



SERVICE STATION MANUAL

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V85TT - V85TT Travel - V85TT Strada



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SERVICE STATION MANUAL

V85TT - V85TT Travel - V85TT Strada

This workshop manual has been produced for consultation by the technical staff of Dealerships, Service Centres, Authorised Service Network Workshops.

This manual is addressed to service mechanics who are supposed to have a basic knowledge of mechanics principles and of vehicle mounting techniques and procedures.

Any technical changes made to the vehicles or to specific mounting operations will be promptly reported by updates to this manual.

In order to achieve satisfactory operations, it is necessary to have adequate work areas and the necessary specific equipment or hierarchies.

N.B.

Indicates a note that provides information to make the process easier and clearer.

IMPORTANT

Indicates the specific processes that must be followed in order to prevent possible injury to the person repairing the vehicle.

WARNING

Indicates the specific processes that must be followed in order to prevent damage to the vehicle.



Personal Safety

The total or partial failure to follow these instructions may lead to serious personal injury.



Environmental Protection

Indicates the correct behaviour to adopt for an environmentally-friendly use of the vehicle.



Vehicle Integrity

The total or partial failure to follow these instructions may lead to serious damage to the vehicle and may even invalidate the warranty.

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LIST OF TOPICS

Pre-delivery

1.1 Appearance check

- Paintwork
- Fitting of Plastics
- Scratches
- Dirt

1.2 Safety locks check

Safety fasteners:

- Front and rear suspension unit
- Front and rear brake calliper retainer unit
- Front and rear wheel unit
- Engine - chassis retainers
- Steering assembly
- Plastics fastening screws

1.3 Electrical system

- Main switch
- Headlamps: high beam lights, low beam lights, tail-lights (front and rear) and relevant warning lights
- Headlight adjustment according to prevailing regulations
- Front and rear stop light switches and their bulbs
- Turn indicators and their warning lights
- Instrument cluster lights
- Instrument cluster: fuel gauge
- Instrument cluster warning lights
- Horn
- Electric Starter
- - Engine stop by emergency stop switch and side stand
- Electric helmet compartment lock release switch (if applicable)
- Through the diagnostic tool, check that the last mapping version is present in the control unit/s and, if required, program the control unit/s again: consult the technical service website to know about available upgrades and details regarding the operation.

WARNING



TO ENSURE MAXIMUM PERFORMANCE, THE BATTERY MUST BE CHARGED BEFORE USE. THE LACK OF AN ADEQUATE BATTERY CHARGE BEFORE THE FIRST USE WILL CAUSE A PREMATURE FAILURE OF THE BATTERY.

WARNING



WHEN INSTALLING THE BATTERY, ATTACH THE POSITIVE LEAD FIRST AND THEN THE NEGATIVE ONE, AND PERFORM THE REVERSE OPERATION DURING REMOVAL.

ATTENTION



THE BATTERY ELECTROLYTE IS TOXIC, CORROSIVE AND, AS IT CONTAINS SULPHURIC ACID, MAY CAUSE BURNING IF IT COMES INTO CONTACT WITH THE SKIN.

WHEN HANDLING BATTERY ELECTROLYTE, WEAR TIGHT-FITTING GLOVES AND PROTECTIVE APPAREL. IN THE EVENT OF SKIN CONTACT WITH THE ELECTROLYTIC FLUID, RINSE WELL WITH PLENTY OF CLEAN WATER.

IT IS PARTICULARLY IMPORTANT TO PROTECT THE EYES BECAUSE EVEN TINY AMOUNTS OF BATTERY ACID MAY CAUSE BLINDNESS.

IF THE FLUID GETS INTO CONTACT WITH THE EYES, WASH WITH ABUNDANT WATER FOR FIFTEEN MINUTES AND CONSULT AN EYE SPECIALIST IMMEDIATELY.

THE BATTERY RELEASES EXPLOSIVE GASES. KEEP IT AWAY OF FLAMES, SPARKS, CIGARETTES OR ANY OTHER HEAT SOURCE.

ENSURE ADEQUATE VENTILATION WHEN SERVICING OR RECHARGING THE BATTERY.

KEEP OUT OF THE REACH OF CHILDREN.

BATTERY FLUID IS CORROSIVE. DO NOT POUR OR SPREAD IT ESPECIALLY ON PLASTIC PARTS.

ENSURE THAT THE ELECTROLYTIC ACID IS COMPATIBLE WITH THE BATTERY BEING ACTIVATED.

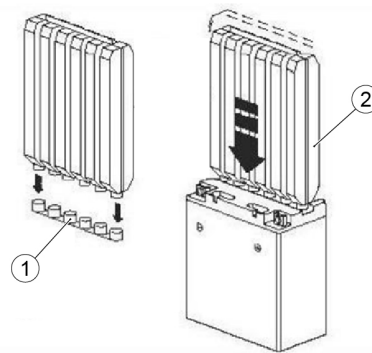
ATTENTION



NEVER USE FUSES WITH A CAPACITY HIGHER THAN THAT RECOMMENDED. THE USE OF A FUSE OF UNSUITABLE CAPACITY MAY RESULT IN SERIOUS DAMAGES TO THE WHOLE VEHICLE OR EVEN CAUSE A FIRE.

TRADITIONAL BATTERY ACTIVATION PROCEDURE

- Place the battery on a flat surface.
- Remove the cell's protective sticker.
- Take the acid container.
- Remove the cap 1 of the container 2.
- Place the container upside down, perpendicularly above the battery, aligning the outlets with the battery cells.
- Apply pressure to the container to break the seals. The liquid will begin to flow into the cells.



- Check that air bubbles come out of the cells; let the liquid flow into the cells for at least 20 minutes.
- If no air bubbles escape and the liquid does not flow, tap lightly on the bottom of the container until the liquid begins to flow into the cells. Never remove the container from the battery, pierce it or cut it to facilitate the exit of the liquid.
- Make sure the liquid container is completely empty before removing it.
- Allow the battery to stand for at least 1 hour, before starting the charging process, without closing the six cells. This operation is extremely important in order to have the best battery performance over time.
- Recharge the battery following the specifications indicated on the battery (see photo) and using a suitable battery charger.



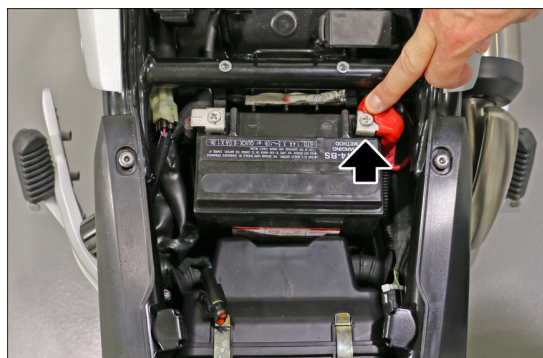
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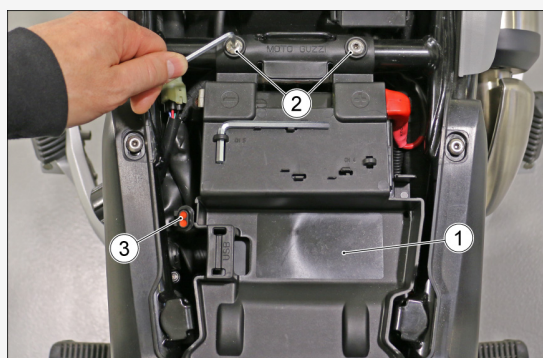
IN THE SHOWN EXAMPLE IT IS IMPORTANT TO USE A BATTERY CHARGER WITH 1.2 AMPERE (CHARGING TIME 5-10 HOURS) OR 5 AMPERE (CHARGING TIME 1 HOUR).

After performing the battery activation procedure, install it in the dedicated compartment under the saddle.

Then connect the cables to the battery, **starting with the positive one (+)**.



Install the storage compartment (1) and tighten the relative fixing screws (2), then place the connector (3) of the provision for the second USB port on it.



1.4 Level check

- Braking system liquid level (front and rear)
- Engine oil level

1.5 Test drive

- Cold start
- Instrument operations
- Throttle control response
- Stability on acceleration and braking
- Front and rear brake efficiency
- Front and rear suspension efficiency
- Abnormal noise

1.6 Static check

- Restarting when warmed up
- Minimum holding (turning the handlebar)
- Uniform turning of the steering
- Any leaks

1.7 Functional checks

- Hydraulic braking system
- Brake and clutch lever stroke (where applicable)
- Clutch - check proper operation
- Engine - check for proper general operation and absence of abnormal noise
- Check documents, frame number and engine number
- Check included tools (where applicable)
- License plate fitting
- Locks check
- Tyre pressure check
- Installation of mirrors and any accessories
- Battery installation

ATTENTION



NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES OR TYRES MAY BURST.

WARNING

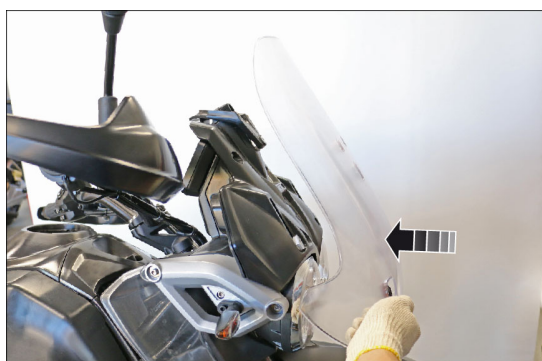


CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

1.8 Specific operations for vehicle

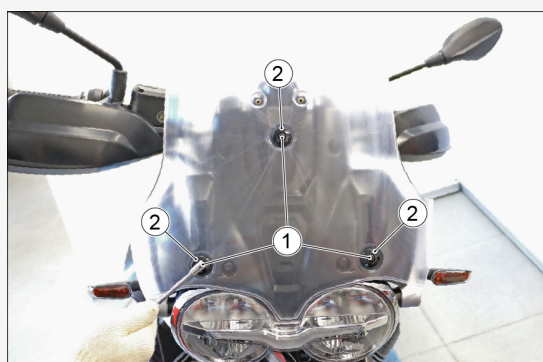
WINDSHIELD KIT ASSEMBLY

- The box containing the windshield is located inside the vehicle packaging; the hardware is mounted on the windshield bracket assembled on the vehicle
- Installation begins with the removal of the mounting hardware from the windshield bracket (for each of the three fastening points, made up of: rubber piece, bushing and screw; plus the two fixing screws of the adjustment handle)
- Subsequently, the three rubber pieces are fitted in the respective holes on the windshield, avoiding the use of tools that can damage or scratch the component
- The windshield is then rested on the relative bracket on the vehicle.



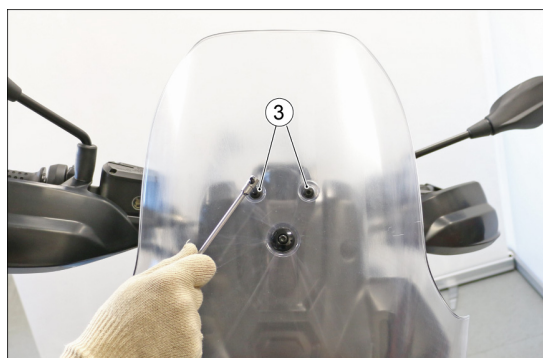
- Supporting the windshield firmly, insert the bushings (2) in the relative rubber grommets then insert and tighten the fixing screws (1) to the prescribed torque.

DESCRIPTION	TORQUE
Windshield fixing screw	$8 \pm 1.6 \text{ Nm}$ ($5.9 \pm 1.18 \text{ lb ft}$)



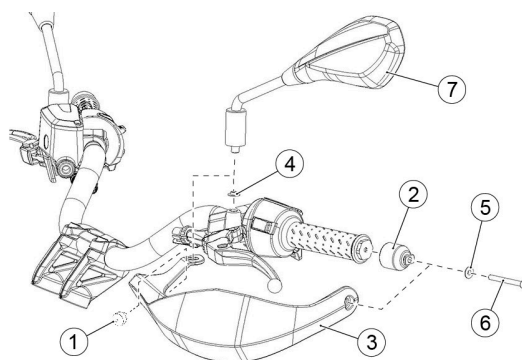
- Fit and tighten the fixing screws (3) of the windshield to the adjustment handle at the prescribed torque.

DESCRIPTION	TORQUE
Windshield adjustment handle fixing screw	$3 \pm 0.6 \text{ Nm}$ (2.21 $\pm 0.44 \text{ lb ft}$)



HANDGUARDS AND REAR VIEW MIRRORS KIT ASSEMBLY

- The box containing the right and left handguards, the anti-vibration weights and the hardware required for assembling the aforementioned components is in the vehicle packaging
- There is also a box containing the rear view mirrors
- Installation of the handguards begins with the insertion of the rubber piece (1) in the specific cylindrical lodging on the internal side of the handguards.
- Then, rest the anti-vibration weight (2) in correspondence to the end of the handlebar and on this handguard (3), taking care to line up the inside with the shape of the anti-vibration weight; then, the "T" bushing (5) (diam.15 mm) should be inserted on the handguard and the screw (6) inserted without tightening it all the way.
- Then, insert the other "T" bushing (4) (diam.18 mm) from below on the second handguard fastening hole and screw in the rear view mirror (7)

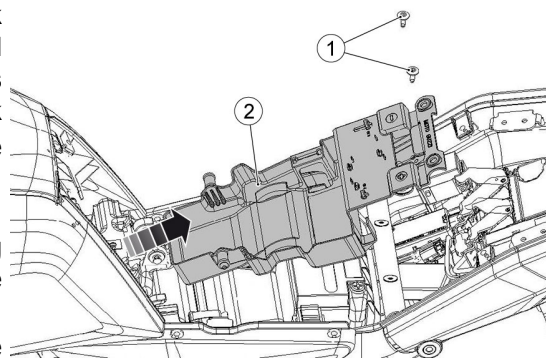


- Then, tighten the screw (6), observing the tightening torque indicated on the attached chart
- Repeat the same procedure to mount the handguard/rear view mirror on the opposite side

DESCRIPTION	TORQUE
Fastening handguard / anti-vibration weight to handlebar	10 ± 2 Nm (7.38 $\pm$ 0.87 lbf ft)

BATTERY COVER ASSEMBLY

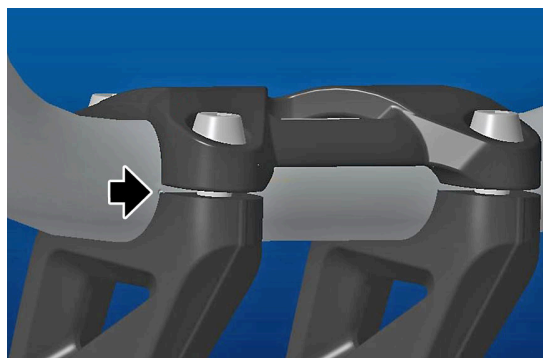
- Remove the saddle, acting on the lock positioned on the licence plate holder and lift it from the rear part, unhooking it from its lodgings in correspondence to the fuel tank
- Remove the screws (1) and extract the battery cover (2) from the front lodgings, sliding it toward the rear
- Place the battery in the appropriate lodging and connect it, taking care to observe the polarity
- Refit the battery cover, inserting it in the appropriate housings
- Insert the screws (1) in the appropriate holes, observing the tightening torque indicated on the attached chart
- Refit the saddle, hooking it in the front part in the appropriate lodgings in correspondence to the fuel tank and lower it at the rear, ensuring that the saddle lock has clicked.



DESCRIPTION	TORQUE
Fastening battery cover to frame	10 ± 2 Nm (7.38 $\pm$ 0.87 lbf ft)

RESTORING THE HANDLEBAR

- Position the centre of the punch mark indicated in the figure in correspondence with the corner of the lower left U-bolt
- Tighten the four fixing screws by hand
- Place a 1 mm (0.04 in) shim to the front between the lower U-bolts and the upper U-bolt
- Tighten the two front screws, in the direction of travel, to 2 Nm (1.48 lbf ft)
- Tighten the two rear screws, in the direction of travel, to 5 Nm (3.69 lbf ft)
- Remove the previously positioned shim.
- In sequence, tighten the front and rear screws to the specified torque



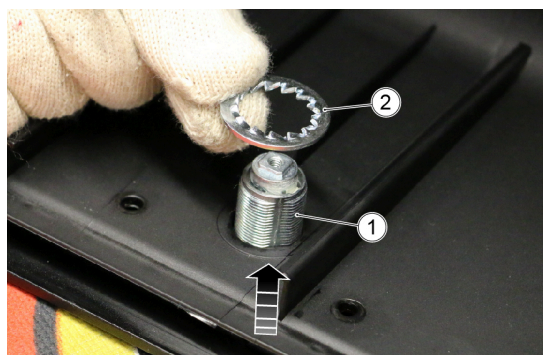
DESCRIPTION	TORQUE
Upper U-bolt fastening	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)

LOCK ASSEMBLY ON THE CASES

In the Travel Pack version, the motorcycle is supplied with two assembly kits to accompany the lock kit already present in the under-seat compartment to assemble and install the cases.

The first kit is used to assemble the lock of the cases:

- Insert the pawl (1) in the case from the outside to the inside and position the knurled washer (2).

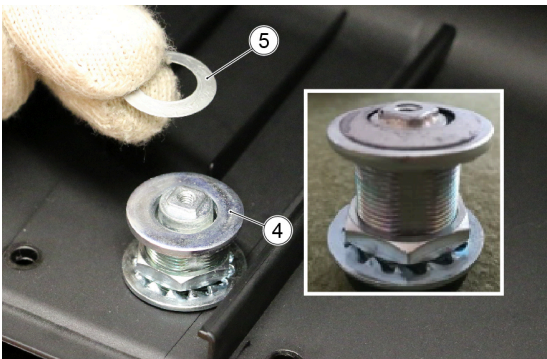


- Insert the locking nut (3) of the pawl and tighten it to the prescribed torque.

DESCRIPTION	TORQUE
Pawl lock nut	10 ± 2 Nm (7.38 ± 1.48 lb ft)



- Position the spacer washer (4) and the spring washer (5) and check the correct position

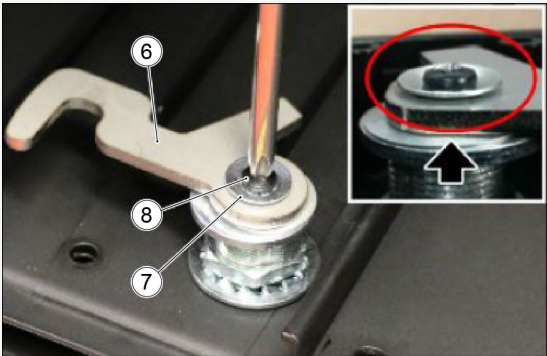


- Position the latch bolt (6) in the direction indicated, the spring washer (7) and relative fixing screw (8).

N.B



MAKE SURE THE SPRING WASHER IS ASSEMBLED CORRECTLY AS SHOWN IN THE IMAGE.



DESCRIPTION	TORQUE
Locking hook locking screw	$3 \pm 0,6 \text{ Nm}$ ($2.21 \pm 0.44 \text{ lbf ft}$) + Loct. 243

- Position the protective cover (9) of the latch bolt and press it onto the cover until it hooks onto the cover itself.





LOCK ASSEMBLY ON THE CASE SUPPORT

The second kit is used to assemble the latch of the cases:

- Insert the pawl (1) in the support as shown in image (A) and position the knurled washer (2).

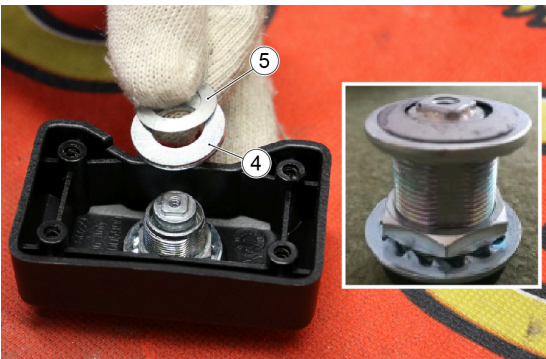


- Insert the locking nut (3) of the pawl and tighten it to the prescribed torque.

DESCRIPTION	TORQUE
Pawl lock nut	10 ± 2 Nm (7.38 ± 1.48 lb ft)



- Position the spacer washer (4) and the spring washer (5) and check the correct position

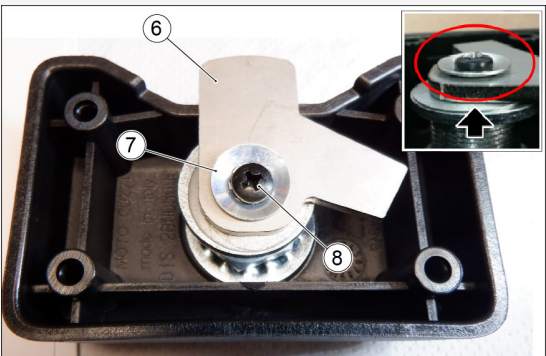


- Position the lock plate (6) in the direction indicated, the spring washer (7) and relative fixing screw (8).

N.B



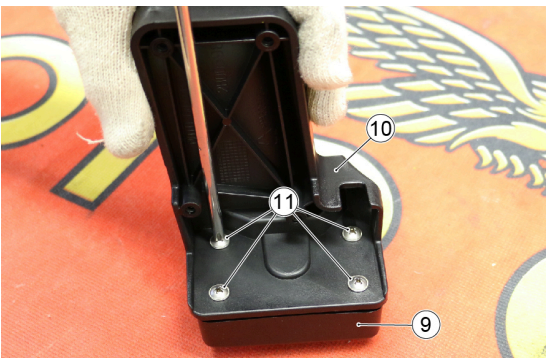
MAKE SURE THE SPRING WASHER IS ASSEMBLED CORRECTLY AS SHOWN IN THE IMAGE.



DESCRIPTION	TORQUE
Locking hook locking screw	$3 \pm 0,6 \text{ Nm}$ ($2.21 \pm 0.44 \text{ lbf ft}$) + Loct. 243

- Position the protective cover (9) of the locking hook on the support (10) with the four screws (11) tightening them to the prescribed torque.

DESCRIPTION	TORQUE
Locking screws of the cover on the support	$3.5 \pm 0,7 \text{ Nm}$ ($2.58 \pm 0.52 \text{ lbf ft}$)



- Position the pre-assembled support on the case and secure it with the four screws (12) tightening them to the prescribed torque.
- Position the protective cover (9) of the locking hook on the support (10) with the four screws (11) tightening them to the prescribed torque.

DESCRIPTION	TORQUE
Case support fixing screws	$3.5 \pm 0,7 \text{ Nm}$ ($2.58 \pm 0.52 \text{ lbf ft}$)

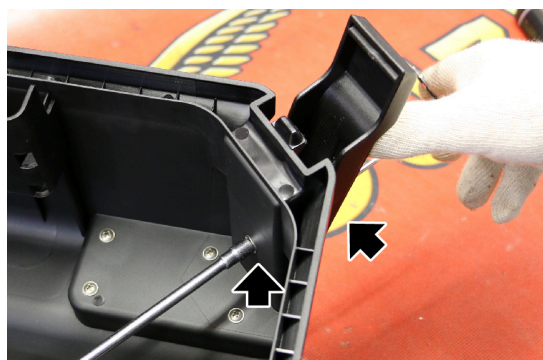


INSTALLATION OF CLOSURE LEVERS ON CASES

THE OPERATION DESCRIBED IS RELATED TO A SINGLE CLOSURE LEVER BUT IS VALID FOR BOTH

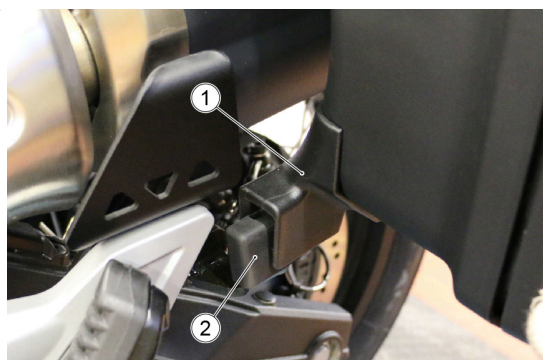
- Position the complete closure lever on the case and insert the screw from the outside towards the inside (with relative washer).
- From the inside of the case, insert the nut (with its washer).
- Holding the nut, tighten the screw to the prescribed torque.

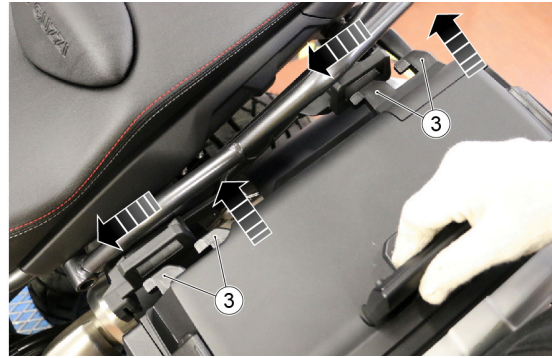
DESCRIPTION	TORQUE
Closure lever locking screws	$2.5 \pm 0,5 \text{ Nm}$ ($1.84 \pm 0.37 \text{ lbf ft}$)



HOOKING THE CASES TO THE VEHICLE

- Position the lower centring element (1) of the case on the pad (2) of the lower centring bracket.
- Insert the hooks of the case (3) on the slots of the connectors.





- Turn the key of the side lock fully anti-clockwise and move the case forward for the entire length of the connector slots.
- With a final push on the rear of the case, make sure the case has arrived at the end of the connector slots.
- Turn the key clockwise to lock the case to the connector.

**ATTENTION**

MAKE SURE THAT THE CASE IS CORRECTLY ALIGNED BY CHECKING THAT THE CASE CONNECTOR IS ALIGNED WITH THE HOOKING SLOT ON THE SUPPORT.

ATTENTION

REMOVE THE KEY ONLY AFTER HAVING CHECKED THAT THE CASE IS CORRECTLY ATTACHED.

LIST OF TOPICS

Specifications

2.1 Regulations

2.1.1 Safety rules

Carbon monoxide

If you need to keep the engine running while working on the vehicle, please ensure that you do so in an open or very well ventilated area. Never run the engine in an enclosed area. If you do work in an enclosed area, make sure to use a fume extraction system.

ATTENTION



EXHAUST EMISSIONS CONTAIN CARBON MONOXIDE, A POISONOUS GAS WHICH CAN CAUSE LOSS OF CONSCIOUSNESS AND EVEN DEATH.

Fuel

ATTENTION



FUEL USED TO DRIVE EXPLOSION ENGINES IS HIGHLY INFLAMMABLE AND CAN BECOME EXPLOSIVE UNDER SPECIFIC CONDITIONS.

IT IS THEREFORE RECOMMENDED TO CARRY OUT REFUELLING AND MAINTENANCE PROCEDURES IN A VENTILATED AREA WITH THE ENGINE SWITCHED OFF. DO NOT SMOKE DURING REFUELLING AND NEAR FUEL VAPOURS, AVOIDING ANY CONTACT WITH NAKED FLAMES, SPARKS OR OTHER SOURCES WHICH MAY CAUSE THEM TO IGNITE OR EXPLODE.

DO NOT ALLOW FUEL TO DISPERSE INTO THE ENVIRONMENT.

KEEP OUT OF THE REACH OF CHILDREN.

Hot parts

The engine and the exhaust system components get very hot and remain in this condition for a certain time interval after the engine has been switched off. Before handling these components, make sure that you are wearing insulating gloves or wait until the engine and the exhaust system have cooled down.

Used engine oil and transmission oil

ATTENTION



WHEN CARRYING OUT MAINTENANCE OPERATIONS, IT IS ADVISABLE TO WEAR PROTECTIVE IMPERMEABLE GLOVES.

THE ENGINE OR GEARBOX OIL MAY CAUSE SERIOUS INJURIES TO THE SKIN IF HANDLED FOR PROLONGED PERIODS OF TIME AND ON A REGULAR BASIS.

WASH YOUR HANDS CAREFULLY AFTER HANDLING OIL.

HAND THE OIL OVER TO OR HAVE IT COLLECTED BY THE NEAREST USED OIL RECYCLING COMPANY OR THE SUPPLIER.

DO NOT DISPOSE OF OIL INTO THE ENVIRONMENT.

KEEP OUT OF THE REACH OF CHILDREN.

ATTENTION



BRAKE FLUID CAN DAMAGE PAINT FINISH, PLASTIC AND RUBBER. WHEN SERVICING THE BRAKING SYSTEM, PROTECT THESE COMPONENTS WITH A CLEAN CLOTH. ALWAYS WEAR PROTECTIVE EYEWEAR WHEN WORKING ON THE BRAKE SYSTEM. BRAKE FLUID IS EXTREMELY HARMFUL FOR THE EYES. IN THE EVENT OF ACCIDENTAL CONTACT WITH THE EYES, RINSE THE EYES IMMEDIATELY WITH PLENTY OF COOL, CLEAN WATER AND SEEK IMMEDIATE MEDICAL ATTENTION.

KEEP OUT OF THE REACH OF CHILDREN.

Battery electrolyte and hydrogen gas

ATTENTION



THE BATTERY ELECTROLYTE IS TOXIC, CORROSIVE AND, AS IT CONTAINS SULPHURIC ACID, MAY CAUSE BURNING IF IT COMES INTO CONTACT WITH THE SKIN.

WHEN HANDLING BATTERY ELECTROLYTE, WEAR TIGHT-FITTING GLOVES AND PROTECTIVE APPAREL. IN THE EVENT OF SKIN CONTACT WITH THE ELECTROLYTIC FLUID, RINSE WELL WITH PLENTY OF CLEAN WATER.

IT IS PARTICULARLY IMPORTANT TO PROTECT THE EYES BECAUSE EVEN TINY AMOUNTS OF BATTERY ACID MAY CAUSE BLINDNESS.

IF THE FLUID GETS INTO CONTACT WITH THE EYES, WASH WITH ABUNDANT WATER FOR FIFTEEN MINUTES AND CONSULT AN EYE SPECIALIST IMMEDIATELY.

THE BATTERY RELEASES EXPLOSIVE GASES. KEEP IT AWAY OF FLAMES, SPARKS, CIGARETTES OR ANY OTHER HEAT SOURCE.

ENSURE ADEQUATE VENTILATION WHEN SERVICING OR RECHARGING THE BATTERY.

KEEP OUT OF THE REACH OF CHILDREN.

BATTERY FLUID IS CORROSIVE. DO NOT POUR OR SPREAD IT ESPECIALLY ON PLASTIC PARTS.

ENSURE THAT THE ELECTROLYTIC ACID IS COMPATIBLE WITH THE BATTERY BEING ACTIVATED.

2.1.2 maintenance instructions

GENERAL PRECAUTIONS AND INFORMATION

When repairs, disassembly and reassembly of the vehicle is carried out, follow the following recommendations strictly.

BEFORE REMOVING COMPONENTS

- Remove the dirt, mud, dust and foreign objects from the vehicle before disassembling components. Wherever required, use the special tools designed for this vehicle.

COMPONENTS REMOVAL

- Do not loosen and/or tighten the screws and nuts using pliers or other tools, but always use the specific wrench.
- Mark the positions on all the connection joints (hoses, cables, etc.) before separating them and identify them with different distinctive marks.
- Each piece should be clearly marked in order to be identified during the installation phase.
- Carefully clean and wash the disassembled components with detergents with a low flammability grade.
- Keep the coupled parts together because they have "adapted" to one another following normal wear.
- Some components must be used together or replaced entirely.
- Keep away from heat sources.

REASSEMBLING THE COMPONENTS

WARNING



THE BEARING MUST ROTATE FREELY, WITHOUT JAMMING AND/OR NOISE, OTHERWISE THEY MUST BE REPLACED.

- Only use ORIGINAL **Moto Guzzi** SPARE PARTS.
- Always use the recommended lubricants and consumable material.
- Lubricate the parts (when possible) before reassembling them.
- When tightening screws and nuts, begin with the larger diameter or internal ones, proceeding diagonally. Tighten with subsequent steps before applying the prescribed torque.
- Always replace the locknuts, gaskets, seal rings, snap rings, O-Rings (OR), cotter pins and screws if they have damaged thread, with new ones.
- When disassembling the bearings, lubricate them abundantly.
- Ensure that each component has been assembled correctly.
- After a repair or periodic maintenance operation, carry out the preliminary checks and test the vehicle on private property or in an area with light traffic.
- Clean all coupling surfaces, oil seal rims and gaskets before refitting them. Smear a light layer of lithium-based grease on the oil seal rims. Reassemble oil seals and bearings with the brand or lot number facing outward (visible side).

ELECTRICAL CONNECTORS

The electrical connectors should be disconnected as follows. Failure to observe these procedures will cause irreparable damage to the connector and the wiring:

If present, press on the specific safety catches.

- Grip the two connectors and unplug them, pulling them apart in opposite directions.
- If there is dirt, rust, moisture, etc., carefully clean the inside of the connector using pressurised air.
- Ensure that the cables make correct contact with the terminals inside the connectors.
- Then plug in the two connectors, ensuring correct coupling (if the specific catches are present, you will hear a typical "click").

WARNING

TO UNPLUG THE TWO CONNECTORS, DO NOT PULL ON THE CABLES.

N.B

THE TWO CONNECTORS CAN BE PLUGGED IN ONLY IN ONE DIRECTION, THEREFORE JOIN THEM TOGETHER IN THE RIGHT DIRECTION.

TIGHTENING TORQUES

ATTENTION

REMEMBER THAT THE TIGHTENING TORQUE FOR ALL THE FIXING ELEMENTS LOCATED ON WHEELS, BRAKES, WHEEL AXLES AND OTHER SUSPENSION COMPONENTS PLAY A FUNDAMENTAL ROLE IN GUARANTEEING THE SAFETY OF THE VEHICLE AND MUST BE KEPT AT THE PRESCRIBED VALUES.

REGULARLY CHECK THE TIGHTENING TORQUE OF THE FIXING ELEMENTS AND ALWAYS USE A TORQUE WRENCH WHEN REFITTING.

IF THESE WARNINGS ARE NOT OBSERVED, ONE OF THESE COMPONENTS COULD LOOSEN AND COME OFF, BLOCKING A WHEEL OR CAUSING OTHER PROBLEMS THAT WOULD COMPROMISE MANOEUVRABILITY, LEADING TO A CRASH WITH THE RISK OF SERIOUS INJURY OR EVEN DEATH.

2.2 Running-in

Running the engine in correctly is essential for ensuring engine longevity and functionality. Twisty roads and gradients are ideal for running in the engine, brakes and suspension effectively. Vary your riding speed during the running in period. This ensures that components operate in "loaded" conditions and then "unloaded" conditions, allowing the engine components to cool.

ATTENTION

THE CLUTCH MAY EMIT A SLIGHT BURNING SMELL WHEN FIRST USED. THIS PHENOMENON SHOULD BE CONSIDERED NORMAL AND WILL DISAPPEAR AS SOON AS THE CLUTCH PLATES GET ADAPTED.

IT IS IMPORTANT TO STRAIN ENGINE COMPONENTS DURING RUN-IN, HOWEVER, MAKE SURE NOT TO OVERDO THIS.

WARNING

THE FULL PERFORMANCE OF THE VEHICLE IS ONLY AVAILABLE AFTER PERFORMING THE SERVICE AT THE END OF THE RUNNING IN PERIOD.

Follow these guidelines:

- Do not fully open the throttle grip abruptly at low engine speeds, either during or after the running in period.
 - During the first 100 Km (62 miles) use the brakes gently, avoiding sudden or prolonged braking. This allows the brake pad friction material to bed in correctly with the brake discs.
-

ATTENTION

AFTER THE SPECIFIED MILEAGE, TAKE THE VEHICLE TO AN OFFICIAL Moto Guzzi DEALER FOR THE CHECKS INDICATED IN THE "AFTER RUN-IN" TABLE IN THE SCHEDULED MAINTENANCE SECTION TO AVOID INJURING YOURSELF, OTHERS AND /OR DAMAGING THE VEHICLE.

2.3 vehicle identification

SERIAL NUMBER LOCATION

These numbers are necessary for vehicle registration.

WARNING

ALTERING IDENTIFICATION NUMBERS MAY BE SERIOUSLY PUNISHABLE BY LAW. IN PARTICULAR, MODIFYING THE CHASSIS NUMBER IMMEDIATELY VOIDS THE WARRANTY.

FRAME NUMBER

The chassis number is stamped on the RH side of the headstock.

This number consists of numbers and letters, as in the example shown below.

ZGUGMLX000XYZZZZZZ

Key:

ZGU: WMI (World Manufacturer Identifier) code;

ML : model;

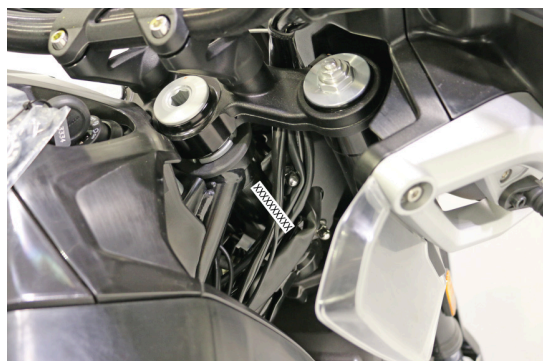
X00 : variant version (A00 / B00 / E00);

0 : free digit

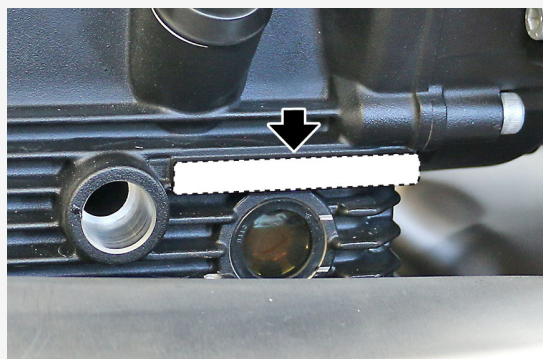
X: variable year of manufacturer (G - for 2019)

Y: Production plant (S = Scorzè - VE / M = Mandello del Lario - LC / OR = unknown);

ZZZZZZ : serial number (6 digits);

**ENGINE NUMBER**

The engine number is stamped on the left side, close to the engine oil level check cap.



2.4 Dimensions and mass

DIMENSIONS AND MASS

Maximum length (V85 TT - V85 TT Travel)	2245 mm (88.39 in)
Maximum length (V85 TT Strada)	2,185 mm (86.02 in)
Maximum width (V85 TT - V85 TT Travel)	955 mm (37.60 in)
Maximum width (V85 TT Strada)	870 mm (34.25 in)
Height (with adjustable windshield) (V85 TT - V85 TT Strada)	1360 - 1420 mm (53.54 - 55.91 in)

DIMENSIONS AND MASS	
Height (with adjustable windshield) (V85 TT Travel)	1410 - 1470 mm (55.51 - 57.87 in)
Wheelbase	1525 mm (60.04 in)
Kerb weight (V85 TT)	230 kg (507.06 in)
Kerb weight (V85 TT Travel)	243 kg (535.72 in)
Kerb weight (V85 TT Strada)	226 kg (498.24 in)

2.5 Engine

FUNCTION	DESCRIPTION / VALUE
Type	traverse-mounted twin-cylinder four-stroke V 90°
Number of cylinders	2
Engine capacity	853 cc (52.05 cu in)
Bore / stroke	84x77 mm (3.31x3.03 in)
Compression ratio	10.5 ± 0.5: 1
Ignition	Electric
Idle engine speed	1,250 +/- 100 (rpm)
Clutch	single disc dry clutch with flexible coupling
Lubrication system	pressure-fed, controlled by valves and trochoidal pump
Air filter	cartridge-type dry filter
Cooling	air

2.6 Transmission

TRANSMISSION

FUNCTION	DESCRIPTION / VALUE
Primary drive	with gears, ratio: 18/23 = 1 : 1,277
Gear ratios, 1st gear	16 / 39 = 1: 2,437

FUNCTION	DESCRIPTION / VALUE
Gear ratios, 2nd gear	18 / 32 = 1: 1,777
Gear ratios, 3rd gear	21 / 28 = 1: 1,333
Gear ratios, 4th gear	24 / 26 = 1: 1,083
Gear ratios, 5th gear	25 / 24 = 1: 0,96
Gear ratios, 6th gear	27 / 24 = 1 : 0,888
Final drive	with shaft, ratio 8 / 33 = 1 : 4,125

GEARBOX

FUNCTION	DESCRIPTION / VALUE
Type	mechanical, 6 speeds with foot lever on the left hand side of the engine

2.7 Capacity

CAPACITY	
Fuel tank capacity (including reserve)	23 +/- 1 l (5.06 +/- 0.22 UK gal; 6.08 +/- 0.26 US gal)
Fuel tank reserve capacity	5 +/- 0.5 l (1.10 +/- 0.11 UK gal; 1.32 +/- 0.13 US gal)
Engine oil	Oil change and oil filter replacement: 1760 cm ³ (107.40 cu.in)
Gearbox oil	700 cc (42.72 cu in)
Bevel gear set oil	180 cm ³ (10.98 cu.in)
Bevel gear oil (in case of replacement)	130 cc (7.93 cu in) MAX
Seats	2
Maximum carrying load (V85 TT)	462 kg (1018.54 lb) (rider + passenger + luggage)
Maximum carrying load (V85 TT Travel)	462 kg (1018.54 lb) (rider + passenger + luggage)

CAPACITY

Maximum carrying load (V85 TT Strada)	462 kg (1018.54 lb) (rider + passenger + luggage)
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2.8 Electrical system**ELECTRICAL SYSTEM**

FUNCTION	DESCRIPTION / VALUE
Battery	12 V – 12 Ah
Fuses	30 - 20 - 15 (3) - 7.5 (4) A
Permanent magnet alternator	12V - 430W

BULBS

FUNCTION	DESCRIPTION / VALUE
High beam/low beam light	LED
Fog lights	LED
Front DRL	LED
Turn signal lights	LED
Rear running light / brake light	LED
Dashboard lighting	LED

INDICATOR LAMPS

FUNCTION	DESCRIPTION / VALUE
Gearbox in neutral	LED
High beam headlight	LED
Cruise control warning light	LED
ABS warning light	LED
MIL indicator light	LED
Turn indicators	LED
Overspeed threshold / gear shift warning lights	LED

FUNCTION	DESCRIPTION / VALUE
Immobilizer warning light	LED
Fuel reserve	LED
MGCT warning light	LED
General alarm	LED
Daytime running lights warning light	LED
Side stand warning light	LED

SPARK PLUGS

FUNCTION	DESCRIPTION / VALUE
Standard	NGK IR MR8BI-8
Spark plug electrode gap	0.8 mm (0.031 in)
Resistance	7.5 KOhm (MAX)

2.9 Frame and suspension

CHASSIS

FUNCTION	DESCRIPTION / VALUE
Type	high strength tubular steel frame
Steering rake angle	25,7°
Trail	128.3 mm (5.05 in)

SUSPENSION

FUNCTION	DESCRIPTION / VALUE
Front	hydraulic telescopic fork, Ø 41 mm (1.61 in)
Travel	168 mm (6.61 in)
Rear	Swingarm in die-cast light alloy with 1 shock absorber with adjustable spring pre-loading and hydraulic brake extension.
Travel	102 mm (4.02 in)

2.10 Brakes

FUNCTION	DESCRIPTION / VALUE
Front	Ø 320-mm (12.59 in) stainless steel floating disc, calliper with 4 Ø 32 mm (1.26 in) counteracting plungers
Rear	260 mm (10.24 in) stainless steel disc, floating calliper with two 22 mm (0.87 in) diameter pistons

2.11 Wheels and tyres

WHEEL RIMS

WHEEL RIMS	
Type (V85 TT - V85 TT Travel)	alloy, with spokes
Type (V85 TT Strada)	alloy monoliths, spoked
Front	2.5" x 19"
Rear	4.25" x 17"

TYRES

FUNCTION	DESCRIPTION / VALUE
Front	110 / 80 R19 59V
Tyre pressure	2.5 bar (250 kPa) (36.26 PSI)
Rear	150 / 70 R17 69V
Tyre pressure	2.8 bar (280 Kpa) (40.61 PSI)
ATTENTION	When using anti-skid wheels it is recommended to decrease the inflation pressure by 0.2 bar (20 Kpa) (2.90 PSI) at the front and 0.3 bar (30 Kpa) (4.35 PSI) at the rear.

2.12 Power feed

FUNCTION	DESCRIPTION / VALUE
Type	Electronic injection (E4: Marelli 7SM2 - E5: Marelli 11MP)
Diffuser	Ø 52 mm (2.05 in)
Fuel	Unleaded gasoline E10 (95 R.O.N.)

2.13 Tightening torques

If the following tables do not expressly indicate the tightening torque values, refer to the table with the generic torque values indicated below.

SELF-TAPPING SCREW TORQUES FOR PLASTIC

	2.9 mm	3.9 mm	4.2 mm	4.9 mm
Tightening torque:	1 Nm (0.73 lbf ft)	1.5 Nm (1.10 lbf ft)	2 Nm (1.47 lbf ft)	2.5 Nm (1.84 lbf ft)

METRIC SCREW TIGHTENING TORQUES

	M4	M5	M6	M8	M10	M12
Tightening torque:	3 Nm (2.21 lbf ft)	5.5 Nm (4.05 lbf ft)	9.5 Nm (7.00 lbf ft)	25 Nm (18.43 lbf ft)	50 Nm (36.87 lbf ft)	80 Nm (59.00 lbf ft)

METRIC SCREW TIGHTENING TORQUES ON FASTENERS WITH PLASTIC COMPRESSION WITHOUT INSERTED COLLAR OR BUSH

	M4	M5	M6
Tightening torque:	1.5 Nm (1.10 lbf ft)	2 Nm (1.47 lbf ft)	3 Nm (2.21 lbf ft)

WARNING

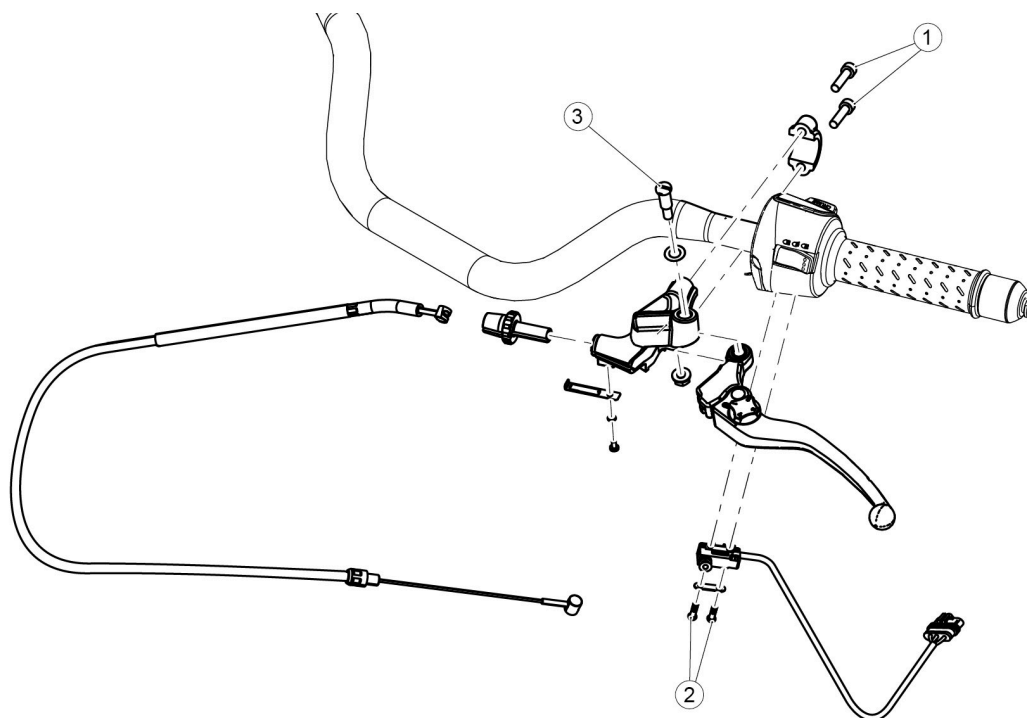


THE SCREWS WITH THREAD-LOCK SEALANT (PRE-IMPREGNATED) MUST BE REPLACED WITH NEW SCREWS AFTER THEY HAVE BEEN LOOSENED.

BEFORE FITTING THE NEW SCREWS, CLEAN THE THREADED HOLES CAREFULLY, MAKING SURE THAT ALL TRACES OF THE OLD THREAD-LOCK SEALANT HAVE BEEN ELIMINATED.

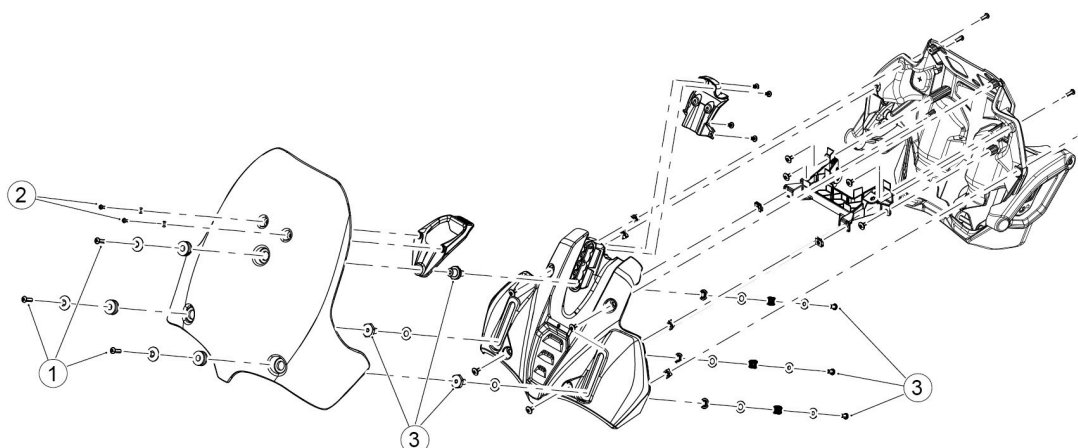
2.13.1 Chassis architecture

2.13.1.1 Front of vehicle

CLUTCH CONTROL

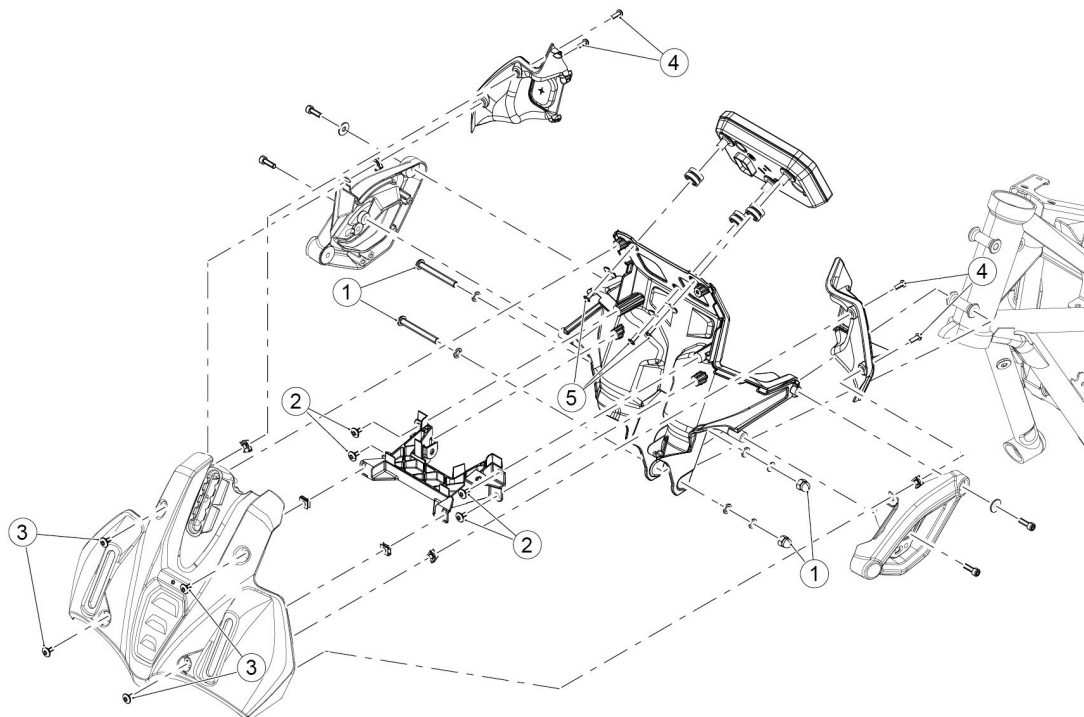
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fixing the clutch command unit to the handlebar	M6	2	10 ± 1,5 Nm (7.38 ± 1.11 lbf ft)	Respect the reference marking on the handlebar
2	Screws fixing the clutch switch to clutch control lever	M2	2	-	Manual
3	Clutch control lever fastening screw	M4	1	8 ± 0.8 Nm (5.9 ± 0.59 lb ft)	Pre-assembled screw on the control

TOP FAIRING-WINDSHIELD



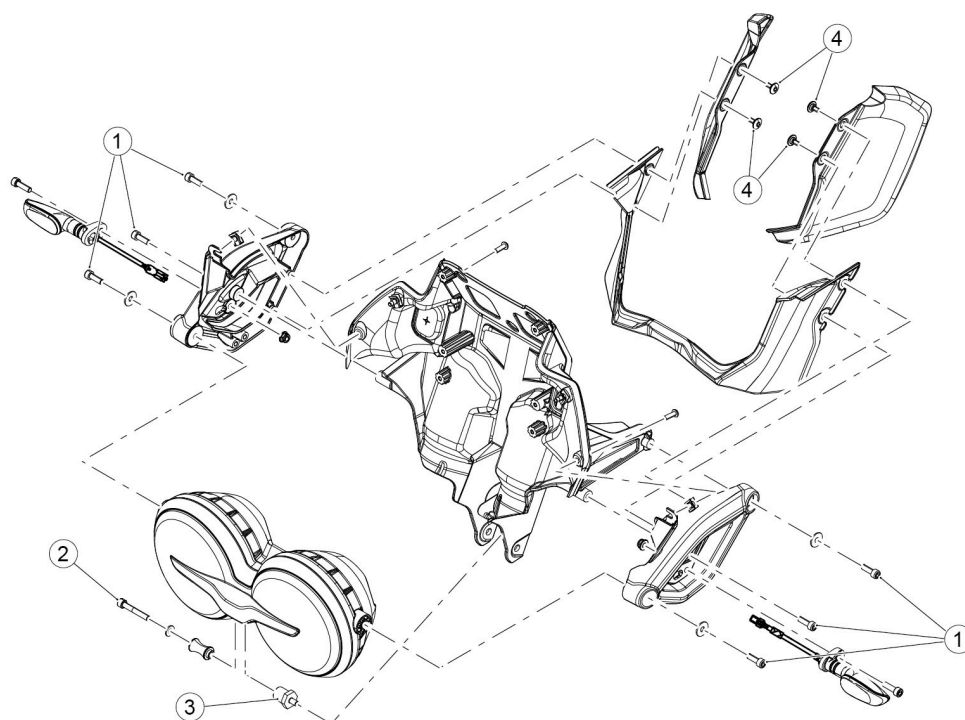
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Windshield fixing screw	M6	3	8 ± 1.6 Nm (5.9 ± 1.18 lb ft)	-
2	Windshield adjustment handle fixing screw	M4	2	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-
3	Fixing of windshield support pins to fairing front	M6	3	8 ± 1.6 Nm (5.9 ± 1.18 lb ft)	-

INSTRUMENT



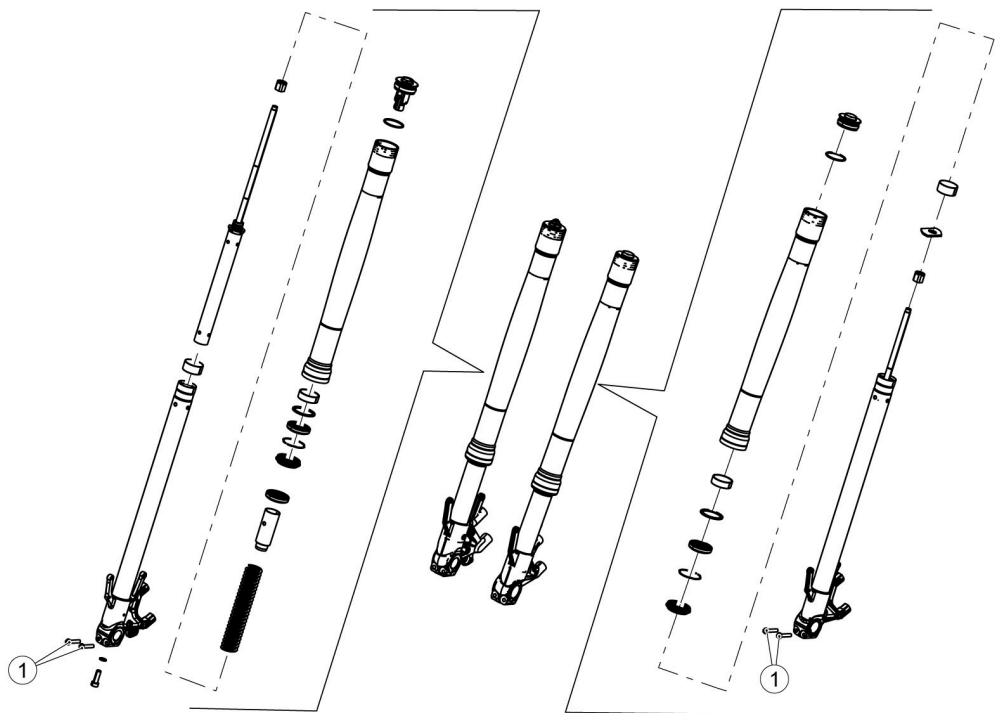
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screw fixing instrument cluster support to frame	M8	2	25 ± 5 Nm (18.44 ± 3.69 lb ft)	Screws with blank nuts
2	Screw fixing the support bracket to the instrument cluster support	M5	4	6 ± 1.2 Nm (4.43 ± 0.89 lb ft)	-
3	Fairing front fastening screw	M5	4	6 ± 1.2 Nm (4.43 ± 0.89 lb ft)	-
4	Internal cover right and left fixing screw to the fairing front	M5	2 + 2	6 ± 1.2 Nm (4.43 ± 0.89 lb ft)	-
5	Fixing screw for TFT instrument panel	SWP 4.9	3	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-

FRONT LIGHTS



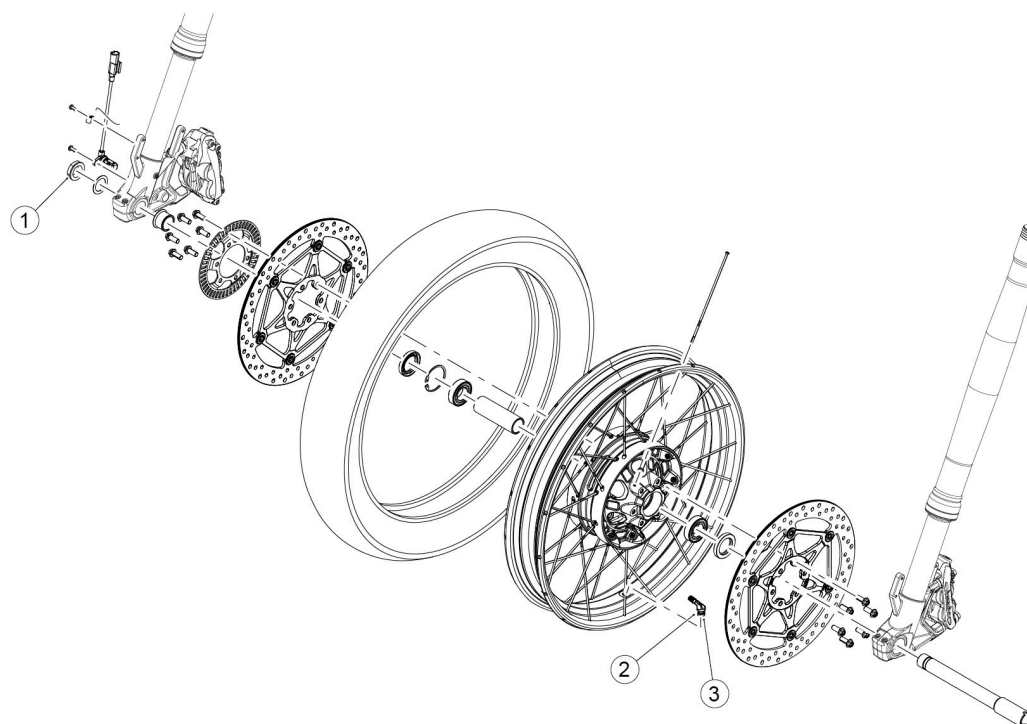
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Right and Left headlamp support fixing screws	M6	6	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
2	Headlamp lower fastening screw	M6	1	8 ± 1,6 Nm (7.38 ± 1.18 lbf ft)	-
3	Front headlight lower fixing pin fastening screw	M6	1	8.5 ± 1,7 Nm (5.90 ± 1.25 lbf ft)	-
4	Right and Left front spoiler and deflectors fastening screws	M5	4	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-

FRONT FORK



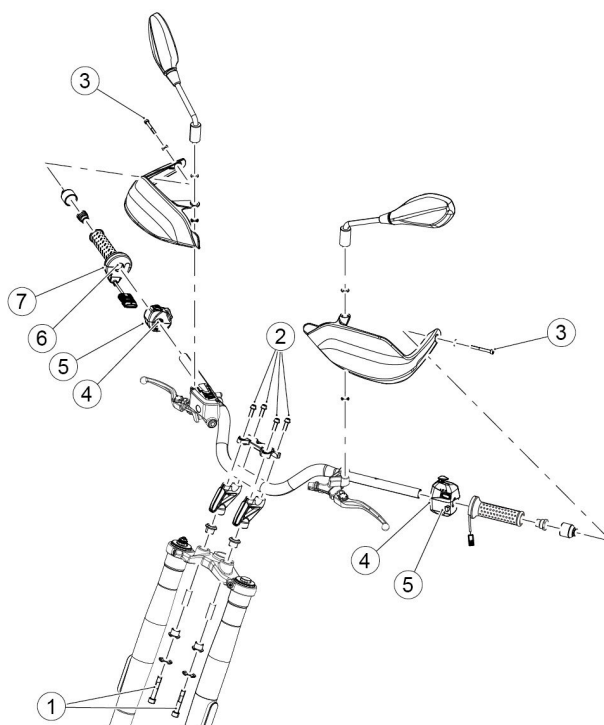
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Calliper mounting bracket fastening screw	M6	4	10 ± 1,5 Nm (7.38 ± 1.11lbf ft)	-

FRONT WHEEL



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Nut fastening the front wheel axle	M25x1.5	1	80 ± 8 Nm (59.01 ± 5.90 lbf ft)	-
2	TPMS valve retaining nut	-	1	4.7 ± 0.25 Nm (3.47 ± 0.18 lb ft)	Only if the TPMS system is present on the vehicle
3	TPMS sensor retaining screw	-	1	1.3 ± 0.05 Nm (0.96 ± 0.037 lb ft)	Only if the TPMS system is present on the vehicle

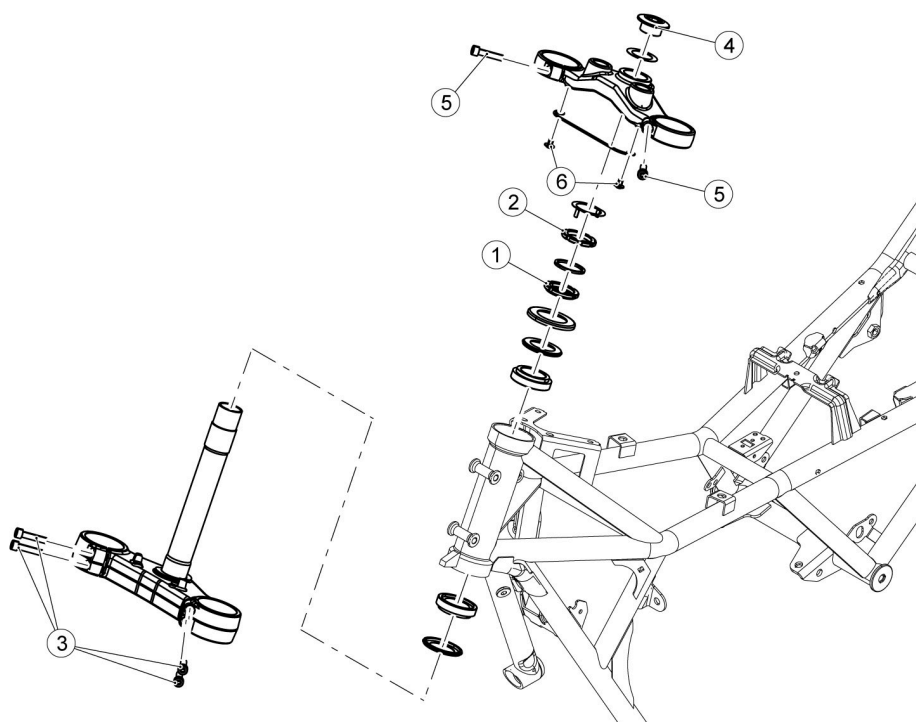
HANDLEBAR-CONTROLS



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the lower U-bolts to the upper steering yoke	M10	2	50 ± 7.5 Nm (36.88 ± 5.53 lb ft)	-
2	Screws fastening the lower U-bolt clamp to the handlebar	M8	4	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)	-
3	Screws fastening the handguards and anti-vibration weights to the handlebar	M6	2	10 ± 2 Nm (7.38 ± 0.87 lbf ft)	-
4	Switch unit fastening screws (internal clamp)	M5	1 + 1	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	Screws pre-mounted on the shell
5	Switch unit fastening screws (external shell)	Self-tapping	2 + 2	1.4 ± 0.2 Nm (1.03 ± 0.15 lbf ft)	Screws pre-mounted on the shell
6	Fastening screws of the electronic throttle control to the handlebar	M4	1	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	Screw pre-mounted on the shell

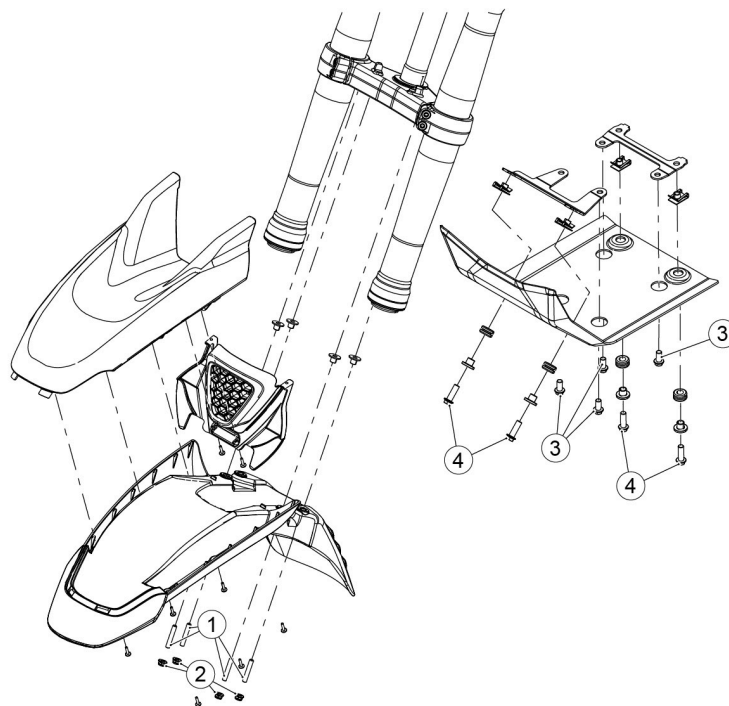
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
7	Fastening screw of the electronic throttle control to the handlebar (external shell)	Self-tapping	2	$2.2 \pm 0,44$ Nm (1.62 ± 0.32 lbf ft)	Screws pre-mounted on the shell

STEERING BEARINGS



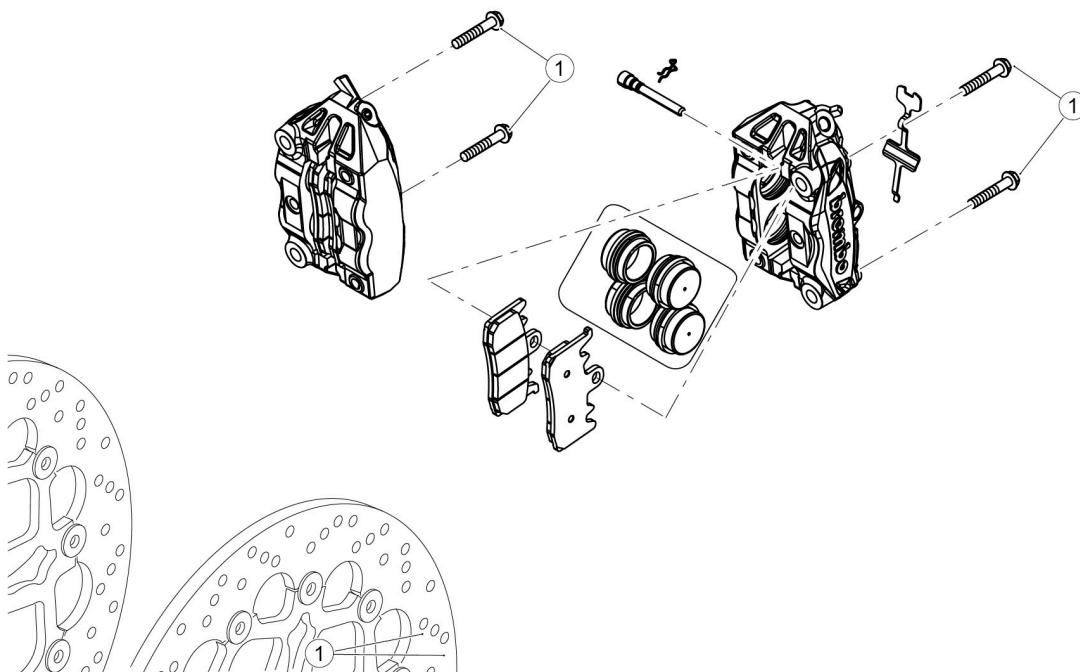
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Ring nut fastening the bottom yoke/steering pin assembly to the headstock	-	1	-	Initial tightening torque 60 Nm (44.25 lb ft) - Second tightening torque 30 Nm (22.13 +/- lbf ft)
2	Counter-lock ring fastening the bottom yoke/steering pin assembly to the headstock	-	1	-	Manual

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
3	Screw fastening the fork stanchions to the lower steering yoke	M8	4	25 ± 2.5 Nm (18.44 ± 1.84 lb ft)	-
4	Top steering yoke fastener bush	-	1	100 ± 10 Nm (73.76 ± 7.38 lb ft)	-
5	Screw fastening the fork stanchions to the upper steering yoke	M8	2	25 ± 2.5 Nm (18.44 ± 1.84 lb ft)	-
6	Screws fastening the cable gland to the upper steering yoke	M6	2	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-

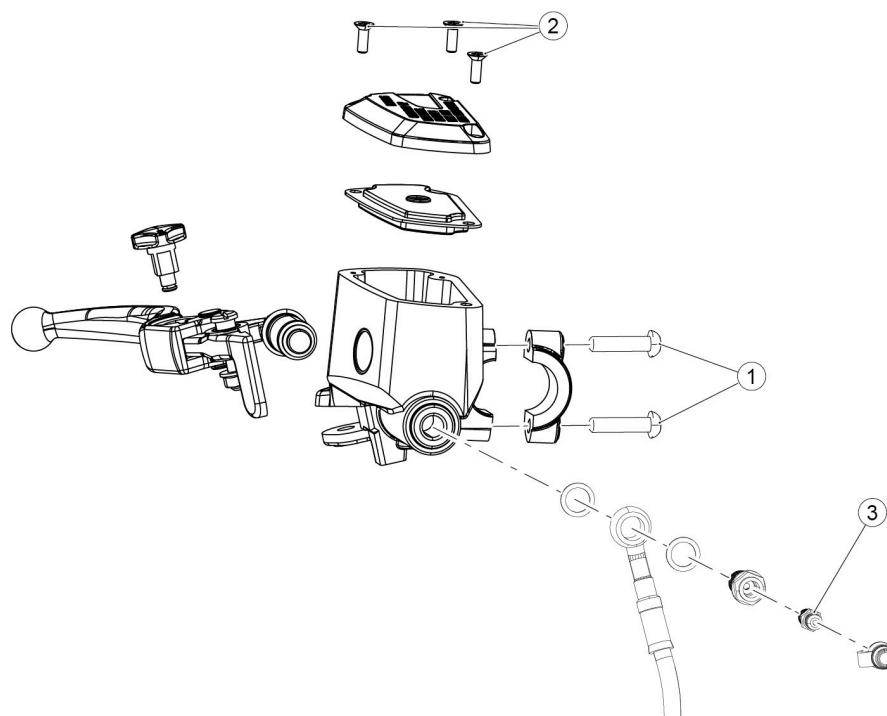
FRONT MUDGUARD - ENGINE FAIRING

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Stud bolt fastening the front mudguard to the lower steering yoke	M6	4	10 ± 2 Nm (7.38 ± 0.87 lbf ft)	-
2	Nuts fastening the front mudguard to the lower steering yoke	M6	4	10 ± 2 Nm (7.38 ± 0.87 lbf ft)	-
3	Screws fastening the sump guard to the engine	M8	4	25 ± 5 Nm (18.44 ± 3.69 lb ft)	Loctite 243
4	Screws fastening the sump guard to the sump guard support bracket	M8	4	15 ± 3 Nm (11.06 ± 2.21 lb ft)	Loctite 243

FRONT BRAKE CALLIPER

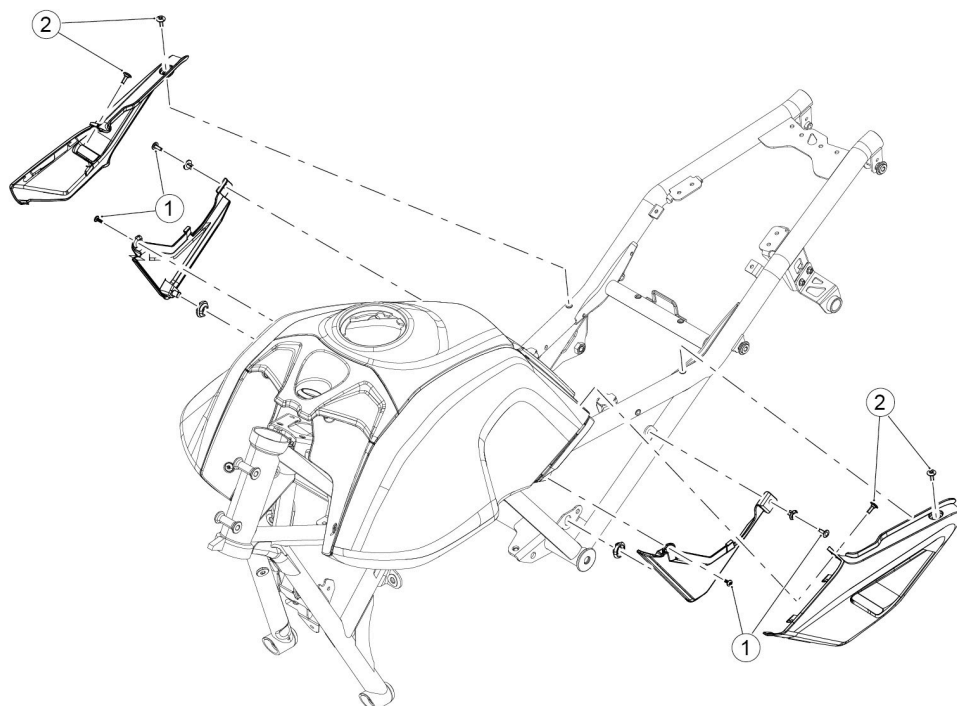


POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the front brake calliper to the calliper mounted bracket	M10	4	50 ± 5 Nm (36.88 ± 3.69 lbf ft)	-

FRONT BRAKE MASTER CYLINDER

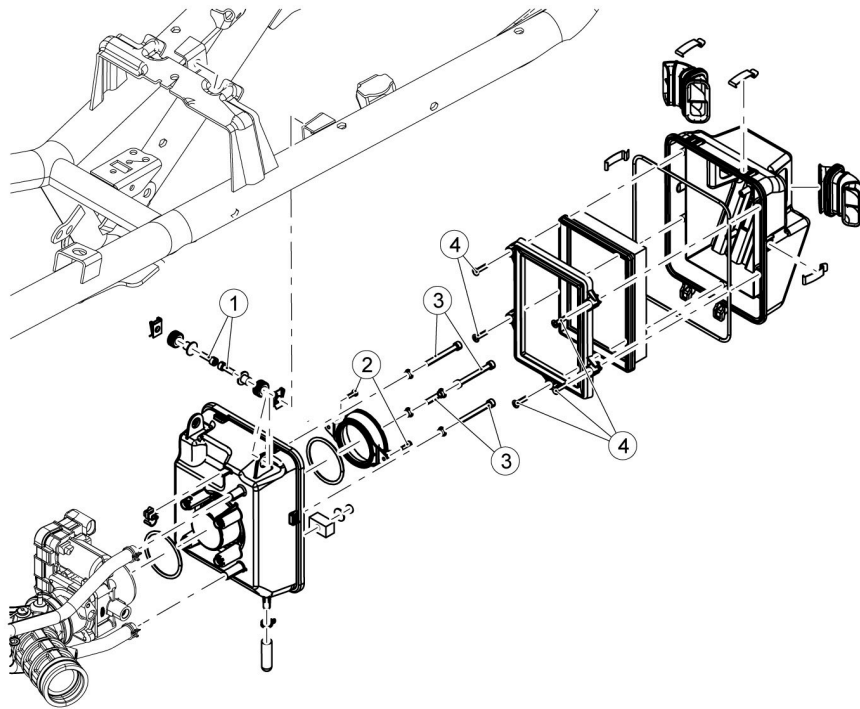
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the front brake master cylinder clamp to the handlebars	M6	2	10 ± 1,5 Nm (7.38 ±1.11 lbf ft)	Screws pre-assembled on the master cylinder
2	Brake pump cover fixing screws	-	3	0.8-1.5 Nm (0.59-1.11 lb ft)	Screws pre-assembled on the master cylinder
3	Bleeder screw	-	1	4-7 Nm (2.95-5.16 lb ft)	-
-	Fastening screw of the brake pipe to the lower steering plate	M6	1	10 ± 2 Nm (7.38 ± 0.87 lbf ft)	-

2.13.1.2 Centre of vehicle

CENTRAL BODYWORK

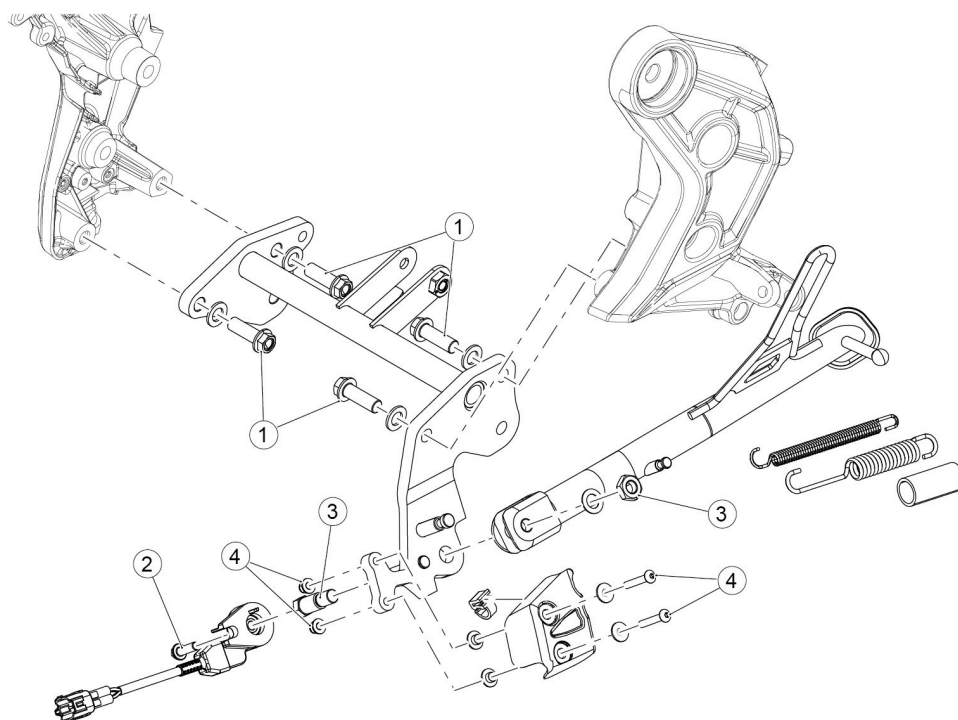
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Fastening of the internal side panels to the frame	Plastic rivet	2+2	-	-
2	Screws fastening the side panels to the frame	M5	2+2	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-

FILTER HOUSING



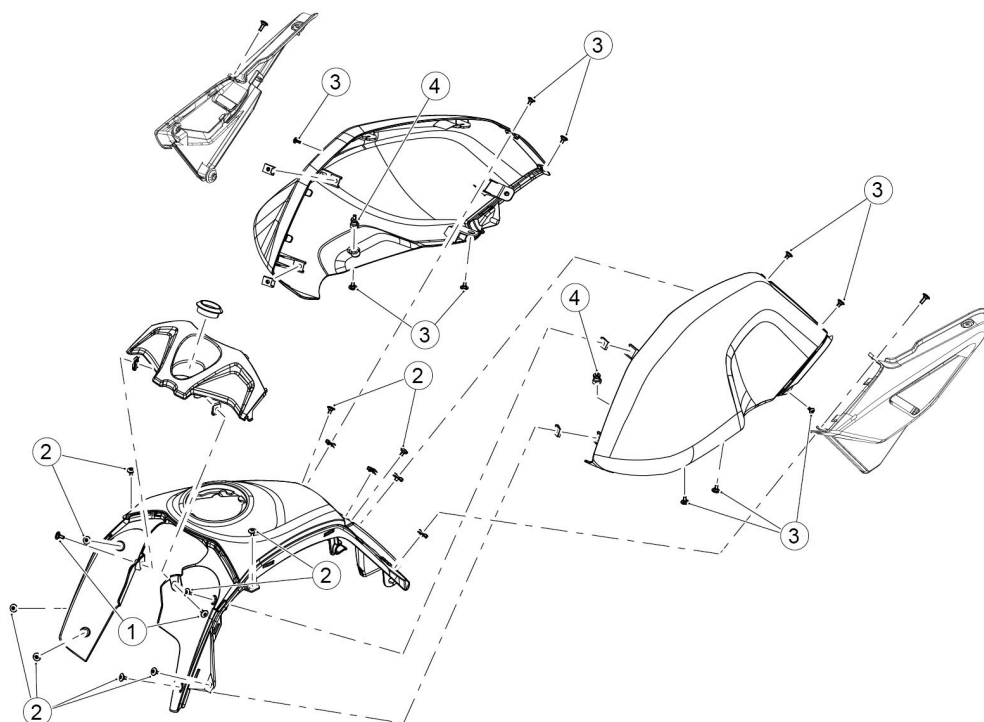
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the filter housing to the frame	M6	2	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
2	Screws fastening the intake duct to the filter casing cover	SWP 4.2	2	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-
3	Screws fastening the throttle body to the filter casing cover	M6	4	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
4	Screws fastening the air filter to the filter casing	SWP 4.9	5	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-

STAND



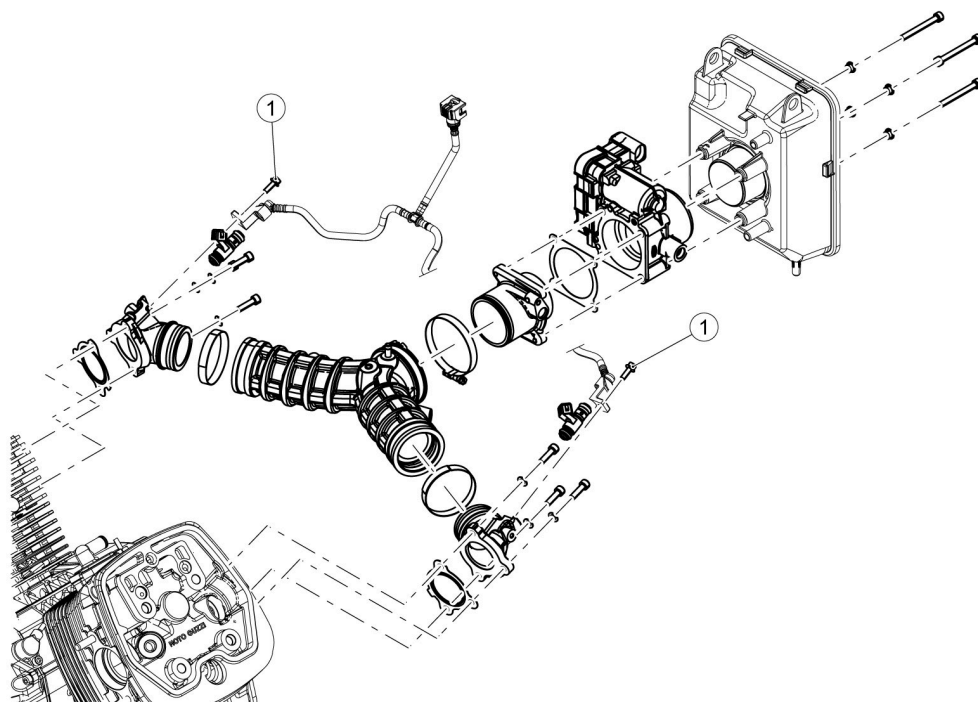
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the stand mounting to the frame	M10	4	50 ± 7.5 Nm (36.88 $\pm$ 5.53 lb ft)	Loctite 243
2	Stand sensor fastening screw	M6	1	10 ± 2 Nm (7.38 $\pm$ 1.48 lb ft)	
3	Fixing of side stand to support	M10 x 1.25	4	30 ± 4.5 Nm (22.13 $\pm$ 3.32 lb ft)	-
4	Screws fixing the side stand protection to the support	M5	2	6 ± 1.2 Nm (4.43 $\pm$ 0.89 lb ft)	Flanged self-locking nuts

FUEL TANK COVER



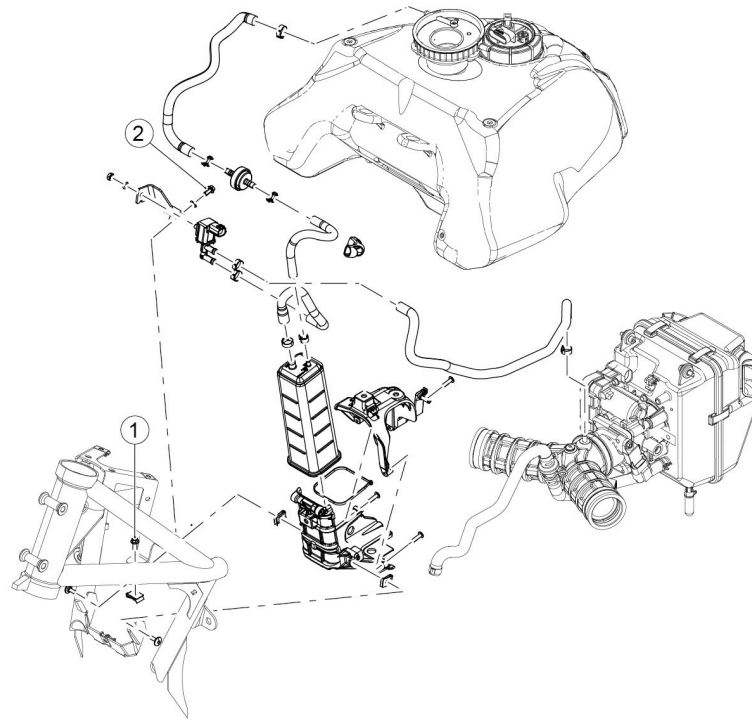
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Ignition block cover fastening screws to central cover	M5	2	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-
2	Central cover fixing screws to the fuel tank	M5	10	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-
3	Lower screws fastening the side cover to the fuel tank	M5	5+5	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-
4	Stud bolt fastening the side cover support to the fuel tank	M5	2	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-

THROTTLE BODY



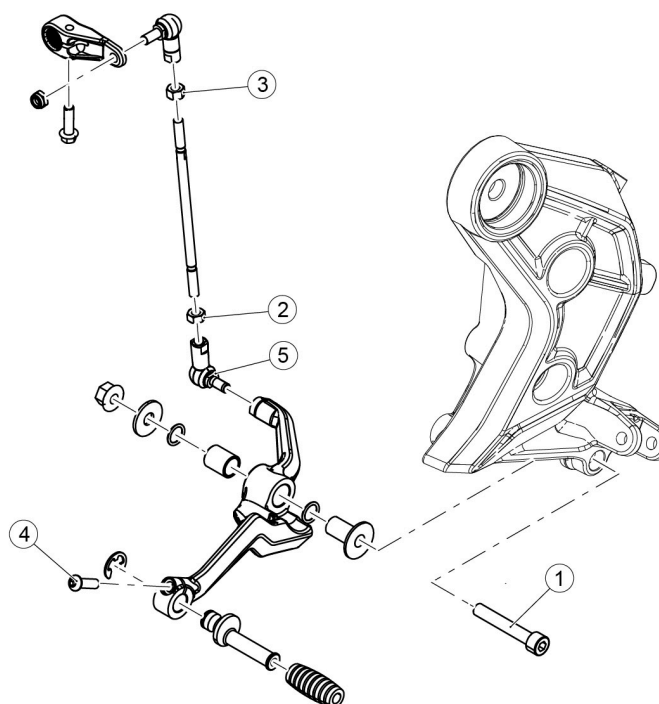
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screw fastening the injector caps to the intake fittings	-	2	6 ± 0.9 Nm (4.43 ± 0.66 lb ft)	-

PETROL VAPOUR RECOVERY SYSTEM



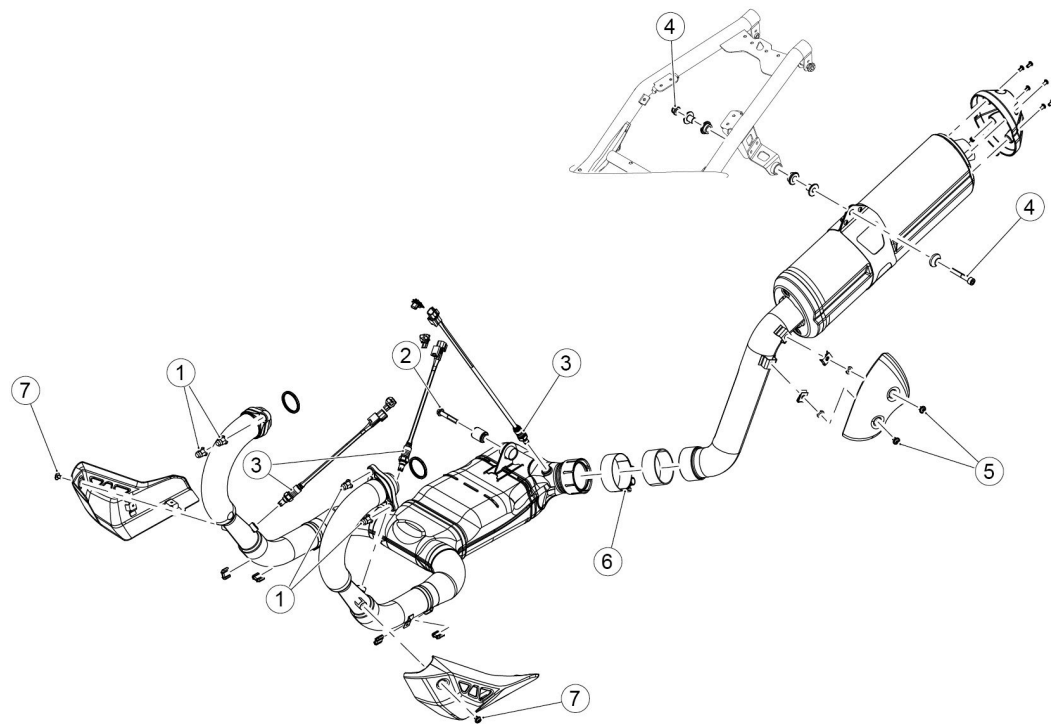
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screw fastening the coil support plate to the ABS system	M6	1	25 ± 5 Nm (18.44 ± 3.69 lb ft)	-
2	Screw fastening the PURGE valve support to the coil mount	M6	1	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-

GEARBOX LEVER

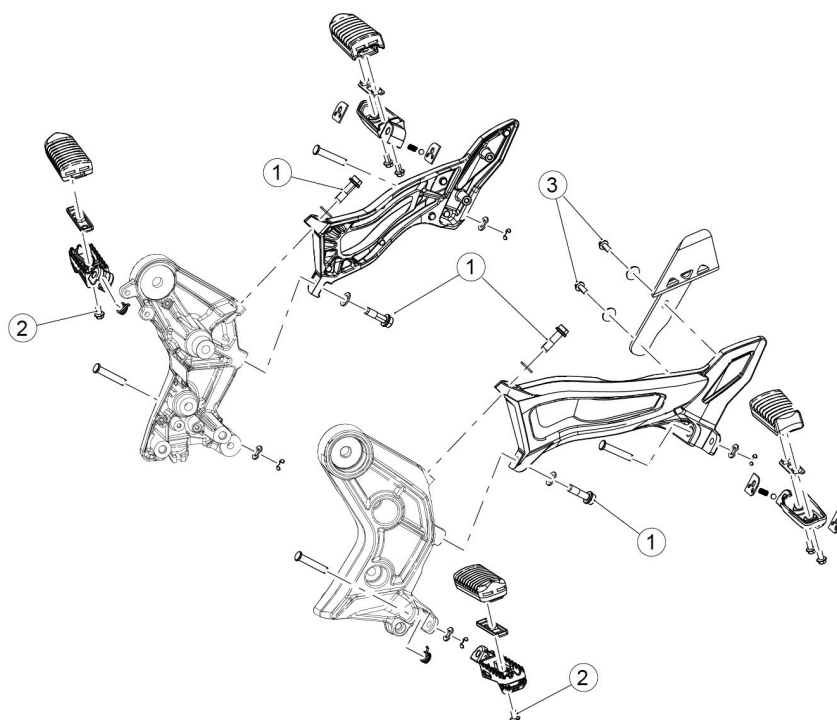


POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screw fastening left frame plate to the gearbox	M8	1	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)	-
2	Nut fastening the gear control linkage to the gear lever	M6	1	-	Manual with template
3	Nut fastening the gear control linkage to the pre-selector lever	M6	1	-	Manual with template
4	Peg fixing screw	M6	1	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
5	Pre-impregnated ball joint	M6	1	6.5 ± 1.3 Nm (4.79 ± 0.96 lb ft)	-

SILENCER - E5

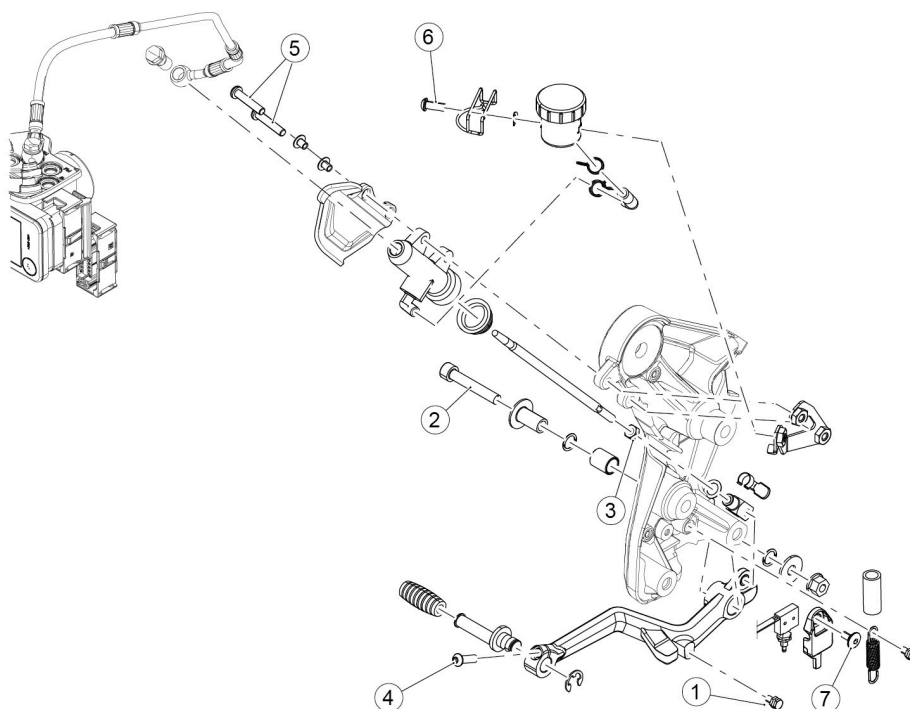


POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Nut fixing exhaust manifolds to engine	M8	2 + 2	25 ± 5 Nm (18.44 ± 3.69 lbf ft)	-
2	Fastening the exhaust manifold to the stand mount	M8	1	25 ± 5 Nm (18.44 ± 3.69 lbf ft)	-
3	Lambda probes fastener	M12 x 1.25	3	25 ± 5 Nm (18.44 ± 3.69 lbf ft)	-
4	Muffler/frame fastening	M8	1	25 ± 5 Nm (18.44 ± 3.69 lbf ft)	-
5	Screws fastening the muffler heat-shield to the muffler	M6	2	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
6	Clamp fixing the muffler to the compensator	-	1	25 ± 5 Nm (18.44 ± 3.69 lbf ft)	Apply grease to thread
7	Heat shield fixing screw to manifold	M6	1 + 1	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-

FOOTRESTS

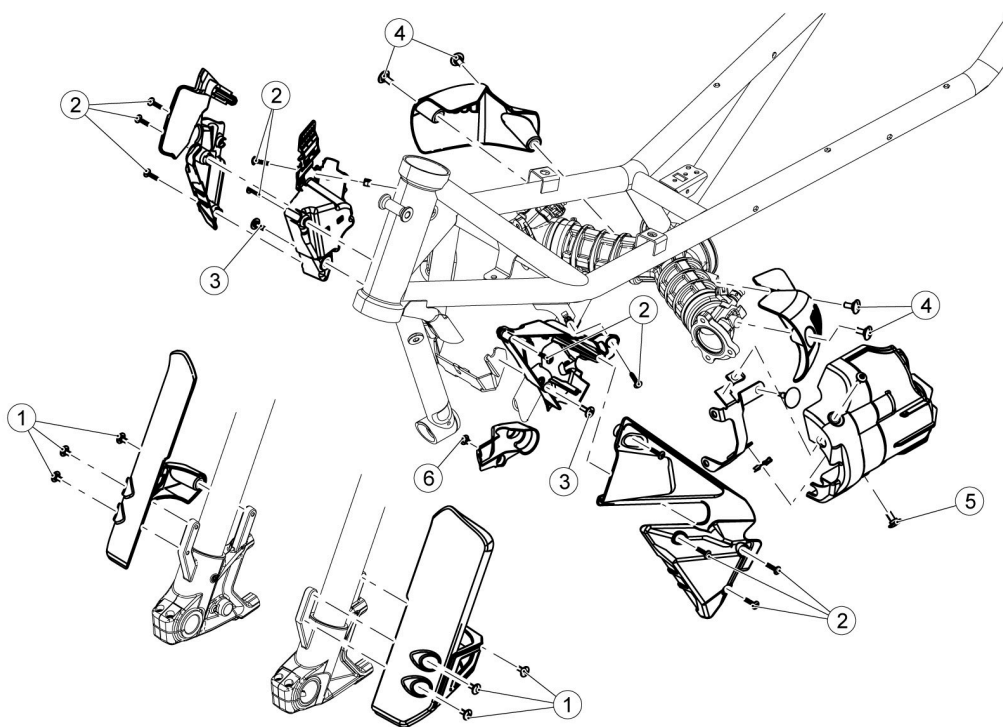
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws for fastening the passenger's footrest supports to the frame support	M8	4	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)	-
2	Screws fastening the footrest rubber to the footrest	M6	6	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
3	Screws fastening the passenger heel guard to the passenger footrest support	M6	2	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-

REAR BRAKE MASTER CYLINDER



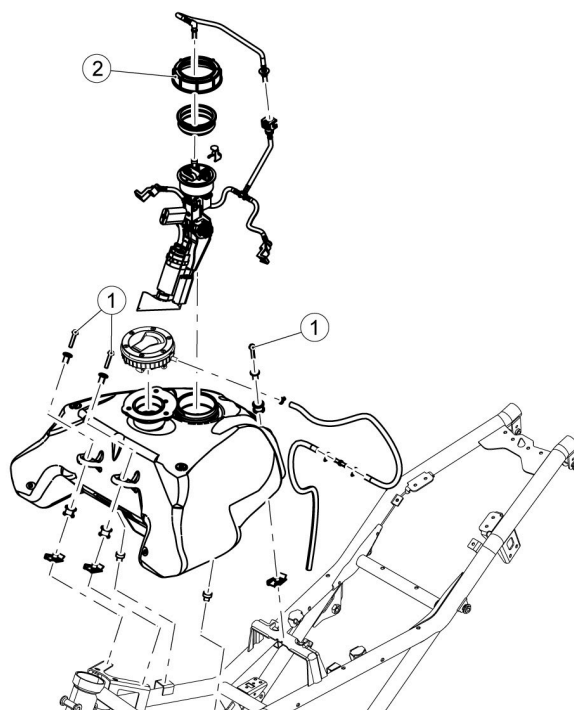
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Pin fastening the rear brake lever spring coupling to the frame plate	-	1	6 Nm $\pm$ 1.2 (4.43 $\pm$ 0.89 lbf ft)	-
2	Screw fastening the rear brake lever to the frame plate	M8	1	25 $\pm$ 3.75 Nm (18.44 $\pm$ 2.77 lb ft)	-
3	Nut fastening the rear master cylinder rod to the lever	M6	1	-	-
4	Peg fixing screw	M6	1	10 $\pm$ 1,5 Nm (7.38 $\pm$ 1.11 lbf ft)	-
5	Screws fastening the rear master cylinder and oil reservoir support to the frame plate	M6	2	10 $\pm$ 1,5 Nm (7.38 $\pm$ 1.11 lbf ft)	-

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
6	Screws fastening the oil reservoir and cap retainer to the oil reservoir support bracket	M6	1	6 Nm $\pm$ 1,2 (4.43 $\pm$ 0.89 lbf ft)	-
7	Screw fastening the rear stop switch to the right frame plate	M5	1	6 Nm $\pm$ 1.2 (4.43 $\pm$ 0.89 lbf ft)	-
-	Pin fastening the rear brake lever spring coupling to the complete rear brake lever	-	1	6 Nm $\pm$ 1.2 (4.43 $\pm$ 0.89 lbf ft)	-

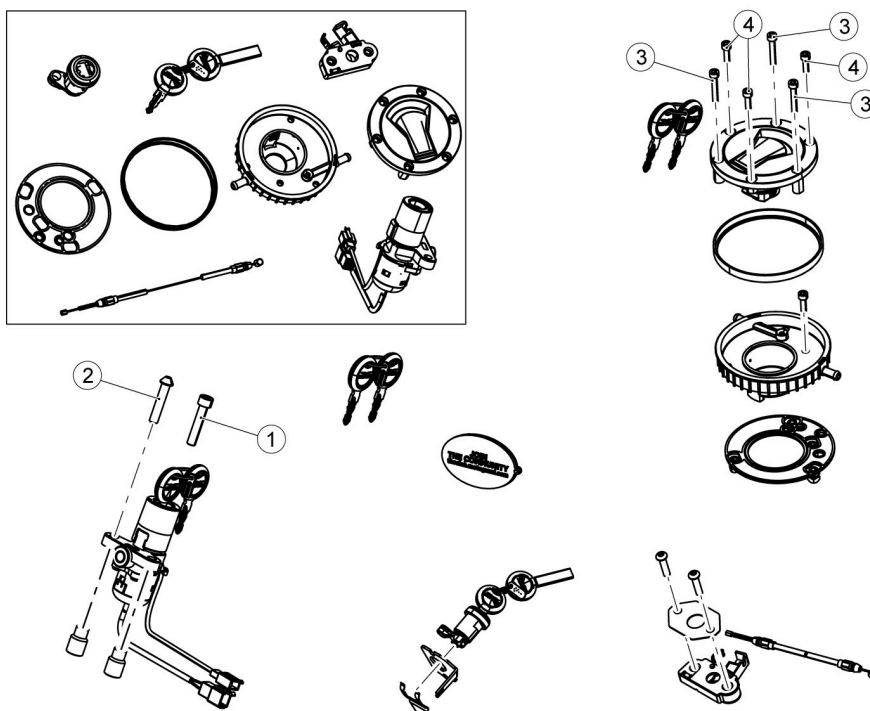
GUARDS

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the fork guards to the fork stanchions	M5	6	6 Nm $\pm$ 1.2 (4.43 $\pm$ 0.89 lbf ft)	-

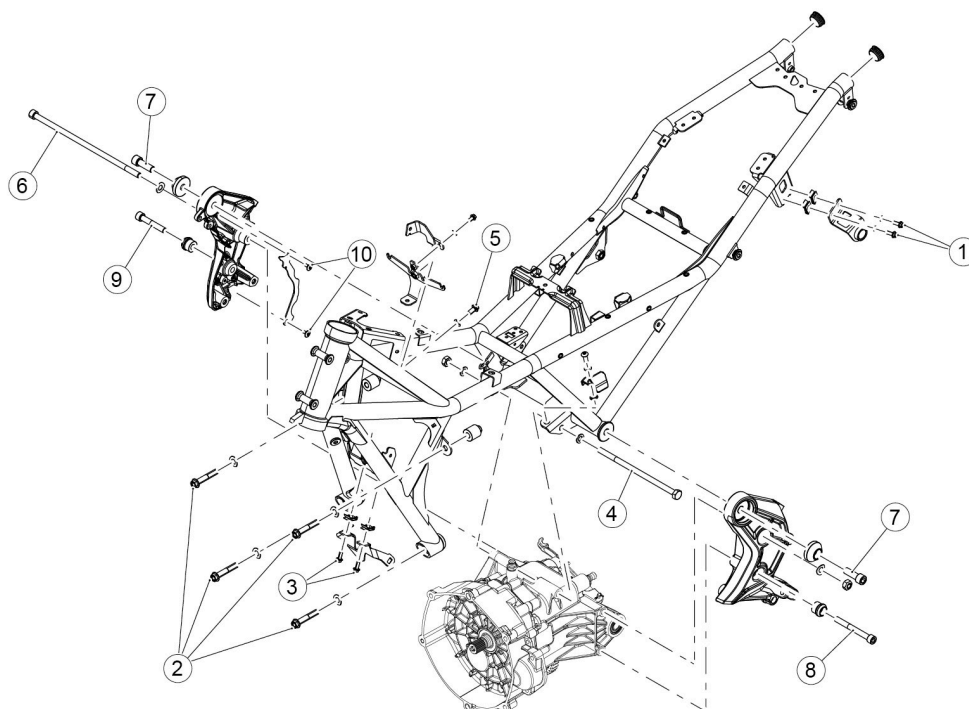
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
2	Screws fastening the headstock cover to the connectors box	SWP 2.9	7	3 ± 0.6 Nm (2.21 ± 0.44 lbf ft)	-
3	Lower screws fastening the connectors box to the frame	M5	2	6 Nm ± 1.2 (4.43 ± 0.89 lbf ft)	-
4	Pin fastening the rear brake lever spring coupling to the frame plate	M5	4	3 ± 0,6 Nm (2.21 ± 0.44 lbf ft)	-
5	Screws fastening the starter motor to the support bracket	M5	2	6 Nm ± 1.2 (4.43 ± 0.89 lbf ft)	-
6	Screw fastening the oil pressure sensor cover to the engine	M5	1	6 Nm ± 1.2 (4.43 ± 0.89 lbf ft)	-

FUEL TANK

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the fuel tank to frame	M6	3	10 ± 2 Nm (7.38 $\pm$ 1.48 lb ft)	-
2	Ring nut fastening the fuel pump to the fuel tank	Ring nut	1	20 ± 3 Nm (14.75 $\pm$ 2.21 lb ft)	-

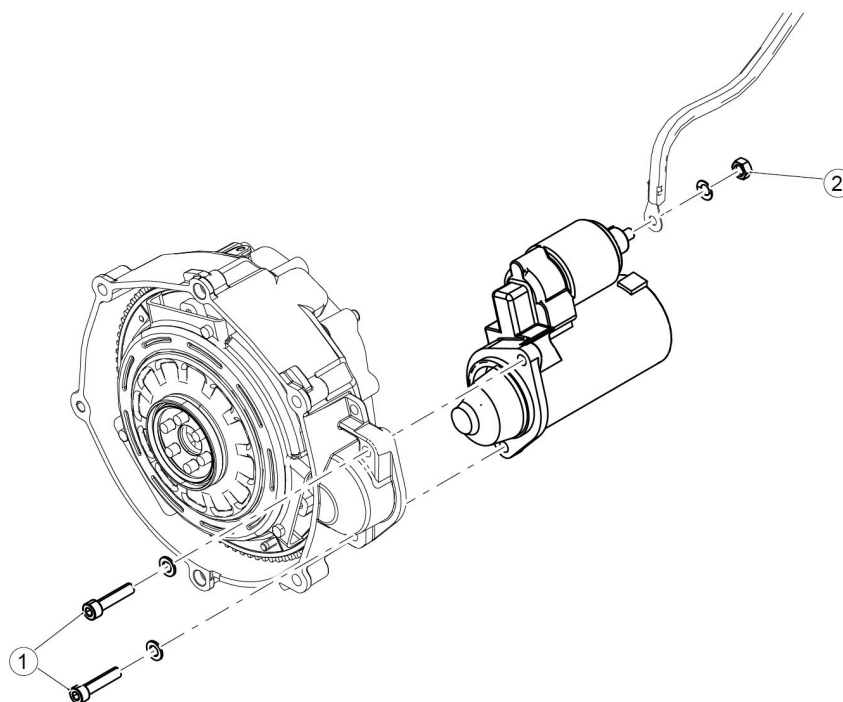
LOCKS

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screw fastening the starter switch to the frame	M8	1	25 ± 3.75 Nm (18.44 $\pm$ 2.77 lb ft)	-
2	Screw fastening the starter switch to the frame	M8	1	-	Shear head screw until it breaks
3	Screws fastening the fuel tank cap to the fuel tank	M5	3	6 Nm $\pm$ 1.2 (4.43 $\pm$ 0.89 lbf ft)	-
4	Screws fastening the fuel tank cap to the fuel tank	M5	4	6 Nm $\pm$ 1.2 (4.43 $\pm$ 0.89 lbf ft)	-

CHASSIS

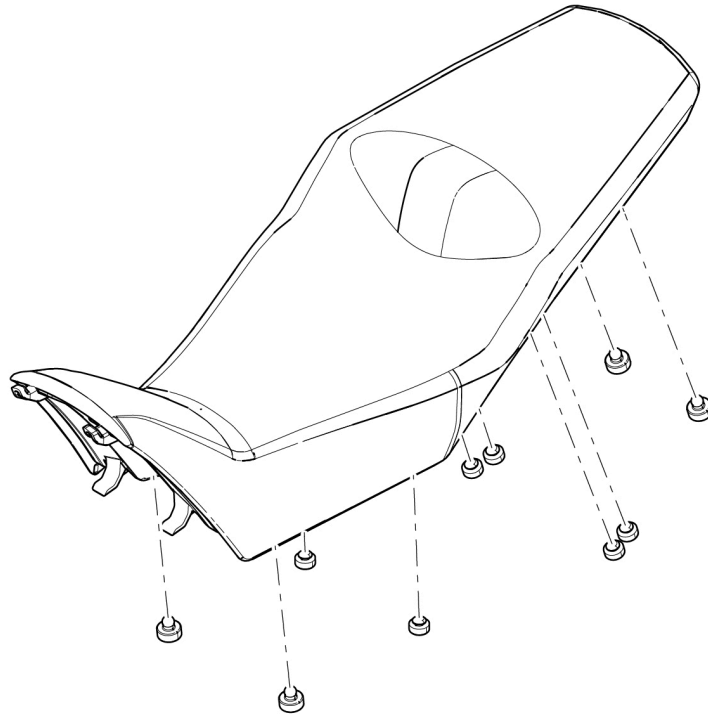
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening muffler support bracket to the frame	M6	2	10 ± 2 Nm (7.38 $\pm$ 1.48 lb ft)	-
2	Screws fastening frame to the engine	M10 x 1.25	4	$50 \pm 7,5$ Nm (36.88 $\pm$ 5.53 lbf ft)	-
3	Screws fastening voltage regulator support bracket to the frame	M6	2	10 ± 2 Nm (7.38 $\pm$ 1.48 lb ft)	-
4	Screw fastening frame to the gearbox	M10	1	$50 \pm 7,5$ Nm (36.88 $\pm$ 5.53 lbf ft)	-
5	Screw fixing coils mounting plate to the frame	M8	1	25 ± 5 Nm (18.44 $\pm$ 3.69 lb ft)	-
6	Screw fastening right frame plate and left frame plate to the gearbox	M10	1	$50 \pm 7,5$ Nm (36.88 $\pm$ 5.53 lbf ft)	-

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
7	Screw fastening the right frame plate to the frame	M12	2	80 ± 12 Nm (59.00 ± 8.85 lbf ft)	-
8	Screw fastening left frame plate to the gearbox	M10	1	50 ± 7,5 Nm (36.88 ± 5.53 lbf ft)	-
9	Screw fastening right frame plate to the gearbox	M10	1	80 ± 12 Nm (59.00 ± 8.85 lbf ft)	-
10	Screw fastening the rear stop switch cable cover to the right frame plate	M5	2	6 Nm ± 1.2 (4.43 ± 0.89 lbf ft)	-

STARTER MOTOR

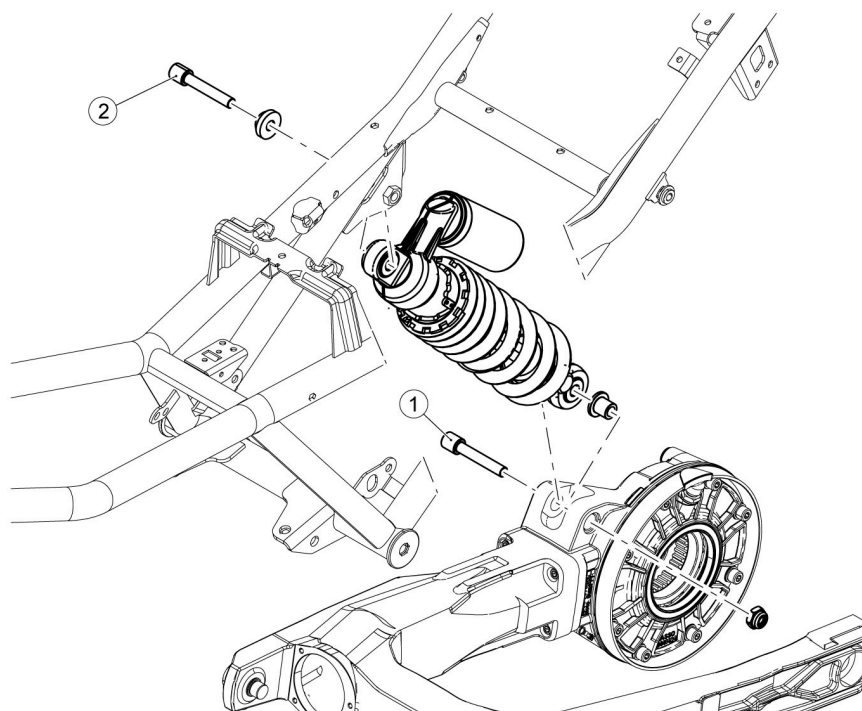
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Starter motor fastening to the gearbox	M8	2	25 ± 5 Nm (18.44 ± 3.69 lb ft)	-

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
2	Fixing of starter motor power cable	M8	1	12 ± 2.4 Nm (8.85 ± 0.86 lbf ft)	

SADDLE

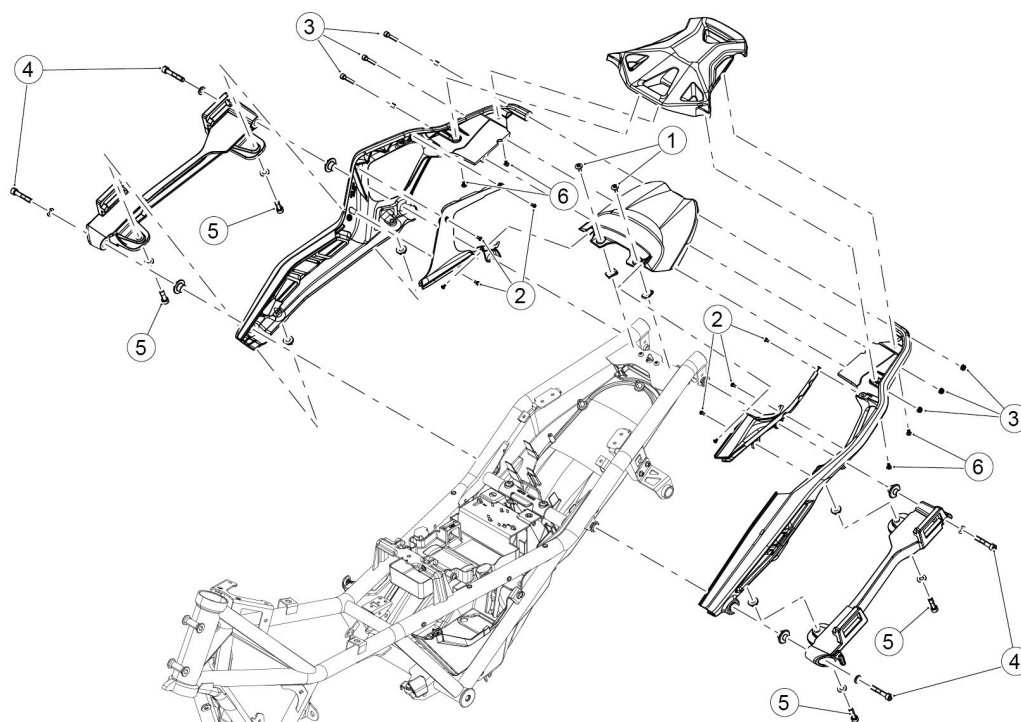
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Self-locking nuts fixing the lumbar support	M5	3	2.5 ± 0.5 Nm (1.84 ± 0.39 lb ft)	-

2.13.1.3 Rear section**SHOCK ABSORBER**



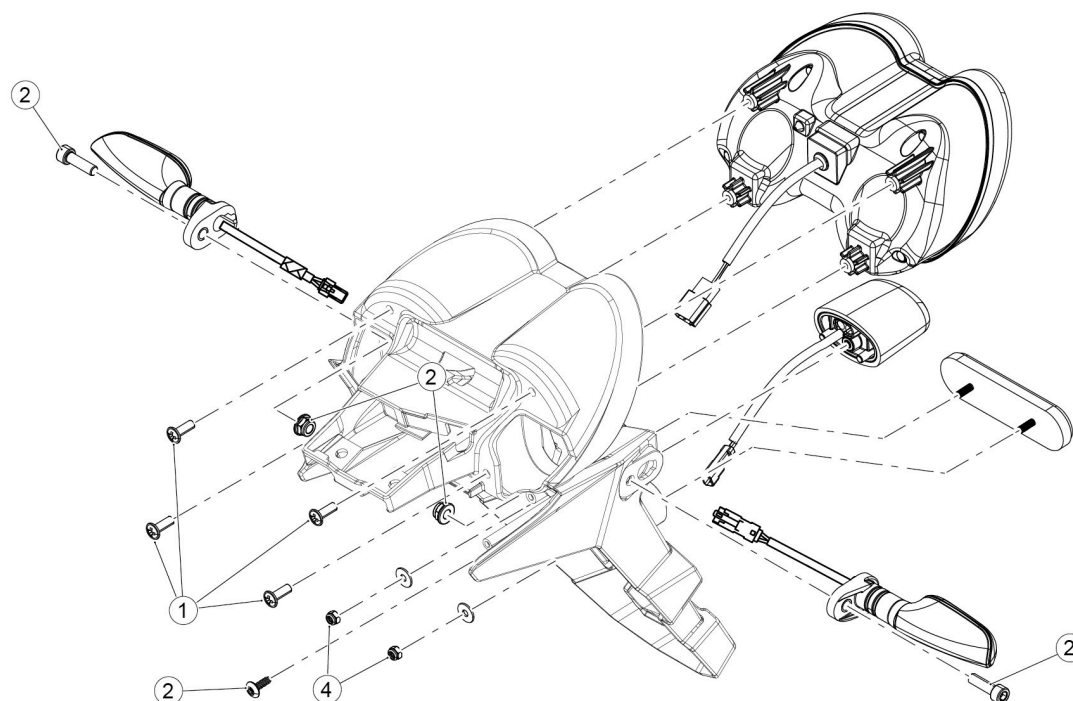
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Rear shock absorber to gearbox fixing screw	M10	1	50 ± 7.5 Nm (36.88 ± 5.53 lb ft)	-
2	Rear shock absorber to frame fixing screw	M10	1	50 ± 7.5 Nm (36.88 ± 5.53 lb ft)	-

REAR BODYWORK



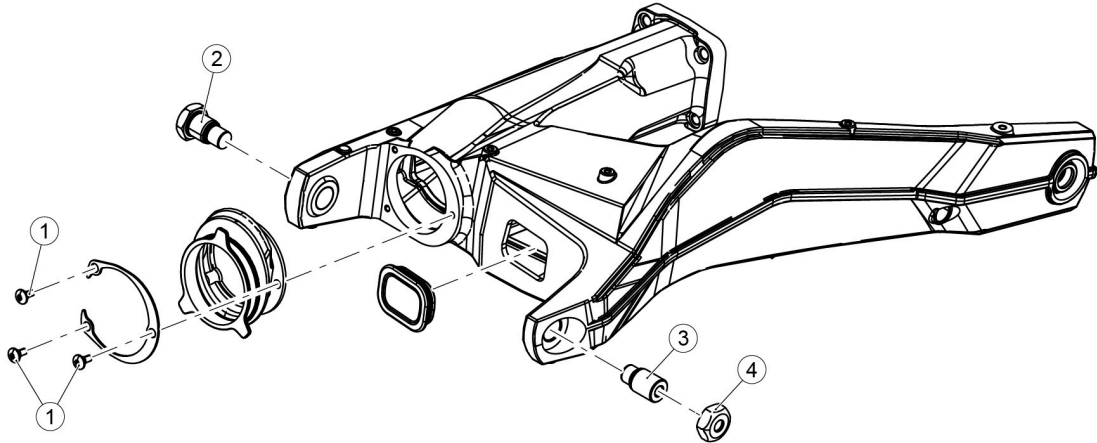
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Rear cover fixing screw to frame	M5	2	6 ± 1,2 Nm (4.43 ± 0.89 lbf ft)	-
2	Right and left grab handle internal cover fixing screw	M4	3 + 3	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-
3	Passenger grab handle fastening screw	M6	3 + 3	10 ± 1.5 Nm (7.38 ± 1.11 lb ft)	-
4	Fixing screw for passenger grab handle to frame	M8	2 + 2	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)	-
5	Screw fixing right and left side case support to grab handle (V85 TT Travel)	M8	2 + 2	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)	-
6	Luggage rack cover fastening screw	SWP 4.2	4	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-

TAILLIGHT



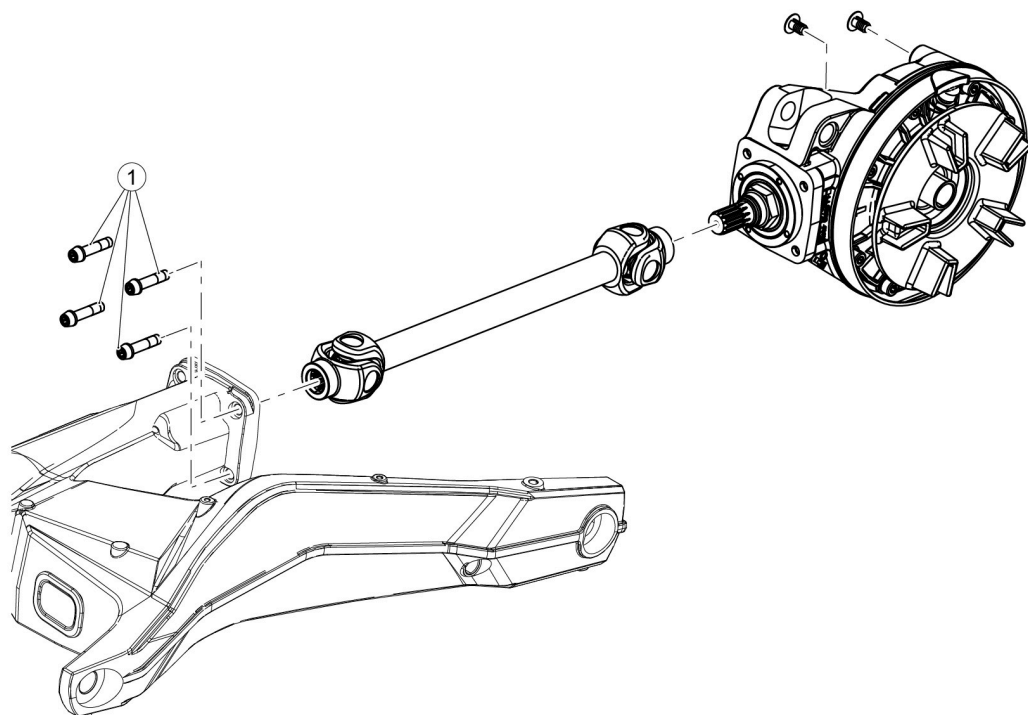
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Taillight to number plate holder fixing screws	Self-tapping 5x14	4	$3 \pm 0.6 \text{ Nm}$ ($2.21 \pm 0.44 \text{ lb ft}$)	-
2	Rear direction indicator to number plate holder fixing screws	M6	2	$3 \pm 0.6 \text{ Nm}$ ($2.21 \pm 0.44 \text{ lb ft}$)	With self-locking nut
3	Licence plate light to number plate holder fixing screws	M4	1	$3 \pm 0.6 \text{ Nm}$ ($2.21 \pm 0.44 \text{ lb ft}$)	-
4	Nuts fastening the rear reflector to the number plate holder	M4	2	$4 \pm 0.8 \text{ Nm}$ ($2.95 \pm 0.59 \text{ lb ft}$)	-

SWINGARM



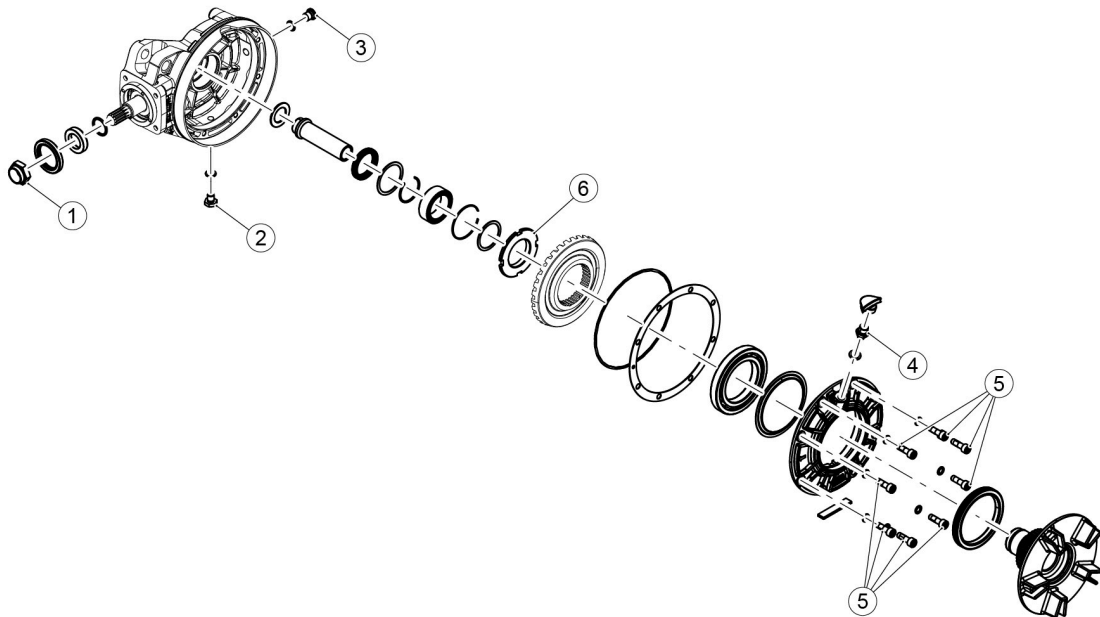
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Bellow to swingarm fixing screw	M5	3	$6 \pm 1.2 \text{ Nm}$ (4.43 $\pm$ 0.89 lbf ft)	-
2	Swingarm pivot bolt fastening nut	-	1	$50 \pm 5 \text{ Nm}$ (36.88 $\pm$ 3.69 lbf ft)	-
3	Swingarm fastening pin	-	1	-	Screw until the end and unscrew by 1/4 of a turn
4	Swingarm pivot bolt fastening nut	-	1	$50 \pm 5 \text{ Nm}$ (36.88 $\pm$ 3.69 lbf ft)	-
-	Rear brake pipe feedthrough to swingarm fixing screw	M5	2	$6 \pm 1.2 \text{ Nm}$ (4.43 $\pm$ 0.89 lbf ft)	-

GEARBOX



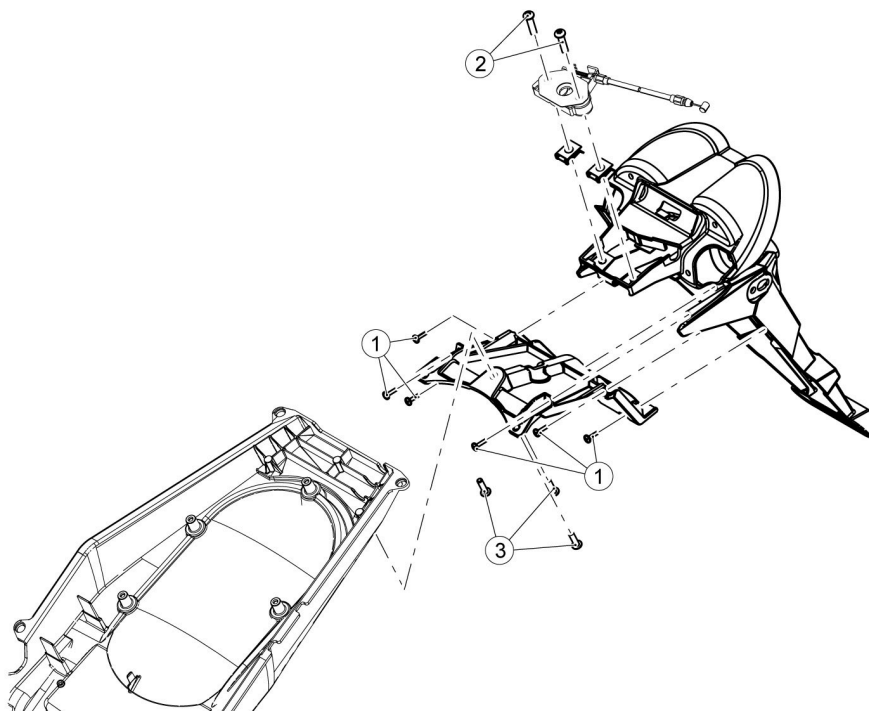
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Gearbox preimpregnated TCC torx fixing screws	M8x35	4	25 ± 5 Nm (18.44 ± 3.69 lb ft)	-

GEARBOX - COMPONENTS



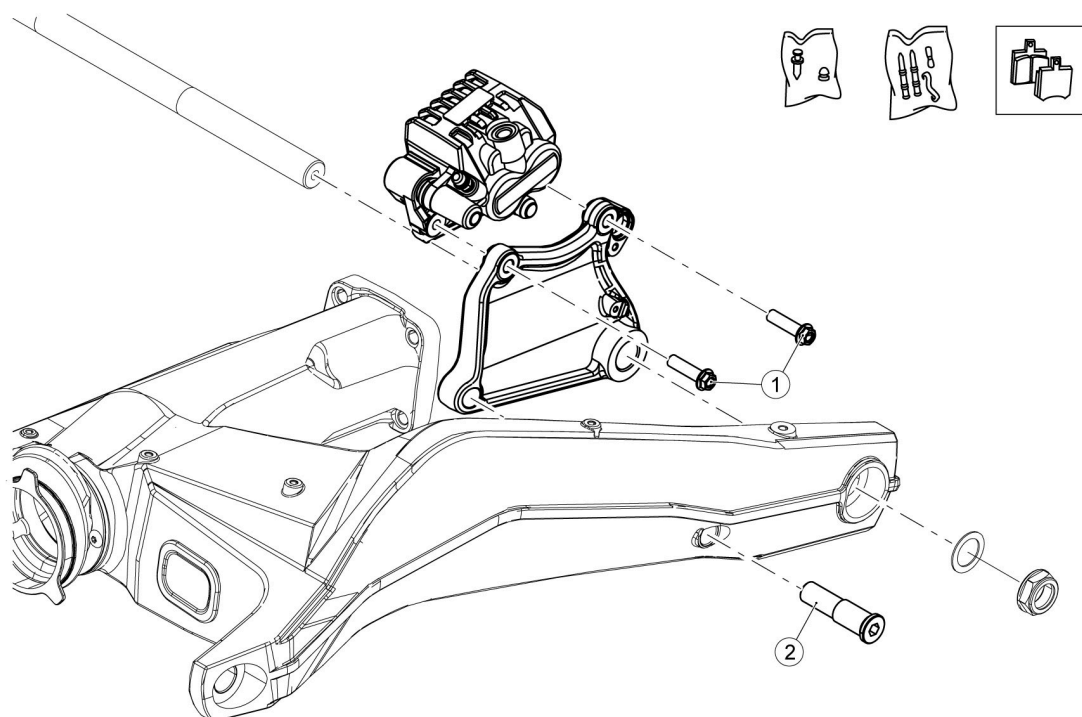
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Pinion fastening nut	M25	1	100 ± 10 Nm (73.76 ± 7.38 lbf ft)	Loct. 648 + Nut rebating on hollow pinion
2	Oil drainage plug	M10	1	30 ± 6 Nm (22.13 ± 4.43 lbf ft)	-
3	Oil load cap	M12	1	25 ± 5 Nm (18.44 ± 3.69 lb ft)	-
4	Bleeder cap	-	1	10 ± 2 Nm (7.38 ± 0.87 lbf ft)	-
5	Gearbox cover fastening screws	M8x25	8	25 ± 5 Nm (18.44 ± 3.69 lb ft)	-
6	Ring nut	-	1	160 ± 16 Nm (118.01 ± 11.08 lbf ft)	Loct. 243 + Riveting on the splash guard hub
-	Pinion bearings holder case	-	1	50 ± 5 Nm (36.88 ± 3.69 lbf ft)	Loct. 243

REAR MUDGUARD



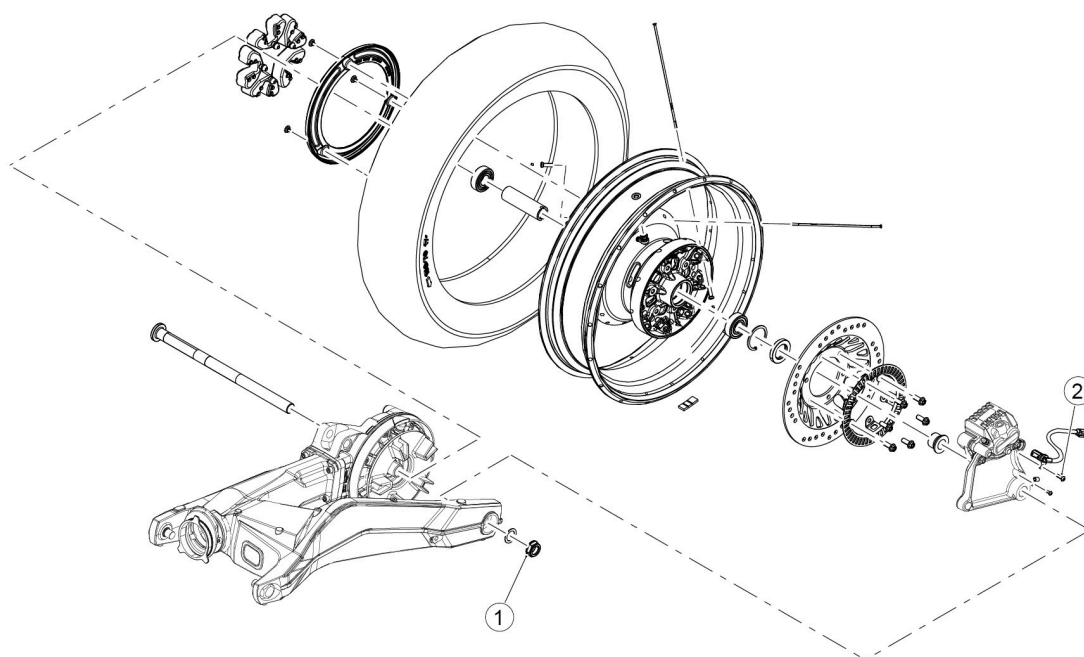
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the licence plate holder fastener to the licence plate holder	SWP 3.9	6	$3 \pm 0.6 \text{ Nm}$ (2.21 $\pm 0.44 \text{ lb ft}$)	-
2	Screws fastening the licence plate holder to the frame	M6	2	$10 \pm 2 \text{ Nm}$ (7.38 $\pm 1.48 \text{ lb ft}$)	-
3	Screws fastening the licence plate holder fastener to the rear wheel arch	SWP 4.9	3	$3 \pm 0.6 \text{ Nm}$ (2.21 $\pm 0.44 \text{ lb ft}$)	-

REAR BRAKE CALLIPER



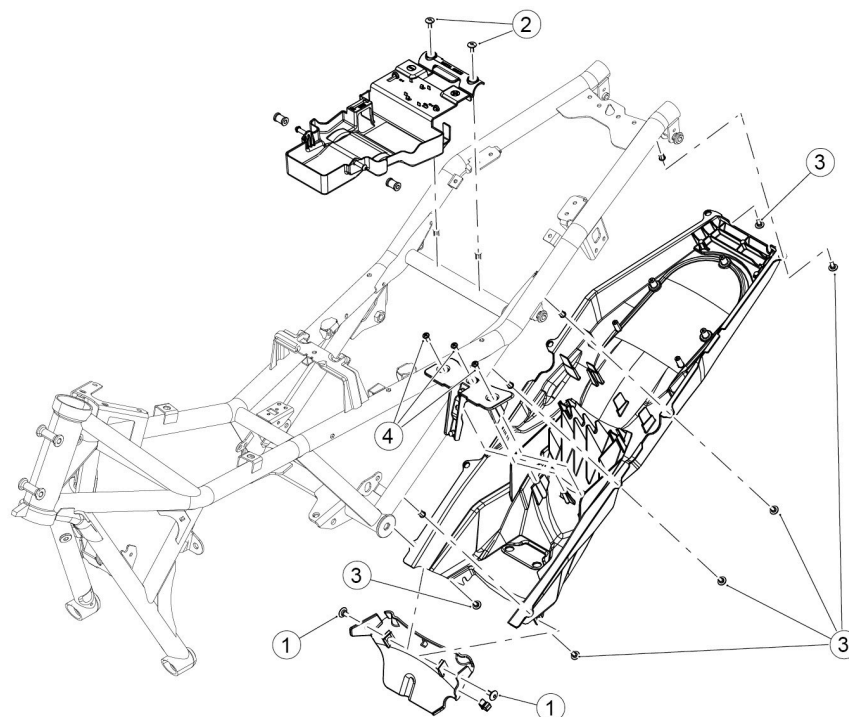
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the rear brake calliper to the calliper support bracket	M8	2	25 ± 2.5 Nm (18.44 ± 1.84 lbf ft)	-
2	Rear calliper mount retaining pin	M16x1	1	35 ± 5,25 Nm (25.81 ± 3.87 lbf ft)	Apply grease to the smooth surface and on the thread

REAR WHEEL



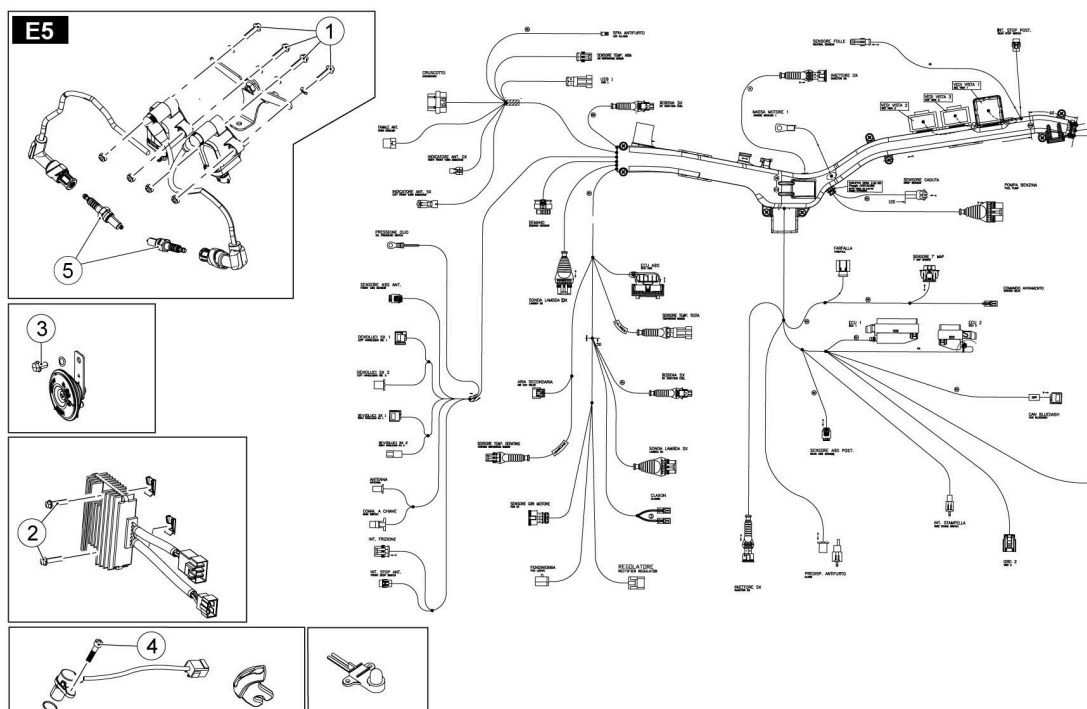
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Rear wheel axle fastener nut	M20x1.5	1	100 ± 15 Nm (73.76 ± 11.06 lbf ft)	-
2	Screw fastening the ABS sensor to the rear calliper support	M5	1	6 ± 1.2 Nm (4.43 ± 0.86 lbf ft)	

UNDER-SEAT COMPARTMENT



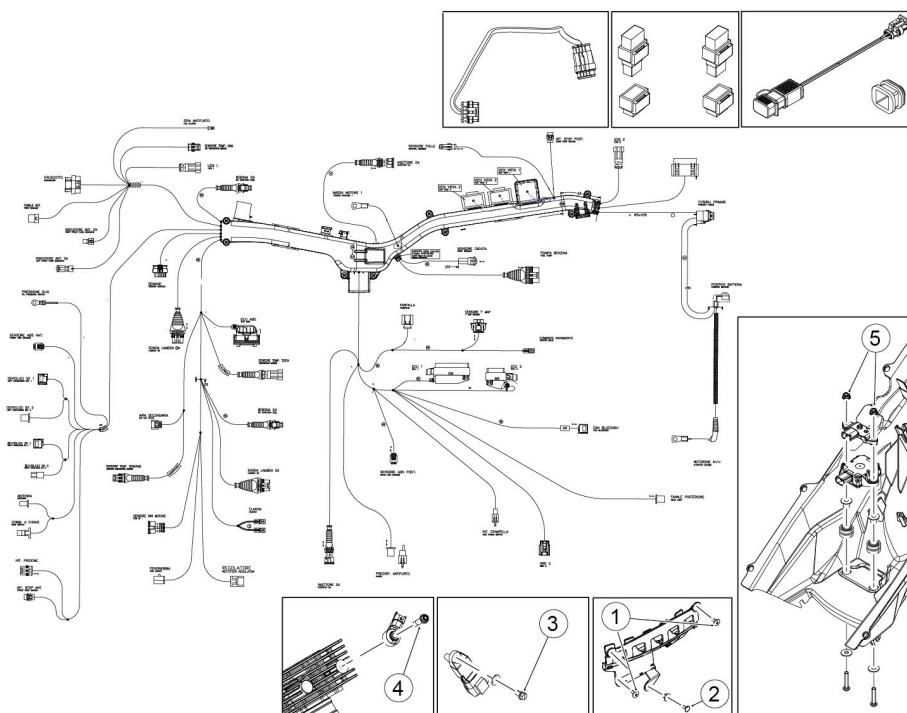
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screw fastening the rear brake pipe feedthrough to the rear wheel arch	M5	2	$6 \pm 1.2 \text{ Nm}$ ($4.43 \pm 0.86 \text{ lbf ft}$)	-
2	Screws fastening the battery cover to the frame	M5	2	$4 \pm 0.8 \text{ Nm}$ ($2.95 \pm 0.59 \text{ lb ft}$)	-
3	Screws fastening the rear wheel arch to the frame	M5	4 + 4	$4 \pm 0.8 \text{ Nm}$ ($2.95 \pm 0.59 \text{ lb ft}$)	-
4	Screws fastening the PMP ECU support to the rear wheel arch	SWP 4.9	3	$3 \pm 0.6 \text{ Nm}$ ($2.21 \pm 0.44 \text{ lb ft}$)	

FRONT ELECTRICAL SYSTEM



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the coil to the frame	M6	4	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
2	Screws fastening the voltage regulator to the frame	M6	2	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
3	Screw fastening the horn to the frame	M8	1	25 ± 5 Nm (18.44 ± 3.69 lb ft)	-
4	Screw fastening the ABS sensor to the right fork stanchion	M5	1	6 ± 1.2 Nm (4.43 ± 0.86 lbf ft)	-
-	Screw fastening the ABS sensor cable gland plate to the right fork stanchion	M4	1	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-
5	Spark plugs	-	2	10-12 Nm (7.38-8.85 lb ft)	-

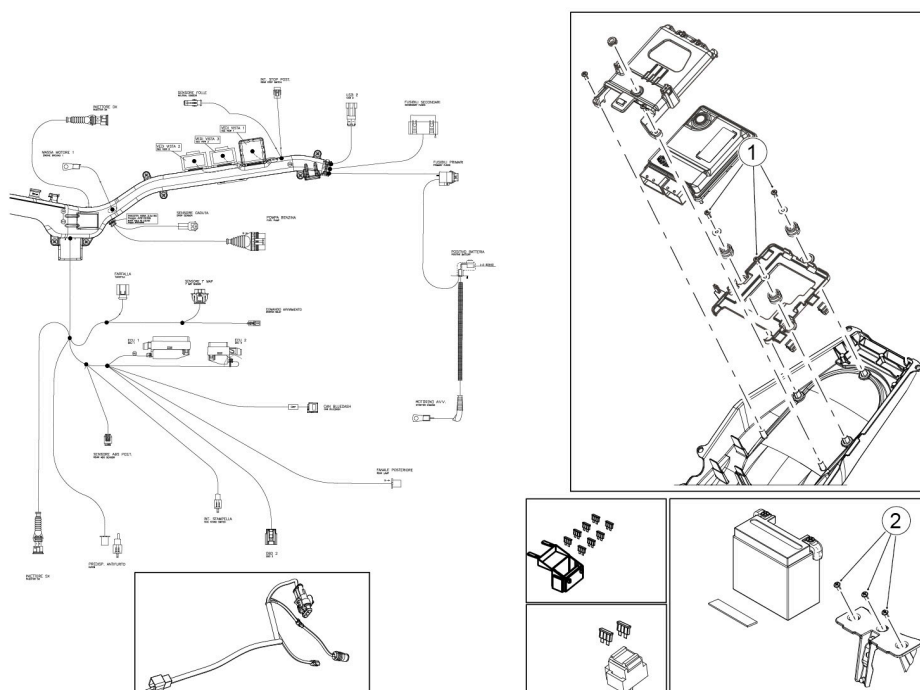
CENTRAL ELECTRICAL SYSTEM



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the left side wiring harness support to the frame	M5	2	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-
2	Rivets fastening the left side wiring harness support to the frame	-	2	-	Press fit
3	Screw fastening the temperature/air pressure sensor to the throttle body fitting	M6	1	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
4	Knock sensor fixing screw	M6	1 + 1	20 ± 5 Nm (14.75 ± 3.69 lbf ft)	-
-	Screws fastening the ECU support to the rear wheel arch	SWP 4.9	3	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
5	Screws fastening the IMU ECU to the rear wheel arch	M6	2	7 ± 1 Nm (5.16 $\pm$ 0.74 lb ft)	-
-	Anti-rollover sensor fastening screw (V 85 TT Strada)	M5	1	6 ± 1.2 Nm (4.43 $\pm$ 0.86 lbf ft)	-

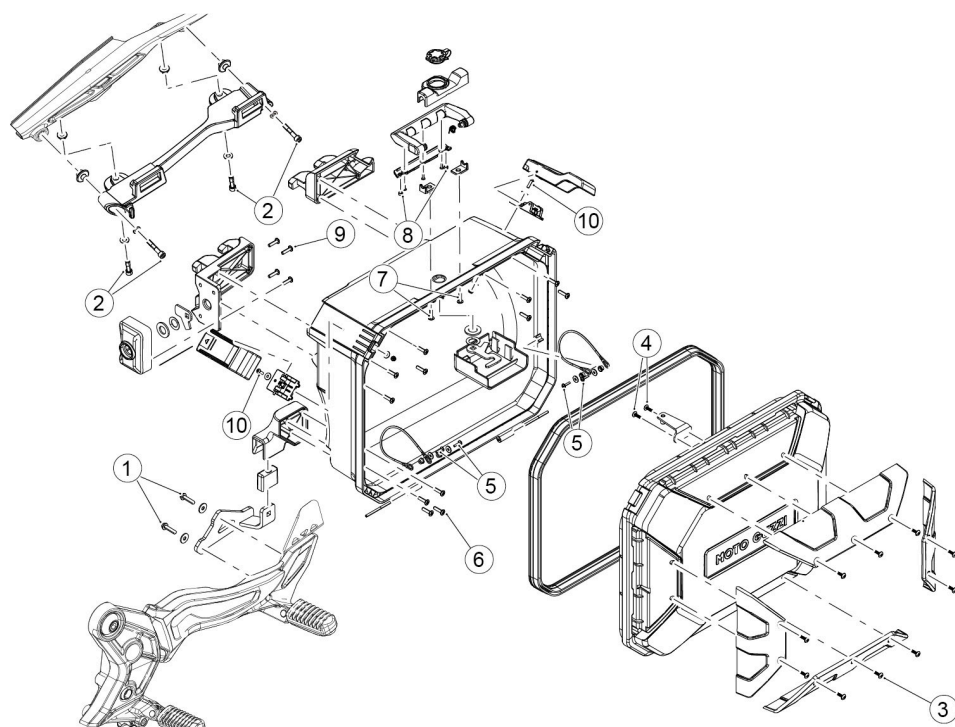
REAR ELECTRICAL SYSTEM



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the ECU support to the rear wheel arch	SWP 4.9	3	3 ± 0.6 Nm (2.21 $\pm$ 0.44 lb ft)	-
2	Battery bracket fixing screw	SWP 4.9	3	3 ± 0.6 Nm (2.21 $\pm$ 0.44 lb ft)	-
-	Screw fastening the ABS sensor cable gland plate to the rear calliper support plate	M4	1	3 ± 0.6 Nm (2.21 $\pm$ 0.44 lb ft)	-

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
-	Screw fastening the ABS sensor to the rear calliper support plate	M5	1	$6 \pm 1.2 \text{ Nm}$ (4.43 $\pm$ 0.86 lbf ft)	-
-	Nut fastening the ground cables to the gearbox	M8	1	$10 \pm 1.5 \text{ Nm}$ (7.38 $\pm$ 1.11 lb ft)	-

CASES

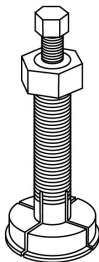
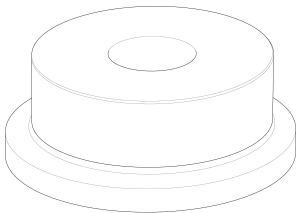
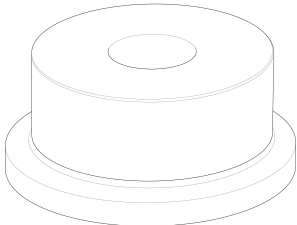
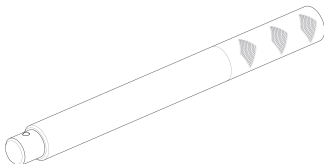
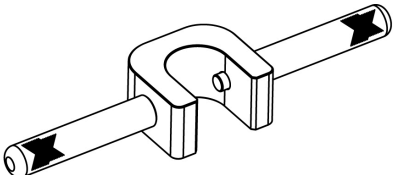


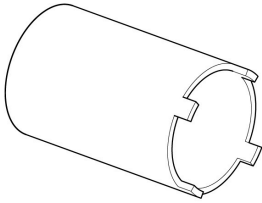
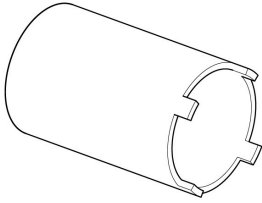
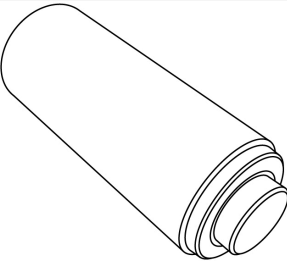
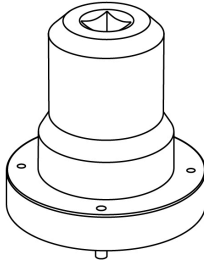
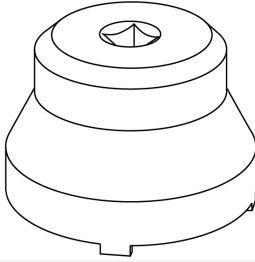
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	TEF fixing screws of lower centering bracket (left)	M6x25	2 + 2	$10 \pm 2 \text{ Nm}$ (7.38 $\pm$ 1.48 lb ft)	-
2	TCEI fixing screws of supports to luggage rack frame	M6x25	4 + 4	$10 \pm 2 \text{ Nm}$ (7.38 $\pm$ 1.48 lb ft)	-
3	Torx self-tapping screws to cover the cover	-	10 + 10	$1.5 \pm 0.15 \text{ Nm}$ (1.11 $\pm$ 0.11 lbf ft)	-

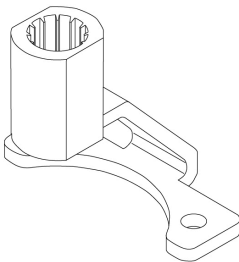
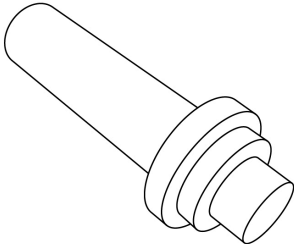
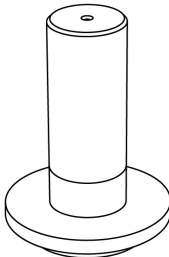
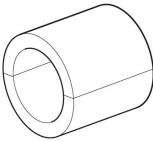
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
4	Torx self-tapping screws fixing the bracket to the cover	-	2 + 2	1.5 ± 0,15 Nm (1.11 ± 0.11 lbf ft)	-
5	SWP self-tapping screws fixing cable hooking bushings	2.9x12	4 + 4	1 ± 0.1 Nm (0.74 ± 0.07 lb ft)	-
6	SWP flanged screws for fixing inserts for case coupling	M5x20	12 + 12	3.5 ± 0,35 Nm (2.58 ± 0.26 lbf ft)	-
7	SWP flanged screws for fixing the handles	M5x20	2 + 2	3.5 ± 0,35 Nm (2.58 ± 0.26 lbf ft)	-
8	SWP self-tapping screws fixing handle covers	2.9x12	3 + 3	1 ± 0.1 Nm (0.74 ± 0.07 lb ft)	-
9	SWP flanged screws for fixing the lock cover	M5x20	4 + 4	3.5 ± 0,35 Nm (2.58 ± 0.26 lbf ft)	-
10	TBEI screws fixing locking levers + Self-locking nut	M4x14	2 + 2	2.5 ± 0,25 Nm (1.84 ± 0.18 lbf ft)	-
-	Fixing nut for locks	-	2 + 2	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
-	Fixing screws for locks/ latches plates	M4x6	2 + 2	3 ± 0.3 Nm (2.21 ± 0.22 lb ft)	Loct. 243

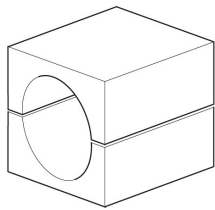
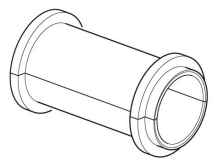
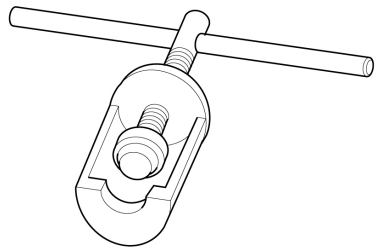
LIST OF TOPICS

Special tools

CODE	DESCRIPTION	IMAGE
001467Y036	Bearing internal cup extractor	
020359Y	42x47 mm Adaptor	
020360Y	Punch 52x55 mm	
020376Y	Adaptor handle	
020888Y	Pliers for preloading Sachs fork tube	

CODE	DESCRIPTION	IMAGE
020966Y	steering adjustment socket	
020966Y	steering adjustment socket	
020978Y	Secondary cardan shaft oil seal installation punch	
020998Y	Pinion case wrench	
020999Y	Crown counter-lock ring wrench	

CODE	DESCRIPTION	IMAGE
021000Y	Bevel gear pinion shoes	
021003Y	Bevel gear external cover oil seal punch	
021005Y	Bevel gear cover oil seal punch	
021999Y	PADS 4.0	
AP8140146	Weight	

CODE	DESCRIPTION	IMAGE
AP8140149	Guard for assembly operations	
AP8140189	Fork oil seal installation punch for 43 mm diam. stanchions	
GU19907000	Extractor for internal ring on drilled bolt on cardan shaft	
GU19927900	Punch for drilled bolt bearing	

SPECIAL TOOLS

020998Y	Pinion case wrench
020999Y	Crown counter- lock ring wrench
GU19907000	Extractor for internal ring on drilled bolt
021000Y	Bevel gear set mounting
021003Y	Bevel gear oil seal punch
021005Y	Bevel gear cover oil seal punch

SPECIAL TOOLS	
020978Y	Cardan secondary oil seal mounting punch
GU19927900	Punch for pressing bearing inner ring onto drilled pin
020376Y	Adaptor handle
020359Y	42 x 47 mm punch
020360Y	52 x 55 mm adaptor
001467Y036	Bearing internal cup extractor
020966Y	Steering adjustment socket
020888Y	Pre-load tube clamp
AP8140148	Plunger-spacer separator plate
AP8140189	Tool for fitting oil seal for 43 mm (1.69 in) diameter hole
AP8140146	Weight
AP8140150	Bored shaft for bleeding plunger air
AP8140149	Guard for assembly operations
020922Y	Diagnostic tool
021017Y	OBD cable for E5 vehicles

LIST OF TOPICS

Maintenance

4.1 Scheduled maintenance table

N.B



CARRY OUT MAINTENANCE OPERATIONS AT HALF THE INTERVALS SPECIFIED IF THE VEHICLE IS USED IN PARTICULAR RAINY OR DUSTY CONDITIONS, OFF ROAD OR FOR TRACK USE.

N.B



THE TIMES LISTED ON THE SCHEDULED MAINTENANCE TABLE INCLUDE TIME DEDICATED TO MANAGEMENT ACTIVITIES.

SCHEDULED MAINTENANCE TABLE RESERVED FOR THE EMEA AND USA-LATAM MARKET

Km x 1000 (mi x 1000)	1,5 (0.9)	10 (6.2)	20 (12.4)	30 (18.6)	40 (24.9)	50 (31.1)	60 (37.3)	EVERY 12 MONTHS	EVERY 24 MONTHS
Oil filter cover O-ring	R	R	R	R	R	R	R	R	R
Gearbox oil filler plug O- ring				I			I		
Engine oil filler plug O-ring	I	I	I	I	I	I	I	I	I
Fork plug O- ring					I				
Spark plugs		I	I	R	I	I	R		
Steering bearings and steering play	I	I	I	I	I	I	I	I	I
Wheel bearings - Wheels		I	I	I	I	I	I	I	I
Diagnosis by tool	I	I	I	I	I	I	I	I	I
Brake discs - Pads wear (4)	I	I	I	I	I	I	I	I	I
Air filter		R	R	R	R	R	R		

Km x 1000 (mi x 1000)	1,5 (0.9)	10 (6.2)	20 (12.4)	30 (18.6)	40 (24.9)	50 (31.1)	60 (37.3)	EVERY 12 MONTHS	EVERY 24 MONTHS
Engine oil filter	R	R	R	R	R	R	R	R	R
Vehicle general operation	I	I	I	I	I	I	I	I	I
Valve clearance	A	A	A	A	A	A	A		
Head cover gasket	I	I	I	I	I	I	I		
Gearbox oil discharge plug aluminium gasket				R			R		
Engine oil discharge plug aluminium gasket	R	R	R	R	R	R	R	R	R
Transmission oil discharge plug gasket				R			R		
Gasket for the engine oil filter fastening screw	R	R	R	R	R	R	R	R	R
Brake systems	I	I	I	I	I	I	I	I	I
Light circuit	I	I	I	I	I	I	I	I	I
Safety switches	I	I	I	I	I	I	I	I	I
Brake fluid	I	I	I	I	I	I	I	I	R
Gearbox oil				R			R		
Fork oil (5)					R				
Engine oil (3)	R	R	R	R	R	R	R	R	R
Final drive oil				R			R		
Headlight aiming		I	I	I	I	I	I		
Fork oil seals (1)		I	I	I		I	I		
Tyres - pressure / wear (2)	I	I	I	I	I	I	I	I	I

Km x 1000 (mi x 1000)	1,5 (0.9)	10 (6.2)	20 (12.4)	30 (18.6)	40 (24.9)	50 (31.1)	60 (37.3)	EVERY 12 MONTHS	EVERY 24 MONTHS
Clutch clearance adjustment	A	A	A	A	A	A	A	A	A
Transmission oil filler plug washer				R			R		
Nut/bolt tightness	I	I	I	I	I	I	I		
Suspensions and stability			I		I		I	I	I
Head cover fastening screws dampers	I	I	I	I	I	I	I		
Filter box drain plug		C	C	C	C	C	C	C	C
Brake lines		I	I	I	I	I	I		
Fuel pipes		I	I	I	I	I	I	I	I
Labour time (minutes)	100	100	100	120	190	110	120	60	60

- **I** : CHECK AND CLEAN, ADJUST, LUBRICATE OR REPLACE, IF NECESSARY
- **C**: CLEAN
- **R**: REPLACE
- **A**: ADJUST
- (1) Replace in case of leaks.
- (2) Check every month.
- (3) Check every 500 km (310 mi).
- (4) Check and clean, adjust or replace if necessary every 1,000 km (621 mi).
- (5) Replace at whichever of the following occurs first: 40,000 km (24.855 mi) or 4 years.

N.B

AT EACH SCHEDULED SERVICE, USE THE DIAGNOSTIC TOOL TO CHECK FOR ERRORS AND CHECK THAT ALL PARAMETERS ARE CORRECT.

ENSURE THAT THE VEHICLE CALIBRATION IS UP TO DATE AFTER UPDATING THE DIAGNOSTIC TOOL.

WARNING



AFTER THE PROVIDED MAINTENANCE PROGRAM IS INDICATED TO PROCEED WITH THE MAINTENANCE OF THE VEHICLE STARTING FROM THE SERVICE OF 10,000 km OR 10 MONTHS.

SCHEDULED MAINTENANCE TABLE RESERVED FOR THE ASIA-PACIFIC MARKET

Km x 1.000 or (months) maximum	1.5 (1)	10 (10)	20 (20)	30 (30)	40 (40)	50 (50)	60 (60)
Oil filter cover O-ring	R	R	R	R	R	R	R
Gearbox oil filler plug O-ring				I			I
Engine oil filler plug O-ring	I	I	I	I	I	I	I
Fork plug O-ring					I		
Spark plugs		I	I	R	I	I	R
Steering bearings and steering play	I	I	I	I	I	I	I
Wheel bearings - Wheels		I	I	I	I	I	I
Diagnosis by tool	I	I	I	I	I	I	I
Brake discs - Pads wear (4)	I	I	I	I	I	I	I
Air filter		R	R	R	R	R	R
Engine oil filter	R	R	R	R	R	R	R
Vehicle general operation	I	I	I	I	I	I	I
Valve clearance	A	A	A	A	A	A	A
Head cover gasket	I	I	I	I	I	I	I
Gearbox oil discharge plug aluminium gasket				R			R
Engine oil discharge plug aluminium gasket	R	R	R	R	R	R	R
Transmission oil discharge plug gasket				R			R

Km x 1.000 or (months) maximum	1.5 (1)	10 (10)	20 (20)	30 (30)	40 (40)	50 (50)	60 (60)
Gasket for the engine oil filter fastening screw	R	R	R	R	R	R	R
Brake systems	I	I	I	I	I	I	I
Light circuit	I	I	I	I	I	I	I
Safety switches	I	I	I	I	I	I	I
Brake fluid	I	I	I	I	I	I	I
Gearbox oil				R			R
Fork oil (5)					R		
Engine oil (3)	R	R	R	R	R	R	R
Final drive oil				R			R
Headlight aiming		I	I	I	I	I	I
Fork oil seals (1)		I	I	I		I	I
Tyres - pressure / wear (2)	I	I	I	I	I	I	I
Clutch clearance adjustment	A	A	A	A	A	A	A
Transmission oil filler plug washer				R			R
Nut/bolt tightness	I	I	I	I	I	I	I
Suspensions and stability			I		I		I
Head cover fastening screws dampers	I	I	I	I	I	I	I
Filter box drain plug		C	C	C	C	C	C
Brake lines		I	I	I	I	I	I
Fuel pipes		I	I	I	I	I	I
Labour time (minutes)	100	100	100	120	190	110	120

- **I** : CHECK AND CLEAN, ADJUST, LUBRICATE OR REPLACE, IF NECESSARY
- **C**: CLEAN
- **R**: REPLACE
- **A**: ADJUST
- **(1)** Replace in case of leaks.
- **(2)** Check every month.

- (3) Check every 500 km (310 mi).
- (4) Check and clean, adjust or replace if necessary every 1,000 km (621 mi).
- (5) Replace at whichever of the following occurs first: 40,000 km (24,855 mi) or 4 years.

N.B

AT EACH SCHEDULED SERVICE, USE THE DIAGNOSTIC TOOL TO CHECK FOR ERRORS AND CHECK THAT ALL PARAMETERS ARE CORRECT.

ENSURE THAT THE VEHICLE CALIBRATION IS UP TO DATE AFTER UPDATING THE DIAGNOSTIC TOOL.

WARNING

AFTER THE PROVIDED MAINTENANCE PROGRAM IS INDICATED TO PROCEED WITH THE MAINTENANCE OF THE VEHICLE STARTING FROM THE SERVICE OF 10,000 km OR 10 MONTHS.

4.2 Recommended products

Piaggio Group recommends the use of products from its official partner Castrol for the scheduled maintenance of its vehicles.

Only use lubricants and fluids which meet or exceed the performance characteristics specified. This also applies when topping up only.

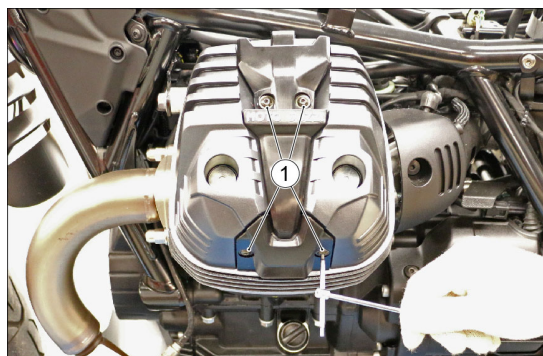


PRODUCT	DESCRIPTION	SPECIFICATIONS
Engine oil 10W-60	Synthetic based Lubricant for four stroke high performance engines.	SAE 10W 60; JASO MA, MA2; API SG
Transmission oil 75W-140	Synthetic lubricant for gearboxes and transmissions.	SAE 75W-140, API GL-5
Front fork oil 7.5W	Oil for front fork.	SAE 7.5W
Molybdenum disulphide grease	Lithium grease with molybdenum disulphide.	Grey black grease

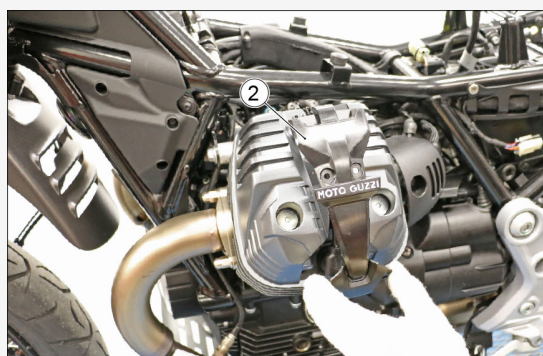
PRODUCT	DESCRIPTION	SPECIFICATIONS
Petroleum jelly	neutral grease for battery terminals	-
DOT 4 brake fluid	Synthetic brake fluid.	SAE J 1703; FMVSS 116; ISO 4925; CUNA NC 956 DOT4

4.3 Spark plug

- Unscrew and remove the screws (1)



- Remove the cover (2)



- Disconnect the spark plug cap (3)



- Unscrew the spark plug (4) and remove it



4.4 Transmission oil

4.4.1 Replacement

N.B



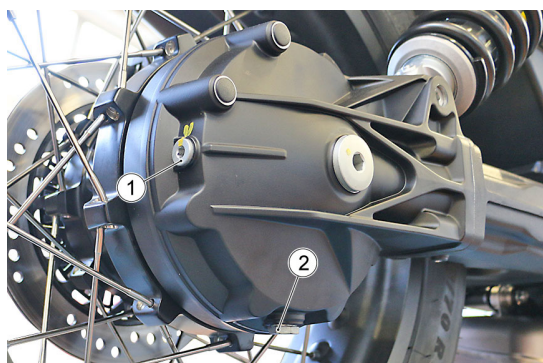
THE UNIT MUST BE HOT WHEN THE OIL IS CHANGED AS UNDER SUCH CONDITIONS OIL IS FLUID AND THEREFORE EASY TO DRAIN.

N.B



RIDE SOME km (miles) TO WARM UP ENGINE OIL.

- Place a recipient with a capacity of at least 400 cc (25 cu.in) under the drain plug (2).
- Unscrew and remove the drainage plug (2).
- Unscrew and remove the filler plug (1).
- Drain the oil into the container for at least 5 minutes for oil to drain out completely.
- Replace the sealing washer of the discharge plug (2).
- Remove any metal scrap attached to the drainage plug (2) magnet.
- Screw and tighten the drainage plug (2).
- Fill with new oil via the inlet hole.
- Quantity 130 cc MAX (7.93 cu in) (filling amount after emptying; - 50 cc (3.05 cu in) compared to the nominal amount of 180 cc (10.98 cu in), to compensate for the oil residue remaining in the gearbox).

**WARNING**

DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID. WHEN USING A FUNNEL OR ANY OTHER ELEMENT, MAKE SURE IT IS PERFECTLY CLEAN.

PRODUCT	DESCRIPTION	SPECIFICATIONS
Transmission oil 75W-140	Synthetic lubricant for gearboxes and transmissions.	SAE 75W-140, API GL-5

- Screw and tighten the cap (1).

WARNING

DURING REPLACEMENT, USE A NEW SEALING WASHER FOR THE BREATHER CAP.

WARNING

IF IT IS NECESSARY TO INSTALL A NEW TRANSMISSION GEARBOX, PAY SPECIAL ATTENTION TO THE PROCEDURE BELOW.

Since they are already run-in at the factory, the complete transmission boxes coming from the Spare parts department contain a minimum residual oil quantity and therefore after installing them on the vehicle, the following procedure must be performed:

- Open the filler plug and drain any residual oil from the lower drain plug leaving it to drip for at least 5 minutes.
- Refit and tighten the lower drain plug and refill through the filler plug with 130 cu cm (7.93 cu in) of oil.
- Refit and tighten the filler plug.
- Assemble the breather plug. If the gearbox arrived with the breather plug already assembled, remove it and blow it with compressed air to carefully remove any oil residues.

WARNING

DURING REPLACEMENT, USE A NEW SEALING WASHER FOR THE BREATHER CAP.

4.5 Engine oil

4.5.1 Check

Check the engine oil level frequently.

N.B

CARRY OUT MAINTENANCE OPERATIONS AT HALF THE INTERVALS SPECIFIED IF THE VEHICLE IS USED IN PARTICULAR RAINY OR DUSTY CONDITIONS, OFF ROAD OR FOR TRACK USE.

WARNING

DO NOT LET THE ENGINE IDLE WITH THE VEHICLE AT A STANDSTILL TO WARM UP THE ENGINE AND OBTAIN THE OPERATING TEMPERATURE OF ENGINE OIL.

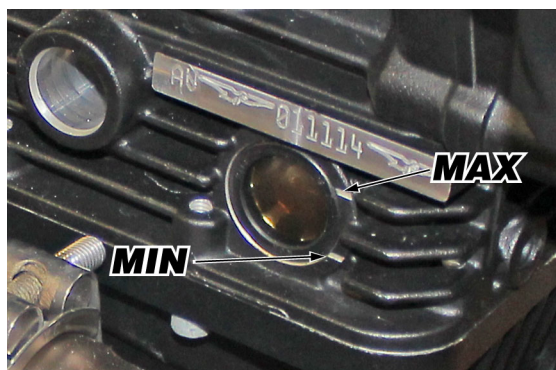
PREFERABLY CHECK THE OIL AFTER A JOURNEY OF AFTER TRAVELLING APPROXIMATELY 15 Km (10 miles) IN EXTRA-URBAN CONDITIONS (ENOUGH TO WARM UP THE ENGINE OIL TO OPERATING TEMPERATURE).

- Shut off the engine.
- Keep the vehicle upright with both wheels on the earth.
- Using the relative opening on the engine casing, check the oil level.

MAX (top notch) = maximum level.

MIN (bottom notch) = minimum level

- The level is correct if it reaches the "**MAX**" level.



4.5.2 Replacement

N.B



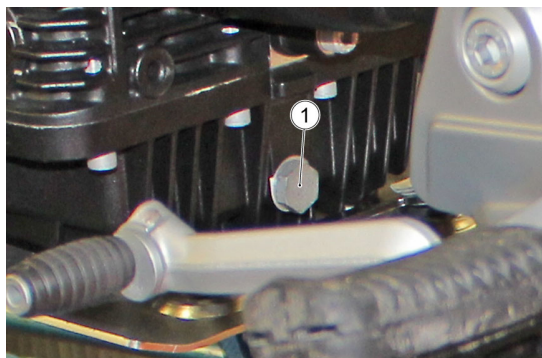
HOT OIL IS MORE FLUID AND WILL DRAIN OUT MORE EASILY AND COMPLETELY.

- Remove the sump guard
- Place a collection container of suitable capacity under the drain plug (1).
- Unscrew and remove the drainage plug (1).

N.B



DURING REPLACEMENT, USE A NEW SEALING WASHER.



- Unscrew and remove the filler plug (2)
- Drain the oil into the container; allow several minutes for oil to drain out completely.
- Check and if necessary, replace the sealing washer of drainage plug (1).
- Remove any metal scrap attached to the drainage plug (1) magnet.
- Screw and tighten the drainage plug (1).

ATTENTION



CHECK THE O-RING PRESENT ON THE FILLING CAP AND REPLACE IF DAMAGED.

WARNING

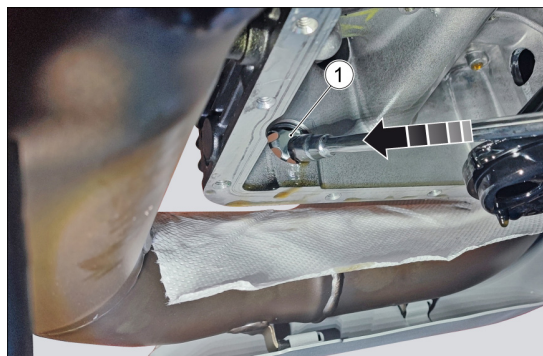


DO NOT DISPOSE OF OIL INTO THE ENVIRONMENT. DISPOSE OF ENGINE OIL IN A SEALED CONTAINER AND TAKE IT TO YOUR SUPPLIER OR TO THE NEAREST USED OIL COLLECTION CENTRE.

4.6 Engine oil inspection port

Removal

- Fully drain the oil from the engine.
- First remove the sump guard, the oil sump and the relative gasket.
- From the lower side of the vehicle, using a pin punch, extract the inspection port (1) from the crankcase, by tapping it out from its housing.



- Once the sight glass is removed, clean the seat of the lower crankcase to remove any engine oil residuals.



Installation

- Insert the new inspection port (2) into its seat on the crankcase.

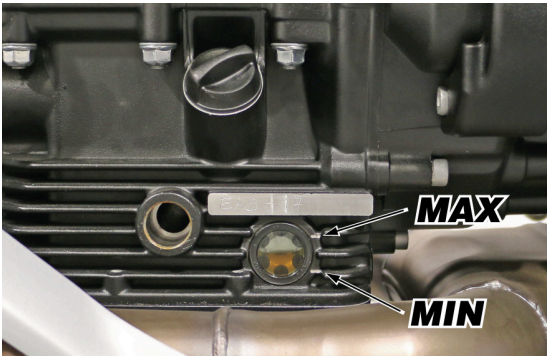


- For installation, use a round tool with diameter slightly less than that of the inspection port.
- Using a rubber mallet, tap on the tool until the inspection port is in contact with the crankcase.



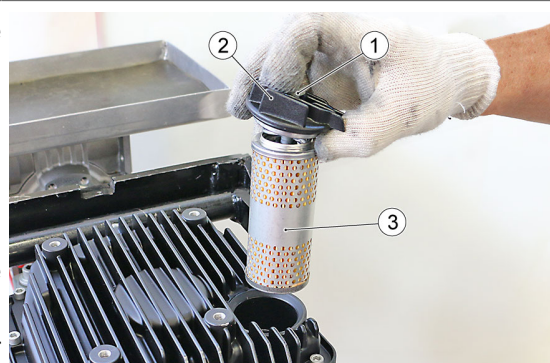
- Once the new inspection port is inserted, refit the oil sump, using a **NEW** gasket and the sump guard.
- Pour in the indicated type of new oil through the filler plug until reaching the "**MAX**" line.

FUNCTION	DESCRIPTION / VALUE
Engine oil 10W-60	SAE 10W 60; JASO MA, MA2; API SG
Oil and oil filter change	1760 cc (107.40 cu in)



4.7 Engine oil filter

- Undo the two screws (1) and remove the cover (2).
- Remove the engine oil filter (3).
- Spread a thin layer of oil on the sealing ring of the new engine oil filter
- Fit the new engine oil filter with the spring facing downwards
- Refit the cover (2), screw and tighten the screw (1).



WARNING



NEVER REUSE AN OLD FILTER.

N.B



DURING REPLACEMENT, USE A NEW SEALING WASHER.

N.B



DURING REFITTING USE A NEW SEALING O-RING.

4.8 Gearbox oil

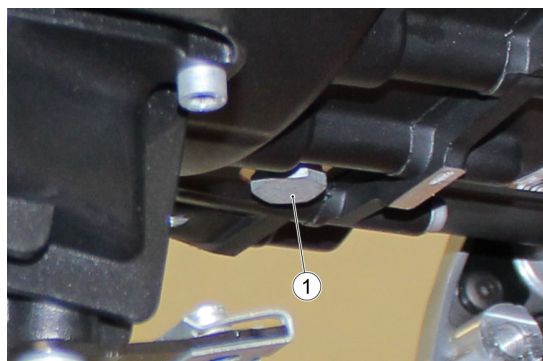
4.8.1 Replacement

N.B



HOT OIL IS MORE FLUID AND WILL DRAIN OUT MORE EASILY AND COMPLETELY.

- Remove the sump guard
- Remove the manifold-terminal
- Place a container of suitable capacity under the drain plug (1).
- Unscrew and remove the drainage plug (1).



- Unscrew and remove the filler cap (2).
- Drain the oil into the container; allow several minutes for oil to drain out completely.
- Remove any metal scrap attached to the drainage plug (1) magnet.
- Pour in new oil, observing the quantity indicated in the "Capacity" table



WARNING



DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID. WHEN USING A FUNNEL OR ANY OTHER ELEMENT, MAKE SURE IT IS PERFECTLY CLEAN.

ATTENTION



CHECK THE O-RING PRESENT ON THE FILLING CAP AND REPLACE IF DAMAGED.

N.B



DURING REPLACEMENT, USE A NEW SEALING WASHER.

4.9 Air filter

REMOVAL

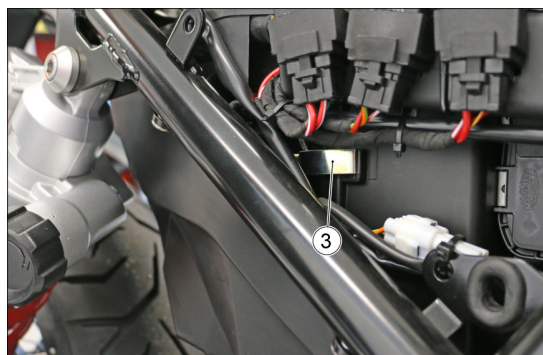
- Remove the saddle
- Remove the side fairing panels.
- Remove the storage compartment and the battery.
- Release the two upper clips (1) of the air filter box.



- Release the left side clip (2).



- Release the right side clip (3).



- Remove the filter box cover, together with the air filter, from the vehicle.

ATTENTION

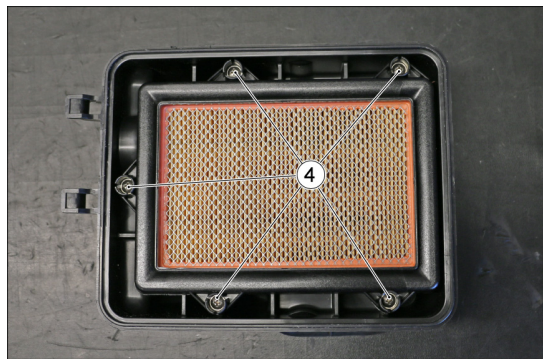


DO NOT START THE ENGINE WITHOUT THE AIR FILTER.

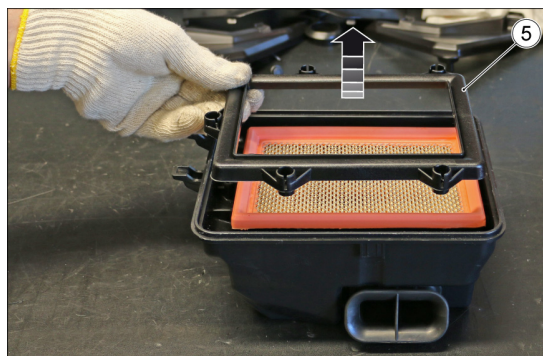
TO CLEAN THE FILTERING ELEMENT, USE A PRESSURISED JET OF AIR, AIMING IT FROM THE INSIDE OUTWARD.



- On the workbench, remove the fixing screws (4) of the air filter frame.



- Remove the frame (5) from the air filter box cover.



- Remove the air filter (6) from the filter box cover.



INSTALLATION

- Follow the removal procedure in reverse order, taking care to insert the air filter box cover correctly in its seat.



4.10 Valve clearance check and adjustment

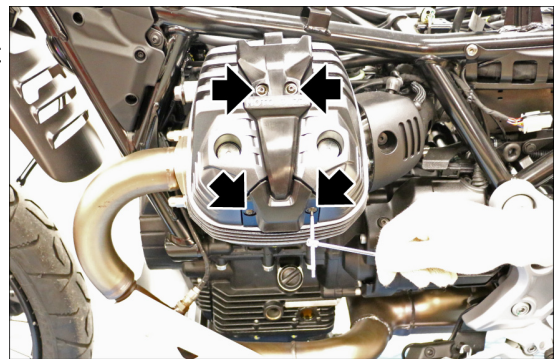
If the timing system is very noisy, check the clearance between the valves and the rocking levers.

N.B

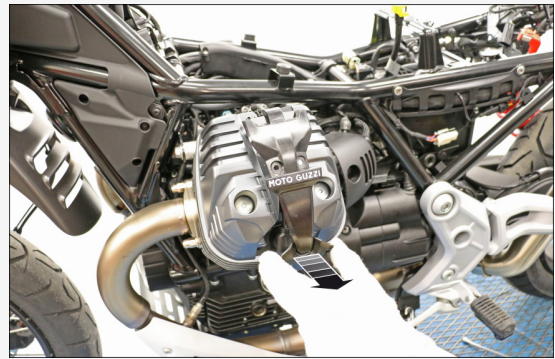


ADJUST WITH COLD ENGINE, WITH PISTON AT TOP DEAD CENTRE (TDC) IN COMPRESSION STROKE (VALVES CLOSED).

- First remove the fuel tank.
- Initially check the valve clearance in the left cylinder, then remove the four fixing screws of the spark plug cover



- Remove the spark plug cover



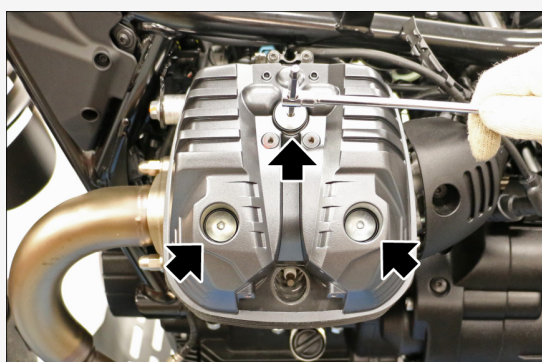
- Remove the spark plug cap



- Remove the three head cover fixing screws

ATTENTION

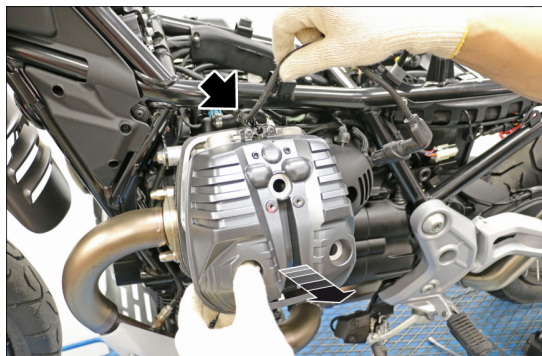
CHECK AND IF NECESSARY REPLACE THE DAMPENING RUBBER GASKETS ON THE BIG END COVER, IF THEY ARE DAMAGED.



- Release the cable of the spark plug cap from the cover, then remove the cover from the head.

ATTENTION

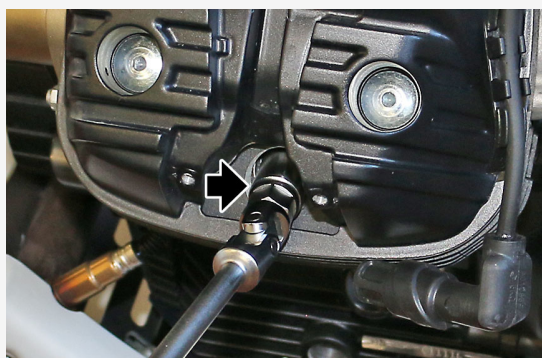
CHECK AND IF NECESSARY REPLACE THE BIG END COVER GASKETS, IF THEY ARE DAMAGED.



- Remove the spark plug from the head.

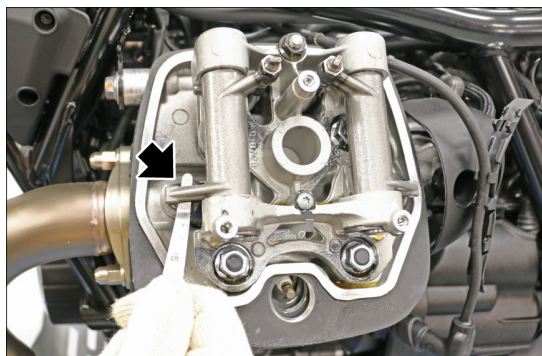
ALSO REMOVE THE SPARK PLUG OF THE RIGHT CYLINDER TO BE ABLE TO MANUALLY ROTATE THE ENGINE, ENGAGE THE FIRST GEAR AND TURN THE REAR WHEEL

- Intercept the top dead centre checking that the rockers have clearance to be able to measure it



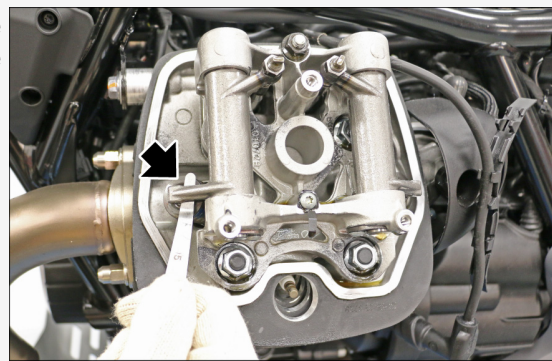
- Use a feeler gauge to check that the clearance between the valve and the set screw corresponds with the indicated values. The corresponding intake and outlet valve clearances are different than what is indicated below, proceed with adjusting them.

FUNCTION	DESCRIPTION / VALUE
Intake valve clearance	0.10 mm (0.0039 in)



FUNCTION	DESCRIPTION / VALUE
Exhaust valve clearance	0.15 mm (0.0059 in)

- Loosen the lock nut, adjust the clearance by acting on the adjuster until reaching the prescribed values
- Tighten the lock nut



- To perform the valve clearance of the right cylinder, it is necessary to bring the right cylinder to the top dead centre, rotating the engine 270 degree

4.11 Braking system

4.11.1 Level check

FRONT BRAKE

- Rest the vehicle on its stand.
- Turn the handlebar so that the fluid is at the same level as the plug.
- Make sure that the fluid level in the reservoir is above the "**MIN**" reference mark:

MIN = minimum level

If the fluid does not reach at least the "**MIN**" reference mark:

- Check brake pads and discs for wear.
- If the pads and/or the disc do not need replacing, top up the fluid.



REAR BRAKE

- Keep the vehicle upright so that the fluid in the reservoir is at the same level as the plug.
- Make sure that the fluid level in the reservoir is above the "**MIN**" reference mark:

MIN = minimum level

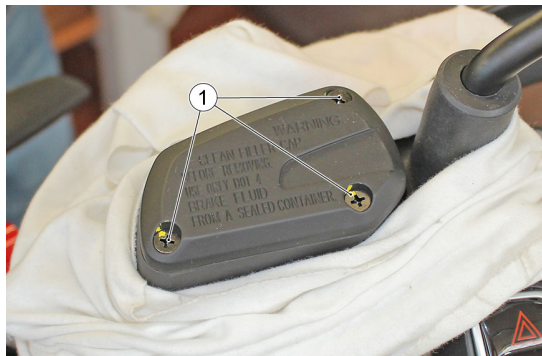
MAX = maximum level

If the fluid does not reach at least the "**MIN**" reference mark:

- Check brake pads and discs for wear.
- If the pads and/or the disc do not need replacing, top up the fluid.

**4.11.2 Top-up****FRONT BRAKE**

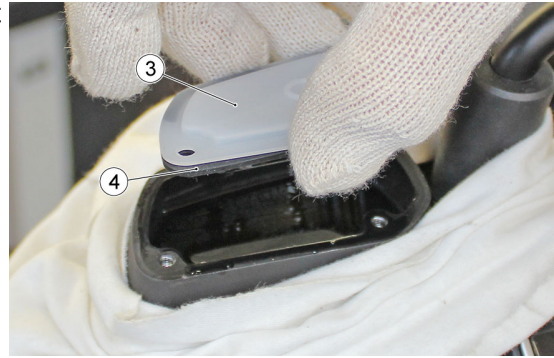
- Unscrew and remove the screws (1)



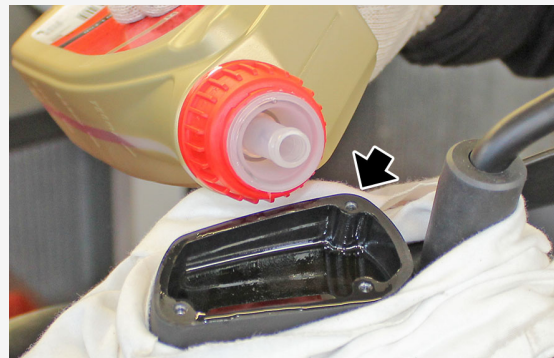
- Remove the cover (2)



- Remove the diaphragm (3) and the gasket (4)



- Top up

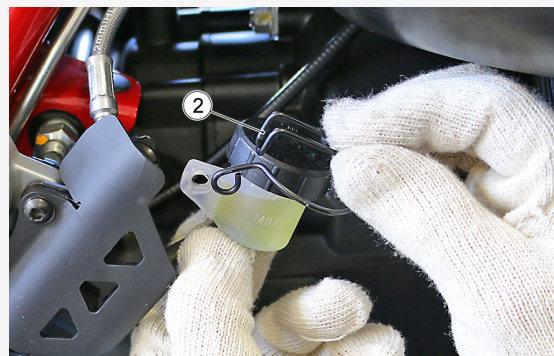


REAR BRAKE

- Undo and remove the screw (1)



- Remove the bracket (2)



- Unscrew and remove the cap (3)



- Remove the gasket (4)
- Top up



WARNING

RISK OF BRAKE FLUID SPILLING. DO NOT OPERATE THE BRAKE LEVER IF THE BRAKE FLUID RESERVOIR CAP IS LOOSE OR HAS BEEN REMOVED.

WARNING

AVOID PROLONGED AIR EXPOSURE OF THE BRAKE FLUID. BRAKE FLUID IS HYGROSCOPIC AND ABSORBS MOISTURE WHEN IN CONTACT WITH AIR.

LEAVE THE BRAKE FLUID RESERVOIR OPEN ONLY FOR THE TIME NEEDED TO COMPLETE THE TOPPING-UP PROCEDURE.

WARNING

TO AVOID SPILLING FLUID WHILE TOPPING UP, KEEP THE LEVEL OF THE FLUID IN THE RESERVOIR PARALLEL WITH THE EDGE OF THE RESERVOIR ITSELF (IN HORIZONTAL POSITION).

DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID.

FUNNELS OR ANY OTHER IMPLEMENTS USED MUST BE PERFECTLY CLEAN.

WARNING



ONLY FILL TO THE “MAX” LEVEL AFTER FITTING NEW BRAKE PADS.

DO NOT FILL TO THE “MAX” LEVEL WITH WORN PADS, AS THIS WILL CAUSE FLUID TO ESCAPE WHEN REPLACING BRAKE PADS.

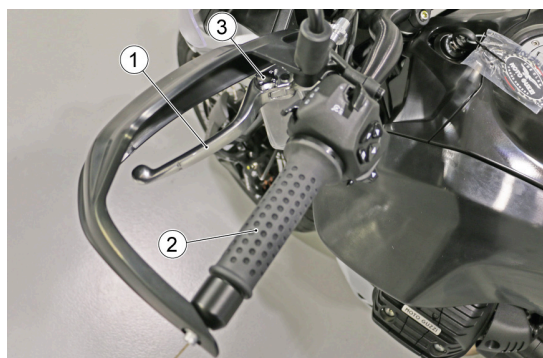
CHECK BRAKING EFFICIENCY. IF THE DEAD ZONE OF THE BRAKE PEDAL OR BRAKE LEVER IS TOO LONG, OR IN CASE OF FLUID LOSS, IT MAY BE NECESSARY TO BLEED THE AIR TRAPPED IN THE SYSTEM.

4.12 Clutch system

4.12.1 Lever adjustment

It is possible to adjust the distance between the end of the lever (1) and the grip (2), turning the adjuster (3).

- Push the control lever (1) forwards and turn the adjuster (3) until the lever (1) is at the desired distance.
- Turning the adjuster anticlockwise, the lever (1) gets closer to the grip (2).



Adjust the clutch when the engine stops or the vehicle tends to move forward even when clutch lever is operated and the gear engaged, or if the clutch “slides”, resulting in acceleration delay considering the engine revs.

- In order to maintain a correct tension and an optimal clutch operation, it is necessary to check and if necessary provide tension to the cable:
- Urban use every 1,000 km (621.37 mi)
- Extra urban use every 5,000 km (3,106.86 mi)
- In any case, every time you detect that the clutch has disengaged before the standard factory setting.

To adjust, do the following:

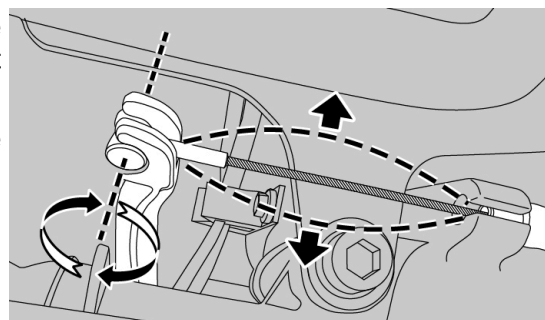
1. Turn the set screw (4) with straight handlebar until the empty travel corresponding to the fixed abutment on the handlebar is 2 mm (0.08 in).



2. Push the clutch control lever on the gearbox housing towards the rear wheel.



3. Pull the clutch control lever placed on the gearbox towards the opposite side (as in point 2) checking that the cable is not tightened.
4. During the previous operation, check that the cable lug turns freely around its axis, regarding the clutch lever.



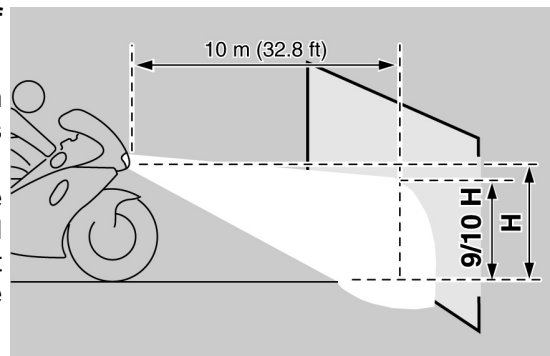
If following the adjustment in "point 1" it is not possible to ascertain the condition of "point 4", check the state of wear and/or the presence of damage to the clutch control or to the clutch disc itself.

If the travel of the adjuster (4) is not sufficient to guarantee the required clearance, check the state of wear and/or the presence of damage to the clutch control or to the clutch disc itself.

4.13 Headlight adjustment

For a quick check of the correct direction of the front light beam:

- Place the vehicle 10 m (32.81 ft) away from a vertical wall and make sure the ground is level.
- Turn on the low beam light, sit on the vehicle and check that the light beam projected to the wall is a little below the headlight horizontal straight line (about 9/10 of the total height).



In order to carry out the vertical adjustment of the light beam:

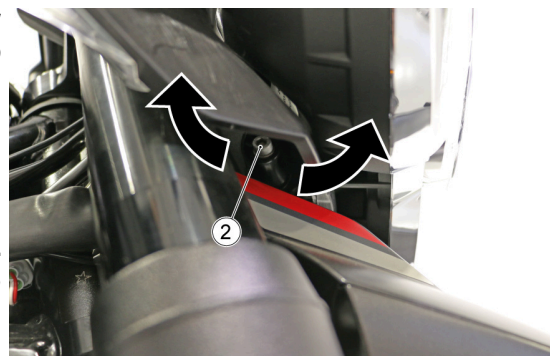
- Stand the motorcycle in a vertical position.
- Slightly loosen the headlamp fixing screws (1) on both sides.



- Slightly loosen the headlamp fixing screw (2), and move the light beam manually to the desired position.
- Once the adjustment is finished tighten all screws.

After adjusting:

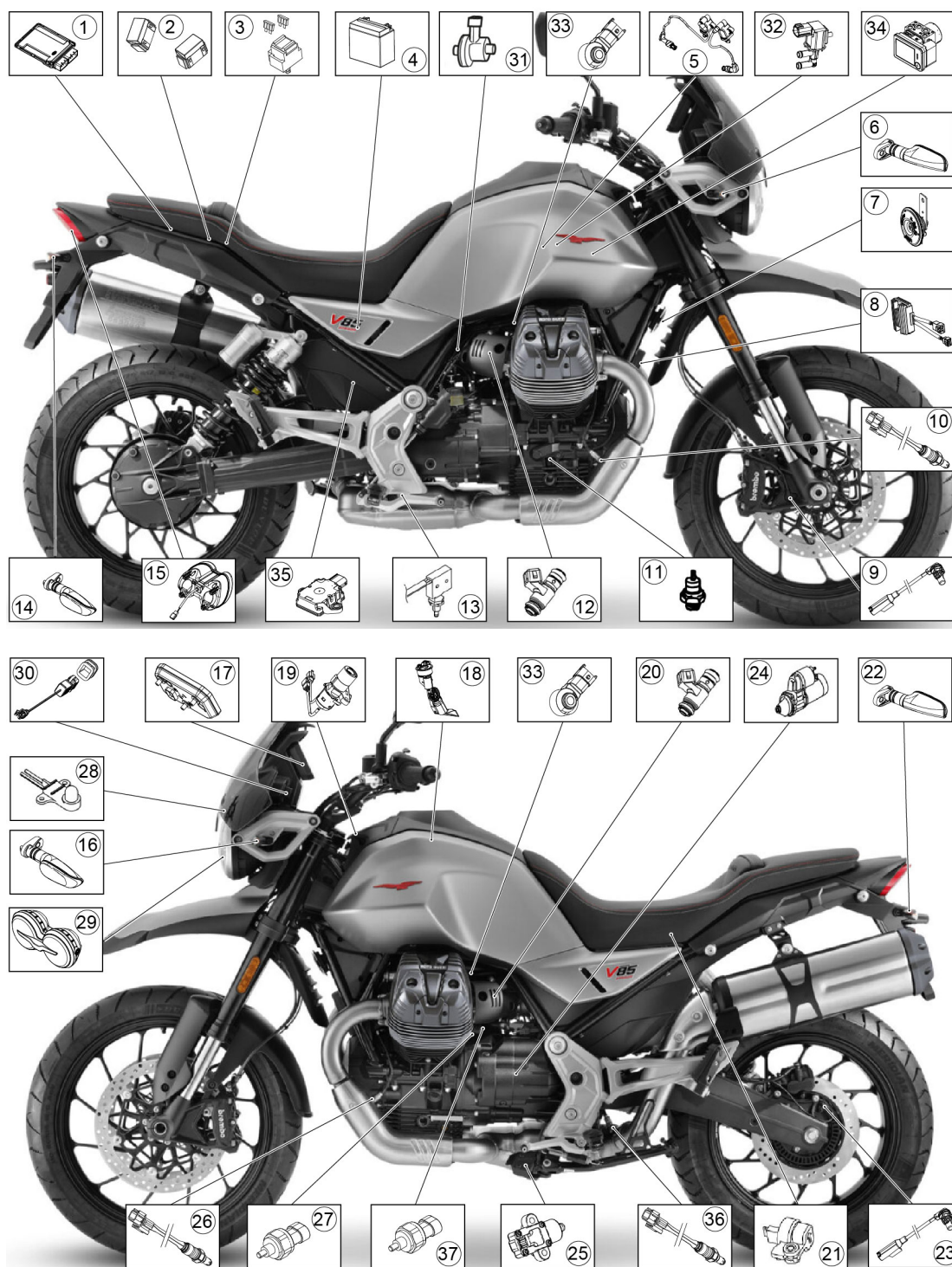
- **CHECK THAT THE VERTICAL ALIGNMENT OF THE BEAM IS CORRECT.**



LIST OF TOPICS

Electrical system

5.1 Component layout



Key:

1. Engine control unit

- 2 . Secondary fuses
- 3 . Main fuses
- 4 . Battery
- 5 . Coils
- 6 . Front right turn indicator
- 7 . Horn
- 8 . Voltage regulator
- 9 . Front speed sensor
- 10 . Right Lambda probe
- 11 . Oil pressure sensor
- 12 . Right injector
- 13 . Stop switch
- 14 . Rear right turn indicator
- 15 . Taillight
- 16 . Front left turn indicator
- 17 . Instrument cluster
- 18 . Fuel pump
- 19 . Key switch
- 20 . Left injector
- 21 . Fall sensor (V85 TT Strada)
- 22 . Rear left turn indicator
- 23 . Rear speed sensor
- 24 . Starter motor
- 25 . Stand switch
- 26 . LH oxygen sensor
- 27 . Engine temperature sensor
- 28 . air temperature sensor
- 29 . Headlamp
- 30 . USB port
- 31 . PURGE valve
- 32 . Secondary air valve
- 33 . Knock sensor
- 34 . ABS control unit
- 35 . IMU ECU (V85 TT - V85 TT Travel)
- 36 . Rear lambda probe catalytic converter
- 37 . Oil temperature sensor

5.2 Checks and controls

GENERAL NOTIONS FOR TROUBLESHOOTING ELECTRICAL FAULTS

THE SECTIONS RELATIVE TO THE ELECTRICAL SYSTEM CONTAIN DRAWINGS OF CONNECTORS; NOTE THAT THE DRAWING ALWAYS DEPICT THE CONNECTOR/COMPONENT VIEWED FROM THE WIRING HARNESS SIDE, I.E. FROM THE SIDE ON WHICH THE CABLES LEADING FROM THE MAIN WIRING HARNESS ENTER THE CONNECTOR/COMPONENT.

WARNING

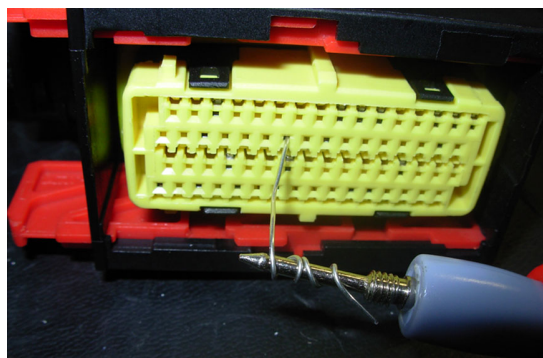


BEFORE STARTING ANY TROUBLESHOOTING PROCEDURES ON THE VEHICLE, CHECK THAT THE BATTERY VOLTAGE IS ABOVE 12V.

PROCEDURE FOR CHECKING CONNECTOR

This procedure consists of the following checks and inspections:

1. Visually inspect connector and check that it is fitted correctly onto the component or onto the relative connection point, and where applicable, check that the connector retainer or clip is correctly fastened.
2. Visually inspect the terminals on the connector: no rust marks or dirt should be present and it is important to check terminal correct positioning on the connector (i.e., all terminals aligned at the same depth) and terminal integrity (i.e., that terminals are not loose, open/bent, etc.). For connectors whose terminals are not visible (e.g. Marelli control unit) use a metal cable of suitable diameter and introduce it carefully in the connector slot at the same depth as for the other terminals of the connector.



WARNING



IN THE CASE OF SPORADIC FAULTS, MOVE OR WIGGLE THE RELATIVE WIRING HARNESS SLIGHTLY WHILE PERFORMING EACH OF THE CHECKS INDICATED FOR TROUBLESHOOTING.

3. Pull cables gently from the back of the connector to check that the terminals are fitted correctly on the connector and that the wires are fastened correctly to the terminals.

CONTINUITY check

Purpose of check: the purpose of this check is ensure that there are no interruptions or excess resistance (due to corroded terminals, for example) in the circuit under inspection.

Tester: set the tester selector to the "continuity" symbol and place the probes of the tested at the two ends of the circuit: Normally, the tester will sound an audible signal to confirm continuity in the section of circuit tested; Continuity may also be tested by setting the tester selector to the "Ohm" symbol and checking that the resistance in the circuit is zero or of a few tenths of an Ohm.

WARNING: THE CIRCUIT MUST BE UNPOWERED DURING THIS TEST. IF THE CIRCUIT IS POWERED, THE RESULTS OF THIS TEST ARE MEANINGLESS.

Checking GROUND CONNECTION

Purpose of check: the purpose of this check is to verify that a cable or circuit is correctly connected to the ground (-) of the vehicle.

Tester: set the tester selector to the "continuity" symbol and place one of the tester probes on the vehicle ground point (or on the battery negative pole) and the other probe on the cable under inspection: Normally, the tester will sound an audible signal to confirm continuity in the section of circuit tested. Continuity may also be tested by setting the tester selector to the "Ohm" symbol and checking that the resistance in the circuit is zero or of a few tenths of an Ohm.

WARNING: WHERE GROUND IS PROVIDED BY THE ECU, CHECK THAT THE ECU IS EFFECTIVELY PROVIDING THE GROUND CONNECTION FOR THE CIRCUIT DURING THE TEST.

Checking VOLTAGE

Purpose of check: the purpose of this check is to determine if a cable is carrying voltage, in other terms, to verify whether it powered by the battery or ECU.

Tester: set the tester selector to the "DC voltage" symbol and place the red tester probe on the cable under inspection and the black tester probe on the vehicle ground point (or on the battery negative pole).

WARNING



IN THE CASE OF SPORADIC FAULTS, MOVE OR WIGGLE THE RELATIVE WIRING HARNESS SLIGHTLY WHILE PERFORMING EACH OF THE CHECKS INDICATED FOR TROUBLESHOOTING.

5.2.1 Immobilizer

The vehicle is equipped with an electronic engine disabling system that is activated automatically when the ignition key is removed. Each key in the grip has an electronic device - transponder - which modulates the radio frequency signal emitted by a special aerial inside the switch when the vehicle is started. The modulated signal is the "password" by which the appropriate central unit recognises the key and only after this occurs, it allows the engine start-up.

The vehicle is delivered to the customer with two pre-programmed keys. The instrument cluster accepts a maximum of four keys at the same time. Approximately ten seconds after the key is set to ON, the instrument cluster requests a personal five-digit code to be entered.

On the leftmost value of the display, a variable value is shown that can be modified from 0 to 9, by using the MODE selector. Press the centre of the MODE selector to confirm each of the five digits. Once confirmed, the display shows the code in a fixed manner, this is so the user can check the code that has been entered. To remove the screen showing the code that has been entered, carry out a KEY OFF- KEY ON cycle. In the future you can always change the last code entered. This request message is no longer displayed once the personal code is entered.

It is important to remember the personal code because:

- the vehicle can be started if the immobilizer system is faulty
- the instrument cluster need not be replaced should the ignition switch be changed
- new keys can be programmed

N.B



IF THE PERSONA CODE IS NOT MEMORISED AND THE VEHICLE IS USED, THE MESSAGE DISAPPEARS AFTER 10 SECONDS BUT REAPPEARS WITH EACH KEY ON.

N.B



THE FACTORY SET CODE IS COMPOSED OF FIVE ZEROES.

All the functions for changing, storing or resetting the immobilizer codes can be carried out by the dealer, whereas some of the instrument cluster settings can also be carried out by the customer.

With the key set to "KEY OFF" the general alarm warning light flashes to indicate activation of the locking system.



If there is an immobilizer failure at ignition, the instrument cluster requests you to enter a user code. If the code is entered correctly, the instrument cluster signals the failure by displaying the word SERVICE and the red general warning light turns on.

Once the code has been correctly entered, the error will be displayed on the screen, and you can still start the motorcycle.



WARNING



PRESSING OR MOVING ANY CONTROL ON THE LEFT SWITCH CLUSTER,

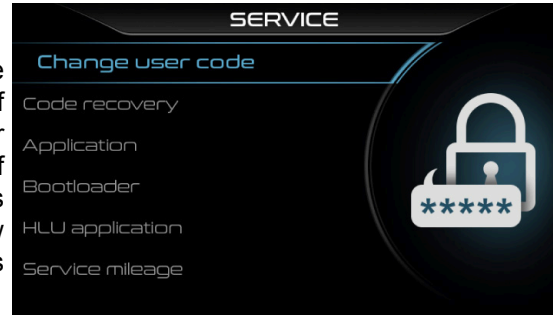
IT IS POSSIBLE TO REMOVE THE ERROR NOTIFICATION SCREEN, BUT THE SCREEN WILL BE VISIBLE AGAIN AFTER ABOUT 10 SECONDS.

Change user code (Change user code)

This function may be used to modify the existing code (you must be in possession of the code itself in order to do this). The user code enables engine start even in the event of an immobiliser system fault. The user code is set by default as five zeros (00000) on a new vehicle, and the message "INSERT CODE" is shown on the display for ten seconds.

This function allows you to change the code itself and remove this message.

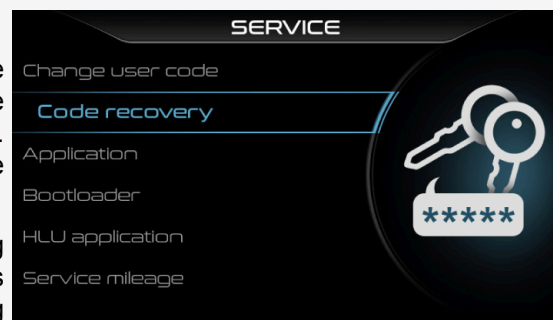
On the value to the leftmost of the display a value from 0 to 9 will be shown (which can be modified by moving the MODE selector upward or downward). Press the MODE RIGHT button briefly to confirm the selection. Repeat the operation for all the digits. Once the code is confirmed, the new code is shown steadily on the display to let the user verify that the code has been entered correctly. Turn the ignition off and then on again to unlock the instrument cluster. The last code set may be modified again in future. Access the setting mode again, enter the last user code used (OLD CODE), then enter a new user code (NEW CODE) as described previously.



Code recovery (Code recovery)

This function must be used should it be necessary to change the user code when the user no longer remembers the current code. Both keys stored in the vehicle memory are needed to access this function.

Once the function is activated, pressing the MODE RIGHT button briefly displays the message "INSERT KEY 1", requesting identification of the first key. Insert the key. If the correct key is recognised within twenty seconds, the message "INSERT KEY 2" is shown on the display. Insert the second key. If the second key is also recognised within twenty seconds, the instrument cluster resets the user code to the default code (five zeros -



00000). Enter the new user code following the "CHANGE USER CODE " procedure.



IMMOBILIZER ANTENNA

Function

detects the transponder code in the key and sends it to the instrument cluster

Level in electrical circuit diagram:

Immobilizer

Position:

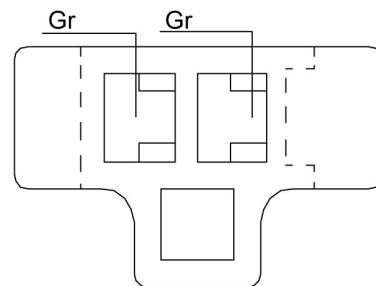
- on the vehicle: in the instrument cluster
- connector: two-way, grey, below the right side steering sleeve

Electrical specifications

- 14 Ohm

Pin out

not significant



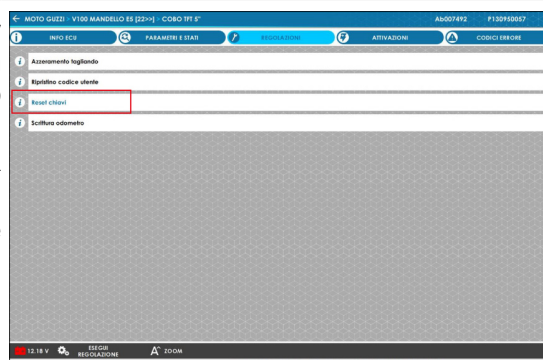
5.2.1.1 New keys storage

N.B



REGARDLESS OF THE LANGUAGE SET IN THE DASHBOARD FUNCTIONS, THE KEY PROGRAMMING PROCEDURE CAN ONLY BE VIEWED IN ENGLISH.

- To carry out the one or more key programming procedures, up to a maximum of four, you must connect the motorcycle to the diagnostic tool.
- Turn key to "ON" and insert the **USER CODE** where required.
- Carry out the self-diagnostic of the dashboard and enter the "**SETTINGS**" section by clicking on "**RESET KEYS**".



- At this point, a screen with a warning message will be visible. Press "OK" and start programming the keys.

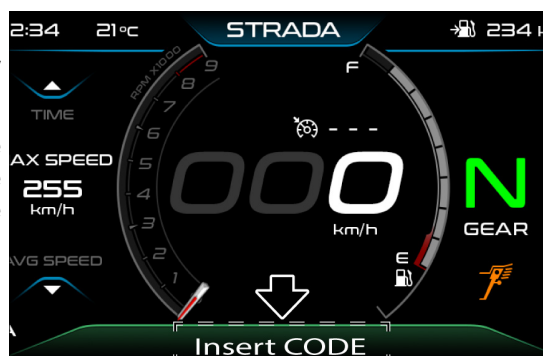
N.B



IF THE IMMOBILIZER ANTENNA IS DISCONNECTED, YOU WILL NOT BE ABLE TO START KEY PROGRAMMING.



- Enter the **USER CODE** to continue.
- If the code entered is correct, the first key is stored.
- At this point, on the digital display of the motorcycle, after the automatic restart of the dynamic presentation screen, a message will appear with a countdown of 20 seconds to insert the second key to be programmed.
- Set key to "OFF", insert the second key and set to "ON".



WARNING



IF YOU DO NOT HAVE A SECOND KEY OR YOU DON'T WANT TO STORE ONE, THE DIAGNOSTIC TOOL WILL SHOW AN ERROR INDICATING "1 KEY STORED" .

- The second key is stored and you will be asked to enter the third key (if you have one). The same operation will be repeated to store the fourth key.
- To complete AND end the memorisation procedure, set key to "OFF".
- You should then test the correct functioning of all keys stored.



5.2.2 Maintenance icon reset

The system displays the function as follows:

- After the maintenance interval thresholds are exceeded (excepting the first), an icon with the adjustable wrench is shown on the digital display.

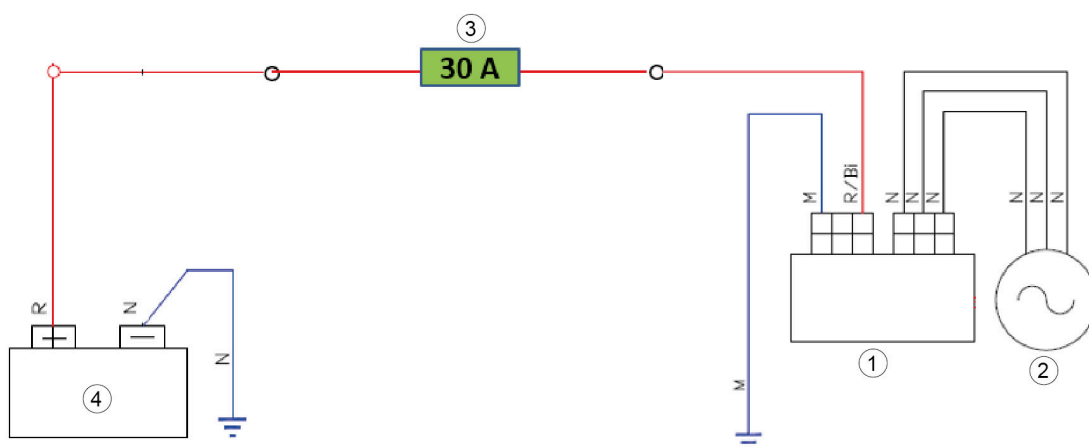
To reset Service proceed as follows:

- Connect the diagnostic tool;
- Select the concerned model;
- Enter in the "INSTRUMENT CLUSTER" section;
- Select "SELF-DIAGNOSTIC";
- Select "ACTIVATIONS";
- Enable the command "SERVICE RESET".



5.2.3 Recharge system

Electrical circuit:

**Key:**

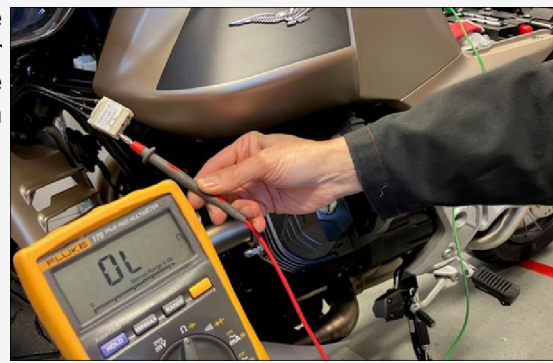
- 1 . Voltage regulator
- 2 . Three-phase stator with delta winding
- 3 . Main fuse
- 4 . Battery

CHECK OF INSULATION TO GROUND OF THE THREE STATOR WINDINGS

Remove the front left cover and disconnect the connector between the regulator and the stator.



Connect one test lead of the multimeter to the negative cable of the battery and the other test lead to the three phases to check the insulation, to ground, of the stator in each phase.



MEASUREMENT OF THE ELECTRICAL RESISTANCE OF THE THREE STATOR WINDINGS

The stator of the V85 has a delta winding, therefore the interruption of one of the three phases is detected by the corresponding electrical resistance value being different from the other two.

- Check, by touching the two test leads of the multimeter, that the electrical resistance value of the cables is **less** than 1 ohm.
- The recorded value must be subtracted from the value of the electrical resistance of each of the three phases.



- Disconnect the stator from the regulator and measure the value of the three electrical resistances using the multimeter. **CARRY OUT THE MEASUREMENT WITH THE STATOR BOTH COLD AND HOT.**
- **THE THREE RESISTORS MUST HAVE THE SAME ELECTRICAL RESISTANCE VALUE.**

Measurement of the electrical resistance of the three phases with a cold stator:

- 1 . $0.6 - 0.4 = 0.2 \pm 10 \% \text{ ohm}$
- 2 . $0.6 - 0.4 = 0.2 \pm 10 \% \text{ ohm}$
- 3 . $0.6 - 0.4 = 0.2 \pm 10 \% \text{ ohm}$



ZERO LOAD VOLTAGE TEST

This test must be carried out at 1500 and 3000 rpm at an ambient temperature $T = 23^{\circ} \pm 5^{\circ} \text{C}$.

Disconnect the stator from the regulator and, using a multimeter set to alternating voltage, measure the three phases at 1500 rpm and then at 3000 rpm.

1500 rpm - Voltage = 27.03 Volt



3000 rpm - Voltage = 38.59 Volt

It is important to underline that the alternating voltage values, detected on the three phases of the stator, must be equal.

**SHORT-CIRCUIT CURRENT TEST****WARNING**

THE FOLLOWING TEST MUST BE CARRIED OUT ONLY AT IDLE SPEED IN THE SHORTEST TIME POSSIBLE, IN ORDER TO AVOID DAMAGING THE STATOR.

- Disconnect the stator from the regulator and short-circuit the three stator phases as shown.
- Measure the alternating short-circuit current on the three phases using a current clamp.

The same short-circuit current value of **29.2 amps** must be measured on all three phases.



MINIMUM ABSORPTION CURRENT

- With the instrument panel off, connect the multimeter (set to direct current mA) in series to the electrical system.
- To do this, connect one test lead of the multimeter to one of the battery poles and the other to the corresponding terminal.



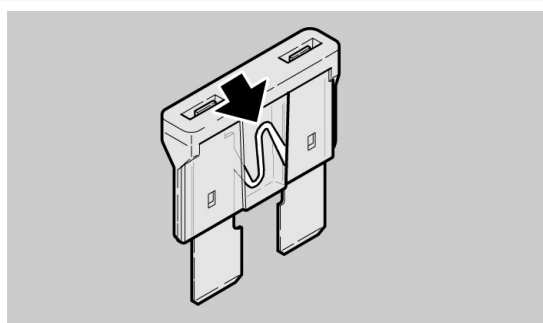
- Then disconnect the terminal from the corresponding battery pole and read the absorption current, which will vary continuously, due to the pulsation of the immobilizer warning light on the instrument cluster.
- During this operation keep the multimeter connected in series to the electrical system, as described above.



**Minimum current 0.41 A
consumption value:**

5.2.4 Fuses**To check:**

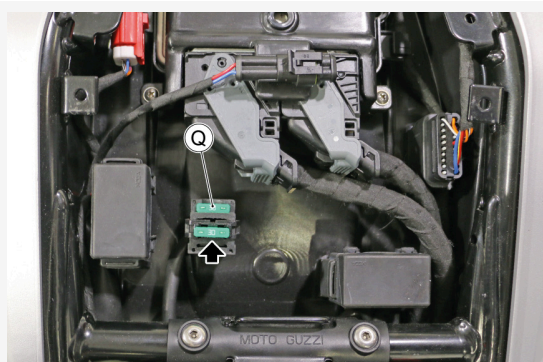
- Set the ignition switch to 'OFF' to avoid an accidental short circuit.
- Remove the seat.
- Remove the fuse box cover.
- Take out one fuse at a time and check if the filament is broken.
- Before replacing the fuse, find and solve, if possible, the reason that caused the problem.
- If the fuse is damaged, replace it with one of the same current rating.

**N.B**

**IF THE SPARE FUSE IS USED, REPLACE
WITH ONE OF THE SAME TYPE IN THE
CORRESPONDING FITTING.**

MAIN FUSE

- It is located under the passenger seat, in front of the E.C.U. control unit.

**MAIN FUSE**

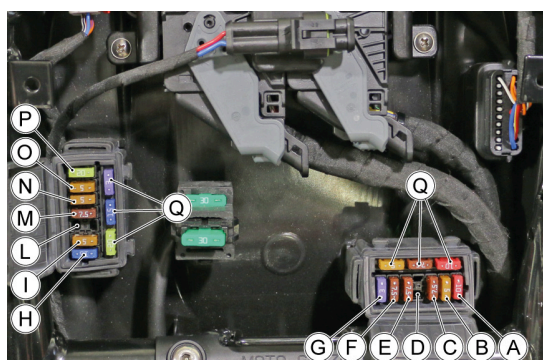
30A fuse

Loads of the entire vehicle.

Q) Spare fuses

SECONDARY FUSES

- They are located under the passenger seat, between the battery and the E.C.U. control unit.

**AUXILIARY FUSES (1)**

A) 10A fuse

Rear position, horn, licence plate light.

B) 5A fuse

Fog lights live positive lead (if applicable).

C) 7.5A fuse

Positive key-on power for ECU, positive key-on for instrument cluster, positive key-on for ABS, positive key-on for right (START) light switch, secondary starter relay, positive key-on for inertial platform, positive key-on for TPMS.

D)

Free

E) 7.5A fuse

Positive key-on power for GMP, positive key-on power for OBD2, positive key-on power for anti-theft system.

F) 7.5A fuse

Positive key-on power for headlamp (load).

AUXILIARY FUSES (1)

G) 3A fuse

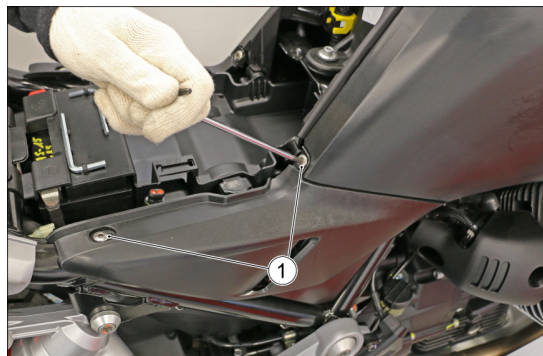
USB 1 and USB 2 key-on positive (if provided).

Q) Spare fuses

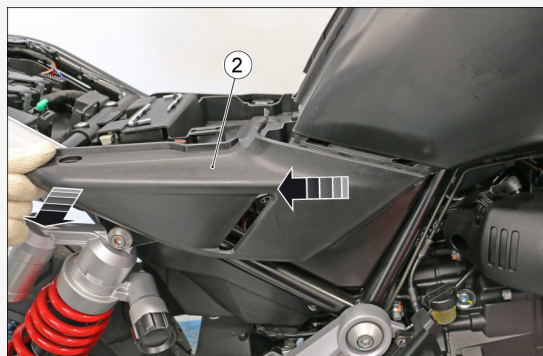
5.2.5 Relay

Whenever relays need to be serviced, to avoid an accidental short-circuit, place the power switch to "OFF".

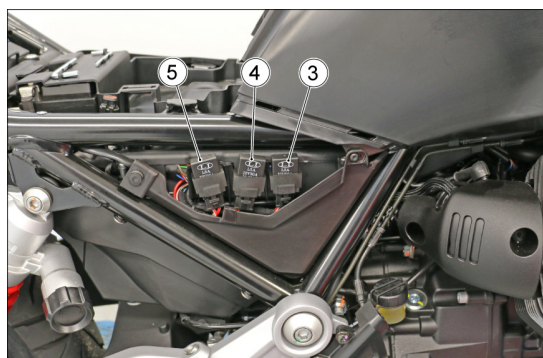
- To access the relay is necessary to remove the saddle, then remove the two fixing screws (1) of the right side fairing.



- Move the right side fairing (2) towards the rear of the vehicle and remove it from the vehicle itself.



- Once the side fairing has been removed, access is possible to: starter relay (3), fuel pump relay (4), injection relay (5).



5.2.6 ECU

ENGINE TONE WHEEL PROGRAMMING PROCEDURE

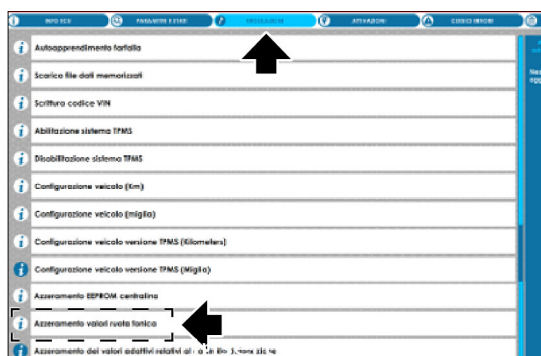
- Select "Tone wheel reset" via the PADS diagnostic tool;
- Bring the engine to a temperature above 80°;

Then proceed as described:

- Mount the vehicle in neutral, with the side stand in the riding position and with the vehicle stationary (engaging on the rear brake) accelerate up at 7,000 rpm;
- release the throttle completely until the idle speed is stable;
- Repeat this procedure three times.

The success of the procedure is confirmed by the immediate turning off of the MIL light (in the presence of other errors the MIL light may remain on but in any case stops flashing).

Switch off the panel and wait for at least one minute (Power Latch).



WARNING



DURING THE ENGINE TONE WHEEL PROGRAMMING PROCEDURE, THE VEHICLE'S SPEED MUST ALWAYS BE 0 km/h.

IN CERTAIN CASES, EVEN SMALL VIBRATIONS GENERATED BY THE ENGINE (WITH THE ENGINE IN NEUTRAL POSITION AND THE SIDE STAND EXTENDED/OPEN, THE INSTRUMENT PANEL DOES NOT DETECT THE VEHICLE'S SPEED), MAY CAUSE THE PROCEDURE TO FAIL, WHICH MEANS IT HAS TO BE REPEATED.

IN THIS CASE, REPEAT THE PROCEDURE WITH THE SIDE STAND CLOSED AND VEHICLE IN NEUTRAL ALWAYS PAYING EXTREME ATTENTION. FOR MORE SAFETY, POSSIBLY BLOCK THE VEHICLE AGAINST A WALL.

WARNING



PROGRAMMING OF THE TONE WHEEL TAKES PLACE DURING THE RELEASE PHASE OF THE THROTTLE (FROM 7000 rpm TO IDLE RPM). IN THIS DESCENDING PHASE THE THROTTLE GRIP MUST REMAIN COMPLETELY CLOSED.

MISFIRE CHECK

The MISFIRE function consists of the system's capacity to recognize **Misfires**. This check is necessary because in the event of a misfire, due to a dirty spark plug for example, the engine emits unburned hydrocarbons. The single MISFIRE can be diagnosed by detecting a deceleration of the crankshaft (for this reason the procedure for calibrating the tone wheel is important). The E5 regulation requires the intervention of the ECU (lighting of the MIL), before repeated Misfires exceed the pre-established limits.

The control of Misfires is very difficult when dealing with unrefined petrol and sometimes mixed with low-cost agricultural petroleum.

ECU 11MP (ENGINE ECU)

The **Marelli 11 MP** ECU is a highly advanced **Ride By Wire** injection system. The 11 MP contains a barometric sensor, which allows a faster calculation of the air flow when climatic conditions change.

The 11MP allows very precise engine management that complies with **EURO 5+** regulations, supporting mapping selection, cruise control and traction control.

During driving, the control unit receives the throttle opening command via a two-track potentiometer called the **Demand** (throttle knob). The control unit will then manage the outputs of:

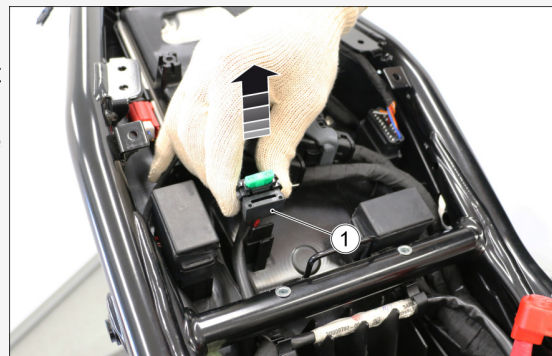
- Throttle opening;
- Injection time;
- Ignition advance.

There are two separate connectors; the larger (1) is dedicated to engine management and the smaller (2) to vehicle interface.

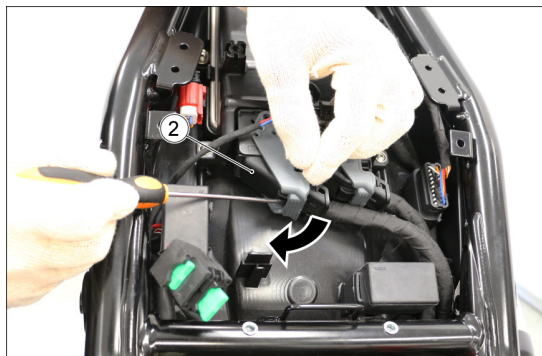


Removal

- Remove the rider's saddle and disconnect the battery.
- Release the main fuse-holder (1) from the wheel arch support.



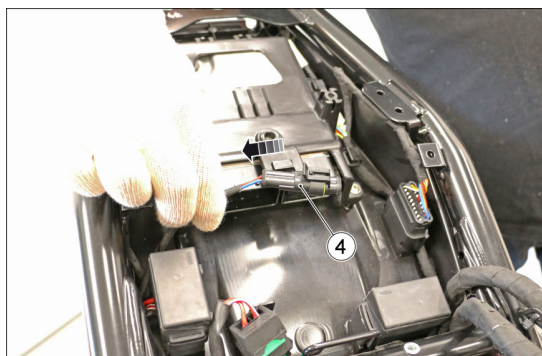
- Press the safety tab, rotate the trigger lever and disconnect the connector (2) from the E.C.U.



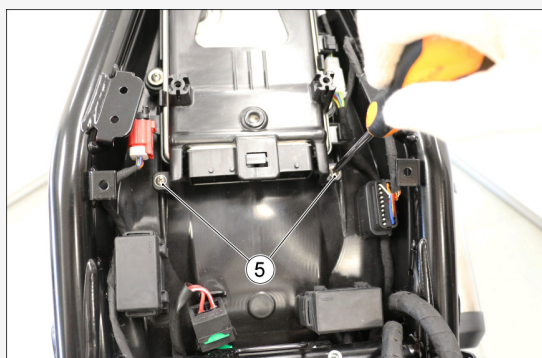
- Press the safety tab, rotate the trigger lever and disconnect the connector (3) from the E.C.U.



- Release the connector (4) from the ECU support.



- Remove the two fastening screws (5).



- Remove the upper fastener (6) of the ECU support.



- Remove the E.C.U. control unit. (7) from the vehicle.



WARNING



WHEN REASSEMBLING THE CONNECTORS, THE SLIDES MUST SLIDE FREELY UP TO THE LIMIT STOP, THUS FACILITATING THE CONNECTOR'S INSERTION: THE CATCH SHOULD SNAP INTO PLACE ONCE THE LIMIT STOP IS REACHED.

N.B



IF THE 11MP CONTROL UNIT IS REPLACED, IT WILL SELF-ADAPT TO THE VEHICLE PARAMETERS. DURING THE FIRST TENS OF KILOMETRES OF VEHICLE USE, THE CONTROL UNIT WILL LEARN THE PARAMETERS NECESSARY FOR THE REGULAR OPERATION OF THE ENGINE AND THE VEHICLE ITSELF.

CONTROL UNIT - Diagnosis

Function

It manages the Ride by wire system, the injection/ignition, the system safety checks and the self-diagnostic function

Level in electrical circuit diagram:

Each level in which the main component involves the control unit

Position:

- on the vehicle: under the passenger seat.

Pin out: See CONNECTORS paragraph

(screen page/example values with key ON)

- Drawing number / - (identified inserted by the manufacturer)
- HW number/ - (indicates the Hardware number)
- Hardware version / -
- Mapping / - (indicates the mapping number)
- Software version / -
- Type approval number / -
- ISO code / -
- Marelli SW code / -
- Serial number (NIP)
- Author of the latest progr. / - (author of the latest programming)
- Internal code (IDEEKE) / -
- Internal code (IDVAG1) / -
- Hardware code / - (indicates the hardware code)
- VIN / - (vehicle identification number)

ADAPTIVE FUEL CORRECTION (EEPROM RESET)

Adaptive fuel correction aims to store the lambda correction when it corresponds to a stable steady state. It is divided into two tables for each cylinder, one for the cold engine and one for the warm engine; the diagnosis tool will only display the adaptive parameter applied by the ECU at that precise moment (hot/cold engine, throttle valve opening, engine rpm). The adaptive correction is cancelled when, using the diagnosis tool, the Adaptive Parameters Reset is carried out (**EEPROM RESET**), or when loading a new mapping. It is recommended to perform the **EEPROM RESET** on the occasion of:

- Air filter cleaning;
- Spark plug replacement;
- Valve clearance adjustment;
- Repairs to the intake or exhaust system.

DERATING STRATEGY

Using the **engine oil temperature sensor**, the 11MP control unit is able to monitor and control the engine oil temperature through the DERATING strategy, preventing it from exceeding **150° C (302° F)**. THE DERATING strategy begins when the engine oil exceeds **113° C (235.4° F)** and involves a gradual decrease in engine torque through a reduction in engine load and ignition advance (to avoid knocking problems). Through the P.A.D.S. diagnosis tool it is possible to verify the **torque reduction (up to -40%)** present at the moment of connection.

High operating temperatures are an important factor in the deterioration of engine oil, which affects the correct lubrication of all related mechanical components. The 11 MP ECU is able to record the number of kilometres travelled with a high engine oil temperature and cause the premature lighting of the maintenance warning light on the instrument panel.

RECOVERY STRATEGIES

Various recovery strategies, characterised by a progressively increasing level of impact on vehicle driving, are provided to ensure maximum driving safety while minimising inconvenience for the customer in the event of a breakdown. Depending on the impact the failure will have on

the safe running/integrity of the engine, the indication on the instrument cluster may be more or less obvious:

Level 1: error recognised, but not of safety significance and not noticeable to the driver => No indication on the instrument cluster

Level 2: Safety-insignificant error but noticeable to the driver => Fixed warning light and display of **SERVICE** message on the instrument cluster.

Level 3: error impairing safety => Flashing warning light and display of the message **URGENT SERVICE** on the instrument cluster.

Four Recovery are possible depending on the severity of the technical problem detected:

1. Recovery Degraded Torque: torque and maximum engine speed are reduced, so as to avoid critical driving situations or engine damage. Such a recovery is, for example, applied when one of the tracks of the TPS or the DEMAND SENSOR fails.

2. Recovery Limp Home: the ECU manages throttle position, advance and injection time in such a way as to keep the engine at a constant idle speed, regardless of the action on the throttle knob. The rider is thus able to drive the vehicle to the repair shop (e.g. in the event of failure of both DEMAND SENSOR tracks).

3. Recovery dead throttle valve: the throttle valve motor is switched off, the valve then moves to the rest position (which is slightly open). In turn, the ECU manages the advance and injection time so as to keep the engine at an accelerated idle speed. This recovery is applied, for example, when both traces of the TPS are faulty or when the MAP sensor reading is implausible (throttle body off).

4. Recovery engine stop: The control unit shuts down the engine when it detects its own internal error or finds that the throttle cannot be set to the accelerated idle position.

DIAGNOSTIC TOOL - 11MP Engine Control Unit ERRORS

ERROR	CODE	DESCRIPTION
P0011	62	VVT actuator stuck in advanced position (low rpm)
P0014	62	VVT actuator stuck in delayed position (high rpm)
P0016	76	VVT tone wheel self-learning error
P0030	12	Left lambda heater circuit - SC to Vbatt
P0030	11	Left lambda heater circuit - SC to Gnd
P0030	13	Left lambda heater circuit - OC
P0036	12	Lambda heater failure downstream the catalytic converter (electrical diagnosis) - SC to Vbatt

ERROR	CODE	DESCRIPTION
P0036	11	Lambda heater failure downstream the catalytic converter (electrical diagnosis) - SC to Gnd
P0036	13	Lambda heater failure downstream the catalytic converter (electrical diagnosis) - OC
P0050	12	Right lambda heater circuit - SC to Vbatt
P0050	11	Right lambda heater circuit - SC to Gnd
P0050	13	Right lambda heater circuit - OC
P0105	12	Left cylinder air pressure sensor - SC to Vbatt
P0105	14	Left cylinder air pressure sensor - OC, SC to Gnd
P0106	62	Left cylinder air pressure sensor
P0106	22	Left cylinder air pressure sensor - Above the maximum limit
P0106	21	Left cylinder air pressure sensor - Below the minimum limit
P0110	15	Air temperature sensor - OC or SC to Vbatt
P0110	11	Air temperature sensor - SC to Gnd
P0111	66	Air temperature sensor - functional diagnosis (intermittent)
P0111	62	Air temperature sensor - functional diagnosis (locked)

ERROR	CODE	DESCRIPTION
P0114	66	Air temperature sensor - intermittent signal
P0115	15	Engine temperature sensor - OC, SC to Vbatt
P0115	11	Engine temperature sensor - SC to Gnd
P0116	62	Engine temperature sensor - functional diagnosis (stuck)
P0116	66	Engine temperature sensor - functional diagnosis (intermittent)
P0119	66	Coolant temperature sensor - Intermittent signal
P0120	12	Potentiometer sensor 1 throttle valve position - SC to Vbatt
P0120	14	Potentiometer sensor 1 throttle valve position - OC or SC to Gnd
P0121	62	Potentiometer plausibility 1 throttle valve - signal not plausible
P0130	11	Left lambda probe - SC to Gnd (polarised probe only)
P0130	12	Left lambda probe - SC to Vbatt
P0130	13	Left lambda probe - OC (polarised probe only)
P0133	62	Left lambda probe (functional diagnosis) - slow response
P0134	62	Left lambda probe (functional diagnosis) stuck - no switching from high
P0135	1E	Left lambda heater - Circuit resistance out of range

ERROR	CODE	DESCRIPTION
P0136	12	Lambda probe sensor failure downstream of the catalytic converter (electrical diagnosis) - SC to Vbatt
P0136	11	Lambda probe sensor failure downstream of the catalytic converter (electrical diagnosis) - SC to Gnd
P0136	13	Lambda probe sensor failure downstream the catalytic converter (electrical diagnosis) - OC
P0139	62	Lambda probe sensor failure downstream the catalytic converter (functional diagnosis) - slow response
P0140	24	Lambda probe downstream of the catalytic converter blocked (functional diagnosis) - blocked
P0141	1E	Lambda heater failure downstream the catalytic converter (functional diagnosis) - out of range
P0150	12	Right lambda probe - SC to Vbatt
P0150	11	Right lambda probe - SC to Gnd (polarised probe only)
P0150	13	Right lambda probe - OC (polarised probe only)
P0153	62	Right lambda probe (functional diagnosis) - Slow response
P0154	62	Right lambda probe (functional diagnosis) stuck - no switching from high
P0155	1E	Right lambda heater - Circuit resistance out of range

ERROR	CODE	DESCRIPTION
P0171	85	Poor status for the left power supply system - Signal above the admissible range
P0172	84	Rich status for the left power supply system - Signal above the admissible range
P0174	85	Poor status for the right power supply system - Signal above the admissible range
P0175	84	Rich status for the right power supply system - Signal above the admissible range
P0195	11	Engine oil temperature sensor - SC to Gnd
P0195	15	Engine oil temperature sensor - OC, SC to Vbatt
P0196	62	Engine oil temperature sensor - functional diagnosis (stuck)
P0196	66	Engine oil temperature sensor - functional diagnosis (Intermittent)
P0199	66	Oil temperature sensor - Intermittent signal
P0201	12	Left cylinder injector - SC to Vbatt
P0201	11	Left cylinder injector - SC to Gnd
P0201	13	Left cylinder injector - OC
P0202	12	Right cylinder injector - SC to Vbatt
P0202	11	Right cylinder injector - SC to Gnd
P0202	13	Right cylinder injector - OC
P0220	12	Potentiometer sensor 2 throttle valve position - SC to Vbatt

ERROR	CODE	DESCRIPTION
P0220	14	Potentiometer sensor 2 throttle valve position - OC or SC to Gnd
P0221	62	Potentiometer plausibility 2 throttle valve - signal not plausible
P0225	12	Pot. A track grip position sensor - SC to Vbatt
P0225	14	Pot. A track grip position sensor - OC, SC to Gnd
P0230	12	Fuel pump relay control - SC to Vbatt
P0230	11	Fuel pump relay control - SC to Gnd
P0230	13	Fuel pump relay control - OC
P0230	15	Fuel pump relay control - OC, SC to Vbatt
P0300	98	Random/multiple cylinder error 200 detected
P0300	92	Random/multiple cylinder error 1000 detected
P0301	98	Left cylinder error 200 detected
P0301	92	Left cylinder error 1000 detected
P0302	98	Right cylinder error 200 detected
P0302	92	Right cylinder error 1000 detected
P0325	12	Left cylinder knocking sensor diagnostics - SC to Vbatt
P0330	12	Left cylinder knocking sensor diagnostics - SC to Vbatt
P0336	62	Engine speed sensor - signal not plausible

ERROR	CODE	DESCRIPTION
P0340	11	electrical diagnosis on camshaft sensor (VVT) - SC to Gnd
P0351	12	Left coil circuit - SC to Vbatt
P0351	14	Left coil circuit - OC, SC to Gnd
P0352	12	Left coil circuit - SC to Vbatt
P0352	14	Right coil circuit - OC, SC to Gnd
P0410	12	Secondary air valve control - SC to Vbatt
P0410	11	Secondary air valve control - SC to Gnd
P0410	13	Secondary air valve control - OC
P0420	21	Catalytic converter efficiency below the permitted threshold - below threshold
P0443	12	Bleed valve control circuit Evaporative emission system - SC to Gnd
P0443	11	Bleed valve control circuit Evaporative emission system - SC to Vbatt
P0443	13	Bleed valve control circuit Evaporative emission system - OC.
P0500	01	Front wheel vehicle speed sensor/signal - Sensor electrically defective
P0500	29	Front wheel vehicle speed sensor/signal - Invalid electrical signal
P0500	62	Front wheel vehicle speed sensor/signal - Sensor signal not plausible

ERROR	CODE	DESCRIPTION
P0500	64	Front wheel vehicle speed sensor/signal - Invalid plausibility signal
P0505	84	RPM of idle control system - lower than expected
P0505	85	RPM of idle control system - higher than expected
P0512	62	Starter Engine button (functional while pressed) - signal not plausible
P0560	22	Battery voltage - above maximum limit
P0560	21	Battery voltage: Below minimum threshold
P0564	62	GCC button errors (On/Off, +, -,) - Signal not plausible
P0564	64	GCC button errors (On/Off, +, -,) - Stuck button error
P0601	62	EEPROM Error - signal not plausible
P0604	62	RAM error - signal not plausible
P0605	62	ROM error - signal not plausible
P060B	86	A/D converter - circuit not working
P060C	86	Engine stop due to Safety - circuit not working
P0615	12	Starter relay - SC to Vbatt
P0615	14	Starter relay - OC, SC to Gnd
P0638	64	DBW 1 position error - EPOS error
P0641	01	Sensor power supply 1 - Internal electronic fault

ERROR	CODE	DESCRIPTION
P0651	01	Sensor power supply 2 - Internal electronic fault
P0685	12	Main relay control - SC to Vbatt
P0685	11	Main relay control - SC to Gnd
P0685	13	Main relay control - OC
P0697	01	Sensor power supply 3 - Internal electronic fault
P0704	62	Clutch switch plausibility error - signal not plausible
P0914	15	Analogue gear sensor - OC, SC to Vbatt
P0914	11	Analogue gear sensor - SC to Gnd
P0915	62	Analogue operation sensor - blocked or out of range
P1305	12	Brake lights relay error - SC to Vbatt
P1305	11	Brake lights relay error - SC to Gnd
P1305	13	Brake light relay error - OC
P1309	55	Flywheel learning error - signal not plausible
P1400	64	DBW1 Limp Home self-learning - LH test failed
P1401	64	DBW 1 (opening) spring test self-learning - opening spring test failed
P1402	64	DBW lower mechanical stop self-learning - lower mechanical stop error
P1403	64	Rec. condition self-learning. DBW 1 - test condition errors

ERROR	CODE	DESCRIPTION
P1404	64	DBW 1 supply voltage self-learning - below the minimum limit
P1405	64	DBW1 spring test (re-closure) spring test self-learning - re-closure spring test failed
P1412	62	DBW 1 self-learning - Test not carried out
P1414	86	DBW 1 Self Learning Limp Home Diagnosis - circuit not working
P1560	18	Low Battery Voltage Error - Voltage Error
P1600	64	Left cylinder manifold small hole error - signal not plausible
P1602	22	Left cylinder intake manifold pressure estimation error - pressure too high
P1602	21	Left cylinder intake manifold pressure estimation error - pressure too low
P1606	45	Incompatibility error between Software and Hardware
P1608	62	Data buffer full and triggered by special events
P1609	38	A-PRC functional error - Scheduling error
P1609	41	A-PRC functional error - CKSUM flash error
P1609	52	A-PRC functional error - Voltage error
P160C	47	Safety level2 reset - circuit not working
P1615	62	ROM checksum test failure report performed on code 2&3 and calibration areas

ERROR	CODE	DESCRIPTION
P1650	62	Engine event configuration checksum calculation error - signal not plausible
P1753	62	Brake pedal switch 1 - Signal comparison error
P1754	62	Brake pedal switch 2 - Signal comparison error
P1760	62	Stand switch congruence - Signal comparison error
P2100	12	HBridge DBW 1 - SC to Vbatt
P2100	11	HBridge DBW 1 - SC to Gnd
P2100	13	HBridge DBW 1 - OC
P2100	1D	HBridge DBW 1 - Overtemperature, current overload
P2130	12	Pot. B track grip position sensor - SC to Vbatt
P2130	14	Pot. B track grip position sensor - OC, SC to Gnd
P2135	62	Throttle valve position sensor congruency
P2140	62	Track A-B hand grip position redundancy - signal not congruent
P2158	01	Rear wheel vehicle speed sensor/signal - Electrically defective sensor
P2158	29	Rear wheel vehicle speed sensor/signal - Invalid electrical signal
P2158	62	Rear wheel vehicle speed sensor/signal - Sensor signal not plausible

ERROR	CODE	DESCRIPTION
P2158	64	Rear wheel vehicle speed sensor/signal - Invalid plausibility signal
P2175	62	Left cylinder manifold pressure too low error - signal not plausible
P2227	62	Barometric pressure sensor - Plausibility at key on
P2227	01	Barometric pressure sensor - generic hardware fault
U0001	88	CAN line diagnosis (NCM) Bus Off - bus off
U0002	87	Mute Node CAN Line - Mute Node
U0121	87	CAN line diagnosis ABS or CLF ECU - Absent signal
U0121	64	CAN line diagnosis ABS or CLF ECU - signal not plausible
U0140	87	NQS CAN line diagnosis-Dashboard node absent - absent signal
U0426	64	Immobilizer error - signal not plausible
U1121	87	CAN line diagnosis ABS or CLF ECU Frame counter - Absent signal
U1140	87	NQS CAN line diagnosis-Dashboard package counter - Absent signal
C1D90	/	Front wheel speed sensor - electrical fault
C1D91	/	Front wheel speed sensor - extrapolation fault
C1D92	/	Front wheel speed sensor - periodic fault

ERROR	CODE	DESCRIPTION
C1D93	/	Front wheel speed sensor - recognition start failure
C1D94	/	Front wheel speed sensor - phase length supervision fault
C1D95	/	Front wheel speed sensor - dual frequency control
C1D9A	/	Front wheel pressure sensor
C1DA0	/	Rear wheel speed sensor - electric fault
C1DA1	/	Rear wheel speed sensor - extrapolation fault
C1DA2	/	Rear wheel speed sensor - periodic fault
C1DA3	/	Rear wheel speed sensor - recognition start failure
C1DA4	/	Rear wheel speed sensor - phase length supervision fault
C1DA5	/	Rear wheel speed sensor - dual frequency control
C1DD3	/	OSEK error
C1DF0	/	Defective pump
C1DF1	/	Pump connection error
C1DF2	/	Hardware fault
C1DF3	/	Voltage too low detected in the long term
C1DF4	/	Voltage too low
C1DF5	/	Hardware inside error
C1DF7	/	Voltage too high
C1E11	/	CAN BUS error
C1E59	/	Vehicle variant coding error

ERROR	CODE	DESCRIPTION
C1E5A	/	ABS switch fault
C1F13	/	IMU - Invalid or not plausible data error
C1F14	/	IMU - Incorrect Voltage
C1F15	/	IMU - Signal error, before ABS initialisation
C1F18	/	IMU - CAN communication loss with IMU
C1F19	/	IMU - Mismatch with IMU ID
U30CB	/	Code check failed - undervoltage

DIAGNOSTIC TOOL - INSTRUMENT PANEL ECU ERRORS

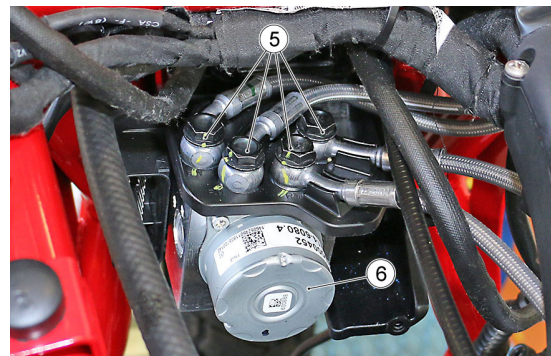
CODE	DESCRIPTION / SYMPTOMS
B0001	Oil sensor fault
B0002	Oil pressure fault
B0003	Immobilizer: Key code read but not recognised
B0004	Immobilizer: Key code reading error
B0005	Immobilizer: antenna electrical fault (open circuit or short circuit)
B0006	Immobilizer: internal error
B0007	Immobilizer: insufficient number of keys memorised
B0010	Engine overtemperature error
B0012	Fuel sensor disconnected
B0013	Fuel sensor configuration error
B0020	Vehicle not configured
B0100	Can line reception error
B0110	Can line transmission error
B0111	Headlight sensor CAN line reception error
B0130	Loss of SCU CAN reception
B0131	SCU Configuration error

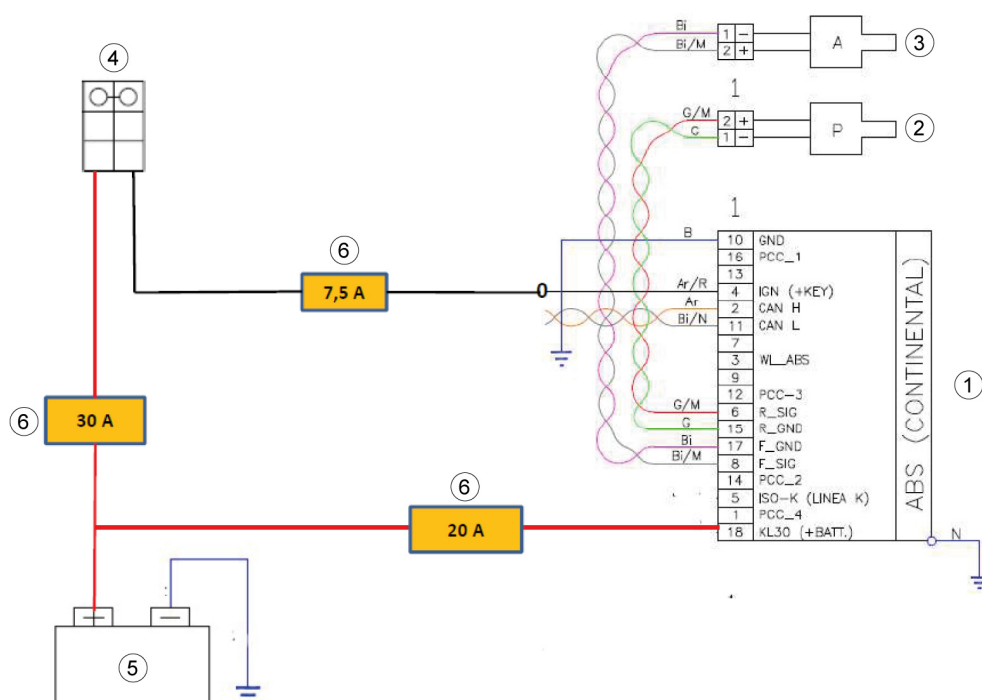
CODE	DESCRIPTION / SYMPTOMS
B0210	Front brake lever locked
B0211	Rear brake lever locked
B0301	Left turn indicators button locked
B0302	Right turn indicators button locked
B0303	Reset indicator button locked
B0304	MODE UP button locked
B0305	MODE DOWN button locked
B0306	MODE SET button locked
B0307	MODE RIGHT button locked
B0308	MODE RIDING button locked
B0309	CRUISE UP button locked
B0310	CRUISE DOWN button locked
B0311	CRUISE SET button locked

ABS CONTROL UNIT

Position

- ECU: Fastened to the ABS modulator, under the steering headstock.
- Connector: on the control unit.





ABS CONTROL UNIT

Key:

- 1 . ABS control unit
- 2 . Rear ABS sensor
- 3 . Front ABS sensor
- 4 . Key switch
- 5 . Battery
- 6 . Fuse

DIAGNOSTIC TOOL - ABS ECU ERRORS

CODE	DESCRIPTION / SYMPTOMS
C1D90	Front wheel speed sensor - electrical fault
C1D91	Front wheel speed sensor - extrapolation fault
C1D92	Front wheel speed sensor - periodic fault
C1D93	Front wheel speed sensor - recognition start failure
C1D94	Front wheel speed sensor - phase length supervision fault
C1D95	Front wheel speed sensor - dual frequency control
C1D9A	Front wheel pressure sensor
C1DA0	Rear wheel speed sensor - electric fault

CODE	DESCRIPTION / SYMPTOMS
C1DA1	Rear wheel speed sensor - extrapolation fault
C1DA2	Rear wheel speed sensor - periodic fault
C1DA3	Rear wheel speed sensor - recognition start failure
C1DA4	Rear wheel speed sensor - phase length supervision fault
C1DA5	Rear wheel speed sensor - dual frequency control
C1DD3	OSEK error
C1DF0	Defective pump
C1DF1	Pump connection error
C1DF2	Hardware fault
C1DF3	Voltage too low detected in the long term
C1DF4	Voltage too low
C1DF5	Hardware inside error
C1DF7	Voltage too high
C1E11	CAN BUS error
C1E59	Vehicle variant coding error
C1E5A	ABS switch error
C1F13	IMU - Invalid or not plausible data error
C1F14	IMU - Incorrect Voltage
C1F15	IMU - Signal error, before ABS initialisation
C1F18	IMU - CAN communication loss with IMU
C1F19	IMU - Mismatch with IMU ID
U30CB	Code check failed - undervoltage

ABS ECU ERRORS HELP LIST

CODE	ACTION REQUIRED
C1D90	In case of short circuit to negative, check the wiring harness. Perform sensor replacement test. Contact technical service, further checks and/or replacement of the ECU.
C1D91	Perform sensor replacement test. Contact technical service, further checks and/or replacement of the ECU.

CODE	ACTION REQUIRED
C1D92	Perform sensor replacement test. Contact technical service, further checks and/or replacement of the ECU.
C1D93	Check the pressure and wear of the tyres. Check the tone wheels, the air gaps of the speed sensors. Perform a replacement test of the front and rear wheel speed sensors. Contact technical service, further checks and/or replacement of the ECU.
C1D94	Perform sensor replacement test. Contact technical service, further checks and/or replacement of the ECU.
C1D95	Perform sensor replacement test. Contact technical service, further checks and/or replacement of the ECU.
C1D9A	Check the connections of the front wheel pressure sensor. Contact technical service to check the replacement of the component.
C1DA0	In case of short circuit to negative, check the wiring harness. Perform sensor replacement test. Contact technical service, further checks and/or replacement of the ECU.
C1DA1	Perform sensor replacement test. Contact technical service, further checks and/or replacement of the ECU.
C1DA2	Perform sensor replacement test. Contact technical service, further checks and/or replacement of the ECU.
C1DA3	Check the tone wheel (number of teeth also), the air gap of the speed sensor. Try to replace the actual sensor.
C1DA4	Check the tone wheel (number of teeth also), the air gap of the speed sensor. Try to replace the actual sensor.
C1DA5	Perform sensor replacement test. Contact technical service, further checks and/or replacement of the ECU.
C1DD3	Contact technical service

CODE	ACTION REQUIRED
C1DF0	Check the wiring harness. Contact technical service to confirm the replacement of the component
C1DF1	Check the wiring harness. Contact technical service to confirm the replacement of the component
C1DF2	Contact technical service to confirm the replacement of the ECU
C1DF3	Check the status of the battery and the efficiency of the charging system.
C1DF4	Check the status of the battery and the efficiency of the charging system.
C1DF5	Contact technical service to confirm the replacement of the ECU
C1DF7	Check the efficiency of the voltage regulation system.
C1E11	Check the integrity of the electrical circuit: disconnect the 12V battery and set the multimeter to Ohmmeter. Connect the multimeter to terminal pins of the CAN and check the reading is 60 Ohm. If however, the circuit is interrupted, the multimeter will give a reading equal to 120 Ohm. If the two wires, CAN H and CAN L, were short-circuited to each other, the resistance measurement would be equal to 0 ohm. Contact technical service.
C1E59	Carry out the coding of the ABS ECU using PADS.
C1E5A	Check the ABS switch wiring harness. Contact technical service.
C1F13	Invalid or implausible data error related to inertial platforms
C1F14	Incorrect Inertial platform voltage
C1F15	Inertial platform signal error before ABS initialization
C1F18	Loss of CAN communication with the inertial platform

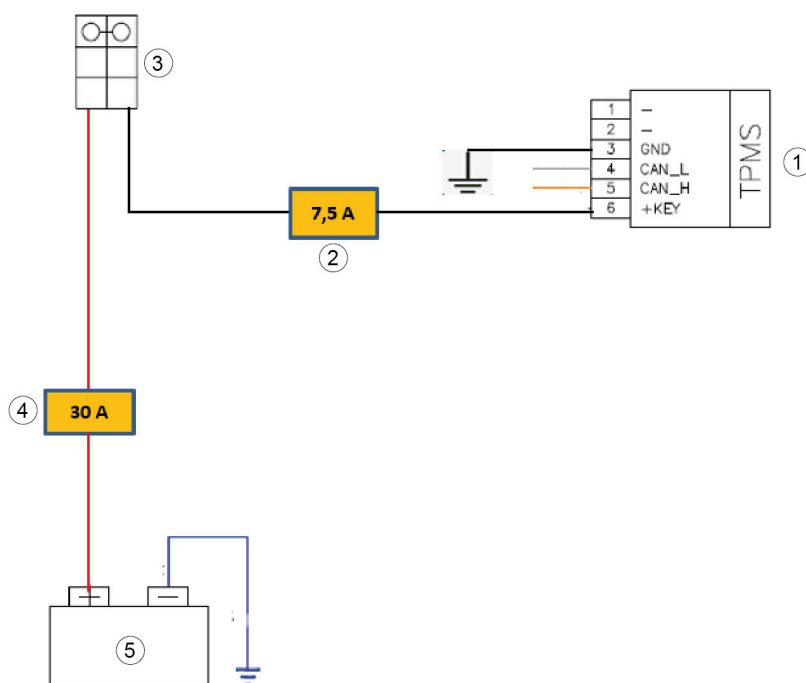
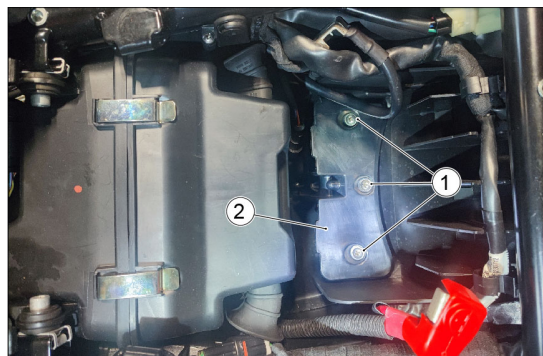
CODE	ACTION REQUIRED
C1F19	Inertial platform ID mismatch
U30CB	Check the status of the battery and the efficiency of the charging system.

TPMS ECU (Tyre pressure monitoring system)

(if applicable)

Position:

- ECU: under the battery compartment. To access, unscrew and remove the fixing screws (1) and remove the partition (2).
- Connector: on the control unit



Key:

- 1 . TPMS ECU
- 2 . Fuse
- 3 . Key switch
- 4 . Main fuse
- 5 . Battery

DIAGNOSTIC TOOL - TPMS ECU ERRORS

CODE	DESCRIPTION / SYMPTOMS
B1000 00	Faulty receiver
B1011 00	Front wheel sensor dead battery
B1012 00	Front wheel high pressure
B1013 00	Front wheel low pressure
B1014 00	Front wheel pressure very low
B1015 00	Front wheel puncture
B1016 00	Missing front wheel sensor signal
B1017 00	Front wheel sensor not configured
B1021 00	Rear wheel sensor dead battery
B1022 00	Rear wheel high pressure
B1023 00	Rear wheel low pressure
B1024 00	Rear wheel pressure very low
B1025 00	Rear wheel puncture
B1026 00	Missing rear wheel sensor signal
B1027 00	Rear wheel sensor not configured

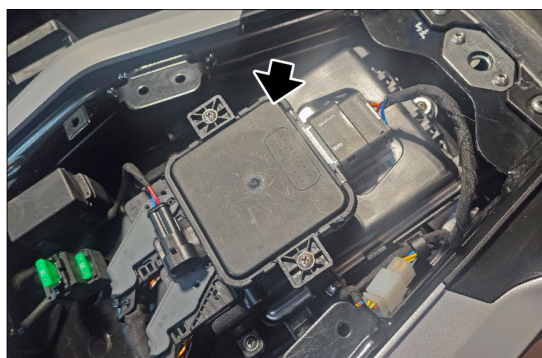
TPMS ECU ERRORS HELP LIST

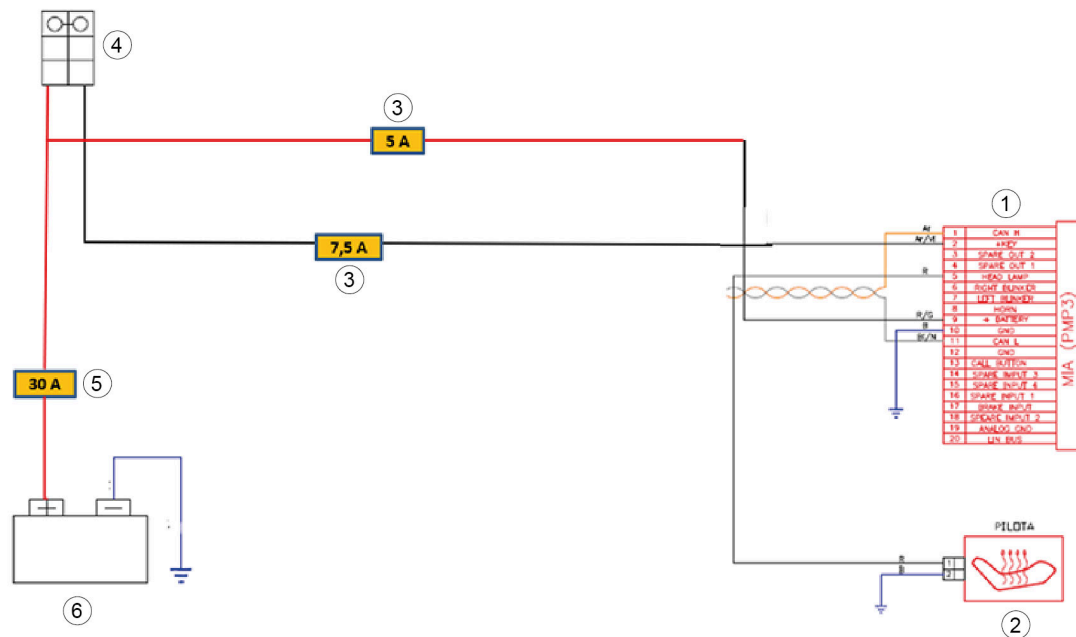
CODE	ACTION REQUIRED
B1000 00	The ECU no longer receives the wheel sensors, try to carry out the learning and replace the ECU if necessary
B1011 00	the front wheel sensor no longer transmits data due to the battery running out, replace the sensor
B1012 00	The front wheel pressure sensor is greater than 2.9 bar
B1013 00	The front wheel pressure sensor is lower than 2.0 bar
B1014 00	The front wheel pressure sensor is lower than 1.5 bar

CODE	ACTION REQUIRED
B1015 00	The front wheel pressure sensor is lower than 1.0 bar
B1016 00	The front wheel sensor does not send the signal to the ECU. Try to carry out the learning and if necessary replace the sensor
B1017 00	The front wheel learning was not carried out, the values displayed are 5.10 bar and 205 °C
B1021 00	the rear wheel sensor no longer transmits data due to the battery running out, replace the sensor
B1022 00	The rear wheel pressure sensor is greater than 3.2 bar
B1023 00	The rear wheel pressure sensor is lower than 2.2 bar
B1024 00	The rear wheel pressure sensor is lower than 1.7 bar
B1025 00	The rear wheel pressure sensor is lower than 1.0 bar
B1026 00	The front wheel sensor does not send the signal to the ECU. Try to carry out the learning and if necessary replace the sensor
B1027 00	The rear wheel learning was not carried out, the values displayed are 5.10 bar and 205 °C

"GUZZI MIA" ECU (where foreseen)**Position**

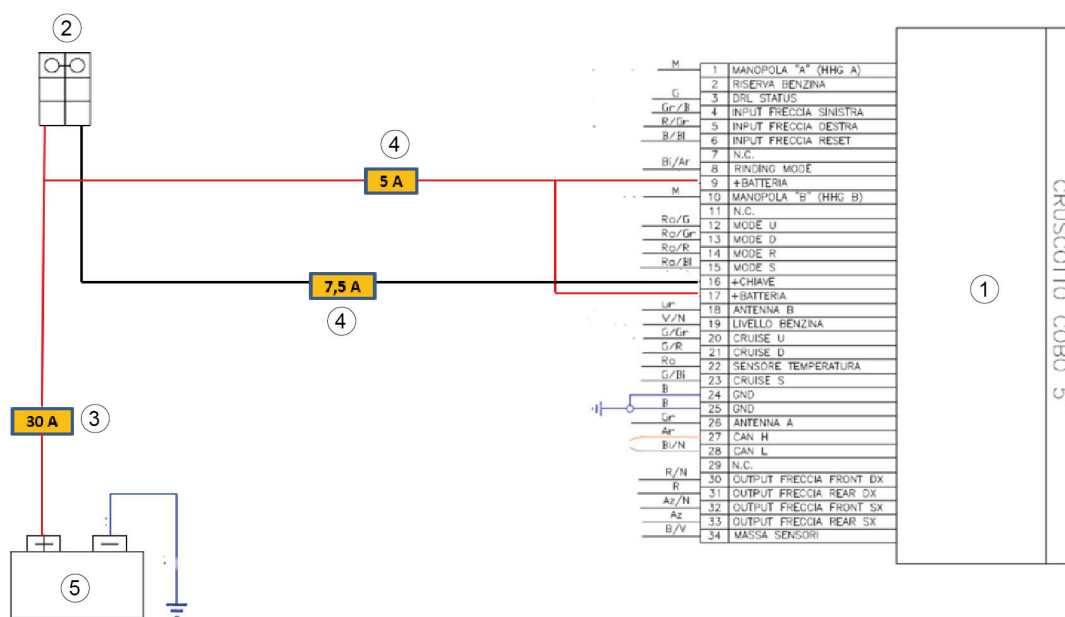
- ECU: under the passenger seat, fixed to the ECU mount
- Connector: on the ECU.



**Key:**

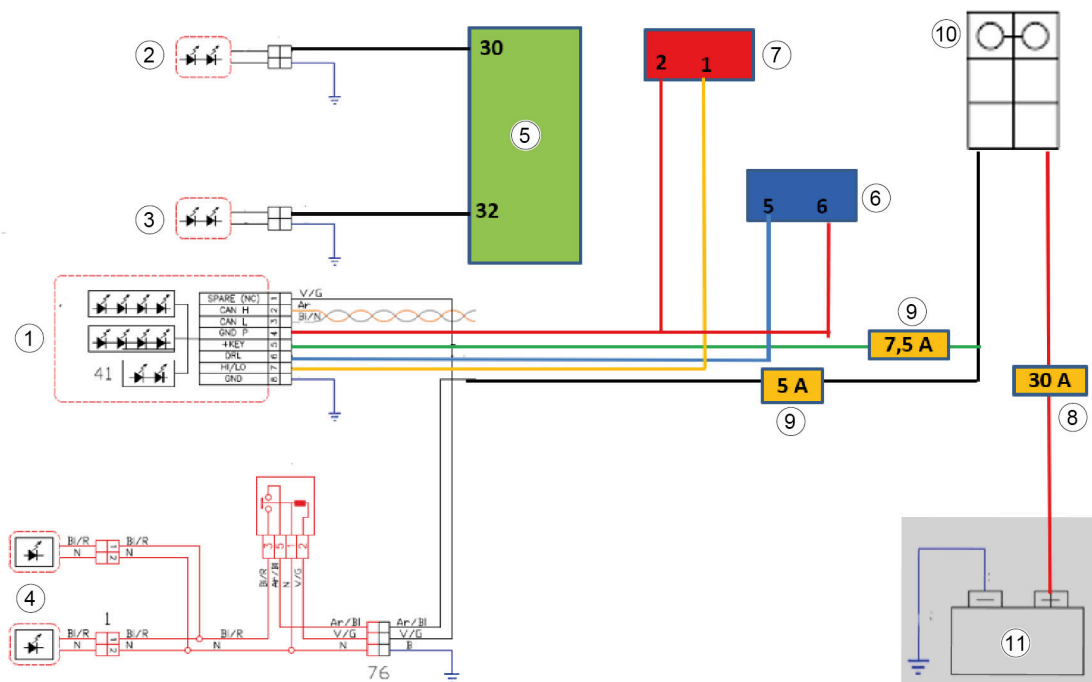
- 1 . "Guzzi MIA" ECU
- 2 . Heated seat (if applicable)
- 3 . Fuse
- 4 . Key switch
- 5 . Main fuse
- 6 . Battery

5.2.7 Instrument cluster**Electrical circuit:**

**Key:**

- 1 . Instrument cluster
- 2 . Key switch
- 3 . Main fuse
- 4 . Fuse
- 5 . Battery

5.2.8 Front light cluster**Electrical circuit:**

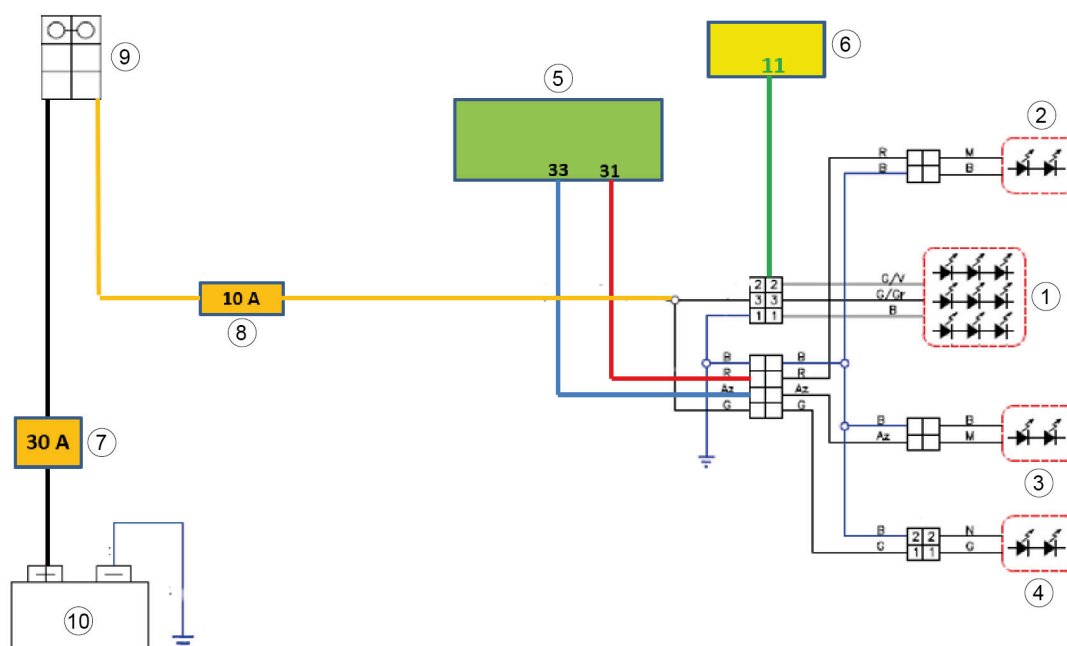


Key:

1. Headlamp
2. Right turn indicator
3. Left turn indicator
4. Fog lights
5. Instrument cluster
6. Right light switch
7. Left light switch
8. Main fuse
9. Fuse
10. Key switch
11. Battery

5.2.9 Rear light assembly

Electrical circuit:



Key:

1. Taillight
2. Right turn indicator
3. Left turn indicator
4. Number plate light
5. Instrument cluster
6. 11MP ECU
7. Main fuse
8. Fuse
9. Key switch
10. Battery

5.2.10 TMAP

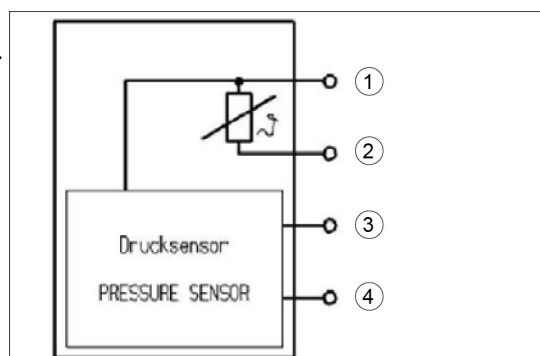
Pin Out :

1. Ground
2. NTC intake air temperature sensor signal
3. MAP SENSOR 5Volt power supply
4. MAP SENSOR signal

Electrical specifications:

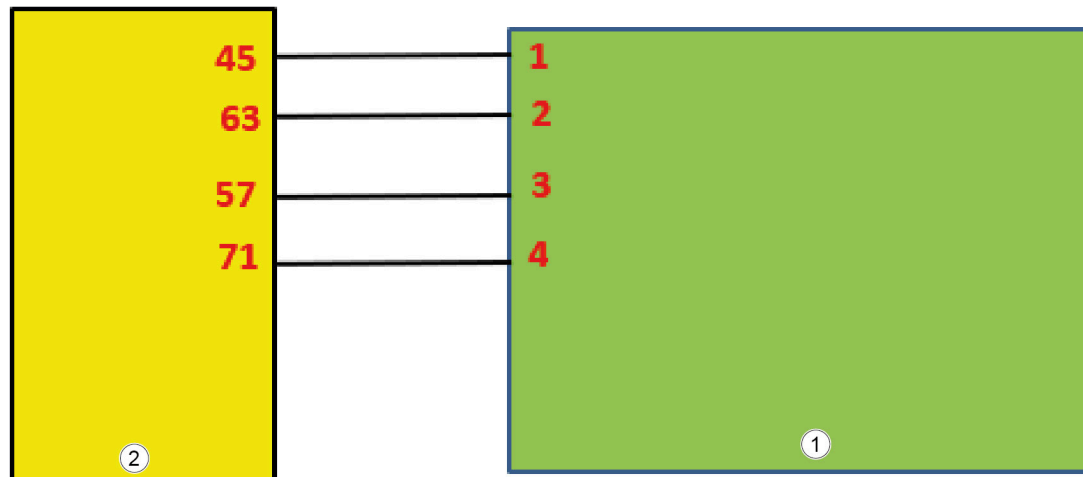
Resistance detected at a temperature of 20° C at sea level:

- Between pin 1 and 2: 2.2 KΩ
- Between pin 1 and 3: 3.1 KΩ



- Between pin 1 and 4: 1.5 K Ω

Electrical circuit:



Key:

- 1 . TMAP Right Cylinder
- 2 . 11MP ECU

5.2.11 OBD 2 socket

Function

Allow the connection of the P.A.D. S. diagnostic tool to the vehicle.

Operation / Operating principle

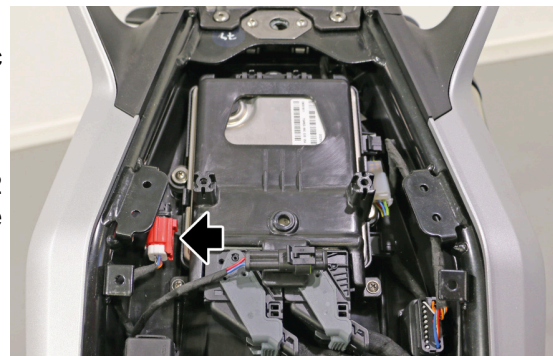
Once the P.A.D. S. is connected to the OBD 2 socket it will be possible to interface with the ECU of the vehicle.

Position:

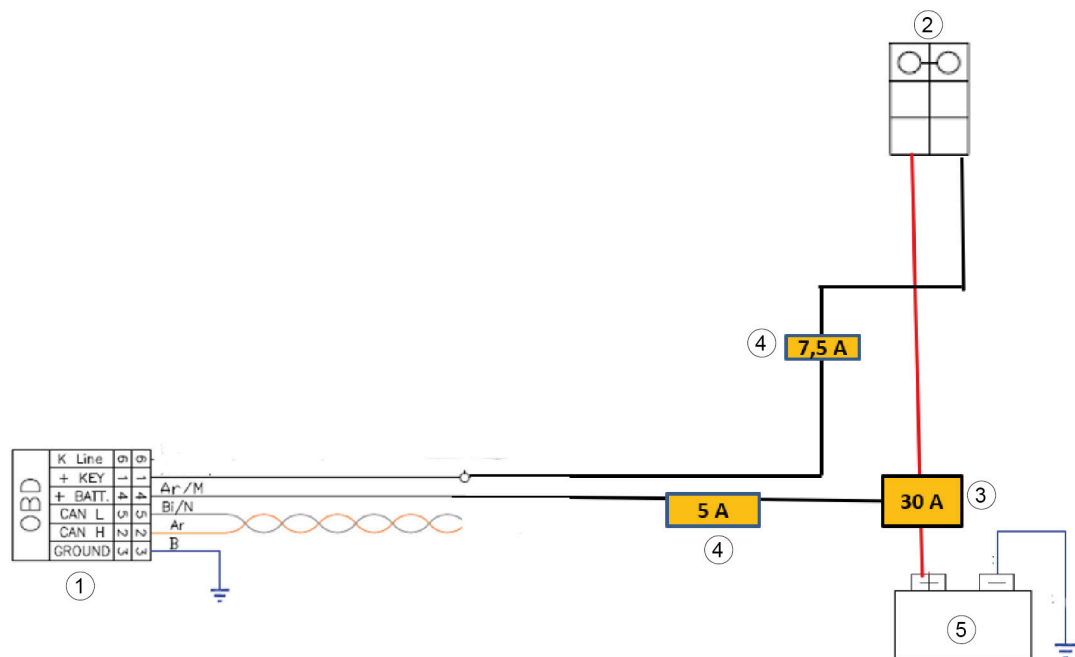
- Next to the ECU under the passenger seat.

Pin out:

- 1 . Live positive lead
- 2 . CAN H
- 3 . Ground
- 4 . Battery positive
- 5 . CAN L



6 . Line K

Electrical circuit:**Key:**

- 1 . OBD 2 socket
- 2 . Key switch
- 3 . Main fuse
- 4 . Fuse
- 5 . Battery

5.2.12 Battery**Function**

Provides electrical power to vehicle.

Level in electrical circuit diagram:

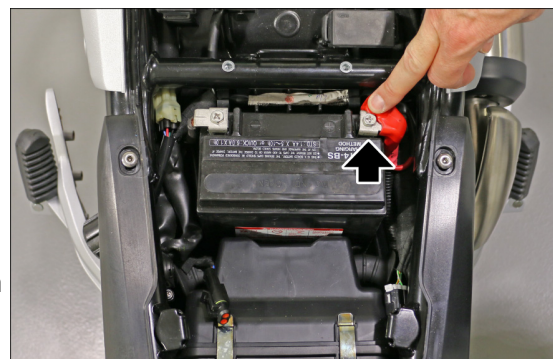
Charging the battery

Position:

- on the vehicle: under the rider saddle, in front of the air filter box
- connector: on the battery

Electrical specifications: 12 V / 18 Ah

Pin out:



- 1 . Positive pole (red): approx. 12.6 V
- 2 . negative pole (black): ground

DIAGNOSTIC TOOL: PARAMETERS**Battery voltage**

- Example value with key ON: 12.0 V
- Example value with engine on: 14.2 V

This is one of the values set by the ECU in the event of recovery mode

Battery voltage before prior to Recovery mode

- Example value with key ON: 12.0 V
- Example value with engine on: 14.2 V

Value determined from signal read without taking considering whether recovery mode is implemented

WARNING

DO NOT LEAVE THE VEHICLE WITH THE ENGINE OFF AND THE IGNITION KEY TO "ON". THE SOPHISTICATED ON-BOARD INSTRUMENTS HAVE A HIGH CURRENT DRAW WHICH, IF LEFT ON WITH THE ENGINE SWITCHED OFF, WILL DISCHARGE THE BATTERY IN A SHORT TIME.

5.2.13 Tone wheel sensors

TONE WHEEL SENSOR**Function:**

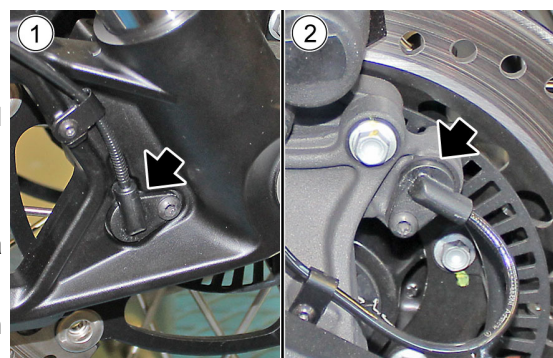
Generates a signal used by the ABS control unit to determine the speed value of the wheel.

Operation / Operating principle:

Magneto-resistive sensor: generation of a square wave having an amplitude of about 1V

Electrical circuit diagram - Level in electrical circuit diagram:

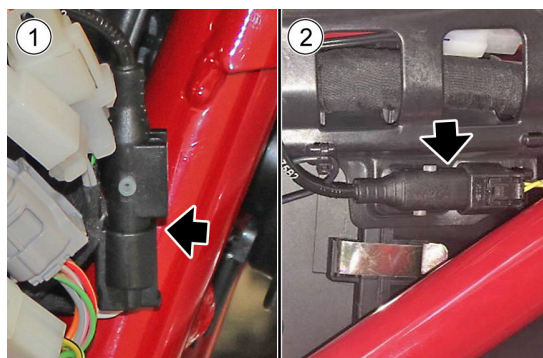
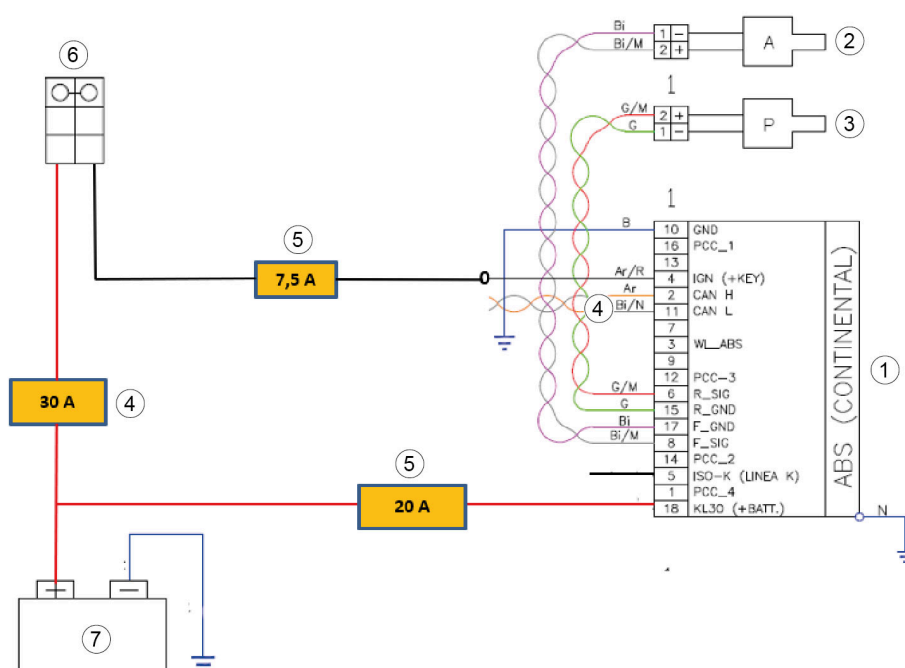
Engine speed sensor

Position of front sensor (1):

- sensor: On right-hand stanchion of fork, near the brake calliper mounting bracket
- connector: right side of the vehicle inside the electrical components box

Position of rear sensor (2):

- sensor: on the rear brake calliper support
- connector: right side of vehicle fixed to the frame under the right fairing

**Electrical circuit:****Key:**

- 1 . ABS control unit
- 2 . Front sensor
- 3 . Rear sensor
- 4 . Main fuse
- 5 . Fuse
- 6 . Key switch
- 7 . Battery

5.2.14 Pick up - timing sensor

PICK-UP

Function

Provide the ECU with the crankshaft position and thus the engine timing, to adjust the ignition timing of the cylinders.

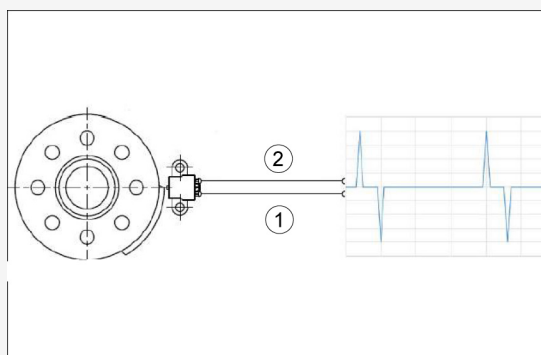
Position:

Pick up: Inside the timing system cover, above the stator.



Specifications:

- Electrical resistance at 20 °C: 100-150 Ohm.
- Air gap distance: 0.6 mm.
- The positive half-wave (1) must precede the negative half-wave (2).



Specific tool must be used to fit the Pick Up (1) inside the stator cover and ensure the correct the air gap with the flywheel.

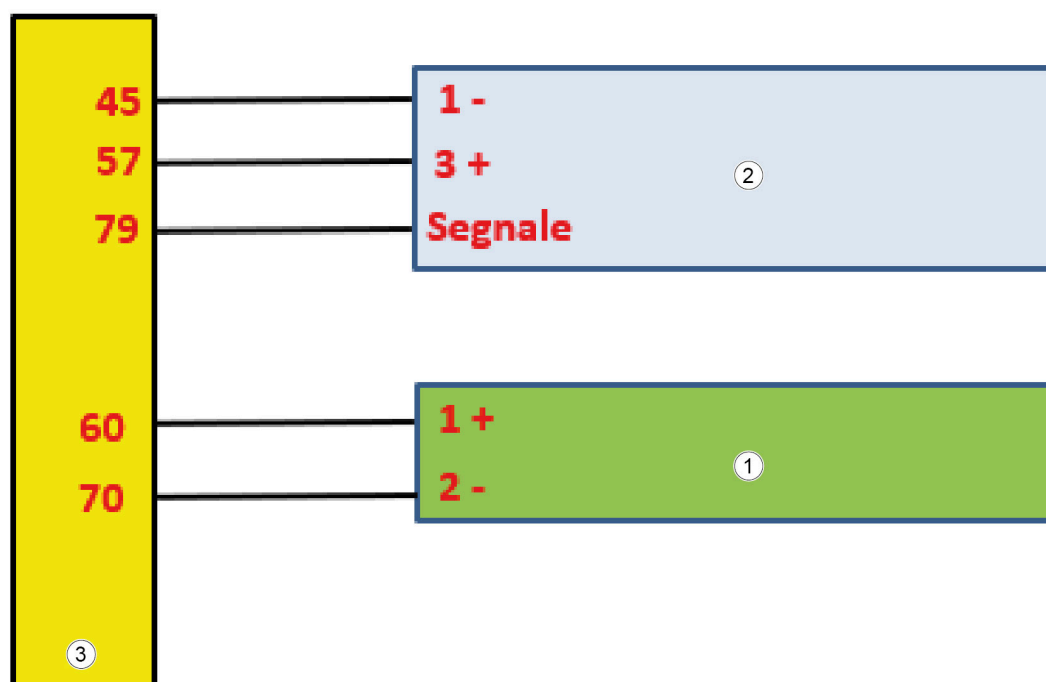
The template (2) must be fitted inside the cover and only the contact between the latter and the Pick Up (1) will guarantee the correct air gap with the flywheel: 0.6 mm.

Any air gap gradients could invalidate the signal of the pick up, causing repeated MISFIRE and the consequent lighting of the MIL warning light (error P 1309).



CODE	DESCRIPTION	IMAGE
021055Y	Pick-up fitting template	

Electrical circuit:

**Key:**

- 1 . Pick-up
- 2 . Timing sensor (Hall-effect sensor)
- 3 . 11MP ECU

The timing cvt , between **6500/7000 rpm**, will delay the entire timing chart (intake and exhaust) by **14 degrees**, which will then return to the nominal value when the number of engine revolutions decreases. **The timing sensor** checks the congruence between the number of engine revs and the position of the camshaft (**0# or - 14°**).

IN CASE OF ELECTRICAL AND/OR MECHANICAL ANOMALIES, THE FOLLOWING ERRORS MAY BE GENERATED:

CODE	DESCRIPTION / SYMPTOMS
P0014	the 11 MP control unit diagnoses that the camshaft is in a different position than expected. VVT (Variable Valve Timing) actuator stuck in delayed position (high rpm).
P0016	this error signals the inconsistency between the position of the camshaft (timing sensor) and the crankshaft (Pick Up).

CODE	DESCRIPTION / SYMPTOMS
P0011	this is an error relating to the position of the camshaft and is activated in the presence of high timing, during the variable timing activation procedure. VVT (Variable Valve Timing) actuator stuck in advanced position (low rpm).
P0340	this error indicates a malfunction of the circuit of the timing sensor: s.c. to ground

N.B

THESE ERRORS ARE CLASSIFIED AS TYPE MIL 3; THIS MEANS THAT THE MIL WARNING LIGHT WILL TURN ON IF AND ONLY IF THE SAME ERROR GENERATES THREE CONSECUTIVE TIMES DURING A SINGLE RIDING CYCLE.

5.2.15 Engine temperature sensors

OIL TEMPERATURE SENSOR

Function

Serves the purpose of communicating the engine oil temperature to the control unit in order to optimise its operation.

Operation / Operating principle

NTC type sensor (resistance sensor, inversely variable with temperature).

Level in electrical circuit diagram:
Temperature sensors

Position:

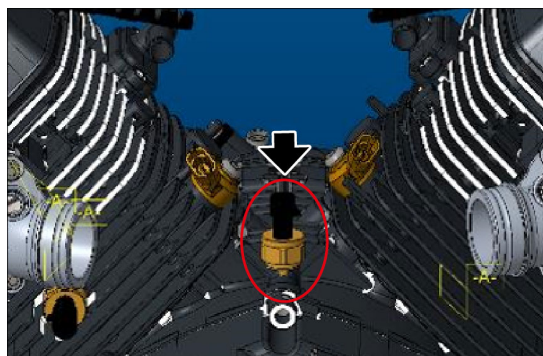
- Sensor: inside the "V" of the engine
- Connector: on the sensor

Pin-out:

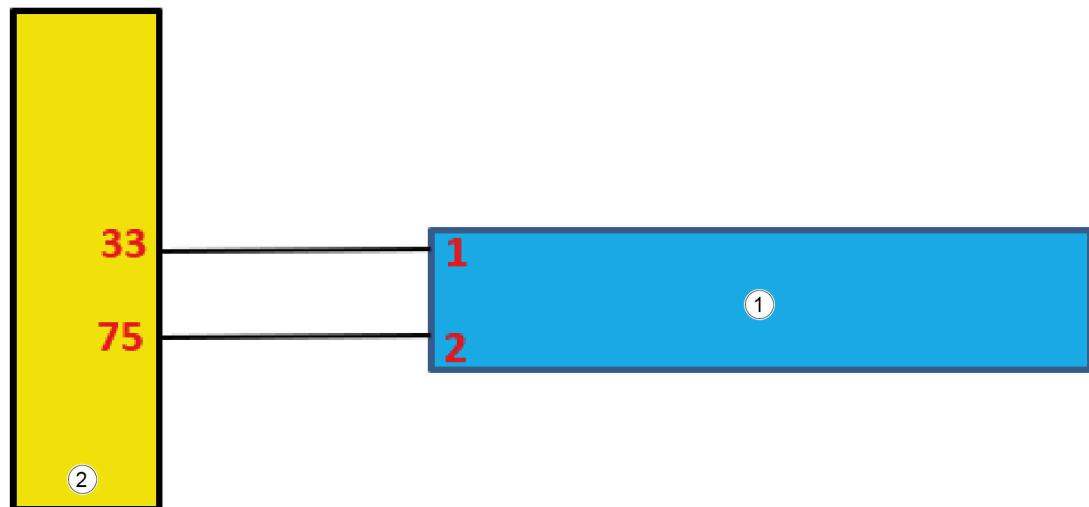
- **PIN 1:** 0-5 V signal
- **PIN 2:** Ground

Electrical specifications:

- Electrical resistance at 25 °C: 5000 Ohm
- Maximum temperature: 170°C
- Maximum temperature for short periods: 185°C



Electrical circuit:

**Key:**

- 1 . Engine oil temperature sensor
- 2 . 11MP ECU

ENGINE TEMPERATURE SENSOR**Function**

Serves the purpose of communicating the internal engine temperature to the control unit in order to optimise its operation.

Operation / Operating principle

NTC type sensor (resistance sensor, inversely variable with temperature).

Level in electrical circuit diagram:
Temperature sensors

Position:

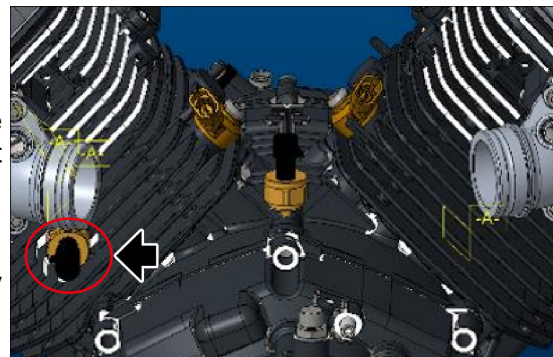
- Sensor: on the rear part of the left cylinder
- Connector: on the sensor

Pin-out:

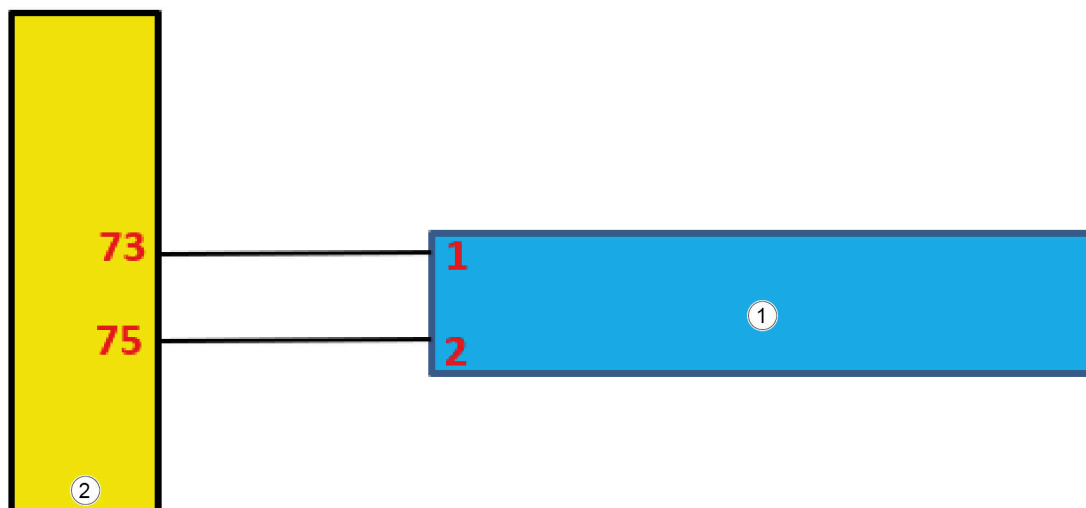
- **PIN 1:** 0-5 V signal
- **PIN 2:** Ground

Electrical specifications:

- Electrical resistance at 25 °C: 5000 Ohm
- Maximum temperature: 170°C



- Maximum temperature for short periods:
185°C

Electrical circuit:**Key:**

- 1 . Engine temperature sensor
- 2 . 11MP ECU

5.2.16 Lambda probe**Function****Operation / Operating principle**

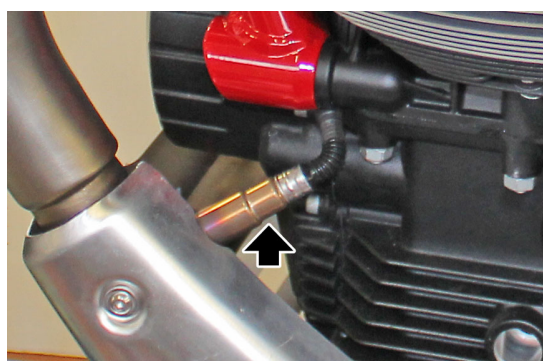
Based on the difference of oxygen in the exhaust fumes and the environment, this generates voltage which is read and interpreted by the injection control unit. It does not require an external supply source but, in order to work properly, it should reach a high operating temperature: that is why there is a heating circuit inside

Level in electrical circuit diagram:

Lambda probe

Left lambda position:

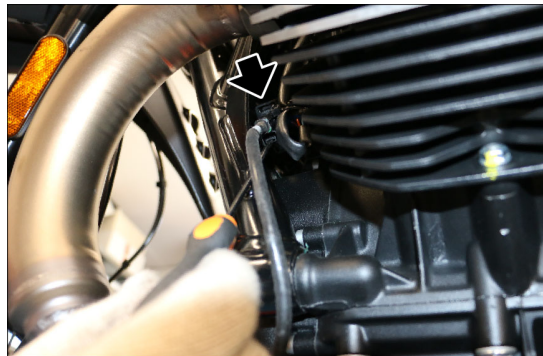
- sensor: on the left exhaust manifold



- connector: front left side fixed to the tubular section of the frame

Right lambda position:

- sensor: on the right exhaust manifold
- connector: front right side fixed to the tubular section of the frame

**Post-catalytic converter lambda position:**

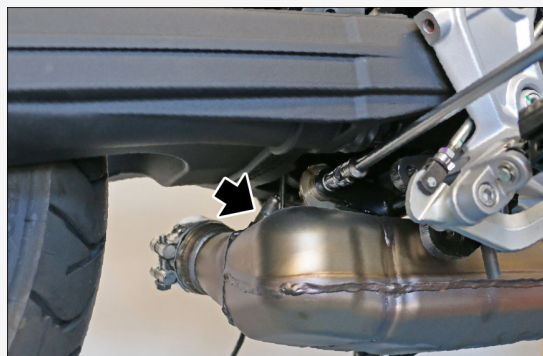
- sensor: on the left rear side of the catalytic converter
- connector: under the left intake manifold

Electrical specifications

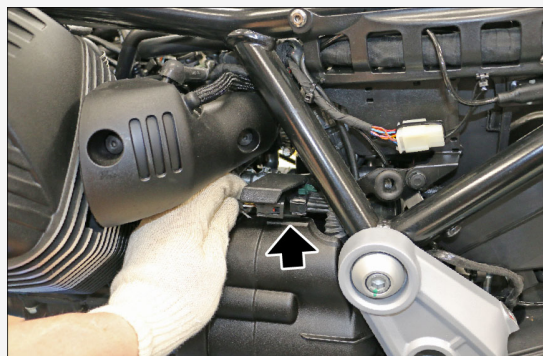
- Heating circuit: 5.5 Ω at ambient temp.

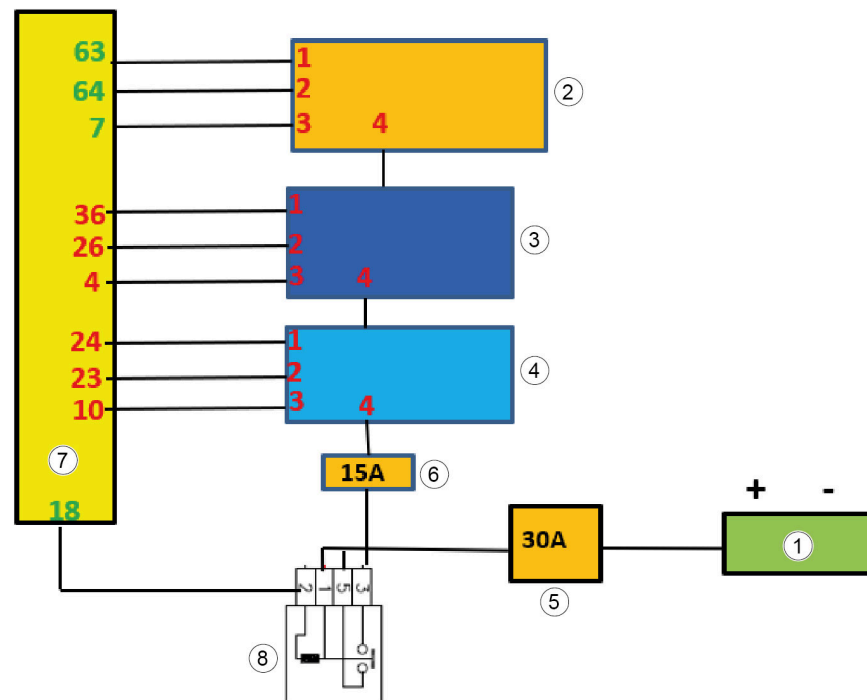
Lambda Pin out:

- 1 . Sensor signal + (black wire)
- 2 . Sensor signal - (grey wire)
- 3 . Heater ground connection (white cable)
- 4 . Heater power supply (white cable)

**WARNING**

BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

**Electrical circuit:**

**Key:**

- 1 . Battery
- 2 . Post-catalytic converter probe
- 3 . Right probe
- 4 . Left probe
- 5 . Main fuse
- 6 . Fuse
- 7 . 11MP ECU
- 8 . Injection relay

5.2.17 Injector**INJECTORS****Function**

Provide the correct amount of fuel at the correct time.

Operation / Operating principle

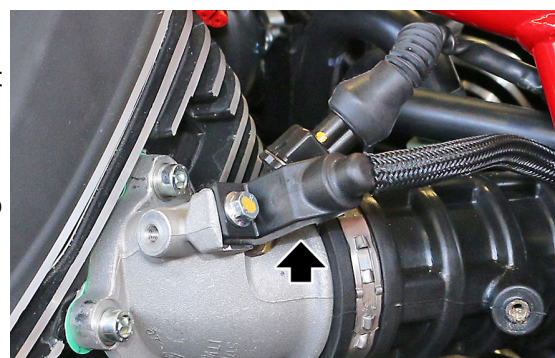
Injector coil is excited for the petrol passage to open.

Level in electrical circuit diagram:

Coils and injectors

Left injector position:

- On the left intake manifold
- Connector: on injector



Right injector position:

- On the right intake manifold
- Connector: on injector

Electrical specifications

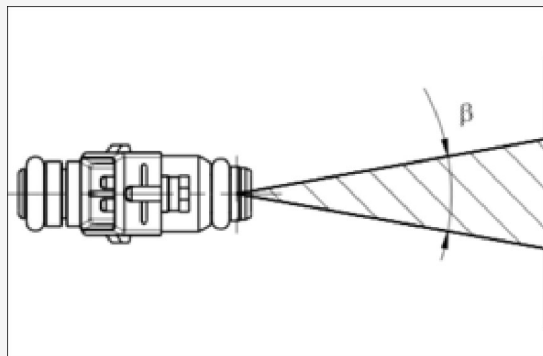
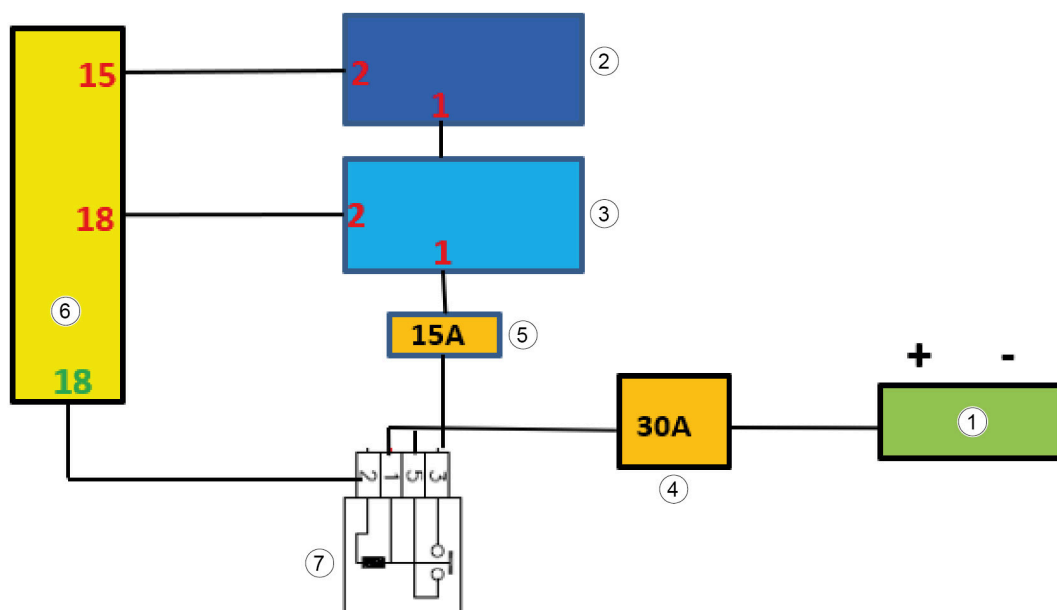
- 14.8 Ohm $\pm$ 5% (at ambient temperature)

Pin out

- 1 . Power supply (+Vbatt)
- 2 . Activation from the control unit

Features:

- Resistance: $12.5 \pm 5\%$ Ohm
- Inductance: $8 \pm 15\%$ mH
- Test liquid pressure: 3 bar
- Static flow rate: $2,45 \pm 3\%$ grams/seconds
- Dynamic flow rate: $4.7 \pm 4.5\%$ mg / pulse
- angle $\beta = 16^\circ$

**Electrical circuit:****Key:**

- 1 . Battery
- 2 . Left injector

- 3 . Right injector
- 4 . Main fuse
- 5 . Fuse
- 6 . 11MP ECU
- 7 . Injection relay

5.2.18 Fuel pump

Function

Fuel pump: keeps pressure of the injectors supply duct.

Low fuel: tells to the instrument cluster about low fuel.

Operation / Operating principle

The fuel reserve is a resistance that if correctly supplied varies its electrical resistance if it is damped or not by petrol.

Level in electrical circuit diagram

Injection loads relay.

Low fuel and oil pressure.

Position

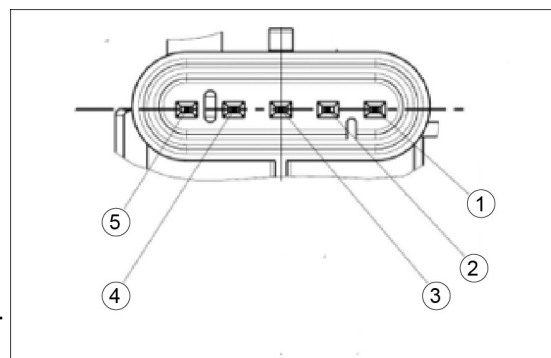
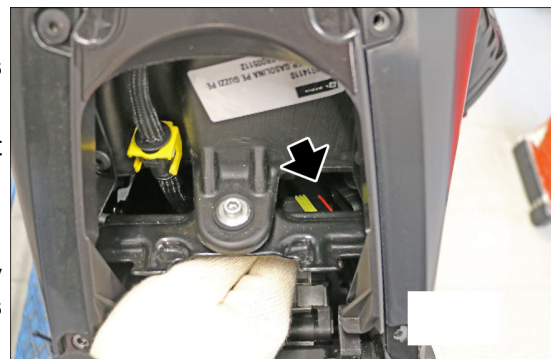
- On the vehicle: Inside the tank.
- Connector: under the tank.

Pin-Out fuel pump and fuel reserve sensor

- 1 . Not connected
- 2 . Fuel pump ground
- 3 . Not connected
- 4 . Not connected
- 5 . Power supply 12V

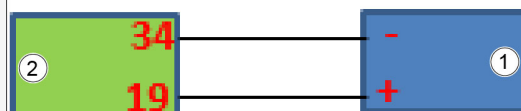
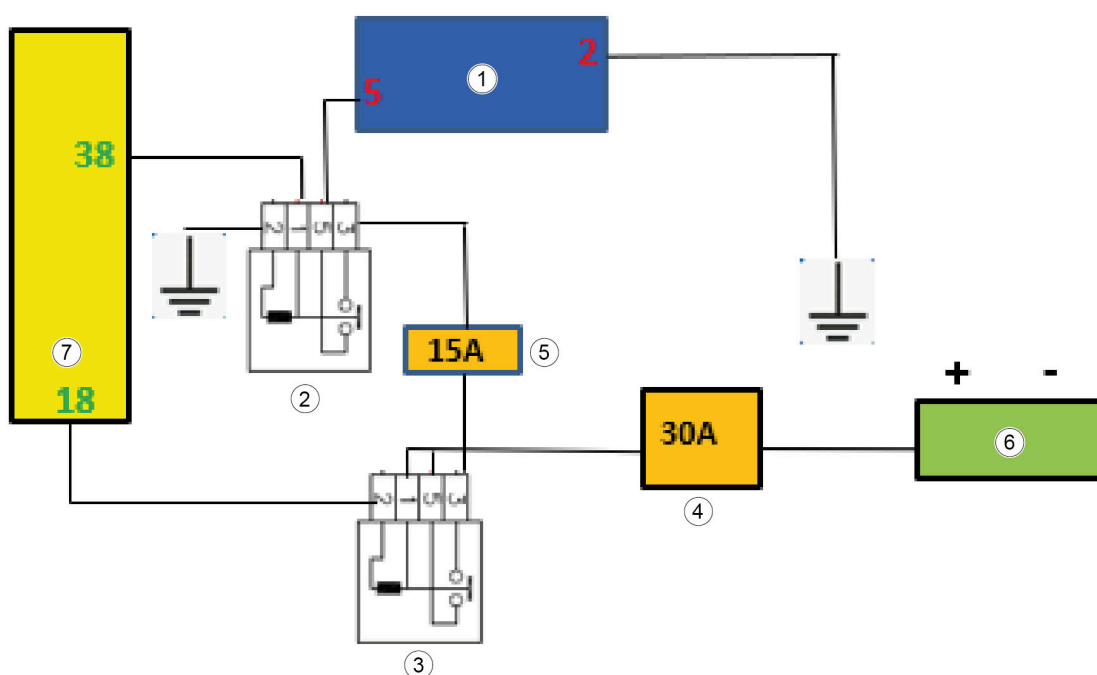
Features:

- Power supply voltage: 12Volt
- Operating pressure: 3 bar
- Current consumption: $I \leq 4.7 \text{ A}$
- Fuel capacity $\geq 80 \text{ l / h}$
- Fuel sensor resistance with empty tank: $300 \pm 7 \text{ Ohm}$
- Full tank fuel sensor resistance: $20 \pm 5 \text{ Ohm}$



Fuel level sensor electrical circuit diagram:

- 1 . Fuel level sensor
- 2 . Instrument cluster

**Electrical circuit:****Key:**

- 1 . Fuel pump
- 2 . Pump relay
- 3 . Injection relay
- 4 . Main fuse
- 5 . Fuse
- 6 . Battery
- 7 . 11MP ECU

5.2.19 Coil

Function

Spark generation.

Operation / Operating principle

Inductive discharge system.

Level in electrical circuit diagram:

coils and injectors.

Position:

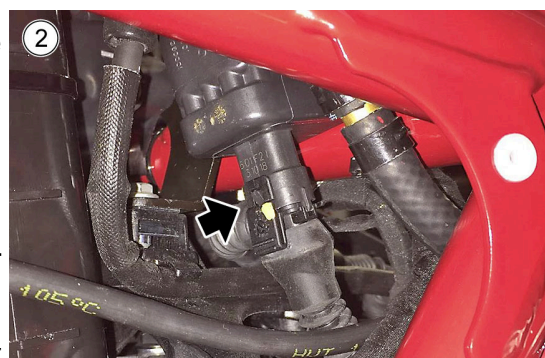
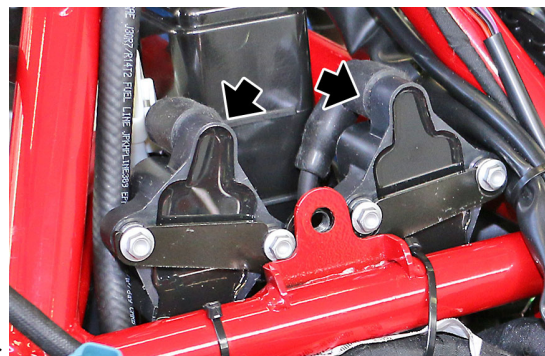
- connector: under the tank near the canister filter.
- sensor: front of vehicle fixed to the frame under the tank.

Primary circuit resistance:

670 mohm

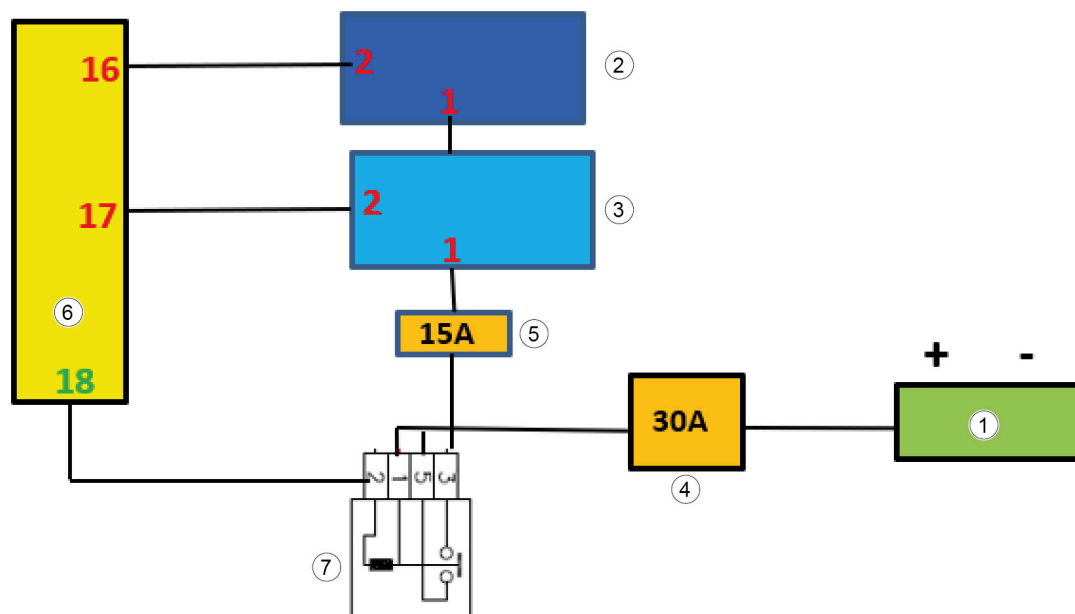
Pin out

- 1 . Power supply (+Vbatt)
- 2 . Activation from the control unit

**WARNING**

BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

Electrical circuit:

**Key:**

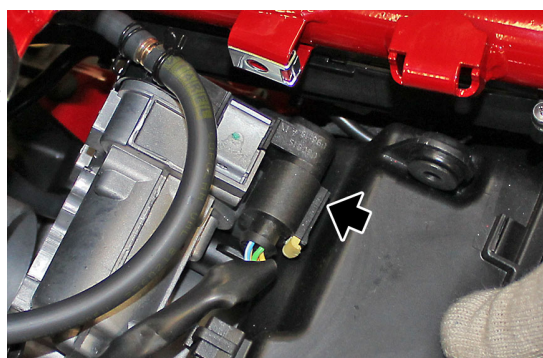
- 1 . Battery
- 2 . Right cylinder coil
- 3 . Left cylinder coil
- 4 . Main fuse
- 5 . Fuse
- 6 . 11MP ECU
- 7 . Injection relay

5.2.20 Throttle body**Function**

To send the throttle position to the injection control unit and to activate the throttle itself based on the request from the demand sensor.

Operation / Operating principle

All the unit internal components (potentiometer and electric motor) are contactless; therefore, no electrical diagnostic is possible for the throttle body, but for the circuits connected to it only.

**Level in electrical circuit diagram:**

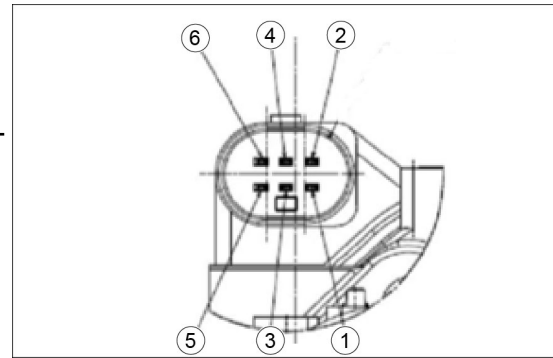
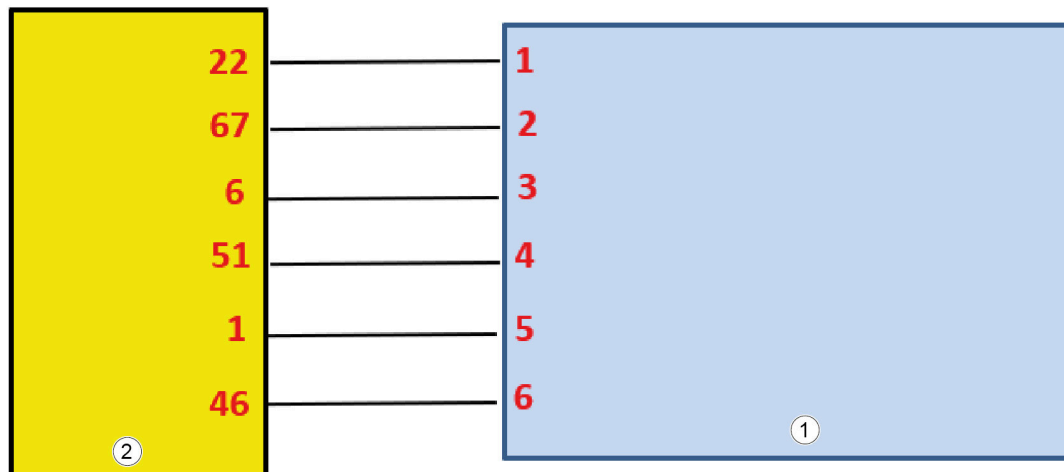
Throttle and hand grip sensor control (Demand).

Position:

- on the vehicle: under the tank.
- connector: on the throttle body.

Pin out:

- 1 . TPS 1 signal positive gradient
- 2 . 5 Volt TPS power supply
- 3 . throttle body motor positive
- 4 . TPS 2 signal negative gradient
- 5 . throttle body motor ground
- 6 . TPS ground

**Electrical circuit:****Key:**

- 1 . Throttle body
- 2 . 11MP ECU

5.2.21 Engine oil pressure sensor

Function

Indicates the instrument cluster if there is enough oil pressure $0.3 \div 0.5$ bar ($4.35 \div 7.25$ PSI) in the engine.

Operation / Operating principle

Normally closed switch. With oil pressure above $0.3 \div 0.5$ bar ($4.35 \div 7.25$ PSI), open circuit.

Level in electrical circuit diagram

Low fuel and oil pressure.

Position

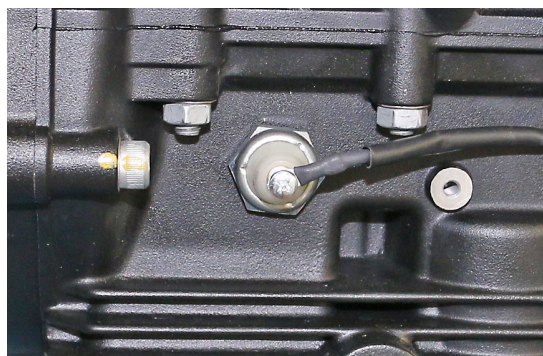
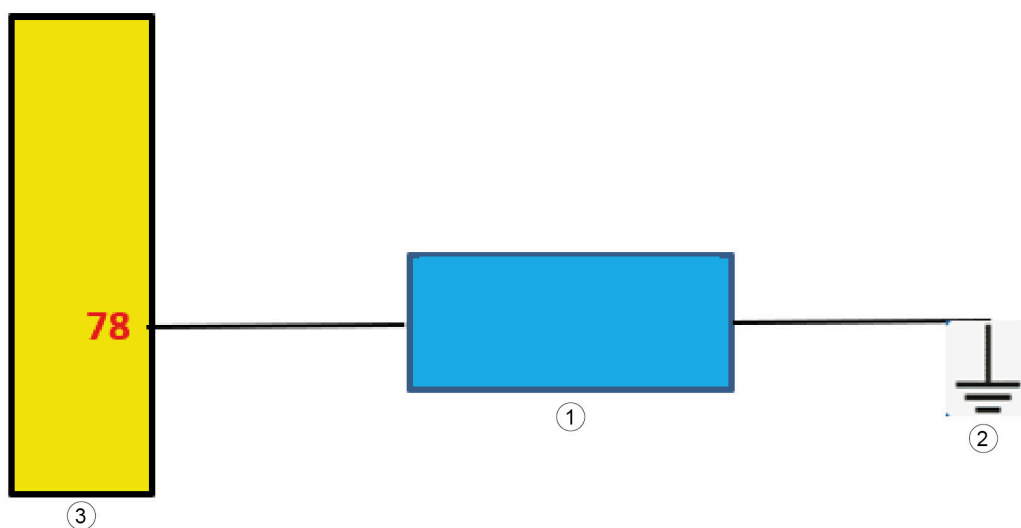
- Sensor: right side of engine.
- Connector: on the sensor.

Electrical specifications

- Engine off: closed circuit (continuity).
- With engine started: open circuit (infinite resistance).

Pin-out

-
1. Voltage 12V.
-

**Electrical circuit:**

Key:

- 1 . Engine oil pressure sensor
- 2 . Motor crankcase
- 3 . 11MP ECU

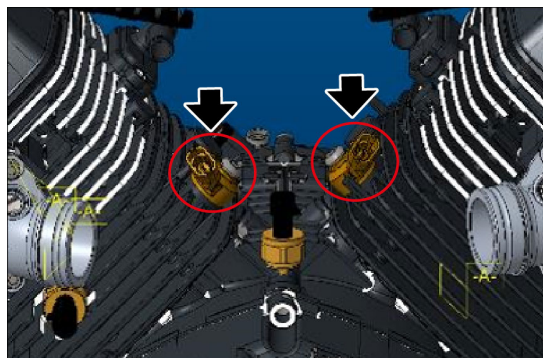
5.2.22 Knock sensor**Knock sensors**

The Knock sensors are located on the internal side of the cylinders and detect vibrations caused by engine knocking.

WARNING

IN THE CASE OF KNOCK SENSOR REPLACEMENT, RESPECT THE TIGHTENING TORQUE OF THE RELEVANT FIXING SCREWS at 20 ± 5 Nm (14.75 ± 3.69 lbf ft).

ANY ENGINE VIBRATIONS COULD AFFECT THE SENSOR SIGNAL, WITH THE CONSEQUENT VARIATION OF THE IGNITION TIMING BY THE 11MP ECU, EVEN IN THE ABSENCE OF KNOCKS..



Thanks to the information received from the aforementioned sensors, the 11MP ECU, in order to avoid further knocking, will reduce the ignition advance by **3#**, and then, in conditions of a return to correct engine operation, restore the relative previous nominal value.

If the intervention of the ECU is not decisive, the latter will provide a further reduction in the ignition advance, up to the maximum value of **-8#**.

The following variation of the ignition advance is adaptive; this means that when the engine speed is stable, the ECU can decide to keep the variation of the advance constant, previously adopted to resolve knocking problems.

To return to the original mapping of the ignition advance, simply **reset the adaptive values** relating to the knocking control via the P.A.D.S.

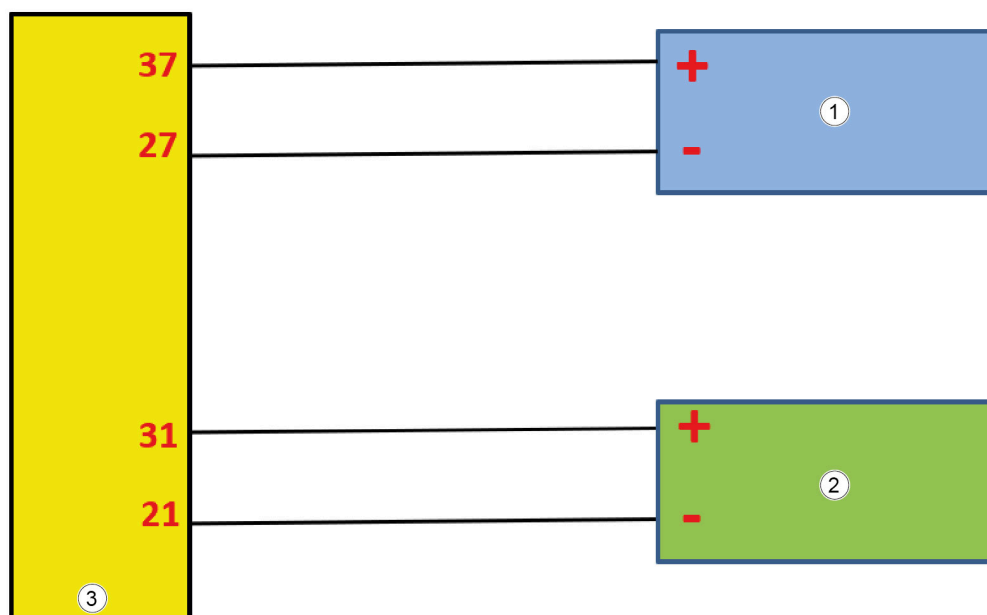
INFO ECU	PARAMETRI E STATI	REGOLAZIONI	ATTIVAZIONI	CODICI ERRORE
Autoapprendimento farfalla				
Scarico file dati memorizzati				
Scrittura codice VIN				
Abilitazione sistema TPMS				
Disabilitazione sistema TPMS				
Configurazione veicolo (Km)				
Configurazione veicolo (miglia)				
Configurazione veicolo versione TPMS (Kilometers)				
Configurazione veicolo versione TPMS (Miglia)				
Azzeramento EEPROM centralina				
Azzeramento valori ruota fonica				
Azzeramento dei valori adattivi relativi al controllo detonazione				

It is possible to view the following parameters via the PADS:

- Advance reduction (in degrees) to check the knocking of the right cylinder
- Advance reduction (in degrees) to check the knocking of the left cylinder

INFO ECU	PARAMETRI E STATI	REGOLAZIONI	ATTIVAZIONI
i	Interruttore RUN/OFF		RUN
i	Marcia inserita		0
i	Modo motore		Indetermi
i	Rapporto finale trasmissione		0.397
i	Regime nominale di minimo		1820
i	Richiesta avviamento		OFF
i	Riduzione anticipo in gradi per il controllo della detonazione cilindro destro		0
i	Riduzione anticipo in gradi per il controllo della detonazione cilindro sinistro		0

Electrical circuit:

**Key:**

-
- 1 . Right knock sensor
 - 2 . Left knock sensor
 - 3 . 11MP ECU

5.2.23 Demand sensor**Function**

Provide the ECU with the throttle grip position signal to operate the motor of the throttle valve accordingly.

Operation / Operating principle

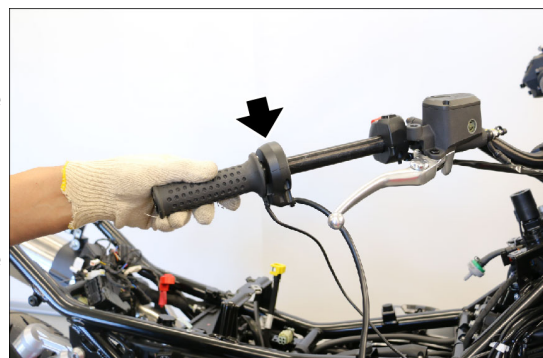
Sends an electrical signal to the 11MP ECU, which in turn relays the information to the throttle valve motor.

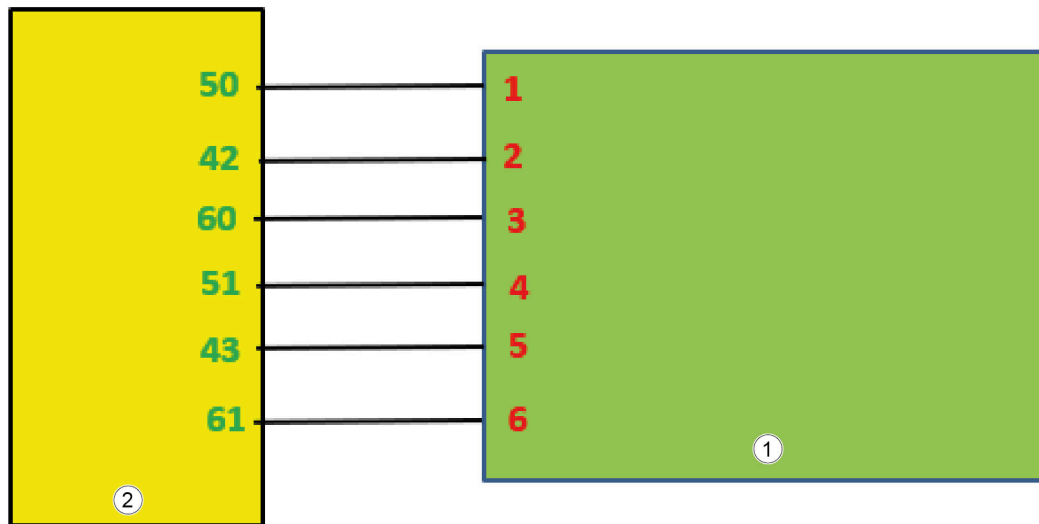
Position:

- Right hand grip (accelerator).

Pin out:

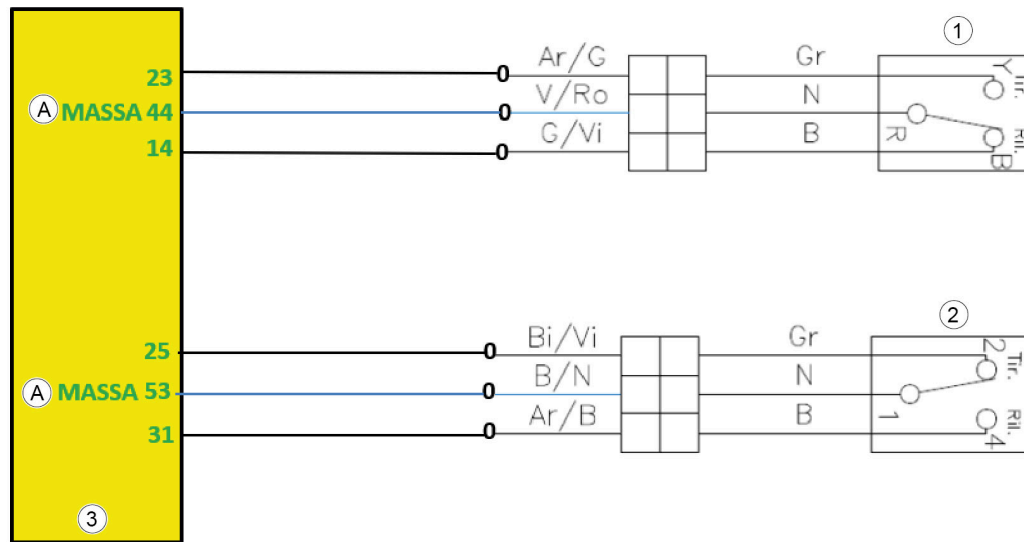
-
- 1 . Track power supply 1
 - 2 . Track 1 ground
 - 3 . Track 1 signal
 - 4 . Track power supply 2
 - 5 . Track 2 ground



6 . Track 2 signal**Electrical circuit:****Key:**

- 1 . Demand sensor
- 2 . 11MP ECU
- 3 .

5.2.24 Rear stop switch - Clutch**Electrical circuit:**



Key:

1. Brake light switch
 2. Clutch switch
 3. 11MP ECU
- A. ECU pin connected to ground

The front brake switch is not provided. Operation of the front brake lever results in pressure changes detected by the ABS module pressure sensor which, via CAN, shares it with the 11 MP control unit.

5.2.25 Stand sensor

Function

Indicates the side stand position to the control unit.

Operation / Operating principle

Hall effect sensor. If the gear is engaged with the side stand is down, and therefore the circuit is open, the control unit prevents starting or switches off the engine if running.

Level in electrical circuit diagram:

Start enable switches.

Position:

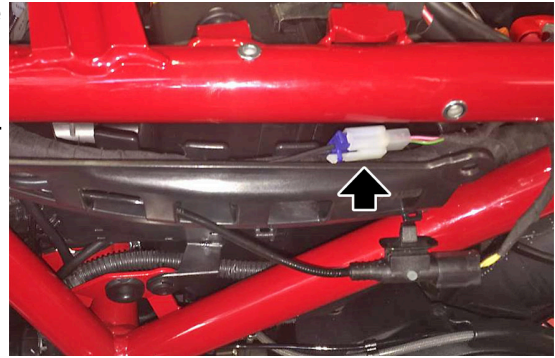
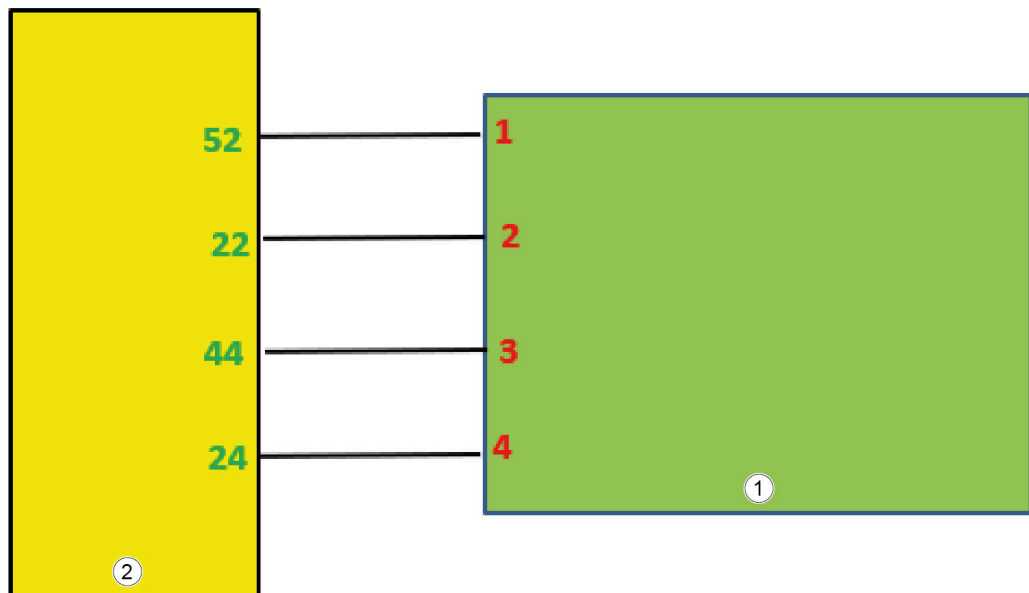
- sensor: on the stand.



- connector: right side of vehicle under the side fairing.

Pin out:

- 1 . Power feed
- 2 . Output A
- 3 . Ground
- 4 . Output B

**Electrical circuit:****Key:**

- 1 . Stand sensor
- 2 . Centralina11MP

5.2.26 Secondary air system

Function

Quickly warms up the catalytic converter and keeps the combustion rich in some critical conditions .

Operation / Operating principle

The valve coil is energized to open the air passage from the filter housing to the exhaust manifolds.

Level in electrical circuit diagram:

Secondary air system

Position:

- (1) The PURGE valve: under the fuel tank, inside the V of the engine.
- (2) Secondary air valve: under the fuel tank, above to the ignition coils.
- Connectors: On the relative valves.

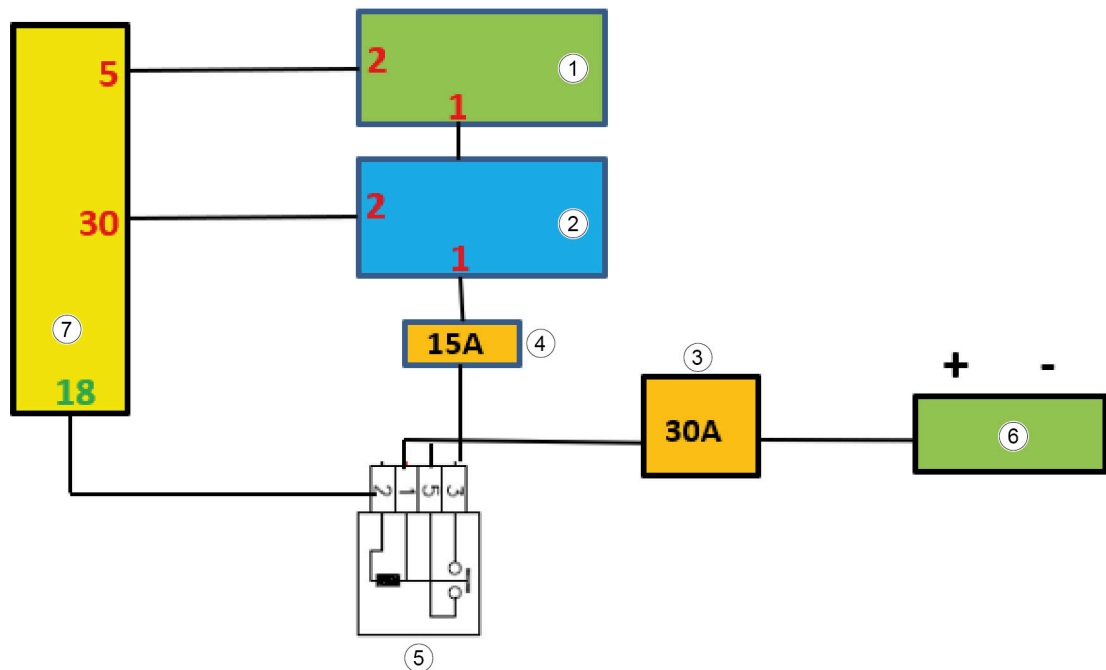
Electrical specifications:

PURGE valve electrical resistance at 20 °C: 24
± 3 Ohm

Secondary air valve electrical resistance at 20
°C: 21.5 Ohm



Electrical circuit:



Key:

1. Purge valve
2. Secondary air valve
3. Main fuse
4. Fuse
5. Injection relay
6. Battery
7. 11MP ECU

5.2.27 Inertia platform (IMU)

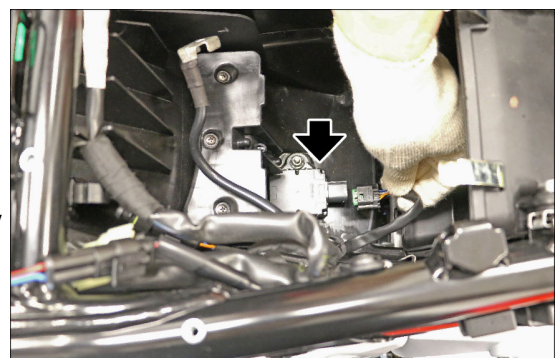
V85 TT - V85 TT TRAVEL

Level in electrical circuit diagram:

Inertia platform

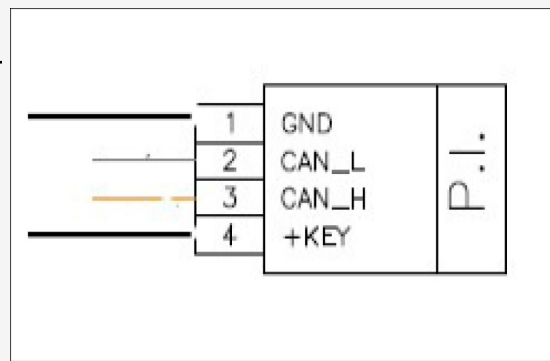
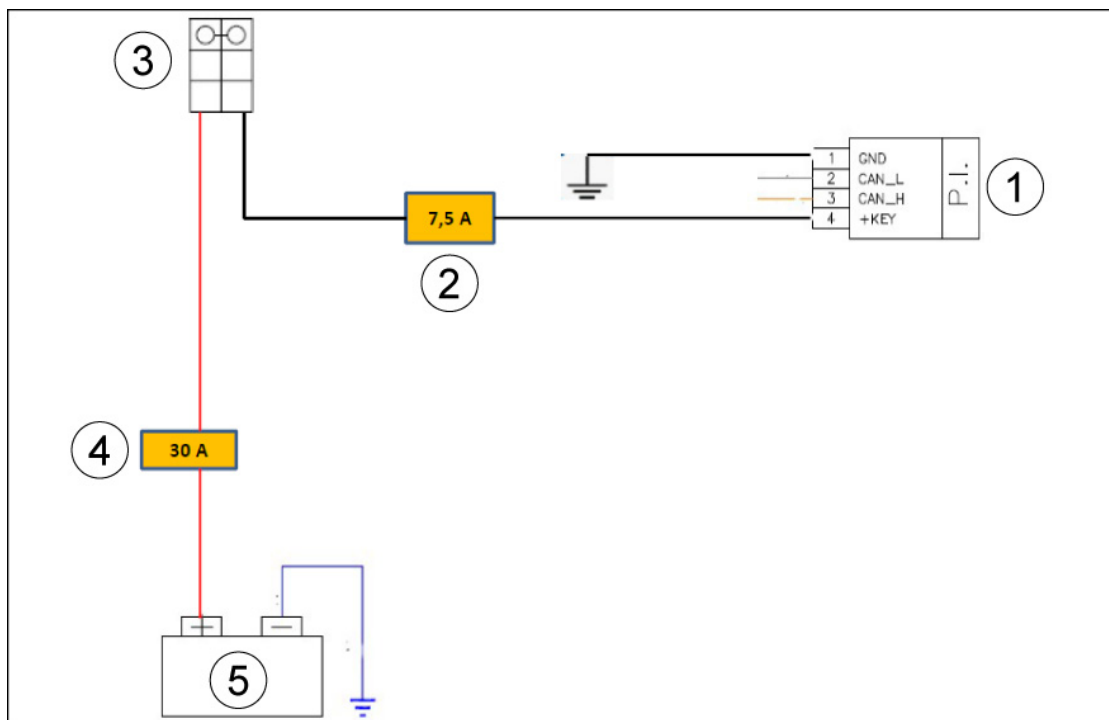
Position:

- On the rear wheel arch, under the battery compartment.



Inertial platform Pin out:

- 1 . Ground
- 2 . CAN line signal_Low
- 3 . CAN line signal_High
- 4 . Power feed

**Electrical circuit:****Key:**

- 1 . Inertia platform
- 2 . Fuse
- 3 . Key switch
- 4 . Main fuse
- 5 . Battery

The inertial platform also functions as FALL SENSOR, which will not be present when the IMU is installed.

5.2.28 fall sensor

V85TT STRADA

WARNING



THE SENSOR MUST BE POSITIONED AS SHOWN IN THE FIGURE.

Electrical specifications:

Output signal

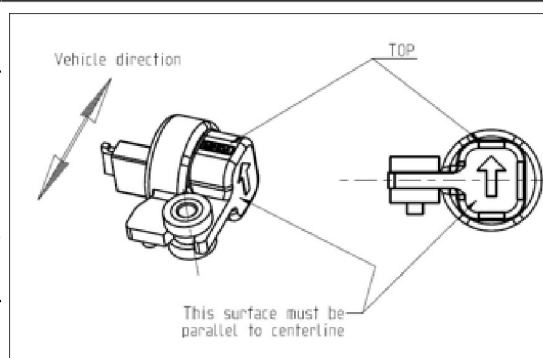
4.3 – 5 V	short circuit to positive
0,8 - 1.2 V	Inclination angle $> 60^\circ$
0.2 – 0.6 V	Normal inclination
0 - 0.1 V	Short circuit to ground

Electrical resistance

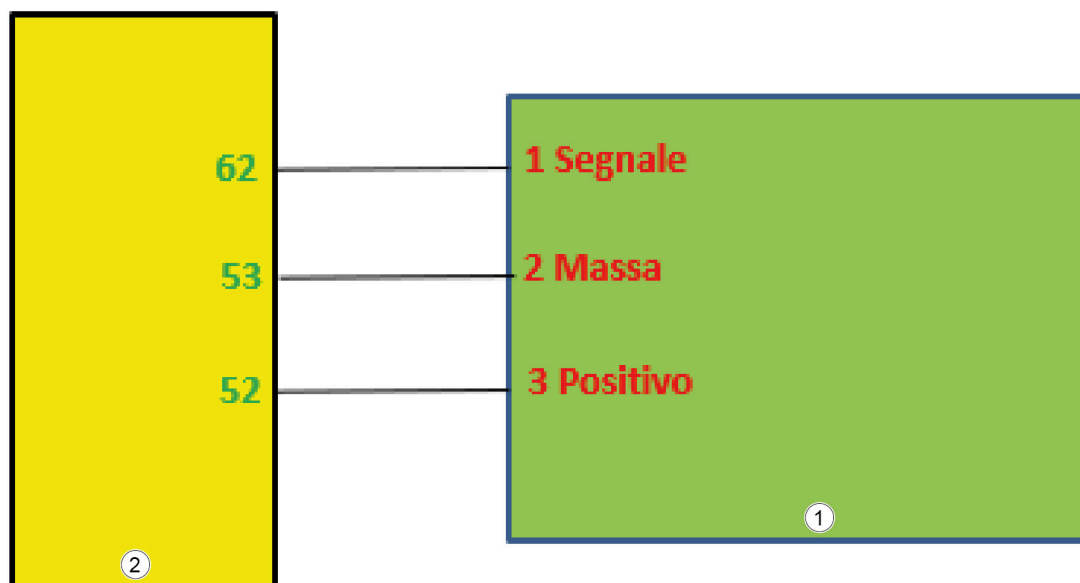
Electrical resistance 1080 Ohm
between pin 1 and pin
2

Electrical resistance 4950 Ohm
between pin 2 and pin
3

Electrical resistance 3880 Ohm
between pin 3 and pin
1



Electrical circuit:

**Key:**

- 1 . Fall sensor
- 2 . 11MP ECU

5.2.29 Start-up system**Function**

Communicates to the control unit the consent to start the engine.

Operation / Operating principle

Pressing the start button closes the relative circuit, bringing the ECU PIN 65 to zero voltage (closure to ground).

Level in electrical circuit diagram:

Start-up enabling switch

Position:

- Button: on right hand light switch.

Electrical specifications:

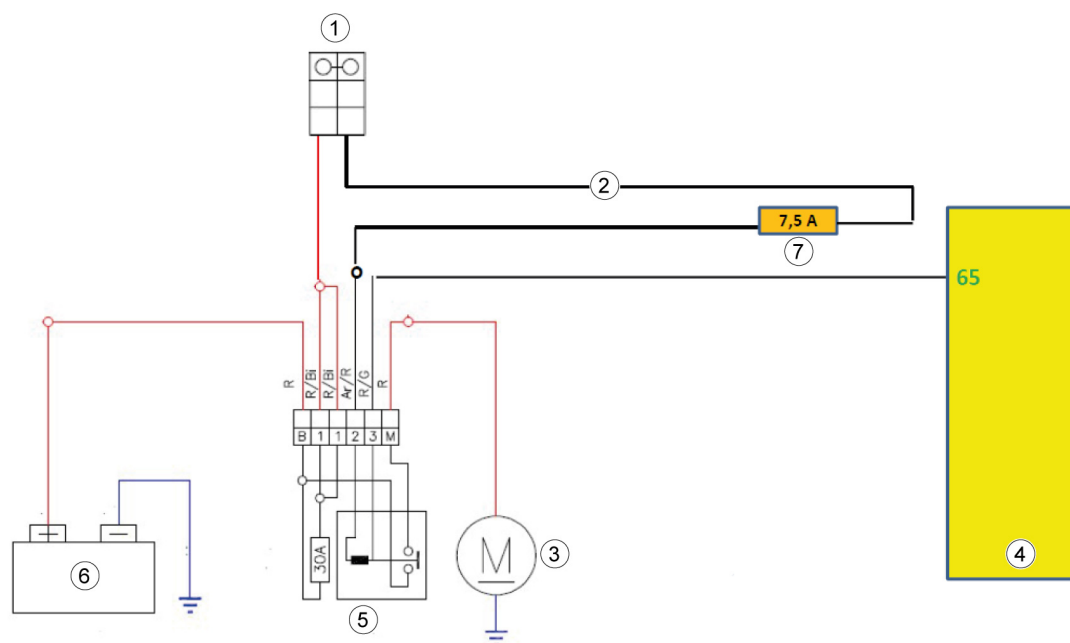
- key released: open circuit
- key pressed: closed circuit

**WARNING**



BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

Electrical circuit:



Key:

- 1 . Key switch
- 2 . Starter button
- 3 . Starter Motor
- 4 . 11MP ECU
- 5 . Starter relay
- 6 . Battery
- 7 . Fuse

5.2.30 TPMS ECU

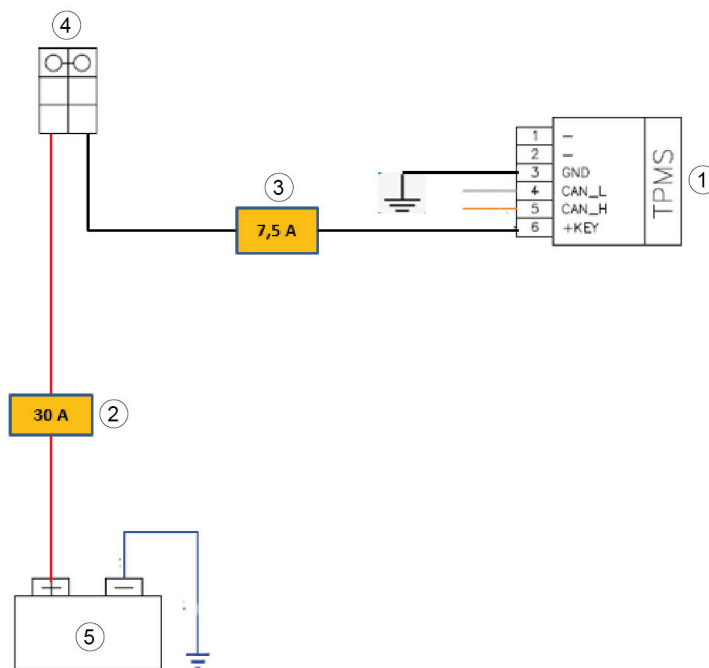
(if applicable)

Pin-Out:

- 1 . Not used

- 2 . Not used
- 3 . Ground
- 4 . CAN L
- 5 . CAN H
- 6 . Live positive lead

Electrical circuit:



Key:

- 1 . TPMS ECU
- 2 . Main fuse
- 3 . Fuse
- 4 . Key switch
- 5 . Battery

5.2.31 Gear sensor

Function

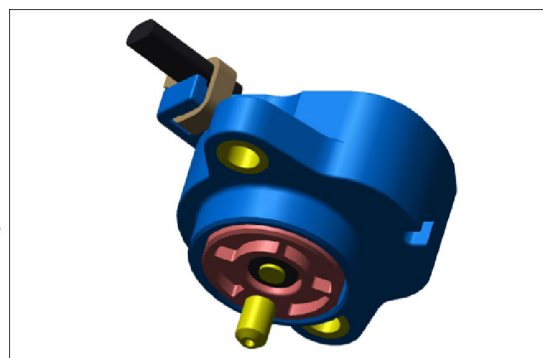
It is used to indicate to the ECU which gear is engaged.

Operation / Operating principle

Each gear engaged has a sensor position, which in turn will have a higher output voltage as the gear engaged increases.

Position:

- On the cover of the gearbox housing.

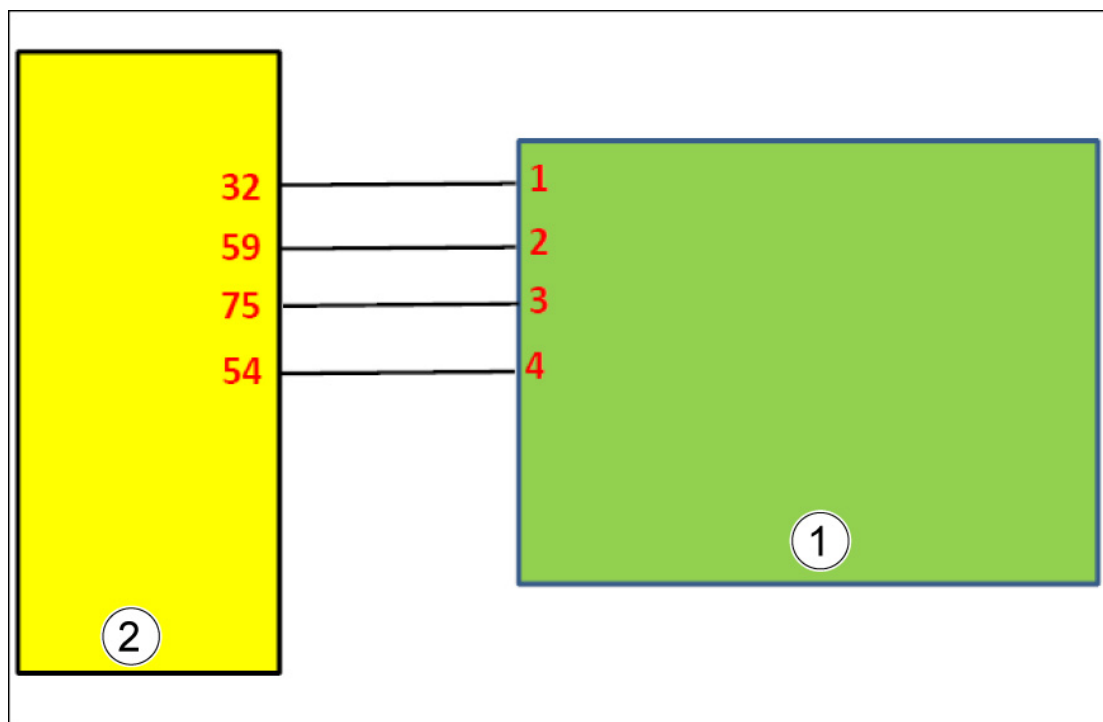


Output voltage:

- First gear: $1,375 \text{ V} \pm 0.1 \text{ V}$
- NEUTRAL: $1,000 \text{ V} \pm 0.09 \text{ V}$
- Second gear: $0,625 \text{ V} \pm 0.1 \text{ V}$
- Third gear: $4,375 \text{ V} \pm 0.1 \text{ V}$
- Fourth gear: $3,625 \pm 0.1 \text{ V}$
- Fifth gear: $2,875 \text{ V} \pm 0.1 \text{ V}$
- Sixth gear: $2,125 \text{ V} \pm 0.1 \text{ V}$

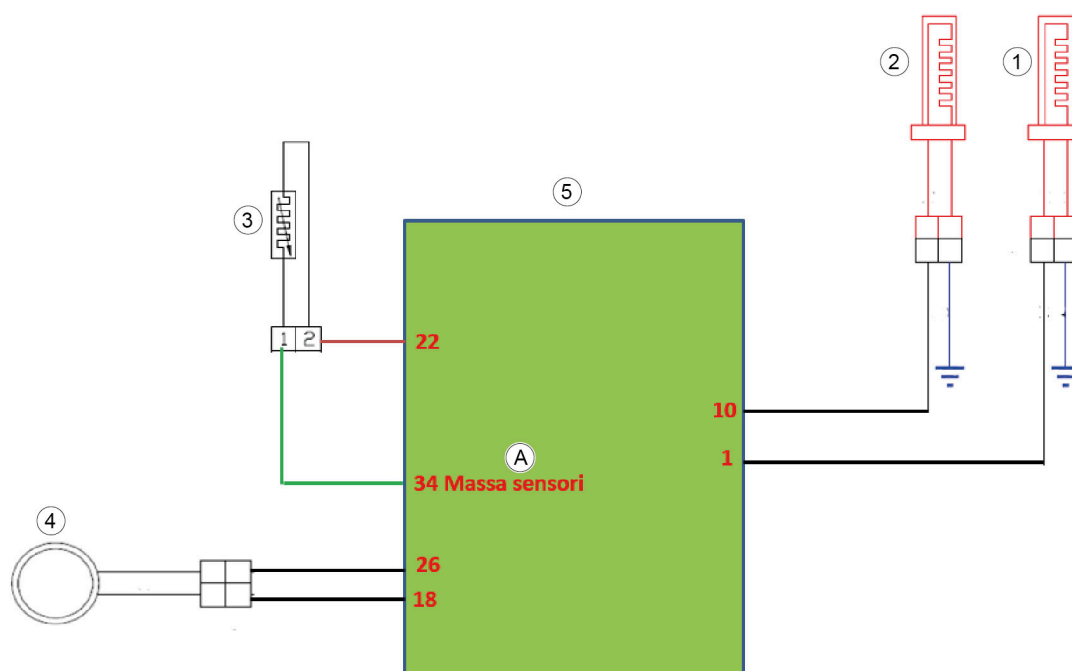
**Pin-Out**

- 1 . Gear signal.
- 2 . Neutral signal.
- 3 . Earth.
- 4 . 5 Volt power supply.

Electrical circuit:**Key:**

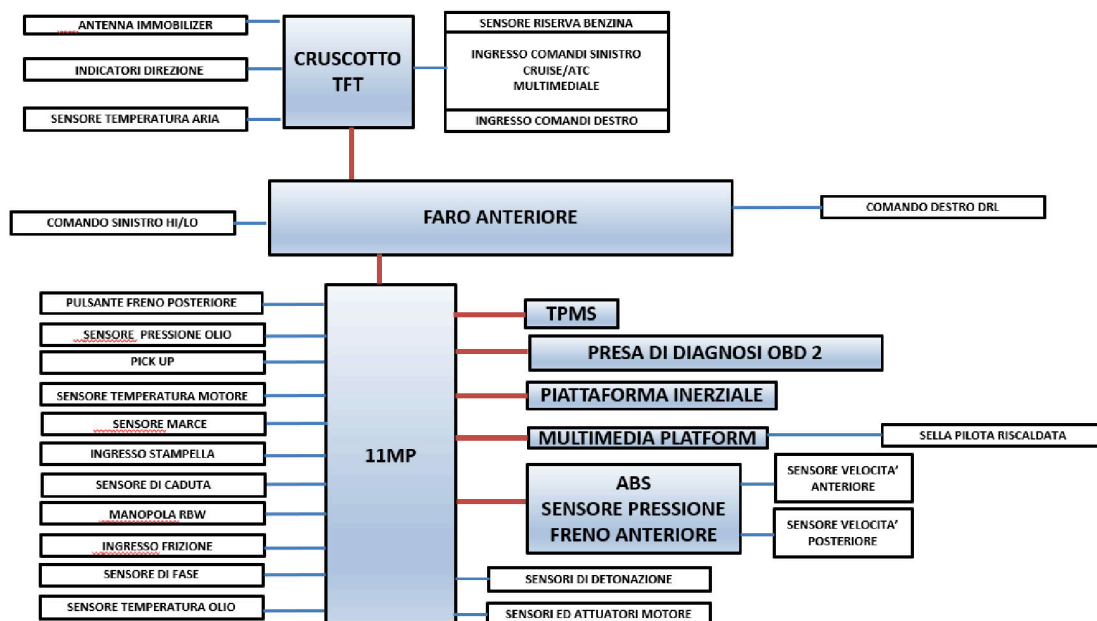
- 1 . Gear sensor
- 2 . 11MP ECU

5.2.32 Heated handgrips**Electrical circuit:**

**Key:**

- 1. Right side heated handle
- 2. Left hand heated handle
- 3. air temperature sensor
- 4. Immobilizer antenna
- 5. Instrument cluster
- A. Pin of the temperature sensor to ground

5.3 CAN Line



Function

Allows the communication between:

- 11MP ECU;
- TFT instrument cluster;
- Front headlamp;
- TPMS ECU;
- OBD2 port;
- IMU control unit (Inertia platform)
- "Guzzi MIA" control unit;
- ABS control unit / front brake pressure sensor.

Operation / Operating principle

A CAN line (Controller Area Network) is a connection between different electronic devices of a vehicle organised like a computer network (internet). The CAN network significantly simplifies the layout of the electrical system and its overall ground. With this communication line, needless duplication of several sensors present on the motorbike has been obviated. The sensor signals are shared by the two electronic elaboration units (instrument panel and control unit).

- Cable number reduction: The CAN line travels through a twisted cable to several nodes.
- These nodes can also isolate the errors without causing a system breakdown (FaultsConfination).
- Immunity to interference: the signal travels through two cables and the signal reading is differential (voltage difference between the two signals on both cables). If the two signals are disturbed by an external factor, their difference remains unaltered.
- Communication speed: messages travel at a speed of 250 kbps (data arrive at nodes every 20 ms, i.e. 50 times/second).

CAN PROTOCOL (CONT. NETWORK AREA)

The communication protocol is CSMA/CD (Carrier Sense Multiple Access w/ Collision Detection).

In order to transmit, every nod must first check that the BUS (the connection among all devices) is free before attempting to send a message with BUS (Carrier Sense).

If during this period there is no activity on BUS, every nod has the same chance to send a message (Multiple Access). If two nodes start transmitting simultaneously, the nodes recognise the "collision" (Collision Detection) and initiate an exchange action based on message priority (messages remain unaltered during exchange and there is no delay for high priority messages).

CAN protocol is based on messages and not on addresses. The message itself is divided into several parts (frames), each of which has a meaning: message priority, data contained, error detection, reception confirmation, etc.

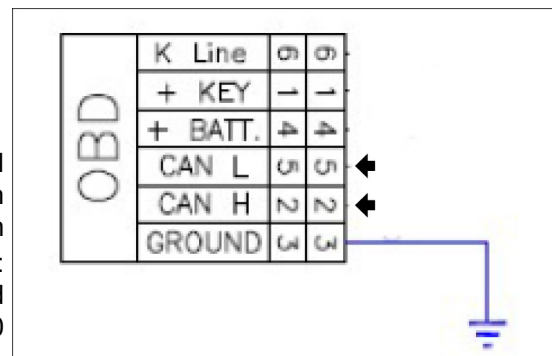
Every network nod receives all the messages sent through the BUS (with reception confirmation or error messages) and each nod decides if the message is to be processed or rejected. Besides, every nod can request information from the other nodes (RTR = Remote Transmit Request).

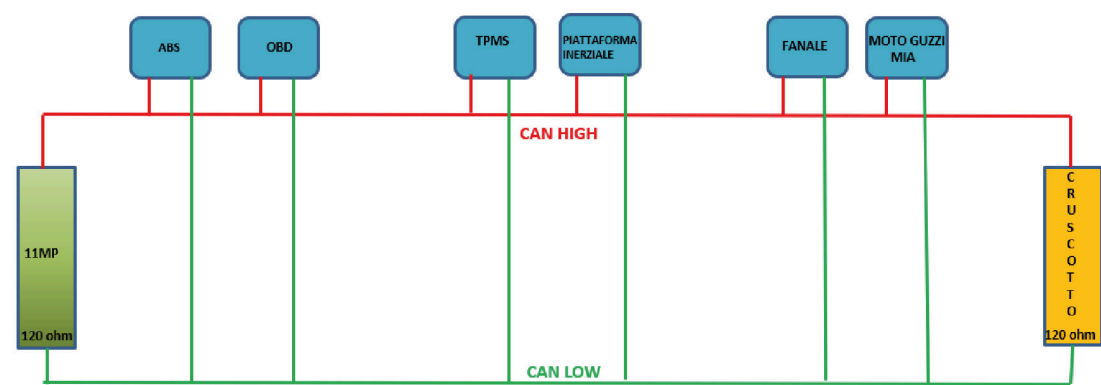
Level in electrical circuit diagram

- CAN Line

Electrical specifications

- All the control units connected: Electrical resistance value, when measured between pins 2 and 5 of the OBD port = 60 ± 6 Ohm
- Only instrument cluster disconnected: Electrical resistance value, when measured between pins 2 and 5 of the OBD port = 120 ± 12 Ohm
- Only 11MP control unit disconnected: Electrical resistance value, when measured between pins 2 and 5 of the OBD port = 120 ± 12 Ohm





LIST OF TOPICS

Engine from the vehicle

6.1 Preparation of the vehicle

WARNING



TO CARRY OUT MAINTENANCE OPERATIONS AND WHERE THERE IS A NEED TO LIFT THE VEHICLE, USE A SCISSOR LIFT LOCATED AT THE OIL SUMP.

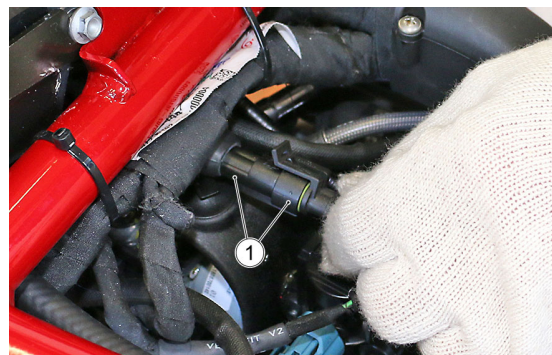
TO PREVENT DAMAGE, PLACE A PROTECTION BETWEEN THE OIL SUMP AND THE LIFT.

Before removing the engine from the vehicle, the following operations must be carried out:

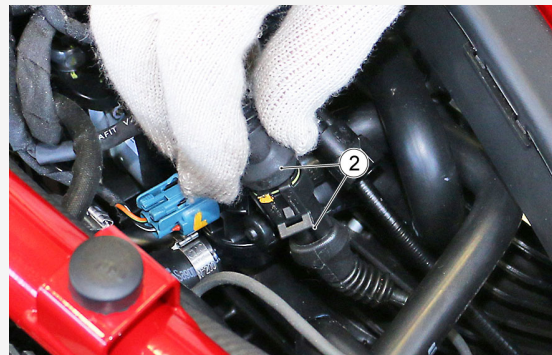
- Position a scissor lift on the oil sump under the vehicle (**WARNING: REMOVE THE SUMP GUARD BEFORE HAND**);
- Remove the battery, the fuel tank, the rider footrest plates, the side stand, the complete exhaust system, the rear shock absorber and the side panels

6.2 removal of the engine from the vehicle

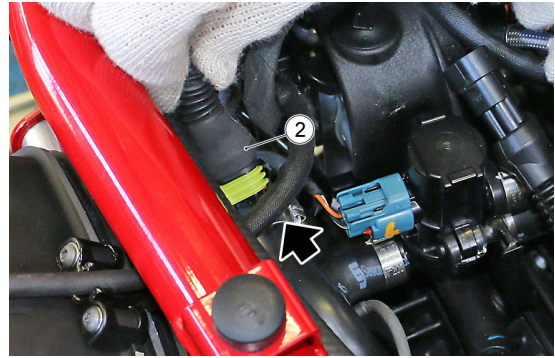
- Disconnect the connector (1).



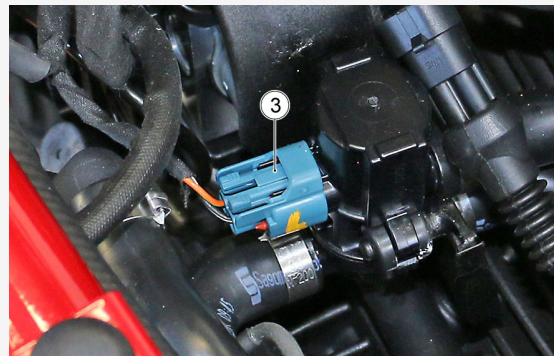
- Disconnect the connector (2).



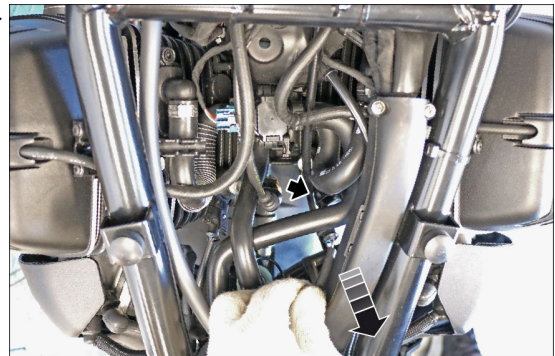
- Free the connector (2) from the wiring harness as illustrated in the figure.



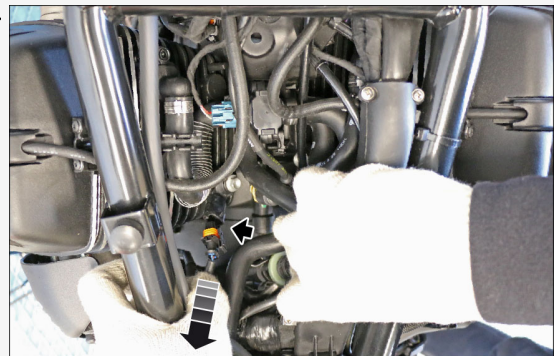
- Disconnect the connector (3).



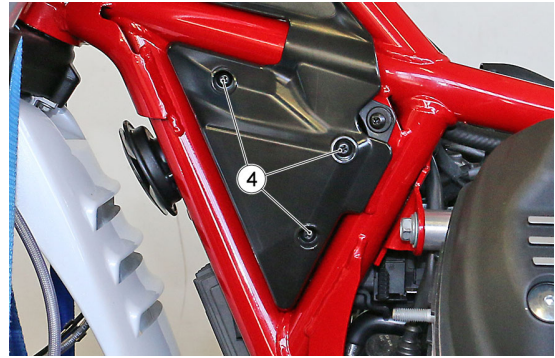
- Disconnect the knock sensor connector from the right cylinder.



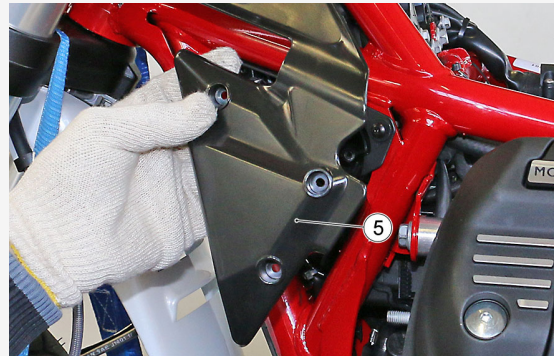
- Disconnect the knock sensor connector from the left cylinder.



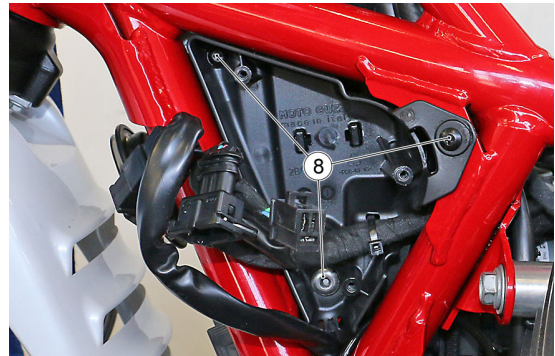
- Unscrew and remove the screws (4).



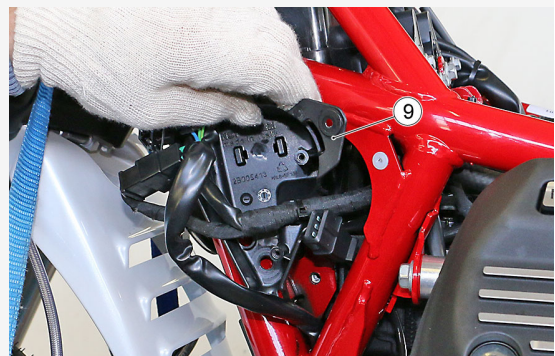
- Remove the left headstock cover (5).



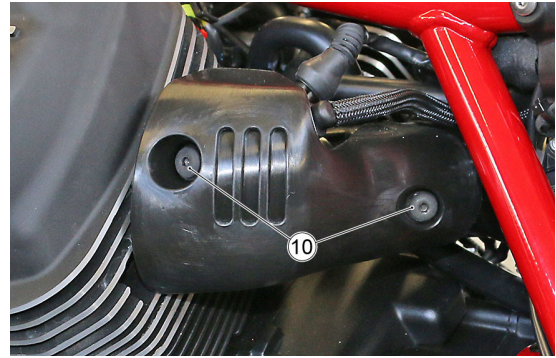
- Unscrew and remove the screws (8).



- Remove the connectors box (9).



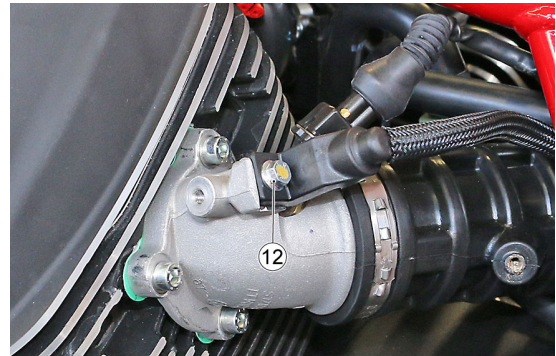
- Unscrew and remove the screws (10).



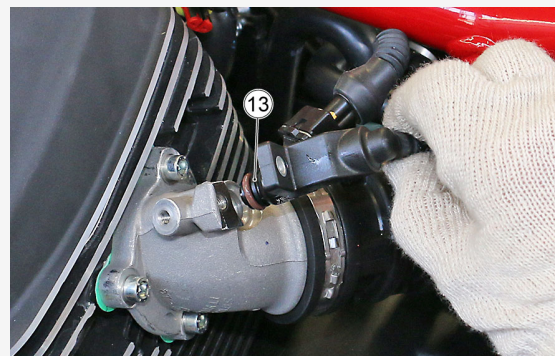
- Remove the injector cover (11).



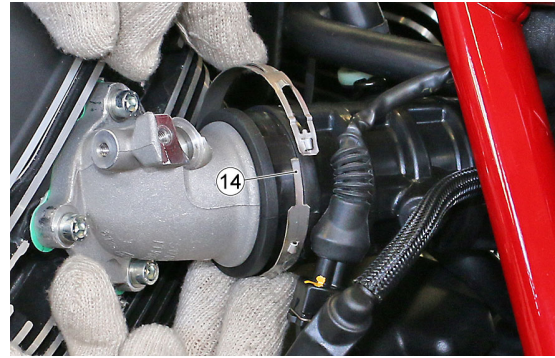
- Undo and remove the screw (12).



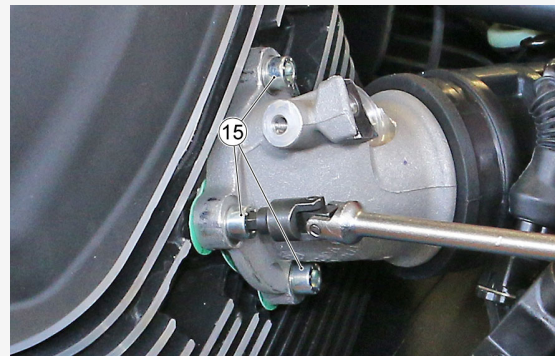
- Remove the left injector (13).



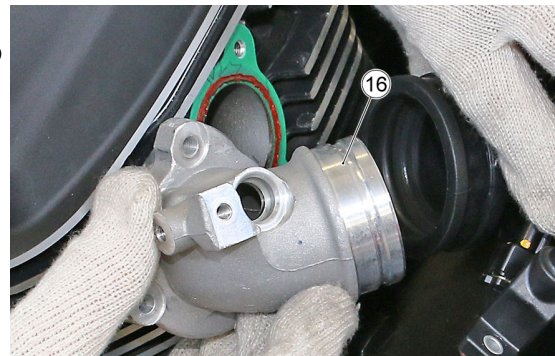
- Remove the clamp (14).



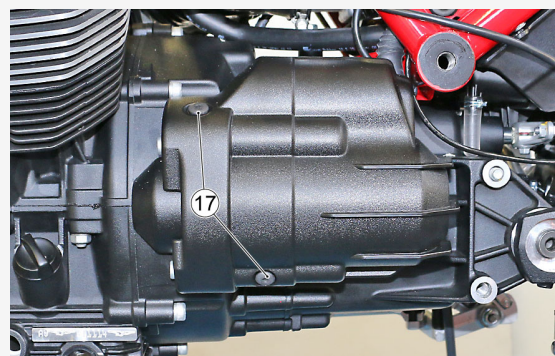
- Unscrew and remove the screws (15).



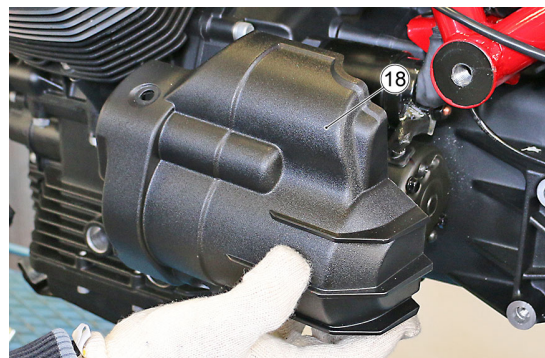
- Remove the left intake fitting (16).
- Repeat the operations from "11" to "17" to remove the right inlet fitting.



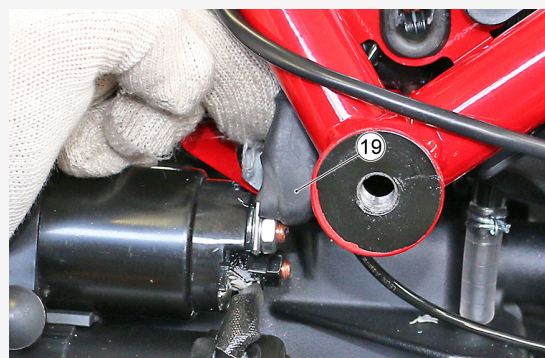
- Unscrew and remove the screws (17).



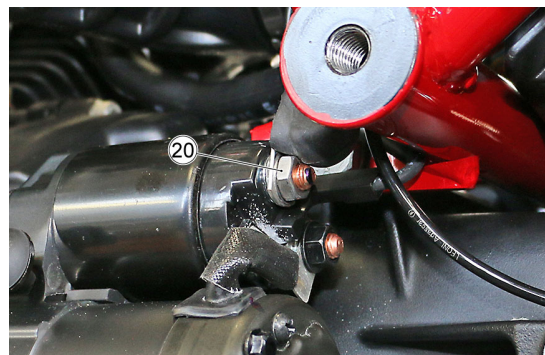
- Remove the starter motor cover (18).



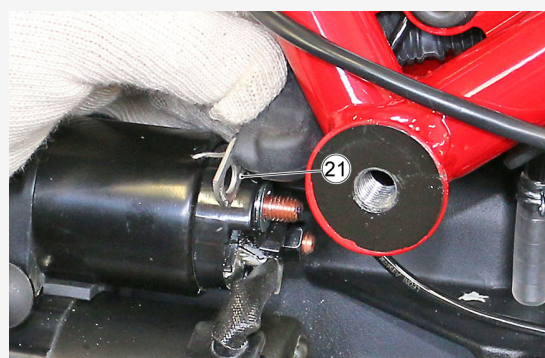
- Lift the protective boot (19).



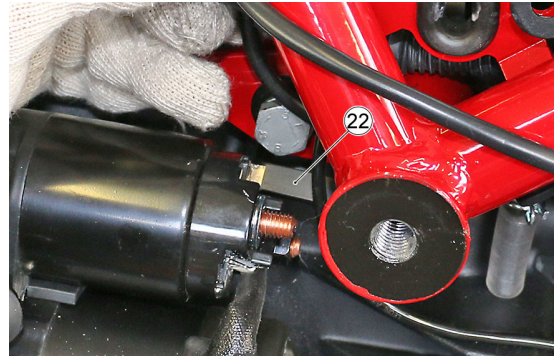
- Unscrew and remove the nut (20).



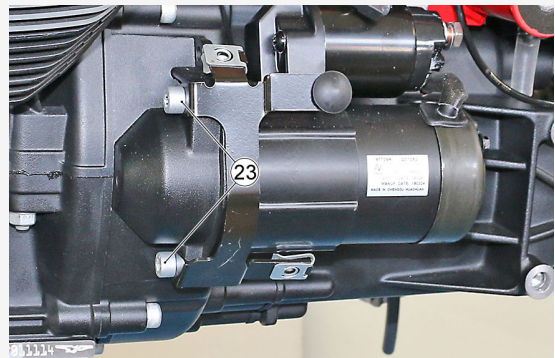
- Remove the cable (21).



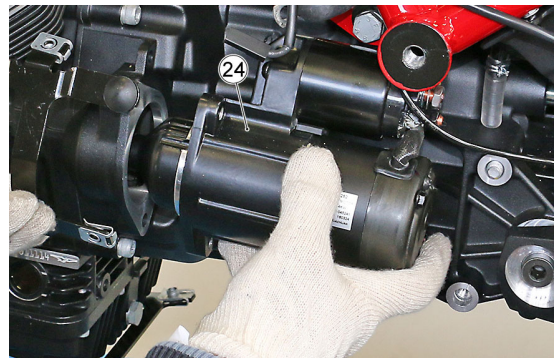
- Disconnect the connector (22).



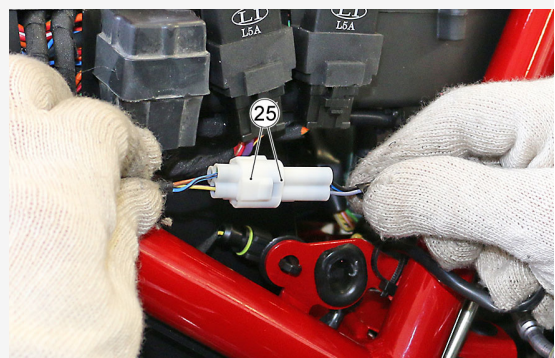
- Unscrew and remove the screws (23).



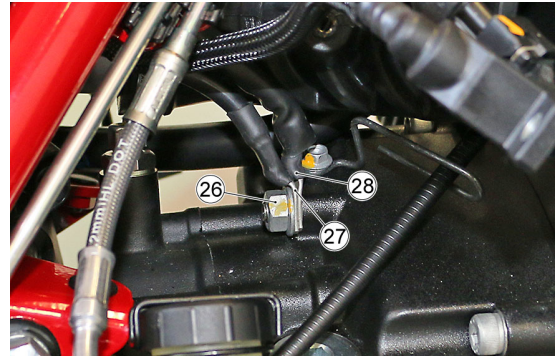
- Remove the starter motor (24).



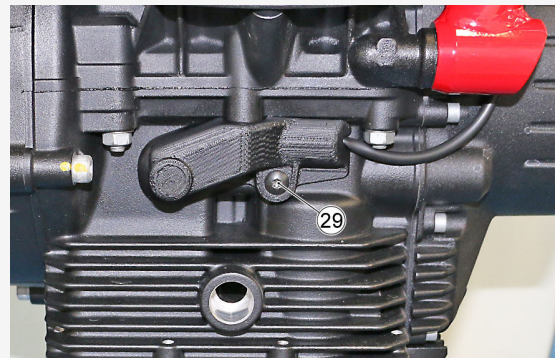
- Disconnect the connector (25).



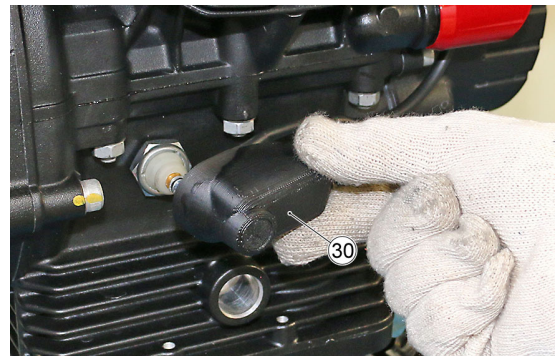
- Unscrew and remove the nut (26).
- Remove the cable (27) and (28).



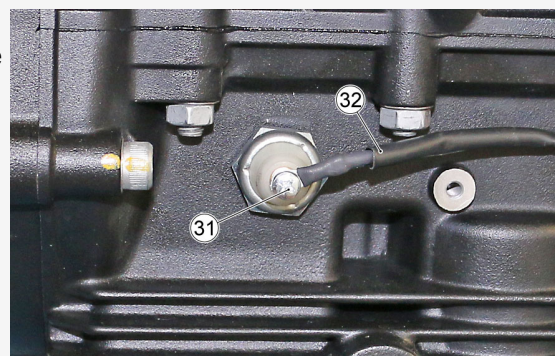
- Undo and remove the screw (29).



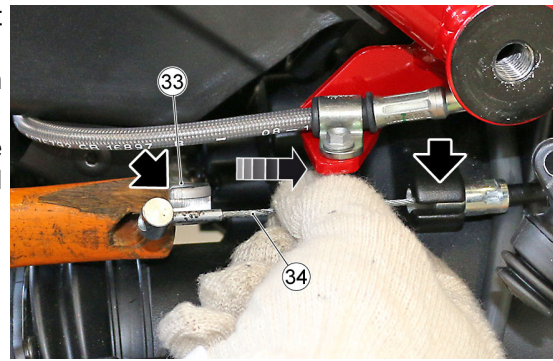
- Remove the oil pressure bulb cover (30).



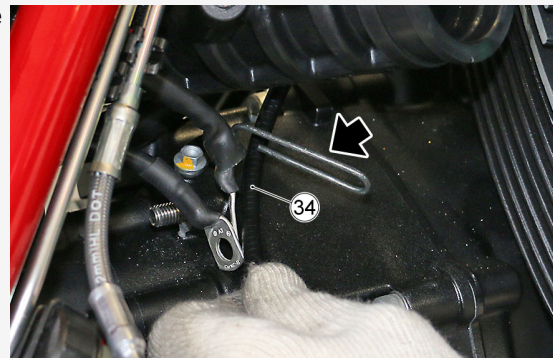
- Undo and remove the screw (31).
- Remove the cable (32) from the oil pressure bulb.



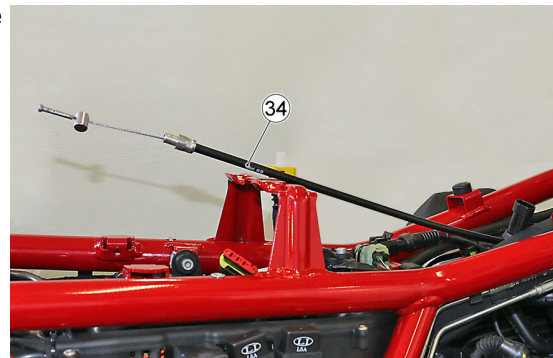
- Press the lever (33) toward the front part of the vehicle, as illustrated in the figure, to eliminate the tension to which the clutch cable is subjected.
- Simultaneously slide out and remove the clutch cable (34) from the points indicated in the figure.



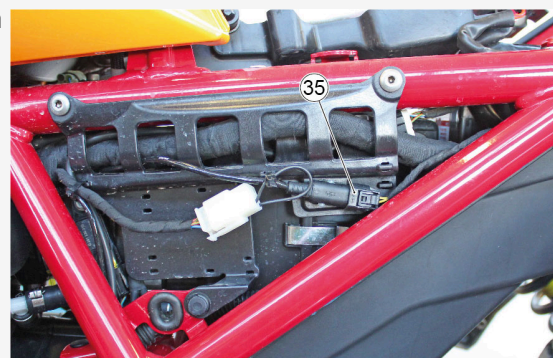
- Remove the clutch cable (34) from the cable grommet as indicated in the figure.



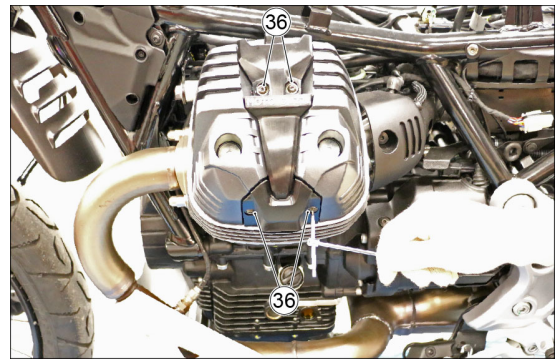
- Remove the clutch cable (34) from the engine and frame area.



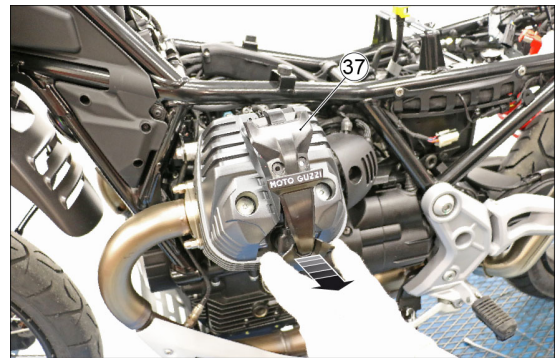
- Disconnect the connector (35) located on the left side of the vehicle.



- Unscrew and remove the screws (36).



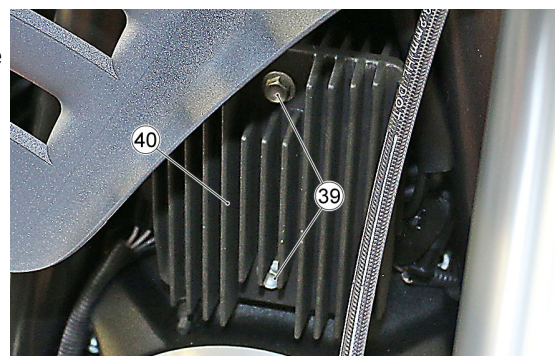
- Remove the cover (37).



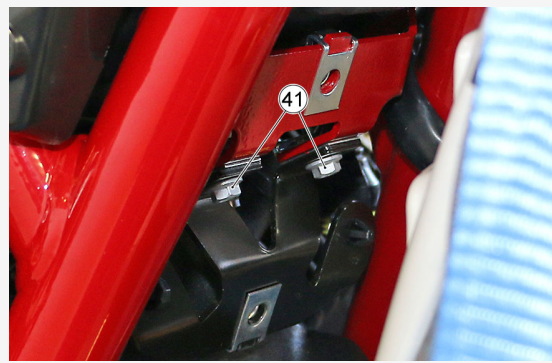
- Disconnect the spark plug cap (38).



- Unscrew and remove the screws (39).
- Remove the voltage regulator (40) from the frame and place it beside the vehicle.



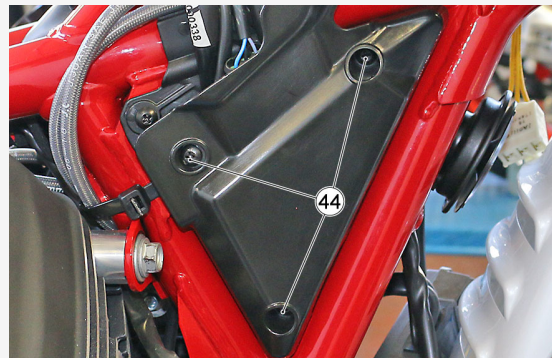
- Unscrew and remove the screws (41).



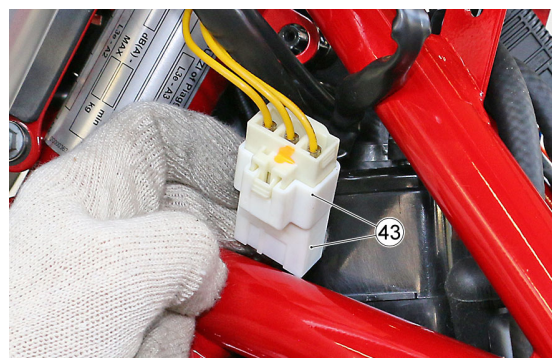
- Remove the voltage regulator support bracket (42).



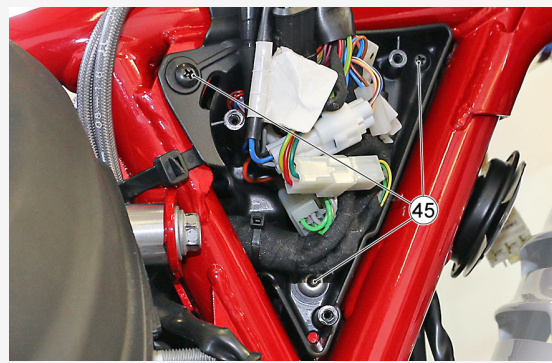
- Unscrew and remove the screws (44).



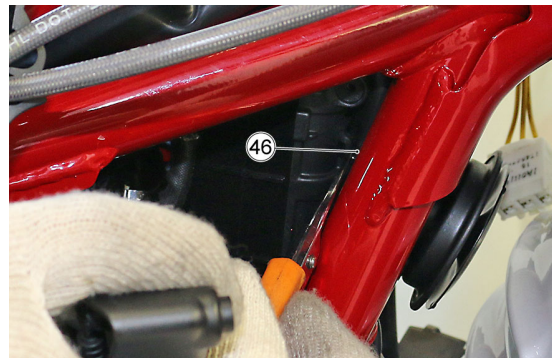
- Disconnect the connector (43).



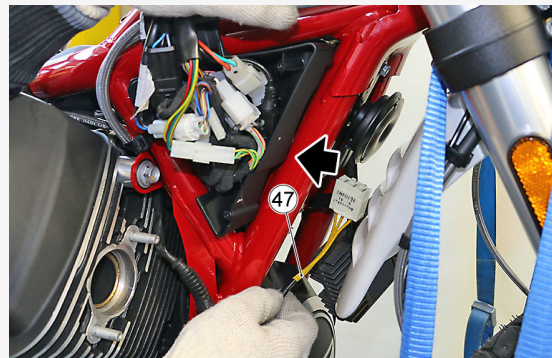
- Unscrew and remove the screws (45).



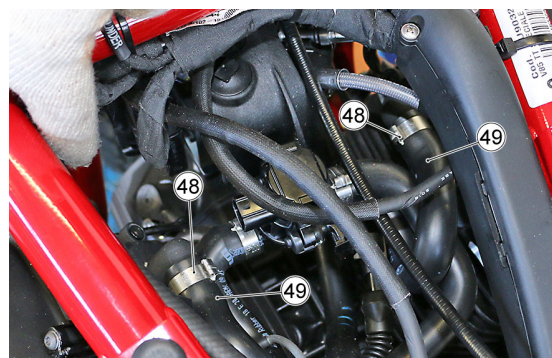
- Momentarily move the connectors box and remove the clamp (46).



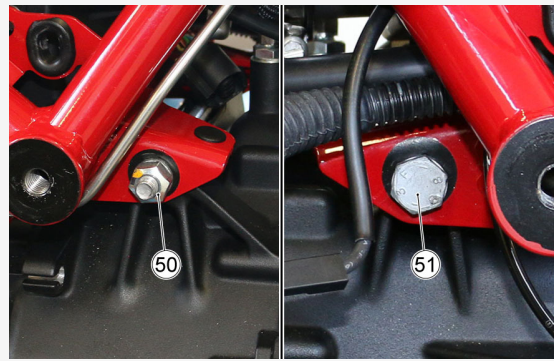
- Keeping the connectors box moved, remove the cable (47) from the chassis area.
- Carry out the removal of the rear wheel.
- Remove the swingarm.
- Remove the cardan shaft.



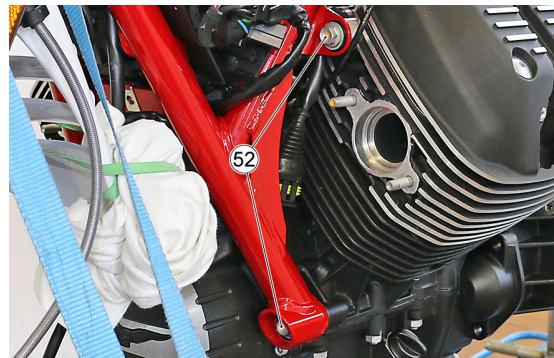
- Remove the pipe feedthrough (48).
- Disconnect the secondary air pipes (49).



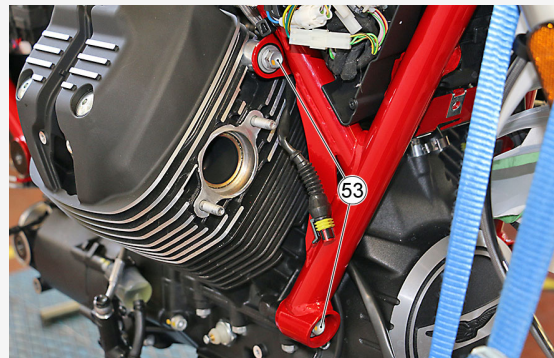
- Holding the pin (51) in place, unscrew and remove the nut (50).
- Remove the pin (51).



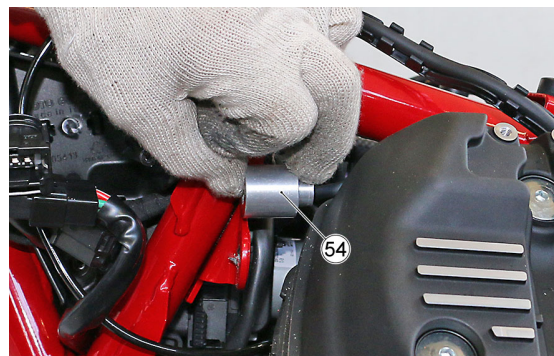
- Unscrew and remove the screws (52).



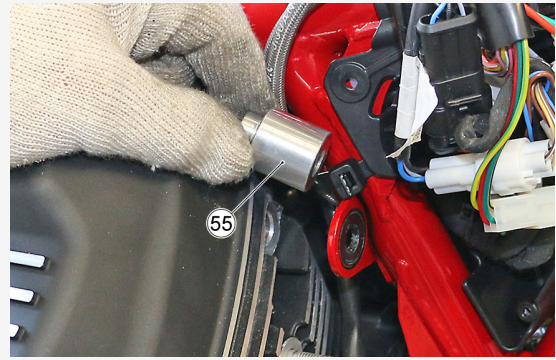
- Unscrew and remove the screws (53).



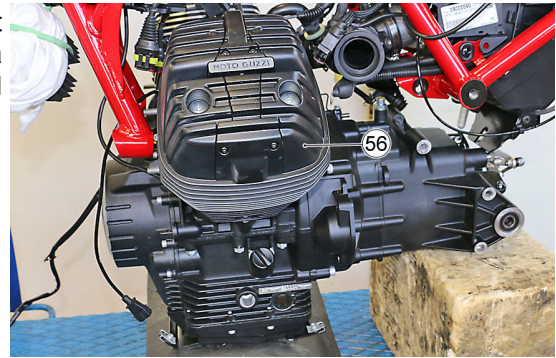
- Collect the spacer (54).



- Collect the spacer (55).



- Secure the engine (56) so that it does not fall and then lift the vehicle's chassis using a suitable lifting device, so that it is separated from the engine.



LIST OF TOPICS

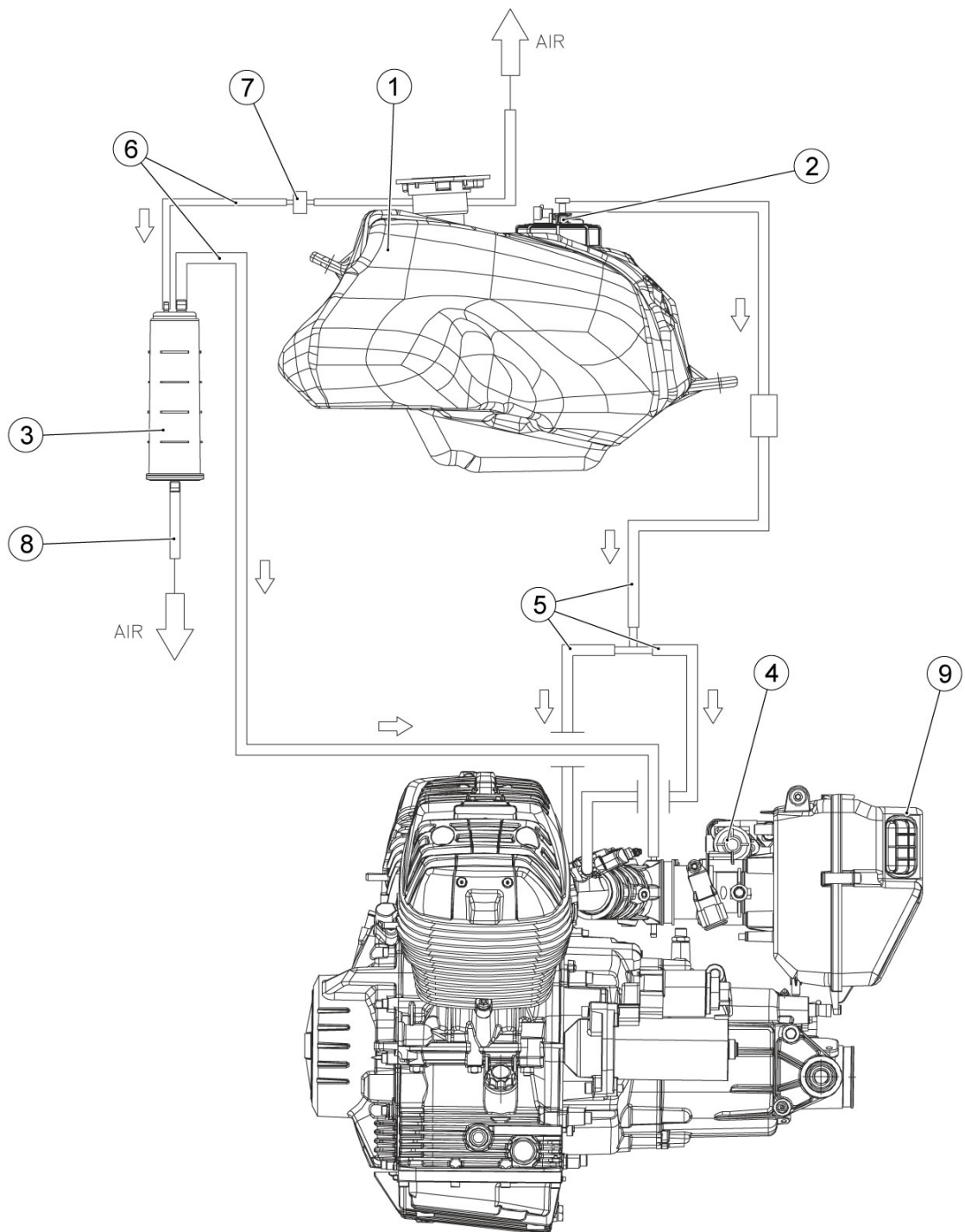
Engine

**TO CONSULT THE CHAPTER ABOUT THE ENGINE AND ITS COMPONENTS PLEASE
REFER TO THE APPROPRIATE MANUAL: "MSS Engine V85"**

LIST OF TOPICS

Power feed

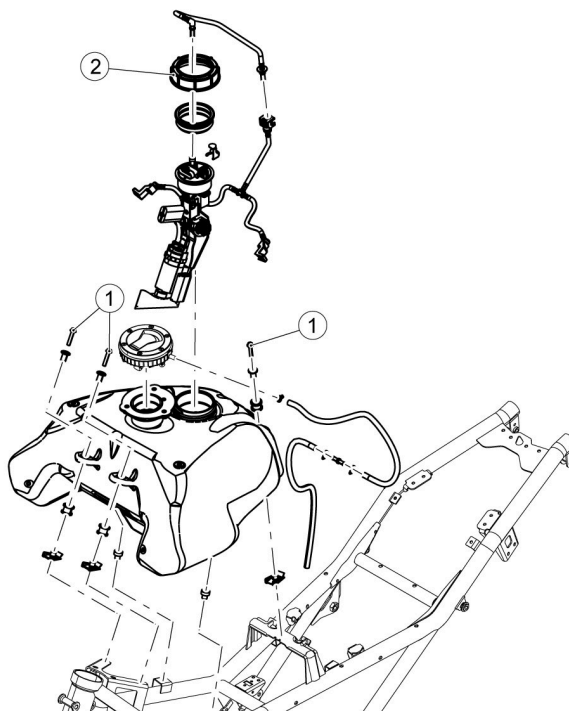
8.1 Circuit diagram

**Key:**

- 1 . Fuel tank
- 2 . Fuel pump
- 3 . Canister

- 4 . Throttle body
- 5 . Fuel delivery pipes
- 6 . Fuel vapour recovery pipe
- 7 . Check valve
- 8 . Breather pipe
- 9 . Intake

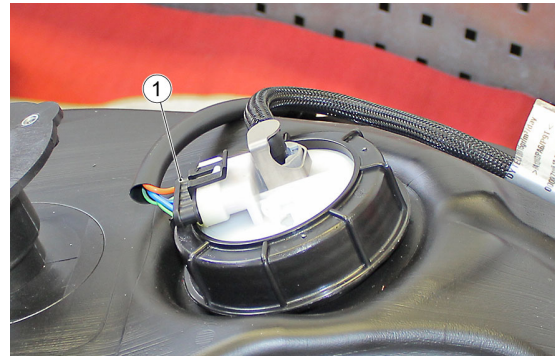
8.2 Fuel pump



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the fuel tank to frame	M6	3	10 Nm (7.38 lbf ft)	-
2	Ring nut fastening the fuel pump to the fuel tank	-	1	20 Nm (14.75 lbf ft)	-

8.2.1 Removing the fuel pump

- Remove the fuel tank
- Remove the side fairings
- Remove the central tank fairing
- Disconnect the connector (1)



- Remove the lock (2)



- Remove the hose (3)



- Unscrew and remove the ring nut (4)



- Remove the fuel pump (5)

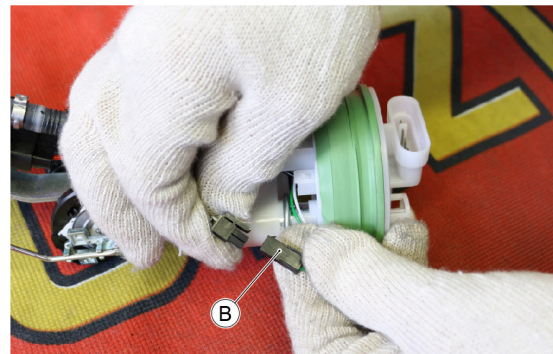


FILTER REPLACEMENT

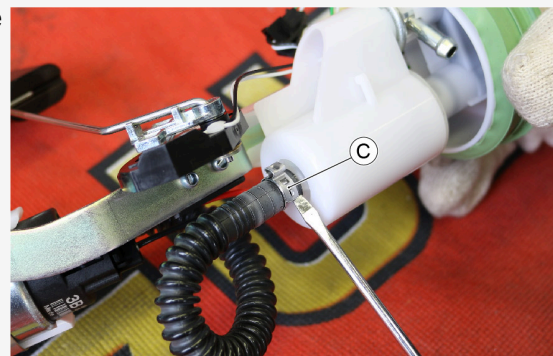
- Remove the plastic clamp (A) securing the connector.



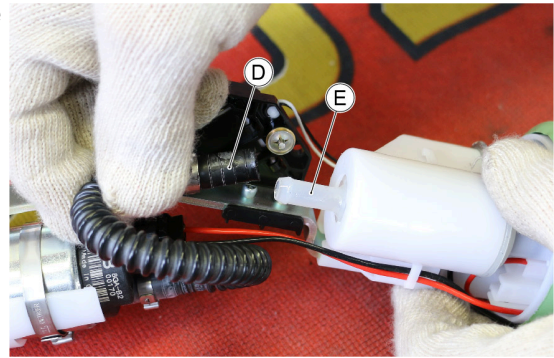
- Disconnect the fuel gauge connector (B).



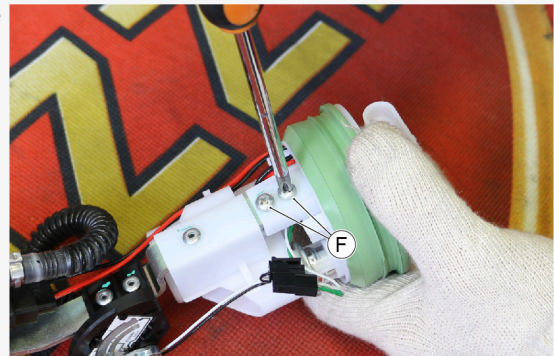
- Remove the metal collar (C) from the corrugated pipe.



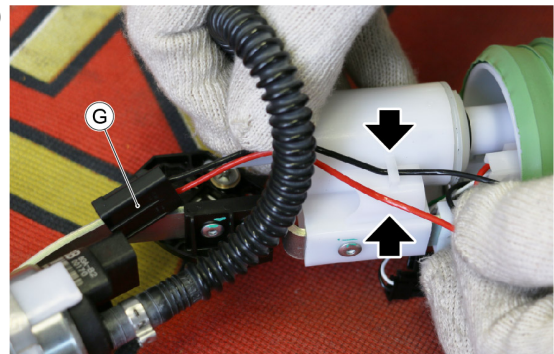
- Remove the corrugated pipe (D) from the filter (E). During the operation, be careful not to damage the fuel level sensor.



- Unscrew the 2 screws (F) between the plastic head and metal bracket



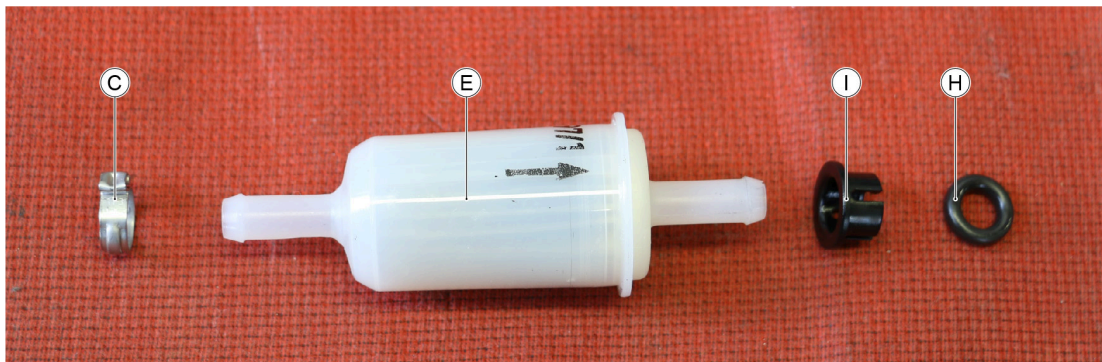
- Disconnect the fuel pump connector (G) and free the wiring harness



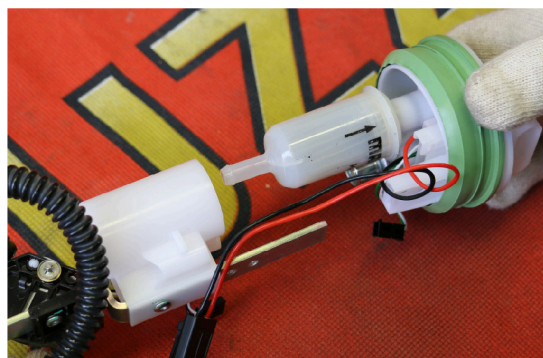
- Remove the plastic head from the metal bracket.



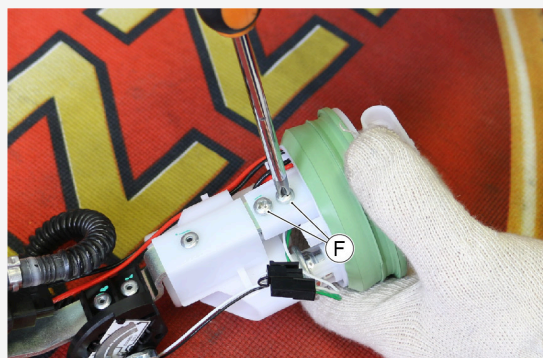
- Replace the filter kit (E) / o-ring (H) / spacer (I) / metal collar (C).



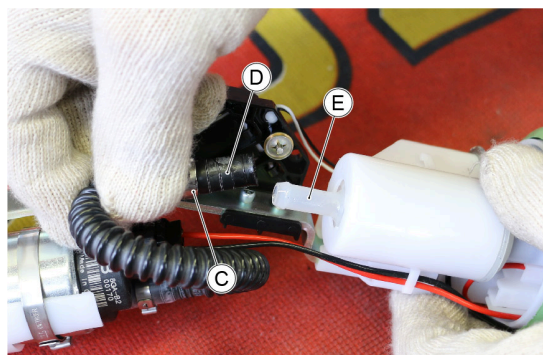
- If the metal plate for fixing the screws had slipped off during the operations, put it back in the appropriate location.
- Insert the spare part kit in the relative seat and then reinsert the bracket into the head



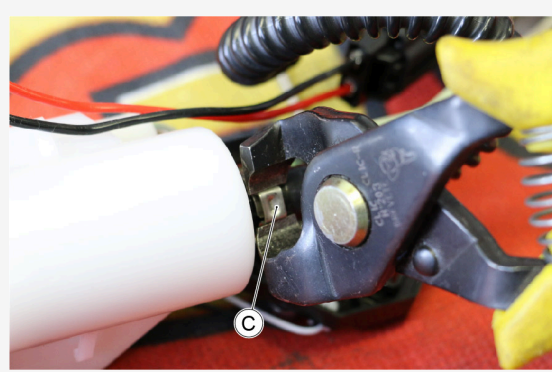
- Proceed by screwing the two screws (F) to block the metal bracket to the head



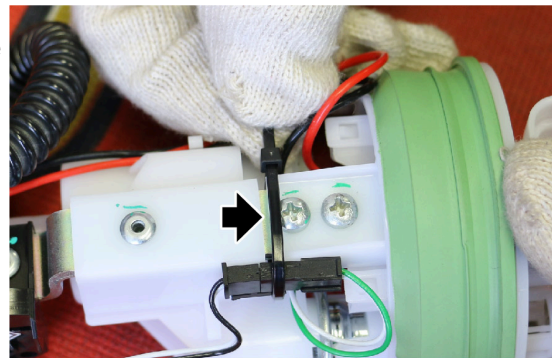
- Insert the metal collar (C) first and then insert the corrugated pipe (D) in the filter shank (E)



- Tighten the metal collar (C) using an appropriate tool.

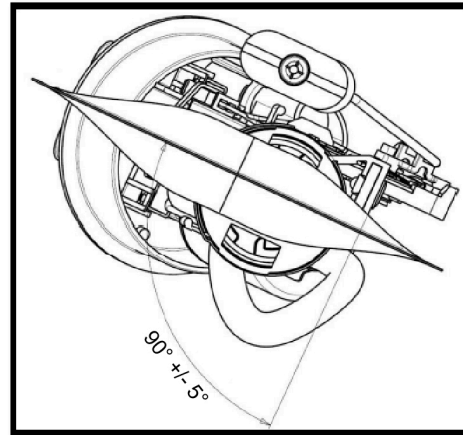
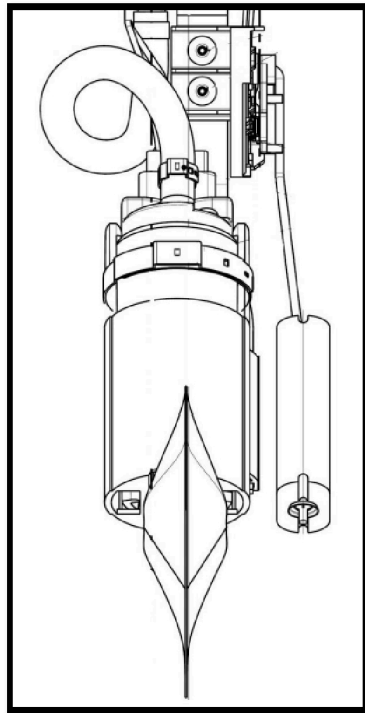


- Secure the connector in the position indicated, using a plastic tie and arrange the cables as shown.



PREFILTER REPLACEMENT

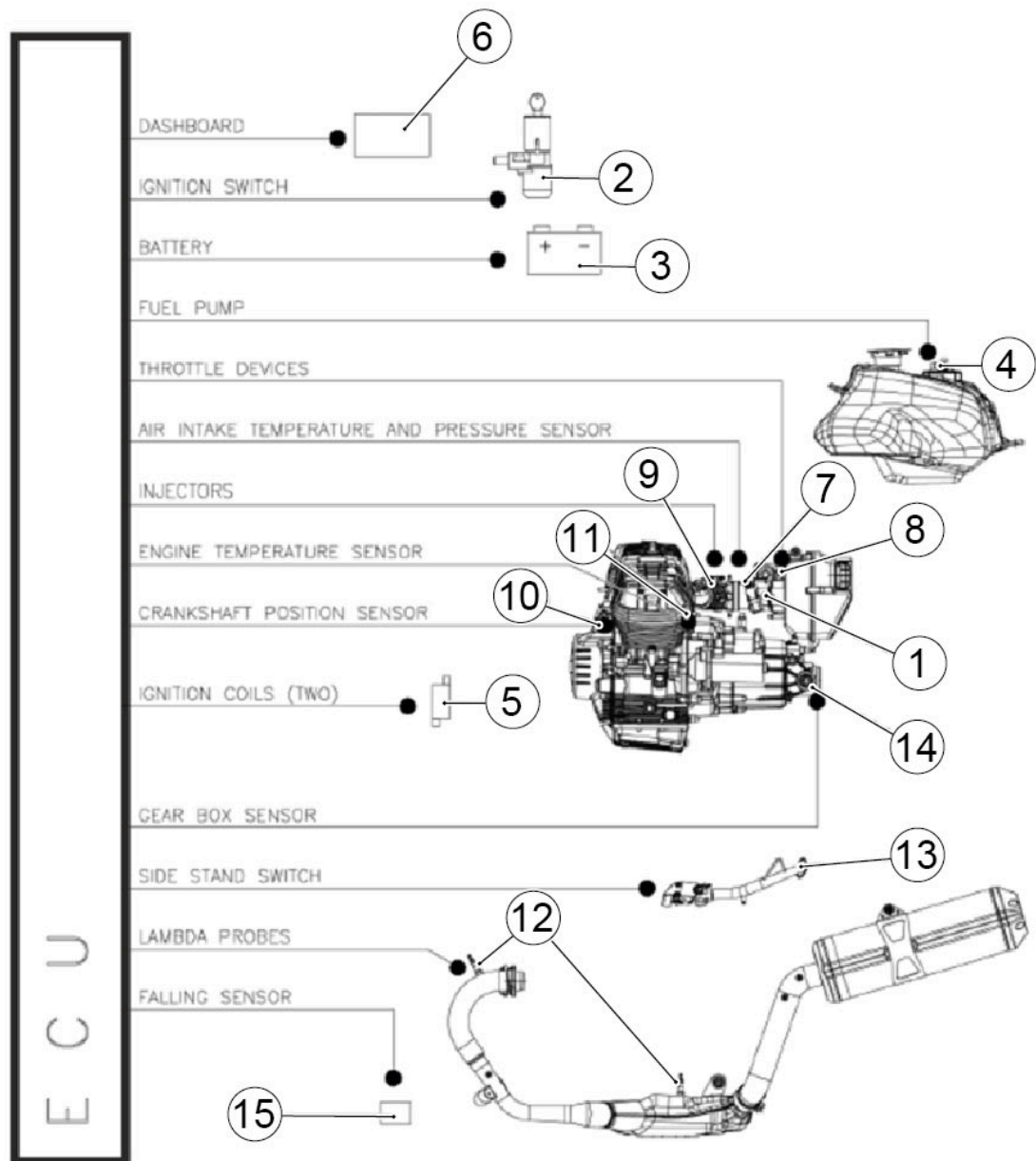
- The prefilter can be replaced manually, without the use of tools. Arrange the prefilter with the angular position indicated in the drawings below



8.3 Injection

8.3.1 Diagram

E5 Plus VEHICLES INJECTION DIAGRAM

**Key:**

- 1 . Control unit position
- 2 . Ignition switch
- 3 . Battery
- 4 . Fuel pump
- 5 . Coils

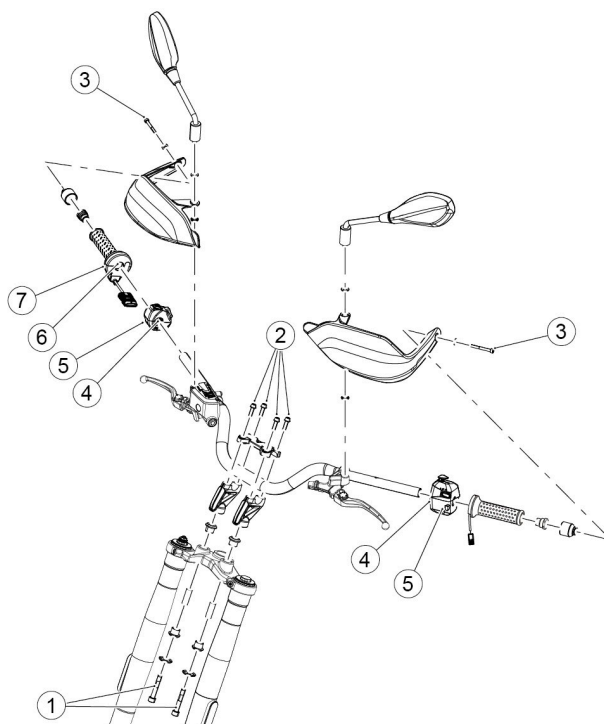
- 6 . Instrument cluster
- 7 . air temperature sensor
- 8 . Throttle valve position sensor
- 9 . Injectors
- 10 . Crankshaft position sensor
- 11 . Engine temperature sensor
- 12 . Lambda probe
- 13 . Side stand switch
- 14 . Gear sensor
- 15 . fall sensor

LIST OF TOPICS

Suspension

9.1 Front

9.1.1 Handlebar

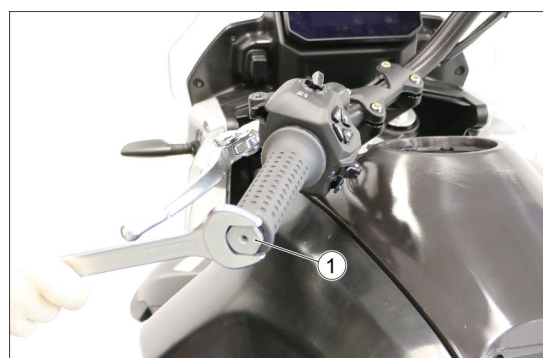


POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the lower U-bolts to the upper steering yoke	M10	2	50 ± 7.5 Nm (36.88 ± 5.53 lb ft)	-
2	Screws fastening the lower U-bolt clamp to the handlebar	M8	4	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)	-
3	Screws fastening the handguards and anti-vibration weights to the handlebar	M6	2	10 ± 2 Nm (7.38 ± 0.87 lbf ft)	-
4	Switch unit fastening screws (internal clamp)	M5	1 + 1	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	Screws pre-mounted on the shell
5	Switch unit fastening screws (external shell)	Self-tapping	2 + 2	1.4 ± 0.2 Nm (1.03 ± 0.15 lbf ft)	Screws pre-mounted on the shell

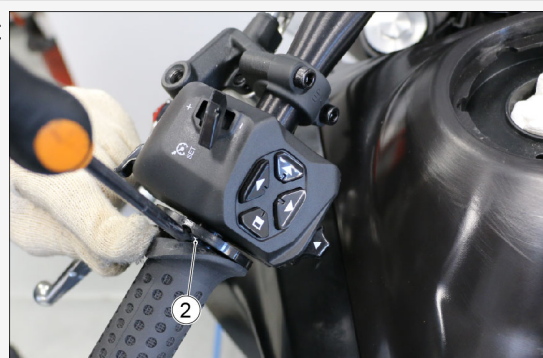
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
6	Fastening screws of the electronic throttle control to the handlebar	M4	1	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	Screw pre-mounted on the shell
7	Fastening screw of the electronic throttle control to the handlebar (external shell)	Self-tapping	2	2.2 ± 0.44 Nm (1.62 ± 0.32 lbf ft)	Screws pre-mounted on the shell

9.1.1.1 Removal

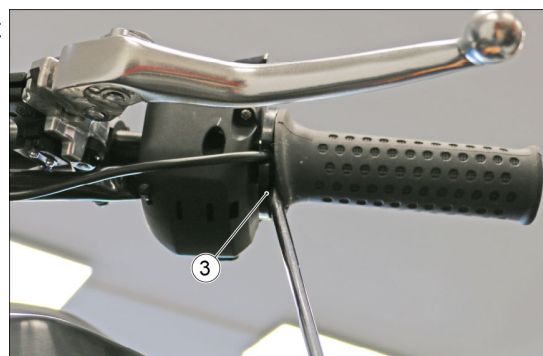
- First remove the rear-view mirrors and hand guards.
- Unscrew and remove the left threaded bushing (1) from the handlebar.



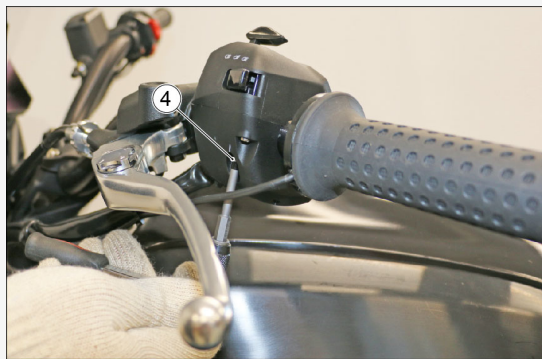
- Remove the upper fixing screw (2) of the left heated grip.



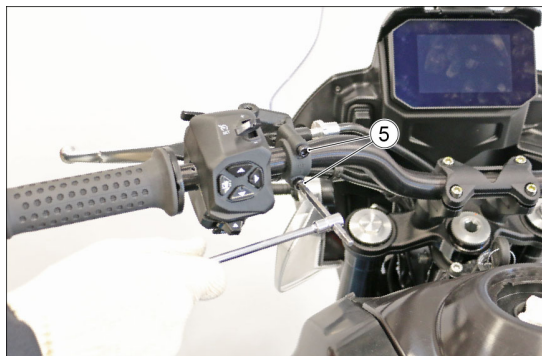
- Remove the lower fixing screw (3) of the left heated grip.



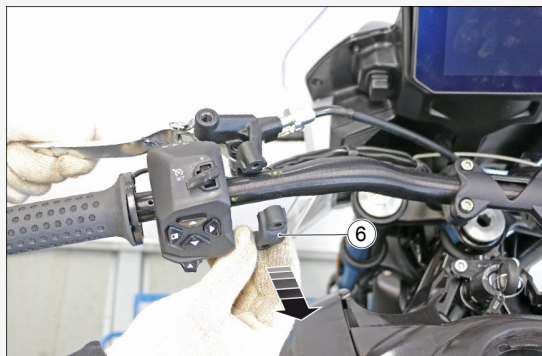
- Loosen, but **DO NOT REMOVE**, the fixing screw (4) on the left-hand switch unit.



- Remove the fixing screws (5) of the clutch lever.



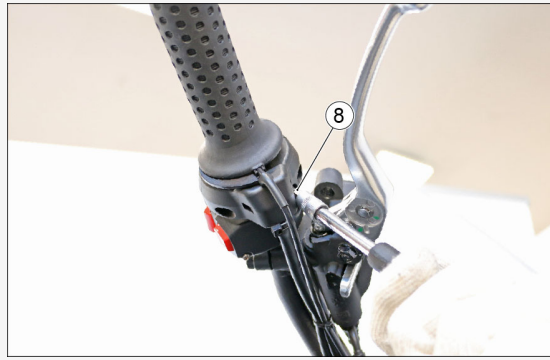
- Remove the U bolt (6) and place the clutch lever, complete with support, away from the work area.



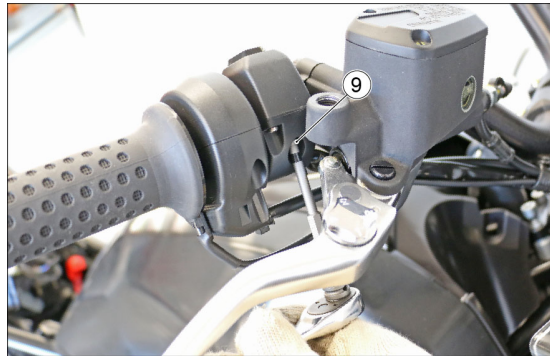
- Unscrew and remove the right threaded bushing (7) from the handlebar.



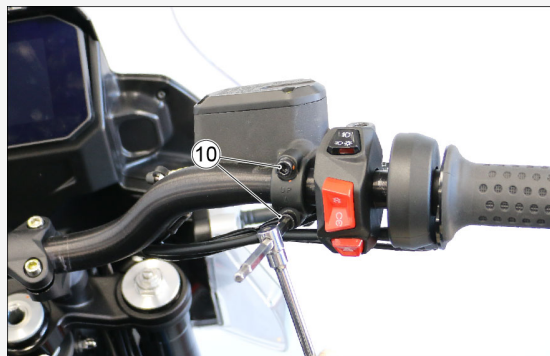
- Loosen, but **DO NOT REMOVE**, the fixing screw (8) of the throttle control



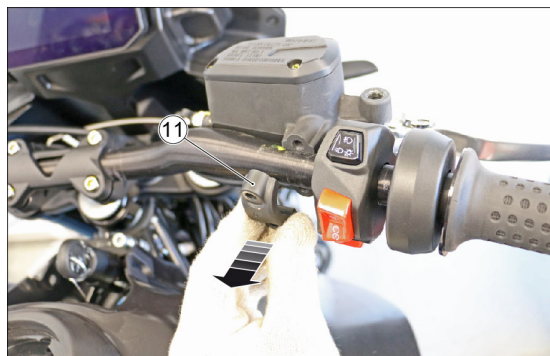
- Loosen, but **DO NOT REMOVE**, the fixing screw (9) on the right-hand switch unit.



- Remove the fixing screws (10) of the front brake master cylinder.

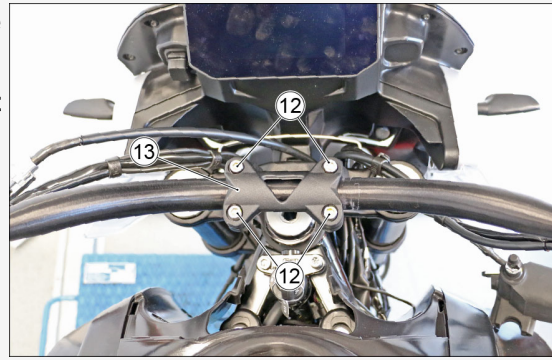


- Remove the U bolt (11) and place the front brake master cylinder outside the work area.



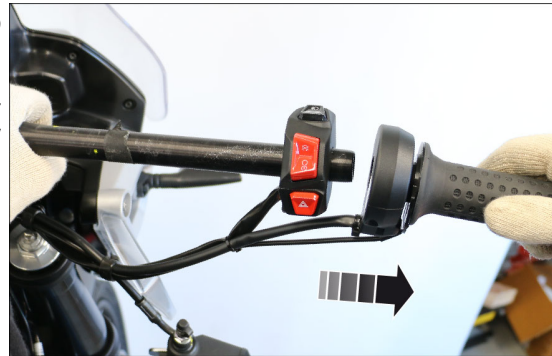
- Remove the fixing screws (12) and the upper U-bolt (13) of the handlebar.

When reassembling, tighten first the front screws, then the rear ones, to the specified torque.



Move the handlebar to the left in order to facilitate the following operation:

- Remove the throttle control and the right-hand switch unit from the handlebar and lay them on the vehicle.



Move the handlebar to the right in order to facilitate the following operation:

- Remove the left heated grip and the left switch unit from the handlebar and lay them on the vehicle.



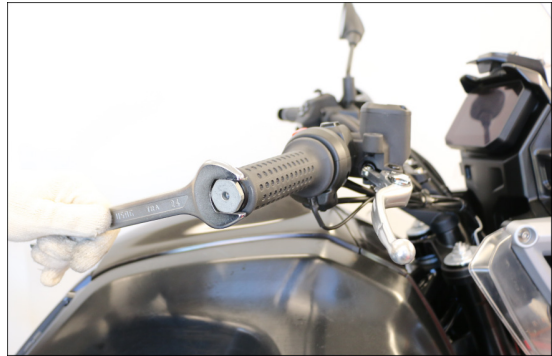
- Remove the handlebar from the vehicle.



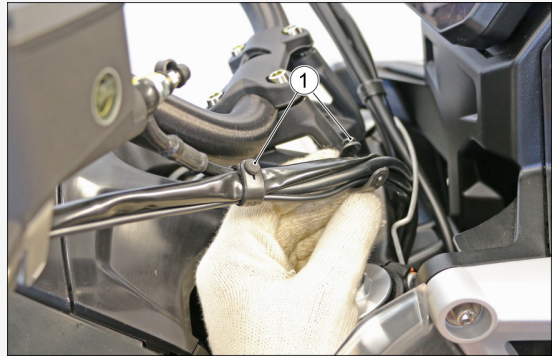
9.1.1.2 Right throttle control and switch unit

Removal

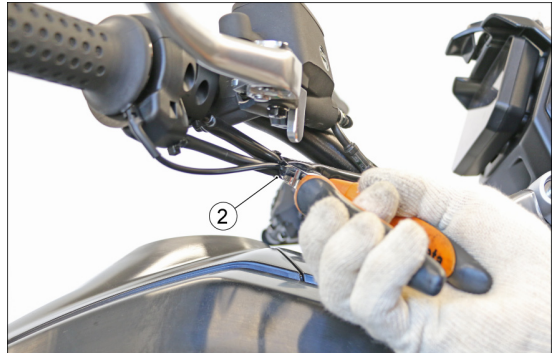
- First remove the fuel tank and the right hand guard.
- Remove the threaded bushing from the handlebar.



- Remove the two rubber clamps (1) from the cable bundle.



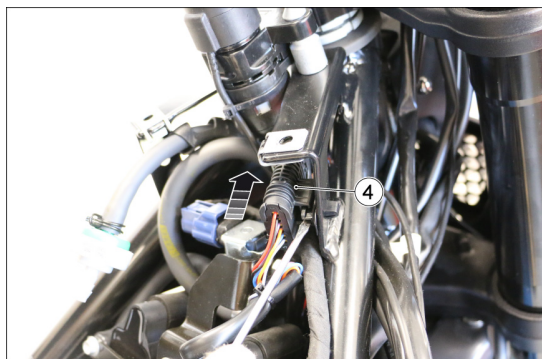
- Cut the plastic clamp (2).



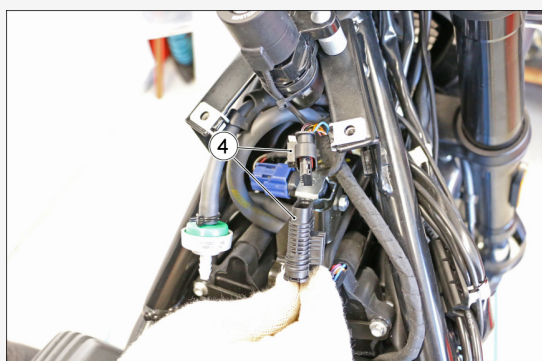
- Loosen, but **DO NOT REMOVE**, the two fixing screw (3) of the throttle control.



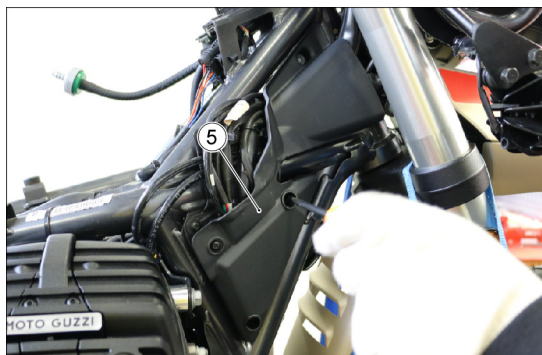
- Press the safety tab and release the ride by wire connector (4) from the relative fastener.



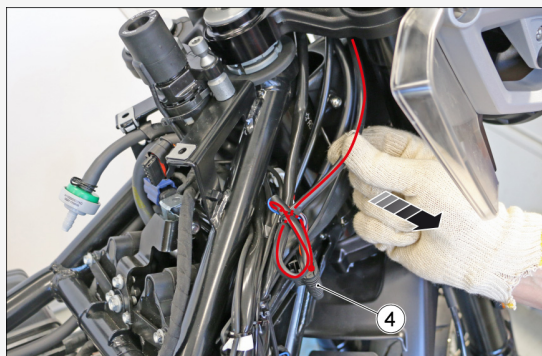
- Disconnect the connector (4).



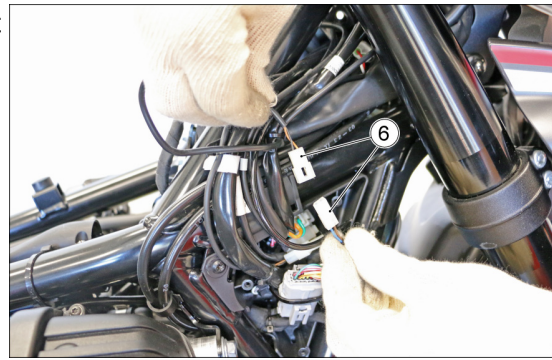
- Remove the plastic cover (5) on the right side of the steering headstock.



- Move the wiring harness and the connector (4) outside of the frame, as shown in the figure.



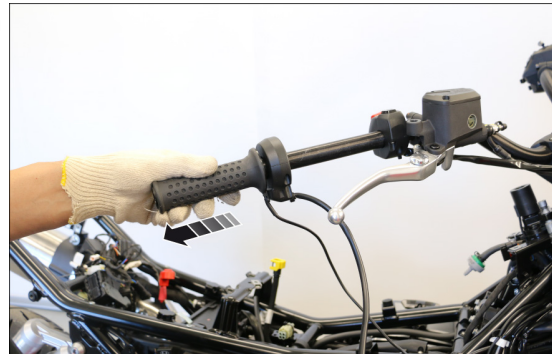
- Disconnect the connector (6) of the right heated grip (where applicable).



- Cut the plastic clamp (7) that fastens the wiring harness to the right heated grip (where applicable)



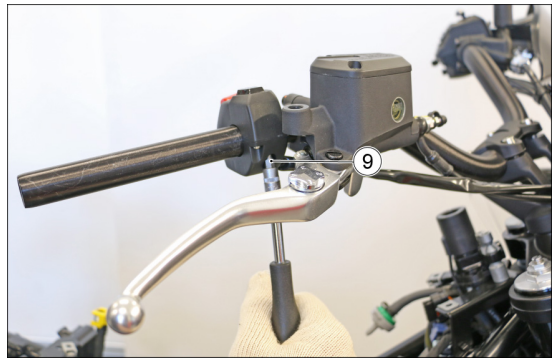
- Remove the complete throttle control from the vehicle, sliding it off the handlebar.



- Disconnect the right-hand light switch connector (8).



- Loosen, but **DO NOT REMOVE**, the fixing screw (9) on the right-hand switch unit.



- Remove the right switch unit from the vehicle, sliding it off the handlebar.



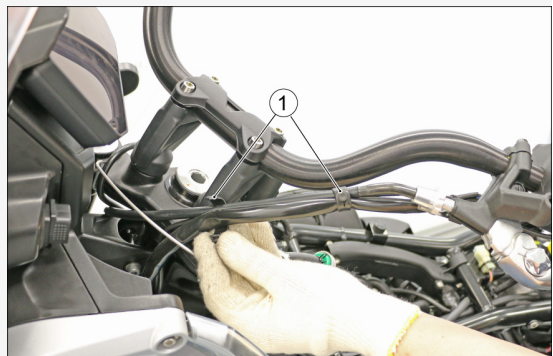
9.1.1.3 Left light switch

Removal

- First remove the fuel tank and the left hand guard.
- Remove the threaded bushing from the handlebar.



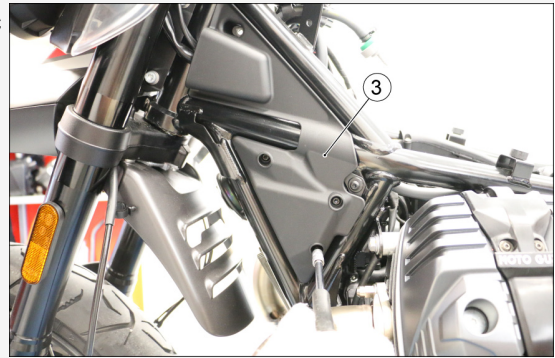
- Remove the two rubber clamps (1) from the cable bundle.



- Cut the plastic clamp (2).



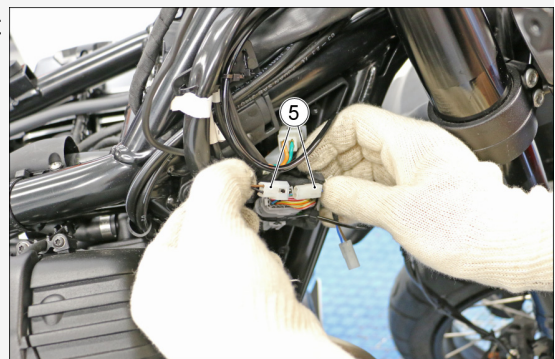
- If there are heated grips, remove the plastic cover (3) on the left side of the steering headstock.



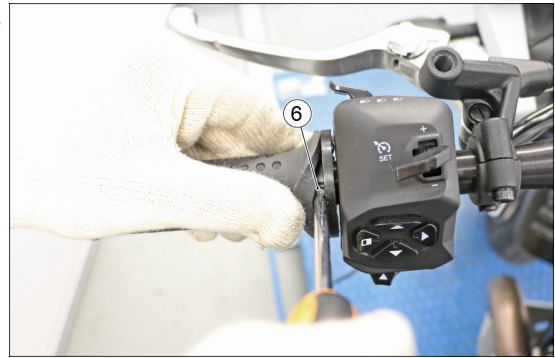
- Cut the plastic clamp (4) (where applicable).



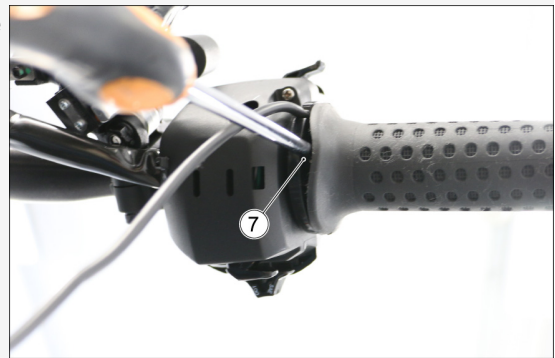
- Disconnect the connector (5) of the left heated grip (where applicable).



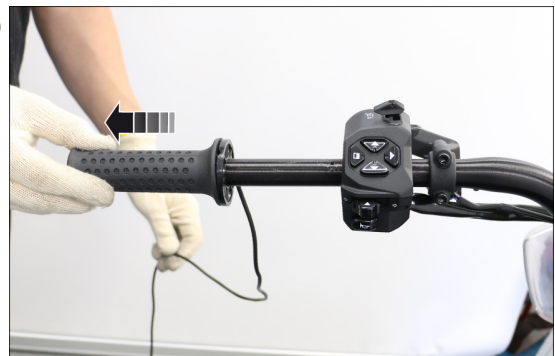
- Remove the upper fixing screw (6) of the heated grip (**where applicable**).



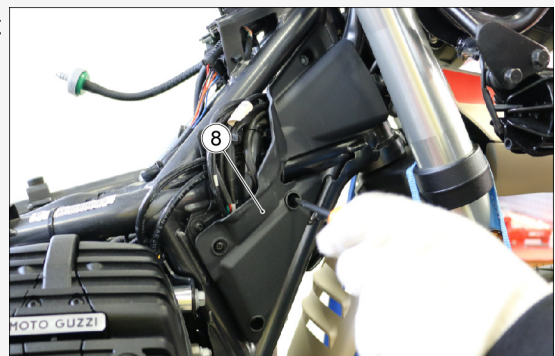
- Remove the lower fixing screw (7) of the heated grip (**where applicable**).



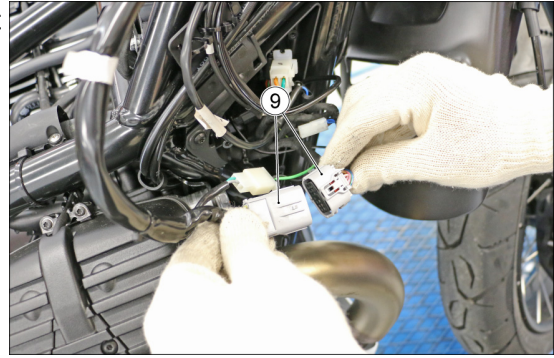
- Slide the heated grip (**where applicable**) from the handlebar.



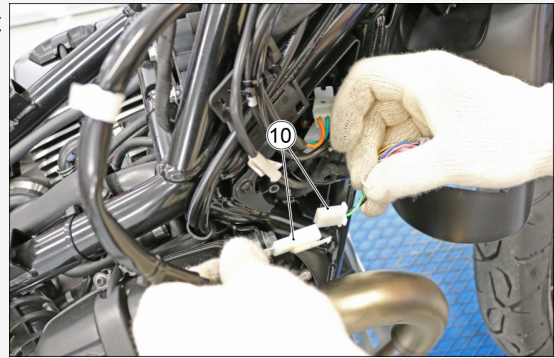
- Remove the plastic cover (8) on the right side of the steering headstock.



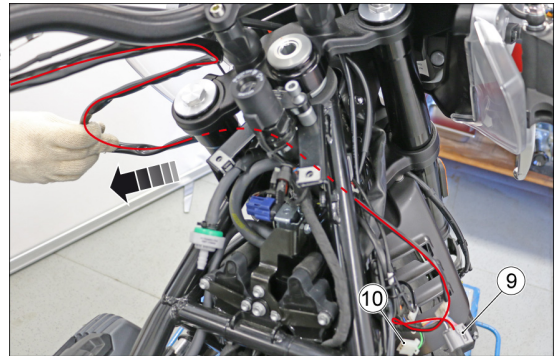
- Disconnect the left-hand switch unit connector (9).



- Disconnect the left-hand switch unit connector (10).



- Move the wiring harnesses (9) and (10) on the left side of the vehicle, as shown in the figure.



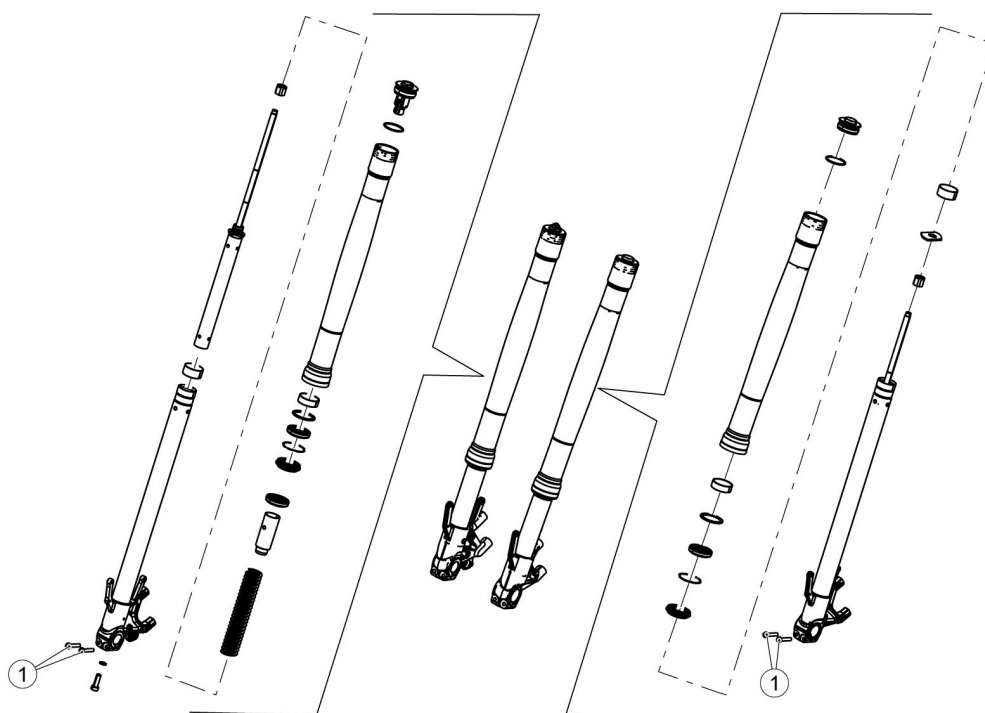
- Loosen, but DO NOT REMOVE, the fixing screw (11) on the left-hand switch unit.



- Remove the left switch unit from the vehicle, sliding it off the handlebar.



9.1.2 Front fork



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Calliper mounting bracket fastening screw	M6	4	10 ± 1,5 Nm (7.38 ± 1.11lbf ft)	-

9.1.2.1 Stanchion removal

WARNING



TO CARRY OUT MAINTENANCE OPERATIONS AND WHERE THERE IS A NEED TO LIFT THE VEHICLE, USE A SCISSOR LIFT LOCATED AT THE OIL SUMP.

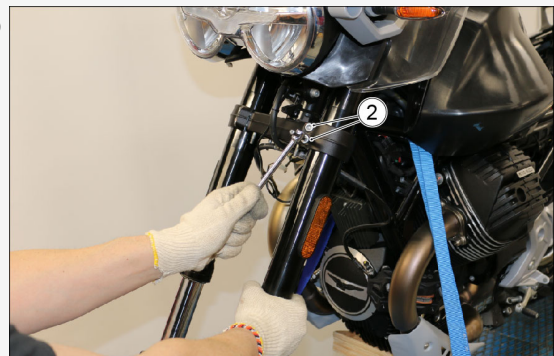
TO PREVENT DAMAGE, PLACE A PROTECTION BETWEEN THE OIL SUMP AND THE LIFT.

The following procedure is described for a single fork stanchion, but is valid for both stanchions.

- Remove the front mudguard.
- Carry out the removal of the front wheel.
- Loosen the screw (1) of the upper steering plate.



- Support the stanchion and loosen the two screws (2) of the lower steering plate.



- Extract the stanchion from the steering plates and remove it from the vehicle..



9.1.2.2 Fork removal

N.B



THE STEMS ARE NOT THE SAME, THEREFORE THEY REQUIRE SEPARATE REMOVAL AND REFITTING PROCEDURES.

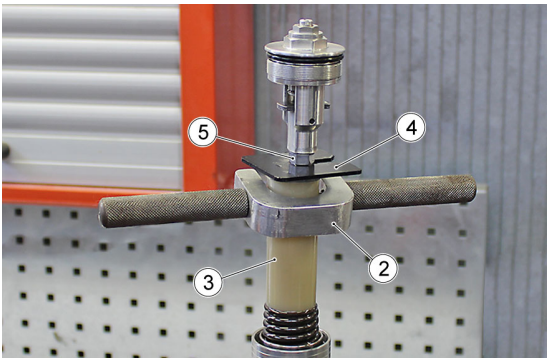
THE FOLLOWING OPERATIONS APPLY WHEN REMOVING THE RIGHT HAND STEM

- Taking care not to damage it, secure the fork vertically in a vice, using the appropriate protection devices.
- Unscrew the upper cap (1).



CODE	DESCRIPTION	IMAGE
AP8140149	Guard for assembly operations	

- Using the special tool (2), fastened to the pre-loading pipe (3), compress the spring and, with the assistance of a second operator, insert the separator plate (4) under the cap retaining nut (5).



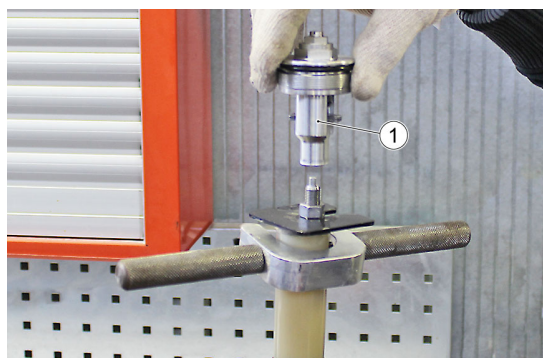
CODE	DESCRIPTION	IMAGE
020888Y	Pliers for preloading Sachs fork tube	

CODE	DESCRIPTION	IMAGE
AP8140148	Plunger-spacer separator plate	

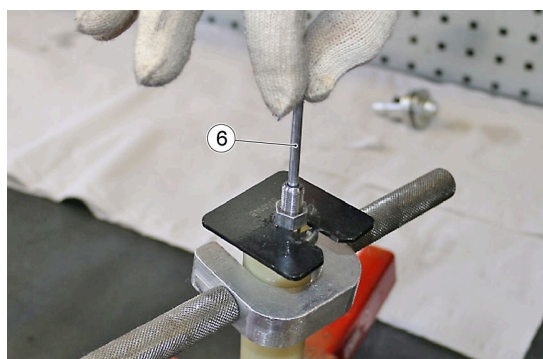
- Ensure that the cap (1) cannot rotate, and then loosen the nut (5).



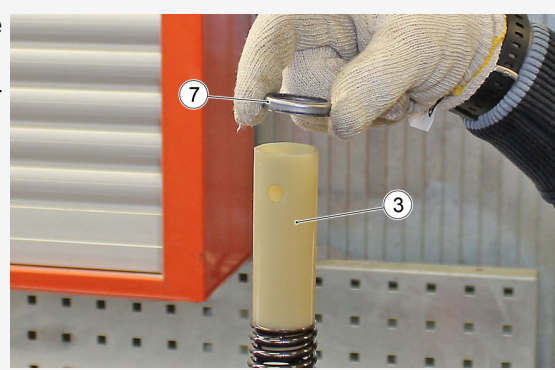
- Unscrew and remove the cap (1).



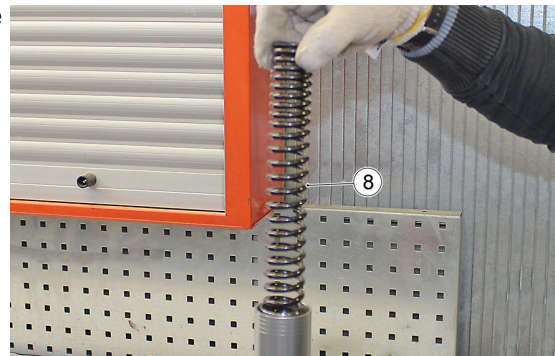
- Extract the shaft (6) and remove it.



- After removing the locking plate and the device used to compress the spring, remove the upper plate (7) and the pre-loading pipe (3).



- Remove the spring (8) allowing the oil inside the stem to drip out.

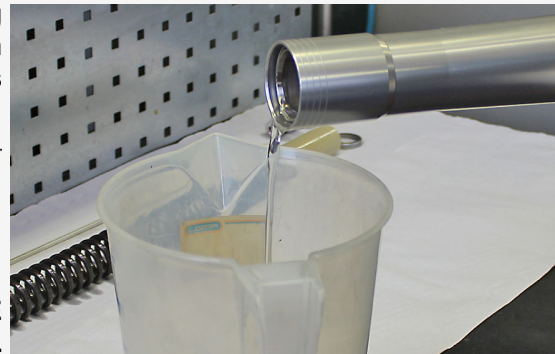


- Drain the oil into a container having sufficient capacity, extending the stanchion several times in order to ensure the oil is drained completely.

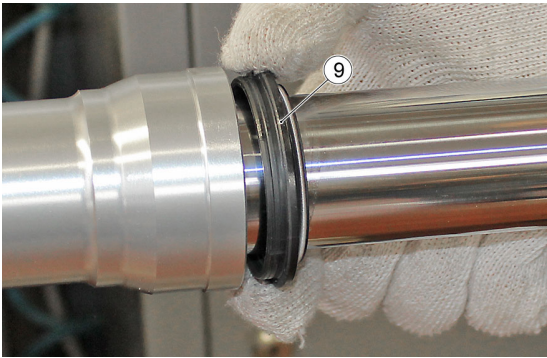
WARNING

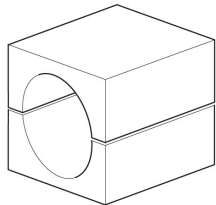


DO NOT DISPOSE OF OIL INTO THE ENVIRONMENT. DISPOSE OF ENGINE OIL IN A SEALED CONTAINER AND TAKE IT TO YOUR SUPPLIER OR TO THE NEAREST USED OIL COLLECTION CENTRE.

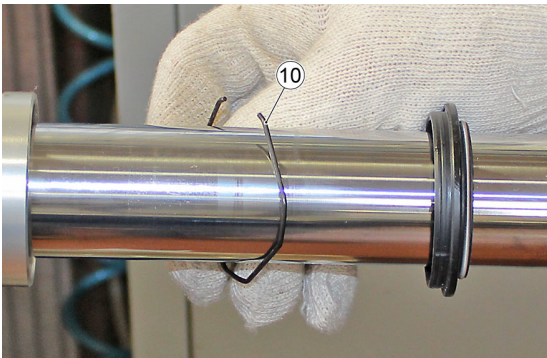


- Taking care not to damage it, secure the sleeve horizontally in a vice, using the appropriate protection devices.
- Extract the dust guard (9).

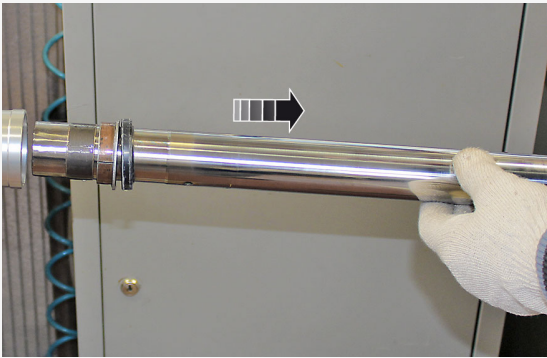


CODE	DESCRIPTION	IMAGE
AP8140149	Guard for assembly operations	

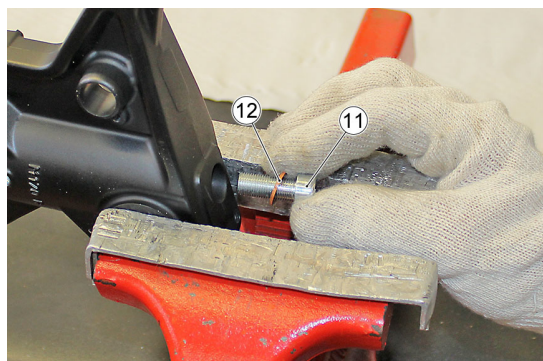
- Remove the seeger ring (10) from inside the sleeve.



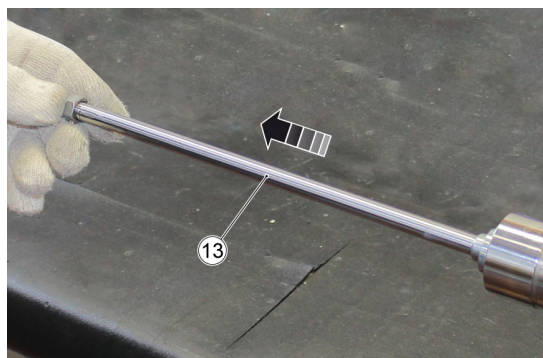
- Pull the stem repeatedly towards yourself in order to remove it from the sleeve.



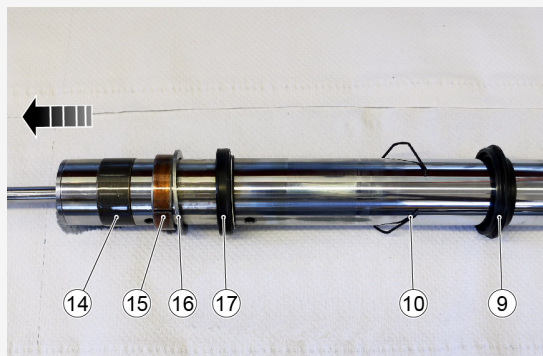
- Secure the stem in a vice and remove the plunger fastening screw (11), taking care not to lose the copper washer (12).



- Remove the complete plunger (13).



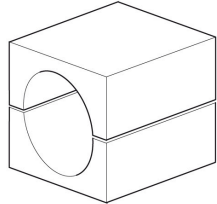
- Observing the indicated sequence, extract and remove the slider bushing (14), the guide bushing (15), the ring (16), the oil seal (17), the seeger ring (10) and the dust guard (9).



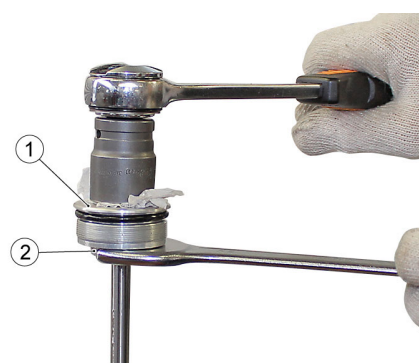
THE FOLLOWING OPERATIONS APPLY WHEN REMOVING THE RIGHT HAND STEM

- Taking care not to damage it, secure the fork vertically in a vice, using the appropriate protection devices.
- Unscrew the upper cap (1).



CODE	DESCRIPTION	IMAGE
AP8140149	Guard for assembly operations	

- Ensure that the cap (1) cannot rotate, and then loosen the special nut (2).



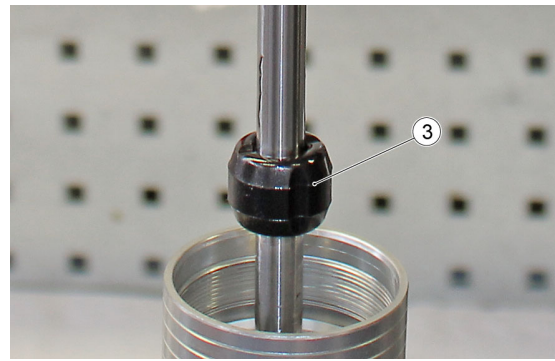
- Unscrew and remove the cap (1).



- Unscrew the special nut (2) and remove it.



- Remove the buffer (3).



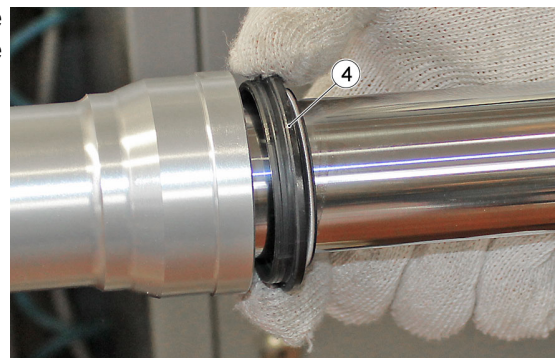
- Drain the oil into a container having sufficient capacity, extending the stanchion several times in order to ensure the oil is drained completely.

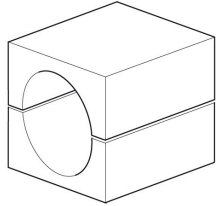
WARNING

DO NOT DISPOSE OF OIL INTO THE ENVIRONMENT. DISPOSE OF ENGINE OIL IN A SEALED CONTAINER AND TAKE IT TO YOUR SUPPLIER OR TO THE NEAREST USED OIL COLLECTION CENTRE.

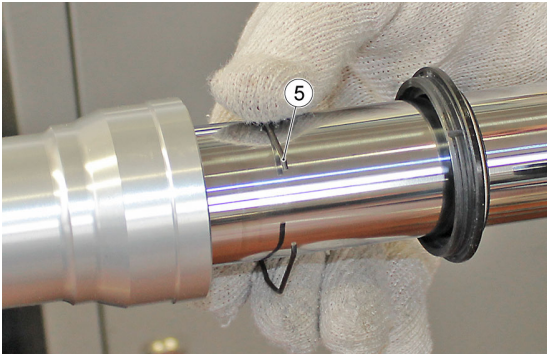


- Taking care not to damage it, secure the sleeve horizontally in a vice, using the appropriate protection devices.
- Extract the dust guard (4).



CODE	DESCRIPTION	IMAGE
AP8140149	Guard for assembly operations	

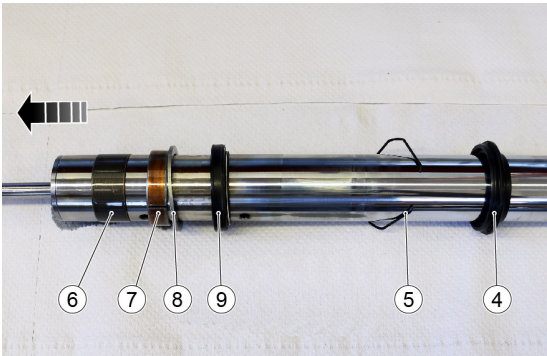
- Remove the seeger ring (5) from inside the sleeve.



- Pull the stem repeatedly towards yourself in order to remove it from the sleeve.



- Observing the indicated sequence, extract and remove the slider bushing (6), the guide bushing (7), the ring (8), the oil seal (9), the seeger ring (5) and the dust guard (4).



9.1.2.3 Checking components
stanchion

Check that the sliding surface is not scratched and/or scored.

Any scoring can be removed by sanding with damp sandpaper (grain 1).

If the scratches are deep, replace the stanchion .

Using a dial gauge, check than any bending of the stanchion is below the limit value.

If it is over the limit, replace the stanchion .

ATTENTION

A BENT STANCHION SHOULD NEVER BE STRAIGHTENED SINCE ITS STRUCTURE WOULD BE WEAKENED MAKING THE VEHICLE DANGEROUS TO USE.

Bending limit: 0.2 mm (0.00787 in)

Sleeve

Check for damage and/or cracks; if it is damaged, replace it.

Spring

Check the condition of the spring, making sure that the length is within the acceptable limits.

If not, replace the spring.

MINIMUM LENGTH OF FREE SPRING: ... mm (... in)

Check the condition of the following components:

- slider bushing;
- guide bushing;
- plunger.

If there is evidence of excessive wear or damage, replace the component concerned.

WARNING

REMOVE ANY IMPURITIES FROM THE BUSHINGS, BEING CAREFUL NOT TO SCRATCH THEIR SURFACES.

Replace the following components with new ones:

- Oil seal.
- Dust guard.
- - O-ring on the cap.

9.1.2.4 Fork refitting

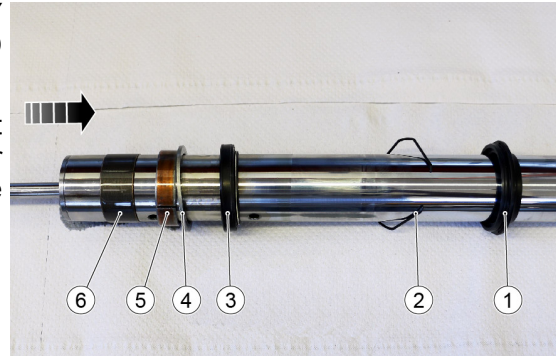
N.B



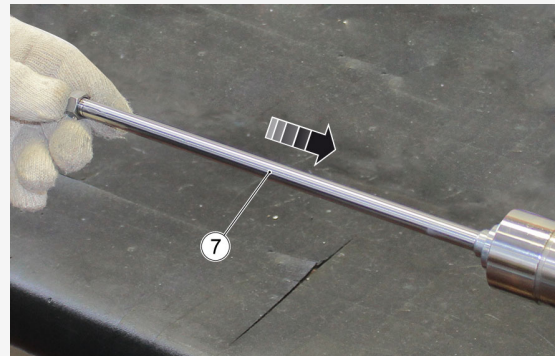
THE STEMS ARE NOT THE SAME, THEREFORE THEY REQUIRE SEPARATE REMOVAL AND REFITTING PROCEDURES.

THE FOLLOWING OPERATIONS APPLY WHEN MOUNTING THE RIGHT HAND STEM.

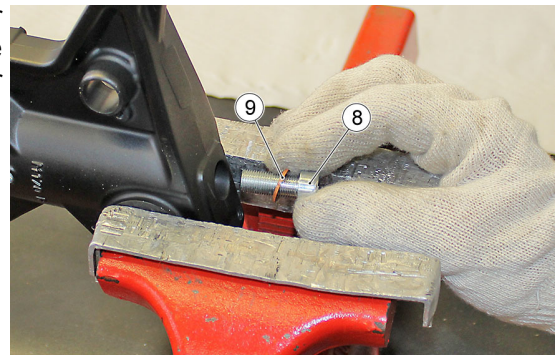
- Observing the indicated sequence, extract and remove the dust guard (1), the seeger ring (2), the oil seal (3), the ring (4), the guide bushing (5) and the slider bushing (6).



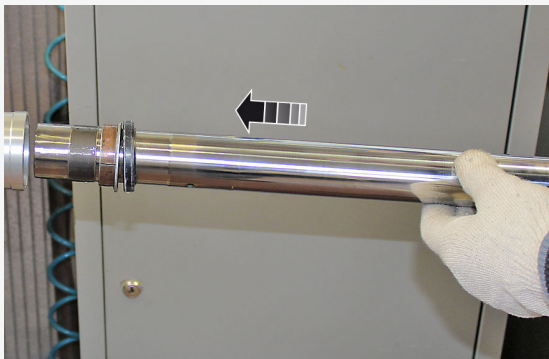
- Insert the complete plunger (7).



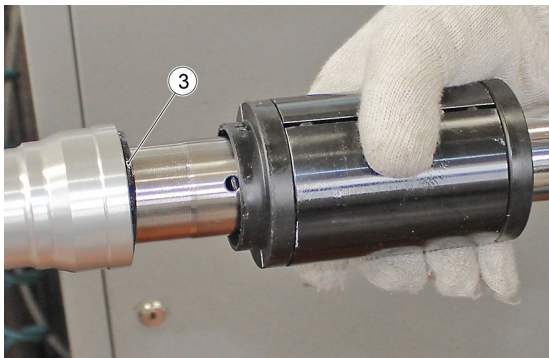
- Secure the stem in a vice and, after inserting the screw (8) used to fasten the plunger, complete with the copper washer (9), apply the pre-defined tightening torque.



- Insert the stem in the sleeve.



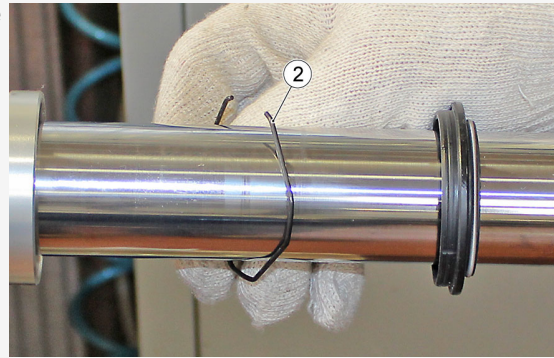
- Using a suitable tool, complete with striking hammer, insert oil seal into its housing (3).



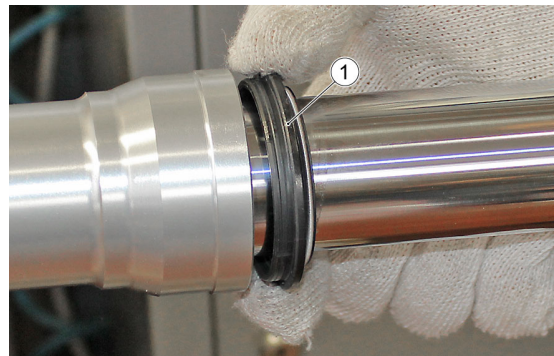
CODE	DESCRIPTION	IMAGE
AP8140189	Fork oil seal installation punch for 43 mm diam. stanchions	

CODE	DESCRIPTION	IMAGE
AP8140146	Weight	

- Position the seeger ring (2) inside the sleeve.



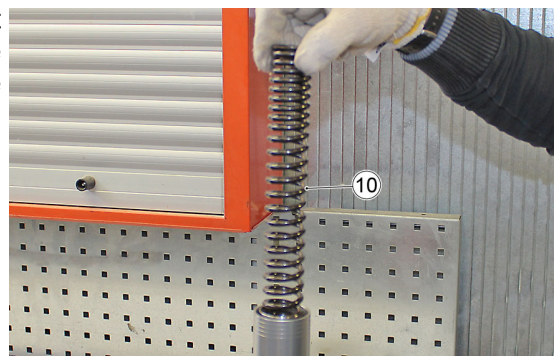
- Insert the dust guard (1) into its housing correctly.



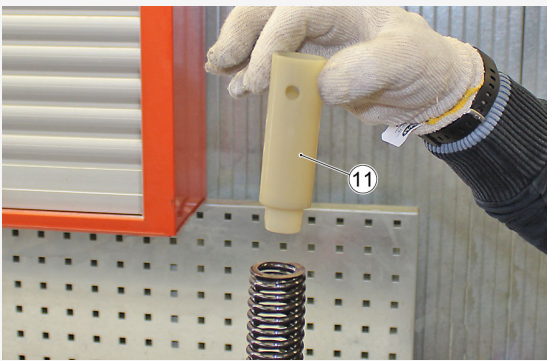
- Place the fork stem vertically on a work surface.
- Fill the stem with the quantity of oil indicated in the "Refilling oil" section.



- Insert the spring (10), making sure that it is aligned correctly. The end where the spirals are more compressed should be facing upwards.



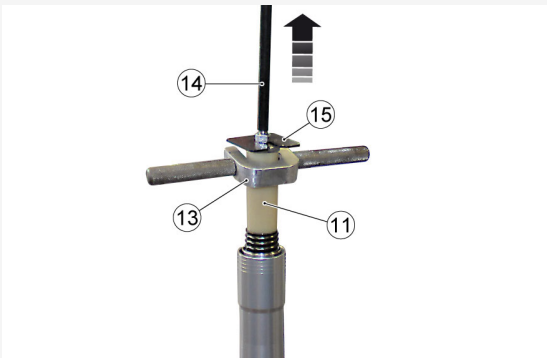
- Insert the pre-load tube (11), making sure that it is aligned correctly. The narrower part must be inserted into the spring.



- Insert the upper plate (12) on the pre-load pipe.



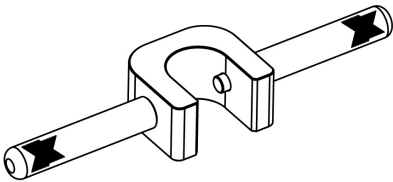
- After positioning the device (13) on the pre-load pipe (11) and the plunger support shaft (14), with the assistance of a second operator, raise the plunger so that it is possible to insert the plate (15) under the cap locking nut.

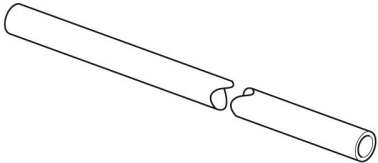


CODE	DESCRIPTION	IMAGE
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020888Y

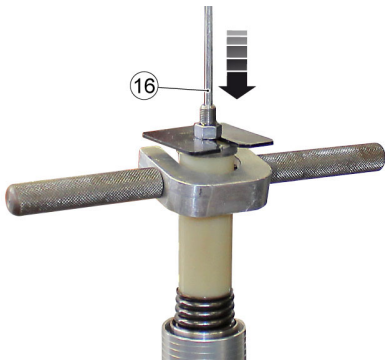
Pliers for preloading
Sachs fork tube



CODE	DESCRIPTION	IMAGE
AP8140150	Bored shaft for b plunger air	

CODE	DESCRIPTION	IMAGE
AP8140148	Plunger-spacer separator plate	

- Insert the shaft (16) into the plunger.



- Before positioning the cap, adjust the hydraulic regulator screw so that the internal distance is as close as possible to 13 mm (0.51 in).



- Screw the cap (17) onto the plunger as far as it will go.

ATTENTION

CHECK THE O-RING PRESENT ON THE FILLING CAP AND REPLACE IF DAMAGED.



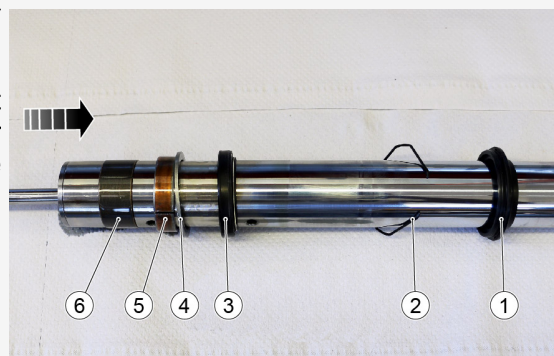
- Ensure that the cap cannot rotate, and then tighten the nut.



- Tighten the cap on the sleeve, applying the pre-defined torque.

**THE FOLLOWING OPERATIONS APPLY WHEN MOUNTING THE LEFT HAND STEM.**

- Observing the indicated sequence, extract and remove the dust guard (1), the seeger ring (2), the oil seal (3), the ring (4), the guide bushing (5) and the slider bushing (6).



- Insert the stem in the sleeve.



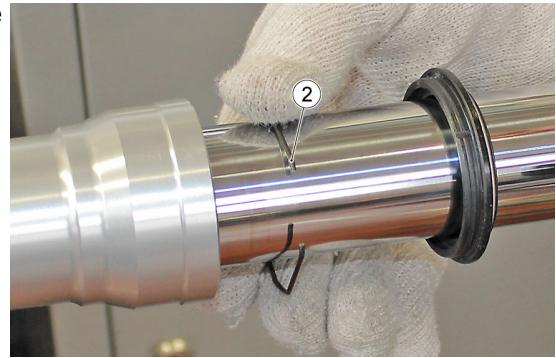
- Using a suitable tool, complete with striking hammer, insert oil seal into its housing (3).

AP8140189 Tool for fitting oil seal for 43 mm (1.69 in) diameter hole

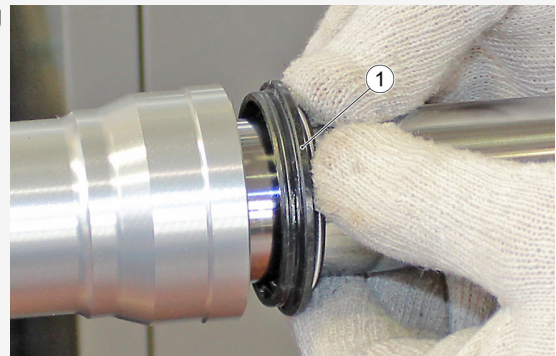
CODE	DESCRIPTION	IMAGE
AP8140189	Fork oil seal installation punch for 43 mm diam. stanchions	

CODE	DESCRIPTION	IMAGE
AP8140146	Weight	

- Position the seeger ring (2) inside the sleeve.



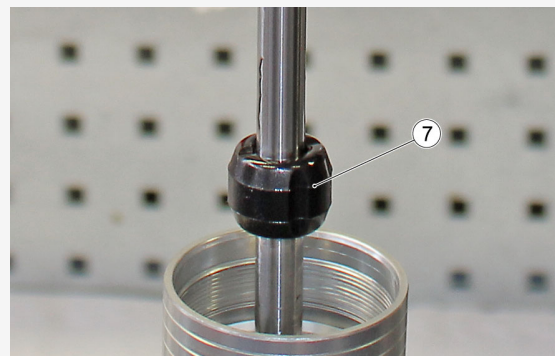
- Insert the dust guard (1) into its housing correctly.



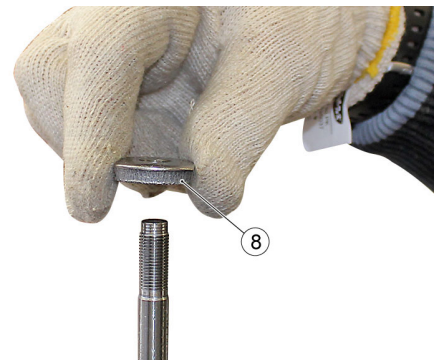
- Place the fork stem vertically on a work surface.
- Fill the stem with the quantity of oil indicated in the "Refilling oil" section.



- Insert the buffer (7).



- Insert the special nut (8) and tighten it as far as it will go.



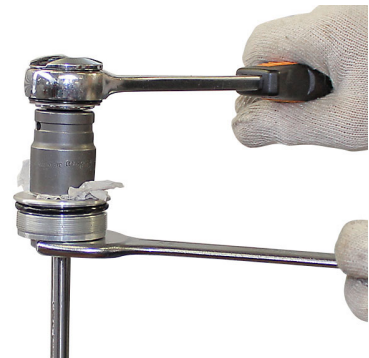
- Insert the cap (9) and tighten it as far as it will go.

ATTENTION

CHECK THE O-RING PRESENT ON THE FILLING CAP AND REPLACE IF DAMAGED.



- Ensure that the cap cannot rotate, and then tighten the nut.



- Tighten the cap on the sleeve, applying the pre-defined torque.



9.1.2.5 Oil filling

THE FOLLOWING OPERATIONS APPLY WHEN MOUNTING THE RIGHT HAND STEM.

- Place the fork stem vertically on a work surface.
- Fill the STEM with the indicated quantity of oil.

WARNING



OPERATE THE PLUNGER MULTIPLE TIMES UNTIL AIR BUBBLES MAY BE SEEN ON THE SURFACE OF THE OIL.

WARNING



THE SLEEVE MUST BE PERFECTLY UPRIGHT IN ORDER TO MEASURE THE CORRECT OIL LEVEL.

- Check the oil level from the rim of the sleeve.



FUNCTION	DESCRIPTION / VALUE
Quantity of oil for RH STEM	446 cc (27.21 cu in)
Oil level (from sleeve rim, without the spring and with the pump all the way lowered)	144 mm (5.67 in)

THE FOLLOWING OPERATIONS APPLY WHEN MOUNTING THE LEFT HAND STEM.

- Place the fork stem vertically on a work surface.
- Fill the STEM with the indicated quantity of oil.



WARNING



OPERATE THE PLUNGER MULTIPLE TIMES UNTIL AIR BUBBLES MAY BE SEEN ON THE SURFACE OF THE OIL.

WARNING



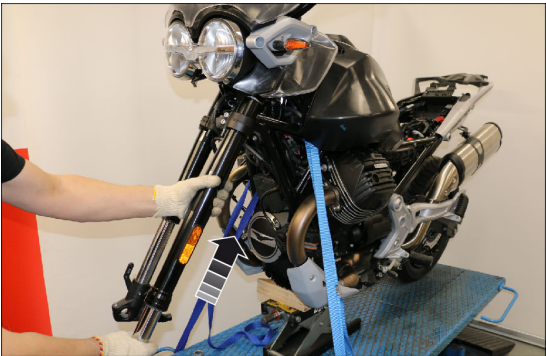
THE SLEEVE MUST BE PERFECTLY UPRIGHT IN ORDER TO MEASURE THE CORRECT OIL LEVEL.

FUNCTION	DESCRIPTION / VALUE
Quantity of oil for LH stem	360 cc (21.97 cu in)
Oil level (from sleeve rim, without the spring and with the pump all the way lowered)	143 mm (5.63 in)

9.1.2.6 Stanchions installation

The following procedure is described for a single fork stanchion, but is valid for both stanchions.

- Insert the fork stanchion into the upper and lower steering yoke holes

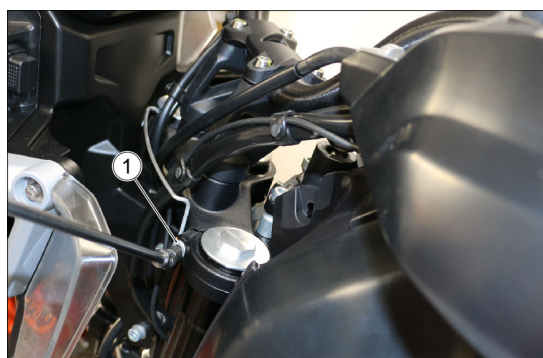


- Align the notch on the sleeve with the upper edge of the upper steering yoke.



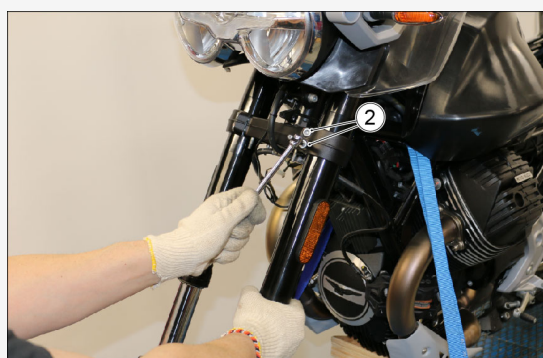
- Keep the sleeve in position and tighten the screw (1), of the upper steering yoke, to the specified torque:

DESCRIPTION	TORQUE
Screw fastening the fork stanchions to the upper steering yoke	$25 \pm 2.5 \text{ Nm}$ ($18.44 \pm 1.84 \text{ lb ft}$)



- Tighten the fixing screws (2) of the lower steering yoke to the specified torque:

DESCRIPTION	TORQUE
Screw fastening the fork stanchions to the lower steering yoke	$25 \pm 2.5 \text{ Nm}$ ($18.44 \pm 1.84 \text{ lb ft}$)



9.1.3 Steering upper plate

9.1.3.1 Removal

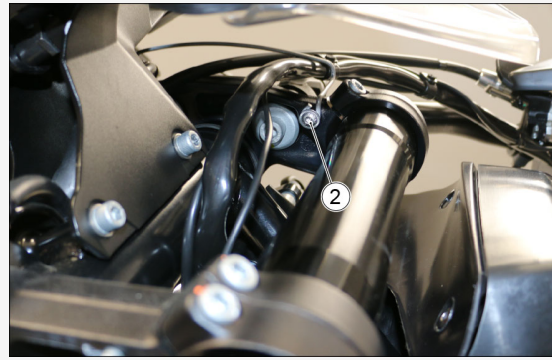
- Loosen the screws (1) from both sides of the steering yoke.

During refitting, tighten the screws (1) to the prescribed torque:

DESCRIPTION	TORQUE
Screw fastening the fork stanchions to the upper steering yoke	$25 \pm 2.5 \text{ Nm}$ ($18.44 \pm 1.84 \text{ lb ft}$)



- From the underside of the steering yoke, remove the screw (2) on both sides.

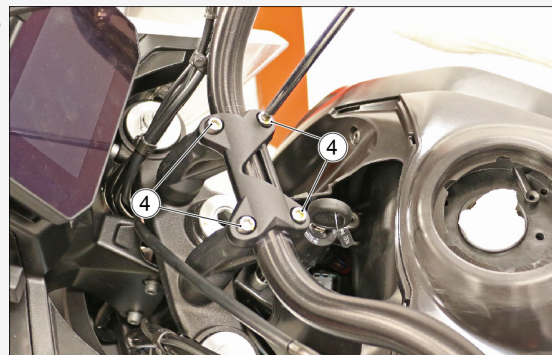


- Remove the cable bracket (3) from the upper steering yoke.

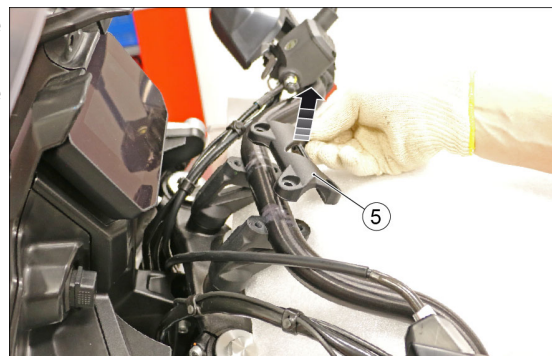


- Unscrew and remove the screws (4) of the upper U-bolt of the handlebar.

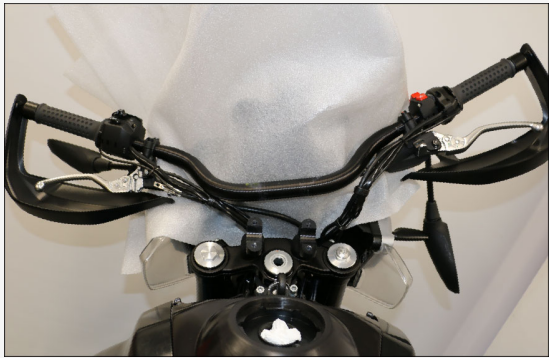
During reassembly, tighten the front screws first then the rear ones.



- Remove the upper U-bolt (5) of the handlebar.
- Pay attention not to damage the tank of the vehicle when removing the handlebar.



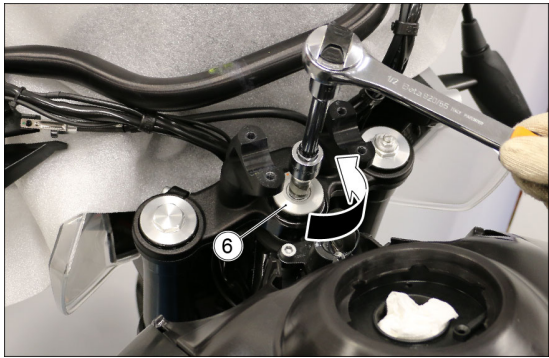
- Protect the instrument panel and the top fairing with suitable protective material;.
- Temporarily remove the handlebar, complete with controls, from the steering yoke, and place it on the inner side of the top fairing.



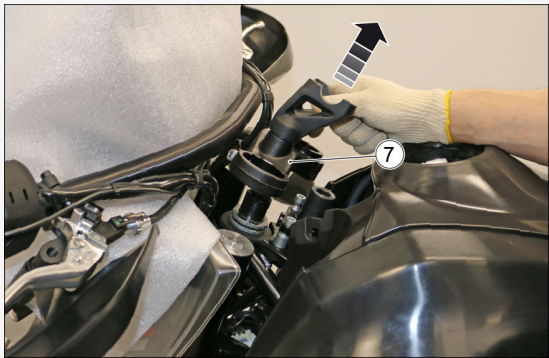
- Remove the fixing bushing (6) from the steering yoke.

During refitting, tighten the bushing (6) to the prescribed torque:

DESCRIPTION	TORQUE
Top steering yoke fastener bush	100 ± 10 Nm (73.76 ± 7.38 lb ft)



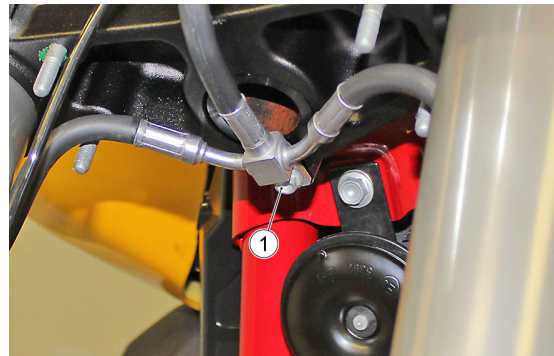
- Remove the upper steering yoke (7) from the vehicle.



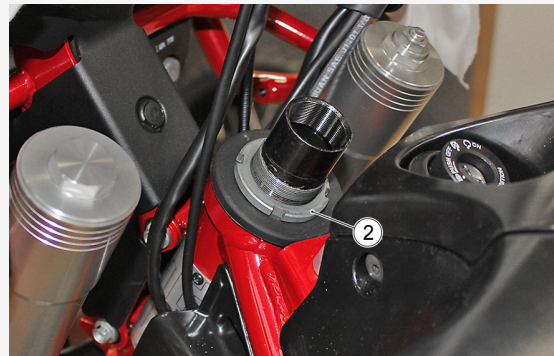
9.1.4 Steering lower plate

9.1.4.1 Removal

- Remove the upper steering yoke
- Remove the front mudguard
- Remove the front wheel
- Undo and remove the screw (1)



- Unscrew and remove the lower ring nut (2), using the special tool



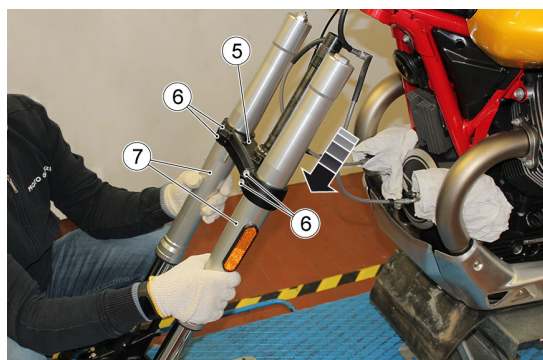
- Remove the dust cover (3)



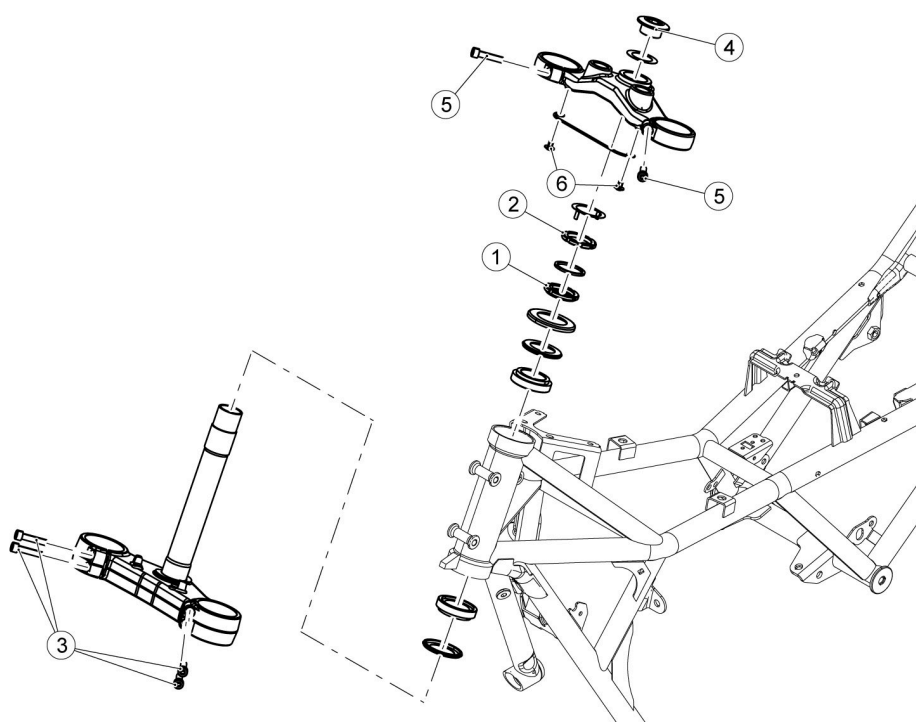
- Remove the dust seal ring (4)



- Remove the lower steering yoke (5) along with the fork stanchions
- Undo and remove the screws (6) and remove the fork stanchions (7)



9.1.5 Steering bearings



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Ring nut fastening the bottom yoke/steering pin assembly to the headstock	-	1	-	Initial tightening torque 60 Nm (44.25 lb ft) - Second tightening torque 30 Nm (22.13 +/- lbf ft)

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
2	Counter-lock ring fastening the bottom yoke/steering pin assembly to the headstock	-	1	-	Manual
3	Screw fastening the fork stanchions to the lower steering yoke	M8	4	25 ± 2.5 Nm (18.44 ± 1.84 lb ft)	-
4	Top steering yoke fastener bush	-	1	100 ± 10 Nm (73.76 ± 7.38 lb ft)	-
5	Screw fastening the fork stanchions to the upper steering yoke	M8	2	25 ± 2.5 Nm (18.44 ± 1.84 lb ft)	-
6	Screws fastening the cable gland to the upper steering yoke	M6	2	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-

9.1.5.1 Clearance adjustment

WARNING



TO CARRY OUT MAINTENANCE OPERATIONS AND WHERE THERE IS A NEED TO LIFT THE VEHICLE, USE A SCISSOR LIFT LOCATED AT THE OIL SUMP.

TO PREVENT DAMAGE, PLACE A PROTECTION BETWEEN THE OIL SUMP AND THE LIFT.

- Remove the upper steering yoke
- Check the stability of the vehicle and lift the front wheel from the ground.
- Remove the safety washer (1)



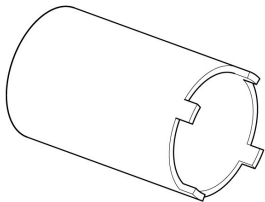
- Using the specific tool, unscrew and remove the counter-lock ring (2).



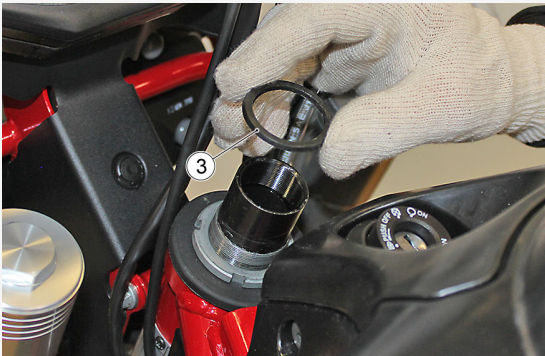
CODE	DESCRIPTION	IMAGE
------	-------------	-------

020966Y

steering adjustment socket



- Remove the rubber gasket (3)



- Tighten the steering ring nut to 60 Nm (44.25 lbf ft)
- Unscrew the ring nut and tighten it again to 30 Nm (22.13 lb ft)
- Turn the steering all the way to the right and left three or four times and check that the rotation is smooth and without jamming.

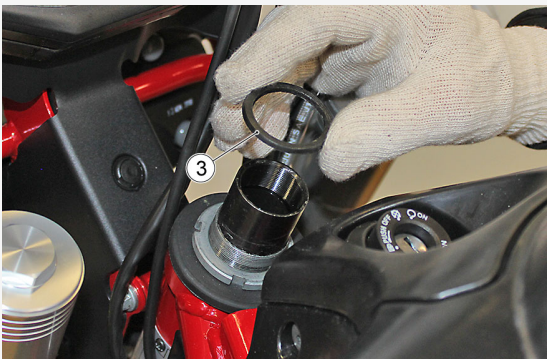


N.B



THE STEERING COLUMN RESISTANCE TO ROTATION MUST BE PERFORMED IN THE TWO OPPOSITE ROTATION DIRECTIONS.

- Refit the rubber gasket (3)



- Insert the counter-lock ring (2) and bring it into contact with the previously installed gasket (3).
- Using the appropriate tool, manually tighten the counter-lock ring (2) until a groove is aligned with the one of the steering ring nut



CODE	DESCRIPTION	IMAGE
020966Y	steering adjustment socket	

- Fit the safety washer (1).



- Fit the upper steering yoke and the handlebar, together with the controls, mirrors and hand guards.
- Apply a dynamometer at the outer end of the grip and measure the steering rotation resistance, in both directions.
- If the resistance is not within the specified values, repeat the clearance adjustment procedure above.

FUNCTION	DESCRIPTION / VALUE
Steering rotation resistance	250 ± 100 gr (0.55 ± 0.22 lb)

9.1.5.2 Removal

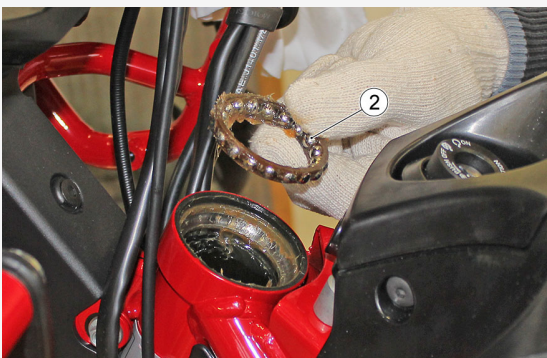
- Remove the lower steering yoke

UPPER STEERING BEARING

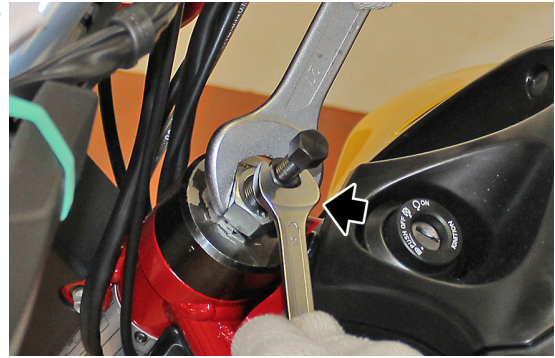
- Remove the upper seat (1) of the upper steering bearing



- Remove the upper steering bearing (2)



- Using a generic bearing puller, remove the lower seat of the steering bearing as illustrated in the figure



LOWER STEERING BEARING

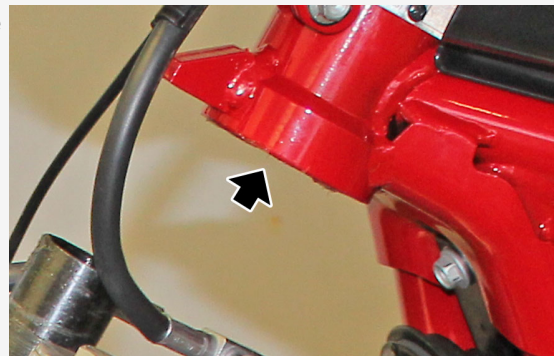
- Remove the lower steering bearing (4)



- Remove the lower seat (5) of the lower steering bearing



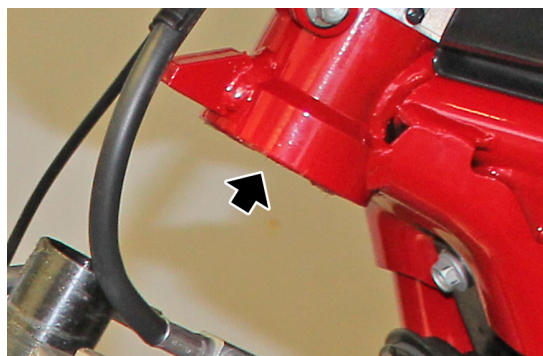
- Using a generic bearing puller, remove the upper seat of the lower steering bearing as indicated in the figure



9.1.5.3 Fitting

LOWER STEERING BEARING

- Using the appropriate punch, insert the upper seat of the lower steering bearing in the point indicated in the figure



- Insert the lower seat (1) of the lower steering bearing

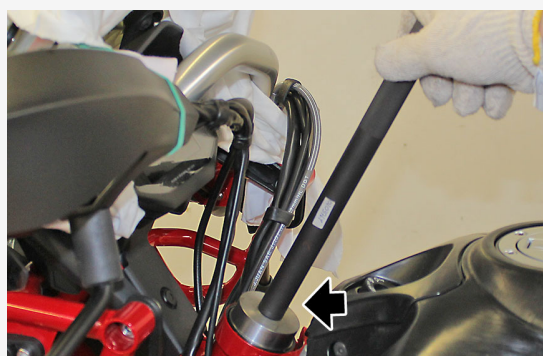


- Insert the lower steering bearing (2)



UPPER STEERING BEARING

- Using the appropriate punch, insert the lower seat of the upper steering bearing as illustrated in the figure



- Insert the upper steering bearing (3)

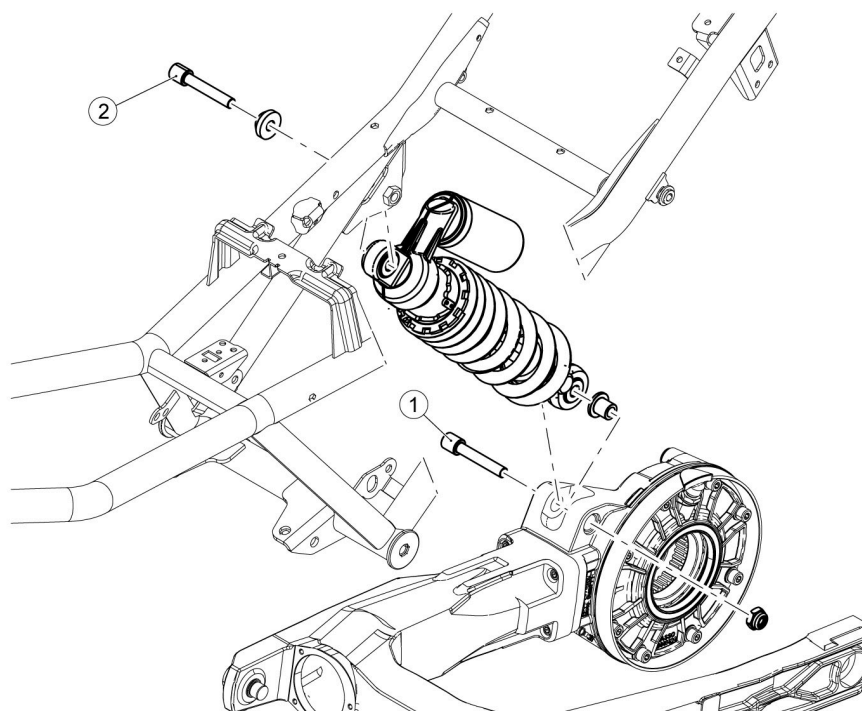


- Insert the upper seat (4) of the upper steering bearing



9.2 Rear

9.2.1 Shock absorbers



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Rear shock absorber to gearbox fixing screw	M10	1	50 ± 7.5 Nm (36.88 ± 5.53 lb ft)	-
2	Rear shock absorber to frame fixing screw	M10	1	50 ± 7.5 Nm (36.88 ± 5.53 lb ft)	-

9.2.1.1 Removal

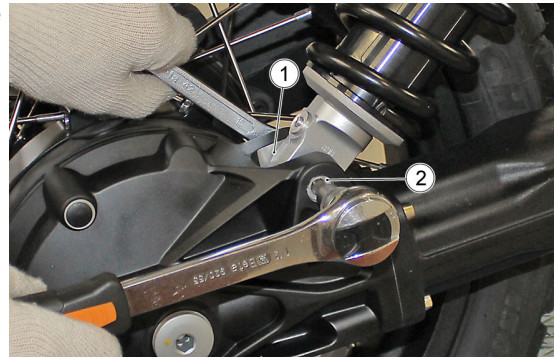
WARNING



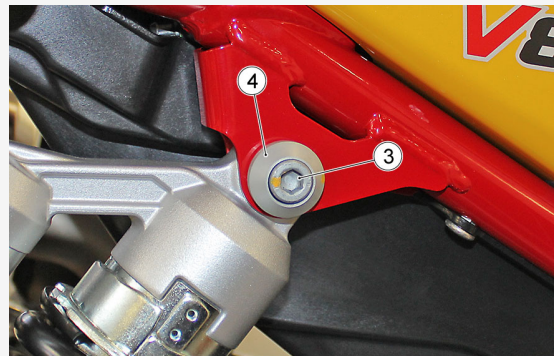
TO CARRY OUT MAINTENANCE OPERATIONS AND WHERE THERE IS A NEED TO LIFT THE VEHICLE, USE A SCISSOR LIFT LOCATED AT THE OIL SUMP.

TO PREVENT DAMAGE, PLACE A PROTECTION BETWEEN THE OIL SUMP AND THE LIFT.

- Check the stability of the vehicle, then lift the rear wheel off the ground.
- Blocking the nut (1)
- Undo and remove the screw (2)



- Undo and remove the screw (3)
- Retrieve the bushing (4)



- Remove the shock absorber (5)



9.2.1.2 Installation

- To refit, follow the steps but in reverse order.

LIST OF TOPICS

Chassis architecture

10.1 Chassis architecture

WARNING



TO CARRY OUT MAINTENANCE OPERATIONS AND WHERE THERE IS A NEED TO LIFT THE VEHICLE, USE A SCISSOR LIFT LOCATED AT THE OIL SUMP.

TO PREVENT DAMAGE, REMOVE THE SUMP GUARD AND PLACE A PROTECTION BETWEEN THE OIL SUMP AND THE LIFT.

10.2 Wheels

REPLACEMENT PROCEDURE OF THE TPMS SENSOR - VALVE

Remove the relevant wheel from the vehicle.

N.B



THE FOLLOWING PROCEDURE APPLIES TO THE REAR TYRE, BUT IS ALSO APPLICABLE TO THE FRONT TYRE.

Remove the tyre using a tyre changer.

WARNING



THE BEAD BREAKING OF THE TYRE MUST TAKE PLACE AT A DISTANCE OF AT LEAST 90° FROM THE INFLATION VALVE.



WARNING

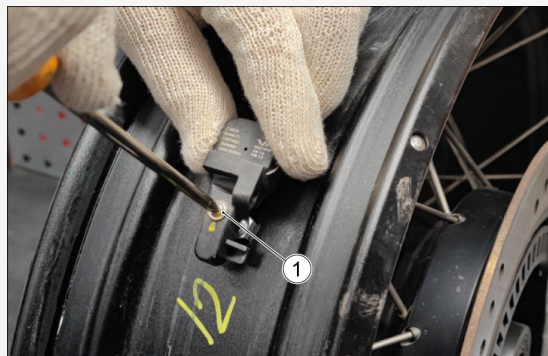
THE POSITIONING OF THE LEVERS FOR THE REMOVAL OF THE TYRE MUST BE AT A DISTANCE OF AT LEAST 10 CM (3.93 IN) FROM THE INFLATION VALVE.



Completely remove the tyre from the rim.



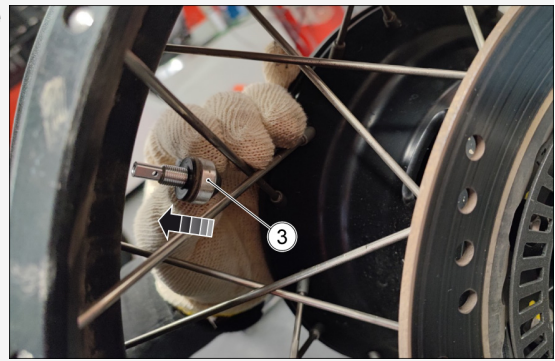
Remove the screw (1) that fastens the TPMS sensor to the valve.



Remove the retaining nut (2) and slide off the valve (3) from inside the rim.

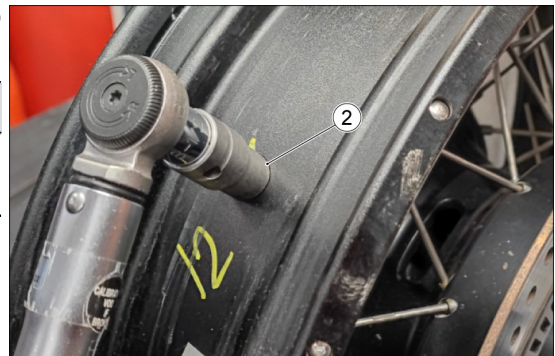


Fit the new valve kit for TPMS (3) - code **2D000689** for tubeless wheels.



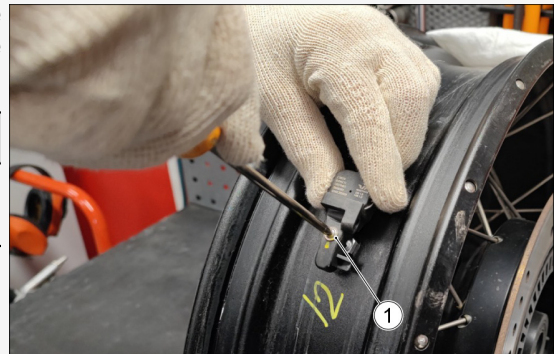
Insert and tighten the valve retaining nut (2) to the prescribed torque.

DESCRIPTION	TORQUE
Valve retaining nut	$4.7 \pm 0.25 \text{ Nm}$ ($3.47 \pm 0.18 \text{ lb ft}$)



Install and tighten to the prescribed torque the screw (1) that fastens the TPMS sensor to the valve.

DESCRIPTION	TORQUE
Sensor retaining screw	$1.3 \pm 0.05 \text{ Nm}$ ($0.96 \pm 0.037 \text{ lb ft}$)



Reassemble the tyre using a tyre changer.



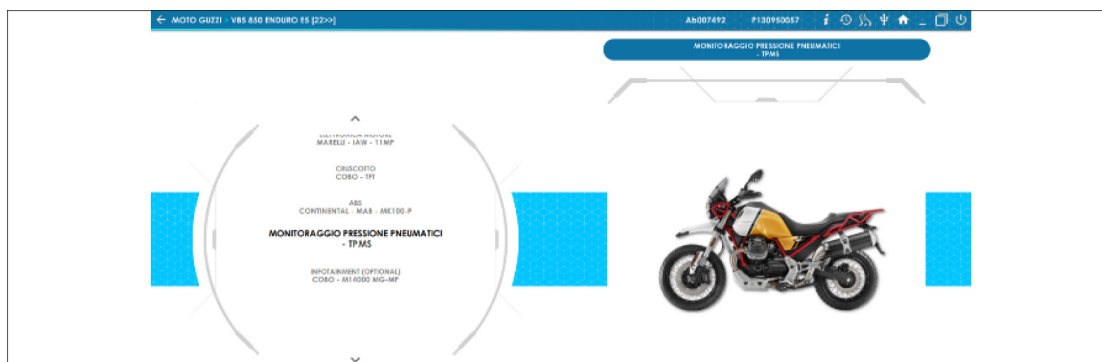
Once the tire has been inserted in its seat, inflate the tyre to the following pressure:

FUNCTION	DESCRIPTION / VALUE
Rear tyre	2.8 bar (280 kPa) (40.61 PSI)
Front tyre	2.5 bar (250 kPa) (36.26 PSI)

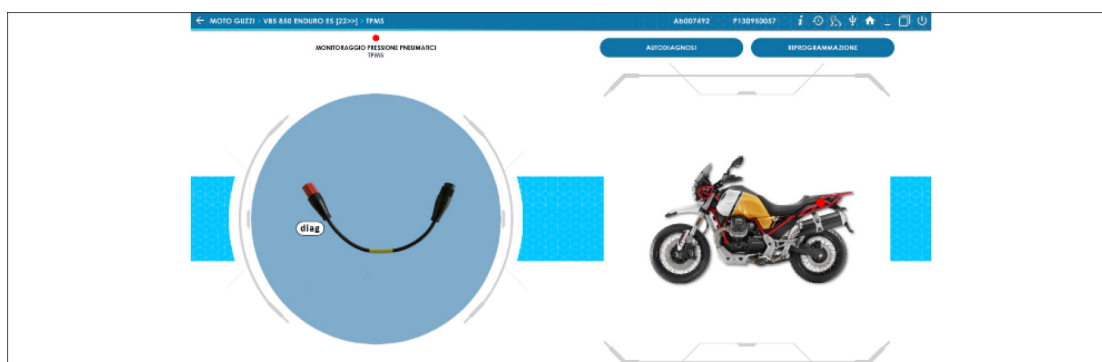


Once the wheels have been reassembled on the vehicle, the following operations are required using the P.A.D.S. diagnostic tool.

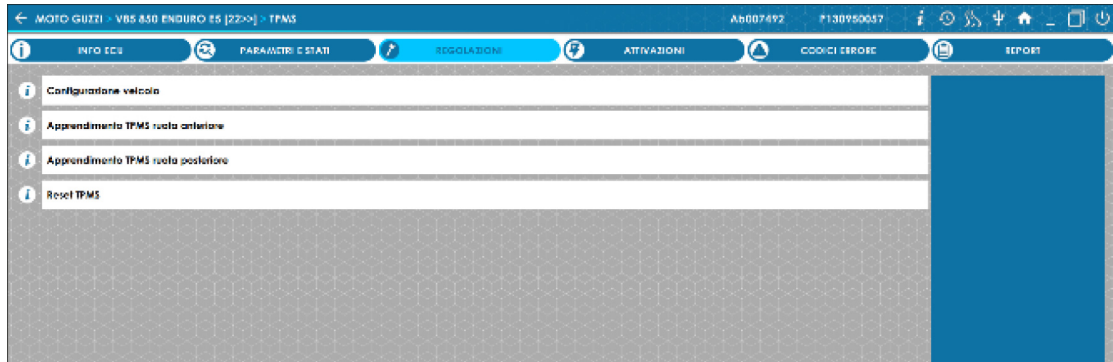
- Connect the P.A.D.S. to the vehicle and search for the model "**V85 850 EDNURO E 5 [22>>]**".
- select the section "**TYRE PRESSURE MONITORING - TPMS**"



- select the "**SELF-DIAGNOSIS**" function



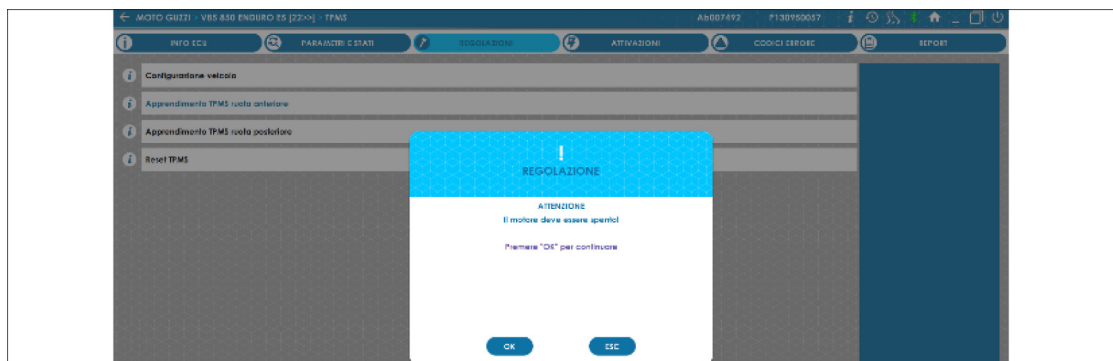
- Select the "**ADJUSTMENTS**" tab



- select **"vehicle configuration"** and press **"OK"**



- select **"front wheel TPMS learning"** and press **"OK"**



- When required by P.A.D.S., deflate the front tyre, until the learning is complete.

WARNING



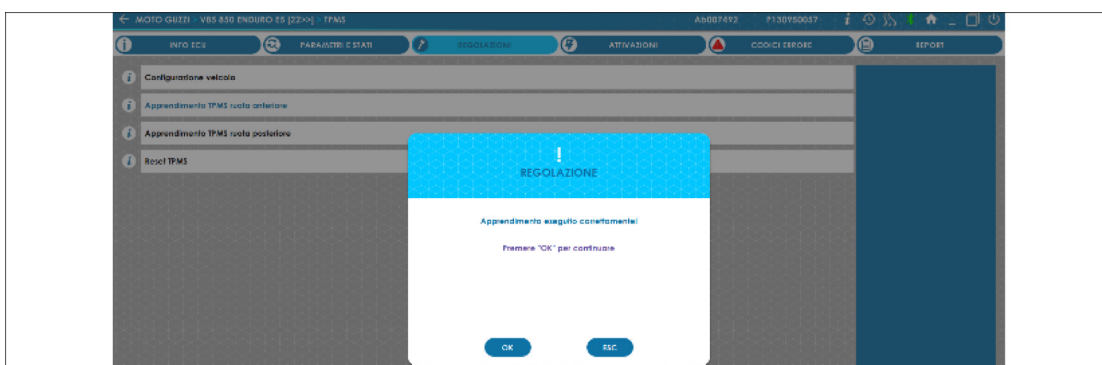
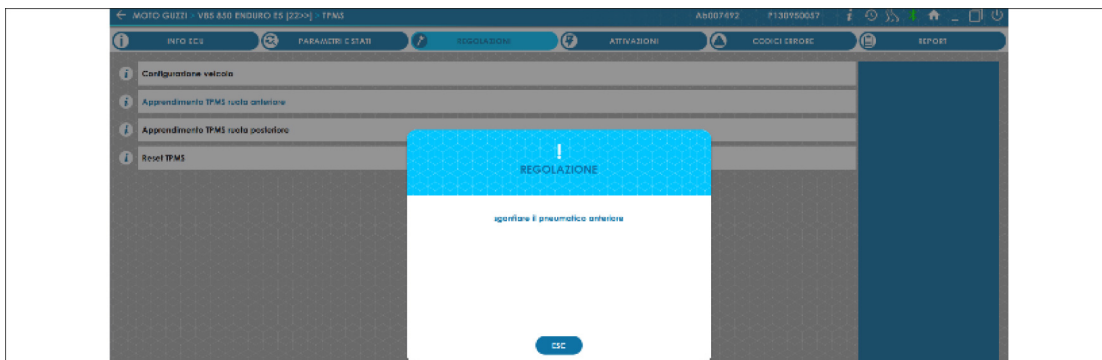
THE DEFLATION / LEARNING OPERATION MUST BE PERFORMED WITHIN A MAXIMUM 90 SECONDS.

WARNING



TO BE ABLE TO PERFORM THE CALIBRATION, THE SENSOR MUST DETECT A DECREASE IN TYRE INFLATION PRESSURE. ONCE THE LEARNING IS COMPLETE, THE TYRE PRESSURE MUST BE BROUGHT BACK TO THE NOMINAL VALUE.

EVEN IF THE INITIAL PRESSURE IS ABOVE THE VALUE, IT WILL STILL BE REQUIRED TO ADJUST THE INFLATION PRESSURE TO THE CORRECT VALUE.

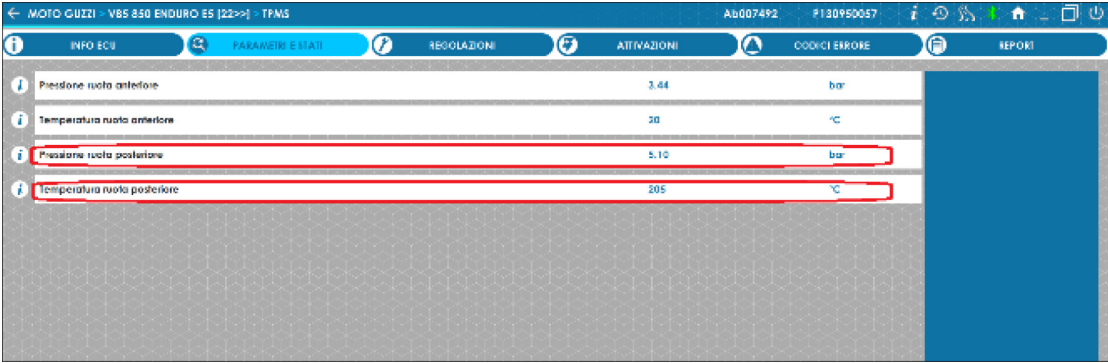


- Repeat the learning operations for the rear wheel also, selecting "**Rear wheel TPMS learning**".
- After both learning procedures have been performed, wait a few minutes for the sensors to align with the vehicle ECU. Any errors present will pass to the "STORED" status and can be cancelled.
- The current tyre pressure and temperature data will be displayed by selecting the "**PARAMETERS AND STATUS**" tab.

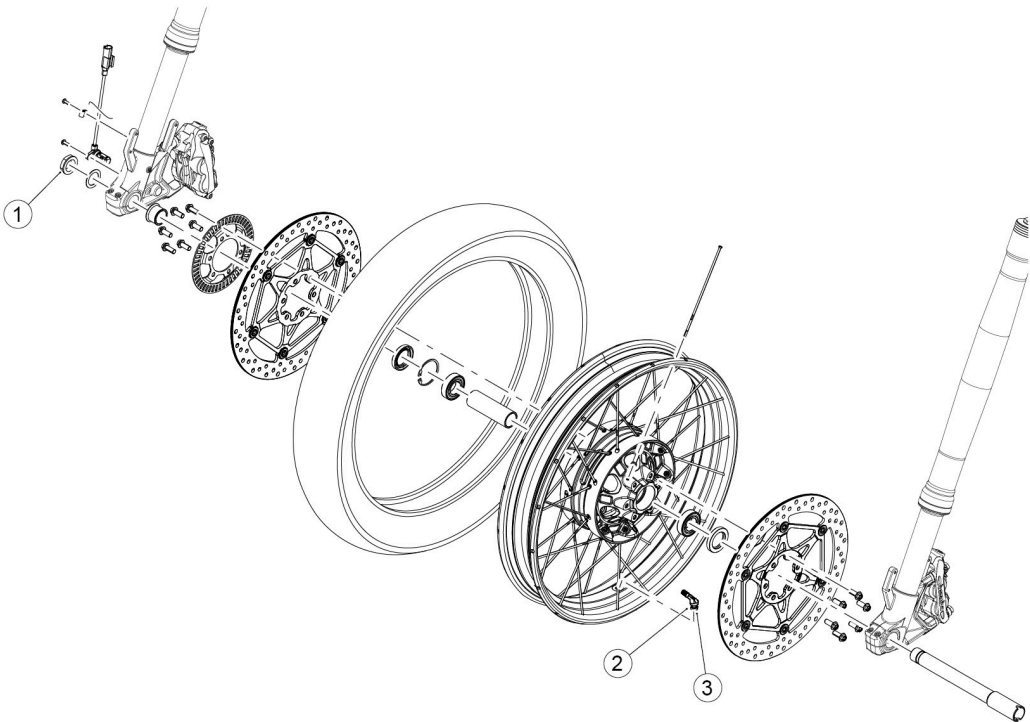
WARNING



IF THE PRESSURE IS 5.10 BAR AND TEMPERATURE IS 205 °C, IT MEANS THAT THE SENSOR IS NOT CALIBRATED. IF A CONDITION OF THIS TYPE OCCURS, IT IS NECESSARY TO CARRY OUT THE TPMS LEARNING PROCEDURE AGAIN.



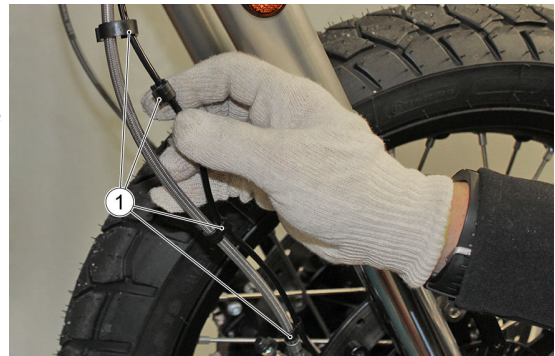
10.2.1 Front wheel



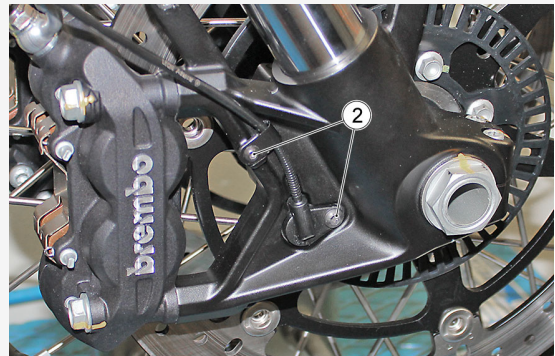
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Nut fastening the front wheel axle	M25x1.5	1	80 ± 8 Nm (59.01 ± 5.90 lbf ft)	-
2	TPMS valve retaining nut	-	1	4.7 ± 0.25 Nm (3.47 ± 0.18 lb ft)	Only if the TPMS system is present on the vehicle
3	TPMS sensor retaining screw	-	1	1.3 ± 0.05 Nm (0.96 ± 0.037 lb ft)	Only if the TPMS system is present on the vehicle

10.2.1.1 Removal

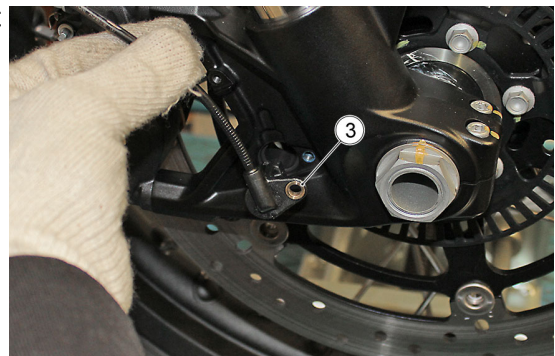
- Place a support under the vehicle and secure it using belts so that the wheel can move freely and the vehicle does not fall.
- Remove the ABS sensor cable from the cable glands (1)



- Unscrew and remove the screws (2)



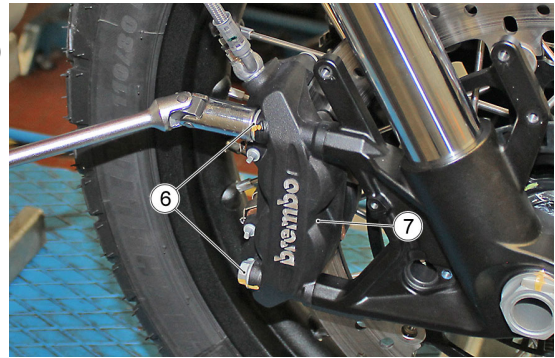
- Remove the ABS sensor (3) from the front right fork



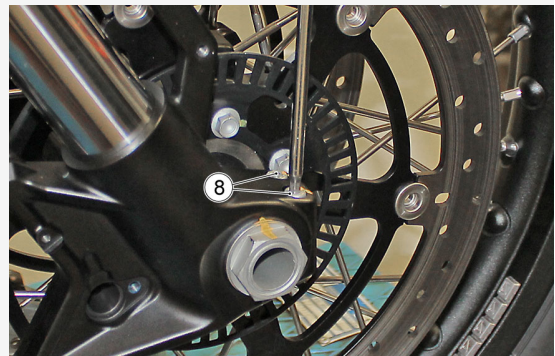
- Unscrew and remove the screws (4)
- Remove the front left brake calliper (5) from the brake disc



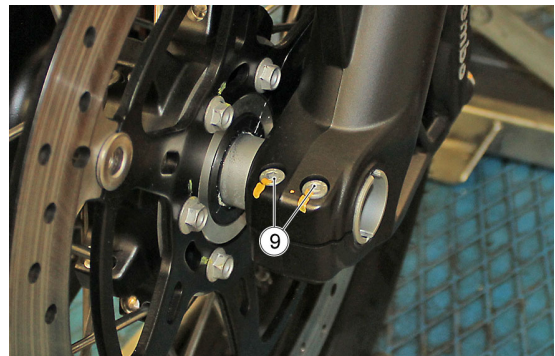
- Unscrew and remove the screws (6)
- Remove the front right brake calliper (7) from the brake disc



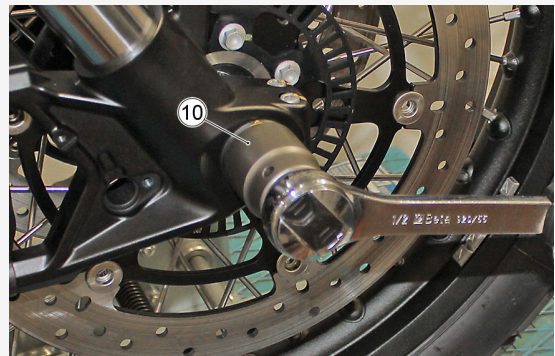
- Loosen the screws (8)



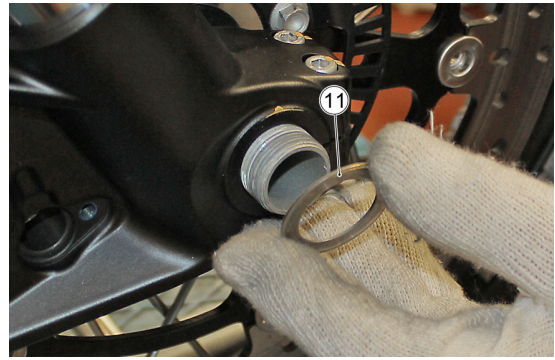
- Loosen the screws (9)



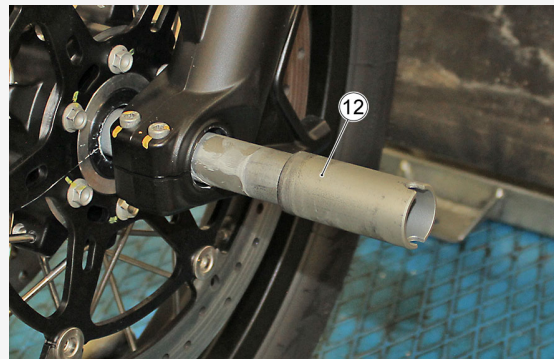
- Unscrew the nut (10) and remove it.



- Retrieve the washer (11)



- Remove the wheel axle (12)



- Remove the front wheel (13)



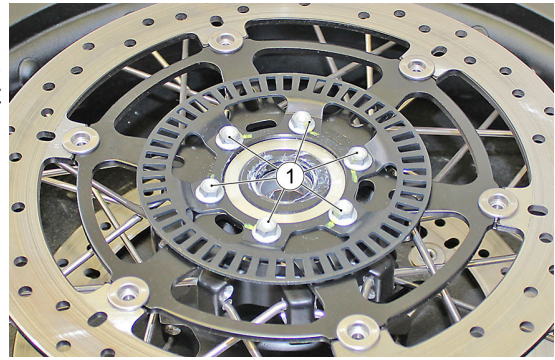
- Retrieve the washer (14)



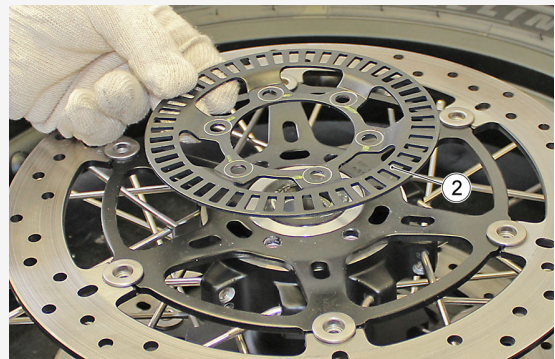
REMOVING THE FRONT BRAKE DISCS

The following procedure is described for a single brake disc, but is valid for both front brake discs.

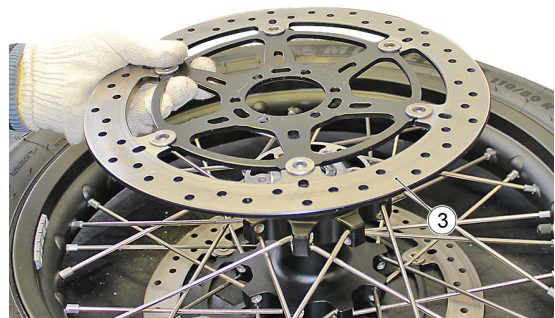
- Remove the front wheel
- Unscrew and remove the screws (1)



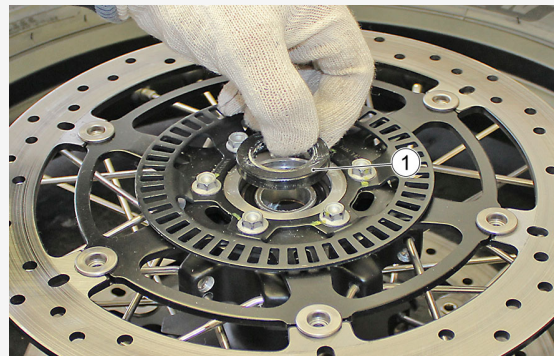
- Remove the phonic wheel (2)



- Remove the front brake disc (3)

**FRONT WHEEL BEARING REMOVAL**

- Remove the front wheel
- Remove the dust cover (1)



- Using a generic bearing puller, remove the bearing as illustrated in the figure
- Repeat the entire operation from the opposite side of the wheel to remove the second bearing



10.2.1.2 Control

FRONT WHEEL BEARINGS

Check the bearings installed on the wheel.

WARNING



CHECK THE CONDITION OF ALL COMPONENTS AND OF THE COMPONENTS INDICATED AS FOLLOWS IN PARTICULAR.

CHECKING ROTATION

- Manually rotate the inner race of each bearing. The race must turn smoothly without impediment or noise.

If one or both bearings do not fall within the control parameters:

- Replace both wheel bearings.

CHECKING RADIAL AND AXIAL PLAY

- Check the radial and axial play.

Axial play: minimal axial play is permitted.

Radial: none.

If one or both bearings do not fall within the control parameters:

- Replace both wheel bearings.

WARNING



ALWAYS REPLACE BOTH BEARINGS.

ALWAYS REPLACE THE BEARINGS WITH COMPONENTS OF THE SAME TYPE.

SEALS

- Check the condition of the seals; replace if damaged or excessively worn.

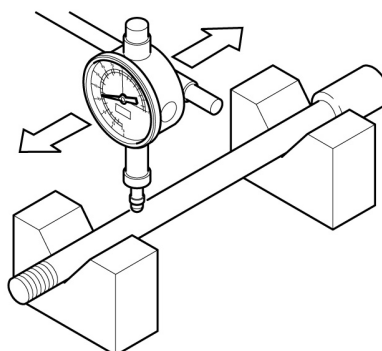
WARNING

ALWAYS REPLACE BOTH SEALS TOGETHER.

ALWAYS REPLACE THE SEALS WITH COMPONENTS OF THE SAME TYPE.

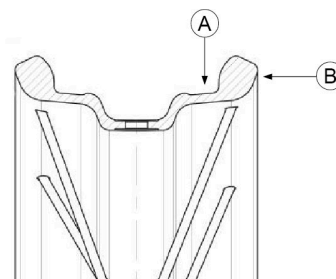
WHEEL AXLE

- Use a dial gauge to measure the eccentricity of the wheel axle. Replace the wheel axle if the eccentricity measured exceeds the specified limit.



FUNCTION	DESCRIPTION / VALUE
Maximum eccentricity	0.20 mm (0.0079 in)

- After having removed the tyre from the wheel rim, use a dial gauge to check that the radial (A) and axial (B) eccentricity of the rim do not exceed the specified limits. Excessive eccentricity is usually caused by worn or damaged bearings. If eccentricity is not within the indicated limits after replacing the bearings, replace the wheel.

E5

FUNCTION	DESCRIPTION / VALUE
Maximum radial and axial eccentricity	1 mm (0.039 in)

ATTENTION

CHECK THE EXCENTRICITY BY PLACING THE DIAL GAUGE ON A SURFACE OF THE WHEEL HUB. BEING A SPOKED WHEEL, THE RIM MAY BE DEFORMED DUE TO SLOW SPOKES THAT MAY CAUSE AN INCORRECT READING OF THE VALUES.

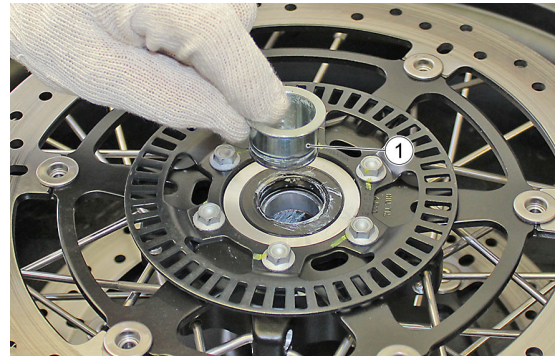
ATTENTION



ADJUST THE SPOKE TENSIONING IF THE SPOKES ARE SLOW AND THE RIM IS DEFORMED.

10.2.1.3 Installation

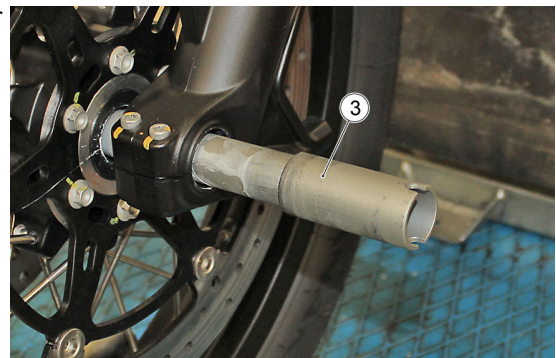
- Insert the spacer (1).



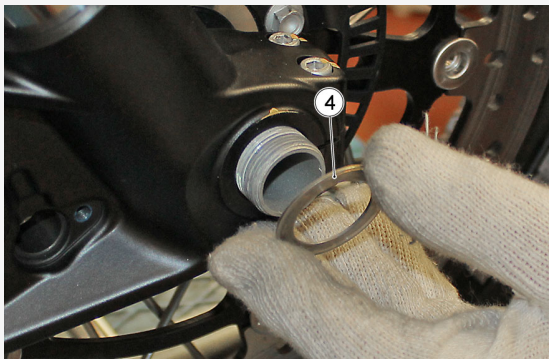
- Place the front wheel (2) between the fork stanchions.



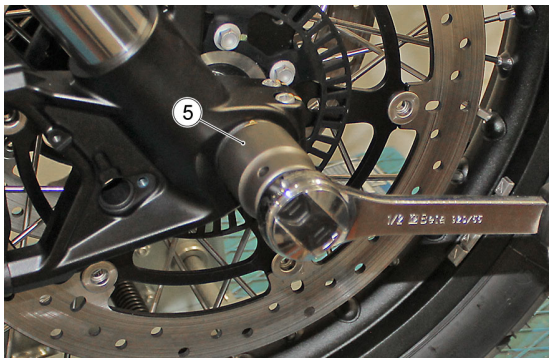
- Insert the wheel pin (3) from the left calliper mounting bracket.



- Insert the washer (4).

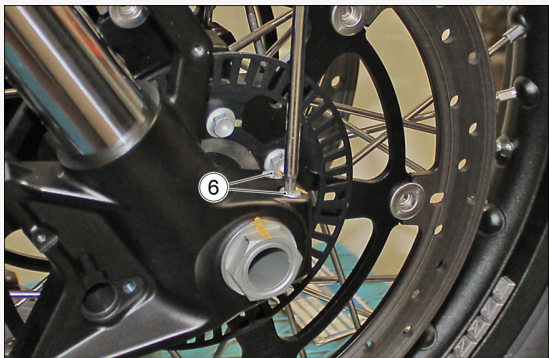


- Insert the nut (5) and bring it against the calliper mounting bracket of the fork.



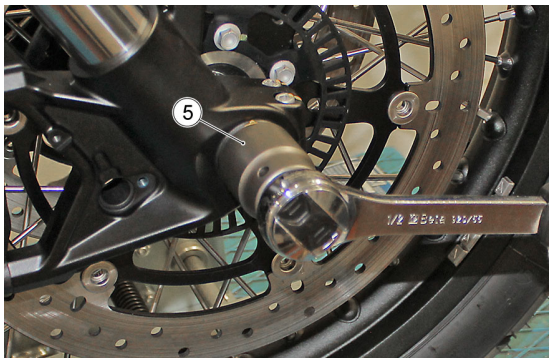
- Tighten the screws (6) of the right calliper mounting bracket to the prescribed torque.

FUNCTION	DESCRIPTION / VALUE
Calliper mounting bracket fastening screw	$10 \pm 1,5 \text{ Nm}$ $(7.38 \pm 1.11 \text{ lbf ft})$



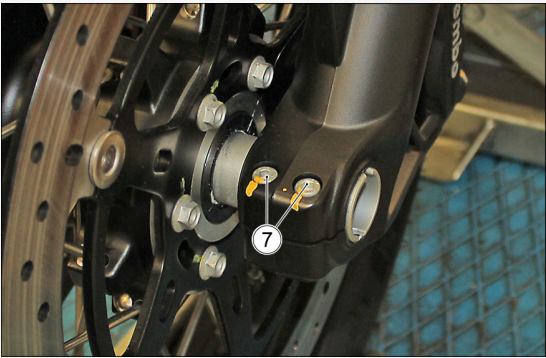
- Tighten the nut (5) to the prescribed torque.

FUNCTION	DESCRIPTION / VALUE
Front wheel axle nut	$80 \pm 8 \text{ Nm}$ $(59.01 \pm 5.90 \text{ lbf ft})$



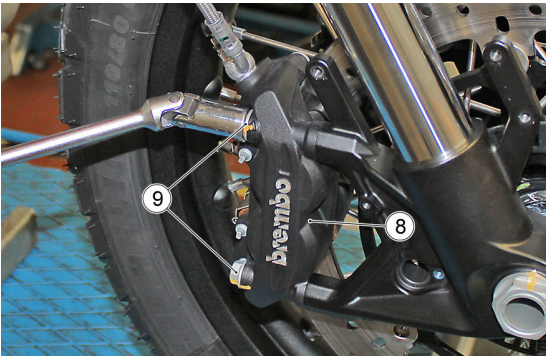
- Tighten the screws (7) of the left calliper mounting bracket to the prescribed torque.

FUNCTION	DESCRIPTION / VALUE
Calliper mounting bracket fastening screw	$10 \pm 1,5 \text{ Nm}$ ($7.38 \pm 1.11 \text{ lbf ft}$)



- Correctly place the right front brake calliper (8).
- Insert and tighten the screws (9) to the specified torque:

FUNCTION	DESCRIPTION / VALUE
Front brake calliper fixing screw	$50 \pm 5 \text{ Nm}$ (36.88 $\pm$ 3.69 lbf ft)

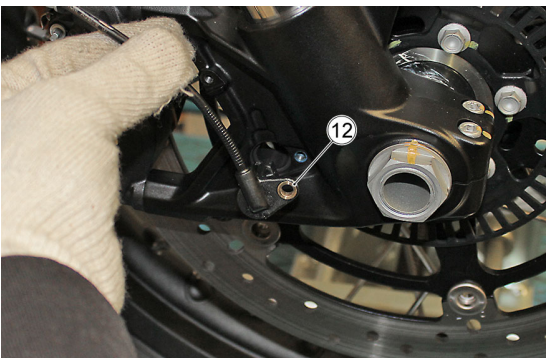


- Correctly place the right front brake calliper (10).
- Insert and tighten the screws (11) to the specified torque:

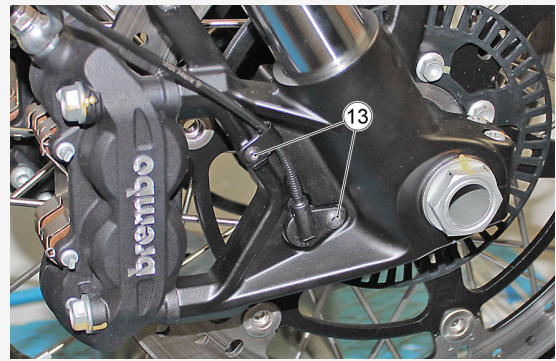
FUNCTION	DESCRIPTION / VALUE
Front brake calliper fixing screw	$50 \pm 5 \text{ Nm}$ (36.88 $\pm$ 3.69 lbf ft)



- Position the ABS sensor (12) on the calliper mounting bracket.



- Insert and tighten the screws (13).



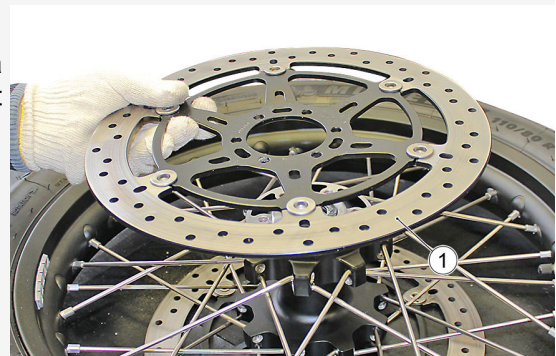
- Insert the ABS sensor cable in the cable glands (14).



FRONT BRAKE DISCS INSTALLATION

The following procedure is described for a single brake disc, but is valid for both front brake discs.

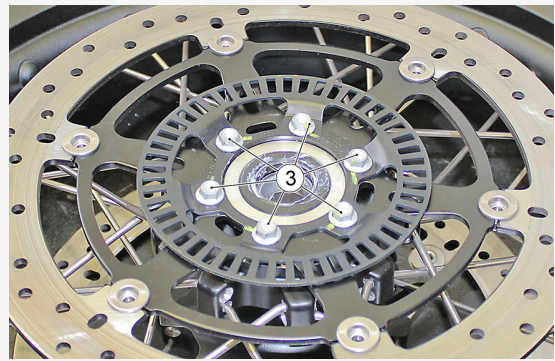
- Place the front brake disc (1)



- Place the phonic wheel (2)



- Insert and tighten the screws (3)



FRONT WHEEL BEARINGS INSTALLATION

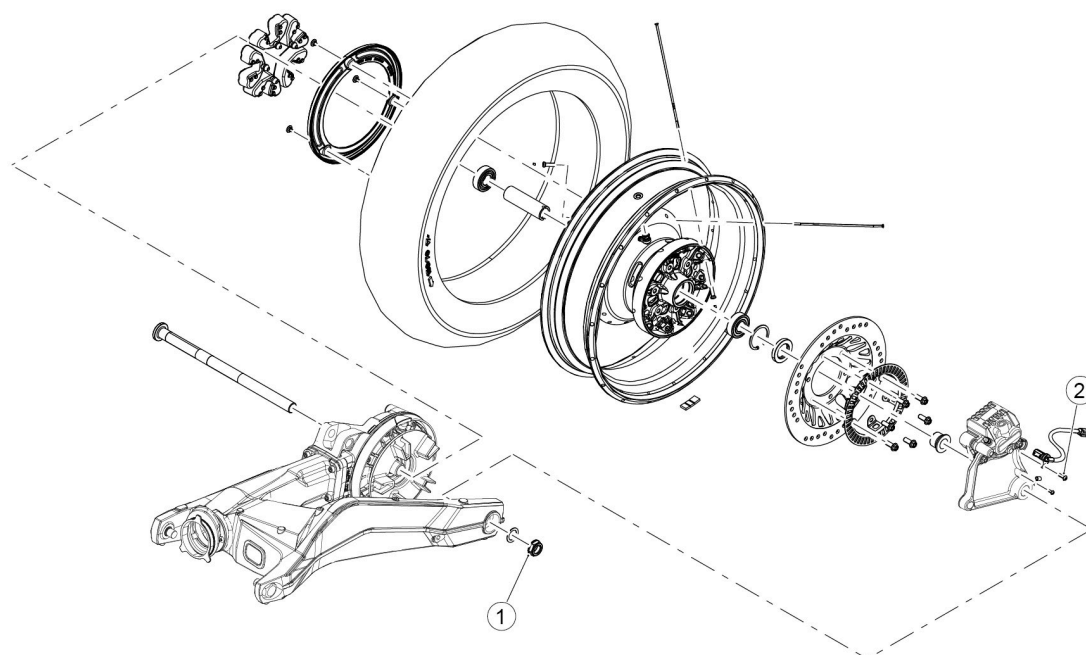
- Using an appropriate punch, install the wheel bearing as illustrated in the figure.



- Insert the dust cover (1)
- Rotate the wheel and repeat the entire operation from the opposite side of the wheel to install the second bearing



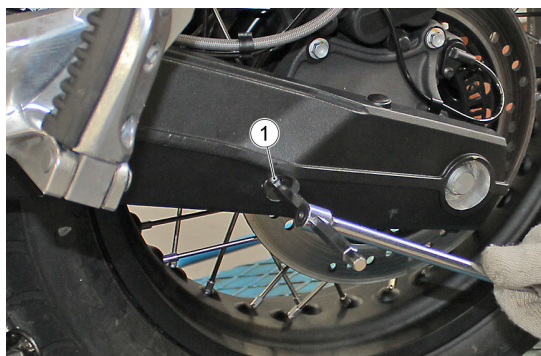
10.2.2 Rear wheel



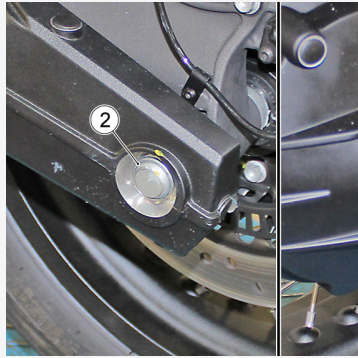
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Rear wheel axle fastener nut	M20x1.5	1	100 ± 15 Nm (73.76 ± 11.06 lbf ft)	-
2	Screw fastening the ABS sensor to the rear calliper support	M5	1	6 ± 1.2 Nm (4.43 ± 0.86 lbf ft)	

10.2.2.1 Removal

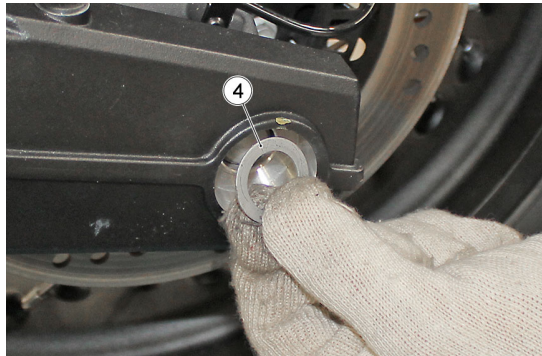
- Undo and remove the screw (1)



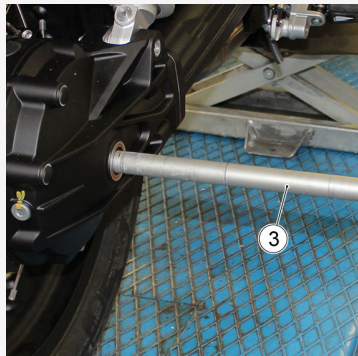
- Holding the pin (3) in place, unscrew and remove the nut (2)



- Retrieve the washer (4)



- Remove the pin (3)



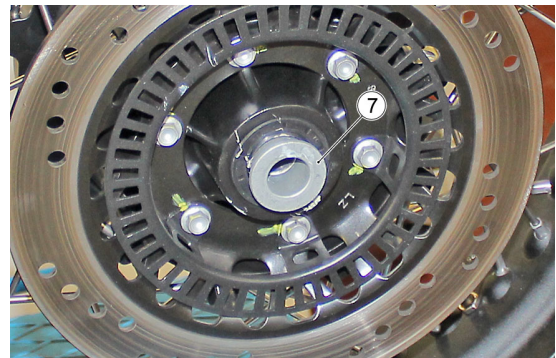
- Remove the brake calliper support plate (5) from the brake disc, complete with rear brake calliper



- Remove the rear wheel (6)

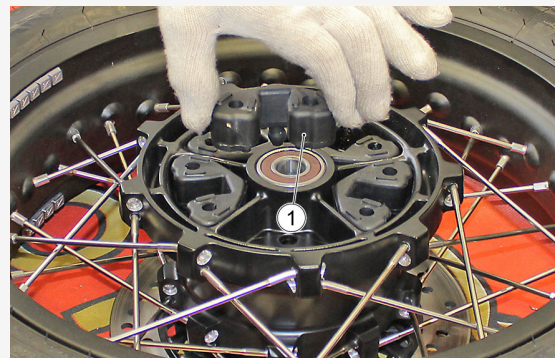


- Retrieve the bushing (7)



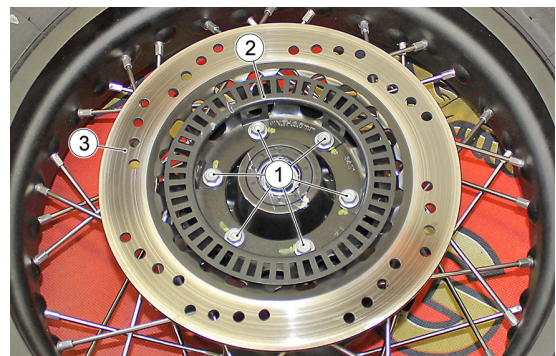
FLEXIBLE COUPLING REMOVAL

- Remove the rear wheel
- Remove the flexible couplings (1)



REMOVING THE REAR BRAKE DISC

- Remove the rear wheel
- Unscrew and remove the screws (1)
- Remove the phonic wheel (2)
- Remove the brake disc (3)



10.2.2.2 Control

WARNING



CHECK THE CONDITION OF ALL COMPONENTS AND OF THE COMPONENTS INDICATED AS FOLLOWS IN PARTICULAR.

REAR WHEEL BEARINGS

Check the bearings installed on the wheel.

CHECKING ROTATION

- Manually rotate the inner race of each bearing. The race must turn smoothly without impediment or noise.

If one or both bearings do not fall within the control parameters:

- Replace both wheel bearings.
-

WARNING



ALWAYS REPLACE BOTH BEARINGS.

ALWAYS REPLACE THE BEARINGS WITH COMPONENTS OF THE SAME TYPE.

- Check the radial and axial play.

Axial play: minimal axial play is permitted.

Radial: none.

If one or both bearings do not fall within the control parameters:

- Replace both wheel bearings.
-

REAR WHEEL GASKETS

- Check the condition of the seals; replace if damaged or excessively worn.
-

WARNING



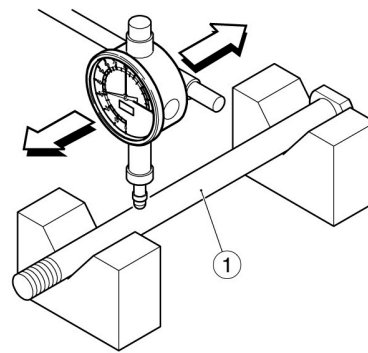
ALWAYS REPLACE BOTH SEALS TOGETHER.

ALWAYS REPLACE THE SEALS WITH COMPONENTS OF THE SAME TYPE.

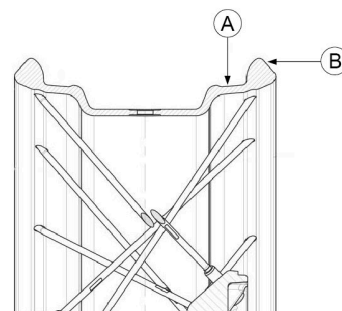
REAR WHEEL AXLE

- Use a dial gauge to measure the eccentricity of the wheel axle (1). Replace the wheel axle (1) if the eccentricity measured exceeds the specified limit.

FUNCTION	DESCRIPTION / VALUE
Maximum eccentricity	0.20 mm (0.0079 in)



- After having removed the tyre from the wheel rim, use a dial gauge to check that the radial (A) and axial (B) eccentricity of the rim do not exceed the specified limits. Excessive eccentricity is usually caused by worn or damaged bearings. If eccentricity is not within the indicated limits after replacing the bearings, replace the wheel.

E5

FUNCTION	DESCRIPTION / VALUE
Maximum radial and axial eccentricity	1 mm (0.039 in)

ATTENTION

CHECK THE EXCENTRICITY BY PLACING THE DIAL GAUGE ON A SURFACE OF THE WHEEL HUB. BEING A SPOKE WHEEL, THE RIM MAY BE DEFORMED DUE TO SLOW SPOKES THAT MAY CAUSE AN INCORRECT READING OF THE VALUES.

ATTENTION

ADJUST THE SPOKE TENSIONING IF THE SPOKES ARE SLOW AND THE RIM IS DEFORMED.

FINAL DRIVE UNIT BEARINGS

Carry out the check with the bearings fitted on the final drive unit.

CHECKING ROTATION

- Remove the left spacer.
- Remove the right spacer.
- Manually rotate the inner race of each bearing. Rotation must be constant, smooth and noiseless.

If one or both bearings do not fall within the control parameters:

- Replace both bearings of the final drive unit.

CHECKING RADIAL AND AXIAL PLAY

- Check the radial and axial play.

Axial play: minimal axial play is permitted.

Radial: none.

If one or both bearings do not fall within the control parameters:

- Replace both bearings of the final drive unit.

FLEXIBLE COUPLINGS

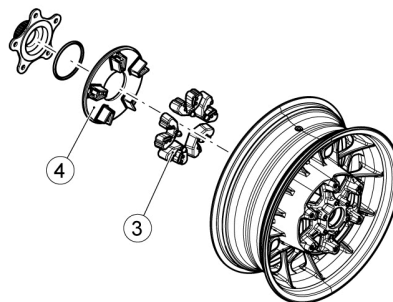
Check that the flexible couplings (3) are not damaged or excessively worn.

To check:

- Position the complete final drive unit on the wheel.
- Manually rotate in both directions the flexible coupling disc (4) and check the clearance between the flexible coupling rubber rings and the coupling holder.

If there is excessive clearance:

- Replace all the flexible couplings (3).



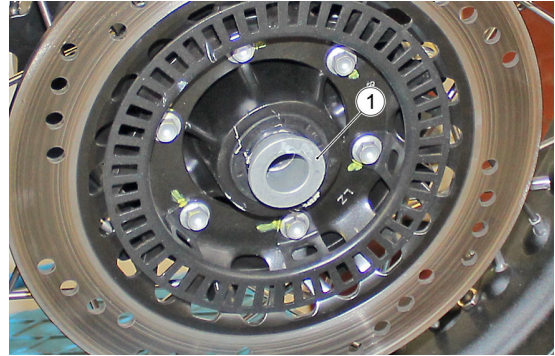
WARNING



ALWAYS REPLACE ALL THE FLEXIBLE COUPLINGS WITH OTHERS OF THE SAME TYPE.

10.2.2.3 Installation

- Place the spacer (1) on the rear wheel



- Place the rear wheel (2) in the swingarm



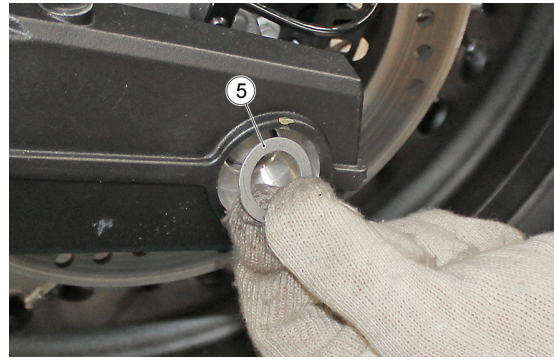
- Correctly place the rear brake calliper (3), complete with support bracket



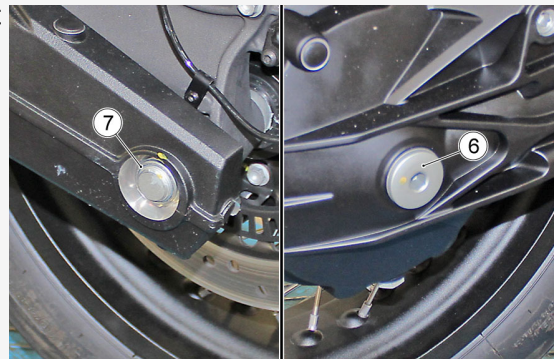
- Insert the wheel pin (4)



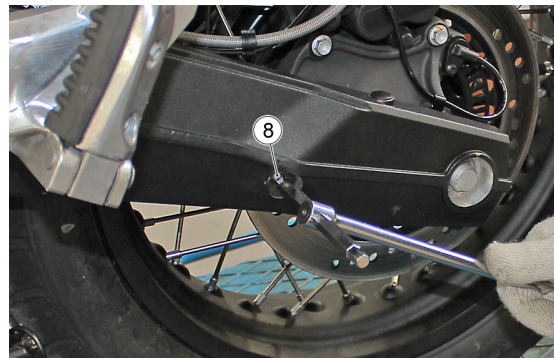
- Insert the washer (5)



- Holding the pin (6) in place, tighten the nut (7)

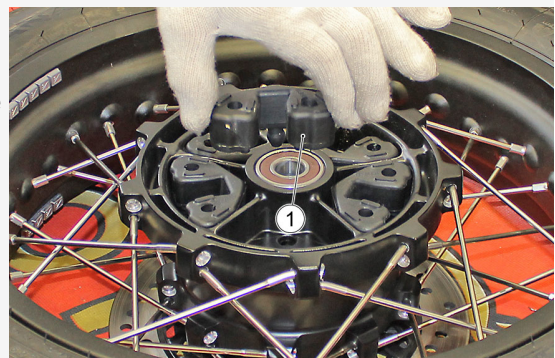


- Insert and tighten the screw (8)



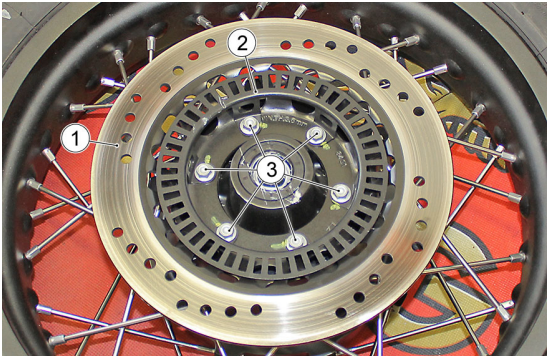
FLEXIBLE COUPLINGS INSTALLATION

- Remove the rear wheel
- Insert the flexible couplings (1) in the specific lodging

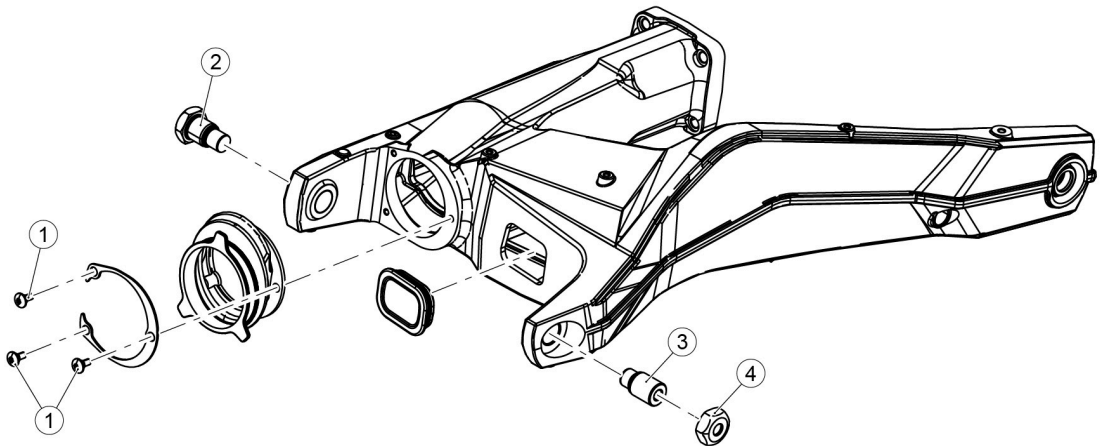


REAR BRAKE DISC INSTALLATION

- Remove the rear wheel
- Place the brake disc (1)
- Place the phonic wheel (2)
- Insert and tighten the screws (3)



10.3 Swingarm



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Bellow to swingarm fixing screw	M5	3	6 ± 1.2 Nm (4.43 ± 0.89 lb ft)	-
2	Swingarm pivot bolt fastening nut	-	1	50 ± 5 Nm (36.88 ± 3.69 lbf ft)	-
3	Swingarm fastening pin	-	1	-	Screw until the end and unscrew by 1/4 of a turn

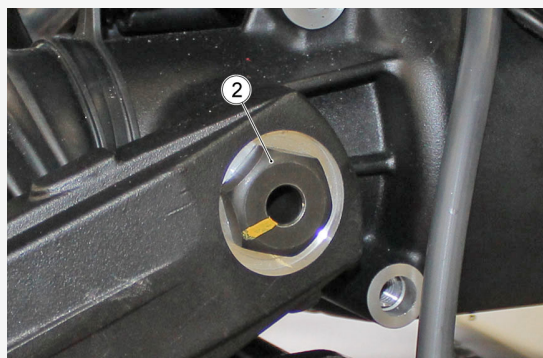
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
4	Swingarm pivot bolt fastening nut	-	1	50 ± 5 Nm (36.88 ± 3.69 lbf ft)	-
-	Rear brake pipe feedthrough to swingarm fixing screw	M5	2	6 ± 1.2 Nm (4.43 ± 0.89 lb ft)	-

10.3.1 Removal

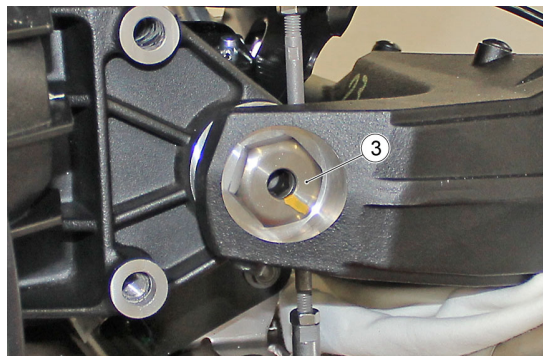
- Removing the clamp (1)



- Unscrew the pin (2) and remove it.



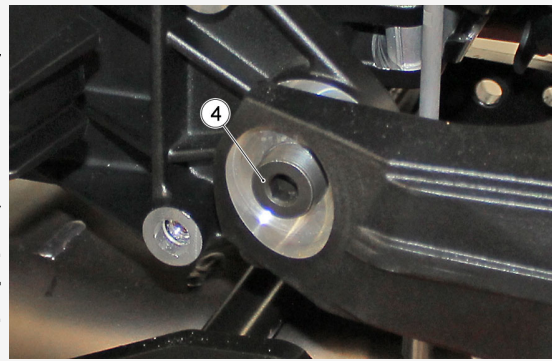
- Unscrew the nut (3) and remove it



- Unscrew the pin (4) and remove it.

N.B

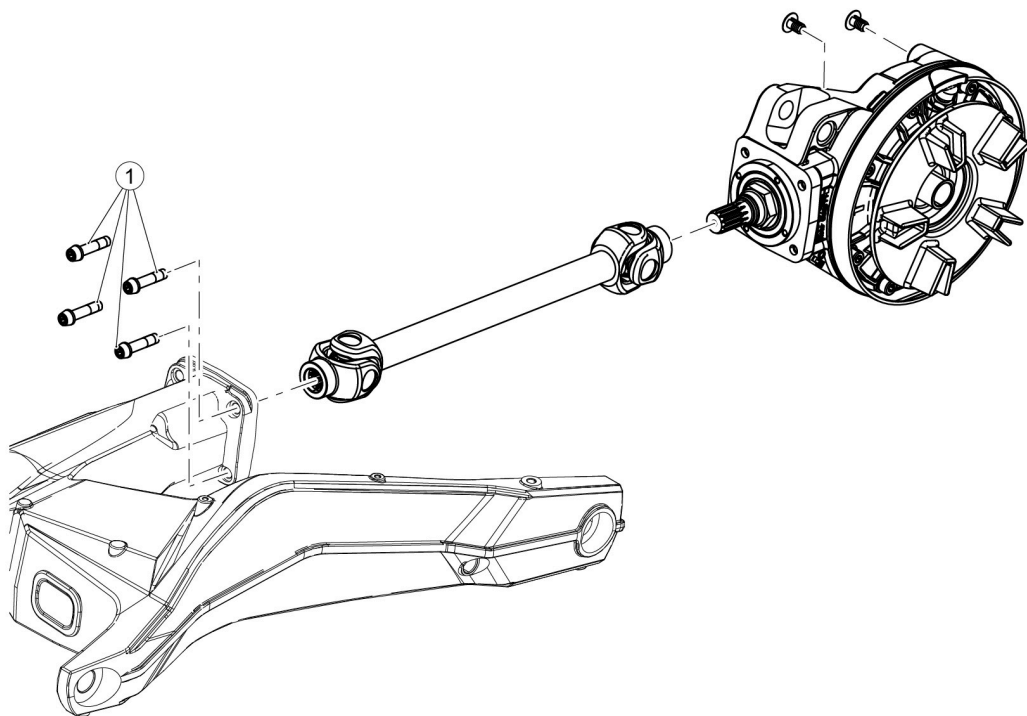
DURING REFITTING, AFTER MANUALLY TIGHTENING THE PIN TO THE PRESCRIBED TORQUE, LOOSEN IT BY 1/4 OF A TURN. TIGHTEN THE NUT (3) TO THE PRESCRIBED TORQUE.



- Remove the swingarm (5)



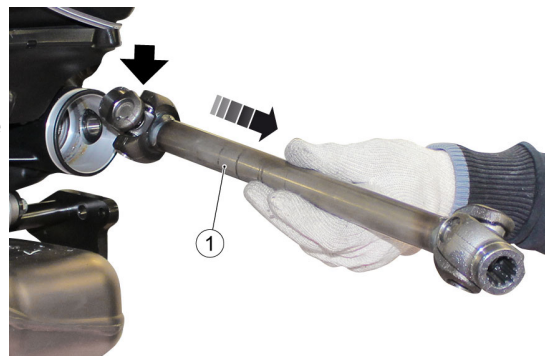
10.4 Cardan shaft



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Gearbox preimpregnated TCC torx fixing screws	M8x35	4	25 Nm (18.44 lbf ft)	-

10.4.1 Removal

- Remove the footrest plates
- Remove the rear wheel
- Remove the swingarm
- Strike a few times with a mallet to remove the cardan shaft (1)

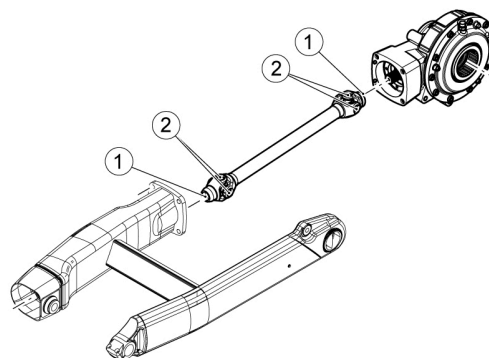


10.4.2 Control

Carefully check:

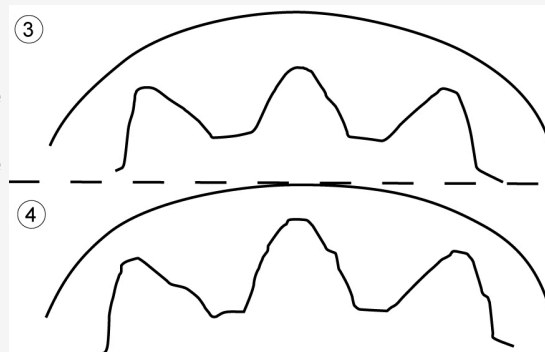
The splines on the cardan shaft (1) must be intact, free from grain or dents.

Check that the joints (2) are not hardened or excessively loose, otherwise replace it.

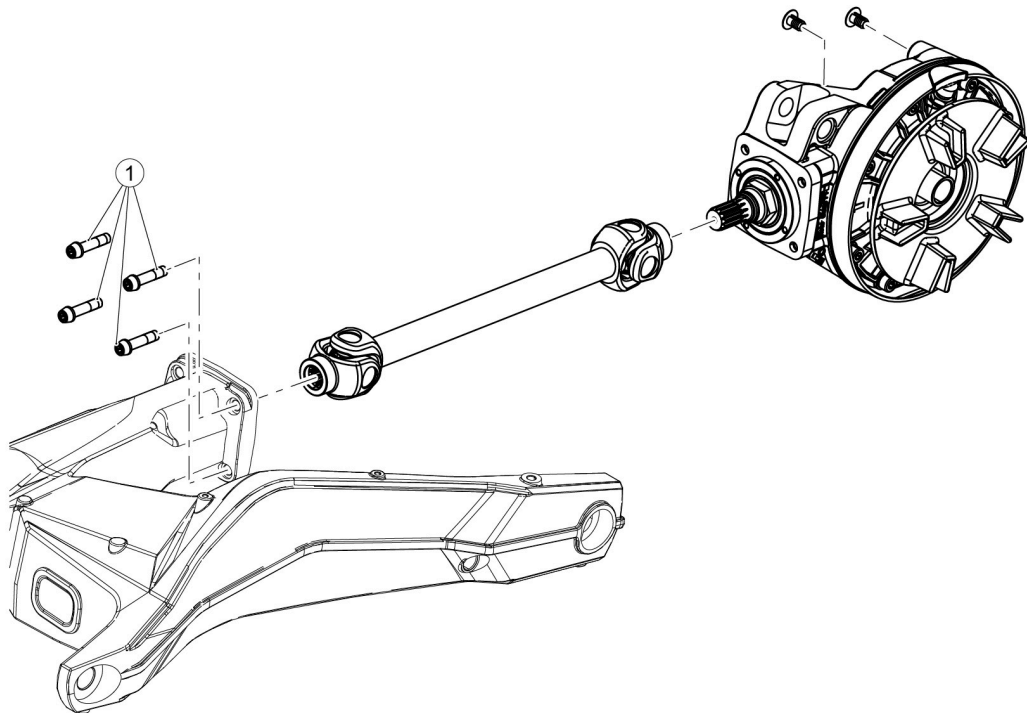


In the figure are shown two worn toothing profiles:

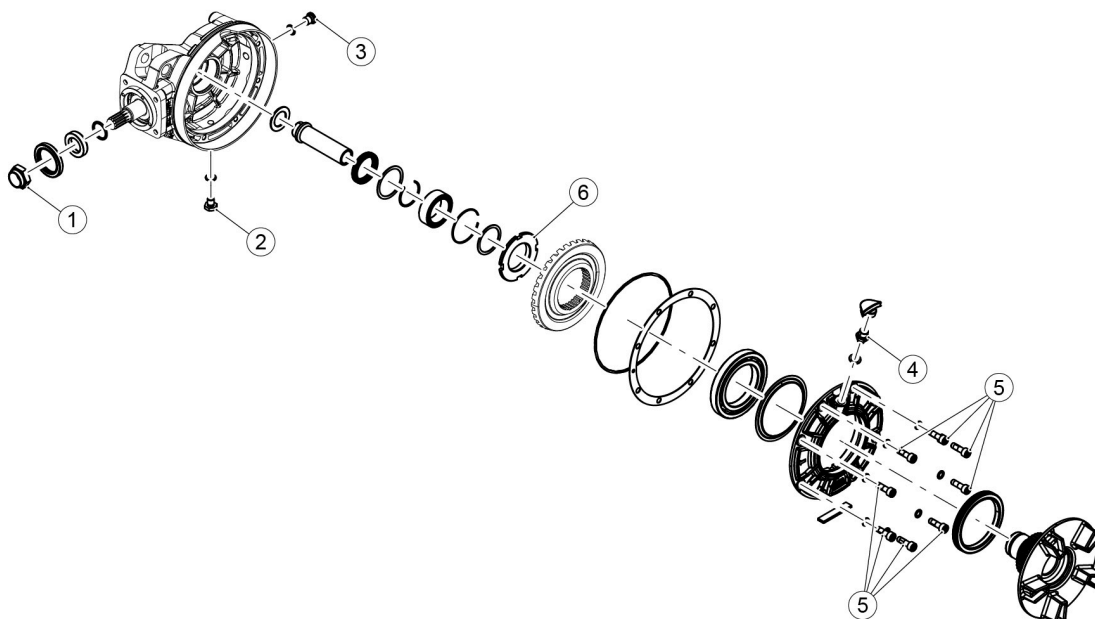
- Profile (3) shows acceptable wear, the cardan shaft should not be replaced.
- Profile (4) shows unacceptable wear, the cardan shaft must be replaced.



10.5 Bevel gear



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Gearbox preimpregnated TCC torx fixing screws	M8x35	4	25 ± 5 Nm (18.44 ± 3.69 lb ft)	-



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Pinion fastening nut	M25	1	100 ± 10 Nm (73.76 ± 7.38 lbf ft)	Loct. 648 + Nut rebating on hollow pinion
2	Oil drainage plug	M10	1	30 ± 6 Nm (22.13 ± 4.43 lbf ft)	-
3	Oil load cap	M12	1	25 ± 5 Nm (18.44 ± 3.69 lb ft)	-
4	Bleeder cap	-	1	10 ± 2 Nm (7.38 ± 0.87 lbf ft)	-
5	Gearbox cover fastening screws	M8x25	8	25 ± 5 Nm (18.44 ± 3.69 lb ft)	-
6	Ring nut	-	1	160 ± 16 Nm (118.01 ± 11.08 lbf ft)	Loct. 243 + Riveting on the splash guard hub
-	Pinion bearings holder case	-	1	50 ± 5 Nm (36.88 ± 3.69 lbf ft)	Loct. 243

ATTENTION



SINCE THE BEVEL GEAR IS A SAFETY COMPONENT, IT IS STRICTLY FORBIDDEN TO PERFORM ANY PINION/SPROCKET CLEARANCE ADJUSTMENTS FOR THE ENTIRE DURATION OF THE COMPONENT'S SERVICE LIFE.

IF THE CLEARANCE IS NOT WITHIN THE REQUIRED TOLERANCE, THE ENTIRE BOX WILL HAVE TO BE REPLACED.

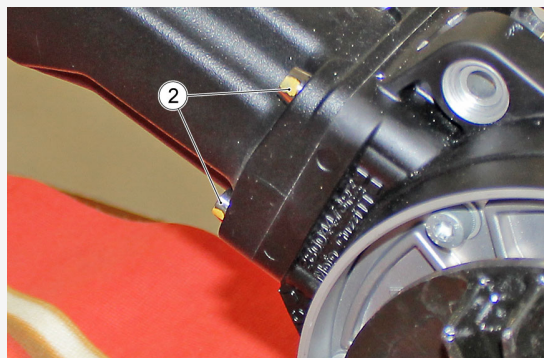
IF OIL LEAKAGES ARE DETECTED ON THE SPROCKET SIDE, REPLACE THE OIL SEALS ACCORDING TO THE DESCRIPTION BELOW.

10.5.1 Removal

- Loosen and remove the screws (1).



- Loosen and remove the screws (2).

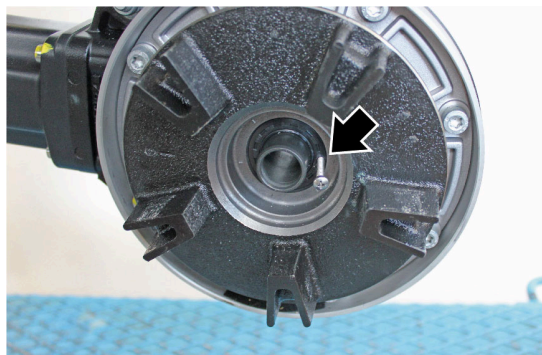


- Remove the gearbox (3).

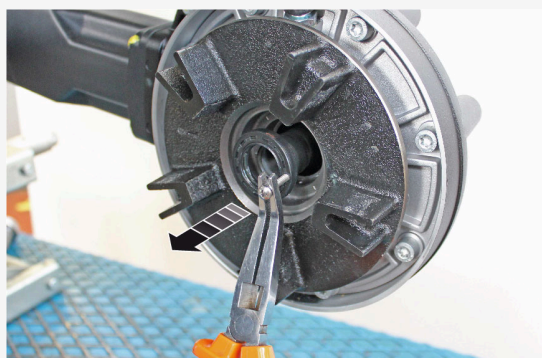


REPLACEMENT OF THE OIL SEAL ON THE WHEEL HUB WITH THE BEVEL GEAR FITTED ON THE VEHICLE

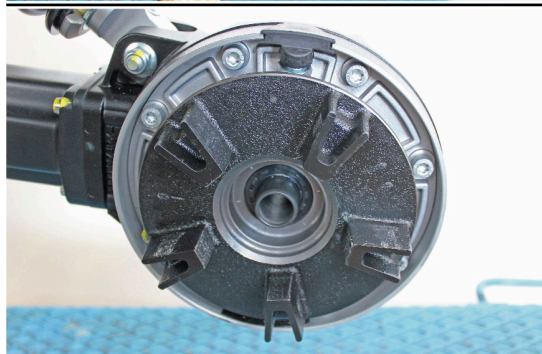
- Firmly screw a small self-tapping screw (M5-M6) on the oil seal



- Use a clamp to grab the screw and remove the oil seal from the wheel hub seat



- Insert a new oil seal in the specific seat, tap it inside with a tube with a slightly smaller diameter than the external diameter of the oil seal
- The oil seal is inserted when it reaches the end



10.5.2 Removal

WARNING



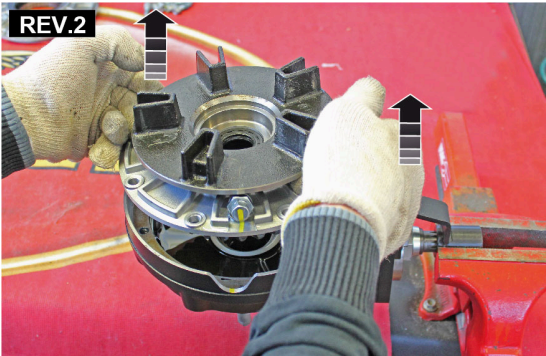
CARRY OUT OIL DRAINING AND PROCEED WITH THE REMOVAL OF THE BREATHER BEFORE DISASSEMBLING THE GEARBOX.

- Using the specific tool, clamp the complete gearbox in the vice.
- Loosen and remove the 8 fastener screws of the flange.



CODE	DESCRIPTION	IMAGE
021000Y	Bevel gear pinion shoes	

- Use threaded stud bolts as a guide and remove the flange.



- Remove the ring gear axle thickness.



- Remove the inner spacer.



- Remove the bearing's roller cage.



- Using a suitable tool, disengage the radial snap ring and remove it.

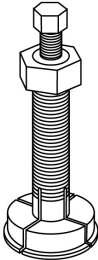


- Heat the outer track seat of the roller bearing using an air heater.



- Insert the special tool under the washer and screw the cursor.



CODE	DESCRIPTION	IMAGE
001467Y036	Bearing internal cup extracto	

- Insert a bush with a suitable diameter on the specific tool and tighten the nut keeping the extractor locked.



- Remove the outer track of the roller bearing.



- Remove the washer.



- Remove the sealing ring.
- When reassembling use a new ring.

ATTENTION



DURING REASSEMBLY BE CAREFUL, AS THE SEALING RING MUST BE INSERTED UNTIL IT STOPS, USING THE SPECIFIC PRESS-FIT PAD.



- Operating from the internal side of the flange, remove the hub's internal oil seal by tapping it with a punch

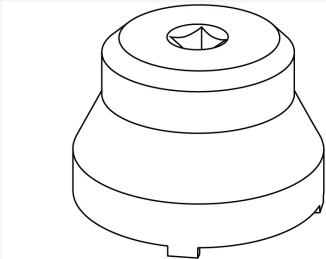


- Using the protective jaws, block the complete flange in the vice and remove the radial stop ring using a specific tool.



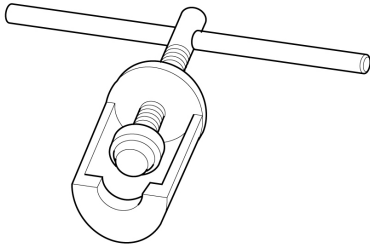
- Unscrew the ring nut, using the special tool, to loose the riveting.
- After unscrewing the ring nut to the end of the thread, re-tighten it until it stops in such a way as to create the space between the ring nut and the shoulder washer.



CODE	DESCRIPTION	IMAGE
020999Y	Crown counter-lock ring wrench	

- Insert the special tool under the shoulder washer and screw the cursor.



CODE	DESCRIPTION	IMAGE
GU19907000	Extractor for internal ring on drilled bolt on cardan shaft	

- Remove the inner track of the roller bearing.



- Remove the shoulder washer.



- Remove the ring nut.



- Remove the crown gear.



- Remove the gearbox flange from the splash guard hub.



- Remove the O-ring.
- When reassembling use a new O-ring.

ATTENTION



PAY SPECIAL ATTENTION TO THE CORRECT REMOVAL PROCEDURE OF THE OIL SEAL TO AVOID THE DAMAGE OF THE STEEL SHEET UNDER THE OIL SEALER.

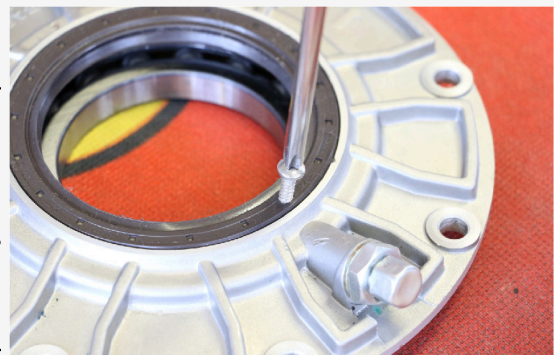


- Use a small self-tapping screw (M5-M6) and screw it slightly to grip on the oil seal.

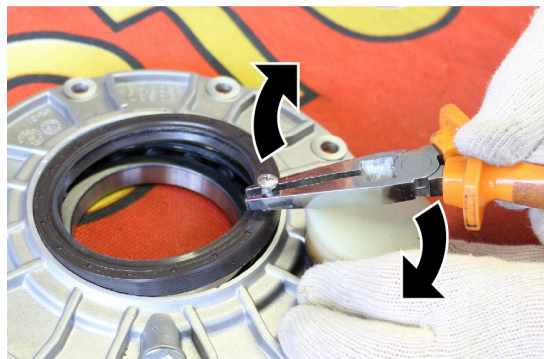
ATTENTION



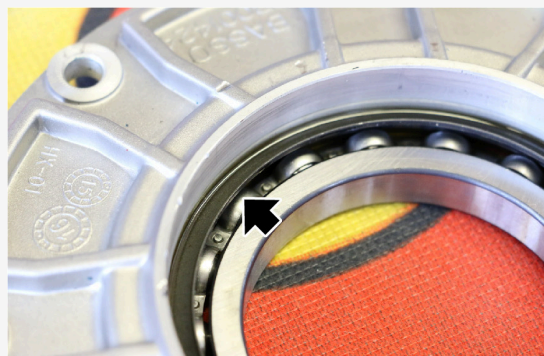
DO NOT TIGHTEN THE SCREW AS IT COULD DAMAGE THE UNDERLYING THIN SHEET.



- Using a clamp to remove the oil seal from the seat, using a Teflon or wooden support to avoid damaging the flange of the gearbox.



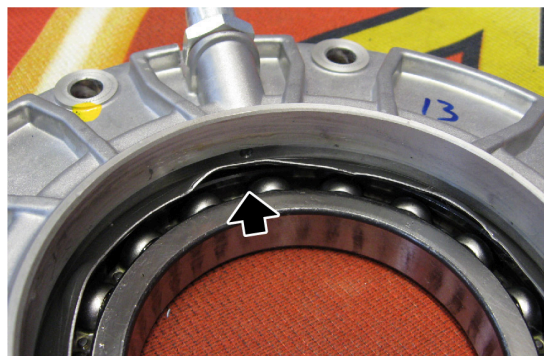
- Check the correct integrity of the underlying thin sheet.



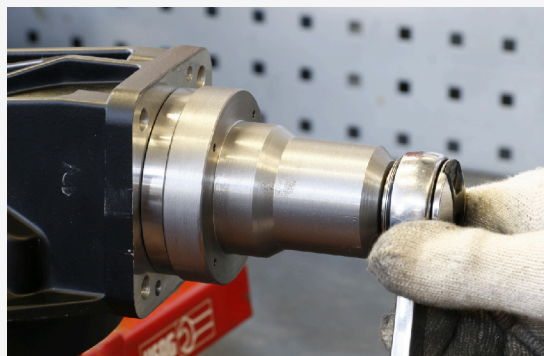
ATTENTION

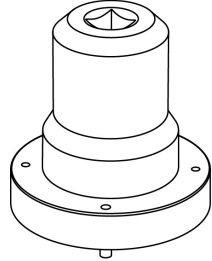


IF THE THIN SHEET IS DAMAGED, THE FLANGE TOGETHER WITH THE BEARING MUST BE REPLACED, AS INDICATED.

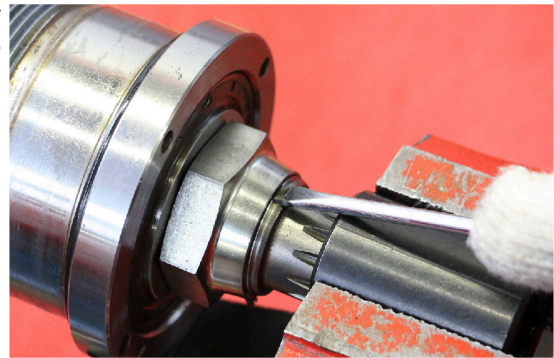


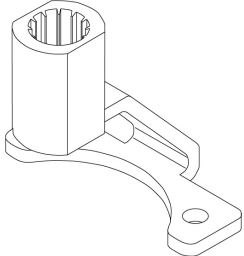
- Heat the outer area of the pinion bearings holder case.
- Using the special tool, loose and remove the pinion bearings holder case.



CODE	DESCRIPTION	IMAGE
020998Y	Pinion case wrench	

- Using the specific tool, clamp the assembly in the vice and lift the nut again before removing it.

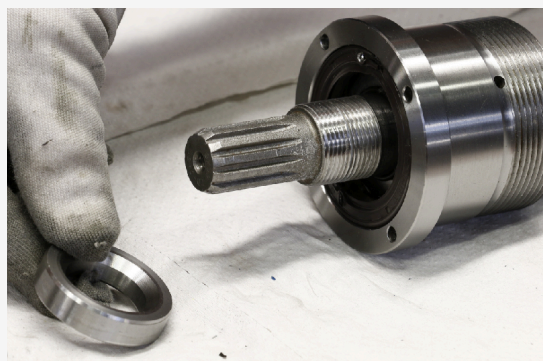


CODE	DESCRIPTION	IMAGE
021000Y	Bevel gear pinion shoes	

- Loosen the pinion bearings holder case locking nut and remove it.



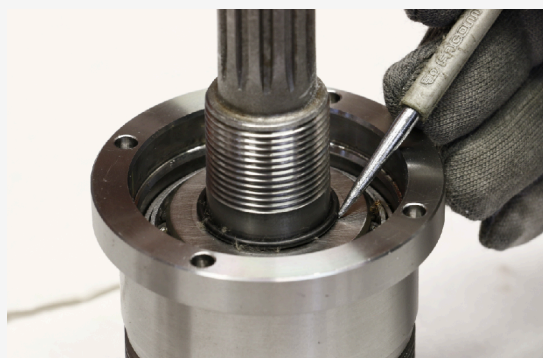
- Remove the spacer closing bearings.



- Remove the sealing ring.



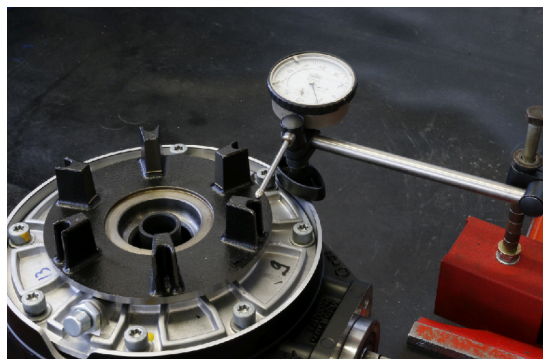
- Remove the O-ring.



10.5.3 Control

- After assembly of the box, it is necessary to check the play between the pinion and the crown. Clamp in a vice and install a dial gauge by means of a suitable support. The dial gauge tester must be placed the outer end of a tooth positioned at 90°.

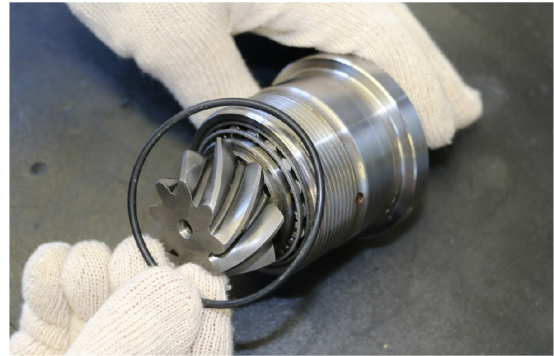
FUNCTION	DESCRIPTION / VALUE
Maximum clearance allowed	0.08-0.2 mm (0.059-0.147 in)



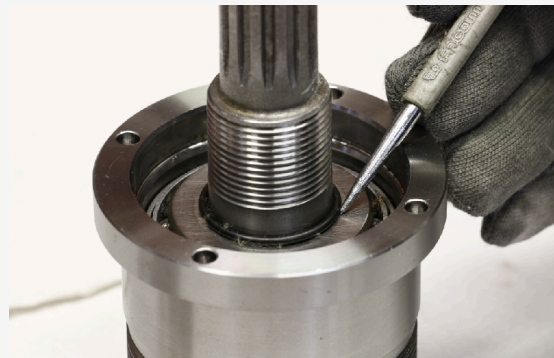
- If the measured play is not compliant with the permitted values, proceed to the correction by selecting and replacing an adequate rear sprocket axle thickness.

10.5.4 Fitting

- Insert the new external O-ring in the pinion unit.



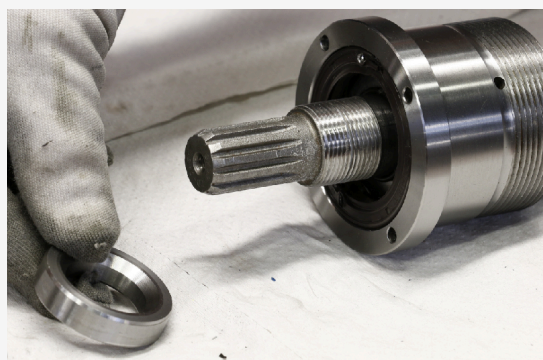
- Insert the new internal O-ring in the pinion unit.



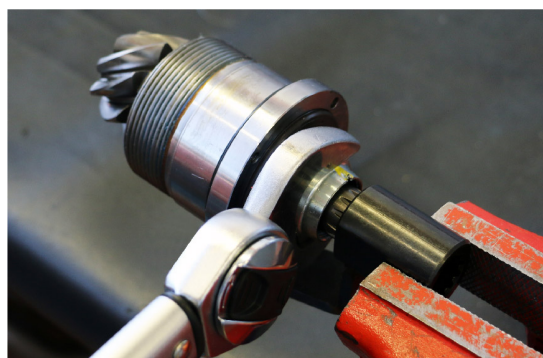
- Insert a new seal ring until it stops.



- Insert the bearings closing spacer paying attention that the chamfer is placed in contact with the O-ring.



- After having placed a new nut, using the specific tool, lock the assembly of the pinion bearing support case in the vice and tighten the nut to the prescribed torque.



CODE	DESCRIPTION	IMAGE
021000Y	Bevel gear pinion shoes	

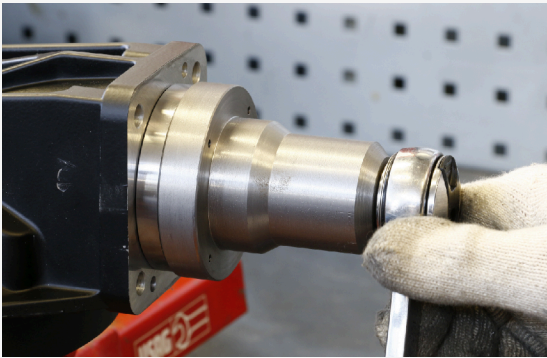
- Rivet the nut at the groove on the pinion.

ATTENTION

CAREFULLY CLEAN THE THREAD OF THE GEARBOX FROM LOCTITE RESIDUES BEFORE INSERTING THE PINION BEARING SUPPORT CASE AGAIN.



- Using the protective jaws, block the gearbox in vice
- Apply **Loctite** along the entire circumference, for a length of 3 threads and, using the specific tool, tighten the pinion bearing holder case to the specified torque.



CODE	DESCRIPTION	IMAGE
020998Y	Pinion case wrench	

- Using the specific tool, insert a new seal ring on the cover.



CODE	DESCRIPTION	IMAGE
021005Y	Bevel gear cover oil seal punch	

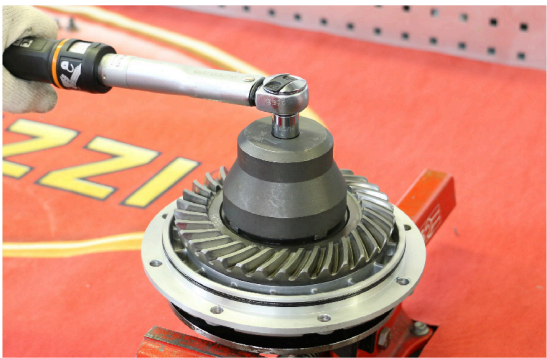
- On the opposite side of the cover, insert a new O-ring.

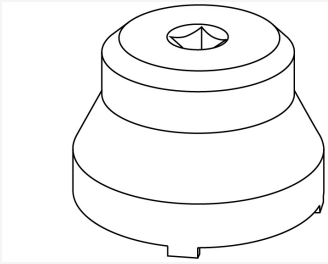


- Place the gearbox flange on the splash guard hub.



- Place a new ring nut and using the specific tool tighten it to the prescribed torque.



CODE	DESCRIPTION	IMAGE
020999Y	Crown counter-lock ring wrench	

- Reattach the ring nut in two opposite points, in correspondence with the grooves on the hub.



- Insert the shoulder washer.



- Using the specific tool, put it in a press and insert the inner track of the roller bearing.

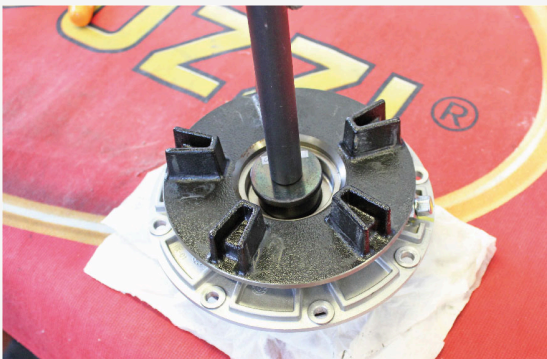


CODE	DESCRIPTION	IMAGE
GU19927900	Punch for drilled bolt bearing	

- Insert the radial snap ring.



- Using the specific tool, fit the internal oil seal of the bevel gear hub, bringing it to the end



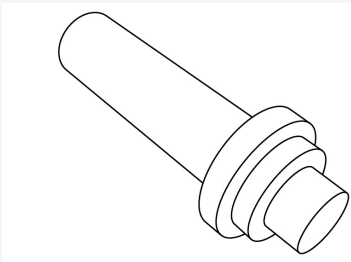
CODE	DESCRIPTION	IMAGE
020359Y	42x47 mm Adaptor	

- Place the flat washer on the gearbox.



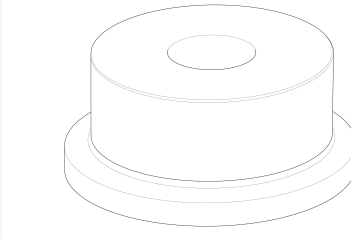
- Insert a new sealing ring on the gearbox using the specific tool, paying attention to the direction of assembly.



CODE	DESCRIPTION	IMAGE
021003Y	Bevel gear external cover oil seal punch	

- Using the specific tool, put it in a press and insert the outer track of the roller bearing until it stops.



CODE	DESCRIPTION	IMAGE
020360Y	Punch 52x55 mm	

- Insert the radial snap ring.



- Insert the roller cage.



- Before proceeding with the assembly of the inner spacer, clean it thoroughly with an oil-soaked cloth.



- Insert the inner spacer until it stops.



- Reposition the crown axle thickness.

N.B



THE THICKNESS HAS A UNIQUE POSITION IN THE BOX. PAY ATTENTION TO THE CORRECT POSITION BY CHECKING THE CORRESPONDENCE OF THE HOLES WITH THE FASTENING SCREWS.

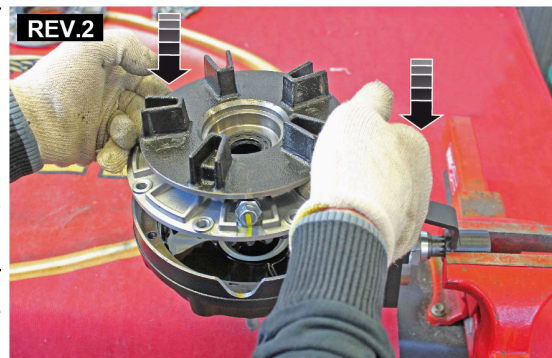


ATTENTION

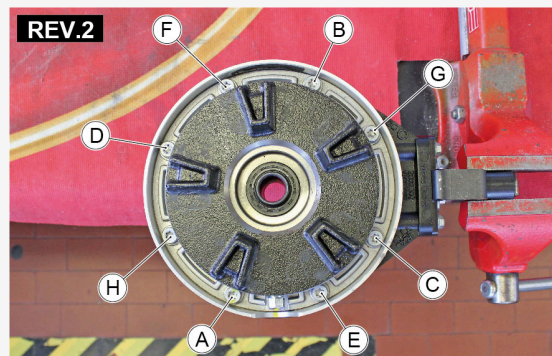


CAREFULLY CLEAN THE THREADS OF THE GEARBOX FROM LOCTITE RESIDUES BEFORE INSERTING THE FLANGE AGAIN.

- Insert the centring pins and reposition the complete flange in its seat in the gearbox.



- Insert the fixing screws of the flange and tighten it to the prescribed torque operating diagonally with the indicated sequence..



- After blowing the breather with compressed air, carefully remove any oil residues and check its correct functioning, put it in its seat again and tighten it to the prescribed torque.

N.B



DURING REPLACEMENT, USE A NEW SEALING WASHER.

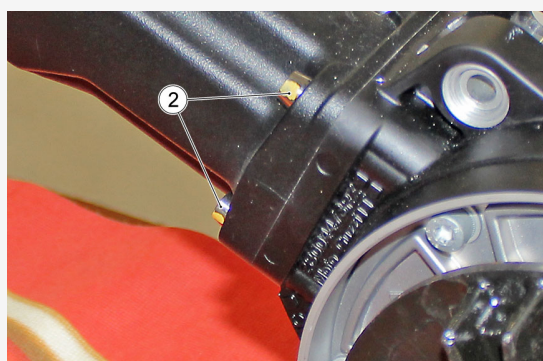


10.5.5 Installation

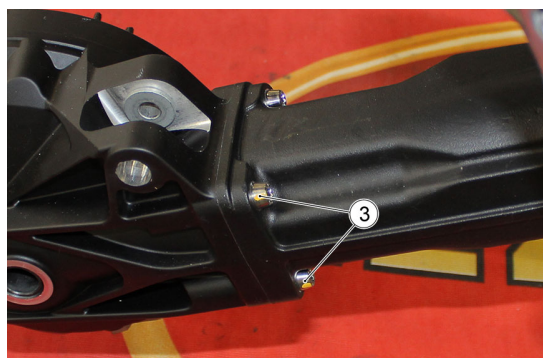
- Insert the bevel gear (1) on the swingarm



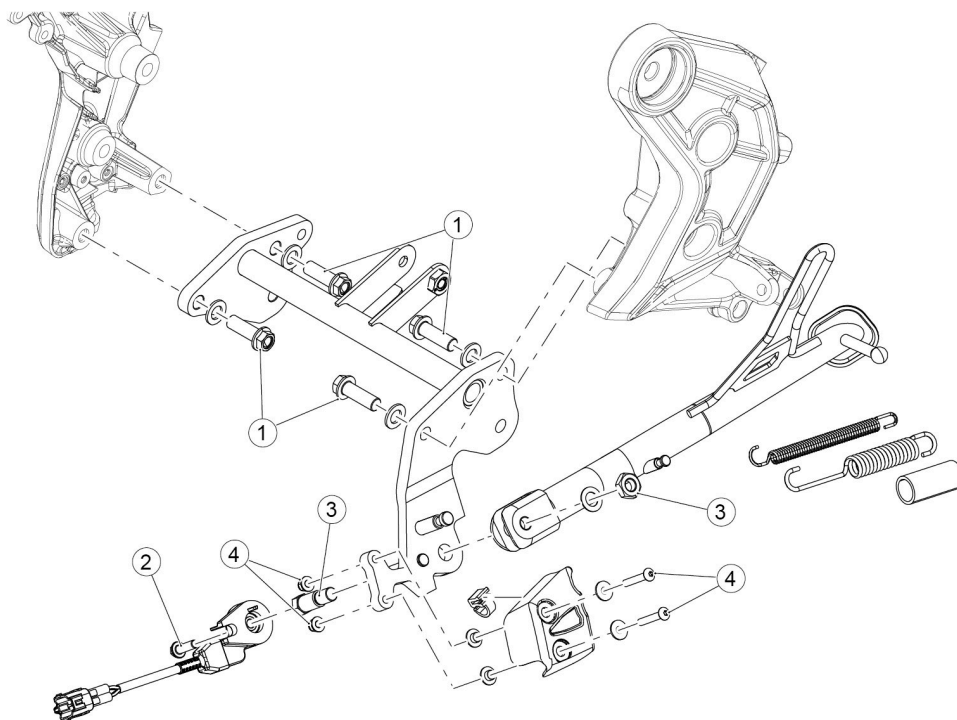
- Insert and tighten the fastening screws (2) to the prescribed torque



- Insert and tighten the fastening screws (3) to the prescribed torque
- Top up the oil following the instructions in the "Maintenance / Transmission oil / Replacement" chapter



10.6 Stand

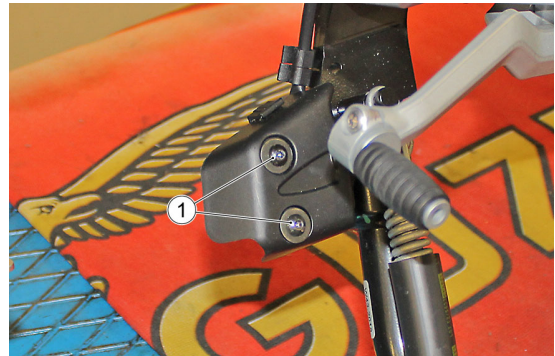


POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the stand mounting to the frame	M10	4	50 ± 7.5 Nm (36.88 ± 5.53 lb ft)	Loctite 243
2	Stand sensor fastening screw	M6	1	10 ± 2 Nm (7.38 ± 1.48 lb ft)	
3	Fixing of side stand to support	M10 x 1.25	4	30 ± 4.5 Nm (22.13 ± 3.32 lb ft)	-
4	Screws fixing the side stand protection to the support	M5	2	6 ± 1.2 Nm (4.43 ± 0.89 lb ft)	Flanged self-locking nuts

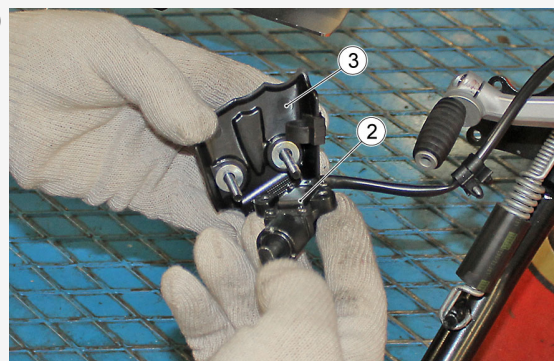
10.6.1 Side stand

REMOVAL

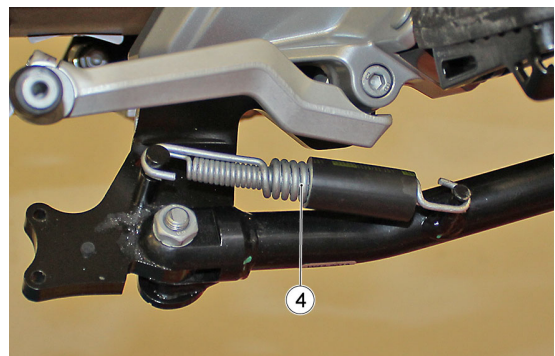
- Unscrew and remove the screws (1)



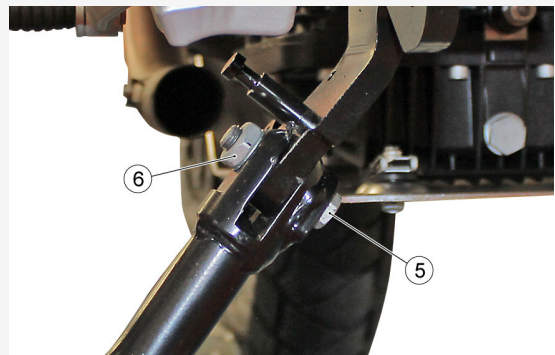
- Remove the sensor (2) and the cover (3) from the stand support



- Remove the spring (4)



- Holding the pin (5) in place, unscrew and remove the nut (6)



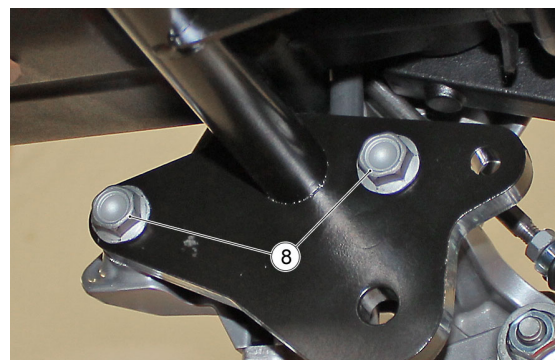
- Remove the side stand (7).



STAND SUPPORT REMOVAL

First remove the entire exhaust system.

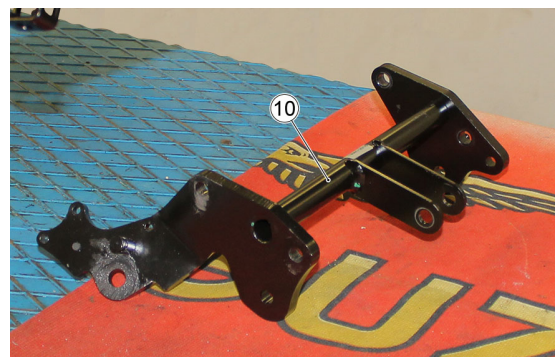
- Unscrew and remove the screws (8)



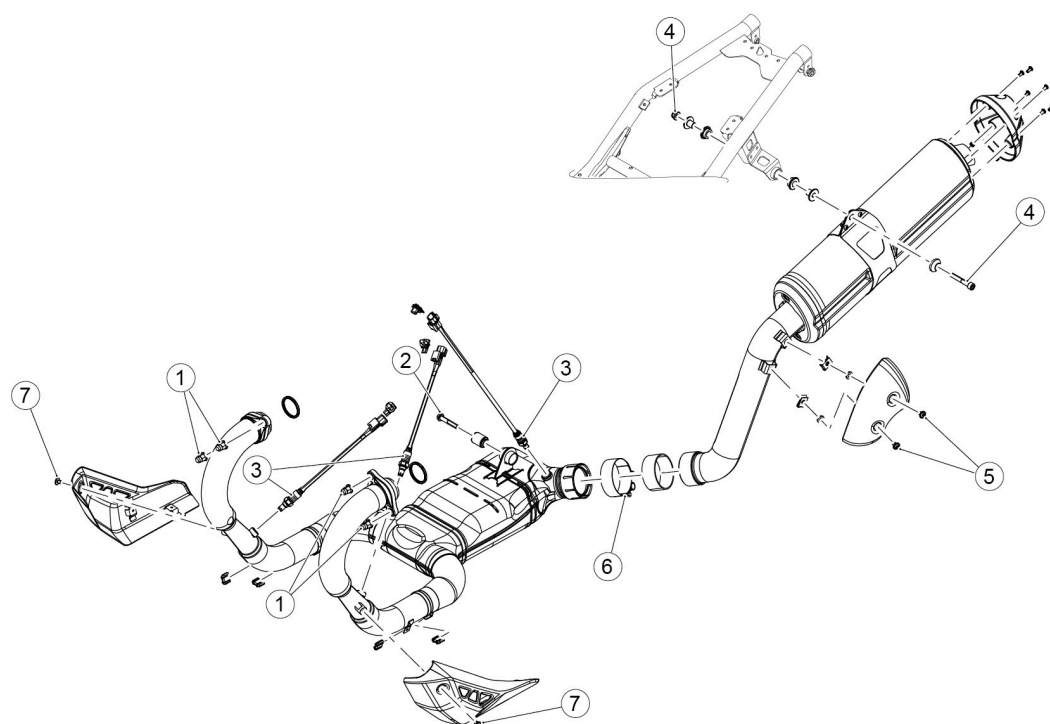
- Unscrew and remove the screws (9)



- Remove the stand support (10)



10.7 Exhaust



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Nut fixing exhaust manifolds to engine	M8	2 + 2	25 ± 5 Nm (18.44 ± 3.69 lbf ft)	-
2	Fastening the exhaust manifold to the stand mount	M8	1	25 ± 5 Nm (18.44 ± 3.69 lbf ft)	-
3	Lambda probes fastener	M12 x 1.25	3	25 ± 5 Nm (18.44 ± 3.69 lbf ft)	-
4	Muffler/frame fastening	M8	1	25 ± 5 Nm (18.44 ± 3.69 lbf ft)	-
5	Screws fastening the muffler heat-shield to the muffler	M6	2	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
6	Clamp fixing the muffler to the compensator	-	1	25 ± 5 Nm (18.44 ± 3.69 lbf ft)	Apply grease to thread

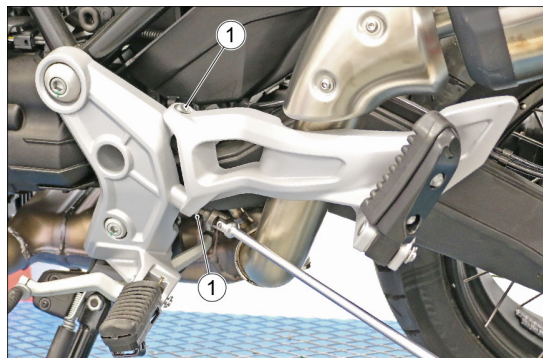
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
7	Heat shield fixing screw to manifold	M6	1 + 1	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-

10.7.1 Exhaust terminal removal

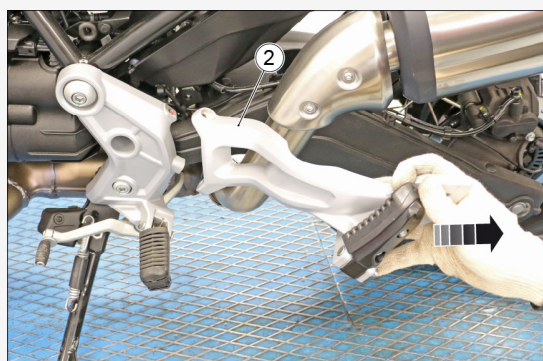
- Remove the two screws (1) that fasten the right passenger footpeg support.

During refitting, tighten the screws (1) to the prescribed torque:

DESCRIPTION	TORQUE
Screws for fastening the passenger's footrests supports to the frame support	25 ± 2.5 Nm (18.44 ± 1.84 lb ft)



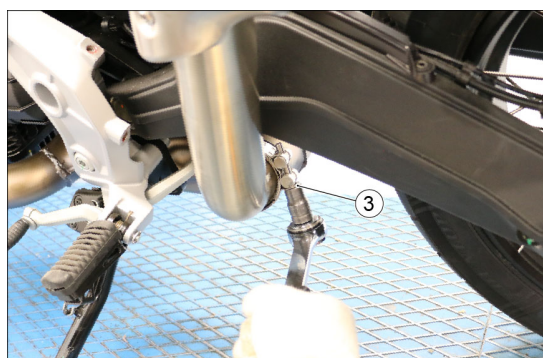
- Remove the right passenger footpeg support (2), complete with footpeg, from the vehicle.



- Loosen the clamp (3).

During refitting, tighten the clamp (3) to the prescribed torque:

DESCRIPTION	TORQUE
Muffler fixing clamp	25 ± 2.5 Nm (18.44 ± 1.84 lb ft)



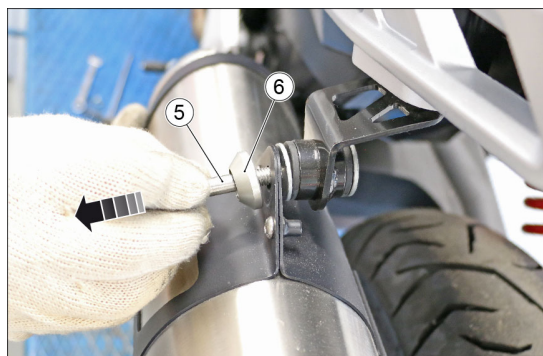
- Block the nut (4) so that it cannot rotate and unscrew the screw (5).

During refitting, tighten the screw (5) to the prescribed torque:

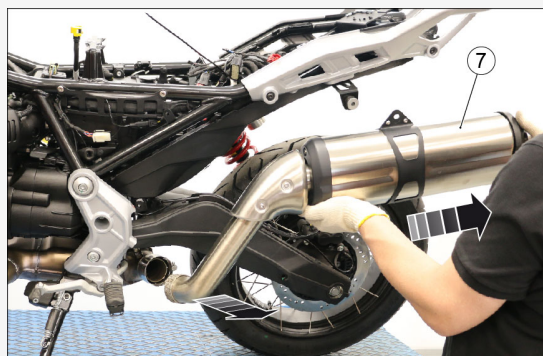
DESCRIPTION	TORQUE
Muffler/frame fastening screw	$25 \pm 2.5 \text{ Nm}$ ($18.44 \pm 1.84 \text{ lb ft}$)



- Remove the screw (5) and retrieve the bushing (6).

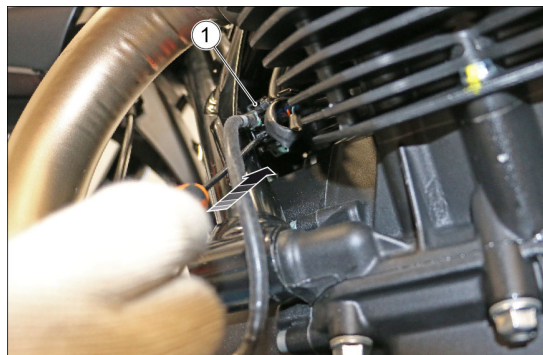


- Remove the terminal (7) from the catalytic converter, then remove it from the vehicle.

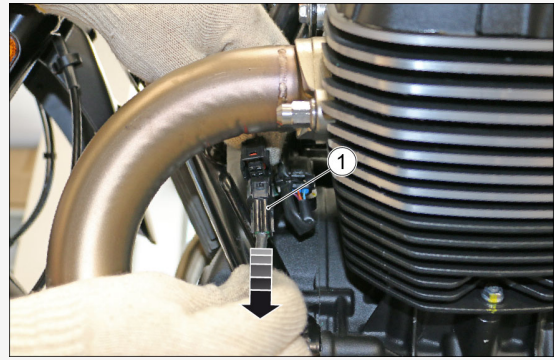


10.7.2 Removal of exhaust manifold

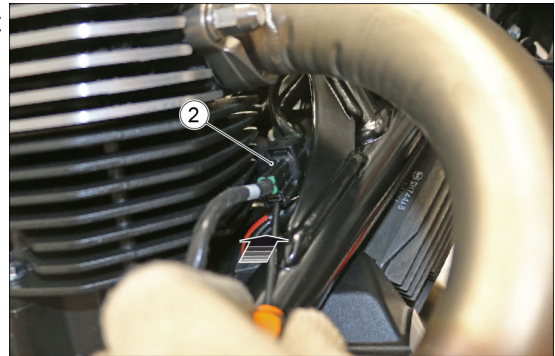
- First remove the sump guard (V 85 TT - V 85 TT Travel) and both heat shield guards.
- Disconnect the connector (1) of the left lambda probe from its support of the frame.



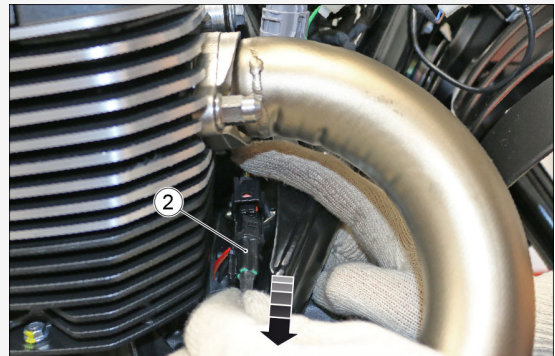
- Disconnect the connector (1).



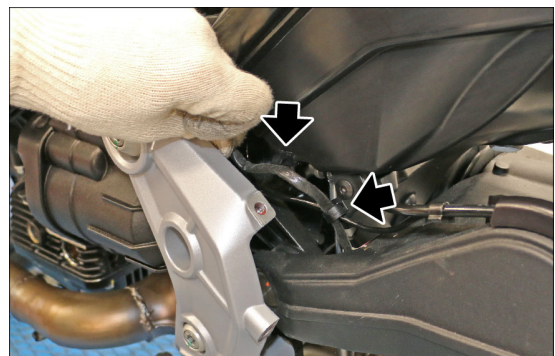
- Release the connector (2) of the right lambda probe from its support of the frame.



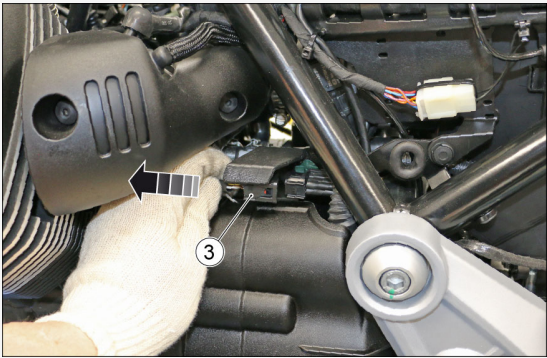
- Disconnect the connector (2).



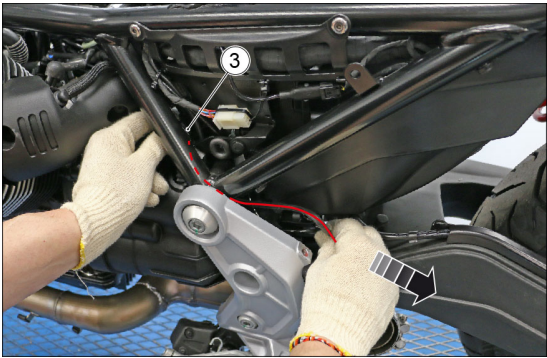
- Remove the rear lambda probe cable from its cable glands on the rear wheel arch.



- Disconnect the connector (3).



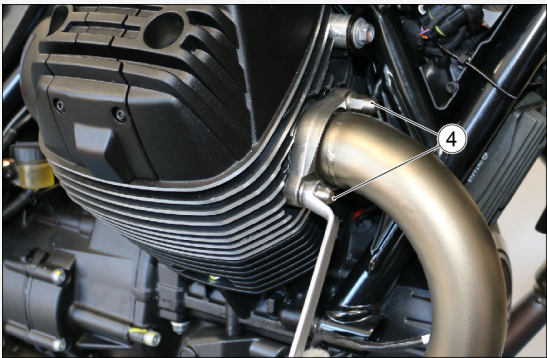
- Disconnect the connector (3) of the rear lambda probe from its support on the engine and remove the cable from the frame, as shown in the figure.



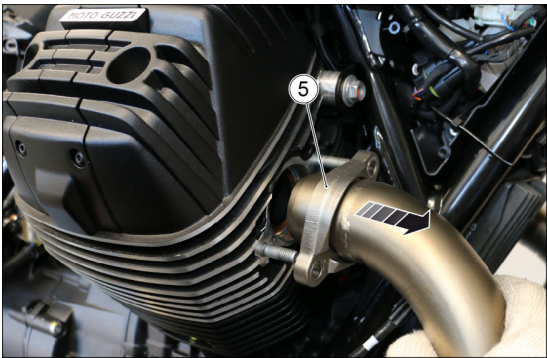
- Remove the two nuts (4) of the exhaust flange.
- Repeat the operation for the exhaust manifold on the opposite side

During refitting, tighten the nuts (4) to the prescribed torque:

DESCRIPTION	TORQUE
Exhaust manifold flange fixing nut	$25 \pm 2.5 \text{ Nm}$ $(18.44 \pm 1.84 \text{ lb ft})$

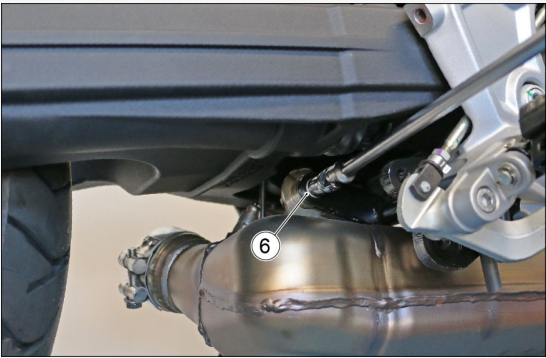


- Extract the flange (5) from the stud bolts and remove the exhaust manifold from the head.
- Repeat the operation for the exhaust manifold on the opposite side

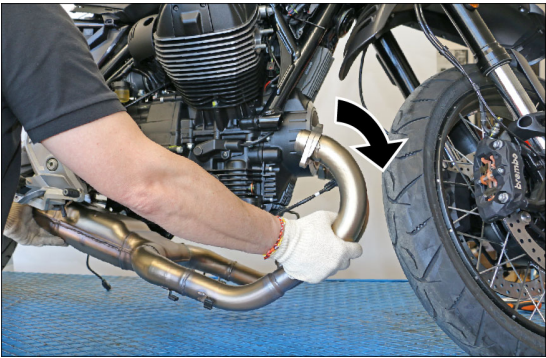


- Remove the lower fastener screw (6).
During refitting, tighten the screw (6) to the prescribed torque:

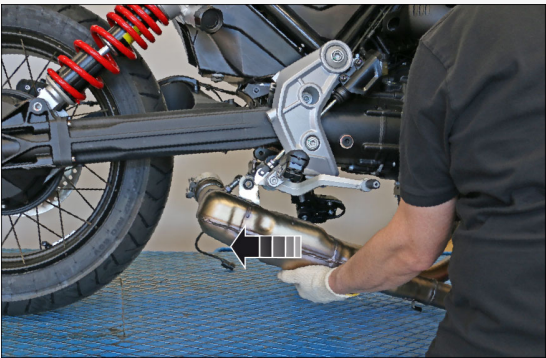
DESCRIPTION	TORQUE
Lower screw fastening the exhaust manifold	$25 \pm 2.5 \text{ Nm}$ ($18.44 \pm 1.84 \text{ lb ft}$)



- Lower the exhaust manifolds.



- Move the exhaust towards the rear of the vehicle to release it from the lower support, then remove the exhaust from the vehicle itself.

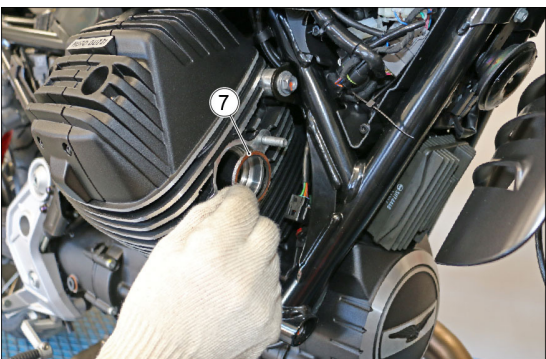


- Retrieve the copper gasket (7) from both heads.

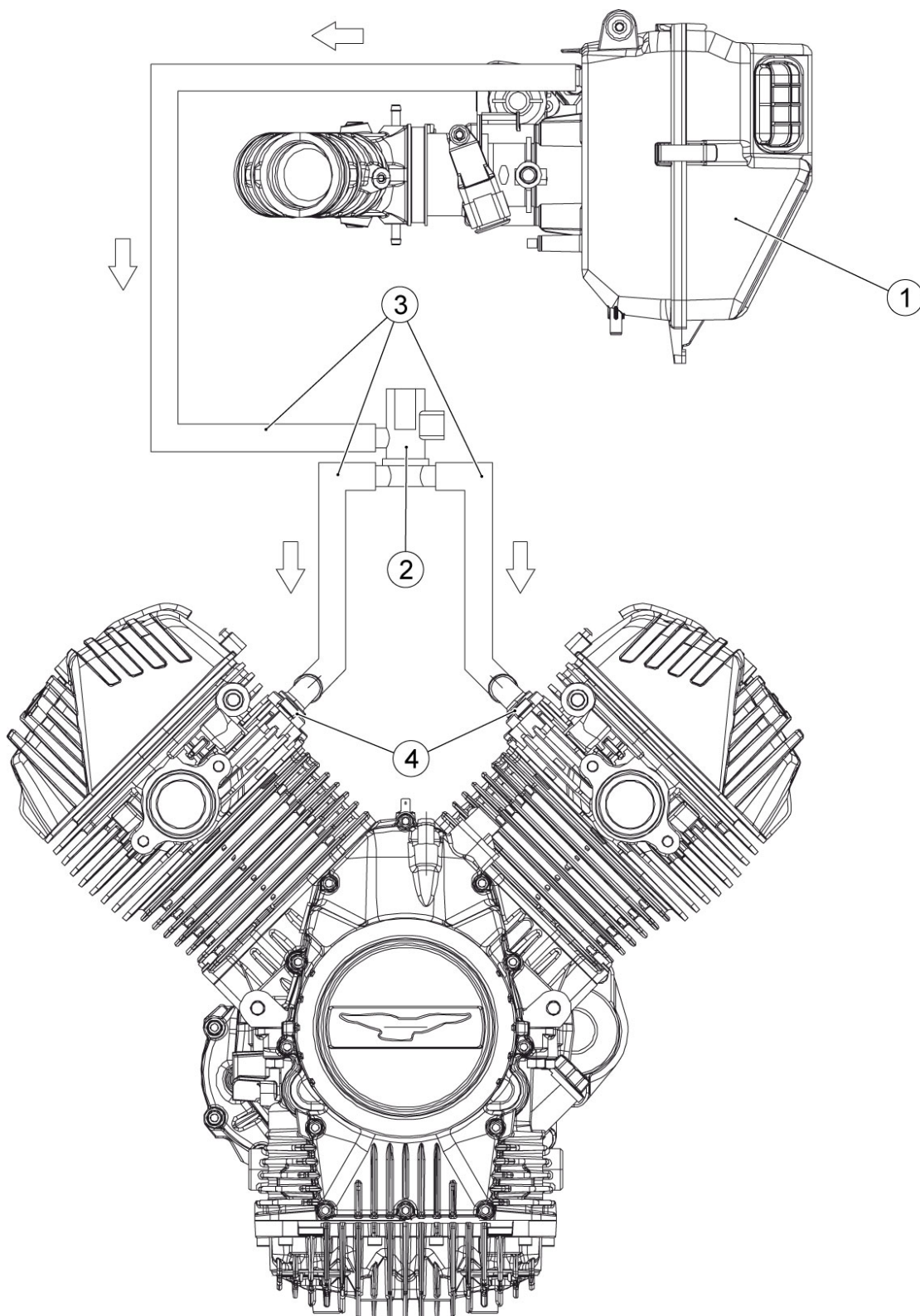
WARNING



DURING REFITTING, USE NEW COPPER GASKETS.

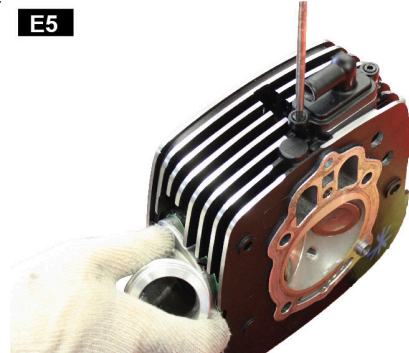


10.8 Secondary air system

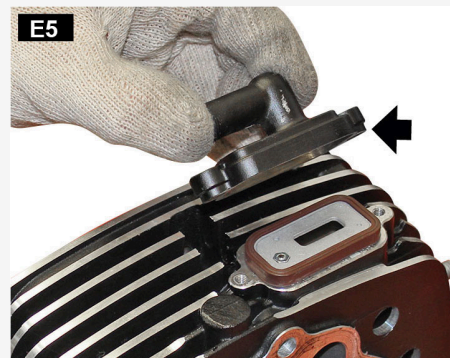


Key:

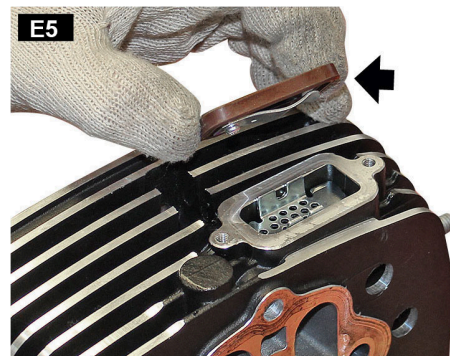
1. Air filter box
 2. Secondary air valve
 3. Secondary air system pipe
 4. Secondary air system inlets on the engine
 - Two auxiliary air inlets have been included in the cylinder head which, in combination with the injection system with lambda probes and three-way catalytic converter, ensure compliance with severe new Euro 5 Plus emissions regulations
-
- Undo the screws fastening the reed valve cover.



- Remove the reed valve cover



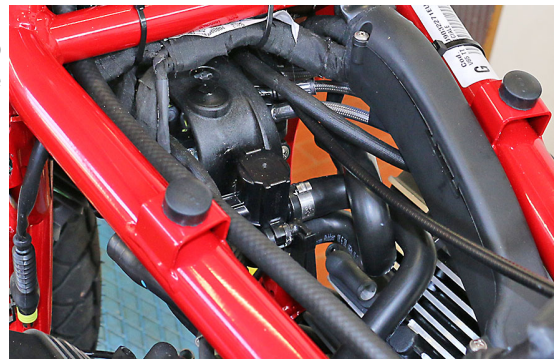
- Remove the reed valve.



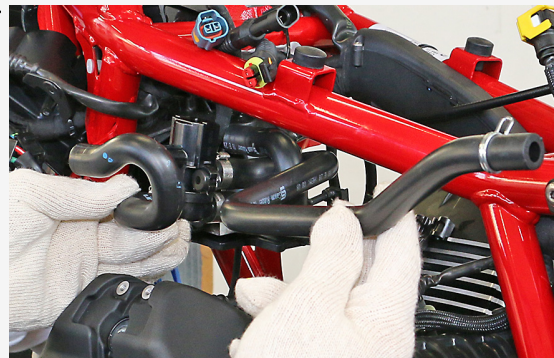
- Remove the flame trap.



- A valve controlled by the engine ECU is installed under the tank, which allows air to flow towards the cylinders via two flexible hoses.



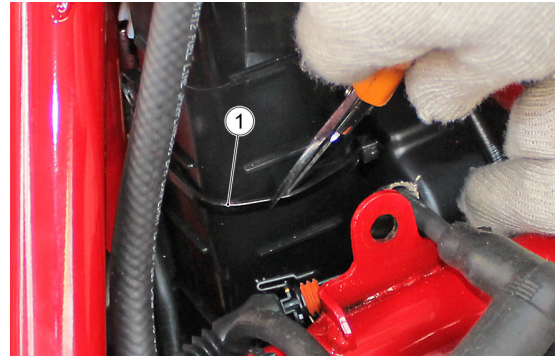
- This valve is connected directly to the filter box via a flexible hose.



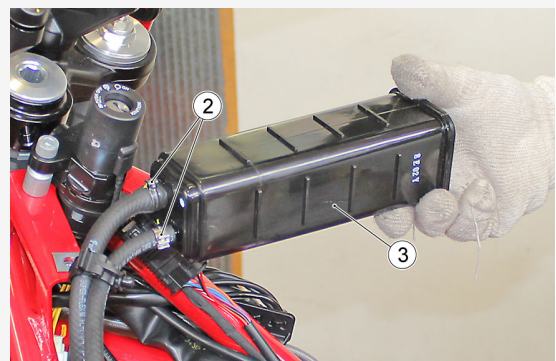
10.9 Evaporative emission control system

REMOVAL

- Remove the fuel tank
- Remove the coil
- Remove the clamp (1)



- Remove the clamps (2)
- Remove the canister filter (3)



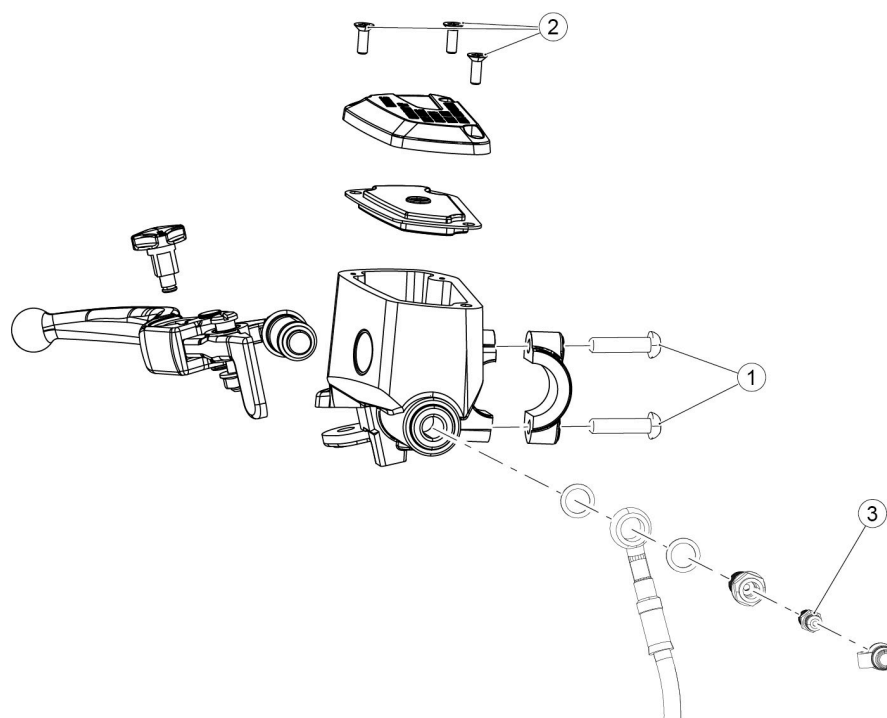
LIST OF TOPICS

Braking system

11.1 Braking system

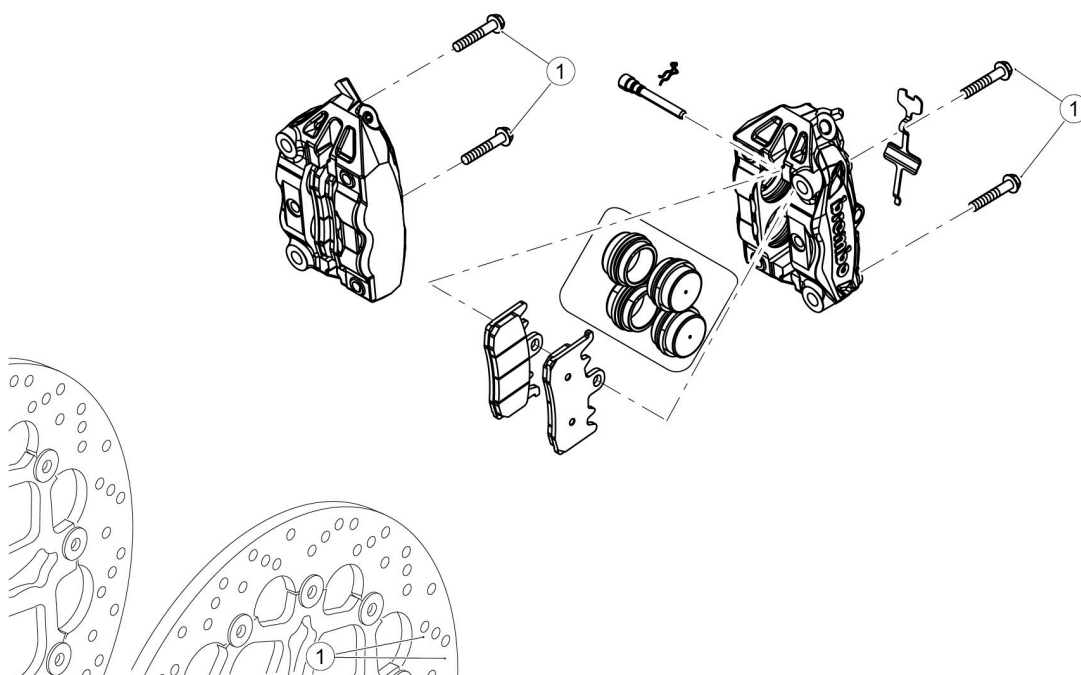
MSS V85TT E5plus

FRONT BRAKE MASTER CYLINDER



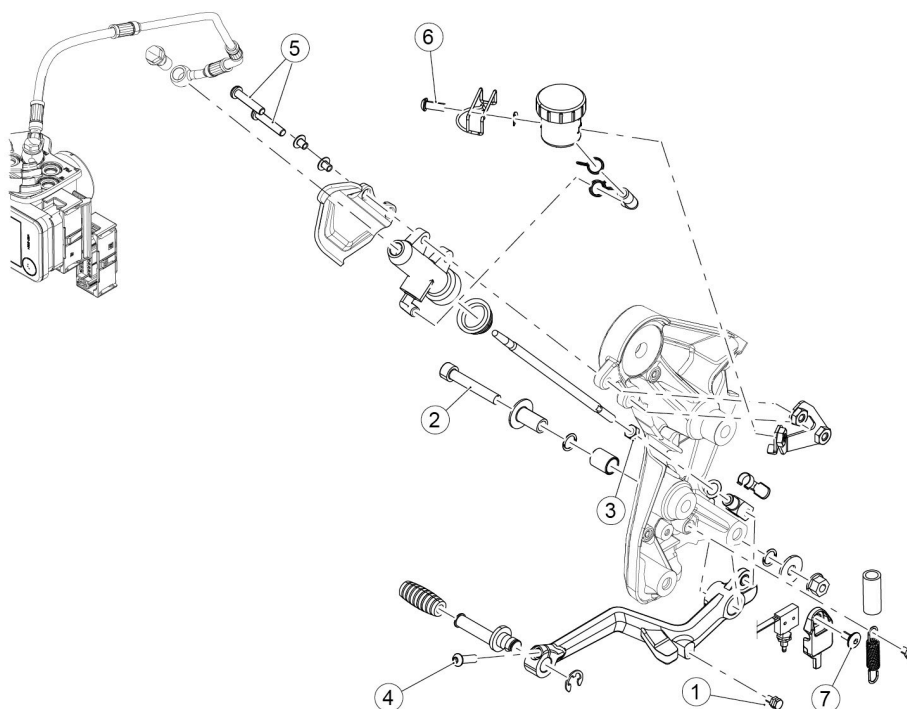
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the front brake master cylinder clamp to the handlebars	M6	2	10 ± 1,5 Nm (7.38 ±1.11 lbf ft)	Screws pre-assembled on the master cylinder
2	Brake pump cover fixing screws	-	3	0.8-1.5 Nm (0.59-1.11 lb ft)	Screws pre-assembled on the master cylinder
3	Bleeder screw	-	1	4-7 Nm (2.95-5.16 lb ft)	-
-	Fastening screw of the brake pipe to the lower steering plate	M6	1	10 ± 2 Nm (7.38 ± 0.87 lbf ft)	-

FRONT BRAKE CALLIPER



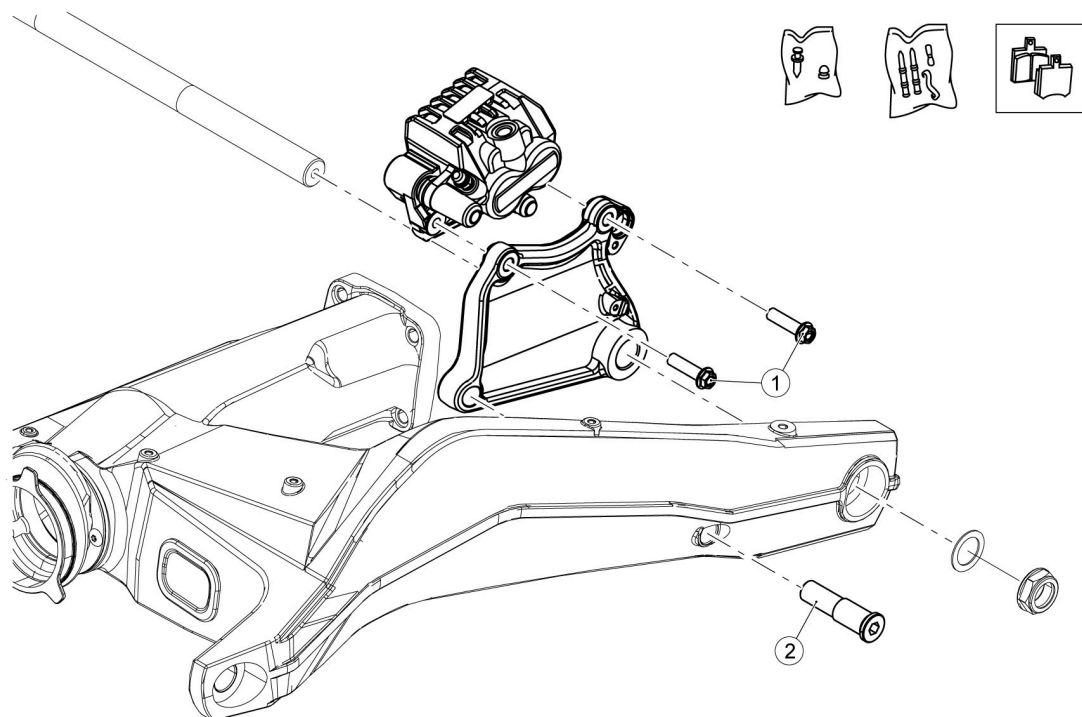
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the front brake calliper to the calliper mounted bracket	M10	4	50 ± 5 Nm (36.88 ± 3.69 lbf ft)	-

REAR BRAKE MASTER CYLINDER



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Pin fastening the rear brake lever spring coupling to the frame plate	-	1	6 Nm ± 1.2 (4.43 ± 0.89 lbf ft)	-
2	Screw fastening the rear brake lever to the frame plate	M8	1	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)	-
3	Nut fastening the rear master cylinder rod to the lever	M6	1	-	-
4	Peg fixing screw	M6	1	10 ± 1,5 Nm (7.38 ± 1.11 lbf ft)	-
5	Screws fastening the rear master cylinder and oil reservoir support to the frame plate	M6	2	10 ± 1,5 Nm (7.38 ± 1.11 lbf ft)	-

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
6	Screws fastening the oil reservoir and cap retainer to the oil reservoir support bracket	M6	1	6 Nm $\pm$ 1,2 (4.43 $\pm$ 0.89 lbf ft)	-
7	Screw fastening the rear stop switch to the right frame plate	M5	1	6 Nm $\pm$ 1.2 (4.43 $\pm$ 0.89 lbf ft)	-
-	Pin fastening the rear brake lever spring coupling to the complete rear brake lever	-	1	6 Nm $\pm$ 1.2 (4.43 $\pm$ 0.89 lbf ft)	-

REAR BRAKE CALLIPER

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the rear brake calliper to the calliper support bracket	M8	2	25 $\pm$ 2.5 Nm (18.44 $\pm$ 1.84 lbf ft)	-

POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
2	Rear calliper mount retaining pin	M16x1	1	35 ± 5,25 Nm (25.81 ± 3.87 lbf ft)	Apply grease to the smooth surface and on the thread

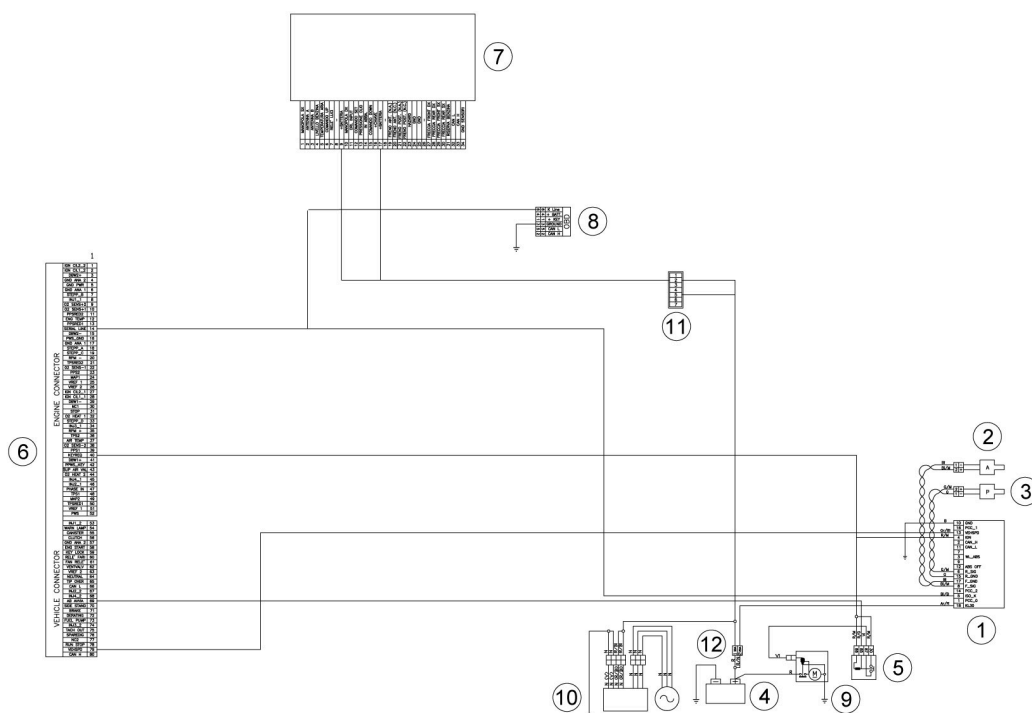
11.2 Maintenance operations instructions

N.B



THE FRONT BRAKE DISC SHAPE DOES NOT CHANGE THE OPERATING AND MAINTENANCE SPECIFICATIONS OF THE SYSTEM.

11.3 ABS

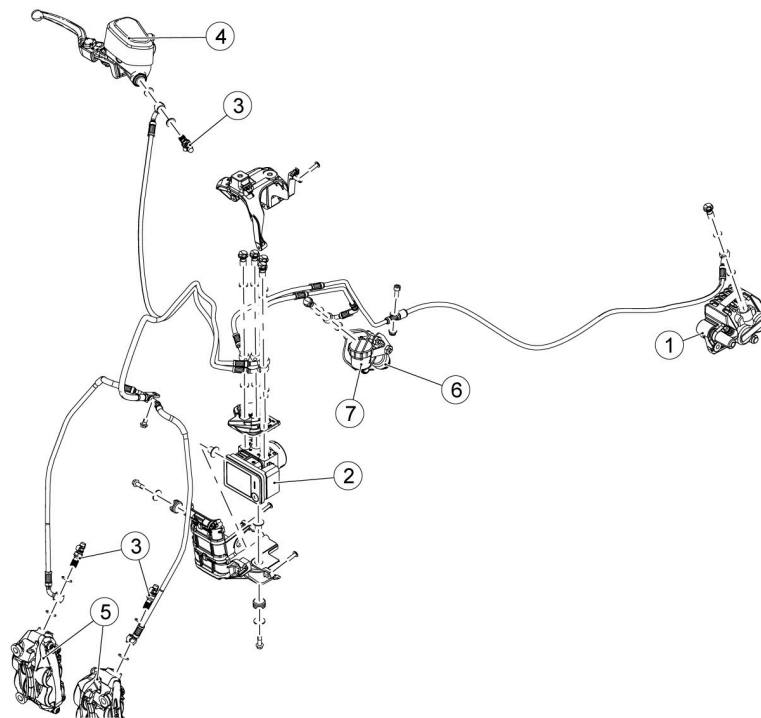


Key:

- 1 . ABS Electronic Control Unit
- 2 . Front ABS sensor
- 3 . Rear ABS sensor
- 4 . Battery
- 5 . Starter relay
- 6 . ECU
- 7 . Instrument cluster

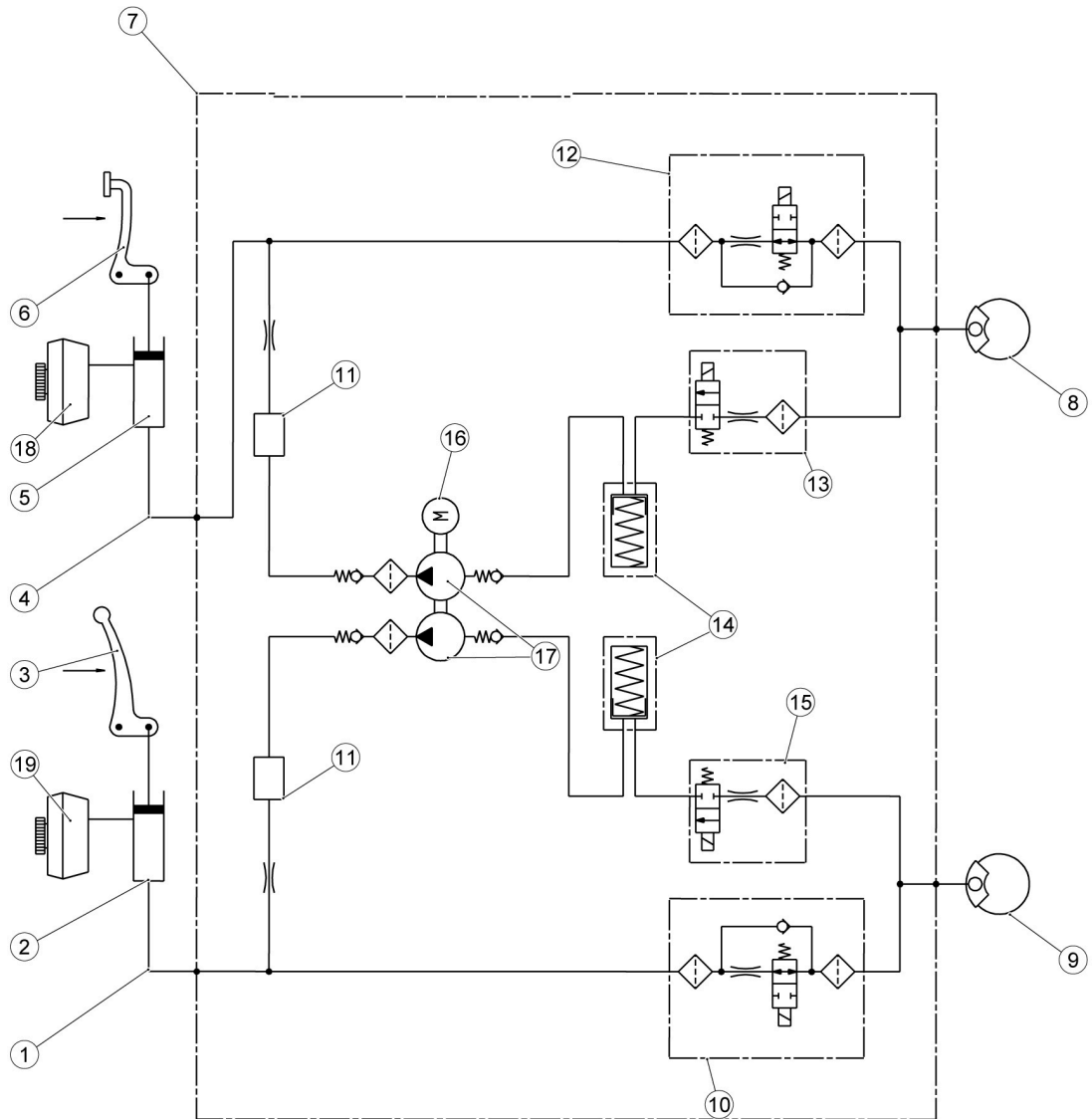
- 8 . Line (diagnostics)
- 9 . Starter motor
- 10 . Voltage regulator
- 11 . Secondary fuses
- 12 . Main fuses

11.3.1 Foreword

**Key:**

- 1 . Rear brake calliper
- 2 . Modulator
- 3 . Front bleed valve
- 4 . Front brake reservoir
- 5 . Front brake callipers
- 6 . Rear brake master cylinder
- 7 . Rear brake reservoir

11.3.2 Functional diagram



ABS functional diagram key

1. Front system circuit
2. Front brake master cylinder
3. Front brake control lever
4. Rear system circuit

- 5 . Rear brake master cylinder
- 6 . Rear brake pedal
- 7 . ABS control unit
- 8 . Rear brake calliper
- 9 . Front calliper (2 callipers)
- 10 . Front brake circuit inlet solenoid valve (normally open)
- 11 . Humidifier
- 12 . Rear brake circuit inlet solenoid valve (normally open)
- 13 . Rear brake circuit outlet solenoid valve (normally closed)
- 14 . Front / rear brake circuit low pressure accumulator
- 15 . Front brake circuit outlet solenoid valve (normally closed)
- 16 . DC electric motor
- 17 . Dual hydraulic circuit pump (ABS)
- 18 . Rear brake reservoir
- 19 . Front brake reservoir

ABS OPERATION

General specifications:

The front circuit is the same as the rear one.

- The ABS inlet valve (10 - 12) is normally open and it is closed only when the system intervenes to avoid wheel locking.
- The exhaust valve (13 - 15) is normally closed and it is opened only when the system intervenes to avoid wheel locking.
- With the system in stand-by mode, the ABS processor controls the wheel speed instant by instant to assess any slippage of the wheels.
- When in standby, the system does not intervene at all when the rider brakes; the braking system is the same as the one without ABS.

ABS Cycle phases (the following operations refer to the front circuit but they are also valid for the rear):

A - Start braking: the rider starts braking as he would usually do.

B - Pressure reduction: coincides with the recognition of the dangerous situation (wheel slippage exceeds the threshold): the system closes the inlet valve (10-12) and opens the exhaust valve (13-15) temporarily.

At this stage the rider cannot increase the pressure on the callipers (8-9) and the system reduces the pressure on the callipers partially. The excess fluid temporarily fills the front reservoir (18-19) until the ABS pump (17) self-activates and delivers the fluid back to the brake pump (2-5).

C - Maintaining pressure: the pressure in the callipers (8-9) remains low until total recovery of speed / wheel grip.

The system restores the fluid taken from the calliper (8-9) in the section of the system between the brake pump (2-5) and the ABS inlet valve (10-12).

D - Pressure restoration: by opening the inlet valve (10-12) momentarily, the pressure of the callipers (8-9) is increased until maximum deceleration is reached. Then, the system gives the control over the braking back to the rider.

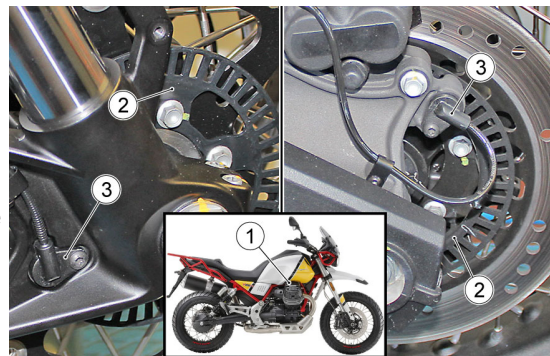
E - If the wheel does not reach complete grip, the system continues operating as before until complete grip is obtained or until the vehicle stops. An error may be generated, however, if the pressure reduction stage persists for longer than a predetermined limit.

ABS SYSTEM DESCRIPTION

The ABS system is a device that prevents wheel locking in case of an emergency braking, thus increasing vehicle stability when braking, compared with a conventional braking system.

Sometimes when the brake is operated, the tyre locks with a consequent loss of grip, which makes it difficult to control the vehicle. A position sensor (3) on the tone wheel (2), forming an integral unit with the vehicle wheel, "reads" the status of the vehicle wheel spotting any possible lock.

A control unit (1) signals this out and adjusts the pressure in the braking circuit accordingly.



N.B



WHEN THE ABS STARTS WORKING, A PULSING IS FELT ON THE BRAKE LEVER.

ATTENTION



THE ANTI-WHEEL LOCK SYSTEM DOES NOT PREVENT FALLS ON A BEND WHEN LEVEL "1" IS USED.

AN EMERGENCY BRAKING WITH THE VEHICLE INCLINED, HANDLEBAR TURNED, ON UNEVEN OR SLIPPERY ROADS, OR WITH POOR GRIP, CREATES A LACK OF STABILITY DIFFICULT TO HANDLE. RIDE CAREFULLY AND SENSIBLY AND ALWAYS BRAKE GRADUALLY.

DO NOT SPEED RECKLESSLY. THE VEHICLE GRIP ON THE ROAD IS SUBJECT TO LAWS OF PHYSICS WHICH NOT EVEN THE ABS SYSTEM CAN ELIMINATE.

When the sensors (3) detect a significant speed difference between the rear and the front wheels (for example, when rearing up on the back wheel), the ABS system could take this as a dangerous situation.

In this case, there are two possible results:

- The ABS system intervenes by releasing pressure from the calliper until the wheel turns again at the same speed of the other wheel. Braking is not possible for an instant.
- if the speed difference lasts long, the system may detect an error and deactivates the ABS system. As a consequence, the system works as any regular braking system.

Setting intervention level of the ABS system

- The ABS system can be set on three levels: 2) The ABS system is active on both wheels; 1) The ABS system is active only on the front wheel; OFF) the ABS system is deactivated on both wheels.
- The system can be set to OFF only when the vehicle is in the **"OFF ROAD"** mode. If the riding mode is changed, ABS reactivates.
- From the main display screen, long press the 'MODE RIGHT' button to access the LAUNCHER MENU. Once in the menu, navigate to the 'Riding Mode' item using the 'MODE UP' or 'MODE DOWN' buttons, then briefly press the 'MODE RIGHT' button to access the page.
- To return to the "MENU", briefly press the MODE selector in the middle on "Exit"



ATTENTION



DISABLING IS POSSIBLE ONLY WHEN THE VEHICLE IS IN "OFF ROAD" MODE.

IF THE RIDING MODE IS CHANGED, ABS REACTIVATES.

IF DISABLED, THE ABS INDICATOR LIGHT STAYS ON STEADY.

- Once entered the page, the setting screen for the various Riding modes will be displayed.
- Using the "MODE UP" or "MODE DOWN" buttons, the desired parameter may be selected and by briefly pressing the "MODE RIGHT" button, the intervention value can be increased.
- Once the maximum level is reached, the setting will restart from the minimum intervention value. After setting the parameters as desired, press "MODE SET" briefly to exit the screen. Press and hold "MODE SET" to restore the factory settings (RESET).

	CUSTOM	SPORT	STRADA	PIOGGIA	OFF-ROAD
MGCM	1	1	1	2	1
MGCT	2	2	OFF	3	1
ABS	2	1	2	1	OFF
MODIFY ► MOVE ◄ RESET ■ EXIT □					

ATTENTION



ABS LEVELS 0 (OFF) AND 1 MUST BE USED BY EXPERIENCED USERS, STRICTLY ON UNPAVED ROADS.

ATTENTION



BEFORE RIDING OFF, CHECK THE ABS LEVEL OF CONTROL SELECTED. IF THE ABS HAS BEEN DEACTIVATED, SWITCHING OFF THE VEHICLE DOES NOT REACTIVATE IT, THE NEXT TIME THE KEY IS TURNED ON, THE SYSTEM WILL STILL BE DEACTIVATED.

- Upon starting the vehicle, after the initial instrument panel check, the ABS warning light flashes until a speed of 5 kph (3.11 mph) is exceeded and then it switches off or continues to flash even after exceeding the speed of 5 kph (3.11 mph).
- If the ABS warning light continues flashing or is permanently on, a failure has been detected and the ABS has been automatically deactivated.



FUNCTION	DESCRIPTION / VALUE
Distance between tone wheel and front sensor	0.1 - 3.17 mm (0.004 - 0.125 in)
Distance between tone wheel and the rear sensor	0.1 - 3.10 mm (0.004 - 0.122 in)

11.3.3 Diagnosis guide

FOREWORD

Each time the key is set to ON, if at least one current or stored error is detected*, the ABS warning light turns on permanently.

The ABS system is automatically deactivated

However, the system is perfectly operative as any other braking system without ABS

*** Diagnosis is possible when exceeding 5 km/h (3.1 mph).**



Each time the key is set to ON, if at least one current or stored error is not detected immediately in the system:

- the ABS warning light flashes.

Once the vehicle speed exceeds 5 km/h (3.1 mph):

- if errors are not detected: the ABS warning light turns off
- if at least one malfunction is detected: the ABS warning light turns on permanently.

The ABS system is disabled!

However, the system is perfectly operative as any other braking system without ABS.

The detection of malfunctions may require more or less time depending on the type of fault.

Error detection logic foresees that for the errors to be diagnosed one or more conditions must persist within a given time.

If during that time, one of the conditions is no longer present and reappears afterwards, the timer is reset and the system is not able to diagnose the error.

The ABS system continues to be inactive.

GUIDE TO ABS FAULT DIAGNOSIS

1. ABS LAMP ON
2. CONNECT THE DIAGNOSTIC TOOL

DIAGNOSTIC TOOL COMMUNICATES? (NO, go to point 3; YES, go to point 4)

3. PERFORM THESE CHECKS:

- **A. PIN 1 Ground**
- **B. +12V at PIN 18**

4. **ARE THERE ANY ERRORS? YES, go to point 5; NO, go to point 6)**

5. CHECK THE ERRORS TABLE

6. ABS WARNING LIGHT ACTIVATION

IT ACTIVATES?(Yes, point 7; NO, go to point 8)

7. CONTACT TECHNICAL SERVICE

8. PERFORM THESE CHECKS:

- **A. Cable continuity between PIN 8 of the ABS control unit connector and PIN 40 of the instrument cluster.**
- **B. Check connectors - refer to the operations described in the chapter**

If the above checks are OK, the causes can be:

- **C. ABS control unit malfunction**
- **D. Instrument panel malfunction**

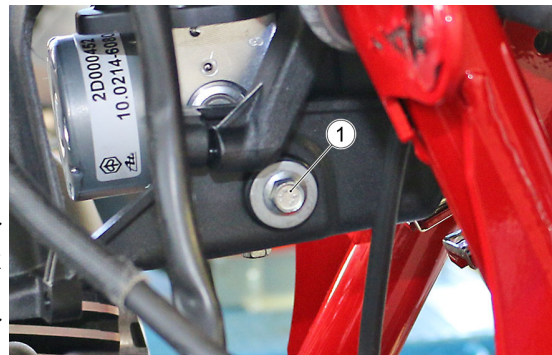
11.3.4 Modulator

REMOVAL

- Remove the engine from the vehicle

PREPARATION OF THE VEHICLE

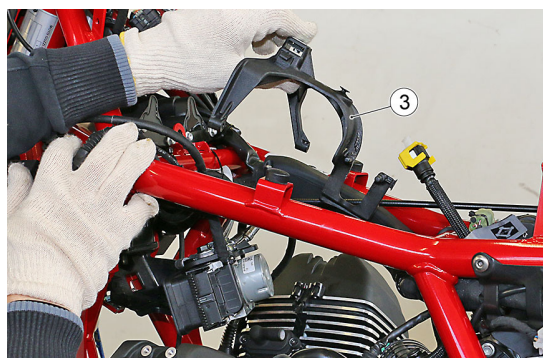
- Connect the bleeder bottles to the front and rear calliper bleeder screws and open them.
- Press the front brake lever and the rear brake pedal as far as they will go and block them in position using the clamping devices. Close the front and rear calliper bleeder screws and remove the bleeder bottle
- Mark a reference on the pipes and on the ABS control unit to avoid inverting them when refitting
- Undo and remove the screw (1)



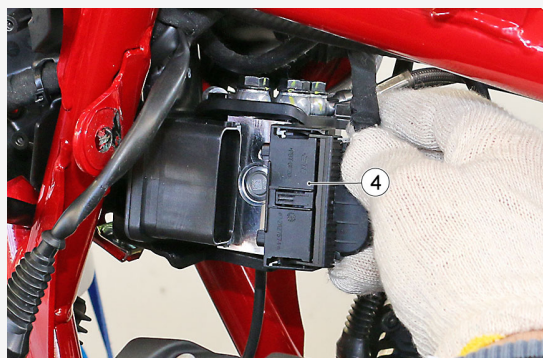
- Undo and remove the screw (2)



- Remove the support bracket (3)



- Disconnect the connector (4)

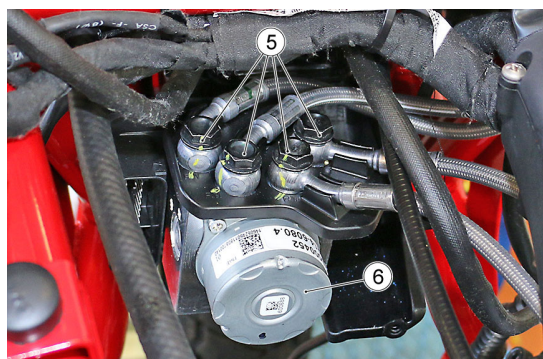


- Unscrew and remove the screws (5)
- Remove the ABS control unit (6)

N.B



FIRST OF ALL, DISCONNECT THE LINES BETWEEN THE ABS CONTROL UNIT AND THE BRAKE MASTER CYLINDERS AND SEAL THE OPEN COUPLINGS ON THE ABS CONTROL UNIT IMMEDIATELY USING PROTECTIVE PLUGS.



NEXT, REMOVE THE LINES BETWEEN THE ABS CONTROL UNIT AND THE BRAKE CALLIPERS AND SEAL THESE COUPLINGS USING PROTECTIVE PLUGS TOO.

INSTALLATION

- Remove the ABS modulator
 - Install the new completely pre-filled ABS control unit
 - In order to ensure that the brake fluid remains inside the ABS control unit, first remove the protective plugs from the braking circuit couplings and connect the corresponding lines.
 - Once all the braking circuit lines have been connected, remove the protective plugs from the couplings of the brake master cylinders and connect the respective lines to the ABS control unit.
 - Remove the clamp from the front brake lever and the rear brake pedal
 - Remove the caps from the reservoirs and fill them with new brake fluid
-

WARNING

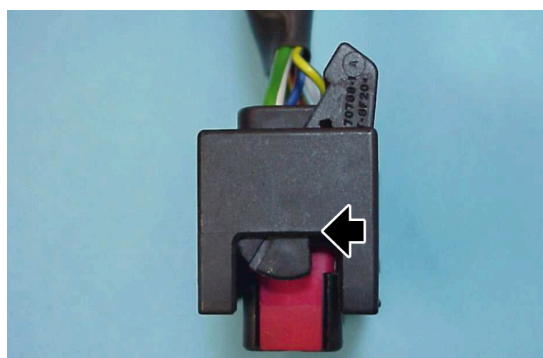


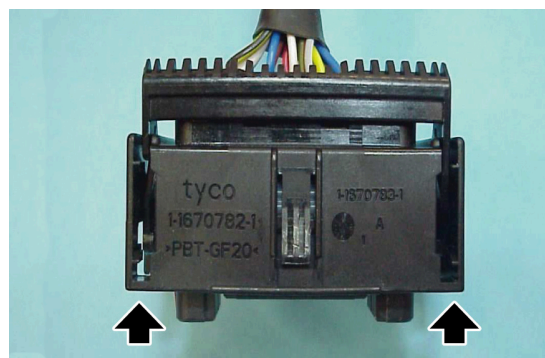
PERFORM THE STANDARD BRAKING SYSTEM BLEEDING PROCEDURE, AS DESCRIBED AT THE END OF THE CHAPTER.

- Fill the reservoirs and refit the caps
 - Check the stroke and sensitivity of the front brake lever and the rear brake pedal
 - If the brake pedal or lever stroke is too long after carrying out the bleeding procedure, check the braking system for leaks and, if none are found, bleed the system using the diagnostic tool, as described.
 - Disconnect the flexible bleeder pipes and re-tighten the bleeder screws, applying the correct torque
-

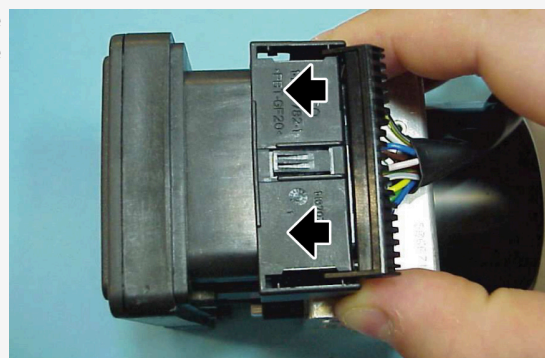
ABS CONTROL UNIT CONNECTOR INSERTION PROCEDURE

- Check the initial position of the connection clip lever.



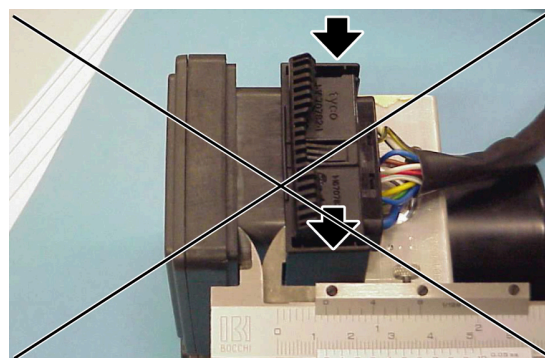
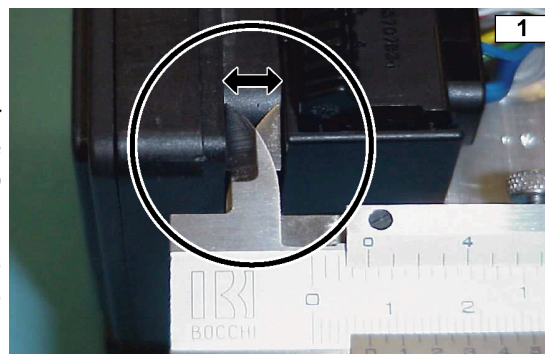


- When the connector is fully inserted, the distance between the connector and the ABS control unit must be 7.5 mm (0.29 in).



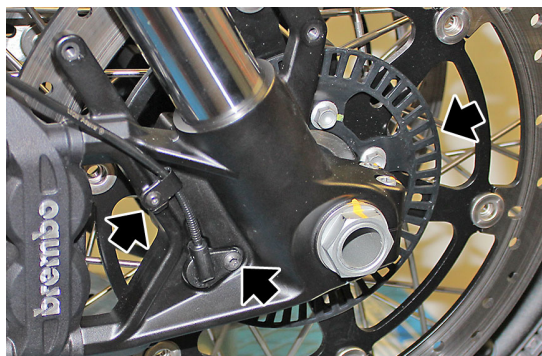
- If the initial position of the connector and the driving lever is not that shown in fig. 1, the connector will not be properly coupled and the distance measured will be greater (12 mm approx. (0.47 in)). In this case repeat the operation as described in the two previous points.

WE RECOMMEND CREATING A TEMPLATE IN ORDER TO ENSURE THAT THE CONNECTOR IS INSERTED CORRECTLY.



11.3.5 Component maintenance

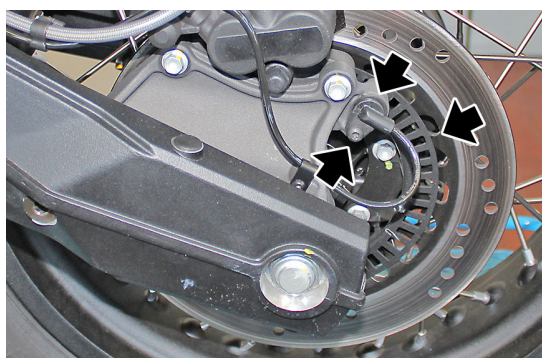
- The vehicle is equipped with two-channel ABS. In other words, it works on both the front and rear wheel. Periodically and each time the wheels are remounted, the phonic wheel or the sensor is replaced, it is important to check that the distance is consistent over all 360°. To do this, use a feeler gauge and check the distance between the sensor and the phonic wheel on three points at a distance of 120°.



WARNING



IF THE READINGS SHOULD RETURN A VALUE OUTSIDE OF THE FIELD OF TOLERANCE, REPLACE THE SENSOR AND/OR THE PHONIC WHEEL AND REPEAT THE CHECK IN ORDER TO ENSURE THAT THE VALUES FALL WITHIN THE FIELD OF TOLERANCE.



FUNCTION	DESCRIPTION / VALUE
Distance between tone wheel and front sensor	0.1 - 3.17 mm (0.004 - 0.125 in)
Distance between tone wheel and the rear sensor	0.1 - 3.10 mm (0.004 - 0.122 in)

CLEANING THE PHONIC WHEELS

- It is important to check that both phonic wheels are always clean. If not: delicately remove any dirt residues using a cloth or wire brush. Do not use solvents or abrasive substances and do not direct air or water jets directly on the phonic wheel.

REPLACING THE PHONIC WHEEL SENSOR

- Disconnect the front phonic wheel sensor connector from the main wiring harness. Unscrew and remove the screws and remove the phonic wheel sensor

WARNING



BEFORE REFITTING, ENSURE THAT THE CONTACT SURFACES BETWEEN THE SENSOR AND THEIR SEATS ARE FREE OF IMPERFECTIONS AND PERFECTLY CLEAN. ALWAYS CHECK THE DISTANCE BETWEEN THE SENSOR AND THE PHONIC WHEEL.

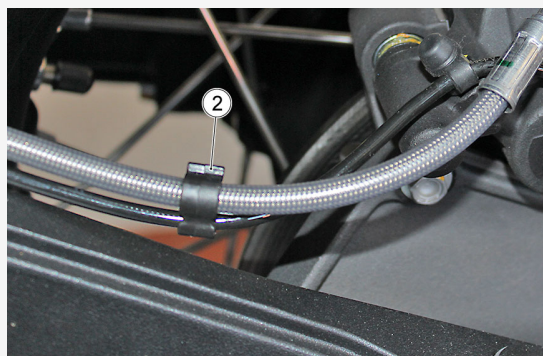
11.4 Rear brake calliper

11.4.1 Removal

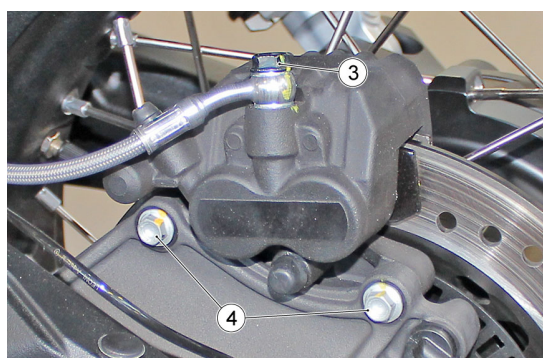
- Connect the bleeder bottles to the calliper bleeder screw and open
- Press the lever down as far as it will go and block it in position using a clamping device in order to prevent the liquid from escaping from the system when it is open.
- Close the calliper bleeder screw and remove the bleeder bottle.
- Loosen the two grub screws (1)



- Free the brake calliper line from the cable grommet (2)



- Unscrew and remove the joint screw (3) from the rear calliper
- Unscrew and remove the screws (4)



- Remove the rear calliper (5)

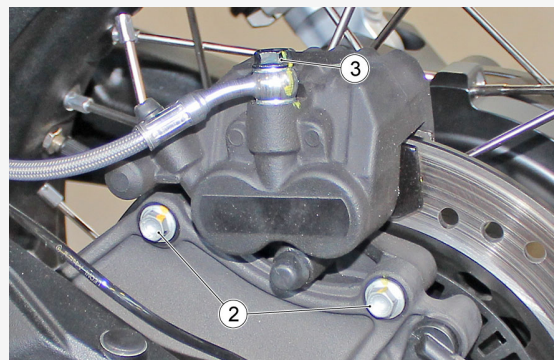


11.4.2 Installation

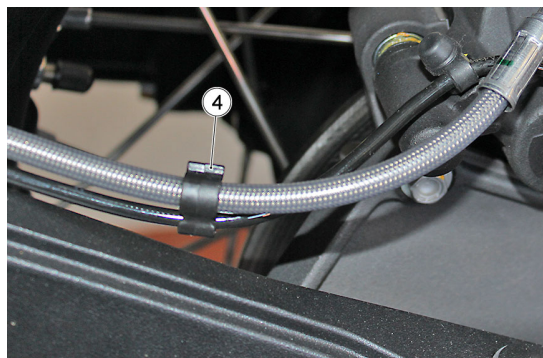
- Remove the rear brake calliper
- Correctly position the new rear brake calliper (1) on the brake disc



- Insert and tighten the screws (2)
- Position the brake line, insert and tighten the screw (3)



- Hook the brake line into the cable grommet (4)



- Insert and tighten the two grub screws (5)



- Remove the clamp from the brake pedal.
- Remove the brake fluid reservoir cap and fill it with new brake fluid

WARNING



PERFORM THE STANDARD BRAKING SYSTEM BLEEDING PROCEDURE, AS DESCRIBED AT THE END OF THE CHAPTER.

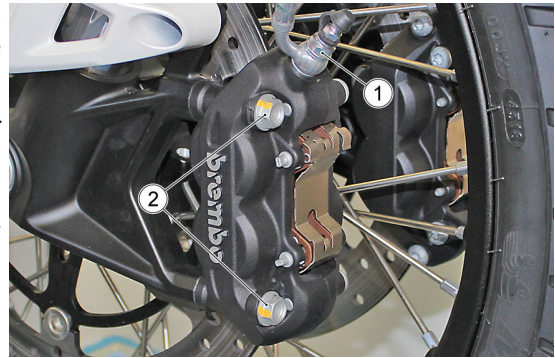
- Top up the oil tank and refit the cap.
- Check the stroke and sensitivity of the brake pedal.
- If, after bleeding, the pedal travel is too long, check the brake system for leaks and, if all is well, bleed using the diagnostic tool as described.
- Disconnect the flexible bleeder pipes and re-tighten the bleeder screws, applying the correct torque.

11.5 Front brake calliper

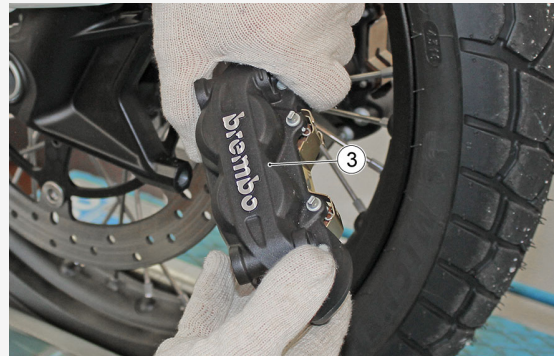
11.5.1 Removal

The following procedure is described for a single calliper, but is valid for both front brake callipers.

- Connect the bleeder bottles to the calliper bleeder screw and open
- Press the lever down as far as it will go and block it in position using a clamping device in order to prevent the liquid from escaping from the system when it is open.
- Close the calliper bleeder screw and remove the bleeder bottle.
- Unscrew and remove the joint screw (1) from the front calliper
- Unscrew and remove the two screws (2)

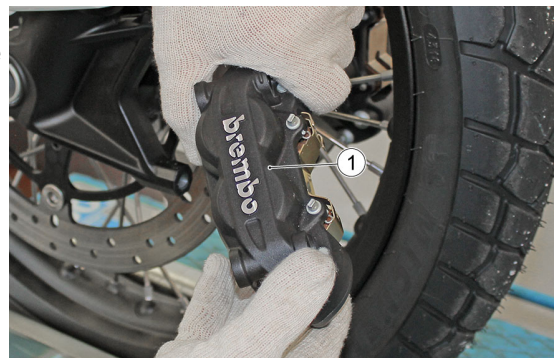


- Remove the front brake calliper (3)

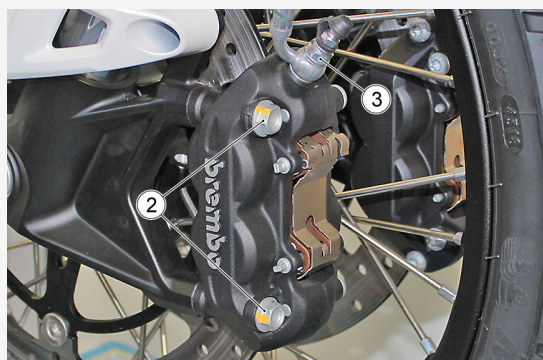


11.5.2 Installation

- Remove the front brake calliper
- Correctly position the new front brake calliper (1) on the brake disc



- Insert and tighten the screws (2)
- Position the brake line on the brake calliper and insert and tighten the screw (3)



- Remove the clamp from the front brake lever.
- Remove the brake fluid reservoir cap and fill it with new brake fluid

WARNING

PERFORM THE STANDARD BRAKING SYSTEM BLEEDING PROCEDURE, AS DESCRIBED AT THE END OF THE CHAPTER.

- Top up the fluid reservoir and refit the cap
- Check the stroke and sensitivity of the brake lever
- If the brake lever stroke is too long after carrying out the bleeding procedure, check the braking system for leaks and, if none are found, bleed the system using the diagnostic instrument, as described
- Disconnect the flexible bleeder pipes and re-tighten the bleeder screws, applying the correct torque

11.6 Rear brake disc

11.6.1 Disc check

REAR

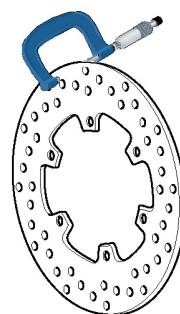
N.B



THE BRAKE DISC SHAPE DOES NOT CHANGE THE OPERATING AND MAINTENANCE SPECIFICATIONS OF THE SYSTEM.

- The following operations are to be carried out with brake disc fitted on the wheel.
- Check the disc for wear by measuring the minimum thickness with a micrometer in different points. If the minimum thickness, even in a single point of the disc, is less than the minimum value, replace the disc.

FUNCTION	DESCRIPTION / VALUE
Disc thickness minimum value	4.5 mm (0.18 in)



11.7 Front brake disc

11.7.1 Disc check

FRONT

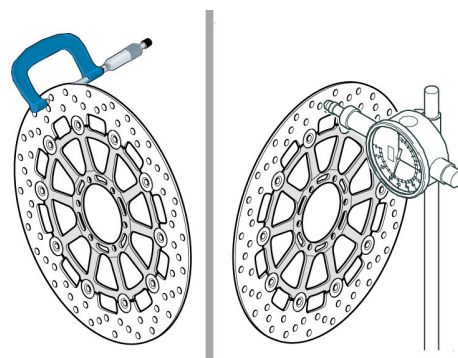
N.B



THE FRONT BRAKE DISC SHAPE DOES NOT CHANGE THE OPERATING AND MAINTENANCE SPECIFICATIONS OF THE SYSTEM.

- The following operations must be carried out with the brake discs fitted on the wheel; they refer to a single disc, but are valid for both.
- Check the disc for wear by measuring the minimum thickness with a micrometer in different points. If the minimum thickness, even in a single point of the disc, is less than the minimum value, replace the disc.

FUNCTION	DESCRIPTION / VALUE
Disc thickness minimum value	4 mm (0.16 in)



- Using a dial gauge, check that the maximum oscillation of the disc does not exceed the tolerance; otherwise, replace it.

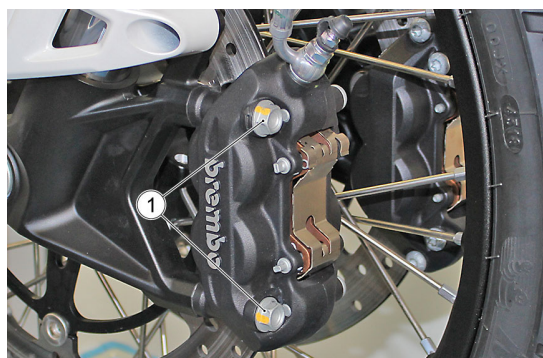
FUNCTION	DESCRIPTION / VALUE
Disc oscillation tolerance	0.15 mm (0.0059 in), with respect to the wheel centre line.

11.8 Front brake pads

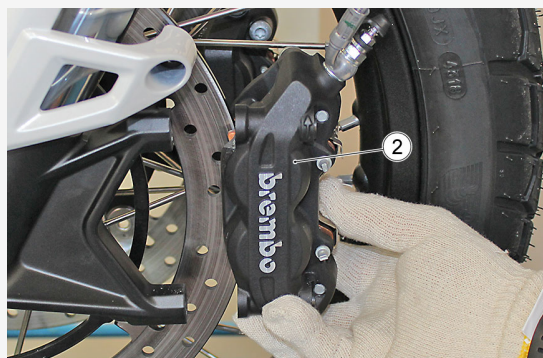
11.8.1 Removal

The following procedure is described for a single calliper, but is valid for both front brake callipers.

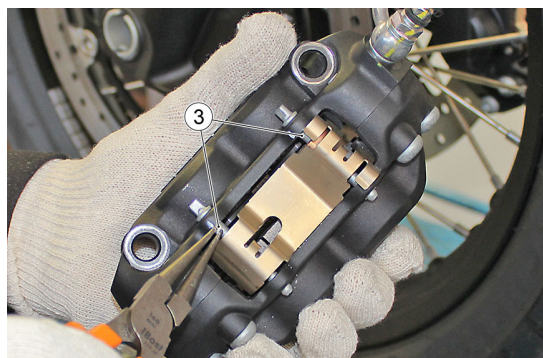
- Unscrew and remove the screws (1)



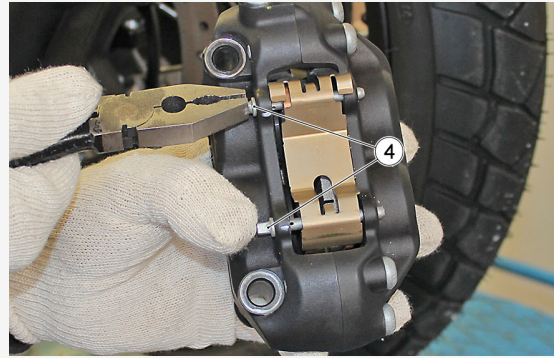
- Remove the front brake calliper (2) from the brake disc



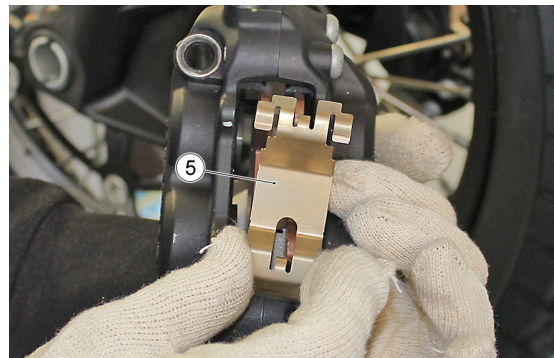
- Remove the two retaining springs (3)



- Remove the two pins (4)



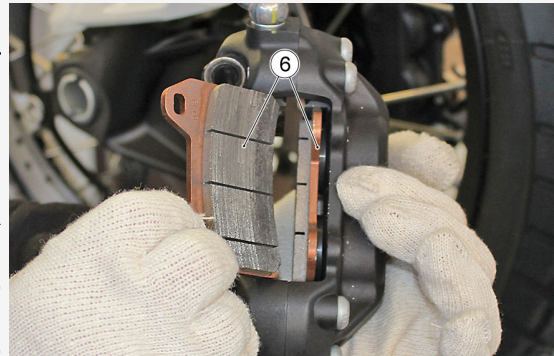
- Remove the spring (5)



- Remove the brake pads (6) one at a time

WARNING

DO NOT OPERATE THE BRAKE LEVER ONCE THE BRAKE PADS HAVE BEEN REMOVED, AS THIS MAY FORCE THE PISTONS OUT FROM THEIR SEATS ON THE CALLIPER AND ALLOW BRAKE FLUID TO ESCAPE.



11.8.2 Installation

The following procedure is described for a single calliper, but is valid for both front brake callipers

- Insert the new pads correctly (1)

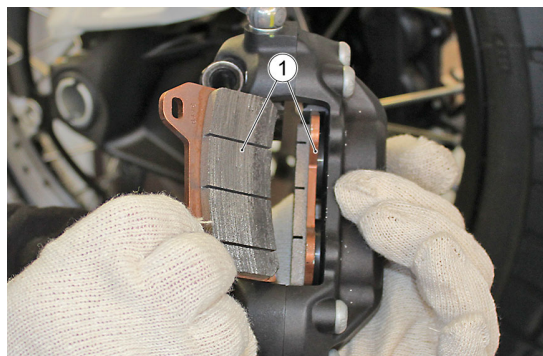
ATTENTION



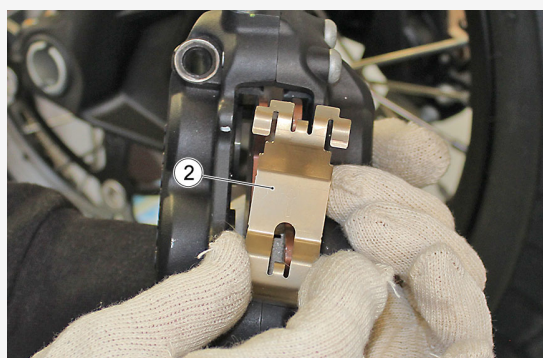
THIS VEHICLE IS FITTED WITH A DOUBLE DISC FRONT BRAKING SYSTEM (RIGHT AND LEFT SIDE).

ALWAYS REPLACE ALL THE PADS FROM BOTH FRONT BRAKE CALLIPERS.

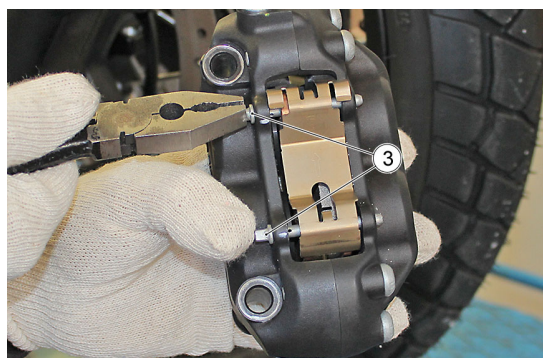
REPLACING THE PADS OF ONLY ONE FRONT CALLIPER MAY JEOPARDISE THE VEHICLE STABILITY AND SAFETY, POSING SERIOUS DANGER FOR PEOPLE, OBJECTS AND THE VEHICLE ITSELF.



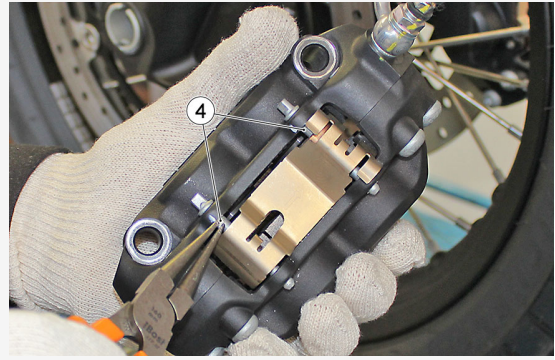
- Insert the spring (2)



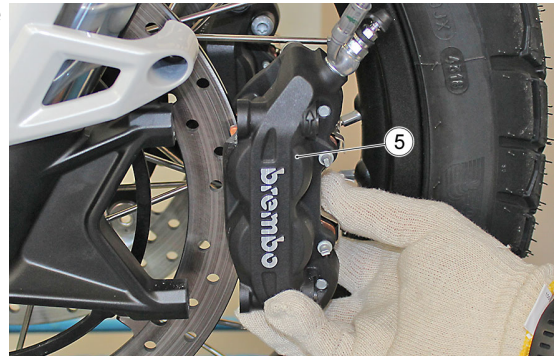
- Insert the two pins (3)



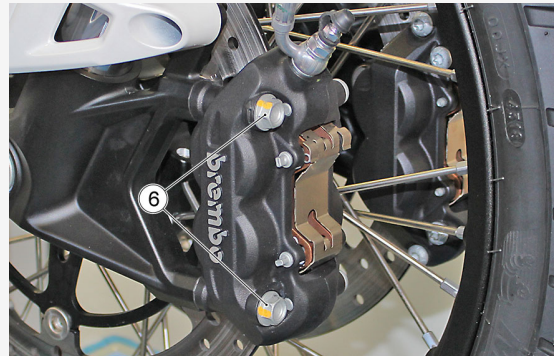
- Insert the two retaining springs (4)



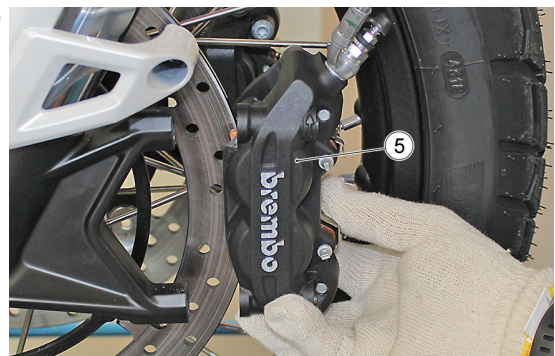
- Insert the front brake calliper (5) on the brake disc



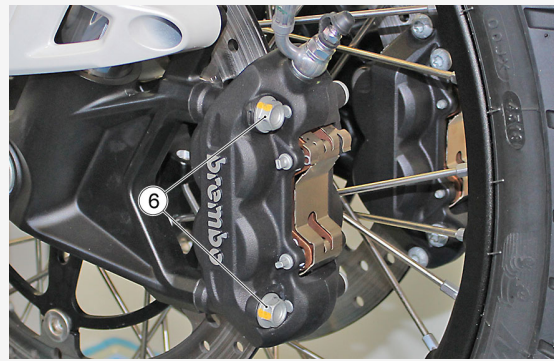
- Insert the two screws (6) and tighten them



- Insert the front brake calliper (5) on the brake disc



- Insert the two screws (6) and tighten them



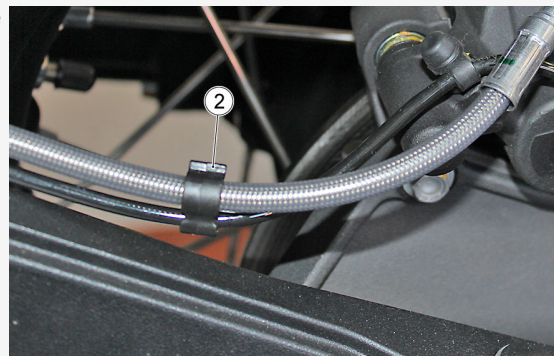
11.9 Rear pads

11.9.1 Removal

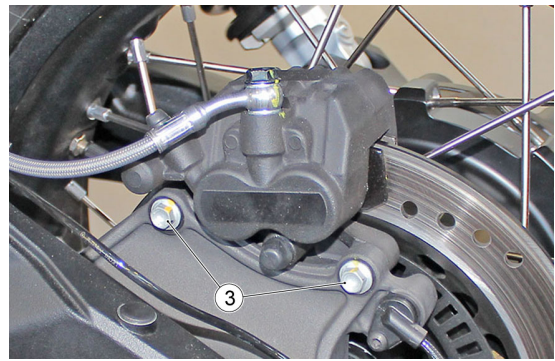
- Connect the bleeder bottles to the calliper bleeder screw and open
- Press the lever down as far as it will go and block it in position using a clamping device in order to prevent the liquid from escaping from the system when it is open.
- Close the calliper bleeder screw and remove the bleeder bottle.
- Loosen the two grub screws (1)



- Free the brake calliper line from the cable grommet (2)



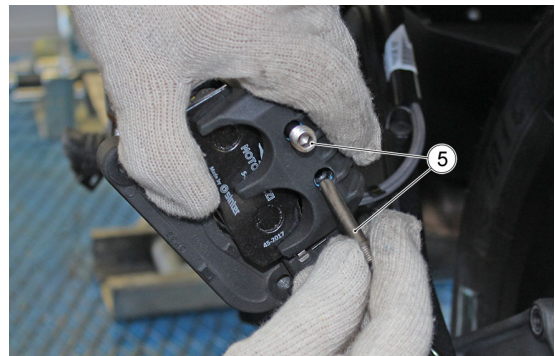
- Unscrew and remove the two screws (3)



- Remove the rear brake calliper (4) from the brake disc



- Unscrew and remove the two grub screws (5).



- Remove the brake pads (6) one at a time

WARNING

DO NOT OPERATE THE BRAKE LEVER ONCE THE BRAKE PADS HAVE BEEN REMOVED, AS THIS MAY FORCE THE PISTONS OUT FROM THEIR SEATS ON THE CALLIPER AND ALLOW BRAKE FLUID TO ESCAPE.



11.9.2 Installation

- Insert the new pads correctly (1)

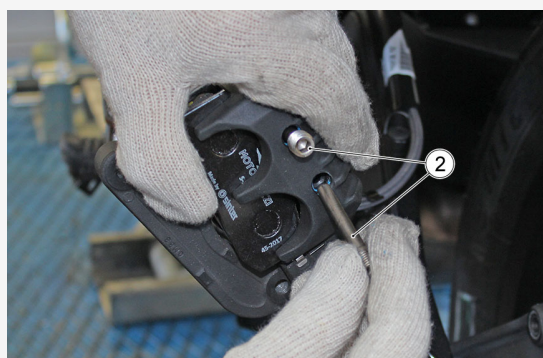
ATTENTION



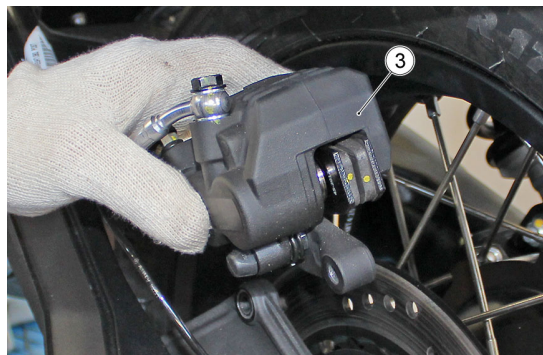
ALWAYS REPLACE BOTH PADS AND MAKE SURE THEY ARE CORRECTLY POSITIONED INSIDE THE CALLIPER.



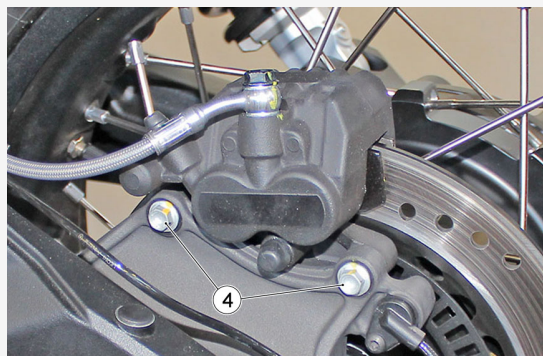
- Insert and tighten the grub screws (2)



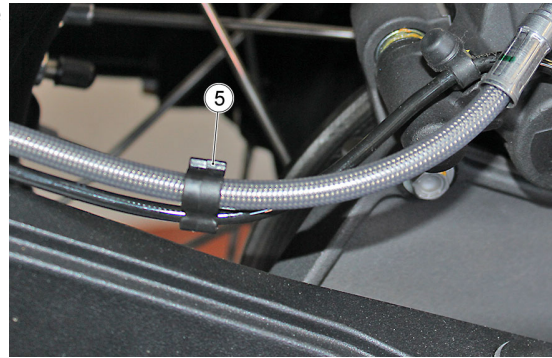
- Insert the rear brake calliper (3) on the brake disc



- Insert and tighten the screws (4)



- Insert the brake calliper line into the cable grommet (5)



- Tighten the two grub screws (2)



11.10 Brake system bleeding

PREPARATION OF THE VEHICLE

- It is important to ensure that there is always a sufficient quantity of brake fluid in the tank.
- These operations may be simplified by using a bleeding device when carrying out the "Replacing the brake fluid" operations.
- In this case, when performing the bleeding procedure, it is also necessary to operate the brake pedal a few times with the bleeder device connected (approximately five times for each wheel circuit).

TRADITIONAL FRONT BLEEDING SYSTEM

Any air trapped in the hydraulic circuit acts as a cushion, absorbing much of the pressure applied by the brake pump and minimising the braking power of the calliper.

The presence of air is signalled by the "sponginess" of the brake and by poor braking.

ATTENTION



CONSIDERING THE DANGER FOR VEHICLE AND RIDER, IT IS STRICTLY NECESSARY, AFTER REFITTING THE BRAKE CALLIPERS TO RESTORE THE BREAKING SYSTEM TO ITS REGULAR USE CONDITIONS, SO THAT THE HYDRAULIC CIRCUIT IS AIR PURGED.

N.B

THE FOLLOWING OPERATIONS REFER TO ONE FRONT BRAKE CALLIPER ONLY, BUT ARE VALID FOR BOTH.

THE VEHICLE MUST BE ON LEVEL GROUND TO BE BLED. WHILE PURGING THE HYDRAULIC SYSTEM, FILL THE TANK WITH THE NECESSARY QUANTITY OF BRAKE FLUID.

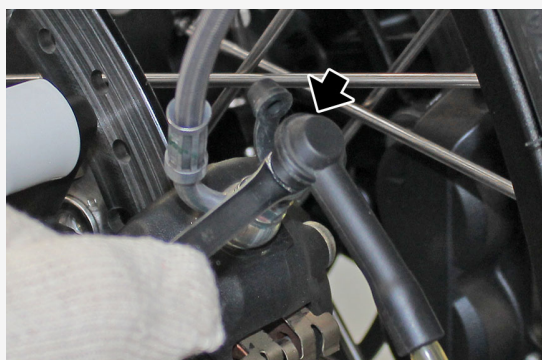
CHECK THAT, DURING THE OPERATION, THERE IS ALWAYS BRAKE FLUID IN THE TANK.

- Remove the rubber protection cover of the bleed valve.
- Insert the transparent plastic pipe in the front brake calliper bleed valve and slide the other end of this pipe in a container to collect the fluid.
- Remove the front brake fluid reservoir cap.
- Quickly press and release the front brake lever several times and then keep it fully pressed.
- Loosen the bleed valve by a 1/4 turn so that the brake fluid flows into the container, this will release the tension on the brake lever and it will make it arrive at the end stop.
- Close the bleed valve before arriving at the end of the stroke with the lever.
- Repeat the operation until there are no air bubbles in the fluid going into the container.

**N.B**

WHILE PURGING THE HYDRAULIC SYSTEM, FILL THE TANK WITH THE NECESSARY QUANTITY OF BRAKE FLUID. CHECK THAT, DURING THE OPERATION, THERE IS ALWAYS BRAKE FLUID IN THE TANK.

- Screw the bleeding valve and remove the pipe.
- Top-up the reservoir until the correct brake fluid level is obtained.
- Refit and block the front brake oil reservoir cap.
- Refit the rubber protection cover.



FRONT BLEEDING SYSTEM WITH DIAGNOSTIC TOOL

If the brake lever still feels "spongy" after completing all checks, it is necessary to bleed the brakes using this type of procedure.

- With the diagnostic tool properly connected, select the function "**FRONT BLEEDING**" in the section "SETTINGS".
- The pump starts running.
- While the pump is performing a rotation cycle, operate and release the front brake lever until the message diagnostic tool cycle completion is received.
- This procedure allows the air to circulate and accumulate.
- Once the procedure with diagnostic tool is finished, perform again the REGULAR PURGING to remove the air from the system completely.

TRADITIONAL REAR BLEEDING SYSTEM

Any air trapped in the hydraulic circuit acts as a cushion, absorbing much of the pressure applied by the brake pump and minimising the braking power of the calliper.

The presence of air is signalled by the "sponginess" of the brake and by poor braking.

ATTENTION



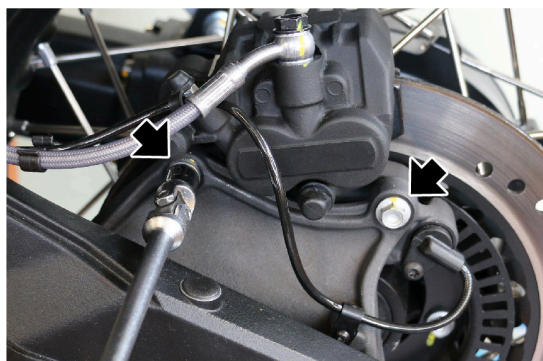
CONSIDERING THE DANGER FOR VEHICLE AND RIDER, IT IS STRICTLY NECESSARY, AFTER REFITTING THE BRAKE CALLIPERS TO RESTORE THE BREAKING SYSTEM TO ITS REGULAR USE CONDITIONS, SO THAT THE HYDRAULIC CIRCUIT IS AIR PURGED.

N.B

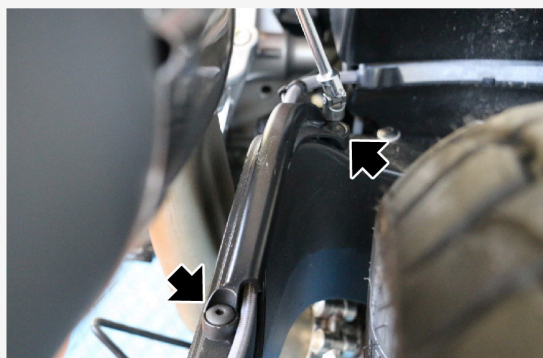


WHILE PURGING THE HYDRAULIC SYSTEM, FILL THE TANK WITH THE NECESSARY QUANTITY OF BRAKE FLUID. CHECK THAT, DURING THE OPERATION, THERE IS ALWAYS BRAKE FLUID IN THE TANK.

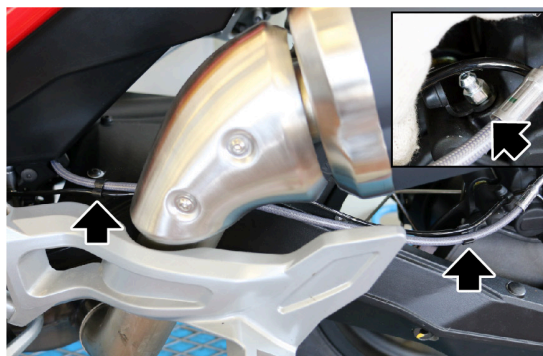
- Remove the rear brake calliper fixing screws.



- Remove the two cable tray fixing screws of the rear brake/rear ABS sensor wiring.



- Release the rear ABS sensor wiring harness from the rubber bleed cap and from the brake pipe by disconnecting the two cable trays.



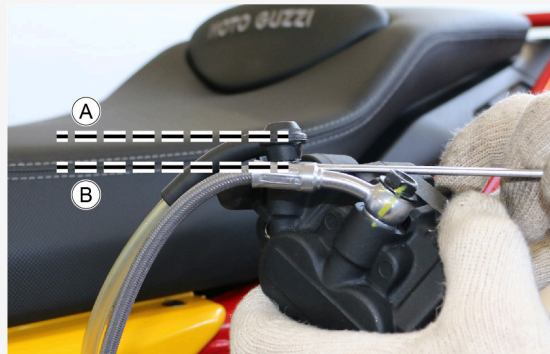
- Without removing the exhaust terminal, extract the rear brake calliper as indicated from the left side of the vehicle.



- Remove the rubber protection cover from the bleed valve.
- Insert the transparent plastic pipe in the rear brake calliper bleed valve and insert the other end of this pipe into a container to collect the fluid.
- Remove the fixing screw that locks the rear brake oil tank and the safety closure.
- Remove the rear brake oil tank cap and lock the tank to the frame again using the screw.



- Lift the brake calliper as much as possible, making sure that the level (A) of the bleed valve is higher than the level (B) of the oil pipe.
- Insert a shim between the rear brake calliper pads similar to the brake disc.
- Repeatedly quickly pull and release the rear brake lever, then keep it fully pulled.
- Loosen the bleed valve by a 1/4 turn so that the brake fluid flows into the container, this will release the tension on the brake lever and it will make it arrive at the end stop.
- Close the bleed valve before arriving at the end of the stroke with the lever.
- Repeat the operation until there are no air bubbles in the fluid going into the container.



N.B



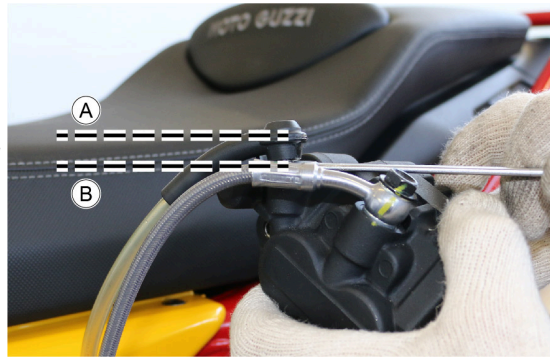
WHILE PURGING THE HYDRAULIC SYSTEM, FILL THE TANK WITH THE NECESSARY QUANTITY OF BRAKE FLUID. CHECK THAT, DURING THE OPERATION, THERE IS ALWAYS BRAKE FLUID IN THE TANK.

- Screw the bleed valve and remove the pipe.
- Top-up the reservoir until the correct brake fluid level is obtained.
- Refit and lock the rear brake oil tank cap together with the cap closure.
- Refit the brake calliper and place the rubber protection cap again, paying attention during repositioning of the ABS wiring harness.

REAR BLEEDING SYSTEM WITH DIAGNOSTIC TOOL

If the brake pedal still feels "spongy" after completing all checks, it is necessary to bleed the brakes using this type of procedure.

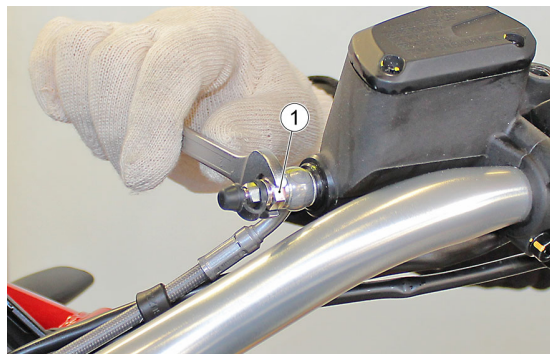
- To perform the bleeding operation using the diagnostic tool, it is necessary to properly position the rear brake calliper, in order to prevent air from remaining inside the circuit.
- Remove the rear brake calliper from the left side of the vehicle (see the procedure described for the traditional bleeding system and lift it as much as possible, making sure that the level (A) of the bleed valve is higher than the level (B) of the oil pipe.
- With the diagnostic tool properly connected, select the function "**REAR BLEEDING**" in the section "**SETTINGS**".
- The pump starts running.
- While the pump is performing a rotation cycle, operate and release the rear brake pedal until the message of diagnostic tool cycle completion is received.
- This procedure allows the air to circulate and accumulate. Once the procedure with the diagnostic tool is finished, perform the REGULAR BLEEDING to remove the air from the system completely.



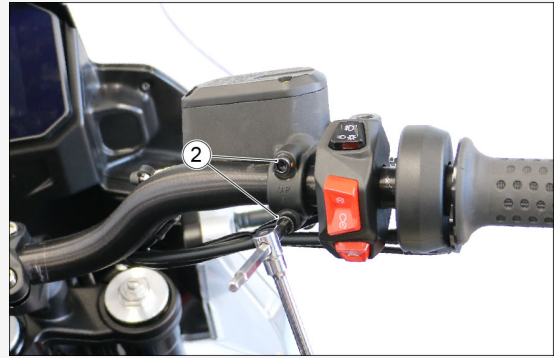
11.11 Front brake master cylinder

11.11.1 Removal

- Undo and remove the joint screw (1) from the front brake master cylinder after placing a suitable container underneath to collect the brake fluid.



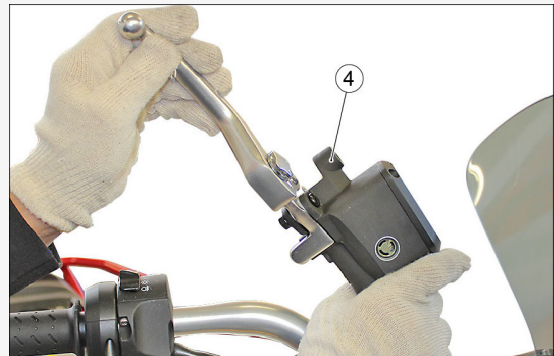
- Unscrew and remove the screws (2).



- Remove the U-bolt (3).



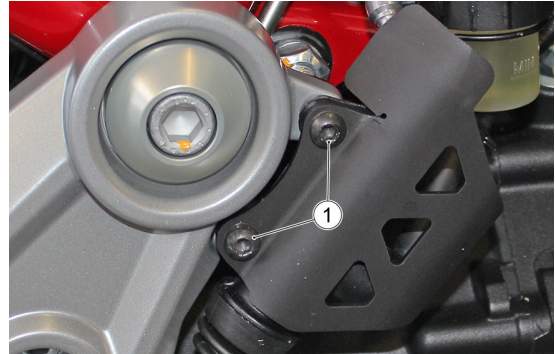
- Remove the front brake master cylinder (4).



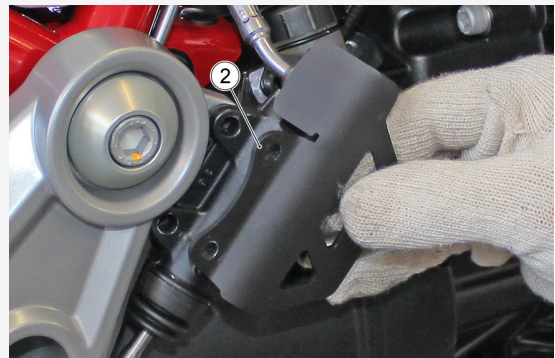
11.12 Rear brake master cylinder

11.12.1 Removal

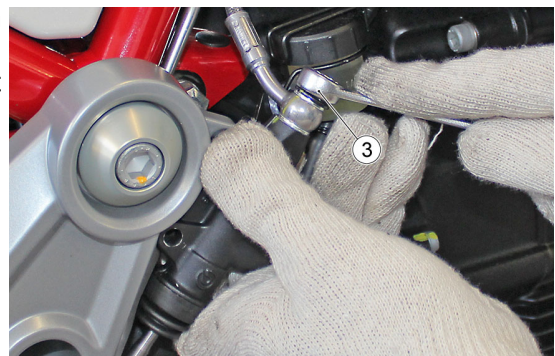
- Unscrew and remove the two screws (1)



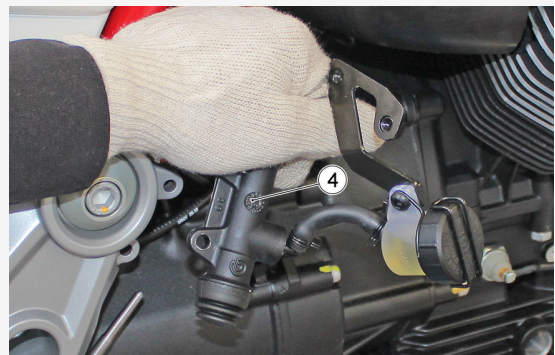
- Remove the protection cover (2)



- Undo and remove the joint screw (3) from the rear brake master cylinder after placing a suitable container underneath to collect the brake fluid.

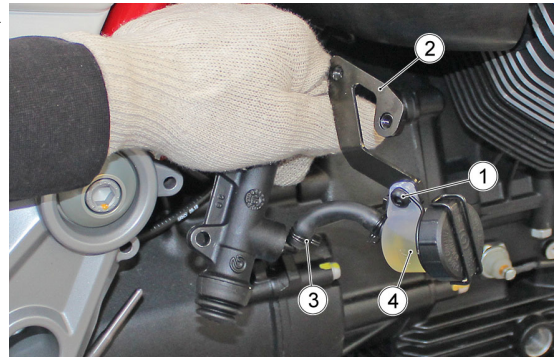


- Remove the rear brake master cylinder (4)



REAR BRAKE FLUID RESERVOIR REMOVAL

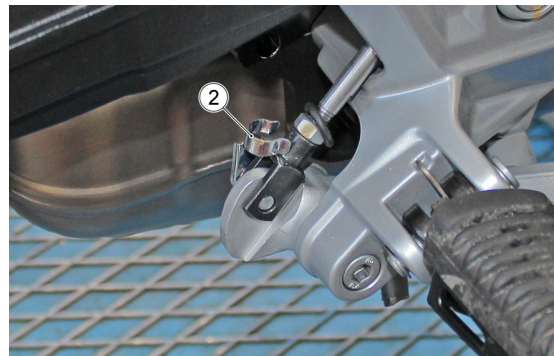
- Remove the rear brake master cylinder
- Undo and remove the screw (1)
- Retrieve the support bracket (2)
- Remove the hose guide (3)
- Remove the brake fluid reservoir (4)

**REMOVING THE REAR MASTER CYLINDER PLUNGER**

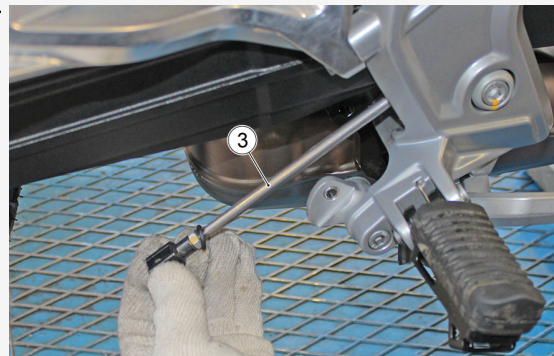
- Slide out the O-ring gasket (1) to free the locking clip



- Remove the locking clip (2)

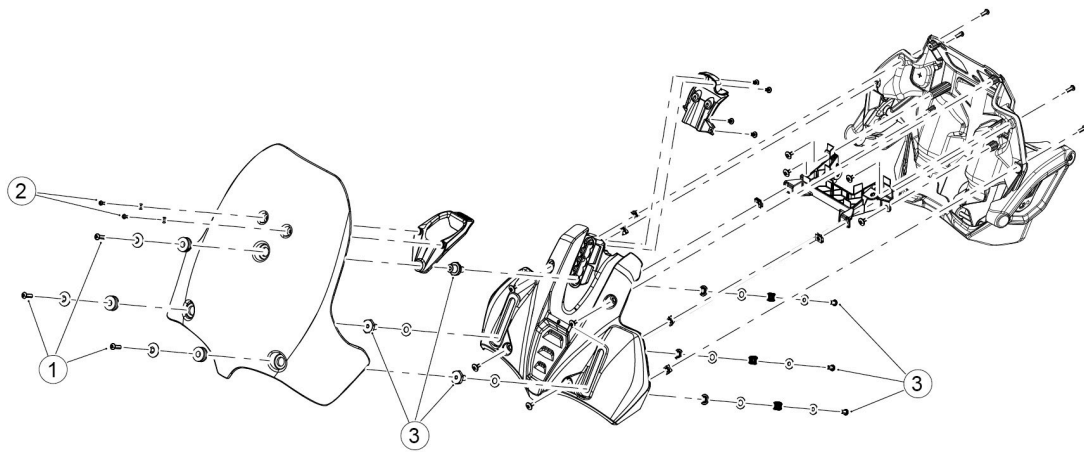


- Remove the rear brake master cylinder plunger (3)



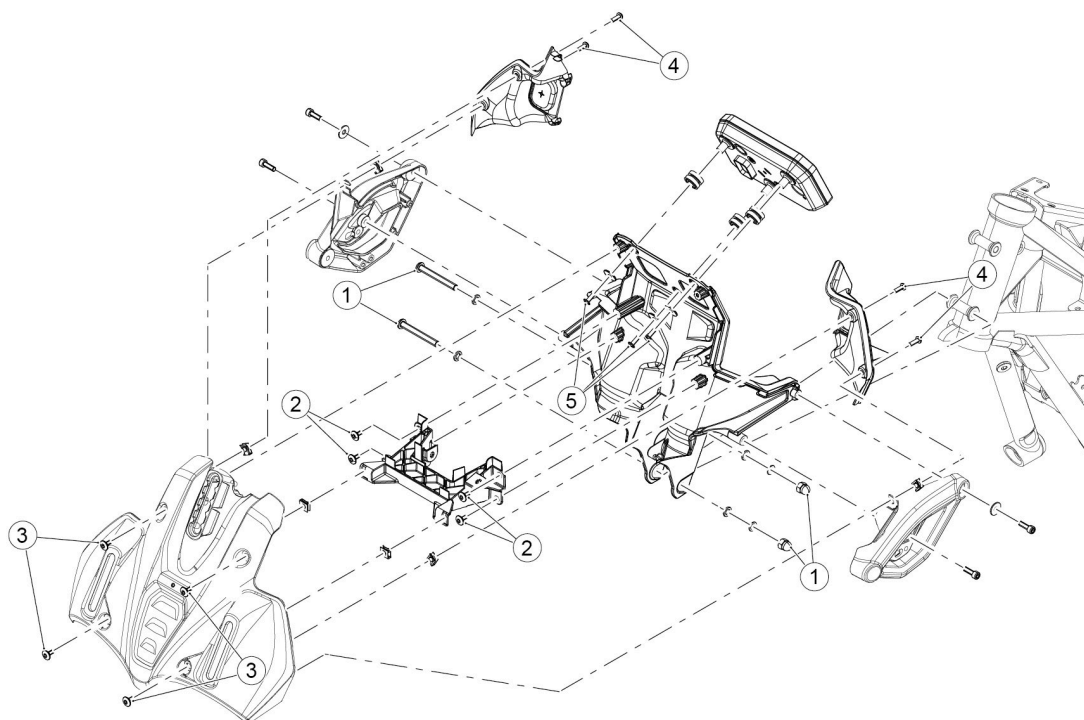
LIST OF TOPICS

Bodywork

TOP FAIRING-WINDSHIELD

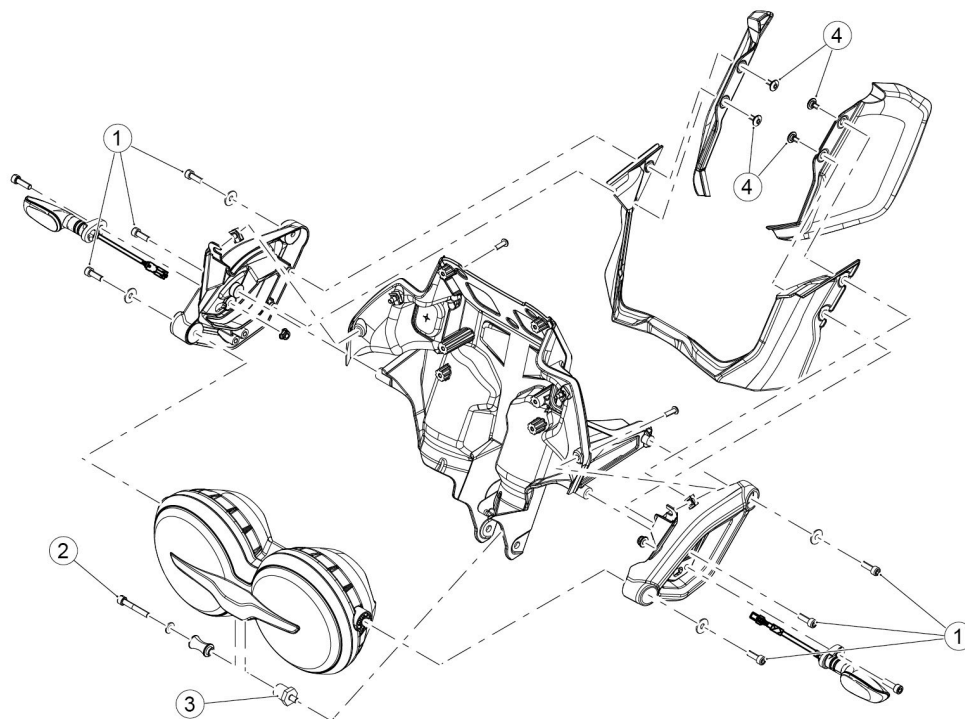
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Windshield fixing screw	M6	3	8 ± 1.6 Nm (5.9 ± 1.18 lb ft)	-
2	Windshield adjustment handle fixing screw	M4	2	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-
3	Fixing of windshield support pins to fairing front	M6	3	8 ± 1.6 Nm (5.9 ± 1.18 lb ft)	-

INSTRUMENT



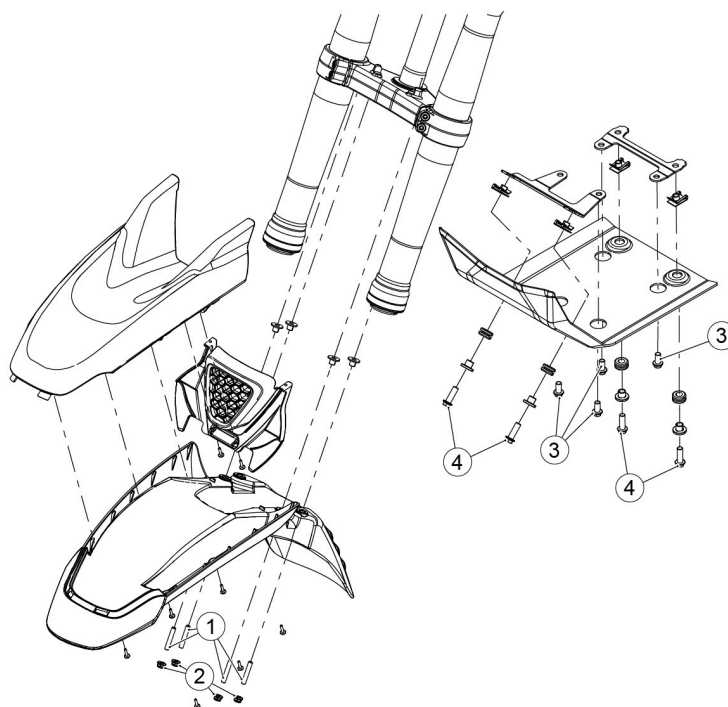
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screw fixing instrument cluster support to frame	M8	2	25 ± 5 Nm (18.44 ± 3.69 lb ft)	Screws with blank nuts
2	Screw fixing the support bracket to the instrument cluster support	M5	4	6 ± 1.2 Nm (4.43 ± 0.89 lb ft)	-
3	Fairing front fastening screw	M5	4	6 ± 1.2 Nm (4.43 ± 0.89 lb ft)	-
4	Internal cover right and left fixing screw to the fairing front	M5	2 + 2	6 ± 1.2 Nm (4.43 ± 0.89 lb ft)	-
5	Fixing screw for TFT instrument panel	SWP 4.9	3	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-

FRONT LIGHTS



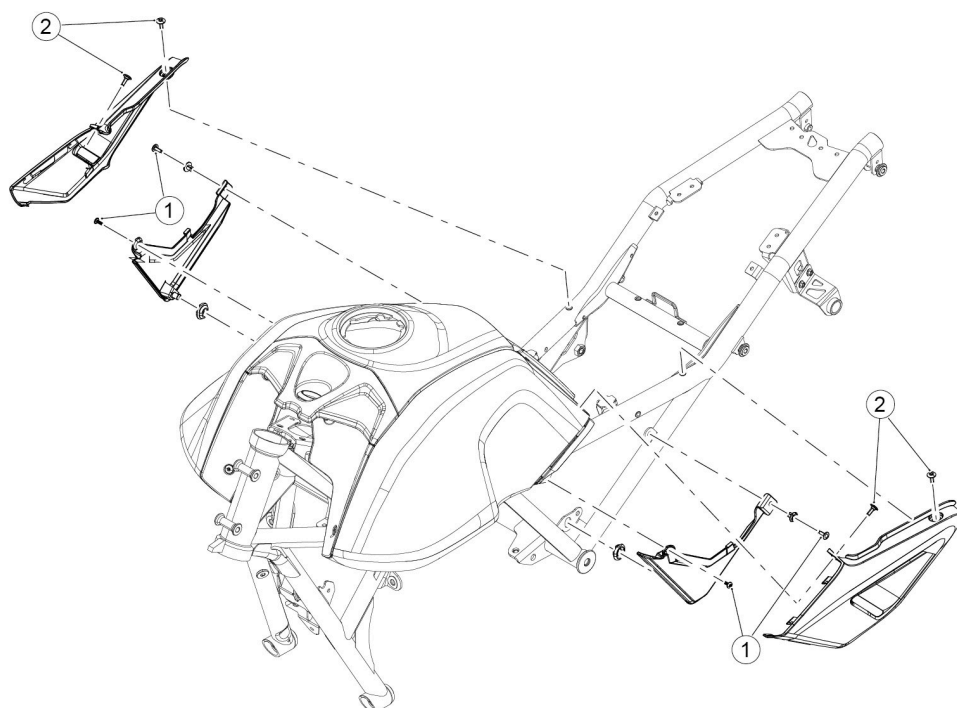
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Right and Left headlamp support fixing screws	M6	6	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
2	Headlamp lower fastening screw	M6	1	8 ± 1,6 Nm (7.38 ± 1.18 lbf ft)	-
3	Front headlight lower fixing pin fastening screw	M6	1	8.5 ± 1,7 Nm (5.90 ± 1.25 lbf ft)	-
4	Right and Left front spoiler and deflectors fastening screws	M5	4	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-

FRONT MUDGUARD - ENGINE FAIRING



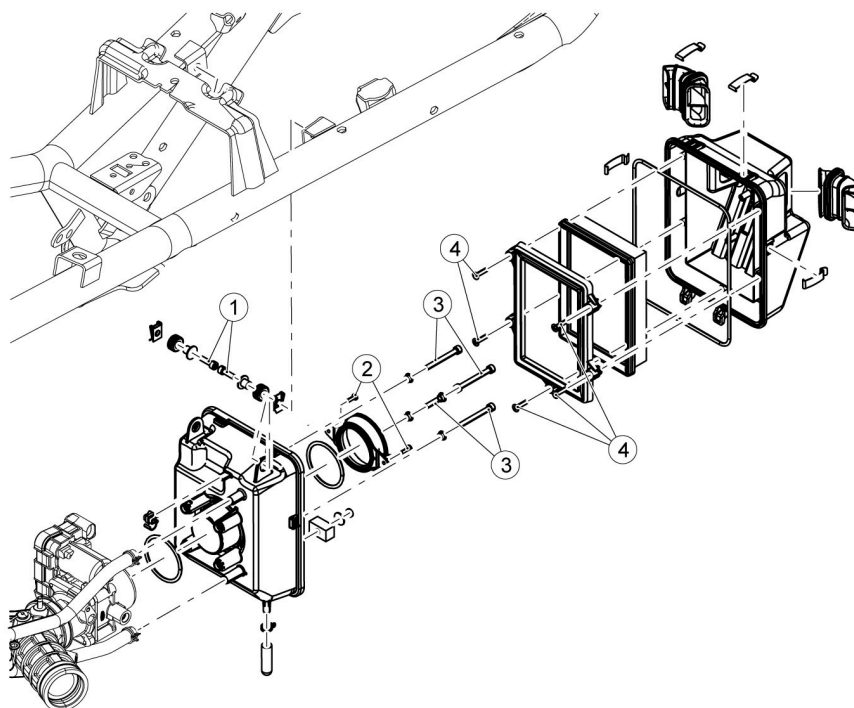
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Stud bolt fastening the front mudguard to the lower steering yoke	M6	4	10 ± 2 Nm (7.38 ± 0.87 lbf ft)	-
2	Nuts fastening the front mudguard to the lower steering yoke	M6	4	10 ± 2 Nm (7.38 ± 0.87 lbf ft)	-
3	Screws fastening the sump guard to the engine	M8	4	25 ± 5 Nm (18.44 ± 3.69 lb ft)	Loctite 243
4	Screws fastening the sump guard to the sump guard support bracket	M8	4	15 ± 3 Nm (11.06 ± 2.21 lb ft)	Loctite 243

CENTRAL BODYWORK



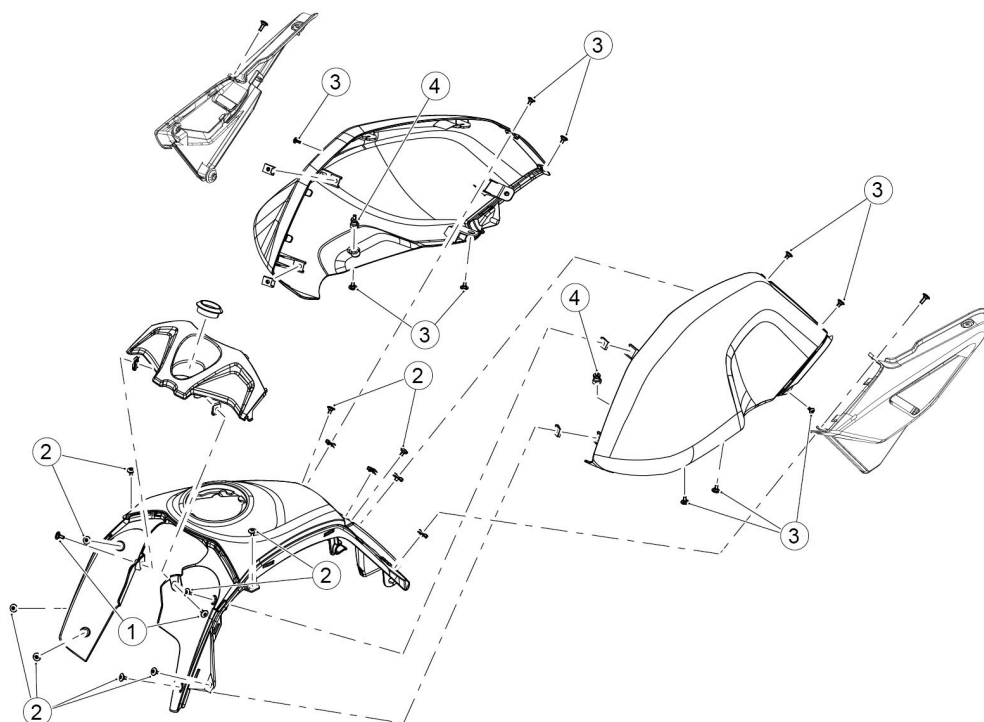
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Fastening of the internal side panels to the frame	Plastic rivet	2+2	-	-
2	Screws fastening the side panels to the frame	M5	2+2	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-

FILTER HOUSING



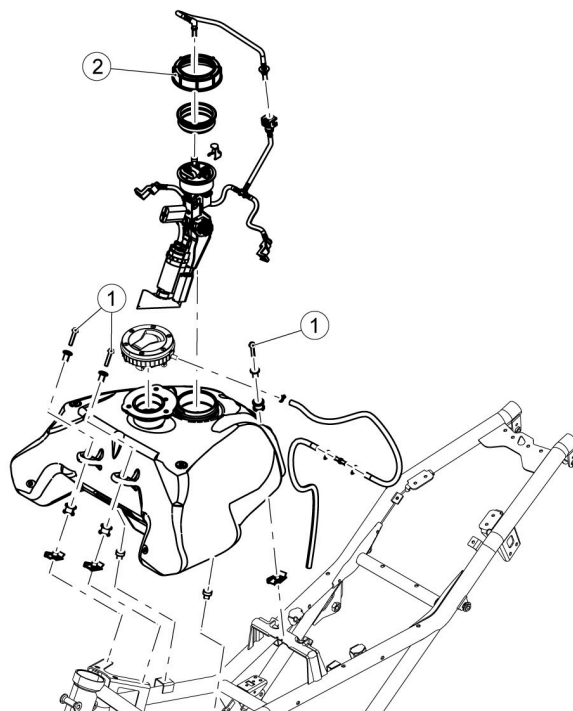
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the filter housing to the frame	M6	2	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
2	Screws fastening the intake duct to the filter casing cover	SWP 4.2	2	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-
3	Screws fastening the throttle body to the filter casing cover	M6	4	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
4	Screws fastening the air filter to the filter casing	SWP 4.9	5	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-

FUEL TANK COVER



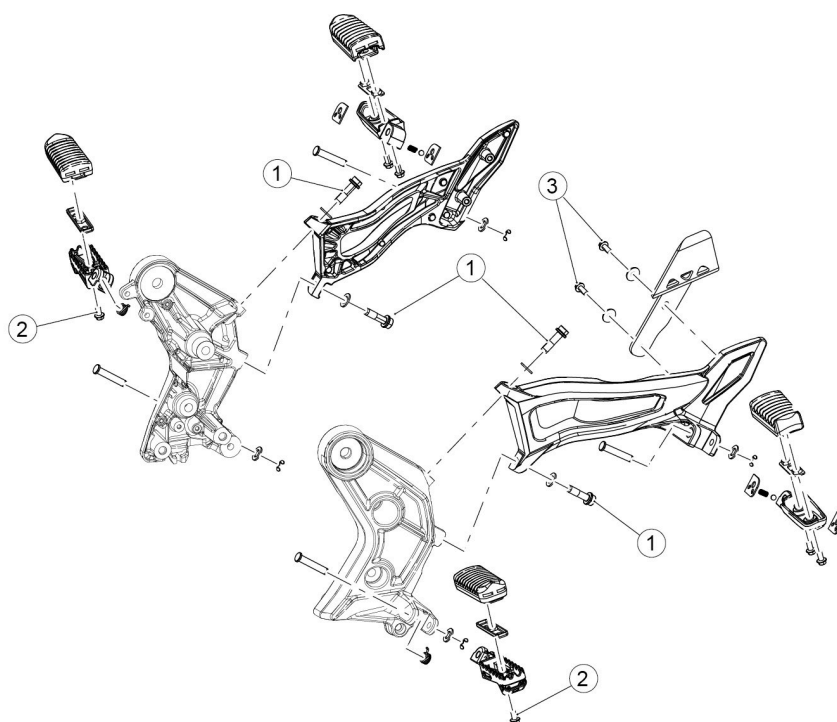
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Ignition block cover fastening screws to central cover	M5	2	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-
2	Central cover fixing screws to the fuel tank	M5	10	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-
3	Lower screws fastening the side cover to the fuel tank	M5	5+5	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-
4	Stud bolt fastening the side cover support to the fuel tank	M5	2	4 ± 0.8 Nm (2.95 ± 0.59 lb ft)	-

FUEL TANK



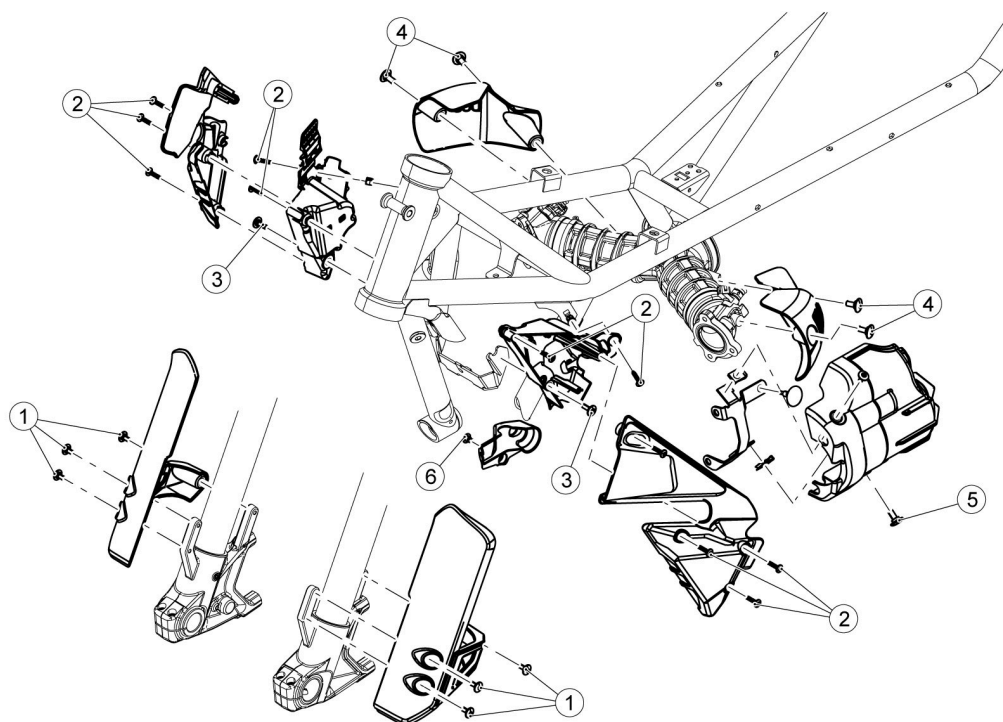
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the fuel tank to frame	M6	3	10 ± 2 Nm (7.38 $\pm$ 1.48 lb ft)	-
2	Ring nut fastening the fuel pump to the fuel tank	Ring nut	1	20 ± 3 Nm (14.75 $\pm$ 2.21 lb ft)	-

FOOTRESTS

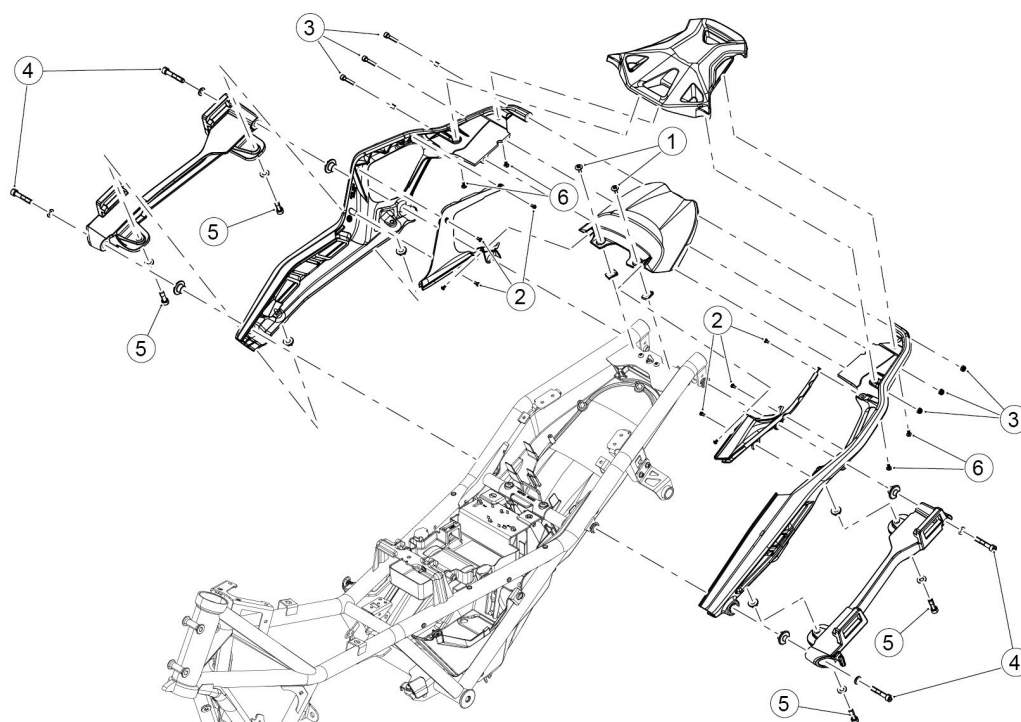


POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws for fastening the passenger's footrest supports to the frame support	M8	4	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)	-
2	Screws fastening the footrest rubber to the footrest	M6	6	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-
3	Screws fastening the passenger heel guard to the passenger footrest support	M6	2	10 ± 2 Nm (7.38 ± 1.48 lb ft)	-

GUARDS

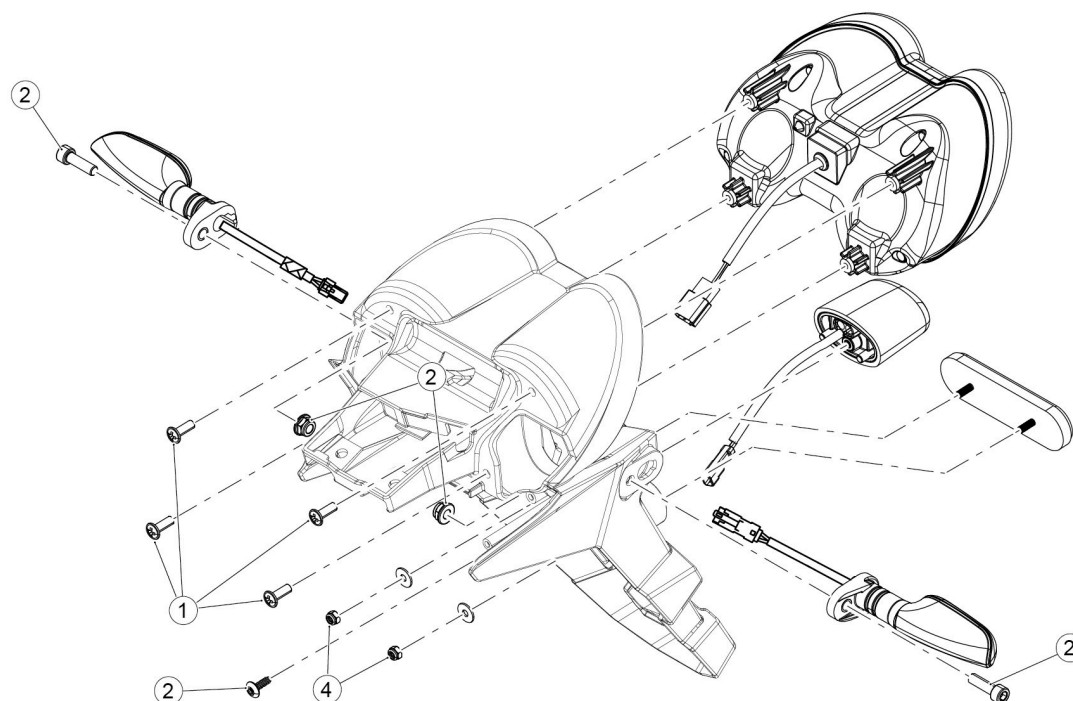


POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the fork guards to the fork stanchions	M5	6	6 Nm ± 1.2 (4.43 ± 0.89 lbf ft)	-
2	Screws fastening the headstock cover to the connectors box	SWP 2.9	7	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-
3	Lower screws fastening the connectors box to the frame	M5	2	6 Nm ± 1.2 (4.43 ± 0.89 lbf ft)	-
4	Pin fastening the rear brake lever spring coupling to the frame plate	M5	4	3 ± 0,6 Nm (2.21 ± 0.44 lbf ft)	-
5	Screws fastening the starter motor to the support bracket	M5	2	6 Nm ± 1.2 (4.43 ± 0.89 lbf ft)	-
6	Screw fastening the oil pressure sensor cover to the engine	M5	1	6 Nm ± 1.2 (4.43 ± 0.89 lbf ft)	-

REAR BODYWORK

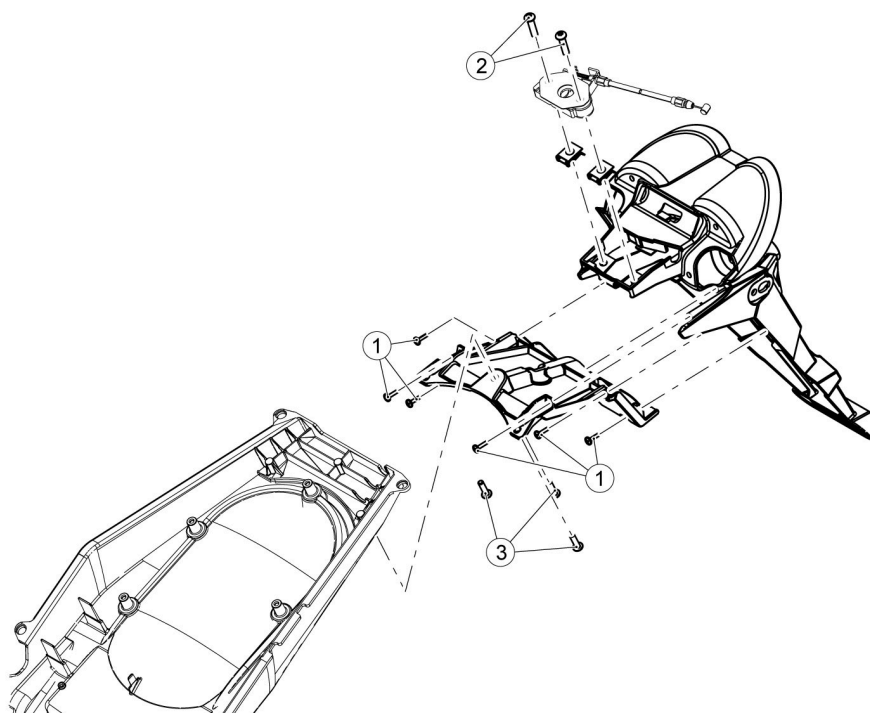
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Rear cover fixing screw to frame	M5	2	6 ± 1,2 Nm (4.43 ± 0.89 lbf ft)	-
2	Right and left grab handle internal cover fixing screw	M4	3 + 3	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-
3	Passenger grab handle fastening screw	M6	3 + 3	10 ± 1.5 Nm (7.38 ± 1.11 lb ft)	-
4	Fixing screw for passenger grab handle to frame	M8	2 + 2	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)	-
5	Screw fixing right and left side case support to grab handle (V85 TT Travel)	M8	2 + 2	25 ± 3.75 Nm (18.44 ± 2.77 lb ft)	-
6	Luggage rack cover fastening screw	SWP 4.2	4	3 ± 0.6 Nm (2.21 ± 0.44 lb ft)	-

TAILLIGHT



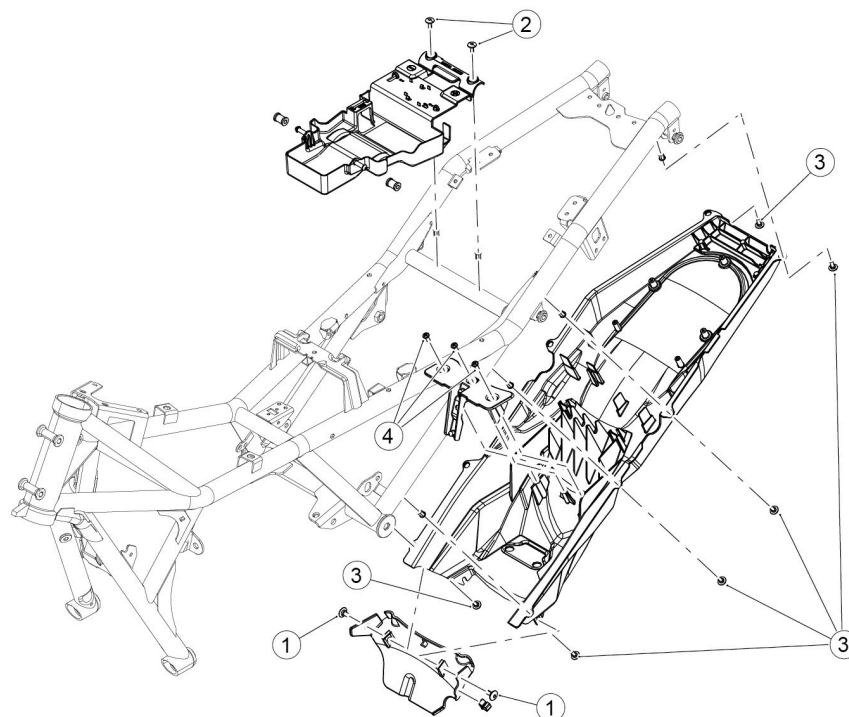
POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Taillight to number plate holder fixing screws	Self-tapping 5x14	4	$3 \pm 0.6 \text{ Nm}$ (2.21 $\pm 0.44 \text{ lb ft}$)	-
2	Rear direction indicator to number plate holder fixing screws	M6	2	$3 \pm 0.6 \text{ Nm}$ (2.21 $\pm 0.44 \text{ lb ft}$)	With self-locking nut
3	Licence plate light to number plate holder fixing screws	M4	1	$3 \pm 0.6 \text{ Nm}$ (2.21 $\pm 0.44 \text{ lb ft}$)	-
4	Nuts fastening the rear reflector to the number plate holder	M4	2	$4 \pm 0.8 \text{ Nm}$ (2.95 $\pm 0.59 \text{ lb ft}$)	-

REAR MUDGUARD



POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screws fastening the licence plate holder fastener to the licence plate holder	SWP 3.9	6	$3 \pm 0.6 \text{ Nm}$ (2.21 $\pm 0.44 \text{ lb ft}$)	-
2	Screws fastening the licence plate holder to the frame	M6	2	$10 \pm 2 \text{ Nm}$ (7.38 $\pm 1.48 \text{ lb ft}$)	-
3	Screws fastening the licence plate holder fastener to the rear wheel arch	SWP 4.9	3	$3 \pm 0.6 \text{ Nm}$ (2.21 $\pm 0.44 \text{ lb ft}$)	-

UNDER-SEAT COMPARTMENT

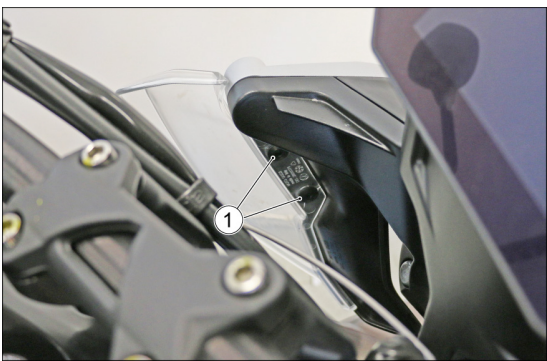


POSITION	DESCRIPTION	TYPE	QUANTITY	TORQUE	NOTES
1	Screw fastening the rear brake pipe feedthrough to the rear wheel arch	M5	2	$6 \pm 1.2 \text{ Nm}$ (4.43 $\pm 0.86 \text{ lbf ft}$)	-
2	Screws fastening the battery cover to the frame	M5	2	$4 \pm 0.8 \text{ Nm}$ (2.95 $\pm 0.59 \text{ lb ft}$)	-
3	Screws fastening the rear wheel arch to the frame	M5	4 + 4	$4 \pm 0.8 \text{ Nm}$ (2.95 $\pm 0.59 \text{ lb ft}$)	-
4	Screws fastening the PMP ECU support to the rear wheel arch	SWP 4.9	3	$3 \pm 0.6 \text{ Nm}$ (2.21 $\pm 0.44 \text{ lb ft}$)	-

12.1 Windscreen

SIDE DEFLECTORS (where applicable)

- From the internal side of the top fairing, support then deflector and remove the two fixing screws (1).



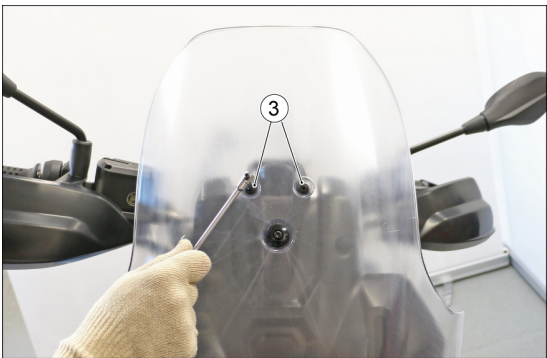
- Remove the side deflector (2) from the vehicle.

Repeat the operations for the side deflector on the opposite side.



WINDSHIELD

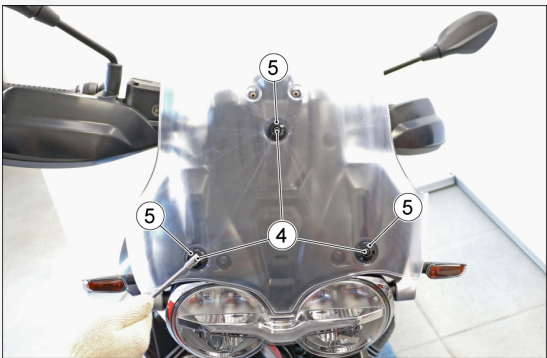
- Remove the two upper fixing screws (3) and retrieve the relative washers.



- Remove the three fixing screws (4) and recover the bushing (5).

During refitting, tighten the screws (4) to the prescribed torque:

FUNCTION	DESCRIPTION / VALUE
Windshield fixing screw	10 ± 1 Nm (7.38 ± 0.74 lbf ft)



- Remove the windshield from the vehicle.



12.2 Top fairing and instrument cluster

TOP FAIRING

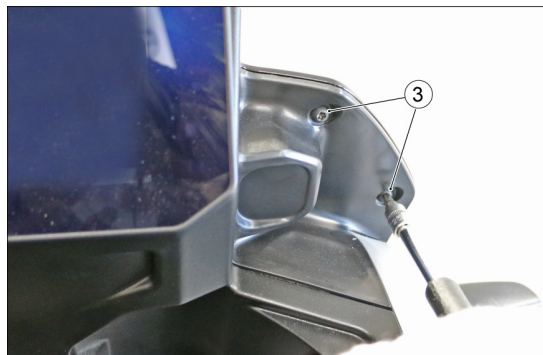
- First remove the windshield.
- Remove the four fixing screws (1).



- From the internal side of the top fairing, remove the two fixing screws (2) on the left.



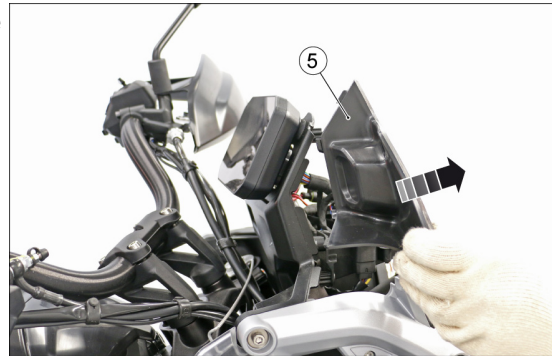
- From the internal side of the top fairing, remove the two fixing screws (3) on the right.



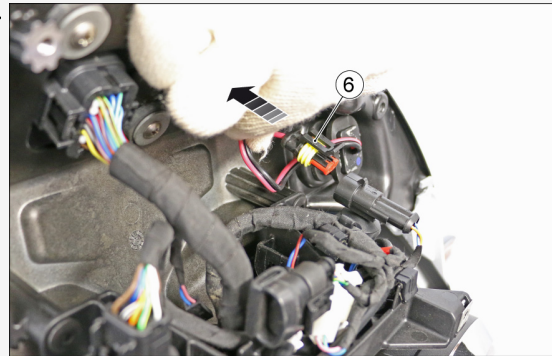
- Remove the front cover (4) of the fairing.



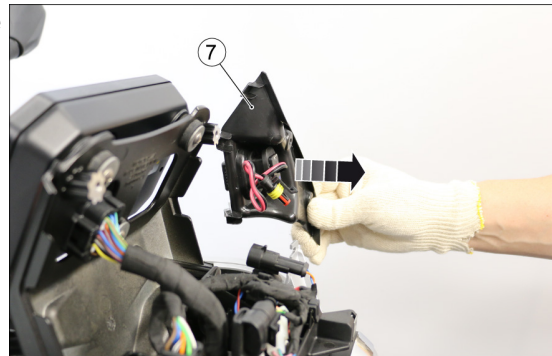
- Remove the right internal cover (5) of the fairing.



- On the left side, disconnect the connector (6) of the USB port.



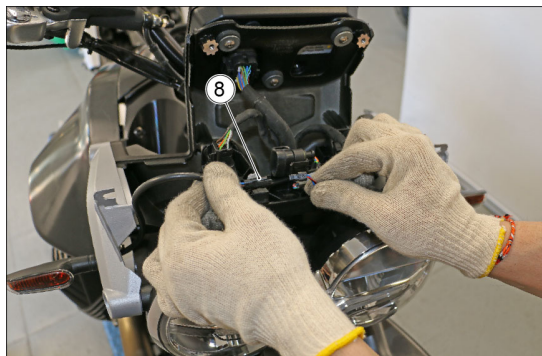
- Remove the left internal cover (7) of the fairing.



- Release the wiring harness from the instrument cluster support grommet.



- Disconnect the right turn indicator connector (8).



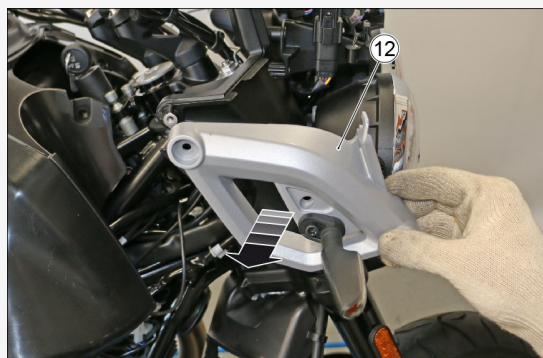
- Remove the two fixing screws (9) and then remove the right deflector (10) from the vehicle.



- Remove the three fixing screws (11).

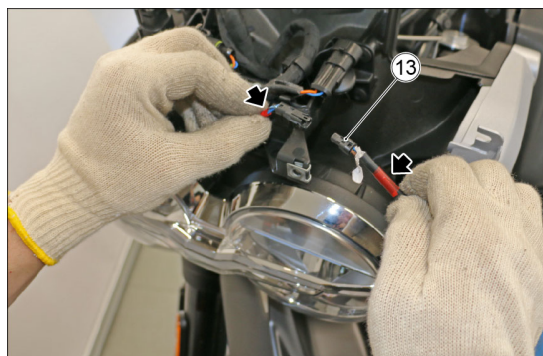


- Remove the right cover (12), complete with turn indicator, from the vehicle.

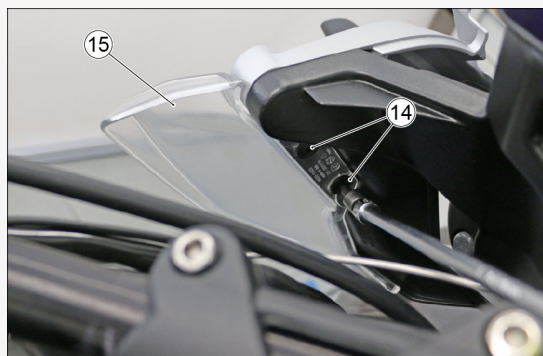


- Disconnect the connector (13) of the left-hand turn indicator.

To facilitate the identification, the wiring harness of the left turn indicator has a red marking.



- Remove the two fixing screws (14) and then remove the left deflector (15) from the vehicle.



- Remove the three fixing screws (16).

WARNING



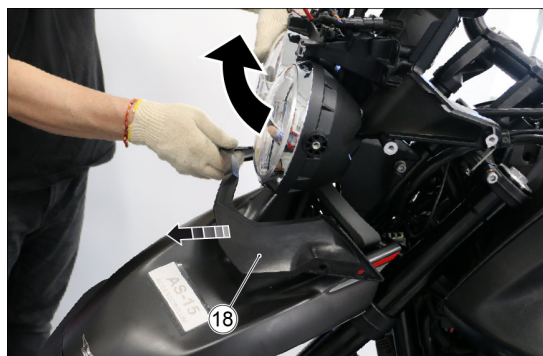
THE FRONT LIGHT ASSEMBLY WILL ONLY REMAIN ATTACHED TO THE LOWER FIXING. WHEN REMOVING THE SIDE COVERS OF THE TOP FAIRING, ROTATE IT DOWNWARDS AND TAKE CARE NOT TO DAMAGE IT.



- Remove the left-hand cover (17), complete with front turn indicator, from the vehicle.



- Lift the front light cluster to allow the removal of the lower cover (18) of the top fairing.

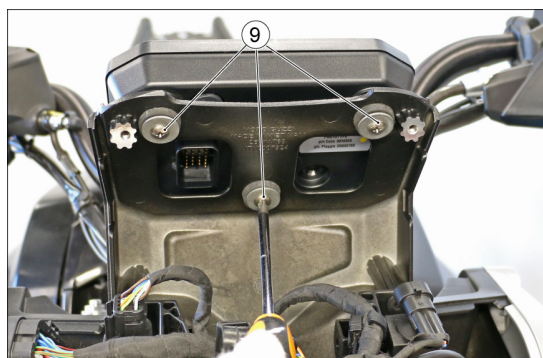


INSTRUMENT

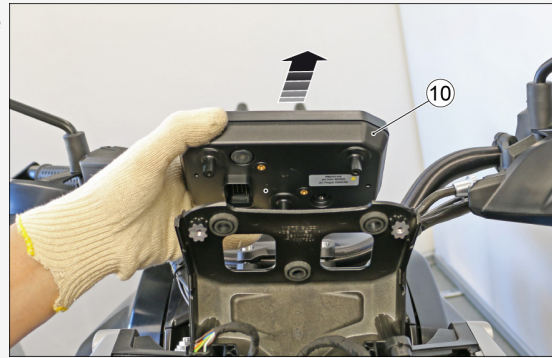
- Disconnect the connector (8).



- Remove the three fixing screws (9) and recover the relative washers.



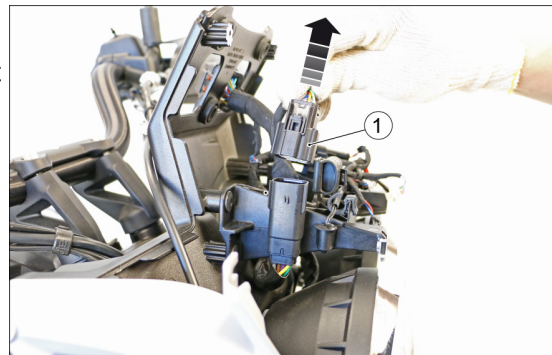
- Extract the instrument cluster from the three instrument cluster support bushings and remove it from the vehicle.



12.3 Front light cluster

Removal

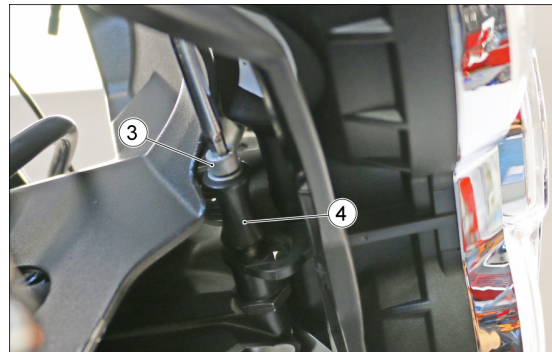
- First remove the top fairing and the front mudguard.
- Disconnect the headlight connector (1).



- Release the connector (2) from the instrument support.



- Remove the lower fixing screw (3) and retrieve the bushing (4).



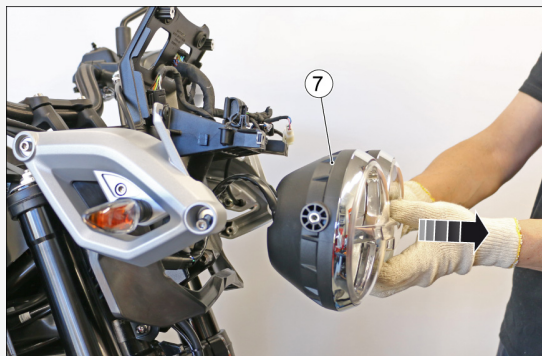
- Remove the right side fixing screw (5) and retrieve the corresponding washer.



- Remove the left side fixing screw (6) and retrieve the corresponding washer.



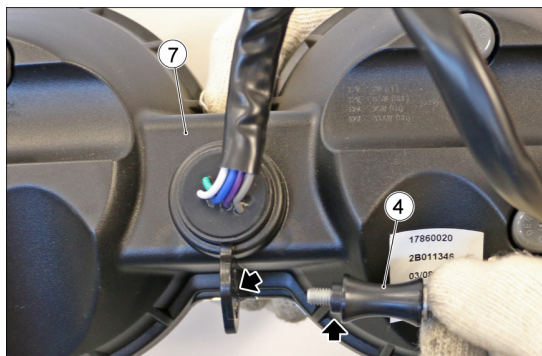
- Remove the front headlight unit (7) from the vehicle.



Installation

- Follow the removal procedure in reverse order.
- Make sure to position the bushing (4) as shown in the figure, so that the thrust washer of the bushing inserts into the slot of the light cluster (7).

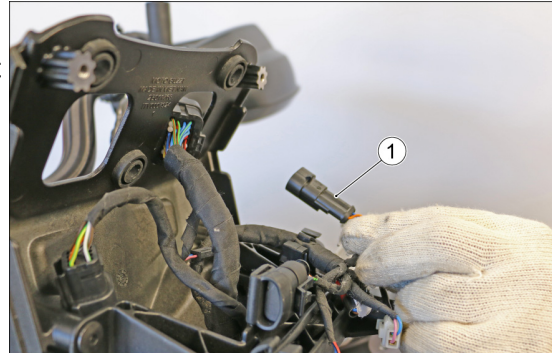
After completing the installation of the front headlight unit, adjust the light beam as shown in the chapter "**Maintenance - Headlamp adjustment**".



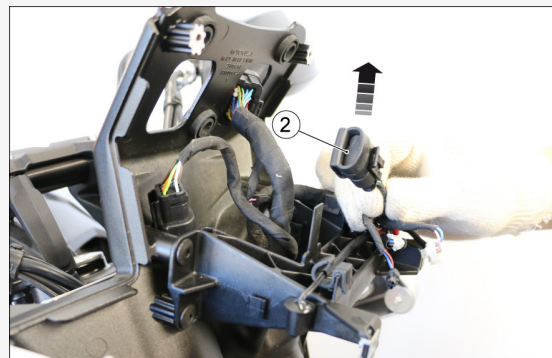
12.4 Instrument cluster support

Removal

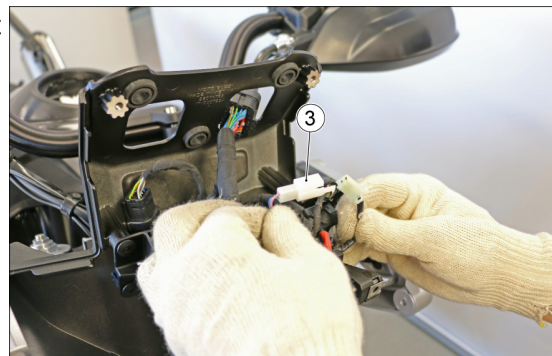
- First remove the top fairing, the instrument cluster and the headlight assembly.
- Disconnect the connector (1) from its retainer.



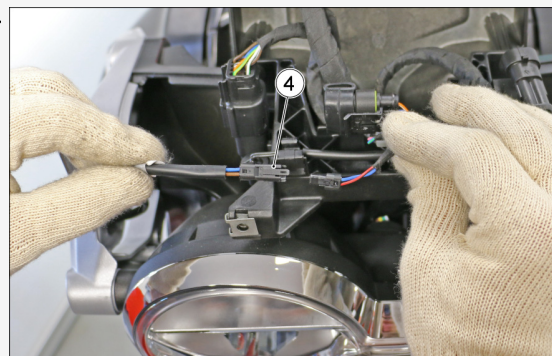
- Disconnect the connector (2) from its retainer.



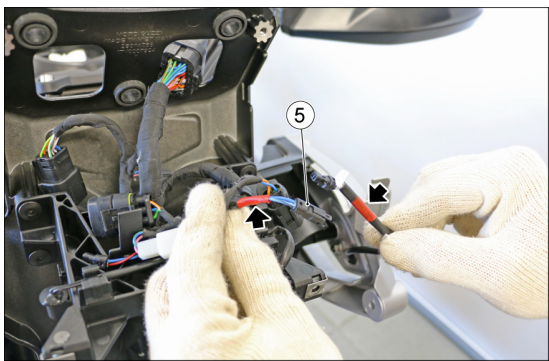
- Disconnect the connector (3) of the ambient temperature sensor.



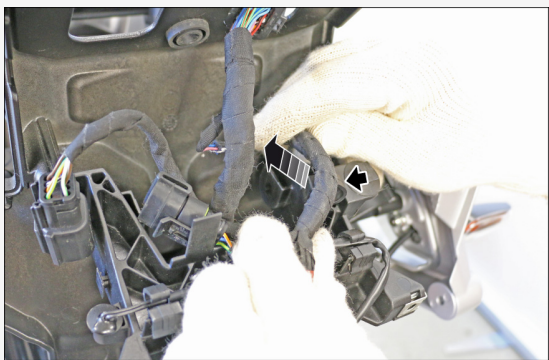
- Disconnect the right turn indicator connector (4).



- Disconnect the connector (5) of the left-hand turn indicator, recognizable by the RED marking on the wiring.



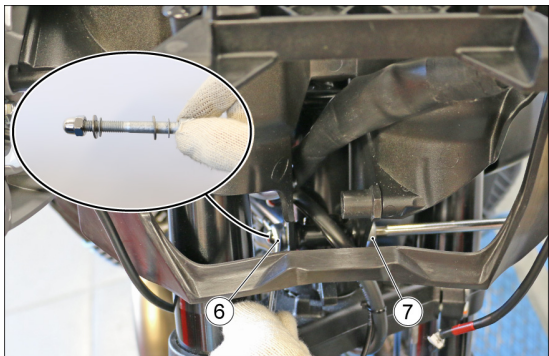
- Release the wiring harness from the instrument cluster support grommet.



- Unscrew the nut (6) and remove the lower fixing screw (7), making sure to retrieve the relative washers.

During refitting, tighten the nut (6) to the prescribed torque:

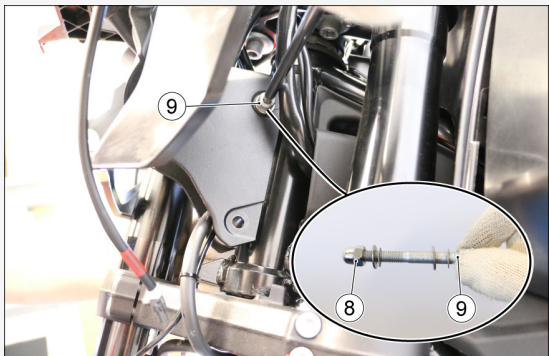
FUNCTION	DESCRIPTION / VALUE
Fixing of the instrument cluster support to frame	



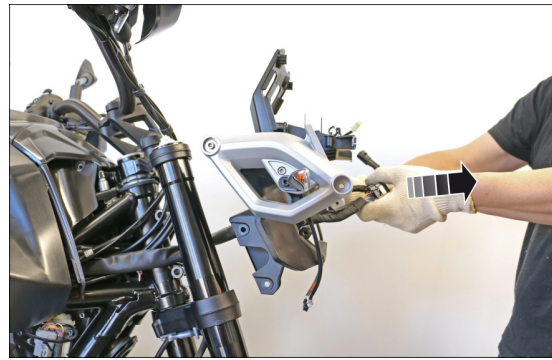
- Unscrew the nut (8) and remove the upper fixing screw (9), making sure to retrieve the relative washers.

During refitting, tighten the nut (8) to the prescribed torque:

FUNCTION	DESCRIPTION / VALUE
Fixing of the instrument cluster support to frame	



- Remove the instrument panel support from the vehicle, sliding the wiring harnesses inside it.



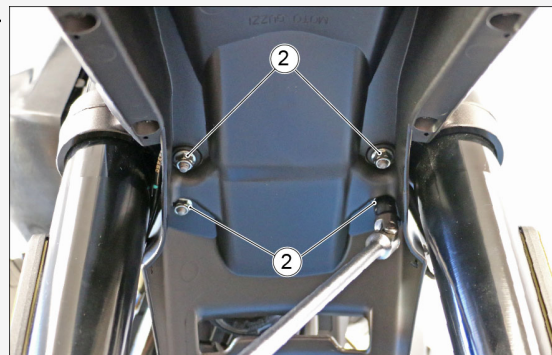
12.5 Front mudguard

Removal

- From the internal side, remove the cable gland (1) from the front mudguard.
- Repeat the operation for the cable gland on the opposite side.



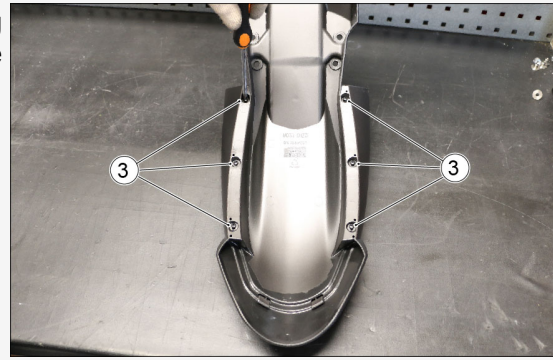
- Support the mudguard and remove the four fixing nuts (2) located on the lower side.



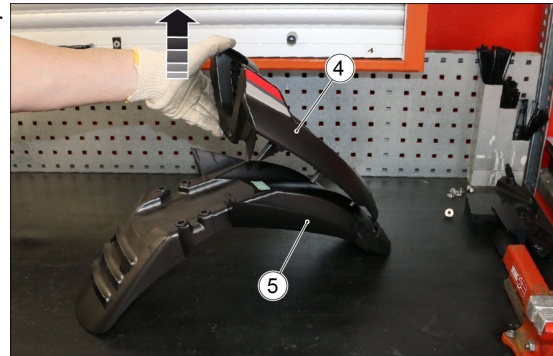
- Remove the front mudguard from the vehicle.



- On the workbench, remove the six fixing screws (3) located on the lower side of the mudguard



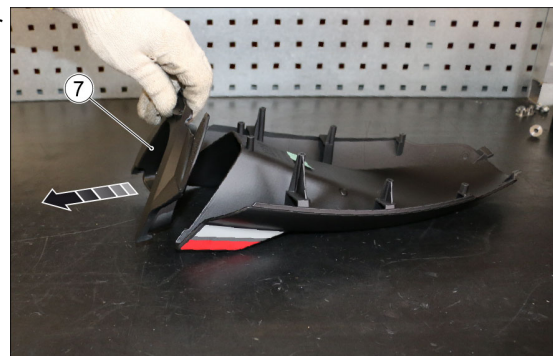
- Separate the upper part (4) from the lower one (5).



- Remove the two fastening screws (6).



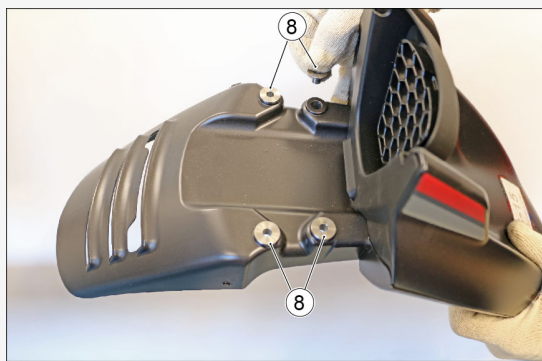
- Remove the front grille (7) from the upper part (4) of the mudguard.



Installation

For the reassembly operations, follow the removal procedures in reverse order, taking care to:

- Check the presence of the four bushings (8) inside the fixing holes of the mudguard.



- Position the front brake lines on both sides as shown in the figure.

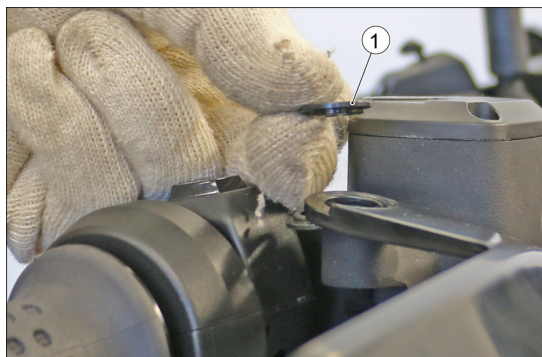


12.6 Hand-guards

Removal

- First remove the rear-view mirrors.
- Remove the upper thrust washer (1).

During refitting, make sure to position the washer as shown in the figure.



- Remove the lower thrust washer (2).

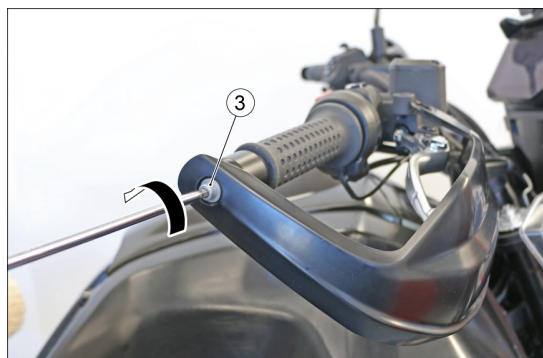
During refitting, make sure to position the washer as shown in the figure.



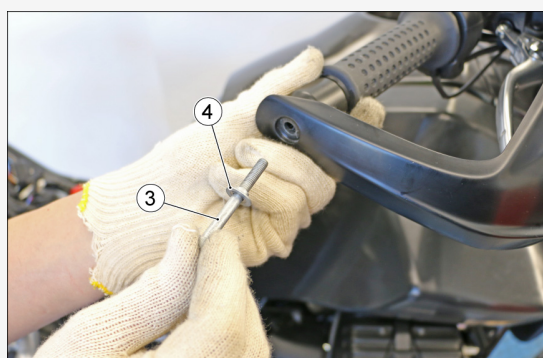
- Unscrew the fixing screw (3).

During refitting, tighten the fixing screw (3) to the prescribed torque:

FUNCTION	DESCRIPTION / VALUE
Fastening handguard / anti-vibration weight to handlebar	$6 \pm 0.6 \text{ Nm}$ ($4.43 \pm 0.44 \text{ lb ft}$)

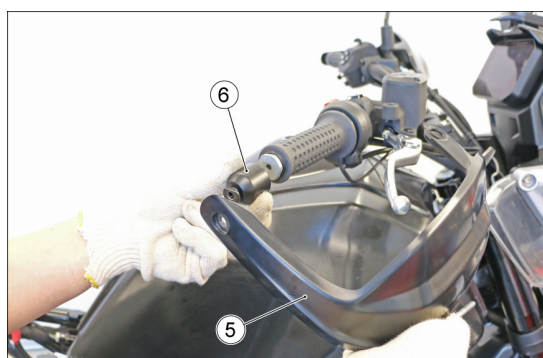


- Support the hand guard and the counterweight of the handlebar, then remove the fixing screw (3) and the bushing (4).



- Remove the hand guard (5) and the counterweight of the handlebar (6).

Repeat the operations for the hand guard on the opposite side.

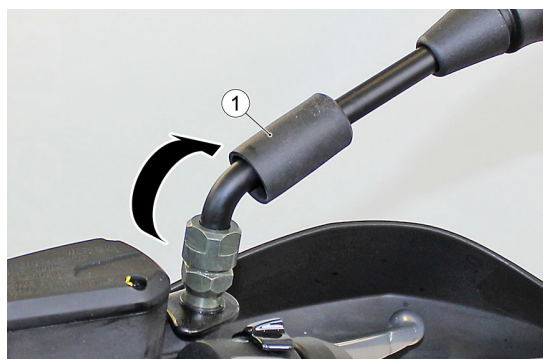


12.7 Rear-view mirrors

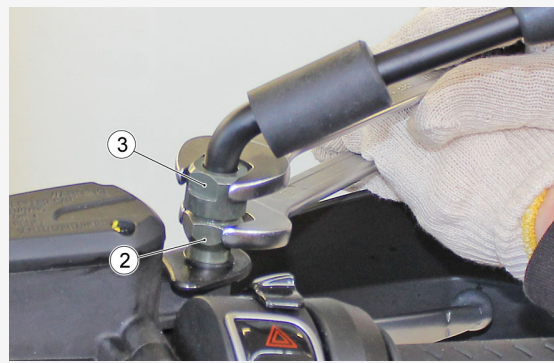
REMOVAL

The following procedure is described for a single rear view mirror, but is valid for both mirrors.

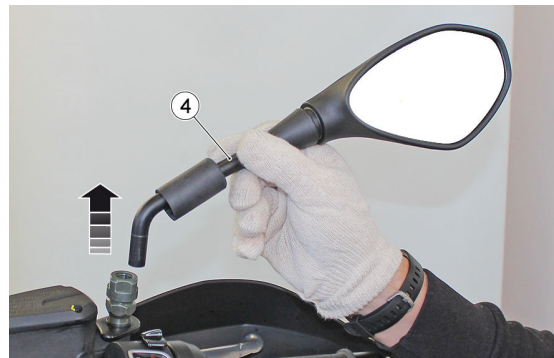
- Remove the rubber piece (1)



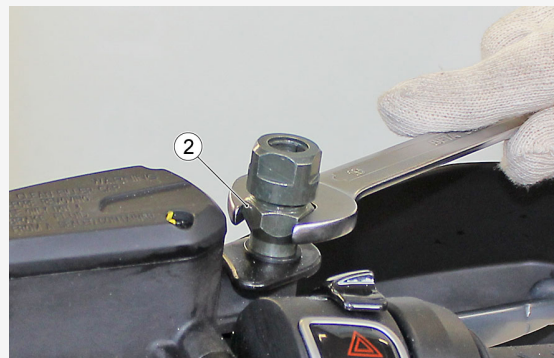
- Holding the locknut (2) so it cannot rotate, loosen the nut (3)



- Remove the rear view mirror (4)



- Undo and remove the locknut (2)



12.8 Saddle

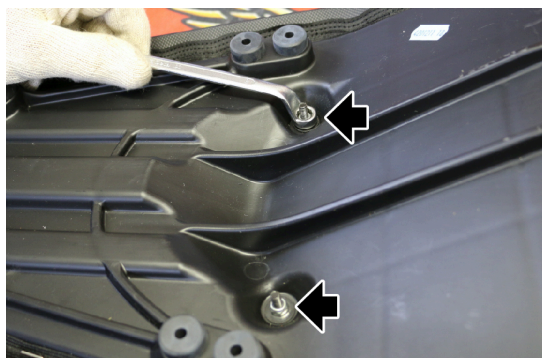
- Rotate the key clockwise to remove the saddle, slightly press the centre of the saddle's rear part in order to unhook the pin easily and lift it.



- Unhook the front part of the saddle and remove it



- Remove the two self-locking nuts fixing the lumbar support



- Recover the two washers before removing the lumbar support.



- Remove the lumbar support



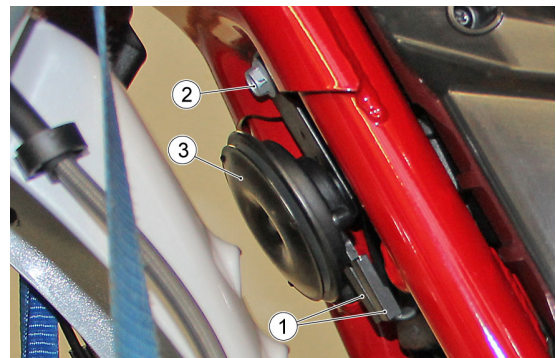
- To remove and eventually replace the rubber supports, simply turn them slightly and pull them outwards.



12.9 Horn

REMOVAL

- Disconnect the connectors (1)
- Undo and remove the screw (2)
- Remove the horn (3)



12.10 Turn indicators

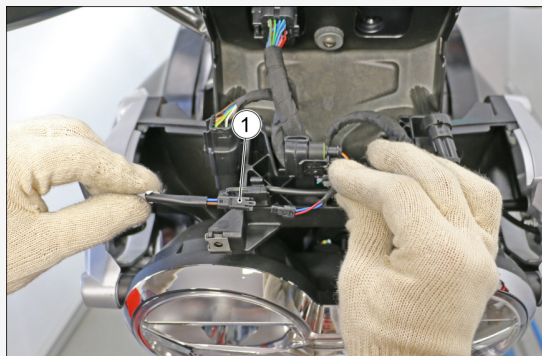
Removal

Front

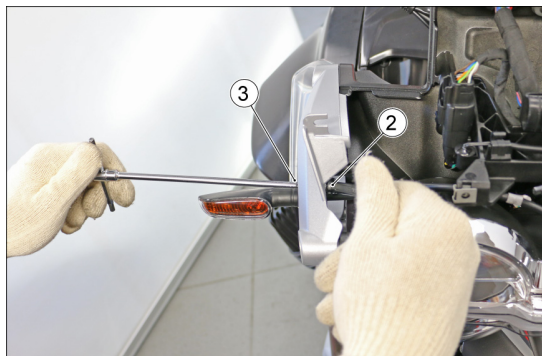
- First remove the windshield and the top fairing.
- Release the wiring harness from the instrument cluster support grommet.



- Disconnect the right turn indicator connector (1).

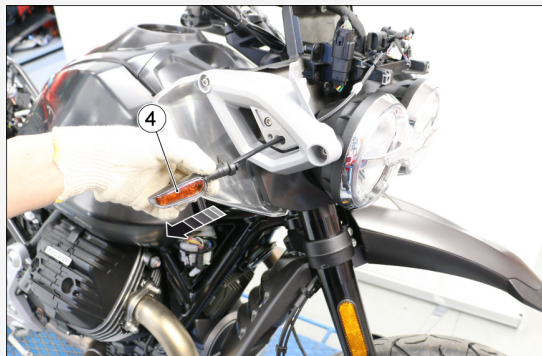


- Holding in the lock nut (2), unscrew and remove the fastening screw (3).



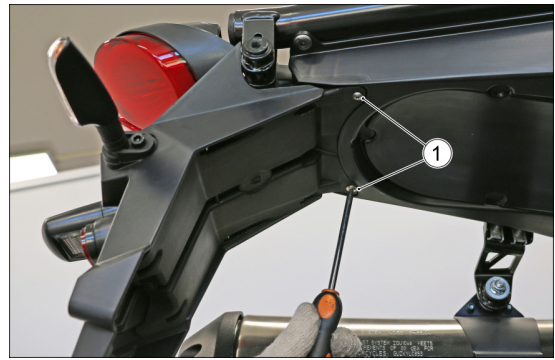
- Remove the right turn indicator (4) from the vehicle.

Repeat the operation for the left turn indicator, which has a **RED** marking on the wiring harness for identification.

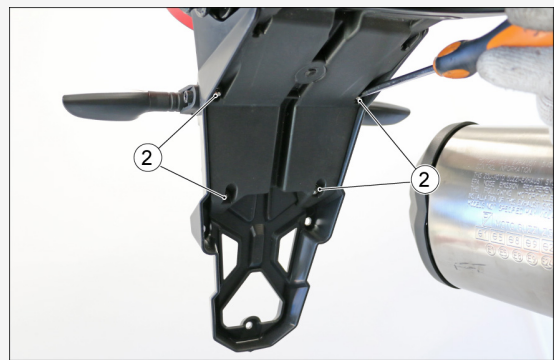


rear

- Remove the two upper fixing screws (1).



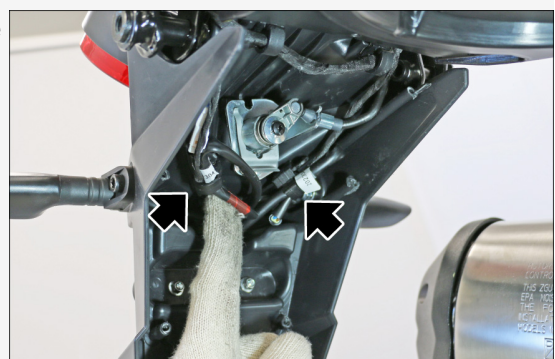
- Remove the four fixing screws (2).



- Remove the lower fastener (3) of the number plate holder



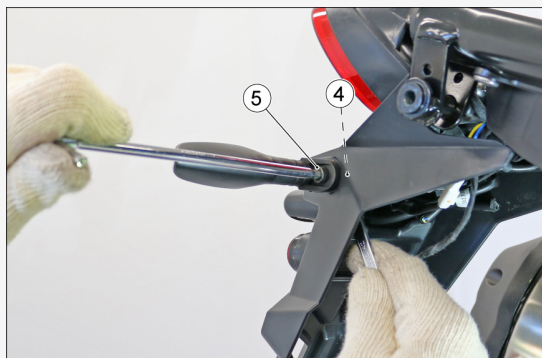
- Remove the wiring harness from the relative fastenings of the number plate holder.



- Disconnect the wiring harness of the right turn indicator, recognizable by the **RED** marking on the harness itself.

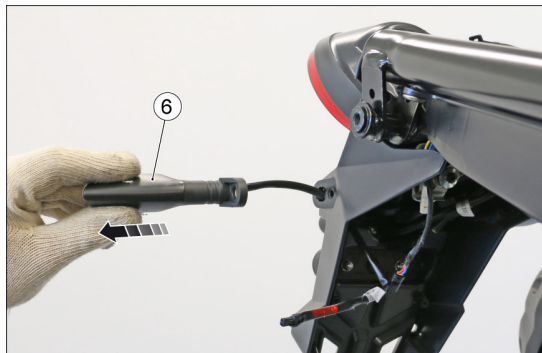


- Blocking the rotation of the nut (4), unscrew and remove the fixing screw (5).



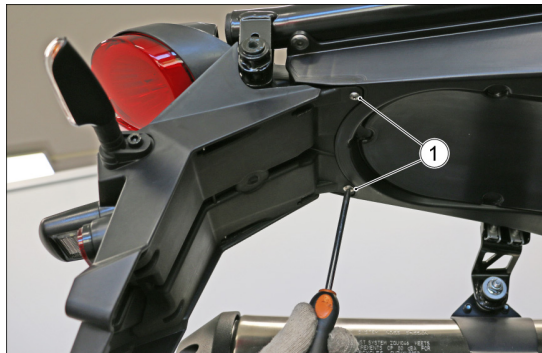
- Remove the right turn indicator (6) from the licence plate holder.

Repeat the operation for the left turn indicator

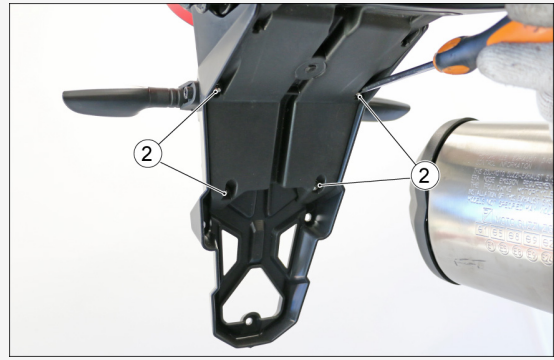


12.11 lock removal

- Remove the two upper fixing screws (1).



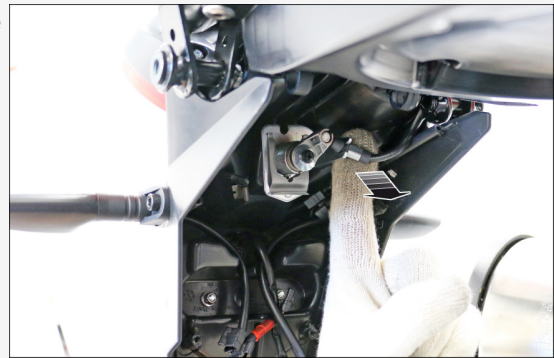
- Remove the four fixing screws (2).



- Remove the lower fastener (3) of the number plate holder.



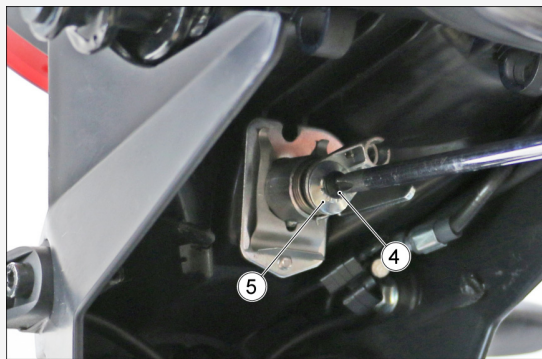
- Release the sheath from the relative retainer.



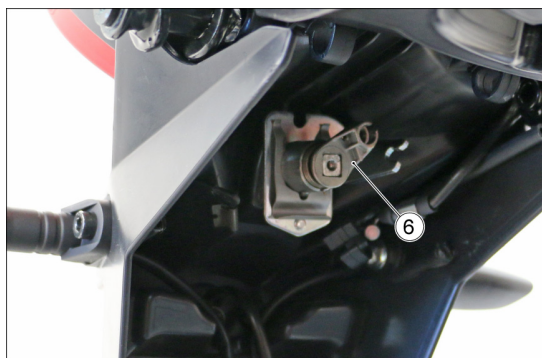
- Remove the cable from the operating lever.



- Remove the screw (4) and washer (5).



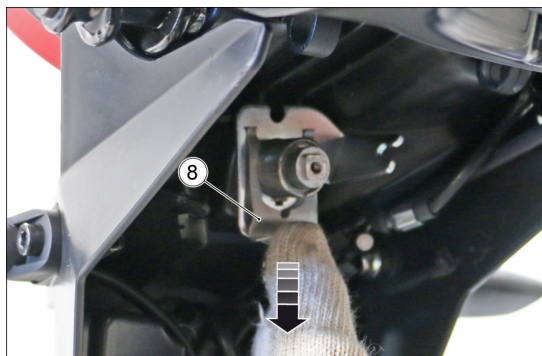
- Remove the operating lever (6).



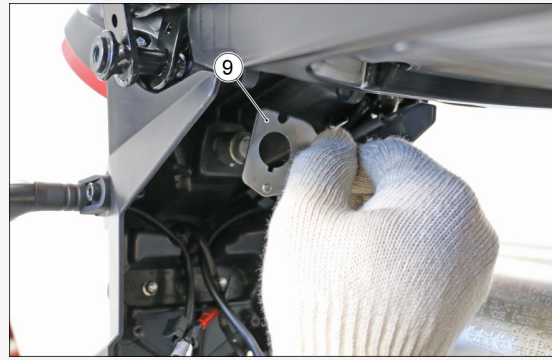
- Remove the return spring (7) of the lever.



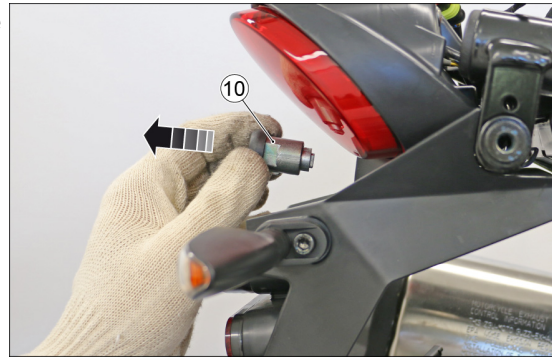
- Remove the retaining spring (8) pulling it downwards.



- Retrieve the fixing plate (9).



- Remove the pawl (10) of the lock from the rear side of the vehicle.



12.12 Rear tail fairing

V85 TT - V85 TT TRAVEL

Removal

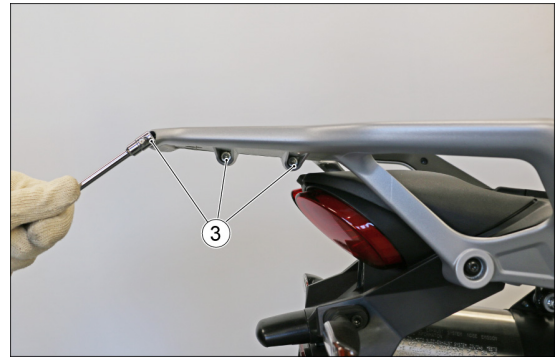
- First remove the saddle.
- Remove the four fixing screws (1) of the luggage rack cover.



- Remove the luggage rack cover (2).



- Remove the three fixing screws (3).



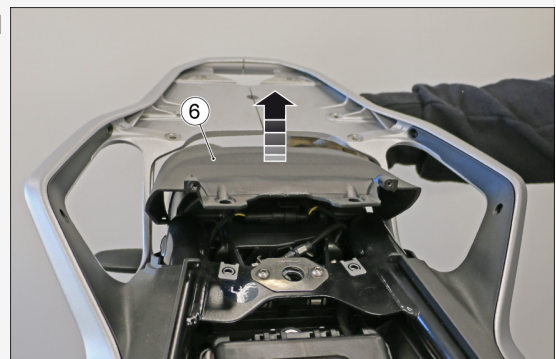
- Remove the fixing screws (4).



- Remove the fixing screws (5).



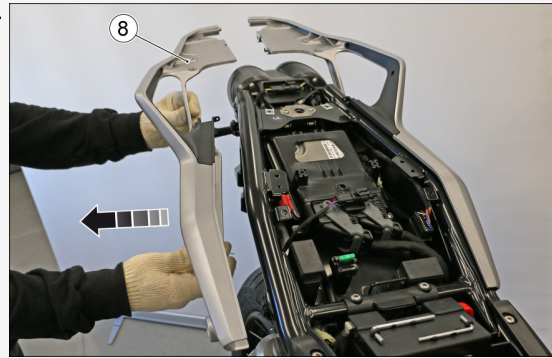
- Lift the upper cover (6) of the taillight and remove it from the vehicle.



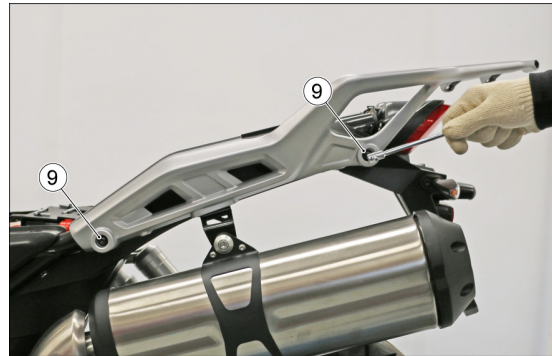
- Remove the two fixing screws (7) of the right side passenger grab handle.



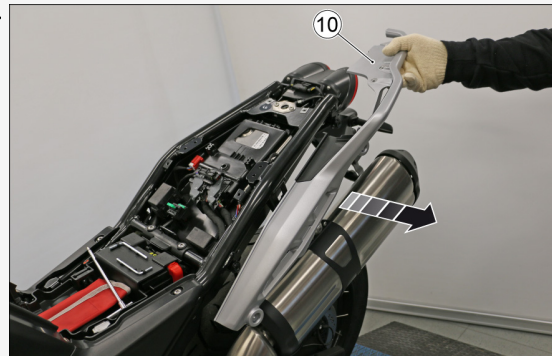
- Separate the right side (8) of the passenger grab handle and remove it from the vehicle.



- Remove the two side fixing screws (9) on the left hand side of the vehicle.

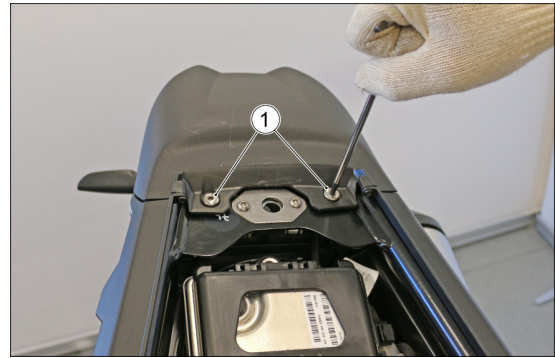


- Remove the left side (10) of the passenger grab handle from the vehicle.



V85 TT STRADA**Removal**

- First remove the saddle.
- Remove the two fastening screws (1).



- Remove the two fastening screws (2).



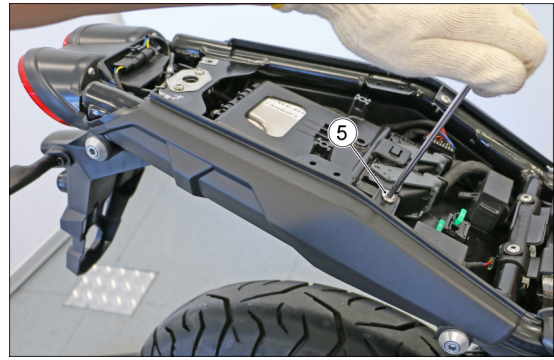
- Remove the two fastening screws (3).



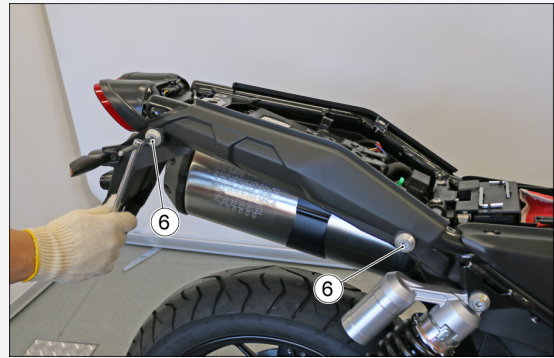
- Remove the upper cover (4) of the taillight from the vehicle.



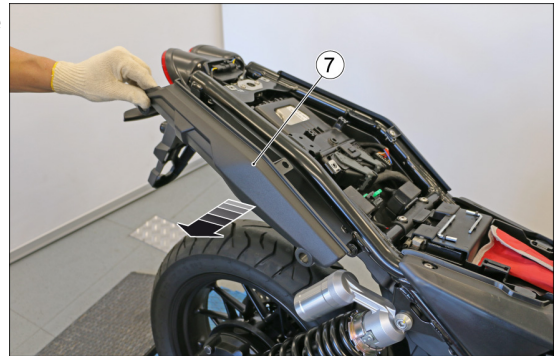
- Remove the upper fastener screw (5).



- Remove the two side fastening screws (6).

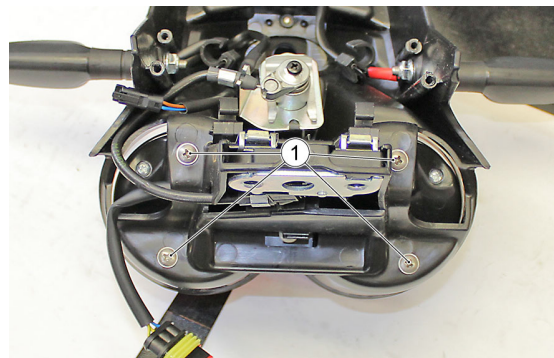


- Remove the rear right fairing (7) from the vehicle.
- Repeat the operation for the rear left fairing.

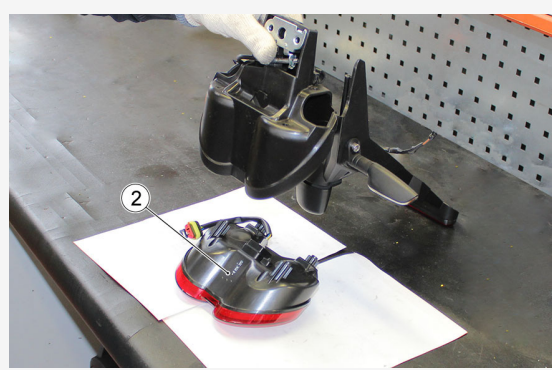


12.13 Rear light assembly

- Remove the licence plate holder bracket
- Unscrew and remove the screws (1)



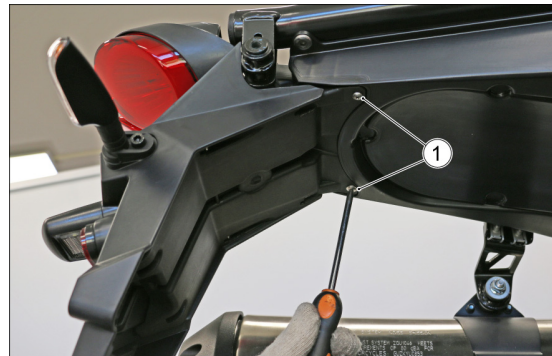
- Remove the rear light assembly (2)



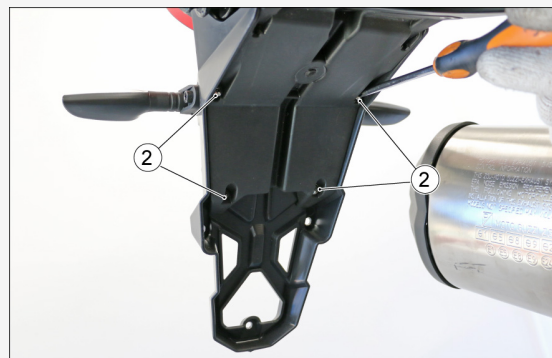
12.14 Number plate light

Removal

- Remove the two upper fixing screws (1).



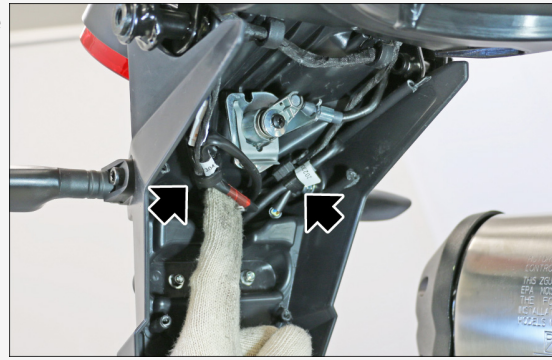
- Remove the four fixing screws (2).



- Remove the lower fastener (3) of the number plate holder



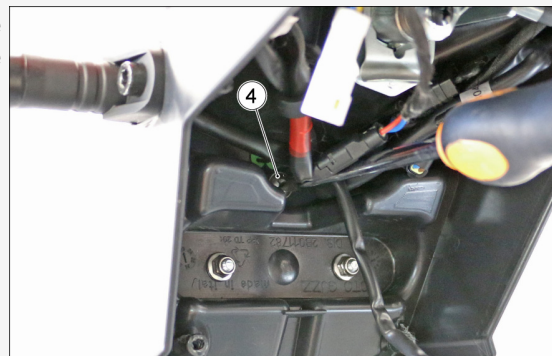
- Remove the wiring harness from the relative fastenings of the number plate holder.



- Disconnect the wiring harness of the licence plate light, identifiable by the **WHITE** colour of the connectors.



- From the internal side of the license plate holder, remove the fixing screw (4) of the license plate light.



- Remove the licence plate light (5) from the licence plate holder.



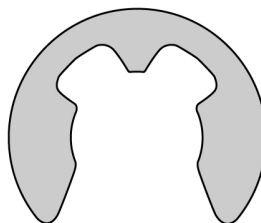
12.15 Footrest

ATTENTION



IF THE TYPE "1" SEEGER-RINGS ARE PRESENT, REPLACE THEM WITH TYPE "2" ONES.

①



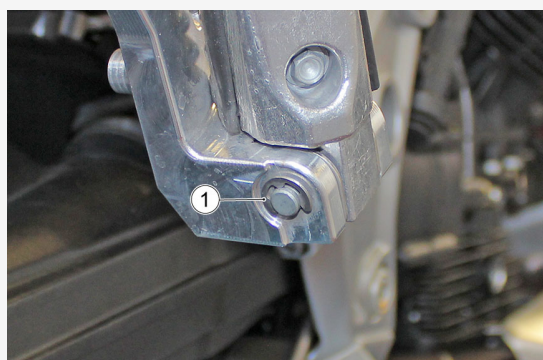
②



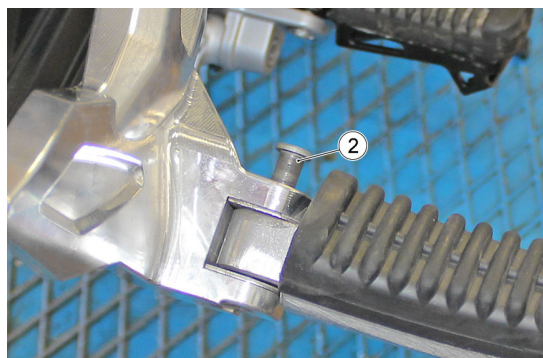
REMOVING THE PASSENGER FOOTRESTS

The following procedure is described for a single footrest, but is valid for both passenger footrests.

- Remove the snap ring(1)



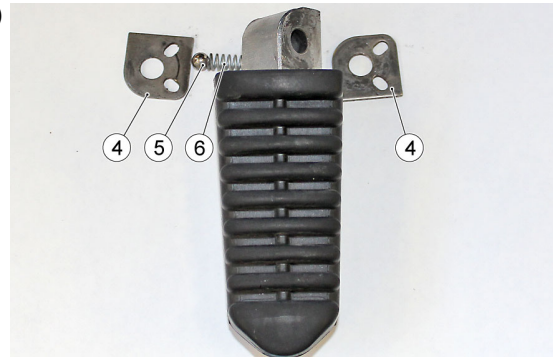
- Remove the pin (2)



- Remove the passenger footrest (3)



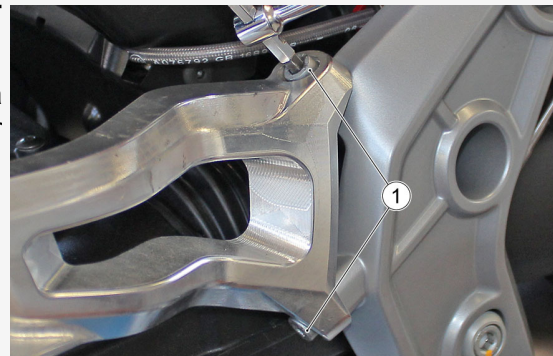
- Retrieve the two plates (4), the sphere (5) and the spring (6)



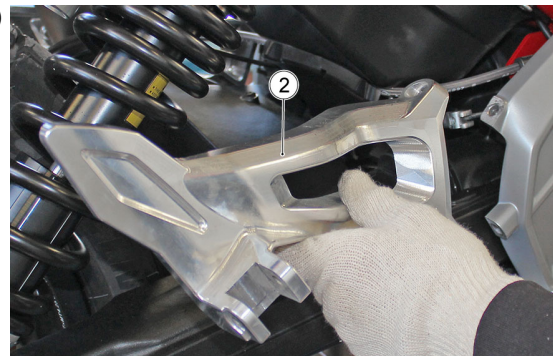
REMOVING THE PASSENGER FOOTREST SUPPORT

The following procedure is described for a single bracket, but is valid for both passenger footrest brackets.

- Unscrew and remove the two screws (1)



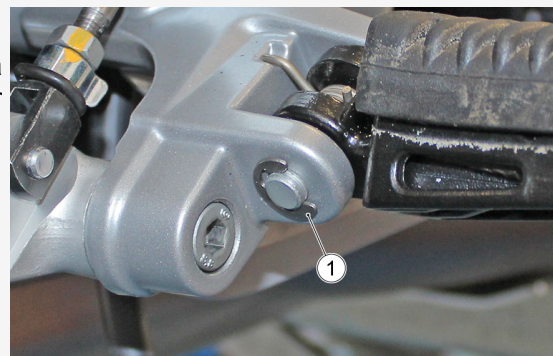
- Remove the passenger footrest bracket (2)



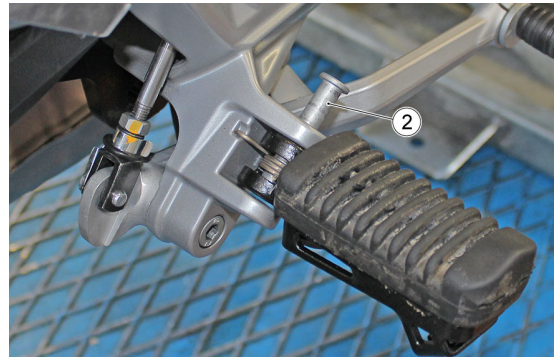
RIDER FOOTREST REMOVAL

The following procedure is described for a single footrest, but is valid for both rider footrests.

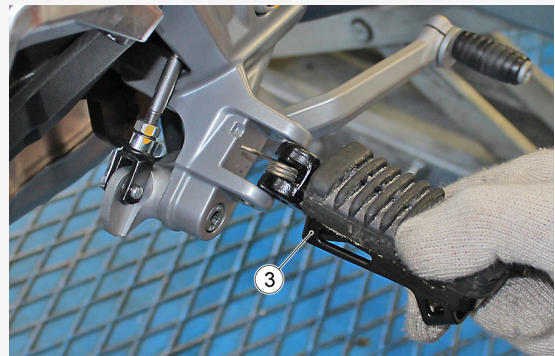
- Remove the snap ring(1)



- Remove the pin (2)

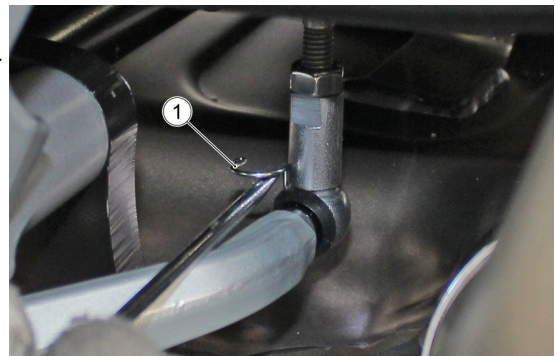


- Remove the rider footrest (3)

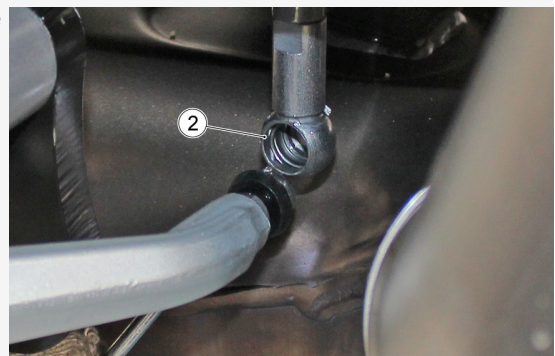


REMOVING THE GEAR SHIFT LEVER

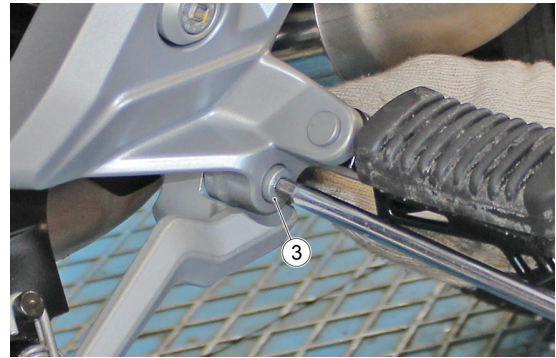
- Remove the safety clip (1) from the gear shift lever



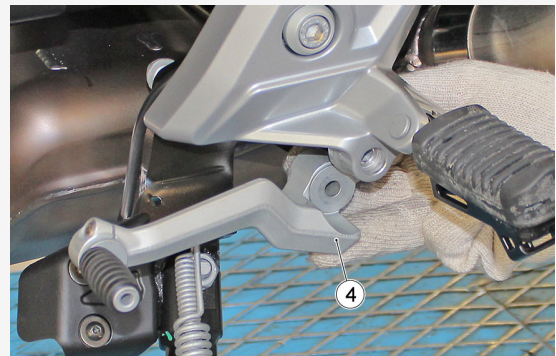
- Remove the gear shift lever from the spherical joint (2)



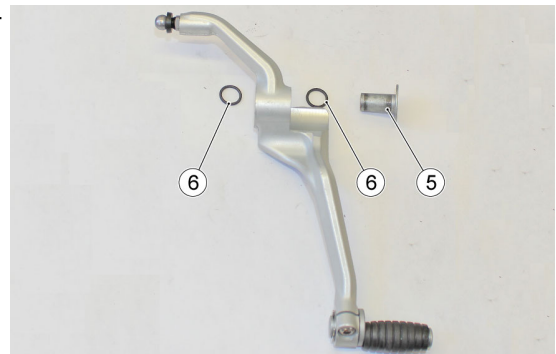
- Undo and remove the screw (3)



- Remove the gear lever (4)

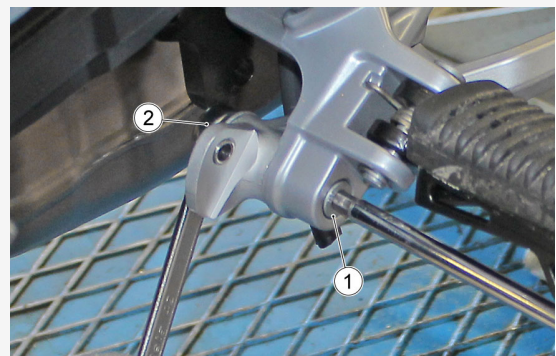


- Retrieve the bushing (5) and the two O-rings (6)

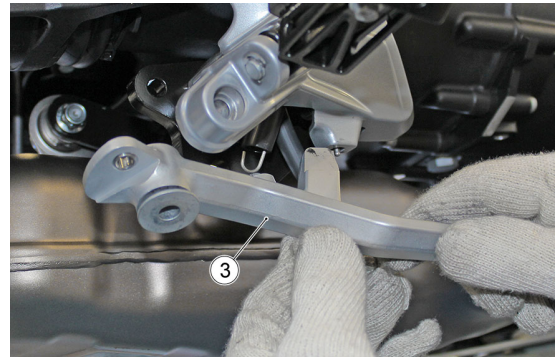


REMOVING THE REAR BRAKE LEVER

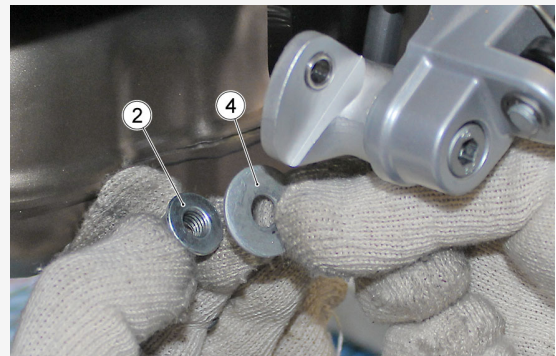
- Holding the nut (2) so that it cannot rotate, remove the screw (1)



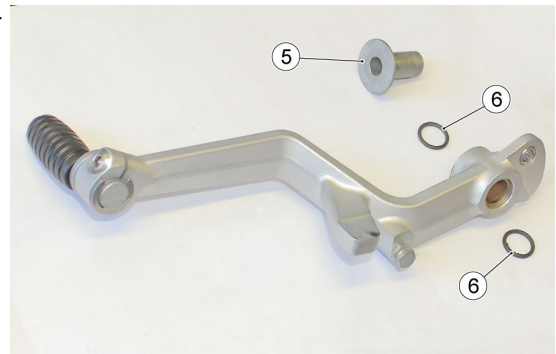
- Remove the rear brake lever (3)



- Retrieve the nut (2) and the washer (4)



- Retrieve the bushing (5) and the two O-rings (6)

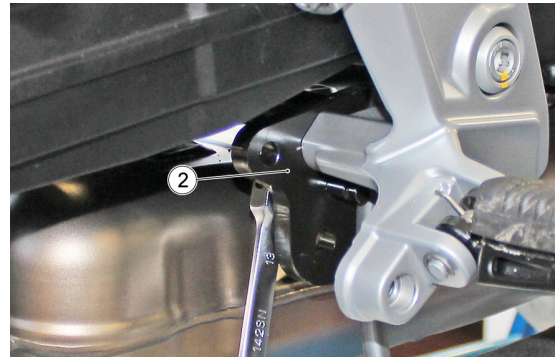


RIGHT RIDER FOOTREST BRACKET REMOVAL

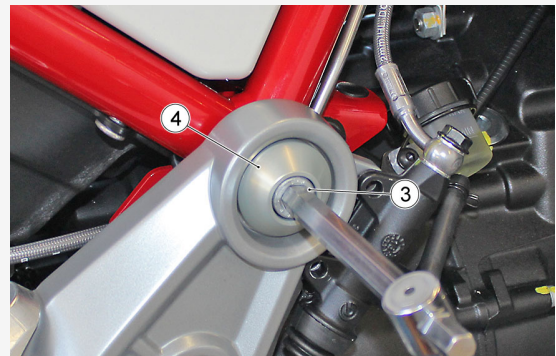
- Remove the rear brake master cylinder, brake master cylinder plunger and front brake lever
- Undo and remove the screw (1)



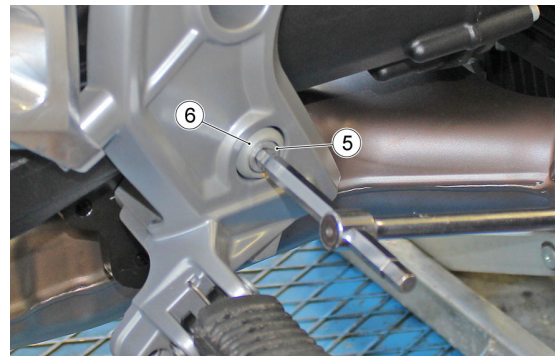
- Undo and remove the screw (2)



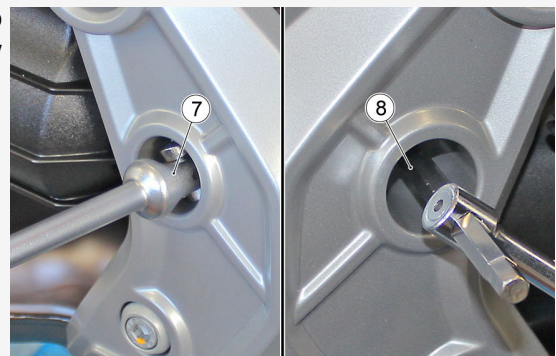
- Undo and remove the screw (3)
- Retrieve the bushing (4)



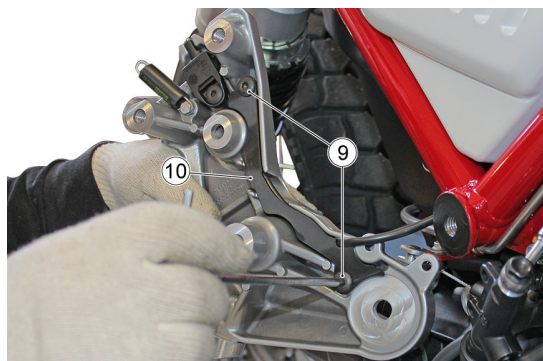
- Undo and remove the screw (5)
- Retrieve the bushing (6)



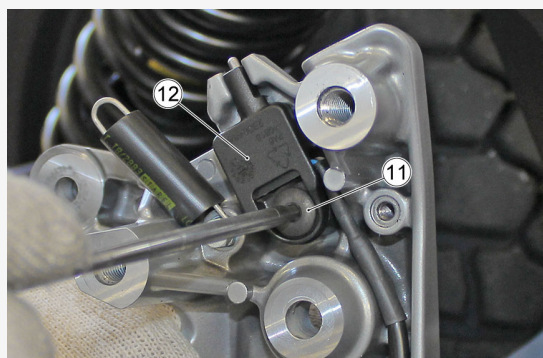
- Hold the nut (7) from the opposite side so that it cannot rotate and remove the screw (8)



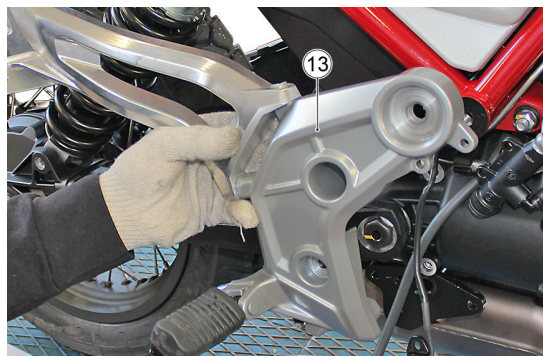
- Rotate the plate 180°, undo and remove the screws (9) and remove the bracket (10)



- Undo and remove the screw (11) and remove the sensor (12) from the bracket

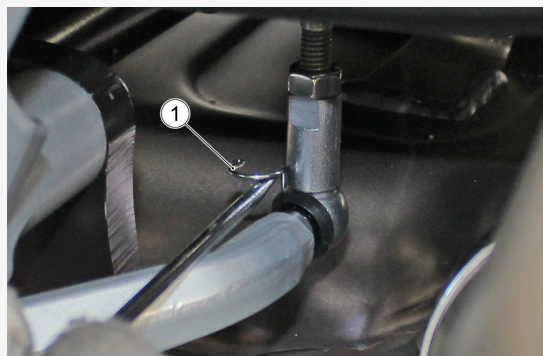


- Remove the right rider footrest bracket plate (13)
- Remove the passenger footrest bracket

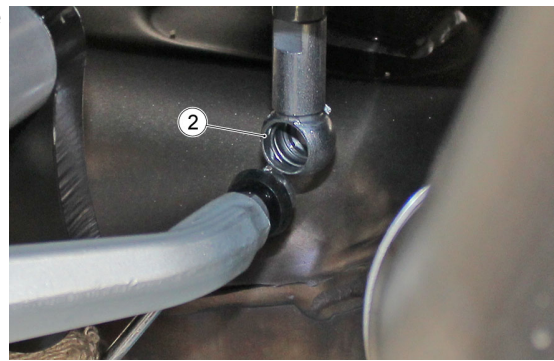


LEFT RIDER FOOTREST BRACKET REMOVAL

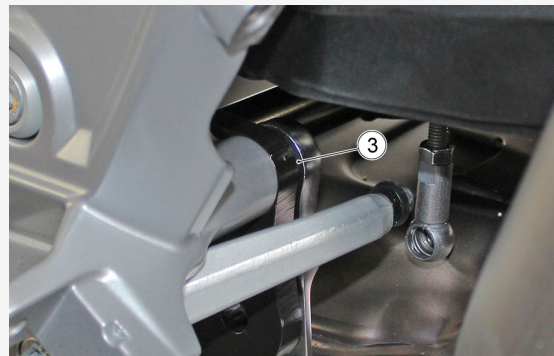
- Remove the safety clip (1)



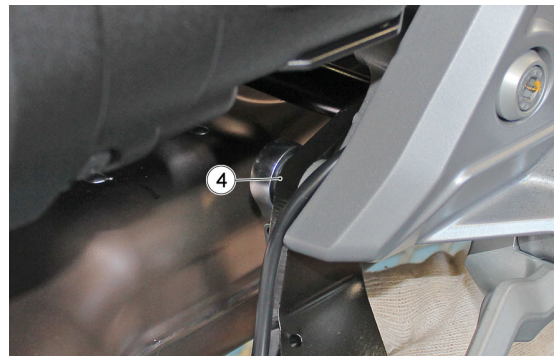
- Remove the gear shift lever from the spherical joint (2)



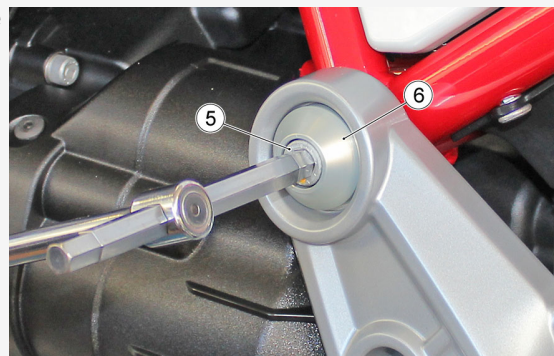
- Undo and remove the screw (3)



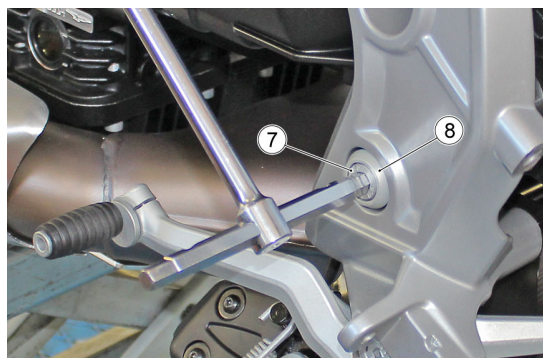
- Undo and remove the screw (4)



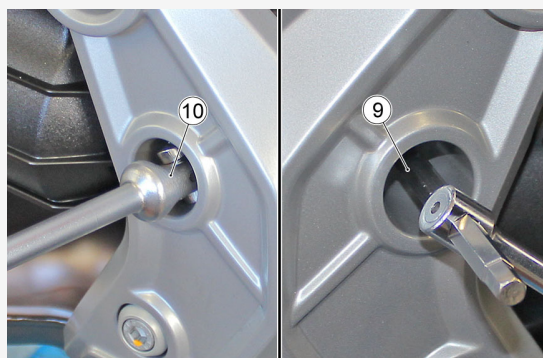
- Undo and remove the screw (5) and retrieve the bushing (6)



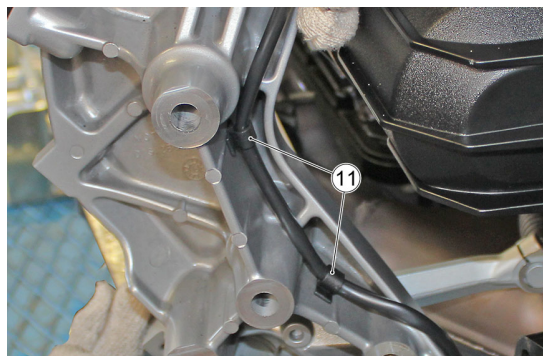
- Undo and remove the screw (7) and retrieve the bushing (8)



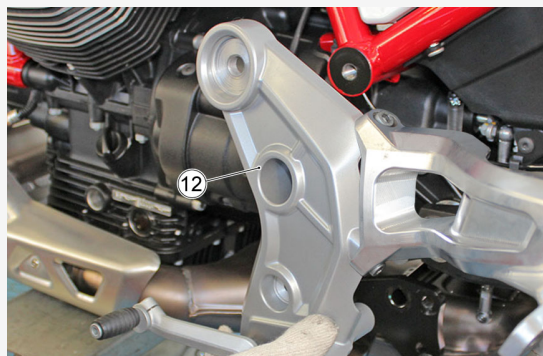
- Holding the screw (9) from the opposite side so that it cannot rotate, undo and remove the nut (10)



- Rotate the plate 180° and remove the two cable grommets (11)



- Remove the left rider footrest bracket plate (12)



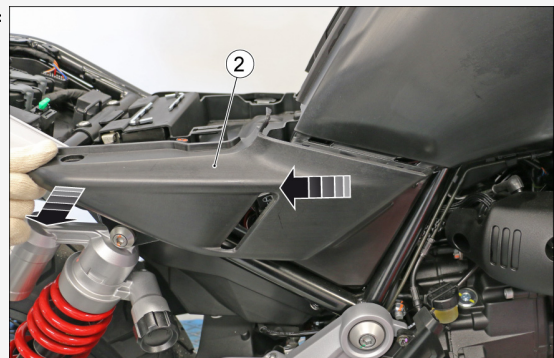
12.16 Side fairings

Removal

- First remove the saddle.
- Unscrew the two fastening screws (1).



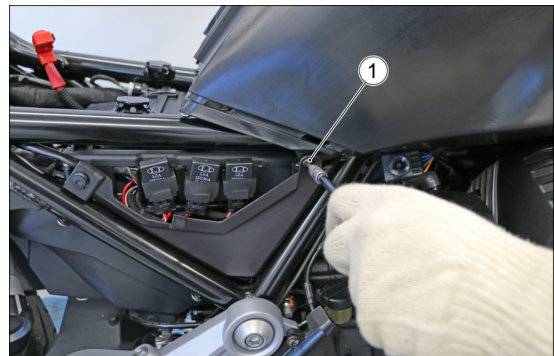
- Move the side fairing (2) towards the rear of the vehicle and remove it from the vehicle.
- Repeat the operations for the side fairing on the opposite side.



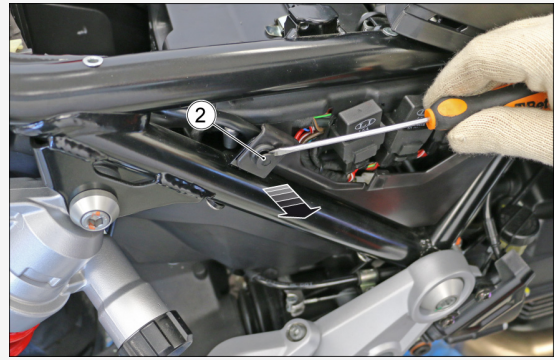
12.17 Lateral underfairings

Removal

- Remove the side panels beforehand.
- Remove the fixing screw (1).

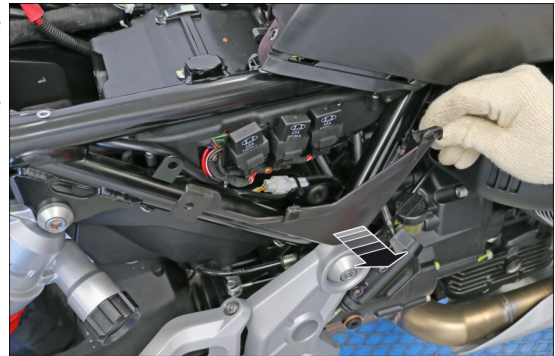


- Remove the expansion cap (2).

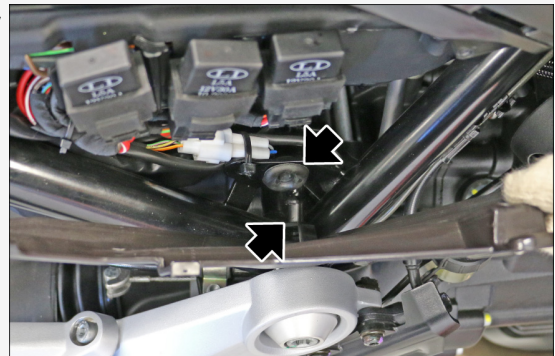


- Remove the lateral underfairing from the vehicle, extracting it outwards.

Repeat the operations for the removal of the underfairing on the opposite side.



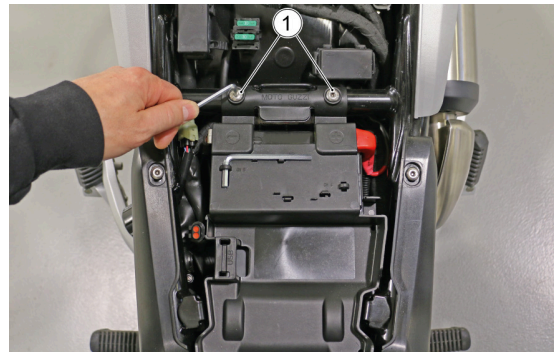
- During **reassembly**, make sure to properly fit the lower fixing stud in its housing.



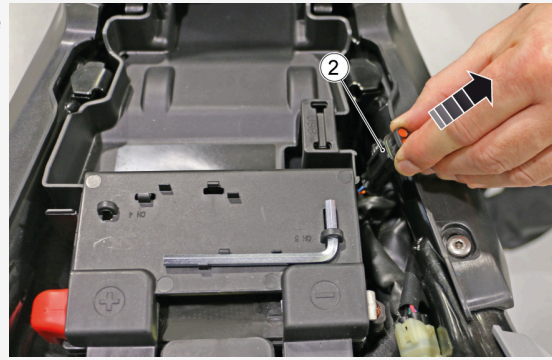
12.18 Glove-box

Removal

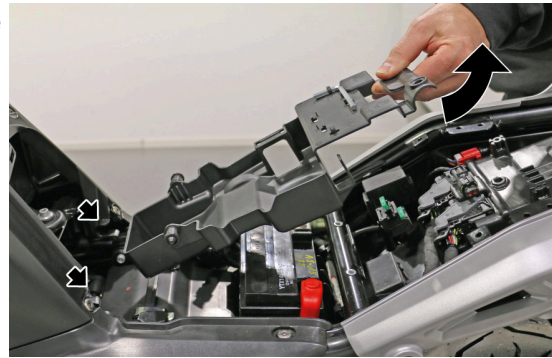
- Remove the saddle
- Unscrew and remove the screws (1)



- Release the connector (2) from storage compartment.



- Unhook the storage compartment from the front part and remove it.

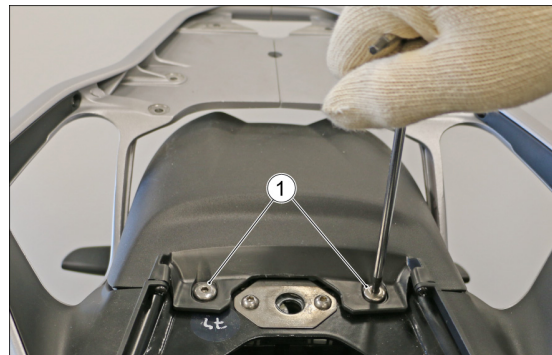


12.19 Licence plate mount

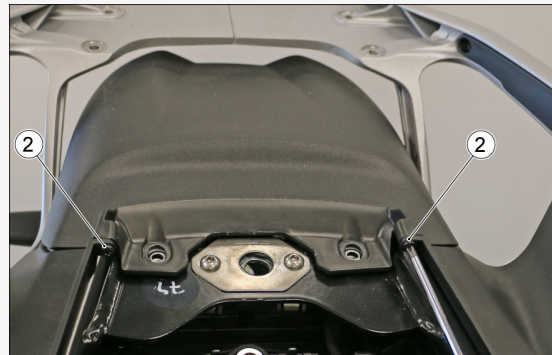
Removal

For **V85 TT Strada** first remove the rear tail fairing.

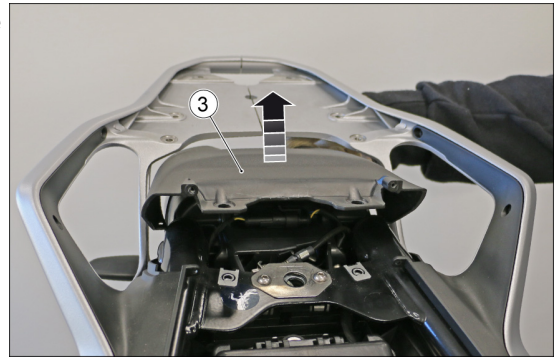
- Remove the two fastening screws (1).



- Remove the two fastening screws (2).



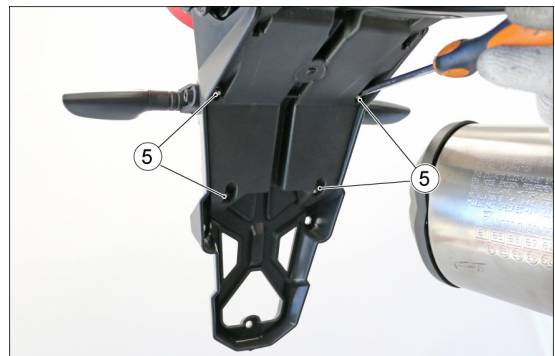
- Remove the upper fastener (3) of the taillight.



- Remove the two upper fixing screws (4).



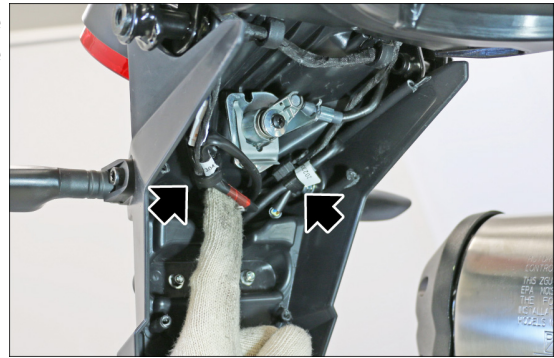
- Remove the four fixing screws (5).



- Remove the lower fastener (6) of the number plate holder.



- Remove the wiring harnesses from the relative fastenings of the number plate holder.



- Disconnect the wiring harness of the right turn indicator, recognizable by the **RED** marking on the harness itself



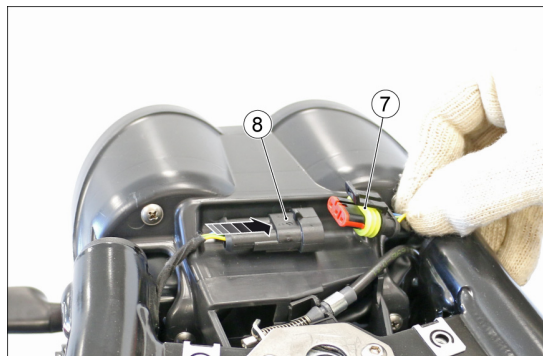
- Disconnect the wiring harness of the licence plate light, identifiable by the **WHITE** colour of the connectors.



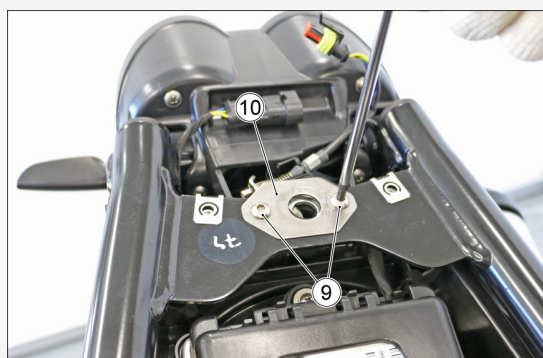
- Disconnect the wiring harness of the left turn indicator



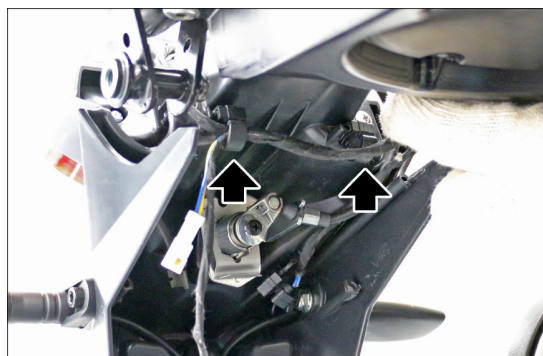
- Disconnect the connector (7) and remove the connector (8) from the fastening on the taillight.



- Support the taillight and remove the two fixing screws (9) of the lock and recover the relevant plate (10).



- Slightly extract the number plate holder, complete with taillight, from the vehicle.
- Release the wiring harnesses from the relative fastenings of the number plate holder.



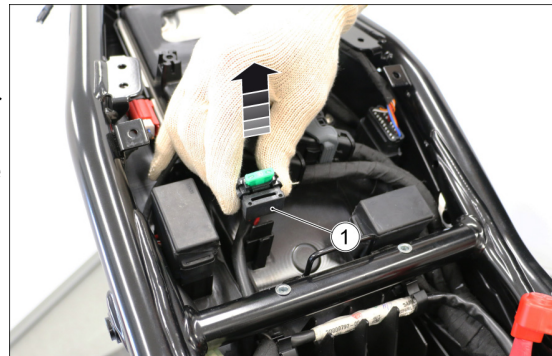
- Remove the license plate holder together with the taillight unit from the vehicle.
- Remove the taillight.
- Remove the licence plate light.
- Remove the rear turn indicators.



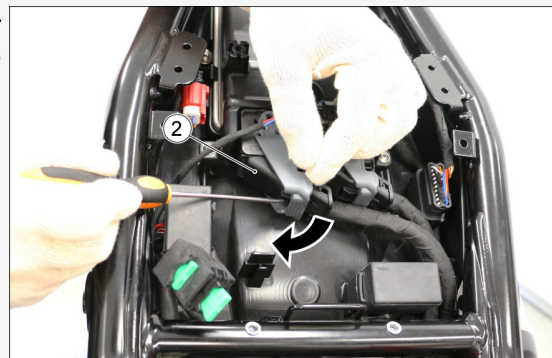
12.20 Rear wheel arch

Removal

- First remove: saddle, side panels, battery, air filter box cover, tail fairing and rear license plate holder.
- Release the main fuse-holder (1) from the wheel arch support.



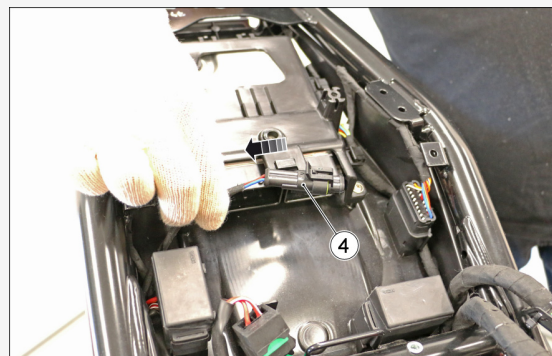
- Press the safety tab, rotate the trigger lever and disconnect the connector (2) from the E.C.U.



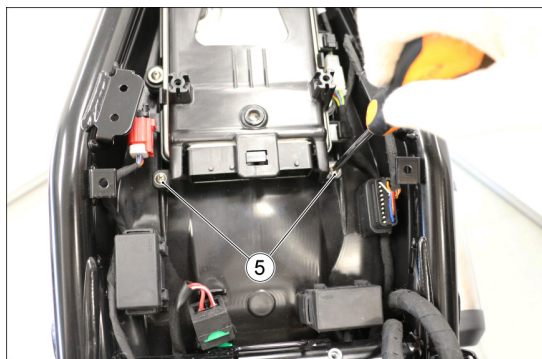
- Press the safety tab, rotate the trigger lever and disconnect the connector (3) from the E.C.U.



- Release the connector (4) from the ECU support.



- Remove the two fastening screws (5).



- Remove the upper fastener (6) of the ECU support.



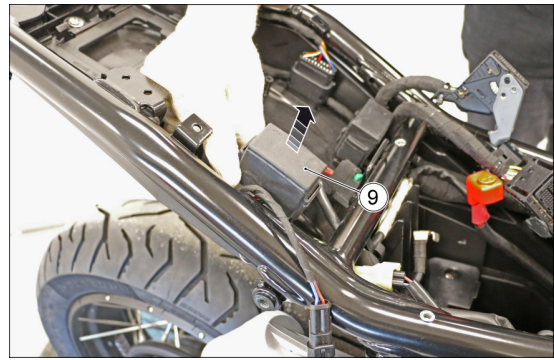
- Remove the E.C.U. control unit. (7) from the vehicle.



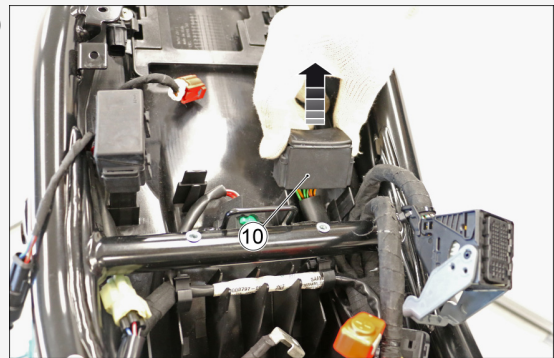
- Remove the OBD2 socket. (8) from the relative retainer.



- Release the secondary fuse-holder (9) from the wheel arch support.



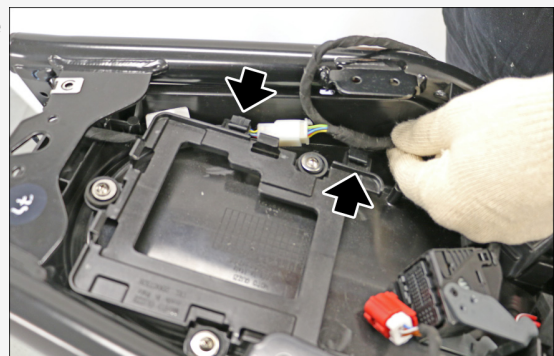
- Release the secondary fuse-holder (10) from the wheel arch support.



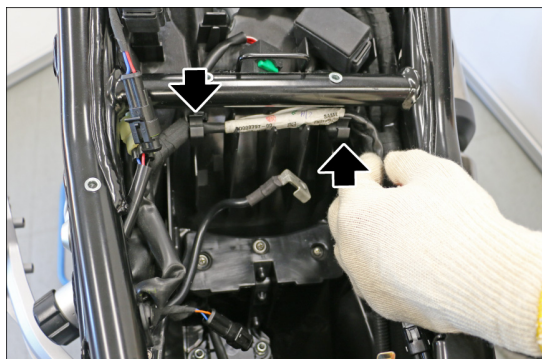
- Release the connector (11) from its support of the wheel arch.



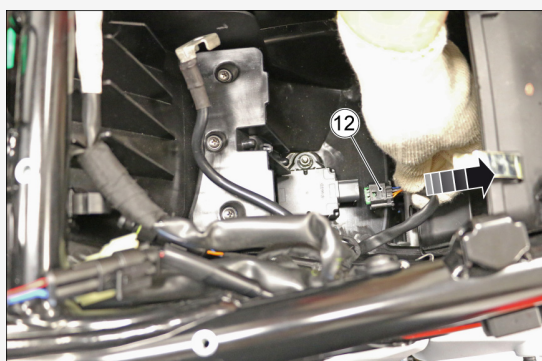
- Release the wiring harness from the relative supports indicated in the figure.



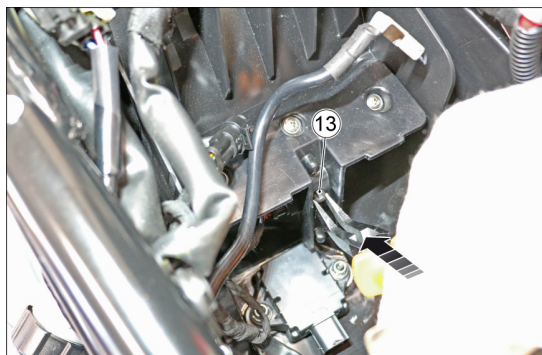
- Release the wiring harness from the relative supports indicated in the figure.



- Disconnect the connector (12) from the IMU control unit.



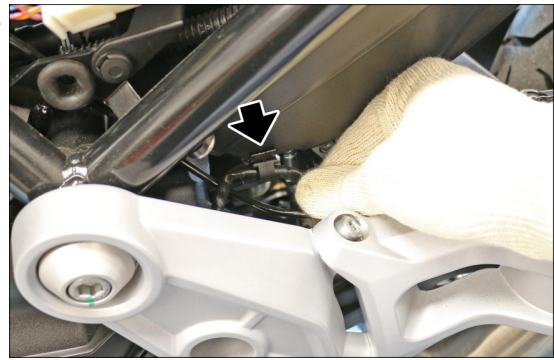
- Press the retainer tabs and remove the cable gland (13) from the wheel arch.



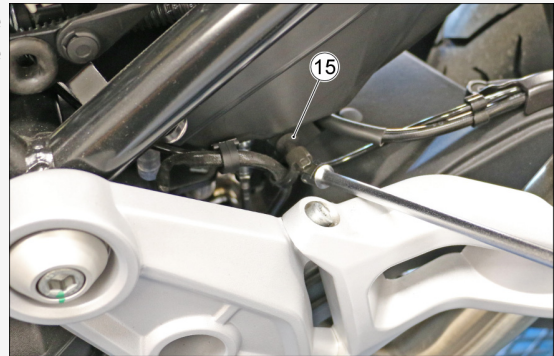
- Remove the fixing screw (14) on the right side of the wheel arch.



- On the left side of the wheel arch, remove the wiring harness from the cable gland shown in the figure.



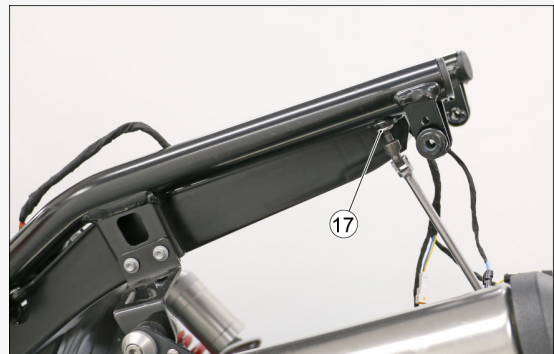
- Remove the fixing screw (15) and move the fastener of the rear brake line from the wheel arch.



- Remove the fixing screws (16).



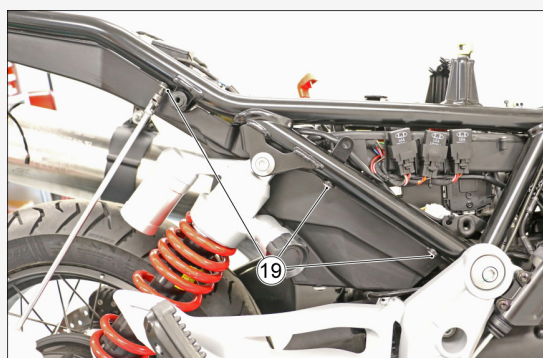
- Remove the fixing screw (17).



- Remove the fixing screw (18).



- Remove the fixing screws (19).



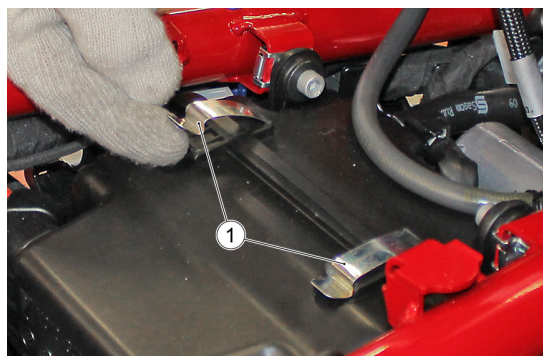
- Taking great care not to damage any components, lower the wheel arch from the frame and remove it from the vehicle.



12.21 Air filter box

REMOVAL

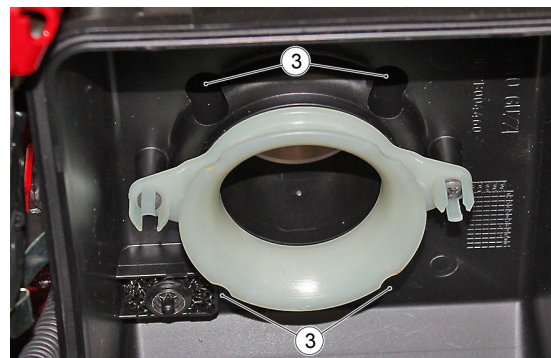
- Remove the saddle
- Remove the glove compartment
- Remove the side fairing panels
- Unhook and remove the four springs (1) located around the airbox filter, two in the upper area, one on the left side and one on the right side



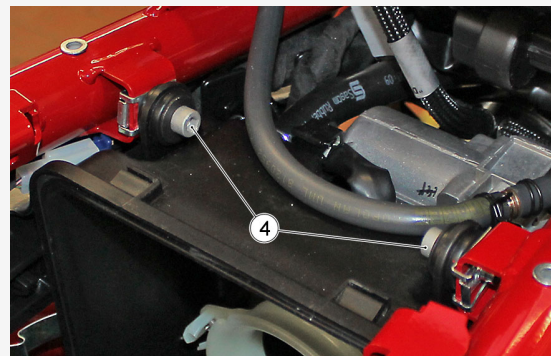
- Remove the filter box (2)



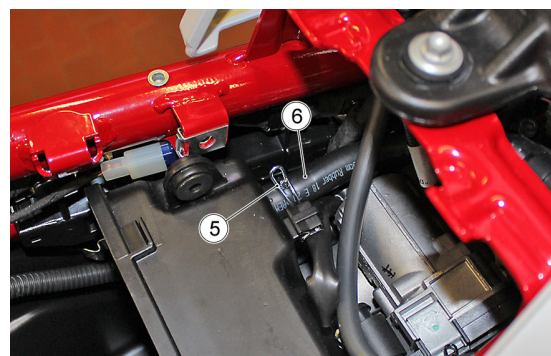
- Unscrew the screws (3)



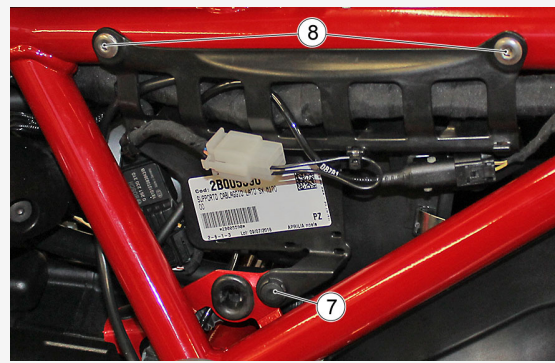
- Unscrew and remove the screws (4)



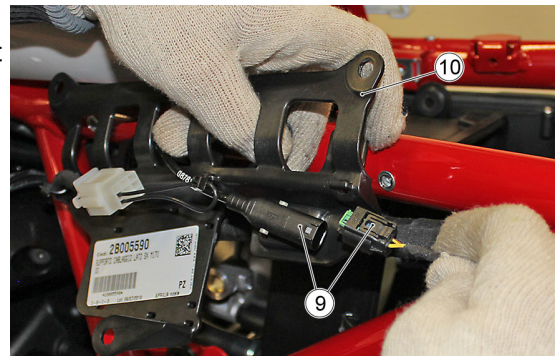
- Loosen the clamp (5)
- Disconnect the pipe (6)



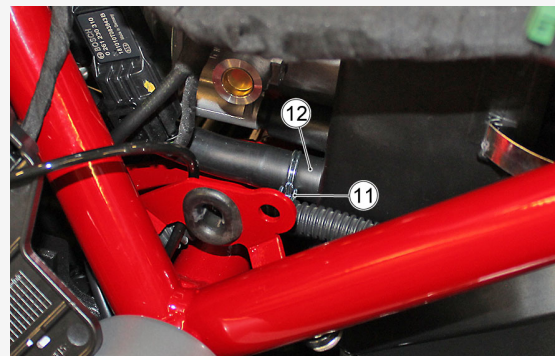
- Remove the plastic rivet (7)
- Unscrew and remove the screws (8)



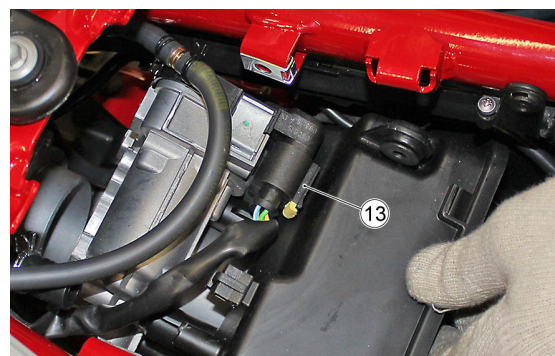
- Disconnect the connector (9)
- Momentarily remove the support bracket (10) from the frame



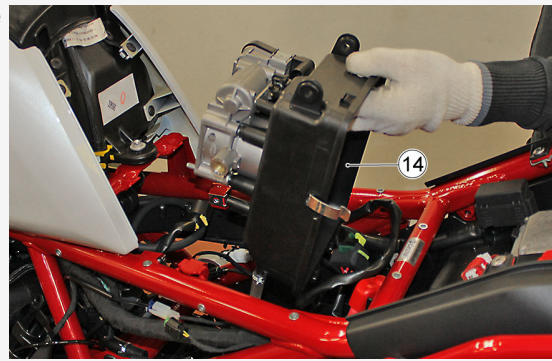
- Loosen the clamp (11)
- Disconnect the pipe (12)



- Disconnect the connector (13)



- Remove the filter box cover (14) complete with throttle body
- Slide the throttle body out and remove it

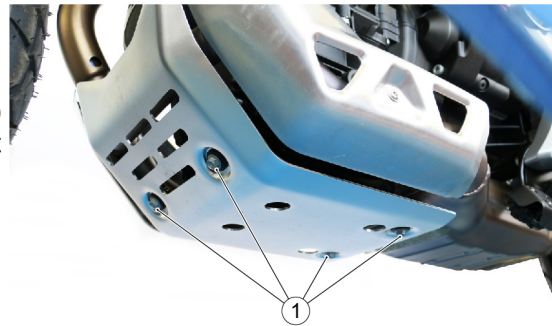


12.22 Oil carter protector

V85TT - V85TT TRAVEL

Removal

- Unscrew and remove the four screws (1) fastening the sump guard to the support bracket

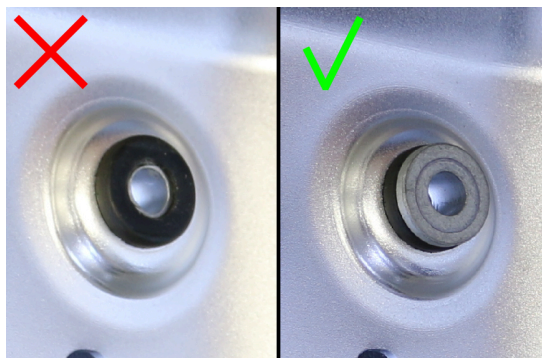


- Remove the sump guard (2).

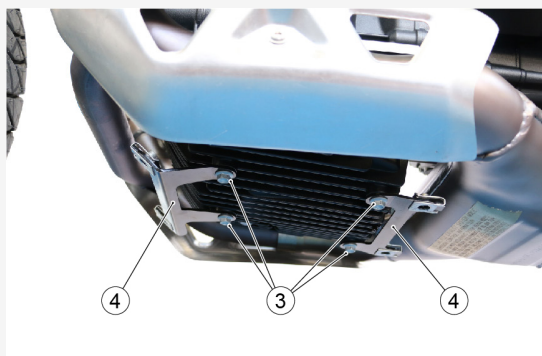


WARNING

DURING THE REASSEMBLY, CHECK THE CORRECT POSITIONING OF THE BUSHINGS ON THE RUBBERS, WHICH SHALL BE AS SHOWN IN THE IMAGE (THE VIEW SHOWS THE INTERNAL SIDE OF THE SUMP GUARD).



- Remove the four screws (3) fastening the support bracket to the sump guard (4).
- Remove the support bracket of the sump guard (4)

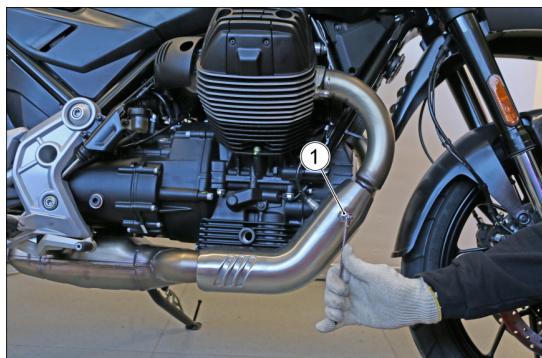
**ATTENTION**

BEFORE REFITTING THE SUPPORT BRACKETS, CLEAN THE THREADED HOLES ON THE CRANKCASE CAREFULLY FROM LOCTITE RESIDUES.

12.23 Heat shield

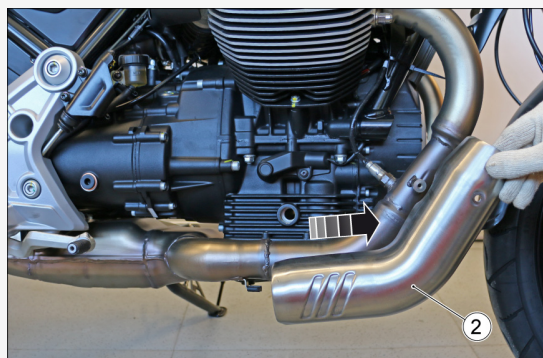
V85TT STRADA**Removal**

- Remove the fixing screw (1).



- Release the heat shield (2) from the relative retainer, on the exhaust manifold, moving it towards the front wheel.
- Place the heat shield (2) in a suitable place.

Repeat the operations for the heat shield on the opposite side.



12.24 Fuel tank

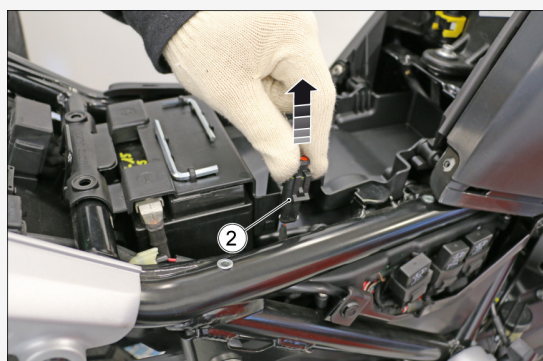
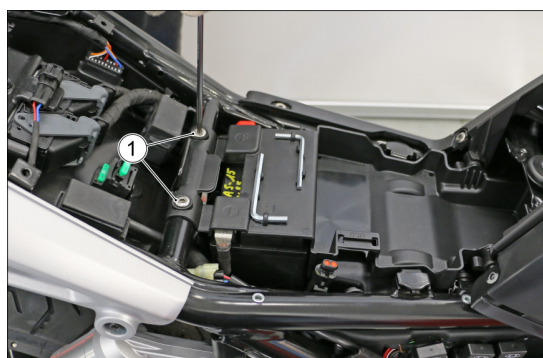
ATTENTION



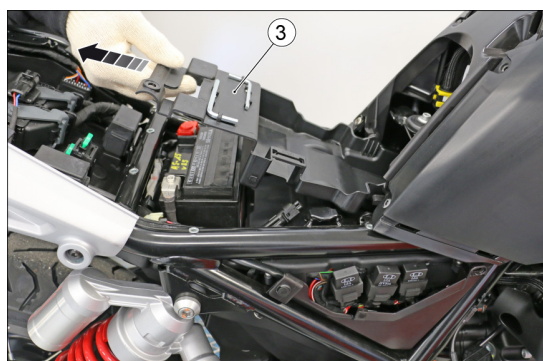
BEFORE REMOVING THE TANK, EMPTY IT OF ALL GASOLINE.

Removal

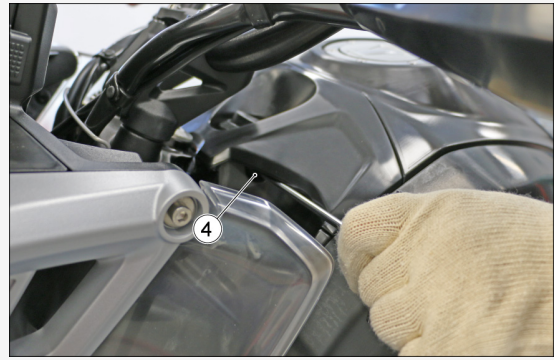
- Remove the saddle and side panels beforehand.
- Remove the two fastening screws (1).
- Release the connector (2) from its support on the storage compartment.



- Lift the storage compartment (3), move it towards the rear of the vehicle and remove it from the vehicle itself.



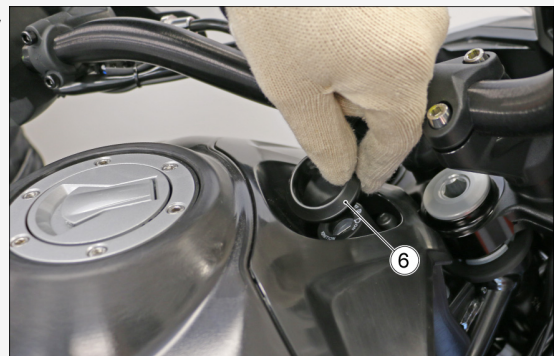
- Remove the fixing screw (4).



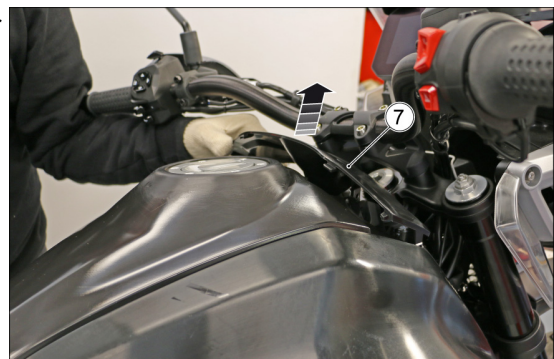
- Remove the fixing screw (5).



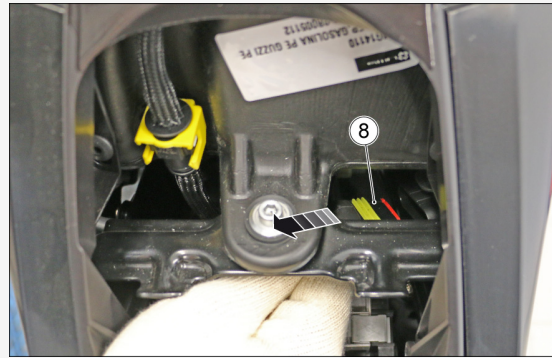
- Remove the ignition switch assembly gasket (6).



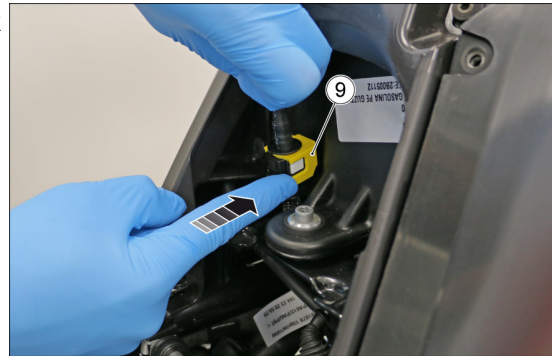
- Remove the ignition switch assembly cover (7).



- Disconnect the connector (8) of the petrol pump.



- Press the safety (9) of the fuel pipe quick connection forwards.



- Press the sides of the quick connection (10) and remove the fuel pipe.



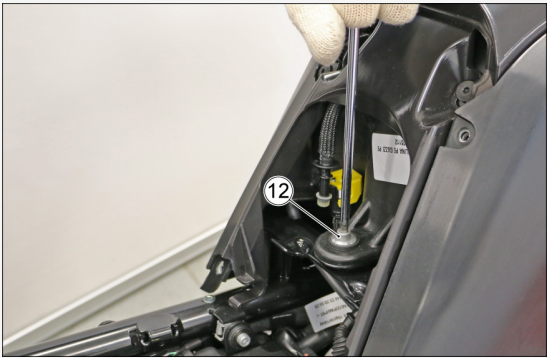
- Remove the metal clamp and disconnect the breather pipe (11).



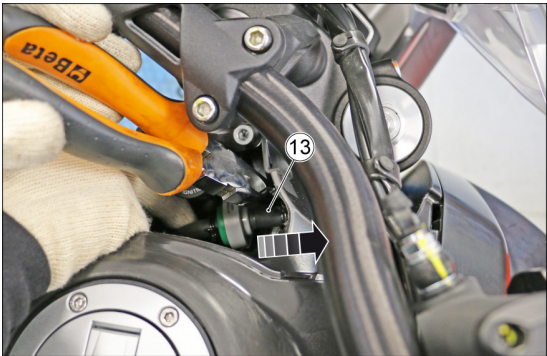
- Remove the rear fixing screw of the tank (12).

During refitting, tighten the screw (12) to the prescribed torque:

DESCRIPTION	TORQUE
Screws fastening the fuel tank to frame	10 Nm (7.38 lbf ft)



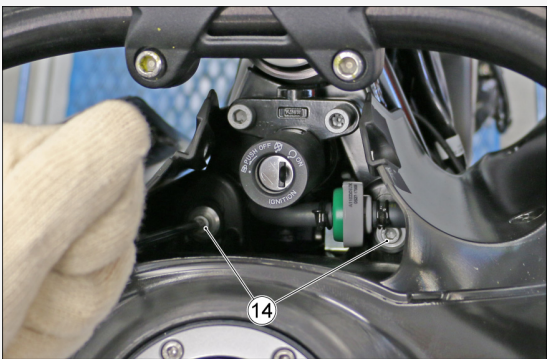
- Remove the metal clamp and disconnect the pipe (13) of the canister check valve.



- Remove the front fixing screws (14) of the tank

During refitting, tighten the screws (14) to the prescribed torque:

DESCRIPTION	TORQUE
Screws fastening the fuel tank to frame	10 Nm (7.38 lbf ft)



- Lift the tank and remove it from the vehicle.

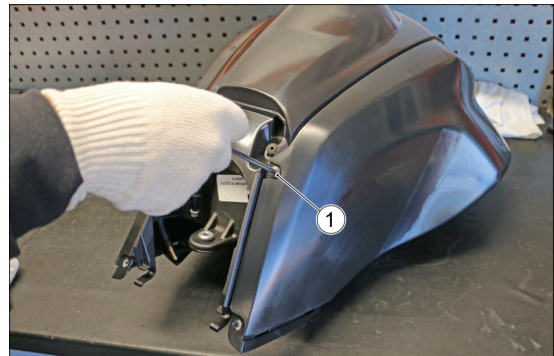


12.25 Fuel tank cover

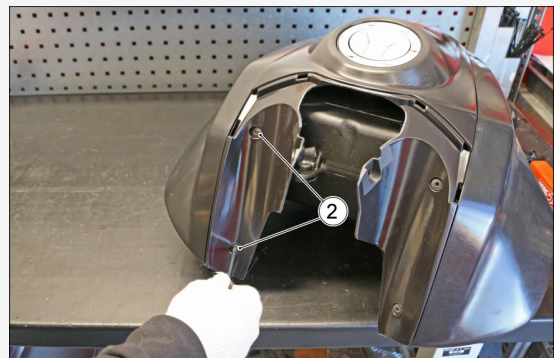
SIDE COVER

Removal

- First remove the fuel tank from the vehicle.
- Remove the rear fixing screw (1).



- Remove the two front fastening screws (2).



- Remove the two lower fixing screws (3).



- Separate the side cover from the tank, lifting it from the bottom.

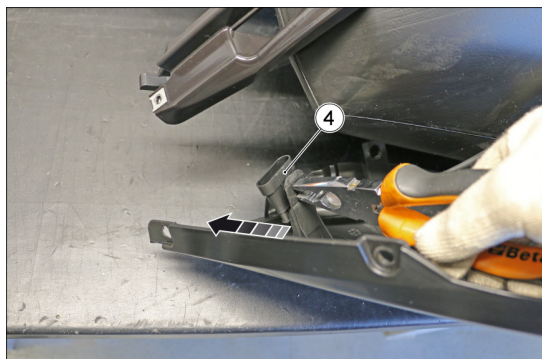


- Remove the fuel pump connector (4) from its support and remove the right cover from the tank.
- Repeat the operations for the cover on the left side.

N.B

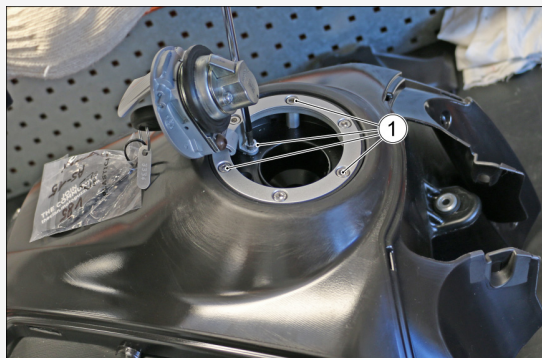


THE CONNECTOR IS ONLY PRESENT ON THE RIGHT COVER.

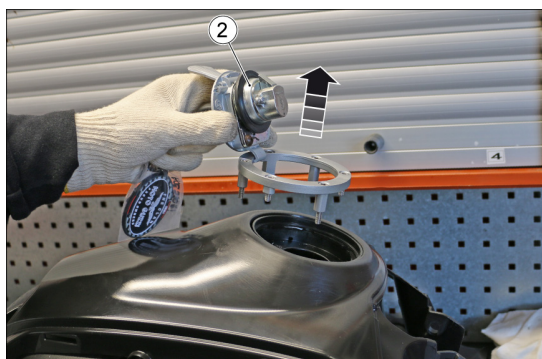


CENTRE COVER

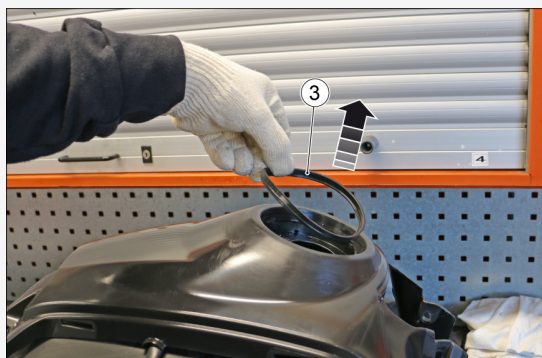
- First remove both side covers.
- Open the tank filler cap and remove the four fixing screws (1).



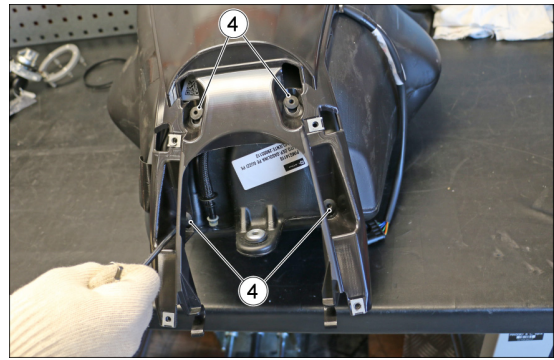
- Remove the cap (2) from the fuel tank.



- Retrieve the gasket (3).



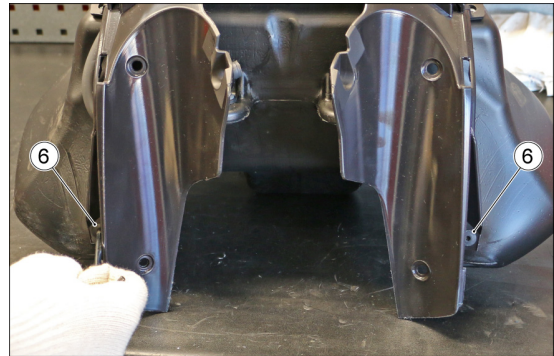
- Remove the four rear fixing screws (4).



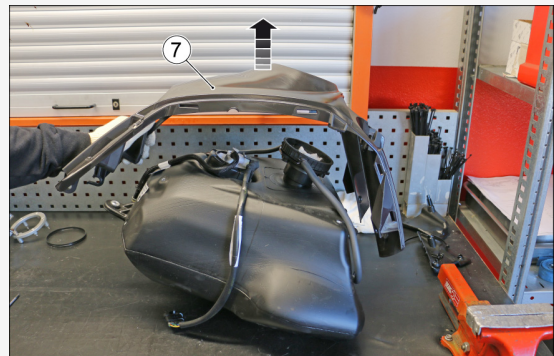
- Remove the two upper fixing screws (5).



- Remove the two front fastening screws (6).



- Remove the centre cover (7) of the tank.



WARNING

WHEN REASSEMBLING, ENSURE THAT THE PETROL PUMP WIRING IS ROUTED IN ITS HOUSING ON THE RIGHT-HAND SIDE OF THE CENTRAL COVER.



12.26 Fork guards

V85 TT STRADA**Removal**

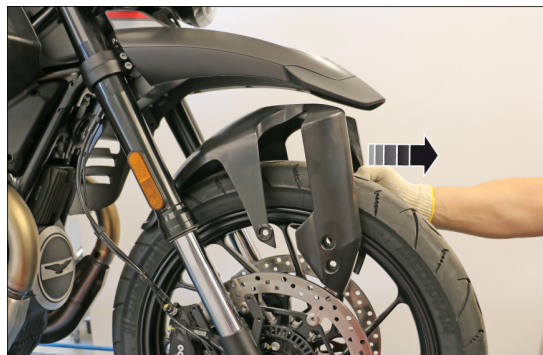
- Remove the three fixing screws (1) on the right side.



- Remove the three fixing screws (2) on the left side.



- Remove the lower the fork guards / mudguard from the vehicle, taking care not to damage the paintwork during the operations.



V85 TT - TT Travel**Removal**

- Remove the three fixing screws (1).



- Remove the fork guard from the vehicle.

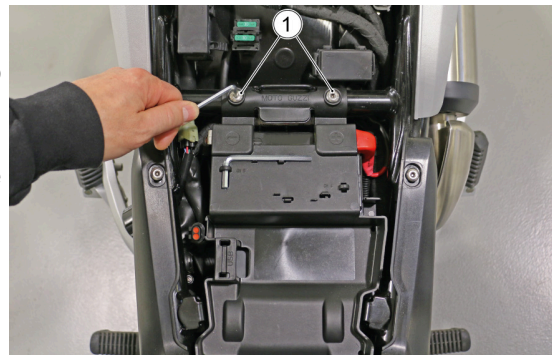
Repeat the operations for the fork guard on the opposite side.



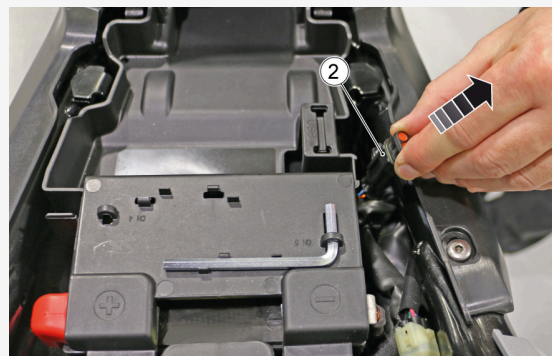
12.27 Battery

Removal

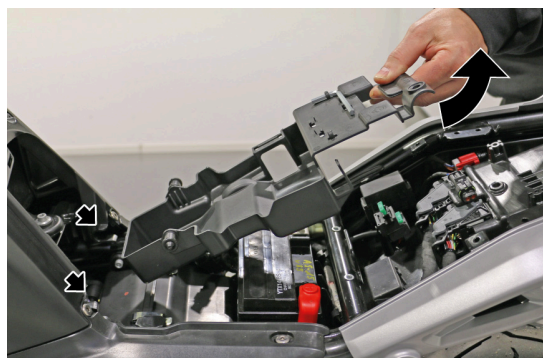
- Ensure that the ignition switch is turned to "KEY OFF"
- Remove the saddle;
- Remove the fixing screws (1) of the storage compartment;



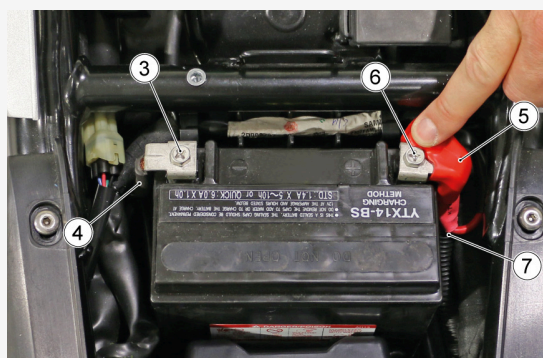
- Disconnect the connector (2) of the second USB port (optional);



- Unhook the storage compartment from the front part and remove it.



- Unscrew and remove the screw (3) from the negative terminal (-).
- Move the negative lead (4) aside.
- Move the protection cap (5), unscrew and remove the screw (6) from the positive terminal (+).
- Move the positive lead (7) aside.
- Grip the battery firmly and remove from its seat.
- Put the battery away on a level surface, in a cool and dry place.



WARNING



CHECK THAT THE CABLE TERMINALS AND BATTERY LEADS ARE:

- IN GOOD CONDITION (NOT CORRODED OR COVERED BY DEPOSITS);
- COVERED BY NEUTRAL GREASE OR PETROLEUM JELLY.

N.B



REMOVING THE BATTERY RESETS THE DIGITAL CLOCK AND THE TRIP JOURNAL FUNCTIONS.

WARNING



UPON REFITTING, CONNECT THE LEAD TO THE POSITIVE TERMINAL (+) FIRST

AND AFTERWARDS THE LEAD TO THE
NEGATIVE TERMINAL (-).
