

SERVICE STATION MANUAL



Pure Passion since 1911



752^S

Code: B000094213000

Translation of original instructions

WARNING:

This manual has been produced by Benelli Q.J. s.r.l. for the main purpose of being used by Benelli dealers and their mechanics. It is not possible to provide a mechanic with all of the information they require in a single manual. The assumption is therefore that the people using this manual for the maintenance and repair of Benelli vehicles have a basic grounding in mechanics and the procedures inherent to the repair techniques for this type of vehicle. Without this knowledge, repairs or maintenance of this type of vehicle may be inefficient or dangerous.

The policy of Benelli Q.J. s.r.l. is the continued improvement of all its models. All authorised Benelli dealers will be informed of amendments and important changes to technical details or procedures, which will be published in future editions of this manual.

NOTE:

Designs, drawings and specifications will be subject to change without prior warning.

IMPORTANT INFORMATION CONCERNING THIS MANUAL

The text in this manual contains the following important warnings.

WARNING

Failure to abide by the instructions following this symbol may lead to serious injury to or even the death of the rider, of persons in the vicinity or people intent on inspecting or repairing the motorbike.

IMPORTANT NOTICE

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

NOTE

A note provides key information to make processes easier or clearer.

HOW TO USE THIS MANUAL

This manual is a practical reference guide that is easy for mechanics to handle and use. The explanations of all of the installation, removal, disassembly, installation, repair and inspection procedures are organised into sequences of individual steps.

1. Each chapter is divided into sections. The title of the current section will be found at the top of every page.
2. To help with the identification of plants and make the different points of the various procedures clearer, the start of each section about the removal or disassembly of parts will contain exploded drawings.
3. The parts to be lubricated or replaced are marked with 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>Checks and Regular adjustments</u>
FRAME		<u>Frame</u>
ENG.		<u>Engine</u>
COOL. SYSTEM		<u>Cooling system</u>
ELEC		<u>Electrical system</u>

INDICATION SYMBOLS

	<u>Service Limit, Clearance</u>		<u>Thread locker application</u>
	<u>Special tool</u>		<u>Recommended solvent</u>
	<u>Tightening torque</u>		<u>Brake fluid</u>
	<u>Grease application</u>		<u>Lubricant</u>
	<u>Sealant paste application</u>		

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GEN.
INFO

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CHAPTER 1

GENERAL INFORMATION

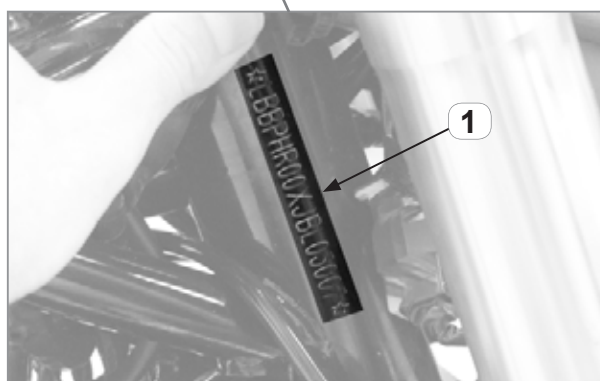
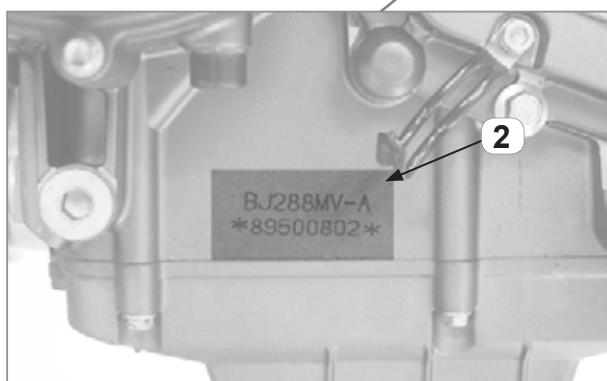
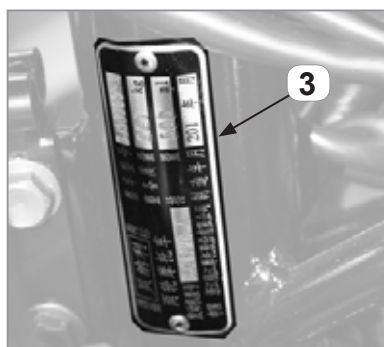
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IDENTIFICATION

MOTORCYCLE IDENTIFICATION

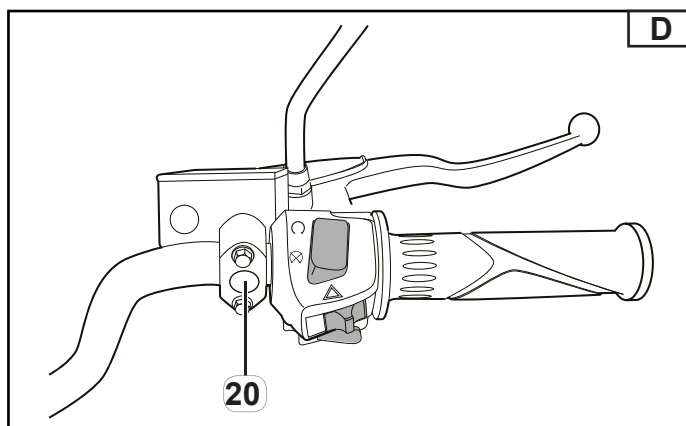
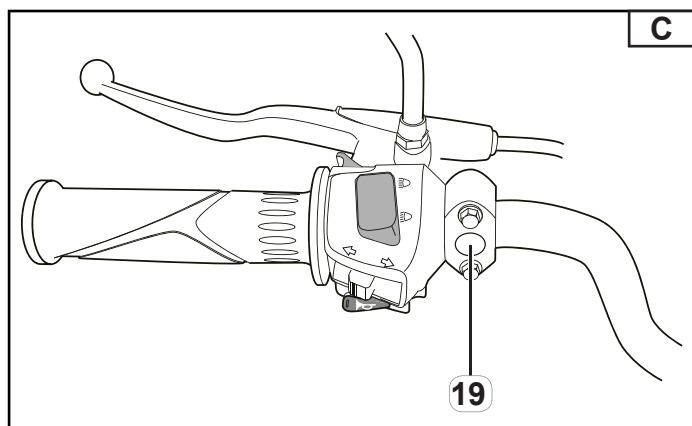
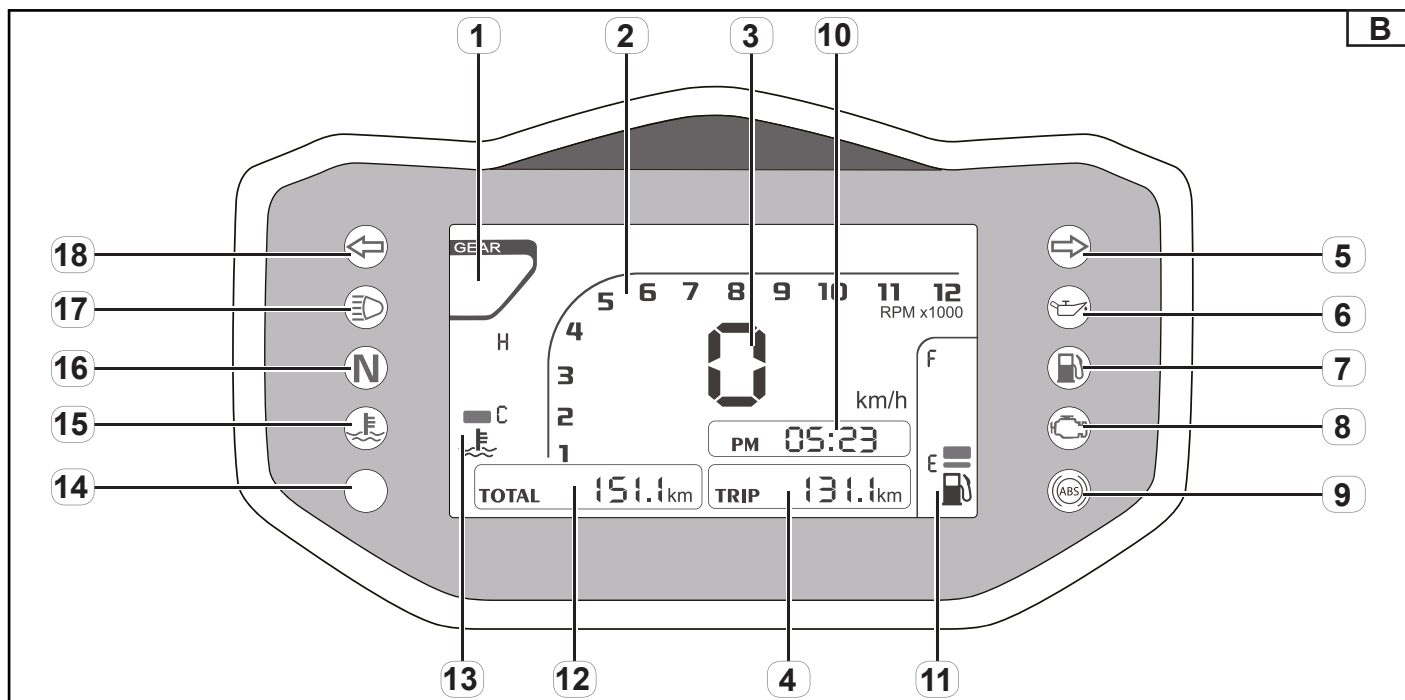
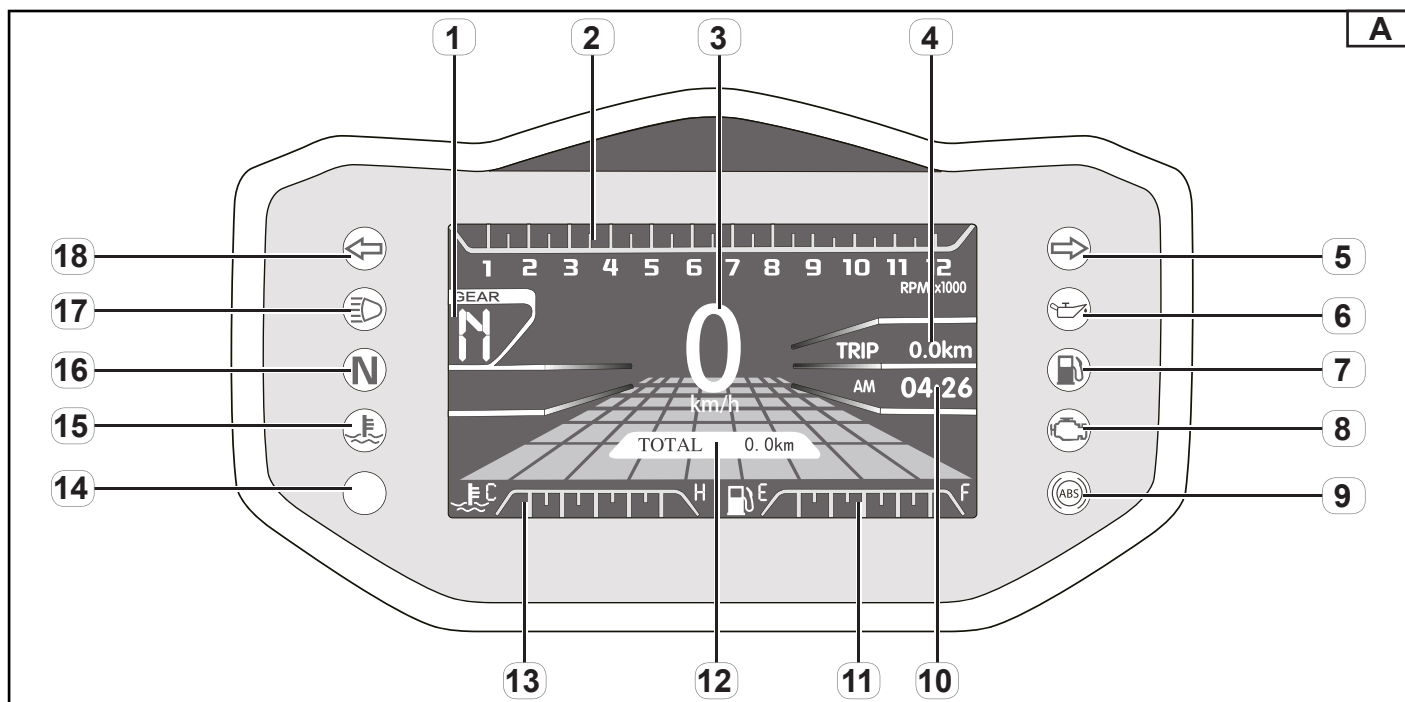
The identification data are:

1. Frame serial No. (on the steering sleeve).
2. Engine serial No. (on the lower crankcase).
3. Type-approval data (on the frame).



FEATURES

INSTRUMENTATION AND INDICATOR LIGHTS



FEATURES

INSTRUMENTATION AND INDICATOR LIGHTS

The instrumentation and the indicator lights go on by turning the ignition key to "ON" position.

After an initial check-up, the information correspond to the general conditions of the motorcycle at that time.

The dashboard is equipped with the following instruments:

1. SHIFT INDICATOR LIGHT

The engaged gear display shows the selected gear.

It is a 6-speed gearbox model.

2. TACHOMETER

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

3. SPEEDOMETER

The Speedometer indicates the vehicle's speed in km/h or mph. For passing from an indication to the other, rotate the key to "ON" position and wait more than 10 seconds, then long press the multi-function button (20) Fig. D.

4. PARTIAL KILOMETRE COUNTER.

The partial kilometre counter (TRIP A/TRIP B) shows the distance covered since the last reset in kilometres. 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.

In any mode ("ODO", "TRIP A" and "TRIP B"), press the multi-function button shortly (20) Fig. D to go from a mode to the other. In the modes TRIP A and TRIP B, long press the multi-function button (20) Fig. D to reset mileage.

5. RIGHT DIRECTION INDICATOR LIGHT (GREEN)

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

6. OIL PRESSURE WARNING LIGHT (RED).

It goes on when the oil pressure value is too low. It is possible to check the electrical circuit of the light 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 it stays on, have the electrical circuit checked by an authorised Benelli centre.

7. FUEL RESERVE LIGHT.

The light on shows that the vehicle has a fuel range of about 3 litres.

8. SELF-DIAGNOSTIC LIGHT.

The light warns the driver of failures of the power supply and ignition systems. The engine yellow light (LED) goes on when the parts of the power supply and the ignition system 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.

9. ABS DIAGNOSTIC LIGHT.

It shows the activation/deactivation status of the anti-lock braking system of brakes.

a. ABS system fault. If any kind of ABS fault is detected and stored, the light goes on and remains on. The ABS diagnostic light goes off with the following SWITCHING ON/OFF of the instrument panel or when the vehicle exceeds the speed by about 5 km/h.

b. ABS mode deactivated. The diagnostic light blinks quickly (once for 1.30 seconds).

c. Keeping the ABS button pressed for a time of 3/30 seconds, the ABS diagnostic light blinks once for about 0.30 seconds (quick blinking).

d. ABS system activated: When the control panel is on, the ABS diagnostic light stays on until the motorcycle exceeds the speed by about 5 km/h. When this speed is exceeded, the ABS diagnostic light turns off.

NOTICE

Usually, the ABS diagnostic light remains on when the instrument panel is turned on and goes off when the motorcycle exceeds the speed by about 5 km/h.

If the ABS diagnostic light shows one of the following symptoms, one or more faults may have occurred in the ABS system.

- The ABS diagnostic light does not go on when the instrument panel is switched on.
- The ABS diagnostic light remains on even when the vehicle exceeds the speed by about 5 km/h.

In this condition, contact an authorized service centre Benelli for servicing the motorcycle.

Please note that the ABS system is not active when the light is on, but the braking system goes on working as a normal system without ABS.

During this situation, a sudden braking may lock the wheels with the subsequent loss of grip and stability of the motorcycle.

10. DIGITAL CLOCK / SETTING

Shows the time in hours and minutes.

For time setting, turn the key to "ON" and keep pressed the multi-function button (20) Fig. D: when it is released, the hour digits start blinking on the instrument. Press the multi-function button shortly to change number, or long press it to move the flashing digit to the next position and continue setting.

11. FUEL TANK CAPACITY AND 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.

12. TOTAL KILOMETRE COUNTER.

The total kilometre counter shows the total distance covered in kilometres.

13. COOLING FLUID TEMPERATURE GAUGE

It shows the cooling fluid temperature; as the temperature rises, the lines become closer and closer to the "H" hot area.

FEATURES

INSTRUMENTATION AND INDICATOR LIGHTS

14. PHOTOSENSITIVE SWITCH.

The instrumentation panel features two kinds of display that alternate automatically according to the light intensity, day mode Fig. A and night mode Fig. B.

To pass from the day mode to the night one manually, cover the switch (18) with your hand for 3-5 seconds.

To pass from the night mode to the day one manually, use a torch to light the switch (18) for 3-5 seconds.

15. WATER TEMPERATURE WARNING LIGHT.

The light goes on in case of engine overheating. In this case, stop the vehicle, switch the engine off and allow it to cool down.

16. NEUTRAL POSITION INDICATOR LIGHT (GREEN)

It goes on when the gear is in neutral position.

17. HIGH BEAM INDICATOR LIGHT (BLUE).

It goes on when the high beam light is activated.

18. LEFT DIRECTION INDICATOR LIGHT (GREEN)

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

19. ABS BUTTON.

This button allows to access the ABS settings.

Do not try to adjust the ABS settings when the motorcycle is running.

The ABS settings are not enable when the vehicle speed is above 5 km/h.

ABS deactivation:

Make sure the motorcycle does not run and in neutral position. Keep the ABS button pressed exactly in 3-5 seconds, the ABS light switches from on to flashing for 1.30 seconds (short flashing).

Now the ABS is not active and the braking system goes on working as a normal system without ABS.

ABS activation:

Make sure the motorcycle does not run and in neutral position. Keep the ABS button pressed exactly in 3-5 seconds, the ABS light switches from flashing to on for 1.30 seconds (short flashing).

An alternative way for activating the ABS is the switching OFF and switching ON.

- The procedure is ignored by the system if the ABS button has been pressed for a time between 5-30 seconds. The ABS system keeps the current settings.
- The ABS system returns active from any other previous setting if it has been pressed for a time above 30 secs.

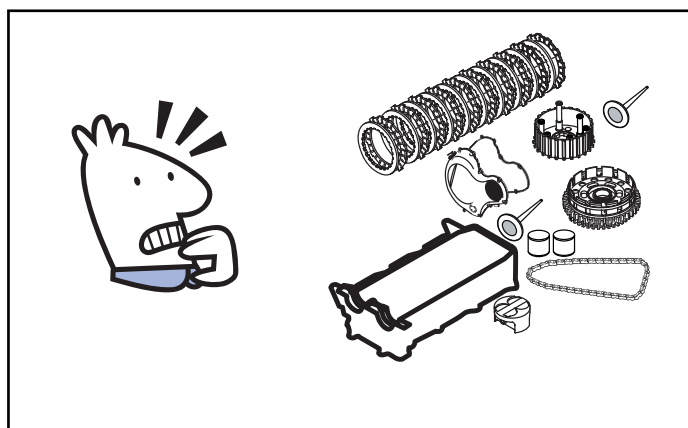
20. MULTI-FUNCTION BUTTON.

This button allows to access the functions of clock setting, the partial kilometre counter, and the speedometer.

IMPORTANT INFORMATION

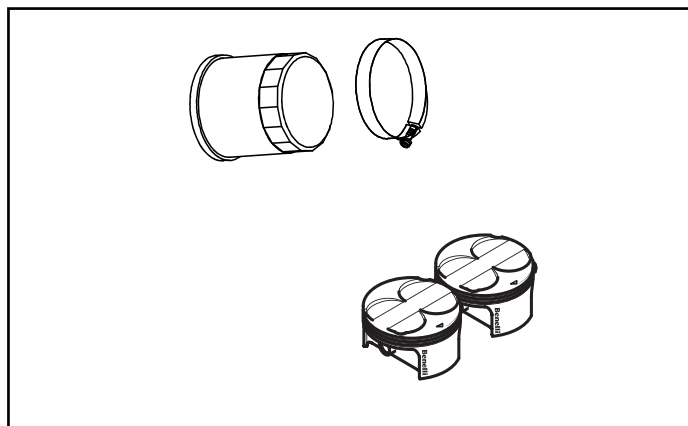
PREPARATIONS FOR REMOVAL AND DISASSEMBLY OPERATIONS

- Before proceeding with disassembly, remove any dirt, mud, dust, and foreign bodies.
- Only use suitable cleaning tools and agents. See the "SPECIAL EQUIPMENT" section.
- 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. The matching parts must always be reused/replaced collectively. During the disassembly operations, clean all parts and position them in a container following the disassembly order. This will make the reassemble operations easier and allow a correct installation of all parts.
- Keep all components away from any heat source.



REPLACEMENT PARTS

Only use original Benelli spare parts. For part lubrication, use oils and greases recommended by Benelli. Other brands may be similar in appearance and function, but have a lower quality.



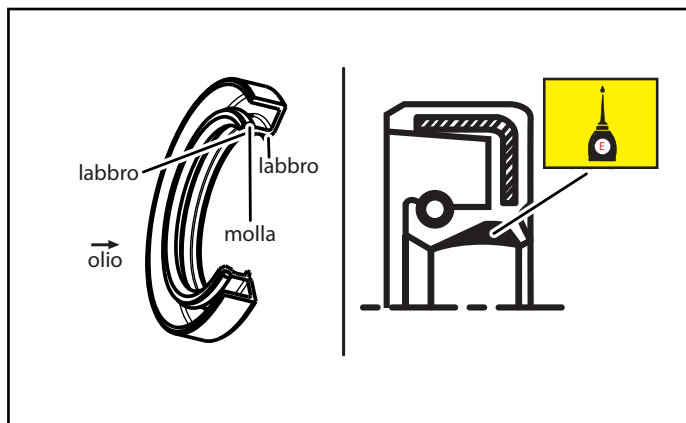
IMPORTANT INFORMATION

GASKETS, O-RINGS, OIL SEALS AND BEARINGS

Always replace all gaskets, oil seals, and O-rings during the engine repairing interventions.

The surfaces of gaskets, the oil seal lips, and the O-rings must be always cleaned.

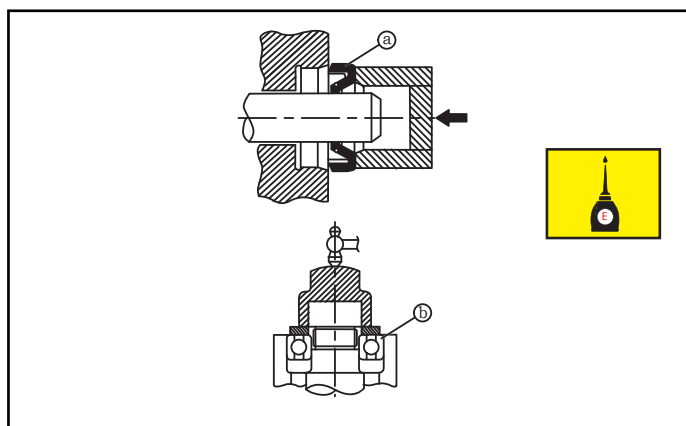
During installation, suitably oil all parts subjects to coupling and the bearings. Furthermore, lubricate the oil seal lips with engine oil.



Install the bearings and the oil seals so that the brand or the manufacturer numbers facing outwards are clearly visible. To position the oil seals, lubricate the lips with a layer of engine oil.

During installation of the bearings, lubricate them thoroughly.

- a. Oil seal
- b. Bearing



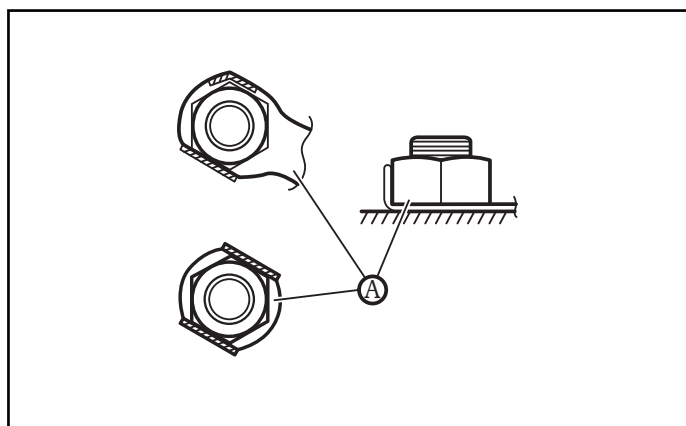
NOTICE

Do not use compressed air to dry the bearing whilst turning them, since the surface might be damaged.

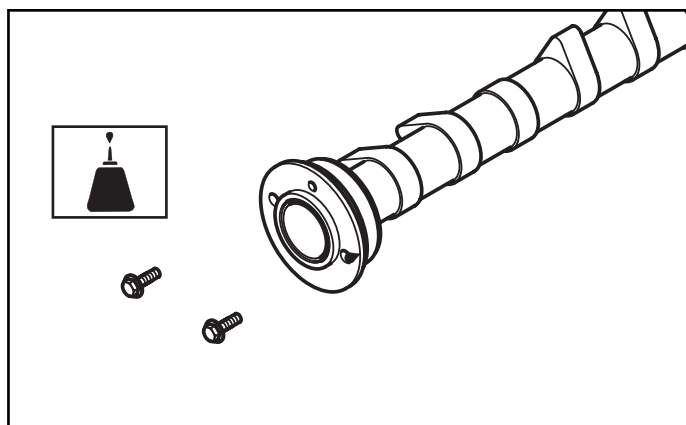
SAFETY WASHERS/SAFETY PLATES, COTTERS AND THREAD LOCKERS

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

After having tightened the bolt or the nut as per specifications, bend the locking tab and the cotter pin ends against the surface of the bolt or nut.



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



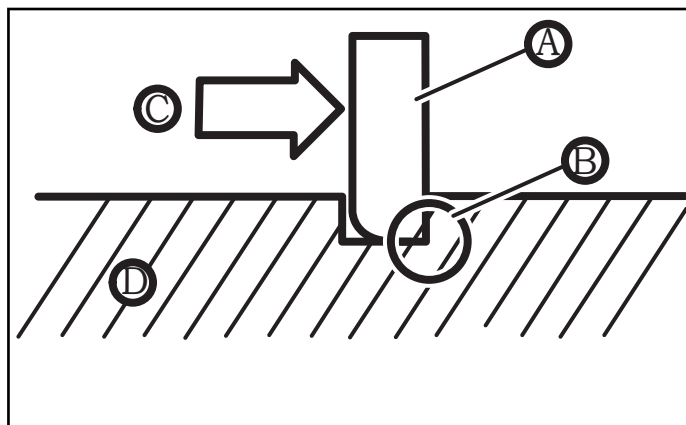
IMPORTANT INFORMATION

RETAINING SNAP RINGS

Before reassemble them, check all snap rings thoroughly and replace the damaged/deformed ones.

Always replace the snap rings of the piston pin after having used 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) is the shaft.

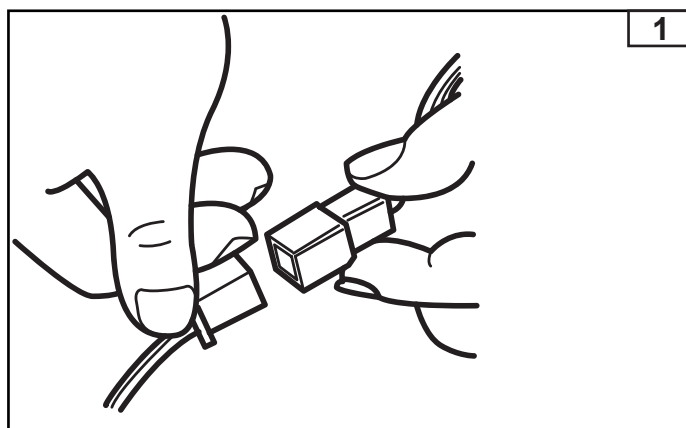


CONNECTION CHECKS

Make sure there are no stains, rust, humidity, etc. on wires, couplers, and connectors.

1. Disconnect:

- The wire
- The coupler
- The connector

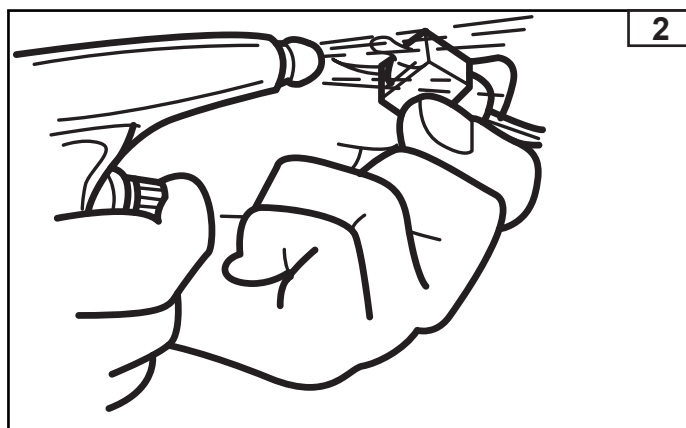


2. Inspection:

- The wire
- The coupler
- The connector

In presence of humidity → Dry using a fan.

In presence of rust/stains → Connect and disconnect the parts several times.



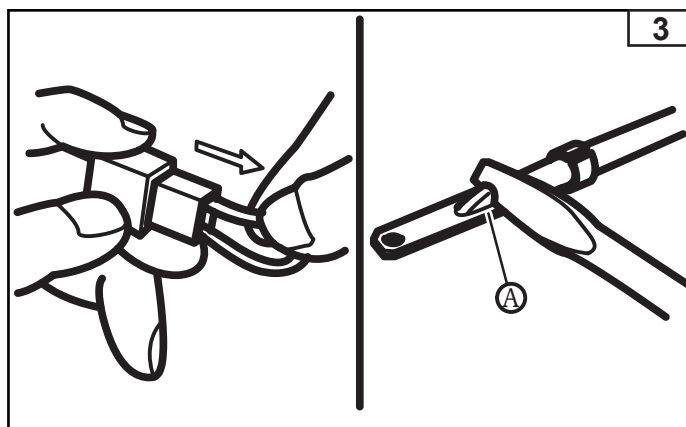
3. Inspection:

- All connections

In case of loose connections → Connect them properly.

NOTE:

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



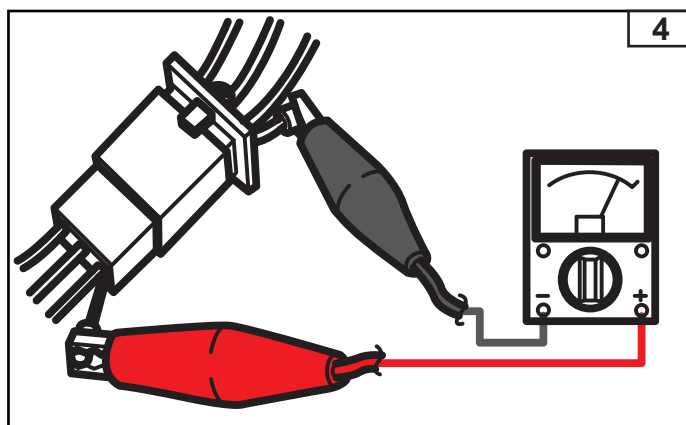
IMPORTANT INFORMATION

4. Connect:

- The wire
- The coupler
- The connector

NOTE:

Make sure all connections are firmly installed.



5. Inspection:

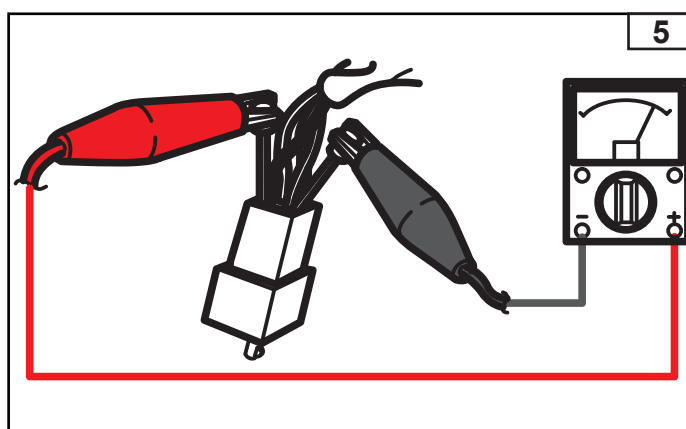
- The continuity using a multimeter.

NOTE:

If there is no continuity, clean the terminals.

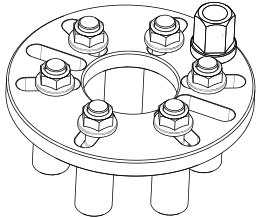
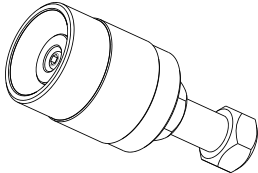
For checking wiring, follow the procedure of points from (1) to (3).

For a quick fix, we recommend using a specific product for contacts, which can be found on sale in spare parts stores.

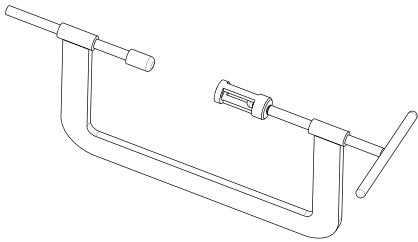


SPECIAL EQUIPMENT

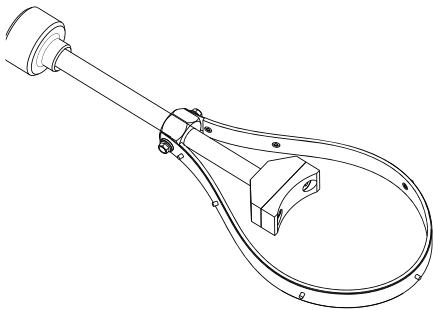
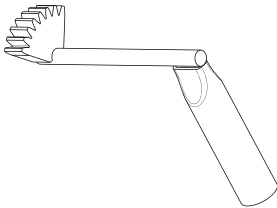
The special tools indicated herein serves for the complete and precise execution of the setting/assembly operations. Their use helps to prevent damages caused by unsuitable tools or improvised techniques. When placing an order, refer to the list below to avoid mistakes.

SPECIAL ENGINE EQUIPMENT		
Tool Code	Tool Name / Function	Image
R180197025000	Pad for valve oil seal This tool serves to install the valve oil seal in place.	
0320097047000	Clutch removal tool This tool serves to lock the clutch drum and tighten 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.	
Standard tool commonly found	Flywheel extractor This tool serves to extract the flywheel from the drive shaft.	

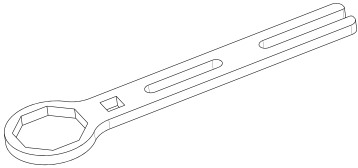
SPECIAL EQUIPMENT

SPECIAL ENGINE EQUIPMENT		
Tool Code	Tool Name / Function	Image
R180197022000	Comparator support 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 disassemble the engine oil filter.	
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 hole inner dimensions.	
Standard tool commonly found	Measuring tool commonly found This tool is used to measure the external dimensions of parts, for instance for measuring the pads calibrated during the valve clearance adjustment.	
Standard tool commonly found	Feeler gauge This tool is used to measure thicknesses.	

SPECIAL EQUIPMENT

SPECIAL ENGINE EQUIPMENT		
Tool Code	Tool Name / Function	Image
0320097044000	Flywheel tightening tool This tool serves to tighten the drive shaft flywheel.	
03200097053000	Toothed wrench for clutch bell lock. This tool is used to disassemble the clutch bell.	
Standard tool commonly found	Tool for disassembly/assembly the main shaft bearing. This tool allows to disassemble and assemble the main shaft bearing.	

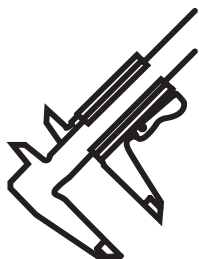
SPECIAL EQUIPMENT

SPECIAL FRAME TOOLS		
Tool Code	Tool Name / Function	Image
R180297129000	Tightening tool for steering sleeve lock nut. This composed tool is used to tighten the steering sleeve lock nut.	
Standard tool commonly found	Tool to tighten / disassemble the front wheel spindle. This tool serves to tighten the front wheel spindle.	
Standard tool commonly found	Tool to extract the rear swingarm bearings This tool serves to extract bearings.	
Standard tool commonly found	Pantograph engine holder for engine removal. It allows to lift the frame and the engine.	
A000097506000	Multi-function Marzocchi key This tool serves to remove the protective cap of the front fork stems.	



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SPEC.



CHAPTER 2

SPECIFICATIONS

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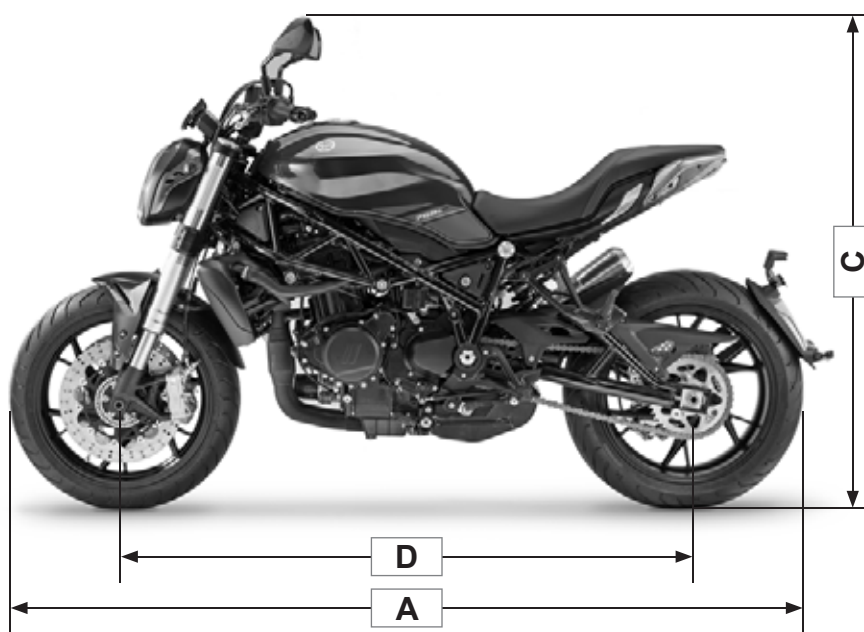
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GENERAL SPECIFICATIONS

SIZE AND WEIGHT

SIZE	STANDARD
Total length (A)	2130 mm
Total width (B)	820 mm
Total height (C)	1100 mm
Wheelbase (D)	1460 mm
WEIGHT	STANDARD
Kerb weight (with full oil and full fuel tank)	228 kg
Max. technical capacity (with rider and load)	397 kg





TECHNICAL DETAILS

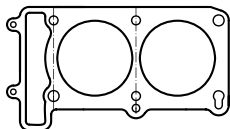
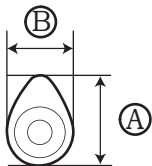
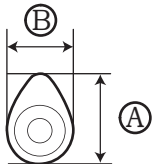
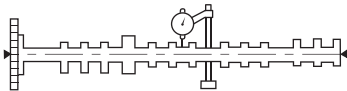
ENGINE SPECIFICATIONS

ENGINE	STANDARD
Type of engine	2 four-stroke, inline cylinders, water cooling, 4-valve for each cylinder, and double overhead camshaft DOHC
Cubic capacity	754 cc
Number of cylinders	2
Cylinder layout	In line facing forwards
Inside diameter × stroke	88 x 62 mm
Compression ratio	11.5: 1
Idle speed	1400 - 1600
Timing	Double overhead camshaft, chain-controlled, and 4-valves for each cylinder
Maximum net power	56 kW (76.8 hp) / 8500 rpm
Maximum net torque	67 N*m / 6500 rpm
FUEL	STANDARD
Recommended fuel	Premium unleaded petrol RON 95 min
ENGINE OIL	STANDARD
Lubrication system	Forced, with wet sump design
Total amount	3 l
Quantity without oil filter cartridge replacement	2.8 l
Quantity with oil filter cartridge replacement	3 l
Recommended oil	SAE 10W-50 API SJ-JASO
OIL FILTER	STANDARD
Type of oil filter	Cartridge
OIL PUMP	STANDARD
Oil pump type	Lobe
Clearance between inner rotor tip and rotor tip	0.25 mm max.
Clearance between outer rotor tip and oil pump housing	0.2 mm max
STARTING	STANDARD
Starting system type	Electric starter



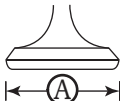
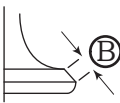
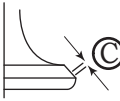
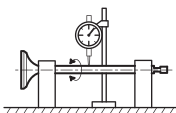
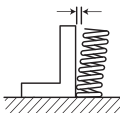
TECHNICAL DETAILS

ENGINE SPECIFICATIONS

SPARK PLUGS	
Model (manufacturer) x quantity	NGK CR8E
Spark plug gap	0.7 ÷ 0.8 mm
CYLINDER HEAD	
	0.05 mm
CAMSHAFT	
Control system	Chain transmission
Camshaft support diameter	Ø 22.975 ~ 22.980 mm (0.9045 ~ 0.9047 in)
Camshaft diameter	$\begin{matrix} - 0.020 \\ \text{Ø 23} - 0.033 \text{ mm} \end{matrix}$
Clearance between support and camshaft cap	0.1 (0.0039 in) max
Clearance between camshaft and camshaft seat	0.02 - 0.050 mm
Camshaft radial clearance	0.01 mm (Limit 0.02 mm)
Camshaft lobe dimensions on intake side 	Measurement "A"= 36.75 mm Measurement "B"= 28.35 mm
Camshaft lobe dimensions on exhaust side 	Measurement "A"= 36.75 mm Measurement "B"= 28.35 mm
Maximum camshaft eccentricity 	0.05 mm (0.0019 in.)
TIMING CHAIN	
Automatic tensioning	System



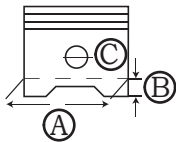
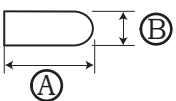
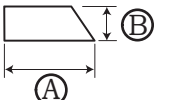
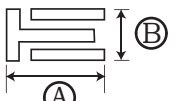
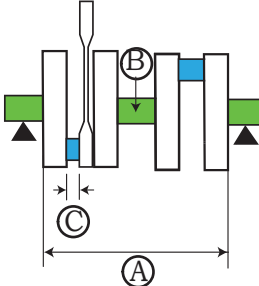
TECHNICAL DETAILS ENGINE SPECIFICATIONS

VALVES, VALVE SEATS, VALVE GUIDES		STANDARD
Intake valve clearance (cold)		0.25 ~ 0.30 mm (0.009 ~ 0.011 in)
Exhaust valve clearance (cold)		0.30 ~ 0.35 mm (0.011 ~ 0.013 in)
VALVE DIMENSIONS		
 Head diameter "A"	Intake	Ø 33 mm (1.29 in)
	Discharge	Ø 29 mm (1.14 in)
 "B" contact surface length	Intake	1 ~ 1.3 mm (0.039 ~ 0.051 in)
	Discharge	1 ~ 1.3 mm (0.039 ~ 0.051 in)
 Width of the "C" seat	Intake	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
	Discharge	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
Valve stem diameter	Intake	4.965 ~ 5.00 mm (0.195 ~ 0.197 in)
	Discharge	4.955 ~ 5.00 mm (0.195 ~ 0.197 in)
Clearance between valve stem and valve guide	Intake	0.010 ~ 0.037 mm (0.00039 ~ 0.0014 in)
	Discharge	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)
 Valve stem eccentricity		0.015 mm (0.0005 in.)
VALVE SPRINGS		STANDARD
Intake/exhaust free length	Outer	37.0 mm (1.45 in.)
	Inner	34.0 mm (1.33 in.)
Intake/exhaust installed length (valve closed)	Outer	186 N*m (18.96 Kg*f*m)
	Inner	92.5 N*m (9.43 Kg*f*m)
 Spring tilting	Intake	1.7 mm (0.066 in)
	Discharge	1.7 mm (0.066 in)
CYLINDERS		STANDARD
Cylinder layout		In line, tilted 15° forward
Stroke ratio		88 x 62
Compression ratio		11.6 ± 0.5 : 1
Bore		88 mm (3.46 in)
Max. ovalization Maximum taper		0.05 mm (0.0019 in.)



TECHNICAL DETAILS

ENGINE SPECIFICATIONS

PISTON		STANDARD
Clearance between piston and cylinder		0.05 ~ 0.07 mm (0.0019 ~ 0.0027 in)
	Piston diameter "A"	88 mm (3.46 in)
	Piston height "B"	10.5 mm (0.41 in)
	Pin "C" seat diameter	19.00 mm (0.748 in)
Piston pin outer diameter		18.995 mm (0.748 in)
Top ring		
	Type	Piston ring
	Overall dimensions "B" X "A"	3.21 x 0.983 mm (0.126 x 0.039 in)
2nd ring		
	Type	Piston ring
	Overall dimensions "B" X "A"	3.546 x 0.984 mm (0.139 x 0.039 in)
Oil scraper ring composite in 3 parts		
	Overall dimensions "B" X "A"	2.960 x 2.600 mm (0.116 x 0.102 in)
CONNECTING RODS		STANDARD
Diameter of connecting rod axle		37 ^{+0.034} _{-0.024} mm
Bearing colour code		A = Red B = Blue C = Yellow
Connecting rod code		K1 = Black K2 = Green K3 = White K4 = Brown K5 = Orange
DRIVE SHAFT		STANDARD
		
Width "A"		133.10 mm
Diameter "B"		38 mm ^{-0.04} _{-0.03} mm
Connecting rod big end side clearance "C"		0.1 - 0.25
Main bearing colour code		A = Red B = Blue C = Yellow



TECHNICAL DETAILS ENGINE SPECIFICATIONS

CLUTCH	STANDARD
Clutch type	Wet clutch, multiple discs, slipper device
Clutch release	Cable with springs
Operation for clutch release	Cable operation
Clutch control	Mechanical
Operation	Via cable
Control layout	Lever on the handlebar, left side
Clutch cable clearance (at the end of the clutch lever)	2 ~ 3 mm
Friction plate thickness	3 ± 0.05 mm - 3 (0 - 0.1) mm
Friction plate quantity	11
Steel plate thickness	1 plate x 2.5 mm 5 plates x 2 mm 5 plates x 1.50 mm
Steel plate quantity	11 of which 1 plate x 2.50 mm 5 plates x 2.0 mm 5 plates x 1.50 mm
Plate pack thickness	53.5 mm (wear limit 49.5 mm)
Maximum warping	0.05 mm
Clutch spring free length	38 ± 0.15 mm
Spring quantity	3
TRANSMISSION	STANDARD
Transmission type	Straight-toothed gearbox
Main reduction ratio	41/71
Second reduction system	Chain, ratio 14:43
Transmission ratio	
1st	13-37
2nd	19-37
3rd	18:-28
4th	24-32
5th	21-25
6th	24-26
GEAR CONTROL MECHANISM	STANDARD
Gear control mechanism type	Sequential with desmodronic drive and preselector
Maximum deformation of the guide bar of the gear control rod	Straightness 0.02 Roundness 0.005
AIR FILTER	STANDARD
Air filter type	Paper
FUEL PUMP	STANDARD
Pump type	Electric pump
Model (manufacturer)	LUOKATE/ROCKET
Output pressure	250 KPa
Flow rate	≥ 50 L/h
THROTTLE BODIES	STANDARD
Diameter	43 mm
Throttle cable clearance (at throttle grip flange)	2-3 mm



TECHNICAL DETAILS

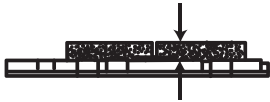
FRAME SPECIFICATIONS

FRAME	STANDARD
Frame type	Pipe truss with steel plates
FRONT WHEEL	STANDARD
Wheel type	Aluminium alloy
Rim Size	17" x MT 3.50" DOT
Material	aluminium
Wheel travel	117 mm
REAR WHEEL	STANDARD
Wheel type	Aluminium alloy
Rim Size	17" x MT 5.50" DOT
Material	Aluminium alloy
Wheel travel	128 mm
FRONT TIRE	STANDARD
Tire type	tubeless
Size	120/70 ZR17 M/C(58W)
Model (manufacturer)	N/A
Cold tire pressure	2.20 KPa.
REAR TIRE	STANDARD
Tire type	tubeless
Size	180/55 ZR17 M/C (69) W
Model (manufacturer)	N/A
Cold tire pressure	2.50 KPa.



TECHNICAL DETAILS

FRAME SPECIFICATIONS

FRONT BRAKE		STANDARD	LIMIT
Brake type		half-floating double disc brake	
Operation		with the right hand	
Recommended liquid		DOT 4	
Brake discs			
	Diameter × Thickness	320x 5 mm (12.5 x 0.15in)	
	Minimum thickness		4.5 mm (0.17in)
	Maximum deformation		0.15mm
	Thickness of worn brake pads	4 mm (0.15 in)	1 mm (0.039in)
Inside diameter of pump cylinder		16 mm (0.62in)	
Inside diameter of caliper cylinder		34 e 34 mm (1.33 e 1.33 in)	
REAR BRAKE		STANDARD	LIMIT
Brake type		1 single disc brake	
Operation		with the right foot	
Recommended liquid		DOT 4	
Brake discs			
	Diameter × Thickness	260x 5 mm	
	Minimum thickness		4.5mm (0.17in)
	Maximum deformation		0.15mm (0.006in)
	Thickness of worn brake pads	4 mm (0.15 in)	1 mm (0.039in)
Inside diameter of pump cylinder		12 mm -12,7 mm	
Inside diameter of caliper cylinder		34 mm	



TECHNICAL DETAILS

FRAME SPECIFICATIONS

FRONT SUSPENSION		STANDARD
Suspension type		Upside-down fork with 50 mm diameter stems
Fork travel		117mm
Spring		
	Free length	300 ± 0.5 mm
	Spacer length	133mm
	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	720 cc.
	Level (from the top of the external tube, with the external tube totally compressed and without the fork spring)	120 mm
Register position setting		
	Extension register	3 turns open from complete closure
	Compression register	1 turns open from complete closure
	Spring pre-load register	7 turns screwed from totally unscrewed
STEERING		STANDARD
Type of steering bearings		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 DETAILS

FRAME SPECIFICATIONS

REAR SUSPENSION		STANDARD
Suspension type		Swingarm with central mono adjustable in the spring preload.
Shock absorber travel		45 mm
Spring		
	Free length	178+/- 1,5 mm
	Installed length	167+/- 1,5 mm
	Flexibility (K1)	16 Nm
	Spring stroke (K1)	42+/- 1 mm
Gas standard pressure		1200kPa (12 bar)
Spring preload adjustment positions		
	Minimum	0
	Standard	0
	Maximum	5 mm (0.19in)
Rebound damping adjustment positions		
	Minimum*	0
	Standard*	unadjustable
	Maximum*	unadjustable
* from the fully retracted position		
TRANSMISSION CHAIN		STANDARD
Model (manufacturer)		Benelli
Number of links		N/A



TECHNICAL DETAILS

ELECTRICAL SPECIFICATIONS

SYSTEM VOLTAGE	STANDARD
System voltage	12.8V
IGNITION COILS	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
CHARGE SYSTEM	STANDARD
System type	AC Magnetic
Model (manufacturer)	QJ
Windings	0.25 ± 0.1 Ohm
Rated output	12 A a 4000 rpm
Rated power	448 W / 5000 rpm
Rated current	32 A / 5000 rpm
Voltage adjustment	$13.5 + 0.5$ V (3000 rpm 25 C°)
STARTER RELAY	STANDARD
Model (manufacturer)	QJ
Amperage	100 A
Coil resistance	4.4 Ohm a 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



TECHNICAL DETAILS

ELECTRICAL SPECIFICATIONS

LAMPS (WATT VOLTAGE x QTY)	STANDARD
Headlamps (High/Dipped beam)	LED
Front position indicator light	LED
Rear position indicator light/brake light	LED
Turn signal lights	LED
Number plate light	12 V 5 W x 1
Instrument panel light	LED x 1
INDICATOR LIGHTS (WATT VOLTAGE x QTY)	STANDARD
Neutral indicator light	LED x 1
High beam indicator light	LED x 1
Oil level warning light	LED x 1
Turn signal indicator light	LED x 1
Engine fault signal light	LED x 1

ELECTRIC IGNITION SYSTEM	STANDARD
Model (manufacturer)	QJ
Power output	0.7kw
HORN	STANDARD
Horn type	low
Model (manufacturer)	QJ
Max. amperage	3 A
Performance	105~ 118db (A)
FLASHER RELAYS	STANDARD
Relay type	Electronic Flasher
Model (manufacturer)	QJ 600 45 Flasher
Flashing frequency of turn signal lights	80~160 cycle/min
Watt	130mA x4
OIL PRESSURE SENSOR	STANDARD
Model (manufacturer)/Setting	0,05 ± 0,015MPa



TECHNICAL DETAILS

ELECTRICAL SPECIFICATIONS

FUSES (AMPERAGE×QTY)	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)
THROTTLE BODY SENSOR	STANDARD
Model (manufacturer)	TGKEYAIR
Resistance	2 KOhm ± 20%
FUEL PUMP	STANDARD
Max. amperage/Pressure/Flow rate	2.8 A / 250 kPa / ≥50 L/h
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)
AIR TEMPERATURE SENSOR AIRBOX	STANDARD
Model (manufacturer)	12160244 (PACKARD)
Resistance	181±8 Ohm 100°C
THROTTLE BODY AIR PRESSURE SENSOR	STANDARD
Model (manufacturer)/Power supply voltage	240600695 (DELPHI) /5V



TECHNICAL DETAILS

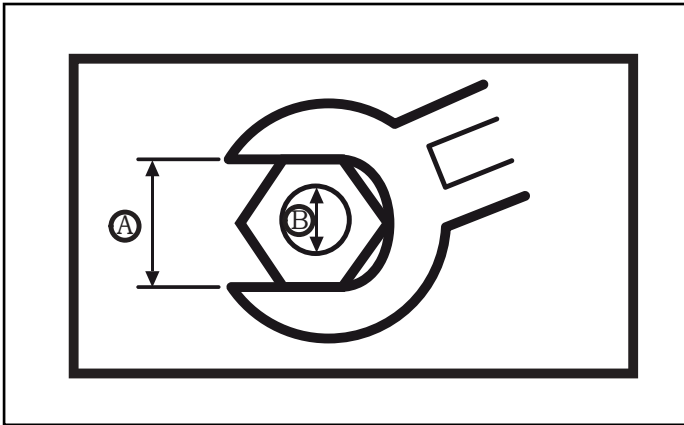
ELECTRICAL SPECIFICATIONS

FLUID TEMPERATURE SENSOR	STANDARD
Model (manufacturer)	WC -12A (QJ)
Resistance	100 °C 178 Ohm
SPEED SENSOR	STANDARD
Model (manufacturer)/GAP	QJ / 1.1mm - 2.2 mm
LAMBDA SENSOR	STANDARD
Model (manufacturer)	OSM (Delphi)
INJECTOR	STANDARD
Model (manufacturer)	Mini (Delphi) 12±1Ω
RELAY ASSEMBLY	STANDARD
Model (manufacturer)	CM1 NAIS
IGNITION SYSTEM	STANDARD
Ignition system type	DELPHI
Ignition timing	10° before TDC from 900 to 1800 r/min
Signal wheel sensor (Pick-up)	250 ± 30 Ω
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 DETAILS

GENERAL TIGHTNESS SPECIFICATIONS



The tightening torques of the different special parts or assemblies are provided in each chapter of this manual.

As far as concerns assemblies with multiple fastenings, in order to prevent the risk of warping, cross tighten in successive stages, until you reach the required torque.

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

Parts must be at ambient temperature.

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



TECHNICAL DETAILS

TIGHTENING TORQUES

TIGHTNESS TORQUES AND RELEVANT PRELOADS FOR STANDARD CONNECTIONS

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

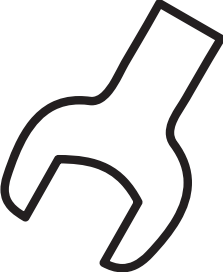
The parts to be tightened together must be in metal or sufficiently rigid not to need the insertion of bushing or spacers.

Coupling must always use lightly oiled or greased threads; alternatively, the type of thread locker paste required must be indicated.

Axial preloads, related to tightness torques, have been increased by 10% on the calculated value to take into account the tolerance on the nominal torque and the changes that the friction coefficient may undergo between tightening operations.

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 indicated 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 in "OFF" position.

While checking fluid levels, it is preferable to keep the motorbike 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.

At 40,000 km (24,854 mi), repeat maintenance services, starting from the one of 13,000 km (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 chart 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 level on a regular basis and top up, if necessary.
- Every two years change the brake fluid.
- Replace the brake hoses every 4 years, or before if cracked or damaged.

KEY: PERIODIC MAINTENANCE AND LUBRICATION INTERVALS	
I	Checking, adjustment, cleaning, lubrication or replacement as required
R	Change
T	Tighten
☐	Dealer



PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

MAINTENANCE INTERVALS

NO.	Item	Maintenance intervention or control	0 km (0 mi) Pre-delivery	1000 km (621 mi) 1° Service	7,000 km (3,726 mi) 2° Service	13,000 km (8,078 mi) (7,452 mi) 3° Service	19,000 km (11,806 mi) (11,178 mi) 4° Service	25,000 km (14,904 mi) (14,904 mi) 5° Service	Annual inspection
1	Engine oil	Check/Top up/Change	I	R	R	R	R	R	R
			Check every 500 km (310 mi)						
2	Oil filter	Change		R	R	R	R	R	
			In any case at every 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	I	I	I
		Change	Every 2 years or 13,000 km (8,078 mi)						
6	Cooling system	Check the level of the cooling fluid and make sure there are no leaks from the vehicle	I	I	I	I	I	I	I
7	Spark plugs	Check/Replacement			I	I	R	I	I
			Check the status, clean and adjust the spark plug gap.						
8	Transmission chain	Check chain slack. Check whether the rear wheel is properly 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	Sprocket	Check/Lubricate		I	I	I	I	I	I
			Replace in any case at every chain replacement.						
10	Rear wheel spring drive	Check/Replacement		I	I	I	I	I	I
			After the first 13,000 km (8,077 mi), then every 2 services (12,000 km - 7,456 mi).						
11	Pinion / Retaining washer	Check/Replacement		I	I	I	I	I	I
			Replace in any case at every chain replacement.						
12	Fuel line circuit	Check for faults and leakages			I	I	I	R	
			Replace in any case every 3 years.						
13	Brake fluid	Check/Top up	I	I	I	I	I	I	I
	* clutch	Replace	Replace every 2 years.						
14	Front brake/ Rear brake	Check the operation of the fluid gauge and make sure there are no leaks from the vehicle	I	I	I	I	I	I	I
15	Brake pads	Check/Replacement		I	I	I	I	I	
			Replace if worn up to limit.						
16	Swingarm chain sliding shoe	Check/Replacement		I	I	I	I	I	
			Replace if worn up to limit.						
17	Swingarm chain guide sliding shoe	Check/Replacement		I	I	I	I	I	
			Replace if worn up to limit.						
18	Throttle hand grip	Check operation and adjust throttle cable clearance, if necessary. Lubricate the throttle hand grip housing and the cable.	I	I	I	I	I	I	I
19	Throttle body	Check operation/Adjust clearance		I	I	I	I	I	



PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

MAINTENANCE INTERVALS

NO.	Item	Maintenance interven- tion or control	0 km (0 mi) Pre-delivery	1000 km (621 mi) 1° Service	7,000 km (3,726 mi) 2° Service	13,000 km (8,078 mi) (7,452 mi) 3° Service	19,000 km (11,806 mi) (11,178 mi) 4° Service	25,000 km (14,904 mi) (14,904 mi) 5° Service	Annual inspec- tion
20	Clutch control	Check/Adjustment	I	I	I	I	I	I	I
21	Throttle body	Check/Adjustment		I	I	I	I	I	
22	Clearance Valves	Check operation/Adjust clearance						I	
			Check clearance every 25,000 km (14,904 mi).						
23	Distribution chain	Check/Replacement						R	
			Every 40000 Km (24854 m)						
24	Distribution chain sliding shoes	Check/Replacement						R	
			When replacing the timing chain and every 40000 km (24854 mi)						
25	Distribution chain tensioner	Check/Replacement						R	
			When replacing the timing chain and every 40000 km (24854 mi)						
26	Steering ring nut and sleeve	Check/Adjustment	T	T	T	T	T	T	T
27	Steering bearings	Check/Replacement				T		T	
			Every 19,000 km (11,806 mi) lubricate using lithium soap grease						
28	Front / rear wheel bearings	Check/Replacement				I		I	
			Every 12/13000 Km (7456-8077 mi) check adjustment / possible replacement of the final transmission sprocket spring drive						
29	Swingarm bearings	Check/Replacement			I	I	I	R	
			Every 25,000 km (14,904 mi)						
30	Swingarm	Check operation and make sure the clearance is adequate. Lubricate.			I	I	I	I	
31	Front suspension	Check operation and make sure there are no leakages.		I	I	I	I	I	I
32	Front suspension oil	Change				R	R		
			Every 12/13000 Km ((7456-8077 mi) or every 2 years change of front suspension oil						
33	Rear suspension	Check/Adjust and make sure there are no leaks.			I	I	I	I	
			Before each use						
34	Wheels	Make sure they are not off centre or damaged.				I	I	I	
			Every 19,000 Km (11,806 mi)						
35	Tires	Check the depth of tread and make sure they are not damaged. Replace, if necessary. Check inflation pressure. Correct, if necessary.		I	I	I	I	I	I
			Replace if worn up to the limit of tread wear 1.5 mm						
36	Side stand	Check/Operation	I	I	I	I	I	I	I
37	Side stand switch	Check/Operation	I	I	I	I	I	I	I
38	Equipment, lights, indicator lights, and switches	Check/Operation	I	I	I	I	I	I	I
39	Front headlight	Check/Operation	I	I	I	I	I	I	
		Adjustment	At every change in vehicle set-up						
40	Horn	Check/Operation	I	I	I	I	I	I	I



PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

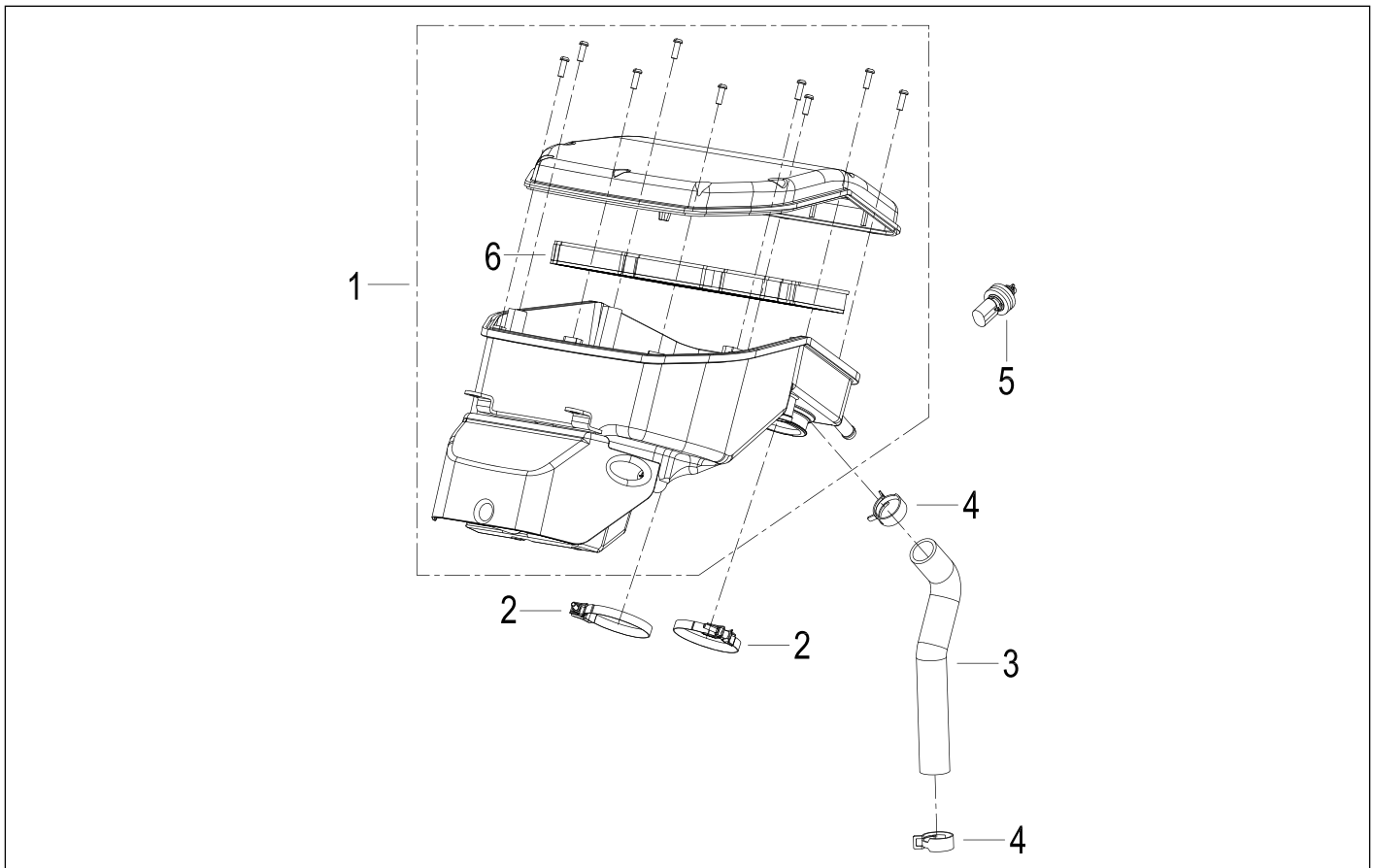
MAINTENANCE INTERVALS

NO.	Item	Maintenance interven- tion or control	0 km (0 mi) Pre-delivery	1000 km (621 mi) 1° Service	7,000 km (3,726 mi) 2° Service	13,000 km (8,078 mi) (7,452 mi) 3° Service	19,000 km (11,806 mi) (11,178 mi) 4° Service	25,000 km (14,904 mi) (14,904 mi) 5° Service	Annual inspec- tion
41	Instrumentation	Check/Operation							
42	Battery connections	Check/Operation							
43	Electric system	Check/Operation							
44	Ignition switch	Check/Operation							
45	Electric fans	Check/Operation							
46	Chassis fasteners	Make sure all nuts, bolts and screws are sufficiently tightened.		T	T	T	T	T	T
47	Oil sump screws	Check		T	T	T	T	T	
48	Clutch cover screws	Change		T	T	T	T	T	
49	Catalytic converter	Check for faults and leakages							
50	Canister	Check for faults and leakages						R	
51	Brake/clutch hoses	Check for faults and leakages							
52	Moving parts and cables	Check/Replacement							
53	Oil intake filter	Check/Replacement							

After the first 13,000 km (8,077 mi), then every 2 services (12,000 km - 7,456 mi).

ENGINE / AIR BOX

REMOVAL/ASSEMBLY OF AIR BOX



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	COMPLETE AIR FILTER BOX					
2	SCREW HOSE CLAMP					
3	HOSE					
4	HOSE GUIDE SPRING					
5	AIR TEMPERATURE SENSOR					
6	AIR FILTER					



ENGINE / AIR FILTER

REMOVAL/INSTALLATION OF AIR FILTER

Park:

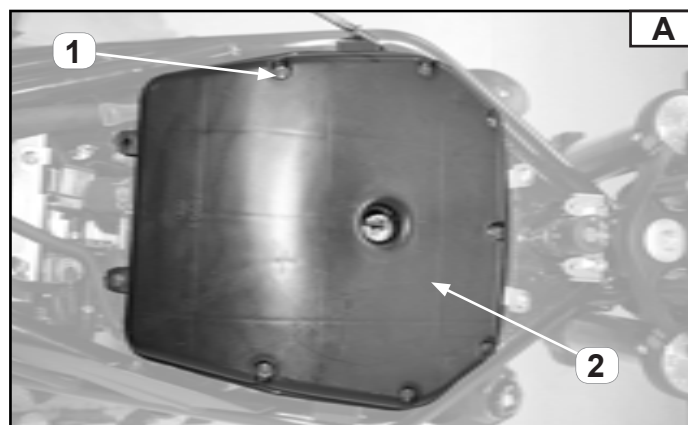
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The screws (1) Fig. A.
- The cover (2) Fig. A.
- The protection mesh (3) Fig. B.
- The filter element (4) Fig. C.



NOTICE

Replace the air filter element every 6,000 km (3728 mi). If the vehicle is used in particularly damp or dusty climates, it will be necessary to change the air filter more often.

Check:

If the air filter element is damaged, replace.

Installation:

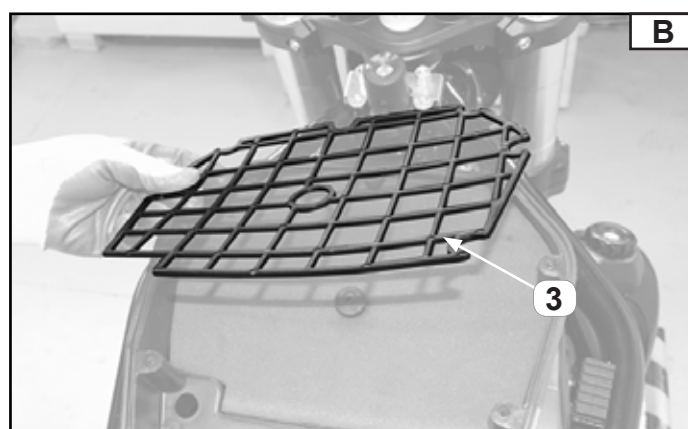
During the installation stage, proceed in the opposite direction to above described removal.

NOTICE

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

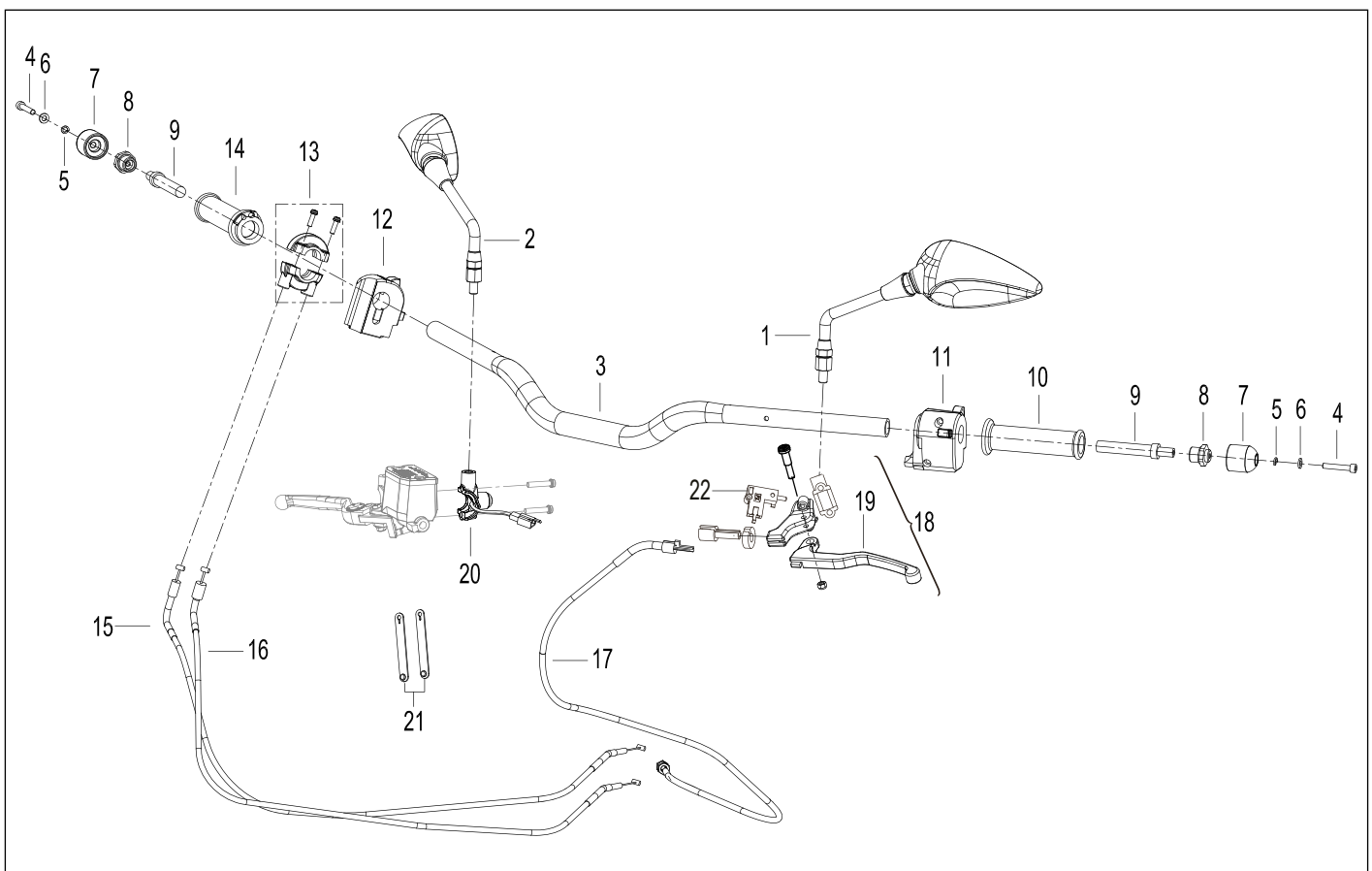
WARNING

Never start the engine without the air filter installed. If not filtered, air will cause engine parts to wear out quickly and may even damage the engine. Using the engine without air filter will also have a negative effect on the fine tuning of the throttle valves and this in turn will cause the engine's performance to suffer and even to eventually overheat. Make sure that the air filter is always in good working order. The lifetime of the engine depends mainly on this part.



ENGINE / THROTTLE CABLE CLEARANCE

ADJUSTMENT OF THROTTLE CABLE CLEARANCE



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	L.H. REAR-VIEW MIRROR					
2	R.H. REAR-VIEW MIRROR					
3	HANDLEBAR					
4	SCREW					
5	SPRING WASHER					
6	WASHER					
7	ROCKER					
8	GRIP CAP					
9	HAND GRIP TERMINAL					
10	L.H. HAND GRIP					
11	L.H. LIGHTS SWITCH					
12	R.H. LIGHTS SWITCH					
13	THROTTLE CONTROL					
14	THROTTLE CONTROL PIPE					
15	CABLE OPENING THROTTLE					
16	CABLE CLOSING THROTTLE					
17	CLUTCH CABLE					
18	CLUTCH CONTROL					
19	CLUTCH CONTROL LEVER					
20	ABS SWITCH					
21	RUBBER HOSE CLAMP					
22	CLUTCH SWITCH					

ENGINE / THROTTLE CABLE CLEARANCE

ADJUSTMENT OF THROTTLE CABLE CLEARANCE

Check:

- The throttle cable clearance (1).

Make sure the throttle grip 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 Fig. A	Dimensions
Throttle cable	2 - 3 mm

Adjust:

- Throttle cable clearance.

Handlebar side

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

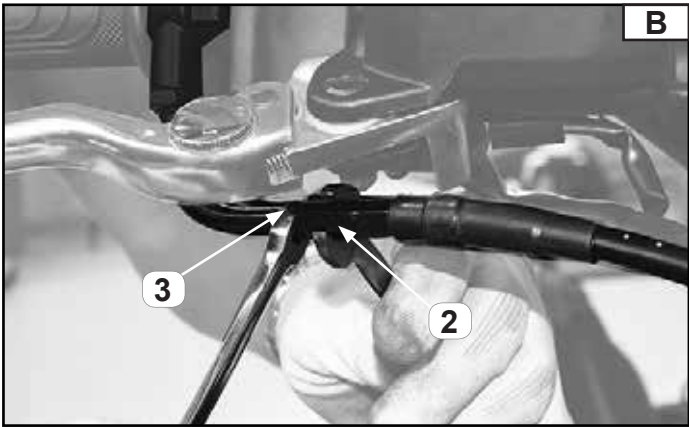
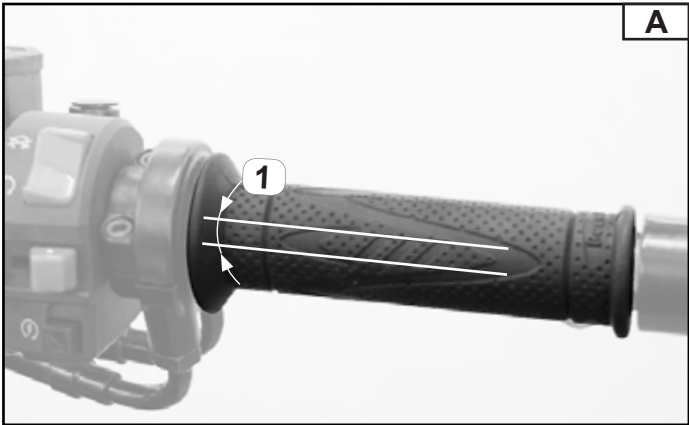
Throttle cable clearance	Clearance
Clockwise	The gap is increased
Counter-clockwise	The gap is decreased

- Tighten the lock nut (2).

Carry out the adjustment on both throttle controls.

WARNING

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



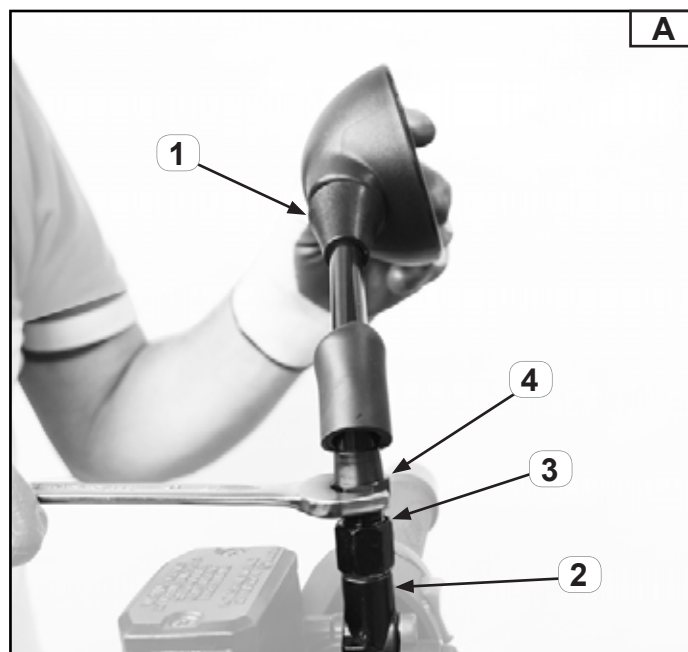


FRAME / HANDLEBAR

ADJUSTMENT OF REAR-VIEW MIRRORS

NOTE:
The following procedure applies to both rear-view mirrors.

1. Screw the mirror (1) on the lever body (2).
2. Move the nut until it stops (3).
3. Adjust the mirror position by rotating it to the required position.
4. Tighten the lock nut (4).



ENGINE / ENGINE OIL

ENGINE OIL LEVEL CHECK

Park:

- The motorcycle on a level surface.

NOTE:

- Place the motorcycle on a suitable support.
- Make sure that the bike is upright.

Start:

- Engine.

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

NOTICE

Do not start the engine if the oil is under the MIN reference of the dipstick.

Remove:

- The oil filler cap (1) with the engine switched off Fig. A.

Check:

- The engine oil level.

The engine oil level must be within the references of the minimum (MIN) and maximum (MAX) level of the dipstick (2) Fig. B.

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



Recommended oil

SAE 10 W-50 API SJ - JASO MA

To top up the engine oil:

- Remove the oil filler cap (1) with the engine switched off Fig. A.
- Pour an amount of oil of the recommended type within the reference of the maximum (MAX) and the minimum (MIN) level of the dipstick Fig. B.

NOTE:

The engine contains approx.ly 3 l of oil.

Use oil rated API-SJ SAE 10W/50.

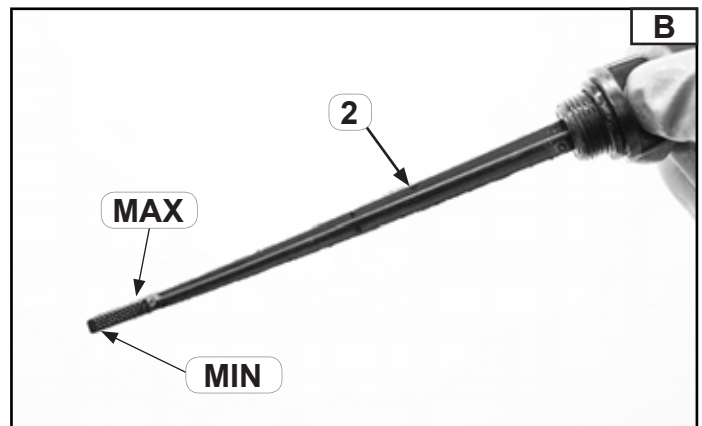
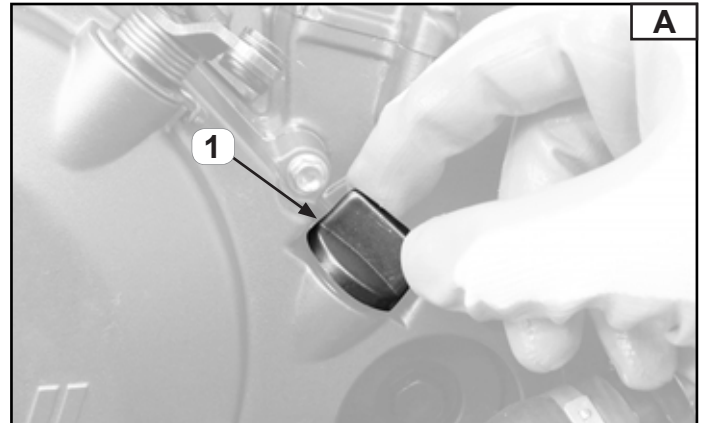
NOTICE

Given that engine oil also lubricates the clutch, if it is not the right type or if it contains additives, it could cause the clutch to slip. Therefore, we recommend not adding any chemical additives or using oils of other types than the one listed in the technical specifications for the engine.

Engine oil, whether new or spent, can be dangerous.

If ingested, engine oil may be poisonous to people or pets. In the event of ingestion, seek medical attention immediately; do not provoke vomiting to avoid breathing the product into the lungs. Brief contact with engine oil may irritate the skin.

- Keep the engine oil out of reach of children and pets.
- Wear long-sleeved clothing and waterproof gloves every time you top up the engine oil.
- Wash off any oil that has come into contact with the skin with soap and water.
- Recycle or correctly dispose of spent engine oil.



- Screw the oil filler cap back in place (1) Fig. A.

NOTE:

When checking the engine oil level, restart the engine, leave it to warm up for a few minutes and then switch it off. Wait a few moments to give the oil enough time to flow down.



ENGINE / ENGINE OIL CHANGE OF ENGINE OIL

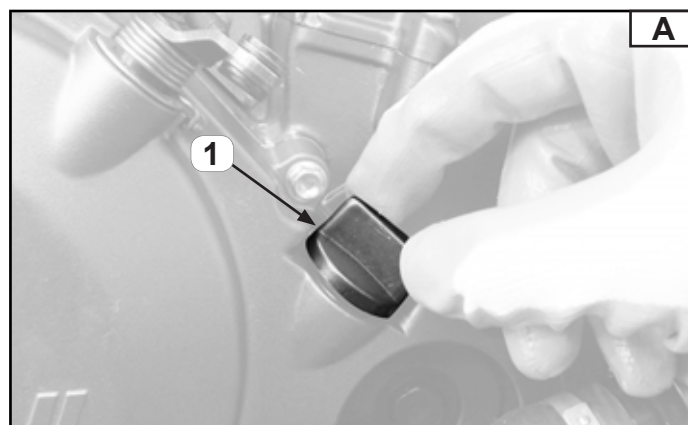
Start:

- Engine.

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

Remove:

- The oil filler cap (1) Fig. A.



Place:

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

NOTE:

Change the engine oil at 1000 Km (621 mi) first and then every 6000 km (3728 mi).



NOTICE

Waste oil are environmentally unfriendly.
Dispose waste oil according to applicable law.

Remove:

- The magnetic cap (2) (together with the copper gasket) Fig. C.

Drain:

- The engine oil from the crankcase.

NOTE:

When changing oil, change also the oil filter cartridge.

Replace:

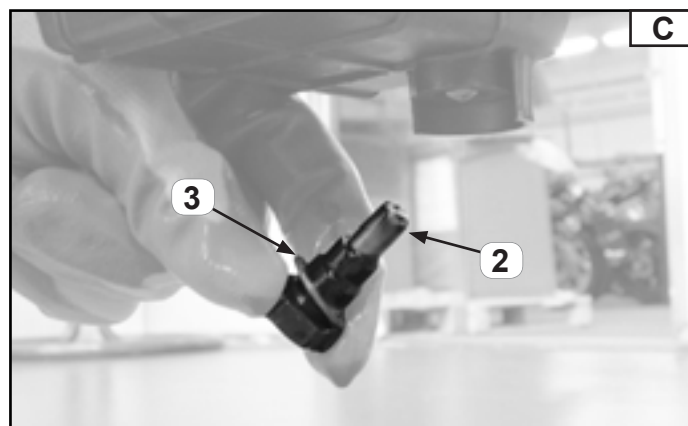
- The gasket (3) of the magnetic cap Fig. C.

Install:

- The magnetic cap.

NOTE:

In case of metal traces on the magnetic cap, clean it before installation.



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 filler cap (1) Fig. A.

Start:

- Engine.

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

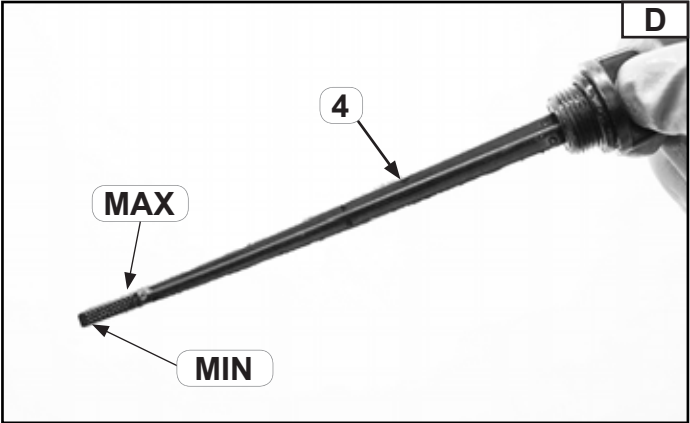
ENGINE / ENGINE OIL

CHANGE OF ENGINE OIL

NOTE:

Always make sure that the level is midway between the MIN and MAX marks on the dipstick (4) Fig. D.

Top up, if necessary.



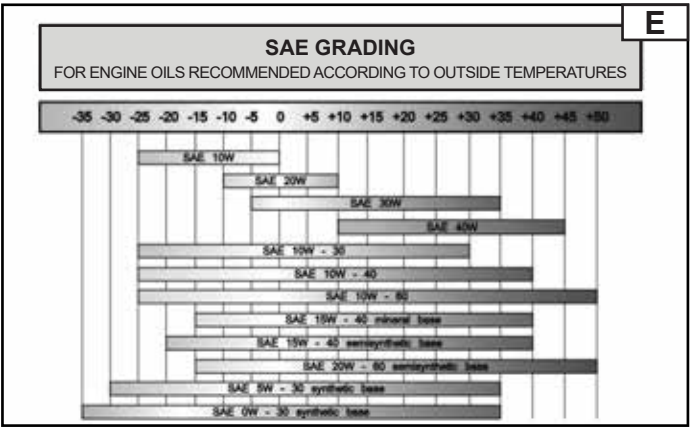
Recommended engine oil:

Grade: API SJ-JASO MA2

Viscosity: 10W50

Capacity: 2.8 l (without removing the filter)

3 l (with filter removal)



ENGINE / ENGINE OIL REMOVAL / INSTALLATION OF OIL FILTER

NOTE:
Before removing the oil filter, it is necessary to remove the oil from the engine.

Removal:

1. Place a suitable container underneath the engine.
2. Use the specific equipment to rotate the oil filter counter-clockwise (1) and take it out Fig. A.



Oil filter tool

Installation:

Proceed using the opposite order to removal.

NOTE:
Before installing a new oil filter, apply a fine layer of engine oil to the contact surfaces of the same to lubricate it Fig. B.

Tighten:

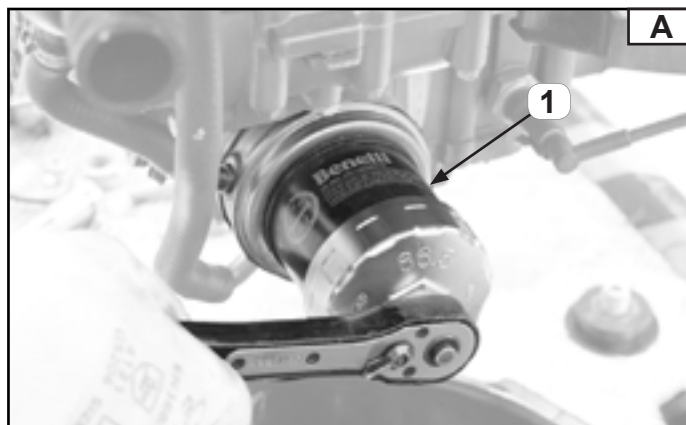
- The oil filter (1) Fig. A to the following torque:



Torque 22 N*m

NOTICE

Always use original Benelli oil filters.
Non-original oil filters may differ in terms of threading (diameter and pitch) or calibration of the inner bypass valve.
The use of other types of filter may affect the filter performance, duration and reliability, which will cause possible damage to the engine or oil leaks.





ENGINE / SPARK PLUGS

REMOVAL OF SPARK PLUGS ON THE VEHICLE

The following procedure applies to all of the spark plugs.

WARNING

Spark pugs must be checked and replaced when the engine is cool.

Park:

- The motorcycle on a level surface.

NOTICE

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

Remove:

- The seat, refer to the section “Removal of the seat, Chapter 4”.
- The tank, refer to the section “Removal of the fuel tank, Chapter 4”.
- The air filter box, refer to the section “Removal of the air filter box, Chapter 4”.

Remove:

- The nut (1) Fig. A.

Disconnect:

- The ground cables (2) Fig. B.
- The bracket (3) Fig. B.

- The connectors (4) of the coils Fig. C.

Slide out:

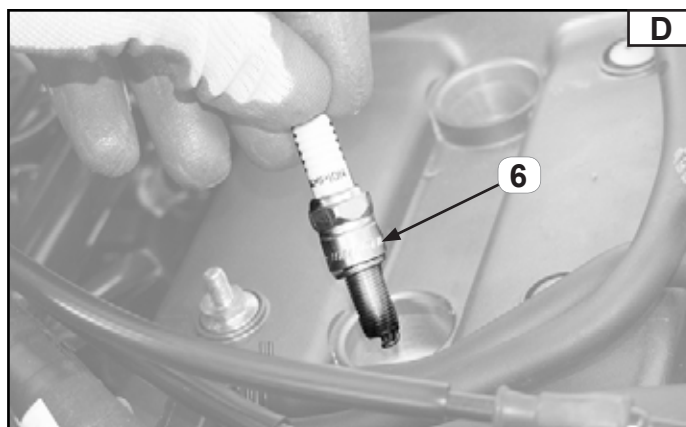
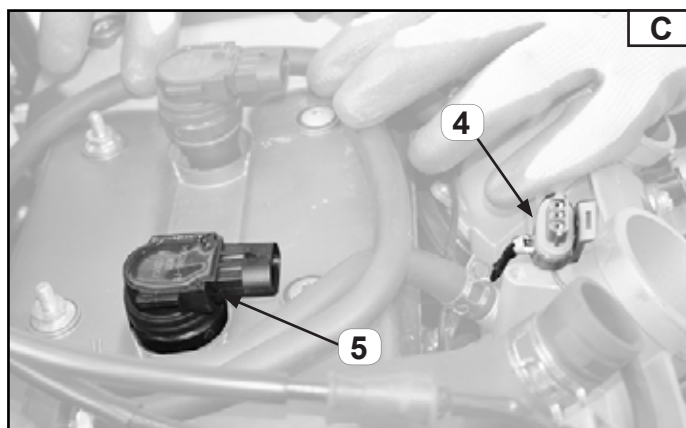
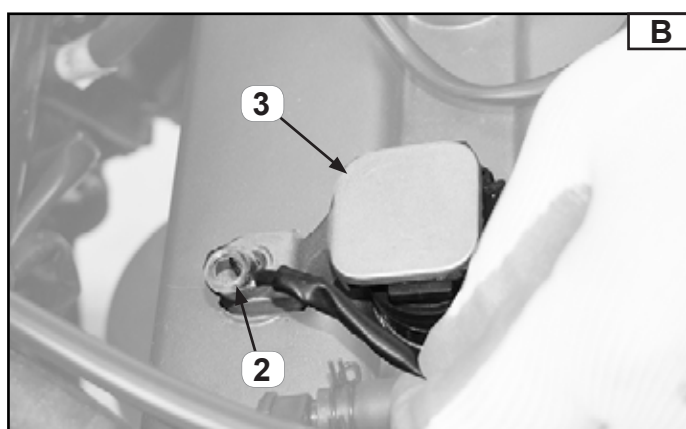
- The coil (5) Fig. C.

NOTICE

Before removing the spark plugs, remove any build up of dirt from the seat with a jet of compressed air, to prevent it from dropping down into the cylinders.

Screw off:

- The spark plug underneath (6) Fig. D.



ENGINE / SPARK PLUGS

CHECKING OF SPARK PLUGS

The following procedure applies to all of the spark plugs.

Check:

- The type of spark plug.

Check:

- The electrodes (1) Fig. A.
- If there is any damage, wear or rounding.

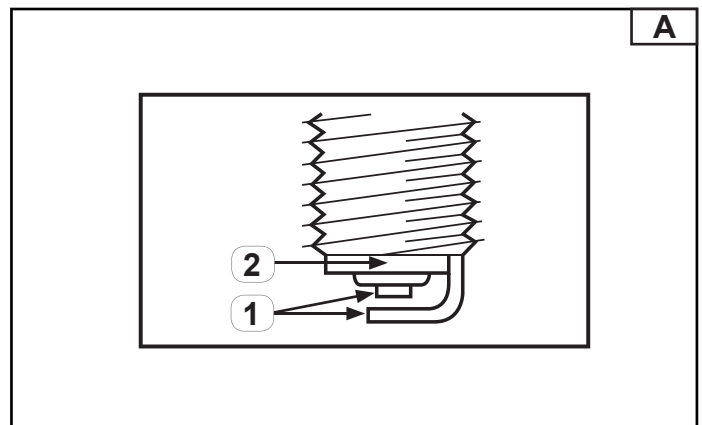
Replace the spark plug.

- The insulating part (2) Fig. A.

Abnormal colour.

Replace the spark plug.

Generally, the colour is a light, medium brown.



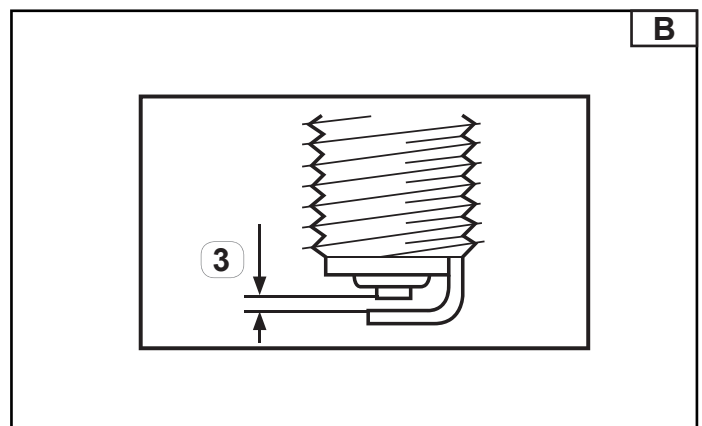
Check:

Measure the distance between electrodes (3) using a thickness gauge Fig. B.

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

Distance between spark plug electrodes	(mm)
(3)	0.7 - 0.8

Spark plug type
NGK CR8E



ENGINE / SPARK PLUGS

CHECKING OF SPARK PLUGS

In general, the table contains the typical conditions of spark plug with the various degeneration causes and corresponding solutions.

 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	Insufficient air/fuel mix	Adjust air/fuel ratio
Specific 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	Insufficient 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 specifications



ENGINE / SPARK PLUGS

INSTALLATION OF SPARK PLUG

NOTE:
The following procedure applies to all of the spark plugs.

WARNING

Lubricate the plug threads with copper grease.



NOTE:
Before installing the spark plug, clean it and also the surfaces in contact with the gasket.

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 coil (1) Fig. A.
- The rubber pads (2) and the O-rings (3) Fig. A.

Connect:

- The coil connector.

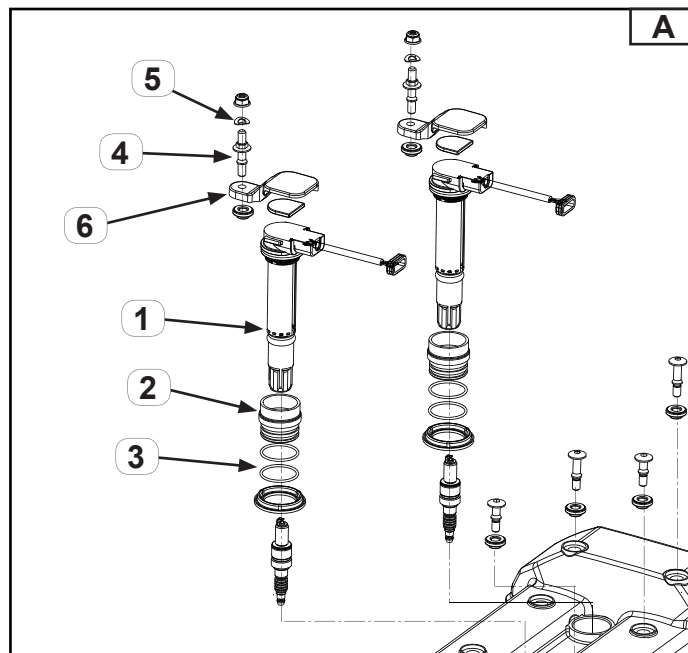
Install:

- The screw (4) Fig. A.
- The washer (5) Fig. A.
- The bracket (6) Fig. A.

Tighten to the following torque:



Torque 10 N*m





ENGINE / CHECK OF VALVE CLEARANCE

ADJUSTMENT OF THE VALVE CLEARANCE WITH ENGINE ON THE FRAME

Park:

- The motorcycle on a level surface.

NOTICE

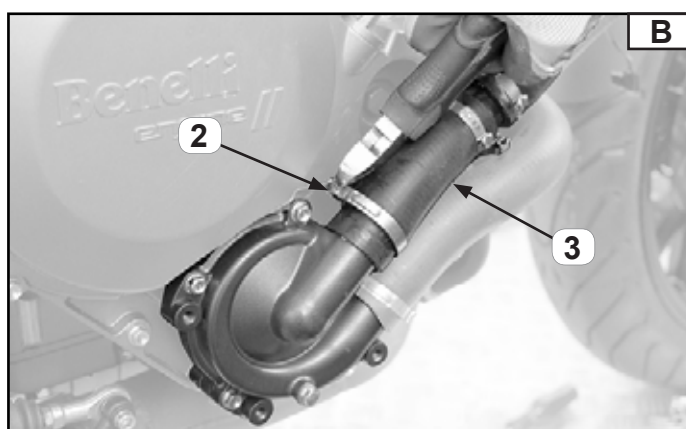
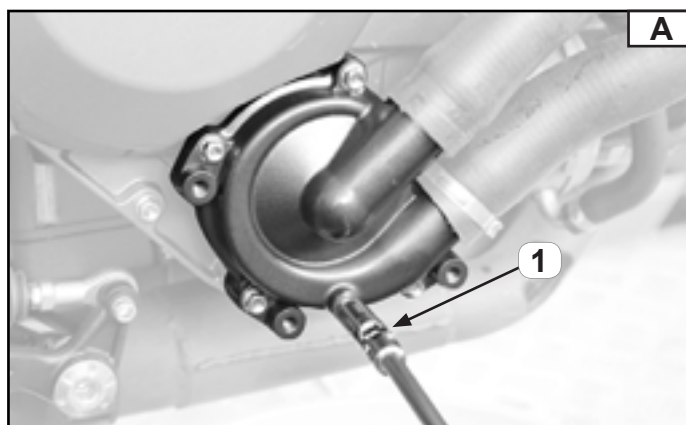
Prop the bike on suitable supports so that it cannot fall.

Remove:

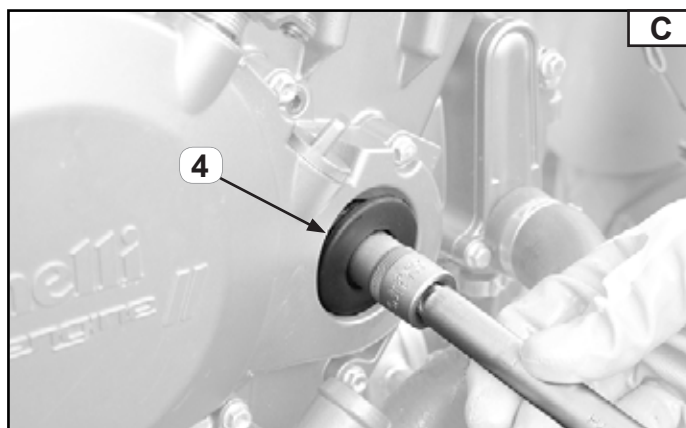
- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The air filter box, refer to the section “**Removal of the air filter box, Chapter 4**”.
- The stepper, refer to section “**Removal of the stepper, Chapter 4**”.
- The throttle body, refer to the section “**Removal of the throttle body, Chapter 4**”.
- The timing cover, refer to the section “**Removal of the timing cover, Chapter 5**”.
- The screw cooling fluid (1) Fig. A.

Remove:

- The clamp (2) Fig. B.
- The tube (3) Fig. B.

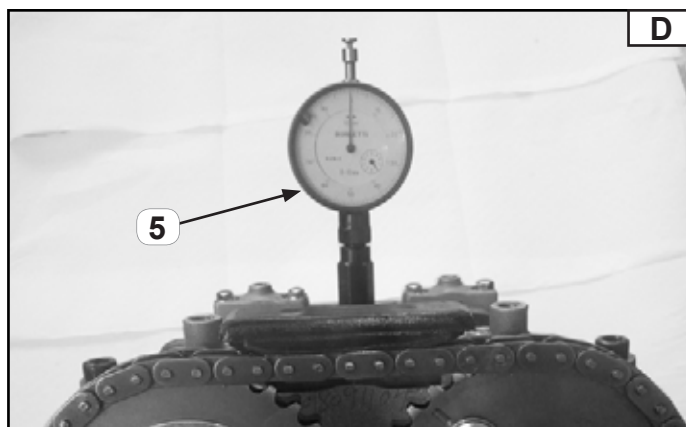


- The drive shaft cap (4) Fig. C.



Install:

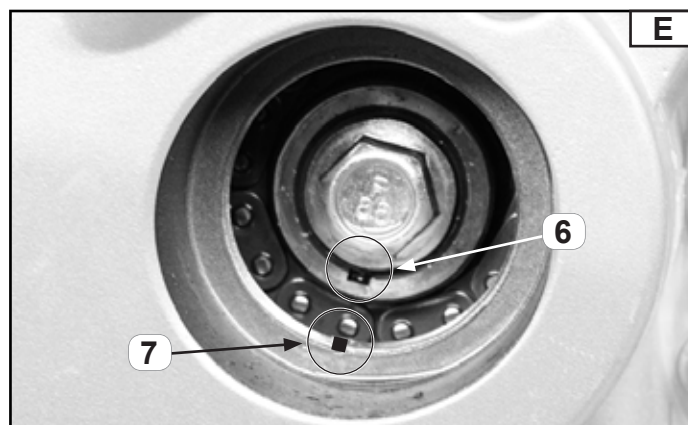
- The comparator (5) with the relevant support on the spark plug hole cylinder 2 (distribution chain side) Fig. D.



ADJUSTMENT OF THE VALVE CLEARANCE WITH ENGINE ON THE FRAME

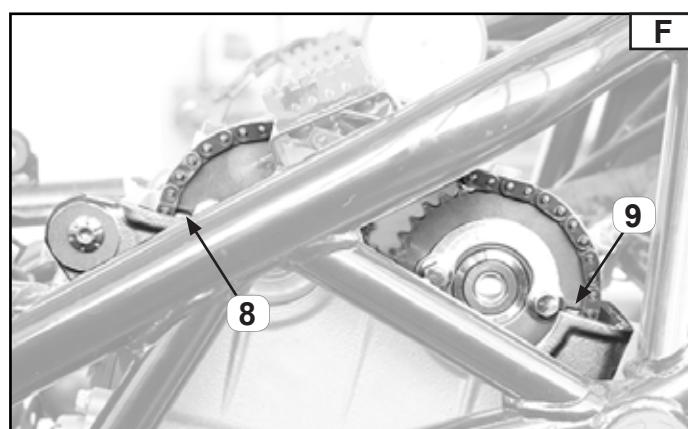
Align:

- The bush notch (6) and the one of the guard seat (7), bringing the piston of the cylinder 2 to the TDC Fig. E.

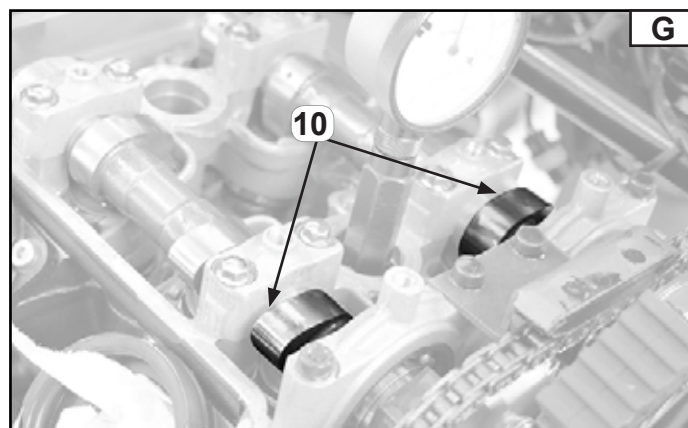


Check:

- The alignment of notches (8) and (9) Fig. F.



- The position of the cam lobes (10), that are facing outward Fig. G.



Measure:

- Valve clearance via thickness gauge (11) Fig. H.

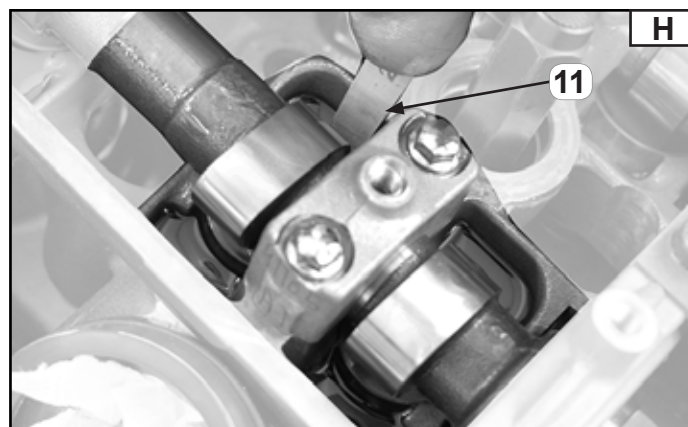
Camshaft	Tappet-cam clearance
Camshaft exhaust side	0.30 ~ 0.35 mm
Camshaft intake side	0.25 ~ 0.30 mm

NOTE:

NOTE: The valve clearance must be checked and adjusted when the engine is cool (ambient temperature).

NOTE:

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



ENGINE / CHECK OF VALVE CLEARANCE

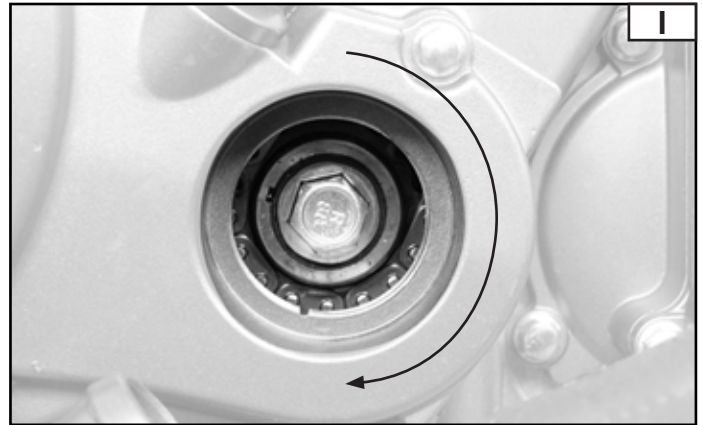
ADJUSTMENT OF THE VALVE CLEARANCE WITH ENGINE ON THE FRAME

Install:

- The comparator with the relevant support on the spark plug hole cylinder 1 (distribution chain side).

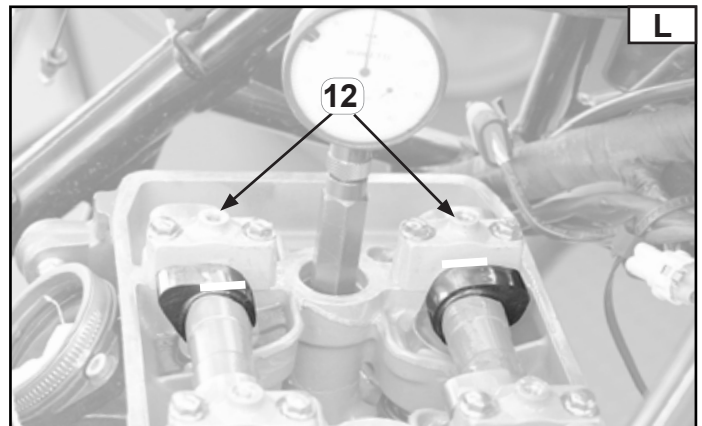
Rotate:

- The 450° drive shaft (360° + 90°) clockwise, from the TDC cylinder 2 (distribution side) Fig. I.



Check:

- Via the comparator, that the piston 1 is situated at the TDC and the position of the lobes of the two shafts (12) are facing outward Fig. L.



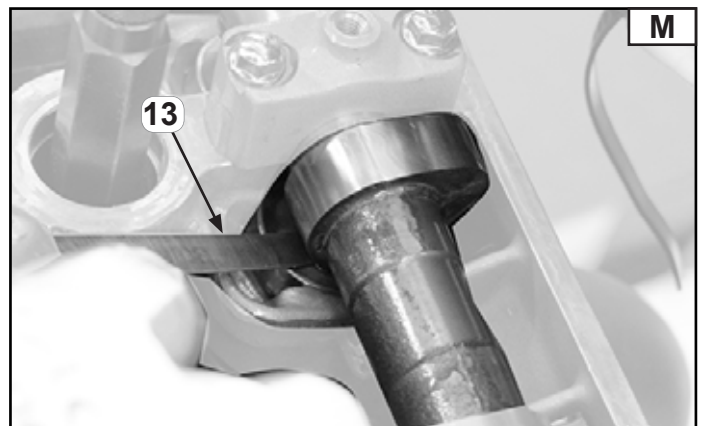
Measure:

- Valve clearance via thickness gauge (13) Fig. M.

Camshaft	Tappet-cam clearance
Camshaft exhaust side	0.30 ~ 0.35 mm
Camshaft intake side	0.25 ~ 0.30 mm

Installation:

Proceed using the opposite order to removal.



ENGINE / COOLING SYSTEM

CHECK OF COOLING FLUID LEVEL

Park:

- The motorcycle on a level surface.

NOTICE

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

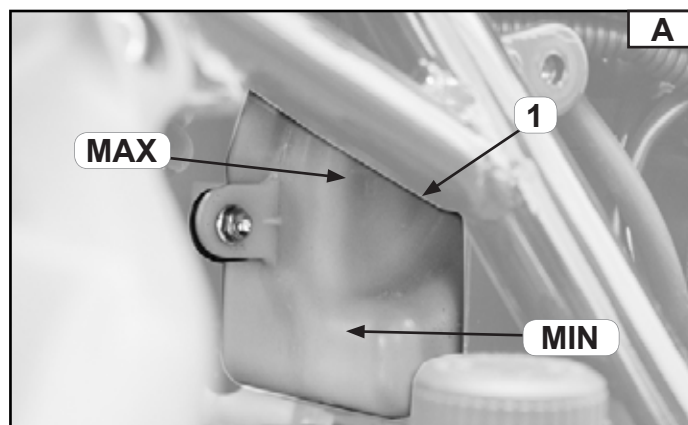
NOTE:

Make sure that the bike is upright.
Check the level when the engine is cold.

Check:

- The cooling fluid level (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.



Remove:

- The seat, refer to the section “Removal of the seat, Chapter 4”.
- The tank, refer to the section “Removal of the fuel tank, Chapter 4”.
- The cap in the expansion tank.

NOTICE

Never try to remove the cap of the expansion tank when the engine is hot.

Add:

- The cooling fluid up to the level line (MAX) Fig. A.

Position:

- The cap in the expansion tank.

NOTICE

It is possible to use distilled water or not calcareous tap water instead of cooling fluid. Do not use calcareous or salty water to prevent damage to the engine. When using water instead of cooling fluid, replace it with the latter at soonest to ensure the protection of the cooling system against frost and corrosion. When adding water to the cooling fluid, have Benelli check the cooling fluid content as soon as possible to ensure its efficiency.

FRAME / BRAKE ADJUSTMENT

ADJUSTMENT OF FRONT BRAKE

Adjust:

- The brake lever position Fig. A.
(distance (1) between the throttle hand grip 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 (2) Fig. B clockwise or counter-clockwise until the brake lever reaches the required position.

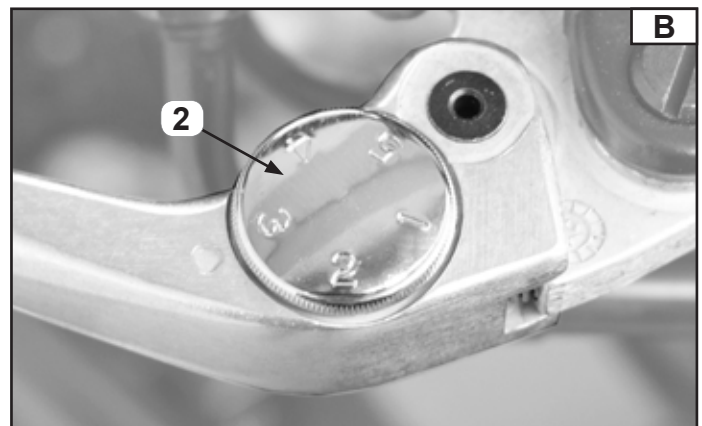
Ring nut Position	Distance
Position 1	The lever is more distant from the hand grip
Position 5	The lever is closer to the hand grip

WARNING

If the brake lever is soft or spongy to the touch, there might be air in the braking system. Before using the motorbike, it is necessary to bleed out the air by emptying out the brake circuit. Air in the brake circuit will considerably reduce the performance of the system and may even lead to a loss of vehicle control and possible accidents. Therefore, check the system and if necessary, bleed it.

NOTICE

After adjusting the position of the brake lever, make sure that there is no brake drag of any kind.



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 control Fig. A.

Tighten:

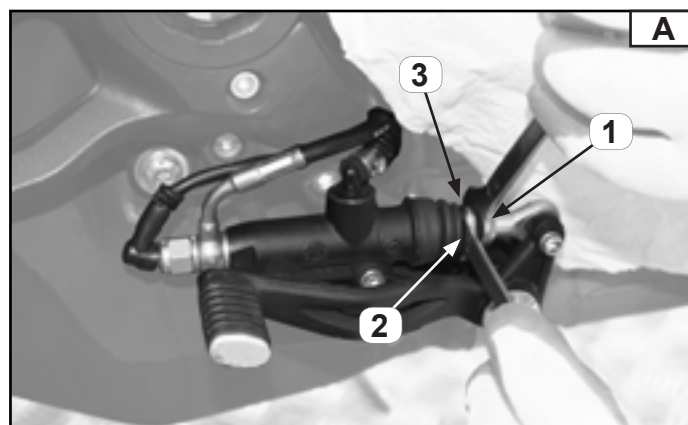
- The nut (1) Fig. A.

Tighten:

- The lock nut (2) Fig. A.

NOTICE

After adjusting the position of the brake pedal, make sure that there is no brake drag of any kind.



FRAME / CHECK OF BRAKE FLUID LEVEL

CHECK / TOP UP OF THE REAR BRAKE FLUID LEVEL

Park:

- The motorcycle on a level surface.

NOTE:
Place the motorbike on a stand and make sure that it is in the upright position.

Check:

- The brake fluid level.

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

Fluid topping up procedure:

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

NOTICE

Brake fluid can damage painted surfaces or 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 peephole on the pump Fig. A.
- Pump the brake fluid by moving the brake lever.
- Once the top up is complete (4) Fig. D, place the cap and tighten the two fastening screws to the cover.

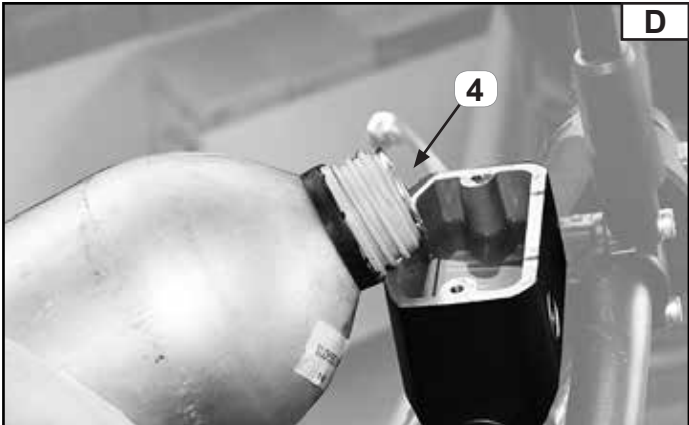
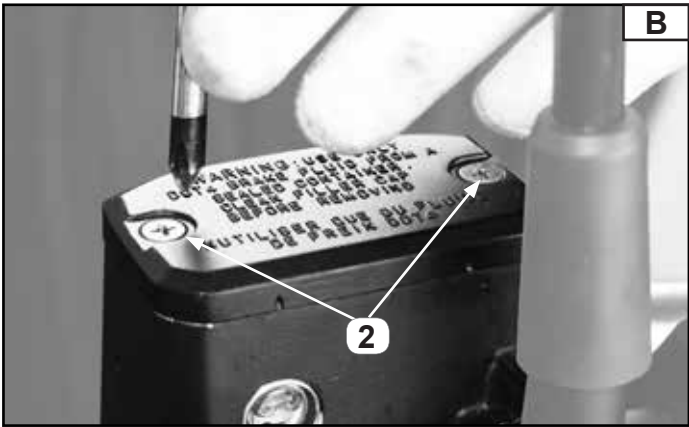
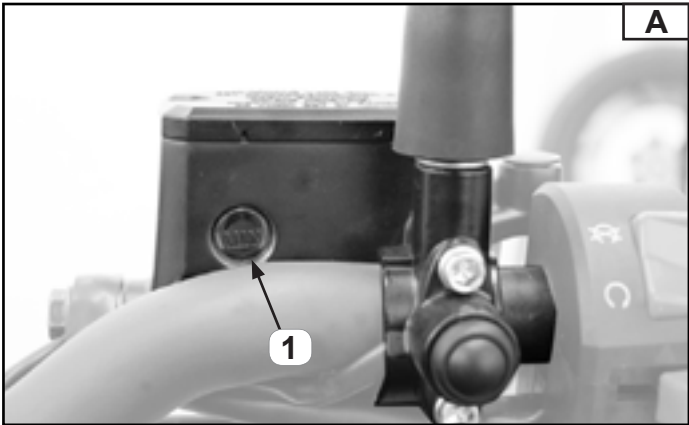
WARNING

Only use the prescribed fluid. Other brake fluids may be the cause of deterioration to rubber gaskets, causing leaks and an unsuitable operation of the braking system.

Top up with the same brake fluid already in the system. The mix of different brake fluids may lead to a harmful chemical reaction, able to cause incorrect operation of the braking system.

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

Recommended brake fluid
DOT4





FRAME / CHECK OF BRAKE FLUID LEVEL CHECK / TOP UP OF THE FRONT BRAKE LIQUID LEVEL

Park:

- The motorcycle on a level surface.

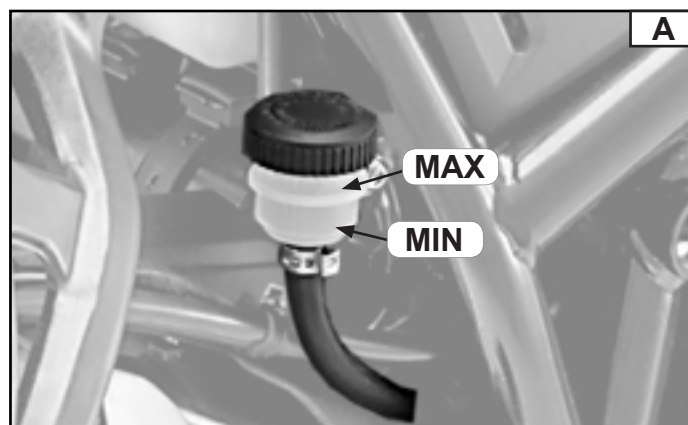
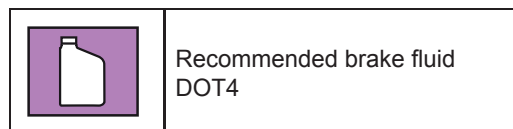
NOTE:

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

Check:

- The brake fluid level.

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



Fluid topping up procedure:

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

NOTICE

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

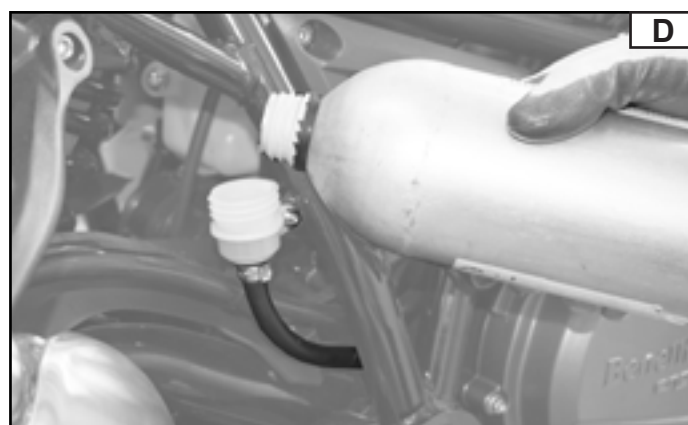
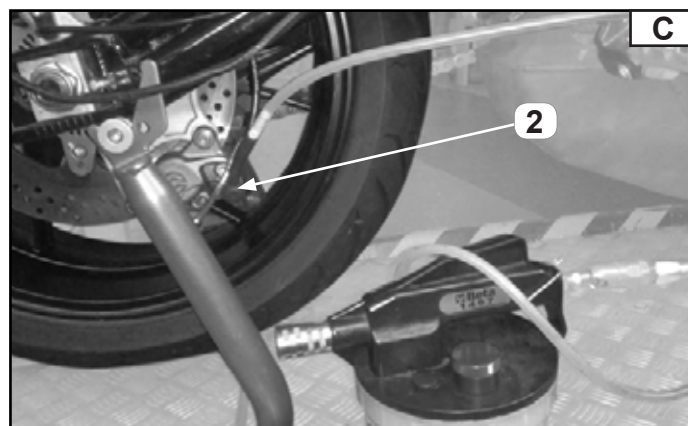
- Apply the vacuum device to the drain screw (2) and loosen the screw Fig. C.
- Top the liquid up to the MAX level indicated on the graduated container Fig. D. Pump the brake fluid by moving the brake lever.

WARNING

Only use the prescribed fluid. Other brake fluids may be the cause of deterioration to rubber gaskets, causing leaks and an unsuitable operation of the braking system.

Top up with the same brake fluid already in the system. The mix of different brake fluids may lead to a harmful chemical reaction, able to cause incorrect operation of the braking system.

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





FRAME / CHECK OF ABS TUBES

CHECK FOR ANY LEAKAGES OF ABS TUBES

Park:

- The motorcycle on a level surface.

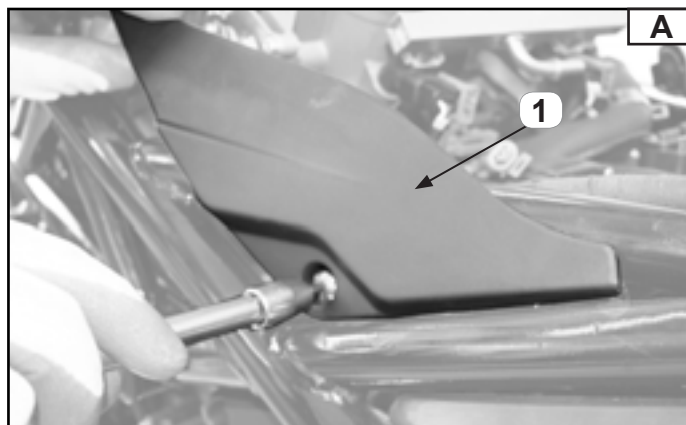
NOTE:

Place the motorbike on a stand and make sure that it is in the upright 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:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The frame covering (1) Fig. A.

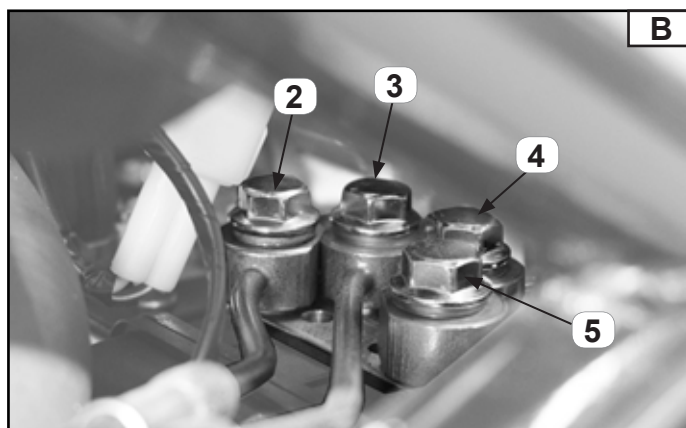
**Enable:**

- The lever or brake pedal and check for any leaks of brake fluid from the hoses, the tubes (models equipped with ABS) and brake fittings.

In case of fluid leakage in any point, check or replace the faulty component.

Check:

- The fitting of the right front caliper (2) Fig. B.
- The fitting from the front brake pump (3) Fig. B.
- The fitting from the rear brake pump (4) Fig. B.
- The fitting of the rear brake caliper (5) Fig. B.



FRAME / CHECK OF BRAKE PAD

CHECK OF WEAR OF FRONT/REAR BRAKE PADS

The following procedure applies to all brake pads.

- Remove:

 - The pads, refer to the section “Removal / installation of the front brake pads, Chapter 4”.
- Check:

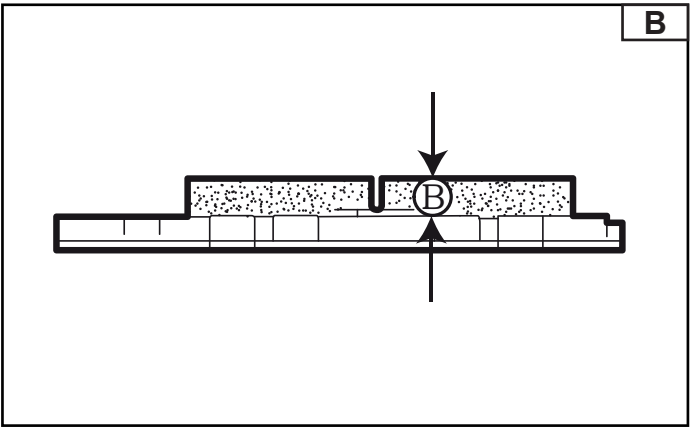
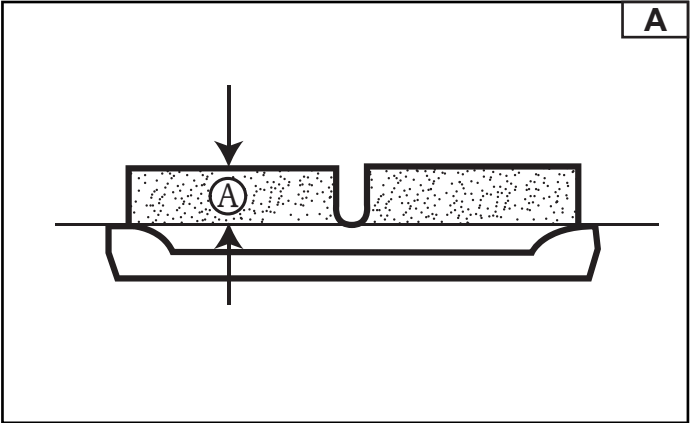
 - The front brake pads Fig. A.
 - The rear brake pads Fig. B.
 - The wear limit for the front and back brake pads.

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



Pads	Wear limit
Front	1 mm
Rear	1 mm

NOTE: To replace the pads, refer to the section “Removal / installation of the front brake pads, Chapter 4”.



FRAME / CHECK OF BRAKING SYSTEM HOSE

CHECK OF BRAKE HOSES

Park:

- The motorcycle on a level surface.

NOTE:

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

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

Check:

- The route of the front and rear brake hoses.
- If there is any cracking/damage/wearing trace, replace.

Check:

- The fitting (1) and the hose (2) of the front brake pump Fig. A.
- The fitting (3) and the hose (4) of the rear brake caliper Fig. B.
- The fitting (5) and the hose (6) of the front right/left brake caliper Fig. C.
- The fitting (7) and the hose (8) of the rear brake caliper pump Fig. D.

Check:

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

Tighten:

- The fitting screws to the following torque.



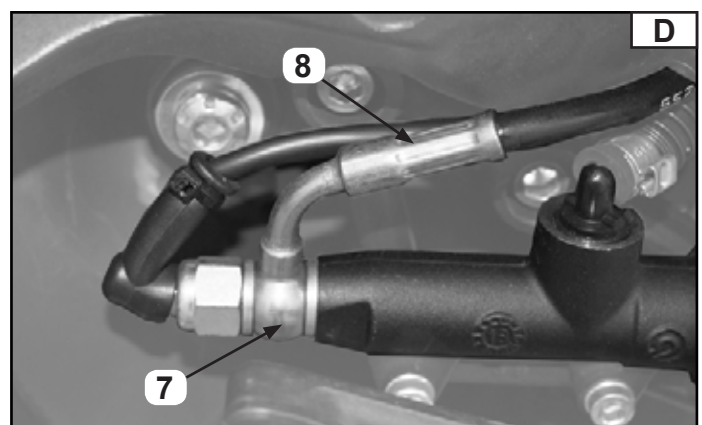
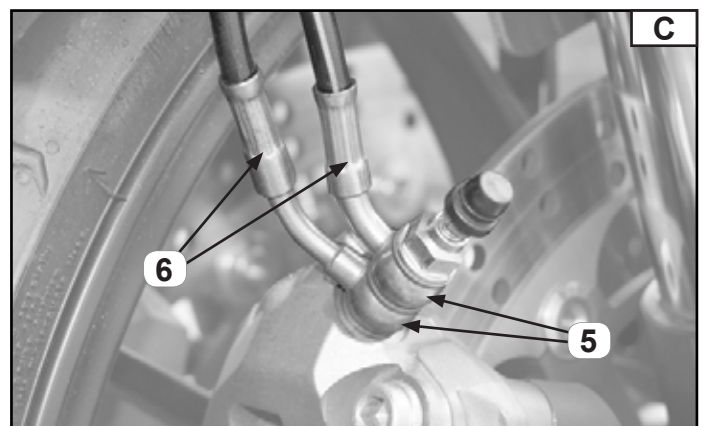
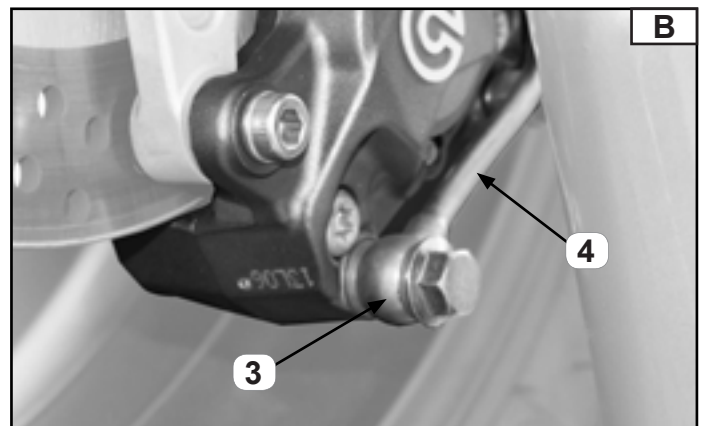
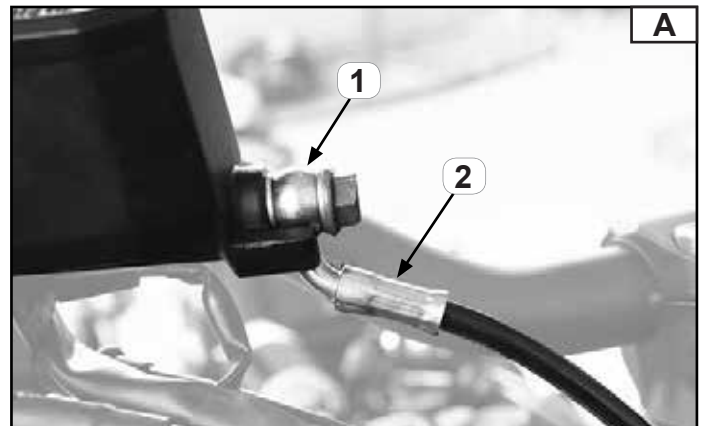
Torque 25 N*m

Enable:

- The brake several times.

Recheck:

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





FRAME / TRANSMISSION CHAIN

ADJUSTMENT OF THE TRANSMISSION CHAIN CLEARANCE

NOTE:

Do not inspect or adjust the transmission chain while the engine is running. Check the transmission chain slackness in the most taut point.

WARNING

If the transmission chain is too taut, this will cause the engine to overload, as well as other vital parts, while if too slack, it may come off and damage the swingarm or cause an accident. Therefore, it is advisable to keep the chain tensioning 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 where the transmission chain is in the most tensioned position.

Check:

- The tensioning of transmission chain. If outside specifications, adjust Fig. A.



Transmission chain clearance	25-30 mm
------------------------------	----------

Hold:

- With the wrench, the wheel spindle on the left side of the vehicle Fig. B.

Adjust:

- The transmission chain tension Fig. C.
- Loosen the nut on the right side Fig. C.
- To tension the transmission chain, turn the adjustment screw (1) for tensioning the chain counter-clockwise Fig. D.
- To loosen the transmission chain, turn the adjustment screw (1) clockwise Fig. D.

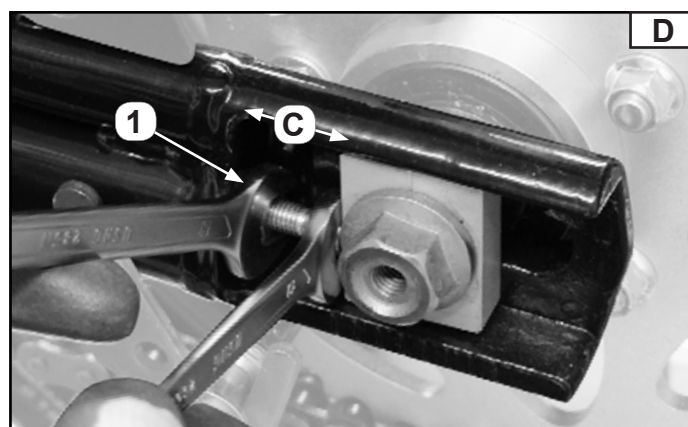
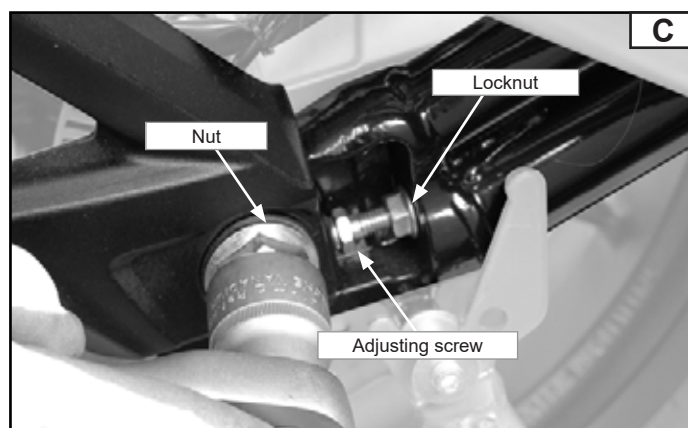
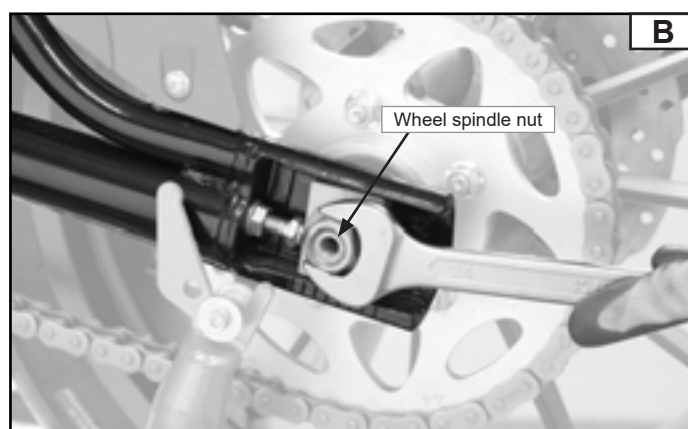
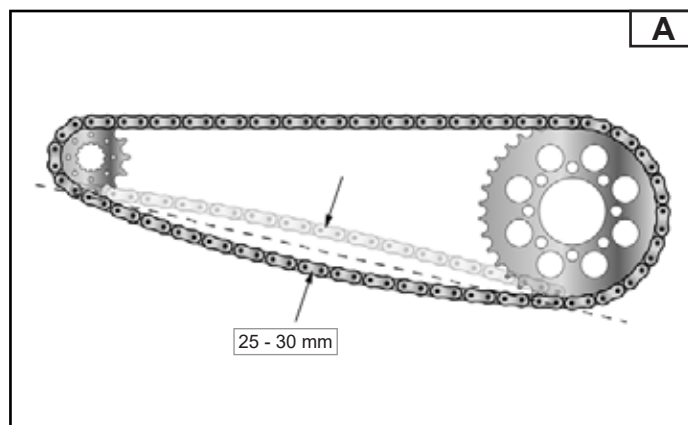
NOTE:

The adjustment is to be carried out on both adjustment screws.

- Push the rear wheel forward.
- At the end of adjustment, check the right/left chain tensioner sliding shoes are at the same distance (X) from the stop on the swingarm Fig. D.
- Tighten the wheel spindle nut to the following torque:



Torque 80 N*m



FRAME / TRANSMISSION CHAIN

LUBRICATION OF TRANSMISSION CHAIN

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 thin and smooth layer of lubricant on the whole chain, being careful not to reach the surrounding parts, especially the tires.





FRAME / TRANSMISSION CHAIN

CHECK OF CHAIN GUIDE

Check:

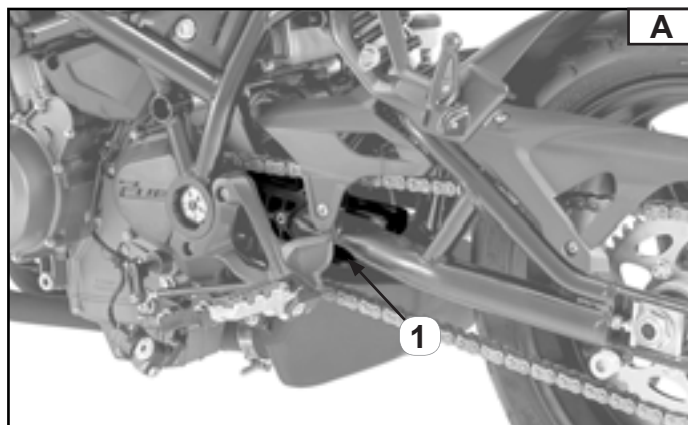
- Visually check the chain guide sliding shoe (1) Fig. A.

Remove:

- The chain sliding shoe, refer to the section “**Removal of the chain sliding shoe, Chapter 4.**”.

NOTE:

In case of any sign of abnormal wear or damage, replace the chain guide, refer to the section “Removal of the chain sliding shoe, Chapter 4”.



FRAME/TRANSMISSION CHAIN

CHECK OF TRANSMISSION CHAIN WEAR

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 remain-
ing dirt.
Remove kerosene from the transmission chain and leave it to dry
completely.

NOTICE

This motorcycle is equipped with a transmission chain com-
plete 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 sol-
vents (such as petroleum oil), 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 (1) Fig. 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 transmission 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 suffi-
ciently distant from the transmission chain and below the swin-
garm.

Lubricate:

- The transmission chain.

NOTE:

Use a specific product.

Check:

- The driving gear.
- The rear sprocket.

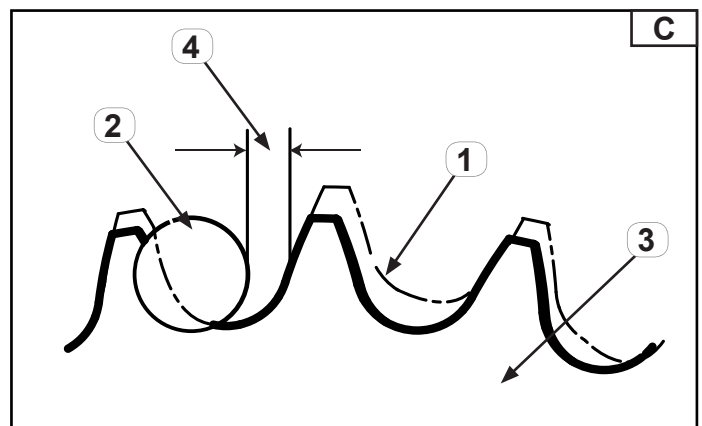
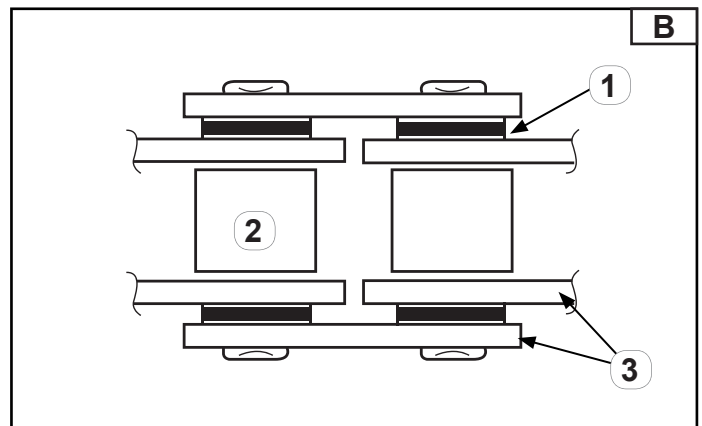
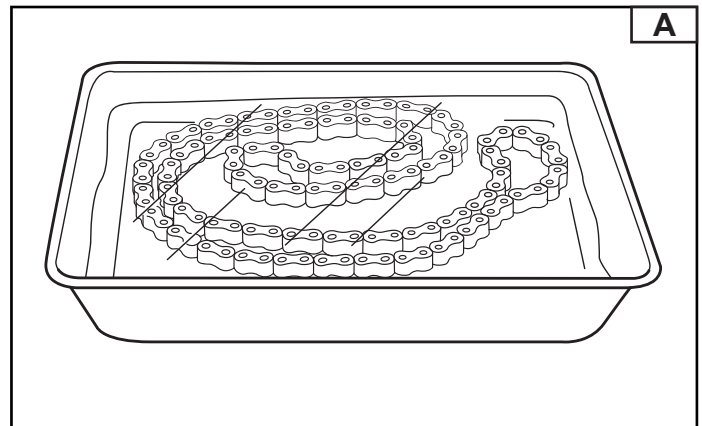
If more than $\frac{1}{4}$ of each tooth (4) Fig. C is worn, replace the trans-
mission chain sprockets all together.

If the teeth are bent, replace the transmission chain sprockets all
together.

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 SPROCKET

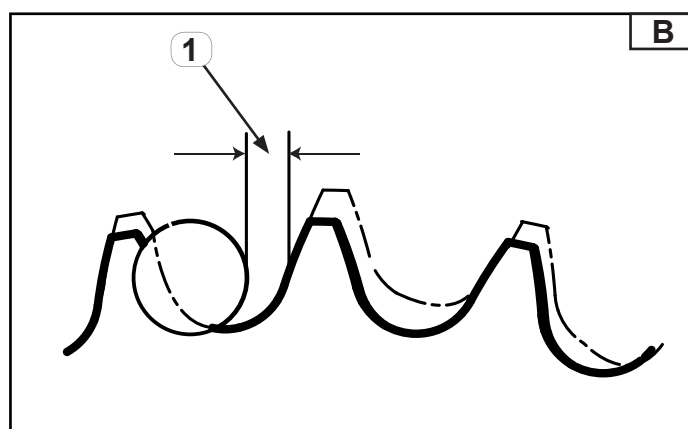
CHECK OF TRANSMISSION CHAIN SPROCKET

Remove:

- The sprocket cover, refer to the section “**Removal of the sprocket cover, Chapter 4**”.

Check:

- The transmission chain sprocket Fig. A.
- If more than $\frac{1}{4}$ of each tooth (1) Fig. B is worn, replace the transmission chain sprockets all together.
- If the teeth are bent, replace the transmission chain sprockets all together.





FRAME / CHECK AND ADJUSTMENT OF STEERING SLEEVE

CHECK/ADJUSTMENT OF STEERING CLEARANCE

Park:

- The motorcycle on a level surface.

NOTE:

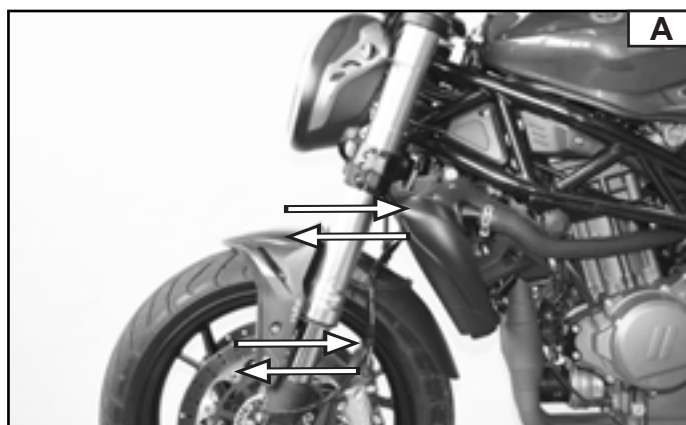
Place the motorcycle on a suitable support so that the front wheel is raised.

Check:

- The steering sleeve.

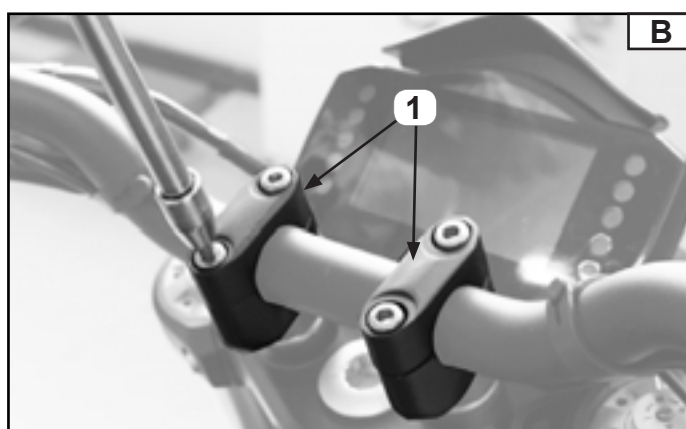
Gently oscillate the front fork, holding it by the ends of the tubes Fig. A.

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



Remove:

- The tank, refer to the section “Removal of the fuel tank, Chapter 4”.
- The upper brackets (1) Fig. B.



Place:

- The handlebar above the front head-light Fig. C.

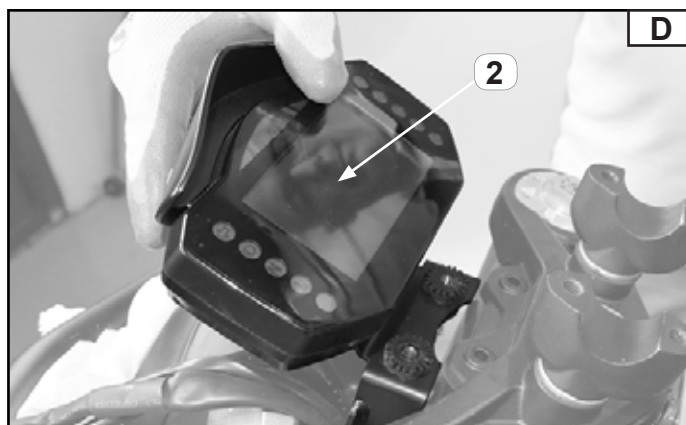
NOTE:

Pay attention to put an adequate protection on the front head-light.



Remove:

- The instrument support (2) Fig. D.

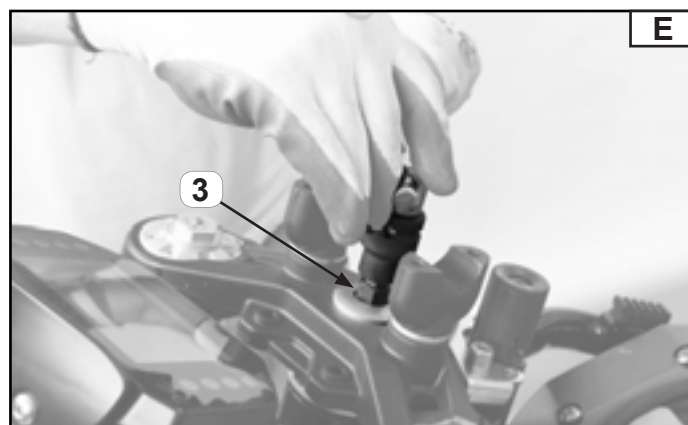




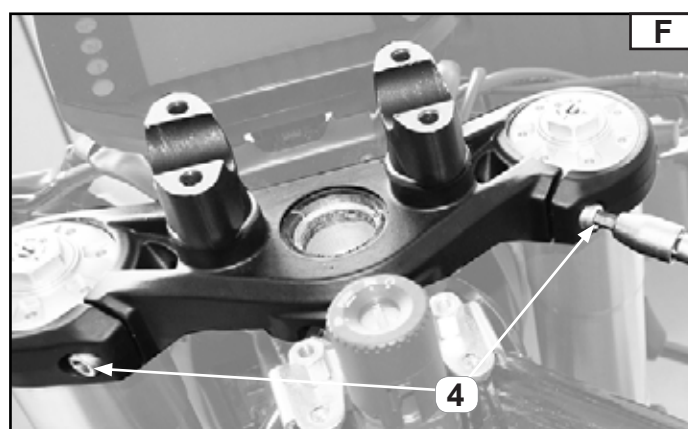
FRAME / CHECK AND ADJUSTMENT OF STEERING SLEEVE

CHECK/ADJUSTMENT OF STEERING CLEARANCE

- The steering head bolt cap (3) Fig. E.



- The fastening screws of the steering head (4) Fig. F.



- The steering head (5) Fig. G.

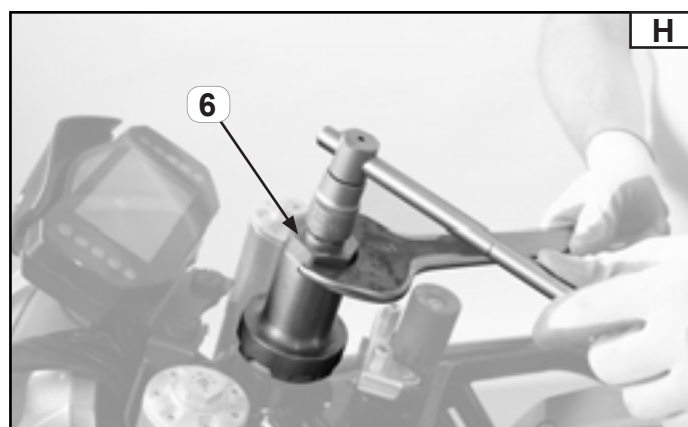


Loosen:

- The steering ring nut with the relevant wrench (6) Fig. H.



Tightening tool for steering sleeve ring nut.
Code: R180297129000



FRAME / CHECK AND ADJUSTMENT OF STEERING SLEEVE

CHECK/ADJUSTMENT OF STEERING CLEARANCE

Remove:

- The steering ring nut pin (7) with the relevant wrench (8) and remove the steering ring nut (9) Fig. I.



Tightening tool for steering sleeve ring nut.
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 head tube, remove the grease and dirt.

Assemble:

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



Tightening tool for steering sleeve ring nut.
Code: R180297129000



Torque 60 N*m

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

Assemble:

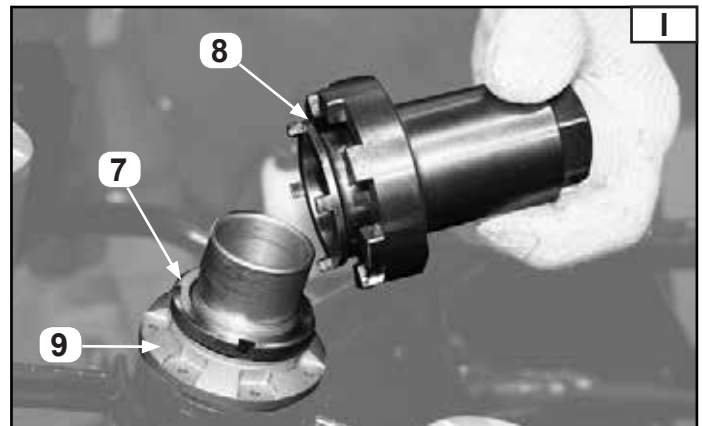
- The steering ring nut pin with the relevant tool, to the following torque:



Tightening tool for steering sleeve ring nut.
Code: R180297129000



Torque 15 N*m



FRAME / CHECK OF FRONT FORK

CHECK OF FRONT FORK

Park:

- The motorcycle on a level surface.

NOTE:

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

Check:

- The fork stem (1) Fig. A.
 - The fork sleeve (2) Fig. A.
- If there is any damage/line, replace.

- The oil seal.

If there is any leakage, replace.

Keep:

- The motorcycle in a upright position.

Enable:

- The front brake.

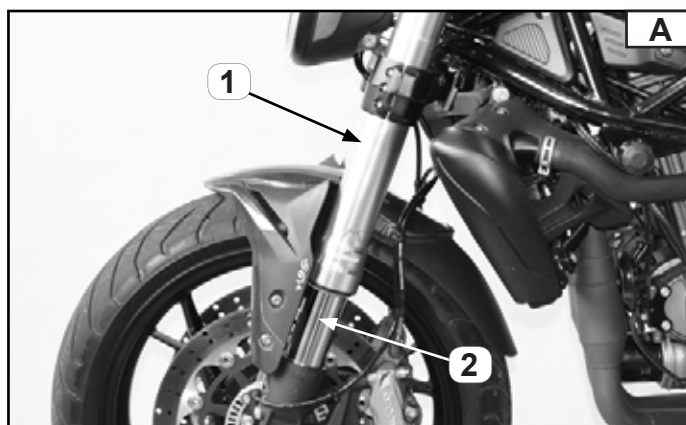
Check:

- The fork operation.

Push hard on the handlebar several times to check that the front fork returns to the stationary position in a smooth way.

If the movement is not smooth, replace, refer to the section

“Check/adjustment of the steering clearance, Chapter 3”.





FRAME / CHECK OF FRONT FORK ADJUSTMENT OF FRONT FORK EXTENSION BRAKE

Park:

- The motorcycle on a level surface.

NOTE:

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

NOTICE

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

Adjustment of compression damping

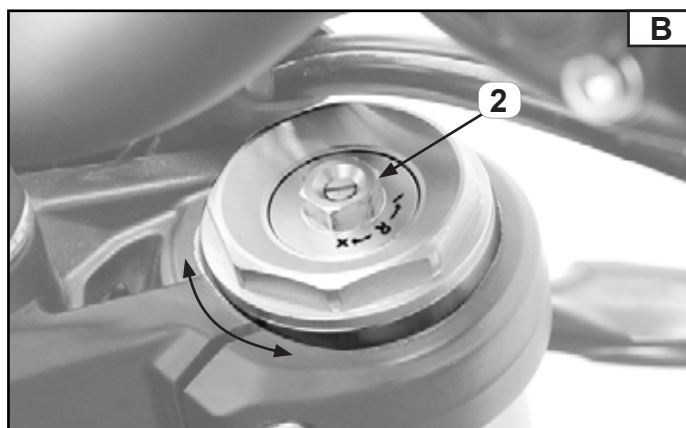
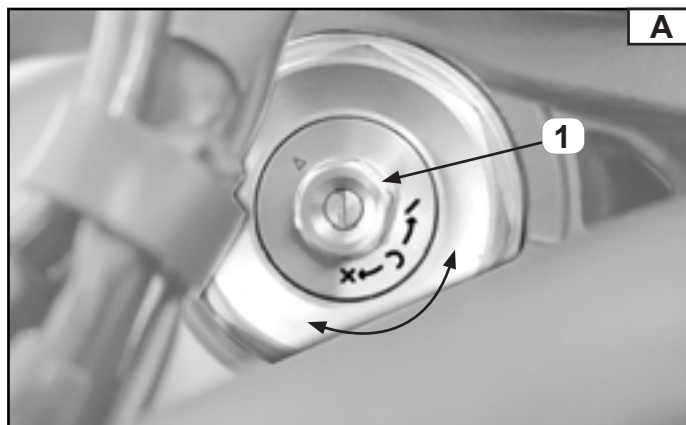
- Rotate the adjustment screw (1) clockwise Fig. A to increase compression damping and therefore, increase the rigidity of the suspension.
- Rotate the adjustment screw (1) counter-clockwise Fig. A to increase compression damping and therefore, reduce the rigidity of the suspension.

Adjustment of rebound damping

- Rotate the adjustment screw (2) clockwise Fig. B to increase rebound damping and therefore, increase the rigidity of the suspension.
- Rotate the adjustment screw (2) counter-clockwise Fig. B to increase rebound damping and therefore, reduce the rigidity of the suspension.

NOTICE

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



FRAME / CHECK OF THE REAR SHOCK ABSORBER ADJUSTMENT OF THE SHOCK ABSORBER

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

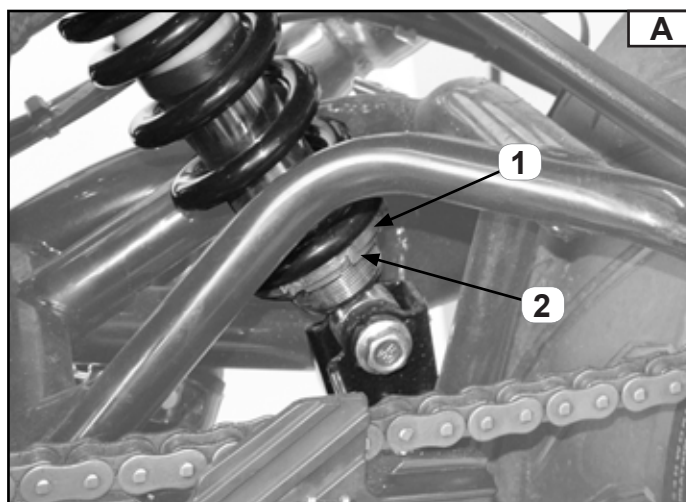
Remove:

- The chain guard, refer to the section “**Removal of the chain guard, Chapter 4.**”.

Preload adjustment

- Adjust the spring preload Fig. A.
The rear shock absorber is equipped with an adjustment ring nut for the spring preload (1) and a return ring nut (2).

- Loosen the return ring nut (2).
- To **increase** the spring preload and thereby harden the suspension, turn the adjusting ring nut (1) in clockwise.
- To **decrease** the spring preload and therefore, increase the rigidity of the suspension, turn the adjustment ring nut (1) counter-clockwise.
- At the end of adjustment, tighten the return ring nut (2).



NOTICE

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

FRAME / CHECK OF THE FRONT REAR TIRES

CHECK OF TIRES

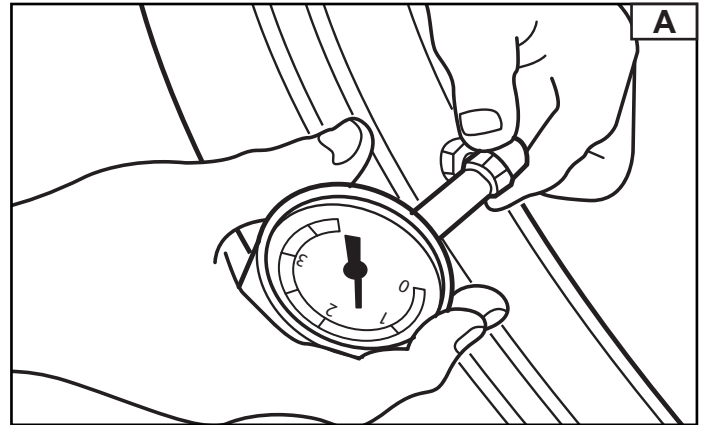
The following procedure is applied to both tires.

Check:

- The tire pressure. If outside specifications, adjust Fig. A.

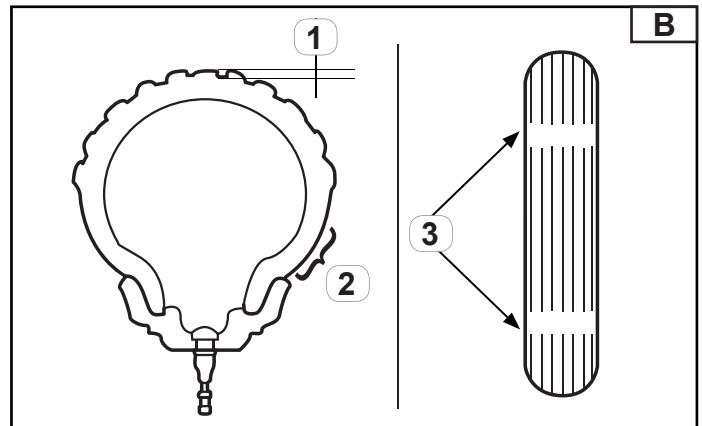
WARNING

Tire pressure must be checked and adjusted only when the wheel temperature is at ambient temperature.
Tire pressure and suspensions need to be adjusted according to total weight (including baggage, rider, passenger and accessories) taking into account the riding speed envisaged. Riding the bike when overloaded may cause damage to the tires, with the risk of accident or injury.
NEVER OVERLOAD THE MOTORCYCLE UNDER ANY CIRCUMSTANCES.



Position	Wear limit (A)	
Net weight (with oil and full fuel tank)	See general specifications	
Max. load*	See general specifications	
COLD TIRE 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, rider, passenger and accessories.



WARNING

It is dangerous to ride with worn treads.
If the tread reaches wear limits, replace the tire immediately.

Check:

- The tire surface Fig. B B.
- If there is any damage or wear, replace.

- Tread pattern depth.
- Sidewall.
- Wear signaller.

WARNING

If tires are new, the grip on the road is relatively weak until they are slightly used. Therefore, we recommend riding at normal speeds for the first 100 km (62.13 mi), before going at speed.

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 tire.

ELECTRIC SYSTEM

CHECK AND CHARGE OF THE BATTERY

WARNING

Batteries can generate explosive gas containing nitrogen and they contain electrolyte, comprised of sulphuric acid, which is a poisonous and highly caustic substance.

Therefore, the following precautions are required:

Wear protective goggles when handling the battery or working near it.

Batteries must be charged in suitably ventilated areas.

Keep batteries away from fire, sparks or naked flame (for example: welding accessories, lit cigarettes).

NEVER SMOKE while charging or handling batteries.

KEEP BATTERIES AND ELECTROLYTE WELL OUT OF REACH OF CHILDREN.

Do not allow electrolyte to come into contact with any are of the body as it can cause serious burns or permanent injury to eyes.

FIRST AID IN CASE 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.

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.

Charge time, amperage and voltages for this battery are different from those of conventional batteries. Charge the battery as illustrated in the figures. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take the utmost care while the battery is charging.

NOTE: _____

Given that the battery is sealed, it is necessary to check the charge by measuring the density of the electrolyte.

Therefore, the battery charge is checked by measuring the voltage on the battery terminals.



ELECTRIC SYSTEM

CHECK AND CHARGE OF THE BATTERY

Remove:

- The seat, refer to the section “Removal of the seat, Chapter 4”.

Disconnect:

- The battery cables from the terminals Fig. A.

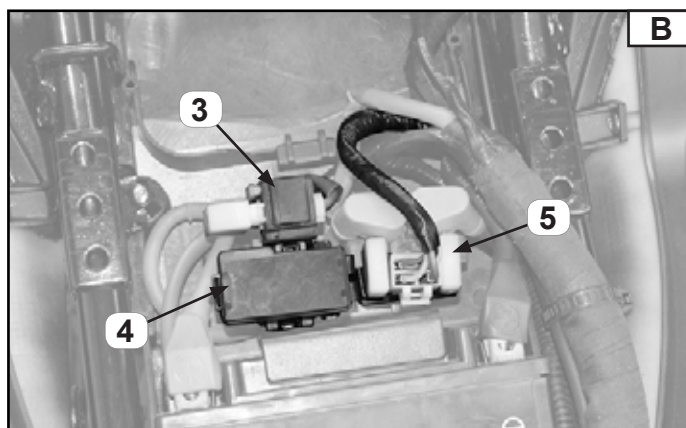
NOTICE

Disconnect the negative cable of the battery (1) first, and then the positive cable (2) Fig. A.



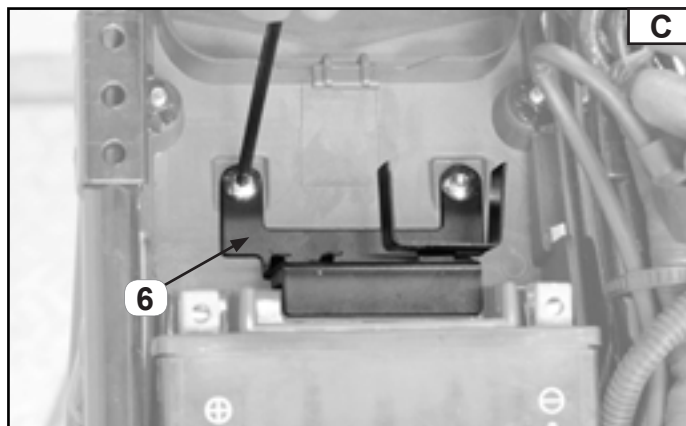
Remove:

- The ABS fuse box (3) Fig. B
- The fuse box (4) Fig. B.
- The starting relay box (5) Fig. B.



Remove:

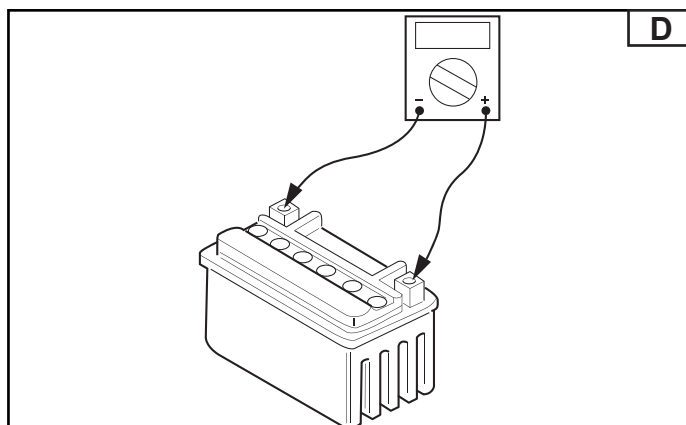
- The battery bracket (6) Fig. C.
- The battery.
- Remove the battery rubber pad and slide out the battery.



Check:

- The battery charge.

Connect a multitester to the battery terminals Fig. D.





ELECTRIC SYSTEM

CHECK AND CHARGE OF THE BATTERY

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

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 or over 12.8 V, no charge is required.

EXAMPLE:

- Open-circuit voltage = 12.0 V
- Charging time = 6.5 hours
- Battery charge amount = 20 -30%

Charge:

- The battery (see the figure with the suitable charging manner) Fig. F.

NOTICE

Do not carry out a quick charging of the battery.

WARNING

- Never remove the caps sealing 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 charge current of the battery charger, take care not to overcharge the battery.

The battery must be removed from the bike for charging. (If it is necessary to charge the battery with it installed on to the bike, disconnect the negative cable from the battery terminal).

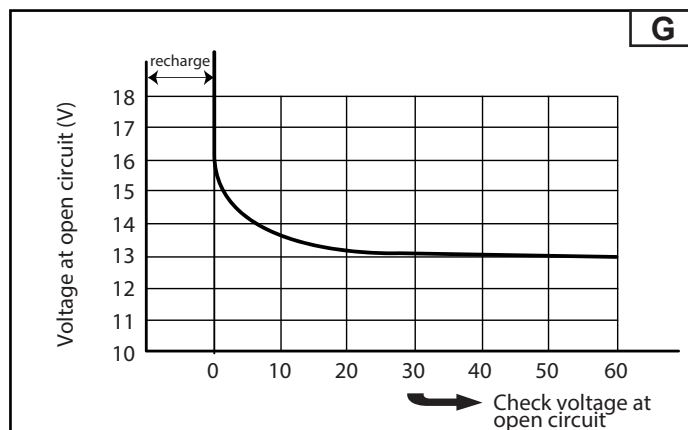
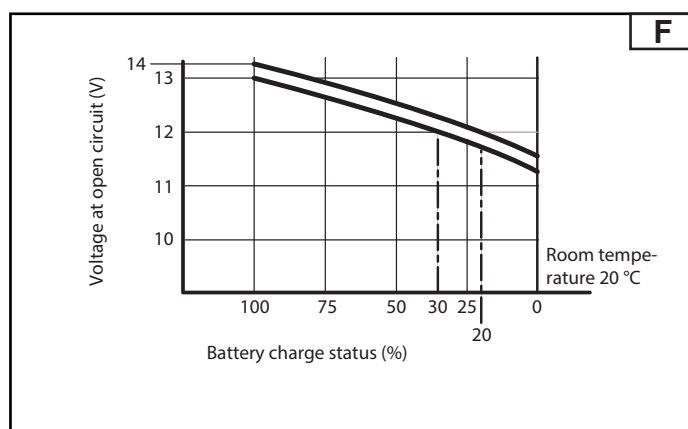
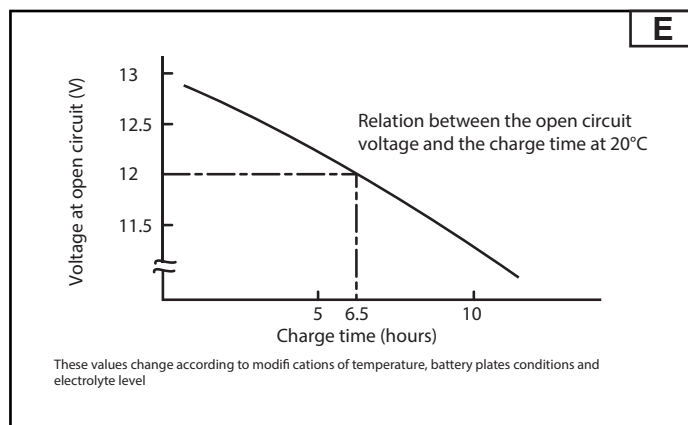
To reduce the possibility of sparks, connect the battery charger to the power supply only after connecting the cables to the battery.

Before removing the clips from the battery terminals, remember to switch off the 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 at any time during charging, disconnect the charger and leave the battery to cool before continuing. Overheated batteries can explode!

As illustrated in Fig. G, the open-circuit voltage of a battery stabilises 30 minutes after the charging end, before measuring the open-circuit voltage.



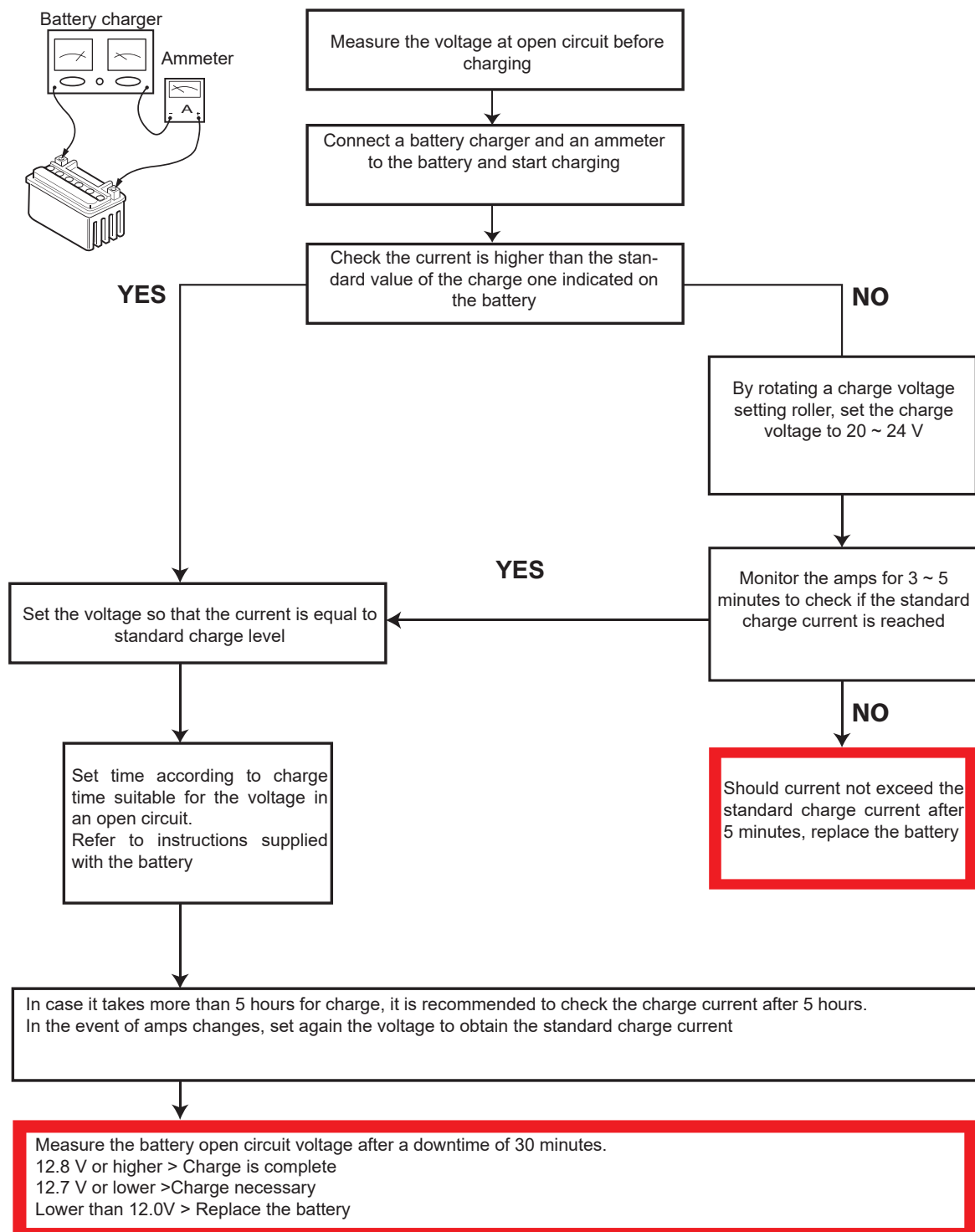
ELECTRIC SYSTEM

CHECK AND CHARGE OF THE BATTERY

CHARGE METHOD USING A CHARGER WITH VARIABLE CURRENT (VOLTAGE)

NOTE:

- Measure the voltage 30 minutes after switching off the equipment.
- Set the charge voltage to 16 ~ 17 V. Setting it on a lower value, the recharge would not be sufficient. If the recharge voltage is set on a too high value, the battery would be overloaded.



ELECTRIC SYSTEM

CHECK AND CHARGE OF THE BATTERY

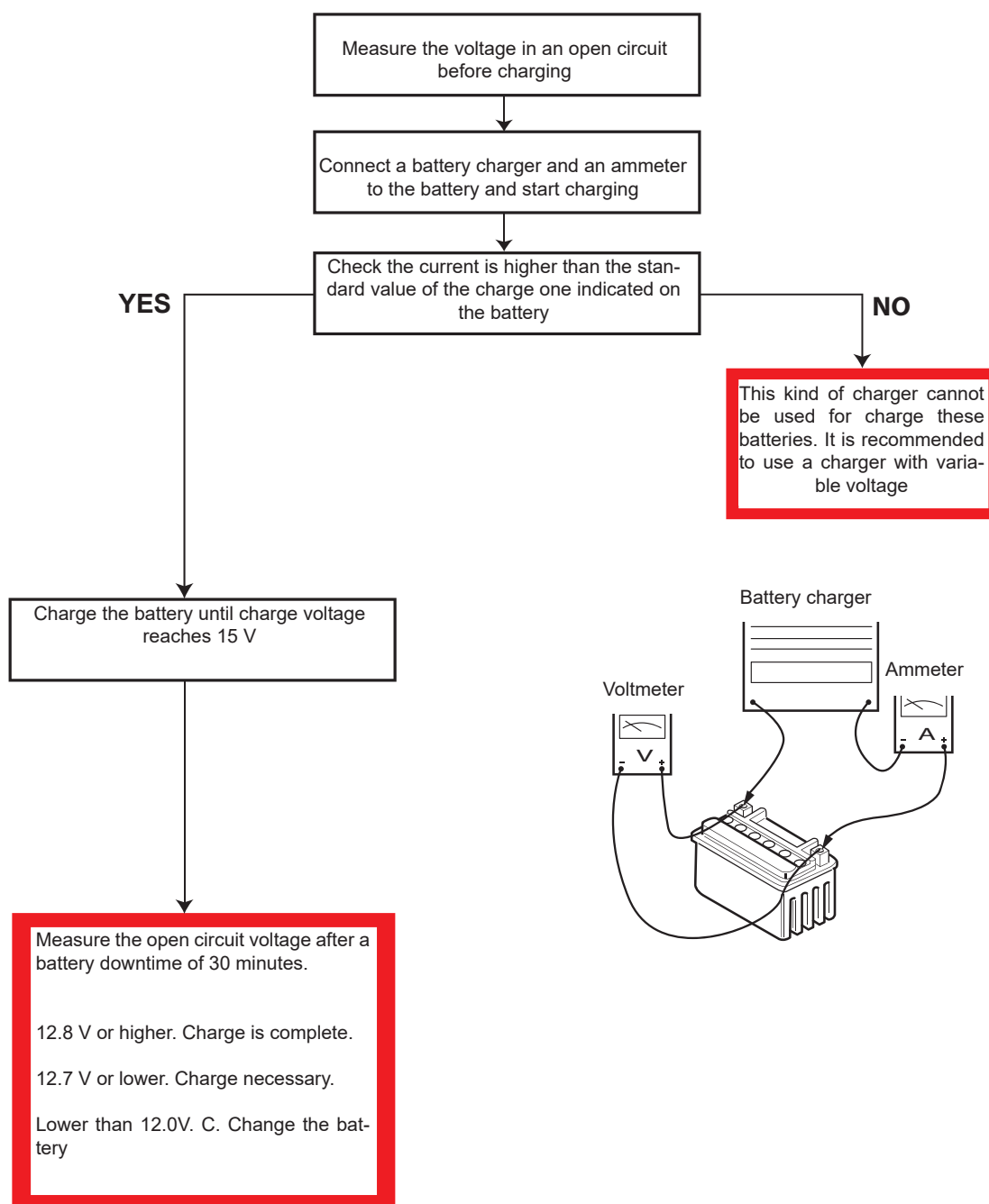
CHARGE METHOD USING A CHARGER WITH CONSTANT VOLTAGE

NOTE: _____

- Measure the voltage 30 minutes after switching off the equipment.
- Set the charge time to a maximum of 20 hours.

NOTE: _____

- To ensure the highest performance and life of battery, it is advisable to use electronic battery chargers that can supply correct charging voltages and currents, according to the specific requirements of the sealed battery technology.



ELECTRIC SYSTEM

CHECK AND CHARGE OF THE BATTERY

Battery activation:

Filling Electrolyte

Make sure that the model (A) marked on the electrolyte bottle matches with the model (B) of the battery Fig. H. 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 port (B) only immediately before use. Use the apposite container to be sure to insert the correct amount of electrolyte.

NOTICE

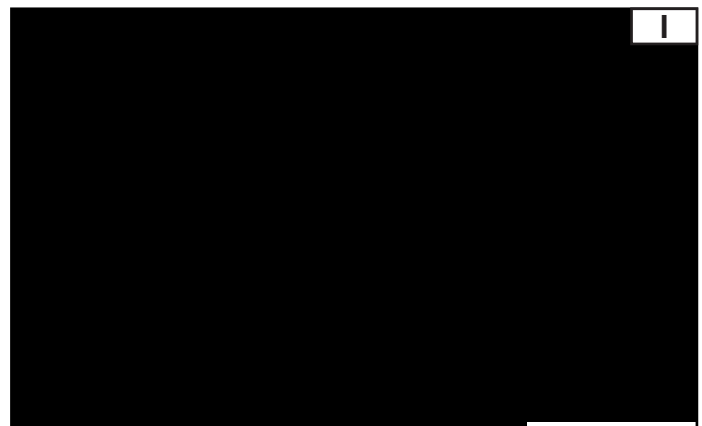
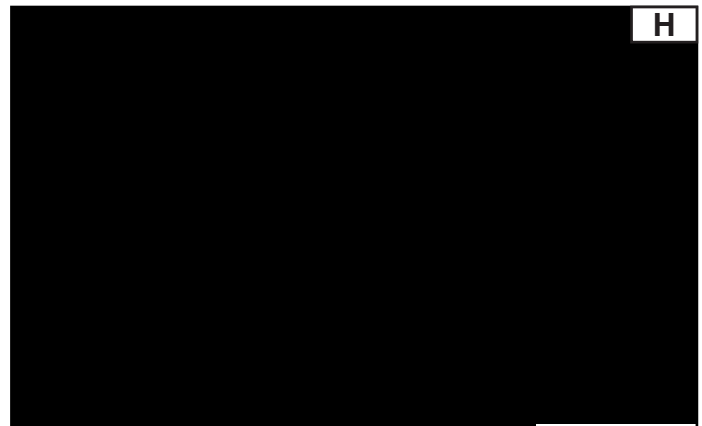
The sulfuric acid present in the battery electrolyte may cause severe burns. To prevent burns from sulfuric acid, before handling the electrolyte wear protective clothing and safety goggles.

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 (A) Fig. I.

NOTE:

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



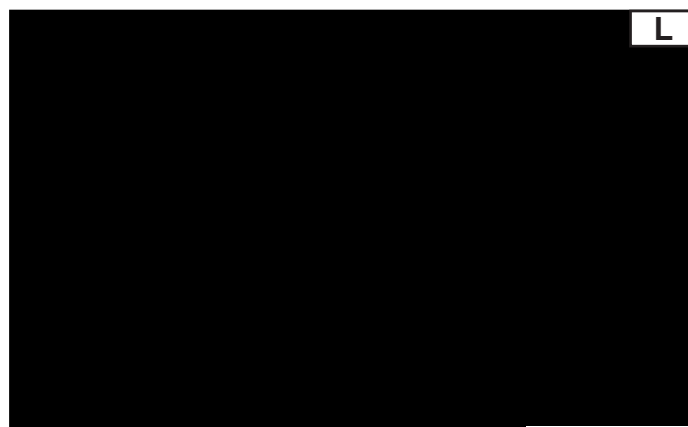
ELECTRIC SYSTEM

CHECK AND CHARGE OF THE BATTERY

- Take the electrolyte bottle away from vinyl bag.
- Detach the sealing film (A) from the bottle and store it for seal the battery subsequently, Fig. L.

NOTE:

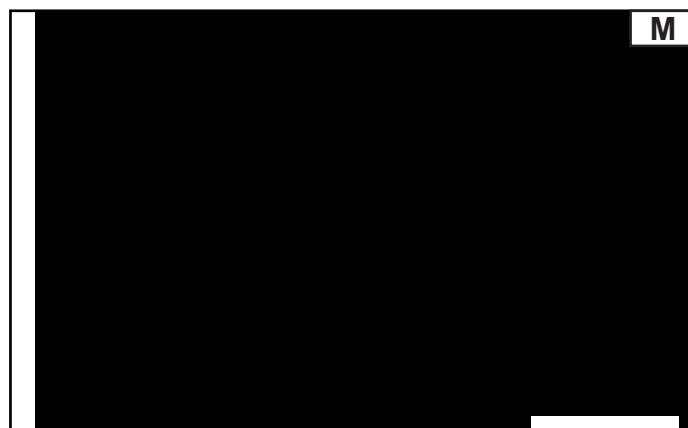
Do not puncture or open the sealed cells (B) of the electrolyte bottle. Do not try to divide the single cells.



- 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. M.

NOTE:

Do not tilt the electrolyte bottle.

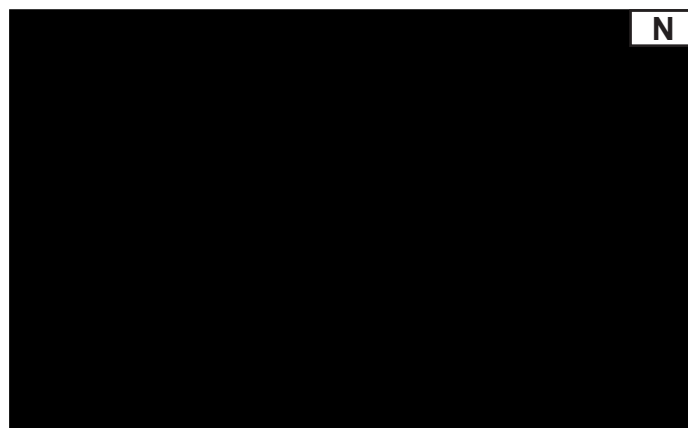


- Check the electrolyte flow.
- If there are no air bubbles (A) that go up through the filling ports or the cells do not fill completely, tap the bottle (B) some times, Fig. N.

NOTE:

Be careful to prevent the battery from falling.

- 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.

ELECTRIC SYSTEM

CHECK AND CHARGE OF THE BATTERY

- Place the strip of caps (A) on the filling ports and press strongly with both hands to insert them into the battery Fig. O, without tapping, Fig. P. 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.

- After the initial charge, let the battery stand for 30 minutes, and then check the voltage with 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. Recheck the voltage and repeat the charging cycle and load test if the voltage is less than 12.6V. If the voltage is still below 12.6V, the battery is defective.**



ELECTRIC SYSTEM FUSES

The following procedure applies to all fuses.

NOTICE

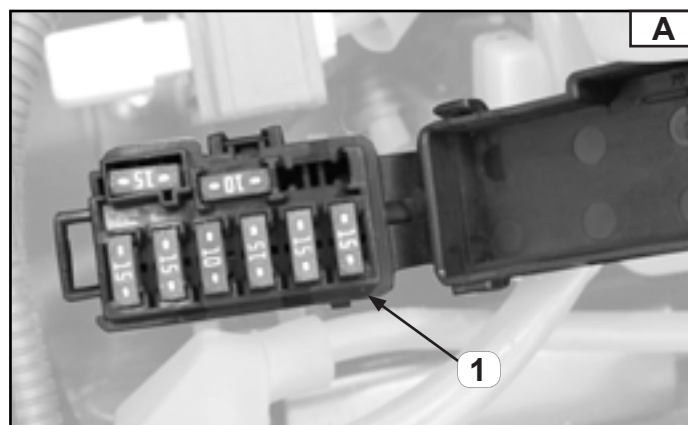
Bring the start switch to the OFF position.

Remove:

- The seat, refer to the section “Removal of the seat, Chapter 4”.

Access:

- The fuse box (1) Fig. A.



Check:

- The fuse.

Connect a multimeter to the fuse and check the continuity Fig. B.

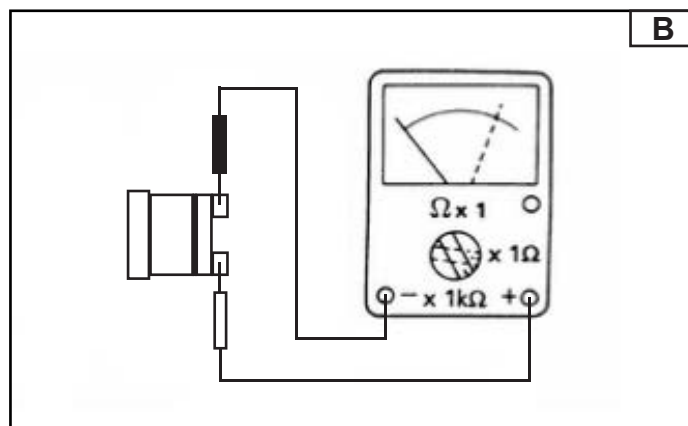
NOTE:

Set the selector switch of the multimeter on “ $\Omega \times 1$ ”.

- If the multimeter indicates “ ∞ ”, replace the fuse.

Replace:

- The blown fuse.
- Position the main switch at “OFF”.
- Install a new fuse with the correct amperage.
- Switch on the switches to check that the electrical circuits functions.
- If the fuse blows immediately, check the electrical circuit.



WARNING

Never use a fuse with amperage other than the one 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.

ELECTRIC SYSTEM
CHECK OF FUSES

KEY TO FUSES

Refer to Fig. A.

1. Fuel Pump

2. Fan

3. ECU

4.

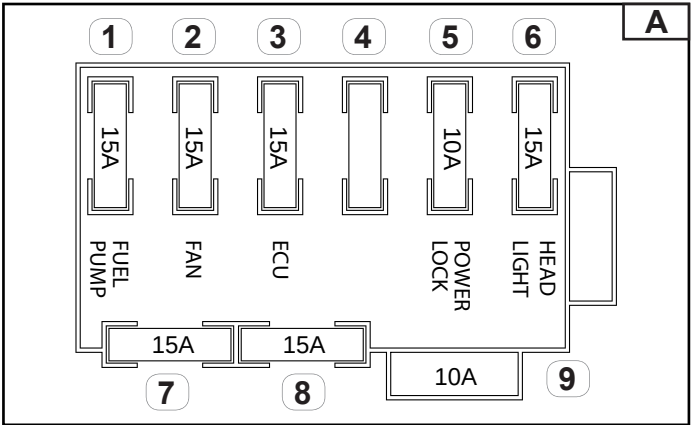
5. Main fuse

6. Lights

7. Spare fuse

8. Spare fuse

9. Spare fuse

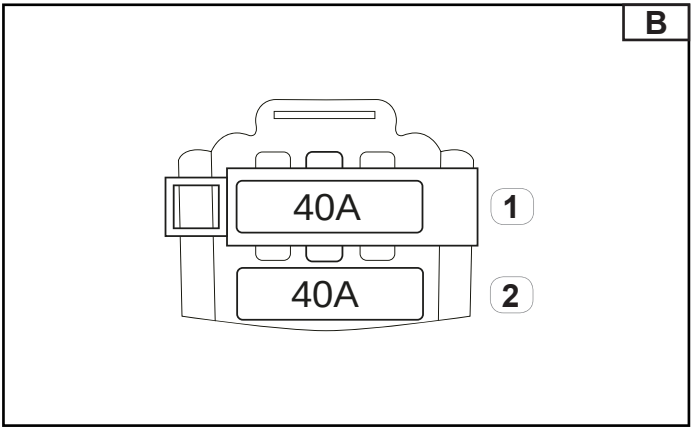


KEY TO ABS FUSES

Refer to Fig. B.

1. ABS fuse

2. Spare fuse

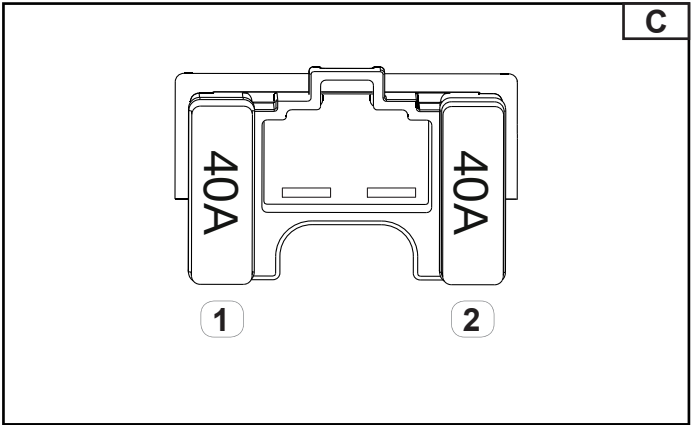


KEY TO STARTING RELAY FUSES

Refer to Fig. C.

1. Starting relay

2. Spare fuse



ELECTRIC SYSTEM

REPLACEMENT OF THE FRONT LIGHTS

NOTICE

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

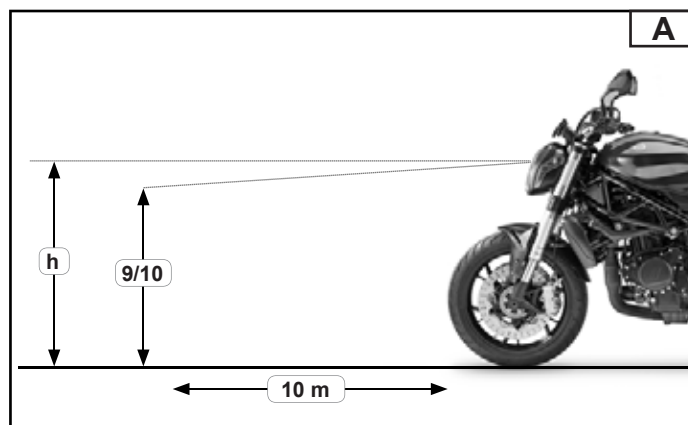


ELECTRIC SYSTEM

ADJUSTMENT OF THE HIGH / DIPPED BEAM HEADLIGHT

To carry out the correct adjustment of the headlights' luminous beam:

- 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.
- Check that the upper limit of the luminous beam projected onto the vertical wall is less than approx. 1/10 in respect of horizontal axis of the headlights.
- If the luminous beam dose not conform to this indication, carry out the adjustment until the luminous beam is in the correct position.



Adjust:

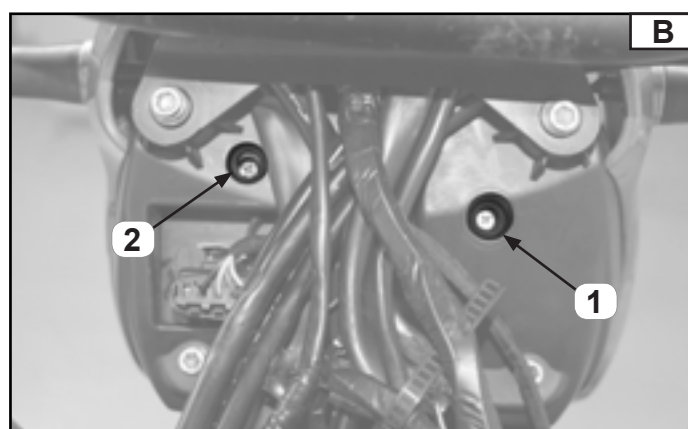
- The headlight high beam using the adjustment screw (1) in the bottom right of the headlamp, at the back Fig. B.
- Rotating counter-clockwise, the luminous bean is lowered.
- Rotating clockwise, the luminous bean is raised.

Adjust:

- The headlight dipped beam using the adjustment screw (2) in the bottom left of the headlamp, at the back Fig. B.
- Rotating clockwise, the luminous bean is lowered.
- Rotating counter-clockwise, the luminous bean is raised.

NOTE:

In case of breakage or malfunctioning, the LED headlight must be completely replaced, see "Removal of the front head-light, Chapter 4".



ELECTRIC SYSTEM

REPLACEMENT OF THE REAR LIGHTS

NOTICE

The vehicle has integrated rear LED lights, and in case of anomaly, it is necessary to replace the whole rear light unit. Refer to the section “Removal of the rear light, Chapter 4”.



ELECTRIC SYSTEM

REPLACEMENT OF THE REAR INDICATOR LIGHTS

Park:

- The motorcycle on a level surface.

NOTICE

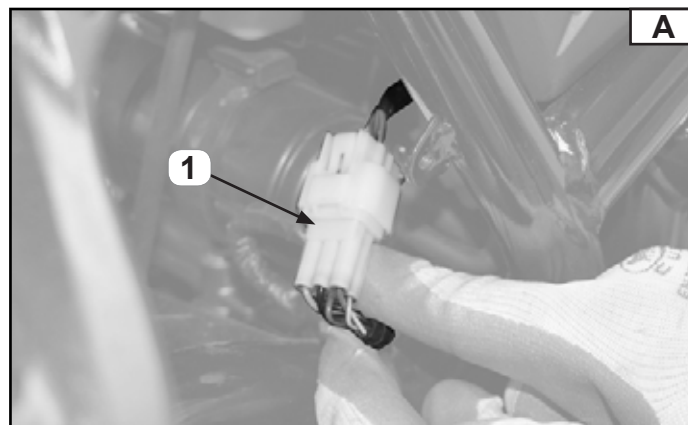
Prop the bike on suitable supports so that it cannot fall.

NOTE:

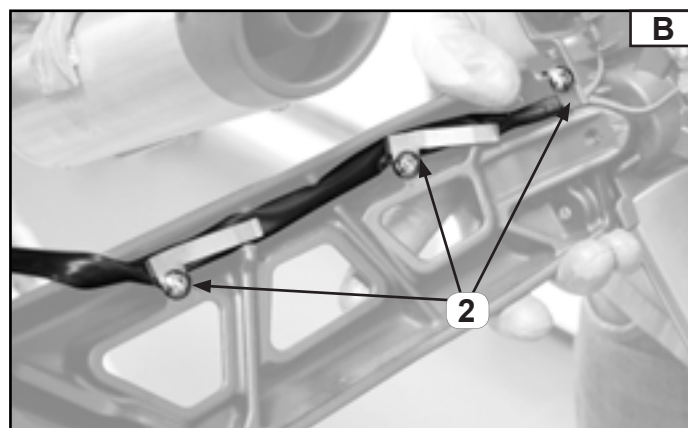
The following procedure applies to both rear indicator lights.

Disconnect:

- The connector of the indicator light / rear number plate light (1) Fig. A.

**Remove:**

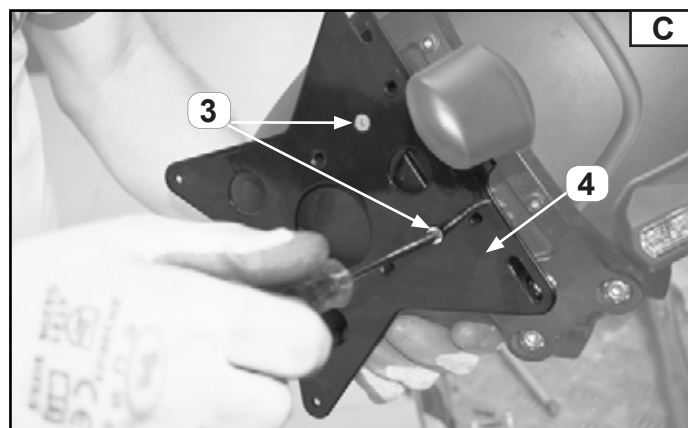
- The wiring clamps.
- The rear mudguard holder, refer to the section “Removal of the rear mudguard holder, Chapter 4”.

**Loosen:**

- The wiring support brackets (2) Fig. B.

Remove:

- The screws (3) Fig. C.
- The number plate bracket (4) Fig. C.



- The number plate holder (5) Fig. D.



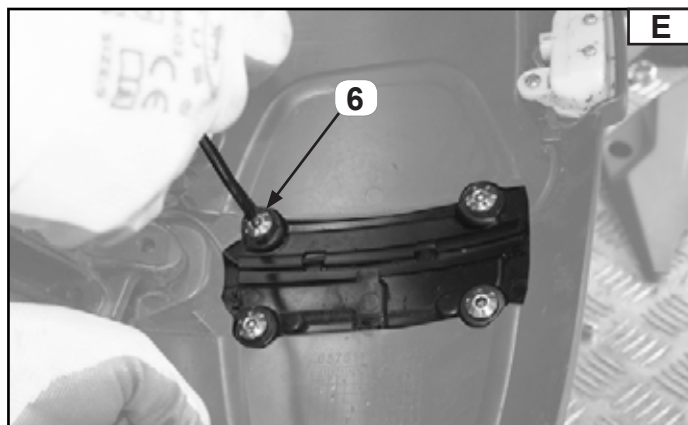


ELECTRIC SYSTEM

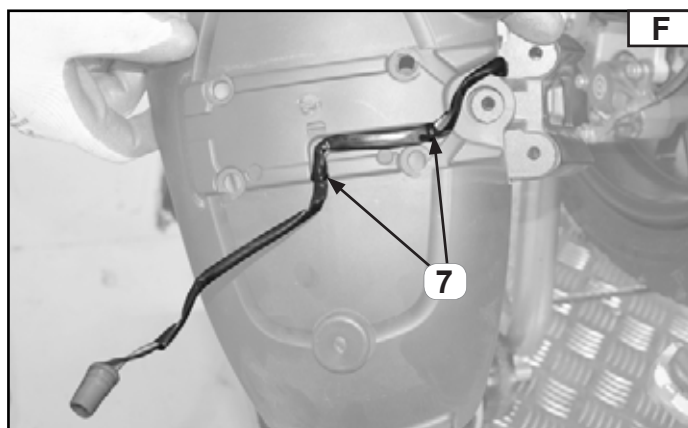
REPLACEMENT OF THE REAR INDICATOR LIGHTS

Remove:

- The indicator light support bracket (6) Fig. E.



- The wiring clamps (7) Fig. F.



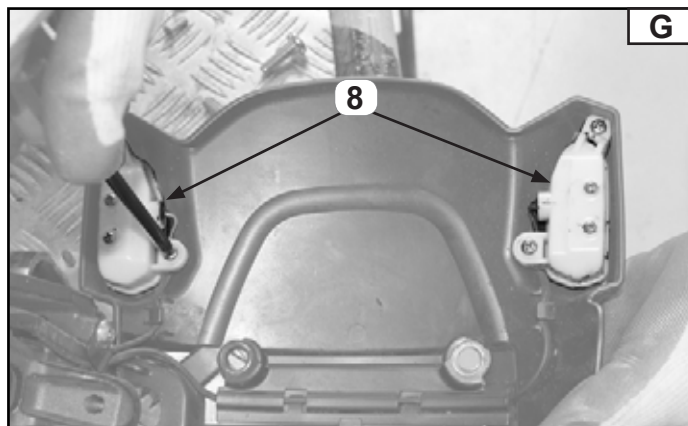
- The left/right indicator lights (8) Fig. G.

Installation:

Proceed using the opposite order to removal.

NOTICE

The vehicle has integrated rear LED lights, and in case of anomaly, it is necessary to replace the whole indicator light unit and the number plate light.





ELECTRIC SYSTEM

REPLACEMENT OF THE FRONT INDICATOR LIGHTS

Park:

- The motorcycle on a level surface.

NOTICE

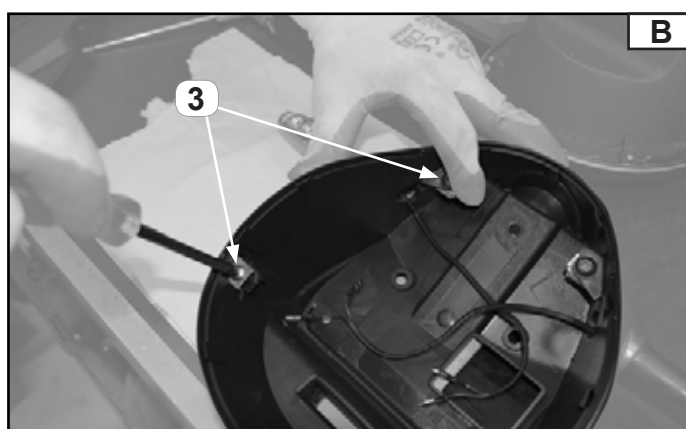
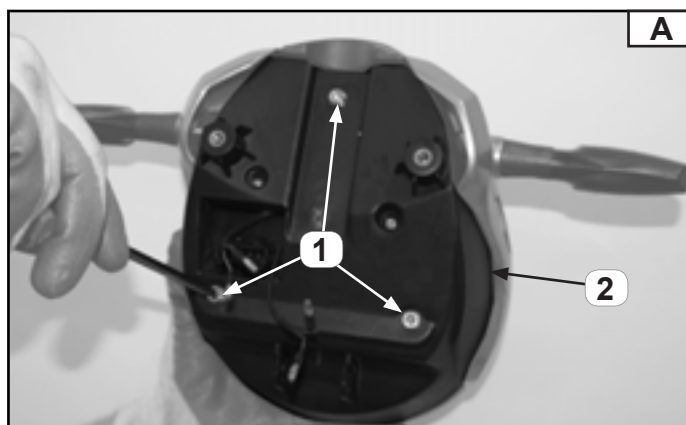
Prop the bike on suitable supports so that it cannot fall.

NOTE:

The following procedure is applicable to both front indicator lights.

Remove:

- The front head-light, refer to the section “**Removal of the front headlamp unit, Chapter 4**”.
- The fastening screws (1) of the protective shield (2) Fig. A.
- The fastening screws (3) of the indicator light holder Fig. B.



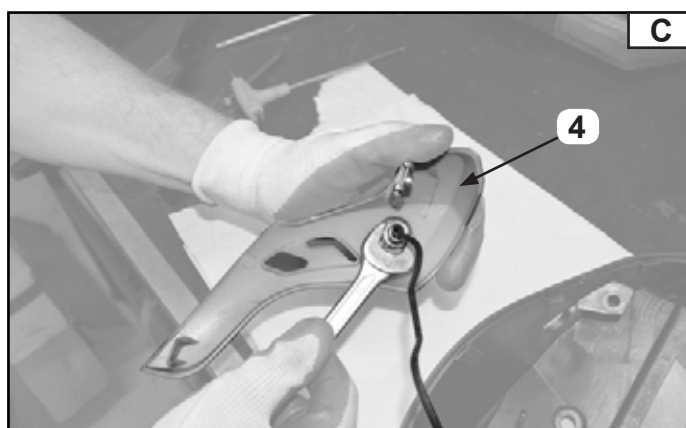
- The indicator light (4) Fig. C.

Installation:

Proceed using the opposite order to removal.

NOTICE

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





ELECTRIC SYSTEM

REPLACEMENT OF THE IGNITION BLOCK

Park:

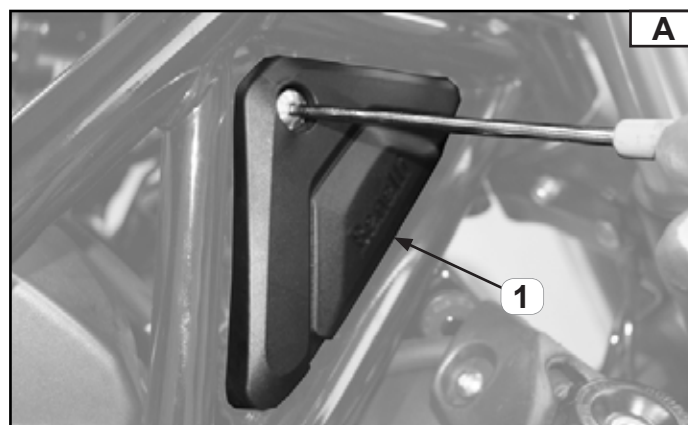
- The motorcycle on a level surface.

NOTICE

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

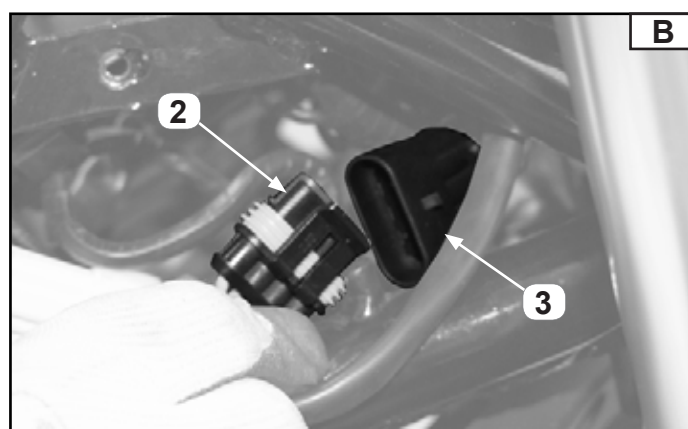
Remove:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The air filter box, refer to the section “**Removal of the air filter box, Chapter 4**”.
- The face shield (1) Fig. A.



Disconnect:

- The connector (2) from the electrical distributor (3) Fig. B.



Remove:

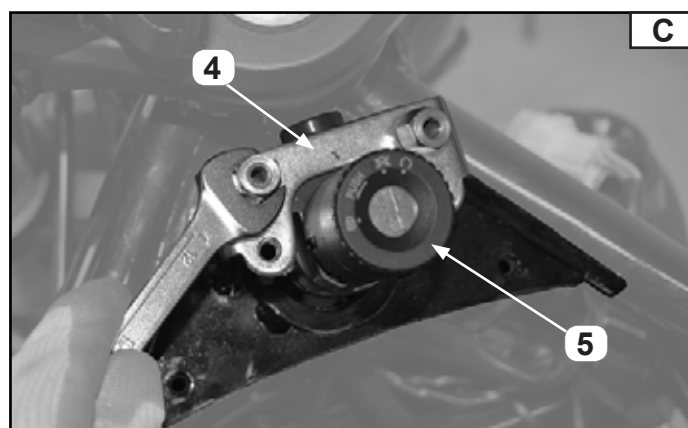
- The bracket (4) Fig. C.
- The ignition block (5) Fig. C.

Installation:

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 one.





ELECTRIC SYSTEM

REPLACEMENT OF THE INSTRUMENT PANEL

Park:

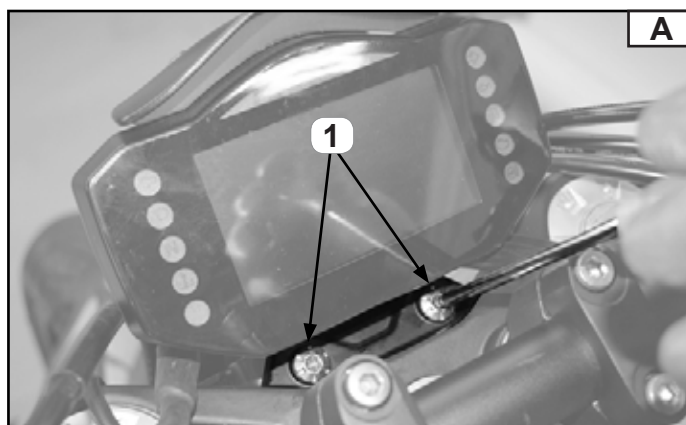
- The motorcycle on a level surface.

NOTICE

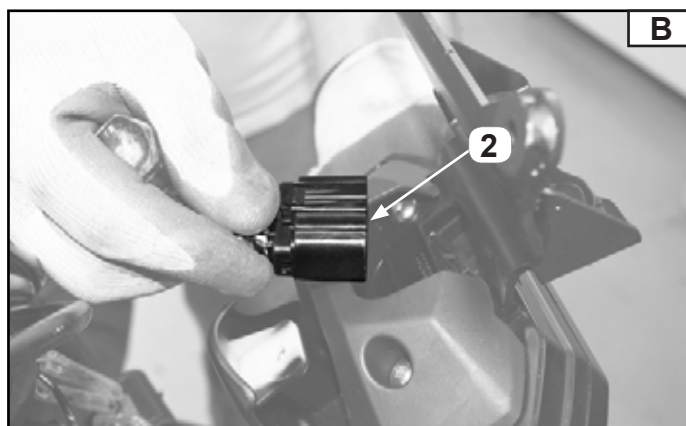
Prop the bike on suitable supports so that it cannot fall.

Remove:

- The front head-light, refer to the section “**Removal of the front headlamp unit, Chapter 4**”.
- The screws (1) Fig. A.

**Disconnect:**

- The connector (2) Fig. B.

**Remove:**

- The instrument panel protections (3) (4) (5) Fig. C.



ELECTRIC SYSTEM

INSTALLATION OF THE INSTRUMENT PANEL

Park:

- The motorcycle on a level surface.

WARNING

Prop the bike 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:

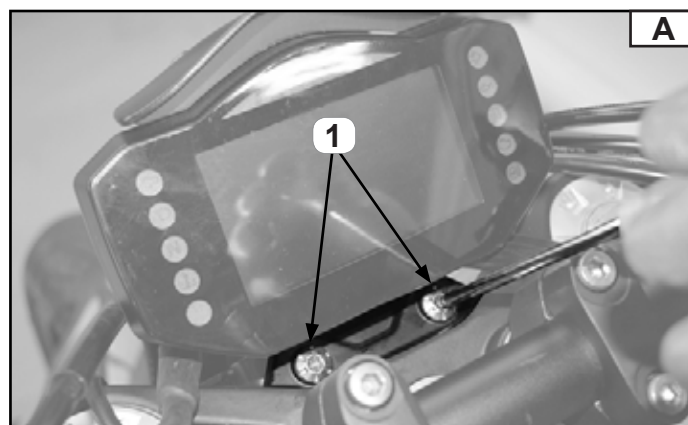


Torque 5-6 N*m

Use Loctite thread sealant to secure.



Loctite 243







CHAPTER 4

FRAME

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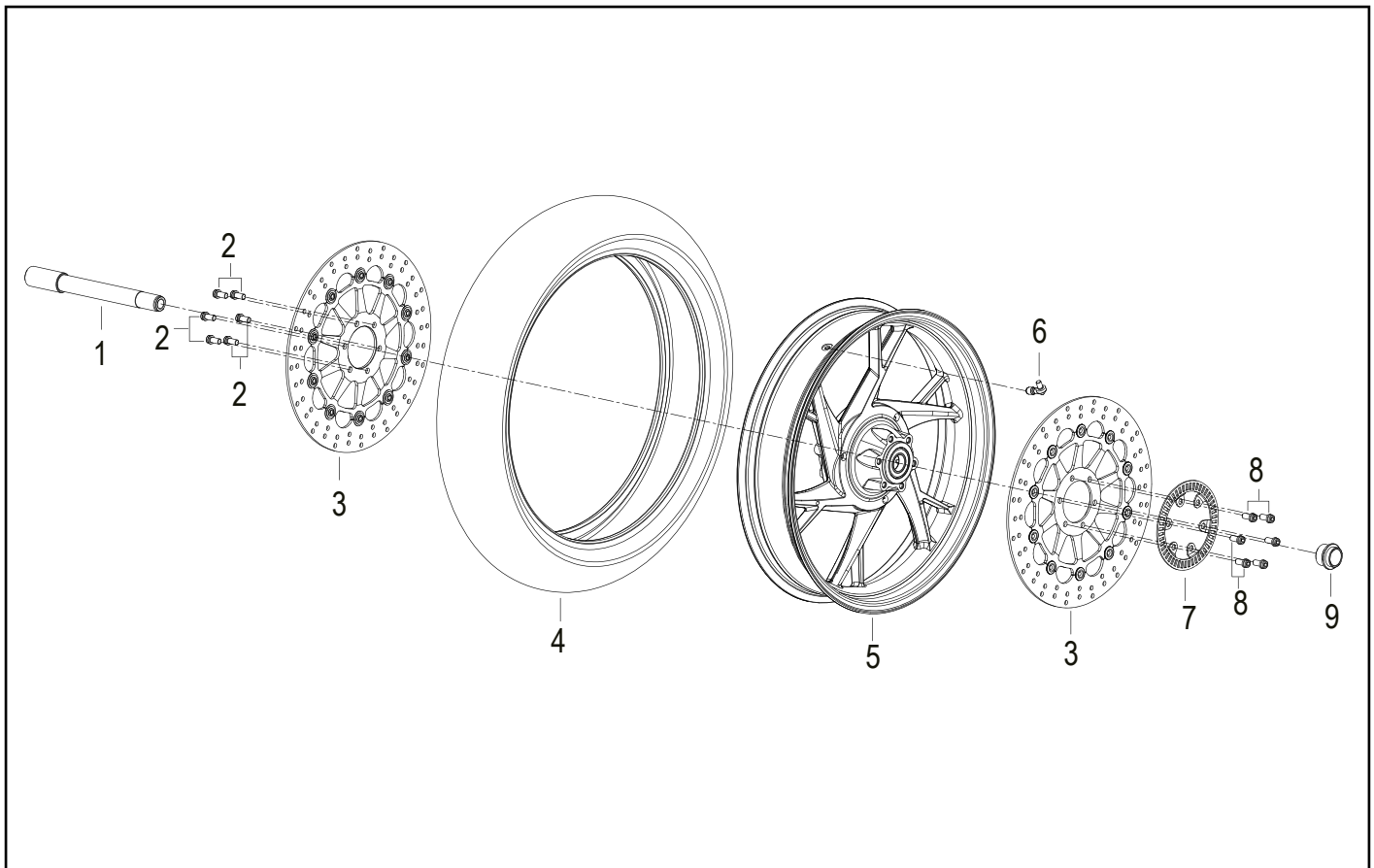
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FRONT WHEEL AND BRAKE DISCS

FRONT WHEEL REMOVAL / INSTALLATION



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	FRONT WHEEL SPINDLE					
2	SCREW					
3	FRONT BRAKE DISC					
4	FRONT TIRE					
5	FRONT WHEEL RIM					
6	VALVE					
7	ABS FRONT SIGNAL WHEEL					
8	SCREW					
9	L.H. SPACER					



FRONT WHEEL AND BRAKE DISCS

FRONT WHEEL REMOVAL

Park:

- The motorcycle on a level surface.

NOTE:

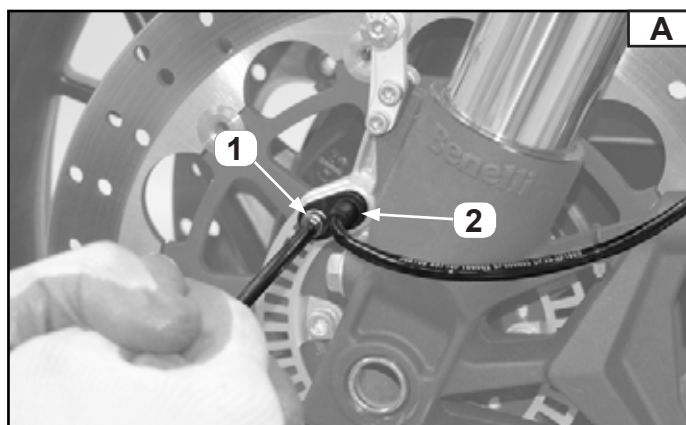
Place the motorcycle on a suitable support so that the front wheel is raised.

Remove:

- The front mudguard, refer to the section “Removal of front mudguard, Chapter 4”.
- The brake caliper, refer to the section “Removal of the front brake caliper, Chapter 4”.

Remove:

- The screw (1) Fig. A
- The ABS sensor (2) Fig. A.



NOTE:

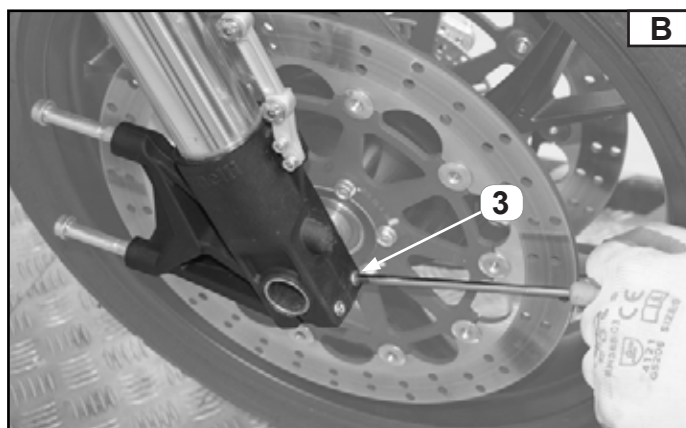
Repeat the above-mentioned procedure for the opposite front brake caliper.

NOTE:

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

Loosen:

- The setscrews (3) Fig. B.



Remove:

- The front wheel spindle (4) with the apposite tool Fig. C.

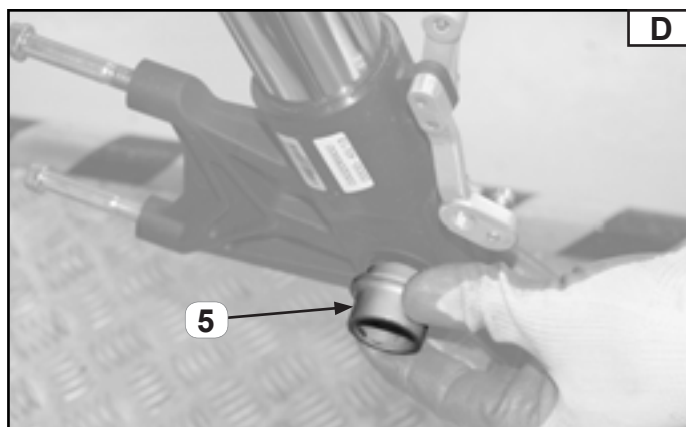


Tightening/disassembly tool of front wheel spindle.

- The front wheel.



- The L.H. inner spacer (5) Fig. D.





FRONT WHEEL AND BRAKE DISCS REMOVAL / INSTALLATION OF BRAKE DISCS

Remove:

- The front wheel, refer to the section “**Removal of the front wheel, Chapter 4**”.
- The screws (1) Fig. A.
- The brake disc (2) Fig. A.

Install:

- The brake disc (2) Fig. A.
- The screws (1) Fig. A.

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



MEDIUM THREAD
LOCKER

The procedure below applies to both brake discs.

Tighten:

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



Torque 22 N*m

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



FRONT WHEEL AND BRAKE DISCS

CHECK OF BRAKE DISCS

The procedure below applies to all brake discs.

Check:

- The brake disc.

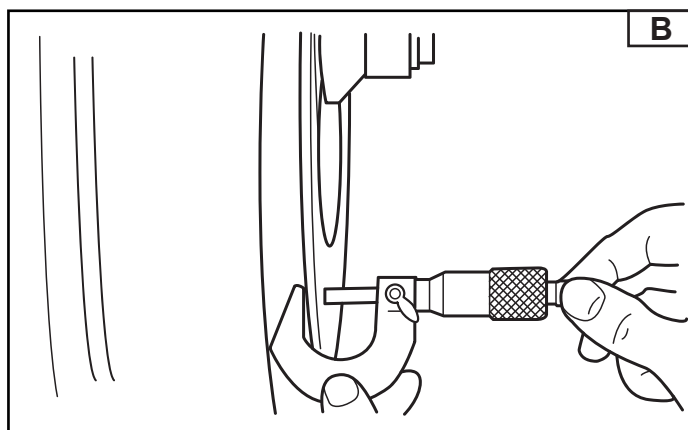
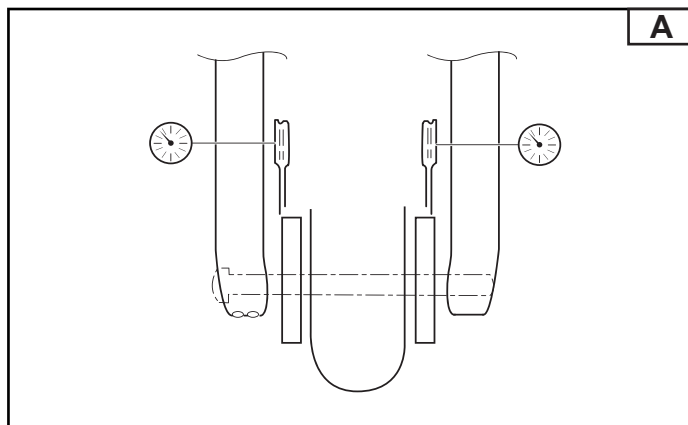
If there is any damage/abrasion, replace.

Measure:

- The deformation of the brake disc.

Replace the brake disc if it is outside the specification.

- Place the bike 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 stops.
- To remove the brake caliper, refer to the section “**Removal of the front/rear brake caliper, Chapter 4**”.
- 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	0.15 mm
Rear	0.15 mm
Disc (thickness 5 mm) Fig. B	4.5 mm

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 spindle to check for damage.

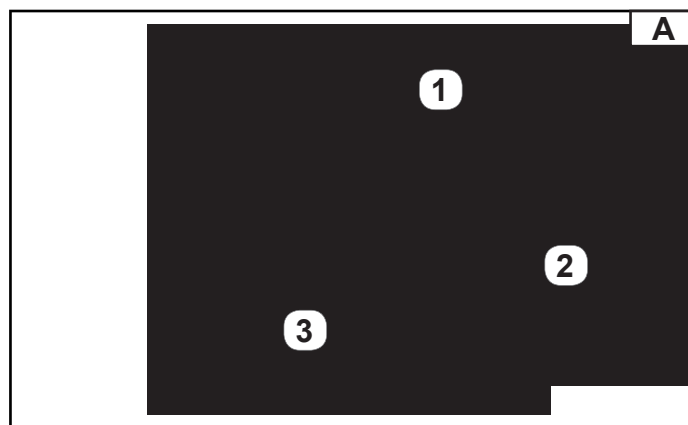
Substitute the wheel spindle if it is damaged or bent.

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 centring.

The difference between the upper and lower detections of the comparator represents the measurement of the misalignment.

Substitute the wheel spindle, if the misalignment exceeds the service limit.



Wheel spindle centring/100 mm	
Standard	LIT 0.1 mm or less
Service limit	LIT 0.2 mm

NOTICE

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

Check:

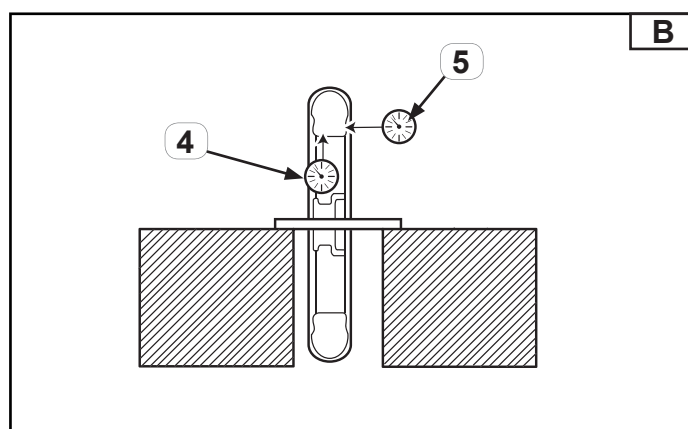
- The tire.
- The front wheel.

If there is any damage or wear, replace.

Measure:

- The radial eccentricity of the wheel (4) Fig. B.
- The lateral eccentricity of the wheel (5) Fig. B.

If the specified limit is exceeded, replace.



Eccentricity	Limit
Radial (4)	2 mm
Lateral (5)	2 mm



FRONT WHEEL AND BRAKE DISCS

CHECK/REPLACEMENT OF WHEEL BEARINGS

Check:

- The wheel bearings Fig. A.

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.

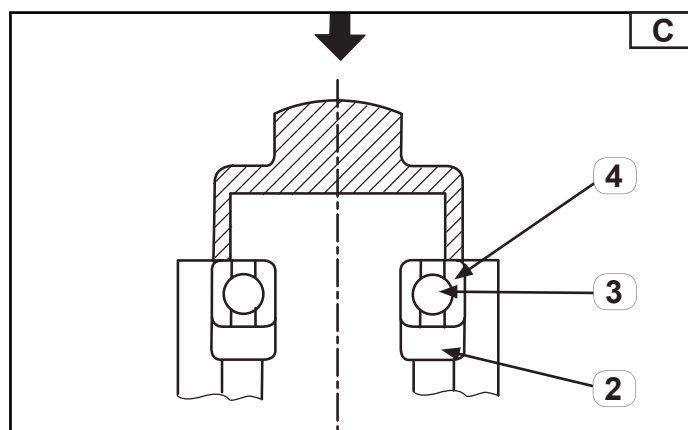
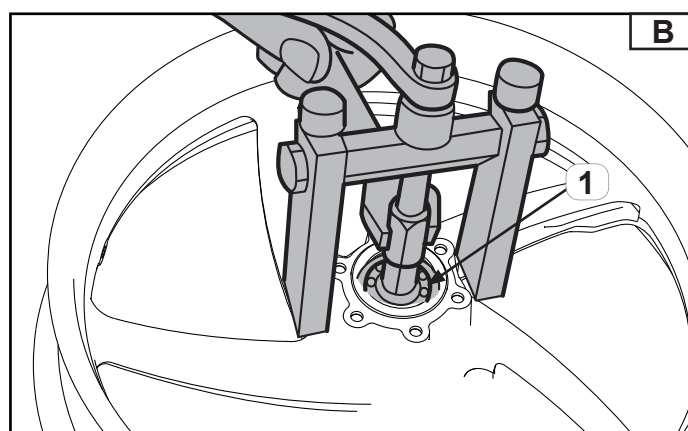
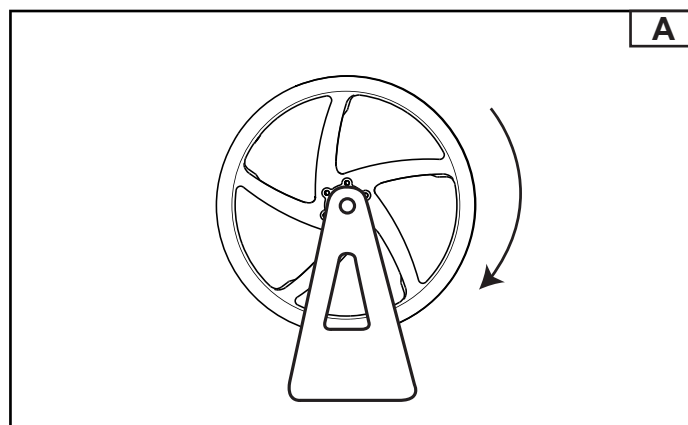
Insert the new wheel bearings, following the removal steps in reverse order.

NOTICE

During the bearing insertion, do not touch the inner seat (2) or the ball bearings of the wheel (3). Contact must only occur with the outer seat of bearing (4) 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.

NOTICE

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

Installation:

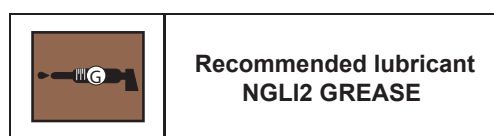
Proceed using the opposite order to removal.

Tighten:

- The front wheel spindle (1) Fig. A to the following torque:



Tightening/disassembly tool of front wheel spindle.



Torque 60 N*m

- The setscrews (2) Fig. B.



Torque 10 N*m

NOTICE

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

Install:

- The ABS sensor (3) Fig. C.

Tighten:

- The screw (4) Fig. C to the following torque:



Torque 10 N*m

Use medium Loctite thread locker to secure.

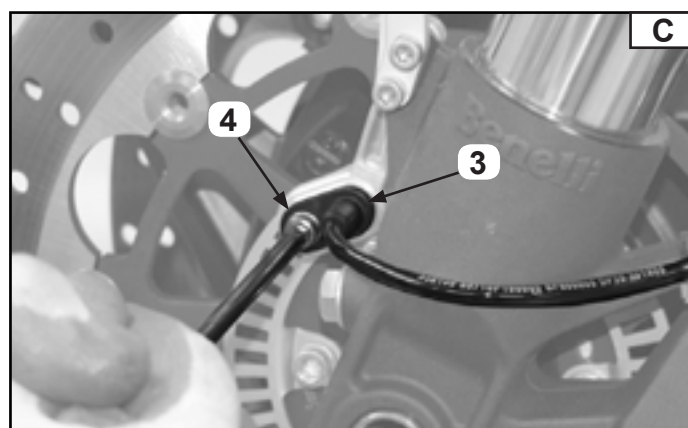
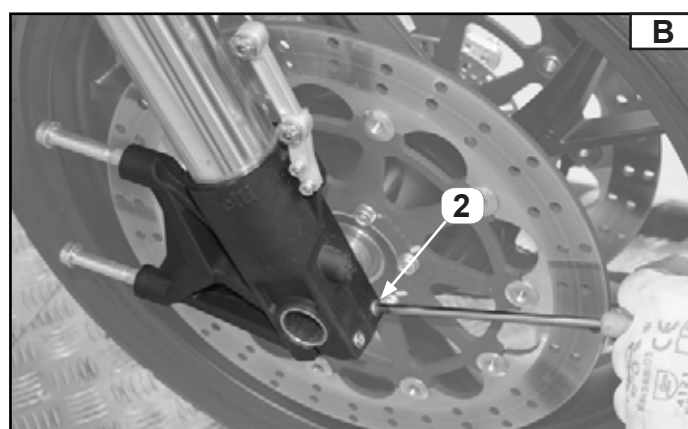
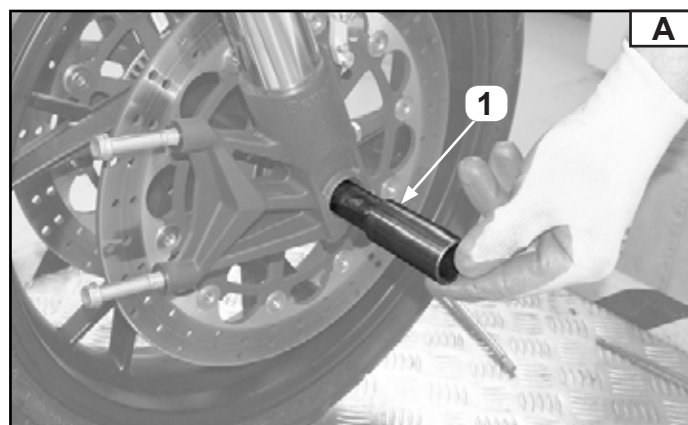


NOTE:

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

Make sure that there is enough space between the brake pads before installing the calipers to the brake discs.

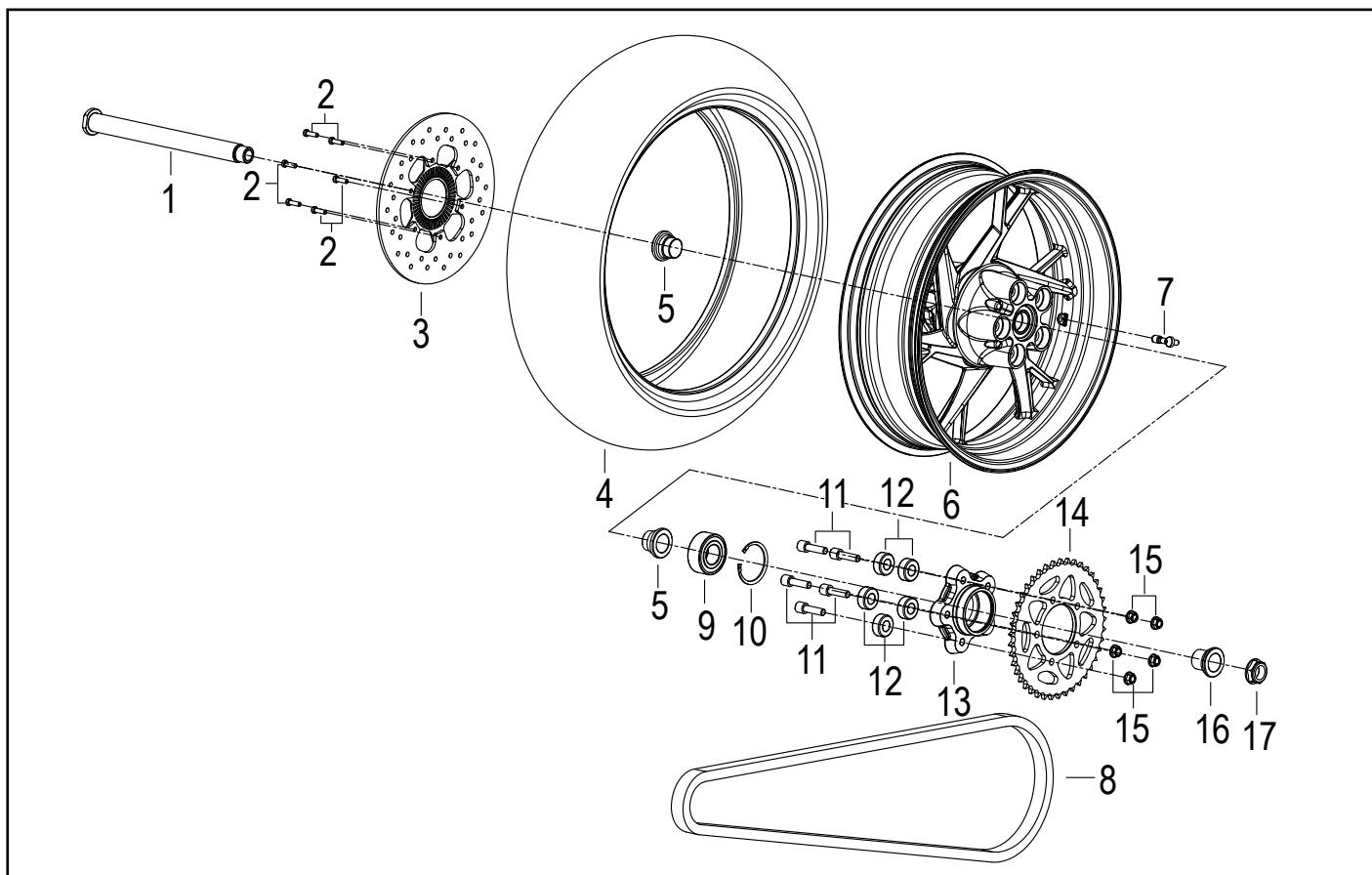
Check that the path of the brake hose is correct.





REAR WHEEL AND BRAKE DISC

REAR WHEEL REMOVAL / INSTALLATION



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	REAR WHEEL SPINDLE					
2	SCREW					
3	REAR BRAKE DISC					
4	REAR TIRE					
5	INNER SPACER					
6	REAR WHEEL RIM					
7	VALVE					
8	TRANSMISSION CHAIN					
9	BEARING					
10	SNAP RING					
11	SCREW					
12	SPRING DRIVE RUBBER					
13	SPROCKET FLANGE					
14	SPROCKET					
15	NUT					
16	SPACER					
17	NUT					



REAR WHEEL AND BRAKE DISC

REAR WHEEL REMOVAL

Park:

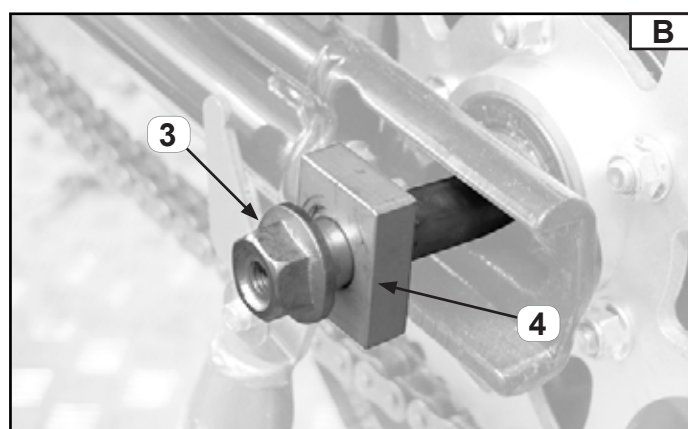
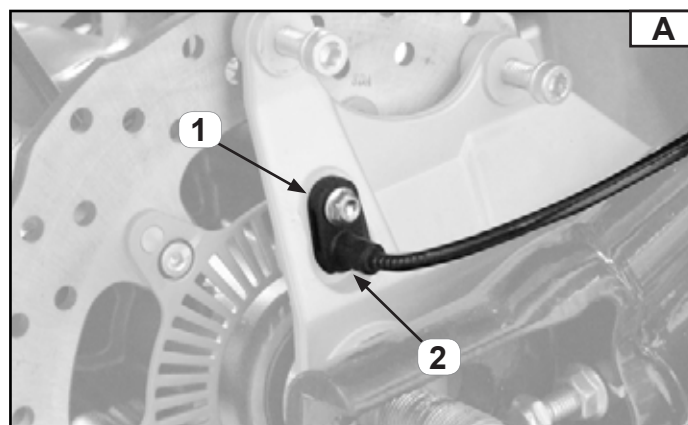
- The motorcycle on a level surface.

NOTE:

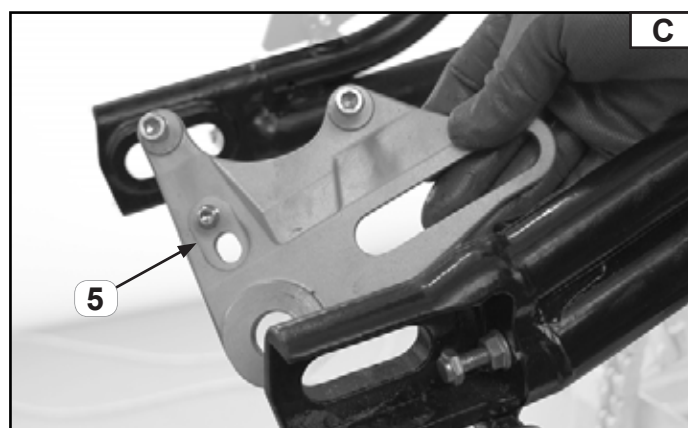
Place the bike on a suitable support so that the rear wheel is raised.

Remove:

- The rear mudguard holder, refer to the section “Removal of the rear mudguard holder, Chapter 4”.
 - The rear brake caliper, refer to the section “Removal of the rear brake caliper, Chapter 4”.
 - The screw (1) Fig. A.
 - The sensor of the signal wheel (2) Fig. A.
-
- The pin (3) on the left side of the vehicle Fig. B.
 - The adjuster sliding shoe (4) on the left side of the vehicle Fig. B.
 - The rear wheel.

**NOTE:**

During this phase, be careful in separating the components such as the chain tensioner registers on the sprocket side and the brake disc side and brake caliper support plate (5) Fig. C.





REAR WHEEL AND BRAKE DISC SPROCKET AND REAR BRAKE DISC REMOVAL

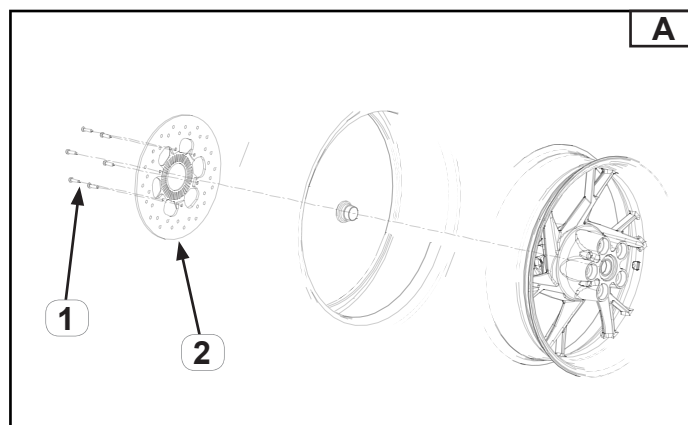
Remove:

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

For removal of brake disc Fig. A.

Remove:

- The screws (1).
- The brake disc (2).



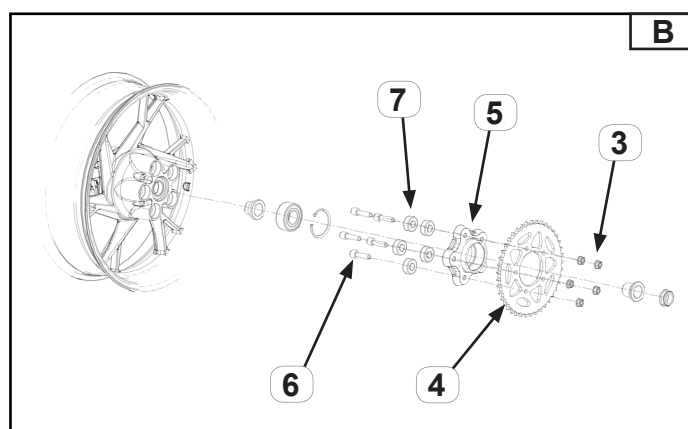
For removing the sprocket Fig. B.

Remove:

- The nuts (3).
- The sprocket (4).
- The flange (5).
- The screws (6).
- The spring drive rubbers (7).

Check:

- The flange (5).
If there is any cracking/damage, replace.
- The spring drive rubbers (7).
If there is any damage or wear, replace.





REAR WHEEL AND BRAKE DISC WHEEL AXLE CHECK

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

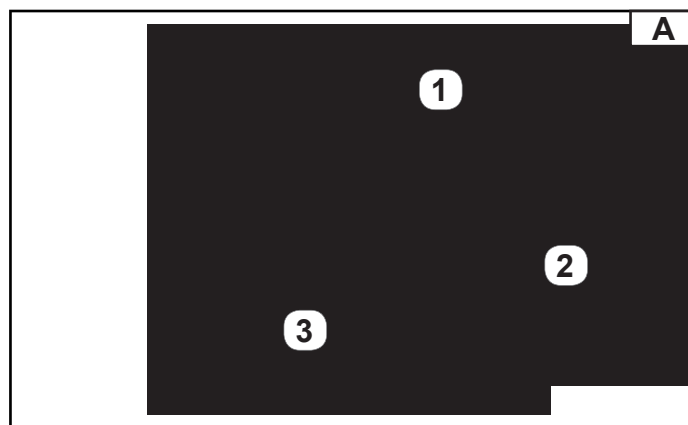
Substitute the wheel spindle if it is damaged or bent.

Check:

- The 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 centring.

The difference between the upper and lower detections of the comparator represents the measurement of the misalignment.

Substitute the wheel spindle, if the misalignment exceeds the service limit.



Wheel spindle centring/100 mm	
Standard	LIT 0.1 mm or less
Service limit	LIT 0.2 mm

NOTICE

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

Check:

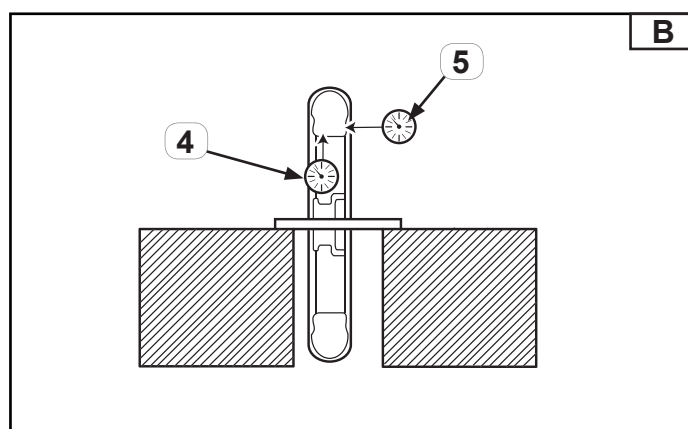
- The tire.
- The rear wheel.

If there is any damage or wear, replace.

Measure:

- The radial eccentricity of the wheel (4) Fig. B.
- The lateral eccentricity of the wheel (5) Fig. B.

If the specified limit is exceeded, replace.



Eccentricity	Limit
Radial (4)	2 mm
Lateral (5)	2 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.

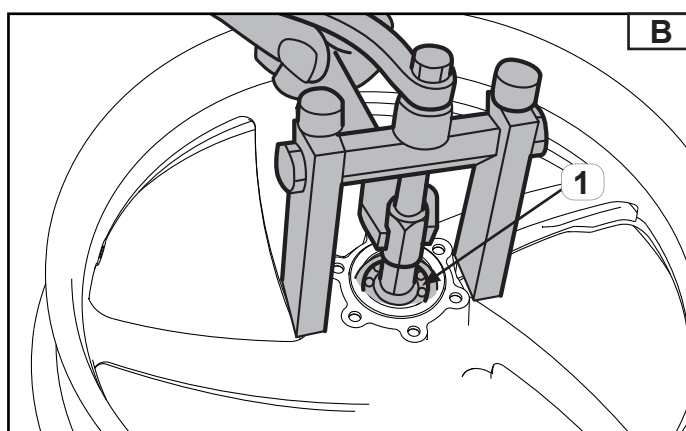
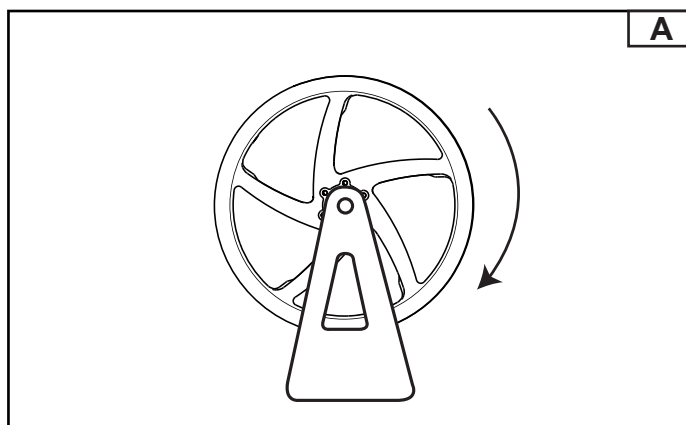
Replace:

- The wheel bearings.

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

Install:

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

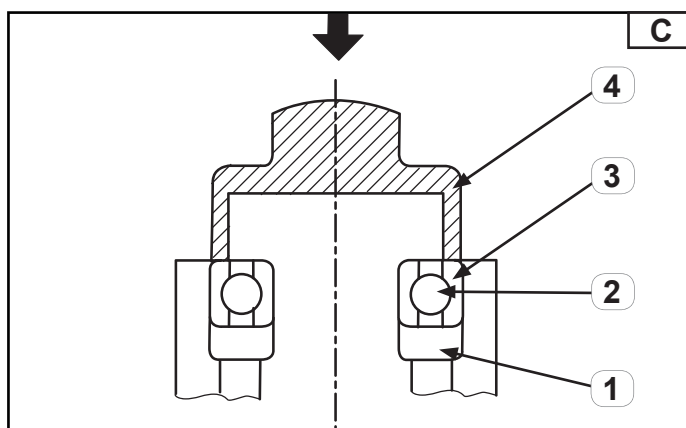


NOTICE

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 SPROCKET CHECK AND REPLACEMENT

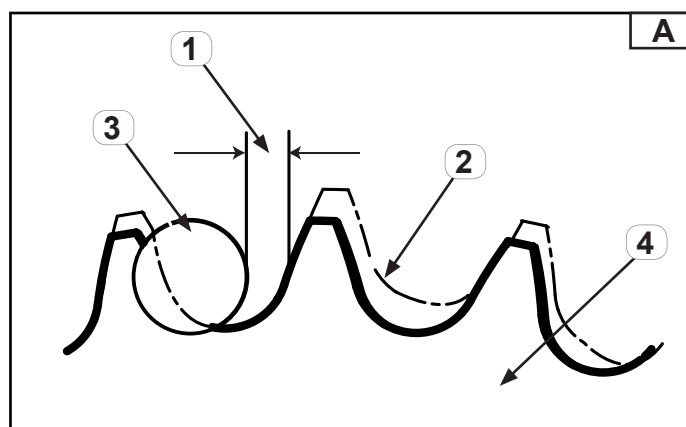
Check:

- The sprocket.

If more than $\frac{1}{4}$ of each tooth is worn, replace the sprocket.

If the teeth are bent, replace the sprocket.

- $\frac{1}{4}$ teeth.
- Correct.
- Transmission chain roller.
- Sprocket.

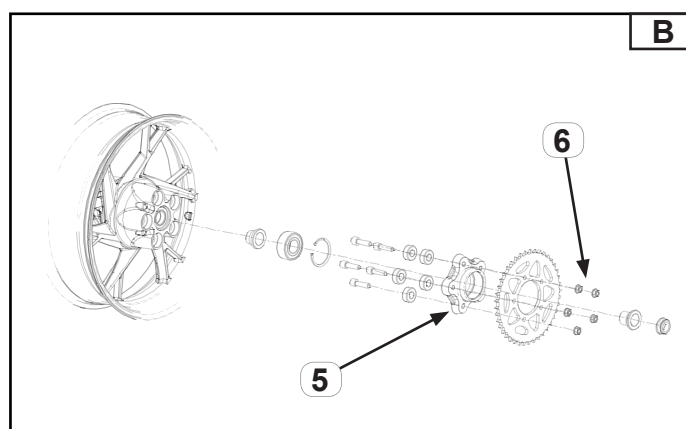
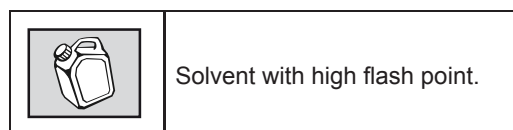


Remove:

- The sprocket, refer to the section “Removal of rear brake disc and sprocket, Chapter 4”.

Clean:

- The sprocket flange (5) Fig. B using a clean cloth, especially surfaces that touch the sprocket.



Install:

- The new sprocket.

Tighten:

- The self-locking nuts (6) Fig. B to the following torque:



Torque 45 N*m

Use medium Loctite thread locker to secure.



NOTE:

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



REAR WHEEL AND BRAKE DISC INSTALLATION OF THE BRAKE DISC

Install:

- The brake disc (1) Fig. A.

Tighten:

- The screws (2) Fig. A to the following torque:

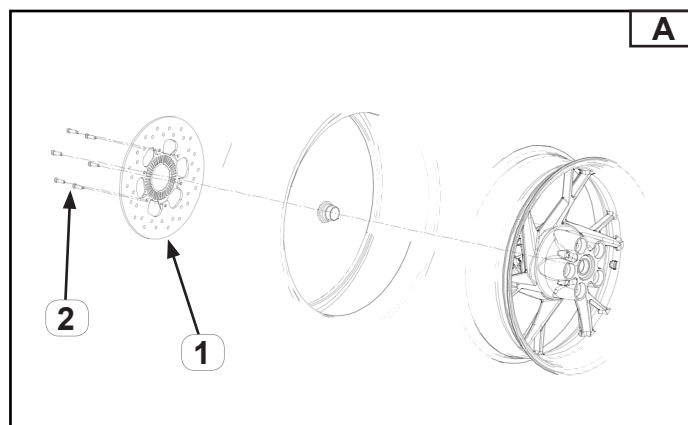


Torque 12 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

**NOTE:**

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



REAR WHEEL AND BRAKE DISC REAR WHEEL INSTALLATION

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

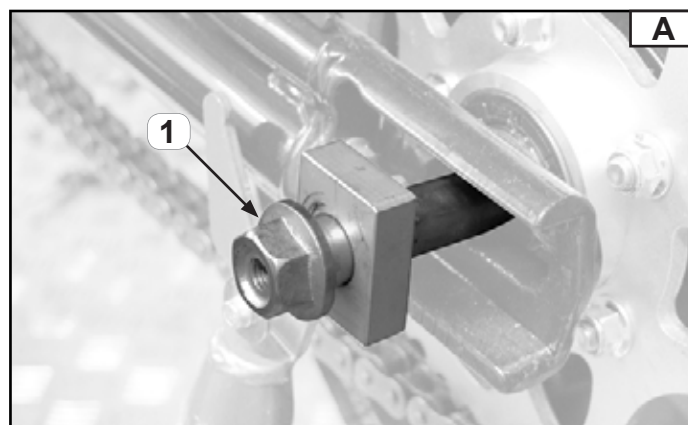
Proceed using the opposite order to removal.

Lubricate and install:

- The pin (1) on the left side of the vehicle Fig. A.



**Recommended lubricant
NGLI2 GREASE**

**NOTE:**

Make sure that there is enough space between the brake pads before installing the caliper to the relevant brake disc.

NOTICE

Check that the path of the brake hose is correct.

FRONT AND REAR BRAKES

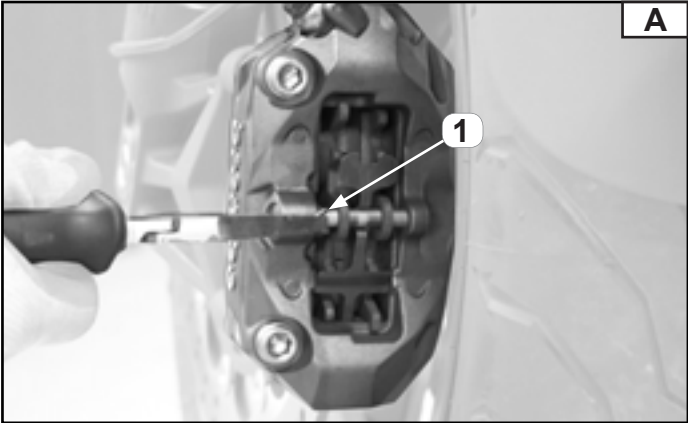
FRONT BRAKE PADS REMOVAL / INSTALLATION

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

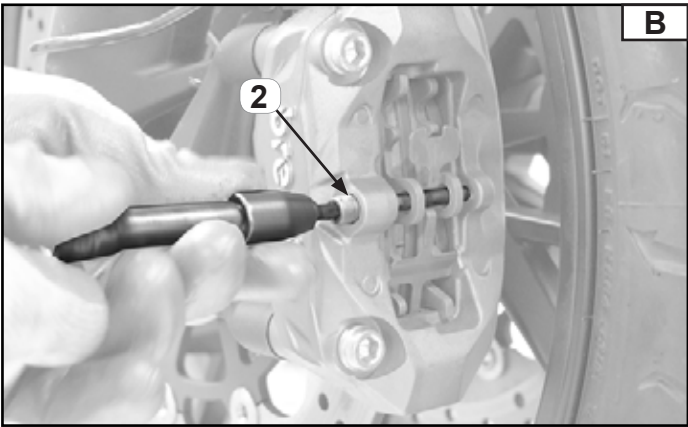
NOTE:
Always replace the brake pads together to ensure an uniform pressure.

Remove:

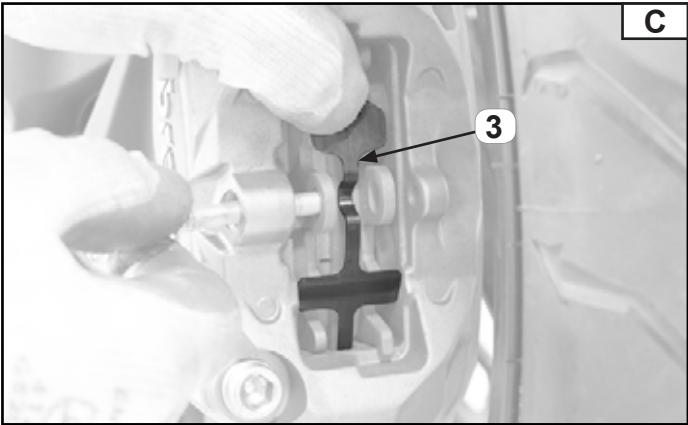
- The pin safety spring (1) Fig. A.



- The fixing pin (2) Fig. B.



- The pad pushing spring (3) Fig. C.

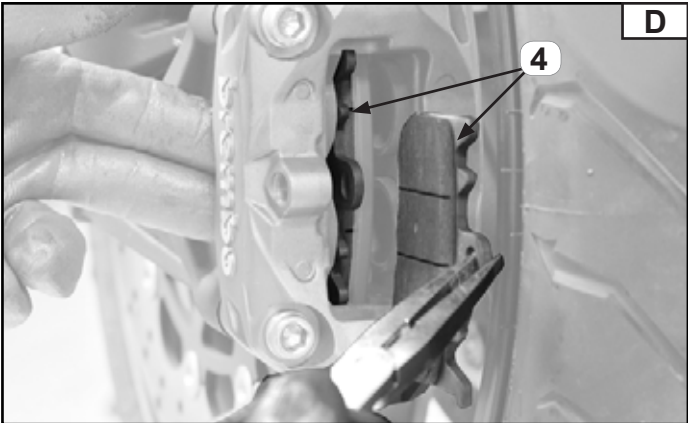


Slide out:

- The brake pads (4) Fig. D.

Measure:

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



Pads	Wear limit
Front	1 mm



FRONT AND REAR BRAKES

FRONT BRAKE PADS REMOVAL / INSTALLATION

Clean:

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

Install:

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

Check:

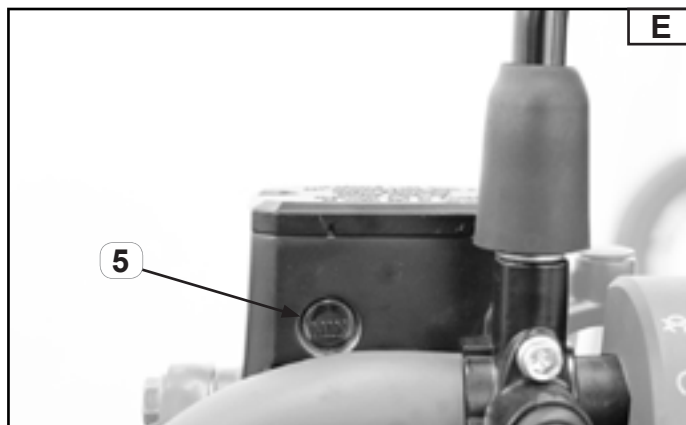
The brake fluid level (5) Fig. E.

If below the minimum notch, top up with the recommended brake fluid until it is at the correct level, refer to the section “**Checking and topping up the front brake fluid level, Chapter 3**”.

Check:

- Brake lever operation.

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



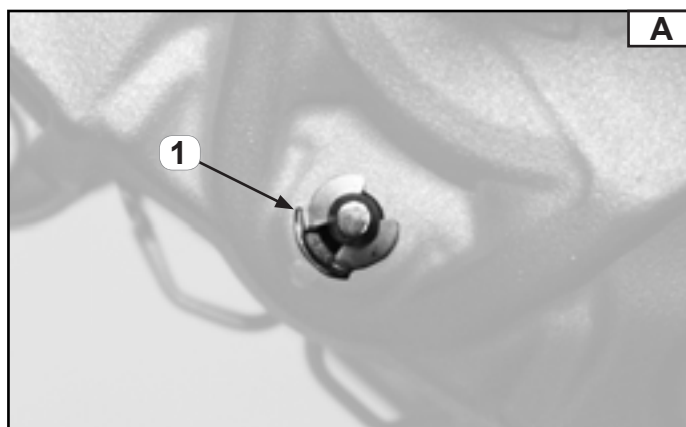


FRONT AND REAR BRAKES

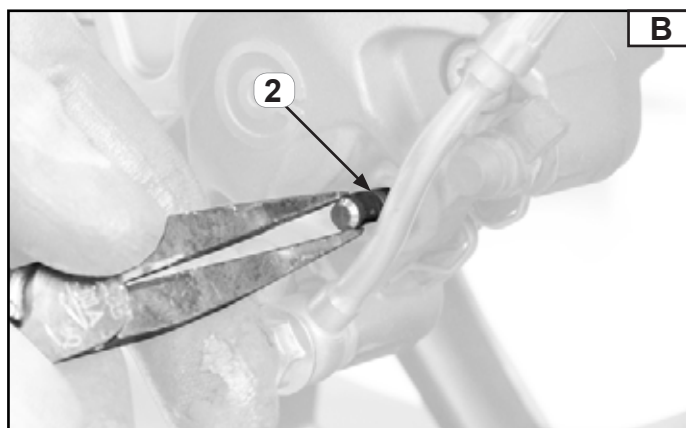
REAR BRAKE PADS REMOVAL / INSTALLATION

Remove:

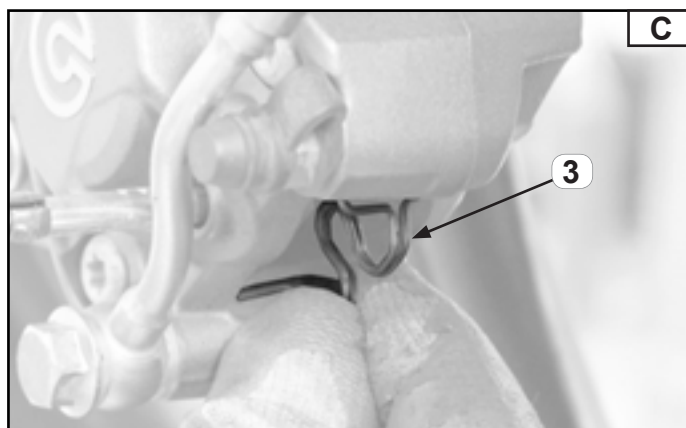
- The safety spring (1) Fig. A.



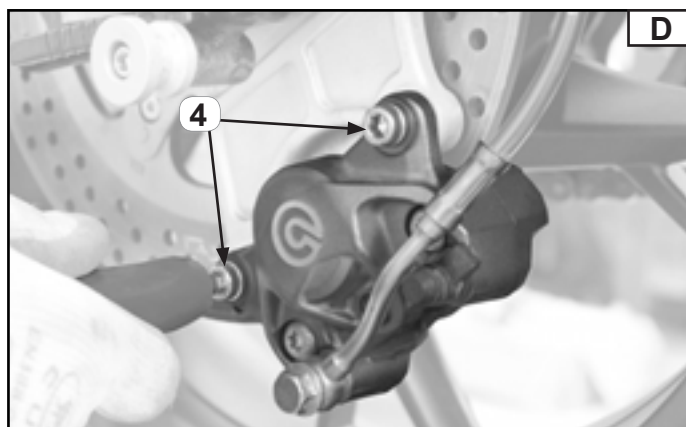
- The fixing pin (2) Fig. B.



- The pad pushing spring (3) Fig. C.



- The brake caliper fixing screws (4) Fig. D.

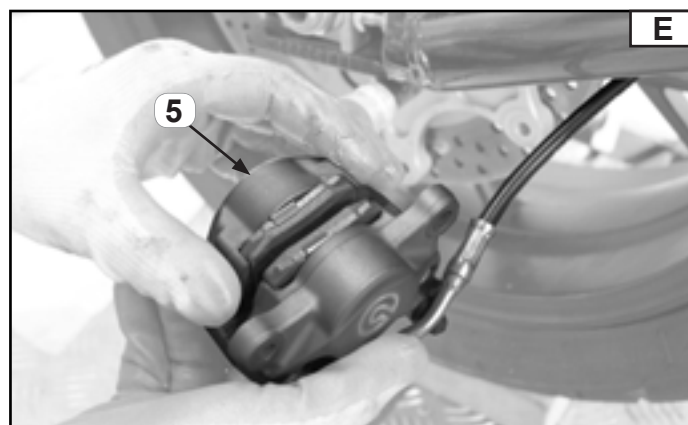




FRONT AND REAR BRAKES

REAR BRAKE PADS REMOVAL / INSTALLATION

- The brake caliper (5) Fig. E.



Slide out:

- The brake pads (6) Fig. F.

Measure:

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



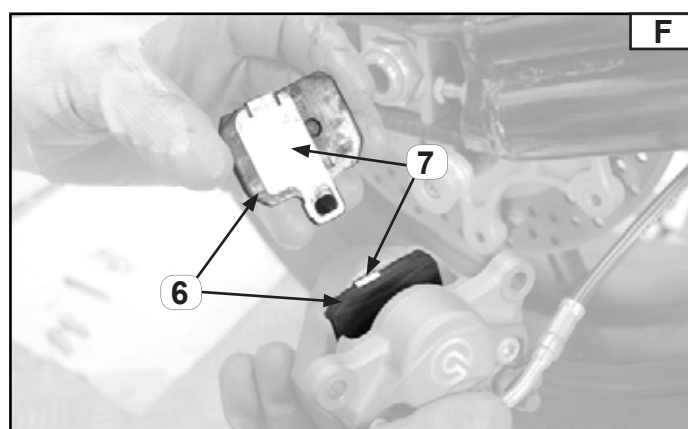
Pads	Wear limit
Rear	1 mm

Clean:

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

Install:

- The brake pads in reverse order of disassembly.



NOTICE

Check, during installation, the metallic plates (7) Fig. F are positioned as shown in the image.

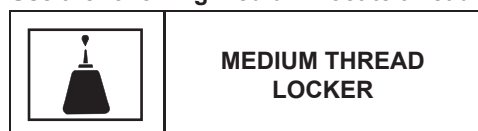
Tighten:

- The screws (8) Fig. G to the following torque:

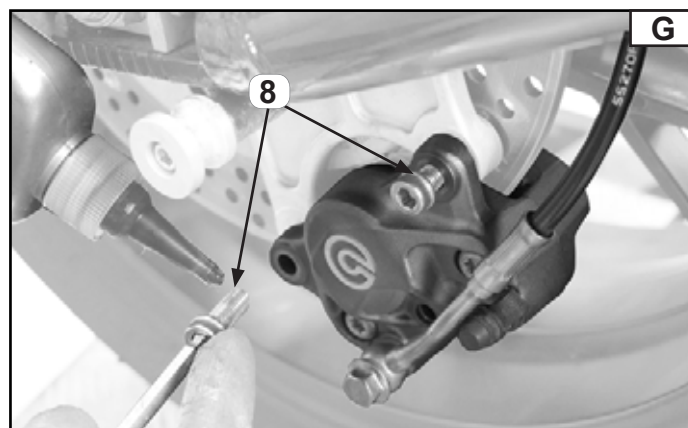


Torque 22 N*m

Use the following medium Loctite thread locker to secure:



**MEDIUM THREAD
LOCKER**



Check:

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



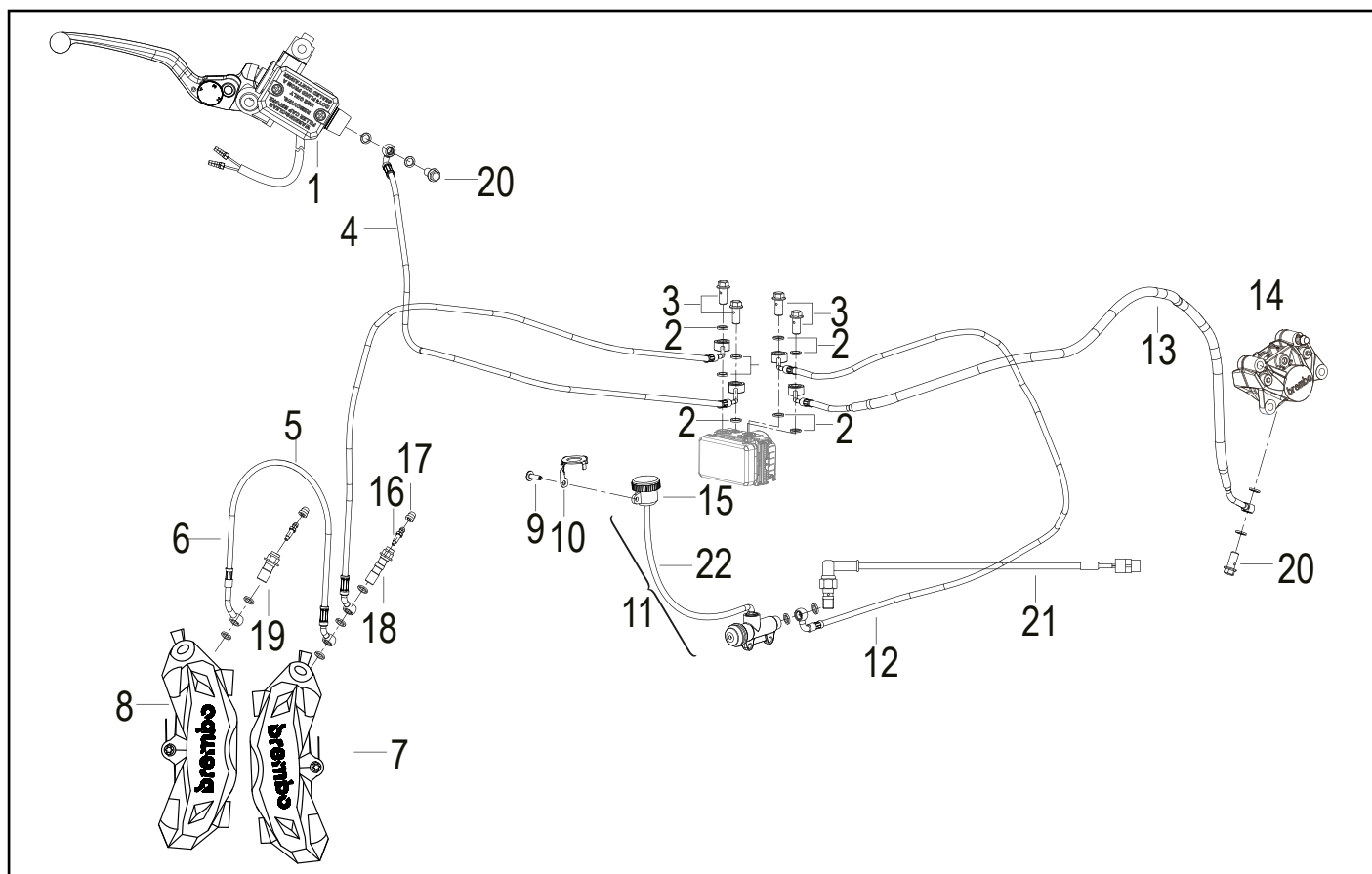
NOTICE

Do not use 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	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	COMPLETE FRONT BRAKE PUMP					
2	GASKET					
3	SPECIAL SCREW					
4	FRONT BRAKE PUMP TUBE - ABS CONTROL UNIT					
5	FRONT BRAKE CALIPER LINE - ABS CONTROL UNIT					
6	BRAKE TUBE					
7	L.H. FRONT BRAKE CALIPER					
8	R.H. FRONT BRAKE CALIPER					
9	SCREW					
10	PLATE					
11	REAR BRAKE PUMP					
12	REAR BRAKE PUMP LINE - ABS CONTROL UNIT					
13	REAR BRAKE CALIPER LINE - ABS CONTROL UNIT					
14	REAR BRAKE CALIPER					
15	BRAKE OIL TANK					
16	SPECIAL SCREW					
17	RUBBER PAD					
18	SPECIAL SCREW					



FRONT AND REAR BRAKES

FRONT BRAKE PUMP REMOVAL

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
19	SPECIAL SCREW					
20	SCREW					
21	HYDROSTOP					
22	PIPE					



FRONT AND REAR BRAKES

FRONT BRAKE PUMP REMOVAL

NOTE:

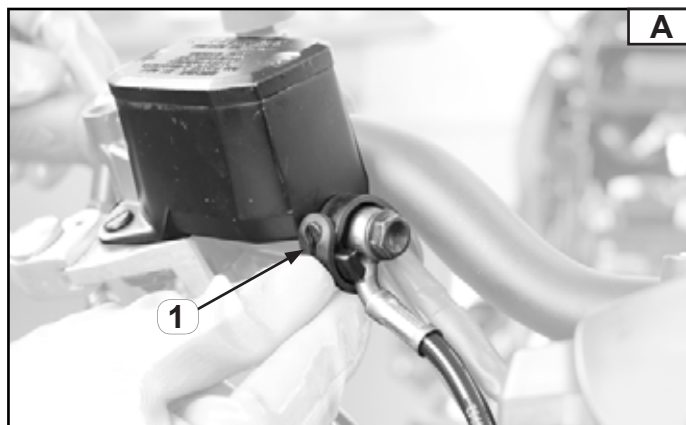
Drain out the brake fluid before proceeding with these operations, refer to the section "Checking and topping up the front brake fluid level, Chapter 3".

NOTICE

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

Remove:

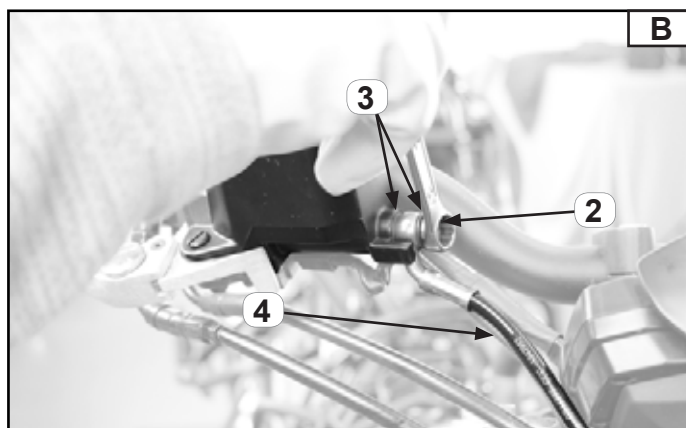
- The clamp (1) Fig. A.



- The special screw (2) Fig. B.
- The sealing washers (3) Fig. B.

Detach:

- The front brake tube (4) Fig. B.



Disconnect:

- The connectors of the front brake switch (5) Fig. C.

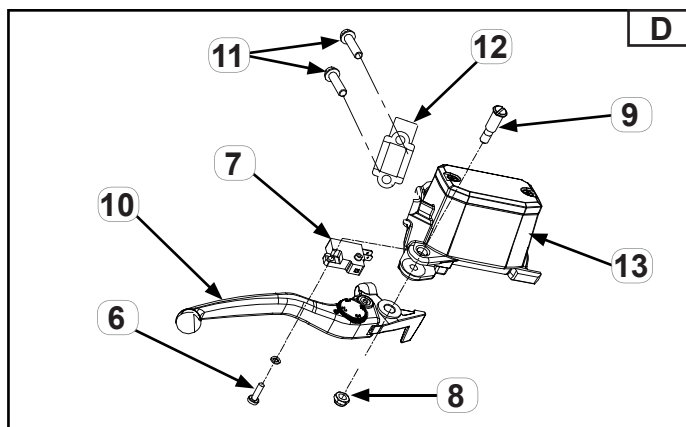


Remove:

- The screw (6) Fig. D.
- The micro-switch (7) Fig. D.
- The nut (8) Fig. D.
- The screw (9) Fig. D.
- Take out the front brake lever (10) Fig. D.
- The screws (11) Fig. D.
- The bracket (12) Fig. D.

Slide out:

- Remove the pump body (13) Fig. D.



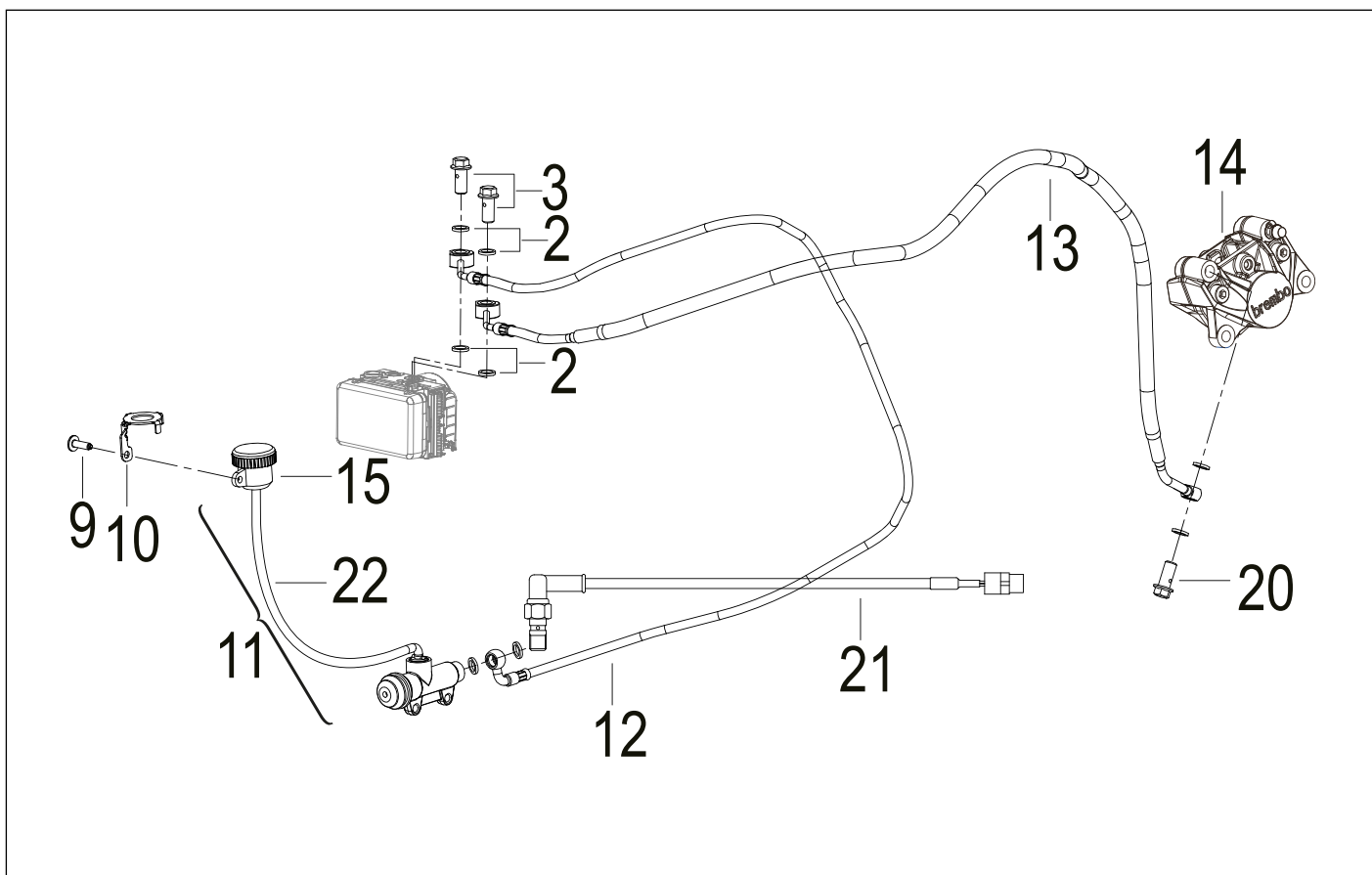
NOTICE

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



FRONT AND REAR BRAKES

REAR BRAKE PUMP REMOVAL



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
2	GASKET					
3	SPECIAL SCREW					
9	SCREW					
10	PLATE					
11	REAR BRAKE PUMP					
12	REAR BRAKE PUMP LINE - ABS CONTROL UNIT					
13	REAR BRAKE CALIPER LINE - ABS CONTROL UNIT					
14	REAR BRAKE CALIPER					
15	BRAKE OIL TANK					
20	SCREW					
21	HYDROSTOP					
22	TUBE					



FRONT AND REAR BRAKES

REAR BRAKE PUMP REMOVAL

NOTE:

Drain out the brake fluid before proceeding with these operations.

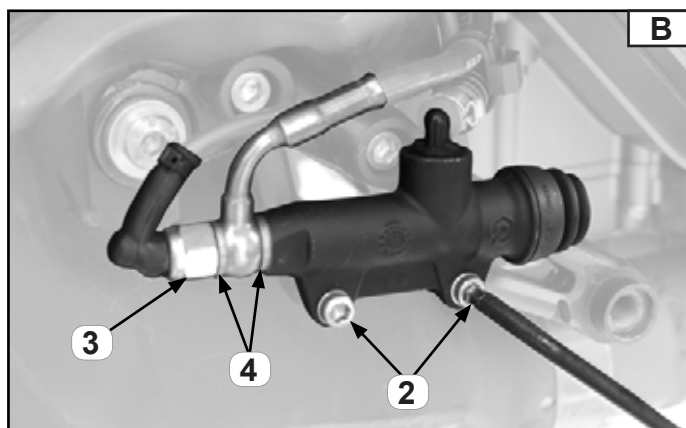
Refer to the section “Checking and topping up the front brake fluid level, Chapter 3”.

Remove:

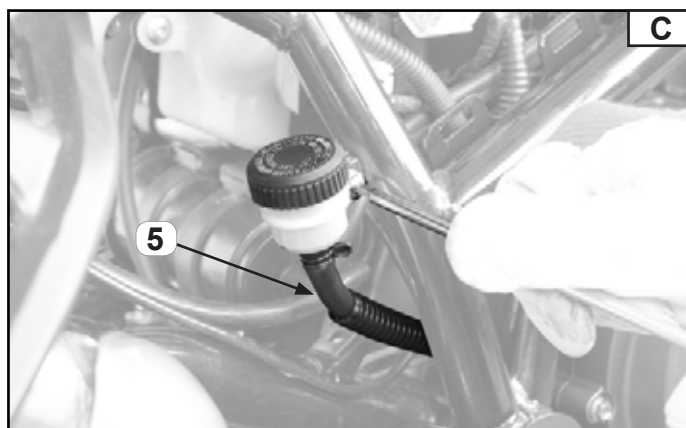
- The ball joint (1) Fig. A.
- The brake control pedal, refer to section “Removal of the brake control pedal, Chapter 4”.



- The screws (2) Fig. B.
- The hydrostop (3) Fig. B.
- The sealing washers (4) Fig. B.



- Release the main brake reservoir hose (5) Fig. C.

**Slide out:**

- Remove the brake pump (6) Fig. D.

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:

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

Install:

- The bracket (2) Fig. A.
- The screws (3) Fig. A and tighten to the following torque:



Torque 8 N*m

Install:

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

Tighten:

- The screw (5) Fig. B to the following torque:



Torque 1.5 N*m

Install:

- The front brake tube (6) to the brake pump Fig. C.
- The sealing washers (7) Fig. C.

Tighten:

- The special screw (8) Fig. C to the following torque:



Torque 26 N*m

Connect:

- The switch connector (4) Fig. D.

Place:

- Position the front brake lever (9) Fig. D.
- The nut (10) Fig. D.

Tighten:

- The screw (11) Fig. D to the following torque:



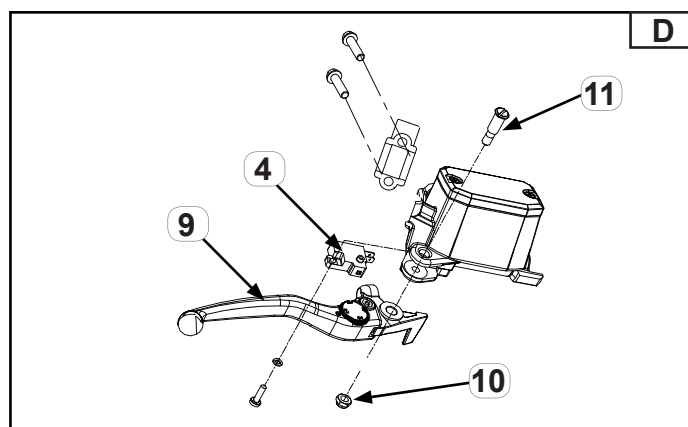
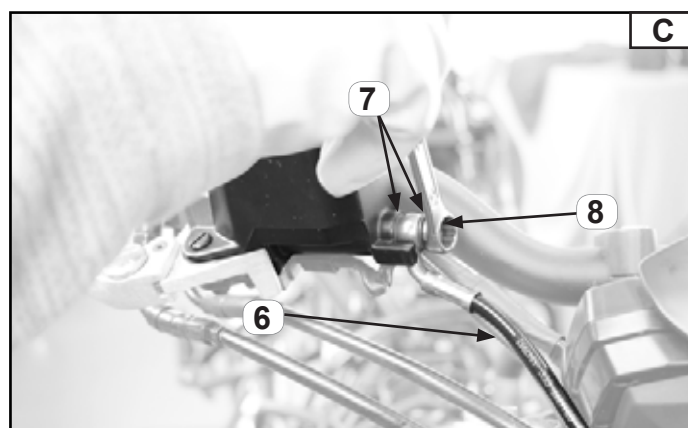
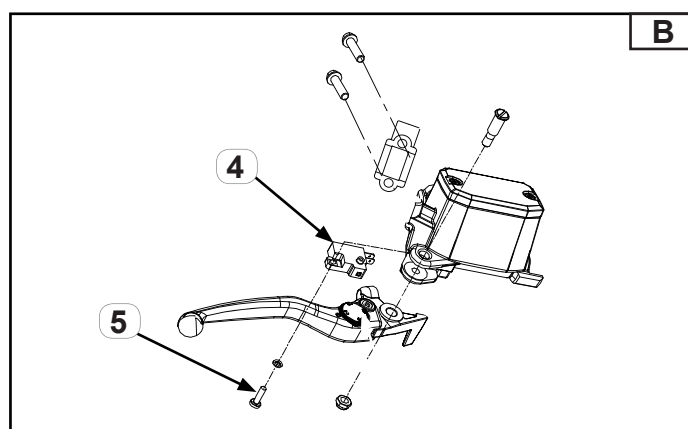
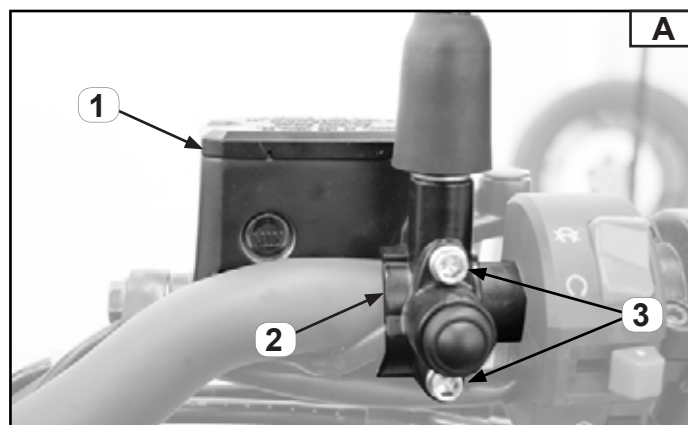
Torque 7 N*m

WARNING

To guarantee the safety of the bike, it is essential for the path of the flexible brake tube to be correct.

NOTE:

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





FRONT AND REAR BRAKES

REAR BRAKE PUMP INSTALLATION

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.

Install:

- The hydrostop (1) Fig. A and tighten to the following torque:



Torque 26 N*m

Tighten:

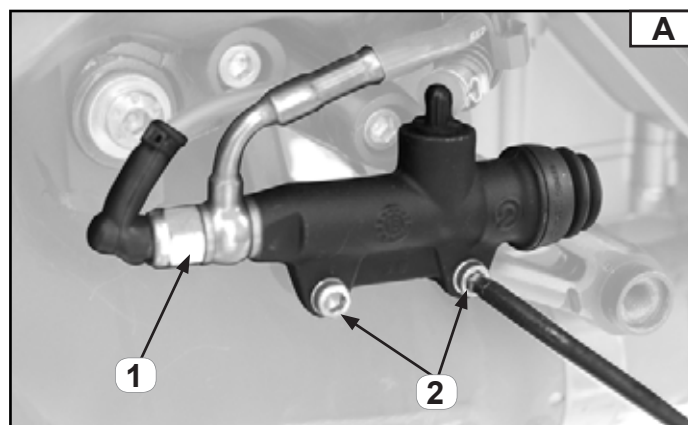
- The screws (2) Fig. A to the following torque:



Torque 12 N*m

NOTICE

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

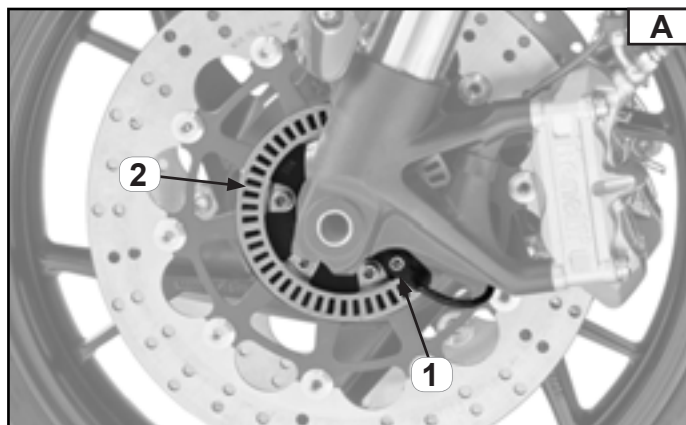




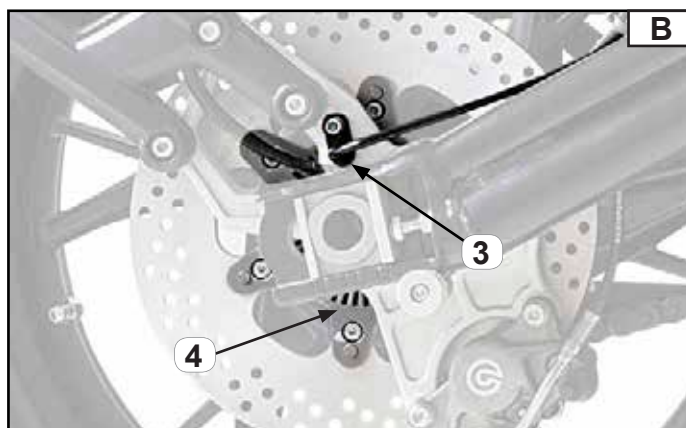
ABS ANTI-LOCK BRAKING SYSTEM POSITION OF THE COMPONENTS

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

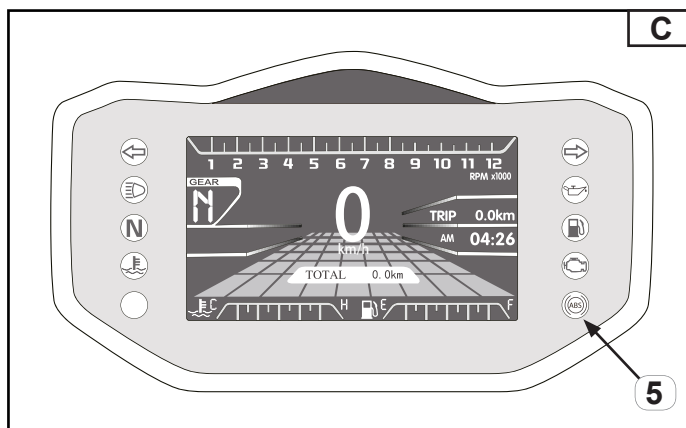
- The signal wheel sensor (1) of the front wheel Fig. A.
- The signal wheel (2) of the front wheel Fig. A.



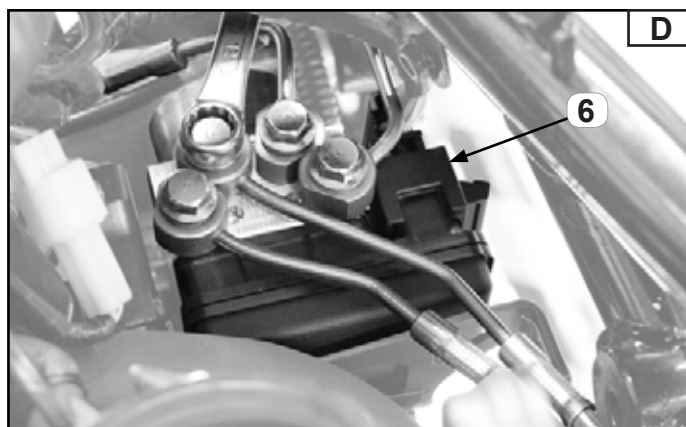
- The signal wheel sensor (3) of the rear wheel Fig. B.
- The signal wheel (4) of the rear wheel Fig. B.



- The ABS yellow light (5) Fig. C.



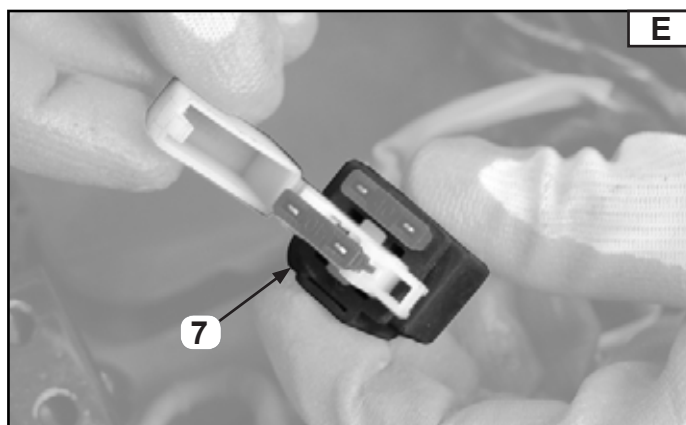
- The ABS hydraulic unit (6) Fig. D.



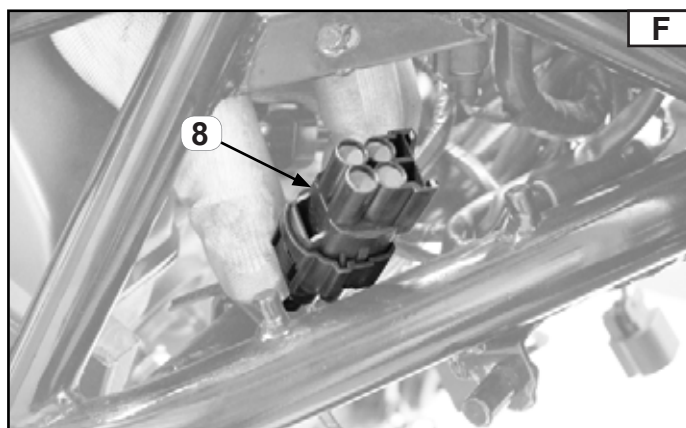


ABS ANTI-LOCK BRAKING SYSTEM POSITION OF THE COMPONENTS

- The ABS fuse box (7) Fig. E.



- The connector of the ABS diagnostic system (8) Fig. F.





ABS ANTI-LOCK BRAKING SYSTEM ROTATION SENSOR CHECK

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, as it is a precision instrument. 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 signal wheel sensor (2) of the front wheel Fig. A.

Disconnect:

- The connector of the signal wheel.

Carry out a visual check of the rotation sensor of the signal 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 signal wheel sensor (4) of the rear wheel Fig. B.

Disconnect:

- The connector of the signal wheel.

Carry out a visual check of the rotation sensor of the signal 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 signal wheel.

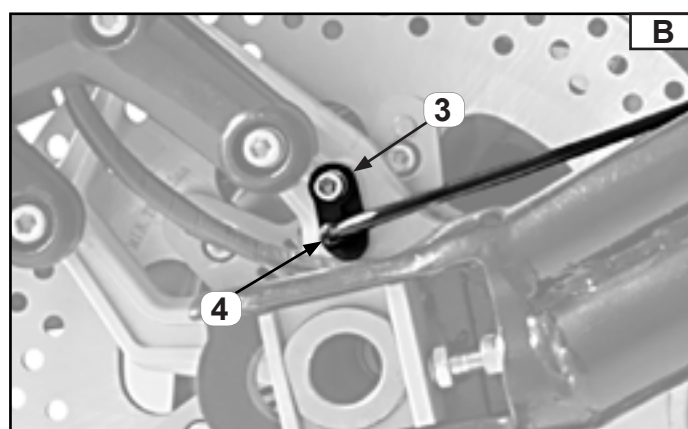
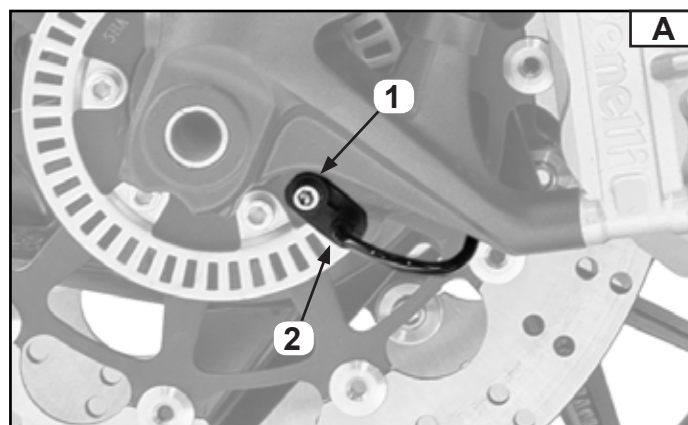


Air gap	
Front	Rear
1 - 1.5 mm	1.0 - 1.5 mm

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 section “**Removal/Installation of the front/rear wheel, Chapter 4**”), the sensor, the signal wheel and the assembly conditions of the sensor.



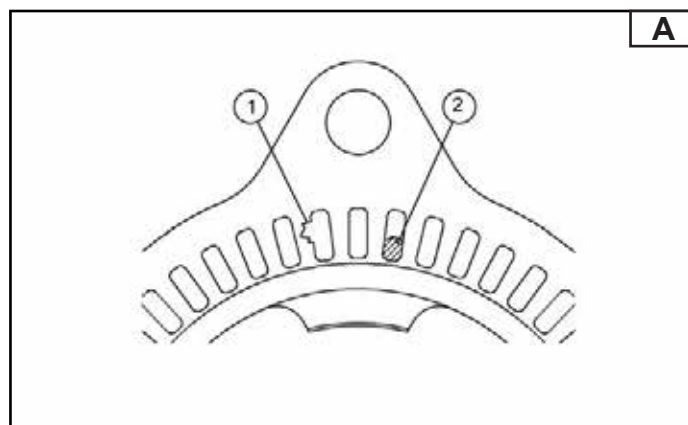


ABS ANTI-LOCK BRAKING SYSTEM

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

Check:

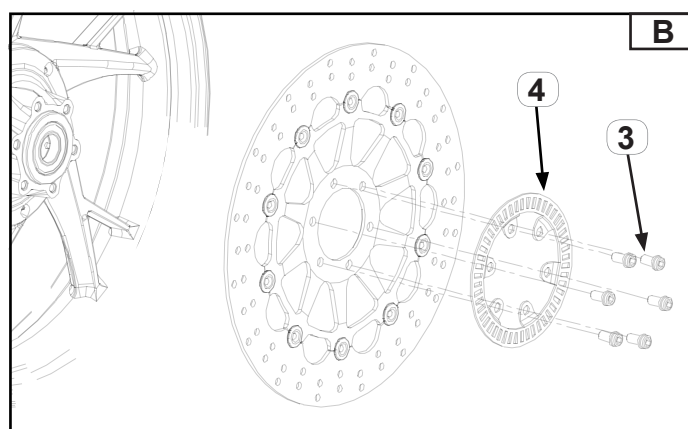
- Carry out a visual check of the signal wheel of the wheel.
- Substitute the signal wheel if it is deformed or damaged, such as damaged teeth (1), Fig. A. Remove any deposits of metal or other magnetic material (2) Fig. A.
- If necessary, replace the signal wheel.



SUBSTITUTION OF THE SIGNAL WHEEL, ABS OF THE FRONT AND REAR WHEEL

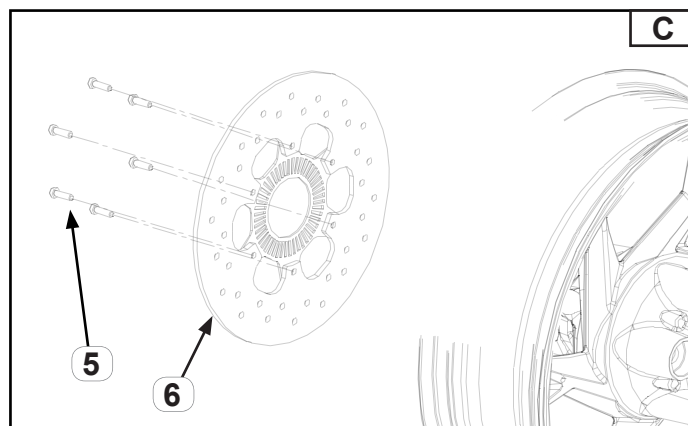
Remove:

- The front wheel, refer to the section “**Removal of the front wheel, Chapter 4**”.
- The screws (3) Fig. B.
- The signal wheel (4) Fig. B.



Remove:

- The rear wheel, refer to the section “**Removal of the rear wheel, Chapter 4**”.
- The screws (5) Fig. C.
- The signal wheel integrated in the brake disc (6) Fig. C.





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 Earth 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 fault 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.

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.

NOTICE

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

NOTICE

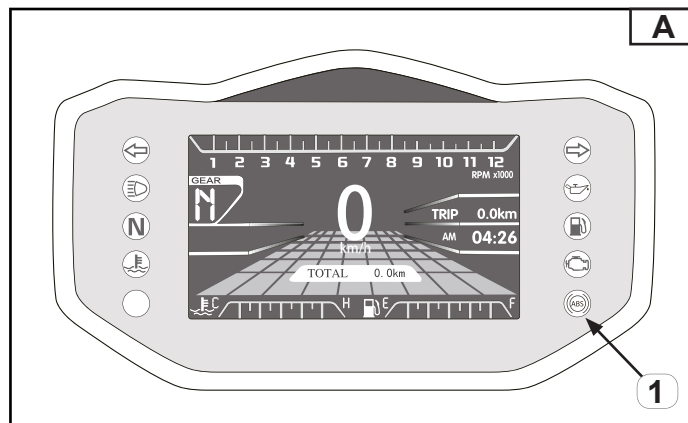
The use of tires that are not recommended could cause malfunctioning of the ABS system and cause an increase in the braking distance thereby causing a serious accident with severe injuries and even death. Always use the recommended standard tires for this motorcycle.



ABS ANTI-LOCK BRAKING SYSTEM PRECAUTIONS

NOTICE

The ABS light (LED) (1) Fig. A goes on when starting to check the system and turns off if the check outcome is positive. Even during braking in ABS, the light remains off. If the ABS light remains on and goes on again whilst travelling, it means that the ABS is faulty: it is necessary to carry out an inspection to identify the fault code and reset the correct operation as the wheels may block in case of sudden braking.





ABS ANTI-LOCK BRAKING SYSTEM

REMOVAL OF THE ABS HYDRAULIC UNIT

NOTICE

The ABS hydraulic unit (1) Fig. A 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:

- The seat, refer to the section “Removal of the seat, Chapter 4”.
- The tank, refer to the section “Removal of the fuel tank, Chapter 4”.

Drain:

- The brake fluid from the front and rear brake circuit utilising the bleed valve and pumping the brake lever and the brake pedal.

NOTE:

Do not forget to place a cloth underneath the ABS hydraulic unit.

Remove:

- The nuts of the rigid tubing (2) Fig. A.
- The screws (3) Fig. B.

- The screw (4) Fig. C.

Disconnect:

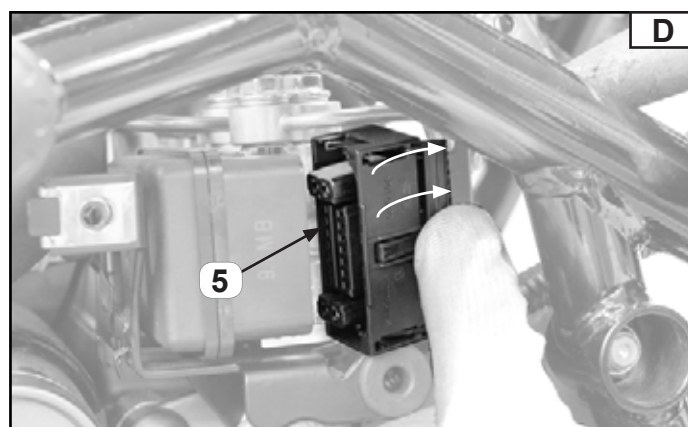
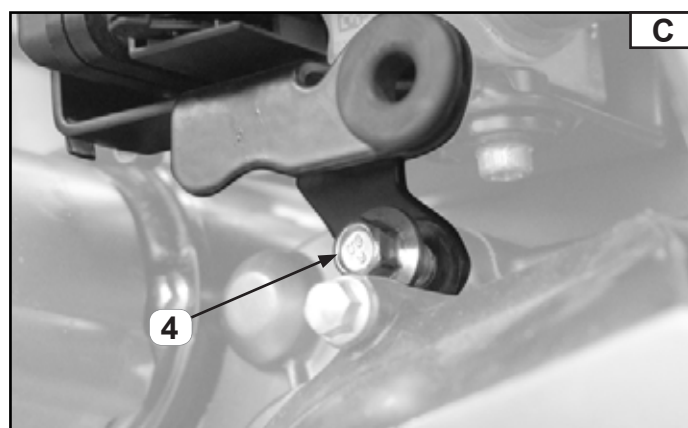
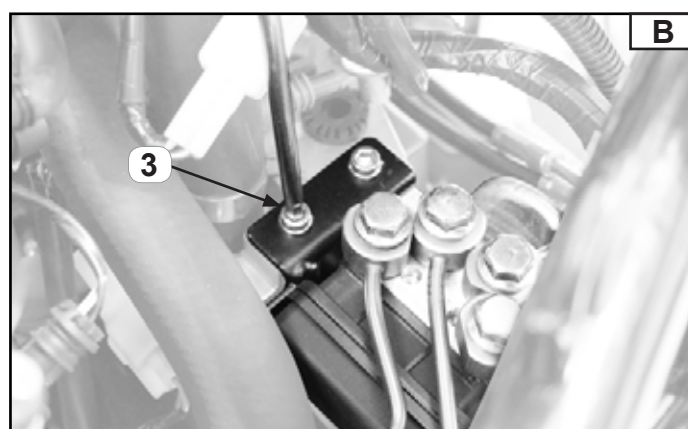
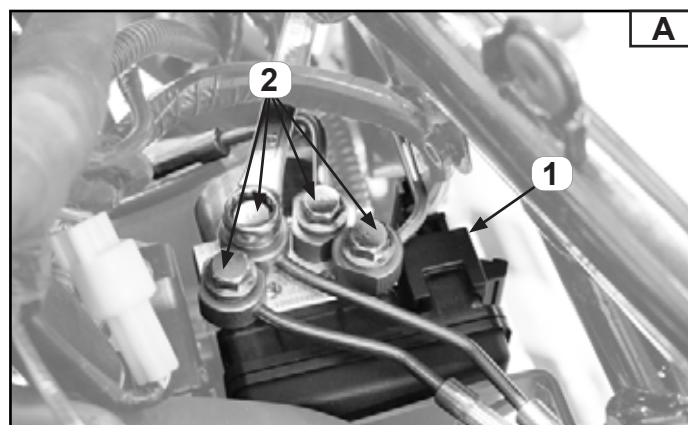
- The connector of the ABS hydraulic unit (5) Fig. D by rotating the lever as indicated in the figure.

Remove:

- The ABS hydraulic unit.

NOTE:

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





ABS ANTI-LOCK BRAKING SYSTEM

REMOVAL OF 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. E.

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 with water the concerned zones immediately.

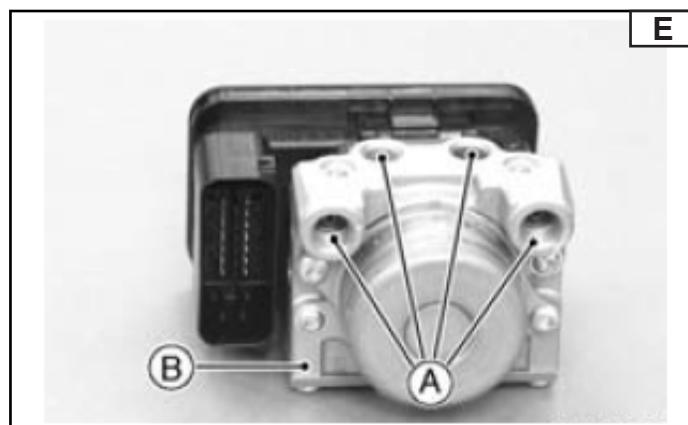
NOTICE

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

Installation:

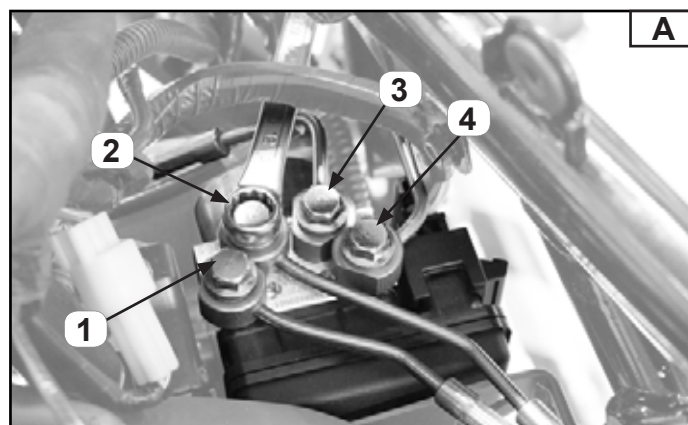
Proceed using the opposite order to removal.

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

Position the ABS hydraulic unit on the frame.

Install:

- The rigid tubes of the brakes onto the ABS hydraulic unit and manually screw in the flare nuts without tightening.
- The front brake caliper tube (1) Fig. A.
- The front brake pump hose (2) Fig. A.
- The rear brake caliper tube (3) Fig. A.
- The rear brake pump tube (4) Fig. A.



Tighten:

- The union nuts of the rigid tubing Fig. A to the following torque:



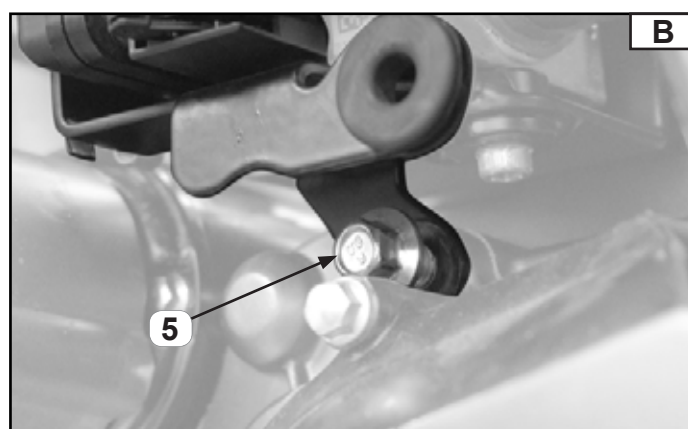
Torque 26 N*m

Tighten:

- The screw (5) Fig. B to the following torque:



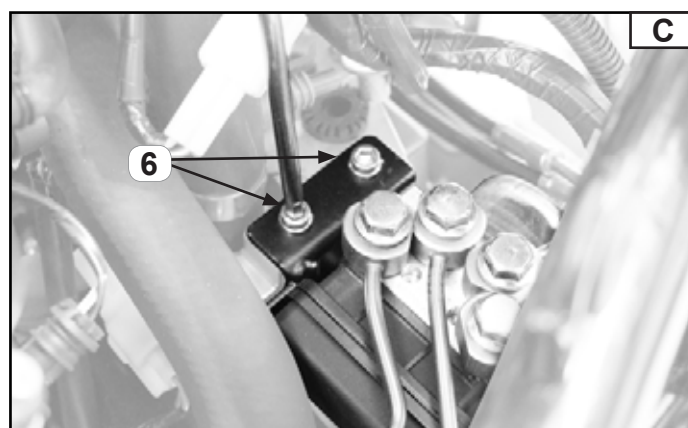
Torque 12 N*m



- The fastening screws (6) Fig. C to the following torque:



Torque 12 N*m





ABS ANTI-LOCK BRAKING SYSTEM

REMOVAL OF THE ABS ROTATION SENSORS OF THE FRONT AND REAR WHEELS

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, as it is a precision instrument. Do not soak the wheel rotation sensor in water or mud. Do not attempt to repair or disassemble the wheel rotation sensor.

Remove:

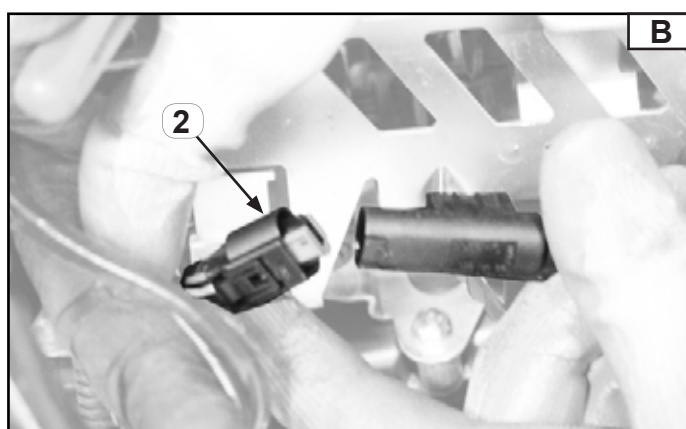
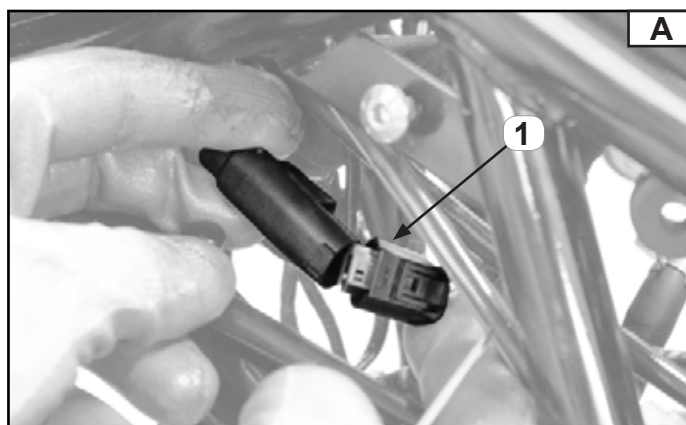
- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- Front wheel rotation sensor, refer to the section “**Check of the rotation sensor, Chapter 4**”.
- The rear wheel rotation sensor, refer to the section “**Check of the rotation sensor, Chapter 4**”.

Disconnect:

- The connector of the front wheel rotation sensor (1) Fig. A.
- The connector of the rear wheel rotation sensor (2) Fig. B.

Installation:

Proceed using the opposite order to removal.
Replace the cable correctly.





FRONT AND REAR BRAKES

REMOVAL OF FRONT BRAKE CALIPER

The following procedure is applied to both brake callipers.

NOTE:

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

Remove:

- The special screw (1) Fig. A.
- The special screw (2) Fig. A.
- The sealing washers (3) Fig. A.
- The front brake tube (4) Fig. A.
- The screws (5) Fig. B.
- Remove both calipers (6) Fig. B.

NOTE:

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

NOTICE

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

Remove:

- The pistons (7) Fig. C.
- The gaskets (8) Fig. C (first the oil seals – the smallest seals, then the O-rings – the largest seals).

Blow:

- Compressed air into the attachment of the flexible brake tube to force the pistons.

NOTICE

Never try to prise out the caliper pistons.

NOTE:

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

Check:

The ring gasket of the damaged brake caliper.

The ring gaskets (piston gasket) (8) Fig. C that are found inside the piston to maintain the play between the pad and the disc.

If the gasket 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.

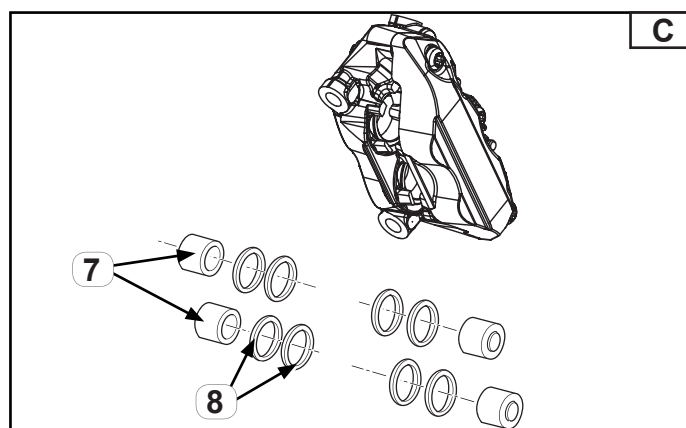
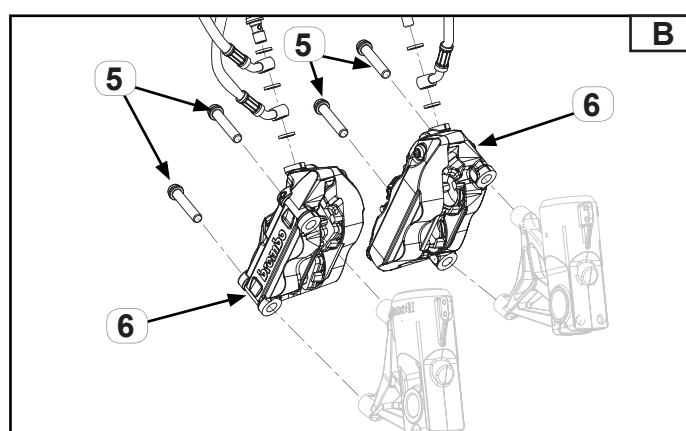
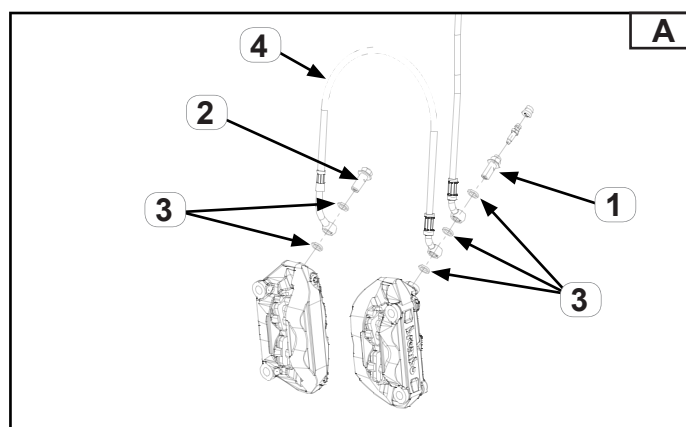
Replace:

- The gaskets (8) Fig. C.

Substitute the gasket 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 gasket and piston are stuck to each other.

Substitute all the gaskets when substituting the brake pads.





FRONT AND REAR BRAKES

REMOVAL OF THE REAR BRAKE CALIPER

NOTE:

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

Remove:

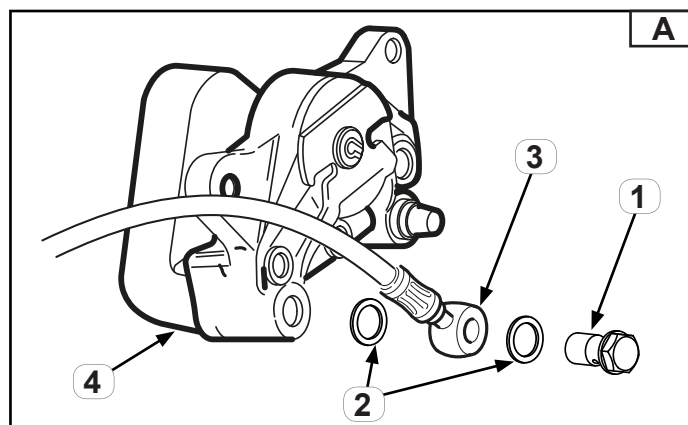
- The special screw (1) Fig. A.
- The sealing washers (2) Fig. C. A.
- The rear brake tube (3) Fig. A.

Detach:

- The brake caliper (4) Fig. A.

NOTE:

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

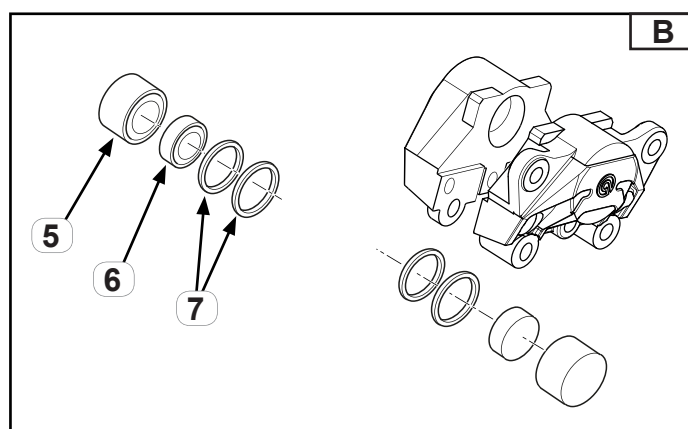


Slide out:

- The pistons (5) of the brake caliper Fig. B.
- The insulation (6) Fig. B.
- The gaskets (7) (first the oil seals – the smallest seals, then the O-rings – the largest seals) Fig. B.

Blow:

- Compressed air into the attachment of the flexible brake tube to force the pistons.



NOTICE

Cover the brake caliper pistons with a rag.
Use caution when the pistons are ejected from the brake caliper to prevent injury.

NOTICE

Never try to prise out the caliper pistons.

Remove:

- The piston gaskets out of the brake caliper.

NOTICE

Every time the brake caliper is removed, replace the piston gaskets.



FRONT AND REAR BRAKES

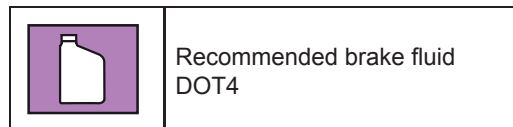
INSTALLATION OF THE FRONT BRAKE CALIPER

NOTE:

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

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 the internal parts of the brake, as the piston gaskets would tend to swell and warp. Every time the brake caliper is removed, replace the piston gaskets.



Install:

- The largest gaskets of the pistons (1) Fig. A.
- The smallest gaskets of the pistons (2) Fig. A.
- The pistons on the brake caliper (3) Fig. A.
- The brake caliper (4) Fig. B.

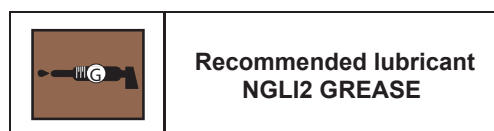
Tighten:

- The screws (5) Fig. B to the following torque:



Torque 50 N*m

Recommended lubricant



Install:

- The brake tube (6) Fig. C.
- The sealing washers (7) Fig. C.

Tighten:

- The special screw (8) Fig. C to the following torque:



Torque 26 N*m

Tighten:

- The special screw (9) Fig. C to the following torque:



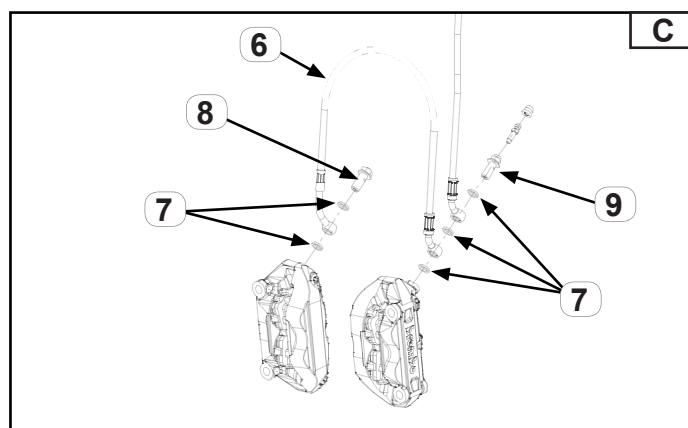
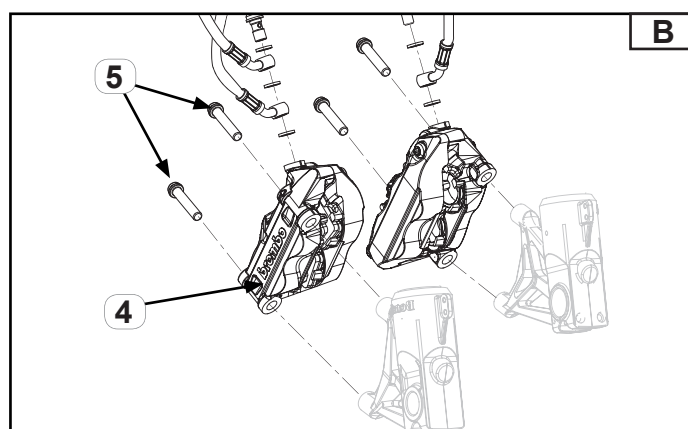
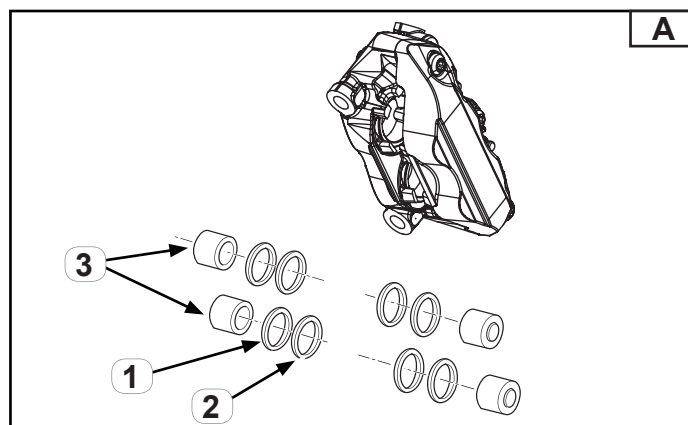
Torque 26 N*m

NOTICE

To guarantee the safety of the bike, it is essential for the path of the flexible brake tube to be correct.

Check:

- The level of the brake fluid and top up, refer to the section "Checking and topping up of the front brake fluid level, Chapter 3".





FRONT AND REAR BRAKES

INSTALLATION OF REAR BRAKE CALIPER

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 the internal parts of the brake, as the piston gaskets would tend to swell and warp. Every time the brake caliper is removed, replace the piston gaskets.



Recommended brake fluid
DOT4

Install:

- The piston gaskets on the brake caliper (1) (first the oil seals - gaskets, larger gaskets then the oil seals - smaller gaskets) Fig. A.
- The insulation (2) Fig. A.
- The brake caliper pistons (3) Fig. A.
- The brake caliper (4) Fig. B.
- The front brake tube (5) Fig. B.
- The copper washers (6) Fig. B.

Tighten:

- The special screw (7) Fig. B to the following torque:



Torque 26 N*m

NOTICE

To guarantee the safety of the bike, it is essential for the path of the flexible brake tube to be correct.

Filling:

- The brake fluid reservoir (1) Fig. C, refer to the section "Checking and topping up the rear brake fluid level, Chapter 3".

NOTICE

Only use the prescribed brake fluid. The use of other types of brake fluid may cause damage to the rubber gaskets, 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 reservoir. Water would considerably reduce the boiling point of the fluid and may lead to the formation of vapour pad.

NOTICE

Brake fluid can damage painted surfaces or plastic parts. Always clean up any brake fluid spills immediately.

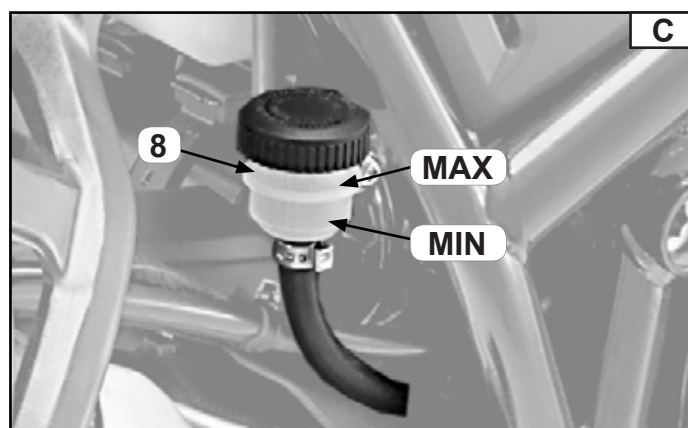
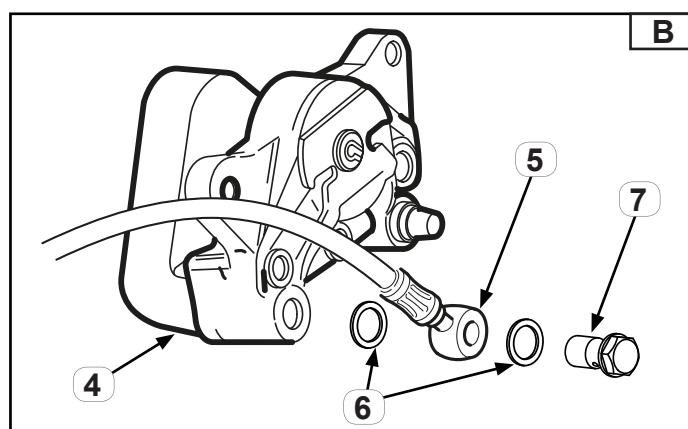
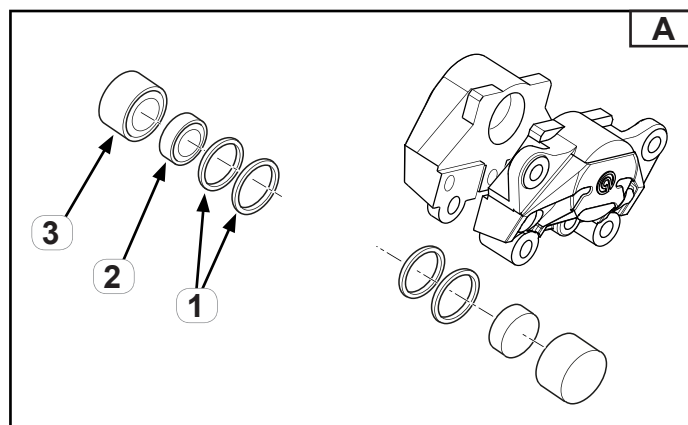
Bleed:

- The braking system, refer to the section "Checking and topping up the rear brake fluid level, Chapter 3".

Check:

- The brake fluid level, Fig. C.

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 the section "Checking and topping up of the rear brake fluid level, Chapter 3".

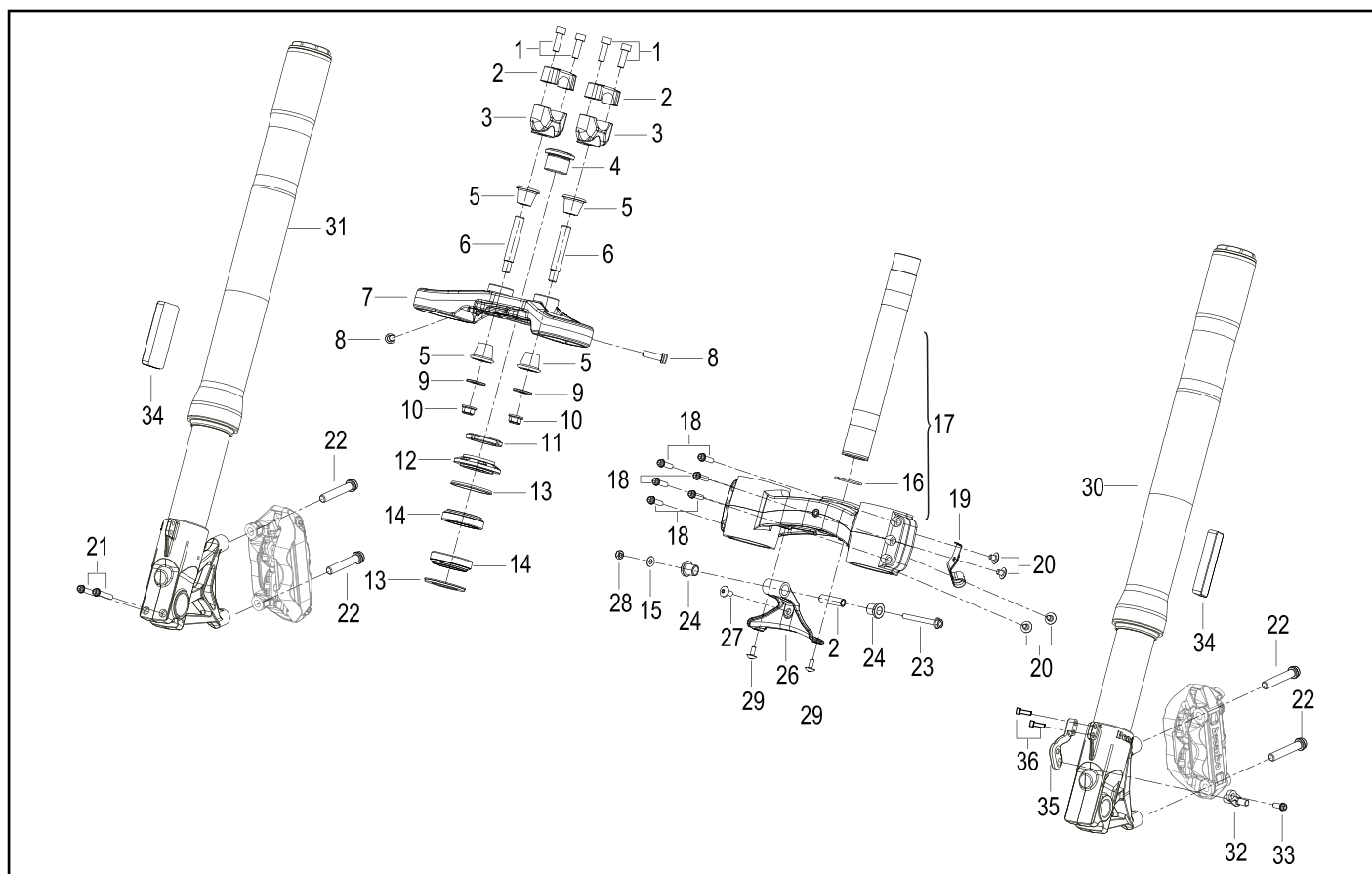
NOTICE

Follow the brake bleeding diagnostic procedure, refer to the section "Brake filling / bleeding diagnostics, Chapter 7", to check the proper filling of the system.



FRONT FORK

REMOVAL OF FRONT FORK STEMS



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SCREW					
2	UPPER BRACKET					
3	LOWER BRACKET					
4	SPECIAL SCREW					
5	BUSH					
6	STUD BOLT					
7	STEERING HEAD					
8	SCREW					
9	WASHER					
10	NUT					
11	STEERING RING NUT PIN					
12	STEERING RING NUT					
13	PROTECTION DUST RING					
14	BEARING					
15	WASHER					
16	CIRCLIP					
17	STEERING HEAD BASE					
18	SCREW					
19	FAIRLEAD					
20	SCREW					
21	SCREW					



FRONT FORK

REMOVAL OF FRONT FORK STEMS

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	SCREW					
23	SCREW					
24	BUSH					
25	SPACER					
26	FRONT HEAD-LIGHT HOLDER					
27	SCREW					
28	NUT					
29	SCREW					
30	L.H. FORK LEG ASSEMBLY					
31	R.H. FORK LEG ASSEMBLY					
32	REAR WHELL SENSOR ABS					
33	SCREW					
34	REFLECTOR					
35	PLATE					
36	SCREW					



FRONT FORK REMOVAL OF FRONT FORK STEMS

Park:

- The motorcycle on a level surface.

NOTE:

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

Remove:

- The front mudguard, refer to the section “**Removal of front mudguard, Chapter 4**”.
- The brake caliper, refer to the section “**Removal of the front brake caliper, Chapter 4**”.
- The front wheel, refer to the section “**Removal of the front wheel, Chapter 4**”.

Loosen:

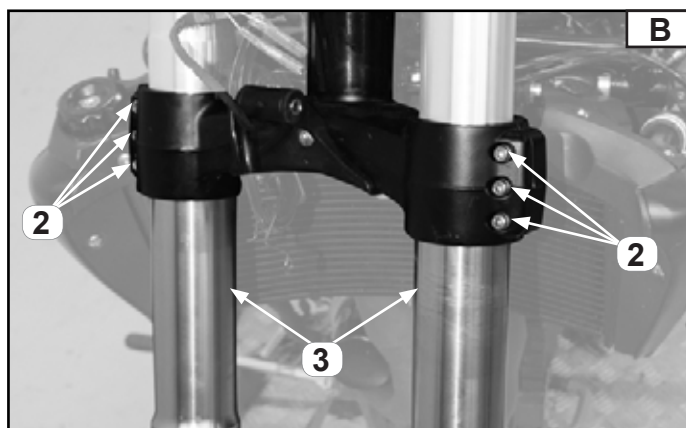
- The screws (1) Fig. A on both sides of the vehicle.
- The screws (2) Fig. B.

NOTICE

Before loosening the setscrews on the top and bottom brackets, install a support for the front fork stem.

Slide out:

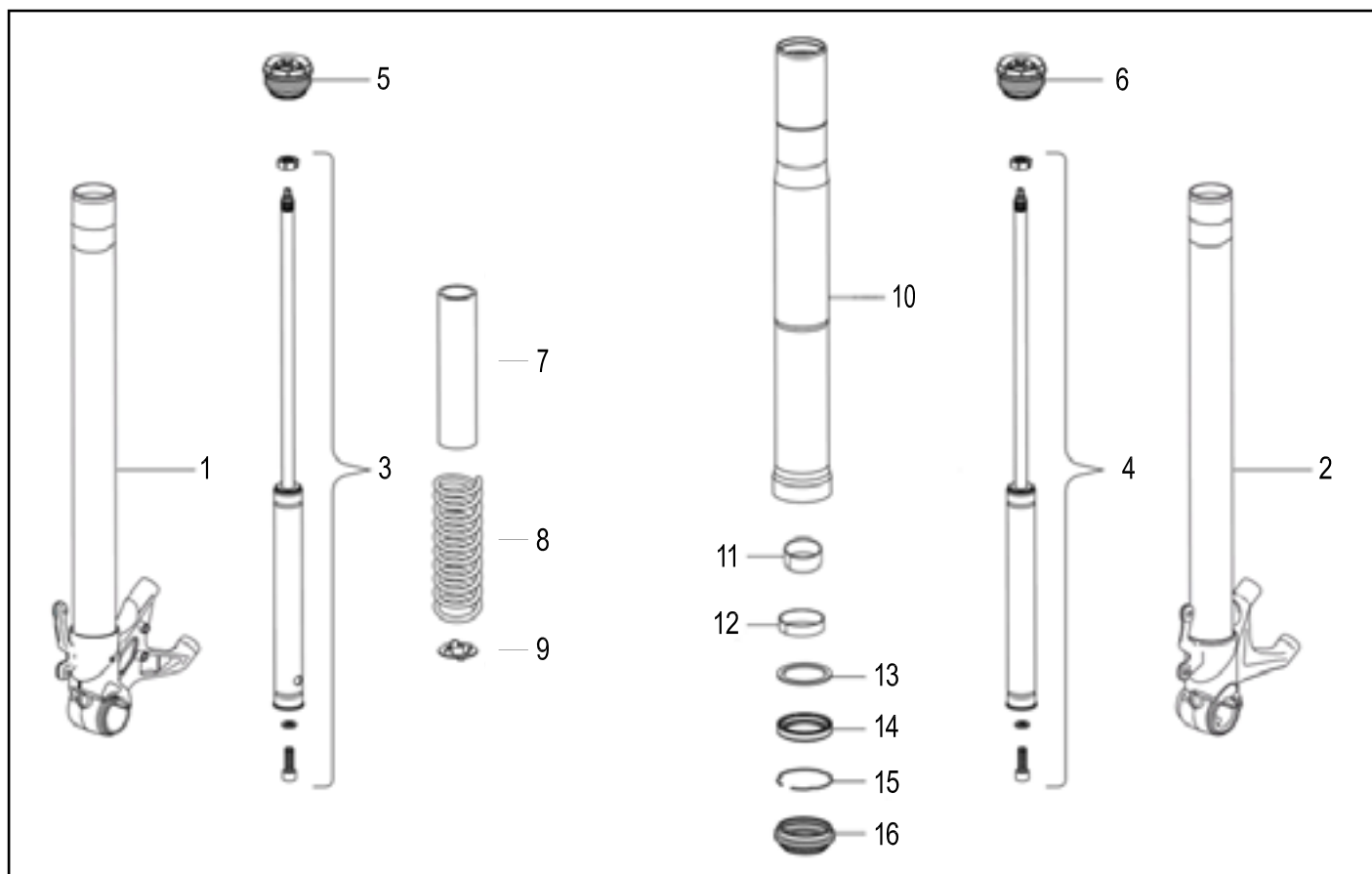
- The front fork stems (3) Fig. B.





FRONT FORK

DISASSEMBLY OF THE FRONT FORK STEMS



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	FORK STEM					
2	FORK STEM					
3	DAMPER ROD UNIT					
4	DAMPER ROD UNIT					
5	CAP/FORK SLEEVE REGISTER UNIT					
6	CAP/FORK SLEEVE REGISTER UNIT					
7	SPACER					
8	SPRING					
9	SPRING SEAT WASHER					
10	FORK SLEEVE					
11	GUIDE BUSHING					
12	GUIDE BUSHING					
13	SPACER					
14	OIL SEAL					
15	SNAP RING					
16	PROTECTION DUST RING					



FRONT FORK

DISASSEMBLY OF THE FRONT FORK STEMS

Disassemble the pieces in the order listed.

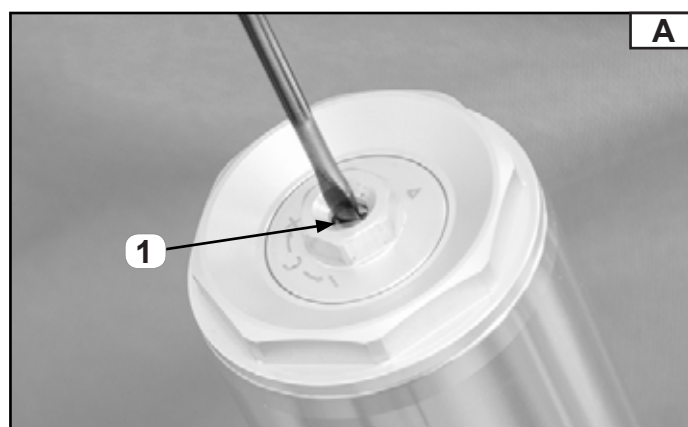
NOTE:
The following procedure is applied to both front fork stems.

Place:

- The fork on the work surface.

Close:

- The hydraulic register (1) Fig. A.

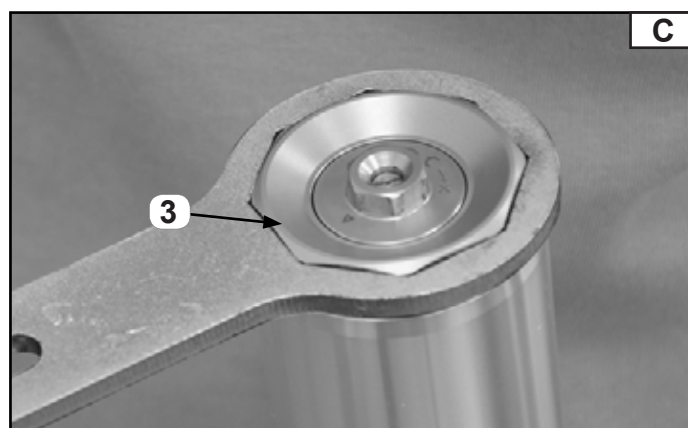


Screw off:

- The preload spring (2) using a 14 mm wrench Fig. B.



- The protective cap (3) using a 49 mm octagonal wrench Fig. C.



Block:

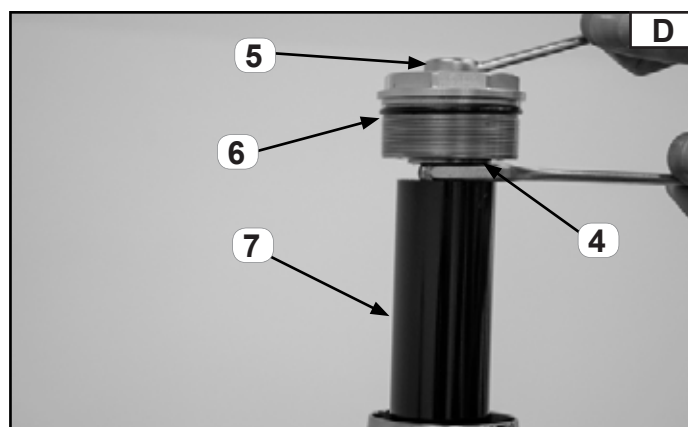
- The locknut (4) using a 19 mm wrench Fig. D.

Screw off:

- The preload spring register (5) from the stem pump unit using a 14 mm wrench Fig. D.

Remove:

- The protective cap group (6) Fig. D.
- The PVC shim (7) Fig. D.



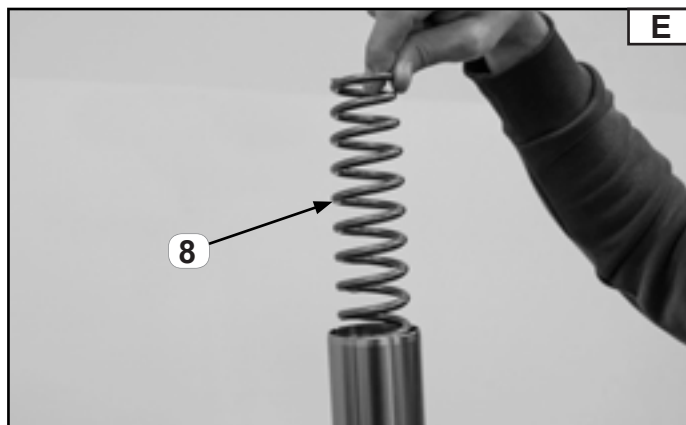


FRONT FORK

DISASSEMBLY OF THE FRONT FORK STEMS

Remove:

- The spring (8) Fig. E.

**Open:**

- The register screw (9) of two turns Fig. F.

Rotate:

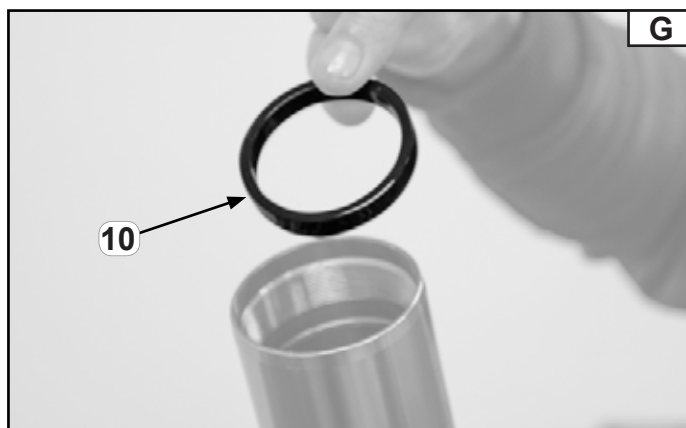
- The stem towards a suitably sized container so as to allow the oil that it contains to flow out Fig. F.

NOTE:

To help drain the rod, it is necessary to pump a few times by pushing the pump rod forwards and backwards.

**Remove:**

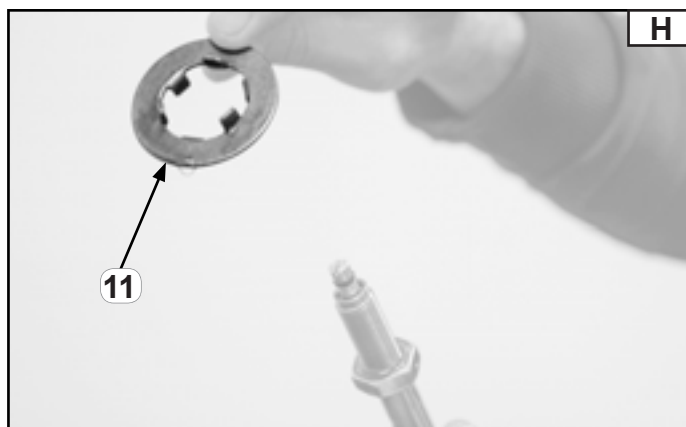
- The "bump rubber" ring (10) present in the sleeve Fig. G.



- The "spring seat" washer (11) Fig. H.

NOTICE

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





FRONT FORK

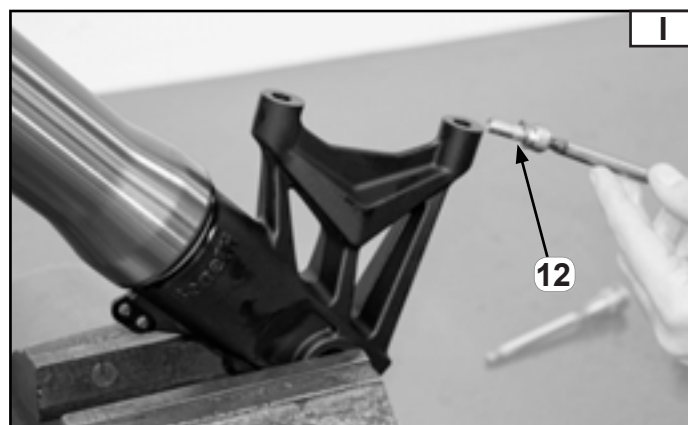
DISASSEMBLY OF THE FRONT FORK STEMS

Block:

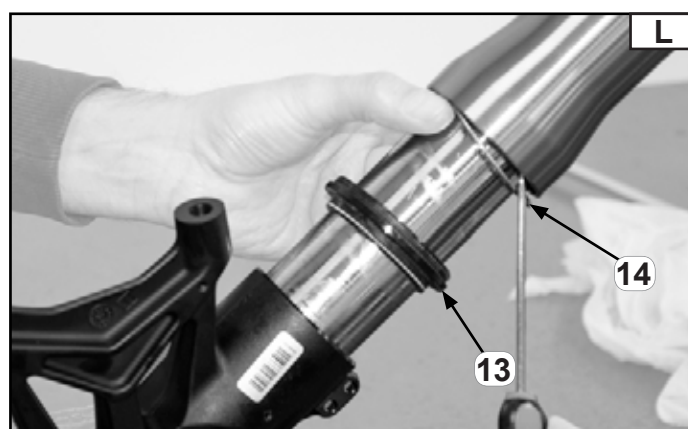
- The fork foot in a vice.

Remove:

- The screw (14) with the relevant washer Fig. I.
- The cartridge.



- The protection dust ring (13) from the seat using a small flat-blade screwdriver Fig. L.
- The snap ring of the oil seal (14) using the same screwdriver Fig. L.

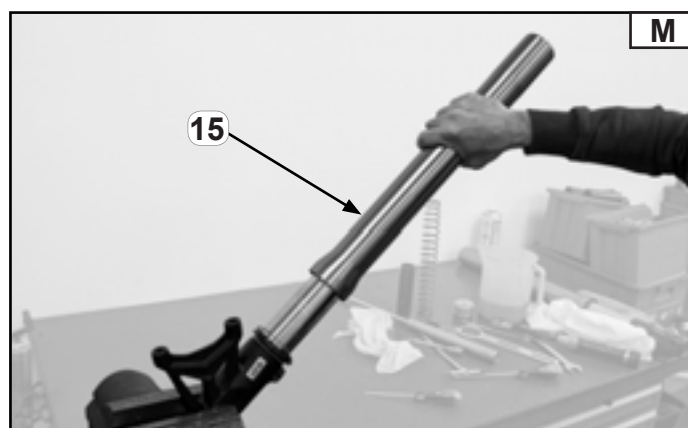


Remove:

- The fork sleeve (15) Fig. M.

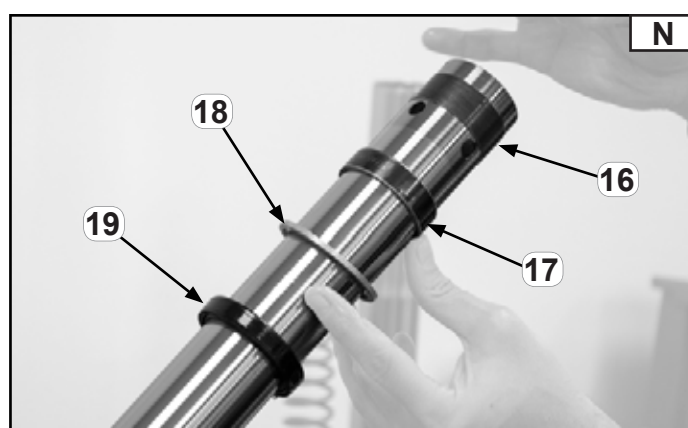
NOTE:

During the sleeve rising sliding it is necessary to apply an adequate force.



Manually remove:

- The small guide bush (16) Fig. N.
- The large guide bush (17) Fig. N.
- The aluminium spacer ring (18) Fig. N.
- The oil seal (19) Fig. N.



FRONT FORK

INSPECTION OF THE FRONT FORK STEMS

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

- Check:**
- The fork stem (1) Fig. A.
 - The fork sleeve (2) Fig. A.
- 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 (3) of the spring (4) Fig. B.
- If outside specifications, replace.



Detail	Full length of the spring.
Spring	300 ± 0.5 mm

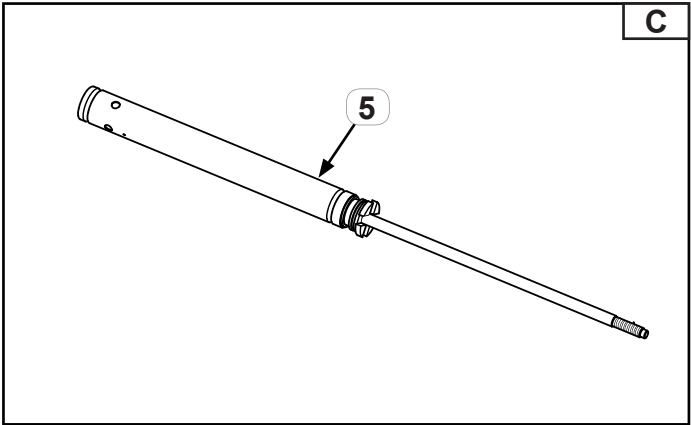
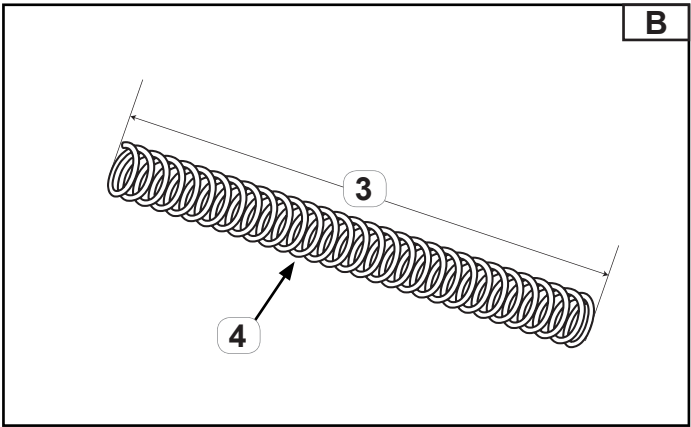
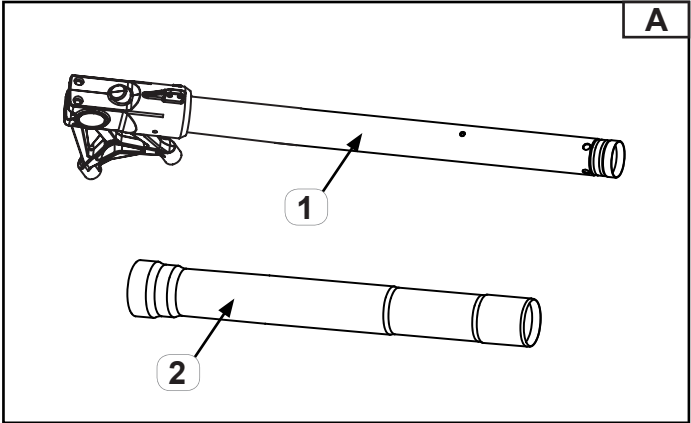
- Check:**
- The damper rod (5) Fig. C.
- If there is any damage or wear, replace.
- If there are any obstructions, free all oil passages with compressed air.

NOTICE

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

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

- Check:**
- The cap O-Ring.
- If there is any damage or wear, replace.





FRONT FORK

ASSEMBLY OF THE FRONT FORK STEMS

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

NOTICE

The oil and dust seals must not be reused after removal. Before reassembling, 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 bushes as this must be integral.

Place:

- Some nylon to protect the sharpened edges of the fork tube Fig. A.

Lubricate:

- The external surface of the nylon with suspension oil.

Insert on the fork tube Fig. B:

- The oil seal (1)
- The aluminium spacer (2).
- The large guide bush (3).

NOTICE

Pay attention to the aluminium spacer direction (2) Fig. B as it needs to be inserted with the step facing the fork foot.

Remove:

- The protective nylon from the fork tube end.

Insert:

- The small guide bush (4) Fig. B.

Check:

- The sleeve set is clean.

Insert:

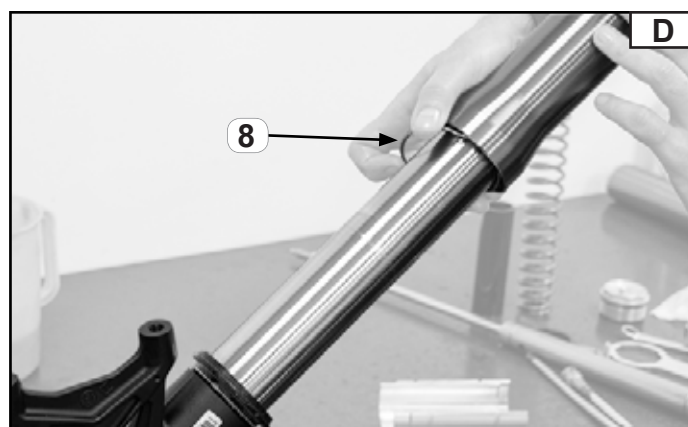
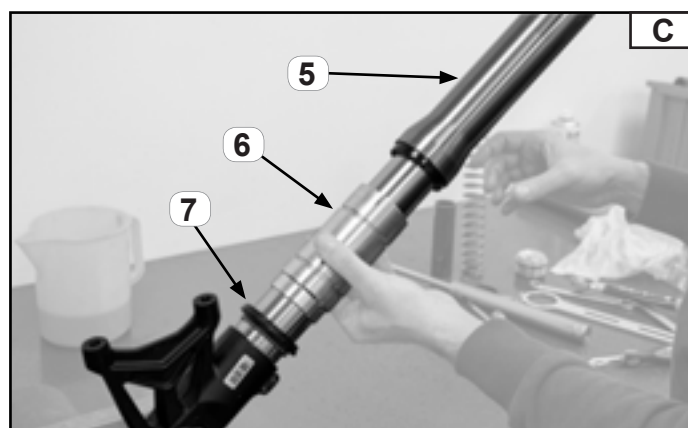
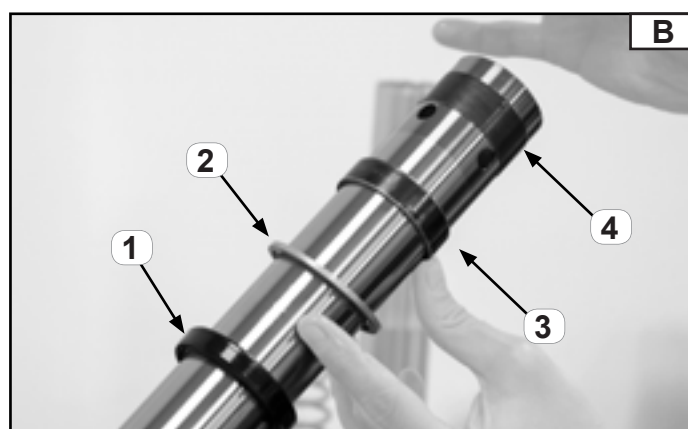
- The fork tube (5) Fig. C.
- The oil seal (7) using the apposite tool (6) Fig. C.



Tool for oil seal insertion

Insert:

- The snap ring of the oil seal (8) Fig. D.

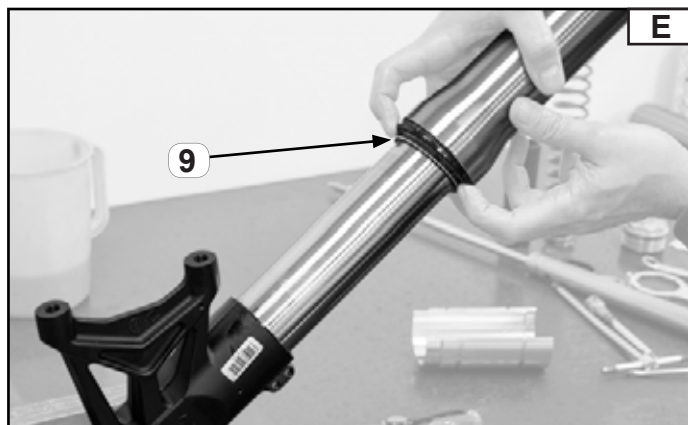




FRONT FORK ASSEMBLY OF THE FRONT FORK STEMS

Insert:

- The oil seal (9) into the fork sleeve Fig. E.

**Install:**

- The cartridge.

Tighten:

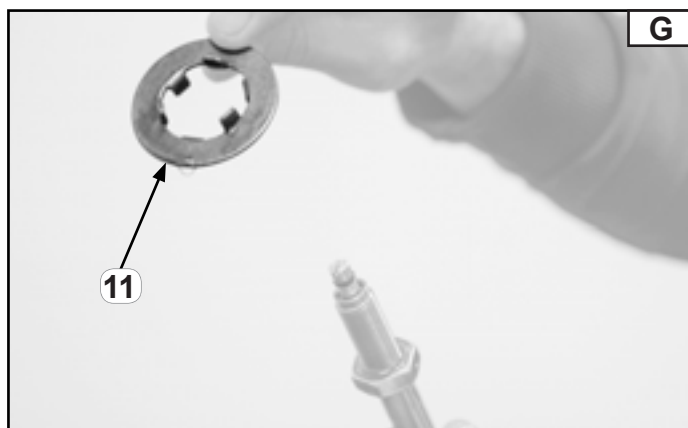
- The fixing screw (10) Fig. F with the new washer to the following torque:



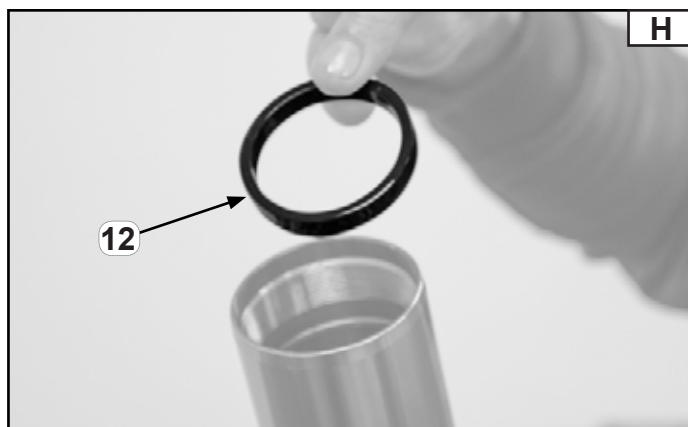
Torque 25 N*m

**Install:**

- The "spring seat" washer (11) Fig. G.



- The "bump rubber" ring (12) present in the sleeve Fig. H.



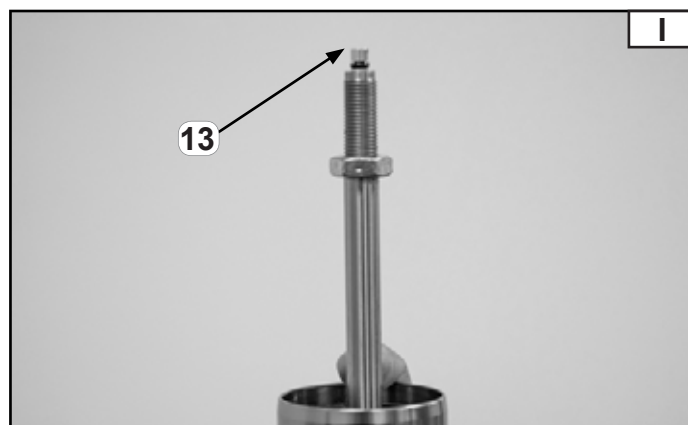


FRONT FORK

ASSEMBLY OF THE FRONT FORK STEMS

Open:

- The register screw (13) of 2-3 turns Fig. I.



Lower:

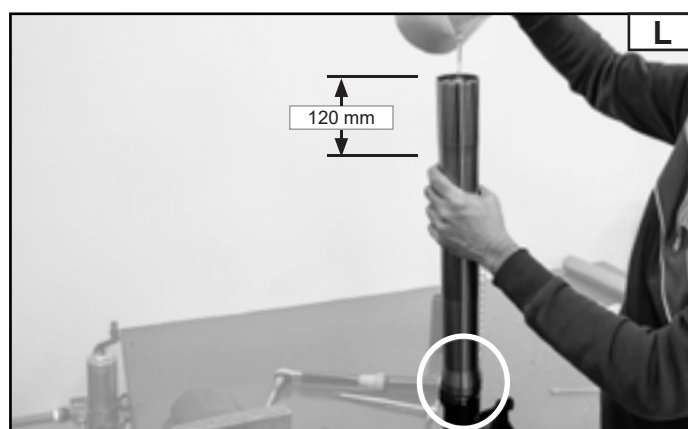
- The fork sleeve over the stem as far as the dust seal stop on the wheel foot Fig. L.

Pour:

- About 720 cc of the indicated oil into the fork sleeve, being sure the pump unit is activated several times to remove air inside Fig. L.

Check:

- The oil level, which must be 120 mm from the sleeve edge.
- Wait a few minutes and check the air volume, then top up, if necessary.

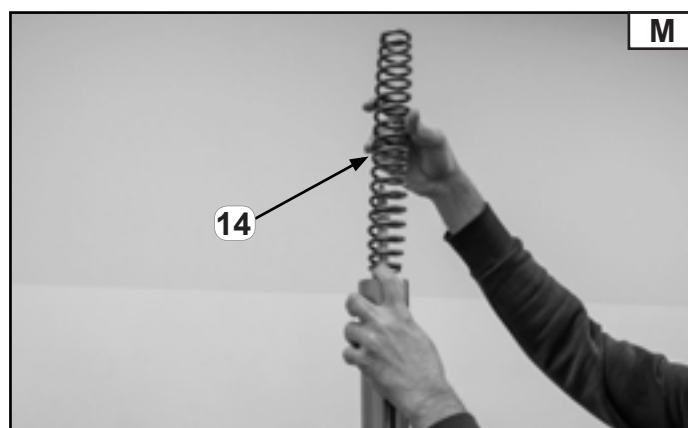


NOTICE

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.

Install:

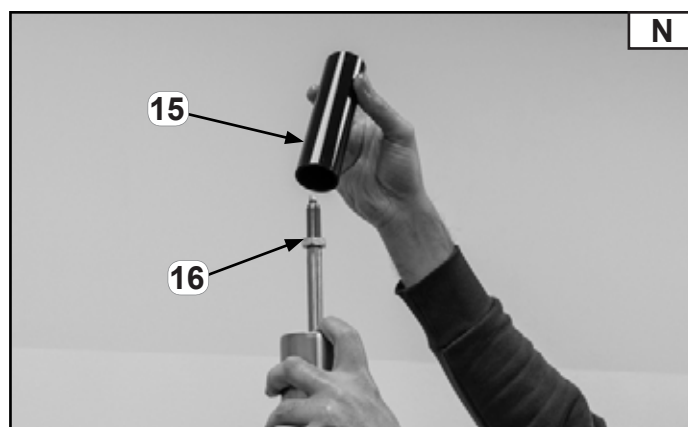
- The spring (14) keeping the pump unit completely extended Fig. M.



- The spacer (15) keeping the pump unit completely extended Fig. N.

Manually screw:

- The fine-threading nut (16) downwards Fig. N.

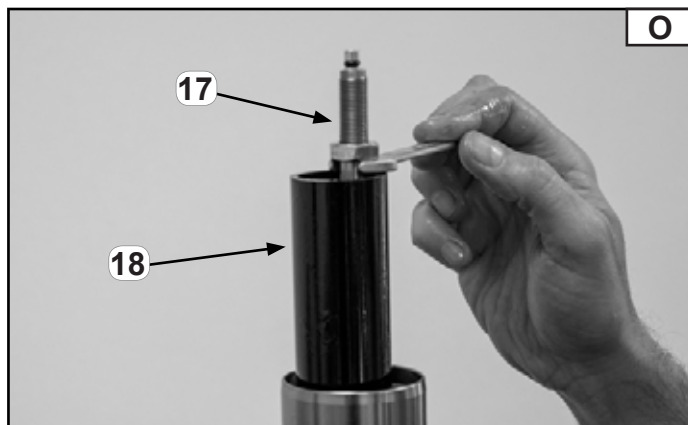




FRONT FORK ASSEMBLY OF THE FRONT FORK STEMS

Block:

- The pump unit stem (17) and the spacer (18) by interposing a 12 mm wrench Fig. O.



Screw in:

- The cap/fork sleeve register unit (19) Fig. P.

Block:

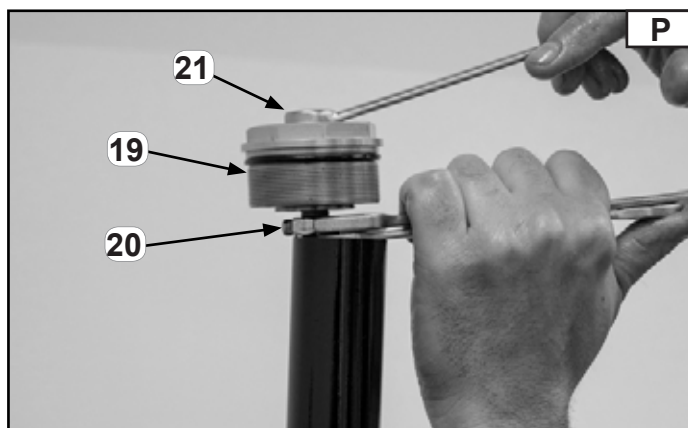
- The 19 mm nut (20) Fig. P.

Tighten:

- The spring preload register (21) Fig. P to the following torque:



Torque 20 N*m



Remove:

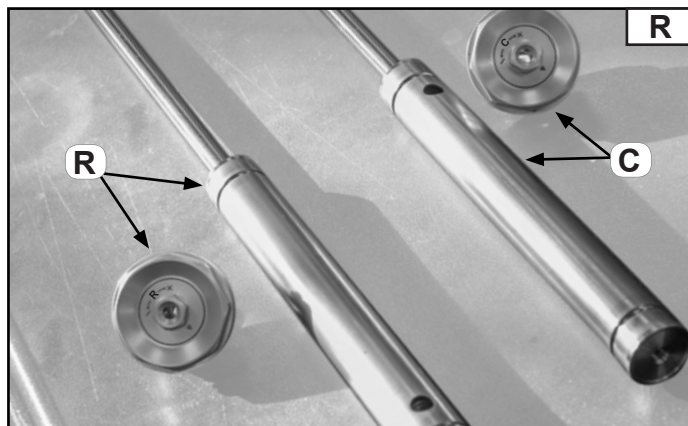
- The 12 mm wrench.

Tighten:

- The cap/fork sleeve register unit (19) Fig. P to the following torque:



Torque 20 N*m



NOTICE

During the installation stage of the cap/fork sleeve register unit, avoid to invert the caps and the cartridges. The correct match for the compression hydraulic adjustment system (C) and the extension hydraulic adjustment system (R) is shown in Fig. R.



FRONT FORK INSTALLATION OF THE FRONT FORK STEMS

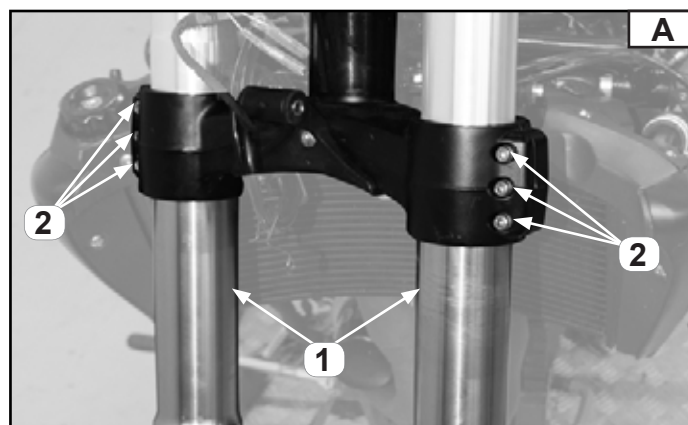
The following procedure is applied to both front fork stems.

Install:

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

Tighten provisionally:

- The setscrews (2) on the bottom steering plate Fig. A.



NOTE:

Check the assembly position (X) Fig. B, which must be identified considering the bottom section of the steering base (3) and the end of the steering rod (excluding the protection dust ring).

Tighten:

- The screws (2) Fig. A of the lower steering plate to the following torque:



Torque 10 N*m

NOTE:

Tighten in three steps.

Tighten:

- The setscrews (4) from the top steering plate (5) Fig. C to the following torque:

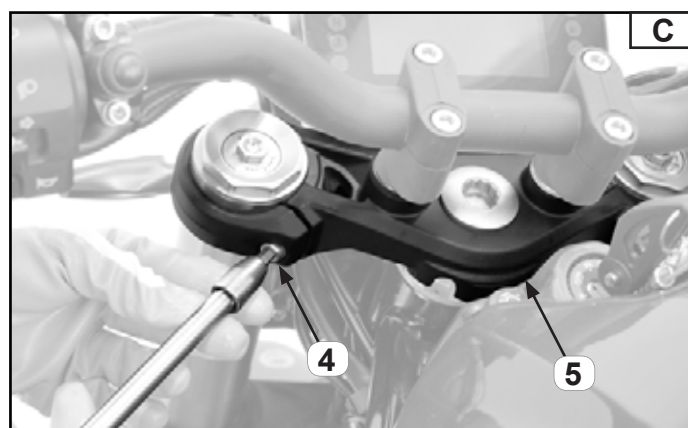
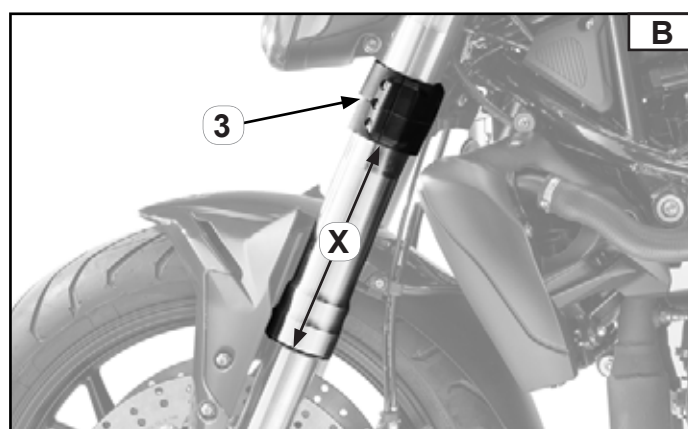


Torque 22 N*m

Use the following medium Loctite thread locker to secure:



MEDIUM THREAD
LOCKER



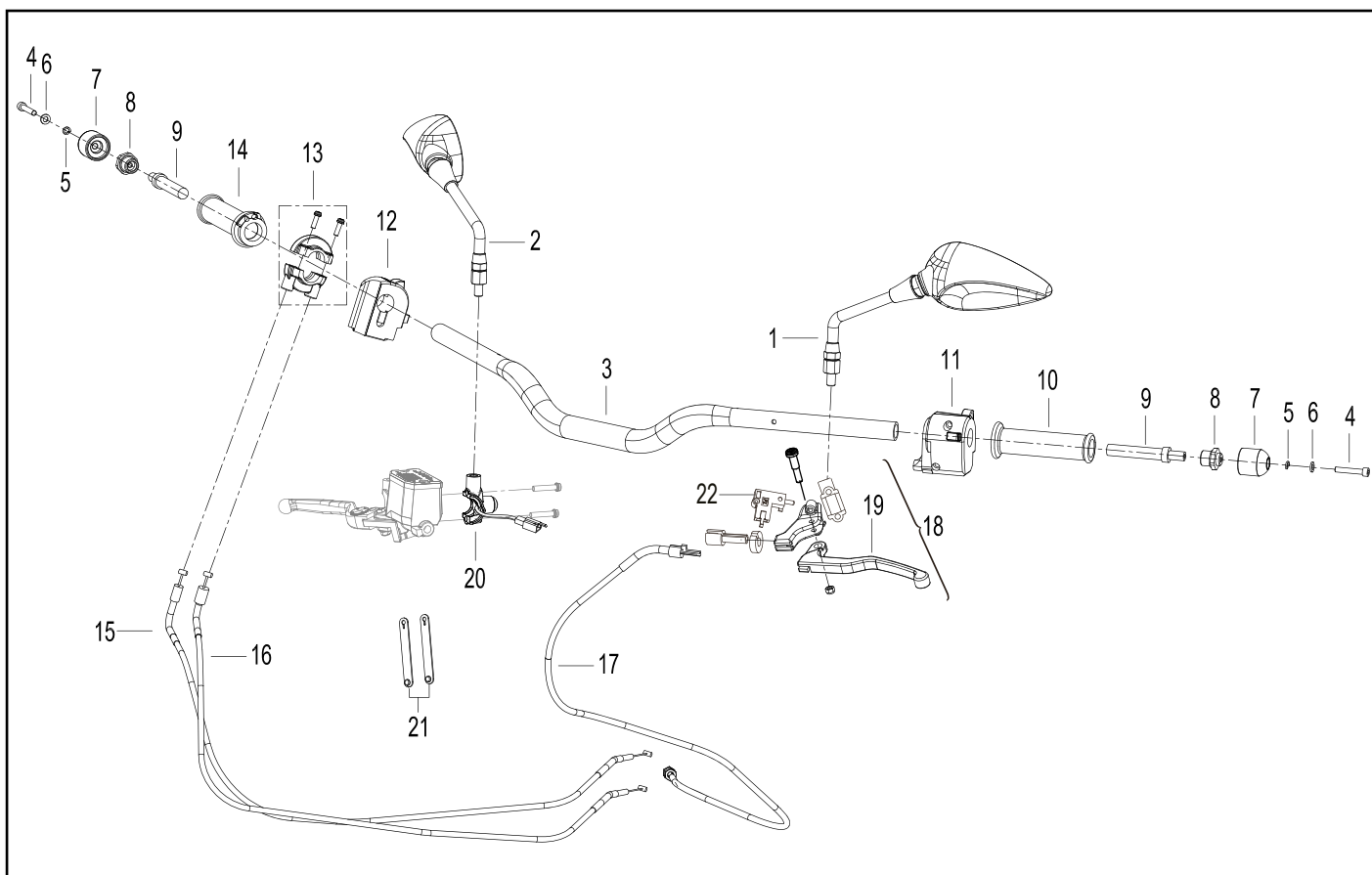
NOTICE

Check that the path of the brake hoses is correct.



HANDLEBAR

REMOVAL OF THE HANDLEBAR



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	L.H. REAR-VIEW MIRROR					
2	R.H. REAR-VIEW MIRROR					
3	HANDLEBAR					
4	SCREW					
5	SPRING WASHER					
6	WASHER					
7	ROCKER					
8	GRIP CAP					
9	HAND GRIP TERMINAL					
10	L.H. HAND GRIP					
11	L.H. LIGHTS SWITCH					
12	R.H. LIGHTS SWITCH					
13	THROTTLE CONTROL					
14	THROTTLE CONTROL PIPE					
15	CABLE OPENING THROTTLE					
16	CABLE CLOSING THROTTLE					
17	CLUTCH CABLE					
18	CLUTCH CONTROL					
19	CLUTCH CONTROL LEVER					
20	ABS SWITCH					
21	RUBBER HOSE CLAMP					
22	CLUTCH SWITCH					



HANDLEBAR REMOVAL OF THE HANDLEBAR

Park:

- The motorcycle on a level surface.

NOTICE

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

NOTE:

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

Remove:

- The L.H./R.H. rear-view mirror (1) Fig. A.
- The screws (2) Fig. A.
- The elastic washer (3) Fig. A.
- The washer (4) Fig. C. A.
- The rocker (5) Fig. A.
- The cap (6) Fig. A.
- The hand grip terminal (7) Fig. A.
- The L.H. grip (8) Fig. A.
- The L.H. switch screws and the L.H. switch (9) Fig. A.
- The clutch control screws (10) Fig. B.
- The clutch control bracket (11) Fig. B.
- The complete clutch control (12) Fig. B.

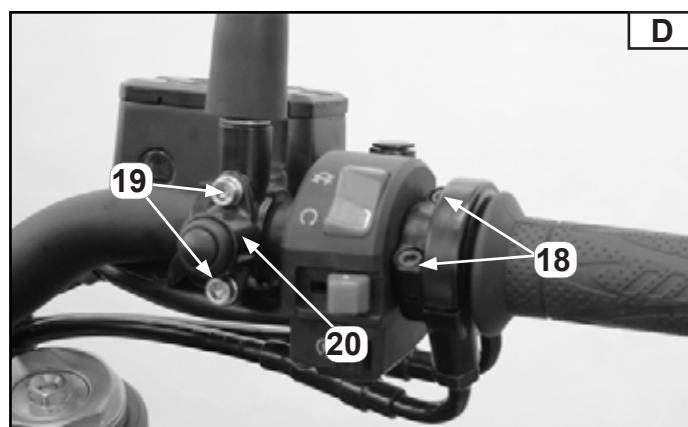
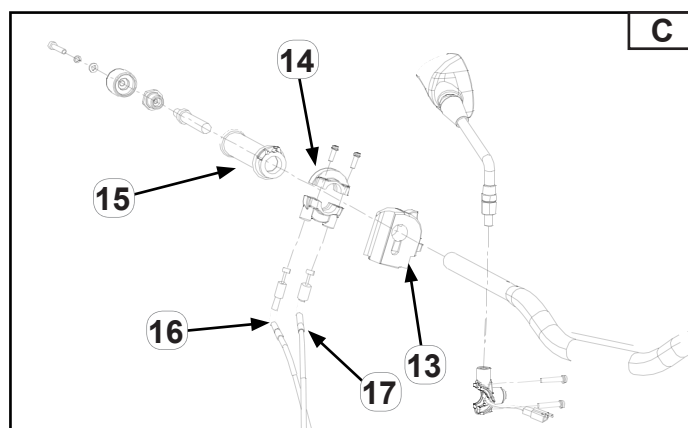
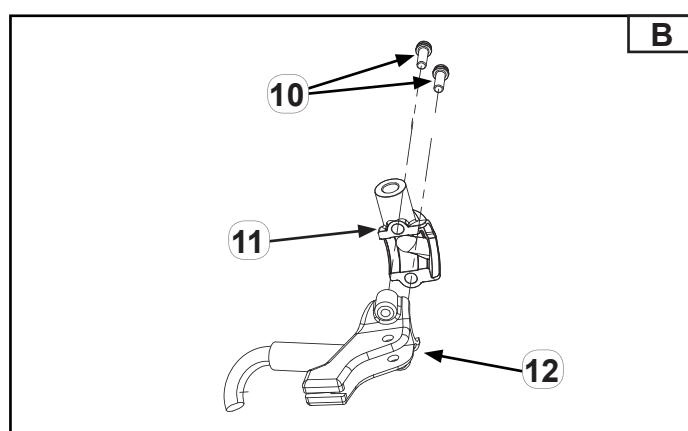
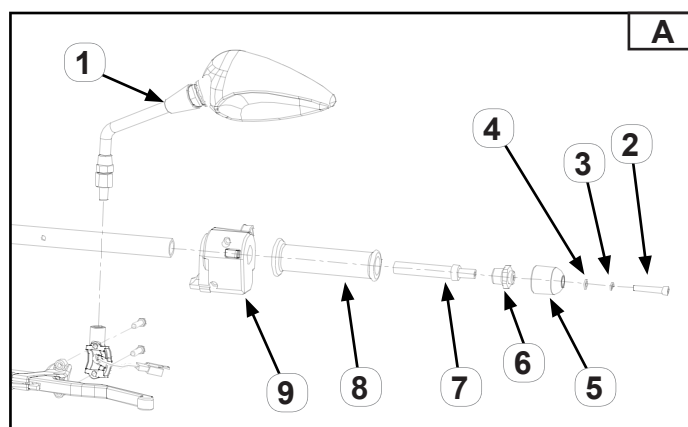
NOTE:

Disconnect the L.H. STOP light switch connector.

Remove:

- The R.H. switch screws and the R.H. switch (13) Fig. C.
- The screws (18) Fig. D throttle control.
- The throttle control (14) Fig. C.
- The throttle hand grip (15) Fig. C.
- The cable opening throttle (16).
- The cable closing throttle (17).

- The screws (19) of the brake pump Fig. D.
- The bracket (20) of the brake pump Fig. D.



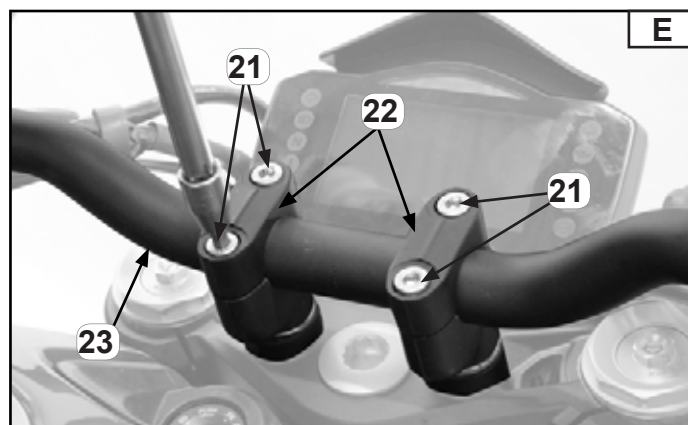


HANDLEBAR

REMOVAL OF THE HANDLEBAR

Remove:

- The screws (21) Fig. E.
- The handlebar brackets (22) Fig. E.
- The handlebar (23) Fig. E.





HANDLEBAR INSPECTION OF THE HANDLEBAR

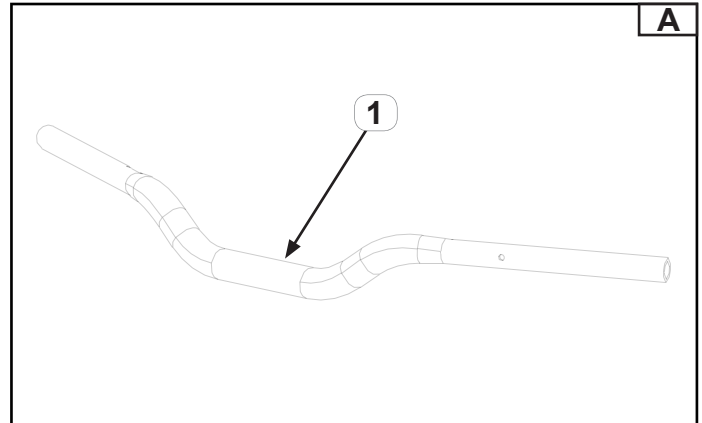
Check:

- The handlebar (1) Fig. A.

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 INSTALLATION OF THE HANDLEBAR

NOTICE

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

Installation:

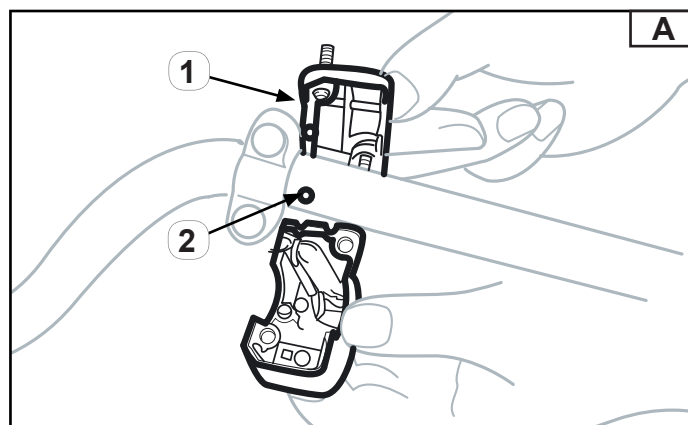
Proceed using the opposite order to removal.

Install:

- The R.H. commutator.

NOTE:

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



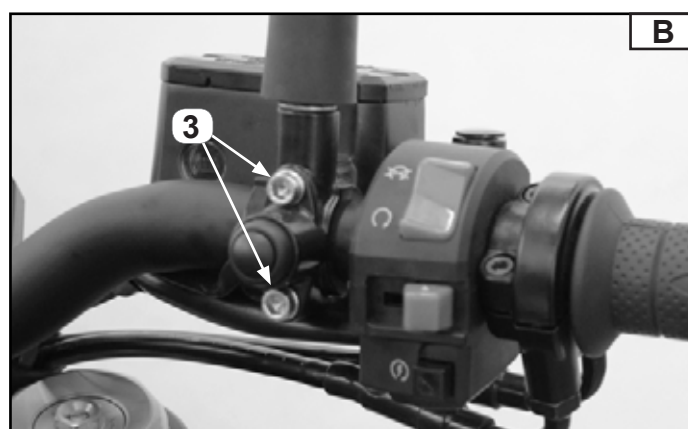
- Front brake pump.

Tighten:

- The screws (3) Fig. B to the following torque:



Torque 8 N*m



Install:

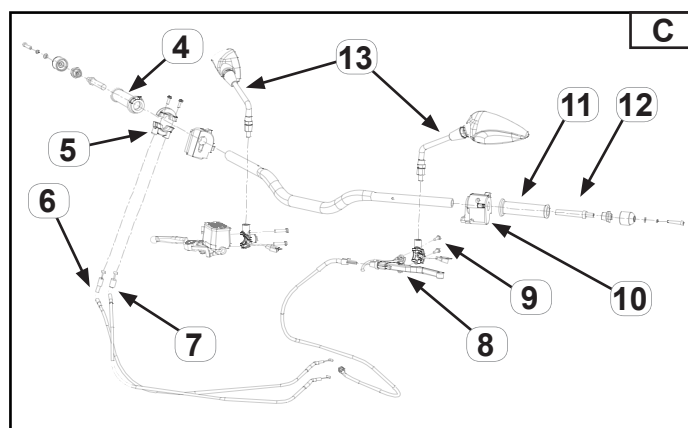
- The throttle hand grip (4) Fig. C.
- The throttle control (5) Fig. C.
- The cable opening throttle (6) Fig. C.
- The cable closing throttle (7) Fig. C.
- The clutch control (8) Fig. C.

Tighten:

- The clutch control screws (9) Fig. C to the following torque:



Torque 8 N*m



Install:

- The L.H. switch (10) Fig. C.
- The L.H. grip (11) Fig. C.
- The hand grip terminal (12) Fig. C.
- Right/left rear-view mirror (13) Fig. C.

Install:

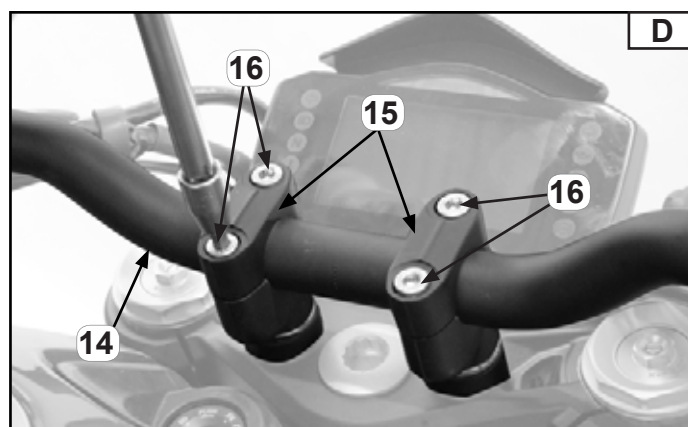
- The handlebar (14) Fig. D.
- The brackets (15) Fig. D.

Tighten:

- The screws (16) Fig. D to the following torque:



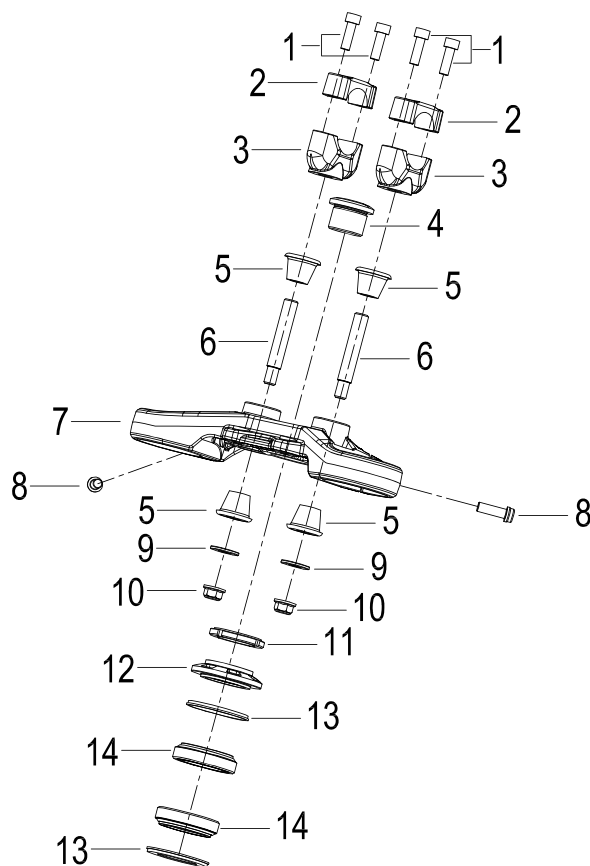
Torque 22 N*m





STEERING HEAD

REMOVAL OF THE STEERING HEAD



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SCREW					
2	UPPER BRACKET					
3	LOWER BRACKET					
4	SPECIAL SCREW					
5	BUSH					
6	STUD BOLT					
7	STEERING HEAD					
8	SCREW					
9	WASHER					
10	NUT					
11	STEERING RING NUT PIN					
12	STEERING RING NUT					
13	PROTECTION DUST RING					
14	BEARING					



STEERING HEAD

REMOVAL OF THE STEERING HEAD

Park:

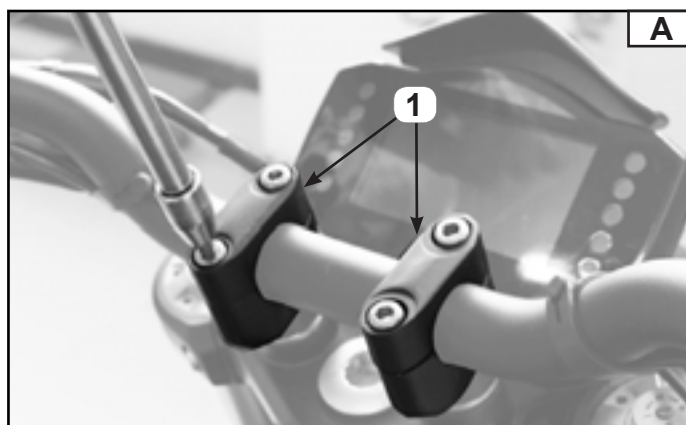
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The upper brackets (1) Fig. A.

**Place:**

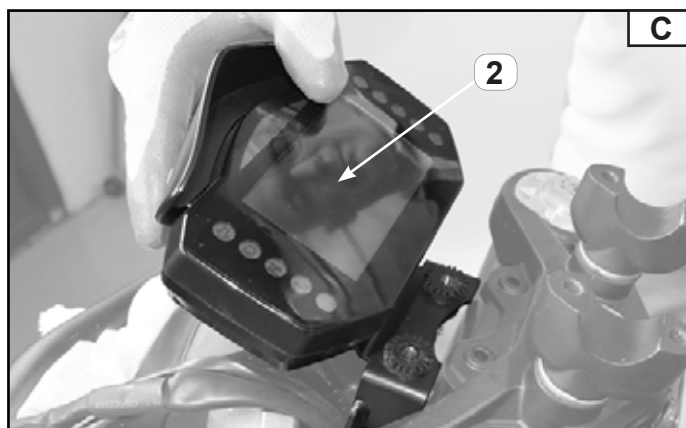
- The handlebar above the front head light Fig. B.

NOTE:

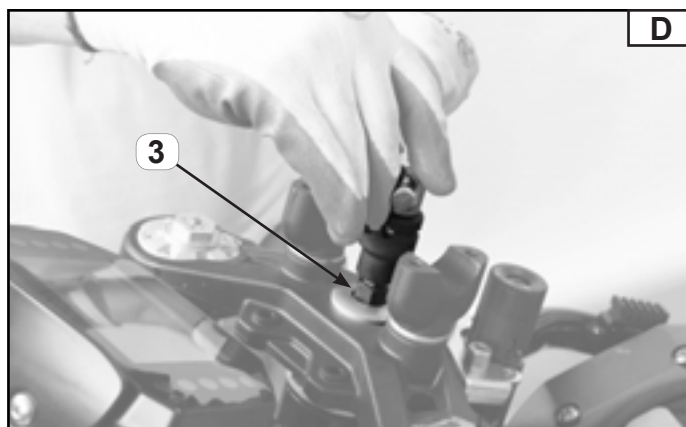
Pay attention to put an adequate protection on the front head light.

**Remove:**

- The instrument support (2) Fig. C.

**Remove:**

- The steering head bolt cap (3) Fig. D.

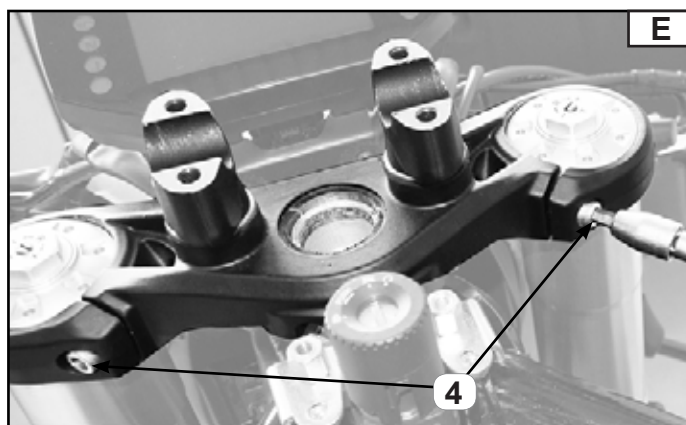




STEERING HEAD

REMOVAL OF THE STEERING HEAD

- The fastening screws (4) of the steering head Fig. E.



- The steering base (5) Fig. F.





STEERING HEAD BASE

REMOVAL OF THE STEERING HEAD BASE

Park:

- The motorcycle on a level surface.

NOTICE

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

Remove:

- The steering head, refer to the section “**Removal of the steering head, Chapter 4**”.

Loosen:

- The steering ring nut (1) with the relevant wrench (2) Fig. A.



Tightening tool for steering sleeve locking ring nut

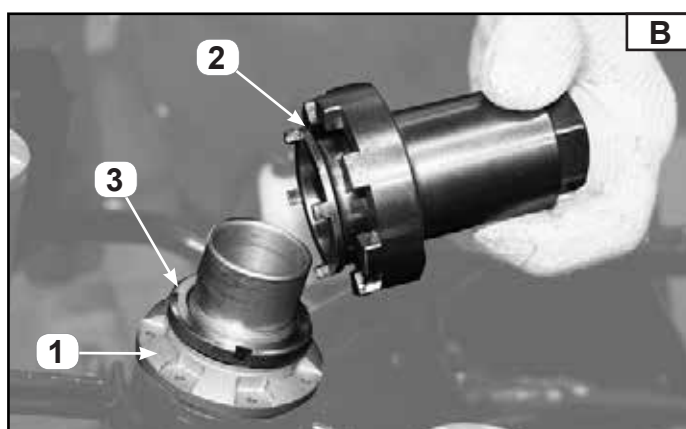
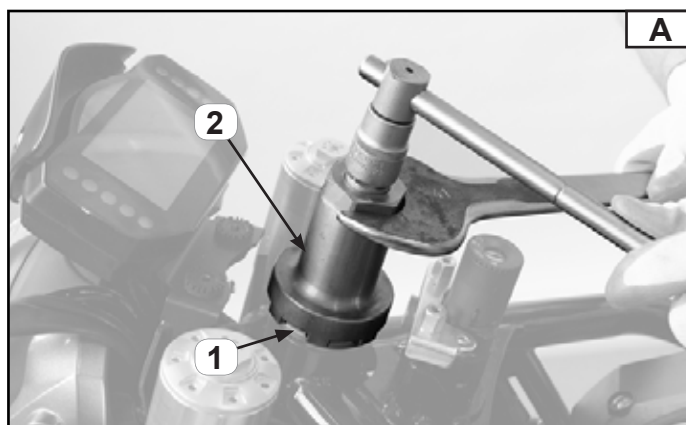
Code: R180297129000

Remove:

- The steering ring nut pin (3) Fig. B.
- The steering ring nut (1) with the relevant wrench (2) Fig. B.

WARNING

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





STEERING HEAD

INSPECTION OF THE STEERING HEAD BASE

Wash:

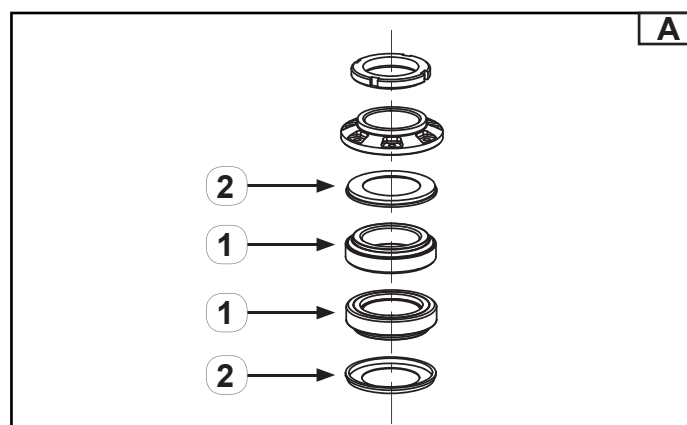
- The bearings.
- The bearing races.



Solvent with high flash point.

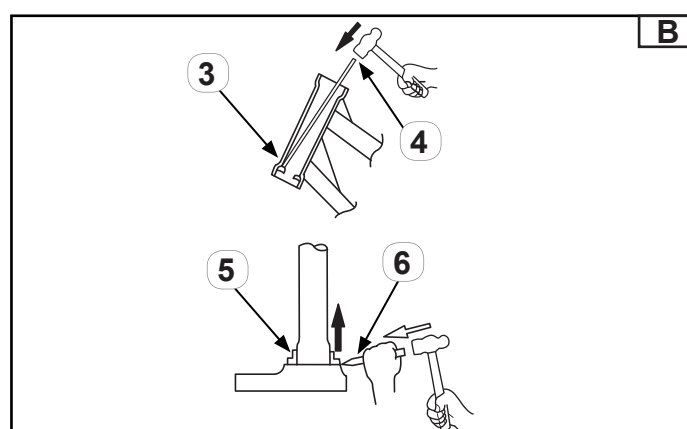
Check:

- The bearings (1) Fig. A.
 - The dust seal rings (2) Fig. A.
- If there is any spotting/damage, replace.



Replace:

- The bearings.
- The bearing races.
- Remove the bearing races (3) from the steering column tube, using a long rod and a hammer (4) Fig. B.
- Remove the race of the bearing (5) from the lower bracket using a chisel (6) and a hammer Fig. B.
- Mount a new rubber gasket and new bearing races.



NOTICE

If the bearing track is not correctly installed, 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 gasket must be installed.**

Check:

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

NOTE:

If necessary:

Lubricate:

- The bearings (1) Fig. A.
- The dust seal rings (2) Fig. A.
- The bearing races.



Recommended lubricant
NGLI2 GREASE



STEERING HEAD

INSTALLATION OF THE STEERING HEAD

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.

Tighten:

- The steering ring nut (1) Fig. A with the special tool at the following torque:



Torque 16 N*m



Tightening tool for steering sleeve locking ring nut
Code: R180297129000

NOTICE

Do not overtighten the steering ring nut.

- The steering ring nut pin (2) Fig. A with the special tool at the following torque:



Torque 60 N*m

Place:

- The upper steering head.

Tighten:

- The cap (3) with the special tool (4) Fig. B to the following torque:



Torque 60 N*m

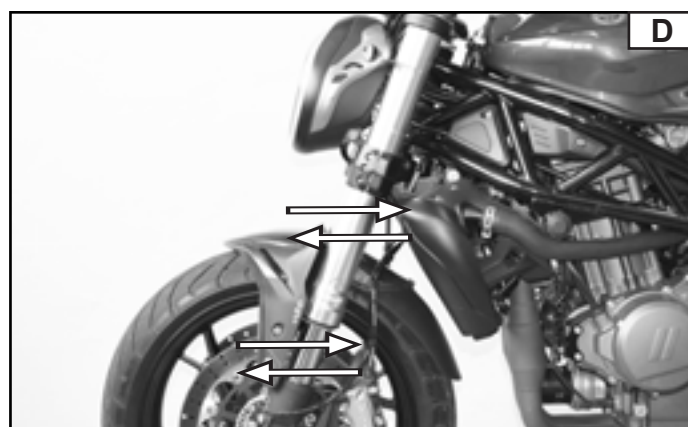
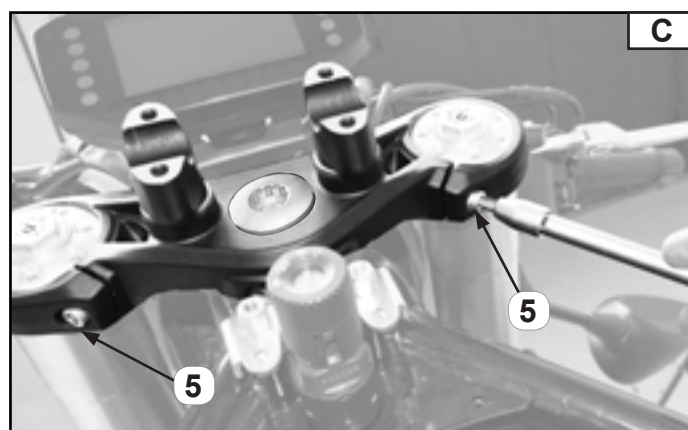
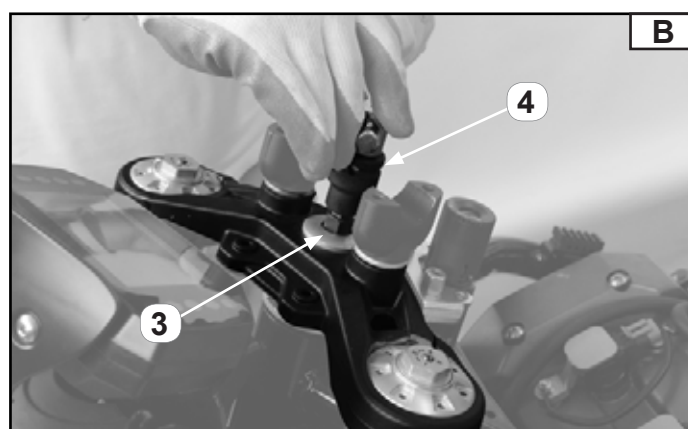
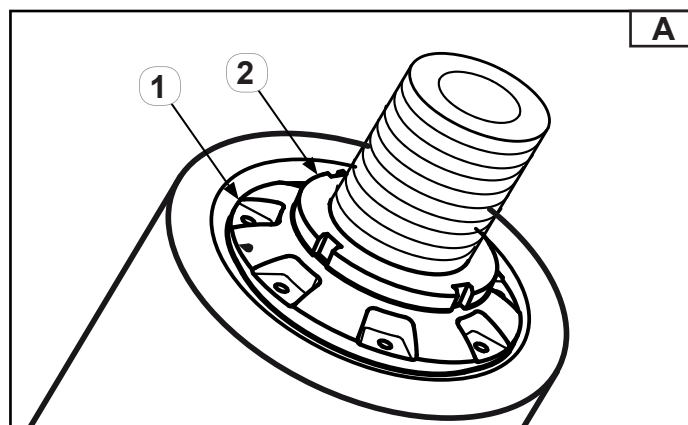
- The setscrews (5) Fig. C to the following torque:



Torque 22 N*m

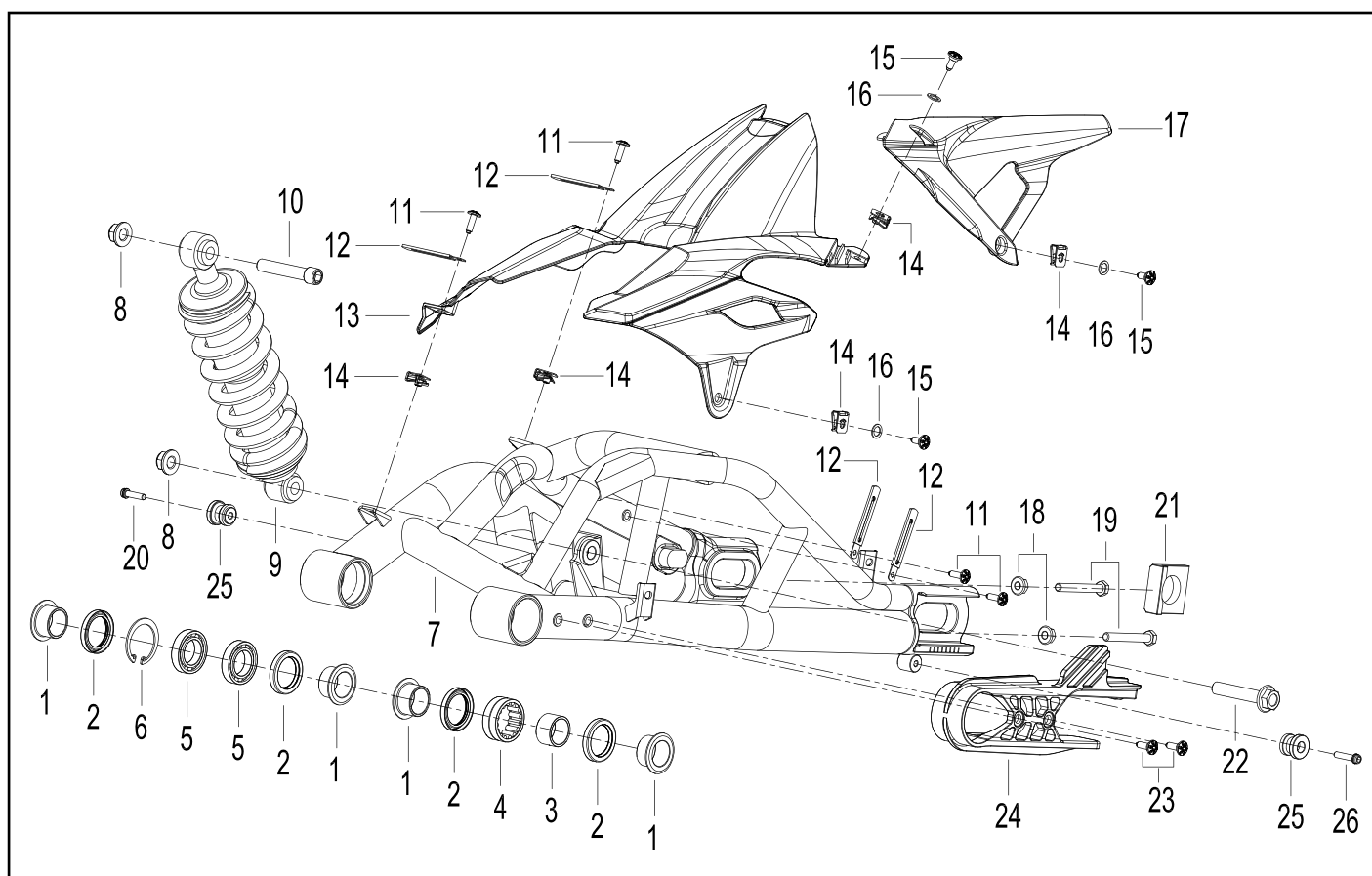
Check:

- The steering sleeve Fig. D.
- Gently oscillate the front fork, holding it by the ends of the tubes. If there is any jamming/loosening, adjust the steering sleeve.





REAR SHOCK ABSORBER REMOVAL OF THE REAR SHOCK ABSORBER



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	BUSH					
2	SEAL RING					
3	BUSH					
4	BEARING					
5	BEARING					
6	CIRCLIP					
7	SWINGARM					
8	NUT					
9	REAR SHOCK ABSORBER					
10	HEXSOCKET HEAD CAP SCREW					
11	SCREW					
12	FAIRLEAD					
13	REAR MUD GUARD					
14	METRIC QUIK FASTENING					
15	SCREW					
16	NYLON WASHER					
17	CHAIN GUARD					
18	NUT					
19	SCREW					
20	SCREW					
21	CHAIN ADJUSTER SLIDING SHOE					



REAR SHOCK ABSORBER

REMOVAL OF THE REAR SHOCK ABSORBER

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	SCREW					
23	SCREW					
24	UPPER CHAIN SLIDING SHOE					
25	BUSH OF GUIDE					
26	SCREW					



REAR SHOCK ABSORBER REMOVAL OF THE REAR SHOCK ABSORBER

Park:

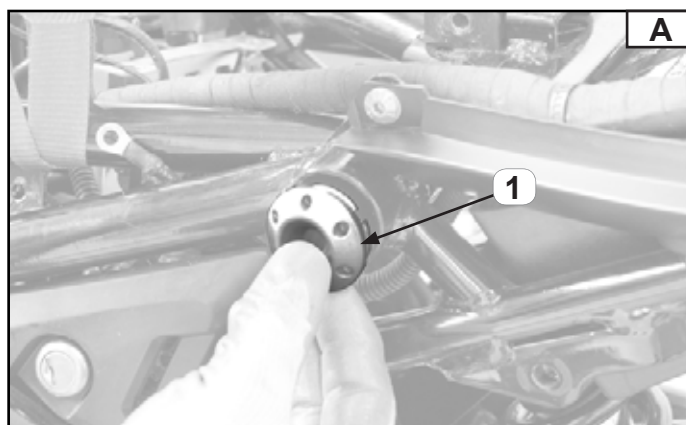
- The motorcycle on a level surface.

NOTICE

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

Remove:

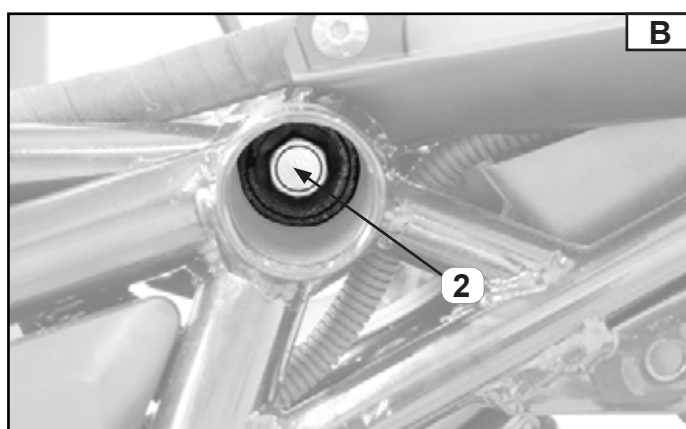
- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The chain guard, refer to the section “**Removal of the chain guard, Chapter 4**”.
- The protective cap (1) Fig. A.



- The upper screw (2) of the rear shock absorber unit Fig. B.
- The relative nut.

NOTE:

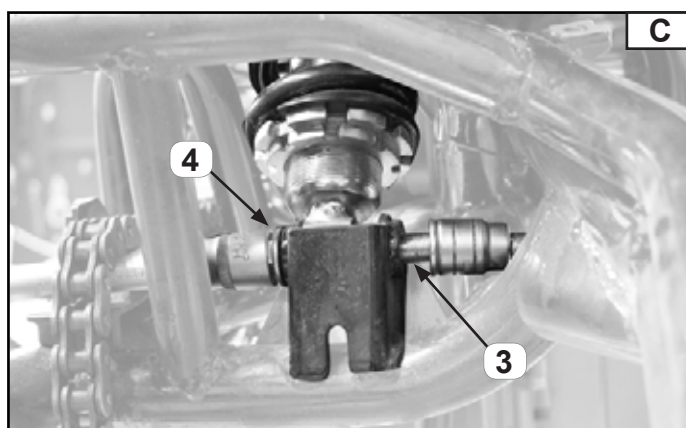
To remove the lower fixing screws of the rear shock absorber unit, hold the swingarm to stop it from falling.



- The lower screw (3) of the rear shock absorber unit Fig. C.
- The relative nut (4) Fig. C.

NOTE:

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





REAR SHOCK ABSORBER

CHECK OF THE REAR SHOCK ABSORBER

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 bushes.

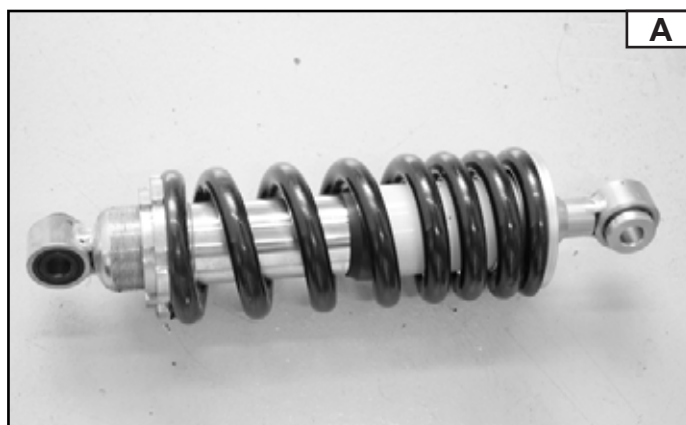
If there is any damage or wear, replace.

- The protection dust rings.

If there is any damage or wear, replace.

- The screws.

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





REAR SHOCK ABSORBER INSTALLATION OF THE REAR SHOCK ABSORBER

Clean:

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



Solvent with high flash point.

Installation:

Proceed using the opposite order to removal.

NOTE:

**Lift the swingarm to install the rear shock absorber unit.
Insert the lower screw of the rear shock absorber unit.**

Tighten:

- The lower nut (1) of the rear shock absorber with the relevant nut (2) Fig. A to the following torque:



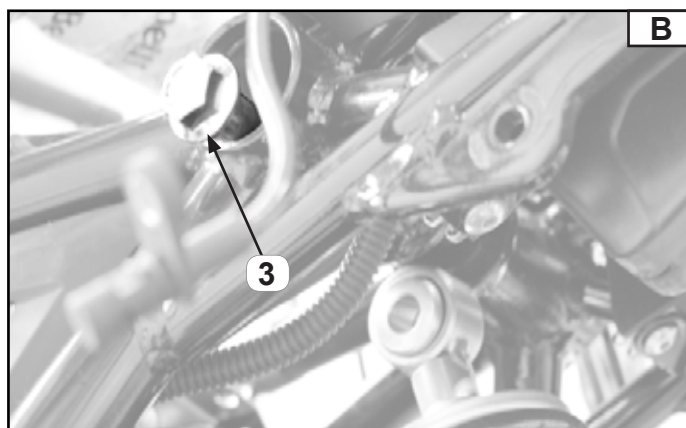
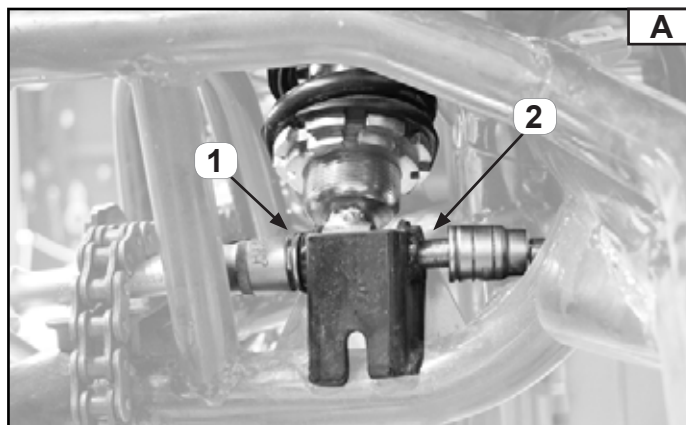
Torque 50 N*m

Tighten:

- The upper nut (3) of the rear shock absorber with the relevant nut Fig. B to the following torque:



Torque 50 N*m





TRANSMISSION CHAIN AND SWINGARM REMOVAL OF THE TRANSMISSION CHAIN

NOTE:

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

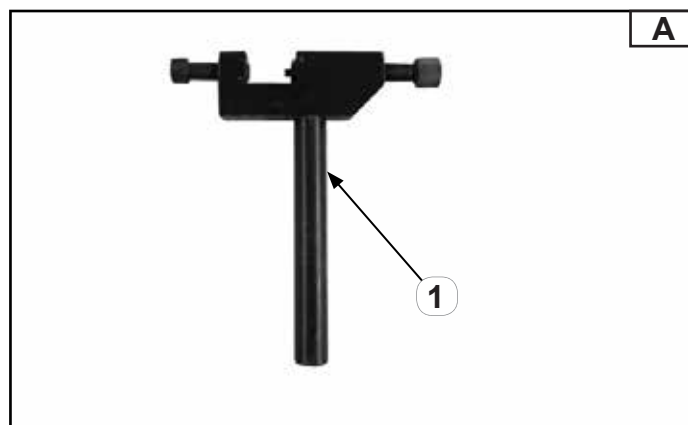
Remove the parts in the indicated order.

- The chain sprocket cover, refer to the section “**Removal of the chain sprocket cover, Chapter 4.**”.

Detach:

- The transmission chain.

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





TRANSMISSION CHAIN AND SWINGARM REPLACEMENT OF THE TRANSMISSION CHAIN

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.

NOTICE

Never reuse 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-Rings (2) Fig. A.
- The clip link (3) Fig. A.

NOTICE

Insert the master link from inside the transmission chain, then install 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:

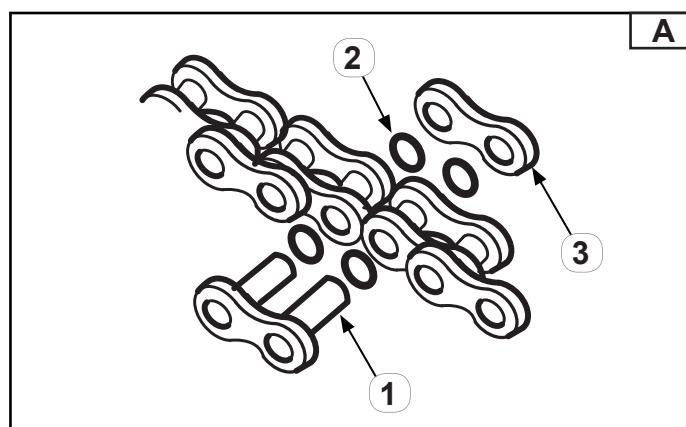
- The surface affected by the clinched master link.

This must have no apertures.

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

NOTICE

Never use a transmission chain with a clip master link.





TRANSMISSION CHAIN AND SWINGARM

REMOVAL OF THE SWINGARM

Park:

- The motorcycle on a level surface.

NOTICE

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

Remove the parts in the indicated order.

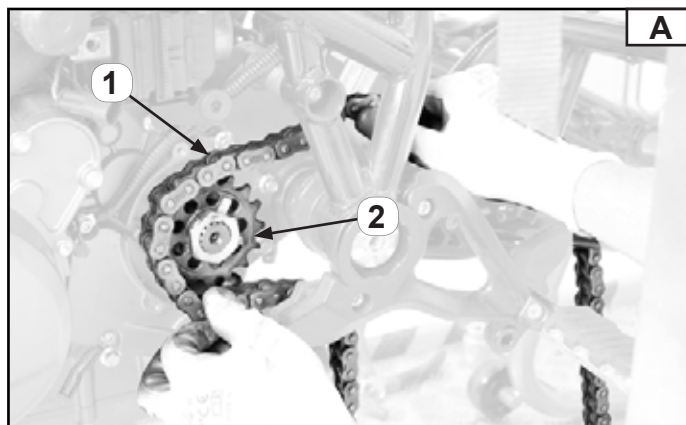
- The rear brake caliper, refer to the section “**Removal of the rear brake caliper, Chapter 4**”.
- The rear wheel, refer to the section “**Removal of the rear wheel, Chapter 4**”.
- The chain guard, refer to the section “**Removal of the chain guard, Chapter 4**”.
- The chain sprocket cover, refer to the section “**Removal of the chain sprocket cover, Chapter 4**”.
- The rear shock absorber, refer to the section “**Removal of the rear shock absorber, chapter 4**”.

NOTE:

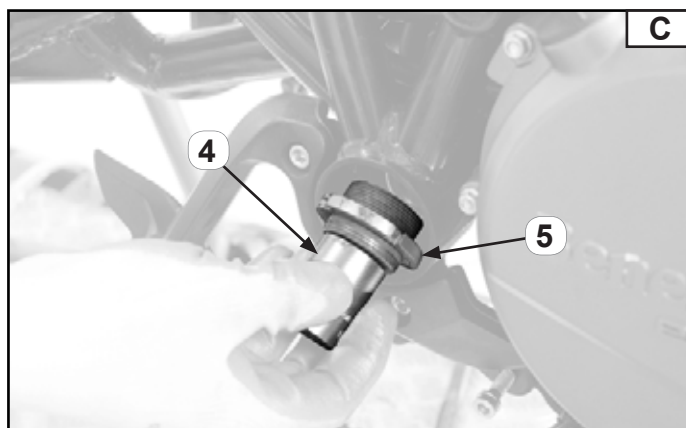
Position a stand (B) to support the rear swingarm.

Remove:

- The chain (1) from the sprocket (2) Fig. A.
- The special screw (3) Fig. B.

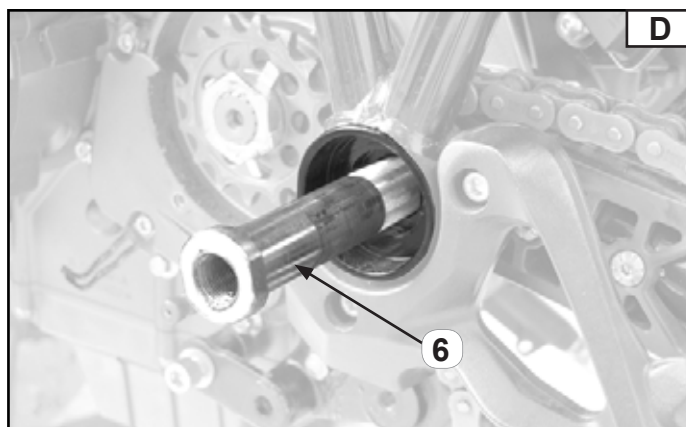


- The register bush (4) and the related safety ring nut (5) Fig. C.



Slide out from the left side:

- The pin (6) of the swingarm Fig. D.





TRANSMISSION CHAIN AND SWINGARM

REMOVAL OF THE SWINGARM

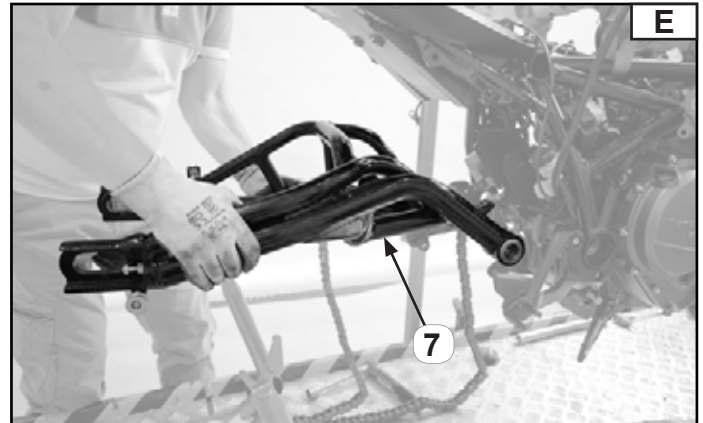
Remove:

- The complete swingarm (7) Fig. E.

Utilise the appropriate tool for the removal of the internal components of the swingarm:



Tool for disassemble the rear swingarm bearing





TRANSMISSION CHAIN AND SWINGARM INSTALLATION OF THE SWINGARM

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

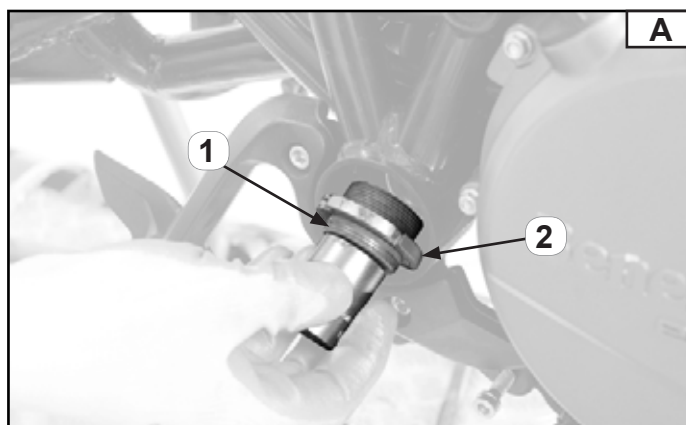
Proceed using the opposite order to removal.

Lubricate:

- The bearings.
- The bushes.



**Recommended lubricant
NGLI2 GREASE**

**Tighten:**

- The register bush (1) to the following torque:



Torque 20 N*m

- The safety ring nut (2) to the following torque:

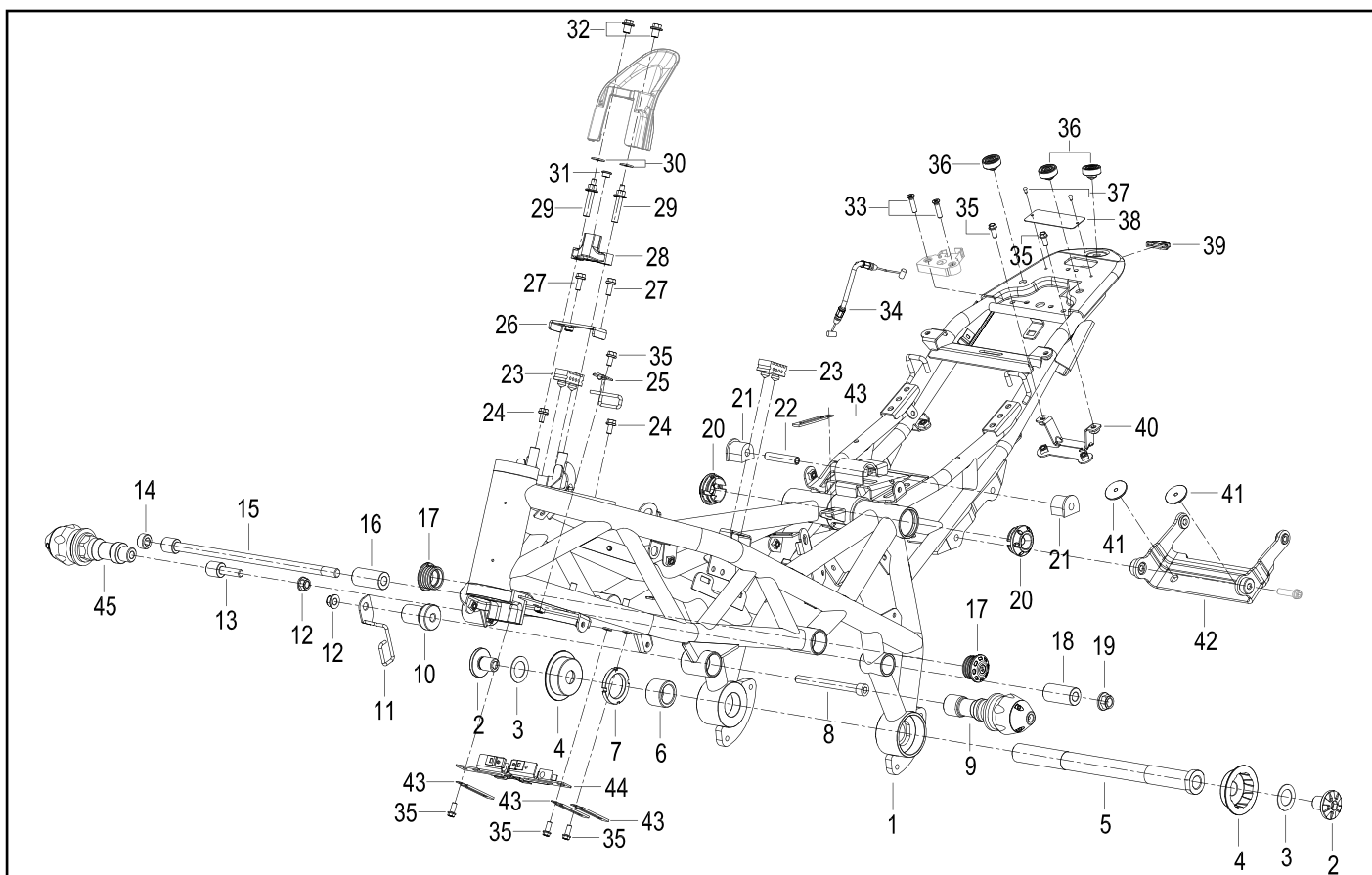


Torque 60 N*m



FRAME

REMOVAL/INSTALLATION OF FRAME PARTS



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	FRAME					
2	SPECIAL SCREW					
3	WASHER					
4	CAP					
5	PIN					
6	SCREW					
7	CROWN NUT					
8	SCREW					
9	L.H. FRAME COVERING PAD					
10	BUSH					
11	FAIRLEAD					
12	NUT					
13	SCREW					
14	NUT					
15	SCREW					
16	BUSH					
17	CAP					
18	BUSH					
19	NUT					
20	L.H. CAP					
21	RUBBER BUSHING					



FRAME

REMOVAL/INSTALLATION OF FRAME PARTS

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	SPACER					
23	RUBBER PAD					
24	SCREW					
25	FAIRLEAD					
26	BRACKET					
27	SCREW					
28	PAD					
29	SCREW					
30	WASHER					
31	CAP					
32	SCREW					
33	SCREW					
34	CABLE OPENING SEAT					
35	SCREW					
36	VIBRATION DAMPER PAD					
37	RIVET					
38	PLATE					
39	VIBRATION DAMPER					
40	HOLDER					
41	RUBBER PAD					
42	BATTERY BOX MOUNT					
43	FAIRLEAD					
44	HOLDER					
45	R.H. FRAME COVERING PAD					



FRAME

REMOVAL OF THE REAR HANDLES

Park:

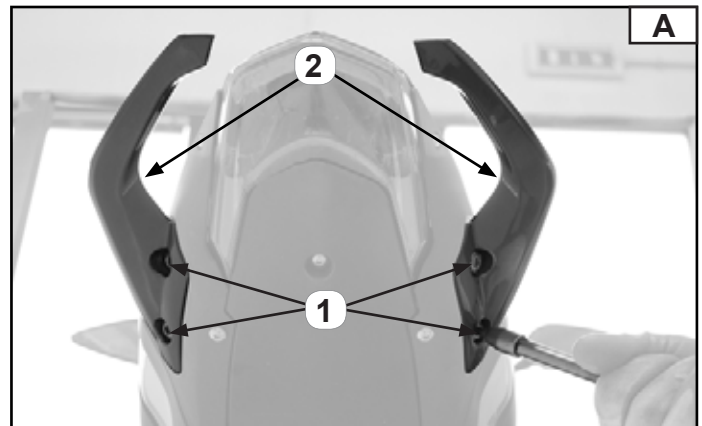
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The screws (1) Fig. A.
- The rear handles (2) Fig. A.





FRAME

INSTALLATION OF THE REAR HANDLES

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

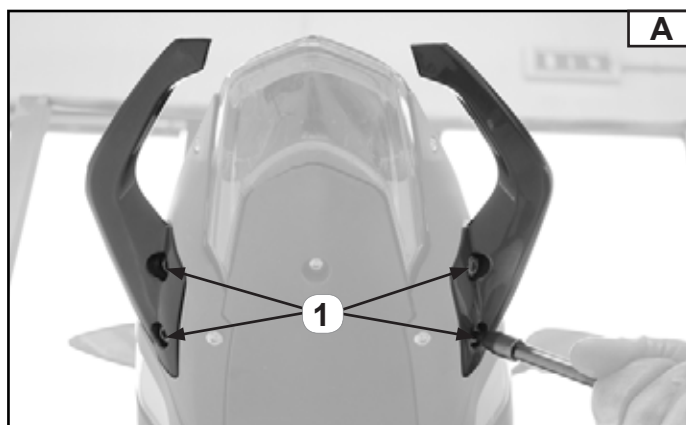
Proceed using the opposite order to removal.

Tighten:

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



Torque 22 N*m





FRAME

REMOVAL OF THE REAR MUDGUARD HOLDER

Park:

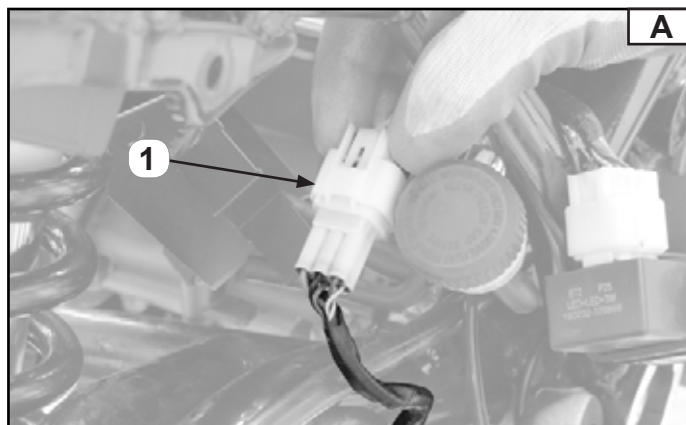
- The motorcycle on a level surface.

NOTICE

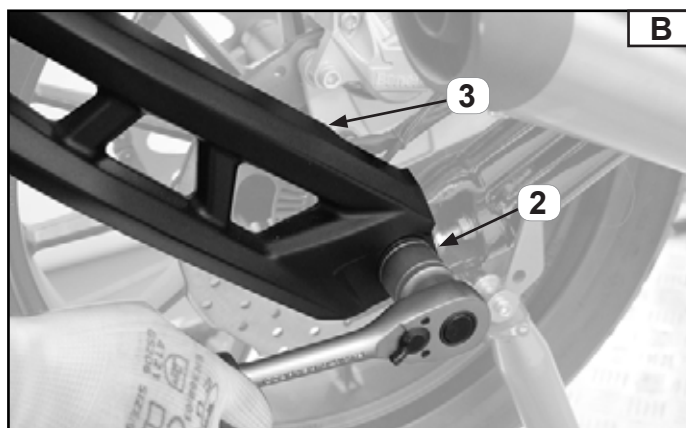
Prop the bike on suitable supports so that it cannot fall.

Disconnect:

- The indicator light / number plate light connector (1) Fig. A.

**Remove:**

- The nut (2) on the left side of the vehicle Fig. B.
- The rear mudguard holder (3) Fig. B.
- The wiring clamp.





FRAME

INSTALLATION OF THE REAR MUDGUARD HOLDER

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

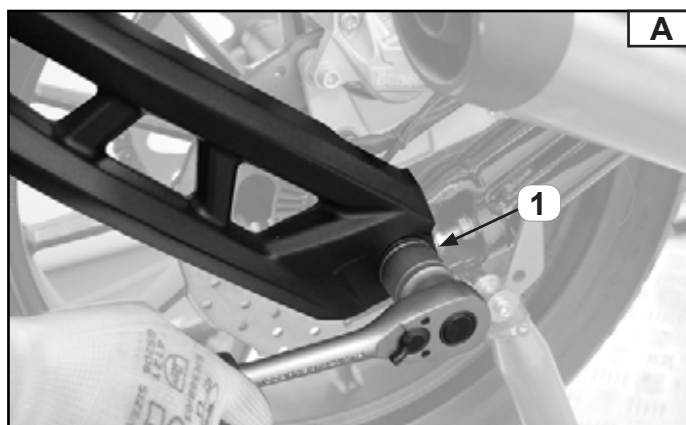
Proceed using the opposite order to removal.

Tighten:

- The nut (1) Fig. A to the following torque:



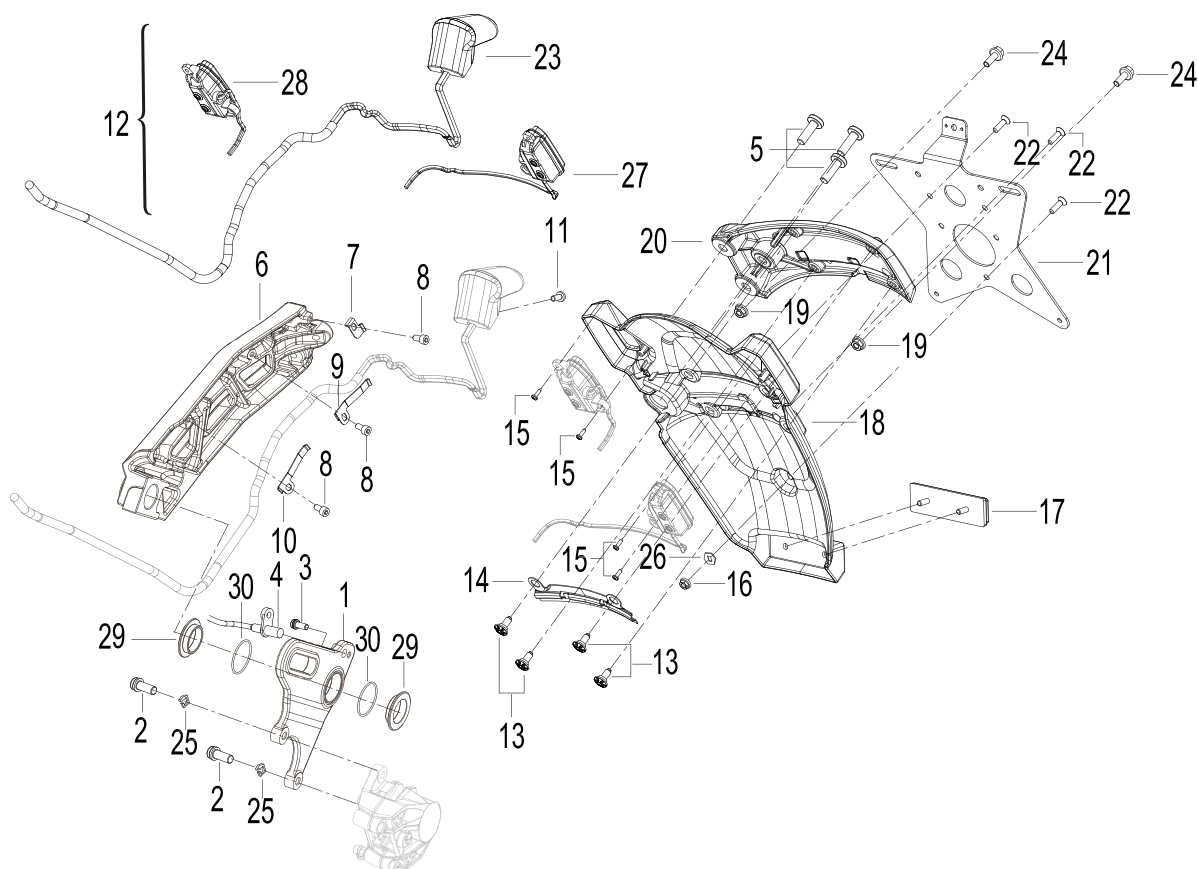
Torque 90 N*m





FRAME

NUMBER PLATE HOLDER



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	CALIPER HOLDER PLATE					
2	SCREW					
3	SENSOR ABS REAR WHEEL					
4	SCREW					
5	SCREW					
6	REAR MUDGUARD HOLDER					
7	PLATE					
8	SCREW					
9	PLATE					
10	PLATE					
11	SCREW					
12	KIT REAR HEADLIGHT					
13	SCREW					
14	PLATE					
15	SCREW					
16	NUT					
17	REFLECTOR					
18	MUDFLAP					
19	NUT					
20	FENDER HOLDER					
21	NUMBER PLATE HOLDER					



FRAME NUMBER PLATE HOLDER

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	SCREW					
23	NUMBER PLATE LIGHT					
24	SCREW					
25	ELASTIC WASHER					
26	WASHER					
27	L.H. REAR TURN INDICATOR					
28	R.H. REAR TURN INDICATOR					
29	BUSH "T"					
30	O-RING					



FRAME

REMOVAL OF THE NUMBER PLATE HOLDER

Park:

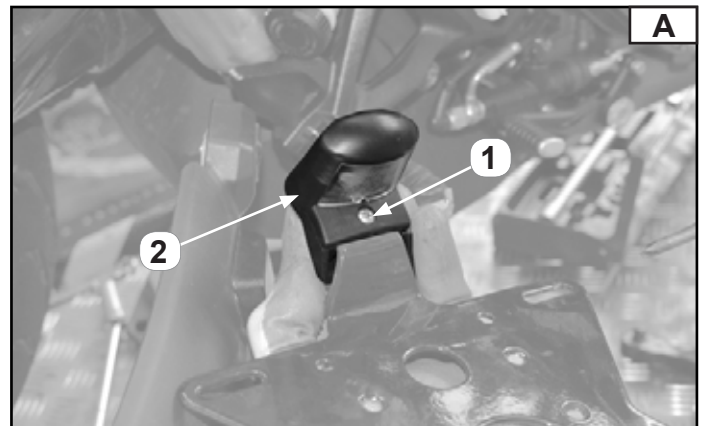
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The number plate bracket, refer to the section **“Replacement of the rear indicator lights, Chapter 3”**.
- The screw (1) Fig. A.
- The number plate light (2) Fig. A.



FRAME

INSTALLATION OF THE NUMBER PLATE HOLDER

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.

Use medium Loctite thread locker to secure.





FRAME

REMOVAL OF THE HORN

Park:

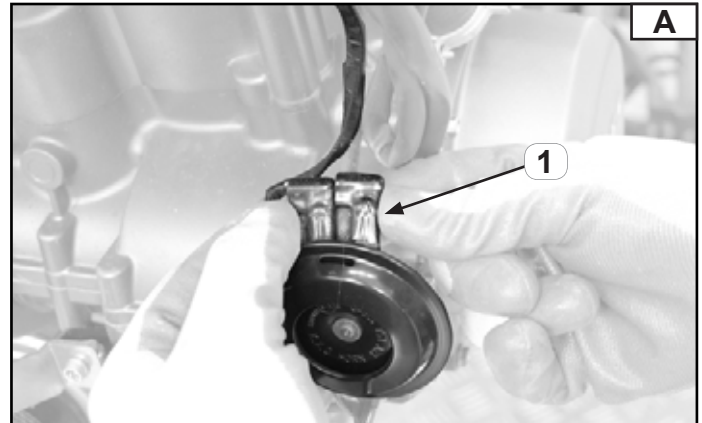
- The motorcycle on a level surface.

NOTICE

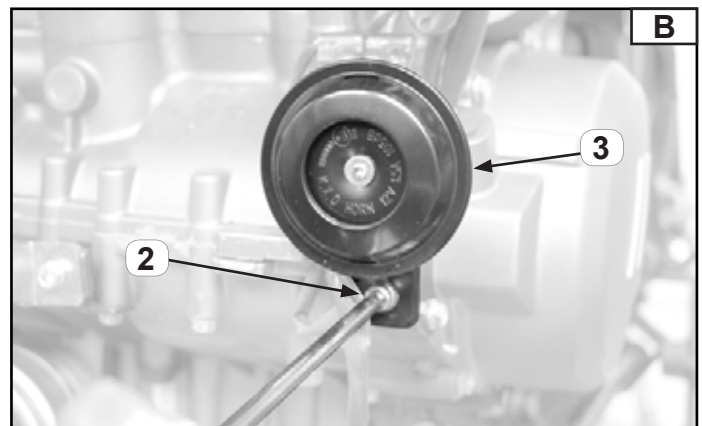
Prop the bike on suitable supports so that it cannot fall.

Disconnect:

- The connector (1) Fig. A.

**Remove:**

- The screw (2) Fig. B.
- The horn (3) Fig. B.





FRAME INSTALLATION OF THE HORN

Park:

- The motorcycle on a level surface.

NOTICE

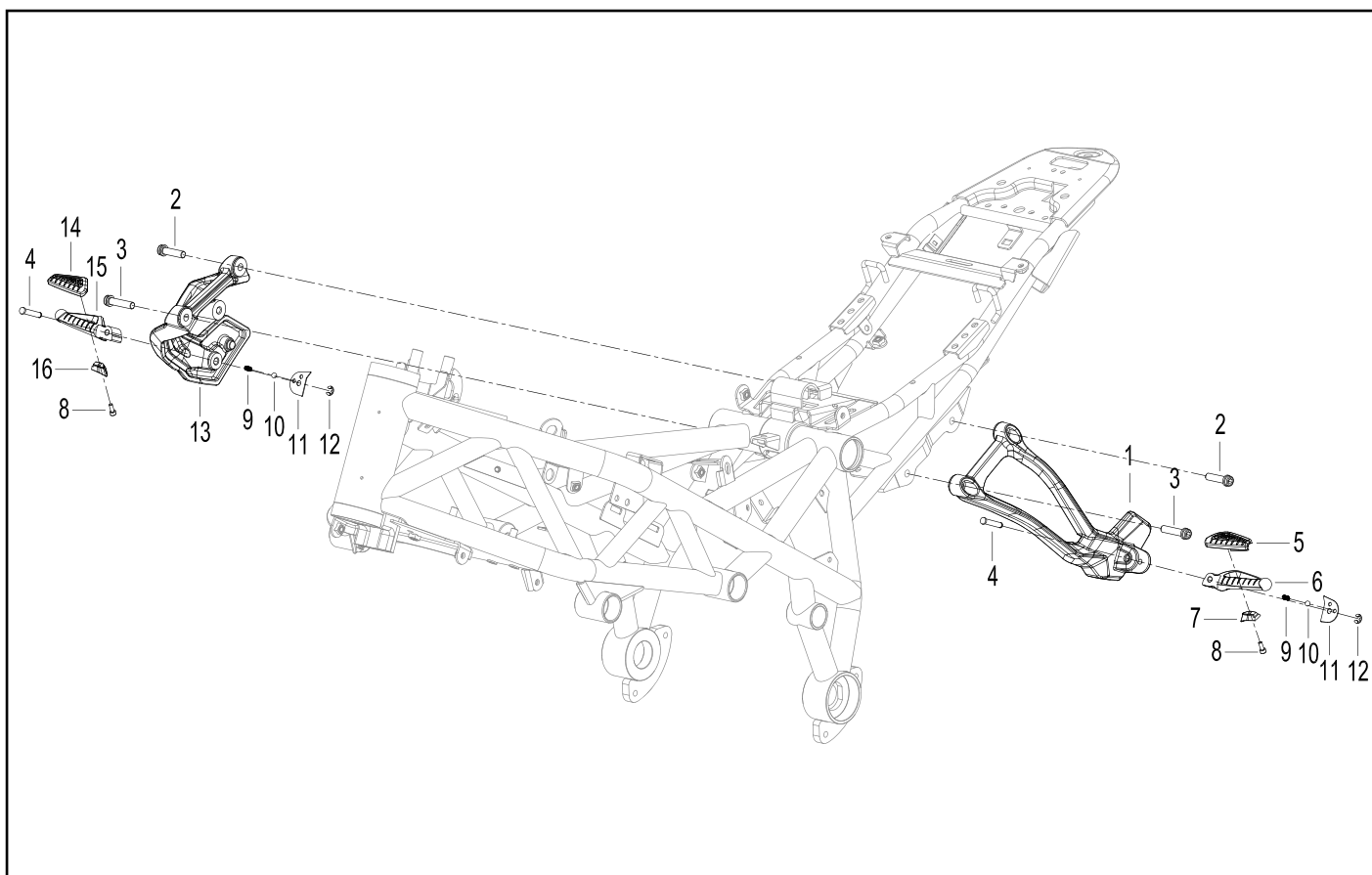
Prop the bike on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.



CYCLING PASSENGER FOOT PEG



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	L.H. FOOT PEG HOLDER PLATE					
2	SCREW					
3	SCREW					
4	PIN					
5	L.H. FOOT PEG RUBBER COVER					
6	L.H. REAR FOOT PEG					
7	L.H. FIXED RUBBER					
8	SCREW					
9	SPRING					
10	BALL					
11	PLATE					
12	SNAP RING					
13	R.H. FOOT PEG HOLDER PLATE					
14	R.H. FOOT PEG RUBBER COVER					
15	R.H. REAR FOOT PEG					
16	R.H. FIXED RUBBER					



CYCLING

REMOVAL OF THE R.H. PASSENGER FOOT PEG PLATE

Park:

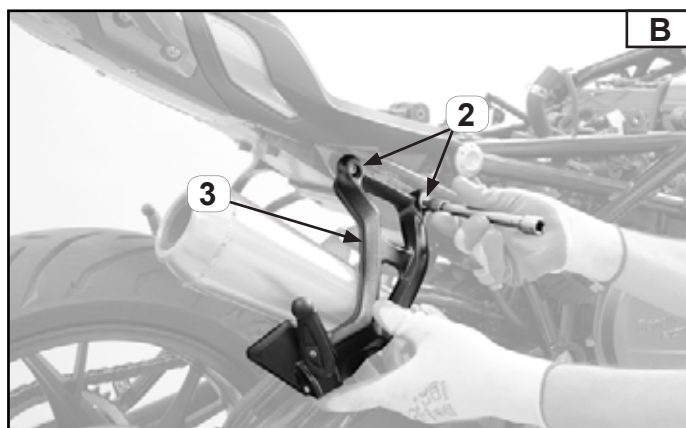
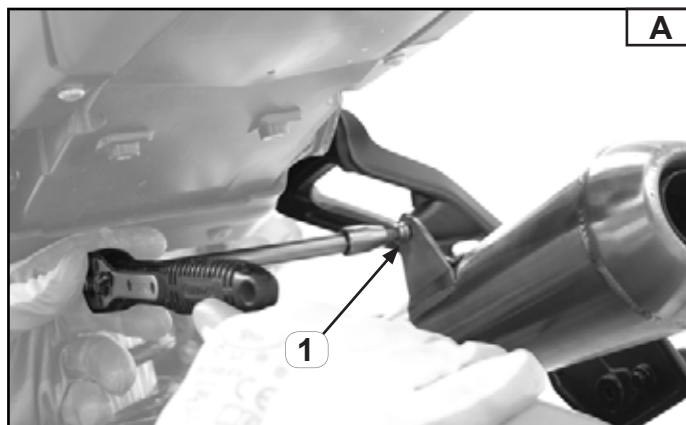
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The screw (1) Fig. A.
- The screws (2) Fig. B.
- The R.H. passenger foot peg plate (3) Fig. B.





CYCLING

INSTALLATION OF THE R.H. PASSENGER FOOT PEG PLATE

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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

- The screw (2) Fig. B to the following torque:

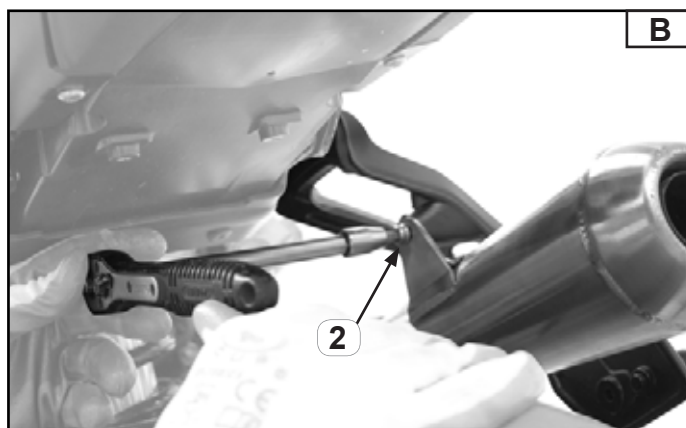
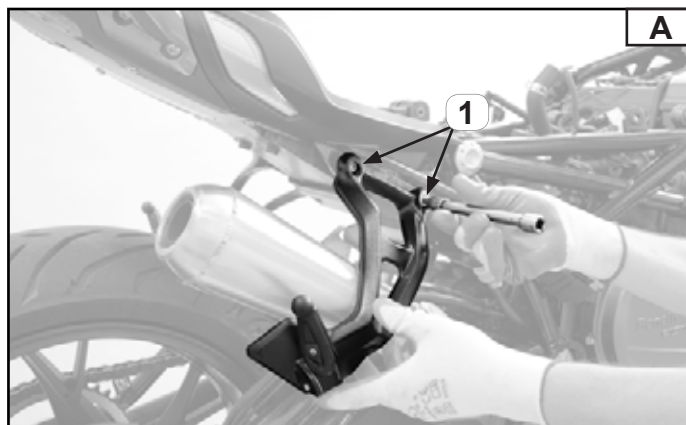


Torque 22 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**





CYCLING

REMOVAL OF THE L.H. PASSENGER FOOT PEG PLATE

Park:

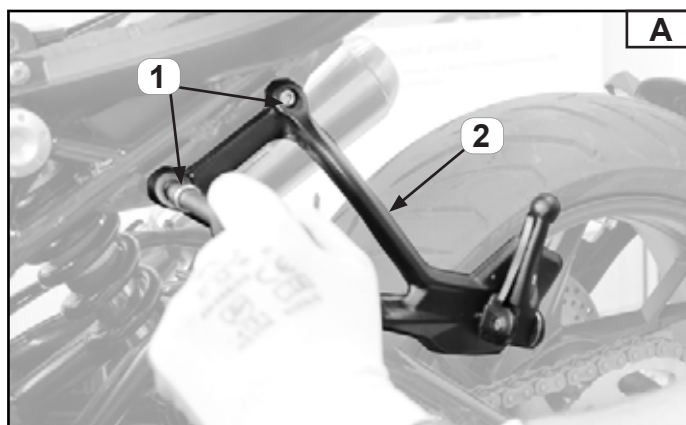
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The screws (1) Fig. A.
- The L.H. rear foot peg holder (2) Fig. A.





CYCLING

INSTALLATION OF THE L.H. PASSENGER FOOT PEG PLATE

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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:

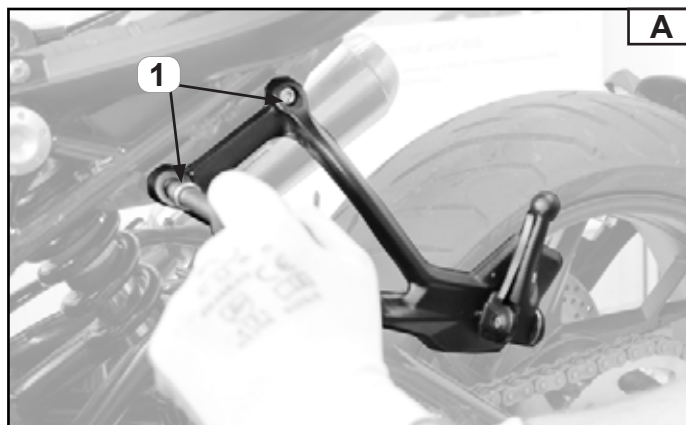


Torque 22 N*m

Use Loctite thread locker to secure the screws.



**MEDIUM THREAD
LOCKER**





CYCLING

REMOVAL OF THE R.H. / L.H. PASSENGER FOOT PEG

Park:

- The motorcycle on a level surface.

NOTICE

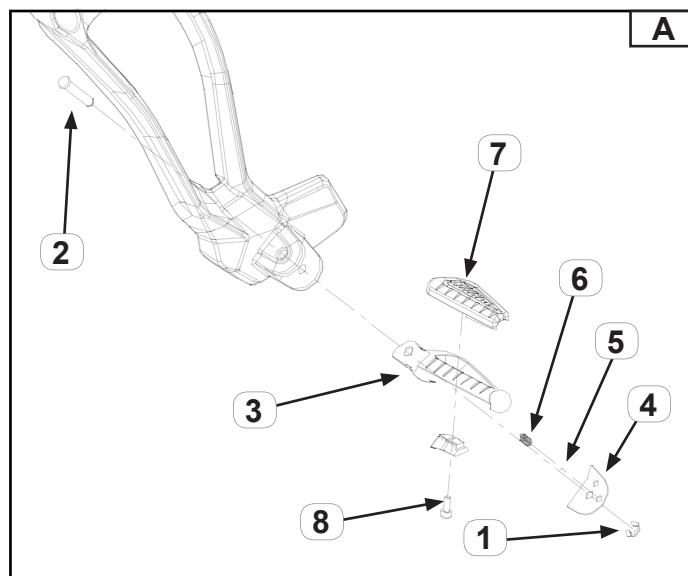
Prop the bike on suitable supports so that it cannot fall.

Remove:

- The snap ring (1) Fig. A.
- The pin (2) Fig. A.
- The foot peg (3) Fig. A.
- The plate (4) Fig. A.
- The ball (5) Fig. A.
- The internal spring (6) Fig. A.

NOTE:

If the foot peg rubber cover (7) is worn, replace by removing the screw (8) Fig. A.





CYCLING

INSTALLATION OF THE R.H. / L.H. PASSENGER FOOT PEG

Park:

- The motorcycle on a level surface.

NOTICE

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

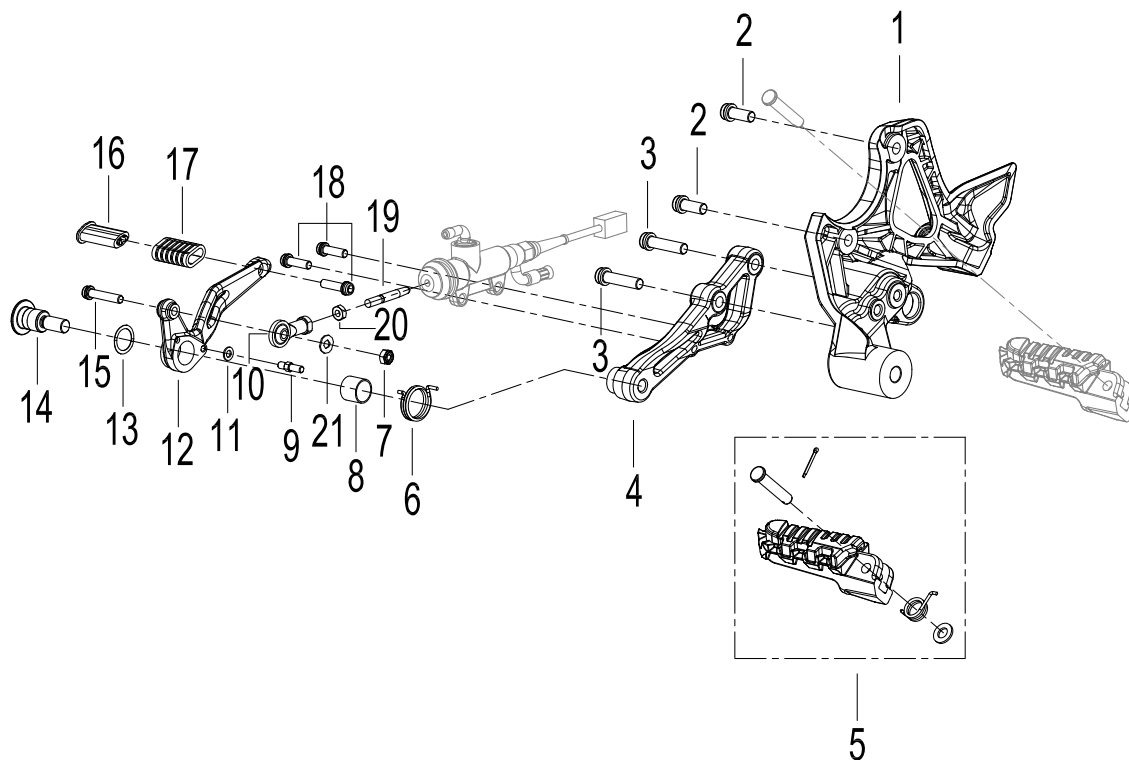
Installation:

Proceed using the opposite order to removal.



CYCLING

R.H. RIDER FOOT PEG



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	FRONT R.H. FOOT PEG HOLDER PLATE					
2	SCREW					
3	SCREW					
4	FRONT R.H. FOOT PEG HOLDER PLATE					
5	RH. FRONT FOOT PEG					
6	SPRING					
7	NUT					
8	BUSH					
9	THREADED PIN					
10	BALL JOINT					
11	WASHER					
12	BRAKE CONTROL PEDAL					
13	ELASTIC WASHER					
14	SPECIAL SCREW					
15	SCREW					
16	RUNNER					
17	RUBBER PAD					
18	SCREW					
19	ADJUSTER ROD					
20	NUT					
21	WASHER					



CYCLING

REMOVAL OF THE R.H. RIDER FOOT PEG PLATE

Park:

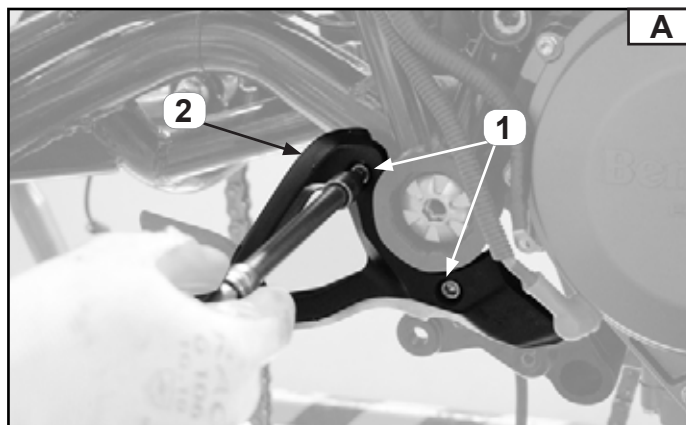
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The brake lever, refer to the section “**Removal of the brake control pedal, Chapter 4**”.
- The brake pump, refer to the section “**Removal of the rear brake pump, Chapter 4**”.
- The screws (1) Fig. A.
- The foot peg plate (2) Fig. A.





CYCLING

INSTALLATION OF THE RH RIDER FOOT PEG PLATE

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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:

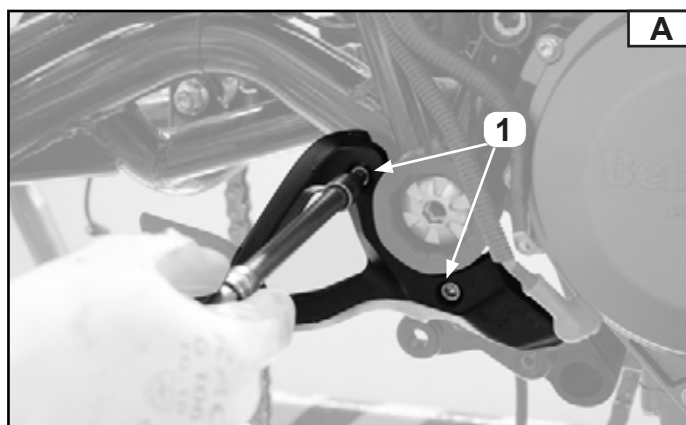


Torque 25 N*m

Use Loctite thread locker to secure the screws.



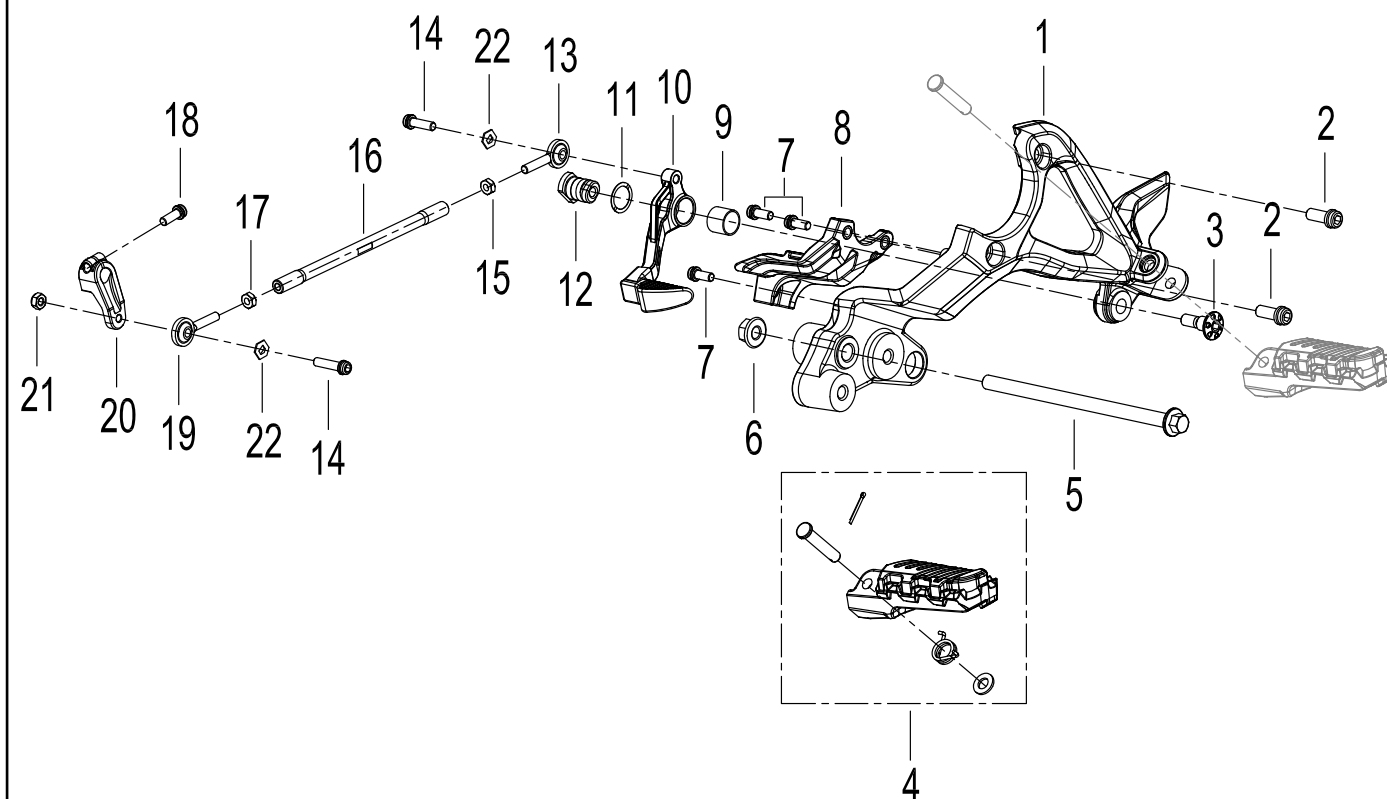
**MEDIUM THREAD
LOCKER**





CYCLING

LH RIDER FOOT PEG



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	FRONT L.H. FOOT PEG HOLDER PLATE					
2	SCREW					
3	SCREW					
4	LH. FRONT FOOT PEG					
5	ENGINE PIN					
6	NUT					
7	SCREW					
8	INNER CHAIN SLIDING SHOE					
9	BUSH					
10	GEAR CHANGE PEDAL					
11	ELASTIC WASHER					
12	THREADED PIN					
13	BALL JOINT					
14	SCREW					
15	NUT					
16	GEARCHANGE CONTROL LEVER					
17	NUT					
18	SCREW					
19	BALL JOINT					
20	GEARCHANGE CONTROL LEVER					
21	NUT					
22	WASHER					



CYCLING

REMOVAL OF THE LH RIDER FOOT PEG PLATE

Park:

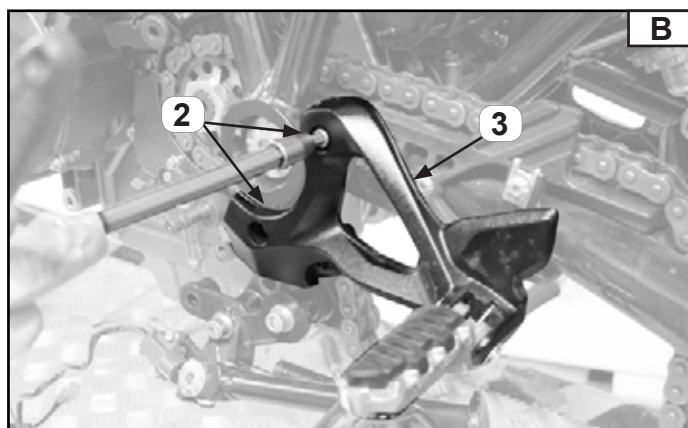
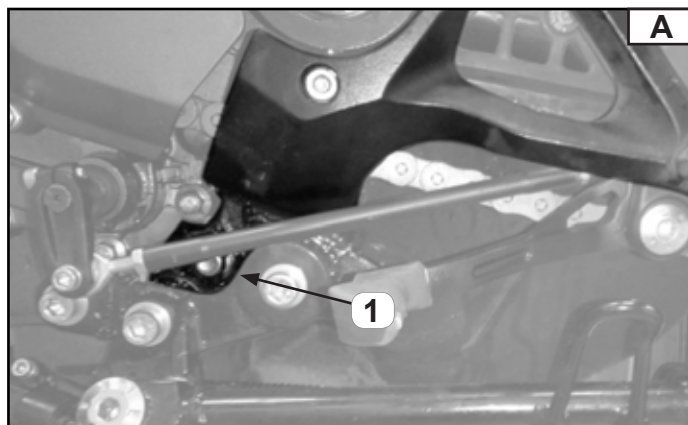
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The gear control rod, refer to the section “**Removal of the gear change pedal, Chapter 4**”.
- The stand support, refer to the section “**Removal of the side stand support, Chapter 4**”.
- The screw on the muffler left side, refer to the section “**Removal of the exhaust assembly, Chapter 4**”.
- The screw (1) Fig. A.
- The screws (2) Fig. B.
- The foot peg plate (3) Fig. B.





CYCLING

INSTALLATION OF THE LH RIDER FOOT PEG PLATE

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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 25 N*m

Use Loctite thread locker to secure the screws.



**MEDIUM THREAD
LOCKER**

Tighten:

- The screw (2) Fig. B to the following torque:

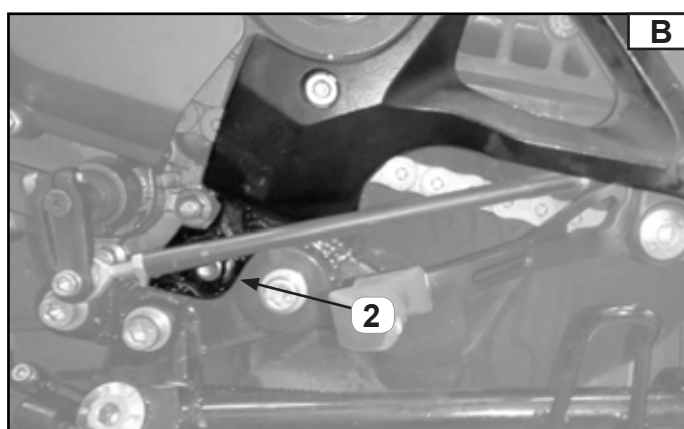
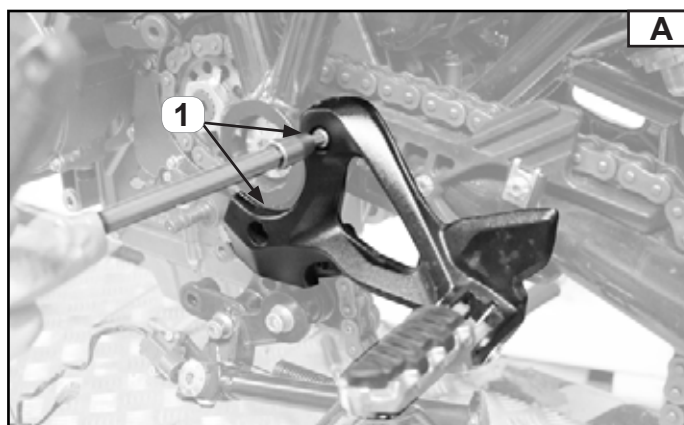


Torque 40 N*m

Use Loctite thread locker to secure the screws.



**MEDIUM THREAD
LOCKER**





CYCLING

REMOVAL OF THE LH / RH RIDER FOOT PEG

Park:

- The motorcycle on a level surface.

NOTICE

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

NOTE:

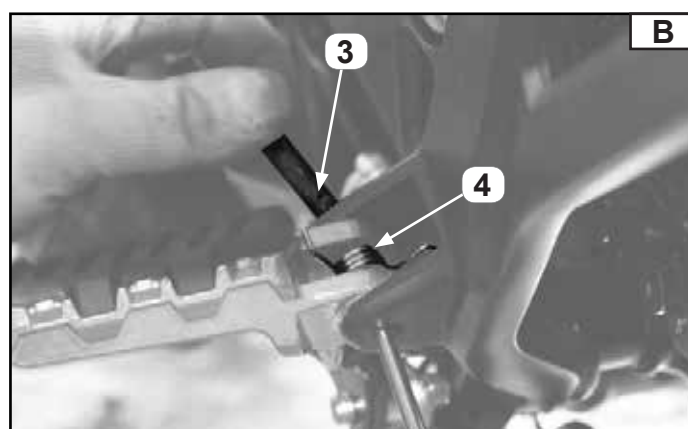
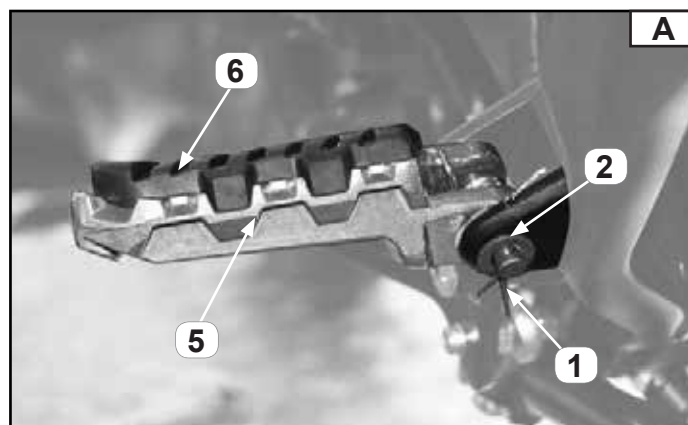
The following procedure is applicable to both rider foot pegs.

Remove:

- The cotters (1) Fig. A.
- The washer (2) Fig. A.
- The pin (3) Fig. B.
- The spring (4) Fig. B.
- The rider foot peg (5) Fig. A.

NOTE:

If the foot peg rubber cover (6) Fig. A is worn, replace.





CYCLING

INSTALLATION OF THE LH/RH RIDER FOOT PEG

Park:

- The motorcycle on a level surface.

NOTICE

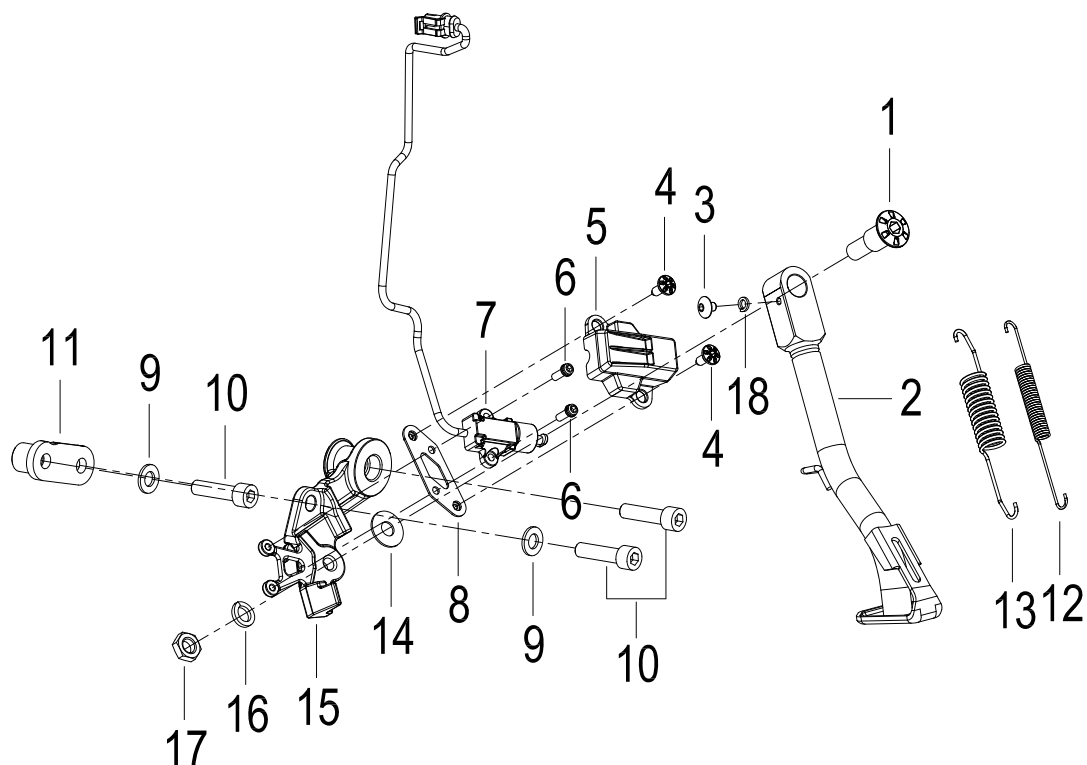
Prop the bike on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.



CYCLING SIDE STAND



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SPECIAL SCREW					
2	SIDE STAND					
3	SCREW					
4	SCREW					
5	COVER					
6	SCREW					
7	SIDE STAND SWITCH					
8	SUPPORT PLATE					
9	WASHER					
10	SCREW					
11	HOLDER					
12	OUTER SPRING					
13	INNER SPRING					
14	WASHER					
15	SIDE STAND SUPPORT PLATE					
16	SPRING WASHER					
17	NUT					
18	SPRING WASHER					



CYCLING

REMOVAL OF THE SIDE STAND SUPPORT

Park:

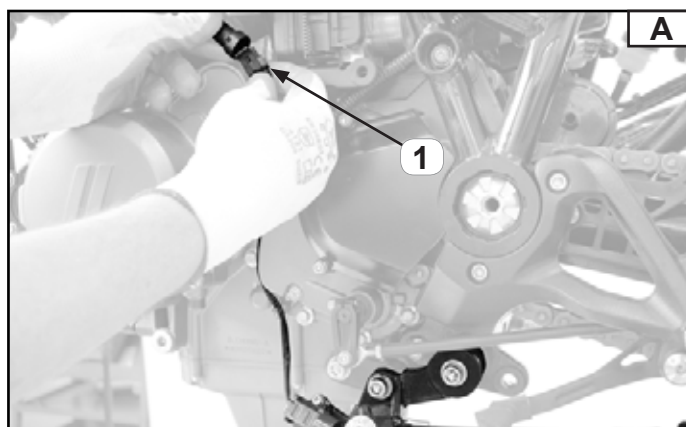
- The motorcycle on a level surface.

NOTICE

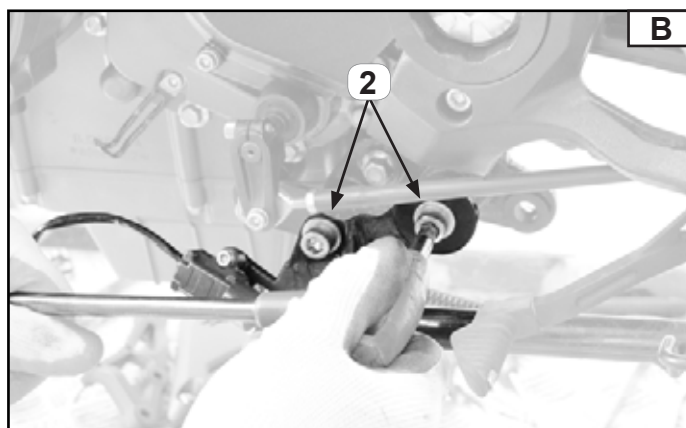
Prop the bike on suitable supports so that it cannot fall.

Disconnect:

- The connector of the side stand sensor (1) Fig. A.

**Remove:**

- The screws (2) Fig. B.



- The stand support plate (3) Fig. C.





CYCLING

INSTALLATION OF THE SIDE STAND SUPPORT

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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:

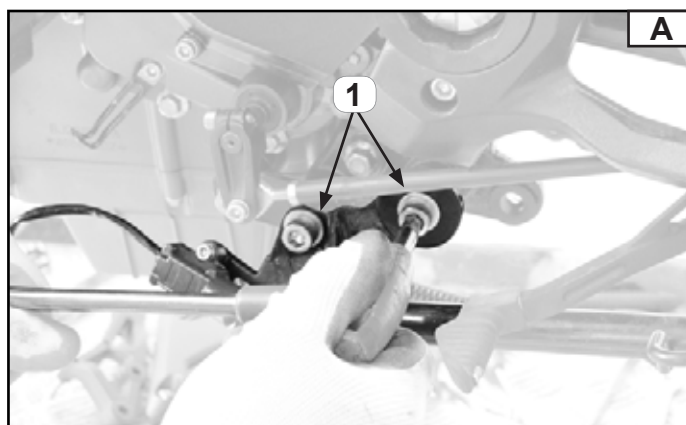


Torque 45 N*m

Use Loctite thread locker to secure the screws.



Loctite 243





CYCLING

REMOVAL OF THE SIDE STAND

Park:

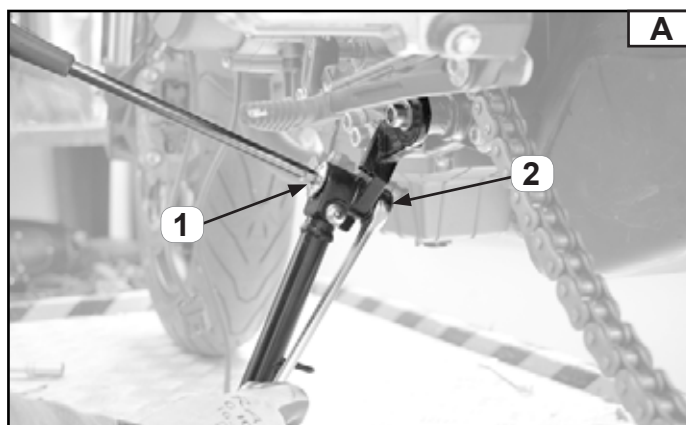
- The motorcycle on a level surface.

NOTICE

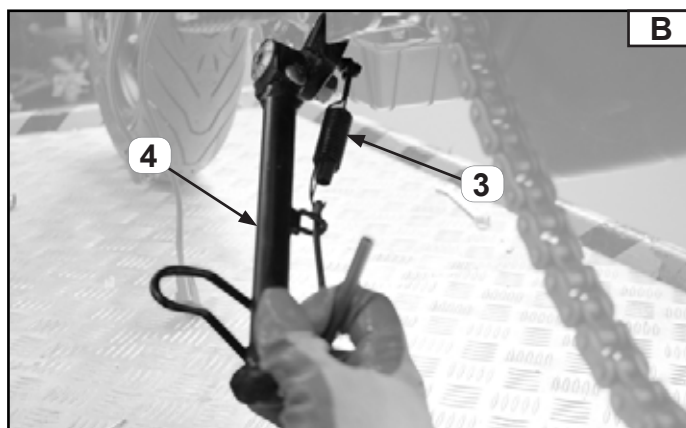
Prop the bike on suitable supports so that it cannot fall.

Remove:

- The special screw (1) Fig. A.
- The relative safety nut (2) Fig. A.



- The spring (3) Fig. B.
- The side stand (4) Fig. B.





CYCLING

INSTALLATION OF THE SIDE STAND

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.

Tighten:

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

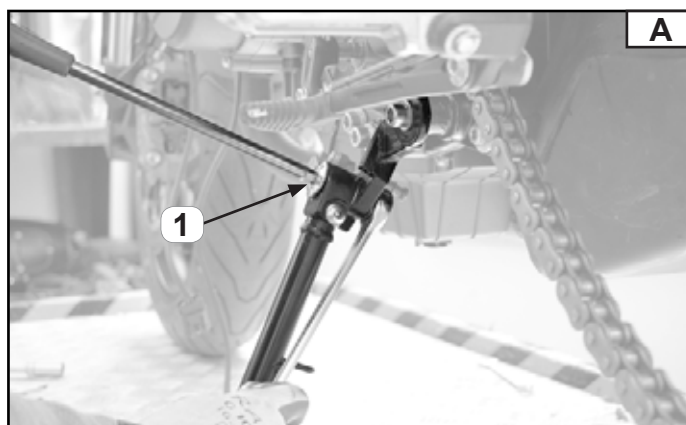


Torque 35 N*m

Use Loctite to secure.



Loctite 243





CYCLING

REMOVAL OF THE GEAR CHANGE PEDAL

Park:

- The motorcycle on a level surface.

NOTICE

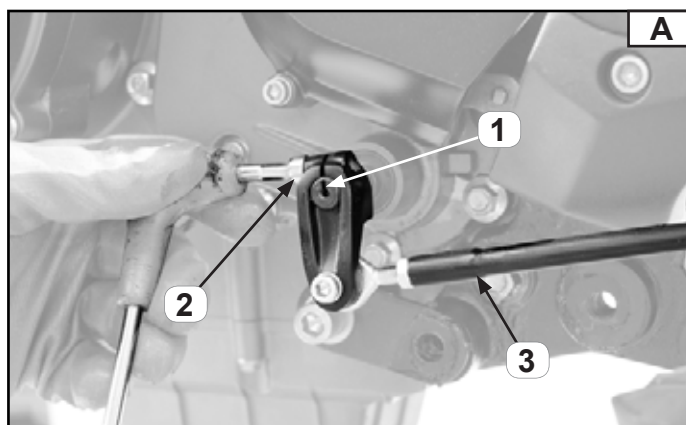
Prop the bike on suitable supports so that it cannot fall.

Mark:

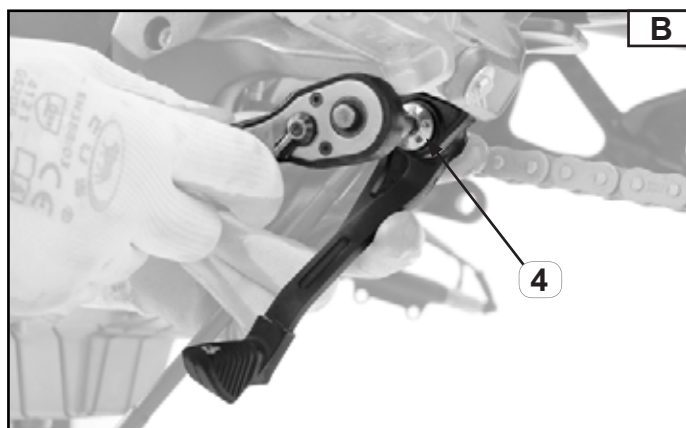
- With a marker next to the gearchange control lever (1) Fig. A.

Remove:

- The screw (2) Fig. A.
- The gear control rod (3) Fig. A



- The special screw (4) Fig. B.





CYCLING

INSTALLATION OF THE GEAR CHANGE PEDAL

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

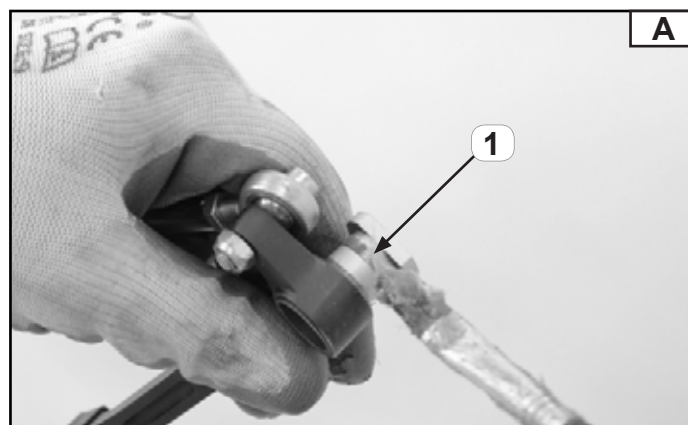
Proceed using the opposite order to removal.

Lubricate:

- The bush (1) Fig. A.



Recommended lubricant
NGLI2 GREASE

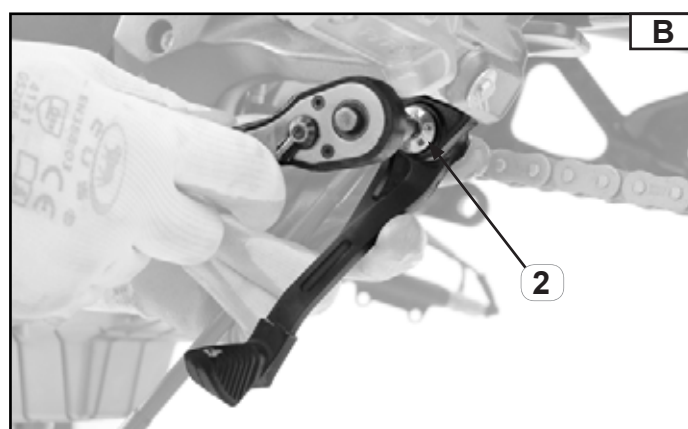


Tighten:

- The special screw (2) Fig. B to the following torque:



Torque 22 N*m



Tighten:

- The screw (3) Fig. C to the following torque:

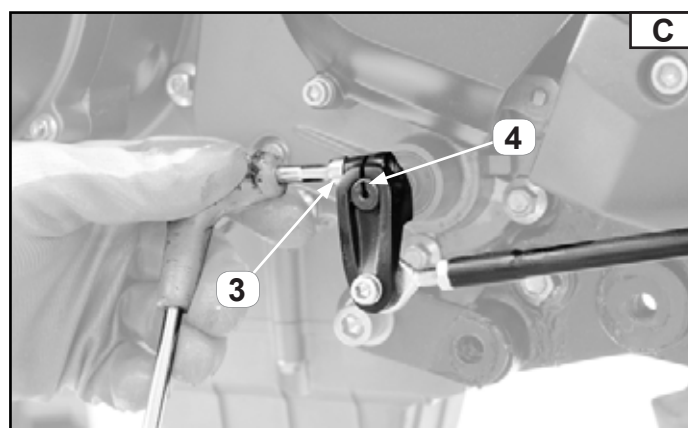


Torque 12 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD
LOCKER



NOTE:

During assembly, make sure the mark (4) made with the marker pen close to the gearchange control lever returns to the same position Fig. C.



CYCLING

REMOVAL OF THE CHAIN SLIDING SHOE

Park:

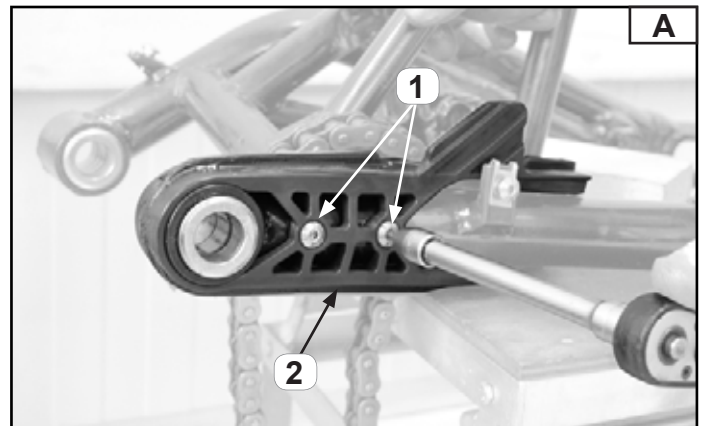
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The rear swingarm, refer to the section “**Removal of the swingarm, Chapter 4**”.
- The screws (1) Fig. A.
- The chain sliding shoe (2) Fig. A.





CYCLING

INSTALLATION OF THE CHAIN SLIDING SHOE

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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:

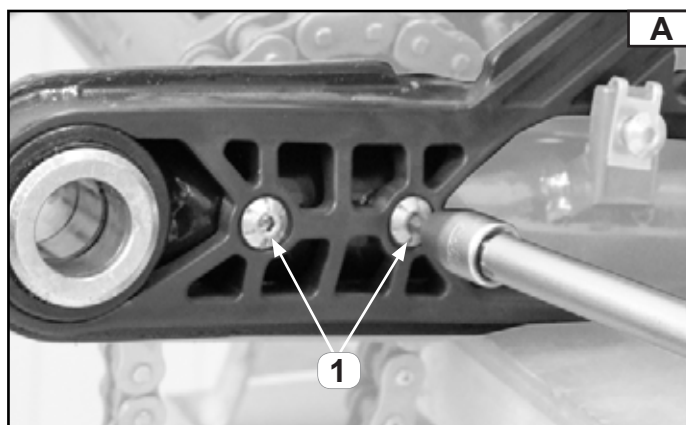


Torque 10 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**





CYCLING

REMOVAL OF THE BRAKE CONTROL PEDAL

Park:

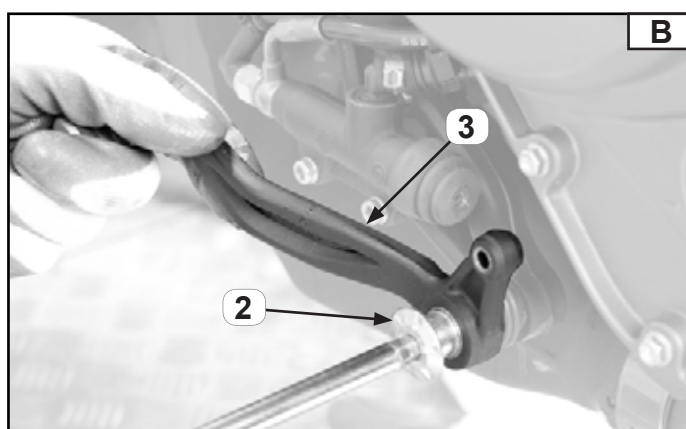
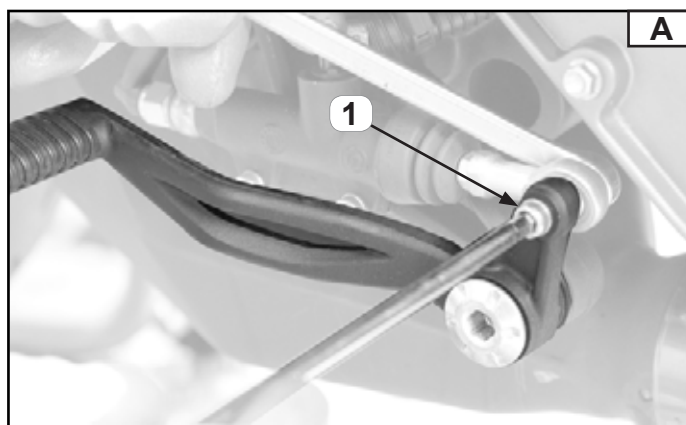
- The motorcycle on a level surface.

NOTICE

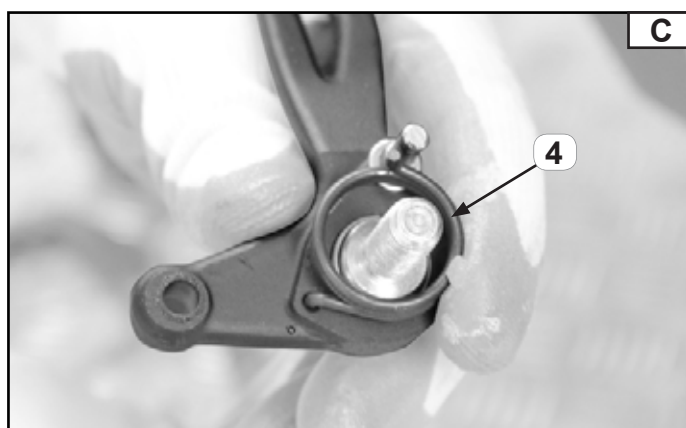
Prop the bike on suitable supports so that it cannot fall.

Remove:

- The screw (1) Fig. A.
- The special screw (2) Fig. B.
- The brake control pedal (3) Fig. B.

**NOTE:**

During removal of the brake control pedal, do not let the return spring fall (4) Fig. C.





CYCLING

INSTALLATION OF THE BRAKE CONTROL PEDAL

Park:

- The motorcycle on a level surface.

NOTICE

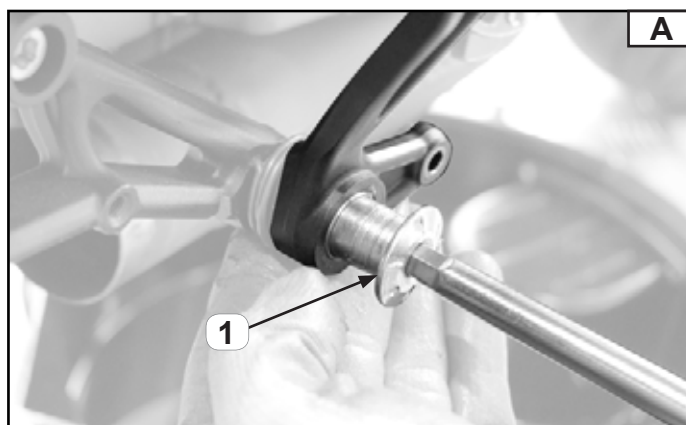
Prop the bike on suitable supports so that it cannot fall.

Installation:

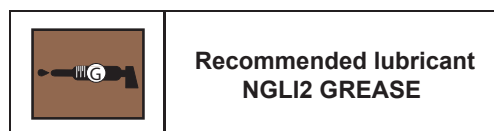
Proceed using the opposite order to removal.

Tighten:

- The special screw (1) Fig. A.

**Lubricate:**

- The unthreaded collar of the special screw (2) Fig. B.

**Tighten:**

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



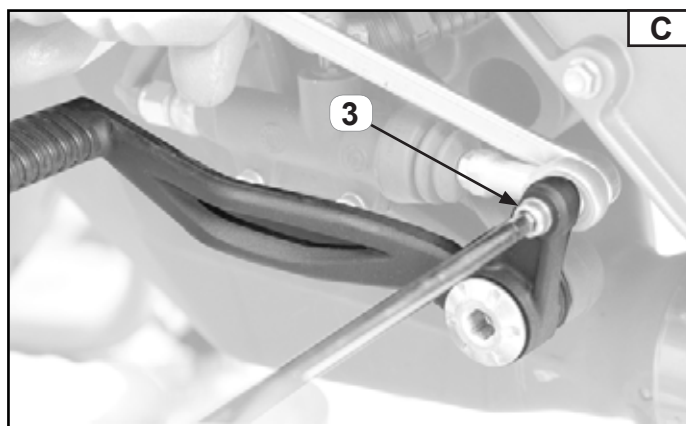
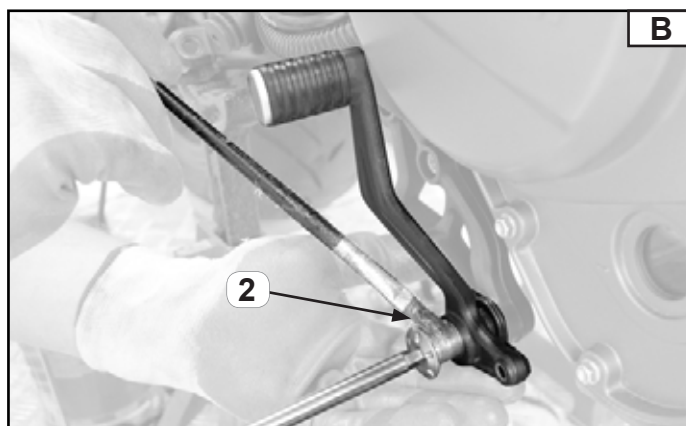
Torque 25 N*m

- The screw (3) Fig. C to the following torque:



Torque 10 N*m

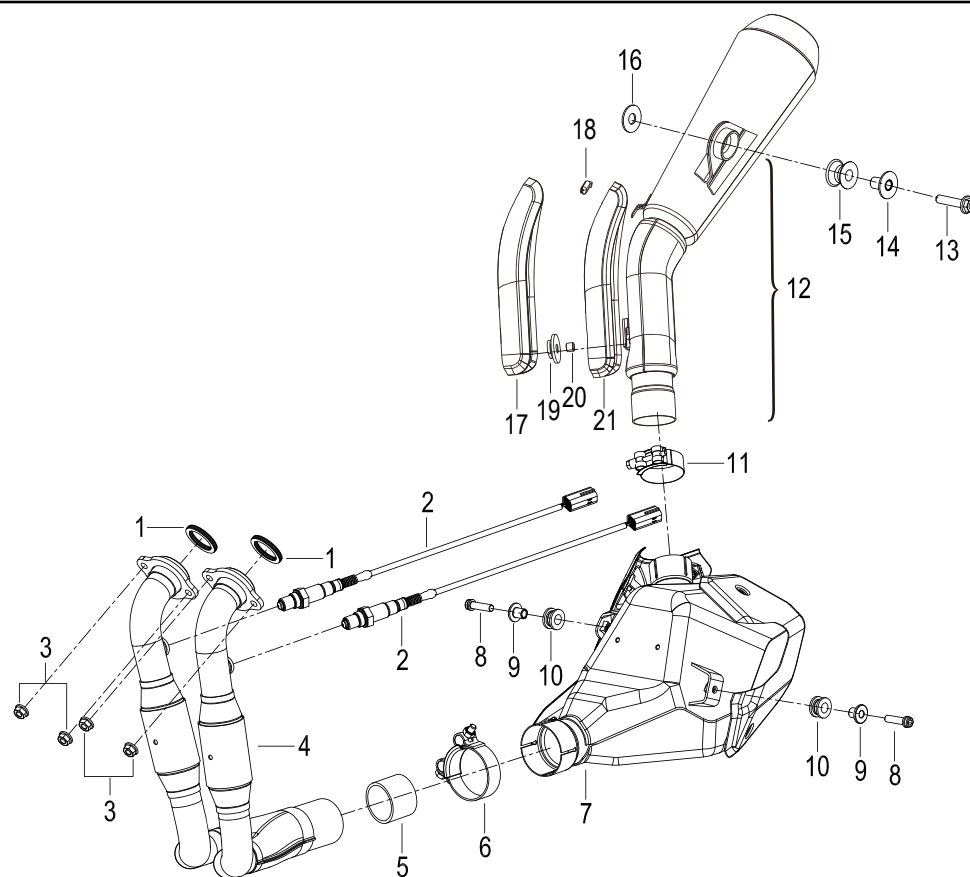
Use medium Loctite thread locker to secure.





EXHAUST SYSTEM

EXHAUST ASSEMBLY



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	EXHAUST GASKET					
2	LAMBDA SENSOR					
3	NUT					
4	EXHAUST MANIFOLD					
5	EXHAUST MANIFOLD					
6	GRAPHITE GASKET					
7	MUFFLER					
8	SCREW					
9	BUSH					
10	RUBBER PAD					
11	SCREW HOSE CLAMP					
12	SILENCER					
13	SCREW					
14	BUSH "T"					
15	RUBBER PAD					
16	SPACER					
17	COVER					
18	RUBBER PAD					
19	RUBBER PAD					
20	SPACER					
21	SILENCER PROTECTION					



EXHAUST SYSTEM

REMOVAL OF THE EXHAUST ASSEMBLY

Park:

- The motorcycle on a level surface.

NOTICE

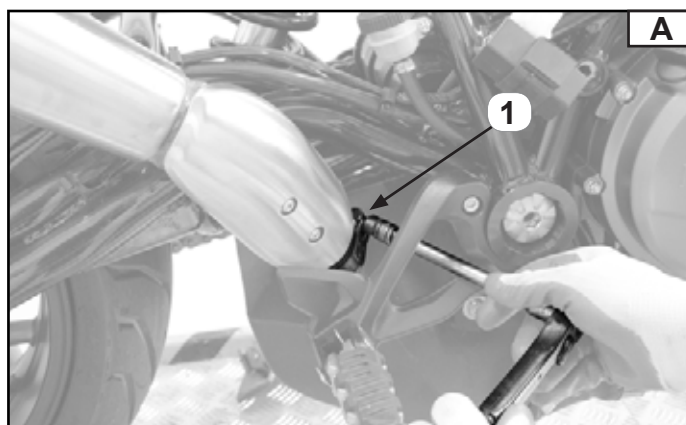
Prop the bike on suitable supports so that it cannot fall.

Remove:

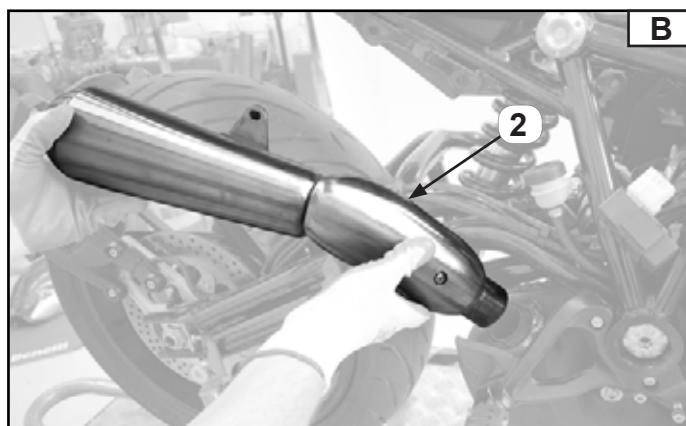
- The RH passenger foot peg plate, refer to the section “**Removal of the RH passenger foot peg plate, Chapter 4**”.

Loosen:

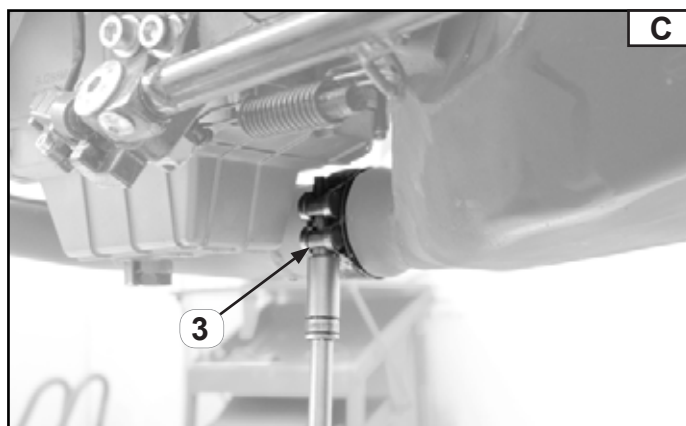
- The screw hose clamp (1) Fig. A.

**Remove:**

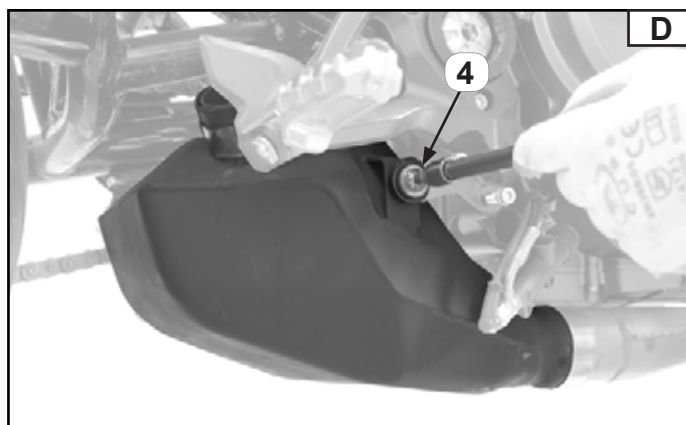
- The silencer (2) Fig. B.

**Loosen:**

- The screw hose clamp (3) Fig. C.

**Remove:**

- The screw (4) on the muffler right side Fig. D.

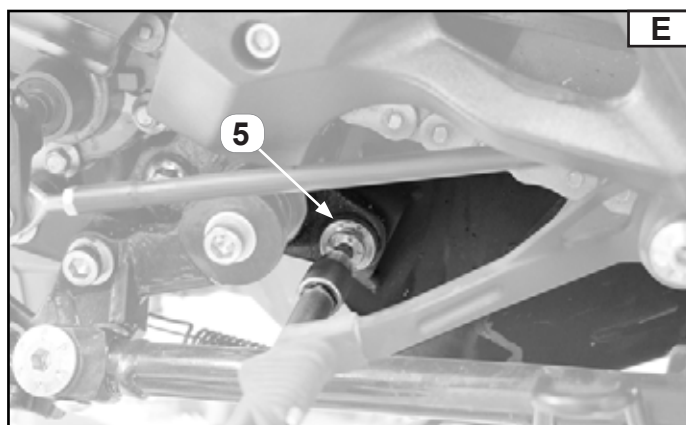




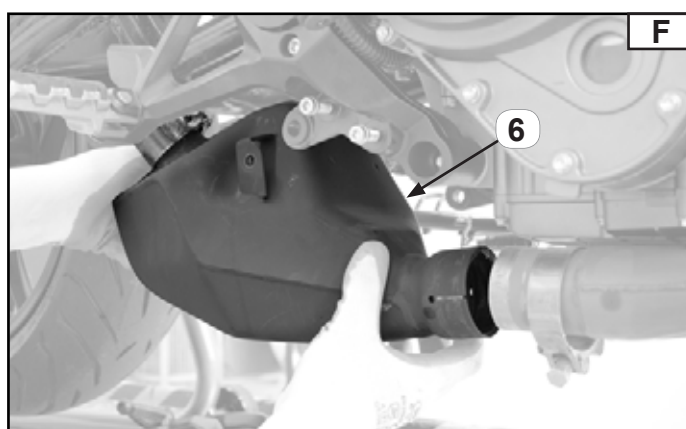
EXHAUST SYSTEM

REMOVAL OF THE EXHAUST ASSEMBLY

- The screw (5) on the muffler left side Fig. E.

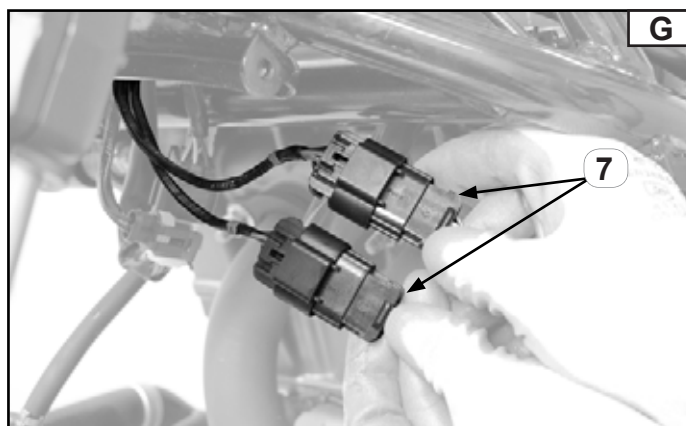


- The muffler (6) Fig. F.



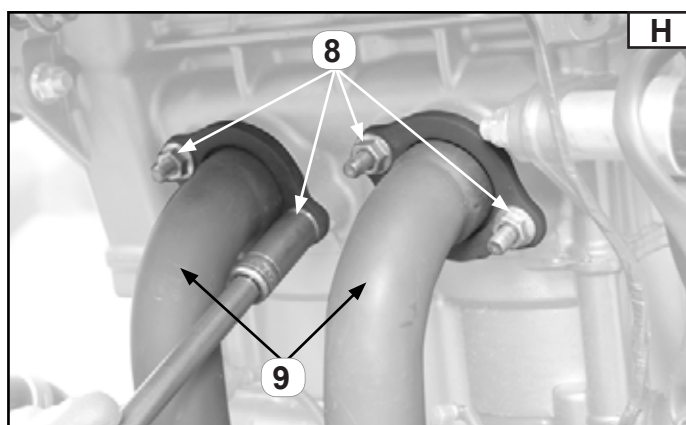
Disconnect:

- The connectors of the lambda sensors (7) Fig. G.



Remove:

- The nuts (8) Fig. H.
- The exhaust manifolds (9) Fig. H.





EXHAUST SYSTEM

INSTALLATION OF THE EXHAUST ASSEMBLY

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.

Tighten:

- The nuts (1) Fig. A to the following torque:



Torque 22 N*m

NOTE:

During assembly stage, lubricate the nuts with copper grease.



Recommended lubricant
COPPER GREASE

Tighten:

- The screw (2) on the muffler left side Fig. B to the following torque:



Torque 25 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD
LOCKER

Tighten:

- The screw (3) on the muffler right side Fig. C to the following torque:

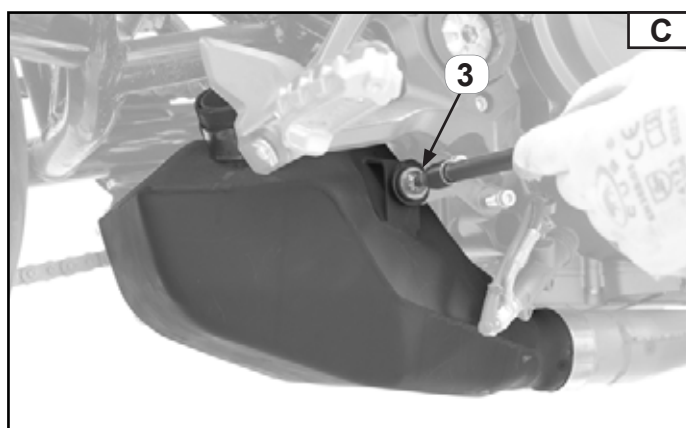
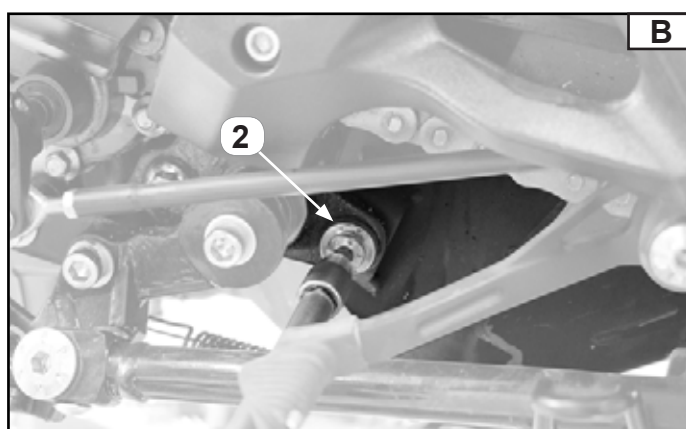
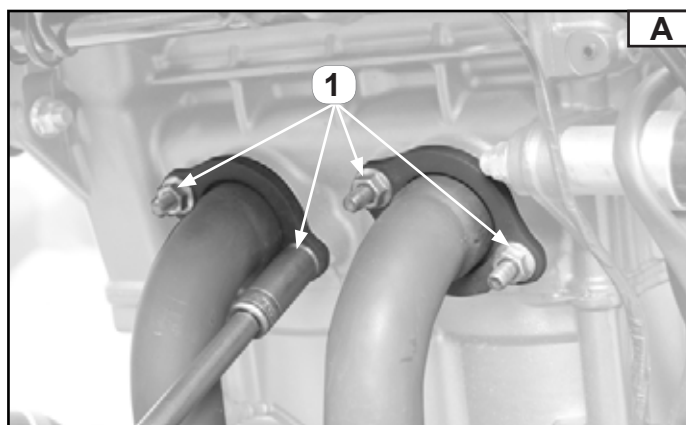


Torque 25 N*m

Use medium Loctite thread locker to secure.

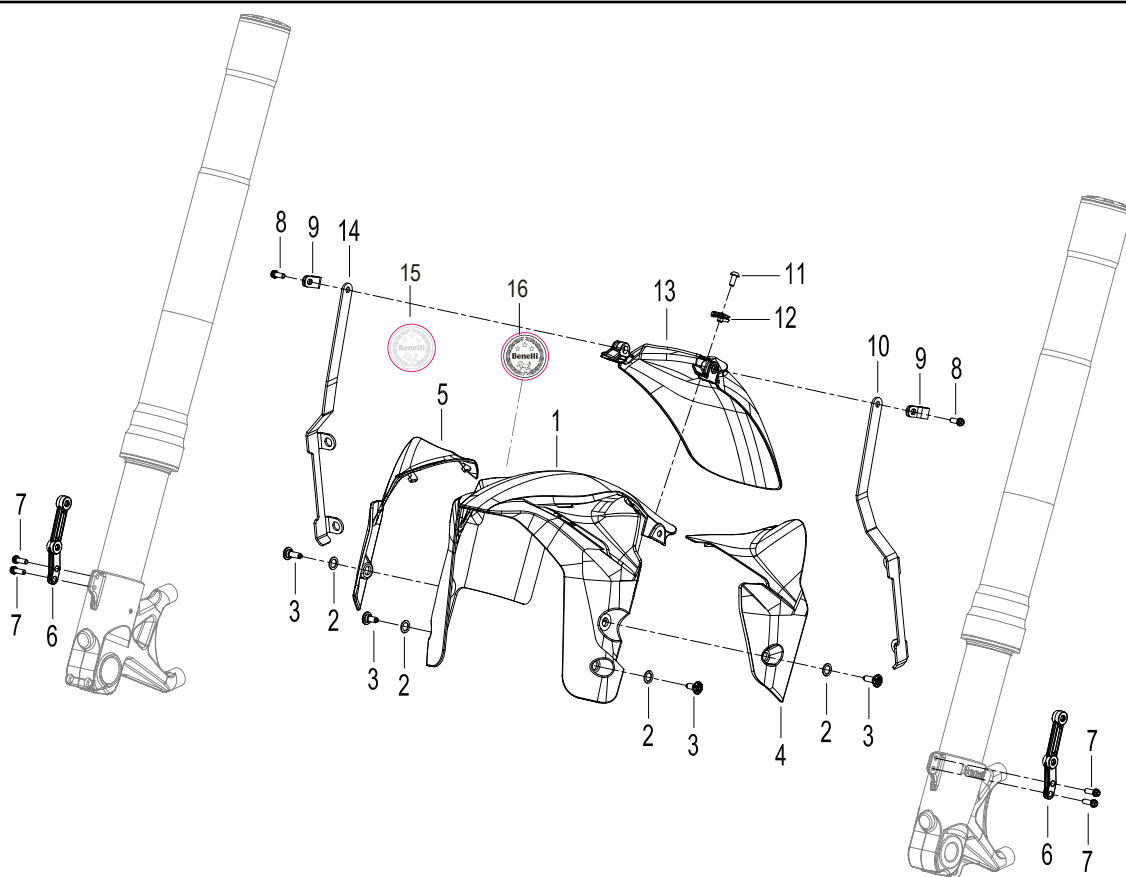


MEDIUM THREAD
LOCKER





FAIRING FRONT MUDGUARD



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	FRONT MUDGUARD					
2	NYLON WASHER					
3	SCREW					
4	L.H. MUDGUARD HOLDER					
5	R.H. MUDGUARD HOLDER					
6	BRACKET					
7	SCREW					
8	SCREW					
9	CLAMP					
10	L.H. HOLDER BRACKET					
11	SCREW					
12	QUICK FASTENING					
13	INFERIOR MUDGUARD					
14	R.H. HOLDER BRACKET					
15	STICKER (BENELLI LOGO)					
16	STICKER (BENELLI LOGO)					



FAIRING

REMOVAL OF THE FRONT MUDGUARD

Park:

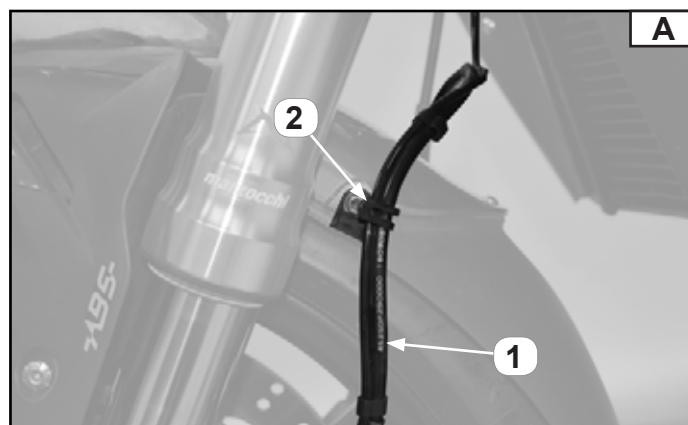
- The motorcycle on a level surface.

NOTICE

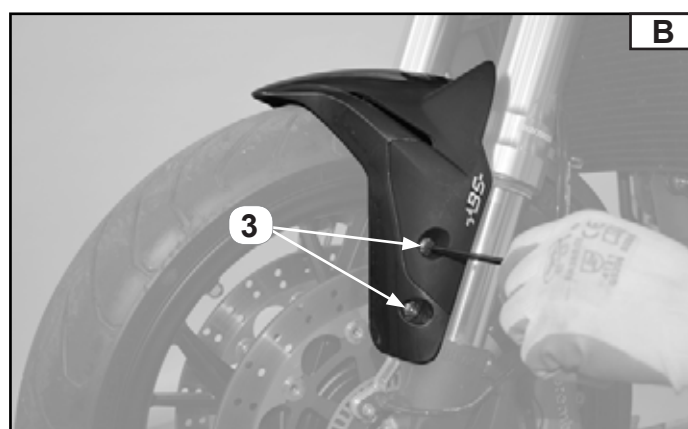
Prop the bike on suitable supports so that it cannot fall.

Remove:

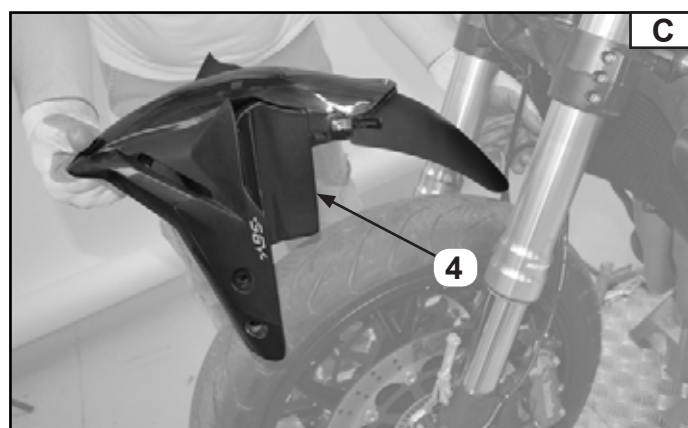
- The front brake pipes (1) from the fairlead (2) Fig. A.



- The screws (3) Fig. B from both sides.



- The front mudguard (4) Fig. C.





FAIRING

INSTALLATION OF THE FRONT MUDGUARD

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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:

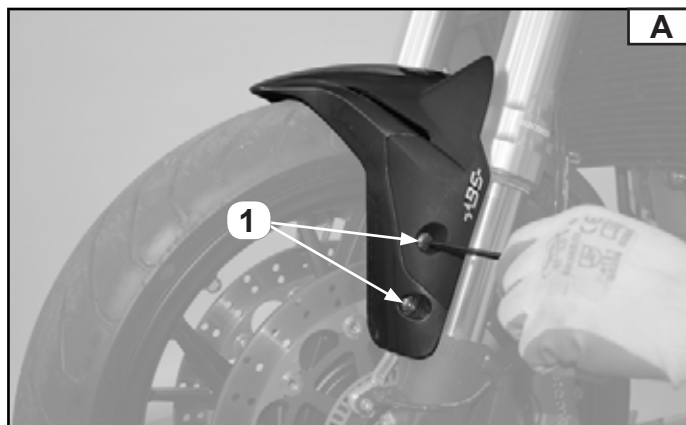


Torque 10 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**





FAIRING

REMOVAL OF MUDFLAP

Park:

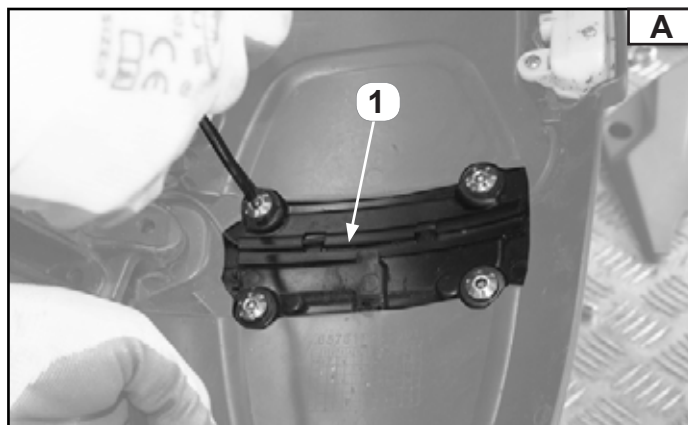
- The motorcycle on a level surface.

NOTICE

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

Remove:

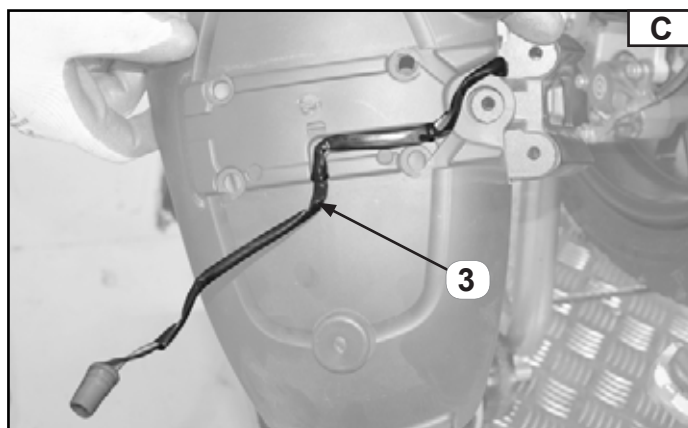
- The rear mudguard holder, refer to the section “**Removal of the rear mudguard holder, Chapter 4**”.
- The number plate holder, refer to the section “**Removal of the number plate holder, Chapter 4**”.
- The indicator light support bracket (1) Fig. A.



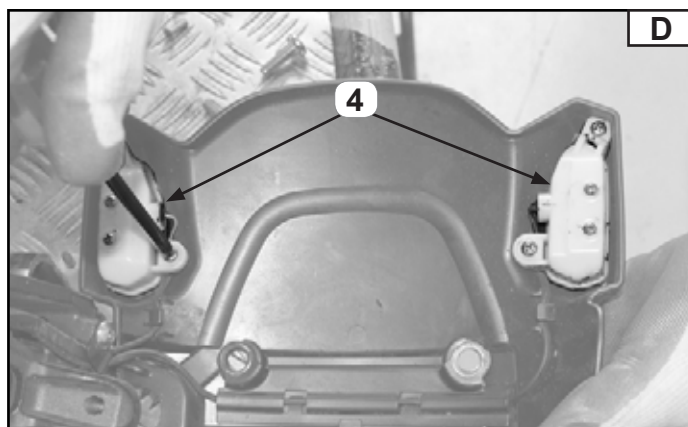
- The screw (2) Fig. B.



- The number plate light wire (3) Fig. C.



- The left/right rear indicator lights (4) Fig. D.



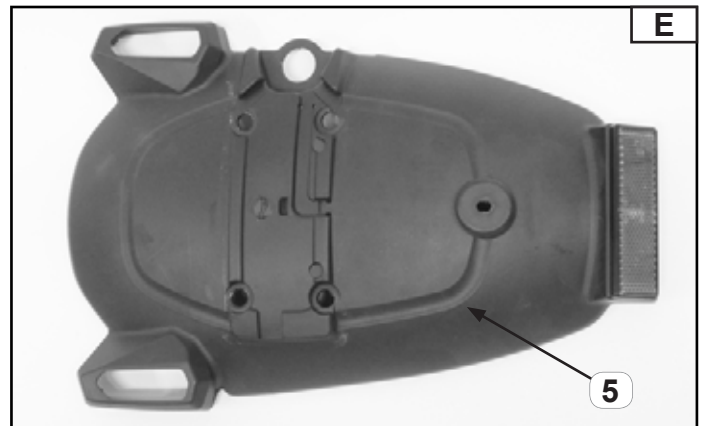


FAIRING

REMOVAL OF MUDFLAP

Slide out:

- The mudflap (5) Fig. E.





FAIRING

INSTALLATION OF THE MUDFLAP

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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:

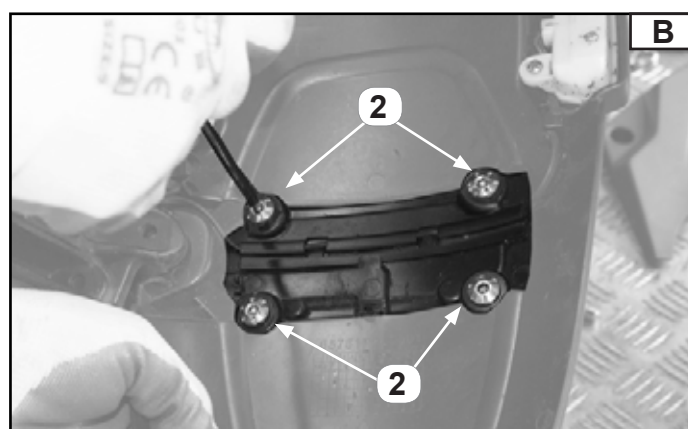


Torque 8 N*m

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



Torque 8 N*m





FAIRING

REMOVAL OF THE CHAIN GUARD

Park:

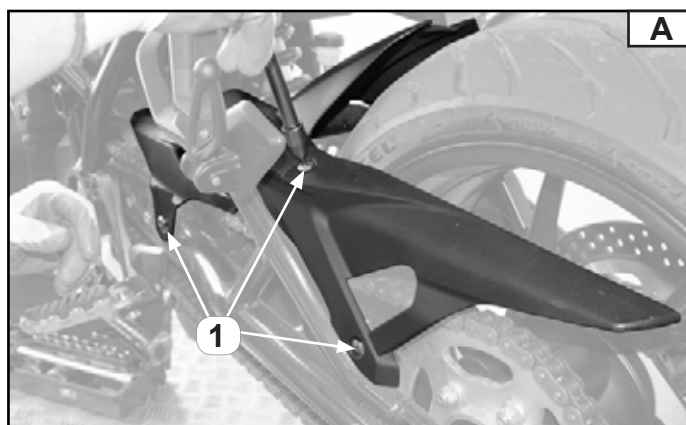
- The motorcycle on a level surface.

NOTICE

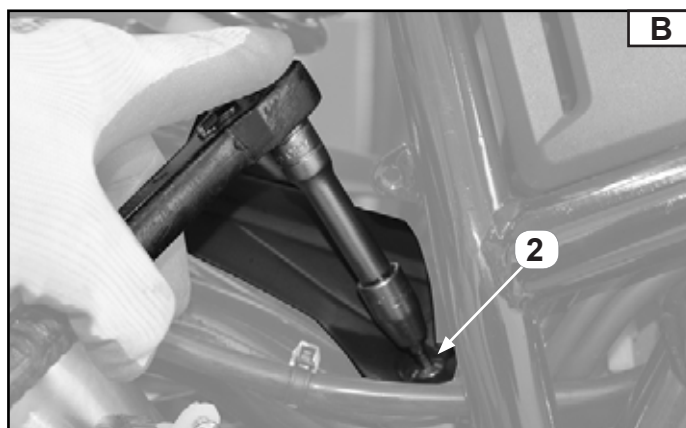
Prop the bike on suitable supports so that it cannot fall.

Remove:

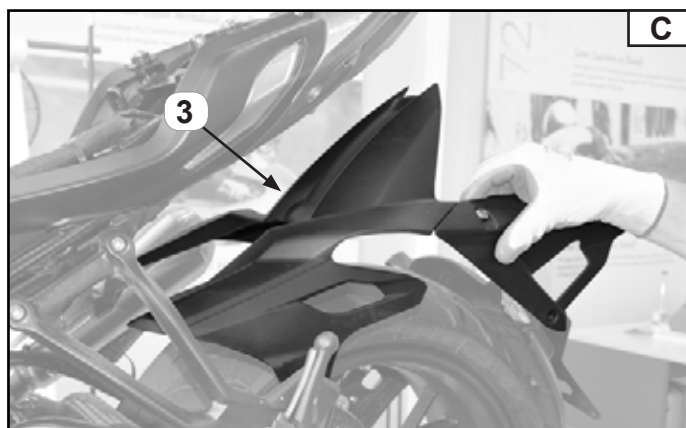
- The screws (1) Fig. A.



- The screw (2) Fig. B.



- The chain guard (3) Fig. C.





FAIRING

INSTALLATION OF THE UPPER CHAIN GUARD

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.

Tighten:

- The screw (1) Fig. A to the following torque:



Torque 12 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

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

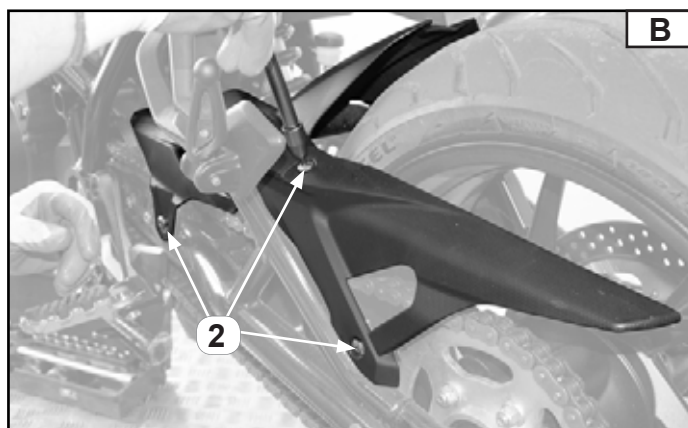
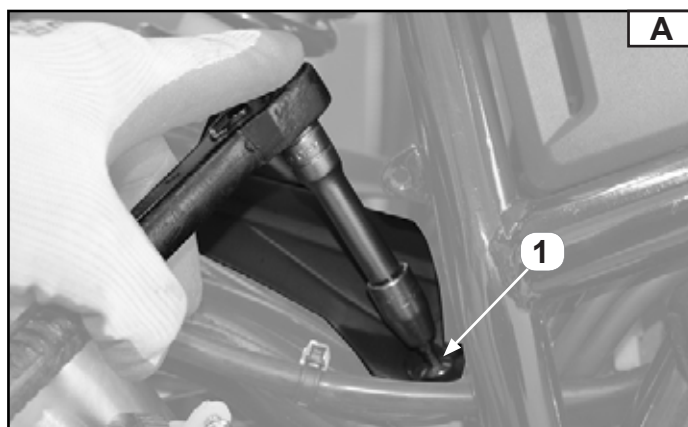


Torque 12 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**





FAIRING

REMOVAL OF THE SEAT

Park:

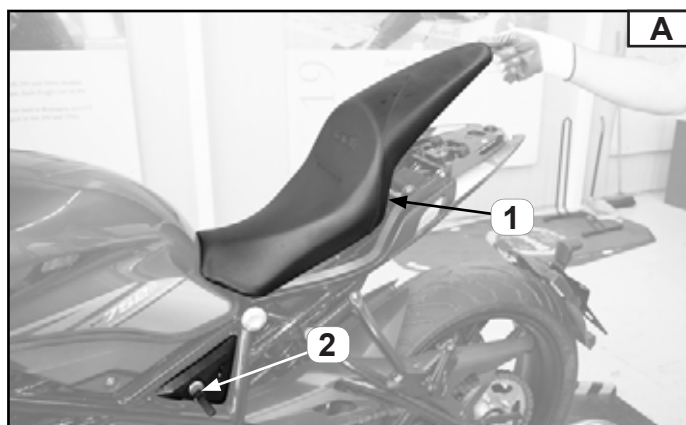
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The seat (1) using the supplied wrench (2) Fig. A.





FAIRING

INSTALLATION OF THE SEAT

Park:

- The motorcycle on a level surface.

NOTICE

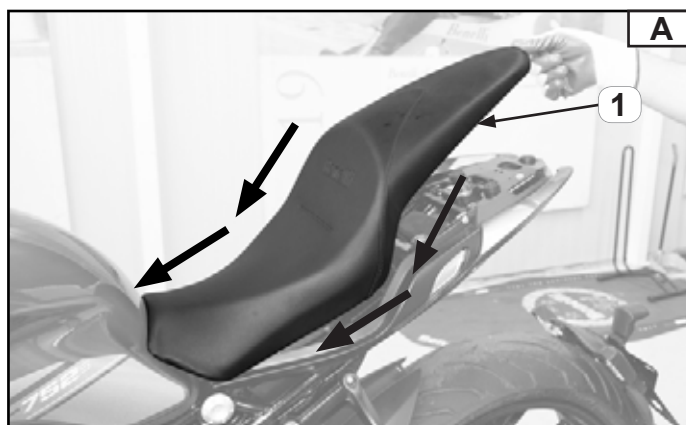
Prop the bike on suitable supports so that it cannot fall.

Installation:

Proceed using the opposite order to removal.

Insert:

- The seat (1) Fig. A following the specified arrows.





FAIRING

REMOVAL OF THE SEAT LEVER

Park:

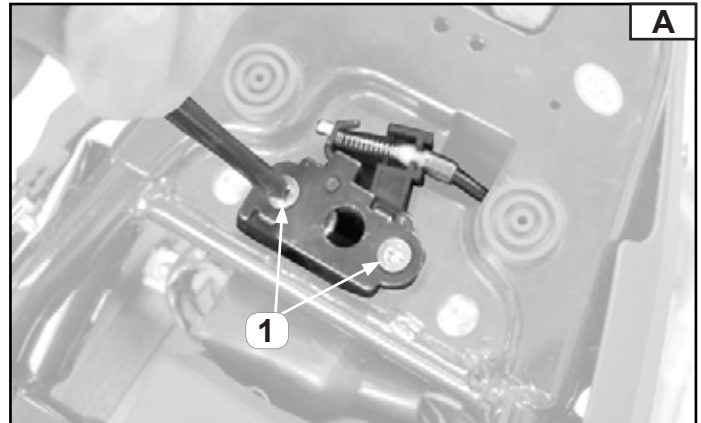
- The motorcycle on a level surface.

NOTICE

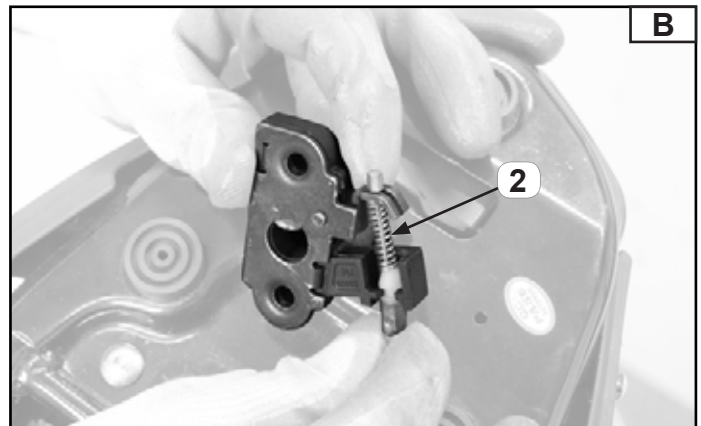
Prop the bike on suitable supports so that it cannot fall.

Remove:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The screws (1) Fig. A.



- The wire cable lug (2) Fig. B.





FAIRING

INSTALLATION OF THE SEAT LEVER

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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:

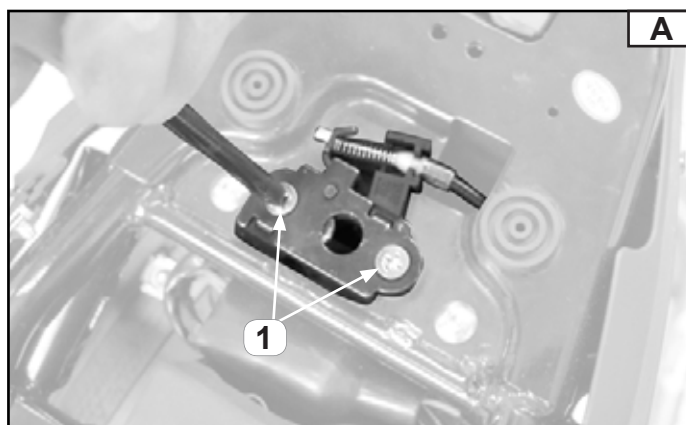


Torque 8 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**





FAIRING

REMOVAL OF THE INSTRUMENT SUPPORT PLATE

Park:

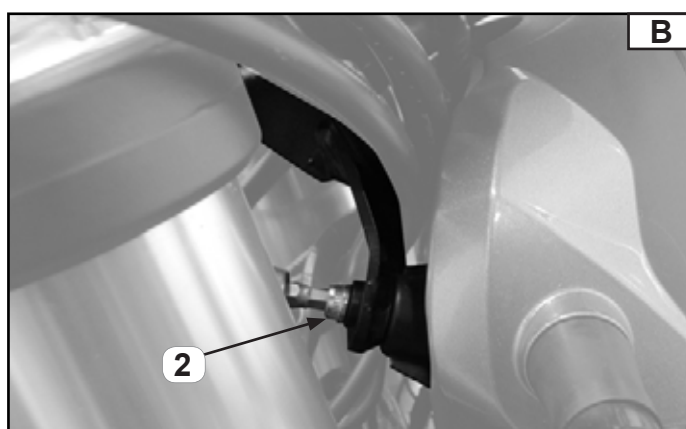
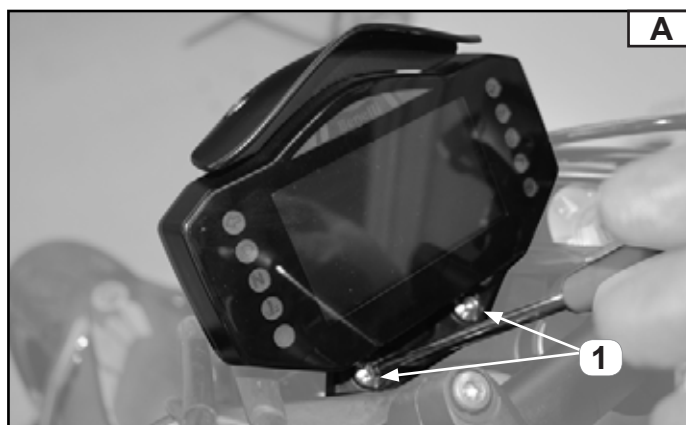
- The motorcycle on a level surface.

NOTICE

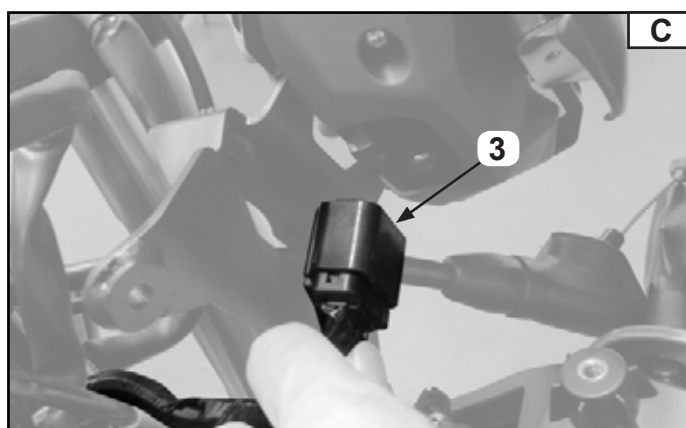
Prop the bike on suitable supports so that it cannot fall.

Remove:

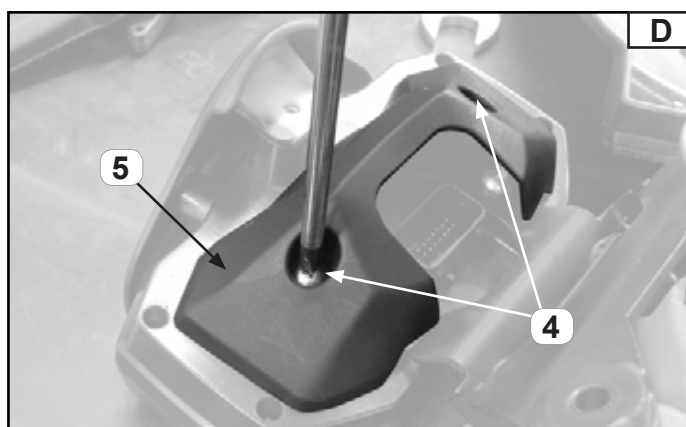
- The seat, refer to the section “**Removal of rider seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The handlebar, refer to the section “**Removal of the handlebar, Chapter 4**”.
- The screws (1) Fig. A.
- The screw (2) Fig. B on both sides of the vehicle.

**Disconnect:**

- The connector (3) Fig. C.

**Remove:**

- The screws (4) Fig. D.
- The face shield (5) Fig. D.



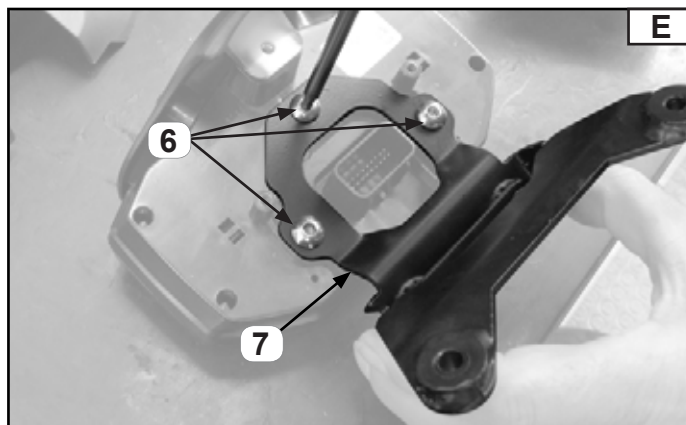


FAIRING

REMOVAL OF THE INSTRUMENT SUPPORT PLATE

Remove:

- The screws (6) Fig. E.
- The instrument support plate (7) Fig. E.





FAIRING

INSTALLATION OF THE INSTRUMENT SUPPORT PLATE

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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 medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

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



Torque 10 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

- The screw (3) Fig. C on both side of the vehicle to the following torque:



Torque 12 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

- The screws (4) Fig. D to the following torque:

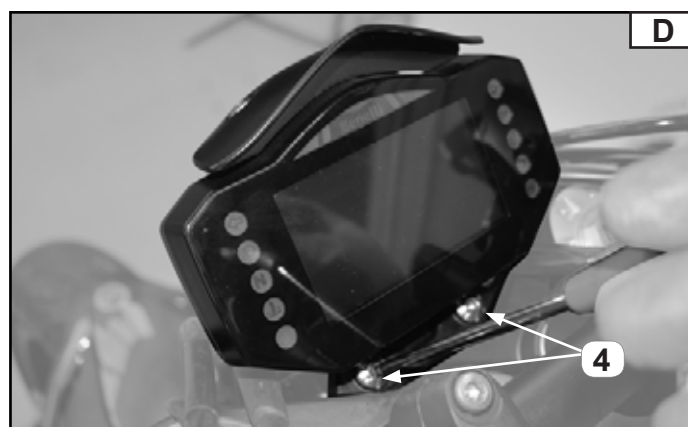
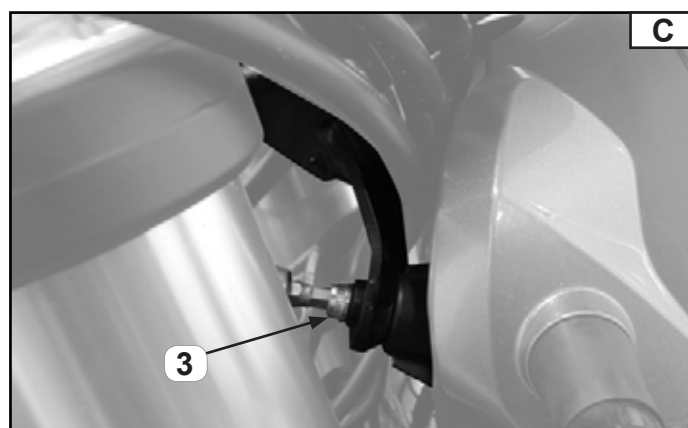
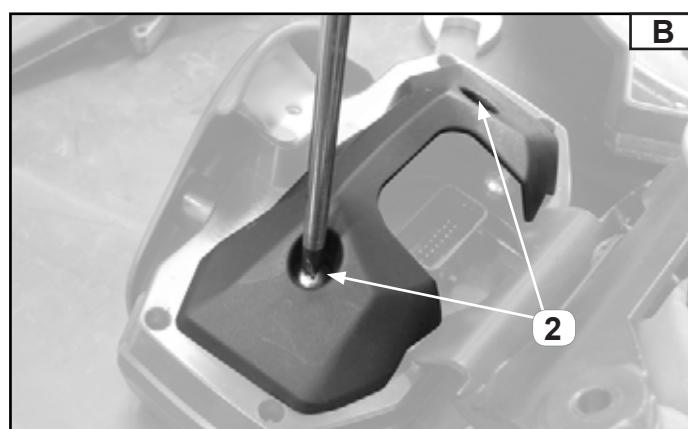
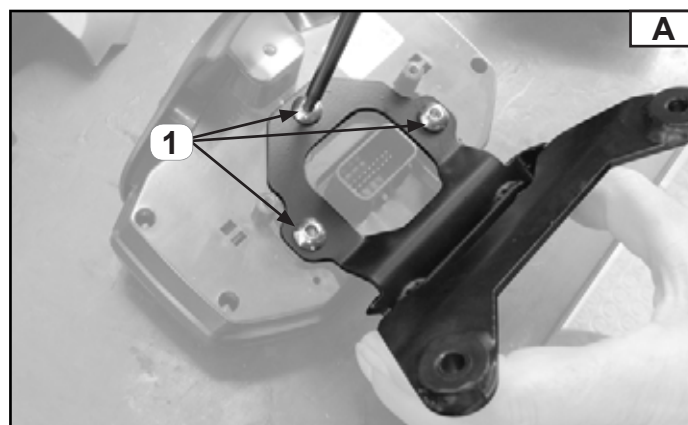


Torque 12 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**





FAIRING

REMOVAL OF THE FRONT HEADLAMP UNIT

Park:

- The motorcycle on a level surface.

NOTICE

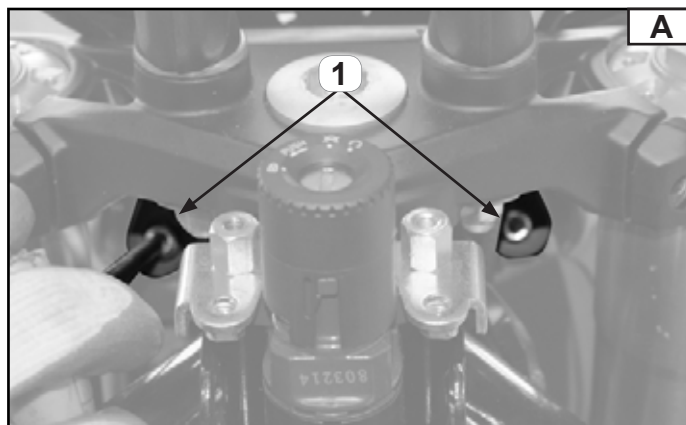
Prop the bike on suitable supports so that it cannot fall.

The vehicle headlight is a LED. If it needs to be replaced, carry out the following procedure:

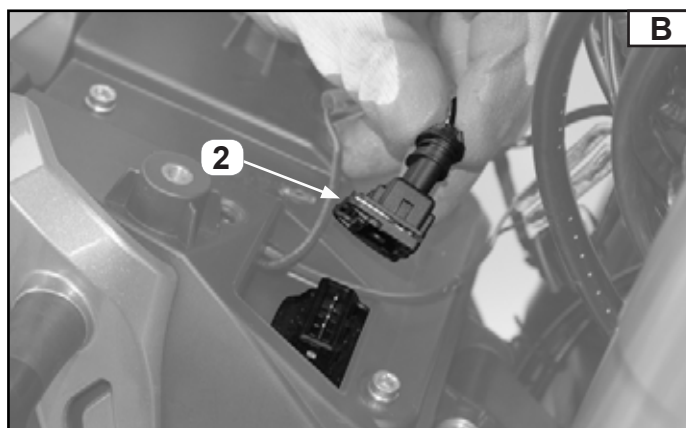
The following procedure applies only to the front lights.

Remove:

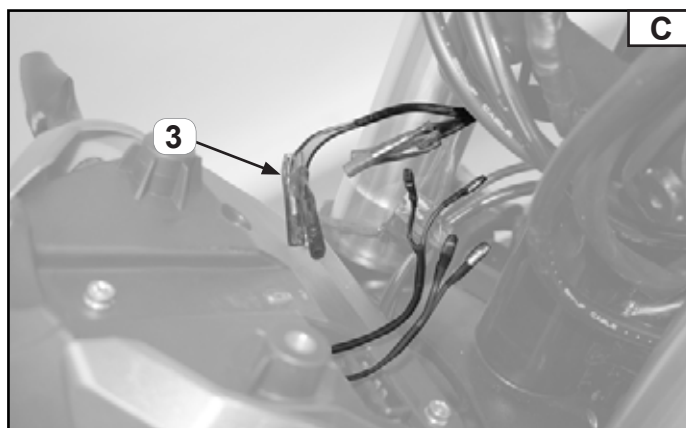
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The fastening screws (1) Fig. A.

**Disconnect:**

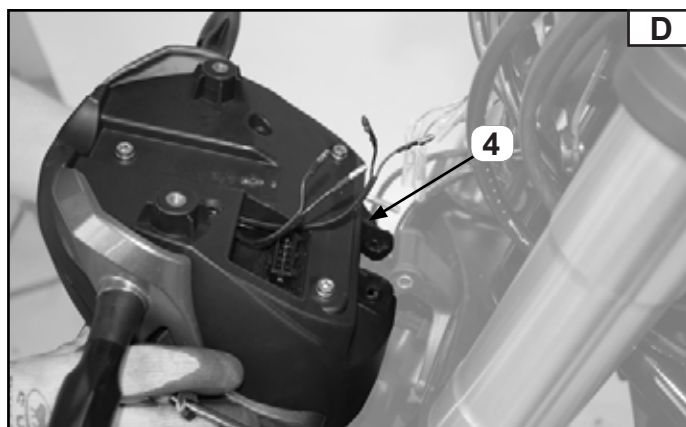
- The instrumentation connector (2) Fig. B.



- The indicator light wire connectors (3) Fig. C.

**Remove:**

- The front head light (4) Fig. D.





FAIRING

INSTALLATION OF THE FRONT HEADLAMP UNIT

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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:

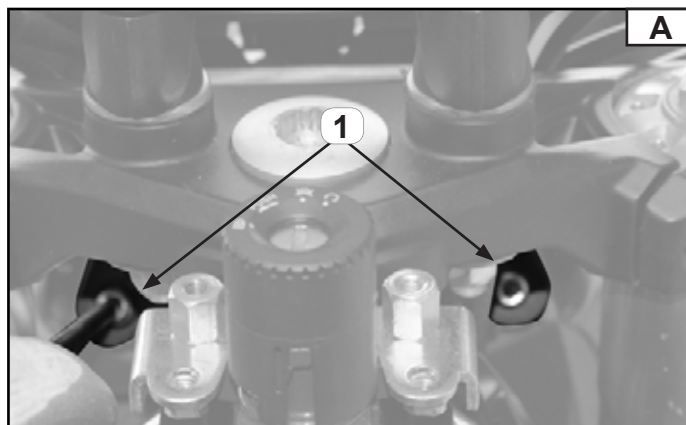


Torque 12 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**





FAIRING

REMOVAL OF THE FUEL TANK

Park:

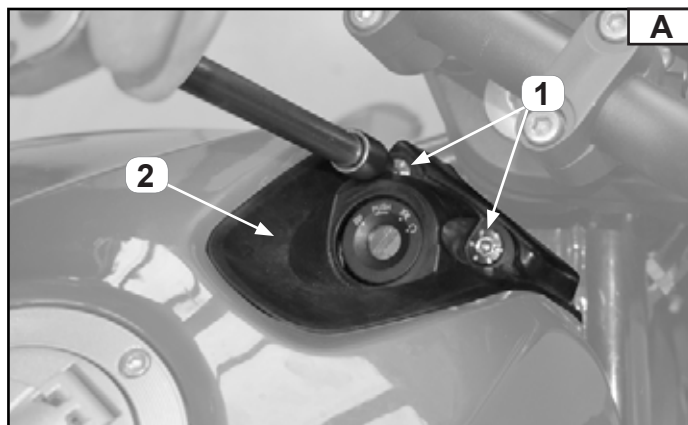
- The motorcycle on a level surface.

NOTICE

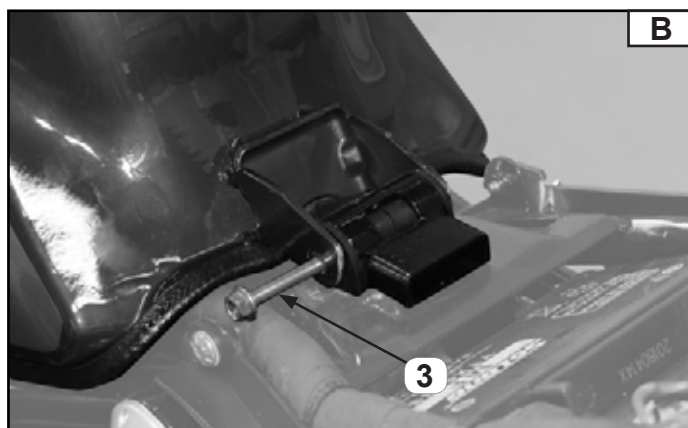
Prop the bike on suitable supports so that it cannot fall.

Remove:

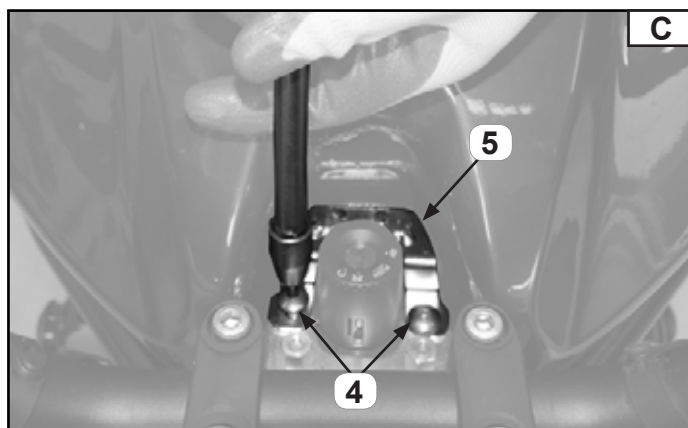
- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The screws (1) Fig. A.
- The tank face shield (2) Fig. A.



- The screw (3) Fig. B.



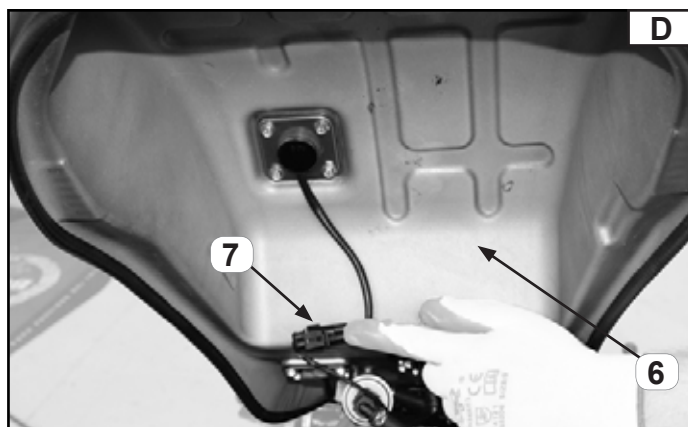
- The screws (4) Fig. C.
- The tank fixing bracket (5) Fig. C.

**Raise:**

- The tank (6) Fig. D.

Disconnect:

- The connector of the front level sensor (7) Fig. D.

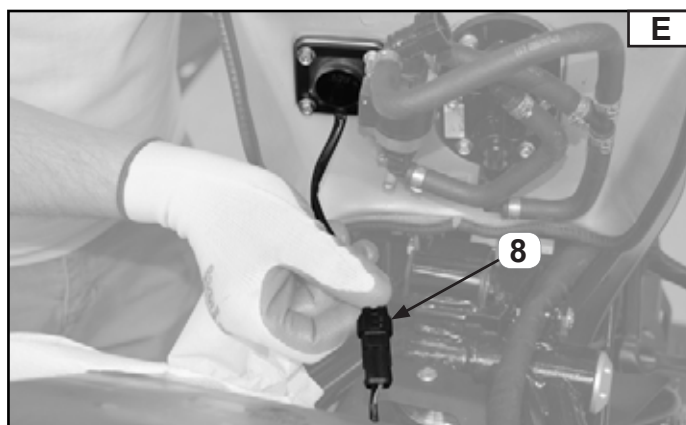




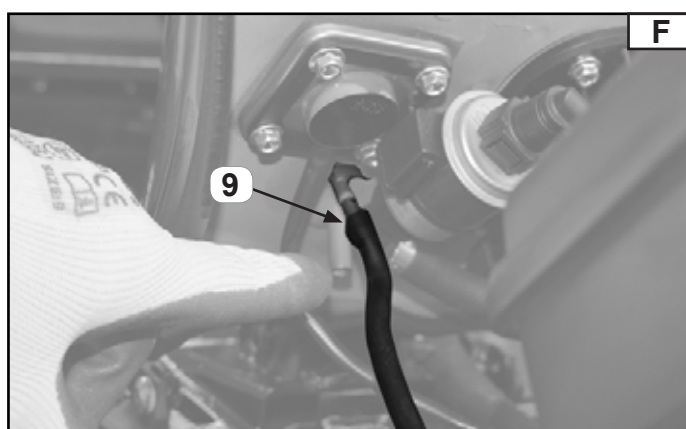
FAIRING

REMOVAL OF THE FUEL TANK

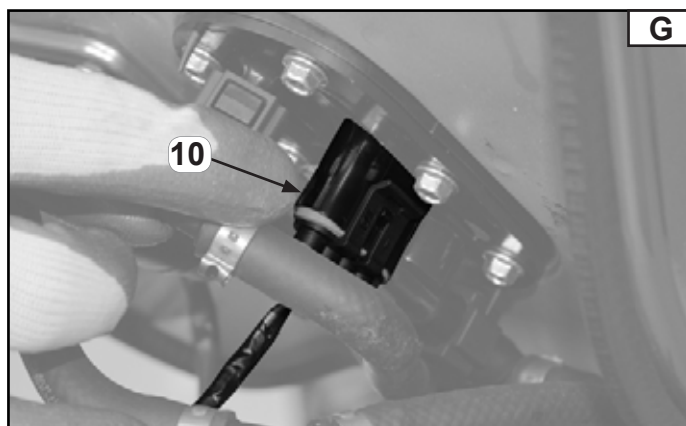
- The connector of the rear level sensor (8) Fig. E.



- The vent valve tube (9) Fig. F.

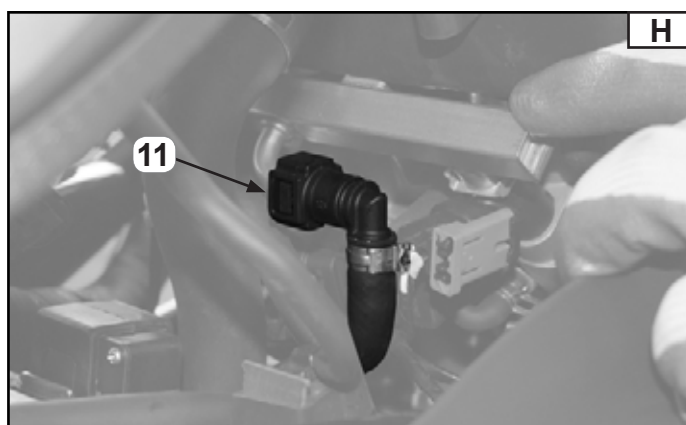


- The fuel pump supply connector (10) Fig. G.



Disconnect:

- The fuel pipe (11) from the throttle body Fig. H.





FAIRING

INSTALLATION OF THE FUEL TANK

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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

- The screw (2) Fig. B to the following torque:

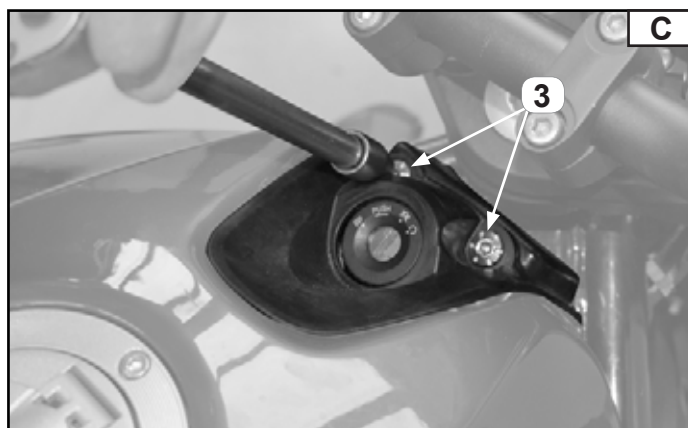
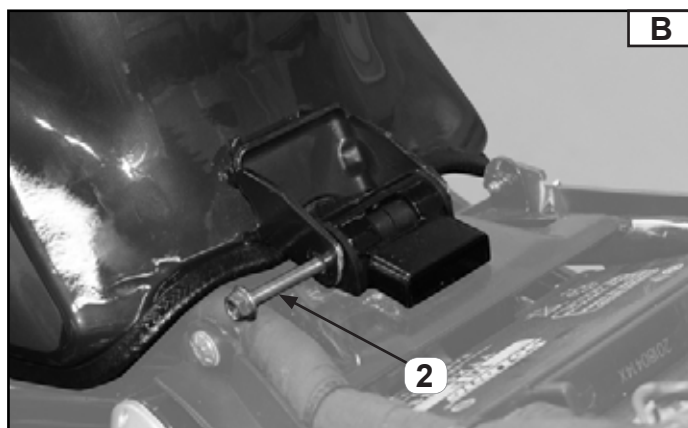
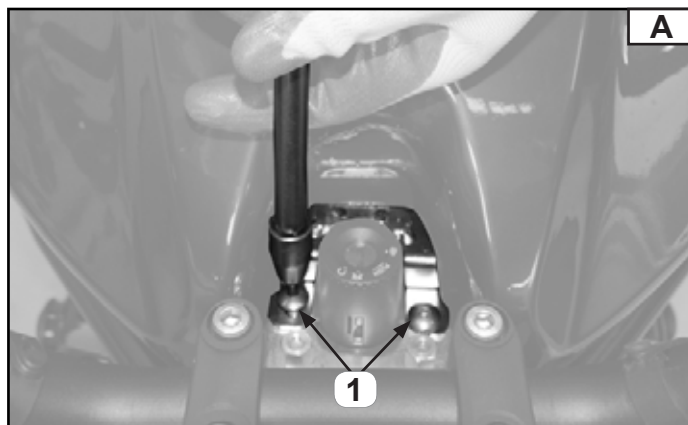


Torque 10 N*m

- The screws (3) Fig. C to the following torque:



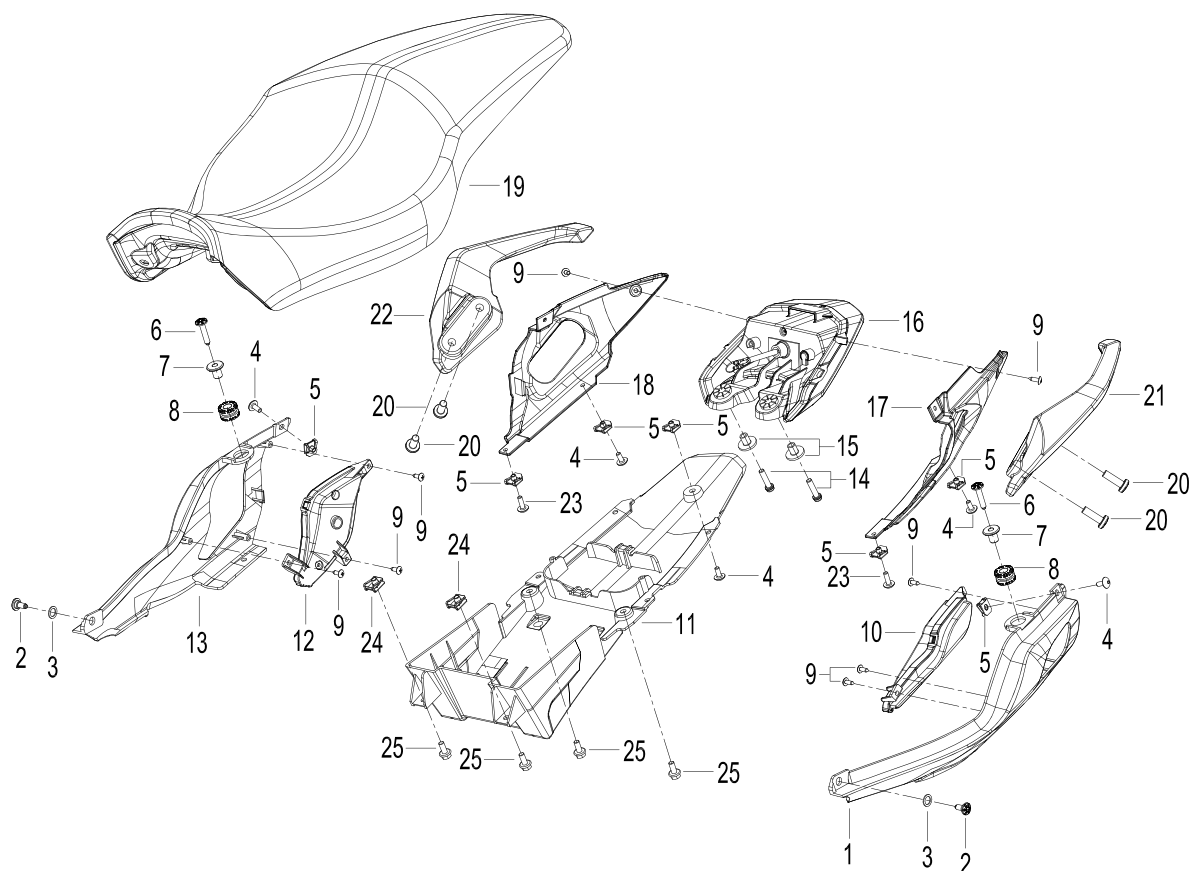
Torque 10 N*m





FAIRING

SIDE FAIRINGS



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	L.H. LOWER PANEL					
2	SCREW					
3	NYLON WASHER					
4	SCREW					
5	QUICK FASTENING					
6	SPECIAL SCREW					
7	UPPER BUSH					
8	RUBBER PAD					
9	SCREW					
10	L.H. PROTECTION					
11	BATTERY BOX					
12	R.H. PROTECTION					
13	R.H. LOWER PANEL					
14	SCREW					
15	BUSH					
16	REAR HEADLIGHT					
17	L.H. TAIL GUARD					
18	R.H. TAIL GUARD					
19	SEAT					
20	SCREW					
21	L.H. REAR HANDLE					

FAIRING

SIDE FAIRINGS

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	R.H. REAR HANDLE					
23	SCREW					
24	METRIC QUIK FASTENING					
25	SCREW					



FAIRING

REMOVAL OF THE BOTTOM COVER

Park:

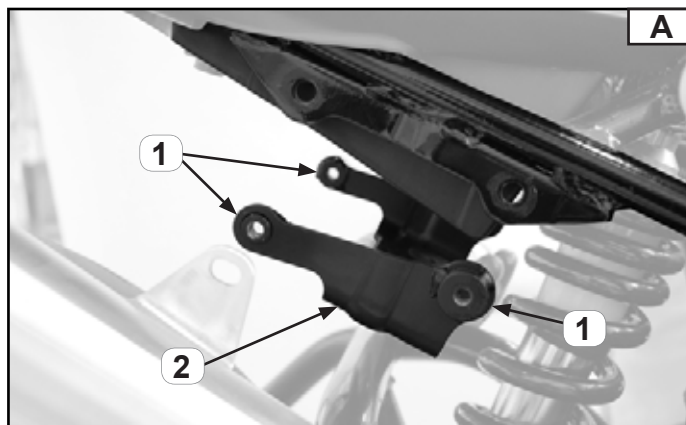
- The motorcycle on a level surface.

NOTICE

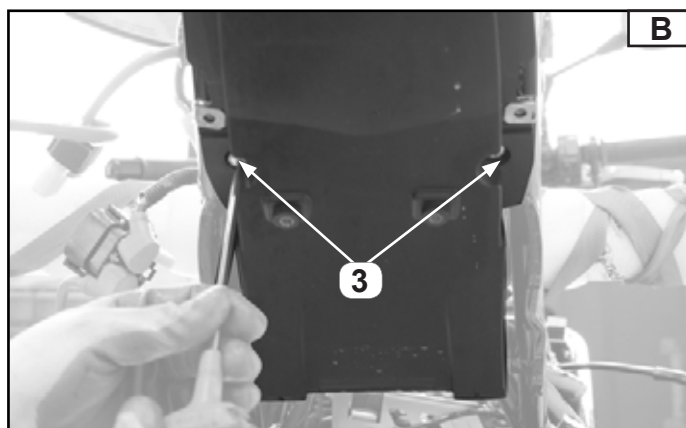
Prop the bike on suitable supports so that it cannot fall.

Remove:

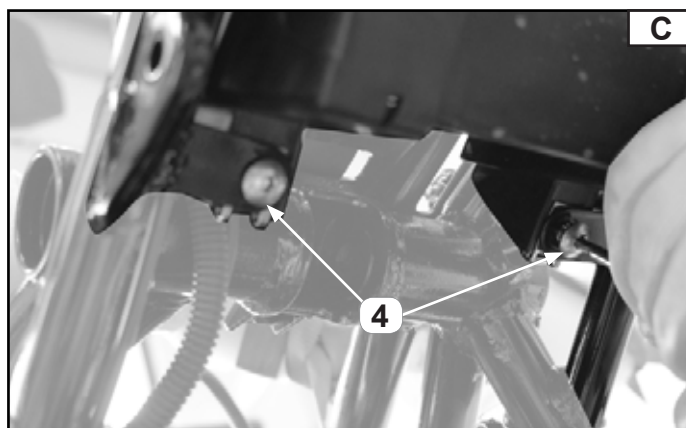
- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The side fairings, refer to chapter “**Removal of the side fairings, Chapter 4**”.
- The screws (1) on both sides of the vehicle Fig. A.
- The bottom cover support holder (2) Fig. A.



- The screws (3) Fig. B.



- The screws (4) Fig. C.





FAIRING

INSTALLATION OF THE BOTTOM COVER

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.



FAIRING

REMOVAL OF THE SEAT LOCK

Park:

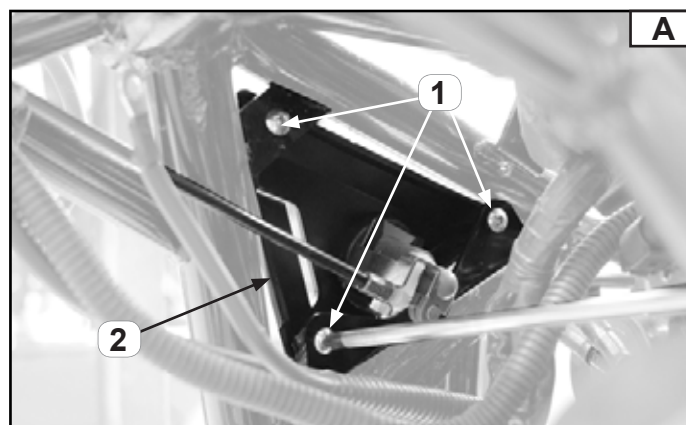
- The motorcycle on a level surface.

NOTICE

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

Remove:

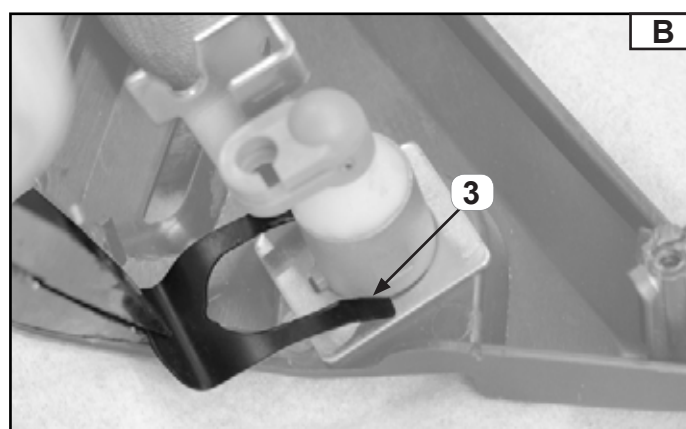
- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The battery, refer to the section “**Check and charge of the battery, Chapter 3**”.
- The expansion tank, refer to section “**Removal of the expansion tank, Chapter 6**”.
- The screws (1) Fig. A.

**Slide out:**

- The lock block holder (2) Fig. A.

Remove:

- The spring (3) Fig. B.

**Slide out:**

- The complete lock block Fig. C.





FAIRING

INSTALLATION OF THE SEAT LOCK

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.



FAIRING

REMOVAL OF THE SIDE FAIRINGS

Park:

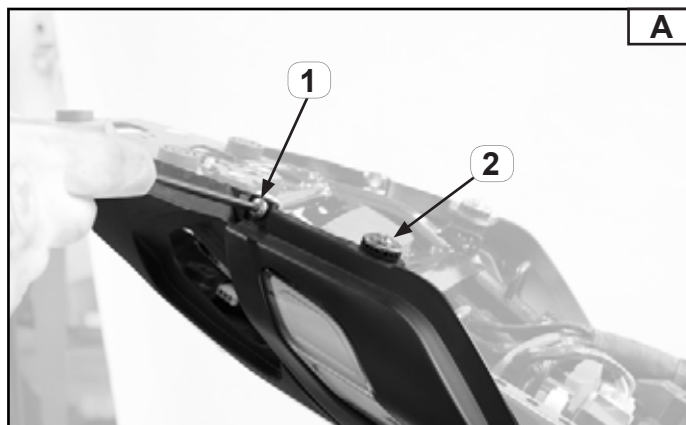
- The motorcycle on a level surface.

NOTICE

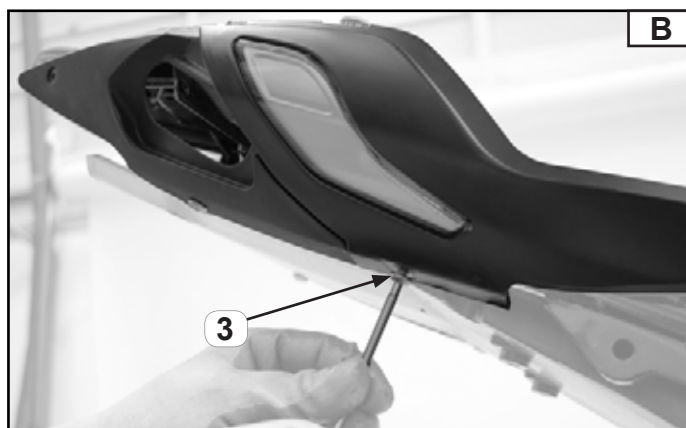
Prop the bike on suitable supports so that it cannot fall.

Remove:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The rear handles, refer to chapter “**Removal of the rear handles, Chapter 4**”.
- The screw (1) Fig. A.
- The screw (2) Fig. A.



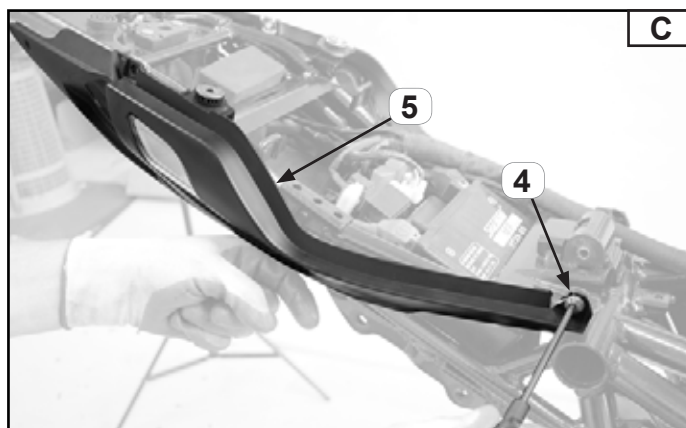
- The screw (3) Fig. B.



- The screw (4) Fig. C.
- The R.H. tail guard fairing (5) Fig. C.

NOTE:

Repeat the same procedure on the left fairing.





FAIRING

INSTALLATION OF THE SIDE FAIRINGS

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.



FAIRING

REMOVAL OF THE REAR HEADLIGHT

Park:

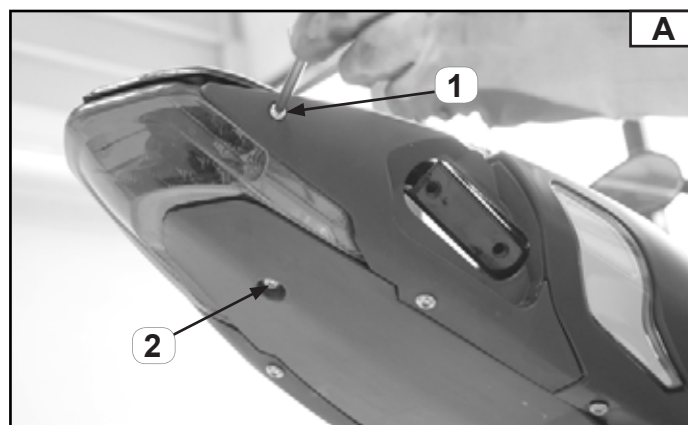
- The motorcycle on a level surface.

NOTICE

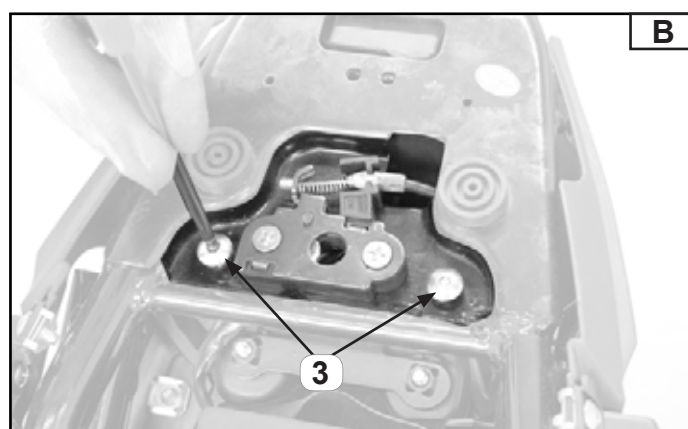
Prop the bike on suitable supports so that it cannot fall.

Remove:

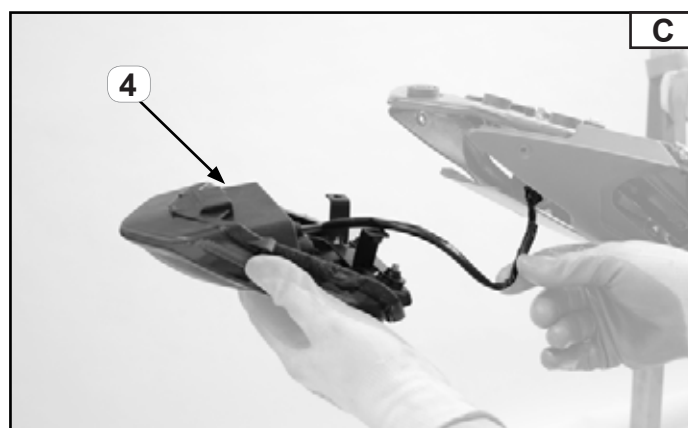
- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The rear handles, refer to chapter “**Removal of the rear handles, Chapter 4**”.
- The screw(1) on both sides of the vehicle Fig. A.
- The screw (2) Fig. A.



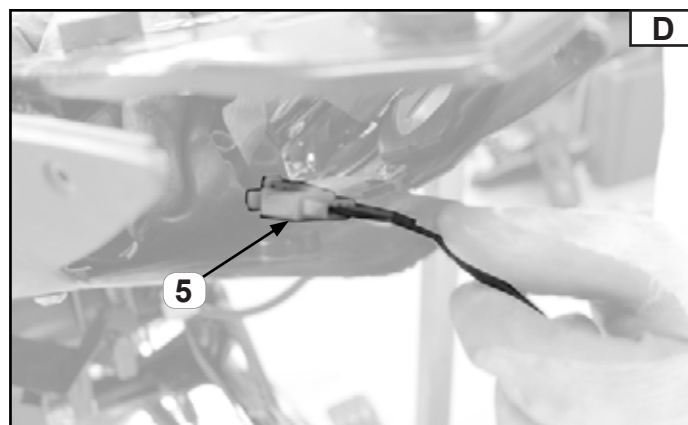
- The screws (3) Fig. B.

**Slide out:**

- The rear headlight (4) Fig. C.

**Disconnect:**

- The rear headlight connector (5) Fig. D.





FAIRING

INSTALLATION OF THE REAR HEADLIGHT

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

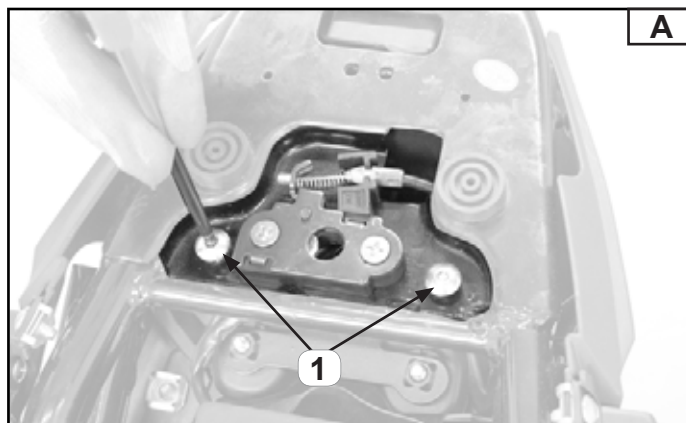
Proceed using the opposite order to removal.

Tighten:

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

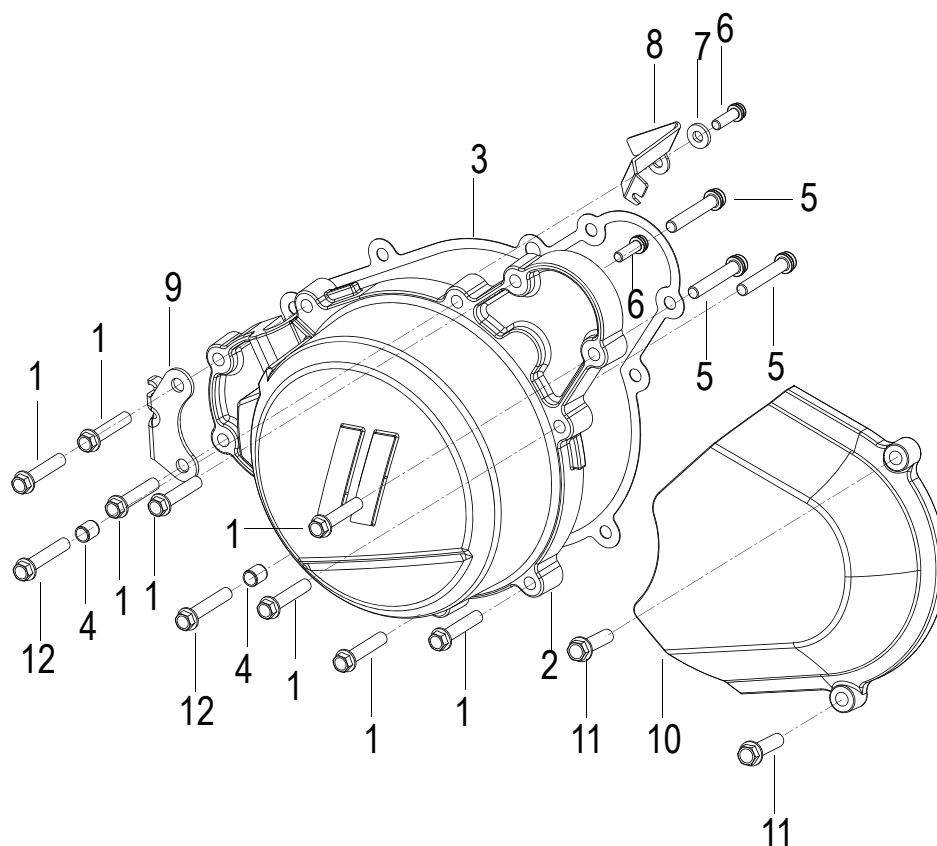


Torque 10 N*m





FAIRING CHAIN SPROCKET COVER



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SCREW					
2	LH CRANKCASE					
3	FLYWHEEL COVER GASKET					
4	BUSH					
5	SCREW					
6	SCREW					
7	WASHER					
8	PLATE					
9	PLATE					
10	SPROCKET COVER					
11	SCREW					
12	SCREW					



FAIRING

REMOVAL OF THE CHAIN SPROCKET COVER

Park:

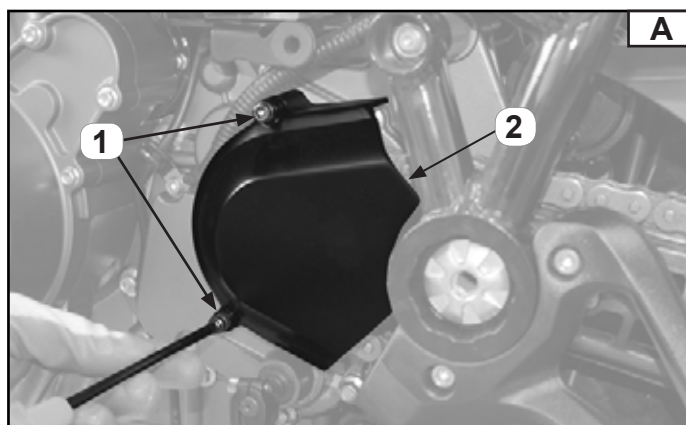
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The screws (1) Fig. A.
- The chain sprocket cover (2) Fig. A.





FAIRING

INSTALLATION OF THE CHAIN SPROCKET COVER

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

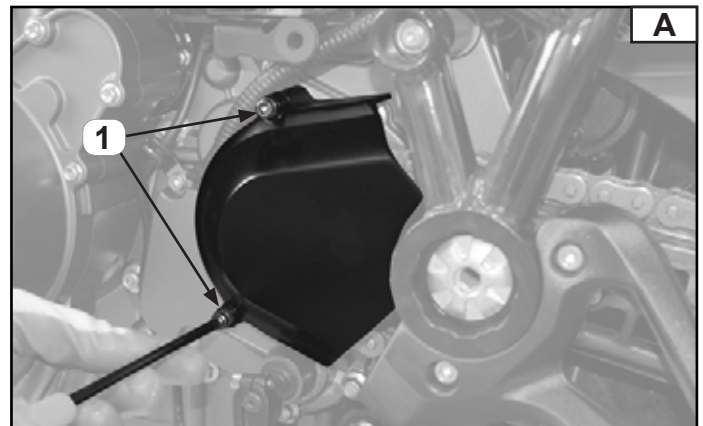
Proceed using the opposite order to removal.

Tighten:

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



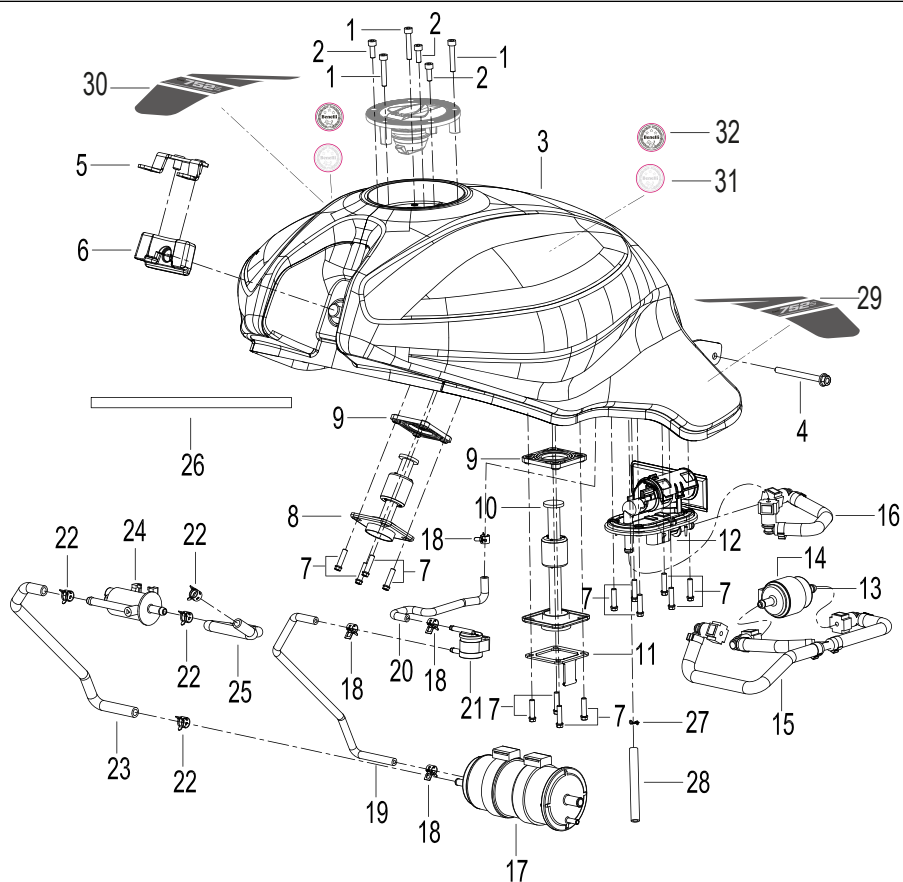
Torque 12 N*m





TANK

TANK PARTS



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SCREW					
2	SCREW					
3	TANK					
4	SCREW					
5	HOLDER					
6	VIBRATION DAMPER					
7	SCREW					
8	FUEL LEVEL SENSOR (FRONT)					
9	GASKET					
10	FUEL LEVEL SENSOR (REAR)					
11	PLATE					
12	FUEL PUMP					
13	FUEL FILTER					
14	FILTER HOLDER					
15	FUEL PIPE					
16	FUEL PIPE					
17	CANISTER FILTER					
18	HOSE GUIDE SPRING					
19	PIPE					
20	PIPE					
21	ONE-WAY VALVE					



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	SPRING HOSE CLAMP					
23	PIPE					
24	VALVE					
25	PIPE					
26	PIPE					
27	SPRING					
28	PIPE					
29	L.H. STICKER FUEL TANK					
30	R.H. STICKER FUEL TANK					
31	STICKER BENELLI (WHITE)					
32	STICKER BENELLI (BLACK)					



TANK

REMOVAL OF THE TANK CAP HOLDER

Park:

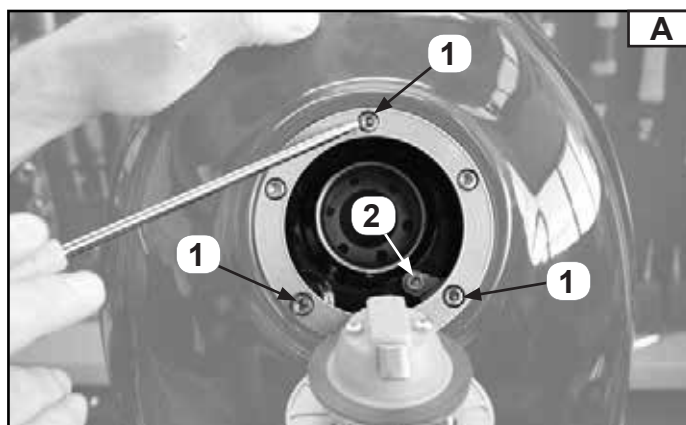
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The screws (1) Fig. A.
- The screw (2) Fig. A.





TANK

INSTALLATION OF THE TANK CAP HOLDER

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.



TANK

REMOVAL OF THE FUEL PUMP

Park:

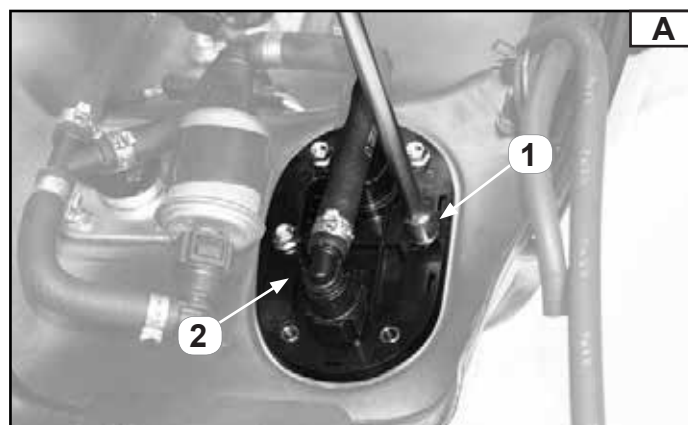
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The screws (1) Fig. A.
- The fuel pump (2) Fig. A.





TANK

INSTALLATION OF THE FUEL PUMP

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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 medium Loctite thread locker to secure.



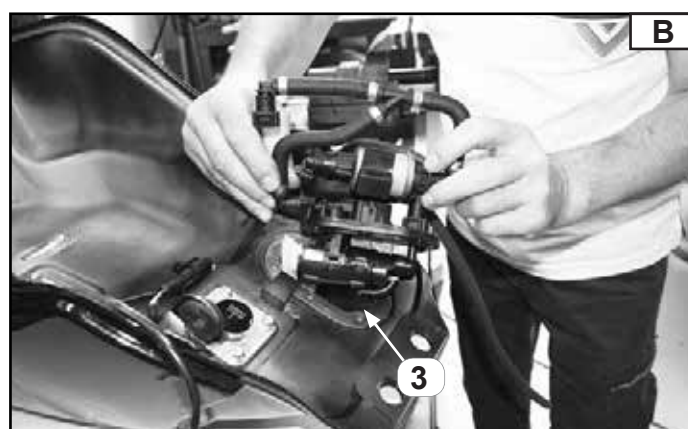
MEDIUM THREAD
LOCKER

NOTE:

At the moment of reassembly of the pump, grease must be smeared around the base of the housing (3) of the fuel pump and insert it to the same direction in which it has been removed Fig. B.



Recommended lubricant
NGLI2 GREASE





TANK

REMOVAL OF THE TANK FUEL LEVEL SENSOR

Park:

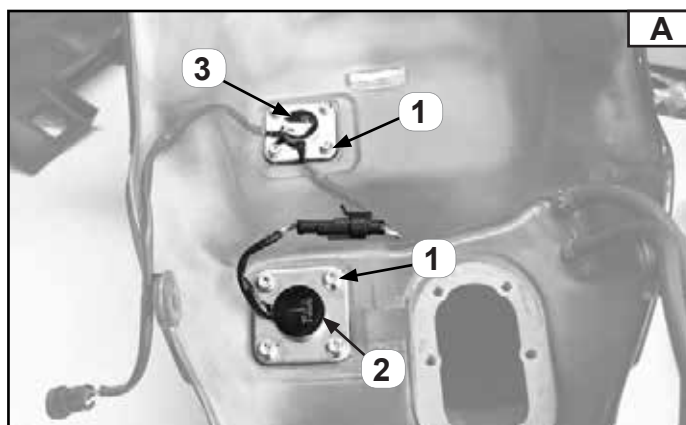
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The screws (1) Fig. A.
- The rear fuel level sensor (2) Fig. A.
- The front fuel level sensor (3) Fig. A.





TANK

INSTALLATION OF THE TANK FUEL LEVEL SENSOR

Park:

- The motorcycle on a level surface.

NOTICE

Prop the bike 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 8 N*m

Use medium Loctite thread locker to secure.



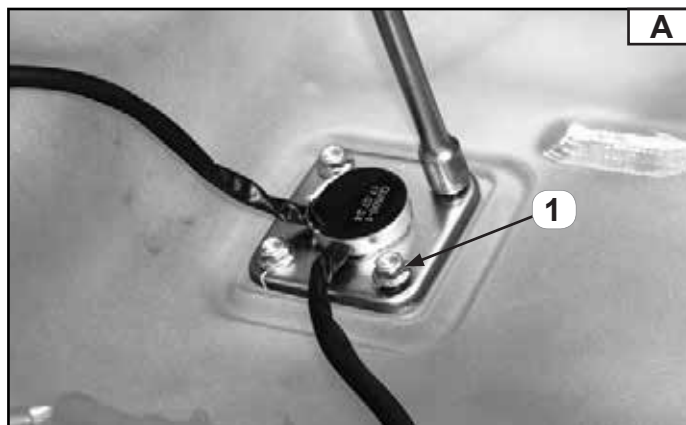
MEDIUM THREAD
LOCKER

NOTE:

The following procedure is applicable to both level sensors.

NOTE:

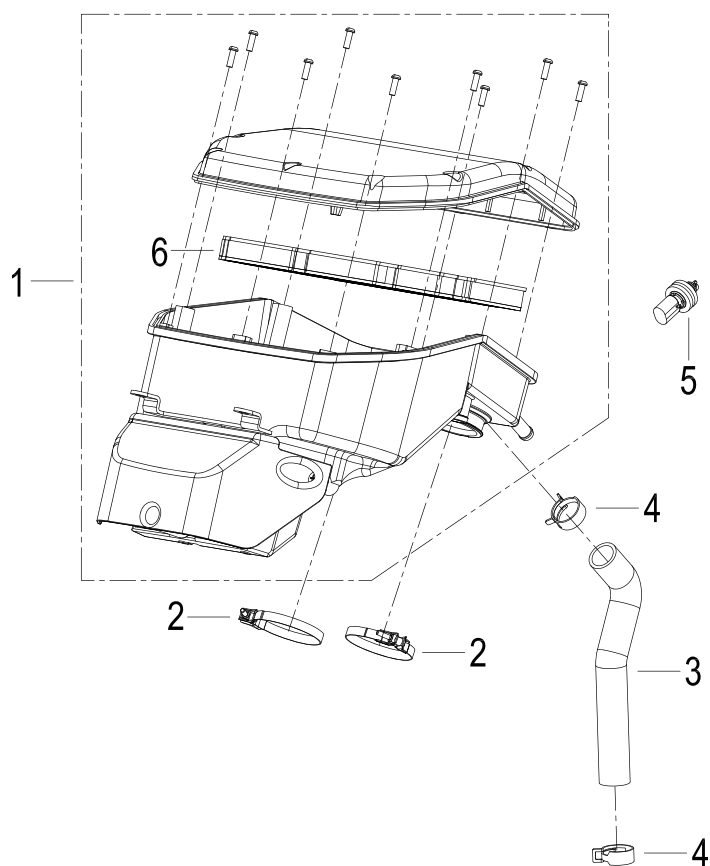
When reassembling, position the level sensors in the same direction as the one of removal.





AIR FILTER

AIR FILTER PARTS



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	COMPLETE AIR FILTER BOX					
2	SCREW HOSE CLAMP					
3	SLEEVE					
4	HOSE GUIDE SPRING					
5	AIR TEMPERATURE SENSOR					
6	AIR FILTER					



AIR FILTER

REMOVAL OF THE AIR FILTER BOX

Park:

- The motorcycle on a level surface.

NOTICE

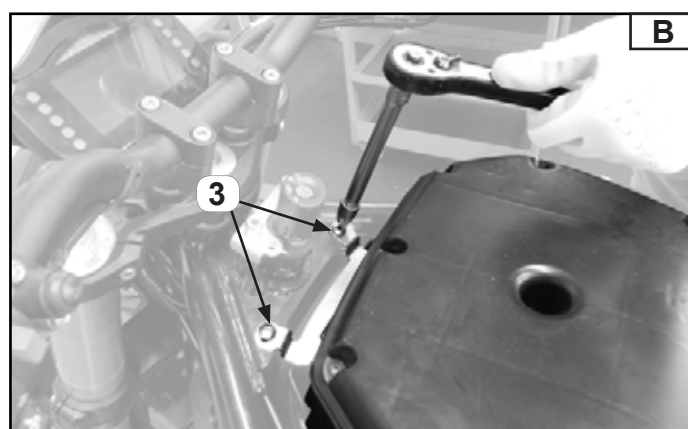
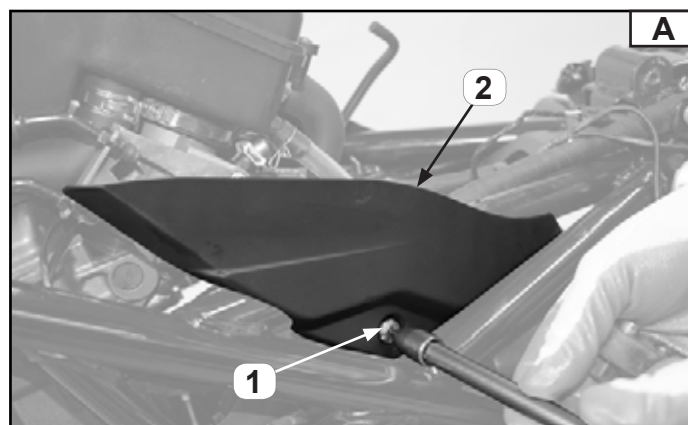
Prop the bike on suitable supports so that it cannot fall.

Remove:

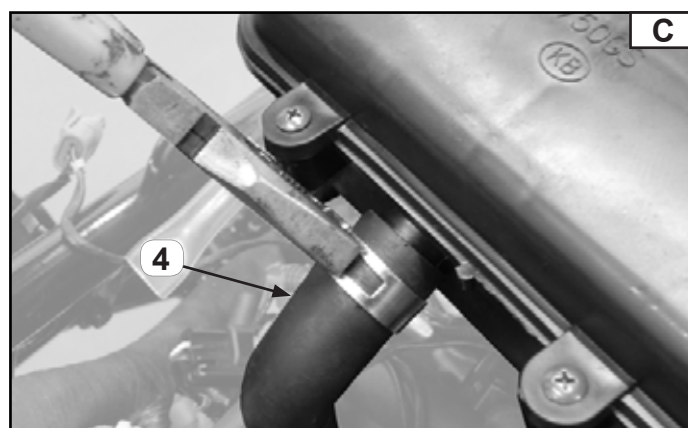
- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.

Remove:

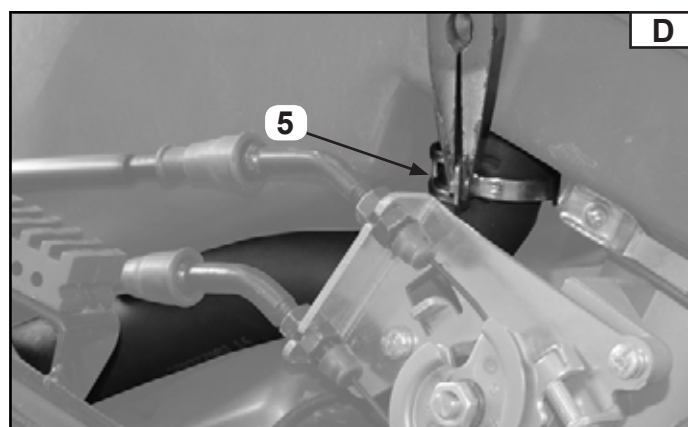
- The screw (1) Fig. A.
- The side guard (2) on both sides Fig. A.
- The screws (3) Fig. B.

**Disconnect:**

- The hose (4) Fig. C.



- The breather hose (5) from the filter casing Fig. D.



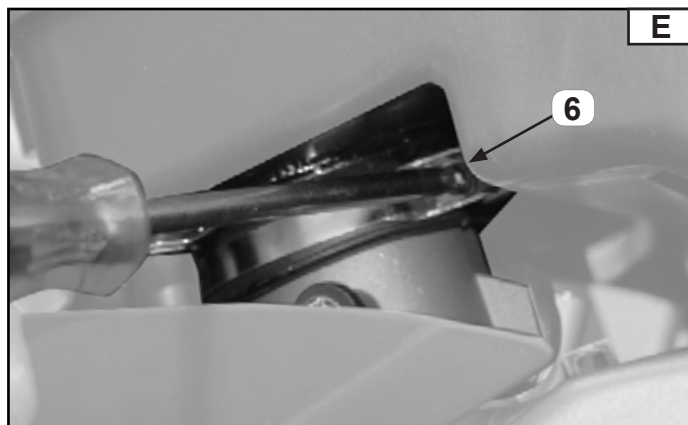


AIR FILTER

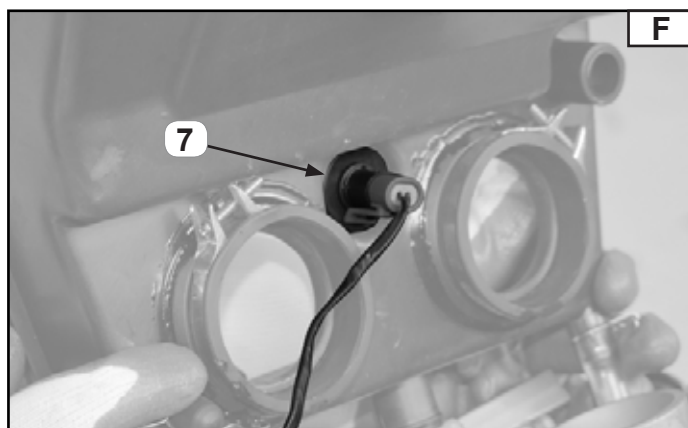
REMOVAL OF THE AIR FILTER BOX

Loosen:

- The screw hose clamp (6) for connection to the throttle body Fig. E.

**Disconnect:**

- The air temperature sensor connector (7) Fig. F.

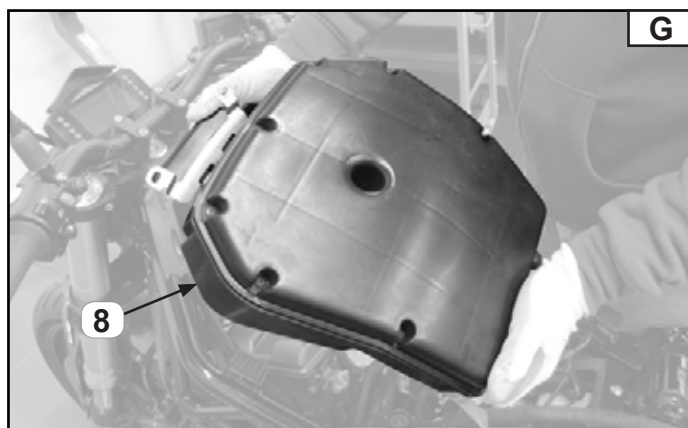
**Slide out:**

- The air filter box (8) Fig. G.

NOTICE

Never start the engine without the air filter installed. If not filtered, air will cause engine parts to wear out quickly and may even damage the engine. Using the engine without air filter will also have a negative effect on the fine tuning of the throttle bodies and this in turn will cause the engine's performance to suffer and even to eventually overheat. Therefore ensure that the air filter box is always in a good condition.

The lifetime of the engine depends mainly on this part.





AIR FILTER

INSTALLATION OF THE AIR FILTER BOX

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

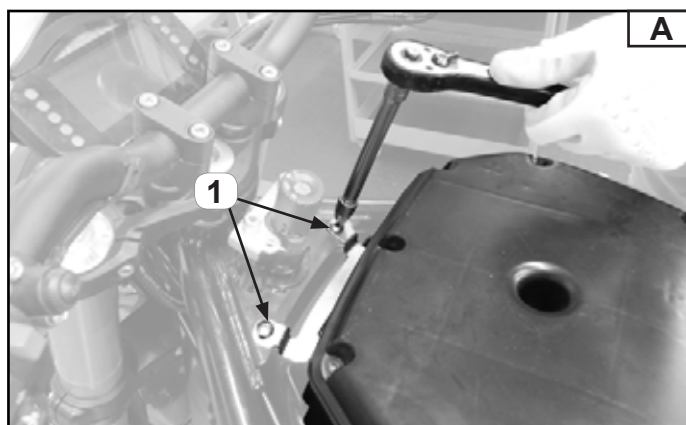
Proceed using the opposite order to removal.

Tighten:

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



Torque 10 N*m



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, the word "Benelli" in a bold, serif font in the middle, and a lion standing on a pedestal at the bottom. The entire watermark is rendered in a light green color.



ENG.

5



CHAPTER 5

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ENGINE REMOVAL OF THE ENGINE FROM THE FRAME

NOTICE

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

- Prop the rear side of the swingarm with a single stay.

NOTICE

Make sure the front wheel is locked when moving the engine to prevent the motorcycle from falling. This could cause accidents and injuries.

Drain:

- The engine oil, refer to the section “**Change of engine oil, Chapter 3**”.
- The cooling fluid, refer to the section “**Removal of the water pump, Chapter 6**”.

Remove:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.

Disconnect:

- The battery, refer to the section “**Check and charge of the battery, Chapter 3**”.

Remove:

- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The air filter box, refer to the section “**Removal of the air filter box, Chapter 4**”.
- The throttle body, refer to the section “**Removal of the throttle body, Chapter 5**”.

Disconnect:

- The neutral position sensor (1) Fig. A.

Remove:

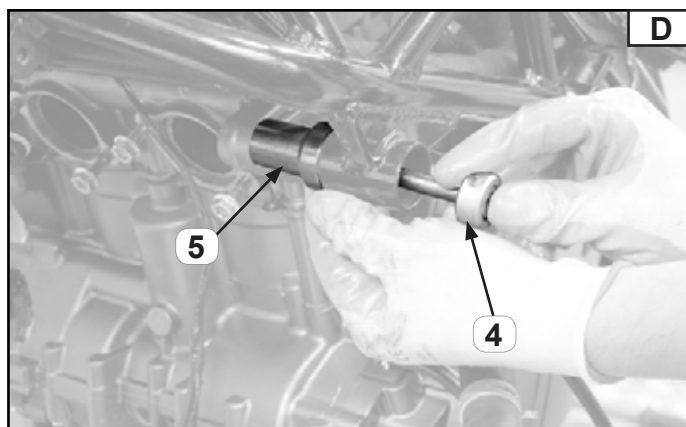
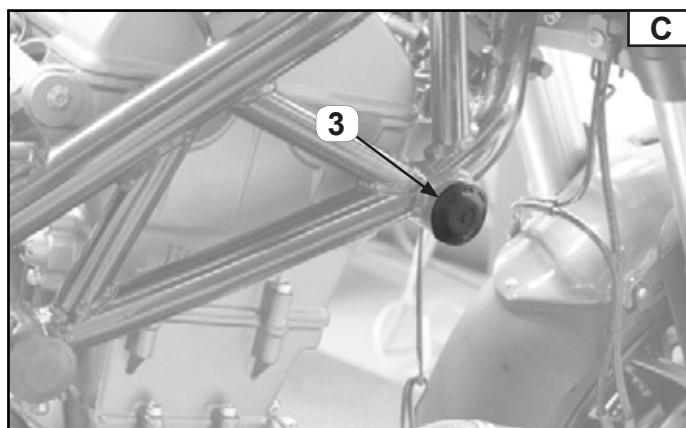
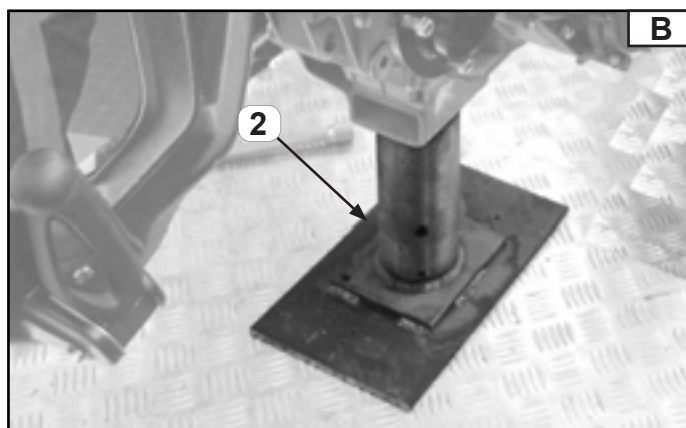
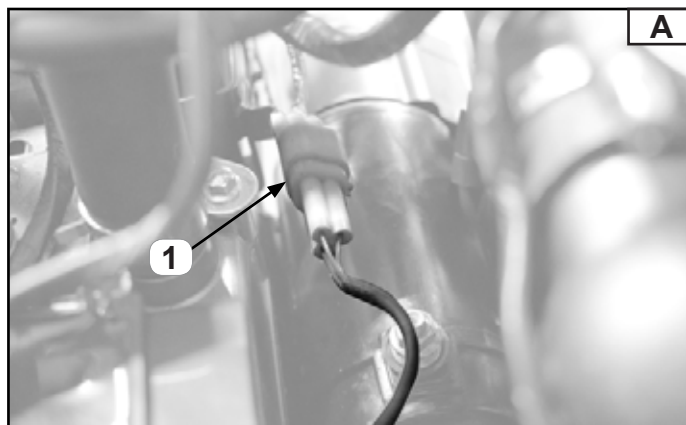
- The stepper, refer to section “**Removal of the stepper, Chapter 5**”.
- The radiator, see the section “**Removal of the radiator, Chapter 5**”.
- The sprocket cover, refer to the section “**Removal of the sprocket cover, Chapter 5**”.
- The foot peg plate, refer to the section “**Removal of the foot peg plate, Chapter 4**”.
- The left rider foot peg plate, refer to the section “**Removal of the left/right rider foot peg plate, Chapter 4**”.

Place:

- The engine holder (2) Fig. B.

Remove:

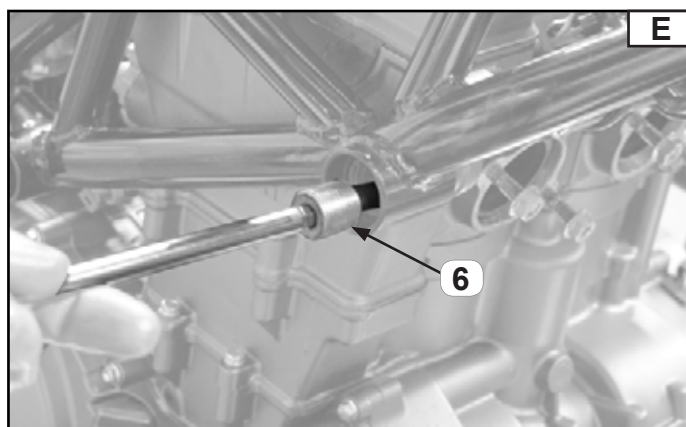
- The rear swingarm, refer to the section “**Removal of the rear swingarm, Chapter 4**”.
- The rear shock absorber, refer to the section “**Removal of the rear shock absorber, chapter 4**”.
- The cap (3) on the left/right side of the vehicle Fig. C.
- The fastening screw (4) and the spacer (5) on the left side Fig. D.



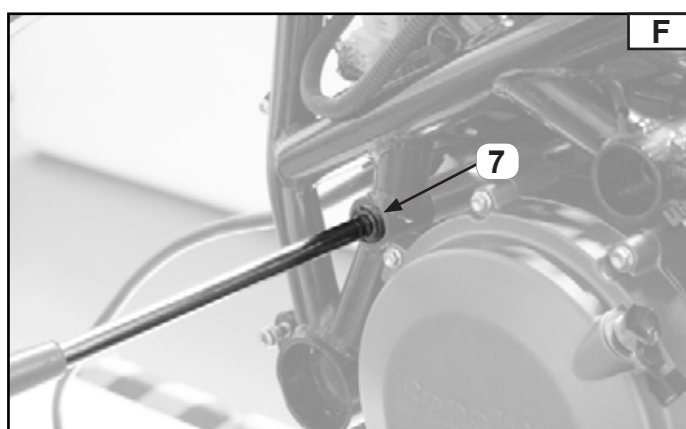


ENGINE REMOVAL OF THE ENGINE FROM THE FRAME

- The fastening screw (6) on the right side Fig. E.



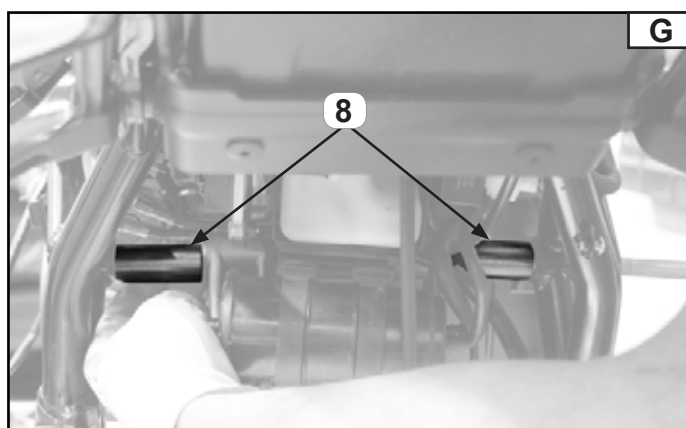
- The rear screw (7) Fig. F on the left/right side of the vehicle.



- The related spacer (8) Fig. G.

NOTE:

The left spacer is longer than the right spacer.



Slide out:

- The engine (9) from the frame Fig. H.





ENGINE INSTALLATION OF THE ENGINE ON THE FRAME

NOTICE

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

Install:

Proceed using the opposite order to removal.

Tighten:

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



Torque 45-50 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER

- The screw (2) on the right side of the vehicle Fig. B to the following torque:



Torque 45-50 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER

- The screw (3) on the left side of the vehicle Fig. C to the following torque:

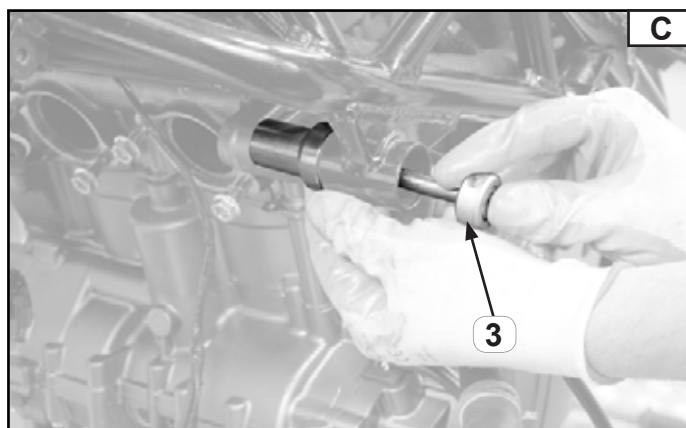
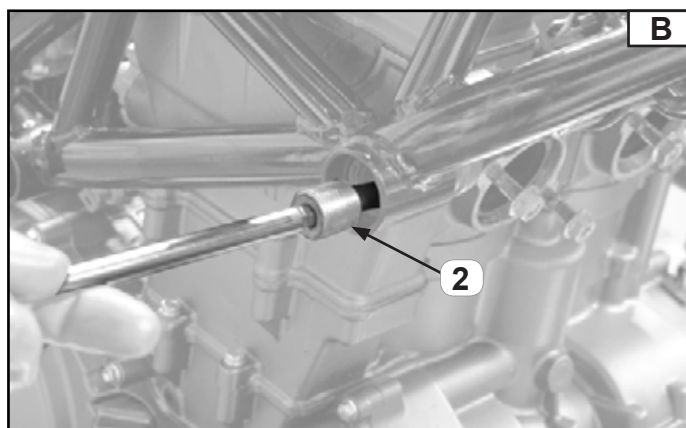
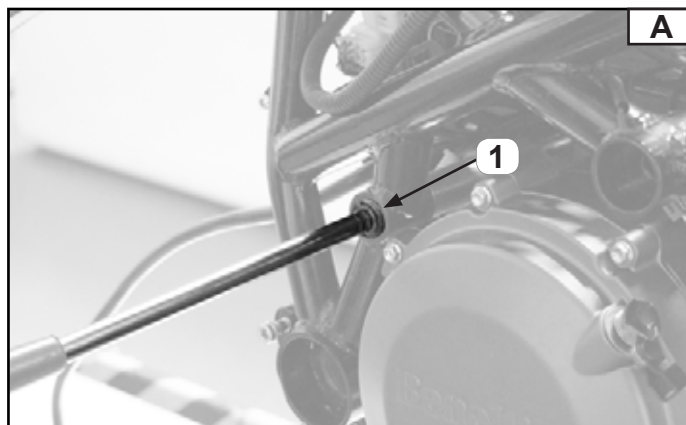


Torque 45-50 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER





ENGINE REMOVAL OF THE DRIVING GEAR

Park:

- The motorcycle on a level surface.

NOTICE

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

Remove:

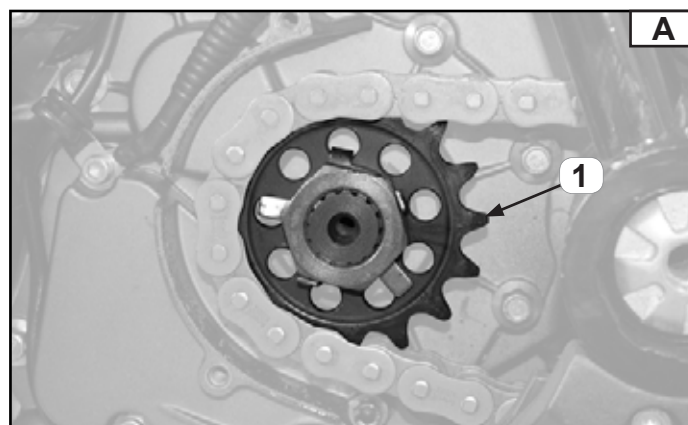
- The chain sprocket cover, refer to the section “**Removal of the chain sprocket cover, Chapter 4**”.

Loosen:

- The transmission chain clearance, refer to the section “**Adjustment of the transmission chain clearance, Chapter 3**”.

Remove:

- The sprocket (1) Fig. A.





ENGINE INSTALLATION OF THE DRIVING GEAR

Park:

- The motorcycle on a level surface.

NOTICE

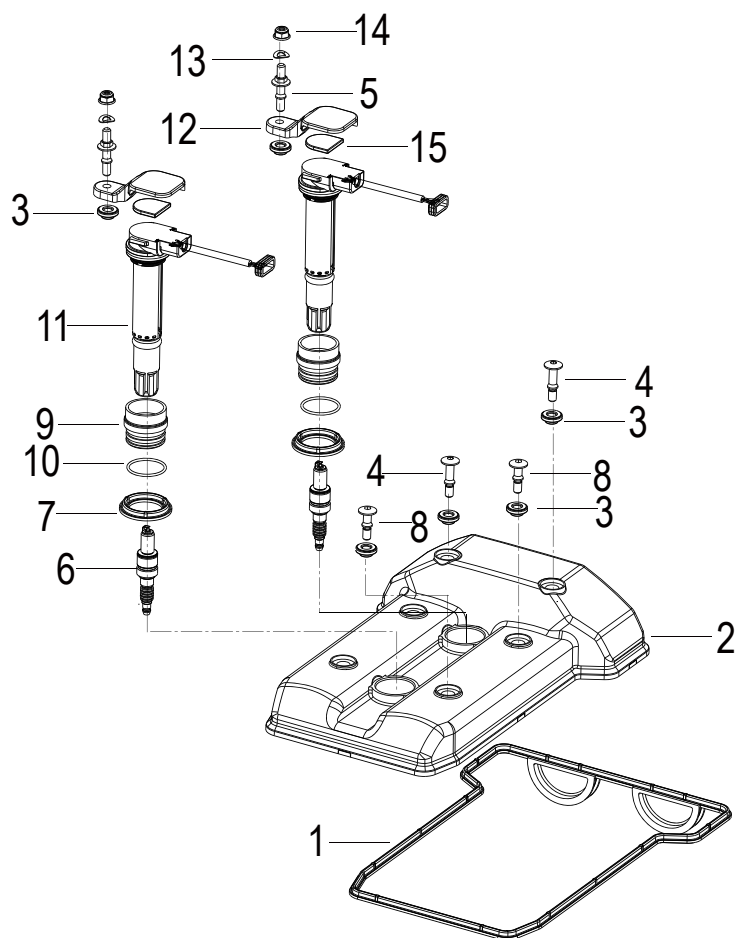
Prop the bike on suitable supports so that it cannot fall.

Install:

Proceed using the opposite order to removal.



HEAD TIMING CAMSHAFT COVER



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	TIMING COVER GASKET					
2	CAMSHAFT COVER					
3	RUBBER PAD					
4	SCREW					
5	SCREW					
6	SPARK PLUG					
7	WASHER					
8	SCREW					
9	RUBBER PAD					
10	O-RING					
11	COIL					
12	BRACKET					
13	WASHER					
14	NUT					
15	RUBBER PAD					



HEAD TIMING

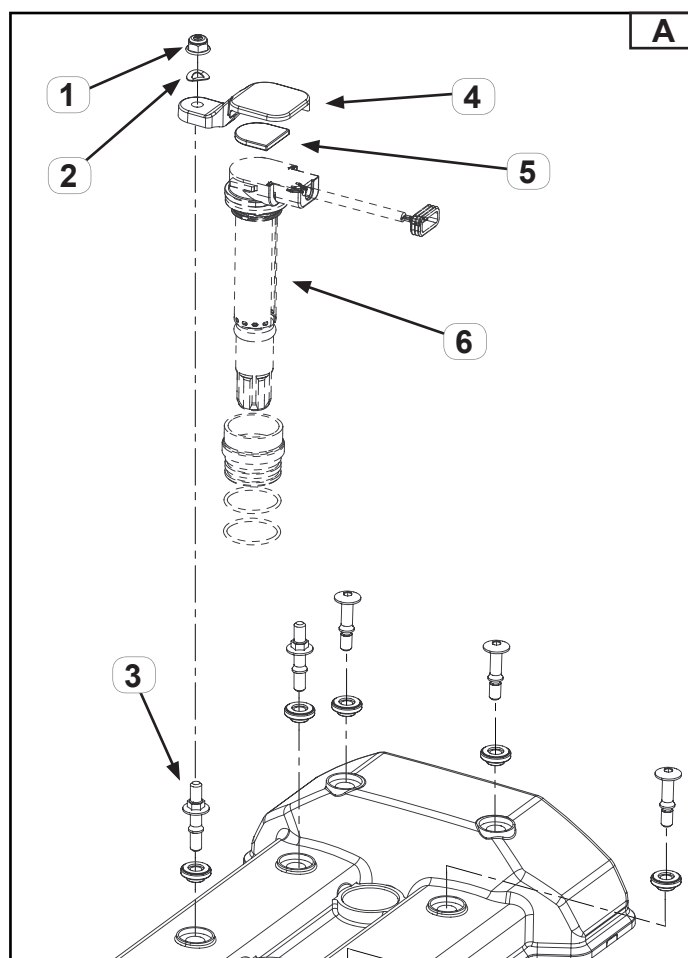
REMOVAL OF COILS AND SPARK PLUGS

NOTE:
The following procedure is applicable to both coils.

Remove:

- The screw (1) Fig. A.
- The washer (2) Fig. A.
- The pin (3) Fig. A.
- The bracket (4) Fig. A.
- The rubber pad (5) Fig. A.
- The coil (6) Fig. A.
- The spark plug, using the special wrench.

NOTE:
To check the spark plugs, refer to the chapter "Removal of the spark plugs, Chapter 3".



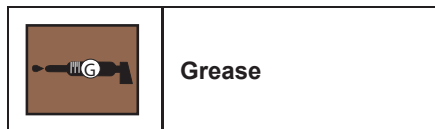


HEAD TIMING ASSEMBLY OF COILS AND SPARK PLUGS

The following procedure applies to all of the spark plugs Fig. A.

WARNING

Lubricate the plug threads with copper grease.



NOTE:

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

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:

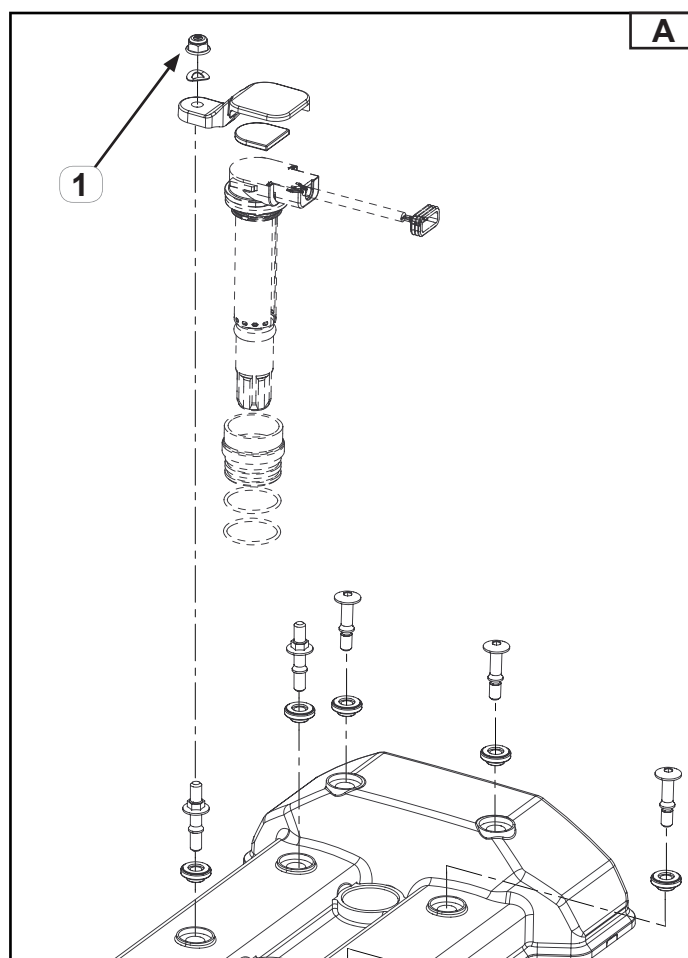
Proceed using the opposite order to removal.

Tighten:

- The screw (1) Fig. A to the following torque:



Torque 10 N*m



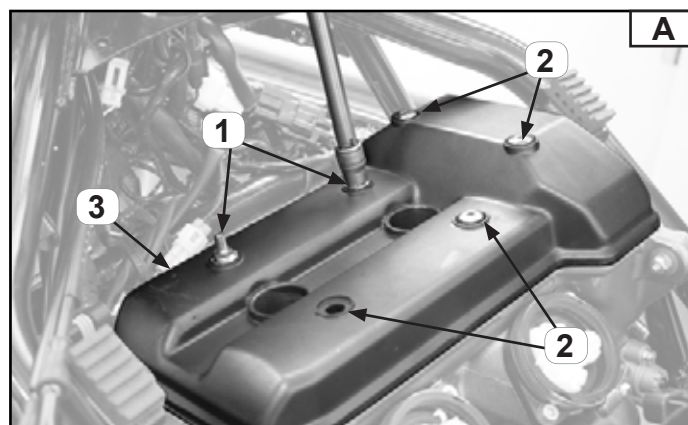


HEAD TIMING

REMOVAL OF THE CAMSHAFT COVER

Remove:

- The screws (1) Fig. A.
- The screws (2) Fig. A.
- The camshaft cover (3) Fig. A.

**NOTE:**

Take care with the gasket on the camshaft cover (4) Fig. B during removal.

NOTE:

In case of seal breakage of the camshaft cover gasket (4), replace.





HEAD TIMING INSTALLATION OF THE CAMSHAFT COVER

Install:

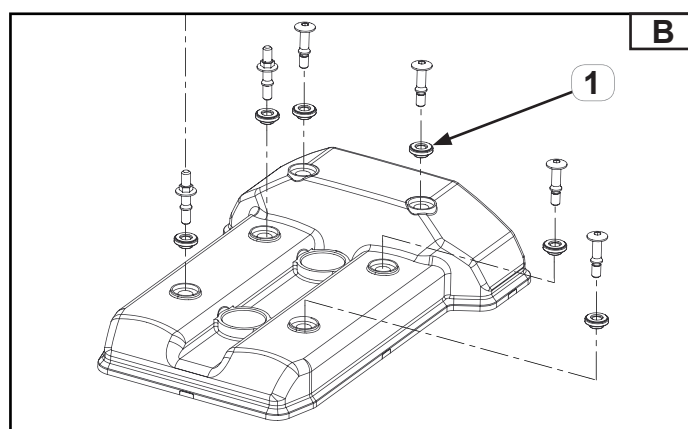
Proceed using the opposite order to removal.

During the assembly of the cover, apply sealing paste type **THREE BOND 1104 /1207B** on the surface, as shown in Fig. A.



NOTE:

During the assembly stage of the camshaft cover, the replacement of the rubber pads (1) is recommended Fig. B.

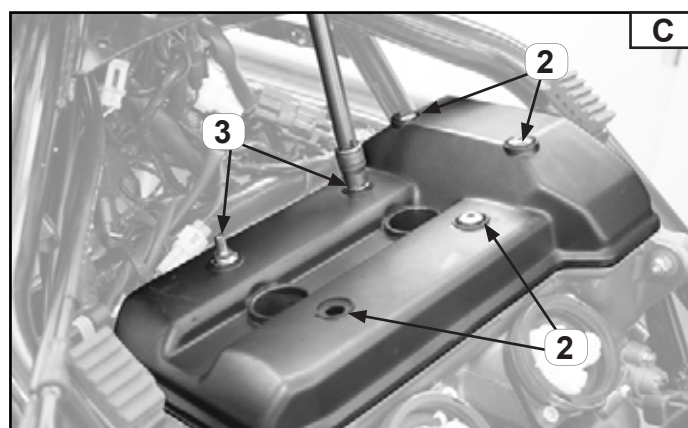


Tighten:

- The screws (2) and (3) Fig. C to the following torque:



Torque 10 N*m



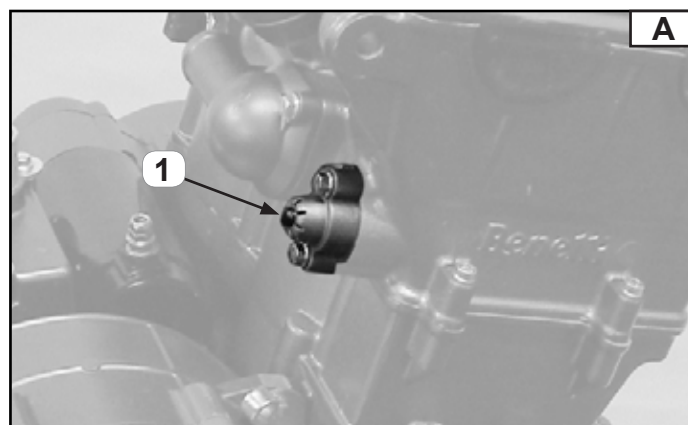


HEAD TIMING

REMOVAL OF THE DISTRIBUTION CHAIN TENSIONER

Remove:

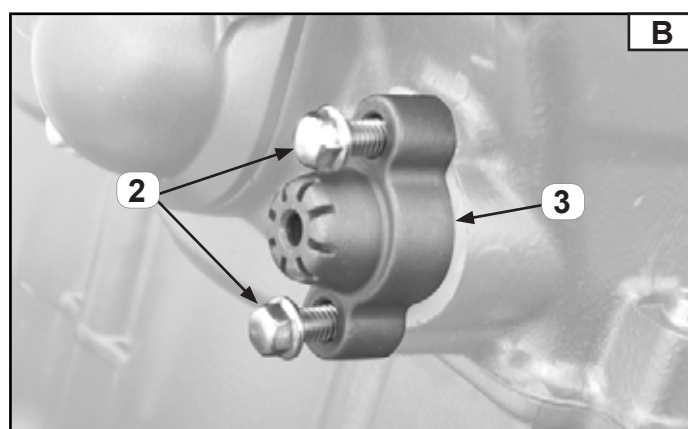
- The rubber cap (1) Fig. A.



- The screws (2) Fig. B.
- The distribution chain tensioner (3) Fig. B.

NOTE:
Operation to perform with the engine in TDC.
During the removal stage, keep the tensioner retracted, then remove the two screws.

NOTE:
Avoid to rotate the crankshaft without chain tensioner.





HEAD TIMING

ASSEMBLY OF THE DISTRIBUTION CHAIN TENSIONER

During the assembly stage, take care to ensure that the gasket is undamaged and unworn, otherwise replace.

Move:

- The tensioner to the retracted position and insert it into its housing using the screwdriver.

Insert:

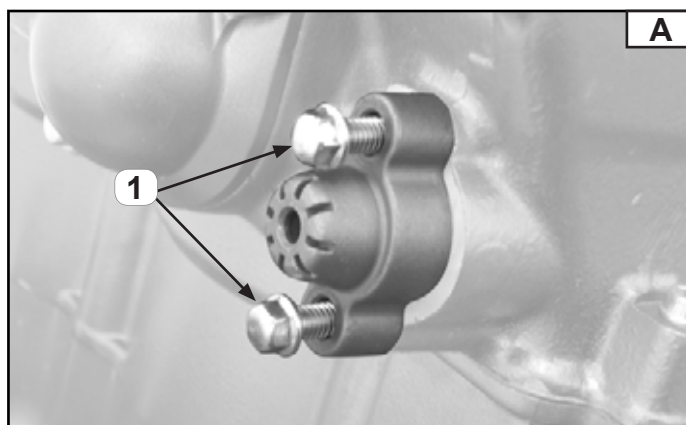
- The tensioner into the seat and gasket.

Tighten:

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



Torque 10 N*m





HEAD TIMING

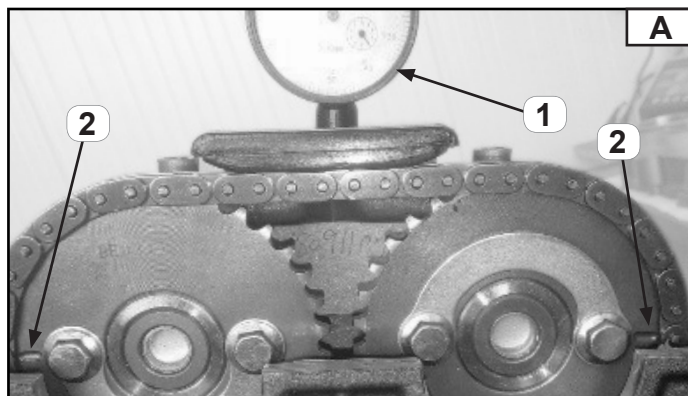
REMOVAL OF THE INTAKE AND EXHAUST CAMSHAFT

Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.
- The cooling fluid.
- The crankshaft cap, refer to the section “**Adjustment of the valve clearance with the engine on the frame, Chapter 3**”.

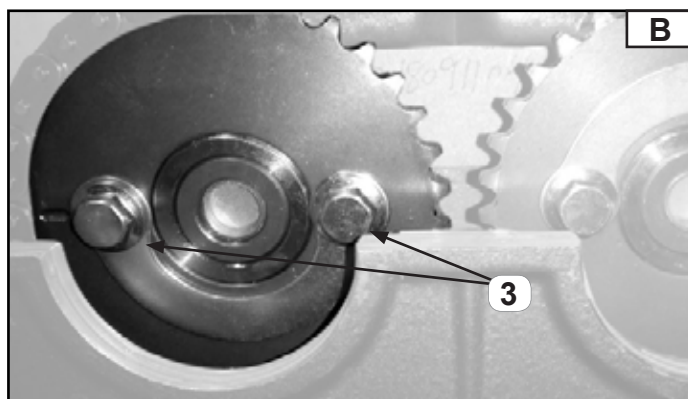
Install:

- The comparator (1) with the relevant holder and bring the piston of the cylinder 2 (distribution chain side) to the TDC, with the reference notches (2) aligned Fig. A.



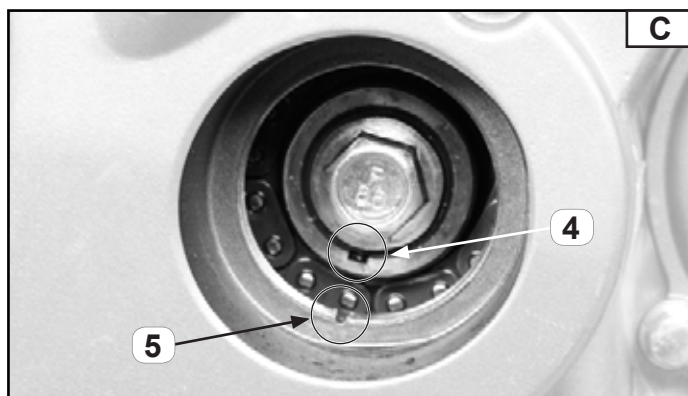
Loosen:

- The screws (3) of the intake camshaft sprocket by about one turn Fig. B.



Check:

- The notch of the crankshaft timing gear (4) and the one of the crankcase housing (5) are aligned Fig. C.



Rotate:

- The crankshaft counter-clockwise by 180°, making sure the notch of the crankshaft timing gear (6) is positioned as in Fig. D compared to the crankcase housing.



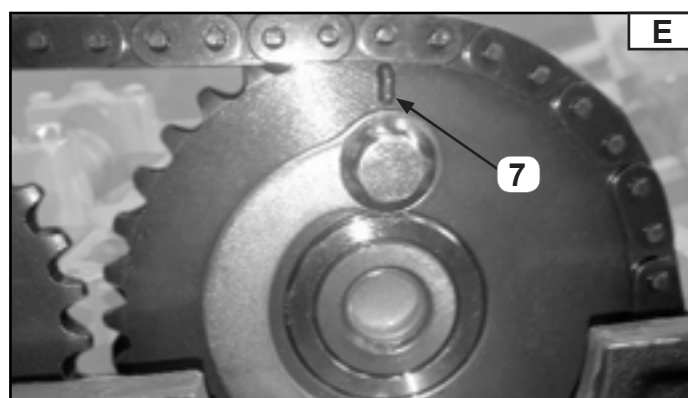


HEAD TIMING

REMOVAL OF THE INTAKE AND EXHAUST CAMSHAFT

Check:

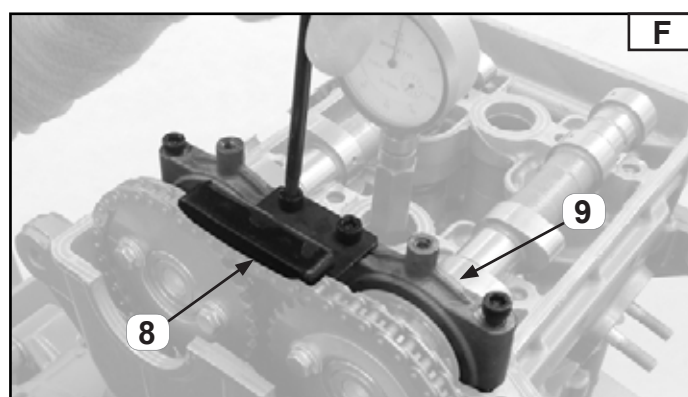
- The reference notch (7) of the exhaust camshaft gear is positioned perpendicularly to the base of the head Fig. E.



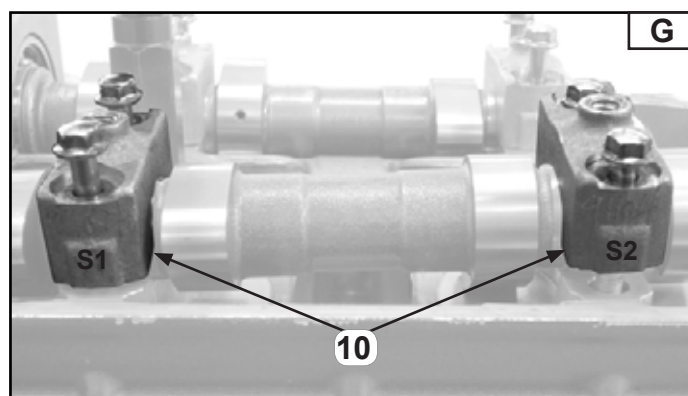
Remove:

- The distribution chain tensioner, refer to the section “Removal of the distribution chain tensioner, Chapter 5”.

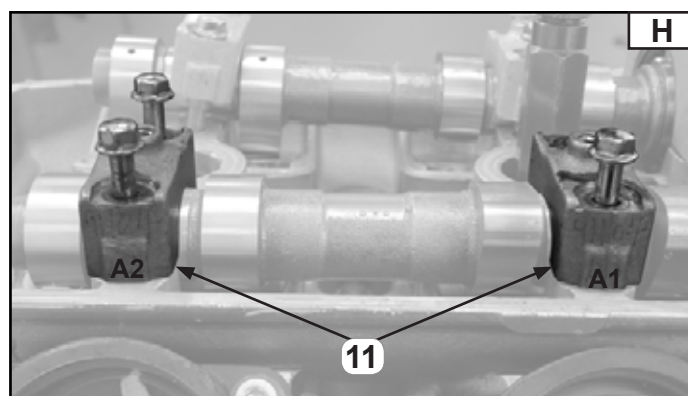
- The upper chain sliding shoe (8) and the related double support holder of the camshaft (9) Fig. F.



- The exhaust camshaft holders (10) Fig. G.



- The intake camshaft holders (11) Fig. H.



NOTE:

During the removal stage, use a marker pen to mark the position of the holders of the intake camshaft Fig. H and the holders of the exhaust camshaft Fig. G, since, when reassembling, they need to be in their original positions. The “arrows” pressed into the holders show the direction in which they need to be mounted towards the distribution.



HEAD TIMING

REMOVAL OF THE INTAKE AND EXHAUST CAMSHAFT

Remove

- The intake camshaft.
- The exhaust camshaft.

NOTE:

During the removal stage of the camshafts, duly secure the distribution chain Fig. I.

NOTE:

The intake camshaft has the engraving "AS08", while the exhaust camshaft has the engraving "SC08".





HEAD TIMING

CHECK OF THE CAMSHAFTS

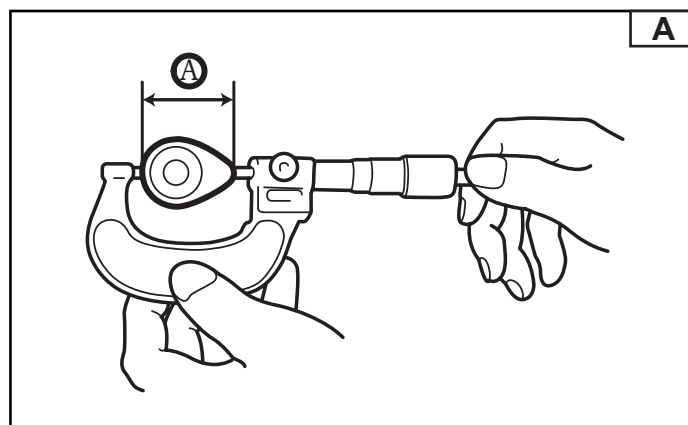
Make a visual check of the camshaft lobes and, if there is any blue discolouration/pitting or lines, replace.

- Measure the size of the lobes.**

If the measures taken (Fig. A) are not compliant with specifications, replace the shaft.

Specifications Table:

Camshaft	Limit (A)	Limit (A)
Camshaft exhaust side	36.75 mm	36.65 mm
Camshaft intake side	36.75 mm	36.65 mm

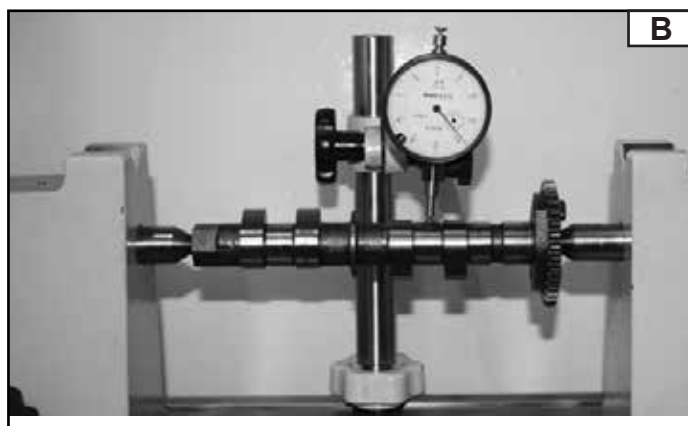


- Measure the eccentricity of the camshaft**

If the measures taken (Fig. B) 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

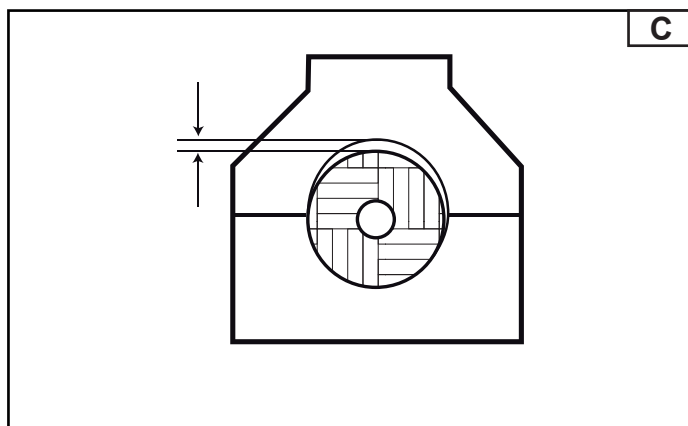


- Measurement of clearance between bearing journals and holder**

If the measurements taken (Fig. c) are not within the specifications, proceed with full head and holder replacement.

Specifications Table:

Camshaft	Clearance between bearing journals and holder
Camshaft exhaust side	0.03 - 0.06 mm
Camshaft intake side	0.02 - 0.05 mm

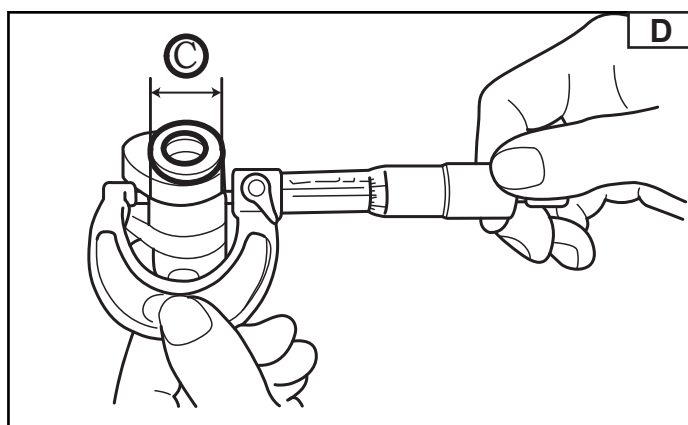


- Measure the diameter of the camshaft support**

If the measurements taken (Fig. D) are not within the specifications, proceed with shaft replacement.

Specifications Table:

Camshaft	Measurement of main bearing (C)
Camshaft exhaust side	Ø 23 mm (-0.025/-0.045)
Camshaft intake side	



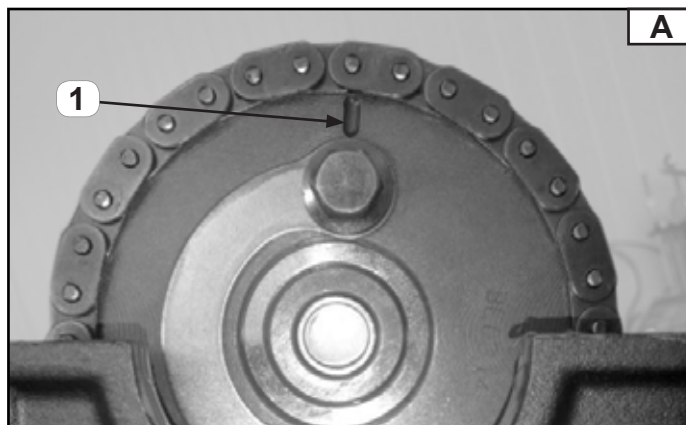


HEAD TIMING

INSTALLATION OF THE INTAKE AND EXHAUST CAMSHAFT

Install:

- The exhaust camshaft with the reference notch (1) of the piston cylinder 2 (distribution chain side) positioned with the perpendicular notch at the base of the head Fig. A.



- The holder (2) of the exhaust camshaft Fig. B and tighten the screws gradually to the following torque:

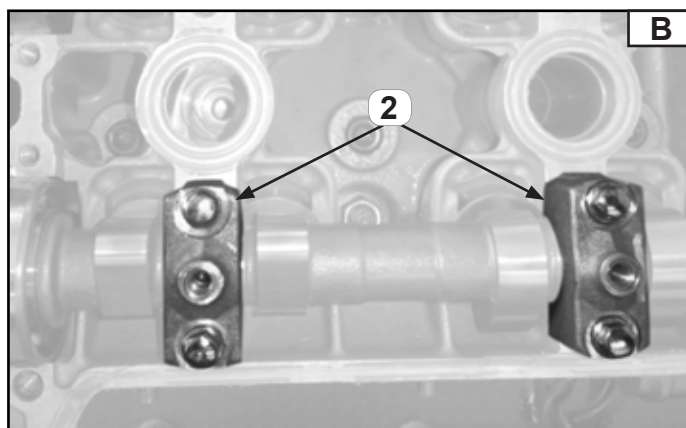


Torque 11 N*m

Use medium Loctite 243 thread locker to secure.



Sintoflon paste



NOTE:

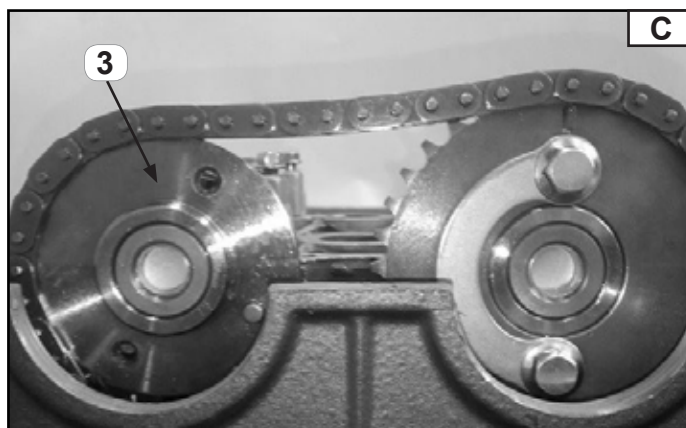
When assembling the holders, it is necessary to lubricate them with special grease to prevent the shafts from rotating dry during initial starting.

Remove:

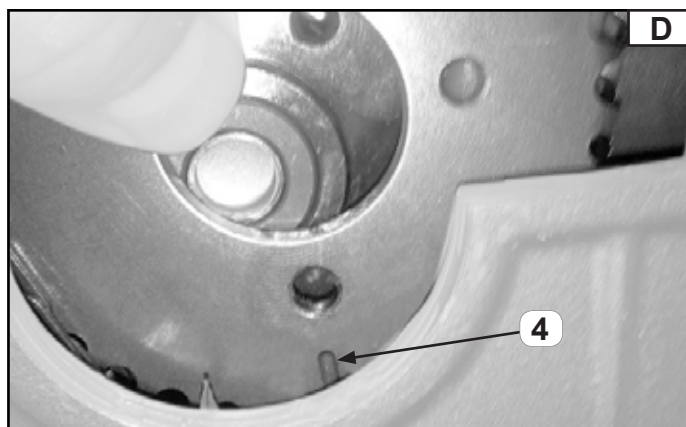
- The intake camshaft sprocket.

Install:

- The intake camshaft (3) Fig. C.



- The intake camshaft sprocket with the reference (4) facing downward Fig. D.
- The distribution chain on the intake camshaft sprocket.





HEAD TIMING

INSTALLATION OF THE INTAKE AND EXHAUST CAMSHAFT

Install:

- The plate (5) and at least a screw (6) without tightening Fig. E.
- The distribution chain tensioner, refer to the section “**Installation of the distribution chain tensioner, Chapter 5**”.

Rotate:

- The crankshaft 180° clockwise.

Check:

- The exact correspondence of the references on the sprockets, the support surface of the camshaft cover and the crankshaft.

NOTE:

For this operation, use the comparator installed on the opposite holder.

NOTE:

To be double sure that the sprockets and the chain are positioned properly, check that 30 chain joint pins (7) are found between the ends of the two sprockets Fig. F.

Install:

- The screws (9) Fig. G and tighten to the following torque:



Torque 13 N*m

Use Loctite thread sealant to secure.



Loctite 243

- The intake camshaft holders (10) Fig. H and tighten the screws gradually to the following torque:



Torque 11 N*m

Use medium Loctite 243 thread locker to secure.



Sintoflon paste

NOTE:

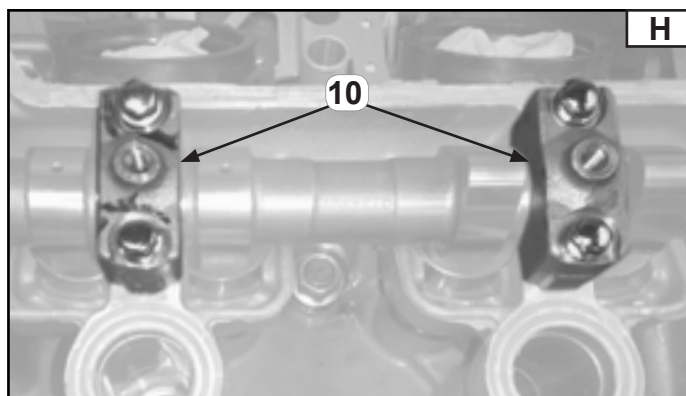
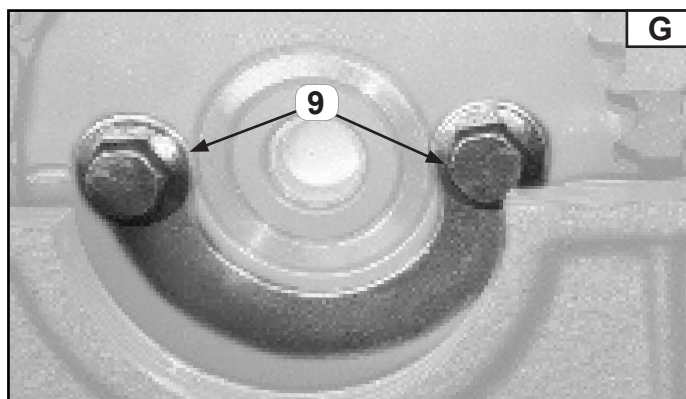
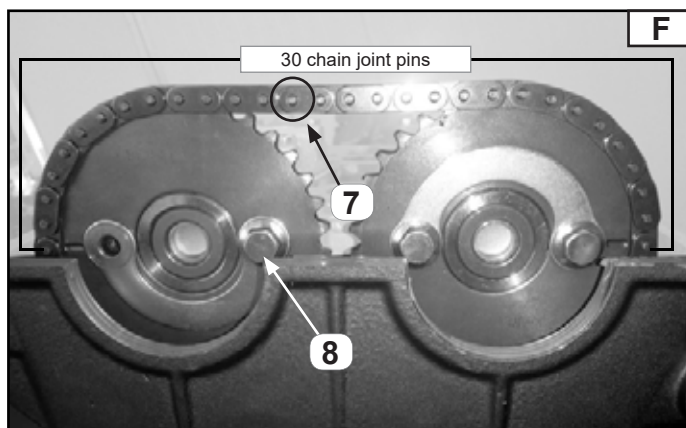
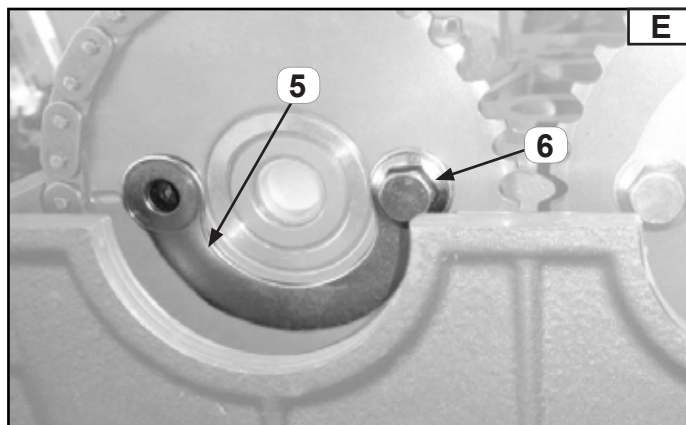
When assembling the holders, it is necessary to lubricate them with special grease to prevent the shafts from rotating dry during initial starting.

Install:

- The crankshaft cap, refer to the section “**Adjustment of the valve clearance with the engine on the frame, Chapter 3**”.
- The camshaft cover, refer to the section “**Installation of the camshaft cover, Chapter 5**”.
- The coils and spark plugs, refer to the section “**Installation of the coils and spark plugs, Chapter 5**”.

NOTE:

Add coolant once these steps have been completed.



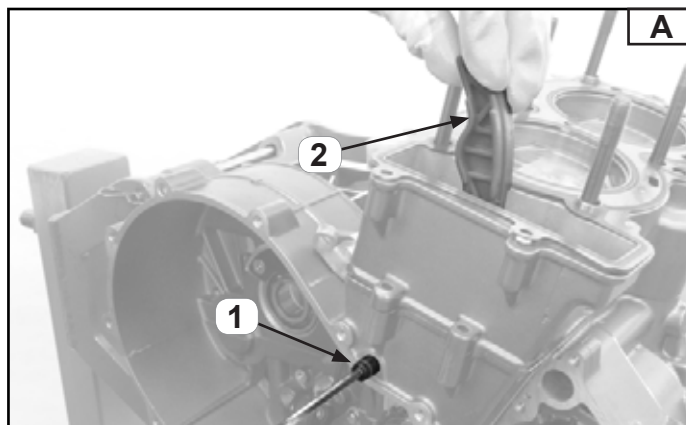


HEAD TIMING

REMOVAL OF THE DISTRIBUTION CHAIN SLIDING SHOES

Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.
- The chain tensioner, refer to the section “**Removal of the distribution chain tensioner, Chapter 5**”.
- The exhaust camshaft, refer to the section “**Removal of the intake and exhaust camshaft, Chapter 5**”.
- The intake camshaft, refer to the section “**Removal of the intake and exhaust camshaft, Chapter 5**”.
- The screw (1) Fig. A.
- The movable chain sliding shoe (2) Fig. I. A.



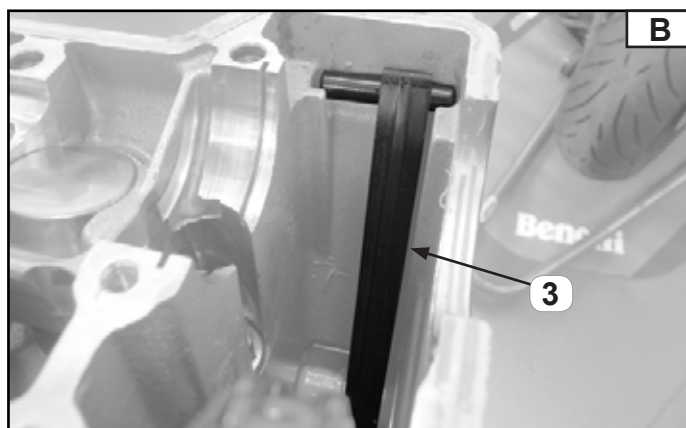
- The fixed chain sliding shoe (3) Fig. B.

CHECK OF THE CHAIN SLIDEING SHOES:

Inspect:

- The contact surface of the fixed sliding shoe.
- The contact surface of the movable sliding shoe.

If there is any damage or wear, replace the parts.





HEAD TIMING

INSTALLATION OF THE DISTRIBUTION CHAIN SLIDING SHOES

Install:

Proceed using the opposite order to removal.

At the end of assembly, proceed with assembly of the distribution chain tensioner. Refer to the section “**Assembly of the distribution chain tensioner, Chapter 5**”.



HEAD TIMING

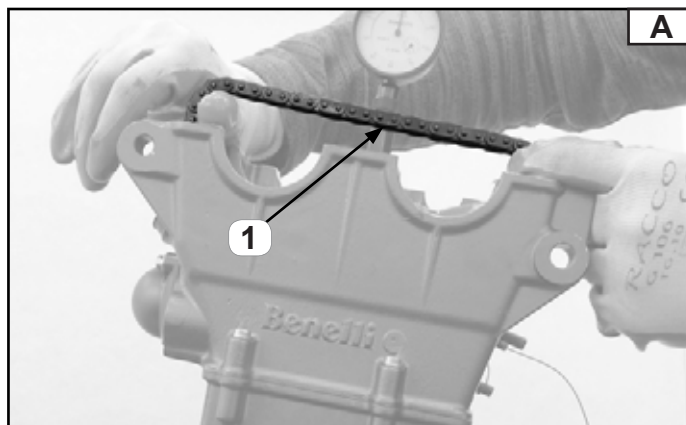
REMOVAL OF THE DISTRIBUTION CHAIN

Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.
- The chain tensioner, refer to the section “**Removal of the distribution chain tensioner, Chapter 5**”.
- The exhaust camshaft, refer to the section “**Removal of the intake and exhaust camshaft, Chapter 5**”.
- The intake camshaft, refer to the section “**Removal of the intake and exhaust camshaft, Chapter 5**”.
- The chain sliding shoes, refer to the section “**Removal of the distribution chain sliding shoes, Chapter 5**”.

Slide out:

- The distribution chain (1) Fig. A.



CHECK OF THE DISTRIBUTION CHAIN

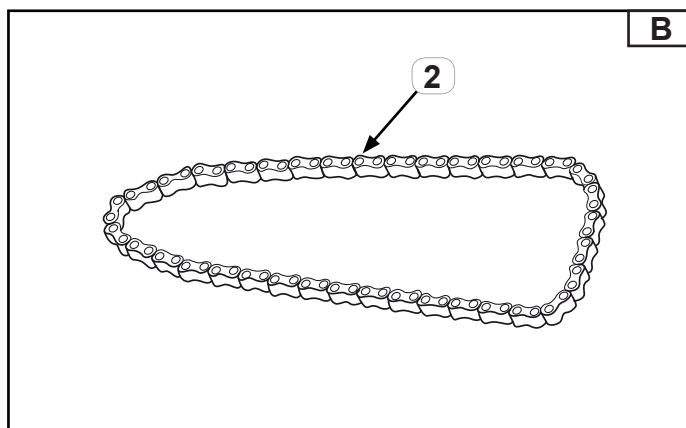
The following process applies to all of the sprockets on the camshafts and all of the distribution chain guides.

Inspect:

- The distribution chain (2) Fig. B.
- In case of damage/lack of flexibility/locked links, replace the whole block of the distribution chain and camshaft gear.

NOTE:

In any case the distribution chain needs to be replaced after wear limits.





HEAD TIMING

INSTALLATION OF THE DISTRIBUTION CHAIN

Insert:

- The distribution chain (1) onto the crankshaft sprocket, Fig. A.
- Insert the fixed and movable chain tensioner sliding shoes, refer to the section **“Assembly of the distribution chain, Chapter 5”**
- The two camshafts, making sure that both are mounted with the phasing references “aligned” with the engine head surface Fig. B.

NOTE:

Assembly of the distribution chain must be always carried out by taking into account the fact that the engine must be in the TDC condition Fig. B, refer to the section “Installation of the intake camshaft, Chapter 5”.



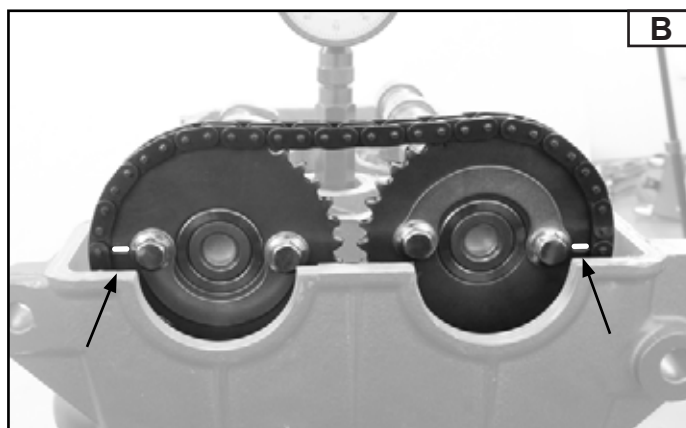
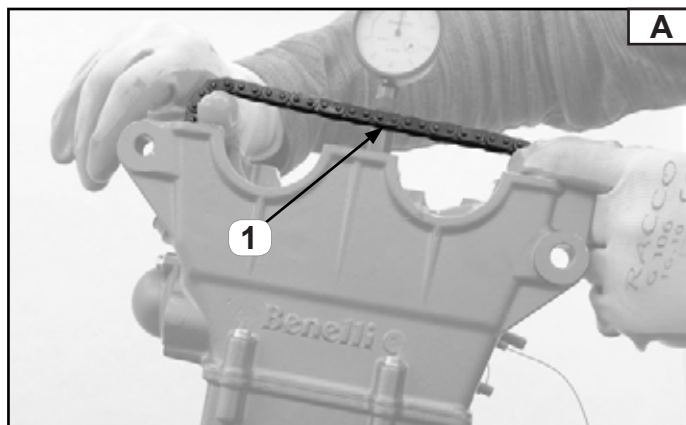
Comparator support tool
Code: R180197022000

NOTE:

During this operation, it is necessary to lubricate the chain and timing gears with engine oil.

NOTE:

Every time that the chain is replaced, it is also necessary to replace the sliding shoes.





HEAD TIMING

ADJUSTMENT OF VALVE CLEARANCE

Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.

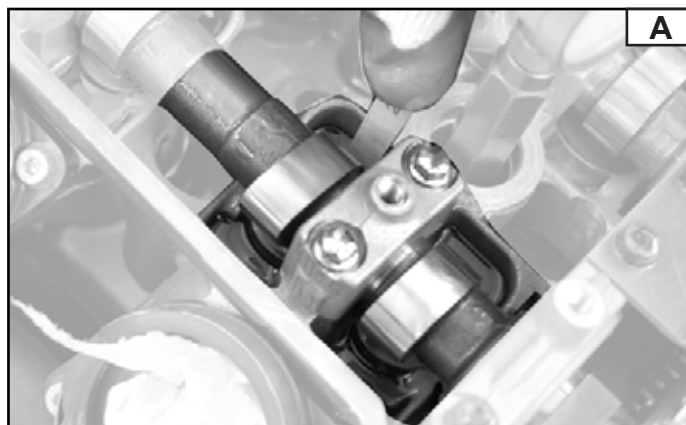
NOTE:

The 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 valve lifter bucket, 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	Bucket-cam clearance
Camshaft exhaust side	0.30 ~ 0.35 mm
Camshaft intake side	0.25 ~ 0.30 mm

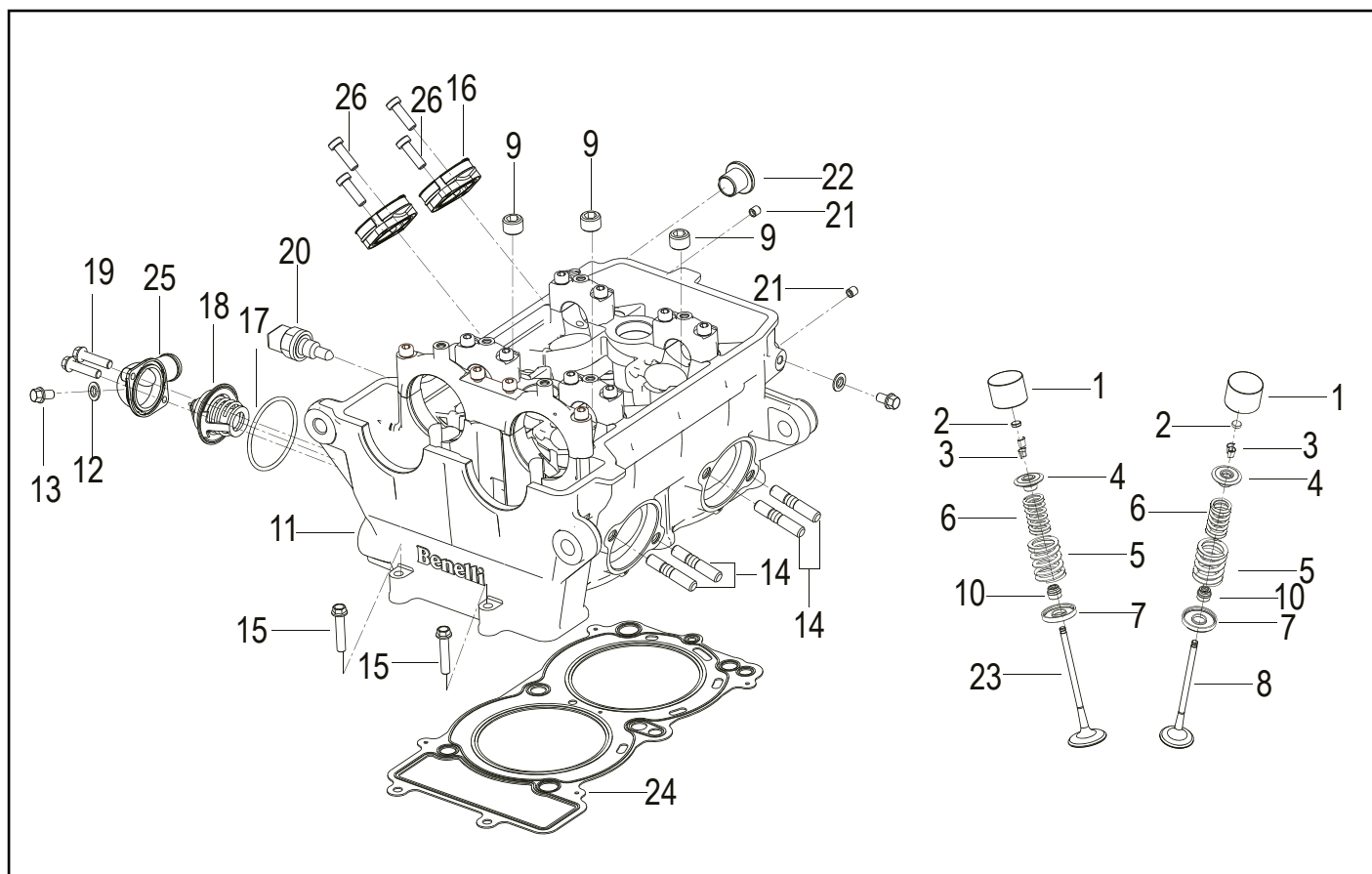
NOTE:

In case of valve clearance correction, replace the calibrated pads (see the following table).



HEAD TIMING

REMOVAL OF THE VALVE LIFTER BUCKET AND CALIBRATED PADS



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	VALVE LIFTER BUCKET					
2	VALVE PAD					
3	HALF CONE					
4	UPPER RETAINER					
5	OUTER SPRING					
6	INNER SPRING					
7	LOWER RETAINER					
8	EXHAUST VALVE					
9	THREADED CAP					
10	VALVE RUBBER PAD					
11	CYLINDER HEAD					
12	GASKET					
13	SCREW					
14	STUD BOLT					
15	SCREW					
16	INTAKE DUCT					
17	O-RING					
18	THERMOSTAT					
19	SCREW					
20	WATER TEMPERATURE SENSOR					
21	PIN					



HEAD TIMING

REMOVAL OF THE VALVE LIFTER BUCKET AND CALIBRATED PADS

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	CAP					
23	EXHAUST VALVE					
24	HEAD GASKET					
25	THERMOSTAT BELLEVILLE					
26	SCREW					



HEAD TIMING

REMOVAL OF THE VALVE LIFTER BUCKET AND CALIBRATED PADS

Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.

To remove the intake and exhaust valve lifter buckets, proceed as follows:

Slide out:

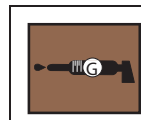
- Use a magnet to take out the valve lifter bucket (1) Fig. A.
- The calibrated pad (2) Fig. A.

Check:

- The valve lifter bucket, ensuring that there is no damage or lines, and if not, replace.
- Check the outside diameter of the valve lifter bucket using a micrometre to exclude any deformation Fig. B.

NOTE:

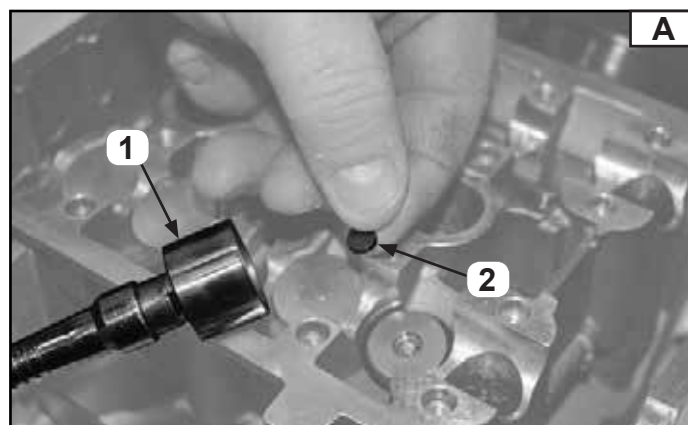
During installation, lubricate the valve lifter buckets, using:



Teflon-based paste or of other lubricants, as graphite, ceramics.

NOTE:

At the end of the check of the parts, always check the valve clearance, as in the section “Adjustment of the valve clearance, Chapter 5”.

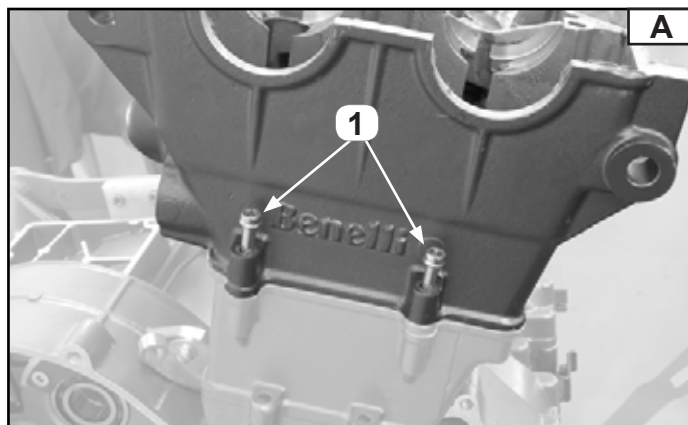




HEAD TIMING HEAD REMOVAL

Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.
- The chain tensioner, refer to the section “**Removal of the distribution chain tensioner, Chapter 5**”.
- The exhaust camshaft, refer to the section “**Removal of the intake and exhaust camshaft, Chapter 5**”.
- The intake camshaft, refer to the section “**Removal of the intake and exhaust camshaft, Chapter 5**”.
- The chain sliding shoes, refer to the section “**Removal of the distribution chain sliding shoes, Chapter 5**”.



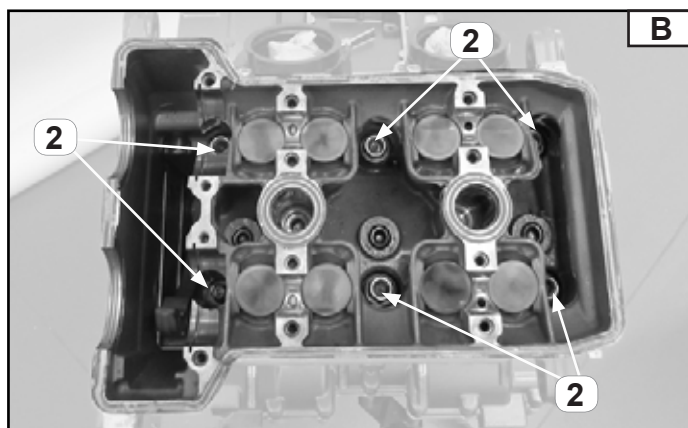
Remove:

- The screws (1) Fig. A.
- The nuts (2) Fig. B.

NOTE:

**Loosen each screw by ½ turn.
Then remove all screws.**

- Head gasket.





HEAD TIMING

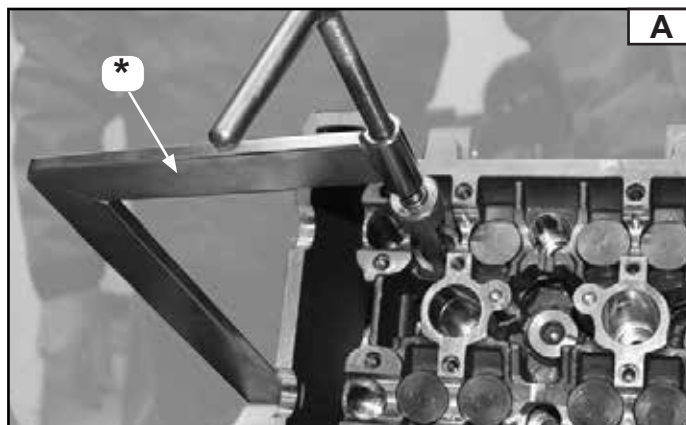
REMOVAL OF THE VALVES AND VALVE SPRINGS

Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.
- The chain tensioner, refer to the section “**Removal of the distribution chain tensioner, Chapter 5**”.
- The exhaust camshaft, refer to the section “**Removal of the intake and exhaust camshaft, Chapter 5**”.
- The intake camshaft, refer to the section “**Removal of the intake and exhaust camshaft, Chapter 5**”.

The following process applies to all of the valves and valve guides.

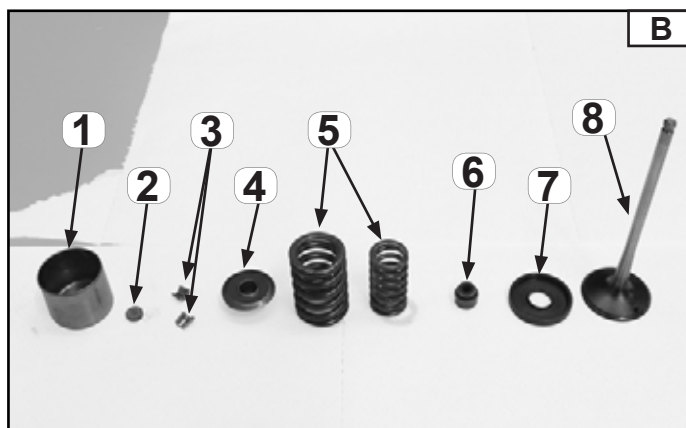
Use the special tool (*) to remove the valves Fig. A.



Valve spring compressor tool
Code: 0320097050000

Remove: B:

- The valve lifter bucket (1).
- Pad (2).
- Half cones (3).
- Top plate (4).
- Springs (5).
- Oil seal (6).
- Bottom plate (7).
- Valve (8).



NOTE:

During removal of the two half cones to lock the valve, use a magnet (9) to recover them Fig. C.





HEAD TIMING

CHECK OF VALVES AND RELATED GUIDES

NOTE:
The following process can be applied to all of the valves and valve guides.

Inspect:

- 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.

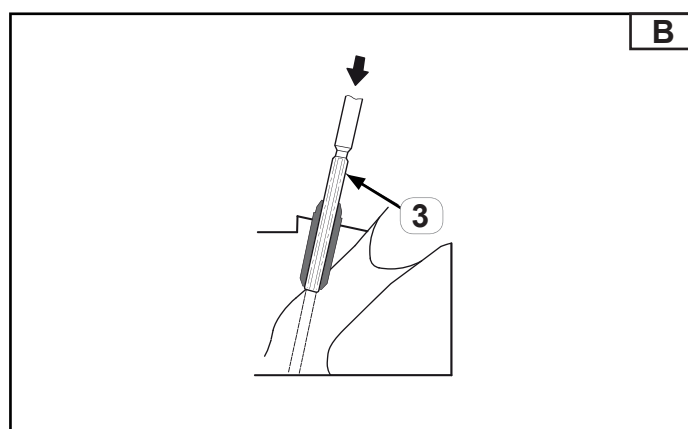
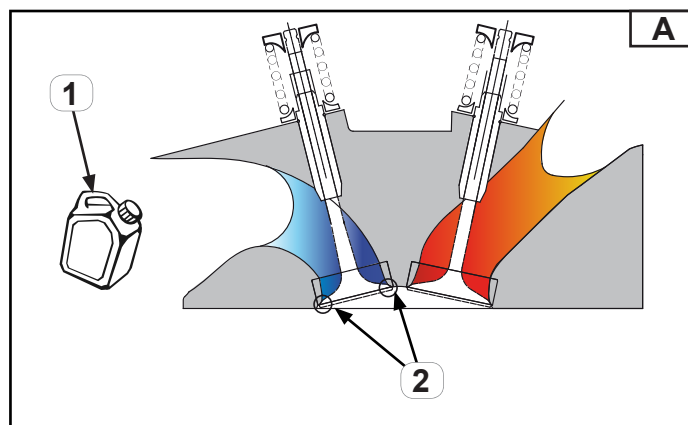
Replace:

- The valve guide.

NOTE:
To make valve guide removal and installation operations easier and to maintain correct assembly, heat the head in an oven, bringing it to 120°C (248°F).

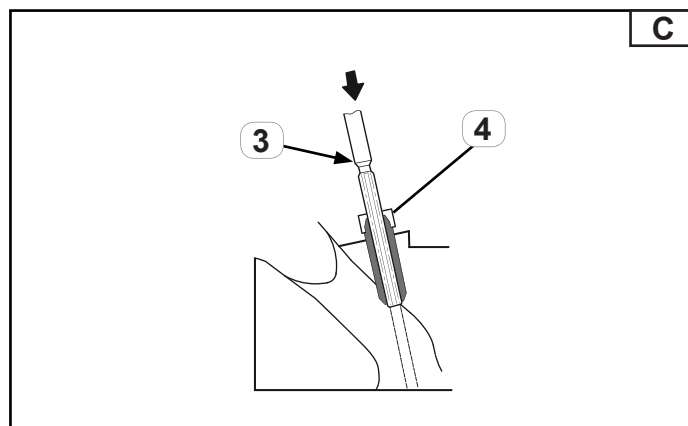
Remove:

- The valve guide with a special extractor (3) Fig. B.



Install:

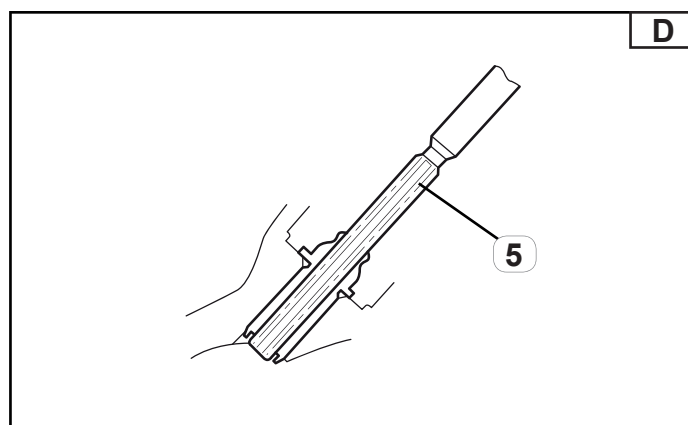
- The new valve guide with the special installer (4) and extractor (3) Fig. C.



Bore:

- The valve guide with a reamer (5) to create the correct clearance between the valve guide and stem Fig. D.

NOTE:
After reinserting the valve guide, grind the seat.



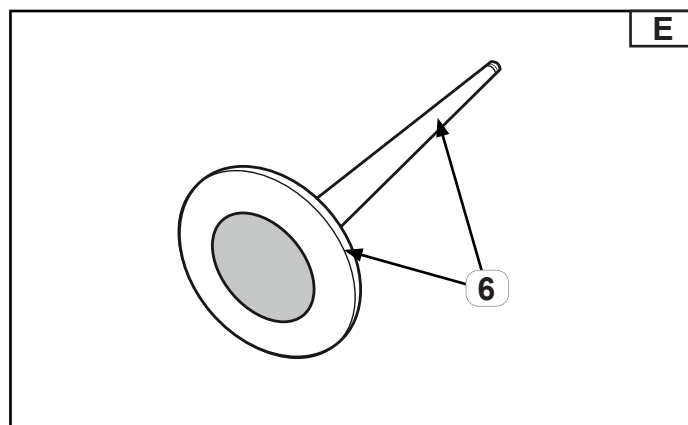


HEAD TIMING

CHECK OF VALVES AND RELATED GUIDES

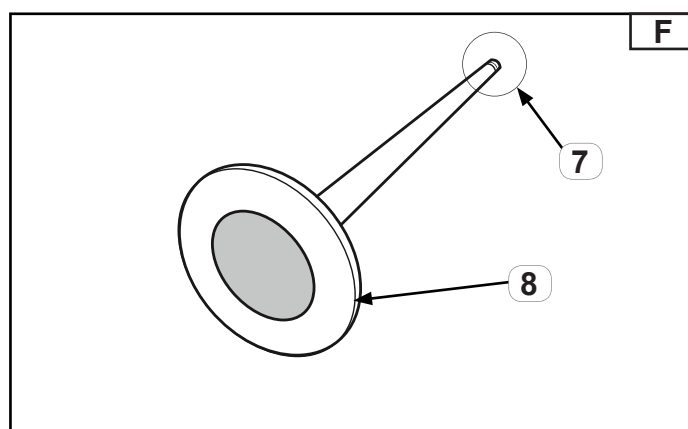
Eliminate:

- The carbon deposits (6) (from the contact surface and valve seat) Fig. E.



Inspect:

- The contact surface of the valve (8) Fig. F.
- If there is any pitting/wear, grind the contact surface of the valve.
- End of the valve stem (7) 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.



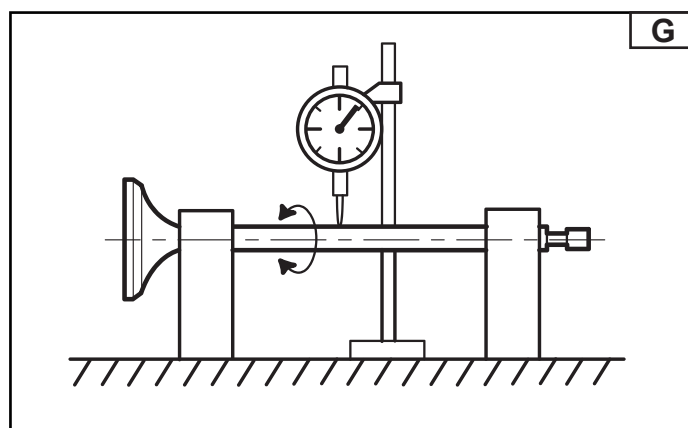
Measure:

- 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 TIMING

CHECK OF VALVE SEATS

The following procedure applies to all valves and valve seats.

Eliminate:

- The carbon deposits from the contact surface (B) and the valve seat (A) Fig. A.

Inspect:

- The valve seat (A) Fig. A.

If there are marks/signs of wear, grind the seats or replace the head.

Measure:

- The width of the valve seat (A) Fig. A.

If outside specifications, grind the seats or replace the head.

Valve	Width of the 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) Fig. A.
- 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. C.

NOTE: After replacing the head or the valve and the relevant guide, it is necessary to lap the seat and contact surfaces of the valve.

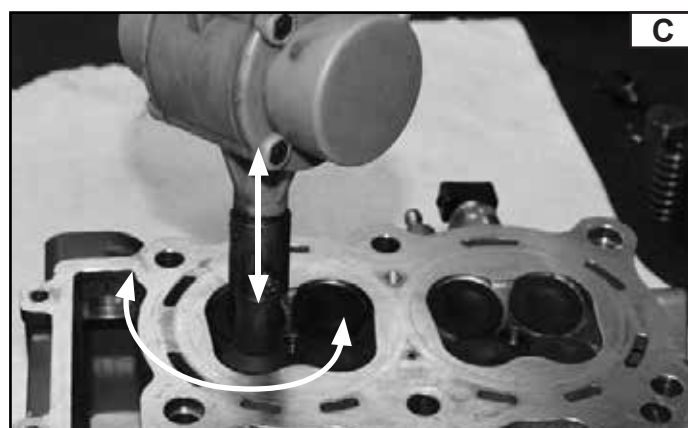
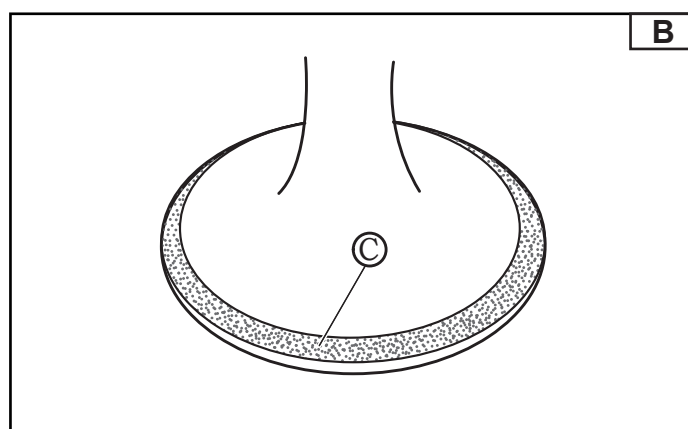
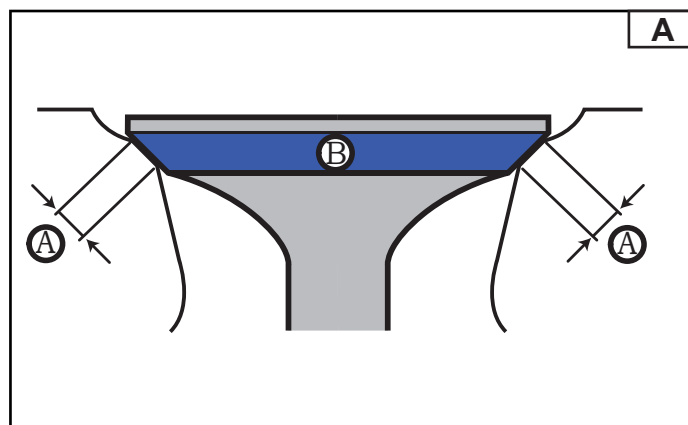
- Apply a paste for adequate lapping of the valve contact surface (C) Fig. B.

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. C.





HEAD TIMING

REMOVAL / INSTALLATION OF THE VALVE OIL SEAL

Remove:

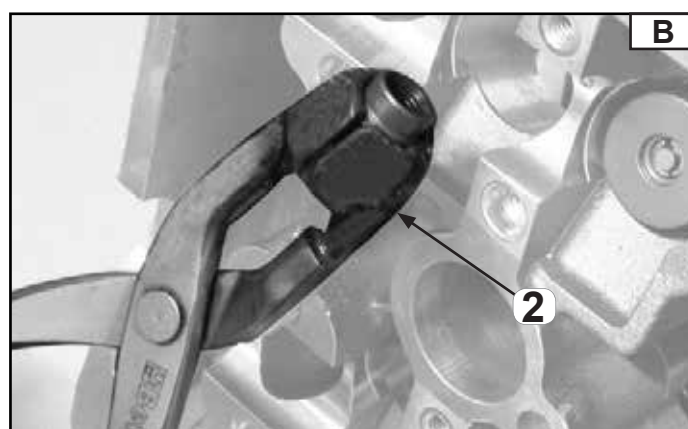
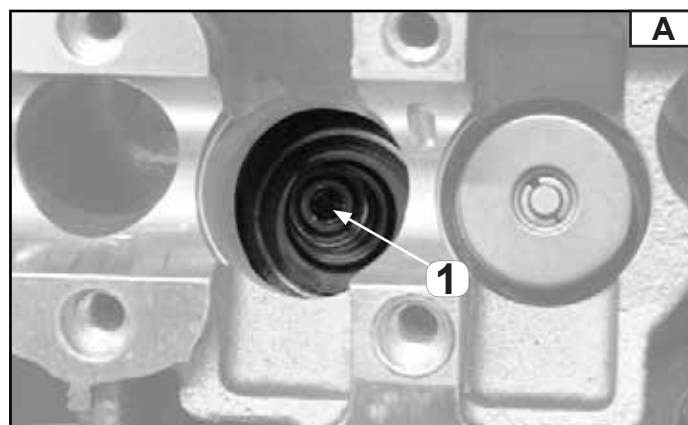
- The valve.

Slide out:

- The oil seal (1) Fig. A with the special tool (2) Fig. B.



Tool for valve oil seal removal

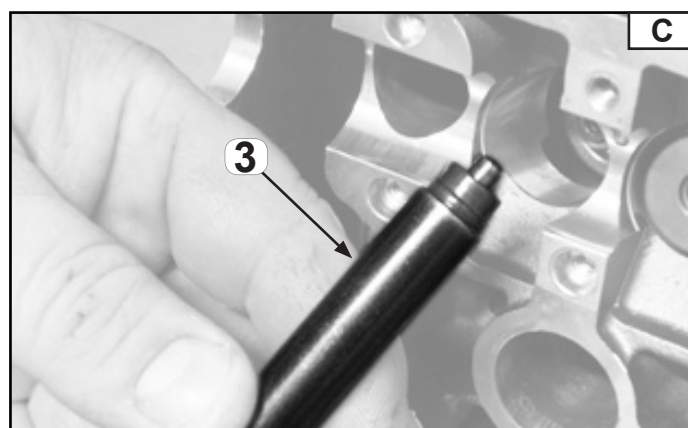
**Install:**

- The oil seal with the special tool (3) Fig. C.



Valve oil seal insertion tool

Code: R180197025000





HEAD TIMING

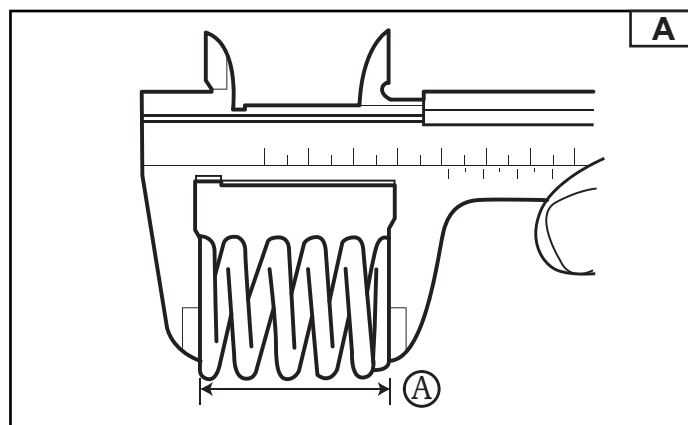
CHECK OF THE VALVE SPRINGS

The following process is applied to all valve springs.

Measure:

- The free length of the valve springs (A) Fig. A.

Valve spring		Size (A)
Intake	Inner	36.60 mm
	Outer	38.8 mm
Exhaust	Inner	40.1 mm
	Outer	41.6 mm



NOTE:

If not compliant with specifications, replace the valve spring.



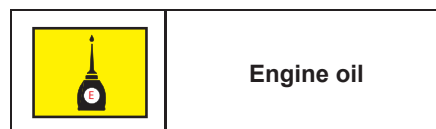
HEAD TIMING

INSTALLATION OF VALVES AND VALVE SPRING

Install into the head:

NOTE:

Lubricate the valve stem and oil seal Fig. A2.



- The valve bottom spring plate (4) Fig. A.
- The valve oil seal (3) Fig. A1, refer to the section “**Removal / installation of the valve oil seal, Chapter 5**”.
- The valve (5) Fig. A.
- The valve springs (2) Fig. A.
- The valve top spring plate (1) Fig. A.
- The half cones.

NOTE:

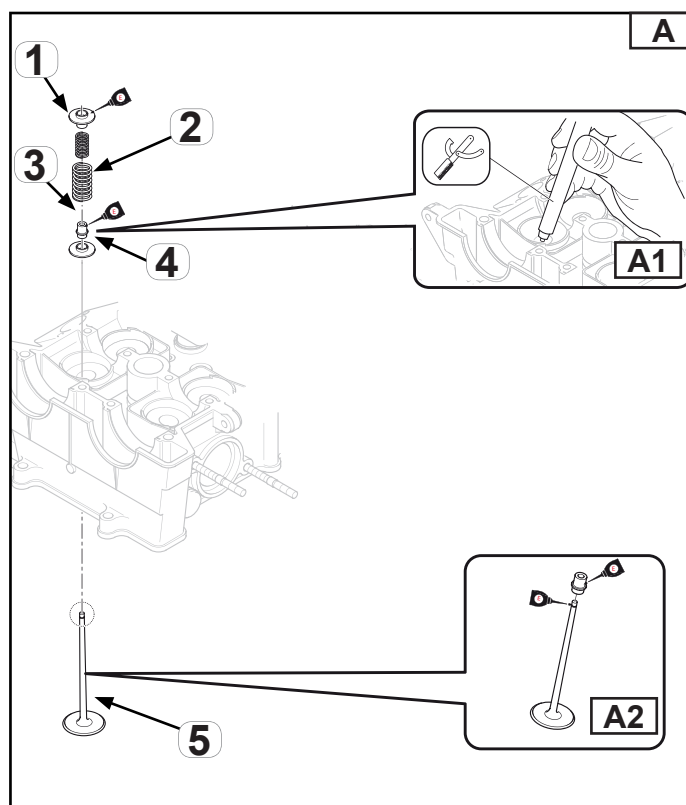
Make sure that every valve has been remounted in its original position.

NOTE:

Reposition the valve cotters, pressing the spring on each valve with the special compression tool (6) Fig. B.



Valve spring compressor tool
Code: 0320097050000





HEAD TIMING

INSTALLATION OF VALVES AND VALVE SPRINGS

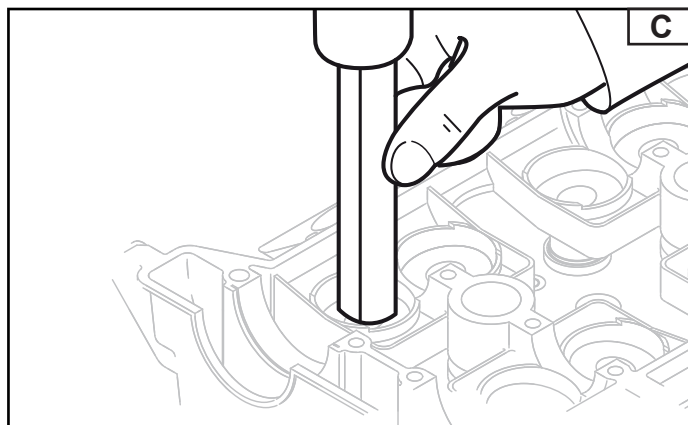
Fix:

- The half cones on the valve stems.

Gently tap on the valve tip with a soft hammer, Fig. C.

NOTICE

Hitting the valve tip with too much force could damage the valve.

**Install:**

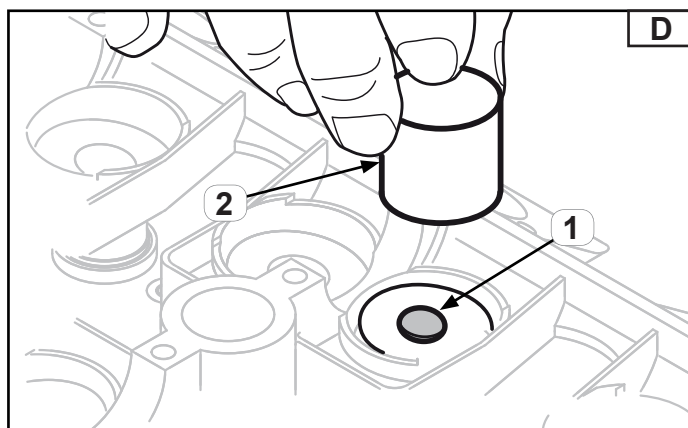
- The calibrated pad (1) Fig. D.
- The valve lifter bucket (2) Fig. D.

NOTE:

Lubricate the valve lifter bucket with grease MOLYKOTE with graphite.

Manually turn the valve lifter bucket, which must be able to slide smoothly.

Reassemble each valve lifter bucket and pad to its original position.



Graphite-based grease

The following process applies to all of the valves and relevant components.



HEAD TIMING CHECK OF CYLINDERS

Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.
- The head, refer to the section “**Removal of the head, Chapter 5**”.

The following procedure applies the whole cylinder group.

Inspect:

- The cylinder wall with a special tool Fig. A.

If there are any vertical lines, replace the cylinder and the piston all together and the relevant clips.

Measure:

- Cylinder bore 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 limit.

CYLINDER bore (C) = 88 (+0.01, +0.02)

$C = \text{Max } D1 \text{ or } D2 - 0.002 \text{ mm}$
 $C = \text{Max } D1 \text{ or } D2 - 0.003 \text{ mm}$

Limit conicity:

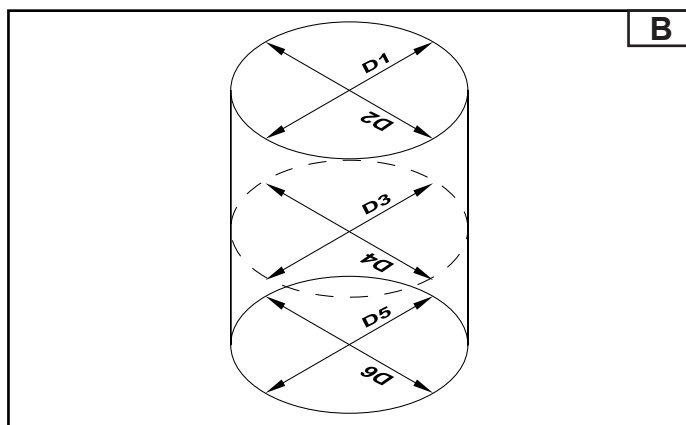
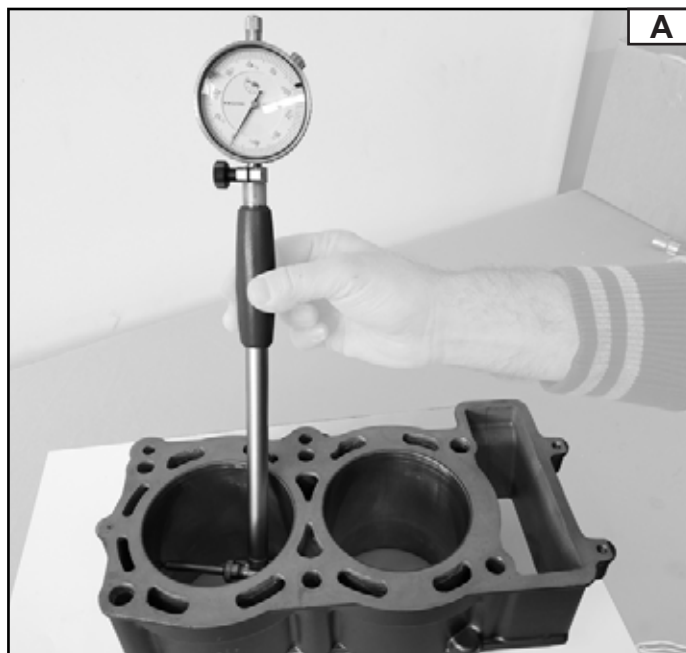
- Max D1 = 0.05 mm
- Max D2 = 0.05 mm
- Max D3 = 0.05 mm
- Max D4 = 0.05 mm
- Max D5 = 0.05 mm

Max. ovalization:

- 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 TIMING HEAD INSTALLATION

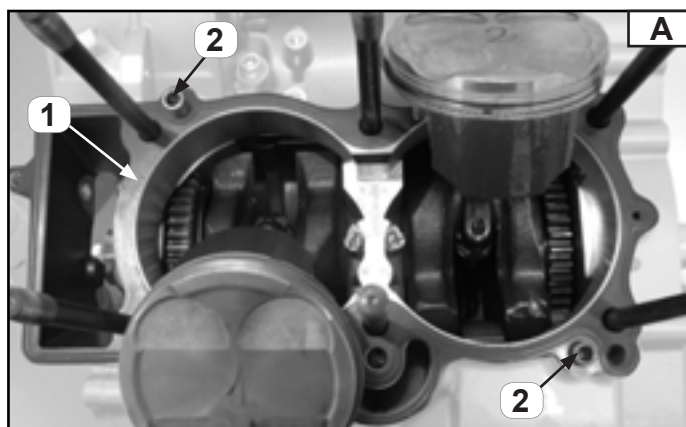
Before assembling the head, replace the gasket (1) Fig. A.

Check:

- The centring grub screws (2) are in position Fig. A.

Place:

- The head.

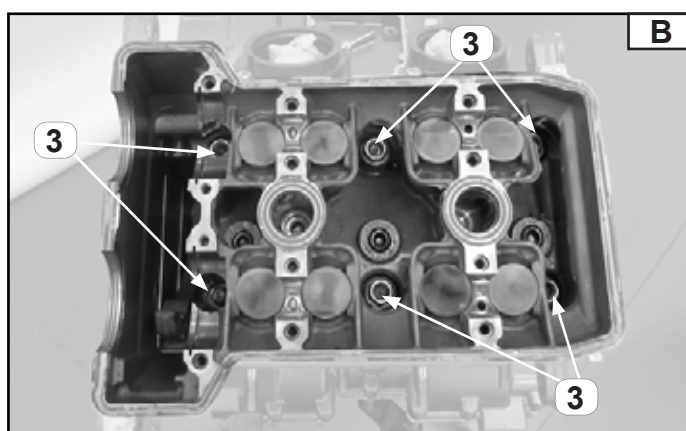
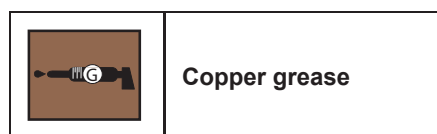


Tighten:

- The screws (3) Fig. B following the sequence stated in Fig. C in four stages:

NOTE:

During assembly of the head, lubricate the head screws with copper grease.



Step one:

Torque 25 N*m

Step two:

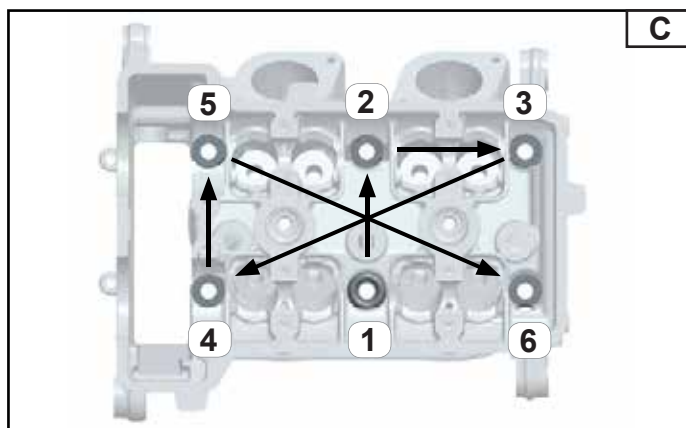
Torque 45 N*m

Step three:

Tightening +50°

Step three:

Tightening +50°



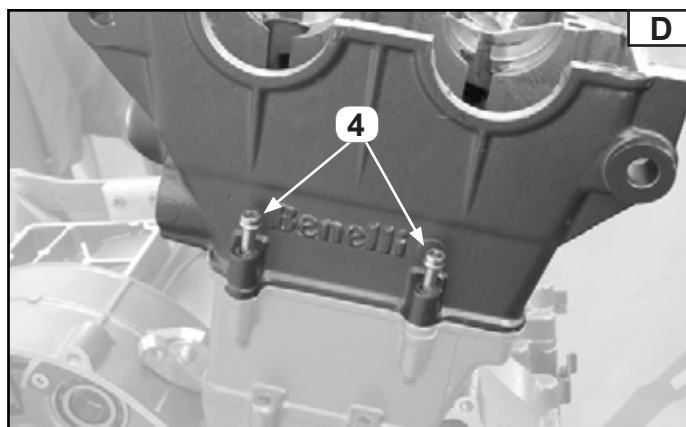
- The screws (4) Fig. D to the following torque:



Torque 10-11 N*m

NOTE:

During assembly of the head, lubricate the head screws with copper grease.





HEAD TIMING

REMOVAL / INSTALLATION OF THE LUBRICATION NOZZLES

Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.
- The head, refer to the section “**Removal of the head, Chapter 5**”.
- The cylinder block.
- The nozzles (1) Fig. A.

Check:

- The nozzles are not clogged.

Install:

Proceed using the opposite order to removal.

Tighten:

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

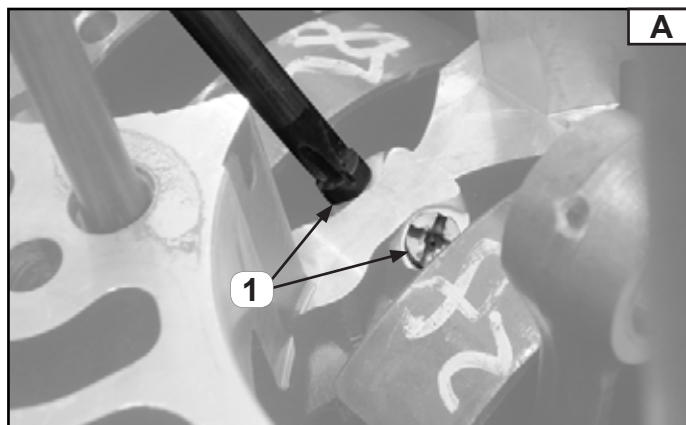


Torque 0.5 N*m

Use a drop of medium Loctite thread locker only on the threading to secure:

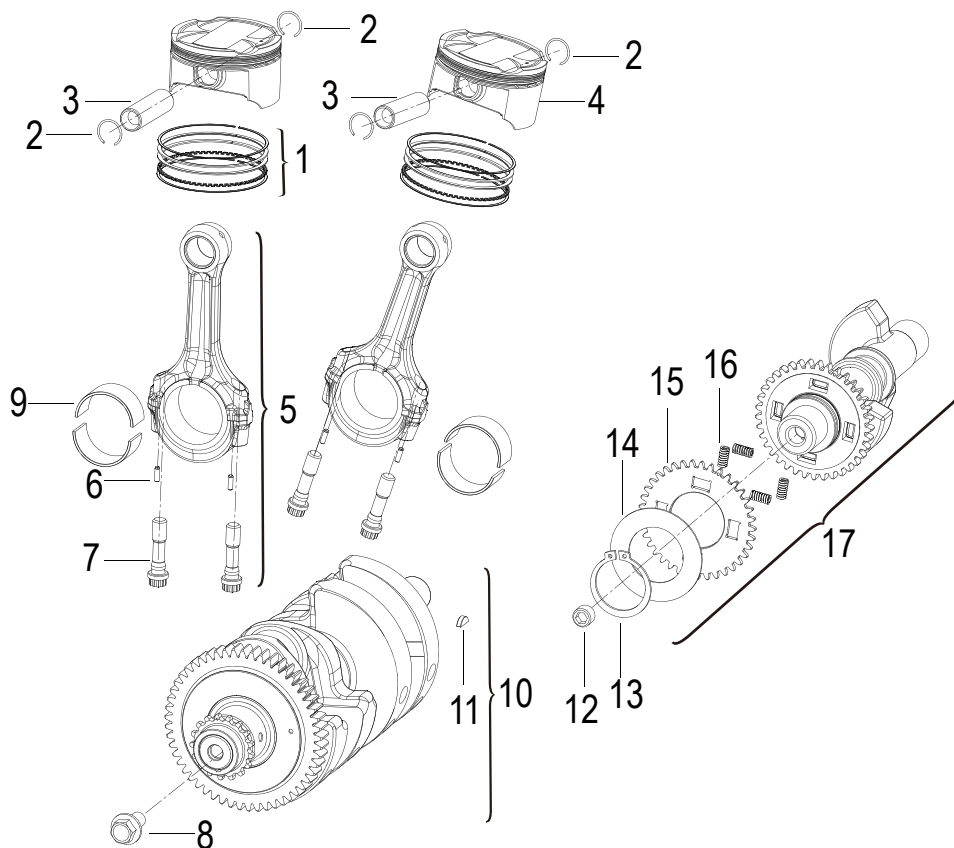


**MEDIUM THREAD
LOCKER**





PISTONS



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	PISTON RINGS SET					
2	PISTON PIN CIRCLIP					
3	PIN					
4	PISTON					
5	COMPLETE CONNECTING ROD					
6	BUSH					
7	SCREW					
8	SCREW					
9	HALF-BEARING					
10	COMPLETE CRANKSHAFT					
11	WOODRUFF KEY					
12	THREADED CAP					
13	SNAP RING					
14	SHIM					
15	BALANCE SHAFT GEAR					
16	SPRING					
17	BALANCE SHAFT					



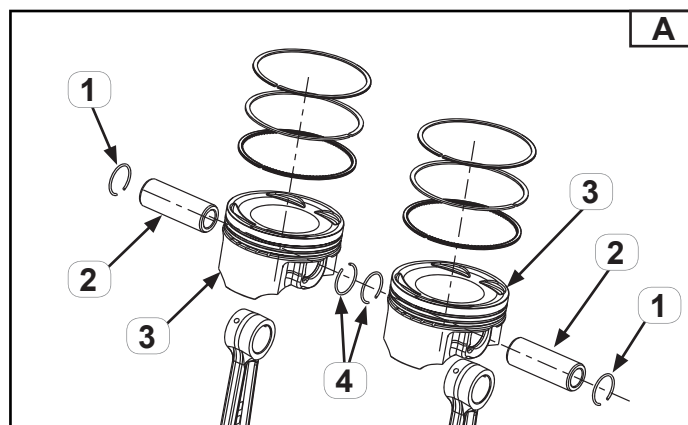
PISTONS

REMOVAL OF THE PISTONS

The following removal process applies to all pistons.

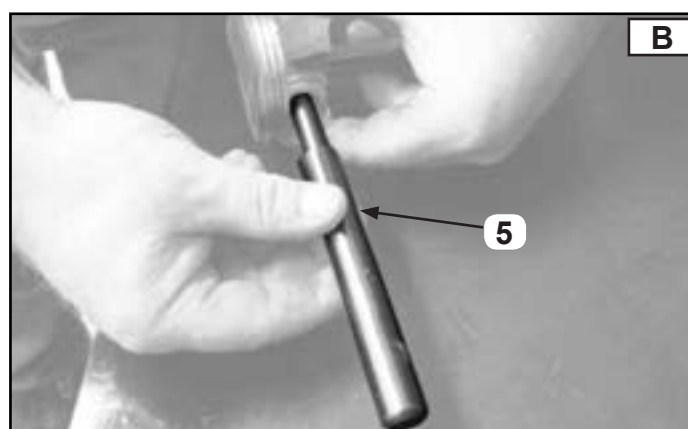
Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.
- The head, refer to the section “**Removal of the head, Chapter 5**”.
- The cylinder block.
- The outer snap ring (1) Fig. A.
- The piston pin (2) Fig. A.
- The piston (3) Fig. A.
- The inner snap ring (4) Fig. A.



NOTE: _____
To remove the piston pin, use a pad (5) Fig. B.

NOTE: _____
Never use hammers to remove the pins.





PISTONS

CHECK OF PINS

The following procedure applies to all piston pins.

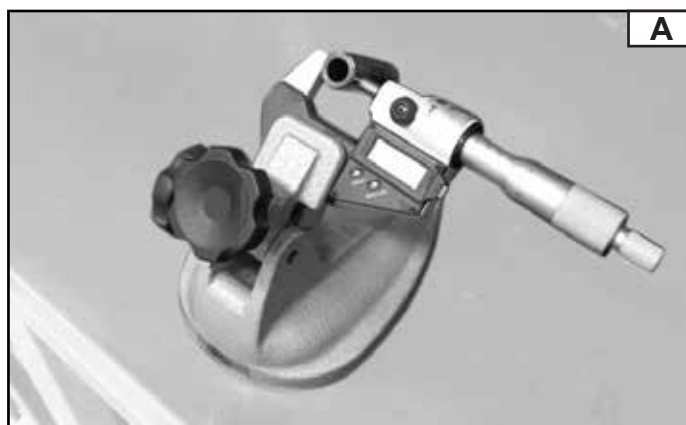
Inspect:

- 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. A.
If not compliant with specifications, replace the pin using the measuring tool.
- The inner diameter of the piston pin bore Fig. B.
If outside specifications, replace the piston.



Internal bore (1)	Size
Pin bore	Ø 18 mm +0.0/+0.005





PISTONS

CHECK OF ELASTIC RINGS

The following procedure is applied to all elastic rings (1) Fig. A.

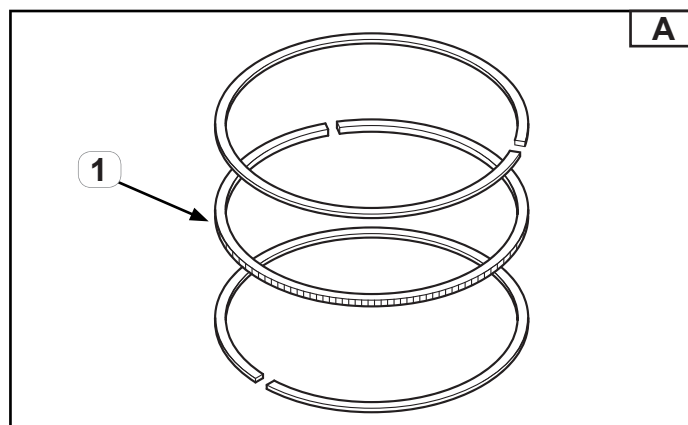
Check:

- The absence of lines and traces of forcing on each ring (1) 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 cylinder and the relevant rings all together.

Ring	Clearance between the elastic rings and the piston groove
Top ring	0.04±0.08 mm
Second ring	0.05±0.09 mm

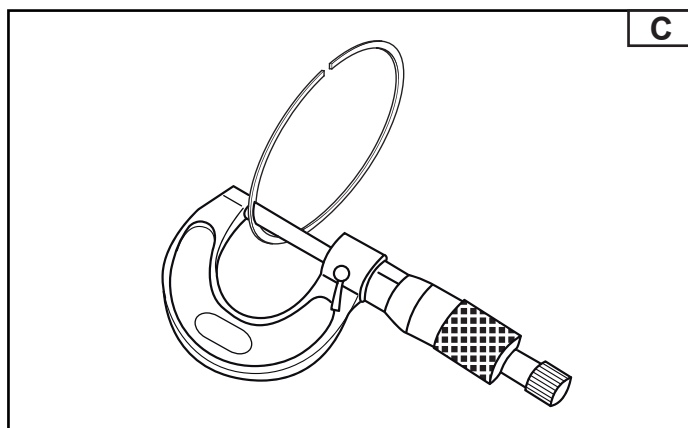


Measure:

- The thickness of the top ring.
- The thickness of the second ring.

See Fig. C.

Ring	Piston ring thickness
Top ring	1 -0.01/-0.03 mm
Second ring	0.8 -0.02/-0.04 mm
Composite ring "oil scraper" 2 rings	0.42 mm -0.005/-0.01
Intermediate spacer ring	It is not subject to a dimensional check but only functional





PISTONS

CHECK OF PISTONS

The following procedure applies to both pistons.

Inspect:

- The wall of the piston (1) Fig. A.

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. B.

CLASS	Piston skirt
A	Ø 88 (-0.025 / -0.03)
B	Ø 88 (-0.02 / -0.025)

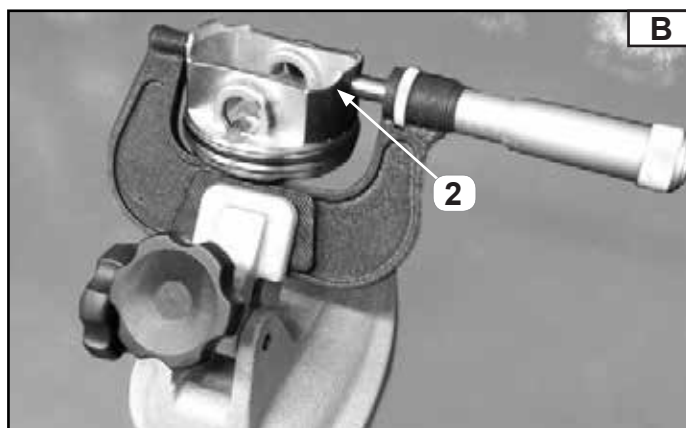
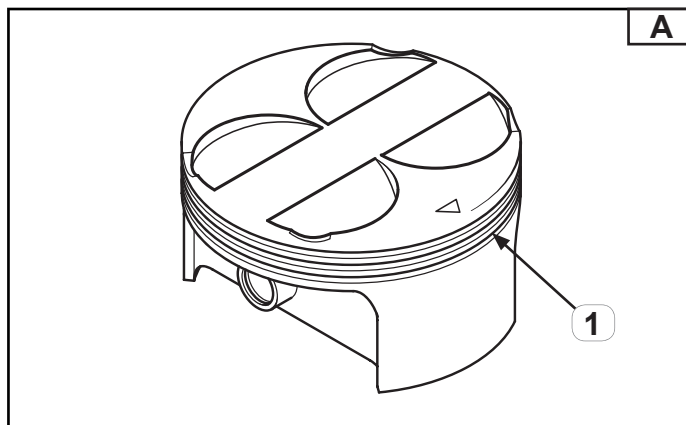
If outside specifications, replace the piston and the relevant rings all together.

If outside specifications:

Wrong tolerance (excessive) between the piston and the cam, max. limit 0.1 mm

NOTICE

The piston is marked by a letter stating its class. The cylinder-piston coupling must be made between the same classes.





PISTONS

ASSEMBLY OF PISTONS

The following procedure applies to all pistons.

Install in the following order Fig. A:

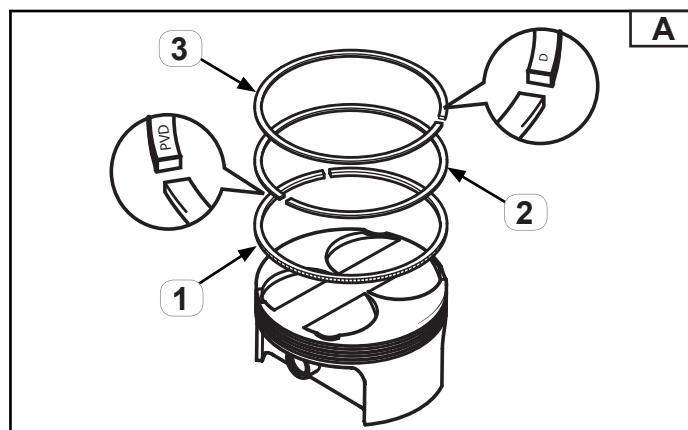
- The composite "oil scraper" ring (1).
- The second ring (2).
- The third ring (3).

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.

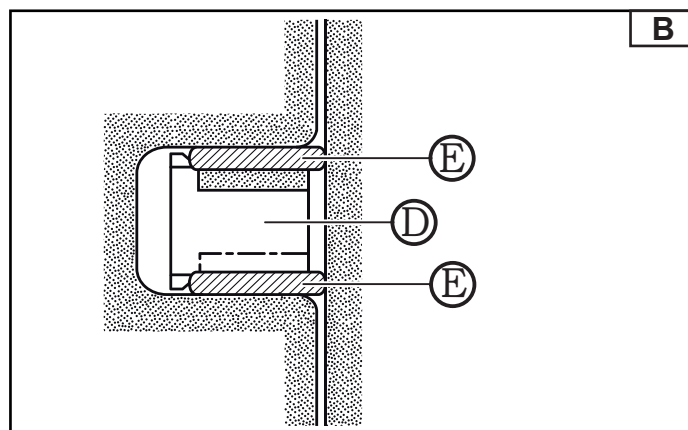


The first element to insert in the oil scraper slot is the spacer (D) Fig. B.

After positioning the spacer, insert its side rings (E) Fig. B.

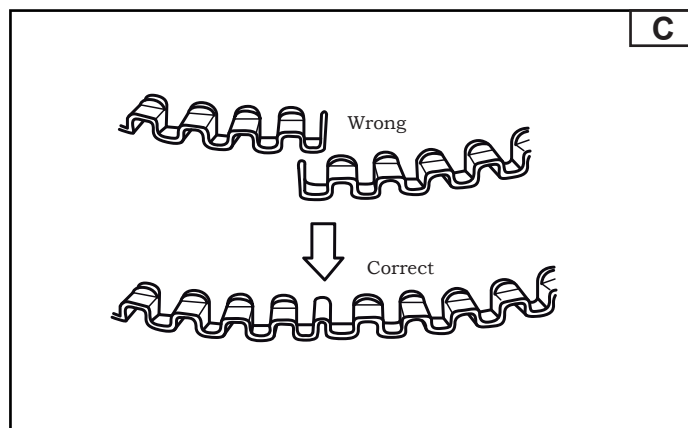
NOTE:

The spacer and side rings have no particular top or bottom side, meaning they can be inserted in any way.



NOTICE

When installing the spacer, make sure that its ends do not overlap the slot Fig. C.





PISTONS

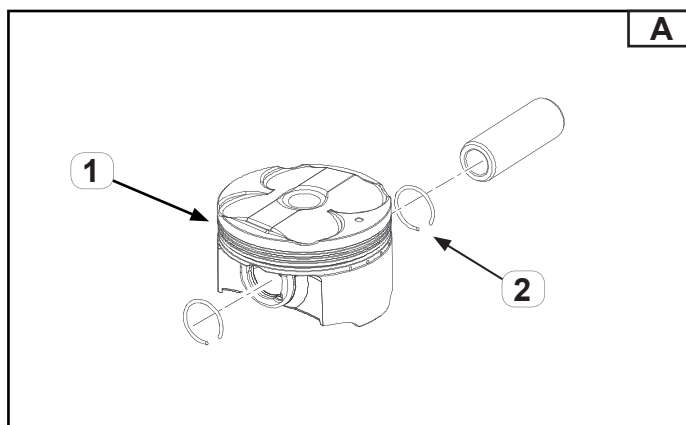
INSTALLATION OF THE PISTON

Insert:

- The pistons (1) into the corresponding cylinders Fig. A.

Place:

- The internal spring (2) Fig. A.



Insert:

- The pin (3) Fig. B.

NOTE:

Place some paper to avoid possible falls of parts into the engine Fig. B.

To insert the pistons inside the cylinders, it is necessary to use a specific piston clamp to hold the rings.

General piston clamp.

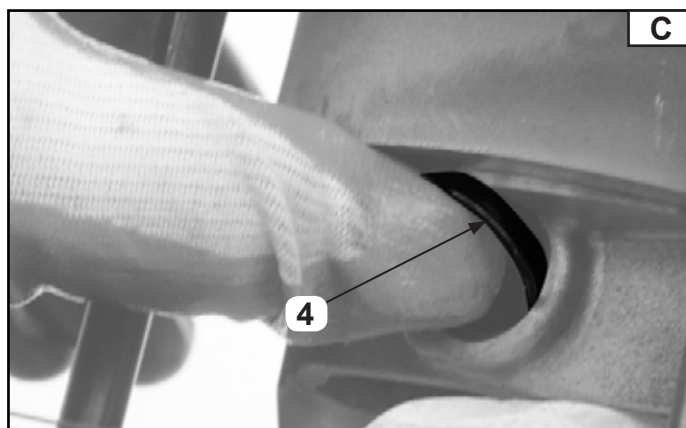
NOTE:

During this stage, lubricate parts with engine oil.



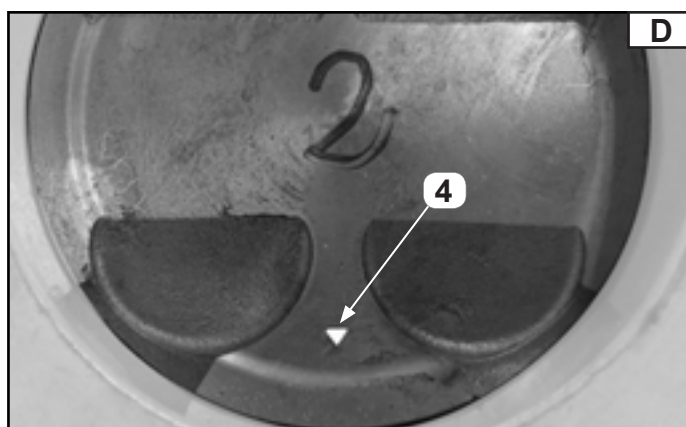
Insert:

- The outer spring (4) Fig. C.



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 (4) Fig. D is facing in correspondence of exhaust.





CRANKCASE

REMOVAL OF CONNECTING RODS

Remove:

- The coils and spark plugs, refer to the section “**Removal of the coils and spark plugs, Chapter 5**”.
- The camshaft cover, refer to the section “**Removal of the camshaft cover, Chapter 5**”.
- The chain tensioner, refer to the section “**Removal of the distribution chain tensioner, Chapter 5**”.
- The exhaust camshaft, refer to the section “**Removal of the intake and exhaust camshaft, Chapter 5**”.
- The intake camshaft, refer to the section “**Removal of the intake and exhaust camshaft, Chapter 5**”.
- The head, refer to the section “**Removal of the head, Chapter 5**”.
- The flywheel, refer to the section “**Removal of the flywheel, Chapter 5**”.
- The chain sliding shoe, refer to the section “**Removal of the chain sliding shoe, Chapter 5**”.
- The clutch, refer to the section “**Removal of the clutch, Chapter 5**”.
- The Oil sump, refer to the section “**Removal of the oil sump, Chapter 5**”.
- The fastening screws (1) of the crankcase Fig. A.
- The retaining screws (2) Fig. A.

NOTE:

During removal of the retaining screws, do not remove also the related washer (4) Fig. B.

- The special screw (3) Fig. A.

NOTE:

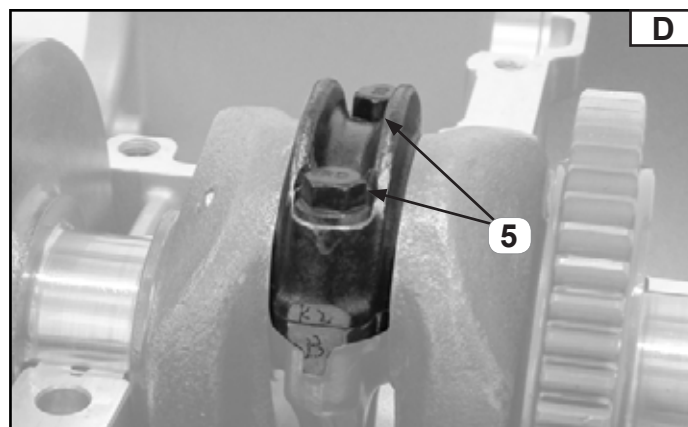
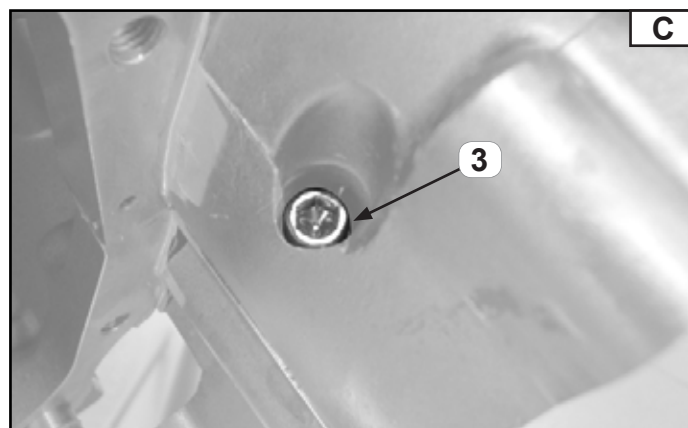
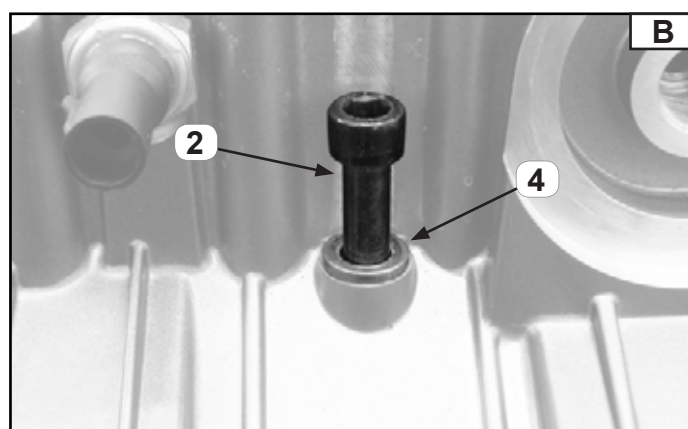
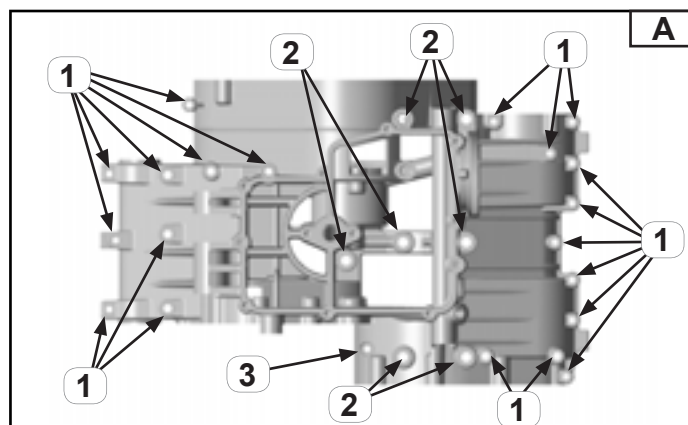
See Fig. C for the special screw (3).

Raise:

- The top crankcase.

Remove:

- The connecting rod screws (5) Fig. D.

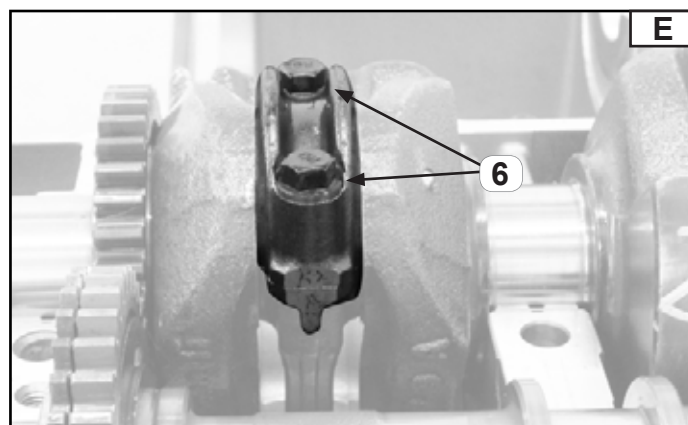




CRANKCASE

REMOVAL OF CONNECTING RODS

- The connecting rod screws (6) Fig. E.



Slide out:

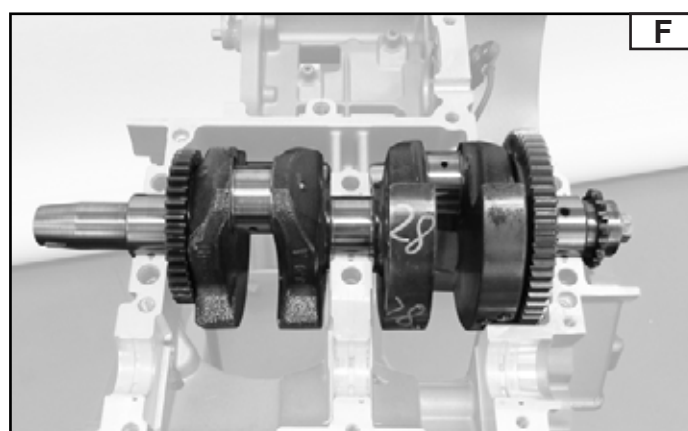
- The crankshaft.

Slide out:

- The connecting rods.

Remove:

- The pistons, refer to the section “**Removal of pistons, Chapter 5**”.





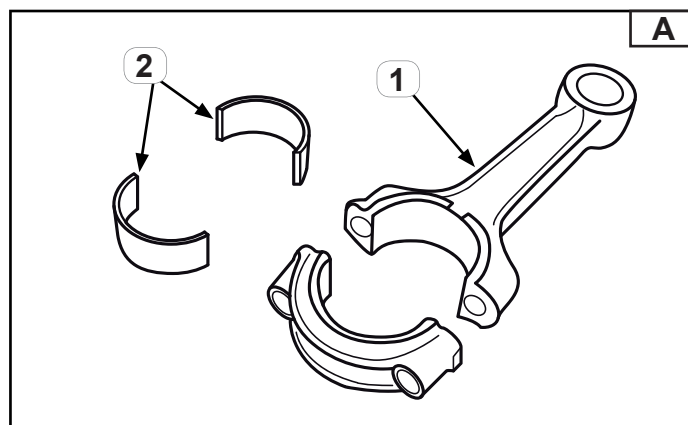
CRANKCASE

CHECK OF CONNECTING RODS AND CONNECTING ROD HALF BEARING

Check:

- For any breakages or excessive clearance on the connecting rod (1) and half bearings of the connecting rod big end (2) Fig. A.

If replacing the connecting rod, check the class of origin marked on the big end.



Measure:

- It is also necessary to measure the internal dimension of the connecting rod big end to check for any anomalies using the special gauge on the market Fig. B. Before measuring, assemble the connecting rod big end, tightening the screws with 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 37 mm (-0/+0.01)
Small end	Ø 19 mm (-0/+0.01)

Before assembling the bushes of the connecting rod big end, measure them with a specific micrometre, see Fig. C.

Detail	Nominal diameter	Clearance Minimum	Clearance Maximum
Connecting rod axle	Ø 37 mm (-0.034/-0.024)	0.035	0.065
Crankshaft	Ø 38 mm (-0.040/-0.030)	0.020	0.050
Balance shaft	Ø 30 mm (-0.035/-0.028)	0.030	0.055
Camshaft	Ø 23 mm (-0.020/-0.033)	0.035	0.070





CRANKCASE

INSTALLATION OF CONNECTING RODS AND CONNECTING ROD HALF BEARINGS

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 (1) on the half bearings of the big end with the slots (2) in the connecting rod and the relevant cap Fig. A.

NOTE:

Do not mix up the steering head bushes 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 connecting rod big end half bearings must be mounted in their original positions Fig. B.

According to the bush type, make the envisaged couplings, see table:

HALF-BEARING		
STD	COLOUR	THICKNESS
A	Red	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 38 mm (+0.008/0)
Ø std seat B blue		Ø 37 mm (+0.008/+0.016)
Ø std seat C yellow		Ø 37 mm (-0.034/-0.041)

According to the class shown on the side of the connecting rod Fig. C, combine the different types making reference to the table below:

SELECTION TABLE		
TYPE	COLOUR	WEIGHT (g)
K1	Black	412/416
K2	Green	396/400
K3	White	400/404
K4	Brown	404/408
K5	Orange	408/412

After all of these checks, install the fastening screws (3) Fig. D and tighten to the following torque:



Step one:

Torque 15 N*m

Step two:

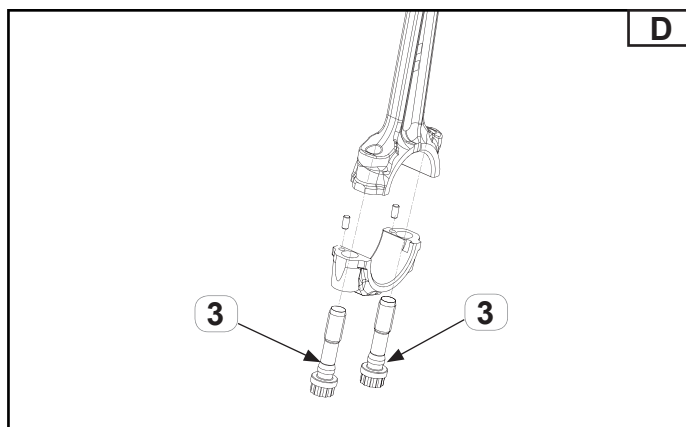
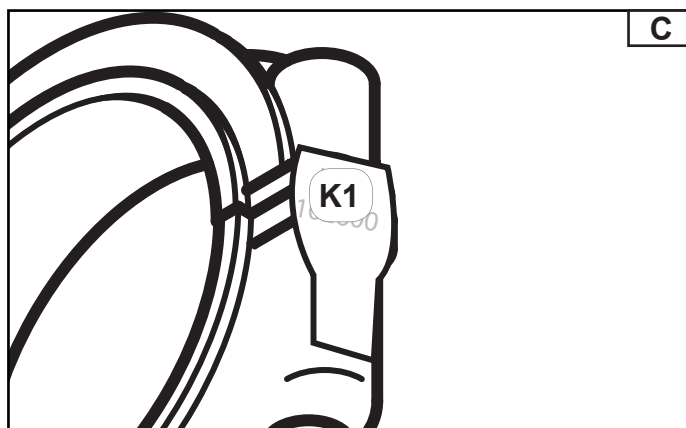
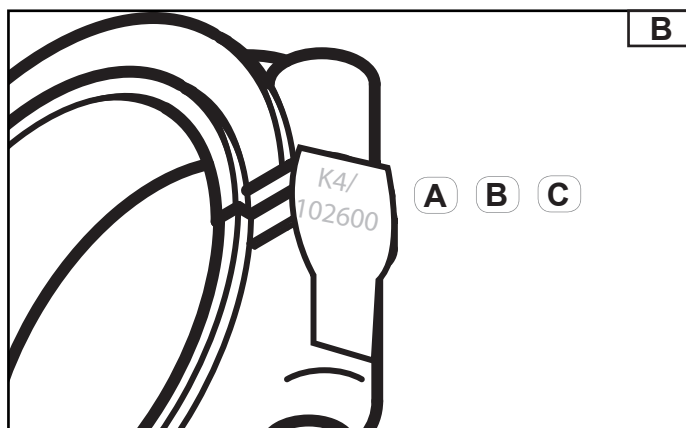
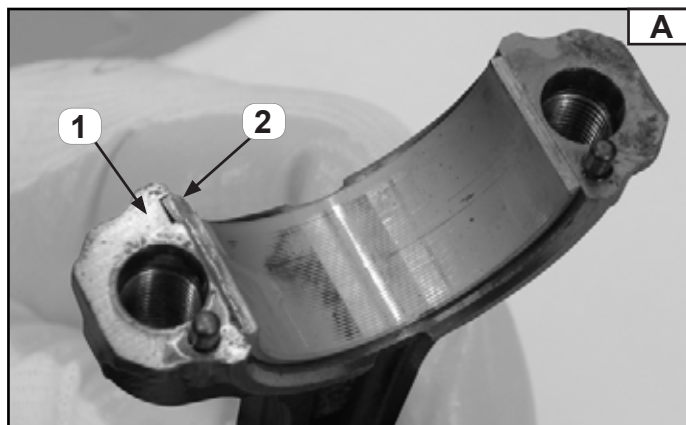
Torque 25 N*m

Step three:

Torque 75 N*m

NOTE:

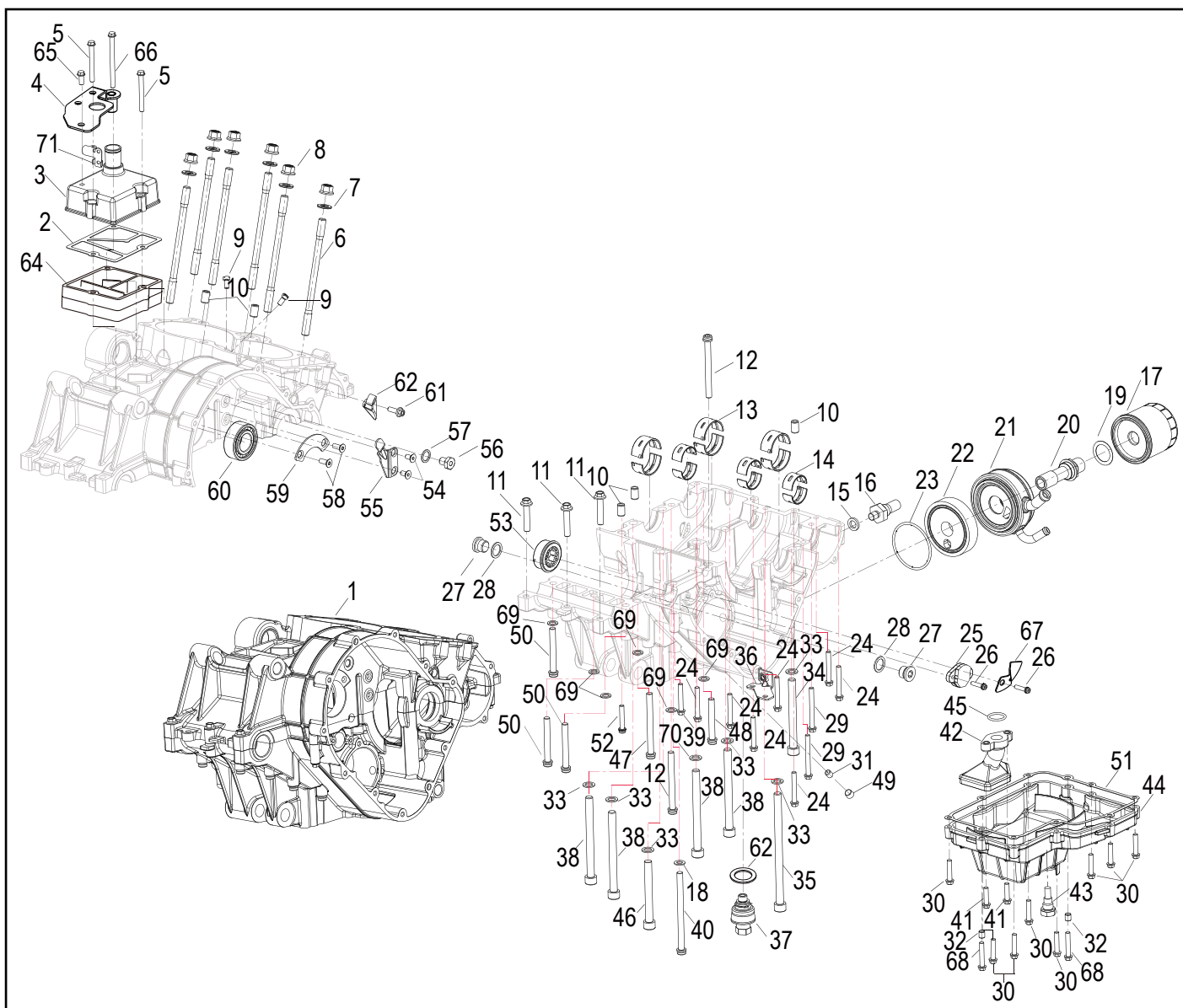
Every time that the connecting rod big end is assembled, it is necessary to replace the fastening screws.





CRANKCASE

INSTALLATION OF THE MAIN HALF BEARINGS AND CRANKSHAFT



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	HALF CRANKCASES					
2	BLOW-BY COVER GASKET					
3	BLOW-BY COVER					
4	PLATE					
5	SCREW					
6	STUD BOLT					
7	WASHER					
8	NUT					
9	SCREW					
10	CENTRING BUSH					
11	SCREW					
12	SCREW					
13	BEARING					
14	BEARING					



CRANKCASE

INSTALLATION OF THE MAIN HALF BEARINGS AND CRANKSHAFT

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
15	WASHER					
16	OIL PRESSURE SENSOR					
17	OIL FILTER					
18	WASHER					
19	GASKET					
20	SCREW					
21	TIMING SYSTEM					
22	OIL FILTER					
23	O-RING					
24	SCREW					
25	GEARBOX SENSOR					
26	SCREW					
27	BUSH					
28	WASHER					
29	SCREW					
30	SCREW					
31	BUSH					
32	BUSH					
33	WASHER					
34	SCREW					
35	SCREW					
36	PLATE					
37	OIL OVER PRESURE VALVE					
38	SCREW					
39	SCREW					
40	SCREW					
41	SCREW					
42	INTAKE FILTER					
43	WASHER					
44	OIL SUMP					
45	O-RING					
46	SCREW					
47	SCREW					
48	SCREW					
49	PIN					
50	SCREW					
51	OIL SUMP GASKET					
52	SCREW					
53	BEARING					
54	SCREW					
55	FAIRLEAD					
56	SCREW					
57	WASHER					
58	SCREW					
59	PLATE					
60	BEARING					



CRANKCASE

INSTALLATION OF THE MAIN HALF BEARINGS AND CRANKSHAFT

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
61	SCREW					
62	GASKET					
63	WASHER					
64	BLOW-BY					
65	SCREW					
66	SCREW					
67	PLATE					
68	SCREW					
69	WASHER					
70	WASHER					
71	PLATE					



CRANKCASE

INSTALLATION OF THE MAIN HALF BEARINGS AND CRANKSHAFT

Clean:

- The main half bearing (1) Fig. A.

Install:

- The main half bearings (1) in the relevant seats from the top and bottom crankcase Fig. A.

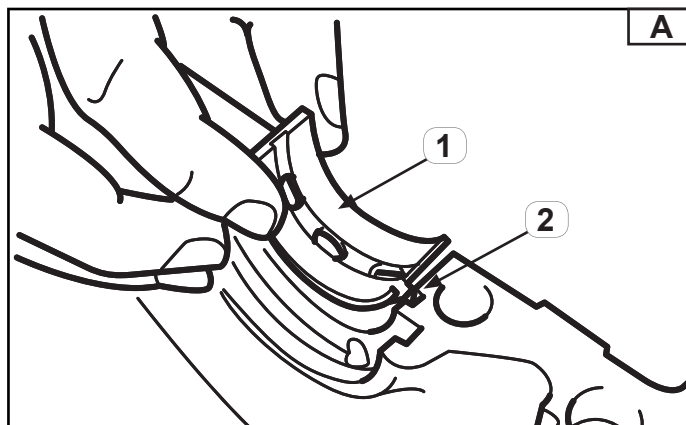
NOTE:

Bring the projecting parts of the main half bearings into line with the notches in the upper crankcase (2) Fig. A.

Use copper grease for assembly.



Teflon-based paste or of other lubricants, as graphite, ceramics.



NOTICE

Do not get the main half bearings mixed up.

To achieve the correct clearance between the connecting rod support and the main half-bearing 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.

HALF-BEARING		
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)

NOTE:

The layout of main bearings is shown on the bottom crankcase, as shown in Fig. B.

NOTE:

In case of replacement of the crankshaft, it is necessary to replace the main half bearings.



CRANKCASE

CHECK OF THE CRANKSHAFT

Measure:

- The eccentricity of the crankshaft.

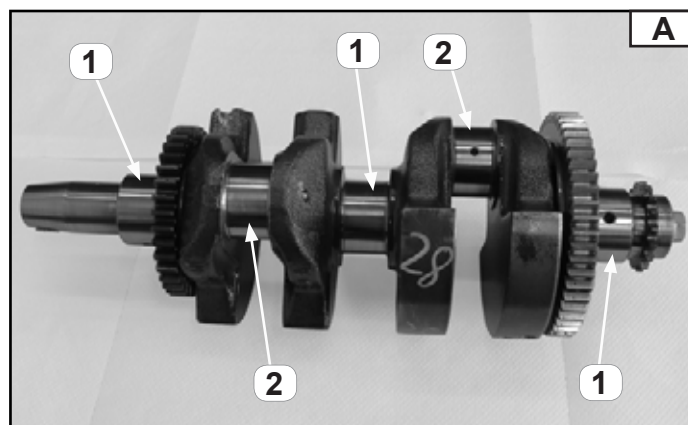
If outside specifications, replace the crankshaft.

Crankshaft eccentricity	Size
Crankshaft	1: $\varnothing 37$ (-0.01, -0.05) mm 2 $\varnothing 30$ (-0.028, -0.042) mm

Inspect:

- 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 crankshaft.

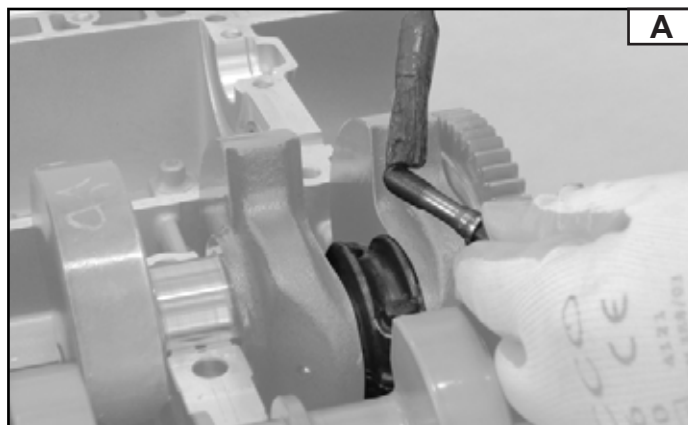




CRANKCASE INSTALLATION OF CONNECTING RODS

Once the crankshaft has been inserted, proceed to assemble the big ends Fig. A.

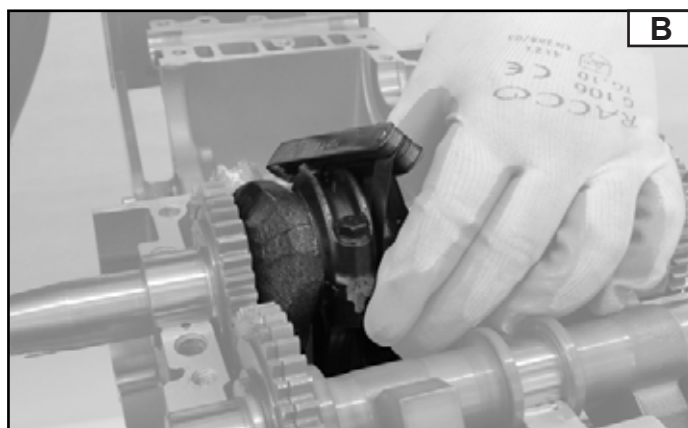
NOTE:
Lubricate the big end pins with copper grease Fig. A.



Measure:
The crankshaft-big end collar using a thickness gauge Fig. B.

Measuring	Size
Crankshaft - Big end	0.1 ~ 0.25 mm

NOTE:
Measure both big ends.

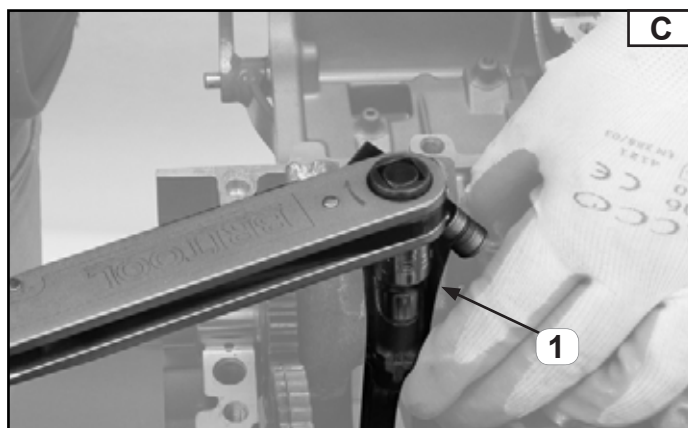


Tighten:
• The screws (1) Fig. C in three stages:



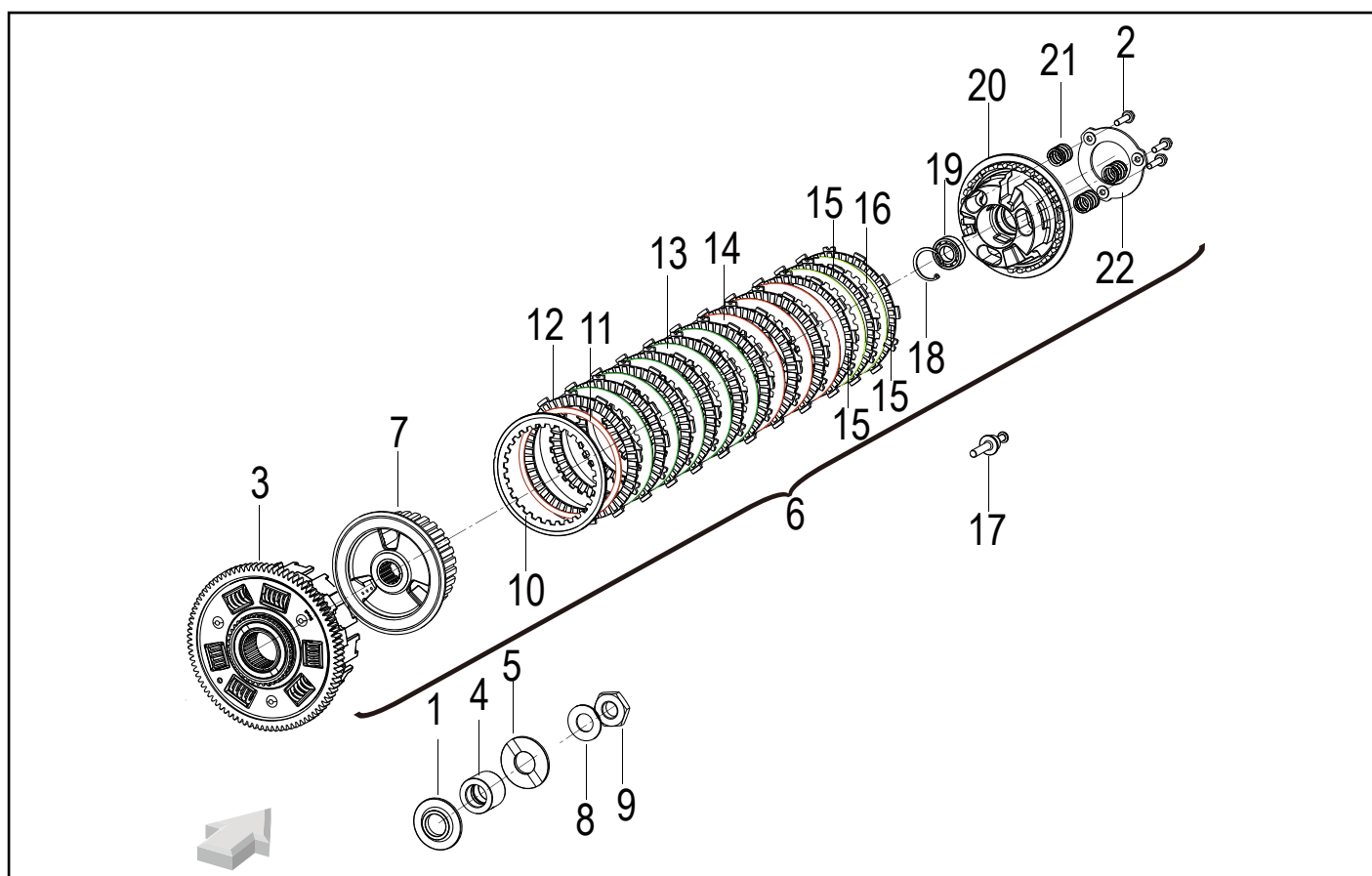
Step one:
Torque 15 N*m
Step two:
Torque 25 N*m
Step three:
Torque 75 N*m

NOTE:
Every time that the connecting rods are assembled, it is necessary to replace the screws.





CLUTCH



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SPACER					
2	SCREW					
3	CLUTCH HOUSING					
4	SPACER					
5	SHIM					
6	CLUTCH PLATES SET					
7	DISC PRESSURE PLATE					
8	WASHER					
9	SCREW					
10	SPRING WASHER					
11	DRIVEN CLUTCH PLATE					
12	SPRING WASHER					
13	STEEL CLUTCH PLATE					
14	STEEL CLUTCH PLATE					
15	STEEL CLUTCH PLATE					
16	DRIVEN CLUTCH PLATE					
17	PRESSURE PLATE PIN					
18	CIRCLIP					
19	BEARING					
20	DISC PRESSURE PLATE					
21	SPRING					
22	FLANGE					



CLUTCH

REMOVAL OF CLUTCH AND PLATES

Remove:

- The water pump, refer to the section “**Removal of the water pump, Chapter 6**”.

Removal:

Proceed using the opposite order to removal, refer to the section “**Installation of the clutch, Chapter 5**”.



CLUTCH

CHECK OF FRICTION PLATES

The following procedure applies to all friction plates.

Inspect:

- The friction plate.

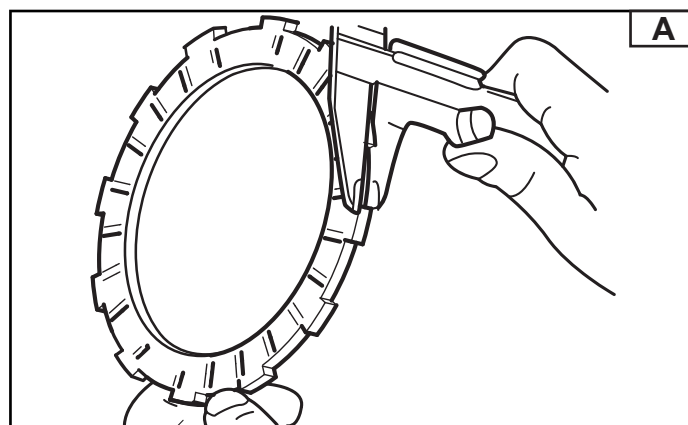
If there is any damage/wear, replace all of the friction plates.

Measure:

- The thickness of the friction plates Fig. A.

If not within specifications, replace all of the friction plates together.

Plate	Size
Coated plate	Thickness 3 (± 0.05) mm



NOTE: _____
Measure the friction plate in four points.



CLUTCH

CHECK OF STEEL PLATES

The following procedure applies to all steel plates.

Inspect:

- The steel plate.

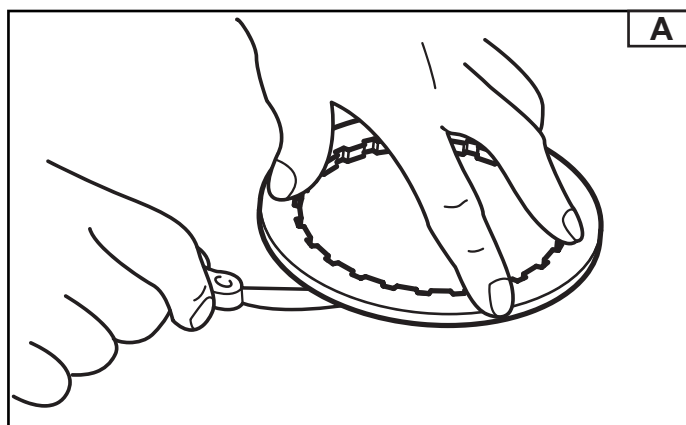
If there is any damage/wear, replace the steel plates all together.

Measure:

- The warping of the steel plates Fig. A.

If not within specifications, replace the steel plates together.

Plate	Warping limit
Steel disc	0.1 mm

**NOTE:**

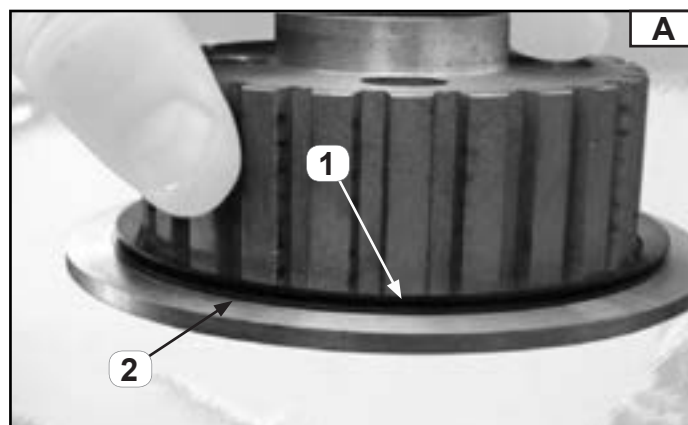
Carry out the check, placing the plates on a reference surface and take the measurements using a thickness gauge.



CLUTCH ASSEMBLY OF PLATES

Assemble:

- The plates in the opposite order to their removal, starting with the ring and then the spring washer (1) on the clutch drum (2) Fig. A.





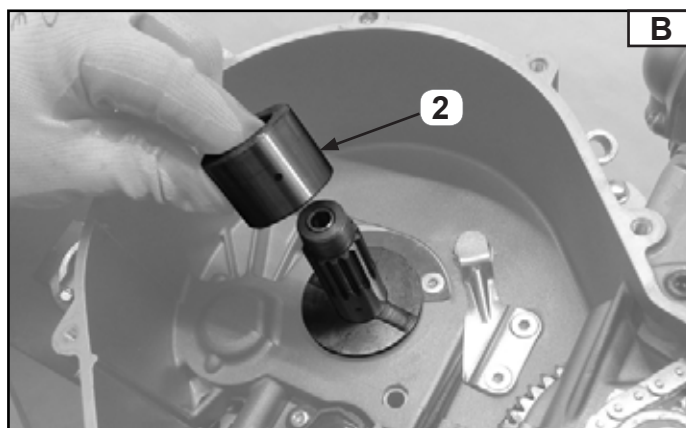
CLUTCH INSTALLATION OF THE CLUTCH

Install:

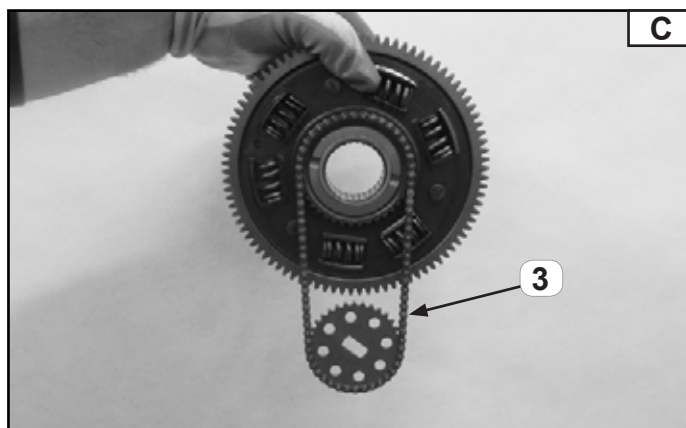
- The washer (1) Fig. A.



- The guide spacer (2) Fig. B.

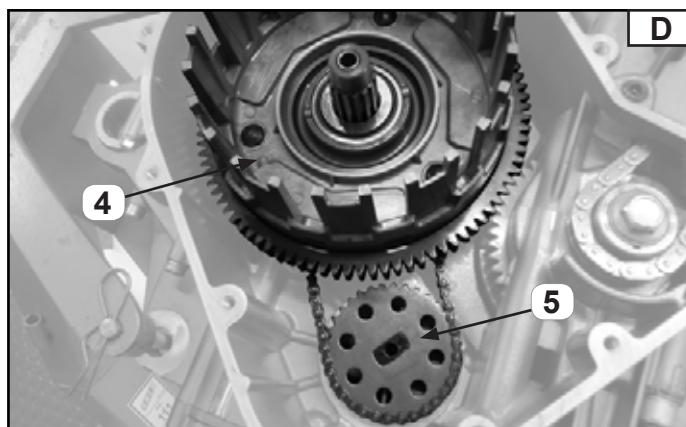


- The chain (2) to the oil pump ring gear Fig. C.



Place:

- The ring gear (4) and the oil pump ring gear (complete with chain) (5) Fig. D.

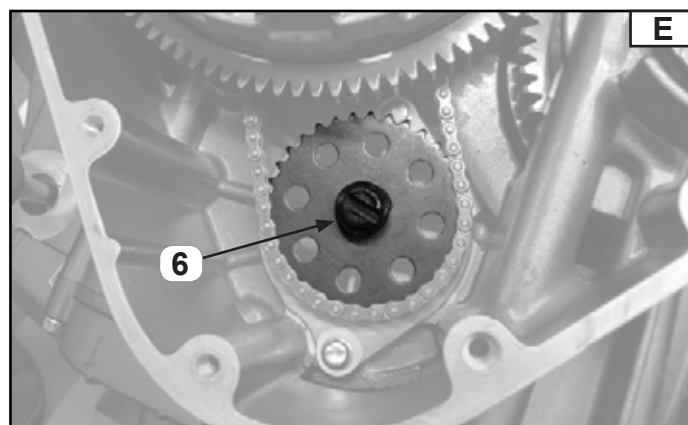




CLUTCH INSTALLATION OF THE CLUTCH

Place:

- The slotted head screw (6) to lock the oil pump Fig. E.



Tighten:

- The slotted head screw Fig. F to the following torque:



Torque 12 N*m



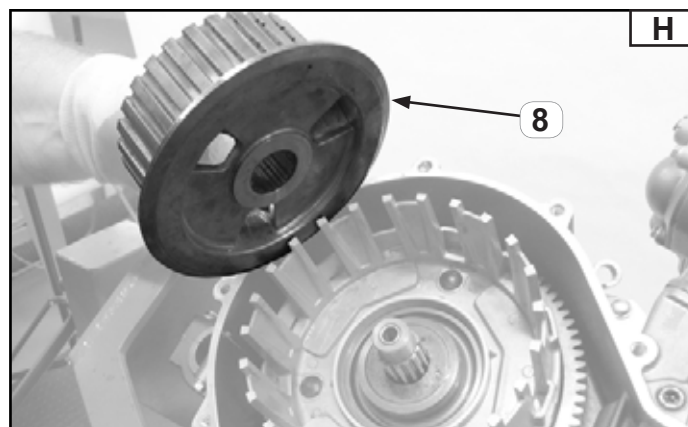
Install:

- The spacer (7) Fig. G.



- The drum (8) Fig. H.

NOTE: Make sure the clutch drum is positioned on the splined shaft properly.

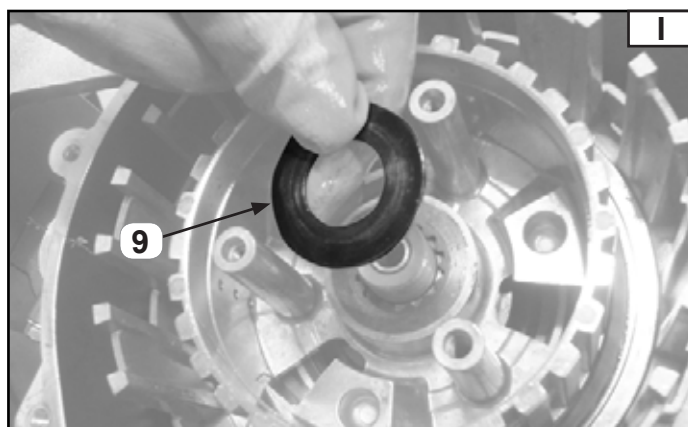




CLUTCH INSTALLATION OF THE CLUTCH

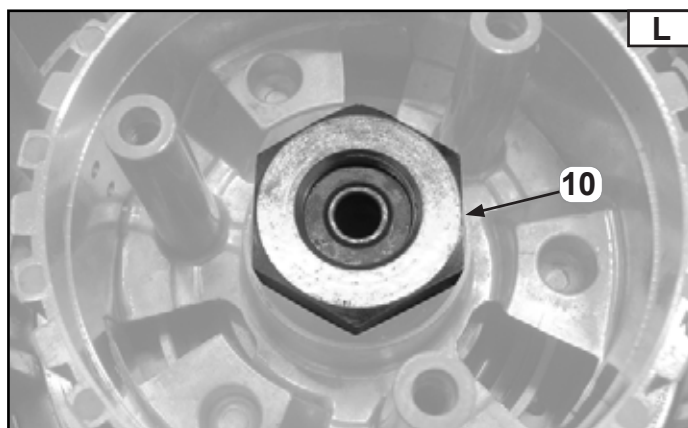
Install:

- The washer (9) Fig. I.



Place:

- The nut (10) Fig. L.

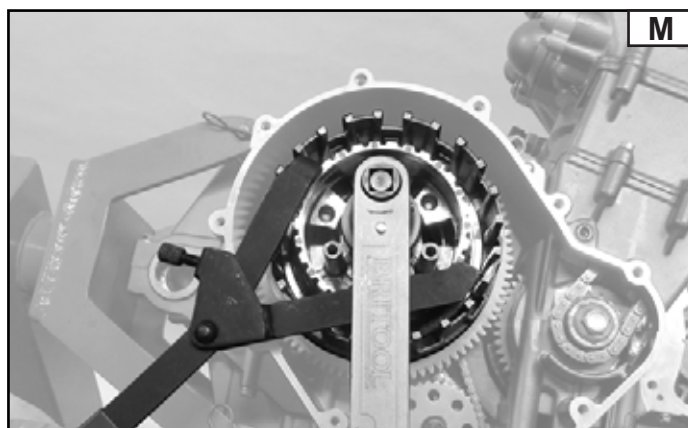


Tighten:

- The nut Fig. M to the following torque:

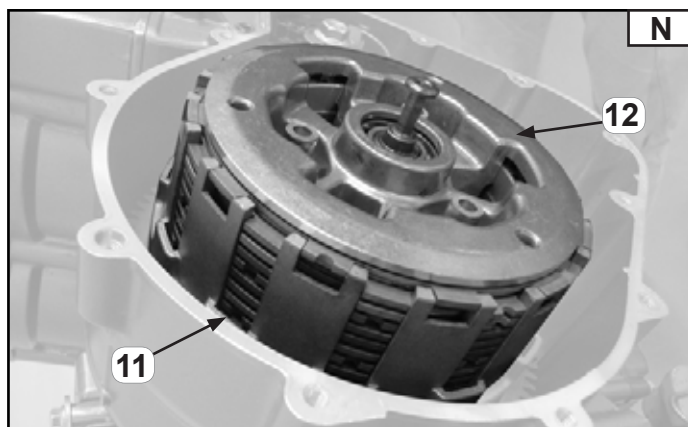


Torque 105 N*m



Install:

- The clutch plates (11) and the related cover (12) Fig. N.

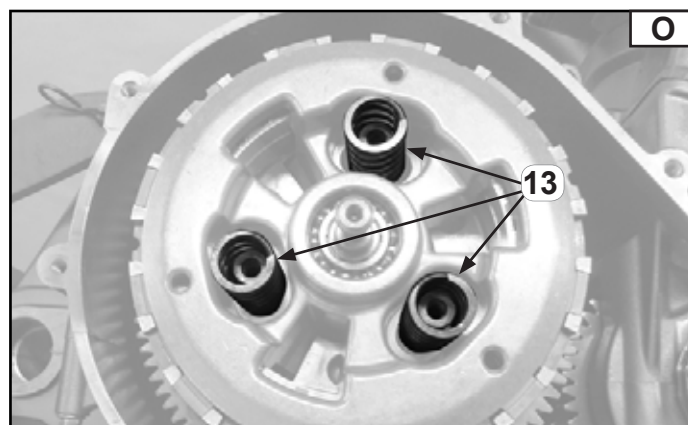




CLUTCH INSTALLATION OF THE CLUTCH

Install:

- The clutch springs (13) Fig. O.



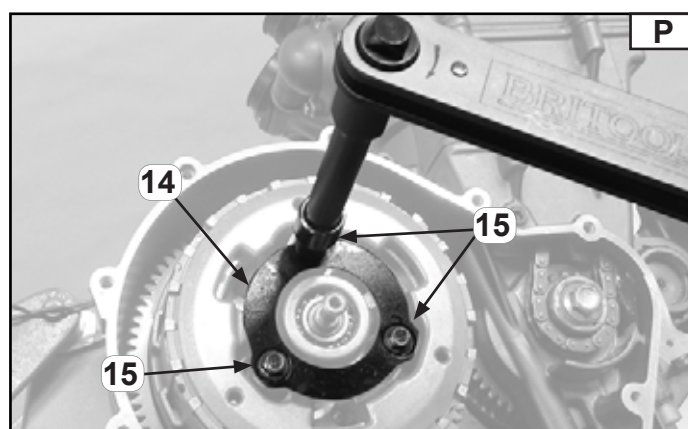
- The support flange (14) Fig. P.

Tighten:

- The screws (15) Fig. P to the following torque:



Torque 10-12 N*m



Install:

- The gasket (16) Fig. R.

NOTE:

In case of gasket anomalies, insert a new one.



- The clutch cover (17) Fig. R.

Tighten:

- The screws fixing the cover to the engine casing Fig. R to the following torque:

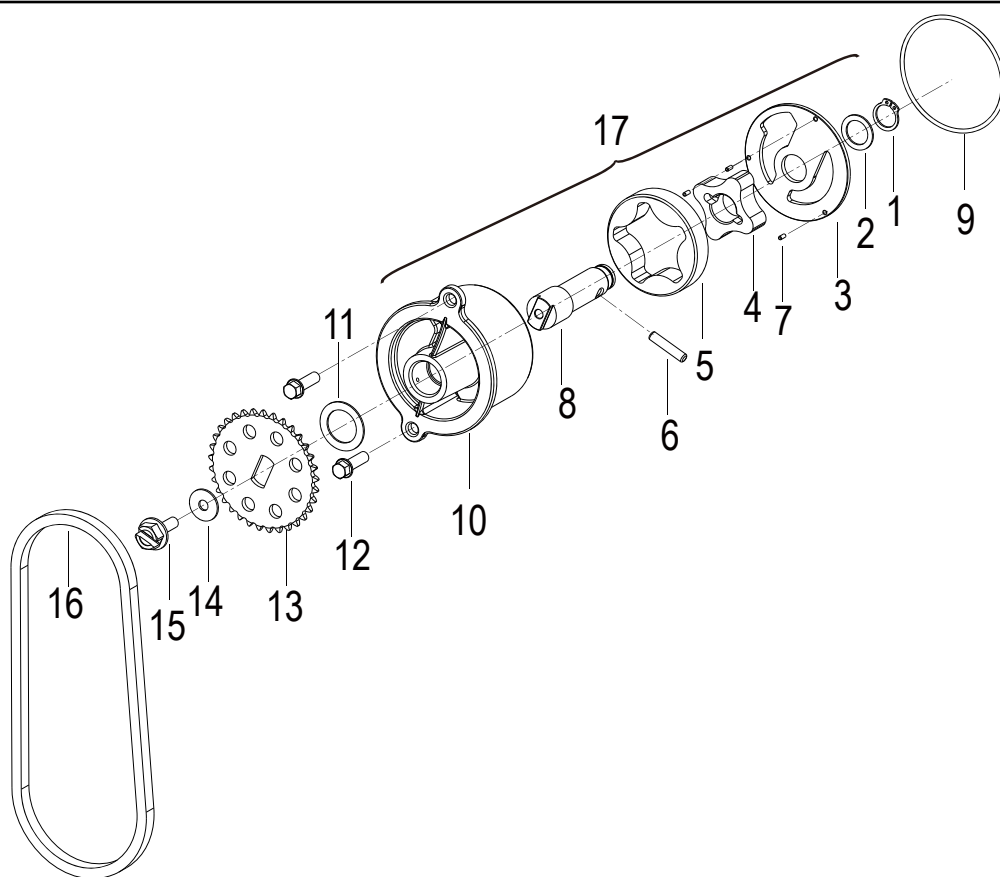


Torque 10-12 N*m





LUBRICATION SYSTEM



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	SHIM					
2	WASHER					
3	FLANGE					
4	INNER ROTOR					
5	OUTER ROTOR					
6	PIN					
7	PIN					
8	OIL PUMP SHAFT					
9	O-RING					
10	OIL PUMP BODY					
11	WASHER					
12	SCREW					
13	OIL PUMP RING GEAR					
14	WASHER					
15	SCREW					
16	OIL PUMP CHAIN					
17	COMPLETE OIL PUMP					



LUBRICATION SYSTEM

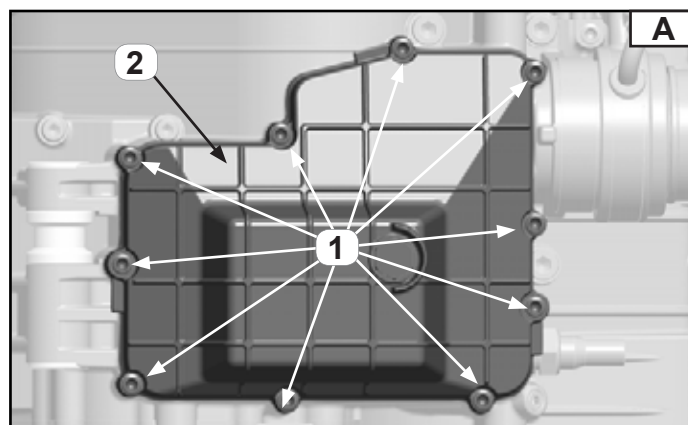
REMOVAL OF THE OIL SUMP

NOTE:

Before removing the oil sump, first drain out any oil in the engine, removing the magnetic cap.

Remove:

- The cover fastening screws (1) Fig. A.
- The cover (2) Fig. A.



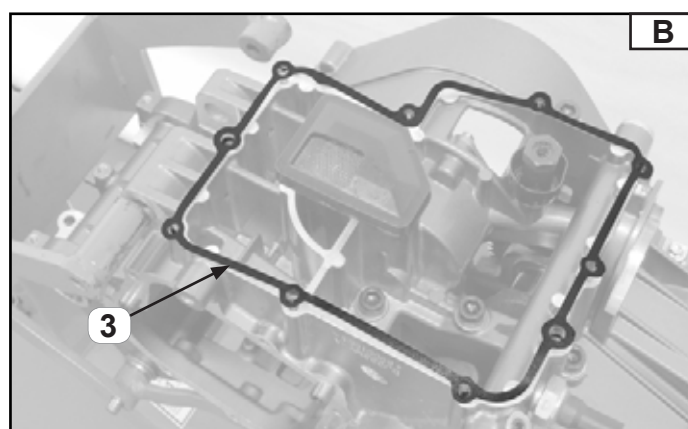
- The gasket (3) Fig. B.

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

INSTALLATION OF THE OIL SUMP

Install:

Proceed using the opposite order to removal.

Tighten:

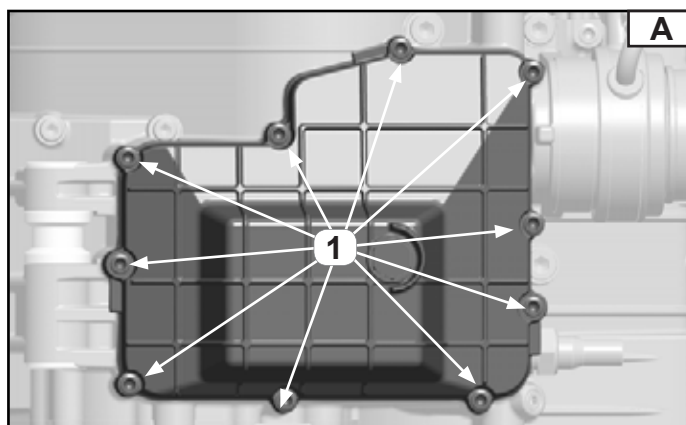
- The screws (1) Fig. A to the following torque:



Torque 10-11 N*m

NOTE:

Add engine oil once these steps have been completed.



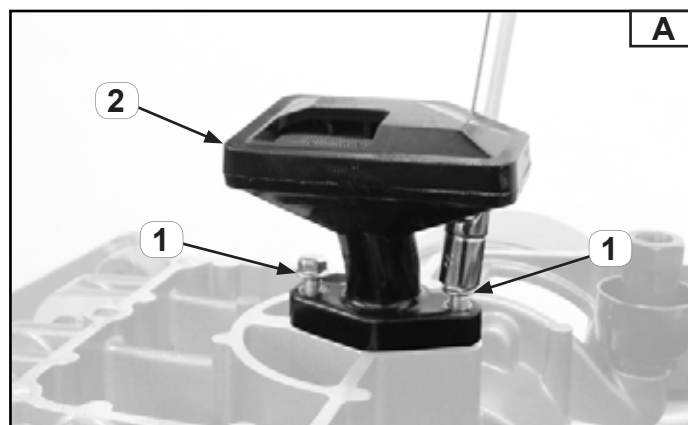


LUBRICATION SYSTEM

REMOVAL OF THE OIL INTAKE FILTER

Remove:

- The oil sump, refer to the section “**Removal of the oil sump, Chapter 5**”.
- The screws (1) Fig. A.
- The inlet filter (2) Fig. A.





LUBRICATION SYSTEM

INSTALLATION OF THE OIL INTAKE FILTER

Install:

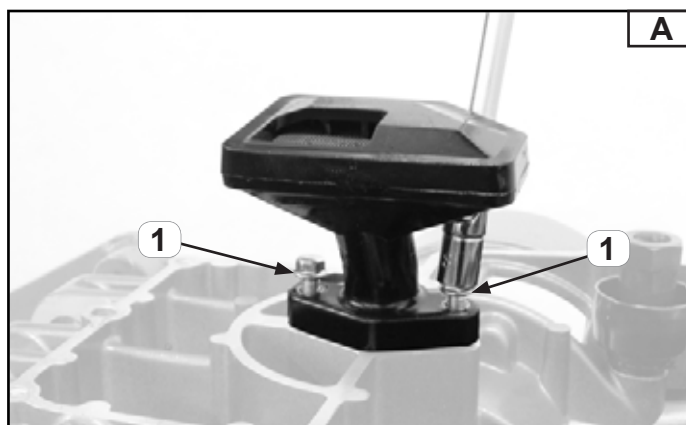
Proceed using the opposite order to removal.

Tighten:

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



Torque 10-12 N*m



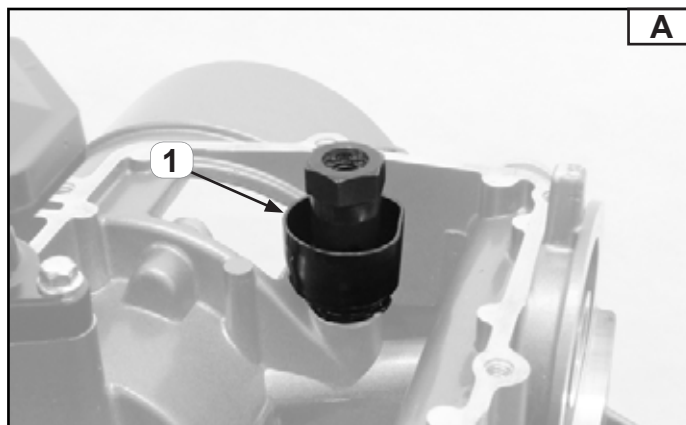


LUBRICATION SYSTEM

REMOVAL OF THE OIL OVER PRESSURE VALVE

Remove:

- The oil sump, refer to the section “**Removal of the oil sump, Chapter 5**”.
- The oil over pressure valve (1) Fig. A.





LUBRICATION SYSTEM

INSTALLATION OF THE OIL OVER PRESSURE VALVE

Inspect:

- Make sure all the parts are free from anomalies Fig. A.
If there is any damage or wear, replace the faulty parts.

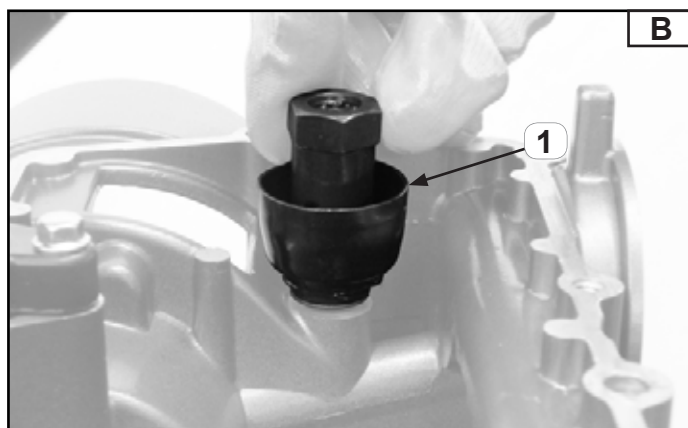


Install:

- The oil over pressure valve (1) with O-ring inside the bottom crankcase, by slotting it Fig. B.

NOTE:

Lubricate the oil over pressure valve during insertion.

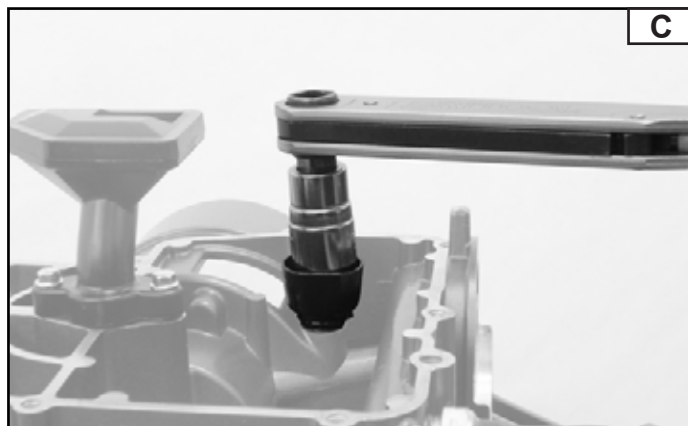


Tighten:

- The oil over pressure valve Fig. C to the following torque:



Torque 25 N*m



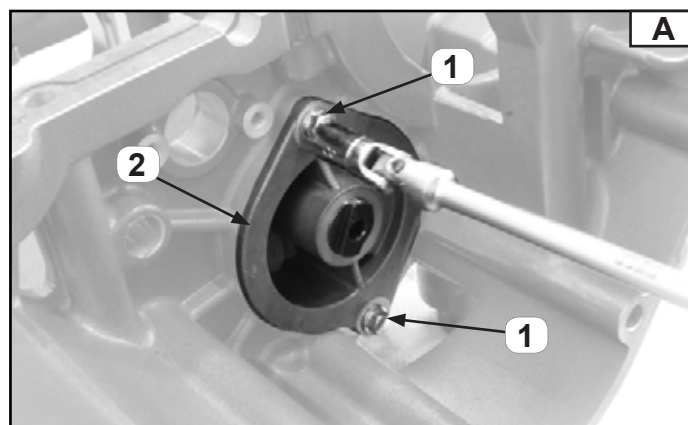


LUBRICATION SYSTEM

REMOVAL OF THE OIL PUMP

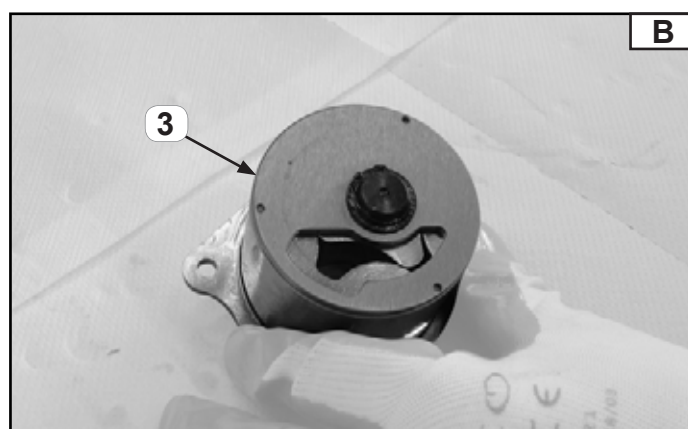
Remove:

- The clutch, refer to the section “**Removal of the clutch, Chapter 5**”.
- The oil pump cover screws (1) Fig. A.
- The oil pump cover (2) Fig. A.



Slide out:

- The oil pump (3) Fig. B.





LUBRICATION SYSTEM

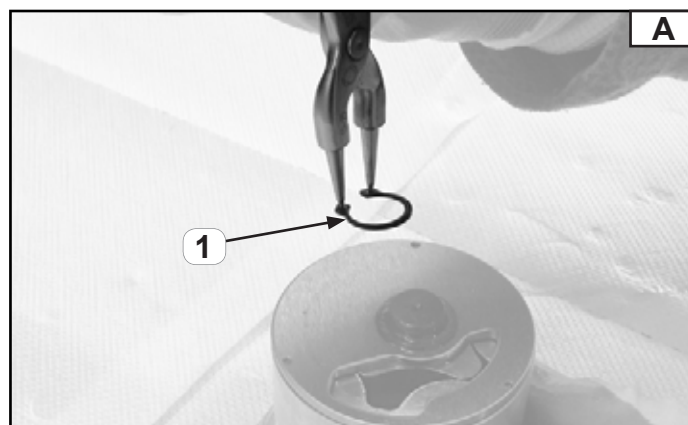
CHECK OF THE OIL PUMP

Slide out:

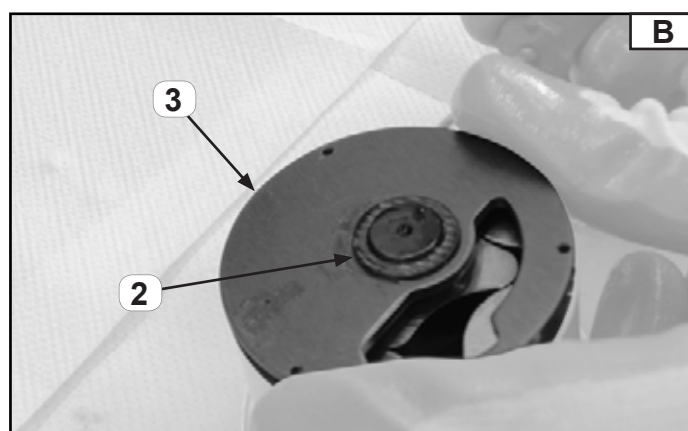
- The oil pump, refer to the section “Oil pump removal, Chapter 5”.

Remove:

- The outer circlip (1) Fig. A.

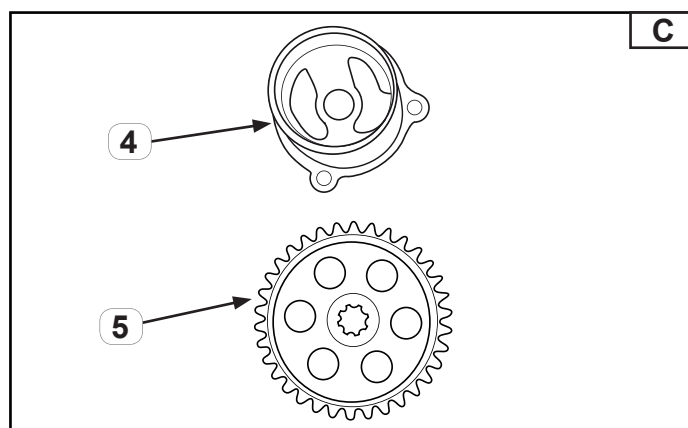


- The washer (2) Fig. B.
- The oil pump cover (3) Fig. B.



Inspect:

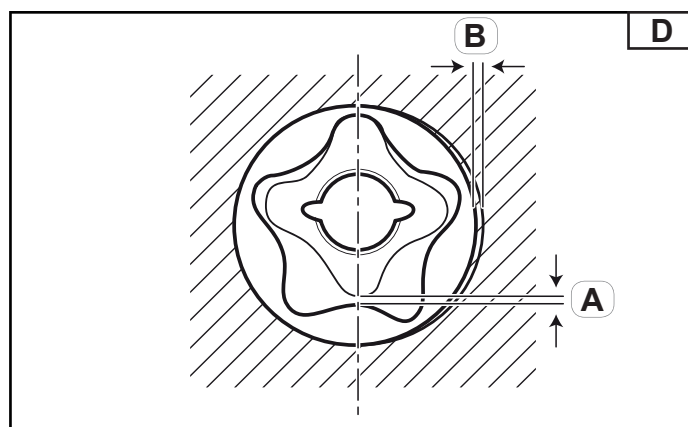
- The pump body (4) Fig. C.
If there are any lines/damage/wear, replace.
- The pump ring gear (5) Fig. C.
If there is any damage or wear to the gears, replace.



Measure:

- Tolerance between the inner rotor and the outer rotor (A) Fig. D.
- The tolerance between the outer rotor and the oil pump housing (B), Fig. D.
- The planarity of both rotors, compared to the oil pump housing.

Clearance	Tolerance
inner rotor and the outer rotor "A".	0.15 mm
outer rotor and the oil pump housing "B"	+0.06, +0.09 mm





LUBRICATION SYSTEM

CHECK OF THE OIL PUMP

Inspect:

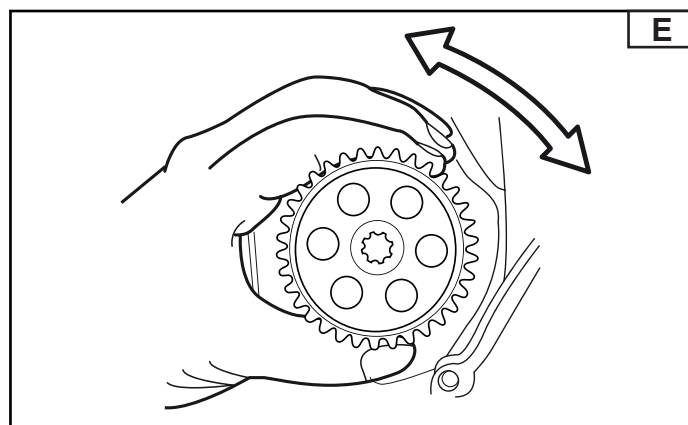
- The oil pump operation.

Turn the pump ring gear as shown in Fig. E.

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 ring gear in its seat.





LUBRICATION SYSTEM

INSTALLATION OF THE OIL PUMP

Install:

Proceed using the opposite order to removal.

Tighten:

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

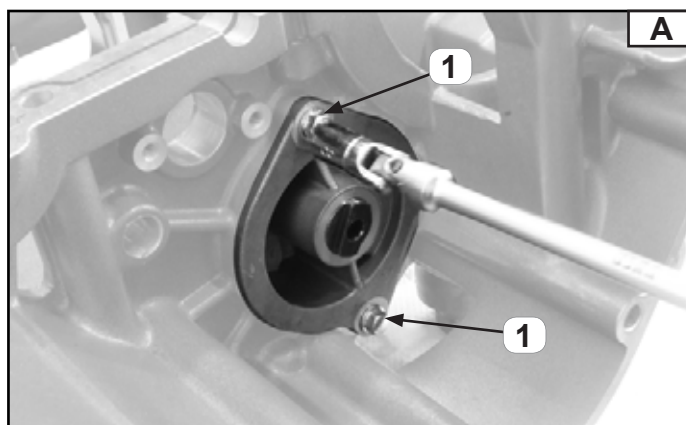


Torque 10-12 N*m

Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

**NOTE:**

Add engine oil once these steps have been completed.

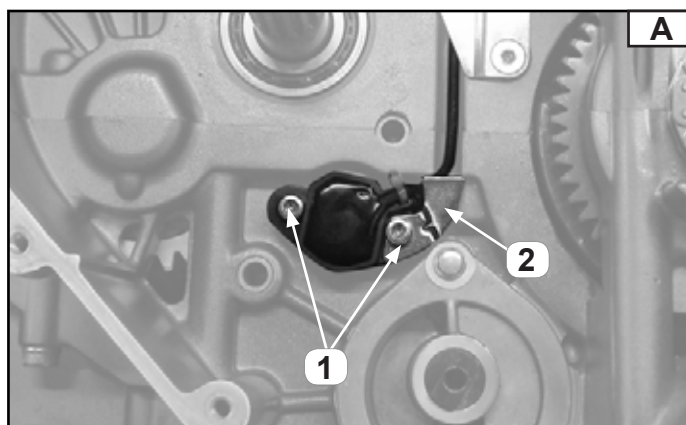


GEARBOX

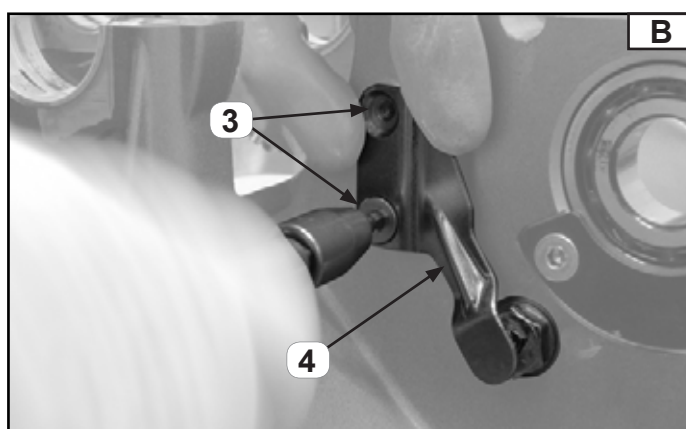
REMOVAL OF THE NEUTRAL SENSOR / GEAR INDICATOR SENSOR

Remove:

- The clutch, refer to the section “**Removal of the clutch, Chapter 5**”.
- The screws (1) and the bracket (2) Fig. A.



- The screws (3) and the bracket (4) Fig. B.

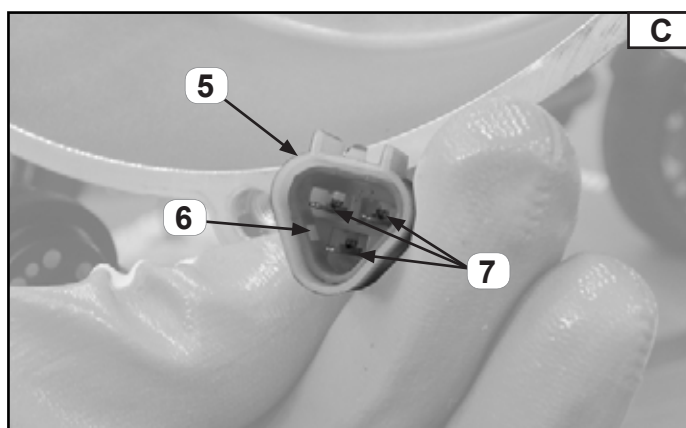


Disconnect:

- The neutral position/gear indicator sensor (5) Fig. C.

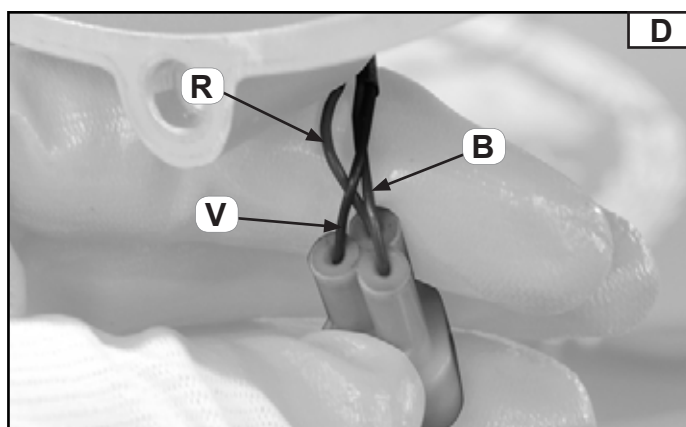
Remove:

- The inner cover (6) Fig. C.
- The pin (7) Fig. C.



NOTE:

When removing the pin of the neutral connector / gear indicator sensor, pay attention to the colours position (B) (V) (R) of the relevant cable Fig. D.



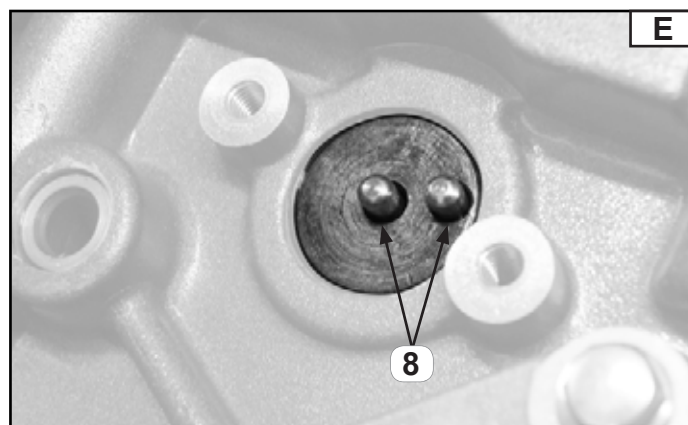


GEARBOX

REMOVAL OF THE NEUTRAL SENSOR / GEAR INDICATOR SENSOR

Remove:

- The pins and the springs (8) Fig. E.





GEARBOX

INSTALLATION OF THE NEUTRAL SENSOR / GEAR INDICATOR SENSOR

Install:

Proceed using the opposite order to removal.

NOTE:

During the assembly stage, check the proper position of the wires of the neutral sensor connector / gear indicator sensor.

Tighten:

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



Torque 7-8 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER

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

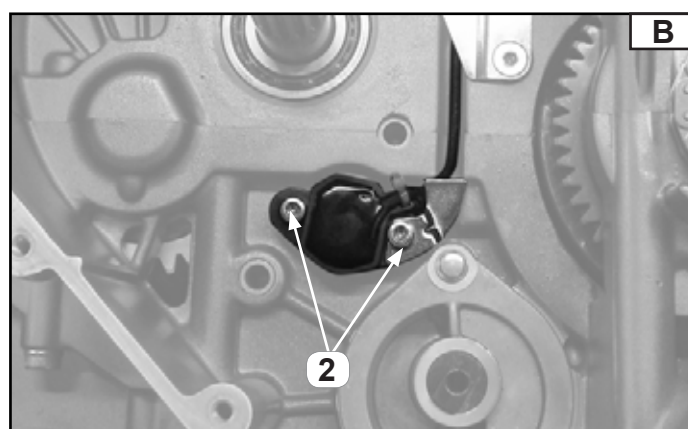
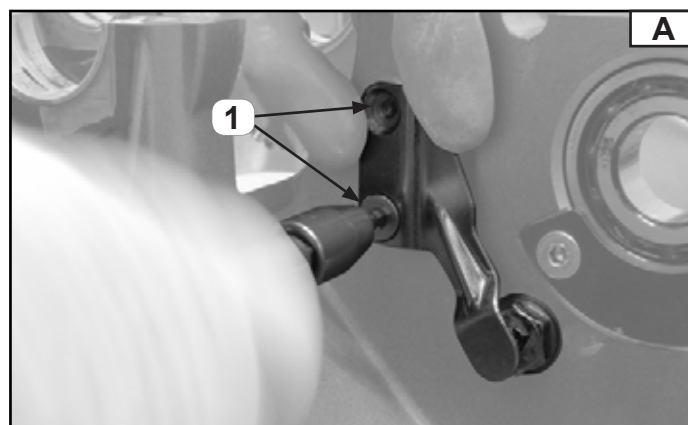


Torque 6 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER



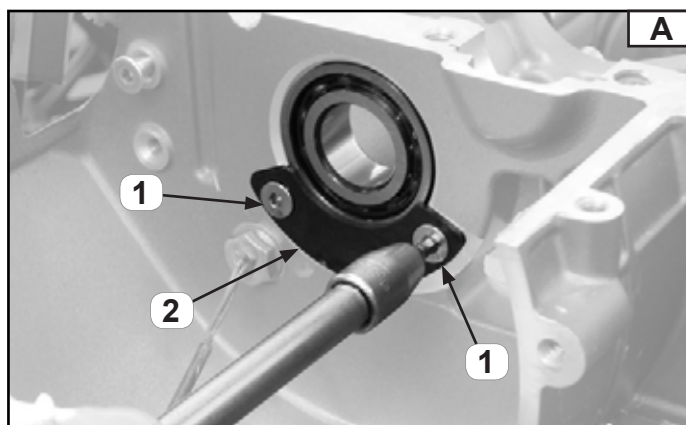


GEARBOX

REMOVAL OF THE COMPLETE MAIN SHAFT BEARING

Remove:

- The clutch, refer to the section “**Removal of the clutch, Chapter 5**”.
- The screws (1) Fig. A.
- The safety plate (2) Fig. H A.

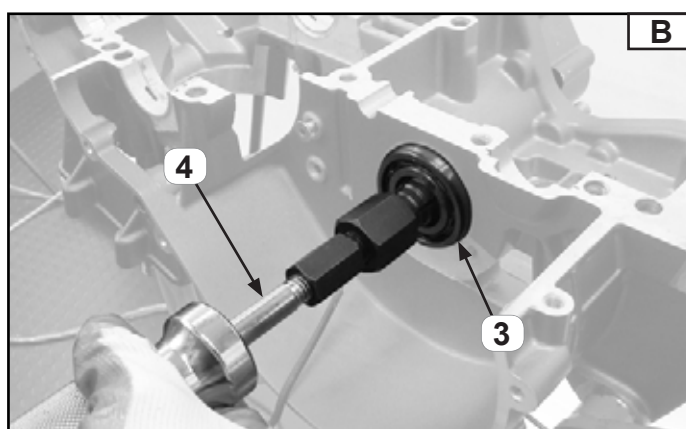


- The cap (3) with the special tool (4) Fig. B.



Tool for disassembly/assembly the main shaft bearing.

NOTE: Make bearing removal stage easier by heating the area with a hair dryer.





GEARBOX

REMOVAL OF THE COMPLETE MAIN SHAFT BEARING

Install:

Proceed using the opposite order to removal.

Check:

- The bearings (1) Fig. A.
If there is any damage/wear, replace.

Tighten:

- The screws (2) Fig. A to the following torque:

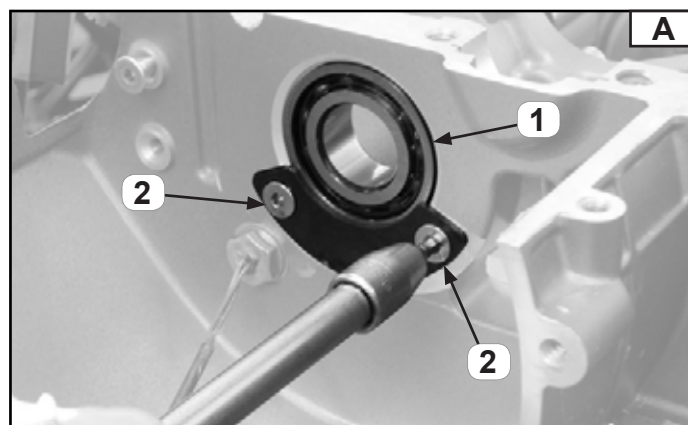


Torque 7 N*m

Use medium Loctite thread locker to secure.

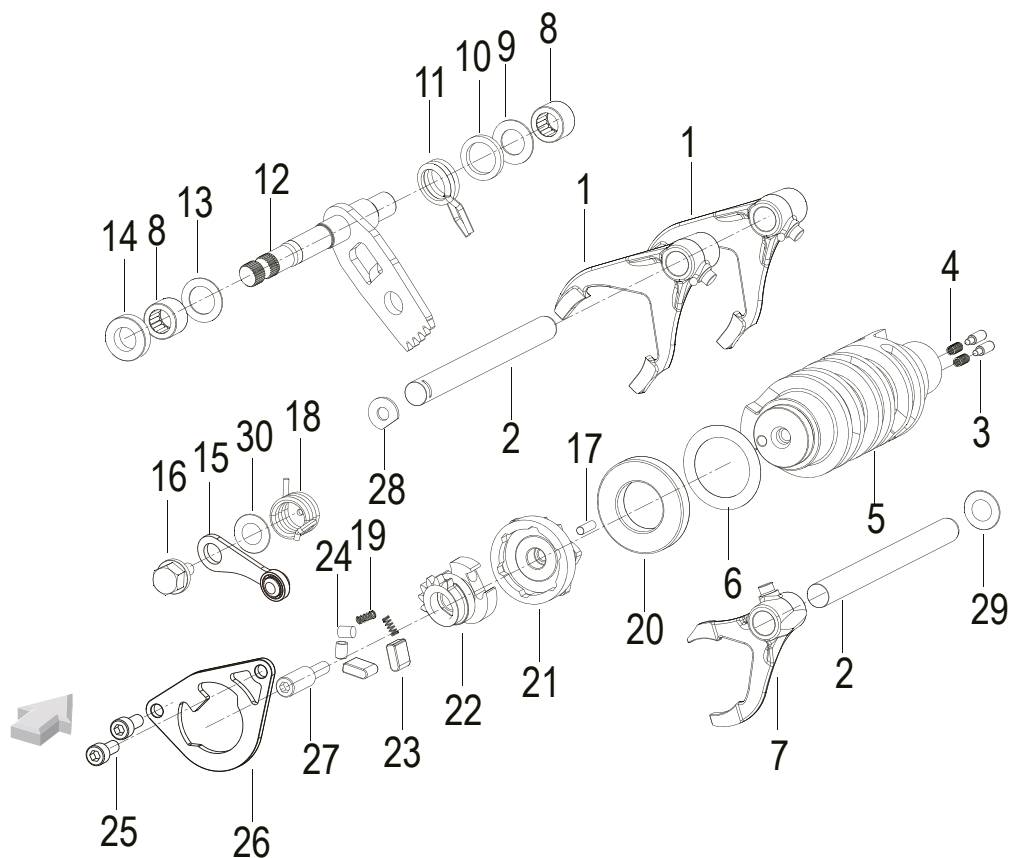


MEDIUM THREAD LOCKER





GEARBOX



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	LAY SHAFT GEAR SELECTION FORK					
2	PIN					
3	PIN					
4	SPRING					
5	SHIFT CAM					
6	SHIM					
7	MAIN SHAFT GEAR SELECTION FORK					
8	SPACER					
9	WASHER					
10	SHIM					
11	GEAR STOP SPRING					
12	SELECTOR SHAFT					
13	WASHER					
14	SHIM					
15	GEAR STOPPER					
16	SCREW					
17	PIN					
18	SPRING					
19	SPRING					
20	BEARING					
21	GEARBOX DRUM					

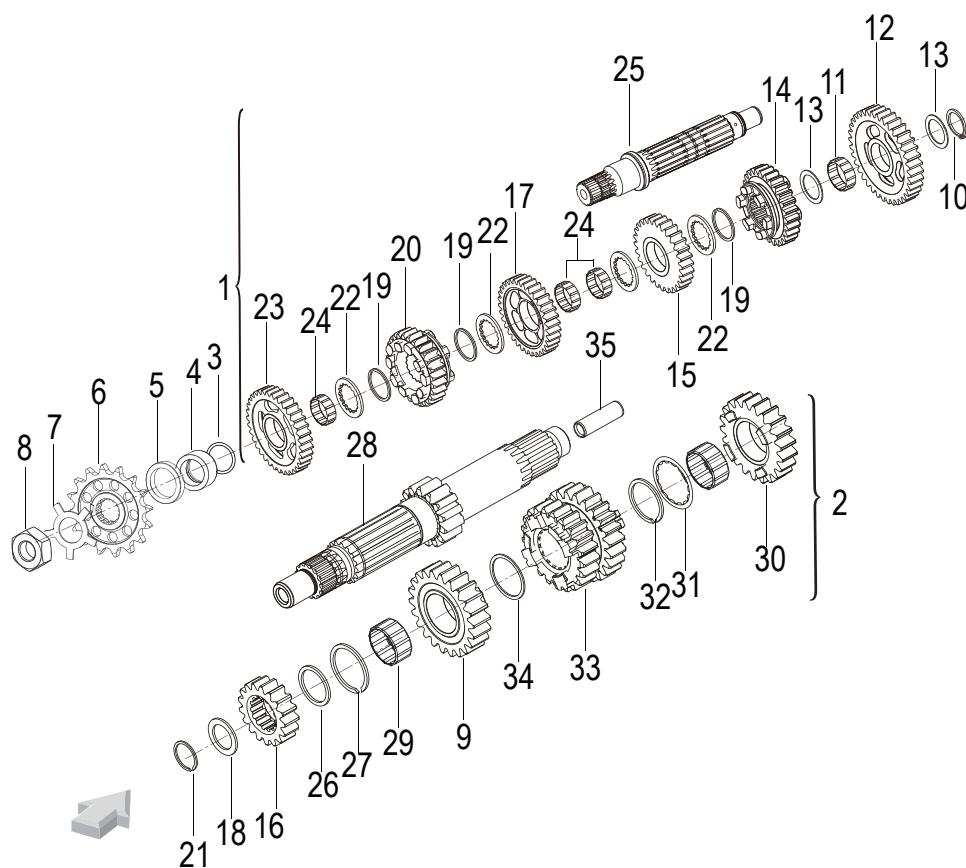


GEARBOX

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	SHIFT CAM RATCHET					
23	GEAR STOPPER					
24	BUSH					
25	SCREW					
26	FLANGE					
27	PIN					
28	WASHER					
29	WASHER					
30	WASHER					



GEARBOX



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	COMPLETE LAY SHAFT					
2	COMPLETE MAIN SHAFT					
3	O-RING					
4	BROACHED BUSH					
5	O-RING					
6	SPROCKET					
7	WASHER					
8	NUT					
9	DRIVEN GEAR 6TH					
10	SNAP RING					
11	BEARING					
12	DRIVEN GEAR 2ND					
13	WASHER					
14	DRIVEN GEAR 5TH					
15	DRIVEN GEAR 4TH					
16	DRIVING GEAR 2ND					
17	DRIVEN GEAR 3RD					
18	WASHER					
19	SNAP RING					
20	DRIVEN GEAR 6TH					
21	SNAP RING					



GEARBOX

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	SHIM					
23	DRIVEN GEAR 2ND					
24	BROACHED BUSH					
25	LAY SHAFT					
26	SNAP RING					
27	SNAP RING					
28	MAIN SHAFT					
29	BROACHED BUSH					
30	DRIVEN GEAR 5TH					
31	SHIM					
32	SNAP RING					
33	DRIVE GEAR 3RD/4TH					
34	SHIM					
35	PIN					



GEARBOX

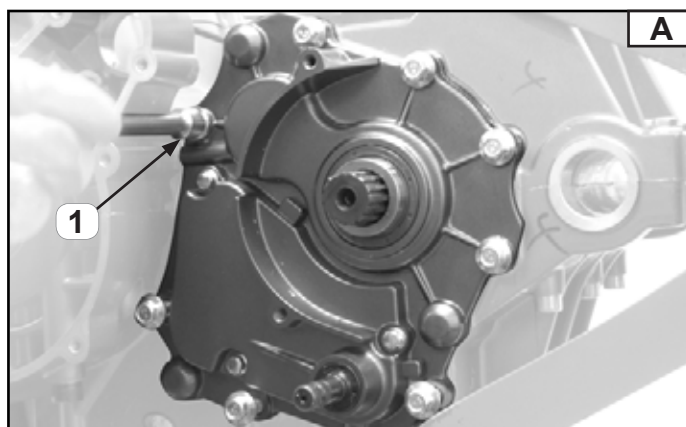
DISASSEMBLY OF THE GEARBOX

Remove:

- The clutch, refer to the section “**Removal of the clutch, Chapter 5**”.
- The transmission chain, refer to the section “**Removal of the transmission chain, Chapter 4**”.
- The gear change pedal, refer to section “**Removal of the gear change pedal, Chapter 4**”.

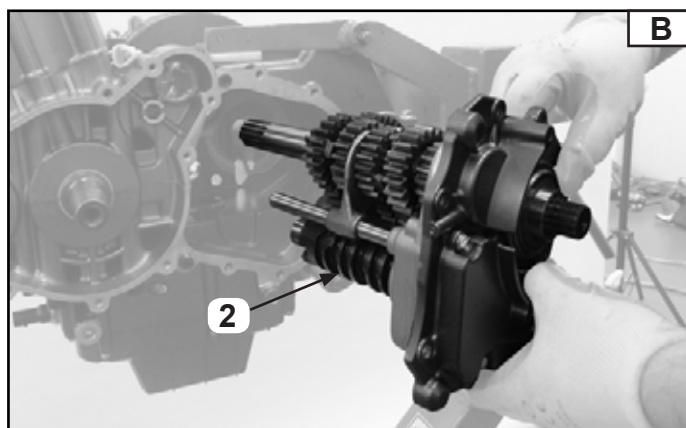
Remove:

- The screws (1) Fig. A.



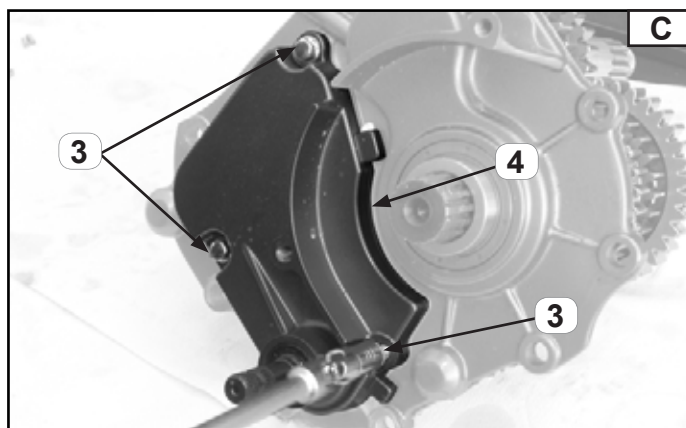
Slide out:

- The gearbox (2) Fig. B.



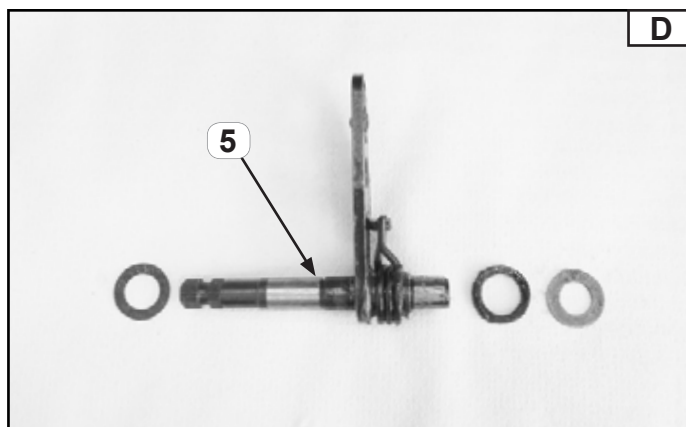
Remove:

- The screws (3) Fig. C.
- The cover (4) and the relevant gasket Fig. C.



Slide out:

- The gear selector (5) Fig. D, paying attention to the order of the various parts.

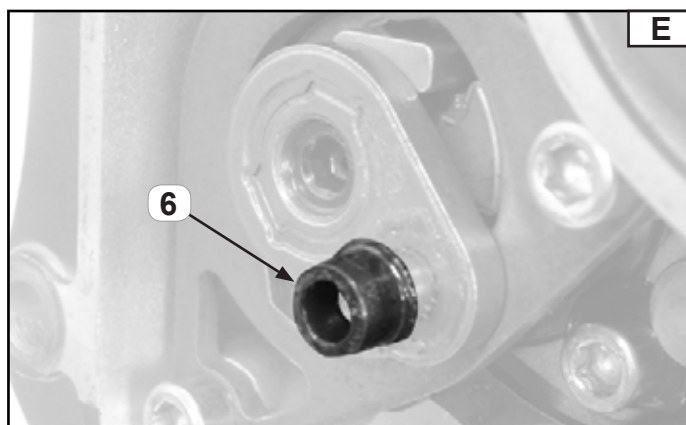




GEARBOX DISASSEMBLY OF THE GEARBOX

Remove:

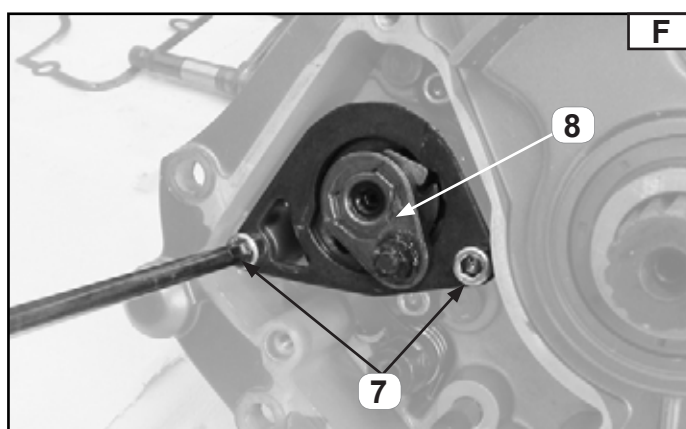
- The bush (6) Fig. E.



- The screws (7) Fig. F.

Slide out:

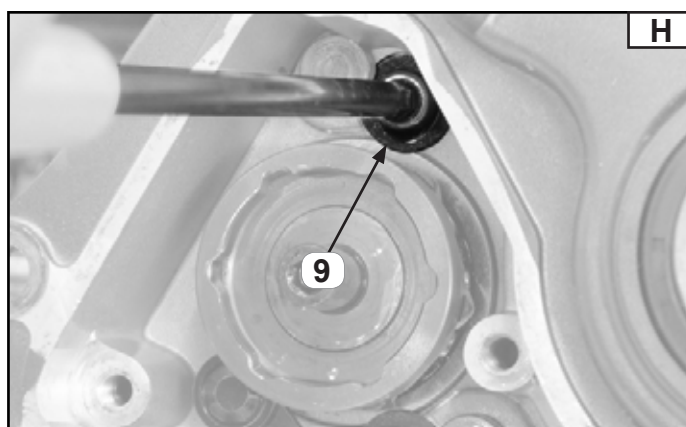
- The ratchet (8) Fig. F.

**NOTE:**

During the the extraction of the ratchet, pay attention to the order of the various parts Fig. G.

**Remove:**

- La screw (9) and the related washer Fig. H.

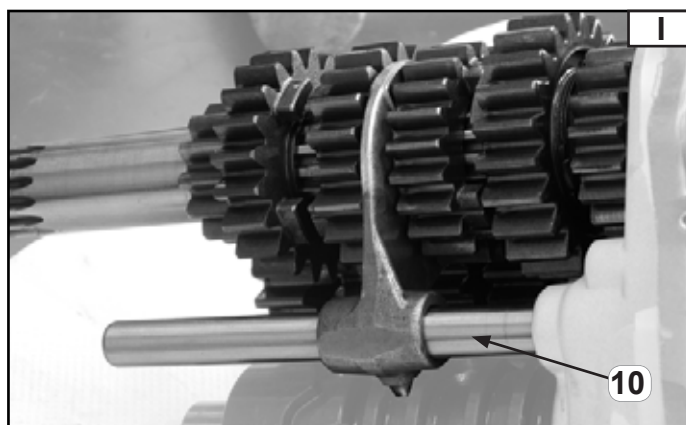




GEARBOX DISASSEMBLY OF THE GEARBOX

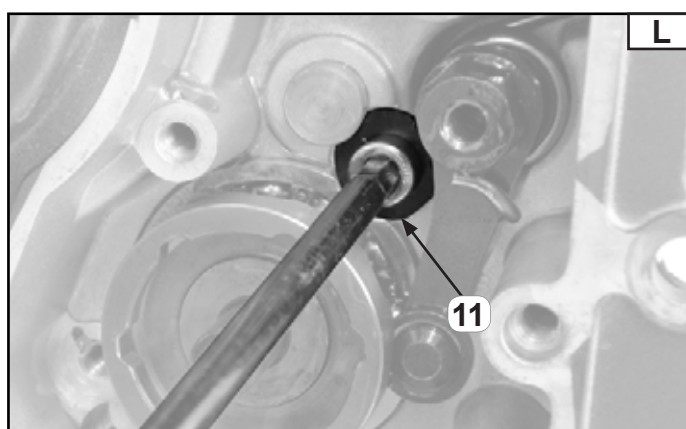
Slide out:

- The main shaft gear selection pin (10) Fig. I.



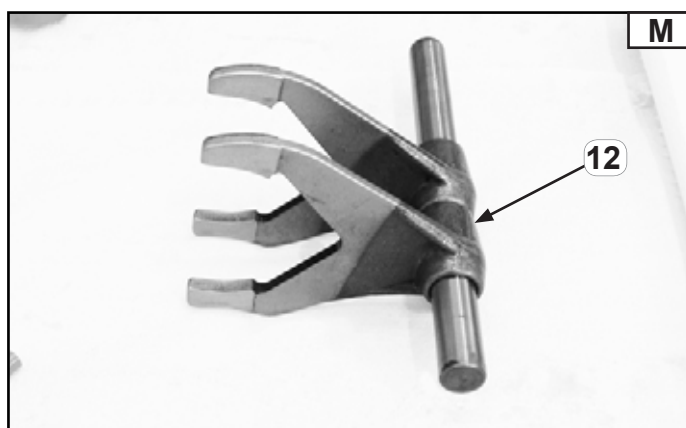
Remove:

- The screw (11) with the relevant washer Fig. L.

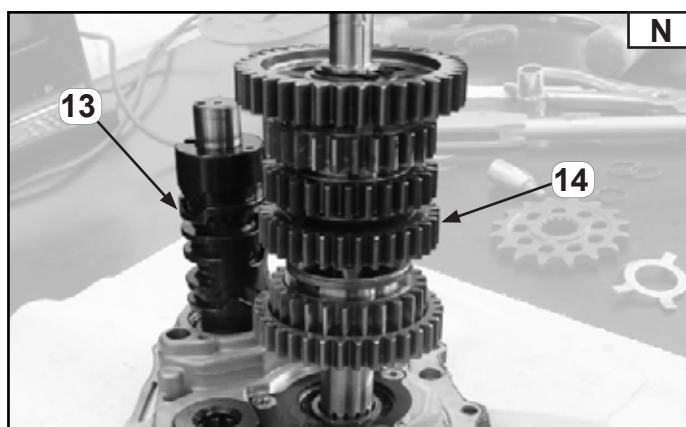


Slide out:

- Main shaft gear selection pin (12) Fig. M.



- The shim cam (13) and the gears (14) Fig. N.





GEARBOX ASSEMBLY OF THE GEARBOX

Install:

Proceed using the opposite order to removal.

Tighten:

- The screw (1) Fig. A to the following torque:



Torque 10 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER

- The screw (2) Fig. B to the following torque:



Torque 10 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER

- The screws (3) Fig. C to the following torque:



Torque 10 N*m

Use medium Loctite thread locker to secure.

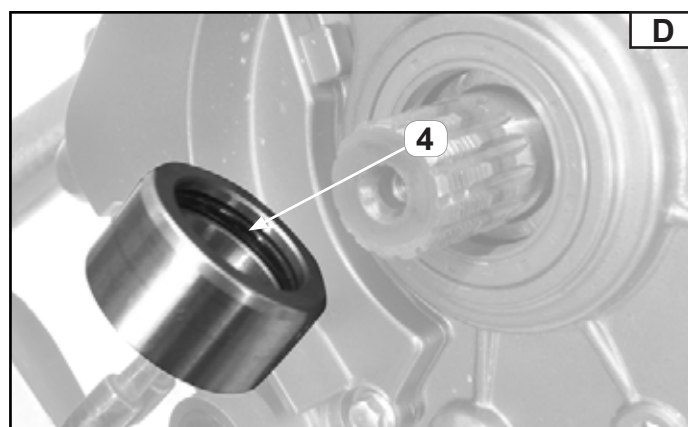
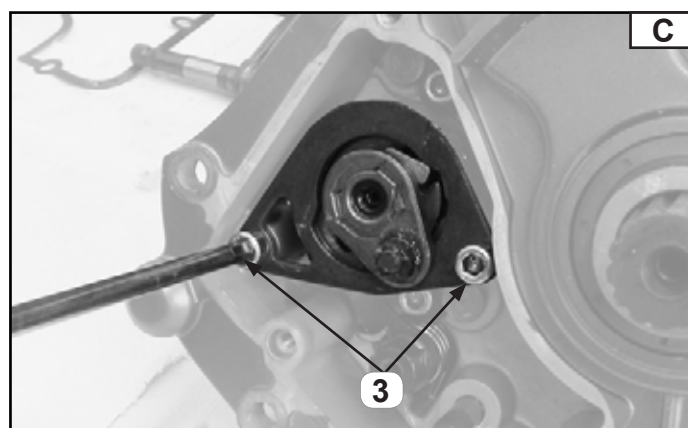
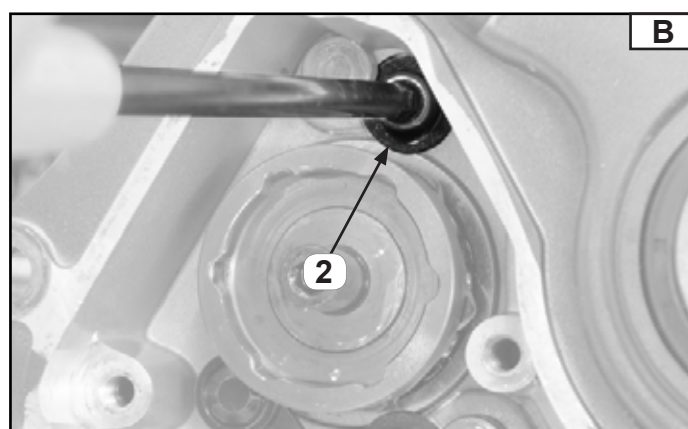
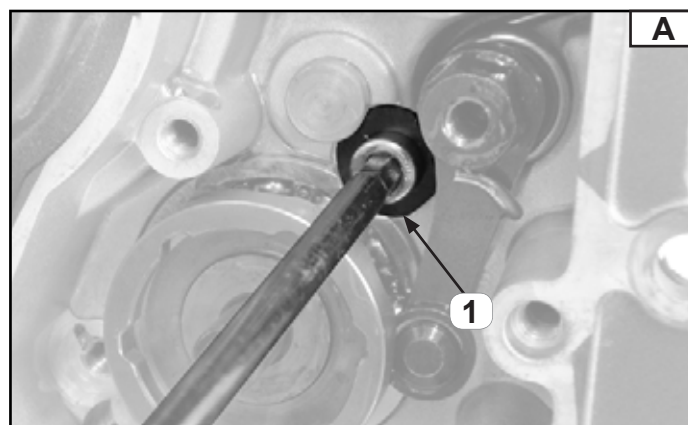


MEDIUM THREAD LOCKER

Check:

- During the installation of the bush, check the gasket (4) Fig. D.

If there is any damage or wear, replace.





GEARBOX

ASSEMBLY OF THE GEARBOX

Install:

- The screws (5) Fig. E to the following torque:

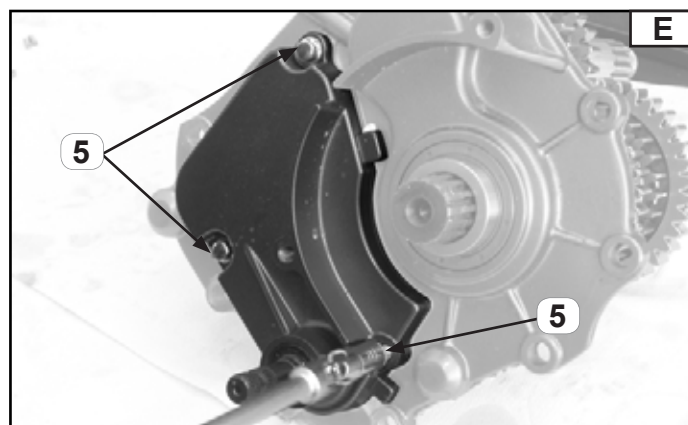


Torque 10-12 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER



- The screws (6) Fig. F to the following torque:

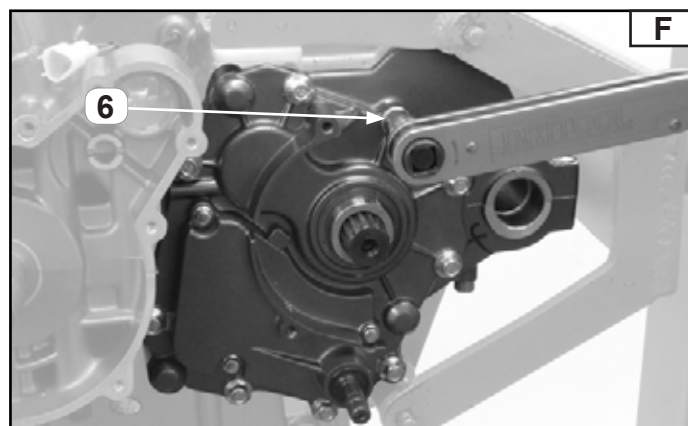


Torque 25 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER





GEARBOX

GEAR SHIFT CONTROL

The following procedure is applied to all gear shift control rods Fig. A.

Inspect:

- The follower of the gear shift control rod cam (1).
- The tooth on the gear control rod (2).

If there is warping/damage/lines/traces of wear, replace the gear control rod.

Measure:

- The thickness of the gear control rod, using a slide gauge.

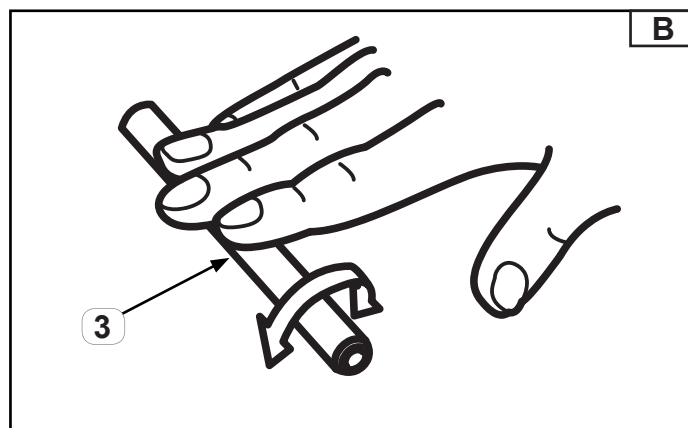
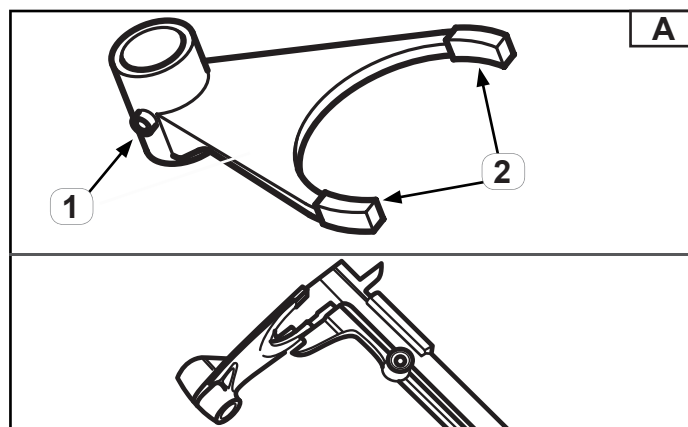
Part	Size
Gear control rod	4.80 ± 0.05 mm

Inspect:

- The guide pin of the gear control rod (3) Fig. B.
- Roll the guide pin of the gear control rod on a flat surface Fig. B.
If there is any warping, replace.

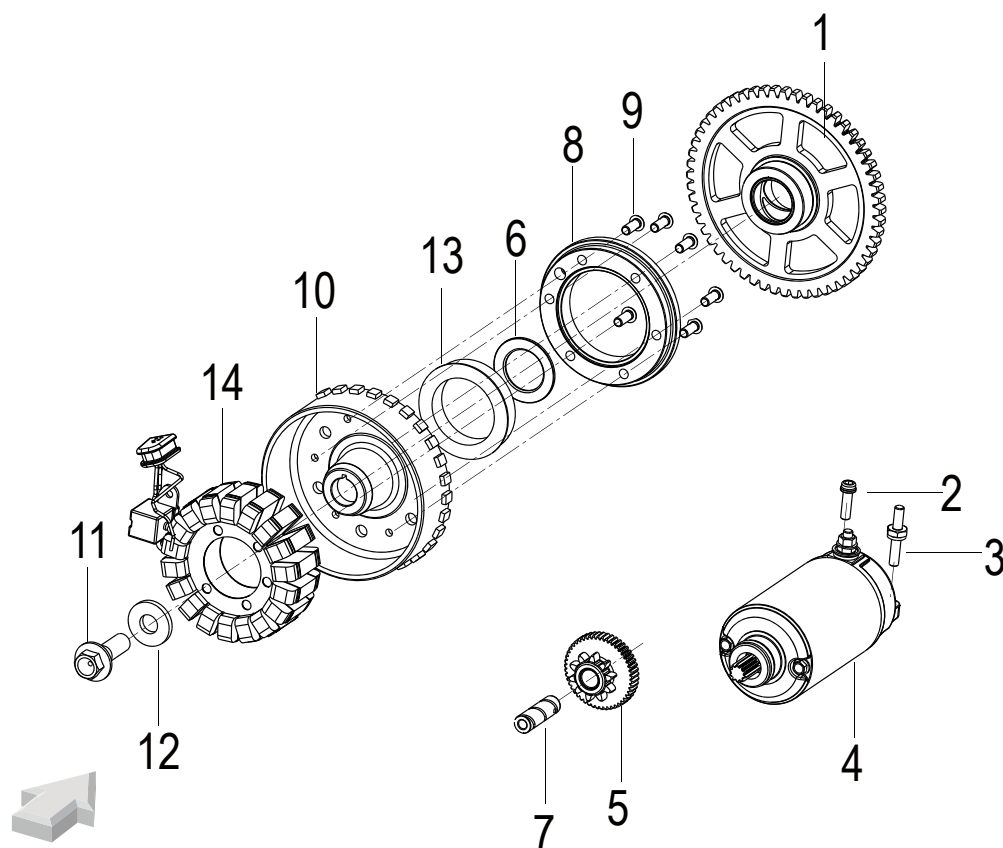
NOTE:

Do not try to straighten the fork guide if it is warped.





STARTING STARTER MOTOR



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	STARTER GEAR					
2	SCREW					
3	SPECIAL SCREW					
4	STARTER MOTOR					
5	DOUBLE GEAR					
6	SHIM					
7	KICK STARTER SPINDLE					
8	ONE WAY WHEEL					
9	SCREW					
10	ROTOR MAGNETO FLYWHEEL					
11	SCREW					
12	WASHER					
13	COMPLETE CLUTCH					
14	MAGNETO FLYWHEEL					



STARTING REMOVAL OF THE STARTER MOTOR

Park:

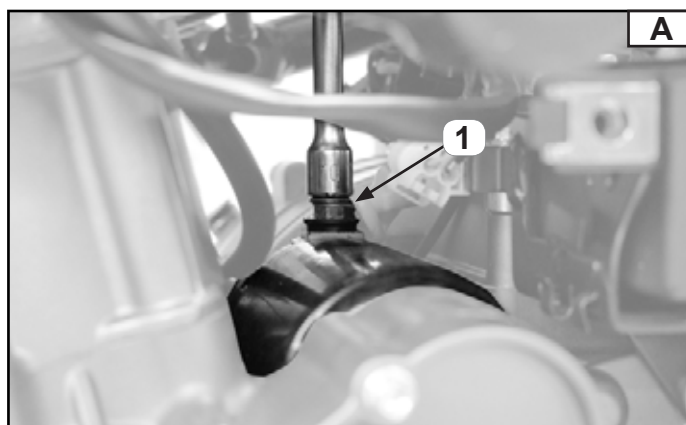
- The motorcycle on a level surface.

NOTICE

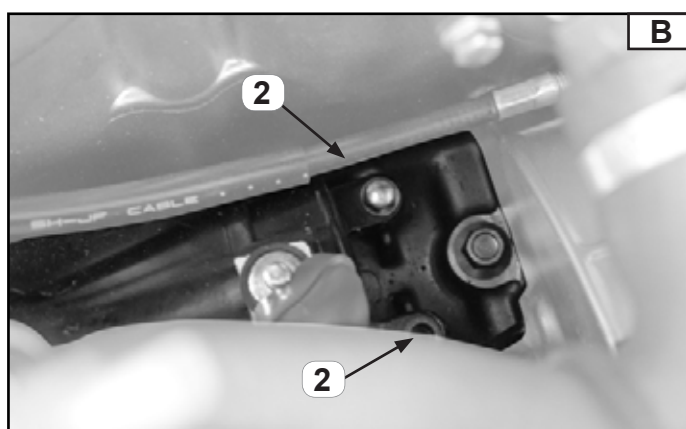
Prop the bike on suitable supports so that it cannot fall.

Remove:

- The electrical connection screw (1) Fig. A.



- The screws (2) and the wire Fig. B.



Slide out:

- The starter motor (3) Fig. C.

Inspect:

- Starter motor operation.

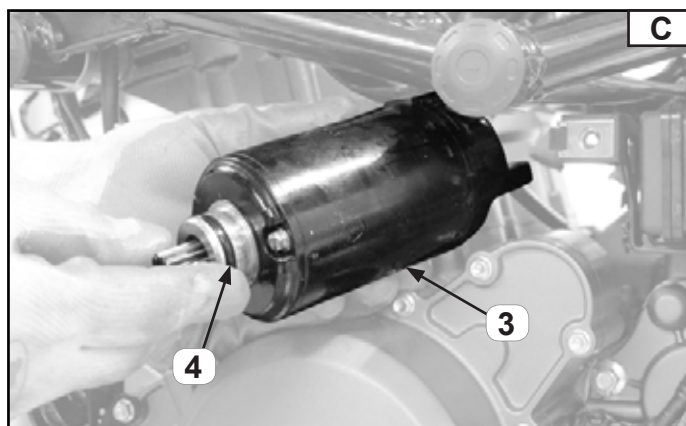
NOTE:

If the starter motor turns with force, replace the part.

- The O-ring (4) Fig. C.
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 INSTALLATION OF THE STARTER MOTOR

Park:

- The motorcycle on a level surface.

NOTICE

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

Install:

Proceed using the opposite order to removal.

Tighten:

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



Torque 10-12 N*m

- The electrical connection screws (2) Fig. B to the following torque:



Torque 10 N*m

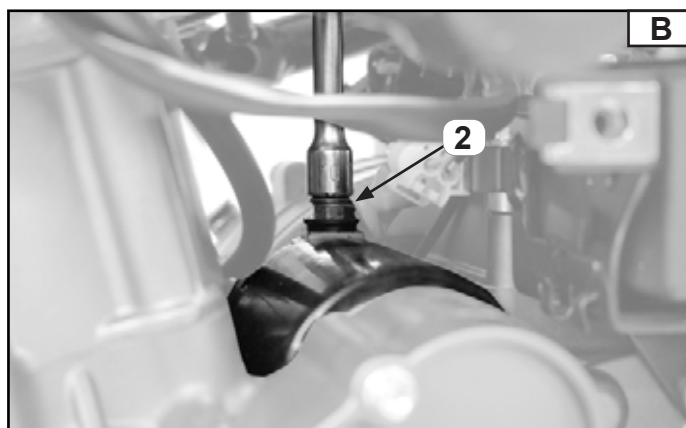
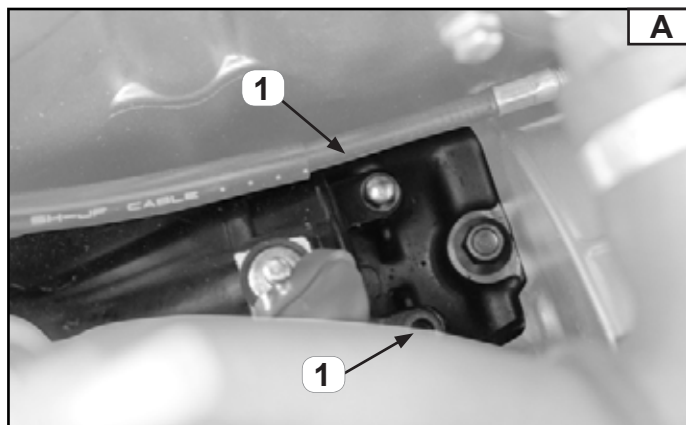
Use medium Loctite thread locker to secure.



**MEDIUM THREAD
LOCKER**

NOTE:

Once the starter motor is assembled, proceed with the current wire connection.

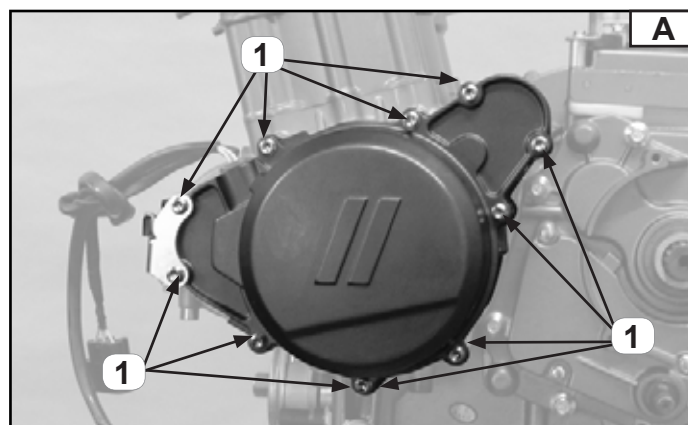




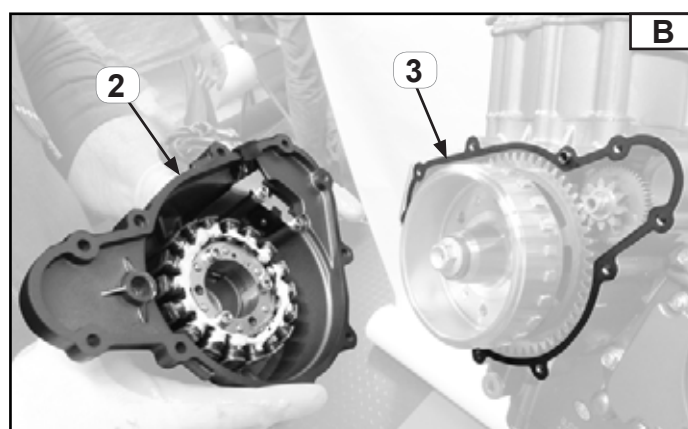
STARTING REMOVAL OF THE FLYWHEEL

Remove:

- The engine oil.
- The fastening screws (1) of the cover Fig. A.

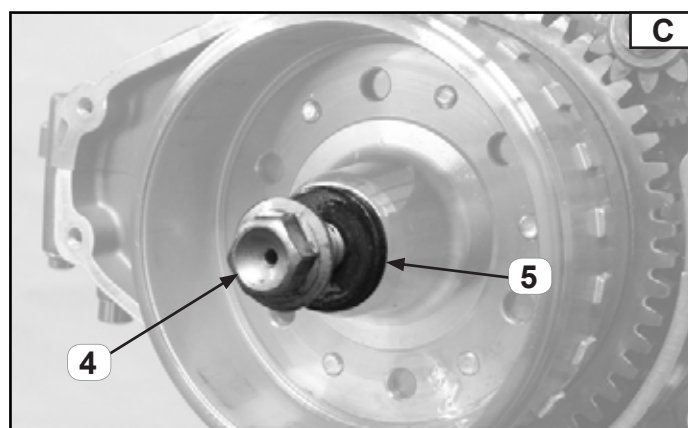


- The cover (2) and the related gasket (3) Fig. B.



Remove:

- The nut (4) Fig. C.
- The washer (5) Fig. C. C.



NOTE:
Use the special tool (6) for this operation Fig. D.



Tool to take out flywheel

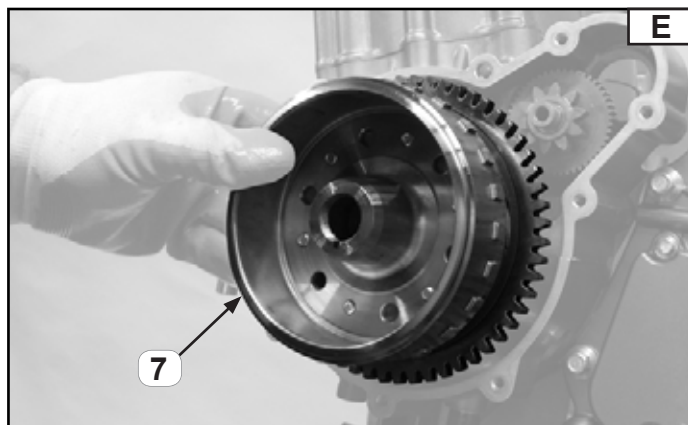




STARTING REMOVAL OF THE FLYWHEEL

Remove:

- The rotor magneto flywheel (7) Fig. E.





STARTING INSTALLATION OF THE FLYWHEEL

Install:

Proceed in the opposite order to removal.

Tighten:

- The nut (1) Fig. A to the following torque:



Torque 90 N*m

Use the special tool for this operation.



Tool to take out flywheel

Tighten:

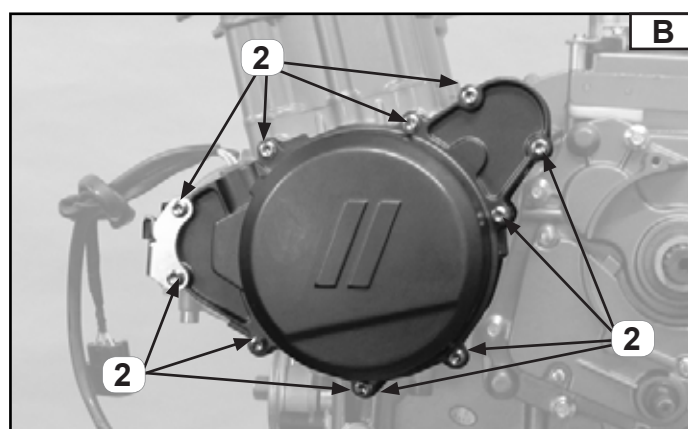
- The cover fastening screws (2) Fig. B to the following torque:



Torque 10 N*m

NOTE:

When closing the magnet flywheel cover, pay attention to the gasket. If the seal is damaged, it must be replaced.





STARTING REMOVAL OF THE ONE WAY WHEEL

Remove:

- The assembled one way wheel elements (1) Fig. A.



- The screws (2) Fig. B.

Inspect:

- The roller cage and support.

If there are any anomalies or signs of wear, replace the whole one way wheel.





STARTING INSTALLATION OF THE ONE WAY WHEEL

Install:

Proceed using the opposite order to removal.

Tighten:

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



Torque 25 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER





STARTING

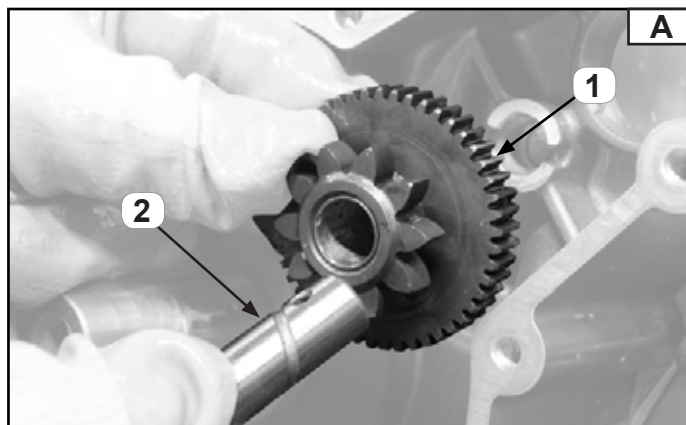
REMOVAL / INSTALLATION OF THE STARTER GEARS

Remove:

- The flywheel, refer to the section “**Removal of the flywheel, Chapter 5**”.
- The starter gear (1) Fig. A.
- The shaft (2) Fig. A.

Install:

Proceed using the opposite order to removal.



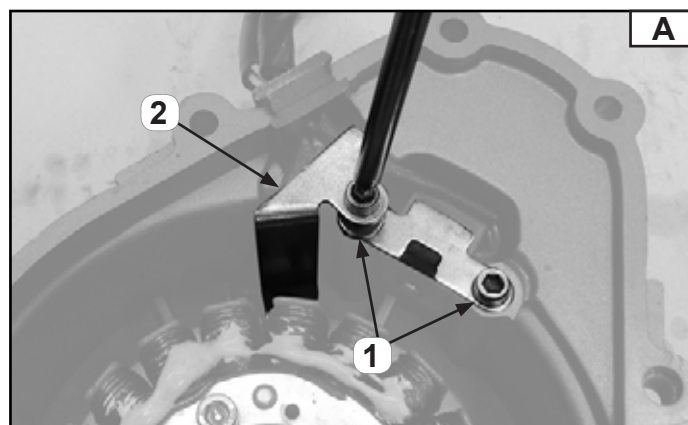


STARTING

REMOVAL OF THE PHASE SENSOR AND STATOR

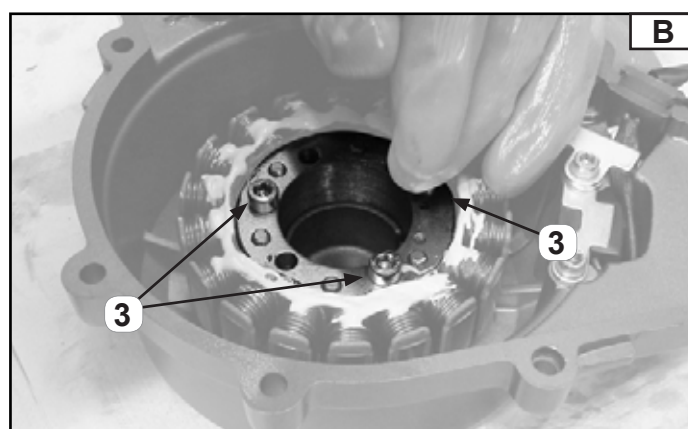
Remove:

- The flywheel cover, refer to the section “**Removal of the flywheel cover, Chapter 5**”.
- The screws (1) Fig. A.
- The bracket (2) Fig. A.



Remove:

- The fastening screws (3) of the stator Fig. B.

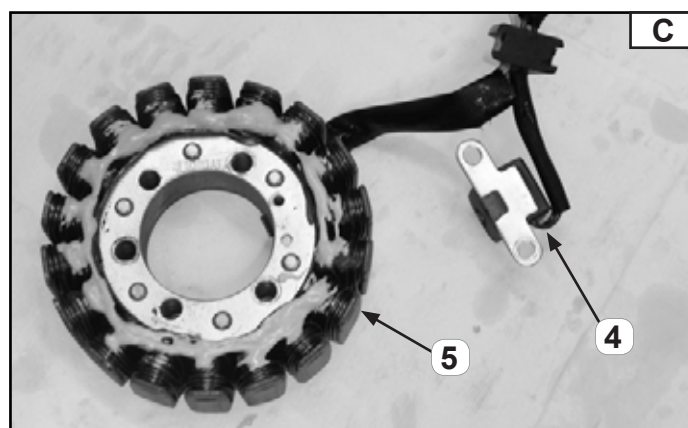


Slide out:

- The phase sensor (4) and the stator (5) Fig. C.

Inspect:

- The integrity of the phase sensor.





STARTING INSTALLATION OF THE PHASE SENSOR

Install:

Proceed using the opposite order to removal.

Tighten:

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



Torque 10-12 N*m

Use medium Loctite thread locker to secure.



MEDIUM THREAD LOCKER

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

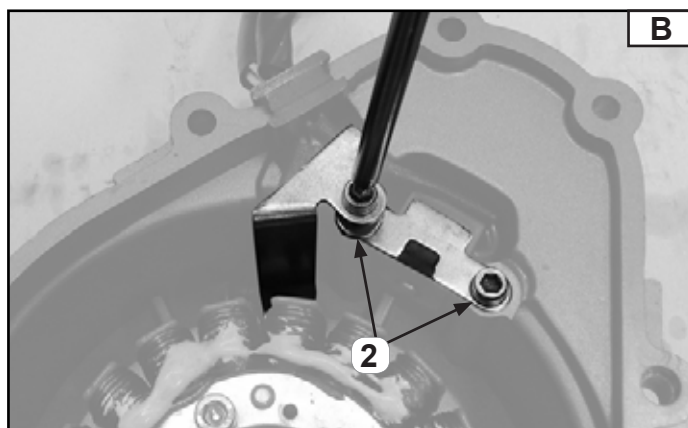
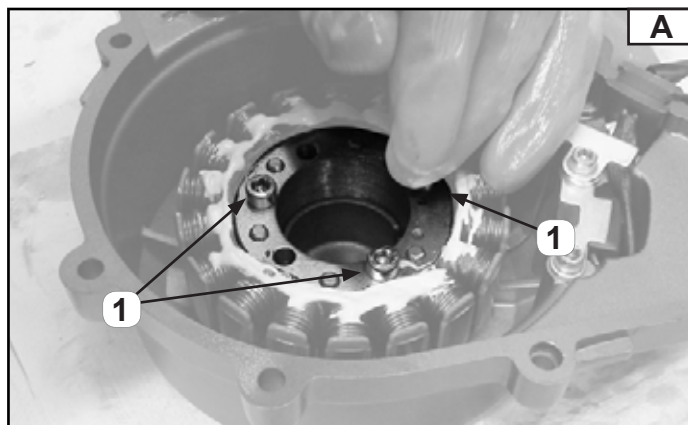


Torque 8 N*m

Use medium Loctite thread locker to secure.

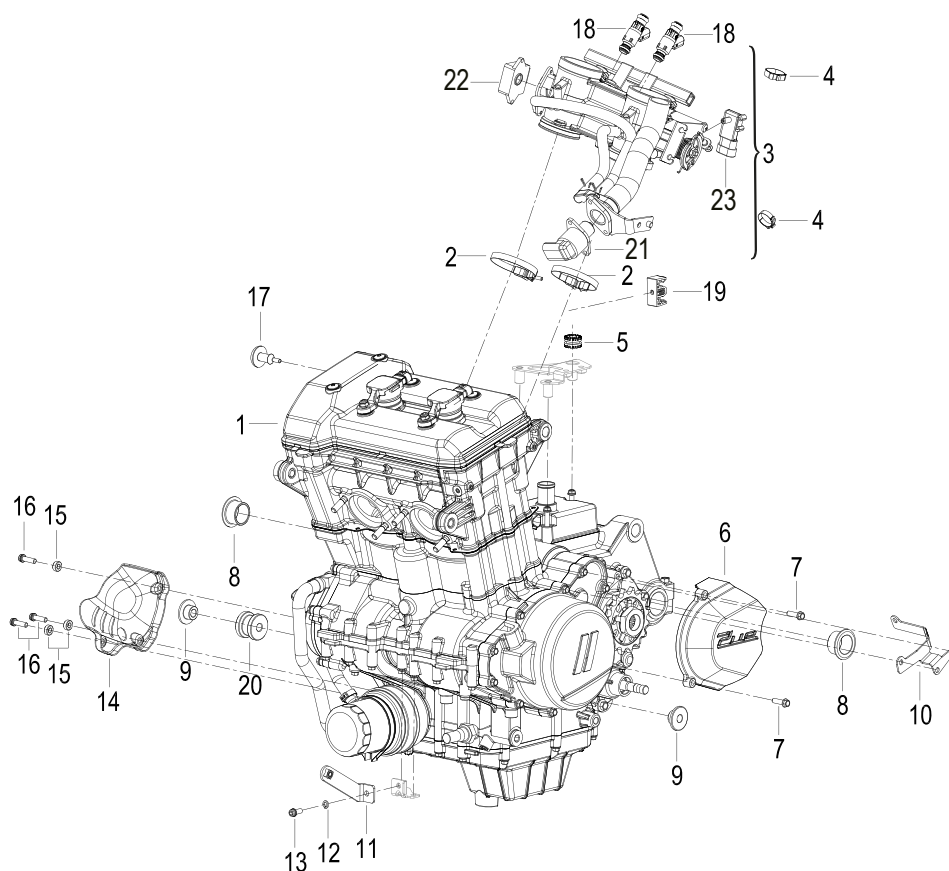


MEDIUM THREAD LOCKER





SUPPLY THROTTLE BODY



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	COMPLETE ENGINE					
2	CLAMP					
3	THROTTLE BODY					
4	CLAMP					
5	RUBBER PAD					
6	L.H. ENGINE PROTECTION					
7	SCREW					
8	BUSH					
9	BUSH "T"					
10	BRACKET					
11	BRACKET					
12	SPRING WASHER					
13	SCREW					
14	R.H. ENGINE PROTECTION					
15	NUT					
16	SCREW					
17	THREADED CAP					
18	INJECTOR					
19	TUBE GUIDE					
20	VIBRATION DAMPER PAD					
21	STEPPER MOTOR					

SUPPLY

THROTTLE BODY

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	POTENTIOMETER					
23	SENSOR					



SUPPLY

REMOVAL OF THE THROTTLE BODY

Park:

- The motorcycle on a level surface.

NOTICE

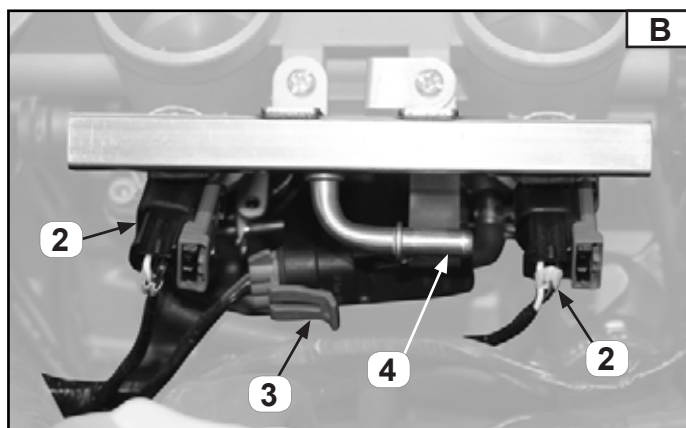
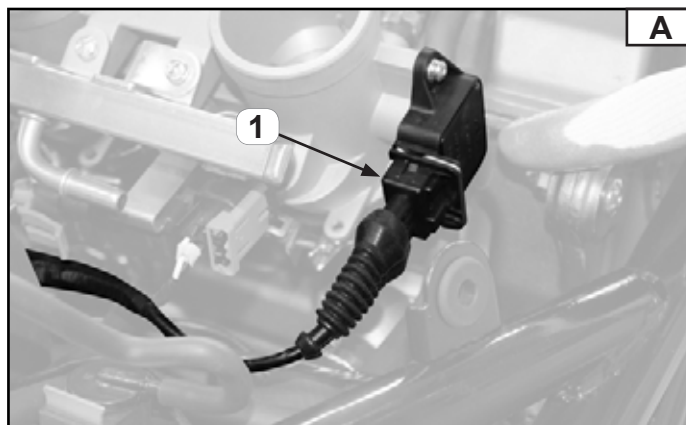
Prop the bike on suitable supports so that it cannot fall.

Remove:

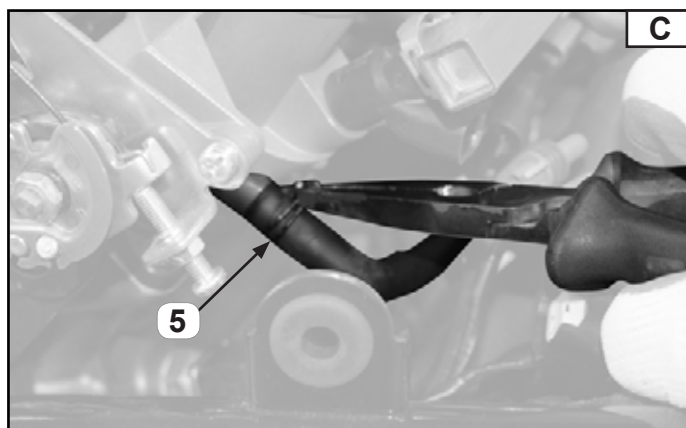
- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The air filter box, refer to the section “**Removal of the air filter box, Chapter 4**”.

Disconnect:

- The potentiometer connector (1) of the throttle body Fig. A.
- The injector connections (2). B.
- The connections of the pressure sensor (3) Fig. B.
- The fuel inlet tube (4) Fig. B.

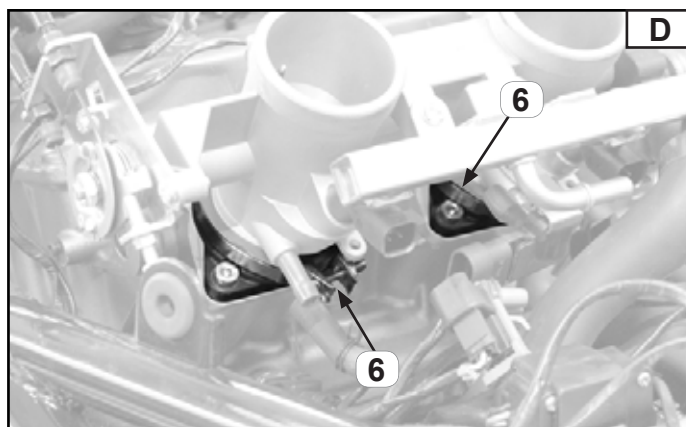


- The canister tube (5) Fig. C.



Loosen:

- The screw hose clamp (6) Fig. D.



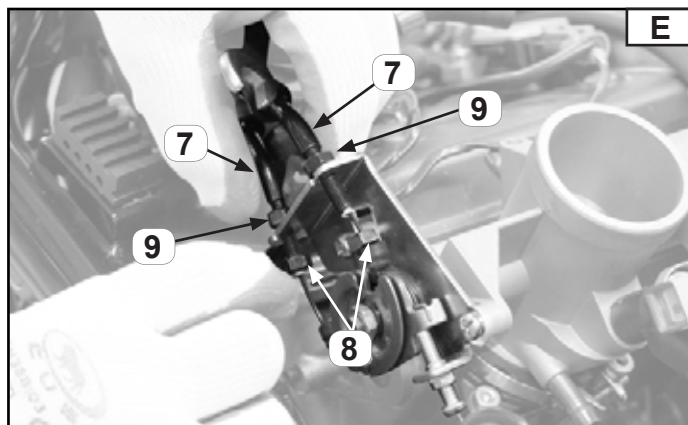


SUPPLY

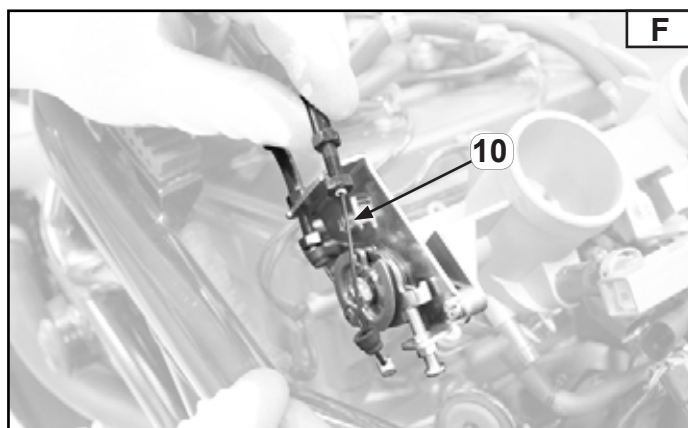
REMOVAL OF THE THROTTLE BODY

Disconnect:

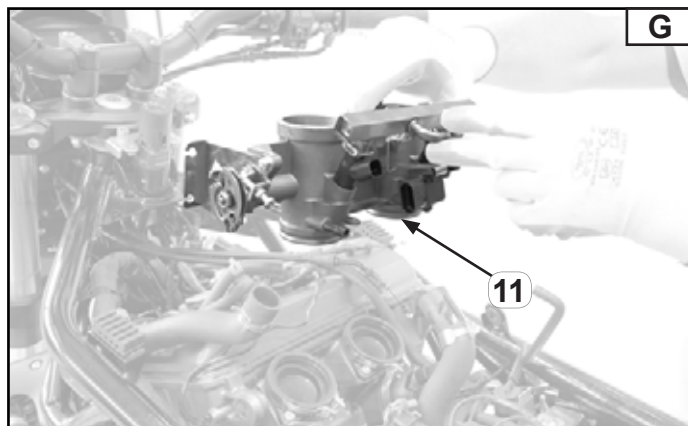
- The bottom ends of the throttle cable (7) loosening the lock nuts (8) of the cable first Fig. E.
- The bottom nuts (9) Fig. E.

**Slide out:**

- The throttle cable (10) Fig. F.



- The throttle body (11) Fig. G.





SUPPLY INSTALLATION OF THE THROTTLE BODY

Park:

- The motorcycle on a level surface.

NOTICE

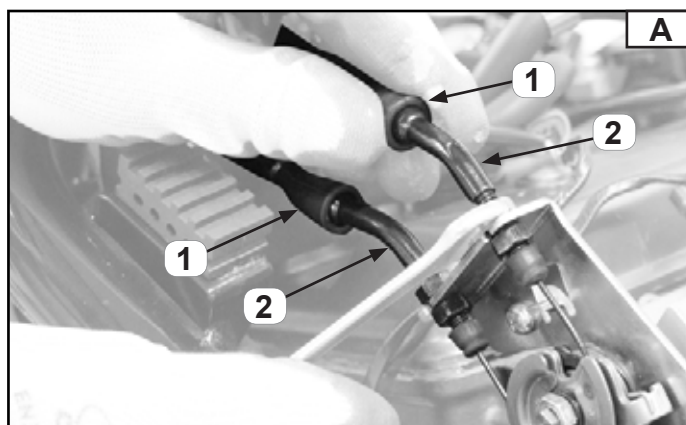
Prop the bike on suitable supports so that it cannot fall.

Install:

Proceed using the opposite order to removal.

NOTICE

During assembly of the accelerator cables, take care to insert the hood (1) on the control line (2) Fig. A.





SUPPLY

REMOVAL OF THE STEPPER

Park:

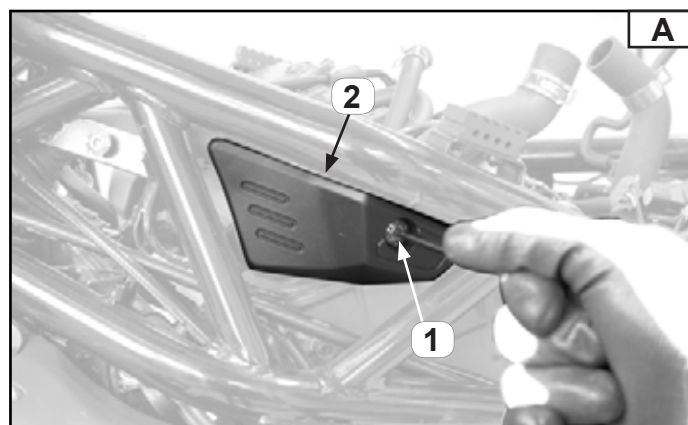
- The motorcycle on a level surface.

NOTICE

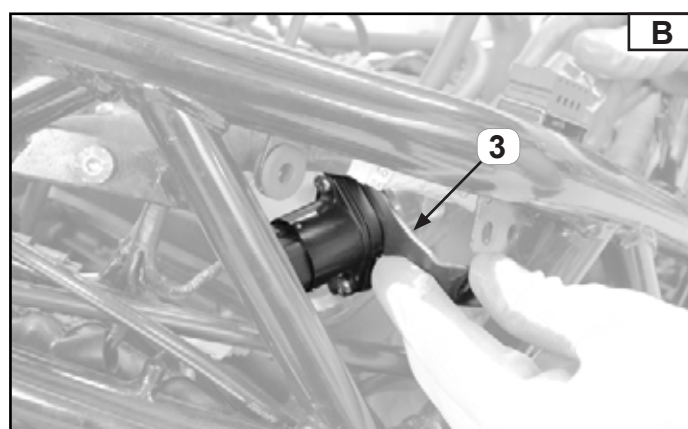
Prop the bike on suitable supports so that it cannot fall.

Remove:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The screw (1) Fig. A.

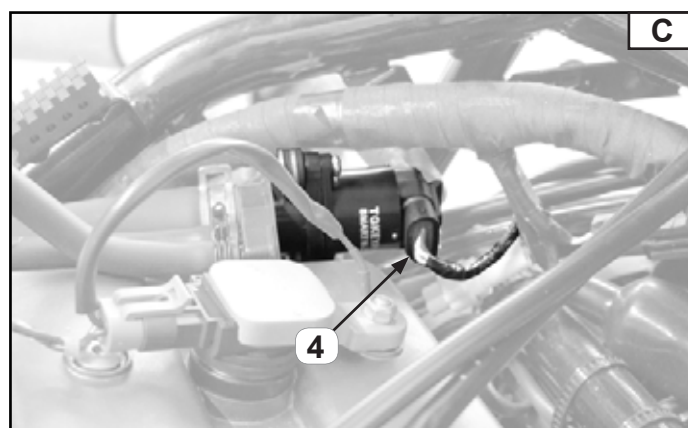


- The stepper support bracket (3) to the frame Fig. B.



Disconnect:

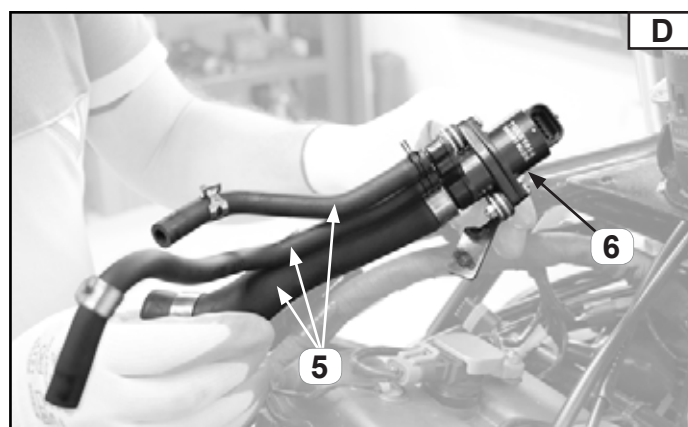
- The stepper electric connector (4) from the electrical distributor Fig. C.



- The tube connections (5) Fig. D.

Slide out:

- The stepper (6) Fig. D.





SUPPLY INSTALLATION OF THE STEPPER

Park:

- The motorcycle on a level surface.

NOTICE

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

Install:

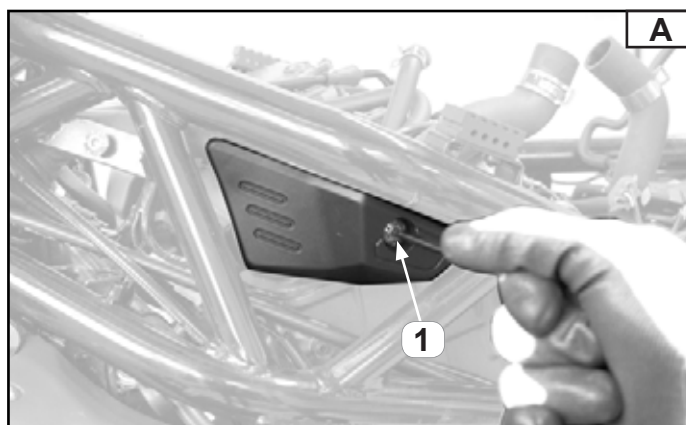
Proceed using the opposite order to removal.

Tighten:

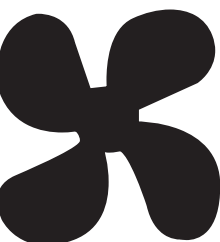
- The screw (1) to the following torque:



Torque 10-12 N*m



The image shows a Benelli logo centered on a white background with horizontal dotted lines. The logo is circular, featuring a green 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 stylized font across the middle of the logo.



COOL.
SYSTEM

6



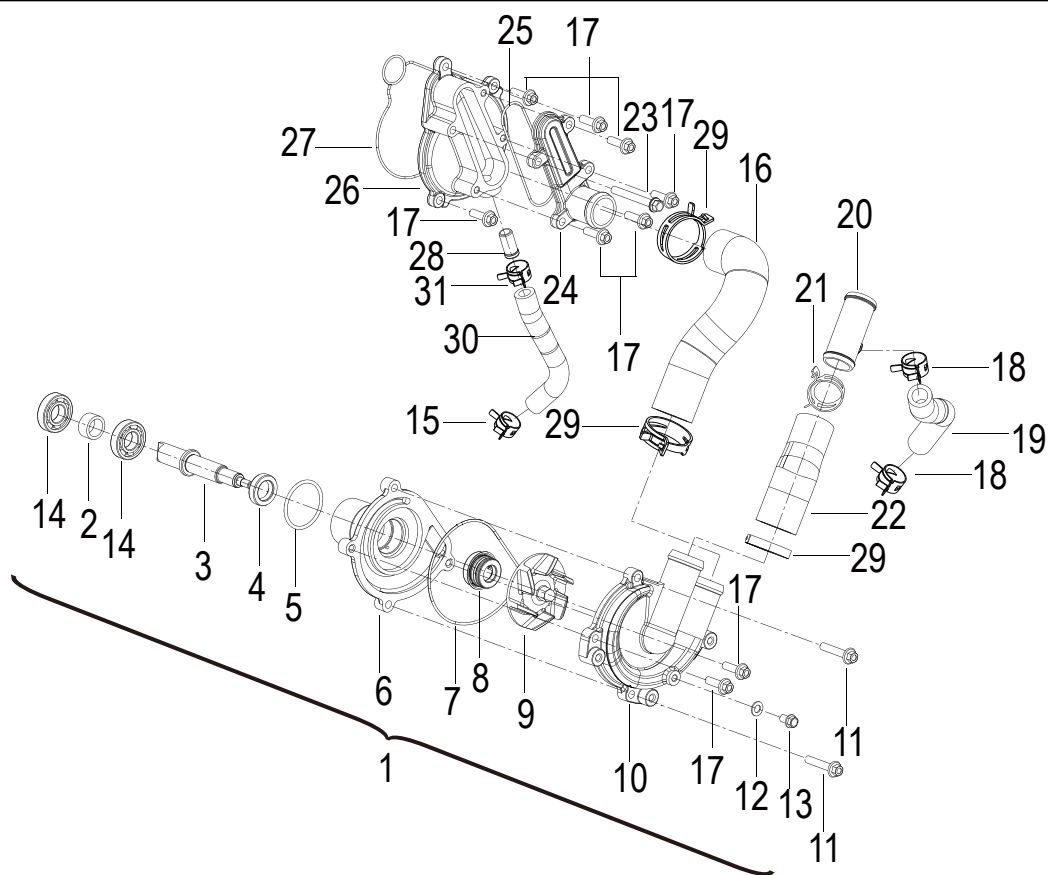
CHAPTER 6

COOLING SYSTEM

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INSTALLATION OF THE WATER PUMP	6
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REMOVAL OF THE THERMOSTAT	7
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REMOVAL OF THE EXPANSION TANK.....	20
INSTALLATION OF THE EXPANSION TANK.....	22



WATER PUMP



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	COMPLETE WATER PUMP					
2	BUSH					
3	WATER PUMP SHAFT					
4	OIL SEAL					
5	O-RING					
6	WATER PUMP BODY					
7	SEAL RING					
8	SEAL RING					
9	WATER PUMP FAN					
10	WATER PUMP COVER					
11	SCREW					
12	WASHER					
13	SCREW					
14	BEARING					
15	CLAMP					
16	HOSE					
17	SCREW					
18	CLAMP					
19	HOSE					
20	HOSE					
21	QUICK FASTENING					



WATER PUMP

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	HOSE					
23	SCREW					
24	EXTERNAL COVER					
25	O-RING					
26	INNER COVER					
27	O-RING					
28	UNION "T"					
29	SCREW HOSE CLAMP					
30	HOSE					
31	CLAMP					



WATER PUMP REMOVAL OF THE WATER PUMP

Park:

- The motorcycle on a level surface.

NOTICE

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

Remove:

- The screw cooling fluid (1) Fig. A.
- The water inlet and return hoses (2) Fig. A.
- The screws (3) Fig. A.

Slide out:

- The parts in the order shown in the exploded drawings.

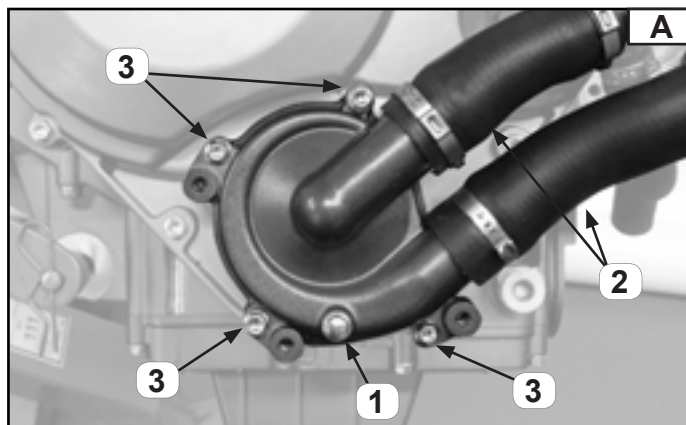
Check:

- Integrity of every single part.

If any of the parts should show signs of wear, replace.

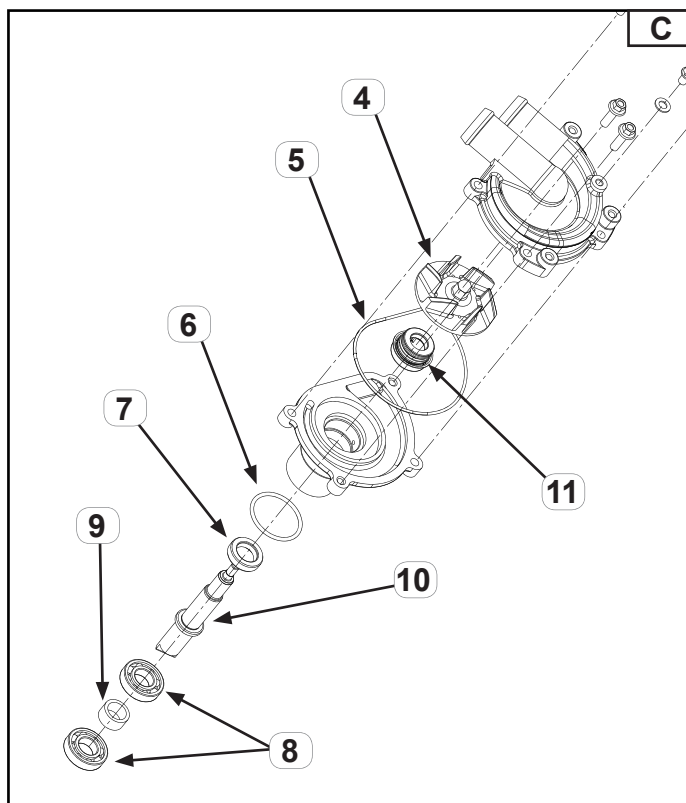
NOTICE

In case of faulty gaskets, it is possible to notice leaks from the hole shown in Fig. B.



Check:

- The water pump fan (4) Fig. C.
- The seal ring (5) Fig. C.
- The O-ring (6) Fig. C.
- The oil seal (7) Fig. C.
- The bearings (8) Fig. C.
- The bush (9) Fig. C.
- The water pump shaft (10) Fig. C.
- The mechanical seal (11) Fig. C.





WATER PUMP

INSTALLATION OF THE WATER PUMP

Install:

Proceed using the opposite order to removal.

Lubricate with engine oil:

- The O-ring.

NOTE:

When inserting the pump, take care to ensure that the notch (1) on the water pump shaft is aligned with the groove on the fixing screw of the distribution sprocket of the oil pump Fig. A.

Tighten:

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

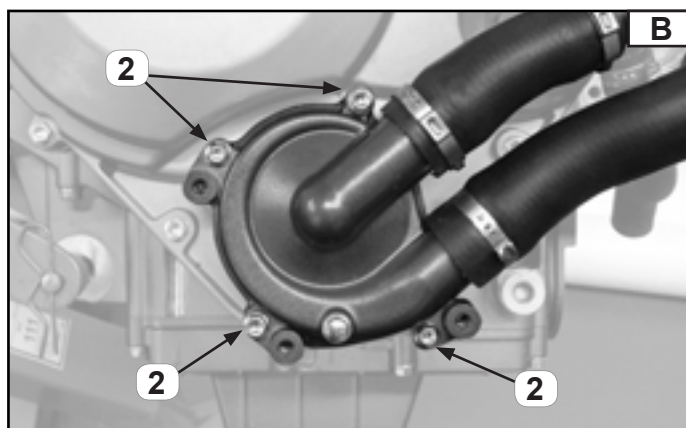
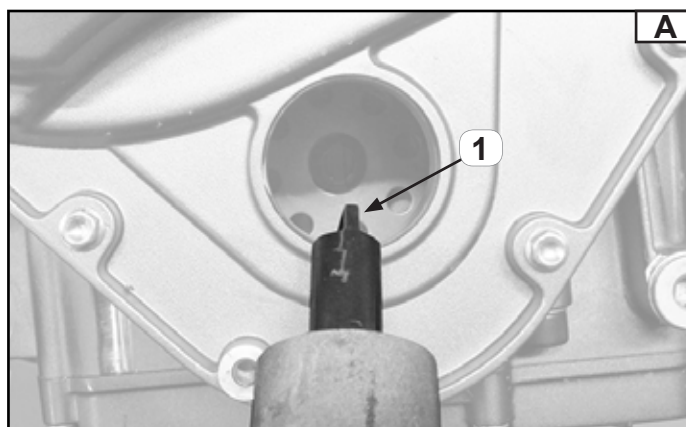


Torque 12 N*m

Use Loctite thread sealant to secure.



Loctite 242/243





THERMOSTAT REMOVAL OF THE THERMOSTAT

Park:

- The motorcycle on a level surface.

NOTICE

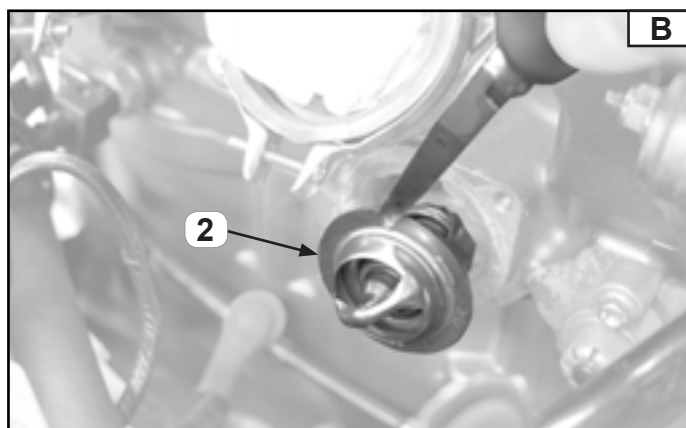
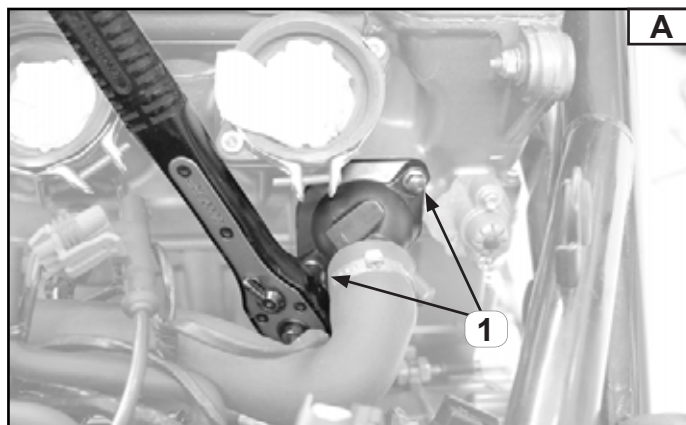
Prop the bike on suitable supports so that it cannot fall.

Remove:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The air filter box, refer to the section “**Removal of the air filter box, Chapter 4**”.
- The throttle body, refer to the section “**Removal of the throttle body removal, Chapter 4**”.
- The screws (1) Fig. A.
- The thermostat (2) Fig. B.

NOTE:

Drain out the cooling fluid before proceeding with these operations, refer to the section “**Removal of the water pump, Chapter 6**”.

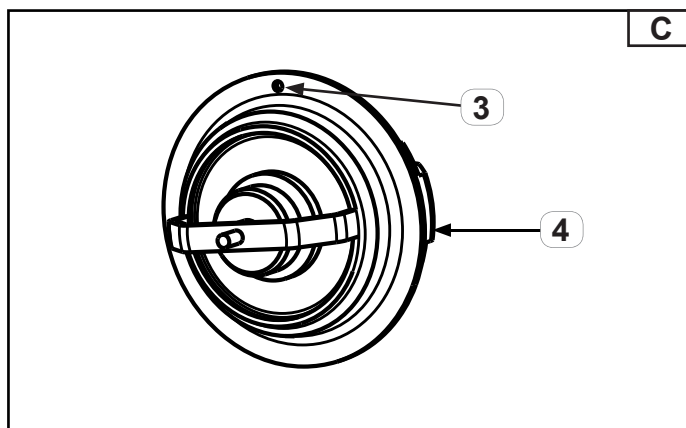


Inspect:

- The by-pass port (3) Fig. C.
If clogged, replace.
- The thermostat (4) Fig. C.
If this does not open at 75° ~ 90°C (167~ 194° F), replace.

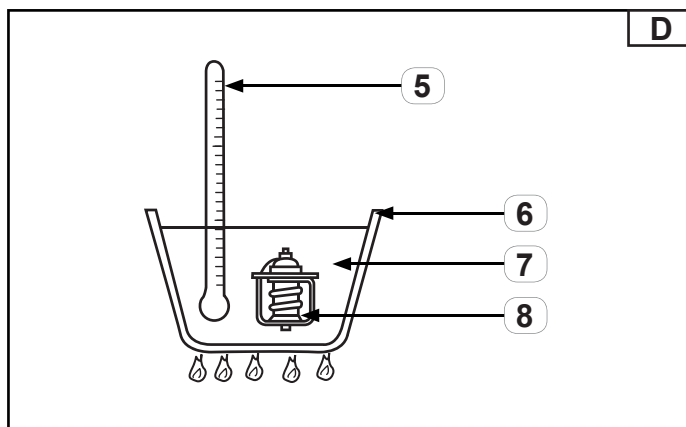
Thermostat check:

- Immerse the thermostat in a container filled with water Fig. C.
- Slowly warm water up.
- Immerse a thermometer in the water.
- Mix the water again, keeping an eye on the thermostat and on the temperature shown on the thermometer.
- When the temperature of 75°C is reached, the thermostat valve will start to open until it reaches a temperature of 90°C. The thermostat valve will open to at least 7 mm.



Key Fig. D.

- 5. Thermometer.
- 6. Container.
- 7. Water.
- 8. Thermostat.





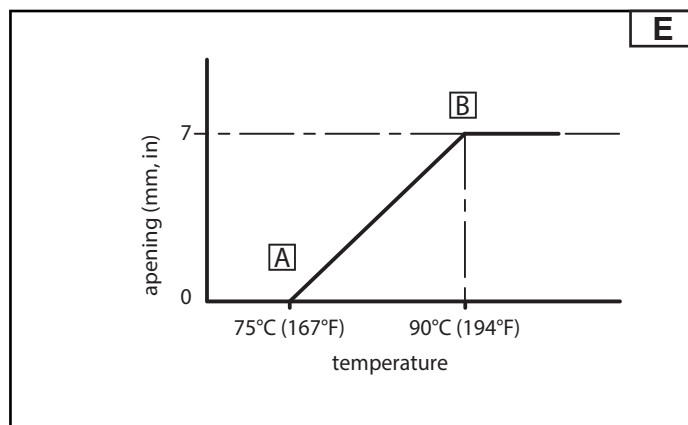
THERMOSTAT REMOVAL OF THE THERMOSTAT

Diagram of thermostat opening / closing Fig. E.

- A. Fully closed.
- B. Fully open.

NOTICE

If there are any doubts about the precision of the thermostat, it should be replaced. A faulty thermostat can cause notable overheating or overcooling.





THERMOSTAT

INSTALLATION OF THE THERMOSTAT

Park:

- The motorcycle on a level surface.

NOTICE

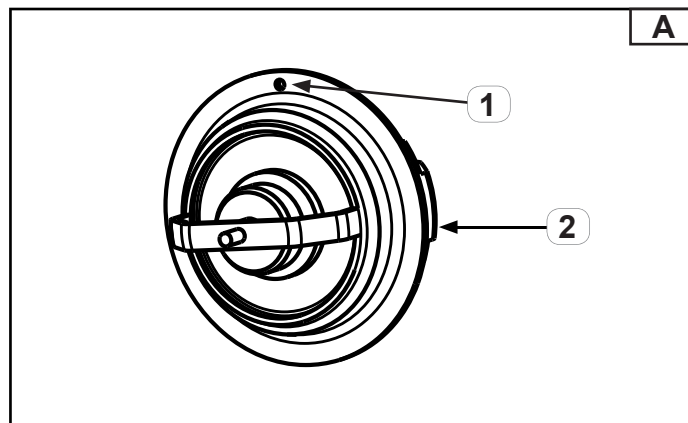
Prop the bike on suitable supports so that it cannot fall.

Install:

Proceed using the opposite order to removal.

Install:

- The thermostat (2) with the by-pass port (1) Fig. A facing upward.

**Tighten:**

- The screws (3) Fig. B to the following torque:

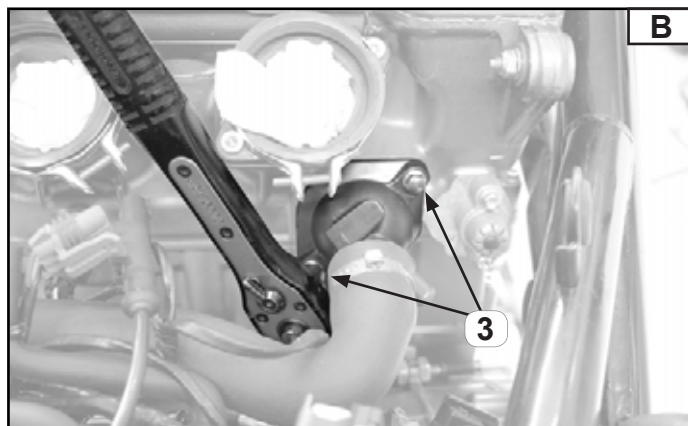


Torque 12 N*m

Use Loctite thread locker to secure the screws.



Loctite 242/243

**NOTE:**

Add coolant once these steps have been completed.



HEAT EXCHANGER TIMING SYSTEM

Park:

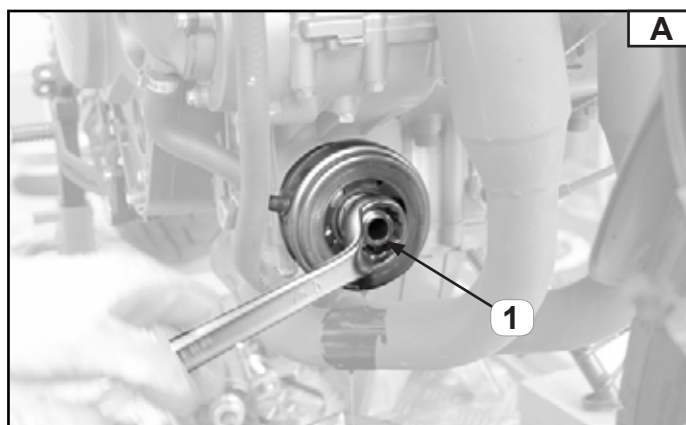
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The cooling fluid, refer to the section “**Removal of the water pump, Chapter 6**”.
- The oil filter, refer to the section “**Removal / installation of the oil filter, Chapter 3**”.
- The special screw (1) Fig. A.



NOTE:

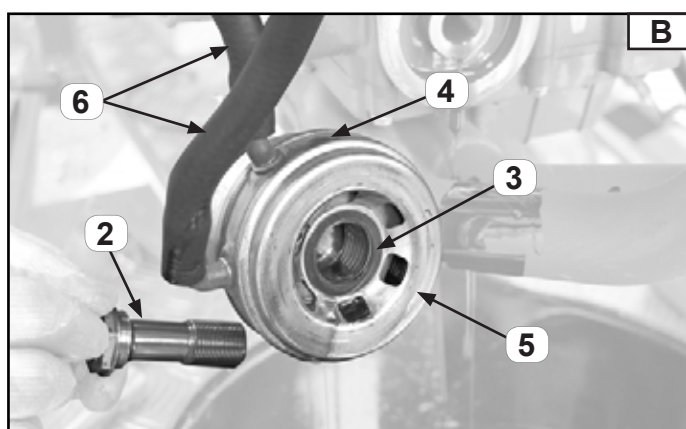
During the extraction of the special screw (2) do not let the washer fall (3) Fig. B.

Remove:

- The timing system (4) Fig. B.
- The adapter (5) Fig. B.

Disconnect:

- Both water pipes (6) Fig. B.





HEAT EXCHANGER TIMING SYSTEM

Park:

- The motorcycle on a level surface.

NOTICE

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

Install:

Proceed using the opposite order to removal.

Tighten:

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

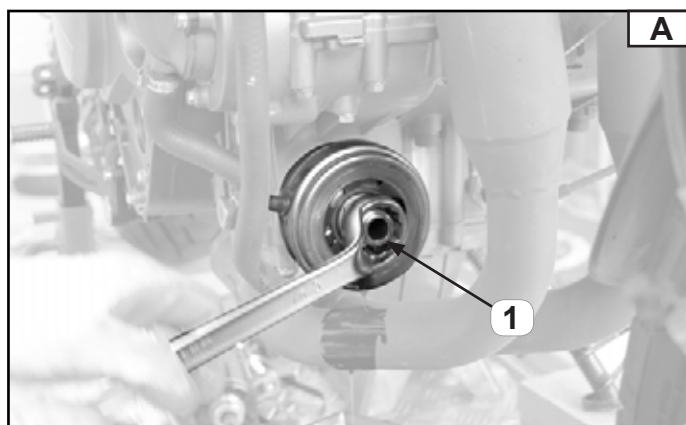


Torque 60 N*m

NOTE: _____

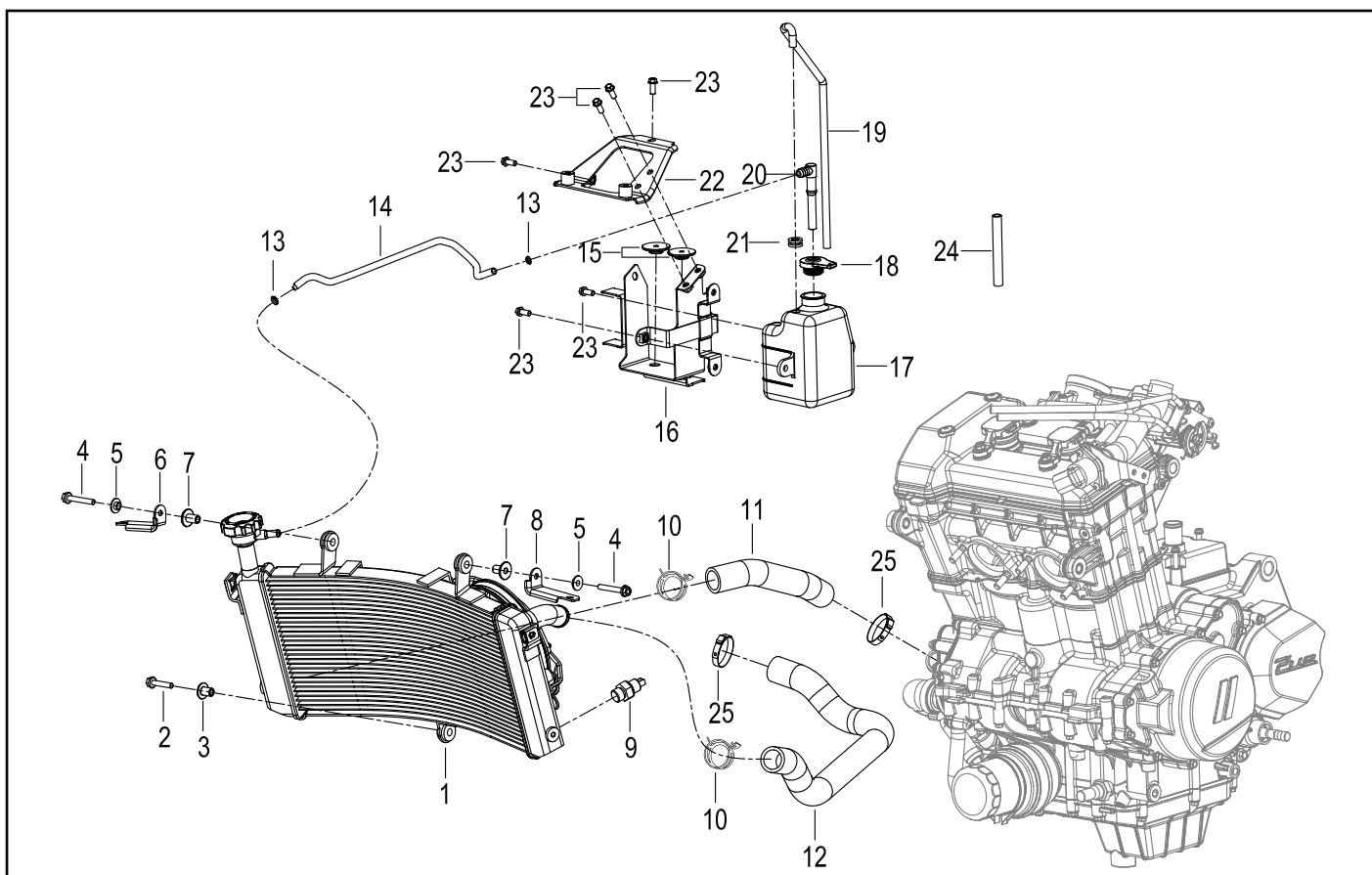
Add coolant once these steps have been completed.

NOTE: _____
During the installation, make sure the various parts of the timing system are positioned as shown in Fig. B.





RADIATOR



Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
1	RADIATOR					
2	SCREW					
3	UPPER BUSH					
4	SCREW					
5	BUSH					
6	R.H. BRACKET					
7	BUSH					
8	L.H. BRACKET					
9	WATER TEMPERATURE SENSOR					
10	QUICK FASTENING					
11	HOSE					
12	RUBBER HOSE ELBOW					
13	HOSE GUIDE SPRING					
14	TUBE					
15	RUBBER PAD					
16	CANISTER HOLDER					
17	WATER TANK					
18	WATER TANK CAP					
19	TUBE					
20	INTAKE TUBE					
21	VIBRATION DAMPER PAD					



RADIATOR

Pos.	Description	Qty	Sq.	SYMBOLS	INTERVENTION DESCRIPTION	REMARKS
22	HOLDER					
23	SCREW					
24	TUBE					
25	CLAMP					



RADIATOR REMOVAL OF THE RADIATOR

Park:

- The motorcycle on a level surface.

NOTICE

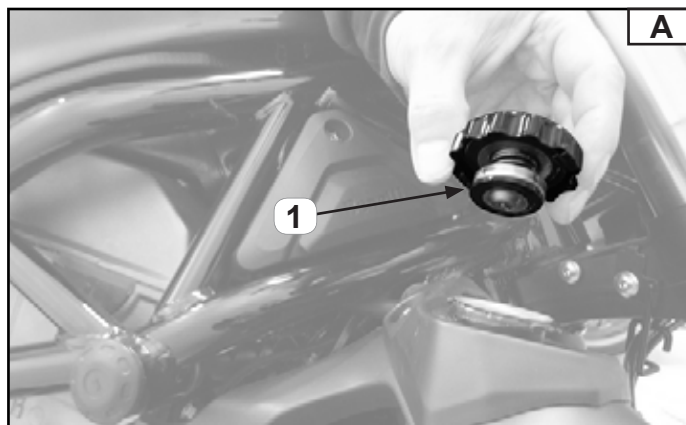
Prop the bike on suitable supports so that it cannot fall.

NOTE:

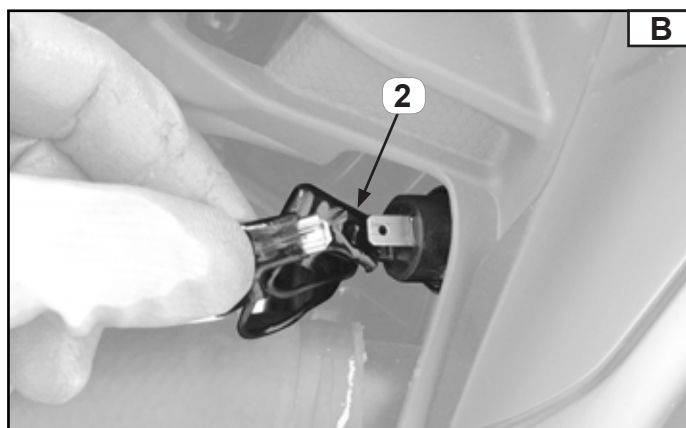
Before carrying out the removal operations of the radiator, make sure the engine is cold.

Remove:

- The upper cap of the radiator (1) Fig. A.
- The cooling fluid.

**Disconnect:**

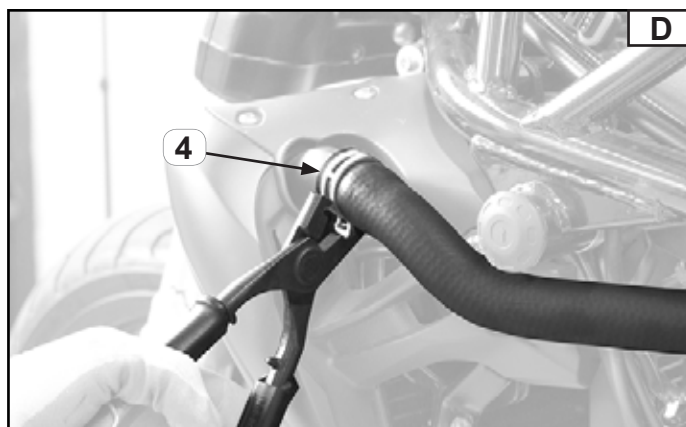
- The connections of the electric fan thermal contact (2) Fig. B.

**Remove:**

- The lower hose (3) Fig. C.



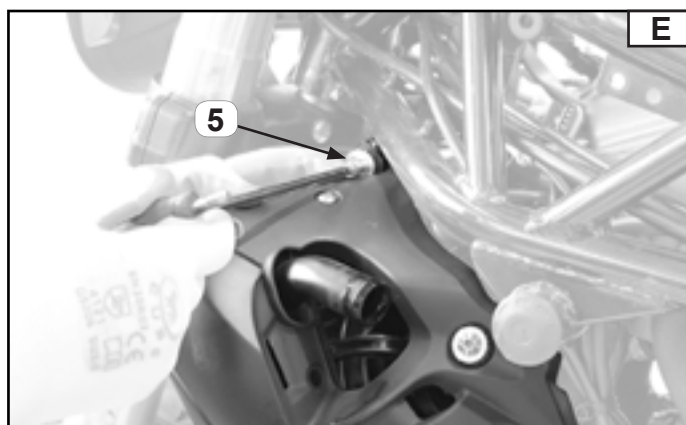
- The L.H. upper hose (4) Fig. D.



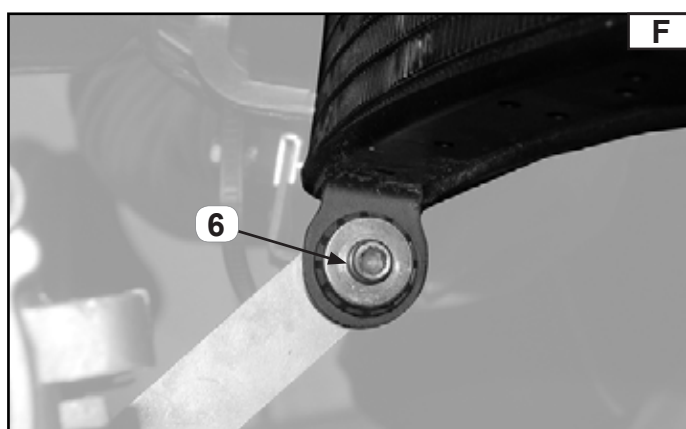


RADIATOR REMOVAL OF THE RADIATOR

- The radiator bracket fixing central screw (5) and the related nut Fig. E.



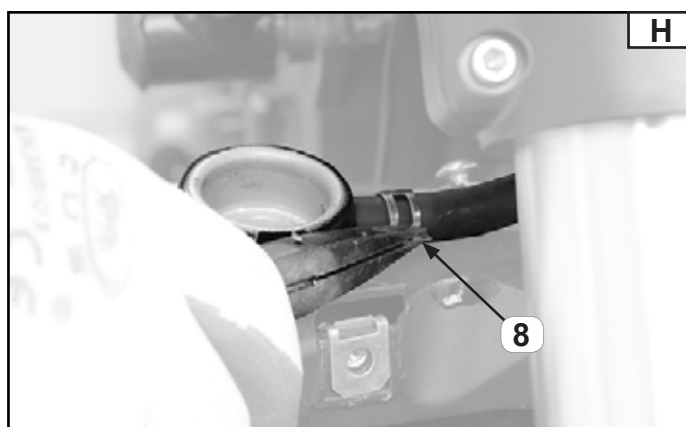
- The screw (6) Fig. F.



- The protection of the cooling fluid return tube (7) Fig. G.



- The return tube clamp (8) Fig. H.



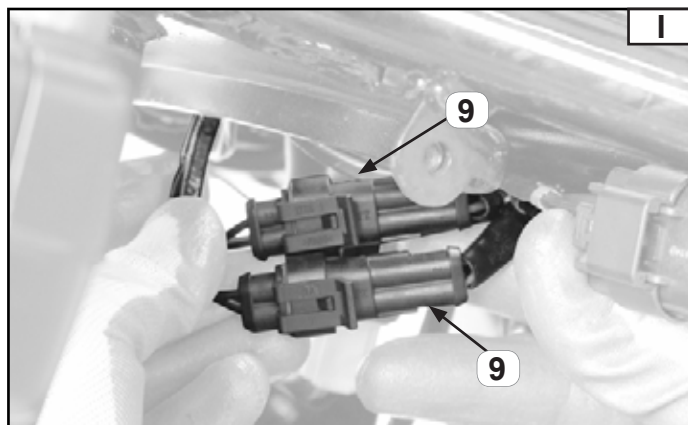


RADIATOR

REMOVAL OF THE RADIATOR

Disconnect:

- The fan connectors (9) Fig. I.

**Slide out:**

- The complete radiator (10) Fig. L.

Inspect:

- The radiator fins.

If clogged, clean.

Use a jet of compressed air on the back of the radiator.

NOTE:

Straighten any crushed fin with a fine, flathead screwdriver.

Inspect:

- The radiator hoses.

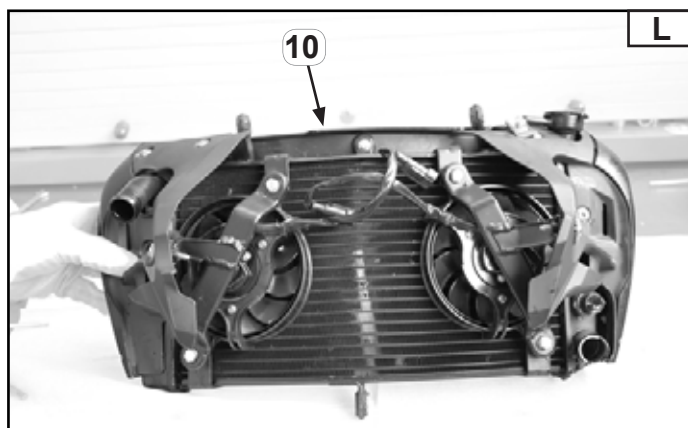
- The radiator pipes.

If there is any cracking/damage, replace.

- The radiator fan

If there is any damage, replace.

In case of malfunction, check and repair.





RADIATOR INSTALLATION OF THE RADIATOR

Park:

- The motorcycle on a level surface.

NOTICE

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

Install:

Proceed using the opposite order to removal.

Tighten:

- The screw (1) Fig. A to the following torque:

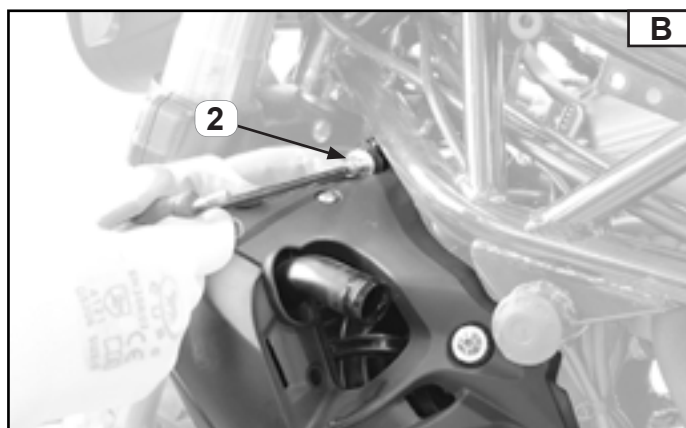
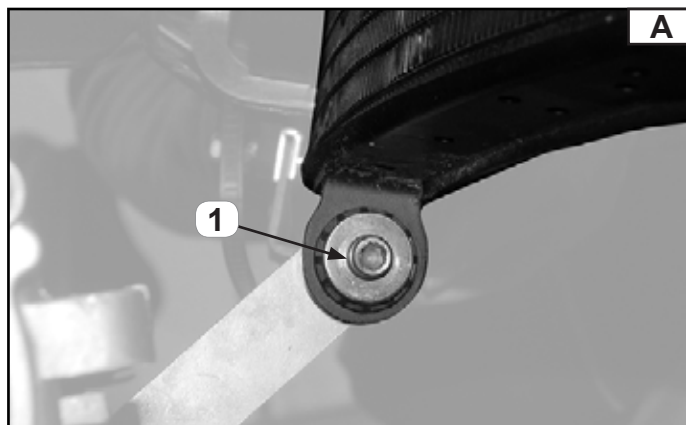


Torque 12 N*m

- The radiator bracket fixing central screw (2) and the related nut Fig. B to the following torque:



Torque 12 N*m





RADIATOR

REMOVAL OF THE ELECTRIC FANS

Park:

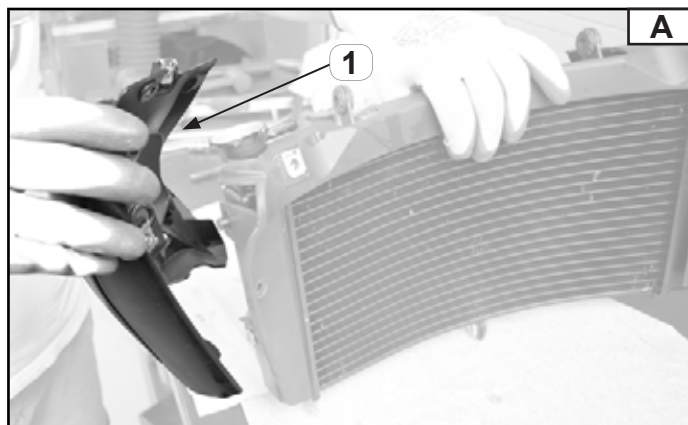
- The motorcycle on a level surface.

NOTICE

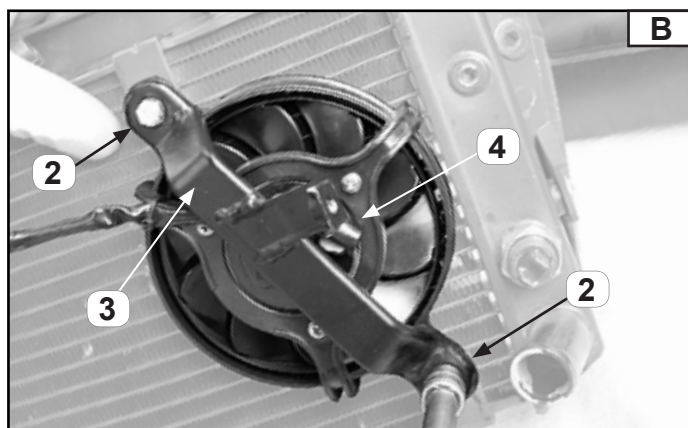
Prop the bike on suitable supports so that it cannot fall.

Remove:

- The radiator, see the section “**Removal of the radiator, Chapter 6**”.
- The protective guard (1) on both sides of the radiator Fig. A.

**Remove for both electric fans:**

- The screws (2) Fig. B.
- The protective bracket (3) Fig. B.
- The electric fan (4) Fig. B.





RADIATOR INSTALLATION OF THE ELECTRIC FANS

Park:

- The motorcycle on a level surface.

NOTICE

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

Install:

Proceed using the opposite order to removal.

Tighten:

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

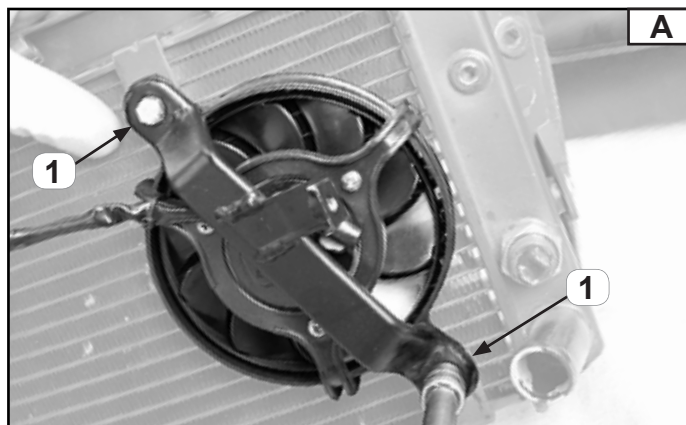


Torque 10 N*m

Use Loctite thread sealant to secure.



Loctite 243





EXPANSION TANK

REMOVAL OF THE EXPANSION TANK

Park:

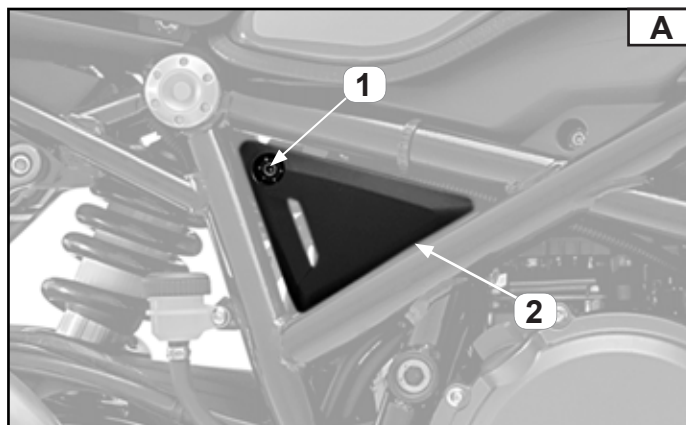
- The motorcycle on a level surface.

NOTICE

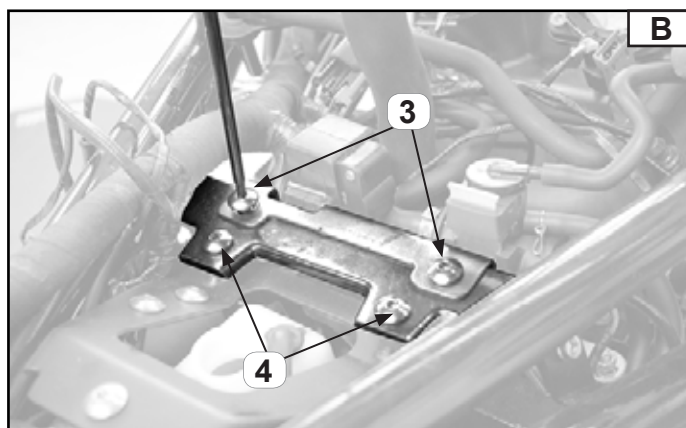
Prop the bike on suitable supports so that it cannot fall.

Remove:

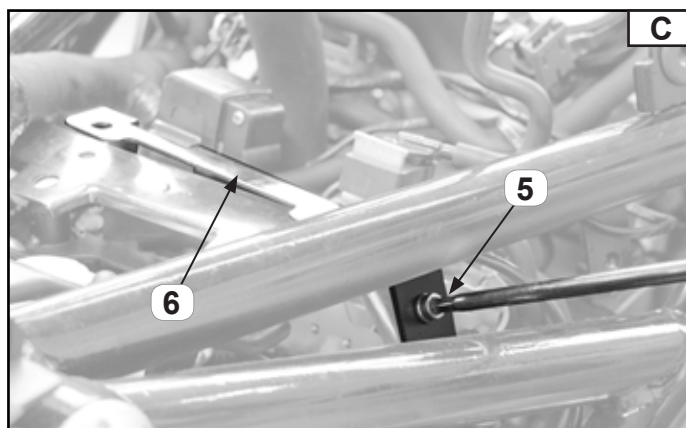
- The seat, refer to the section “**Removal of the seat, Chapter 4**”.
- The tank, refer to the section “**Removal of the fuel tank, Chapter 4**”.
- The screw (1) Fig. A.
- The face shield (2) Fig. A.



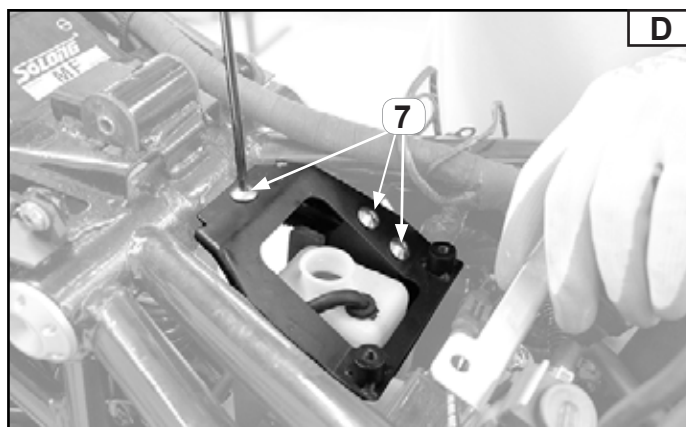
- The screws (3) Fig. B.
- The screws (4) Fig. B.



- The screw (5) Fig. C on both sides of the vehicle.
- The support bracket of the electrical components (6) Fig. C.



- The tank support screws (7) Fig. D.



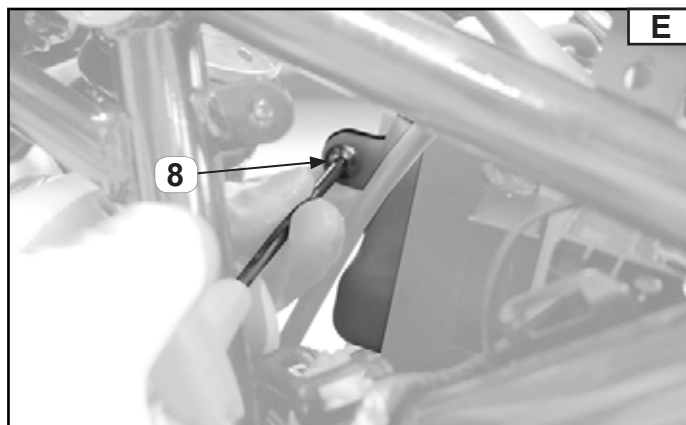


EXPANSION TANK

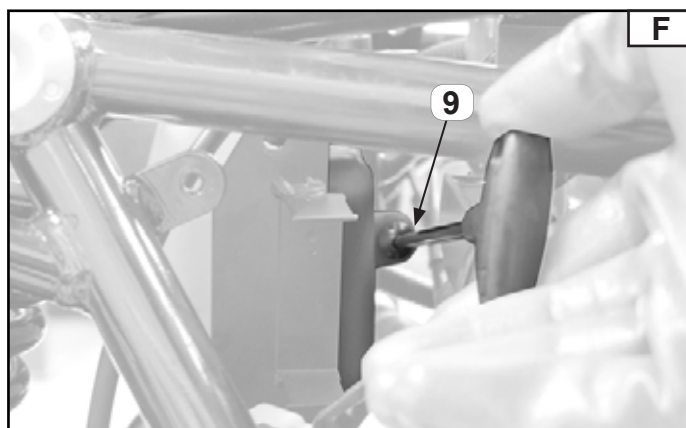
REMOVAL OF THE EXPANSION TANK

Remove:

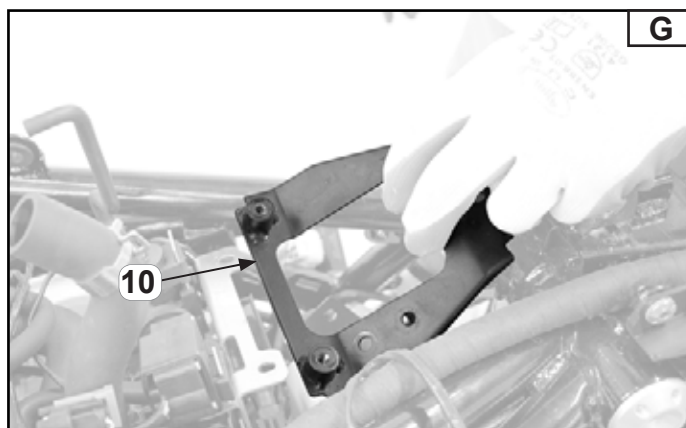
- The left screw (8) Fig. E.



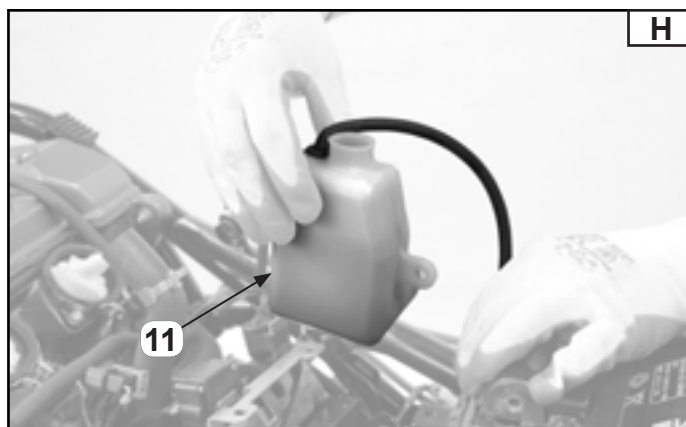
- The right screw (9) Fig. F.

**Slide out:**

- The plate (10) Fig. G.

**Remove:**

- The expansion tank (11) Fig. H.





EXPANSION TANK

INSTALLATION OF THE EXPANSION TANK

Park:

- The motorcycle on a level surface.

NOTICE

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

Install:

Proceed using the opposite order to removal.





CHAPTER 7

ELECTRIC SYSTEM

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SENSORS

ENGINE CONTROL SYSTEM DESCRIPTION

Each model is equipped with an electronic system of engine management featuring a control, which includes both starting and distribution of fuel.

The electronic control module (ECM) gets information from the engine sensors, the cooling/intake systems and calculate precisely the ignition advance and the need of fuel for all engine speeds/loads.

Furthermore, the system features hardware diagnostic functions in compliance with the provisions of the US State of California for on-board diagnostics.

In the event of a system failure, this function ensures that the type of fault and the engine data at the time of fault are stored in the ECM memory.

The stored data can be recovered by means of an apposite service equipment available at any Benelli's Dealer (see Texa instruction manual),

thus allowing a precise fault diagnostic and the immediate solving of the defect.



SENSORS

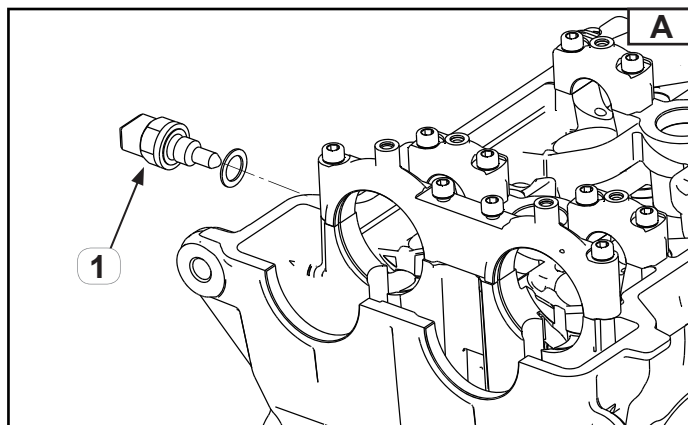
COOLING FLUID TEMPERATURE SENSOR

It is situated close to the cylinder head (1) Fig. A and calculates the information of cooling fluid temperature received from the ECM that are used to optimize the supply to all engine temperatures and to calculate the supply requirements in the heat and cold setting off.

NOTICE

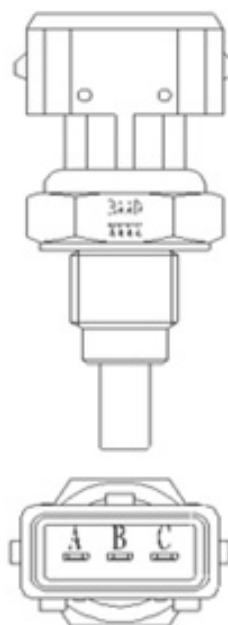
On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



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 sprocket, and detects the position of the gear.

Disconnect:

- The electrical coupling.

Remove:

- The gear position sensor from the half crankcase.

Check:

- The continuity.

Ø 3: Neutral

Ø 3.5: Grey for Neutral

1. Brown/yellow first gear

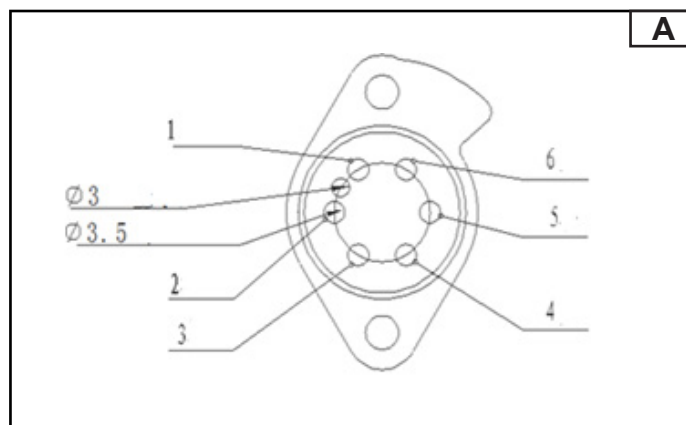
2. Green/black second gear

3. Green/blue third gear

4. Yellow/blue fourth gear

5. Brown/red fifth gear

6. Yellow/red sixth gear

**NOTICE**

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



SENSORS PHASE SENSOR

It is situated close to the LH engine crankcase (1), Fig. A.

The position sensor of the crankshaft shows the movement of a sprocket fixed to the right end of the crankshaft by reading a particular wheel consisting of 28 equidistant teeth near to a triple length space.

The interpretation of such reading is used by the ECM to fix the position of the crankshaft in relation to the point in which fuel is injected and to the requirements of fuel ignition.

Disconnect:

- The main wiring connector.

Measure:

- Resistance value:



Standard	250 ± 30 Ω
----------	------------

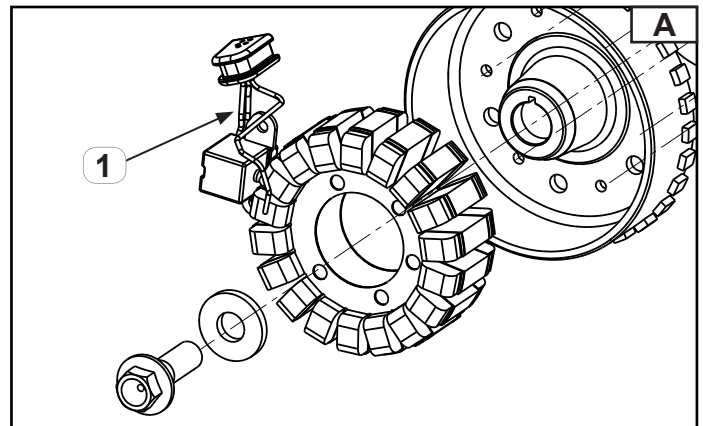
NOTE:

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.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



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.

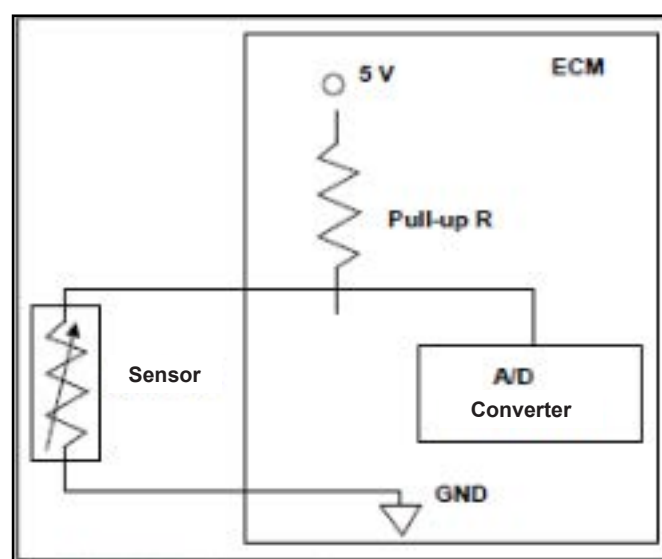
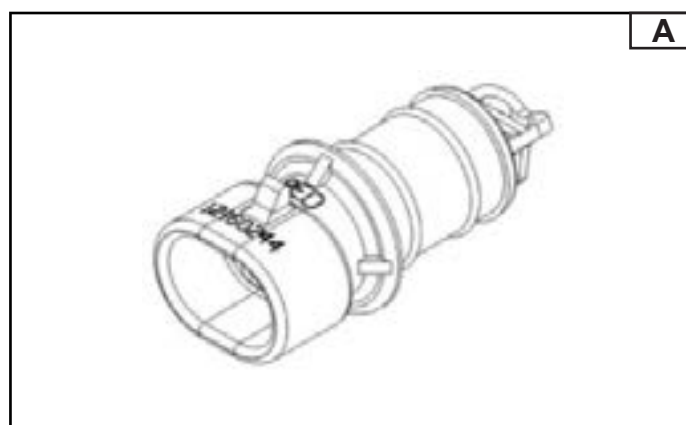
Appearance of the air temperature sensor Fig. A:

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

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





SENSORS

SIDE STAND SWITCH

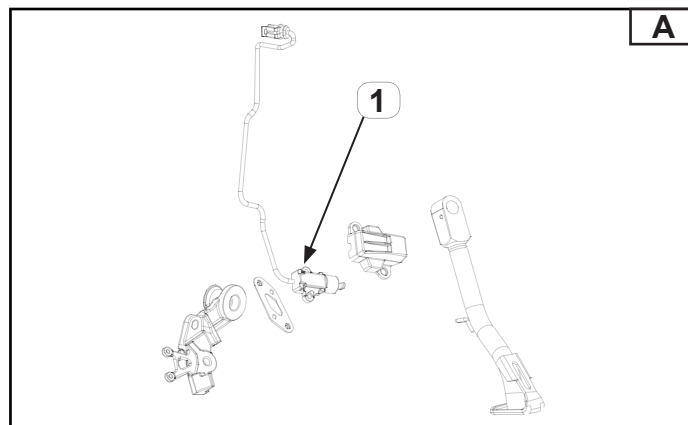
It is situated near the supporting plate of the side stand (1), Fig. A.

If the gear is engaged and the stand is open, and therefore the circuit is open, the ECU prevents starting or shuts off the engine (if rotating).

Check:

- The continuity using the multitester.

STAND	PIN 1	PIN 2
Raised	● — ●	● — ●
Lowered	●	●



NOTE:

If the conditions above are met, the sensor will be operational, if not, replace the part.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

SENSORS

LAMBDA SENSOR

They are situated on the exhaust manifold Fig. A.

The lambda 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

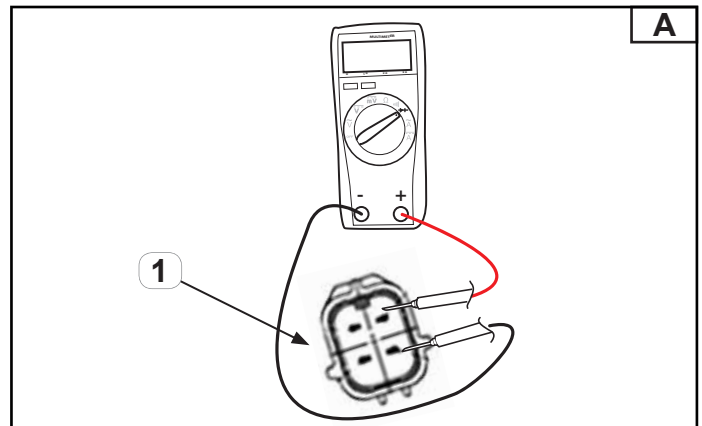
The probe transmits the electric signal to the ECU, which controls the insertion of fuel and air into the combustion chamber.

- Threshold value of air-fuel ratio: >750 mVcc
- Dilute threshold of air-fuel ratio: <120 mVcc.
- Heating power of lambda sensor: 7.0 W.
- 450°C exhaust gas temperature, 70% duty ratio, 10 Hz, 13.5V voltage.
- Heating power: $9.6 \pm 1.5 \Omega$ (measured at 21°C).
- Operating temperature range: $260\text{--}850^{\circ}\text{C}$.

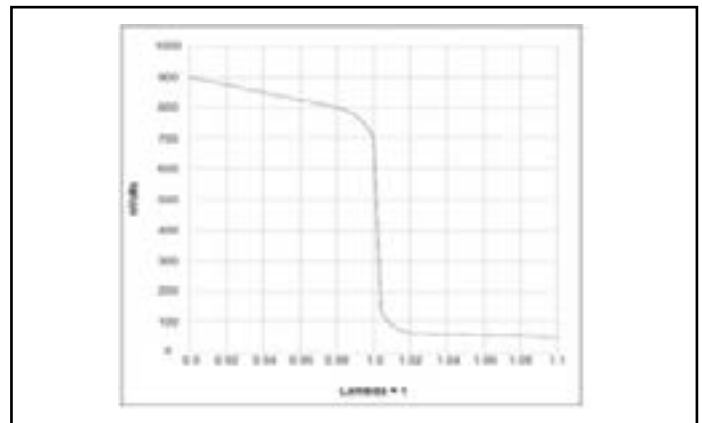
NOTICE

On the electric systems there could be equal connectors for different functions.

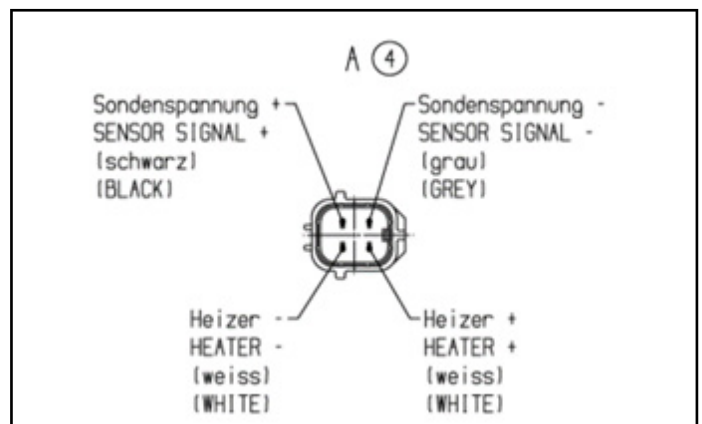
In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



CHARACTERISTIC OPERATING CURVE



COUPLER





SENSORS

OIL PRESSURE SENSOR

On the bottom half crankcase, measure the pressure of the oil in the bush gallery (1) Fig. A.

It indicates the presence of sufficient oil pressure to the dashboard.

Disconnect:

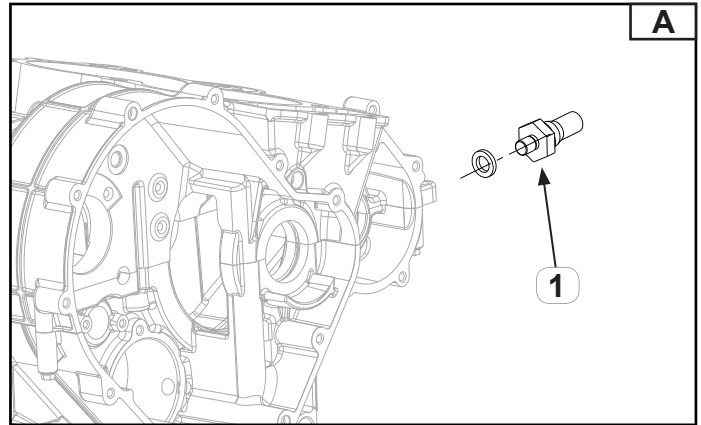
- The electrical coupling.

Remove:

- The oil pressure sensor from the half crankcase.

Check:

- Continuity between pin1 and sensor mass via an air pressure regulator, issued onto the detection hole.
- Set the air pressure regulator at 2 bar.
- Gradually lower the pressure to 0.2 - 0.3 bar.



Continuity between PIN1 and mass	<0.8 - 0.3 bar
----------------------------------	----------------

NOTE: _____

If there is no continuity between PIN1 and engine mass, replace the part.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



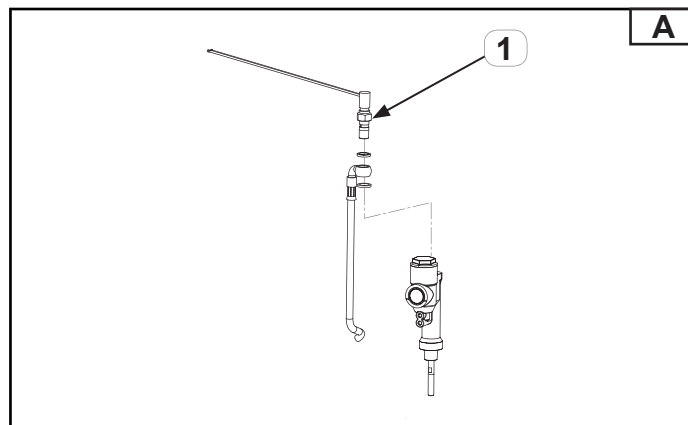
SENSORS HYDROSTOP

It is a switch situated on the rear brake pump, which reads the oil pressure exerted on the pump.
It serves to switch the stop lights on (1) Fig. A.

Check:

- The continuity by positioning the multitester on PIN 1 and PIN 2 and checking the table.

BRAKE	PIN 1	PIN 2
Pulled	● — ●	● — ●
Released	●	●



NOTE:

If the above conditions are met, the front brake sensor is working; if not, replace the part.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



SENSORS CLUTCH SWITCH

On the clutch lever, to ensure that the engine will not start until the lever is completely pulled (1) Fig. A.

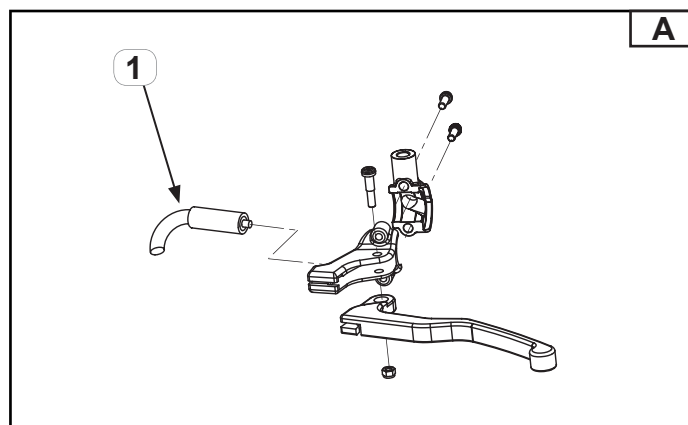
Disconnect:

- The clutch switch cables.

Use:

- The tester and check the table on the clutch switch pins.

CLUTCH	PIN 1	PIN 2
Pulled	● — ●	● — ●
Released	●	●



NOTE: _____

If the above conditions are met, the front brake sensor is working; if not, replace the part.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



SENSORS

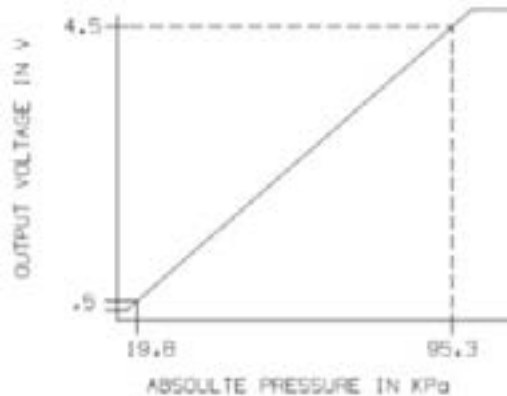
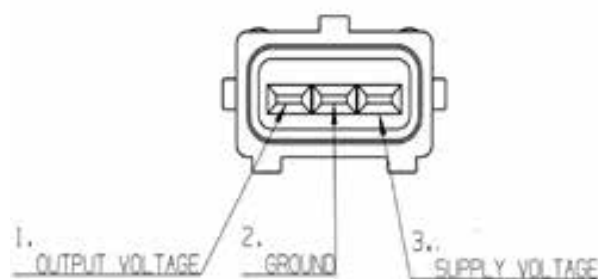
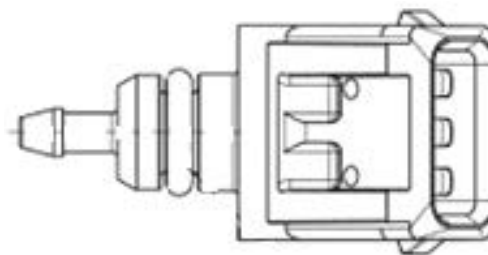
MAP SENSOR (MANIFOLD ABSOLUTE PRESSURE)

It is situated close to the throttle 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.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





SENSORS

THROTTLE BODY POSITION SENSOR (POTENTIOMETER)

It is situated on the right end of the shaft of the throttle body unit.

The position sensor of the throttle body unit (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. A.

Hereunder the various sensor pins are listed:

PIN 1	Power supply: +5 Vcc
Pin 2	Ground: 0
Pin 3	Signal output: 0.5 - 4.5 Vcc

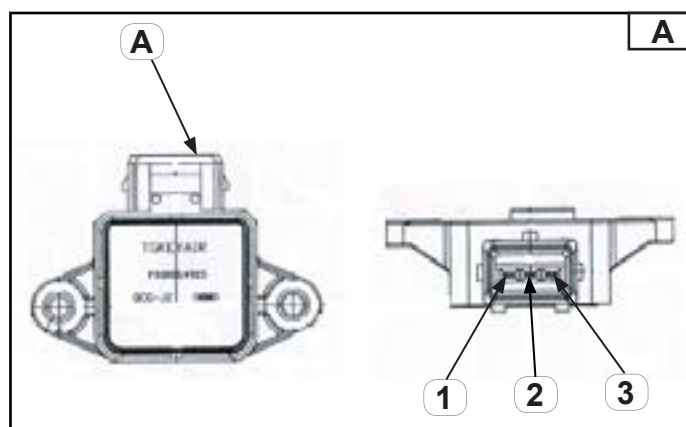
Disconnect:

- The electrical coupling.

Check:

- The resistance using the multimeter on symbol Ω between pin 3 and pin 2.

Throttle location	RESISTANCE
Fully closed throttle	1.050 KΩ $\pm$ 20%
Fully open throttle	2.5 KΩ $\pm$ 20%



NOTICE

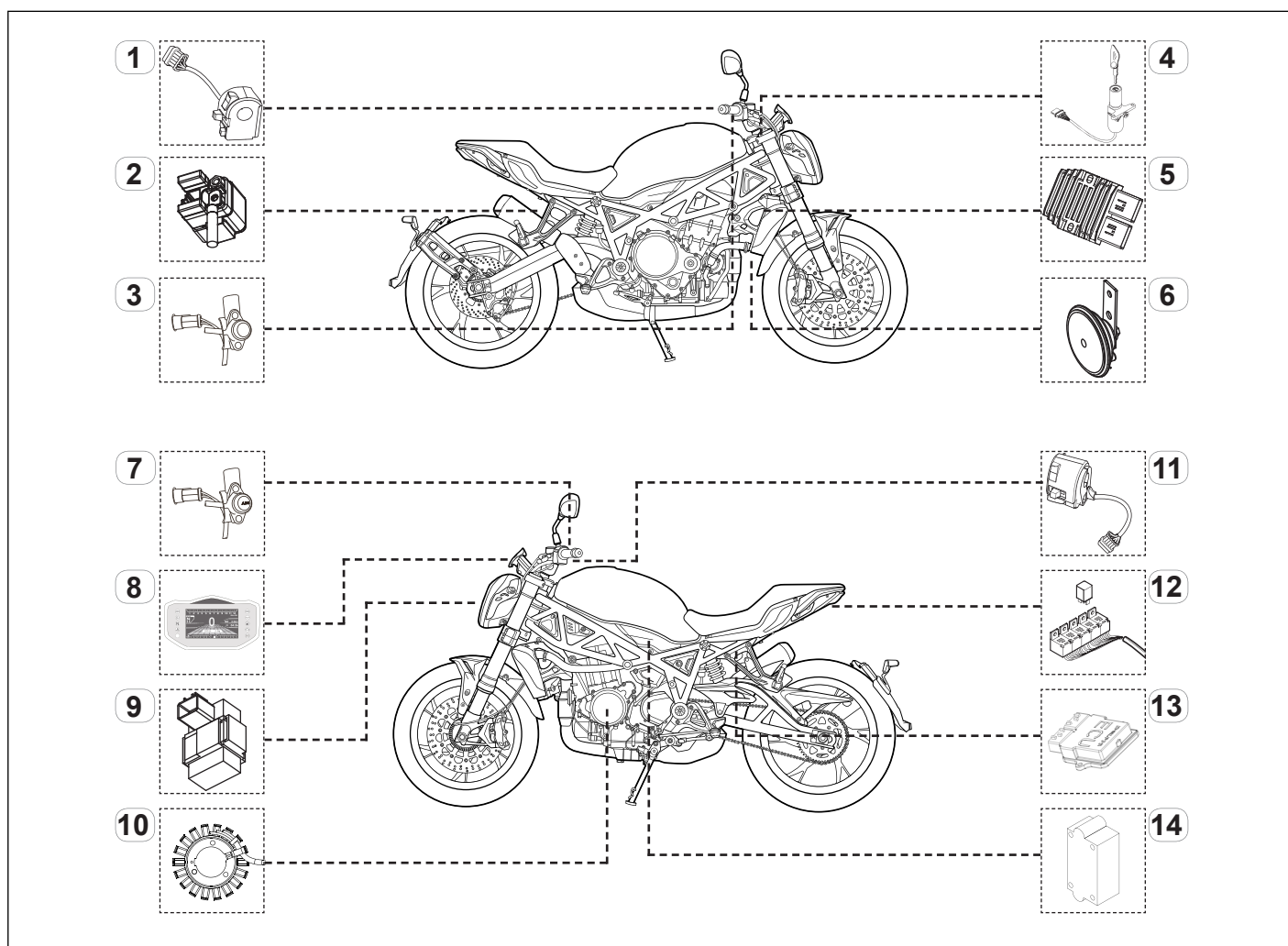
On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



DEVICES

DEVICE POSITION



Position	Device
1	RIGHT ELECTRIC DEVICE
2	STARTER RELAY
3	MULTI-FUNCTION BUTTON
4	IGNITION SWITCH
5	REGULATOR
6	HORN
7	ABS BUTTON
8	INSTRUMENTATION
9	INDICATOR LIGHT CONTROL RELAY
10	STATOR
11	LEFT ELECTRIC DEVICE
12	SERVICES RELAY
13	INJECTION ECU
14	DROP SENSOR

NOTICE

On the electric systems there could be equal connectors for different functions. In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

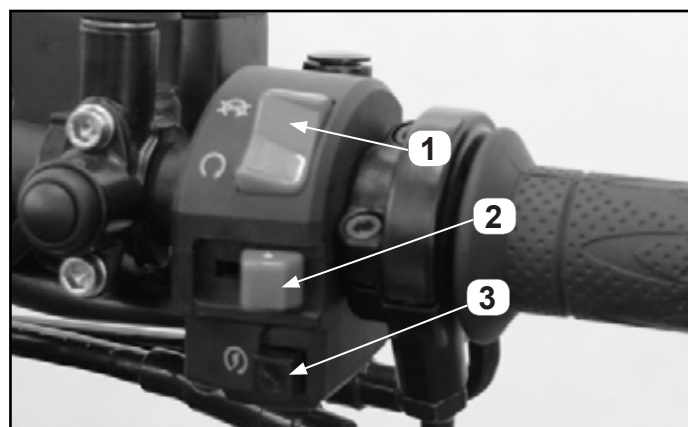


DEVICES

RIGHT ELECTRIC DEVICE

On the right side of the handlebar Fig. A the electrical device is comprised of:

- **RUN/OFF button (1)**
It serves to break contact to the electric device in case of emergency.
- **Hazard lights switch (2)**
It serves to activate the hazard lights in case of emergency.
- **Ignition button (3)**
It serves to start the engine.



Check:

- The continuity
by positioning the multitester on RUN/OFF button located on ON.

Check:

- The continuity
by positioning the multitester on the ignition button pressed on ON.

Check:

- The continuity
by positioning the multitester on the hazard lights switch located on ON.

Refer to the table.

AR/BL	AR/GR	N	R	MR/GR	VE/GL
	1L		1R	2R	2L

NOTICE

On the electric systems there could be equal connectors for different functions.

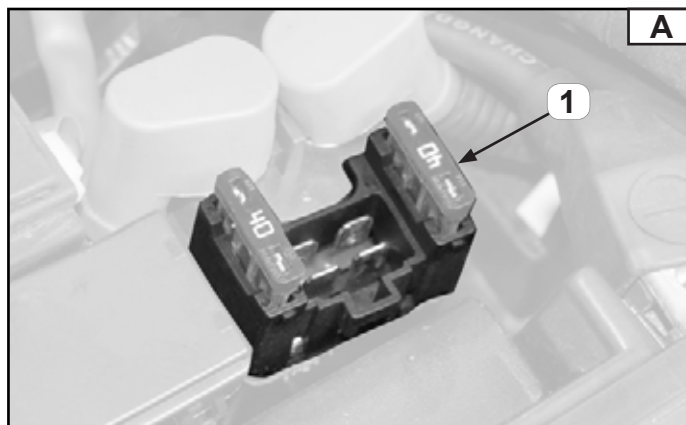
In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



DEVICES

STARTER RELAY (REMOTE CONTROL SWITCH)

It is situated close to the fuse block box and breaks power contact on the starter motor (1) Fig. A.



Apply:

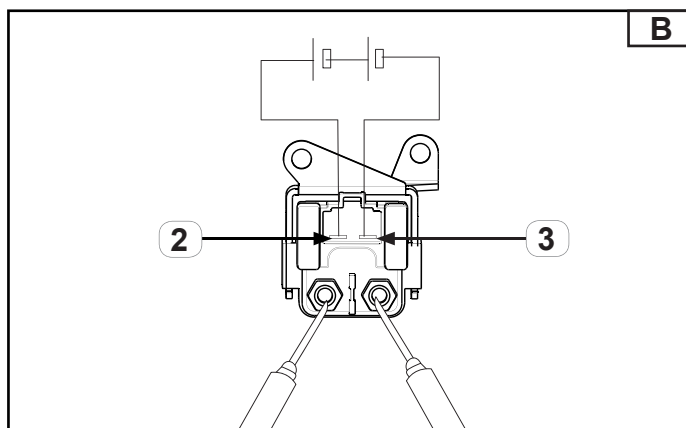
- 12 volt to terminals (2) and (3) Fig. B.

Check:

- The continuity between power terminals.
- In presence of continuity, the starter relay works properly.

WARNING

Do not apply the battery voltage to the starter relay for more than 5 seconds to prevent overheating and damages to winding.



Check:

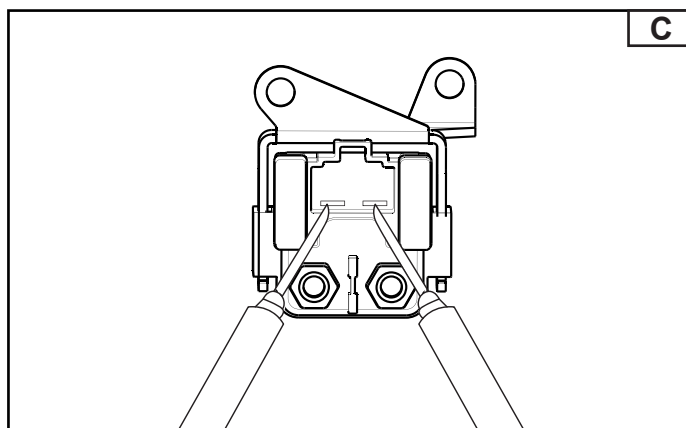
- The winding Fig. C.
- If it is "open" or "grounded" and if there is resistance.
The winding is in good working order if the resistance is:

Starter relay resistance	3 - 6 Ω
--------------------------	----------------

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





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, which serves as acoustic warning device.

Connect:

- PIN1 and PIN2 to the battery and check.

Check:

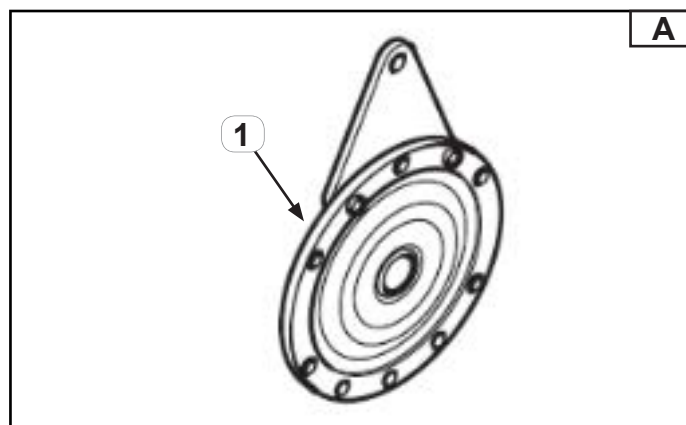
- After the external horn being connected to rechargeable battery, if there is any sound, it refers to normal operation.

Resistance value	3.2 Ω
------------------	--------------

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





DEVICES

INSTRUMENTATION DASHBOARD

Situated on the instrumentation support frame, the instrumentation provides all information concerning the motorcycle operation to the driver Fig. A:

INDICATOR LIGHTS:

- High beam indicator light
- Left turn signal indicator lights
- Right turn signal indicator light
- Neutral position indicator light
- Injection fault indicator light
- ABS light
- Oil pressure warning light
- Water temperature light
- Fuel reserve 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/h or mph.

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 is a connector Fig. B.

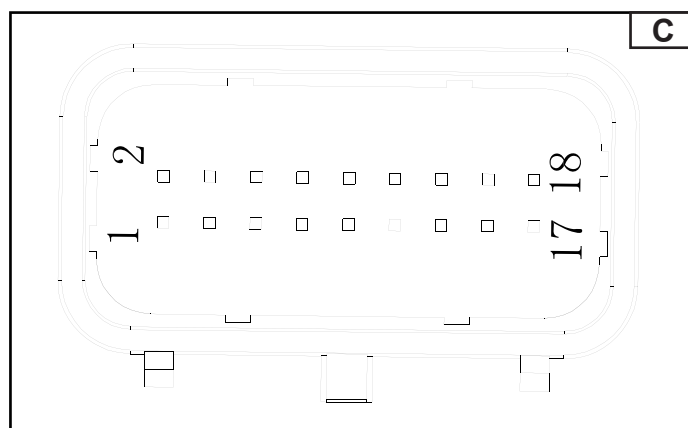
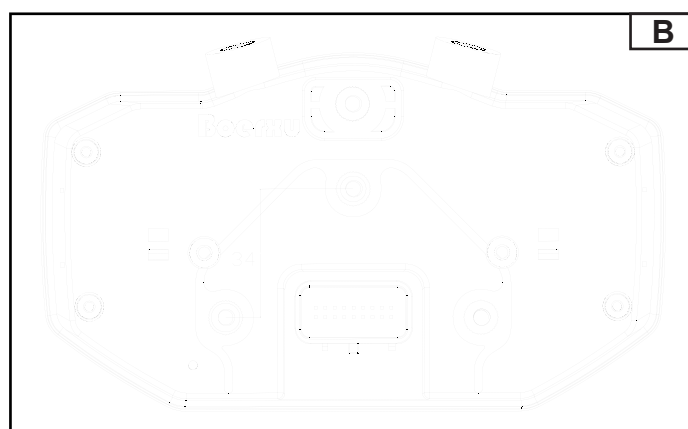
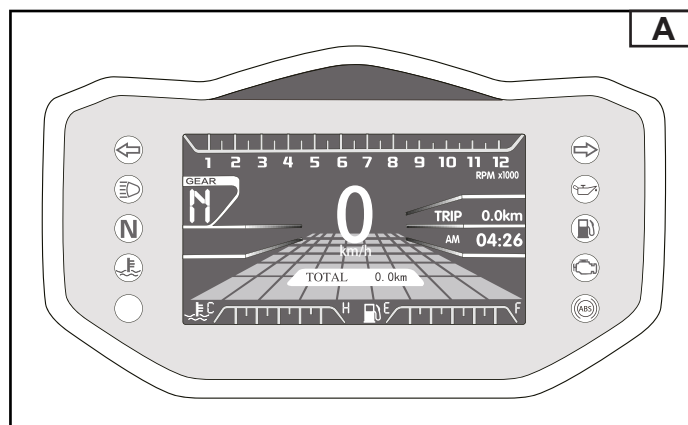
- Connector Fig. C.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

CODE	COLOUR
B	Black
BL	Blue
LBL	Light blue
N	Brown
G	Green
O	Orange
Y	Yellow
R	Red
LR	Pink
W	White
P	Purple
Gr	Grey
LG	Light green





DEVICES

INSTRUMENTATION DASHBOARD

Pos.	Colour	Function	Symbol	Colour/LED
1	R/W	ABS		Yellow
2	N	Gear position		Green
3	G/W	Button		
4	O/W	Fuel level 1		
5	N/Y	Check engine light		Yellow
6	P	High beam		Blue
7	B/P	Engine oil pressure		Red
8	W/B	Tachometer		
9	N/BL	Left turn indicator		Green
10	G/Gr	Speed		
11	B	Right turn indicator		Yellow
12	LR/Y	Gear position 2		
13	R/BL	Coolant temperature		
14	BL/P	Fuel level 2		
15	O/B	Ground		
16	BL	Ground		
17	R/BL	Ignition		
18	LR/BL	Battery		



DEVICES MASTER SWITCH

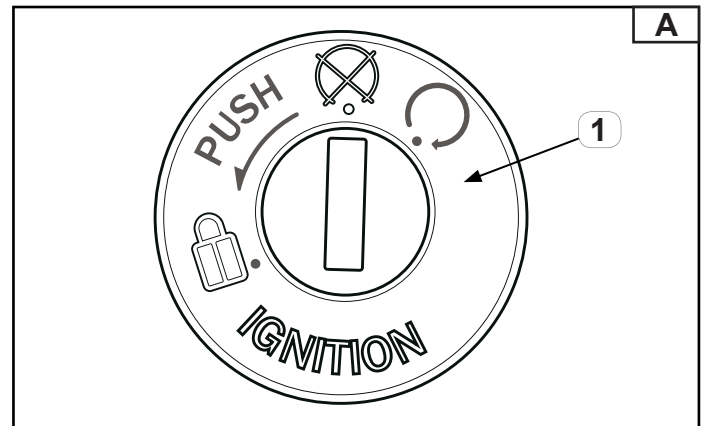
The ignition switch (1) Fig. A, is positioned behind the steering sleeve and serves to:

- Provide the main contact to the electrical system
- Close the steering block.
- Keep the parking lights on for all conditions required.

Check:

- The continuity using the multitester and referring to the table.

COLOUR	V/G	R/B
PIN	PIN 1	PIN 2
Key ON	● ——— ●	
Key OFF		
Lock		



When the above conditions are fulfilled, the ignition switch is working properly, otherwise replace the part.

- **Key set to “ON”**

All electric circuits are activated, the instrumentation and the lights carry out the self-diagnostics. The engine can be started. The key cannot be removed.

- **Key set to “OFF”**

All electric circuits are deactivated, the key can be removed.

- **Key set to “LOCK”**

All electric circuits are deactivated and the steering is locked. The key can be removed.

NOTICE

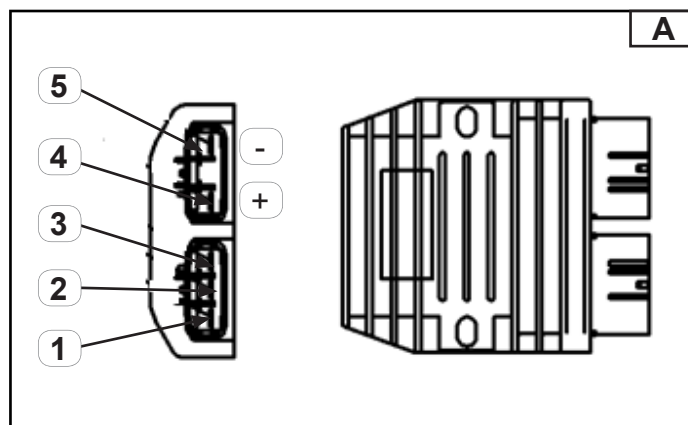
On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

DEVICES

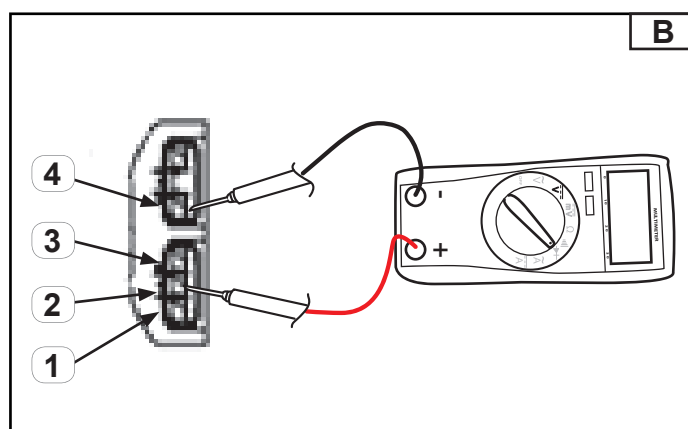
VOLTAGE REGULATOR

It is in the middle of the vehicle, underneath the throttle body and allows balancing of electrical consumption via the battery re-charge.

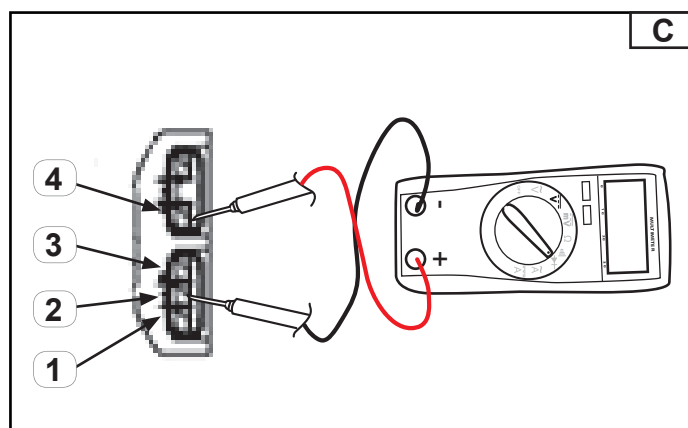


Multimeter selection: diode test.

1. Connect the black probe to the red line terminal (4) of voltage regulator. Connect the red probe to the white line terminal of voltage regulator (white 1, white 2 and white 3) Fig. B.
If the gauge shows the value ∞ on the three pins, the regulator is valid.
The gauge shows a value (range 0.3~0.8V) on the three pins when the regulator is damaged and must be replaced.



2. Connect the red probe to the red line terminal (4) of voltage regulator. Connect the black probe to the white line terminal of voltage regulator (white 1 - 2 - 3) Fig. C.
If the gauge shows the value ∞ on the three pins, the regulator is valid.
The gauge shows a value (range 0.3~0.8V) on the three pins when the regulator is damaged and must be replaced.



NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



DEVICES

LEFT ELECTRIC DEVICE

On the left side of the handlebar Fig. A the left electrical device is comprised of:

- **Light change-over control (1)**

Deviator to switch from full beam to dipped beam.

- **Turn signal indicator lights control (2)**

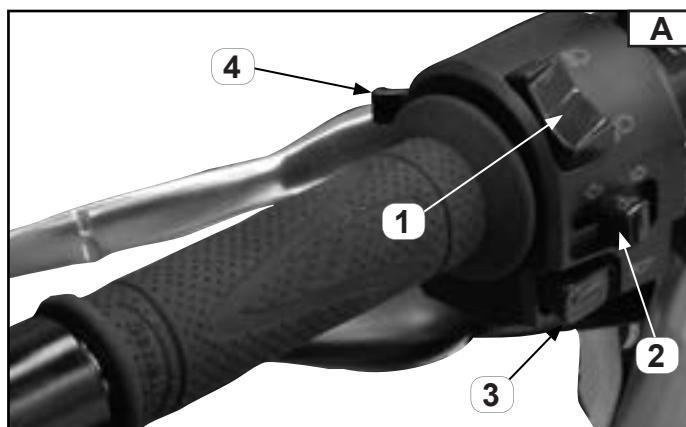
By moving the control to the right or to the left, the relevant indicator lights are activated. The control returns to the centre. Press to deactivate the turn signal indicator lights.

- **Horn button (3)**

Press to activate the horn.

- **High beam flash button (4)**

It is used to signal the presence in conditions of poor visibility.



Check:

- The continuity using the multimeter positioned on the relevant terminals with the button pressed.

Check:

- The continuity by positioning the multimeter on the relevant terminals with the button pressed.

Check:

- The continuity using the multimeter positioned on the relevant terminals according to selection (left/right).

Check:

- The continuity using the multimeter positioned on the relevant terminals according to selection (high/dipped beam).

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

Refer to 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	● — ●								
High beam flash button	● — ●		●						
Horn								● — ●	

When the above conditions are fulfilled, the horn, the light switching control, the high beam flash button are operating properly, otherwise replace the parts.



DEVICES

DROP SENSOR

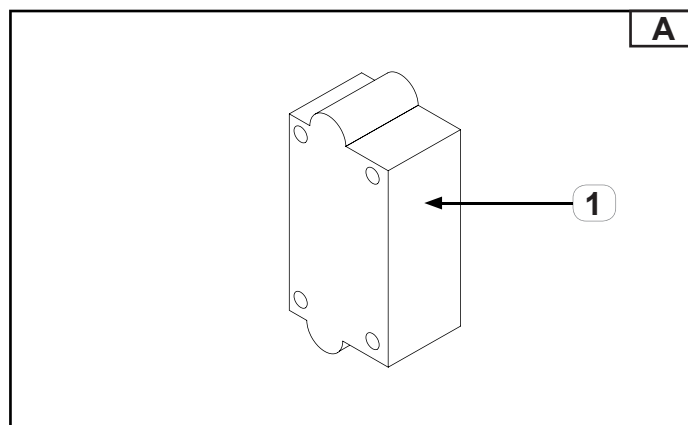
Situated close to the rear frame, in case of falling, it cuts off the fuel supply to the injection system (1) Fig. A.

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.



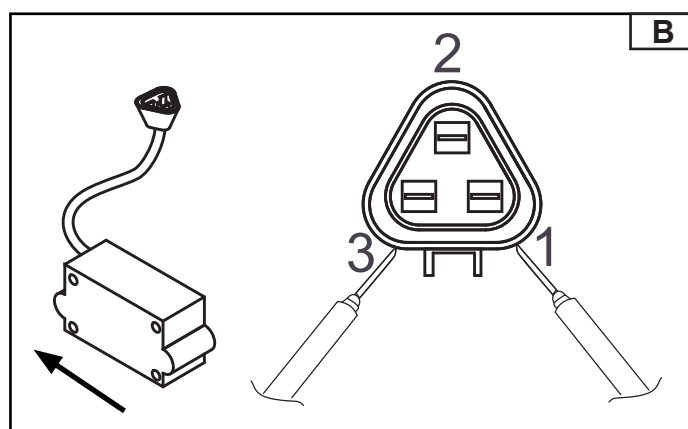
Insert:

- 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).

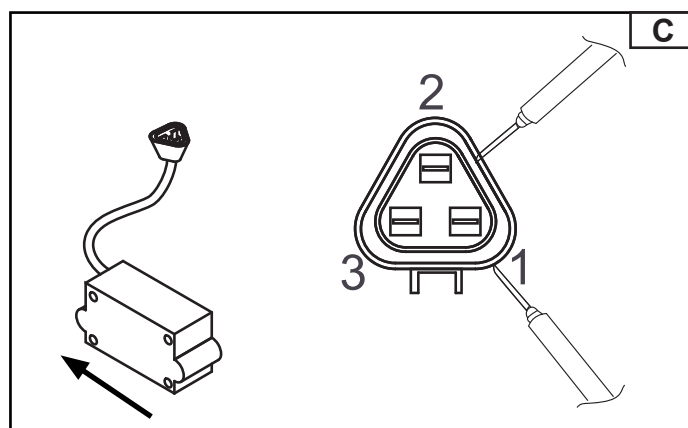


Insert:

- 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 or more Vcc).



If the check between the pin 2 and the pin 1 is positive, place the drop sensor in vertical position Fig. D.

Insert:

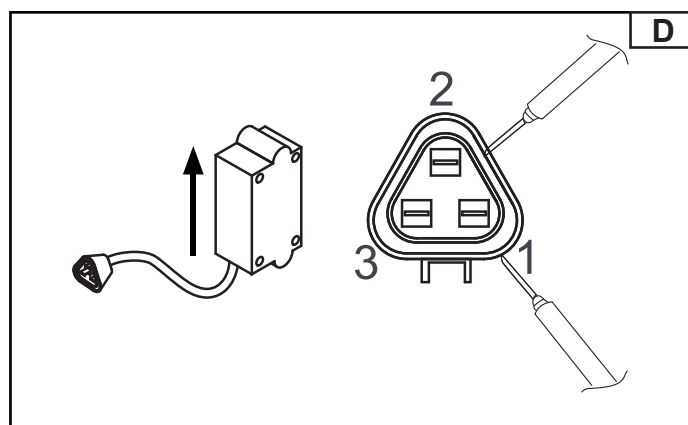
- The red tip of the multimeter (+) into the pin 2 Fig. D.
- The black tip of the multimeter (-) into the pin 1 Fig. D.

Check:

The voltage between the pin 2 and pin 1 must be below 2Vcc.

NOTICE

When the above conditions are fulfilled, the drop sensor is working properly, otherwise replace the part.





DEVICES

DROP SENSOR

NOTE:

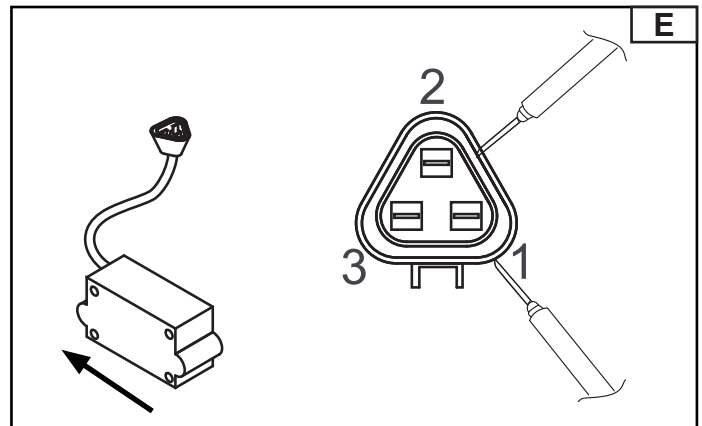
Every time the sensor is positioned vertically, it activates and the output voltage from pin 2 goes below $\frac{2}{3} V_{cc}$, the ECU memorizes such condition and to proceed with motor starting it is necessary to proceed as described below.

- 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 Fig. E.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





DEVICES INJECTION ECU

Check the various utilities situated close to the seat.
Refer to the diagram below.

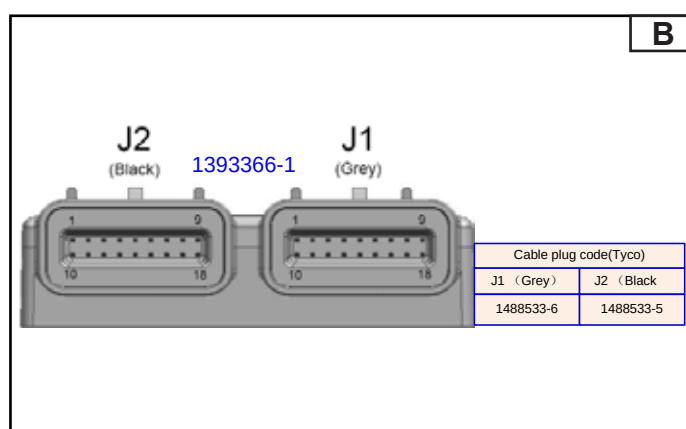
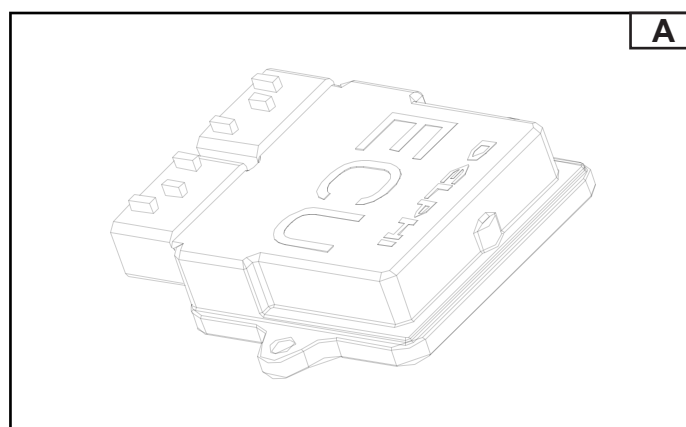
NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

Hereunder is a table containing the list of the various PINs Fig. B.

PIN	DESCRIPTION
J1-1	Idle STEPPING MOTOR A HIGH
J1-2	CARBON CANISTER SOLENOID VALVE
J1-3	MIL
J1-4	O2 SENSOR HEATER CYLINDER 2
J1-5	CYLINDER 2 O2 SENSOR SIGNAL
J1-6	TACHOMETER
J1-7	CAN signal LOW
J1-8	CAN signal HIGH
J1-9	GROUND
J1-10	Ignition COIL drive (cylinder 2)
J1-11	IDLE STEPPING MOTOR A LOW
J1-12	IDLE STEPPING MOTOR B HIGH
J1-13	IDLE STEPPING MOTOR B LOW
J1-14	Roll over sensor
J1-15	SPEED sensor
J1-16	
J1-17	
J1-18	NEUTRAL/CLUTCH switch
J2-1	Ignition COIL DRIVE A (cylinder 1)
J2-2	POWER (system) GROUND
J2-3	KW2000
J2-4	23X signal LOW
J2-5	INJECTOR A
J2-6	INJECTOR B
J2-7	O2 SENSOR HEATER CYLINDER 1
J2-8	INTAKE AIR TEMP signal
J2-9	FUEL PUMP CONTROL signal
J2-10	5V GROUND
J2-11	Intake air pressure signal
J2-12	Throttle position signal
J2-13	23X signal HIGH
J2-14	COOLANT TEMP signal
J2-15	KEY SWITCH POWER



J2-16	5V (REFERENCE VOLTAGE)
J2-17	CYLINDER 1 O2 SENSOR SIGNAL
J2-18	BATTERY POWER



DEVICES

INJECTION ECU

Hereunder is a table indicating the meaning corresponding to the error code detected.

ERROR TABLE	
Code error	Error description
P0030	1st oxygen heater cylinder - open/short circ.
P0031	1st oxygen heater cylinder - ground open/short circ.
P0032	1st oxygen heater cylinder - positive open/short circ.
P0053	1st resistance oxygen heater coil cylinder - abnormal value
P0036	2nd oxygen heater cylinder - open/short circ.
P0037	2nd oxygen heater cylinder - ground open/short circ.
P0038	2nd oxygen heater cylinder - positive open/short circ.
P0059	2nd resistance oxygen 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 - short circuit to ground
P0262	1st injector - positive short circuit
P0202	2nd injector - open circuit
P0264	2nd injector - short circuit to ground
P0265	2nd injector - positive short circuit
P0321	Crankshaft position sensor - failure (out of range)
P0322	Crankshaft 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) - short circuit to ground

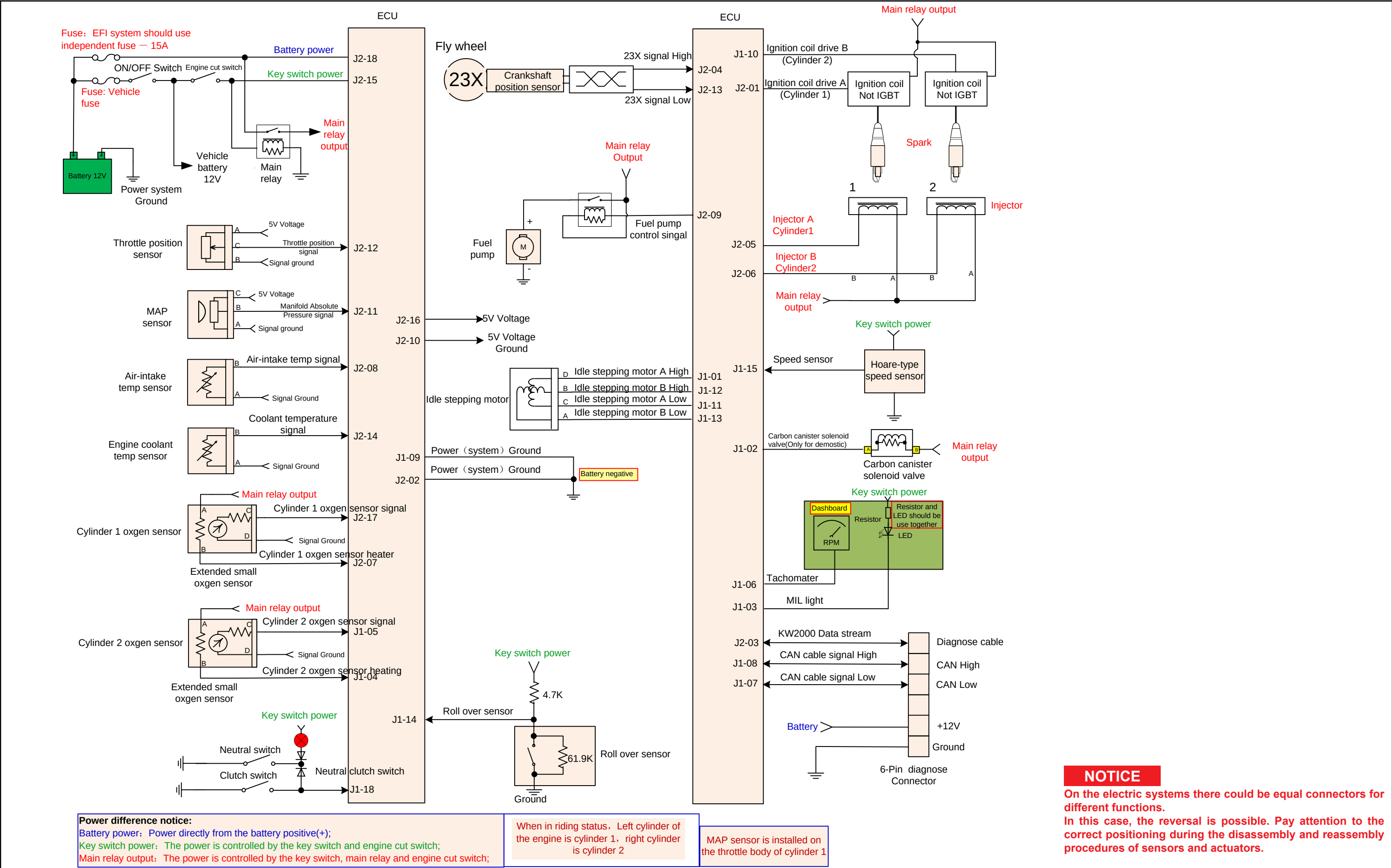


DEVICES

INJECTION ECU

ERROR TABLE	
Code error	Error description
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

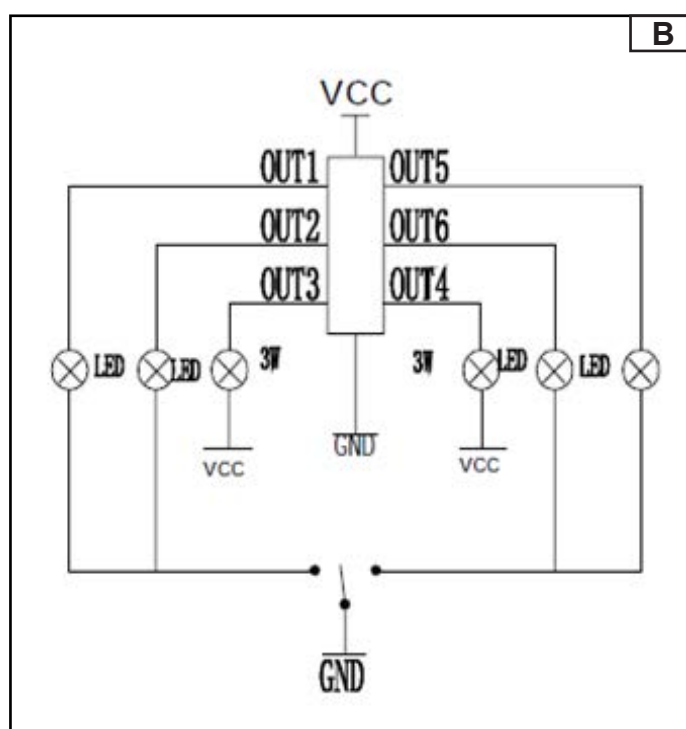
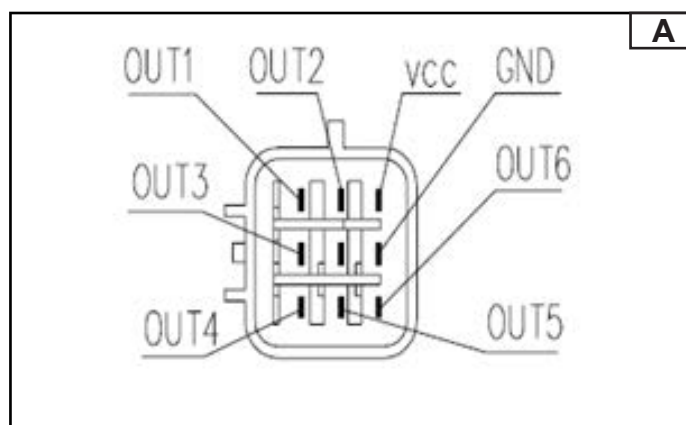
INDICATOR LIGHT INTERMITTENCE

It is situated inside the storage compartment, underneath the vehicle seat, and allows to control the indicator flashers.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





DEVICES

ABS BUTTON

It is situated on the left side of the control handlebar (3) Fig. A, the ABS button allows the management of the insertion/release of ABS control.

Disconnect:

- The electrical coupling.

Check:

- The resistance using the multimeter on symbol Ω between pin 1 and pin 2.

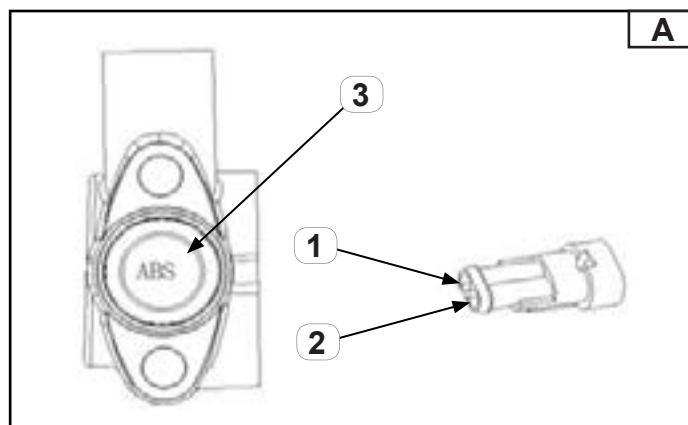
Resistance:

- 0Ω

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





DEVICES SERVICES RELAY

Situated inside the storage compartment, underneath the vehicle seat, the relay assembly Fig. A 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".
Check the resistance 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	● — ●		● — ●

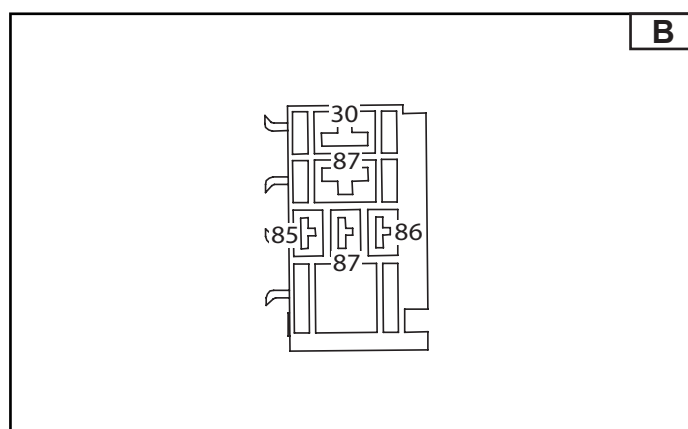
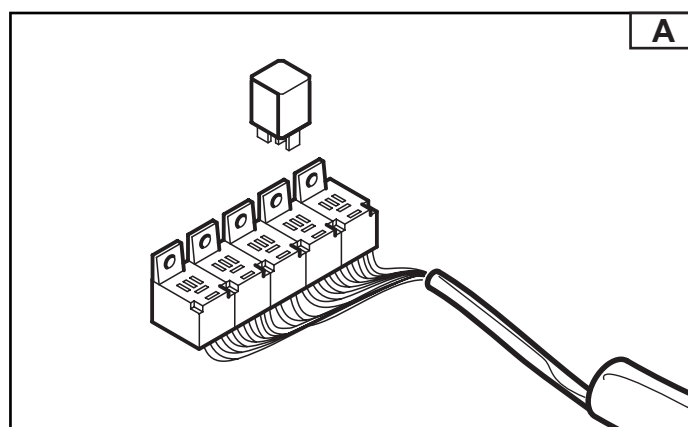
NOTE:

When the above conditions are fulfilled, the relays are operating properly, otherwise replace the parts.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





DEVICES STATOR

There are three types of failures of magneto electric generator (stator) Fig. A:

- **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.

Close the ignition switch.

Disconnect:

- The connector of the 3-pole magneto electric generator.

Measure:

- The resistance value among the three black terminals of the magneto electric generator with a multimeter.

Standard	$0.25 \pm 0.1 \Omega$ a 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 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 short-circuit of coil and engine. And it needs to check the charge coil.
- If the resistance of stator coil is normal, but the voltage check detects a failure of the magneto electric 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 magneto electric generator.

Range of tester	Wiring		Reading at 5000 rpm
	Tester (+) a	Tester (-) a	
750 V AC	Black wire	Another black wire	55 V or higher

NOTE:

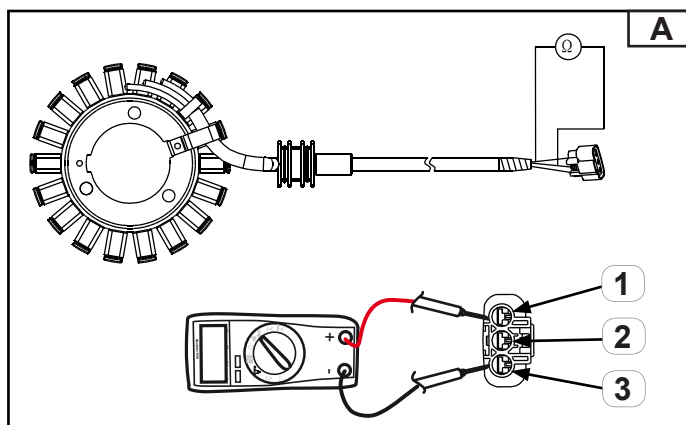
If the output voltage indicated is within the value of the table, the magneto electric generator works properly.

If the output voltage indicated is much lower than the value within the value of the table, problems occur on the generator.

NOTICE

On the electric systems there could be equal connectors for different functions.

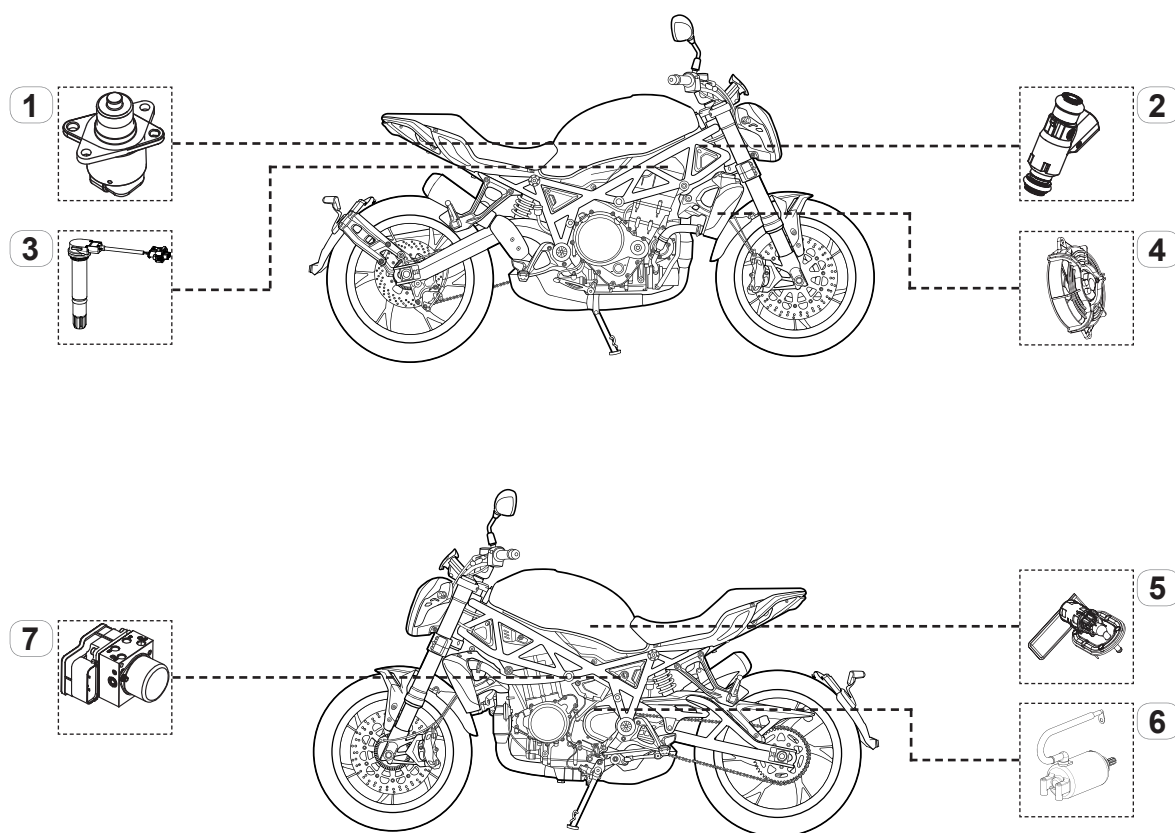
In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





ACTUATORS

ACTUATOR POSITIONS



Position	Device
1	STEPPER
2	INJECTORS
3	IGNITION COILS
4	COOLING FAN
5	FUEL PUMP
6	STARTER MOTOR
7	ABS ECU

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



ACTUATORS

IDLE AIR CONTROL SYSTEM (STEPPER)

The system is situated inside the air filter case, contains a valve for checking air flow underneath the throttle body throttles and is equipped with a stepper motor.

The system controls the following parameters:

- **Idle speed.**
- **Air supply in the event of engine overspeed.**
- **Correction of the air/fuel ratio operating at minimum speed and altitude above sea level.**
- **Correction of the air/fuel ratio for cold hot starts.**

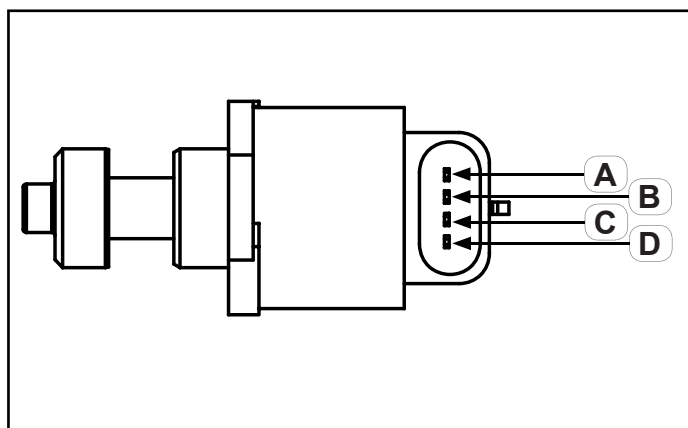
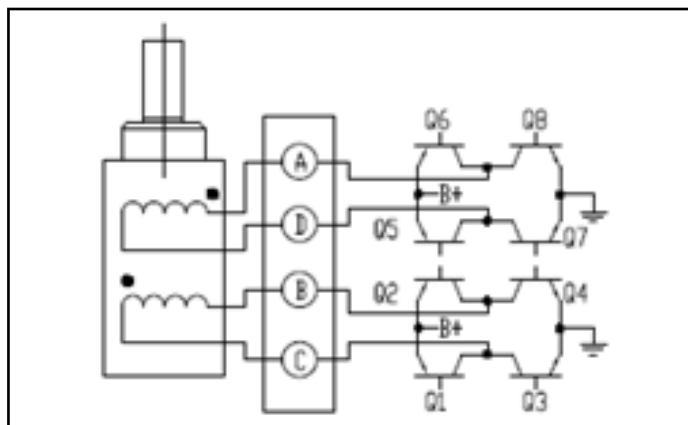
When the stepper motor is activated, it opens the valve that controls the air flow and allows a certain air flow to run off along a series of hoses in the throttle body unit.

Operating voltage	12 V DC
Minimum /maximum operating voltage	14V DC/ 7.5V DC
Impedance per coil (27°C)	53 ± 5.3 Ω
Minimum impedance	35 Ω
Step	0.04167 mm
Maximum travel	8.5 mm (200 steps)
Resonant frequency range	20-120 pps

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



					PINS			
STEP	Q6-Q7	Q5-Q8	Q1-Q4	Q2-Q3	STEP	A	B	C
1	ON	OFF	ON	OFF	1	+	-	+
2	ON	OFF	OFF	ON	2	+	-	-
3	OFF	ON	OFF	ON	3	-	+	-
4	OFF	ON	ON	OFF	4	-	+	+
1	ON	OFF	ON	OFF	1	+	-	+

Motor 4 steps drive control table



ACTUATORS INJECTORS

They are positioned on the throttle body unit.
The engine is equipped with three four-jet injectors (1), Fig. A.
The amount of jet of the injectors is constant, but the duration of time during which each injector remains open is variable.
The duration of each injection is calculated via ECM according to the data received from the various system sensors.

Disconnect:

- The electrical coupling.

Check:

- The resistance
- using the multitester on symbol Ω between PIN1 and PIN2 (2), Fig. B.

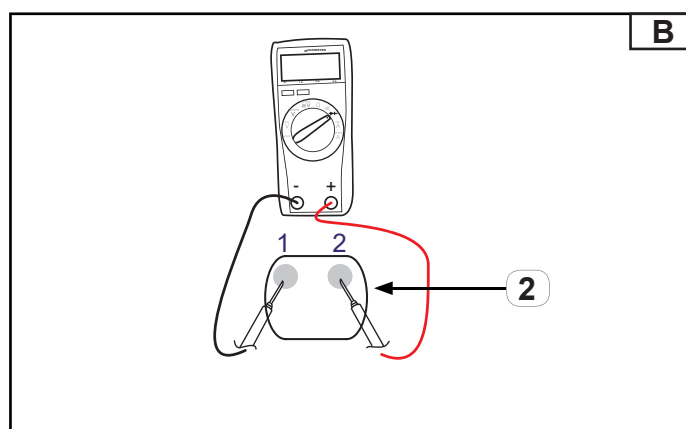
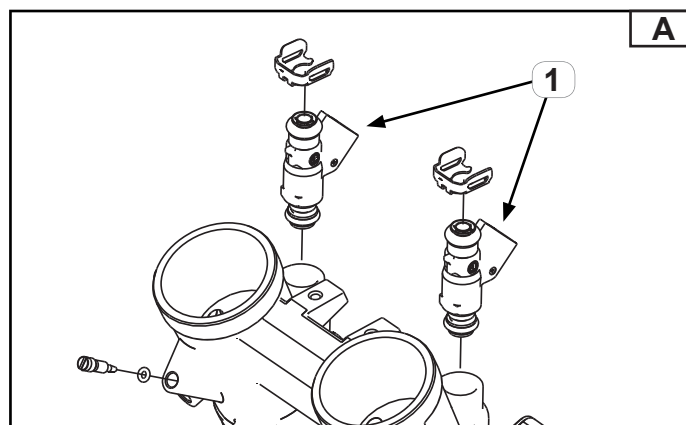


Resistance
$12 \pm 2 \Omega$

NOTICE

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In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





ACTUATORS IGNITION COILS

Directly above the head of each spark plug (1) Fig. A the ignition coil makes available the high voltage and ignition energy needed to produce sparks at high voltage among the spark plug electrodes.

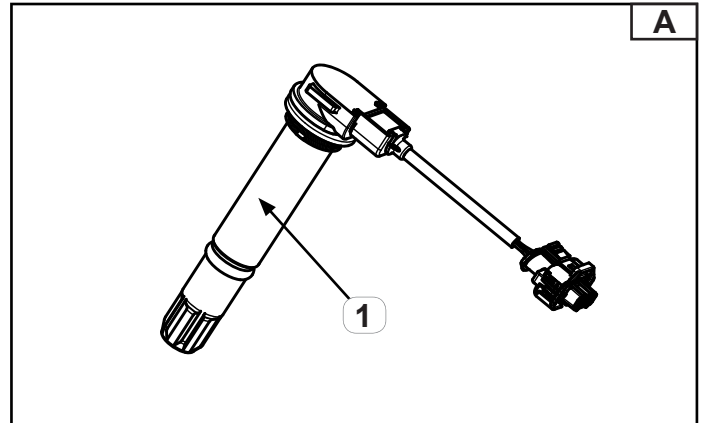
Check:

- 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.



NOTICE

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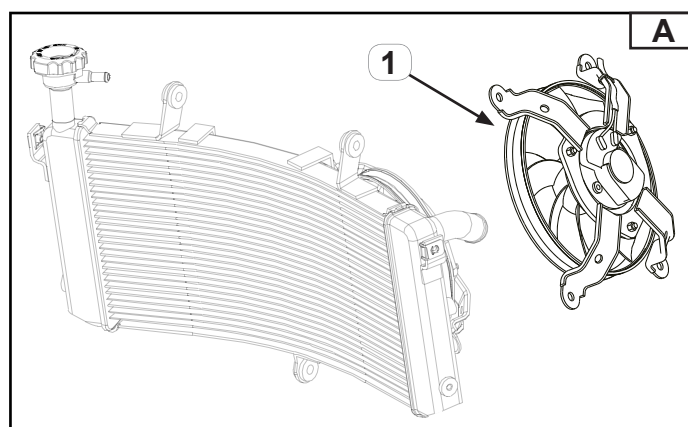


ACTUATORS COOLING FANS

The ECM is on the radiator body (1) Fig. A and activates/deactivates the cooling fans according to a signal received from the cooling fluid temperature sensor.

When the cooling fluid temperature reaches the upper-tier temperature, the cooling fans are activated via command.

When the cooling fluid temperature lowers enough (lower-tier temperature), the coolant fans are activated via command by the ECM.



Check:

- The load current of the fan motor by connecting an ammeter, as shown in Fig. B.

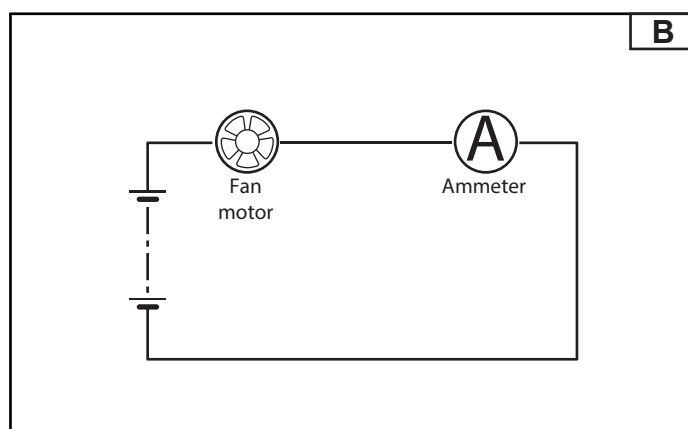
The voltmeter serves to check that the battery powers the 12 volt motor.

When the fan rotates at the highest speed, the ammeter must show no more than 5 Amps.

If the motor does not rotate, replace the motor unit of the fan.

NOTE:

To perform the above test, it is necessary to remove the cooling fan from the radiator.



NOTICE

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In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



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 bar.

The ECM controls the pump operation directly, by ensuring the correct fuel pressure necessary for starting the engine from the first activation of the instrument panel via a timed function, and a continuous operation for the normal use of the vehicle.

Check:

- The fuel pump (1) Fig. A.

1. Put an outlet pipe into a container to let the fuel flow out Fig. A.

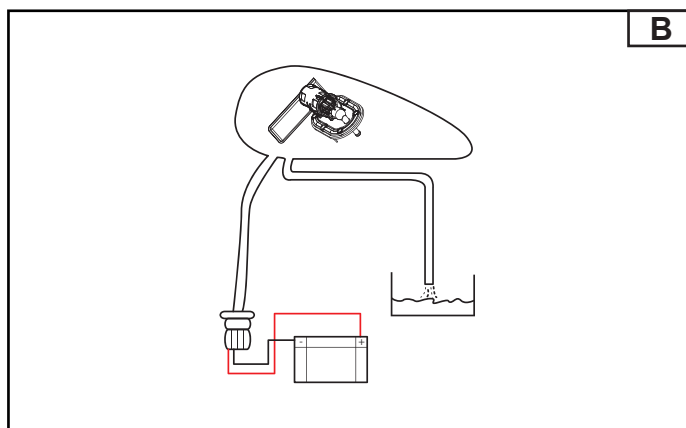
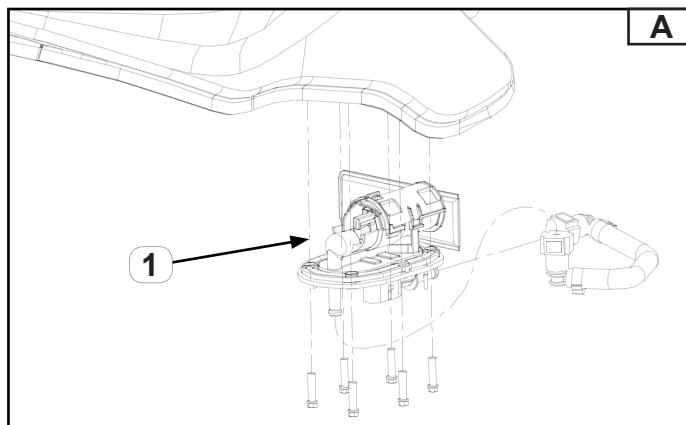
2. Connect the battery (12 V) to the fuel pump Fig. B.

- RED/BLACK positive wire +
- BLACK negative wire -

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

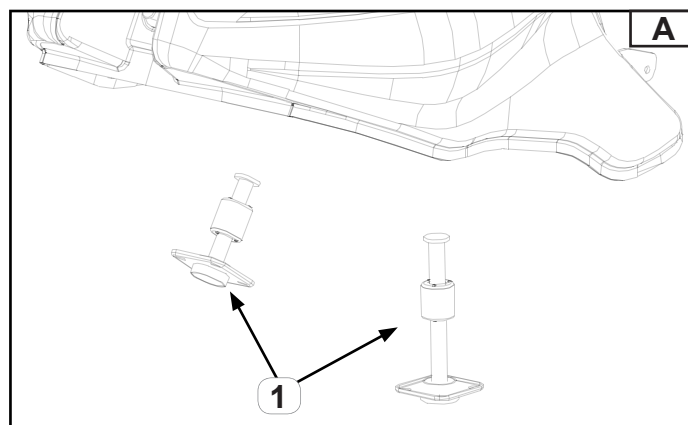




ACTUATORS

FUEL LEVEL SENSOR

Situated close to the fuel pump (1) Fig. A and provides an outlet value of variable resistance according to the present fuel level.



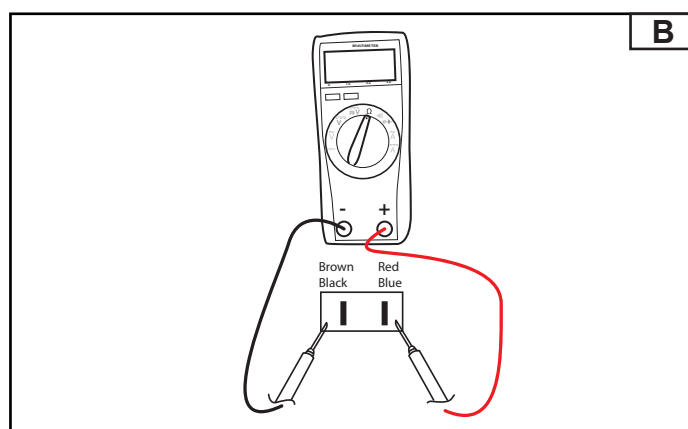
Check:

- The resistance depending on fuel level Fig. B by positioning the multimeter on symbol Ω between the PIN 1 - PIN 2.

NOTICE

On the electric systems there could be equal connectors for different functions.

In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.





ACTUATORS STARTER MOTOR

The starter motor (1) Fig. A, is a part that can be replaced totally. If the starter motor 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.

NOTE:

Reading should be max 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.

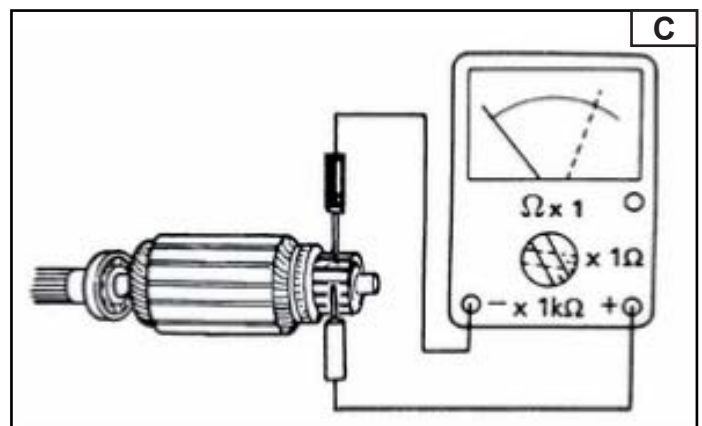
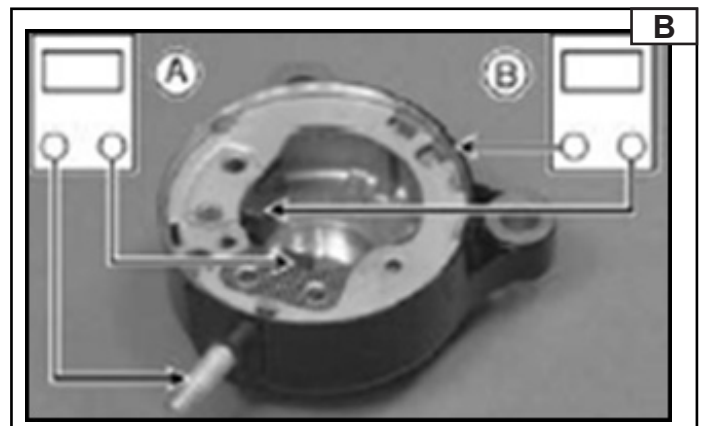
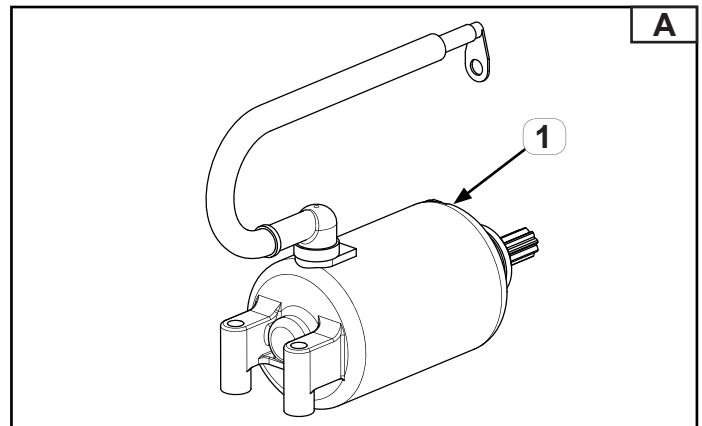
Measure:

- The resistance between each segment of the switch Fig. C. A digital multimeter is used for measurement.

NOTE:

Reading should be max 3 ohm.

Continuity of lower framework	
Lower framework	3 Ω at 20°C (68°F)





ACTUATORS STARTER MOTOR

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 motor.

- 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:

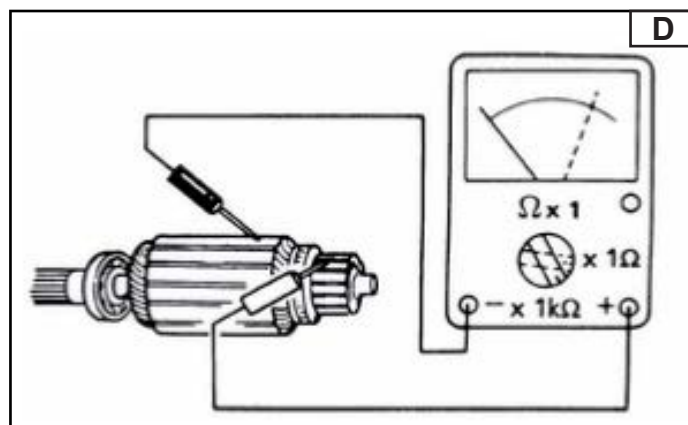
If the saw blade is attracted towards a pole of the framework, the latter has a short circuit and must be replaced.

Check:

- The permanent magnets in the starter motor housing.

NOTE:

Make sure they are not cracked or far away from the housing.





ACTUATORS

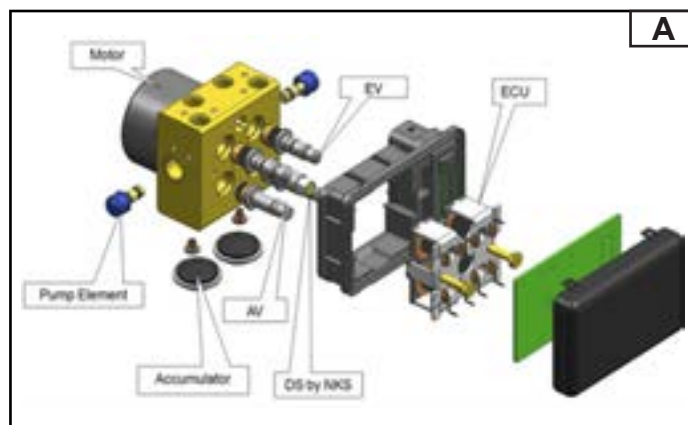
ABS ECU

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. This kind of shock may damage 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 normal performance of the brake. 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.

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

ABS ECU

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 signal wheel for deformation or faults.
5044	
5025	Check speed sensors, distance, signal wheel, and tire specifications.
5122	Replace ABS unit.
5223	

NOTICE

On the electric systems there could be equal connectors for different functions.

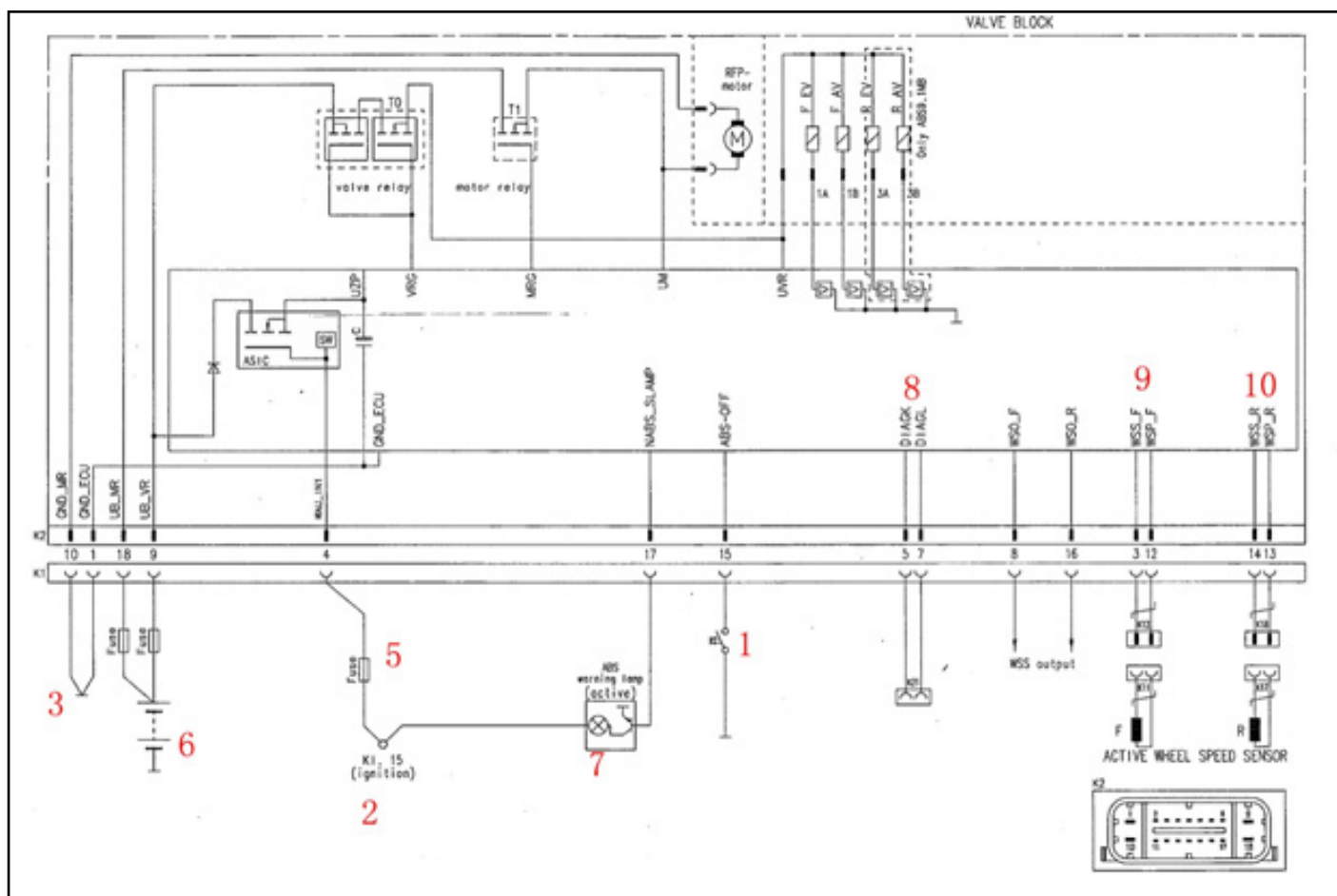
In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.



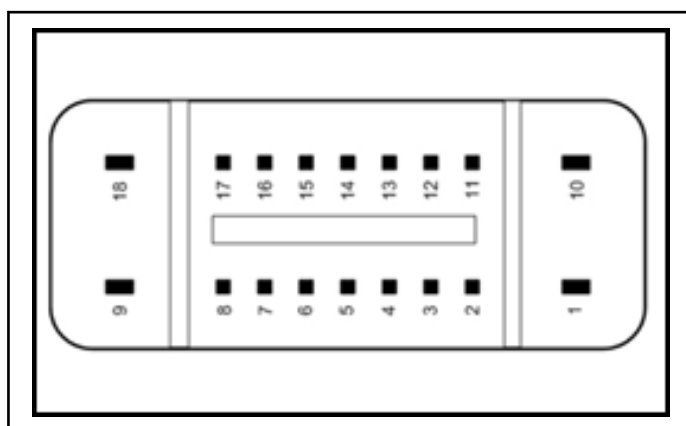
ACTUATORS

ABS ECU

Diagram



Position	Code
1	GND_ECU
2	CAN1P
3	WSS_F
4	WU_IN1
5	DIAGK
6	BLS - input_PD -SW2H_NO
7	DIAGL
8	WSS_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	WSS_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:

- The seat, refer to the section “**Removal of the seat, Chapter 4**”.

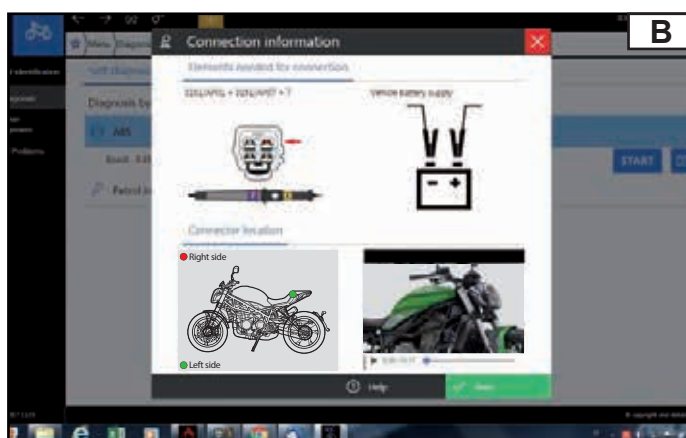
Connect:

- The diagnostic ECU pin to the female connector situated on the motorcycle Fig. A.



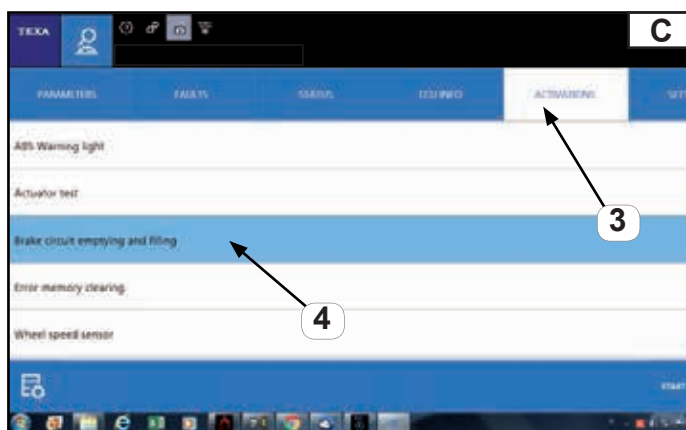
Follow:

- 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.

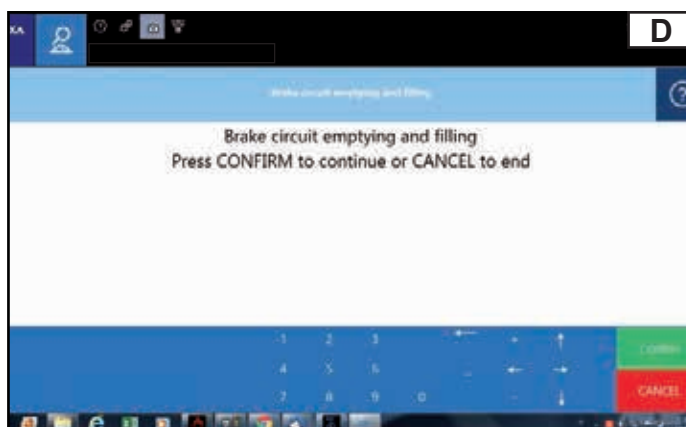
Select “Brake circuit emptying and filling” (4) Fig. C.



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.

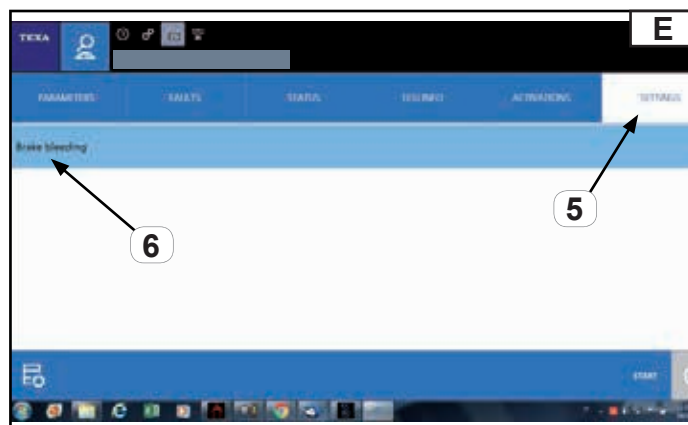
Follow:

- The instructions of the diagnostic device.

NOTICE

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BATTERY VEHICLE BATTERY

NOTICE

Do not use batteries other than the indicated ones (1) Fig. A.

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.

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.

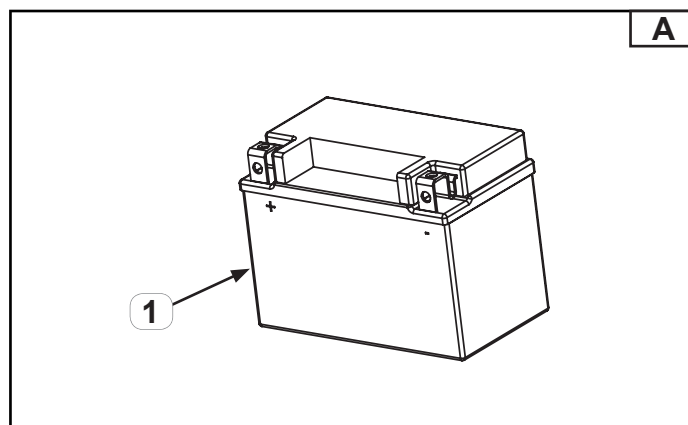
At the end of connection, grease slightly.

Mount a cap on the positive terminal.

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BATTERY

CHECK OF BATTERY EFFICIENCY

CHECK OF BATTERY CURRENT LOSSES

Connect:

- The multimeter between the negative terminal and the negative wire of the battery as ammeter in direct current Fig. A.

NOTICE

Since the current losses may be high in case of malfunctioning, use a high range of the multimeter first to prevent damages.

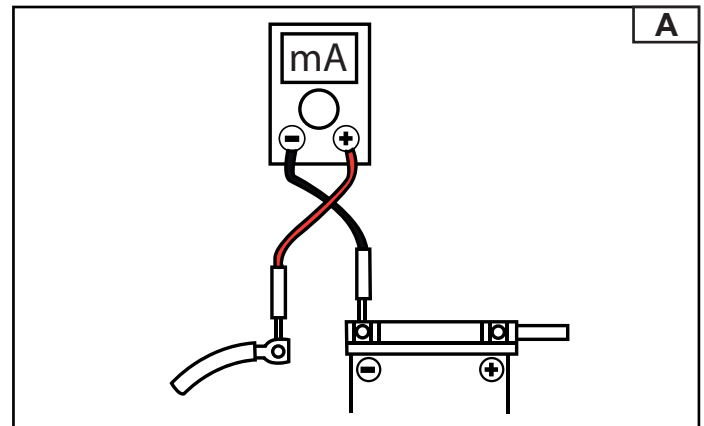
Do not position the ignition switch to ON whilst measuring the current.

When the panel is off, the current losses must be $\leq 2 - 2.5$ mA.

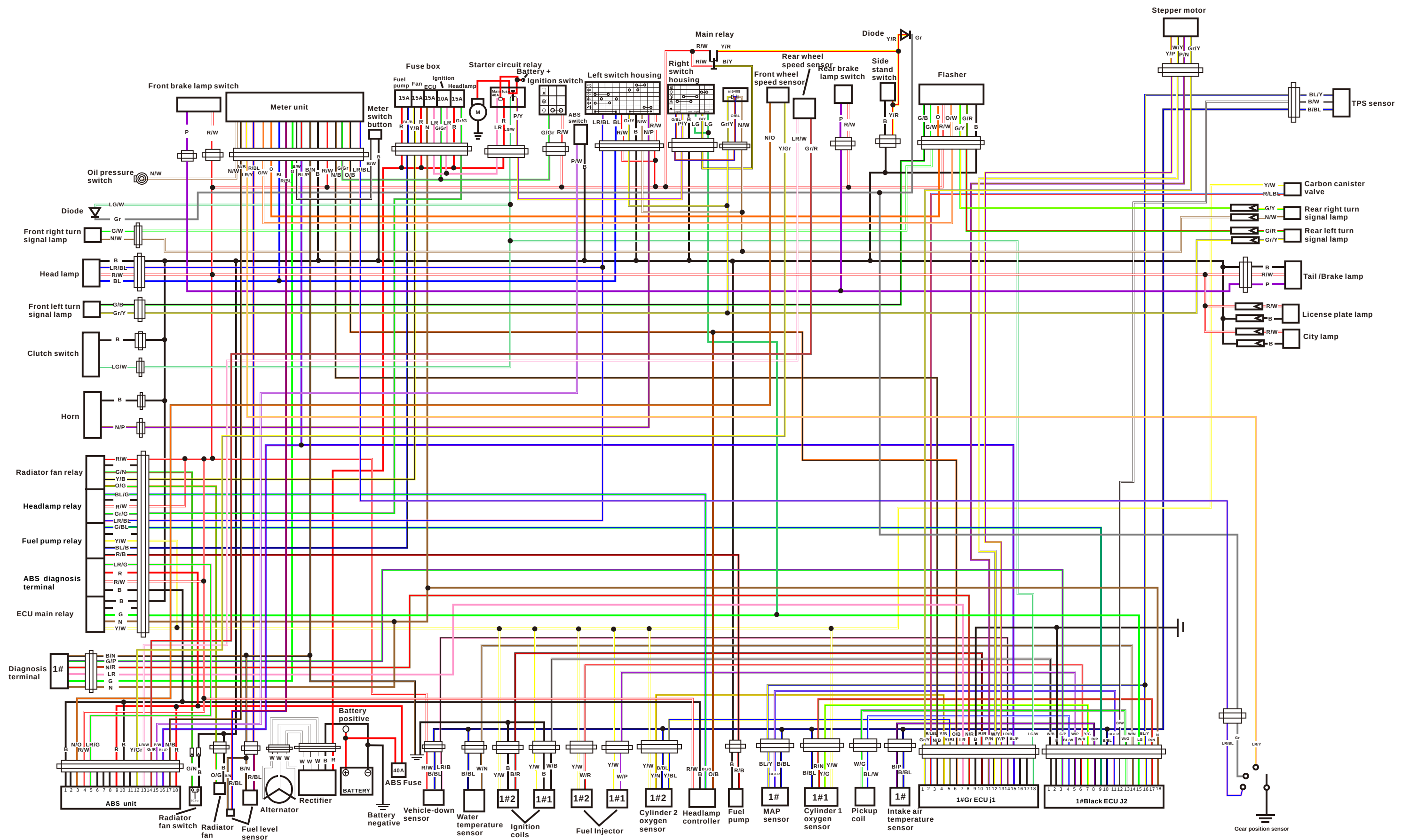
- Otherwise, find out the source of such absorption by disconnecting the connectors of each utility powered by the battery directly.

NOTE:

In the event an anti-theft device is installed, disconnect it before carrying out the modifications.



ELECTRIC SYSTEM ELECTRIC SYSTEM DIAGRAM





ELECTRIC SYSTEM COLOUR KEY

CODE	COLOUR
B	Black
BL	Blue
LBL	Light blue
N	Brown
G	Green
O	Orange
Y	Yellow
R	Red
LR	Pink
W	White
P	Purple
Gr	Grey
LG	Light green

NOTICE

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The Benelli logo is a circular emblem. It features a green laurel wreath that encircles the central elements. At the top of the wreath are three five-pointed stars. In the center, the word "Benelli" is written in a bold, serif font. Below the text is a detailed illustration of a lion standing on its hind legs, facing left. The entire logo is rendered in a light, semi-transparent style.

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, a lion standing on a pedestal in the middle, and a stylized 'B' at the bottom. The word 'Benelli' is written in a serif font across the center of the wreath.

The image shows a Benelli logo centered on a white background with horizontal dotted lines. The logo is circular, featuring a green 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 stylized font across the middle of the logo.

The Benelli logo is a circular emblem. It features a central illustration of a lion standing on its hind legs, facing left. Above the lion are three five-pointed stars arranged in a slight arc. The entire scene is enclosed within a circular border that appears to be a laurel wreath. The logo is rendered in a light, semi-transparent style.



Pure Passion since 1911



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