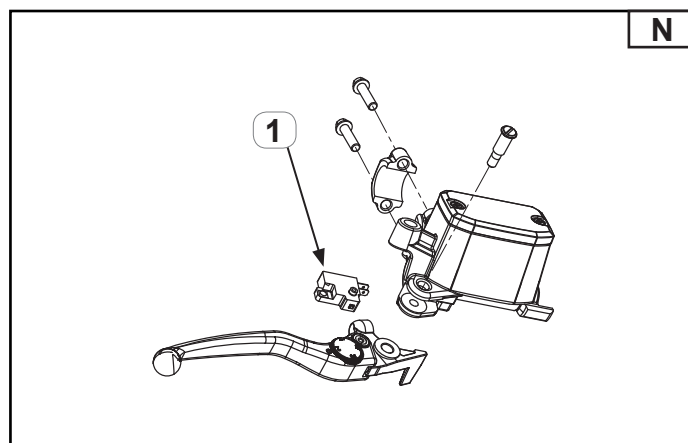
FRONT BRAKE MICROSWITCH:

It is a switch in contact with the brake lever, situated on the front brake pump, which serves to switch on the stop lights (1), Fig. N.

Check:

- Continuity
- with the multimeter on the symbol $\rightarrow|$ - (diode/continuity test function), check operation as shown in the table.

SENSOR	PIN 1	PIN 2
Brake lever Pulled	● — ●	● — ●
Brake lever Released	●	●

**NOTE:** _____

When the above conditions are fulfilled, the front brake sensor is working properly, otherwise replace the part.



SENSORS

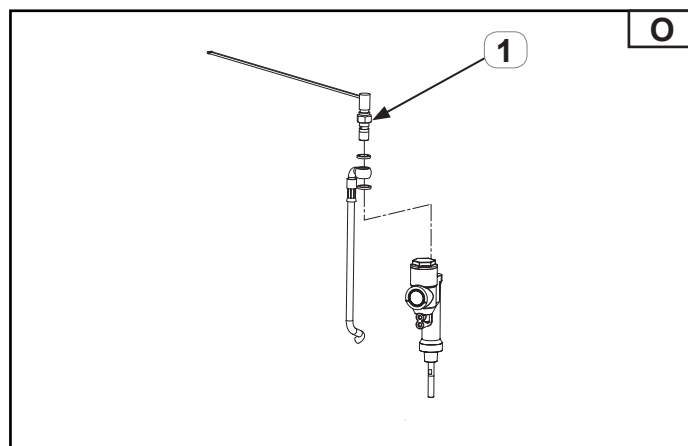
IDROSTOP

A switch on the front brake pump that works by reading the oil pressure on the pump. It serves to switch the stop lights on (1), Fig. O.

Check:

- Continuity with the multitester on PIN 1 and PIN 2, check the table.

BRAKE	PIN 1	PIN 2
Pulled	●	●
Released	●	●

**NOTE:**

When the above conditions are fulfilled, the front brake sensor is working properly, otherwise replace the part.



SENSORS

CLUTCH SWITCH

On the clutch lever, to ensure that the engine will not start until the lever is completely pulled (1) Fig. P.

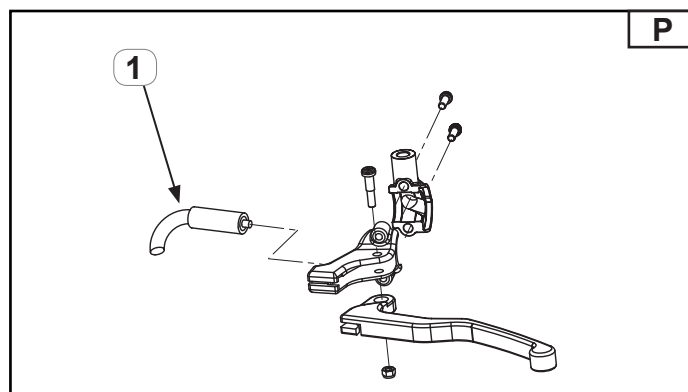
Disconnect:

- The clutch switch cables.

Use:

- The tester and check the clutch switch pins referring to the table.

CLUTCH	PIN 1	PIN 2
Pulled	●	●
Released	●	●

**NOTE:**

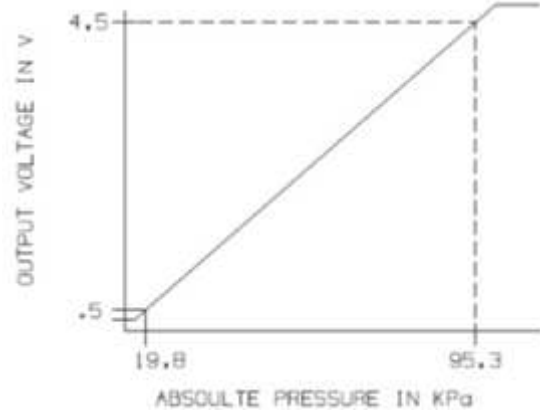
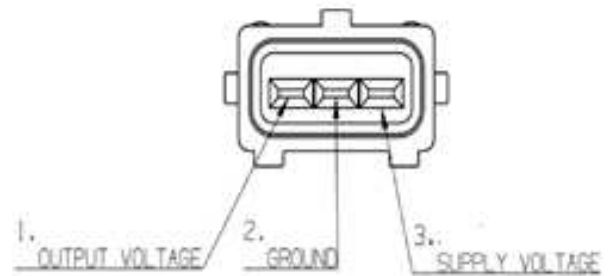
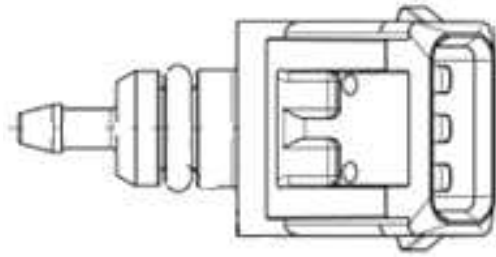
When the above conditions are fulfilled, the front brake sensor is working properly, otherwise replace the part.



SENSORS

MAP SENSOR (MANIFOLD ABSOLUTE PRESSURE)

It is situated close to the throttled body and serves to detect the absolute pressure on the intake manifold. It reflects the size of inlet pressure, which can be converted to air intake volume accessing the combustion chamber of the engine.





SENSORS

POSITION SENSOR OF THE THROTTLED BODY UNIT (POTENTIOMETER)

It is situated on the right end of the shaft of the throttled body unit.

Position sensor of the throttled body group (potentiometer), controlled and supplied directly by the ECM, gives out a signal, which identifies the throttle opening position used by the ECM to determine fuel dosage and ignition advance (A), Fig. Q.

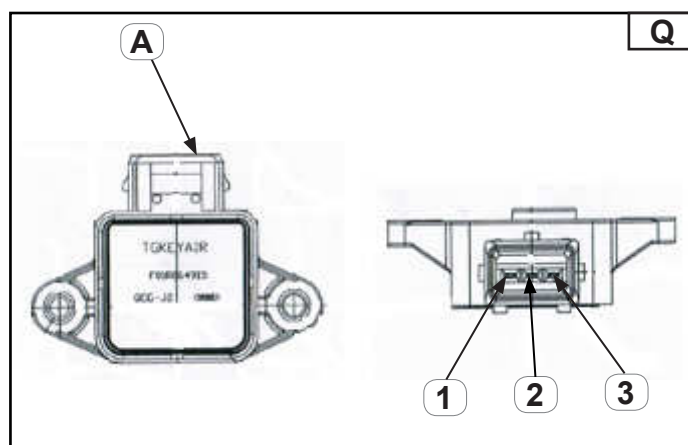
Disconnect:

- The electrical coupling.

Check:

- The resistance using the multitester on symbol Ω between pin 3 and pin 2.

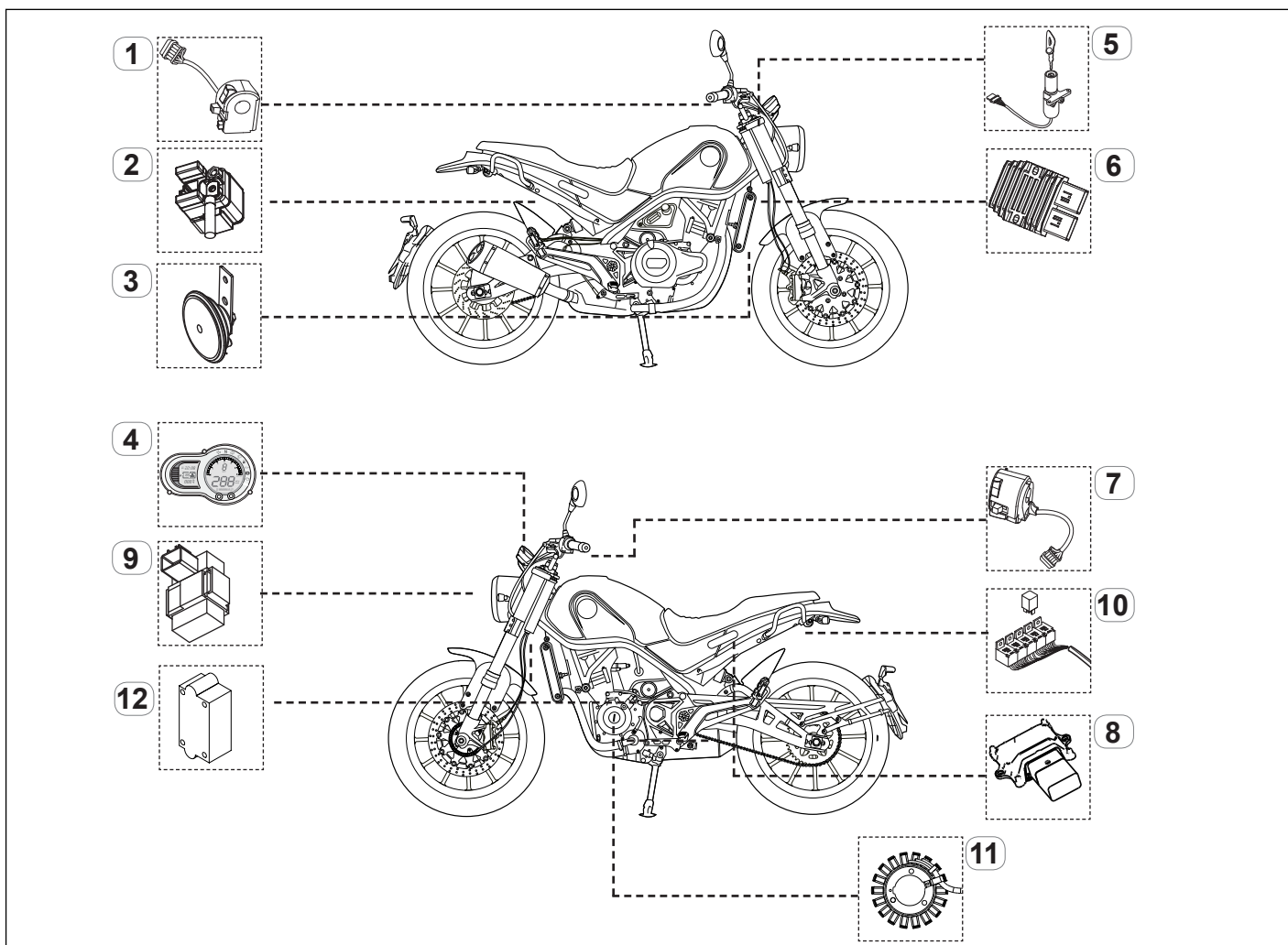
Throttle location	RESISTANCE
Fully closed throttle	1.050 K Ω $\pm$ 20%
Fully open throttle	2.5 K Ω $\pm$ 20%





DEVICES

DEVICES POSITION



Position	Device
1	RIGHT ELECTRIC DEVICE
2	STARTING RELAY
3	HORN
4	INSTRUMENTS
5	IGNITION SWITCH
6	REGULATOR
7	LEFT ELECTRIC DEVICE
8	INJECTION ECU
9	LIGHT CONTROL RELAY
10	SERVICES RELAY
11	STATOR
12	DROP SENSOR



DEVICES

RIGHT ELECTRIC DEVICE

On the right side of the handlebar Fig.1, the electrical device is comprised of:

- **RUN/OFF button (A)**
it serves to break contact to the electric device in case of emergency.
- **Ignition button (C)**
it serves to start the engine.
- **Hazard lights switch (B)**
it serves to activate the hazard lights in case of emergency.

Check:

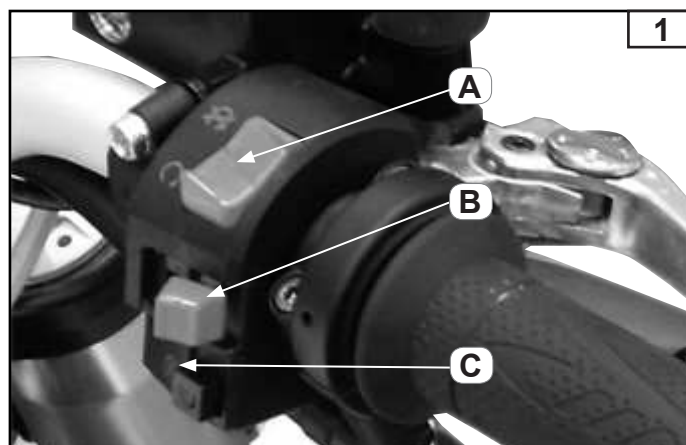
- Continuity
with the multimeter positioned on the RUN/OFF button set to ON.

Check:

- Continuity
with the multimeter positioned on the ignition switch, pressed to ON.

Check:

- Continuity
with the multimeter positioned on the hazard lights switch set to ON.



Refer to the table.

	AR/BL	AR/GR	N	R	MR/GR	VE/GL
	1L		1R	2R		2L



DEVICES

STARTING RELAY (REMOTE CONTROL SWITCH)

It is situated close to the fuse block and breaks power contact on the starter (1) Fig. A.

Apply:

- 12 volt to terminals (2) and (3) Fig. B

Check:

- The continuity between power terminals.
- If there is continuity, the ignition relay is operational.

WARNING

Do not apply the battery voltage to the starter relay for more than 5 seconds to prevent overheating and damages to winding.

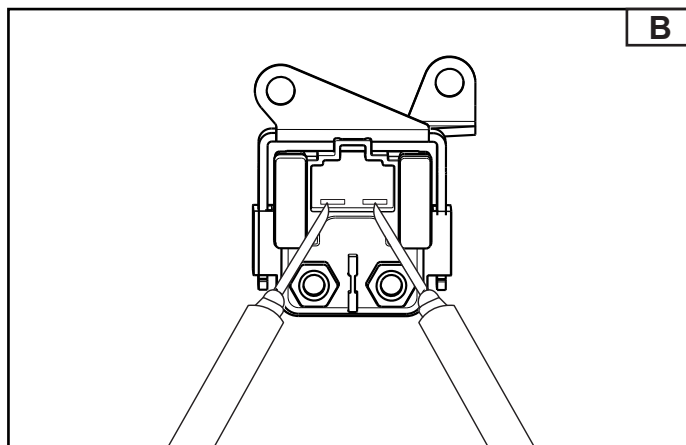
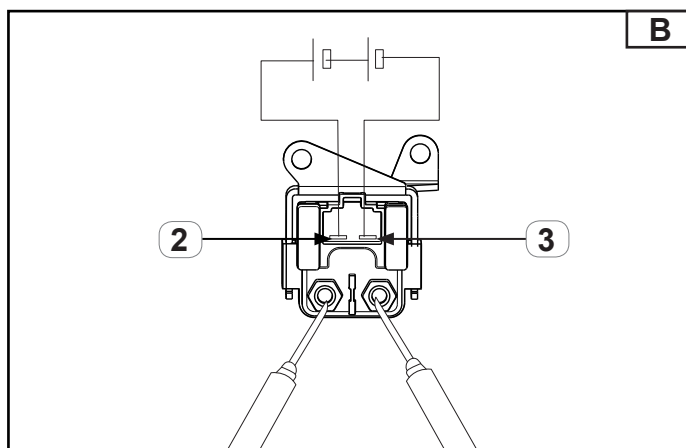
Check:

- The winding Fig. B.

If it is "open" or "grounded" and if there is resistance.

Winding is in good condition if the resistance is:

Starting relay resistance	3 - 6 Ω
---------------------------	----------------





DEVICES

HORN

It is situated on the left side of the frame close to the radiator (1)
Fig. A.

The horn is an electromechanical device serving as an acoustic warning device.

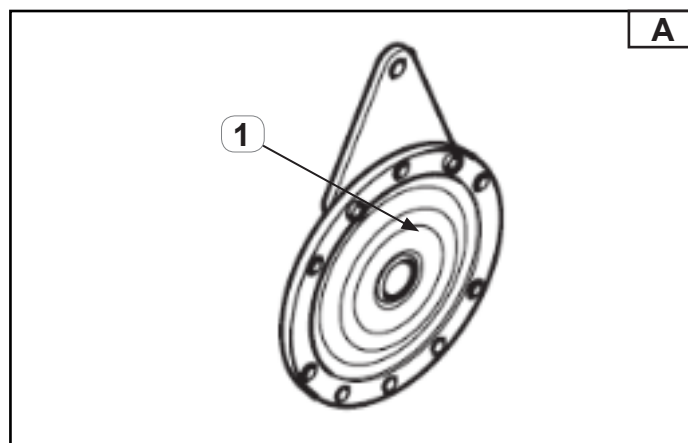
Connect:

- PIN1 and PIN2 to the battery and check operation.

Check:

- After the external horn being connected to rechargeable battery, if there is any sound, it refers to normal operation.

Resistance value	3.2 Ω
------------------	--------------





DEVICES

INSTRUMENTATION DASHBOARD

On the headlamp instrumentation support frame, the instrumentation provides the rider with all the information needed concerning the motorcycle operation Fig. A:

INDICATOR LIGHTS:

- high beam light
- left indicator light
- right indicator light
- neutral position indicator light
- injection fault indicator light
- ABS light
- oil pressure warning light

COOLING FLUID TEMPERATURE GAUGE

- It indicates the cooling fluid temperature.

TACHOMETER

- It indicates the number of revolutions per minute of the engine.

SPEED

- It indicates the vehicle speed in km or miles.

TRIP

- It indicates the distance travelled from the reset.

TOTAL

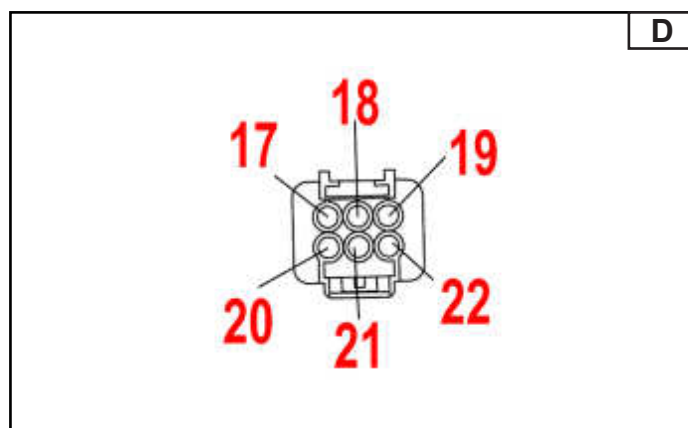
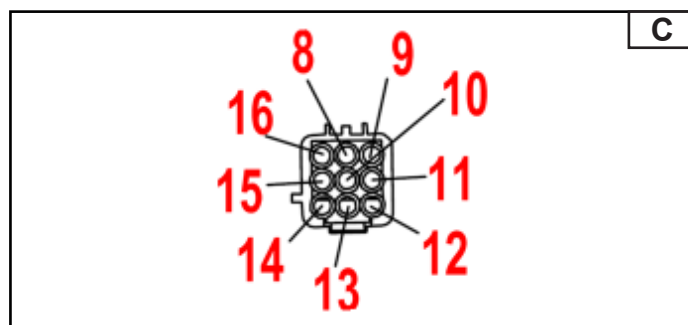
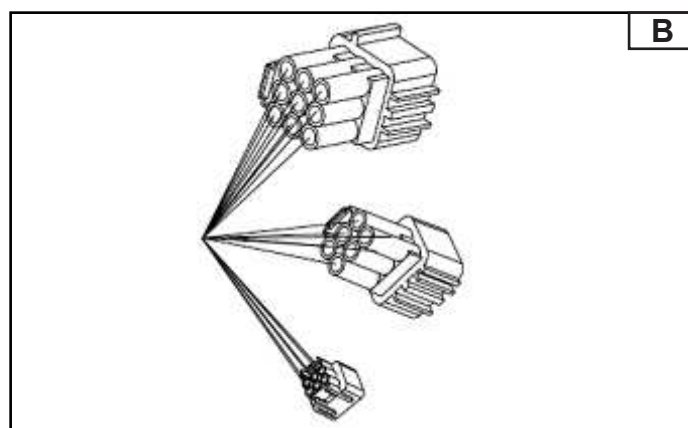
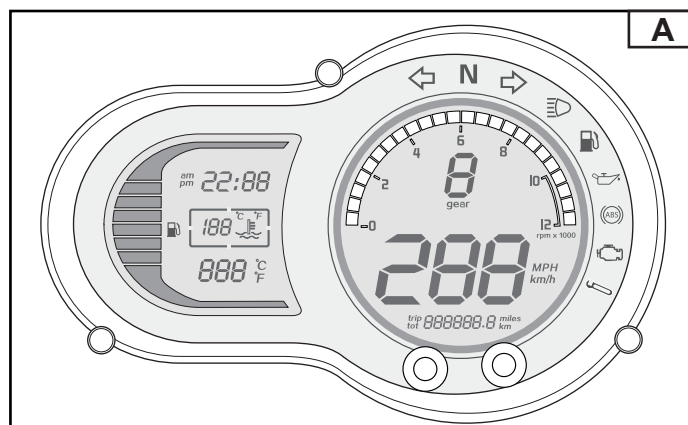
- It indicates the total distance travelled.

Pin-out (see table)

On the instrumentation dashboard outlet are three connectors Fig. B:

- The connector 1 Fig. C.
- The connector 2 Fig. D.
- The connector 3 Fig. E.

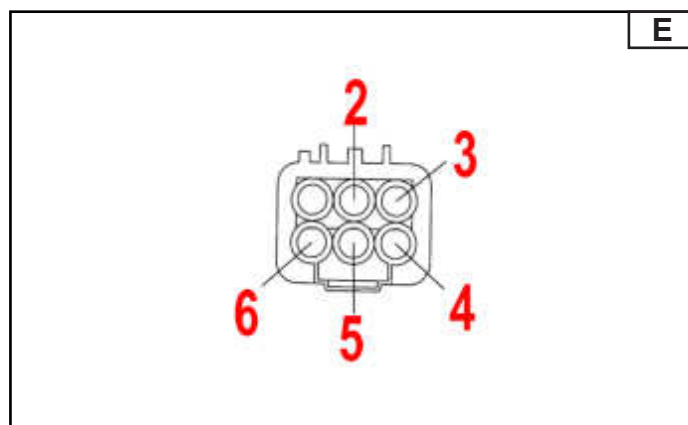
CODE	COLOUR
B	Black
BL	Blue
GR	Green
W	White
Y	Yellow
O	Orange
R	Red
Dg	Dark grey
P	Purple
N	Brown
G	Grey
LR	Pink





DEVICES

INSTRUMENTATION DASHBOARD



Pos.	Colour	Function	Symbol	Colour/LED	Verification signal
1		Instrument light			It goes on when the vehicle starts
2	G/W	Right turn signal	⇒	Green	12V-
3	R/W	Key			12V+
4	W/BL	Fuel level			
5	G/BL	Odometer			
6	R/Y	ABS		Yellow	
7	B/BL	Negative sensor			
8	BL	High beam		Blue	12V+
9	G/B	Left turn signal	⇐	Green	12V-
10	Y/W	Oil indicator		Red	12V-
11	Br/B	Engine diagnostic light		Yellow	12V-
12	Br	Water temperature			K line diagnosis
13	B	Battery negative terminal			12V-
14	R	Battery			12V+
15	R/Br	RPM signal			
16	Gr	Neutral	N	Green	
17	Br/Y	1st Gear	1	Black	
18	B/G	2nd Gear	2	Black	
19	G/R	3rd Gear	3	Black	
20	Y/BL	4th Gear	4	Black	
21	Br/R	5th Gear	5	Black	
22	P/R	6th Gear	6	Black	



DEVICES

MASTER SWITCH

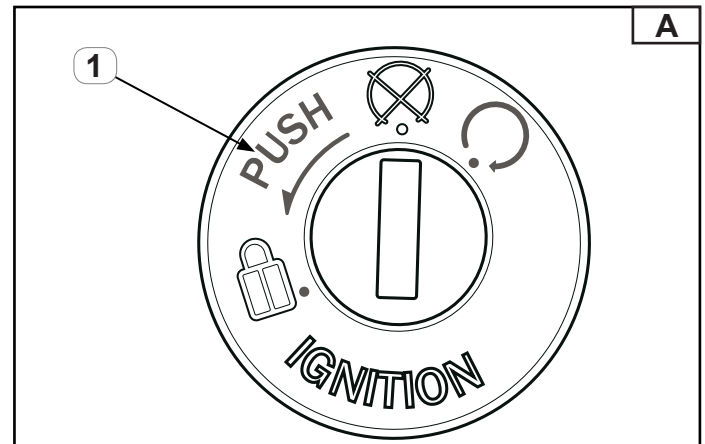
The ignition switch (1), Fig. A, is positioned behind the steering sleeve and serves to:

- Give the main contact for the electrical system
- Close the steering block
- Leave on the parking lights for all of the above conditions required

Check:

- Continuity
- using the multitester to check the table

COLOUR	V/G	R/B
PIN	PIN 1	PIN 2
Key ON	●	●
Key OFF		
Lock		



If the above conditions are met, then the ignition switch is operating: if not, replace the component.

- **Key in position “ON”**

All power circuits are active, instruments and lights carry out auto diagnostics; the engine can be switched on.

The key cannot be removed.

- **Key in position “OFF”**

All power circuits are deactivated; the key can be removed.

- **Key in position “LOCK”**

All power circuits are deactivated; the steering is locked.

The key can be removed.

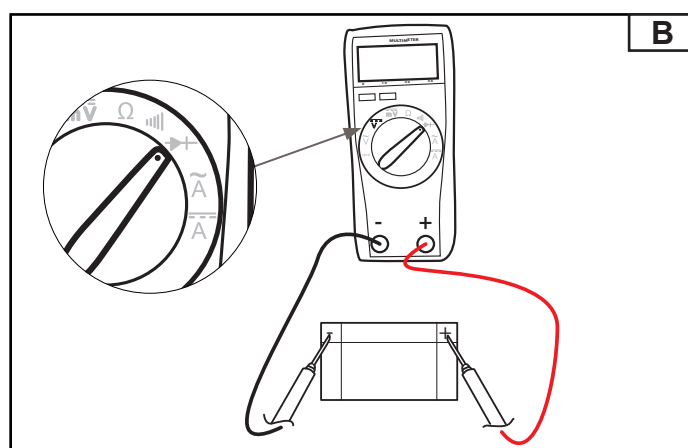
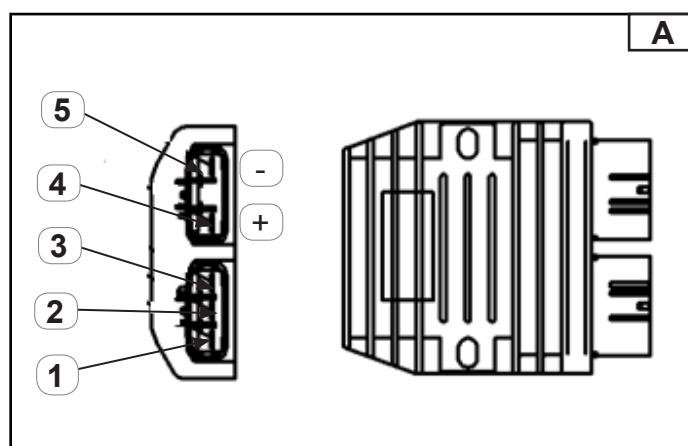


DEVICES

VOLTAGE REGULATOR

It is situated on the left side of the vehicle close to the water radiator and allows balancing of electrical consumption via the battery recharge.

1. Multimeter selection: diode test Fig. B.
2. Connect the black probe to the red line terminal (4) of voltage regulator. The red probe is to connect the white line terminal of voltage regulator (white 1 - 2 - 3). The pointer shows a certain value (value range 0.1~0.5V) indicating the need of replacing the regulator.
3. Connect the red probe to the red line terminal (4) of voltage regulator. The black probe is to connect the white line terminal of voltage regulator (white 1 - 2 - 3). The pointer shows a certain value (value range 0.3~0.8V) indicating the need of replacing the regulator.



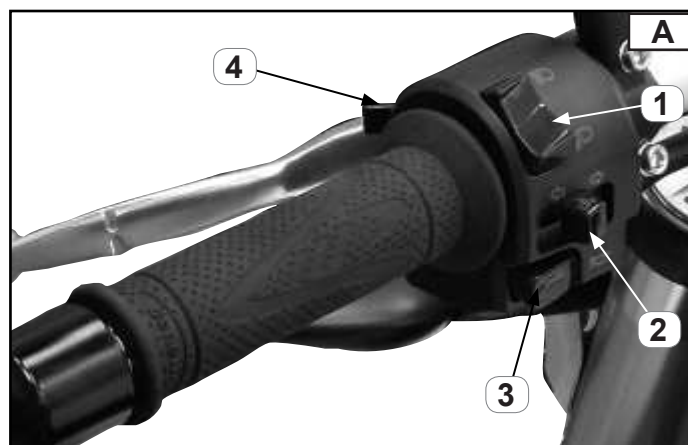


DEVICES

LEFT ELECTRIC DEVICE

It is situated on the left side of the handlebar (Fig. A), the left electric device consists of:

- **Light change-over control (1)**
for switching-over the high/dipped beam.
- **Direction indicator control (2)**
move the control from right to left to enable the relevant direction indicators.
The control returns to the centre; press to deactivate the direction indicators.
- **Horn button (3)**
press to start the sound.
- **High beam flash button (4)**
Used to signal the driver's presence when visibility is poor.



Check:

- Continuity with a multimeter, positioning it on the relevant terminals with the button pressed.

Check:

- Continuity with a multimeter, positioning it on the relevant terminals with the button pressed.

Check:

- Continuity with the multimeter on the relevant reference terminals for the selection (lh/rh).

Check:

- Continuity with the multimeter on the relevant reference terminals for the selection (bright/dim).

Check the table.

WIRE COLOURING	Red/Yel	Light Blue	Blue	Red/Whi	Gre/Bla	Oran	Gre/Whi	Red/Wh	Bro
Right indicator light						● — ●			
Left indicator light					● — ●				
High beam			● — ●						
Dipped beam	● — ●								
Flash button High beam	● — ●		●						
Horn								● — ●	

If the above conditions are met, then the horn, light switch control, high beam flash button are operating: if not, replace the components.



DEVICES

DROP SENSOR

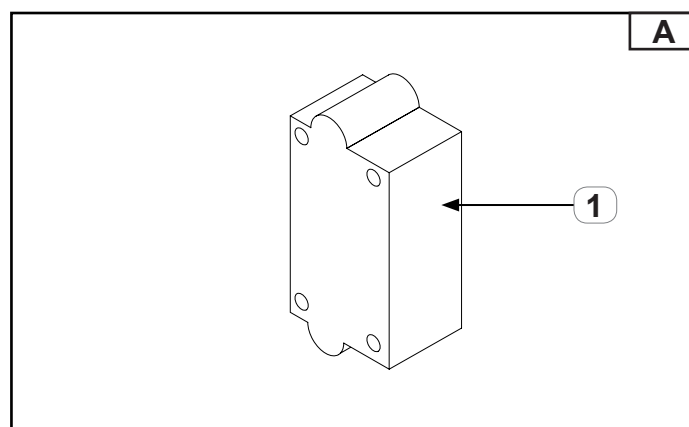
Situated close to the rear frame, in case of falling, it cuts off the fuel supply to the injection system (1) Fig. A.

Check:

Position the drop sensor in the condition of normal use of the motorcycle (horizontal) Fig. B.

NOTE:

The test will be carried out with the electrical circuit closed, that is with the sensor connector stably connected to the electrical system. The tips will be inserted behind the connector.



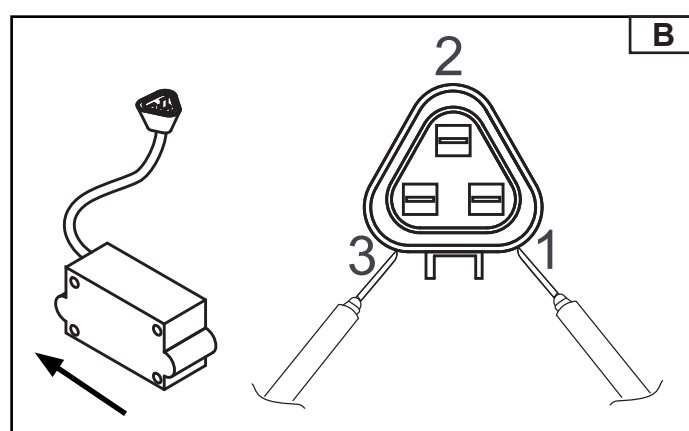
Insert:

- The red tip of the multimeter (+) into the pin 3 Fig. B.
- The black tip of the multimeter (-) into the pin 1 Fig. B.

Rotate the key of the ignition block to "ON".

Check:

The voltage between the pin 3 and pin 1 must correspond to the battery one (12 or more Vcc).



Insert:

- The red tip of the multimeter (+) into the pin 2 Fig. C.
- The black tip of the multimeter (-) into the pin 1 Fig. C.

Check:

The voltage between the pin 2 and pin 1 must correspond to the battery one (12 Vcc or more).

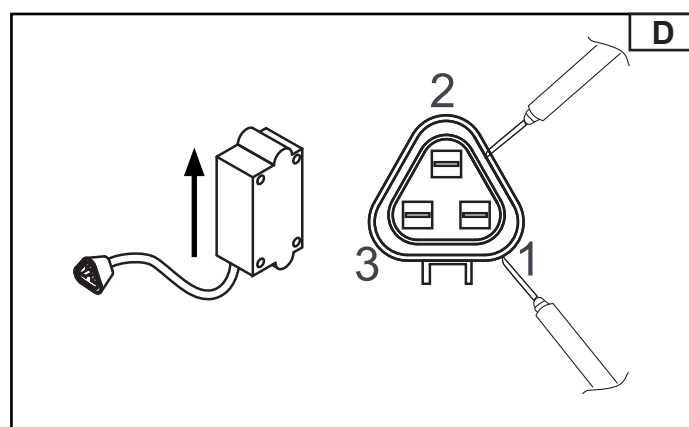
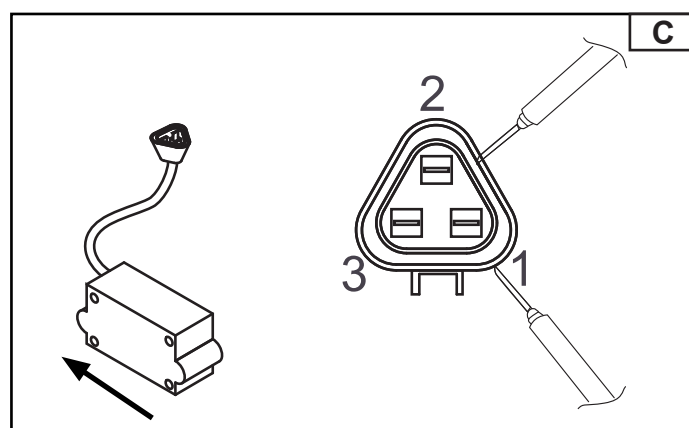
If the check between the pin 2 and the pin 1 is positive, place the drop sensor in vertical position Fig. D.

Insert:

- The red tip of the multimeter (+) into the pin 2 Fig. D.
- The black tip of the multimeter (-) into the pin 1 Fig. D.

Check:

The voltage between the pin 2 and pin 1 must be below 2Vcc.



IMPORTANT NOTICE

When the above conditions are fulfilled, the drop sensor is working properly, otherwise replace the part.



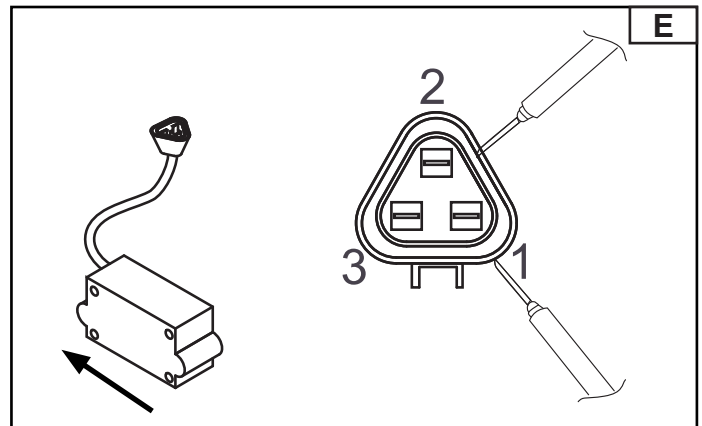
DEVICES

DROP SENSOR

NOTE:

Every time the sensor is positioned vertically, it activates and the output voltage from pin 2 goes below $\frac{2}{3} V_{cc}$, the ECU memorizes such condition and to proceed with motor starting it is necessary to proceed as described below.

- Position the drop sensor in horizontal and install in the correct position on-board.
- Rotate the key in the ignition block to OFF.
- After few seconds, rotate the key in the ignition block to ON and check that the voltage to pins 1 and 2 is the one of the battery (12 Vcc or more). If the outcome is positive, proceed with the engine start test.

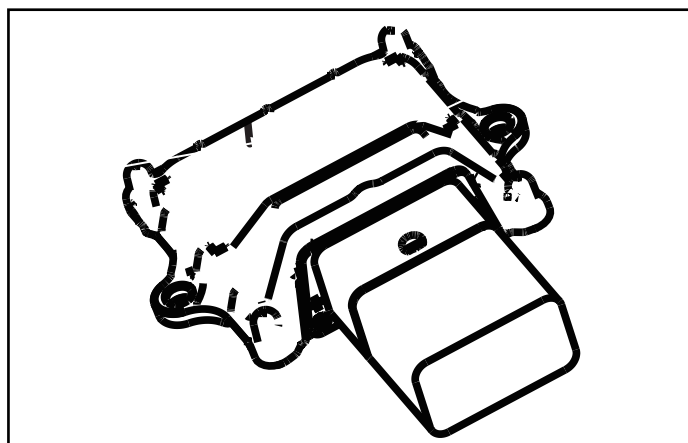




DEVICES

INJECTION ECU

Check the various utilities situated close to the seat, according to the diagram below.
Hereunder is a table indicating the meaning corresponding to the error code detected.



ERROR TABLE	
Error code	Error description
P0030	1st oxygen sensor heater cylinder - open/short circ.
P0031	1st oxygen sensor heater cylinder - ground open/short circ.
P0032	1st oxygen sensor heater cylinder - positive open/short circ.
P0053	1st resistance oxygen sensor heater coil cylinder - abnormal value
P0036	2nd oxygen sensor heater cylinder - open/short circ.
P0037	2nd oxygen sensor heater cylinder - ground open/short circ.
P0038	2nd oxygen sensor heater cylinder - positive open/short circ.
P0059	2nd resistance oxygen sensor heater coil cylinder - abnormal value
P0105	MAP sensor - abnormal response (no variation)
P0106	MAP sensor - abnormal response (out of range values)
P0107	MAP sensor - abnormal circuit grounded
P0108	MAP sensor - abnormal circuit on positive
P0112	Air temperature sensor - output voltage too low
P0113	Air temperature sensor - output voltage too high
P0116	ECT (Engine coolant temperature) - abnormal response (out of range)
P0117	ECT (Engine coolant temperature) - abnormal response (too low voltage)
P0118	ECT (Engine coolant temperature) - abnormal response (too high voltage)
P0122	TPS - abnormal response (too low voltage)
P0123	TPS - abnormal response (too high voltage)
P0130	1st lambda sensor cylinder - abnormal value (out of range)
P0131	1st oxygen sensor cylinder - abnormal value (too low voltage)
P0132	1st oxygen sensor cylinder - abnormal value (too high voltage)
P0134	1st oxygen sensor cylinder - open circuit
P0136	2nd oxygen sensor cylinder - abnormal value (out of range)
P0137	2nd oxygen sensor cylinder - abnormal value (too low voltage)
P0138	2nd oxygen sensor cylinder - abnormal value (too high voltage)
P0140	2nd oxygen sensor cylinder - open circuit
P0201	1st injector - open circuit
P0261	1st injector - ground short circuit
P0262	1st injector - positive short circuit

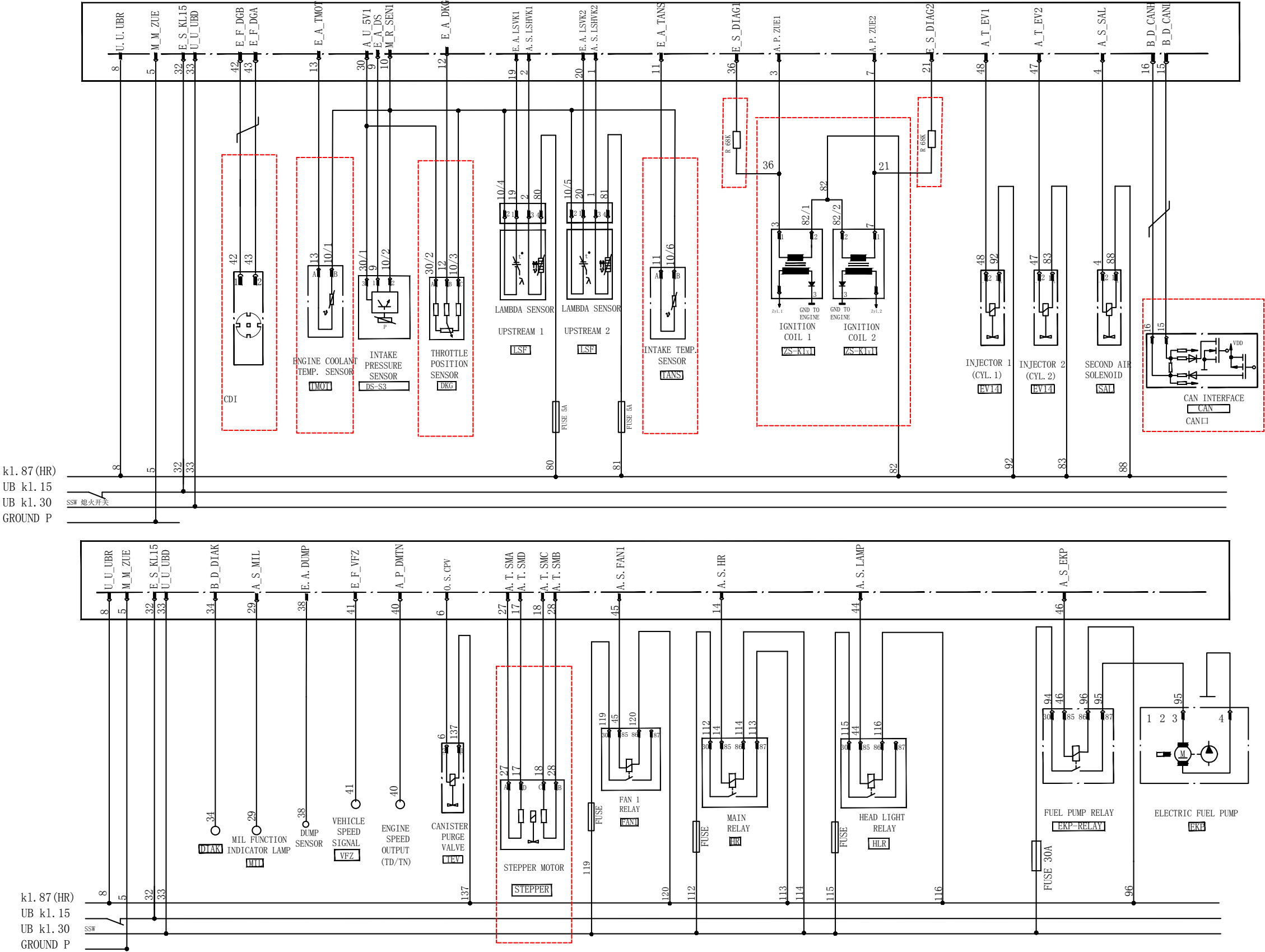


DEVICES

INJECTION ECU

ERROR TABLE	
Error code	Error description
P0202	2nd injector - open circuit
P0264	2nd injector - ground short circuit
P0265	2nd injector - positive short circuit
P0321	Drive shaft position sensor - failure (out of range)
P0322	Drive shaft position sensor - failure (open circuit)
P0444	Vapour exhaust checking valve - open circuit
P0458	Vapour exhaust checking valve - too low circuit voltage
P0459	Vapour exhaust checking valve - too high circuit voltage
P0501	Speed sensor - failure (out of range)
P0506	High minimum speed target compared to the limit of air control system
P0507	Low minimum speed target compared to the limit of air control system
P0508	IAC (idle air control) - ground short circuit
P0509	IAC (idle air control) - positive short circuit
P0511	IAC (idle air control) - open circuit
P0560	Abnormal system voltage response (out of range)
P0562	Too low system voltage
P0563	Too high system voltage
P0602	ECU map - coding error
P0627	Fuel pump relay check - open circuit
P0628	Fuel pump relay check - short circuit to ground
P0629	Fuel pump relay check - positive short circuit
P0650	Lamp circuit error - MIL indication
P2177	Too high CLL value
P2178	Too low CLL value
P1105	Canister purge valve - positive short circuit
P1116	Too high engine temperature
P1117	Canister purge valve - short circuit to ground
P1118	Canister purge valve - open circuit
P0571	Brake switch - failure
P1136	K line - open circuit

DEVICES
INJECTION ECU CONNECTIONS

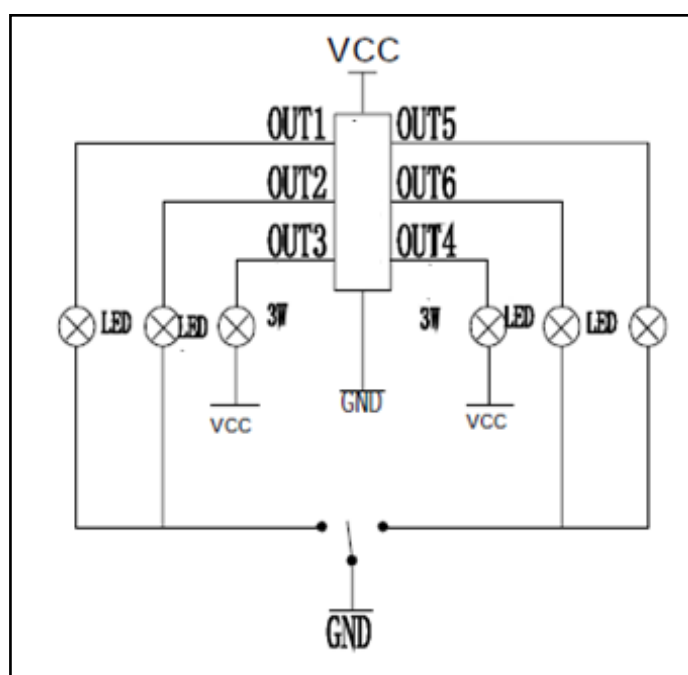
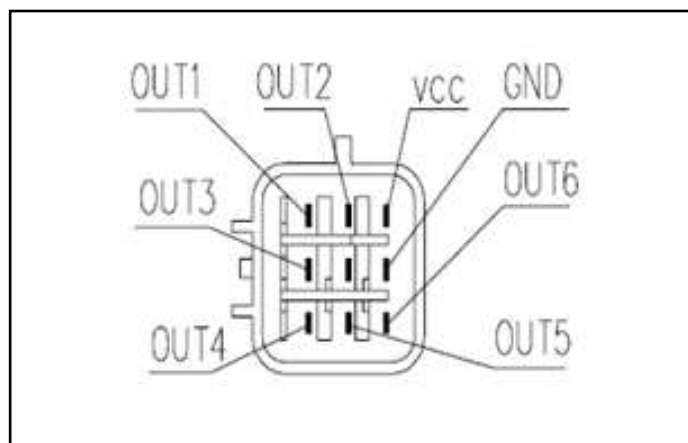




DEVICES

INDICATOR LIGHT INTERMITTENCE

It is situated inside the storage compartment, underneath the vehicle seat, and allows to control the indicator flashers.





DEVICES

ABS BUTTON

It is situated on the left side of the control handlebar (3), Fig. A, and allows to manage the insertion/release of ABS control.

Disconnect:

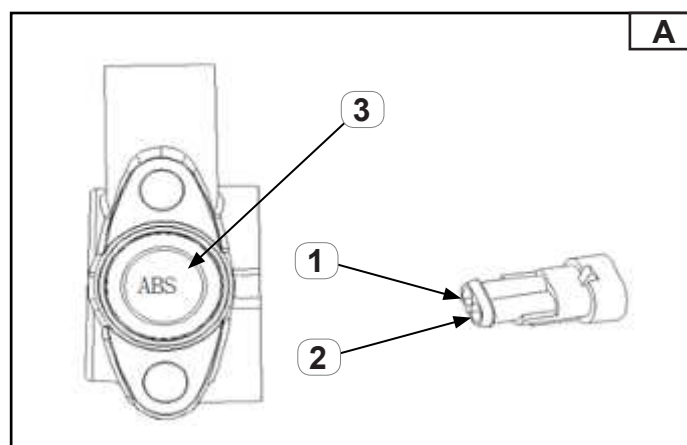
- The electrical coupling.

Check:

- The resistance using the multitester on symbol Ω between pin 1 and pin 2.

Resistance:

- 0Ω



DEVICES

SERVICES RELAY

It is situated inside the storage compartment, underneath the vehicle seat (Fig. A). The relay assembly is managed by the ECM to control each load at best, such as:

- **The lighting system**

The ECM ensures that the lights turn on in certain conditions.

- **The fuel pump**

The fuel pump is activated only when the starter lets the engine rotate.

- **The electric fans**

- **The injection**

The ECM controls the injection relay pull-in according to the relevant conditions, as ignition, shutdown, and use of the vehicle, thus allowing a stable supply to ECM, which can carry out any correct procedure of storage and setting of the parameters in the standstill phase, by continuing its self-powering for some seconds after the instrument panel shutdown.

- **Services**

All devices “with ignition on”, as dashboard, various safety devices and lighting system, are connected to the services relay.

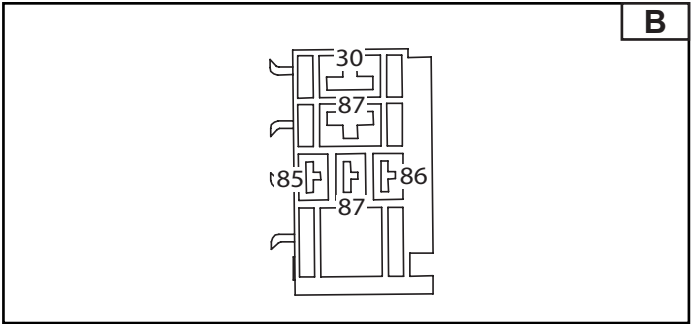
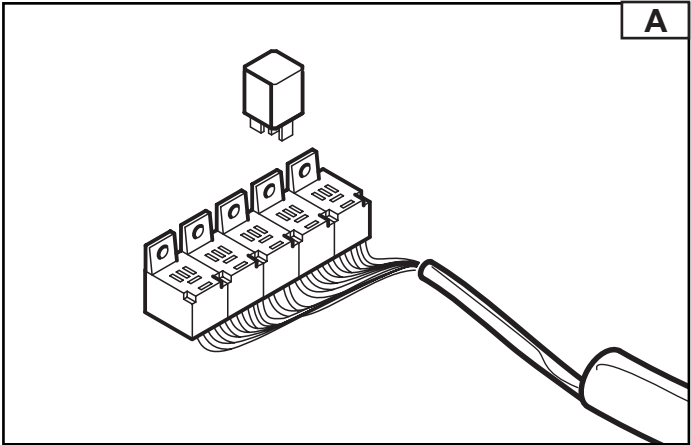
Check:

- The resistance using the multimeter on symbol “Ω” between pin 85 and pin 86 (Fig. B).



Resistance

12 ± 2 Ω



Use:

- The tester and, referring to the table, check on relay pins, by powering the PIN 85 and the PIN 86 to the battery.

RELAY	PIN 87	PIN 30	PIN 87A
Powered on battery	●	●	
Not powered on battery	●		●

NOTE:

When the above conditions are fulfilled, the relays are operating properly, otherwise replace the parts.



DEVICES

STATOR

Three types of failures may occur on the magnetoelectric generator (stator):

- **Short circuit.**
- **Line break (wire burnt).**
- **Lack/reduction of the magnetic field.**

Short circuit or open circuit of coil wires that cause low output or even no output.

Disappearing of rotor magnetism will lead to low output, which may be caused by AC electric generator or striving. Or it may be because of aging.

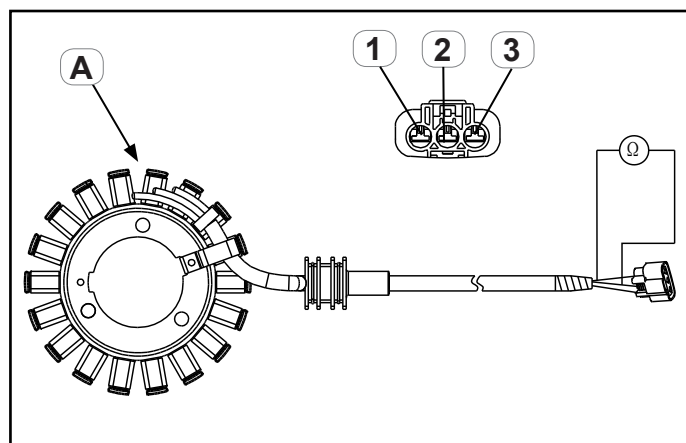
Turn off the ignition switch.

Disconnect:

- The connector of the 3-pole magnetoelectric generator.

Measure:

- The resistance value among the three black terminals of the magnetoelectric generator with a multimeter.



Standard

$0.18 \Omega \pm 0.01 \Omega$ at 25°C

- If the resistance is greater than the aforementioned values, or it is not possible to measure (infinite value) one of the two wires using the multimeter, it shall be replaced. When it is far lower than the resistance, it refers to a stator short-circuit. It shall be replaced.
- Measure the resistance between every single black wire and frame grounding with a multimeter in the highest resistance range.
- Use tester coil to check whether the engine is through. If yes, it refers to a short-circuit of the coil and engine. Check the charge coil.
- If the resistance of stator coil is normal, but the voltage check detects a failure of the magnetoelectric generator, the rotor magnets might have become loose. At this moment, replace the rotor.

Start up the engine:

- Run the revolutions per minute (rpm) according to Table 1.
- Record the voltage readings (three measurement values in total).

Table 1 Output voltage of magnetoelectric generator

Range of tester	Wiring		Readings at 5000 rpm
	Tester (+) to	Tester (-) to	
750 V AC	Black wire	Another black wire	55 V or higher

NOTE:

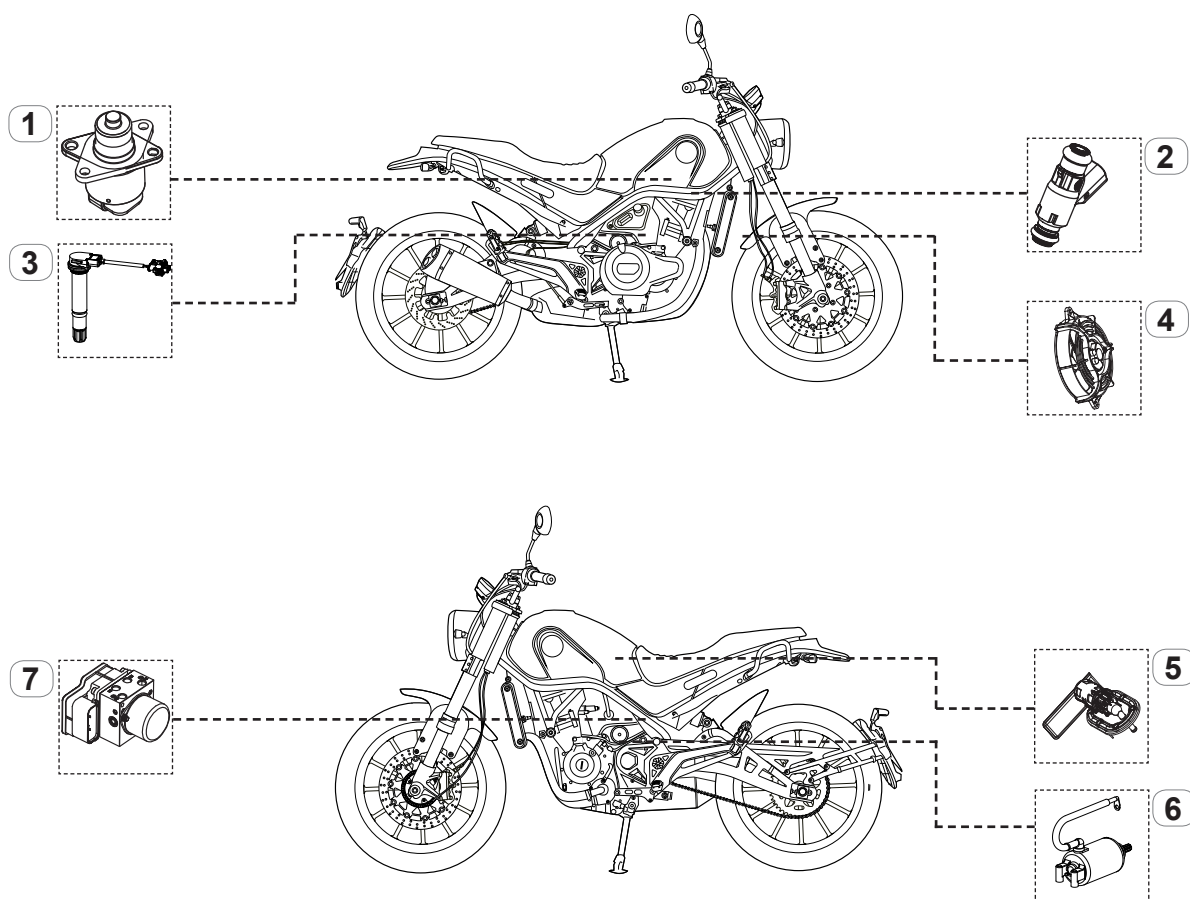
If the output voltage indicated is within the value of the table, the magnetoelectric generator works properly.

If the output voltage indicated is much lower than the value within the value of the table, problems occur on the generator.



ACTUATORS

POSITION OF ACTUATORS



Position	Device
1	STEPPER
2	INJECTORS
3	IGNITION COILS
4	COOLING FAN
5	FUEL PUMP
6	STARTER
7	ABS ECU



ACTUATORS

IDLE AIR CONTROL SYSTEM (STEPPER)

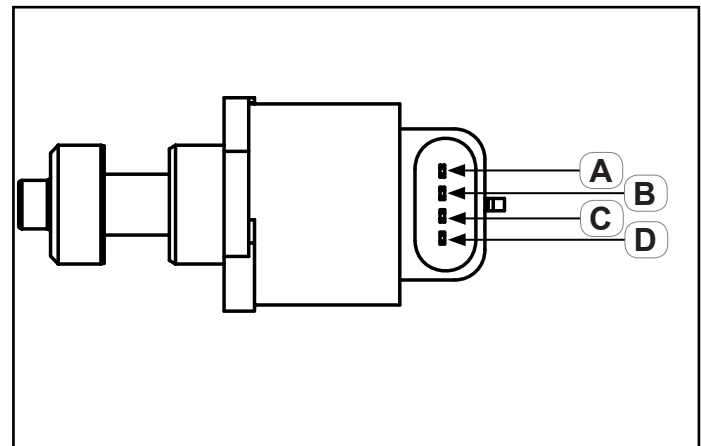
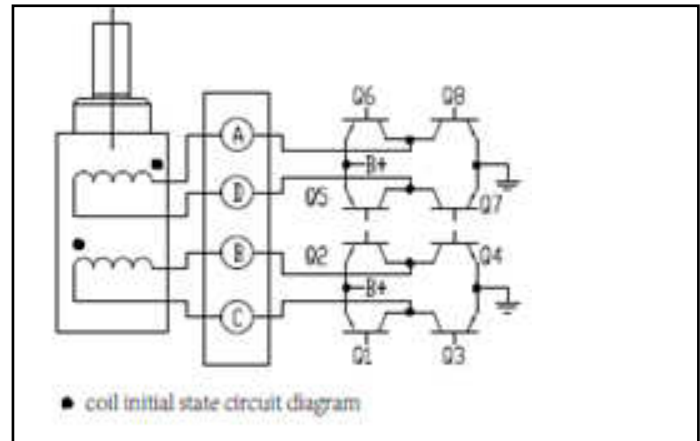
The system is situated inside the air filter case, contains a valve for checking air flow underneath the throttled body throttles and is equipped with a stepper motor.

The system controls the following parameters:

- **Idle speed.**
- **Air supply in case of engine overspeed.**
- **Adjustment of air/fuel ratio by working at idle speed at altitudes above sea level.**
- **Adjustment of air/fuel ratio in cold/hot setting-off.**

When enabled, the stepper opens the valve by a certain amount to check the passage of air, allowing a set amount to flow down a series of hoses in the group of throttles.

Operating voltage	12V DC
Minimum /maximum operating voltage	14V DC/ 7.5V DC
Impedance per coil (27°C)	53±5.3Ω
Minimum impedance	35 Ω
Distance	0.04167 mm
Maximum travel	8.5 mm (204 steps)
Resonant frequency range	70-120 pps



					PINS					
STEP	Q6-Q7	Q5-Q8	Q1-Q4	Q2-Q3	STEP	A	B	C	D	
1	ON	OFF	ON	OFF	1	+	-	+	-	Extend
2	ON	OFF	OFF	ON	2	+	-	-	+	
3	OFF	ON	OFF	ON	3	-	+	-	+	
4	OFF	ON	ON	OFF	4	-	+	+	-	
1	ON	OFF	ON	OFF	1	+	-	+	-	Retract
2	ON	OFF	OFF	ON	2	+	-	-	+	
3	OFF	ON	OFF	ON	3	-	+	-	+	
4	OFF	ON	ON	OFF	4	-	+	+	-	

Motor 4 steps drive control table



ACTUATORS

INJECTORS

They are positioned on the throttled body unit.
 The engine is equipped with three four-jet injectors (1), Fig. A.
 The number of jets from the injectors is constant, but the amount of time each injector remains open will vary.
 The duration of each injection is calculated by the ECM based on data from the different system sensors.

Disconnect:

- The electrical coupling.

Check:

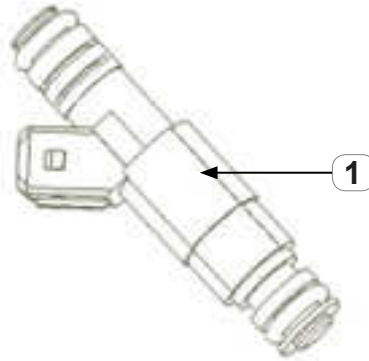
- The resistance using the multitester on symbol Ω between PIN1 and PIN2 (2), Fig. B.



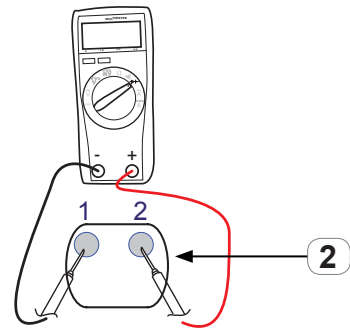
Resistance

 $12 \pm 2 \Omega$

A



B





ACTUATORS

IGNITION COILS

The ignition coil is situated directly on the head of each spark plug (1), Fig. A, and provides high voltage and ignition energy necessary to produce high-voltage sparks between the electrodes of the spark plug.

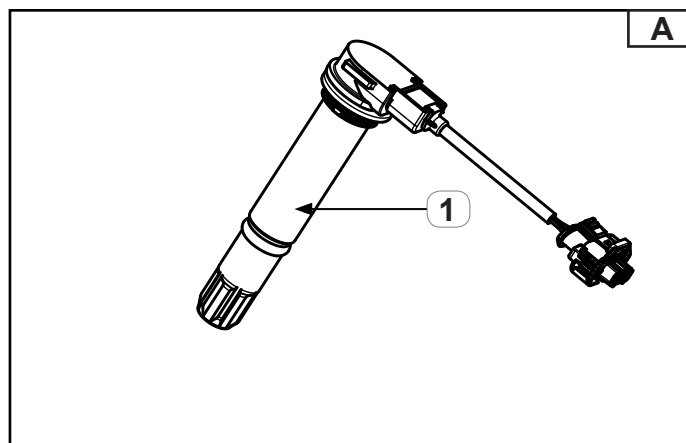
Check:

- The measurement of the coil terminal impedance.

Primary coil	$0.65 \pm 0.07 \Omega$
Secondary coil	$4 \pm 0.5 \text{ k}\Omega$

The optimal condition is achieved when the resistance value is within the standard value.

Resistance value " ∞ " indicates coil wire disconnection", therefore it is necessary to replace the ignition coil.





ACTUATORS

COOLING FAN

It is situated on the radiator body (1.) Fig. A. The ECM enables and disables the cooling fan according to a signal received by the cooling fluid temperature sensor.

When the cooling fluid temperature reaches the upper threshold temperature, the cooling fan is enabled by a command.

When the cooling fluid temperature has lowered enough (to the lower threshold temperature), the cooling fan is disabled by a command from the ECM.

Check:

- The load current of the fan motor by connecting an ammeter, as shown in Fig. B.

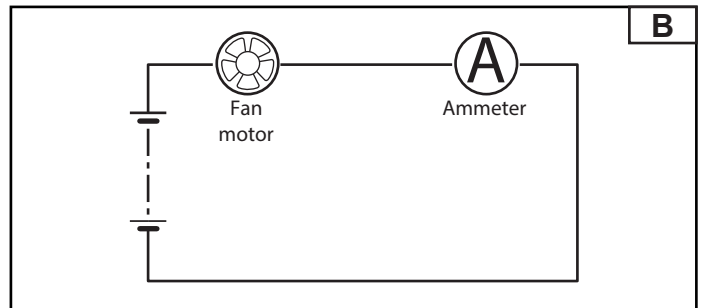
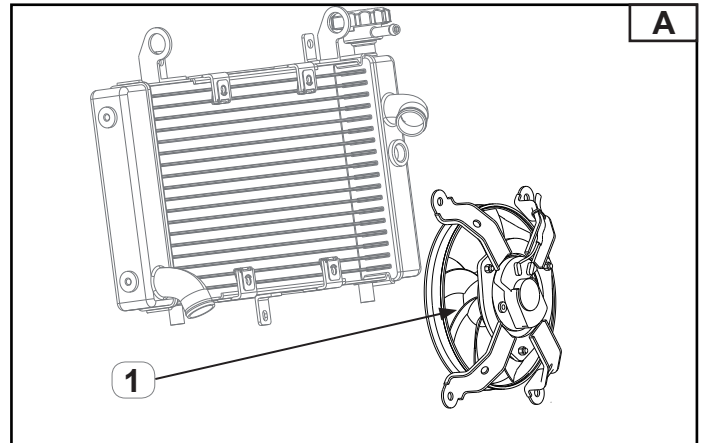
The voltmeter serves to check that the battery powers the 12 volt motor.

When the fan is turning at full speed, the ammeter must not read any more than 5 amps.

If the motor is not turning, replace the fan motor with a new one.

NOTE:

It is not necessary to remove the cooling fan from the radiator to carry out the above test.





ACTUATORS

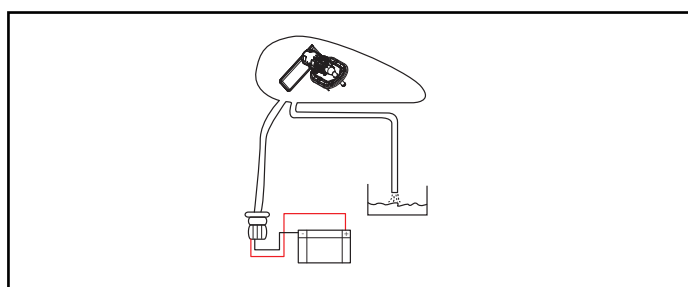
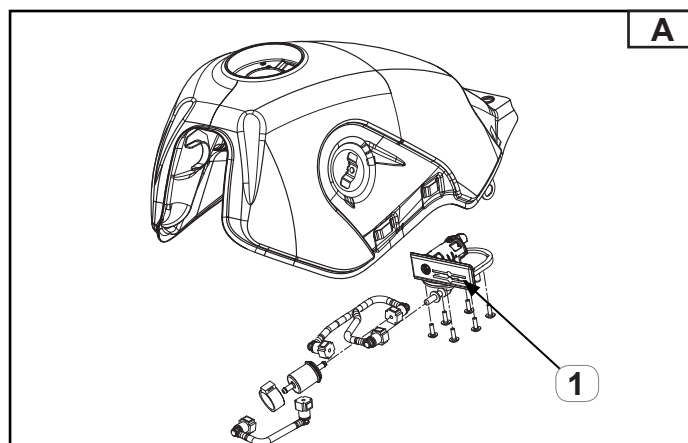
FUEL PUMP

The electric pump is situated in the fuel tank (1), Fig. A, and provides fuel in the supply circuit via a pressure regulator at a constant pressure of 3.5 bar.

The ECM directly controls pump action, guaranteeing, from when the panel is switched on with a timed function, that the fuel is at the correct pressure to start the engine, with a continued operation for the successive use of the bike.

Check:

- The fuel pump.
1. Put the outlet pipe into a container to drain out the fuel Fig. A.
 2. Connect the battery (12 V) to the fuel pump.
 - RED/BLACK positive wire +
 - BLACK negative wire -





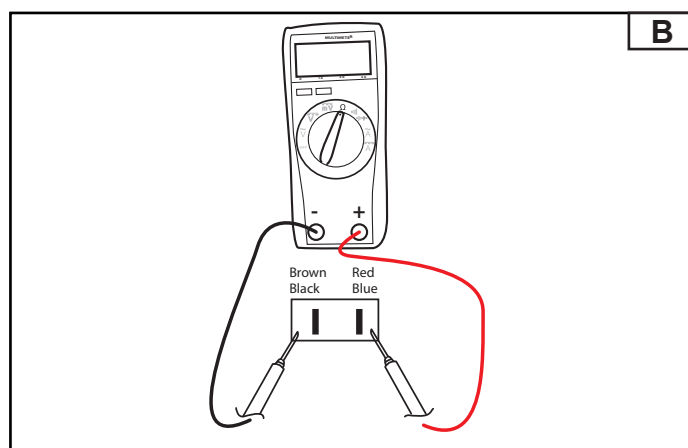
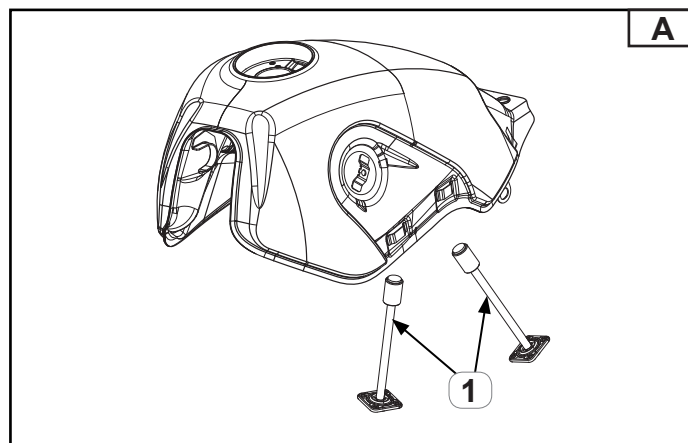
ACTUATORS

FUEL LEVEL SENSOR

It is situated close to the fuel pump (1-2), Fig. A, and provides an outlet value of variable resistance according to the present fuel level.

Check:

- The resistance depending on fuel level (Fig. B) by positioning the multitester on symbol Ω between the PIN1 - PIN2.



Indicated level	6	5	4	3	2	1	0
Resistive value Ω	0-18	19-24	25-36	37-52	53-69	70-89	90-95
Tank fuel (Lt)	20	15.3	12.7	10	7.7	5.1	2.7
Extension (mm)	262	228±3	207±3	186±3	165±3	144±3	112±3



ACTUATORS

STARTER

The starter (1), Fig. A, is a part that can be replaced totally. If the starter is damaged, replace it.

Remove:

- Release the coiled spring of brushes.
- Remove the casing framework.
- Use an ohmmeter to measure the resistance between the wire terminal and the insulated brush.

Reading should be max 0.3 ohm.

Measure the resistance between the wire terminal and the brush holder.

- Make sure the brush does not come in contact with the casing.
- Reading should be infinite (no reading).
-

Remove:

- The brush holding plate and the brushes.

Measure:

- The brush length and replace in case of wearing exceeding the allowed limit.

Brush wear limit (length)	
Standard	10 mm
Service Limit	5.0 mm

Check:

- The switch surface for wearing or discoloration.
- The framework test.

Make sure the insulating washer of the terminal bolt is inserted properly into its housing and the tab on the brush holding plate engages the housing notch of the plate.

- Remove the magnet housing by keeping the framework and the brush holder united.

FRAMEWORK TEST

Check:

- The switch surface.
- Replace if overly worn or damaged.

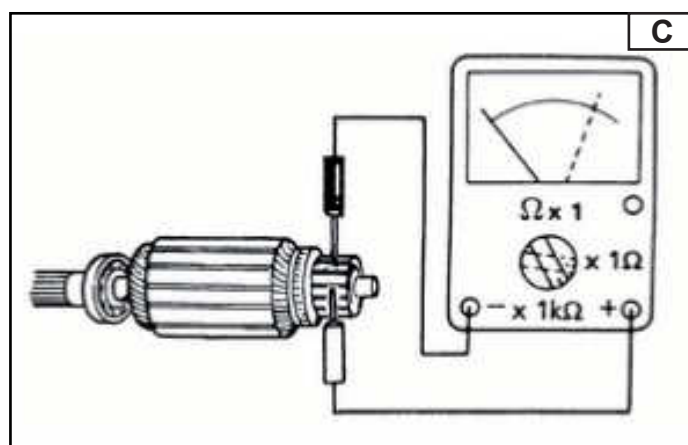
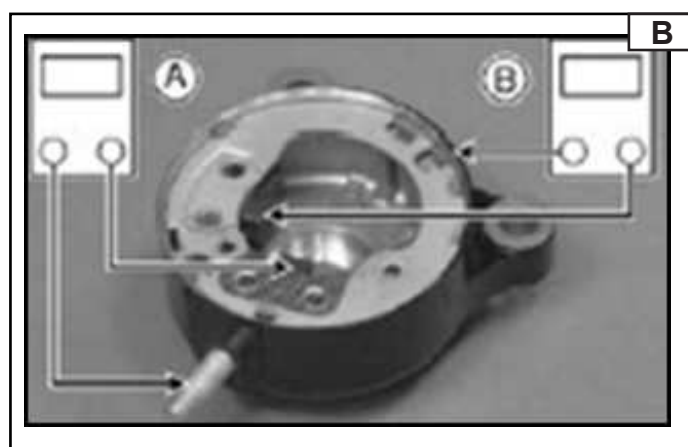
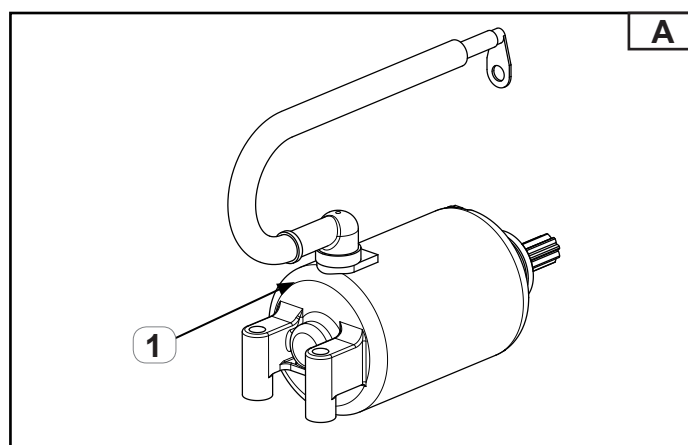
Measure:

- The resistance between each segment of the switch Fig. C. A digital multitester is used for measurement.

NOTE:

Reading should be max 3 ohm.

Continuity of lower framework	
coil resistance	3 Ω at 20°C (68°F)





ACTUATORS

STARTER

Measure:

- The resistance between each segment of the switch and the framework shaft (Fig. D). Reading should be infinite (no reading).

Insulation check	
Ω infinite	20°C (68°F)

Check:

- The switch segments for discoloration.

NOTE:

The presence of discoloured segments in pairs refers to short circuits of coils that require the replacement of the starter.

- Position the framework in a short circuit detector.
- Switch on the detector and position longitudinally a saw blade or a thickness gauge for 3 mm (1/8") above the laminates of the framework coil.
- Turn the framework by 360°.

NOTE:

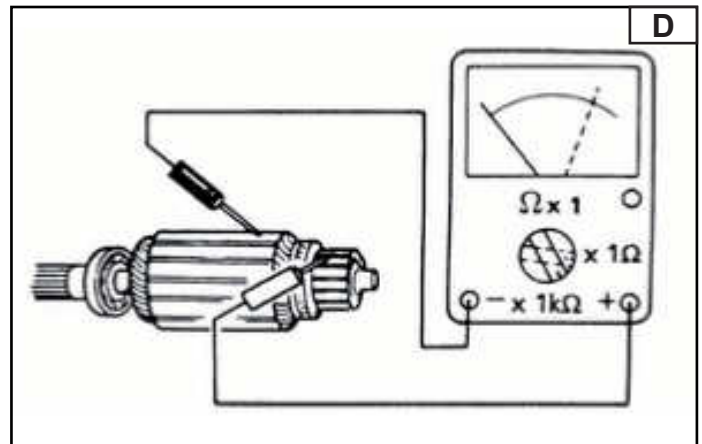
If the saw blade is attracted towards a pole of the framework, the latter has a short circuit and must be replaced.

Check:

- The permanent magnets in the starter housing.

NOTE:

Make sure they are not cracked or far away from the housing.





ACTUATORS

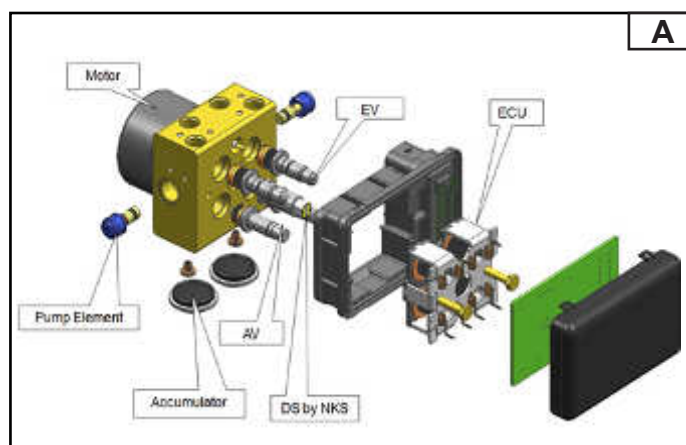
ECU ABS

It is situated underneath the fuel tank Fig. A.

Precautions

There are several precautions to follow concerning the ABS system.

- The power supply of the ABS system must be equipped with a 12 V sealed battery. Do not use other types of batteries.
- Do not reverse the battery connections to prevent damages to the ABS hydraulic control.
- Do not disconnect the battery wire or other electric parts when the main switch is on or the engine is operating to prevent damages to the ABS parts.
- Do not short circuit the positive electrode of the battery (+) on the frame.
- Do not activate the main switch when the ABS electric parts are disconnected. The ABS control unit stores the diagnostic fault code.
- Do not spray water on electric parts, ABS parts, connectors, wires, and conductors.
- Make sure the motorcycle transceiver does not interfere with the ABS system. Keep antennas as far away from ABS ECU as possible.
- Switch the master switch before disconnecting the ABS electrical parts.
- Never strike the ABS parts with a hammer or leave them fall on hard surfaces to prevent damages to the ABS parts.
- Do not disassemble or try to repair the ABS parts, even in case of malfunctioning of the ABS.
- The ABS system cannot detect malfunctioning of the conventional braking system (burnt/worn discs, worn pads or other mechanical failures). To avoid problems, keep checked the hoses and the wiring for a correct layout. For the standard braking performance, check for any brake fluid leaks. Make sure the system is properly drained.



WARNING

If the linking parts of the brake hoses are removed, including the connecting screws of the ABS hydraulic system or the air bleed screws, bleed air in the circuit carefully.

IMPORTANT NOTICE

Do not ride the vehicle if the system is not drained properly as the presence of air may jeopardize the efficiency of the ABS and the brakes.



ACTUATORS

ECU ABS

Please refer to the features on the Texa diagnostic device for managing the diagnostics. Hereunder are the main fault codes and the necessary corrective actions.

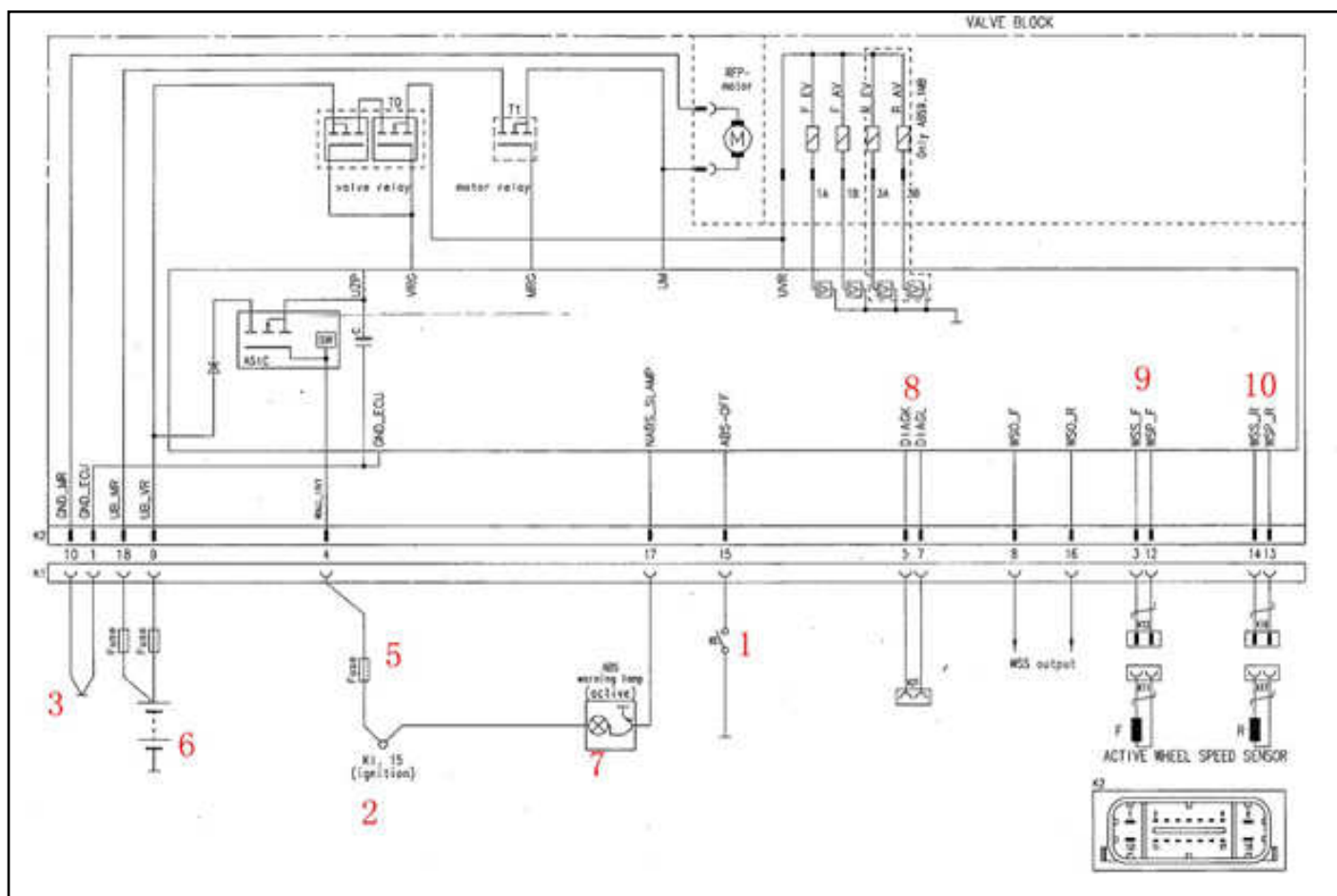
DTC (Hex) Fault codes	Solutions
5055	Replace ABS unit.
5019	
5017	
5013	
5018	
5014	
5053	Check battery voltage.
5052	
5035	Replace ABS unit.
5043	Check connection of the speed sensors using a new sensor.
5045	
5042	Check phonic wheel for deformation or faults.
5044	
5025	Check speed sensors, distance, phonic wheel, and tyre specifications.
5122	Replace ABS unit.
5223	



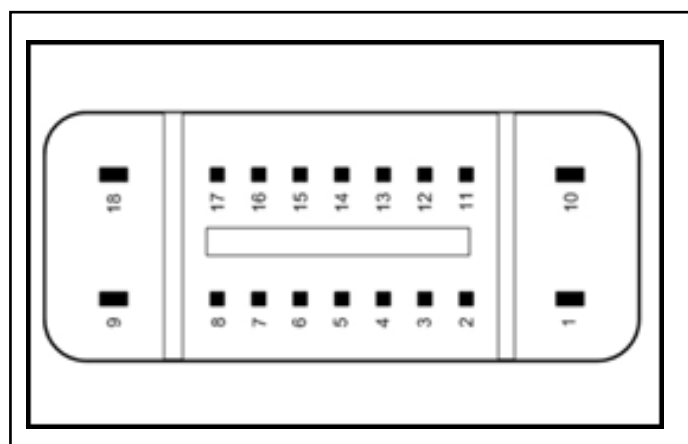
ACTUATORS

ECU ABS

Diagram



Position	Code
1	GND_ECU
2	CAN1P
3	WSS_F
4	WAU_IN1
5	DIAGK
6	BLS - input_PD -SW2H_NO
7	DIAGL
8	WSO_F
9	UB_VR
10	GND_MR
11	CAN1M
12	WSP_F
13	WSP_R
14	WSS_R
15	ABS_OFF -input_PU - SW2L_NO
16	WSO_R
17	NABS_SLAMP
18	UB_MR





DIAGNOSTICS

BRAKE FILLING/BLEEDING DIAGNOSTICS

This procedure is carried out every time it is necessary to change the brake fluid or when it is necessary to replace the brake fluid hoses.

Remove:

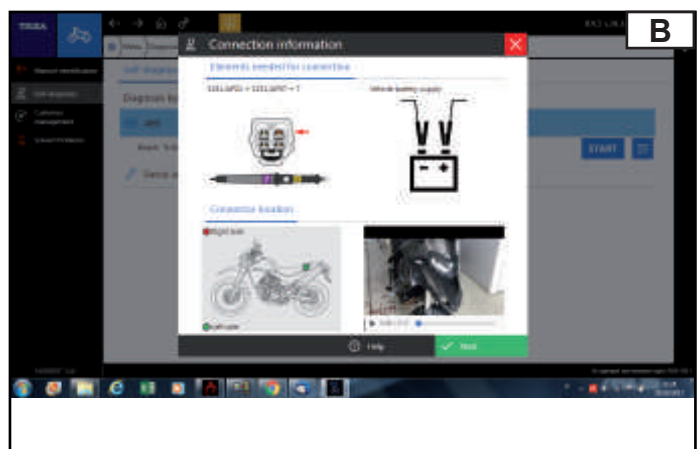
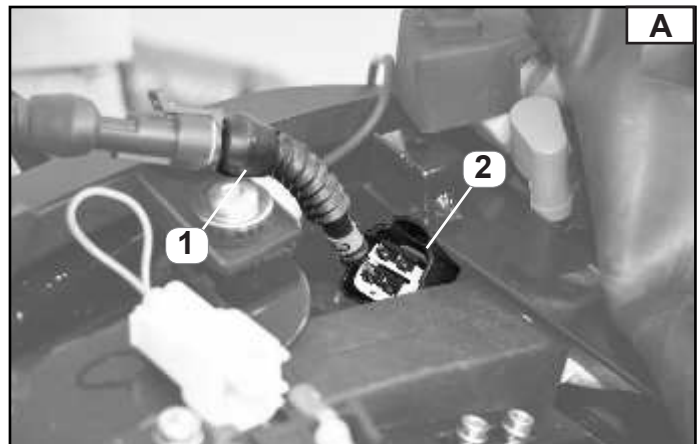
- Rider seat, refer to section “**Removal of rider seat, Chapter 4**”.

Connect:

- The ECU pin (1) to the female connector (2) situated on the motorcycle Fig. A.

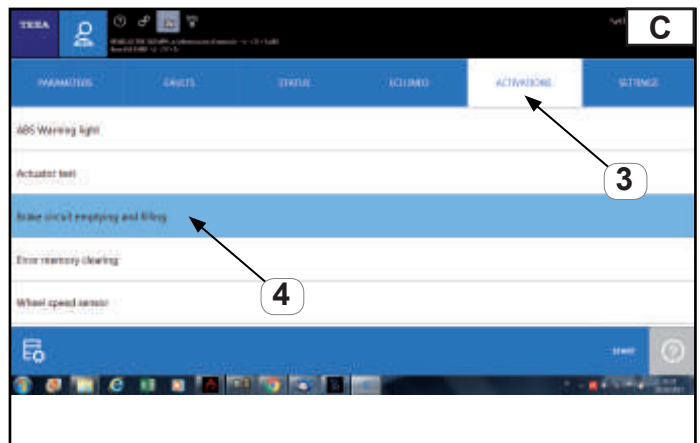
Follow:

- The instructions of the diagnostic device Fig. B.



After having completed the first stage of instructions, enter the first page of the software and select “ACTIVATIONS” (3) Fig. C.

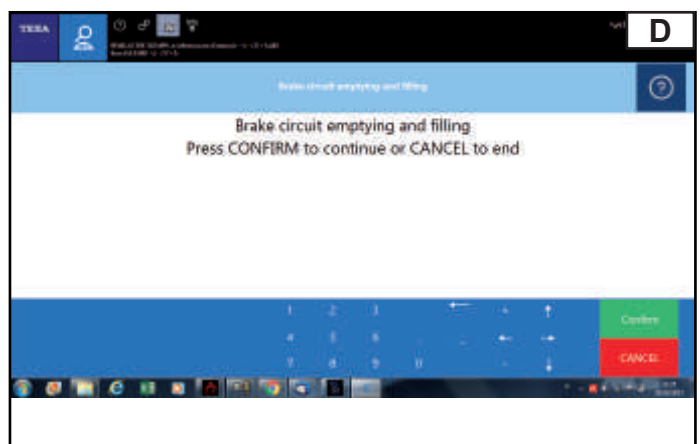
Select “Brake circuit emptying and filling” (4) Fig. C.



Fill and bleed by activating the braking system manually when requested by the software.

At the end of the procedure, the screen will appear Fig. D.

Press “Confirm” to proceed.





DIAGNOSTICS

BRAKE FILLING/BLEEDING DIAGNOSTICS

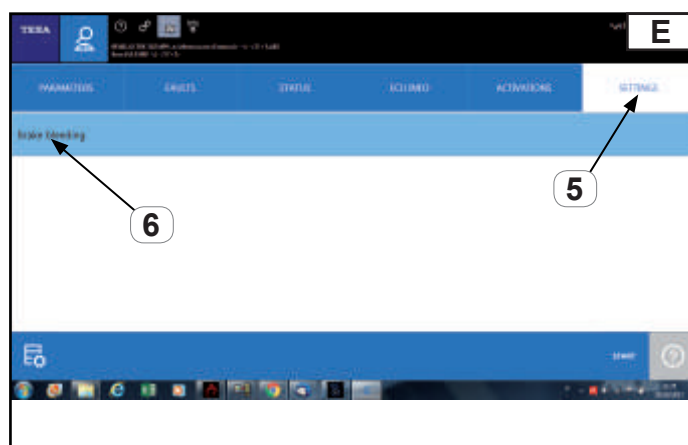
Brake bleeding function:

At the end of the system filling, select the “setting” function (5) Fig. E.

And then “Brake bleeding” (6) Fig. E.

Follow:

- The instructions of the diagnostic device.





BATTERY

VEHICLE BATTERY

IMPORTANT NOTICE

Do not use batteries other than the indicated ones (A), Fig. 1.

The MF battery (maintenance-free) mounted on this vehicle does not require maintenance operations, as electrolyte level control and topping up of distilled water.

Please note that the charging system of the MF battery differs from the one of a standard one.

Therefore, do not replace the MF battery with a standard one. The recommended battery is 12V-9Ah.

IMPORTANT NOTICE

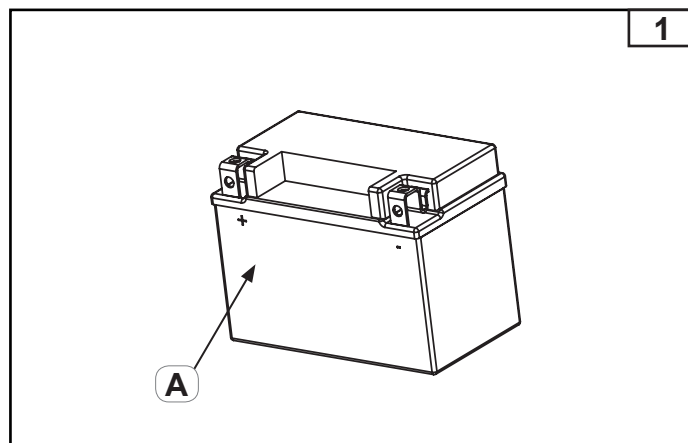
Hydrogen is not produced during the normal recharge of the battery, but it can be produced when the battery is recharged excessively.

Please keep flames away from battery during recharge.

In case of corroded terminals, remove the battery, pour warm water on it and clean using a metal brush.

At the end of connection, grease slightly.

Mount a cap on the positive terminal.





BATTERY

BATTERY EFFICIENCY CONTROL

CHECKING BATTERY CURRENT LOSSES

Connect:

- The multimeter between the negative terminal and the negative wire of the battery as ammeter in direct current (B) Fig. 2.

IMPORTANT NOTICE

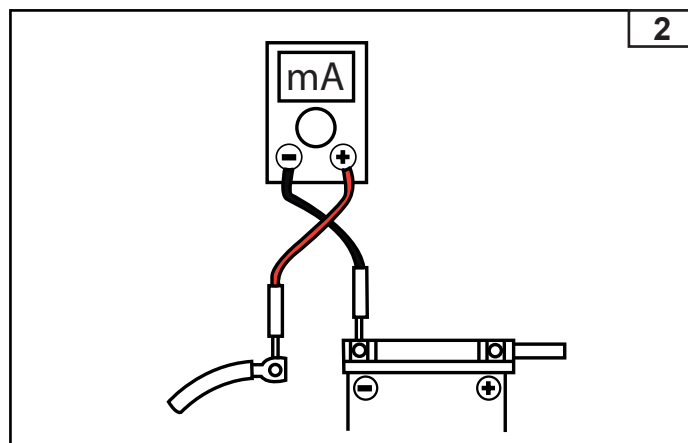
Since the current losses may be high in case of malfunctioning, use a high range of the multimeter first to prevent damages. Do not position the ignition switch to ON whilst measuring the current.

When the panel is off, the current losses must be $\approx 2\text{--}2.5\text{ mA}$.

- Otherwise, find out the source of such absorption by disconnecting the connectors of each utility powered by the battery directly.

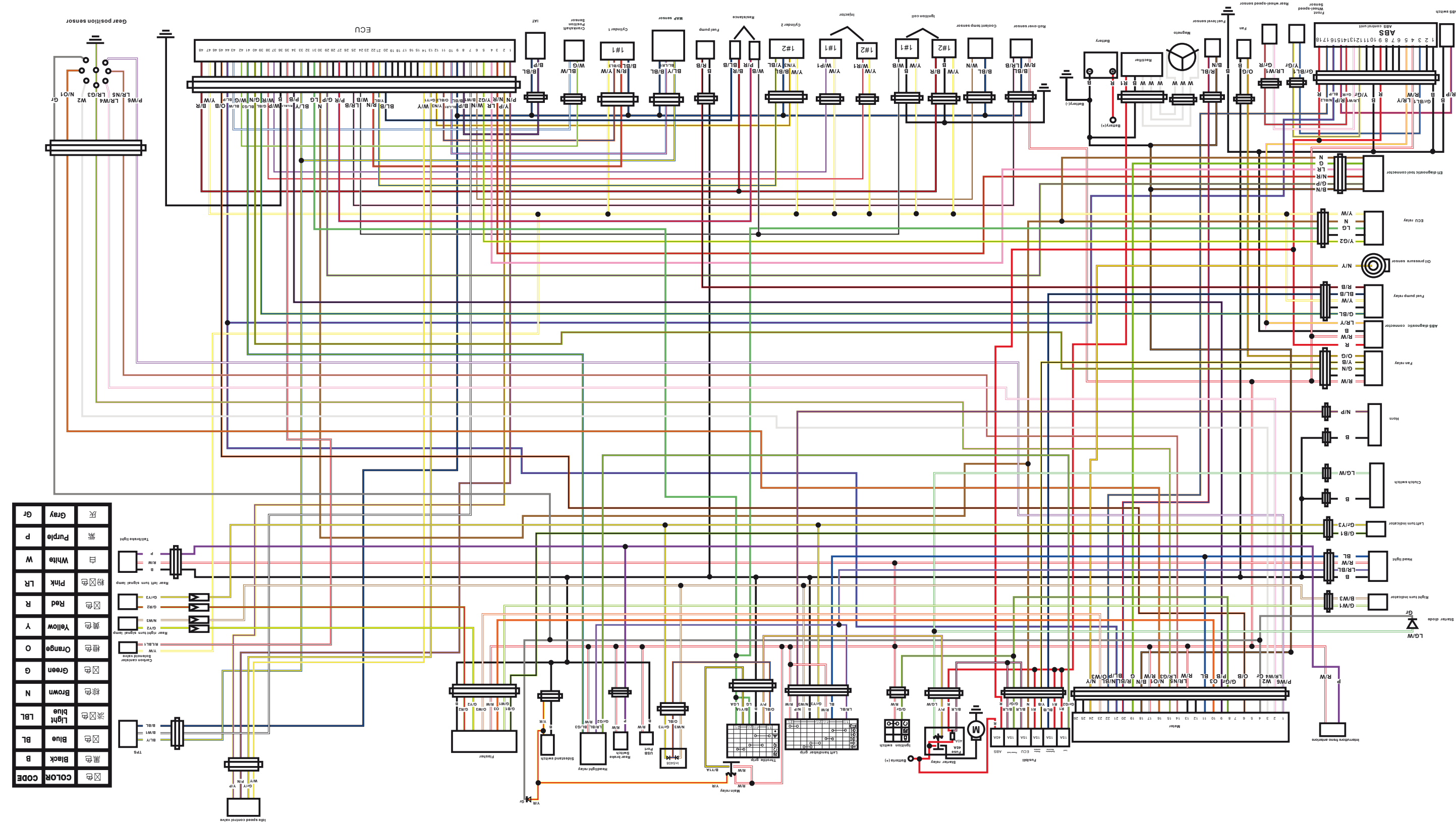
NOTE:

In the event an anti-theft device is installed, disconnect it before carrying out the modifications.



ELECTRICAL SYSTEM

ELECTRICAL WIRING DIAGRAM





ELECTRICAL SYSTEM COLOUR KEY

CODE	COLOUR
B	Black
BL	Blue
GR	Green
W	White
Y	Yellow
O	Orange
R	Red
Dg	Dark grey
P	Purple
N	Brown
G	Grey
LR	Pink

A large, faint, circular watermark of the Benelli logo is centered on the page. The logo features a green laurel wreath encircling a central emblem. The emblem consists of three stars at the top and a lion standing on a pedestal at the bottom. The word "Benelli" is written in a stylized font across the middle of the wreath.

The Benelli logo is centered on the page. It consists of a circular emblem with a green laurel wreath. Inside the wreath, there are three five-pointed stars at the top and a lion standing on a pedestal at the bottom. The word 'Benelli' is written in a bold, stylized font across the middle of the emblem. The entire logo is rendered in a light green color.

A large, faint, circular watermark of the Benelli logo is centered on the page. The logo features a green laurel wreath encircling a central emblem. The emblem consists of three stars at the top and a lion standing on a pedestal at the bottom. The word "Benelli" is written in a bold, sans-serif font across the middle of the wreath.

The image shows a Benelli logo centered on a white background with horizontal dotted lines. The logo is circular and features a green laurel wreath. Inside the wreath, there are three five-pointed stars at the top and a lion standing on its hind legs at the bottom. The word "Benelli" is written in a bold, serif font across the middle of the wreath. The entire logo is rendered in a light green color.

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