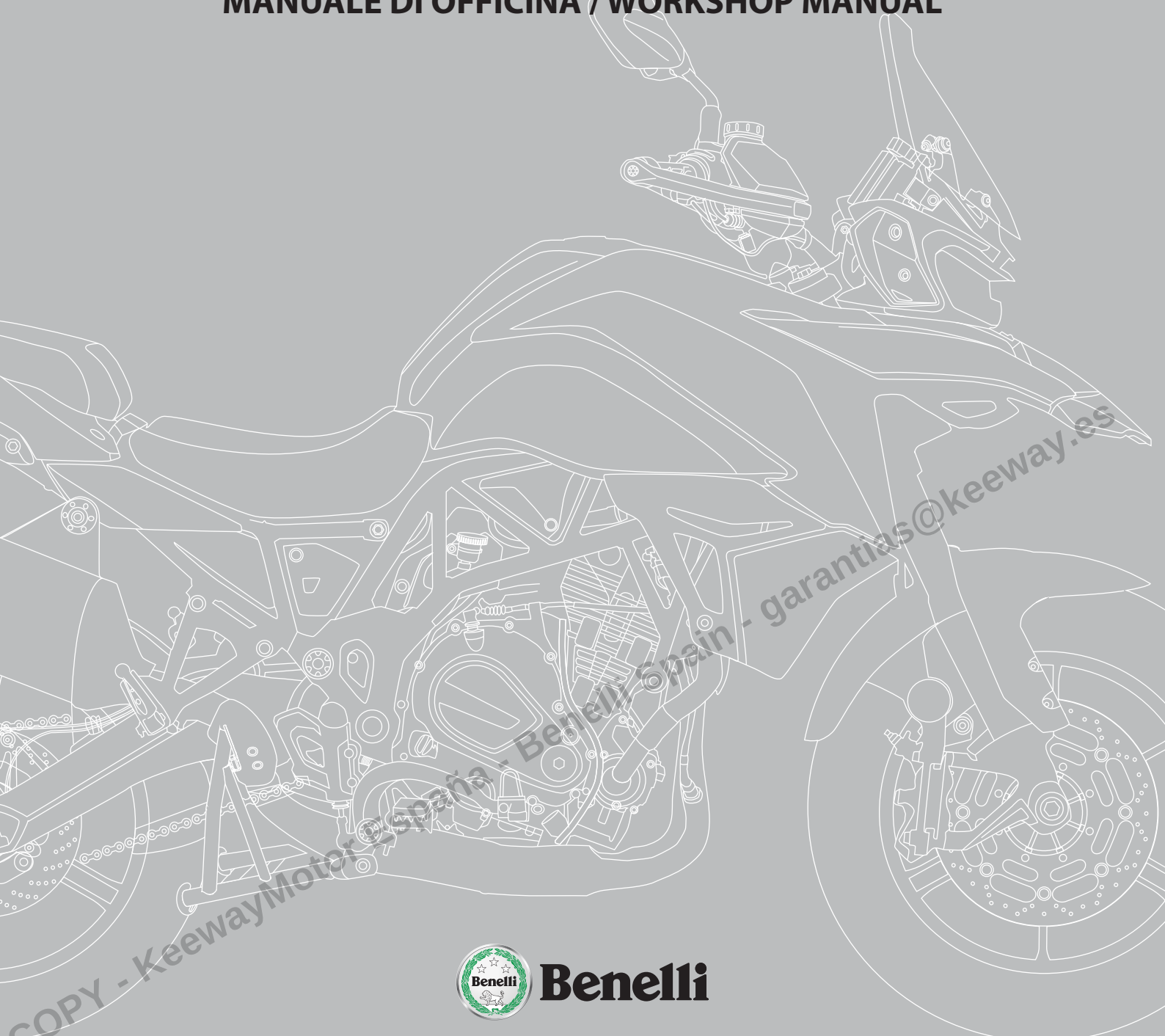
TRK 702

TRK 702X

MANUALE DI OFFICINA / WORKSHOP MANUAL



Benelli

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:
Drawings and specifications are subject to change without prior warning.

IMPORTANT INFORMATION ABOUT THE 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 motorcycle.

NOTICE A notice means that specific precautions are required to avoid causing damage to the motorcycle.

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

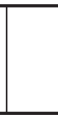
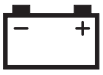
HOW TO USE THIS MANUAL

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 is at the top of every page.
2. To help with the identification of parts and make the different points of the various procedures clearer, at the beginning 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 section “SYMBOLS”.
4. The exploded drawing contains a table showing the position on the spare part catalogue, its description, the sequence of the task, the symbols used, the description of the task, and any notes for the operator.
5. Tasks requiring additional information (for example, special tools and technical information) are described in sequence.

SYMBOLS

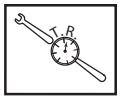
SUBJECT SYMBOLS

GEN. INFO 	General Information
SPEC. 	Specifications
PERIOD. INSP. & ADJ. 	Checks and regular adjustments
FRAME 	Frame
ENG. 	Engine
COOL. SYSTEM 	Cooling system
ELEC. 	Electrical System

EXPLANATORY SYMBOLS


Wear limits, Backlash


Special tool


Tightening torque


Grease application

Sealant paste application


Thread locker application


Recommended solvent


Brake fluid


Lubricant

CONTENTS

CHAPTER 1

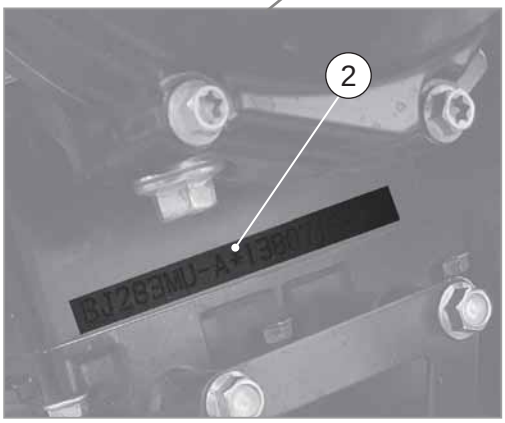
GENERAL INFORMATION

IDENTIFICATION

MOTORCYCLE IDENTIFICATION

Identification data are as follows:

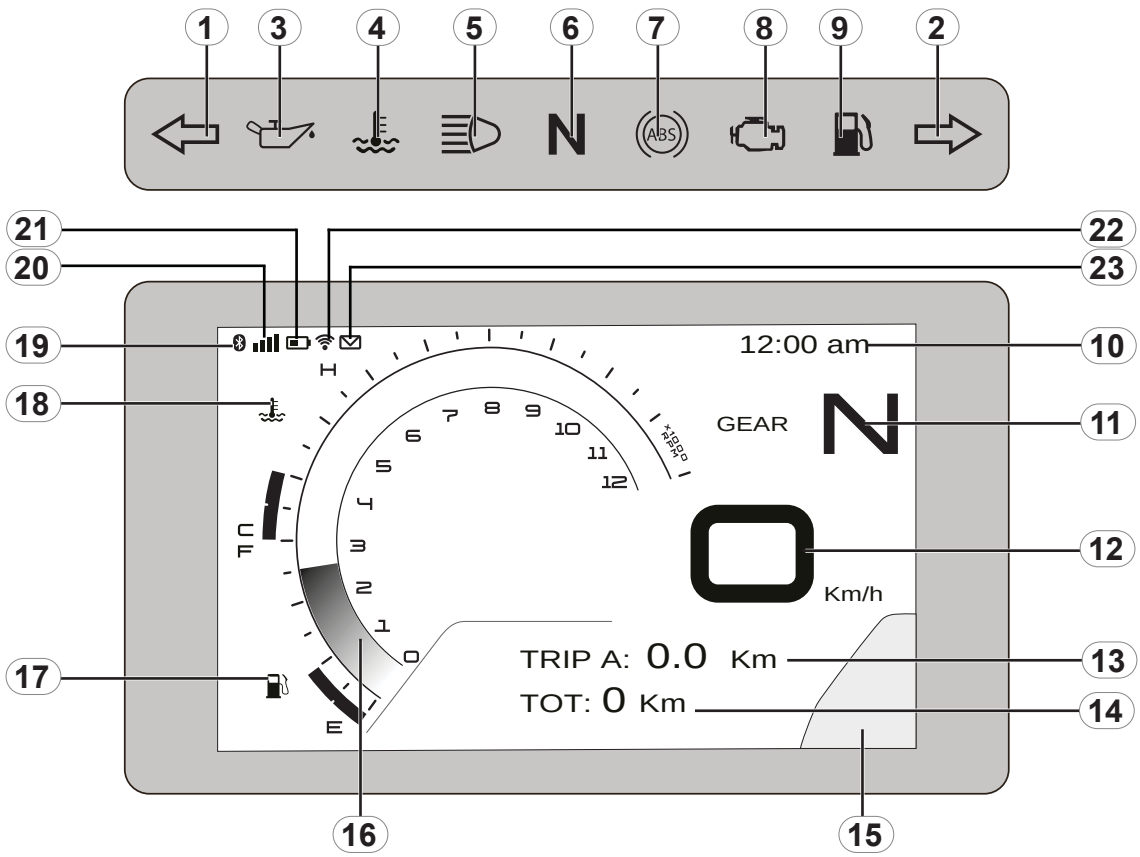
1. Frame serial No. (on the steering sleeve, right side)
2. Engine serial No. (on the lower crankcase)
3. Type-approval data (on the steering sleeve, left side).



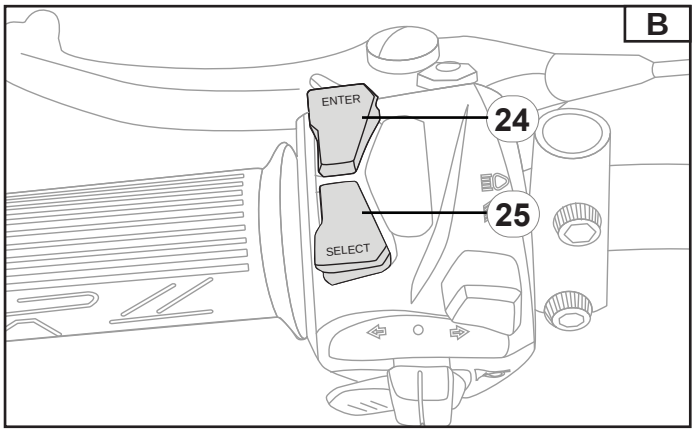
FEATURES

INSTRUMENTATION AND INDICATOR LIGHTS

A



B



FEATURES

INSTRUMENTATION AND INDICATOR LIGHTS

The instruments and lights will switch on when the ignition key is turned to "ON".
After an initial check-up, the information correspond to the general conditions of the motorcycle at that time.
The dashboard is equipped with the following instruments:

1. LEFT DIRECTION INDICATOR LIGHT (GREEN)
It goes on when the left turn signal light is activated.

2. RIGHT DIRECTION INDICATOR LIGHT (GREEN)
It goes on when the right turn signal light is activated.

3. OIL PRESSURE INDICATOR LIGHT.
It goes on when the engine oil pressure is low.
The electrical circuit of the indicator light can be checked by turning the key to "ON". Once the engine is running, the indicator light should switch off.

4. COOLANT TEMPERATURE
It indicates the coolant temperature. The coolant temperature varies according to the climatic changes and the engine load. If the indicator light flashes, stop the vehicle, switch the engine off and allow it to cool down.

5. HIGH BEAM INDICATOR LIGHT
This switches on when the high beam is on.

6. NEUTRAL POSITION INDICATOR LIGHT
It goes on when the gear is in “Neutral” position.

7. ABS SYSTEM INDICATOR LIGHT
It shows the activation/deactivation status of the anti-lock braking system of brakes.
a. ABS system fault: whenever any fault is detected and saved, the ABS diagnostic light is on and remains on.
b. 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.

Please note that the ABS system is not active when the light is on, but the braking system continues 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.

8. ENGINE WARNING LIGHT
This warning light comes on if a problem is detected in the engine or another vehicle control system. The electrical circuit of the warning light can be checked by turning the key to "ON".The warning light should come on and then go off when the engine is started. If the warning light does not come on initially when the key is turned to “ON”, or if it remains on, connect the diagnostic system.

9. FUEL WARNING LIGHT.
It goes on when there are approx.ly 3 l of fuel in the tank, therefore it is necessary to refuel, when possible.

10. DIGITAL CLOCK
Shows the time in hours and minutes.

11. ENGAGED GEAR INDICATOR
The engaged gear display shows the selected gear.
This is a 6-speed gearbox model.

12. SPEEDOMETER
The speedometer indicates the vehicle’s speed in km/h or mph.

13. TRIP ODOMETER
The trip odometer (TRIP A / TRIP B)
shows the distance covered after the latest
reset.
- Short press the “SELECT” button to pass from “TRIP A” mode to “TRIP B” mode.
- Long press the button “SELECT” to reset the trip odometer.

14. ODOMETER
The odometer records the total mileage travelled.

15. WARNING INDICATOR
The icon will flash 20 seconds when a failure or warning light is on.

16. TACHOMETER
The tachometer allows the rider to monitor the engine revolution speed and to keep it within the optimal power range.

17. RESERVE FUEL GAUGE
The digital fuel gauge shows the fuel tank level. As the fuel level drops, the filling references
on the gauge will become closer and closer to the "E" reserve area.
As soon as the final line starts to blink, the autonomy is about 3 litres of fuel.

18. COOLANT TEMPERATURE GAUGE
It indicates the coolant temperature.
The coolant temperature varies according to the climatic changes and the engine load.

FEATURES
INSTRUMENTATION AND INDICATOR LIGHTS

19. BLUETOOTH
When it is on, indicates the presence of a device connected via Bluetooth.

You can select ON / OFF from the BLUETOOTH menu.

After having selected the ON function, access the BLUETOOTH settings of the smartphone and select the network shown on the display for pairing.
Once pairing is completed, the icon BLUETOOTH appears on the display.
It will be possible to view the charging level of the smartphone and receive notifications of missed calls.

20. NETWORK SIGNAL INDICATOR
When the vehicle is connected via Bluetooth to the smartphone, the reception intensity of the device is shown.

21. BATTERY STATUS INDICATOR OF THE CONNECTED DEVICE
When the vehicle is connected via Bluetooth to the smartphone, the residual charging level of the device is shown.

22. WIFI
The WIFI icon appears only when the mobile device is connected via the VIFI network.

- **APPEARANCE**

You can select from the following modes:
LIGHT, DARK or AUTO.

When AUTO is selected, the brightness sensor selects the display viewing mode automatically based on the ambient brightness.

- **BRIGHTNESS**

You can select 5 brightness levels or AUTO.

FEATURES
INSTRUMENTATION AND INDICATOR LIGHTS

When AUTO is selected, the brightness sensor adjusts the display brightness automatically based on the ambient brightness.

- **INFO**

The fault codes, fault code history, battery voltage, and the software version installed in the multifunction display are shown.

- **TIME**

It shows the time expressed in hours and minutes.
After having accessed the CLOCK menu, the first digit starts blinking.

Short press the SELECT button to change the number or press ENTER to move the blinking digit to the next position. Once having completed time setting, await 5 seconds to allow the display to go back to the main screen automatically.

- **UNIT**

It allows to switch the value of speed and distance travelled from km to miles.

FEATURES
INSTRUMENTATION AND INDICATOR LIGHTS

- **LANGUAGE**

It allows to change the system language by selecting among Italiano, English; Español, Français, and Deutsch.

- **WIRELESS CONNECTION**

Hold the ENTER button pressed for 3 seconds to access or exit the WIRELESS connection menu.

The WIRELESS connection menu allows to scan the QR code for downloading the App "**CARBIT RIDE**" from Play Store or App Store and access the navigation mode on the vehicle.

NOTE

The download of a different application might be necessary over time.

Short press the "ENTER" button to enable/disable the pairing menu of the multifunction display.

Short press the SELECT button to select the Android or Apple pairing mode.

Once having selected the related icon, press ENTER to confirm.

Android device
For connection to the multifunction display via Android device, create a Hotspot by entering the username and the password as shown on the display.

Apple device
For connection to the multifunction display via Apple device, access the WIFI menu of the phone and connect with the network shown on the display.
Once the WIFI connection is completed successfully, the icon is displayed.

23. NOTIFICATION OF INCOMING CALL

FEATURES
INSTRUMENTATION AND INDICATOR LIGHTS

24. ENTER BUTTON
With the vehicle at standstill, access the multifunction menu by short pressing the ENTER button.
If the mobile device is connected with the multifunction display, a call can be answered or closed via the ENTER button.

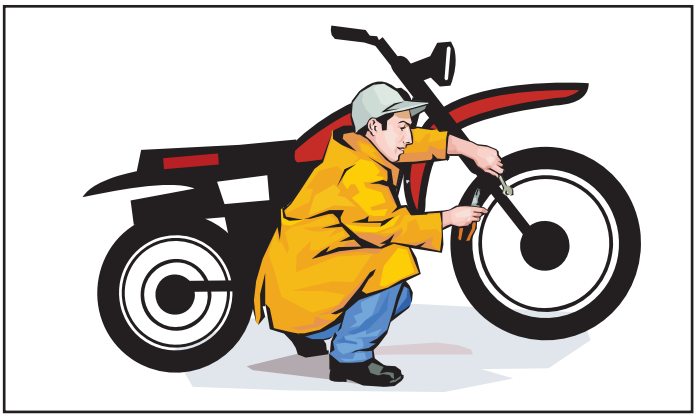
25. SELECT BUTTON
Short press the SELECT button to set Trip A / Trip B in the multifunction display. Hold the button for at least 3 seconds to reset Trip A / Trip B. If the mobile device is connected with the multifunction display, the SELECT button allows to answer an incoming call.

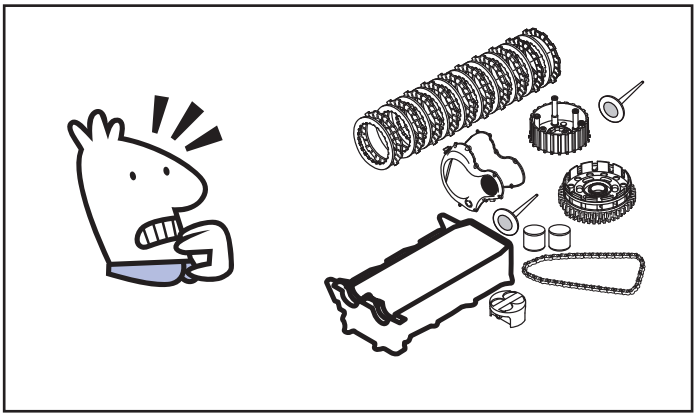
Remarks

IMPORTANT INFORMATION

PREPARATIONS FOR REMOVAL AND DISASSEMBLY OPERATIONS

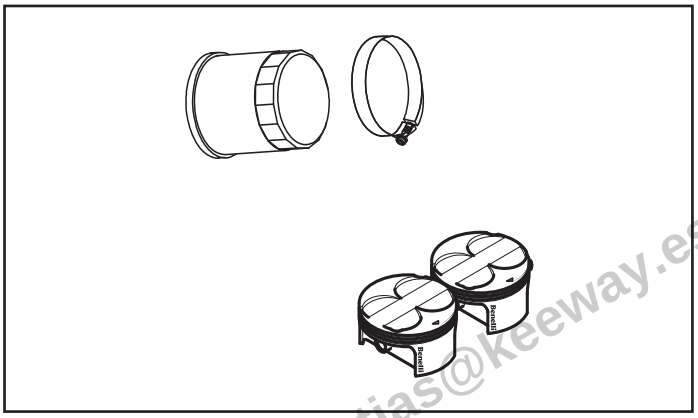
- Before proceeding with disassembly, remove any dirt, mud, dust, and foreign bodies.
- Only use suitable cleaning tools and agents.
  Refer to "SPECIAL EQUIPMENT" section.
- While disassembling the vehicle, it is advisable to always keep matched parts together. These parts include gears, cylinders, pistons and other parts, whose surfaces will be “matched" 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.





SPARE PARTS

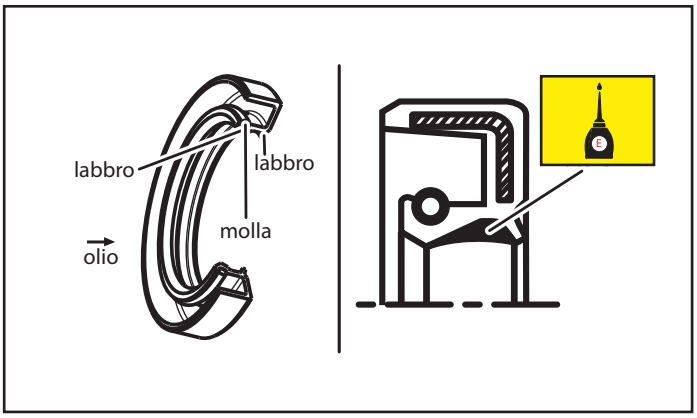
Only use original Benelli spare parts. For part lubrication, use oils and greases recommended by Benelli. Other brands may be similar in appearance and function, but have a lower quality.



IMPORTANT INFORMATION

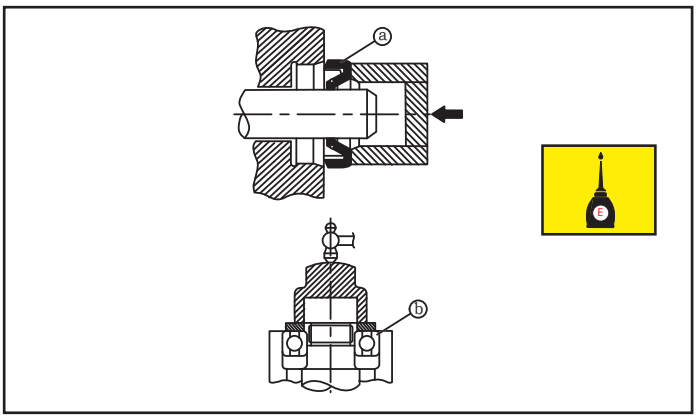
GASKETS, O-RINGS, OIL SEALS AND BEARINGS

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, always oil the coupled parts and bearings, and 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

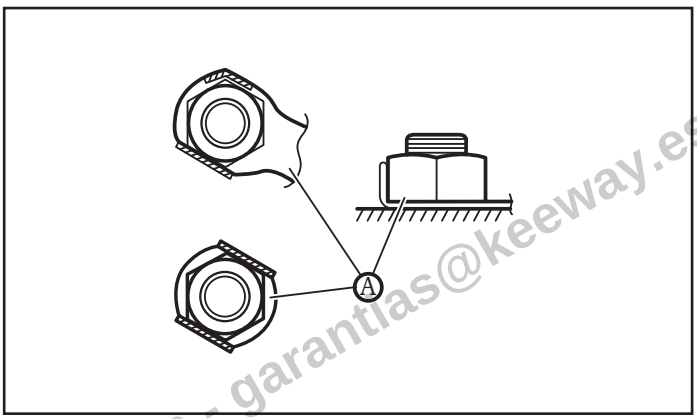


NOTICE

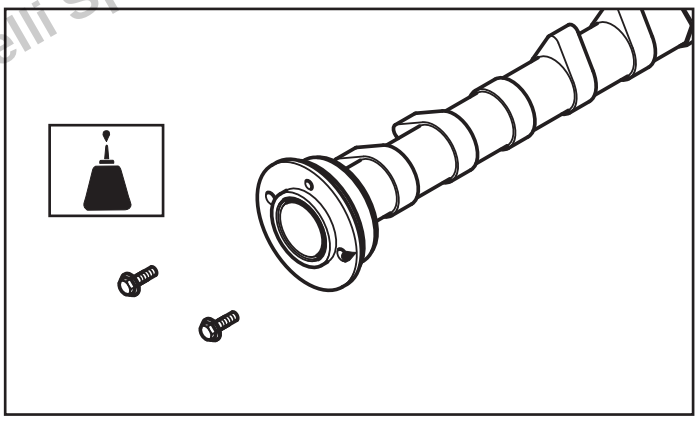
Never use compressed air to dry bearings, allowing them to turn, as this will damage the surfaces.

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.



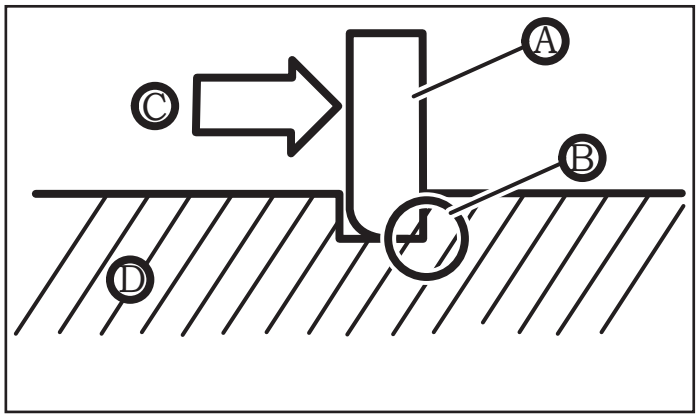
Before applying the thread locker, always degrease both parts with solvent.



IMPORTANT INFORMATION

SAFETY SNAP RINGS

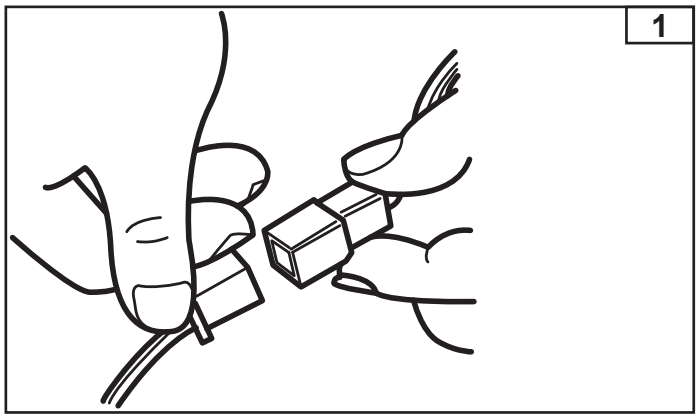
Before reassemble them, check all snap rings thoroughly and replace the damaged/deformed ones.
Always replace the snap rings of the piston pin after having used them once. When installing a snap ring “A”, make sure the sharp edge “B” is positioned on the other side compared to the thrust “C” that it receives.
"D" Shaft



CONNECTION CHECKS

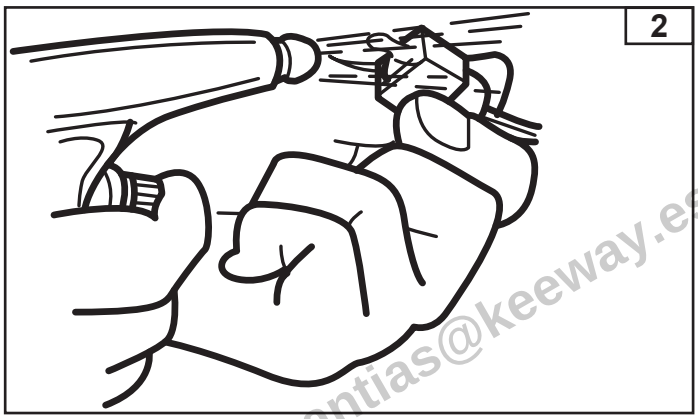
Make sure there are no stains, rust, humidity, etc. on wires, couplers, and connectors.

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



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

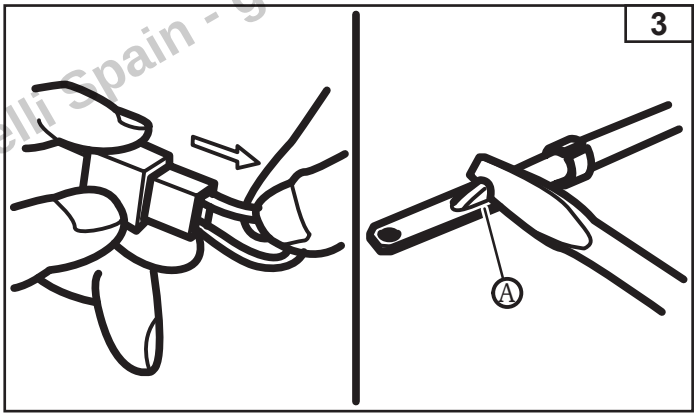
In presence of humidity → Dry using a fan.
In presence of rust/stains → Connect and disconnect the parts several times.



3. Check:
- **all connections**

In case of loose connections → Connect them properly.

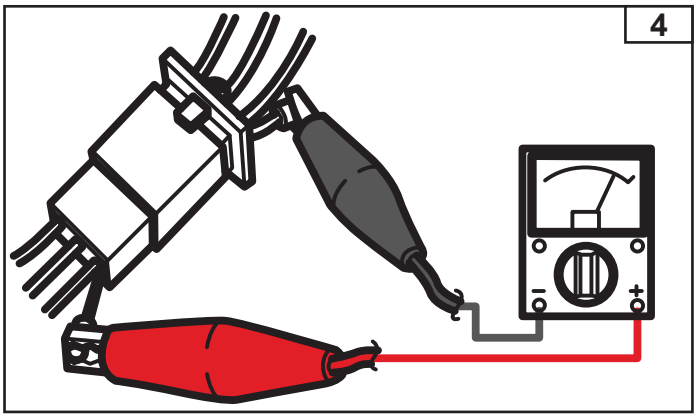
NOTE:
If the foot of terminal "A" is bent, raise it.



IMPORTANT INFORMATION

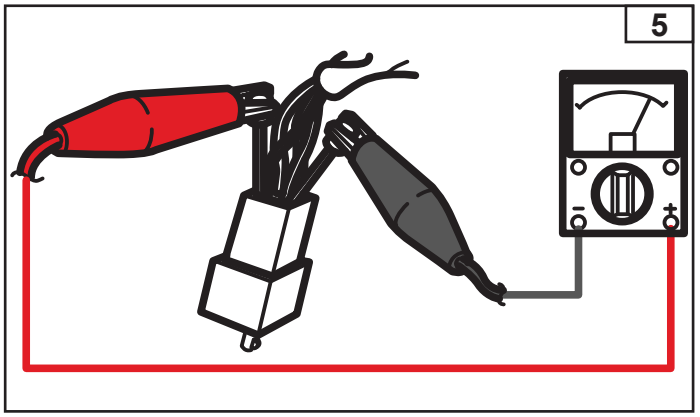
4. Connect:
- **The wire**
- **The coupler**
- **The connector**

NOTE:
Make sure all connections are firmly installed.



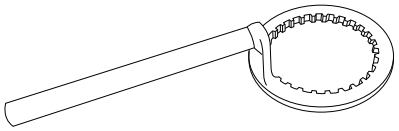
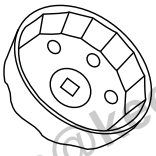
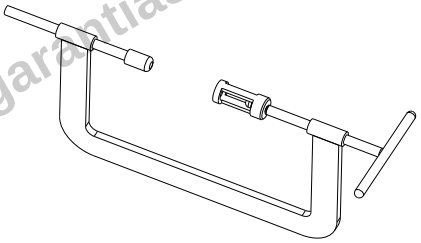
5. Check:
- **Continuity** (with a pocket tester)

NOTE:
If there is no continuity, clean the terminals.
To control the wiring, follow the steps from "1" through to "3"
For a quick fix, we recommend using a specific product for contacts, which can be found on sale in spare parts stores.

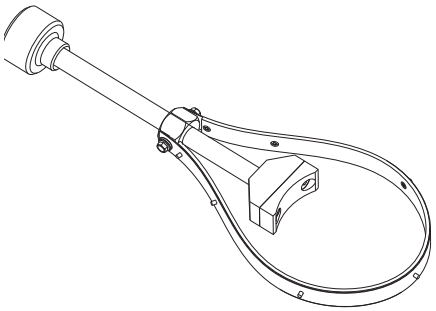
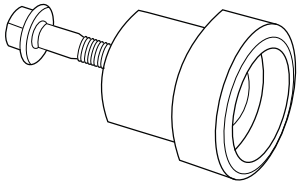
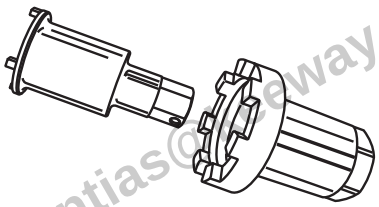


SPECIAL EQUIPMENT

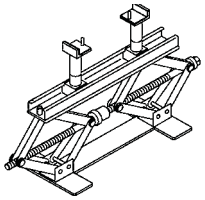
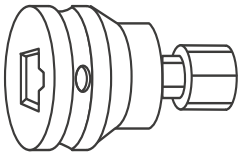
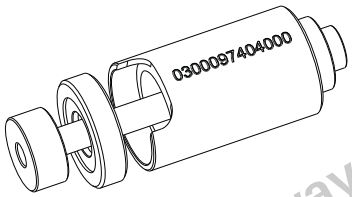
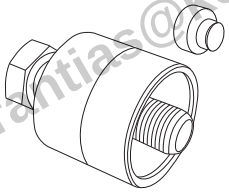
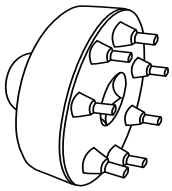
The special equipment listed here serves for the complete, thorough performance of fine tuning and assembly operations.
Their use helps to prevent damages caused by unsuitable tools or improvised techniques.
When placing an order, refer to the list below to avoid mistakes.

SPECIAL ENGINE EQUIPMENT		
Tool Code	Tool Name-Function	Image
KST03BS01206	**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.	
KST0BL01031	**Oil filter tool** This tool serves to replace the 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.	

SPECIAL EQUIPMENT

SPECIAL ENGINE EQUIPMENT		
Tool Code	Tool Name-Function	Image
Standard tool commonly found	**Measuring tool commonly found** This tool is used to measure the outer dimensions of parts.	
Standard tool commonly found	**Measuring tool commonly found** This tool is used to measure thicknesses.	
0320097044000	**Flywheel tightening tool** This tool serves to tighten the drive shaft flywheel.	
R000097710000	**mechanical seal mounting tool kit** This tool serves to assemble the mechanical seal of the water pump.	
R180297129000	**Tightening tool for steering sleeve lock nut.** This assembled tool is used to tighten the lock nut securing the steering head.	
Standard tool commonly found	**Tool to tighten the front wheel spindle** This tool serves to tighten the front wheel spindle.	

SPECIAL EQUIPMENT

SPECIAL ENGINE EQUIPMENT		
Tool Code	Tool Name-Function	Image
Standard tool commonly found	**Tool to extract the rear swingarm bearings** This tool serves to extract bearings.	
Standard tool commonly found	**Jack** It allows to lift the frame and the engine.	
R300097146000	**Steering plate screw key**	
0300097404000	**Silent block insertion/extraction tool**	
R000097709000	**Flywheel extractor kit** This tool serves to extract the flywheel from the drive shaft.	
KST03BL01061	**Fork cap key tool**	

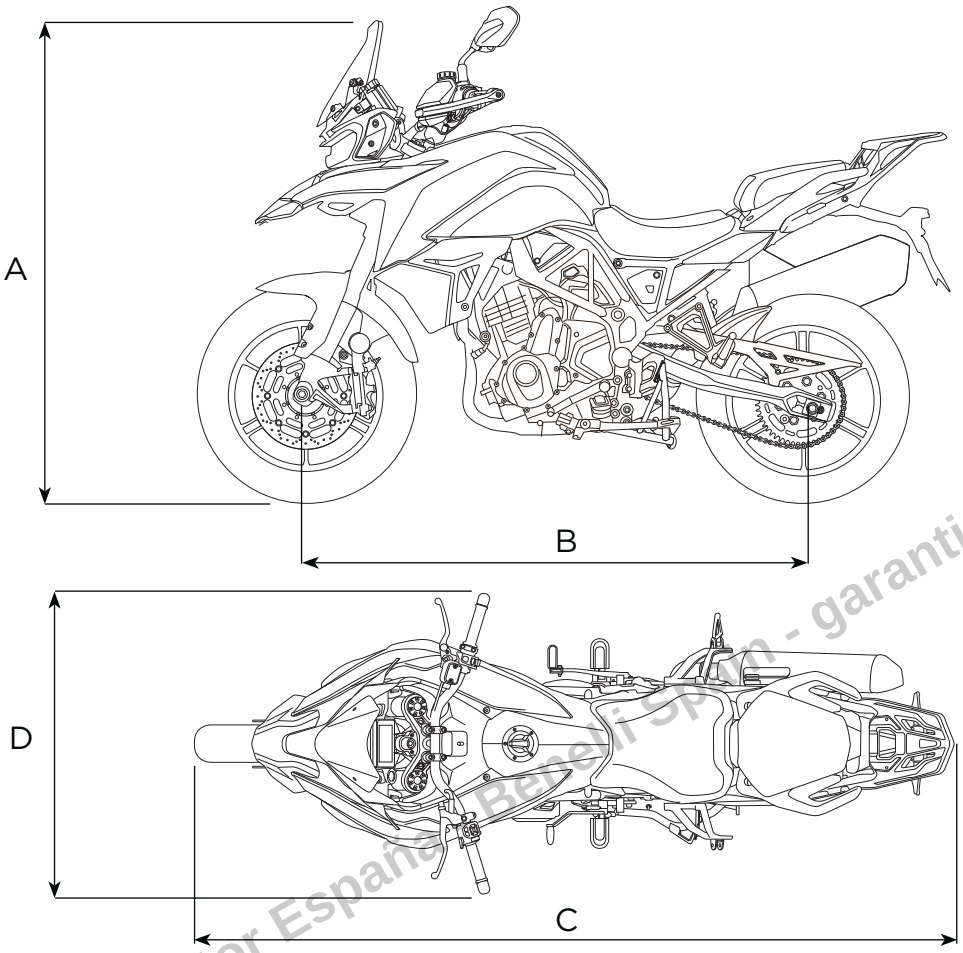
Remarks

CHAPTER 2

SPECIFICATIONS

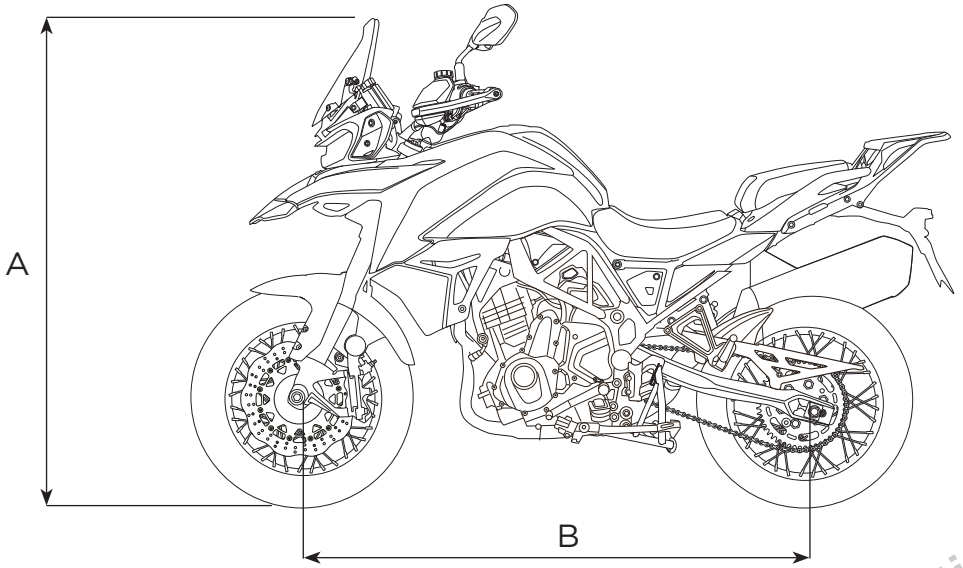
GENERAL SPECIFICATIONS

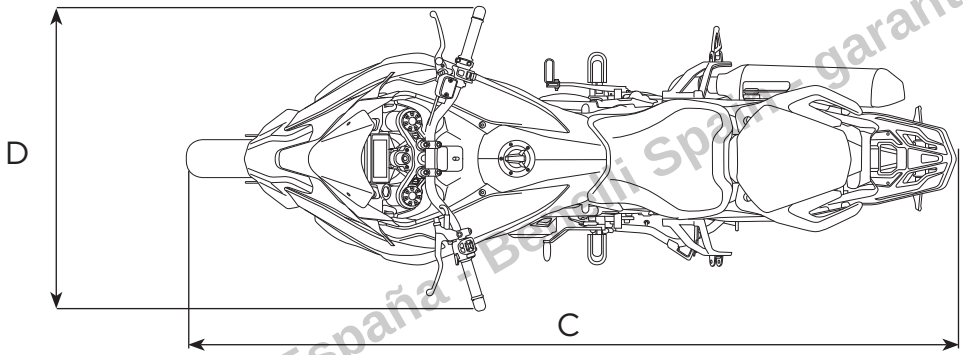
TRK702	
SIZE	**STANDARD**
Total length (C)	2200 mm (86.61417 in.)
Total width (D)	925 mm (36.4173 in.)
Total height (A)	1390 mm (54.724 in.)
Wheelbase (B)	1505 mm (59.252 in.)
WEIGHT	**STANDARD**
Kerb weight (with full oil and fuel tank)	239 Kg
Max. technically permissible load (with rider and load)	202 Kg



GENERAL SPECIFICATIONS

TRK702X	
SIZE	**STANDARD**
Total length	2220 mm (87.40157 in.)
Total width	925 mm (36.42 in.)
Total height	1420 mm (56 in.)
Wheelbase	1505 mm (59.3 in.)
WEIGHT	**STANDARD**
Kerb weight (with full oil and fuel tank)	244 Kg
Max. technically permissible load (with rider and load)	197 Kg

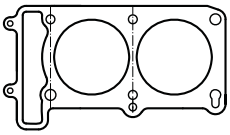
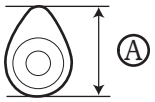
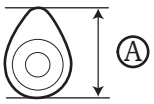
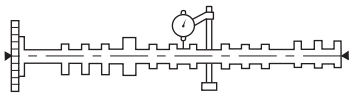




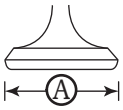
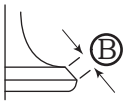
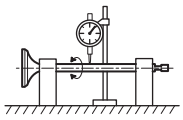
TECHNICAL DATA
ENGINE SPECIFICATIONS

TRK702/TRK702X	
ENGINE	**STANDARD**
Type of engine	2 inline cylinders, 4 stroke, water cooling, 4 valves for each cylinder, and double overhead camshaft DOHC
Displacement:	698 cc
Number of cylinders	2
Cylinder layout	In line
Bore × stroke	83 x 64.5 mm (3.26772 x 2.53937 in)
Compression ratio	11.6: 1
Idle speed	1400 - 1600
Timing	Double overhead camshaft, chain-controlled, and 4-valves for each cylinder
Maximum net power	51.5 kW at 8000 rpm (70.02) HP 35.0 kW at 6500 rpm (47.58) HP
Max. net torque	70 Nm / 6000 rpm 58 Nm / 5250 rpm
FUEL	**STANDARD**
Recommended fuel	Unleaded petrol (gasohol containing Ethanol no at 10% volume (E10)
ENGINE OIL	**STANDARD**
Lubrication system	Wet sump
Amount without replacement of oil filter cartridge	2.2 +/- 0.1 L
Amount with replacement of oil filter cartridge	2.4 +/- 0.1
Recommended oil:	API SN - SAE 10w50
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. (0.984252 in.)
Clearance between outer rotor and oil pump housing	0.2 mm max (0.0787402 in.)
IGNITION	**STANDARD**
Ignition system type	Electric starter

TECHNICAL DATA
ENGINE SPECIFICATIONS

SPARK PLUGS	STANDARD
Model (manufacturer) x quantity	NGK CR8EGP
Spark plug gap	0.7 ÷ 0.8 mm (0.275591 ÷ 0.314961 in)
CYLINDER HEAD	**STANDARD**
	0.05 mm (0.1968504 in.)
CAMSHAFT	**STANDARD**
Control system	Chain transmission
Camshaft diameter	Ø 23.950 mm - 24.965 mm (0.9429 ~ 0.9828 in)
Clearance between camshaft and camshaft seat	0.1 max (0.0039 in.)
Camshaft radial clearance	0.02 - 0.050 mm (0.07874016 - 1.968504 in)
Camshaft lobe dimensions, intake side 	Size "**A**" intake 36.543 - 36.657 mm (1.43870079 - 1.44318898 in) Intake wear limit 36.50 mm (1.437008 in.)
Camshaft lobe dimensions, exhaust side 	Size "**A**" exhaust 35.843 - 35.957 mm (1.41114173 - 1.41562992 in) Exhaust wear limit 35.80 mm (1.40944882 in.)
Max camshaft eccentricity 	0.05 mm (0.0019 in.)
TIMING CHAIN	**STANDARD**
Automatic tensioning	System

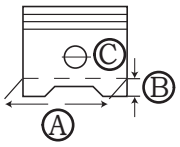
TECHNICAL DATA
ENGINE SPECIFICATIONS

VALVES, VALVE SEATS, VALVE GUIDES		STANDARD
Intake valve clearance (cold)		0.15 - 0.21 mm (0.009 ~ 0.011 in)
Exhaust valve clearance (cold)		0.25 - 0.31 mm (0.011 ~ 0.013 in)
VALVE DIMENSIONS		
 Head diameter ”A”	Intake	Ø 33 mm (1.29 in)
	Exhaust	Ø 28 mm (1.14 in)
 Ground surface width ”B”	Intake	0.8 - 1.2 mm (0.039 ~ 0.051 in)
	Exhaust	0.8 - 1.2 mm (0.039 ~ 0.051 in)
Valve stem diameter	Intake	4.465 - 4.480 mm (0.1757 ~ 0.176378 in) limit 4.460mm (0.1755 in.)
	Exhaust	4.455 - 4.470 mm (0.1753 ~ 0.1759 in) limit 4.45mm (0.1751 in.)
Clearance between valve stem and valve guide	Intake	0.04 - 0.1 mm (0.00157 ~ 0.00393 in) limit 0.12mm (0.00472 in.)
	Exhaust	0.06 - 0.12 mm (0.00236 ~ 0.00472 in) limit 0.14mm (0.00551 in.)
 Valve stem eccentricity		0,015 mm (0.0005 in)

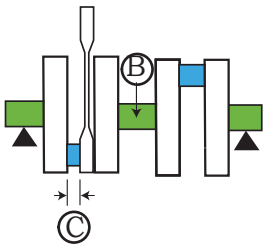
VALVE SPRINGS		STANDARD
Intake/exhaust free length	Intake	41.90 mm (1.649 in.) limit 41.60mm (1.637 in.)
	Exhaust	41.90 mm (1.649 in.) limit 41.60mm (1.637 in.)

CYLINDERS	STANDARD
Cylinder layout	In line
Bore x stroke:	Ø 83 x 64.5 mm
Compression ratio	11.6:1
Maximum ovalization	83.036 mm (3.269 in.)
Maximum taper	0.05 mm (0.0019 in.)

TECHNICAL DATA
ENGINE SPECIFICATIONS

PISTON		STANDARD
Clearance between piston and cylinder		0,032 - 4,044 mm (0.00125 ~ 0.1592 in) limit 0.060 mm (0.00236 in.)
	Piston diameter “A”	83 mm (3.267 in.)
	Piston height “B”	140 mm (5.511 in.)
	Pin seat diameter "C"	19.00 mm (0.748 in.)
Piston pin outside diameter		18.995 mm (0.748 in.)

CONNECTING RODS	STANDARD
Diameter of connecting rod axle	37.984 - 38.000 mm (1.495 ~ 1.496 in) Limit 37.97mm (1.494 in.)
Bearing colour codes	A = Black B = Blue C = Brown

DRIVE SHAFT	STANDARD
	
Diameter “B”	37.984 - 38 mm (1.495 ~ 1.496 in) Limit 37.97 mm (1.494 in)
Side clearance of connecting rod big end “C”	0.1 - 0.25 mm (0.039 - 0.98 in)
Main bearing colour code	A = Black B = Blue C = Brown

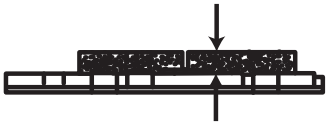
TECHNICAL DATA
ENGINE SPECIFICATIONS

CLUTCH	STANDARD
Clutch type	Wet clutch, multiple discs, slipper device
Clutch release method	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 (0.0787402 ~ 0.11811 in)
Friction plate thickness	min 3 mm (0.11811 in) max 3.1 mm (0.122047 in) limit 2.8 mm (0.110236 in)
Number of friction plates	7
Steel disc thickness	min 1.95 mm (0.076 in) max 2.0 mm (0.078 in) limit 1.95 mm (0.076 in)
Steel disc thickness	6
Disc pack thickness	min 32.36 mm (1.274 in) max 33.36 mm (1.313 in)
Max. warping	0.05 mm (0.0019 in)
Clutch spring free length	51.20 mm ± 0.15 mm (2.0157 ± 0.0059 in)
Spring quantity	3
TRANSMISSION	**STANDARD**
Transmission type	Straight-toothed gearbox
Main reduction ratio	42 / 88
Secondary reduction system	Chain, ratio 15 / 46
Transmission ratio	
1st	17 / 40
2nd	21 / 36
3rd	24 / 32
4th	27 / 30
5th	29 / 28
6th	27 / 23
GEAR CONTROL MECHANISM	**STANDARD**
Gear control mechanism type	Sequential with desmodromic 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)	ROCKET
Output pressure	250 KPa
Flow rate	≥ 50 L/h
THROTTLE BODIES	**STANDARD**
Diameter	41 mm (1.61417 in.)
Throttle cable clearance (at the throttle hand grip flange)	2-3 mm (0.078 - 0.118 in)

TECHNICAL DATA
FRAME SPECIFICATIONS

FRAME		STANDARD	
Frame type		Pipe truss with steel plates	
FRONT WHEEL		**STANDARD**	
Wheel type	TRK702	Aluminium alloy	
	TRK702X	Spokes	
Rim	TRK702	17” x MT 3.50 DOT	
	TRK702X	19” x MT 3.00 DOT	
Wheel travel		140 mm	
REAR WHEEL		**STANDARD**	
Wheel type		Aluminium alloy	
Rim	TRK702	17” x MT 4.50 DOT	
	TRK702X	17” x MT 4.25 DOT	
Wheel travel		128 mm	
FRONT TIRE		**STANDARD**	
TRK702		Tube type 120/70 - ZR17 58W	
TRK702X		Tube type 110/80- R19 - 59V	
Model (Manufacturer)		N/A	
Tire pressure		220kpa±10kpa	
REAR TIRE		**STANDARD**	
TRK702		Tube type 160/60 - ZR17 69W	
TRK702X		Tube type 150/70 - R17 – 69V	
Model (Manufacturer)		N/A	
Tire pressure		250kpa±10kpa	
FRONT BRAKE		**TRK 702**	**TRK 702x**
Brake type		Semi-floating double disc with 4-piston caliper and ABS	Semi-floating double disc with 2-piston caliper and ABS
Activation		Use right hand	Use right hand
Recommended liquid		DOT 4	DOT 4
Brake discs		ROAD	MODEL X
	Diameter × Thickness	320x 5 mm (12.5 x 0.15 in)	320 x 5 mm (12.5 x 0.15 in)
	Minimum thickness	4.5 mm (0.17 in)	4.5 mm (0.17 in)
	Maximum deformation	0.15 mm (0.60 in)	0.15 mm (0.60 in)
	Thickness of worn brake pads	refer to the size limit on the pad	refer to the size limit on the pad
Inside diameter of pump cylinder		16 mm (0.62 in)	16 mm (0.62 in)
Inside diameter of caliper cylinder		4 x 32 mm (0.157 x 1.25 in)	1 x 30 mm (0.039 x 1.18 in) + 1 x 32mm (0.039 x 1.25 in)

TECHNICAL DATA
FRAME SPECIFICATIONS

REAR BRAKE			TRK 702	TRK 702x
Brake type			Single disc with single-piston calliper and ABS	Single disc with semi-floating single-piston caliper and ABS
Activation			With the right pedal	With the right pedal
Recommended liquid			DOT 4	DOT 4
Brake discs			ROAD	MODEL X
	Diameter × Thickness		260 x 5 mm (10.2 x 0.15 in)	260 x 5 mm (10.2 x 0.15 in)
	Minimum thickness		4.5 mm (0.17 in)	4.5 mm (0.17 in)
	Maximum deformation		0.15 mm (0.60 in)	0.15 mm (0.60 in)
	Thickness of worn brake pads		refer to the size limit on the pad	refer to the size limit on the pad
Inside diameter of pump cylinder			14 mm (0.551 in.)	14 mm (0.551 in.)
Inside diameter of caliper cylinder			34 mm (1.33 in.)	34 mm (1.33 in.)
FRONT SUSPENSION			**STANDARD**	
Suspension type			Upside – down fork with ø 50mm stems	
Wheel travel	TRK702		140 mm	
	TRK702		145.50 mm	
Spring	Free length	TRK702	360 mm (14.17 in)	
		TRK702X	328 mm (12.91 in)	
	Flexibility (K1)		8.6 Nm	
	Spring stroke (K1)		0~120 mm (0~4.72 in)	
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 (4.72 in)	
STEERING			**STANDARD**	
Bearing type for the steering			Ball bearing	
Angle from one end of stroke to the other (left)			35°	
Angle from one end of stroke to the other (right)			35°	

TECHNICAL DATA
FRAME SPECIFICATIONS

REAR SUSPENSION			STANDARD
Suspension type			Swingarm with central mono adjustable
Travel of rear shock absorber	TRK702		45 mm (1.77 in)
	TRK702X		50 mm (1.97 in)
Travel of rear wheel	TRK702		168 mm (6.61 in.)
	TRK702X		173 mm (6.81 in.)
Spring	Free length	TRK702	162 mm (6.38 in.)
		TRK702X	185 mm (7.28 in.)
	Flexibility (K1)		16 Nm
	Spring stroke (K1)		42 ± 1 mm (1.7 ± 0.04 in)
TRK702			
Adjustment of spring preload ring nut	Comfort		Ring nut 37 mm (1.456 in) from travel end
	Sport		Ring nut 39 mm (1.535 in) from travel end
Rebound damping	Comfort		- 13 clicks from fully closed
	Sport		- 11 clicks from fully closed
TRK702X			
Adjustment of spring preload ring nut	Comfort		Ring nut 8.5 mm (0.334 in) from travel end
	Dirt road		Ring nut 5 mm (0.196 in) from travel end
Damping	Comfort	Extension	- 9 clicks from fully closed
		Compression	-14 clicks from fully closed
	Dirt road	Extension	-7 clicks from fully closed
		Compression	- 10 clicks from fully closed

TRANSMISSION CHAIN	STANDARD
Number of links TRK702	112
Number of links TRK702X	112

TECHNICAL DATA
ELECTRICAL SPECIFICATIONS

SYSTEM VOLTAGE	STANDARD
System voltage	12 V
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 Power	11.20 A
Rated Power	360 W
Voltage adjustment	13.5 +0.5 V (3000 rpm 25 °C)
STARTING RELAY	**STANDARD**
Model (manufacturer)	QJ
Amperage	100 A
Coil resistance	4.4 Ohm at 20°C
BATTERY	**STANDARD**
Model (manufacturer)	YTZ14S NANO-GEL Super Sealed
Voltage of battery capacity	12 V / 11.8 Ah
CCA inrush current	230CCA
HEADLAMP	**STANDARD**
Type of headlamp	LED
LAMPS (WATT VOLTAGE X QTY)	**STANDARD**
Headlamps (High/Dipped beam)	LED12V 13/21W
Front position indicator light	LED 12V 1.3W
Rear position indicator light/brake light	LED 12V 1.2W
Turn signal light	LED 12V 3.6W
License plate light	LED 12V 0.5W
Instrument panel light	Integral LED
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 lights	LED x 1
Engine fault warning light	LED x 1

TECHNICAL DATA
ELECTRICAL SPECIFICATIONS

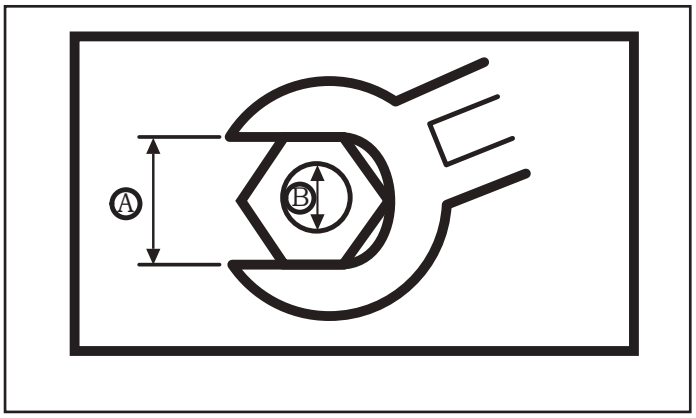
ELECTRONIC START-UP SYSTEM	STANDARD
Model (manufacturer)	QJ
Power output	0.7 kW
HORN	**STANDARD**
Horn type	Electromagnetic with disc resonator
Model (manufacturer)	QJ
Maximum amperage	3 A
Performance	87 - 112 dB
FLASHER RELAYS	**STANDARD**
Relay type	Electronic Flasher
Model (manufacturer)	QJ 600 45 Flasher
Flashing frequency of turn signal lights	85/min
Watt	3.6W x 4
OIL PRESSURE SENSOR	**STANDARD**
Model (manufacturer)/Setting	0.05 ±0.015 MPa
FUSES (AMPERAGE X QTY)	**STANDARD**
Power Lock	15 A
ECU	15 A
LIGHT	15 A
FAN	15 A
FUEL PUMP	15 A
ABS 1	15 A
ABS 2	25 A
THROTTLE VALVE SENSOR	**STANDARD**
Model (manufacturer)	BOSCH
Output power voltage	0.63 to 3.91 V
FUEL PUMP	**STANDARD**
Max. amperage/Pressure/Flow rate	2.8 A / 2.50 kPa /≥50 L/h
Level sensor	External
Min. Max. resistance	95 Ohm +/-3 empty - 10 Ohm +/-2 full
SAFETY SWITCHES	**STANDARD**
Stand switch	QJ
Neutral switch	QJ
Drop sensor	QJ 250T - 3 (QJ)
AIRBOX AIR TEMPERATURE SENSOR	**STANDARD**
Model (manufacturer)	12160244 (PACKARD)
Resistance	181 ± 8 Ohm 100°C
BODY AIR PRESSURE SENSOR THROTTLE	**STANDARD**
MODEL (manufacturer)/Power supply voltage	240600695 (DELPHI) 5 V

TECHNICAL DATA
ELECTRICAL SPECIFICATIONS

FLUID TEMPERATURE SENSOR	STANDARD
Model (manufacturer)	Loreada
Resistance	20 ± 12.5 kOhm
SPEED SENSOR	**STANDARD**
Model (manufacturer)/GAP	QJ/ 1 mm -1.5 mm
OXYGEN SENSOR	**STANDARD**
Model (manufacturer)	QJ
INJECTOR	**STANDARD**
Model (manufacturer)	MINI (Delphi) 12 ±1 Ω
RELAY ASSEMBLY	**STANDARD**
Model (manufacturer)	CM1 NAIS
IGNITION SYSTEM	**STANDARD**
Ignition type	BOSCH MSE6.0
Ignition timing	26.25° ± 2° before TDC at maximum power
Signal wheel sensor (pick-up)	260 Ohm ± 10% at 20°C
Model (manufacturer)	QJ
STEPPER	**STANDARD**
Model (manufacturer)	Continental
Stepper type	Dual-phase
RADIATOR FAN	**STANDARD**
Model (manufacturer)/Electric consumption	Panasonic - 33W

TECHNICAL DATA

GENERAL TIGHTNESS SPECIFICATIONS



The tightness torques for parts or special 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 DATA
TIGHTENING TORQUES

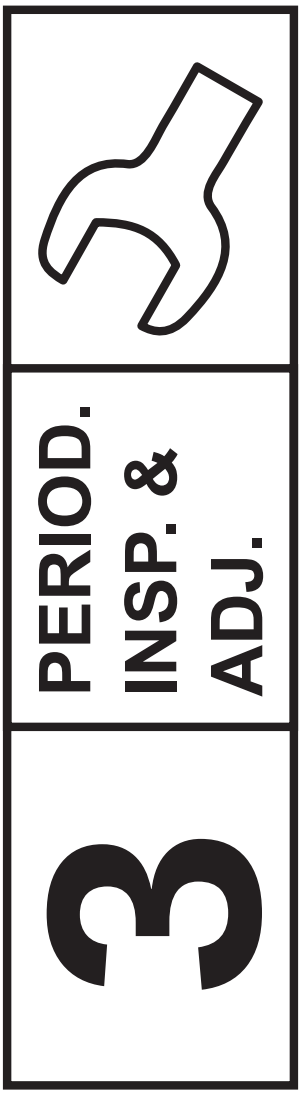
TIGHTNESS TORQUES AND RELEVANT PRELOADS FOR STANDARD CONNECTIONS

The values given in the following table refer to standard tightness, i.e., for metric screws coupled with the relevant nut, or with screw nut in metal.
The 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 tightening torque have increased by 10% compared to the value calculated, to take into account the tolerance on the nominal torque and the variation that the friction coefficient may undergo from tightening to tightening.

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

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

Remarks



3 PERIOD. INSP. & ADJ.

CHAPTER 3

REGULAR MAINTENANCE

CHAPTER 3

Remarks

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 motorcycle upright without using the rear stand.
Checks are to be made every year, except in cases where maintenance inspections are carried out as part of services linked to mileage.
When reaching 25.000 km (15,500 mi), repeat services, starting from the one of 7000 km (4400 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 pages contain the tables of the maintenance tasks.

NOTE:
AIR FILTER
• The air filter needs to be replaced more often when using the vehicle in particularly damp or dusty environments.

HYDRAULIC BRAKE MAINTENANCE
• Check brake fluid levels on a regular basis and top up as necessary.
• Replace 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	Check or maintenance intervals		Before Delivery	Frequency										Check Yearly
						1st		2nd		3rd		4th		5th		
				Km X 1,000	0	1		7		13		19		25		
				ml X 1,000	0	0.6		44		8.0		11.5		15.5		
1		Engine oil	Top up/Replacement	I		R		R		R		R		R		R
			Check	Every 500 km												
2	■	Oil filter	Change			R		R		R		R		R		
3	■	Air filter	Check/Replacement							R				R		
				Replace the air filter element more frequently when driving in very damp or dusty areas.												
4	■	Intake filter Oil	Check/Cleaning											I		
			Replace, if necessary.													
5	■	Fuel filter	Change									R				
				Every 18,000 km												
6	■	Throttle body	Check/Balancing/Cleaning							I						
7	■	Valve clearance	Operation check Adjust clearance.											I		
8	■	Distribution chain														
				N/A												
9	■	Distribution chain slides	Check											I		
			Change	Whenever the distribution chain tensioner is replaced												
10	■	Distribution chain tensioner	Check											I		
			Change	Every 48,000 km												
11	■	Spark plugs	Check/Replacement									R				
				Check the status, clean and adjust the spark plug gap.												
12	■	Distribution Chain	Check chain tension. Check whether the rear wheel is properly aligned. Clean and grease.	I		I		I		I		I		I		I
				Every 500 km and after every wash or if the motorcycle has been used in the rain.												

PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

MAINTENANCE INTERVALS

NO.		Item	Check or maintenance intervals		Before Delivery	Frequency										Check Yearly
						1st		2nd		3rd		4th		5th		
				Km X 1,000	0	1		7		13		19		25		
				ml X 1,000	0	0.6		44		8.0		11.5		15.5		
13	■	Chain wheel	Check/Lubricate			I		I		I		I		I		I
				Replace whenever the transmission chain is replaced.												
14	■	Sprocket/ Retaining washer	Check/Replacement			I		I		I		I		I		I
				Replace whenever the transmission chain is replaced.												
15	■	Fuel circuit hoses	Verify the fuel hoses are not cracked or damaged. If necessary, replace.			I		I		I		I		I		I
				Replace in any case every 4 years.												
16	■	Brake fluid	Check/Top up	I		I		I		I		I		I		I
			Change	Replace in any case every 2 years.												
17	■	Front brake/ Rear brake	Check caliper tightening. If necessary, replace pads. Make sure there are no leakages.	I		I		I		I		I		I		I
				Replace hoses every 4 years.												
19	■	Brake pads	Check/Replacement	I		I		I		I		I		I		I
				Replace if worn up to limit.												
20	■	Swingarm chain slides	Check/Replacement					I		I		I		I		I
				Replace if worn up to limit.												
21	■	Clutch control	Operation check Adjustment	I		I		I		I		I		I		I
22	■	Engine cover screws	Check/Tighten	I		T		T		T		T		T		
23	■	Control system of evapora-tive emissions (Canister)	Check for faults and leakages.			I		I		I		I		I		I
				No maintenance required. In case of malfunction, replace.												
24	■	Throttle control handgrip and cable	Check operation, if necessary, adjust throttle cable clearance.	I		I		I		I		I		I		I

PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

MAINTENANCE INTERVALS

NO.		Item	Check or maintenance intervals		Before Delivery	Frequency										Check Yearly
						1st		2nd		3rd		4th		5th		
				Km X 1,000	0	1		7		13		19		25		
				ml X 1,000	0	0.6		44		8.0		11.5		15.5		
25	■	Steering ring nut and sleeve	Check/Adjustment	I		I		I		I		I		I		I
				Adjust if necessary.												
26	■	Steering bearings	Verify that the bearing is not loose or damaged.			I		I		I		I		I		
				Lubricate and replace, if necessary.												
27	■	Front/rear wheel bearings	Verify that the bearing is not loose or damaged.							I				I		
				Lubricate and replace, if necessary.												
28	■	Bearings and guide pin Swingarm	Verify that the bearing is not loose or damaged.					I		I		I		I		
				Lubricate and replace, if necessary.												
29	■	Swingarm .	Check operation, the pin tightening and make sure the clearance is not excessive. Lubricate.	I				I		I		I		I		
30	■	Fork	Check operation and make sure there are no leaks.	I		I		I		I		I		I		I
31	■	Rear Suspension	Check/Adjustment, make sure there are no leaks.	I		I		I		I		I		I		I
32	■	Wheels	Check they are not damaged.	I		I		I		I		I		I		I
				Replace, if necessary.												
33	■	Tires	Check depth, verify they are not damaged. Check inflation pressure.	I		I		I		I		I		I		I
				Replace if worn up to limit.												
34	■	Side stand	Check/Operation	I		I		I		I		I		I		I
				Lubricate and tighten if necessary.												
35	■	Side stand	Check/Operation	I		I		I		I		I		I		I
36	■	Ignition Side stand	Check/Operation	I		I		I		I		I		I		I
37	■	Spring drive rubber on sprocket	Check/Operation					I		I		I		I		
				Replace if worn.												

PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

MAINTENANCE INTERVALS

NO.		Item	Check or maintenance intervals		Before Delivery	Frequency										Check Yearly
						1st		2nd		3rd		4th		5th		
				Km X 1,000	0	1		7		13		19		25		
				ml X 1,000	0	0.6		44		8.0		11.5		15.5		
38	■	Instruments, lights, signals, and switches	Check/Operation	I		I		I		I		I		I		I
39	■	Front head-light	Check/Operation	I		I		I		I		I		I		I
			Adjustment	At every change in vehicle set-up												
40	■	Acoustic signal	Check/Operation	I		I		I		I		I		I		I
41	■	Battery	Check/Operation/Re-charge	I		I		I		I		I		I		I
				Replace, if necessary.												
42	■	Electric system	Check operation, rubbing, clearance, and free movement.	I		I		I		I		I		I		I
43	■	Ignition switch	Check/Operation	I		I		I		I		I		I		I
44	■	Electronic injection	Reading of faults memo-ry ECU/ Parameters	I		I		I		I		I		I		I
45	■	Fastening of motorcycle parts	Ensure that all nuts, bolts, and screws have been accurately fastened.	T		T		T		T		T		T		T
46	■	Parts and wires subject to movement	Check/Replacement	I		I		I		I		I		I		I
				Replace, if damaged.												
47	■	Coolant .	Check/Top up	I		I		I		I		I		R		I
			Change	Every 3 years when reaching the mileage.												
48	■	Cooling System	Check the coolant level and verify that there are no leaks of coolant from the vehicle.	I		I		I		I		I		I		I
49	■	Electric fans	Check/Operation	I		I		I		I		I		I		I
50	■	Spokes of front / rear wheel	Tightness test and alignment for equipped versions	I		I				I				I		

ENGINE/AIR-BOX

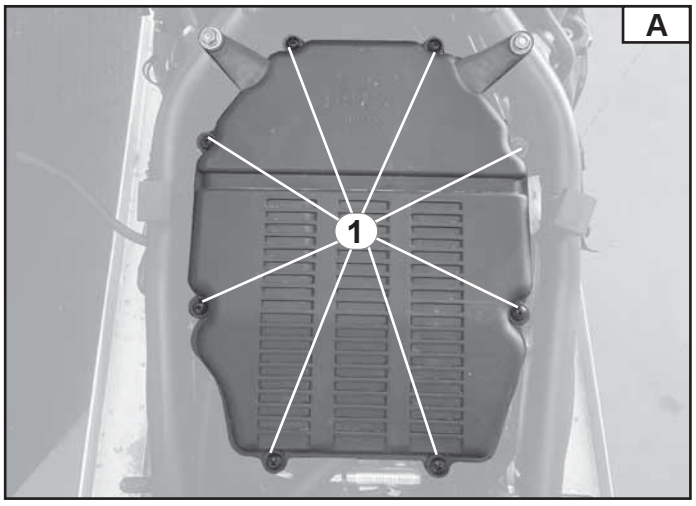
REMOVAL OF FILTER ELEMENT

Park the motorcycle on a level surface.

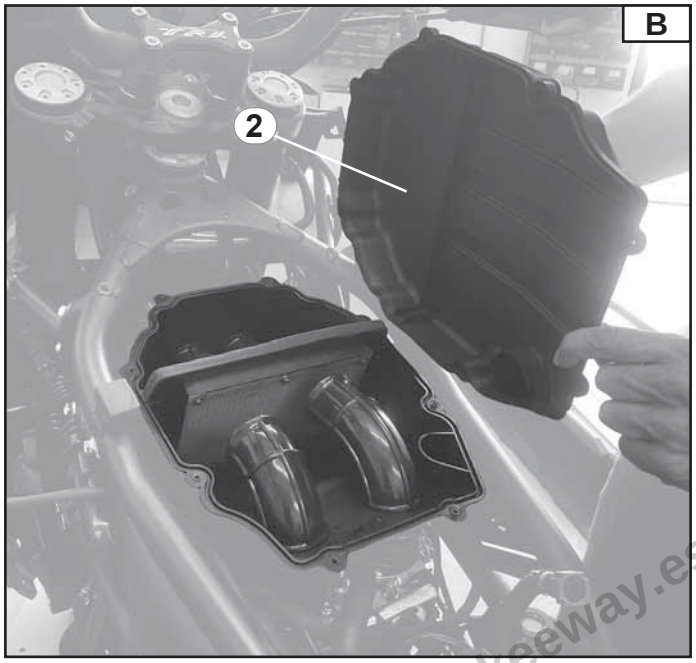
NOTICE

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

Remove:
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The fuel tank, refer to **"Removal of the fuel tank, Chapter 4.".**
- The 8 screws (1) Fig. A.
- The cover (2) Fig. B.



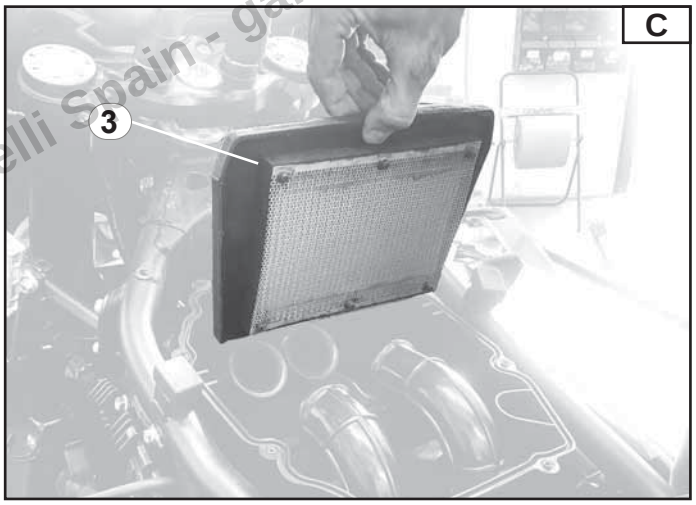
Remove:
- The filter element (3) Fig. C.



NOTICE

Replace the air filter element every 13,000 km (8,078 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 filter element is damaged, replace.



ENGINE/AIR-BOX

INSTALLATION OF THE FILTER ELEMENT

Installation:

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

WARNING

Never switch on the engine if the ait filter is not installed. The unfiltered air causes a quick wear of the engine parts and might 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 engine life depends mainly on this part.

ENGINE/THROTTLE CABLE CLEARANCE

ADJUSTMENT OF THROTTLE CABLE CLEARANCE

Check:

- **The throttle cable clearance (1) Fig. A.**

Make sure the throttle hand grip works smoothly. Furthermore, check that the max opening position and the automatic closing one can be reached in any steering position. If outside specifications, adjust.

Throttle cable clearance (A)	Size
Throttle cable	2 - 3 mm (0.0787 - 0.1181 in)

Adjust:

- Throttle cable clearance.

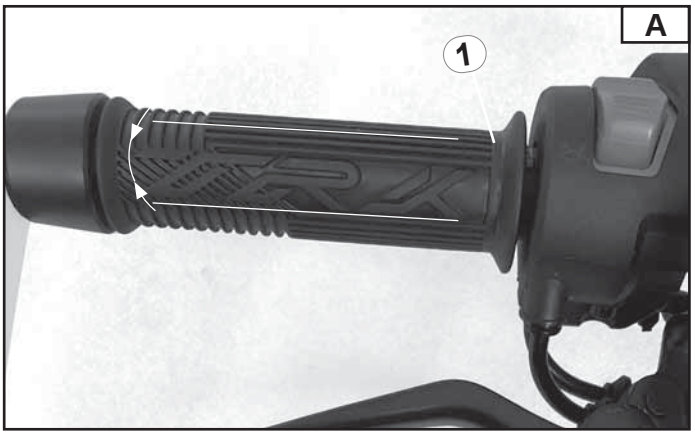
Handlebar side

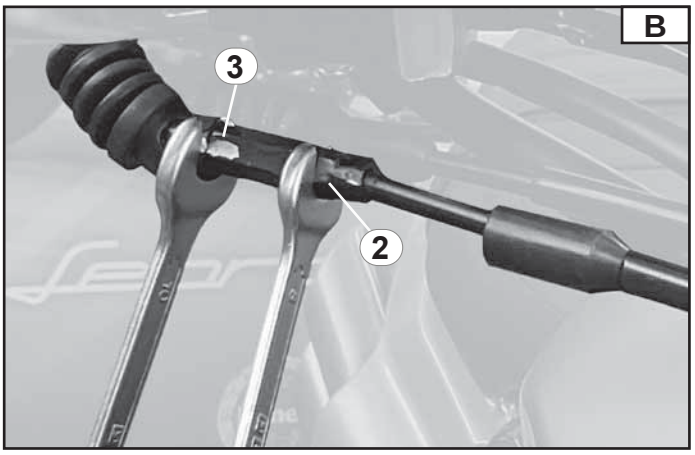
1. Loosen the lock nut (3) Fig. B.
2. Turn the adjustment nut (2) clockwise or counter-clockwise until the throttle cable clearance meets specifications, Fig. B.

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

3. Tighten the lock nut (3).

Make the adjustment to both acceleration 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.

ENGINE/CLUTCH CABLE

ADJUSTMENT OF CLUTCH CABLE CLEARANCE

Check:

- **The clutch cable clearance (1) Fig. A.**

If outside range, adjust.

Clearance distance
3 - 4 mm (0.1181 - 0.15748 in)

Adjust:

- The clutch cable clearance.

Handlebar side

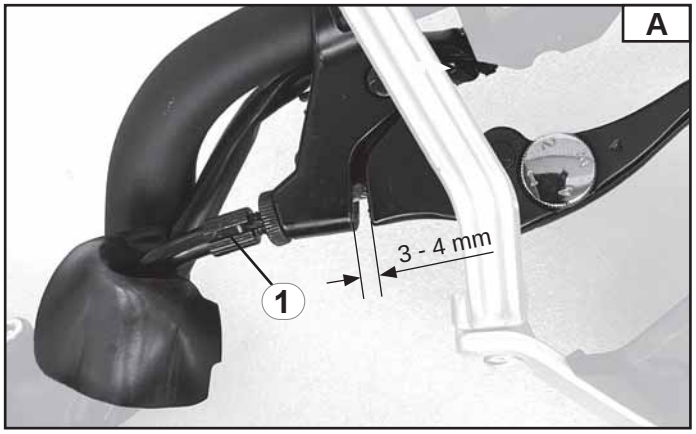
1. Move the clutch cable cowling.
2. Tighten the ring nut (2) Fig. B.
3. Rotate the register (3) clockwise or counter-clockwise up to the specified clutch cable clearance Fig. B.

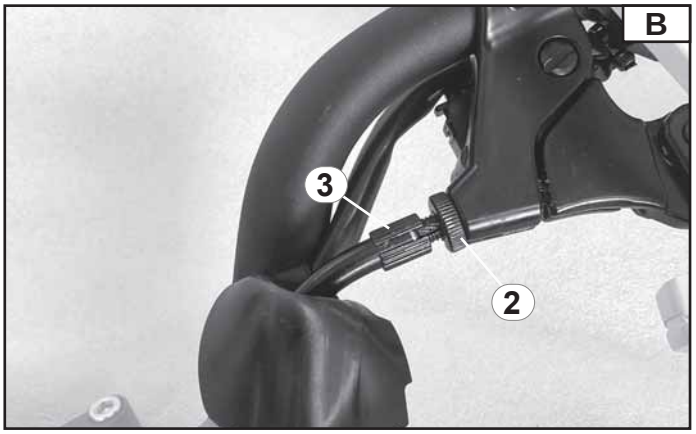
Clutch cable clearance	Clearance
Clockwise	The gap is increased
Counter-clockwise	The gap is decreased

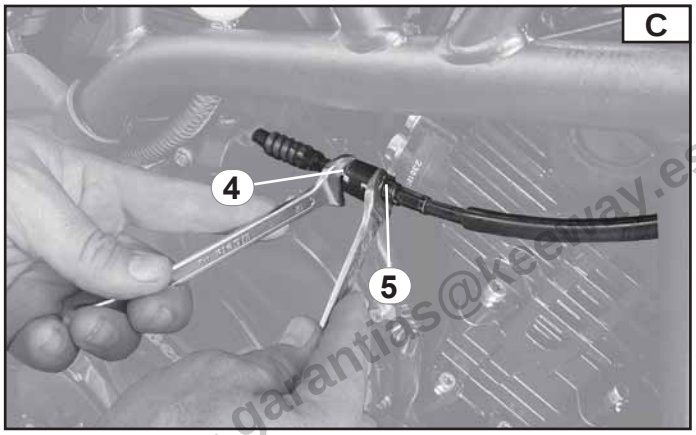
4. Tighten the ring nut (2) Fig. B.

NOTE:
If it is not possible to achieve the specified clearance for the clutch cable from the handlebar side, use the adjustment nut on the engine side (5) Fig. C.

1. Prise the dust seal in the middle of the clutch cable.
2. Loosen the lock nut (4) in the middle of the clutch cable.
3. Turn the adjustment nut (5) until the clearance is reached.
4. Tighten the lock nut (4) in the middle of the clutch cable.
5. Reposition the dust seal.



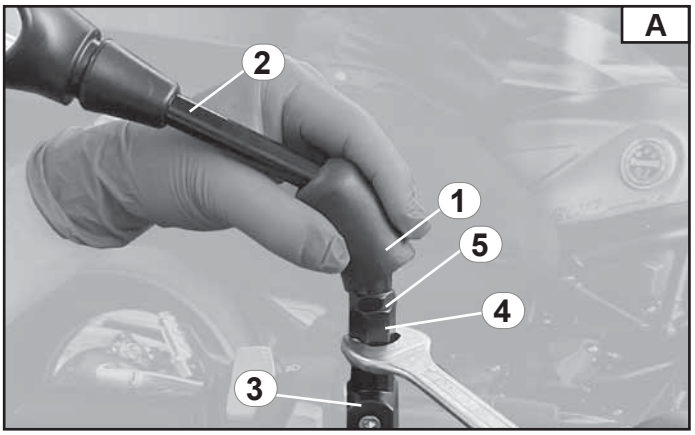




FRAME/HANDLEBAR

ADJUSTMENT OF THE REAR-VIEW MIRRORS

The following procedure applies to both rear-view mirrors.



Install:

1. Lift the protective cap (1).
2. Screw the mirror (2) on the lever body (3).
3. Move the nut (4) until it stops.
4. Adjust the mirror position by rotating it.
5. Tighten the lock nut (5).

ENGINE/ENGINE OIL

ENGINE OIL LEVEL CHECK

Park:
- The motorcycle on a level surface.

NOTE:
- **Place the motorcycle on a suitable stand.**
- **Make sure that the motorcycle is upright.**

Start:
- The engine.

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

NOTICE

Do not start the engine if the oil level is below the MIN level shown on the sight glass (2) Fig. B.

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

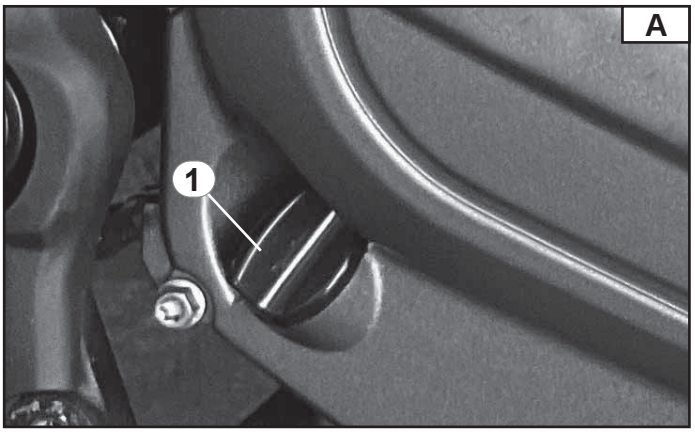
Check of engine oil level:
- Start the engine, warm it up for several minutes, and then turn it off.
- Wait a few minutes to allow oil to settle.
- Place the vehicle on a flat surface keeping it upright. A slight tilt to the side can lead to control errors.
- Check oil level via the sight glass (2) Fig. B.
- Unscrew the oil filler cap and add oil. Engine oil should be between the MIN and MAX level marks.
- If the engine oil is below the minimum level mark, top up sufficient recommended oil up to the correct level.

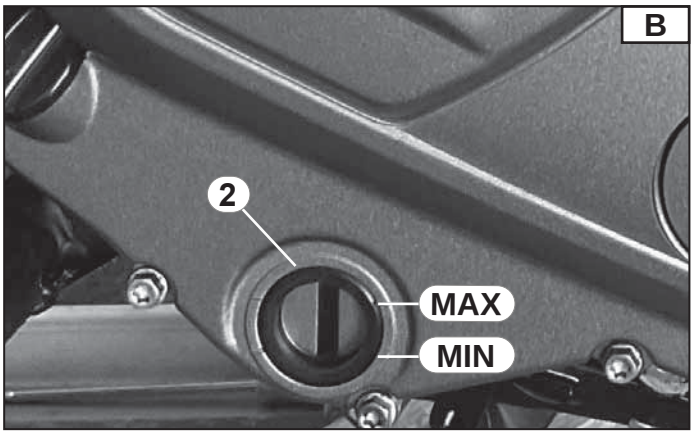
Recommended oil
API SN - SAE 10w50

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 sight glass (2) Fig. B.
- Screw the oil filler cap back in place (1) Fig. A.

NOTE:

The engine contains 2.4 +/- 0.1 l of oil (with filter replacement), 2.2 +/- 0.1 l of oil (without filter replacement).





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.**

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.

NOTICE

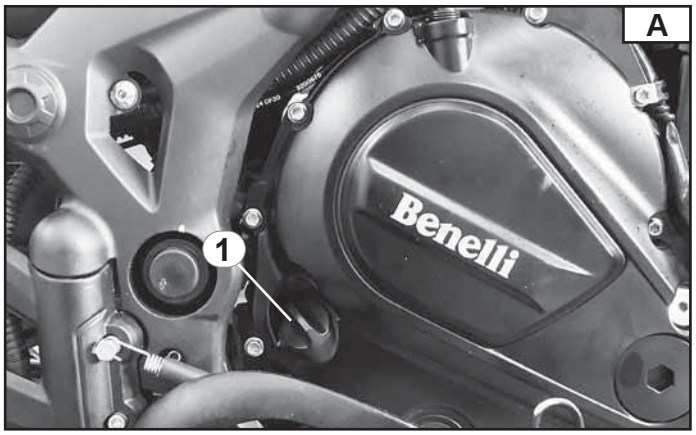
ENGINE/ENGINE OIL

CHANGE OF ENGINE OIL

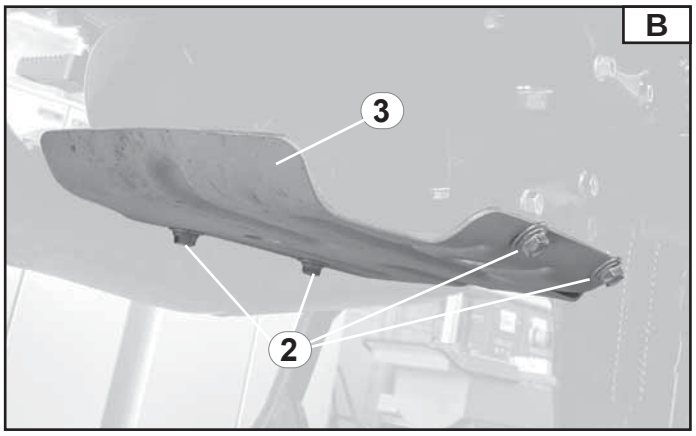
Start:
- The engine.

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

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



- The screws (2) Fig. B.
- The oil pan protective plate (3) Fig. B.



Place:
- A suitable container underneath the drainage for engine oil recovery Fig. C.

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) and the copper gasket (3) Fig. D.

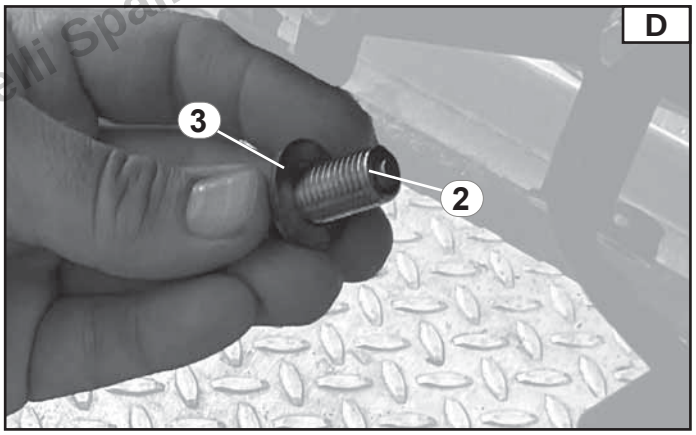
Drain:
- The engine oil from the crankcase.

NOTE:
When changing oil, change also the oil filter cartridge.

Replace:
- The gasket (3) of the magnetic cap Fig. D.

Install:
- The magnetic cap.

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



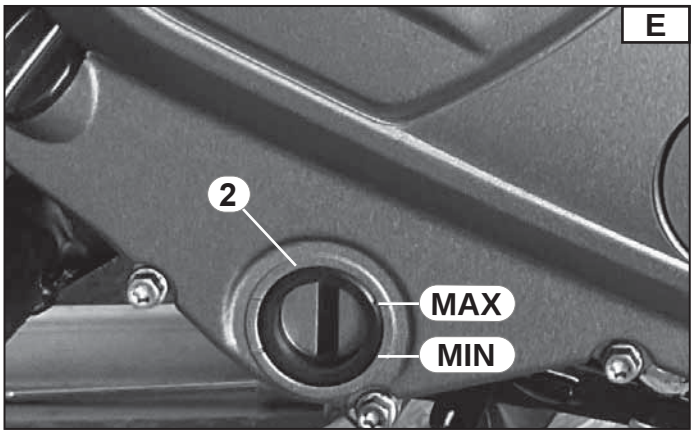
Tighten:
- The magnetic cap to the following torque:

Torque 22N*
Fill:

ENGINE/ENGINE OIL
CHANGE OF ENGINE OIL

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

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



Start:
- The engine.

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

NOTE:
Always make sure that the level is halfway between the MIN and MAX marks on the gauge (2) Fig. E.
Top up, if necessary.

Recommended engine oil:
Grade: API SN - SAE
Viscosity: 10W50
Capacity: 2.4 ± 0.1 l of oil (with filter replacement)
Capacity: 2.4 ± 0.1 l of oil (without filter replacement)

ENGINE/ENGINE OIL

OIL FILTER REMOVAL/INSTALLATION

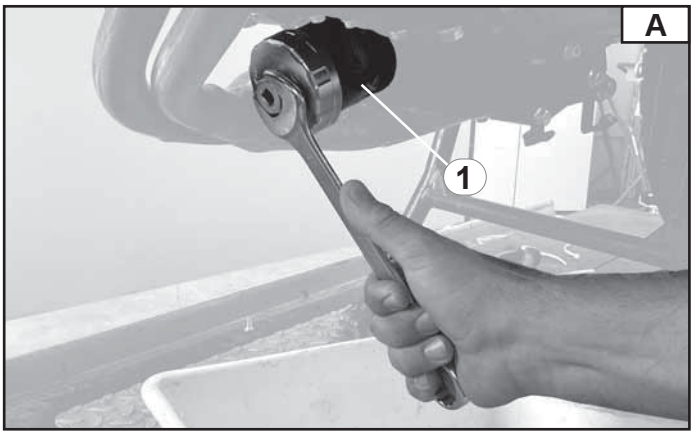
NOTE:
Before removing the oil filter, it is necessary to remove the oil from the engine.

Removal:

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

Tool for oil filter removal
Code: KST03BL01031

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 15 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 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 motorcycle on suitable supports so that it cannot fall.

Remove:
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The tank, refer to **"Removal of the fuel tank, Chapter 4".**
- The air filter box, refer to **"Removal of the air filter box, Chapter 4"**.

Remove:
- The screw (1) Fig. A.
- The bracket (2) Fig. A.

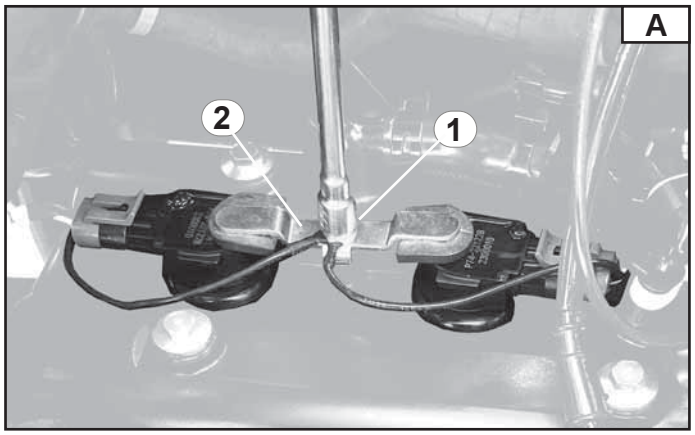
Disconnect:
- The ground cables (3) Fig. B.
- The connectors (4) of the coils Fig. B.

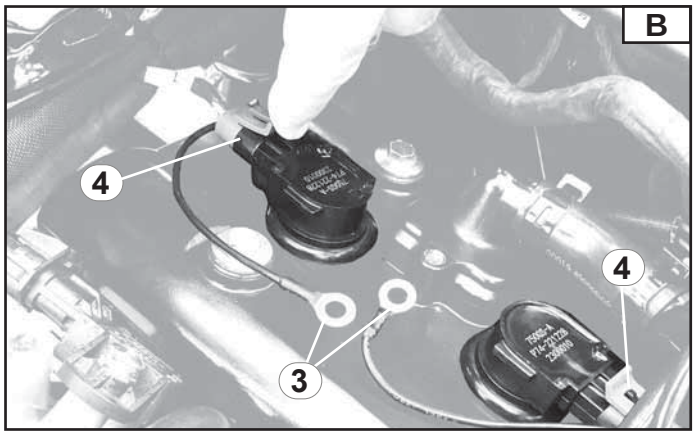
Slide out:
- The coil (5) Fig. C.

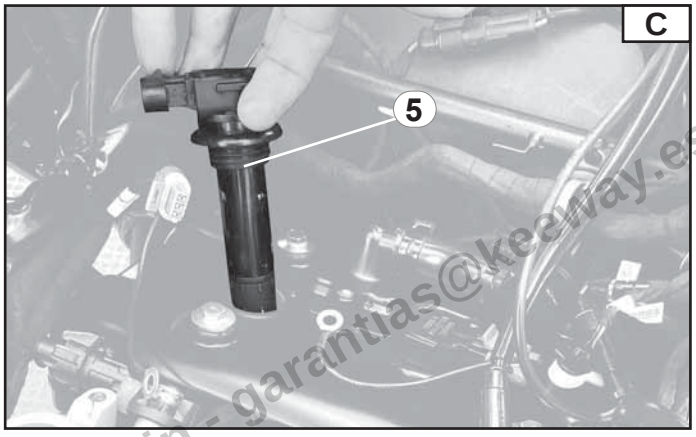
NOTICE

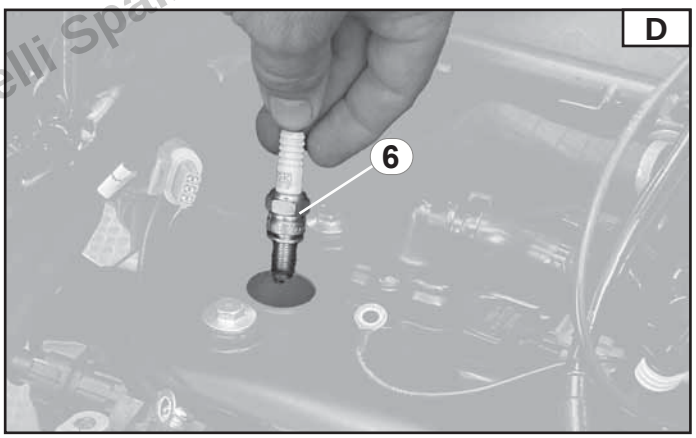
Before removing the spark plugs, remove any build up of dirt from the seat with a jet of compressed air, to prevent it from dropping down into the cylinders.

Screw off:
- The spark plug underneath (6) Fig. D.









ENGINE/SPARK PLUGS

CHECKING OF SPARK PLUGS

The following procedure applies to all spark plugs.

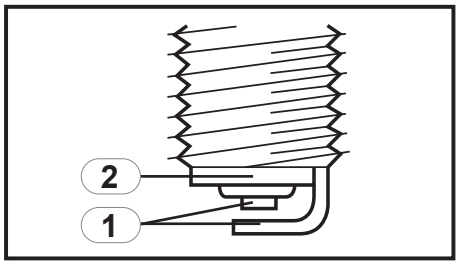
Check:
- The type of spark plug.

Check:
- the electrodes (1) Fig. E.
- If there is any damage, wear or rounding.

Replace the spark plug.
- the insulating part (2) Fig. E.

Abnormal colour.
Replace the spark plug.
Generally, the colour is a light, medium brown.

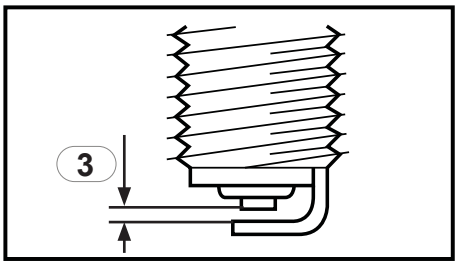
E



Check:
Measure the spark plug gap Fig. F with a thickness gauge.

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

F



Distance between spark plug electrodes	(mm)
3	0.7 - 0.8 mm (0.027 - 0.031 in)

Spark plug type
NGK CR8EGP

ENGINE/SPARK PLUGS

CHECKING OF SPARK PLUGS

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

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

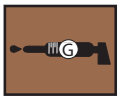
ENGINE/SPARK PLUGS

INSTALLAZIONE OF SPARK PLUG

NOTE:
The following procedure applies to all spark plugs.

WARNING

Lubricate the spark 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:
- The coil (1) Fig. A.

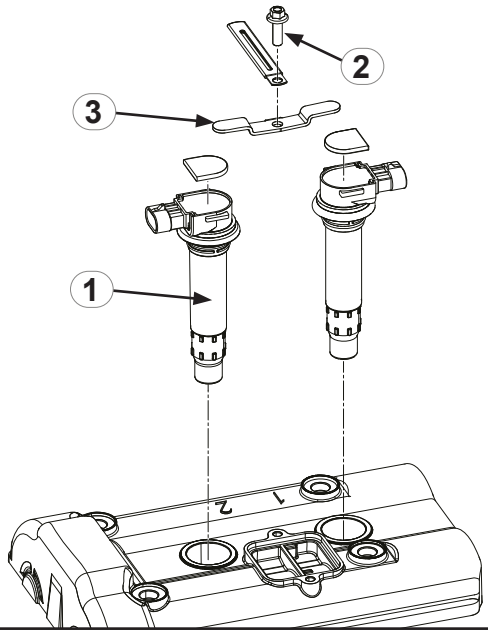
Connect:
- The coil connector.

Install:
- The screw (2) Fig. A.
- The bracket (3) Fig. A.

Tighten to the following torque:

Torque 10 N*m

A



CHECK OF THE ENGINE/VALVE CLEARANCE

ADJUSTMENT OF THE VALVE CLEARANCE WITH ENGINE ON THE FRAME

Park:

- The motorcycle on a level surface.

NOTICE

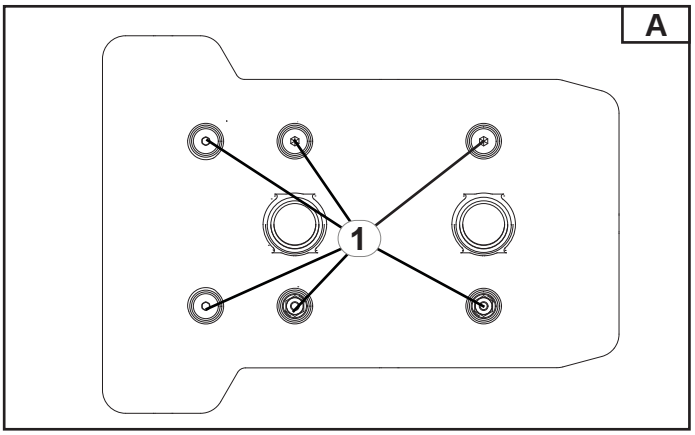
Prop the motorcycle on suitable supports so that it cannot fall.

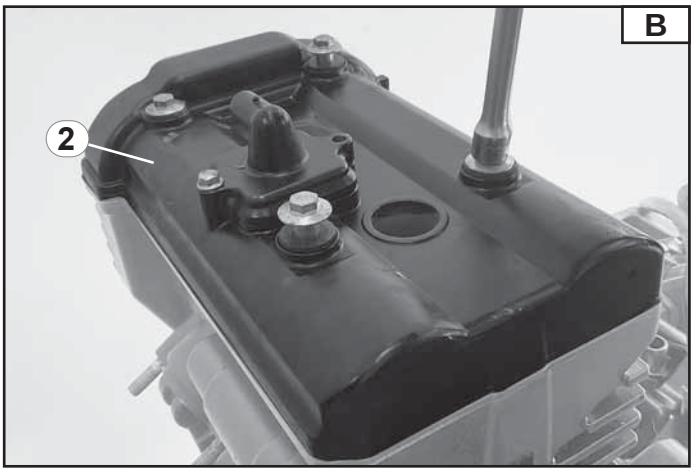
Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The tank, refer to **"Removal of the fuel tank, Chapter 4".**
- The air filter box, refer to **"Removal of the air filter box, Chapter 4"**.
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**

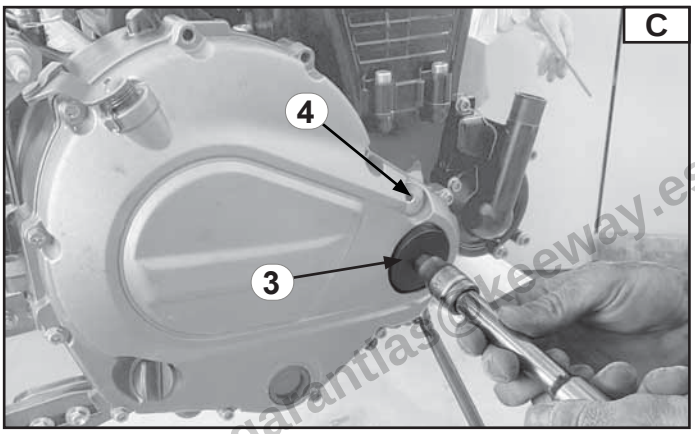
Remove:

- The 6 screws (1) Fig. A.
- The cover (2) Fig. B.



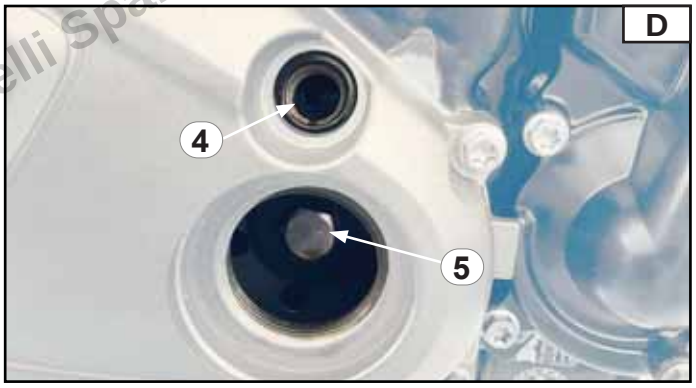


- The drive shaft cap (3) Fig. C.
- The distribution sprocket timing check cap (4) Fig. C.



Check for piston 1:

- That the reference mark (1T) on the camshaft sprocket is aligned as shown in Fig. D, otherwise rotate the crankshaft (5) for alignment Fig. D.



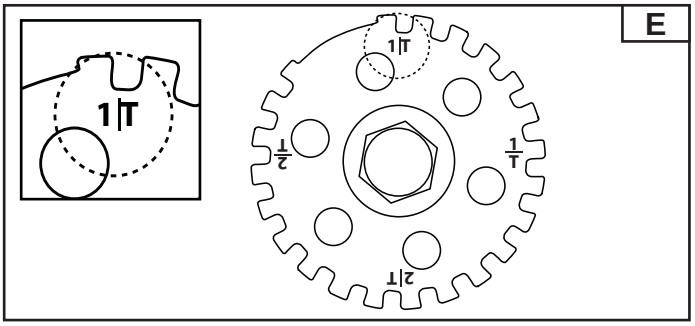
CHECK OF THE ENGINE/VALVE CLEARANCE

ADJUSTMENT OF THE VALVE CLEARANCE

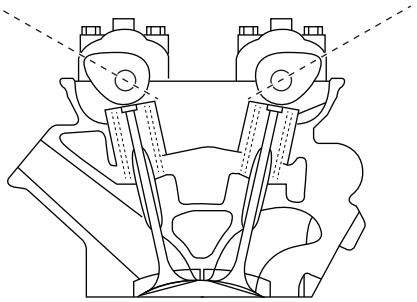
- Fig. E shows the position of the camshaft during the positioning of the piston 1(SX). at top dead centre, position (1IT).

NOTE:
The position of the intake/exhaust camshafts must be outwards as shown in Fig. F.

E



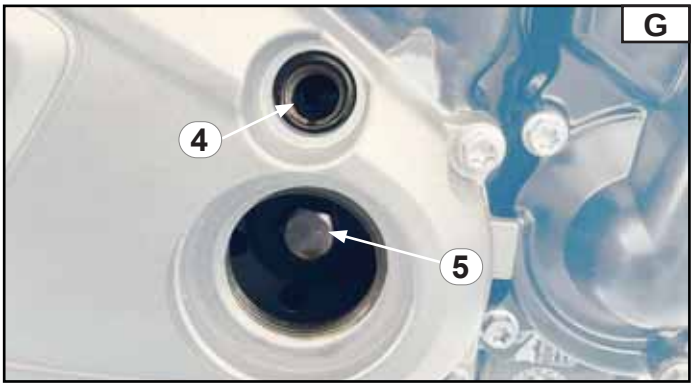
F



Check for piston 2:

- That the reference mark (2T) on the camshaft sprocket is aligned as shown in Fig. G, otherwise rotate the crankshaft (5) for alignment Fig. G.

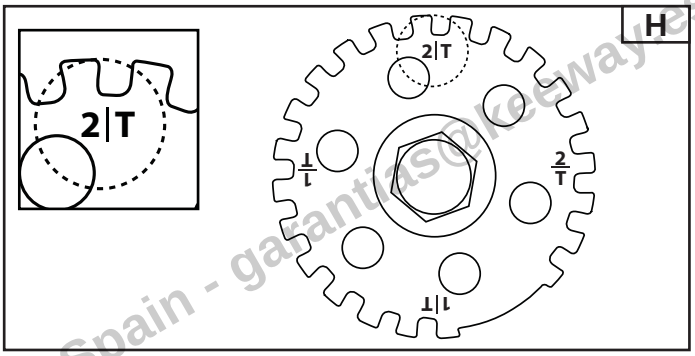
G



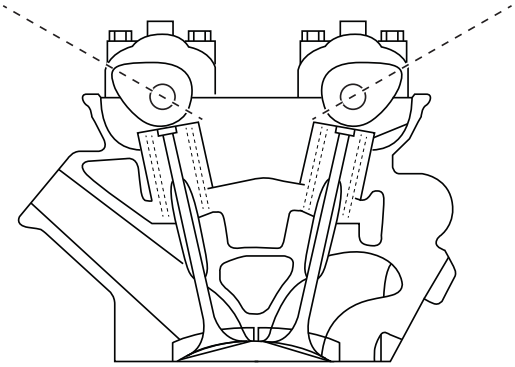
- Fig. H shows the position of the camshaft during the positioning of the piston 2(DX). at top dead centre, position (2IT).

NOTE:
The position of the intake/exhaust camshafts must be outwards as shown in Fig. I.

H



I

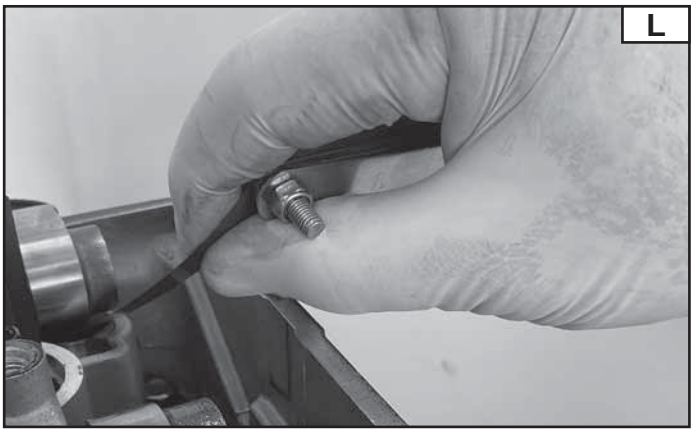


CHECK OF THE ENGINE/VALVE CLEARANCE

ADJUSTMENT OF THE VALVE CLEARANCE

Check:

- The valve clearance via thickness gauge Fig. L.



NOTE:
The valve clearance must be controlled and adjusted while the engine is cold and at ambient temperature.

NOTE:
The measurement must be taken on all cams and tappets.

Camshaft	Tappet-cam clearance
Camshaft on exhaust side	0.25 - 0.31 mm (0.0098 - 0.0122 in)
Camshaft inlet side	0.15 - 0.21 mm (0.0059 - 0.0082 in)

NOTE:
In case of valve clearance correction, replace the calibrated tappets, referring to the following calibrated tappets selection tables.

CHECK OF THE ENGINE/VALVE CLEARANCE

ADJUSTMENT OF THE VALVE CLEARANCE

Table for selection of the intake valve tappets

Clearance detected (mm)	Tappet installed															
	346	350	354	358	362	366	370	374	378	382	386	390	394	398	402	406
0									346	350	354	358	362	366	370	374
0.01-0.02								346	350	354	358	362	366	370	374	378
0.03-0.04							346	350	354	358	362	366	370	374	378	382
0.05-0.06						346	350	354	358	362	366	370	374	378	382	386
0.07-0.08					346	350	354	358	362	366	370	374	378	382	386	390
0.09-0.10				346	350	354	358	362	366	370	374	378	382	386	390	394
0.11-0.12			346	350	354	358	362	366	370	374	378	382	386	390	394	398
0.13-0.14		346	350	354	358	362	366	370	374	378	382	386	390	394	398	402
0.15-0.21	Correct clearance															
0.22-0.23	350	354	358	362	366	370	374	378	382	386	390	394	398	402	406	
0.24-0.25	354	358	362	366	370	374	378	382	386	390	394	398	402	406		
0.26-0.27	358	362	366	370	374	378	382	386	390	394	398	402	406			
0.28-0.29	362	366	370	374	378	382	386	390	394	398	402	406				
0.30-0.31	366	370	374	378	382	386	390	394	398	402	406					
0.32-0.33	370	374	378	382	386	390	394	398	402	406						
0.34-0.35	374	378	382	386	390	394	398	402	406							
0.36-0.37	378	382	386	390	394	398	402	406								
0.38-0.39	382	386	390	394	398	402	406									
0.40-0.41	386	390	394	398	402	406										
0.42-0.43	390	394	398	402	406											
0.44-0.45	394	398	402	406												
0.46-0.47	398	402	406													
0.48-0.49	402	406														
0.50-0.51	406															

(1 mm = 0,0393701 in)

Example:

- Valve clearance detected (0.30mm)
- Tappet installed (366)

Tappet to be used to obtain the correct clearance 0.15/0.21 (386)

CHECK OF THE ENGINE/VALVE CLEARANCE

ADJUSTMENT OF THE VALVE CLEARANCE

Table for selection of the exhaust valve tappets

Clearance detected (mm)	Tappet installed															
	346	350	354	358	362	366	370	374	378	382	386	390	394	398	402	406
0.05-0.06							346	350	354	358	362	366	370	374	378	382
0.07-0.08						346	350	354	358	362	366	370	374	378	382	386
0.09-0.10						346	350	354	358	362	366	370	374	378	382	386
0.11-0.12					346	350	354	358	362	366	370	374	378	382	386	390
0.13-0.14					346	350	354	358	362	366	370	374	378	382	386	390
0.15-0.16				346	350	354	358	362	366	370	374	378	382	386	390	394
0.17-0.18				346	350	354	358	362	366	370	374	378	382	386	390	394
0.19-0.20			346	350	354	358	362	366	370	374	378	382	386	390	394	398
0.21-0.22			346	350	354	358	362	366	370	374	378	382	386	390	394	398
0.23-0.24		346	350	354	358	362	366	370	374	378	382	386	390	394	398	402
0.25-0.31	Correct clearance															
0.32-0.33	350	354	358	362	366	370	374	378	382	386	390	394	398	402	406	
0.34-0.35	354	358	362	366	370	374	378	382	386	390	394	398	402	406		
0.36-0.37	354	358	362	366	370	374	378	382	386	390	394	398	402			
0.38-0.39	358	362	366	370	374	378	382	386	390	394	398	402				
0.40-0.41	358	362	366	370	374	378	382	386	390	394	398					
0.42-0.43	362	366	370	374	378	382	386	390	394	398						
0.44-0.45	362	366	370	374	378	382	386	390	394							
0.46-0.47	366	370	374	378	382	386	390	394								
0.48-0.49	366	370	374	378	382	386	390									
0.50-0.51	370	374	378	382	386	390										
0.52-0.53	370	374	378	382	386											
0.54-0.55	374	378	382	386												
0.56-0.57	374	378	382													
0.58-0.59	378	382														
0.60-0.61	378															

(1 mm = 0,0393701 in)

Example:

- Valve clearance detected (0.11mm)
- Tappet installed (386)

Tappet to be used to obtain the correct clearance 0.25/0.31 (370)

ENGINE/COOLING SYSTEM

CHECK OF THE COOLANT

Park the motorcycle on a level surface.

NOTICE

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

NOTE:
Make sure that the motorcycle is upright.
Check the level when the engine is cold.

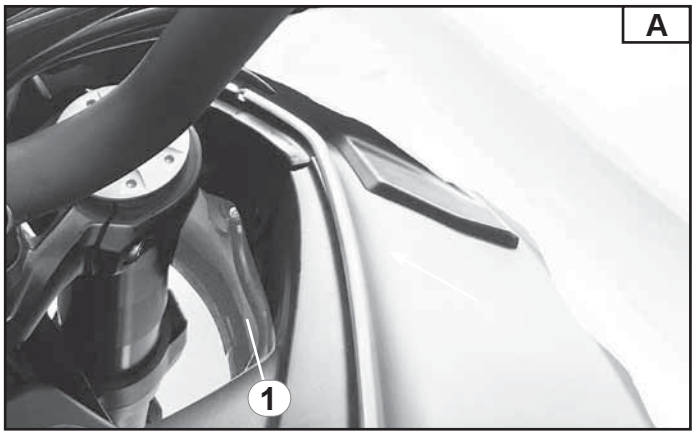
Check:
- The coolant level (1) Fig. A.

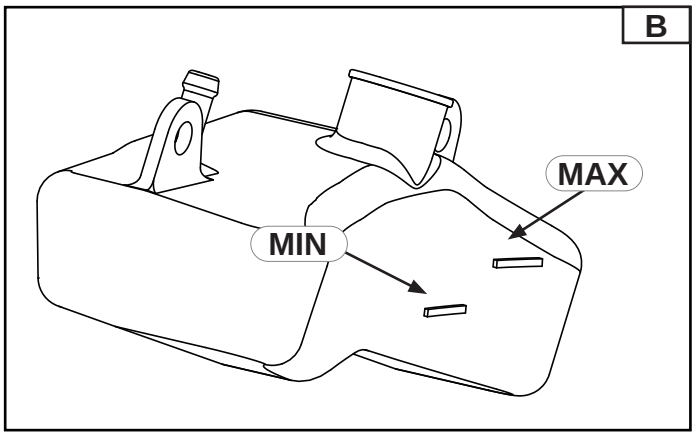
The coolant level must be within the maximum level reference (MAX) and the minimum one (MIN). If below the minimum notch, top up with the recommended coolant up to the correct level Fig. B.

Remove:
- The expansion tank cap.

Add:
- The coolant up to the level line (MAX) Fig. B.

Position:
- The expansion tank cap.





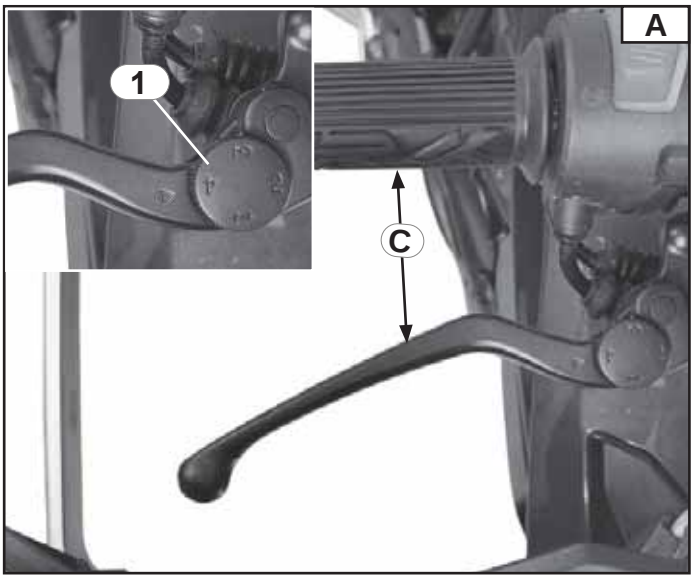
FRAME/BRAKE ADJUSTMENT

ADJUSTMENT OF FRONT BRAKE

Adjust:

- The brake lever position Fig. A.

(Distance "x" 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 (1) Fig. A clockwise or counter-clockwise until the brake lever reaches the required position.

Ring nut Position	Distance
Position 1	The distance is further from the handlebar.
Position 4	The distance is nearer to the handlebar.

WARNING

If the brake lever is soft or spongy to the touch, this may be a symptom of air in the brake system. Before using the motorcycle, 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

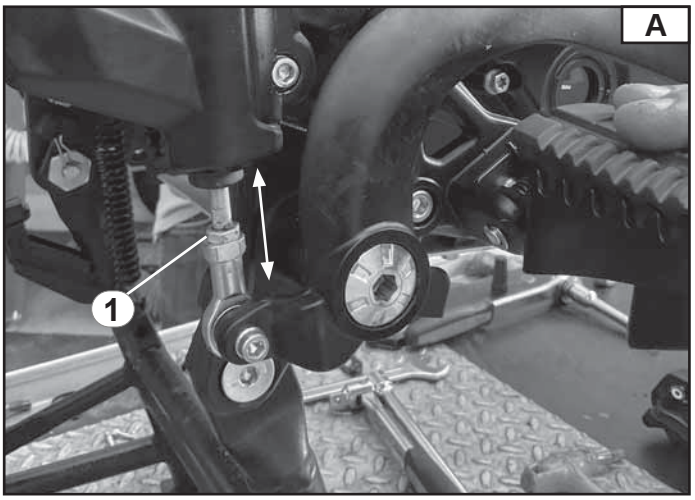
ADJUSTMENT OF THE REAR BRAKE

Screw off:
- The lock nut (1) Fig. A.

Adjust:
- Screw up o screw off the threaded pin to increase or reduce the rear brake lever clearance.

Tighten:
- The lock nut (1) Fig. A after adjustment.

NOTE:
Check the clearance on the tip ranges from 3 and 5 mm (between 0.118 in and 0.196 in).



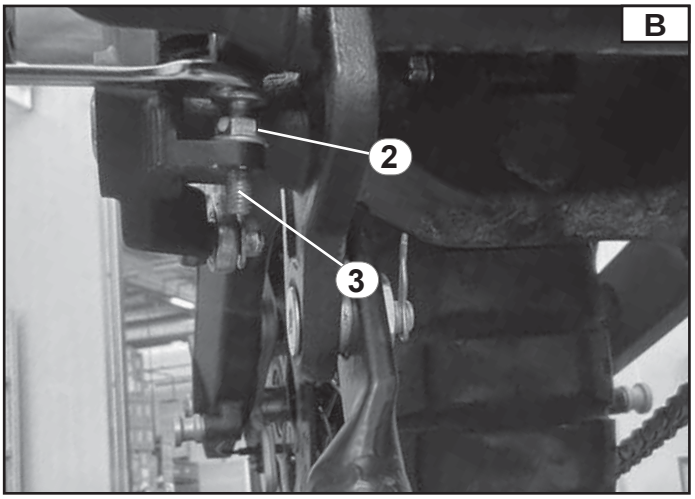
Adjust:
The stop screw of the brake pedal.

Screw off:
- The lock nut (2) of the stop screw (3) Fig. B.

Adjust:
- Tighten or loosen the stop screw (3) to obtain the correct stop.

Tighten:
- The locknut (2) after adjustment.

NOTE:
Check the clearance on the tip ranges from 3 and 5 mm (between 0.118 in and 0.196 in).



WARNING

If the brake pedal is soft or spongey to the touch, this may be a symptom of air in the brake system. Before using the motorcycle, 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 position of the brake pedal, make sure that there is no brake dragging.

FRAME/BRAKE FLUID CHECK AND CHANGE

FRONT BRAKE FLUID CHANGE

Park:

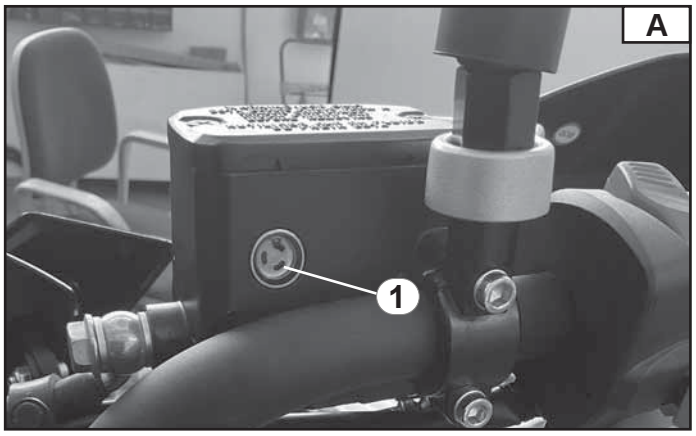
- The motorcycle on a level surface.

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

Check:

- The brake fluid level.

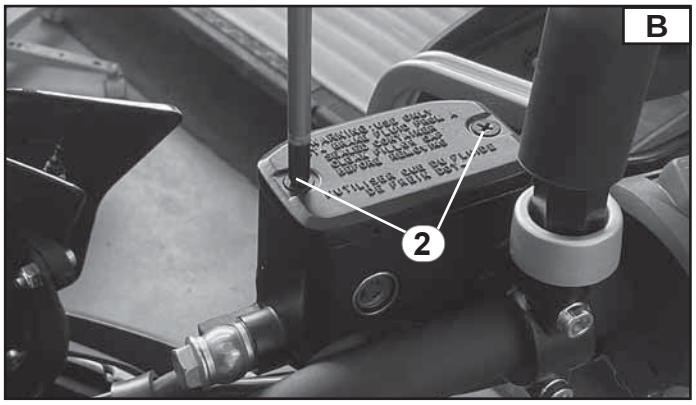
If below the minimum notch (1) Fig. If below the minimum notch "A" Fig. A, top up with the recommended brake fluid until it is at the correct level.



NOTE:
Before proceeding with the topping-up procedure, check the brake pads for wear.
To replace the pads, refer to Chapter "Frame", paragraph "Removal and installation of the front brake pads".

Fluid topping up procedure:

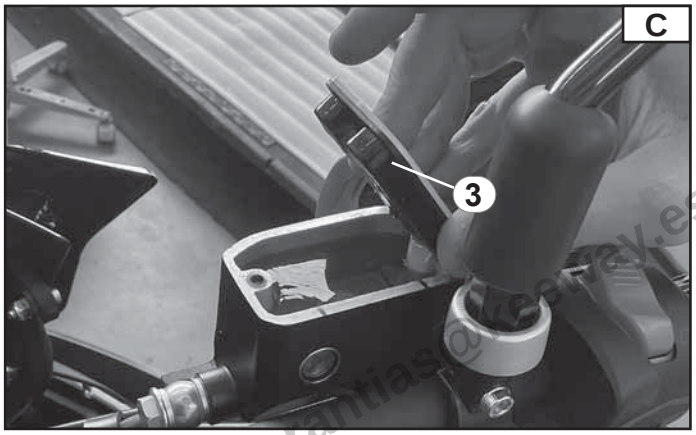
- Place the motorcycle on a level surface.
- Loosen the screws (2) Fig. B.



Check:

- The cap gasket (3) Fig. C.

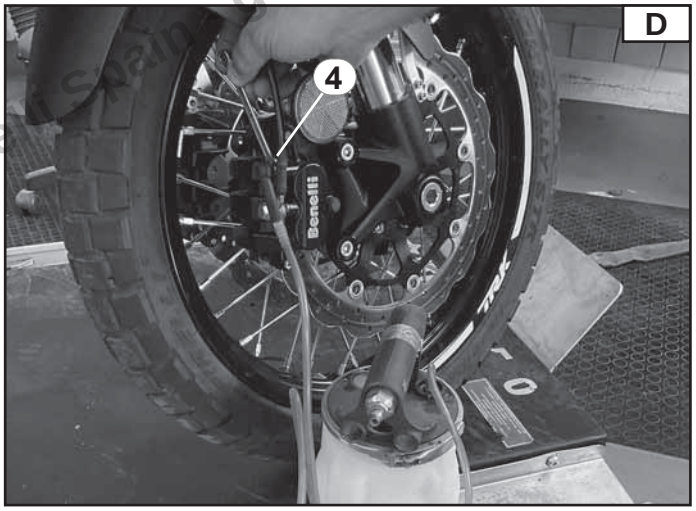
If there is any damage/wear,
Replace the gasket.



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.

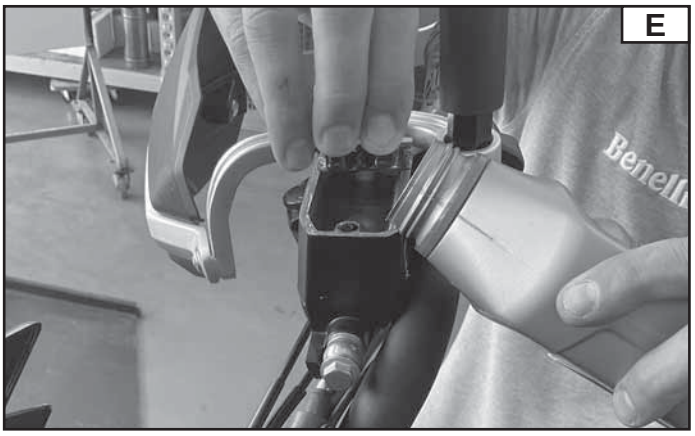
- Apply the vacuum device to the drain screw (4) Fig. D.
- Activate the device and open the drain screw.



FRAME/BRAKE FLUID CHECK AND CHANGE

FRONT BRAKE FLUID CHANGE

- Regularly top the fluid up during the drain phases.
- Close the drain screw and stop the vacuum device.
- Repeat the same procedure on both calipers.
- Restore the correct level of brake fluid in the container.
- Top up the fluid as far as the level in the peephole (1) on the pump Fig. A.
- Pump the brake fluid by moving the brake lever.
- Should the brake lever be spongy to the touch, activate the bleeding function present on the ABS diagnostic system.
- Once the top up is complete Fig. E, apply the cap and tighten the two fixing screws of 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.

TOP 4	Fluido freni consigliato DOT-4

FRAME/BRAKE FLUID CHECK AND CHANGE

REAR BRAKE FLUID CHANGE

Park:

- The motorcycle on a level surface.

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

Check:

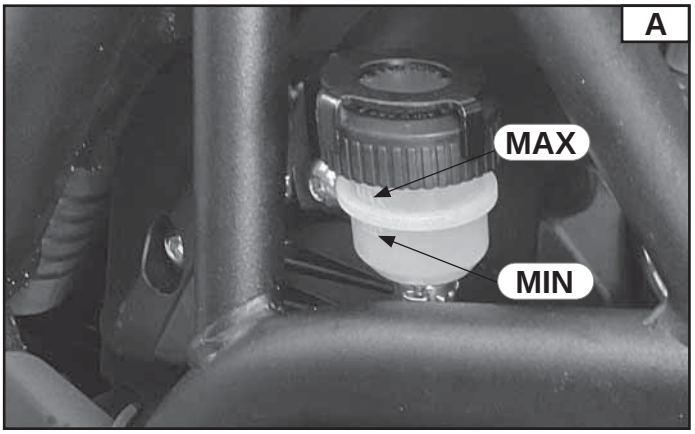
- The brake fluid level.

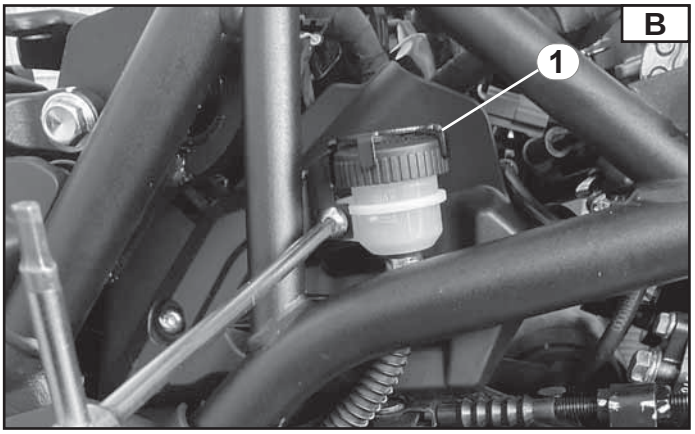
If below the minimum notch Fig. A, top up with the recommended brake fluid until it is at the correct level.

NOTE:
Before proceeding with the topping-up procedure, check the brake pads for wear.
To replace the pads, refer to Chapter "Frame", paragraph "Removal and installation of Rear brake pads".

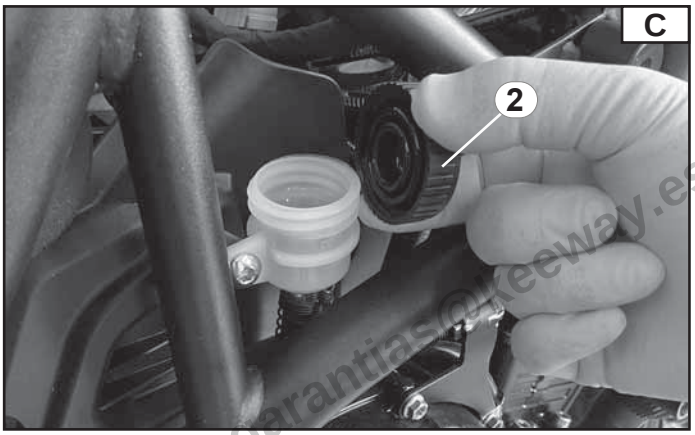
Fluid topping up procedure:

- Remove the protection (1) Fig. B of the cap of the rear brake pump tank.





- Loosen the top cap (2) on the brake pump tank Fig. C.



NOTICE

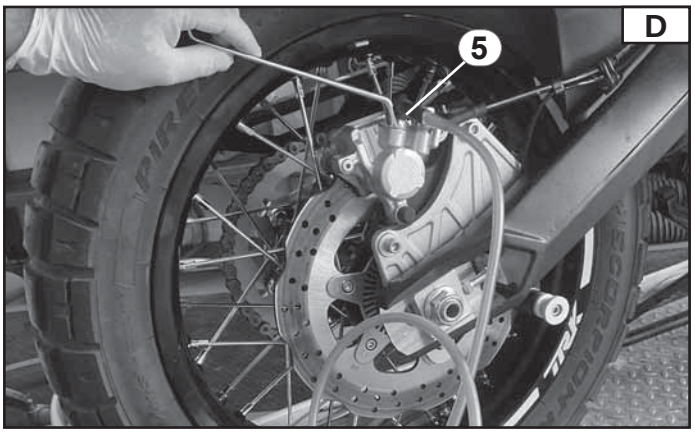
Brake fluid can damage painted surfaces or plastic parts. Therefore, wrap the absorbent paper around the pump and always clean up any brake fluid spills immediately.

- Top the liquid up to the MAX level indicated on the container.

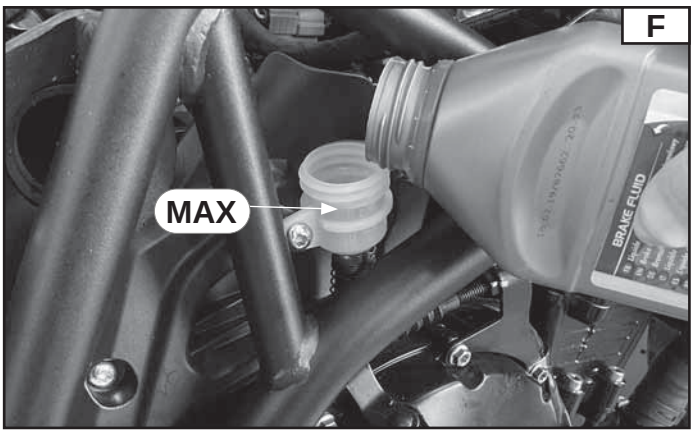
FRAME/BRAKE FLUID CHECK AND CHANGE

REAR BRAKE FLUID CHANGE

- Connect and activate the device and open the drain screw (5) Fig. D.
- Regularly top the fluid up during the drain phases.
- Close the drain screw and stop the vacuum device.
- Restore the correct level of brake fluid in the container.
- Top up the fluid as far as the level in the peephole (1) on the pump Fig. A.
- Pump the brake fluid through movement of the brake pedal.
- Should the brake pedal be spongy to the touch, activate the bleeding function present on the ABS diagnostic system.
- Once the top up is complete Fig. F, position the cap back.



- Close the pump tank cover.
- Re-install the pump cover protection.



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/CHECKING ABS HOSES

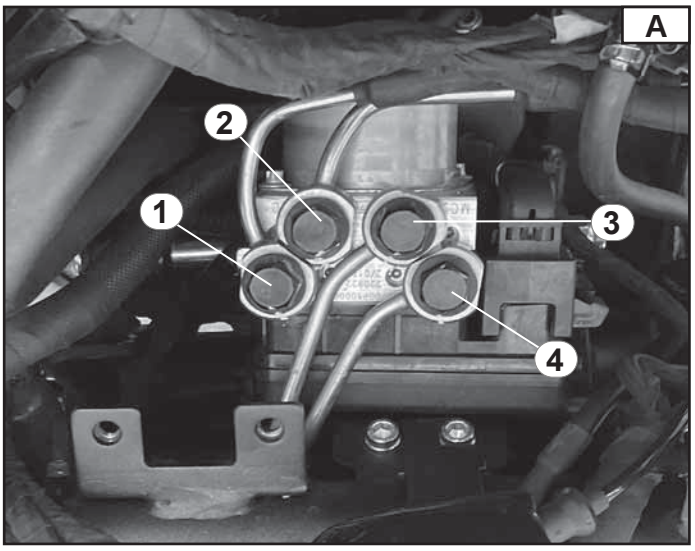
CHECK FOR ANY LEAKAGES OF ABS TUBES

Park:

- The motorcycle on a level surface.

NOTE:
Place the motorcycle 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 passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The tank, refer to **"Removal of the fuel tank, Chapter 4".**
- The air filter box, refer to **"Removal of the air filter box, Chapter 4"**.
- The throttle body, refer to **"Removal of the throttle body, Chapter 5"**.
- Activate the lever or the brake pedal and check for any leaks of brake fluid from the hoses and brake fittings.
- In case of fluid leakage in any point, check or replace the faulty component.

Check:

- The fitting (1) "front braking system" on the ABS control unit Fig. A.
- The fitting (2) "front brake pump" on the ABS control unit Fig. A.
- The fitting (3) "rear brake pump" on the ABS control unit Fig. A.
- The fitting (4) "rear braking system" on the ABS control unit Fig. A.

FRAME/BRAKE PAD CHECK

CHECK OF FRONT/REAR BRAKE PADS WEAR

The following procedure applies to all brake pads.

Check:

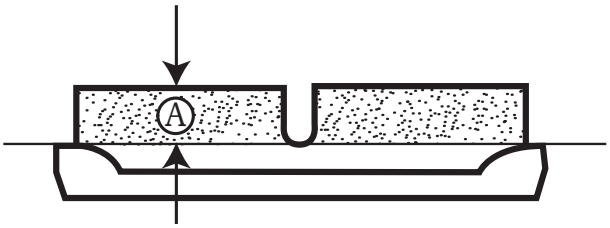
- The front brake pads Fig. A.
- The rear brake pads Fig. B.
- The wear limit for the front and rear brake pads.

If the wear limit has been reached, replace the brake pads.

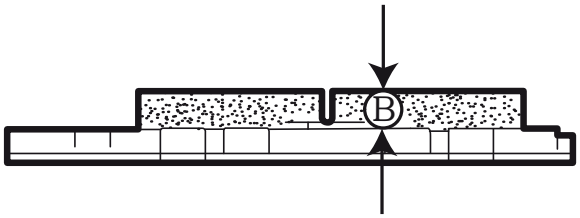
Pads	Wear limit (A)
Front	1 mm (0.0393 in.)
Rear	1 mm (0.0393 in.)

NOTE:
To replace the pads, refer to “Frame, Chapter 4”.

A



B



FRAME/BRAKE SYSTEM HOSE CHECK

CHECK OF BRAKE HOSES

Park:

- The motorcycle on a level surface.

NOTE:

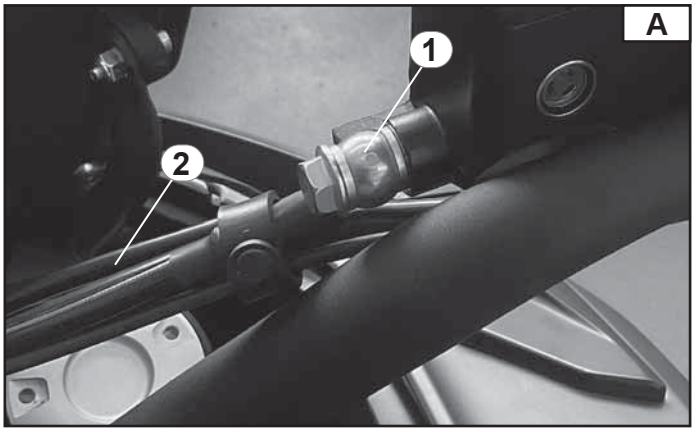
Place the motorcycle on a stand and make sure that it is in the upright position.

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

Check:

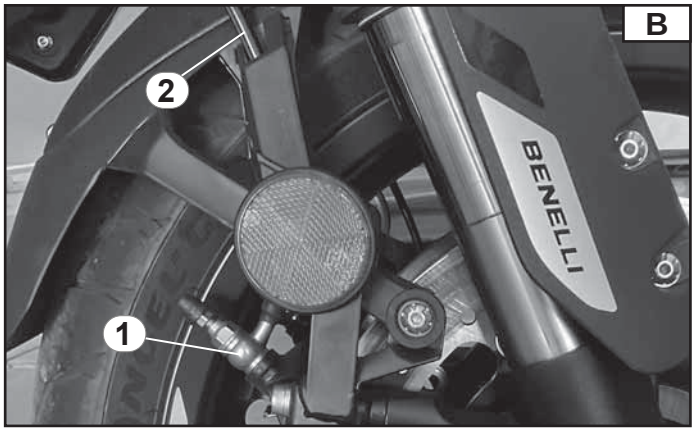
- The route of the front and rear brake hoses.

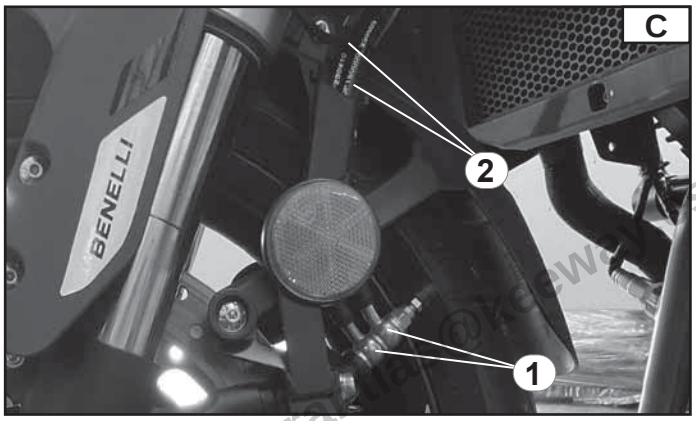
If there is any cracking/damage/wearing trace, replace.



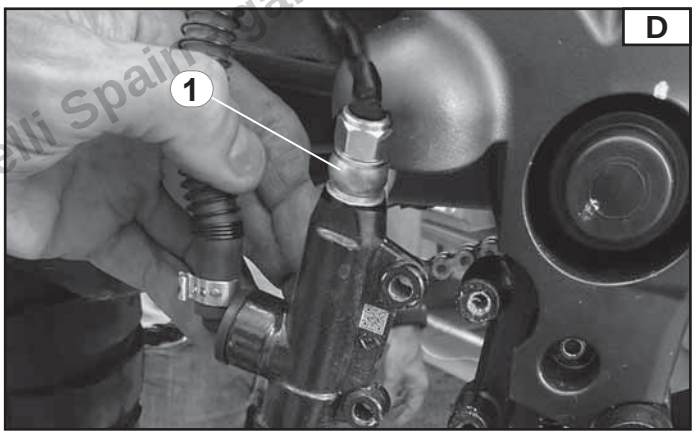
Check:

- The fitting (1) and the hose (2) of the front brake pump Fig. A.
- The fitting (1) and the hoses (2) of the front right/left brake caliper Fig. B-C.





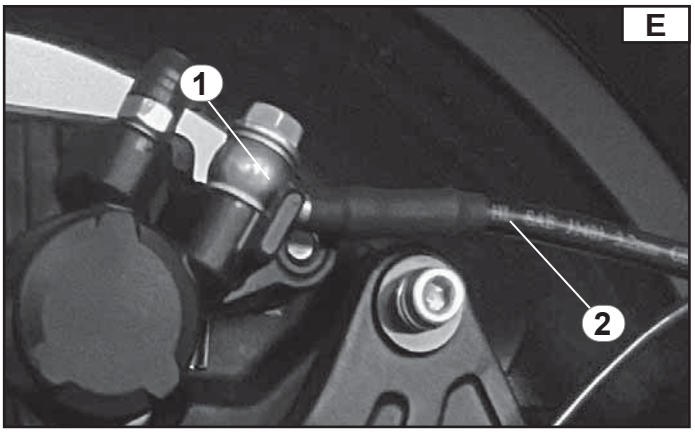
- The fitting (1) and the hose of rear brake pump Fig. D.



FRAME/BRAKE SYSTEM HOSE CHECK

CHECK OF BRAKE HOSES

- The fitting (1) and the hose (2) of the rear brake caliper Fig. E.



Check:
- Tightness of the fitting screws.

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.

Park:
- The motorcycle on a level surface.

WARNING

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

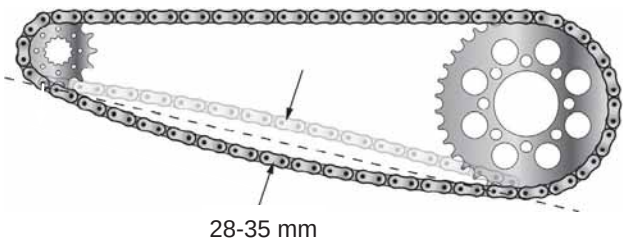
- Rotate the rear wheel several times and determine where the transmission chain is in the most tensioned position.

Check:
- The slackness of the transmission chain. If outside specifications, adjust Fig. A.

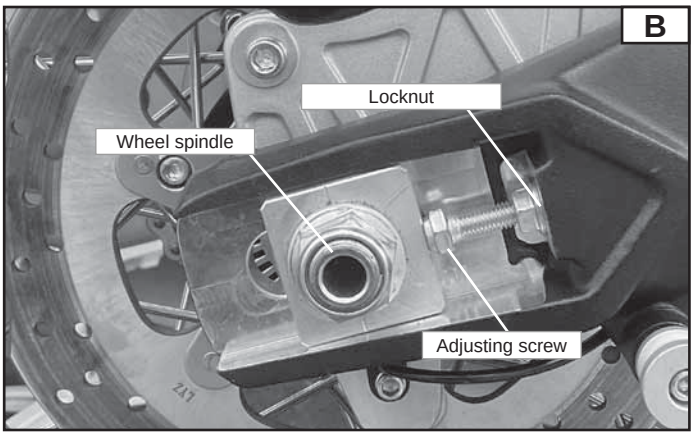
Transmission chain clearance	28 - 35 mm (1.102 - 1.377 in)

Adjust:
- The transmission chain clearance Fig. A.
- Loosen the wheel spindle nut on the right side Fig. B.

A



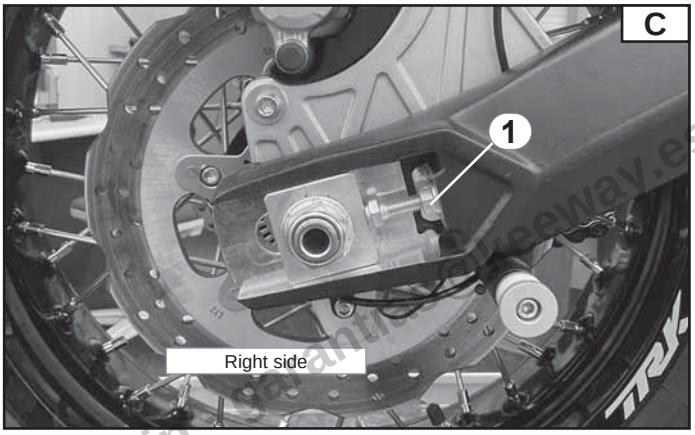
B



- To tension the transmission chain, loosen the lock nut Fig. B on both sides Fig. C - D and turn the adjustment screw counter-clockwise on both sides.
- To loosen the transmission chain, turn the adjustment screw clockwise on both sides Fig. C - D and push the rear wheel forward.
- After adjustment, tighten the lock nut on both sides (1) Fig. C - (2) Fig. D.
- Tighten the wheel spindle nut to the following torque:

Torque 80 N*m.

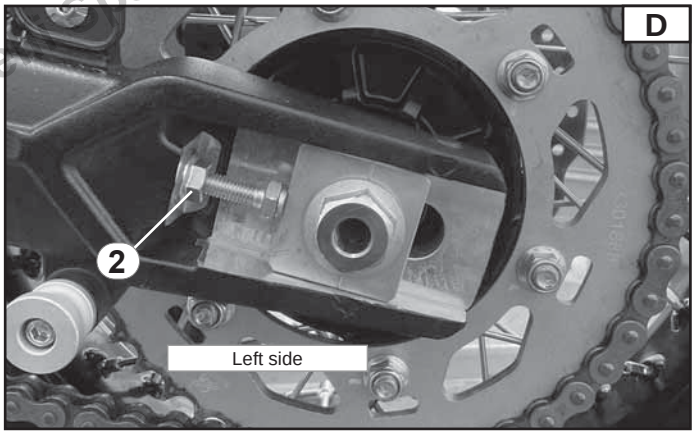
C



WARNING

If the chain is too taut, there may be an overload of the engine or other vital parts, while , if it is too slack, it may jump out and damage the suspension arm or cause an accident. We recommend keeping the chain slack to within specified limits.

D



FRAME/TRANSMISSION CHAIN

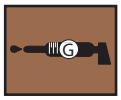
LUBRICATION OF TRANSMISSION CHAIN

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 when the motorcycle 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.

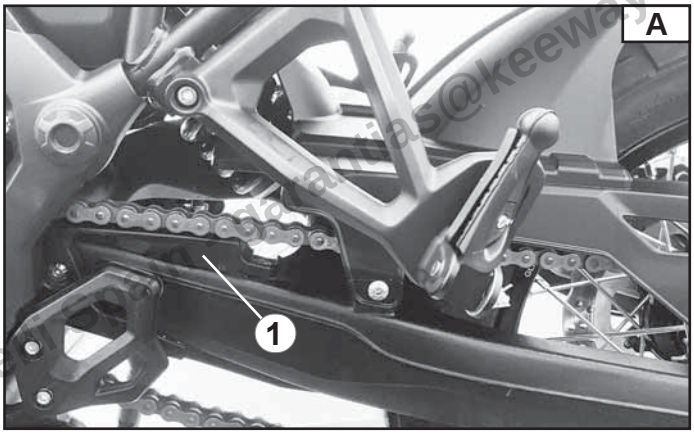
	**Recommended lubricant Specific spray for chains with O-rings.**

CHECK OF CHAIN GUIDE

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

Replace:
In case of any sign of abnormal wear or damage, replace the chain guide.
See:

- Removal of the chain sliding shoe, refer to **"Removal of the chain sliding shoe, Chapter 4".**



FRAME/TRANSMISSION CHAIN

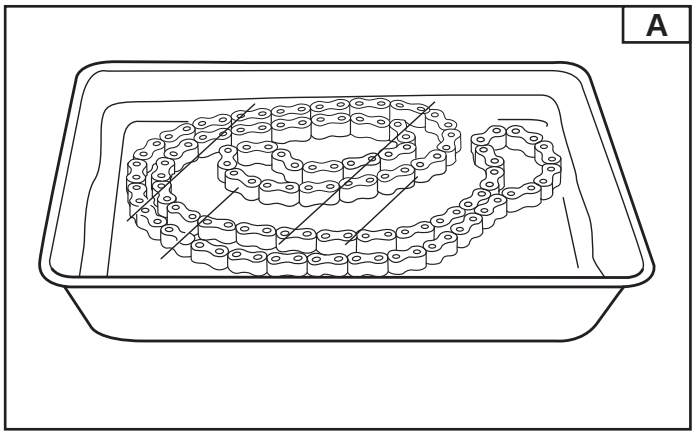
CHECK OF TRANSMISSION CHAIN WEAR

Check:
- The transmission chain.

Clean and grease, or replace.

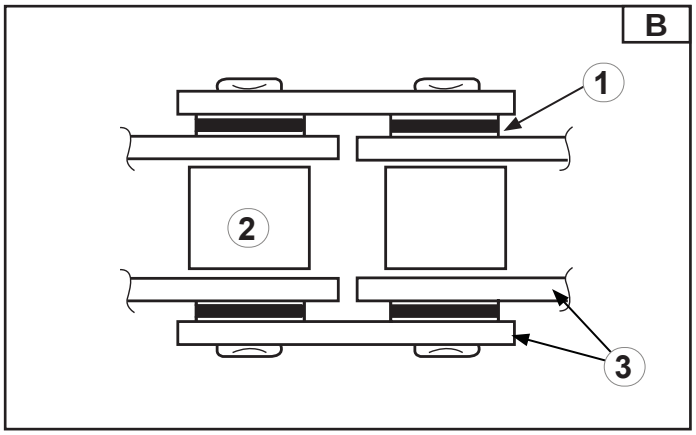
Clean:
- The transmission chain.

Clean the transmission chain with a clean rag.
Soak the transmission chain in kerosene and remove any remaining dirt.
Remove kerosene from the transmission chain and leave it to dry completely.



NOTICE

This motorcycle is fitted with a transmission chain complete with small rubber O-rings (1) Fig. B inserted between one side plate and another.
To clean the transmission chain, do not use high-pressure jets of water or air, do not use steam, petrol, aggressive solvents (such as petroleum 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.
In the event of cracks, replace the transmission chain.

Lubricate:
- The transmission chain.

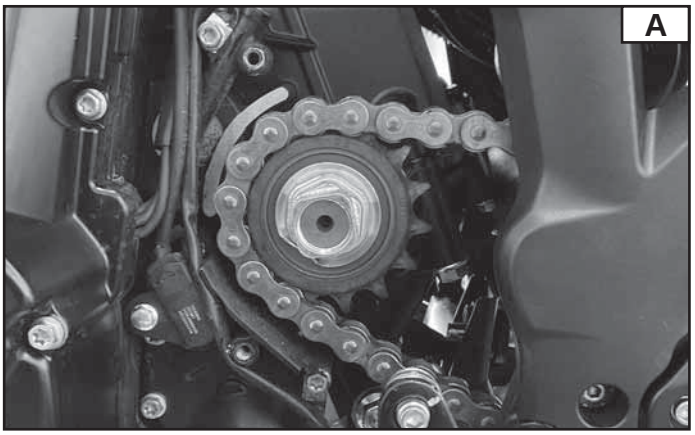
NOTE:
Use a specific product.

FRAME/CHAIN SPROCKET

CHECK OF TRANSMISSION CHAIN SPROCKET

Check:
- The transmission chain sprocket.

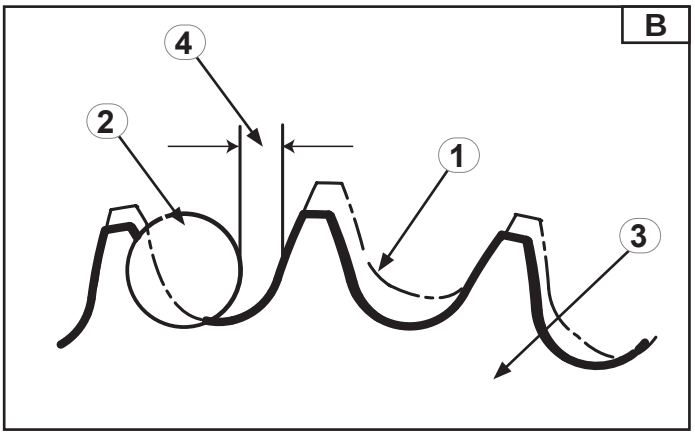
Remove:
- The sprocket cover, refer to **"Removal of the sprocket cover, Chapter 4".**



Check:
- The transmission chain sprocket.

If more than 1/4 of each tooth is worn, replace the sprocket. B is worn, replace the transmission 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.



(1) Adjustment
(2) Transmission chain roller
(3) Transmission chain sprocket

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.

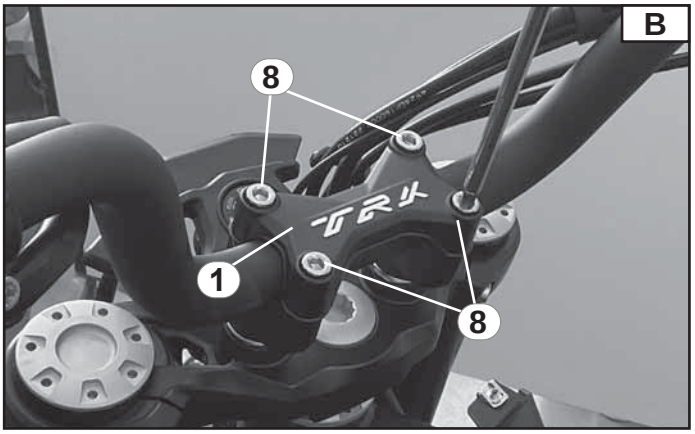
Check:

- The steering sleeve.

Gently oscillate the front fork, holding it by the end of the stems Fig. A.
If there is any jamming/loosening, adjust the steering sleeve.

Remove:

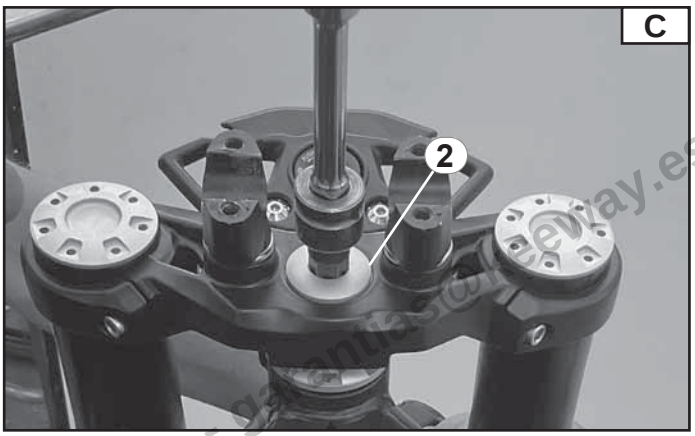
- The screws (8) Fig. B.
- The upper bracket (1) Fig. B.



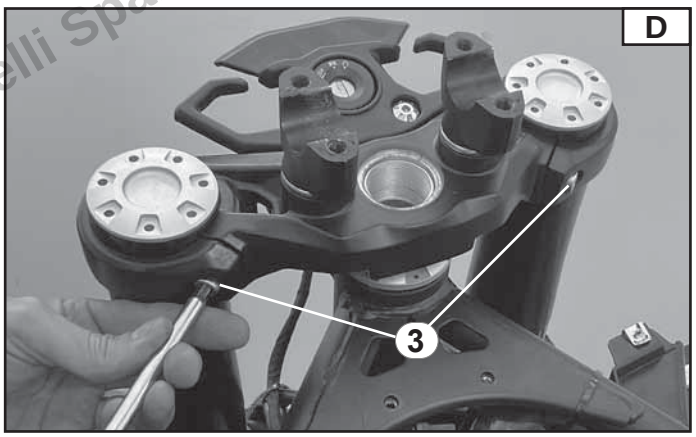
Remove:

- The special screw (2) Fig. C.

Special tool
Code: R300097146000



- The screws (3) Fig. D.

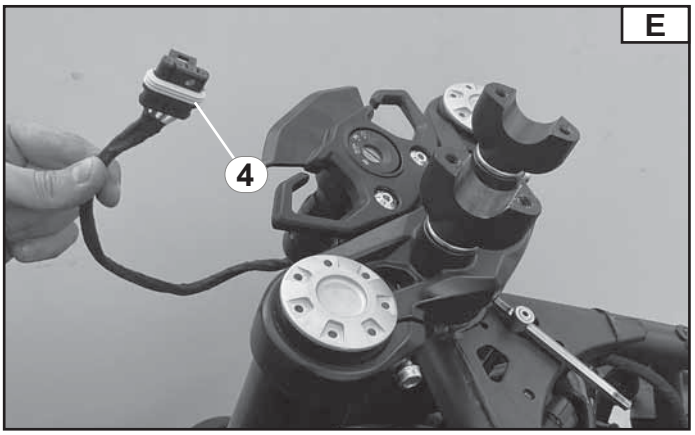


FRAME/CHECK AND ADJUSTMENT OF STEERING SLEEVE

STEERING SLEEVE BEARING LUBRICATION

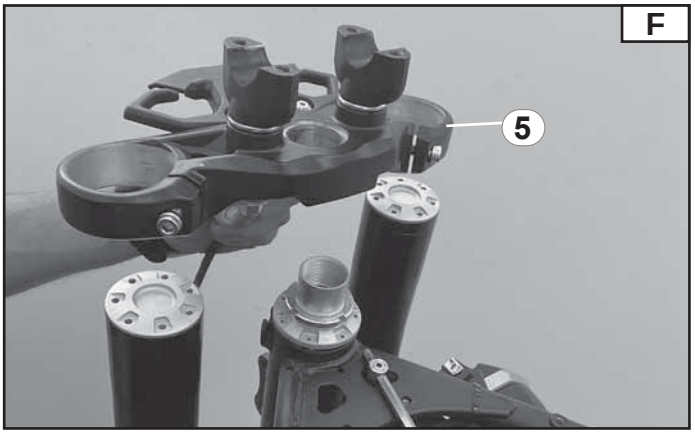
Disconnect:

- The ignition block connector (4) Fig. E.



Remove:

- The steering head (5) Fig. F.

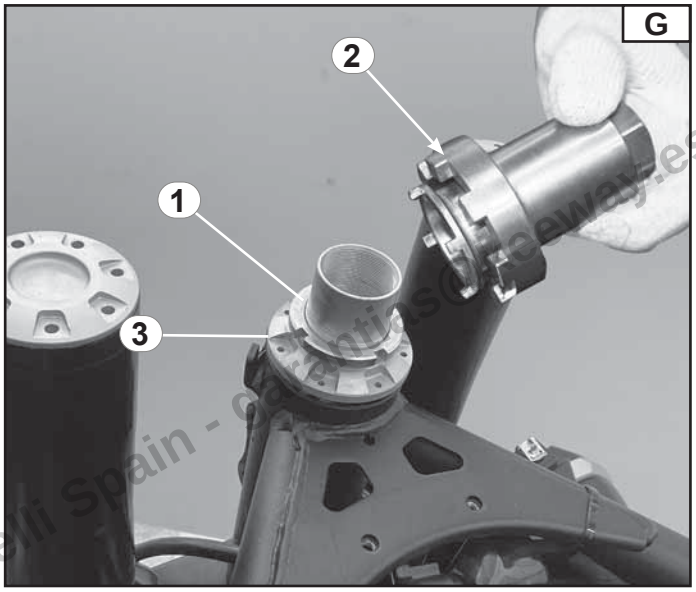


Remove:

- The steering ring nut pin (1) Fig. G.
- The steering ring nut (3) Fig. Fig. G.

Tightening tool for steering sleeve ring nut (2) Fig. G.
Code: R180297129000

Using a solvent with a high flash point, wash the steering bearings.



FRAME/CHECK AND ADJUSTMENT OF STEERING SLEEVE

STEERING SLEEVE BEARING LUBRICATION

Check:

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

Assemble:

Once assembled, tighten the steering ring nut (3) Fig. I to the following torque:

Tightening tool for steering sleeve lock nut.
Code: R180297129000

Torque 15 N*m

Assemble:

- The steering ring nut pin (1) Fig. I with the relevant tool, to the following torque Fig. L:

Tightening tool for steering sleeve lock nut.
Code: R180297129000

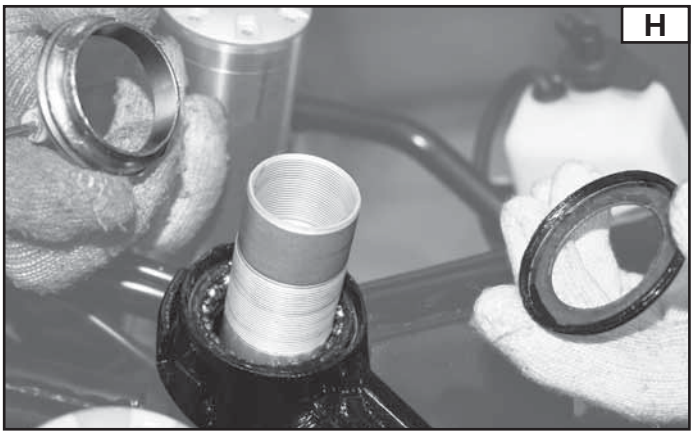
Torque 60 N*m

	Specific grease

Check:

- Gently oscillate the front fork, holding it by the end of the stems Fig. M.

If there are any sticking/slackening points, adjust the steering sleeve again.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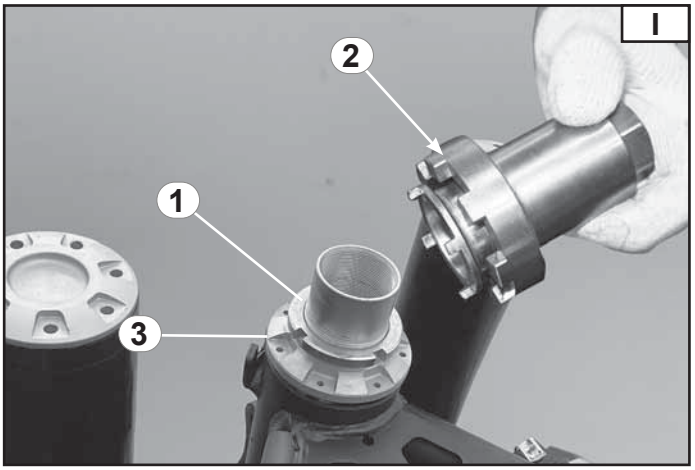

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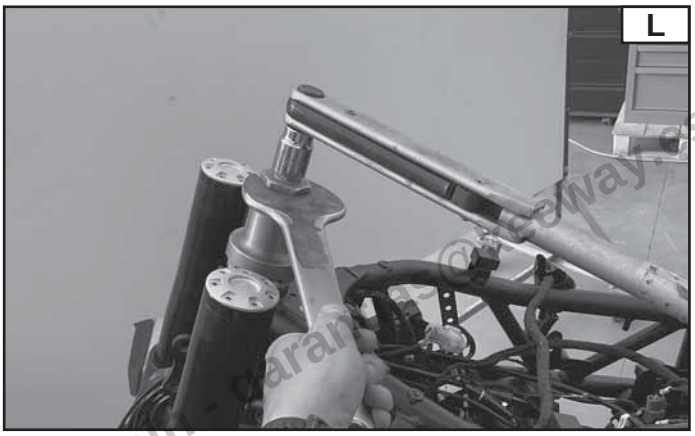

L


M

FRAME/FRONT FORK CHECK

CHECK OF FRONT FORK

Park:
- The motorcycle on a level surface.

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

Check:
- The fork sleeve (1) Fig. A.
- The fork stem (2) Fig. A.

In case of damage/scuffing, replace.

- The oil seal.

If there are any leaks, replace.

Keep:
- The motorcycle in a upright position.

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, refer to "**Check and adjustment of the steering sleeve, Chapter 4**."
Inspect and overhaul, see "**Front fork, Chapter 4**."

FRAME/REAR SHOCK ABSORBER CHECK

ADJUSTMENT OF THE SHOCK ABSORBER

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

Adjustment of spring preload on TRK702 vehicle.

- Adjust the spring preload Fig. A.

The rear shock absorber is equipped with an spring preload adjusting ring nut (1).

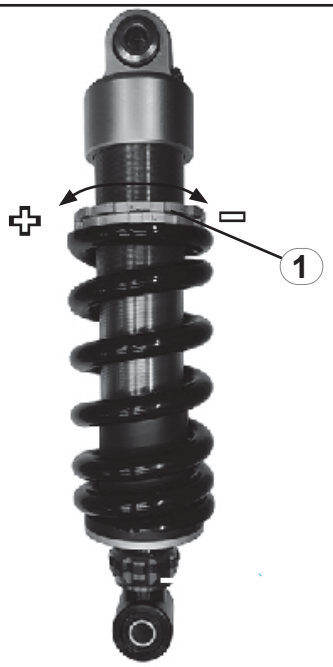
- To **increase** the spring preload and thereby harden the suspension, turn the adjusting ring clockwise.
- To **decrease** spring reload and therefore decrease the rigidity of the suspension, turn the adjustment ring nut counter-clockwise.

NOTICE

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

Position	Distance
Confort	Ring nut 37 mm (1.456 in) from travel end
Sport	Ring nut 39 mm (1.535 in) from travel end

A



Adjustment of damping on TRK702 vehicle

To adjust shock absorber damping, proceed as follows:

- To increase damping, rotate the adjusting screw (2) clockwise Fig. B.
- To reduce damping, rotate the adjusting screw (2) counter-clockwise Fig. B.

NOTICE

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

Position	Distance
Confort	-13 clicks from fully closed
Sport	-11 clicks from fully closed

B

FRAME/REAR SHOCK ABSORBER CHECK

ADJUSTMENT OF THE SHOCK ABSORBER

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

Adjustment of spring preload on TRK702X vehicle.

- Adjust the spring preload Fig. A.

The rear shock absorber is equipped with an spring preload adjusting ring nut (1).

- To **increase** the spring preload and thereby harden the suspension, turn the adjusting ring clockwise.
- To **decrease** spring reload and therefore decrease the rigidity of the suspension, turn the adjustment ring nut counter-clockwise.

NOTICE

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

Position	Distance
Confort	Ring nut 8.5 mm (0.334 in) from travel end
Dirt road	Ring nut 5 mm (0.196 in) from travel end

A

Adjustment of rebound damping on TRK702X vehicle.

To adjust shock absorber damping, proceed as follows:

- To increase damping, rotate the adjusting screw (2) clockwise Fig. B.
- To reduce damping, rotate the adjusting screw (2) counter-clockwise Fig. B.

NOTICE

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

Position	Distance
Confort	-9 clicks from fully closed
Dirt road	-7 clicks from fully closed

B

FRAME/REAR SHOCK ABSORBER CHECK

ADJUSTMENT OF THE SHOCK ABSORBER

Adjustment of compression damping on TRK702X vehicle

To adjust shock absorber compression damping, proceed as follows:

- To increase damping, rotate the adjusting screw (3) clockwise Fig. C.
- To reduce damping, rotate the adjusting screw (3) counter-clockwise Fig. C.

NOTICE

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

Position	Distance
Confort	-14 clicks from fully closed
Dirt road	-10 clicks from fully closed

C

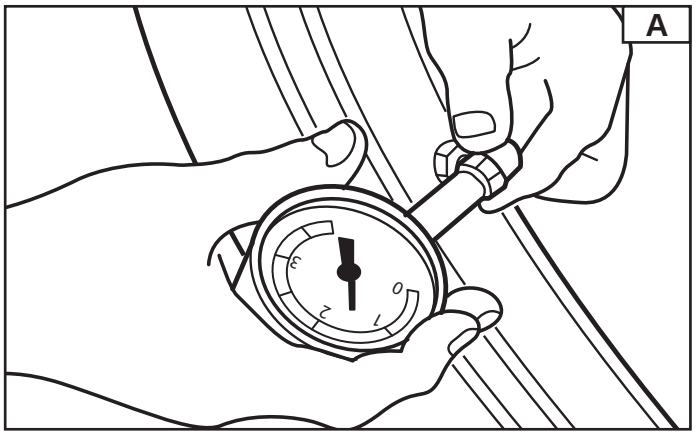
FRAME/CHECK OF FRONT/REAR TIRES

CHECK OF TIRES

The following procedure applies to both tires.

Check:

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

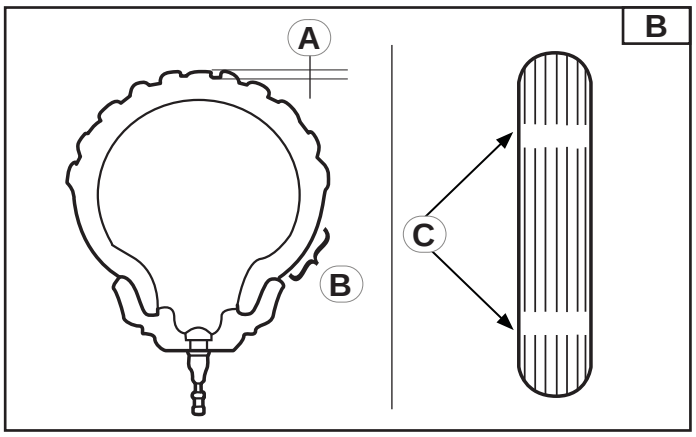


WARNING

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 motorcycle 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	
PRESSURE TIRES A COLD	**FRONT**	**REAR**
	220Kpa±10Kpa	250Kpa±10Kpa
	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/wear, replace the tire.

A. Tread pattern depth.
B. Sidewall.
C. 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 might generate explosive gas and contain electrolyte, consisting 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 recharged in suitably ventilated areas.
Keep batteries away from fire, sparks or naked flame (for example: welding accessories, lit cigarettes).
NEVER SMOKE while recharging or handling batteries.
KEEP BATTERIES AND ELECTROLYTE WELL OUT OF REACH OF CHILDREN.
Do not allow electrolyte to come into contact with body parts to prevent severe burns or permanent injury to eyes.

FIRST AID IN CASE OF PHYSICAL CONTACT:

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

SWALLOWING
- Immediately contact a poison centre or a doctor.

NOTICE

This battery is sealed. Never remove the sealed caps under any circumstances, as this will damage the balance between the cells and affect battery performance.
Recharge time, amperage and voltages for this battery are different from those of conventional batteries. Recharge 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.

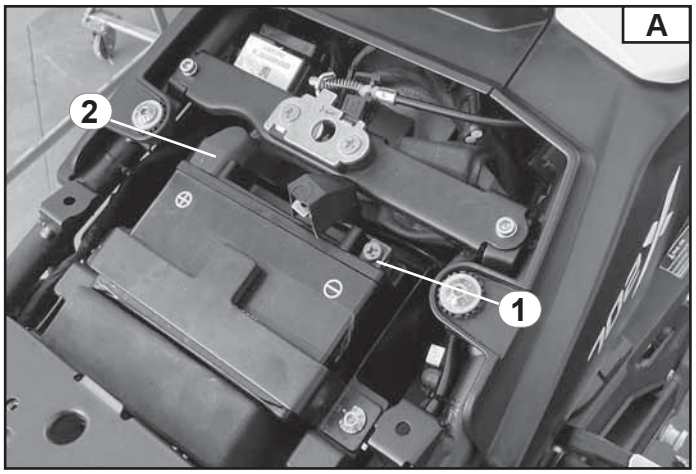
ELECTRIC SYSTEM
CHECK AND CHARGE OF THE BATTERY

Remove:
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**

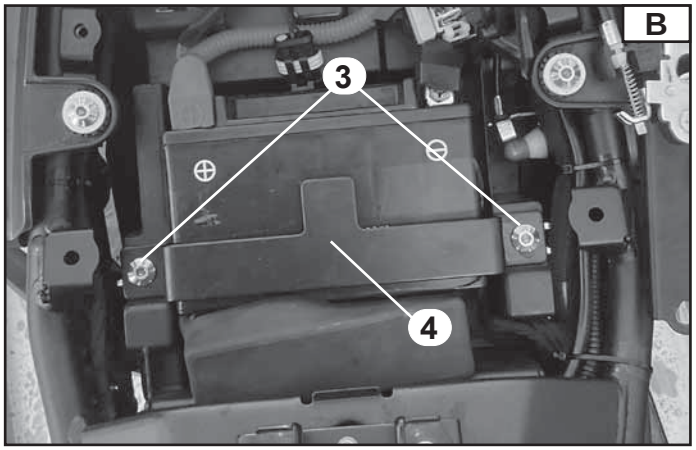
Disconnect:
- The battery cables from the terminals Fig. A.

NOTICE

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

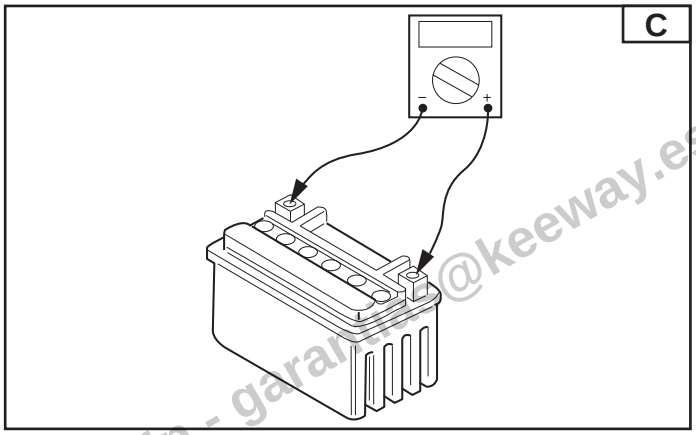


When replacing the battery:
Remove:
- The screws (3) Fig. B.
- The battery bracket (4) Fig. B.
- The battery.



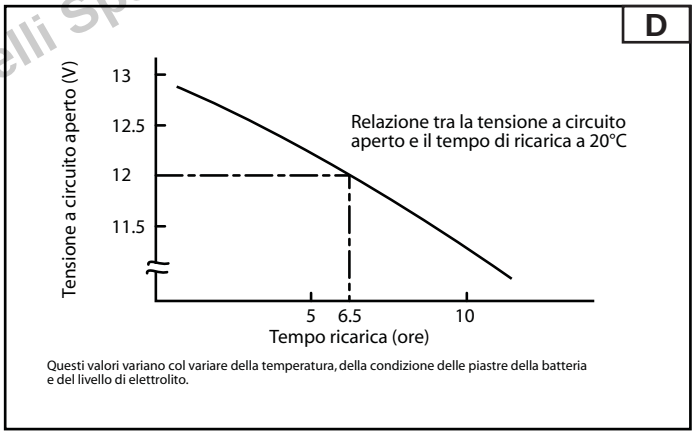
Check:
- The battery charge.

Connect a multimeter to the battery terminals Fig. C.



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

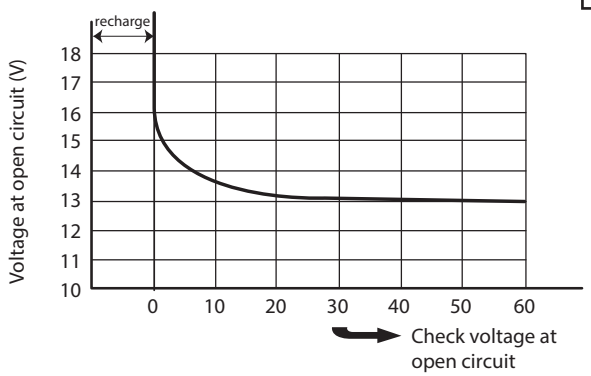
NOTE:
The charge status of a battery can be checked by measuring its open-circuit voltage (that is the voltage when the positive terminal is disconnected).
If the open-circuit voltage is equal to or over 12.8 V, no recharge is required.



ELECTRIC SYSTEM
CHECK AND CHARGE OF THE BATTERY

RECHARGING METHOD:
- Standard: 1.1A x 5/10 hour.
- Fast: 5.5A x 1 hour max.

E



WARNING

- **Never remove the caps sealing the battery.**
- **Use fast chargers with extreme care, as there 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 recharging current of the battery charger, be careful to prevent the battery from over-charging.

The battery must be disconnected from the motorcycle for recharging. (If it is necessary to recharge the battery connected to the motorcycle, disconnect the negative cable from the battery terminal).

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

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

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

If the battery overheats at any time during recharging, disconnect the battery charger and leave the battery to cool down before continuing. Overheated batteries can explode!

As illustrated in Fig. E, await 30 minutes after the end of recharging, before measuring the open-circuit voltage.

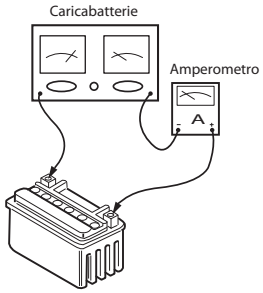
ELECTRIC SYSTEM

CHECK AND CHARGE OF THE BATTERY

RECHARGING METHOD WITH A VARIABLE CURRENT (VOLTAGE) BATTERY CHARGER

NOTE:

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



Misurare la tensione a circuito aperto prima di procedere con la ricarica.

↓

Collegare alla batteria un caricabatterie e un amperometro e iniziare la ricarica.

↓

Verificare che la corrente sia più elevata del valore standard della corrente di ricarica riportato sulla batteria.

SI → Regolare la tensione in modo tale che la corrente sia al livello di carica standard.

NO → Ruotando la rotella di regolazione della tensione di ricarica, impostare la tensione di ricarica su 20 ~ 24 V.

↓

Tenere sotto controllo l'amperaggio per 3 ~ 5 minuti per verificare se la corrente di carica standard viene raggiunta.

SI → Regolare la tensione in modo tale che la corrente sia al livello di carica standard.

NO → Se la corrente non supera la corrente di carica standard una volta trascorsi 5 minuti, sostituire la batteria.

↓

Impostare il tempo in base al tempo di ricarica adatto per la tensione a circuito aperto.
Vedere le istruzioni incluse alla batteria.

↓

Se per la ricarica sono necessarie più di 5 ore, è consigliabile controllare la corrente di carica dopo 5 ore. Se si verificano variazioni dell'amperaggio, regolare nuovamente la tensione per ottenere la corrente di carica standard.

↓

Misurare la tensione a circuito aperto della batteria dopo averla lasciata per più di 30 minuti inutilizzata.
12.8 V o superiore ⟶ La ricarica è completa
12.7 V o inferiore ⟶ Ricarica necessaria.
Inferiore a 12.0 V ⟶ Sostituire la batteria.

ELECTRIC SYSTEM
CHECK AND RECHARGE OF THE BATTERY

RECHARGING METHOD WITH A CONSTANT VOLTAGE BATTERY CHARGER

NOTE:
- **Measure the voltage after 30 minutes from switching off of the appliance.**
- **Set the charge time to a maximum of 20 hours.**

NOTE:
- **To guarantee maximum battery performance and durability, it is advisable to use an electronic battery charger able to supply charge currents or voltages based on the specific requirement of the sealed battery technology.**

Misurare la tensione a circuito aperto prima di procedere con la ricarica.

↓

Collegare alla batteria un caricabatterie e un amperometro e iniziare la ricarica.

↓

Verificare che la corrente sia più elevata del valore standard della corrente di ricarica riportato sulla batteria.

SI → Caricare la batteria finché la tensione di carica non arriva a 15 V.

↓

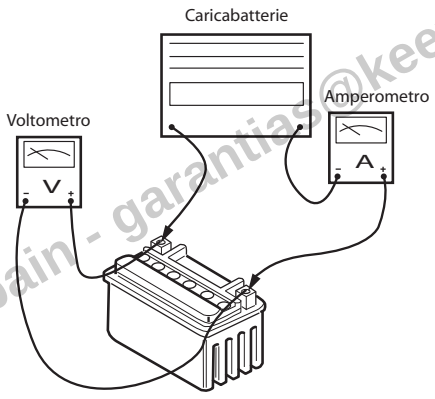
Misurare la tensione a circuito aperto dopo aver lasciato la batteria per più di 30 minuti inutilizzata.

12.8 V o superiore ⟶ La ricarica è completa.

12.7 V o inferiore ⟶ Ricarica necessaria.

Inferiore a 12.0 V ⟶ Sostituire la batteria.

NO → Questo tipo di caricabatterie non può essere utilizzato per ricaricare queste batterie. Si consiglia l'uso di un caricabatterie a tensione variabile.



ELECTRIC SYSTEM
FUSES

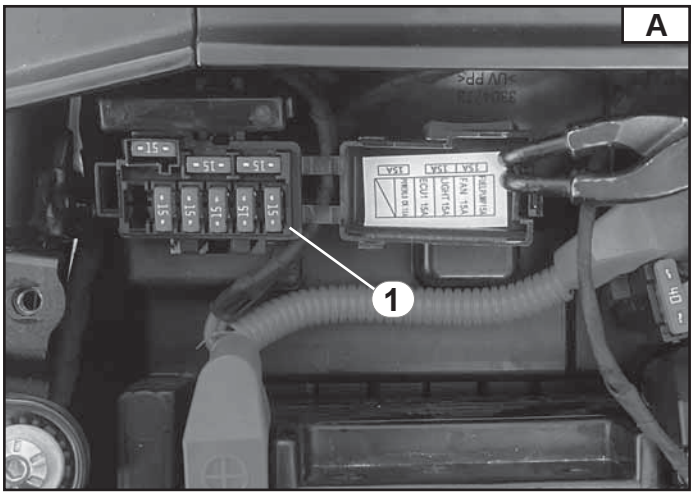
The following procedure applies to all fuses.

NOTICE

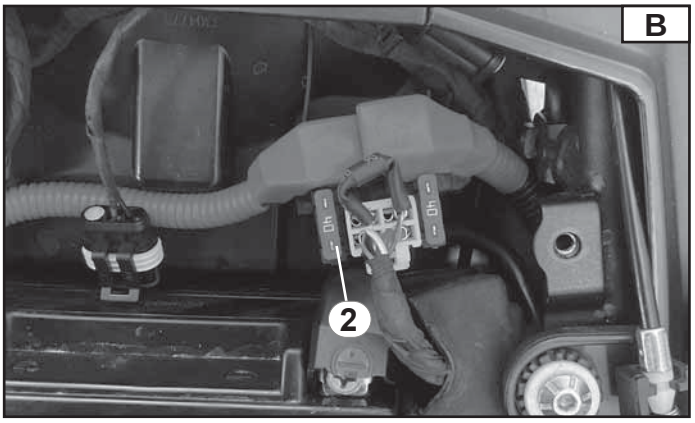
Bring the start switch to the OFF position.

Remove:
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**

Access:
- The fuse box (1) Fig. A.



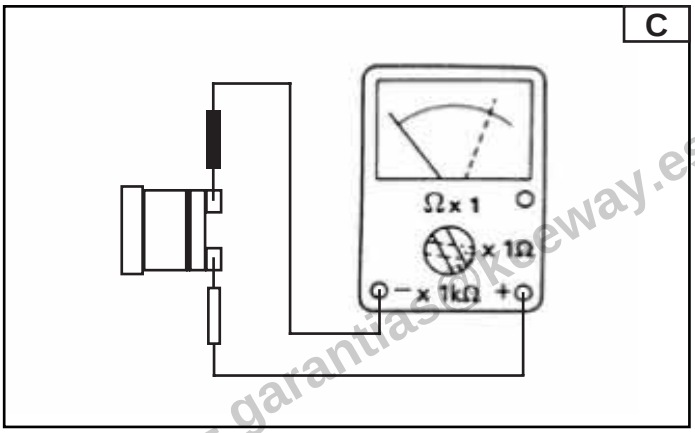
Check:
- The main fuse (2) Fig. B.



Connect a multitester to the fuse and check its continuity Fig. C.

NOTE:
Set the selector switch of the multimeter on "Ω x 1".

- If the multitester 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

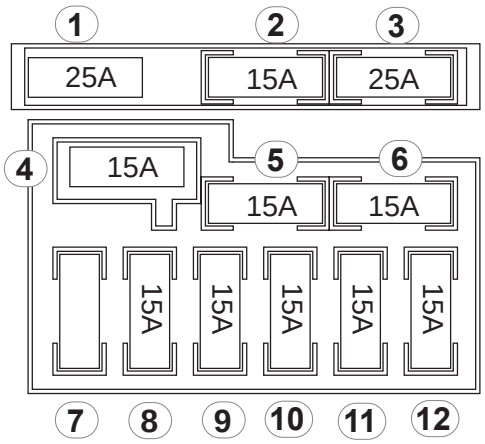
Never use a fuse with amperage other than the one specified. The use of improvised techniques or fuses with different amperages could cause irreversible damage to the electrical system, or cause functioning defects of the lighting system and the ignition system and eventually cause a fire.

ELECTRIC SYSTEM
CHECK OF FUSES

KEY TO FUSES
Refer to Fig. A.

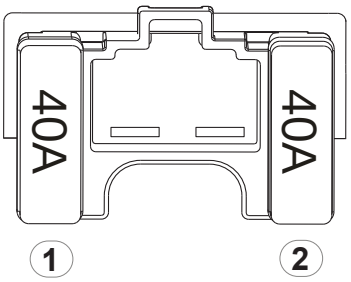
1. Spare fuse
2. Abs1
3. Abs2
4. Spare fuse
5. Spare fuse
6. Spare fuse
7. Fuse housing
8. Locked up
9. ECU
10. Lights
11. Cooling fan
12. Fuel pump

A



KEY TO STARTING RELAY FUSES
Refer to Fig. B.
1. Main fuse
2. Spare fuse

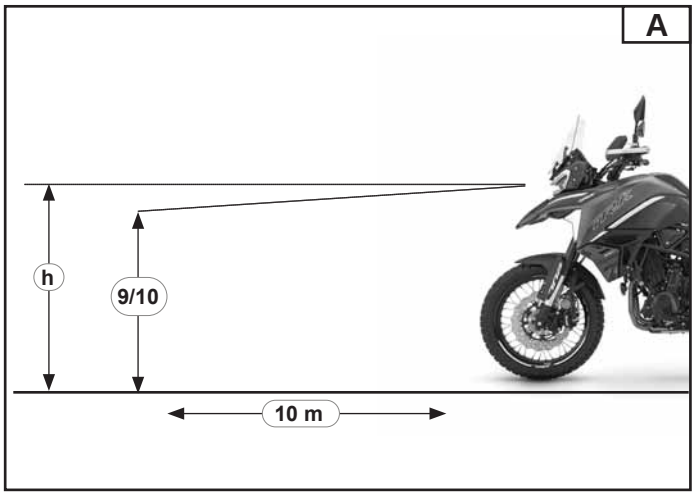
B



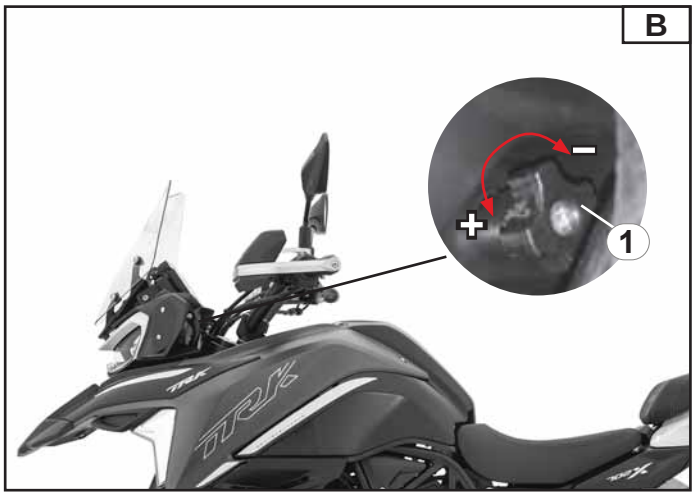
ELECTRIC SYSTEM
ADJUSTMENT OF HEADLIGHT

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

- Position the vehicle approx. 10 metres distance from a vertical wall on a perfectly flat piece of ground Fig. A.
- Sit on the vehicle in the riding position.
- 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 beam using the adjustment screw (1) at the top centre of the rear projection lamp. Fig. B.
- Rotating counter-clockwise, the luminous beam is raised.
- Turn clockwise to lower the beam.



ELECTRIC SYSTEM

REPLACEMENT OF THE REAR TURN SIGNAL LIGHTS

Park the motorcycle on a level surface.

NOTICE

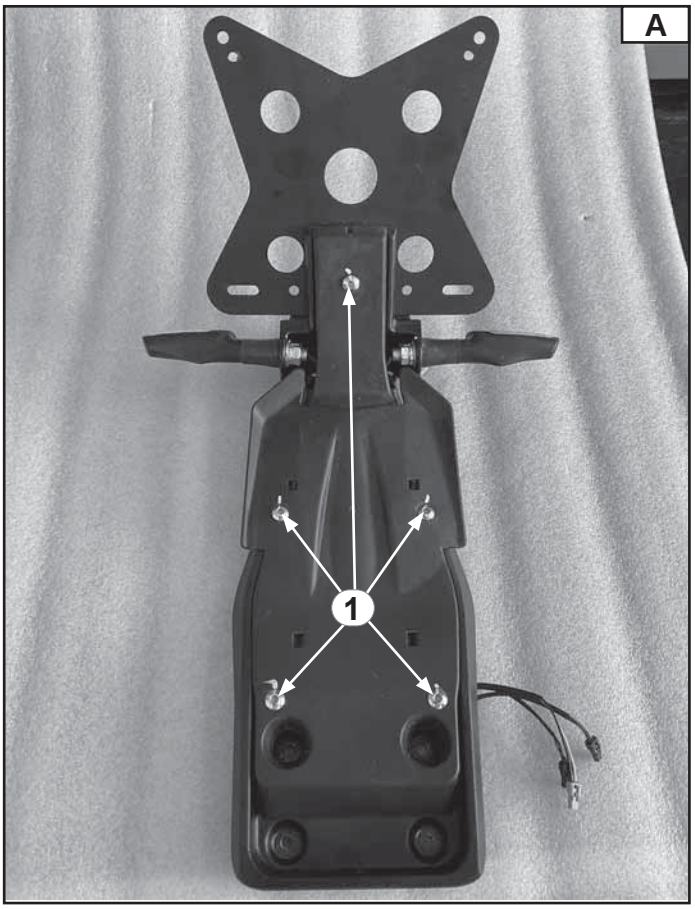
Prop the motorcycle on suitable supports so that it cannot fall.

NOTE:
The following procedure applies to both rear indicator lights.

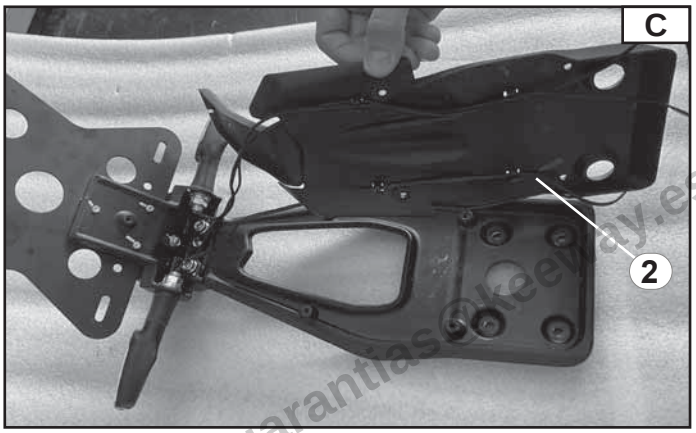
Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The license plate holder, refer to **"Removal of the license plate holder, Chapter 4".**

- The 5 screws (1) Fig. A.

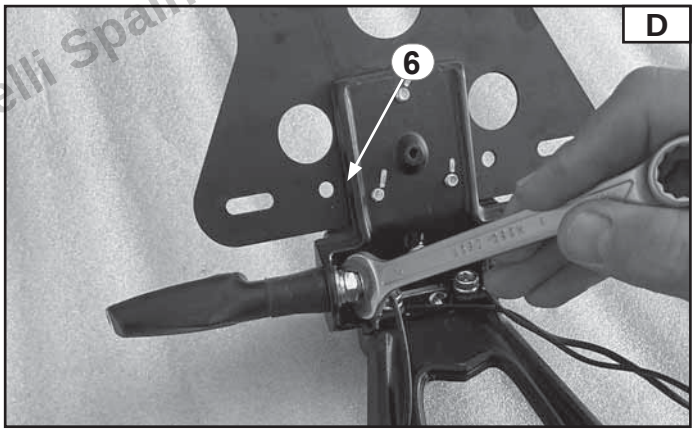


- The covering (2) Fig. C.



Remove:

- The left/right turn signal light (3) Fig. D.



ELECTRIC SYSTEM

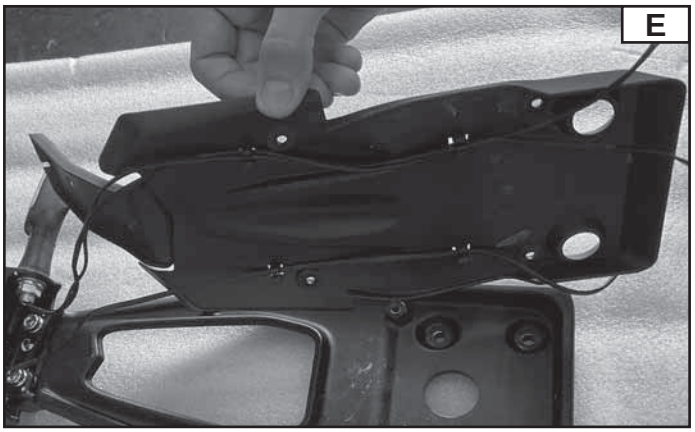
REPLACEMENT OF REAR TURN SIGNAL LIGHTS

Install:

- Proceed using the opposite order to removal being careful to position the cables into the apposite housings inside the cover.

Connect:

- Connect the electrical connectors of the turn signal lights.



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 LICENSE PLATE LIGHT

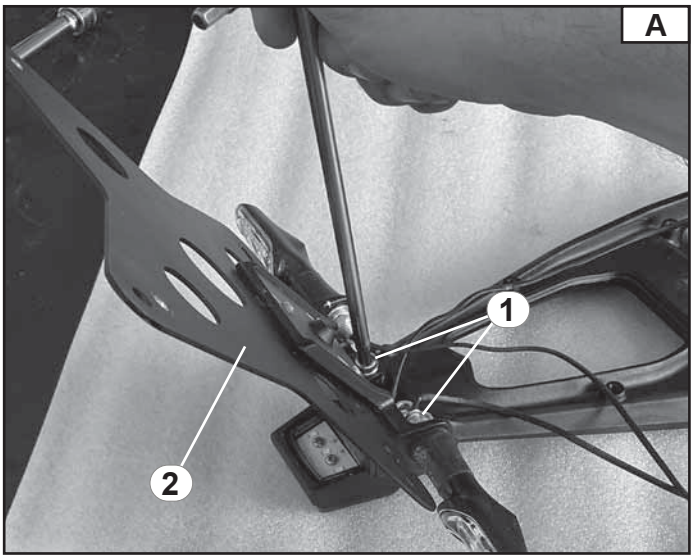
Park the motorcycle on a level surface.

NOTICE

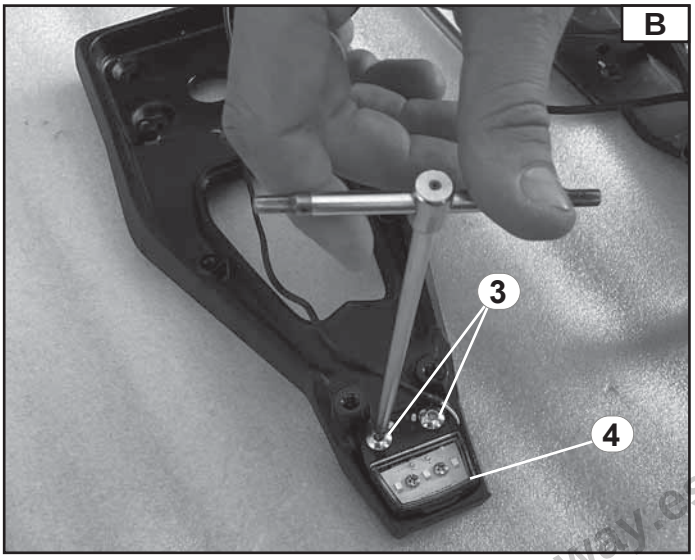
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The license plate holder, refer to **"Removal of the license plate holder, Chapter 4".**
- The rear indicator light covering, refer to **"Replacement of the rear indicator lights, Chapter 3".**



- The 2 screws (1) Fig. A.
- The license plate holder (2) Fig. A.



- The screws (3) Fig. B.
- The license plate light (4) Fig. B.

Install:

- Proceed using the opposite order to removal being careful to position the cables properly.

Connect:

- Connect the electric connector of the license plate light.

NOTICE

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

ELECTRIC SYSTEM

SUBSTITUTION OF THE REAR LED LIGHT

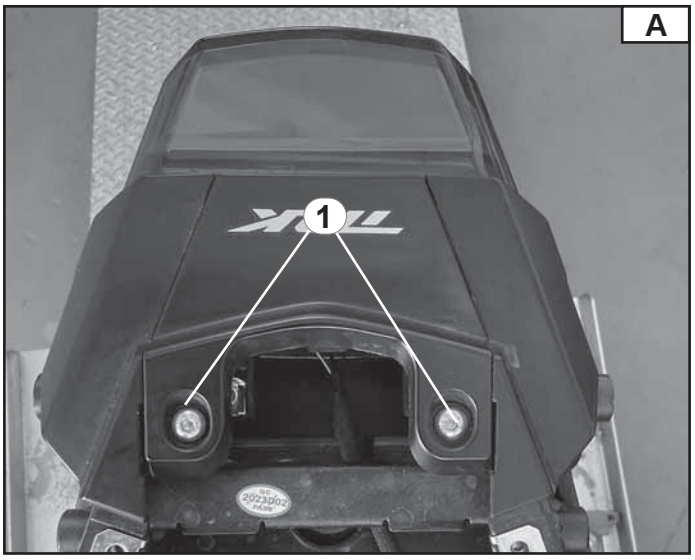
Park the motorcycle on a level surface.

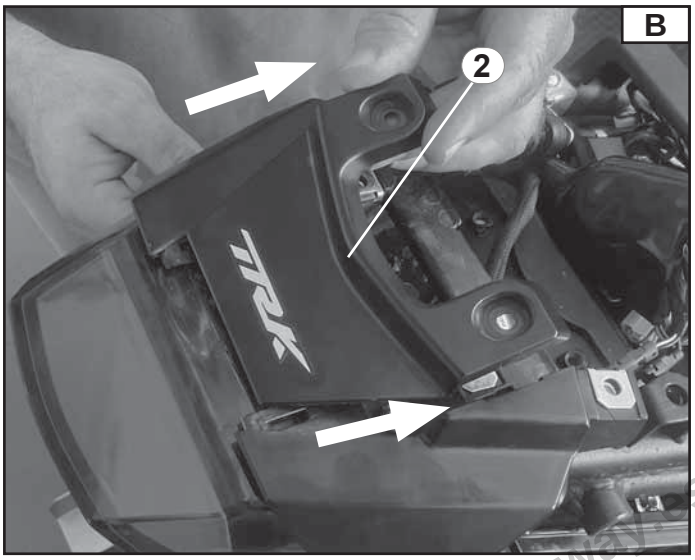
NOTICE

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

Remove:

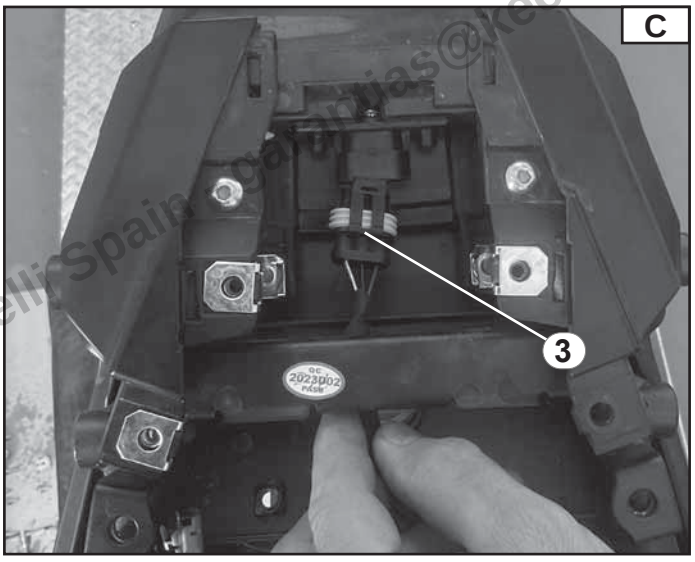
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The license plate holder, refer to **"Removal of the license plate holder, Chapter 4".**
- The rack **"Removal of the rack, Chapter 4".**
- The passenger handles, refer to **"Removal of the passenger handles, Chapter 4".**
- The 2 screws (1) Fig. A.
- The cover (2), by pushing it forward, as shown by Fig. B.





Disconnect:

- The connector (3) Fig. C.



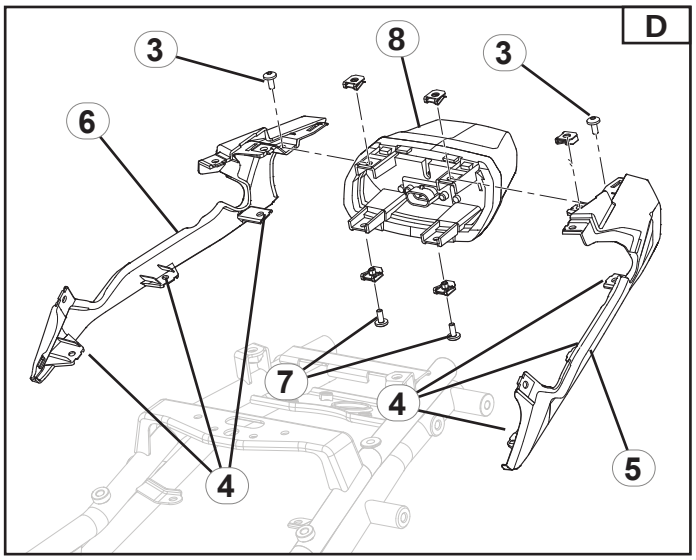
ELECTRIC SYSTEM

REPLACEMENT OF THE REAR LED LIGHT

Remove:

In sequence:

- The screws (3) Fig. D.
- The screws (4) Fig. D.
- The left side (5) Fig. D.
- The right side (6) Fig. D.
- The screws (7) Fig. D.
- The rear light (8) Fig. D. D.



Install:

- Proceed using the opposite order to removal being careful to position the cables properly.

Connect:

- Connect the electric connector of the rear light.

NOTICE

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

ELECTRIC SYSTEM

REPLACEMENT OF THE FRONT TURN SIGNAL LIGHTS

Park the motorcycle on a level surface.

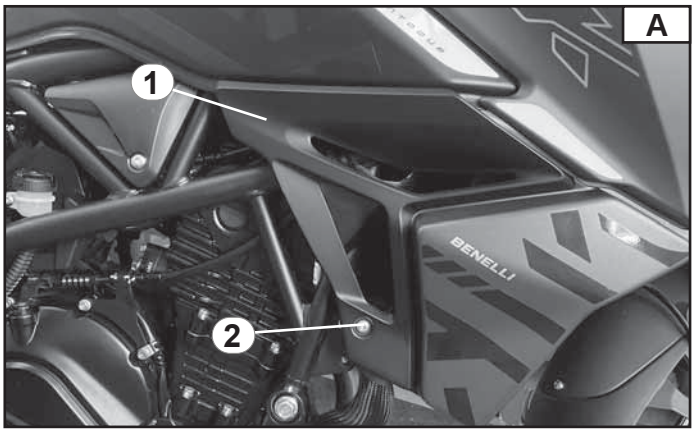
NOTICE

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

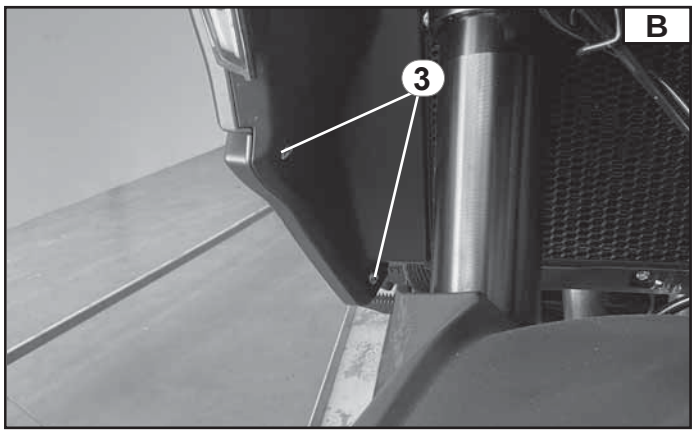
NOTE:
The following procedure is applicable to both front indicator lights.

Remove:

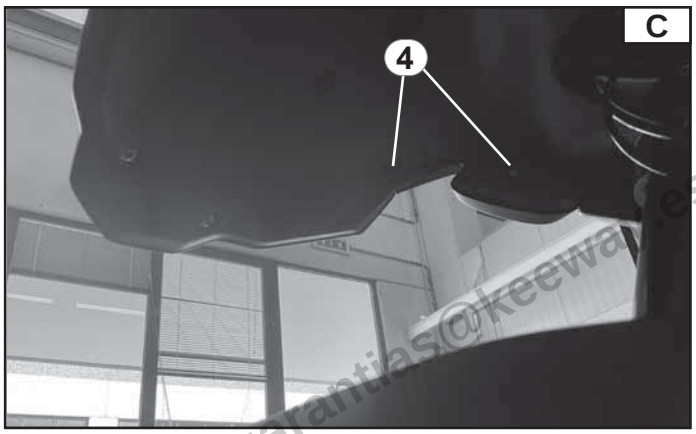
- The right lower fairing (1) Fig. A.
- The screw (2) Fig. A.



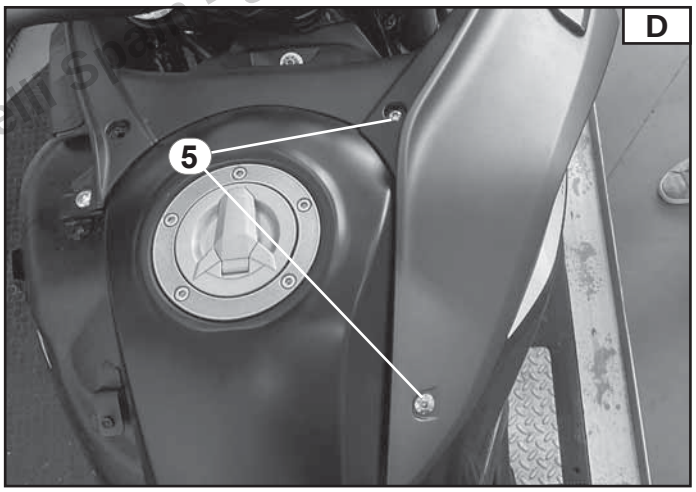
- The screws (3) Fig. B.



- The screws (4) Fig. C.



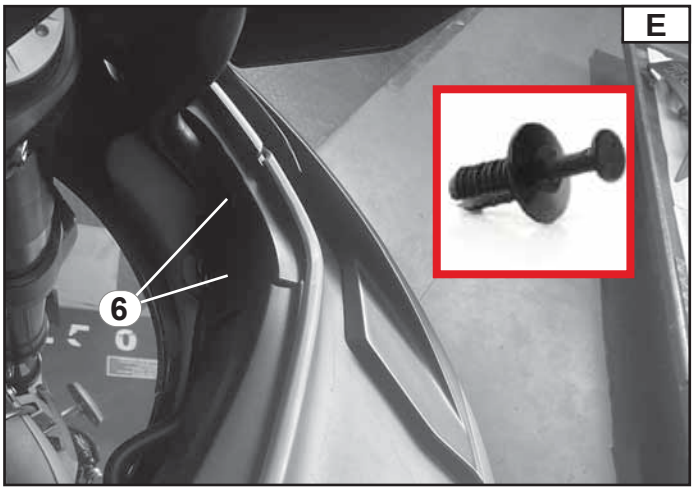
- The screws (5) Fig. D.



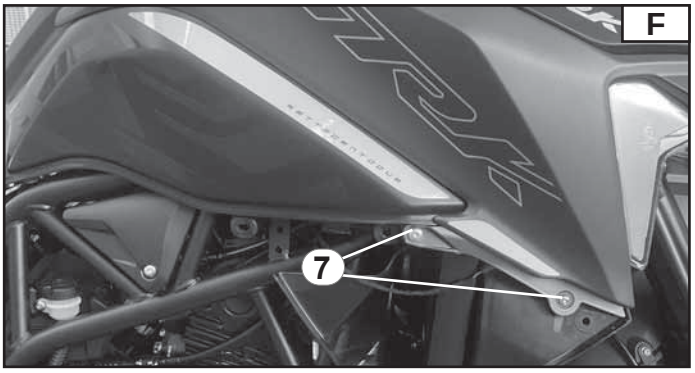
ELECTRIC SYSTEM

REPLACEMENT OF THE FRONT TURN SIGNAL LIGHTS

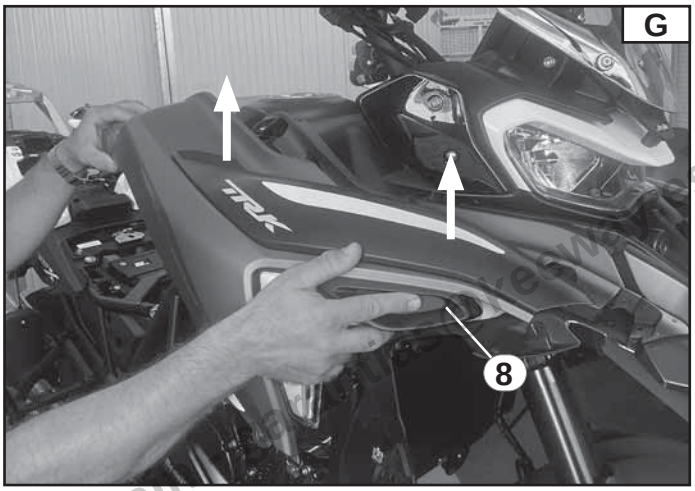
- The two expansion rivets (6) Fig. E.



- The 2 screws (7) Fig. F.

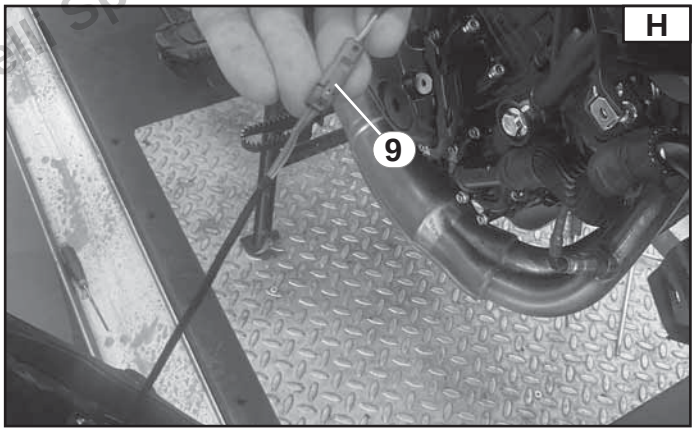


- The right tank cover (8), by lifting it upward Fig. G.



Disconnect:

- The turn signal light connector (9) Fig. H.

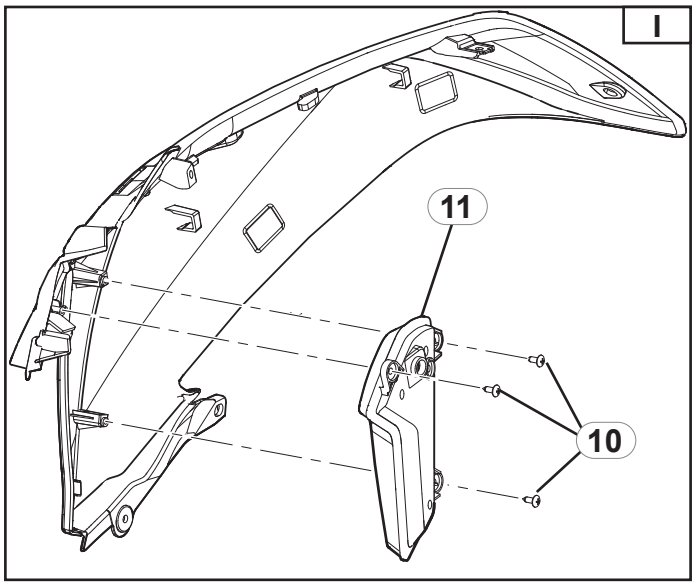


ELECTRIC SYSTEM

REPLACEMENT OF THE FRONT TURN SIGNAL LIGHTS

Remove:

- The screws (10) Fig. I.
- The right turn signal light (11) Fig. I.



Remove:

- Carry out the same procedure as the one for the turn signal light of the opposite side.

Install:

- Proceed using the opposite order to removal.

NOTICE

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

ELECTRIC SYSTEM

REPLACEMENT OF THE USB SOCKET

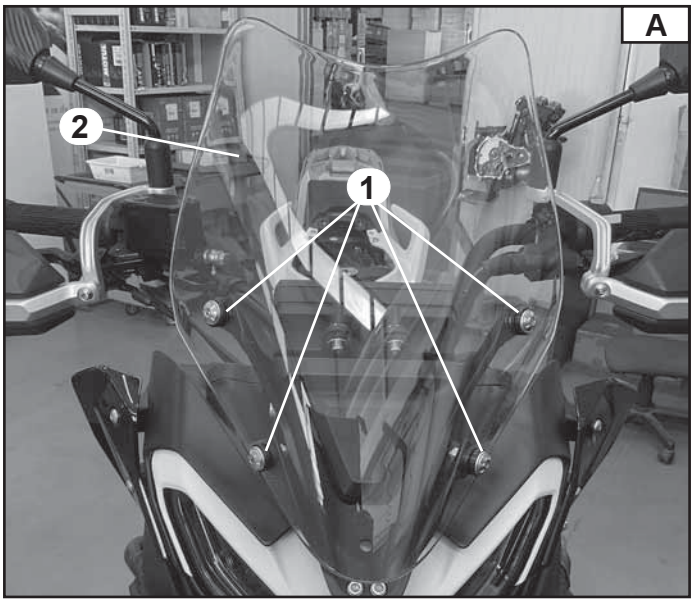
Park the motorcycle on a level surface.

NOTICE

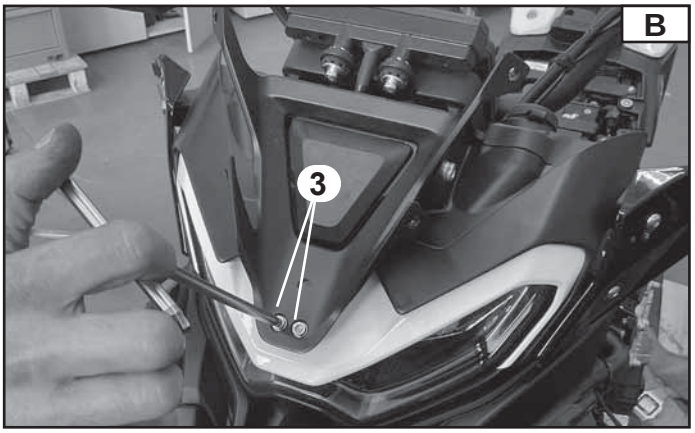
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

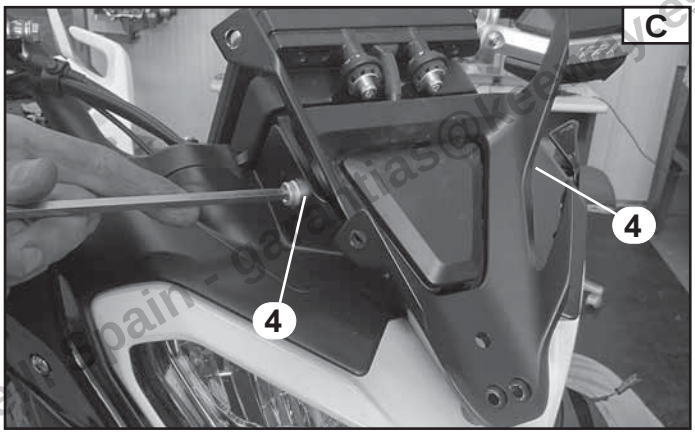
- The screws (1) Fig. A.
- The transparent windscreen (2) Fig. A.



- The screws (3) Fig. B.



- The 2 screws (4) Fig. C.

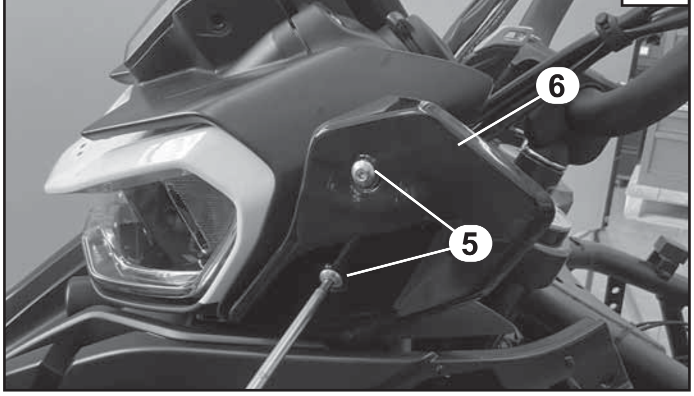


ELECTRIC SYSTEM
REPLACEMENT OF THE USB SOCKET

Remove:
- The 2 screws (5) Fig. D.
- The left dashboard fairing (6) Fig. D.

(Repeat the same procedure for the right dashboard fairing).

D



- The 2 screws (7) Fig. E.
- The 2 screws (8) Fig. E.
- The USB socket holder (9) Fig. E.

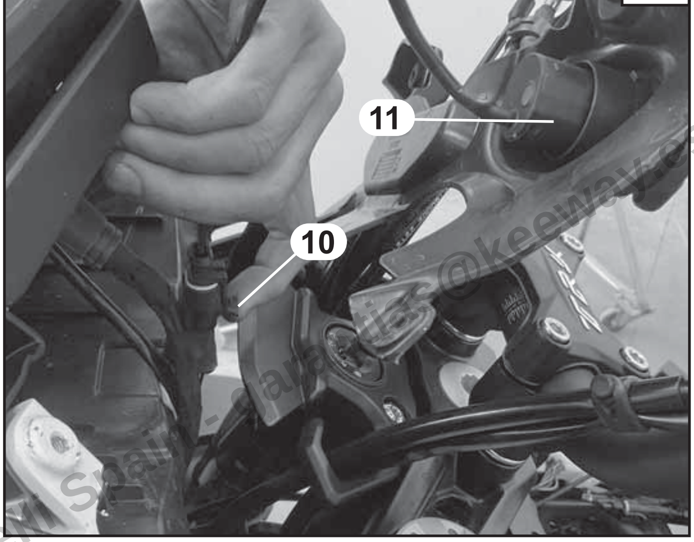
E

Disconnect:
- The connector (10) Fig. F.

Slide out:
- The USB socket (11) Fig. F.

Install:
- Proceed using the opposite order to removal.

F



ELECTRIC SYSTEM

REPLACEMENT OF THE INSTRUMENT PANEL

Park the motorcycle on a level surface.

NOTICE

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

Remove:

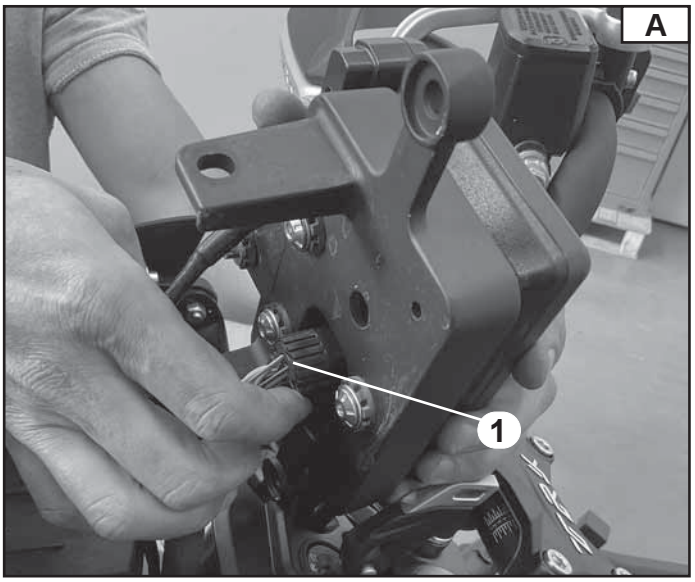
- The USB socket holder cap, refer to **"Replacement of the USB socket, Chapter 3".**

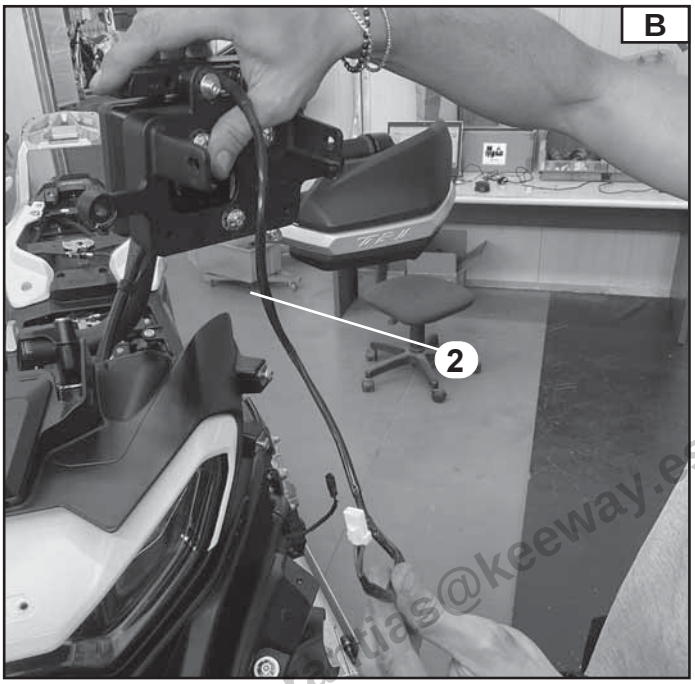
Disconnect:

- The instrument panel connector (1) Fig. A.
- The indicator light connector (2) Fig. B.

Install:

- Proceed using the opposite order to removal.





ELECTRIC SYSTEM

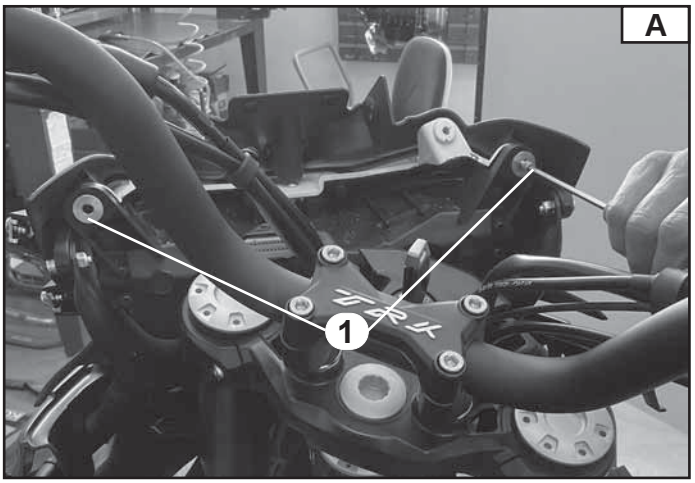
REPLACEMENT OF THE FRONT HEADLIGHT UNIT

NOTICE

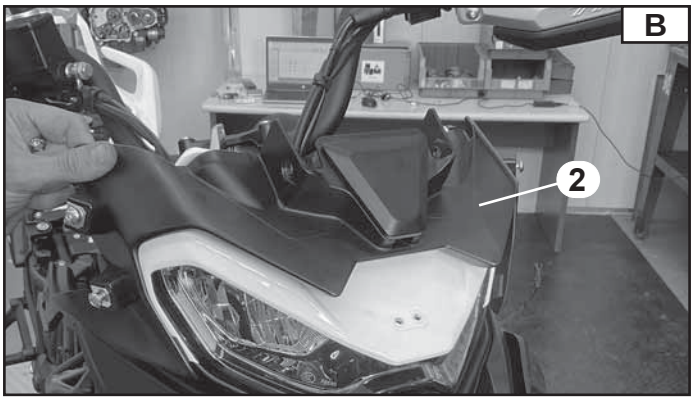
The vehicle has a LED projector integrated into the headlight, and in case of anomaly, it is necessary to replace the whole light.

Remove:

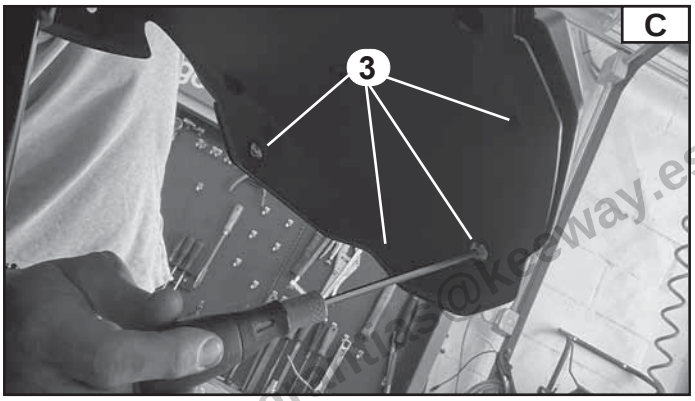
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The USB socket holder cap, refer to **"Replacement of the USB socket, Chapter 3".**
- The screws (1) Fig. A.



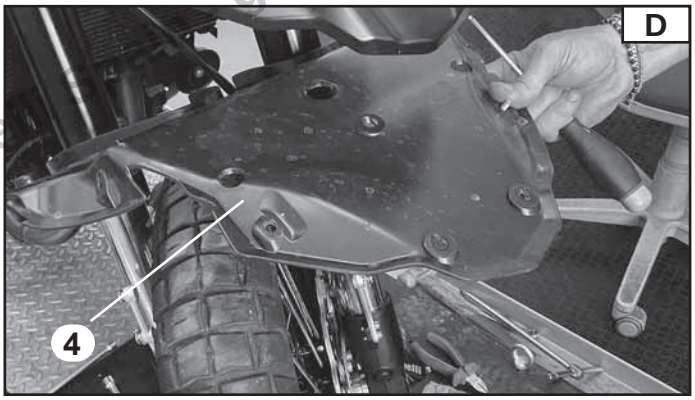
- The front headlight rim (1) Fig. B.



- The screws (3) Fig. C.



- The front fairing closure (4) Fig. D.

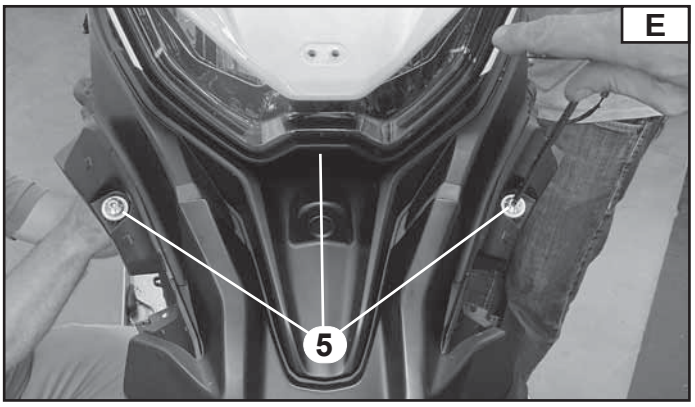


ELECTRIC SYSTEM

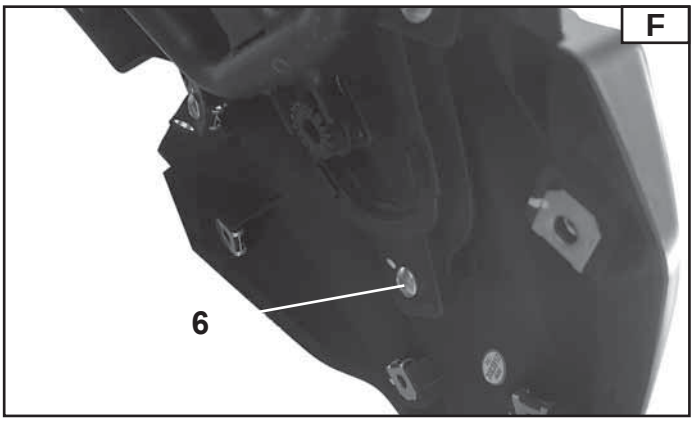
REPLACEMENT OF THE FRONT HEADLIGHT UNIT

Remove:

- The screws (5) Fig. E.



- The screw (6) Fig. F.

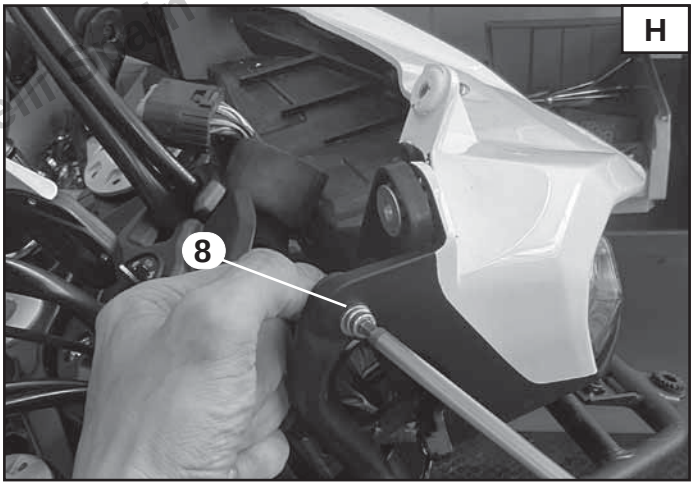


Slide out:

- The front fairing (7) Fig. G.

Remove:

- The side screws (8) on both sides of the light Fig. H.

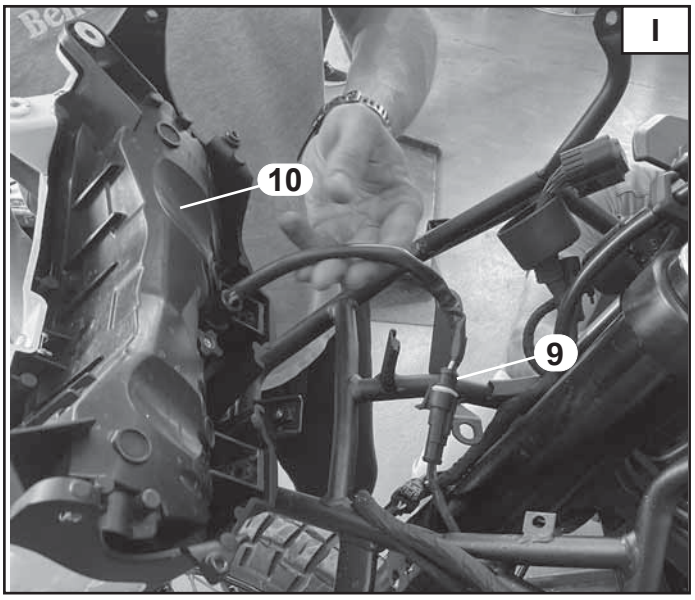


ELECTRIC SYSTEM

REPLACEMENT OF THE FRONT HEADLIGHT UNIT

Disconnect:

- The connector (9) of the headlights Fig. I.
- The front headlight(10) Fig. I.



Install:

- Proceed using the opposite order to removal.

ELECTRIC SYSTEM

REPLACEMENT OF THE IGNITION BLOCK

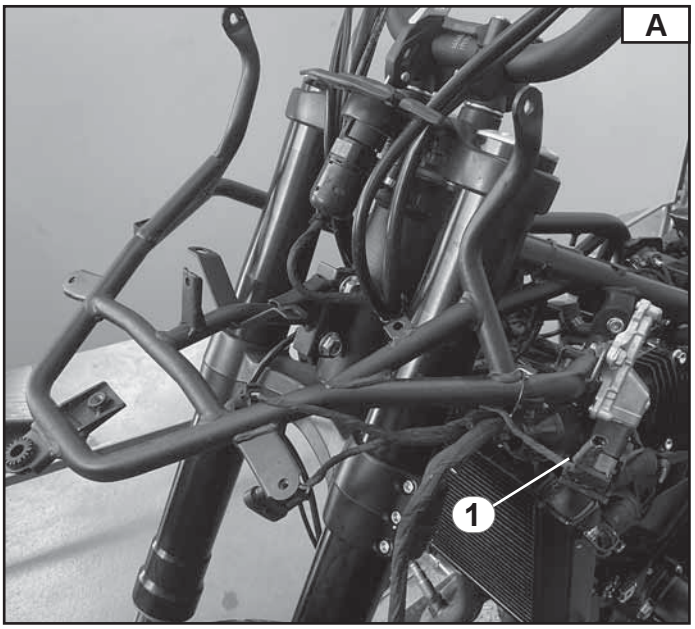
Park the motorcycle on a level surface.

NOTICE

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

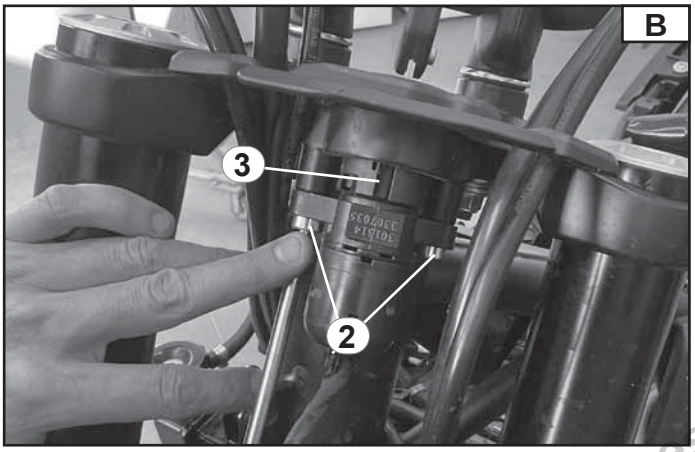
Remove:
- The headlights, refer to **"Replacement of the headlights, Chapter 3".**

Disconnect:
- The connector (1) of the electrical distributor Fig. A.



Remove:
- The safety screws (2) Fig. B.
- The ignition block (3) Fig. B.

Install:
- Proceed using the opposite order to removal.



Remarks

4 FRAME

CHAPTER 4

FRAME

CHAPTER 4

CHAPTER 4

FRONT WHEEL AND BRAKE DISCS

REMOVAL OF THE FRONT WHEEL

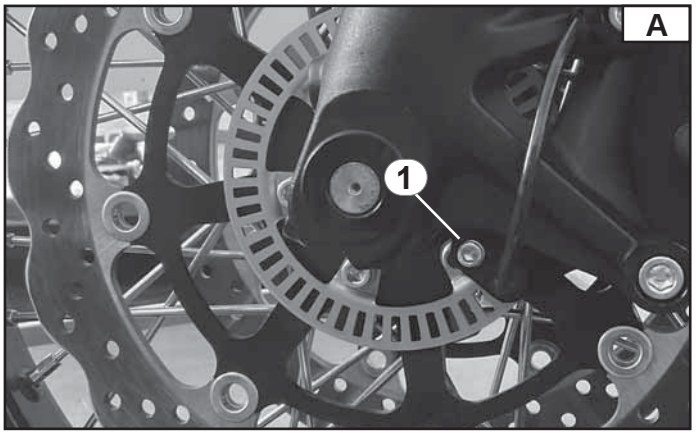
Park:

- The motorcycle on a level surface.

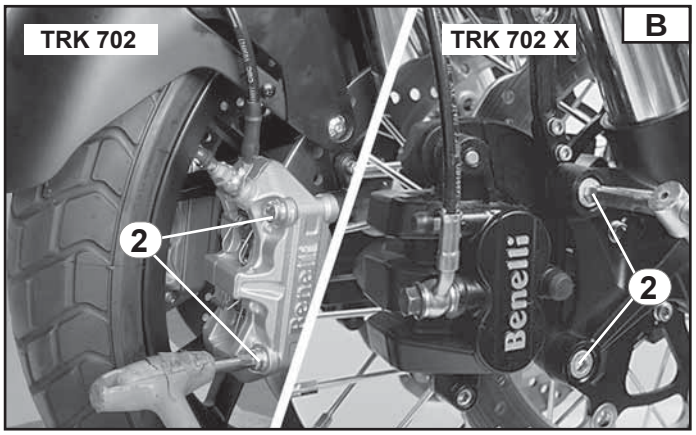
NOTE:
Place the motorcycle on a suitable support stand so that the front wheel is raised.

Remove:

- The screw (1) of the ABS sensor Fig. A.

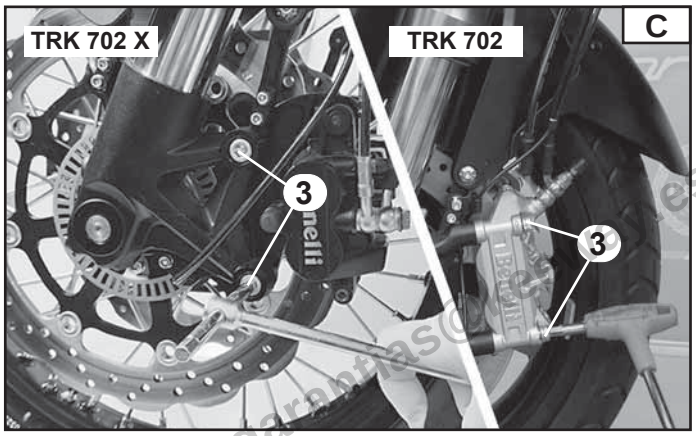


- The right brake caliper screws (2) Fig. B.



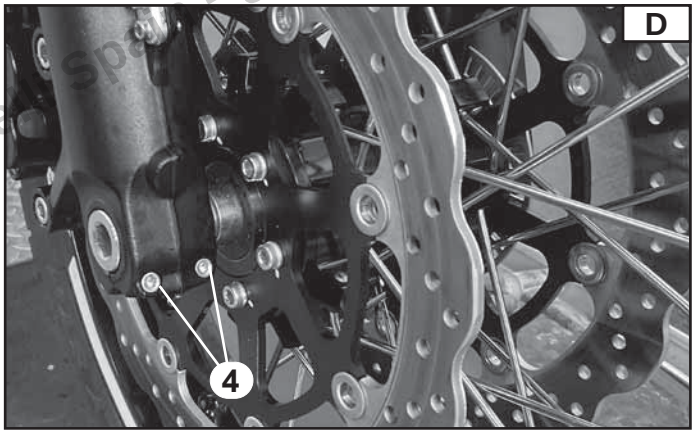
- The left brake caliper screws (3) Fig. C.

NOTE:
Do not activate the front brake lever while removing the calipers.



Loosen:

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

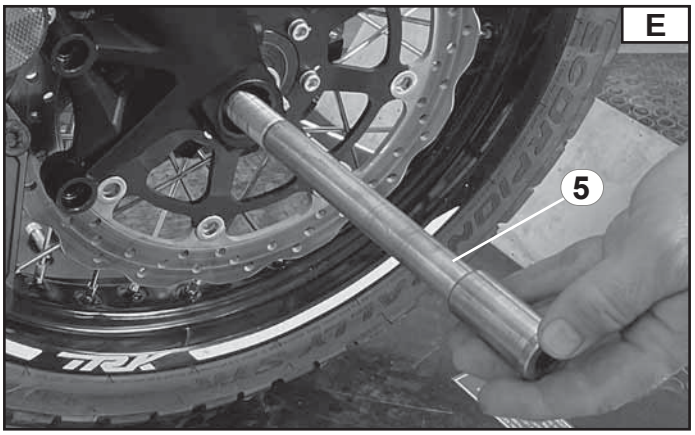


FRONT WHEEL AND BRAKE DISCS

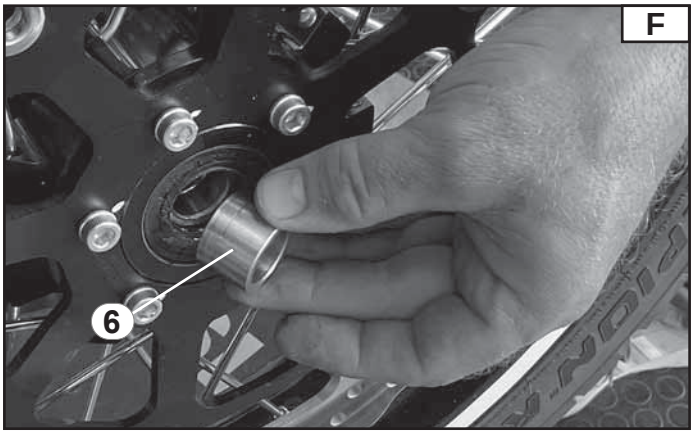
REMOVAL OF THE FRONT WHEEL

Remove:

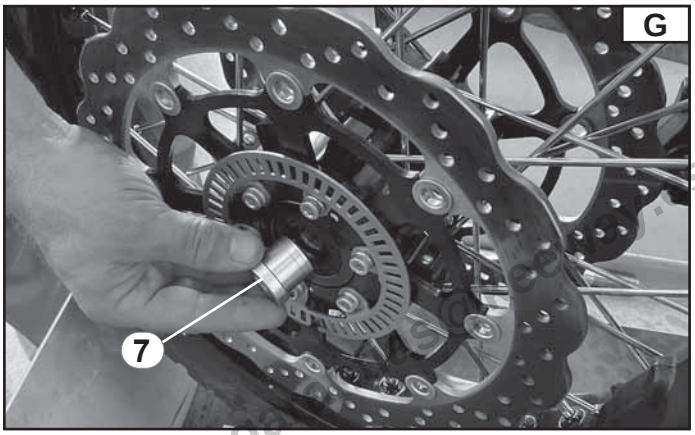
- The front wheel spindle (5) Fig. E.



- The right inner spacer (6) Fig. F.



- The left inner spacer (7) Fig. G.
- The front wheel.



FRONT WHEEL AND BRAKE DISCS

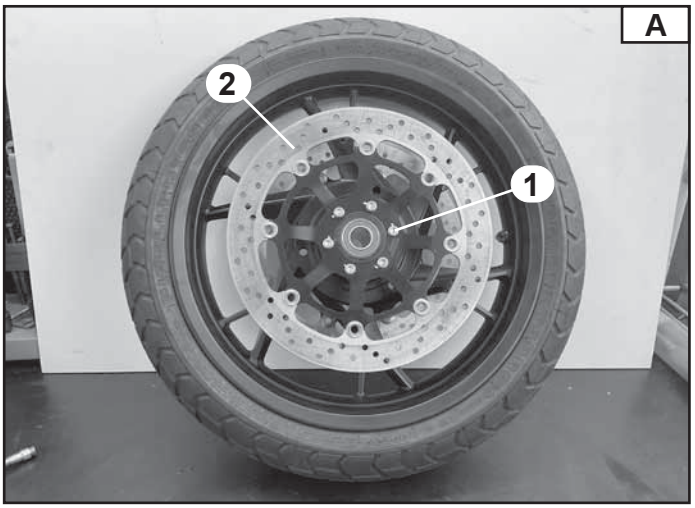
REMOVAL/INSTALLATION OF THE BRAKE DISCS

Remove:

- The front wheel, refer to **"Removal of the front wheel, Chapter 4".**
- The brake calipers, refer to **"Removal of the front brake caliper, Chapter 4".**
- The screws (1) Fig. A.
- The brake disc (2) Fig. A.

Install:

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



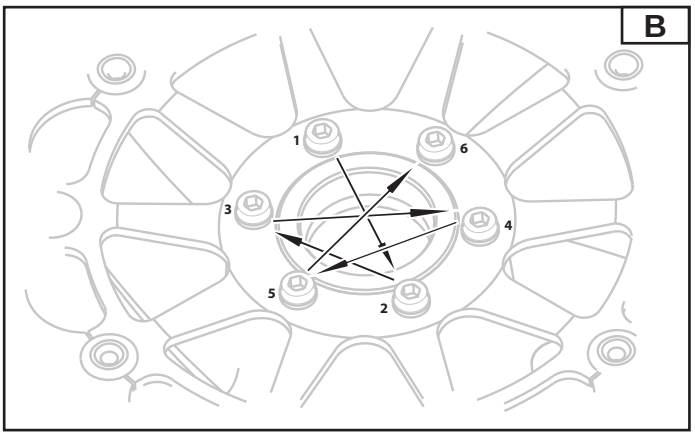
	**MEDIUM THREAD LOCKER**

The procedure below applies to both brake discs.

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

- Tighten to the torque:

Torque 22 N*m



FRONT WHEEL AND BRAKE DISCS

CHECK OF THE BRAKE DISCS

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

Check:

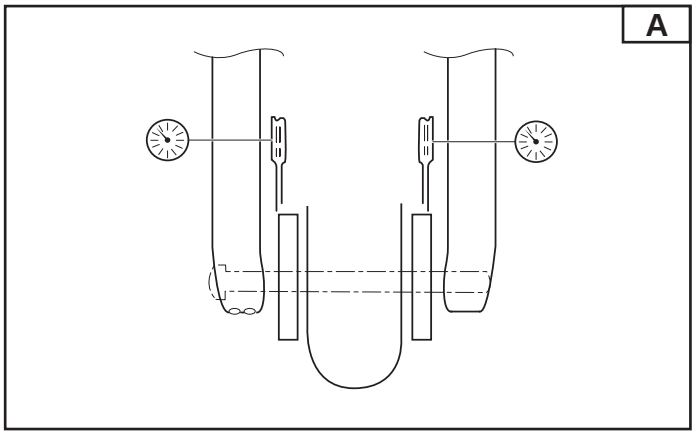
- The brake disc.

If there is any damage/abrasion, replace.

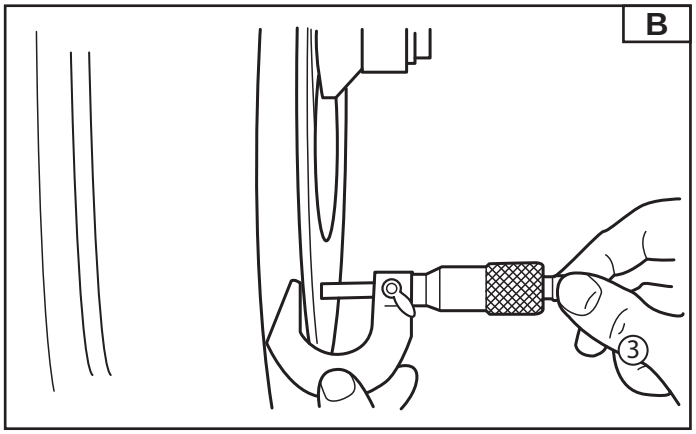
Measure:

- The deformation of the brake disc Fig. A.

Replace the brake disc if it is outside the specification.



- Place the motorcycle on a suitable support stand so that the wheel is raised.
- To remove the brake caliper, refer to **"Removal of the front brake caliper, Chapter 4".**
- Keep the gauge perpendicular 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 (0.0059 in.)
Rear	0.15 mm (0.0059 in.)
Wear limit Fig. B	4.5 mm (0.1771 in.)

Measure:

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

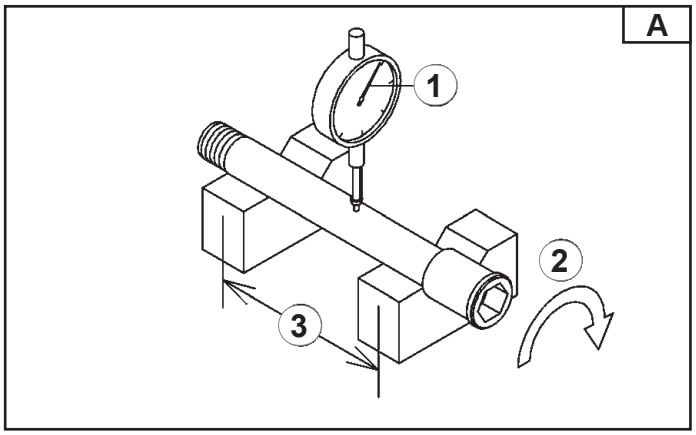
FRONT WHEEL AND BRAKE DISCS

CHECK OF THE WHEEL SPINDLE

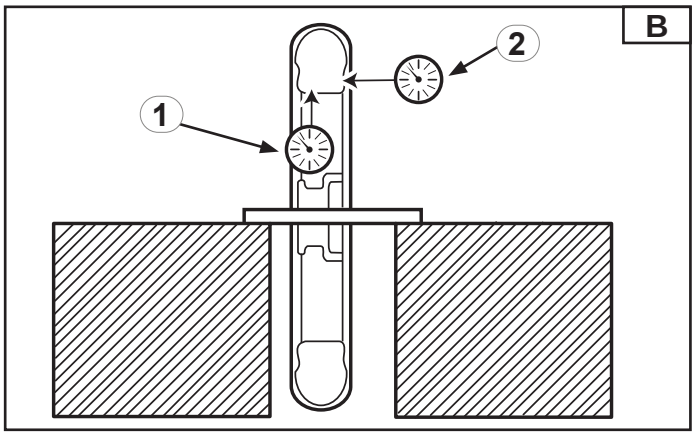
Carry out a visual check of the front/rear wheel spindle to make sure they are not damaged.
Replace the wheel spindle if damaged or bent.

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

The difference between the top and bottom detections of the comparator represents the measurement of the misalignment. Replace the wheel spindle, if the misalignment exceeds the service limit.



Wheel spindle runout /100 mm	
Standard	about 0.1 (0.0039 in)
Service limit	0.2 mm (0.0078 in.)



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 (1) Fig. B.
- The lateral eccentricity of the wheel (2) Fig. B.

If the specified limit is exceeded, replace.

Eccentricity	Limit
Radial (1)	2 mm (0.0787 in.)
Lateral (2)	2 mm (0.0787 in.)

NOTE:
The procedure below applies to both vehicles TRK702 and TRK702x.

FRONT WHEEL AND BRAKE DISCS

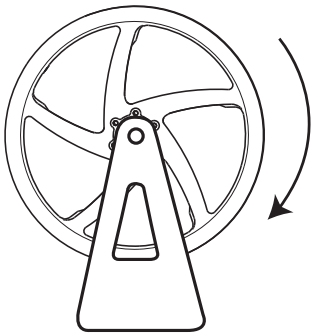
CHECK/REPLACEMENT OF THE WHEEL BEARINGS

Check:

- The wheel bearings Fig. A.

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

A

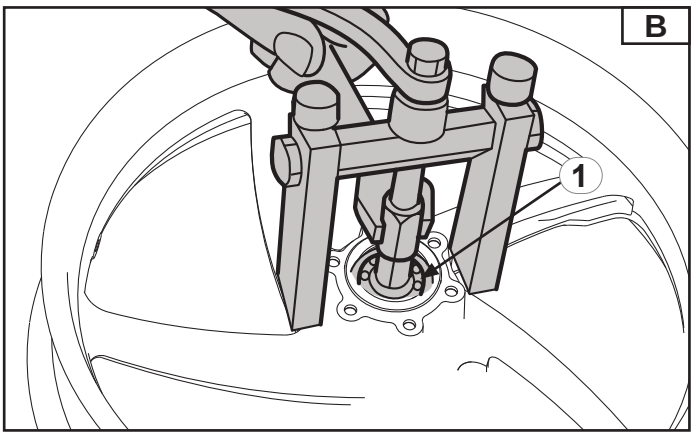


Replace:

- 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.

B

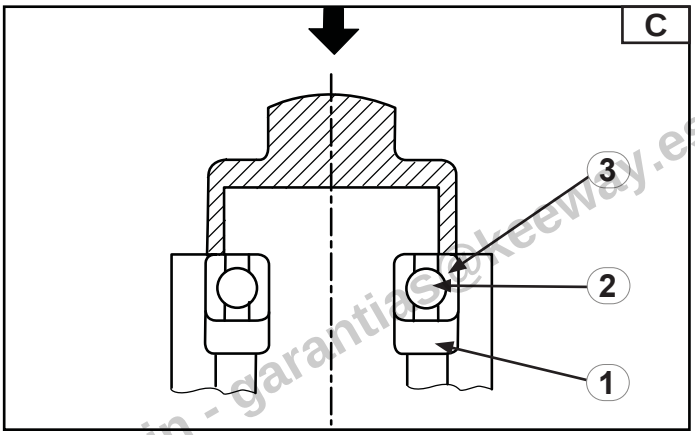


NOTICE

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

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

C



FRONT WHEEL AND BRAKE DISCS

INSTALLATION OF THE FRONT WHEEL

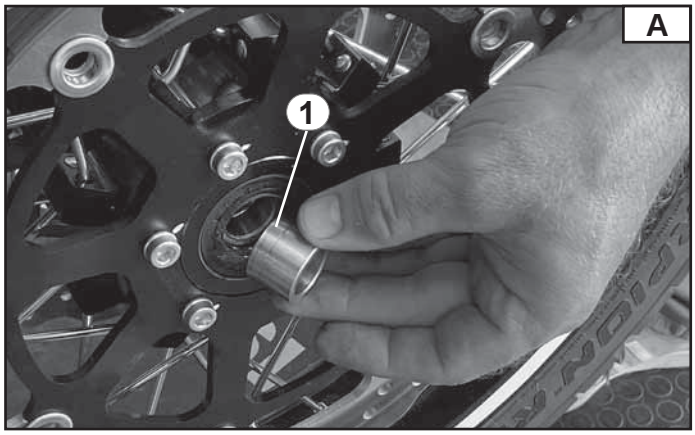
Park the motorcycle on a level surface.

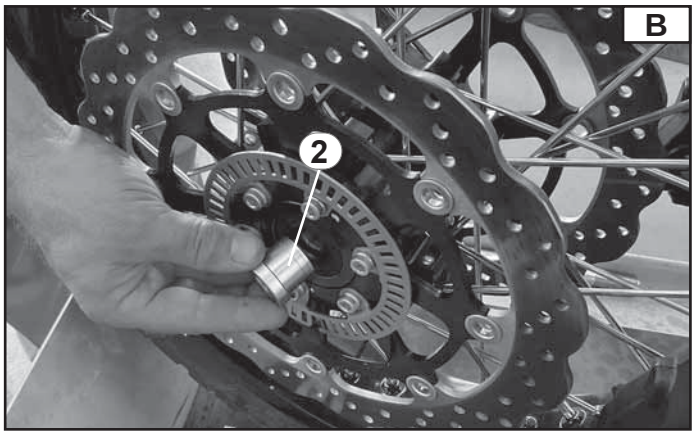
NOTICE

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

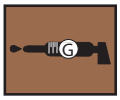
Install:
Proceed using the opposite order to removal.

Insert:
- The right inner spacer (1) Fig. A.
- The left inner spacer (2) Fig. B.

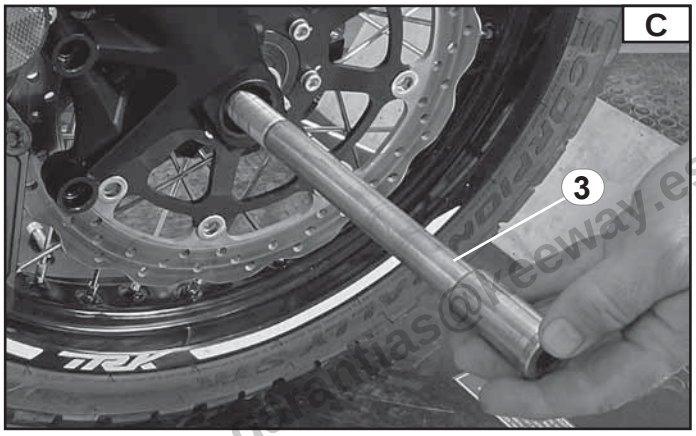




Tighten to the torque:
- Wheel spindle (3) Fig. C.

	**Recommended lubricant NGLI2 GREASE**

Torque 60 N*m

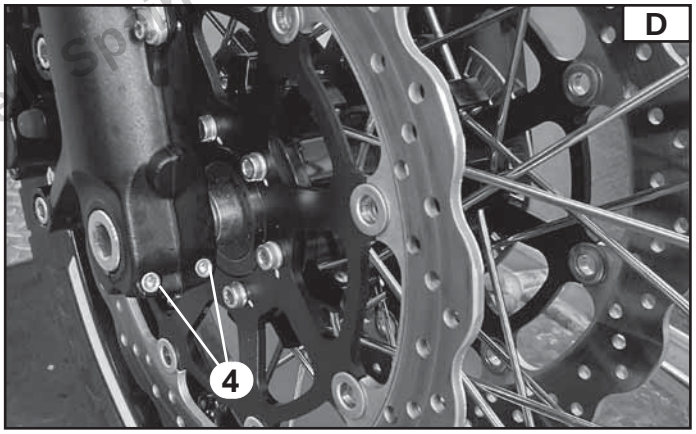


- The setscrews (4) Fig. D.

Torque 10 N*m

NOTICE

Before tightening the setscrews (4) Fig. D push hard on the handlebars to check that the front fork returns to the stationary position in a smooth way.



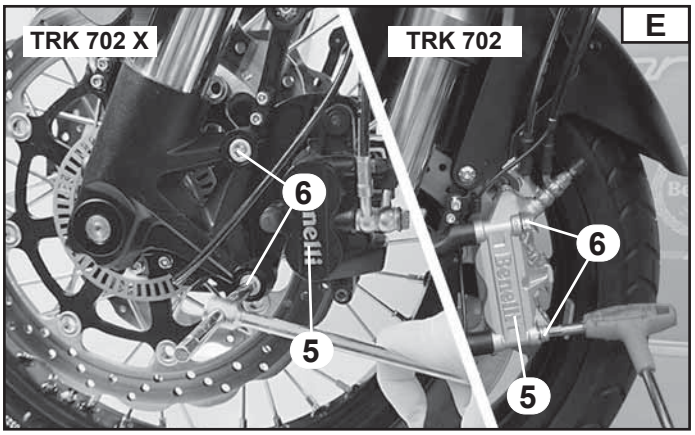
FRONT WHEEL AND BRAKE DISCS

INSTALLATION OF THE FRONT WHEEL

Install:
- The left brake caliper (5) Fig. E.

Tighten to the torque:
- The screws (6) Fig. E.

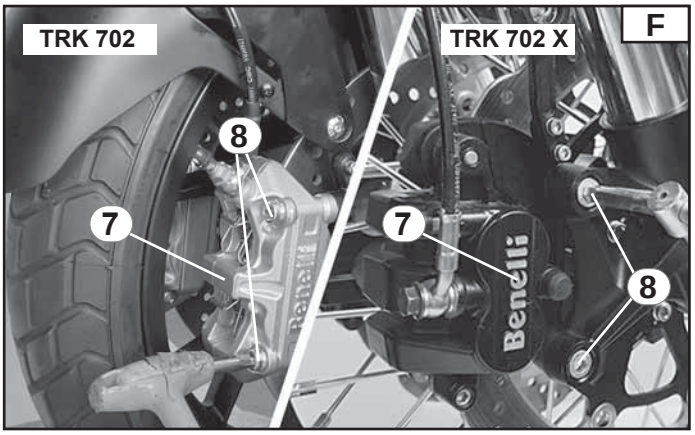
Torque 50 N*m



Install:
- The right brake caliper (7) Fig. F.

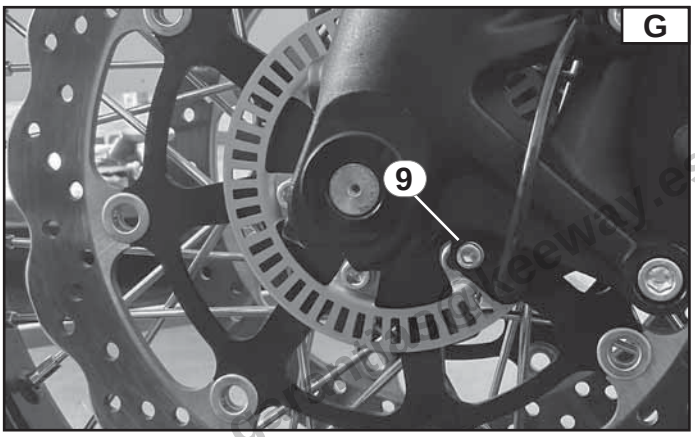
Tighten to the torque:
- The screws (8) Fig. F.

Torque 50 N*m



Install:
- The ABS sensor and screw (9) Fig. G.

Torque 10 N*m



NOTE:
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.

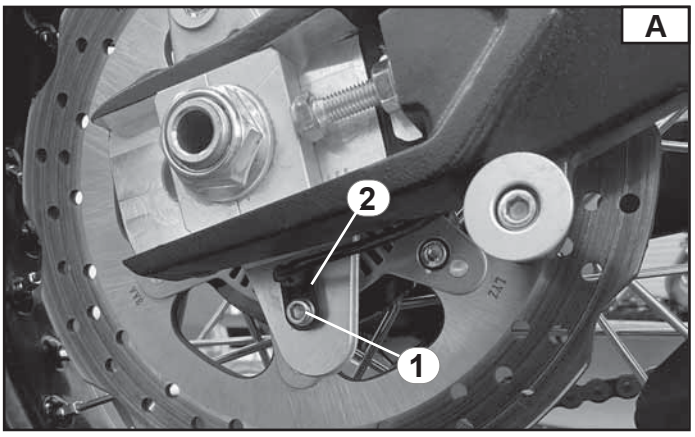
REAR WHEEL AND BRAKE DISC

REMOVAL OF THE REAR WHEEL

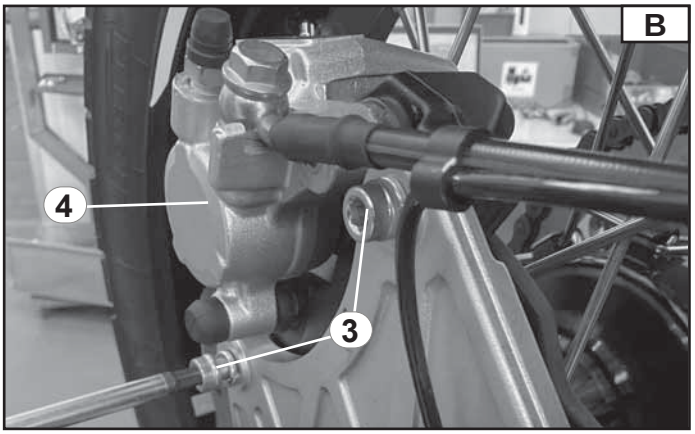
Park:
- The motorcycle on a level surface.

NOTE:
Place the motorcycle on a suitable support stand so that the rear wheel is raised.

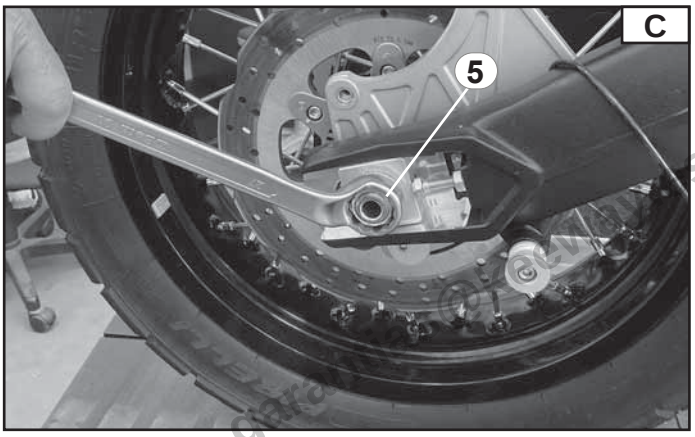
Remove:
- The screw (1) Fig. A.
- The ABS sensor (2) Fig. A.



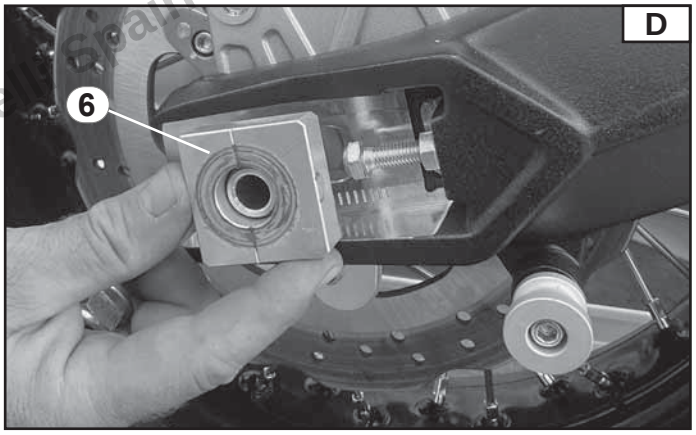
Remove:
- The screws (3) Fig. B.
- The brake caliper (4) Fig. B.



Remove:
- The nut (5) Fig. C.



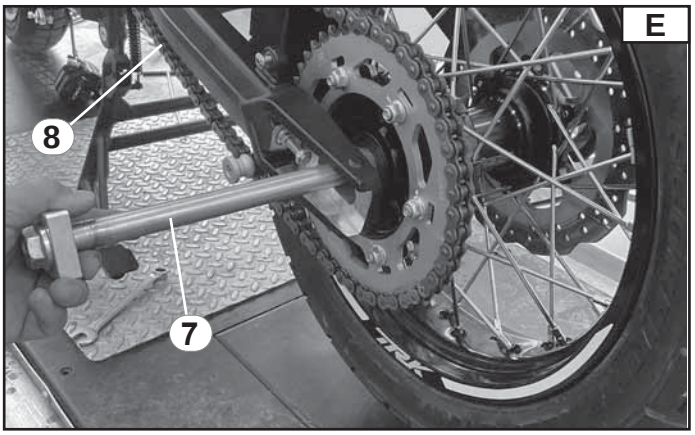
- The adjuster sliding shoe (6) Fig. D.



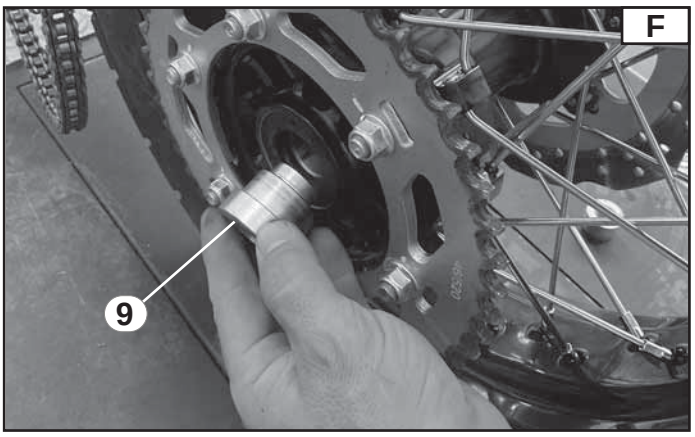
REAR WHEEL AND BRAKE DISC

REMOVAL OF THE REAR WHEEL

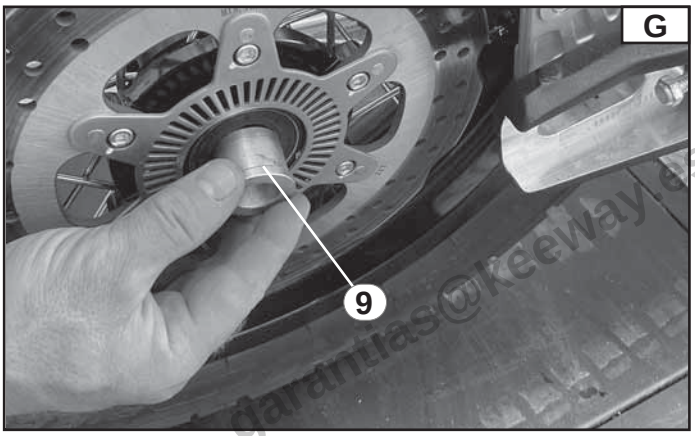
- The pin (7) Fig. E.
- The chain (8) Fig. E.



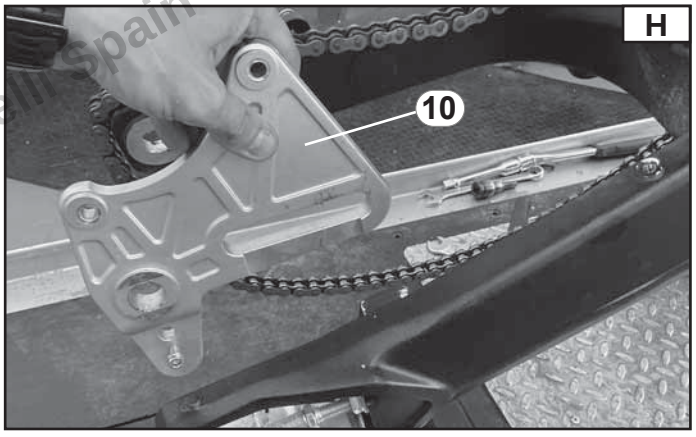
- The spacer (9) of the left side Fig. F.



- The spacer (9) of the right side Fig. G.



- The rear caliper support plate (10) Fig. H.

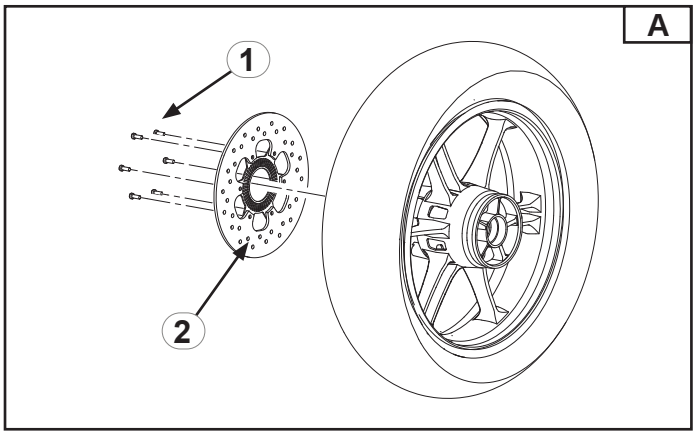


REAR WHEEL AND BRAKE DISC

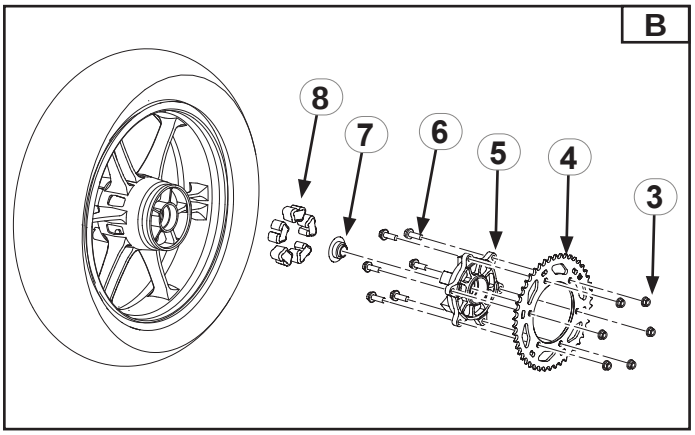
REMOVAL OF THE SPROCKET AND REAR BRAKE DISC

Remove:
- The rear wheel, refer to **"Removal of the rear wheel, Chapter 4".**

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



Remove:
- The nuts (3).
- The sprocket (4).
- The flange (5).
- The screws (6).
- The spacer (7).
- The spring drive rubbers (8).



Check:
- The sprocket flange (5).
- The spring drive rubbers (8).

NOTE:
If there are any anomalies or traces of wear, replace the parts.

NOTE:
The procedure below applies to both vehicles TRK702 and TRK702x.

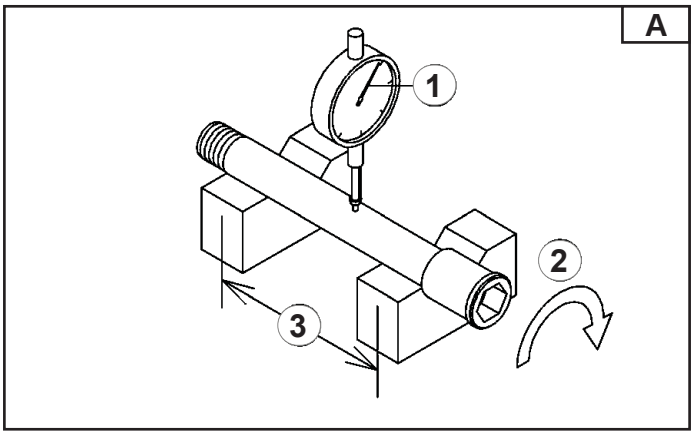
REAR WHEEL AND BRAKE DISC

CHECK OF THE WHEEL AXLE

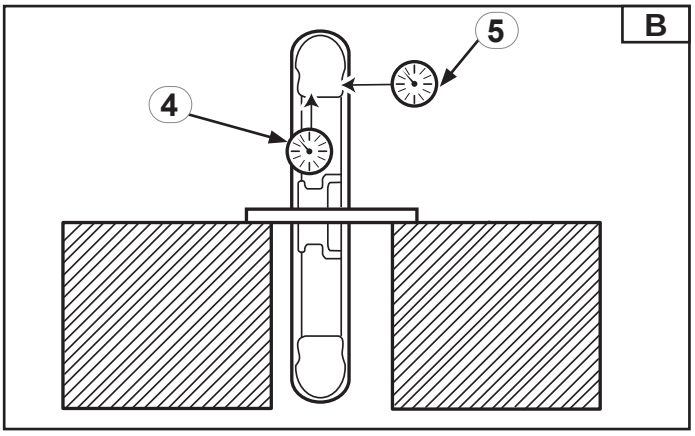
Carry out a visual check of the front/rear wheel spindle to make sure they are not damaged.
Replace the wheel spindle if damaged or bent.

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



Wheel spindle centring/100 mm (3.93 in)	
STANDARD	0.1 mm or less (0.0039 in)
Service limit	0.2 mm (0.0078 in.)



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 (0.0787 in.)
Lateral (5)	2 mm (0.0787 in.)

NOTE:
The procedure below applies to both vehicles TRK702 and TRK702x.

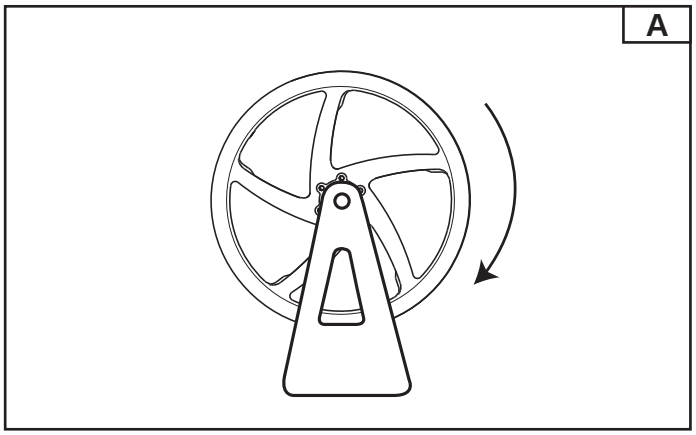
REAR WHEEL AND BRAKE DISC

CHECK/REPLACEMENT OF THE WHEEL BEARINGS

Check:

- The wheel bearings Fig. A.

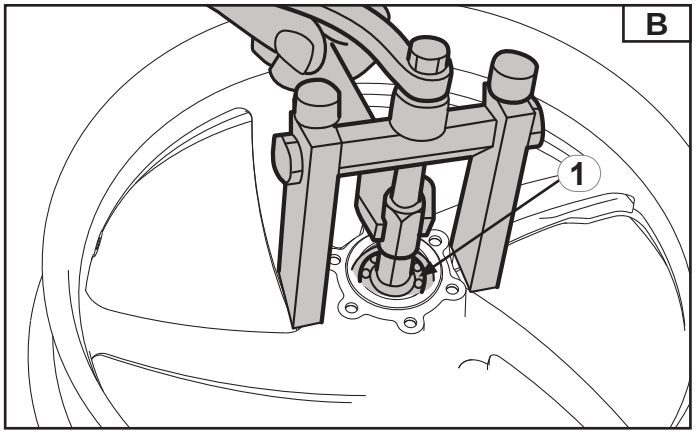
If the rear wheel turns irregularly or is loose, replace the wheel bearings.



Replace:

- The wheel bearings.

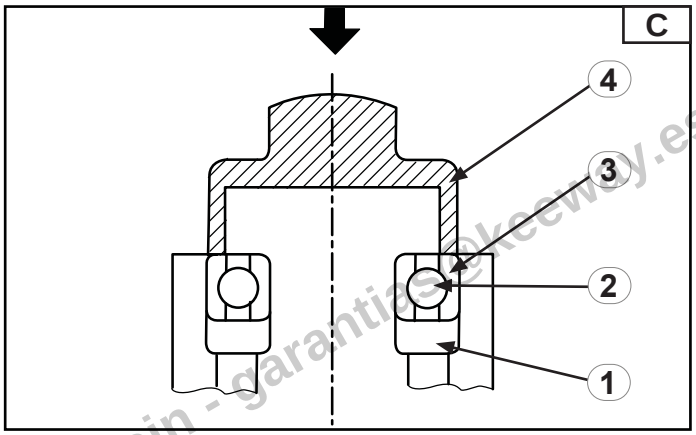
Remove the wheel bearings (1) using a general bearing extractor Fig. B.
Insert the new wheel bearings, following the removal steps in reverse order.



NOTICE

During the bearing insertion, do not touch the inner seat (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.



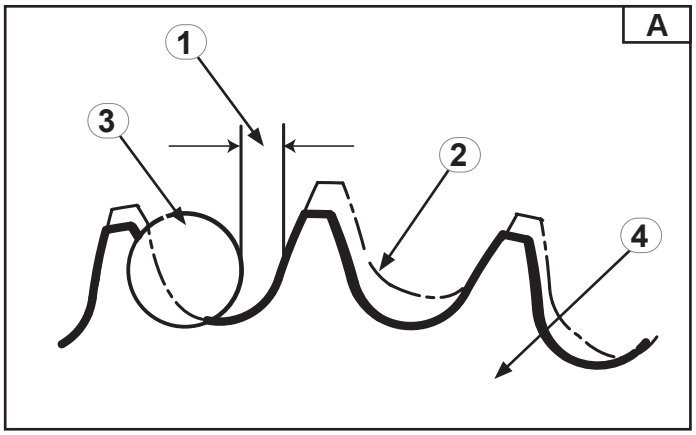
REAR WHEEL AND BRAKE DISC

SPROCKET CHECK AND REPLACEMENT

Road version
Check:
- The sprocket.

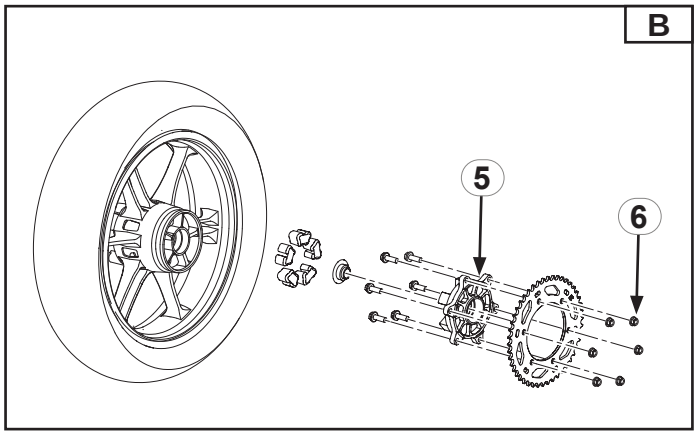
If more than ¼ of each tooth is worn, replace the sprocket.
If the teeth are bent, replace the sprocket Fig. A.

1. ¼ teeth.
2. Correct.
3. Transmission chain roller.
4. Sprocket.



Replace:
- **The sprocket,** refer to section “Removal of the rear brake disc, sprocket and signal wheel”.
- Clean the sprocket flange (5) Fig. B using a clean cloth, especially surfaces that touch the sprocket.

	Solvent with high flash point.



Install:
- The new sprocket.
- The screws and the self-locking nuts (6) Fig. B and tighten to the following torque:

Torque 45 N*m

	**MEDIUM THREAD LOCKER**

NOTE:
Tighten the self-locking nuts in repeated steps, proceeding with a crossover sequence.

NOTE:
The procedure below applies to both vehicles TRK702 and TRK702x.

REAR WHEEL AND BRAKE DISC

INSTALLATION OF THE BRAKE DISC

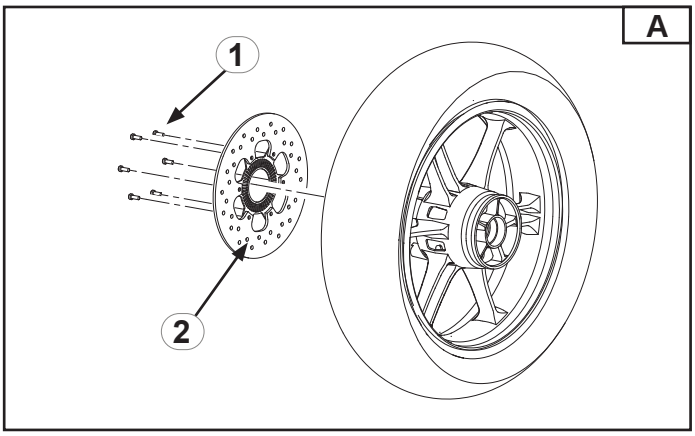
Road version
Install:

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

	**MEDIUM THREAD LOCKER**

Tighten to the following torque:

Torque 10 N*m



NOTE:
Tighten the self-fixing nuts in several stages, proceeding with a crossover sequence.

NOTE:
The procedure below applies to both vehicles TRK702 and TRK702x.

REAR WHEEL AND BRAKE DISC

INSTALLATION OF THE REAR WHEEL

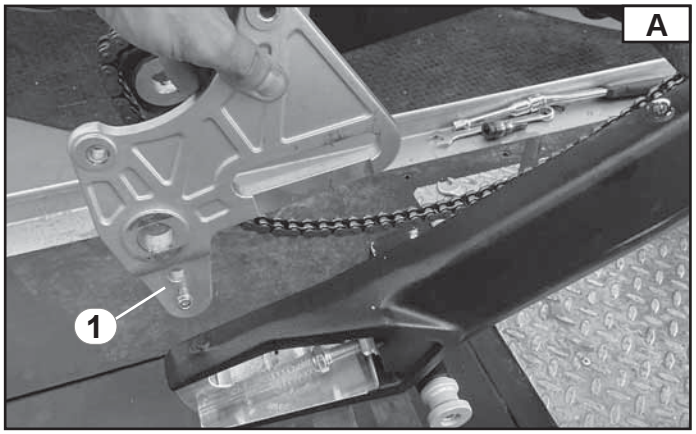
Park the motorcycle on a level surface.

NOTICE

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

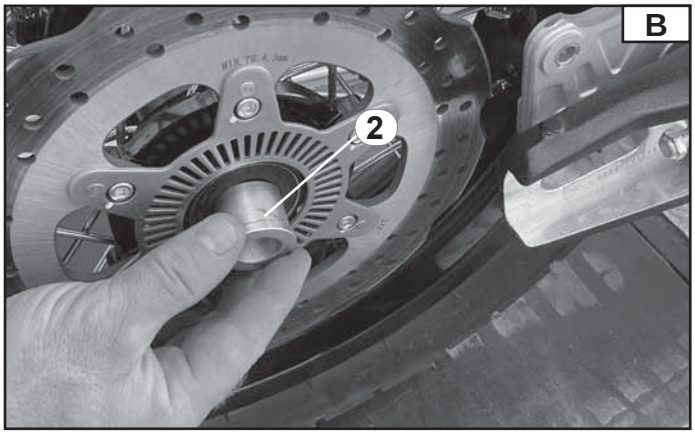
Install:

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

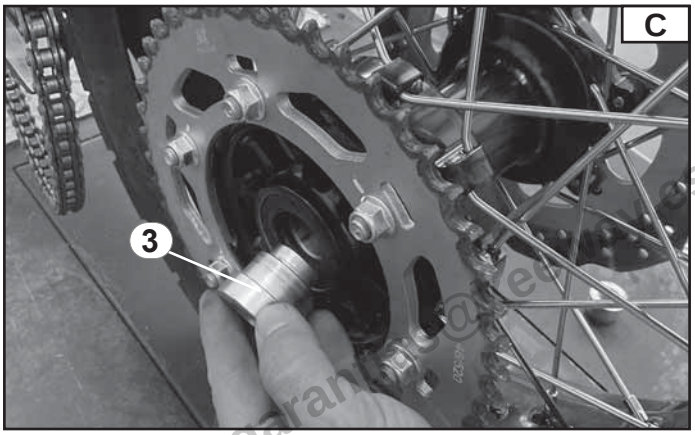


Insert:

- The RH spacer (2) Fig. B.

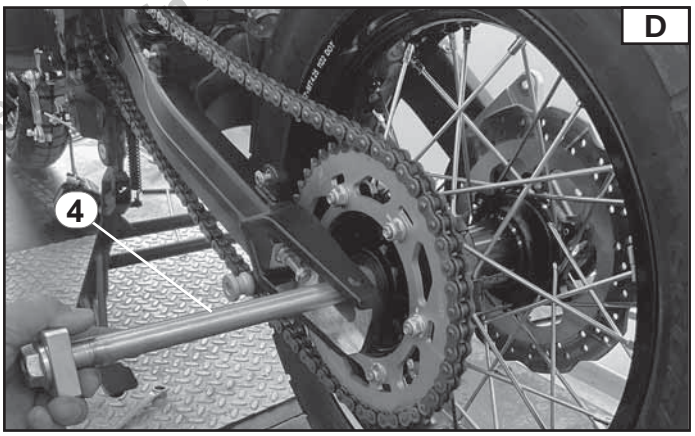


- The LH spacer (3) Fig. C.



Insert:

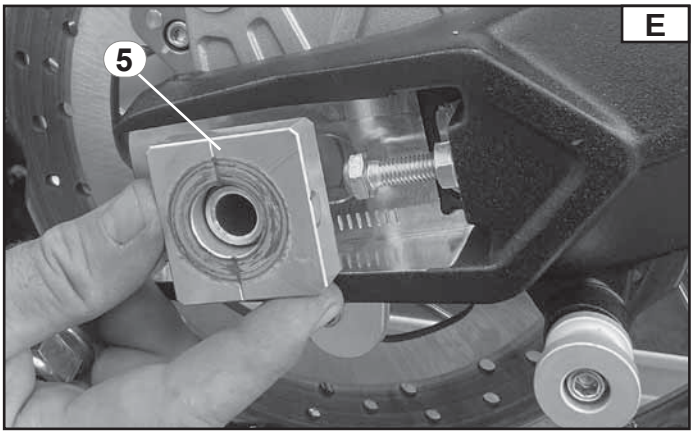
- The wheel.
- The chain.
- The pin (4) Fig. D.



REAR WHEEL AND BRAKE DISC

INSTALLATION OF THE REAR WHEEL

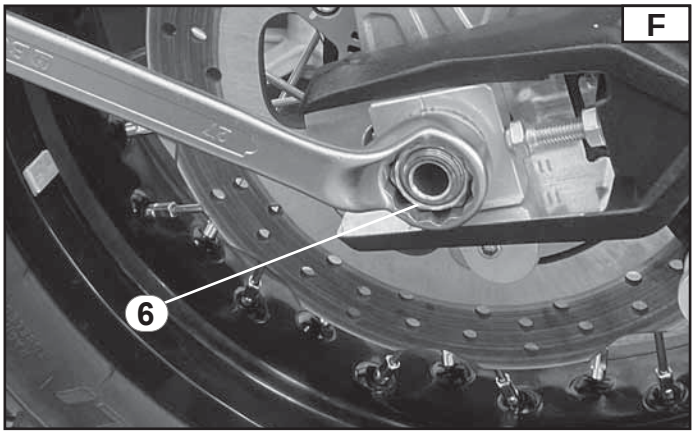
- The adjuster sliding shoe (5) Fig. E.



Lubricate and install:

- The nut (6) Fig. F.

	**Recommended lubricant NGLI2 GREASE**



- Tighten to the following torque:

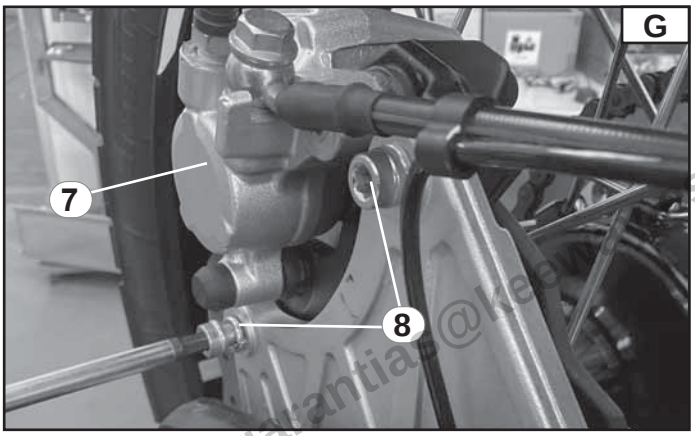
Torque 80 N*m

Install:

- The brake caliper (7) Fig. G.
- The screws (8) Fig. G.
- Tighten to the following torque:

Torque 22 N*m

	**MEDIUM THREAD LOCKER**



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

NOTICE

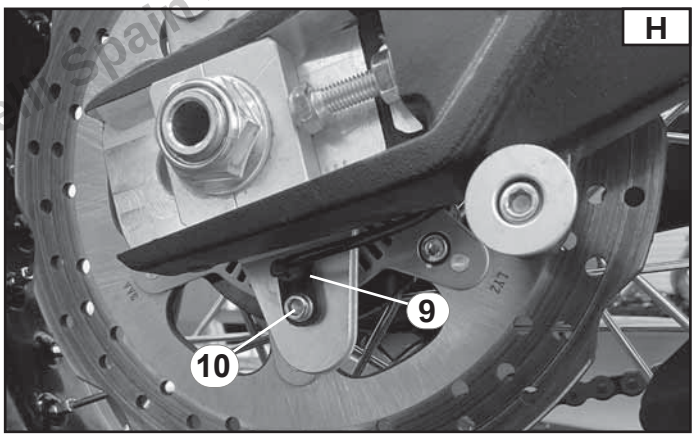
Check that the path of the brake hose is correct.

Install:

- The ABS sensor (9) Fig. H.
- The screw (10) Fig. H.

Tighten:

- The screw (10) to 10 Nm.



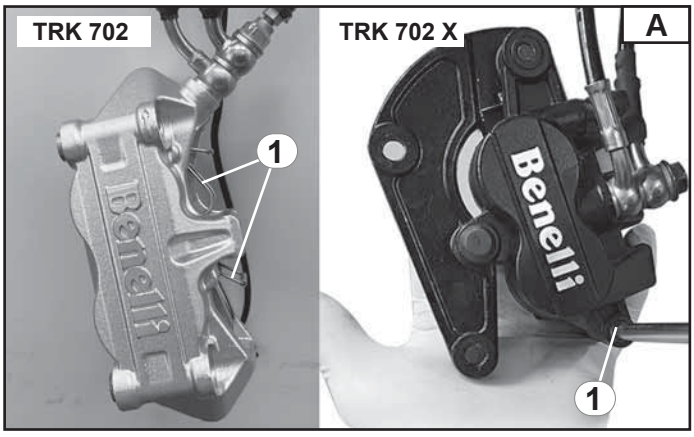
FRONT AND REAR BRAKES

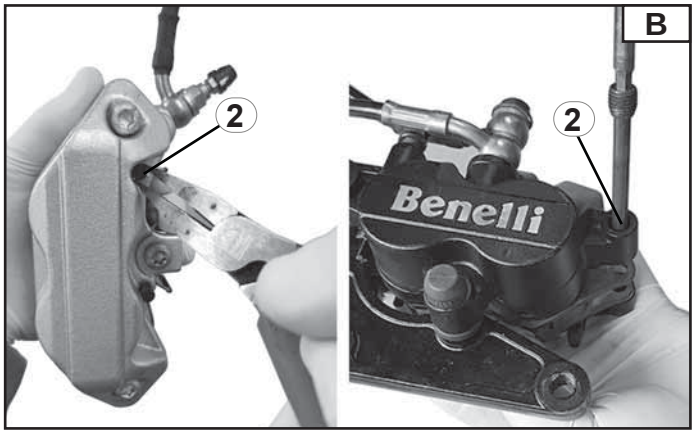
REMOVAL OF THE FRONT BRAKE PADS

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

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

Remove:
- The fixing pins (2) Fig. B by disengaging them from the clips (1) Fig. A. (TRK 702).
- The fixing pins (2) Fig. B by unscrewing the pin anticlock-wise (1) Fig. A. (TRK 702 X).



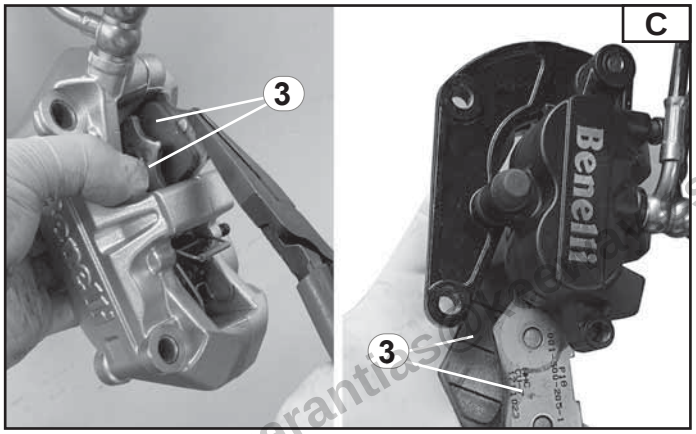


- Remove the brake pads (3) Fig. C.

Measure:
- The wear limit of the brake pads.

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

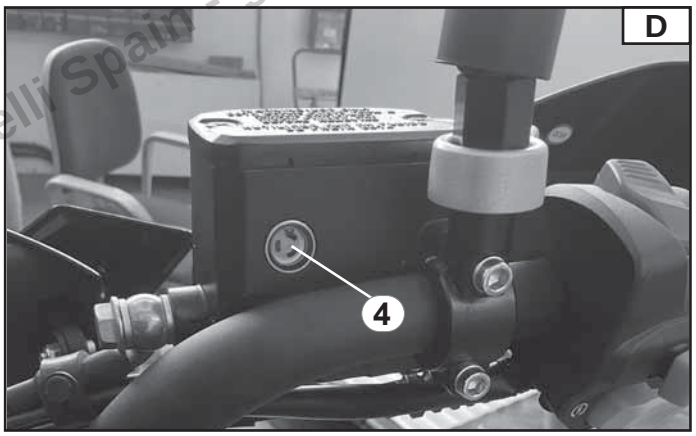
Pads	Wear limit
Front	1 mm (0.039 in.)



Clean:
- Press the pistons of the caliper inwards to allow installation of the new brake pads.

Install:
- The brake pads into the relevant housing.
- The brake caliper. Refer to "**Frame, Chapter 4**".

Check:
The brake fluid level (4) Fig. D.
If below the minimum notch, top up with the recommended brake fluid until it is at the correct level.
Refer to "**Periodic maintenance, Chapter 3**".



Check:
- Brake lever operation.

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

NOTICE

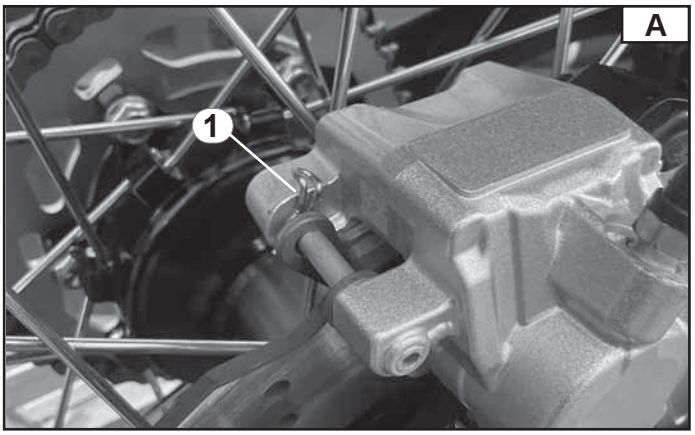
Do not use the motorcycle before reaching the full efficiency of the brake lever by operating it several times so as to bring the pads into contact with the disc. If this operation is not carried out, the brakes will not operate when activating the lever for the first time.

FRONT AND REAR BRAKES

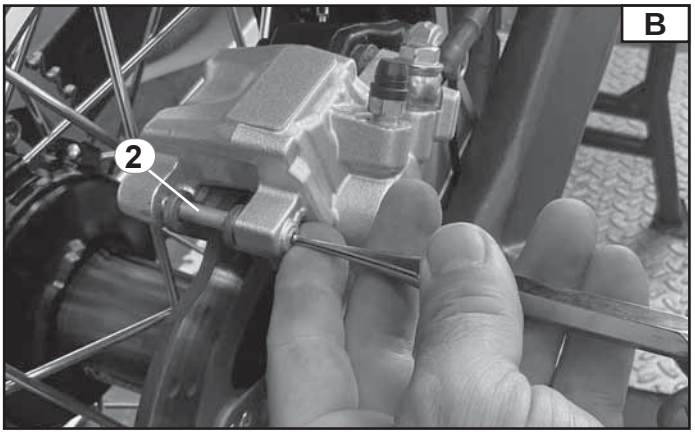
REMOVAL OF THE REAR BRAKE PADS

Remove:

- The safety cotter (1) Fig. A.

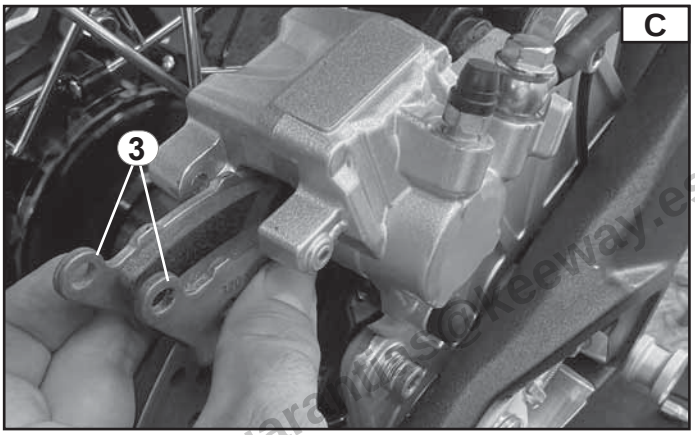


- The pin (2) Fig. B.



Slide out:

- The brake pads (3) Fig. C.



Measure:

- The wear limit of the brake pads.

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

Pads	Wear limit
Rear	1 mm (0.039 in.)

Clean:

- The caliper inside.
- The pistons, then dry everything.

Press:

- The pistons of the caliper inwards to allow the installation of the new brake pads.

Install:

- The brake pads into the relevant housing.
- The pin.
- The safety cotter.

FRONT AND REAR BRAKES

INSTALLATION OF THE REAR BRAKE PADS

Check:

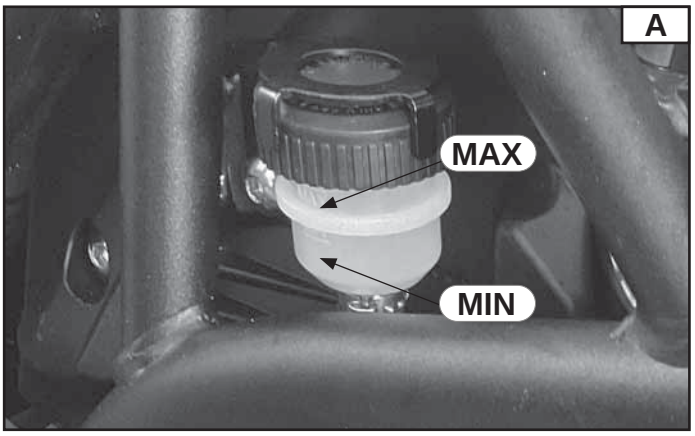
- The brake fluid level Fig. A.

Top up with brake fluid if the level is less that the minimum level mark.

- The brake pedal operation.

NOTICE

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



FRONT AND REAR BRAKES

FRONT BRAKE PUMP REMOVAL

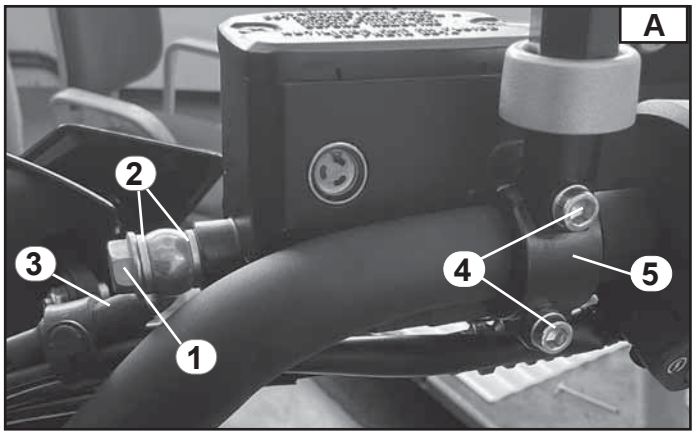
NOTE:
Drain out the brake fluid before proceeding with these operations.
Refer to Chapter 3, Periodic maintenance, section "Check and topping up of the front brake fluid level".

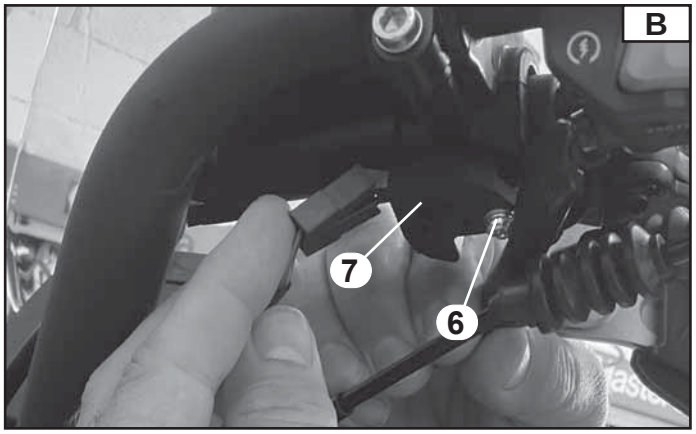
NOTICE

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

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

Disconnect:
- The connector and the switch of the front brake (7) Fig. B.

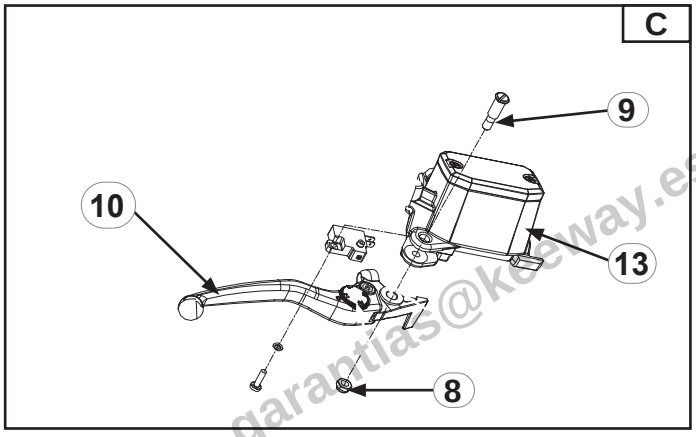




Remove:
- The nut (8) Fig. C.
- The screw (9) Fig. C.
- The front brake lever (10) Fig. C.
- Remove the pump body (13) Fig. C.

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

INSTALLATION OF THE FRONT BRAKE PUMP

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

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

Install:

- The bracket (3) Fig. A.
- The screws (2) Fig. A.

Tighten to the following torque:

Torque 8 N*m

Install:

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

Tighten to the following torque:

Torque 6 N*m

Install:

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

Tighten to the following torque:

Torque 26 N*m

Connect:

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

Tighten to the following torque:

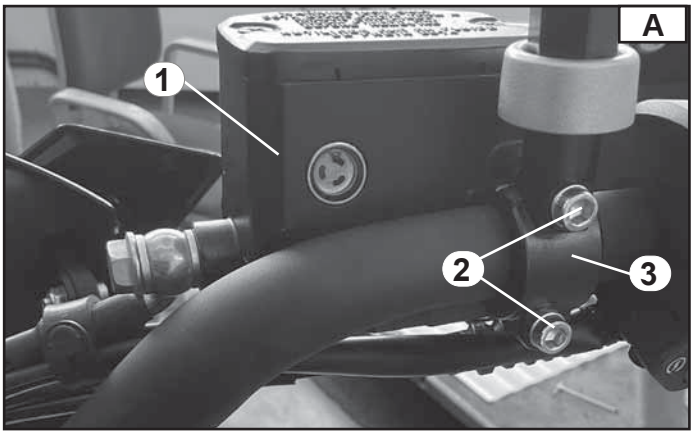
Torque 10 N*m

WARNING

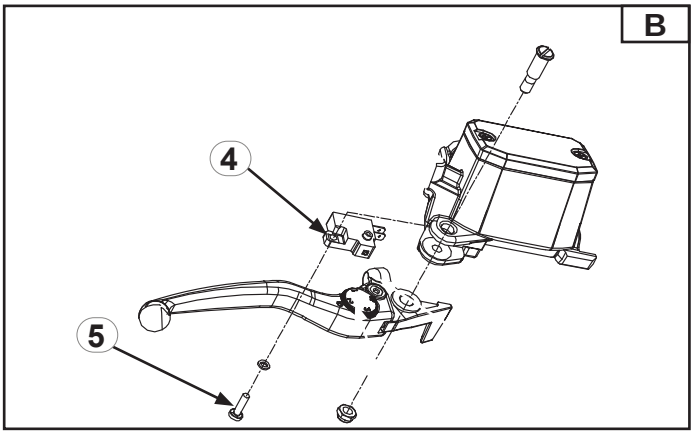
To guarantee the safety of the motorcycle, it is essential for the path of the flexible brake tube to be correct.

NOTE:
Once topping up operations of the brake fluid has finished, refer to Chapter 3, Periodic maintenance, section "Check and topping up of the front brake fluid level".

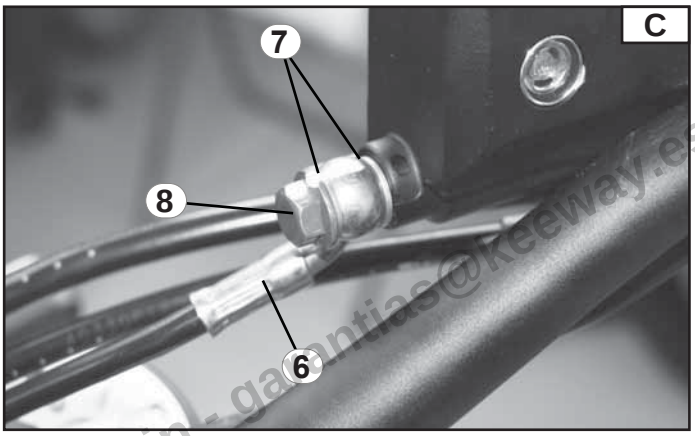
A



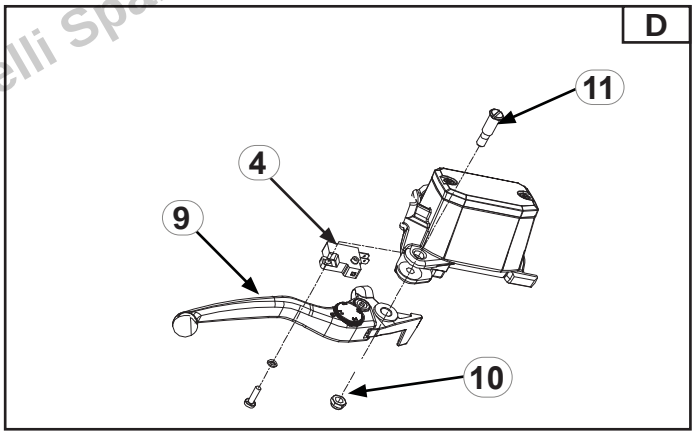
B



C



D

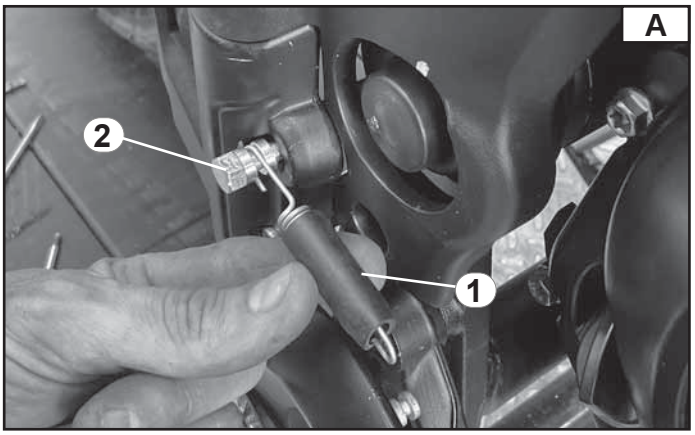


FRONT AND REAR BRAKES

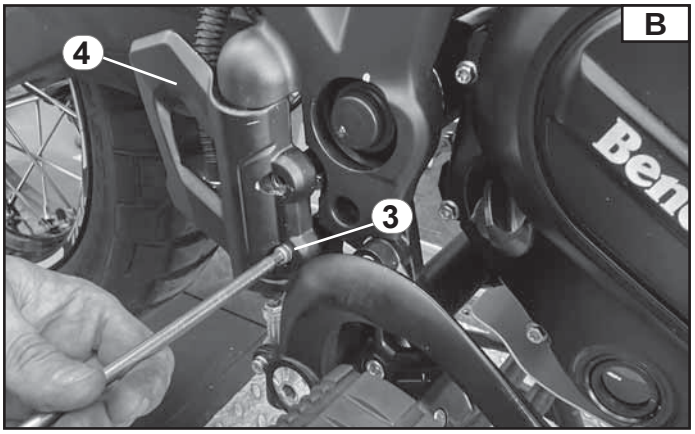
REAR BRAKE PUMP REMOVAL

NOTE:
Drain out the brake fluid before proceeding with these operations.
Refer to Chapter 3, Periodic maintenance, section "Checking and topping up the rear brake fluid level".

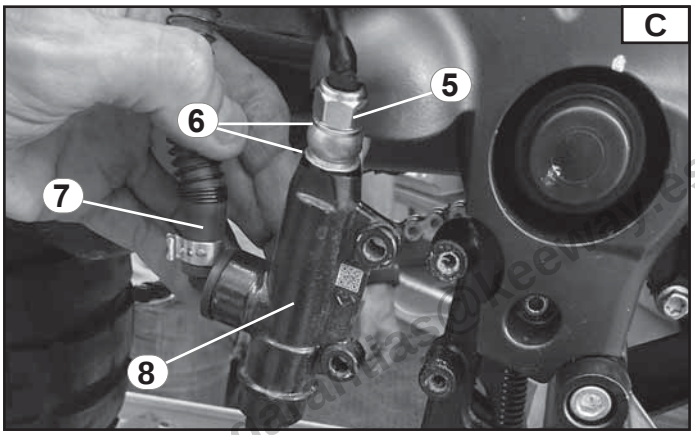
Remove:
- The spring (1) Fig. A.
- The screw (2) Fig. A.



- The screw (3) Fig. B.
- The protection (4) Fig. B.



- The hydrostop (5) Fig. C.
- The sealing washers (6) Fig. C.



- Release the brake reservoir hose (7) Fig. C.
- Remove the brake pump (8) Fig. C.

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
INSTALLATION OF THE REAR BRAKE PUMP

NOTICE

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

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

Install:
- The rear brake reservoir hose to the brake pump (1) Fig. A.
- The rear brake tube with the relevant sealing washers (2) Fig. A.
- The hydrostop (3) Fig. A and tighten to the following torque:

Torque 26 N*m

- The protection (4) Fig. B.
- The screws (5) Fig. B.

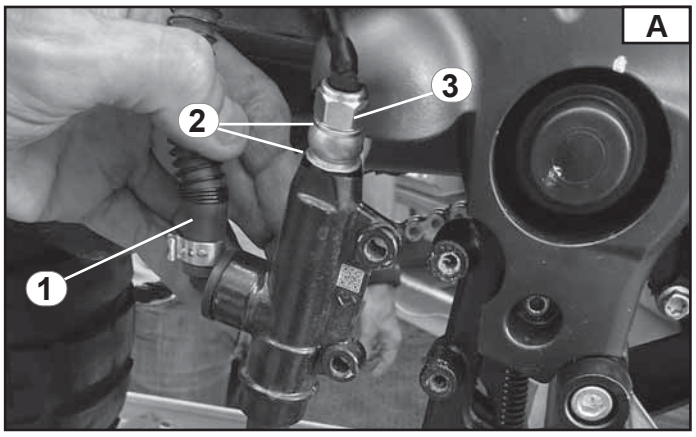
Tighten to the following torque:

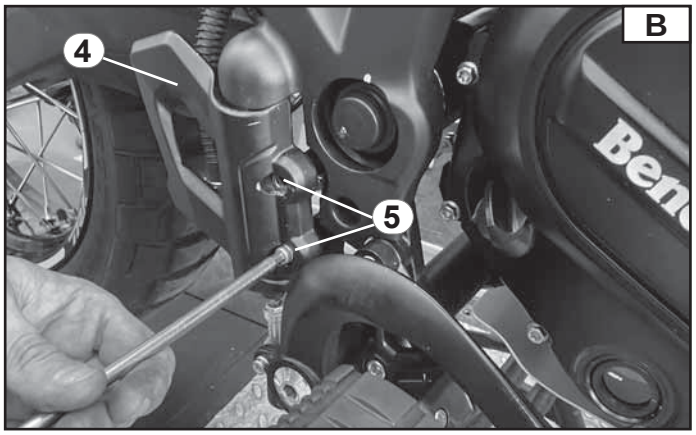
Torque 12 N*m

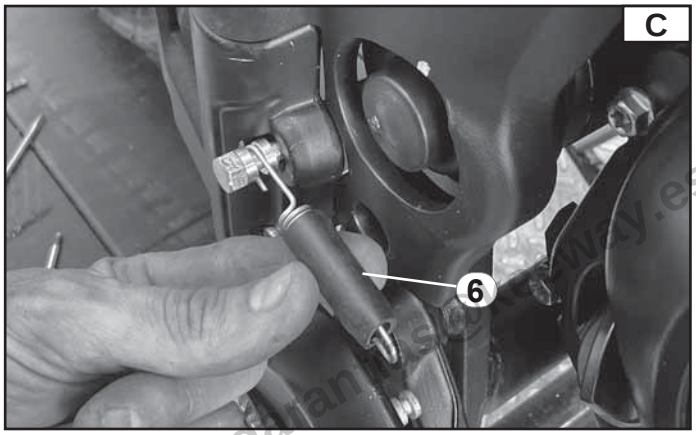
- The spring (6) Fig. C.

NOTICE

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





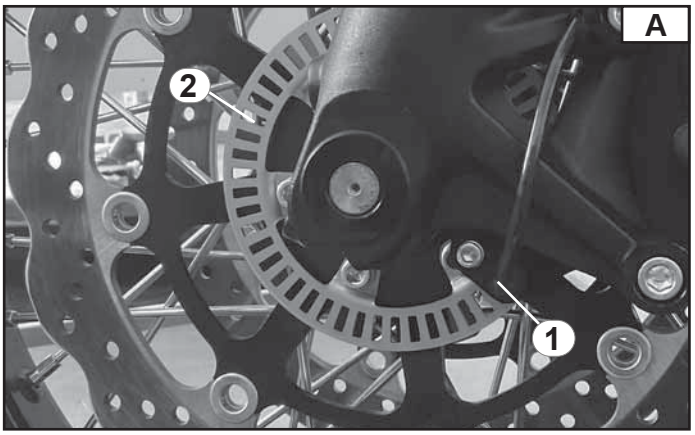


ABS ANTI-LOCK BRAKING SYSTEM
POSITION OF THE COMPONENTS

The parts making up the anti-lock braking system are:

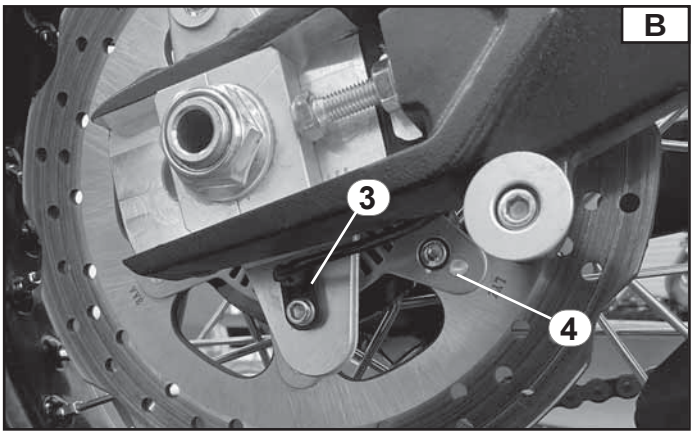
- The ABS sensor (1) of the front wheel Fig. A.
- The signal wheel (2) on the front wheel Fig. A.

A



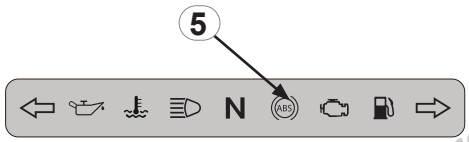
- The ABS sensor (3) of the rear wheel Fig. B.
- The signal wheel (4) on the rear wheel Fig. B.

B



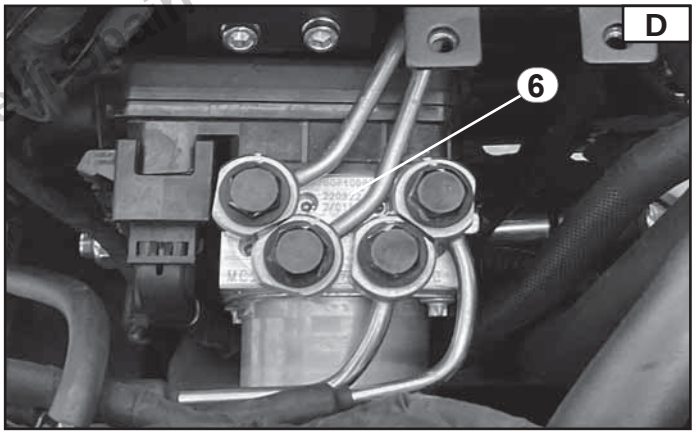
- The ABS indicator light (5) on the light display Fig. C.

C



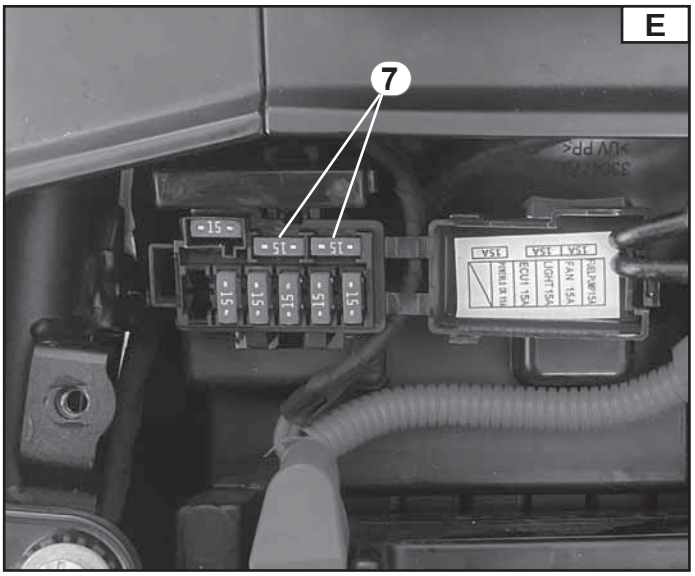
- The ABS hydraulic unit (6) Fig. D.

D

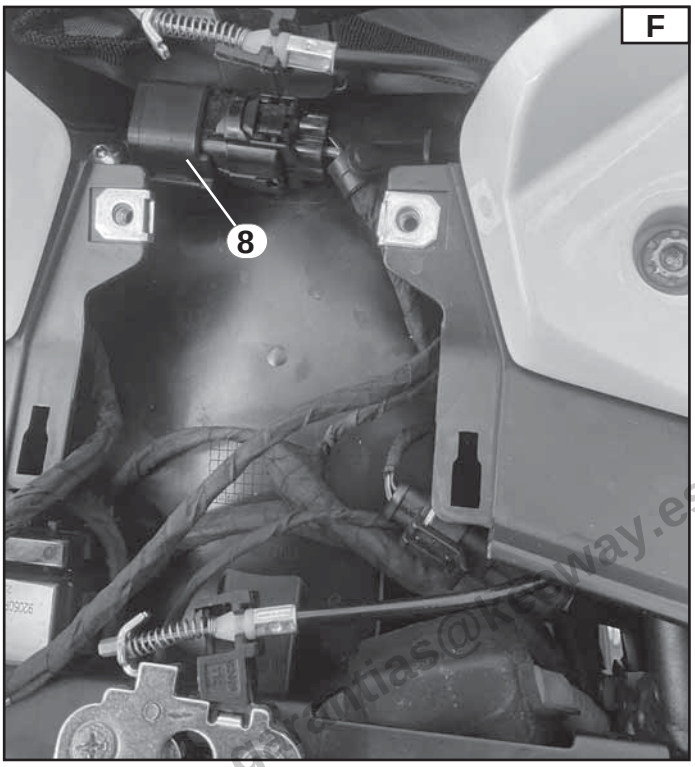


ABS ANTI-LOCK BRAKING SYSTEM
POSITION OF THE COMPONENTS

- ABS1/ABS2 fuse, (7) Fig. E.



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



ABS ANTI-LOCK BRAKING SYSTEM
CHECK OF THE ROTATION SENSOR

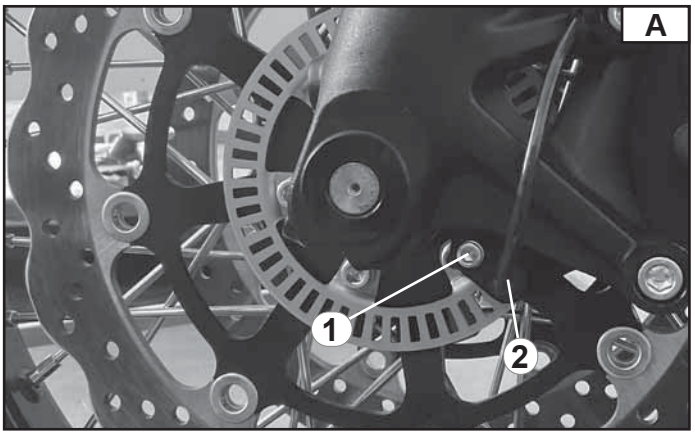
NOTICE

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.

Remove:
- The screw (1) Fig. A.
- The ABS sensor (2) on the front wheel Fig. A.

Disconnect:
- The connector of the ABS sensor.

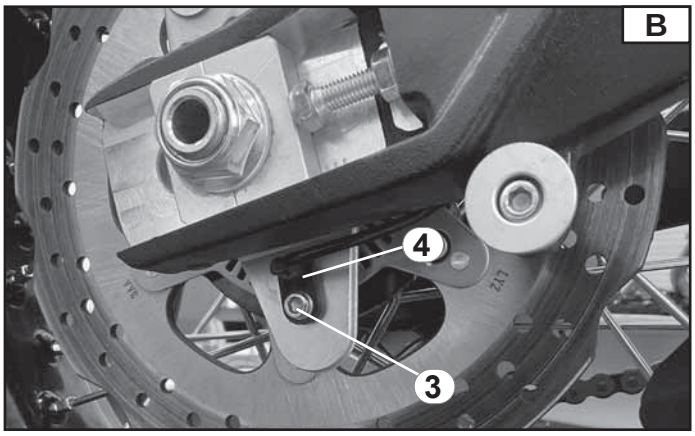
Carry out a visual check of the ABS sensor. Replace the ABS sensor if it is cracked, bent or damaged in any way. If an electrical fault in the sensors is suspected, check the electrical circuit.



Remove:
- The screw (3) Fig. B.
- The ABS sensor (4) of the rear wheel Fig. B.

Disconnect:
- The connector of the ABS sensor.

Carry out a visual check of the ABS sensor. Replace the ABS sensor if it is cracked, bent or damaged in any way. If an electrical fault in the sensors is suspected, check the electrical circuit.



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

Check:
Lift the front/rear wheel off the ground and measure the distance at various points between the sensor and the signal wheel.

Air gap	
Front	**Rear**
1.0 – 1.5 mm (0.039 - 0.059 in)	1.0 - 1.5 mm (0.039 - 0.059 in)

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

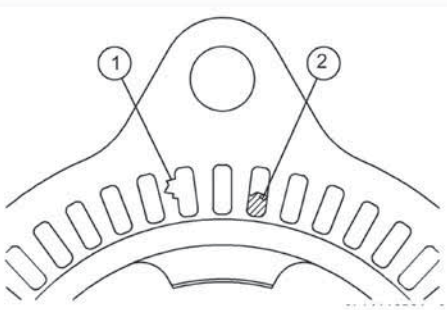
- If the distance does not come within the prescribed values, check the hub bearing (refer to section Removal/Installation of the front/rear wheel), the sensor, the signal wheel and the assembly conditions of the sensor.

ABS ANTI-LOCK BRAKING SYSTEM

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

Check:
Replace the signal wheel if it is deformed, damaged or with damaged teeth (1) Fig. A.
Remove any deposits of metal or other magnetic material (2). If necessary, replace the signal wheel.

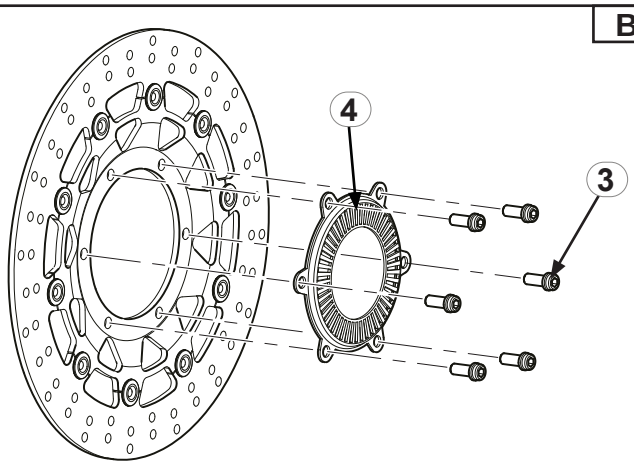
A



TRK 702 version
REPLACEMENT OF THE SIGNAL WHEEL, FRONT/REAR WHEEL ABS

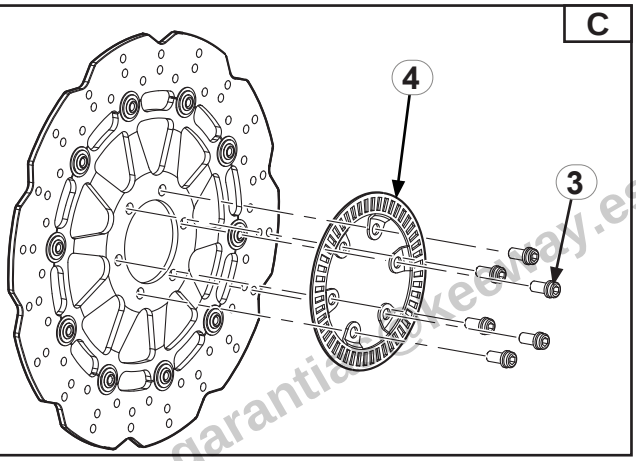
Remove:
- The front wheel, refer to **"Removal of the front wheel, Chapter 4"**.
- The screws (3) Fig. B.
- The signal wheel (4) Fig. B.

B



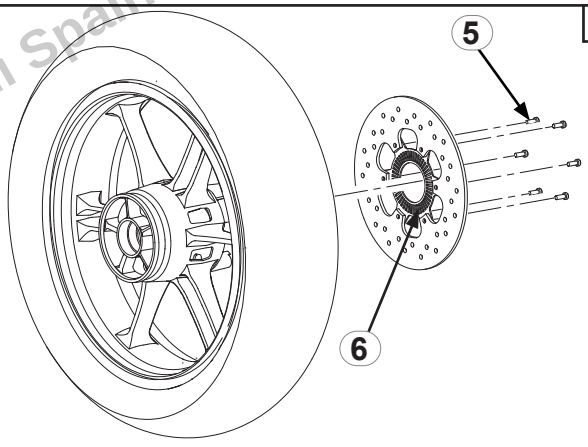
TRK 702X version
Making reference to Fig. C, carry out the same replacement procedure as the front wheel of the ABS signal wheel of the road version.

C



TRK 702 version
Remove:
- The rear wheel, refer to **"Removal of the rear wheel, Chapter 4"**.
- The screws (5) Fig. D.
- The signal wheel integrated in the brake disc (6) Fig. D.

D

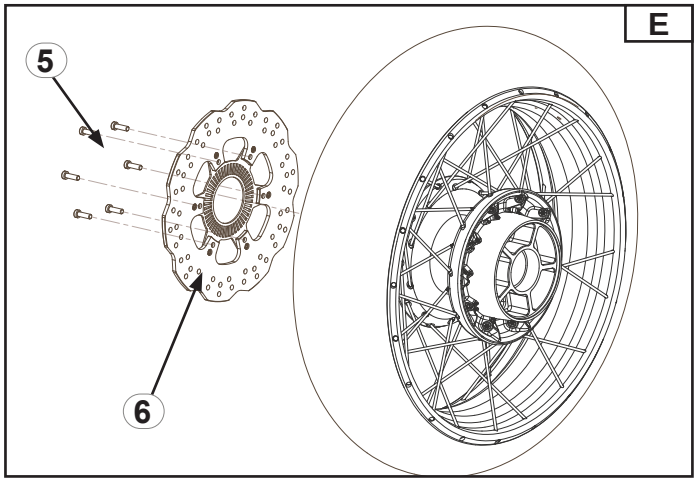


ABS ANTI-LOCK BRAKING SYSTEM

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

TRK 702X version

Making reference to Fig. E, carry out the same replacement procedure as the rear wheel of the ABS signal wheel of the road version. D.



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 maintenance codes.
- Do not spray water onto the electrical components, the components of the Abs, cables, connectors or the cabling.
- If there is a transmitter/receiver installed on the motorcycle, ensure that the functioning of the ABS system is not disturbed by electromagnetic waves irradiated by the antenna.
- Position the antenna as far away as possible from the ABS hydraulic unit.
- Position the antenna as far away as possible from the hydraulic unit 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 components cannot be disassembled.
- Furthermore, the ABS system cannot detect problems of the conventional braking system (abnormal wear of the brake discs, uneven wear of the brake
- pads and other mechanical faults). To avoid inconveniences, check that the brake circuits and tubes are positioned and connected properly, the wiring is laid out suitably and the brakes have 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 might operate improperly.

NOTICE

The use of non-recommended tires might 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 standard tires recommended for this motorcycle.

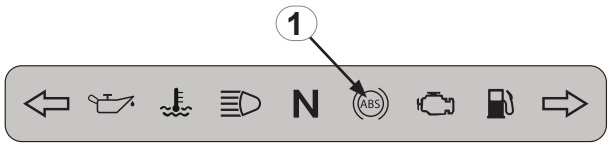
ABS ANTI-LOCK BRAKING SYSTEM

PRECAUTIONS

NOTICE

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

A



ABS ANTI-LOCK BRAKING SYSTEM

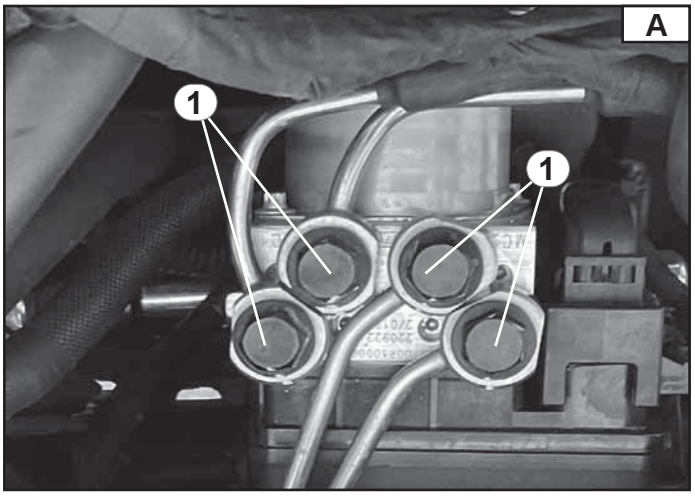
REMOVAL OF THE ABS HYDRAULIC UNIT

NOTICE

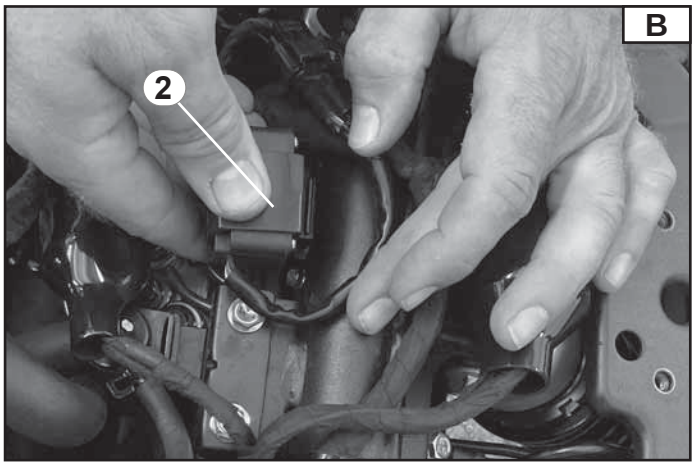
The ABS hydraulic unit Fig. A has been adjusted and set with precision by the manufacturer. Therefore, handle it with care.

Remove:

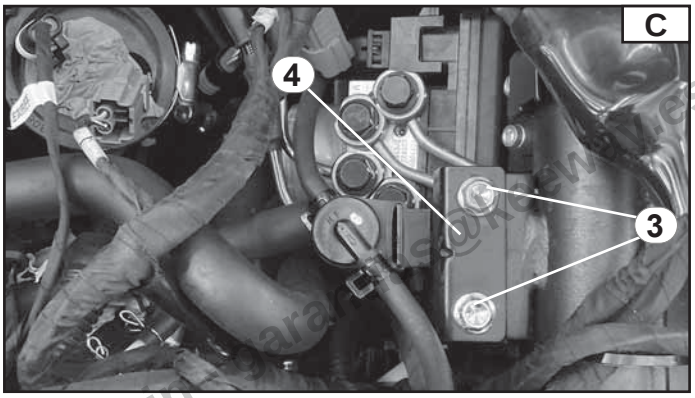
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The fuel tank, refer to **"Fuel tank removal, Chapter 4".**
- The air - box, refer to **"Removal of the air-box, Chapter 4".**
- The throttle body, refer to **"Removal of throttle body, Chapter 5".**
- Discharge the brake fluid from the front and rear brake circuit utilising the bleed valve and pumping the brake lever and the brake pedal.
- Place a cloth underneath the ABS hydraulic unit.



- The special screws of the rigid tubing (1) Fig. A.
- The drop sensor (2) Fig. B.



- The screws (3) Fig. C.
- The fuel vapor one-way valve support (4) Fig. C.

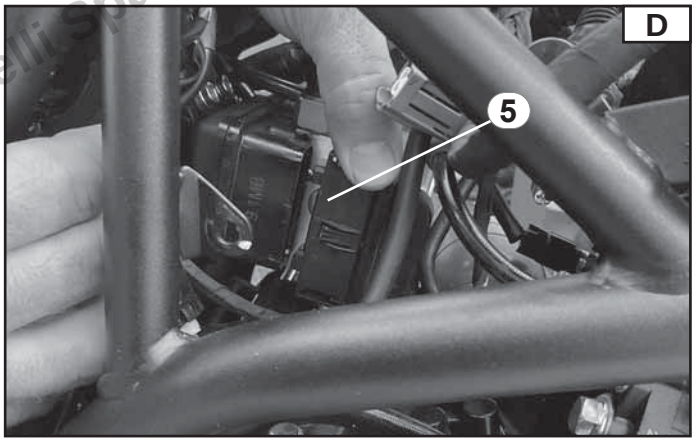


Disconnect:

- The connector of the ABS hydraulic unit (5) Fig. D.

Remove:

- The ABS hydraulic unit.



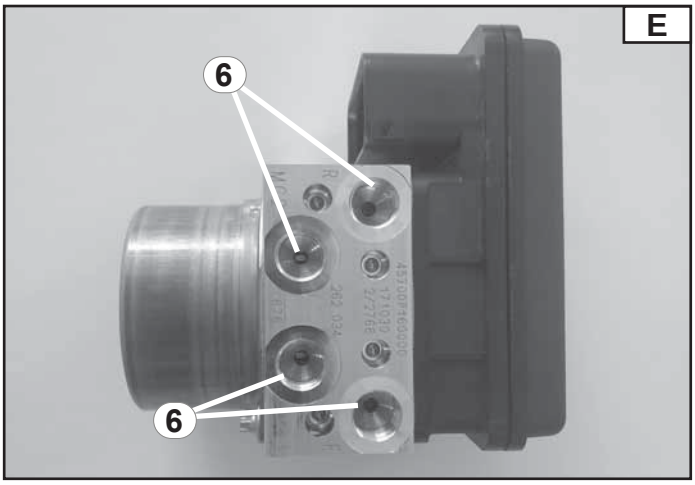
NOTE:

Be careful not to 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 of the ABS hydraulic unit with a cloth to avoid dirt from entering into the unit (6) 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 dismount and repair the ABS hydraulic unit.

Check:

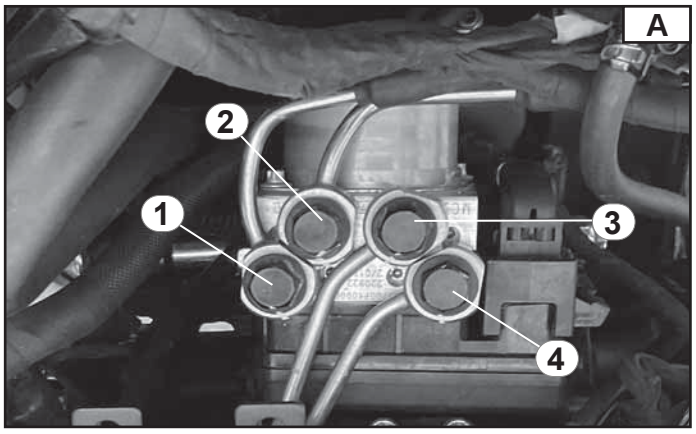
- Carry out a visual check of the ABS hydraulic unit.
- Replace the ABS hydraulic unit if any component is cracked or damaged in any way.

ABS ANTI-LOCK BRAKING SYSTEM
INSTALLATION OF THE ABS HYDRAULIC UNIT

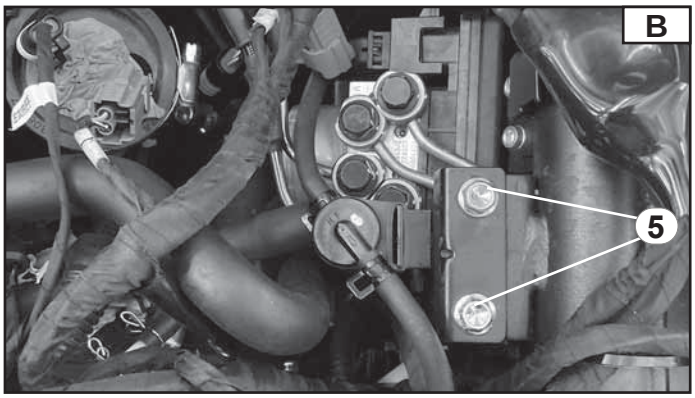
Position the ABS hydraulic unit on the frame.
Install:
- The rigid tubes of the brakes onto the ABS hydraulic unit and screw in the special screws manually with the relevant sealing washers without tightening.
- The front brake caliper supply tube (1) Fig. A.
- The front brake pump supply tube (2) Fig. A.
- The rear brake pump supply tube (3) Fig. A.
- The rear brake caliper supply tube (4) Fig. A.

Tighten the connecting screws of the rigid tubing Fig. A to the following torque:

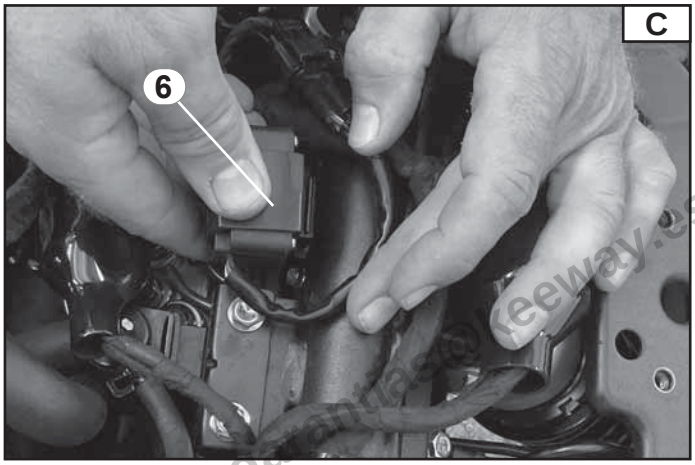
Torque 26 N*m



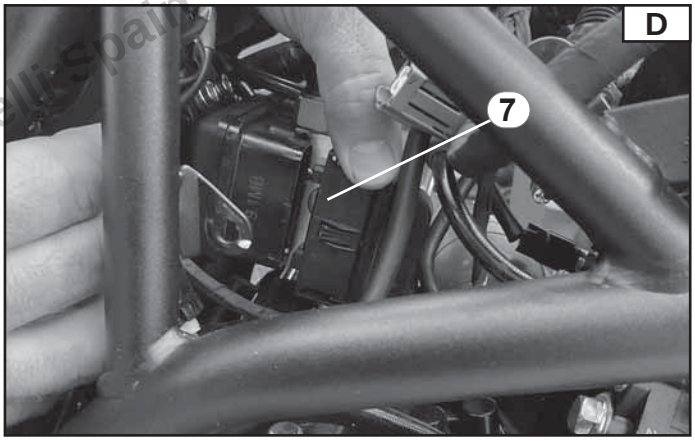
Tighten:
- The screws (5) Fig. B.



Install:
- The drop sensor (6) Fig. C.



Connect:
- The connector of the ABS hydraulic unit (7) Fig. D.



Install:
For installation, reverse the order of the removal operation.
- Bleed air from the brake circuit, refer to **"Frame/brake fluid level check, Chapter 3"**.

ABS ANTI-LOCK BRAKING SYSTEM

REMOVAL OF THE ABS ROTATION SENSORS – FRONT/REAR WHEEL

NOTICE

The ABS sensor must be handled with care, since it is a precision component.
Do not attempt to disassemble or repair the wheel ABS sensor.

Remove:

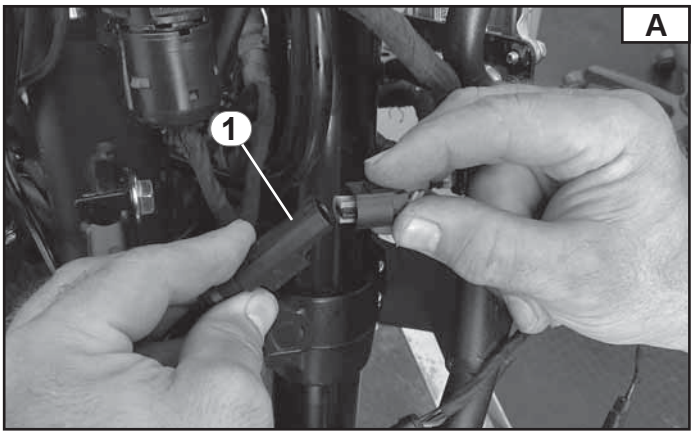
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The fuel tank, refer to **"Removal of the fuel tank, Chapter 4".**
- The front ABS sensor, refer to **"Check of the rotation sensor, Chapter 4".**
- The rear ABS sensor, refer to **"Check of the rotation sensor, Chapter 4".**
- The front fairing, refer to **"Replacements of the headlights, Chapter 3".**

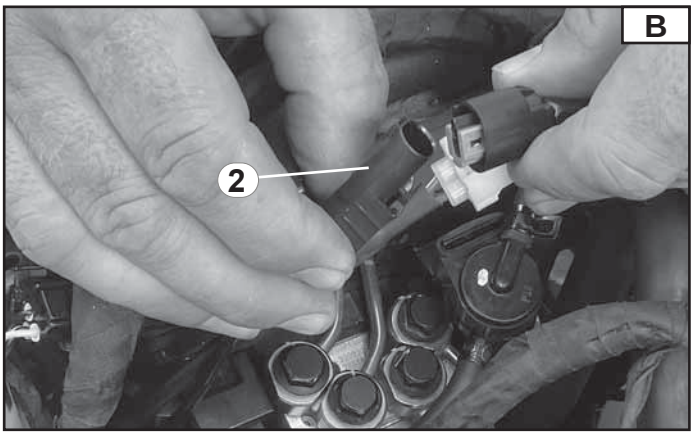
Disconnect:

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

Install:

For installation, reverse the order of the removal operation.
Lay down the cable correctly.





FRONT AND REAR BRAKE CALIPER

REMOVAL OF FRONT BRAKE CALIPER

The following procedure applies to both brake callipers.

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

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

NOTE:
Insert the end of the brake hose into a container and slowly pump out and drain the residual brake fluid by activating the front brake lever.

NOTICE

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

Fix:
- The pistons of the brake calipers.
- Blow compressed air into the fitting of the flexible brake hose to push the left and right pistons out from the brake caliper Fig. D.

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

NOTICE

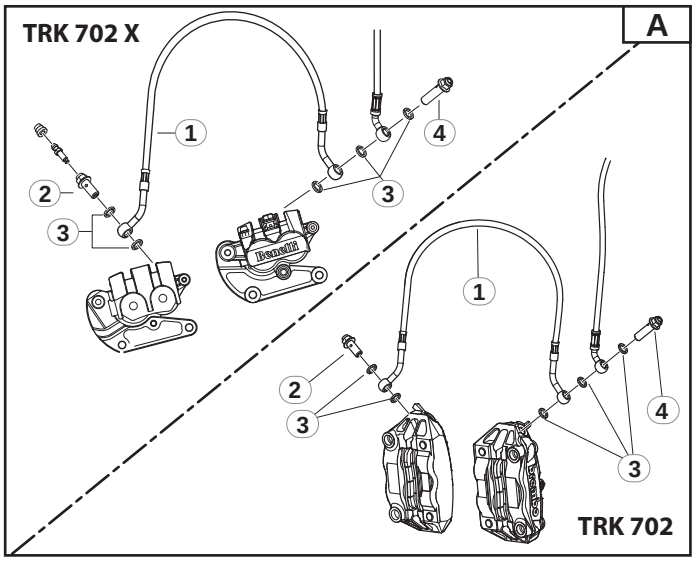
Never try to prise out the caliper pistons.

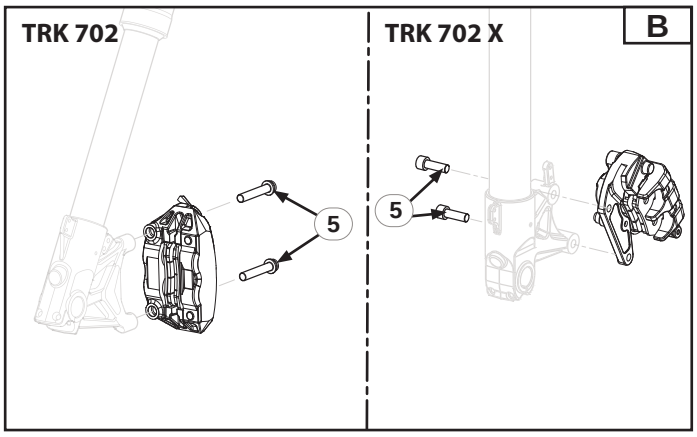
Check:
The sealing gasket of the brake caliper.
The ring gaskets (piston gasket) (2) Fig. C that are found inside the piston to maintain the play between the pad and the disc.
If the gasket is in bad condition, it can cause excessive wear of the pads or sticking of the brake, with a consequent increase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

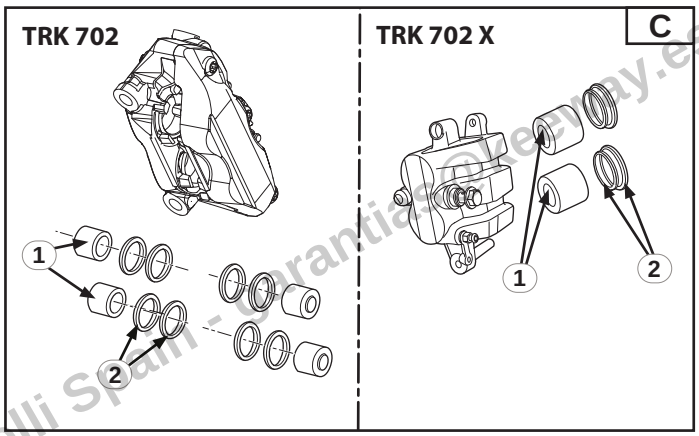
Replace:
- The gaskets (2) Fig. C.

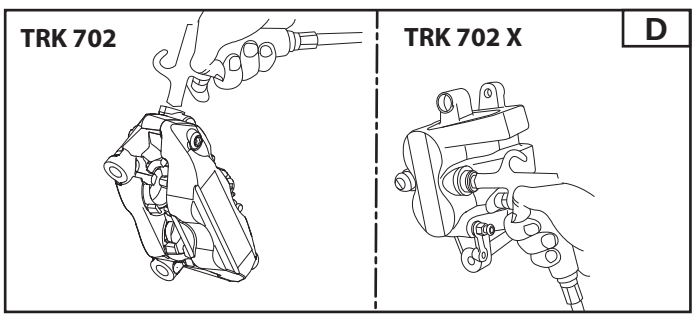
Replace the gasket if it shows signs of the following:
- Leakage of brake fluid around the brake pad.
- Overheating of brakes.
- Notable difference of wear between the internal and external brake pad.
- If the gasket and piston are stuck to each other.

Replace all gaskets when replacing the brake pads.









FRONT AND REAR BRAKE CALIPER

INSTALLATION OF THE FRONT BRAKE CALIPER

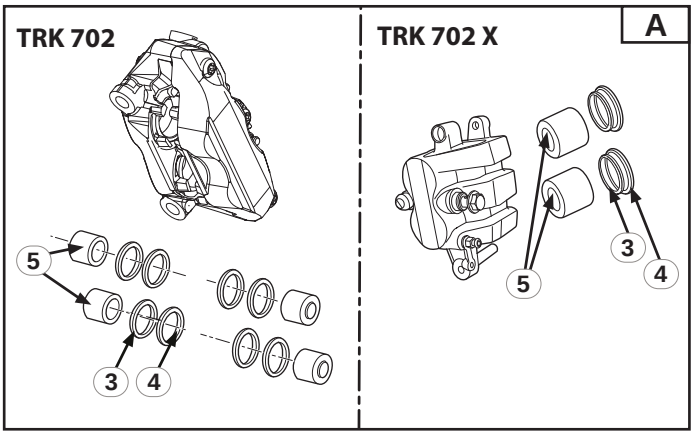
NOTE:
The procedure mentioned below is applicable to both calipers of the front brake.

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 might swell and warp.

	Recommended brake fluid DOT4

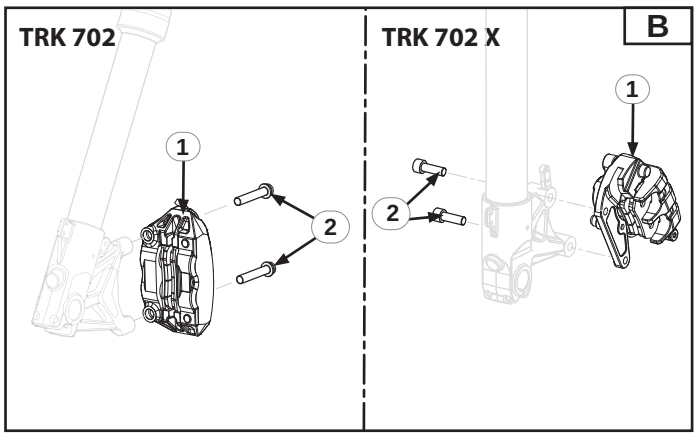
Install:
- The largest gaskets of the pistons (3) Fig. A.
- The smallest gaskets of the pistons (4) Fig. A.
- The pistons on the brake caliper (5) Fig. A.



Install:
- The brake caliper (1) Fig. B.
- The screws (2) Fig. B.

To the following torque:

Torque 50 N*m



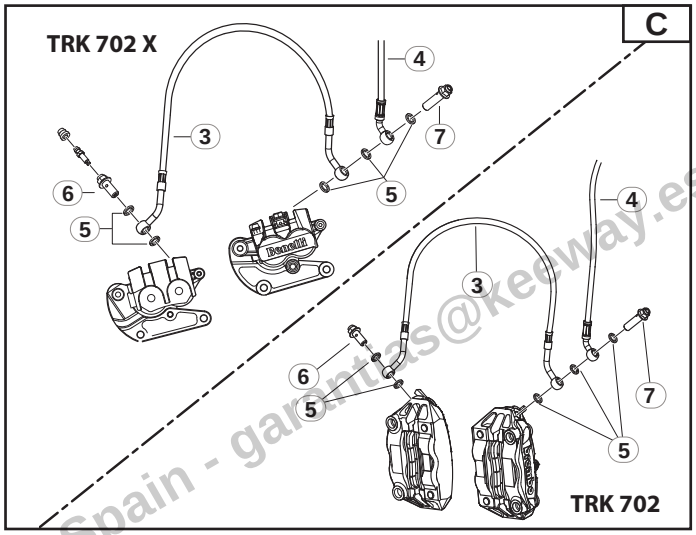
Recommended lubricant

	**Recommended lubricant NGLI2 GREASE**

Install:
- The brake tube (3) Fig. C.
- The brake tube (4) Fig. C.
- The sealing washers (5) Fig. C.

Install:
- The special screw (6) Fig. C.
- The special screw (7) Fig. C.

To the following torque:



Torque 26 N*m

NOTICE

To guarantee the safety of the motorcycle, 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 section "**Check and topping up of the front brake fluid level, Chapter 3"**).

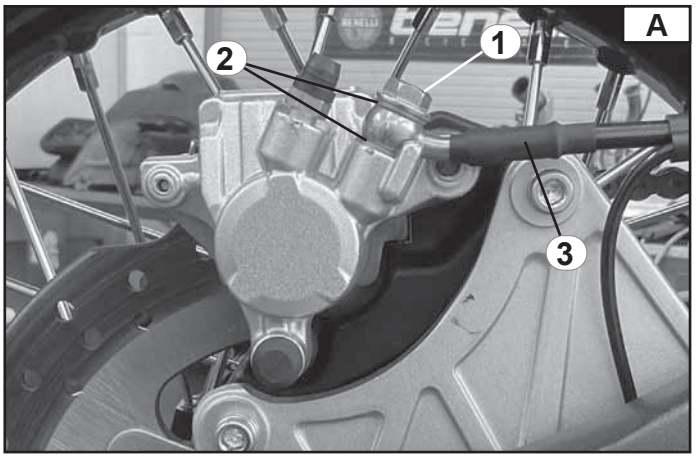
FRONT AND REAR BRAKE CALIPER

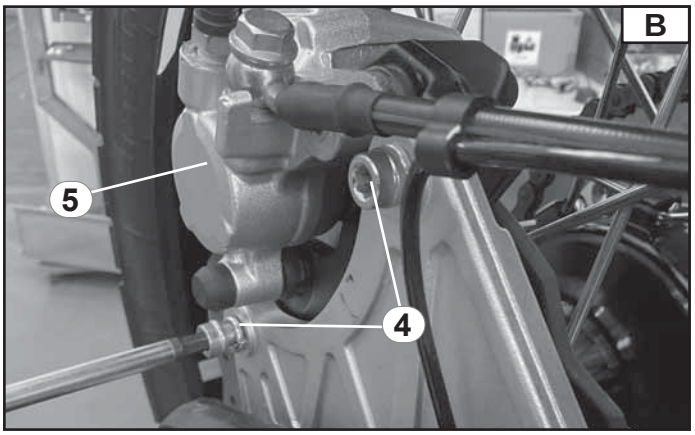
REMOVAL OF THE REAR BRAKE CALIPER

The following procedure applies to both brake callipers of the versions TRK 702 / TRK702x.

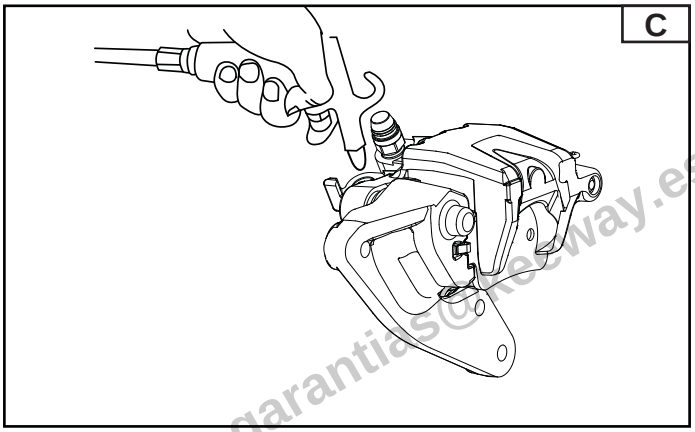
NOTE:
Before disassembling the brake caliper, discharge the brake fluid from the complete braking system: refer to section "Frame/check of brake fluid level, Chapter 3".

Remove:
- The special screw (1) Fig. A.
- The sealing washers (2) Fig. C. A.
- The rear brake tube (3.) Fig. A.
- The screws (4) Fig. B.
- The caliper (5) Fig. B.





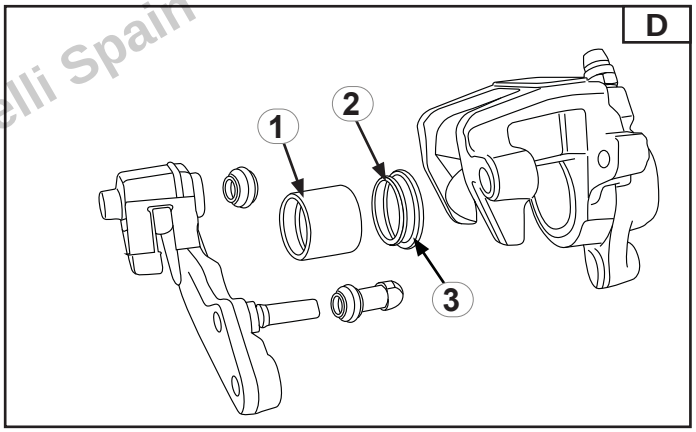
Disassemble:
- Fix the pistons of the brake caliper with a block of wood Fig. C.
- Blow compressed air into the attachment of the flexible brake hose to force the pistons out from the brake caliper.
- The piston (1) Fig. D.
- The gaskets (2) and (3) Fig. D.
- (first the oil seals – the smallest seals, then the O-rings – the largest seals).



NOTICE

Never try to prise out the caliper pistons.

Replace:
- The gaskets (2) Fig. D.
- The gasket in case of:
- Leakage of brake fluid around the brake pad.
- Overheating of brakes.
- Notable difference of wear between the internal and external brake pad.
- If the gasket and piston are stuck to each other.



NOTICE

After repairing, press the lever or brake pedal several times so that the pads come into contact with the brake disc in order to reduce the braking distance, thus avoiding an accident with serious injuries or death. Do not use the motorcycle before reaching the full efficiency of the brake lever or pedal by operating them several times so as to bring the pads into contact with the disc.

FRONT AND REAR BRAKE CALIPER

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 might swell and warp.

	Recommended brake fluid DOT4

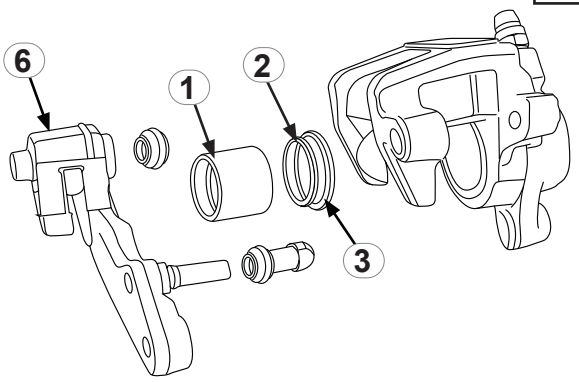
Install:

- The largest gaskets of the pistons (3) Fig. A.
- The smallest gaskets of the pistons (2) Fig. A.
- The pistons on the brake caliper (1) Fig. A
- The caliper holder bracket (6) Fig. A.
- The brake caliper (4) Fig. B.
- The screws (5) Fig. B.

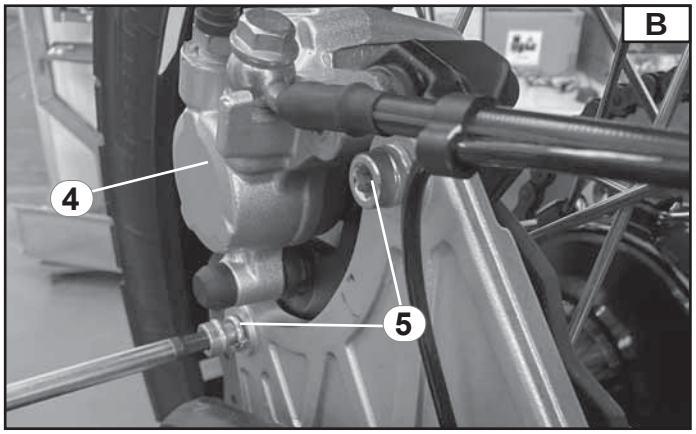
To the following torque:

Torque 22 N*m

A



B



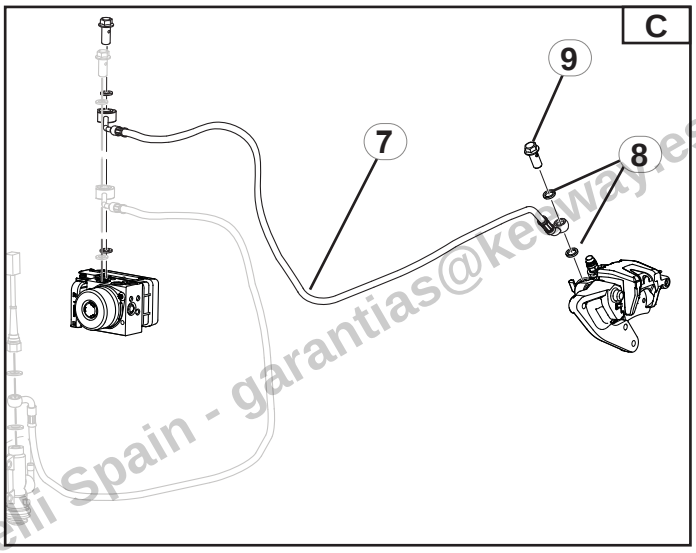
Install:

- The brake tube (7) Fig. C.
- The sealing washers (8) Fig. C.
- The special screw (9) Fig. C.

Tighten twice to the previous torque set after having loosened:

Torque 26 N*m

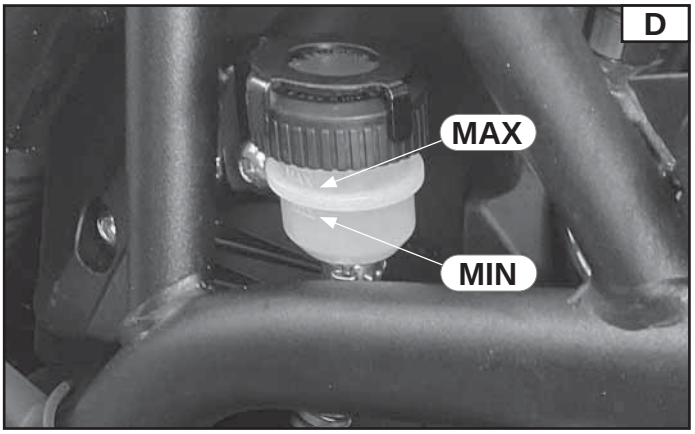
C



FRONT AND REAR BRAKE CALIPER

INSTALLATION OF REAR BRAKE CALIPER

Check:
The level of the brake fluid Fig. D and top up (refer to "**Chapter 3 Frame/check of the brake fluid level"**, section "**Check and topping up of the rear brake fluid level"**).



NOTICE

Only use the prescribed 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 already present in the system. Never mix the brake fluid with fluids of other brands, since this might cause a dangerous chemical reaction, with a drop in brake performance as a result.
While topping up, take care not to let any water enter the container.
Water would considerably reduce the boiling point of the fluid and might lead to the formation of vapour pad.

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

- The brake lever operation.

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

FRONT FORK

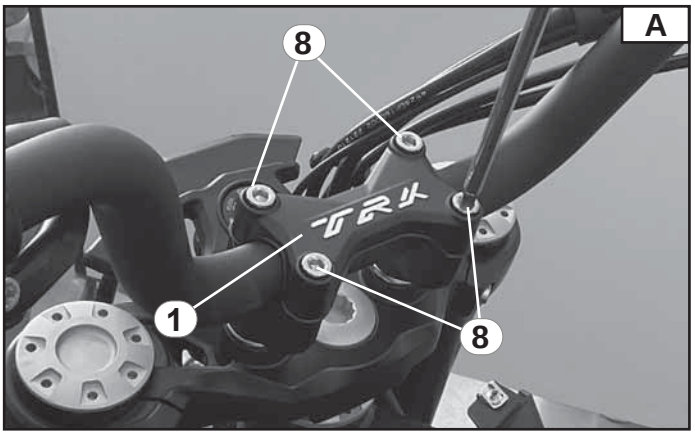
REMOVAL OF FRONT FORK STEMS

The following procedure is applied to both front fork stems.

Park:
- The motorcycle on a level surface.

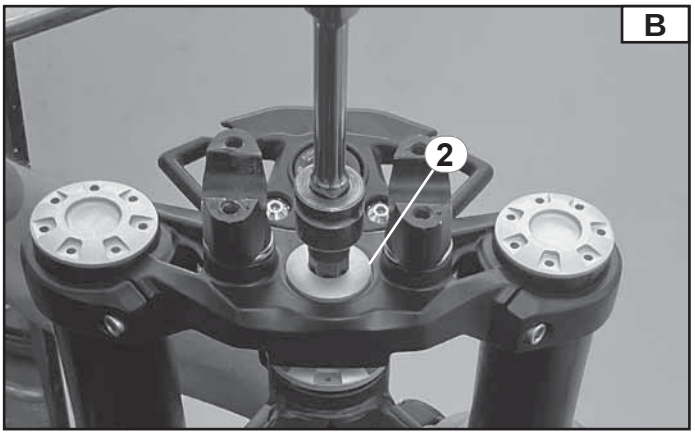
NOTE:
Place the motorcycle on suitable support stand so that the front wheel is raised.

Remove:
- The front brake caliper, refer to **"Removal of the front brake caliper, Chapter 4".**
- The front wheel, refer to **"Removal of the front wheel, Chapter 4"**.
- The front mudguard, refer to **"Removal of the front mud-guard, Chapter 4".**

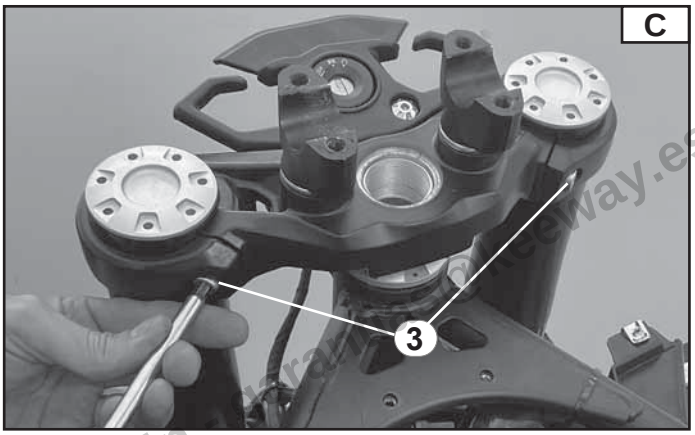


Remove:
- The screws (8) Fig. A.
- The upper bracket (1) Fig. A.
- The special screw (2) Fig. B.

Special tool
Code: R300097146000

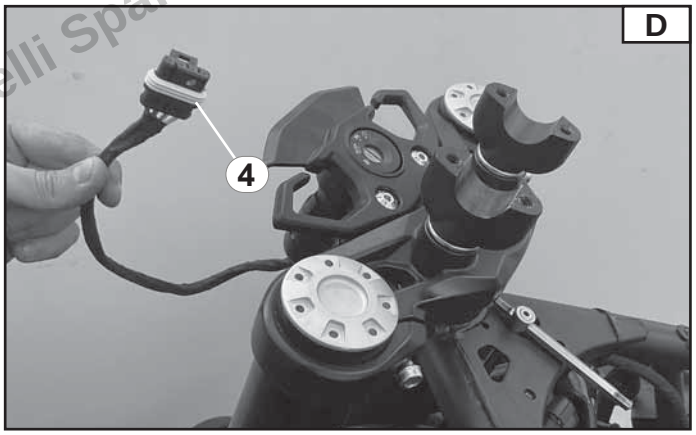


- The screws (3) Fig. C.



Disconnect:

- The ignition block connector (4) Fig. D.

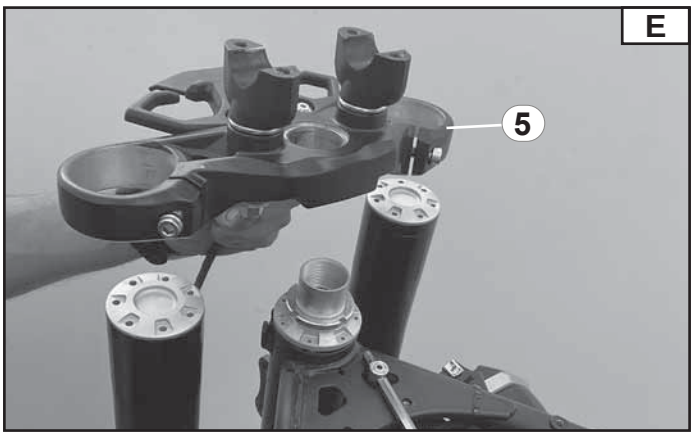


FRONT FORK

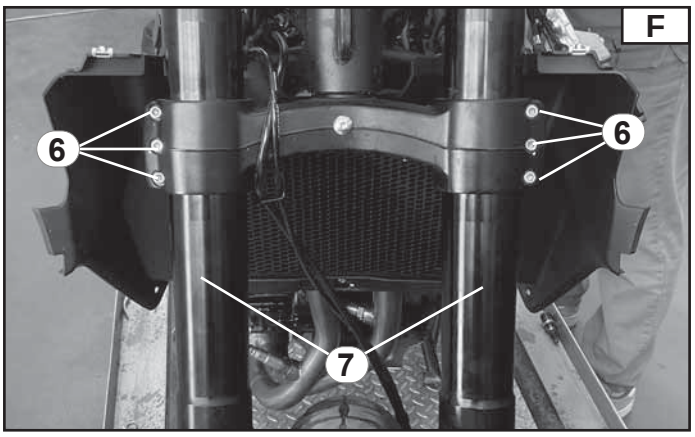
REMOVAL OF FRONT FORK STEMS

Remove:

- The steering head (5) Fig. E.

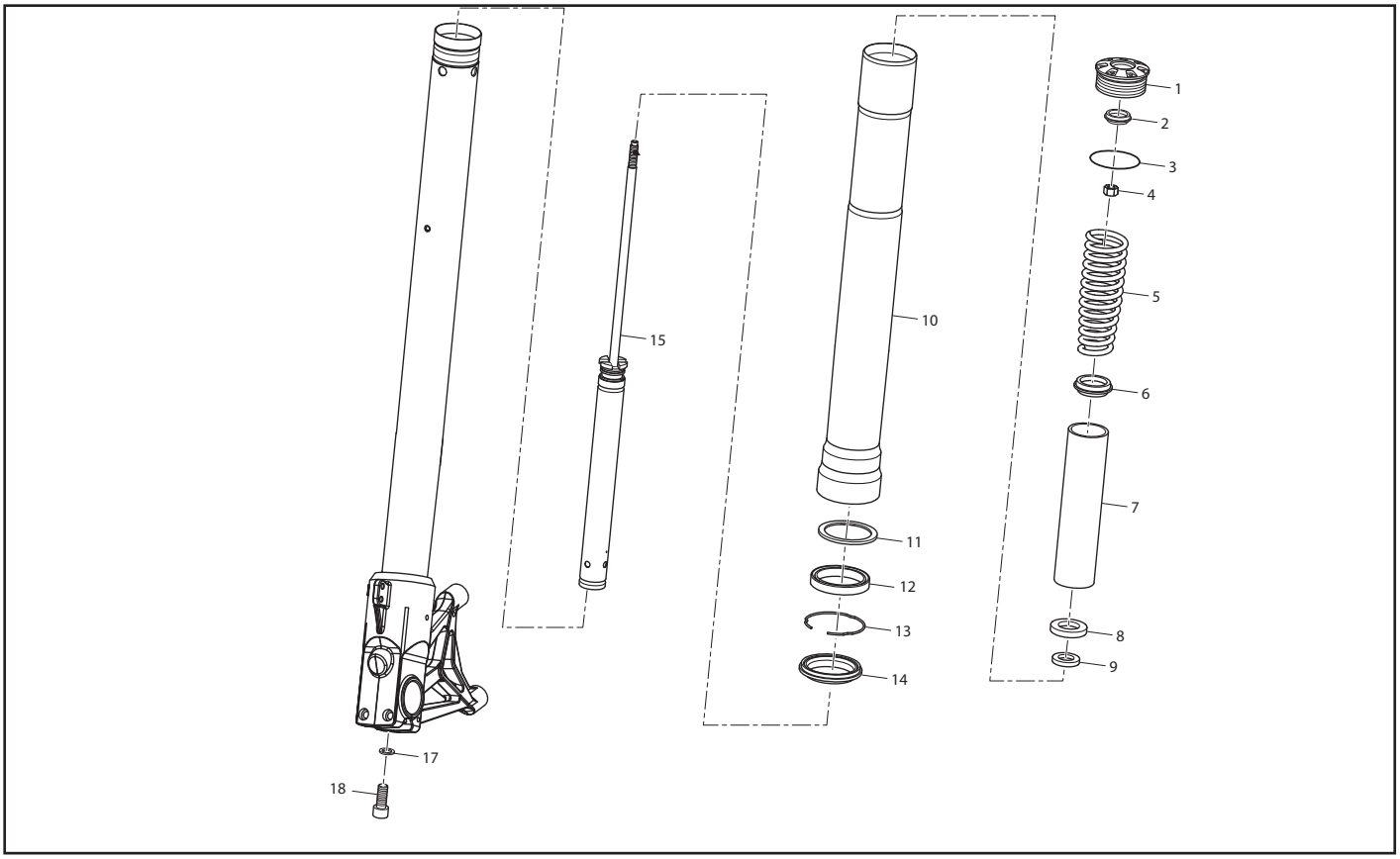


- Loosen the screws (6) Fig. F.
- Remove the fork stem (7) Fig. F.



FRONT FORK

DISASSEMBLY OF THE FRONT FORK STEMS



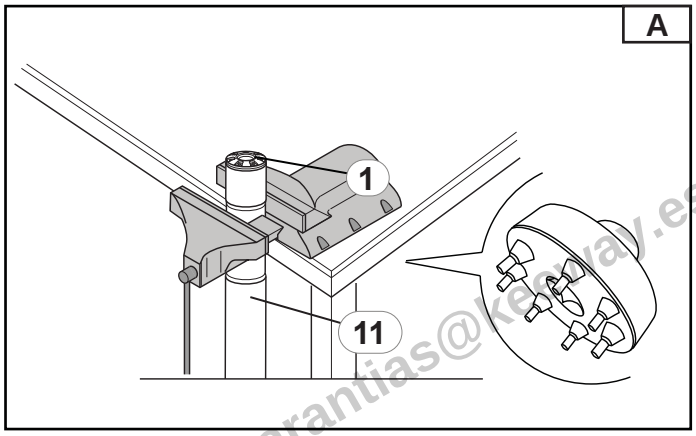
Disassemble the pieces in the order listed.

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

Fix:
- The fork sleeve (11) in a clamp Fig. A.
- Completely unscrew the protective cap assembly (1) from the support tube Fig. A.

Fork cap key tool
Code: KST03BL01061

- Lower the fork sleeve (11) slowly Fig. A.



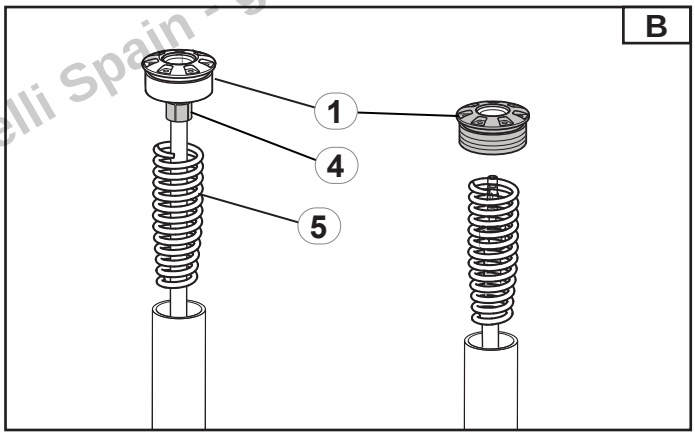
NOTICE

The fork spring is compressed.

Push down:
- The spring (5) Fig. B.
- The preload spacer so as to be able to insert a 17 mm wrench (0.669 in) in the nut (4). B.

Fork cap key tool
Code: KST03BL01061

- Hold the cap assembly (1) in place with the fork cap tool and use a 17 mm wrench (0.669 in) to loosen the nut (4) Fig. B.
- Unscrew and remove the top cap assembly (1) Fig. B.



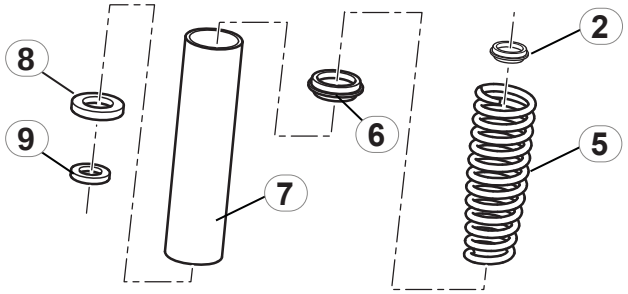
FRONT FORK

DISASSEMBLY OF THE FRONT FORK STEMS

Slide out from the inner part of the sleeve Fig. C.

- The tip (2).
- The spring (5).
- The bush (6).
- The spacer (7).
- The bottom bush (8).
- The tip (9).

C

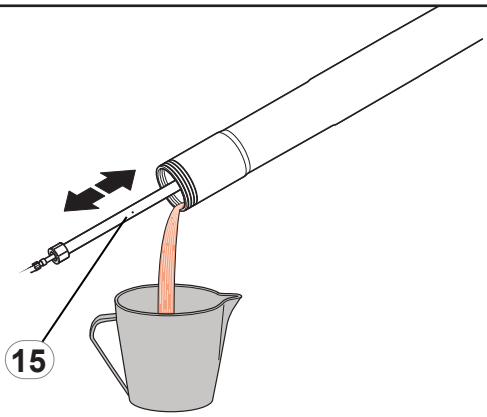


Release:

- Stem from the clamp.
- Turn the stem towards a suitably sized container so as to allow the contained oil out Fig. D.

NOTE:
To help drain the rod, it is necessary to pump a few times by pushing the pump rod (15) forwards and backwards Fig. D.

D



FRONT FORK

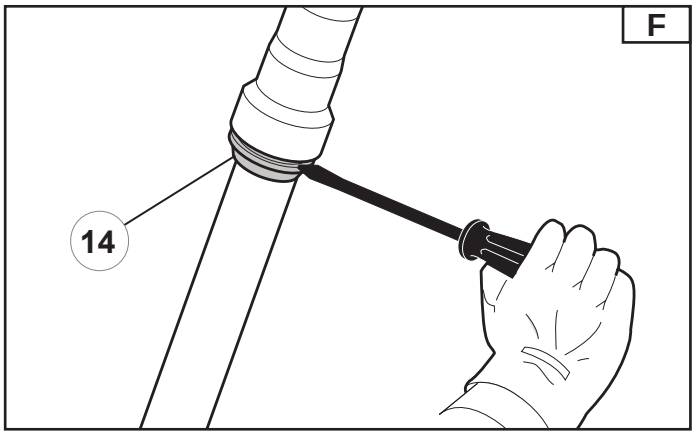
DISASSEMBLY OF THE FRONT FORK STEMS

NOTICE

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

Remove:

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

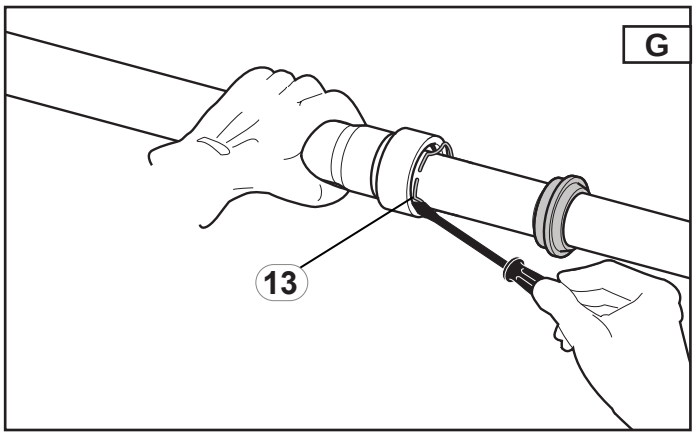


NOTICE

Pay attention to not damage or scratch the fork stem.

Remove:

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

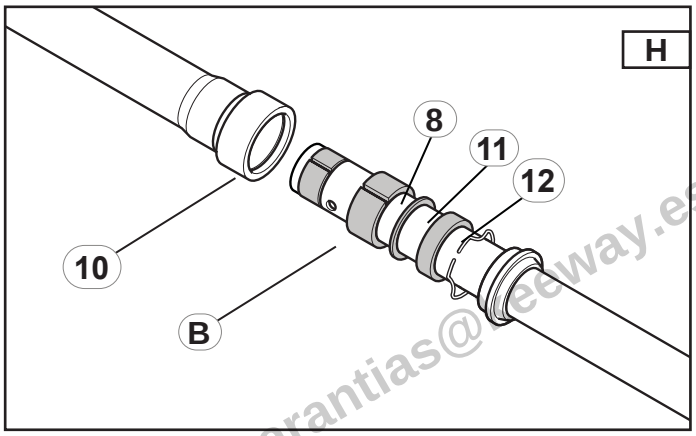


Slide out:

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

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

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



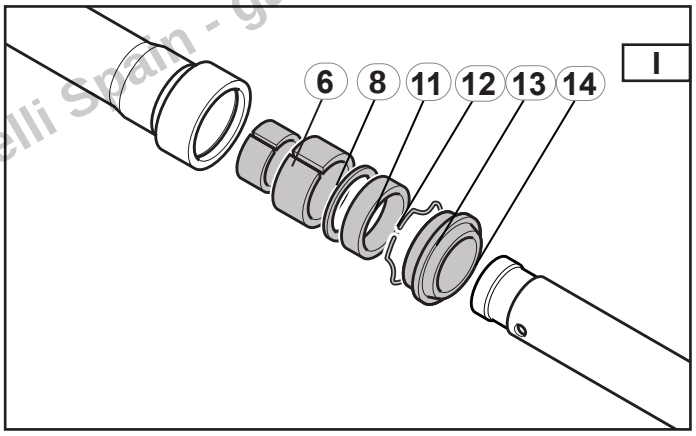
Manually remove:

- The top guide bush (6) Fig. I.

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

- The lower guide bushing (8) Fig. I.
- The washer (11) Fig. I.
- The oil seal (12) Fig. I.
- The oil seal clip (13) Fig. I.
- The dust seal (14) Fig. I.

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



FRONT FORK

INSPECTION OF THE FRONT FORK STEMS

The following procedure is applied to both front fork stems.

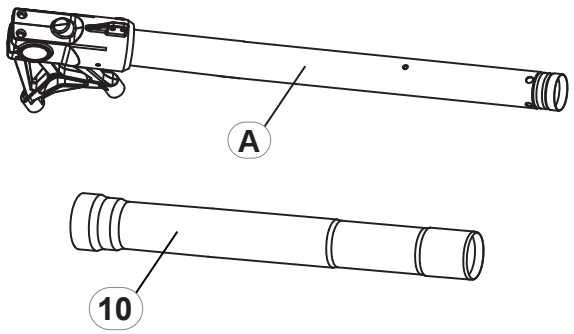
Check:
- The fork stem (A) Fig. A.
- The fork sleeve (10) Fig. A.

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

WARNING

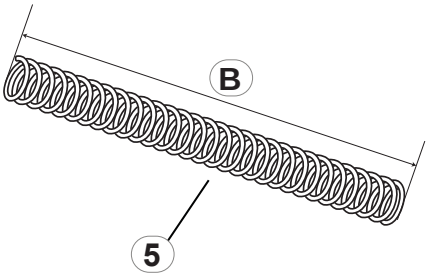
Do not try to straighten the inner fork if bent, since it will become weaker with time and could be dangerous.

A



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

B

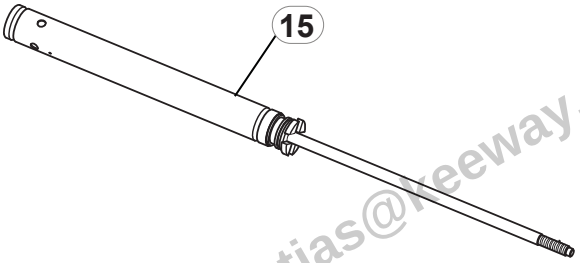


Vehicle	Oil quantity	Full length of the spring
TRK 702	620 ml	360 mm (14.17 in.)
TRK 702X	670 ml	328 mm (12.91 in.)

Check:
- The damper rod (15) Fig. C.

If there is any damage or wear, replace.
If there are any obstructions, free all oil passages with compressed air.

C



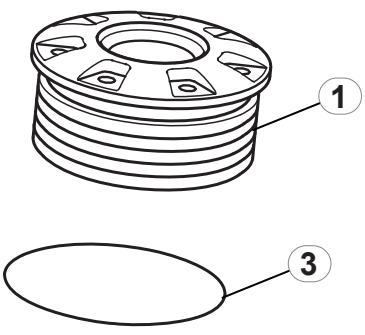
NOTICE

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

If there is any damage or wear, replace.

D



FRONT FORK

ASSEMBLY OF THE FRONT FORK STEMS

The following procedure is applied to both front fork stems.

NOTICE

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

Apply adhesive tape to the end of the supporting tube:

- Adhesive tape so as to cover the seat for the top bush Fig. A.
- Slightly lubricate the oil/dust seals with grease.

Insert into the support tube Fig. B:

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

NOTICE

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

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

Insert:

- The top guide bushing (6) Fig. C.

Tool for stem guide bush insertion.

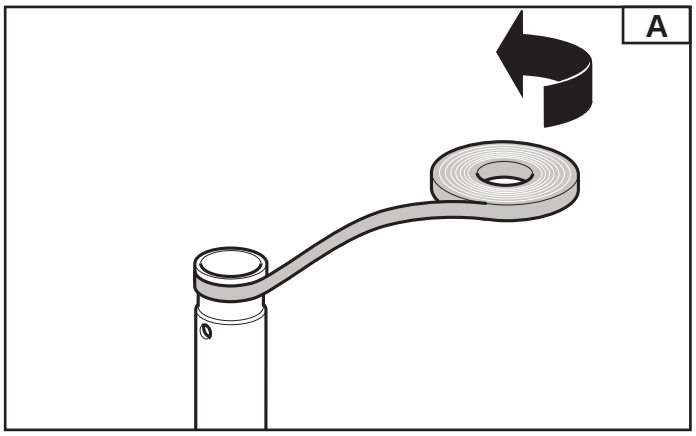
NOTE:
If this operation becomes difficult, it is possible to use a flat-head screwdriver in the slot in the bush, to make it easier.

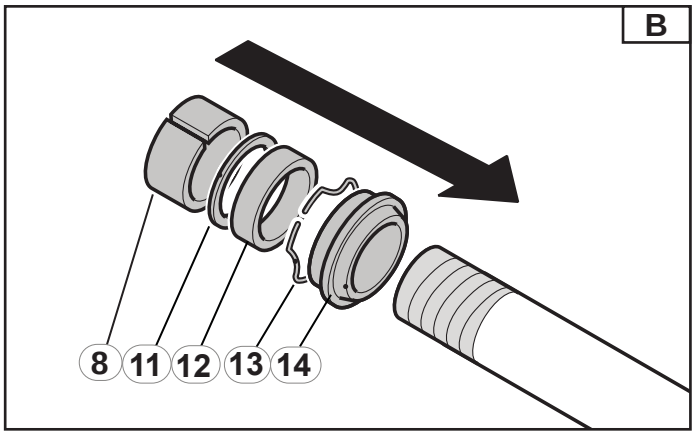
- Insert the fork stem into the sleeve very gently to make sure it does not damage the top guide bush.

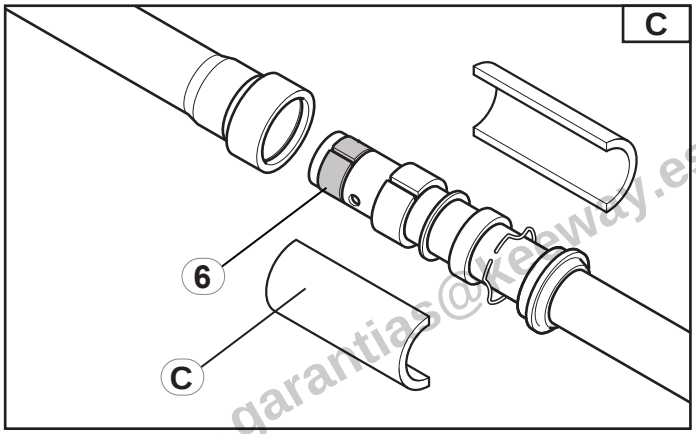
Accompany:

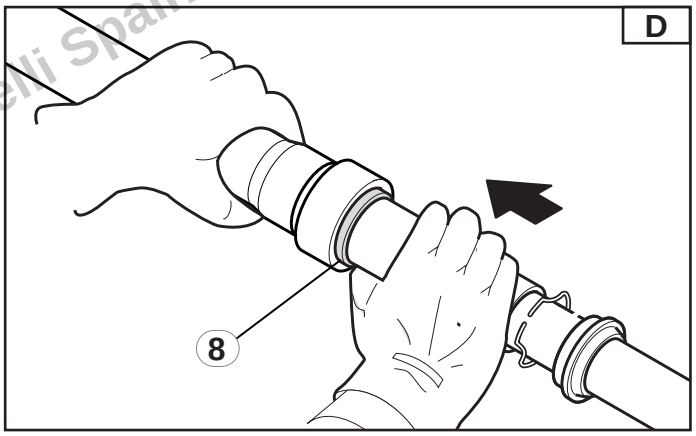
- The lower guide bushing (8) as far as the sleeve comes into contact with the fork Fig. D.
- The washer (11).
- The oil seal (12).

Then place them in place via the apposite tool (6) Fig. C.







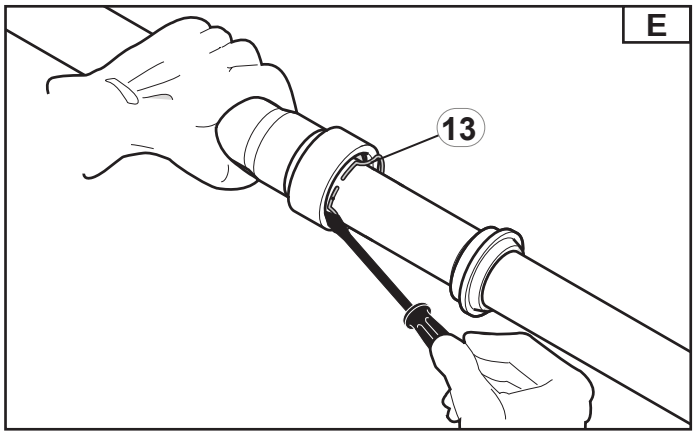


FRONT FORK

ASSEMBLY OF THE FRONT FORK STEMS

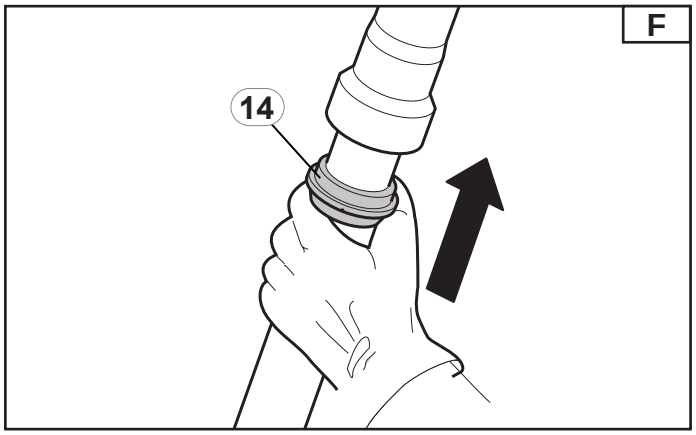
Assembly

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



Insert into the seat:

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



FRONT FORK

ASSEMBLY OF THE FRONT FORK STEMS

- Lift the fork sleeve completely Fig. I.
- Using a graduated measuring container, prepare the correct amount of oil to be poured into the stem Fig. I.
- Pour an amount of oil (see table) about 2/3 of the oil necessary according to the vehicle, then pump repeatedly to discharge air.
- Continue pouring up to the required amount.
- Lower the fork sleeve over the stem up to the stop of the dust seal on the wheel holder foot.
- Await some minutes and check the oil level with the compressed fork, which must be 150 mm (5.90 in) from the top edge of the sleeve (h) Fig. I.

Vehicle	Oil quantity	Full length of the spring
TRK 702	620 ml	360 mm (14.17 in.)
TRK 702X	670 ml	328 mm (12.91 in.)

Oil features
Fork oil SAE 15W

NOTICE

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

Insert the following into the fork sleeve:
- The spring tip (9).
- The bottom spring guide bushing (8).
- The spacer (7).
- The top spring guide bushing (6).
- The fork spring (5).
- The spring tip (2) Fig. L.

Screw the following fully:
- The protective cap (1) Fig. M.

Push down:
- The spring (5) Fig. N.
- The preload spacer.
- Insert a 17 mm wrench (0.669 in) in the nut (4).
- Hold the protective cap in place with the special tool and use a 17 mm wrench (0.669 in) to tighten the nut.
- Tighten to the following torque:

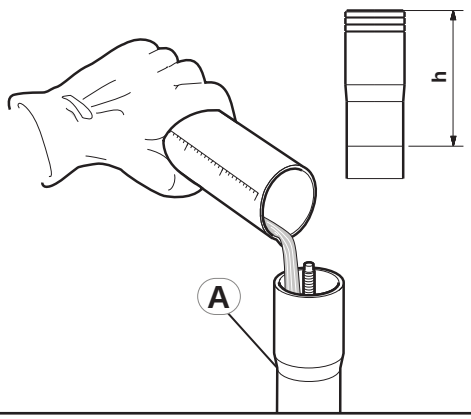
Torque 20 N*m

Special tool for fork cap key.
Code: KST03BL01061
- Lift the fork sleeve over the stem.

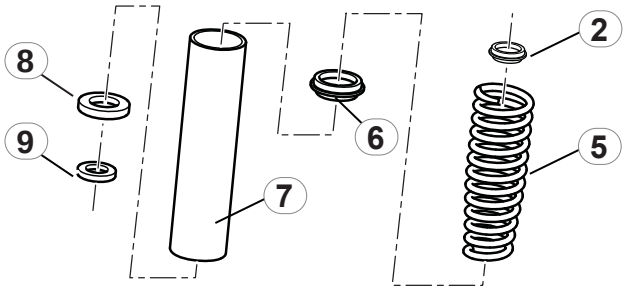
Fix:
- The fork sleeve in a clamp.
- Hold the protective cap in place with a 4 mm wrench (0.157 in) and tighten to the following torque:

Torque 20 N*m

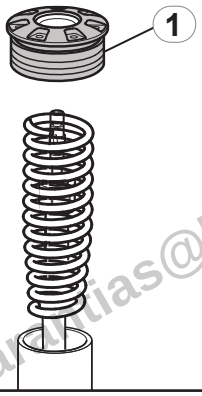
I



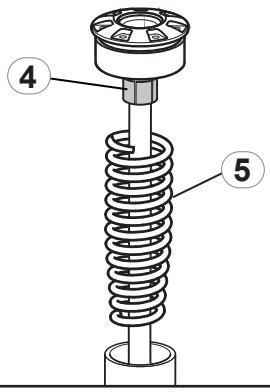
L



M



N



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 dust seal thickness).
TRK 702 = 232 mm (9.13 in)
TRK 702X = 227 mm (8.93 in)

Tighten:

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

Torque 10 N*m

NOTE:
Tighten in three steps.

Tighten:

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

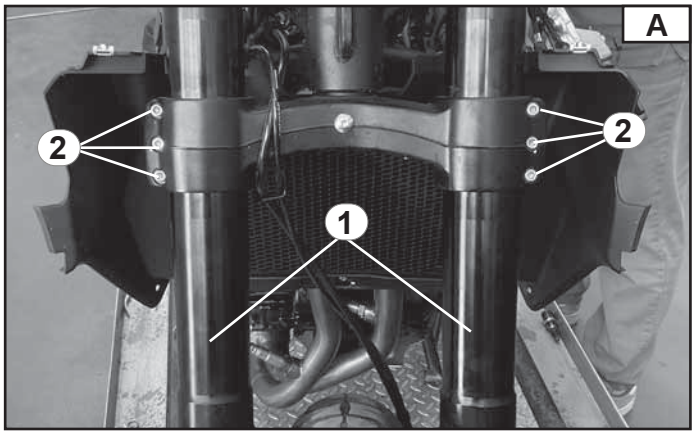
Torque 22 N*m

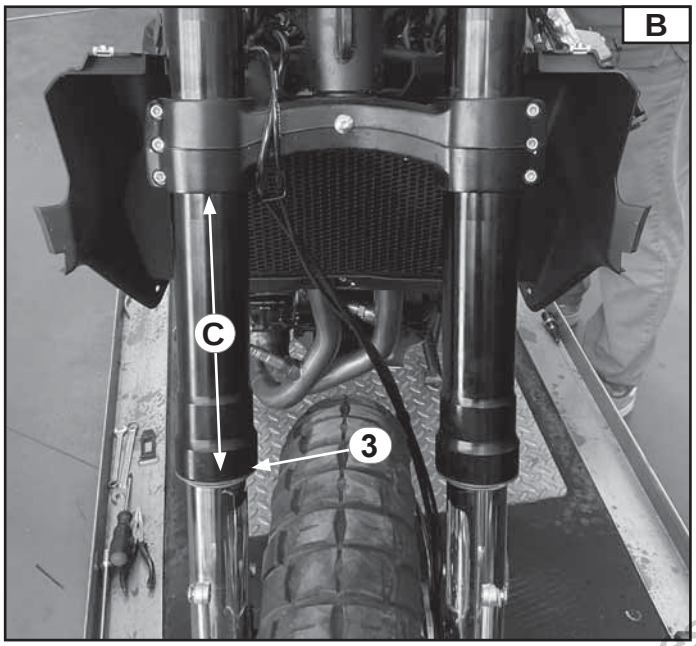
Use:

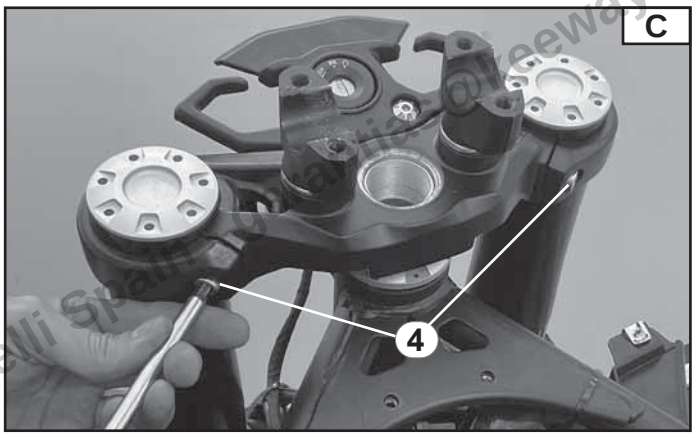
	MEDIUM THREAD LOCKER

NOTICE

Check that the path of the brake hoses is correct.







HANDLEBAR

REMOVAL OF THE HANDLEBAR AND ITS PARTS

Park the motorcycle on a level surface.

NOTICE

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

This procedure applies to both models TRK 702 and TRK702X

Removal of the left parts:

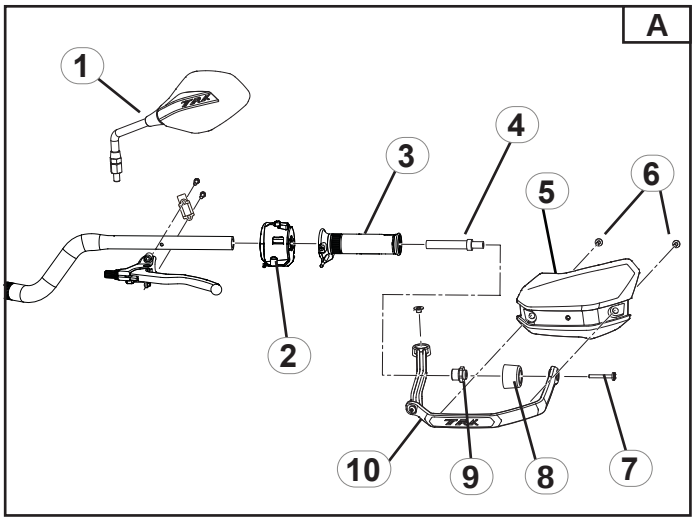
- The rear-view mirror (1) Fig. A.
- The left switch (2) Fig. A.
- The screw (7) Fig. A.
- The hand guard bracket (10) Fig. A.
- The screws (6) Fig. A.
- The hand guard (5) Fig. A.
- The hand grip terminal (8) Fig. A.
- The lock nut (9) Fig. A.
- The balance weight (4) Fig. A.
- The left hand grip (3) Fig. A.

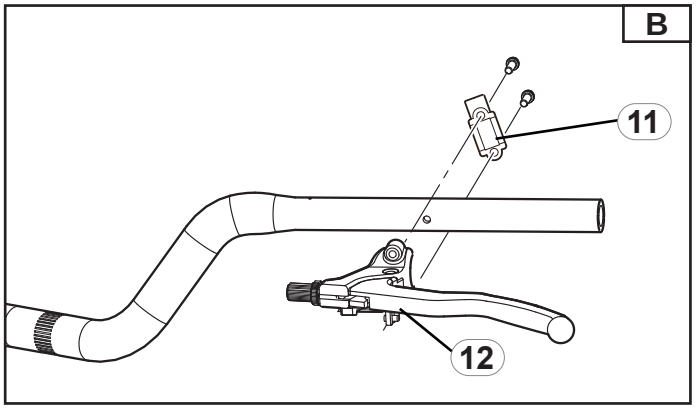
NOTE:

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 clutch control bracket (11) Fig. B.
- The clutch control lever (12) Fig. B.





This procedure applies to both models TRK 702 and TRK702X

Removal of the right parts:

- The rear-view mirror (1) Fig. C.
- The right switch (2) Fig. C.
- The screw (7) Fig. C.
- The hand guard bracket (10) Fig. C.
- The screws (6) Fig. C.
- The hand guard (5) Fig. C.
- The hand grip terminal (8) Fig. C.
- The lock nut (9) Fig. C.
- The balance weight (4) Fig. C.
- The right hand grip (3) Fig. C.

NOTE:

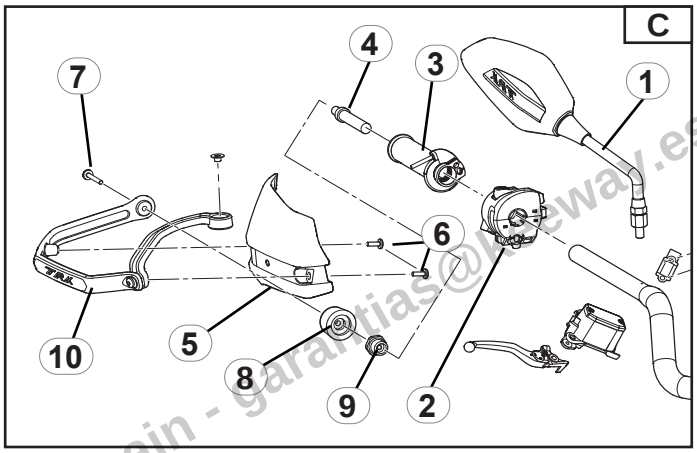
Direct a jet of compressed air between the right side of the handlebar and the relevant hand grip, so that it can be slid off the handlebar gradually.

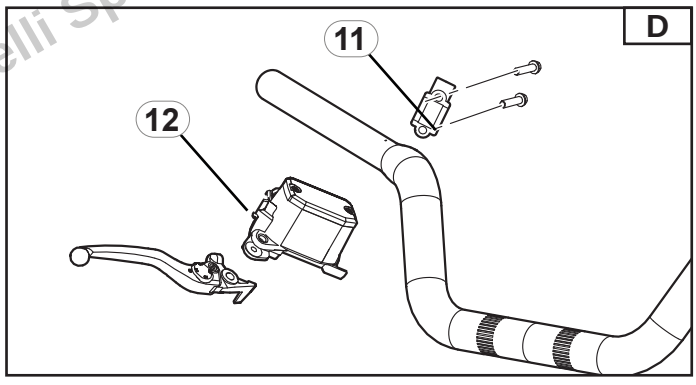
Remove:

- The brake pump support bracket (11) Fig. D.
- The brake pump (12) Fig. D.

NOTE:

Disconnect the connector of the right STOP light switch.



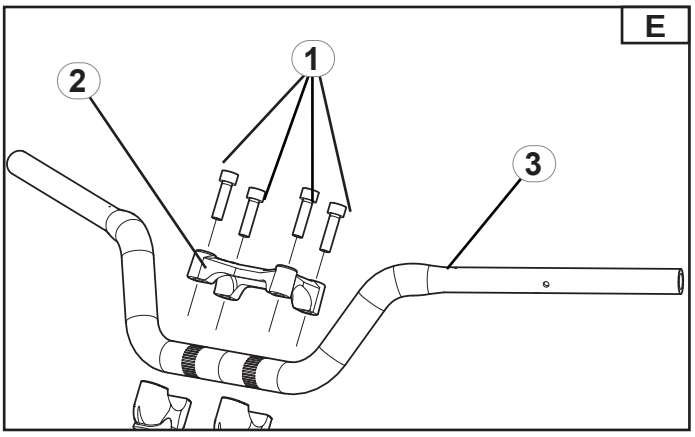


HANDLEBAR

REMOVAL OF THE HANDLEBAR AND ITS PARTS

Remove:

- The screws (1) Fig. E.
- The bracket (2) Fig. E.
- The handlebar (3) Fig. D E.



HANDLEBAR

INSPECTION OF THE HANDLEBAR

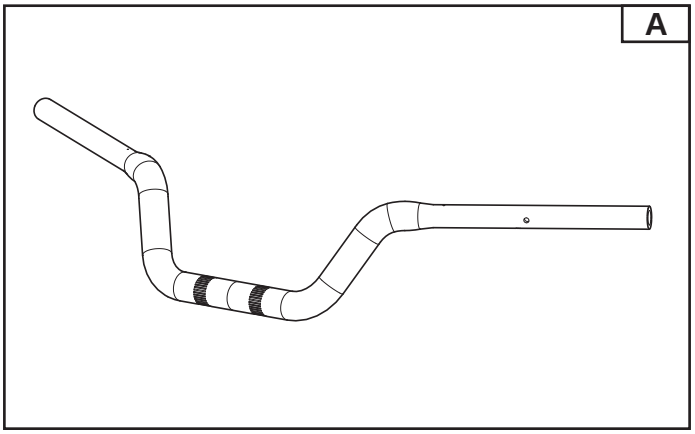
Check:

- The handlebar 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

REMOVAL OF THE HANDLEBAR AND ITS PARTS

NOTICE

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

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

Install:

- The front brake pump (1) Fig. A.
- The screws (2) Fig. A.

Tighten to the following torque:

Torque 8 N*m

Install:

- The switches Fig. B.

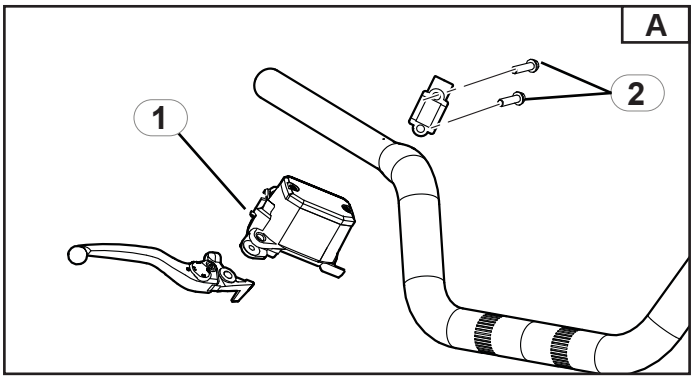
NOTE:

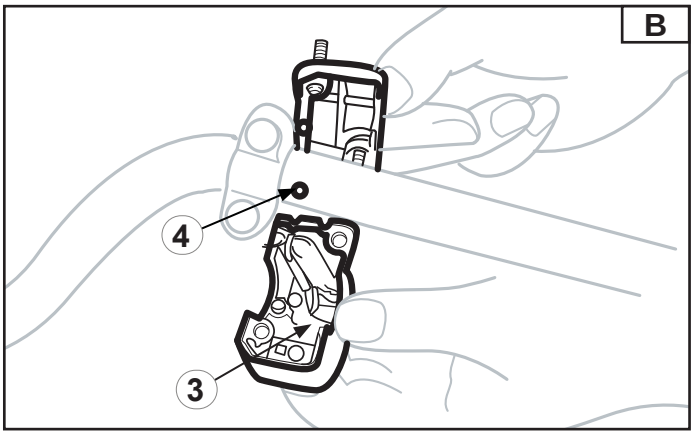
Align the projections (3) of the switch with the hole (4) on the right side of the handlebar Fig. C.

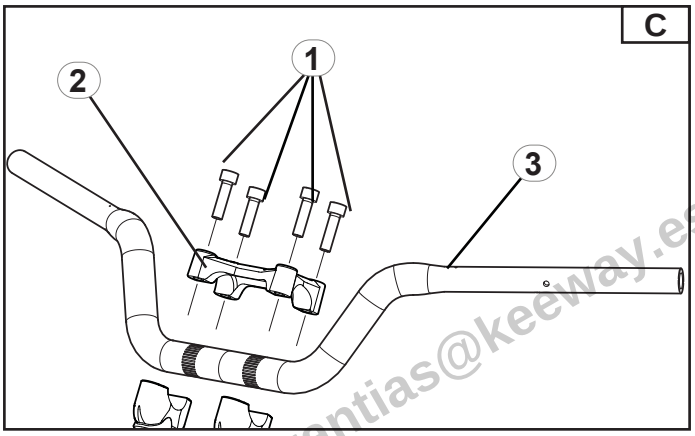
- The handlebar (3) Fig. D C.
- The bracket (2) Fig. C.
- The screws (1) Fig. C.

Tighten to the following torque:

Torque 22 N*m







STEERING

REMOVAL OF THE STEERING HEAD

NOTICE

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

Remove:

- The handlebar, refer to **"Removal of the handlebar and its components, Chapter 4".**

Remove:

- The special screw (2) Fig. A.

Special tool
Code: R300097146000

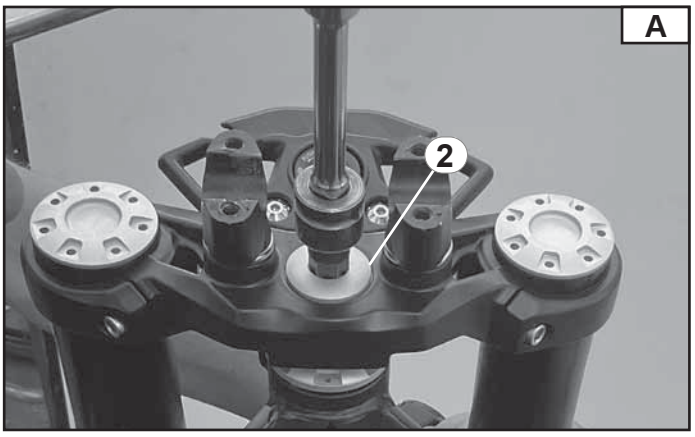
- The screws (3) Fig. B.

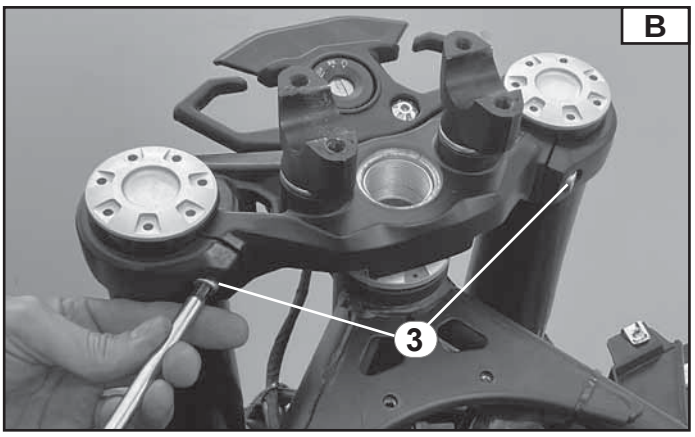
Disconnect:

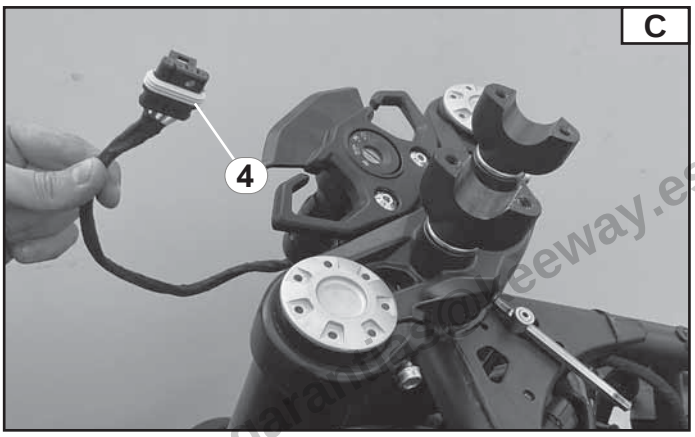
- The ignition block connector (4) Fig. C.

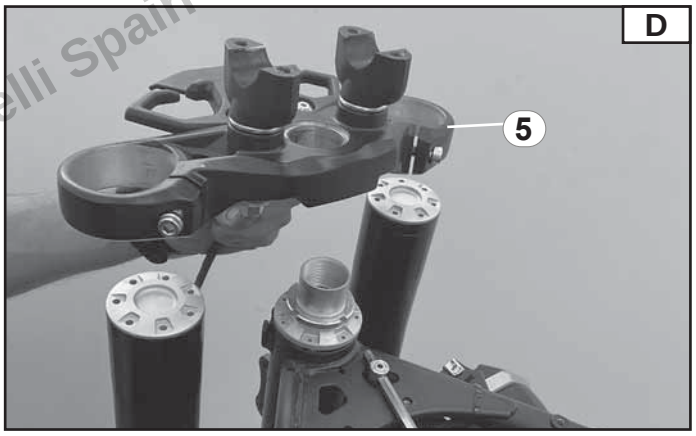
Remove:

- The steering head (5) Fig. D.







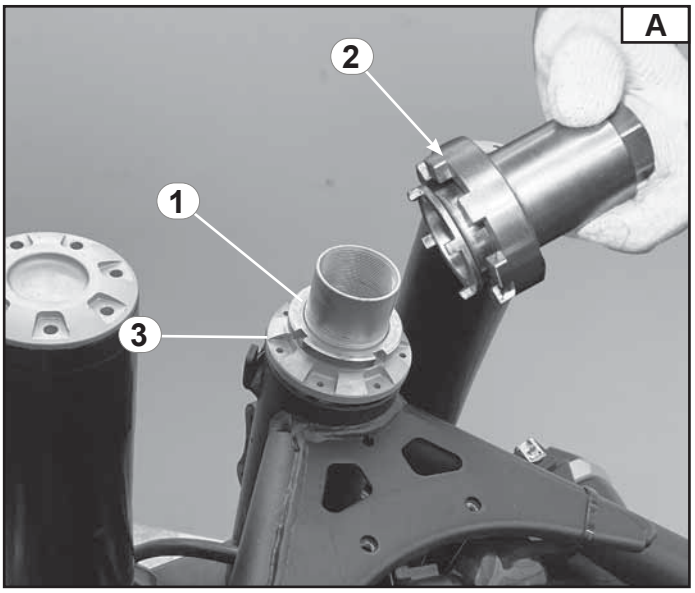


STEERING

REMOVAL OF THE STEERING HEAD BASE

NOTICE

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



Remove:

- The handlebar, refer to **"Removal of the handlebar and its components, Chapter 4".**
- The steering head, refer to **"Removal of the steering head, Chapter 4".**
- The steering ring nut pin (1) Fig. A.
- The steering ring nut (3) Fig. Fig. A..

Disassembling tool for steering sleeve ring nut (2) Fig. A.

Code: R180297129000

STEERING

INSPECTION OF THE STEERING HEAD

Wash:
- The bearings.
- The bearing races.

	Solvent with high flash point.

Check:
- The bearings (15) Fig. A.
- The dust seal rings (14) Fig. A.

If there is any spotting/damage, replace.

Replace:
- The bearings.
- The bearing races.
- Remove the bearing races (1) from the frame tube using a long rod and a hammer (2) Fig. B.
- Detach the race of the bearing (3) from the lower bracket using a chisel (4) and a hammer Fig. B.
- Mount a new dust seal ring and new bearing races.

NOTICE

If the bearing race is not installed properly, the steering head tube could be damaged.

NOTE:
- **Always replace the bearings and the related races as an assembly and greased when needed Fig. C.**
- **Every time the steering sleeve is removed, fit a new rubber gasket.**

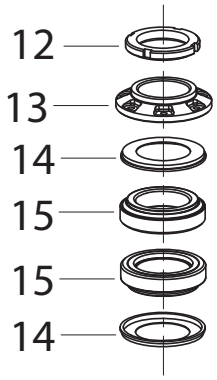
Check:
- The steering head.
- The bottom steering head base (along with the sleeve).
- If there is any warping/cracking/damage, replace.

NOTE:
If necessary:

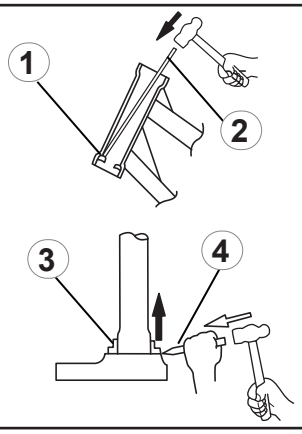
Lubricate:
- The bearings Fig. A.
- The dust seal rings Fig. A.
- The races of the bearings Fig. A.

	**Recommended lubricant NGLI2 GREASE**

A



B



C

STEERING

INSTALLATION OF THE STEERING HEAD

Park the motorcycle on a level surface.

NOTICE

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

Install:
Proceed using the opposite order to removal.
Tighten:

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

Torque 15 N*m

Tool to tighten the steering sleeve lock nut.
Code: R180297129000

NOTICE

Do not overtighten the steering ring nut.

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

Torque 60 N*m

Install:

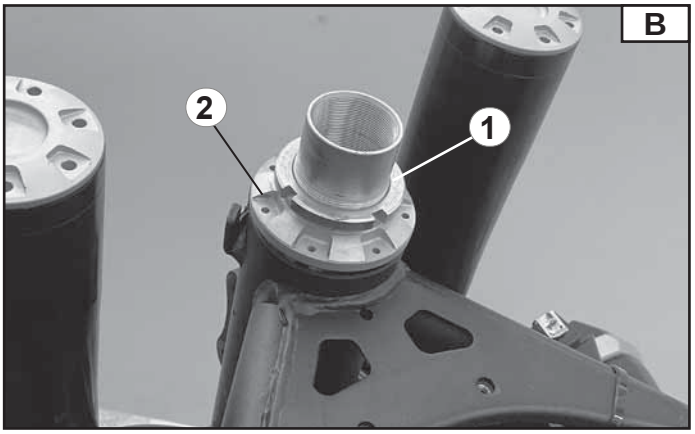
- The steering head (3) Fig. C.

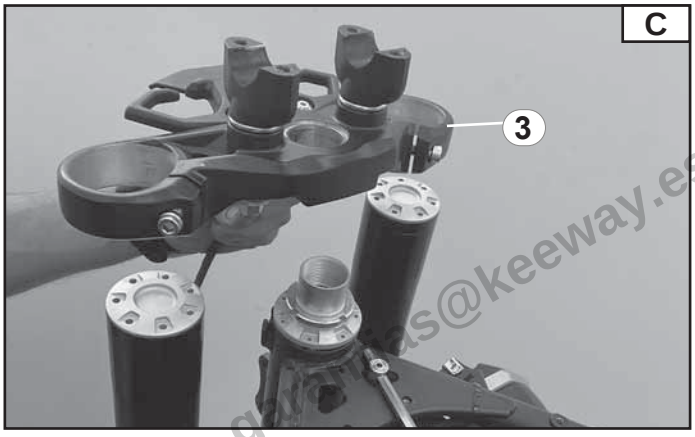
- The special screw (4) via the special tool (5) Fig. D.

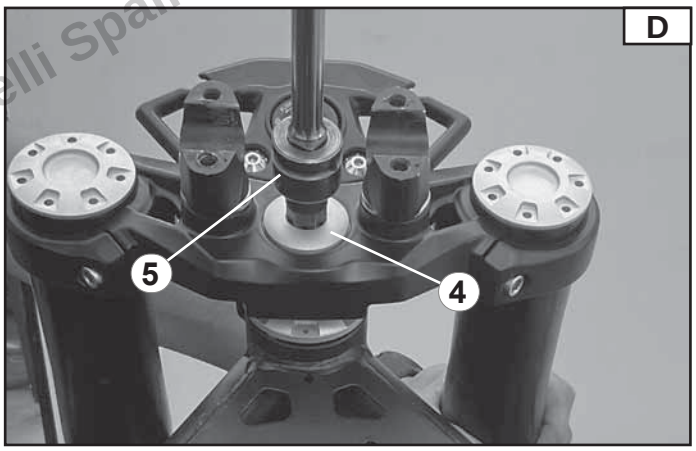
Tighten to the following torque:

Torque 60 N*m

The steering head wrench.
Code: R300097146000





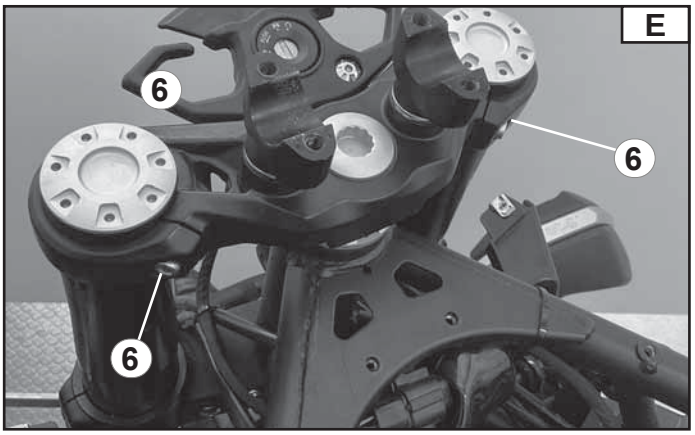


STEERING

INSTALLATION OF THE STEERING HEAD

• The side setscrews (6) of the fork stem Fig. E.
To the following torque:

Torque 22 N*m



Check:

- The steering sleeve Fig. F.

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

Park the motorcycle on a level surface.

NOTICE

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

Remove:

- The rear brake caliper, refer to **"Removal of the rear brake caliper, Chapter 4".**
- The rear wheel, refer to **"Removal of the rear wheel, Chapter 4".**
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The tank, refer to **"Removal of the fuel tank, Chapter 4".**

NOTICE

This rear shock absorber contains nitrogen.
Before handling the rear shock absorber, carefully read the following information and ensure to understand it properly.
The manufacturer cannot be held responsible for any damage to property or personal injuries deriving from the improper use of the rear shock absorber.

- **Do not tamper with and do not try to open the rear shock absorber.**
- **Do not expose the rear shock absorber to open flames or other sources of extreme heat.**
- **Elevated overheating could cause an explosion due to the excessive pressure of the gas.**
- **Do not deform or damage the rear shock absorber in any way. If the rear shock absorber is damaged, the damping performance will be prejudiced.**

Remove:

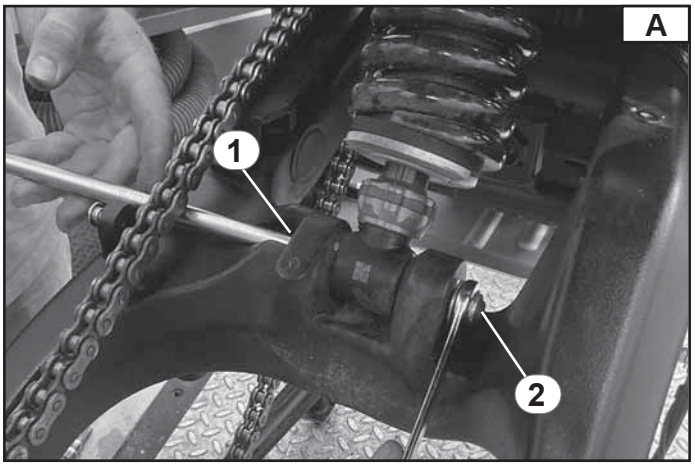
- The lower screw (1) of the whole rear shock absorber Fig. A.
- The related nut (2) Fig. A.

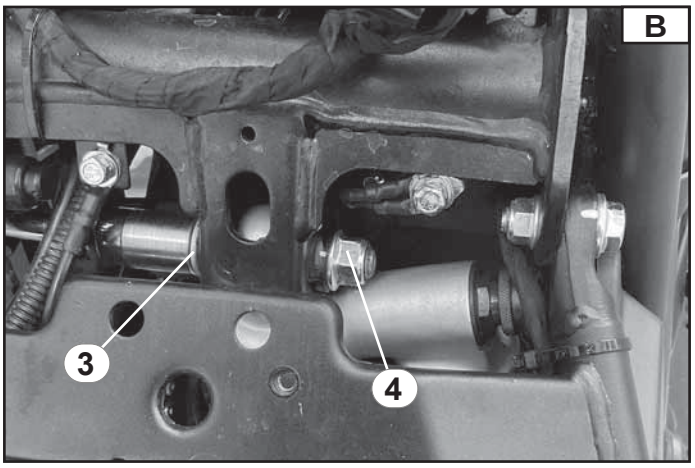
NOTE:
Place a support underneath the engine.
Prop the swingarm, then remove the rear shock absorber assembly from the attachment point on the swingarm.

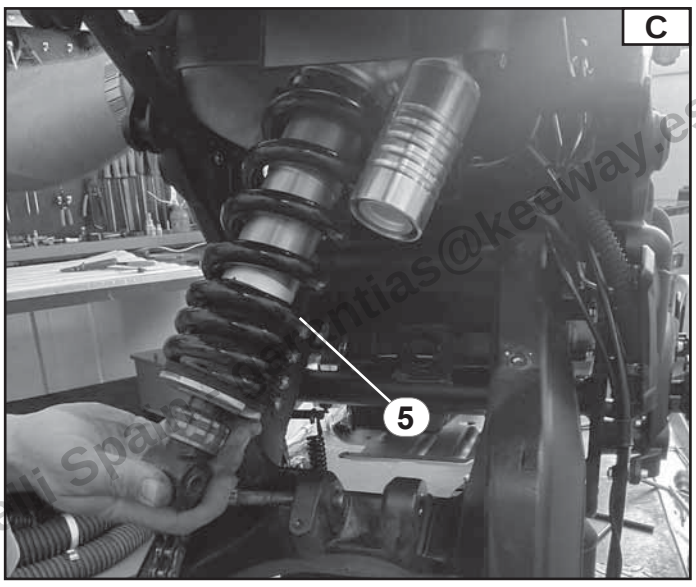
- The upper screw (3) of the whole rear shock absorber Fig. B.
- The relative nut (4) Fig. B.

Slide out:

- The rear shock absorber (5) Fig. C.







REAR SHOCK ABSORBER

INSTALLATION OF THE REAR SHOCK ABSORBER

Park the motorcycle on a level surface.

NOTICE

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

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

Install:
- The top part of rear shock absorber.

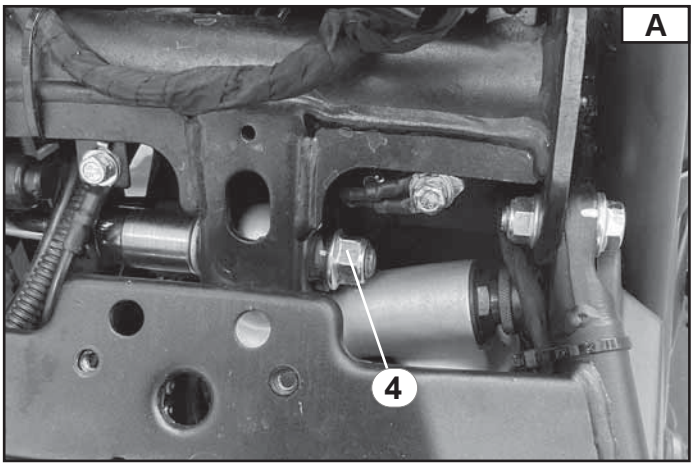
Tighten:
- The nut (4) Fig. A to the following torque:

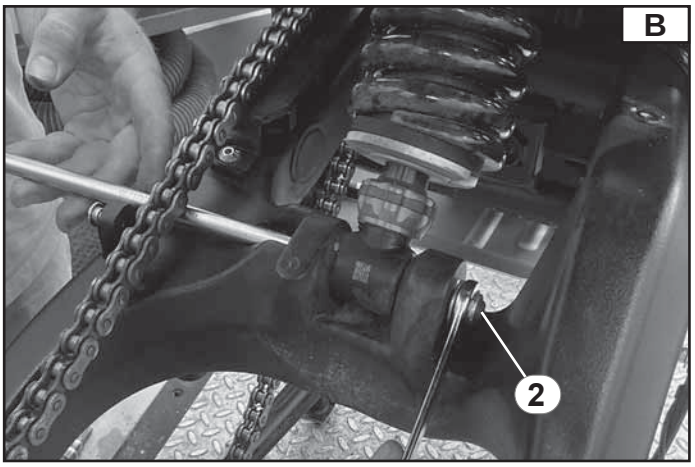
Torque 50 N*m

Install:
- The bottom part of rear shock absorber.

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

Torque 50 N*m





TRANSMISSION CHAIN

REMOVAL OF THE TRANSMISSION CHAIN

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

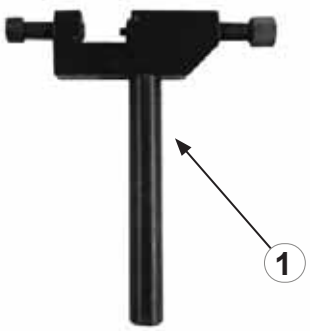
Remove the parts in the indicated order.

- The chain pinion cover, refer to **"Removal of the chain pinion cover, Chapter 4".**

Remove:

- The transmission chain by opening the link Fig. B via the apposite tool (1) Fig. A.

A



TRANSMISSION CHAIN

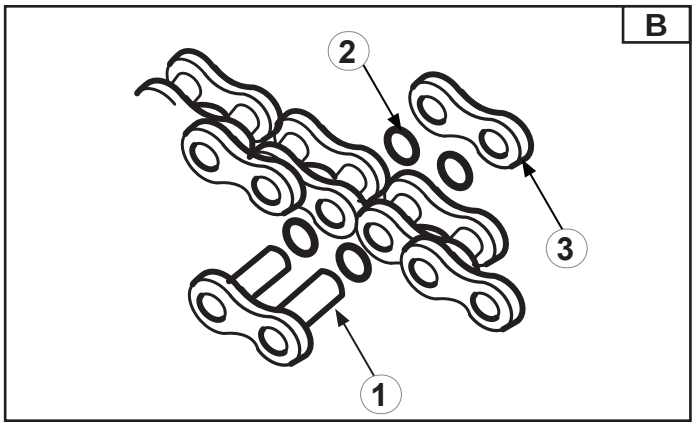
REPLACEMENT OF THE TRANSMISSION CHAIN

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. B.
- The O-Rings (2) Fig. B.
- The clip link (3) Fig. B.



NOTICE

Insert the master link from inside the transmission chain, then fit 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.

SWINGARM

REMOVAL OF THE SWINGARM

Park the motorcycle on a level surface.

NOTICE

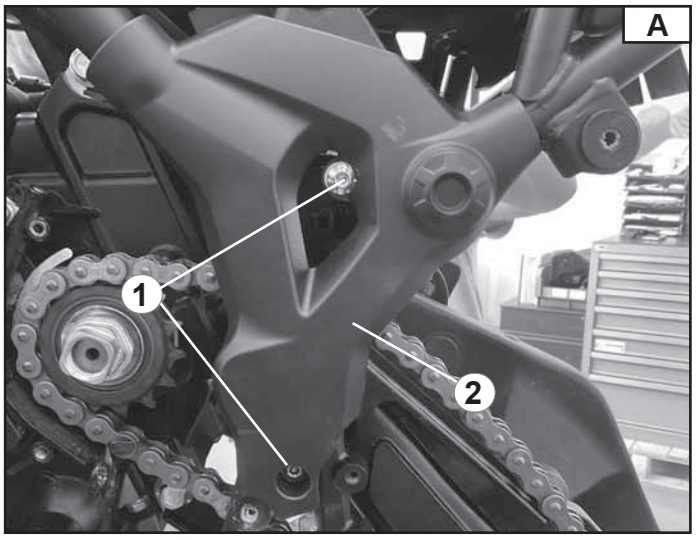
Prop the motorcycle on suitable supports so that it cannot fall.

Remove the parts in the indicated order.

- The rear brake caliper, refer to **"Removal of the rear brake caliper, Chapter 4".**
- The rear wheel, refer to **"Removal of the rear wheel, Chapter 4".**
- Rear shock absorber, refer to **"Removal of the rear shock absorber, Chapter 4".**
- The rear mudguard, refer to **"Removal of the rear mudguard and top chain guard, Chapter 4".**

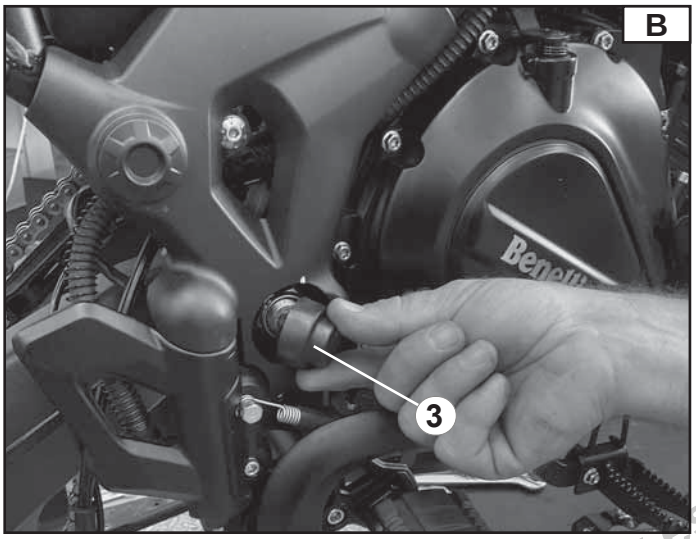
Remove:

- The screws (1) Fig. A.
- The left frame cover (2) Fig. A.



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

- The RH cover cap (3) Fig. B.

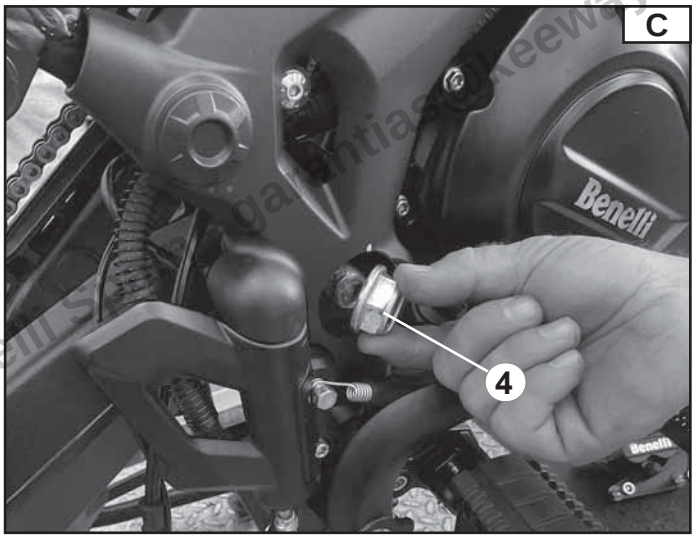


NOTE:
Position a stand to support the rear swingarm.

- The nut (4) Fig. C.

Slide out:

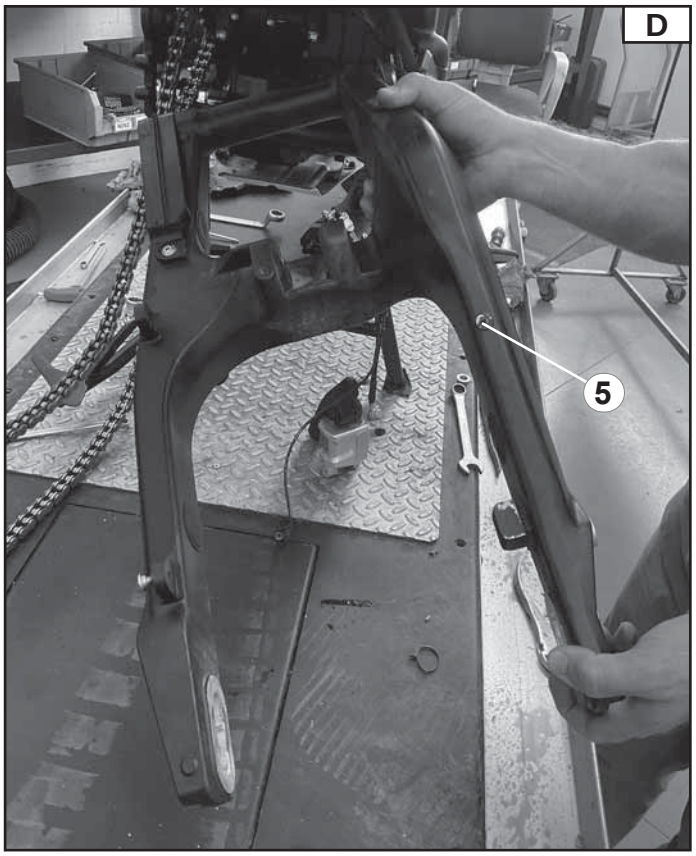
- The swingarm pin (1) Fig. E.



SWINGARM

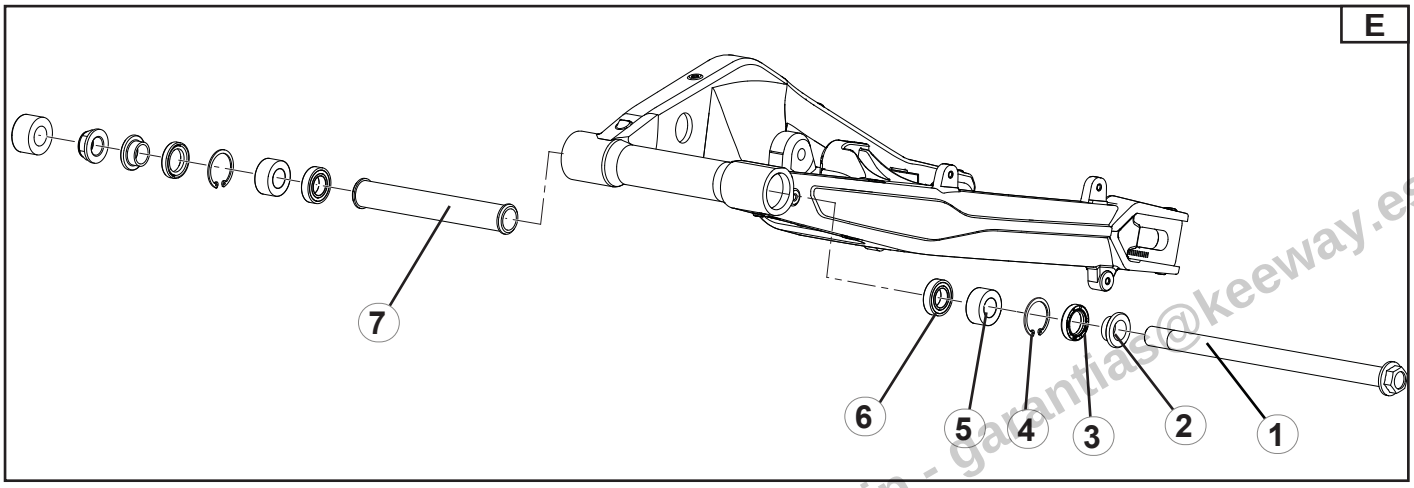
REMOVAL OF THE SWINGARM

- The swingarm (5) Fig. D.



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

Rear swingarm bearing disassembly tool, see "Special tools for the frame, Chapter 1".



Slide out:

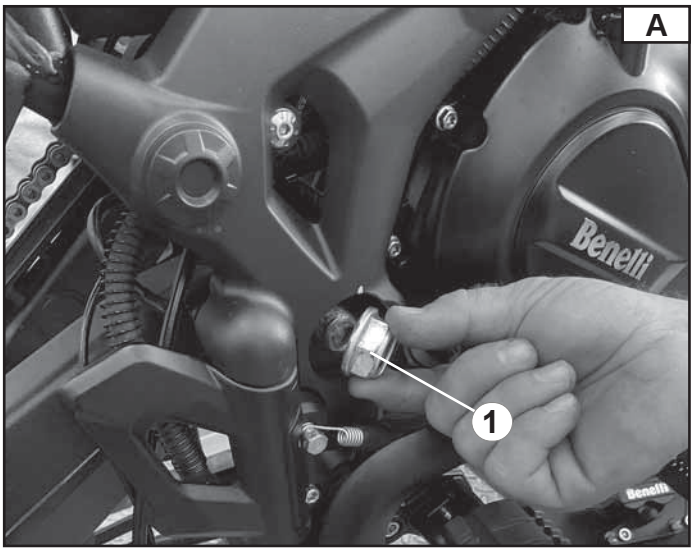
- The bush (2) Fig. E.
- The oil seal (3) Fig. E.
- The Seeger ring (4) Fig. E.
- The bearing (5) Fig. E.
- The bearing (6) Fig. E.
- The central spacer (7) Fig. E.

Remove the other parts on the right side following the same sequence.

TRANSMISSION CHAIN AND SWINGARM

INSTALLATION OF THE SWINGARM

Park the motorcycle on a level surface.



NOTICE

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

Install:

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

Lubricate:

- The internal bearings.
- The bushes.

	**Recommended lubricant NGLI2 GREASE**

Tighten:

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

Torque 60 N*m

FRAME

REMOVAL OF THE REAR FRAME

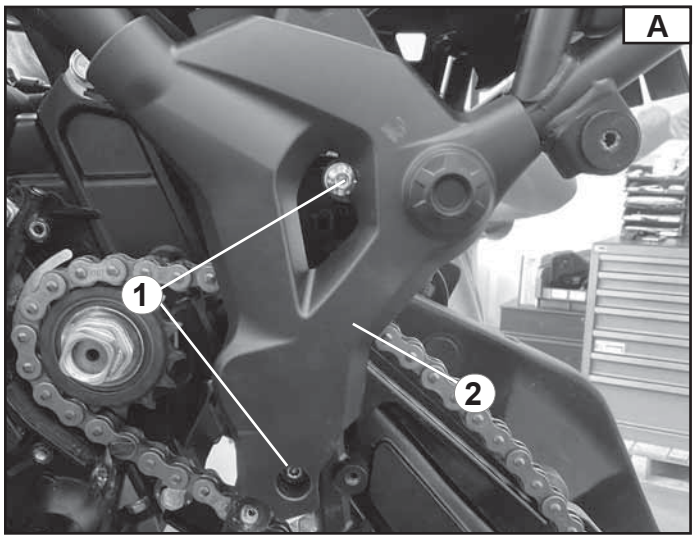
Park the motorcycle on a level surface.

NOTICE

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

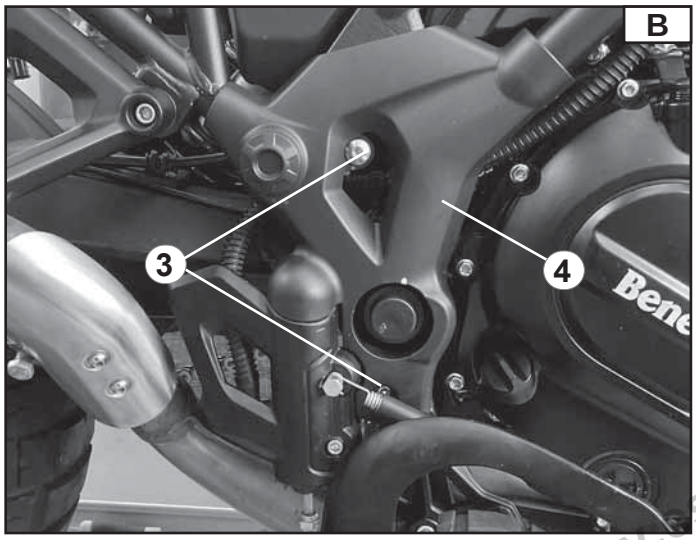
Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The fuel tank, refer to **"Removal of the fuel tank, Chapter 4".**
- The battery, refer to **"Check and charge of the battery, Chapter 3"**.
- The upper fairing, refer to **"Removal of the upper fairing, Chapter 4".**
- The side fairings, refer to **"Removal of the side fairings, Chapter 4".**
- The license plate holder, refer to **"Removal of the license plate holder, Chapter 4".**
- The rear light, refer to **"Removal of the rear light, Chapter 4".**
- The exhaust system, refer to **"Removal of the exhaust system, Chapter 4".**



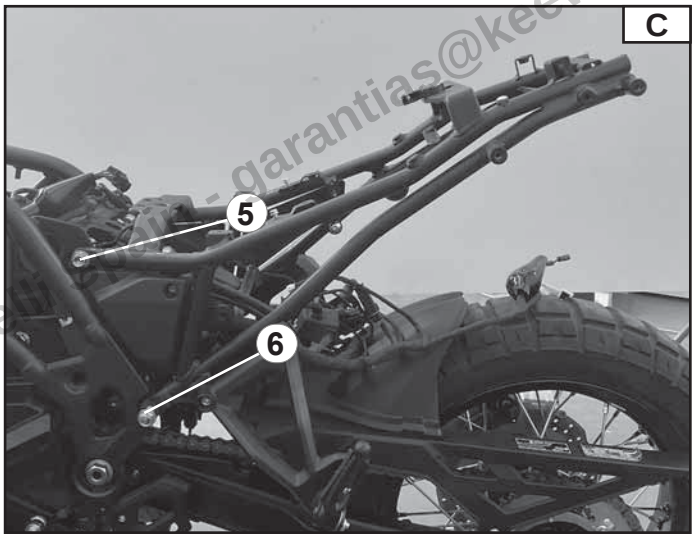
Remove:

- The screws (1) Fig. A.
- The left frame cover (2) Fig. A.
- The screws (3) Fig. B.
- The right frame cover (4) Fig. B.

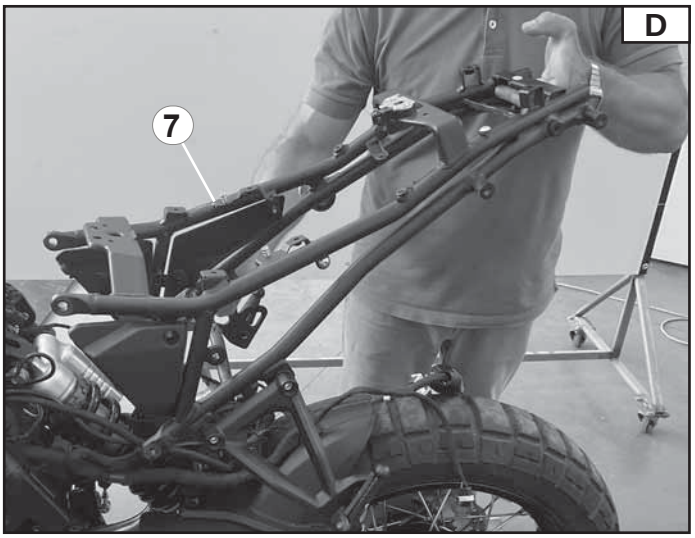


Remove:

- The fixing bolt (5) Fig. C.
- The screw (6) Fig. C on both sides of the frame.



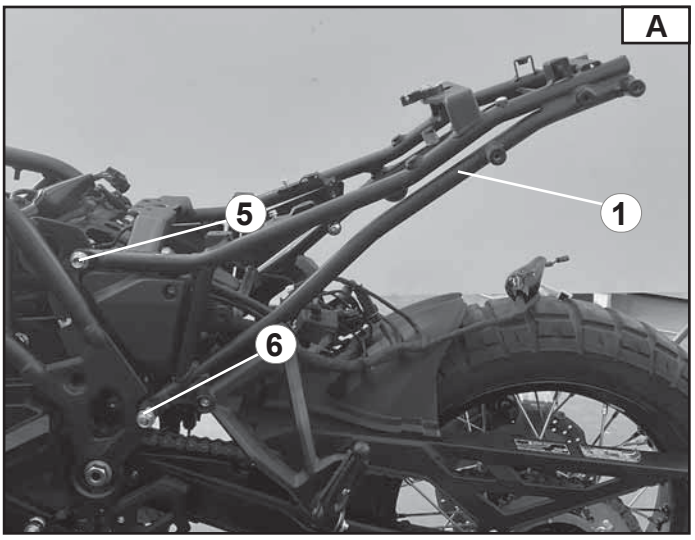
FRAME
REMOVAL OF THE REAR FRAME



Remove:
- The rear frame (7) Fig. D.

FRAME
INSTALLATION OF THE REAR FRAME

Park the motorcycle on a level surface.



NOTICE

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

Installation:
Proceed using the opposite order to removal.

Install:
- The rear frame (1) Fig. A.

Tighten:
- The fixing bolt (5) Fig. A.
- The screw (6) Fig. A on both sides of the frame.

To the following torque:

Torque 45 N*m

FRAME
REMOVAL OF THE FRONT FRAME

Park the motorcycle on a level surface.

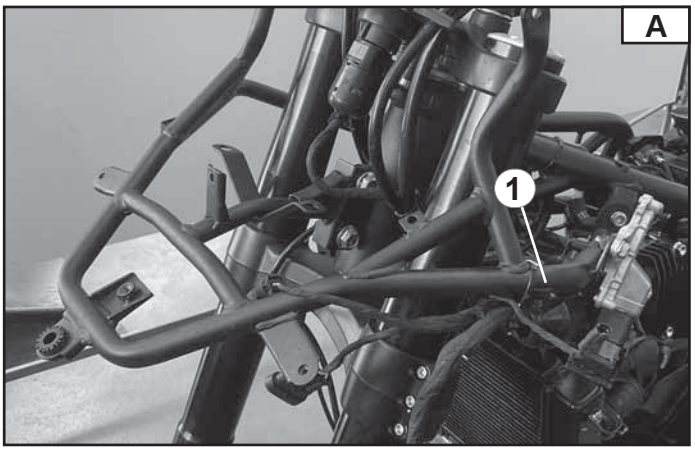
NOTICE

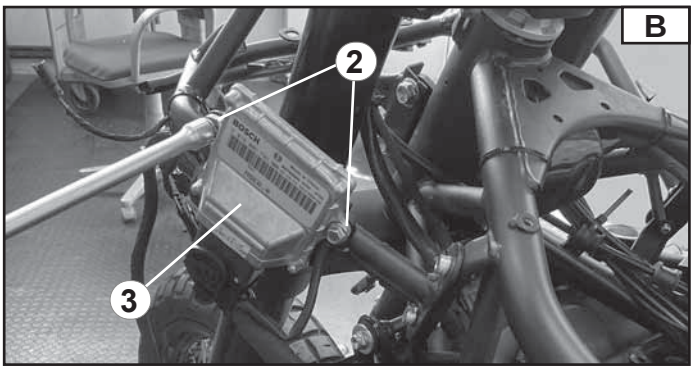
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:
- The headlight, refer to **"Replacement of the headlights, Chapter 3".**

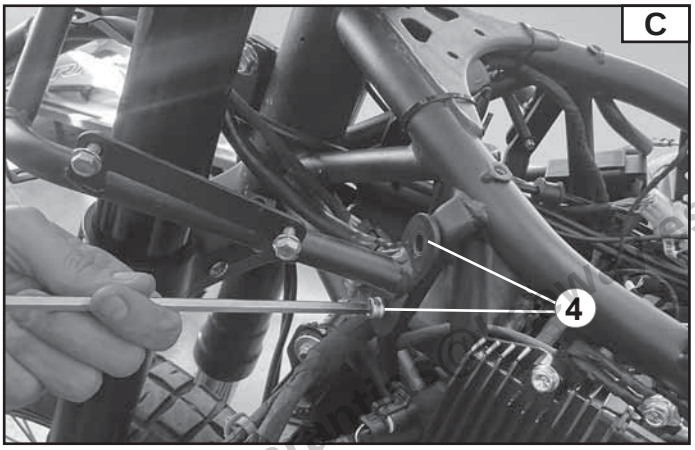
Disconnect:
- The cables fastened via the clamp (1) Fig. A.

Remove:
- The screws (2) Fig. B.
- The ECU (3) Fig. B.

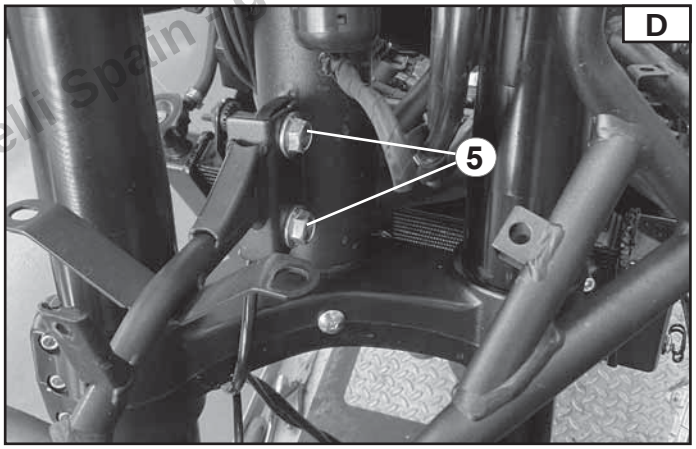




- The screws on the right/left side (4) Fig. C.

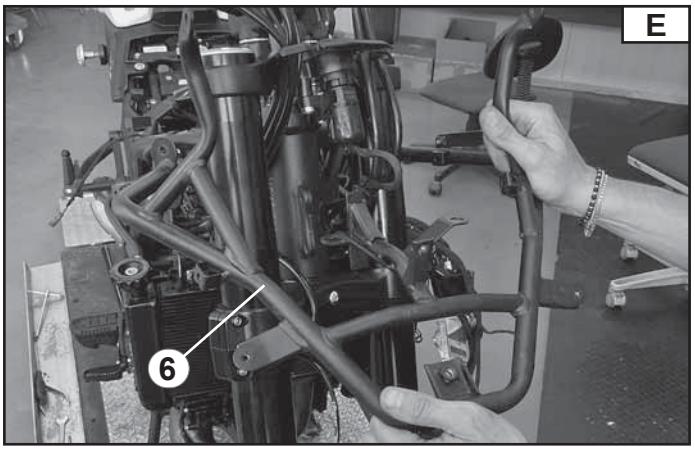


- The screws (5) Fig. D.



FRAME
REMOVAL OF THE FRONT FRAME

Remove:
- The front frame (6) Fig. E.



FRAME

INSTALLATION OF THE FRONT FRAME

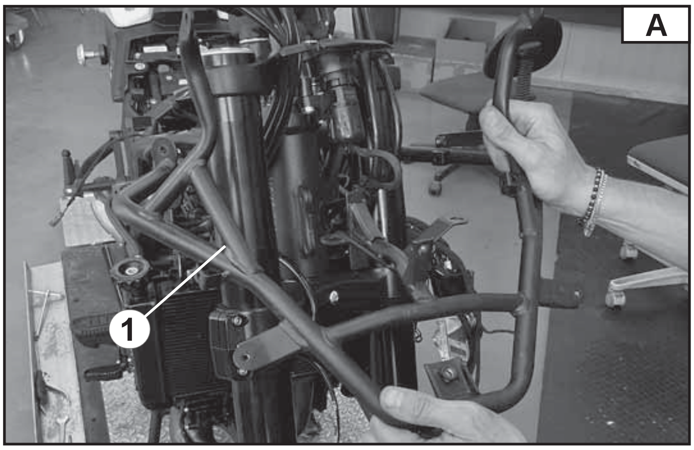
Park the motorcycle on a level surface.

NOTICE

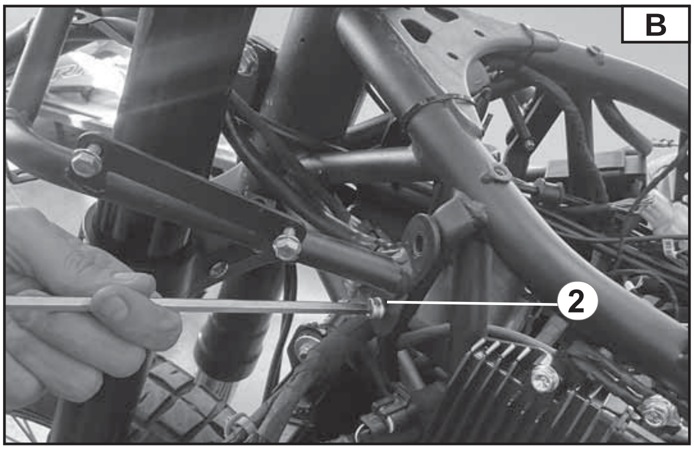
Prop the motorcycle on suitable supports so that it cannot fall.

Installation:
Proceed using the opposite order to removal.

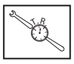
Install:
- The front frame (1) Fig. A.



Tighten:
- The fixing screws (2) on both sides Fig. B.

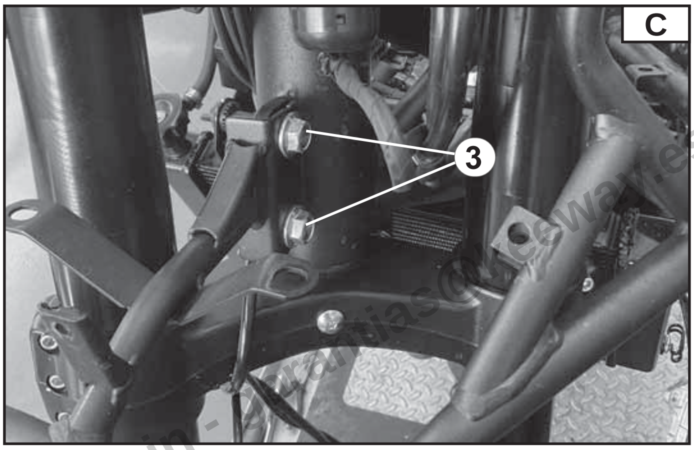


To the following torque:

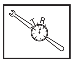


Torque 20 N*m

Tighten:
- The fixing screws (3) Fig. C.



To the following torque:



Torque 45 N*m

FRAME

REMOVAL OF THE LICENCE PLATE HOLDER

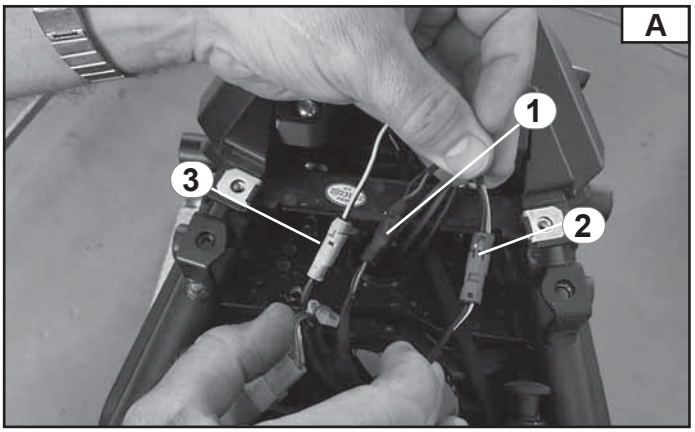
Park the motorcycle on a level surface.

NOTICE

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

Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**

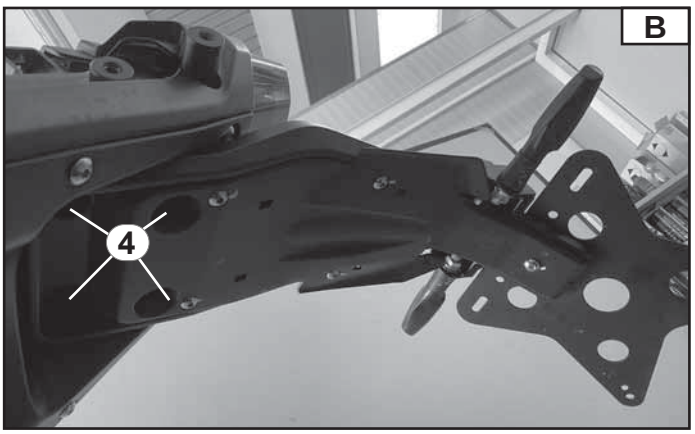


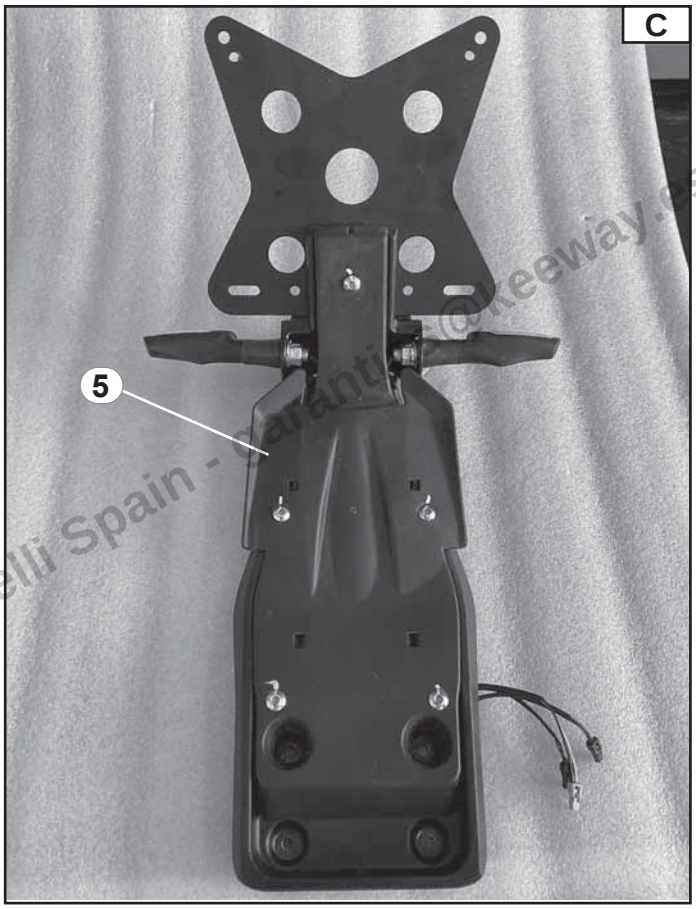
Disconnect:

- The right turn signal light connector (2) Fig. A.
- The left turn signal light connector (1) Fig. A.
- The license plate light connector (3) Fig. A.

Remove:

- The screws (4) Fig. B.
- The number plate holder (5) Fig. C.





FRAME

INSTALLATION OF THE LICENCE PLATE HOLDER

Park the motorcycle on a level surface.

NOTICE

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

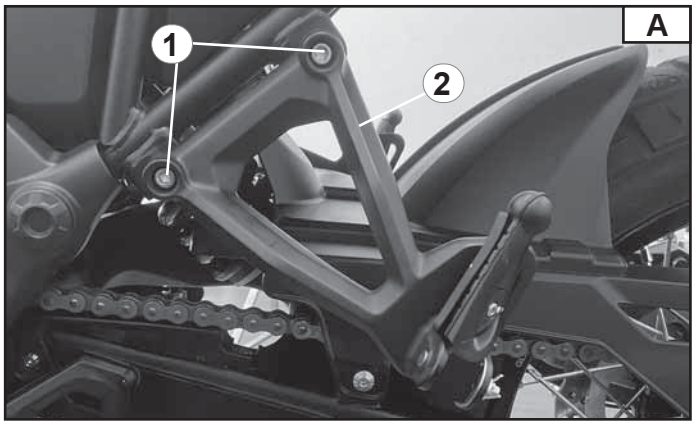
Installation:

- Proceed using the opposite order to removal.

CYCLING

REMOVAL OF THE RIGHT/LEFT REAR FOOT PEG

Park the motorcycle on a level surface.



NOTICE

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

Remove:

- The screws (1) Fig. A.
- The left foot peg (2) Fig. A.

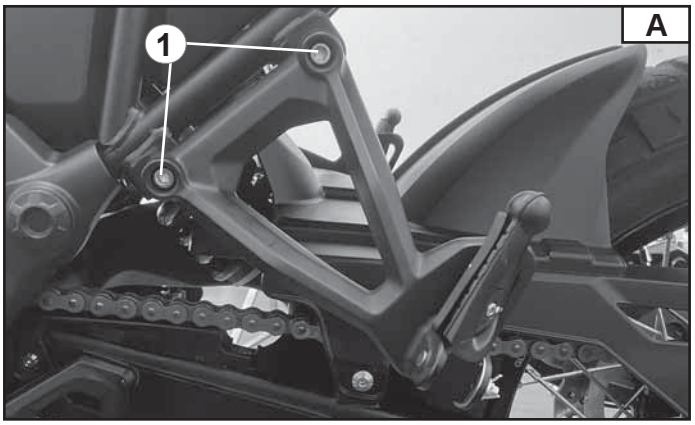
NOTE:

Carry out the same removal procedure on the right side.

CYCLING

INSTALLATION OF THE RIGHT/LEFT REAR FOOT PEG

Park the motorcycle on a level surface.



NOTICE

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

Installation:

- Proceed using the opposite order to removal.

Tighten:

- The screws (1) Fig. A.

To the following torque:

Torque 25 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

CYCLING

REMOVAL OF THE LEFT FRONT FOOT PEG SUPPORT

Park the motorcycle on a level surface.

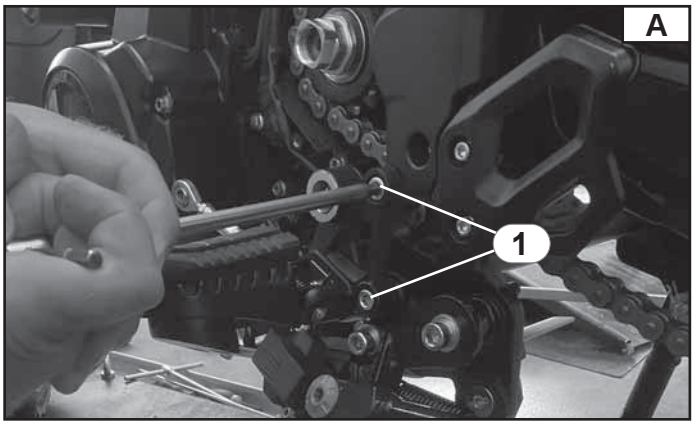
NOTICE

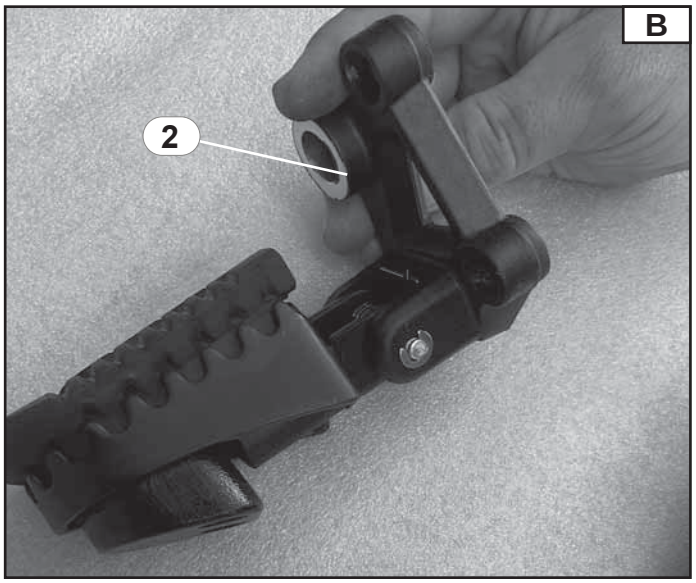
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The gear control foot peg, refer to **"Removal of the gear control foot peg, Chapter 4".**

- The screws (1) Fig. A.
- The left front foot peg support (2) Fig. A. B.

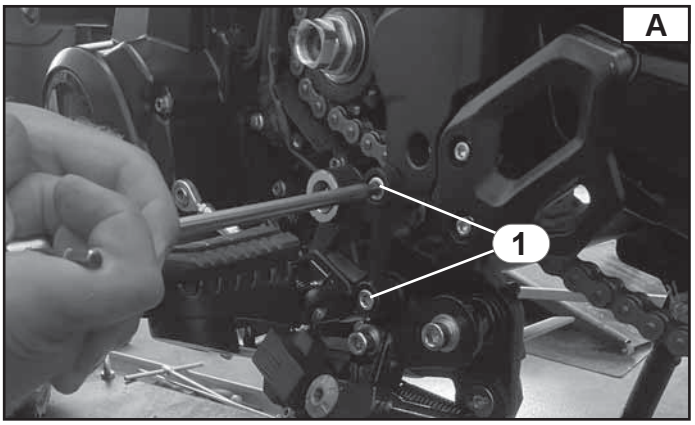




CYCLING

INSTALLATION OF THE LEFT FRONT FOOT PEG SUPPORT

Park the motorcycle on a level surface.



NOTICE

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

Installation:

- Proceed using the opposite order to removal.

Tighten:

- The screws (1) Fig. A.

To the following torque:

Torque 25 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

CYCLING

REMOVAL OF THE RIGHT FRONT FOOT PEG SUPPORT

Park the motorcycle on a level surface.

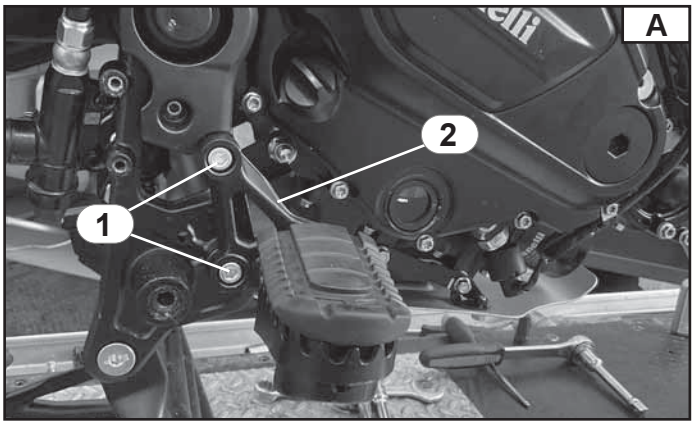
NOTICE

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

Remove:

- The rear brake pedal, refer to **"Removal of the rear brake caliper, Chapter 4".**

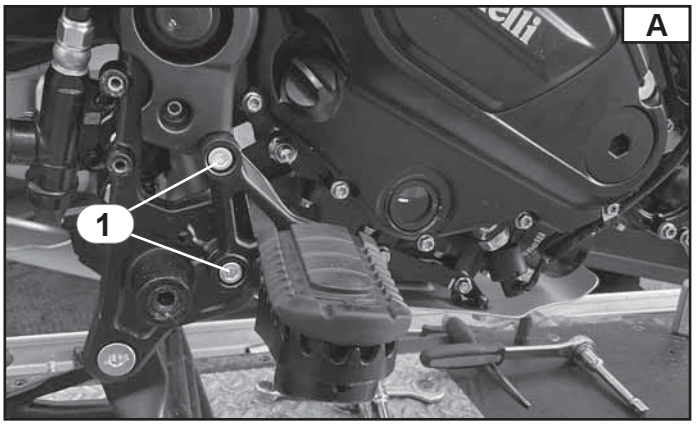
- The screws (1) Fig. A.
- The right front foot peg (2) Fig. A.



CYCLING

INSTALLATION OF THE RIGHT FRONT FOOT PEG SUPPORT

Park the motorcycle on a level surface.



NOTICE

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

Installation:

- Proceed using the opposite order to removal.

Tighten:

- The screws (1) Fig. A.

To the following torque:

Torque 25 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

CYCLING

REMOVAL OF THE SIDE STAND

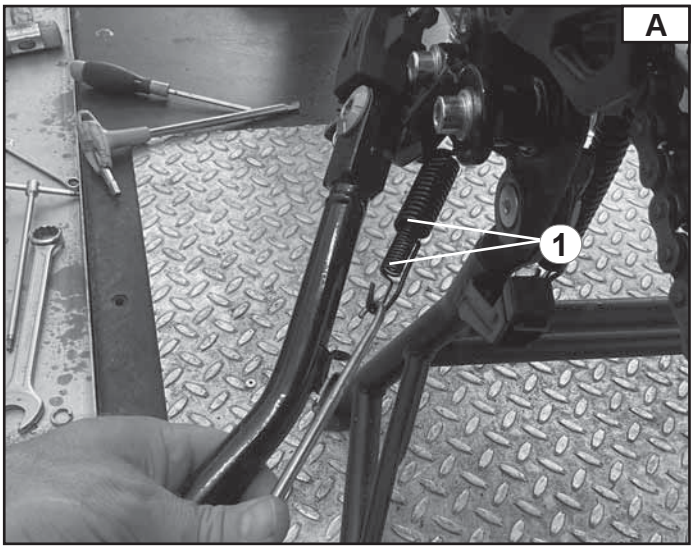
Park the motorcycle on a level surface.

NOTICE

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

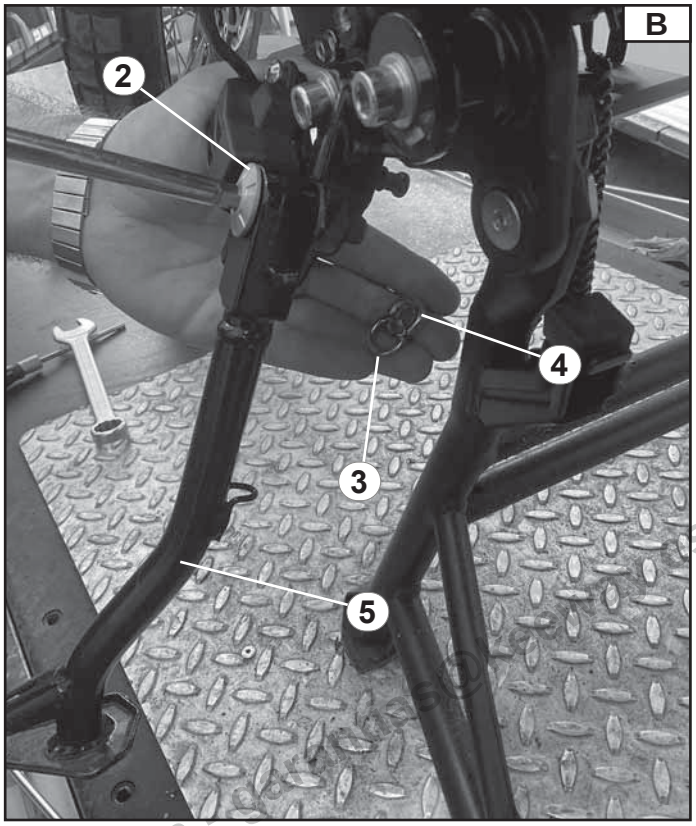
Remove:

- The springs (1) Fig. A.



Remove:

- The nut (4) Fig. B.
- The spring washer (3) Fig. B.
- The special screw (2) Fig. B.
- The side stand (5) Fig. B.



CYCLING
INSTALLATION OF THE SIDE STAND

Park the motorcycle on a level surface.

NOTICE

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

Installation:
Proceed using the opposite order to removal.

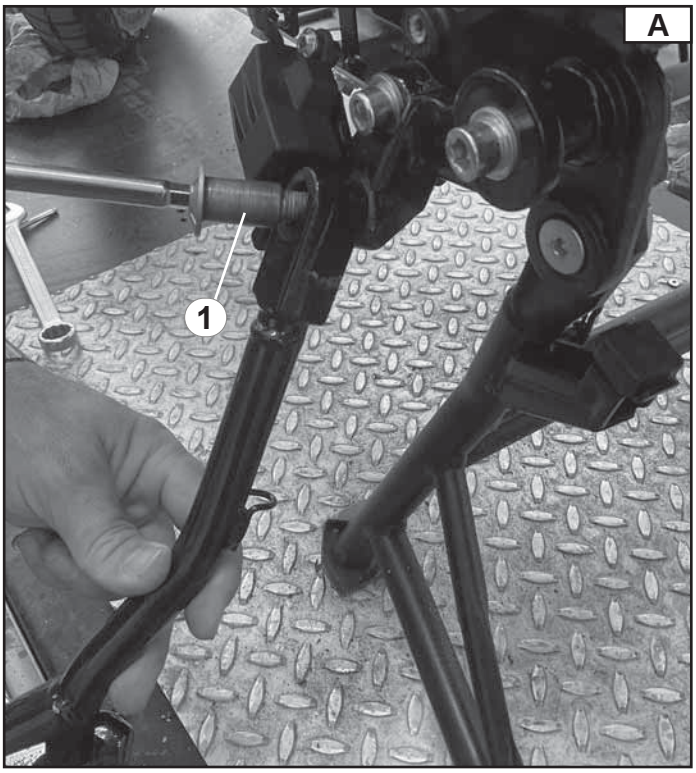
Tighten:
- The special screw (1) Fig. A.

To the following torque:

Torque 50 N*m

NOTE:
Make use of grease around the unthreaded collar during the assembly Fig. A.

	Recommended lubricant NGLI2 GREASE



CYCLING

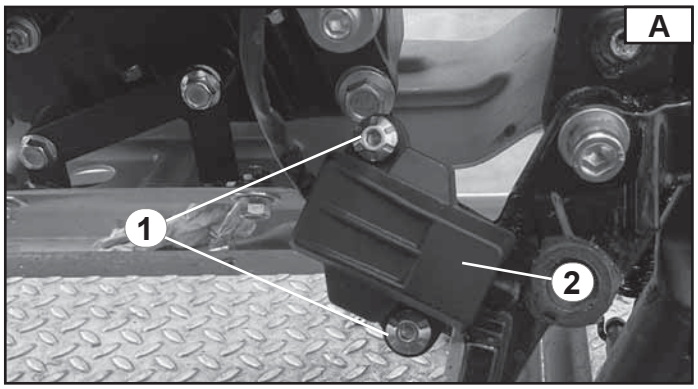
REMOVAL OF THE SIDE STAND SENSOR

Park the motorcycle on a level surface.

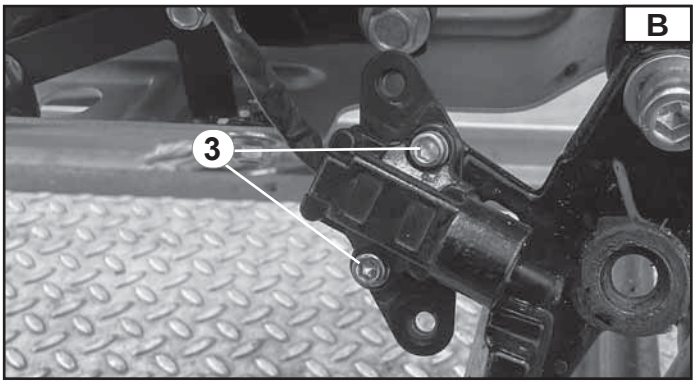
NOTICE

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

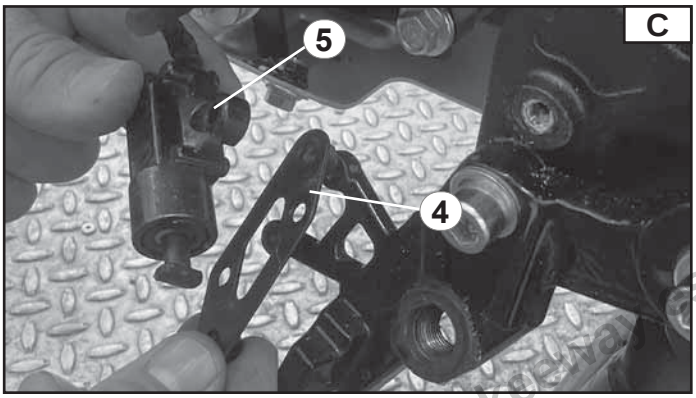
Remove:
- The screws (1) Fig. A.
- The sensor protection (2) Fig. A.



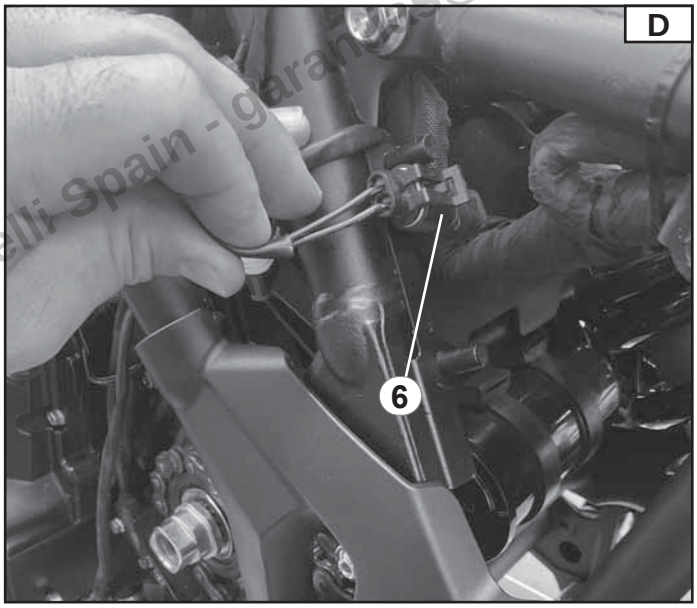
Remove:
- The screws (3) Fig. B.



Remove:
- The support plate (4) Fig. C.
- The sensor (5) Fig. C.



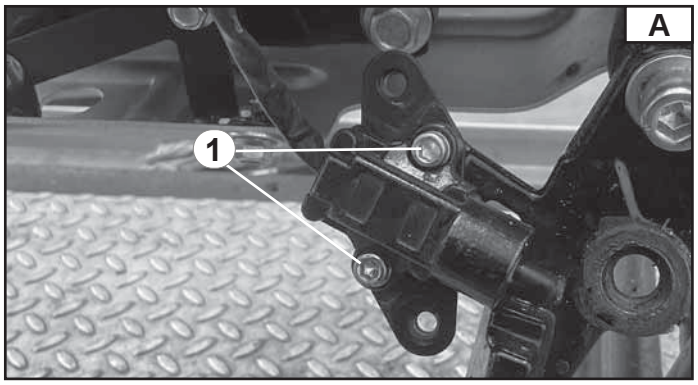
Disconnect:
- The connector (6) Fig. D.



CYCLING

INSTALLATION OF THE SIDE STAND SENSOR

Park the motorcycle on a level surface.



NOTICE

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

Installation:

- Proceed using the opposite order to removal.

Tighten:

- The screws (1) Fig. A.

To the following torque:

Torque 10 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

CYCLING

REMOVAL OF THE SIDE STAND HOLDER

Park the motorcycle on a level surface.

NOTICE

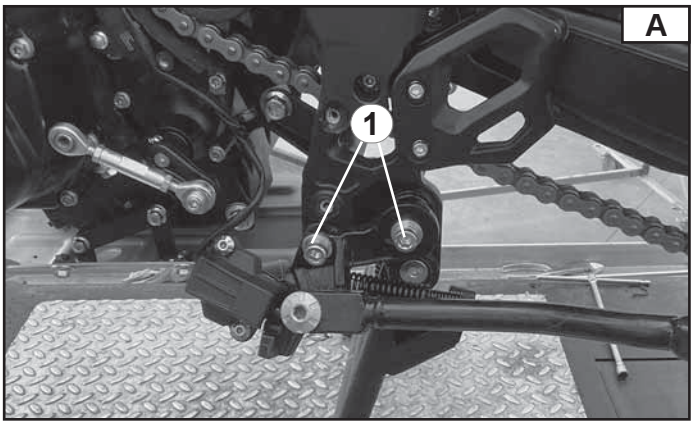
Prop the motorcycle on suitable supports so that it cannot fall.

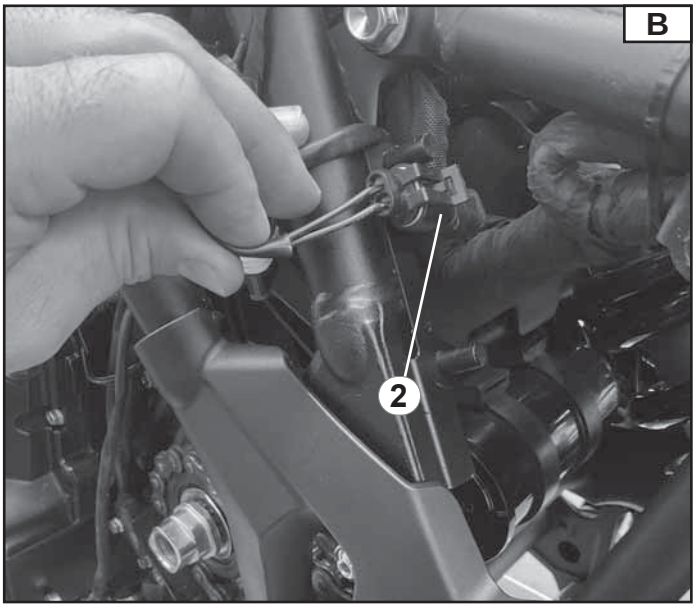
Remove:

- The screws (1) Fig. A.

Disconnect:

- The connector of the side stand sensor (2) Fig. B.

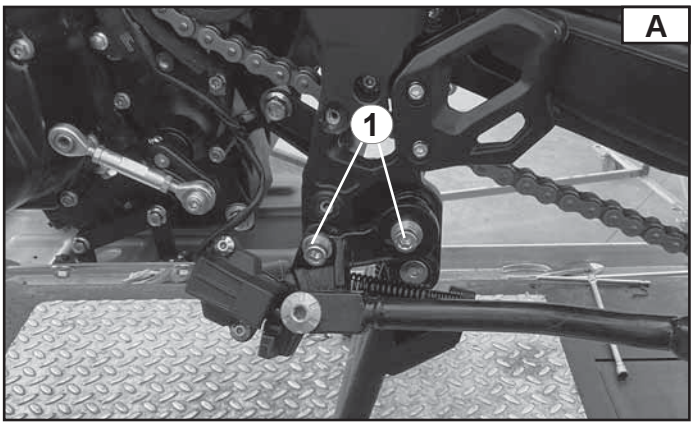




CYCLING

INSTALLATION OF THE SIDE STAND SUPPORT

Park the motorcycle on a level surface.



NOTICE

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

Installation:
Proceed using the opposite order to removal.

Tighten:
- The screws (1) Fig. A.

To the following torque:

Torque 45 N*m

Use Loctite.

	Medium thread locker

CYCLING

REMOVAL OF THE LEFT HEEL GUARD

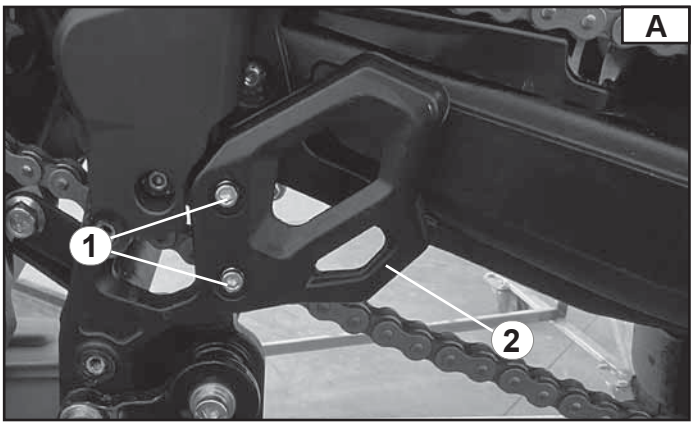
Park the motorcycle on a level surface.

NOTICE

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

Remove:

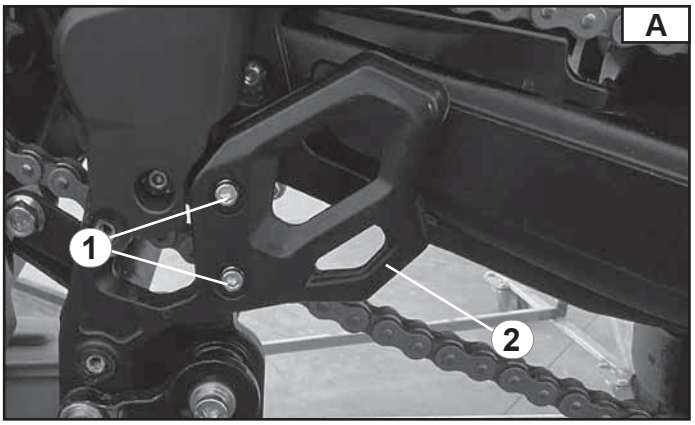
- The screws (1) Fig. A.
- The left heel guard (2) Fig. A.



CYCLING

INSTALLATION OF THE LEFT HEEL GUARD

Park the motorcycle on a level surface.



NOTICE

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

Installation:
Proceed using the opposite order to removal.

Tighten:
- The screws (1) Fig. A.

To the following torque:

Torque 10 N*m

Use Loctite.

	Medium thread locker

CYCLING

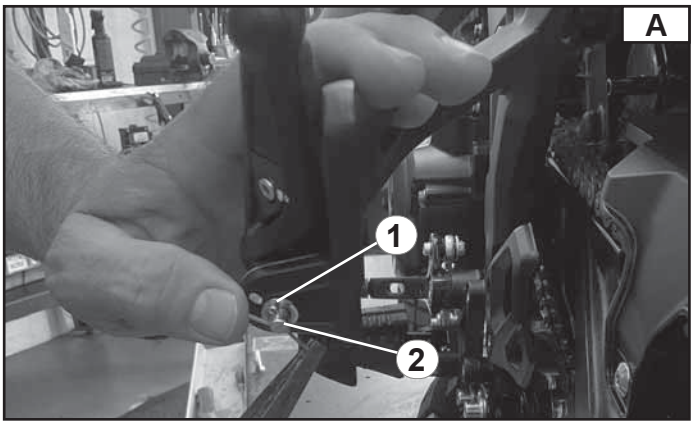
REMOVAL OF THE RIGHT/LEFT REAR FOOT PEG

Park the motorcycle on a level surface.

NOTICE

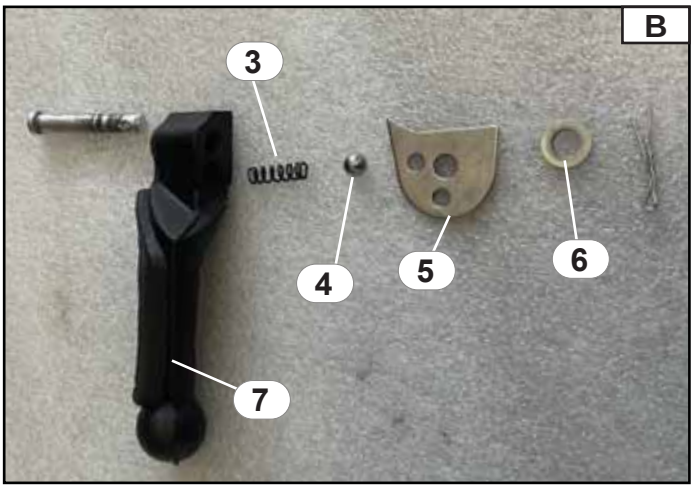
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:
- The cotter pin (1) Fig. A.
- The washer (6) Fig. B.
- The pin (2) Fig. A.



Remove:
- The plate (5) Fig. B.
- The ball (4) Fig. B.
- The internal spring (3) Fig. B.
- The foot peg (7) Fig. B.

NOTE:
Carry out the following operation for the right rear foot peg.



CYCLING

INSTALLATION OF THE LEFT/RIGHT REAR FOOT PEG

Park the motorcycle on a level surface.

NOTICE

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

Installation:
Proceed using the opposite order to removal.

CYCLING

REMOVAL OF THE LEFT/RIGHT FRONT FOOT PEG

Park the motorcycle on a level surface.

NOTICE

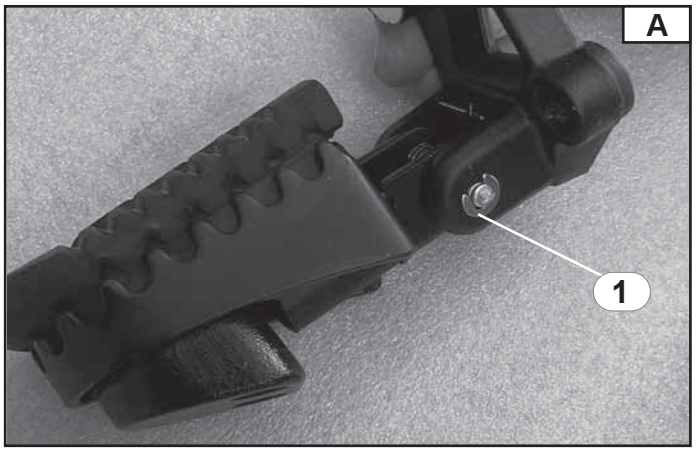
Prop the motorcycle on suitable supports so that it cannot fall.

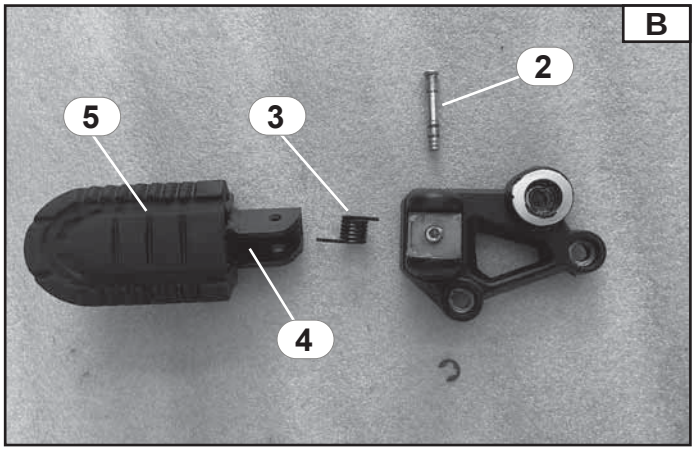
Remove:

- The snap ring (1) Fig. A.
- The pin (2) Fig. B.
- The spring (3) Fig. B.
- The left front foot peg (4) Fig. A. B.

NOTE:
If the rubber foot peg covers (5) Fig. A are worn, replace.

NOTE:
Carry out the following operation for the right front foot peg.





CYCLING

INSTALLATION OF THE LEFT/RIGHT FRONT FOOT PEG

Park the motorcycle on a level surface.

NOTICE

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

Installation:
Proceed using the opposite order to removal.

CYCLING

REMOVAL OF THE GEARBOX CONTROL PEDAL

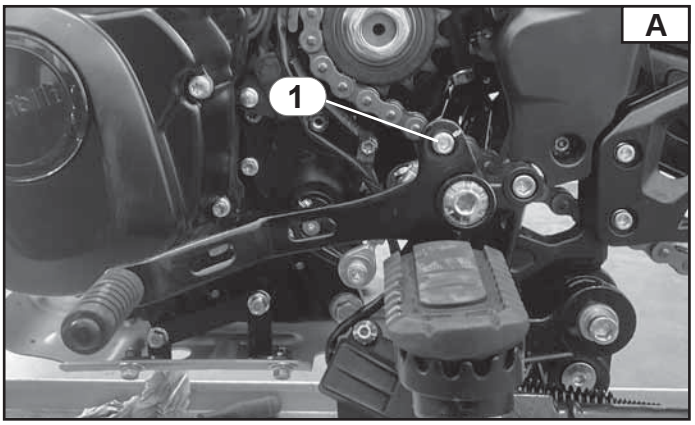
Park the motorcycle on a level surface.

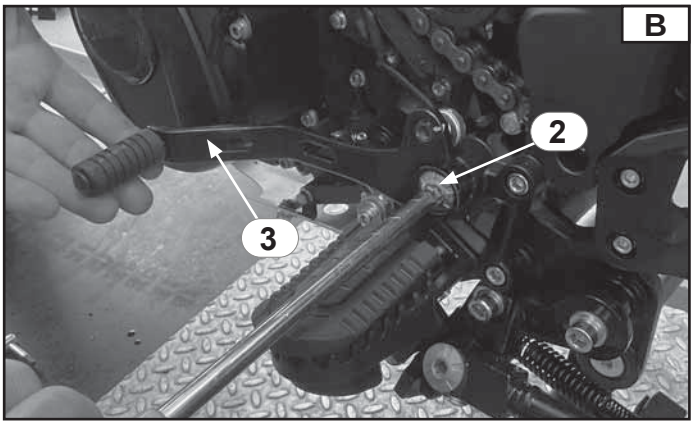
NOTICE

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

Remove:

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





CYCLING

INSTALLATION OF THE GEARBOX CONTROL PEDAL

Park the motorcycle on a level surface.

NOTICE

Prop the motorcycle 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 40 N*m
NOTE:
Make use of grease around the unthreaded collar during the assembly Fig. B and insert washers (3).

	Recommended lubricant NGLI2 GREASE

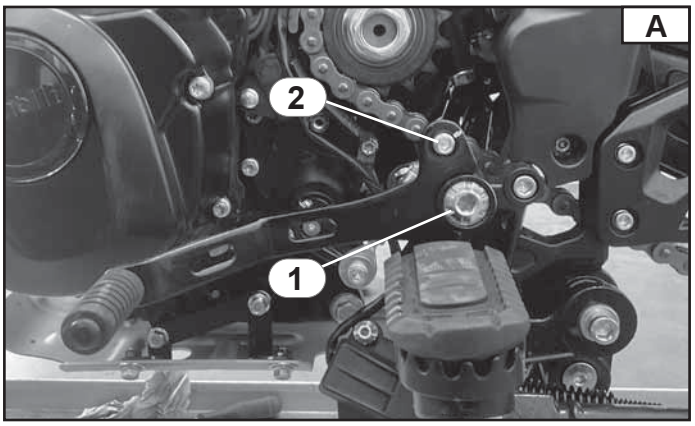
Tighten:
- The screw (2) Fig. A.

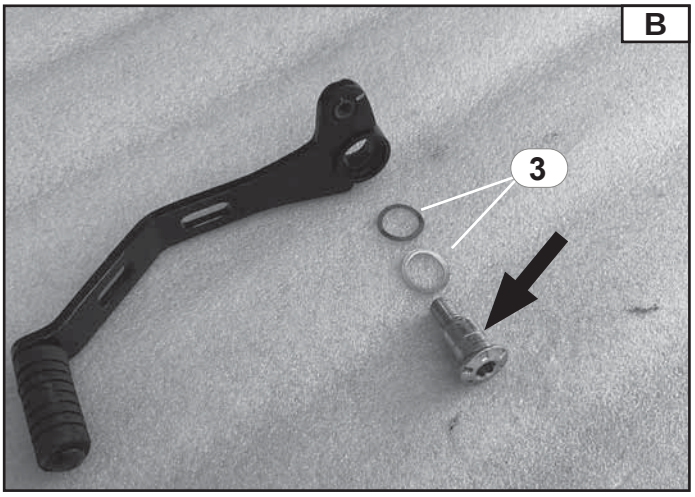
To the following torque:

Torque 12 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER





CYCLING

REMOVAL OF THE CHAIN SLIDING SHOE

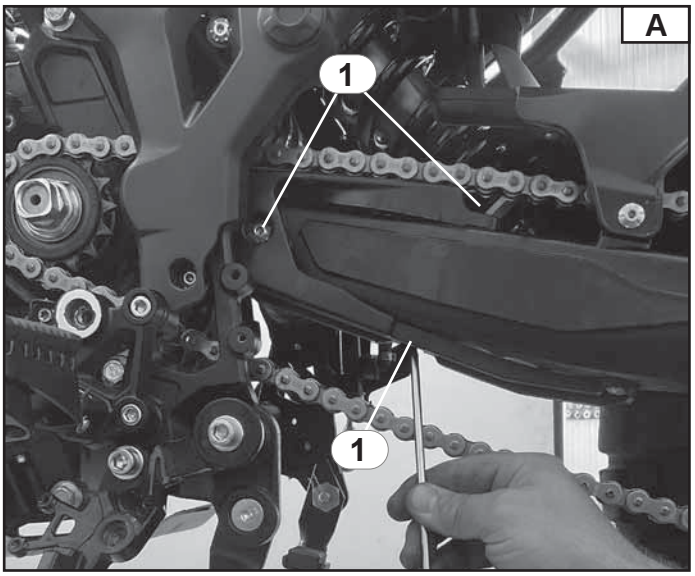
Park the motorcycle on a level surface.

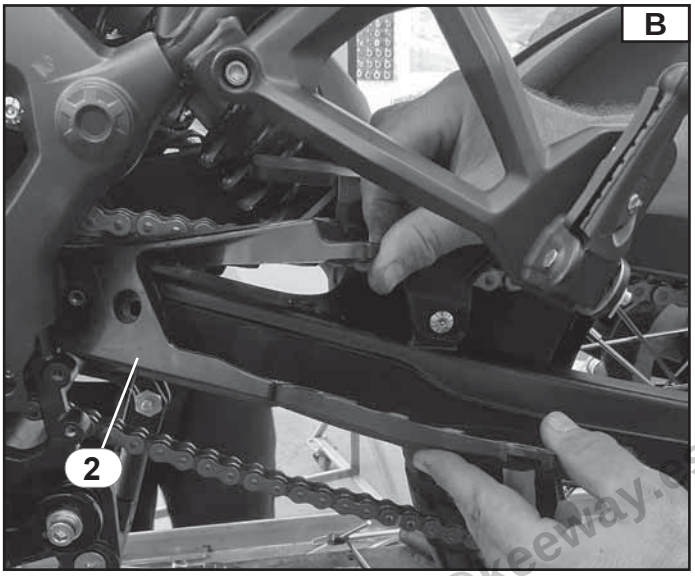
NOTICE

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

Remove:

- The left front foot peg plate, see **"Removal of the left front foot peg plate, Chapter 4".**
- The screws (1) Fig. A.
- The chain sliding shoe (2) Fig. B.

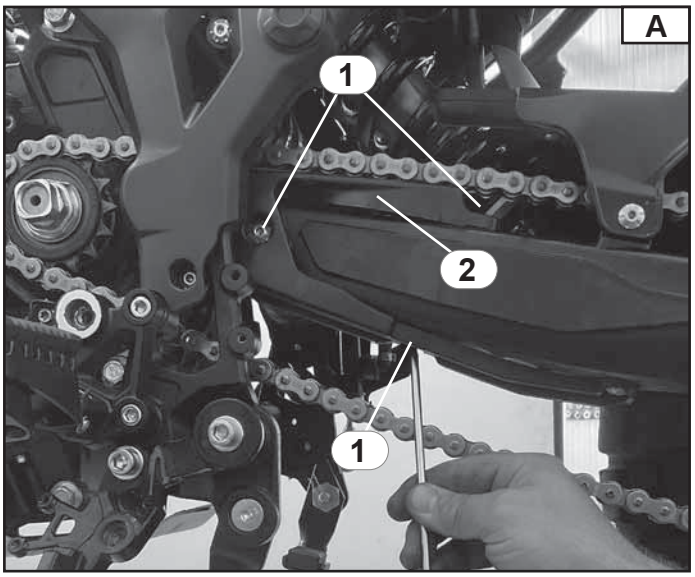




CYCLING

INSTALLATION OF THE CHAIN SLIDING SHOE

Park the motorcycle on a level surface.



NOTICE

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

Installation:
Proceed using the opposite order to removal.
Tighten:
- The screws (1) Fig. A.

To the following torque:

Torque 8 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

CYCLING

REMOVAL OF THE BRAKE CONTROL PEDAL

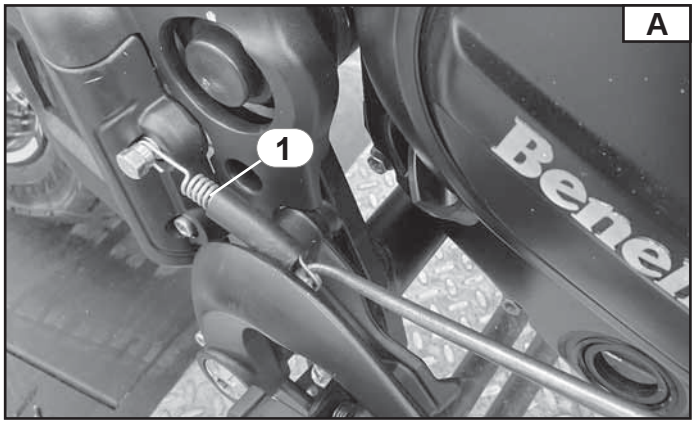
Park the motorcycle on a level surface.

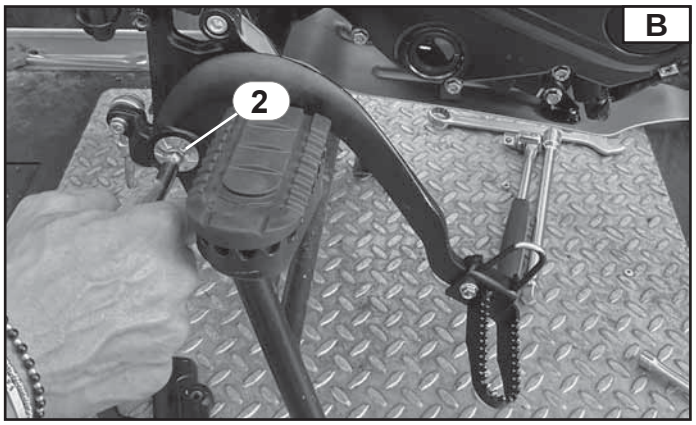
NOTICE

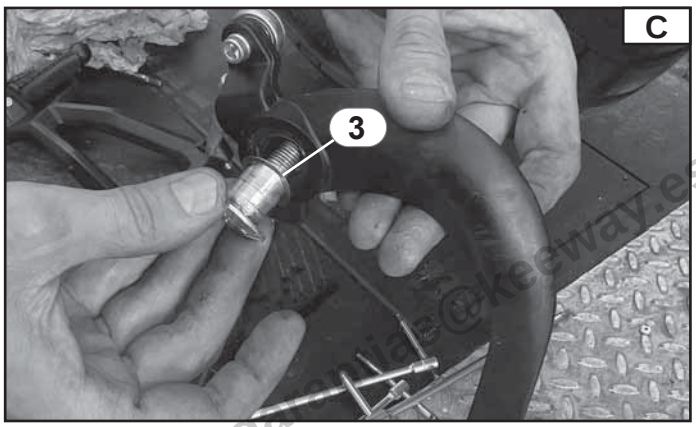
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The rear brake pump, refer to **"Removal of the rear brake pump, Chapter 4".**
- The spring (1) Fig. A.
- The screw (2) Fig. B.
- The elastic washer (3) Fig. C.







CYCLING

INSTALLATION OF THE BRAKE CONTROL PEDAL

Park the motorcycle on a level surface.

NOTICE

Prop the motorcycle 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:

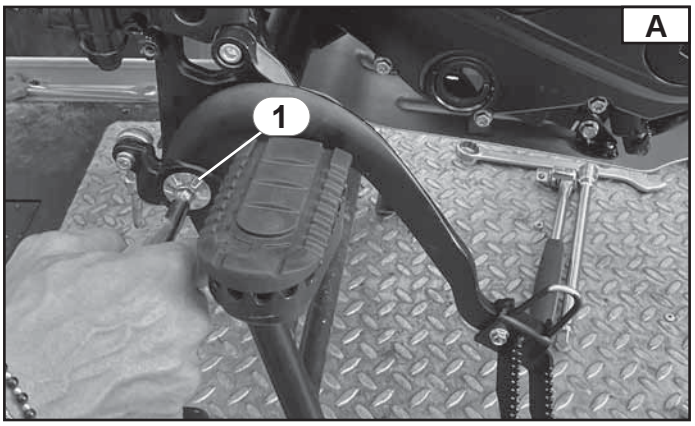
Torque 25 N*m

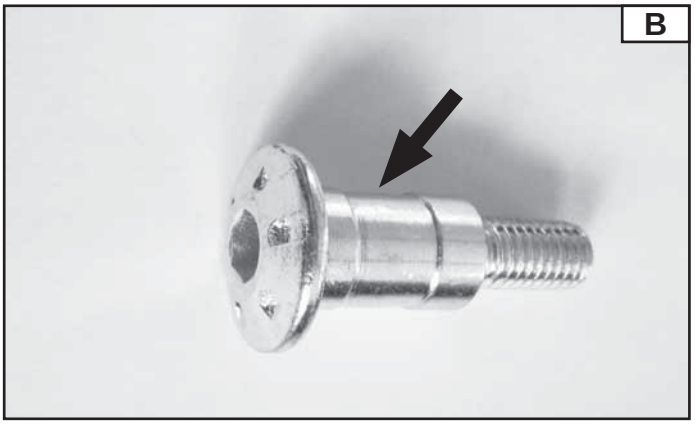
Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

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

	Recommended lubricant NGLI2 GREASE





CYCLING

REMOVAL OF THE CLUTCH CABLE

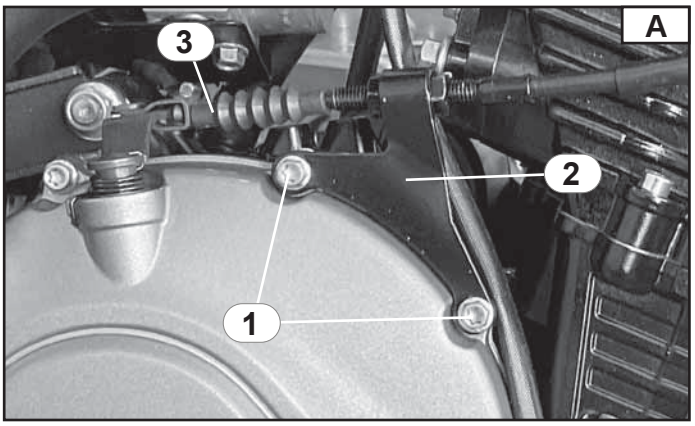
Park the motorcycle on a level surface.

NOTICE

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

Remove:
- The screws (1) Fig. A.
- The support bracket (2) Fig. A.

Disconnect:
- The clutch cable (3) Fig. A.



CYCLING

INSTALLATION OF THE CLUTCH CABLE

Park the motorcycle on a level surface.

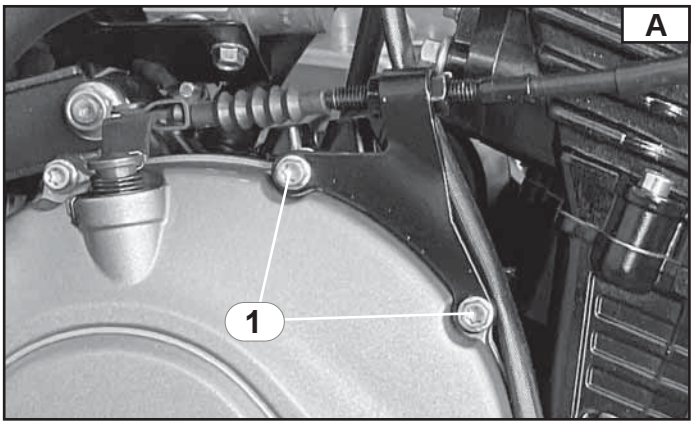
NOTICE

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

Installation:
Proceed using the opposite order to removal.
Tighten:
- The screws (1) Fig. A.

To the following torque:

Torque 10 N*m



EXHAUST SYSTEM

REMOVAL OF THE EXHAUST ASSEMBLY

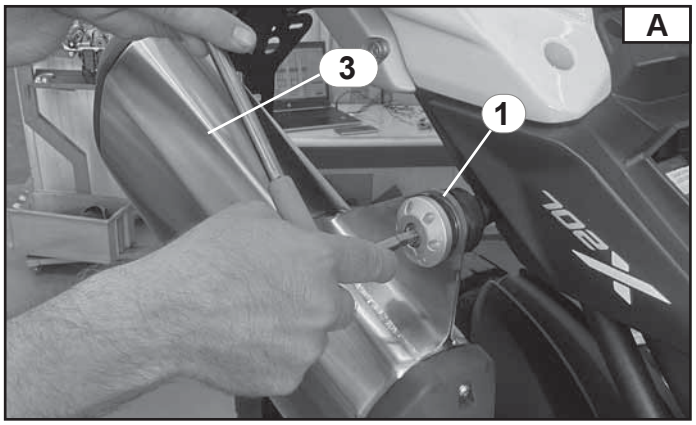
Park the motorcycle on a level surface.

NOTICE

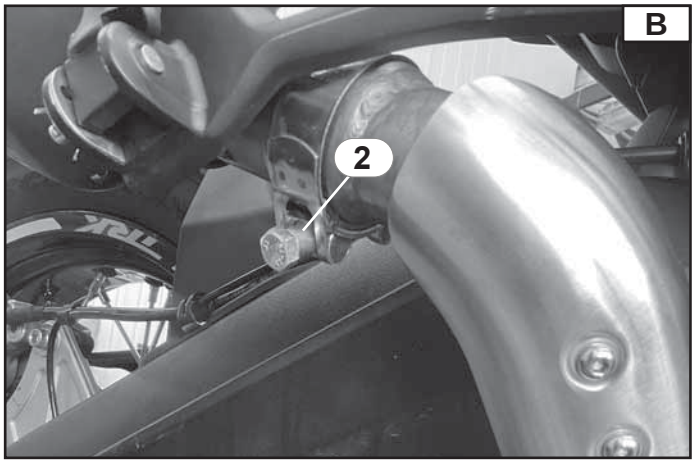
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The screw (1) Fig. A.



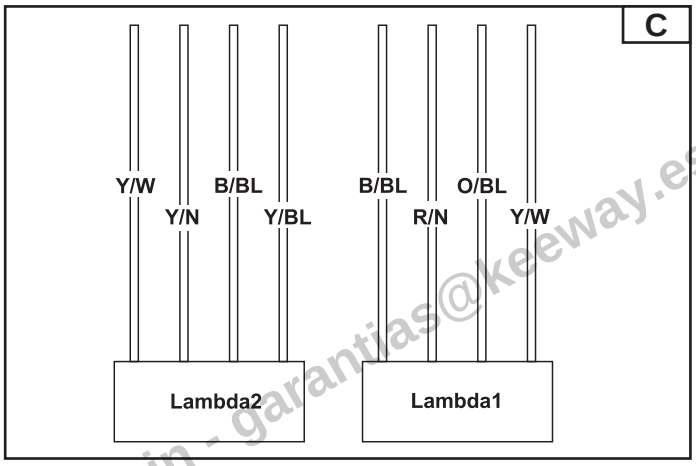
- The screw hose clamp (2) Fig. B.
- The silencer (3) Fig. A.



Disconnect the oxygen sensor:

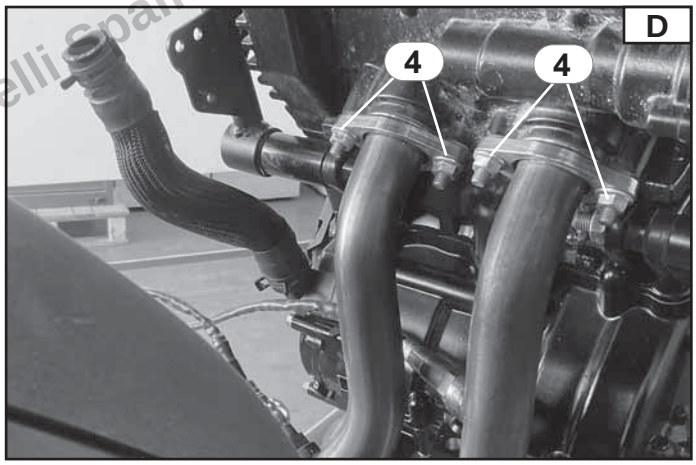
NOTE:

During this stage, refer to the colours of the cables making up the connectors as per diagram of Fig. C.



Remove:

- The nuts (4) Fig. D.



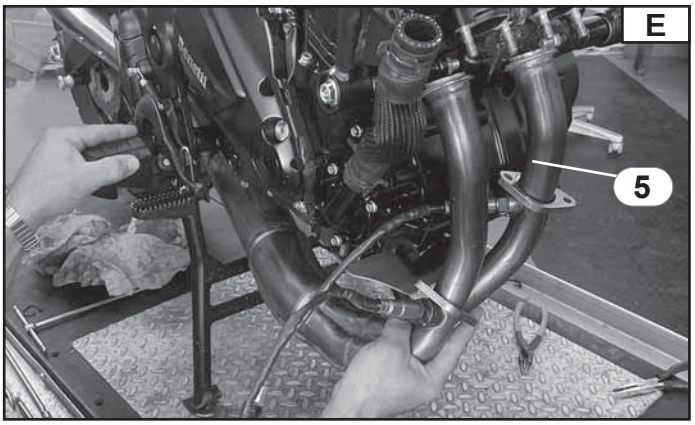
EXHAUST SYSTEM

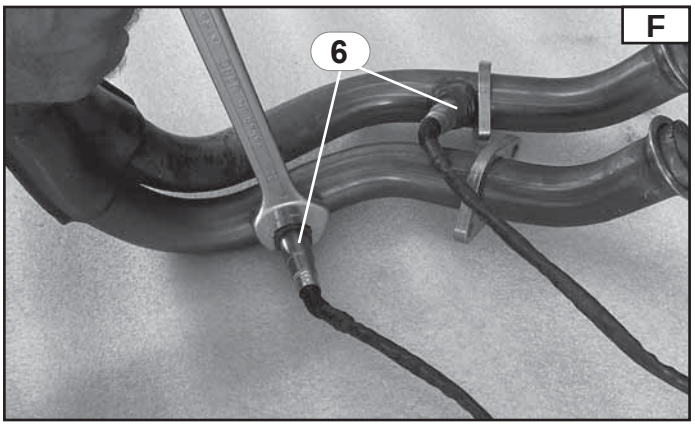
REMOVAL OF THE EXHAUST ASSEMBLY

Remove:

- The exhaust manifolds (5) Fig. E.

NOTE:
If necessary, remove the lambda sensors (6) Fig. F, from the manifold being careful not to damage the sensors.





EXHAUST SYSTEM

INSTALLATION OF THE EXHAUST ASSEMBLY

Park the motorcycle on a level surface.

NOTICE

Prop the motorcycle 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.

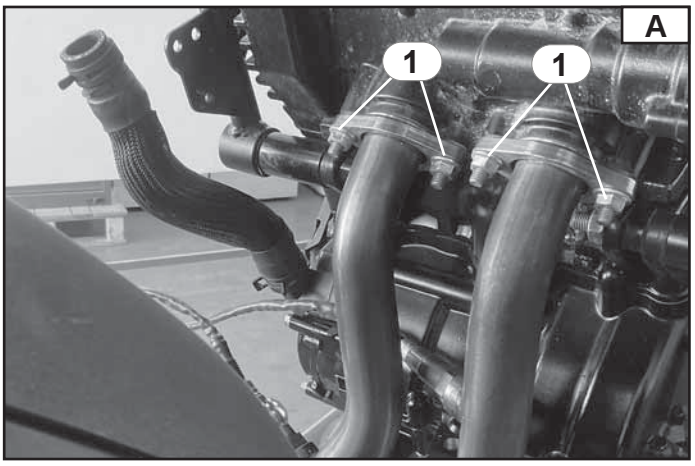
	Recommended lubricant COPPER GREASE

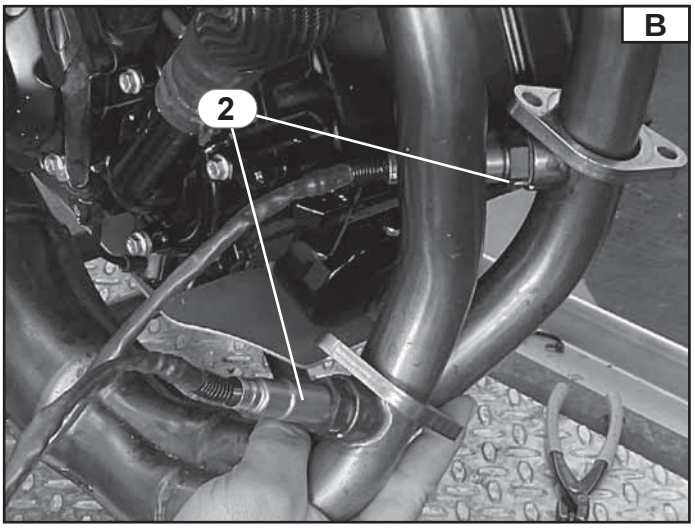
- The oxygen sensor (2) on both sides Fig. B.

To the following torque:

Torque 40 N*m

NOTE:
During the assembly phase of the lambda sensor is necessary to lubricate the threads with copper grease for high temperatures.





EXHAUST SYSTEM

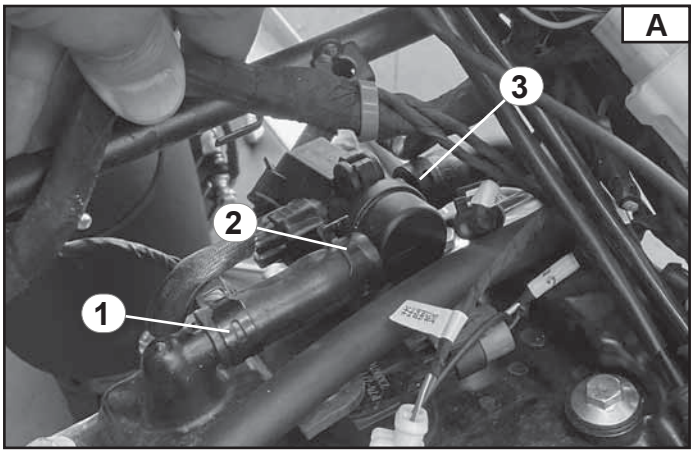
REMOVAL OF THE SECONDARY AIR VALVE

Park the motorcycle on a level surface.

NOTICE

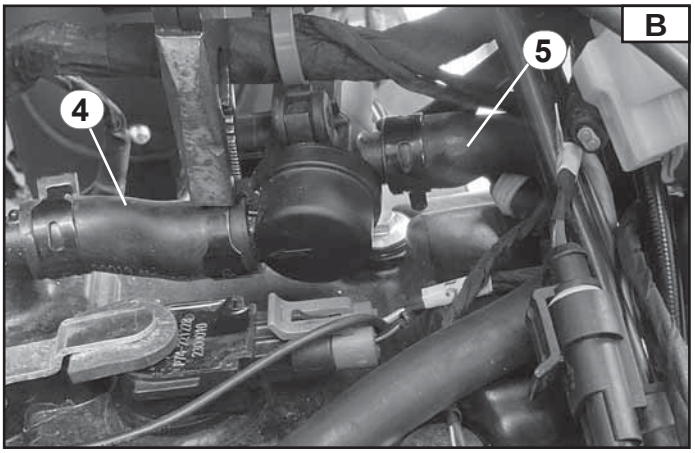
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The tank, refer to **"Removal of the fuel tank, Chapter 4".**
- The air filter box, refer to **"Removal of the air filter box, Chapter 4"**.



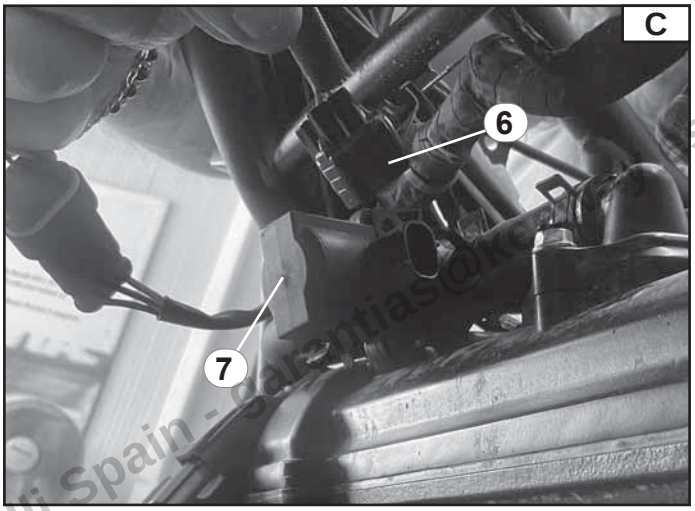
- The clamp (1) Fig. A.
- The clamp (2) Fig. A.
- The clamp (3) Fig. A.

Disconnect:
- The tube (4) Fig. B.
- The tube (5) Fig. B.



Disconnect:
- The electrical connector (6) Fig. C.

Remove:
- The valve (7) Fig. C.



EXHAUST SYSTEM

INSTALLATION OF THE SECONDARY AIR VALVE

Park the motorcycle on a level surface.

NOTICE

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

Installation:
Proceed using the opposite order to removal.

FAIRINGS

REMOVAL OF THE FRONT MUDGUARD

Park the motorcycle on a level surface.

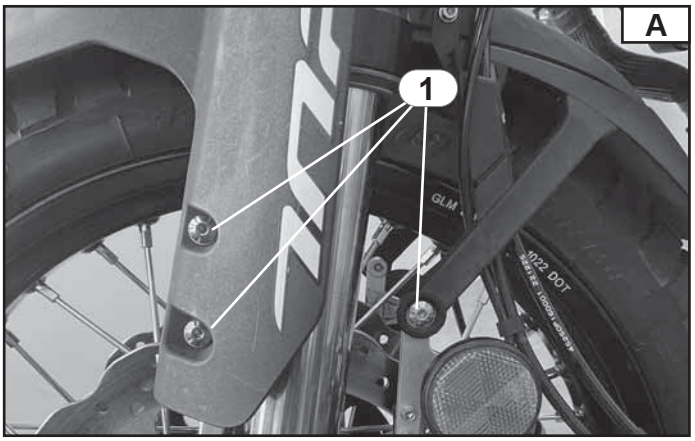
NOTICE

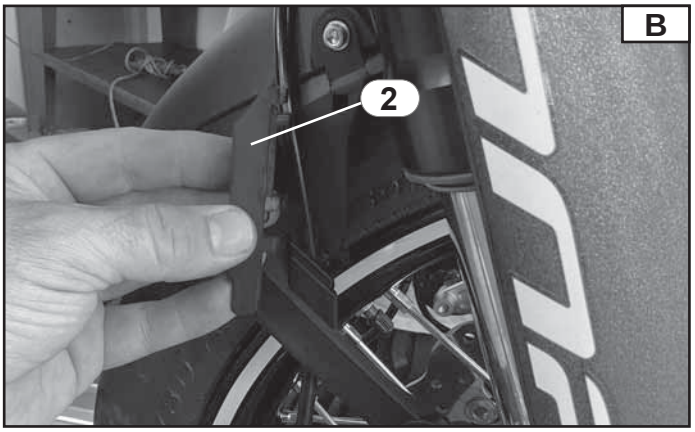
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The screws (1) Fig. A from both sides.

- The fairlead covers from the front brake hoses (2) Fig. B from both sides.
- The front mudguard (3) Fig. C.

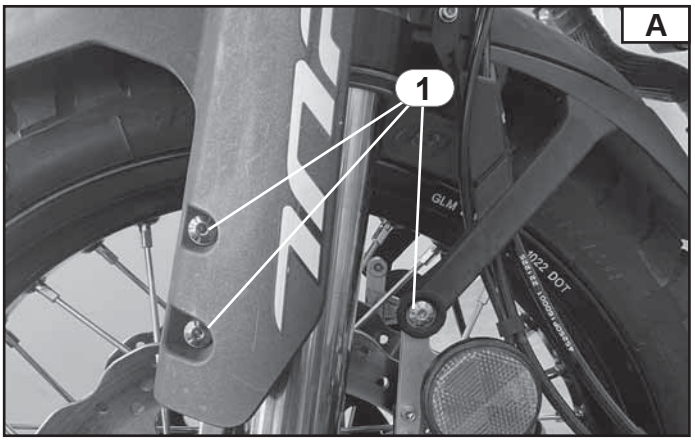




FAIRINGS

INSTALLATION OF THE FRONT MUDGUARD

Park the motorcycle on a level surface.



NOTICE

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

Installation:
Proceed using the opposite order to removal.
Tighten:
- The screws (1) from both sides Fig. A.

To the following torque:

Torque 10 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

FAIRINGS

REMOVAL OF THE REAR MUDGUARD AND TOP CHAIN GUARD

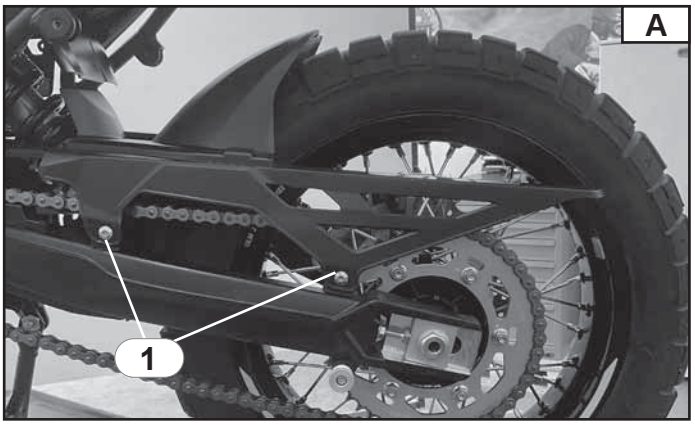
Park the motorcycle on a level surface.

NOTICE

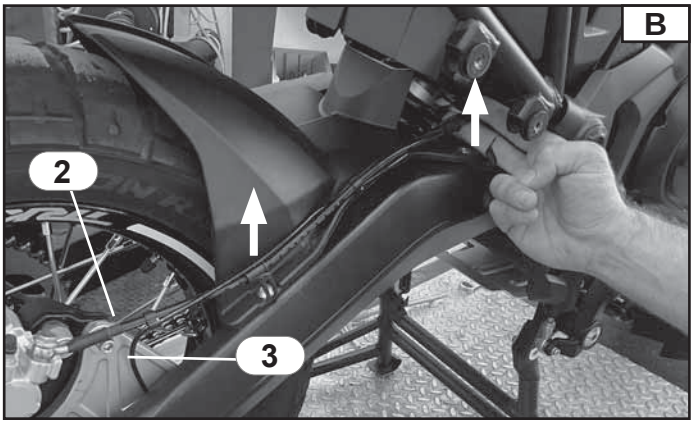
Prop the motorcycle on suitable supports so that it cannot fall.

NOTE:
The rear mud guard and the top chain guard are a single part.

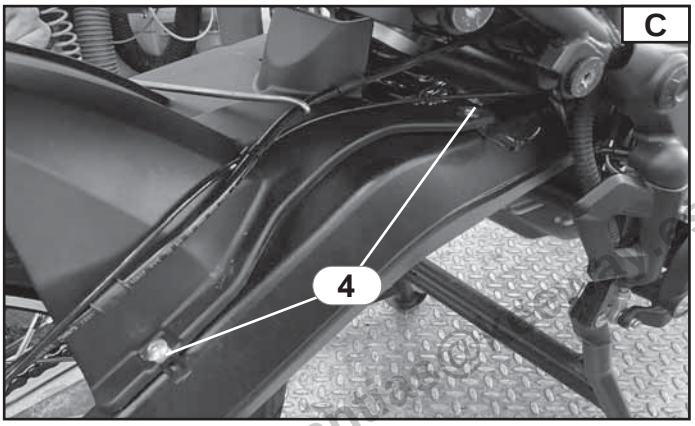
Remove:
- The screws (1) on the left side of the vehicle Fig. A.



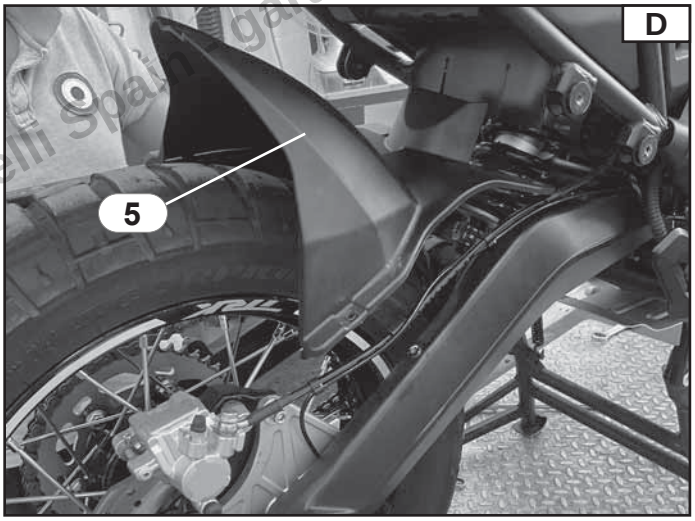
Disconnect:
- The brake hose (2) Fig. B.
- The signal wheel sensor cable (3) Fig. B.



Remove:
- The screes (4) of the right side of the vehicle Fig. C.



- The rear mud guard and the top chain guard (5) Fig. D.



FAIRINGS

INSTALLATION OF THE REAR MUDGUARD AND TOP CHAIN GUARD

Park the motorcycle on a level surface.

NOTICE

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

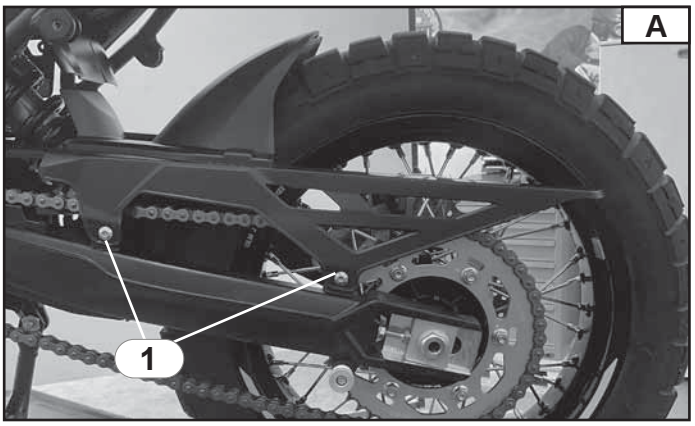
Installation:
Proceed using the opposite order to removal.
Tighten:
- The screws (1) Fig. A.

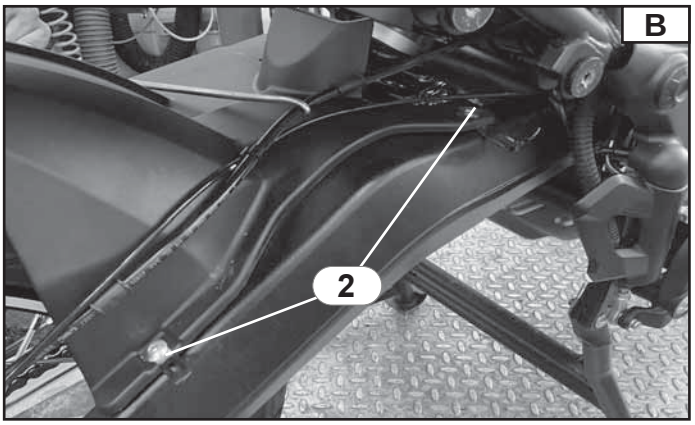
To the following torque:

Torque 8 N*m
- The screws (2) Fig. B.

To the following torque:

Torque 8 N*m





FAIRINGS

REMOVAL OF THE PASSENGER SEAT

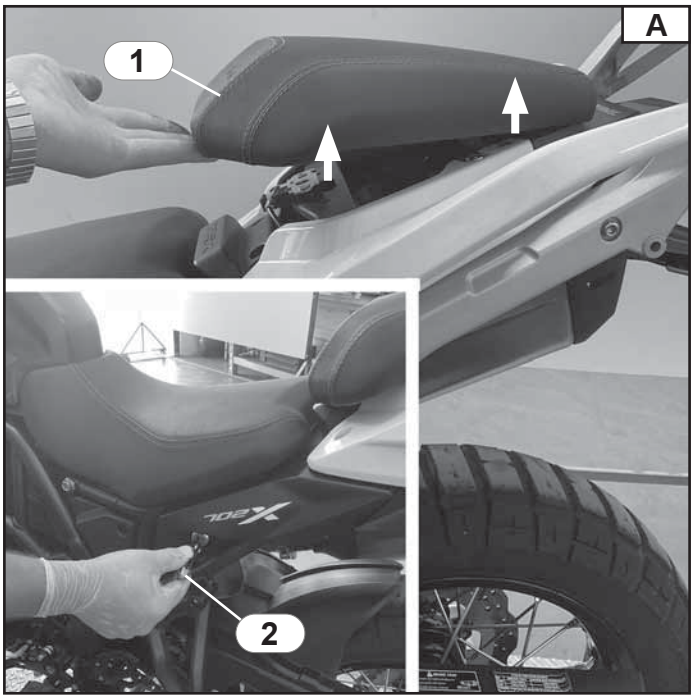
Park the motorcycle on a level surface.

NOTICE

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

Remove:

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



FAIRINGS

INSTALLATION OF THE PASSENGER SEAT

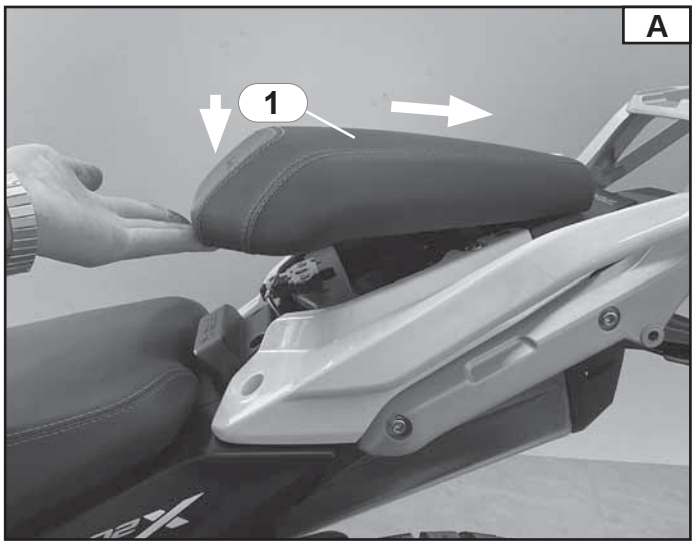
Park the motorcycle on a level surface.

NOTICE

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

Installation:
Proceed using the opposite order to removal.

Insert:
- The passenger seat (1) as shown by the arrow Fig. A.
- Push down Fig. A.



FAIRINGS

REMOVAL OF THE RIDER SEAT

Park the motorcycle on a level surface.

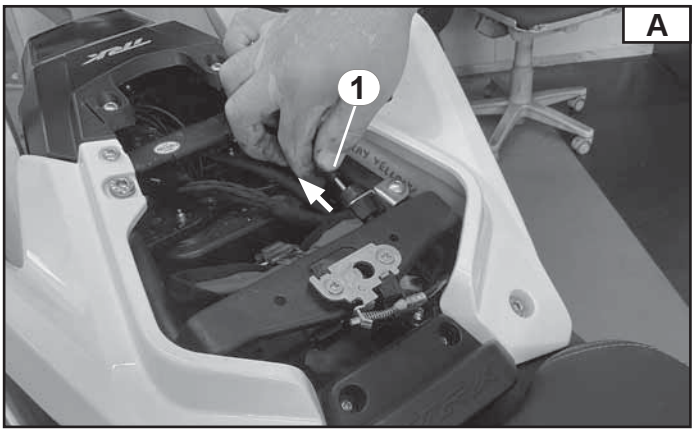
NOTICE

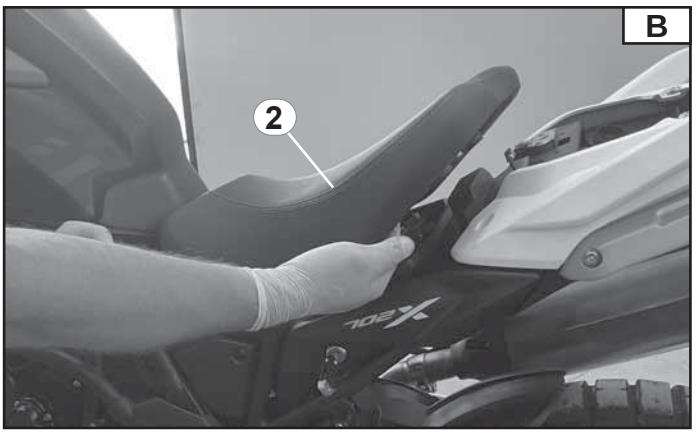
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**

- The rider seat (2) Fig. B by pulling the knob upward (1) Fig. A.





FAIRINGS

INSTALLATION OF THE RIDER SEAT

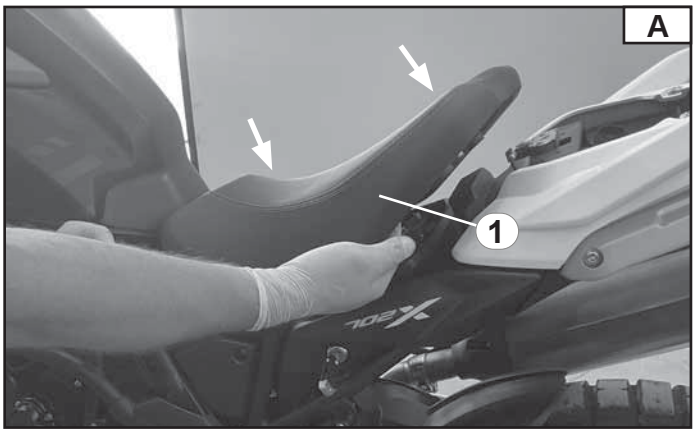
Park the motorcycle on a level surface.

NOTICE

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

Installation:
Proceed using the opposite order to removal.

Insert:
- The rider seat (1) Fig. A as shown by the arrows.



FAIRINGS

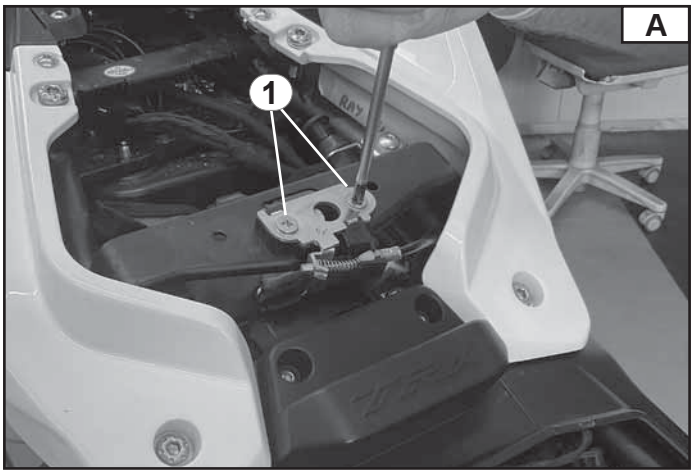
REMOVAL OF THE PASSENGER SEAT OPENING LOCK

Park the motorcycle on a level surface.

NOTICE

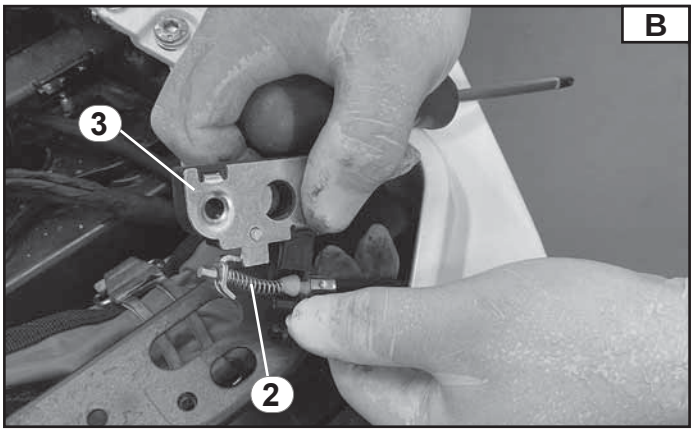
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The screws (1) Fig. A.



Disconnect:
- The lock control cable (2) Fig. B.

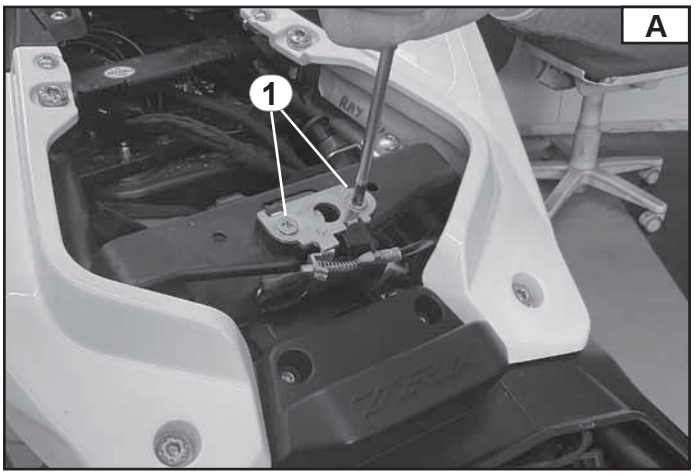
Remove:
- The lock (3) Fig. B.



FAIRINGS

INSTALLATION OF THE SEAT LEVER

Park the motorcycle on a level surface.



NOTICE

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

Installation:
Proceed using the opposite order to removal.

Tighten:
- The screws (1) Fig. A.

To the following torque:

Torque 10 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

FAIRINGS

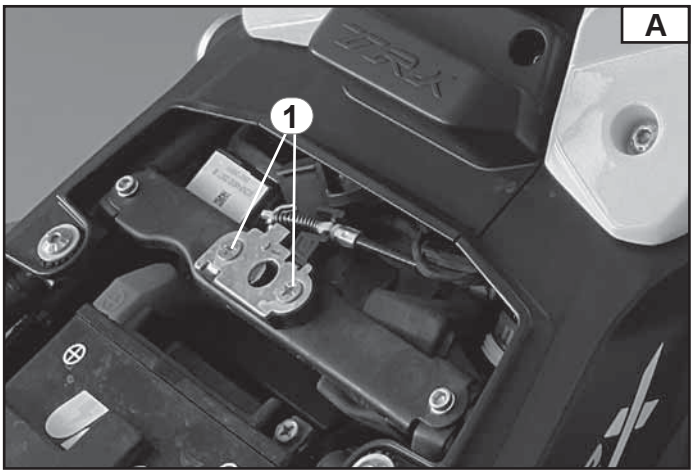
REMOVAL OF THE RIDER SEAT OPENING LOCK

Park the motorcycle on a level surface.

NOTICE

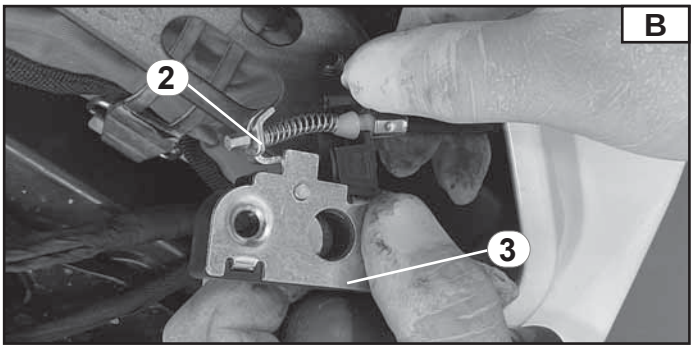
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to the section **"Removal of the rider seat, Chapter 4".**
- The screws (1) Fig. A.



Disconnect:
- The lock control cable (2) Fig. B.

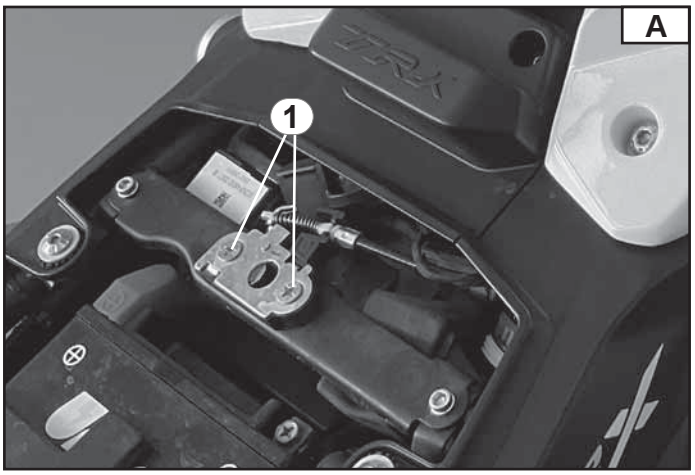
Remove:
- The lock (3) Fig. B.



FAIRINGS

INSTALLATION OF THE RIDER SEAT OPENING LOCK

Park the motorcycle on a level surface.



NOTICE

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

Installation:
Proceed using the opposite order to removal.

Tighten:
- The screws (1) Fig. A.

To the following torque:

Torque 10 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

FAIRINGS

REMOVAL OF THE PASSENGER SEAT OPENING BLOCK

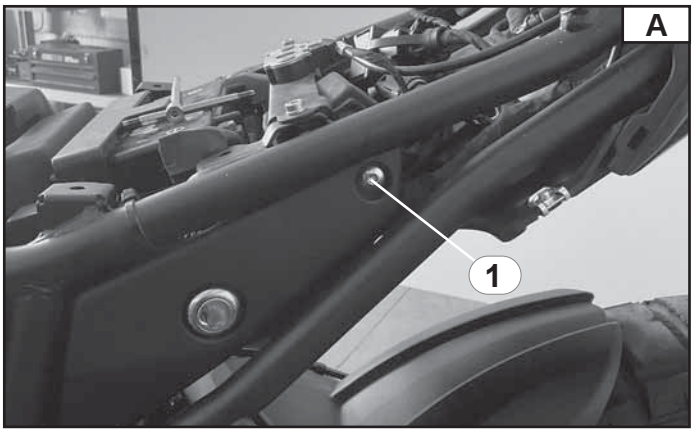
Park the motorcycle on a level surface.

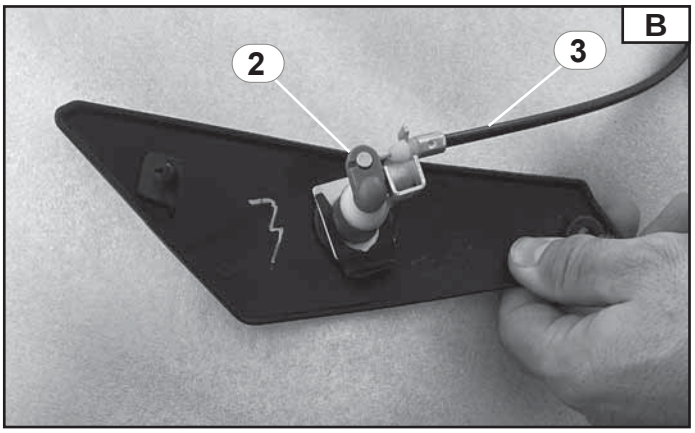
NOTICE

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

Remove:

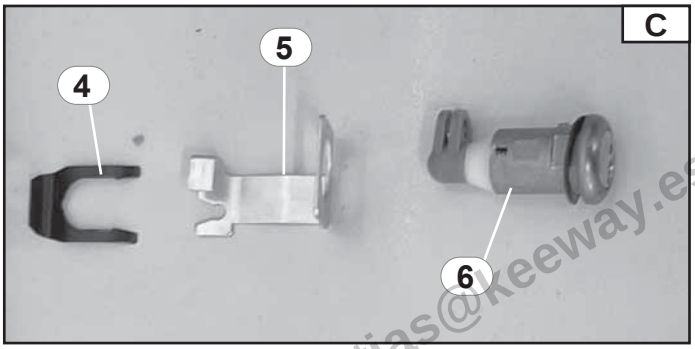
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The side fairings, see **"Removal of the side fairings, Chapter 4".**
- The screw (1) Fig. A.
- The cable (3) from the block (2) Fig. B.





Slide out:

- The elastic fork (4) Fig. C.
- The support plate (5) Fig. C.
- The lock block (6) Fig. C.



FAIRINGS

INSTALLATION OF THE PASSENGER SEAT OPENING BLOCK

Park the motorcycle on a level surface.

NOTICE

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

Installation:
Proceed using the opposite order to removal.

FAIRINGS

REMOVAL OF THE PASSENGER HANDLES

Park the motorcycle on a level surface.

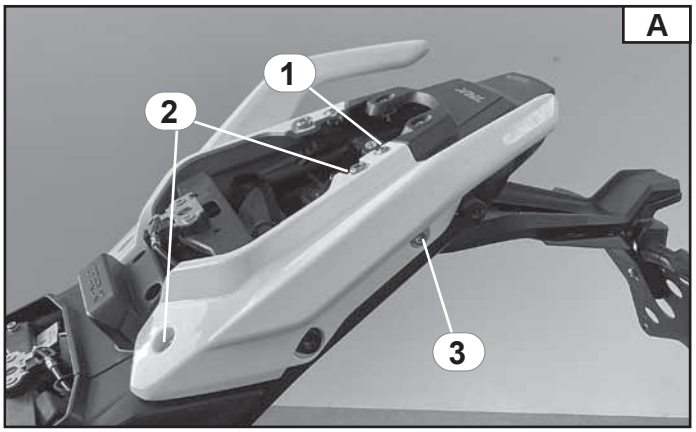
NOTICE

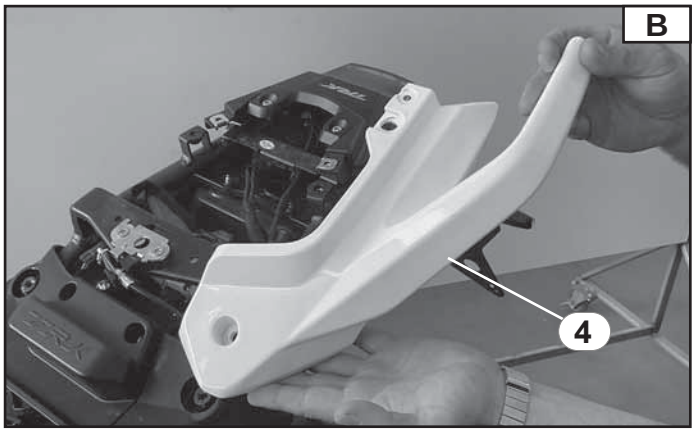
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The rack, refer to **"Removal of the rack, Chapter 4".**
- The screw (1) Fig. A.
- The screws (2) Fig. A.
- The screw (3) Fig. A.
- The left handle (4) Fig. B.

NOTE:
Carry out the following operation for the right passenger handle.

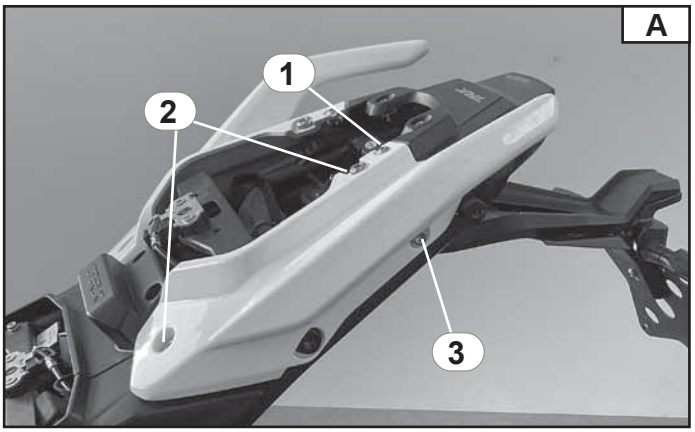




FAIRINGS

INSTALLATION OF THE PASSENGER HANDLES

Park the motorcycle on a level surface.



NOTICE

Prop the motorcycle 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 10 N*m

- The screws (2) Fig. A.

To the following torque:

Torque 22 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

- The screw (3) Fig. A.

To the following torque:

Torque 22 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

NOTE:
Carry out the following operation for the right passenger handle.

FAIRINGS

REMOVAL OF THE RACK

Park the motorcycle on a level surface.

NOTICE

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

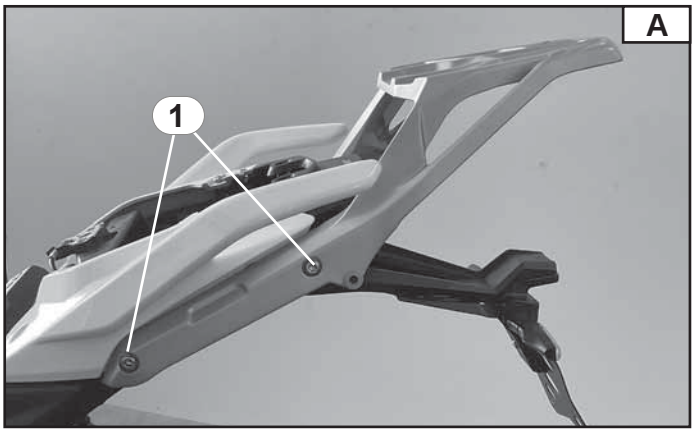
Remove:

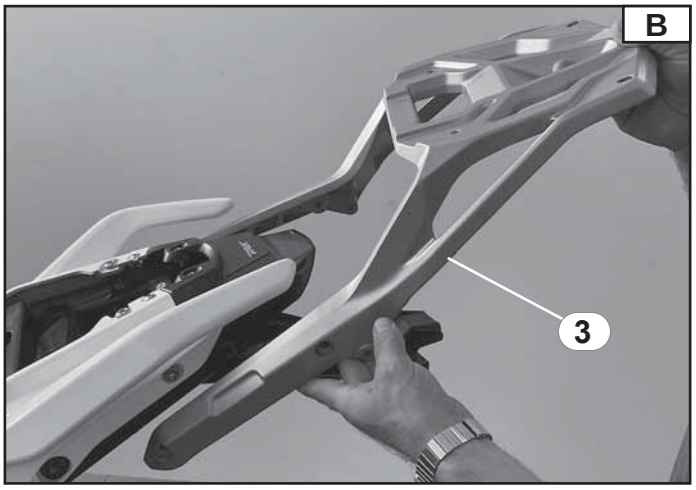
- The screws (1) Fig. A.

NOTE:

Carry out the following operation for the right side.

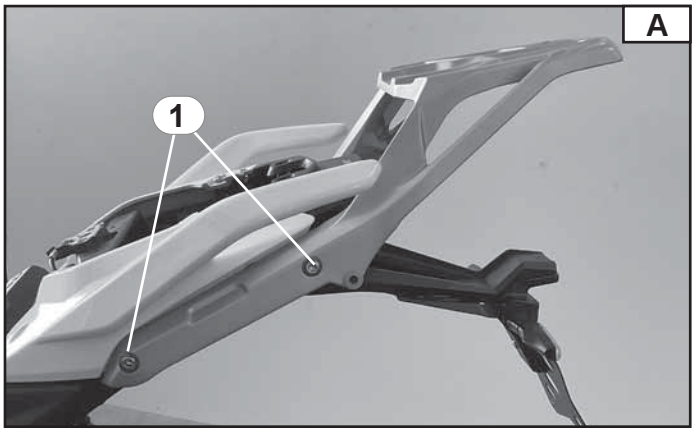
- The rack (3) Fig. B.





FAIRINGS
INSTALLATION OF THE RACK

Park the motorcycle on a level surface.



NOTICE

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

Installation:
Proceed using the opposite order to removal.

Tighten:
- The screws (1) on both sides Fig. A.

To the following torque:

Torque 22 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

NOTE:
Carry out the following operation for tightening the screws on the right side.

FAIRINGS

REMOVAL OF THE SIDE TAILPIECES FAIRINGS

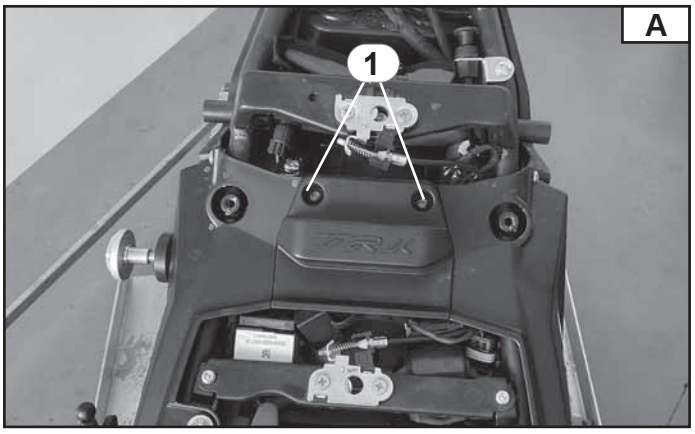
Park the motorcycle on a level surface.

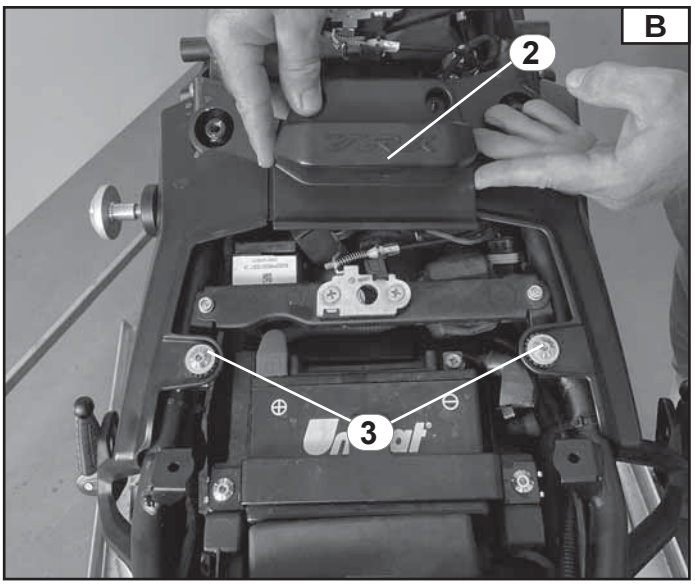
NOTICE

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

Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The rack, refer to **"Removal of the rack, Chapter 4".**
- The passenger handles, refer to **"Removal of the passenger handles, Chapter 4".**
- The screws (1) Fig. A.
- The central tailpiece (2) Fig. B.
- The screws (3) Fig. B.



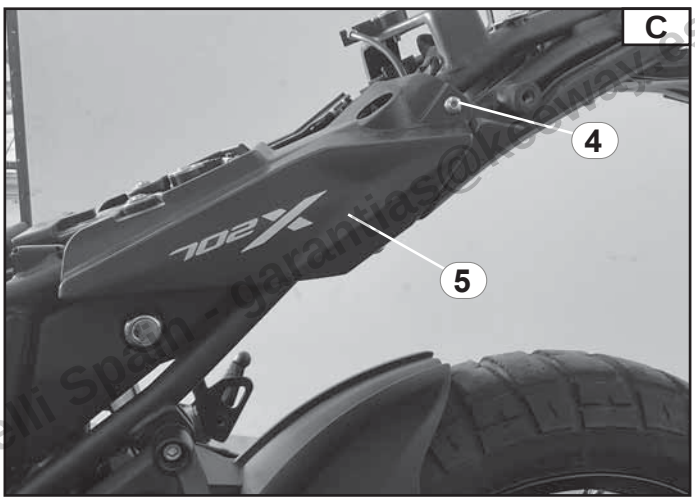


Remove:

- The screw (4) Fig. C on both sides.
- The left lower side (5) Fig. C

NOTE:

Carry out the following operation for the right side.



FAIRINGS

INSTALLATION OF THE SIDE TAILPIECE FAIRINGS

Park the motorcycle on a level surface.

NOTICE

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

Installation:
Proceed using the opposite order to removal.

FAIRINGS

REMOVAL OF THE UPPER FAIRING

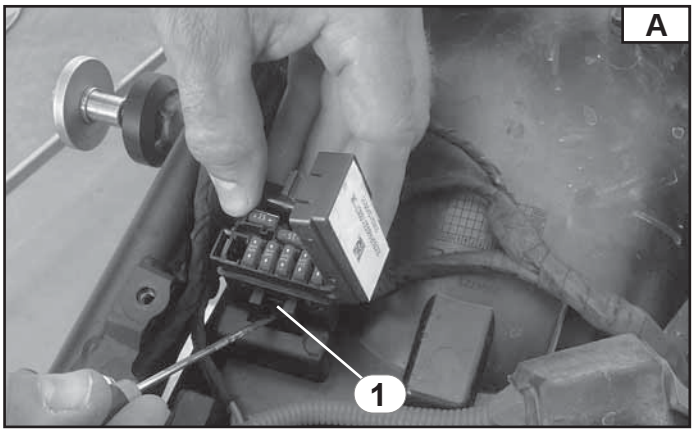
Park the motorcycle on a level surface.

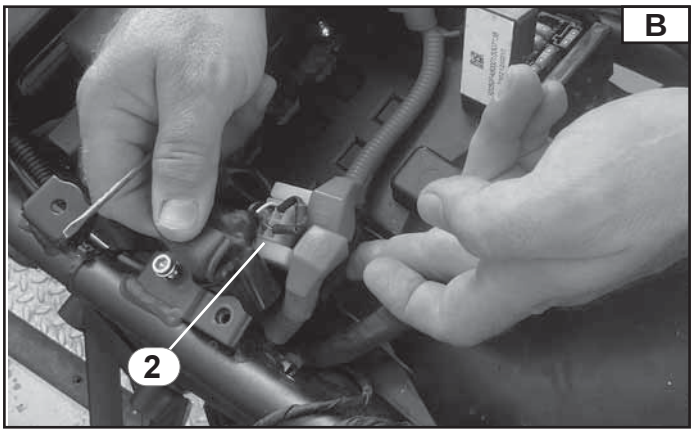
NOTICE

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

Remove:

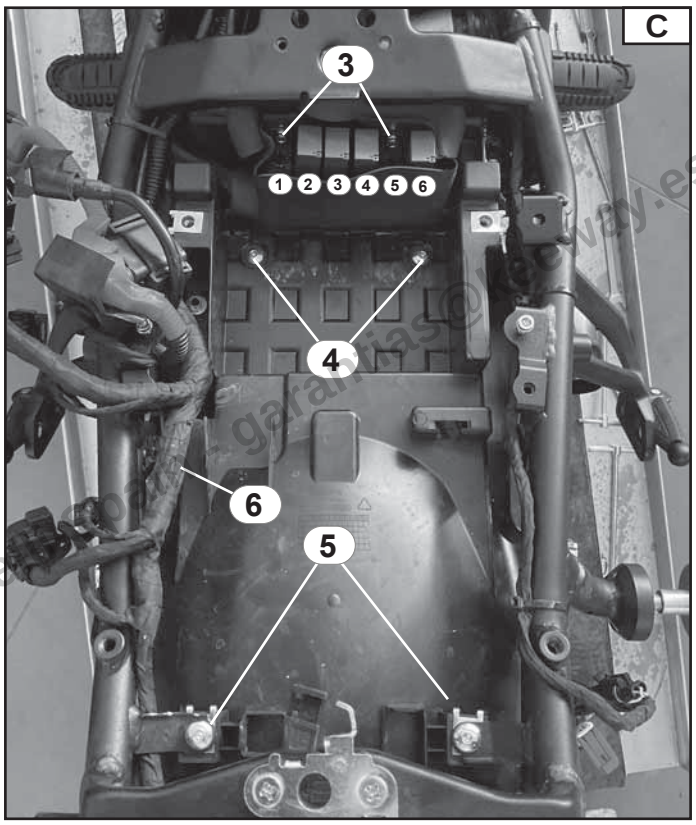
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The rack, refer to **"Removal of the rack, Chapter 4".**
- The passenger handles, refer to **"Removal of the passenger handles, Chapter 4".**
- The side fairings, refer to **"Removal of the side fairings, Chapter 4".**
- The battery, see **"Check and charge of the battery, Chapter 3"**.
- The fuse box (1) Fig. A.
- The starting remote control switch group (2) Fig. B.





Remove:

- The relays # 1 and # 5. C.
- The screws (3) Fig. C.
- The screws (4) Fig. C.
- The screws (5) Fig. C.
- Release the electrical wiring (6) Fig. C.

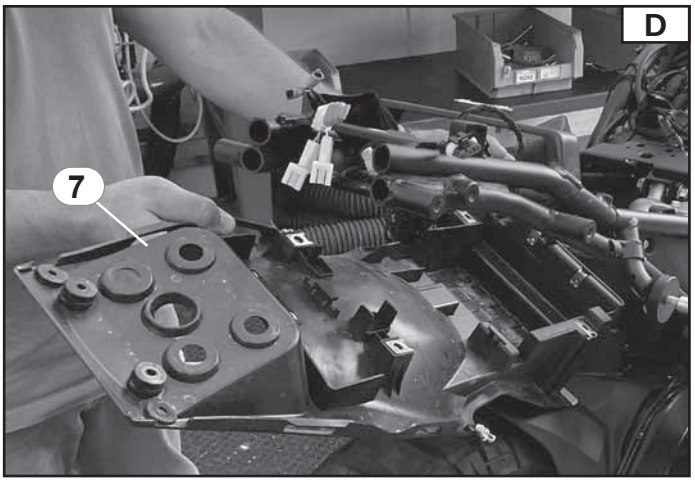


FAIRINGS

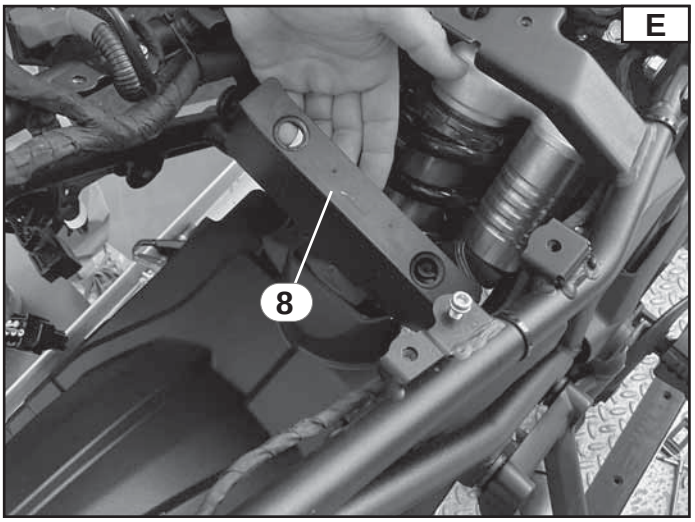
REMOVAL OF THE UPPER FAIRING

Remove:

- The upper fairing (7) Fig. D.



- Il sprayguard (8) Fig. E.



FAIRINGS

INSTALLATION OF THE UPPER FAIRING

Park the motorcycle on a level surface.

NOTICE

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

Installation:
Proceed using the opposite order to removal.

FAIRINGS

REMOVAL OF THE CHAIN PINION COVER

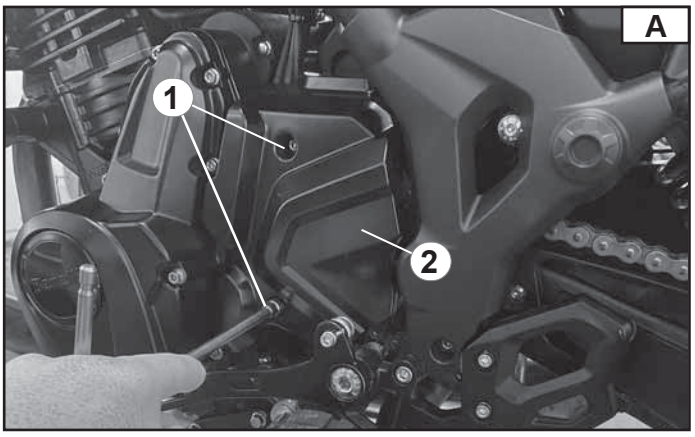
Park the motorcycle on a level surface.

NOTICE

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

Remove:

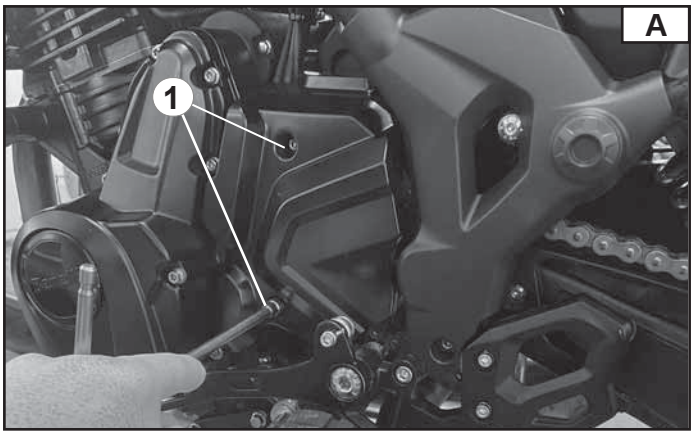
- The screws (1) Fig. A.
- The chain pinion cover (2) Fig. A.



FAIRINGS

INSTALLATION OF THE CHAIN PINION COVER

Park the motorcycle on a level surface.



NOTICE

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

Installation:
Proceed using the opposite order to removal.
Tighten:
- The screws (1) Fig. A.

To the following torque:

Torque 10 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

FUEL TANK

REMOVAL OF THE FUEL TANK

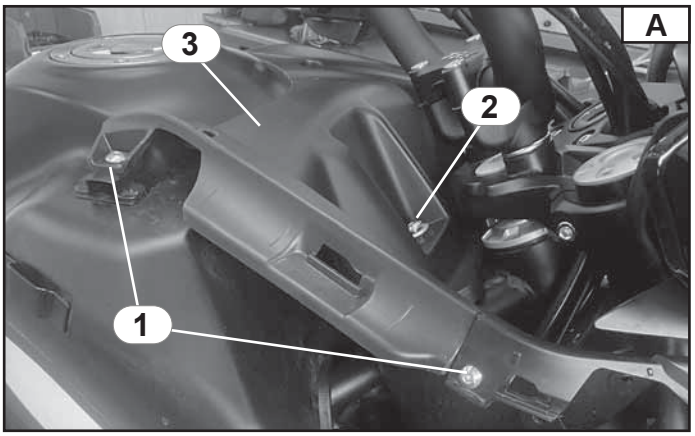
Park the motorcycle on a level surface.

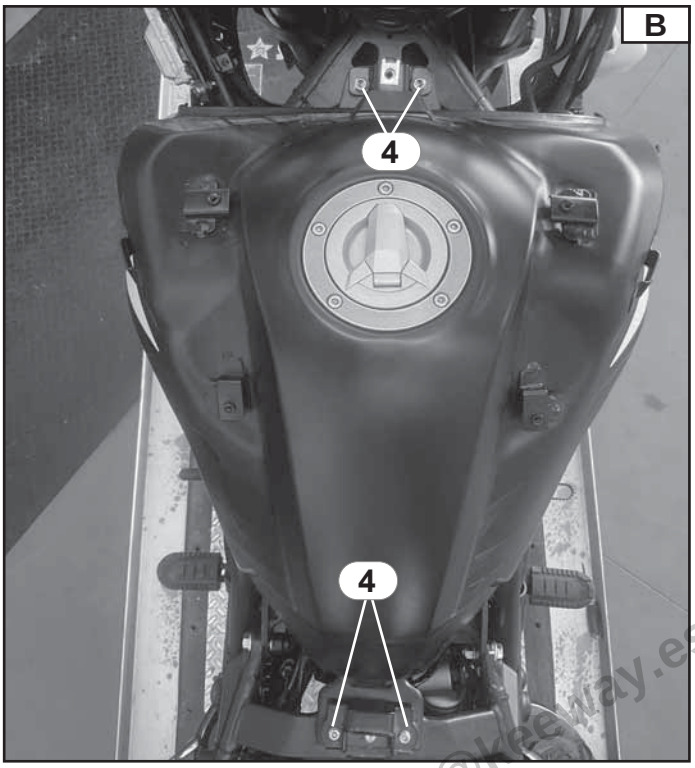
NOTICE

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

Remove:

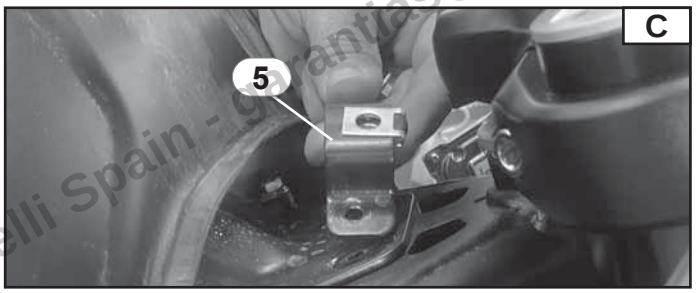
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The side fairings, refer to **"Replacement of the front turn signal lights, Chapter 3"**.
- The RH/LH screws (1) Fig. A.
- The central screw (2) Fig. A.
- The central covering (3) Fig. A.
- The screws (4) Fig. B.

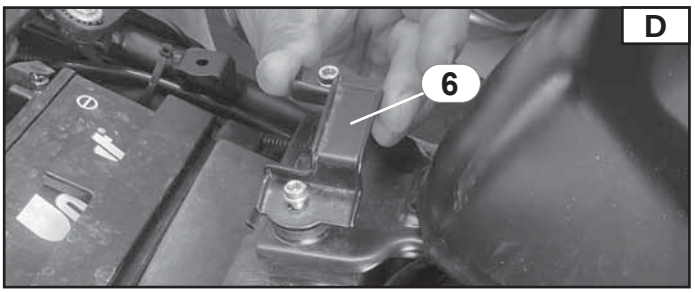




Remove:

- The upper bracket (5) Fig. C.
- The lower bracket (6) Fig. D.

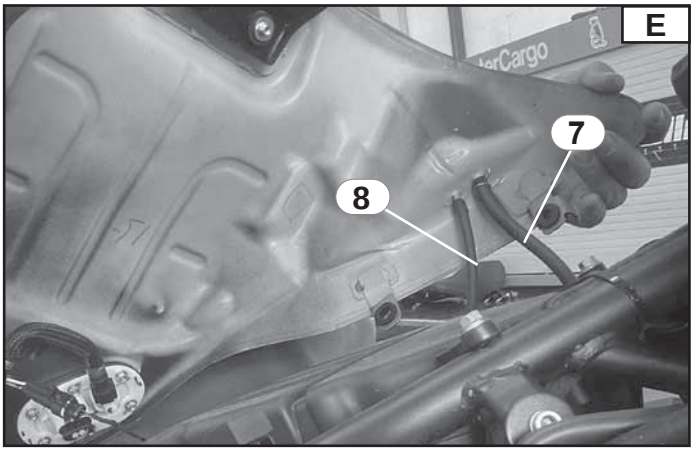




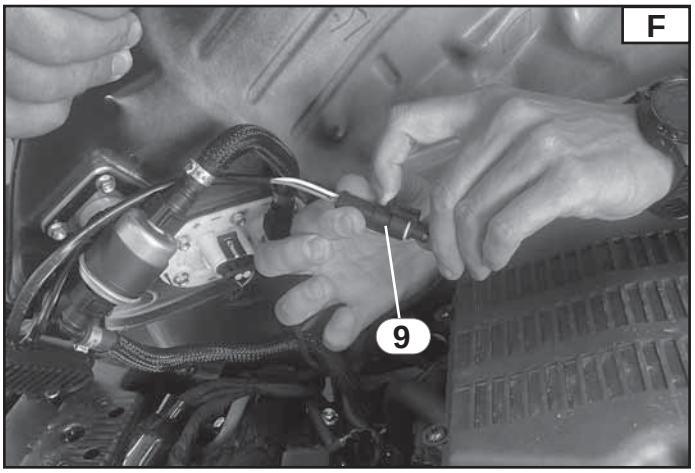
FUEL TANK

REMOVAL OF THE FUEL TANK

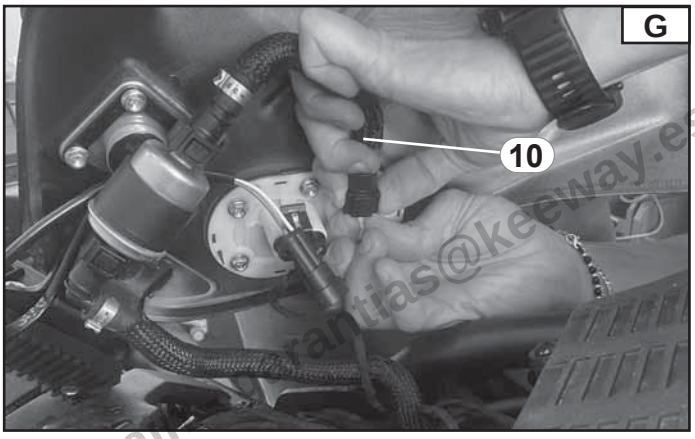
Disconnect:
- The vapor tube (7) Fig. E.
- The breather hose (8) Fig. E.



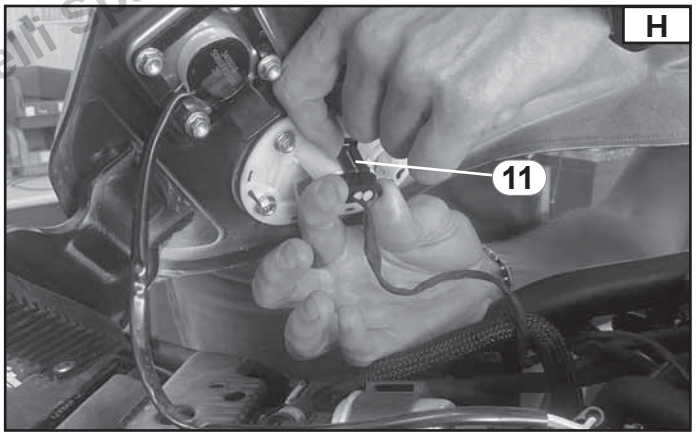
Disconnect:
- The connector of the fuel level sensor (9) Fig. F.



- The fuel pipes (10) Fig. G.



- The fuel pump supply connector (11) Fig. H.



FUEL TANK

INSTALLATION OF THE FUEL TANK

Park the motorcycle on a level surface.

NOTICE

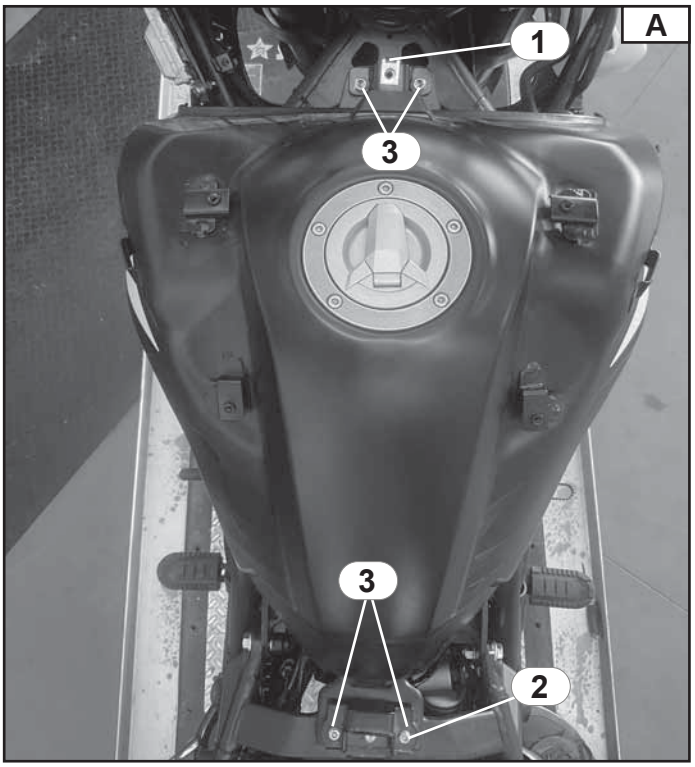
Prop the motorcycle on suitable supports so that it cannot fall.

Installation:
Proceed using the opposite order to removal.
Install:
- The upper bracket (1) Fig. A.
- The lower bracket (2) Fig. A.

Tighten:
- The screws (3) on both brackets Fig. A.

To the following torque:

Torque 10 N*m



FUEL TANK

REMOVAL OF THE FUEL TANK CAP

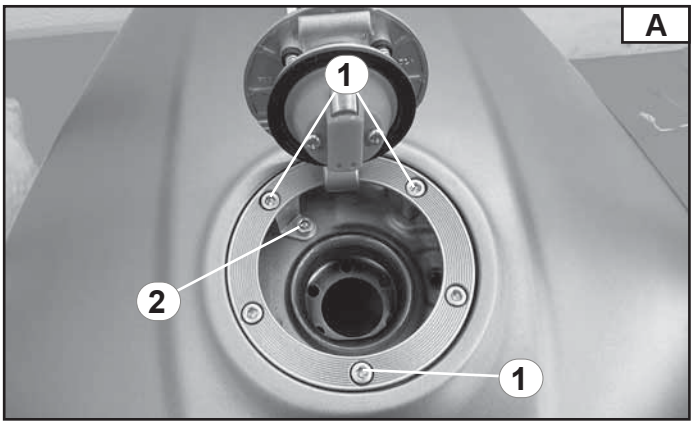
Park the motorcycle on a level surface.

NOTICE

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

Remove:

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



FUEL TANK

INSTALLATION O THE FUEL TANK CAP

Park the motorcycle on a level surface.

NOTICE

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

Installation:
Proceed using the opposite order to removal.

FUEL TANK

REMOVAL OF THE FUEL PUMP

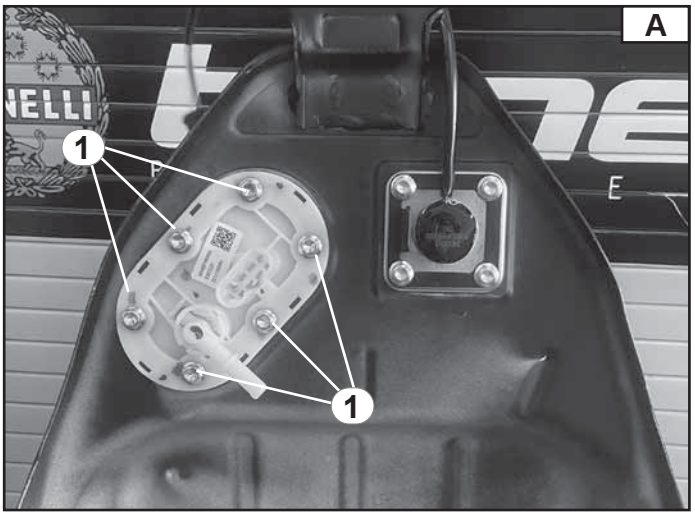
Park the motorcycle on a level surface.

NOTICE

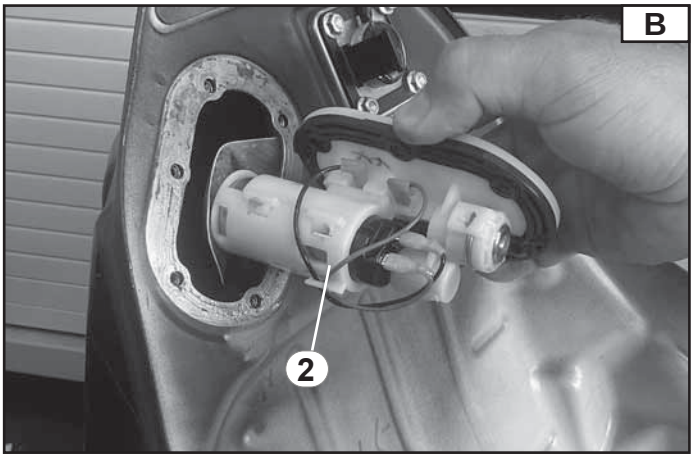
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The fuel tank, see **"Removal of the fuel tank, Chapter 4".**
- The screws (1) Fig. A.



- The fuel pump (2) Fig. B.



FUEL TANK
INSTALLATION OF THE FUEL PUMP

Park the motorcycle on a level surface.

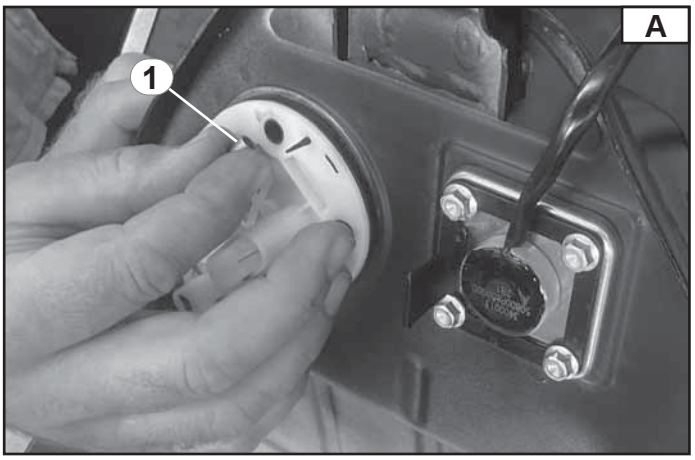
NOTICE

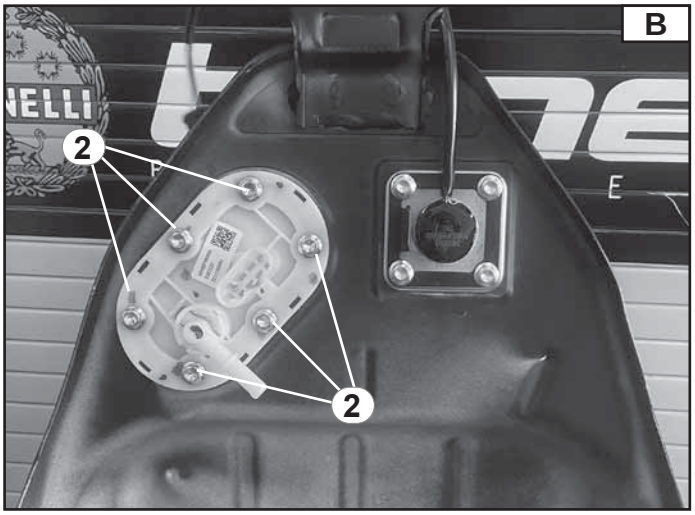
Prop the motorcycle on suitable supports so that it cannot fall.

Installation:
Proceed using the opposite order to removal.
NOTE:
When assembling the pump, insert the bushes (1) into the housing holes of the screws, as shown on Fig. A.
Tighten:
- The screws (2) Fig. B.

To the following torque:

Torque 10 N*m





FUEL TANK

REMOVAL OF THE FUEL LEVEL SENSOR

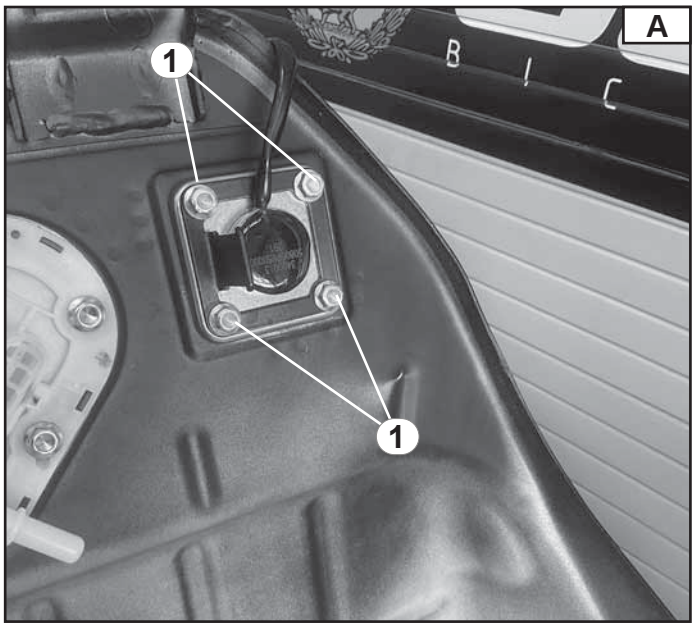
Park the motorcycle on a level surface.

NOTICE

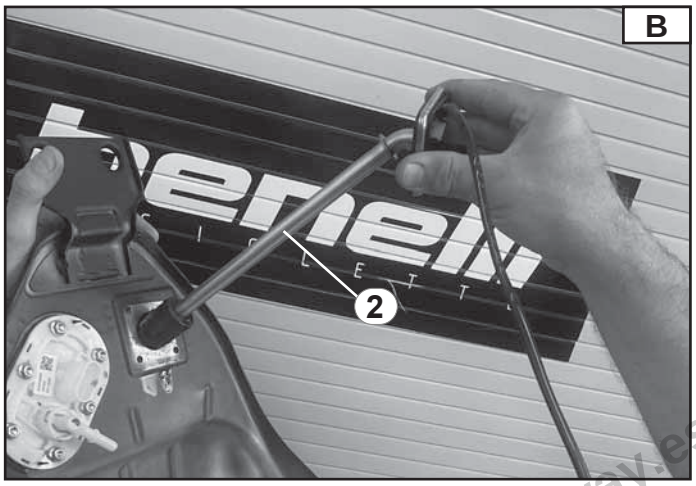
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The fuel tank, see **"Removal of the fuel tank, Chapter 4".**
- The screws (1) Fig. A.



- The fuel level sensor (2) Fig. B.



FUEL TANK

INSTALLATION OF THE FUEL LEVEL SENSOR

Park the motorcycle on a level surface.

NOTICE

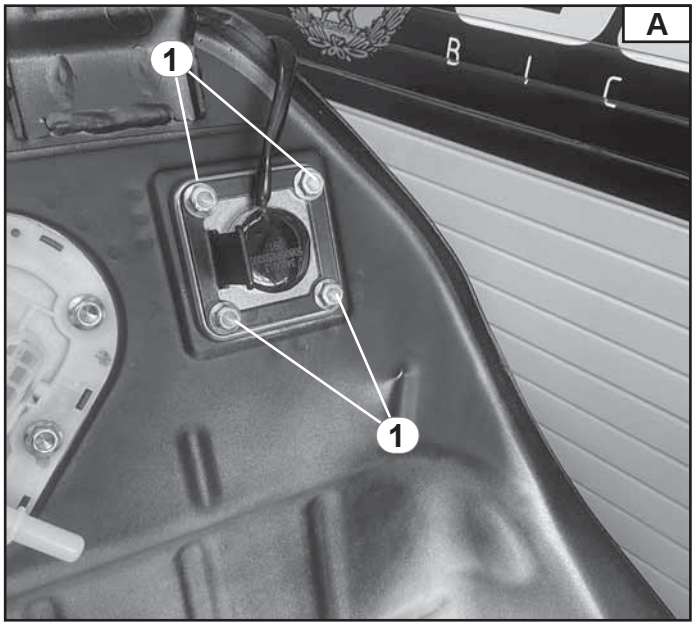
Prop the motorcycle on suitable supports so that it cannot fall.

Installation:
Proceed using the opposite order to removal.

Tighten:
- The screws (1) of the level sensor Fig. A.

To the following torque:

Torque 8 N*m



AIR FILTER

REMOVAL OF THE AIR-BOX

Park the motorcycle on a level surface.

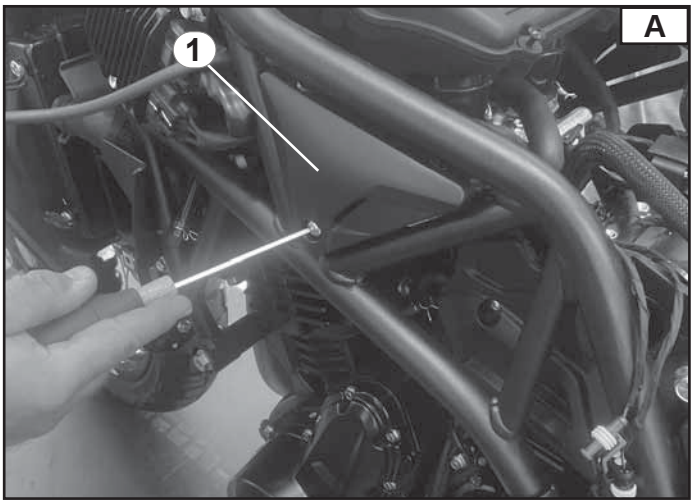
NOTICE

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

Remove:

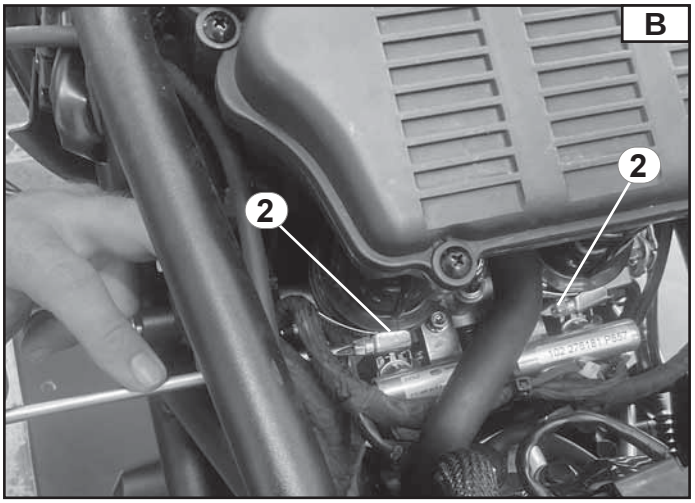
- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The fuel tank, refer to **"Removal of the fuel tank, Chapter 4.".**
- The left side cover (1) Fig. A.

NOTE:
Remove also the RH cover.



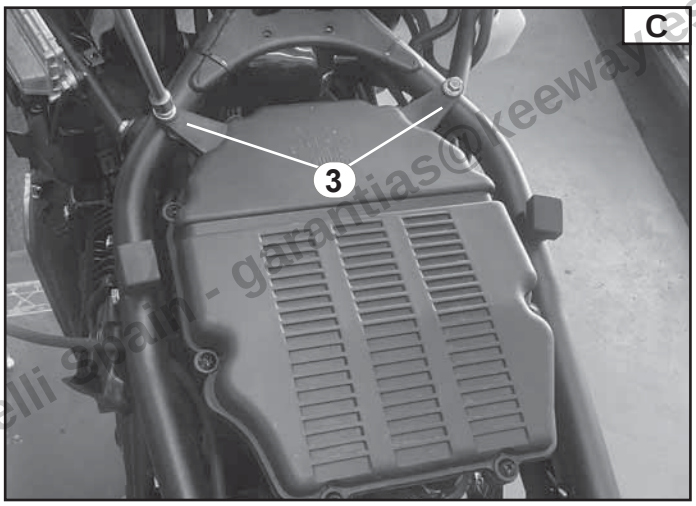
Loosen:

- The clamps (2) Fig. B.



Remove:

- The fastening screws (3) of the frame Fig. C.

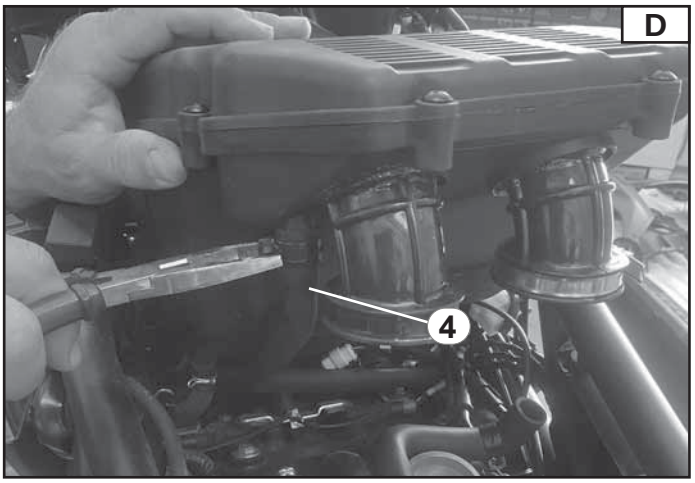


AIR FILTER

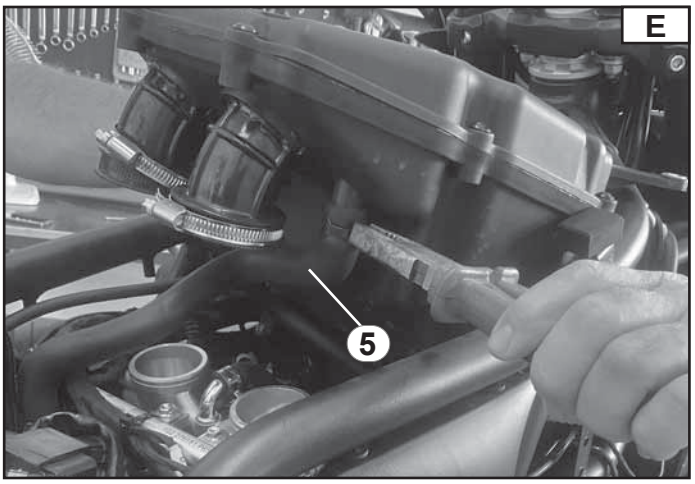
REMOVAL OF THE AIR-BOX

Disconnect:

- The secondary air tube (4) Fig. D.

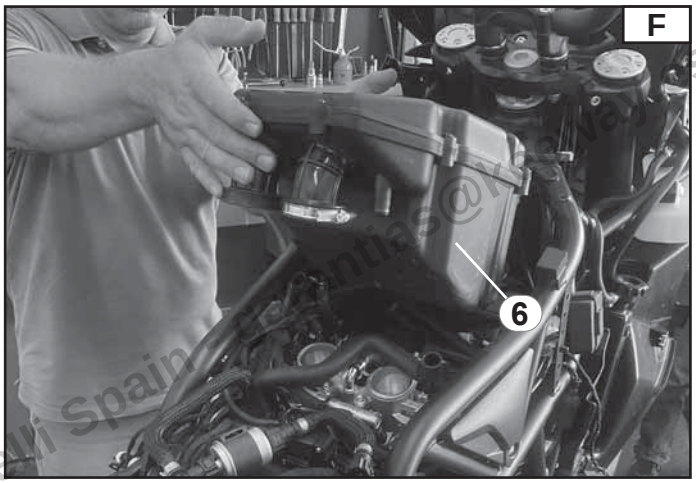


- The Blow-by vapor tube (5) Fig. E.



Remove:

- The air-box (6) Fig. F.



AIR FILTER

INSTALLATION OF THE AIR-BOX

Park the motorcycle on a level surface.

NOTICE

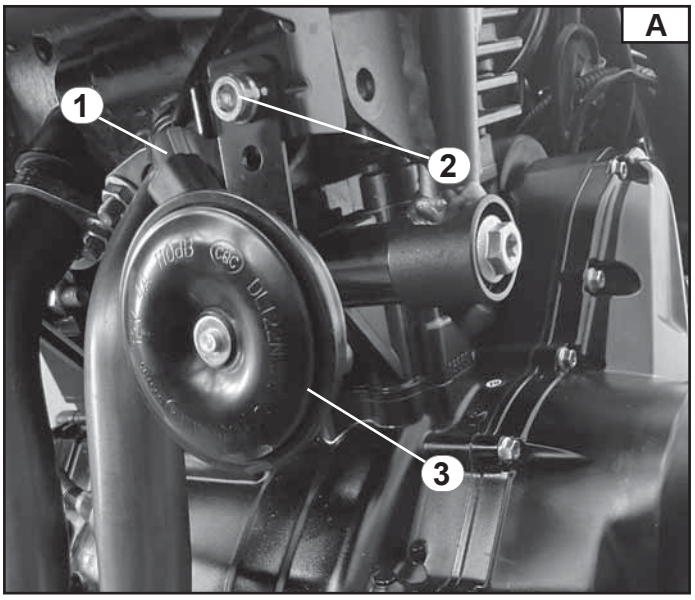
Prop the motorcycle on suitable supports so that it cannot fall.

Installation:
Proceed using the opposite order to removal.

HORN

REMOVAL OF THE HORN

Park the motorcycle on a level surface.



NOTICE

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

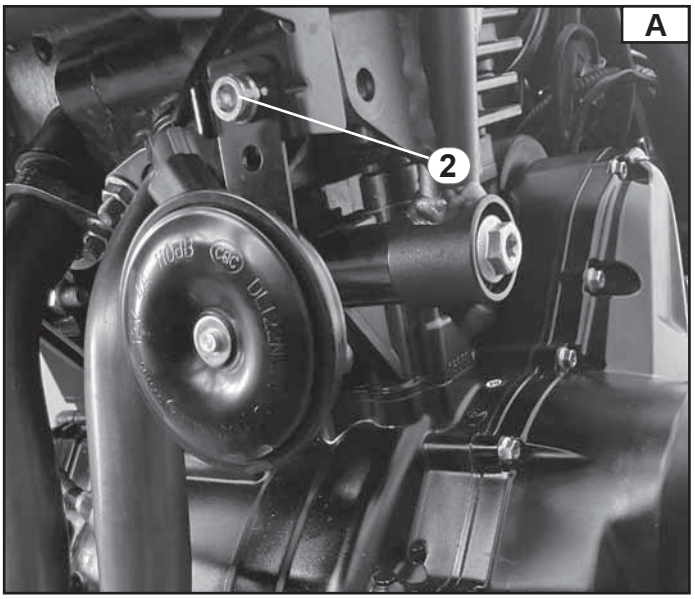
Disconnect:
- The connector (1) Fig. A.

Remove:
- The screw (2) Fig. A.
- The horn (3) Fig. A.

HORN

INSTALLATION OF THE HORN

Park the motorcycle on a level surface.



NOTICE

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

Installation:
Proceed using the opposite order to removal.

Tighten:
- The screw (2) Fig. A.

To the following torque:

Torque 22 N*m

Remarks

ENG.

5

CHAPTER 5

ENGINE

CHAPTER 5

Remarks

ENGINE

REMOVAL OF THE ENGINE FROM THE FRAME

NOTICE

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

- Prop the rear side of the swingarm with a stand.

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 **"Change of the engine oil, Chapter 3".**

Remove:
- The seat, refer to **"Removal of the rider seat, Chapter 4".**

Disconnect:
- The battery, refer to **"Check and charge of the battery, Chapter 3".**

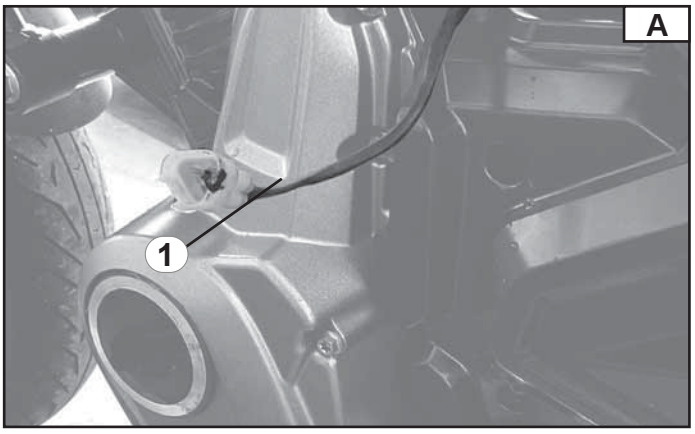
Remove:
- The fuel tank, refer to **"Removal of the fuel tank, Chapter 4".**
- The air-box, refer to **"Removal of the air-box, Chapter 4".**
- The throttle body, refer to **"Removal of the throttle body, Chapter 5".**
- The sprocket cover, refer to **"Removal of the sprocket cover, Chapter 5".**
- The sprocket, refer to " **Removal of the driving gear, Chapter 5".**
- The exhaust system, refer to **"Removal of the exhaust system, Chapter 5**".

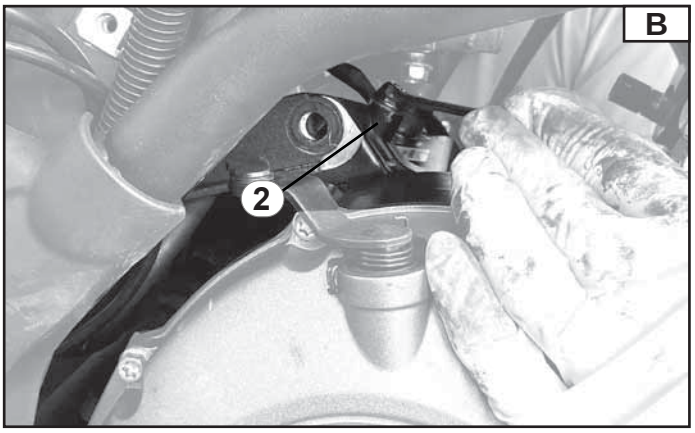
Disconnect:
- The gearbox position sensor (1) Fig. A.
- The starter cable (2) Fig. B.

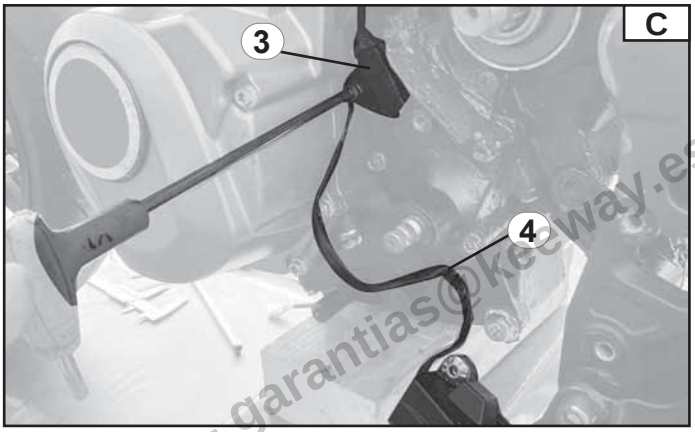
Remove:
- The gearbox position sensor (3) Fig. C.
- The stand sensor cable (4) Fig. C.

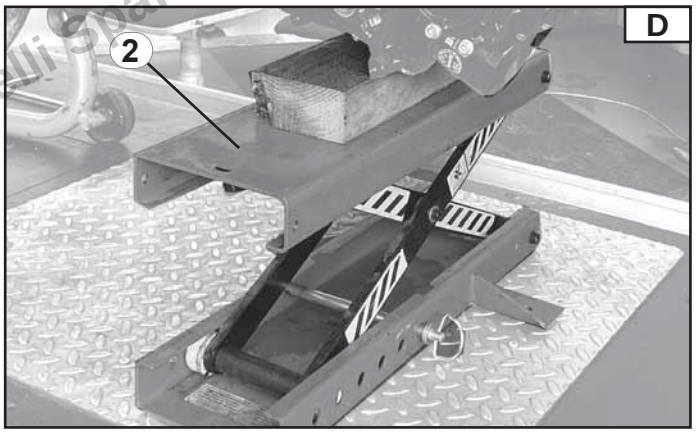
Place:
- The engine holder (2) Fig. D.

Remove:
- The clutch cable, refer to **"Removal of the clutch cable, Chapter 4"**.
- The radiator, refer to **"Removal of the radiator, Chapter 6".**
- The coils, refer to **"Removal of the coils and spark plugs, Chapter 5".**







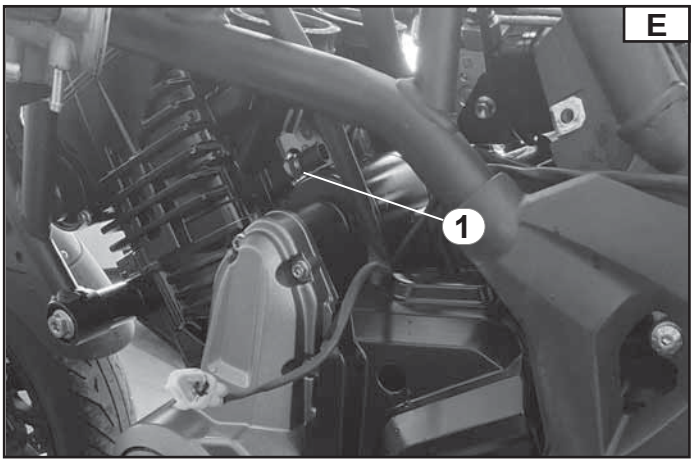


ENGINE

REMOVAL OF THE ENGINE FROM THE FRAME

Disconnect:

- The coolant temperature sensor (1) Fig. E.

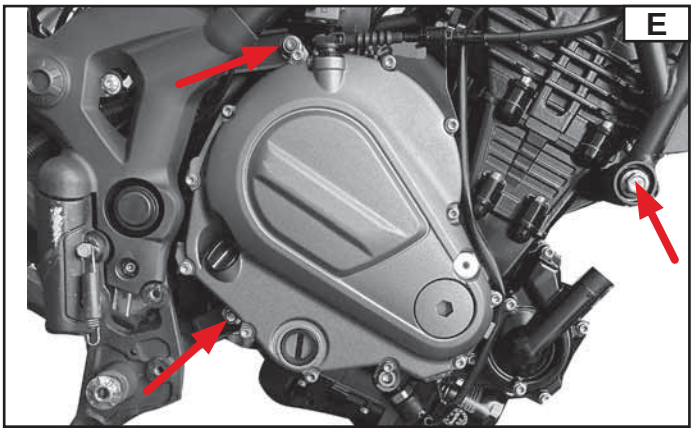


- The secondary air valve, refer to **"Removal of the secondary air valve, Chapter 4".**

ENGINE

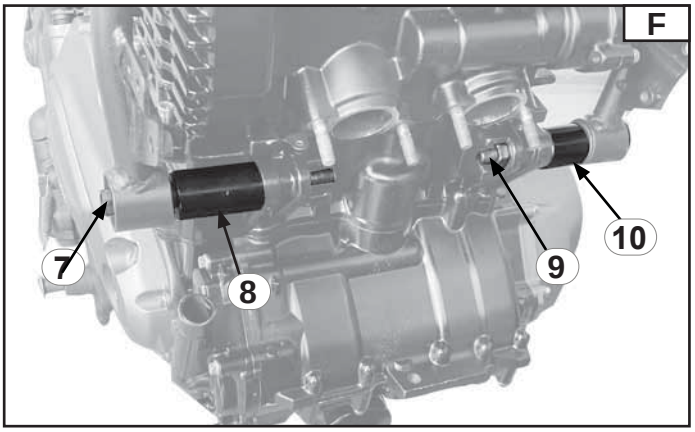
REMOVAL OF THE ENGINE FROM THE FRAME

- The fixing screws shown by the arrows Fig. E.



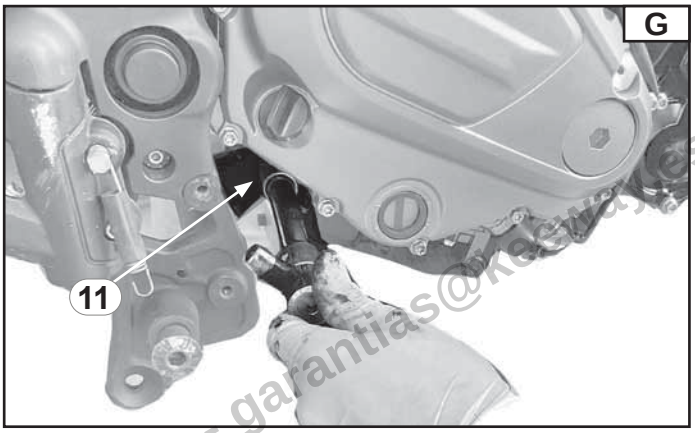
Remove:

- The fixing screw (7) on the right side of the vehicle and the related spacer (8) (L=43 mm) (1.692 in) Fig. F.
- The fixing screw (9) on the left side of the vehicle and the related spacer (10) (L=30 mm) (1.181 in) Fig. F.

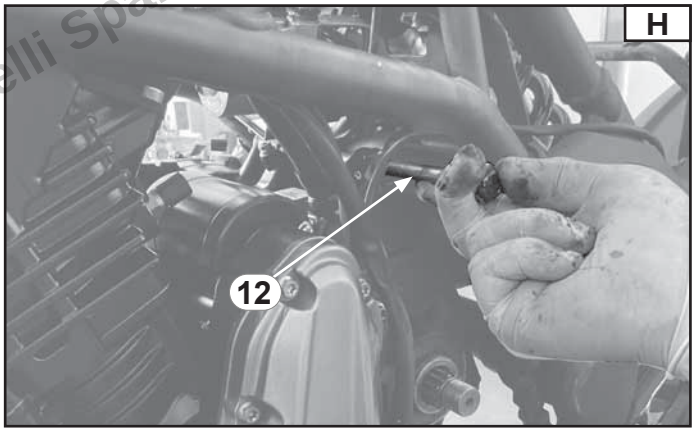


NOTE:
The spacers are different from one another.

- The rear screw (11) Fig. G on the left/right side of the vehicle.



- The upper screw (12) Fig. H of the left side of the vehicle.

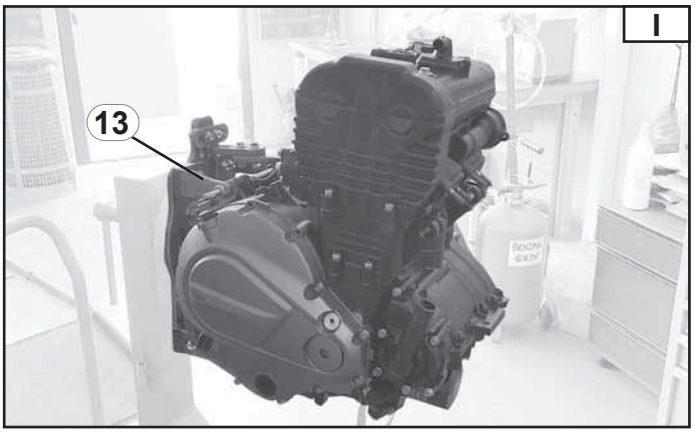


ENGINE

REMOVAL OF THE ENGINE FROM THE FRAME

Slide out:

- The engine (13) from the frame Fig. I.



ENGINE
INSTALLATION OF THE ENGINE ON THE FRAME

NOTICE

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

Installation:
Proceed using the opposite order to removal.

Tighten:
- The screws (7) and (9) Fig. A to the following torque:

Torque 45-50 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

- The screw (11) 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.

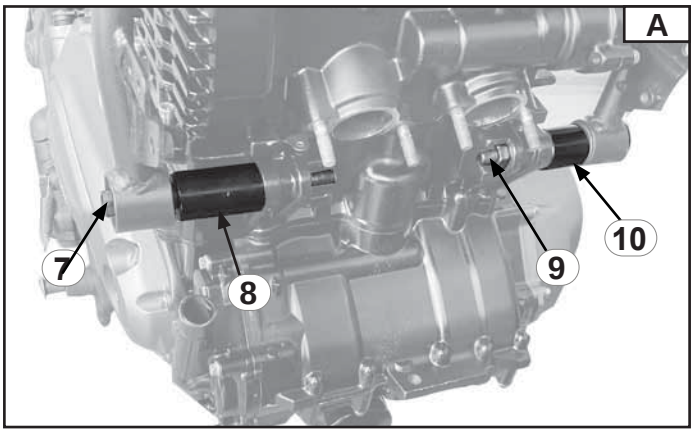
	MEDIUM THREAD LOCKER

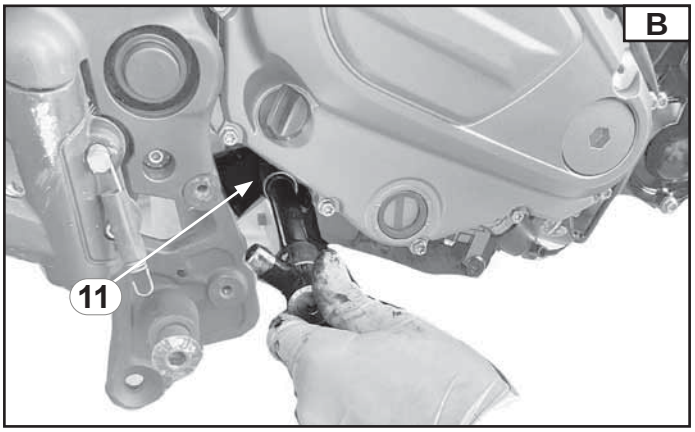
- The screw (12) on the left side of the vehicle Fig. C to the following torque:

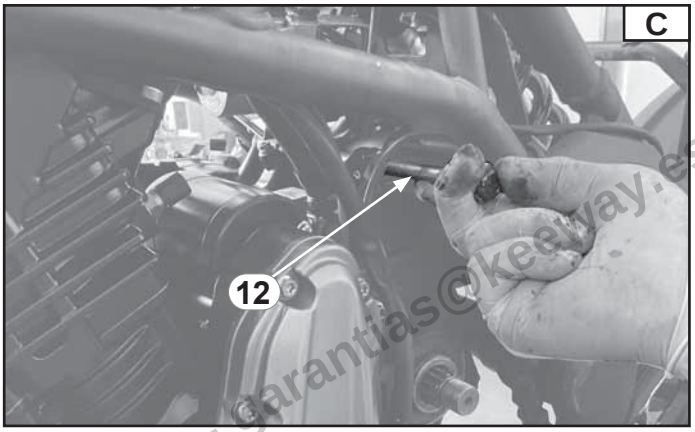
Torque 45-50 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER







ENGINE
REMOVAL OF THE DRIVING GEAR

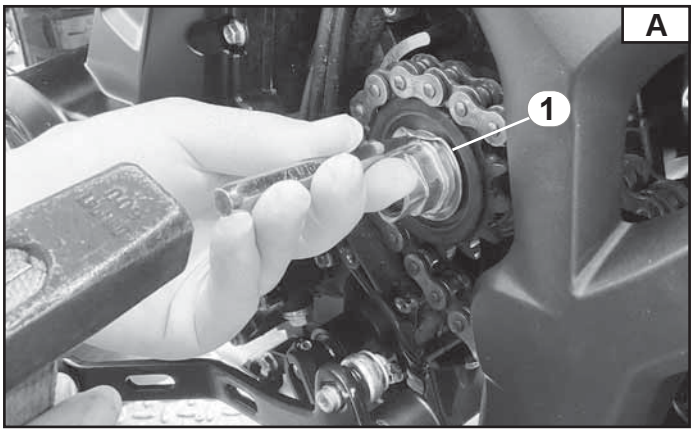
Park the motorcycle on a level surface.

NOTICE

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

Remove:

- The chain pinion cover, refer to **"Removal of the chain pinion cover, Chapter 4".**
- The spring washer (1) Fig. A.

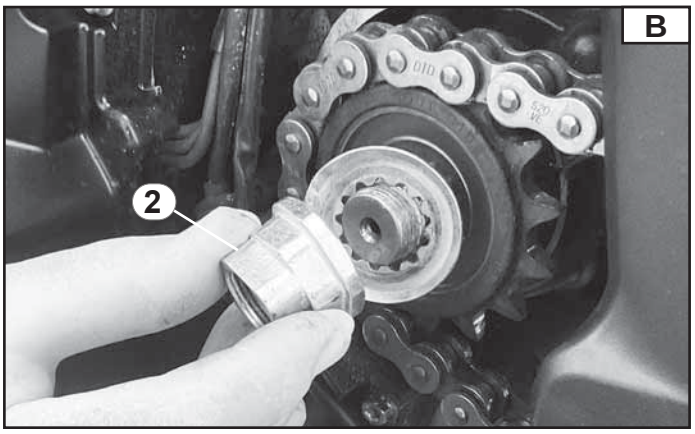


- The special nut (2) Fig. B.

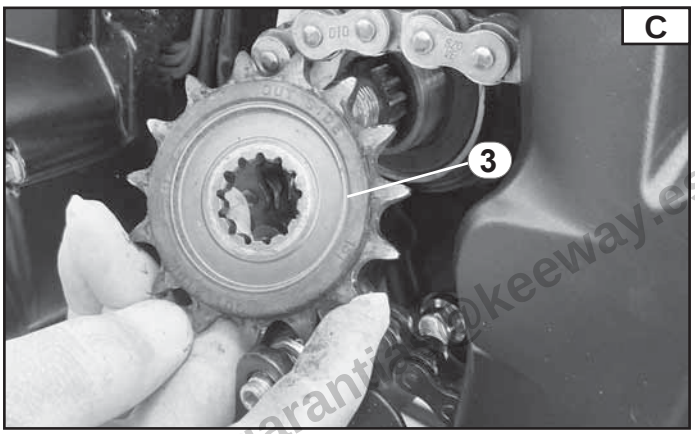
NOTE:

When the driving gear nut become loose, lock the rear brake.

- Loosen the transmission chain clearance, refer to **"Adjustment of the transmission chain clearance, Chapter 3"**.



- The sprocket (3) Fig. C.



ENGINE
INSTALLATION OF THE DRIVING GEAR

NOTICE

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

Installation:

Proceed using the opposite order to removal.

Tighten:

- The special nut (1) Fig. A.

To the following torque:

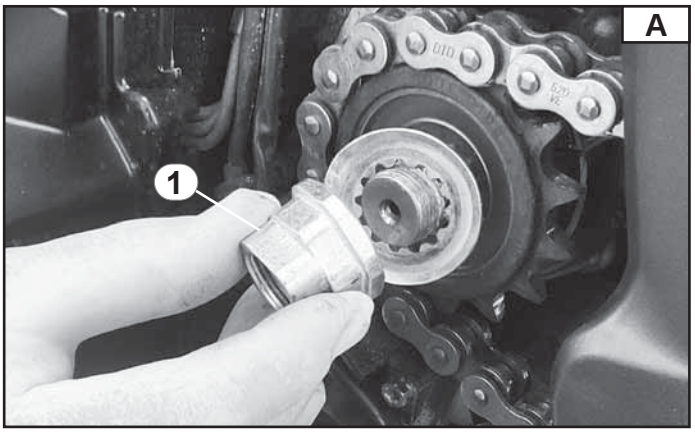
Torque 90 N*m

Use medium Loctite thread locker to secure.

	STRONG THREAD LOCKER

NOTICE

After tightening of the driving gear nut, fold the safety washer over the nut. If damaged, it must be replaced with a new one.



HEAD TIMING

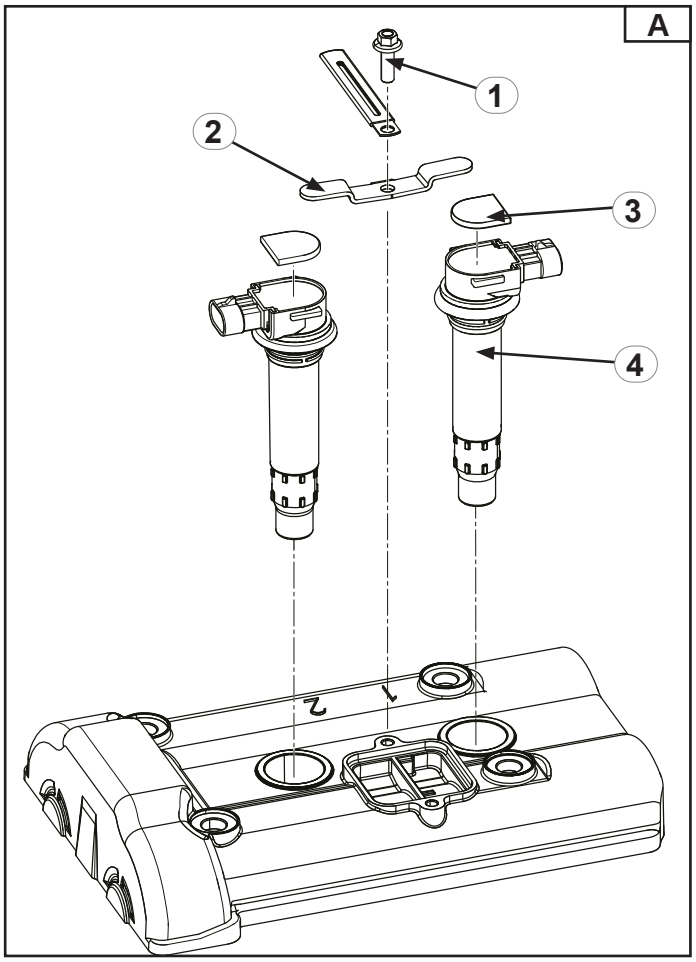
REMOVAL OF COILS AND SPARK PLUGS

NOTE:
The following procedure is applicable to both coils.

Remove:

- The screw (1) Fig. A.
- The bracket (2) Fig. A.
- The rubber pad (3) Fig. A.
- The coil (4) Fig. A.
- The spark plug, using the special wrench.

NOTE:
To check the spark plugs, refer to "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 spark plug threads with copper grease.

	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 15 N*m

Installation:

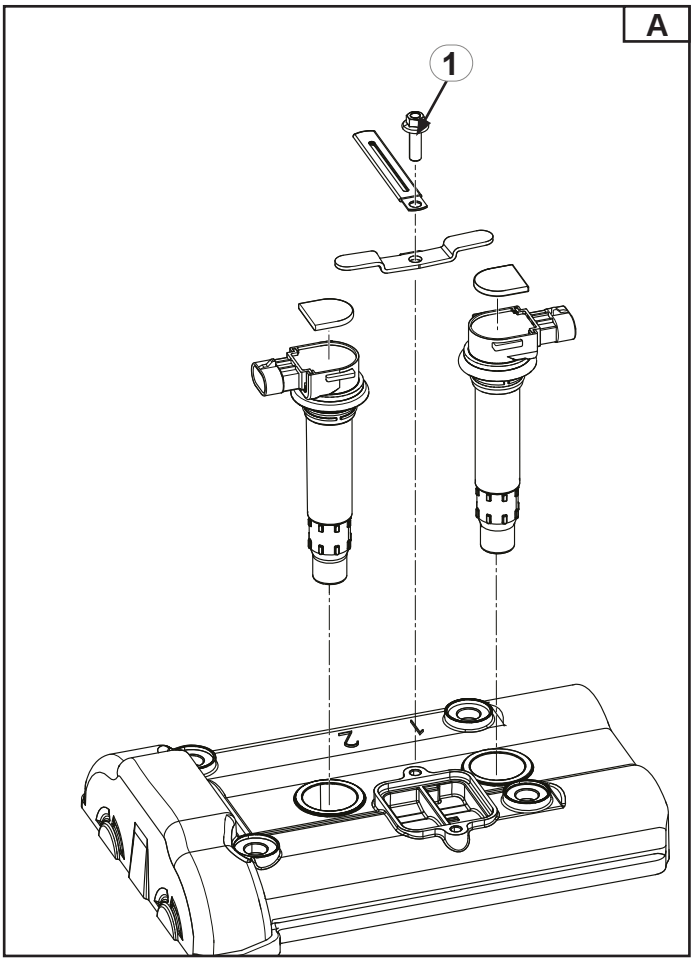
Proceed using the opposite order to removal.

Tighten:

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

Torque 10 N*m

A

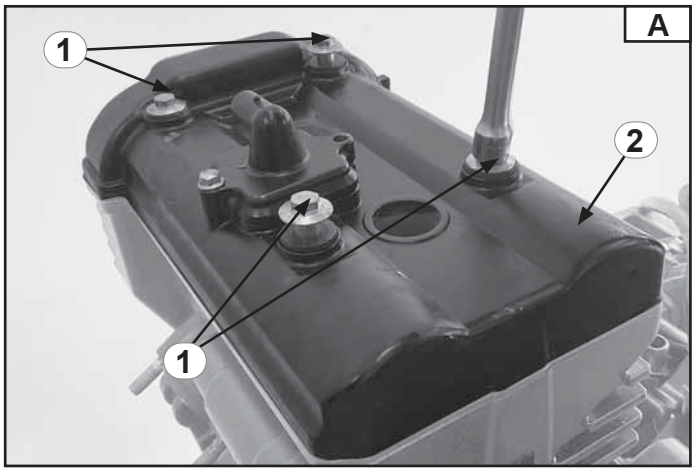


HEAD TIMING

REMOVAL OF THE CAMSHAFT COVER

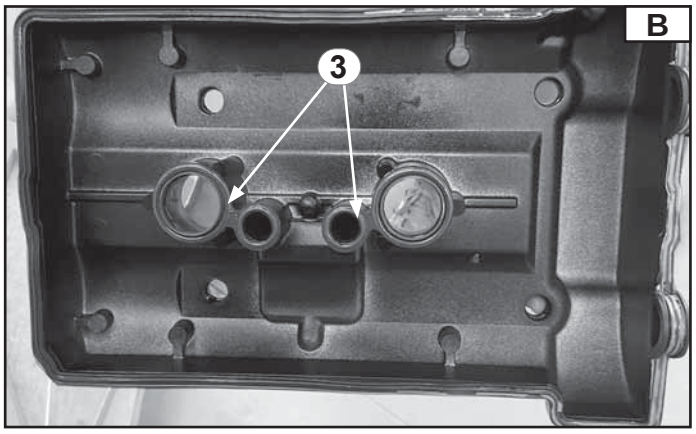
Remove:

- The screws (1) Fig. A.
- The camshaft cover (2) Fig. A.



NOTE:
Take care with the gaskets on the camshaft cover (3) Fig. B during removal.

NOTE:
In the case of breakage of the camshaft cover gasket (3), Fig. B, replace.

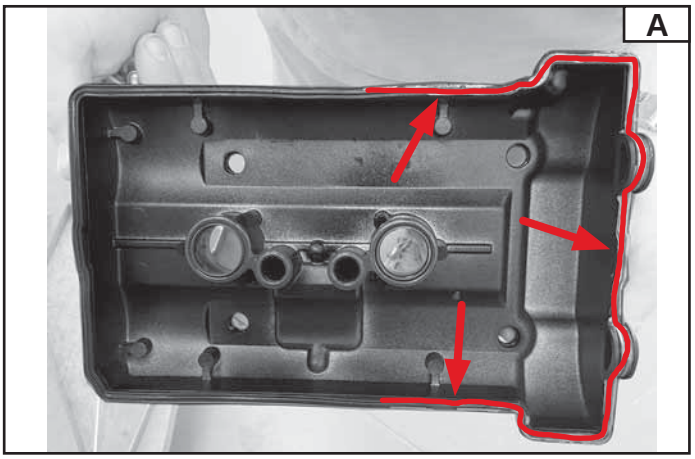


HEAD TIMING

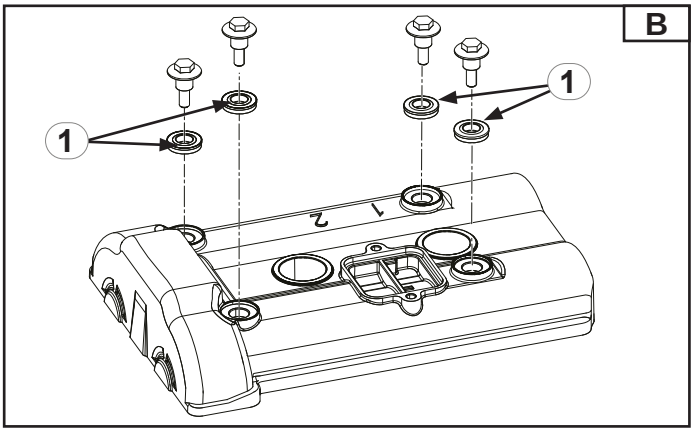
INSTALLATION OF THE CAMSHAFT COVER

Installation:
Proceed using the opposite order to removal.

NOTE:
During the assembly of the cover, apply sealing paste type Three Bond 1215 on the surface, as shown in Fig. A.



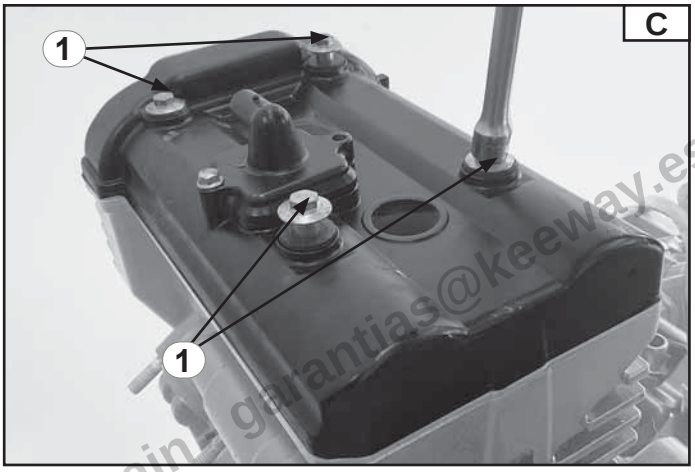
NOTE:
During the assembly stage of the camshaft cover, the replacement of the rubber pads (1) is recommended Fig. B.



Tighten:

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

Torque 10 N*m

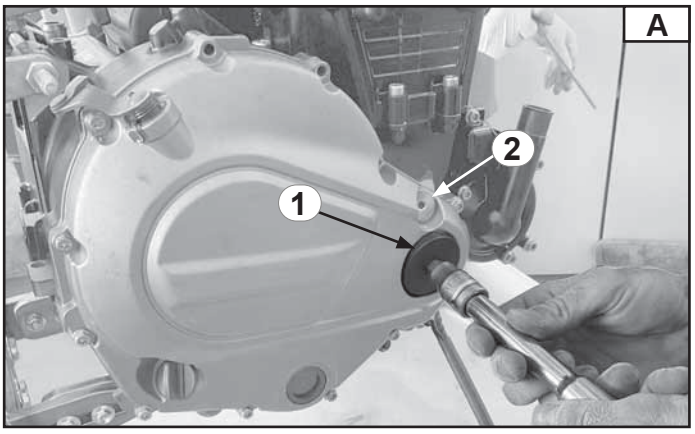


HEAD TIMING

REMOVAL OF THE DISTRIBUTION CHAIN TENSIONER

Remove:

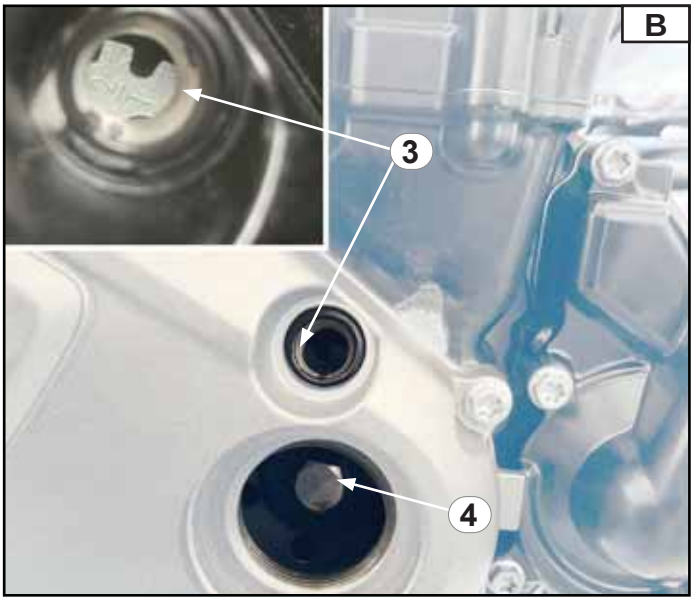
- The screw cap (1) and the inspection cap (2) Fig. A.

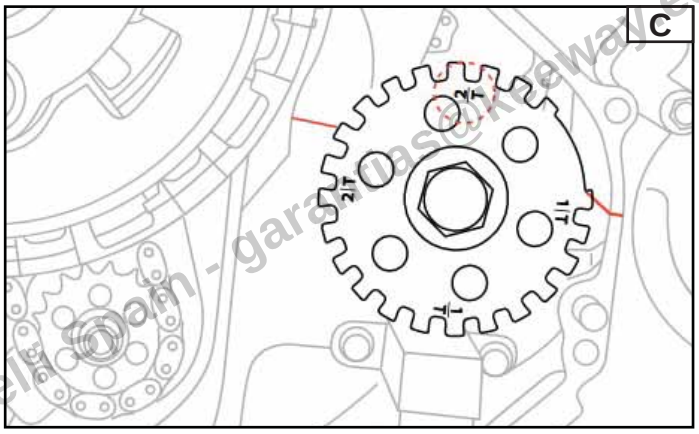


Check:

- That the reference mark (2T) on the camshaft sprocket is aligned with the reference mark on the hole (3) Fig. G, otherwise rotate the crankshaft (4) for alignment Fig. B.

NOTE:
Fig. C shown the correct position of the sprocket.



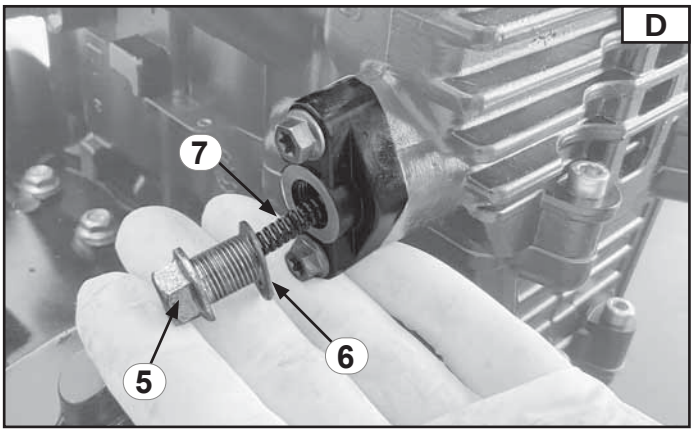


HEAD TIMING

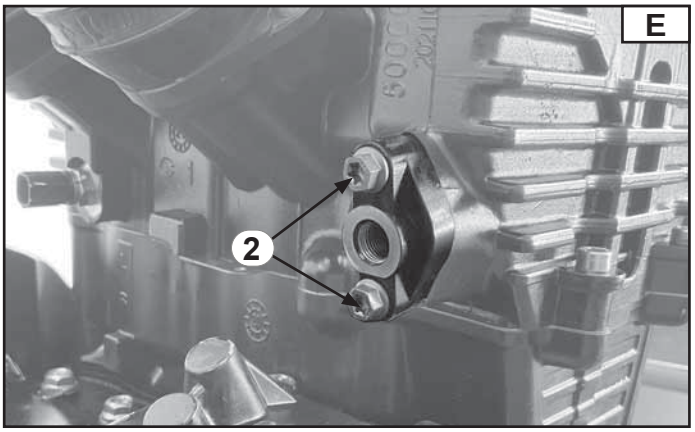
REMOVAL OF THE DISTRIBUTION CHAIN TENSIONER

Remove:

- The loading screw of the chain tensioner (5), the washer (6) and the spring (7) Fig. D.



- The screws (2) Fig. E.



NOTE:
Avoid to rotate the crankshaft without chain tensioner.

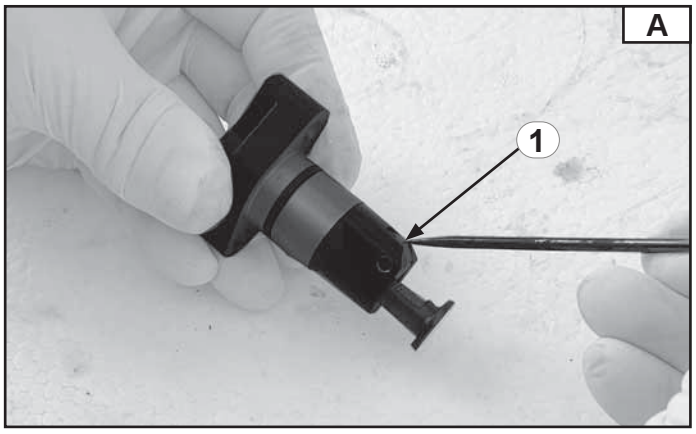
HEAD TIMING

ASSEMBLY OF THE DISTRIBUTION CHAIN TENSIONER

During the assembly stage, take care to ensure that the OR is undamaged and unworn, otherwise replace.

Move:

- The tensioner in completely retracted position using a screwdriver on the snap tooth (1) as shown in Fig. A.



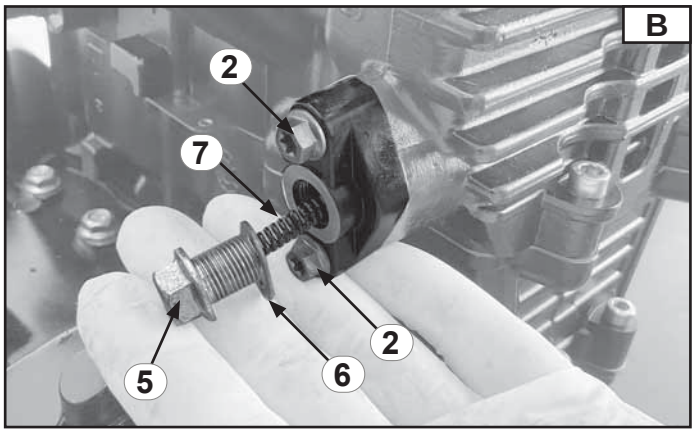
Insert:

- The fixing screws (2) Fig.B, the load screw of the chain tensioner (5), the washer (6) and the spring (7) Fig. B.

Tighten:

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

Torque 12 N*m

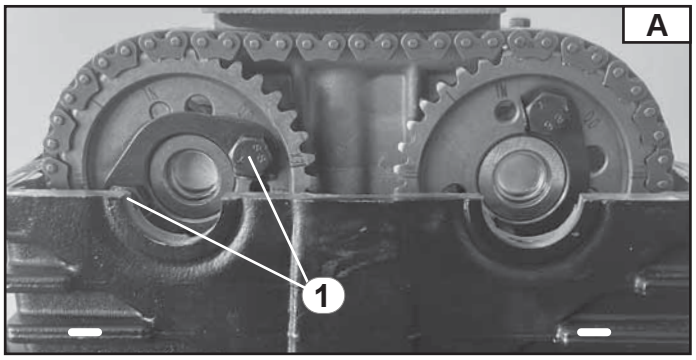


HEAD TIMING

REMOVAL OF THE INTAKE AND EXHAUST CAMSHAFT

NOTE:
This procedures applies in case the engine has been extracted from the vehicle frame.

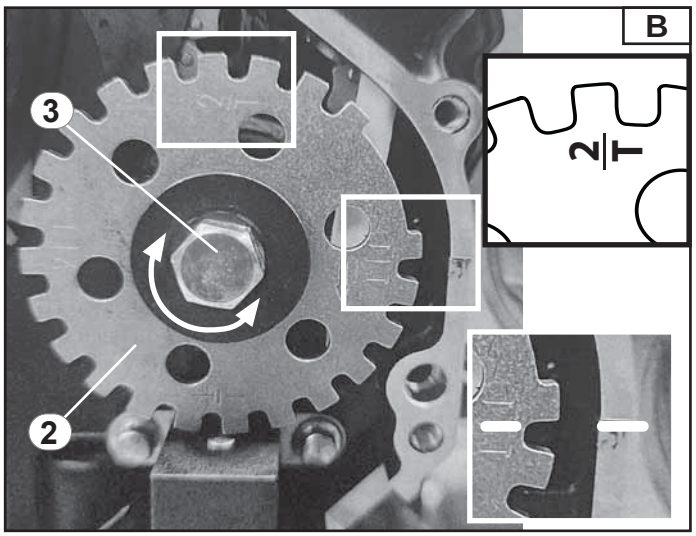
Remove:
- The coils and spark plugs, refer to **"Removal of the coils and spark plugs, Chapter 5".**
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The coolant.
- The crankshaft cap, refer to **"Adjustment of the valve clearance with the engine on the frame, Chapter 3".**



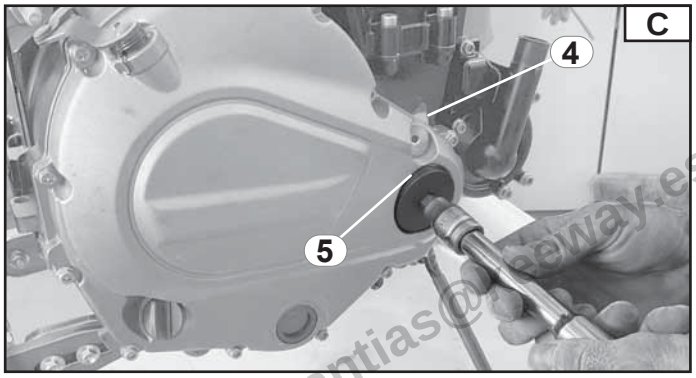
Loosen:
- The screws (1) of the intake camshaft sprocket by about one turn Fig. A.

Check:

In case the clutch casing has been extracted.
- That the reference mark on the camshaft sprocket (2) is aligned with the reference mark on the engine casing, as shown in Fig. B, otherwise rotate the crankshaft (3) for alignment.



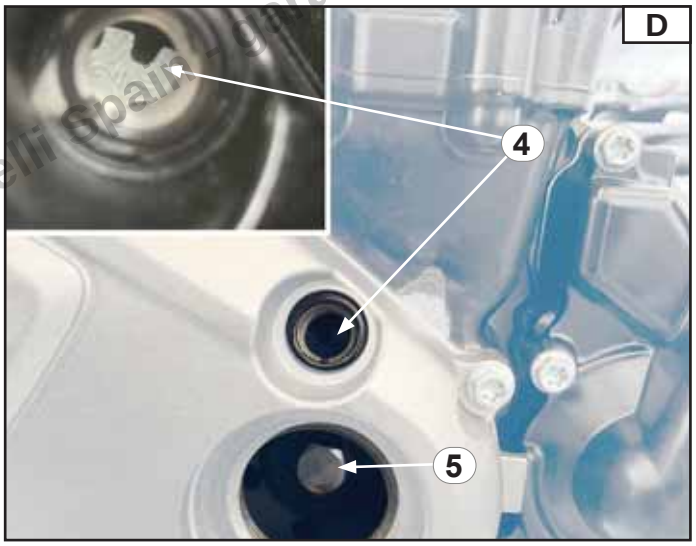
In case the clutch casing is still fitted.
Slide out:
- The signal wheel control cap (4) Fig. C.
- The crankshaft cap (5) Fig. C.



Check:

- That the reference mark (2T) on the camshaft sprocket (4) is aligned as shown in Fig. D, otherwise rotate the crankshaft (5) for alignment Fig. D.

After having carried out the alignment according to the procedure previously described, proceed with the following stages of camshaft extraction.

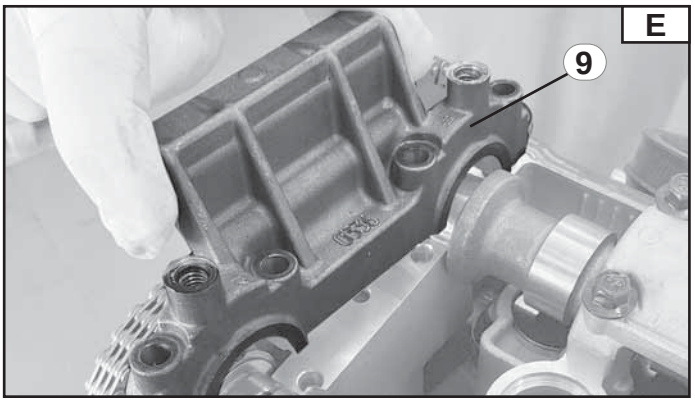


HEAD TIMING

REMOVAL OF THE INTAKE AND EXHAUST CAMSHAFT

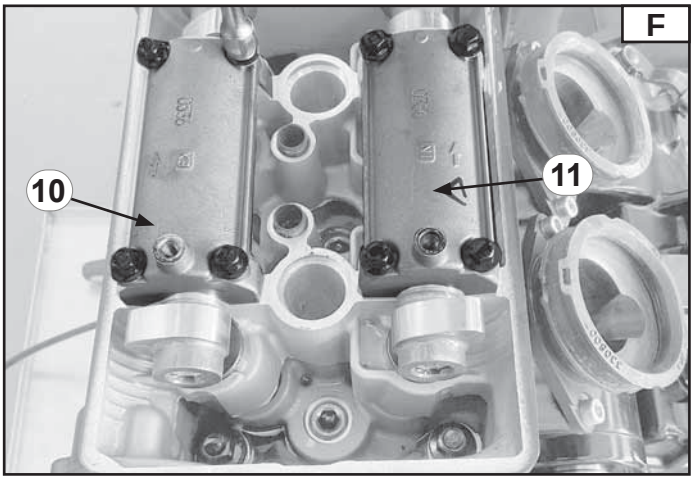
Remove:

- The distribution chain tensioner, refer to **"Removal of the distribution chain tensioner, Chapter 5".**



- The double-support holder of the camshaft (9) Fig. E.

NOTE:
During this stage, pay attention to the two bushes at the end of the holder (8) Fig. G.



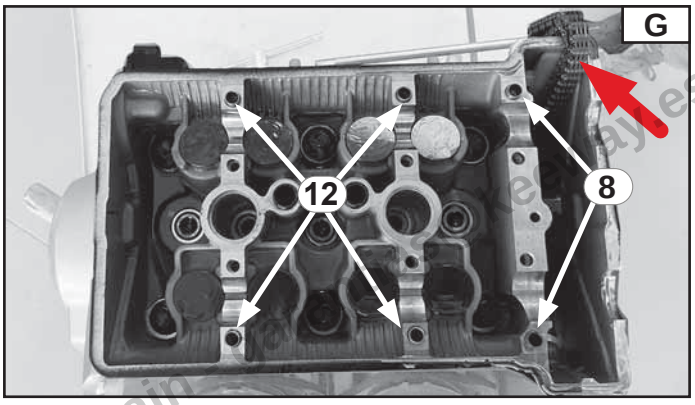
- The exhaust camshaft holder (10) Fig. F.
- The intake camshaft holder (11) Fig. F.

NOTE:
During the removal stage, use a marker pen to mark the position of the holder of the intake and exhaust camshaft Fig. F, 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.

NOTE:
During this stage, pay attention to the four bushes (12) Fig. G.

Remove

- The intake camshaft.
- The exhaust camshaft.



NOTE:
During the removal stage of the camshafts, duly secure the distribution chain Fig. G.

NOTE:
The intake camshaft has the engraving "I", while the exhaust camshaft has the engraving "E".

HEAD TIMING

CHECK OF THE CAMSHAFTS

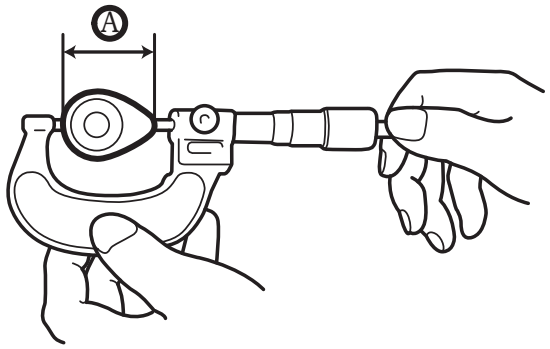
Make a visual check of the camshaft lobes and, if there is any blue discolouration/pitting or lines, replace.

- **Measure the size of the lobes.**

If the measures taken (Fig. B) are not compliant with specifications, replace the shaft.
Specifications Table:

Camshaft	STANDARD (A)	Limit (A)
Camshaft exhaust side	35.84 - 35.95 mm (1.411 - 1.415 in)	35.80 mm (1.409 in.)
Camshaft inlet side	36.54 - 36.65 mm (1.438 - 1.442 in)	36.50 mm (1.437 in.)

A

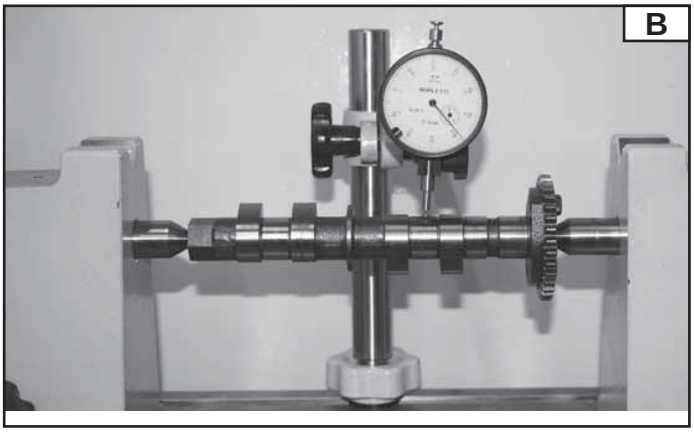


- **Measure the eccentricity of the camshaft**

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 (0.0019 in.)
Camshaft inlet side	0.05 mm (0.0019 in.)

B

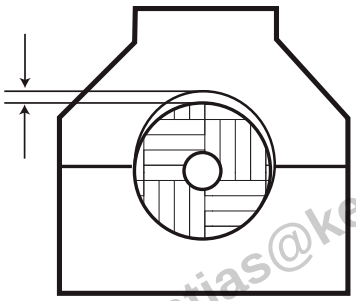


- **Measurement of clearance between camshaft pins and holder.**

If the measures taken (Fig. C) are not within the specifications, proceed with full head and holder replacement.
Specifications Table:

Camshaft	Clearance between bearing journal and holder
Camshaft exhaust side	0.03 - 0.06 mm (0.0011 - 0.0023 in)
Camshaft inlet side	0.02 - 0.05 mm (0.0007 - 0.0019 in)

C

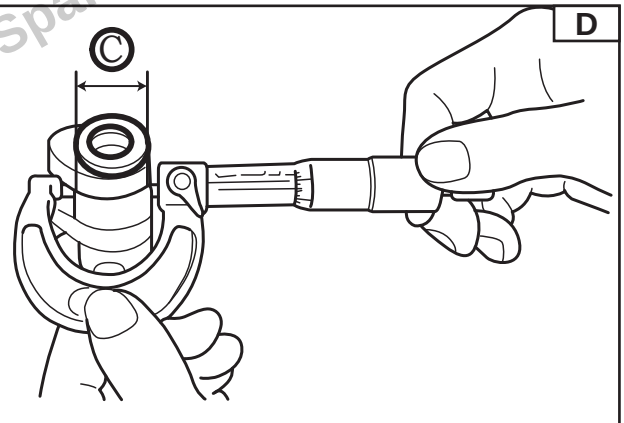


- **Measure the diameter of the camshaft support.**

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 23.950 - 23.965 mm (0.942 - 0.943 in) Limit 23.940mm (0.942 in.)
Camshaft inlet side	

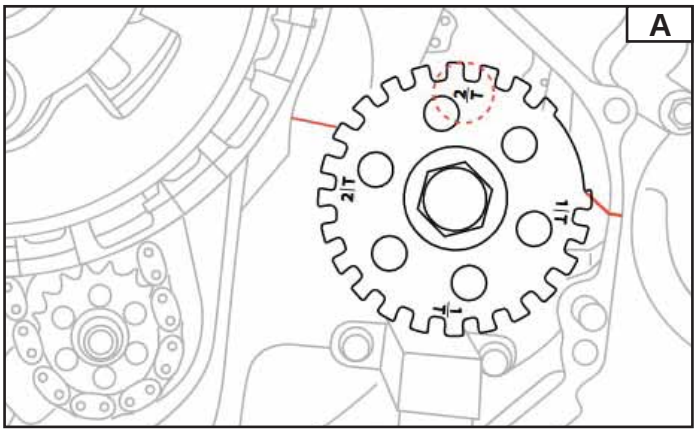
D



HEAD TIMING

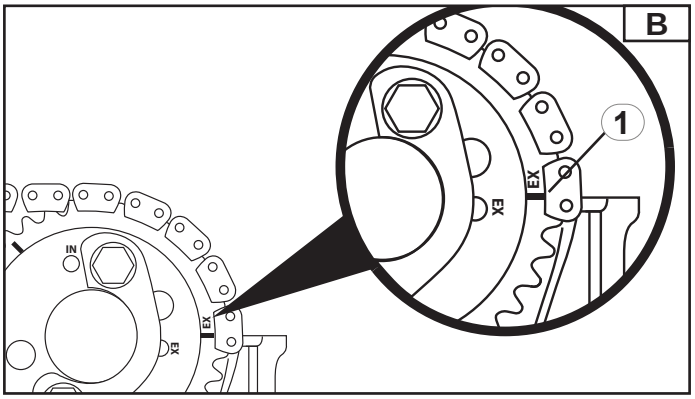
INSTALLATION OF THE INTAKE AND EXHAUST CAMSHAFT

Position the timing shaft sprocket so that the reference mark (2T) is aligned as shown in Fig. A.



Install:

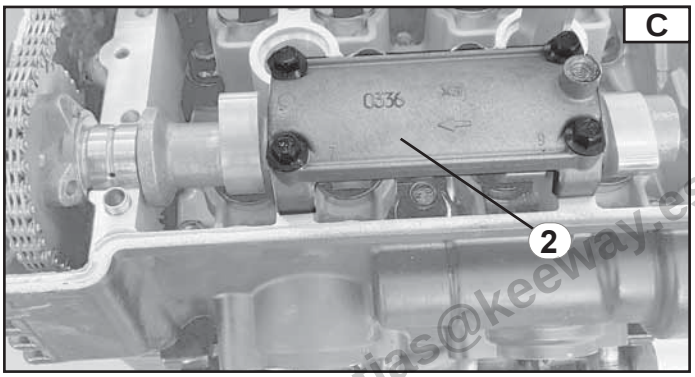
- The exhaust camshaft with the reference mark (EX) on the sprocket (1) positioned parallel with the head surface Fig. B.



- The holder (2) of the exhaust camshaft Fig. C and tighten the screws gradually to the following torque:

Torque 11 N*m

SPECIALE GREASE



NOTE:
When assembling the holders, it is necessary to lubricate them with special grease.

HEAD TIMING

INSTALLATION OF THE INTAKE AND EXHAUST CAMSHAFT

Install:

- The intake camshaft with the reference mark (IN) on the sprocket (3) positioned parallel with the head surface Fig. D.
- The distribution chain on the intake camshaft sprocket.

NOTE:
For this operation, use the comparator installed on the apposite holder.

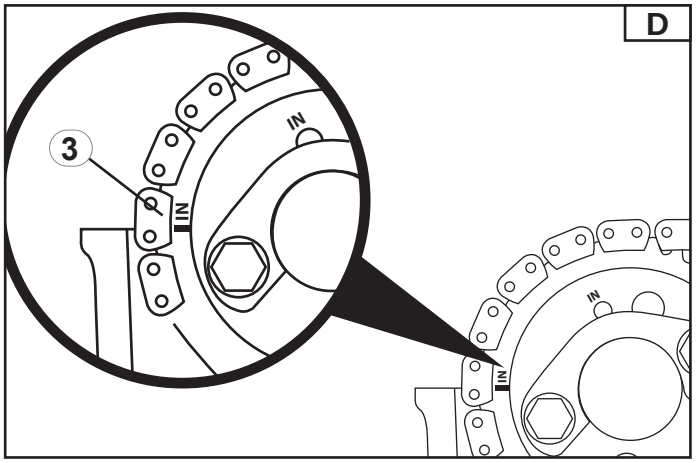
- The holder (5) of the exhaust camshaft Fig. E and tighten the screws gradually to the following torque:

Torque 11 N*m

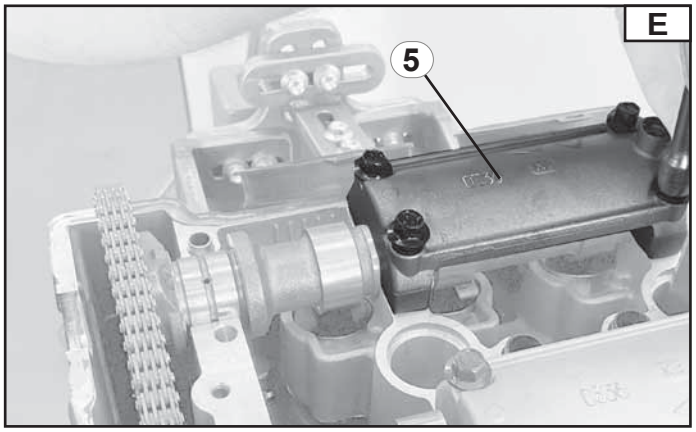
	SPECIALE GREASE

NOTE:
When assembling the holders, it is necessary to lubricate them with special grease.

D



E



HEAD TIMING

INSTALLATION OF THE INTAKE AND EXHAUST CAMSHAFT

Install:

- The double-support holder of the camshaft (6) Fig. F.

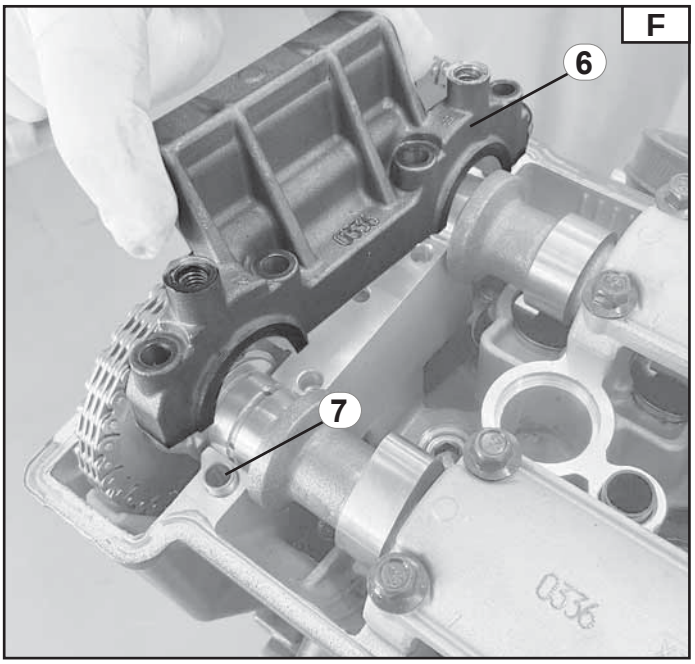
Torque 11 N*m

NOTE:
During this stage, pay attention to the two bushes at the end of the holder (7) Fig. F.

	SPECIALE GREASE

NOTE:
When assembling the holders, it is necessary to lubricate them with special grease.

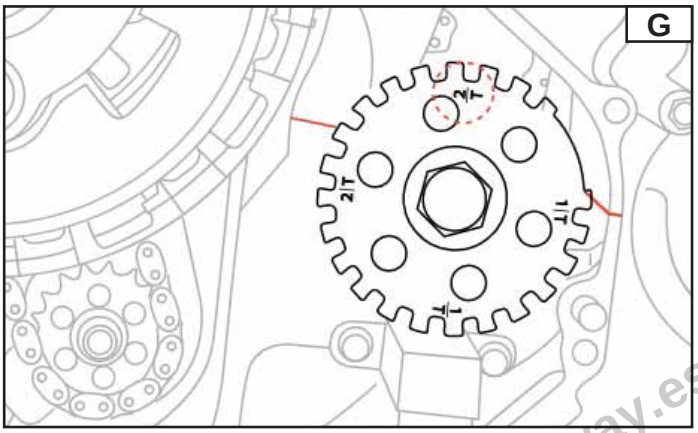
F



Check:

- The correct positioning of the timing shaft sprocket Fig. G

G



Check:

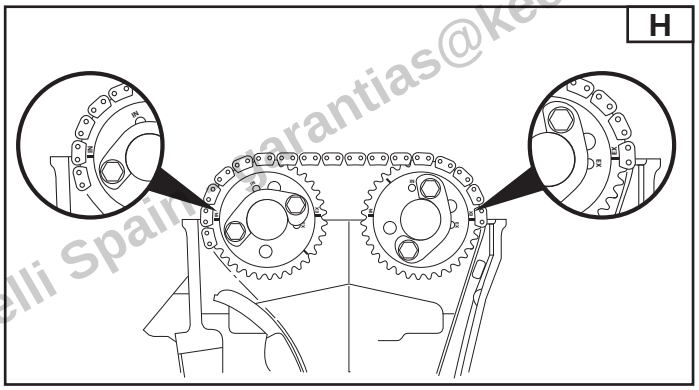
- The correct alignment of the camshafts Fig. H as previously described.

Install:

- The distribution chain tensioner, refer to "**Removal of the distribution chain tensioner, Chapter 5".**
- The crankshaft cap, refer to **"Adjustment of the valve clearance with the engine on the frame, Chapter 3".**
- The camshaft cover, refer to **"Installation of the camshaft cover, Chapter 5".**
- The coils and spark plugs, refer to **"Installation of the coils and spark plugs, Chapter 5".**

NOTE:
Add coolant once these steps have been completed.

H

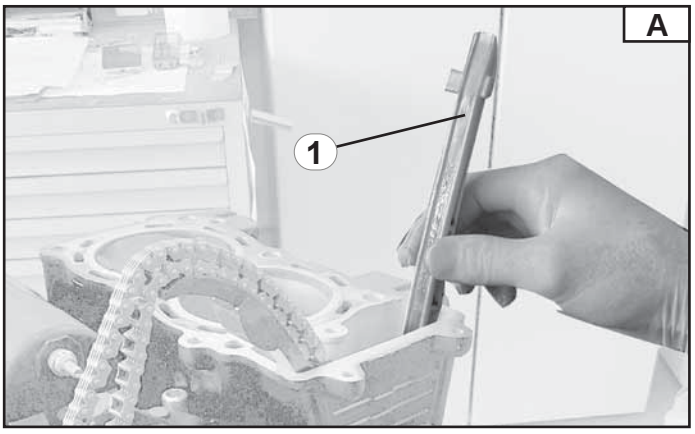


HEAD TIMING

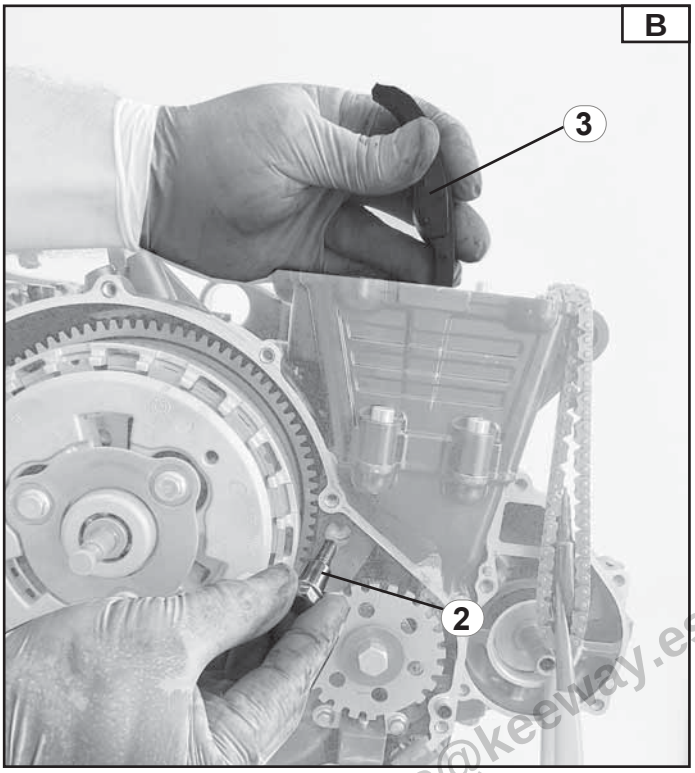
REMOVAL OF THE DISTRIBUTION CHAIN SLIDING SHOES

Remove:

- The coils and spark plugs, refer to "**Removal of the coils and spark plugs, Chapter 5**".
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The chain tensioner, refer to **"Removal of the distribution chain tensioner, Chapter 5".**
- The exhaust camshaft, refer to **"Removal of the intake and exhaust camshaft, Chapter 5".**
- The intake camshaft, refer to **"Removal of the intake and exhaust camshaft, Chapter 5".**
- The engine head, refer to**"Removal of the head, Chapter 5".**



- The fixed chain sliding shoe (1) Fig. A.



- The cylinders, refer to **"Removal of the cylinders, Chapter 5".**
- The clutch casing, refer to**"Removal of the clutch, Chapter 5"**.

- The screw (2) Fig. B.

- The movable chain sliding shoe (3) Fig. I. 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

Installation:
Proceed using the opposite order to removal.

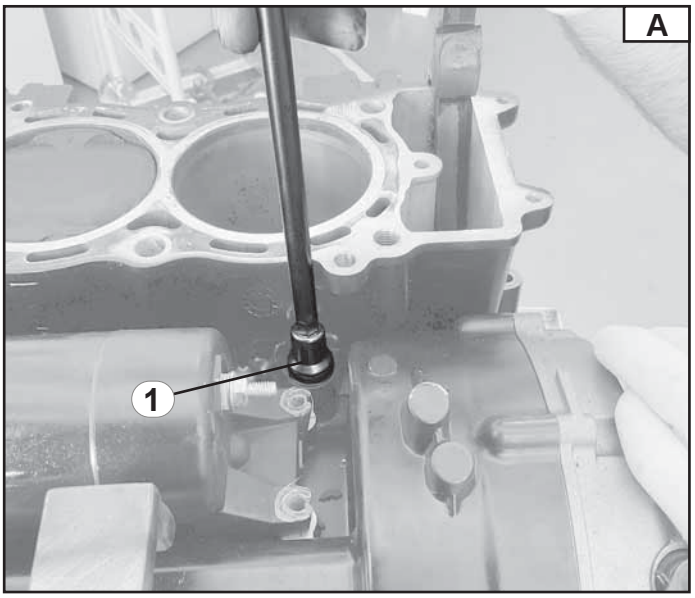
At the end of assembly, proceed with assembly of the distribution chain tensioner, refer to **"Assembly of the distribution chain tensioner, Chapter 5".**

HEAD TIMING

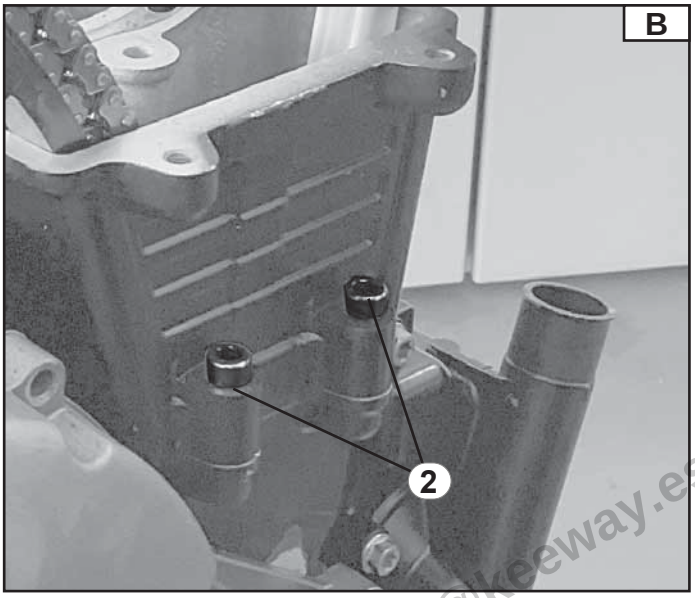
REMOVAL OF THE CYLINDERS

Remove:

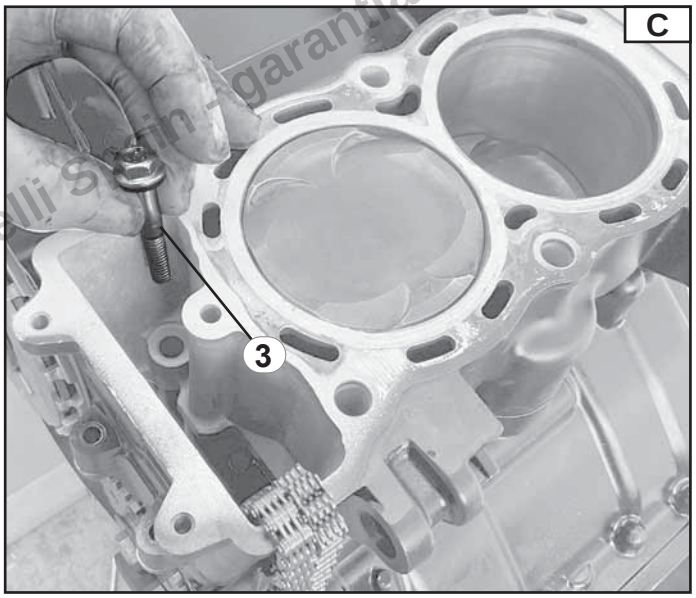
- The coils and spark plugs, refer to "**Removal of the coils and spark plugs, Chapter 5**".
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The chain tensioner, refer to **"Removal of the distribution chain tensioner, Chapter 5".**
- The exhaust camshaft, refer to **"Removal of the intake and exhaust camshaft, Chapter 5".**
- The intake camshaft, refer to **"Removal of the intake and exhaust camshaft, Chapter 5".**
- The engine head, refer to**"Removal of the head, Chapter 5".**



- The special nut (1) Fig. A.



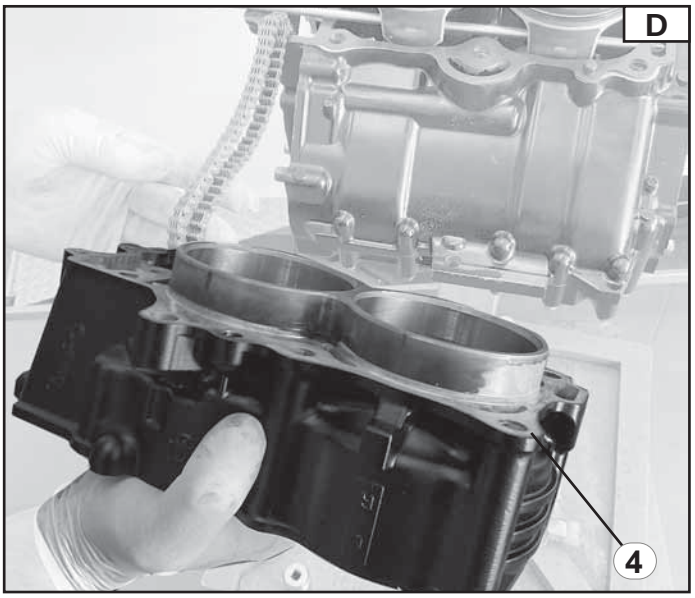
- The two screws (2) Fig. B.



- The screw (3) Fig. C.

HEAD TIMING
REMOVAL OF THE CYLINDERS

- The cylinders (4) Fig. D.



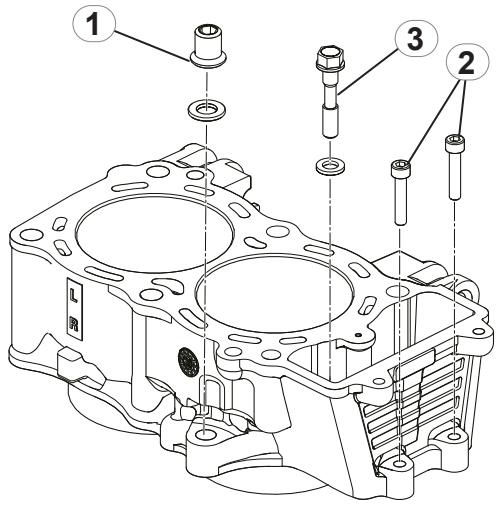
HEAD TIMING
INSTALLATION OF THE CYLINDERS

Installation:
Proceed using the opposite order to removal.

For tightening to torque, refer to the table below:

Description	Tightening torque
Special nut (1) Fig. A	49 N*m
Cylinder base screws (2) Fig. A	11 N*m
Inner cylinder screws (3) Fig. A	28 N*m

A



HEAD TIMING
ADJUSTMENT OF VALVE CLEARANCE

Remove:
- The coils and spark plugs, refer to "**Removal of the coils and spark plugs, Chapter 5**".
- The camshaft cover, refer to **"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 thickness gauge to measure the valve clearance (Fig. A) on cylinder 1 first by positioning the crankshaft as shown in Fig. B and verifying the cam lobes of the cylinder 1 are positioned as shown in Fig. C.

NOTE:
In case of valve clearance correction, replace the calibrated tappets, increasing or reducing the thickness to obtain the required size. Refer to the following table to select the calibrated tappet.

NOTE:
If lobes are not aligned, rotate the crankshaft by 360°.

If the measurement is outside specifications, replace the calibrated bucket.

NOTE:
The measurement must be taken on all cams and tappets.

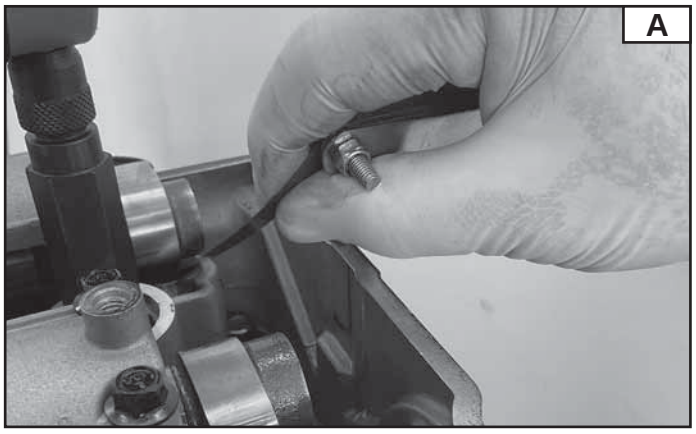
Camshaft	Bucket-cam clearance
Camshaft exhaust side	0.25 - 0.31 mm (0.00984 - 0.01220 in)
Camshaft intake side	0.15 - 0.21 mm (0.00590 - 0.00826 in)

Check:
- the valve clearance on cylinder 2 by rotating the crankshaft clockwise by 180° as per Fig. D, making sure that the cam lobes of the cylinder 2 are positioned as in Fig. C.

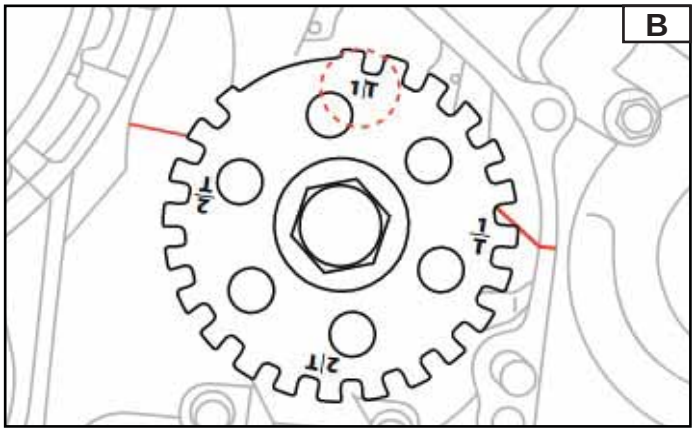
NOTE:
If lobes are not aligned, rotate the crankshaft by 360°.

NOTE:
In case of valve clearance correction, replace the calibrated tappets, increasing or reducing the thickness to obtain the required size. Refer to the following table to select the calibrated tappet.

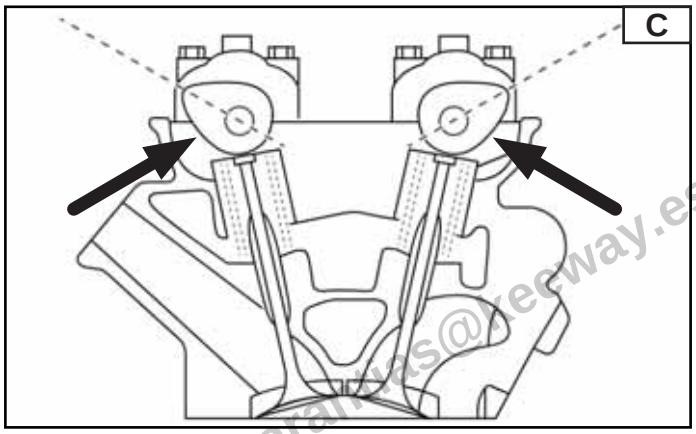
A



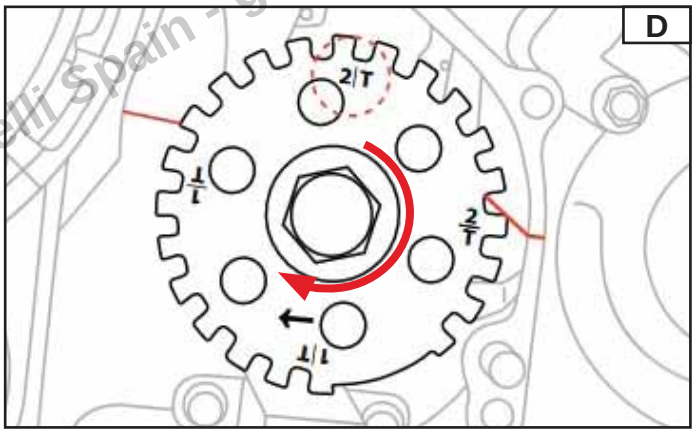
B



C



D



HEAD TIMING
TABLE OF TAPPET SELECTION

Table for selection of the intake valve tappets

Clearance detected (mm)	Tappet installed															
	346	350	354	358	362	366	370	374	378	382	386	390	394	398	402	406
0									346	350	354	358	362	366	370	374
0.01-0.02								346	350	354	358	362	366	370	374	378
0.03-0.04							346	350	354	358	362	366	370	374	378	382
0.05-0.06						346	350	354	358	362	366	370	374	378	382	386
0.07-0.08					346	350	354	358	362	366	370	374	378	382	386	390
0.09-0.10				346	350	354	358	362	366	370	374	378	382	386	390	394
0.11-0.12			346	350	354	358	362	366	370	374	378	382	386	390	394	398
0.13-0.14		346	350	354	358	362	366	370	374	378	382	386	390	394	398	402
0.15-0.21	Correct clearance															
0.22-0.23	350	354	358	362	366	370	374	378	382	386	390	394	398	402	406	
0.24-0.25	354	358	362	366	370	374	378	382	386	390	394	398	402	406		
0.26-0.27	358	362	366	370	374	378	382	386	390	394	398	402	406			
0.28-0.29	362	366	370	374	378	382	386	390	394	398	402	406				
0.30-0.31	366	370	374	378	382	386	390	394	398	402	406					
0.32-0.33	370	374	378	382	386	390	394	398	402	406						
0.34-0.35	374	378	382	386	390	394	398	402	406							
0.36-0.37	378	382	386	390	394	398	402	406								
0.38-0.39	382	386	390	394	398	402	406									
0.40-0.41	386	390	394	398	402	406										
0.42-0.43	390	394	398	402	406											
0.44-0.45	394	398	402	406												
0.46-0.47	398	402	406													
0.48-0.49	402	406														
0.50-0.51	406															

(1 mm = 0,0393701 in)

Example:

- Valve clearance detected (0.30mm)
- Tappet installed (366)

Tappet to be used to obtain the correct clearance 0.15/0.21 (386)

HEAD TIMING
TABLE OF TAPPET SELECTION

Table for selection of the exhaust valve tappets

Clearance detected (mm)	Tappet installed															
	346	350	354	358	362	366	370	374	378	382	386	390	394	398	402	406
0.05-0.06							346	350	354	358	362	366	370	374	378	382
0.07-0.08						346	350	354	358	362	366	370	374	378	382	386
0.09-0.10						346	350	354	358	362	366	370	374	378	382	386
0.11-0.12					346	350	354	358	362	366	370	374	378	382	386	390
0.13-0.14					346	350	354	358	362	366	370	374	378	382	386	390
0.15-0.16				346	350	354	358	362	366	370	374	378	382	386	390	394
0.17-0.18				346	350	354	358	362	366	370	374	378	382	386	390	394
0.19-0.20			346	350	354	358	362	366	370	374	378	382	386	390	394	398
0.21-0.22			346	350	354	358	362	366	370	374	378	382	386	390	394	398
0.23-0.24		346	350	354	358	362	366	370	374	378	382	386	390	394	398	402
0.25-0.31	Correct clearance															
0.32-0.33	350	354	358	362	366	370	374	378	382	386	390	394	398	402	406	
0.34-0.35	354	358	362	366	370	374	378	382	386	390	394	398	402	406		
0.36-0.37	354	358	362	366	370	374	378	382	386	390	394	398	402			
0.38-0.39	358	362	366	370	374	378	382	386	390	394	398	402				
0.40-0.41	358	362	366	370	374	378	382	386	390	394	398					
0.42-0.43	362	366	370	374	378	382	386	390	394	398						
0.44-0.45	362	366	370	374	378	382	386	390	394							
0.46-0.47	366	370	374	378	382	386	390	394								
0.48-0.49	366	370	374	378	382	386	390									
0.50-0.51	370	374	378	382	386	390										
0.52-0.53	370	374	378	382	386											
0.54-0.55	374	378	382	386												
0.56-0.57	374	378	382													
0.58-0.59	378	382														
0.60-0.61	378															

(1 mm = 0,0393701 in)

Example:

- Valve clearance detected (0.11mm)
- Tappet installed (386)

Tappet to be used to obtain the correct clearance 0.25/0.31 (370)

HEAD TIMING

REMOVAL OF THE CALIBRATED BUCKETS

Remove:

- The coils and spark plugs, refer to "**Removal of the coils and spark plugs, Chapter 5**".
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The distribution chain tensioner, refer to **"Removal of the distribution chain tensioner, Chapter 5".**
- The camshaft, refer to **"Removal of the intake/exhaust camshaft, Chapter 5".**

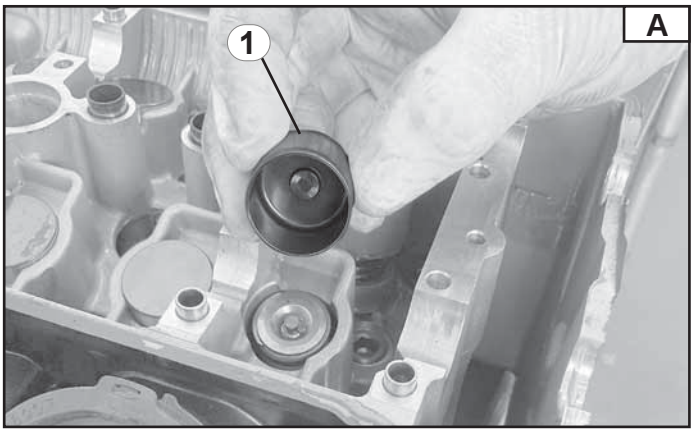
To remove the intake and exhaust valve lifter buckets, proceed as follows:

Slide out:

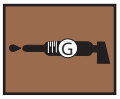
- Use a magnet to take out the valve lifter bucket (1) Fig. A.

Check:

- The valve lifter bucket, ensuring that there is no damage or lines, and if not, replace.



NOTE:
During installation, lubricate the valve lifter buckets, using:

	**Teflon-based paste or of other lubricants, as graphite, ceramics.**

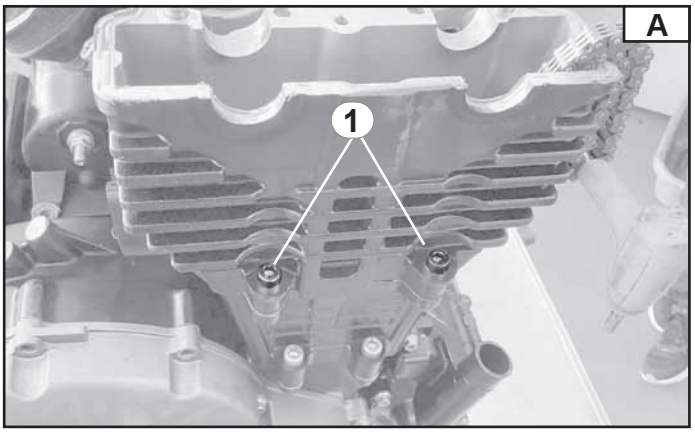
NOTE:
At the end of the part inspection, always check the valve clearance, refer to "Adjustment of the valve clearance, Chapter 5".

HEAD TIMING

HEAD REMOVAL

Remove:

- The coils and spark plugs, refer to "**Removal of the coils and spark plugs, Chapter 5**".
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The chain tensioner, refer to **"Removal of the distribution chain tensioner, Chapter 5".**
- The exhaust camshaft, refer to **"Removal of the intake and exhaust camshaft, Chapter 5".**
- The intake camshaft, refer to **"Removal of the intake and exhaust camshaft, Chapter 5".**
- The chain sliding shoes, refer to **"Removal of the distribution chain sliding shoes, Chapter 5".**

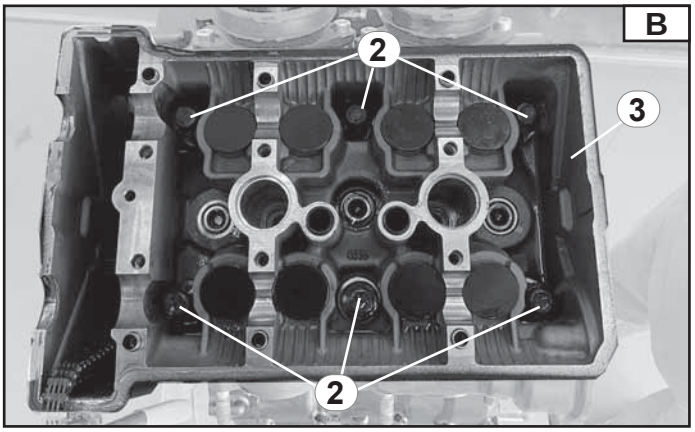


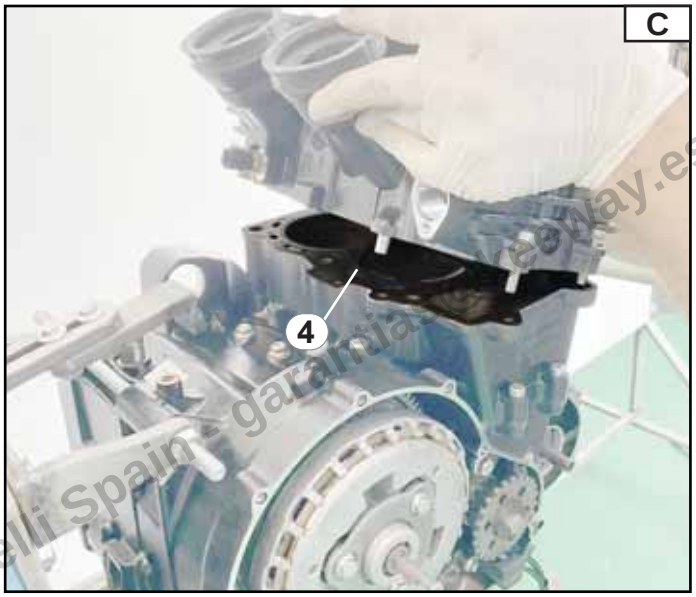
Remove:

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

NOTE:
Loosen each screw by ½ turn.
Then remove all screws.

- Head (3) Fig. B.
- Head gasket (4) Fig. C.



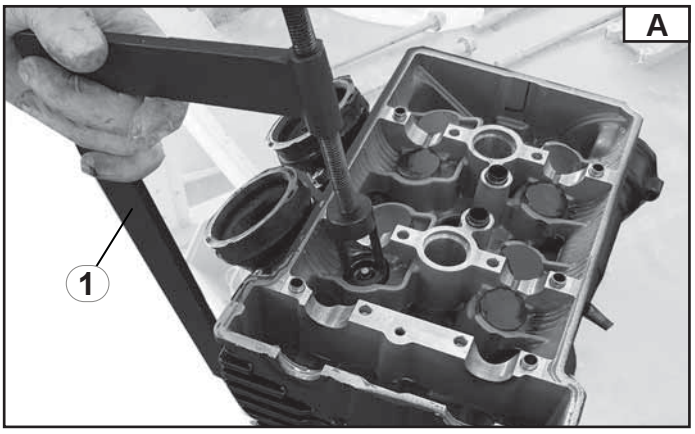


HEAD TIMING

REMOVAL OF THE VALVES AND VALVE SPRINGS

Remove:

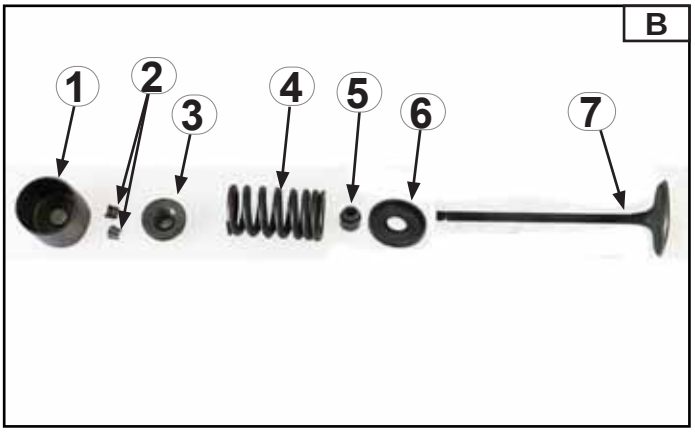
- The coils and spark plugs, refer to "**Removal of the coils and spark plugs, Chapter 5**".
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The chain tensioner, refer to **"Removal of the distribution chain tensioner, Chapter 5".**
- The exhaust camshaft, refer to **"Removal of the intake and exhaust camshaft, Chapter 5".**
- The tapped valve, refer to **"Removal of the calibrated buckets, Chapter 5".**
- The head, refer to **"Removal of the head, Chapter 5".**
- The valves Fig. A.



The following process applies to all of the valves and valve guides.

NOTE:
Press the spring on each valve with the apposite compression tool (1) Fig. A

Valve spring compressor tool
Code: 0320097050000



Remove: B:

- Valve lifter bucket (1).
- Half cones (2).
- Top plate (3).
- Spring (4).
- Oil seal (5).
- Bottom plate (6).
- Valve (7).

NOTE:
During removal of the two valve locking half cones, use a magnet to recover them.

HEAD TIMING

CHECK OF VALVES AND RELATED GUIDES

NOTE:
The following process can be applied to all of the valves and valve guides.

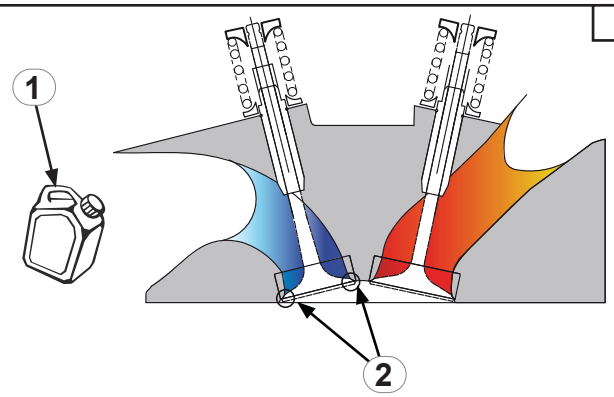
Inspect:
- The valve seals.

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/exhaust pipes.
- Make sure the valves have a suitable seal.

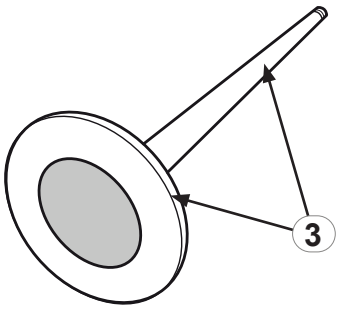
NOTE:
There should not be any leaks from the valve seat (2) Fig. A.

A



Eliminate:
- The carbon deposits (3) (from the contact surface and the valve seat) Fig. B.

B

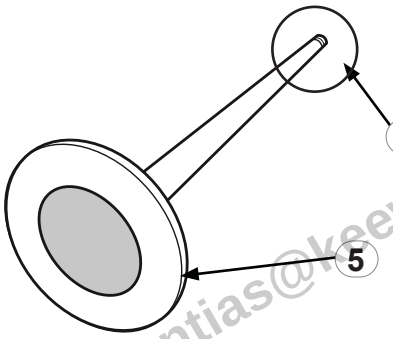


Inspect:
- The contact surface of the valve (5) Fig. C.

If there is any pitting/wear, grind the contact surface of the valve.
- End of the valve stem (4) Fig. C.

If there is a shape or a diameter of the mushroom that is larger than the body of the valve stem, replace the valve.

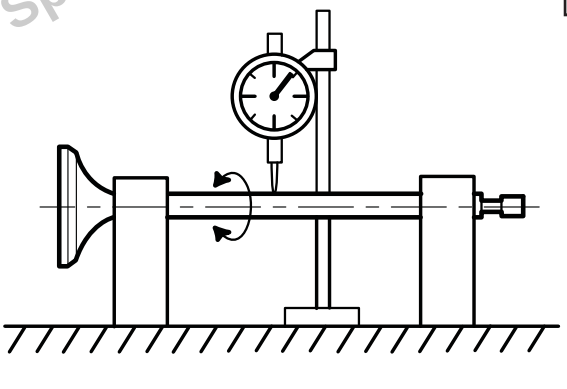
C



Measure:
- The eccentricity of the valve stem Fig. D.

If outside specifications, replace the valve.

D



Valve	Valve stem eccentricity
Intake	0.01 mm (0.00039 in)
Exhaust	

NOTE:
When replacing the valve, always replace the oil seal.

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	0.5 ~ 1.0 mm (0.019 ~ 0.039 in)
Exhaust	0.5 ~ 1.0 mm (0.019 ~ 0.039 in)

- 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 Dykem blue pigment will have been removed.

Lap:
- The valve seat Fig. C.

NOTE:
After replacing the head or the valve, it is necessary to lap the seat and contact surface of the valve.

- Apply a paste for adequate lapping of the valve contact surface (C) Fig. B.

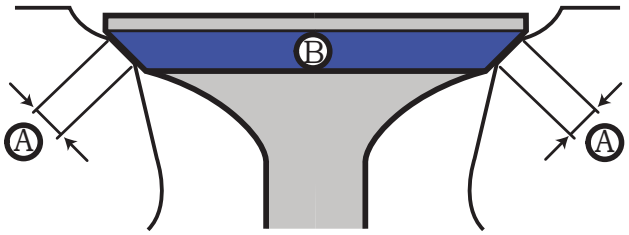
NOTICE

Do not allow the lapping paste to enter the area between the valve stem and the guide.

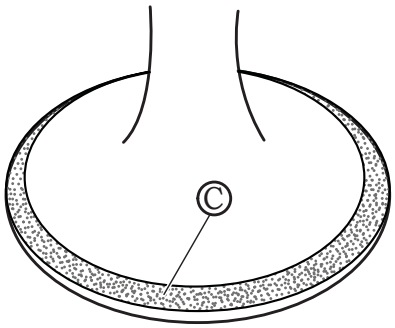
- Apply molybdenum disulphide oil to the valve stem.
- Install the valve in the head.
- Turn the valve until the contact surface and the seat have been polished evenly, then remove all the lapping paste.

NOTE:
To get the best results from lapping, gently tap on the valve seat while turning it forwards and back manually Fig. C.

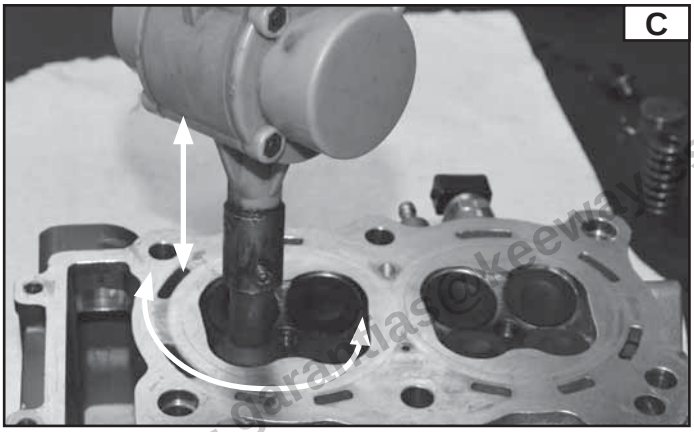
A



B



C



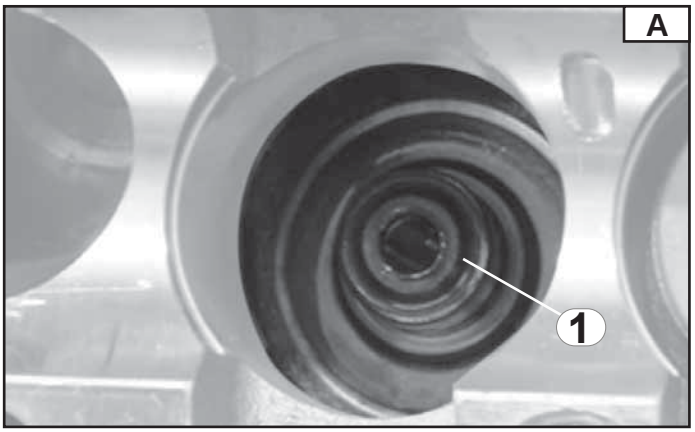
HEAD TIMING

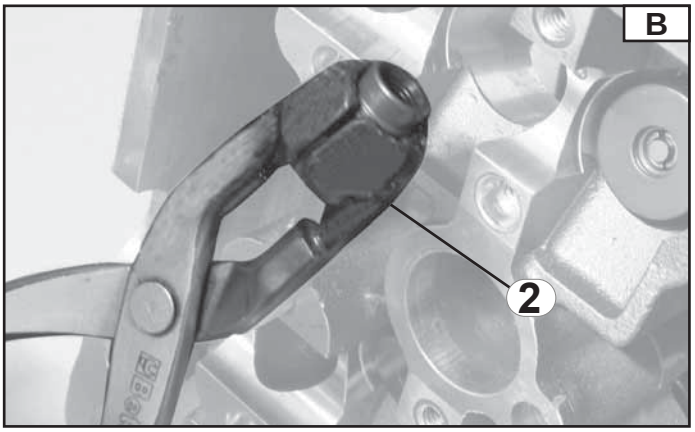
REMOVAL / INSTALLATION OF THE VALVE OIL SEAL

Remove:
- The valve.

Slide out:
- The oil seal (1) Fig. A with the special tool (2) Fig. B.

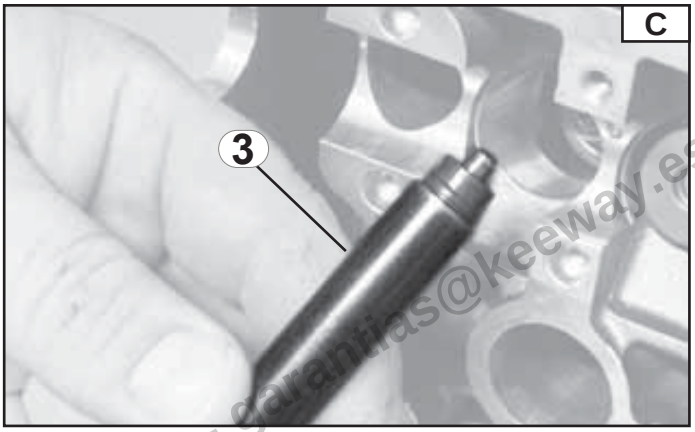
Generic **tool for valve oil seal removal.**





Install:
- The oil seal with the special tool (3) Fig. C.

Generic tool for valve oil seal insertion pad.



HEAD TIMING

CHECK OF THE VALVE SPRINGS

The following process is applied to all valve springs.

Measure:

- The full length of the valve spring (A) Fig. A.

Valve spring	Size (A)
Intake	41.55 mm ± 0.15 (1.63 ± 0.0059 in)
Exhaust	

NOTE:
If not compliant with specifications, replace the valve spring.

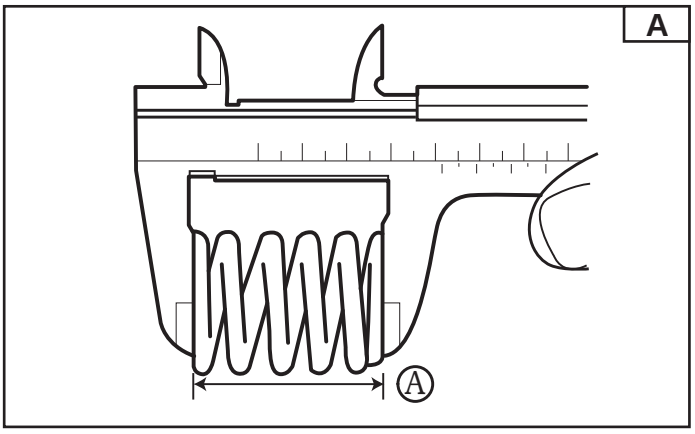


Fig. A

HEAD TIMING

INSTALLATION OF VALVES AND VALVE SPRINGS

Install into the head:

NOTE:
Lubricate the valve stem and oil seal Fig. A2.

	ENGINE OIL

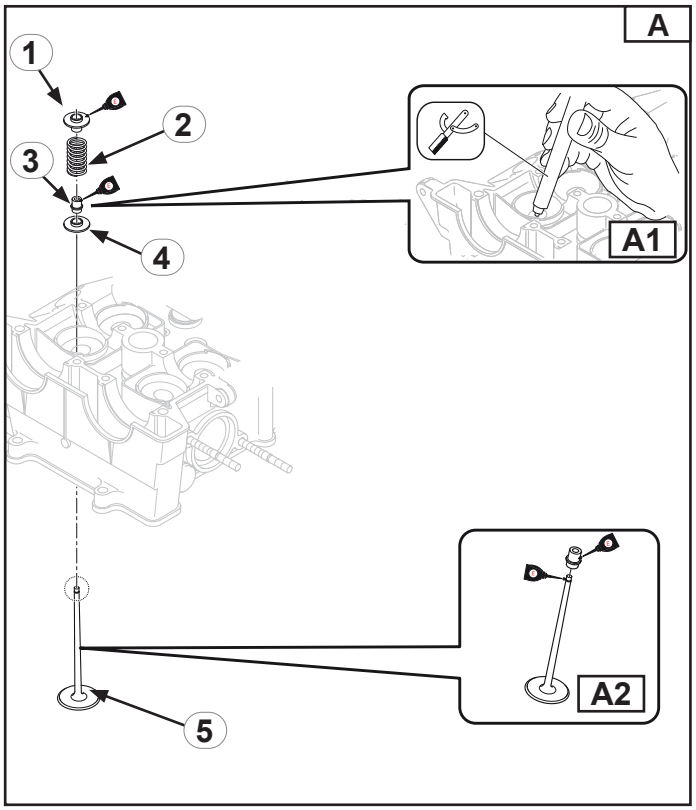
- The valve bottom spring plate (4) Fig. A.
- The valve oil seal (3) Fig. A1, refer to "**Removal / installation of the valve oil seal, Chapter 5**".
- The valve (5) Fig. A.
- The valve spring (2) Fig. A.
- The valve top spring plate (1) Fig. A.
- The half cones.

NOTE:
Make sure that every valve has been remounted in its original position.

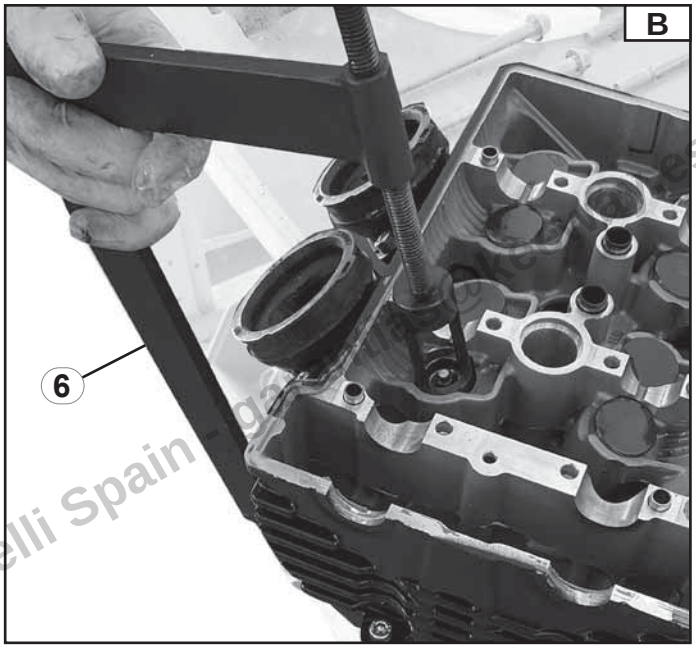
NOTE:
Press the spring on each valve with the apposite compression tool (6) Fig. B for installation of the cotters.

Valve spring compressor tool.
Code: 0320097050000

A



B



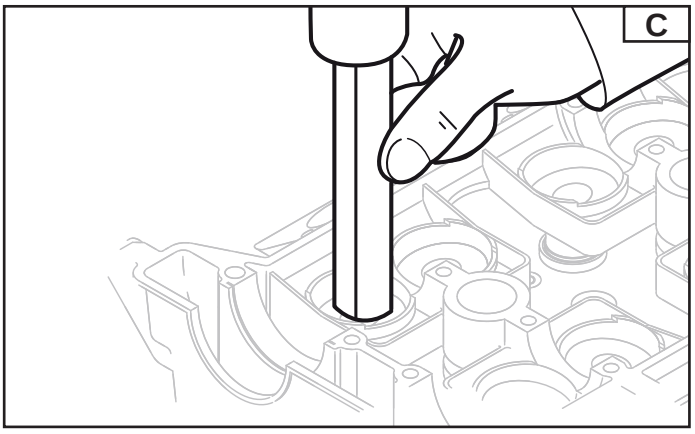
HEAD TIMING

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.

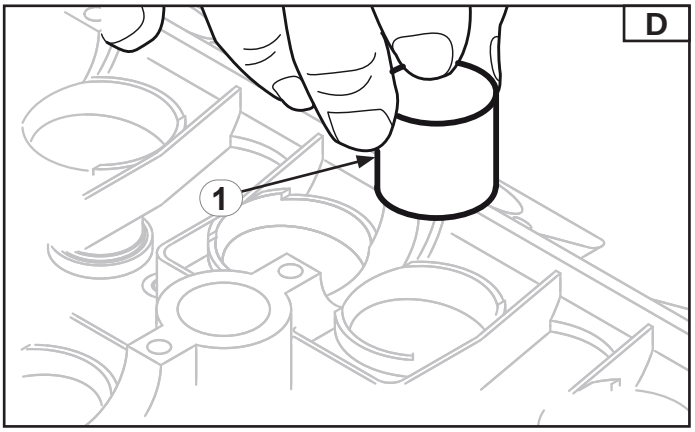


NOTICE

Hitting the valve tip with too much force could damage the valve.

Install:

- The calibrated bucket (1) Fig. D.



NOTE:

Lubricate the tappet with grease MOLYKOTE with graphite.
Manually turn the valve lifter tappet, which must be able to slide smoothly.
Reassemble each valve lifter tappet 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 "**Removal of the coils and spark plugs, Chapter 5**".
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The head, refer to **"Removal of the head, Chapter 5".**
- The cylinder.

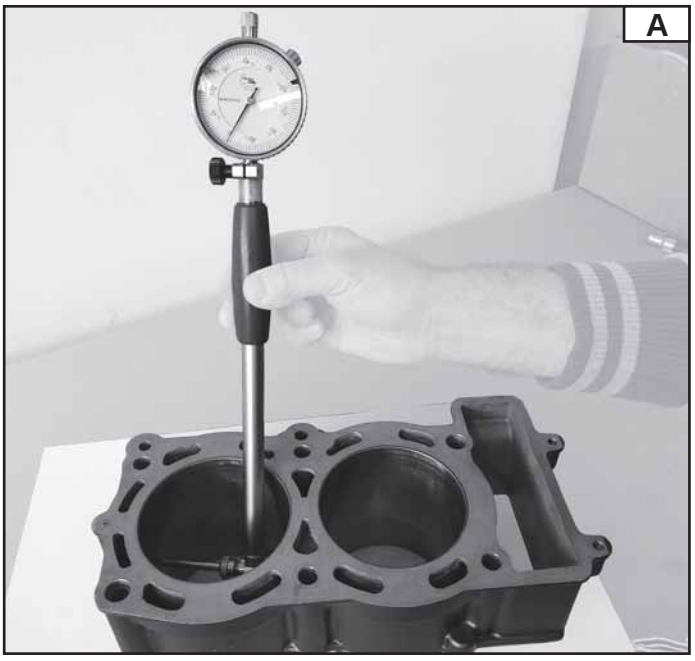
The following procedure applies the whole cylinder group.

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. A.

Make different measurements at different distances of 13 mm (0.511 in), 45 mm (1.771 in) e 78 mm (3.070 in) from the head coupling surface.
The highest value is considered when calculating wear limit.



Selection identification	Minimum value	Maximum value	Limit value
I	83.008 mm (3.2680 in.)	83.014 mm (3.2682 in.)	83.024 mm (3.2686 in.)
II	83.014 mm (3.2682 in.)	83.020 mm (3.2685 in.)	83.030 mm (3.2688 in.)
III	83.020 mm (3.2685 in.)	83.026 mm (3.2687 in.)	83.036 mm (3.2691 in.)

HEAD TIMING

HEAD INSTALLATION

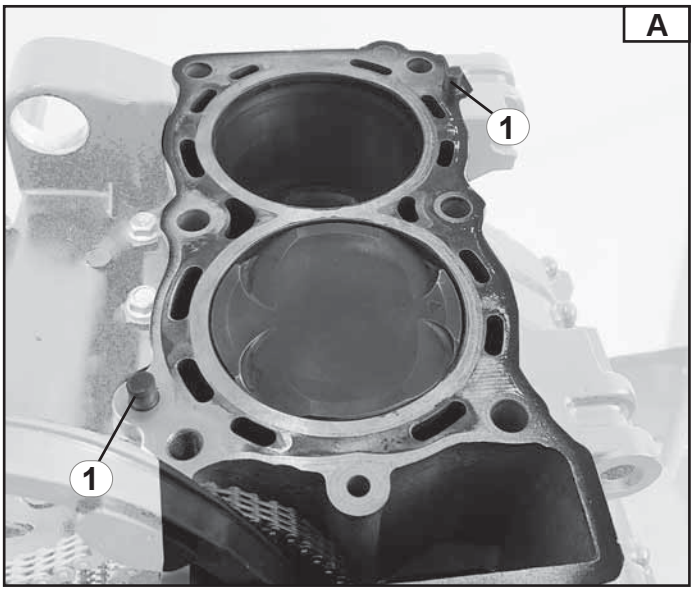
Install:
- The cylinder assembly.

Check:
- The centring bushes (1) are in position Fig. A.

Place:
- The head.

Before assembling the head, replace the gasket.

A

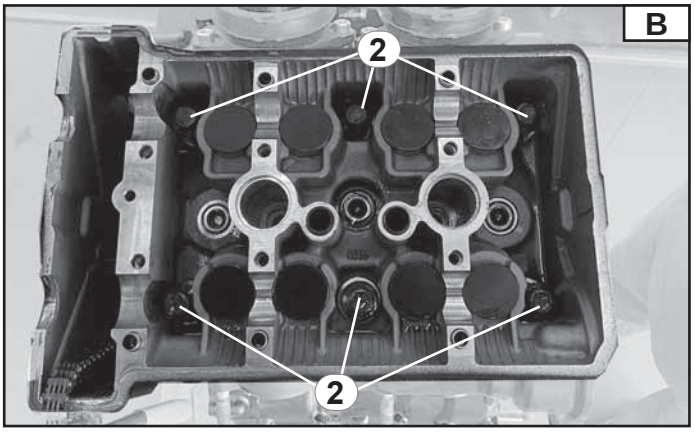


Tighten:
- The screws (2) Fig. B following the sequence stated in Fig. C in two stages:

NOTE:
During assembly of the head, lubricate the head screws with copper grease.

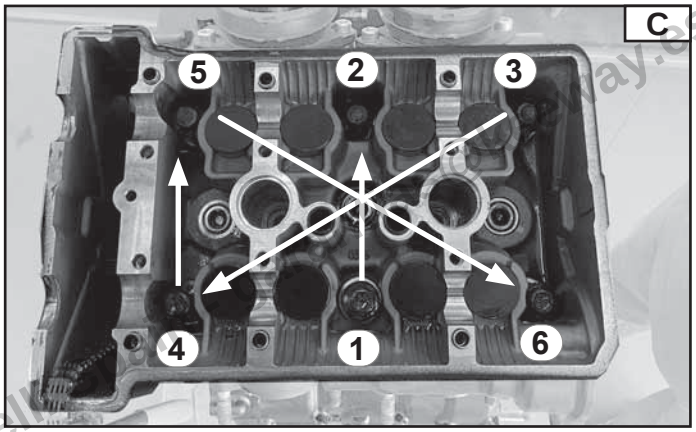
	COPPER GREASE

B



Step one:
Torque 25 N*m
Step two:
Torque 55 N*m

C

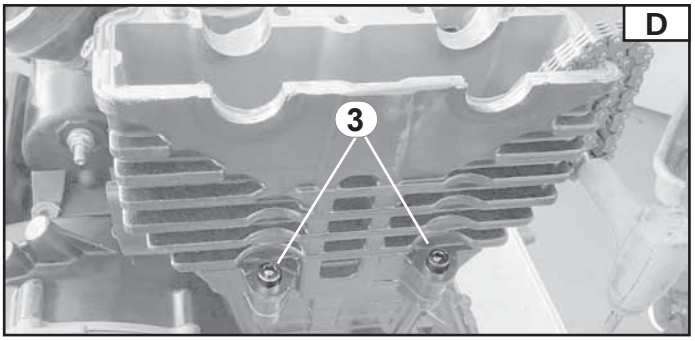


- The screws (3) Fig. D to the following torque:

Torque 10-11 N*m

NOTE:
During assembly of the head, lubricate the head screws with copper grease.

D

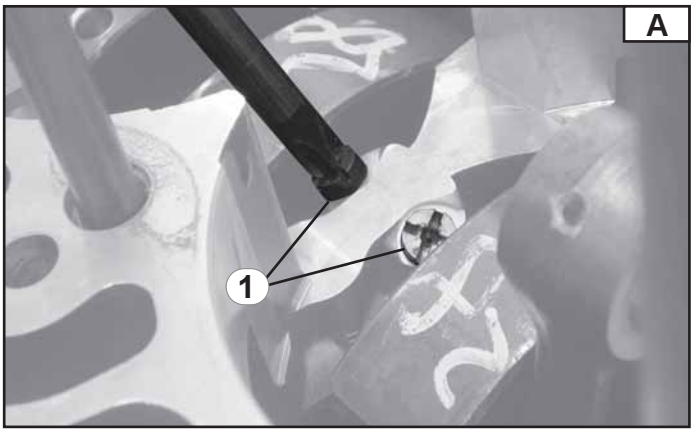


HEAD TIMING

REMOVAL / INSTALLATION OF THE LUBRICATION NOZZLES

Remove:

- The coils and spark plugs, refer to "**Removal of the coils and spark plugs, Chapter 5**".
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The head, refer to **"Removal of the head, Chapter 5".**
- The cylinder block.
- The nozzles (1) Fig. A.



Check:

- That the nozzles are not clogged.

Installation:

Proceed using the opposite order to removal.

Tighten:

- The nozzles (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

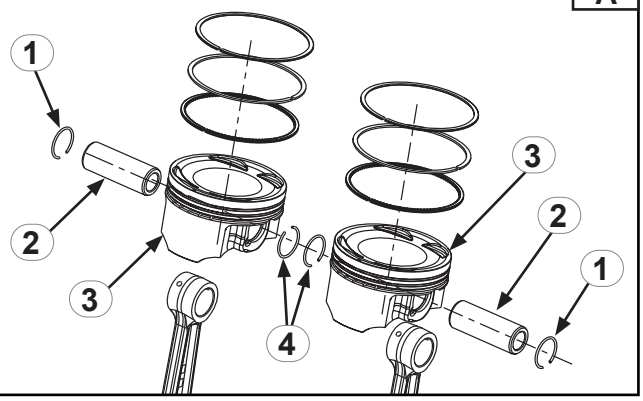
REMOVAL OF THE PISTONS

The following removal process applies to all pistons.

Remove:

- The coils and spark plugs, refer to "**Removal of the coils and spark plugs, Chapter 5**".
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The head, refer to **"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.

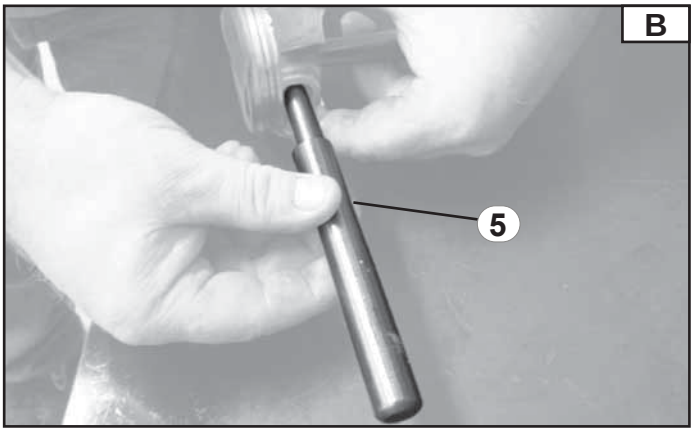
A



NOTE:
To remove the piston pin, use a pad (5) Fig. B.

NOTE:
Never use hammers to remove the pins.

B



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.

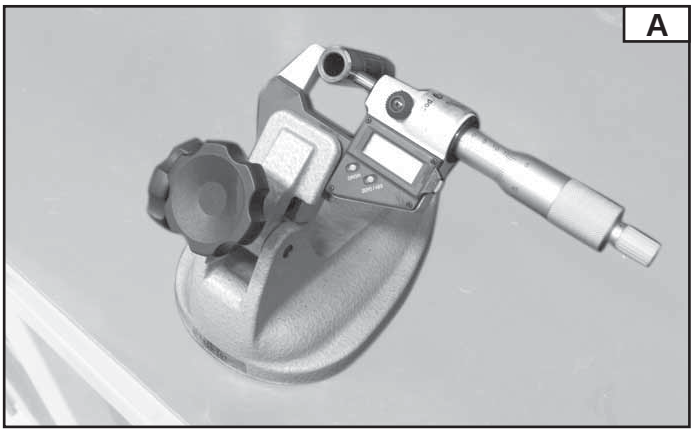
Measure:
- The outer diameter of the piston pin Fig. A via the measure tool.

If outside the specifications, replace the piston pin.

- The inner bore diameter of the piston pin (1) Fig. B.

If outside specifications, replace the piston.

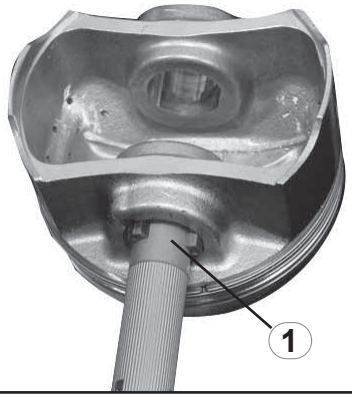
A



Piston pin OD	
STANDARD	18.994 mm - 19.000 mm (0.747 - 0.748 in)
Limit	18.980 mm (0.747 in.)

Piston ID	
STANDARD	19.004 mm - 19.010 mm (0.748 - 0.748 in)
Limit	19.020 mm (0.748 in.)

B



PISTONS
CHECK OF ELASTIC RINGS

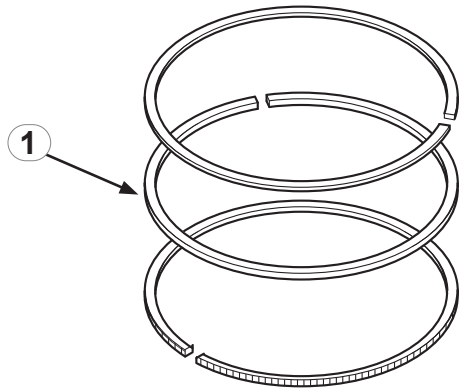
The following procedure is applied to all elastic rings (1) Fig. A.

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.

A



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.

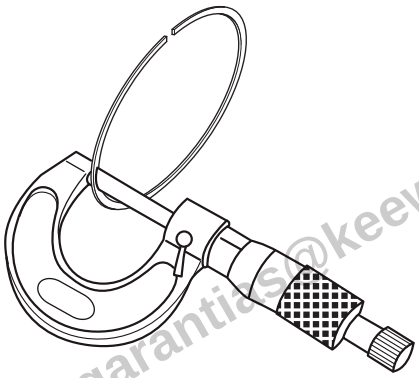
B

Ring	Clearance between the elastic rings and the piston groove
Top ring	0.05÷0.07 mm (0.0019 ÷ 0.0027 in)
Second ring	0.04÷0.06 mm (0.00157 ÷ 0.00236 in)

Measure:
- The thickness of the top ring.
- The thickness of the second ring.

Refer to Fig. C.

C



1st segment (compression)
Thickness= 0.87 - 0.89 mm
Limit= 0.85mm
End span= 0.25 - 0.40 mm
Limit =0.5 mm
2nd segment (compression/oil scraper)
Thickness= 0.97 - 0.99 mm
Limit= 0.95mm
End span= 0.40 - 0.60 mm
Limit =0.6 mm
3rd segment (oil scraper)
End span= 0.20 - 0.70 mm
Limit =1.0 mm
(1 mm = 0.0393701 in)

PISTONS
CHECK OF PISTONS

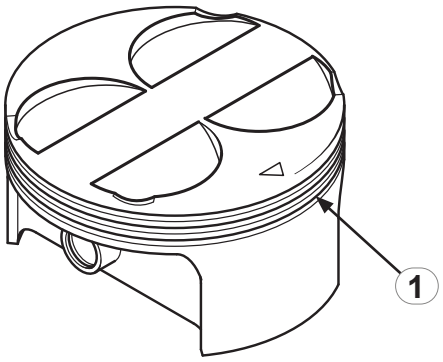
The following procedure applies to both pistons.

Inspect:
- The wall of the piston (1) Fig. A.

If there are any vertical lines, replace the piston all together with the relevant rings.

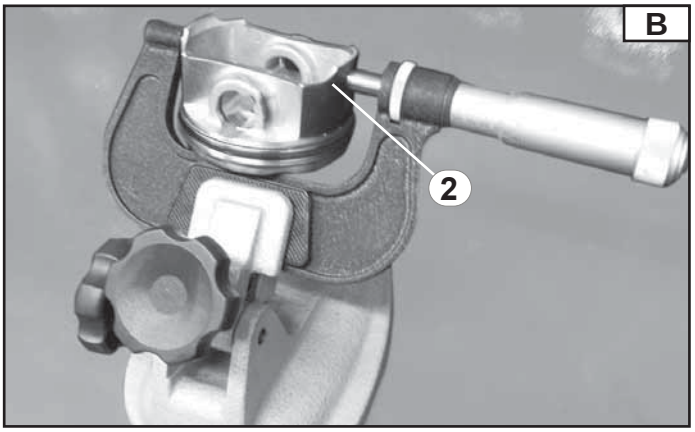
Measure:
- The diameter of the piston skirt (2) via a micrometre, considering a distance from the bottom edge of around 14 mm (0.551181 in) Fig. B.

A



Selection identification	Minimum value	Maximum value	Limit value
I	82.970 mm	82.976 mm	82.960 mm
II	82.976 mm	82.982 mm	82.966 mm
III	82.982 mm	82.988 mm	82.972 mm
(1 mm = 0.0393701 in)			

B



If outside specifications, replace the cylinder and the relevant rings all together.

If outside specifications:
Wrong tolerance (excessive) between the piston and the cam, max. limit 0.06 mm

Minimum clearance	Maximum clearance	Limit value
0.032 mm	0.044 mm	0.06 mm
0.032 mm	0.044 mm	
0.032 mm	0.044 mm	
(1 mm = 0.0393701 in)		

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).

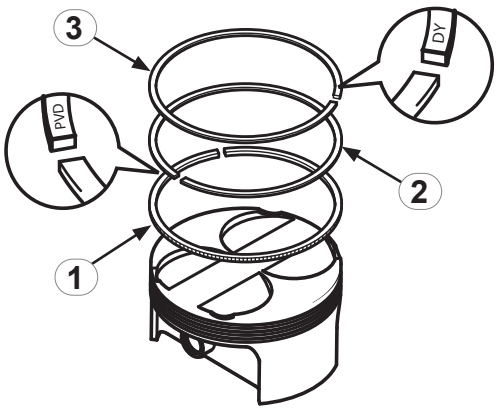
NOTE:
The first and second ring are marked with the letter DY on the top side and PVD Fig. A.
Remember to install the piston rings so that the letters are facing upwards Fig. B.
Lubricate the rings with engine oil during the insertion stage.

The first element to insert in the oil scraper slot is the spacer (D) Fig. C.
After positioning the shim, insert its side rings (E) Fig. B. C.

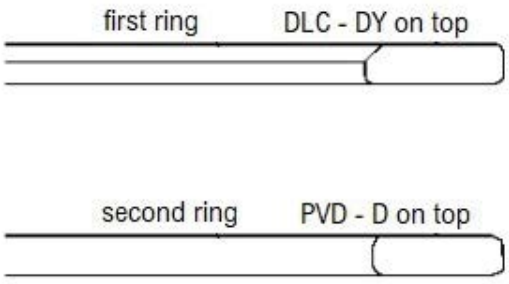
NOTE:
The spacer and side rings have no particular top or bottom side, meaning they can be inserted in any way.

NOTICE
When installing the spacer, make sure that its ends do not overlap in the slot Fig. D.

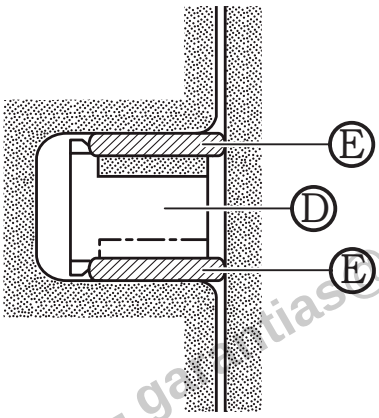
A



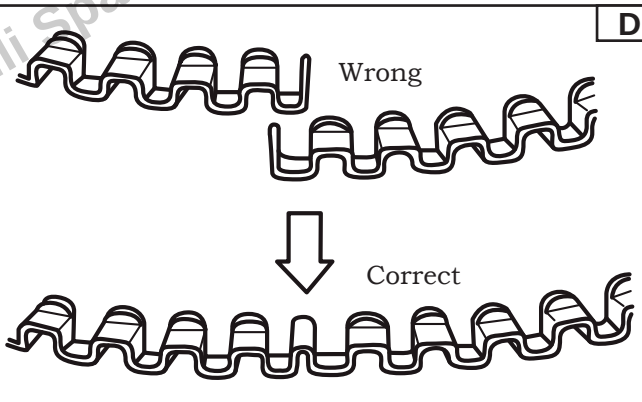
B



C



D



PISTONS

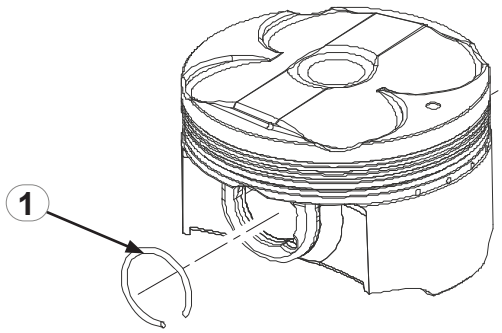
INSTALLATION OF THE PISTON

Place:
- The internal spring (1) Fig. A.

Insert:
- The pistons (1) into the corresponding cylinders (2) Fig. B.

To insert the pistons into the cylinders, it is necessary to use a specific ring clamp to hold the rings.
Generic ring clamp tool.

A

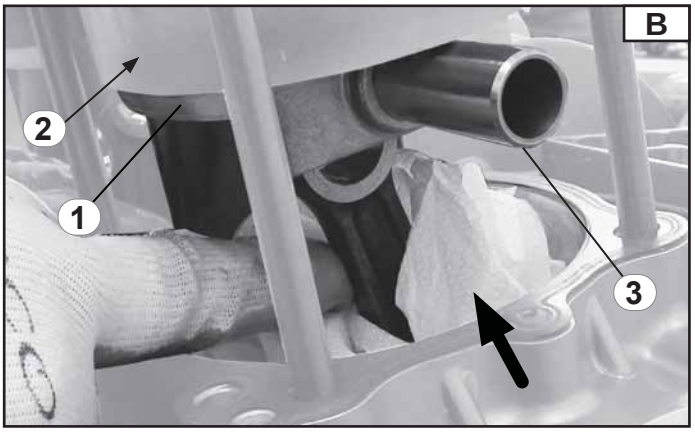


Insert:
- The pin (3) Fig. B.

NOTE:
Place some paper to avoid possible falls of parts into the engine Fig. B.

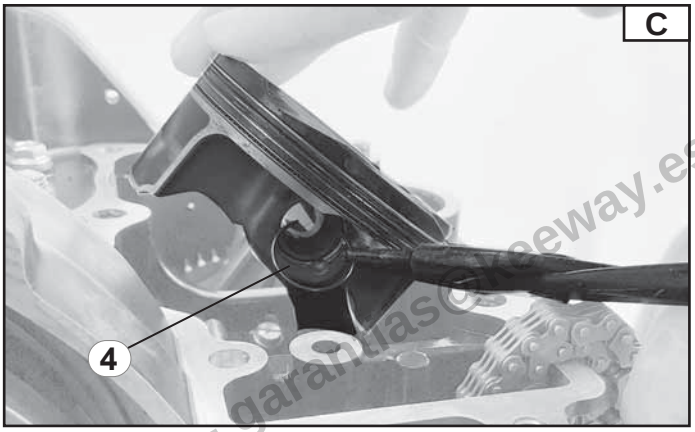
NOTE:
During this stage, lubricate parts with engine oil.

B



Insert:
- The outer spring (4) Fig. C.

C

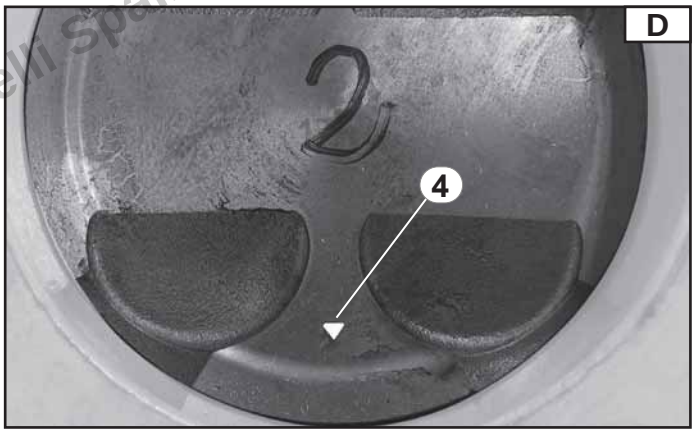


NOTICE

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.

NOTE:
Insert also the insertion of the second piston into the second cylinder as previously described.

D



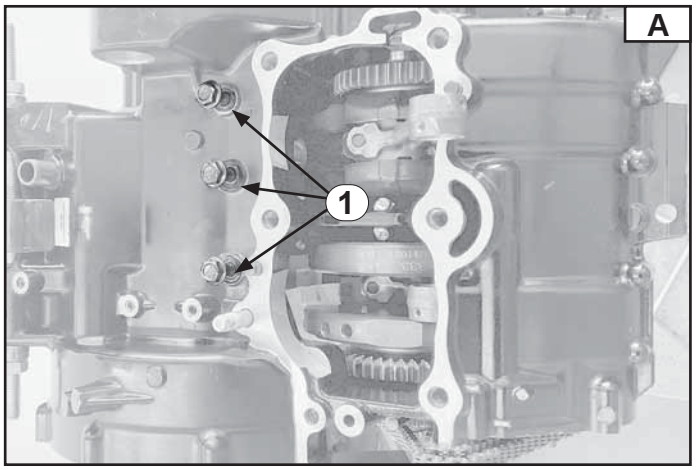
CRANKCASE

REMOVAL OF CONNECTING RODS

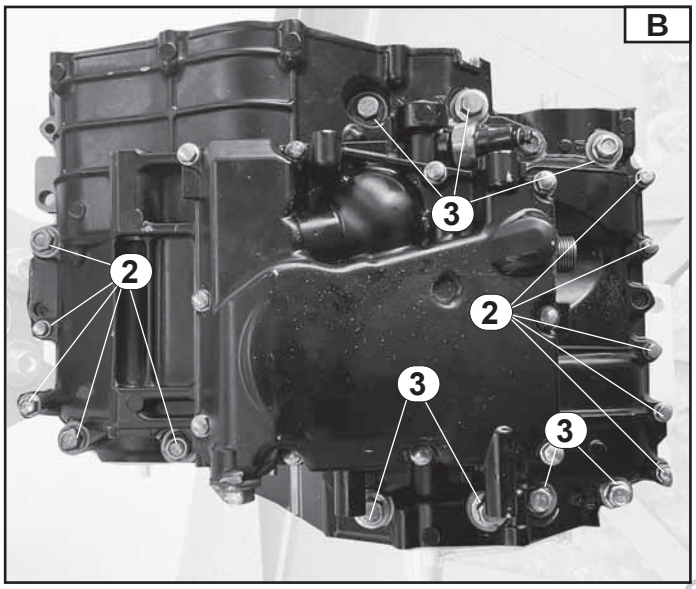
Remove:

- The coils and spark plugs, refer to "**Removal of the coils and spark plugs, Chapter 5**".
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The chain tensioner, refer to **"Removal of the distribution chain tensioner, Chapter 5".**
- The exhaust camshaft, refer to **"Removal of the intake and exhaust camshaft, Chapter 5".**
- The intake camshaft, refer to **"Removal of the intake and exhaust camshaft, Chapter 5".**
- The head, refer to **"Removal of the head, Chapter 5".**
- The cylinders, refer to **"Removal of the cylinders, Chapter 5".**
- The pistons, refer to **"Removal of pistons, Chapter 5".**
- The flywheel, refer to **"Removal of the flywheel, Chapter 5".**
- The movable chain sliding shoe, refer to **"Removal of the chain sliding shoe, Chapter 5".**
- The clutch, refer to **"Removal of the clutch, Chapter 5".**
- The gearbox, refer to **"Removal of the gearbox, Chapter 5".**
- The oil sump, refer to **"Removal of the oil sump, Chapter 5".**
- The screws (1) Fig. A.

NOTE:
During removal of the retaining screws, do not remove also the related washer Fig. A.

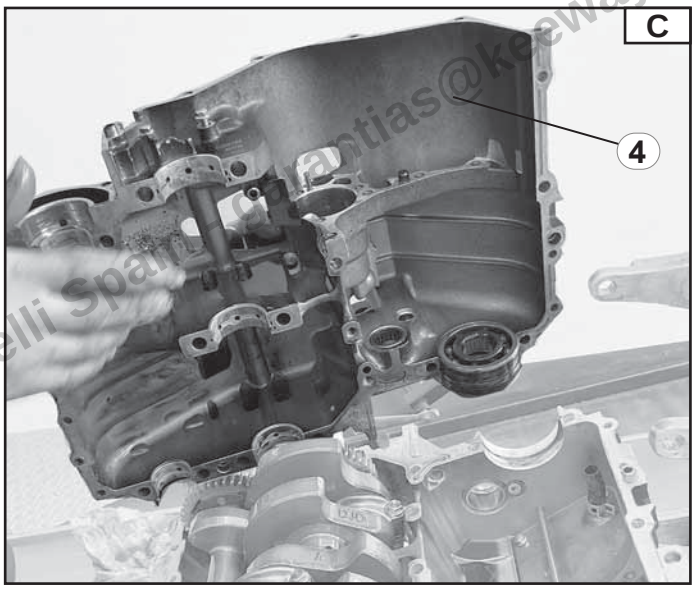


- The screws (2) Fig. B.
- The screws with corresponding seals (3) Fig. B.



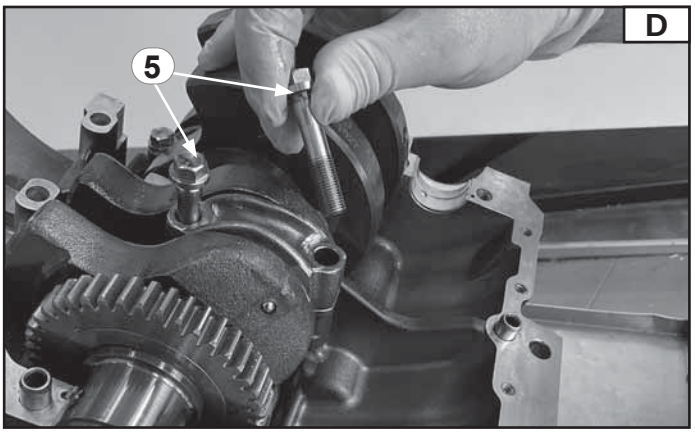
Raise:

- The lower crankcase (4) Fig. C.



CRANKCASE

REMOVAL OF CONNECTING RODS



Remove:

- The connecting rod screws (5) Fig. D for both connecting rods.

Slide out:

- The crankshaft.

Slide out:

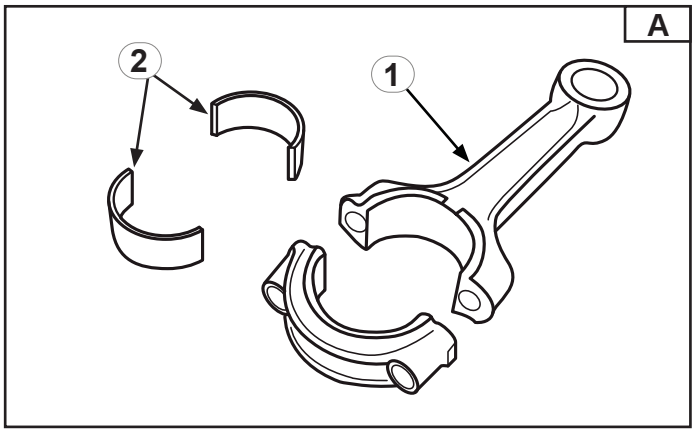
- The connecting rods.

CRANKCASE

CHECK OF CONNECTING RODS AND CONNECTING ROD HALF BEARING

Check:

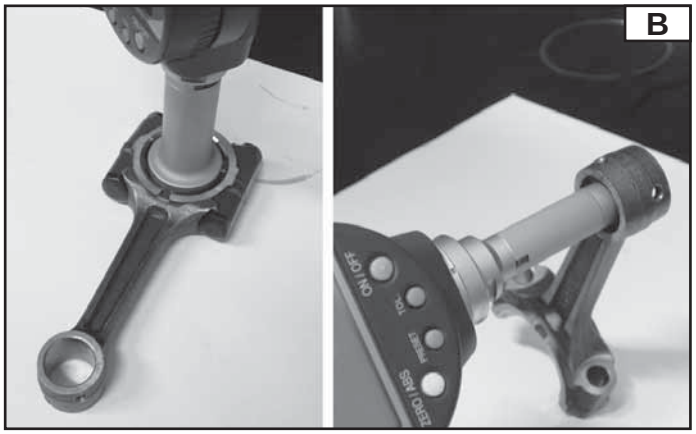
- For any breakages or excessive clearance on the connecting rod (1) and half bearings of the connecting rod big end (2) Fig. A.



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 at 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 41 mm (41.000-41.008)
	Ø 41 mm (41.009-41.016)
Connecting rod small end	Ø 19 mm (-0/+0.01)
(1 mm = 0.0393701 in)	

For selecting the bushes of the connecting rod, refer to the table below.

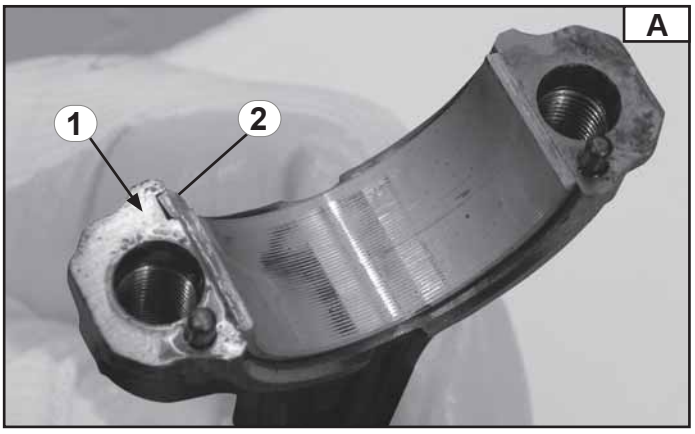
Selection of connecting rod big end inserts		
Hole selection: (connecting rod)	Shaft selection:	
	(A) 37.984 37.992 (mm)	(B) 37.993 38.000 (mm)
(I) Ø 41 mm (41.000-41.008)	Black	Brown
(II) Ø 41 mm (41.009-41.016)	Blue	Black
(1 mm = 0.0393701 in)		

CRANKCASE

INSTALLATION OF CONNECTING RODS AND CONNECTING ROD HALF BEARINGS

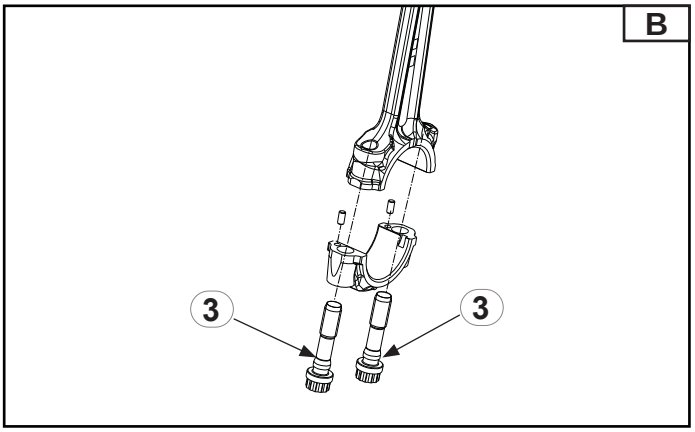
Install:

- connecting rod big end half bearing



NOTE:
Align the projections (2) on the half bearings with the reference marks (1) 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.



Install:

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

Step one:
Torque 14-16 N*m
Step two:
Torque 26-26 N*m
Step three:
Torque 44-66 N*m

NOTE:
Apply molybdenum disulphide oil to the threads and the surfaces of the nuts and the bolts of the connecting rod big ends.

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

Clean:

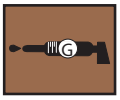
- The main half bearing (1) Fig. A.

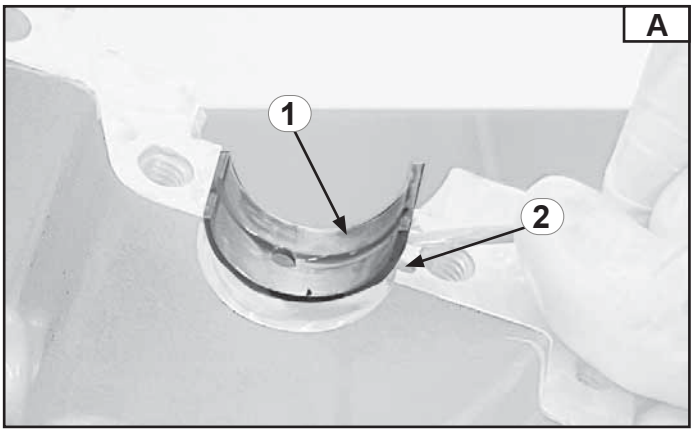
Install:

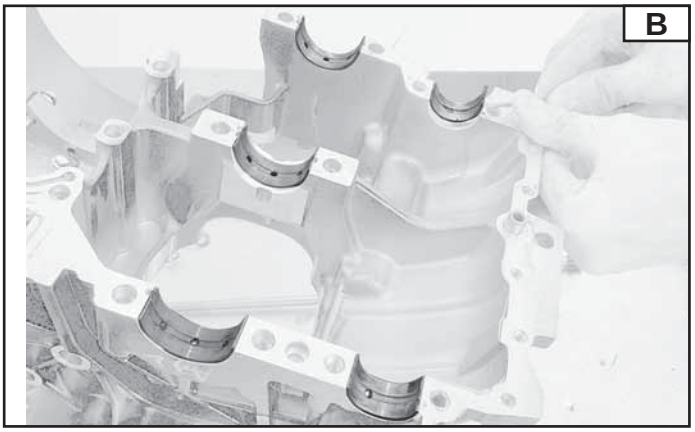
- The main half bearings (1) in the relevant seats from the upper and lower crankcase Fig. A.

NOTE:
Align the projections of the main half bearings with the slots in the 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.

Hole selection: (crankcase)	Shaft selection (bearing journal)	
	(A) 37.984 37.992 (mm)	(B) 37.993 38.000 (mm)
(I) Ø 41 mm (41.000-41.008)	Black	Brown
(II) Ø 41 mm (41.009-41.016)	Blue	Black
Hole selection: (crankcase)	(A) 27.987 27.993 (mm)	(B) 27.994 28.000 (mm)
(I) Ø 31 mm (31000-31.008)	Black	Brown
(II) Ø 31 mm (31.009-31.016)	Blue	Black
(1 mm = 0.0393701 in)		

NOTE:
In case of replacement of the crankshaft, it is necessary to replace the main half bearings.

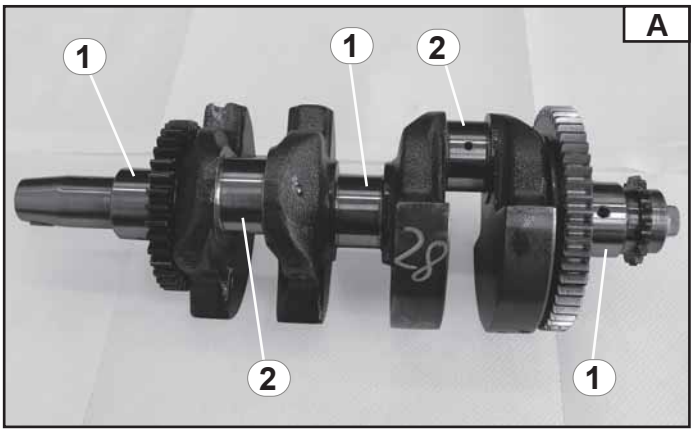
CRANKCASE

CHECK OF THE CRANKSHAFT

Measure:

- The eccentricity of the crankshaft.

If outside specifications, replace the crankshaft.



Crankshaft eccentricity	Size	
Crankshaft	(1) 37.984 37.992 (mm)	(2) 37.993 38.000 (mm)
Standard eccentricity	0.02 mm	
Eccentricity limit	0.05 mm	
(1 mm = 0.0393701 in)		

NOTE:
If the eccentricity limit value is exceeded, replace the shaft.

Inspect:

- The main support surfaces (1) Fig. A.
- The connecting rod support surfaces (2) Fig. A.

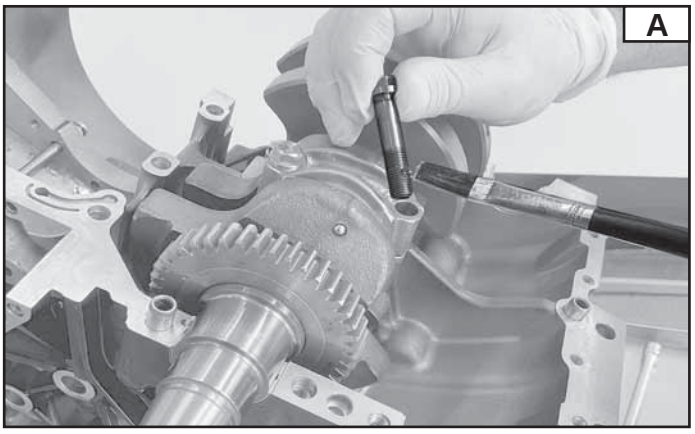
If there is any rust/lines/signs of wear, replace the crankshaft.

CRANKCASE

INSTALLATION OF CONNECTING RODS

Once the crankshaft has been inserted, proceed to assemble the big ends Fig. A.

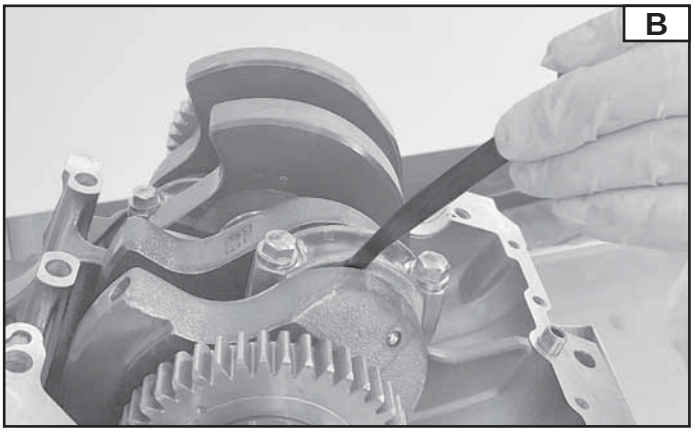
NOTE:
Lubricate the connecting rod big end pins with copper grease Fig. A.



Measure:
The crankshaft-connecting rod big end collar using a thickness gauge Fig. B.

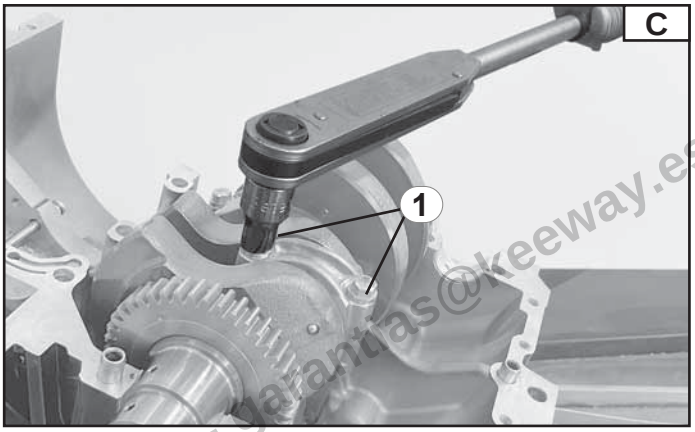
Measuring	Size
Crankshaft - Connecting rod big end	0.15 ~ 0.25 mm (0.5905512 ~ 0.0098 in)

NOTE:
Measure both big ends.



Tighten:
- The screws (1) Fig. C in three stages:

Step one:
Torque 14-16 N*m
Step two:
Torque 26-26 N*m
Step three:
Torque 44-66 N*m



NOTE:
Apply molybdenum disulphide oil to the threads and the surfaces of the nuts and the bolts of the connecting rod big ends.

NOTE:
Every time that the connecting rods are assembled, it is necessary to replace the screws.

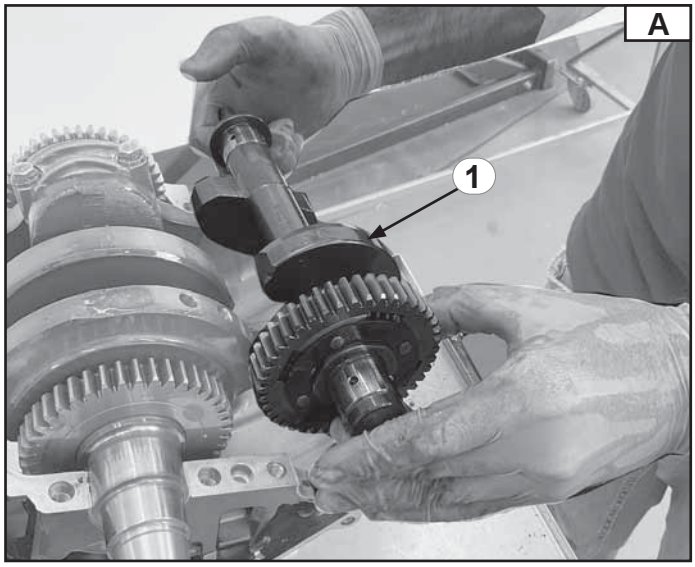
After having inserted the crankshaft and the connecting rods, assemble the balance shaft.

CRANKCASE

REMOVAL OF THE BALANCE SHAFT

Remove:

- The engine from the frame, refer to "**Removal of the engine, Chapter 5**".
- The flywheel, refer to **"Removal of the flywheel, Chapter 5".**
- The clutch, refer to **"Removal of the clutch, Chapter 5".**
- The top and bottom engine half casing**, refer to "Removal of the connecting rods".**
- The intake camshaft, refer to **"Removal of the intake and exhaust camshaft, Chapter 5".**
- The coils and spark plugs, refer to "**Removal of the coils and spark plugs, Chapter 5**".
- The flywheel, refer to "**Removal of the flywheel, Chapter 5**".
- The camshaft cover, refer to **"Removal of the camshaft cover, Chapter 5".**
- The chain tensioner, refer to **"Removal of the distribution chain tensioner, Chapter 5".**
- The head, refer to **"Removal of the head, Chapter 5".**
- The movable chain sliding shoe, refer to **"Removal of the chain sliding shoe, Chapter 5".**
- The balance shaft (1) Fig. A.



CRANKCASE

INSTALLATION OF THE BALANCE SHAFT

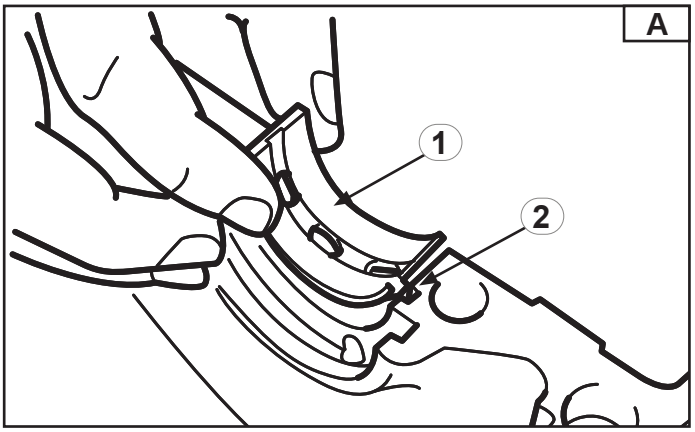
Clean:

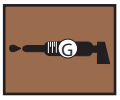
- The main half bearing (1) Fig. A.

Install:

- The main half bearings (1) in the relevant seats from the upper and lower 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.



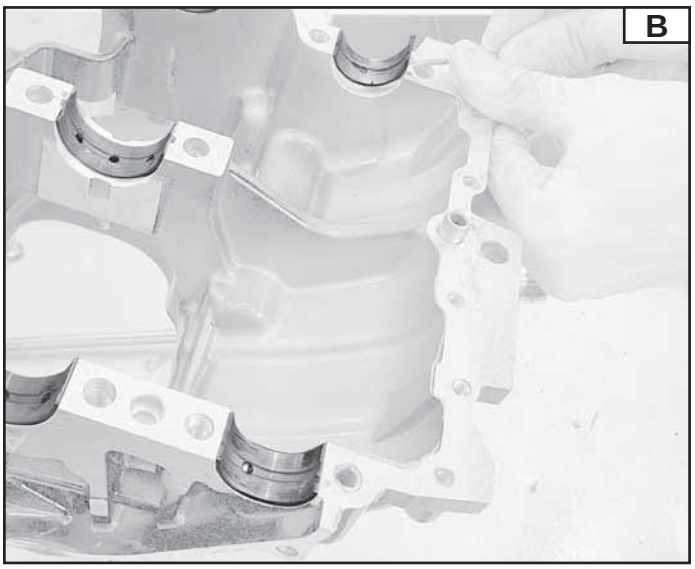
	**Teflon-based paste or of other lubricants, as graphite, ceramics.**

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.

Hole selection: (crankcase)	(A) 27.987 27.993 (mm)	(B) 27.994 28.000 (mm)
(I) Ø 31 mm	Black	Brown
(II) Ø 31 mm	Blue	Black
(1 mm = 0.0393701 in)		

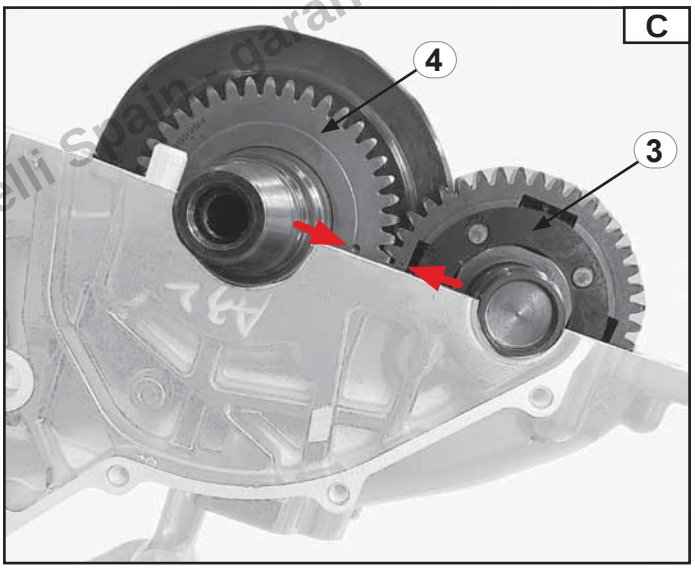


NOTE:
In case of replacement of the balance shaft, it is necessary to replace the main half bearings.

Install:

- The balance shaft (3) Fig. C.

NOTE:
When installing the balance shaft, pay attention to align the crankshaft (4) with the balance shaft (3) as shown in Fig. C.



CLUTCH

REMOVAL OF THE CLUTCH

Park:

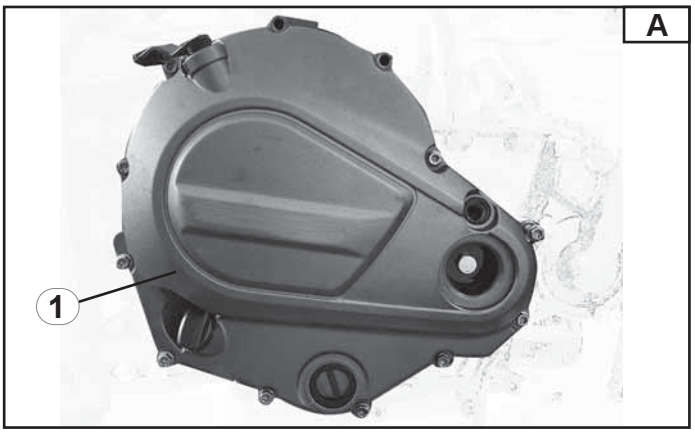
- The motorcycle on a level surface.

NOTICE

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

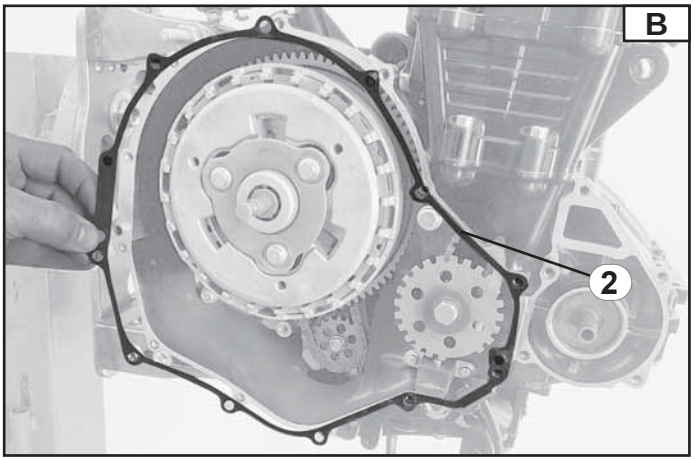
Remove:

- The engine oil, refer to **"Change of the engine oil, Chapter 3".**
- The clutch cover (1) Fig. A.

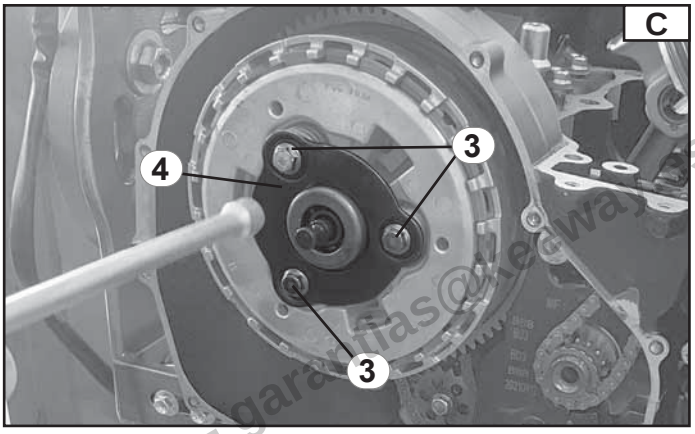


- The gasket (2) Fig. B.

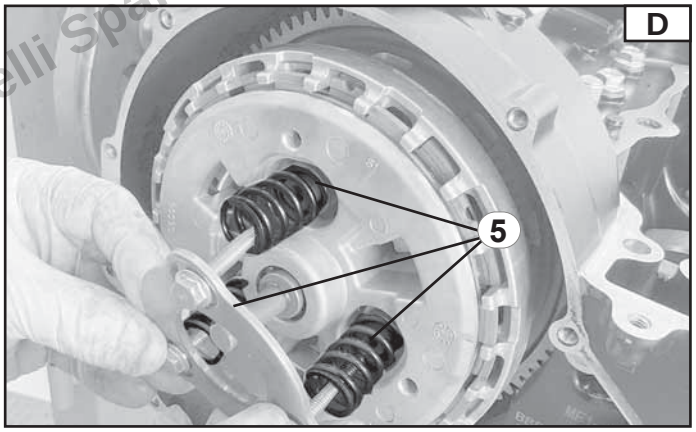
NOTE:
In case of anomalies of the gasket, replace with a new one during the installation.



- The screws (3) Fig. C.
- The support flange (4) Fig. C.



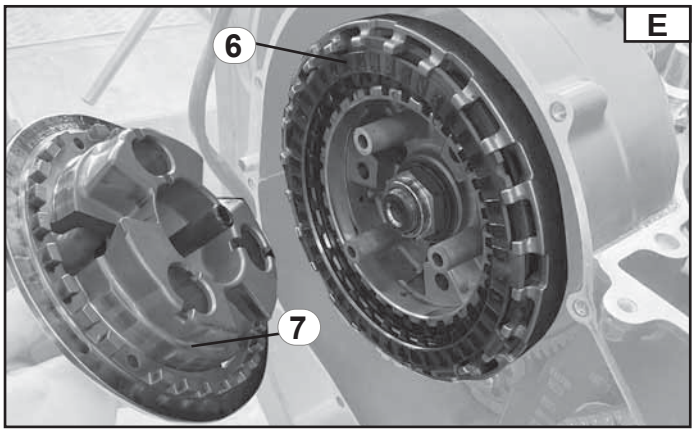
- The clutch springs (5) Fig. D.



CLUTCH

REMOVAL OF THE CLUTCH

- The clutch plates (6) and the related cover (7) Fig. E.

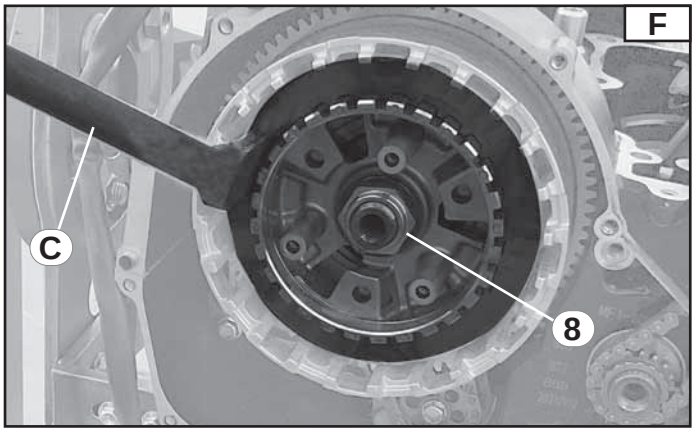


Remove:

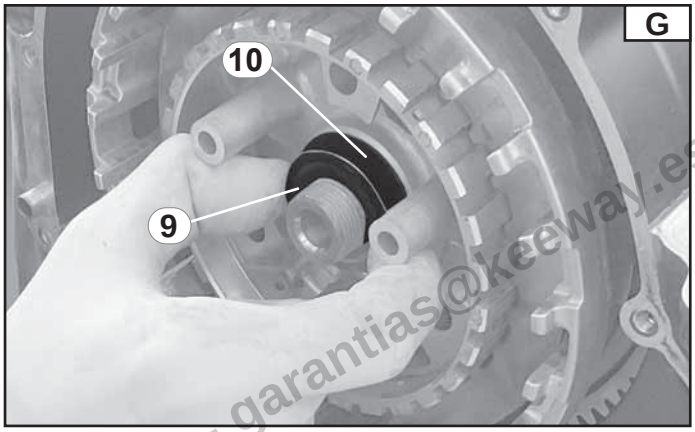
- The nut (8) Fig. F.

NOTE:
For disassembly, use the specific tool (X) Fig. F.

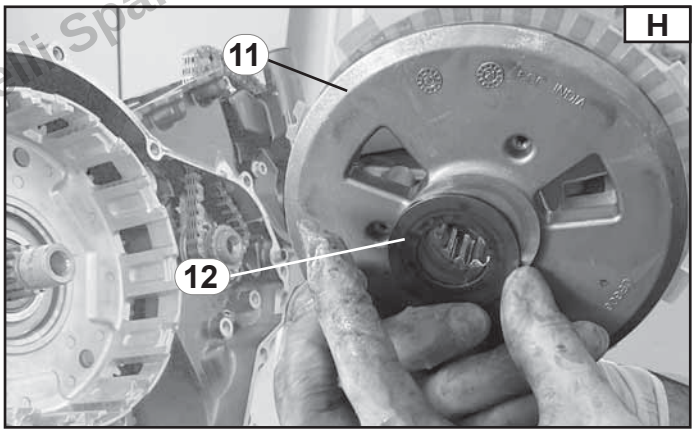
Clutch drum locking tool.
Code: KST03BS01206



- The two washers (9) and (10) Fig. G.



- The disc support (11) with the relevant washer (12) Fig. H.

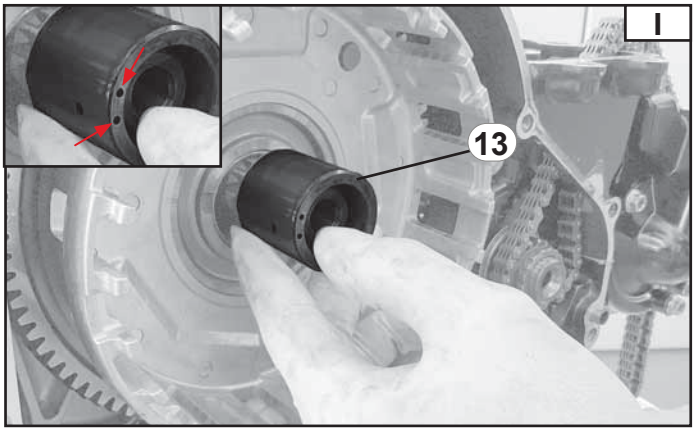


CLUTCH

REMOVAL OF THE CLUTCH

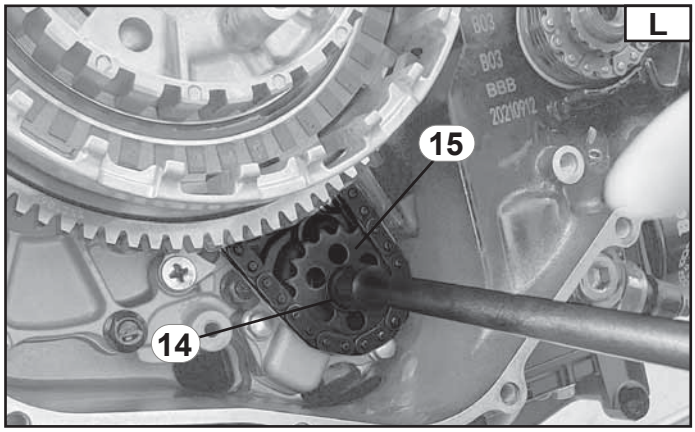
- The guide spacer (13) Fig. I.

NOTE:
Pay attention to the direction of the bush. The 2 points on it indicate the outer side Fig. I.

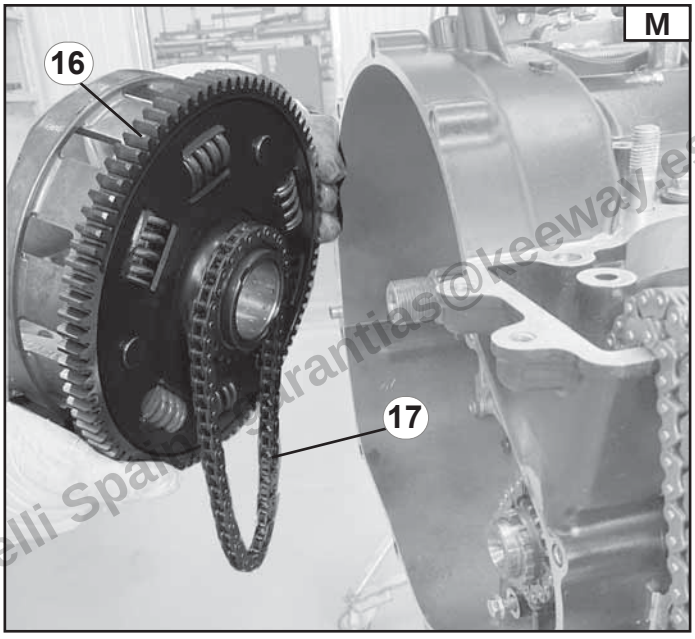


- The oil pump ring gear locking screw (14) with the relevant washer Fig. L.
- The oil pump ring gear (15) Fig. L.

NOTE:
The screw is lefthanded, therefore pay attention when extracting.

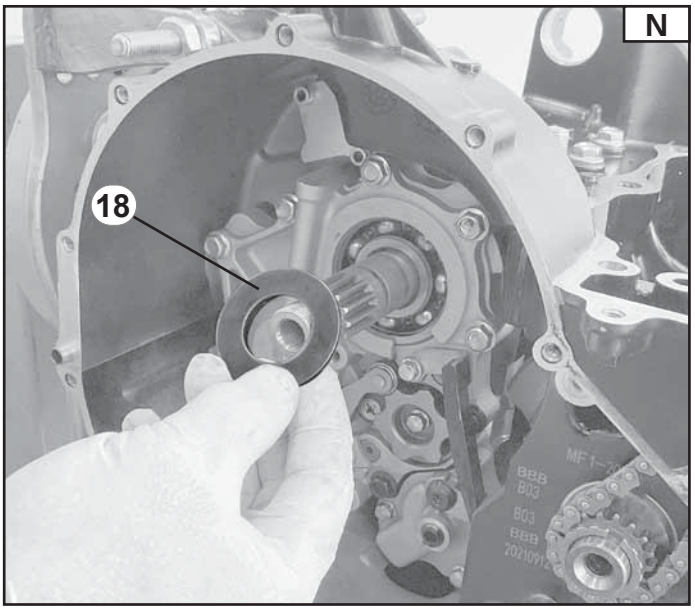


- The clutch bell (16) and the relevant chain (17) Fig. M.



CLUTCH
REMOVAL OF THE CLUTCH

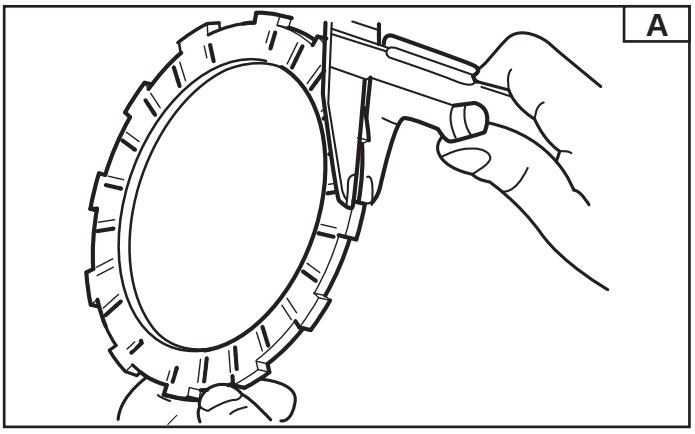
- The scraper washer (18) Fig. N.



CLUTCH

CHECK OF THE FRICTION PLATES

The following procedure applies to all friction plates.



Inspect:

- The friction plate.

If there is any damage/wear, replace the friction plates.

Measure:

- The thickness of the friction plates Fig. A.

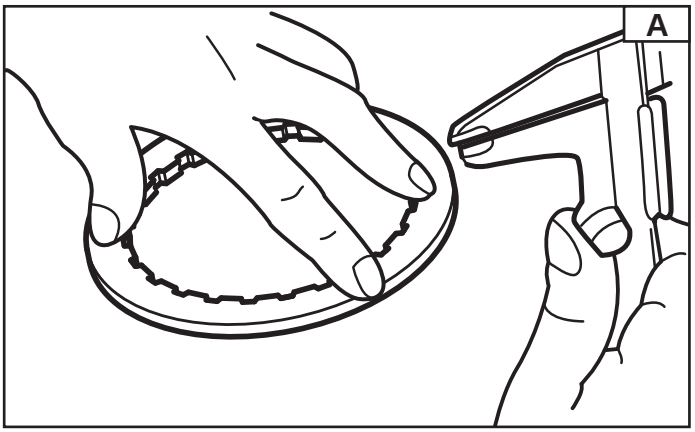
If not within specifications, replace the friction plates together.

Disc	Disc number	Minimum thickness of new disc (mm)	Maximum thickness of new disc (mm)	Minimum thickness of worn disc (mm)
Friction disc	7	3	3.1	2.8
(1 mm = 0.0393701 in)				

NOTE:
Measure the friction plate in four points.

CLUTCH
STEEL DISC CHECK

The following procedure applies to all steel discs.



Inspect:
- The steel disc.

If there is any damage/wear, replace the steel discs all together.

Measure:
- The warping of the steel discs Fig. B. A.

If not within specifications, replace the steel discs together.

Disc	Disc number	Minimum thickness of new disc (mm)	Maximum thickness of new disc (mm)	Minimum thickness of worn disc (mm)
Single disc (steel)	6	1.95	2	1.95
Steel disc warping (mm) 0.1				
(1 mm = 0.0393701 in)				

NOTE:
Carry out the check, placing the plates on a reference surface and take the measurements using a thickness gauge.

CLUTCH

INSPECTION OF CLUTCH SPRINGS

The following process is applied to all clutch springs.

Inspect:

- The clutch springs.

If there is any damage/wear, replace all of springs.

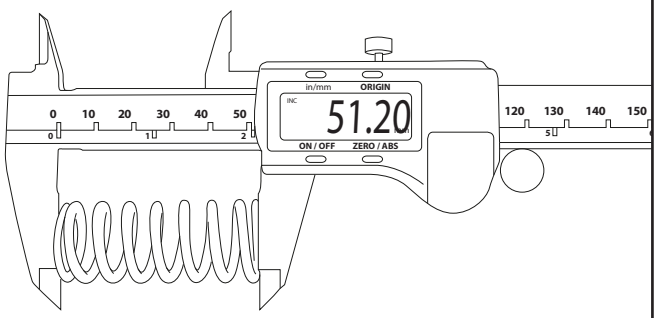
Measure:

- The full length of the clutch spring Fig. A.

If not within specifications, replace the clutch springs together.

Spring	Free length
Clutch spring	51.20 ± 0.2 mm
(1 mm = 0.0393701 in)	

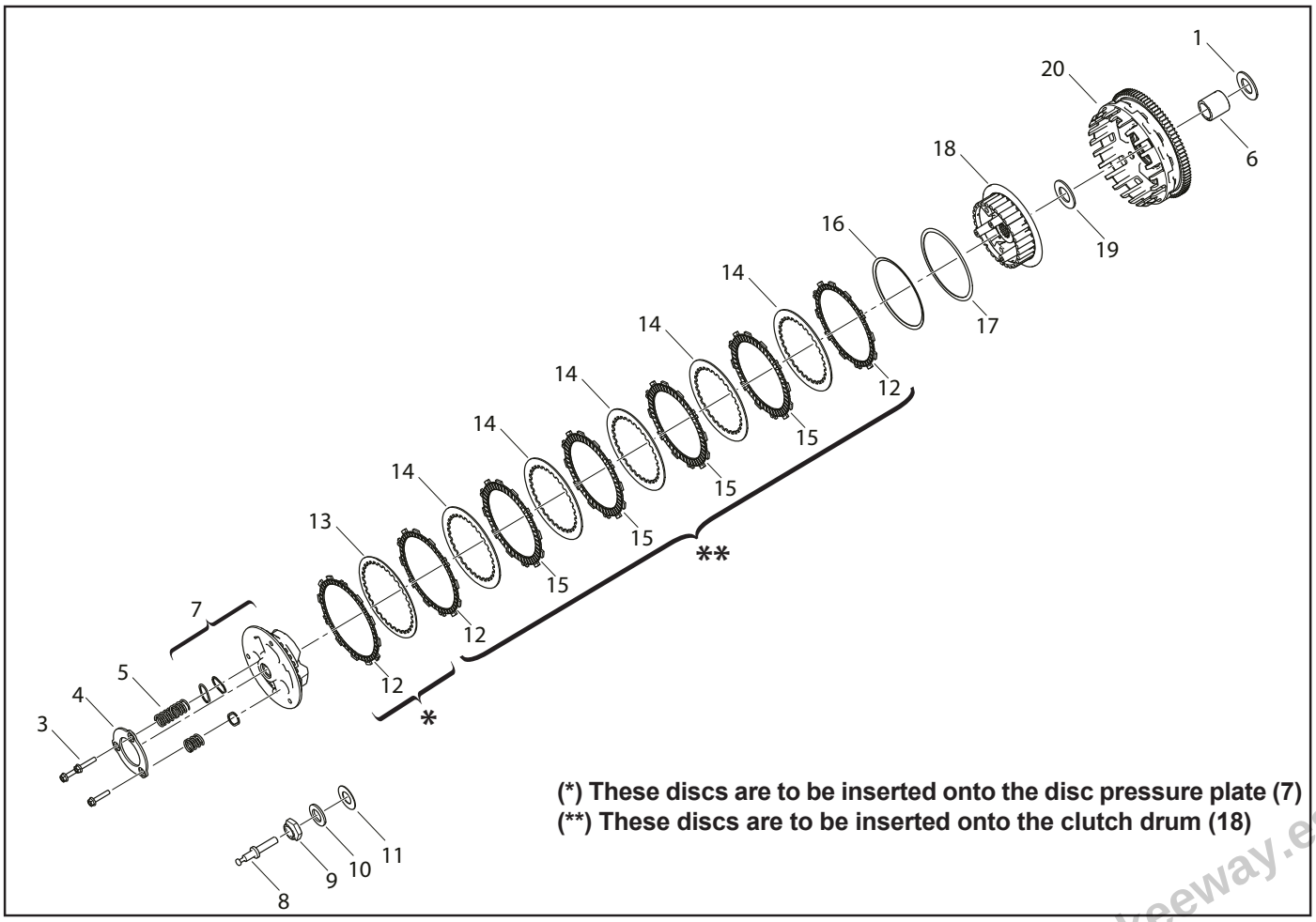
A



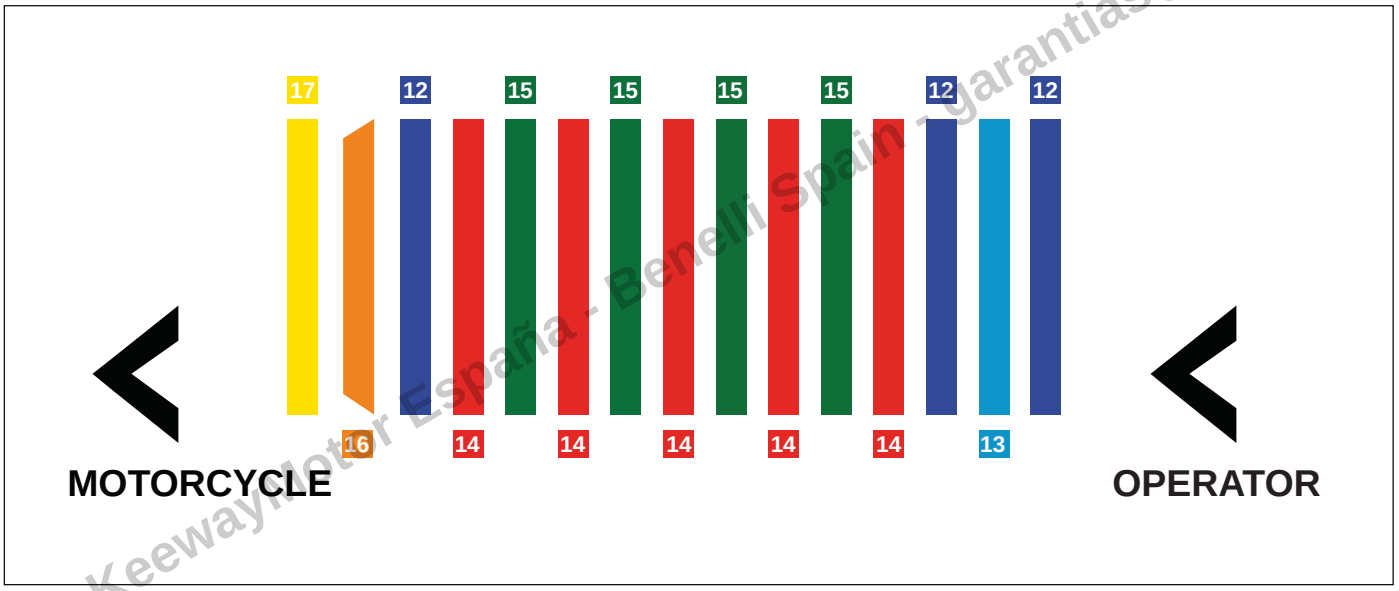
CLUTCH
DISC ASSEMBLY

Assemble:

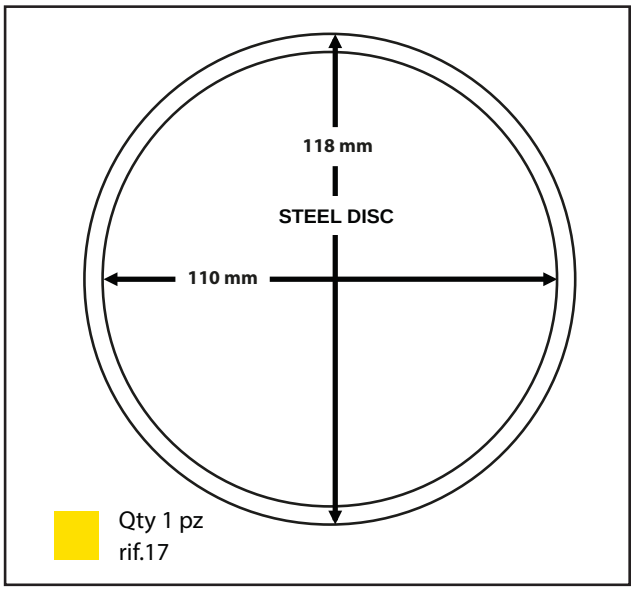
- The discs in the opposite order than their removal, following the diagram below.

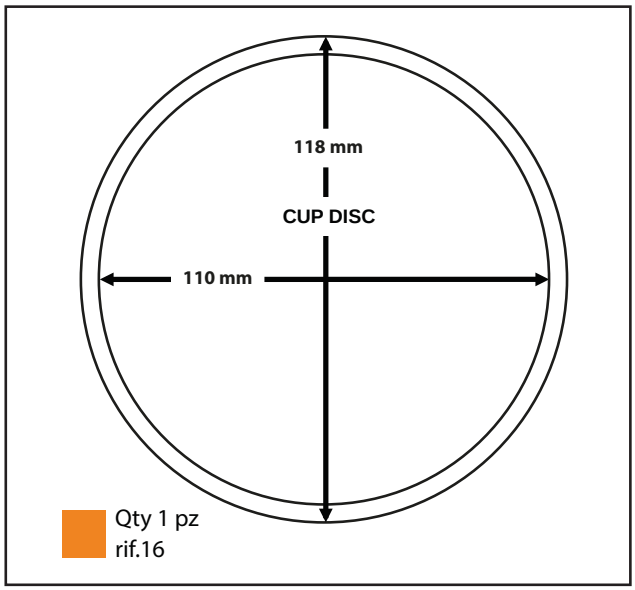


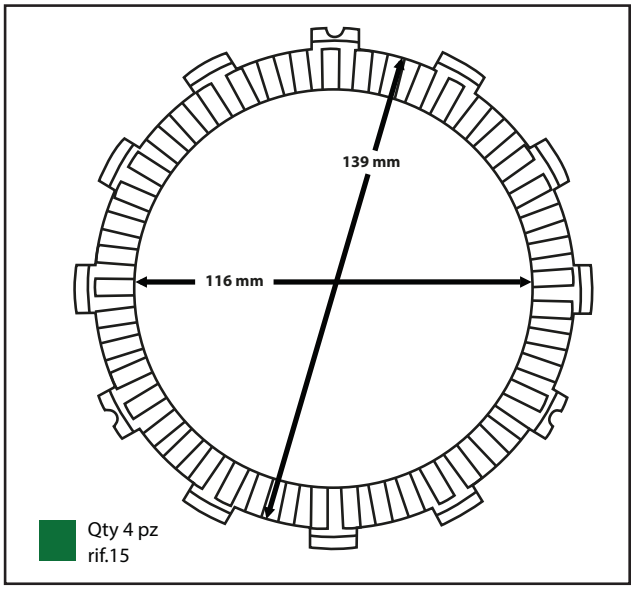
(*) These discs are to be inserted onto the disc pressure plate (7)
(**) These discs are to be inserted onto the clutch drum (18)

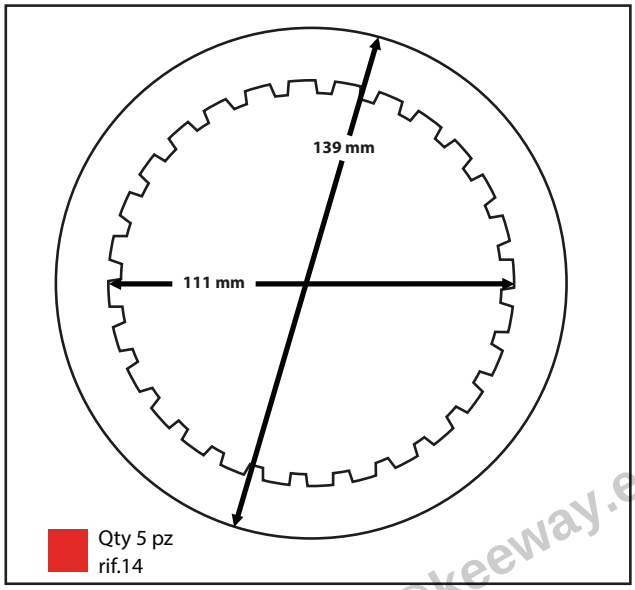


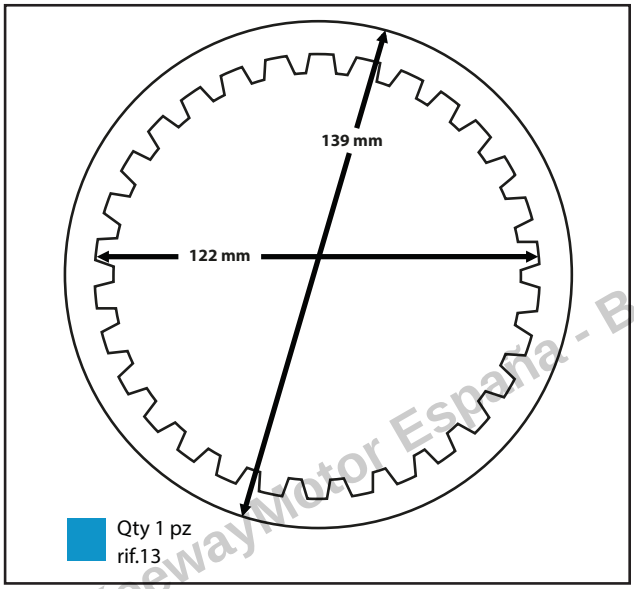
CLUTCH
DISC ASSEMBLY

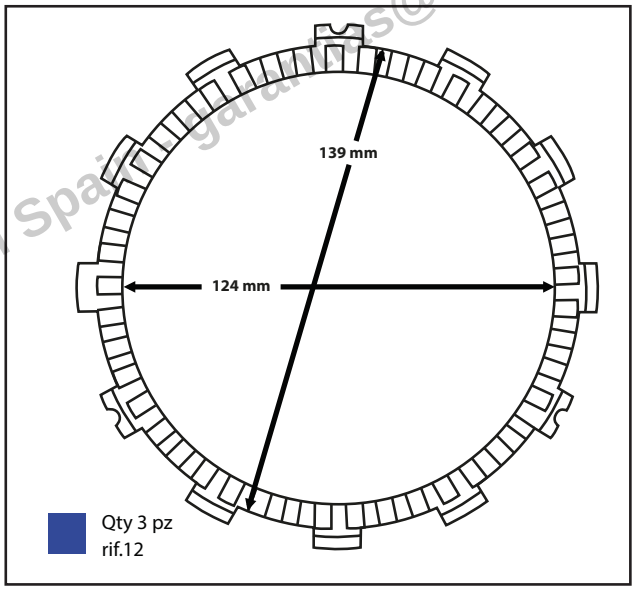












(1 mm = 0,0393701 in)

CLUTCH
INSTALLATION OF THE CLUTCH

Park the motorcycle on a level surface.

NOTICE

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

Install:
Proceed using the opposite order to removal.
Tighten:

- The oil pump ring gear locking screw (1) with the relevant washer Fig. A.

NOTE:
the screw is lefthanded, therefore pay attention when tightening.

Torque 12 N*m

Use medium Loctite thread locker to secure.

	**MEDIUM THREAD LOCKER**

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

Torque 105 N*m

Use medium Loctite thread locker to secure.

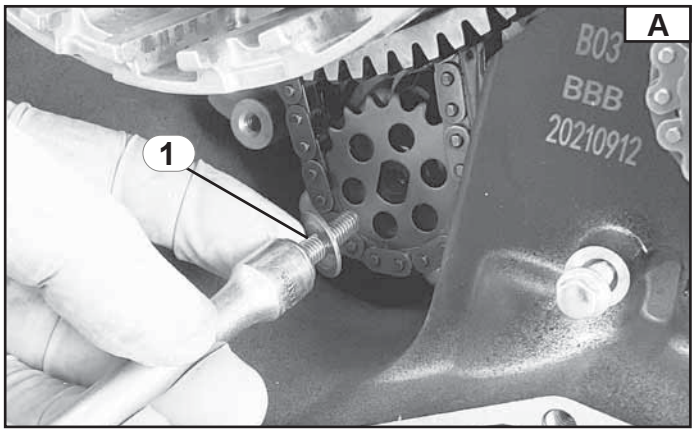
	**MEDIUM THREAD LOCKER**

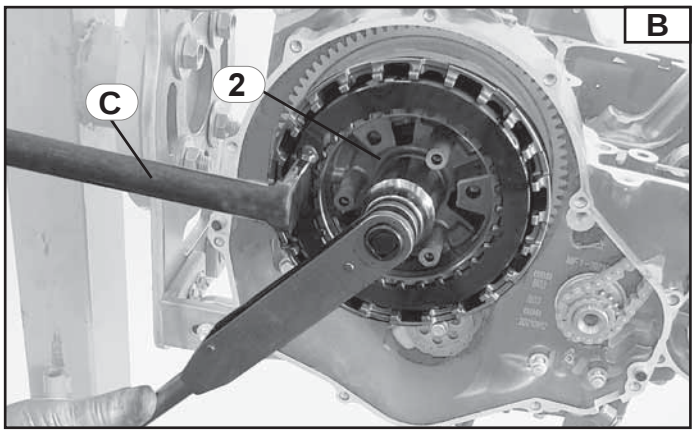
NOTE:
To lock the clutch drum, use the specific tool (X) Fig. B

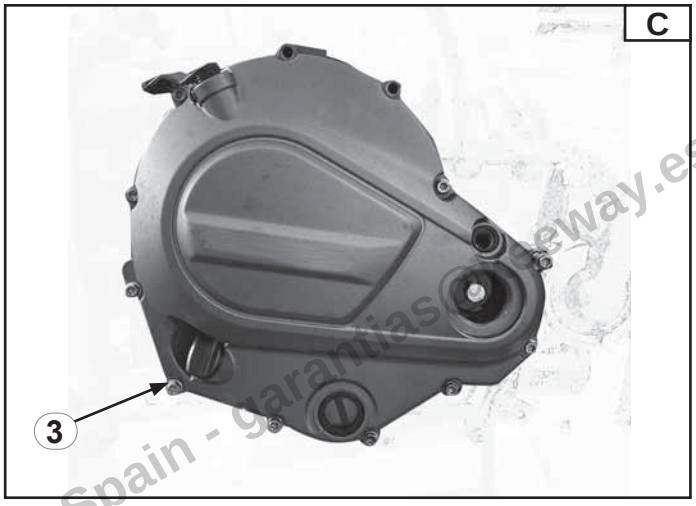
Clutch drum locking tool.
Code: KST03BS01206

- The fixing screws of the engine casing cover (3) Fig. C to the following torque:

Torque 10-12 N*m



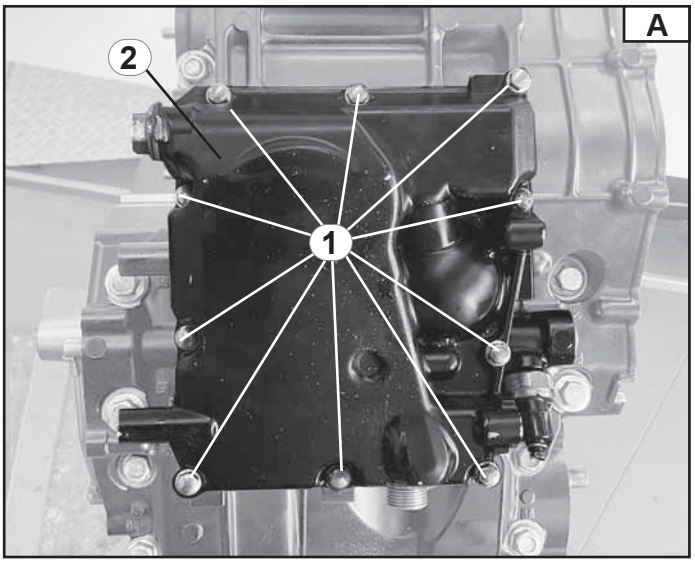




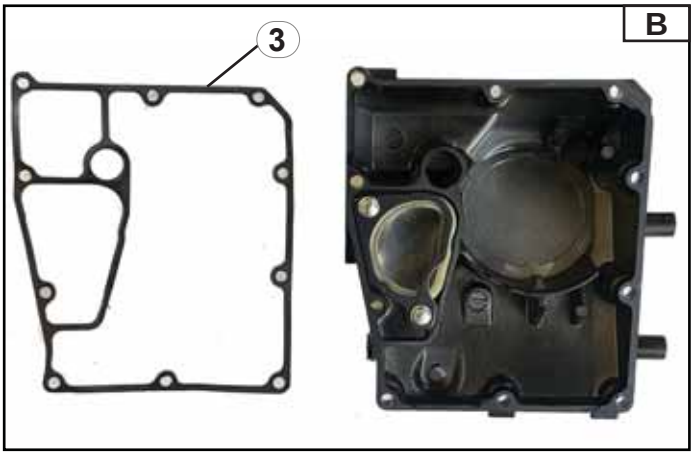
LUBRICATION SYSTEM
REMOVAL OF THE OIL SUMP

NOTE:
Before removing the oil sump, first drain out any oil in the engine, removing the oil drain cap.

Remove:
- The exhaust assembly, refer to **"Removal of the exhaust assembly, Chapter 4"**.
- The cover fastening screws (1) Fig. A.
- The oil sump (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.

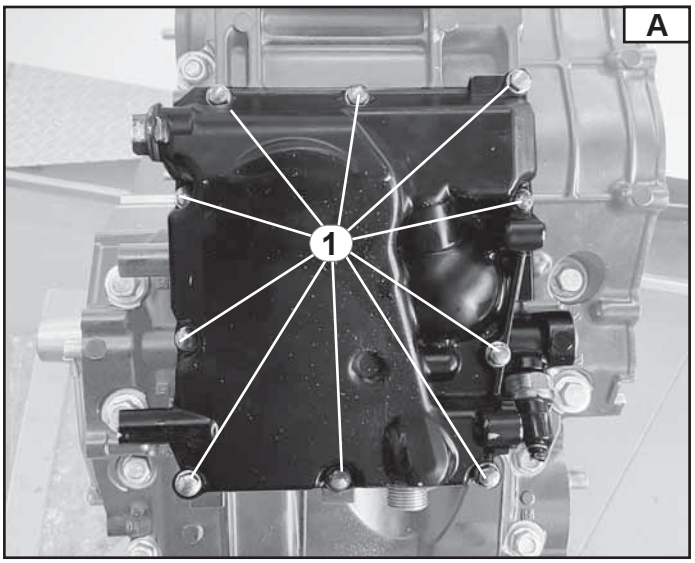
LUBRICATION SYSTEM
INSTALLATION OF THE OIL SUMP

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.

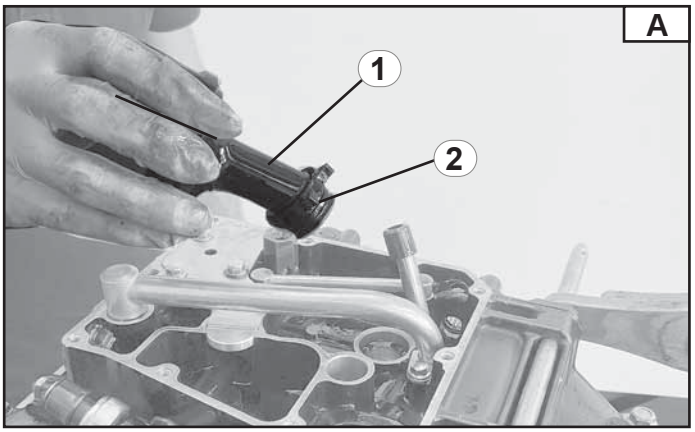


LUBRICATION SYSTEM

REMOVAL OF THE OIL INTAKE FILTER

Remove:

- The oil sump, refer to "**Removal of the oil sump, Chapter 5**".
- The inlet filter (1) and the rubber fitting (2) Fig. A.



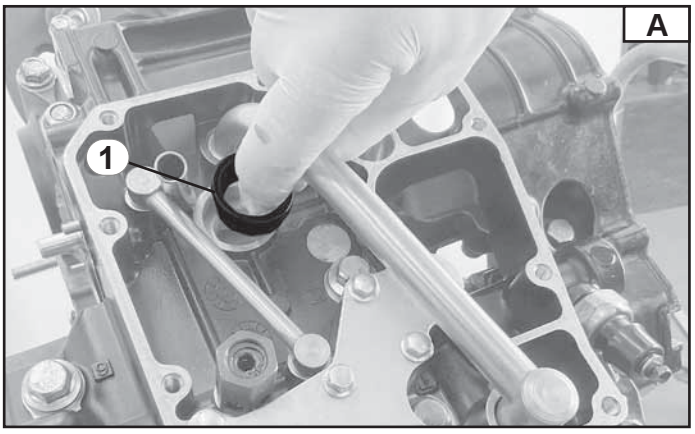
LUBRICATION SYSTEM
INSTALLATION OF THE OIL INTAKE FILTER

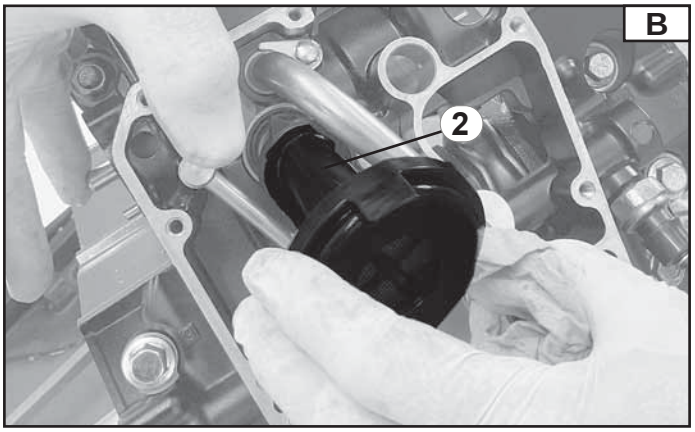
Installation:
Proceed using the opposite order to removal.

Install:

- The rubber fitting (1) Fig. A.
- The inlet filter (2) Fig. B.

NOTE:
If the rubber fitting is worn, install it again.



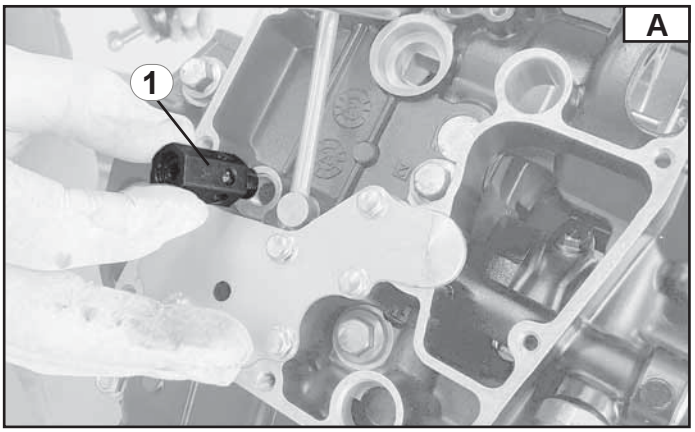


LUBRICATION SYSTEM

REMOVAL OF THE OIL OVER PRESSURE VALVE

Remove:

- The oil sump, refer to "**Removal of the oil sump, Chapter 5**".
- The oil over pressure valve (1) Fig. A.



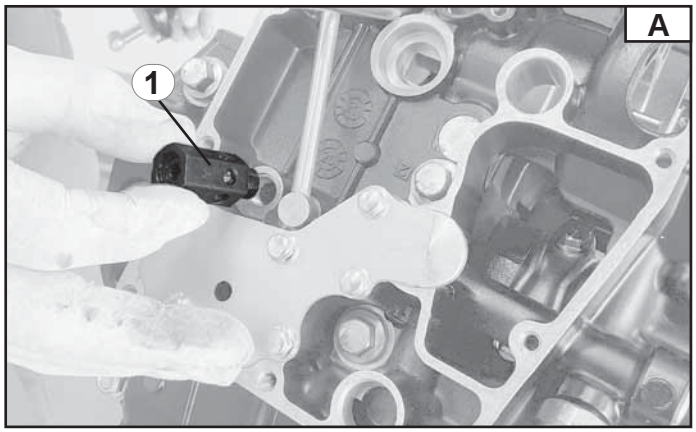
LUBRICATION SYSTEM

INSTALLATION OF THE OIL OVER PRESSURE VALVE

Install:

- The over pressure valve (1) inside the bottom crankcase Fig. A.

NOTE:
Lubricate the oil over pressure valve during insertion.



Tighten:

- The over pressure valve (1) Fig. A to the following torque:

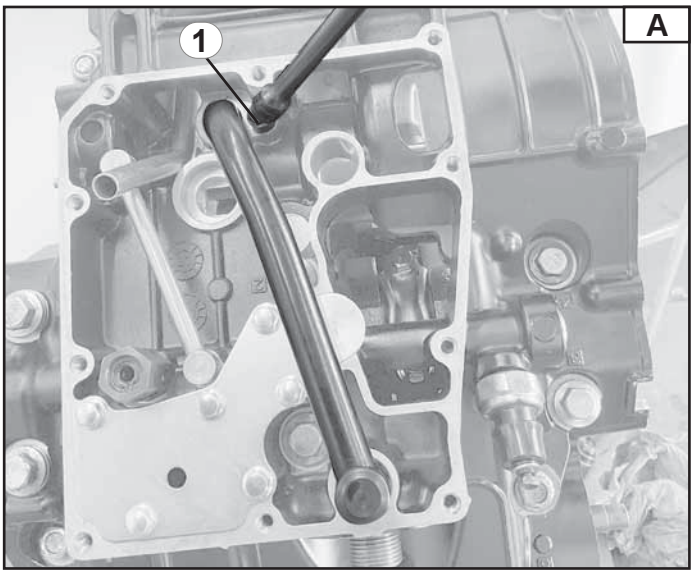
Torque 25 N*m

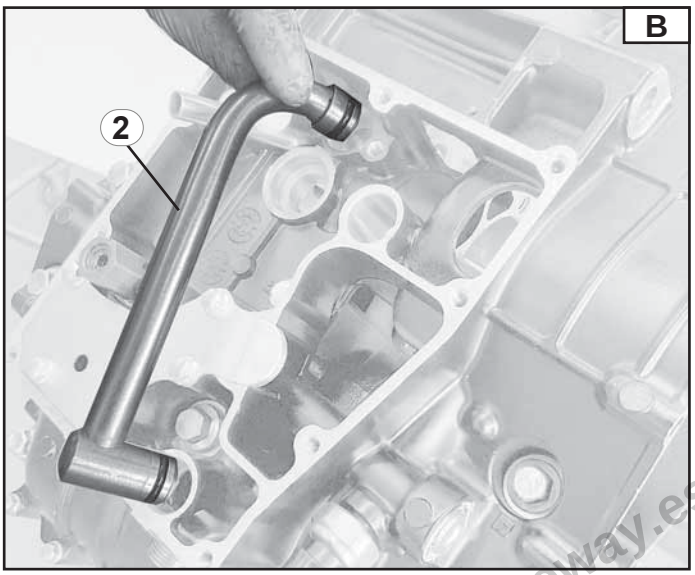
LUBRICATION SYSTEM

REMOVAL OF THE OIL SUMP PIPES

Remove:

- The oil sump, refer to "**Removal of the oil sump, Chapter 5**".
- The oil intake filter, refer to "**Removal of the oil intake filter, Chapter 5**".
- The fixing screw (1) Fig. A.
- The hose (2) Fig. B





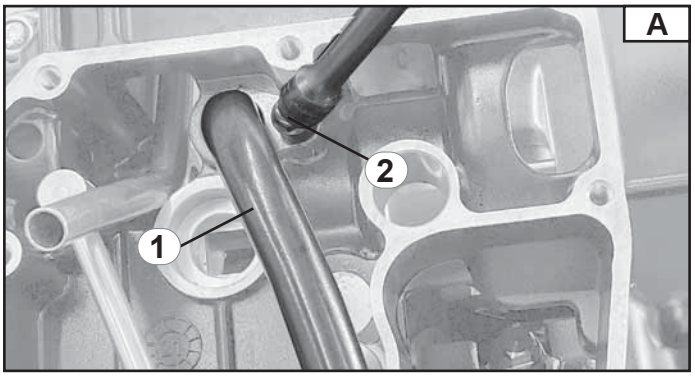
LUBRICATION SYSTEM
INSTALLATION OF THE OIL SUMP HOSES

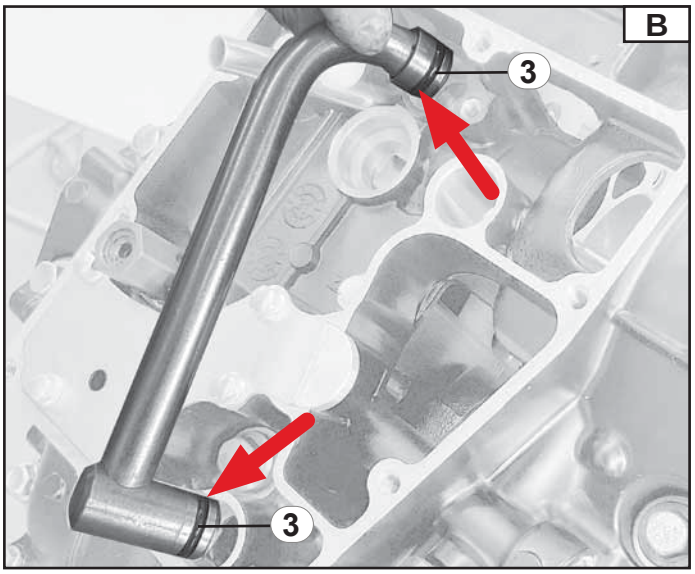
Install:
- The hose (1) Fig. A
- The fixing screw (2) Fig. A.

Tighten:
- The screw to the following torque:

Torque 10 N*m

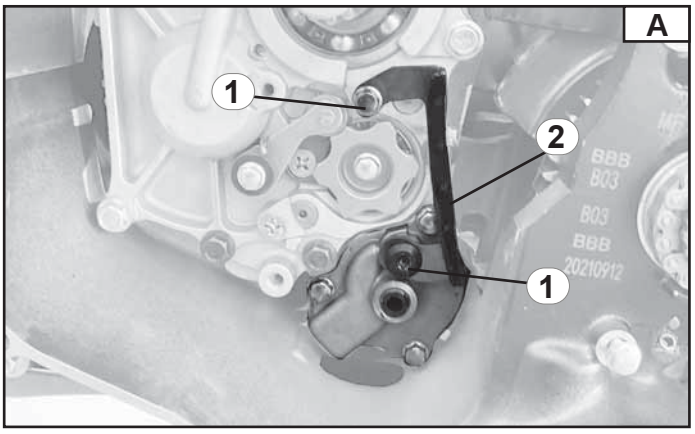
NOTE:
If the two ORs (3) Fig. B are worn out, replace.



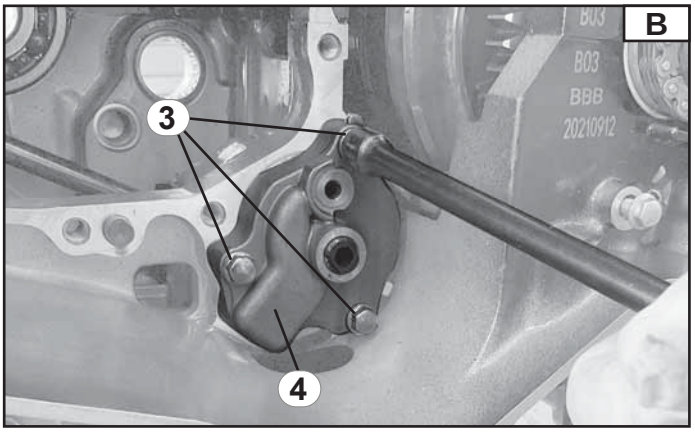


LUBRICATION SYSTEM
REMOVAL OF THE OIL PUMP

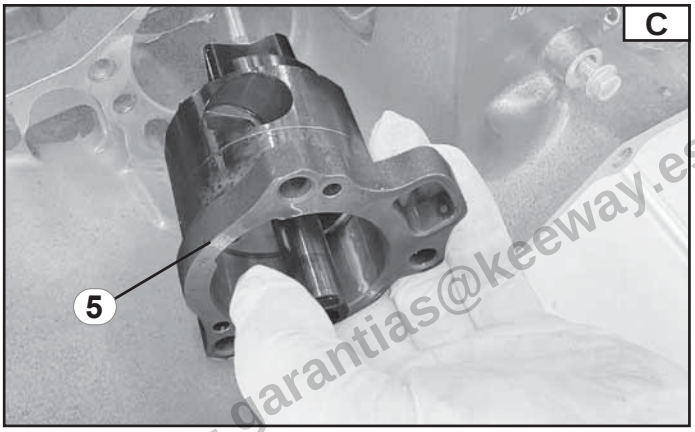
Remove:
- The clutch, refer to **"Removal of the clutch, Chapter 5".**
- The screws (1) Fig. A**.**
- The bracket (2) Fig. A**.**



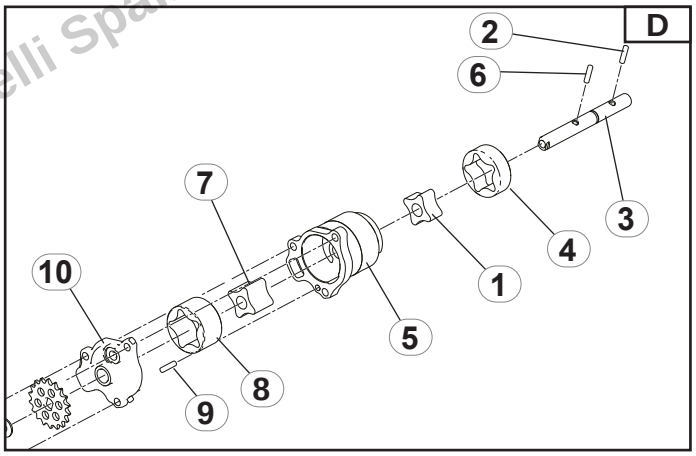
Remove:
- The screws (3) Fig. B**.**
- The oil pump cover (4) Fig. B.



Slide out:
- The oil pump (5) and all its parts Fig. C.



- Remove the parts following the numerical sequence stated in Fig. D.



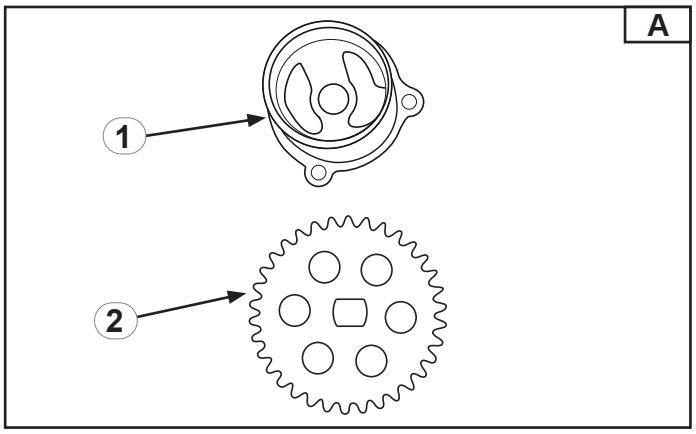
LUBRICATION SYSTEM
CHECK OF THE OIL PUMP

Inspect:
- The pump body (1) Fig. A.

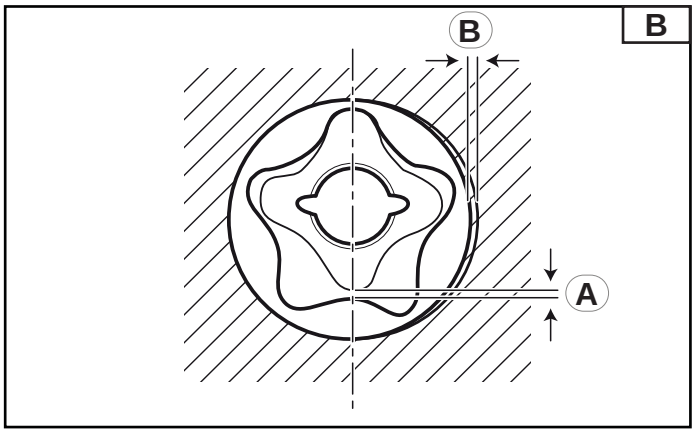
If there are any lines/damage/wear, replace.

- The pump ring gear (2) Fig. A.

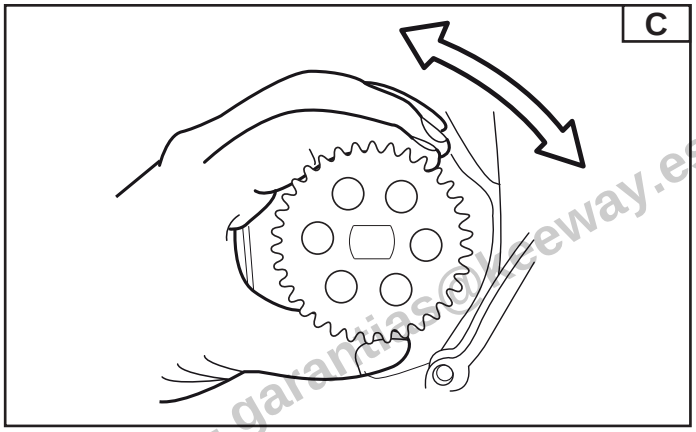
If there is any damage or wear to the gears, replace.



Measure:
- Tolerance between the inner rotor and the outer rotor (A) Fig. B.
- The tolerance between the outer rotor and the oil pump housing (B), Fig. B.
- The planarity of both rotors, compared to the oil pump housing.



Clearance	Tolerance	Limit
Radial clearance between the inner rotor and the outer rotor "**A**".	0.08-0.16 mm	0.02 mm
Radial clearance between the outer rotor and the oil extraction pump housing "**B**".	0.05-0.12 mm	0.16 mm
Radial clearance between the outer rotor and the supply pump housing.	0.06 -0.12 mm	0.16 mm
Radial clearance between the rotor and the extraction pump housing.	0.06 -0.11 mm	0.14 mm
Radial clearance between the rotor and the supply pump housing.	0.06 -0.14 mm	0.17 mm
(1 mm = 0.0393701 in)		



Inspect:
- The oil pump operation.

Turn the pump ring gear as shown in Fig. C.
If the movement is not smooth, check the inner/outer rotor seat. If there is any lines/damage, replace.
NOTE:
This check is carried out after securing the oil pump in the engine body and inserting the pump ring gear in its seat.

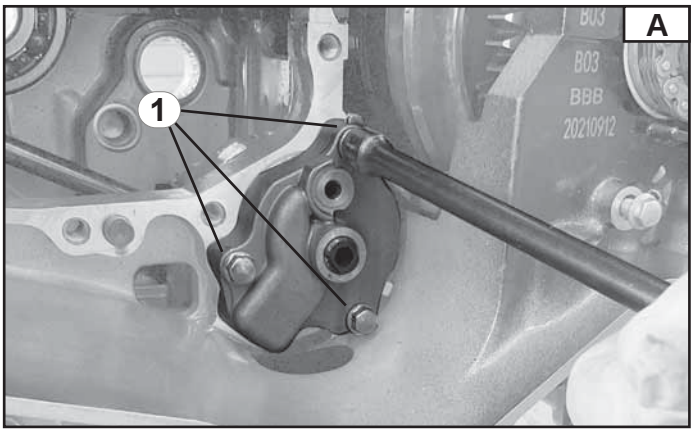
LUBRICATION SYSTEM
INSTALLATION OF THE OIL PUMP

Installation:
Proceed using the opposite order to removal.

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

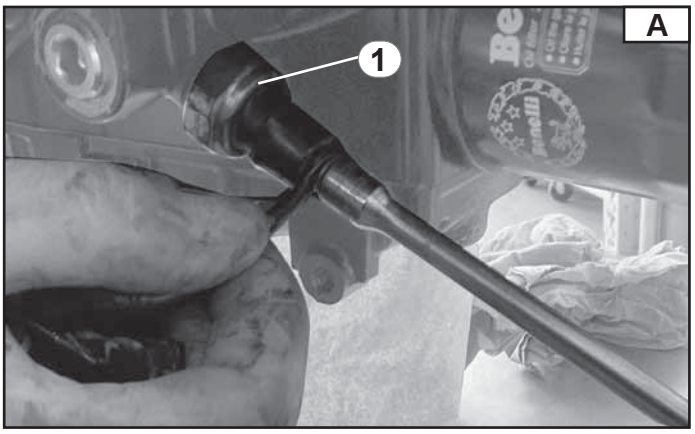
Torque 10-12 N*m

NOTE:
The oil pump sprocket locking screw is lefthanded, therefore pay attention when fixing.



LUBRICATION SYSTEM
CHECK OF OIL PRESSURE

To check oil pressure, proceed as described:



Disconnect:
- The connector of the oil pressure sensor

Remove:
- The silicone hood.
- The oil pressure sensor (1) Fig. A.

Install:
- A generic pressure gauge (min full scale 7 Kg/cm2) as the one shown in Fig. B.

After having brought the engine to operating temperature, check that the pressure corresponds to the values contained in the table:

Standard oil pressure	Engine rpm	Temperature (°C)
	4000	90
Oil pressure	2.0 - 3.0 Kg/cm^2 (28.4 - 42.7 PSI)	

At the end of the check, allow the engine to cool down and proceed with connection of the oil pressure sensor.

Tighten:
- the oil pressure sensor to the following torque:

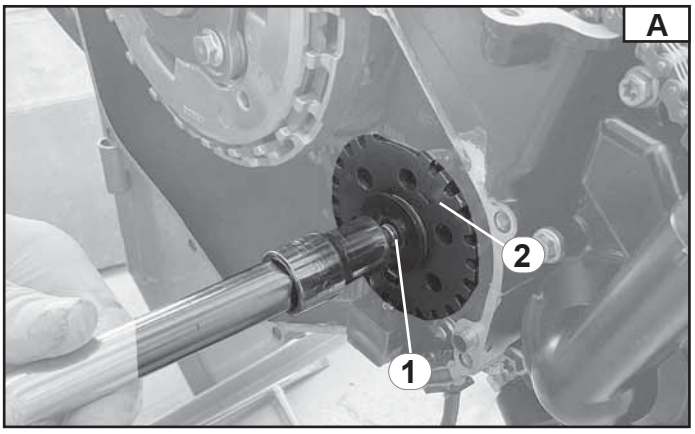
Torque 20 N*m

GEARBOX

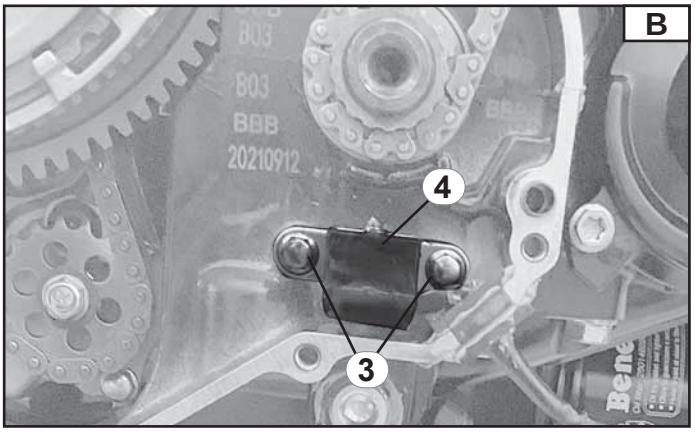
REMOVAL OF THE PHASE SENSOR

Remove:

- The clutch cover, refer to **"Removal of the clutch, Chapter 5"**.
- The screw (1) Fig. A.
- The signal wheel (2) Fig. A.

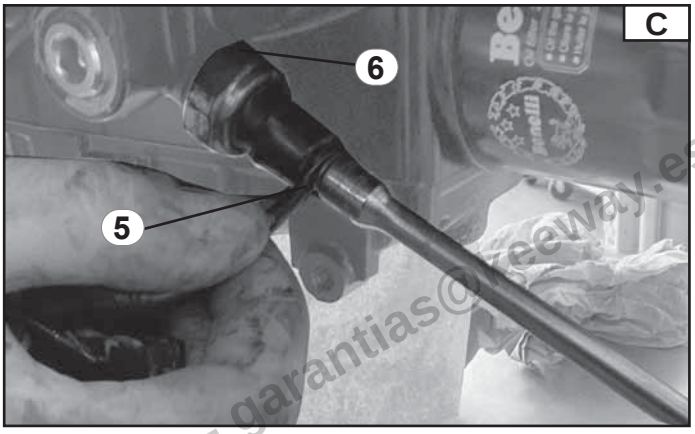


- The screws (3) and the phase sensor (4) Fig. B.



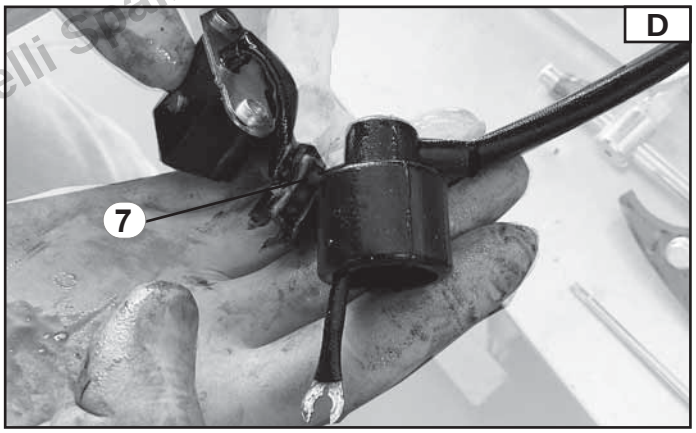
Disconnect:

- The connector (5) of the oil pressure sensor (6) Fig. C.



Remove:

- The wiring (7) Fig. D.



GEARBOX
INSTALLATION OF THE PHASE SENSOR

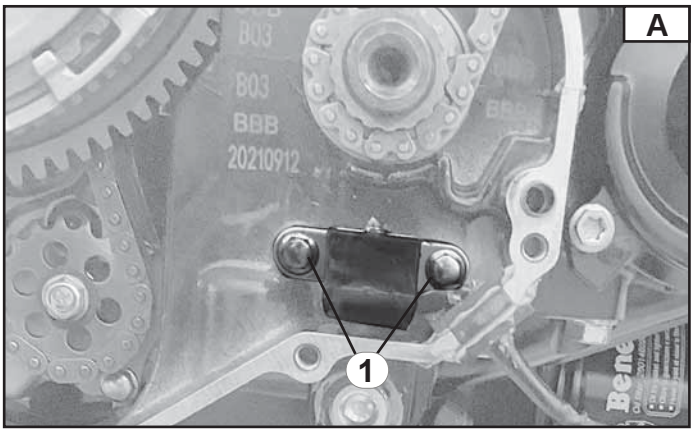
Installation:
Proceed using the opposite order to removal.

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

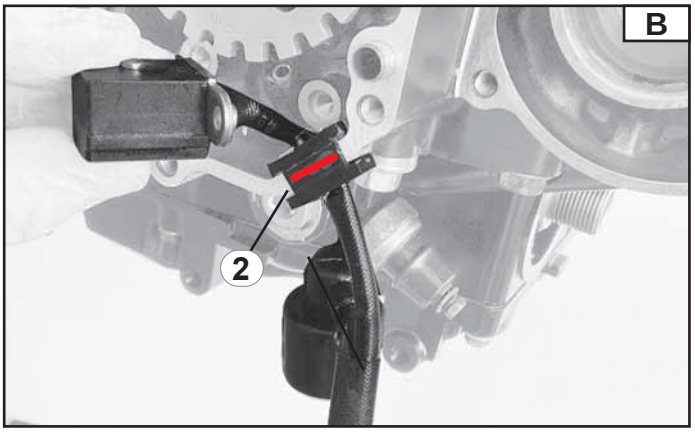
Torque 10-12 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER



NOTE:
During the assembly of the CABLE, apply sealing paste type Three Bond 1215 on the fairlead rubber (2), as shown in Fig. B.

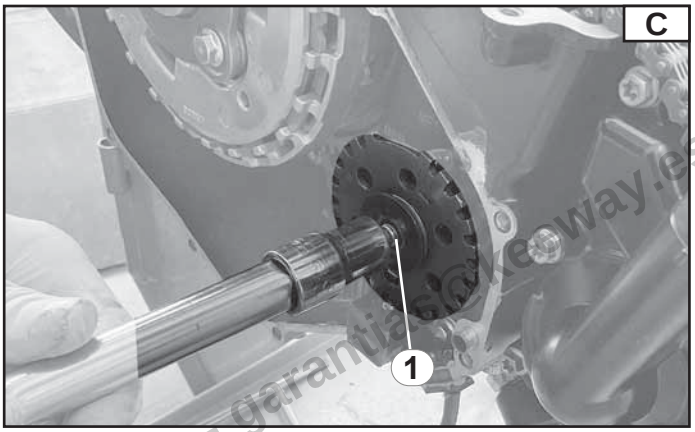


Tighten:
- The screw (1) Fig. C to the following torque:

Torque 25 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER



GEARBOX

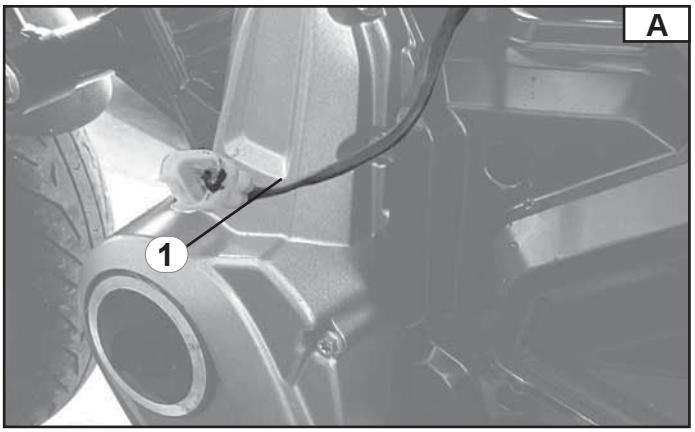
REMOVAL OF THE NEUTRAL SENSOR / GEAR INDICATOR SENSOR

Remove:

- The sprocket cover, refer to **"Removal of the sprocket cover, Chapter 5".**

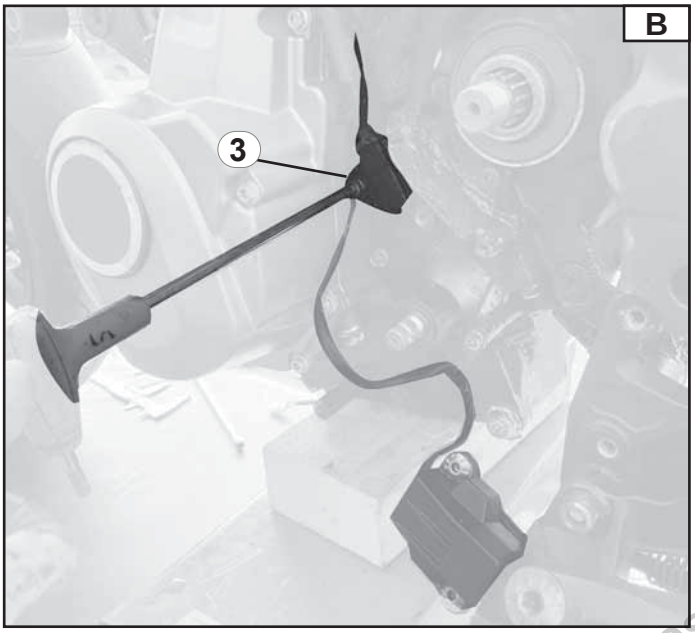
Disconnect:

- The neutral sensor/gear indicator cable (1) Fig. A.



Remove:

- The neutral sensor/gear indicator (3) Fig. B.



GEARBOX

INSTALLATION OF THE NEUTRAL SENSOR / GEAR INDICATOR SENSOR

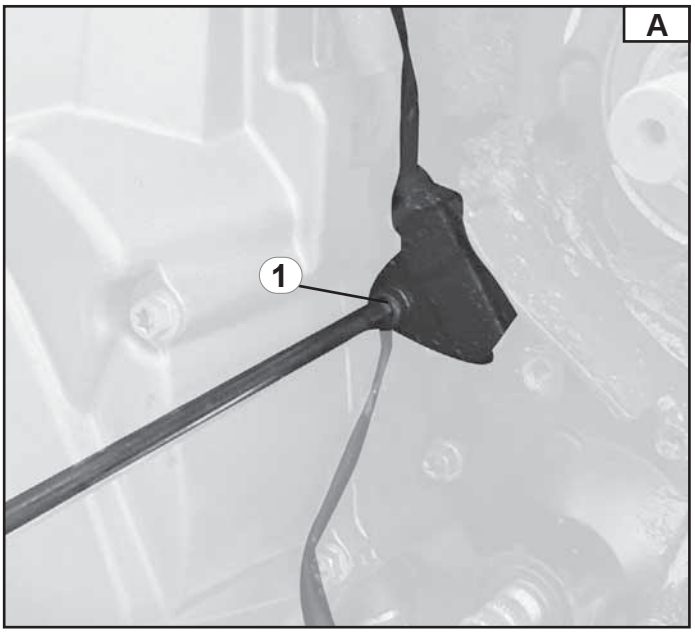
Installation:
Proceed using the opposite order to removal.

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

Torque 10-12 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER



GEARBOX

REMOVAL OF THE GEARBOX

For removal of the gearbox, proceed as follows:

Remove:

- The gear change pedal, refer to section **"Removal of the gear change pedal, Chapter 4".**

Disconnect:

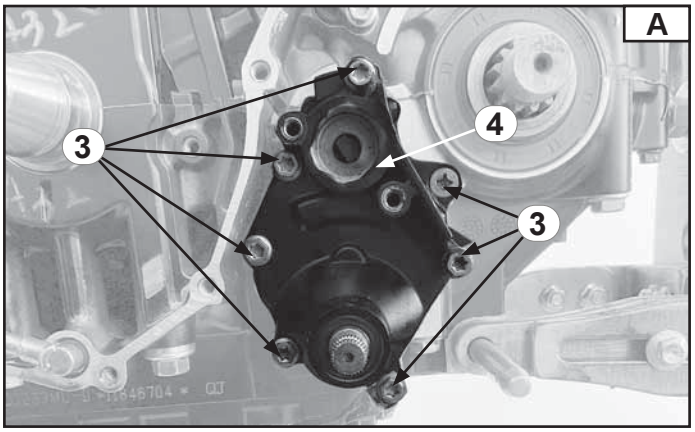
- Disconnect the gearbox position sensor.

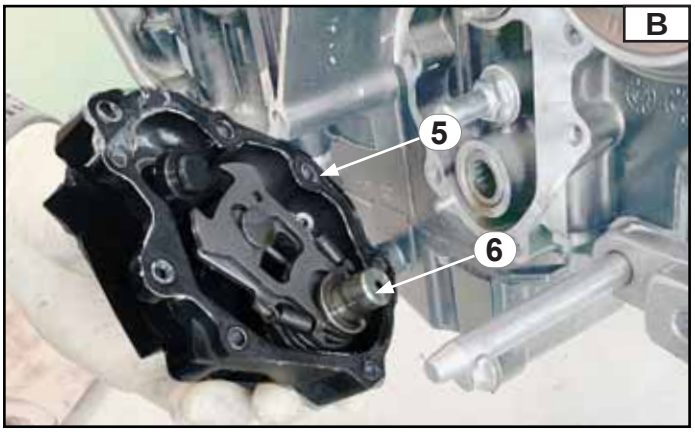
Remove:

- the gearbox position sensor.

Remove:

- The screws (3) Fig. A.
- The selector cover (4) Fig. A and the related gasket (5) Fig. B.



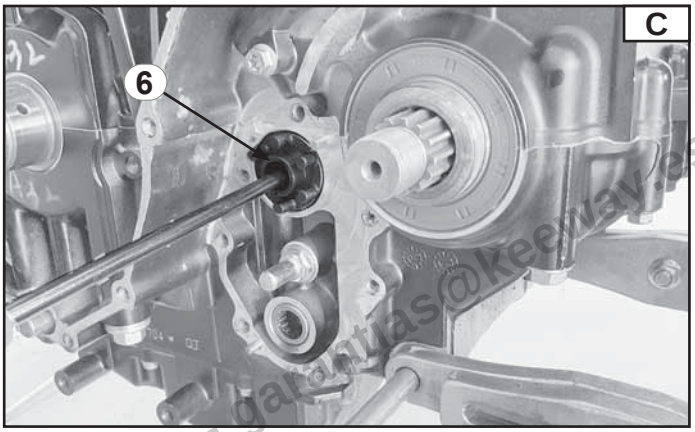


Slide out:

- The gear selector (6) Fig. B, paying attention to the order of the various parts.

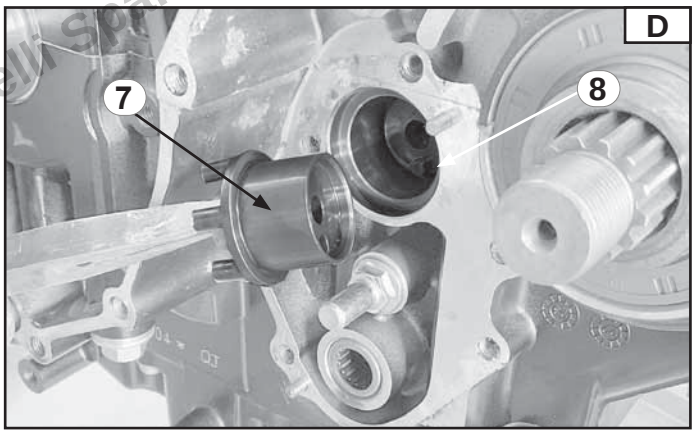
Remove:

- The gearbox drum screw (6) Fig. C.



Remove:

- The gearbox drum (7) and the dragging pin (8) Fig. D.

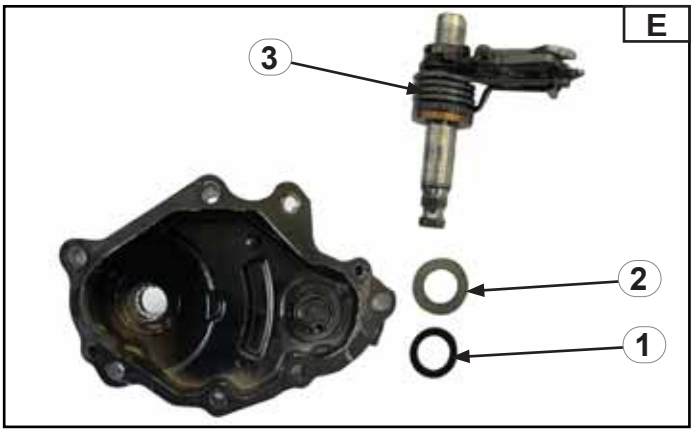


GEARBOX

REMOVAL OF THE GEARBOX

Slide out:

- The scraper (1) and the washer (2) from the gearbox selector shaft (3) Fig. E.

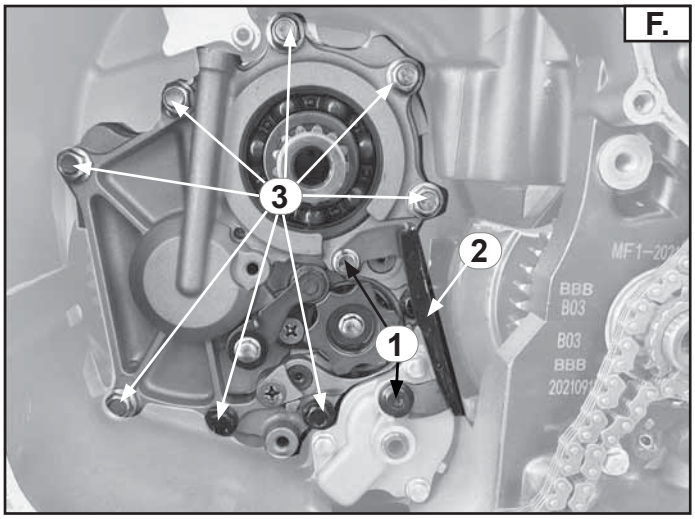


Remove:

- The clutch, refer to **"Removal of the clutch, Chapter 5".**
- The sprocket, refer to **"Removal of the sprocket, Chapter 4".**
- The transmission chain, refer to **"Removal of the transmission chain, Chapter 4"**.

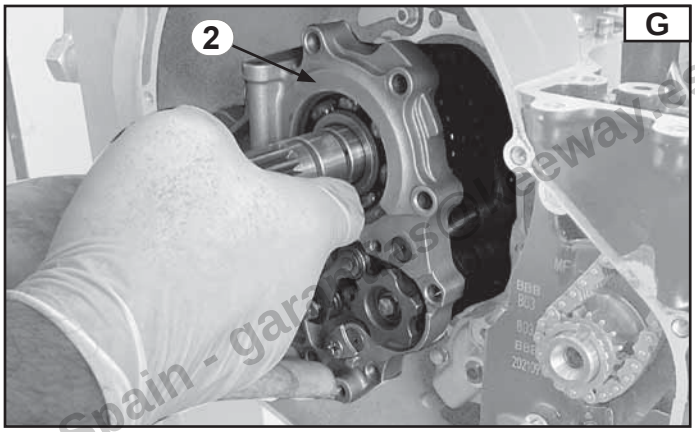
Remove:

- The screws (1) and the bracket (2) Fig. F.
- The screws (3) Fig. F.



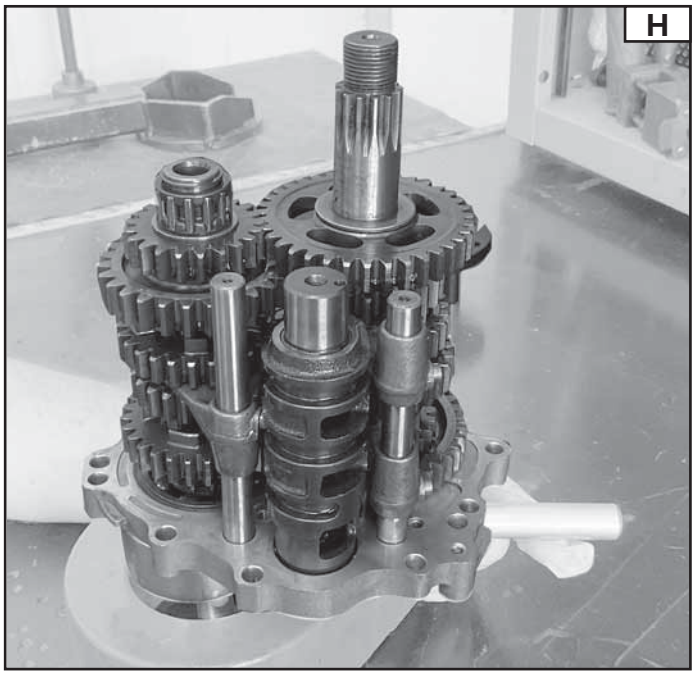
Slide out:

- The gearbox (2) Fig. G.

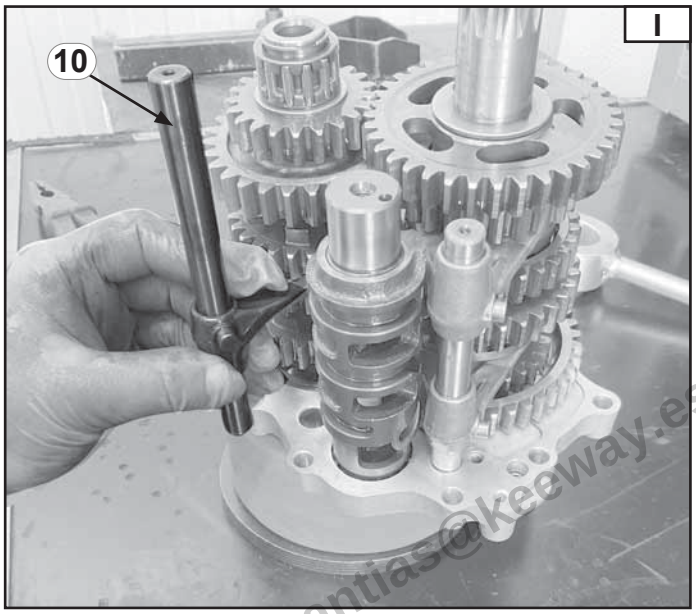


GEARBOX
REMOVAL OF THE GEARBOX

Position the gearbox sprocket group on a suitable surface Fig. H.

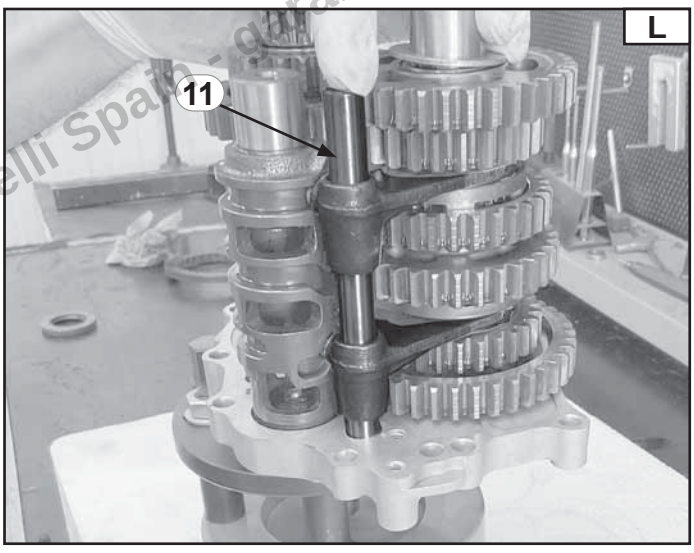

H

Slide out:
- The main shaft gear fork pin (10) Fig. I



I

Slide out:
- The secondary shaft gear fork pin (11) Fig. L.

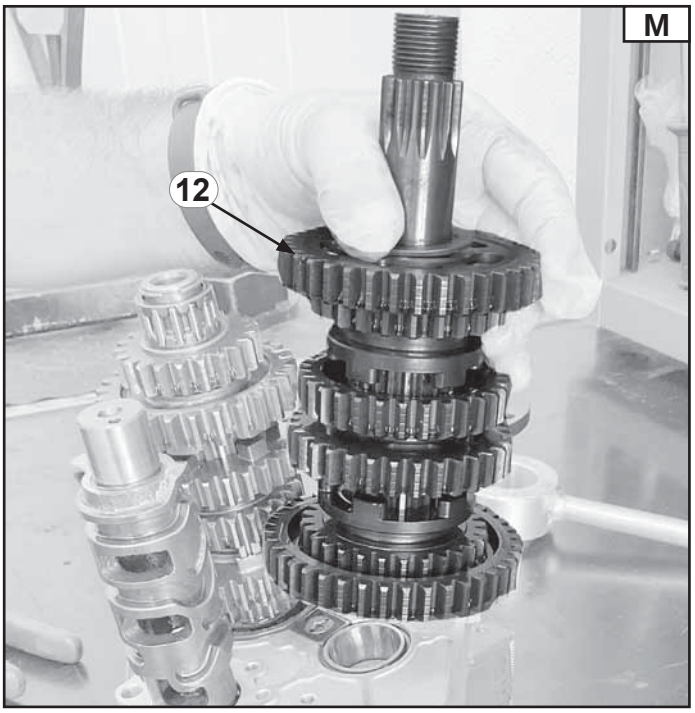


L

GEARBOX
REMOVAL OF THE GEARBOX

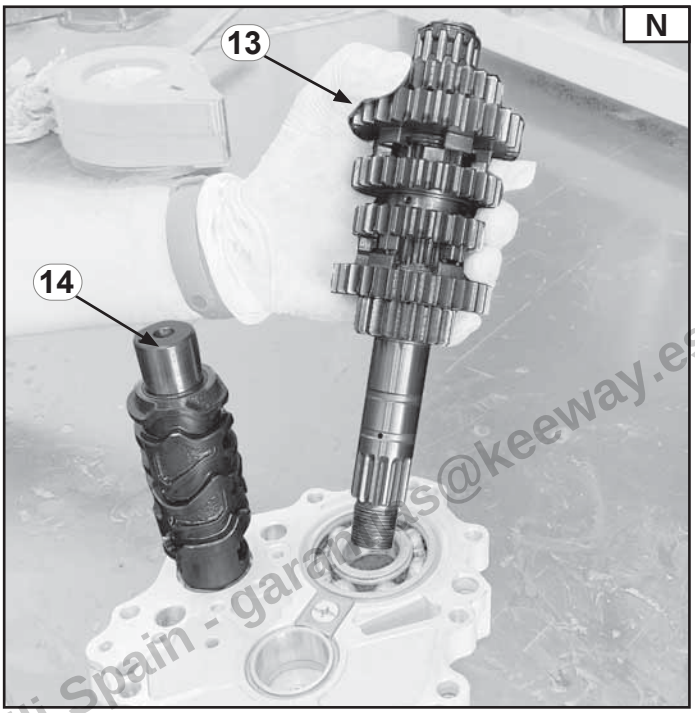
Slide out:
- The secondary shaft sprocket group (12) Fig. M.

M



- The primary shaft sprocket group (13) Fig. N.
- The desmodromic shaft (14) Fig. N.

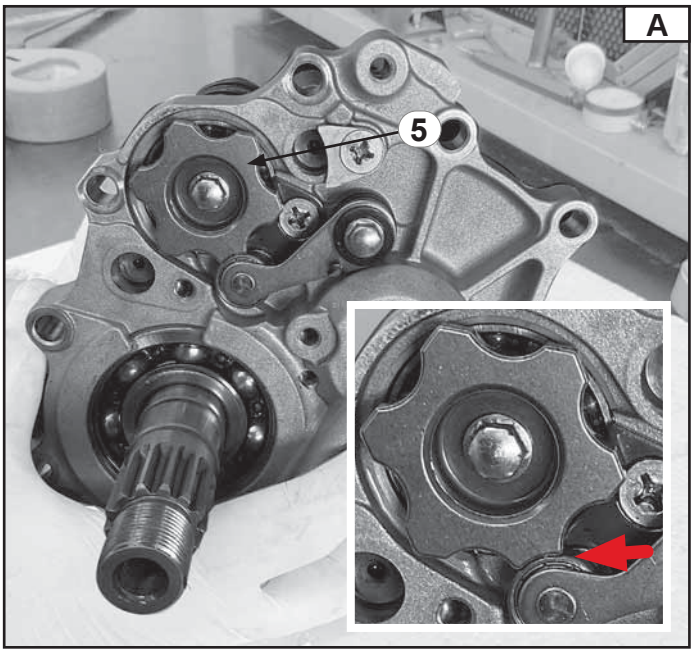
N



GEARBOX
INSTALLATION OF THE GEARBOX

Installation:
Proceed using the opposite order to removal.

Place:
- The desmodromic ratchet (5) Fig. A in the neutral position.

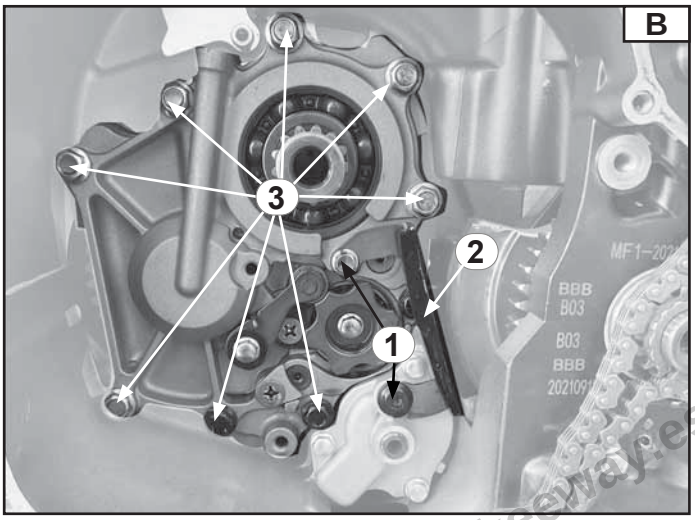


Install:
- The bracket (2) Fig. B.
- The screws (1) Fig. B.
- The screws (3) Fig. B to the following torque:

Torque 18. N*m

Use medium Loctite thread locker to secure.

	MEDIUM LOCTITE THREAD LOCKER

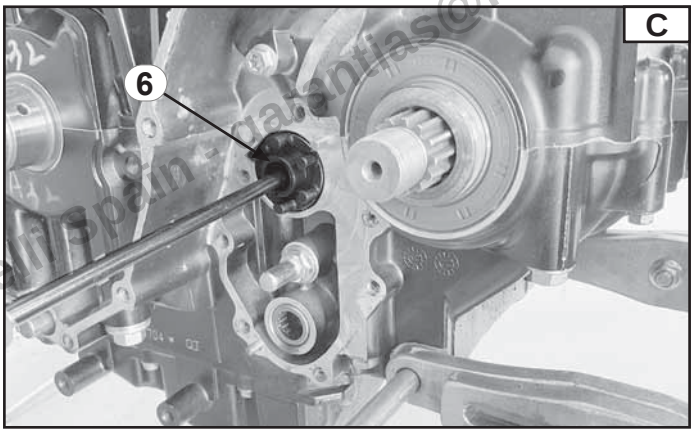


Tighten:
- The screw (6) Fig. C to the following torque:

Torque 10-12 N*m

Use medium Loctite thread locker to secure.

	MEDIUM LOCTITE THREAD LOCKER



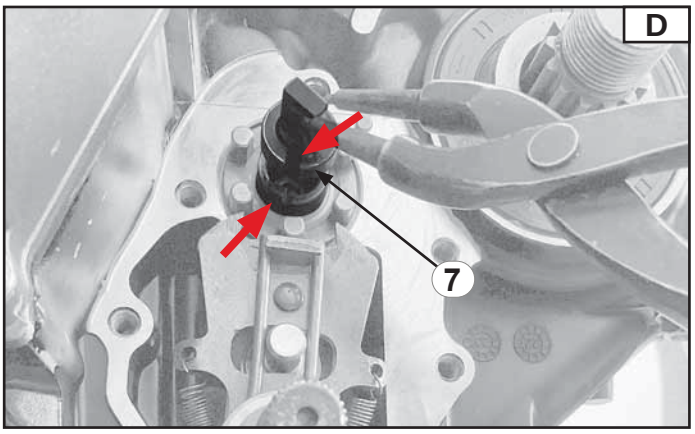
GEARBOX

INSTALLATION OF THE GEARBOX

Install:

- The pin (7) Fig. D.

NOTE:
During insertion of the pin, make sure it is inserted with the slot in correspondence with the bush as shown in Fig. D.



Install:
The gear selector, the cover and the relevant gasket.

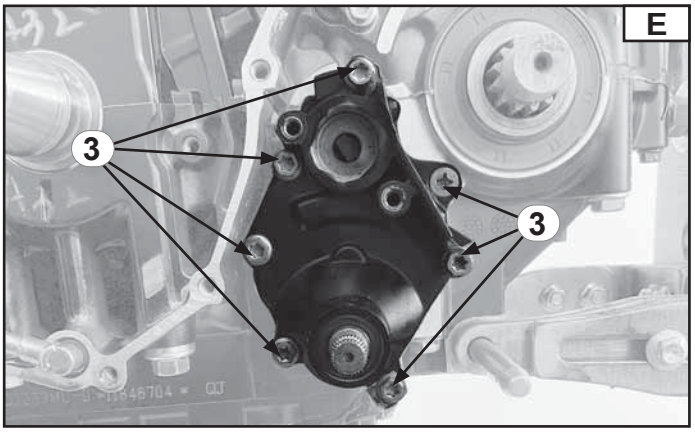
Tighten:

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

Torque 10-12 N*m

Use medium Loctite thread locker to secure.

	**MEDIUM THREAD LOCKER**



GEARBOX
GEAR SHIFT CONTROL

The following procedure applies to all gear fork Fig. A.

Inspect:
- The follower of the gear control fork (1) Fig. A.
- The tooth on the gear control fork (2) Fig. A.

If there is warping/damage/lines/traces of wear, replace the gear control fork.

Measure:
- The thickness of the gear control fork, using a slide gauge.

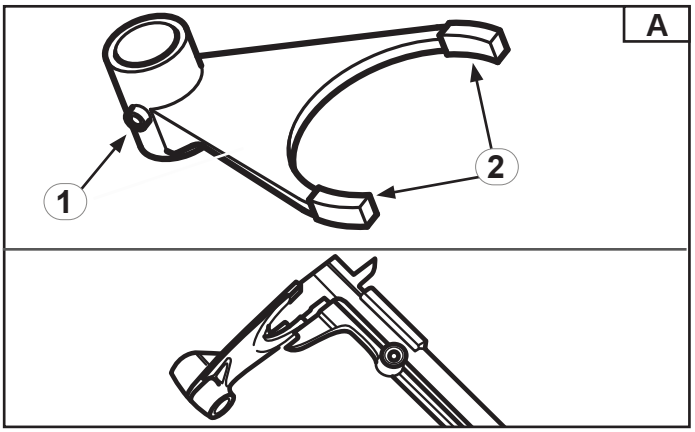
Part	Size	Limit
• Gear control fork	5.90 - 6.00 mm (in)	5.85 mm (in)

Inspect:
- The guide pin of the gear control fork (3) Fig. B.

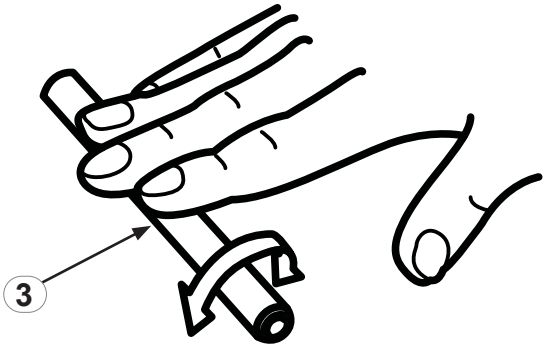
Roll the guide pin of the gear control fork on a flat surface Fig. B. If there is any warping, replace.

NOTE:
Do not try to straighten the control fork guide if it is warped.

A



B



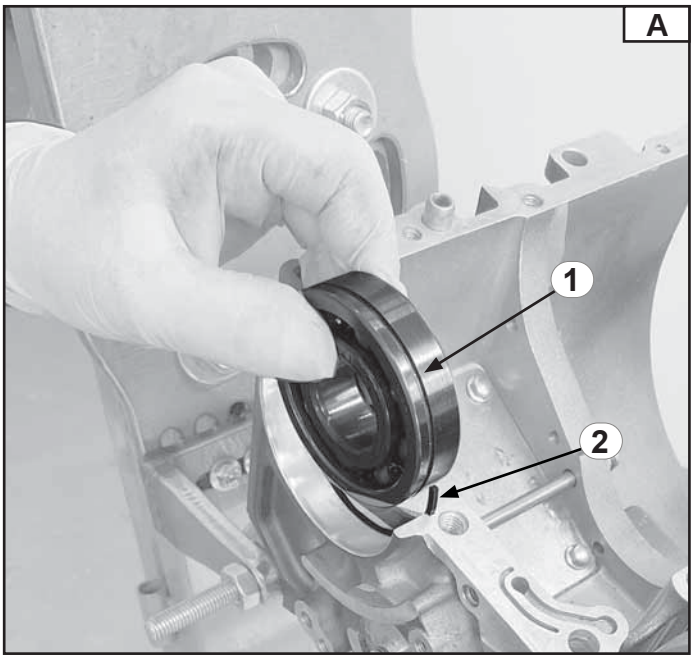
GEARBOX

REMOVAL OF THE COMPLETE MAIN SHAFT BEARING

Remove:

- The flywheel, refer to **"Removal of the flywheel, Chapter 5".**
- The clutch, refer to **"Removal of the clutch, Chapter 5"**.
- The lower crankcase, refer to **"Removal of the connecting rods, Chapter 5".**
- The gearbox, refer to **"Removal of the gearbox, Chapter 5".**

- The bearing (1) and the guide (2) Fig. A.



GEARBOX

REMOVAL OF THE COMPLETE MAIN SHAFT BEARING

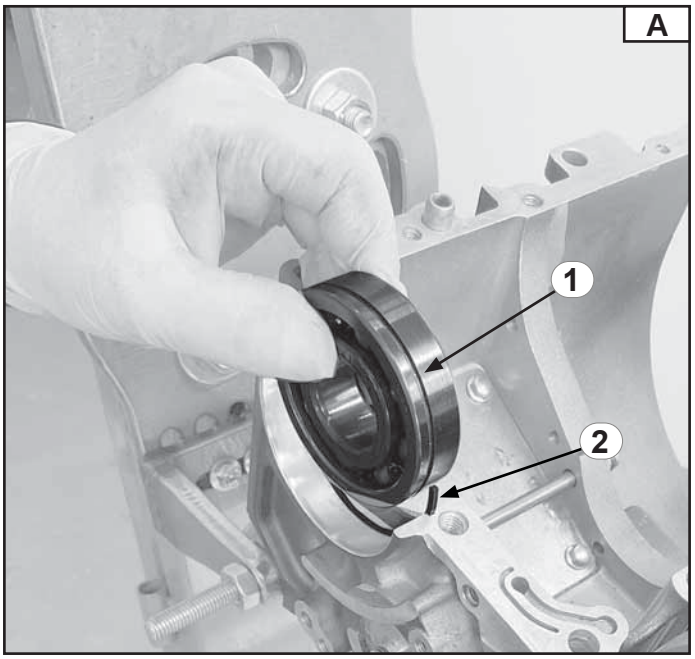
Installation:
Proceed using the opposite order to removal.

Check:
- The bearings (1) Fig. A.

If there is any damage/wear, replace.

- The integrity of the guide (2) Fig. A.

If there is any damage/wear, replace.



IGNITION

REMOVAL OF THE FLYWHEEL

Park:

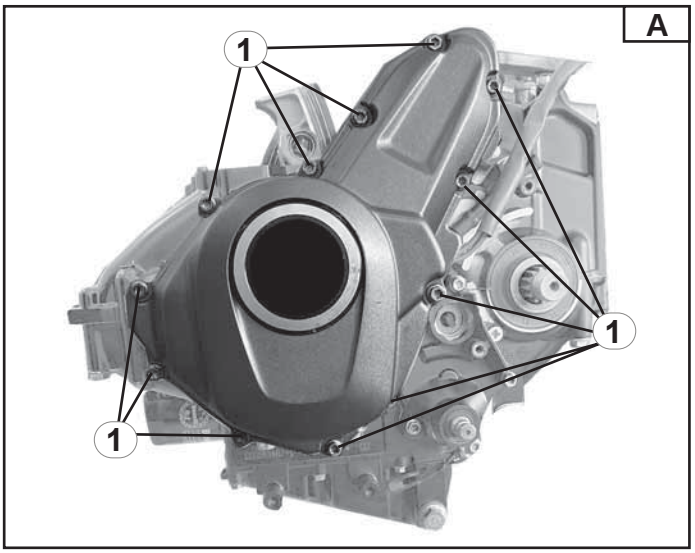
- The motorcycle on a level surface.

NOTICE

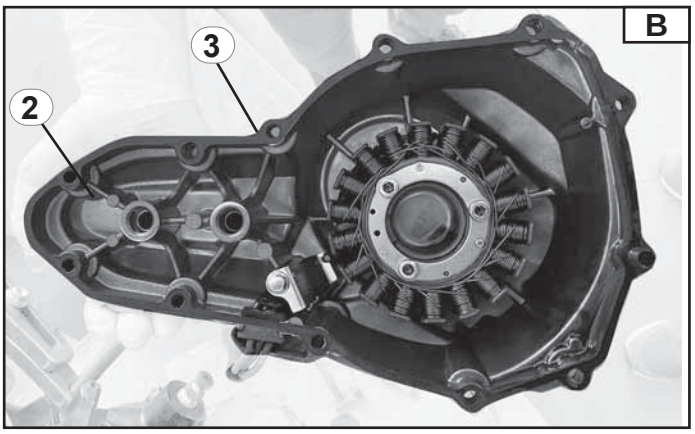
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The engine oil, refer to **"Change of the engine oil, Chapter 3".**
- The fixing screws (1) of the cover Fig. A.

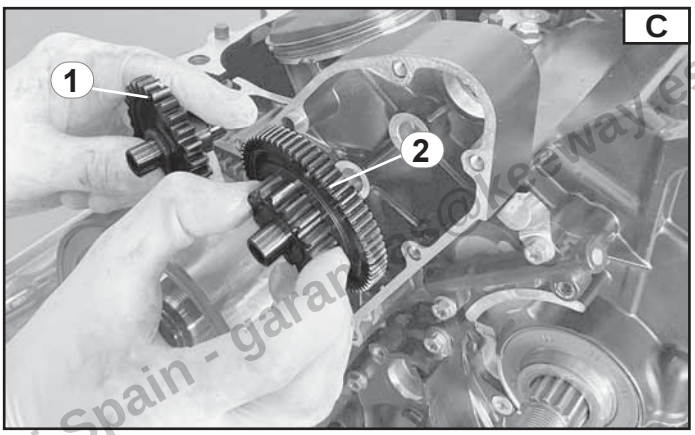


- The cover (2) and the related gasket (3) Fig. B.



Remove:

- The driven sprocket (1) Fig. C.
- The start sprocket (2) Fig. C.



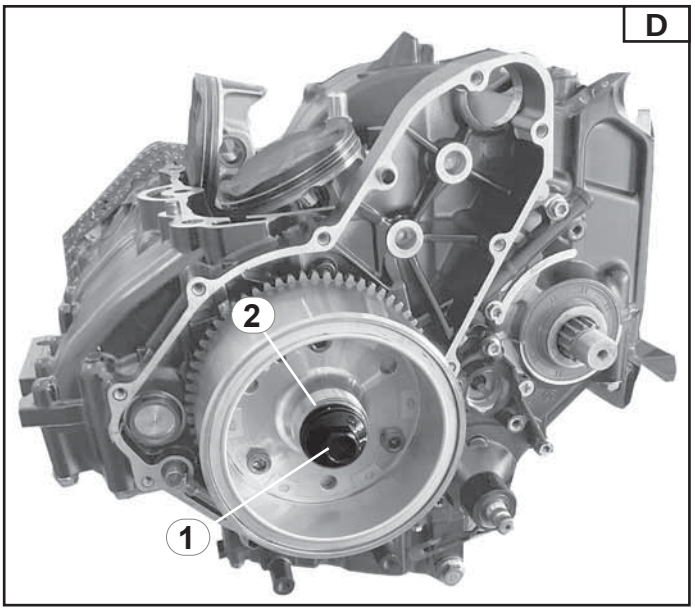
IGNITION

REMOVAL OF THE FLYWHEEL

Remove:

- The screw (1) and the washer (2) Fig. D.

D

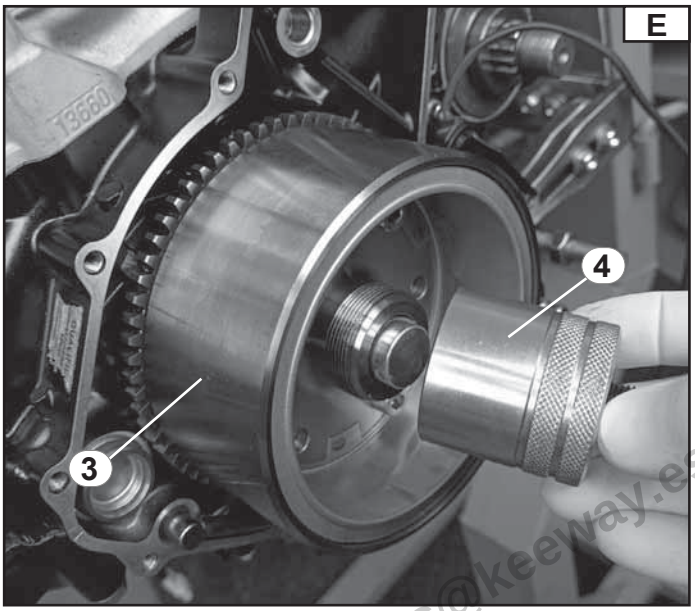


Remove:

- The rotor magneto flywheel (3) Fig. E.

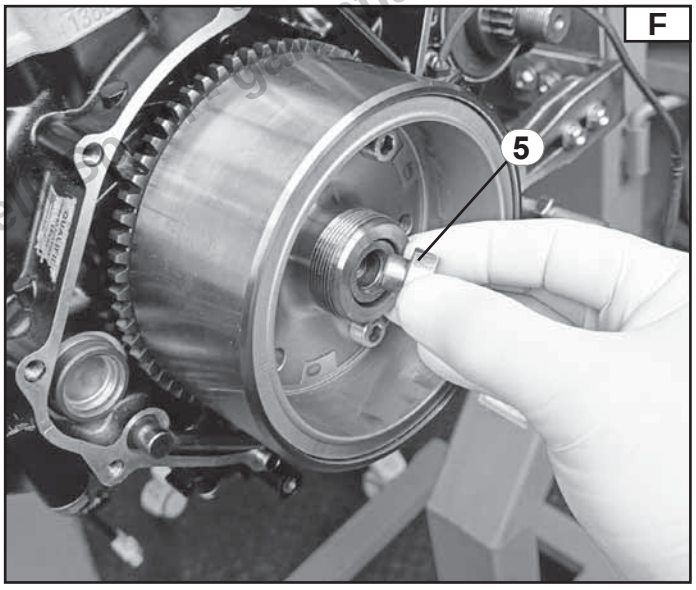
NOTE:
Use the special extracting tool of the flywheel for this operation (4) Fig. E.

E



NOTICE:
To avoid damage to the crankshaft, put the protective pad (5) between the crankshaft and the flywheel extractor Fig. F.

F



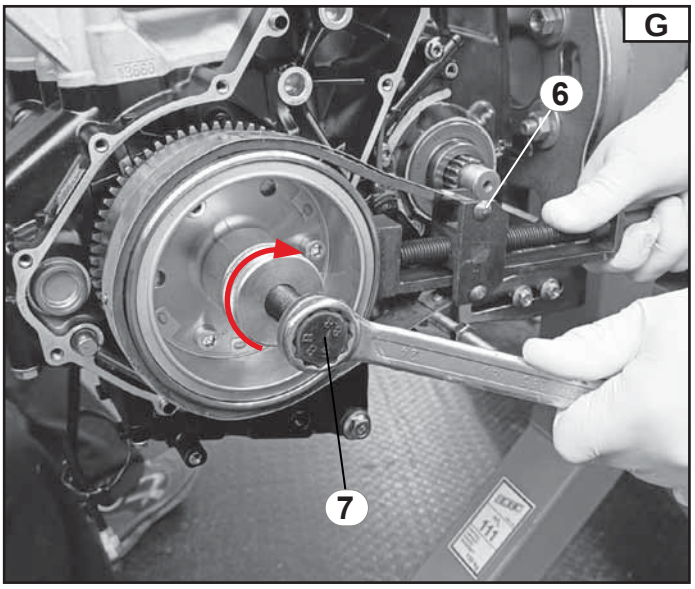
Flywheel extractor kit
Code: R000097709000
Flywheel locking key
Code: 0320097044000

IGNITION

REMOVAL OF THE FLYWHEEL

Remove:

- By holding the flywheel locking key (6) in place with the apposite hex spanner, rotate the extractor screw (7) clockwise Fig. G.



IGNITION
INSTALLATIO OF THE FLYWHEEL

Installation:
For assembly, follow the removal process in the opposite order.

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

Torque 155 N*m
NOTE:
Apply molybdenum disulphide oil to the thread and the surface of the rotor bolt.

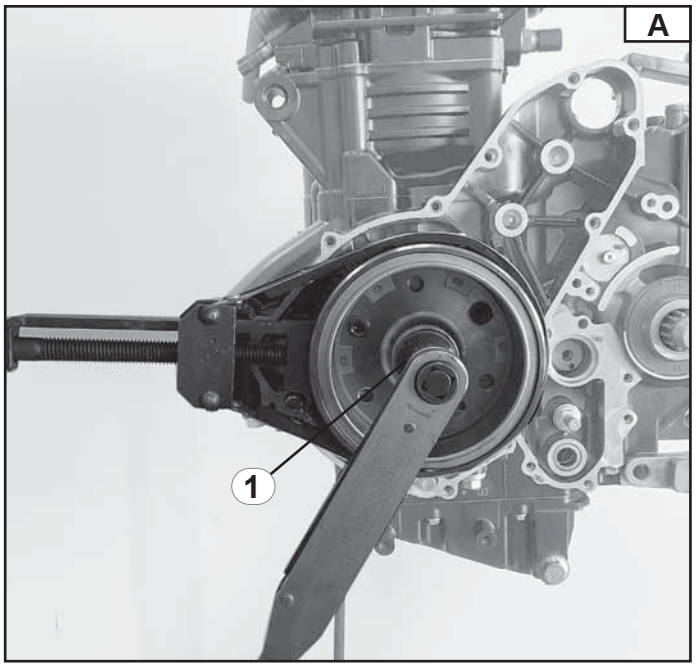
Use the special tool for this operation.

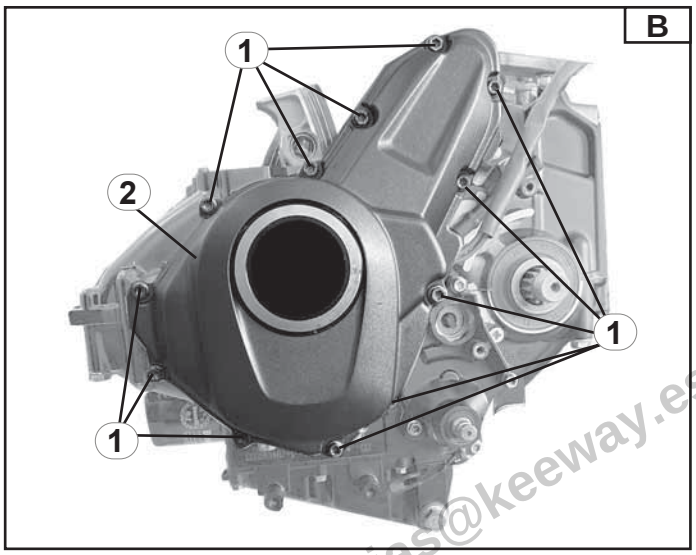
Flywheel locking key
Code: 032009704400

Tighten:
- The fixing screws (1) of the cover (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.



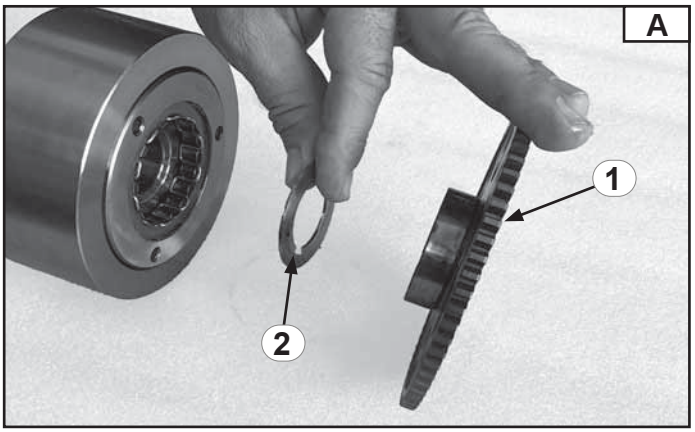


IGNITION

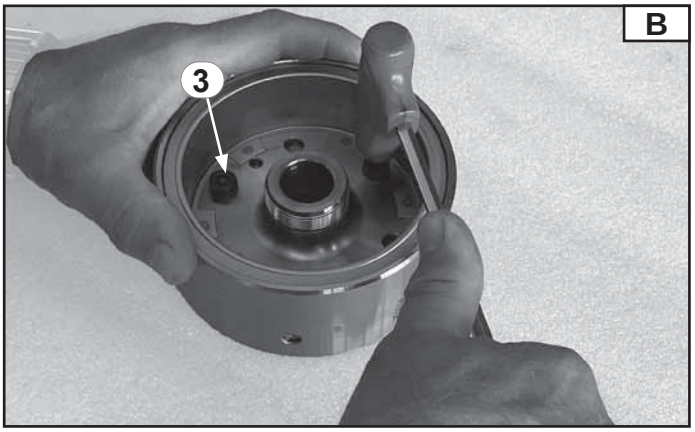
REMOVAL OF THE ONE WAY WHEEL

Remove:

- the one way wheel gear (1) and the washer (2) Fig. A.



- The screws (3) Fig. B-C.



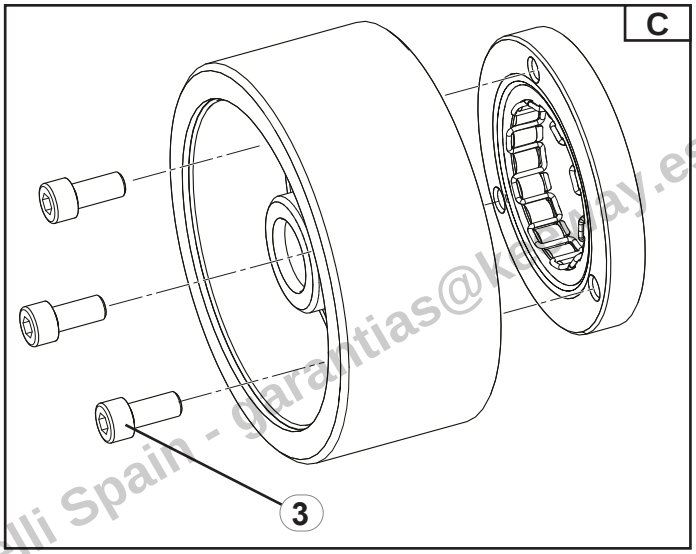
Inspect:

- The roller cage and support.

If there are any anomalies or signs of wear, replace the whole one way wheel.

- The one way wheel bearing and the outer ring.

If there are any anomalies/traces of wear, replace.



IGNITION

INSTALLATIO OF THE ONE WAY WHEEL

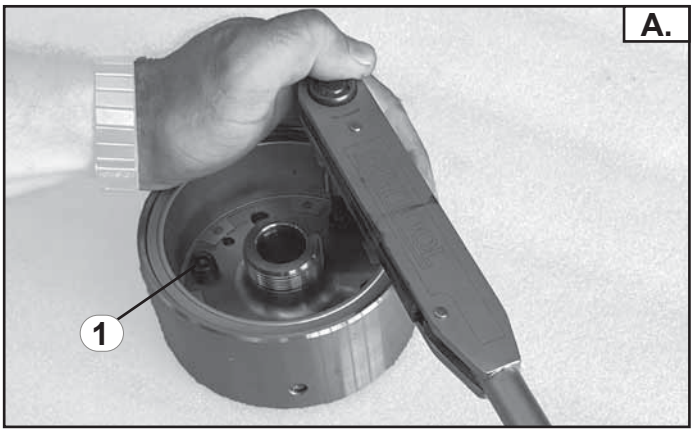
Installation:
Proceed using the opposite order to removal.

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

Torque 25 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

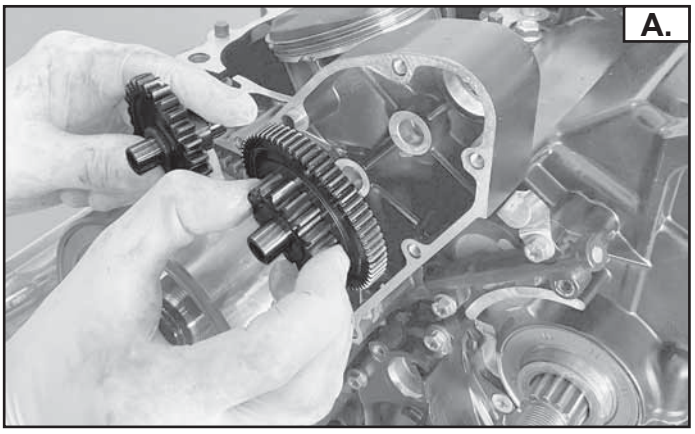


IGNITION

REMOVAL OF THE START SPROCKETS

Remove:

- The flywheel cover, refer to **"Removal of the flywheel cover, Chapter 5".**



IGNITION

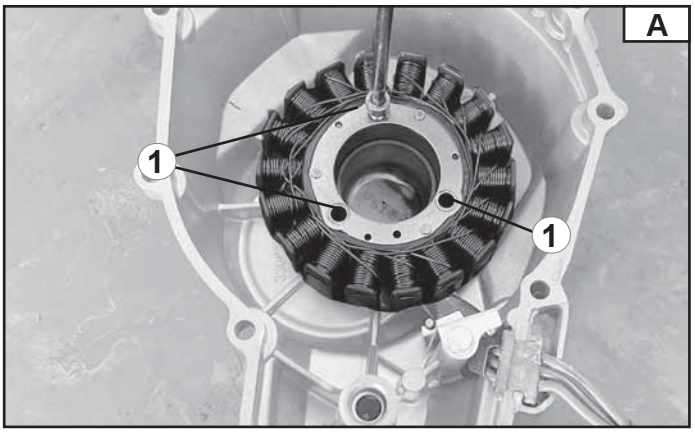
INSTALLATION OF THE START SPROCKETS

Installation:
Proceed using the opposite order to removal.

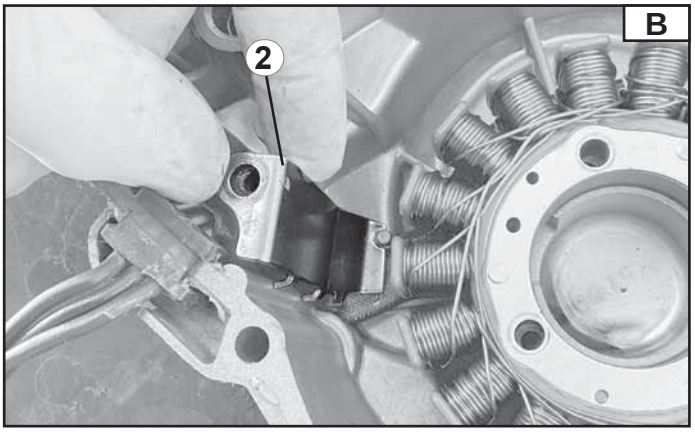
IGNITION
REMOVAL OF THE STATOR

Remove:
- The flywheel cover, refer to **"Removal of the flywheel cover, Chapter 5".**

- The fixing screws (1) of the stator Fig. A.

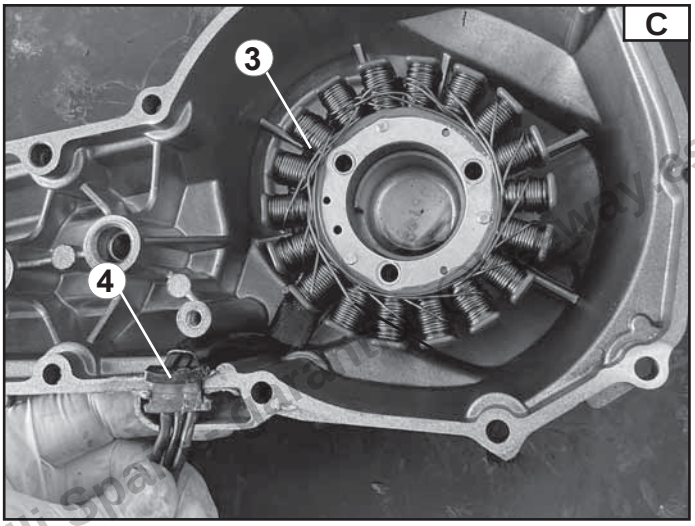


Remove:
- The fixing screw of the bracket Fig. B.
- The bracket (2) Fig. B.



Slide out:
- The stator (3) Fig. C.
- The rubber fairlead (4) Fig. C.

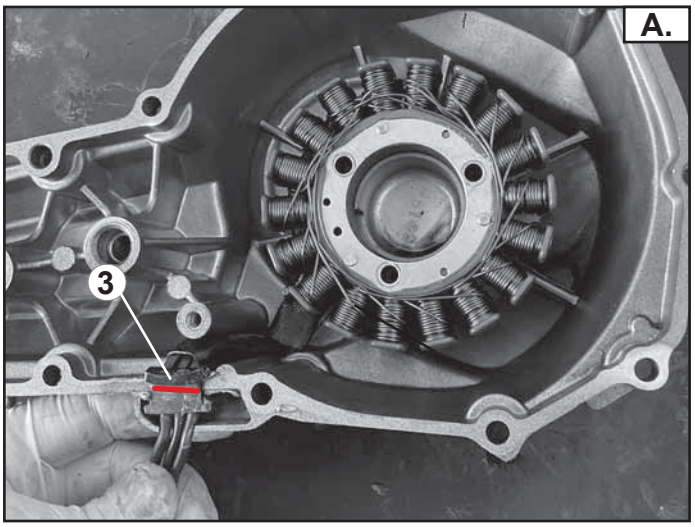
Inspect:
- The integrity of the stator, and if damaged, replace.



IGNITION
INSTALLATION OF THE STATOR

Installation:
Proceed using the opposite order to removal.

NOTE:
During the assembly of the rubber fairlead (3), apply sealing paste type Three Bond 1215 on the surface, as shown in Fig. A.

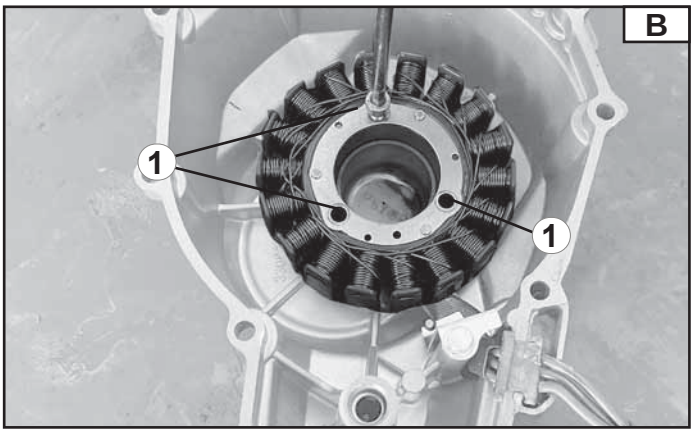


Tighten:
- The screws (1) Fig. B to the following torque:

Torque 10-12 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER

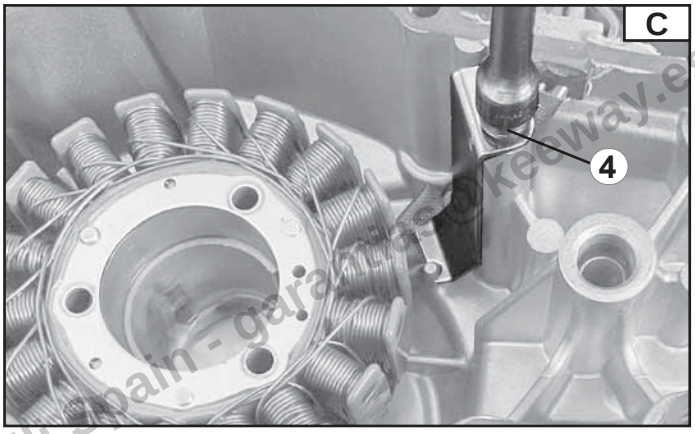


- The screw (4) Fig. C to the following torque:

Torque 10 N*m

Use medium Loctite thread locker to secure.

	MEDIUM THREAD LOCKER



IGNITION

REMOVAL OF THE STARTER MOTOR

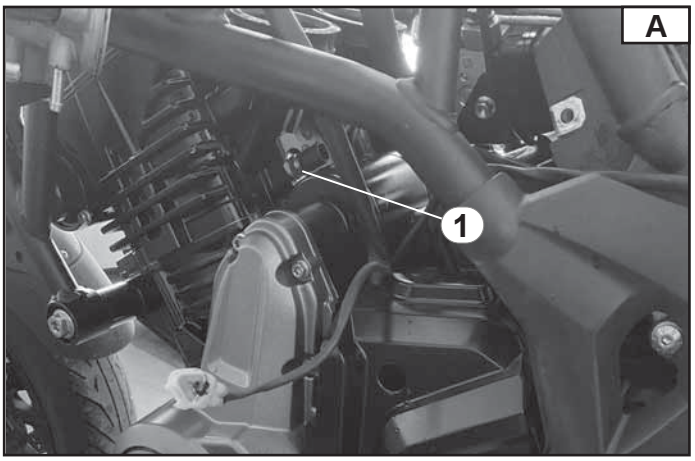
Park the motorcycle on a level surface.

NOTICE

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

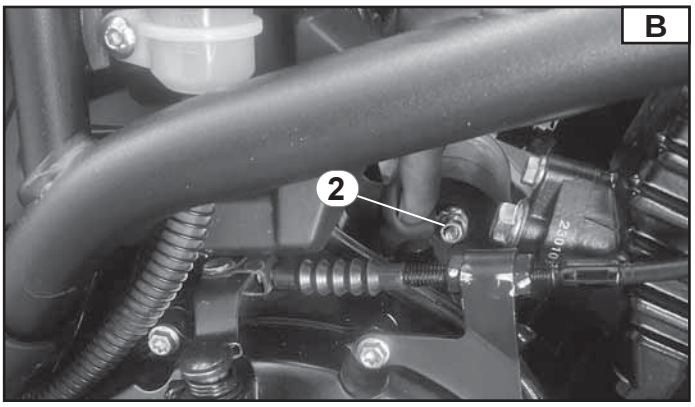
Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- Fuel tank, refer to **"Fuel tank removal, Chapter 4".**
- The air-box, refer to **"Removal of the air-box, Chapter 4".**
- The throttle body, refer to **"Removal of throttle body, Chapter 5".**
- The coolant temperature sensor (1) Fig. A.



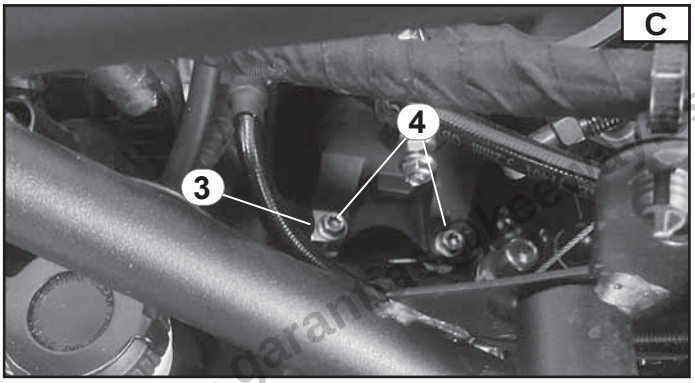
Disconnect:

- The positive cable (2) Fig. B.

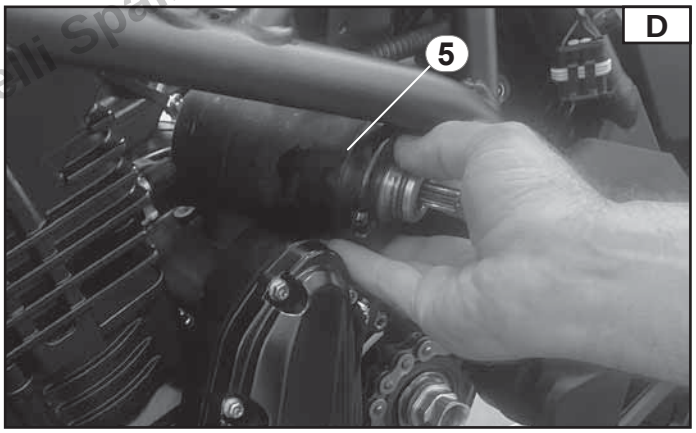


Remove:

- The screws (4) Fig. C.
- The negative cable (3) Fig. C.

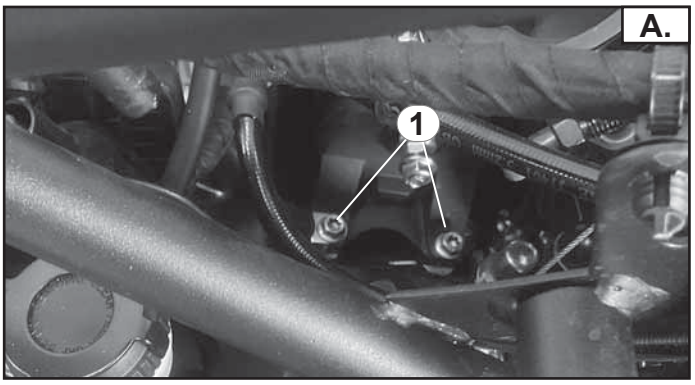


- The starter motor (5) Fig. D.



IGNITION
INSTALLATION OF THE STARTER MOTOR

Installation:
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

SUPPLY

REMOVAL OF THE THROTTLE BODY

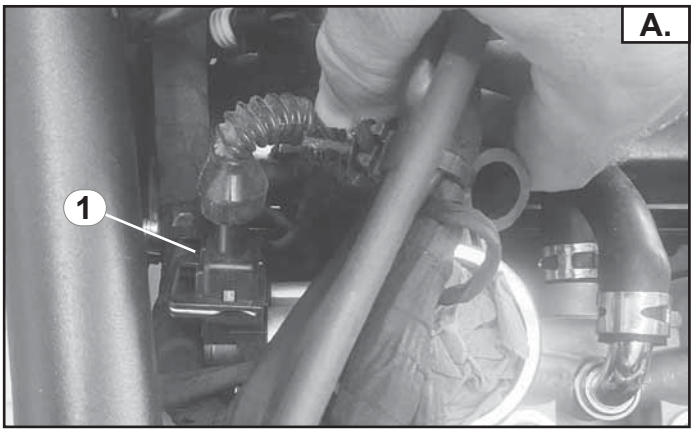
Park:
- The motorcycle on a level surface.

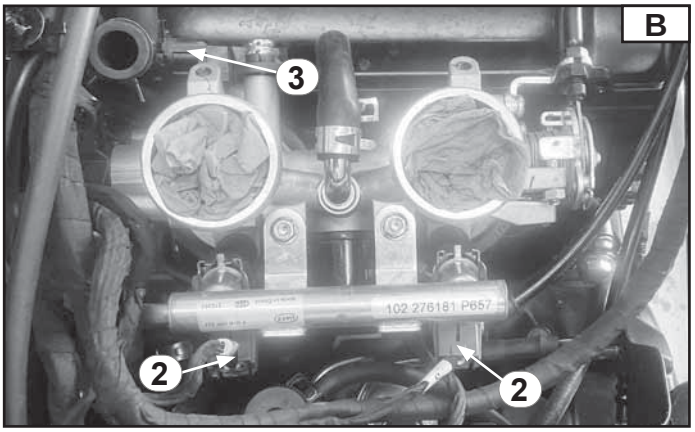
NOTICE

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

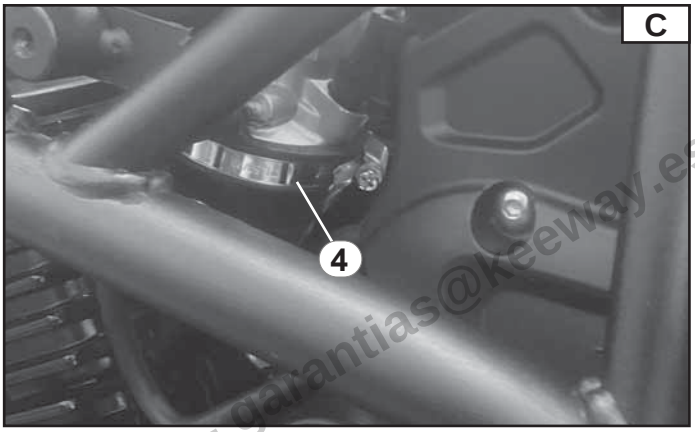
Remove:
- The seat, refer to **"Removal of the rider seat, Chapter 4".**
- The tank, refer to **"Removal of the tank, Chapter 4".**
- The air - box, refer to **"Removal of the air-box, Chapter 4".**

Disconnect:
- The TPS connector (1) of the throttle body Fig. A.
- The injector connector (2) Fig. B.
- The connector of the MAP pressure and temperature sensor (3) Fig. B.

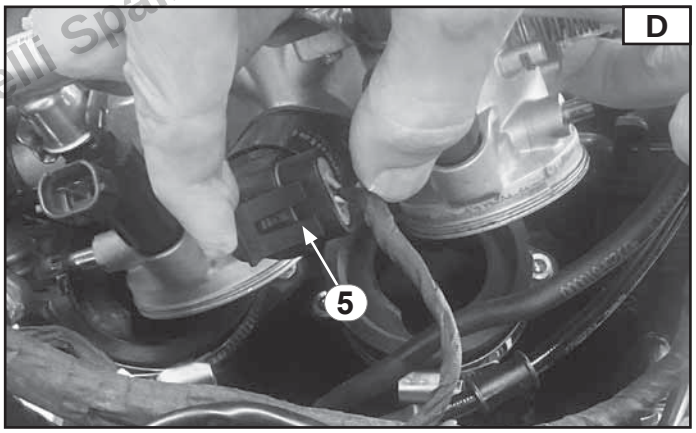




Loosen:
- The screw hose clamps (4) Fig. C.

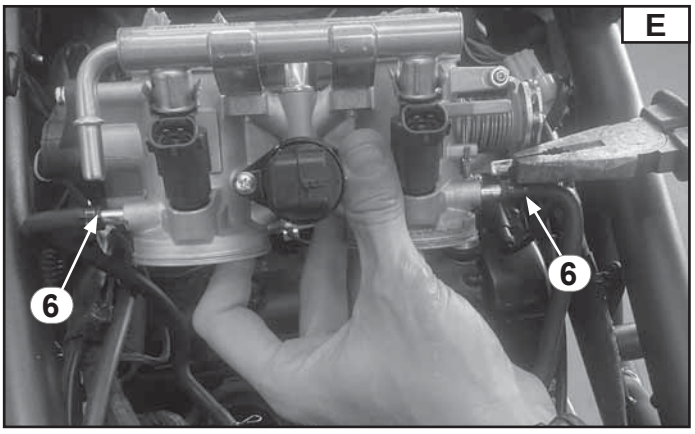


Disconnect:
- The Stepper connector (5) Fig. D.



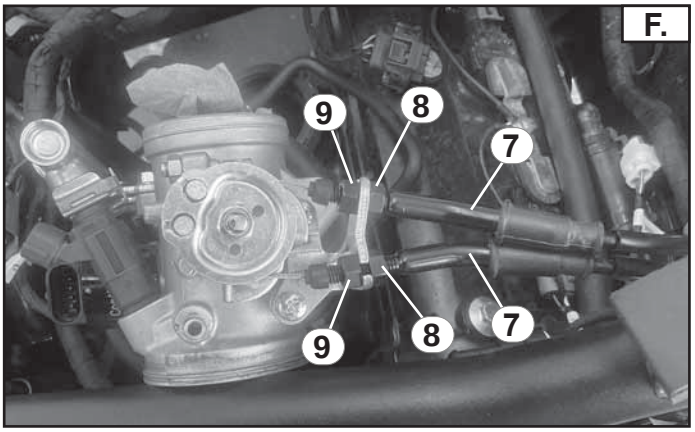
SUPPLY
REMOVAL OF THE THROTTLE BODY

Disconnect:
- The depression hoses (6) Fig. E.

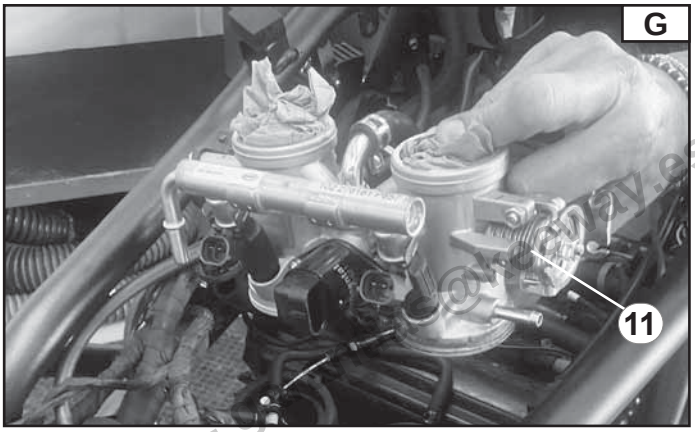


Disconnect:
- The lower end of the throttle opening/closure cable (7) by releasing the lock nuts (8) Fig. F
- The lower nuts (9) Fig. F.

Slide out:
- Throttle cables.



- The throttle body (11) Fig. G.



SUPPLY
INSTALLATION OF THE THROTTLE BODY

Park:
- The motorcycle on a level surface.

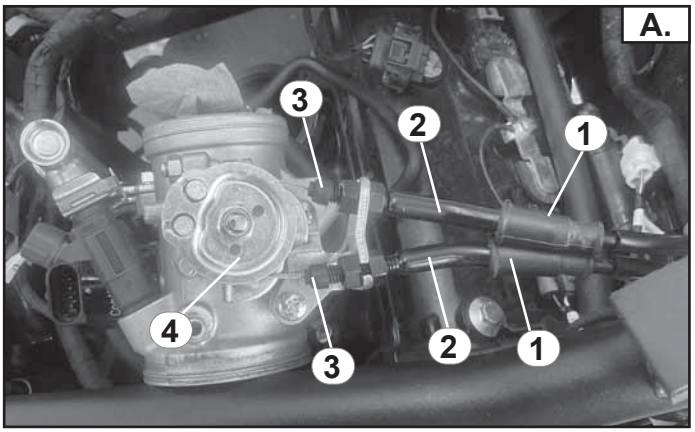
NOTICE

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

Installation:
Proceed using the opposite order to removal.

NOTICE

During assembly of the throttle cables, take care to insert the hood (1) on the control line (2) Fig. A, the rubber terminals (3), otherwise they could interfere with the throttle opening nut (4) Fig. A.



SUPPLY
REMOVAL OF THE STEPPER

Park:
- The motorcycle on a level surface.

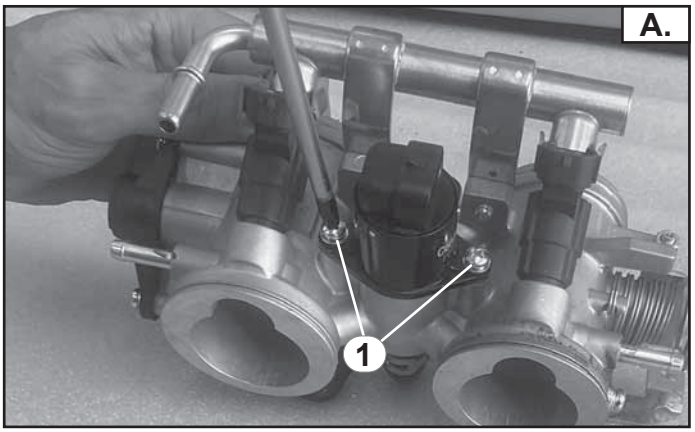
NOTICE

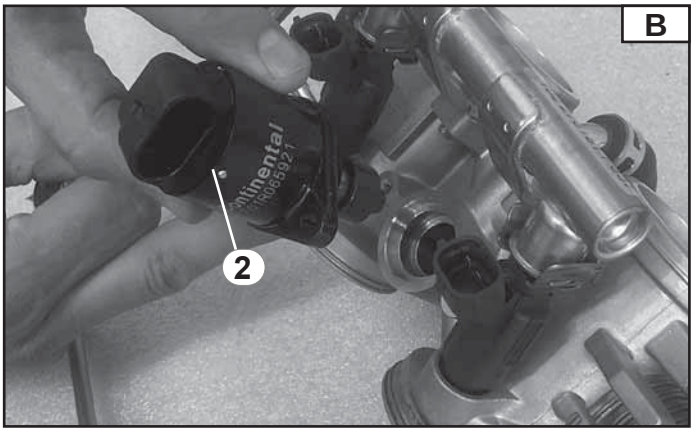
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:
- The seat, refer to **"Removal of the rider seat, Chapter 4".**
- The tank, refer to **"Removal of the tank, Chapter 4"**.
- The air - box, refer to **"Removal of the air-box, Chapter 4".**
- The throttle body, refer to "**Removal of the throttle body, Chapter 4**".

Remove:
- The screws (1) Fig. A.

Slide out:
- The stepper (2) Fig. B.





SUPPLY
INSTALLATION OF THE STEPPER

Park:
- The motorcycle on a level surface.

NOTICE

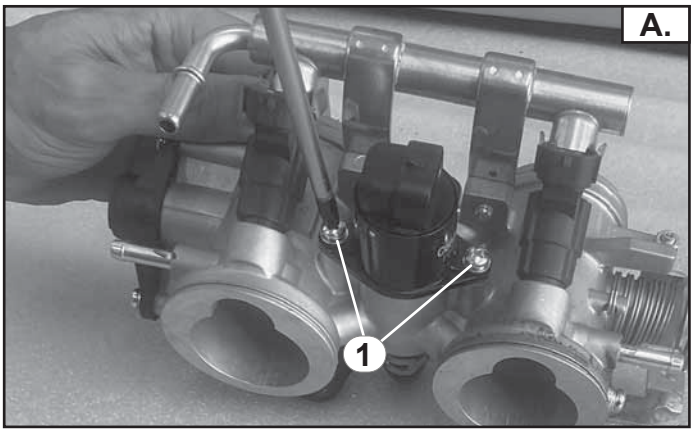
Prop the motorcycle on suitable supports so that it cannot fall.

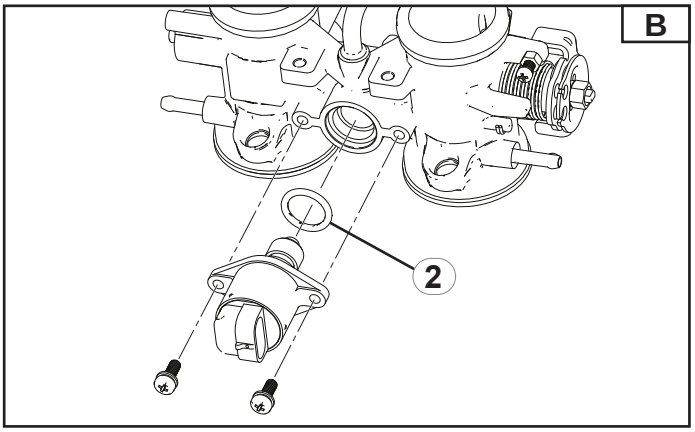
Installation:
Proceed using the opposite order to removal.

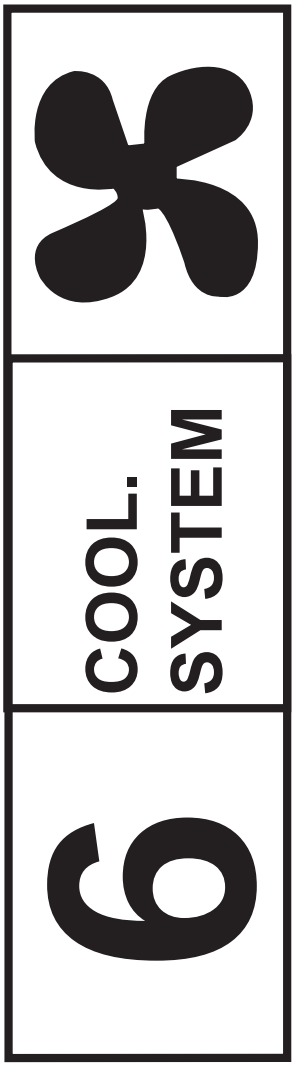
Tighten:
- The screws (1) Fig. A to the following torque:

Torque 8-10 N*m

NOTE:
During the assembly stage of the stepper, pay attention that the OR (2) Fig. B is not damaged during insertion into its seat.







CHAPTER 6

COOLING SYSTEM

WATER PUMP

REMOVAL OF THE WATER PUMP

Park:

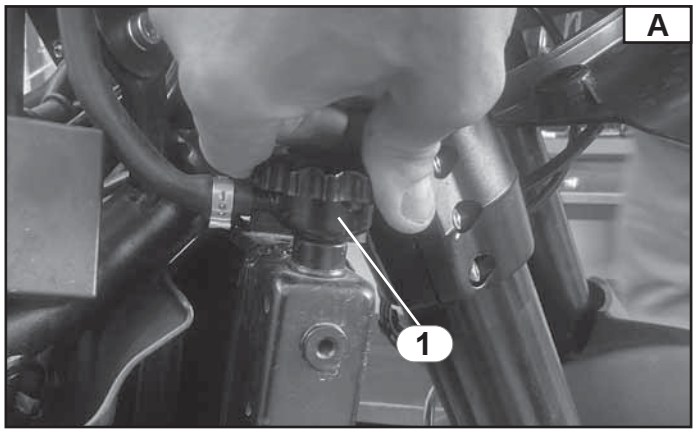
- The motorcycle on a level surface.

NOTICE

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

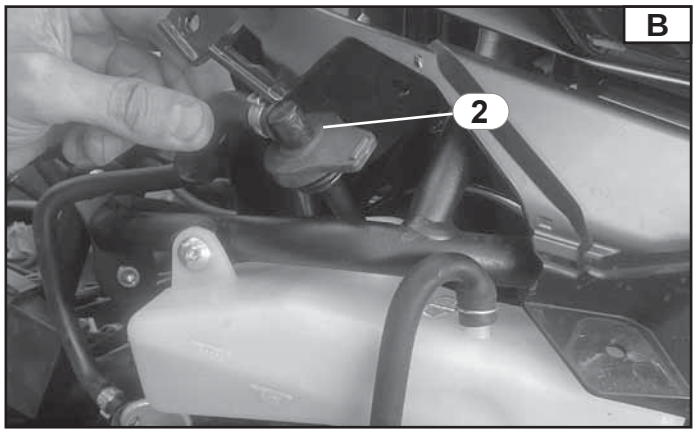
Remove:

- The fuel tank fairing, refer to **"Replacement of the front turn signal lights, Chapter 3"**.
- The radiator cap (1) Fig. A.



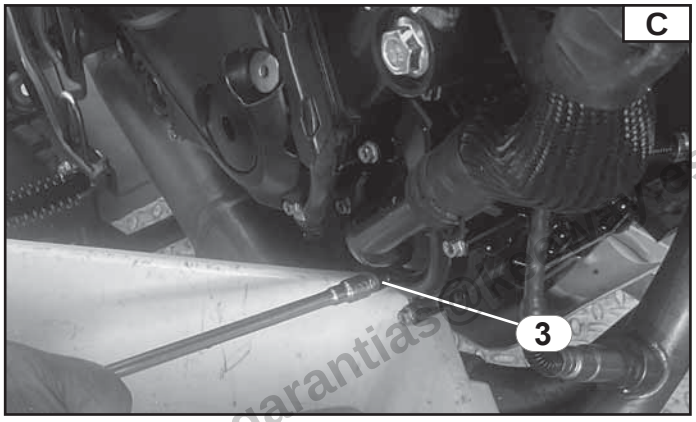
- The expansion tank cap (2) Fig. B.

NOTE:
Place a container underneath the drain cap of the water pump Fig. C.

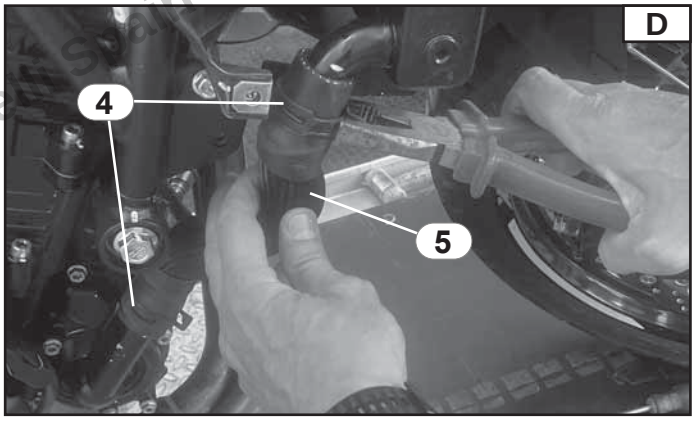


Remove:

- The coolant drain screw (3) Fig. C.
- The coolant.



- The metal clamps (4) Fig. D.
- The sleeve (5) Fig. D.

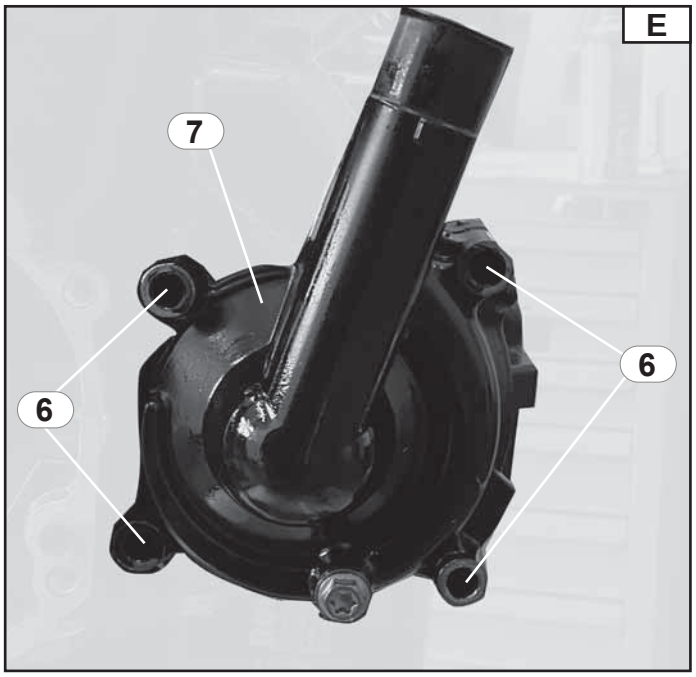


WATER PUMP

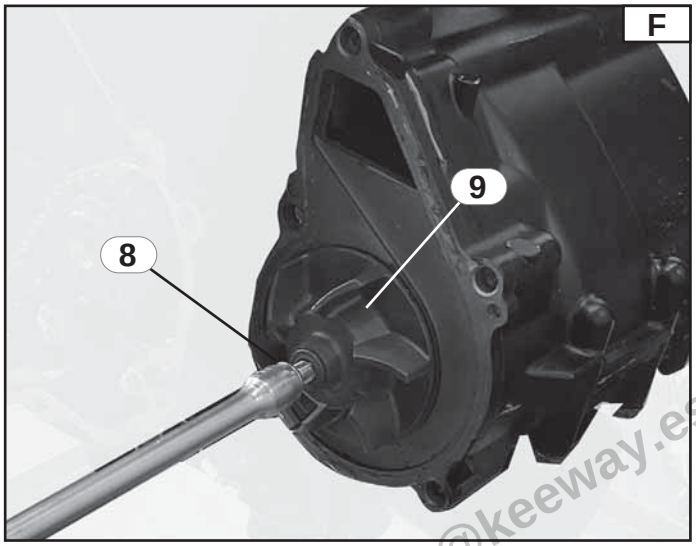
REMOVAL OF THE WATER PUMP

Remove:

- The screws (6) Fig. E.
- The cover (7) Fig. E.

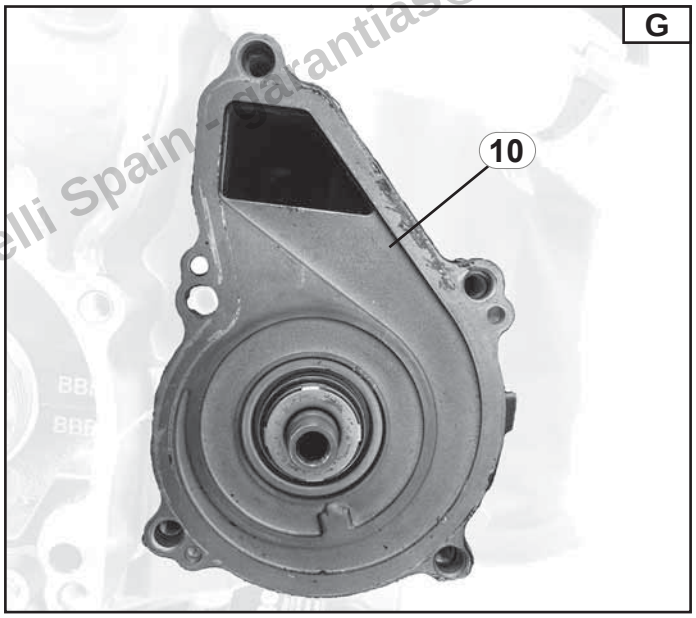


- The screw (8) Fig. F.
- The impeller (9) Fig. F.



Slide out:

- The cover (10) Fig. G.



WATER PUMP

REMOVAL OF THE WATER PUMP

Slide out:

- All of parts of the pump in the order shown in the exploded drawing Fig. H.

Check:

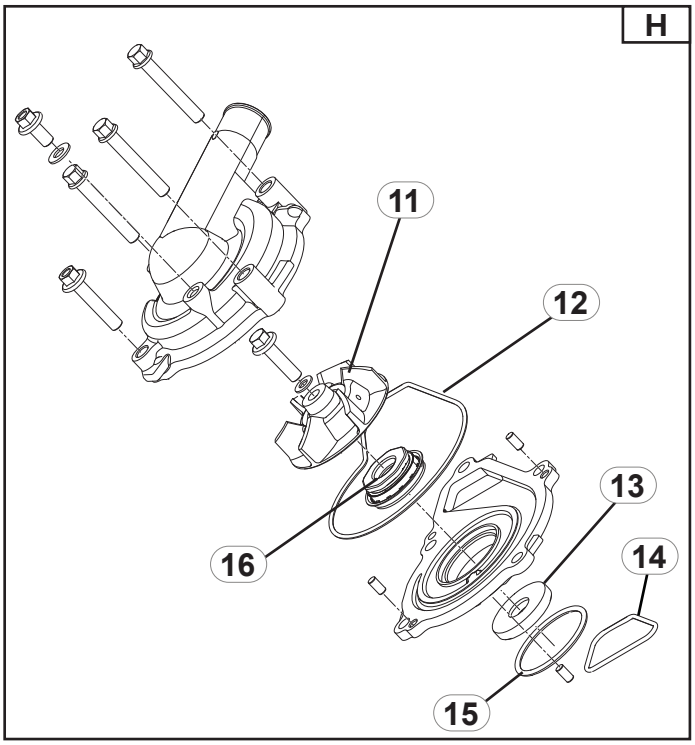
- Integrity of every single part.

If any of the parts should show signs of wear, replace.

Check:

- The impeller (11) Fig. H.
- The O-ring (12) Fig. H.
- The oil seal (13) Fig. H.
- The O-ring (14) Fig. H.
- The O-ring (15) Fig. H.
- The mechanical seal (16) Fig. H.

H



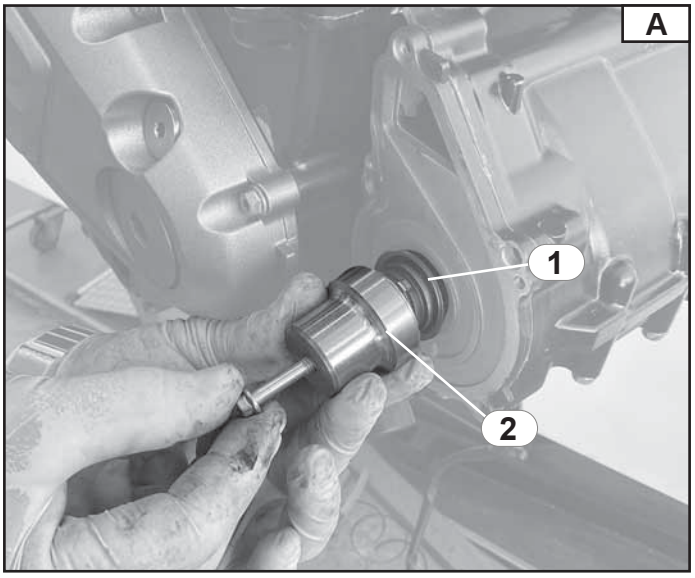
WATER PUMP

INSTALLATION OF THE WATER PUMP

Installation:
Proceed using the opposite order to removal.

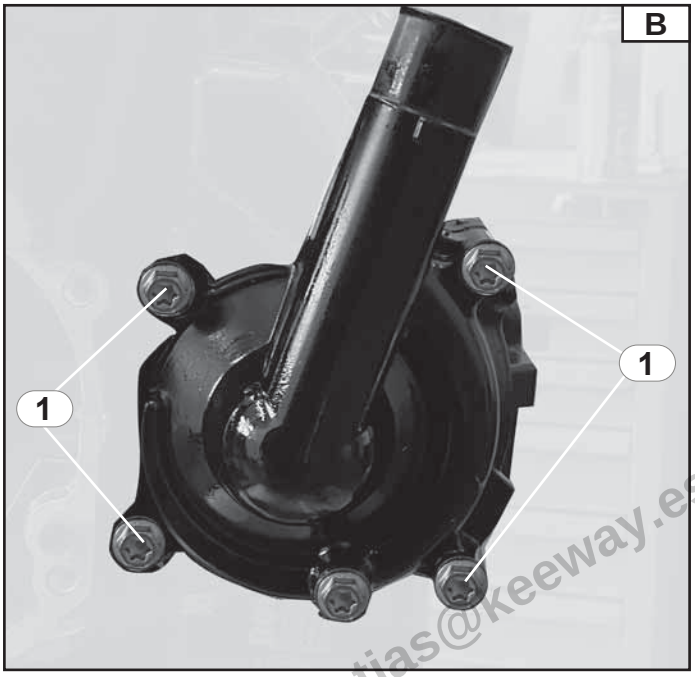
NOTE:
For installing the mechanical seal (1) Fig. A, use the special tool (2) Fig. A.

mechanical seal mounting tool kit
Code: R000097710000



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

Torque 12 N*m



THERMOSTAT

REMOVAL OF THE THERMOSTAT

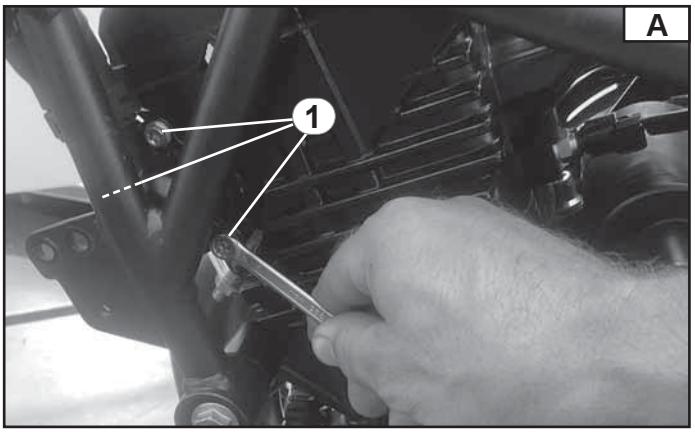
Park:
- The motorcycle on a level surface.

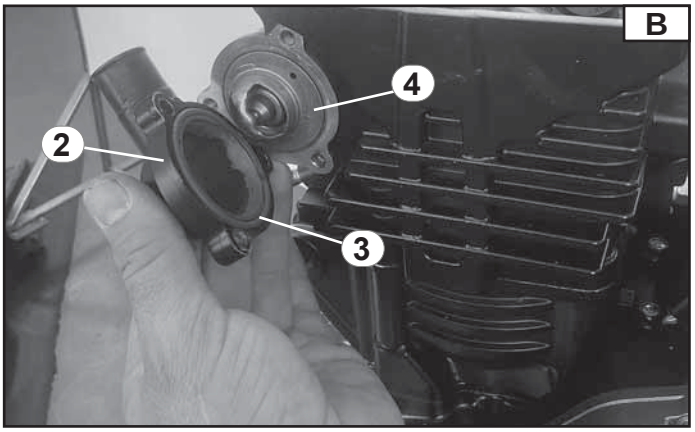
NOTICE

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

Remove:
- The screws (1) Fig. A.
- The cover of the thermostat (2) Fig. B.
- O-ring (3) Fig. B.
- The thermostat (4) Fig. B.

NOTE:
Drain out the coolant before proceeding with these operations, refer to "Removal of the water pump, Chapter 6".



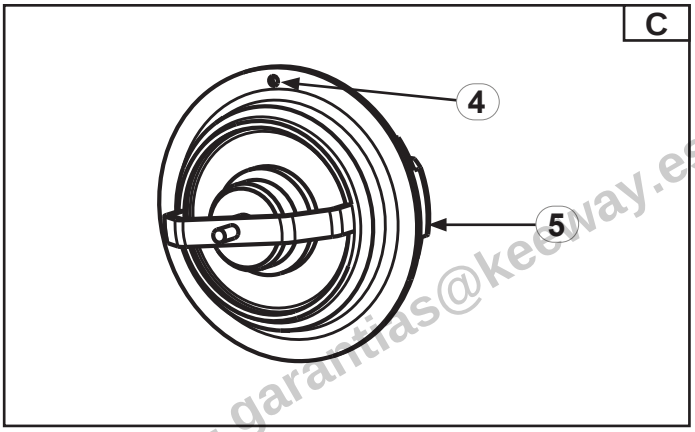


Check:
- The by-pass port (4) Fig. C.

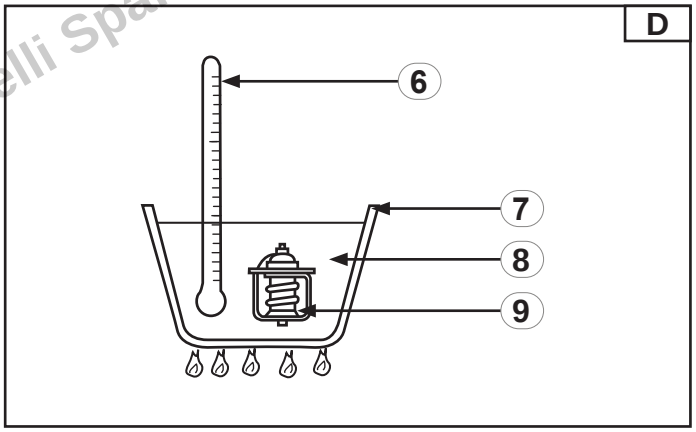
If clogged, replace.
- The thermostat (5) Fig. C.

If this does not open at 82° ~ 95° C (167~ 203° F), replace.

Thermostat check:
- Immerse the thermostat in a container filled with water Fig. D.
- Slowly heat the water.
- Immerse a thermometer in water.
- Mix the water again, keeping an eye on the thermostat and on the temperature shown on the thermometer.
- When the temperature of 82°C (179° F) is reached, the thermostat valve starts to open up to the max opening at a temperature of 95°C (203° F). The thermostat valve will open at least to 7 mm (0.275 in).



Key Fig. D.
Thermometer (6).
Container (7).
Water (8).
Thermostat (9).

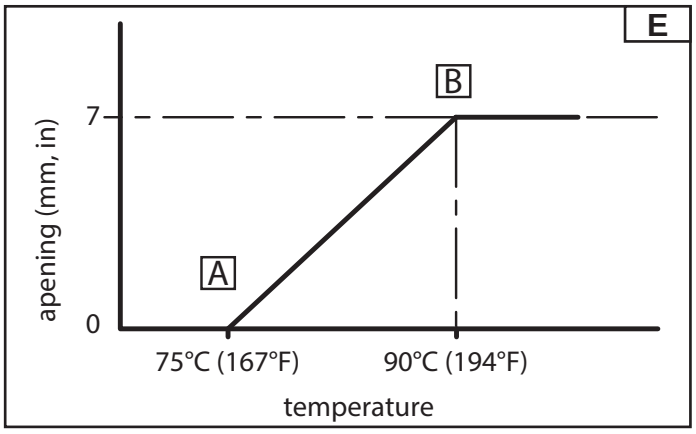


THERMOSTAT

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 might cause overheating.

THERMOSTAT

INSTALLATION OF THE THERMOSTAT

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.

Install:

- The thermostat (1) Fig. A.

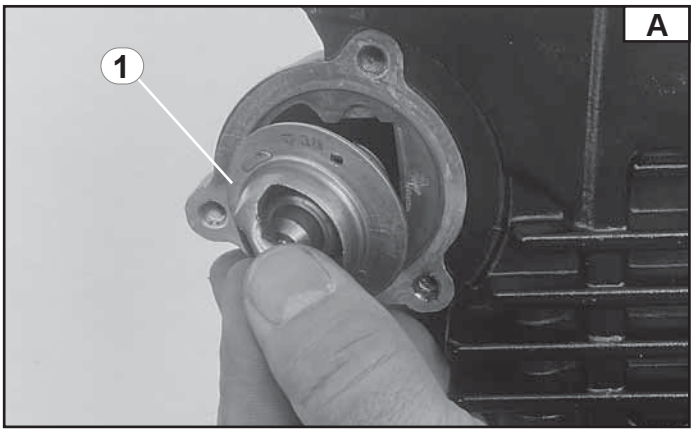
Tighten:

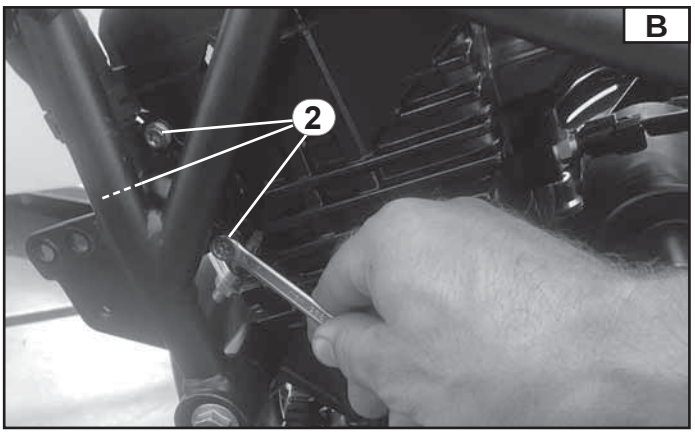
- The screws (2) Fig. B to the following torque:

Torque 12 N*m

NOTE:

Add coolant once these steps have been completed.





RADIATOR

REMOVAL OF THE RADIATOR

Park:

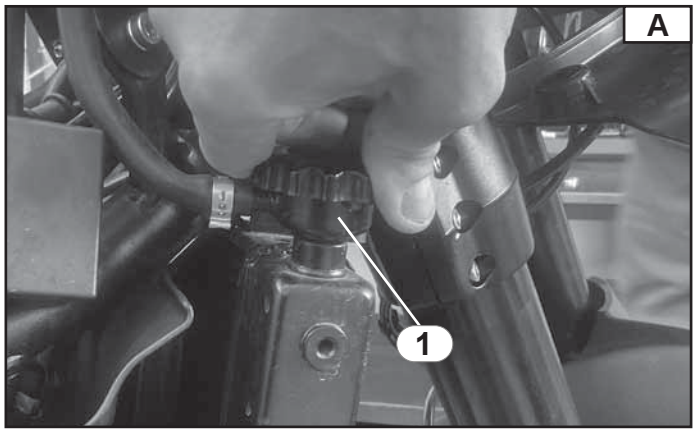
- The motorcycle on a level surface.

NOTICE

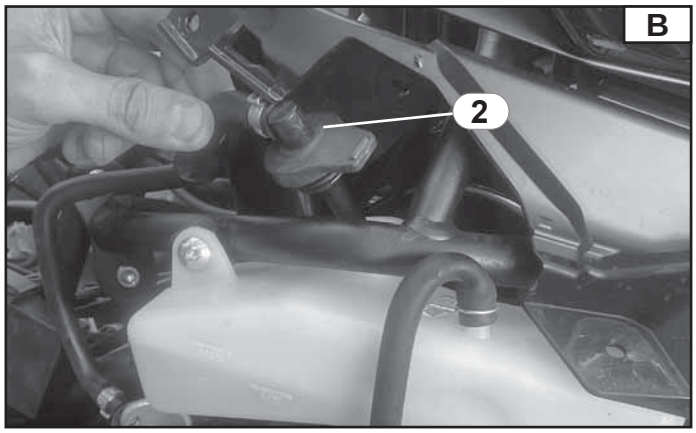
Prop the motorcycle on suitable supports so that it cannot fall.

Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The fuel tank fairing, refer to **"Replacement of the front turn signal lights, Chapter 3"**.
- The radiator cap (1) Fig. A.



- The expansion tank cap (2) Fig. B.

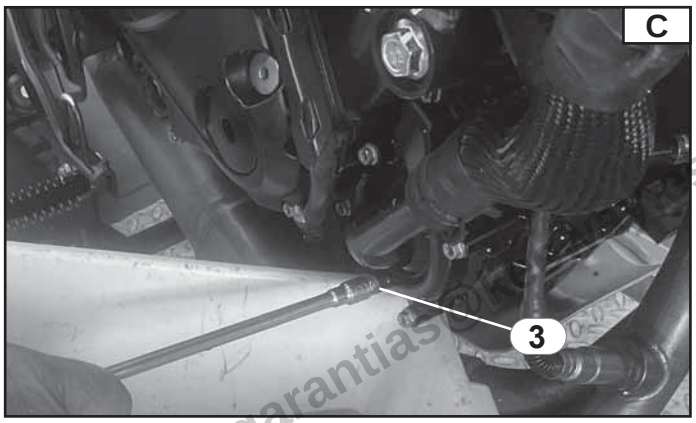


NOTE:

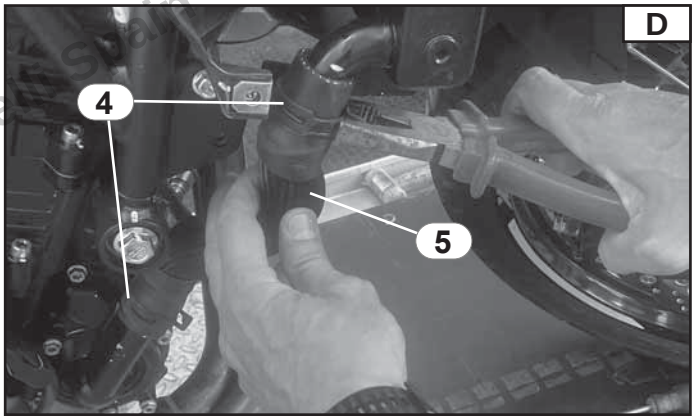
Place a container underneath the drain cap of the water pump Fig. C.

Remove:

- The coolant drain screw (3) Fig. C.



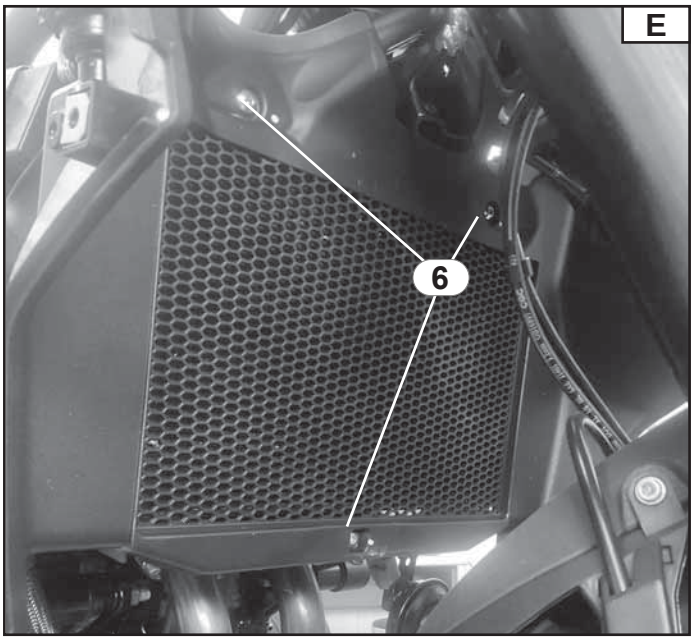
- The metal clamps (4) Fig. D.
- The sleeve (5) Fig. D.



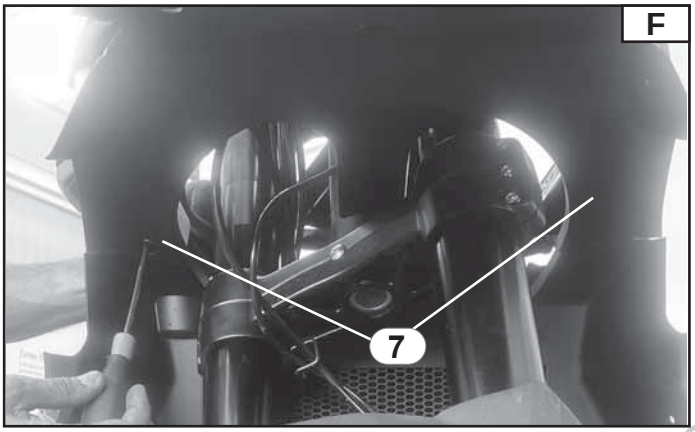
RADIATOR
REMOVAL OF THE RADIATOR

Remove:

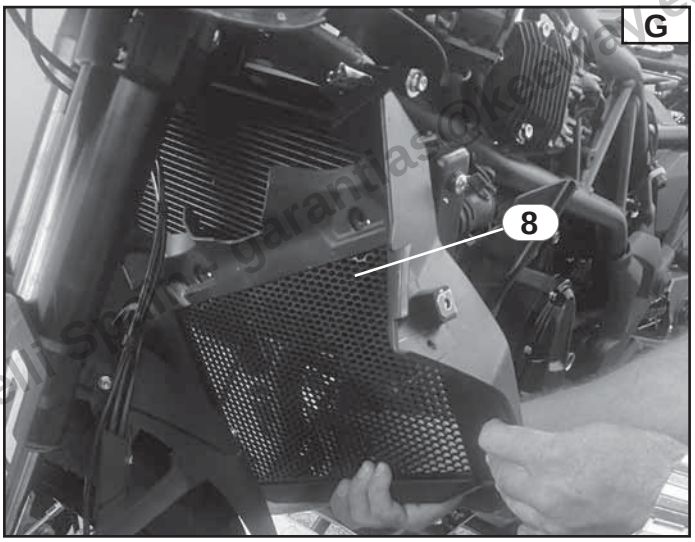
- The screws (6) Fig. E.



- The screws (7) Fig. F.



- The safety grid (8) Fig. G.

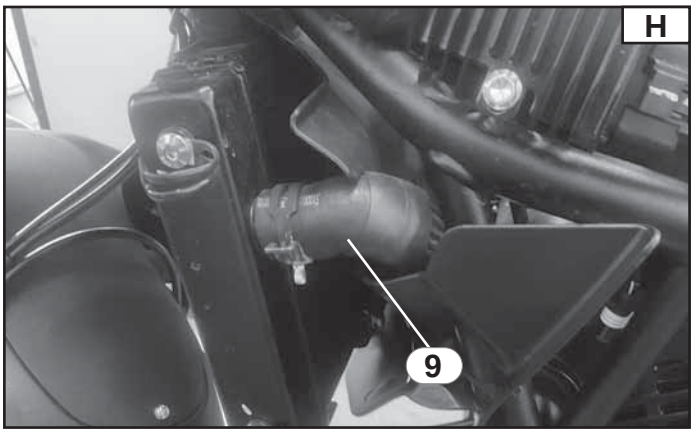


RADIATOR

REMOVAL OF THE RADIATOR

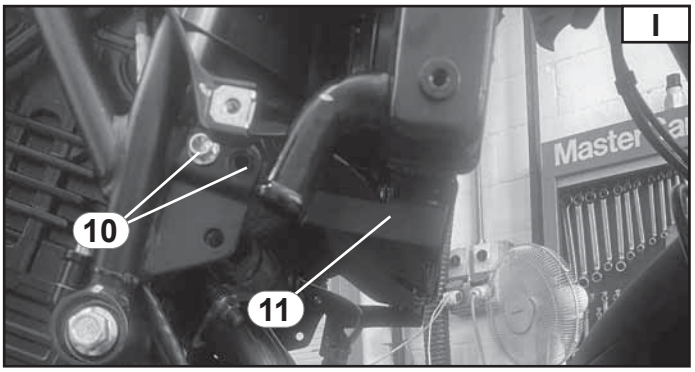
Disconnect:

- The sleeve (9) Fig. H.

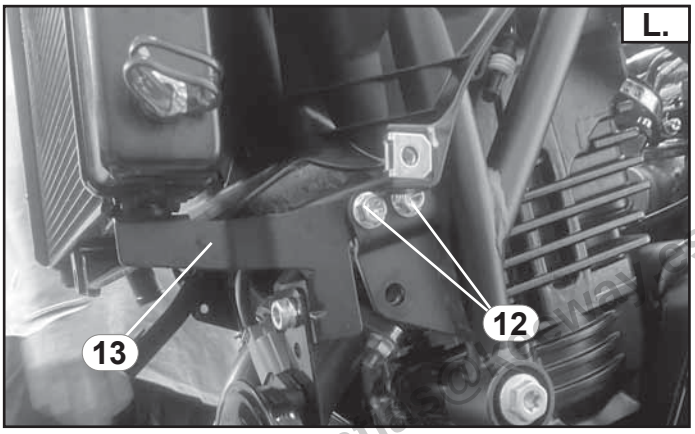


Remove:

- The screws (10) Fig. I.
- The right radiator support bracket (11) Fig. M. I.

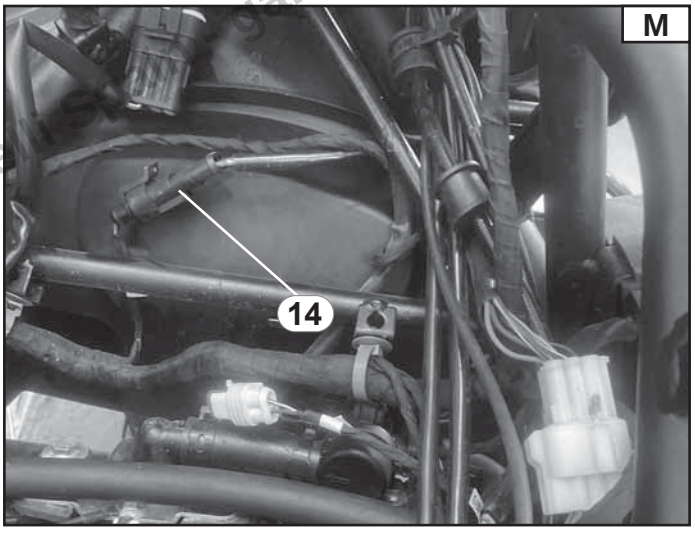


- The screws (12) Fig. L.
- The left radiator support bracket (13) Fig. L.



Disconnect:

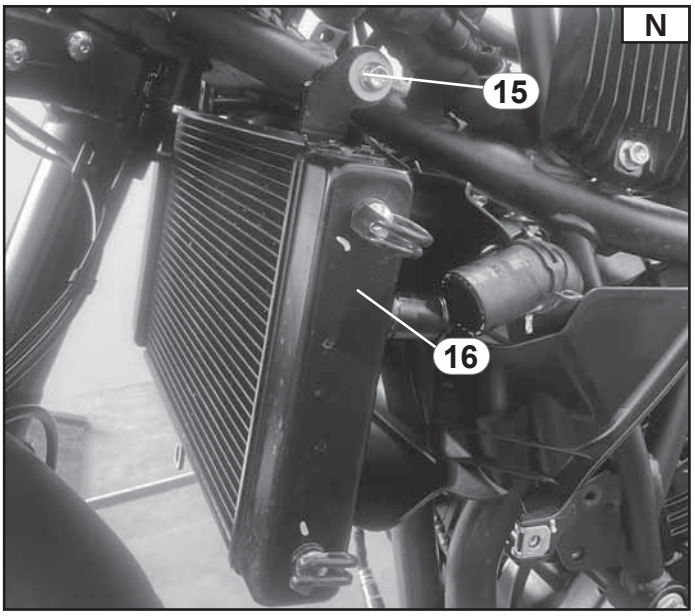
- The electric fan power cable (14) Fig. M.



RADIATOR

REMOVAL OF THE RADIATOR

Remove:
- The bolt (15), Fig. N.
- The radiator (16) Fig. N.



Check:
- 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.

Check:
- The radiator sleeves.

If there is any cracking/damage, replace.

RADIATOR

INSTALLATION OF THE RADIATOR

Park:

- The motorcycle on a level surface.

NOTICE

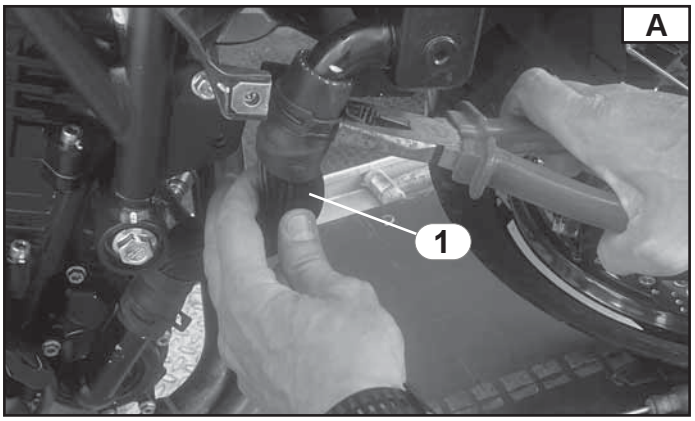
Prop the motorcycle on suitable supports so that it cannot fall.

Once each individual part has been checked, proceed to install the radiator following the removal steps in reverse order.

- Once the parts have been assembled, proceed with filling of the circuit.

NOTE:

Whilst filling the circuit, pinch the sleeve close to point in which the liquid is being delivered (1) Fig. A, to remove any air bubbles.



RADIATOR

REMOVAL OF THE RADIATOR CONVEYOR

Park:

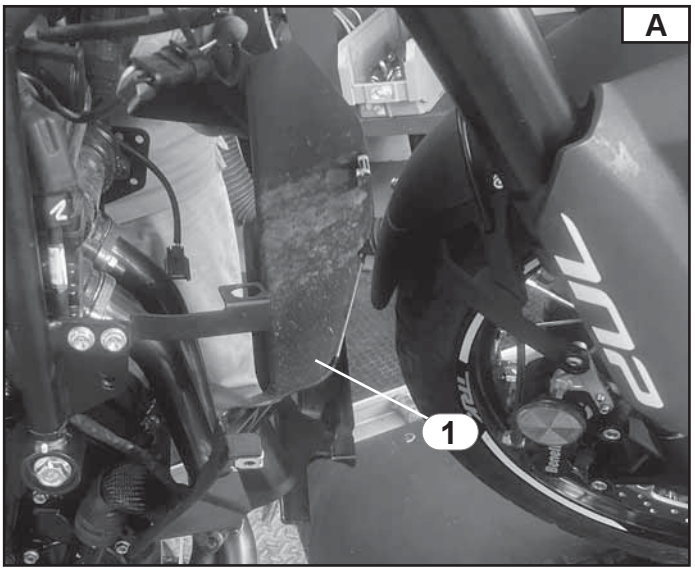
- The motorcycle on a level surface.

NOTICE

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

Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The fuel tank fairing, refer to **"Replacement of the front turn signal lights, Chapter 3"**.
- The radiator, refer to **"Removal of the radiator, Chapter 4".**
- The radiator cap (1) Fig. A.



RADIATOR

INSTALLATION OF THE RADIATOR CONVEYOR

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.

EXPANSION TANK

REMOVAL OF THE EXPANSION TANK

Park:

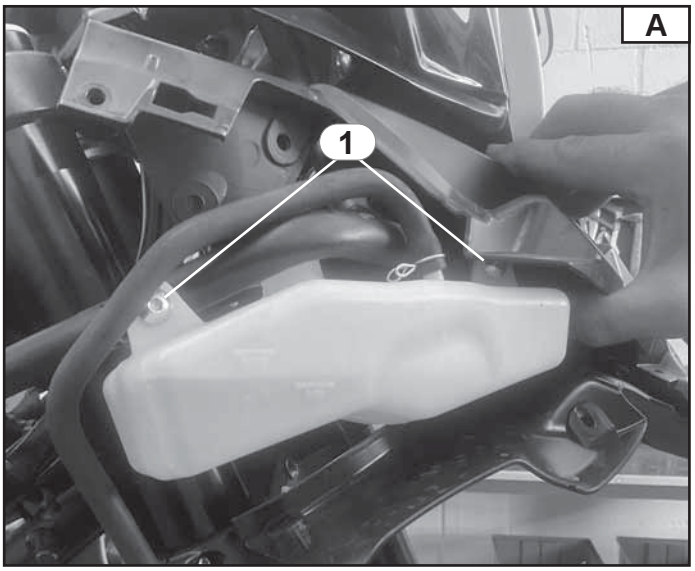
- The motorcycle on a level surface.

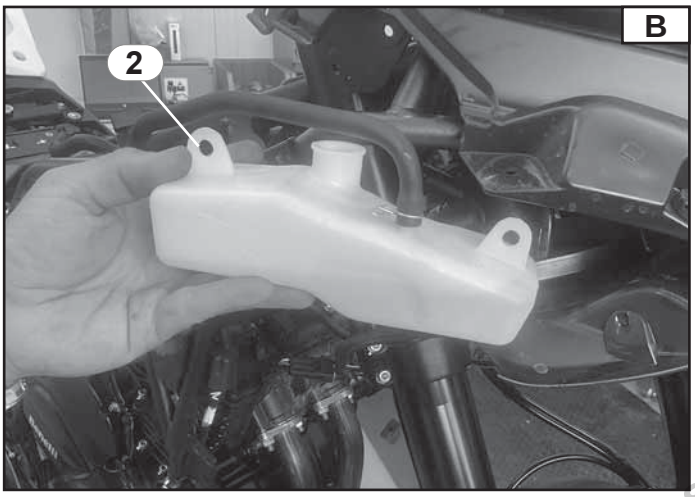
NOTICE

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

Remove:

- The passenger seat, refer to **"Removal of the passenger seat, Chapter 4".**
- The rider seat, refer to **"Removal of the rider seat, Chapter 4".**
- The fuel tank fairing, refer to **"Replacement of the front turn signal lights, Chapter 3"**.
- The screws (1) Fig. A.
- The expansion tank (2) Fig. B.





EXPANSION TANK

INSTALLATION OF THE EXPANSION TANK

Park:

- The motorcycle on a level surface.

NOTICE

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

Installation:

Proceed using the opposite order to removal.

ELECTRIC FAN

REMOVAL OF THE ELECTRIC FAN

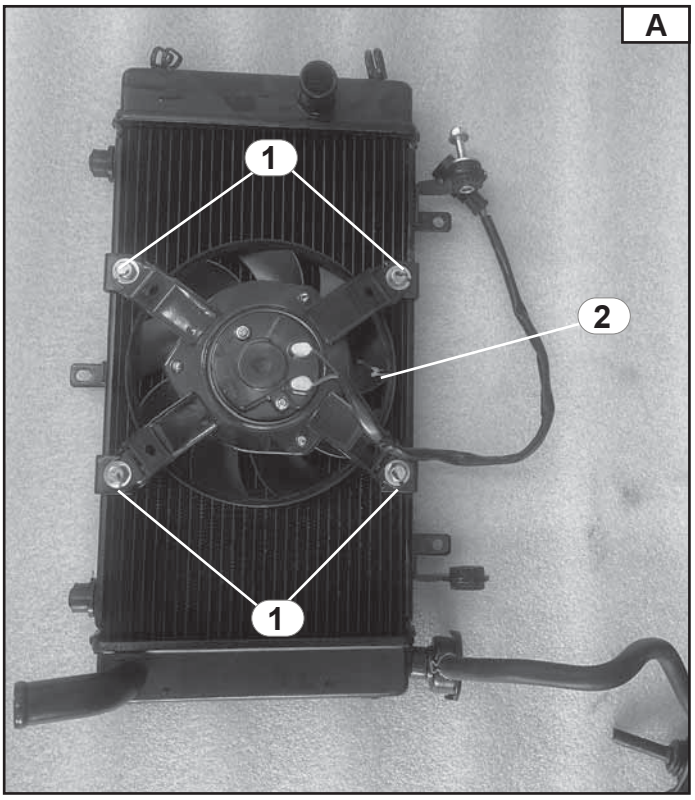
Park the motorcycle on a level surface.

NOTICE

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

Remove:

- The radiator, refer to **"Removal of the radiator, Chapter 6".**
- The screws (1) Fig. A.
- The electric fan (2) Fig. A.



ELECTRIC FAN
INSTALLATION OF THE ELECTRIC FAN

Park the motorcycle on a level surface.

NOTICE

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

Installation:

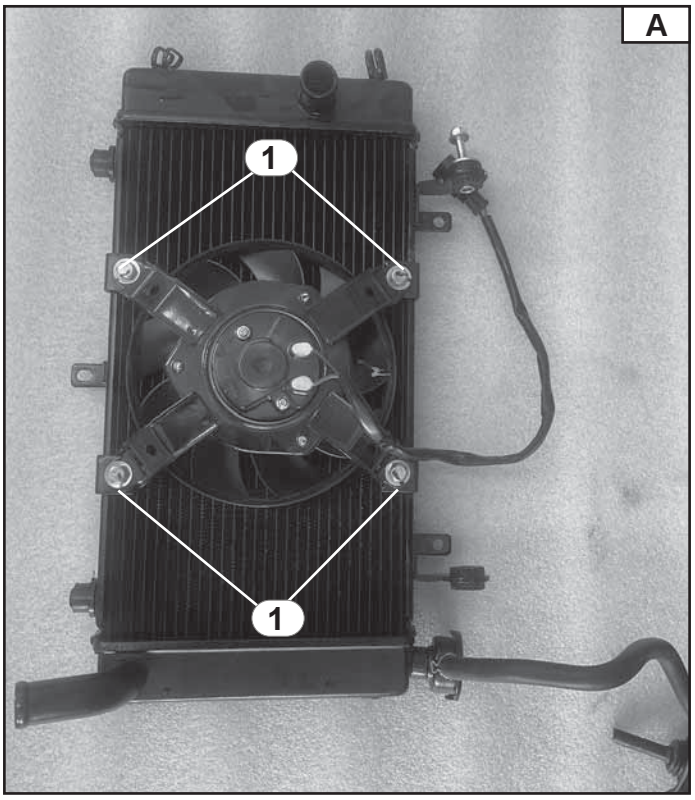
Proceed using the opposite order to removal.

Tighten:

- The screws (1) Fig. A.

To the following torque:

Torque 10 N*m



ELEC.

7

ELECTRIC SYSTEM

SENSORS

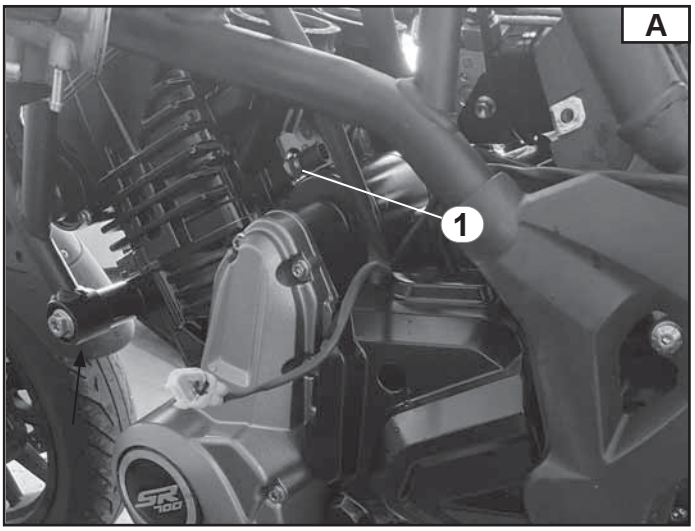
ENGINE CONTROL SYSTEM DESCRIPTION

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) uses information from the sensors around the engine, the cooling system and intake system, calculating with precision, the advance ignition time and fuel needs for all engine speeds and loads.
Furthermore, the system features hardware diagnostic functions in compliance with the provisions of the EOBD protocol.
This function makes sure that if a breakdown occurs in the system, the type of breakdown and engine data at the time of the problem are stored in the ECM memory.
The data stored can be recovered by means of an apposite service equipment available at any Benelli's Dealer.
This way, there can be exact diagnosis of the breakdown and prompt, efficient repair of the fault.

SENSORS

COOLANT TEMPERATURE SENSOR

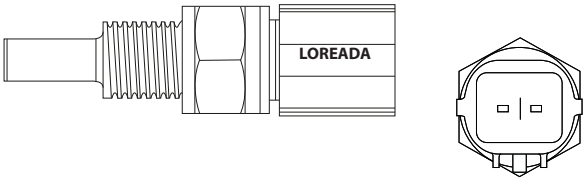
It is situated close to the cylinder head (1) Fig. A.,
The ECM receives and uses information about coolant to optimise supply at all engine temperatures and to calculate the supply requirement with hot and cold starting.



CHECKLIST

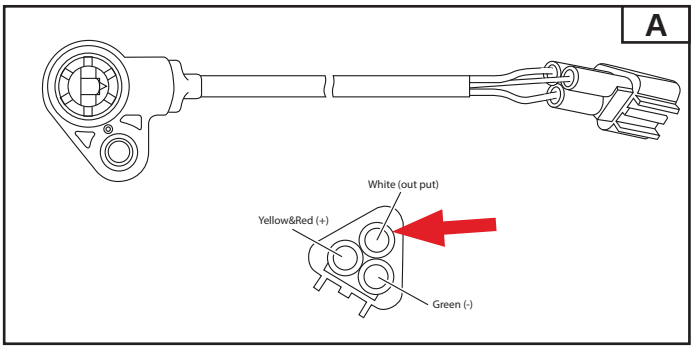
TEMPERATURE			
T °C	Rmin	Rnom	Rmax
-40	333.16	349.19	365.95
-35	239.71	250.35	261.44
-30	174.52	181.65	189.05
-25	128.49	133.30	138.28
-20	95.61	98.88	102.24
-15	71.862	74.093	76.386
-10	54.527	56.057	57.624
-5	41.750	42.801	43.875
0	32.242	32.965	33.701
5	25.075	25.571	26.074
10	19.685	19.996	20.338
15	15.528	15.757	15.988
20	12.356	12.509	12.662
25	9.900	10.00	10.100
30	7.949	8.047	8.145
35	6.425	6.157	6.611
40	5.224	5.311	5.398
45	4.274	4.353	4.433
50	3.156	3.588	3.661
55	2.908	2.973	3.039
60	2.417	2.476	2.536
65	2.020	2.072	2.126
70	1.696	1.743	1.791
75	1.430	1.472	1.516
80	1.211	1.249	1.288
85	1.031	1.064	1.099
90	0.880	0.910	0.942
95	0.755	0.782	0.810
100	0.650	0.674	0.699
105	0.561	0.583	0.606

TEMPERATURE			
T °C	Rmin	Rnom	Rmax
110	0.487	0.506	0.526
115	0.423	0.441	0.459
120	0.369	0.385	0.402
125	0.323	0.338	0.353
130	0.284	0.297	0.310
135	0.250	0.262	0.274
140	0.221	0.231	0.242
145	0.195	0.205	0.215
150	0.174	0.182	0.191
155	0154	0.162	0.171
160	0.138	0.145	0.153
165	0.123	0.130	0.137
170	0.111	0.117	0.123
175	0.099	0.105	0.111
180	0.089	0.095	0.100
185	0.081	0.085	0.090
190	0.073	0.077	0.082
195	0.066	0.070	0.074
200	0.060	0.064	0.068



SENSORS
GEARBOX POSITION SENSOR

It is situated on the left side of the engine, under the sprocket cover, detects the position of the gear.



KEY OF GEAR SENSOR CONNECTOR WIRE
- Yellow/Red wire (positive + 5 V from the ECU)
- Green wire (negative - ground)
- White wire (signal +0.77 - +4.22 volt)

Check:
- Operation of the gear position sensor.
- Use a voltmeter to check the output voltage of the white wire (OUTPUT) and the engine ground Fig. A.

GEAR	Angle	Rated value	Minimum limit	Minimum limit
1	10.46	4.22	4.10	4.50
N	40.46	3.87	3.75	4.00
2	70.46	3.52	3.30	3.65
3	130.46	2.83	2.50	3.10
4	190.46	2.12	1.90	2.30
5	250.46	1.46	1.20	1.70
6	310.46	0.77	0.50	1.00

NOTICE

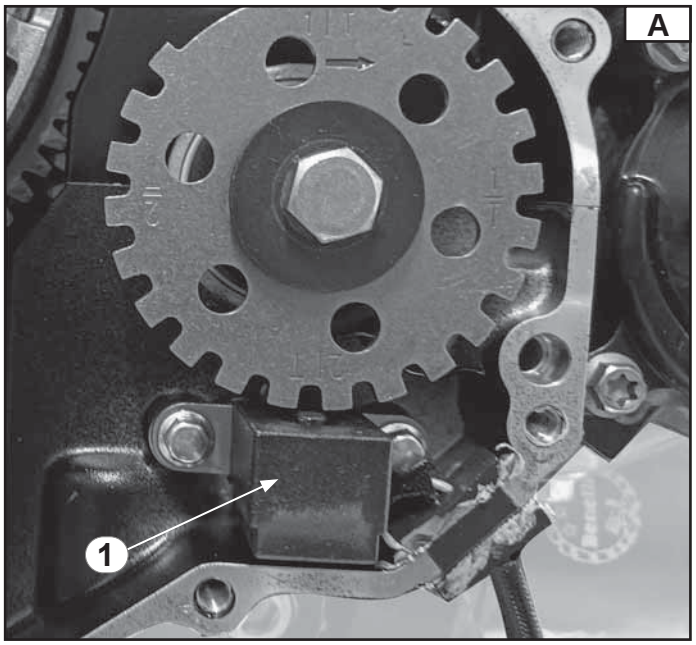
On the electric systems there could be equal connectors for different functions.
In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

SENSORS

PHASE SENSOR

It is situated close to the right engine crankcase (1), Fig. A.

The position sensor of the crankshaft shows the movement of a sprocket fixed to the left end of the crankshaft by reading a particular wheel consisting of 28 equidistant teeth near to a triple-length space.
The interpreted reading is used by the ECM to identify the position of the drive shaft compared to the point in which the fuel is injected, and the need for the fuel ignition.

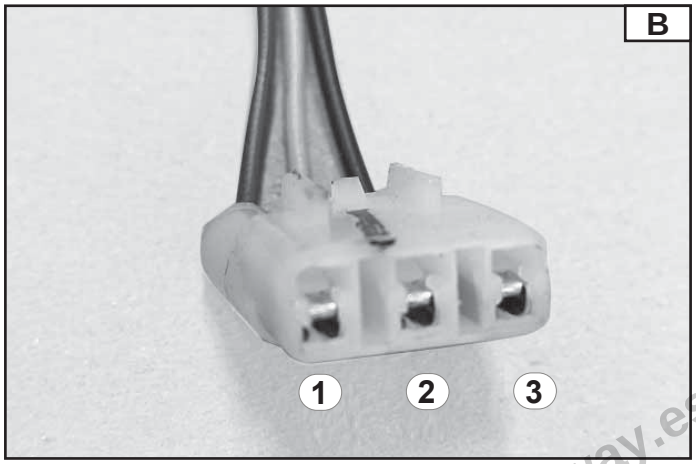


Disconnect:
- The main wiring connector.

Measure:
- The resistance value on the connector Fig. B, on the light green pins 2 (LG) and 3 Black (B)

Standard	**260 ± 20 Ω**	**20 ° C**

NOTE:
If the measured resistance is lower than the stipulated value, the inner coil might be an open circuit or short-circuited, therefore it is necessary to replace it.



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

TMPA SENSOR (intake air temperature + intake pressure)

This vehicle is equipped with an integrated air temperature/intake air pressure sensor Fig. A

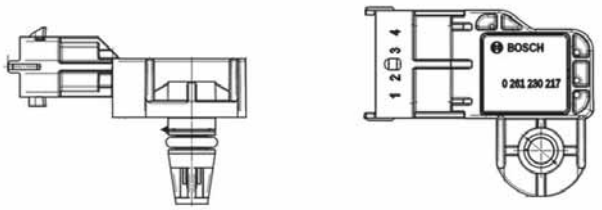
Working principle of INTAKE AIR TEMPERATURE sensor:
Within the sensor temperature range, the resistance varies according to the various temperature.
It is distinguished by the negative temperature coefficient resistor.
It is a part that can not be maintained.

For checking the intake air temperature sensor, measure the impedance on (pin 1) and (pin 2) Fig. B of the sensor via a multimeter.

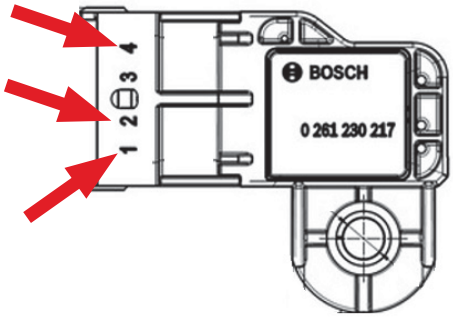
Temp. (°C)	Resistance (Ω)
-40	45303
-35	34273
-30	26108
-25	19999
-20	15458
-15	12000
-10	9395
-5	7413
0	5895
5	4711
10	3791
15	3068
20	2499
25	2056
30	1706
35	1411

Temp. (°C)	Resistance (Ω)
40	1174
45	987.4
50	833.8
55	702.7
60	595.4
65	508.2
70	435.6
75	374.1
80	322.5
85	279.5
90	243.1
95	212.6
100	186.6
105	163.8
110	144.2
115	127.3
120	112.7
125	100.2
130	89.28

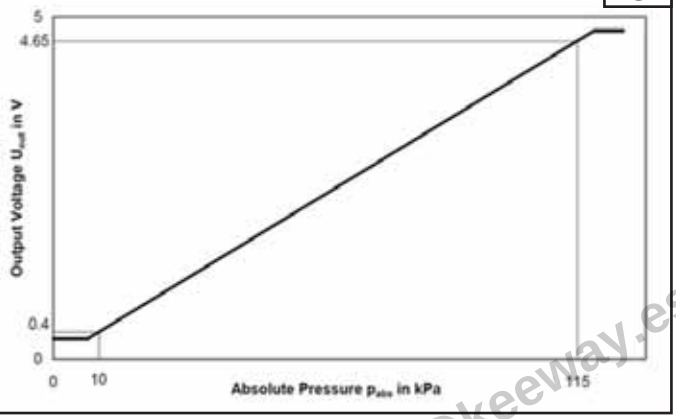
A



B



C



Working principle of INTAKE AIR TEMPERATURE sensor:
The sensor detects the absolute pressure on the intake manifold that corresponds to the inlet pressure, which can be converted to air intake volume accessing the combustion chamber of the engine.

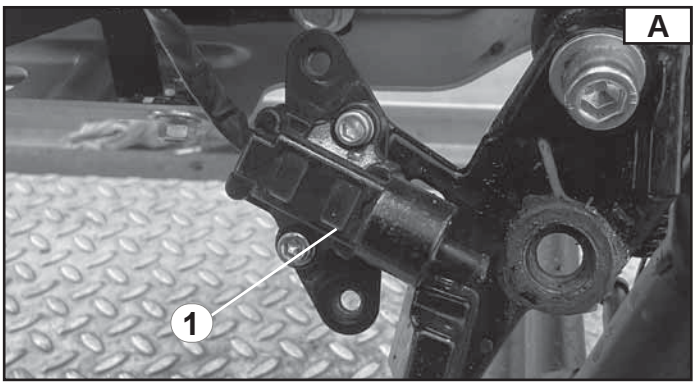
For checking the intake air pressure sensor (map), detect the output voltage on (pin 4) Fig. B of the sensor via a voltmeter.

The chart Fig. C shows the pressure trend according to the output voltage.

SENSORS

SIDE STAND SENSOR

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).

Inspect:

- The continuity using the multitester.

STAND	PIN 1	PIN 2
Raised	●	●
Lowered	●	●

NOTE:
When the above conditions are fulfilled, the sensor is working, otherwise 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

Situated on the exhaust manifold (1), 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 sensor transmits an electric signal to the ECU, which controls the insertion of fuel and air into the combustion chamber Fig. B

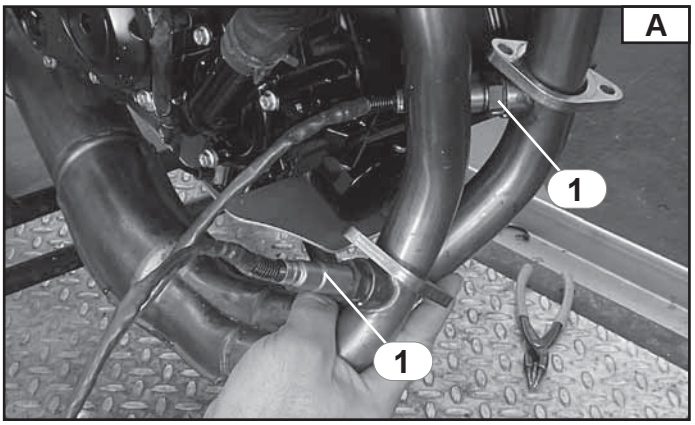
- Threshold value of air-fuel ratio: 750 mVcc
- Dilute threshold of air-fuel ratio: <120 mVcc.
- Heating power of lambda sensor: 7.0 W
- 450°C exhaust gas temperature, 70% duty ratio, 10 Hz, 13.5V voltage.
- Heating power: 9.6±1.5 Ω (measured at 21°C)
- Operating temperature range: 260-850°C

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.

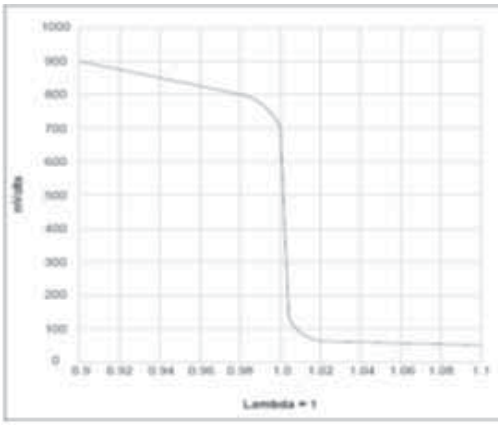
To check the heating resistance, measure the impedance via a multitester on (pin 1) and (pin 3) Fig. C

A



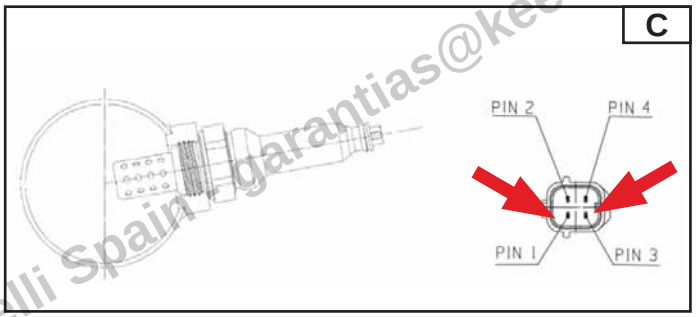
CHARACTERISTIC OPERATING CURVE

B



COUPLER

C



SENSORS

OIL PRESSURE SENSOR

On the bottom half casing, measures the pressure of the oil in the bushes (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 casing.

Check:
- The continuity between pin 1 and the ground (2) Fig. B of the sensor via an air pressure regulator onto the detection hole.
- Set the air pressure regulator at 2 bar.
- Gradually lower the pressure to 0.2 - 0.3 bar.

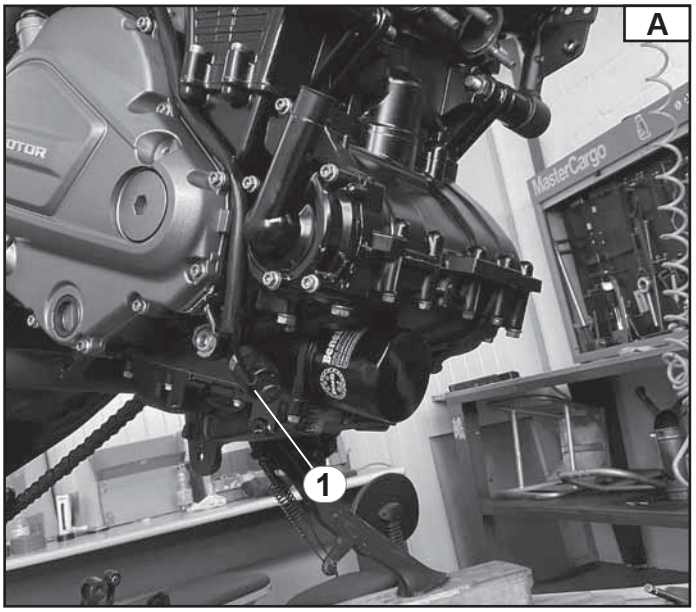
Continuity between (PIN 1) and ground (2)	**<0.8 - 0.3 bar**

NOTE:
If there is no continuity between PIN (1) and ground (2) Fig. B, replace the part.

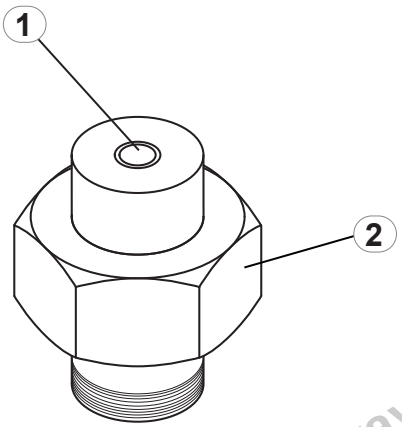
NOTICE

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.

A



B



SENSORS

FRONT BRAKE MICROSWITCH

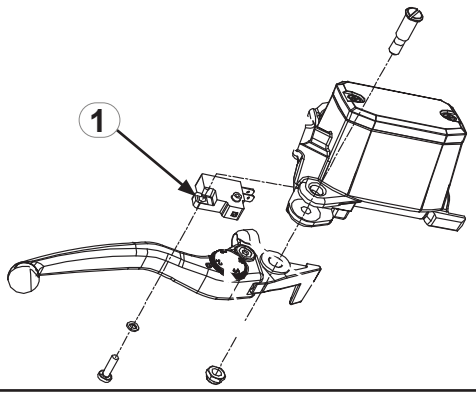
Situated on the front brake pump (1) Fig. A, it is a switch in contact with the brake lever, which serves to switch on the stop lights.

Inspect:

- The continuity by positioning the multitester on the symbol →|- (function diode/continuity test) to check operation, as shown in the table.

SENSOR	PIN 1	PIN 2
Brake lever Pulled	●	●
Brake lever Released	●	●

A



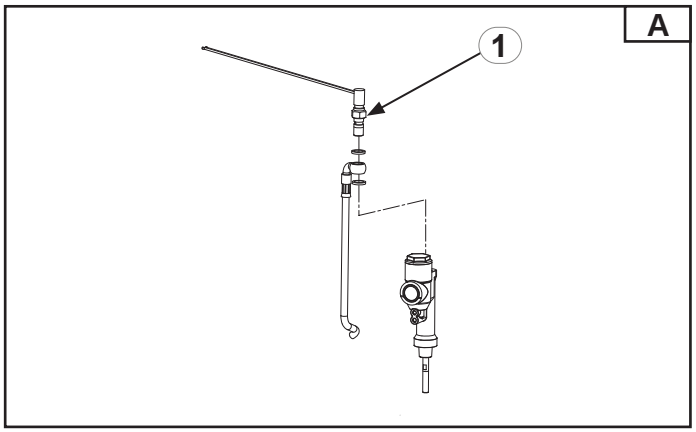
NOTE:
If the above conditions are met, the front brake sensor is working; if not, replace the part.

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
HYDROSTOP

Situated on the rear brake pump (1) Fig. A is a switch, which reads the oil pressure exerted on the pump.
It serves to switch the stop lights on.



Inspect:
- The continuity by positioning the multitester on PIN 1 and PIN 2 and checking the table.

BRAKE	PIN 1	PIN 2
Operated	●	●
Released	●	●

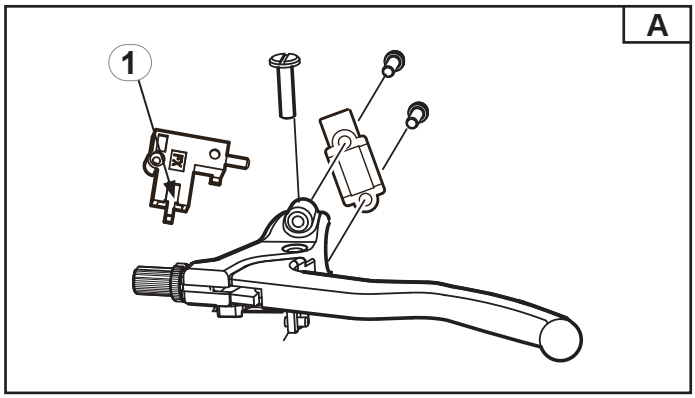
NOTE:
When the above conditions are fulfilled, the rear brake sensor is working properly, otherwise replace the part.

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.

SENSORS

THROTTLE BODY POSITION SENSOR (SYNC CONTACTS)

It is situated on the left end of the shaft of the throttle body unit (1) Fig. A.
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.
Hereunder the sensor pins are listed Fig. B:

PIN 1	**Ground: 0**
Pin 2	**Power supply: +5 Vdc**
Pin 3	**Signal output: 0.5 - 4.5 Vdc**

Disconnect:
- The electrical coupling.

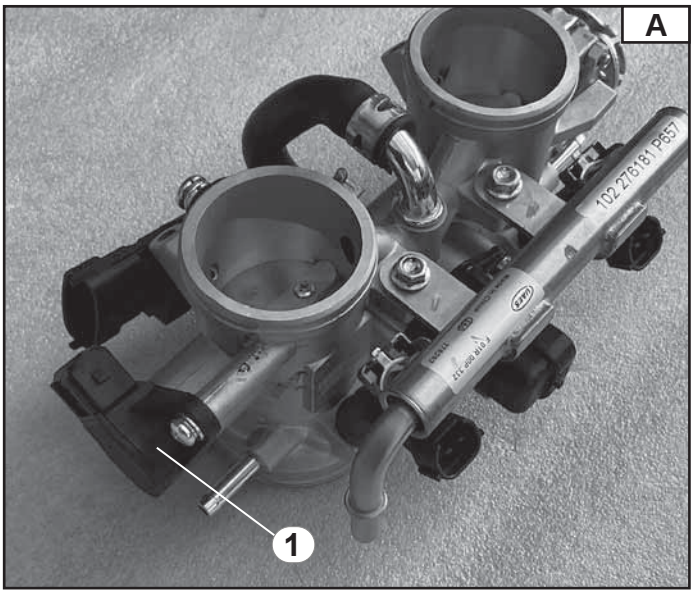
Inspect:
- The output voltage with the voltmeter positioned on (pin 3) Fig. B.

Throttle location	RESISTANCE
Fully closed throttle	**0.37 K±10%**
Fully open throttle	**4.5 K±10%**

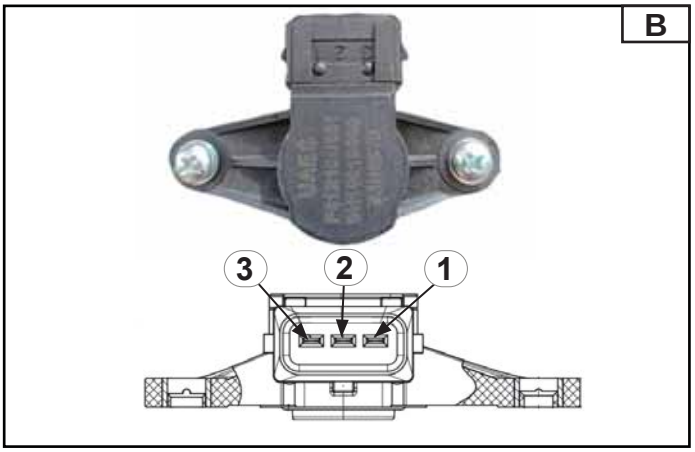
NOTICE

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.

A

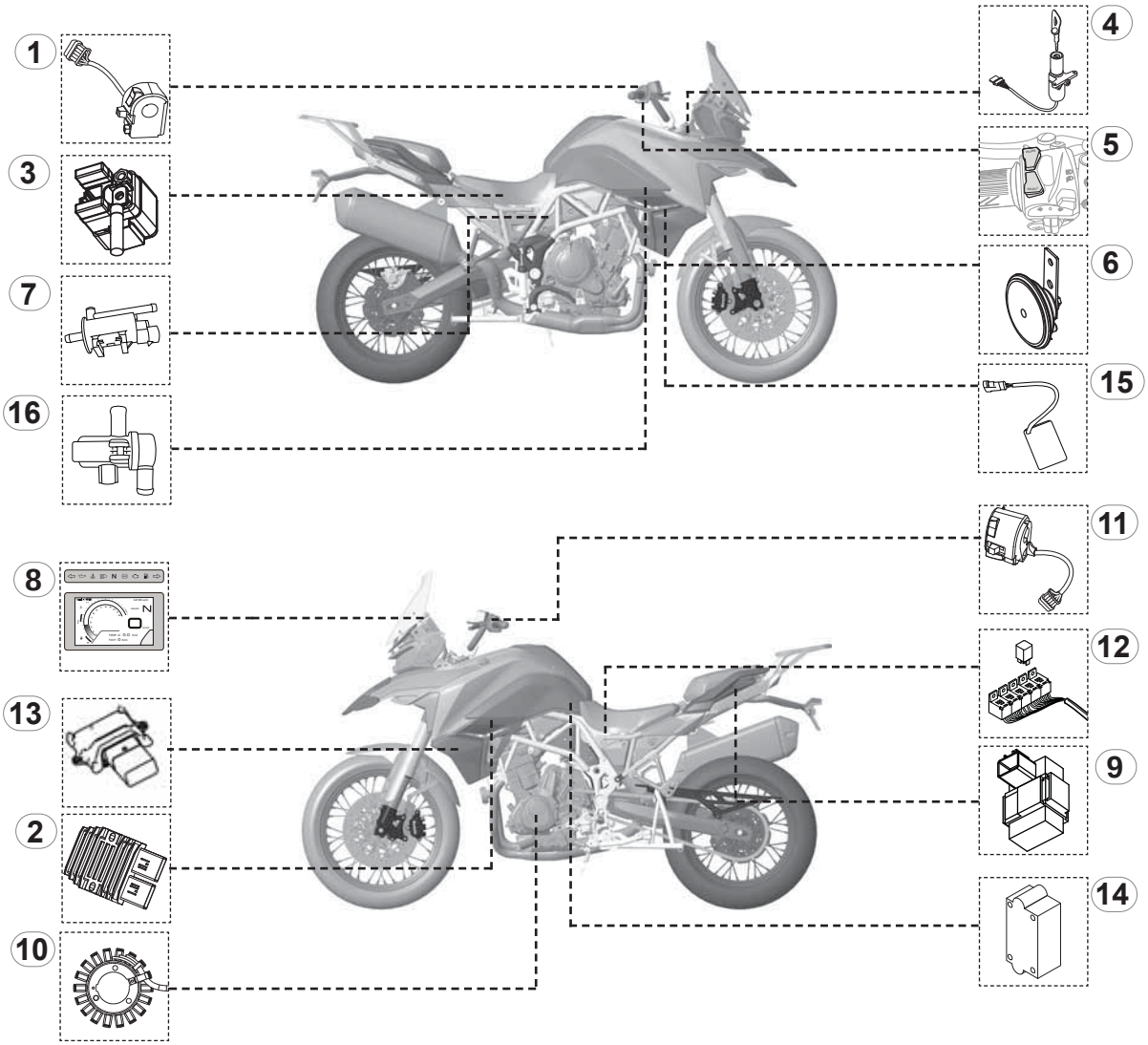


B



DEVICES

DEVICE POSITION



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.

Position	Device
1	RIGHT ELECTRIC DEVICE
2	REGULATOR
3	STARTER RELAY
4	IGNITION SWITCH
5	DISPLAY CONTROL BUTTONS
6	HORN
7	CARTRIDGE FILTER SOLENOID
8	INSTRUMENTATION
9	INDICATOR LIGHT CONTROL RELAY
10	STATOR
11	LEFT ELECTRIC DEVICE
12	SERVICES RELAY
13	INJECTION ECU
14	DROP SENSOR
15	ECS (condenser)
16	SECONDARY AIR SOLENOID

DEVICES

RIGHT ELECTRIC DEVICE

On the right side of the handlebar Fig. A the right electrical device consists of:

- **Run/Start switch (1)**

It serves to break contact to the electric device in case of emergency.

- **Emergency switch (2)**

It serves to switch on the emergency light (hazard lights) to alert the other users to the vehicle stop.

- **Electric ignition button (3)**

It serves to start the engine via the starter.

Inspect:

- The continuity by positioning the multitester on RUN/OFF button located on ON.

Inspect:

- The continuity by positioning the multitester on the ignition button pressed on ON.

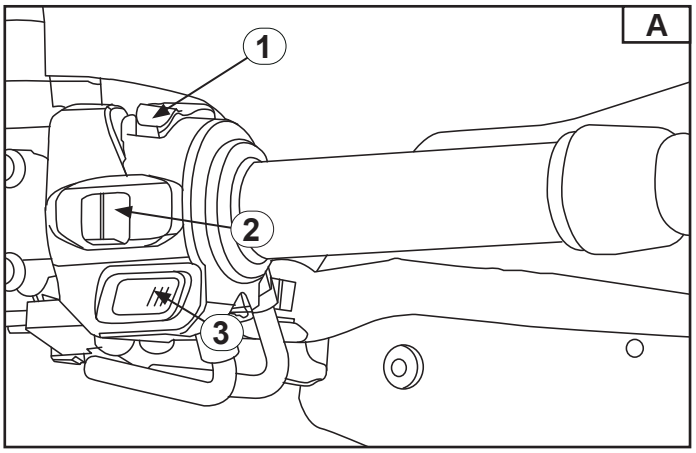
Inspect:

- The continuity by positioning the multitester on the emergency switch located on ON.

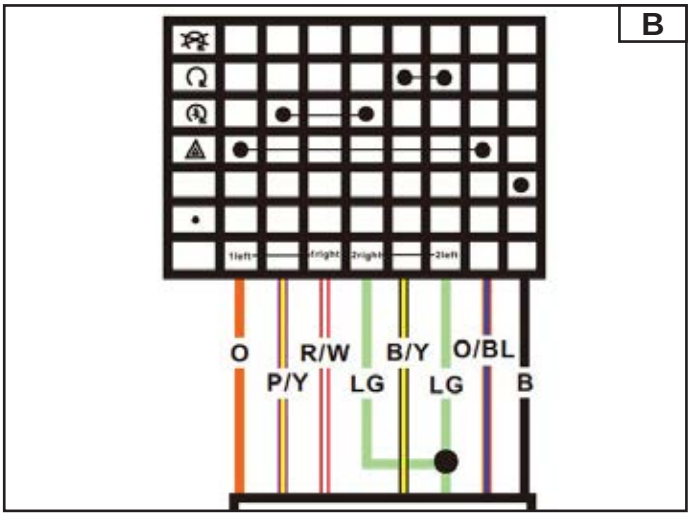
Check:

the table, in Fig. B, via the right electric device connector Fig. C

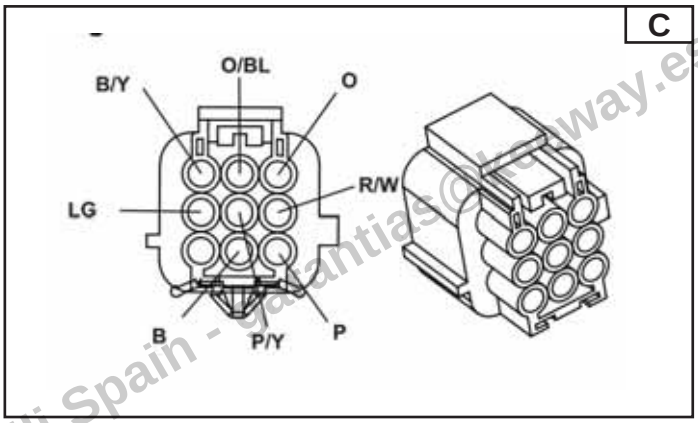
A



B



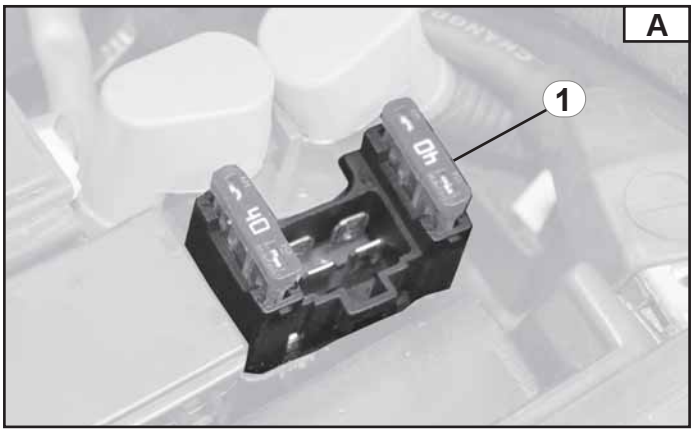
C



DEVICES

STARTING RELAY (REMOTE CONTROL SWITCH)

It is situated close to the fuse block box and breaks power contact on the starter motor (1) Fig. A.



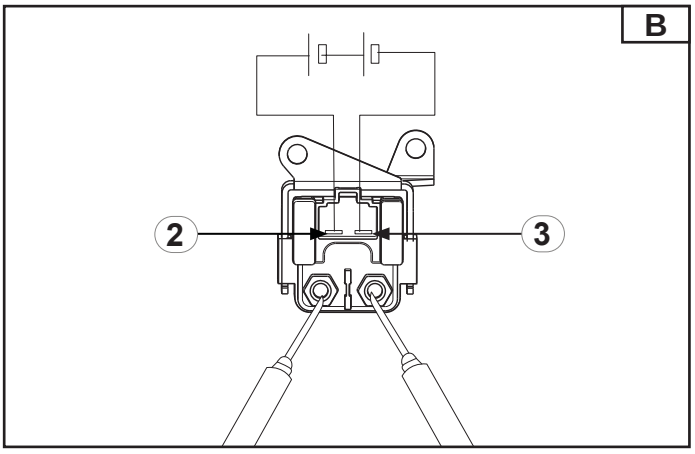
Apply:

- 12 volt to terminals (2) and (3) Fig. B.

Inspect:

- The continuity between power terminals.

In presence of continuity, the starter relay works properly.



WARNING

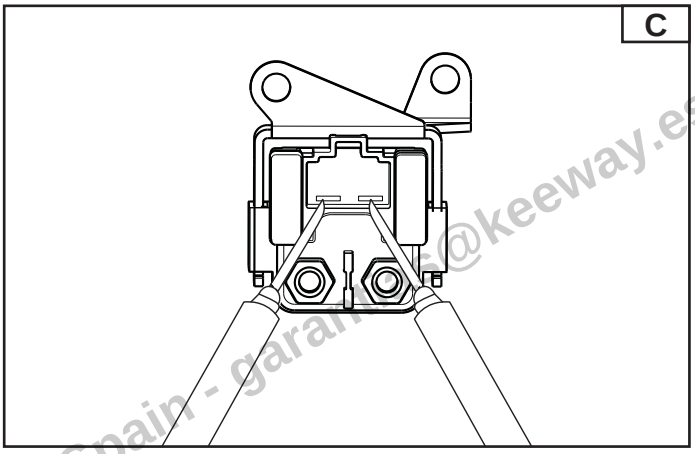
Do not apply the battery voltage to the starter relay for more than 5 seconds to prevent overheating and damages to winding.

Inspect:

- 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 serving as an acoustic warning device.

Connect:

- (PIN 1) and (PIN 2) Fig. A to the battery and check operation.

Inspect:

- After having connected the horn to rechargeable battery, the presence of a sound signals a 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.
For information about instrumentation, refer to **"Instrument and indicator lights, Chapter 1".**

Pin-out (see table)

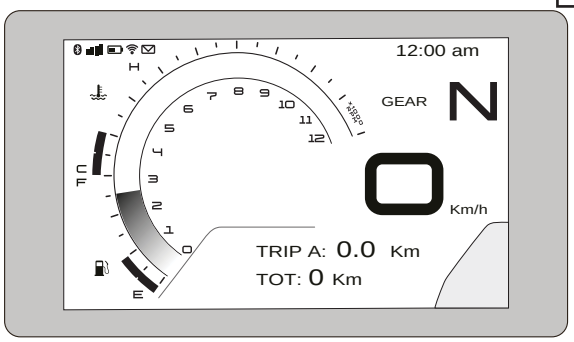
- The dashboard Fig, B is connected with a 26 pin male connector. Fig. C.
- The male connector pins activated for communication with the device are the ones highlighted in Fig. C (18 pin)
- The connection with the main wiring occurs via an intermediate wiring ending with 3 connectors with 8 pins and one with 3 pins Fig. D
- the pins activated for communication with the device are the ones highlighted in Fig. D (18 pin).

NOTICE

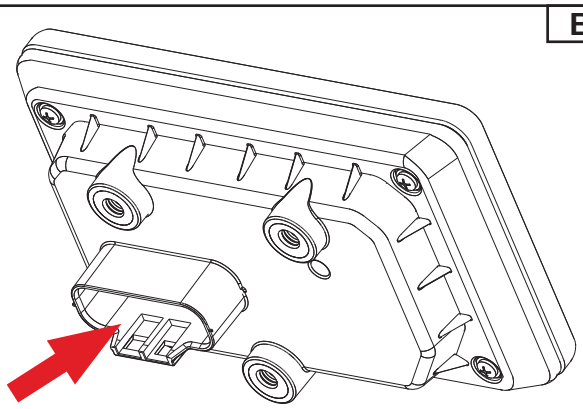
On the electric systems there could be equal connectors for different functions.
In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

CODE	COLOUR
B	Black
BL	Blue
N	Brown
G	Green
O	Orange
Y	Yellow
R	Red
LR	Pink
W	White
P	Purple
Gr	Grey
LG	Light green

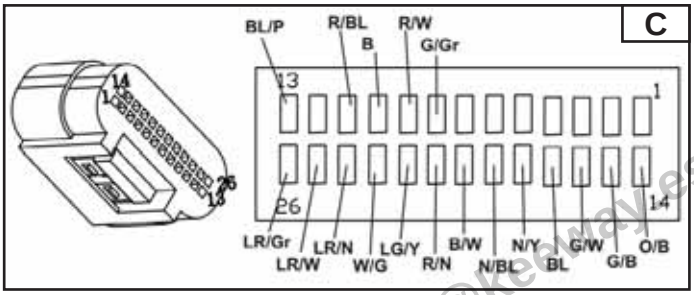
A



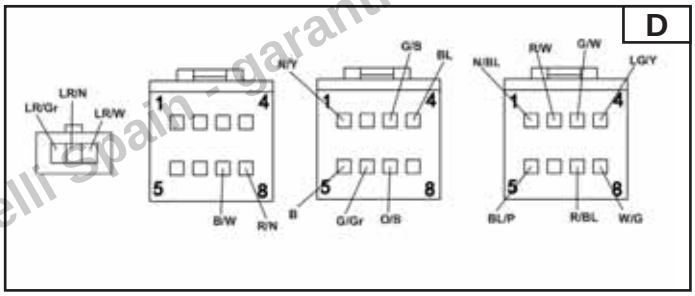
B



C



D



DEVICES
IGNITION SWITCH

The ignition switch (1), Fig. A, is positioned behind the steering sleeve A and serves to:
- Provide the main contact to the electrical system
- Close the steering lock.

Inspect:
- The continuity using the multitester referring to the table.

COLOUR	G/GR	R/W
PIN	PIN 1	PIN 2
Key ON	●	●
Key OFF		
Lock		

Fig. B shows the ON switch connector.

If the above conditions are met, then the ignition switch is operating: if not, replace the component.

- **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.

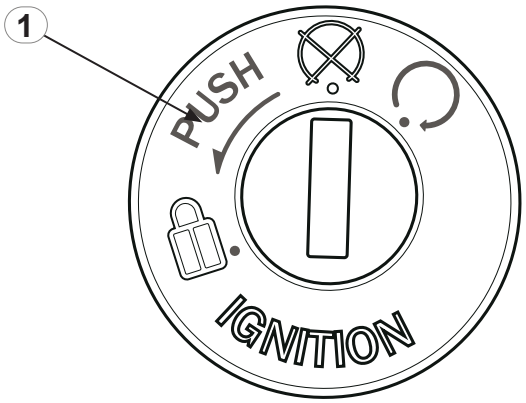
- **Key set to "LOCK"**

All electric circuits are deactivated and the steering is locked. The key can be removed.

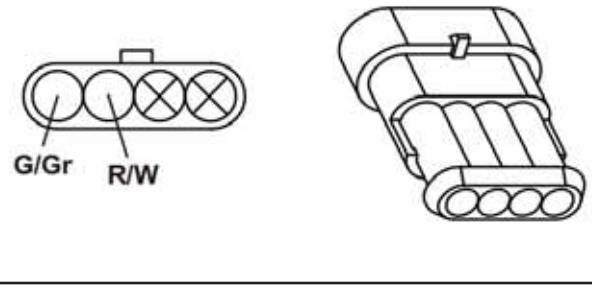
NOTICE

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.

A



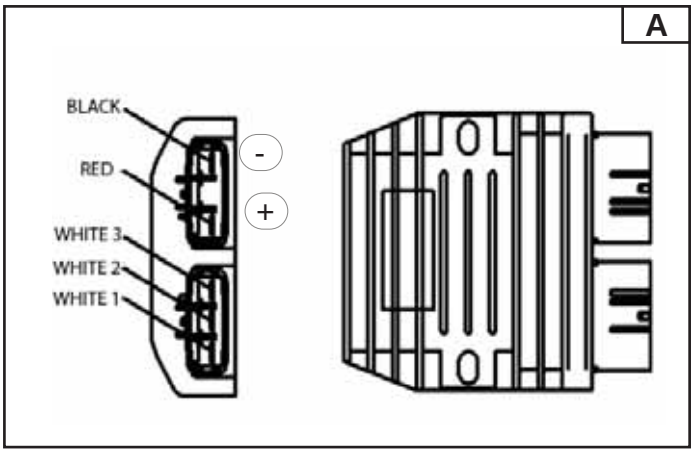
B



DEVICES
VOLTAGE REGULATOR

Situated in the front left area, it allows balancing of electrical consumption via the battery recharge Fig. A.

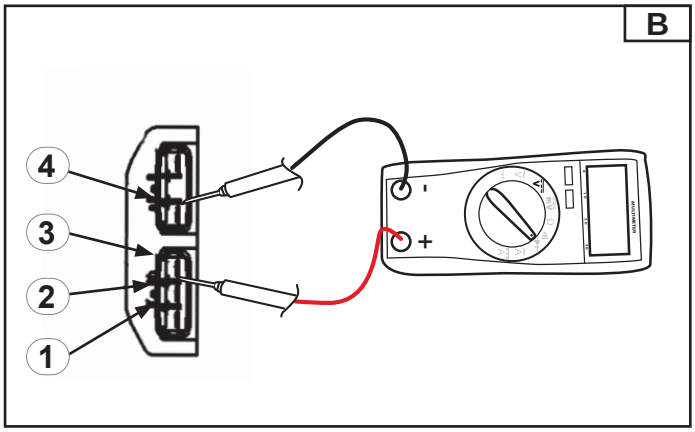
A



Multimeter selection: diode test.

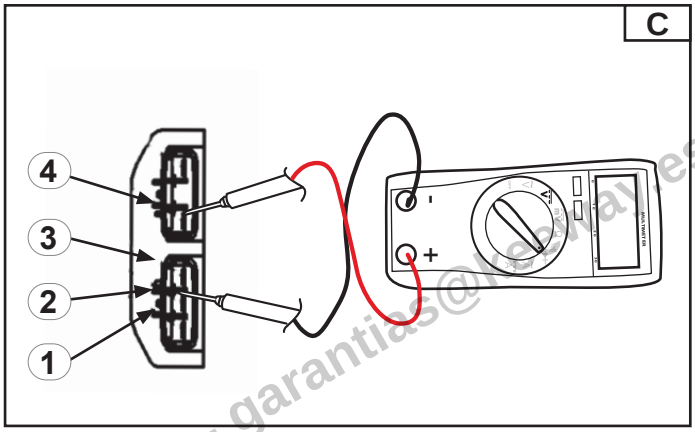
1. Connect the black probe to the red line terminal (4) of voltage regulator. Connect the red probe to the white line terminal of voltage regulator (white 1, white 2 and white 3) Fig. B.
   If the gauge shows the value ∞ on the three pins, the regulator is valid.
   The gauge shows a value (range 0.3~0.8V) on the three pins when the regulator is damaged and must be replaced.

B



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.

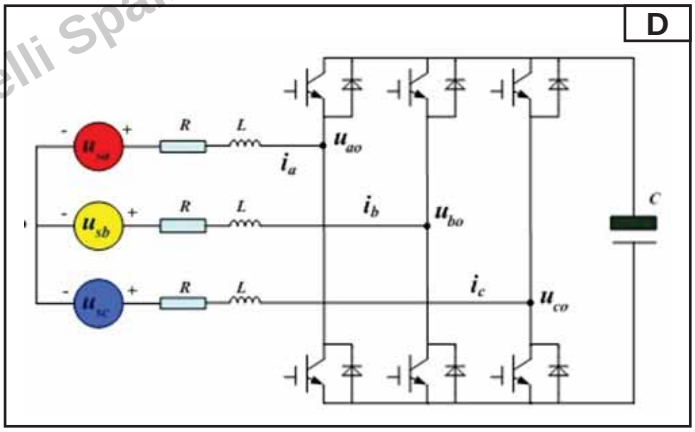
C



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.
Fig. D shows the wiring diagram of the voltage regulator.

D



DEVICES
LEFT ELECTRIC DEVICE

On the left side of the handlebar (Fig. A) the left electrical device consists of:

- **Horn button (1)**

Press to activate the horn.

- **Direction indicator control (2)**

By moving the control to the right or to the left, the relevant turn signal lights are activated. The control returns to the centre. Press to deactivate the turn signal lights.

- **Light change-over control (3)**

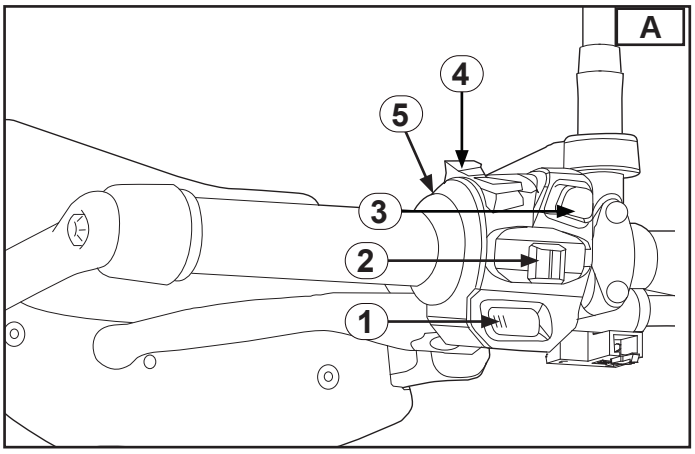
Deviator to switch from high beam to low beam.

- **Enter/select control (4)**

For information about control, refer to **"Instrument and indicator lights, Chapter 1".**

- **Flash button control (5)**

This function serves to alert other road users in case of possible dangerous situations.



Check the horn (1):

- The continuity

With the multitester on the relevant reference terminals for the selection (high beam/low beam).

Check the turn signal lights (2):

- The continuity

With the multitester on the relevant reference terminals for the selection (LH/RH).

Check the light switch (3):

- The continuity

By positioning the multitester on the relevant terminals with the button pressed.

Check the Enter/select control (4):

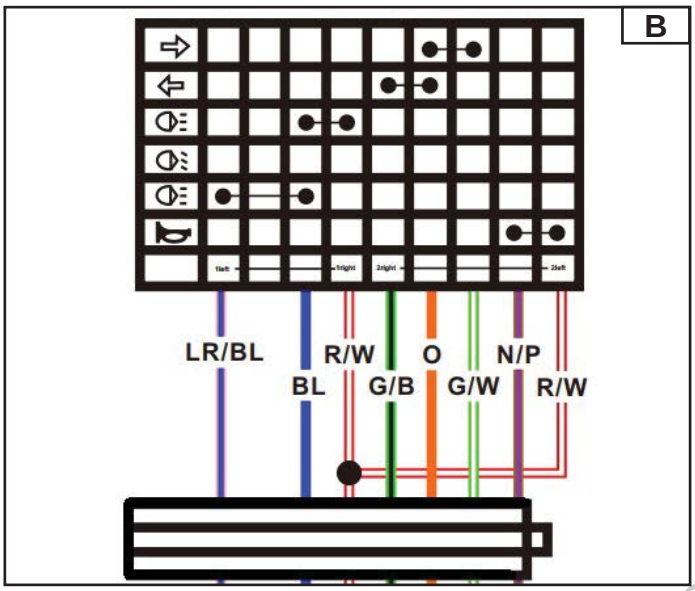
- The continuity

By positioning the multitester on the relevant terminals with the button pressed.

Check the flash control (5):

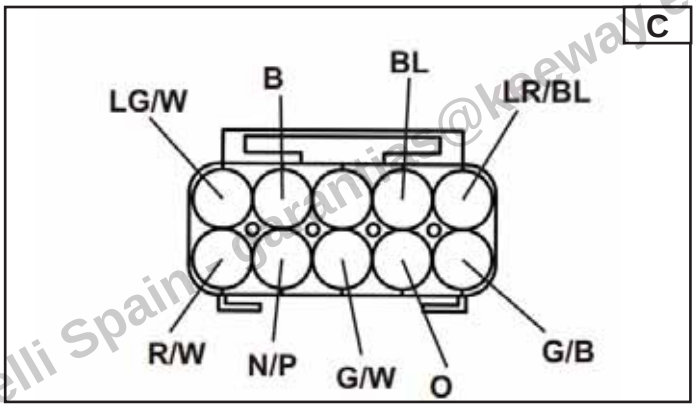
- The continuity

By positioning the multitester on the relevant terminals with the button pressed.



Check:

the table, in Fig. B, via the left electric device connector Fig. C



DEVICES
DROP SENSOR

Situated under the fuel tank, in case of falling, it cuts off the fuel supply to the injection system (1) Fig. A.

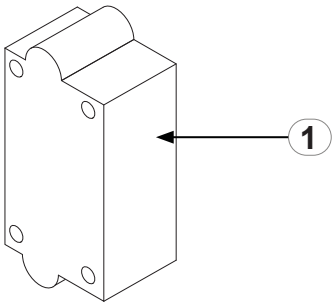
Inspect:

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.

A



Insert:

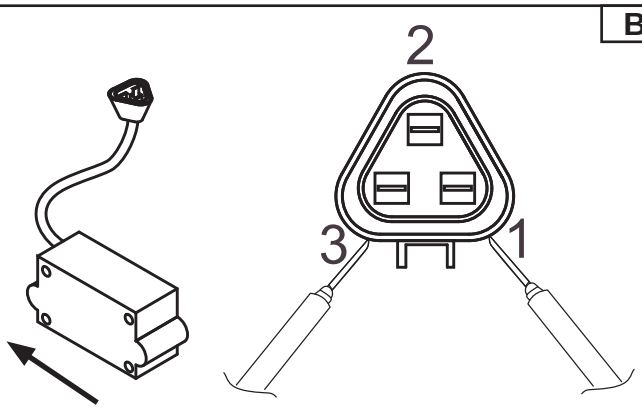
- The red tip of the multimeter (+) into the pin 3 Fig. B.
- The black tip of the multimeter (-) into the pin 1 Fig. B.

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 Vdc).

B



Insert:

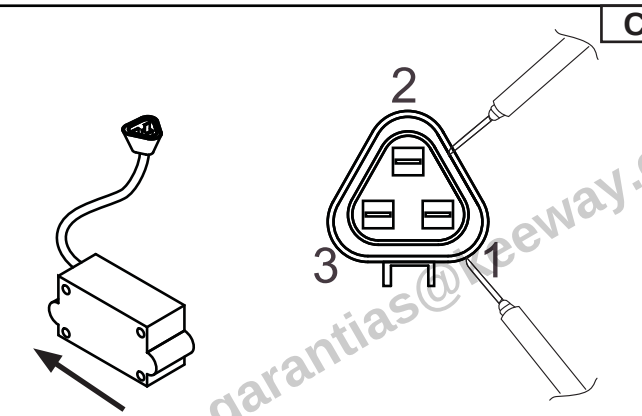
- The red tip of the multimeter (+) into the pin 2 Fig. C.
- The black tip of the multimeter (-) into the pin 1 Fig. C.

Check:

The voltage between the pin 2 and pin 1 must correspond to the battery one (12 Vdc or more).

If the check between the pin 2 and the pin 1 is positive, place the drop sensor in vertical position Fig. D.

C



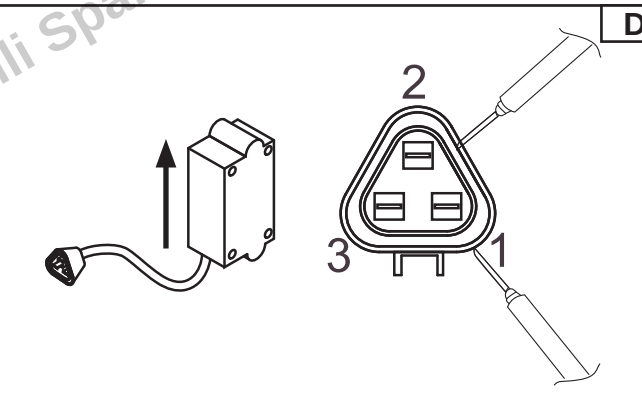
Insert:

- 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.

D



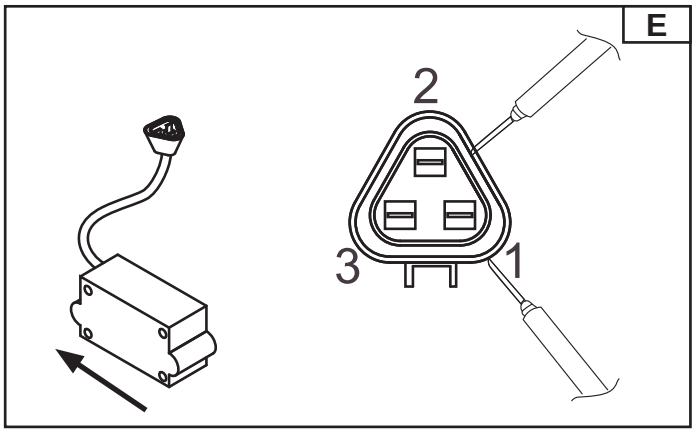
NOTICE

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 2/3 Vdc, the ECU memorizes such condition and to proceed with engine 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 Vdc or more). If the outcome is positive, proceed with the engine start test.



DEVICES
INJECTION ECU

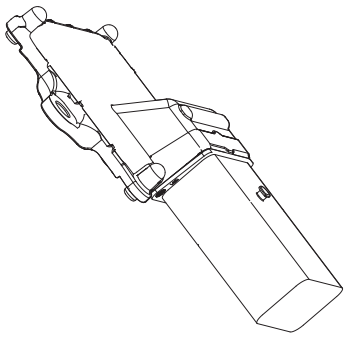
The injection unit is situated close to the LH dashboard frame Fig. A.

NOTICE

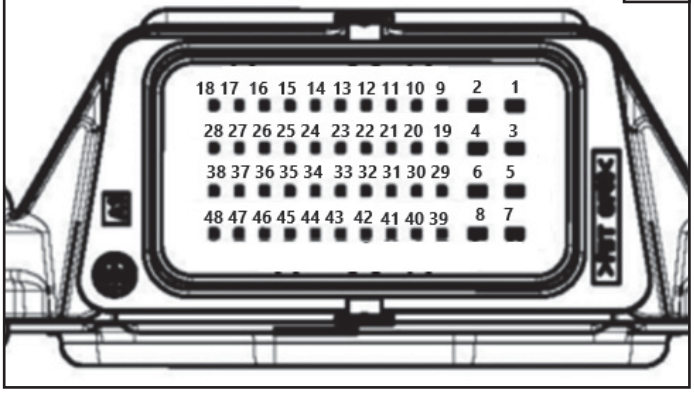
On the electric systems there could be equal connectors for different functions.
In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

The position of the Pin is shown in Fig. B

A



B



DEVICES
CARTRIDGE FILTER SOLENOID

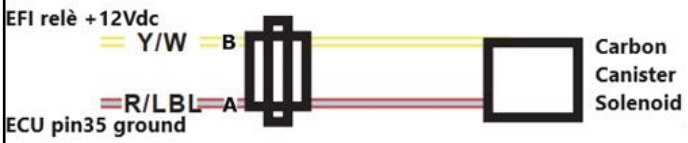
The canister filter solenoid (Fig. A) is situated close to the canister filter (motorcycle central area) and serves to adjust the gas flow from the fuel tank to the air-box for recycling.

The device is normally open and cuts off the gas flow according based on the control of the ECU.

A

Operation:
The solenoid receives a direct supply from the injection relay (yellow/white wire) (Fig. B) and a signal from the unit (red/light blue wire) via the pin 35. (Fig. B)

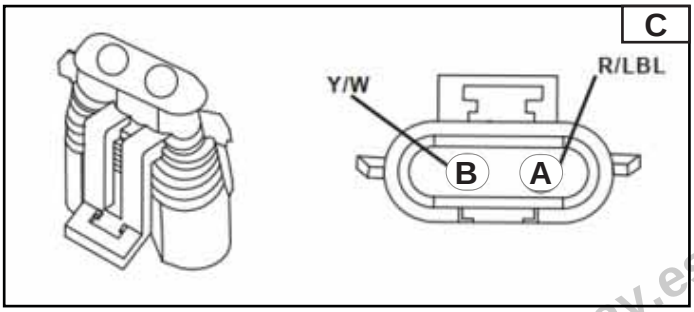
B



Check:
With the multitester on the symbol Ω between PinA and PinB the resistance at 20°C (Fig. C)

Resistance (Ω)	PIN A	PIN B
20 Ohm +/-10%	●	●

C



DEVICES
SECONDARY AIR SOLENOID

The secondary air solenoid (Fig. A) situated above the engine, close to the valve cover, serves to adjust the air flow from the filter casing to the exhaust pipes.
The device is normally open and cuts off the air flow according based on the control of the ECU.

A

Operation:
The solenoid receives a direct supply from the injection relay (yellow/white wire) and a ground signal from the unit (yellow/light green wire) via the pin 23. (Fig. B)

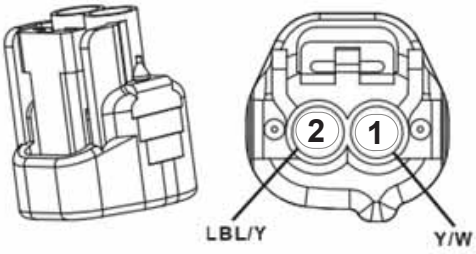
B

Check:
With the multitester on the symbol Ω between PIN1 and PIN2 the resistance at 20°C (Fig. C)

Pin1 – Pin2 20 Ohm +/-10%

Resistance (Ω)	PIN 1	PIN 2
20 Ohm +/-10%	●	●

C



DEVICES

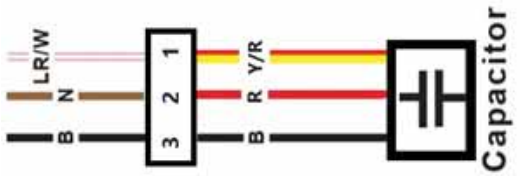
ECS (condenser)

The ECS device situated on the right side of the trellis frame serves to stabilize the supply voltage for ECM

A

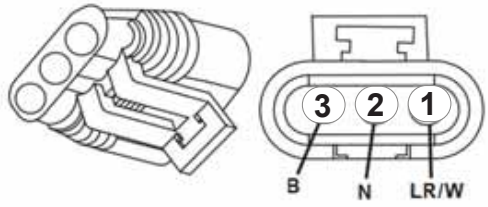
Operation:
The ECS device receives a direct supply from the ECU fuse (15Ah brown wire) and a ground from the main wiring (black wire). It provides a stabilized voltage (Fig. B) to the ECU (pin30) via the pink/white wire.

B



Check:
With the multitester on the Vdc symbol, carry out the following checking on the ECS connector:

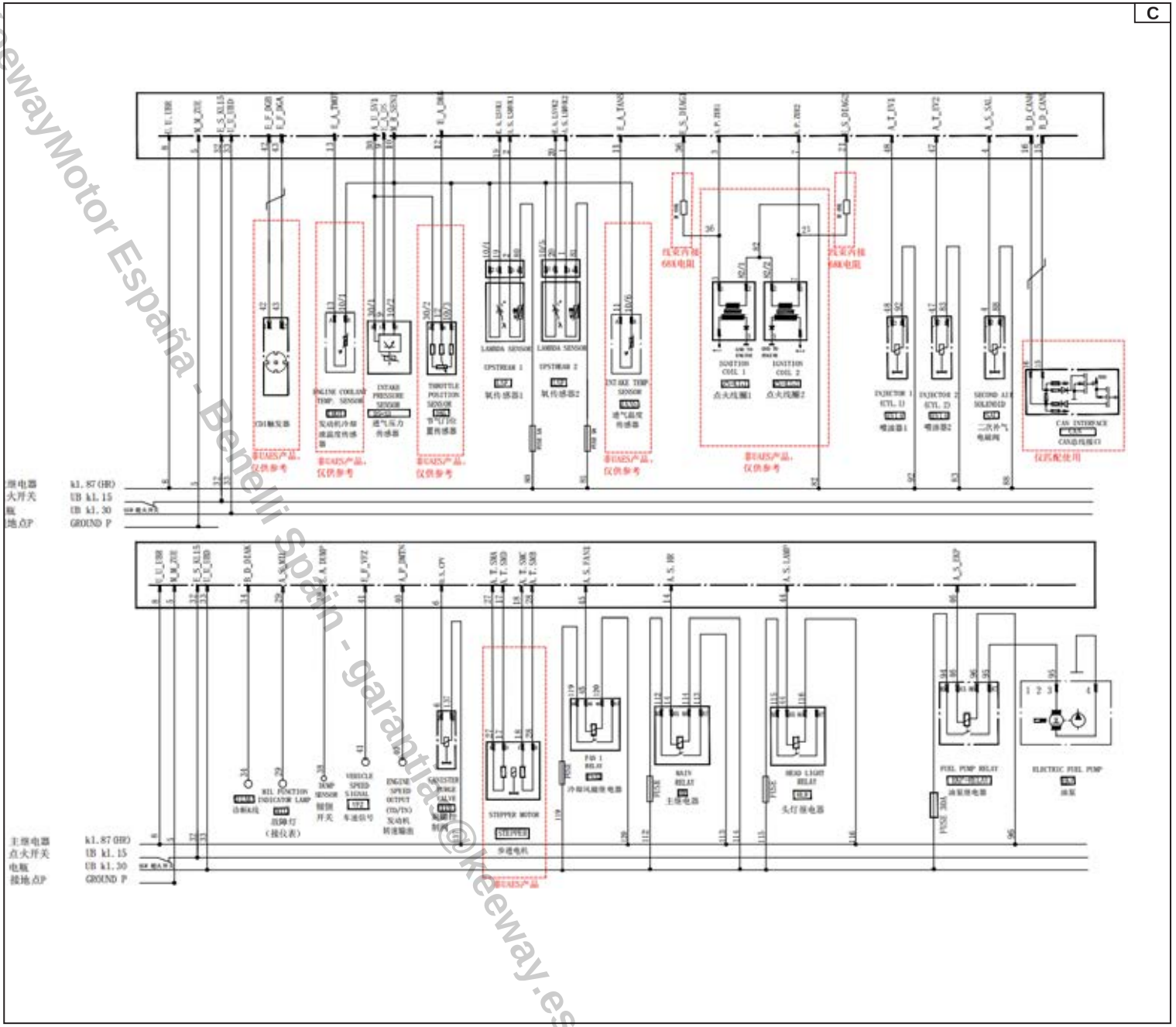
- verify that the battery voltage (Vbatt) is present on pin3 and pin2 (black and brown).
- verify that there is a voltage, which is 0.5V lower that the one of the battery (Vbatt-0.5Vdc) on pin3 and pin1 (black and pink/white).



PIN	1	2	3
Colour (ECS)	Yellow/Red	Red	Black
Colour (plant)	Red/White	Brown	Black
Standard	Vbatt-0.5Vdc	Vbatt	Negative

DEVICES

INJECTION ECU CONNECTIONS



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

ERROR TABLE		
Code error	**Error description**	**Active MIL**
P0030	O2 Sensor Heater Contr. Circ.(Bank(1)Sensor 1)open	yes
P0031	O2 Sensor Heater Contr. Circ.(Bank(1)Sensor 1) Low	yes
P0032	O2 Sensor Heater Contr. Circ.(Bank(1)Sensor 1) High	yes
P0050	O2 Sensor Heater Contr. Circ.(Bank(2)Sensor 2)open	yes
P0051	O2 Sensor Heater Contr. Circ.(Bank(2)Sensor 2) Low	yes
P0052	O2 Sensor Heater Contr. Circ.(Bank(2)Sensor 2) High	yes
P0053	O2 Sensor Heater Resistance(Bank(1)Sensor 1)	yes
P0059	O2 Sensor Heater Resistance(Bank(2)Sensor 2)	yes
P0130	O2 Sensor Circ.,Bank1-Sensor1 Malfunction	yes
P0131	O2 Sensor Circ.,Bank1-Sensor1 Low Voltage	yes
P0132	O2 Sensor Circ.,Bank1-Sensor1 High Voltage	yes
P0133	O2 Sensor Circ.,Bank1-Sensor1 Slow Response	yes
P0134	O2 Sensor Circ.,Bank1-Sensor1 No Activity Detected	yes
P0150	O2 Sensor Circ.,Bank1-Sensor2 Malfunction	yes
P0151	O2 Sensor Circ.,Bank1-Sensor2 Low Voltage	yes
P0152	O2 Sensor Circ.,Bank1-Sensor2 High Voltage	yes
P0153	O2 Sensor Circ.,Bank1-Sensor2Slow Response	yes
P0154	O2 Sensor Circ.,Bank1-Sensor2 No Activity Detected	yes
P0122	Throttle/Pedal Pos.Sensor Circ. Low Input	yes
P0123	Throttle/Pedal Pos.Sensor Circ. High Input	yes
P0105	Manifold Abs.Pressure or Bar.Pressure Circuit	yes
P0106	Manifold Abs.Pressure or Bar.Pressure Range/Performance	yes
P0107	Manifold Abs.Pressure or Bar.Pressure Low Input	yes
P0108	Manifold Abs.Pressure or Bar.Pressure High Input	yes
P0111	Intake Air Temp.Circ. struck/Performance	yes
P0112	Intake Air Temp.Circ. Low Input/range	yes
P0113	Intake Air Temp.Circ. High Input	yes
P0116	Engine Coolant Temp.Circ. Range/Performance	yes
P0117	Engine Coolant Temp.Circ. Low Input	yes
P0118	Engine Coolant Temp.Circ. High Input	yes
P0119	Engine Coolant Temperature Sensor 1 Circuit Intermittent	yes
P1116	Engine Coolant Temp.over Range	yes
P0201	Cylinder 1- Injector Circuit open	yes
P0261	Cylinder 1- Injector Circuit Low	yes
P0262	Cylinder 1- Injector Circuit High	yes
P0202	Cylinder 2- Injector Circuit open	yes
P0264	Cylinder 2- Injector Circuit Low	yes
P0265	Cylinder 2- Injector Circuit High	yes
P2300	Ignition Coil “A” Primary Control Circuit low	yes
P2303	Ignition Coil “B” Primary Control Circuit low	yes
P0300	Random/Multiple Cylinder Misfire Detected	Yes or Blink
P0301	Cyl.1 Misfire Detected	Yes or Blink

DEVICES
INJECTION ECU

ERROR TABLE		
Code error	**Error description**	**Active MIL**
P0302	Cyl.2 Misfire Detected	Yes or Blink
P0322	Eng.Speed Inp.Circ. No Signal	yes
P0413	second air system valve Circuit open	yes
P0414	second air system valve Circuit low	yes
P0412	second air system valve Circuit high	yes
P0411	secondary Air Injection System Incorrect Flow Detected	yes
P0441	Evaporative Emission System Incorrect Purge Flow	yes
P0444	canister purge valve Circuit open	yes
P0458	canister purge valve Circuit low	yes
P0459	canister purge valve Circuit high	yes
P0480	electric fan output stage A open	yes
P0691	electric fan output stage A low	yes
P0692	electric fan output stage A high	yes
P0501	Vehicle Speed Sensor Range/Performance	yes
P0506	Idle Control System RPM Lower than Expected	NO
P0507	Idle Control System RPM Higher than Expected	NO
P0511	Stepper motor power stage	yes
P0615	Starter Relay Circuit open	yes
P0616	Starter Relay Circuit low	yes
P0617	Starter Relay Circuit high	yes
P0627	Fuel Pump “A” Control Circuit /Open	yes
P0628	Fuel Pump “A” Control Circuit Low	yes
P0629	Fuel Pump “A” Control Circuit High	yes
P0650	Malfunction Indicator Lamp Control Circ.	NO
P0560	System Voltage Malfunction	NO
P0562	System Voltage Low Voltage	NO
P0563	System Voltage High Voltage	NO
P1098	DUMP control Circuit low	yes
P1099	DUMP control Circuit high	yes
P2177	System Too Lean bank1	yes
P2178	System Too Rich bank1	yes
P2179	System Too Lean bank2	yes
P2180	System Too Rich bank2	yes

DEVICES

TURN SIGNAL LIGHT INTERMITTENCE

It is situated underneath the passenger seat and allows to control the turn signal lights.

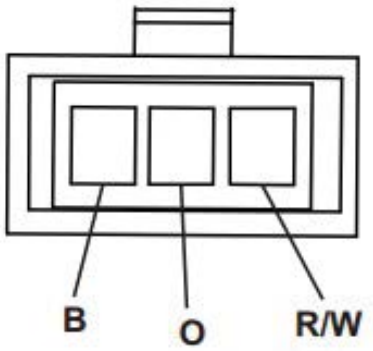
NOTICE

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.

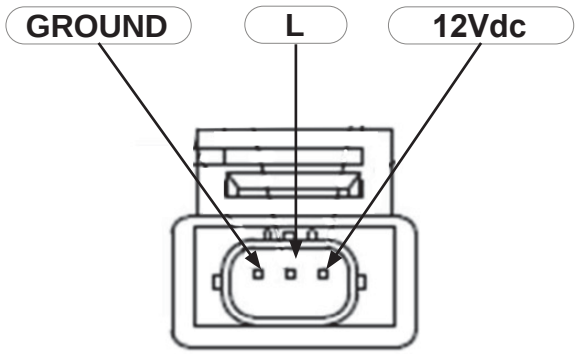
Check:
the diagram in Fig. , via the electric device connector Fig. B

Features:
- Type: electronic
- Power: 10Wx4
- Operating voltage: 10.5-16V
- Flashing frequency: 85 flashes per minute
- Hazard light function

A



B



DEVICES
SERVICES RELAY

Situated under the rider seat and in front of the battery, the relay group 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, start safety devices and lighting system, are connected to the services relay.

Inspect:

- The resistance using the multitester 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 respectively at the positive and negative terminals of the battery.

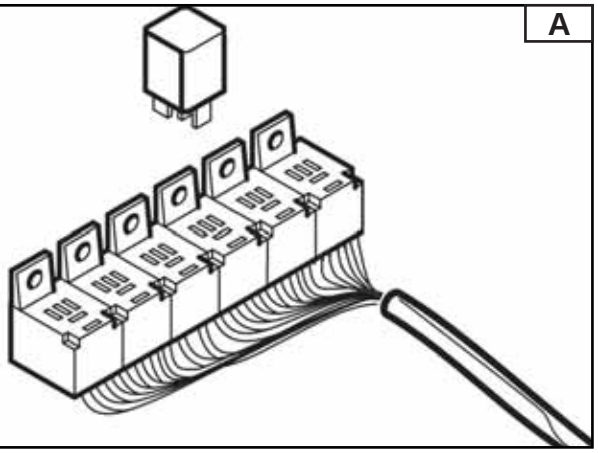
RELAY	PIN 87	PIN 30
Powered on battery	●	●
Not powered on battery	●	●

NOTE:
When the above conditions are fulfilled, the relays are operating properly, otherwise replace.

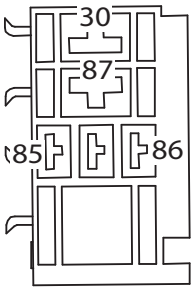
NOTICE

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.

A

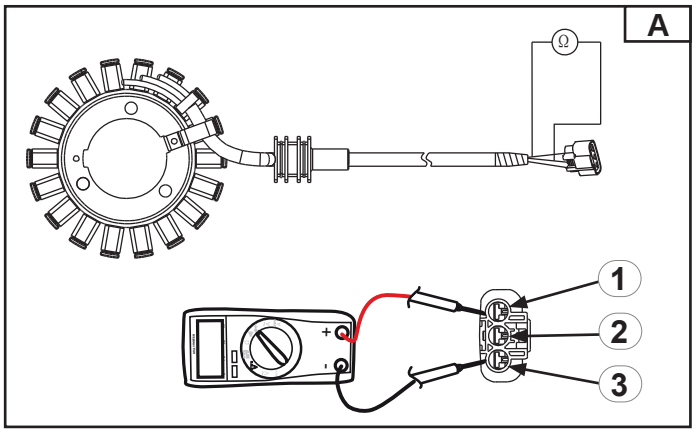


B



DEVICES
STATOR

The problems that may occur on the magneto electric generator (stator) Fig. A are of three types:
- **Short circuit**
- **Line break (wire burnt)**
- **Lack/reduction of the magnetic field.**



Close the ignition switch.

Disconnect:
- The connector of the 3-pole magneto electric generator.

Measure:
- The resistance value among the three terminals 1-2, 1-3, 2-3 of the generator with a multimeter.

Standard	**1.65 ± 20% Ω a 25°C**

- If the resistance is greater than the aforementioned values, proceed with replacement. When it is far lower than the resistance, it refers to stator short-circuit. It shall be replaced.
- If the resistance of stator coil is normal, but the voltage check detects a failure of the magnetoelectric generator, the rotor magnets might have become loose. At this moment, replace the rotor.

Start up the engine:
- Run the revolutions per minute (rpm) according to Table 1.
- Record the voltage readings (three measurement values in total).

Table 1 Output voltage of magneto electric generator.

Range of tester	Wiring		Steady state reading limit	Reading at 5000 rpm
	Tester (+) a	Tester (-) a		
750 V AC	Wire 1	Wire 2	10 V ac +/- 20%	60 V ac +/- 20%
750 V AC	Wire 1	Wire 3	10 V ac +/- 20%	60 V ac +/- 20%
750 V AC	Wire 2	Wire 3	10 V ac +/- 20%	60 V ac +/- 20%

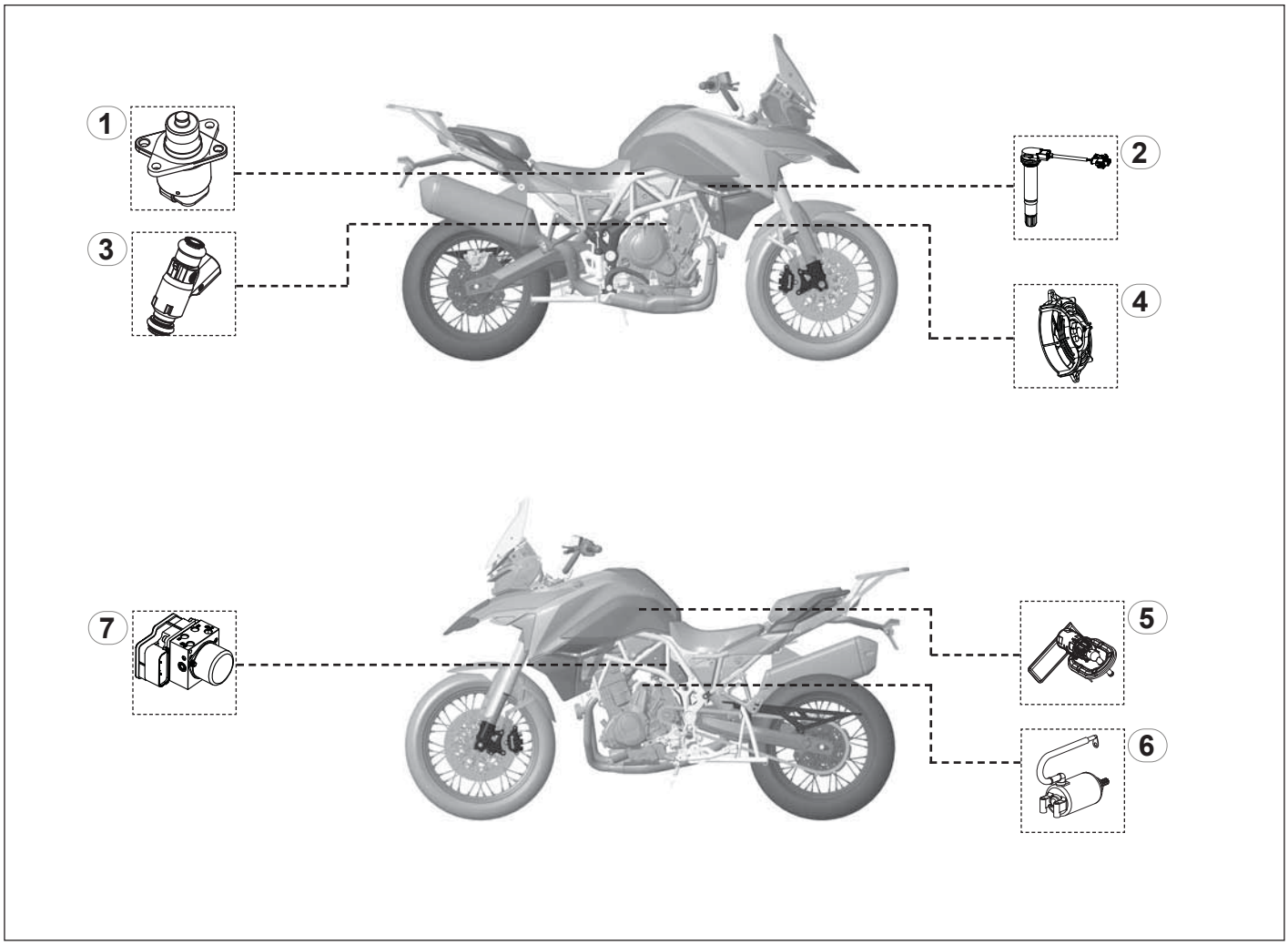
NOTE:
If the output voltage indicated is within the value of the table, the magneto electric generator works properly.
If the output voltage indicated is much lower than the value within the value of the table, problems occur on the generator.

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	IGNITION COILS
3	INJECTORS
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)

Situated on the throttle body, the system includes a valve to check the passage of air under the throttle body and equipped with a step motor (stepper).
The system controls the following parameters:

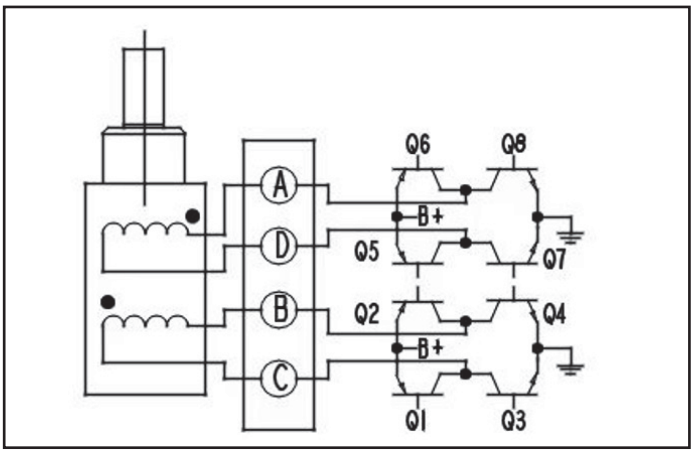
- **Idle speed.**
- **Correction of the air/fuel ratio operating at minimum speed and altitude above sea level.**
- **Correction of the air/fuel ratio for cold hot starts.**

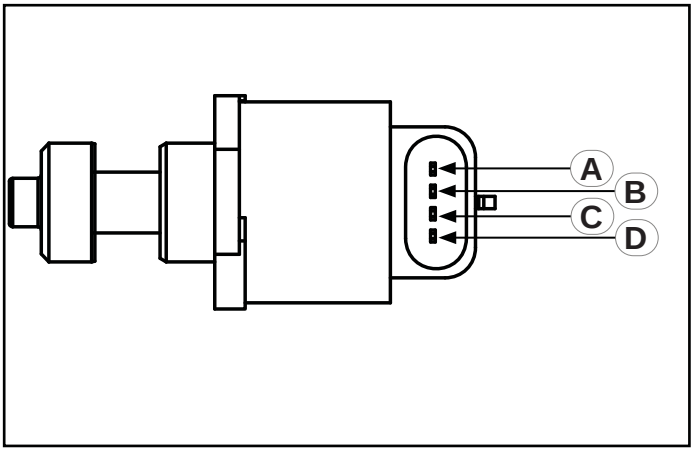
When the stepper motor is activated, it opens the valve that controls the air flow and allows a certain air flow to run off along a series of hoses in the throttle body unit.

Operating voltage	12 V DC
Minimum /maximum operating voltage	7.5 V DC/ 14.0V DC
Impedance per coil (27°C)	53 ± 5.3 Ω
Minimum impedance	35 Ω
Step	0.04167 mm (0.00164 in.)
Maximum travel	8.5 mm (0.334 in.) (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	D	C	B
Extend	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	+	-	+	-

Retract

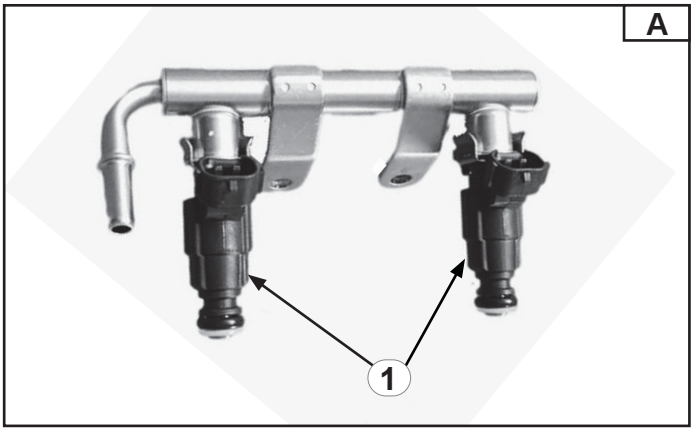
Motor 4 steps drive control table

ACTUATORS
INJECTORS

They are positioned on the throttle body unit.
The engine is equipped with two 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.

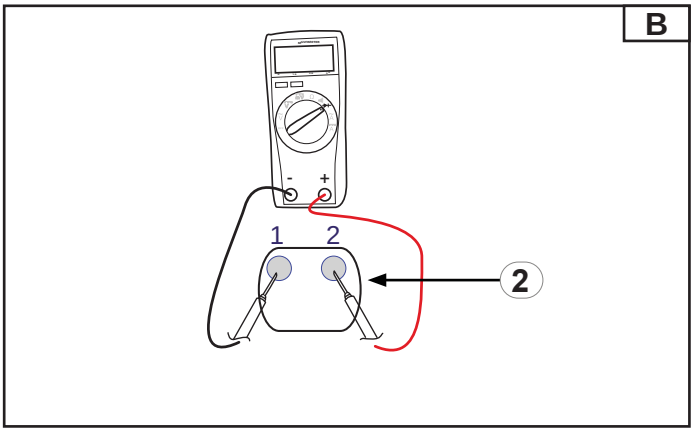
A



Inspect:
- The resistance using the multitester on symbol Ω between PIN 1 and PIN 2 (2) Fig. B.

Resistance	12 ± 2 Ω

B



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
IGNITION COILS

Situated 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.

Inspect:
- The measurement of the coil terminal impedance.

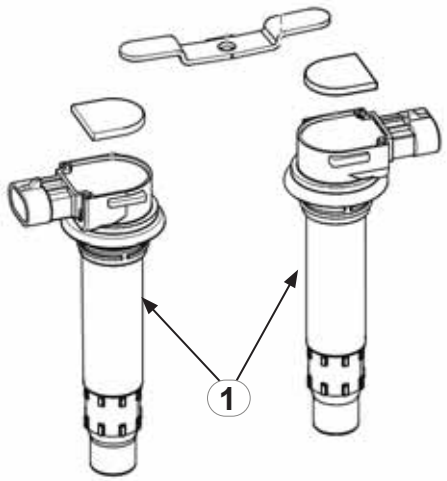
Primary coil	0.65 ± 0.07 Ω
Secondary coil	4 ± 0.5 kΩ

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

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.

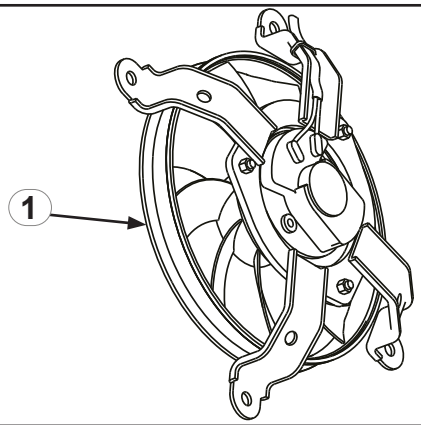
A



ACTUATORS
COOLING FAN

Situated on the radiator body, the cooling fan (1) Fig. A is powered via the FAN relay when the ECM requires it.
The activation signal is generated when the coolant reaches the temperature of 96 °C.
When the coolant temperature lowers enough (lower-tier temperature), the coolant fan is deactivated.

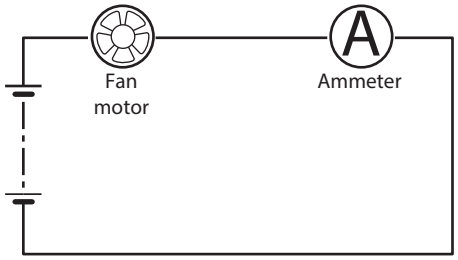
A



Inspect:
- 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 is not turning, replace the fan.

B



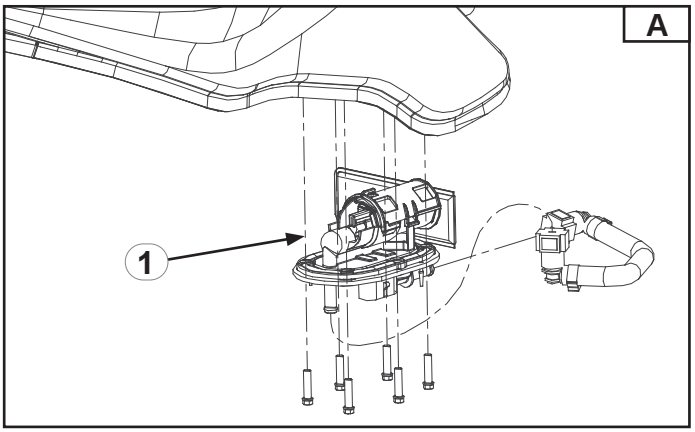
NOTE:
To perform the above test, it is necessary to remove the cooling fan from the radiator.

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.

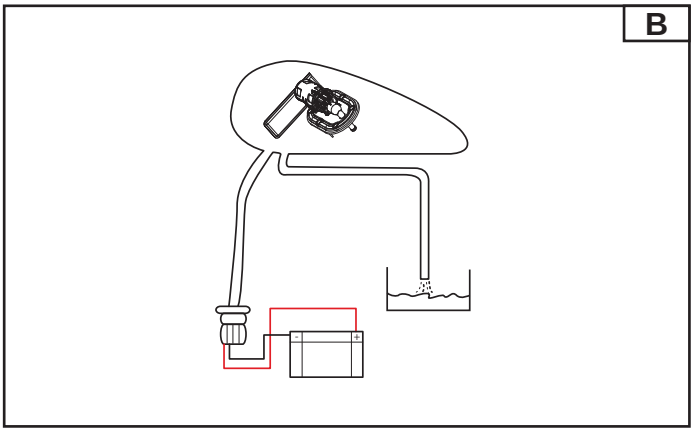
ACTUATORS
FUEL PUMP

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.



Inspect:
- The fuel pump (1) Fig. A.

1. Put an outlet pipe into a container to let the fuel flow out Fig. B.



2. Connect the battery (12 V) to the fuel pump Fig. B.
- RED/BLACK positive wire +
- BLACK negative wire -

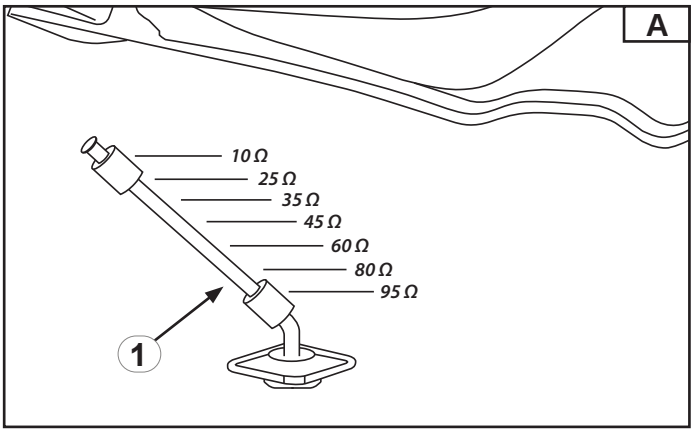
Flow rate:
≥ 0.65 litres/min.
Pressure:
3±0.2 bar

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.

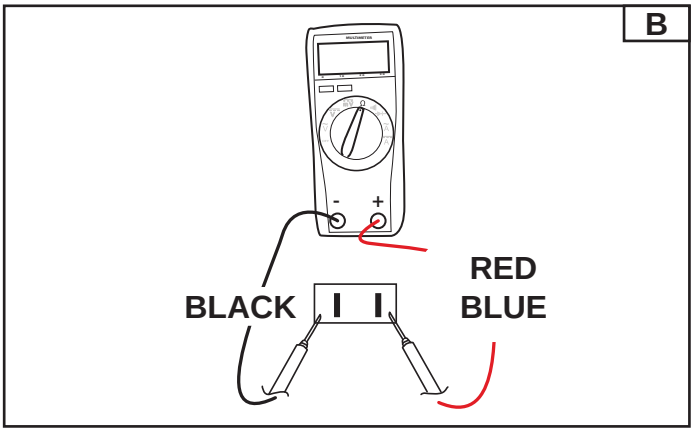
ACTUATORS
FUEL LEVEL SENSOR

Situated close to the fuel pump (1) Fig. A provides an value of variable resistance according to the present fuel level.



Inspect:

- The resistance based on fuel level by positioning the multi-tester on symbol Ω between PIN 1 - PIN 2 Fig. B.



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.

- Resistance of the sensor with floater in minimum position: 95 Ω +/-3 (Fig. A)
- Resistance of the sensor with floater in maximum position: 10 Ω +/-2 (Fig.A)

To check the resistance on the other levels, refer to the table below:

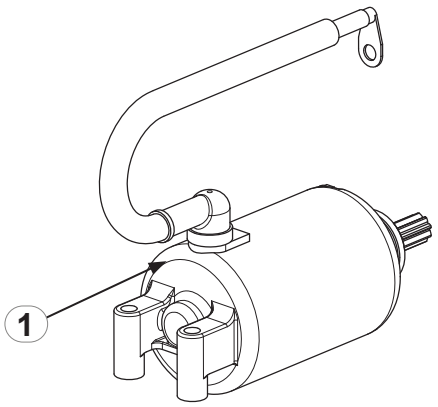
Probe level	Resistance	Tolerance
6	10	± 2 Ω
5	25	± 2 Ω
4	35	± 2 Ω
3	45	± 2 Ω
2	60	± 2 Ω
1	80	± 2 Ω
0	95	± 3 Ω

ACTUATORS

STARTER MOTOR

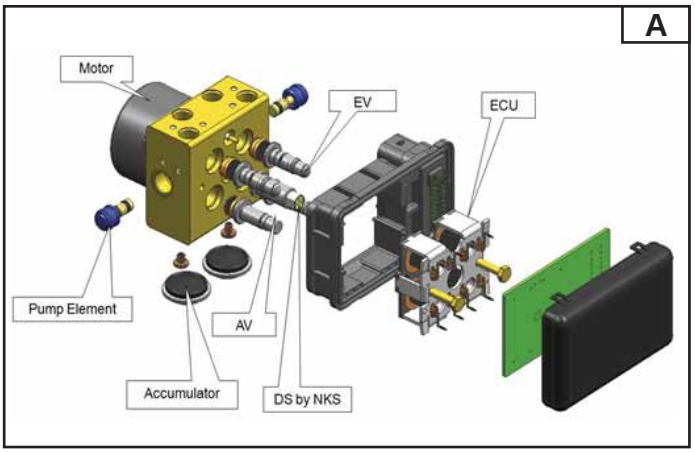
The starter motor (1) Fig. A, is a part that can be replaced. If the starter is damaged, replace it completely.

A



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). 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

For the diagnostic management of the device, hereunder are the main fault codes and the necessary corrective actions.

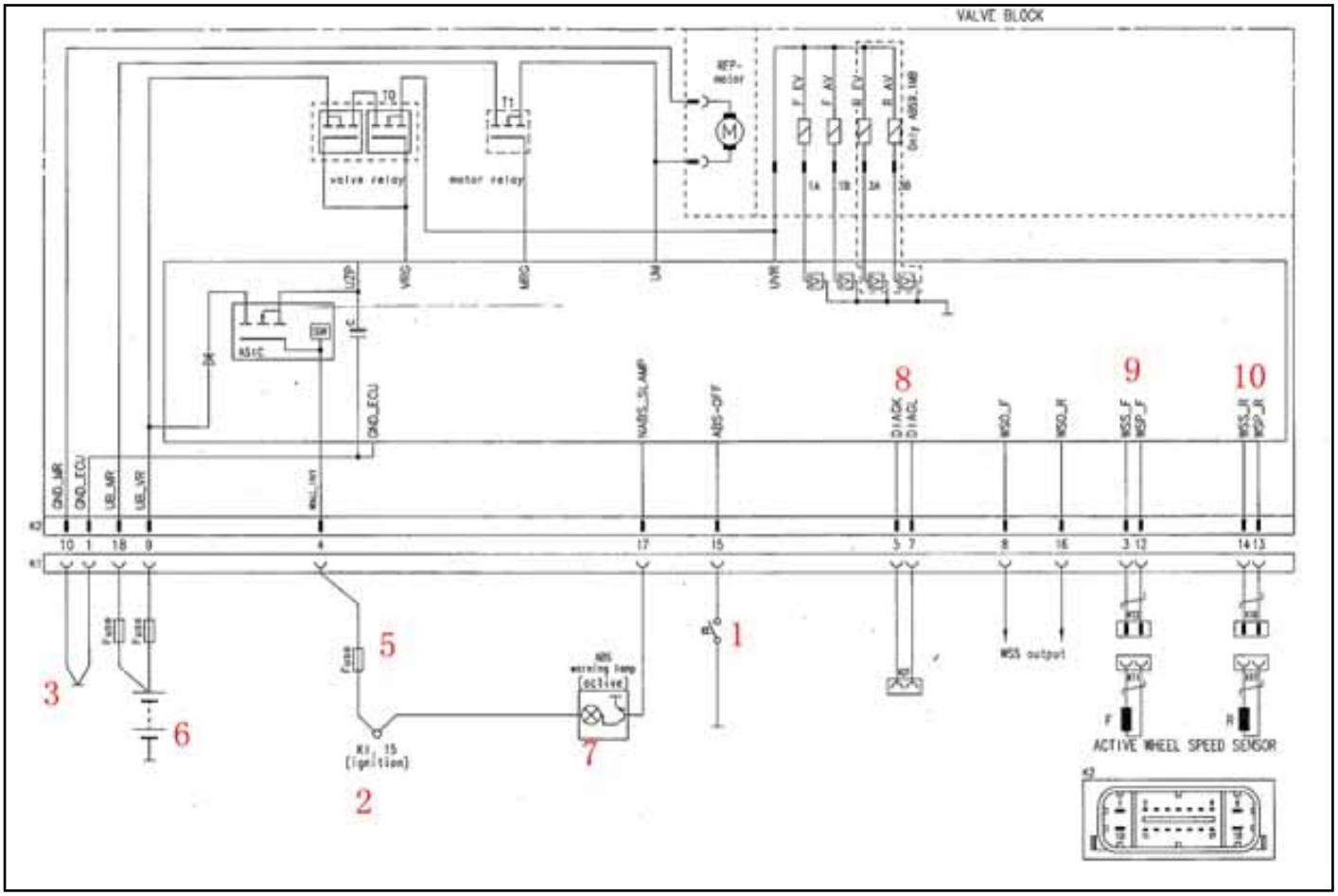
DTC (Hex) Fault codes	Solutions
5055	Replace ABS unit
5019	
5017	
5013	
5018	
5014	
5053	Check battery voltage
5052	
5035	Replace ABS unit
5043	Check connection of the speed sensors using a new sensor
5045	
5042	Check signal wheel for deformation or faults
5044	
5025	Check speed sensors, distance, signal wheel, and tire specifications.
5122	Replace ABS unit
5223	

NOTICE

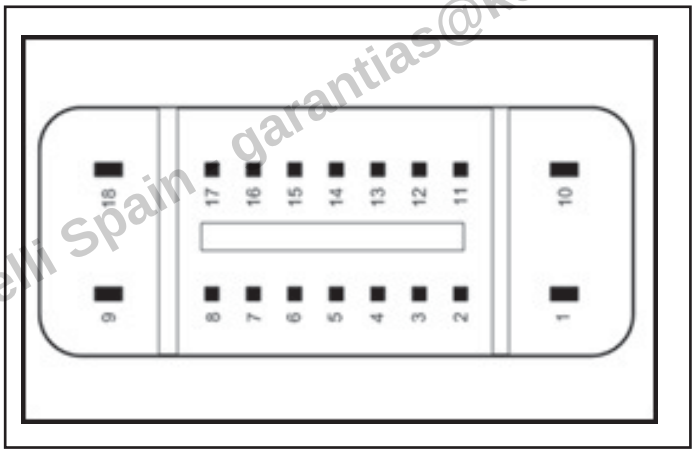
On the electric systems there could be equal connectors for different functions.
In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

ACTUATORS
ABS ECU

Diagram



Position	Code
1	GND_ECU
2	CAN1P
3	WSS_F
4	WAU_IN1
5	DIAGK
6	BLS - input_PD -SW2H_NO
7	DIAGL
8	WSO_F
9	UB_VR
10	GND_MR
11	CAN1M
12	WSP_F
13	WSP_R
14	WSS_R
15	ABS_OFF -input_PU - SW2L_NO
16	WSO_R
17	NABS_SLAMP
18	UB_MR



DIAGNOSTICS

BRAKE FILLING/BLEEDING DIAGNOSTICS

Refer to the Texa diagnostic instructions.

BATTERY

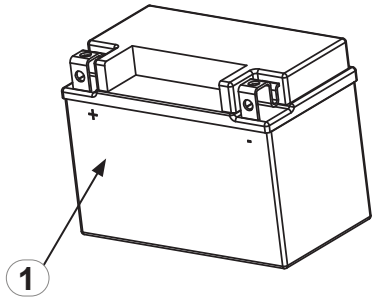
VEHICLE BATTERY

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 YTZ14-S 12V 11.8 Ah - 230 CCA.

A



NOTICE

Hydrogen is not produced during the normal recharge of the battery, but it can be produced when the battery is re-charged 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.

NOTICE

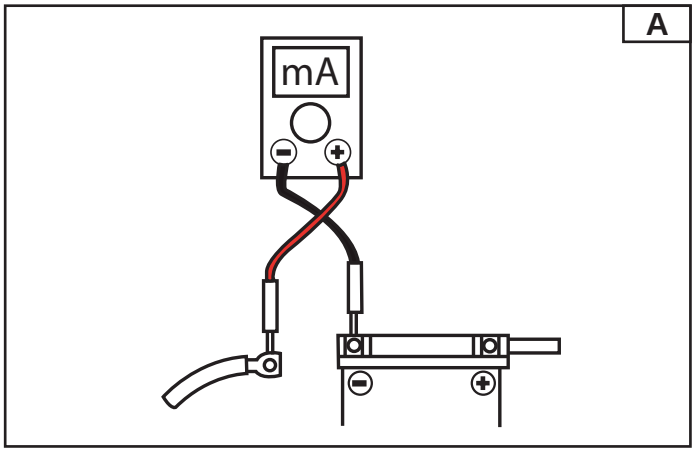
On the electric systems there could be equal connectors for different functions.
In this case, the reversal is possible. Pay attention to the correct positioning during the disassembly and reassembly procedures of sensors and actuators.

BATTERY
CHECK OF BATTERY EFFICIENCY

CHECK OF BATTERY CURRENT LOSSES

Connect:

- The multitester 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 multitester first to prevent damages.
Do no position the ignition switch to ON whilst measuring the current.

When the panel is off, the current losses must be ≤ Ã 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.

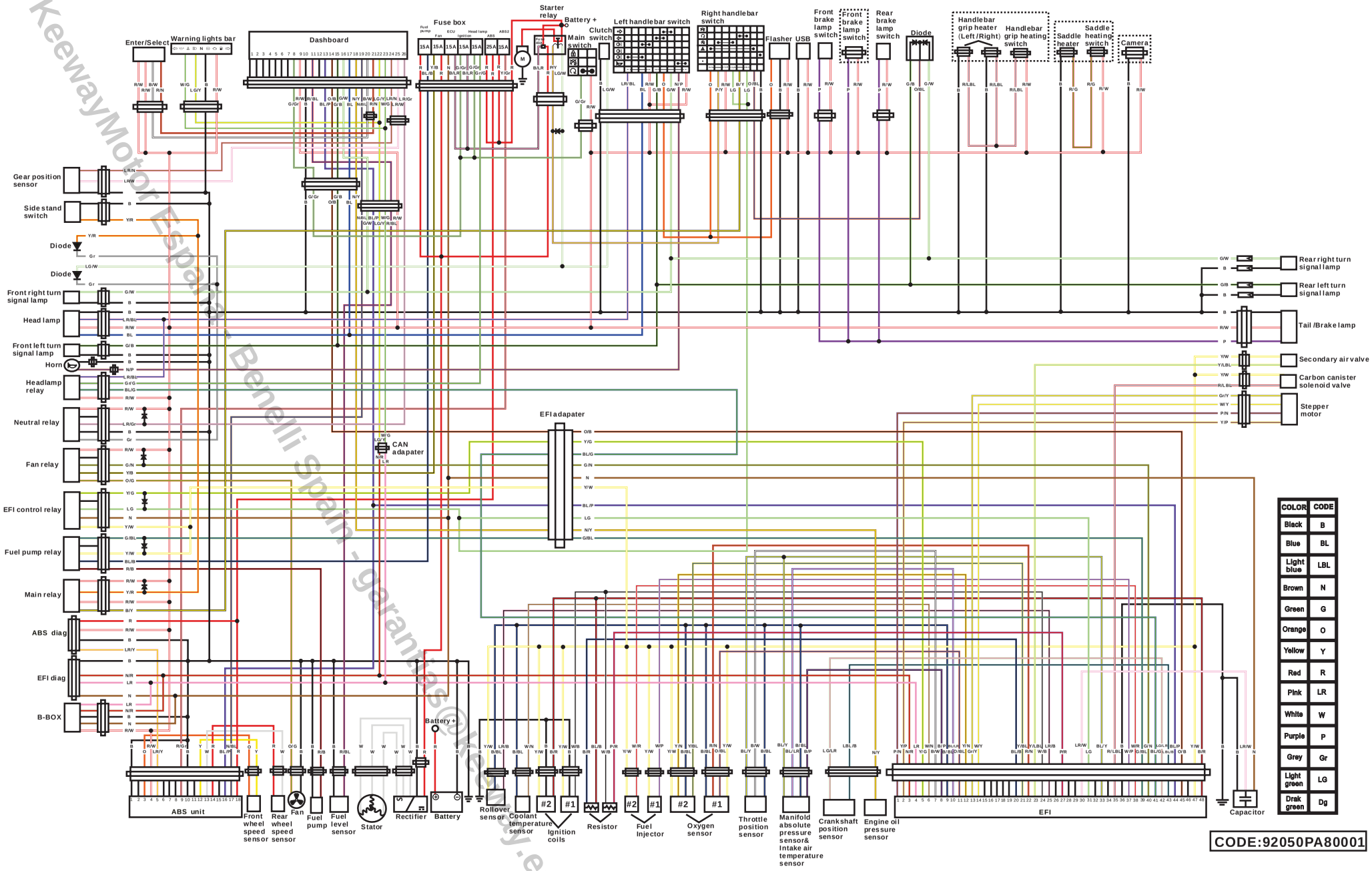
NOTICE

For vehicles equipped with B-BOX device, make sure the connector is disconnected before proceeding with measurements.

Remarks

ELECTRIC SYSTEM

ELECTRIC SYSTEM DIAGRAM



COLOR	CODE
Black	B
Blue	BL
Light blue	LBL
Brown	N
Green	G
Orange	O
Yellow	Y
Red	R
Pink	LR
White	W
Purple	P
Grey	Gr
Light green	LG
Drak green	Dg

CODE:92050PA80001

ELECTRIC SYSTEM

COLOUR KEY

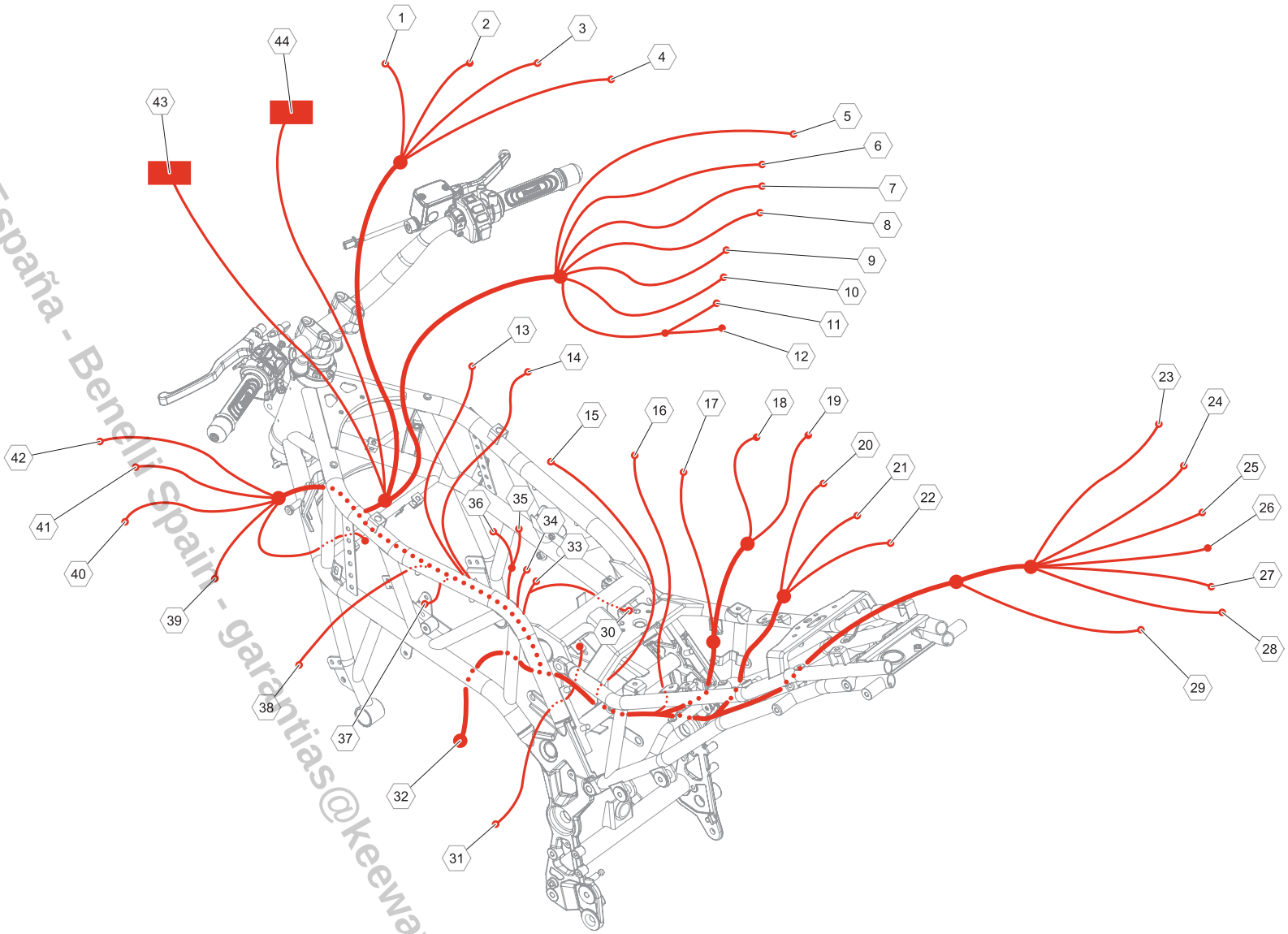
CODE	COLOUR
B	Black
BL	Blue
LBL	Light blue
N	Brown
G	Green
O	Orange
Y	Yellow
R	Red
LR	Pink
W	White
P	Purple
Gr	Grey
LG	Light green
DG	Dark green

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.

ELECTRIC SYSTEM

SERVICE ELECTRICAL DISTRIBUTOR CONNECTIONS



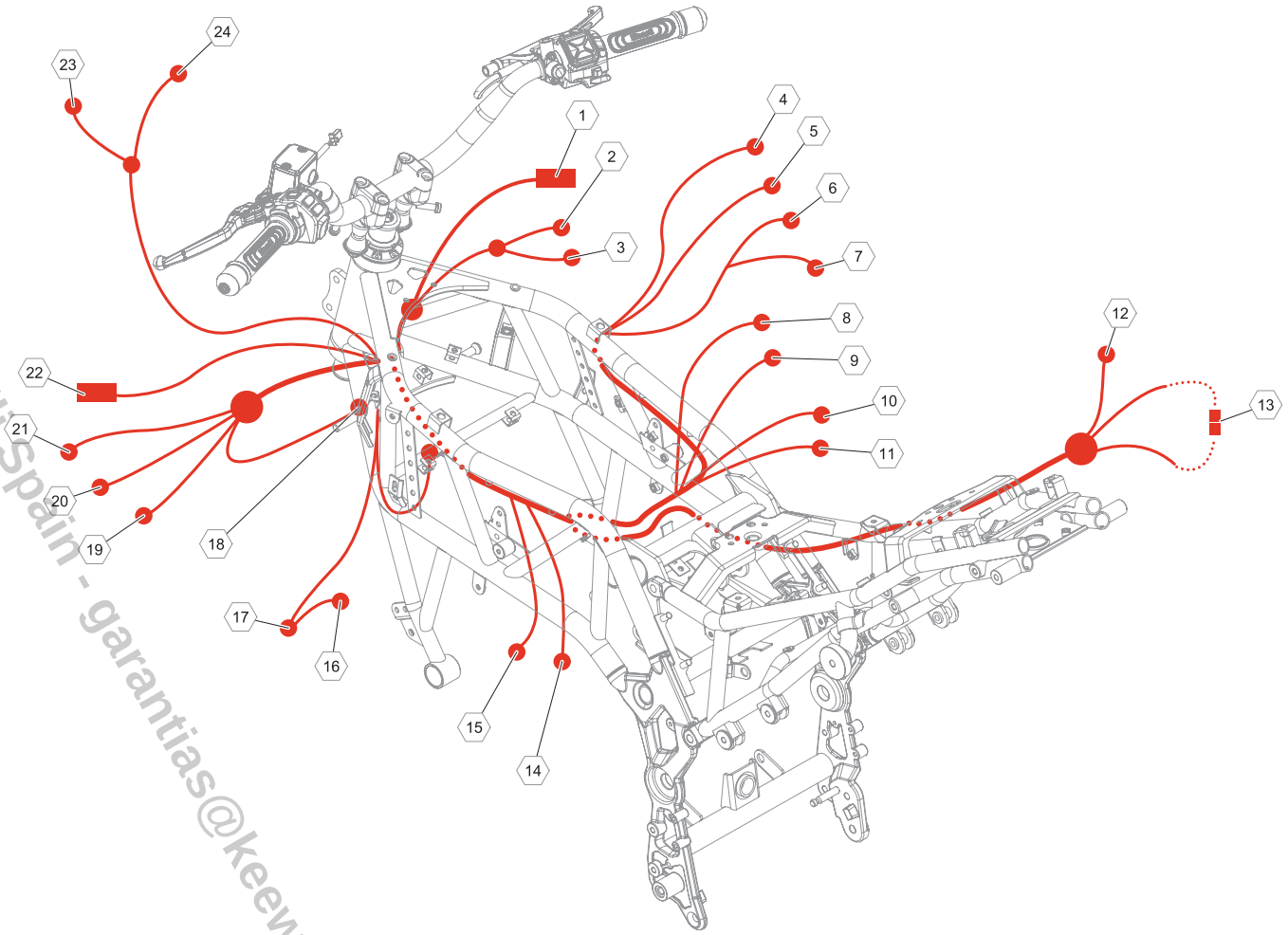
ELECTRIC SYSTEM

SERVICE ELECTRICAL DISTRIBUTOR KEY

POS.	DESCRIPTION
1	Indicator light module
2	Headlamp
3	Front speed sensor
4	Left turn indicator
5	Horn
6	Heated seat switch
7	Right turn indicator
8	Right heated hand grip
9	Front brake
10	Right control block
11	Left control block
12	Left button panel
13	Level probe
14	Fuel Pump
15	Relays (6)
16	Remote control switch
17	Heated seat
18	Fuse box
19	Turn signal light intermittence
20	Dash CAM
21	B-box
22	ABS diagnostic socket
23	License plate light
24	Left turn indicator
25	Right turn indicator
26	Clutch diode
27	Crutch diode
28	Turn signal light diodes
29	Rear light
30	Ground
31	Starter motor ground
32	Side stand switch
33	ABS
34	Gear sensor
35	Hydrostop
36	Rear speed sensor
37	Ground
38	LH heated hand grip
39	Voltage regulator
40	Key lock
41	Heated hand grip switch
42	Cooling fans
43	EFI system disconnection
44	Dashboard disconnection

ELECTRIC SYSTEM

INJECTION ELECTRICAL DISTRIBUTOR CONNECTIONS

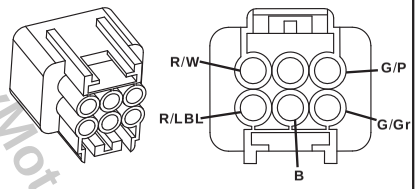


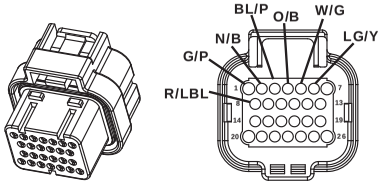
ELECTRIC SYSTEM

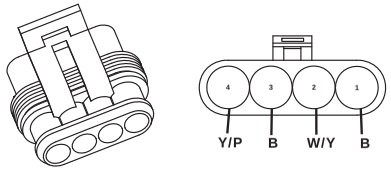
INJECTION ELECTRICAL DISTRIBUTOR CONNECTIONS KEY

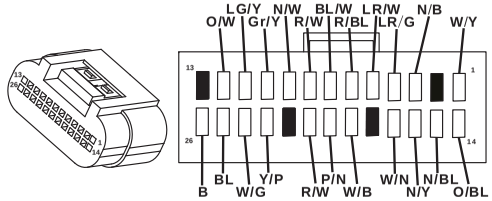
POS.	DESCRIPTION
1	EFI system disconnection
2	ECS
3	Secondary area solenoid
4	Oxygen Sensor (1)
5	Oxygen Sensor (2)
6	Coil (2)
7	Ground
8	Injector 1
9	Engine Temperature Sensor
10	Injector 2
11	Stepper motor
12	O.D.B. diagnosis socket
13	CAMBAS disconnecting switch
14	TMAP
15	TPS
16	Reciprocating mass
17	Coil 1
18	Ground
19	ECU
20	Coil resistance
21	Coil resistance
22	Dashboard disconnection
23	USB
24	Dashboard

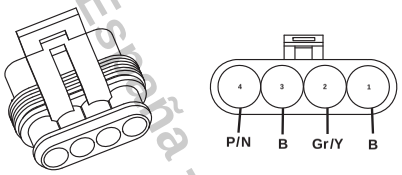
ELECTRIC SYSTEM
CONNECTORS

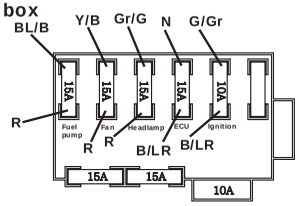
Booster module


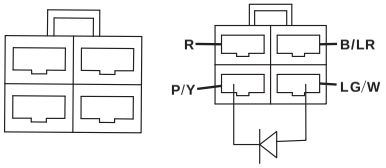
Speedometer


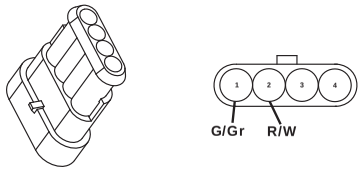
Button1


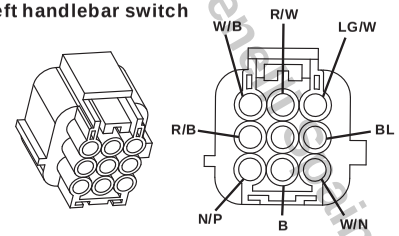
Speedometer convertor


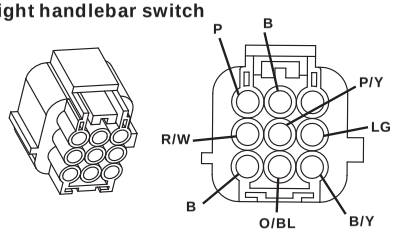
Button2


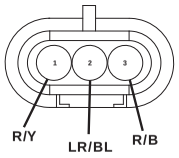
Fuse box


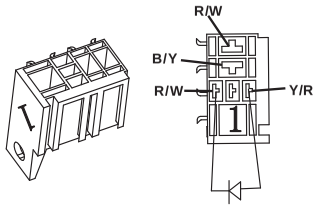
Starter relay


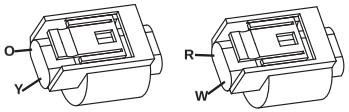
Main switch


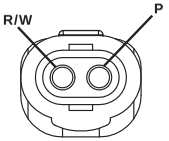
Left handlebar switch


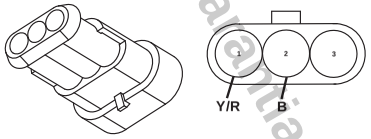
Right handlebar switch


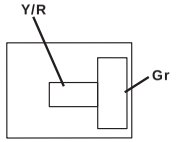


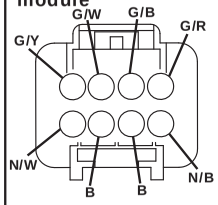
Main relay


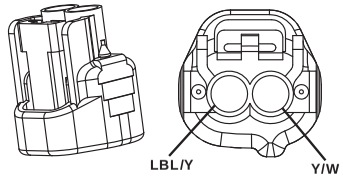
Front/Rear wheel speed sensor


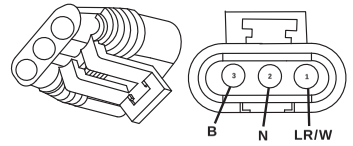
Front/Rear brake lamp switch


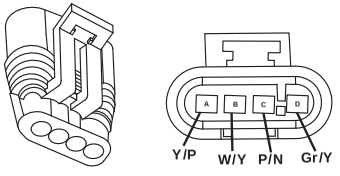
Side stand switch


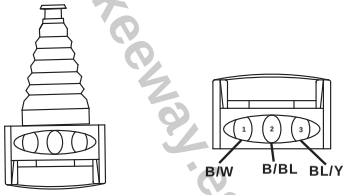
Diode


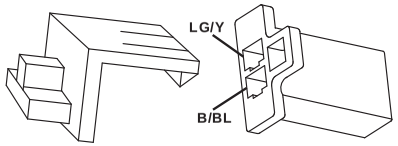
Constant current module


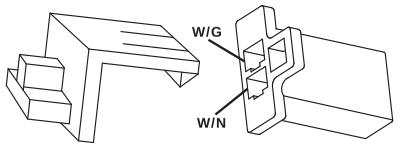
Secondary air valve


Capacitor


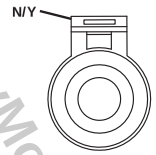
Stepper motor


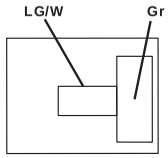
Throttle position sensor


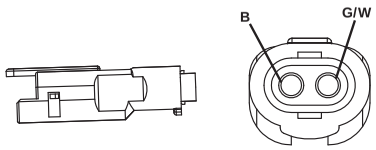
CAN-L connector


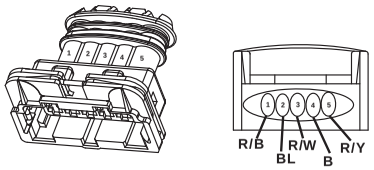
CAN-H connector


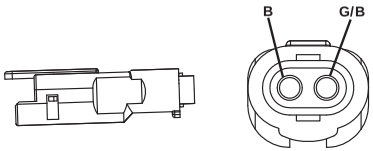
ELECTRIC SYSTEM
CONNECTORS

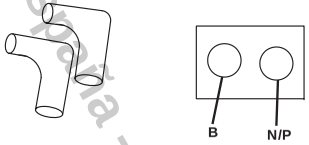
Engine oil pressure sensor


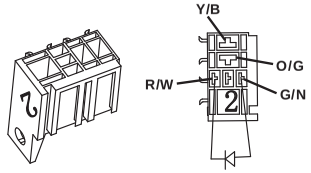
Diode


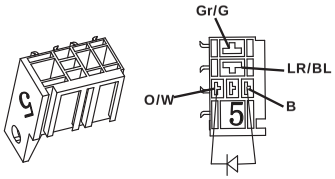
Front right turn signal lamp


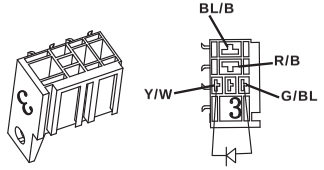
Head lamp


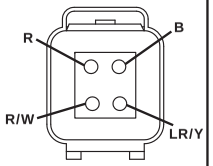
Front left turn signal lamp


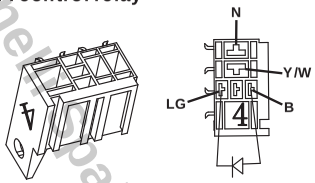
Horn


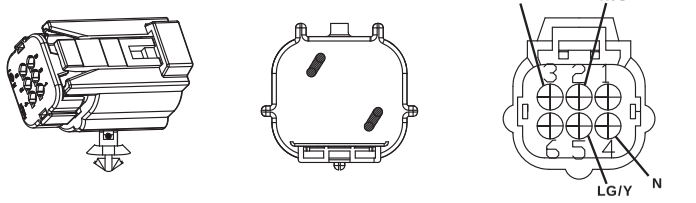
Fan relay


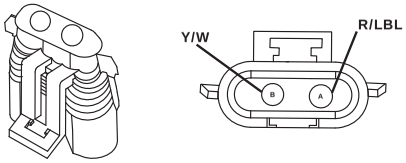
Headlamp relay


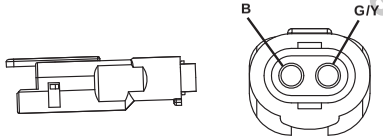
Fuel pump relay


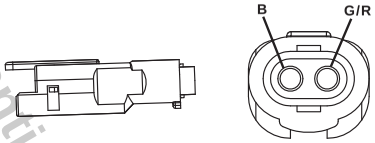
ABS diagnosis connector


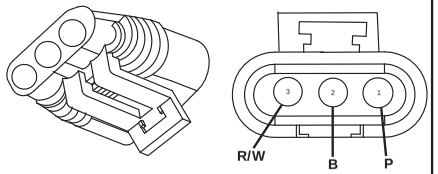
EFI control relay


EFI diagnosis connector


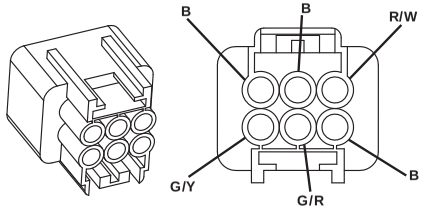
Carbon canister solenoid valve


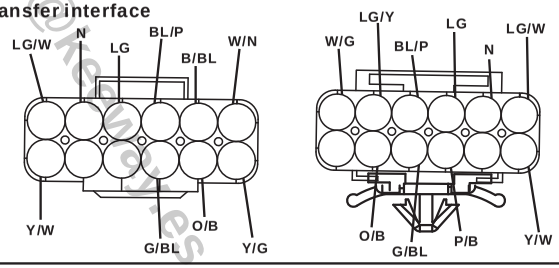
Rear right turn signal lamp


Rear left turn signal lamp


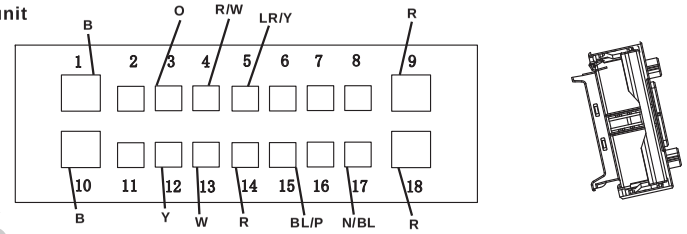
Tail /Brake lamp


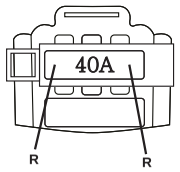
License plate lamp

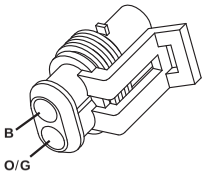

Reserved tail light connector


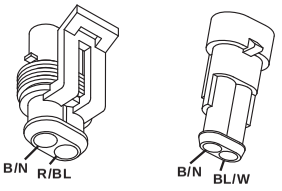
Transfer interface


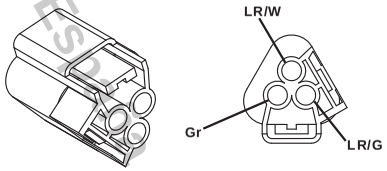
ELECTRIC SYSTEM
CONNECTORS

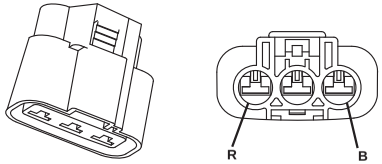
ABS unit


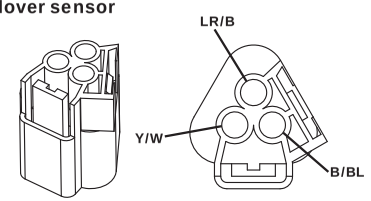
ABS fuse


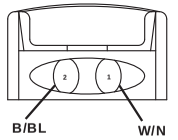
Fan


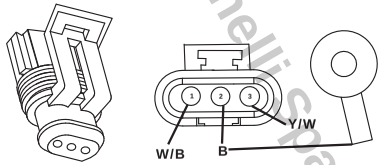
Fuel level sensor


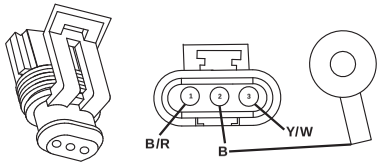
Gear position sensor


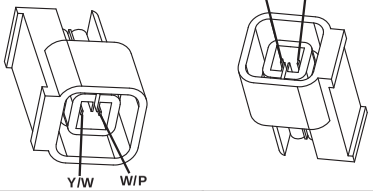
Rectifier


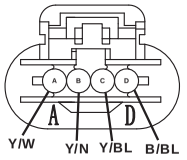
Rollover sensor


Coolant temperature sensor


Ignition coil 1




Fuel Injector


2 cylinder oxygen sensor


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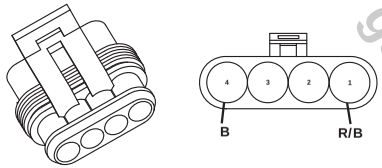
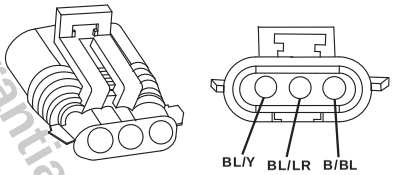
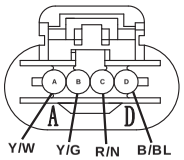
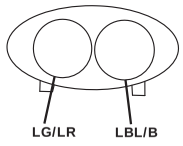
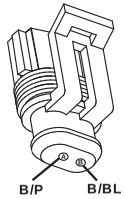
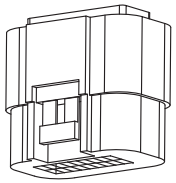


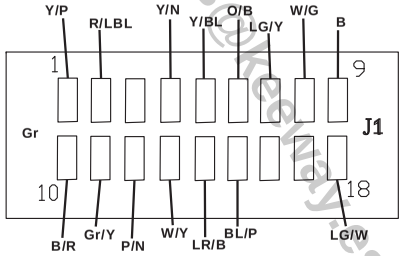
Manifold absolute pressure sensor


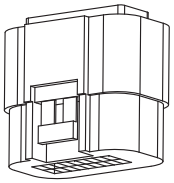
1 cylinder oxygen sensor


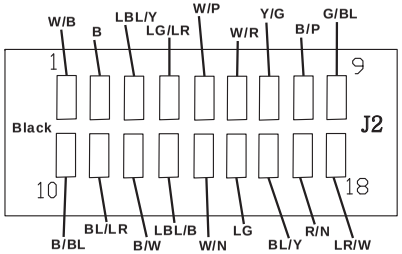
Crankshaft position sensor


Intake air temperature sensor


ECU








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Benelli Q.J. s.r.l.

Strada della Fornace Vecchia, sn - 61122 Pesaro Italy
Tel. +39 0721 41871 Fax +39 0721 418722
support@benelli.com / www.benelli.com / www.benellishop.com