



MANUALE STAZIONE DI SERVIZIO

2Q000187



V9 Roamer - V9 Bobber



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V9 Roamer - V9 Bobber

THE VALUE OF GOOD SERVICE

As a result of continuous updates and specific technical training programs for Moto Guzzi products, only **Moto Guzzi** Official Network mechanics know this vehicle fully and have the specific tools necessary to carry out maintenance and repair operations correctly.

The bike's reliability also depends on its mechanical condition. Checking the vehicle before riding it, its regular maintenance and the use of **original Moto Guzzi spare parts** only are essential factors!

To find out which is your nearest **Official Dealer and/or Service Center** visit our website:

www.motoguzzi.com

Only by requesting Moto Guzzi original spare parts can you be sure of purchasing products that were developed and tested during the actual vehicle design stage. All Moto Guzzi original spare parts undergo quality control procedures to guarantee reliability and durability.

The descriptions and images in this publication are given for illustrative purposes only.

While the basic features as described and illustrated in this manual remain unchanged, Moto Guzzi reserves the right, at any time and without being required to update this publication beforehand, to make any changes to components, parts or accessory supplies which it deems necessary to improve the product, or which are required for manufacturing or commercial reasons.

Not all versions shown in this publication are available in all countries. The availability of individual versions should be checked with the official Moto Guzzi Sales Network.

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MANUALE STAZIONE DI SERVIZIO

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Questo manuale fornisce le informazioni principali per le procedure di normale intervento sul veicolo. Questa pubblicazione è indirizzata ai **Concessionari Moto Guzzi** e ai loro meccanici qualificati; molte nozioni sono state volutamente omesse, perché giudicate superflue. Non essendo possibile includere nozioni meccaniche complete in questa pubblicazione, le persone che utilizzano questo manuale devono essere in possesso sia di una preparazione meccanica di base, che di una conoscenza minima sulle procedure inerenti ai sistemi di riparazione dei motoveicoli. Senza queste conoscenze, la riparazione o il controllo del veicolo potrebbe essere inefficiente o pericolosa. Non essendo descritte dettagliatamente tutte le procedure per la riparazione, e il controllo del veicolo, bisogna adottare particolare attenzione al fine di evitare danni ai componenti e alle persone. Per offrire al cliente maggiore soddisfazione dall'uso del veicolo, **Moto Guzzi** s.p.a. si impegna a migliorare continuamente i propri prodotti e la relativa documentazione. Le principali modifiche tecniche e modifiche alle procedure per le riparazioni del veicolo vengono comunicate a tutti i **Punti Vendita Moto Guzzi e alle Filiali nel Mondo**. Tali modifiche verranno apportate, nelle edizioni successive di questo manuale. Nel caso di necessità o dubbi sulle procedure di riparazione e di controllo, interpellare il **REPARTO ASSISTENZA Moto Guzzi**, il quale sarà in grado di fornirvi qualsiasi informazione al riguardo, oltre a fornire eventuali comunicazioni su aggiornamenti e modifiche tecniche applicate al veicolo.

NOTE Provides key information to make the procedure easier to understand and carry out.

IMPORTANT Refers to specific procedures to carry out for preventing damages to the vehicle.

WARNING Refers to specific procedures to carry out to prevent injuries to the repairer.



Personal safety Failure to completely observe these instructions will result in serious risk of personal injury.



Protecting the environment Sections marked with this symbol indicate the correct use of the vehicle to prevent damaging the environment.



Vehicle condition The incomplete or lack of observance to these regulations can lead to risk of serious damage to the vehicle and may even invalidate the warranty.



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INDEX OF TOPICS

PRE-DELIVERY

PRE DE

Carry out the listed tests before delivering the vehicle.

WARNING

PROCEED WITH THE UTMOST CAUTION WHEN HANDLING PETROL.

Aesthetic inspection

- Paintwork
- Fitting of plastics
- Scratches
- Dirt

Tightening torques inspection

- Safety fasteners:
 - front and rear suspension unit
 - front and rear brake calliper retainer unit
 - front and rear wheel unit
 - engine - chassis retainers
 - steering assembly
- Plastic parts fixing screws

Electrical system

- Main switch
- Headlamps: high beam lights, low beam lights, taillights (front and rear) and relevant warning lights
- Headlight adjustment according to regulations in force
- Front and rear stop light switches and their bulbs
- Turn indicators and their warning lights
- Instrument panel lights
- Instrument panel: fuel and temperature indicator (if present)
- Instrument panel warning lights
- Horn
- Electric starter
- Engine stop via emergency stop switch and side stand
- 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.

IMPORTANT

TO ENSURE MAXIMUM PERFORMANCE, THE BATTERY MUST BE CHARGED BEFORE USE. INADEQUATE CHARGING OF THE BATTERY WITH A LOW LEVEL OF ELECTROLYTE BEFORE IT IS FIRST USED SHORTENS THE LIFE OF THE BATTERY.

IMPORTANT

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

IMPORTANT

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 YOUR EYES BECAUSE EVEN TINY AMOUNTS OF BATTERY ACID MAY CAUSE BLINDNESS. IN THE EVENT OF CONTACT WITH THE EYES, RINSE WITH PLENTY OF WATER FOR FIFTEEN MINUTES AND CONSULT AN EYE SPECIALIST IMMEDIATELY. THE BATTERY RELEASES EXPLOSIVE GASES; KEEP IT AWAY FROM FLAMES, SPARKS, CIGARETTES OR ANY OTHER HEAT SOURCES. ENSURE ADEQUATE VENTILATION WHEN SERVICING OR RECHARGING THE BATTERY. KEEP OUT OF THE REACH OF CHILDREN.

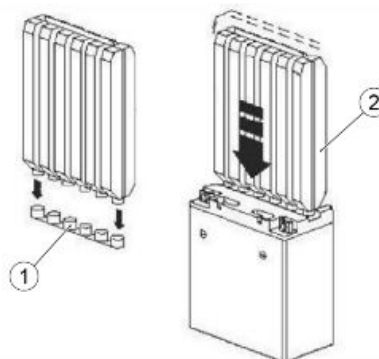
BATTERY LIQUID IS CORROSIVE. DO NOT POUR OR SPILL ON PLASTIC COMPONENTS IN PARTICULAR. ENSURE THAT THE ELECTROLYTIC ACID IS COMPATIBLE WITH THE BATTERY BEING ACTIVATED.

IMPORTANT

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.

**NOTE**

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).

Levels check

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

Road test

- Cold start
- Instrument operations
- Response to throttle control
- Stability on acceleration and braking
- Front and rear brake efficiency
- Front and rear suspension efficiency
- Abnormal noise

Static test

Static control after the test drive:

- Restarting when warmed up
 - Starter operation (if present)
 - Minimum holding (turning the handlebar)
 - Uniform turning of the steering
 - Possible leaks
 - Radiator electric fan operation (if present)
-

Functional inspection

- Hydraulic braking system
- Stroke of brake and clutch levers (if present)
- Clutch - Check for correct operation
- Engine - Check for correct general operation and absence of abnormal noise
- Other
- Documentation check:
- Check the chassis and engine numbers
- Supplied tools check
- Licence plate fitting
- Locks checking
- Tyre pressure check
- Fitting of mirrors and possible accessories



NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES SINCE THE TYRES MAY BURST.

IMPORTANT



CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

Specific operations for the vehicle

(2018)

(ROAMER)

- Fit the support bracket (1)



- Insert and tighten the screw (2)



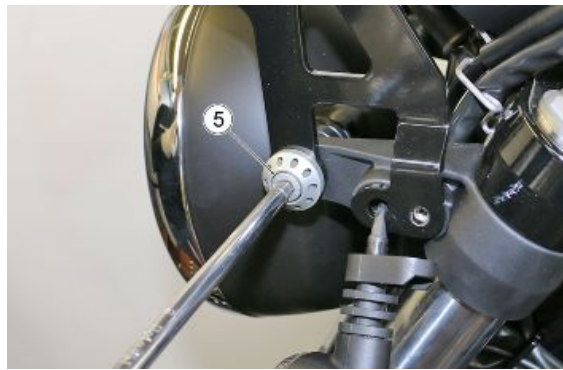
- Insert and tighten the screw (3)



- Fit the support bracket (4)



- Insert and tighten the screw (5)



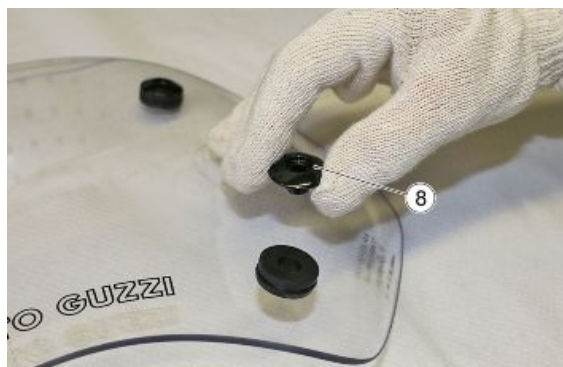
- Insert and tighten the screw (6)



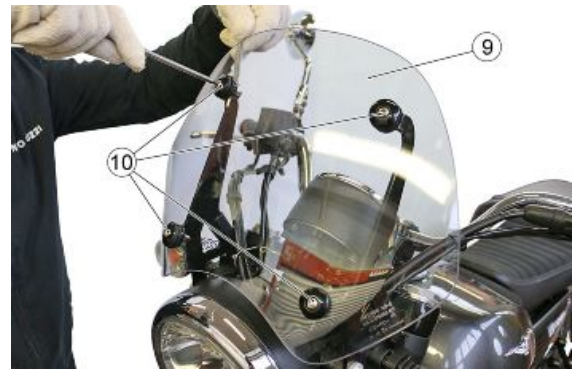
- Fit the four rubber pads (7) in the appropriate holes of the top fairing



- Fit the four bushings (8)



- Put the top fairing (9) on the support brackets
- Insert the four screws (10) and tighten them



INDEX OF TOPICS

CHARACTERISTICS

CHA

Rules

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.

IMPORTANT



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

Fuel

IMPORTANT



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 OR NEAR FUEL VAPOUR. AVOID ANY CONTACT WITH NAKED FLAME, SPARKS OR OTHER HEAT SOURCES WHICH MAY CAUSE IGNITION OR EXPLOSION.

**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

IMPORTANT



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 IN THE ENVIRONMENT
KEEP OUT OF THE REACH OF CHILDREN.**

Brake and clutch fluid

BRAKE AND CLUTCH FLUIDS CAN DAMAGE THE PLASTIC OR RUBBER PAINTED SURFACES. WHEN SERVICING THE BRAKING SYSTEM OR THE CLUTCH SYSTEM, PROTECT THESE COMPONENTS WITH A CLEAN CLOTH. ALWAYS WEAR PROTECTIVE GOGGLES WHEN SERVICING THESE SYSTEMS. BRAKE AND CLUTCH FLUIDS ARE EXTREMELY HARMFUL FOR YOUR 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**IMPORTANT**

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BATTERY LIQUID IS CORROSIVE. DO NOT POUR OR SPILL ON PLASTIC COMPONENTS IN PARTICULAR. ENSURE THAT THE ELECTROLYTIC ACID IS COMPATIBLE WITH THE BATTERY BEING ACTIVATED.

Maintenance rules**GENERAL PRECAUTIONS AND INFORMATION**

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

BEFORE DISASSEMBLING 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.

DISASSEMBLING COMPONENTS

- 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

IMPORTANT

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").

IMPORTANT

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

NOTE

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

TIGHTENING TORQUE

IMPORTANT

IN THE EVENT THAT A SELFBRAKING NUT IS UNSCREWED, IT IS NECESSARY TO REPLACE IT WITH A NEW ONE.

IMPORTANT

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.

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.

IMPORTANT

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.

IMPORTANT

THE FULL PERFORMANCE OF THE VEHICLE IS ONLY AVAILABLE AFTER 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.



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.

Vehicle identification

Manual legend

- (2016): Roamer - Bobber model year 2016
- (2017): Roamer - Bobber model year 2017
- (2018): Roamer - Bobber model year 2018

SERIAL NUMBER LOCATION

These numbers are necessary for vehicle registration.

NOTE

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

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

ZGULH00016MXXXXXX

KEY:

ZGU: WMI (World Manufacturer Identifier) code;

LH: model;

0/00 (V9 Roamer), **A/00** (V9 Bobber): versions;

0: free digit

16: variable year of manufacture (16 - for 2016)

M: production plant (M= Mandello del Lario);

XXXXXX: serial number (6 digits);

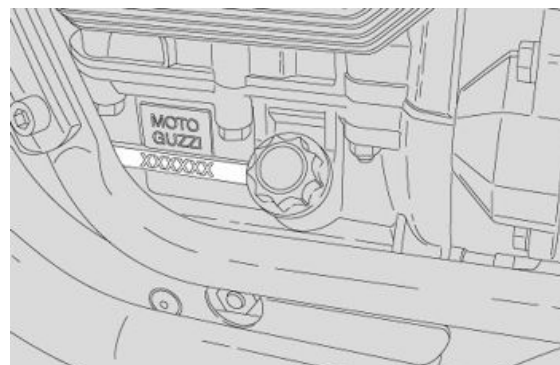
FRAME NUMBER

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



ENGINE NUMBER

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



Dimensions and mass

(2016-2017)

DIMENSIONS AND MASS

Specification	Desc./Quantity
Max. length. (Roamer)	2,240 mm (88.19 in)
Max. length. (Bobber)	2,185 mm (86.02 in)
Max. width (Roamer)	865 mm (34.06 in)
Max. width (Bobber)	840 mm (33.07 in)
Max. height. (Roamer)	1,165 mm (45.87 in)
Max. height. (Bobber)	1,160 mm (45.67 in)
Wheelbase	1,465 mm (57.68 in)
Saddle height (Roamer)	785 mm (30.91 in)
Saddle height (Bobber)	780 mm (30.71 in)
Kerb weight	210 Kg (462.97 lb)

(2018)

DIMENSIONS AND MASS

Specification	Desc./Quantity
Max. length. (Roamer)	2,240 mm (88.19 in)
Max. length. (Bobber)	2,185 mm (86.02 in)
Max. width (Roamer)	865 mm (34.06 in)
Max. width (Bobber)	840 mm (33.07 in)
Max. height (to top fairing) (Roamer)	1300 mm (51.18 in)
Max. height. (Bobber)	1,160 mm (45.67 in)
Wheelbase	1,465 mm (57.68 in)
Saddle height (Roamer)	818 mm (32.20 in)
Saddle height (Bobber)	808 mm (31.81 in)
Kerb weight	210 Kg (462.97 lb)

Engine**ENGINE**

Specification	Desc./Quantity
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
Starting	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

Transmission**TRANSMISSION**

Specification	Desc./Quantity
Primary drive:	with gears, ratio: 21 / 25 = 1 : 1.190
Gear ratios, 1st gear	16 / 39 = 1: 2,437
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	28 / 24 = 1: 0.857
Final drive	with shaft, ratio 8 / 33 = 1 : 4,125

Capacities**CAPACITY**

Specification	Desc./Quantity
Fuel tank (including reserve)	15 +/- 0.5 l (3.30 +/- 0.11 UK gal; 3.96 +/- 0.13 US gal)
Fuel tank reserve capacity	4±0.5 l (0.88±0.11 UK gal; 1.06±0.13 US gal)
Engine oil	Oil change and oil filter replacement: 2,000 cm³ (122.05 cu.in)
Gearbox oil	500 cm³ (30.51 cu.in)
Bevel gear set oil	180 cm³ (10.98 cu.in)
Bevel gear oil (in case of replacement)	160 cc (9.76 cu in) MAX
Seats	2
Max. vehicle load	420 kg (925.94 lb) (rider + passenger + luggage)

Electrical system

ELECTRICAL SYSTEM

Specification	Desc./Quantity
Battery	12 V - 12 Ah
Fuses	30 - 5 (2) - 15 (3) - 20 (2) A
Permanent magnet alternator	12V - 270W

SPARK PLUGS

Specification	Desc./Quantity
Standard	NGK CPR8EB-9
Spark plug electrode gap	0.9 mm (1.98 in)
Resistance	5 kOhm

BULBS

Specification	Desc./Quantity
Low/high beam light (halogen)	12 V - 55 W / 60 W H4
Front DRL	12 V - 5 W
Turn indicators	12 V - 10 W (orange RY 10 W bulb)
taillight /stop lights	12 V - 5 / 21 W
Dashboard lighting	LED

INDICATOR LAMPS

Specification	Desc./Quantity
Gearbox in neutral	LED
Turn indicators	LED
Fuel reserve	LED
High beam light	LED
General alarm	LED
MI warning light	LED
ABS warning light	LED
MGCT warning light	LED

Frame and suspensions

FRAME

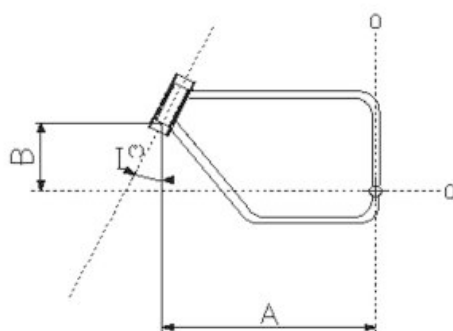
Specification	Desc./Quantity
Type	Modular double cradle, high-strength steel tubular chassis
Steering rake angle	26°
Trail	117 mm (4.61 in)

SUSPENSION

Specification	Desc./Quantity
Front	hydraulic telescopic fork, Ø 40 mm (1.57 in)
Travel	130 mm (5.12 in)
Rear	Swingarm in die-cast light alloy, 2 shock absorbers with adjustable spring pre-loading
Stroke (Roamer)	87 mm (3.43 in)
Stroke (Bobber)	80 mm (3.15 in)

SIZES A AND B

Specification	Desc./Quantity
Size A	707 mm (27.83 in)
Size B	391 mm (15.39 in)



Brakes

BRAKES

Specification	Desc./Quantity
Front	Ø 320-mm (12.59 in) stainless steel floating disc, calliper with 4 different and counteracting plungers
Rear	260 mm (10.24 in) stainless steel disc, floating calliper with two 22 mm (0.87 in) diameter pistons

Wheels and tyres

WHEEL RIMS

Specification	Desc./Quantity
Type	Alloy wheels for tubeless tyres
Front (Roamer)	2.5" x 19"
Front (Bobber)	3.5" x 16"
Rear	4.0" x 16"

TYRES

Specification	Desc./Quantity
Tyre type (Roamer)	Pirelli Sport Demon
Tyre type (Bobber)	(Front) Continental Conti Milestone CM1 (Rear) Continental Conti Milestone CM2
Front (Roamer)	100 / 90 - 19 57V
Front (Bobber)	130 / 90 - 16 67H
Front tyre inflation pressure (Roamer)	2.3 bar (230 kPa) (33.36 PSI)
Front tyre inflation pressure (Bobber)	2.5 bar (250 kPa) (36.26 PSI)
Front tyre inflation pressure with passenger (Roamer)	2.4 bar (240 kPa) (34.81 PSI)
Front tyre inflation pressure with passenger (Bobber)	2.6 bar (260 kPa) (37.71 PSI)
Rear (Roamer)	150 / 80 - V16 71V
Rear (Bobber)	150 / 80 - B16 77H
Rear tyre inflation pressure (Roamer)	2.5 bar (250 kPa) (36.26 PSI)
Rear tyre inflation pressure (Bobber)	2.8 bar (280 Kpa) (40.61 PSI)
Rear tyre inflation pressure with passenger (Roamer)	2.6 bar (260 kPa) (37.71 PSI)
Rear tyre inflation pressure with passenger (Bobber)	2.9 bar (290 Kpa) (42.06 PSI)

Supply

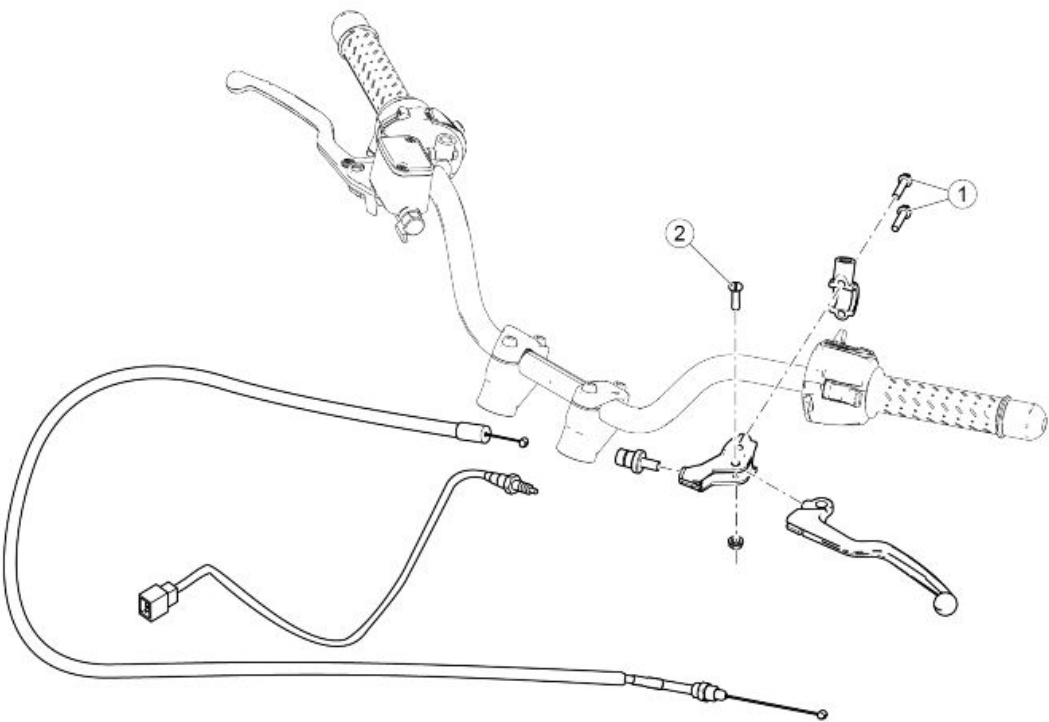
POWER SUPPLY

Specification	Desc./Quantity
Type	Electronic injection (Marelli MIU G3)
Diffuser	Ø 38 mm (1.50 in)
Fuel	Unleaded gasoline E10 (95 R.O.N.)

Tightening torques

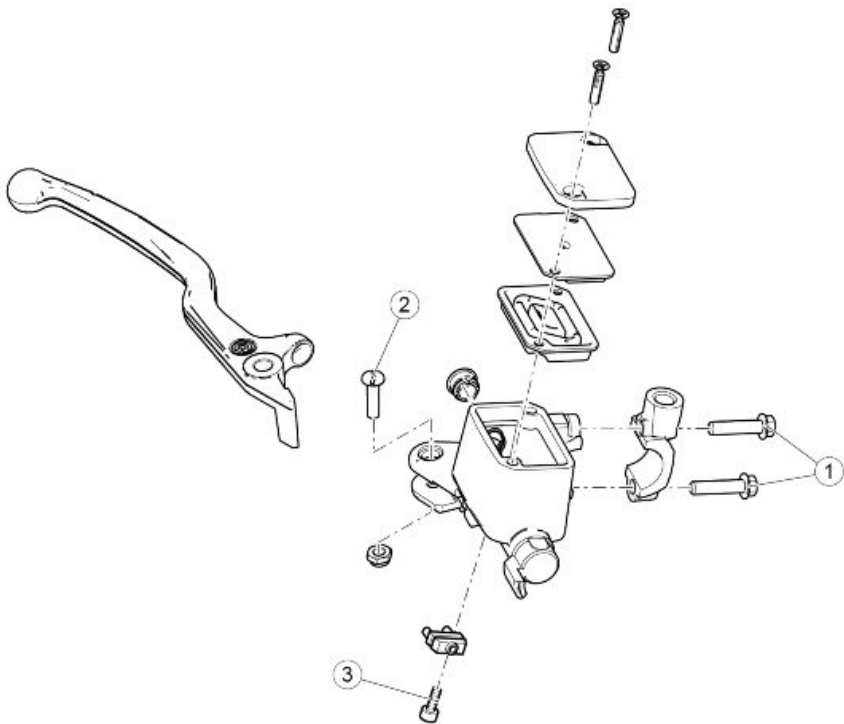
Chassis

Front side



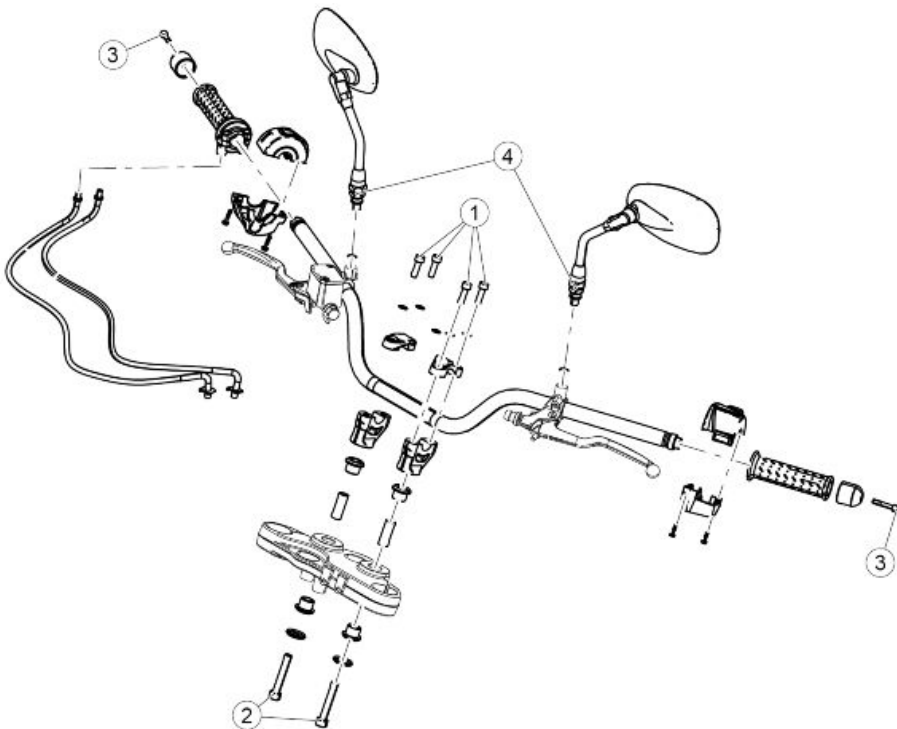
CLUTCH CONTROL

Pos.	Description	Type	Quantity	Torque	Notes
1	Throttle control U-bolt fixing screws	M6x25	2	10 Nm (7.38 lb ft)	-
2	Clutch control pin	M6	1	10 Nm (7.38 lb ft)	-



FRONT BRAKE MASTER CYLINDER

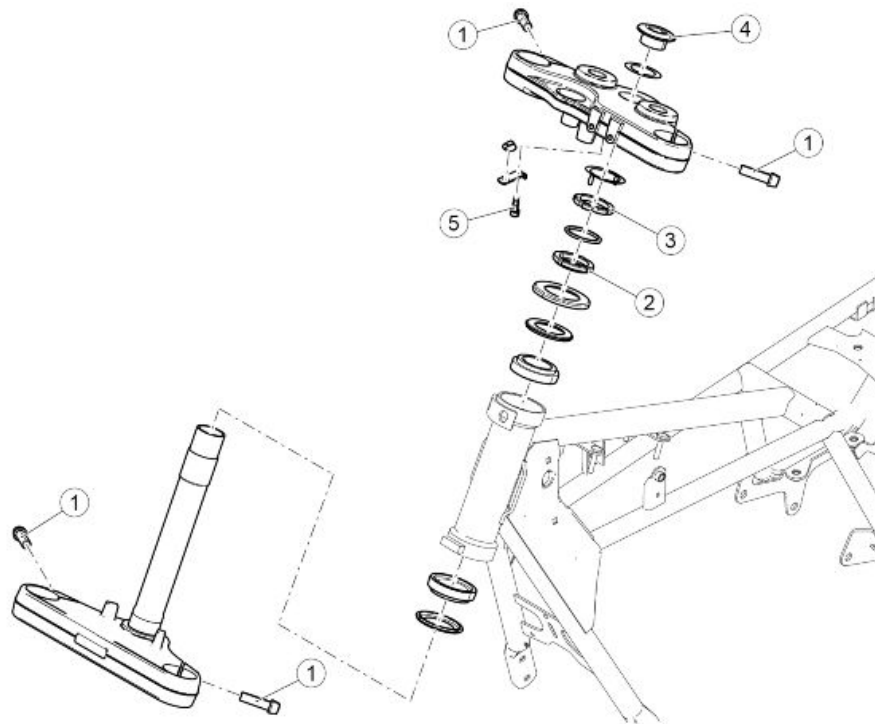
Pos.	Description	Type	Quantity	Torque	Notes
1	Brake pump U-bolt fixing screws	M6x25	2	10 Nm (7.38 lb ft)	-
2	Brake pump control pin	M6	1	10 Nm (7.38 lb ft)	-
3	SHC screws fastening the stop switch	M4x10	1	3 Nm (2.21 lb ft)	-



HANDLEBAR

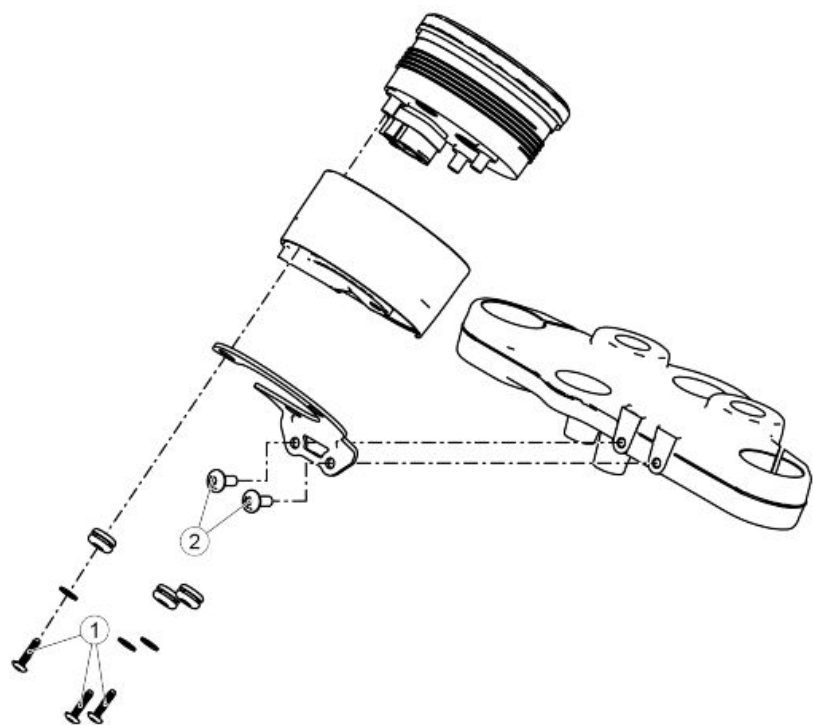
Pos.	Description	Type	Quantity	Torque	Notes
1	Handlebar U-bolt fastener screw	M8	4	25 Nm (18.44 lb ft)	-

Pos.	Description	Type	Quantity	Torque	Notes
2	Handlebar U-bolt mountings fastener screw	M10x60	2	50 Nm (36.88 lb ft)	Loct. 243
3	Handlebar counterweight fastener SHC screws	M6x35	2	10 Nm (7.38 lb ft)	-
4	Rear-view mirrors	M10	2	Manual	-



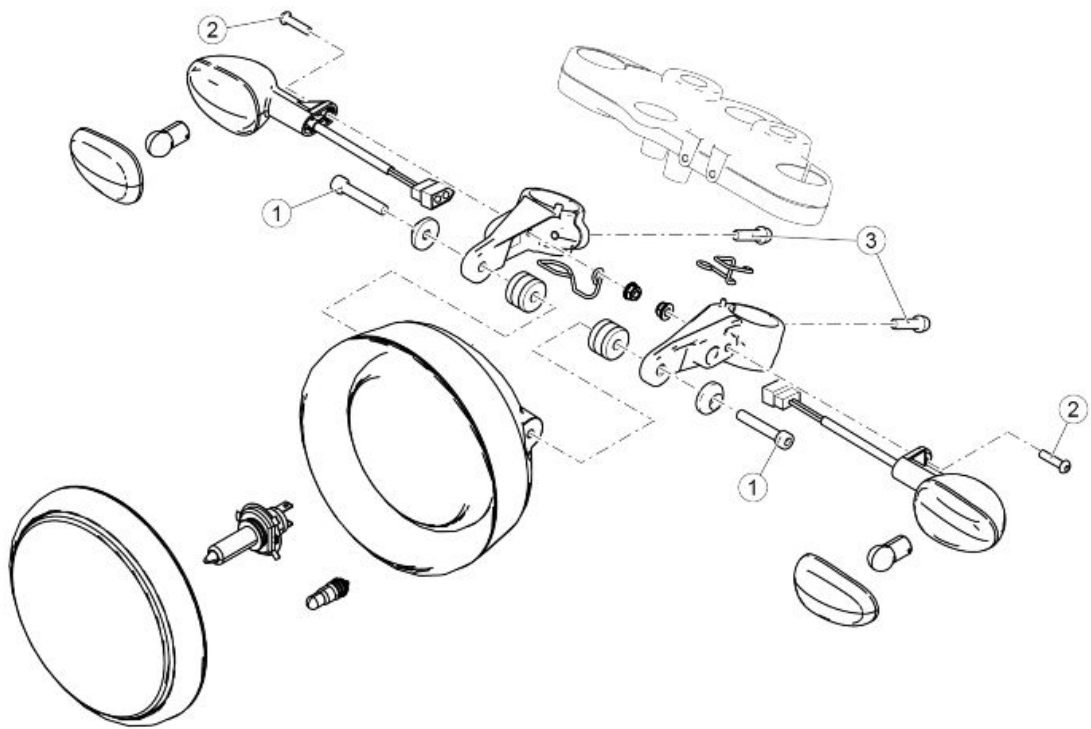
STEERING

Pos.	Description	Type	Quantity	Torque	Notes
1	Screw fixing stanchions to upper and lower plate	M8x35	4	25 Nm (18.44 lb ft)	-
2	Steering headstock ring nut (pre-tightening)	-	1	60 Nm (44.25 lb ft)	-
2	Steering headstock ring nut (tightening)	-	1	50 +/- 5 Nm (36.88 +/- 3.69 lb ft)	-
3	Headstock counter-lock ring	-	1	-	Screw until obtaining contact with the rubber washer
4	Headstock bushing	-	1	100 Nm (73.76 lb ft)	-
5	SHC flanged screw fastening the cable grommet plate	M6x16	-	10 Nm (7.38 lb ft)	-



INSTRUMENT CLUSTER

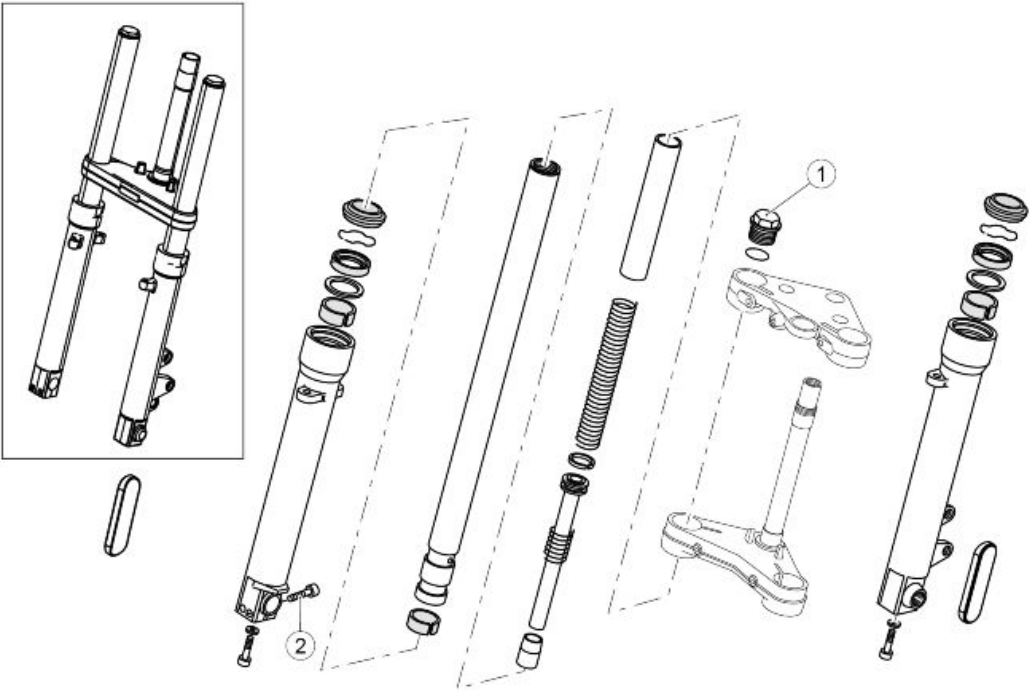
Pos.	Description	Type	Quantity	Torque	Notes
1	Instrument panel support bracket fixing screws	-	3	1.5 Nm (1.11 lb ft)	-
2	Screw fixing the support bracket to the steering plate	M6x10	2	10 Nm (7.38 lb ft)	-



HEADLIGHT UNIT

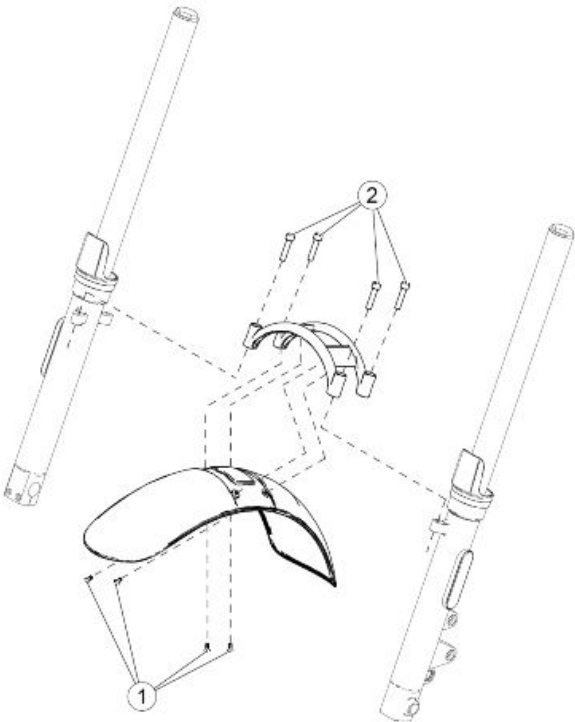
Pos.	Description	Type	Quantity	Torque	Notes
1	Headlamp fastening screws	M8x45	2	15 Nm (11.06 lb ft)	-

Pos.	Description	Type	Quantity	Torque	Notes
2	Front turn indicators SHC fastening screws	M6x25	2	10 Nm (7.38 lb ft)	-
3	SHC screws fastening the headlight support strips	M6x25	2	10 Nm (7.38 lb ft)	-



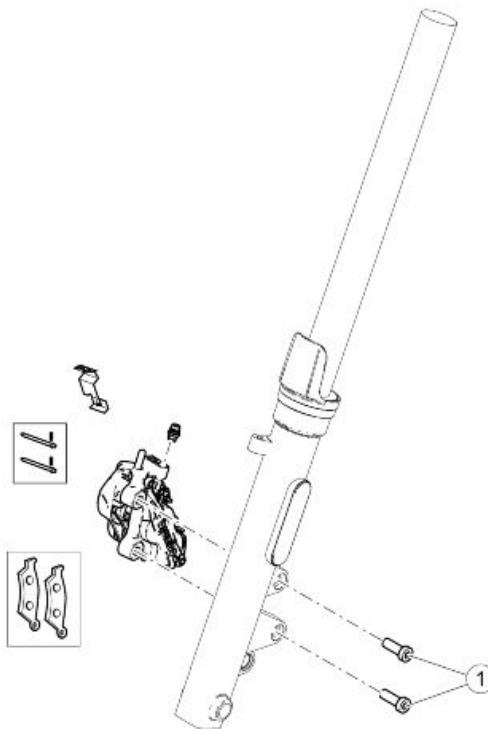
RAKED

Pos.	Description	Type	Quantity	Torque	Notes
1	Stanchion cap	-	2	50 Nm (36.88 lb ft)	-
2	Screw fixing wheel axle to right fork leg	M6x30	1	10 Nm (7.38 lb ft)	-
-	Screws fastening stanchions to the lower plate	M10x40	2	25 Nm (18.44 lb ft)	-



FRONT MUDGUARD

Pos.	Description	Type	Quantity	Torque	Notes
1	Screws fastening the mudguard to the stabiliser plate	M5x10	4	4 Nm (2.95 lb ft)	Loct. 243
2	Screws fastening the stabiliser plate to the fork sleeves	M8x45	4	15 Nm (11.06 lb ft)	Loct. 243

**FRONT BRAKE CALLIPER**

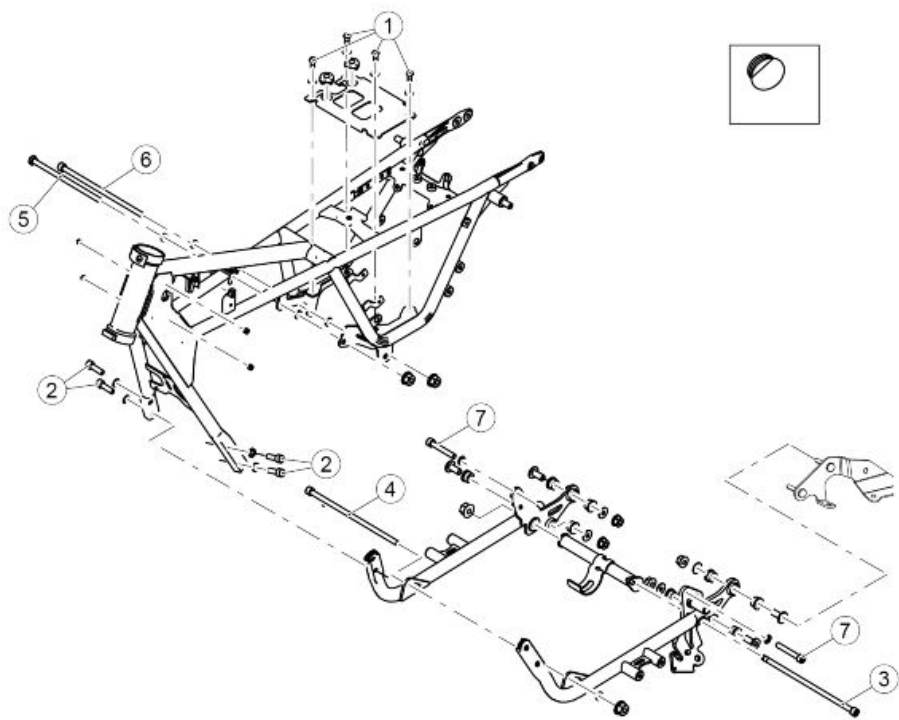
Pos.	Description	Type	Quantity	Torque	Notes
1	Brake calliper fixing screws	M10x30	2	50 Nm (36.88 lb ft)	-



FRONT WHEEL

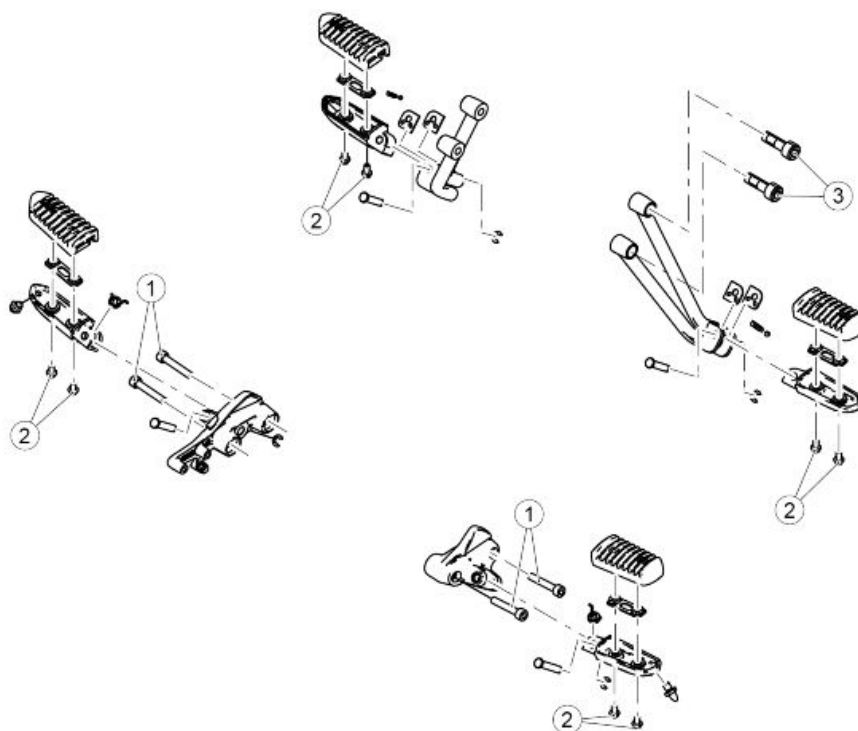
Pos.	Description	Type	Quantity	Torque	Notes
1	Front wheel axle	M18	1	80 Nm (59.00 lb ft)	-
2	Phonic wheel/brake disc fastening screws	M8x18	6	25 Nm (18.44 lb ft)	Loct. 243
3	ABS-sensor fixing stud bolt	M5	1	6 Nm (4.43 lb ft)	Loct. 243
4	Cable grommet retainer nut	M6	1	6 Nm (4.43 lb ft)	-

Central part



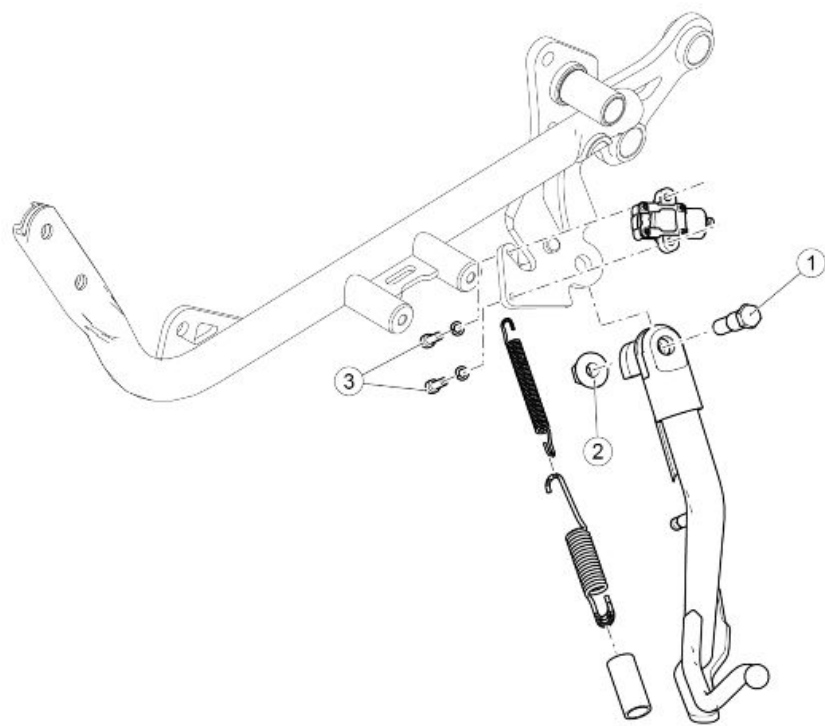
CHASSIS

Pos.	Description	Type	Quantity	Torque	Notes
1	Battery holder plate fastening screws	M8x20	4	25 Nm (18.44 lb ft)	Loct. 243
2	Front cradle SHC fixing screws	M10x30	4	50 Nm (36.88 lb ft)	-
3	Cradles joint pin	M10	1	50 Nm (36.88 lb ft)	-
4	Front pin fastening the engine to the cradles	M10x253	1	50 Nm (36.88 lb ft)	-
5	Central pin fastening the engine to the cradles	M10x205	1	50 Nm (36.88 lb ft)	-
6	Central pin fastening the engine to the cradles	M10x234	1	50 Nm (36.88 lb ft)	-
7	Screws fastening gearbox to frame	M10x55	2	50 Nm (36.88 lb ft)	-



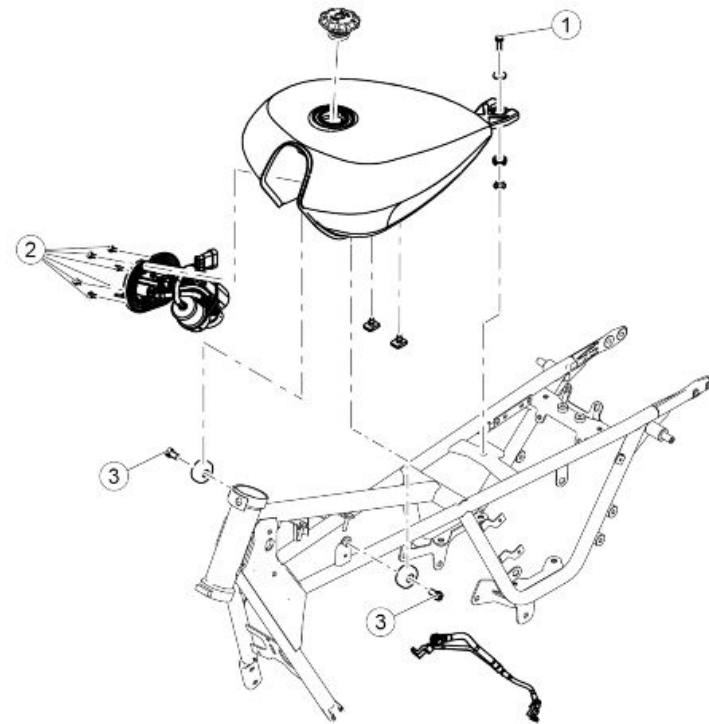
FOOTRESTS

Pos.	Description	Type	Quantity	Torque	Notes
1	SHC screws fastening the rider footrest mounting	M8x45	4	25 Nm (18.44 lb ft)	Loct. 243
2	Flanged hexagon screws fastening the footrest rubber guards	M6x12	8	10 Nm (7.38 lb ft)	-
3	Passenger footrest mounting fastening screws	M8x30	4	25 Nm (18.44 lb ft)	Loct. 243



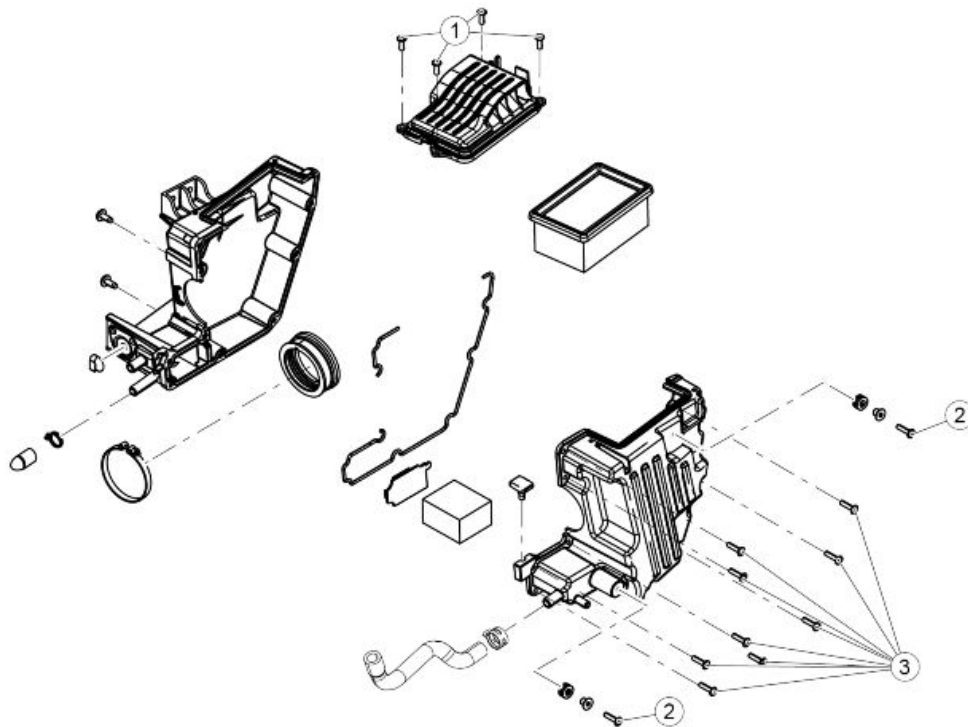
SIDE STAND

Pos.	Description	Type	Quantity	Torque	Notes
1	Side stand retainer pin	M10x1.2 5	1	10 Nm (7.38 lb ft)	-
2	Lock nut for side stand bolt	M10x1.2 5	1	30 Nm (22.13 lb ft)	-
3	SHC screws fastening the switch	M5x16	2	6 Nm (4.43 lb ft)	Loct. 243



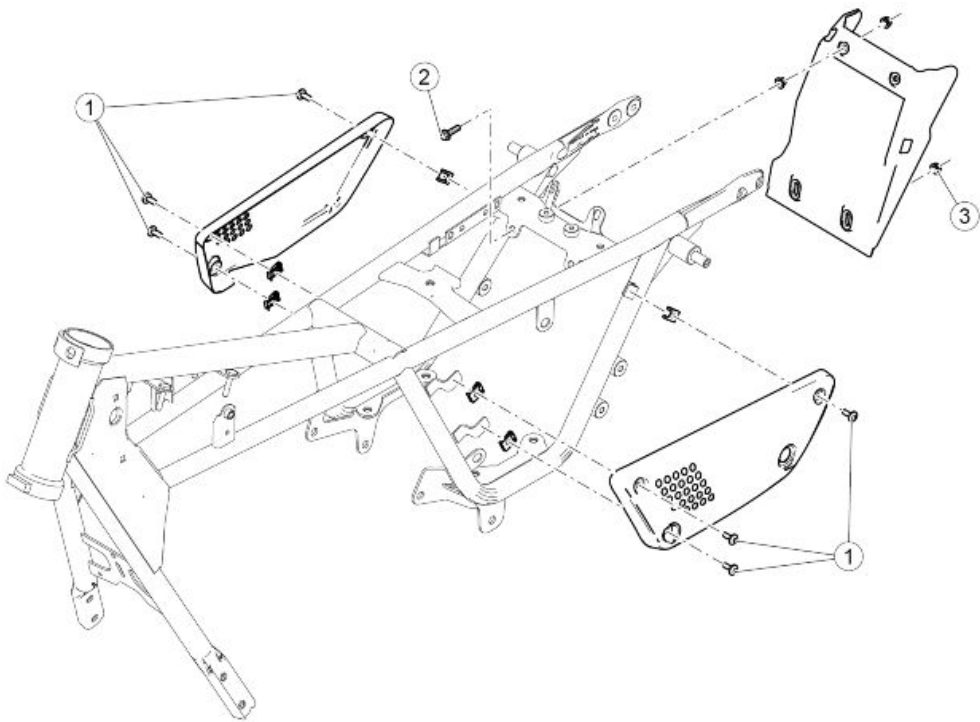
FUEL TANK

Pos.	Description	Type	Quantity	Torque	Notes
1	Tank rear fastening hexagon screw	M8	1	25 Nm (18.44 lb ft)	-
2	Fuel pump fastening hexagon screws	M5x16	6	5 Nm (3.69 lb ft)	-
3	SHC screws fastening the tank support buffers	M8x16	2	25 Nm (18.44 lb ft)	-



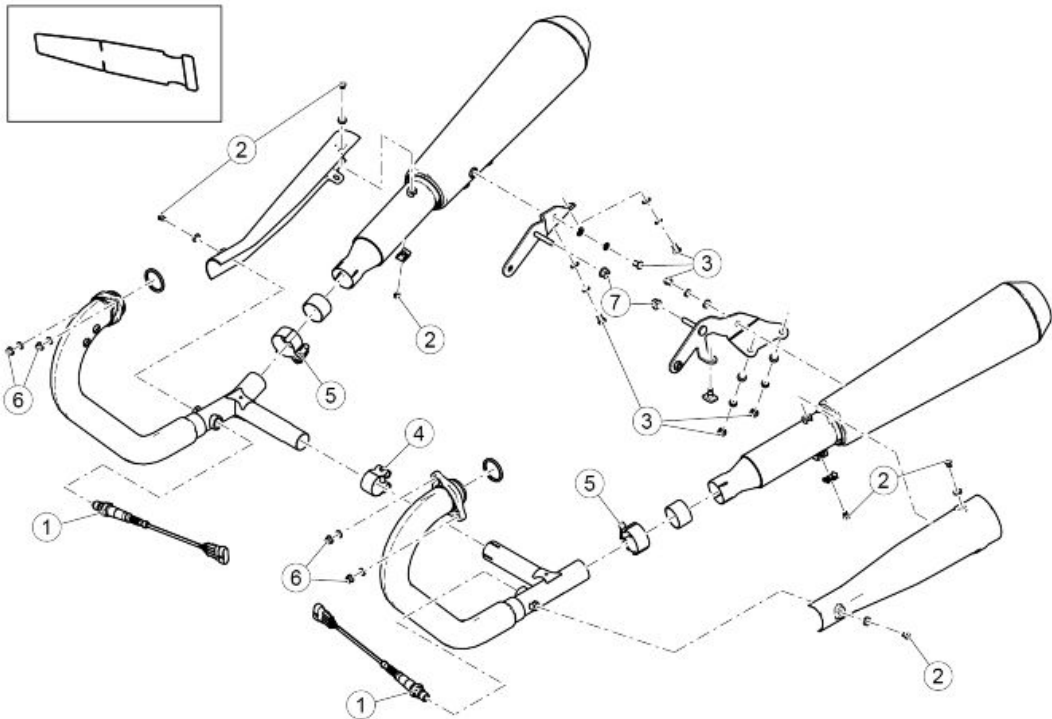
FILTER BOX

Pos.	Description	Type	Quantity	Torque	Notes
1	Air filter box cover fastening self-threading screw	M5x14	4	3 Nm (2.21 lb ft)	-
2	SWP screws fixing filter box to chassis	M5x20	2	3 Nm (2.21 lb ft)	-
3	SWP filter box locking screws	M5x20	9	3 Nm (2.21 lb ft)	-



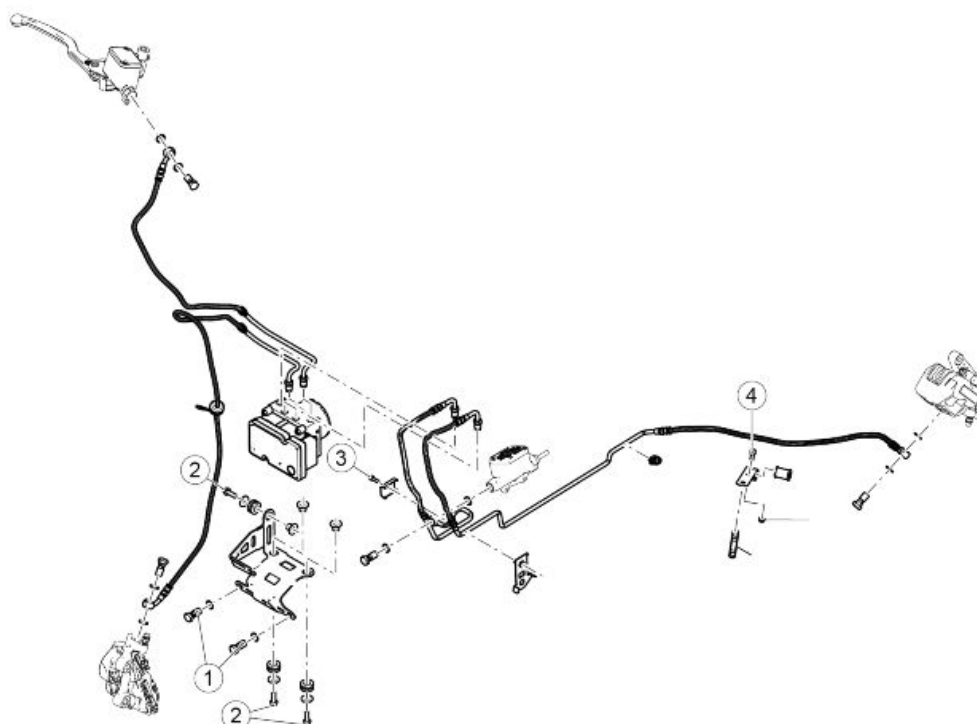
CENTRAL BODYWORK

Pos.	Description	Type	Quantity	Torque	Notes
1	TBEI screws fastening fearing	M5x15	6	4 Nm (2.95 lb ft)	-
2	TE flanged screws fastening top splash guard	M6	2	10 Nm (7.38 lb ft)	-
3	Flanged nuts fastening bottom splash guard	M6	2	10 Nm (7.38 lb ft)	-



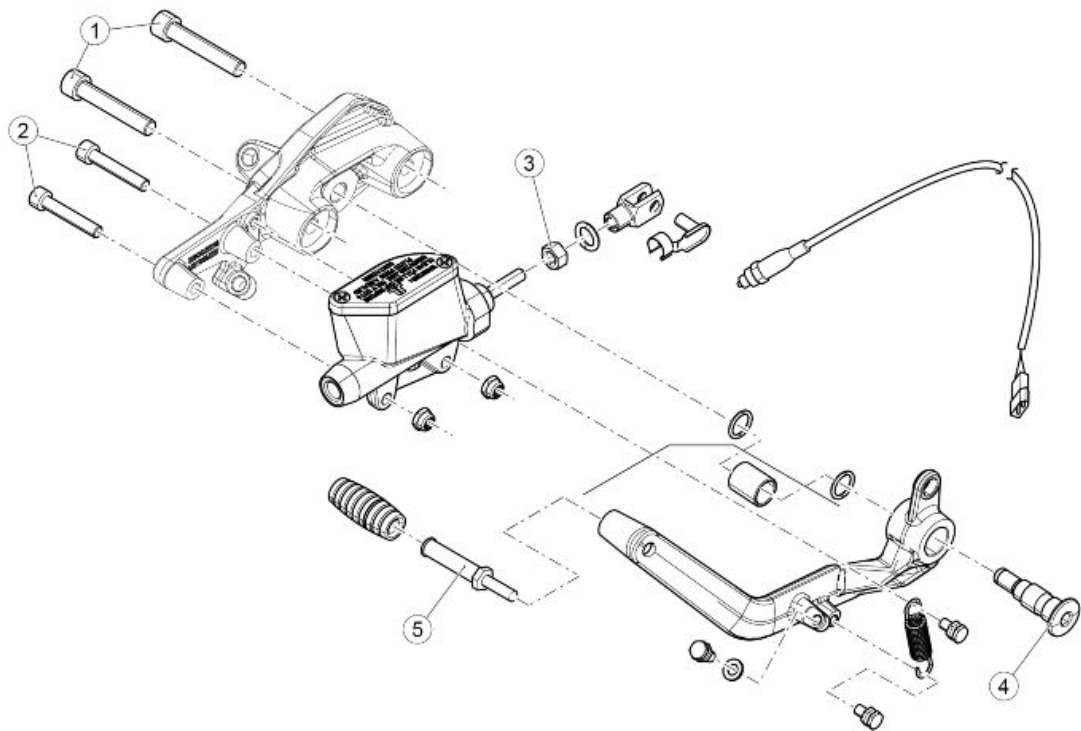
EXHAUST SYSTEM

Pos.	Description	Type	Quantity	Torque	Notes
1	Lambda probes fastener	M18x1.5	2	38 Nm (28.03 lb ft)	-
2	Flanged TBEI screws fixing exhausts protections	M6x10	6	8 Nm (5.90 lb ft)	Loct. 243
3	TBEI screws fixing mufflers to the supports	M8x12	6	25 Nm (18.44 lb ft)	-
4	Fixing exhaust pipes to the compensator	M8	1	25 Nm (18.44 lb ft)	-
5	Fixing exhaust pipes to the mufflers	M10	2	30 Nm (22.13 lb ft)	-
6	Flanged nuts fastening to the engine exhaust pipes	M8	4	25 Nm (18.44 lb ft)	-
7	Nuts fastening mufflers' support to the frame	M8x1.25	4	25 Nm (18.44 lb ft)	-



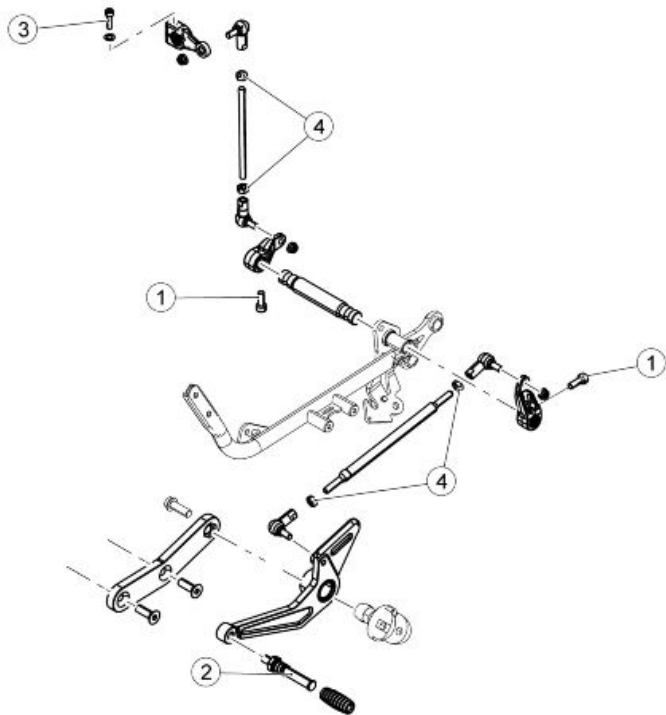
ABS SYSTEM

Pos.	Description	Type	Quantity	Torque	Notes
1	Control unit bracket fastening to the frame	M6x16	2	10 Nm (7.38 lb ft)	-
2	Screws fastening the ABS modulator to the support	M6x20	3	10 Nm (7.38 lb ft)	-
3	SHC screw fastening the brake pipes fixing plate	M4x16	1	3 Nm (2.21 lb ft)	-
4	SHC screw fastening the cable grommet plate	M5x12	1	6 Nm (4.43 lb ft)	-



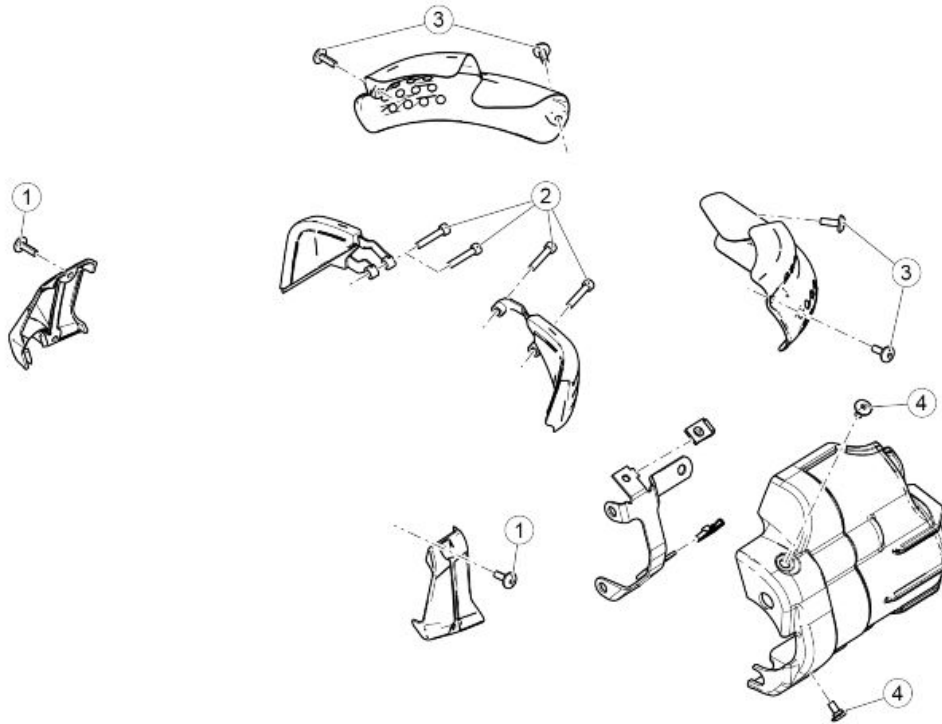
REAR BRAKE PUMP

Pos.	Description	Type	Quantity	Torque	Notes
1	SHC screws fastening the gearbox support plate to the chassis	M8x45	2	25 Nm (18.44 lb ft)	Loct. 243
2	SHC screws fastening the brake pump to the gearbox support plate	M6x25	2	10 Nm (7.38 lb ft)	-
3	Rear brake rod lock nut	M6	1	10 Nm (7.38 lb ft)	-
4	Brake lever pin	-	1	20 Nm (14.75 lb ft)	Loct. 243
5	Rear brake pedal	M8	1	25 Nm (18.44 lb ft)	-

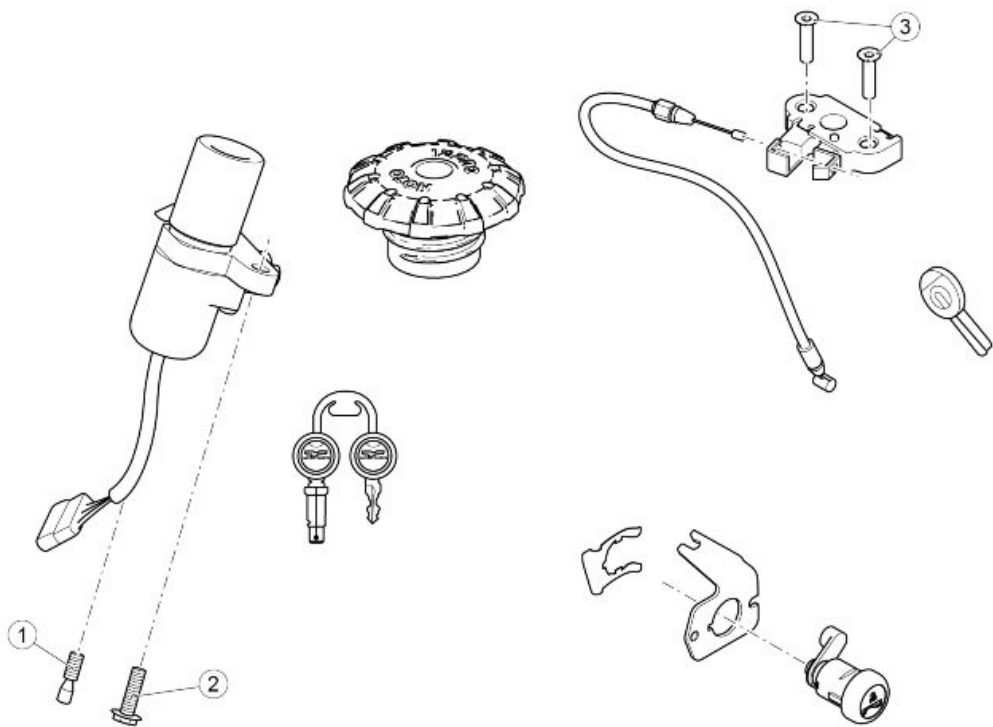


GEARBOX LEVER

Pos.	Description	Type	Quantity	Torque	Notes
1	Preselector lever SHC fixing screw	M8x60	1	20 Nm (14.75 lb ft)	Loct. 243
2	Gearbox pedal	-	1	20 Nm (14.75 lb ft)	Loct. 243
3	SHC screws fixing the gearbox control lever	M6x16	2	10 Nm (7.38 lb ft)	-
4	Nuts fastening the gearbox control tie rods	M6	4	10 Nm (7.38 lb ft)	-

**GUARDS**

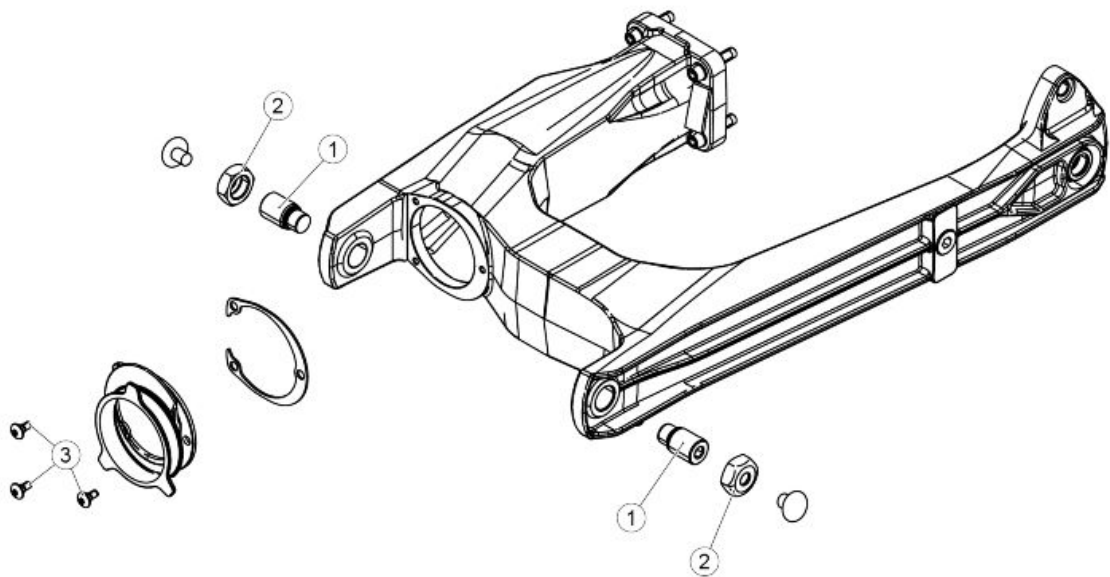
Pos.	Description	Type	Quantity	Torque	Notes
1	SWP screws fastening the frame cover	-	4	3 Nm (2.21 lb ft)	-
2	SHC screws fastening the head cover	M6x30	4	10 Nm (7.38 lb ft)	-
3	Throttle body cover fastening screws	M5x15	4	4 Nm (2.95 lb ft)	-
4	TBEI screws fastening the starter motor cover	M5x9	2	4 Nm (2.95 lb ft)	-



Locks

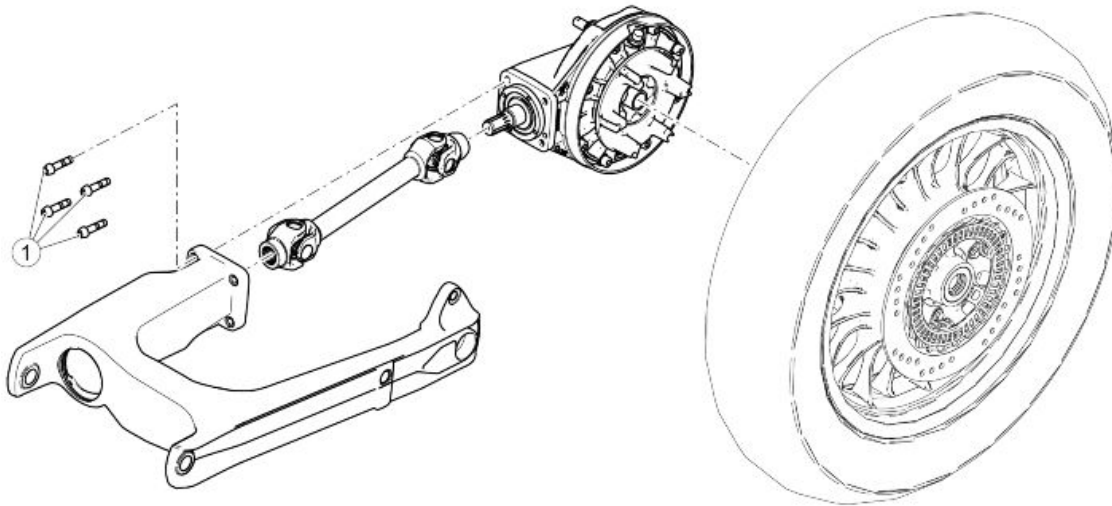
Pos.	Description	Type	Quantity	Torque	Notes
1	Special screw fastening the ignition lock	M8x15	1	At the point of failure	-
2	Ignition lock fixing screw	M8x15	1	25 Nm (18.44 lb ft)	Loct. 243
3	Saddle release block fixing screws	M6x25	2	10 Nm (7.38 lb ft)	-

Back side



SWINGARM

Pos.	Description	Type	Quantity	Torque	Notes
1	Pins fixing swingarm to gearbox	-	2	-	Manual
2	Counter-nuts fixing swingarm to gearbox	-	2	50 Nm (36.88 lb ft)	-
3	Rubber bellows torx fixing screws	-	3	6 Nm (4.43 lb ft)	-

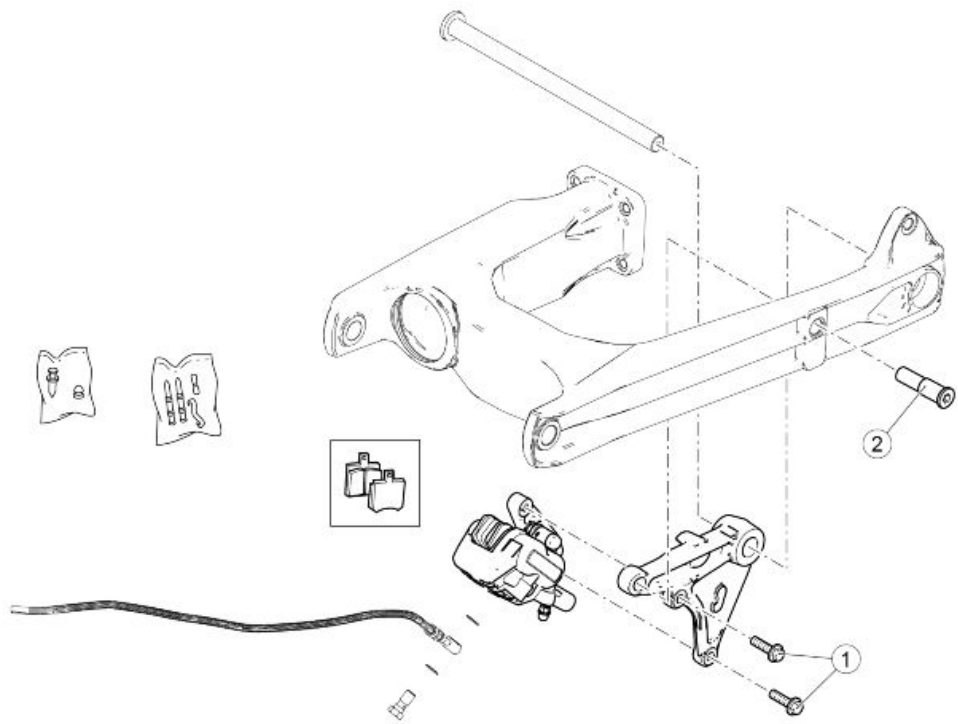
**REAR WHEEL TRANSMISSION**

Pos.	Description	Type	Quantity	Torque	Notes
1	SHC torx fixing screws swingarm to gearbox	M8x35	4	25 Nm (18.44 lb ft)	-



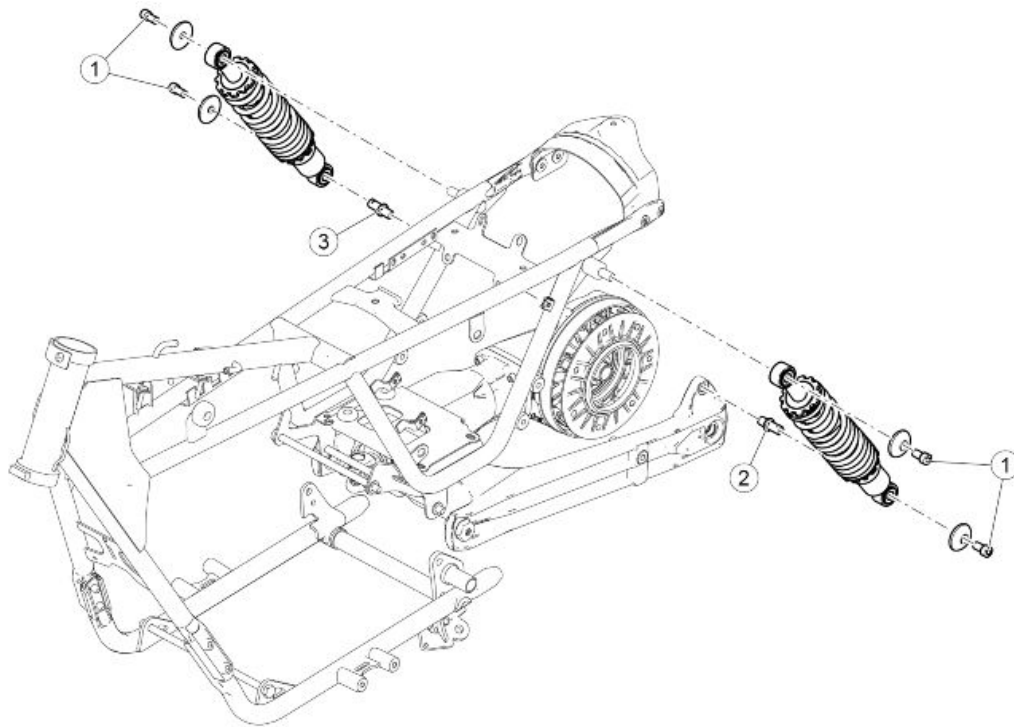
REAR WHEEL

Pos.	Description	Type	Quantity	Torque	Notes
1	Rear wheel fixing pin-nut	M20	1	120 Nm (88.51 lb ft)	-
2	TE flanged screws fastening phonic wheel and brake disc	M8x22	6	25 Nm (18.44 lb ft)	Loct. 243
3	SHC flanged screws fastening ABS sensor support	M6x12	2	10 Nm (7.38 lb ft)	-
4	TBEI torx screw fastening the ABS sensor	M5x16	1	6 Nm (4.43 lb ft)	Loct. 243

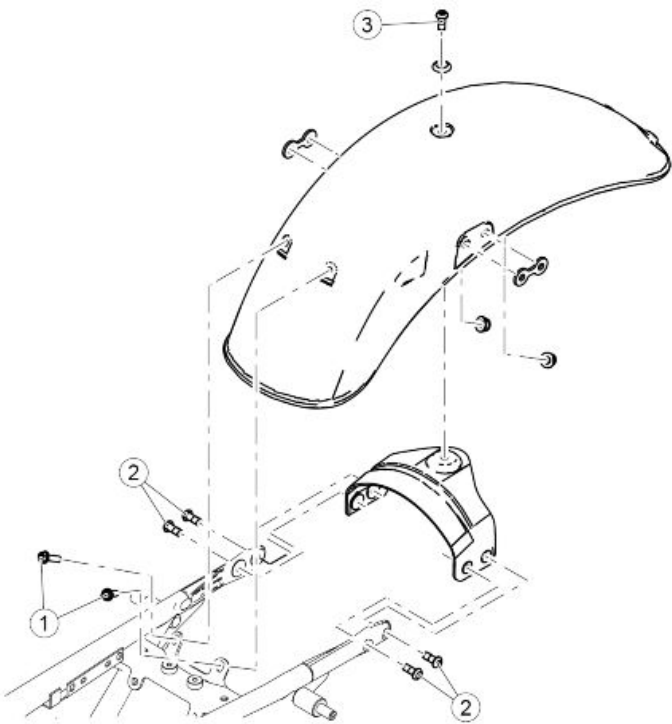


REAR BRAKE CALLIPER

Pos.	Description	Type	Quantity	Torque	Notes
1	TE flanged screws fastening rear brake calliper	M8x30	2	25 Nm (18.44 lb ft)	-
2	Rear brake calliper support fixing pin	M16	1	35 Nm (25.81 lb ft)	-

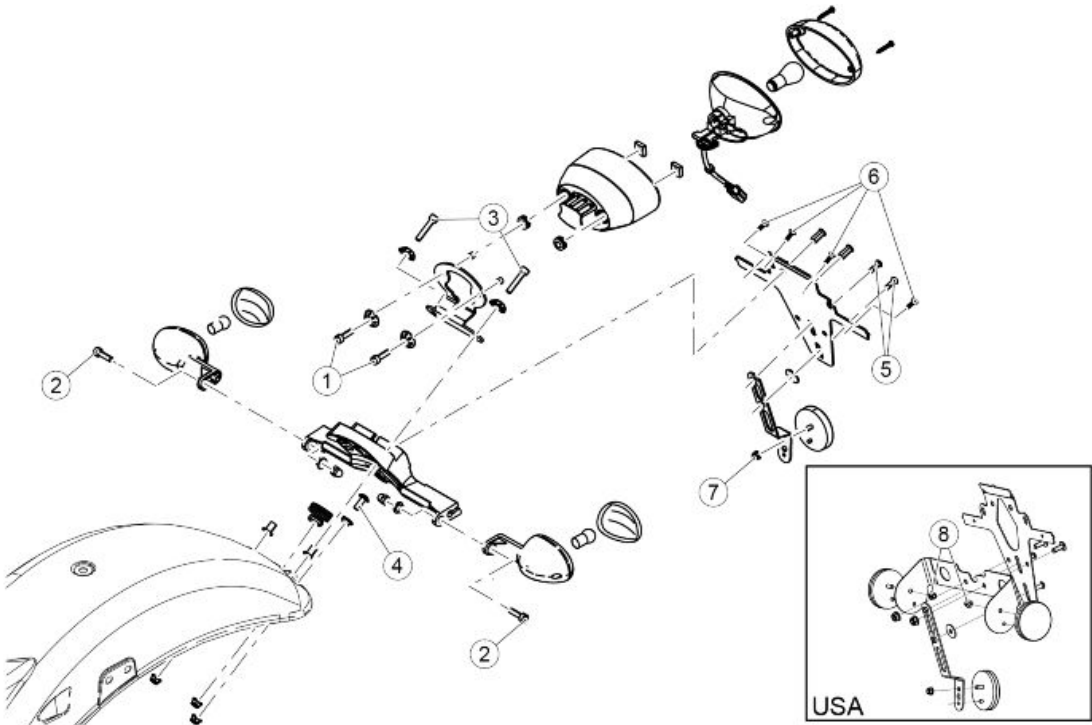
**SHOCK ABSORBERS**

Pos.	Description	Type	Quantity	Torque	Notes
1	Shock absorber SHC fixing screws	M6x14	4	10 Nm (7.38 lbf ft)	Loct. 243
2	Pin for fastening the shock absorber to chassis	M12	1	35 Nm (25.81 lb ft)	Loct. 243
3	Pin for fastening the shock absorber to gearbox	M12	1	35 Nm (25.81 lb ft)	Loct. 243



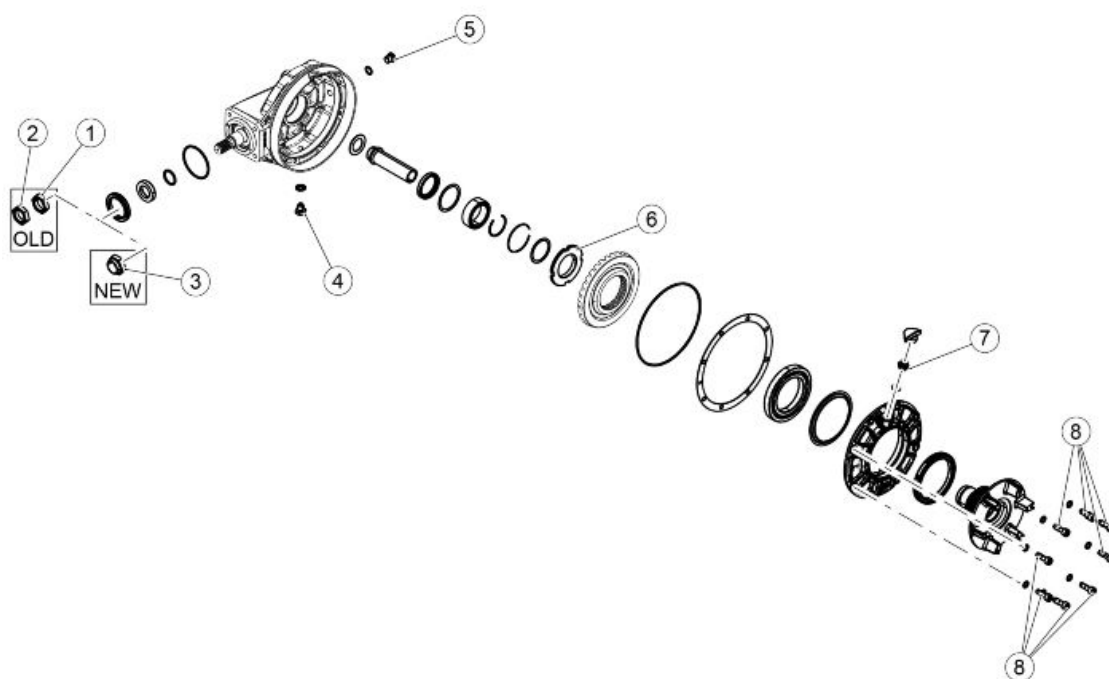
REAR MUDGUARD

Pos.	Description	Type	Quantity	Torque	Notes
1	Flanged screw fixing front mudguard to chassis	M6	2	10 Nm (7.38 lbf ft)	-
2	Mudguard side fixing screws to chassis	M8x20	4	35 Nm (25.81 lb ft)	-
3	Big end rounded torx screw fastening top mudguard to chassis	M8x20	1	15 Nm (11.06 lbf ft)	-



REAR LIGHTS

Pos.	Description	Type	Quantity	Torque	Notes
1	Taillight SHC fixing screws	M6x20	1	10 Nm (7.38 lbf ft)	-
2	TBEI screws fastening rear turn indicators	M6x25	2	10 Nm (7.38 lbf ft)	-
3	SHC screws fastening the license plate and headlight support to the mudguard	M6x30	2	10 Nm (7.37 lbf ft)	-
4	Flanged TBEI screw for fastening the license plate and headlight support to the mudguard	M6x16	1	10 Nm (7.38 lbf ft)	-
5	Screw fastening license plate mounting and reflector mounting	-	2	6 Nm (4.43 lbf ft)	-
6	Licence plate cover self-threading fixing screws	-	4	1 Nm (0.74 lb ft)	-
7	Flanged self-locking nut fastening reflector	M5	1	6 Nm (4.43 lbf ft)	-
8	Flanged self-locking nuts for fastening the reflectors	M5	1	6 Nm (4.43 lbf ft)	-

**BEVEL GEAR**

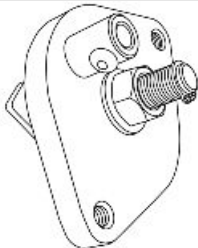
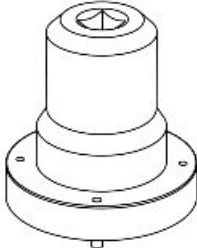
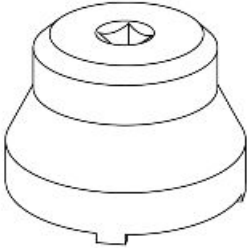
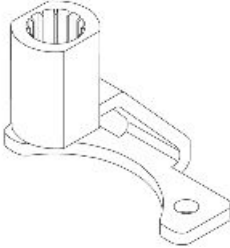
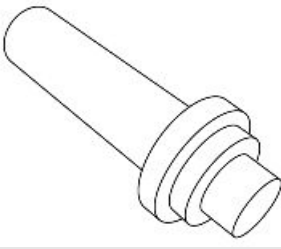
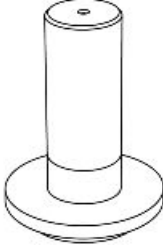
Pos.	Description	Type	Quantity	Torque	Notes
1	Pinion unit fixing nut - OPTION 01	M25	1	100 Nm (73.76 lb ft)	Loct. 243
2	Pinion unit fixing lock nut - OPTION 01	M25	1	20 Nm (14.75 lbf ft)	Loct. 243
3	Pinion unit fixing nut - OPTION 02	M25	1	100 Nm (73.76 lb ft)	Loct. 243 + Nut re-bating on hollow pinion
4	Oil drainage plug	M10	1	30 Nm (22.13 lbf ft)	-
5	Oil load cap	M12	1	25 Nm (18.44 lbf ft)	-
6	Ring nut	-	1	100 Nm (118.01 lbf ft)	Loct. 243 + Riveting on the splash guard hub
7	Bleeder cap	-	1	10 Nm (7.38 lbf ft)	-
8	Gearbox cover fastening screws	M8x25	8	25 Nm (18.44 lbf ft)	-

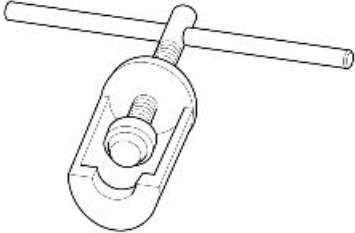
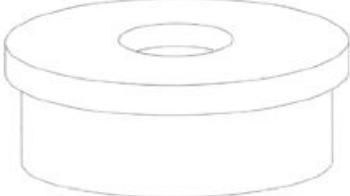
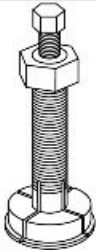
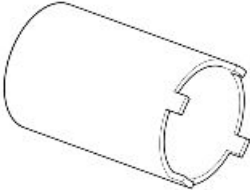
INDEX OF TOPICS

SPECIAL FEATURES

SF

SPECIAL TOOLS

Stores code	Description	
021009Y	Engine axial clearance check tool	
020998Y	Pinion case wrench	
020999Y	Crown counter- lock ring wrench	
021000Y	Angle transmission support	
021003Y	Bevel gear oil seal punch	
021005Y	Bevel gear cover oil seal punch	

Stores code	Description	
GU19927900	Punch for pressing bearing inner ring on-to drilled pin	
GU19907000	Extractor for internal ring on drilled bolt	
020360Y	52 x 55 mm adaptor	
020376Y	Adaptor handle	
001467Y036	Bearing internal cup extractor	
AP8140190	Steering tightening tool	
020922Y	Diagnostic tool	

Stores code	Description	
020931Y	PADS instrument panel connection cable	

INDEX OF TOPICS

MAINTENANCE

MTN

Maintenance chart

NOTE

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.

NOTE

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

I: CHECK AND CLEAN, ADJUST, LUBRICATE OR REPLACE, IF NECESSARY

C: CLEAN, R: REPLACE, A: ADJUST, L: LUBRICATE

(1): Replace in case of leaks

(2): Replace every 4 years

(3): At each engine start

(4): Check every month

(5): Check every 5,000 km (3,106 miles)

(6): Check and clean, adjust or replace if necessary every 1000 km (621 miles)

(7): Replace at whichever of the following occurs first: 40,000 km (24,855 miles) or 4 years

(8): At each service (except the first one), check inside the filter box, if there is oil. Clean if necessary

SCHEDULED MAINTENANCE TABLE

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 MONTH S	EVERY 24 MONTH S
Spark plugs		R	R	R	R	R	R		
Filter box (8)		C	C	C	C	C	C		
Transmission cables and controls	I	I	I	I	I	I	I	I	I
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	I
Diagnosis by tool	I	I	I	I	I	I	I	I	I
Brake discs - Pads wear (6)	I	I	I	I	I	I	I	I	I
Air filter		R	R	R	R	R	R		
Oil filter change	C						C		
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		
Rear wheel cush drive rubber cushions						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 (7)					R				
Engine oil (5)	R	R	R	R	R	R	R	R	R
Final drive oil				R			R	R	R
Headlight aiming		I	I	I	I	I	I		
Fork oil seals (1)	I	I	I	I		I	I		
Tyres - pressure / wear (4)	I	I	I	I	I	I	I	I	I
Clutch clearance adjustment	I	I	I	I	I	I	I		
Nut/bolt tightness	I	I	I	I	I	I	I		
Battery terminals tightening	I							I	I
Suspensions and stability	I		I		I		I	I	I
Engine oil pressure warning light (3)									
Filter box drain plug	C	C	C	C	C	C	C	C	C

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 MONTH S	EVERY 24 MONTH S
Brake lines		I	I	I	I	I	I		
Fuel lines (2)		I	I	I	I	I	I	I	I
Clutch wear		I	I	I	I	I	I		
Labour time (minutes)	80	90	90	90	120	110	100	60	60

SCHEDULED MAINTENANCE TABLE ONLY FOR THE ASIA/PACIFIC MARKET

I: CHECK AND CLEAN, ADJUST, LUBRICATE OR REPLACE, IF NECESSARY

V: CHECK AND CLEAN, ADJUST AND REPLACE IF NECESSARY

C: CLEAN, R: REPLACE, A: ADJUST, L: LUBRICATE

(1) Replace in case of leaks.

(2) Replace every 2 years or 20,000 km (12,427.42 mi).

(3) Replace every 4 years.

(4) At each engine start.

(5) Check every month.

(6) Check every 5,000 km (3,106.86 mi).

(7) Check and clean and adjust or replace, if necessary, every 1,000 km (621.37 mi).

(8) Replace at whichever of the following occurs first: 40,000 km (24,854.85 mi) or 4 years.

(9) At each service (except the first one), check inside the filter box, if there is oil. Clean if necessary.

SCHEDULED MAINTENANCE TABLE

km x 1,000 or (months) maximum	1.5 (1)	10 (10)	20 (20)	30 (30)	40 (40)	50 (50)	60 (60)
Spark plugs		R	R	R	R	R	R
Filter box (9)		C	C	C	C	C	C
Transmission cables and controls	I	I	I	I	I	I	I
Steering bearings and steering play	I	I	I	I	I	I	I
Wheel bearings		I	I	I	I	I	I
Diagnosis by tool	I	I	I	I	I	I	I
Brake discs	I	I	I	I	I	I	I
Air filter		R	R	R	R	R	R
Oil filter change	C						C
Engine oil filter	R	R	R	R	R	R	R
Lights operation / aiming		I	I	I	I	I	I
Vehicle general operation	I	I	I	I	I	I	I
Rear wheel cush drive rubber cushions						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 (2)	I	I	I	I	I	I	I
Gearbox oil	R						R
Fork oil (8)					R		
Engine oil (6)	R	R	R	R	R	R	R
Final drive oil				R			R
Fork oil seal (1)	I	I	I	I		I	I
Tyres - pressure/wear (5)	I	I	I	I	I	I	I
Clutch clearance adjustment	I	I	I	I	I	I	I
Valve clearance adjustment	A	A	A	A	A	A	A
Wheels	I	I	I	I	I	I	I
Nut/bolt tightness	I	I	I	I	I	I	I
Battery terminals tightening	I						
Suspension and setup	I		I		I		I
Engine oil pressure warning light (4)							
Filter box drain plug	C	C	C	C	C	C	C
Fuel lines (3)		I	I	I	I	I	I

km x 1,000 or (months) maximum	1.5 (1)	10 (10)	20 (20)	30 (30)	40 (40)	50 (50)	60 (60)
Brake pipes		I	I	I	I	I	I
Clutch wear		I	I	I	I	I	I
Brake pads wear (7)	V	V	V	V	V	V	V
Labour time (minutes)	80	90	90	90	120	110	100

NOTE

AT EACH SCHEDULED MAINTENANCE MUST BE VERIFIED WITH THE DIAGNOSTIC TOOL IF THERE ARE ERRORS AND THE IF THE PARAMETERS ARE CORRECT. ENSURE THAT THE VEHICLE CALIBRATION IS UP TO DATE AFTER UPDATING THE DIAGNOSTIC TOOL.

Recommended Products

Piaggio Group recommends the use of products from its Castrol official partner 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.



TABLE OF RECOMMENDED PRODUCTS

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 85W-140	Lubricant for transmissions.	API GL-4; GL-5
75W-90 lubricant for gearboxes and transmissions	Synthetic lubricant for gearboxes and transmissions.	SAE 75W-90; API GL4, GL5, MT1; MAN 3343 Typ S; MAN 341 E3; MIL-PRF-2105 E.
Fork oil 7.5W	Fork oil.	SAE 7.5W
Molybdenum disulphide grease	Lithium grease with molybdenum disulphide.	Grey black grease
Petroleum jelly	neutral grease for battery terminals	-
DOT 4 brake fluid	Synthetic brake fluid.	SAE J 1703; FMVSS 116; ISO 4925; CU-NA NC 956 DOT4

NOTE

USE NEW BRAKE FLUID ONLY. DO NOT MIX DIFFERENT BRANDS OR TYPES OF OIL WITHOUT CHECKING THEIR BASE COMPATIBILITY.

Transmission fluid

Replacement

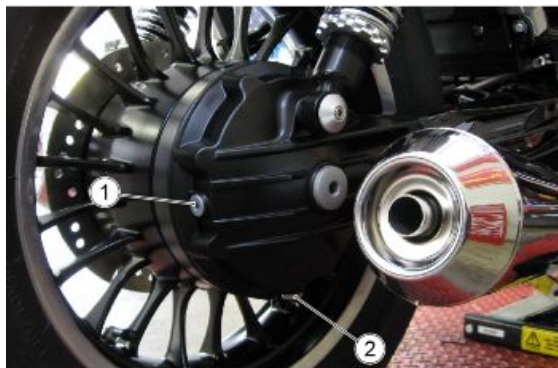
IMPORTANT

THE REPLACEMENT MUST BE PERFORMED WITH THE UNIT HOT, SINCE IN THESE CONDITIONS THE OIL IS FLUID AND THEREFORE EASY TO BE DRAINED.

NOTE

TO BRING THE OIL TO THE SUITABLE TEMPERATURE, DRIVE A FEW km (mi)

- Place a container, with a capacity higher than 400 cu cm (25 cu in) underneath the drain plug (2).
- Unscrew and remove the drainage cap (2).
- Unscrew and remove the oil cap (1).
- Drain the oil and let it drip for at least 5 minutes into the container.
- Check and, if necessary, replace the sealing washer from the drainage cap (2).
- Remove the metal residue attached to the magnet on the drainage cap (2).
- Screw in and lock the drainage cap (2).
- Pour new oil through the filler hole.
- MAX quantity 160 cu cm (9.76 cu in) (filling quantity after emptying; -20 cu cm (1.22 cu in) compared to the nominal quantity of 180 cu cm (10.98 cu in), to compensate for the remaining oil in the transmission gear box).

**IMPORTANT**

DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID. IF YOU USE A FUNNEL OR ANOTHER IMPLEMENT, MAKE SURE THAT IT IS PERFECTLY CLEAN.

NOTE

THE RECOMMENDED OIL QUANTITY FOR REPLACEMENT IS MAX. 160 CU CM (9.76 cu in).

Recommended products

75W-140 lubricant for gearboxes and transmissions Synthetic lubricant for gearboxes and transmissions

SAE 75W-140 - API GL5

- Screw in the cap tightly (1).

NOTE

NELLA FASE DI RIMONTAGGIO UTILIZZARE UNA NUOVA RONDELLA DI TENUTA.

IMPORTANT

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 160 cu cm (9.76 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.

IMPORTANT

NELLA FASE DI RIMONTAGGIO UTILIZZARE UNA NUOVA RONDELLA DI TENUTA PER IL TAPPO DI SFIATO.

Engine oil

Check

IMPORTANT

ENGINE MUST BE WARM TO CHECK ENGINE OIL LEVEL.



ENGINE OIL LEVEL MUST BE CHECKED WHEN THE ENGINE IS WARM AND WITH THE DIPSTICK INSERTED BUT NOT SCREWED IN.

IF YOU CHECK LEVEL WHEN THE ENGINE IS COLD, OIL LEVEL COULD TEMPORARILY DROP BELOW THE 'MIN' MARK.

THIS SHOULD NOT BE CONSIDERED A PROBLEM PROVIDED THAT THE ALARM WARNING LIGHT AND THE ENGINE OIL PRESSURE ICON DISPLAY DO NOT TURN ON SIMULTANEOUSLY.

NOTE

DO NOT LET THE ENGINE IDLE WITH THE VEHICLE AT STANDSTILL TO WARM UP THE ENGINE OIL AND REACH THE OPERATING TEMPERATURE OF ENGINE OIL. OIL IS BEST CHECKED AFTER RUNNING FOR ABOUT 15 KM (9.32 miles).

- Switch off the engine and wait at least five minutes to allow the lubricant to drain back into the sump.
- Keep the vehicle upright with both wheels on the earth.
- Unscrew and remove the cap with dipstick.
- Clean dipstick.
- Refit the cap with dipstick into its hole and tighten it.
- Remove the cap with dipstick.
- Check oil level by means of the oil dipstick.
- The oil level is correct when it close to the "MAX" mark.

MAX = maximum level

MIN = minimum level

Add engine oil if required:

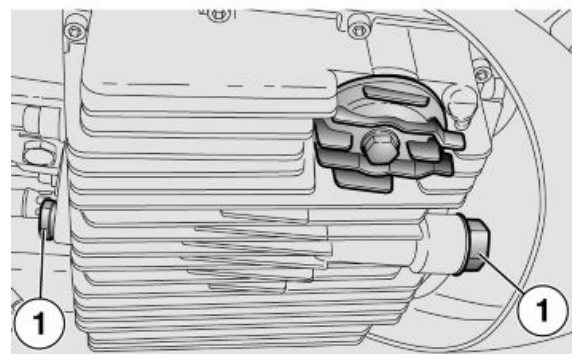
- Unscrew and remove the cap with dipstick.
- Top-up with engine oil until it goes above the minimum level marked "MIN".

IMPORTANT

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

**Replacement**

- Place a recipient with a capacity of at least 2,000 cm³ (122.05 cu.in) under the drain plug (1).
- Unscrew and remove the drainage plug (1).



- 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 deposits attached to the drainage plug (1) magnet.
- Screw and tighten the drainage plug (1).



Tightening torque for drainage plugs (1): 20 - 22 Nm (14.75 - 16.23 lb ft).



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

Engine oil filter

- Loosen the screw (3) and remove the cover (4).
- Remove the engine oil filter (5).

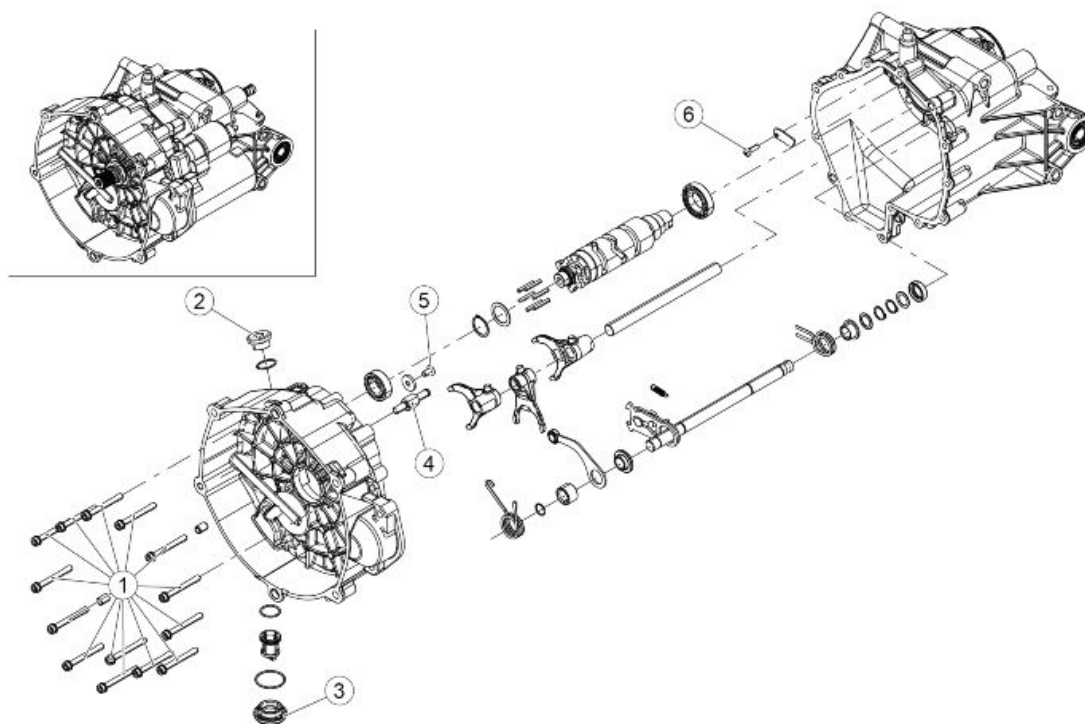
NOTE

NEVER REUSE AN OLD FILTER.



- Spread a thin layer of oil on the sealing ring (6) of the new engine oil filter.
- Fit the new engine oil filter with the spring facing downwards.
- Refit the cover (4), screw and tighten the screw (3).

Gearbox oil



COMPLETE GEAR - SELECTOR - DESMODROMIC

Pos.	Description	Type	Quantity	Torque	Notes
1	Gearbox fixing SHC screws	M6x55	14	9-11 Nm (6.64-8.11 lb ft)	-
2	Oil load cap	M20x1.5	1	23-27 Nm (16.96-19.91 lb ft)	-
3	Oil filter cap	M28x1	1	25-30 Nm (18.44-22.13 lb ft)	-
4	Pre-selector pin	M8	1	18-22 Nm (18.28-16.23 lb ft)	Loct. DRI 2040

Pos.	Description	Type	Quantity	Torque	Notes
5	Washers fixing countersunk head screws	M6x12	5	9-11 Nm (6.64-8.11 lb ft)	Loct. DRI 2045
6	Plate fixing torx screw	M5x16	1	6-7 Nm (4.42-5.16 lb ft)	Loct. DRI 2045

Replacement

NOTE

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

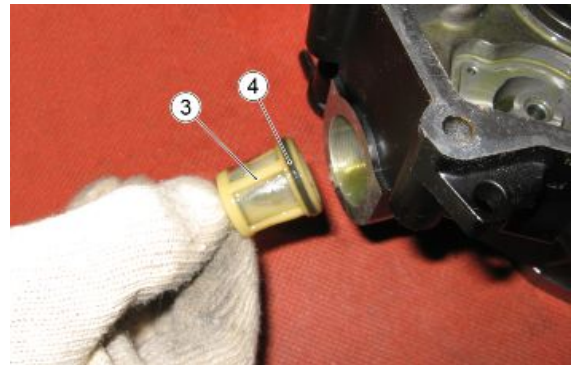
- Place a container with suitable capacity under the drainage plug (2).
- Unscrew and remove the drainage plug (2).



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



- Remove the air filter (3) and clean it
- Check the O-Ring (4) and if necessary replace it
- Screw and tighten the drainage plug (2)



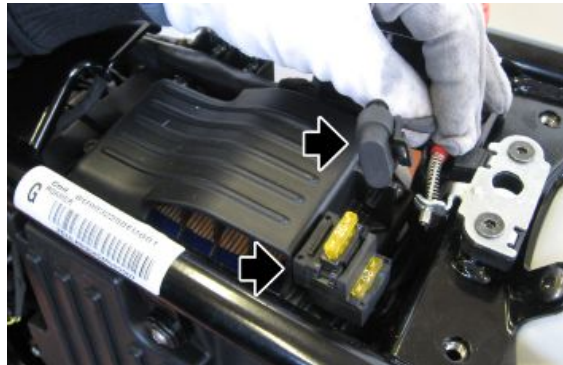
- Pour in new oil, observing the quantity indicated in the table "capacity"
- Tighten the filler cap (1).

IMPORTANT

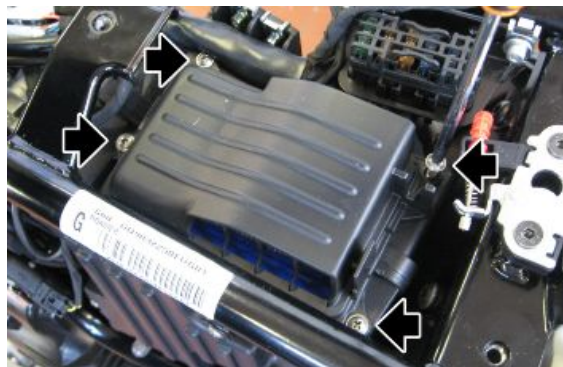
DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID. IF YOU USE A FUNNEL OR ANOTHER IMPLEMENT, MAKE SURE THAT IT IS PERFECTLY CLEAN.

Air filter

- Remove the saddle
- Unhook the connector from the air-box cover



- Remove the air-box cover fixing screw



- Remove the air-box cover
- Extract the air filter



Rimozione corpo farfallato

- Remove the clip clamp fixing the sleeve to the filter box

IMPORTANT

DURING REFITTING, REPLACE THE CLIP CLAMP



- Loosen the clamps that secure the sleeve to the intake manifolds



- Remove the sleeve



-
- Remove the battery
 - Remove the MIU G3 control unit connector support bracket fixing screw



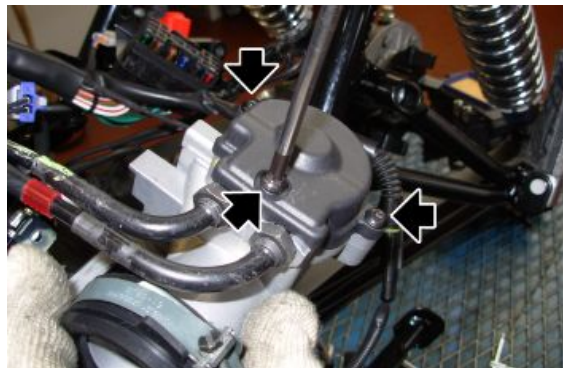
-
- Disconnect the MIU G3 control unit connector



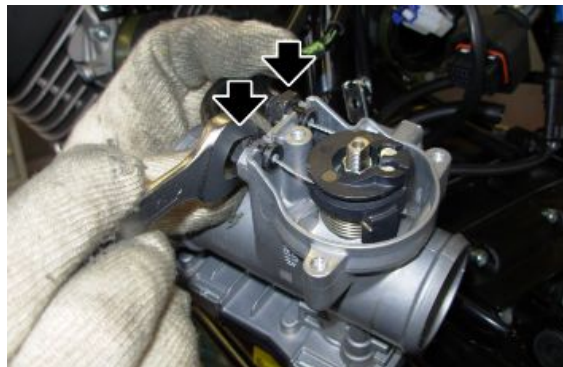
- Remove the clip clamp fixing the throttle body to the filter box
- Extract the throttle body laterally



- Remove the throttle body guard



- Loosen the gas cables fixing nuts on the throttle body and unhook them



- Remove the throttle body

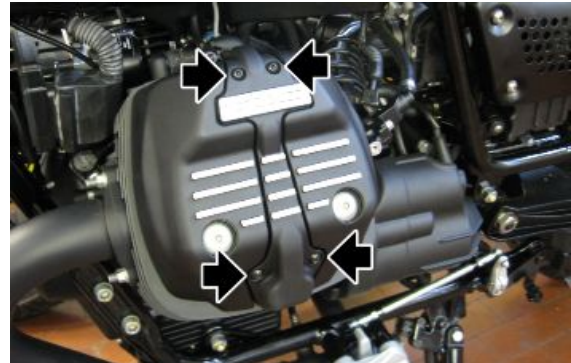
Checking the valve clearance

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

NOTE

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

- 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



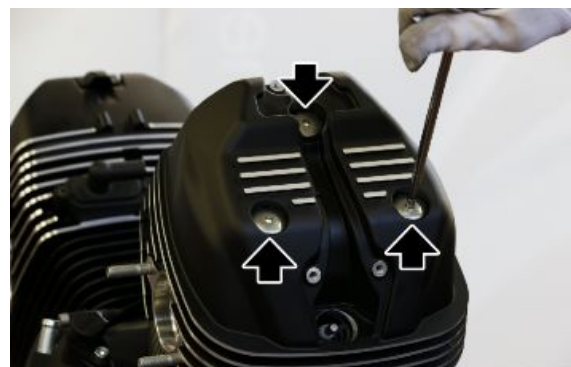
- Remove the spark plug tube



- Remove the three head cover fixing screws

IMPORTANT

VERIFICARE ED EVENTUALMENTE SOSTITUIRE SE DANNEGGIATI I GOMMINI SMORZATORI PRESENTI SUL COPERTCHIO TESTA.



- Remove the head cover

IMPORTANT

VERIFICARE ED EVENTUALMENTE SOSTITUIRE SE DANNEGGIATE LE GUARNIZIONI DEI COPERCHI TESTA.



- Remove the spark plug

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.

**Characteristic****Intake valve clearance**

0.10 mm (0.0039 in)

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 cylinder to the top dead centre, rotating the engine 270 degree

Braking system

Level check

FRONT BRAKE

CHECK

- Rest the vehicle on its stand
- Turn the handlebar so that the fluid is at the same level as the plug.
- Check that the fluid contained in the tank (1) exceeds the 'MIN' level reference mark



MIN = minimum level

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

IMPORTANT

FLUID LEVEL DECREASES GRADUALLY AS BRAKE PADS WEAR DOWN.

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

REAR BRAKE

CHECK

- 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

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

IMPORTANT

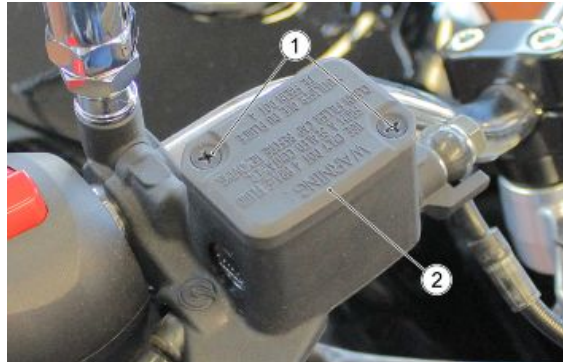
FLUID LEVEL DECREASES GRADUALLY AS BRAKE PADS WEAR DOWN.

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

Top-up

FRONT BRAKE

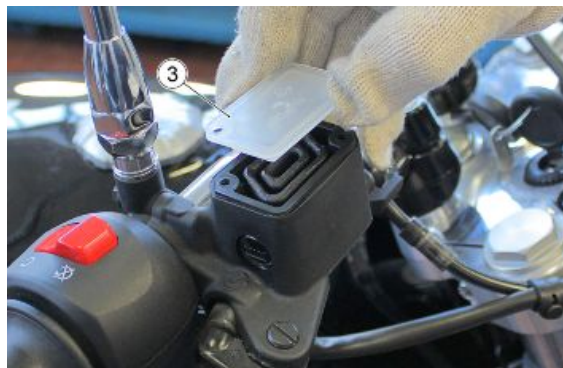
- Unscrew and remove the two fastening screws (1) on the brake fluid reservoir cover (2).



- Remove the brake fluid reservoir cover (2)



- Remove the inner cover (3)



- Remove the diaphragm (4)
- Top up the brake fluid reservoir

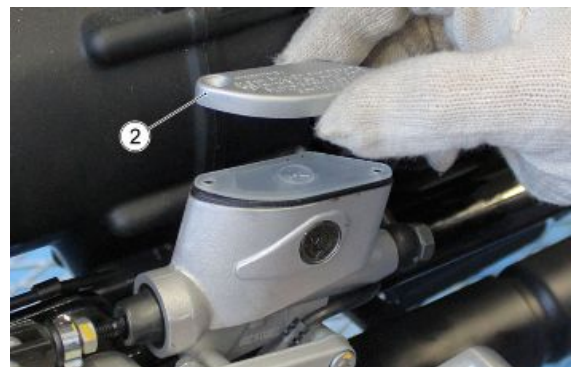


REAR BRAKE

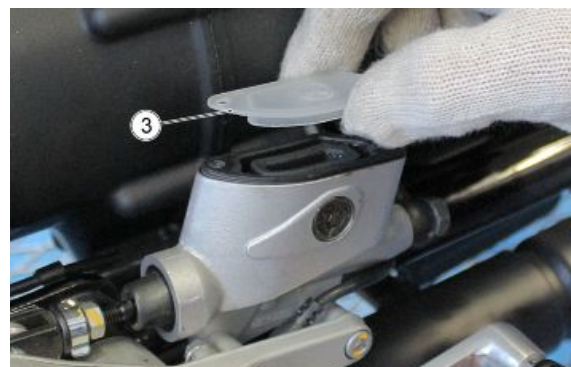
- Unscrew and remove the two fastening screws (1) on the brake fluid reservoir cover (2).



- Remove the brake fluid reservoir cover (2)



- Remove the inner cover (3)
- Remove the diaphragm (4)
- Top up the brake fluid reservoir



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

IMPORTANT

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.



TO AVOID SPILLING FLUID WHILE TOPPING-UP, KEEP THE TANK PARALLEL TO THE RESERVOIR EDGE (IN HORIZONTAL POSITION).

DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID.

WHEN USING A FUNNEL OR ANY OTHER ELEMENT, MAKE SURE IT IS PERFECTLY CLEAN.

Rilievo gioco albero motore

IMPORTANT

THE PROCEDURE TO MEASURE THE CRANKSHAFT CLEARANCE MUST BE PERFORMED AT COLD ENGINE

- Remove the starter motor.
- Place the specific tool and tighten it with the same screws used for the fixing of the starter motor.

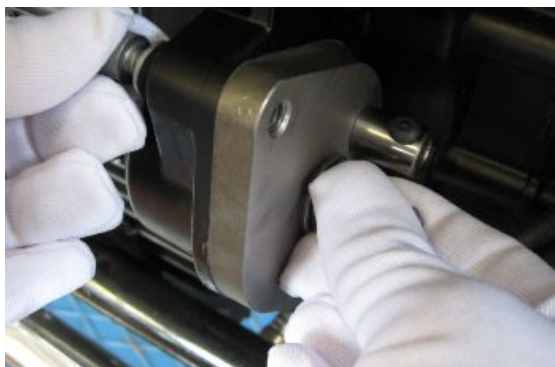
NOTE

THE BRACKET ON THE END OF THE CENTRE PIN MUST CLAMP CORRECTLY ONTO THE STARTER RING GEAR.

Special tools

021009Y Engine axial clearance check tool

- The image serves to show the correct positioning of the tab of the central pin attached on the starting sprocket.



- Insert a dial gauge on the tool, as indicated, to be able to measure the clearance.



- Reset the dial gauge.



- Screw the central nut until the dial gauge indicates a value of 0.5 mm (0.020 in) (the value indicated on the dial gauge is expressed in hundredths of a millimetre) and then loosen completely the nut until the central pin of the tool moves freely.



- Reset the dial gauge again and pull the clutch lever. Maximum permissible endfloat: 0.45 mm (0.018 in).

IMPORTANT

A CORRECT CRANKSHAFT ENDFLOAT READING IS ONLY GIVEN THE FIRST TIME THE CLUTCH LEVER ON THE HANDLEBAR IS PULLED COMPLETELY.



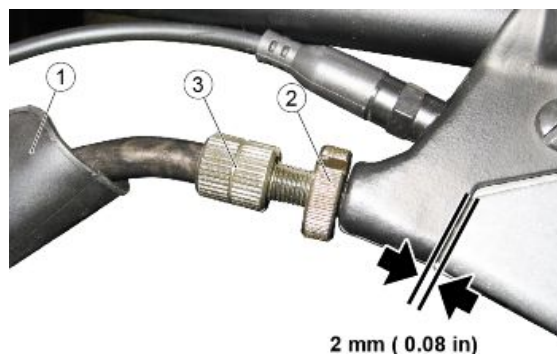
Clutch system

Adjusting the lever

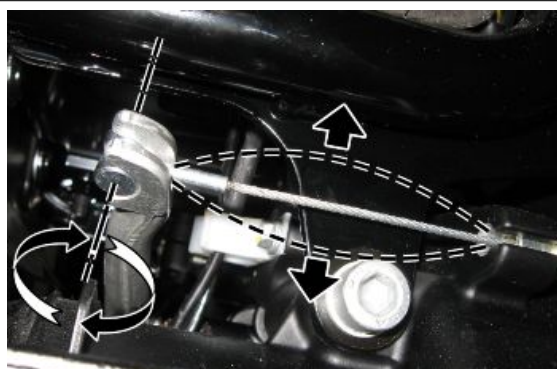
Adjust the clutch when the engine stops or the vehicle tends to move forward even when clutch lever is operated and the gear engaged, or if the clutch "slides", resulting in acceleration delay considering the engine revs.

- 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.

1. Pull back the protective boot (1)
2. Loosen the ring nut (2)
3. Turn the set screw (3) with straight handlebar until the empty travel corresponding to the fixed abutment on the handlebar is 2 mm (0.08 in)



4. Push the clutch control lever on the gearbox housing towards the rear wheel.
5. Pull the clutch control lever placed on the gearbox towards the opposite side (as in point 4) checking that the cable is not tightened.
6. During the previous operation, check that the cable lug turns freely around its axis, regarding the clutch lever
7. Tighten the ring nut (2), holding the adjuster nut (3) to prevent it from turning



8. Refit the protection casing (1)
9. If after the adjustment in point 3 it is not possible to check the condition in point 6, check the sliding of the clutch cable and if necessary lubricate or replace
10. If the adjustable range of the adjuster nut (3) is not enough to attain the free travel required, check the clutch components for wear

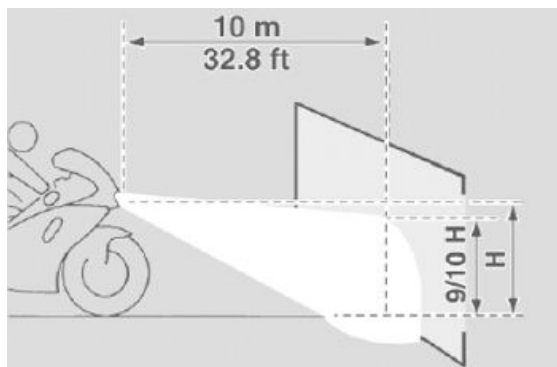
Headlight adjustment

NOTE

IN COMPLIANCE WITH LOCAL LEGAL REQUIREMENTS, SPECIFIC PROCEDURES MUST BE FOLLOWED WHEN CHECKING LIGHT BEAM ADJUSTMENT.

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

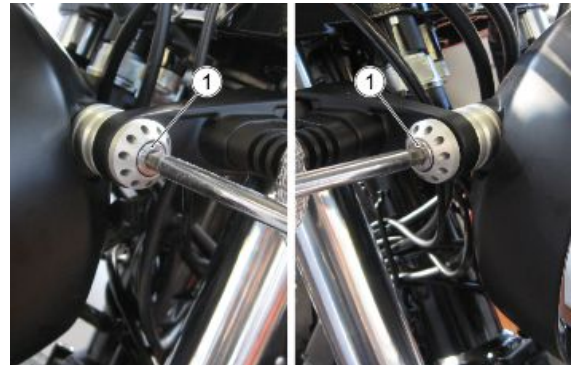
- Place the vehicle 10 m (32.8 ft) from a vertical wall and make sure the ground is level.
- Turn on the low beam light, sit on the vehicle and check that the light beam projected to the wall is a little below the



headlight horizontal straight line (about 9/10 of the total height).

To carry out vertical adjustment of the light beam:

- Stand the motorcycle in a vertical position.
- Slightly loosen the headlight fixing screws (1), and move the light beam manually to the desired position.
- Once the adjustment is finished tighten the screws (1).



After adjusting:

NOTE

CHECK THAT THE VERTICAL ALIGNMENT OF THE BEAM IS CORRECT.

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

- Stand the motorcycle in a vertical position.
- Actuating on the screw (2) adjust the direction of the light beam.



After adjusting:

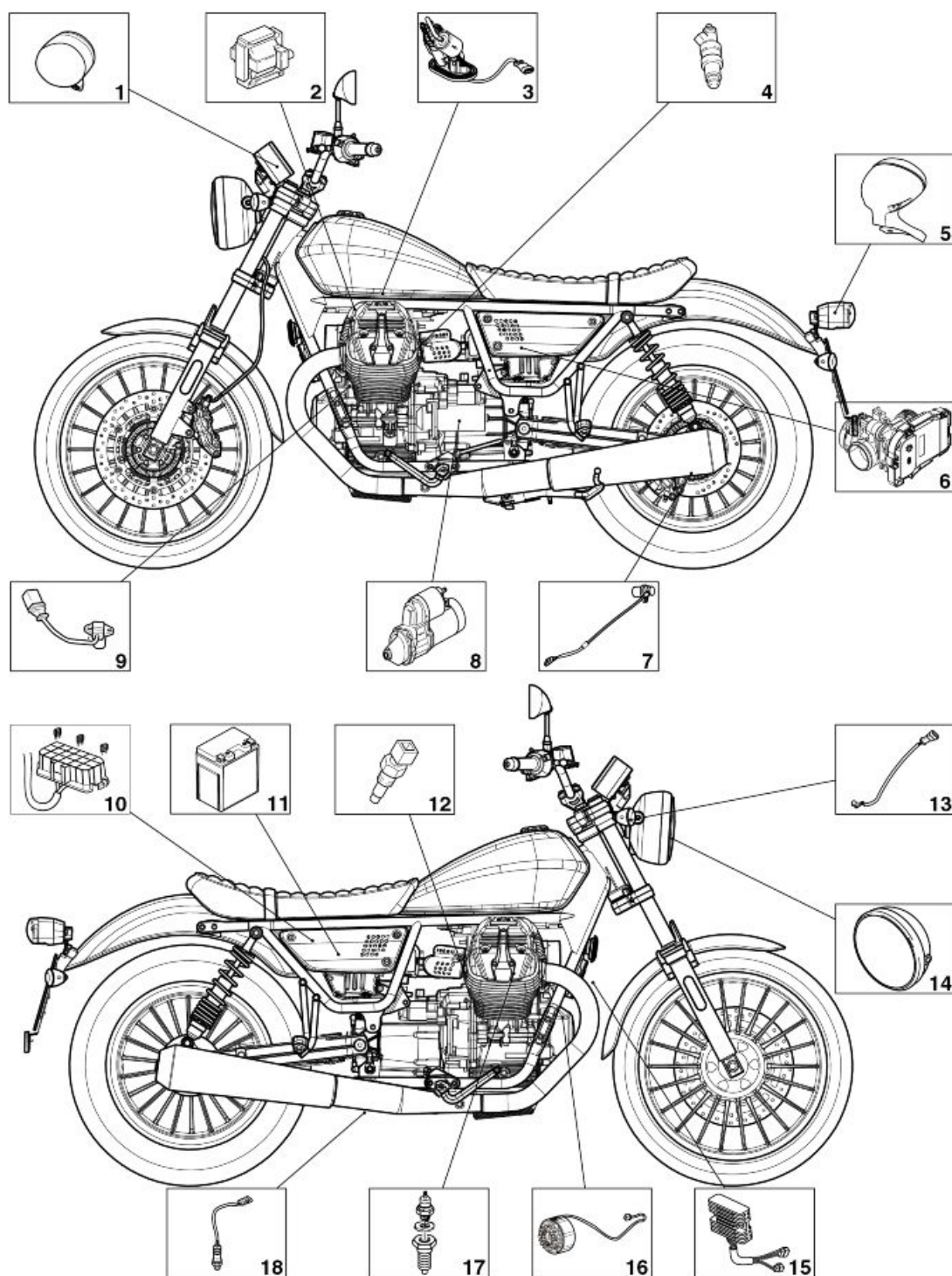
NOTE

CHECK THAT THE LIGHT BEAM HORIZONTAL DIRECTION IS CORRECT.

INDEX OF TOPICS

ELECTRICAL SYSTEM

ES

Components arrangement**Key:**

- 1. Instrument cluster
- 2. Coil
- 3. Fuel pump

4. Injector
 5. Taillight
 6. MIU G3 Control Unit
 7. Engine speed sensor
 8. Starter motor
 9. Engine speed sensor
 10. Fuses
 11. Battery
 12. Head temperature sensor
 13. Instrument cluster air sensor
 14. Headlamp
 15. Voltage regulator
 16. Alternator
 17. Oil pressure sensor
 18. Lambda probes
-

Electrical system installation

INTRODUCTION

Scope and applicability

The position of the wiring harnesses, how they are fixed to the motorcycle and potential problems are defined on the following sections in order to reach the objectives of vehicle reliability.

Materials used and corresponding quantities

The electrical system consists of the following wiring harnesses and parts:

- 1 Vehicle wiring harness
- 1 Taillight Cable harness
- 2 ABS speed sensor
- 1 Horn
- 2 Lambda probe
- 1 Stand switch
- 1 Fall sensor (grey connector)

Small parts and mountings

- 11 Large black 290x4 clamps
- 4 Small black 160x2.5 clamps
- 1 Small cable guide rubber clamp
- 2 Large cable guide rubber clamps
- 1 ECU bracket
- 2 Connector supports

- 1 Cable grommet
- 1 Black sheath
- 7 ABS Cable grommets
- 1 connector clip

Motorcycle division

The wiring harnesses on the vehicle are subdivided into three main sections, as indicated in the figure.

1. Front of vehicle
2. Centre of vehicle
3. Rear section



SPECIAL CHECKS FOR THE CORRECT CONNECTION AND ROUTING OF CABLES

It is extremely important that any security-locks for the following connectors are properly connected and correctly tightened to ensure proper engine, and therefore proper vehicle, operation.

Carry out the checks listed below.

- Instrument panel connector (is engaged and the boot well inserted)
- Rear and front wheel ABS sensor connector
- Check the correct routing of the rear turn indicators cables on the license plate holder (RH and LH)
- Check the correct closing of the ABS ECU and the correct routing of the branch on the conduit
- Taillight connector
- Right and Left light switch connectors
- Clutch connector
- Connector ignition switch connector (check that the cable is not live)
- Immobilizer antenna connector
- ECU connector (G3) and the correct insertion of the relative rubber plug
- Check the correct fastening of metallic bracket screw on the throttle body
- Check the fastening of the positive Battery cable on the starter motor. Check that the cap is well inserted
- Check the insertion of the starter motor faston
- Check the correct passage and fixing of the ABS fuse
- Check the right and left injectors connection
- Check the connection of the engine head temperature sensor
- Check the correct insertion of H.V. Cables with the Coils (RH and LH)
- Check whether the Grey H.V. Cable connects on the Coil with the Grey tape

- Check whether the Grey H.V. Cable goes to the Left engine head
- Check the coils connection (and their correct positioning on the frame)
- Check that the engine oil cap has been inserted correctly
- Check ground fastening on the engine
- Check NEUTRAL cable fastening
- Check whether the right lambda probe is connected to the output labelled "LAMBDA DX" (RH LAMBDA)
- Check the Regulator and Flywheel connection
- Check whether the right and left lambda probe cable is inserted on the cable grommet under the clutch housing
- Check the right Lambda connections
- Check the Pick Up connection
- Check correct insertion of the starter motor hood and engine start faston
- Check the presence of the Red protective hood on the battery Positive
- Check that the stand switch connector is blue and clamped
- Check the side stand connection and the left lambda
- Check the rear stop connection
- Check the stand switch cable ties on the frame under the vehicle
- Check the assembly of the fall sensor (if the arrow is upwards and the connector is grey)
- Check the connection of the secondary air valve and the correct positioning of the cap
- Check the connection of the front stop faston.

IMPORTANT

THE ENCIRCLED CONNECTORS ARE CONSIDERED CRITICAL IN COMPARISON WITH ANY OTHER BECAUSE THE VEHICLE WILL STOP OR PRESENT A MALFUNCTION IF THEY ARE ACCIDENTALLY DISCONNECTED.

Undoubtedly the connection of the rest of connectors is also important and essential for the correct operation of the vehicle. It is also important and essential that the instructions regarding the routing and fixing of the wiring harness in the various areas are followed meticulously in order to guarantee functionality and reliability

COMPONENTS PRE-FITTING**TABLE A - ENGINE**

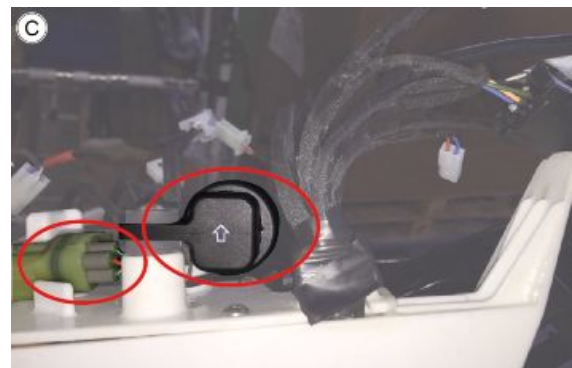
- Check that the HV cable of the left cylinder has grey taping

**TABLE B - REAR COIL ON THE FRAME**

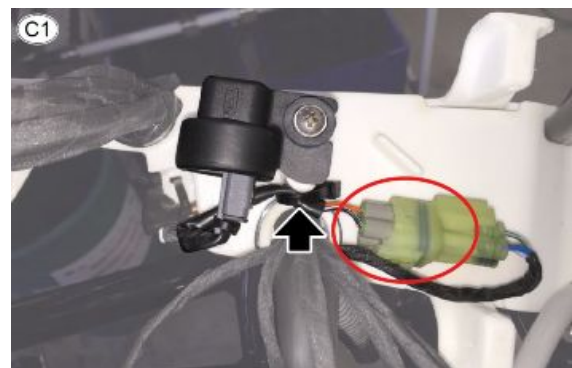
- Check that the coil in this position has the connector (wiring harness side) with two contacts

**TABLE C - CONDUIT**

- Check that the fall sensor arrow is upwards and that the connector is grey



- Place a large clamp so that the sensor cable is positioned as indicated



- Check that the ABS control unit cable is backwards, as illustrated in the image



Front side

TABLE A - FRONT WHEEL ABS SENSOR PASSAGE

1. Front ABS sensor

2. Cable gland

- Pass the front ABS sensor wiring harness through the cable gland as indicated.



- Connect the front ABS sensor wiring harness with the brake pipe using cable guides (3)



- Pass the ABS sensor wiring harness around the steering column and through the metallic cable grommet (4) on the frame

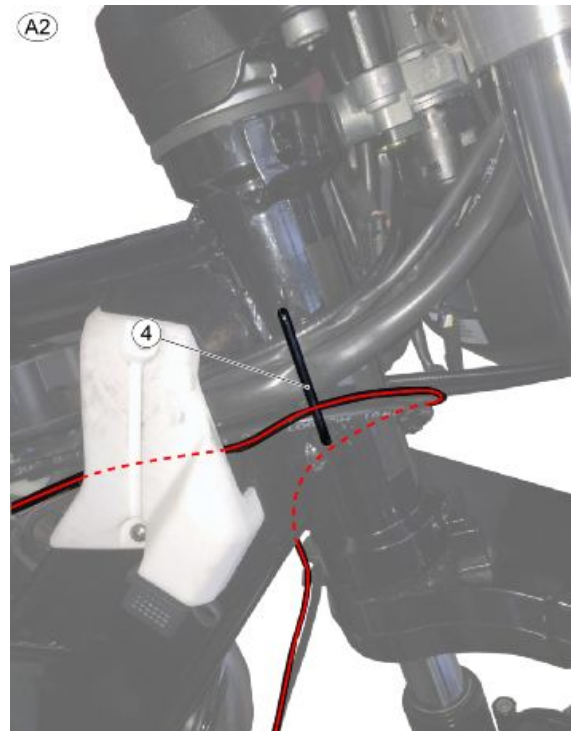


TABLE B - STEERING LIGHTS CABLE PASSAGE ON THE HANDLE BAR

- Using the cable guides (1), fasten the RH light switch wiring harness with the throttle cable
- Using the cable guide (2), fasten the front stop switch wiring harness with the front brake pipe
- Using the cable grommets (3), fasten the LH light switch wiring harness with the clutch cable

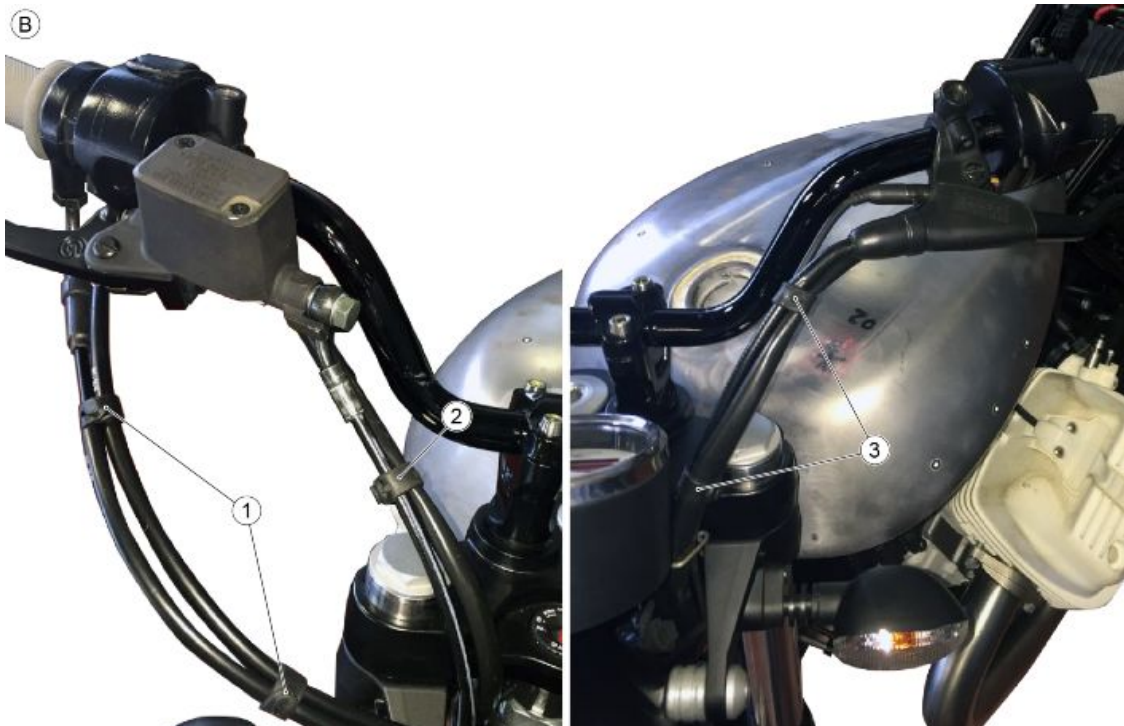
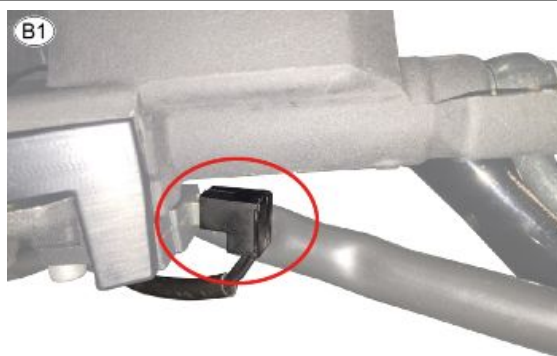
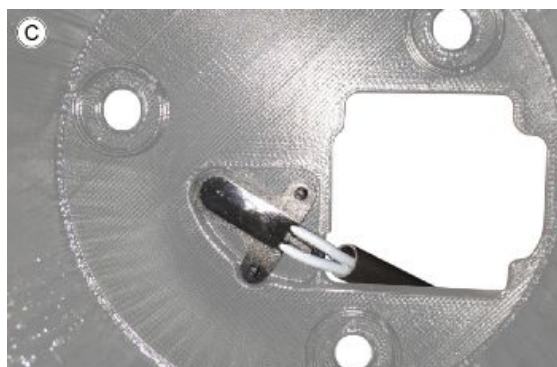


TABLE B1

- Check that the front stop fastons are well fastened, by slightly pulling them

**TABLE C - PRE-FITTING OF THE EXTERNAL AIR SENSOR ON THE INSTRUMENT PANEL CAP**

- Place the external air temperature sensor in its seat on the instrument panel cap

**TABLE C1**

- Fasten the external air temperature sensor in its seat using an adhesive sponge strip sized 40x20x3 mm

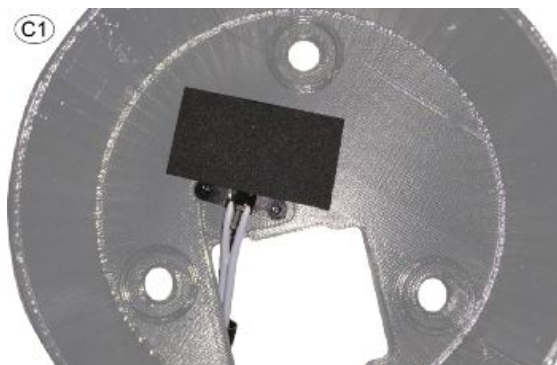


TABLE D - INSTRUMENT PANEL FITTING

- Use a medium sized clamp to fasten the instrument panel wiring harness with the external air temperature sensor, as illustrated

**TABLE D1**

- Check that the instrument panel connector is well fastened and that the protection case is well inserted

**TABLE E - USB SOCKET**

- Pass the USB socket wiring harness as indicated

**TABLE F - CABLE PASSAGE ON THE STEERING HEADSTOCK**

- Pass it on the sides of the steering headstock and through the cable grommets on the frame and under the side covers



Parte centrale

TABLE A - CONDUIT ON THE FRAME

- Check that the relays (1) are well inserted
- Fasten the rear part of the conduit using a large clamp (2)



TABLE A1

- Pass the connector of the voltage regulator (1) and the horn connector (2) in the hole created by the conduit with the frame at the bottom, to facilitate their connection



TABLE A2

- Main wiring harness (1)



TABLE A3

- Right light switch connector (1)
- Left light switch connectors (2)
- Coil connector 2 (3)
- Front ABS sensor connector (4)
- USB socket connector (5)
- Right turn indicator connector (6)

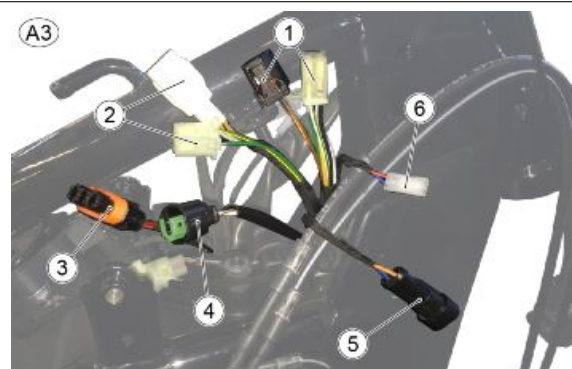
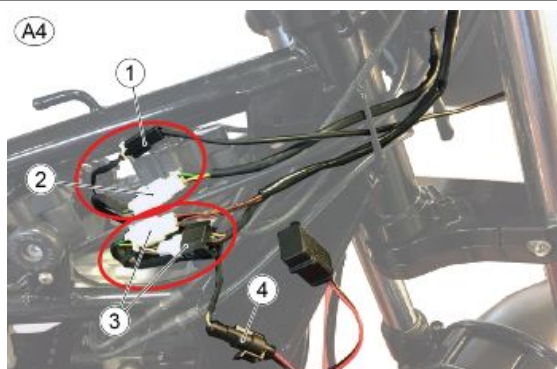
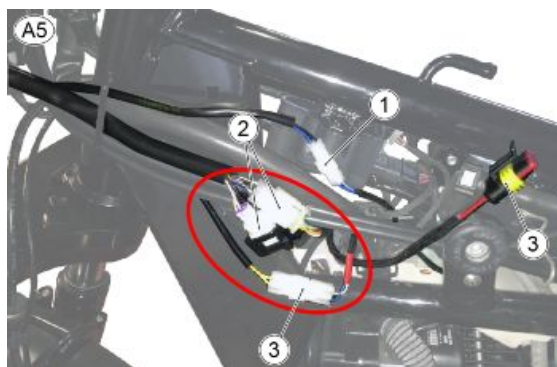


TABLE A4

- Key connector (1)
- Immobilizer antenna connector (2)
- Right light switch connector (3)
- USB socket connector (4)

**TABLE A5**

- Left arrow connector (1)
- Left light switch connectors (2)
- Clutch switch connector (3)
- Fuel pump connector (4)

**TABLE A6**

- Pass t the PICK-UP connector (1) on the right side of the frame



TABLE A7

- Check that the connector of the coil (1) is well coupled

**TABLE A8**

- Check that the connector of the engine head temperature sensor (1) is well coupled
- The HV cable (2) must remain inside the conduit groove

**TABLE B - COIL AND LEFT CYLINDER CONNECTION**

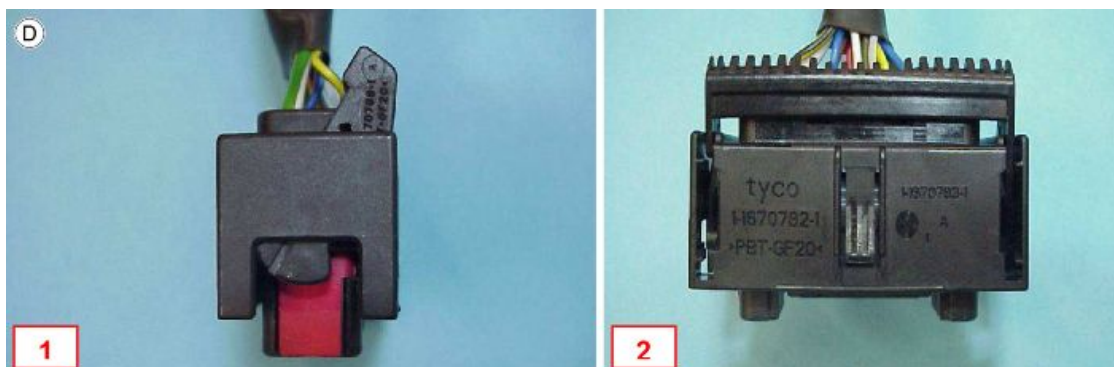
- Check that the HV cable with grey mark (left engine head) is well inserted in the coil with grey mark on the connector

**TABLE C - COIL AND RIGHT CYLINDER CONNECTION**

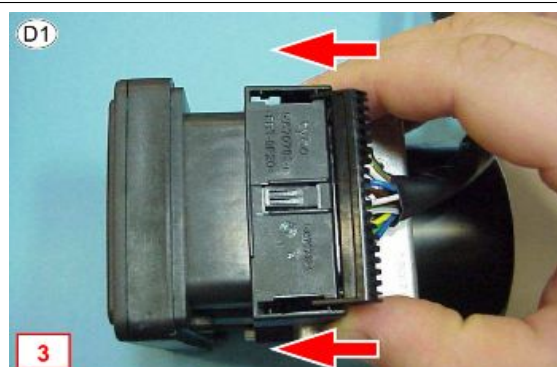
- Check that the HV cable without grey mark (right engine head) is well inserted in the front coil

**TABLE D - PROCEDURE FOR CORRECTLY FITTING THE ABS CONTROL UNIT CONNECTOR**

- The initial position of the connector fastener lever must be as shown in the figure

**TABLE D1**

- Place the connector on the opposite side of the control unit and lower the driving lever until the "click" that signals the end of the stroke is heard.

**TABLE D2**

- When the connector is fully inserted, the distance between the connector and the ABS control unit must be 7.5 mm (0.29 in)

**TABLE D3**

- If the initial position of the connector and driving lever is not as the one shown in "TABLE D". The connector will not be coupled correctly and the measured distance will be greater, approximately 12 mm (0.47 in). In this case, repeat the operations according to the instructions in "TABLES D1/D2". It is recommended to create a template to check the correct insertion of the connector.

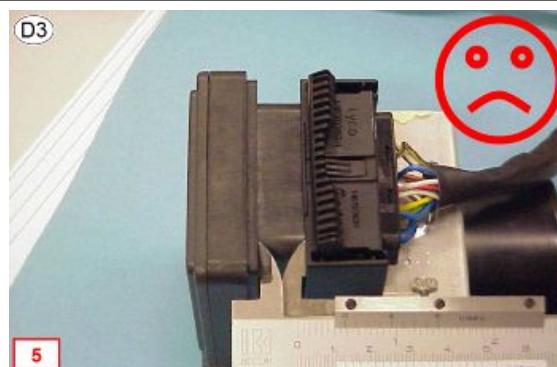
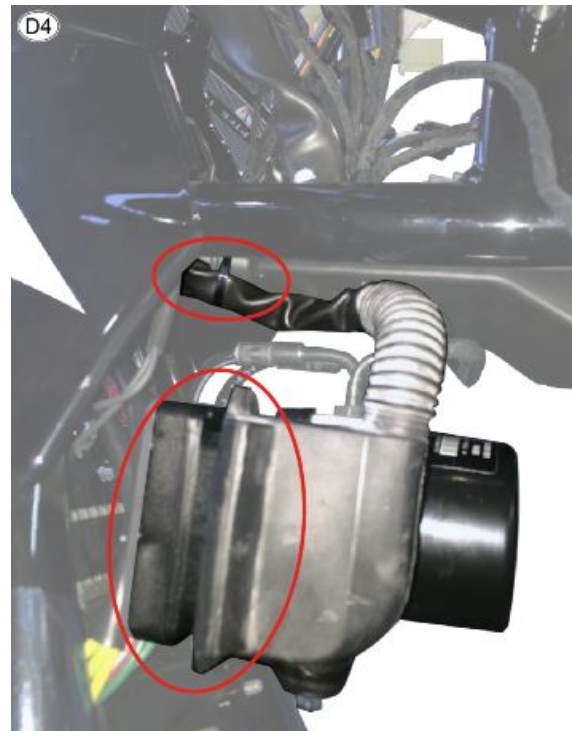
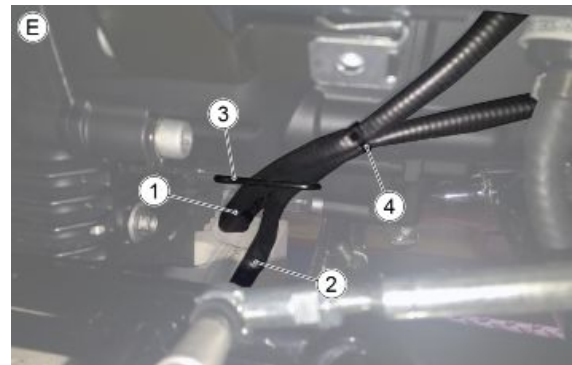


TABLE D4

- Check that the ABS control unit connector cap is well inserted and that the cable does not touch the frame

**TABLE E - LAMBDA PROBES PASSAGE UNDER THE ENGINE**

1. Right lambda probe wiring harness
2. Left lambda probe wiring harness
3. Cable gland
4. Small clamp

**TABLE E1**

- Pass the wiring harness of the right lambda probe (1) and of the left lambda probe (2) under the starter motor, as indicated

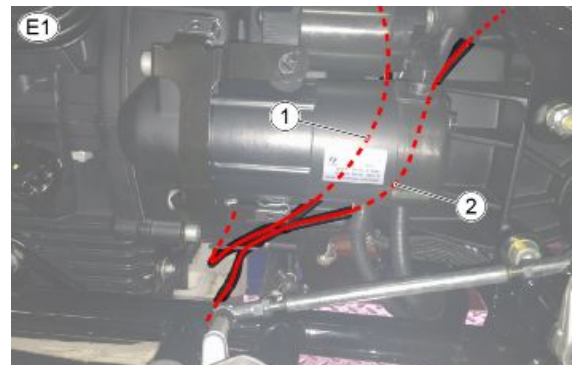
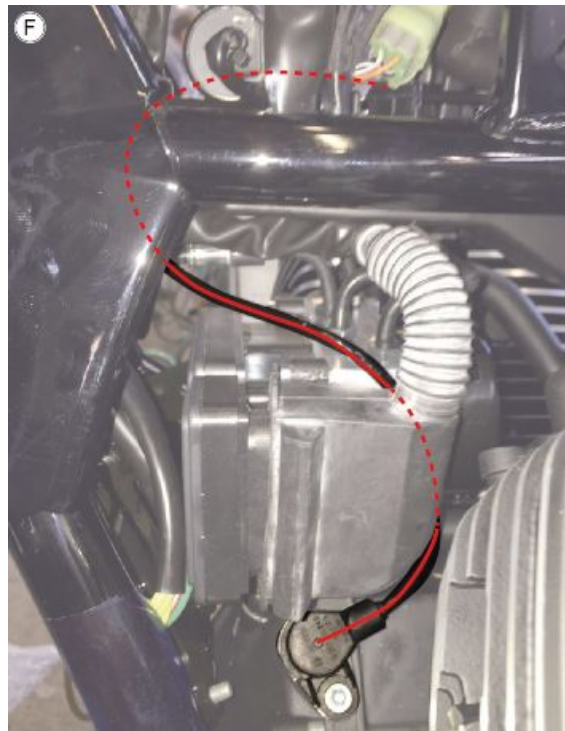


TABLE F - PICK UP CABLE PASSAGE

- Pass the pick up cable between the ABS modulator and the ABS connector

**TABLE F1**

- Pass the pick up cable through the central flap, towards the right side of the motorcycle

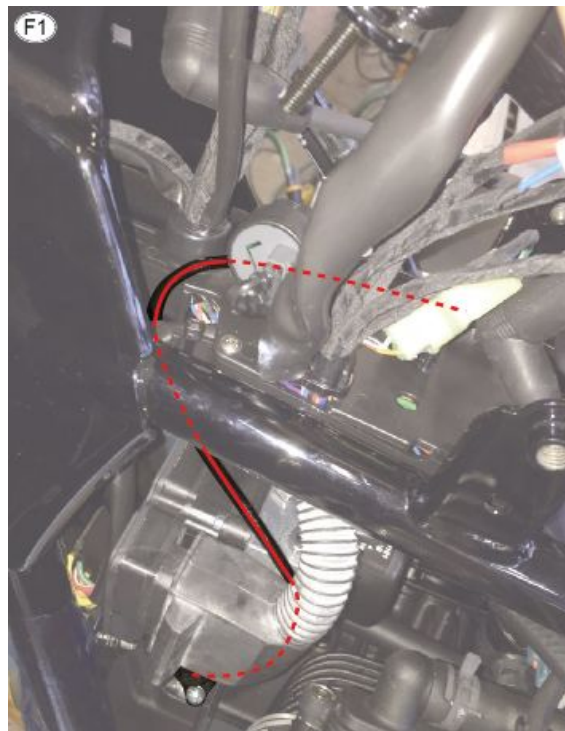
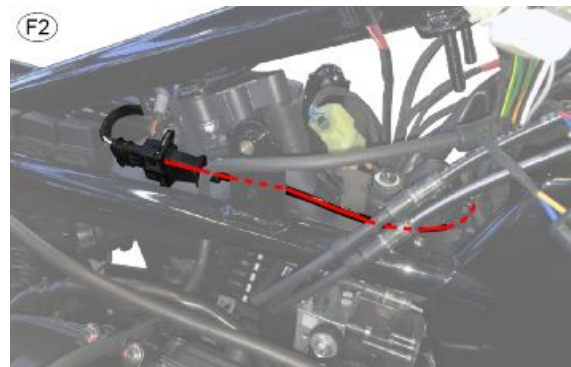


TABLE F2

- Pass the pick up cable to the back of the tank support and throttle cables

**TABLE F3**

- Check the correct connection of the pick up connector

**TABLE G - HORN AND REGULATOR**

1. Voltage regulator
2. Horn

- The regulator's cable must pass behind the frame bracket

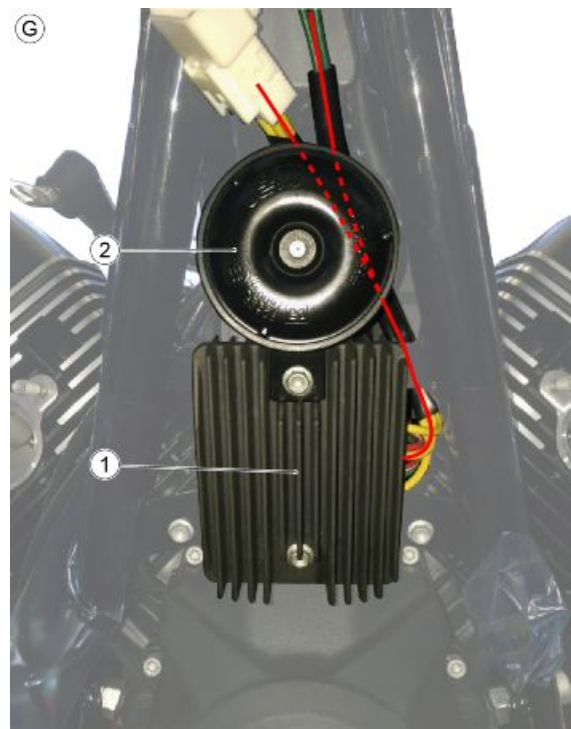


TABLE G1

- Check the connection of the flywheel white connector and regulator's black connector that must have a safety clamp to avoid disconnection.

**TABLE G2**

- Using a medium clamp, fasten the regulator's cables along the frame's tube

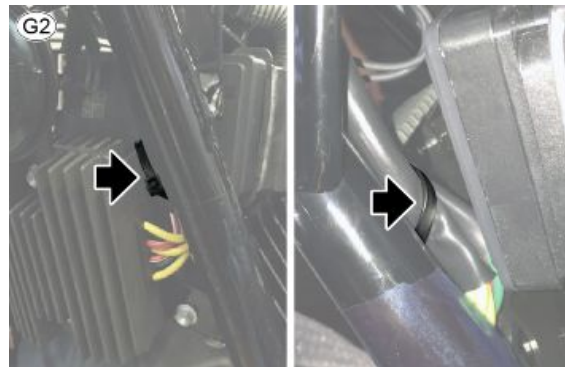
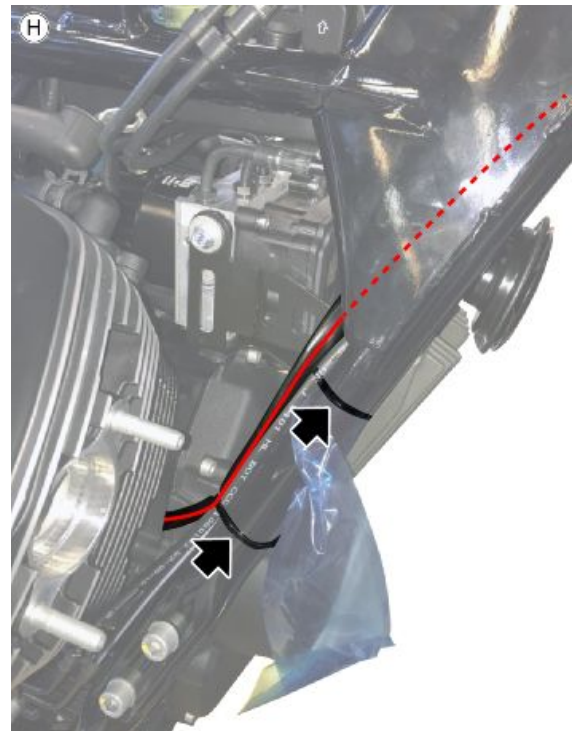


TABLE H - FLYWHEEL CABLES PASSAGE

- Using two medium clamps, fasten the flywheel's wiring harness

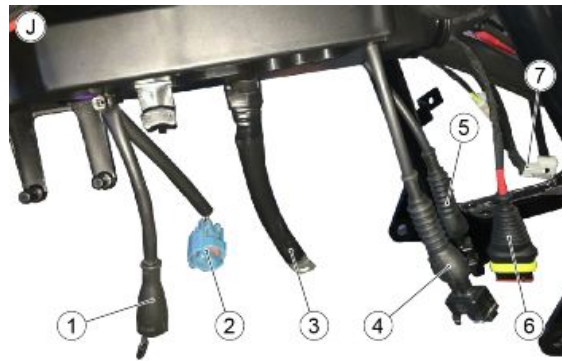
**TABLE I - NEUTRAL SENSOR CABLES PASSAGE**

- The wiring harness (1) of the neutral sensor must pass through the filter box support and in the cable guide (2)

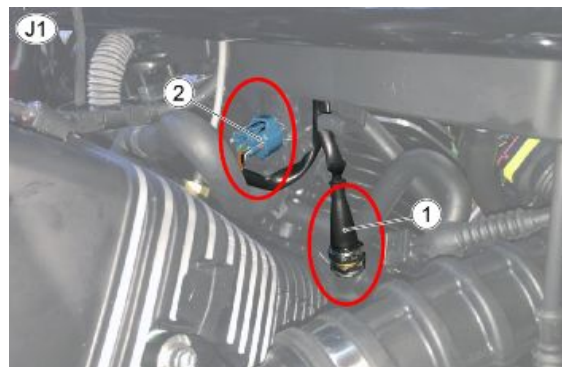


TABLE J - OIL PRESSURE and SECONDARY AIR SENSORS

1. Oil pressure bulb
2. Secondary air system
3. Engine ground
4. Left injector
5. Right injector
6. Right Lambda probe
7. Battery ground

**TABLE J1**

- Check the correct connection of the oil pressure bulb connector (1) and of the secondary air connector (2)

**TABLE K - INJECTORS**

- Check the correct connection of the injectors
- The cable of the engine head temperature bulb (1) must pass under the rubber pipe

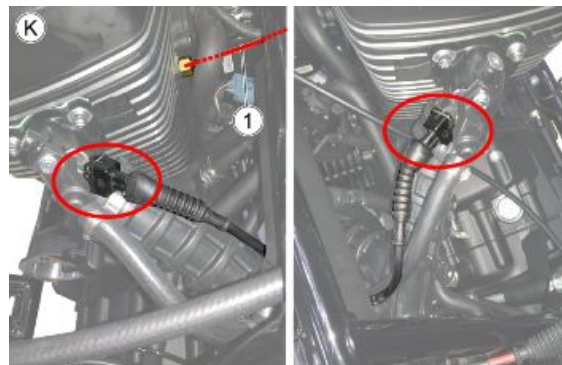
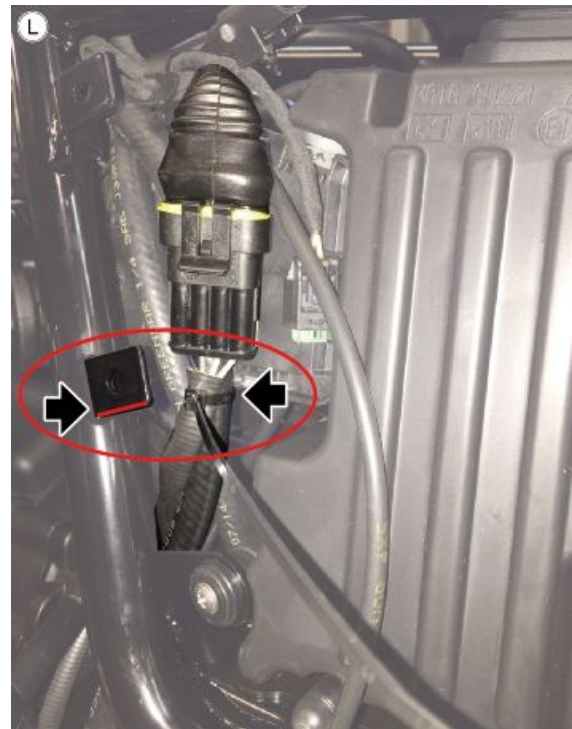


TABLE L - CONNECTION OF THE LEFT LAMBDA AND REAR ABS SENSOR

- Using a clamp, aligned with the frame flap fixing the side fairing, fasten the lambda probe wiring harness so that the cables are covered

**TABLE L1**

- The wiring harnesses of the rear ABS sensor, the connector of the side stand and the faston for the starter motor must pass through the cable grommet (1)

THE CONNECTOR OF THE LEFT LAMBDA PROBE AND THE ANTI-THEFT FITTING MUST NOT PASS THROUGH THE CABLE GROMMET

- Check that the connector of the left lambda probe (2) and the rear ABS sensor (3) are correctly connected

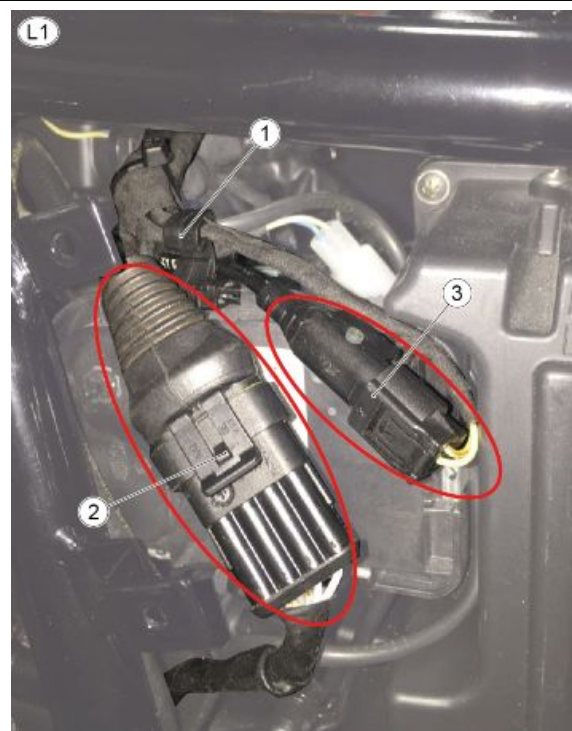
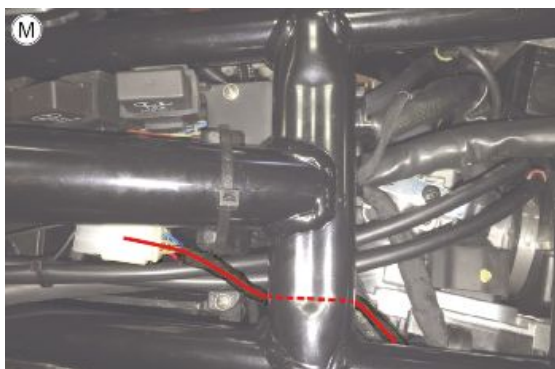


TABLE M - ANTI-THEFT FITTING POSITIONING

- The wiring harness of the anti-theft fitting must pass under the frame, as indicated

**TABLE M1**

- Using a small clamp, fasten the anti-theft connector to one of the two gas cables

**TABLE N - RIGHT EXHAUST LAMBDA and REAR BRAKE CONNECTION**

1. Check that the neutral sensor connector is well connected
2. Rear stop connector
3. Right Lambda probe connector



TABLE N1

- Check that the right lambda probe connector is well connected and that it is hooked to the specific support



TABLE N2

- The wiring harness of the lambda probe (1) must pass through the filter box and starter motor positive cable (2)

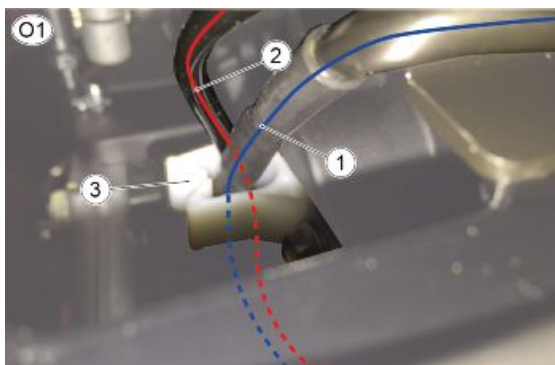


**TABLE O - REAR BRAKE WIRING HARNESS
PASSAGE**

- Check that the rear brake sensor connector is well connected

**TABLE O1**

- Pass the wiring harness of the rear brake sensor (1) and of the rear BAS sensor (2) through the cable grommet (3) mounted on the engine and inside the gearbox clutch lever.

**TABLE O2**

- Using a clamp, fasten the wiring harness of the rear brake sensor (1) to the wiring harness of the rear ABS sensor (2)
- The rear ABS sensor wiring harness must pass through the cable grommet (3)

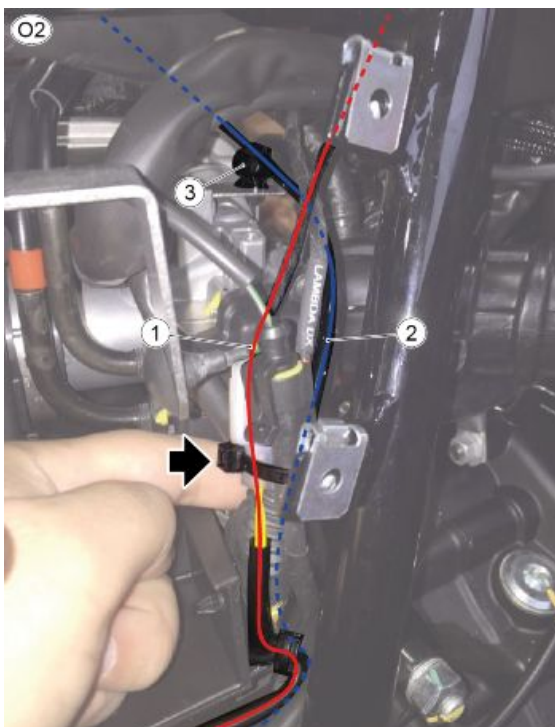
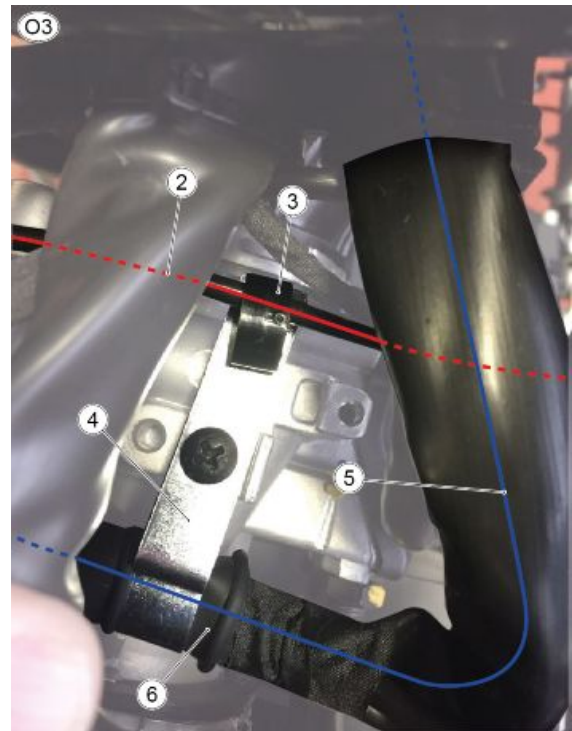
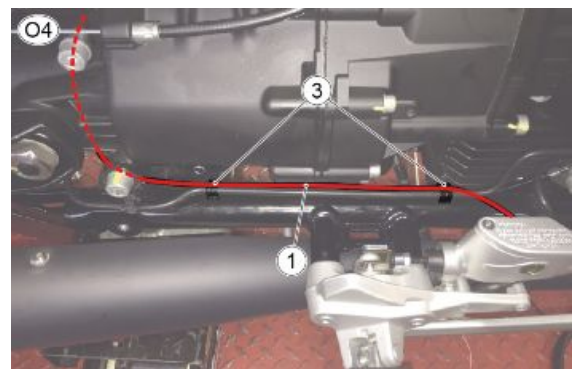


TABLE O3

- The wiring harness of the rear ABS sensor (2) must pass through the cable grommet (3) located on the bracket (4) that, in its turn, fixes the wiring harness of the engine control unit (5) in line with the rubber ring (6)

**TABLE O4**

- Fasten the wiring harness of the rear brake sensor (1) using the cable grommets (3)

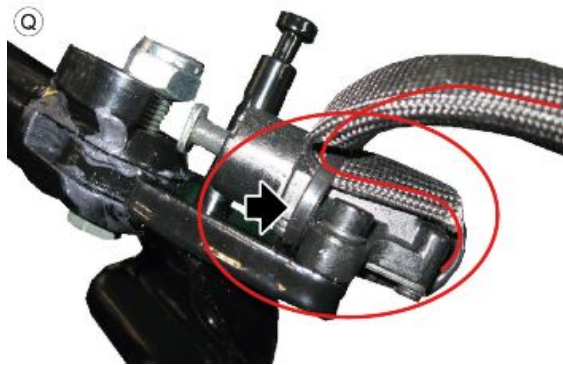
**TABLE P - ENGINE BATTERY GROUND**

- An incorrect fastening of the fixing screws of the engine battery ground eyelet may cause the vehicle to catch fire
- Check the tightening to the prescribed torque

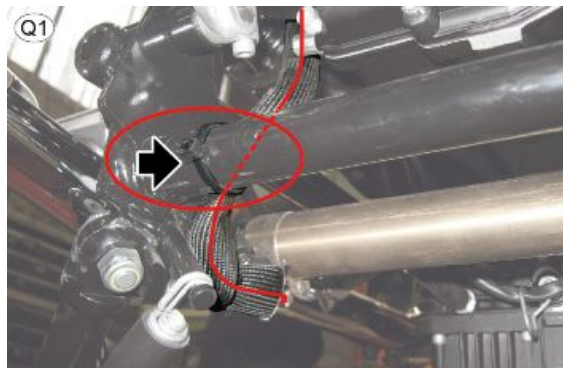


TABLE Q - SIDE STAND SENSOR

- Using a small clamp, fasten the wiring harness of the side stand switch, as indicated

**TABLE Q1**

- Using a medium clamp, fasten the wiring harness of the side stand switch to the frame

**TABLE Q2**

- Pass the wiring harness of the side stand switch under the starter motor power supply cable

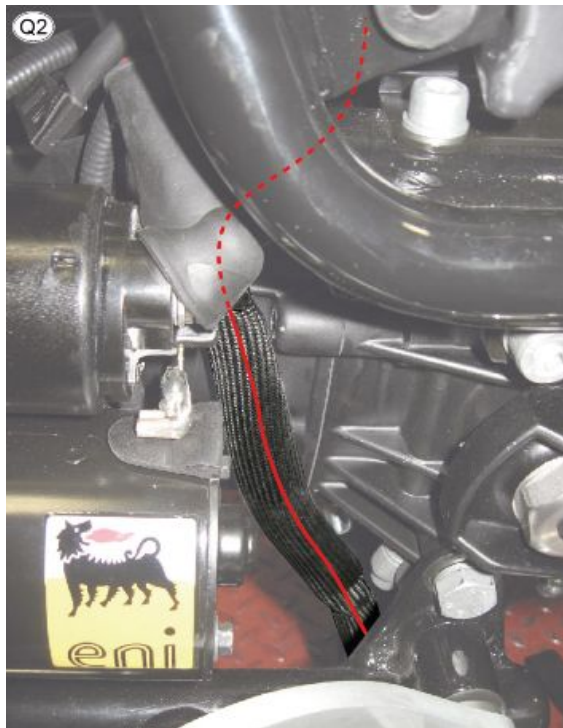
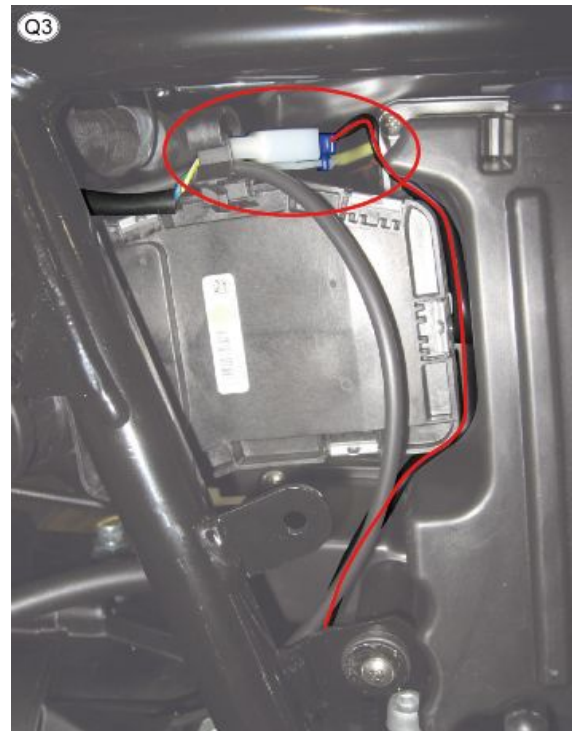
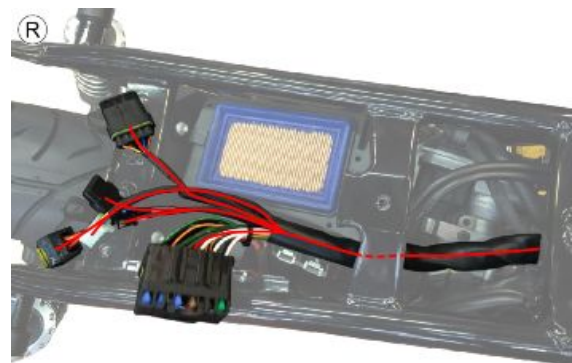


TABLE Q3

- Pass the wiring harness of the side stand switch behind the MIU G3 control unit and check that the connector is well connected

**TABLE R - ROUTING THE CABLES IN THE FILTER BOX/UNDER-SEAT AREA**

- The main wiring harness must pass under the central beam of the frame

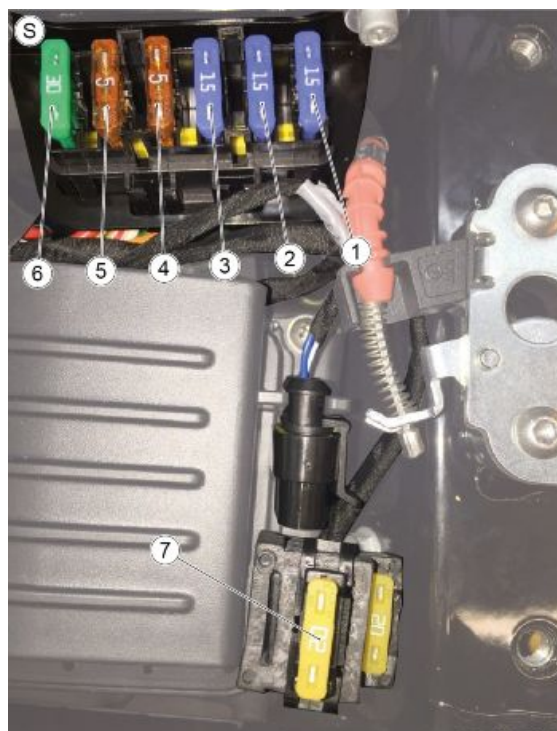
**TABLE R1**

- The layout of the main wiring harness and of the various branches in the filter box area must be as illustrated in the image

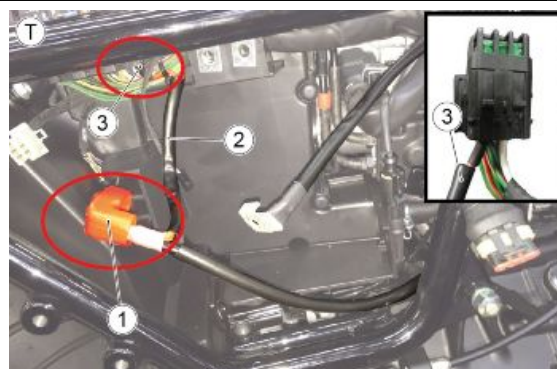


TABLE S - MAIN FUSES AND ABS

1. Fuse "A" (15A)
2. Fuse "B" (15A)
3. Fuse "C" (15A)
4. Fuse "D" (5A)
5. Fuse "E" (5A)
6. Fuse "F" (30A)
7. Fuse "G" (20A)

**TABLE T - PASSAGE OF THE STARTER MOTOR BATTERY**

- The cap of the battery positive (1) must be red
- The cable that goes from the battery positive to the fuse box must be covered with sheath (2) and the terminal must be covered with heat shrink material (3)



INCORRECT SECURING OF THIS COMPONENT MAY CAUSE THE VEHICLE TO CATCH FIRE

TABLE T1

- The starter motor cable must pass over the filter box pipe



TABLE T2

- Check that the starter positive cap is correctly inserted and that the nut is fastened to the prescribed torque



INCORRECT SECURING OF THIS COMPONENT MAY CAUSE THE VEHICLE TO CATCH FIRE

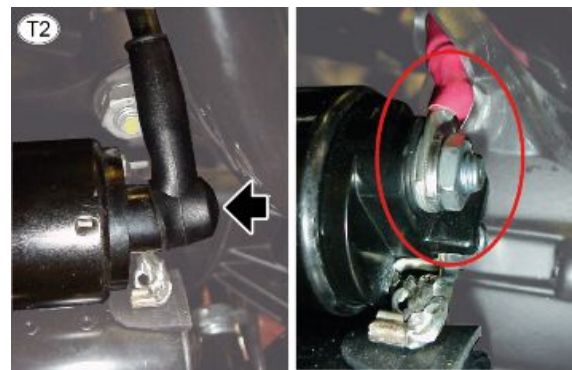


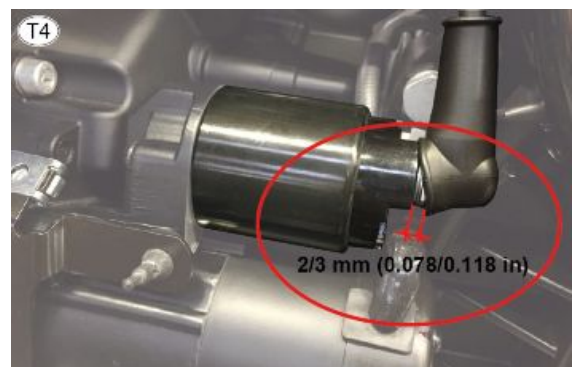
TABLE T3

- Check that the faston is correctly inserted



TABLE T4

- The protection cap may remain outside for maximum 2-3 mm (0.078-0.118 in)



Back side

TABLE A - REAR WHEEL ABS SENSOR ROUTING

- Fasten the rear ABS sensor wiring harness to the brake pipe using one of the cable guides, as indicated

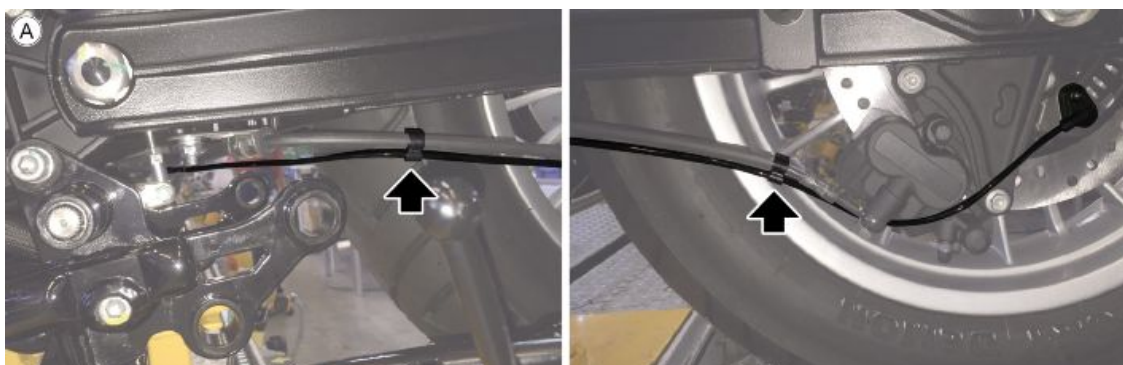


TABLE A1

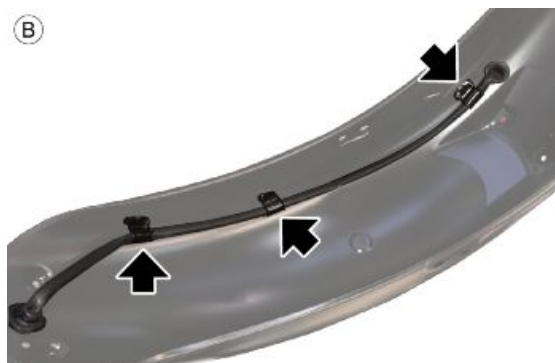
- fasten the rear ABS sensor wiring harness to the brake pipe, under the swingarm, using one cable guide (1) and a clamp (2)

**TABLE A2**

- Using a clamp, fasten all electric cables

**TABLE B - REAR MUDGUARD PRE-FITTING**

- Pre-fit the taillight wiring harness on the mudguard and fasten it using the specific flaps on the mudguard

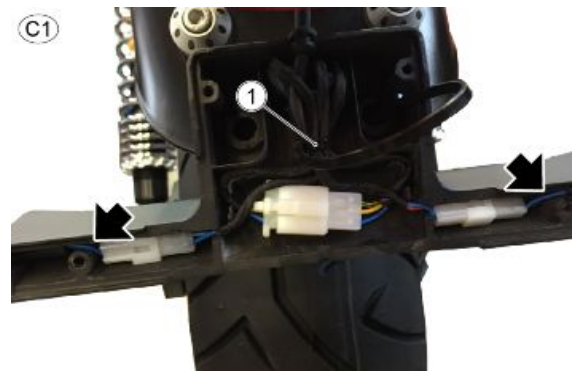
**TABLE C - TAILLIGHT CONNECTIONS**

- In the marked areas there should be no cables or connectors



TABLE C1

- Using a medium clamp (1), fasten all cables
- Pay attention so that the cables of the turn indicators are inserted in the space above the screws stern

**TABLE C2**

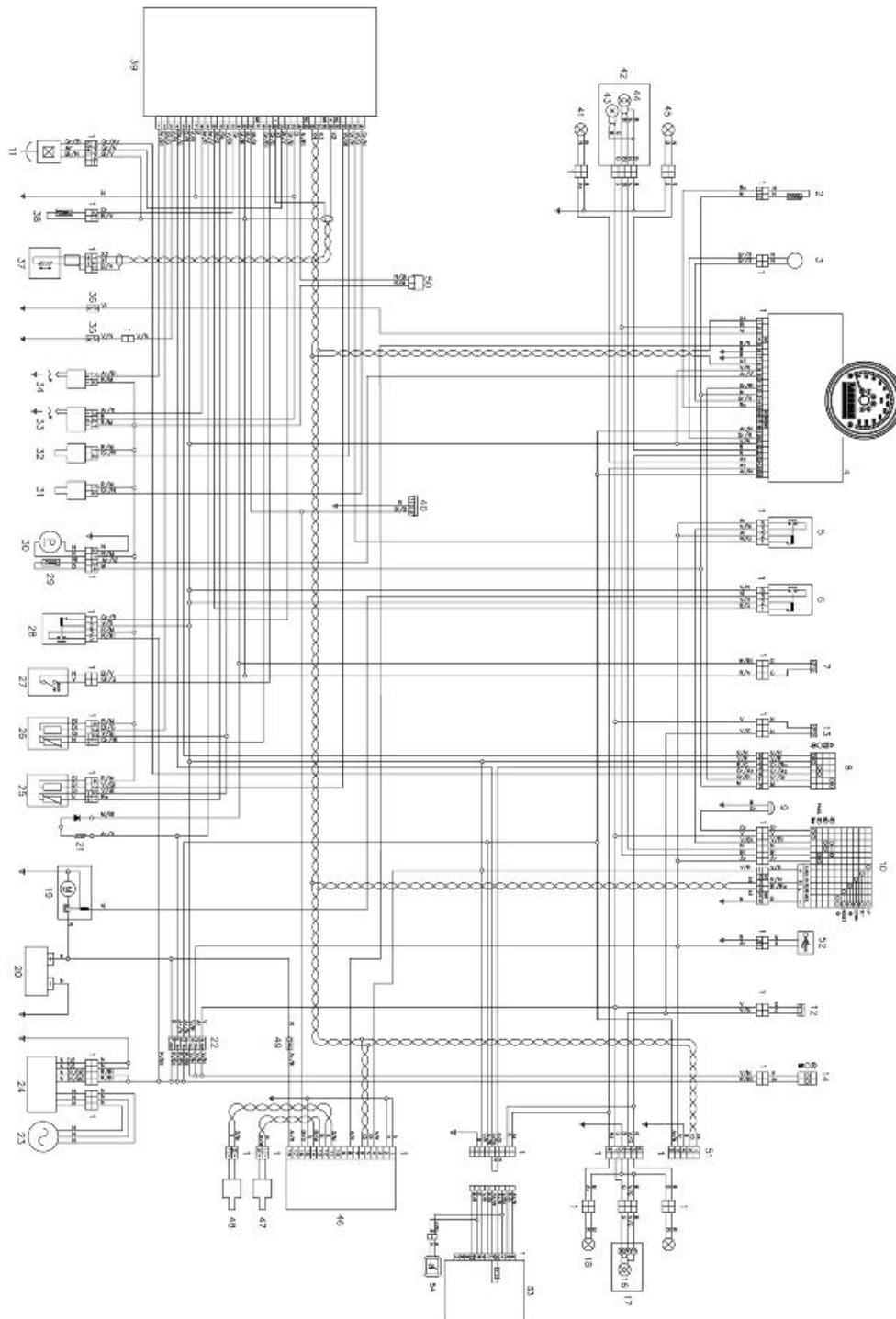
- Check the correct insertion of the rubber ring on the license plate holder

**TABLE D - TAILLIGHT CONNECTION AND "MGPM" FITTING POSITIONING**

- Check the correct connection of the taillight connector



General wiring diagram



Key:

1. Multiple connectors
2. air temperature sensor
3. Immobilizer antenna
4. Instrument cluster

5. Light logic relay
6. Starter motor relay
7. Clutch switch
8. Right light switch
9. Horn
10. Left light switch
11. Fall sensor
12. Rear stop switch
13. Front stop switch
14. Ignition switch
15. Turn indicator
16. Tail light bulb
17. Tail light
18. Rear left turn indicator
19. Starter Motor
20. Battery
21. Pull up
22. Fuses
23. Alternator
24. Voltage regulator
25. Lambda probe 1 (left exhaust)
26. Lambda probe 2 (right exhaust)
27. Side stand switch
28. Injection loads relay
29. Fuel reserve sensor
30. Fuel pump
31. Injector 1 (left cylinder)
32. Injector 2 (right cylinder)
33. Coil 2 (right cylinder)
34. Coil 1 (left cylinder)
35. Neutral sensor
36. Oil pressure sensor
37. Pick up
38. Engine temperature sensor
39. MIU G3 control unit
40. Diagnostic socket
41. LH front turn indicator
42. Complete headlamp

- 43.Front daylight running light bulb
- 44.High beam / low beam bulb
- 45.RH front turn indicator
- 46.ABS control unit
- 47.Front ABS sensor
- 48.Rear ABS sensor
- 49.ABS control unit fuse
- 50.Secondary air system
- 51.BLUEDASH pre-installation
- 52.USB port
- 53.Pre-installation for anti-theft device
- 54.Antitheft device warning light

Cable colour:

Ar orange

Az light blue

B blue

Bi white

G yellow

Gr grey

M brown

N black

R red

Ro pink

V green

Vi purple

Checks and inspections

Immobiliser

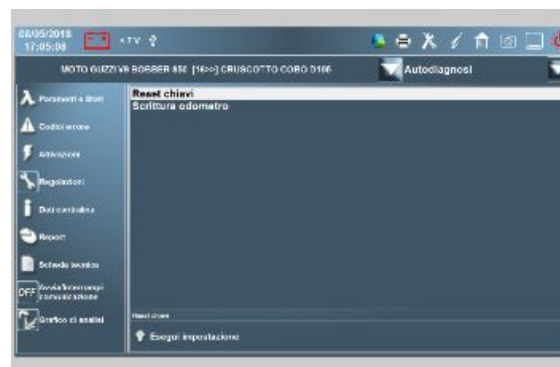
System not programmed

Storing new keys

NOTE

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

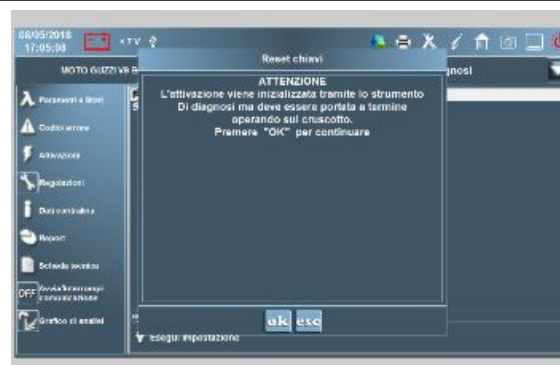
- To carry out the one or more key programming procedures, up to a maximum of four, you must connect the motorcycle to the diagnostic tool.
- Turn key to "ON" and insert the USER CODE where required.
- Carry out the self-diagnostic of the dashboard and enter the "SETTINGS" section by clicking on "RESET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



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

NOTE

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".

**IMPORTANT**

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



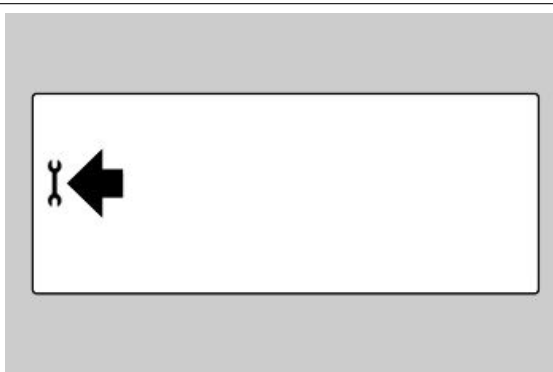
Azzeramento icona manutenzione

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:

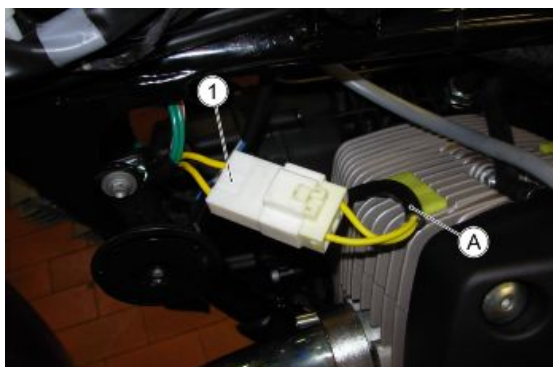
- Connect the diagnostic tool;
- Select the concerned model;
- Enter in the "INSTRUMENT CLUSTER" section;
- Select "SELF-DIAGNOSTIC";
- Select "ACTIVATIONS";
- Enable the command "SERVICE RESET".



Battery recharge circuit

RECHARGING SYSTEM

- Slightly lift the fuel tank, being careful not to pull the pipes with the relative hooks;
- Remove the connectors from the compartment behind the steering column
- Disconnect the three-way connector (1) (white).

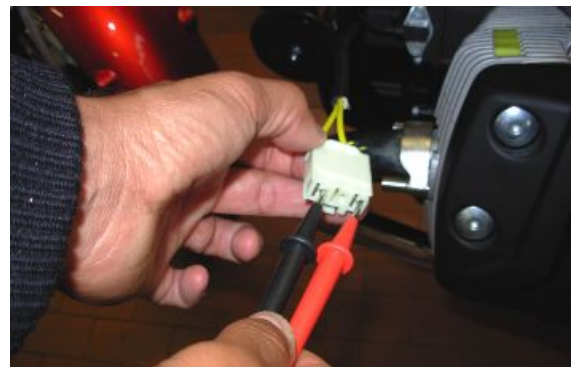
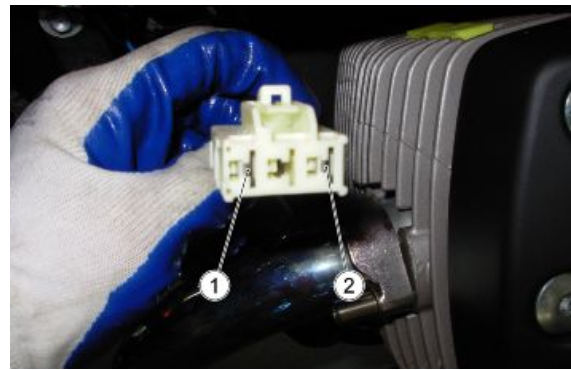


NOTE

THE ENGINE SIDE IS IDENTIFIED WITH THE LETTER "A"

Measurement of resistance (with engine off)

- For a correct detection of the alternator resistance, must be performed an ambient temperature measurement and then a further heat stabilisation with a tester.



- Take the measurement; The correct value is determined by subtracting the wire resistance of the tester obtained by touching the two pins.

Example:

- Resistance of stage 1 read on the display = 0.67 Ohm



- Resistance of the wires read on the display = 0.47 Ohm



- Effective resistance stage 1 = $0.67 - 0.47 = 0.20$ Ohm

RESISTANCE MEASURE

Winding stage	Ambient temperature (ohm)	Afterwards heat stabilisation (ohm)
Phase	0.18 - 0.23	0.20 - 0.25

Zero load voltage

- Disconnect the three-way connector (1);
- For a correct detection of the alternator voltage, a measurement must be carried out using alternatively the 3 engine side connector pins: stage "1" (pin 1-2), stage "2" (pin 1-3), stage "3" (pin 2-3)
- Take the measurements;
- If there is a significant difference between one stage and another (other than 15 V), this means that the alternator is defective and must be replaced.

IMPORTANT

WITH THE ENGINE HOT THE VALUES RECORDED ARE ON AVERAGE 4-5 V LESS THAN THOSE DETECTED WITH THE ENGINE COLD.

ZERO LOAD VOLTAGE

rpm	2000	4000	6000
Vm line-to-line voltage Reference values (V rms)	40 - 45	82 - 87	132 - 138

Short-circuit current

- For a correct detection of the short-circuit current, a connector must be prepared that generates a downstream short circuit between the three alternator cables;
- Start the engine and with a clamp ammeter measure each single cable.
- If there is a significant difference between the measure of the single cables



(other than 10 A), this means that the alternator is defective and must be replaced.

IMPORTANT

WITH THE ENGINE HOT THE VALUES RECORDED ARE ON AVERAGE 2-3 A LESS THAN THOSE DETECTED WITH THE ENGINE COLD.

WARNING

NEVER KEEP THE ENGINE RUNNING FOR MORE THAN ONE MINUTE; FAILURE TO DO SO COULD CAUSE SERIOUS OVERHEATING DAMAGES TO THE MOTORCYCLE CIRCUITS.

COLD SHORT-CIRCUIT CURRENT

RPM	2000	4000	6000	8,000
RMS DC current (Arms) (average of the 3 stage currents)	18	20.4	20.6	20.7

Voltage on battery terminals with engine running between 3,000 - 5,000 RPM

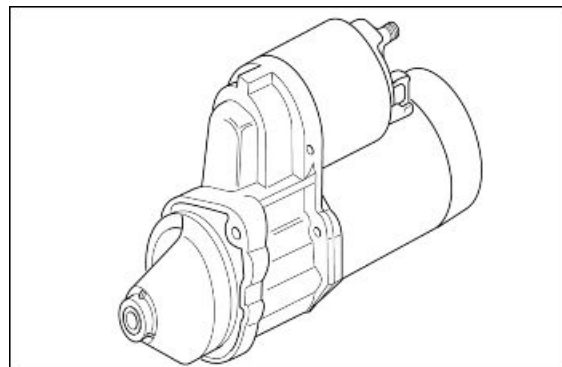
- Start the engine. After about one minute of operation, rev the engine to 3,000-5,000 RPM, then use a tester to measure the voltage at the battery terminals which should be between 13V and 15V. Otherwise, if correct operation of the alternator has already been confirmed, replace the regulator.

IMPORTANT

CONDUCT THE CHECK DESCRIBED ABOVE WITH A BATTERY WHICH IS IN GOOD CONDITION (STARTING VOLTAGE AROUND 13V) AND DOES NOT HAVE ELEMENTS IN SHORT CIRCUIT.

Start up system check

peak absorption about 100 A



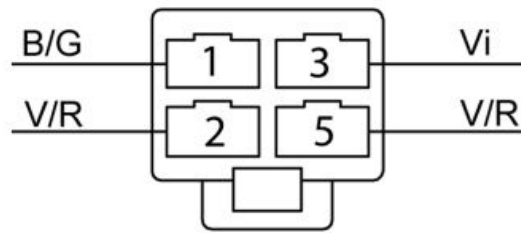
STARTER

Function

Communicates the starter motor request to the control unit

Operation / Operating principle

By pressing the start button, the related circuit closes and brings PIN 5 of the control unit to a voltage equal to zero (ground closure). The starter button, the clutch switch, the No. 6 starter motor relay and the injection control unit between PIN 6 and 10 are involved



Level in electrical circuit diagram

Starting

Start enable switches

Position

Under the fuel tank, right side

Electrical specifications

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

Starter relay pin out

1. control unit relay output (blue/yellow)
2. Control unit ignition switched live (red/green)
3. Starter motor (violet)
4. /
5. Control unit ignition switched live (red/green)

Diagnostic tool - Parameters and statuses

- Starting request - (Absent, Present, Closed Loop, Closed)
- Start enable - (NO, YES)

Diagnostics tool - Logic errors

Starter button P0512 - signal not valid

Cause of error

- Fault in the switch (lock) of the engine start-up or short circuit to ground

Troubleshooting

- Check if the button remains in start position; if not OK, restore, if OK check that there is no short circuit to ground of the grey/red cable; if it is not, restore. If it is OK, replace

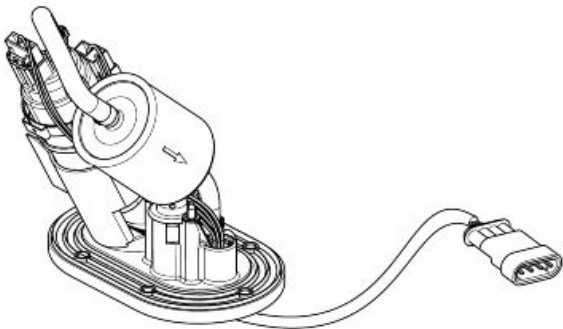
level indicators

Petrol pump:

Input 4A (to be measured between pins 1 and 2 with 12V supply voltage)

Fuel level sensor:

Resistance 1.4 Ohm (to be measured between pins 3 and 4 with fuel level equal to 0 litres)



Lights list

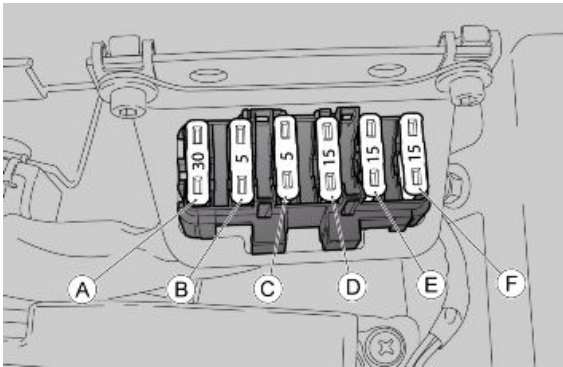
BULBS

Specification	Desc./Quantity
Low/high beam light (halogen)	12 V - 55 W / 60 W H4
Front DRL	12 V - 5 W
Turn indicators	12 V - 10 W (orange RY 10 W bulb)
taillight /stop lights	12 V - 5 / 21 W
Dashboard lighting	LED

Fuses

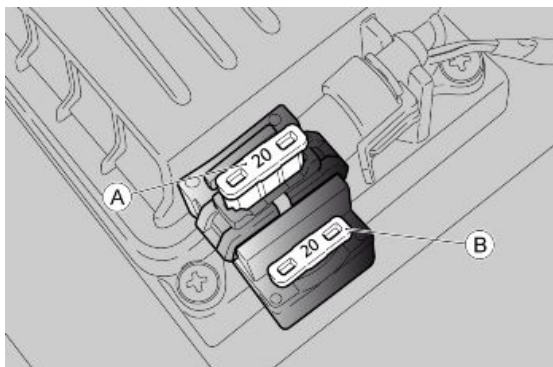
FUSE DISTRIBUTION

- A) Main fuse, coil 1 and 2, injector 1 and 2, oxygen sensor 1 and 2 (30 A).
- B) (Battery positive) MIU G3 ECU (5 A).
- C) (Battery positive) Instrument panel, turn indicators, bluedash (5 A).
- D) ECU, engine kill, start relay, instrument panel, injection loads relay (15 A).
- E) Provision for GPS, low beam / high beam, passing, USB, bluedash (15 A).
- F) Brake light, running lights, horn (15 A).



ABS FUSE LAYOUT

- A) ABS Control unit (20 A).
- B) Spare fuses (20 A).

**Control unit****ONLY FOR VEHICLES VERSION EURO 5****ENGINE TONE WHEEL PROGRAMMING PROCEDURE**

- Using the PADS diagnostic tool, perform the "Reset wheel tooth values";
- Bring the engine to a temperature above 80°;

Then proceed as described:

- In neutral position, with the side stand extended/open and with the vehicle absolutely immobile, quickly bring the engine above 8000 rpm (it is not necessary to stay there, it is sufficient to exceed it);
- Close the throttle completely and wait for the engine to go down to idle speed;
- 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).

IMPORTANT

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.

IMPORTANT

PROGRAMMING OF THE TONE WHEEL TAKES PLACE DURING THE RELEASE PHASE OF THE THROTTLE (FROM 8000 rpm TO IDLE RPM). IN THIS DESCENDING PHASE THE THROTTLE GRIP MUST REMAIN COMPLETELY CLOSED.

Battery

Function

Provide electrical supply, the battery is YUASA.

Level in electrical circuit diagram

Battery charge

Position

- on the vehicle: right side, under fairing
- connector: on the battery

Electrical specifications

- 12 V / 12 Ah

Pins:

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

Diagnostic tool - Parameters and statuses

- Battery voltage - (V) - (Example value with key ON: 12.0 V, example value with engine on: 14.2 V)

IMPORTANT

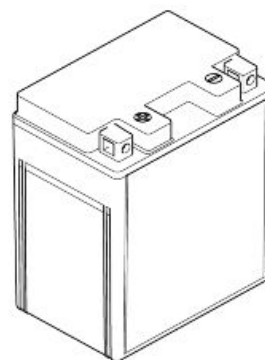
BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

Diagnostics tool - Logic errors

Battery voltage P0560 - too high/too low

Error cause

- If too high: too high a voltage has been detected at PIN 9. If too low: too low a voltage has been detected at PIN 9. The instrument panel does not indicate the presence of this error even in the ATT status.

Troubleshooting

- If too high: verify correct operation of the alternator or voltage regulator.
- If too low: carry out the verification procedure for the alternator connector, the engine - vehicle cabling harness connector and the ECU connector (paying particular attention to any oxidation); if not OK, restore. If OK, check that cable resistance between the alternator cable and the control unit is a few tenths of Ohm; if not OK, restore wiring harness; if OK, check correct operation of the electrical alternator; if it is not, replace it. If it is OK, replace the battery.

Speed sensor

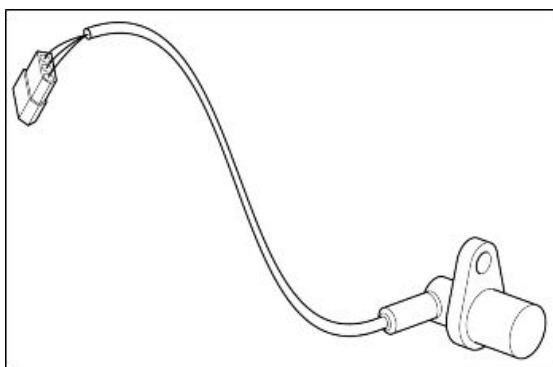
FRONT SPEED SENSOR

Function

To indicate the vehicle speed by reading the front wheel turning speed

Operation / Operating principle

Magneto-resistive sensor: a square-wave pulse is generated with voltage approx. between 11.55 V and 11.25 V



Level in electrical circuit diagram

ABS system

Position

- On the fork, left stanchion, near the brake calliper mounting bracket

Pin-out

1. Ground (White)
2. Power supply voltage/Output signal (white/brown)

Diagnostic tool - Parameters and statuses

- Vehicle speed - (km/h)
- Front wheel speed - (km/h)

Diagnostic tool - Electrical errors

Electric malfunction 5D90

Error cause

- Electrically defective wiring or sensor

Troubleshooting

- Check the sensor connector and the ABS control unit connector. If they are not OK, restore the connectors. If they are OK, check continuity of the white/brown cable between PIN 2 of the sensor on the wiring harness side and PIN 14 of the ABS control unit connector. If there

is no continuity, restore them. If there is, PIN 2 of the sensor on the wiring harness side, with the sensor disconnected and key set to ON, must have 12V voltage approximately; if there is no voltage, check PIN 2 for continuity with the vehicle ground connection: if not ok to ground, restore the wiring harness. If OK, replace the control unit. If PIN 2 has approx. 12 V, check the continuity of the white cable between PIN 1 of the sensor on the wiring harness side and PIN 13 of the ABS control unit connector. If there is no continuity, restore the wiring harness. If there is, replace the logic errors sensor.

Front wheel speed signal/sensor P0501 - signal not validTroubleshooting

- Connect to the ABS control unit diagnostics

Diagnostics tool - Logic errors**The signal changes irregularly 5D91**Error cause

- Faulty sensor or signal interference

Troubleshooting

- Check speed sensor retainer; if not ok restore, if ok, check if the tone wheel is dirty, deformed or wrongly fixed; if it is not OK, replace the tone wheel; if it is OK, replace the speed sensor.

The signal decreases periodically 5D92Error cause

- Possible tone wheel fault due to deformations or dirt; the surface of the wheel bearings may be deteriorated. In very rare cases, abnormal phonic wheel vibrations

Troubleshooting

- Check if the tone wheel is dirty, deformed or wrongly fixed. If the tone wheel is not OK, replace it. If it is OK, check for possible faults in the wheel bearings; if it is not OK, replace the bearings.

Missing signal or speed measured too low in relation to the rear wheel 5D93Error cause

- Faulty sensor or missing sensor/tone wheel. Or excessive distance between the sensor and the tone wheel or tone wheel with wrong number of teeth

Troubleshooting

- Check that the speed sensor and the tone wheel are installed; If they are not, install them. If they are, check the speed sensor retainer; If it is not OK, restore it. If it is, check if the tone wheel has the correct number of teeth or if it is dirty, deformed or wrongly fixed; if it is not OK, replace the tone wheel; if it is OK, replace the speed sensor

missing acceleration after pressure reduction 5D94Error cause

- Faulty sensor or missing sensor/tone wheel or excessive distance between the sensor and the tone wheel

Troubleshooting

- Check that the speed sensor and the tone wheel are installed; If they are not, install them. If they are, check the speed sensor retainer; If it is not OK, restore it. If it is, check if the tone wheel has the correct number of teeth or if it is dirty, deformed or wrongly fixed; if it is not OK, replace the tone wheel; if it is OK, replace the speed sensor.

Excessive speed detected 5D95

Error cause

- Faulty sensor or tone wheel, or tone wheel with wrong number of teeth or wrong tyre size

Troubleshooting

- Check that the speed sensor and the tone wheel are installed; If they are not, install them. If they are, check the speed sensor retainer; If it is not OK, restore it. If it is, check if the tone wheel has the correct number of teeth or if it is dirty, deformed or wrongly fixed; If it is not OK, replace the tone wheel and if it is OK, check that the tyre size is the correct one. If it is not OK, replace it. If it is OK, check that the tyre pressure is the correct one; if it is not, replace it. If it is OK, replace the speed sensor

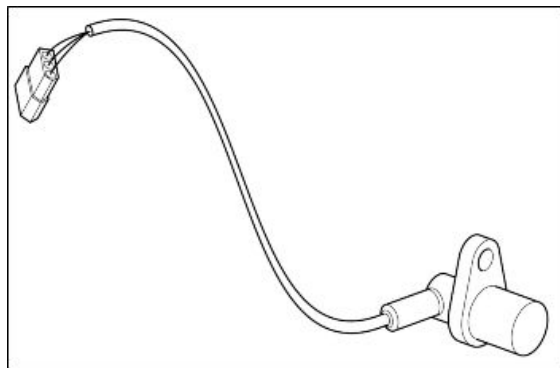
REAR SPEED SENSOR

Function

To indicate the vehicle speed by reading the rear wheel turning speed

Operation / Operating principle

Magneto-resistive sensor: a square-wave pulse is generated with voltage approx. between 11.55 V and 11.25 V



Level in electrical circuit diagram

ABS system

Position

- On the swingarm, left side, on the rear brake calliper support plate

Pin-out

1. Earth (Yellow)
2. Power supply voltage/Output signal (yellow/brown)

Diagnostic tool - Parameters and statuses

- Vehicle speed - (km/h)
- Rear wheel speed - (km/h)

Diagnostic tool - Electrical errors**Electrical malfunction 5DA0****Error cause**

- Electrically defective wiring or sensor

Troubleshooting

- Check the sensor connector and the ABS control unit connector; If it is not OK, restore the connectors; if it is OK, check continuity of the yellow/brown cable between sensor PIN 2 on the wiring harness side and PIN 11 ABS control unit connector; If there is no continuity, restore them. If there is, PIN 2 of the sensor on the wiring harness side, with the sensor disconnected and key set to ON, must have 12V voltage approximately; if there is no voltage, check PIN 2 for continuity with the vehicle ground connection if not ok to ground, restore the wiring harness. If OK, replace the control unit. If PIN 2 has approx. 12 V, check continuity of the yellow cable between PIN 1 of the sensor on the wiring harness side and PIN 12 of the ABS control unit connector if not OK, restore the wiring harness; if OK, replace the sensor

Rear wheel speed signal/sensor P2158 - signal not valid**Troubleshooting**

- Connect to the ABS control unit diagnostics

Diagnostics tool - Logic errors**The signal works irregularly 5DA1****Error cause**

- Faulty sensor or signal interference

Troubleshooting

- Check speed sensor retainer; if not ok restore, if ok, check if the tone wheel is dirty, deformed or wrongly fixed; if it is not OK, replace the tone wheel; if it is OK, replace the speed sensor

The signal decreases periodically 5DA2**Error cause**

- Possible tone wheel fault due to deformations or dirt; the surface of the wheel bearings may be deteriorated. In very rare cases, abnormal phonic wheel vibrations

Troubleshooting

- Check if the tone wheel is dirty, deformed or wrongly fixed If the tone wheel is not OK, replace it. If it is OK, check for possible faults in the wheel bearings; if it is not OK, replace the bearings

No signal or speed measured too low in relation to the front wheel 5DA3**Error cause**

- Faulty sensor or missing sensor/tone wheel. Or excessive distance between the sensor and the tone wheel or tone wheel with wrong number of teeth

Troubleshooting

- Check that the speed sensor and the tone wheel are installed; If they are not, install them. If they are, check the speed sensor retainer; If it is not OK, restore it. If it is, check if the tone wheel has the correct number of teeth or if it is dirty, deformed or wrongly fixed; if it is not OK, replace the tone wheel; if it is OK, replace the speed sensor

Missing acceleration after pressure reduction 5DA4

Error cause

- Faulty sensor or missing sensor/tone wheel or excessive distance between the sensor and the tone wheel

Troubleshooting

- Check that the speed sensor and the tone wheel are installed; If they are not, install them. If they are, check the speed sensor retainer; If it is not OK, restore it. If it is, check if the tone wheel has the correct number of teeth or if it is dirty, deformed or wrongly fixed; if it is not OK, replace the tone wheel; if it is OK, replace the speed sensor

Excessive speed detected 5DA5

Error cause

- Faulty sensor or tone wheel, or tone wheel with wrong number of teeth or wrong tyre size

Troubleshooting

- Check that the speed sensor and the tone wheel are installed; If they are not, install them. If they are, check the speed sensor retainer; If it is not OK, restore it. If it is, check if the tone wheel has the correct number of teeth or if it is dirty, deformed or wrongly fixed; If it is not OK, replace the tone wheel and if it is OK, check that the tyre size is the correct one. If it is not OK, replace it. If it is OK, check that the tyre pressure is the correct one; if it is not, replace it. If it is OK, replace the speed sensor
-

Engine rpm sensor

Function

It informs crankshaft position and speed to the Marelli control unit

Operation / Operating principle

Inductive sensor: sinusoidal-type generated voltage; two teeth are missing on the flywheel for the reference position

Level in electrical circuit diagram

Engine speed sensor

Position

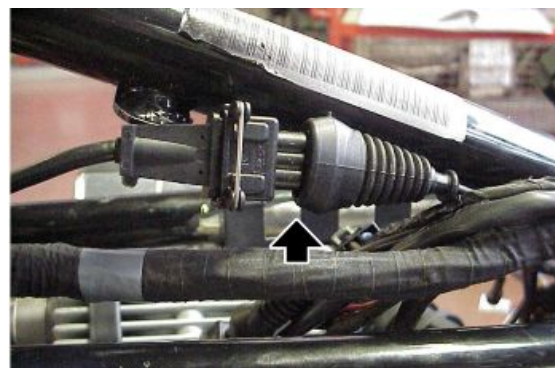
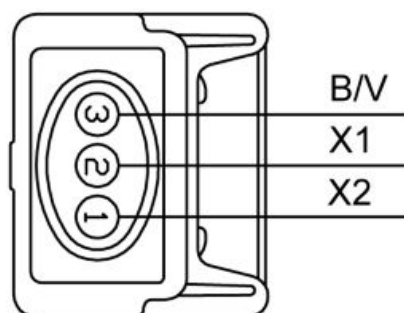
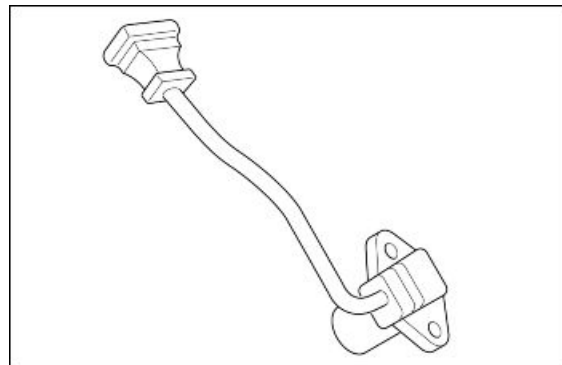
- Sensor: engine front left section, under the left cylinder
- Connector: under the fuel tank

Electrical specifications

- Winding resistance: $650 \Omega \pm 15\%$ Output alternating voltage, value range: minimum: 0.5 V - maximum 5 V

Pin-out

1. Engine revolution sensor positive signal (X2)
2. Engine revolution sensor negative signal (X1)
3. Engine speed sensor anti-jamming cable (blue/green)



Diagnostic tool - Parameters and statuses

- Engine speed - (rpm)
- Target engine revs - (rpm) (Parameter valid at idle, setting depends especially on engine temperature: the ECU unit will try to keep the engine running at this revs, acting on the ignition advance)

Diagnostic tool - Electrical errors

Engine revolution sensor P0335 - open circuit

Error cause

- Faulty wiring harness or engine revolution sensor (pick up)

Troubleshooting

- An interruption in the sensor circuit has been detected, from PIN 20 to PIN 29 of the control unit connector.
- Check the sensor connector and the injection ECU connector: If the values are incorrect restore them.
- If the values are correct, check the continuity of the two cables that go from PIN 20 to PIN 29 of the control unit connector; if not OK, restore the wiring harness; if OK, check the continuity of the sensor; replace it if not OK.

Installation

The air gap width should be between 0.7 and 0.9 mm.

Engine revolution sensor P0336 - inconsistent signal

Error cause

- Possible false contact in the electric circuit detected at PIN 20 and 29 of the engine control unit connector

Troubleshooting

- Check the electric circuit is in good conditions and the flywheel teeth cleaning and correct positioning of the sensor in its own housing; if it is not, replace it. If it is OK, replace the sensor

Engine temperature sensor

Function

indicates the engine temperature to the control unit so as to optimise mixture and idle control

Operation / Operating principle

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

Level in electrical circuit diagram

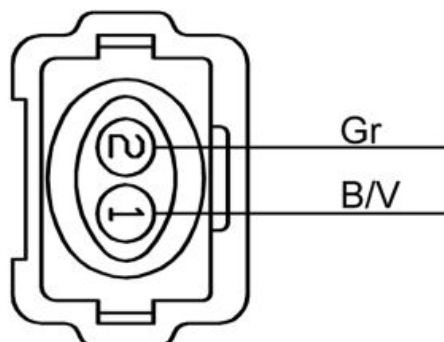
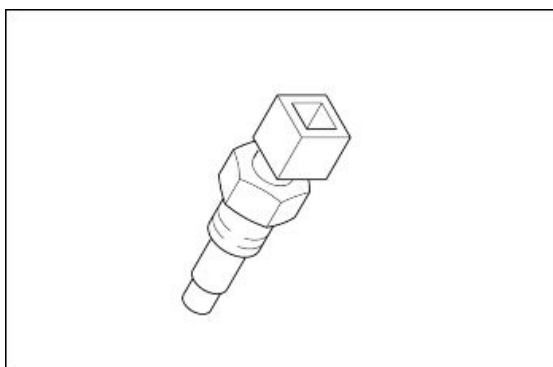
Temperature sensors

Position

- On the right head, towards the inside of the "V" of the engine
- Connector: on the sensor

Electrical specifications

- Resistance at 0°C: $9.75 \text{ k}\Omega \pm 5\%$
- Resistance at 20°C: $3.747 \text{ k}\Omega \pm 5\%$
- Resistance at 40°C: $1.598 \text{ k}\Omega \pm 5\%$
- Resistance at 60°C: $0.746 \text{ k}\Omega \pm 5\%$



- Resistance at 80°C: 0.377 kΩ ± 5%
- Resistance at 100°C: 0.204 kΩ ± 5%

Pin-out

- 0-5 V signal (grey wiring harness side)
- Ground (blue/green wiring harness side)

**Diagnostic tool - Parameters and statuses**

- Engine temperature - (°C)

Diagnostic tool - Electrical errors

Engine temperature sensor P0115 - shorted to positive or open circuit / shorted to negative.

Cause of error

- Short-circuit to positive or open circuit: interruption of the circuit or excessive voltage at PIN 13 of the control unit connector
- Short-circuit to negative: zero voltage between PIN 13 and 15 of the control unit connector

Troubleshooting

Short-circuit to positive:

- With the sensor connector and the control unit disconnected, verify that the fault is shorted with the battery positive of sensor connector PIN 2 (or control unit PIN 13) and restore the wiring harness.

Open circuit:

- Disconnect the connector of the control unit.
- Measure the resistance value of the sensor at different temperatures between PIN 13 and 15.
- Disconnect the sensor connector.
- Check the continuity of the wiring harness between the sensor connector and the control unit connector: Control unit PIN 13 - sensor PIN 2 and control unit PIN 15 - sensor PIN 1. Repair the wiring harness if necessary.
- If the wiring harness is intact but the sensor resistance value is incorrect, this means that the sensor is faulty and must be replaced, otherwise proceed with the checks.

Short-circuit to negative:

- Disconnect the sensor connector.
- Check the sensor connector PIN 2 ground insulation.
- If there is no ground insulation restore the wiring harness.

- If PIN 2 is insulated from the ground and the error persists, this means that there is a probable fault in the control unit.

Lambda sensor

Function

In charge of telling the control unit whether the mixture is lean or rich

Operation / Operating principle

The Marelli injection control unit reads and interprets a voltage generated by the difference in oxygen content between the exhaust fumes and the ambient. 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

RIGHT LAMBDA

Level in electrical circuit diagram

Lambda probe

Position

- Sensor: right exhaust pipe
- Connector: near the throttle body right side

Electrical specifications

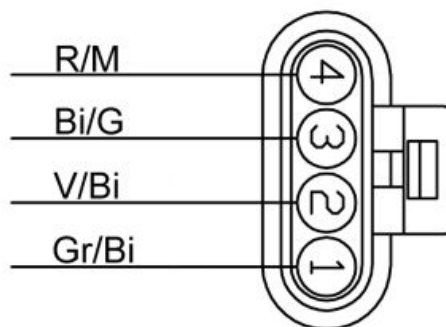
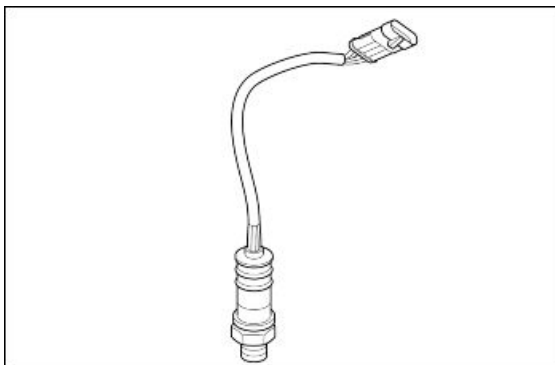
- Heating circuit: 12 -14 Ω at 20 °C (68 ° F)

Pin-out

1. Positive signal sensor (grey/white)
2. Negative signal sensor (green/white)
3. Heater ground (white/yellow)
4. Heater power (red/brown cable)

Diagnostic tool - Parameters and statuses

- Oxygen sensor voltage RH - (mV)
- Right lambda probe - (---, Not enabled, Not active (start), Not active (heat.), Not active (rich), Operating, Not active (lean), Fault



Diagnostic tool - Activation

- Lambda probe heater 2

Diagnostic tool - Electrical errors

Control of the air-fuel ratio / Right lambda probe P0150 - positive short circuit / open circuit, short circuit to negative / signal not valid.

Cause of error

- Short-circuit to positive: excessive voltage at PIN 18 or PIN 12 of the control unit connector.
- Open circuit or short-circuit to negative: interruption of the circuit or null voltage between control unit connector PIN 18 and 12

Troubleshooting

Short-circuit to positive:

- Disconnect the control unit connector and the sensor connector.
- Verify that there is no short to battery positive on sensor connector PIN 1 (corresponding to control unit connector PIN 18); if there is a short, restore the wiring harness.
- Verify that there is no short to battery positive on sensor connector PIN 2 (corresponding to control unit connector PIN 12); if there is a short, restore the wiring harness.

Open circuit:

- Disconnect the control unit connector and the sensor connector.
- Check the continuity of the wiring harness between the sensor connector and the control unit connector: Control unit PIN 18 - sensor PIN 1 and control unit PIN 12 - sensor PIN 2. Repair the wiring harness if necessary.
- If the wiring harness is intact and the error persists, proceed with the following checks.

Short-circuit to negative:

- Disconnect the sensor connector and the control unit connector.
- Check the sensor connector PIN 1 ground insulation. If there is no insulation, restore the wiring harness.
- Check the sensor connector PIN 2 ground insulation. If there is no insulation, restore the wiring harness.
- If PIN 1 and PIN 2 are insulated from the ground and the error persists, this means that there is a probable fault in the control unit.

Lambda probe heater P0155 - short circuit to positive / open circuit / short circuit to negative.

Cause of error

- Short-circuit to positive: excessive voltage at PIN 2 of the control unit connector.
- Short-circuit to negative: lack of insulation from ground on the sensor connector PIN 4
- Open circuit: broken circuit.

Troubleshooting

Short-circuit to positive:

- Disconnect the control unit connector and the sensor connector.
- Verify that there is no short to battery positive on sensor connector PIN 3 (corresponding to control unit connector PIN 2); if there is a short, restore the wiring harness.

Open circuit:

- Disconnect the control unit connector and the sensor connector.
- Check the continuity of the wiring harness between the sensor connector and the control unit connector: Control unit PIN 2 - sensor PIN 3. Repair the wiring harness if necessary.
- Verify continuity of the wiring harness between the sensor connector and the injection relay: sensor PIN 4 - injection relay PIN 3. Repair the wiring harness if necessary.
- If the wiring harness is intact and the error persists, proceed with the following checks.

Short-circuit to negative:

- Disconnect the sensor connector.
- Check the sensor connector PIN 3 ground insulation. If there is no insulation, restore the wiring harness.
- If PIN 3 is insulated from ground and in the absence of other errors (fuel pump, injector, coil), this means that the control unit is most likely faulty.

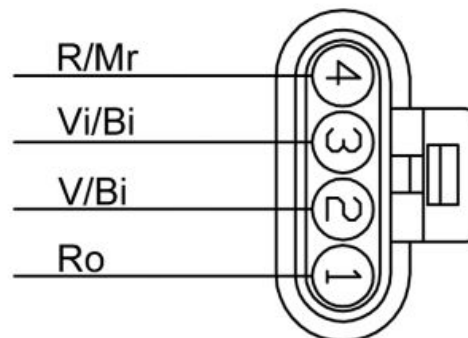
LEFT LAMBDA

Level in electrical circuit diagram

Lambda probe

Position

- Sensor: left exhaust pipe
- Connector: adjacent to the filter box, left side



Electrical specifications:

- Heating circuit: 12 -14 Ω at 20 °C (68 ° F)

Pin-out

1. Positive sensor signal (pink)
2. Negative signal sensor (green/white)
3. Heater ground (violet/white)
4. Heater power (red/brown cable)



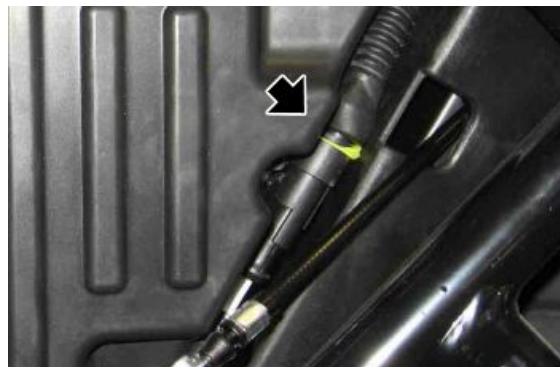
Diagnostic tool - Parameters and statuses

- Oxygen sensor voltage LH - (mV)
- Left lambda probe - (---, Not enabled, Not active (start), Not active (heat.),

Not active (rich), Operating, Not active (lean), Fault

Diagnostic tool - Activation

- Lambda probe heater 1



Diagnostic tool - Electrical errors

Control of the air-fuel ratio / Left lambda probe P0130 - positive short circuit / open circuit, short circuit to negative / signal not valid.

Cause of error

- Short-circuit to positive: excessive voltage to PIN 11 or PIN 12 of the control unit connector
- Open circuit or short-circuit to negative: interruption of the circuit or null voltage between control unit connector PIN 11 and 12

Troubleshooting

Short-circuit to positive:

- Disconnect the control unit connector and the sensor connector.
- Verify that there is no short to battery positive on sensor connector PIN 1 (corresponding to control unit connector PIN 11); if there is a short, restore the wiring harness.
- Verify that there is no short to battery positive on sensor connector PIN 2 (corresponding to control unit connector PIN 12); if there is a short, restore the wiring harness.

Open circuit:

- Disconnect the control unit connector and the sensor connector.
- Check the continuity of the wiring harness between the sensor connector and the control unit connector: Control unit PIN 11 - sensor PIN 1 and control unit PIN 12 - sensor PIN 2. Repair the wiring harness if necessary.
- If the wiring harness is intact and the error persists, proceed with the following checks.

Short-circuit to negative:

- Disconnect the sensor connector and the control unit connector.
- Check the sensor connector PIN 1 ground insulation. If there is no insulation, restore the wiring harness.
- Check the sensor connector PIN 2 ground insulation. If there is no insulation, restore the wiring harness.
- If PIN 1 and PIN 2 are insulated from the ground and the error persists, this means that there is a probable fault in the control unit.

Lambda probe heater P0135 - shorted to positive / shorted to negative / open circuit.

Cause of error

- Short-circuit to positive: excessive voltage at PIN 31 of the control unit connector
- Short-circuit to negative: lack of insulation from ground on the sensor connector PIN 4
- Open circuit: broken circuit.

Troubleshooting

Short-circuit to positive:

- Disconnect the control unit connector and the sensor connector.
- Verify that there is no short to battery positive on sensor connector PIN 3 (corresponding to control unit connector PIN 31); if there is a short, restore the wiring harness.

Short-circuit to negative:

- Disconnect the sensor connector.
- Check the sensor connector PIN 3 ground insulation. If there is no insulation, restore the wiring harness.
- If PIN 3 is insulated from ground and in the absence of other errors (fuel pump, injector, coil), this means that the control unit is most likely faulty.

Open circuit:

- Disconnect the control unit connector and the sensor connector.
- Check the continuity of the wiring harness between the sensor connector and the control unit connector: control unit PIN 31 - sensor PIN 3. Repair the wiring harness if necessary.
- Verify continuity of the wiring harness between the sensor connector and the injection relay: sensor PIN 4 - injection relay PIN 3. Repair the wiring harness if necessary.
- If the wiring harness is intact and the error persists, proceed with the following checks.

Injector

Function

To supply the correct amount of petrol at the right timing

Operation / Operating principle

Injector coil is energised for the petrol passage to open

RIGHT INJECTOR**Level in electrical circuit diagram**

Coils and injectors

Right injector position

- On the intake manifold
- Connector: on injector

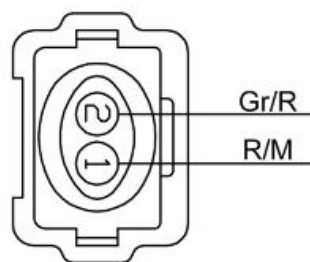


Electrical specifications

- 14.8 Ohm +/- 5% (at 20 °C - 68 °F)

Pin-out

1. Power 12V (red/brown)
2. Ground (grey/red)

**Diagnostic tool - Parameters and statuses**

- Injection time cyl. RH - (ms)

**Diagnostic tool - Activation**

- Right injector
- Injector control

Diagnostic tool - Electrical errors

Front injector P0202 - shorted to positive / shorted to negative / open circuit.

Cause of error

- Short-circuit to positive: excessive voltage at PIN 32 of the control unit connector
- Short-circuit to negative: zero voltage at PIN 1 of the right injector connector
- Open circuit: circuit interruption

Troubleshooting

Short-circuit to positive:

- Disconnect the right injector connector, turn the key to ON and activate the component through the diagnostic tool.
- Verify the absence of voltage at the right injector connector PIN 2; if present restore the wiring harness, otherwise proceed with the following checks.

Short-circuit to negative:

- Disconnect the right injector connector, turn the key to ON and activate the component through the diagnostic tool.
- Verify the presence of voltage at the ends of the right injector connector; if there is no voltage, restore the wiring harness, otherwise proceed with the following checks.

Open circuit:

- Carry out the check procedure of the right injector and control unit connectors.

- Verify continuity of the wiring harness between the control unit connector and the right injector connector (control unit PIN 32 - right injector PIN 2). If there is no continuity, restore the wiring harness.

LEFT INJECTOR**Level in electrical circuit diagram:**

Coils and injectors

Left injector position:

- On the intake manifold
- Connector: on injector

Electrical specifications

- 14.8 Ohm +/- 5% (at 20 °C - 68 °F)

Pins:

1. Power 12V (red/brown)
2. Ground (grey/black)

Diagnostic tool - Parameters and statuses

- Injection time cyl. LH - (ms)

Diagnostic tool - Activation

- Left injector
- Injector control

Diagnostic tool - Electrical errors**Left injector P0201** - shorted to positive / shorted to negative / open circuit.**Cause of error**

- Short-circuit to positive: excessive voltage at PIN 34 of the control unit connector
- Short-circuit to negative: zero voltage at PIN 1 of the left injector connector
- Open circuit: circuit interruption

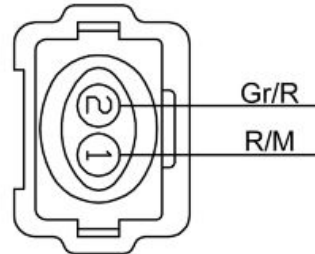
Troubleshooting

Short-circuit to positive:

- Disconnect the left injector connector, turn the key to ON and activate the component through the diagnostic tool.
- Verify the absence of voltage at the left injector connector PIN 2; if present restore the wiring harness, otherwise proceed with the following checks.

Short-circuit to negative:

- Disconnect the left injector connector, turn the key to ON and activate the component through the diagnostic tool.



- Verify the presence of voltage at the ends of the left injector connector; if there is no voltage, restore the wiring harness, otherwise proceed with the following checks.

Open circuit:

- Carry out the check procedure of the left injector and control unit connectors.
- Verify continuity of the wiring harness between the control unit connector and the left injector connector (control unit PIN 34 - left injector PIN 2). If there is no continuity, restore the wiring harness.

fuel pump

Function

Fuel pump: keeps pressure of the injectors supply duct.

Low fuel: tells to the instrument panel 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

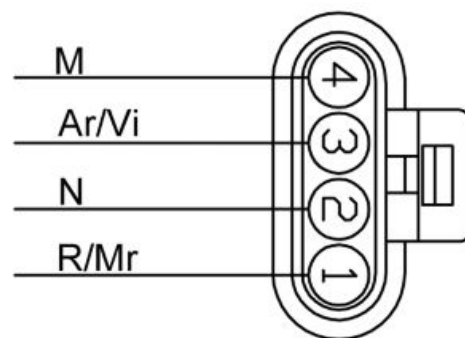
Level in electrical circuit diagram

Injection loads relay

Low fuel and oil pressure

Position

- On the vehicle: on the tank.
- Connector: on the front left part of the bike, under the fuel tank.



Fuel pump pin-out and fuel reserve sensor

1. Power 12V (red/brown)
2. Ground (black)
3. Positive signal to instrument panel (orange/violet)
4. Ground (brown)

IMPORTANT

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.

Diagnostic tool - Activation

- Fuel pump

Diagnostic tool - Electrical errors

Fuel pump relay control P0230 - shorted to positive / shorted to negative / open circuit.

Cause of error

Short-circuit to positive:

- Excessive voltage to PIN 22 of the control unit connector.

Short-circuit to negative:

- null voltage at PIN 2 of the injection loads relay.

Open circuit:

- Circuit interruption.

Troubleshooting

Short-circuit to positive:

- Disconnect the injection loads relay (No. 28 on the electrical circuit diagram), turn the key to the ON position and activate the injection loads relay through the diagnostic tool.
- Verify the presence of voltage between injection loads relay connector PIN 1 and 2 toward the wiring harness.
- If no voltage is read, disconnect the control unit and verify insulation from battery positive of the injection loads relay PIN 1 (or control unit PIN 22). Repair the wiring harness if necessary.

Short-circuit to negative:

- Disconnect the injection loads relay (No. 28 on the electrical circuit diagram) and the control unit.
- Verify ground insulation of the injection loads relay connector PIN 1 and 2 toward the wiring harness: if there is no insulation, restore the wiring harness.

Open circuit:

- Disconnect the injection loads relay (No. 28 on the electrical circuit diagram) and the control unit.
 - Verify continuity of the wiring harness between the injection loads relay and control unit: Injection loads relay PIN 1 - control unit PIN 22. Repair the wiring harness if necessary.
-

Coil

Function

It controls the ignition spark plug in order to generate the fuel ignition spark.

Operation / Operating principle

Inductive discharge system.

LEFT COIL

Level in electrical circuit diagram

Coils and injectors

Position

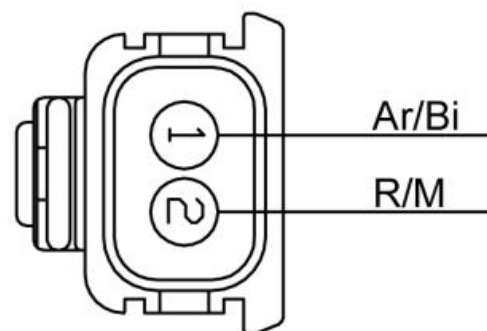
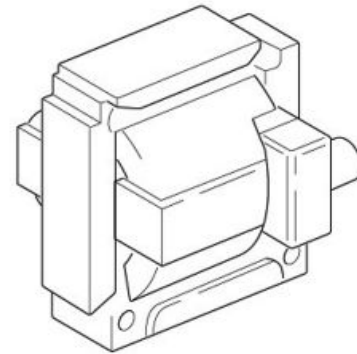
- Centred under the fuel tank.
- Connector: on the coil.

Electrical specifications

- Primary winding resistance: $550\text{ k}\Omega \pm 10\%$
- Secondary winding resistance: $3\text{ k}\Omega \pm 10\%$
- Tube resistance $5\text{ k}\Omega$

Pin-out

1. Circuit ground (orange/white)
2. Power supply (red/brown)



Diagnostic tool - Activation

- Left coil
- Coil command

Diagnostic tool - Electrical errors

H.V. Coil P0351 - shorted to positive / open circuit or short-circuit to negative.

Cause of error

- Short-circuit to positive: excessive voltage at PIN 1 of the control unit connector
- Open circuit or short-circuit to negative: interruption of the circuit or zero voltage at PIN 1 of the control unit connector

Troubleshooting

Short-circuit to positive:

- Disconnect the left coil connector, turn the key to ON and activate the component through the diagnostic tool.
- Verify the presence of voltage on the left coil connector PIN 1: if present, restore the wiring harness, otherwise replace the left coil.

Open circuit:

- Carry out the check procedure of the left coil and control unit connectors.
- Verify continuity of the wiring harness between the left coil and control unit: Left coil PIN 1 - control unit PIN 1. If there is no continuity, restore the wiring harness.
- Verify, with the key turned ON, the presence of voltage on the left coil connector PIN 2. If no voltage is read, verify the continuity of the wiring harness between left coil and injection loads relay (No. 28 on the electrical circuit diagram): Left coil PIN 2 - injection loads relay PIN 3.
- If the above tests provided a positive result, the left coil should be replaced.

Short-circuit to negative:

- Disconnect the control unit connector and the left coil connector.
- Verify the left coil connector PIN 1 ground insulation (or control unit connector PIN 1). Repair the wiring harness if necessary.

RIGHT COIL

Level in electrical circuit diagram

Coil 2 (right cylinder)

Position

- Centred under the fuel tank.
- Connector: on the coil.

Electrical specifications

- Primary winding resistance: $550\text{ k}\Omega \pm 10\%$
- Secondary winding resistance: $3\text{ k}\Omega \pm 10\%$
- Tube resistance $5\text{ k}\Omega$

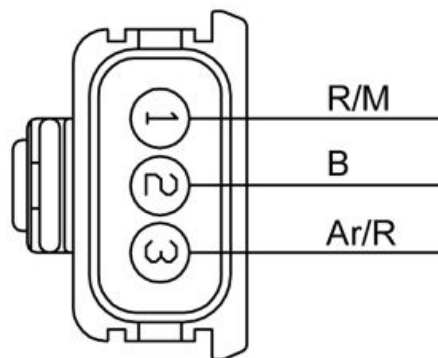
Pin-out

1. Power supply (red/brown)
2. Power ground 2 (blue)
3. Circuit ground (orange/red)

Diagnostic tool - Activation

- Right coil
- Coil command

Diagnostic tool - Electrical errors



H.V. Coil P0352 - shorted to positive / open circuit or short-circuit to negative.

Cause of error

- Short-circuit to positive: excessive voltage at PIN 8 of the control unit connector
- Open circuit or short-circuit to negative: interruption of the circuit or zero voltage at PIN 8 of the control unit connector

Troubleshooting

Short-circuit to positive:

- Disconnect the right coil connector, turn the key to ON and activate the component through the diagnostic tool.
- Verify the presence of voltage on the right coil connector PIN 3: if present, restore the wiring harness, otherwise replace the right coil.

Open circuit:

- Carry out the check procedure of the right coil and control unit connectors.
- Verify continuity of the wiring harness between the right coil and control unit: Right coil PIN 3 - control unit PIN 8. If there is no continuity, restore the wiring harness.
- Verify, with the key turned ON, the presence of voltage on the right coil connector PIN 1. If no voltage is read, verify the continuity of the wiring harness between right coil and injection loads relay (No. 28 on the electrical circuit diagram): Right coil PIN 1 - relay PIN 3.
- If the above tests provided a positive result, the right coil should be replaced.

Short-circuit to negative:

- Disconnect the control unit connector and the right coil connector.
- Verify the right coil connector PIN 3 ground insulation (or control unit connector PIN 8).
Repair the wiring harness if necessary.

Neutral sensor

Function

Indicates the gear position to the instrument panel:
if it is in neutral or in gear

Operation / Operating principle

For neutral gear, the circuit is closed to ground connection: the instrument panel turns on the neutral warning light

Level in electrical circuit diagram

Neutral sensor

Position



- Sensor: rear / upper side of the gear-box
- Connector: on the sensor

Electrical specifications

- Gear in neutral: closed circuit (0 V on wire from control unit to sensor / switch in continuity).
- Gearshift engaged: open circuit (12 V on the wire from control unit to sensor)

Pins:

1. Voltage 12V (green/black)

Diagnostic tool - Parameters and statuses

- Gear in neutral - (YES, NO)

Diagnosis**Warning light "N" always off****Error cause**

- Possible malfunction

Troubleshooting

- Carry out the check procedure on the green/black sensor/control unit cable.
- Restore if damaged.
- If OK, with the transmission in neutral, check for continuity to ground of the sensor connector.
- If there is no continuity, replace the sensor.
- Restore if damaged.
- If OK, check continuity.
- If there is no continuity, restore the wiring harness.
- If OK, replace the instrument panel if the vehicle performs properly.

Warning light "N" always on**Error cause**

- Possible malfunction

Troubleshooting

- Disconnect the terminals from the sensor and verify that, with the transmission in gear, there is continuity with the ground.
- If there is continuity, replace the sensor.
- If there is no continuity this means that there is a short to ground of the green black cable which goes to PIN 3 of the control unit, therefore restore the wiring harness.

- If there is no continuity, restore the wiring harness.
- If there is no continuity, replace the wiring harness.

Clutch lever sensor

Function

Indicates the clutch lever position to the control unit

Operation / Operating principle

In order to start the engine, pull the clutch also with the gear in neutral

Level in electrical circuit diagram

Start enable.

Position

- Sensor: under clutch lever
- Connector: under the fuel tank on right side

Electrical specifications

- Clutch engaged: closed circuit (continuity)
- Clutch released: open circuit (infinite resistance)

Pin-out

1. 12 V Voltage (brown/white)
2. Ground (blue/green)

Diagnostic tool - Parameters and statuses

- Clutch - (Pulled, Released)

Diagnosis

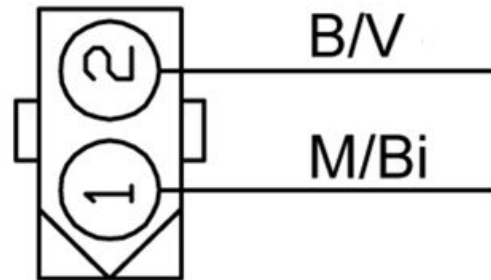
Even with the clutch lever engaged, the vehicle does not start

Error cause

- Possible malfunction

Troubleshooting

- Verify that, if a gear is engaged, the stand is up.
- If it is up, check continuity of the brown/white cable and control unit PIN 14.
- If there is no continuity, restore the wiring harness.



- If there is continuity, disconnect the sensor and, with the clutch engaged, check for continuity between the two sensor PINs.
- If absent, replace the sensor.
- If present, check for continuity of the blue/green cable between the sensor and control unit PIN 15.
- If absent, restore the wiring harness.

The vehicle starts even without pulling the clutch leverError cause

- Possible malfunction

Troubleshooting

- Disconnect the terminals from the sensor and check that, with the clutch released, there is continuity between the two PINs.
- If there is continuity, replace the sensor.
- If there is no continuity, this means that the blue/green cable which goes from the sensor PIN 2 to the control unit PIN 15 is shorted to ground.

Side stand sensor

Function

Indicates the side stand position to the control unit

Operation / Operating principle

If the gear is engaged and the side stand is unfolded, and therefore the circuit is open, the control unit does not enable vehicle start-up or shuts off the engine if it is rotating

Level in electrical circuit diagram

Start enable switches

Position

- Sensor: on side stand supporting plate
- Connector: left side, near the starter motor

Electrical specifications

- Stand up: closed circuit (continuity)
- Stand down: open circuit (infinite resistance)

Pin-out

1. Ground (blue/green)



2. 12 V voltage (grey/yellow)

Diagnostic tool - Parameters and statuses

- Side stand - (Up, Down)

Diagnosis

The vehicle with clutch engaged, gear engaged and side stand retracted does not start (side stand switch always open)

Error cause

- Possible malfunction

Troubleshooting

- verify continuity of the grey/yellow cable between the sensor and PIN 19 of the control unit.
- If absent, restore the wiring harness, if present, with the stand up, check for continuity between the two PINs on the sensor. If absent, replace the sensor. If present, check for continuity to ground of the blue/green cable on the wiring harness side connector.

The vehicle, with clutch operated and gear engaged, starts but with the side stand extended

Error cause

- Possible malfunction

Troubleshooting

- disconnect the sensor connector and check that, with side stand extended, there is not continuity between the two PINS.
- If present, replace the sensor. If absent, disconnect from control unit PIN 19 and check insulation from the ground of the grey/yellow cable between sensor and control unit.

Bank angle sensor

Function

It tells the vehicle position to the control unit

Operation / Operating principle

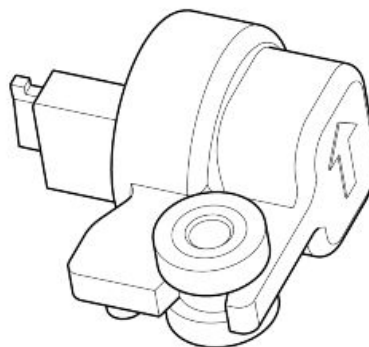
The sensor operates by sending an engine stop signal to the control unit, in cases where the vehicle detects an inclination greater than ~ 60 ° (for example, due to slips or falls)

Level in electrical circuit diagram

Start enable switches

Position

- On the vehicle: under the tank.
- Connector: near the sensor.

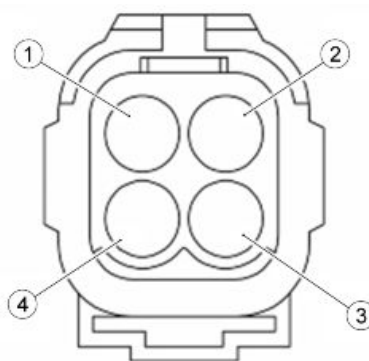


Pin-out

1. /
2. Ground (blue/green)
3. Power supply (grey/green)
4. Signal/consent (grey/sky blue)

Diagnostic tool - Parameters and statuses

- Tipping sensor - (Engine inhibited, Gear allowed, YES, Lean, Rich, Rich title, Error, Lean title)

**IMPORTANT**

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.

Diagnosis

The engine stop button is in "ON" but its status remains in "OFF"

Error cause

- Possible malfunction caused by the fall sensor or RUN-STOP switch

Troubleshooting

- See diagnosis "RUN-STOP switch", if not ok check the correct status of the fall sensor

SAS valve actuator**Function**

Improves the reaction of oxide, reduction after combustion

Operation / Operating principle

The valve coil is excited to open the air passage of the filter box to the exhaust manifold

Level in electrical circuit diagram

Secondary air valve

Location:

- on the vehicle: under the fuel tank, in the middle of the "V" of the engine, attached to the chassis
- connector: on the valve

Electrical specifications

- Resistance at ambient temperature: 21
+3/- 1 Ω

Pin-out

- Power supply (red/brown)
- Ground (black/white)

Diagnostic tool - Parameters

- Example value with key ON: 0%
- Example value with engine on: %

Used only at 0 or 100%

IMPORTANT

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Diagnostic tool - Activation

- Secondary air EV

Diagnostics tool - Logic errors**Error cause**

- Possible malfunction

Troubleshooting

- Disconnect the connector and check the resistance between PIN of the valve connector; if the resistance value is close to 10-20 Ω the valve is ok, if the value of the resistance is equal to 0 it can be said that there is a short circuit on the valve, instead if there is a resistance equal to a ∞ this means that inside the valve occurs an open circuit; in both cases it is necessary to replace the valve

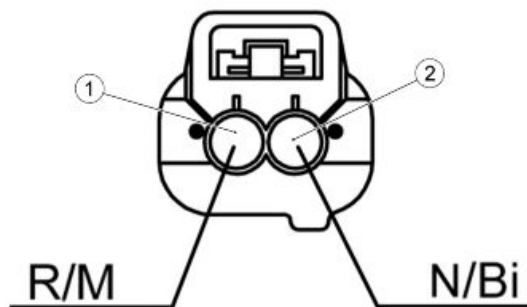
Secondary air valve P0410 - shorted to positive / shorted to negative / open circuit

Error cause

- Short-circuit to positive: excessive voltage measured at PIN 24 of the engine control unit
- If shorted to negative/open circuit: no voltage has been detected. The instrument panel does not indicate the presence of this error even in the ATT status.

Troubleshooting

- Short-circuit to positive: disconnect the component, set the key to ON, start the vehicle and check if the error symptom is still "shorted to positive": it means that short circuit is between black/white cable and a cable in voltage, therefore restore wiring harness; if the error symptom is short circuit to ground, it means that short circuit is inside the valve and therefore, you must replace the component.
- If shorted to negative or open circuit: check the component connector and control unit connector: if not OK, restore; if they are OK, check the continuity of the black/white cable



between the two connectors: if not OK, restore wiring harness; if OK, with key ON, check if there is voltage at PIN 1: if there is not voltage, check red/brown cable; if there is voltage, check component electrical characteristics and replace the component

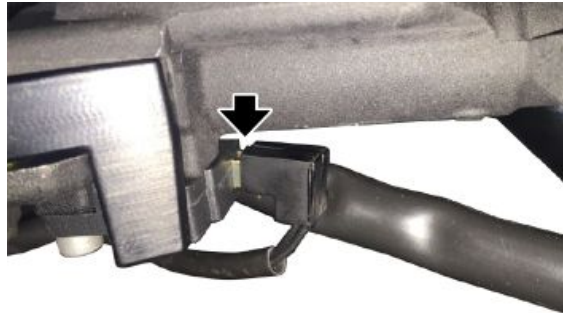
RUN/STOP switch

Function

Indicates the control unit if the rider wishes to enable engine start-up or to keep the engine running

Operation / Operating principle

If the driver wants to shut off the engine or to disable engine start-up, the switch should be open, i.e. the Marelli control unit should not detect voltage at PIN 4 of the control unit connector



Level in electrical circuit diagram

Start enable switches

Position

- Sensor: right light switch
- Connector: next to the headstock, right side

Electrical specifications

- STOP position: open circuit
- RUN position: closed circuit (continuity)

Pin-out

1. Voltage 0 V with engine kill in STOP; 12V if engine kill in RUN (pink/yellow cable)
2. Always voltage 12 V (with key on) (red/yellow cable)

Diagnostic tool - Parameters and statuses

- RUN/OFF Switch - (RUN-OFF)

Diagnosis

Engine does not start

Error cause

- Possible malfunction

Troubleshooting

- Disconnect the connector and check, with the switch set to RUN, that there is continuity between the two grey/light blue and red/grey cables (sensor side); If not ok, replace the sensor; if ok, check the connector; if not ok, restore the wiring harness; if ok, check, with key

set to ON, if there is voltage on Yellow/Red cable (wiring harness side). If not ok, restore the wiring harness; if ok, check the red/yellow cable ground insulation (wiring harness side); If there is continuity with ground connection, restore the wiring harness; if it is OK, set the key to KEY OFF and check the engine control unit connector; if it is OK, replace the engine control unit

Engine does not shut off with switch in "STOP"Error cause

- Possible malfunction

Troubleshooting

- Disconnect the connector and verify, with the switch set to STOP, that there is continuity between the two grey/light blue and red/grey cables (sensor side). If present, replace the switch; if absent this means that, with the key ON, the pink/yellow cable shorts to positive; if not OK, restore the wiring harness; if OK, replace the engine control unit

Connectors

ECU

Function

It manages injection/ignition, the system safety checks and the self-diagnosis function. The control unit is Magneti Marelli MIU G3

Level in electrical circuit diagram

Secondary air system

Bluedash pre-installation

Antitheft device

ABS system

Diagnosis

Low beam and running lights logic

High-beam lights logic

CAN Line

Temperature sensors

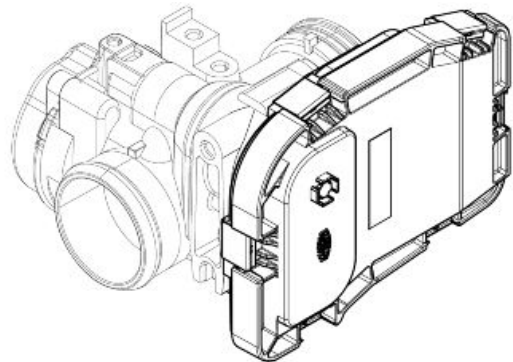
Lambda probe

Neutral sensor

Engine speed sensor

Coils and injectors

Injection loads relay



ECU base power circuit

Starting

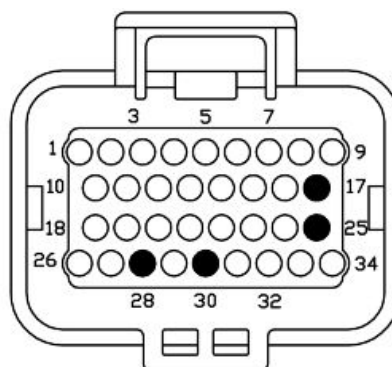
Start enable switches

Position

- on the vehicle: under the tank, near the battery
- connector: on the control unit from 34 PIN

Pin-out

1. Left coil control (1)
2. Right lambda probe heater signal (2)
3. Neutral gear switch control inlet (neutral)
4. Run-off control input
5. Start button inlet
6. Ignition switch positive
7. Ground 1 (-)
8. Right coil control (2)
9. Battery positive 12V
10. Starter motor relay control
11. Left lambda probe positive signal (1)
12. Left (1) and right (2) lambda probe negative signal
13. Temperature signal sensor
14. Clutch switch signal
15. External sensor ground
16. K diagnostic line
17. /
18. Right lambda probe positive signal (2)
19. Hanger switch and fall sensor inlet
20. Engine revolution sensor negative signal (pick up)
21. Sensors power supply
22. Injection relay control
23. Ground 2 (power)
24. Secondary air system control
25. /
26. CAN H line



- 27. CAN L line
- 28. /
- 29. Engine revs positive signal (pick up)
- 30. /
- 31. Left lambda probe heater signal (1)
- 32. Right injector control (2)
- 33. Light logic relay control
- 34. Left injector control (1)

Diagnostic tool - Control unit info screen page

In this screen page are read the general data regarding the control unit, for example: type of software, mapping, control unit programming data

- ISO code
- Drawing number (identification inserted by manufacturer)
- HW number (hardware number)
- SW ver. (software version)
- Approval number
- Author last progr. (author of the last programming)
- HW MM version (hardware MM version)
- Mapping (indicates the mapping number)
- Manufacturing data (control unit manufacturing data)
- Programming data (control unit programming data)
- NIP code



Diagnostic tool - Parameters and statuses

This screen page shows the parameters measured by the several sensors (engine revs, engine temperature, etc.) or values set by the control unit (injection time, ignition advance); in addition to the parameters in this screen page, are also shown the status of the vehicle devices or the operation



condition of some vehicle systems (for example, lambda probe functioning status)

- Engine speed - (rpm)
- Complete throt. angle - (°)
- Engine temperature - (°C)
- Intake air temperature - (°C)
- Oxygen sensor voltage LH - (mV)
- Oxygen sensor voltage RH - (mV)
- Corr. title cylinder LH - (%)
- Corr. title cylinder RH - (%)
- Corr. title carb. cyl. LH - (%)
- Corr. title carb. cyl. RH - (%)
- Steps carried out - (step)
- Programmed steps - (step)
- Advance cylinder LH - (°)
- Advance programmed - (°)
- Advance cylinder RH - (°)
- Injection time cyl. LH - (ms)
- Injection time cyl. RH - (ms)
- Atmospheric pressure - (mbar)
- Intake pressure - (mbar)
- Battery voltage - (V)
- Minimum target revs - (rpm)
- Throttle valve equiv. stepper - (°)
- Vehicle speed - (km/h)
- Ctrl title cylinder LH - (Open Loop, Closed Loop, Not allowed, Ecu universal code, ---, Recovery, Fault, Key not OK, Timeout)
- Lean title cyl. LH - (NO, YES)
- Rich title cyl. LH - (NO, YES)
- Right lambda probe - (---, Not enabled, Not active (start), Not active (heat.), Not active (rich), Operating, Not active (lean), Fault)
- Left lambda probe - (---, Not enabled, Not active (start), Not active (heat.),

Gruppo di parametri	Pagina 1		
Giri motore	1553	rpm	
Angolo farf. complessivo	18.1	°	
Temperatura motore	71	°C	
Temp.aria aspirata	32	°C	
Tensione sonda lambda SX	40368	mV	
Tensione sonda lambda DX	0	mV	
Crz.ne titolo cilindro SX	-1979.8	%	
Crz.ne titolo cilindro DX	0.0	%	
Crz.ne adatt. carb.cil.SX	0.0	%	
Crz.ne adatt. carb.cil.DX	0.0	%	
Passi attuati	-21117	step	
Passi programmati	50303	step	

Not active (rich), Operating, Not active (lean), Fault

- Ctrl title cylinder RH - (Open Loop, Closed Loop)
- Lean title cyl. RH - (NO, YES)
- Rich title cyl. RH - (NO, YES)
- Idle motor - (start ready, Open Loop, Closed Loop, delayed start, accelerated start, Minimum compensated, Stable out of min., Minimum, Acceleration, Deceleration, Cut-off, Restore Cut-off)
- Throttle valve status - (---, Minimum, Full power, partial position)
- Engine status - (Undetermined, PowON/Engine off, KeyON/engine off, Rotation, Engine Stall, Pwr latch in progress, Pow.Latch Term, Stop, Synchronis. 4-stroke)
- Engine mode - (Undetermined, Start, Stabilised, delayed start, accelerated start, Minimum compensated, Stable out of min., Minimum, Acceleration, Deceleration, Cut-off, Restore Cut-off)
- Synchronised panel - (NO, YES, Partially, ---, Error)
- 4Stroke cycle - (Not synchronised, Synchronised)
- Starting request - (Absent, Present, Closed Loop, Closed)
- Start enable - (NO, YES)
- RUN/OFF Switch - (RUN-OFF)
- Tipping sensor - (Engine inhibited, Gear allowed, YES, Lean, Rich, Rich title, Error, Lean title)
- Side stand - (Up, Down)
- Gear in neutral - (YES, NO)
- Clutch - (Pulled, Released)
- Front wheel speed - (km/h)

- Rear wheel speed - (km/h)
- Traction control (MGCT) - (Disabled, Enabled, Complete, Lean, Rich, Operating)
- Number of enabled keys - (.)
- Previously unused Ecu - (NO, YES)
- Start enabled - (NO, YES)
- Previously unused Ecu-universal c. - (NO, YES)
- Unlock with gas - (NO, YES)
- Key or antenna faulty - (NO, YES)
- Wrong code - (NO, YES)
- Communication timeout - (NO, YES)

IMPORTANT

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Diagnostic tool - Activation

On this screen page, you can delete the errors from the memory of the controller and enable some systems controlled by the control unit

- Left coil
- Right coil
- Left injector
- Right injector
- Stepper control
- MGCT warning light
- Lambda probe heater 1
- Lambda probe heater 2
- Injector control
- Headlights relay
- Stepper
- Coil command
- Fuel pump
- General warning light
- Secondary air EV



Diagnostic tool - Errors screen page

This display shows potential errors detected in the vehicle (ATT) or stored in the control unit (MEM) and it allows to check error clearing (STO).

**Diagnostic tool - Adjustment**

This screen page is used to adjust some control unit parameters

- Resetting
- Downloading Mem Data
- Self-adaptive parameters reset

**Diagnostic tool - Electrical errors**

Air pressure sensor P0105 - short circuit to positive / open circuit, short circuit to negative, signal not valid

Error cause

- Malfunction of sensor inside the control unit

Troubleshooting

- Replace the control unit

Air temperature sensor P0110 - short circuit to positive, open circuit / short circuit to negative

Error cause

- Malfunction of sensor inside the control unit

Troubleshooting

- Replace the control unit

Error EEPROM P0601 - circuit not working

Error cause

- The instrument panel does not indicate the presence of this error even in the ATT status

Troubleshooting

- Replace the engine control unit

Error RAM P0604 - circuit not workingError cause

- The instrument panel does not indicate the presence of this error even in the ATT status

Troubleshooting

- Replace the engine control unit

Error ROM P0605 - circuit not workingError cause

- The instrument panel does not indicate the presence of this error even in the ATT status

Troubleshooting

- Replace the engine control unit

Saved data file (for safety) P1607 - filledError cause

- This indication appears only if the Level 2 safety has reset the engine (C gravity). The instrument panel does not indicate the presence of this error even in the ATT status.

Troubleshooting

- Replace the engine control unit

Sensor potentiometer throttle valve position P0120 - short circuit to positive, open circuit / short circuit to negativeError cause

- Malfunction of sensor inside the control unit

Troubleshooting

- Replace the control unit

Diagnostic tool - AdjustmentThrottle positioner self-acquisition

- It allows the control unit to detect the closed throttle position; just press the Enter key

Reset of self-adaptive parameters

- operation to be carried out after the throttle body is cleaned or in the case a new engine, a new lambda probe or a new injector is fitted, or the correct operation of the injection system or the valves is restored.

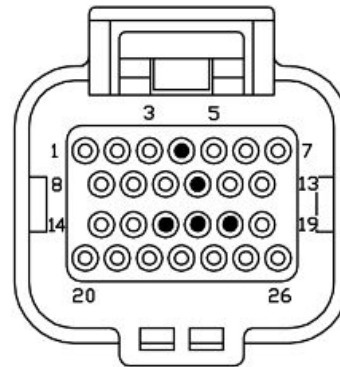
Diagnostic tool - Reset

- Once the throttle body or the injection control unit is replaced, it is necessary to connect to the diagnostic tool selecting FUEL INJECTION and carry out the operation "THROTTLE POSITIONER AUTODETECTION"

Dashboard

PIN:

1. CAN H line
2. High beam warning light inlet
3. Engine oil pressure sensor inlet
4. /
5. ABS Warning light control inlet
6. Ground
7. Ground
8. CAN L line
9. Instrument panel backlighting control inlet (DRL)
10. Fuel sensor inlet
11. /
12. Inlet (hazard)
13. Sensor ground
14. Immobilizer antenna A
15. Air temperature input
16. /
17. /
18. /
19. Instrument panel power supply (+ 12V)
20. Immobilizer antenna B
21. Key-on positive (+ key)
22. RH front turn indicator control
23. RH rear turn indicator control
24. LH front turn indicator control
25. LH Rear turn indicator control
26. Instrument panel power supply (+ 12V)



Diagnostic tool - Electrical errors

The instrument panel errors are detected by means of the diagnostic tool. It is therefore necessary to connect it to the vehicle.

Error code B0003 (ALARM IMMO B0003)

Error cause

- Occurs, when the transponder is working, but it is not within the recognised ones.

Identification

- General alarm warning continuously on (red) and indication "ALARM IMMO B0003" on the display

Troubleshooting

- Store the new key

Error code B0004 (ALARM IMMO B0004)Error cause

- Occurs, when the key has no transponder or the transponder is damaged

Identification

- General alarm warning continuously on (red) and indication "ALARM IMMO B0004" on the display

Troubleshooting

- Replace the key and store it

Error code B0005 (ALARM IMMO B0005)Error cause

- Occurs when an electric interruption or a ground short circuit or voltage to the circuit have been detected.

Identification

- General alarm warning continuously on (red) and indication "ALARM IMMO B0005" on the display

Troubleshooting

- Check the sensor connector on the wiring harness and the instrument panel connector. Check that the antenna is connected, if OK remove it and check the continuity of the antenna between the PIN of the connector (resistance between 10 - 100 Ohm), if not OK replace the sensor; if OK reconnect the connector to the antenna and check from the wiring harness side that there is continuity between the two PIN (resistance between 10-100 Ohm), if not OK restore the wiring harness; if OK check continuity between the two PIN 20 and 14 of the instrument panel, if not OK replace the instrument panel.

Error code B0006 (ALARM IMMO B0006)Error cause

- Occurs when a fault in the instrument panel has been detected

Identification

- General alarm warning continuously on (red) and indication "ALARM IMMO B0006"

Troubleshooting

- Replace the instrument panel

Error code B0007 (ALARM 1 KEY STORED)Error cause

- Occurs when the number of stored keys is less than two

Identification

- General alarm warning continuously on (red) and indication "ALARM 1 KEY STORED" on the display

Troubleshooting

- Store the two keys again

Error code B0008 (ALARM DISCONNECTED)Error cause

- Occurs during the encoding of the first key connection, if the CAN line from the engine control unit is missing, the error is activated

Identification

- General alarm warning continuously on (red) and indication "ALARM DISCONNECTED" on the display

Troubleshooting

- Check the integrity and the continuity of the cables of the CAN line between PIN 8 instrument cluster and PIN 27 injection control unit and between PIN 1 instrument cluster and PIN 26 injection control unit
- Further check that in the CAN line is no continuity with the vehicle mass or with positive

Error code B0009 (ALARM DISCONNECTED)Error cause

- The instrument cluster is not able to send data on the CAN line

Identification

- General alarm warning continuously on (red) and indication "ALARM DISCONNECTED" on the display

Troubleshooting

- Check the integrity, the continuity and the absence of the cables of the CAN line between PIN 8 instrument cluster and PIN 27 injection control unit and between PIN 1 instrument cluster and PIN 26 injection control unit
- Further check that in the CAN line is no continuity with the vehicle mass and with positive

Error code B0300 (ALARM DISCONNECTED)Error cause

- Occurs during the encoding of the first key connection, if the CAN line from the left light switch control is missing, the error is activated

Identification

- General alarm warning continuously on (red) and indication "ALARM DISCONNECTED" on the display

Troubleshooting

- Check that there is no continuity between the two cables of the CAN line; if not OK restore, if OK check the integrity and the continuity between PIN 8 instrument cluster and PIN 4 left light switch; if not OK restore, if OK check the integrity and the continuity between PIN 1 instrument cluster and PIN 3 left light switch; if not OK restore, if OK check that the CAN lines are not in continuity with the vehicle ground or with positive

ENGINE OIL PRESSURE SENSOR

Function

Indicates the instrument panel if there is enough oil pressure 0.35 +/- 0.2 bar (5.1 +/- 2.9 PSI) in the engine.

Operation / Operating principle

Switch normally open. With oil pressure above 0.35 + / - 0.2 bar (5.1 + / - 2.9 PSI), closed circuit.

Level in electrical circuit diagram

fuel reserve and oil pressure.

Position

- Sensor: between the two heads, at the back.
- Connector: on the sensor.

Electrical specifications

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

Pin-out

1. Voltage 12V (violet).

Diagnostic tool - Electrical errors

Error code B0001 (ALARM OIL SENSOR)

Occurs when the sensor is disconnected or faulty. When detected, the diagnostic tool shows the error only if this is still active after having performed two TRIP followed by a third key switching OFF-ON.

Error cause



- An oil sensor fault is signalled when, with engine running, it is detected that the sensor circuit is closed. The test is performed only once when the key is set to ON

Identification

- General alarm warning continuously on (red) and indication "ALARM OIL SENSOR" on the display

Troubleshooting

- Check that the sensor connector is properly connected; Check the sensor connector and the instrument panel connector (PIN 3): if they are not OK, restore. If OK, check with engine off, continuity of the purple cable between the sensor connector and the instrument panel connector PIN 3: if not OK, restore the wiring harness, if OK check continuity between the positive of the sensor and the vehicle ground, if not OK restore, if OK replace the sensor

Error code B0002 (ALARM OIL PRESSURE)

This alarm occurs when the engine is on and the pressure of the engine oil is low. Just above 650 rpm.

Error cause

- An oil sensor fault is signalled when, with engine running, it is detected that the sensor circuit is open.

Identification

- General alarm warning flashing (red) and indication "ALARM OIL PRESSURE" on the display

Troubleshooting

- Check the engine and its operation before continuing with the verifications related to the sensor. Check the sensor connector and the instrument panel connector PIN 3: if not OK restore, if OK disconnect the sensor and check that there is no continuity between vehicle sensor connector and vehicle ground, if not OK restore, if OK check with running engine with disconnected sensor that there is no continuity between sensor and vehicle ground, if not OK restore, if OK replace sensor.

AIR TEMPERATURE SENSOR

Function

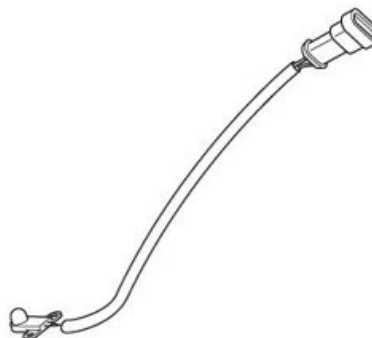
Indicates the ambient air temperature to the instrument panel

Operation / Operating principle

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

Level in electrical circuit diagram

Temperature sensors

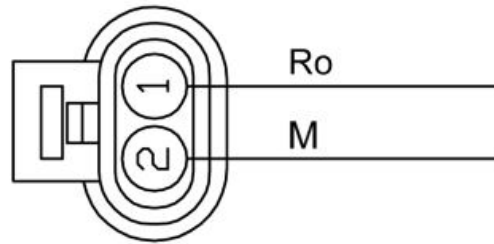


Position

- Under instrument panel supporting bracket
- Connector: under the ignition lock

Electrical specifications

- Resistance at 0°C: 32.5 kOhm +/- 5%
- Resistance at 25°C: 10.0 kOhm +/- 5%

**Pin-out**

1. Voltage 5V (pink)
2. Ground (brown)

**Diagnosis**

An instrument panel temperature sensor failure is signalled when it is detected that the sensor circuit is open or shorted to positive/negative

Cause of error

- Possible malfunction

Troubleshooting

- Check the sensor connector and the instrument panel connector (PIN 15); If they are not OK, restore. If OK, check continuity of the pink cable between the sensor connector (wiring harness side) and the instrument panel connector PIN 15; if it is not OK, restore the wiring harness; if OK, check the correct sensor resistance; If not OK, replace the sensor; if OK, with key set to ON, check if there is voltage at the sensor connector PIN 1 if not OK, replace the instrument panel; if there is approximately 12V, restore the wiring harness, as there is a short circuit in the battery. If there is instead 5V voltage, connect a 10 kOhm resistance to PIN 1 of the sensor connector and to the vehicle ground connection. If, with the key ON, the voltage measured upstream of the resistance drops, replace the instrument panel. If it continues to stay at about 5 V restore the pink cable, as there is a short circuit to + 5V. In case of short circuit to ground detected on PIN 15 of the instrument cluster connector, check isolation from ground of the pink cable from the sensor connector; If connected to ground, restore the cabling. If insulated from ground, check correct resistance of the sensor; if not OK, replace the sensor; if it is OK, replace the instrument panel

Can line

Function

Allows the communication between injection control unit, instrument cluster, ABS control unit, right light switch

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

Pin-out

- Between PIN 26 and 27 of the engine control unit

- Between PIN 1 and 8 of the instrument panel
- Between PIN 5 and 6 of the ABS control unit
- Between PIN 3 and 4 of the left light switch
- Between PIN 1 and 2 of the bluedash preparation

Diagnostic tool - Electrical errors**CAN line U0001 NO SIGNAL (BUS OFF) - Bus Off.****Error cause**

- No communication on CAN line (PIN 26 and/or PIN 27): problem on the whole network (for example, battery cut-off or short circuited or shorted to ground).

Troubleshooting

- Check the engine control unit connector if not OK, restore; if OK, check the ground insulation of the two CAN lines from PIN 26 and PIN 27 of the engine control unit connector if not OK, restore wiring harness; if OK, check the continuity of the two CAN lines from the engine control unit connector to the instrument panel connector if not OK restore cabling, if OK check that the two lines are not short circuited to positive testing from each of the connectors (engine control unit, instrument panel connector) with connector at a time disconnected and turning the key to the ON position If not OK, restore; if OK, replace the engine control unit.

CAN line U0002 MUTE NODE - Mute node.**Error cause**

- The engine control unit is not able to send CAN signals, but to receive signals from the instrument cluster, ABS control unit, right light switch, it might be necessary to replace the engine control unit.

Troubleshooting

- Replace the engine control unit.

ABS control unit "NO NODE" U0121 - No node/frame counter**Error cause**

- Missing communication of the ABS control unit to the CAN line

Troubleshooting

- Disconnect the ABS control unit connector and check that there is no dirty, oxidised or damaged PIN; if not ok restore, if ok check continuity between PIN 5 and 6 ABS control unit and PIN 26 and 27 engine control unit; if not ok restore, if ok check continuity between PIN 5 and 6 ABS control unit and PIN 1 and 8 of the instrument cluster; if not ok restore, if ok check continuity between PIN 5 and 6 ABS control unit and PIN 3 and 4 of the left light switch; if not ok restore, if ok check that there is no continuity between the two cables of the CAN line (L and H); if not ok restore, if ok check that there is no continuity between vehicle ground and the battery positive; if not ok restore, if ok replace the ABS control unit

CAN line D347 - transmission time-out

Error cause

- Electric malfunction. Open circuit, short circuit to negative, short circuit to positive of one or both wires of CAN line

Troubleshooting

- Replace the wiring harness

CAN line 5E11 - Bus OffError cause

- Electric malfunction. Open circuit, short circuit to negative, short circuit to positive of one or both wires of CAN line

Troubleshooting

- Replace the wiring harness

CAN line 5E16 - vehicle code message absentError cause

- Missing reception of CAN line to engine control unit

Troubleshooting

- Check the control unit software version; if not ok restore, if ok remove the battery and check continuity of the CAN line; if not ok restore, if ok reconnect the battery and check that there is no continuity between CAN line to positive and/or negative; if not ok restore, if ok check and if necessary replace the ABS control unit

Diagnostics tool - Logic errors**Rear wheel radius acquisition P1800 - signal not valid**Error cause

- CAN error during acquisition

Troubleshooting

- If there is a CAN error during acquisition, the impossibility to complete the procedure is diagnosed, due to a CAN line communication problem. If the value is not plausible, a writing error of the rear wheel radius value from the non-volatile memory (EEPROM) to the volatile memory (RAM) has occurred at key-ON. In this case the default value is used.

CAN line 5E1F - incorrect vehicle codeError cause

- The ABS control unit was installed in a wrong vehicle

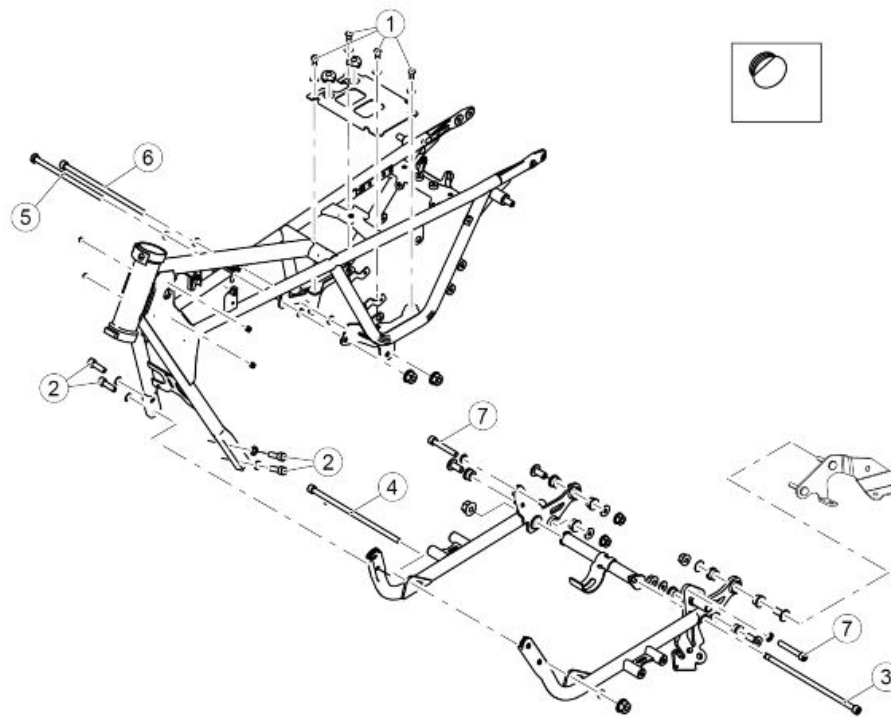
Troubleshooting

- Replace the control unit
-

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VEHICLE ENGINE

V ENG



CHASSIS

Pos.	Description	Type	Quantity	Torque	Notes
1	Battery holder plate fastening screws	M8x20	4	25 Nm (18.44 lb ft)	Loct. 243
2	Front cradle SHC fixing screws	M10x30	4	50 Nm (36.88 lb ft)	-
3	Cradles joint pin	M10	1	50 Nm (36.88 lb ft)	-
4	Front pin fastening the engine to the cradles	M10x253	1	50 Nm (36.88 lb ft)	-
5	Central pin fastening the engine to the cradles	M10x205	1	50 Nm (36.88 lb ft)	-
6	Central pin fastening the engine to the cradles	M10x234	1	50 Nm (36.88 lb ft)	-
7	Screws fastening gearbox to frame	M10x55	2	50 Nm (36.88 lb ft)	-

Vehicle preparation

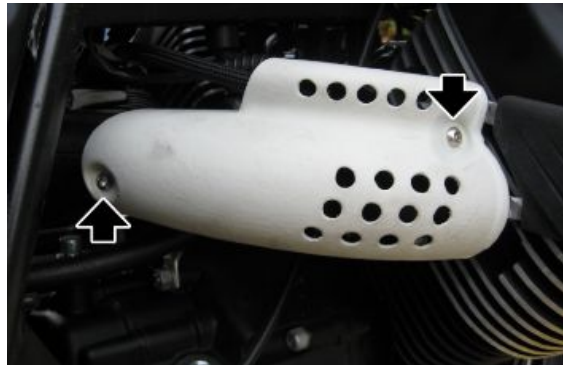
- To arrange for the removal of the engine block, you must first remove the saddle, fuel tank, side fairings and the battery
- From the front, secure the vehicle with belts attached to a hoist
- Position a centre stand under the engine sump
- Position an engine support so as not to damage the rubber bellows of the drive shaft

Removing the engine from the vehicle

- Remove the two fixing screws of the collector cover and remove the latter

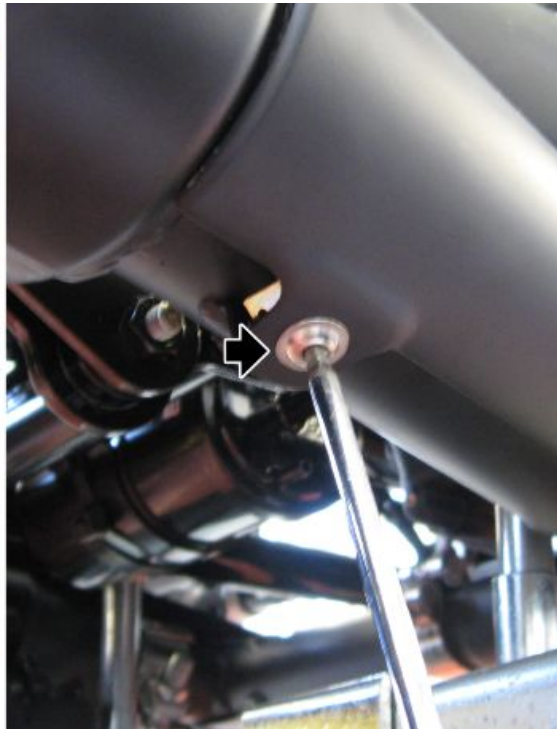
NOTE

REPEAT THE OPERATION FOR THE RIGHT COVER AS WELL

**NOTE**

THE OPERATIONS FOR REMOVING THE EXHAUST TERMINAL, APPLY TO BOTH ENDS

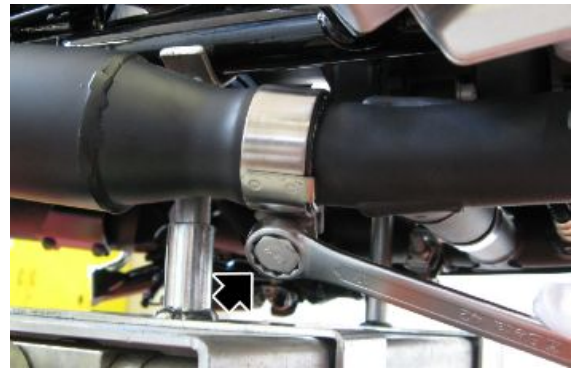
- Remove the three fixing screws of the silencer protection



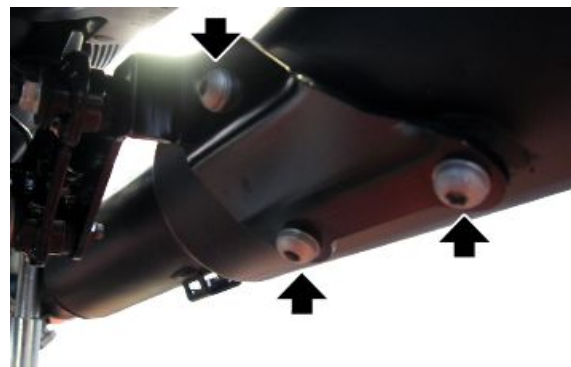
- Remove the silencer protection



- Loosen the clamp between the silencer and manifold



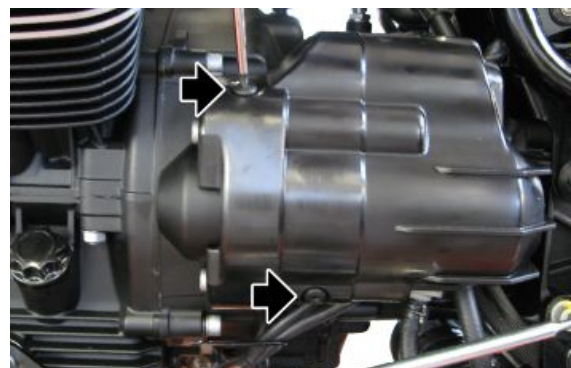
- Remove the three fastening screws of the silencer to the support bracket



- Slide and remove the silencer from the collector



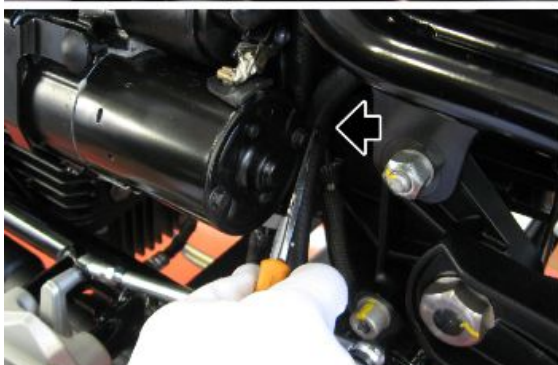
- Remove the two starter motor cover fixing screws



- Remove the starter motor cover



- Remove the clamps that secure the wiring harnesses of the Lambda probes



- Disconnect the connectors of the lambda probes and free the wiring harness from the cable grommet



- Remove the nuts and the corresponding fixing washers of the exhaust manifolds



- Remove the exhaust manifolds at the same time



- Disconnect the clutch cable from the lever and free it from the cable grommet



- Undo the screws fixing the spark plug covers, remove the covers



- Disconnect the spark plugs tubes



-
- Remove the screws fixing the manifold to the cylinder heads



-
- Disconnect the engine oil pressure sensor connector



-
- Remove the fixing nut of the engine ground cable



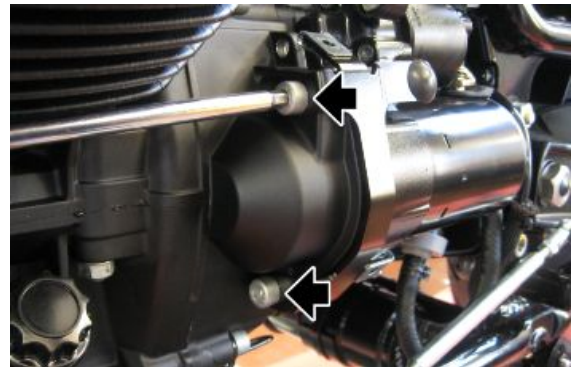
- Remove the fixing nut of the power supply cable located on the starter motor. Then remove the cable



- Disconnect the starter motor faston



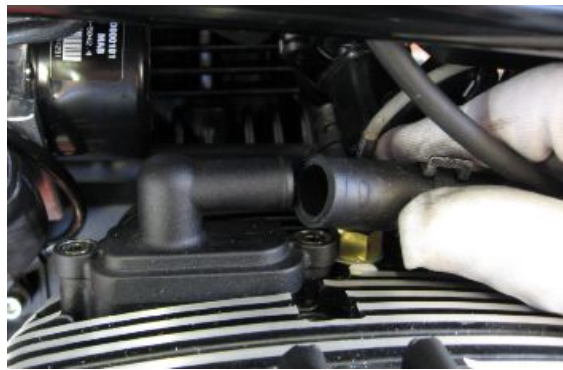
- Remove the two starter motor fixing screws



- Remove the starter motor complete with support bracket for the cover



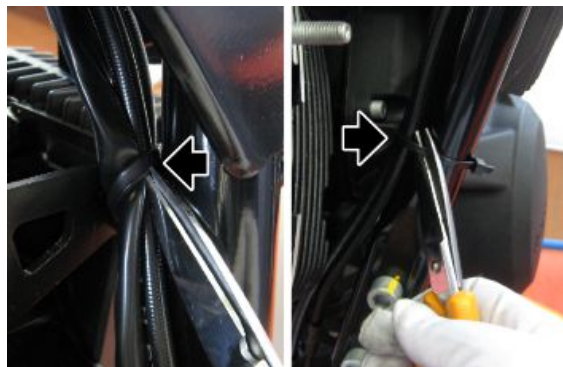
- Disconnect the secondary air pipes from the cylinder heads



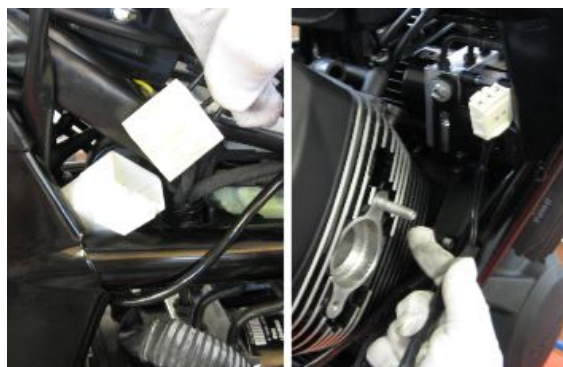
-
- Remove the tone wheel sensor



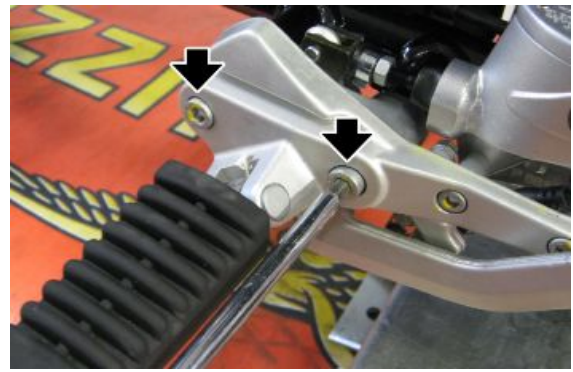
-
- Remove the clamps fixing the flywheel wiring harness to the brake pipes



-
- Disconnect the flywheel/alternator connector and free it from the passage in the frame



- Remove the fixing screws of the right rider footrest



- Remove the front screws fixing the cradle, making sure to recover the nuts and washers



- Remove the lower fixing pin of the cradle making sure to collect the washer and the nut



- Remove the rear fixing screws of the cradle
- Remove the cradle



- Remove the lower fixing screws of the rear shock absorbers and move them from the support pins on the swing-arm/bevel gear



- Remove the rear brake calliper and the ABS sensor



- Remove the cable grommet plate placed under the swingarm



- Disconnect the rear ABS sensor, rear brake switch and neutral sensor connectors
- Move the rear brake system complete



-
- Slightly lift the frame and disconnect the blow-by pipe



-
- Lift the frame sufficiently and remove the engine complete with swingarm



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ENGINE

ENG

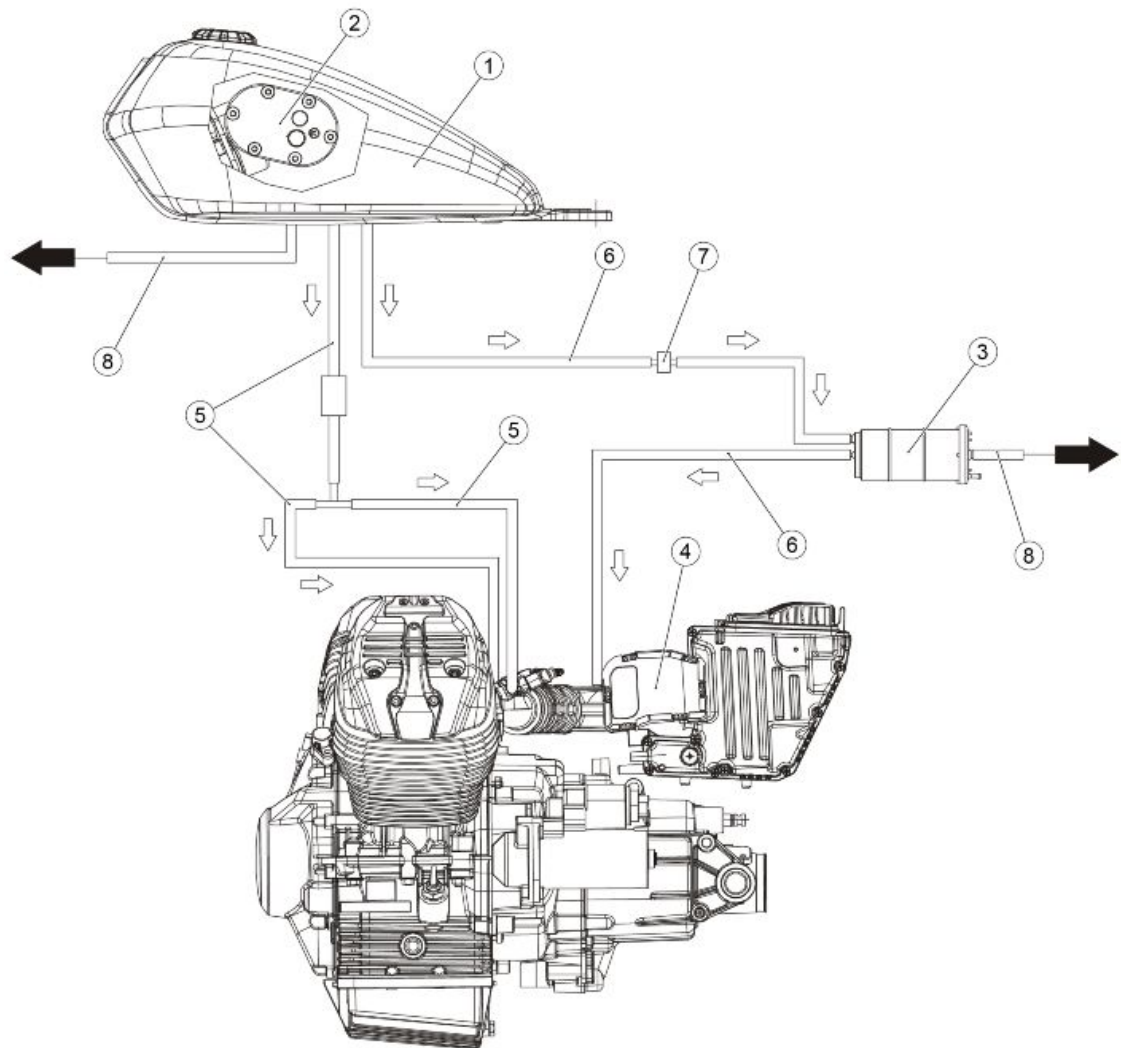
TO CONSULT THE CHAPTER ABOUT THE ENGINE AND ITS COMPONENTS PLEASE REFER TO THE APPROPRIATE MANUAL:

"MSS Engine V9 IE MIU G3"

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FUEL SUPPLY

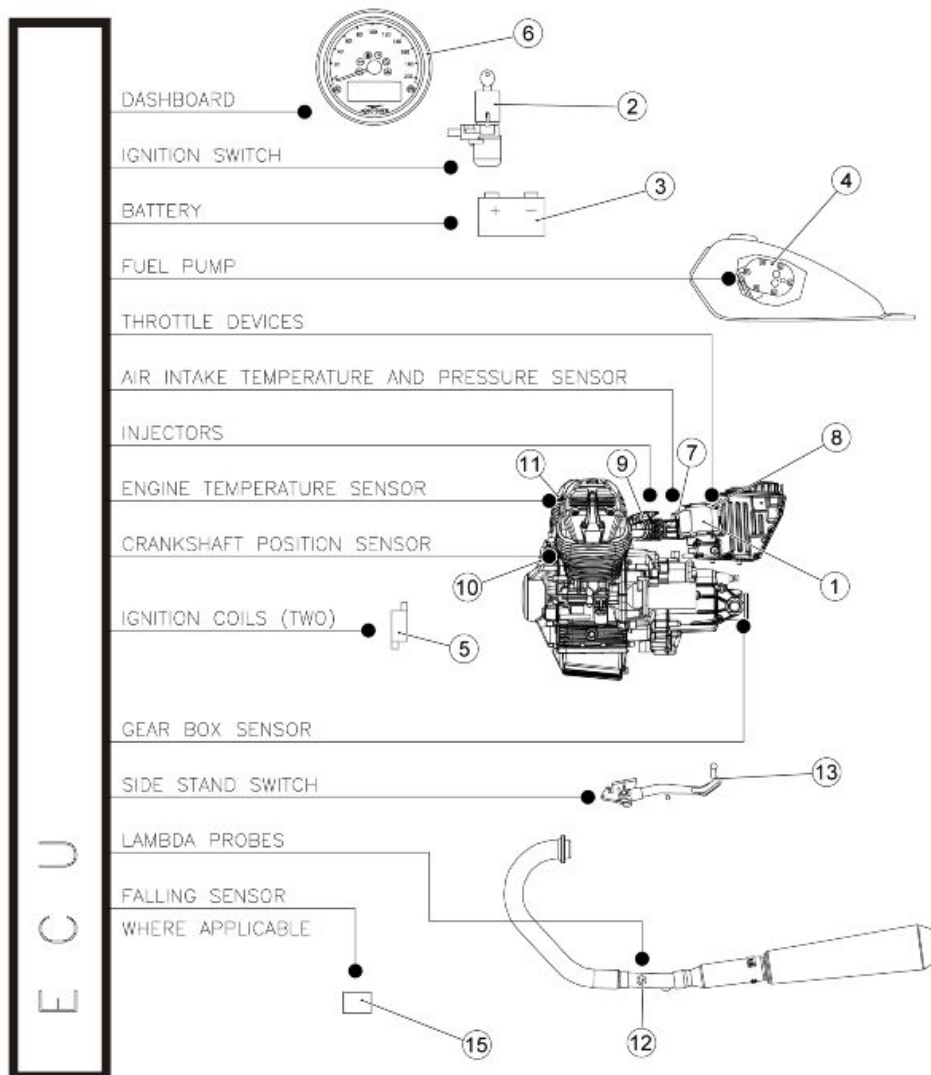
FUE

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

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

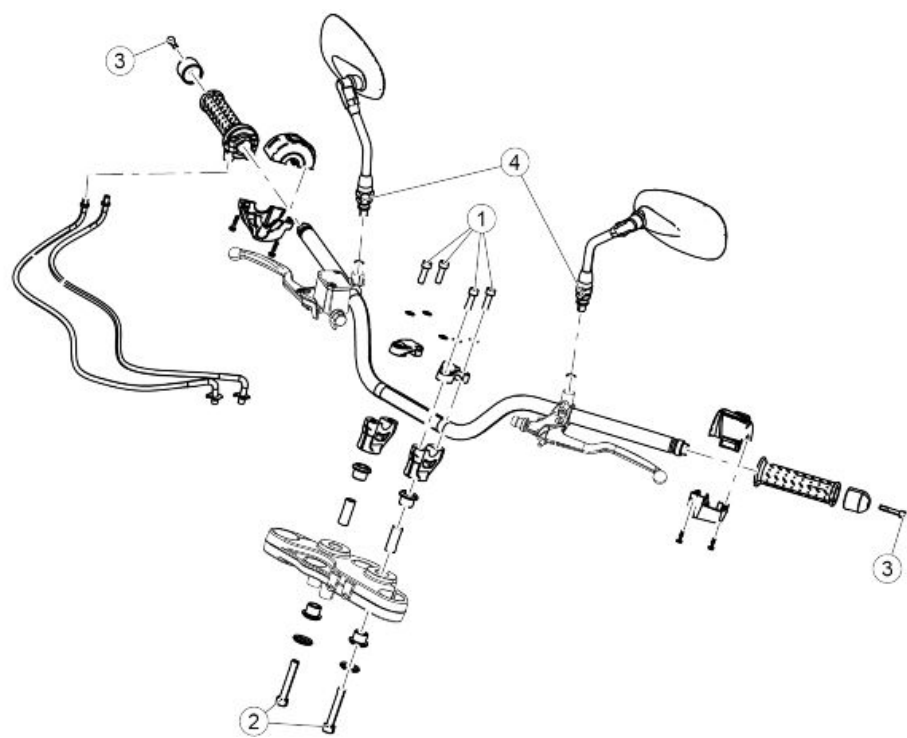
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SUSPENSION **S**YSTEM

SUS

Front

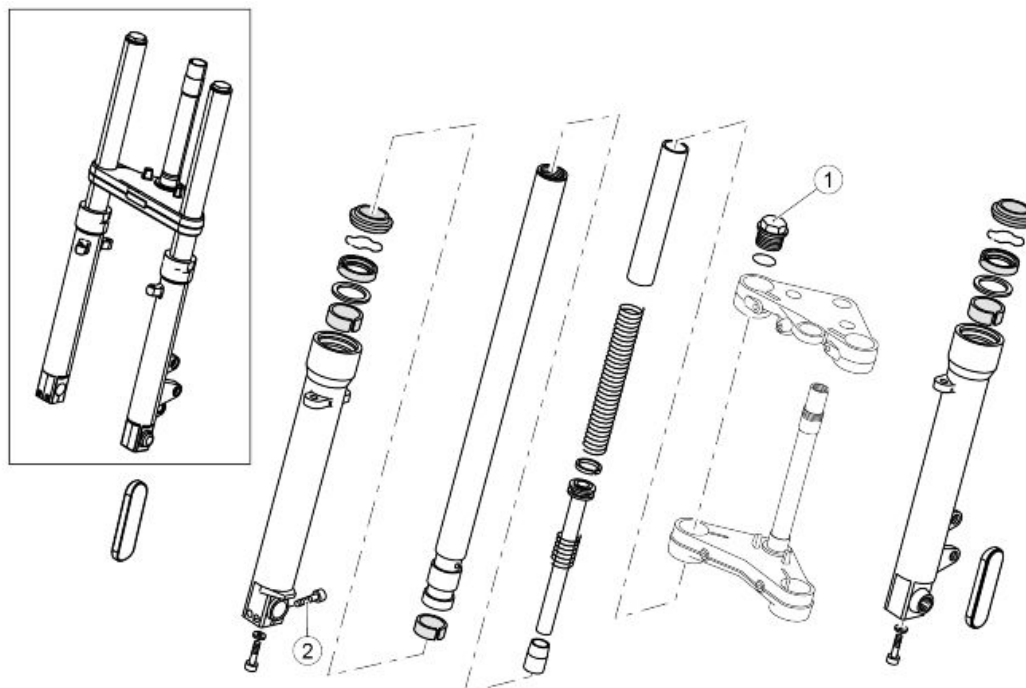
Handlebar



HANDLEBAR

Pos.	Description	Type	Quantity	Torque	Notes
1	Handlebar U-bolt fastener screw	M8	4	25 Nm (18.44 lb ft)	-
2	Handlebar U-bolt mountings fastener screw	M10x60	2	50 Nm (36.88 lb ft)	Loct. 243
3	Handlebar counterweight fastener SHC screws	M6x35	2	10 Nm (7.38 lb ft)	-
4	Rear-view mirrors	M10	2	Manual	-

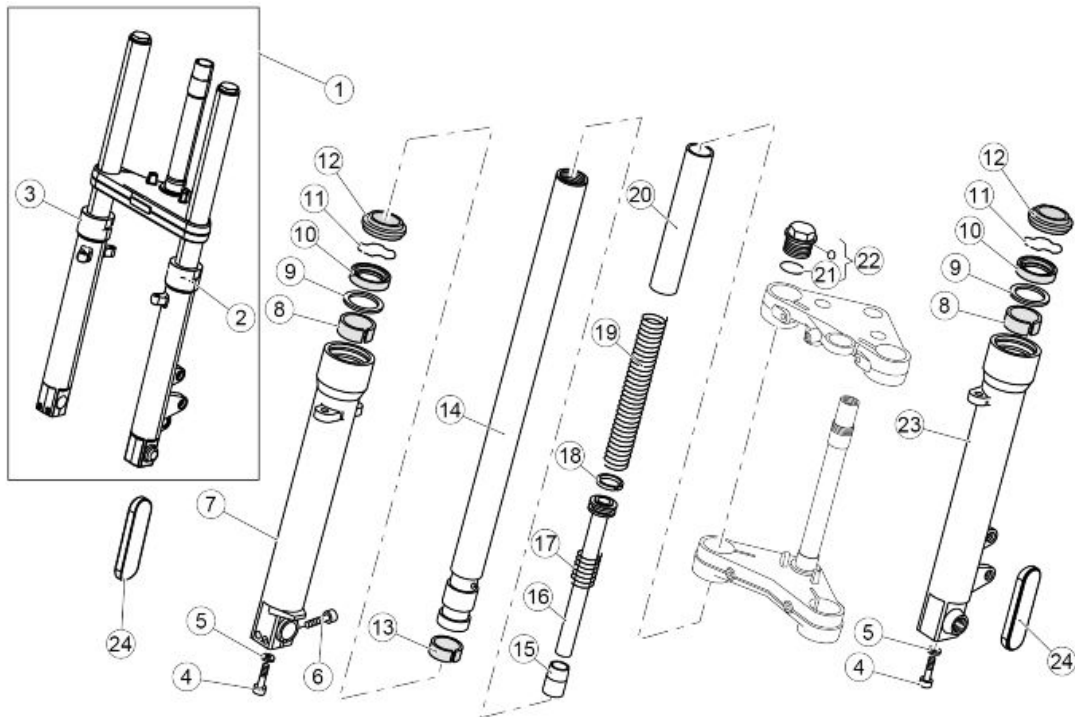
Front fork



RAKED

Pos.	Description	Type	Quantity	Torque	Notes
1	Stanchion cap	-	2	50 Nm (36.88 lb ft)	-
2	Screw fixing wheel axle to right fork leg	M6x30	1	10 Nm (7.38 lb ft)	-
-	Screws fastening stanchions to the lower plate	M10x40	2	25 Nm (18.44 lb ft)	-

Diagram



Key:

1. Complete front fork
2. Stanchion with left sleeve
3. Stanchion with right sleeve
4. M10x30 screw
5. Washer
6. Screw
7. Right sleeve
8. Upper bushing
9. Washer
10. Seal ring
11. Retainer ring
12. Dust gaiter
13. Bushing
- 14....
15. Buffer
16. Complete pumping member
17. Counter spring
18. Ring
19. Spring

- 20. Pipe
- 21. O-ring
- 22. Complete cap
- 23. Left sleeve
- 24. Amber reflector

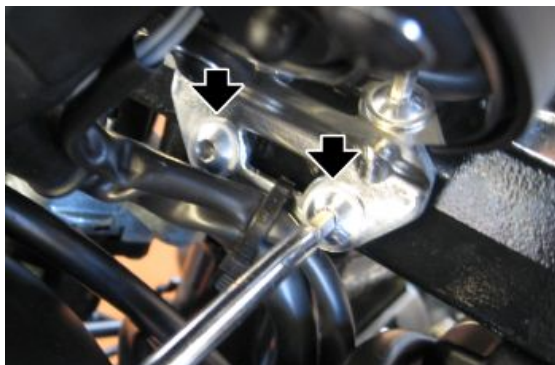
Removing the fork legs

The vehicle is equipped with a non adjustable fork. The operations described below are valid for both stanchions.

IMPORTANT

DURING THE OPERATIONS DESCRIBED BELOW, THE STANCHIONS AND THEIR INTERNAL COMPONENTS SHOULD BE TIGHTENED ON A VICE. MAKE SURE NOT TO DAMAGE THEM BY OVERTIGHTENING; ALWAYS USE ALUMINIUM JAW CAPS

- Remove the front wheel.
- Remove the front mudguard.
- Unscrew and remove the two instrument panel support bracket fixing screws



- Move the instrument cluster forwards.
- Undo the upper sealing screw.

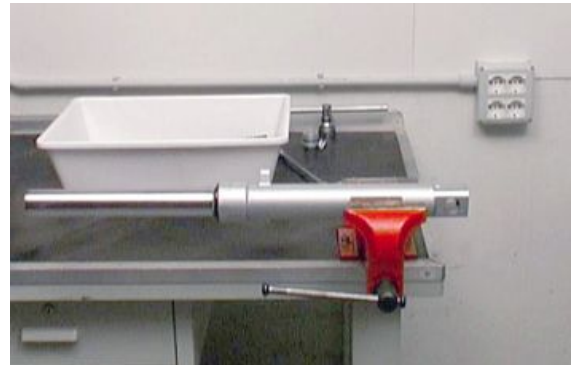


- Undo the lower sealing screw.
- Slide off the stem downwards by turning it slightly first in one direction then to the opposite direction.

Draining oil

To drain out the oil follow these steps.

- Remove the stanchion.
- Tighten the removed stanchion in a vice fitted with aluminium jaw caps in order to avoid damaging them.



- Unscrew the upper closing cap. Pay attention to the possible thrust that the spring can cause to the loosened cap.



- Be careful not to damage the O-Ring during extraction.
- Press the bearing tube inside the wheel holder fork leg.
- Remove the preload tube and the spring.



- Drain out all the oil inside the stanchion.

NOTE

FOR EASY DRAINAGE OF THE OIL INSIDE THE PISTON ROD, PRESS THE STANCHION IN THE WHEEL HOLDER SLEEVE TO PUMP OIL OUT.



- Carefully check each part of the stanchion and make sure that there are no damaged elements.
- If there are no damaged or worn elements, refit the stanchion; otherwise, replace the damaged elements.

NOTE

FOR EASY DRAINAGE OF THE OIL INSIDE THE PISTON ROD, PRESS THE STANCHION IN THE WHEEL HOLDER SLEEVE TO PUMP OIL OUT.



Disassembling the fork

- Drain all the oil from the stem.
- Block the wheel holder fork leg on the vice.
- Undo the bottom screw and remove it with the corresponding gasket.



- Remove the dust scraper using a screwdriver as a lever.

IMPORTANT

BE CAREFUL NOT TO DAMAGE THE FORK LEG RIM AND THE DUST SCRAPER.



- Slide the dust scraper off and upwards.



- Remove the locking ring inside the fork leg using a thin screwdriver.

IMPORTANT

BE CAREFUL NOT TO DAMAGE THE FORK LEG RIM



- Slide off the bearing tube from the wheel holder fork leg together with the sealing ring, the cap, the upper bushing and lower bushings.

NOTE

WHEN REMOVING THE PIPE FROM THE WHEEL HOLDER FORK LEG SOME PARTS MAY REMAIN INSIDE THE FORK LEG. IF THIS OCCURS, THESE PARTS MUST BE REMOVED AFTERWARDS, BEING CAREFUL NOT TO DAMAGE THE FORK LEG RIM AND THE UPPER BUSHING SEAT



Checking the components

- Check every component removed from the fork leg, specially: the sealing ring and the dust guard as they are elements that guarantee sealing; replace them if some of them are damaged.
- Check the bushing on the bearing tube; remove it and replace it if damaged or worn.
- Slide off the pumping member unit from the holding tube; if it is damaged, replace the counter spring and the ring.



Reassembling the fork

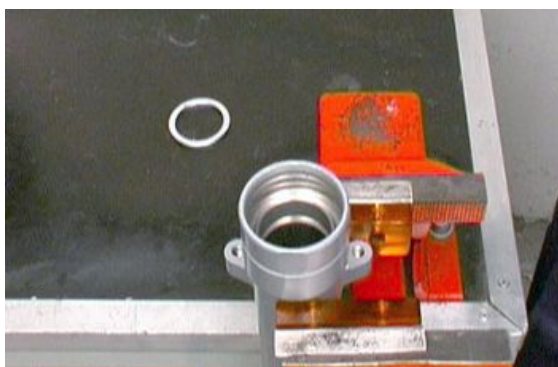
IMPORTANT

ALL COMPONENTS MUST BE CAREFULLY WASHED AND DRIED WITH COMPRESSED AIR BEFORE REFITTING.

- Carry out any necessary service operation.
- Insert the pumping member unit with the counter spring and the ring in the bearing tube.



- Check that the upper guide bushing is fitted on the wheel holder fork leg.



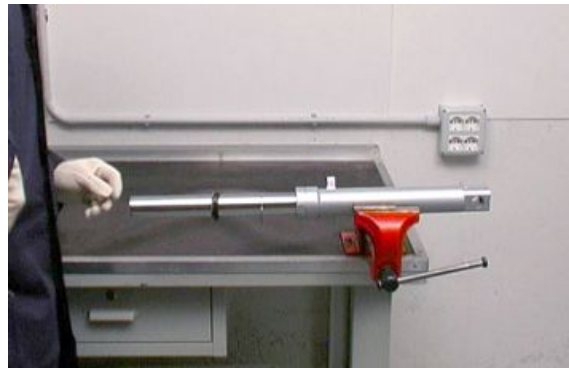
- Insert the lower sliding bushing in its seat on the bearing tube.



- Reassemble the bearing tube in the wheel holder fork leg.



- Insert the bearing tube in the wheel holder and push it until it stops.



- Screw the bottom screw and tighten it to the prescribed torque.



- Insert the cap and the well-lubricated sealing ring on the bearing tube.
- Use a suitable inserting tool to push the sealing ring in the fork leg until it stops.



- Fit the locking ring.

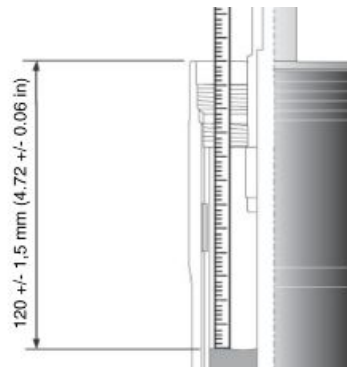


- Fit the dust scraper.
- Pour oil into the bearing tube so that it also fills the internal grooves of the pumping member rod.
- Pump with the bearing tube, making sure the oil has completely filled the pumping member rod.
- Introduce the spring and the preload tube.
- Place the cap on the bearing tube, taking care not to damage the O-ring. Then, tighten the cap to the prescribed torque.



Filling oil

- Place the sleeve upright in a vice fitted with protection shoes.
- Compress the sleeve in the stanchion.
- Pour part of the fork oil into the sleeve.
- Wait a few minutes until the oil fills all the ducts.
- Pour the remaining oil.
- Pump out oil a few times.
- Measure the air gap between the oil level and the rim.



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

Characteristic

Oil level (from sleeve rim, without the spring and with stem at end of stroke)

120 +/- 1.5 mm (4.72 +/- 0.06 in)

- Introduce the spring and the preload tube.



- Place the cap on the bearing tube, taking care not to damage the O-ring.

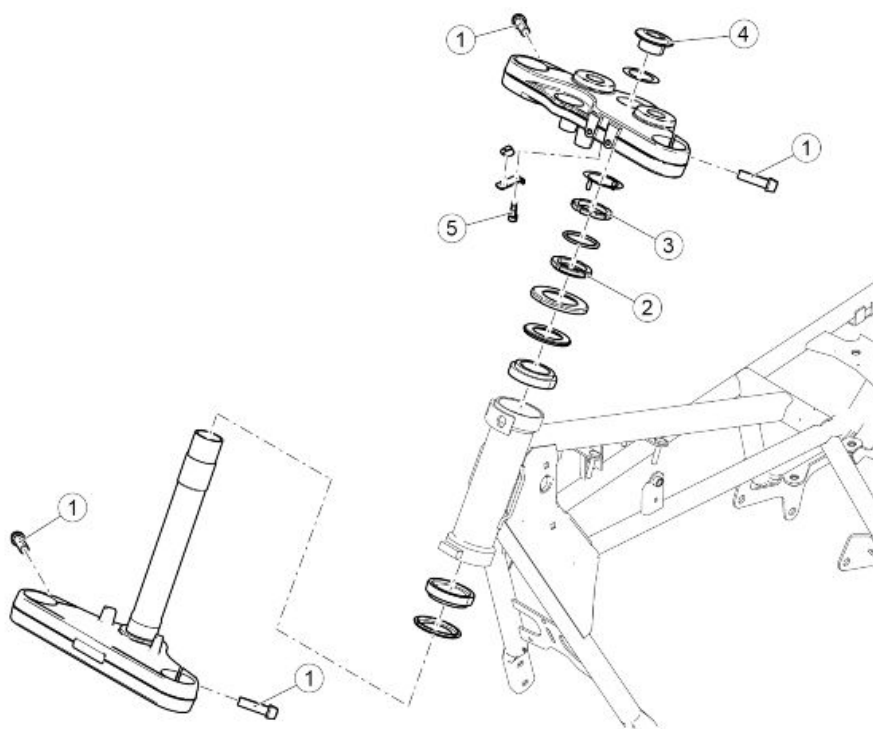


- Then, tighten the cap to the prescribed torque.



Steering bearing

Tightening torques



STEERING

Pos.	Description	Type	Quantity	Torque	Notes
1	Screw fixing stanchions to upper and lower plate	M8x35	4	25 Nm (18.44 lb ft)	-
2	Steering headstock ring nut (pre-tightening)	-	1	60 Nm (44.25 lb ft)	-
2	Steering headstock ring nut (tightening)	-	1	50 +/- 5 Nm (36.88 +/- 3.69 lb ft)	-
3	Headstock counter-lock ring	-	1	-	Screw until obtaining contact with the rubber washer
4	Headstock bushing	-	1	100 Nm (73.76 lb ft)	-
5	SHC flanged screw fastening the cable grommet plate	M6x16	-	10 Nm (7.38 lb ft)	-

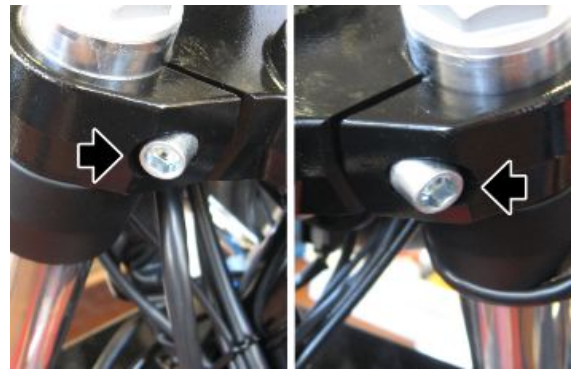
Adjusting play

- Place the vehicle so that the front wheel is off the ground.
- Carry out a handlebar rotation test, using a dynamometer at the hand grip external end.
- The resistance of the handlebar at turning must be ... Nm (+... / -... g) (+... / -... lb) in both directions.
- Adjust if clearance is detected.

NOTE

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

- Remove the handlebar
- Undo the two fixing screws of the upper plate



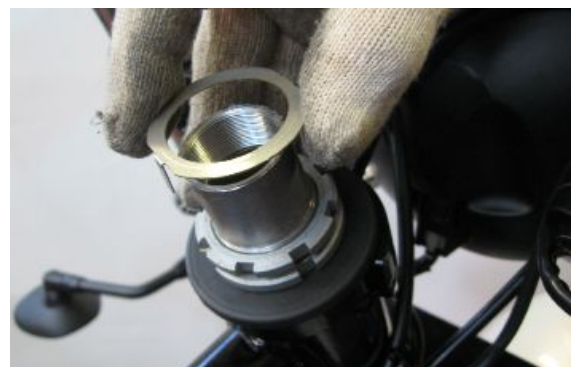
- Remove the upper bush



- Remove the upper steering plate from the fork stanchions



- Remove the safety plate



- Remove the steering counter-lock ring using the special tool

Special tools**AP8140190 Steering tightening tool**

- Remove the rubber spacer



- Undo the ring nut to be able to repeat the adjustment of the steering clearance the correct way.

Special tools**AP8140190 Steering tightening tool**

- Pre-tighten the lower ring nut to the torque of 60 Nm (44.25 lb ft).
- Steer repeatedly completely left and completely right to allow the bearings to settle.
- Loosen the ring nut.
- Check again the pre-tightening torque and then tighten the ring nut again to a torque of 50 +/- 5 Nm (36.88 +/- 3.69 lb ft).
- Steer completely left and completely right and check that the steering ro-



tates smoothly and without excessive resistance.

- If any problems are noted, repeat the procedures described above.

Special tools

AP8140190 Steering tightening tool

- Insert the rubber spacer



- Screw the counter-lock ring unit the milling are aligned with the ring nut to be able to insert the safety plate

Special tools

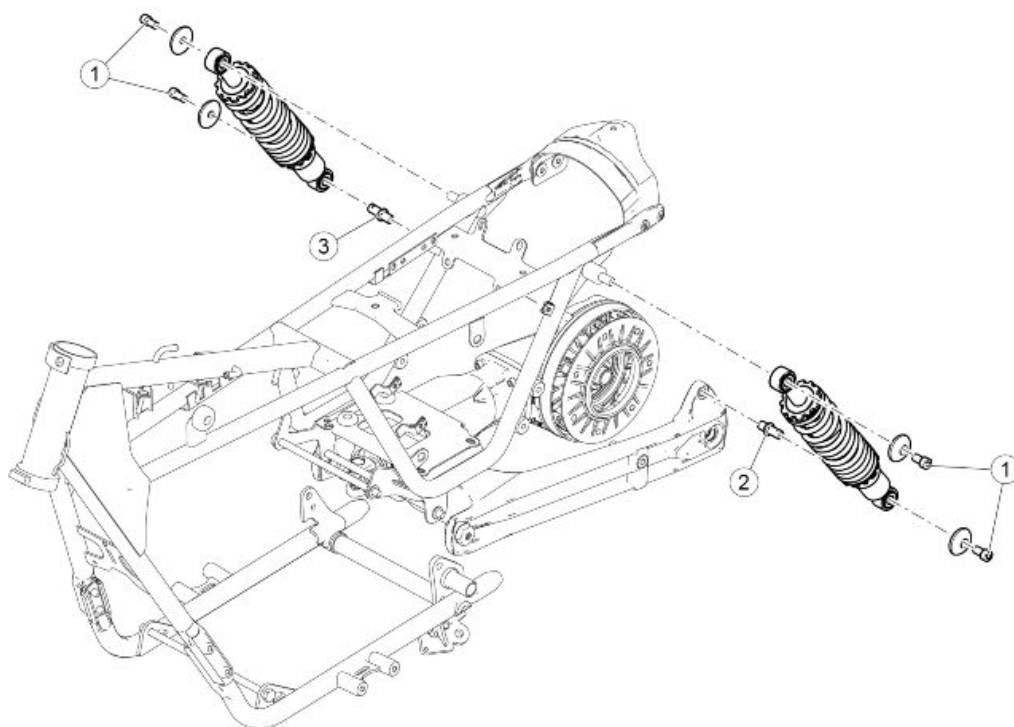
AP8140190 Steering tightening tool



- Place the upper steering plate again, tighten the side screws and the central bushing to the prescribed torque.
- Install the instrument and the handlebar complete

Rear

Shock absorbers



SHOCK ABSORBERS

Pos.	Description	Type	Quantity	Torque	Notes
1	Shock absorber SHC fixing screws	M6x14	4	10 Nm (7.38 lbf ft)	Loct. 243
2	Pin for fastening the shock absorber to chassis	M12	1	35 Nm (25.81 lb ft)	Loct. 243
3	Pin for fastening the shock absorber to gearbox	M12	1	35 Nm (25.81 lb ft)	Loct. 243

Removing

NOTE

THE OPERATIONS BELOW ARE VALID FOR REMOVAL OF BOTH SHOCK ABSORBERS

- Remove the muffler
- Unscrew and remove the two screws (1)
- Retrieve the two bushings (2)



- Remove the rear shock absorber (3)



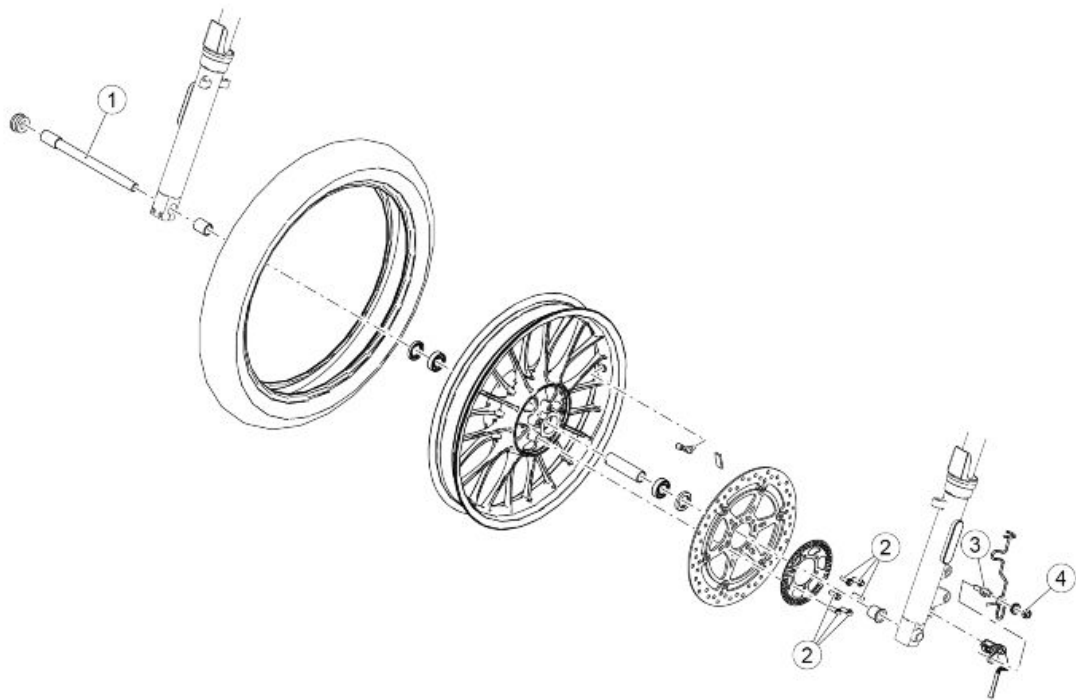
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CHASSIS

GEA

Ruote

Ruota anteriore



FRONT WHEEL

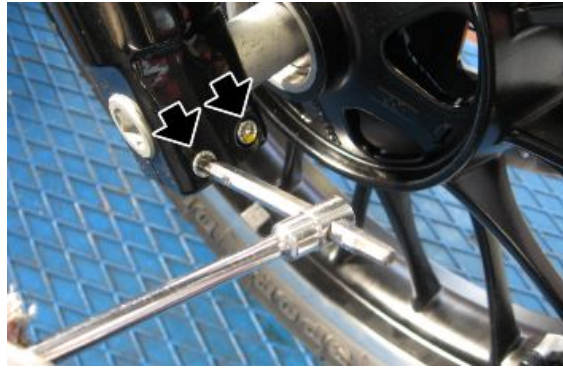
Pos.	Description	Type	Quantity	Torque	Notes
1	Front wheel axle	M18	1	80 Nm (59.00 lb ft)	-
2	Phonic wheel/brake disc fastening screws	M8x18	6	25 Nm (18.44 lb ft)	Loct. 243
3	ABS-sensor fixing stud bolt	M5	1	6 Nm (4.43 lb ft)	Loct. 243
4	Cable grommet retainer nut	M6	1	6 Nm (4.43 lb ft)	-

Rimozione

- Place the vehicle on a stable support so that the front wheel does not touch the ground;
- Remove the brake calliper without disconnecting the oil pipes;
- Working on the right side of the motorcycle, remove the cap from the pin;



- Loosen the two wheel pin locking screws;



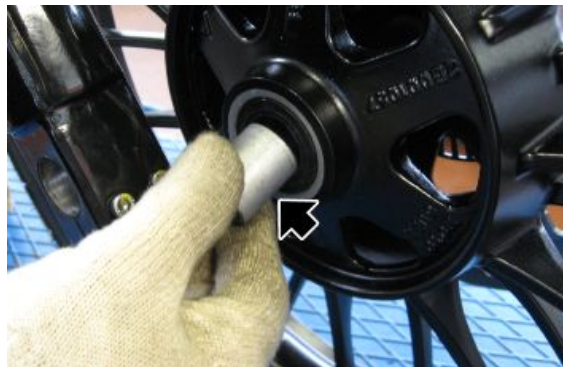
- Unscrew and remove the wheel pin;



- Working on the opposite side, remove the left spacer;

NOTE

DURING REFITTING, PAY ATTENTION TO THE CORRECT POSITIONING OF THE SPACER WHICH MUST BE INSERTED IN THE DUST SEAL UNTIL IT REACHES THE BEARING



- Working on the opposite side, remove the left spacer;

NOTE

DURING REFITTING, PAY ATTENTION TO THE CORRECT POSITIONING OF THE SPACER WHICH MUST BE INSERTED IN THE DUST SEAL UNTIL IT REACHES THE BEARING

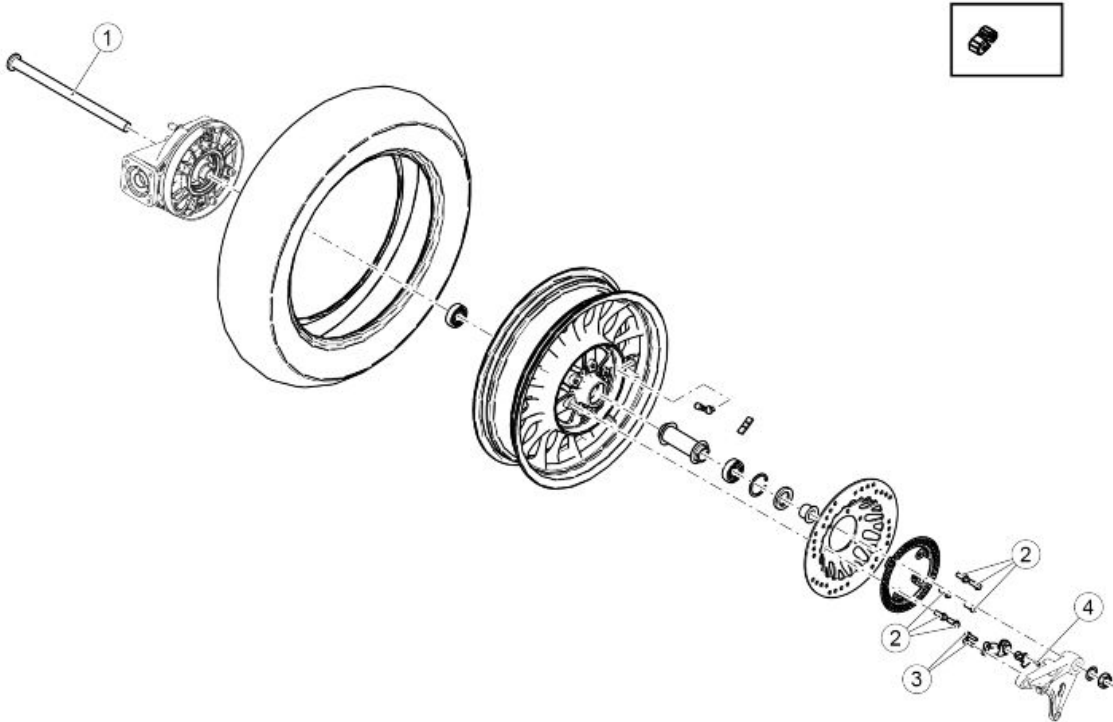


- Remove the dust seal from both sides



- Using a generic bearing extractor remove the bearings from both sides

Ruota posteriore



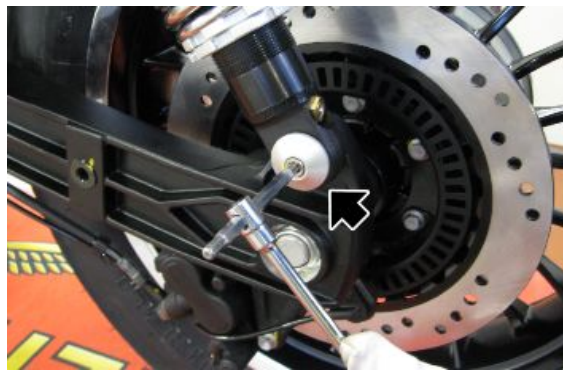
REAR WHEEL					
Pos.	Description	Type	Quantity	Torque	Notes
1	Rear wheel fixing pin-nut	M20	1	120 Nm (88.51 lb ft)	-
2	TE flanged screws fastening phonic wheel and brake disc	M8x22	6	25 Nm (18.44 lb ft)	Loct. 243
3	SHC flanged screws fastening ABS sensor support	M6x12	2	10 Nm (7.38 lb ft)	-
4	TBEI torx screw fastening the ABS sensor	M5x16	1	6 Nm (4.43 lb ft)	Loct. 243

Rimozione

- Remove the screw fixing the right-hand rear right shock absorber and pull it from the pin on the drive shaft



- Remove the screw fixing the left-hand rear shock absorber and remove it from the pin



- Using a jack, lift the rear of the motorcycle.
- Unscrew the rear fixing screw of the rear brake calliper support



- Unscrew the wheel axle nut, making sure to take the washer from the left side and pull the pin itself from the right side.



- Remove the rear brake calliper support



- Collect the spacer

NOTE

DURING REFITTING, PAY ATTENTION TO THE CORRECT POSITIONING OF THE SPACER WHICH MUST BE INSERTED IN THE DUST SEAL UNTIL IT REACHES THE BEARING



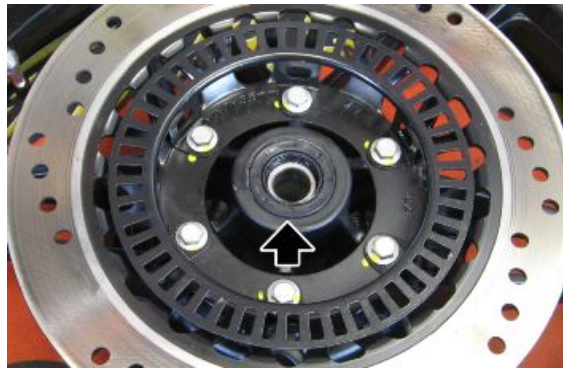
- Remove the rear wheel



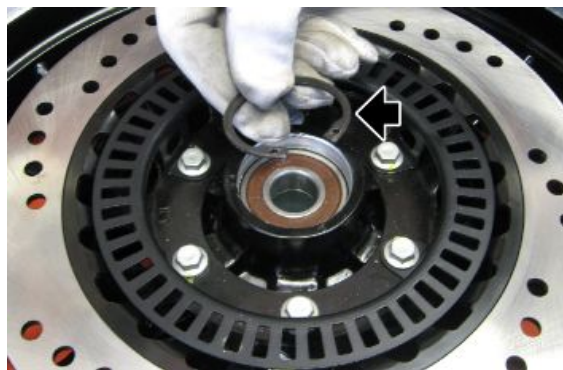
- Remove and if necessary replace the six flexible couplings



- Remove the dust seal

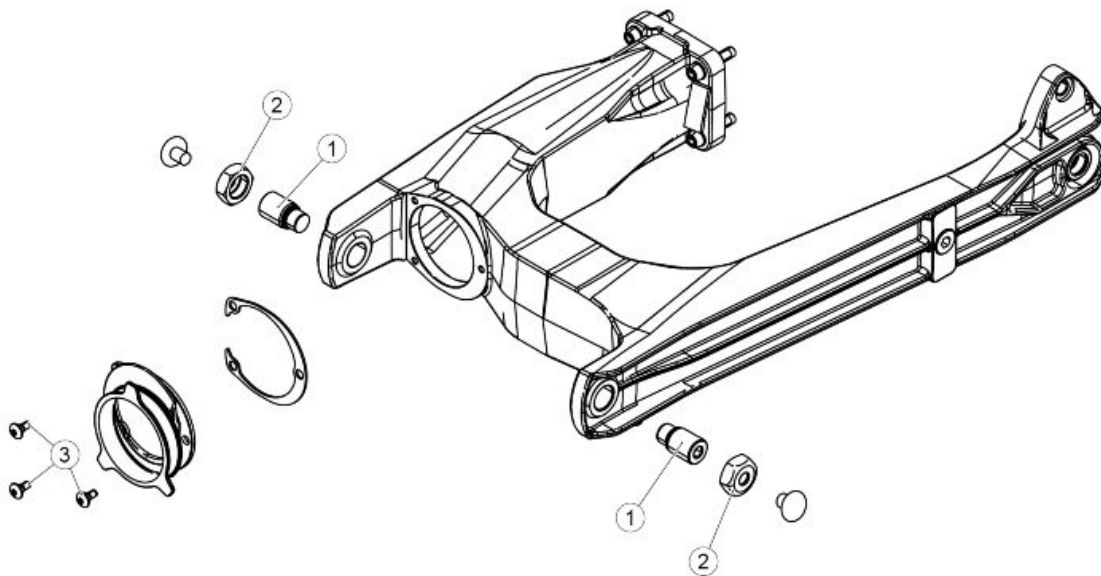


- Remove the locking Seeger ring of the bearing from the side where the encoder/brake disc wheel is present



- Using a generic bearing extractor remove the bearings from both sides

Swinging arm



SWINGARM					
Pos.	Description	Type	Quantity	Torque	Notes
1	Pins fixing swingarm to gearbox	-	2	-	Manual
2	Counter-nuts fixing swingarm to gearbox	-	2	50 Nm (36.88 lb ft)	-
3	Rubber bellows torx fixing screws	-	3	6 Nm (4.43 lb ft)	-

Removing

- Remove the mufflers, the rear wheel, and the brake calliper support complete with clamp / ABS sensor, and disconnect the shock absorbers from the support pins.
- Remove the fixing nut of the cable grommet plate and disconnect it from the swingarm



- Cut the sealing clamp and lift the folding

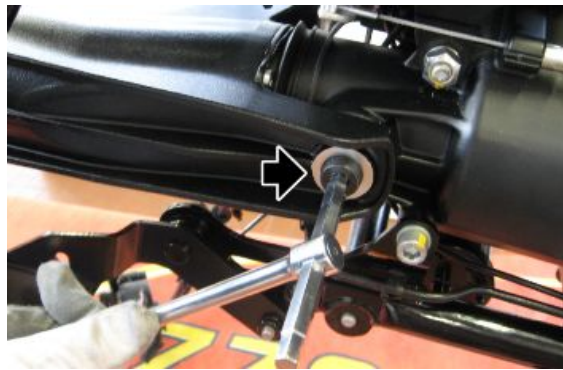
IMPORTANT
PAY ATTENTION NOT TO CUT AND DAMAGE THE RUBBER FOLDING



- Unscrew the nuts on both sides of the swingarm



- Loosen the pins so that the oscillating swingarm can be removed from the gearbox.



- Remove the complete swingarm from the gearbox



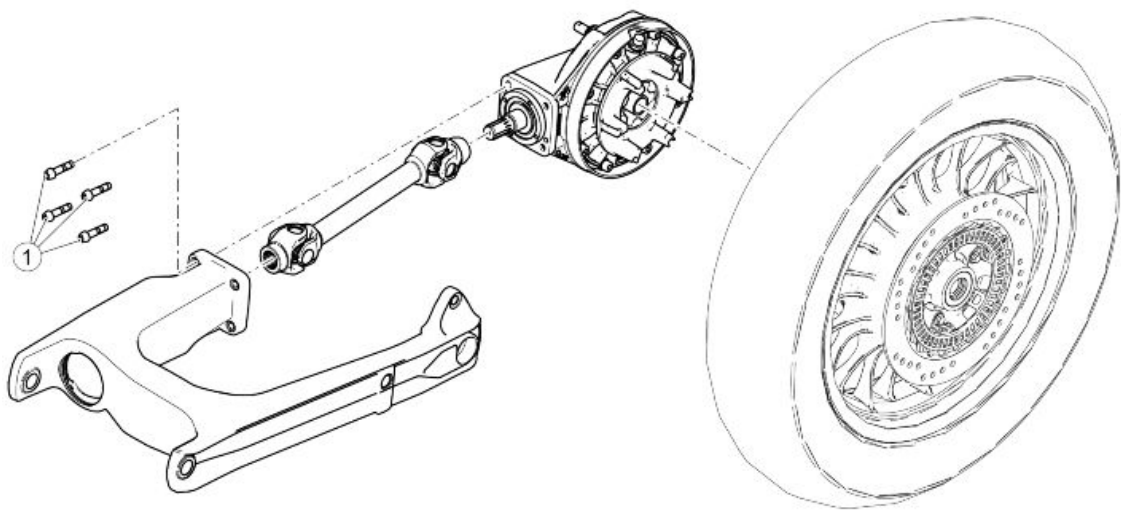
- Remove the three screws (1) to remove the folding (2) complete with retaining ring (3)



Checking

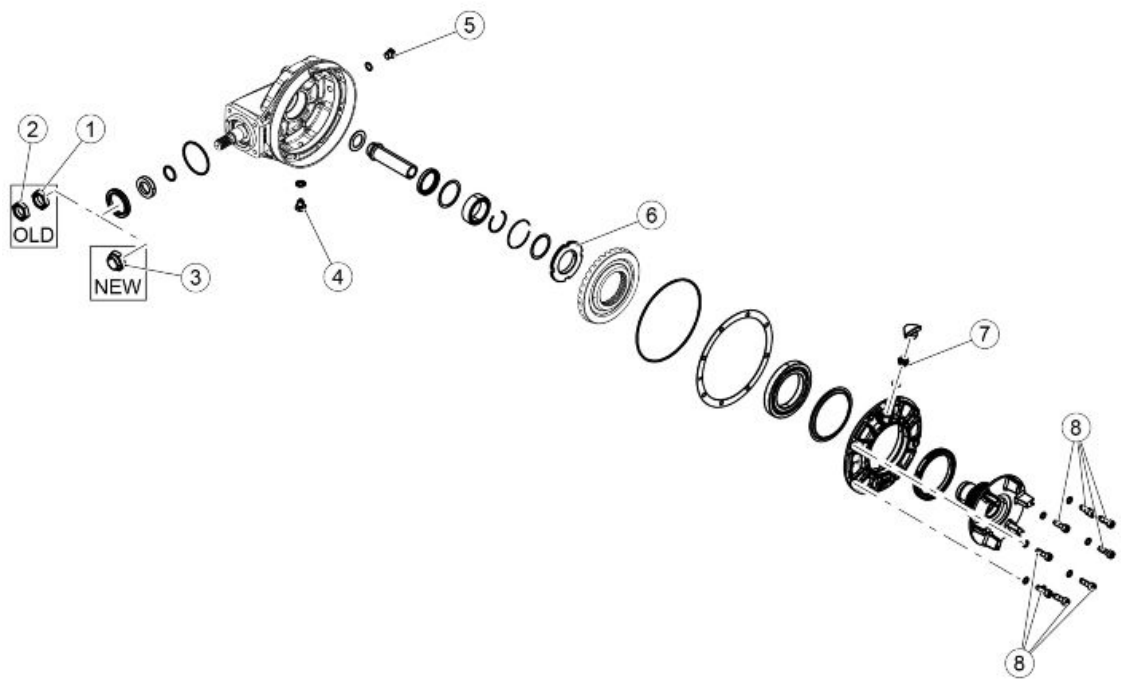
- Check that the universal joint is not damaged, the gear teeth inserting in the sleeve grooves and the grooves on the joint are not deformed or damaged; otherwise, replace the joint.
 - Check that the rubber bellows are not cut or pierced; otherwise, replace it.
 - Check that the swingarm pin threads and the swingarm fixing nuts are not damaged, deformed or flattened; otherwise, replace them.
 - Check that the sleeve grooves are not damaged, deformed or deteriorated; replace if necessary.
 - Check that the sleeve outer tothing and internal grooves are not damaged.
-

Bevel gears



GEARBOX

Pos.	Description	Type	Quantity	Torque	Notes
1	Gearbox preimpregnated TCC torx fixing screws	M8x35	4	25 Nm (18.44 lbf ft)	-



BEVEL GEAR

Pos.	Description	Type	Quantity	Torque	Notes
1	Pinion unit fixing nut - OPTION 01	M25	1	100 Nm (73.76 lbf ft)	Loct. 243
2	Pinion unit fixing lock nut - OPTION 01	M25	1	20 Nm (14.75 lbf ft)	Loct. 243
3	Pinion unit fixing nut - OPTION 02	M25	1	100 Nm (73.76 lbf ft)	Loct. 243 + Nut re-bating on hollow pinion
4	Oil drainage plug	M10	1	30 Nm (22.13 lbf ft)	-
5	Oil load cap	M12	1	25 Nm (18.44 lbf ft)	-
6	Ring nut	-	1	100 Nm (118.01 lbf ft)	Loct. 243 + Riveting on the splash guard hub
7	Bleeder cap	-	1	10 Nm (7.38 lbf ft)	-
8	Gearbox cover fastening screws	M8x25	8	25 Nm (18.44 lbf ft)	-

IMPORTANT

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.

Removing

- Svitare e rimuovere le viti (1)



- Svitare e rimuovere le viti (2)



- Rimuovere la coppia conica (3)

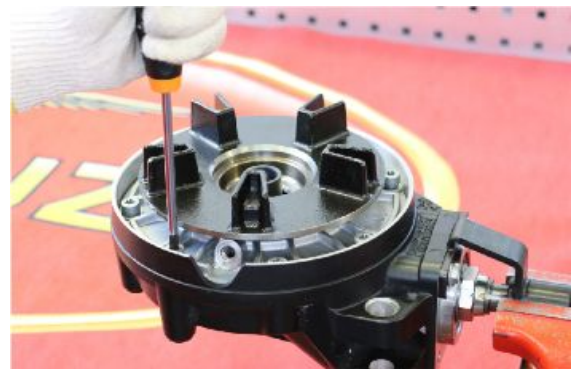


Disassembling

IMPORTANT

EFFETTUARE LO SVUOTAMENTO OLIO E PROCEDERE CON LA RIMOZIONE DELLO SFIATO PRIMA DI EFFETTUARE LO SMONTAGGIO DELLA SCATOLA DI TRASMISSIONE.

- Utilizzando l'attrezzo specifico, bloccare in morsa la scatola di trasmissione completa.
- Allentare e rimuovere le 8 viti di fissaggio della flangia.



Special tools

021000Y Angle transmission support

- Utilizzare delle colonnette filettate come guida e rimuovere la flangia.



- Remove the ring gear axle thickness.



- Remove the inner spacer.



- Remove the needle bearing.



- Utilizzando un utensile idoneo, disimpegnare l'anello di arresto radiale e rimuoverlo.



- Scaldare la sede della pista esterna del cuscinetto a rulli utilizzando un riscaldatore ad aria.



- Insert the special tool under the washer and screw the cursor.

Special tools

001467Y036 Bearing internal cup extractor



- Inserire una bussola di diametro idoneo sull'attrezzo specifico e avvitare il dado tenendo bloccato l'estrattore.



- Rimuovere la pista esterna del cuscinetto a rulli.



- Remove the washer.



- Rimuovere l'anello di tenuta.
- In fase di rimontaggio utilizzare un nuovo anello.

IMPORTANT

PRESTARE ATTENZIONE DURANTE LA FASE DI RIMONTAGGIO, IN QUANTO L'ANELLO DI TENUTA DEVE ESSERE INSERITO FINO IN FONDO ALLA SUA BATTUTA, MEDIANTE L'UTILIZZO DELL'APPOSITO TAMPONE DI PIANTAGGIO.



- Utilizzando delle ganasce di protezione, bloccare in morsa la flangia completa e mediante in utensile idoneo, rimuovere l'anello di arresto radiale.



- Utilizzando l'attrezzo specifico, svitare la ghiera per allentare la ribaditura.
- Dopo aver svitato la ghiera a fine filettatura, riavvitarla fino a battuta in modo tale da creare lo spazio tra la ghiera stessa e la rondella di spallamento.

**Special tools**

020999Y Crown counter- lock ring wrench

- Insert the special tool under the shoulder washer and screw the cursor.

Special tools

19.90.70.00 Extractor for internal ring on drilled bolt



- Remove the inner track of the needle bearing.



- Remove the shoulder washer.



- Remove the ring nut.



- Remove the crown gear.



- Remove the cover from the gearbox of the splash guard hub.



- Remove the O-ring. When reassembling use a new O-ring.

**IMPORTANT**

PRESTARE PARTICOLARE ATTENZIONE ALLA CORRETTA PROCEDURA DI RIMOZIONE DEL PARAOLIO ONDE EVITARE IL DANNEGGIAMENTO DEL LAMIERINO PRESENTE SOTTO AL PARAOLIO STESSO.

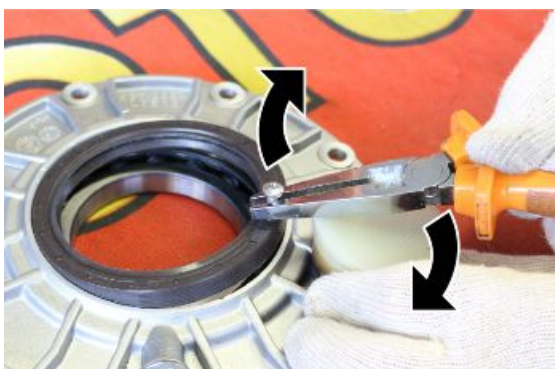
- Munirsi di una vite autofilettante piccola (M5-M6) ed avvitarela leggermente per far presa sul paraolio stesso.

IMPORTANT

NON AVVITARE TROPPO LA VITE POICHE' SI POTREBBE DANNEGGIARE IL LAMIERINO SOTTOSTANTE.



- Mediante l'utilizzo di una pinza rimuovere il paraolio dalla sede, utilizzando un supporto in teflon o in legno per non danneggiare la flangia della scatola trasmissione.



- Verificare la corretta integrità del lamierino sottostante.

**IMPORTANT**

NEL CASO IN CUI IL LAMIERINO FOSSE DANNEGGIATO COME INDICATO È NECESSARIO PROVVEDERE ALLA SOSTITUZIONE DELLA FLANGIA COMPLETA DI CUSCINETTO.



- Riscaldare la zona esterna in corrispondenza della custodia portacuscini pignone.
- Utilizzando l'attrezzo specifico, allentare e rimuovere la custodia portacuscini pignone.

**Special tools**

020998Y Pinion case wrench

(OPTION 01)

- Using the specific tool lock the assembly in the vice, unscrew the nut and the lock nut fixing the pinion bearing holder guard.

Special tools

021000Y Angle transmission support



(OPTION 02)

- Utilizzando l'attrezzo specifico, bloccare in morsa il complessivo e sollevare la ribattitura del dado prima di procedere con la rimozione.

Special tools**021000Y Angle transmission support**

- Allentare e rimuovere il dado di bloccaggio della custodia portacuscini pignone.



- Remove the bearing closing spacer.



- Remove the seal ring.



- Remove the O-ring.



Checking

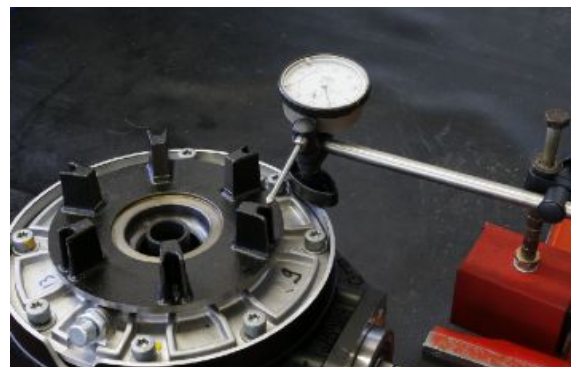
- Dopo il montaggio della scatola, è necessario verificare il gioco tra pignone e corona. Bloccare in morsa il pignone e installare un comparatore mediante un supporto idoneo. Il tastatore del comparatore deve appoggiarsi all'estremità esterna di un dente posizionato a 90°.

Characteristic

Gioco massimo ammesso

0.08-0.2 mm (0.059-0.147 in)

- Nel caso in cui il gioco misurato risulti discordante rispetto ai valori ammessi, procedere alla correzione mediante selezione e sostituzione di in adeguato spessore asse corona.



Montaggio

- Inserire un nuovo anello interno o-ring nel gruppo pignone.



- Inserire un nuovo anello di tenuta fino in battuta.



- Inserire il distanziale di chiusura cuscinetti prestando attenzione che lo smusso sia posto a contatto con l'O-ring.



(OPTION 01)

- Using the specific tool lock the assembly in the vice, screw at the recommended torque the nut and the lock nut fixing the pinion bearing holder guard.



Special tools

021000Y Angle transmission support

(OPTION 02)

- Dopo aver posizionato un nuovo dado, utilizzando l'apposito attrezzo bloccare in morsa il complessivo della custodia portacuscinetti pignone e serrare il dado alla coppia prescritta.



Special tools

021000Y Angle transmission support

- Rivet the nut at the groove on the pinion.

**IMPORTANT**

PULIRE ACCURATAMENTE LA FILETTATURA DELLA SCATOLA TRASMISSIONE DAI RESIDUI DI LOCTITE PRIMA DI INSERIRE NUOVAMENTE LA CUSTODIA PORTACUSCINETTI PIGNONE.

- Utilizzando delle ganasce di protezione bloccare la scatola trasmissione in morsa
- Applicare la loctite su tutta la circonferenza, per una lunghezza di 3 filetti e mediante l'attrezzo specifico serrare la custodia portacuscini pignone alla coppia prescritta.

**Special tools****020998Y Pinion case wrench**

- Using the special tool, insert a new seal ring in the cover.
- On the opposite side of the cover, insert a new O-ring.
- Replace the sprocket hub cover.
- Replace the crown and the fastening ring nut.

**Special tools****021005Y Bevel gear cover oil seal punch**

- Sul lato opposto del coperchio, inserire un nuovo anello o-ring.



- Posizionare la flangia della scatola trasmissione sul mozzo parastrappi.



- Posizionare una nuova ghiera e utilizzando l'apposito attrezzo, serrarla alla coppia prescritta.

Special tools

020999Y Crown counter- lock ring wrench



- Ribadire la ghiera in due punti contrapposti, in corrispondenza delle scanalature presenti sul mozzo.



- Inserire la rondella di spallamento.



- Utilizzando l'attrezzo specifico, posizionarsi in una pressa e inserire la pista interna del cuscinetto a rullini.

Special tools

GU19927900 Punch for pressing bearing inner ring onto drilled pin



- Inserire l'anello di arresto radiale.



- Posizionare la rondella piana sulla scatola trasmissione.



- Inserire in nuovo anello di tenuta sulla scatola trasmissione utilizzando l'apposito attrezzo, prestando attenzione al verso di montaggio.

Special tools**021003Y Bevel gear oil seal punch**

- Utilizzando l'attrezzo specifico, posizionarsi in una pressa e inserire la pista esterna del cuscinetto a rulli fino in battuta.

Special tools**020360Y Adattatore 52x54 mm**

- Inserire l'anello di arresto radiale.



- Inserire la gabbia a rulli.



- Inserire il distanziale interno fino in battuta.



- Reposition the crown axle thickness.

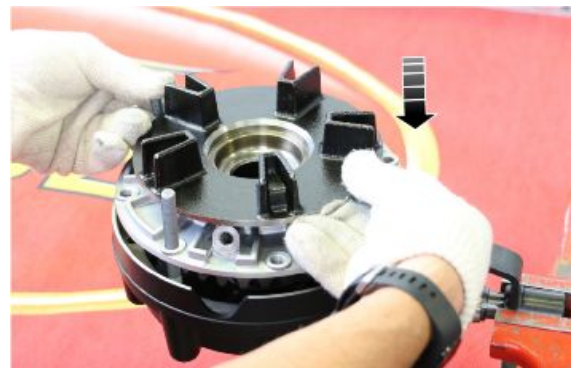
NOTE

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.

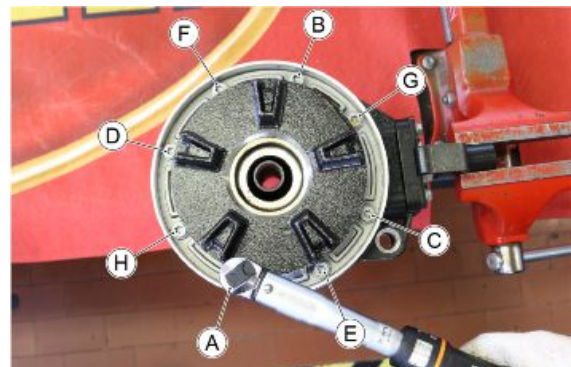
**IMPORTANT**

PULIRE ACCURATAMENTE LE FILETTATURE DELLA SCATOLA TRASMISSIONE DAI RESIDUI DI LOCTITE PRIMA DI INSERIRE NUOVAMENTE LA FLANGIA.

- Inserire delle spine di centraggio e riposizionare in sede la flangia completa nella scatola trasmissione.



- Inserire le viti di fissaggio della flangia e serrarle alla coppia prescritta operando diagonalmente con la sequenza indicata.



- Dopo aver soffiato con aria compressa lo sfiato, eliminato con cura eventuali residui di olio e verificato il suo corretto funzionamento, riposizionarlo in sede e serrarlo alla coppia prescritta.

IMPORTANT

NELLA FASE DI RIMONTAGGIO UTILIZZARE UNA NUOVA GUARNIZIONE DI TENUTA.



Installing

- Inserire la coppia conica (1) sul forcellone



- Inserire e serrare alla coppia prescritta le viti di fissaggio (2)



- Inserire e serrare alla coppia prescritta le viti di fissaggio (3)

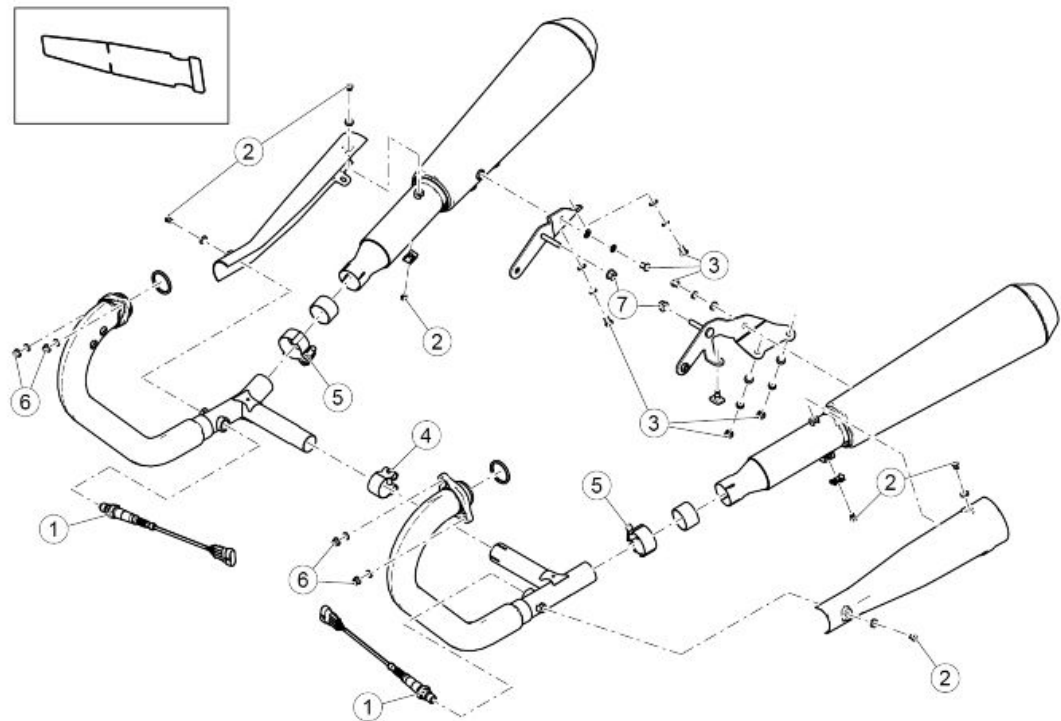


- Effettuare il riempimento olio seguendo quanto riportato nel capitolo "Manutenzione / Olio trasmissione / Sostituzione"

See also

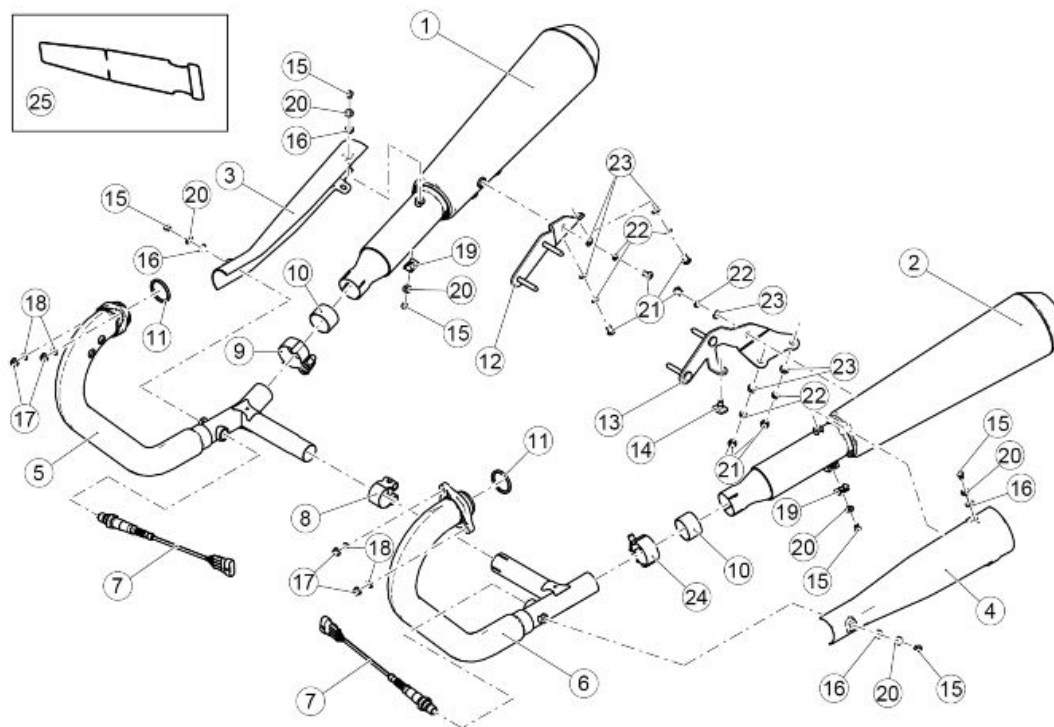
Replacement

Exhaust



EXHAUST SYSTEM

Pos.	Description	Type	Quantity	Torque	Notes
1	Lambda probes fastener	M18x1.5	2	38 Nm (28.03 lb ft)	-
2	Flanged TBEI screws fixing exhausts protections	M6x10	6	8 Nm (5.90 lb ft)	Loct. 243
3	TBEI screws fixing mufflers to the supports	M8x12	6	25 Nm (18.44 lb ft)	-
4	Fixing exhaust pipes to the compensator	M8	1	25 Nm (18.44 lb ft)	-
5	Fixing exhaust pipes to the mufflers	M10	2	30 Nm (22.13 lb ft)	-
6	Flanged nuts fastening to the engine exhaust pipes	M8	4	25 Nm (18.44 lb ft)	-
7	Nuts fastening mufflers' support to the frame	M8x1.25	4	25 Nm (18.44 lb ft)	-

**Key:**

1. Right muffler
2. Left muffler
3. Right converter protections
4. Left converter protections
5. Right exhaust manifold
6. Left exhaust manifold
7. Lambda probe l. 660 mm (25.98 in)
8. Band D. 37 mm (1.46 in)
9. Clamp
10. Bushing
11. Exhaust gasket
12. Right muffler support bracket.
13. Left muffler support bracket.
14. Rubber ring
15. TBEI flanged screw M6x10
16. Elastic spacer
17. Flanged nut M8
18. Washer 8.4x13x0.8
19. Elastic plate M6
20. Washer
21. TBEI Screws M8x12 conic

- 22.Washer 8.4x13x0.8
- 23.Washer 8.4x15x1.5
- 24.Clamp
- 25.Heat-protecting cover

Removing the tail pipe

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.

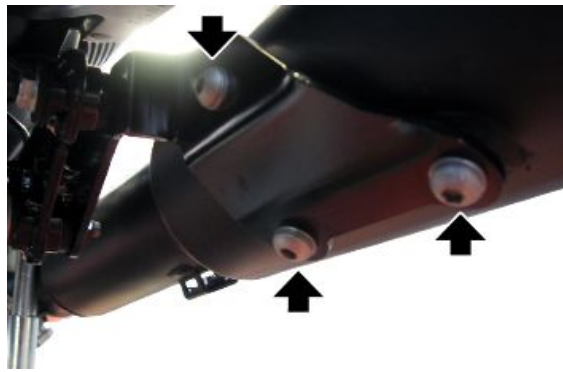
- Remove the three fixing screws of the silencer protection



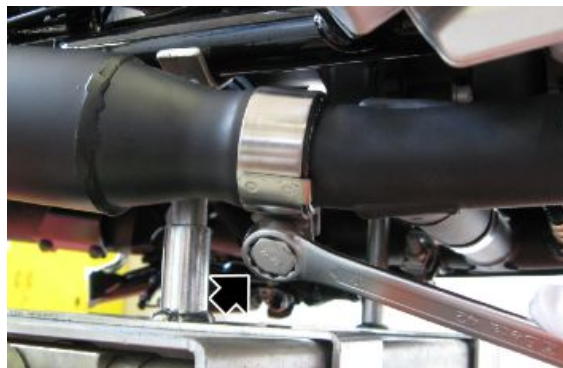
- Remove the silencer protection



- Remove the three fastening screws of the silencer to the support bracket



- Loosen the clamp between the silencer and manifold



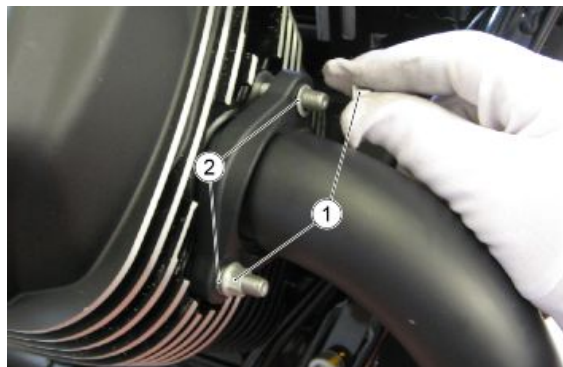
- Slide and remove the silencer from the collector

**NOTE**

THE OPERATIONS FOR REMOVING THE EXHAUST TERMINAL, APPLY TO BOTH ENDS

Removing the exhaust manifold

- Remove the fixing nuts (1) of the exhaust manifold paying attention to keep the washers (2)



- Disconnect the connectors of the lambda probes and free the wiring harness of the cable grommet/clamps
- Simultaneously remove both exhaust manifolds



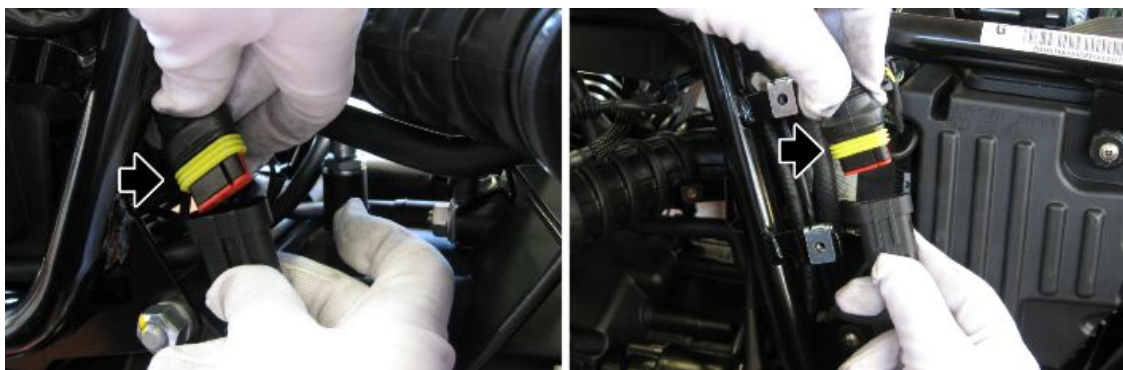
- Unscrew the screw of the central clamp to separate the two manifolds

Removing the lambda sensor

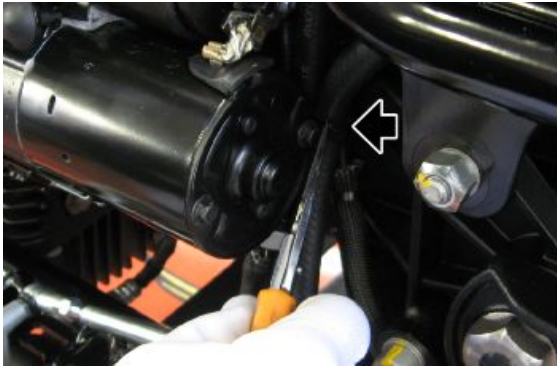
- Remove the side panels to access the connectors of the lambda probes.
- Remove the clamps that secure the connectors to other wiring harnesses



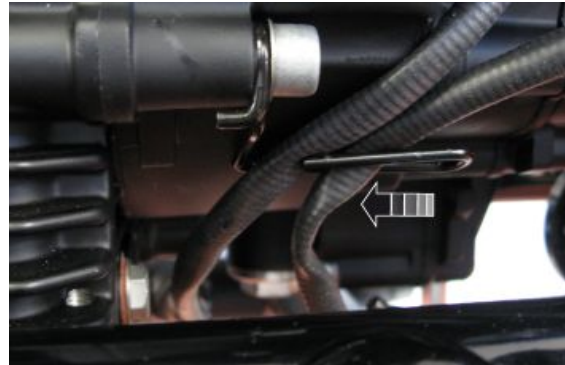
- Disconnect the connectors of the lambda probes



- Remove the clamps that secure the wiring harnesses of the Lambda probes



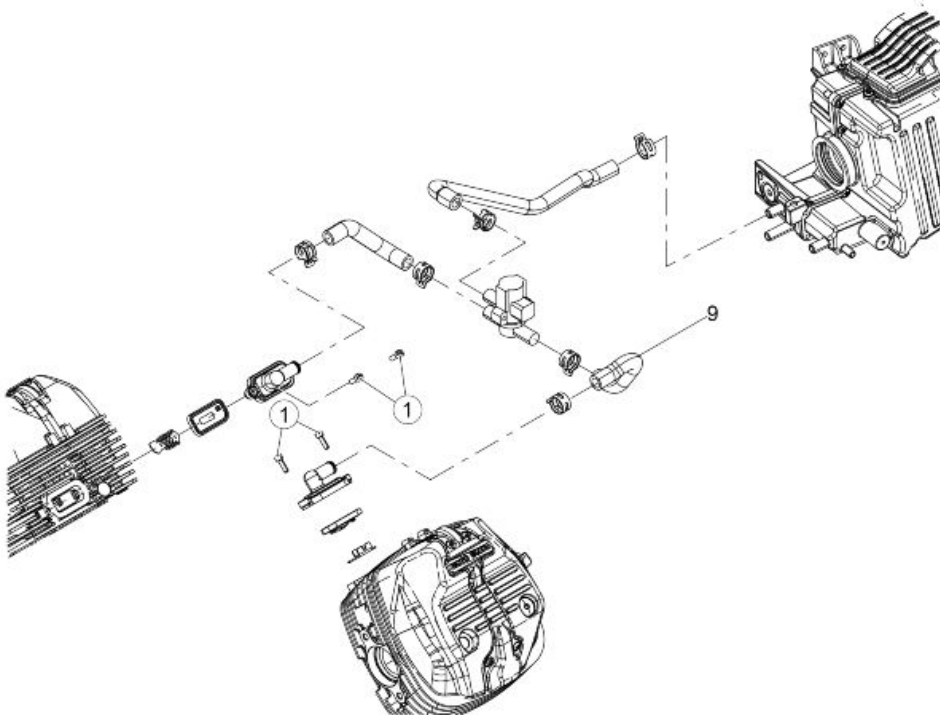
- Release the wiring harness from the grommet cable



- Unscrew and remove the lambda probes

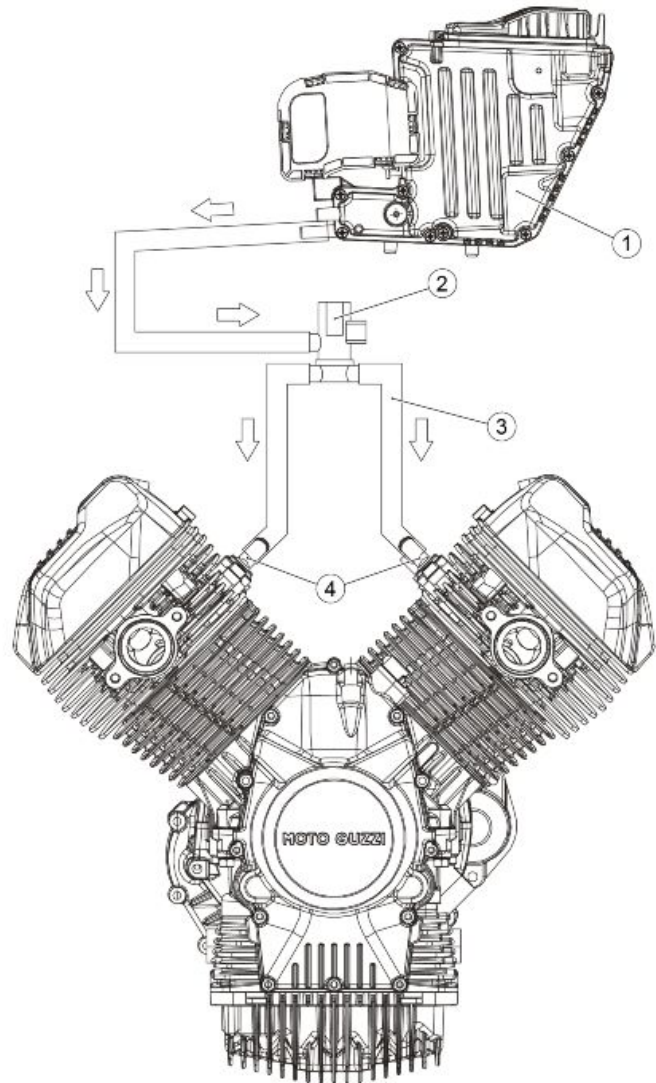
Sistema aria secondaria

Tightening torques



SECONDARY AIR SYSTEM

Pos.	Description	Type	Quantity	Torque	Notes
1	Red valve cover fixing SHC screws	M5x16	4	3-4 Nm (2.21-2.95 lb ft)	-



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 oxygen sensor and three-way catalytic converter, ensure compliance with severe new Euro 4 emissions regulations

- Undo the screws fastening the reed valve cover.



- Remove the reed valve cover



- Remove the reed valve.



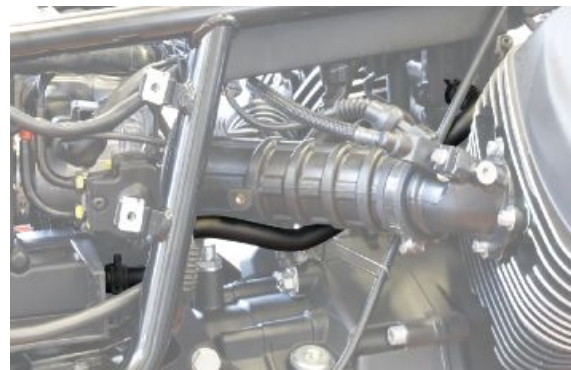
- Remove the flame trap.



- A valve controlled by the engine ECU is installed under the tank, which allows air to flow towards the cylinders via two flexible hoses.



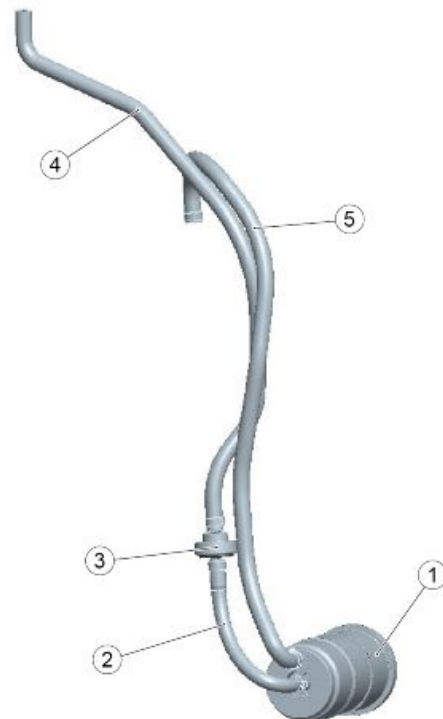
- This valve is connected directly to the filter box via a flexible hose.



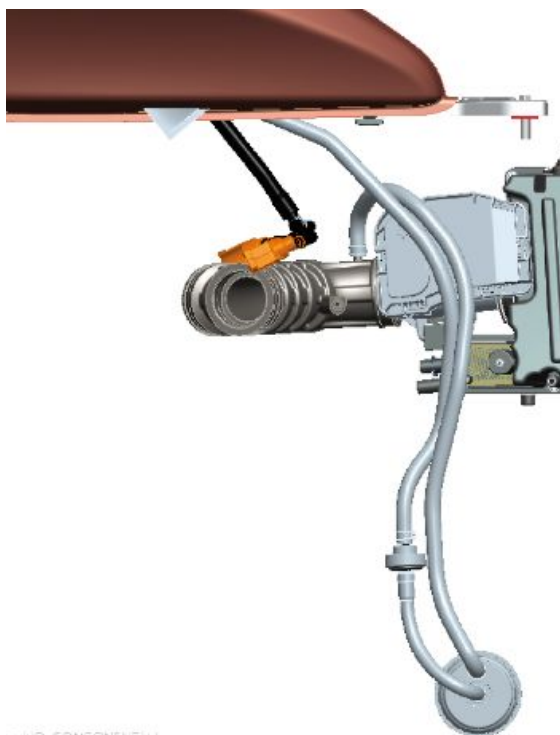
Evaporative emissions control system

Key:

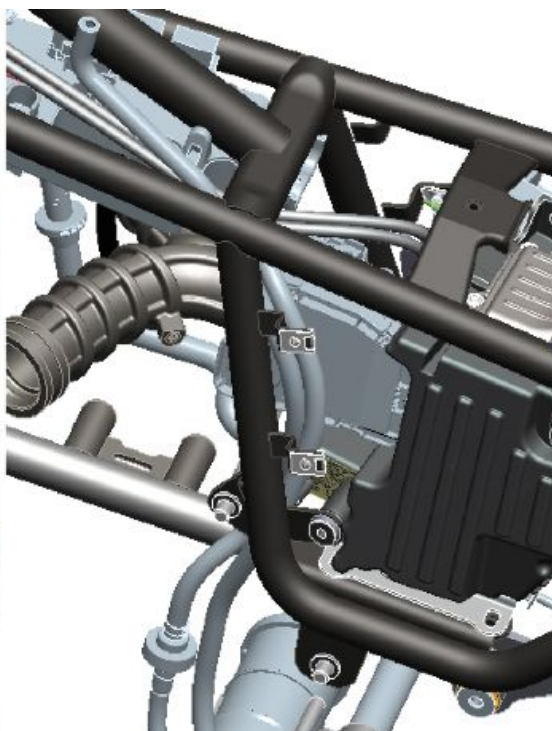
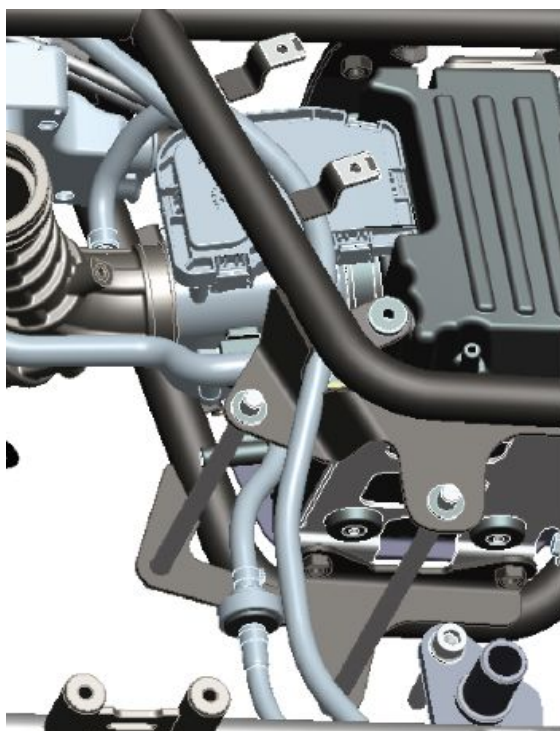
1. Canister
2. SAE 30 R12A-3/16 pipe
3. Breather valve
4. SAE 30 R12A-1/4 pipe
5. SAE 30 R12A-1/4 pipe



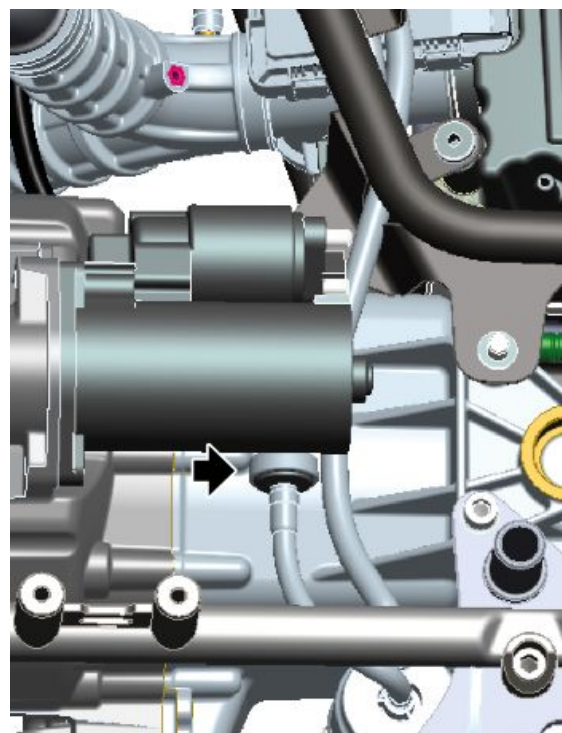
- The canister is installed with the intake inlet above the tank inlet



- Check the correct passage of the pipes on the chassis



- Check the correct passage of the pipes on the starter motor

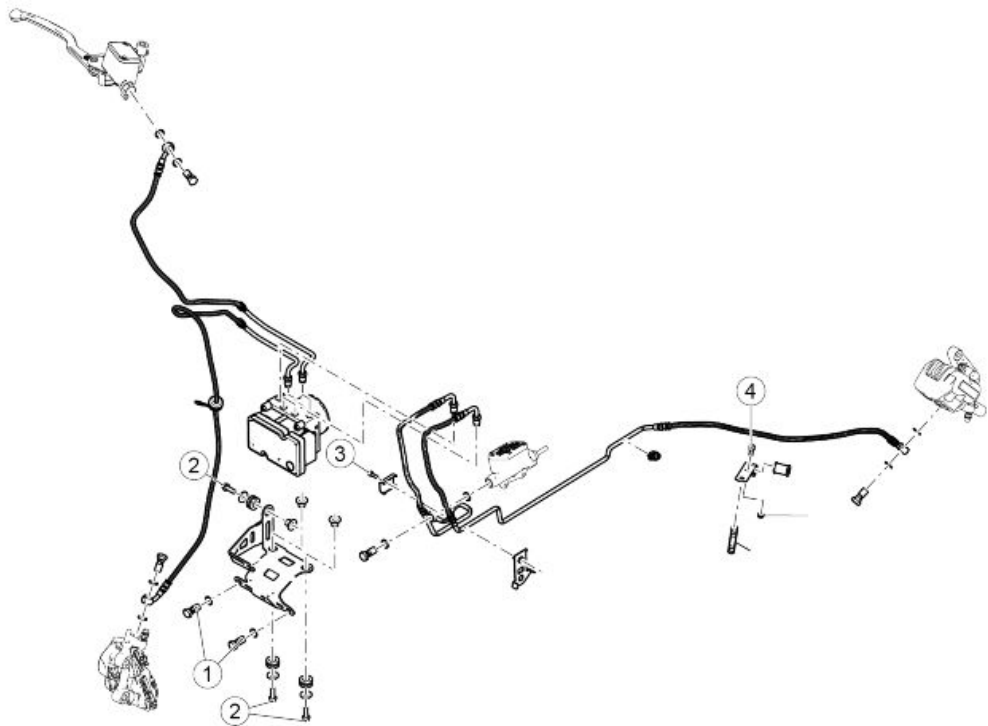


INDEX OF TOPICS

B RAKING SYSTEM

BS

ABS



ABS SYSTEM

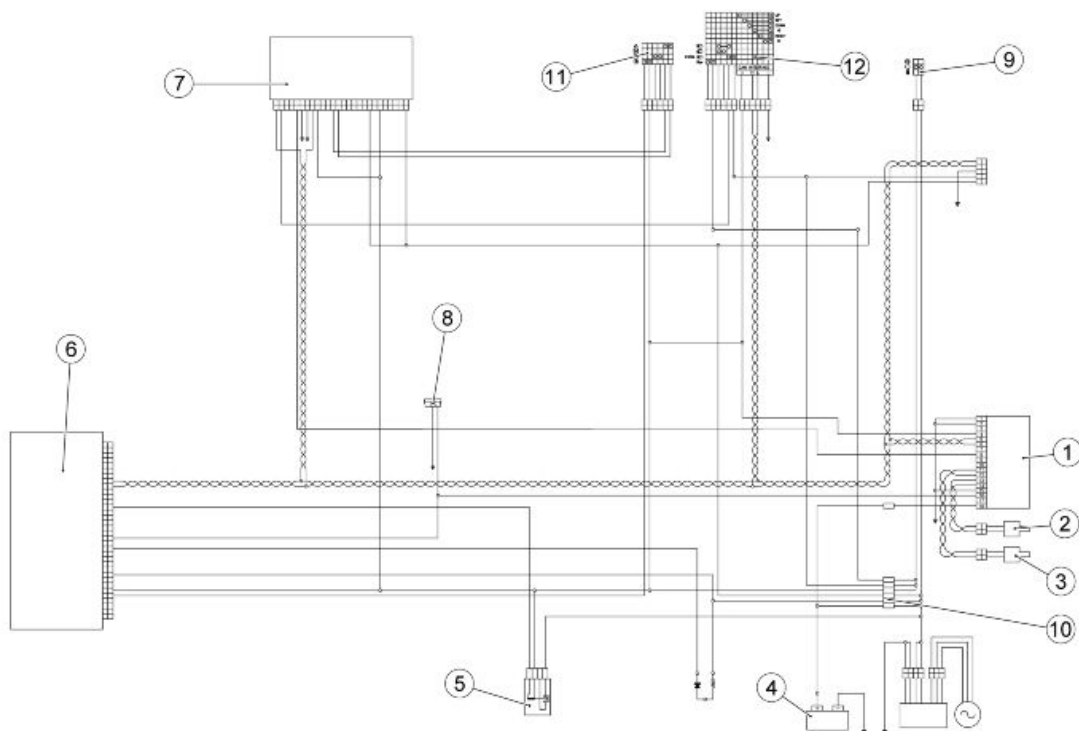
Pos.	Description	Type	Quantity	Torque	Notes
1	Control unit bracket fastening to the frame	M6x16	2	10 Nm (7.38 lb ft)	-
2	Screws fastening the ABS modulator to the support	M6x20	3	10 Nm (7.38 lb ft)	-
3	SHC screw fastening the brake pipes fixing plate	M4x16	1	3 Nm (2.21 lb ft)	-
4	SHC screw fastening the cable grommet plate	M5x12	1	6 Nm (4.43 lb ft)	-

Key:

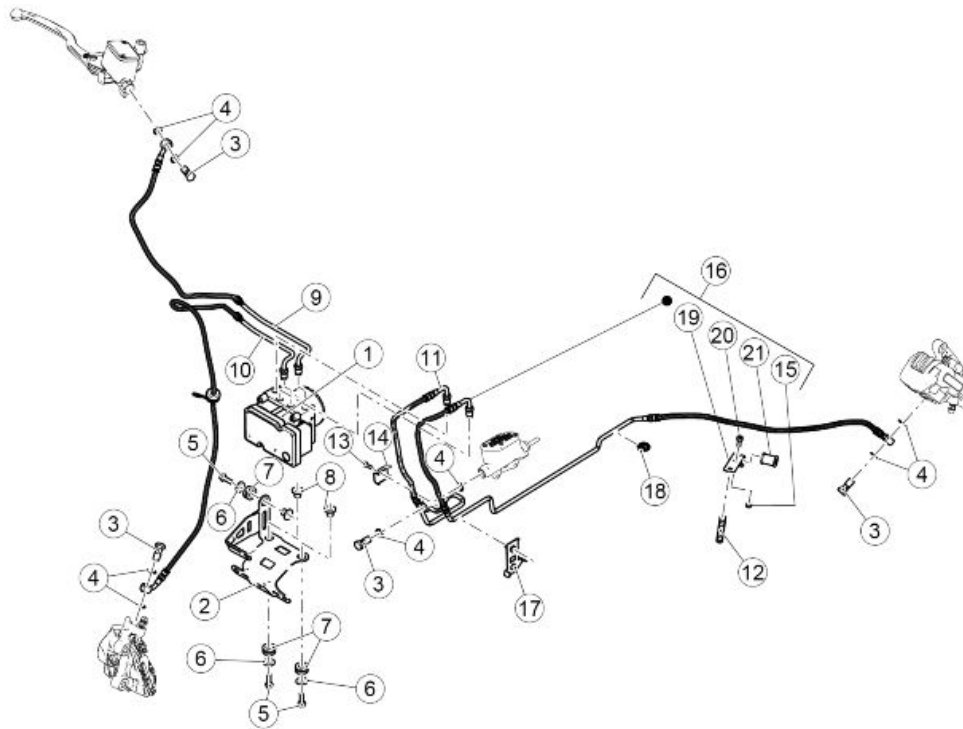
- 1. ABS control unit
- 2. Front ABS sensor
- 3. Rear ABS sensor
- 4. Battery
- 5. Injection loads relay
- 6. ECU
- 7. Instrument cluster
- 8. K line (diagnostics)
- 9. Ignition switch
- 10.Fuses
- 11.Right light switch
- 12.Light switch left

ABS control unit pin out

1. Ground
2. Ground
3. /
4. Live supply (+ key)
5. CAN H line
6. CAN L line
7. /
8. ABS Warning light control
9. /
- 10./
- 11.Rear ABS sensor positive signal
- 12.Rear ABS sensor ground
- 13.Front ABS sensor ground
- 14.Front ABS sensor positive signal
- 15.Ground
- 16.K diagnostic line
- 17.Control unit power



Foreword



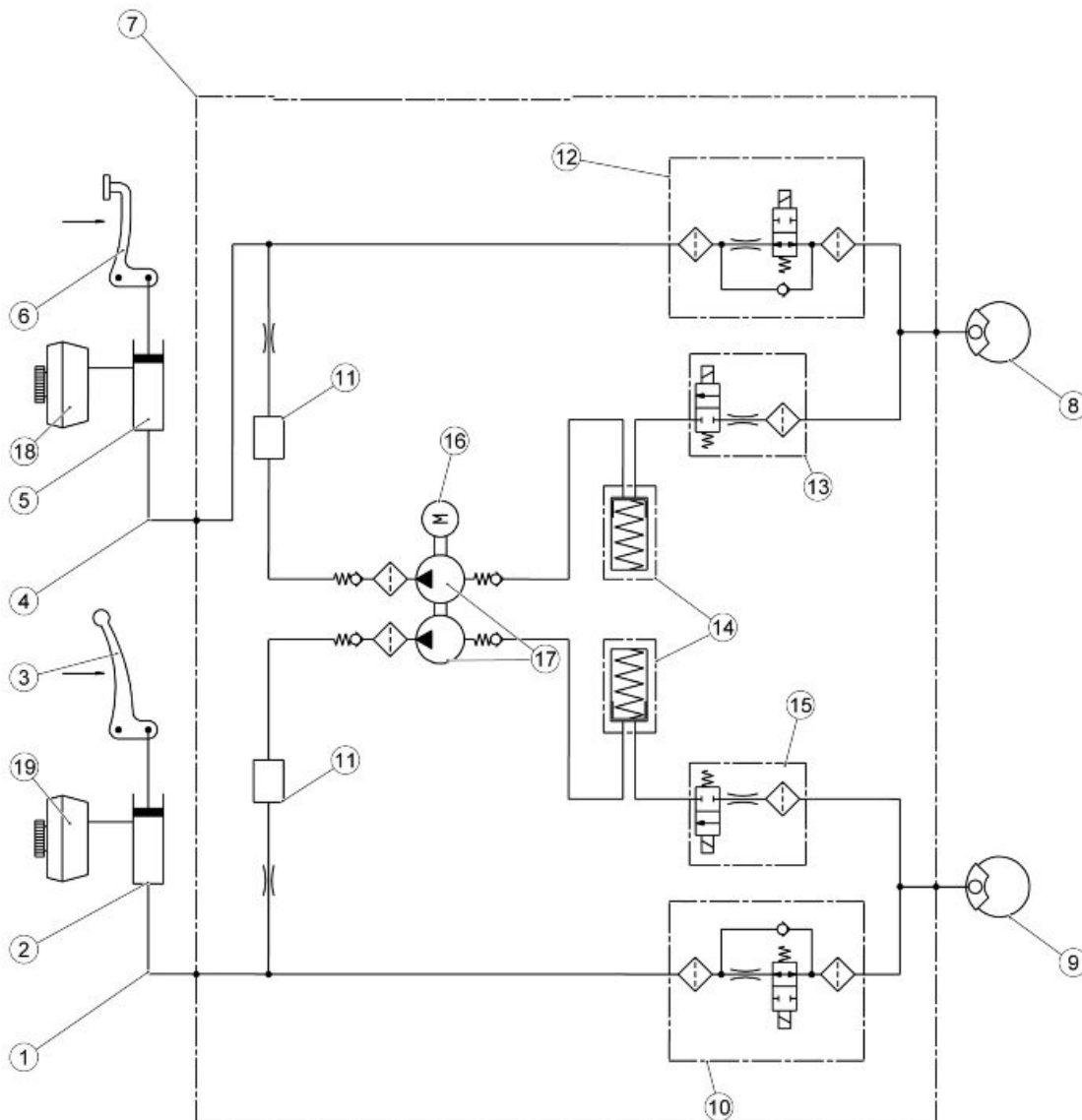
Key:

1. ABS control unit
2. ABS control unit support bracket
3. Oil pipe screw
4. Washer 10x14x1.6
5. Screw 6x20
6. Washer 6.6x18x1.6
7. Rubber ring
8. T-shaped bushing
9. ABS HECU pipe - Front pump
10. ABS HECU pipe - Front clamp
11. ABS HECU pipe - Rear pump
12. Stud bolt
13. SHC screw M4x16
14. Pipe fixing plate
15. Low self-locking nut
16. Nut
17. Brake pipe mounting plate
18. Cable guide
19. Clamp

20.M5x12 SHC screw

21.Ring

Operating diagram



Key for ABS system functional diagram

1. Front system circuit

2. Front brake master cylinder
3. Front brake control lever
4. Rear system circuit
5. Rear brake pump
6. Rear brake pedal
7. ABS control unit
8. Rear brake calliper
9. Front Calliper
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. Rear/front 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 - Brake activation: 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 to avoid wheels locking in case of emergency braking, increasing vehicle braking stability when compared to a traditional 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.

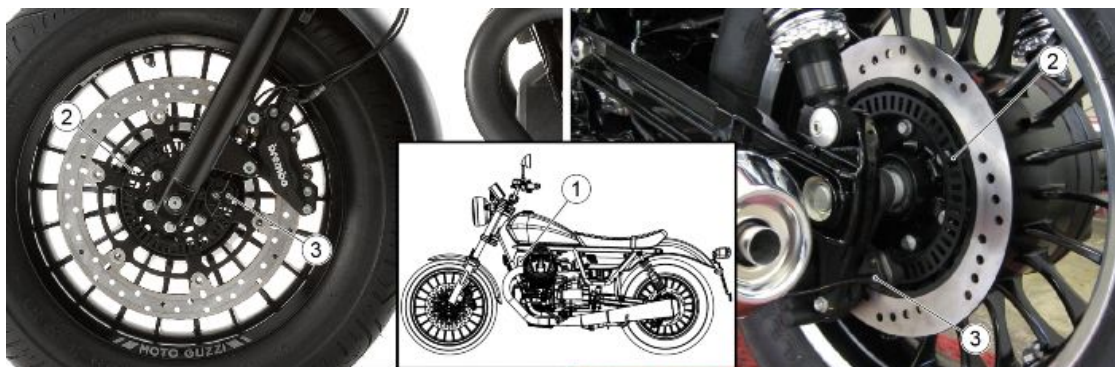
A control unit (1) signals this out and adjusts the pressure in the braking circuit accordingly.

NOTE

WHEN THE ABS STARTS WORKING, A PULSING IS FELT ON THE BRAKE LEVER.



THE WHEEL ANTILOCK BRAKING SYSTEM DOES NOT PREVENT FALLS WHILE ON A BEND. AN EMERGENCY BRAKING WITH THE VEHICLE INCLINED, HANDLE BAR TURNED, ON UNEVEN OR SLIPPERY ROADS, OR WITH POOR GRIP CREATES LACK OF STABILITY DIFFICULT TO HANDLE. THEREFORE, RIDE CAREFULLY AND SENSIBLY AND ALWAYS BRAKE GRADUALLY. BRAKING WHILE TURNING A CORNER IS SUBJECT TO LAWS OF PHYSICS WHICH NOT EVEN ABS 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 deactivate the ABS system. As a consequence, the system works like any regular braking system.

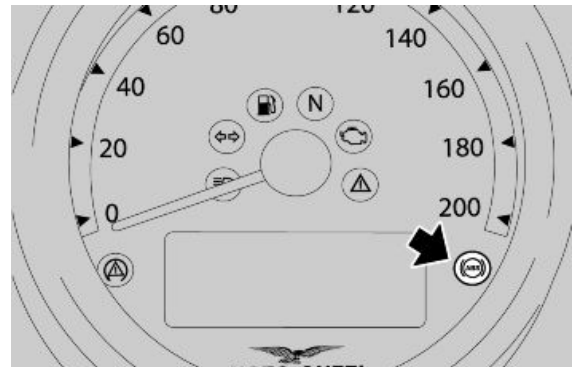
Riding with the ABS system active

- When turning the key on, the ABS warning light turns on and flashes until reaching 5 km/h (3.11 mph); at this point it turns off.

IMPORTANT

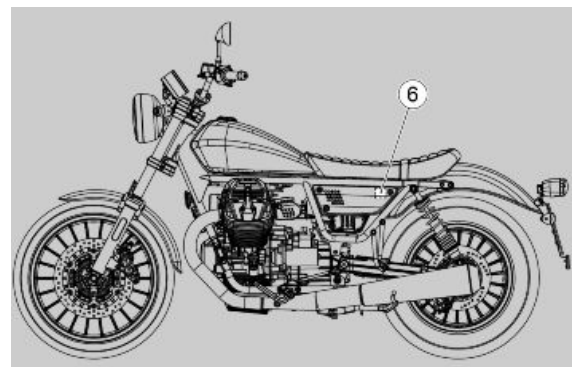


THE STEADY LIGHTING OR THE CONTINUOUS FLASHING OF THE ABS WARNING LIGHT INDICATES THE PRESENCE OF AN ANOMALY AND THE DEACTIVATION OF THE ABS FUNCTIONALITY.



20 A fuse (ABS Main fuse) (6)

Protects: ABS Control unit.



Guide to diagnosis

FOREWORD

Each time the key is ON, at least one current or stored* error of the ABS system is often detected:

- the ABS warning light turns on permanently

The ABS system is deactivated!

The system operates perfectly just as any other braking system without ABS

*** The diagnosis requires exceeding the 5 km/h.**

Each time the key is ON, if at least one current or stored* error of the ABS system is not detected:

- the ABS warning light flashes

Once vehicle speed exceeds 5 km/h (3.11 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 deactivated!

However, the system is perfectly operative as any other braking system without ABS.

The detection of malfunctions may require more or less time according to the type of failure.

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.

Example:

- error code 5D93 requires some minutes before it is diagnosed during the given time:

- the ABS warning light ABS keeps flashing
-

GUIDE TO ABS FAULT DIAGNOSIS

1. ABS LAMP ON

2. CONNECT PADS

PADS COMMUNICATE? (NO, go to point 3; YES, go to point 4)

3. PERFORM THESE CHECKS:

- A. PIN 1 Ground connection
- B. +12V at PIN 18
- C. +12V at PIN 4 with key ON

4. ARE THERE ANY ERRORS? YES, go to point 5; NO, go to 6)

5. CHECK THE ERRORS TABLE

6. ABS WARNING LIGHT ACTIVATION

IS IT ACTIVATED?(YES, go to point 7; NO, go to point 8)

7. CONTACT TECHNICAL SERVICE

8. PERFORM THESE CHECKS:

- A. Cable continuity between PIN8 of the ABS control unit connector and the instrument panel warning light.
- 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

NOTE: to carry out a check using the diagnostic tool on the wheel speed sensor, refer to the operations described in chapter ""ELECTRICAL SYSTEM/CHECKS AND CONTROLS/SPEED SENSOR" chapter.

Using Navigator for the abs

Abs screen pages

ECU INFO screen page

Diagnostic tool - Control unit info screen page

In this screen page are read the general data regarding the control unit, for example: type of software, mapping, control unit programming data

- Chassis number
- SW version (software version)
- Vehicle code
- Vehicle manuf. or encoding
- Vehicle ID PIN 2, 15 or ECU



PARAMETERS screen page

Diagnostic tool - Parameters

This screen page is used to adjust some control unit parameters

- Front wheel speed
- Rear wheel speed



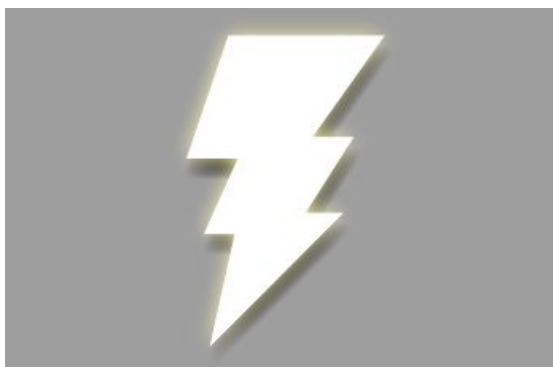


Quality test of the sensors

When turning the wheel or acting on the brake, a variation of parameters must be detected.

ACTIVATION screen page

On this screen, you can delete the errors from the memory of the controller and you can enable some systems controlled by the control unit.



ACTIVATION

Diagnostic tool characteristics	Value/example	Unit of measurement	Notes
ABS warning light	-	-	During the test the warning light flashes
Front brake bleed	-	-	Useful in the event of sponginess of the lever, despite the bleeding having been performed like in a traditional brake system
Rear brake bleed	-	-	Useful in the event of sponginess of the lever, despite the bleeding having been performed like in a traditional brake system

ERRORS screen page

This display shows potential errors detected in the vehicle (ATT) or stored in the control unit (MEM) and it allows to check error clearing (STO).



ERRORS

Diagnostic tool characteristics	Notes
Front wheel speed sensor: Electric malfunction 5D90	Electronically defective wiring or sensor
Front wheel speed sensor: The signal changes irregularly 5D91	Faulty sensor; Signal interference
Front wheel speed sensor: the signal decreases periodically 5D92	Possible tone wheel fault due to deformations or dirt; possible alterations on the wheel bearing surface; abnormal tone wheel vibrations
Front wheel speed sensor: Missing signal or speed too low in relation to the rear wheel 5D93	Faulty sensor; missing sensor or tone wheel; excessive distance between the sensor and the tone wheel; tone wheel with wrong number of teeth;
Front wheel speed sensor: missing acceleration after pressure reduction 5D94	Faulty sensor; missing sensor or tone wheel; excessive distance between the sensor and the tone wheel
Front wheel speed sensor: Excessive speed detected 5D95	Faulty sensor; tone wheel with wrong number of teeth; wrong tyre size
Rear wheel speed sensor: electrical malfunction 5DA0	Electronically defective wiring or sensor
Rear wheel speed sensor: the signal works irregularly 5DA1	Faulty sensor; Signal interference
Rear wheel speed sensor: the signal decreases periodically 5DA2	Possible tone wheel fault due to deformations or dirt; possible alterations on the wheel bearing surface; abnormal tone wheel vibrations
Rear wheel speed sensor: No signal or speed measured too low in relation to the front wheel 5DA3	Faulty sensor; missing sensor or tone wheel; excessive distance between the sensor and the tone wheel; tone wheel with wrong number of teeth;
Rear wheel speed sensor: missing acceleration after pressure reduction 5DA4	Faulty sensor; missing sensor or tone wheel; excessive distance between the sensor and the tone wheel
Rear wheel speed sensor: Excessive speed detected 5DA5	Faulty sensor; tone wheel with wrong number of teeth; wrong tyre size
Control unit 5DD3	Possible control unit fault
Recirculation pump 5DF0	Possible control unit fault
Recirculation pump 5DF1	Possible control unit fault
Control unit 5DF2	Possible control unit fault
Low electrical voltage - long period detection 5DF3	Excessively low voltage detected at PIN 18 of the ABS ECU for 30 seconds. Potential fault at the regulator / low battery
Low electrical voltage 5DF4	Insufficient voltage detected at PIN 18 of the ABS ECU. Check that the PIN 18 of the control unit and the connection of the fuse are not oxidised, if not ok restore; if ok check the integrity of the orange/red cable on the ABS control unit side and the red cable on the battery side
Control unit 5DF5	Possible control unit fault
High electrical voltage 5DF7	Excessively high voltage detected at PIN 18 of ABS ECU. Potential fault at the regulator
Vehicle encoding 5E59	Inconsistency detected between memory coding (INFO ECU/ Vehicle code) and what is measured at wiring harness identification PIN (INFO ECU screen, Vehicle identification line - Pins 2-15 of ABS control unit)
Control unit F01F	Possible control unit fault

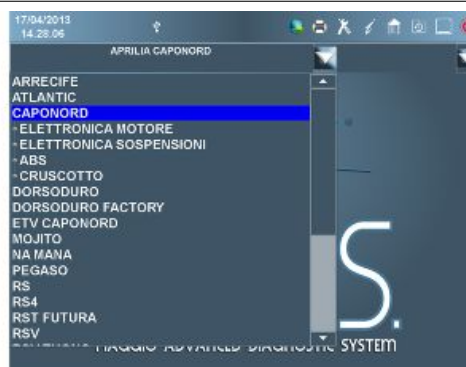
Diagnostic tool report diagnostic tool

In the following are described the procedure to be performed through the diagnostic tool in order to generate an errors report:

- When started the program, select the brand.



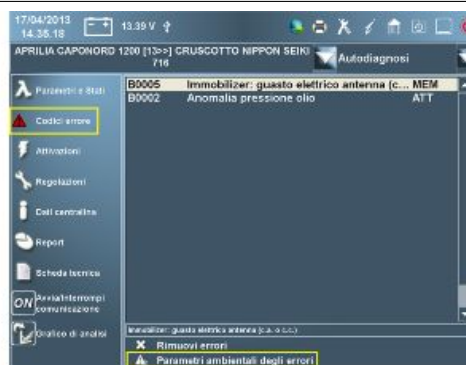
- Select the vehicle and the component.



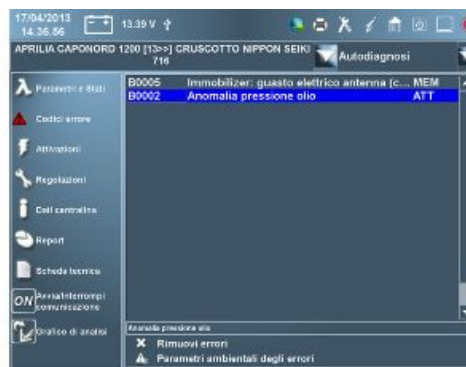
- Select Self-diagnostic.



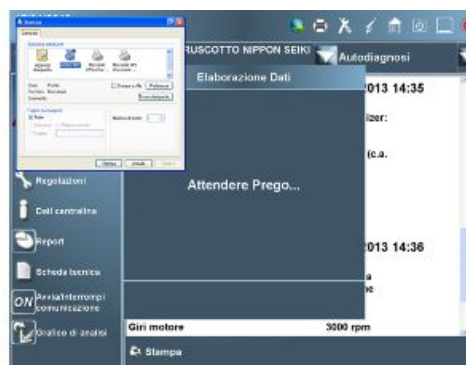
- Go to the page Error codes.
- Select an error and show the Ambient parameter error(where provided).



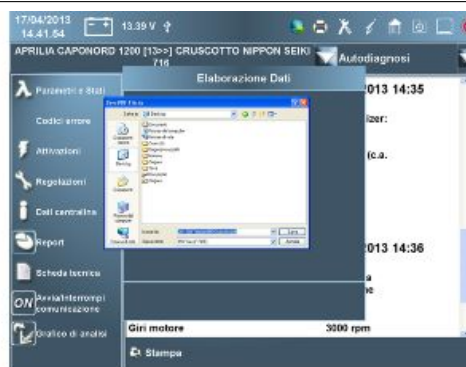
- Repeat the operation by selecting each error and showing the corresponding Ambient parameter error (where provided).



- Go to the page Report and then on Print and select the virtual PDF printer.



- If there is no PDF printer, there are several free programs, ask the information systems to install it.
- Name the file with a name that contains the main information of the vehicle and the analysed component e.g. CN1200-Chassis0465-Instrument cluster.



Modulator

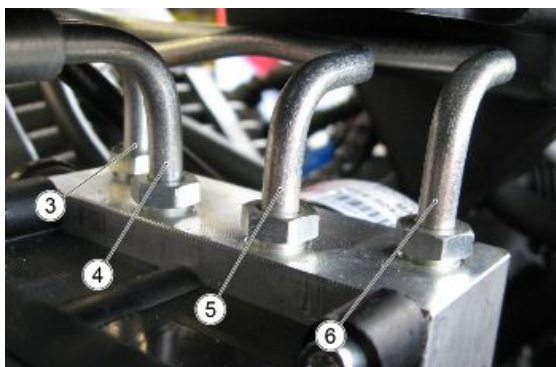
Before removing the modulator, it is necessary to completely purge the braking system.

MODULATOR REMOVAL

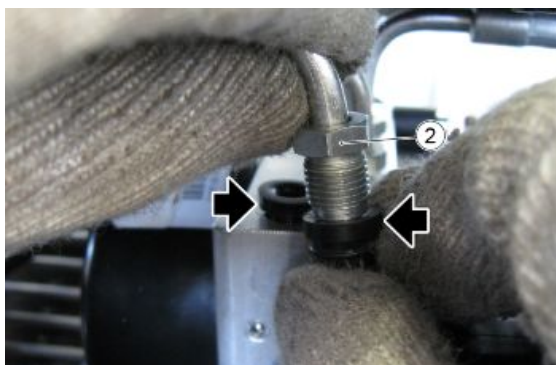
- Remove the horn.
- Disconnect the connector (1).



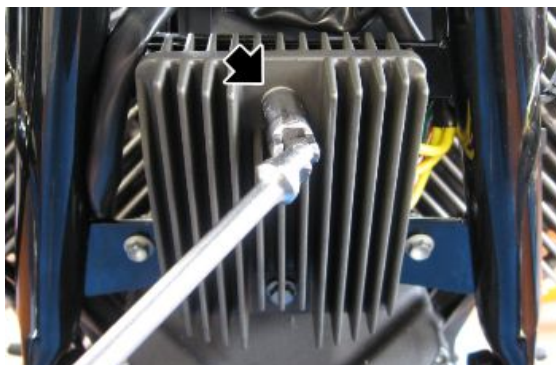
- With a felt-tip pen, mark a reference on the pipes and on the ABS control unit to avoid inverting them when refitting
- Remove the oil pipes in the order (3) - (4) - (6) - (5)



- Unscrew the nut of the oil pipe (3) and cover both the pipe and the hole on the modulator.



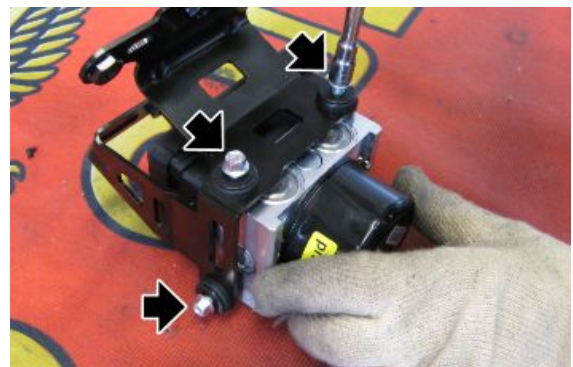
- Remove the fixing screw from the voltage regulator that holds the support bracket of the ABS control unit.



- Operating from the LH side of the motorcycle, remove the ABS modulator

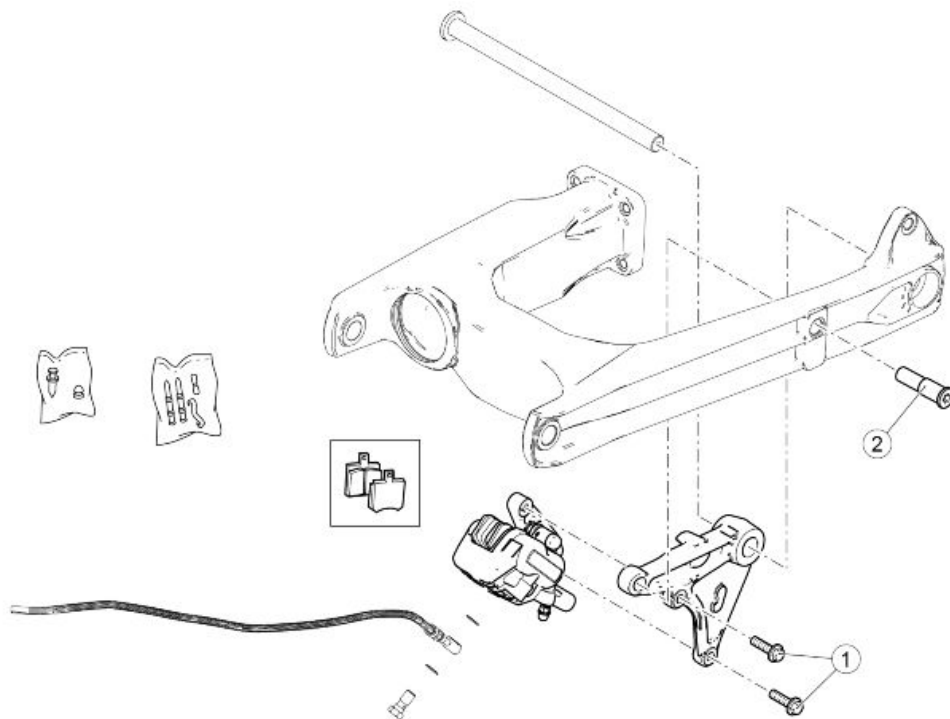


- To remove the ABS modulator from the support, remove the three fixing screws



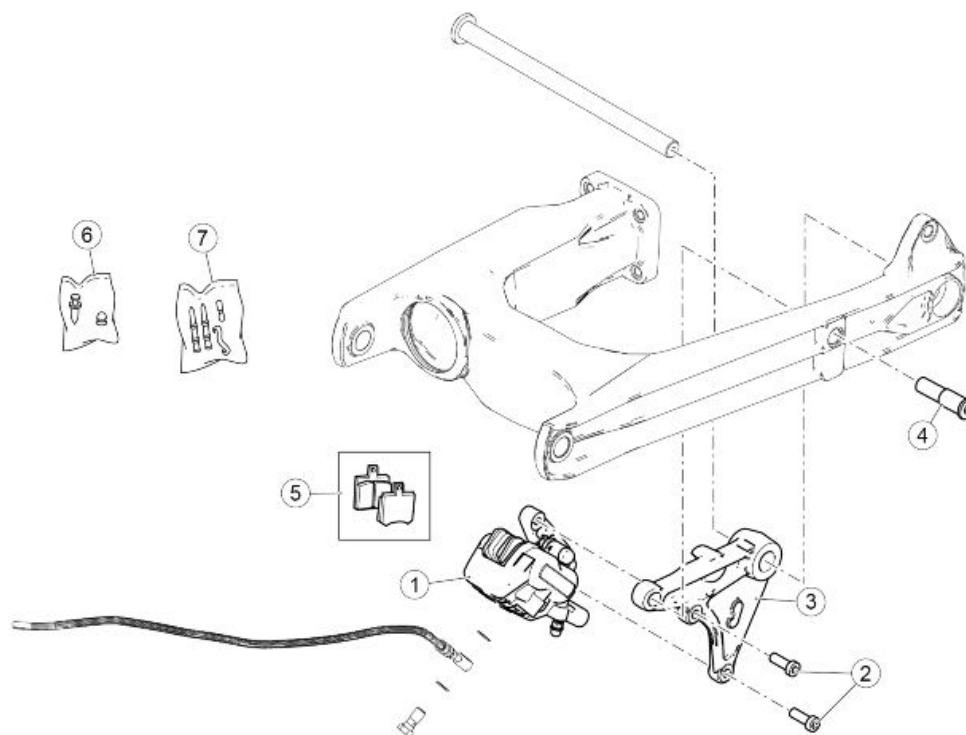
Rear brake calliper

Tightening torques



REAR BRAKE CALLIPER

Pos.	Description	Type	Quantity	Torque	Notes
1	TE flanged screws fastening rear brake calliper	M8x30	2	25 Nm (18.44 lb ft)	-
2	Rear brake calliper support fixing pin	M16	1	35 Nm (25.81 lb ft)	-

Rear brake calliper components**Key:**

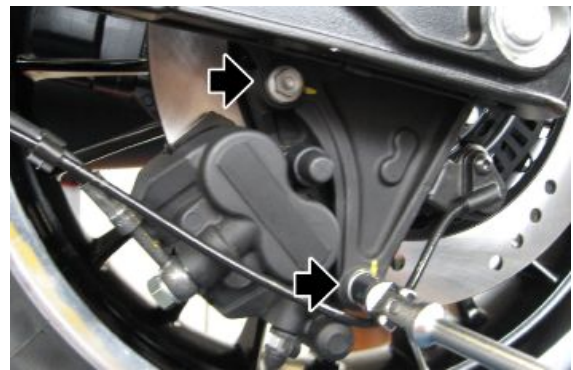
1. Rear brake calliper
2. Flanged hex cap screw
3. Rear brake calliper support
4. Pin
5. Brake pads copy
6. Bleed with hood
7. Pins and springs kit

Removal

- Obtain a special container and empty the system
- Remove the screw fixing the brake pipe to the clamp



- Remove the two calliper fixing screws

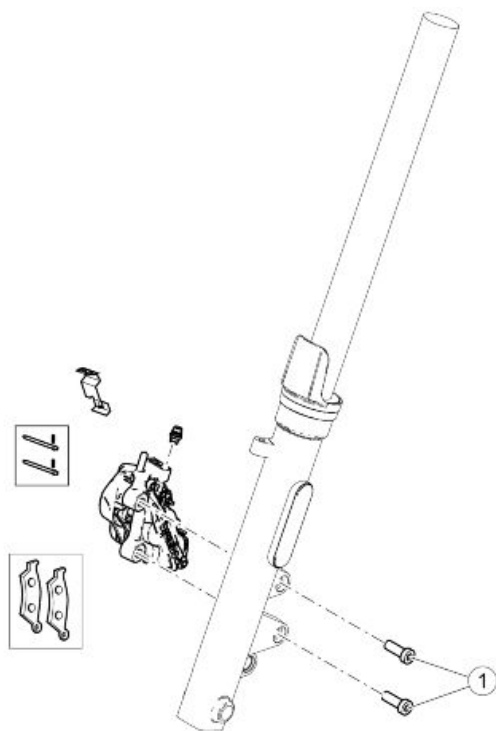


- Remove the brake calliper



Front brake calliper

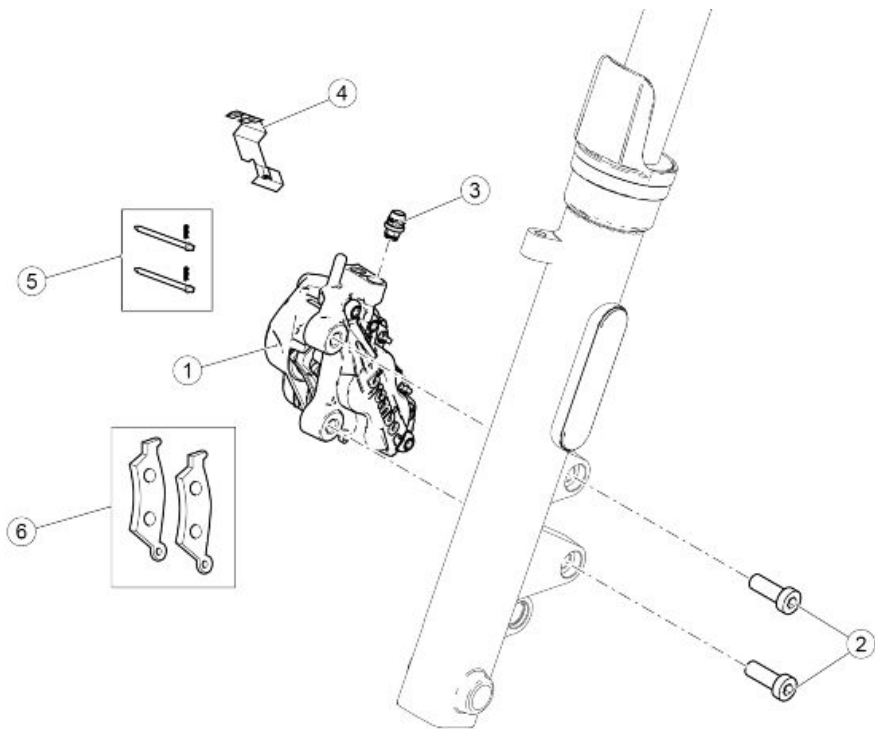
Tightening torques



FRONT BRAKE CALLIPER

Pos.	Description	Type	Quantity	Torque	Notes
1	Brake calliper fixing screws	M10x30	2	50 Nm (36.88 lb ft)	-

Front brake calliper components



Key:

- 1. Front brake calliper

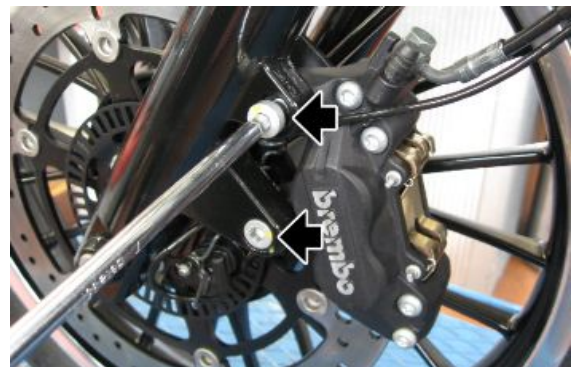
2. SHC screws M10x1.25
3. Bleed with hood
4. Spring
5. Pins and spring clamp
6. Brake pads

Removal

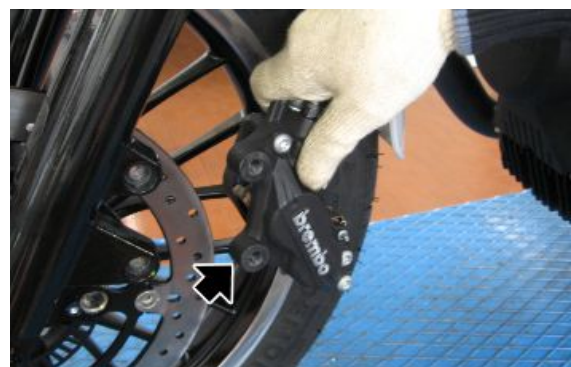
- Obtain a special container and empty the system
- Remove the screw fixing the brake pipe to the clamp



- Remove the two calliper fixing screws



- Remove the brake calliper



Rear brake disc

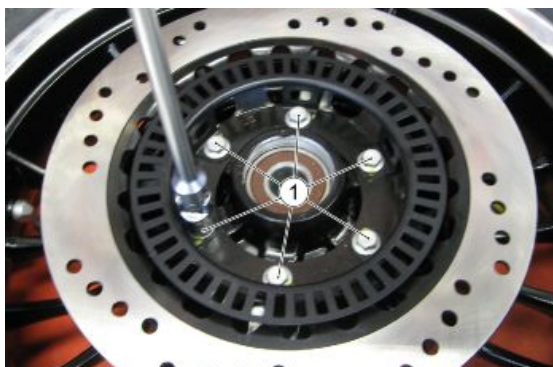
Tightening torques

**REAR WHEEL**

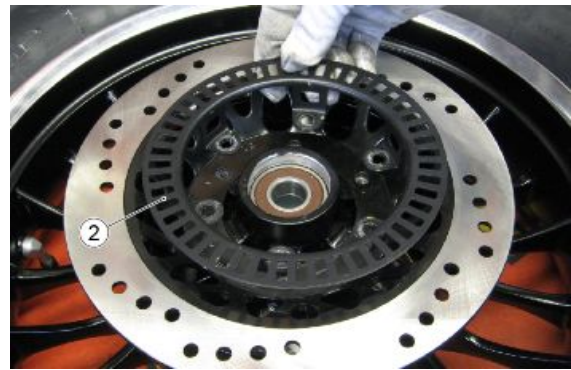
Pos.	Description	Type	Quantity	Torque	Notes
1	Rear wheel fixing pin-nut	M20	1	120 Nm (88.51 lb ft)	-
2	TE flanged screws fastening phonic wheel and brake disc	M8x22	6	25 Nm (18.44 lb ft)	Loct. 243
3	SHC flanged screws fastening ABS sensor support	M6x12	2	10 Nm (7.38 lb ft)	-
4	TBEI torx screw fastening the ABS sensor	M5x16	1	6 Nm (4.43 lb ft)	Loct. 243

Removal

- Remove the rear wheel
- Remove the six fixing screws (1) of the tone wheel and the front disc



- Remove the phonic wheel (2)



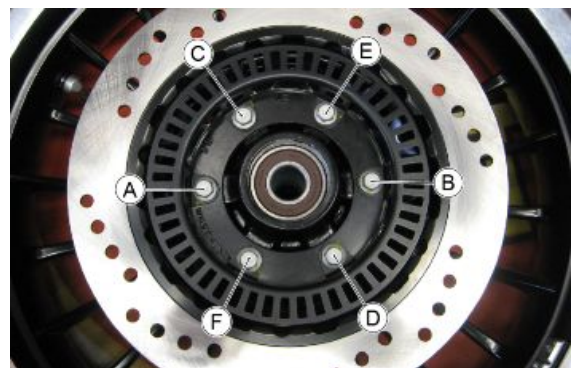
- Remove the brake disc (3)



DURING REFITTING, APPLY LOCTITE 243 ON THE THREAD OF THE BRAKE DISC SCREWS (1).

IMPORTANT

DURING REFITTING, SCREW ALL THE SCREWS (1) MANUALLY AND TIGHTEN THEM OPERATING DIAGONALLY FOLLOWING THIS SEQUENCE: A-B-C-D-E-F.



Disc Inspection

IMPORTANT

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

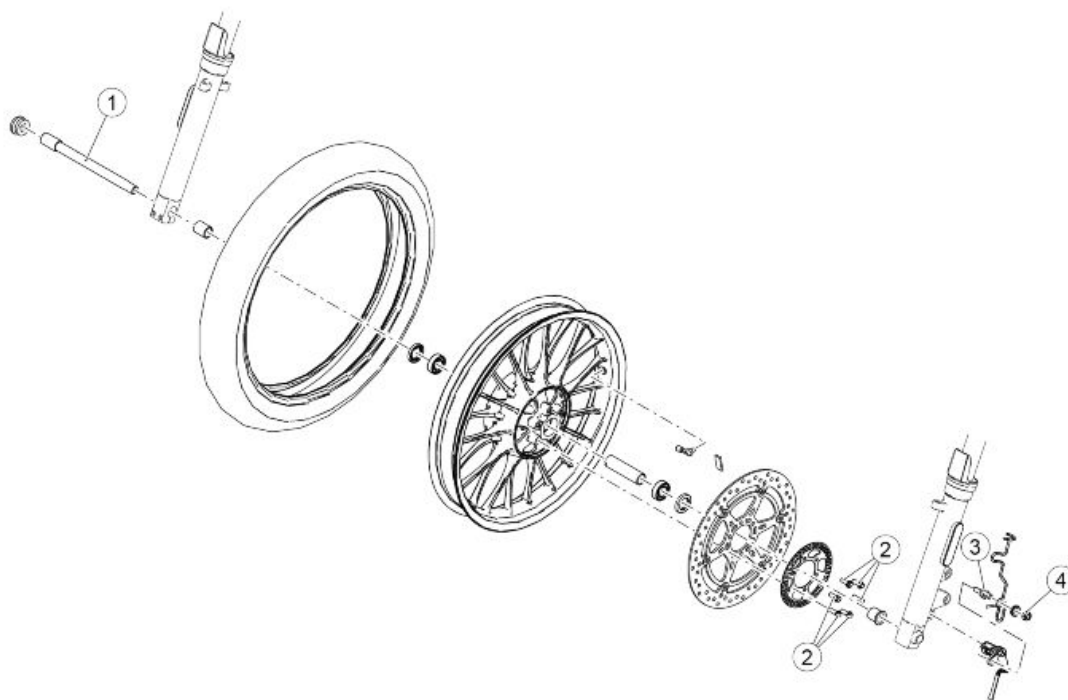


of the disc, is less than the minimum value, replace the disc.

Disc thickness minimum value: 4.5 mm (0.18 in)

Front brake disc

Tightening torques



FRONT WHEEL

Pos.	Description	Type	Quantity	Torque	Notes
1	Front wheel axle	M18	1	80 Nm (59.00 lb ft)	-
2	Phonic wheel/brake disc fastening screws	M8x18	6	25 Nm (18.44 lb ft)	Loct. 243
3	ABS-sensor fixing stud bolt	M5	1	6 Nm (4.43 lb ft)	Loct. 243
4	Cable grommet retainer nut	M6	1	6 Nm (4.43 lb ft)	-

Removal

- Remove the rear wheel
- Remove the six fixing screws (1) of the tone wheel and the front disc



- Remove the phonic wheel (2)



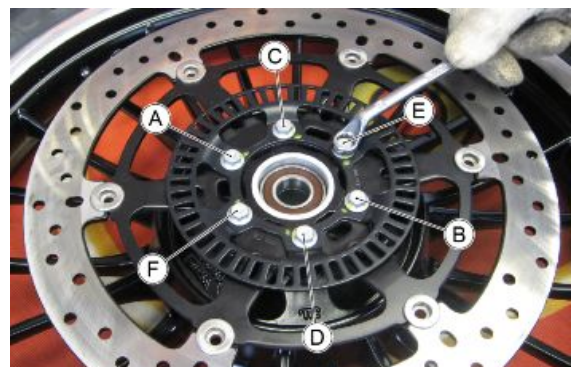
- Remove the brake disc (3)



DURING REFITTING, APPLY LOCTITE 243 ON THE THREAD OF THE BRAKE DISC SCREWS (1).

IMPORTANT

DURING REFITTING, SCREW ALL THE SCREWS (1) MANUALLY AND TIGHTEN THEM OPERATING DIAGONALLY FOLLOWING THIS SEQUENCE: A-B-C-D-E-F.

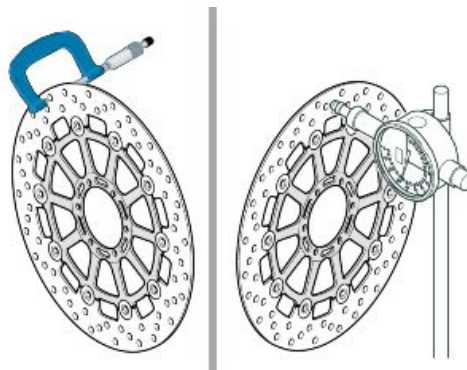


Disc Inspection

IMPORTANT

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.



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.

Disc oscillation tolerance: 0.15 mm (0.0059 in)

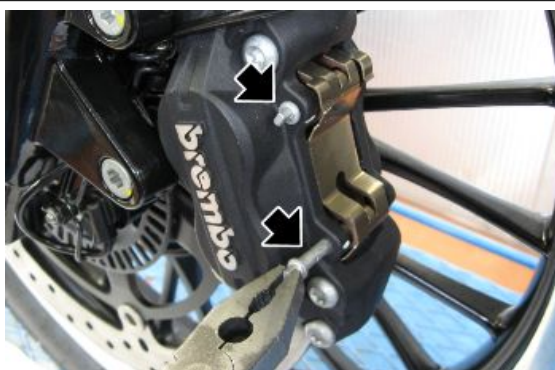
Front brake pads

Removal

- Remove the Seeger locking the retaining pins of the brake pads



- Remove the brake pad retaining pins



- Collect the protection plate.



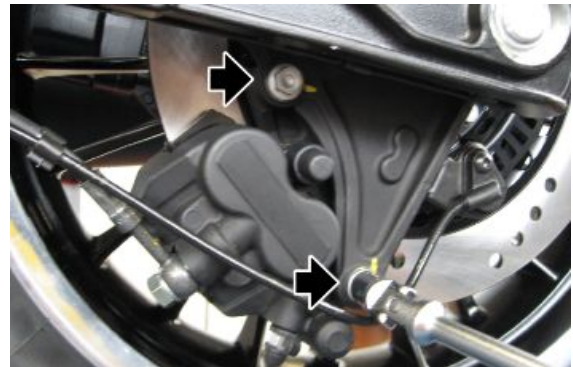
- Remove the brake pads



Rear brake pads

Removal

- Remove the rear brake calliper



- Remove the screws locking the brake pads



- Remove the brake pads



Bleeding the braking system

Front

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 control and by poor braking efficiency.

IMPORTANT

IN VIEW OF THE DANGER THIS POSES FOR VEHICLE AND RIDER, THE HYDRAULIC CIRCUIT MUST BE BLED AFTER REFITTING THE BRAKES AND RESTORING THE BRAKING SYSTEM TO ITS NORMAL OPERATING CONDITIONS.

NOTE

THE VEHICLE MUST BE ON LEVEL GROUND TO BE BLED. WHILE BLEEDING THE HYDRAULIC SYSTEM, FILL THE RESERVOIR WITH THE NECESSARY QUANTITY OF BRAKE FLUID. CHECK THAT, DURING THE OPERATION, THERE IS ALWAYS BRAKE FLUID IN THE RESERVOIR.

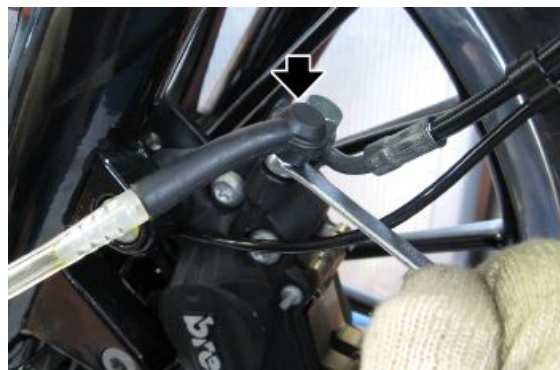
The bleeding procedure can be performed in a traditional way or using specific tools such as vacuum pumps or similar.

In the following is shown the "traditional" bleeding procedure.

- Remove the rubber protection cover from 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.
- Operate the brake lever and then open the bleed valve on the calliper 1/4 of a turn to let the air out.
- Close the bleed again before reaching the lever end of the stroke and repeat the operation until there is no air.
- Repeat the procedure for both callipers.
- 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.



Rear

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 control and by poor braking efficiency.

IMPORTANT

IN VIEW OF THE DANGER THIS POSES FOR VEHICLE AND RIDER, THE HYDRAULIC CIRCUIT MUST BE BLED AFTER REFITTING THE BRAKES AND RESTORING THE BRAKING SYSTEM TO ITS NORMAL OPERATING CONDITIONS.

NOTE

THE VEHICLE MUST BE ON LEVEL GROUND TO BE BLED. WHILE BLEEDING THE HYDRAULIC SYSTEM, FILL THE RESERVOIR WITH THE NECESSARY QUANTITY OF BRAKE FLUID. CHECK THAT, DURING THE OPERATION, THERE IS ALWAYS BRAKE FLUID IN THE RESERVOIR.

- Remove the rubber protection cover from the bleed valve.

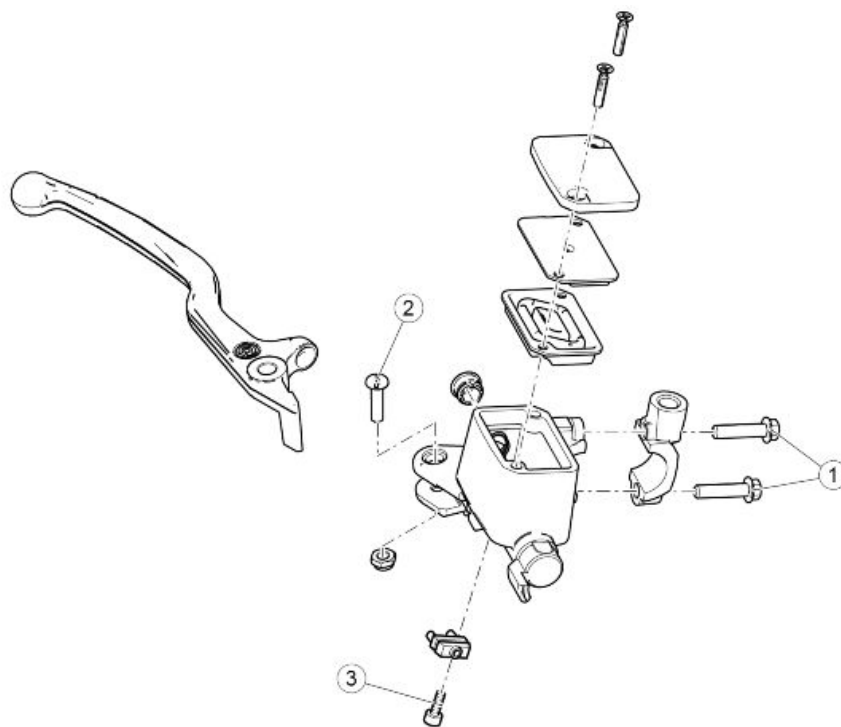


- Insert the transparent plastic pipe in the rear brake calliper bleed valve and insert the other end of this pipe into a container to collect the fluid.
- Remove the rear brake fluid reservoir cap.
- Operate the brake lever and then open the bleed valve on the calliper 1/4 of a turn to let the air out.
- Close the bleed again before reaching the lever end of the stroke and repeat the operation until there is no air.
- Screw the bleeding valve and remove the pipe.
- Top-up the reservoir until the correct brake fluid level is obtained.
- Refit and lock the rear brake oil reservoir cap.
- Refit the rubber protection cover.



Front brake pump

Tightening torques



FRONT BRAKE MASTER CYLINDER

Pos.	Description	Type	Quantity	Torque	Notes
1	Brake pump U-bolt fixing screws	M6x25	2	10 Nm (7.38 lb ft)	-
2	Brake pump control pin	M6	1	10 Nm (7.38 lb ft)	-
3	SHC screws fastening the stop switch	M4x10	1	3 Nm (2.21 lb ft)	-

Removal

- Remove the rear-view mirror
- Drain off the front brake system
- Disconnect the brake switch connectors



- Remove the two brake pump fixing screws

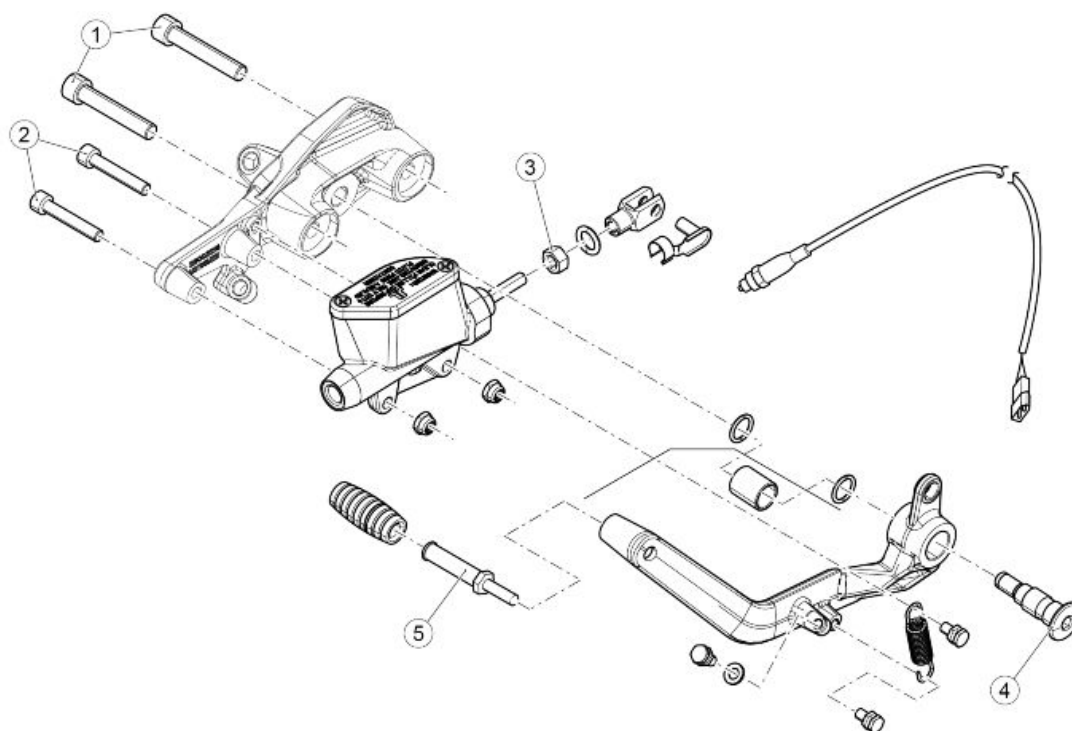


- Remove the brake pump

IMPORTANT
DURING REFITTING FILL UP THE BRAKE SYSTEM WITH THE RELATIVE BLEEDING PROCEDURE TO AVOID AIR BUBBLES IN THE SYSTEM

Pompa freno posteriore

Tightening torques

**REAR BRAKE PUMP**

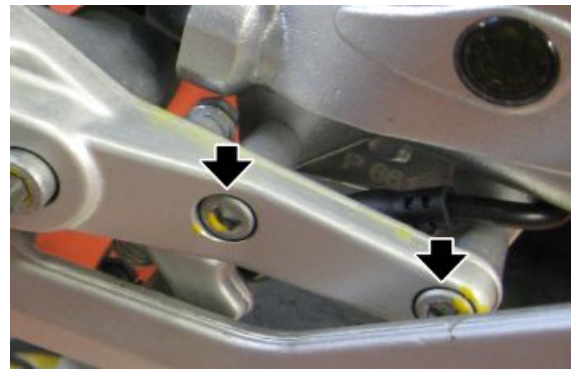
Pos.	Description	Type	Quantity	Torque	Notes
1	SHC screws fastening the gearbox support plate to the chassis	M8x45	2	25 Nm (18.44 lb ft)	Loct. 243
2	SHC screws fastening the brake pump to the gearbox support plate	M6x25	2	10 Nm (7.38 lb ft)	-
3	Rear brake rod lock nut	M6	1	10 Nm (7.38 lb ft)	-
4	Brake lever pin	-	1	20 Nm (14.75 lb ft)	Loct. 243
5	Rear brake pedal	M8	1	25 Nm (18.44 lb ft)	-

Rimozione

- Use an appropriate container to recover the oil inside the brake system.
- Remove the brake pipe by acting on the fitting and empty the system



- Remove the two brake pump rear fixing screws at the support plate



- Move the O-Ring from the retainer plate and remove it



- Remove the brake pump



Brake system lines

Removal

- Drain the braking system
- Remove the saddle
- Remove the fuel tank
- Remove the silencers

IMPORTANT

WHILE IT IS NOT MANDATORY TO REMOVE THE SILENCERS, WE RECOMMEND DOING SO IN ORDER TO AVOID CAUSING ANY SUPERFICIAL DAMAGE TO THEM.

REMOVING THE FRONT BRAKE PIPE (BETWEEN THE BRAKE FLUID TANK AND THE ABS CONTROL UNIT)

- Unscrew and remove the two screws (1)



- Disconnect the connector (2)



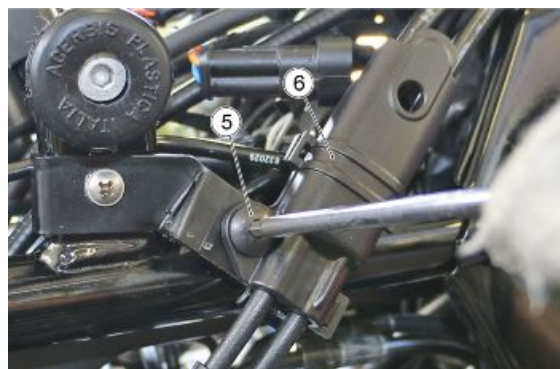
- Remove the usb cover (3)



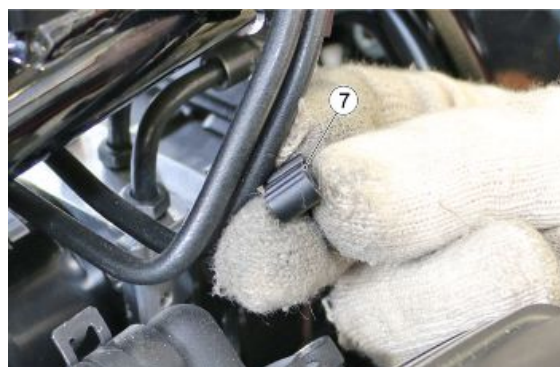
- Remove the clamp (4)



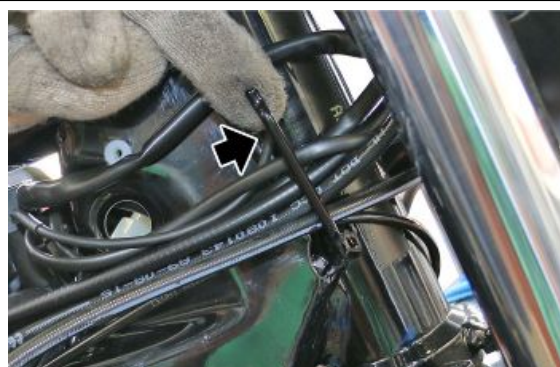
- undo the screw (5)
- Remove the cover (6)



- Remove the cable clamp (7)



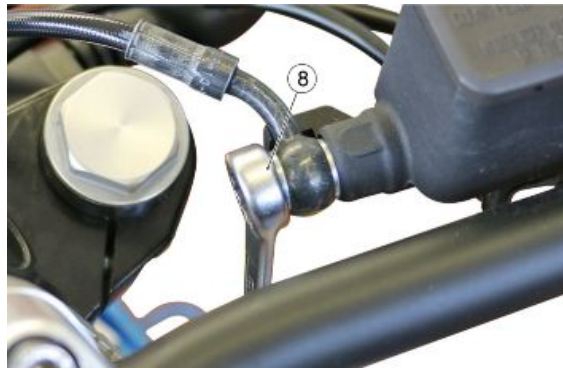
- Widen the cable clamp as indicated in figure



- Remove the brake pipe as indicated in figure



- Unscrew and remove the screw (8)



- Retrieve the two washers (9)



- Unscrew the nut (10)



- Remove the brake pipe (11)



REMOVING THE FRONT BRAKE PIPE (BETWEEN THE BRAKE CALLIPERS AND THE ABS CONTROL UNIT)

- Unscrew and remove the two screws (1)



- Disconnect the connector (2)



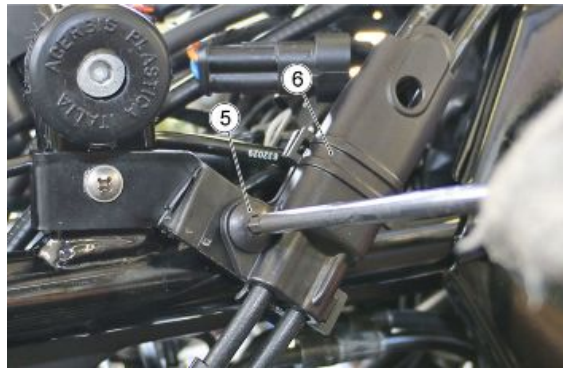
- Remove the usb cover (3)



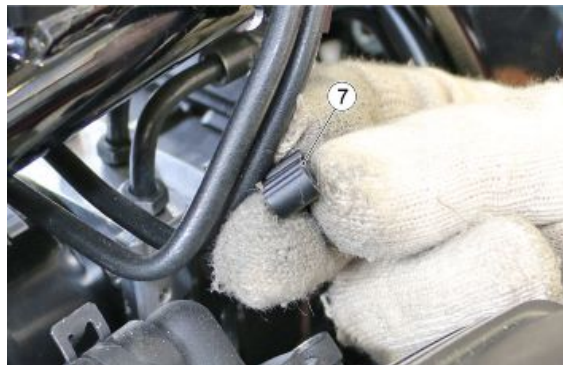
- Remove the clamp (4)



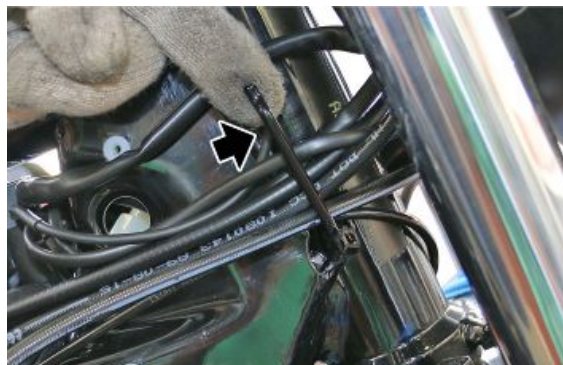
- undo the screw (5)
- Remove the cover (6)



- Remove the cable clamp (7)



- Widen the cable clamp as indicated in figure



- Remove the brake pipe as indicated in figure



- Remove the brake pipe from the cable clamp (8)



- Undo and remove the screw (9)



- Retrieve the washer (10)



- Undo and remove the screw (11)



- Retrieve the two washers (12)



- Unscrew the nut (13)



- Remove the brake pipe (14)



REMOVING THE REAR BRAKE PIPE (BETWEEN THE BRAKE FLUID TANK AND THE ABS CONTROL UNIT)

- Unscrew and remove the two screws (1)



- Disconnect the connector (2)



- Remove the usb cover (3)



- Remove the clamp (4)



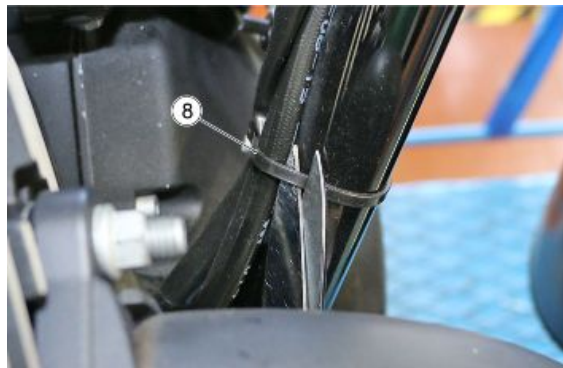
- undo the screw (5)
- Remove the cover (6)



- Remove the cable clamp (7)



- Remove the clamp (8)



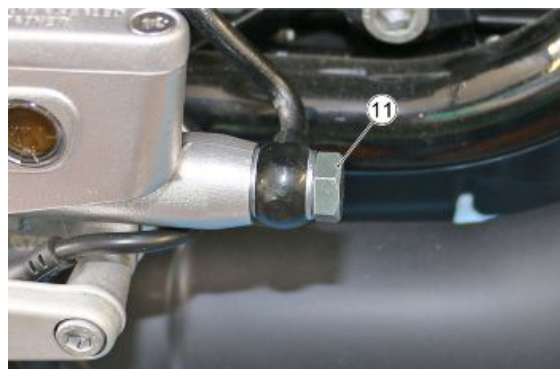
- Undo and remove the screw (9)



- Remove the plate (10)



- Undo and remove the screw (11)



- Retrieve the two washers (12)



- Unscrew the nut (13)



- Remove the brake pipe (14)



REMOVING THE REAR BRAKE PIPE (BETWEEN THE BRAKE CALLIPERS AND THE ABS CONTROL UNIT)

- Unscrew and remove the two screws (1)



- Disconnect the connector (2)



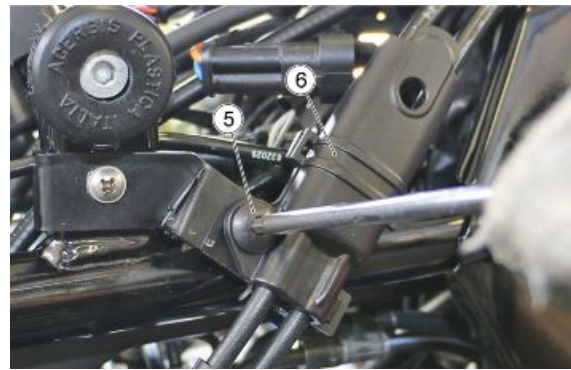
- Remove the usb cover (3)



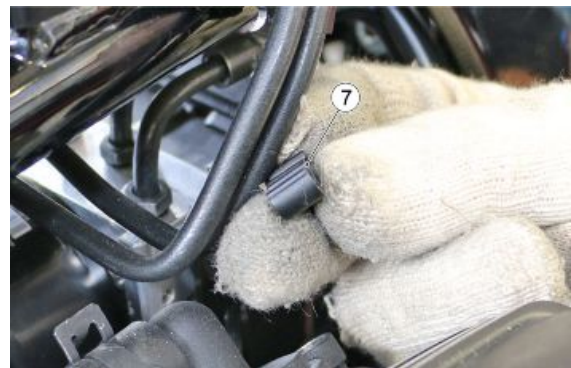
- Remove the clamp (4)



- undo the screw (5)
- Remove the cover (6)



- Remove the cable clamp (7)



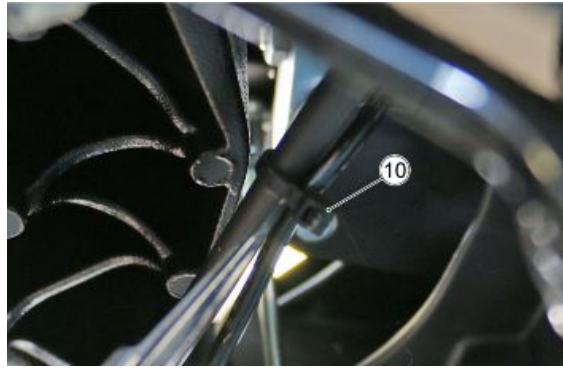
- Remove the brake pipe from the cable clamp (8)



- Unscrew the nut (9) and remove it



- Remove the clamp (10)



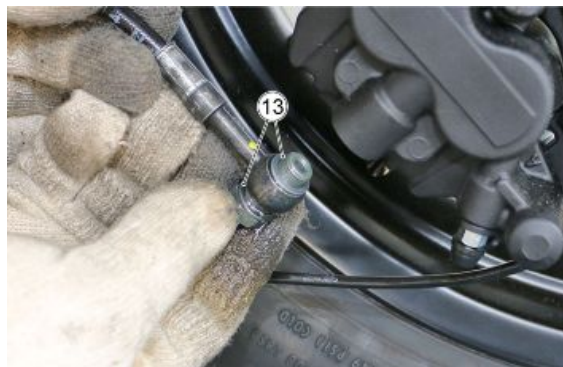
- Remove the brake pipe from the cable clamp (11)



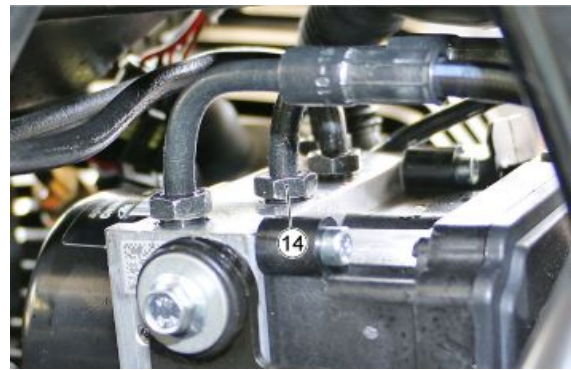
- Undo and remove the screw (12)



- Retrieve the two washers (13)



- Unscrew the nut (14)



- Remove the brake pipe (15)

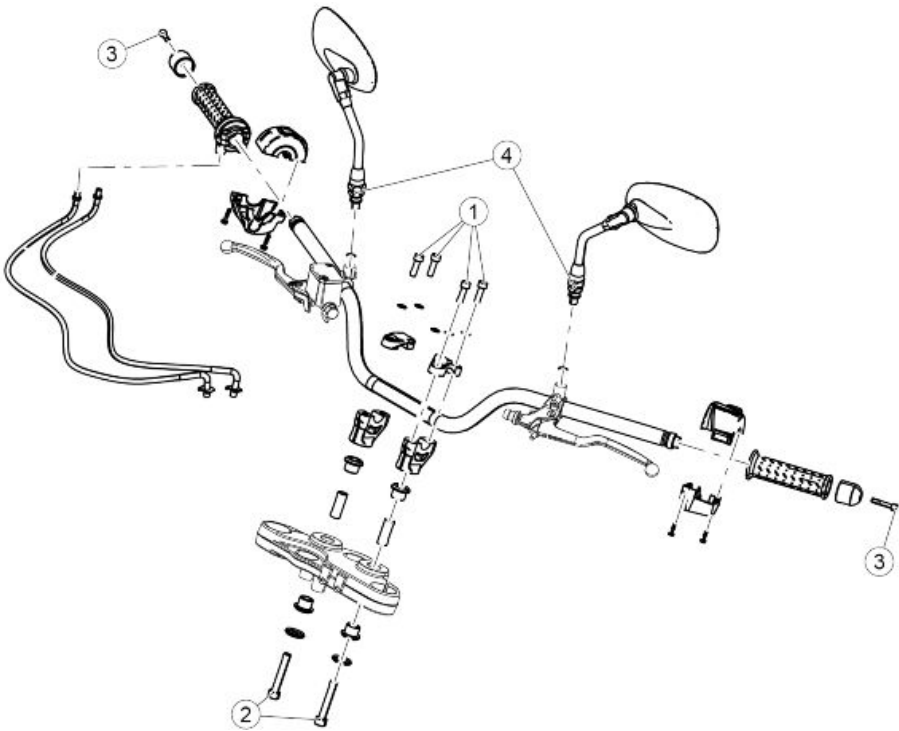


INDEX OF TOPICS

BODYWORK

BOD

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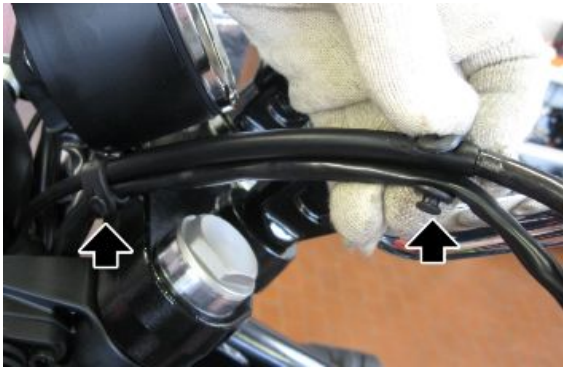
HANDLEBAR

Pos.	Description	Type	Quantity	Torque	Notes
1	Handlebar U-bolt fastener screw	M8	4	25 Nm (18.44 lb ft)	-
2	Handlebar U-bolt mountings fastener screw	M10x60	2	50 Nm (36.88 lb ft)	Loct. 243
3	Handlebar counterweight fastener SHC screws	M6x35	2	10 Nm (7.38 lb ft)	-
4	Rear-view mirrors	M10	2	Manual	-

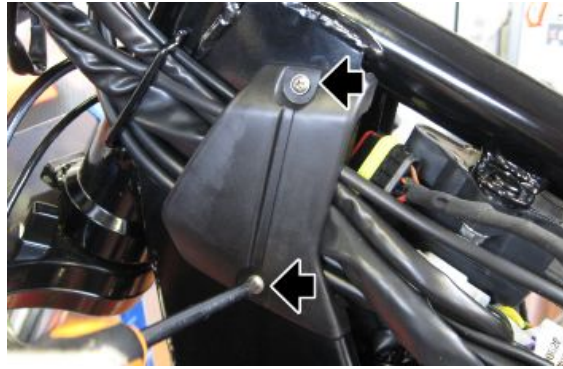
- Remove the tank to have access to the connectors of the light switch

LEFT LIGHT SWITCH

- Remove the vibration-damping weight and the handlebar
- Remove the cable grommet fixing the wiring harness of the light switch to the clutch cable



- Remove the left frame protection



- Disconnect the connectors and free the wiring harness from the vehicle



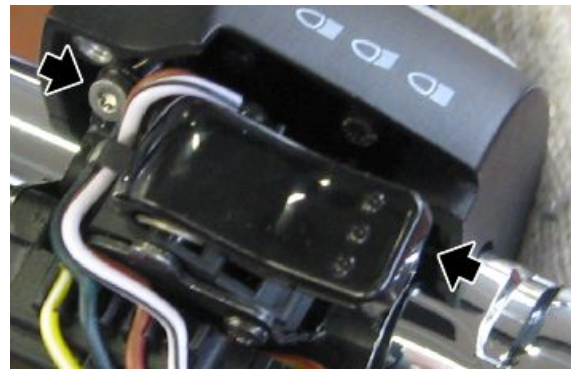
- Remove the two light switch cover fixing screws



- Remove the light switch cover



- Loosen the two light switch fixing screws

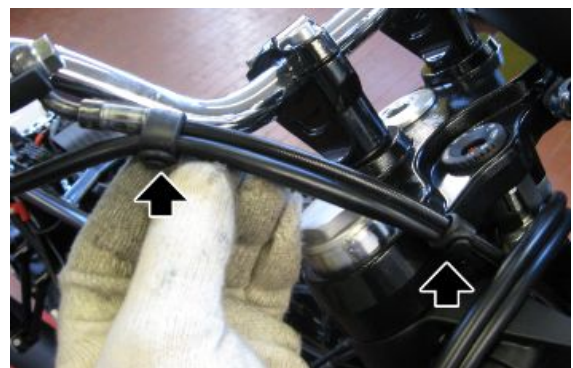


- Remove the light switch sliding it off the handlebar



RIGHT LIGHT SWITCH

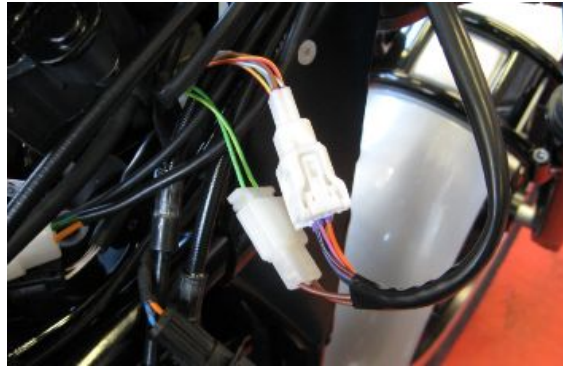
- Remove the vibration-damping weight and the handlebar
- Remove the cable grommet fixing the wiring harness of the light switch to the brake cable



-
- Remove the right frame protection



- Disconnect the connectors and free the wiring harness from the vehicle



- Disconnect the faston from the front brake switch



- Loosen the fixing screws of the front brake pump U bolt and move it from the light switch to allow its demounting/removal



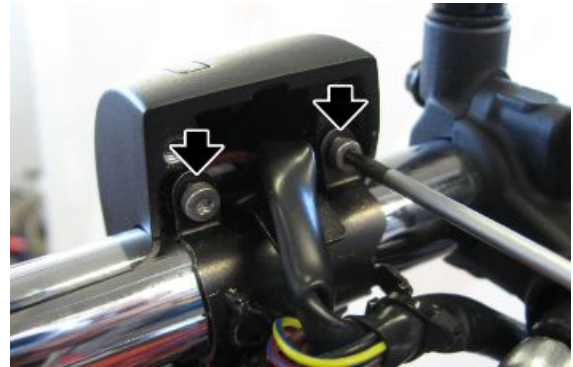
- Remove the two light switch cover fixing screws



- Remove the light switch cover



- Loosen the two light switch fixing screws

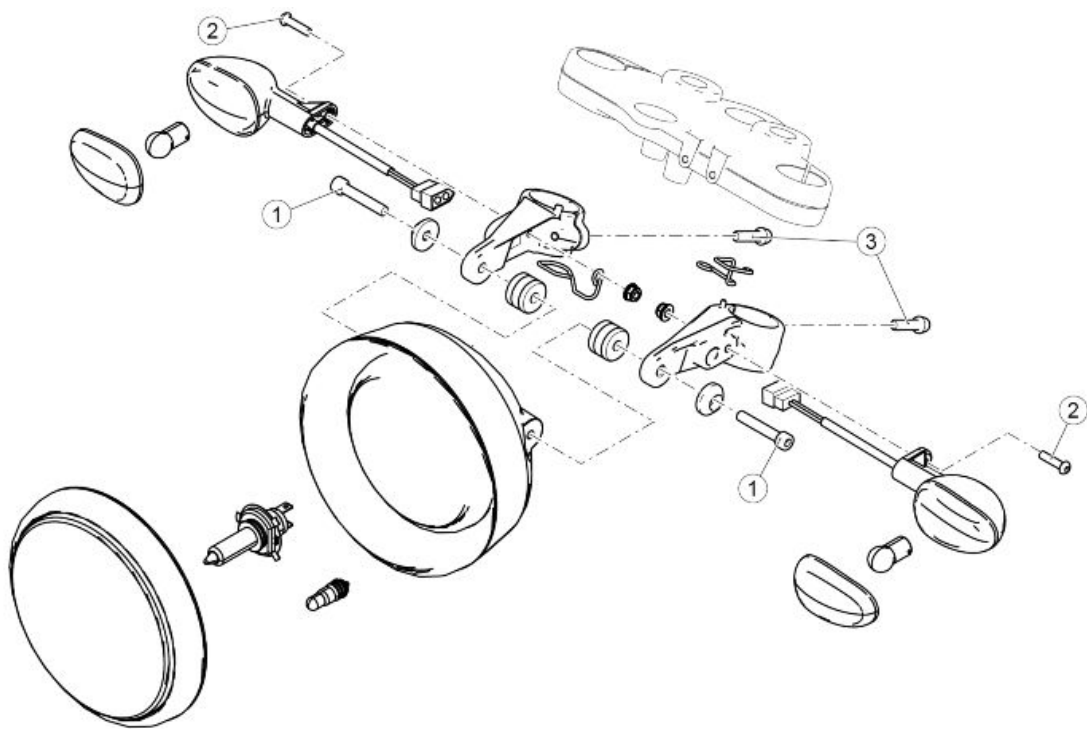


- Remove the light switch sliding it off the handlebar



Headlight assy.

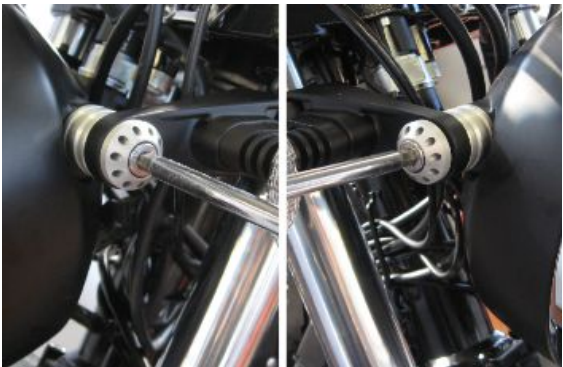
Tightening torques



HEADLIGHT UNIT

Pos.	Description	Type	Quantity	Torque	Notes
1	Headlamp fastening screws	M8x45	2	15 Nm (11.06 lb ft)	-
2	Front turn indicators SHC fastening screws	M6x25	2	10 Nm (7.38 lb ft)	-
3	SHC screws fastening the headlight support strips	M6x25	2	10 Nm (7.38 lb ft)	-

- Remove the two screws fixing the headlamp to the supports



- Move the headlamp from the supports and remove the spacers



- Disconnect the connector from the headlamp and remove it



BULB REPLACEMENT

- To replace the bulbs, remove the complete parabole from the headlight body by undoing the screw (1)

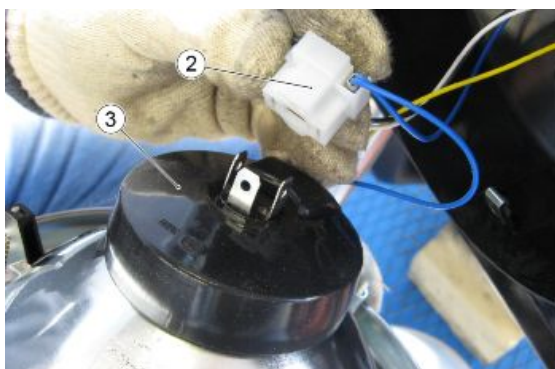


LOW BEAM / HIGH BEAM LIGHT BULB

- Pull out the electrical connection to the bulb (2), and disconnect it from the bulb.
- Move hood (3) manually.
- Release the two ends of the retaining spring (4) located on the bulb holder.
- Pull the bulb (5) out of its fitting.

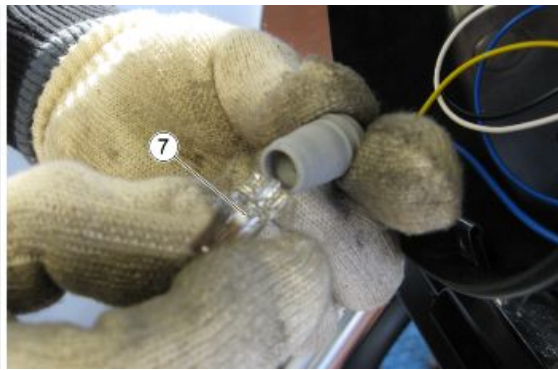
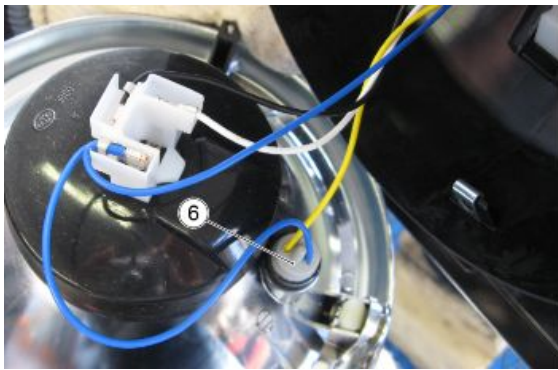
NOTE

INSERT THE BULB INTO THE BULB HOLDER, MAKING SURE THE REFERENCE FITTINGS MATCH.



DAYLIGHT RUNNING LIGHT BULB

- Pull out the daylight running light bulb holder (6) from its seat.
- Remove the bulb (7) and replace it with another of the same type.
- Check the proper insertion of the bulb in the bulb holder.

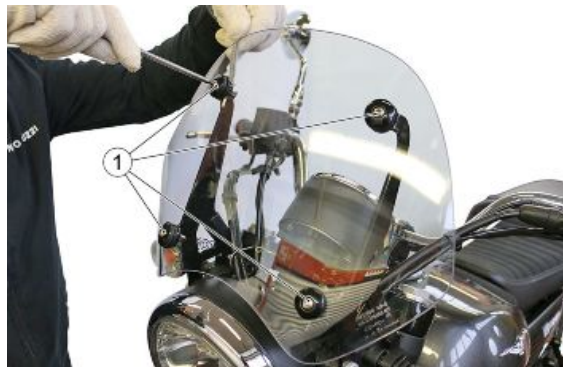


Headlight fairing

(2018)

(ROAMER)

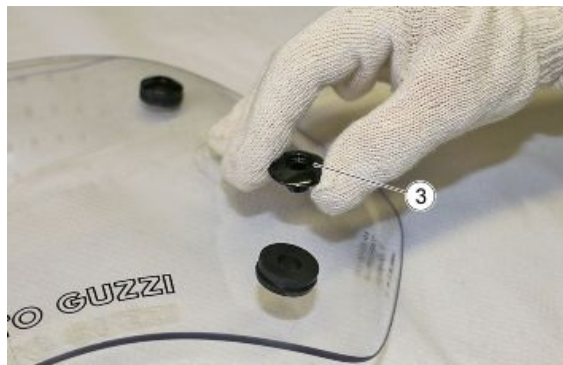
- Unscrew and remove the four screws (1)



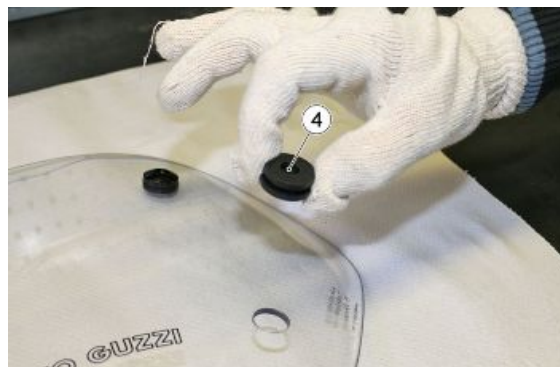
- Remove the top fairing (2)



- Retrieve the four bushings (3)



- Collect the four rubber pads (4)



- Undo and remove the screw (5)



- Undo and remove the screw (6)



- Remove the support bracket (7)



Unscrew and remove the screw (8)



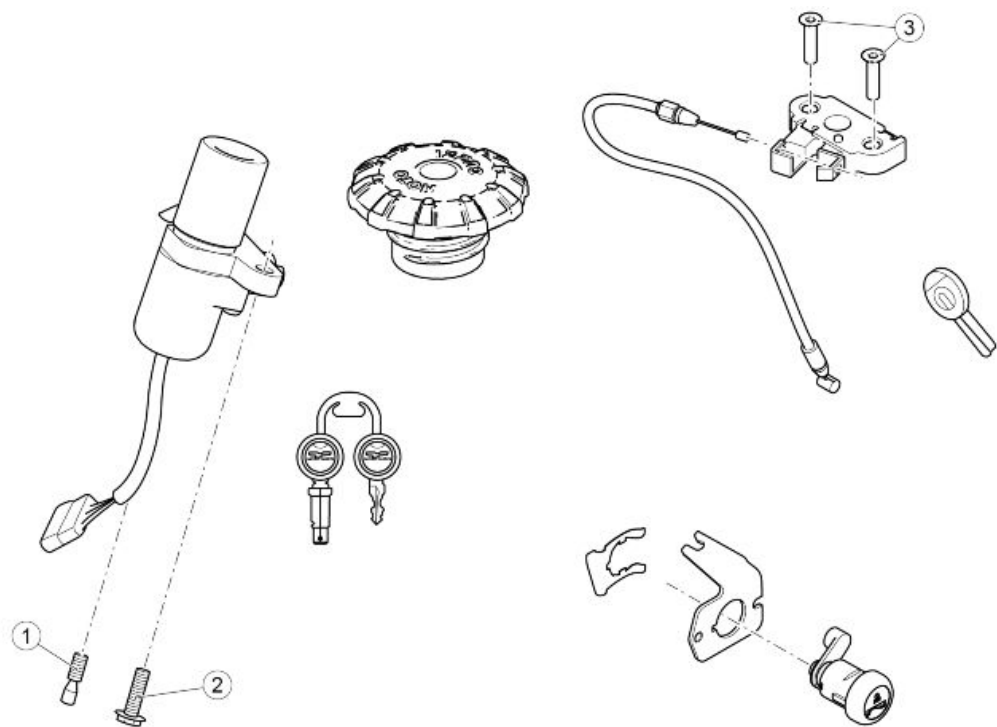
-
- Undo and remove the screw (9)



-
- Remove the support bracket (10)



Disassembling the lock



Locks

Pos.	Description	Type	Quantity	Torque	Notes
1	Special screw fastening the ignition lock	M8x15	1	At the point of failure	-
2	Ignition lock fixing screw	M8x15	1	25 Nm (18.44 lb ft)	Loct. 243
3	Saddle release block fixing screws	M6x25	2	10 Nm (7.38 lb ft)	-

- Remove the left side fairing
- Remove the fork spring



- Remove the cable support plate



- Extract the ignition switch assembly externally



Taillight assy.

- Remove the license plate cover
- Remove the locking clamp of the tail-light wiring harness / arrows and disconnect the connector



- Remove the three fastening screws of the headlight to the support bracket



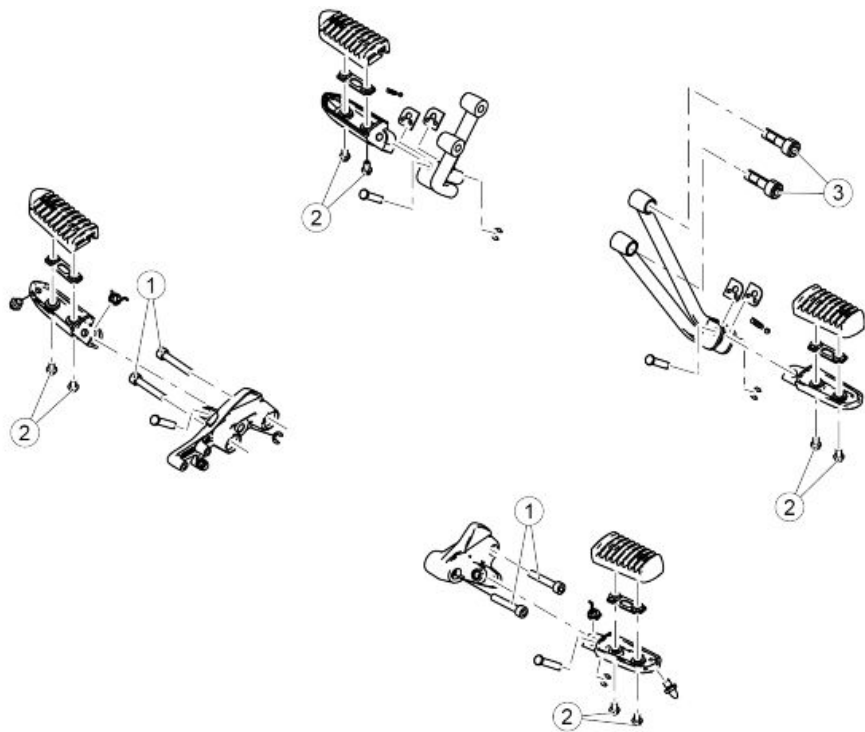
- Remove the taillight together with the wiring harness



- During reassembly, pay attention to correctly position the present grommet on the taillight wiring harness, the groove of the license plate holder



Footrest



FOOTRESTS

Pos.	Description	Type	Quantity	Torque	Notes
1	SHC screws fastening the rider footrest mounting	M8x45	4	25 Nm (18.44 lb ft)	Loct. 243

Pos.	Description	Type	Quantity	Torque	Notes
2	Flanged hexagon screws fastening the footrest rubber guards	M6x12	8	10 Nm (7.38 lb ft)	-
3	Passenger footrest mounting fastening screws	M8x30	4	25 Nm (18.44 lb ft)	Loct. 243

(2016)

REMOVAL OF THE RIGHT-HAND RIDER FOOTREST SUPPORT

- Move the gasket (1)



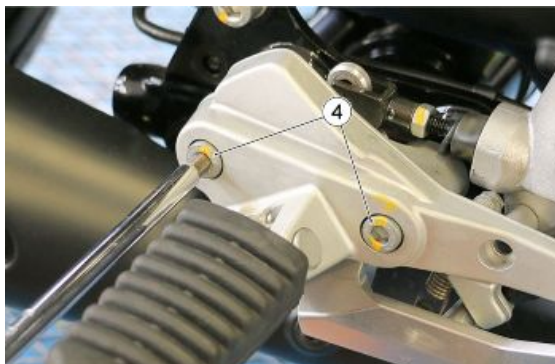
- Unhook and remove the clip (2)



- Block the nut so that it cannot rotate, as illustrated in the figure, and unscrew and remove the two retaining screws (3)



- Undo and remove the two fastening screws (4)

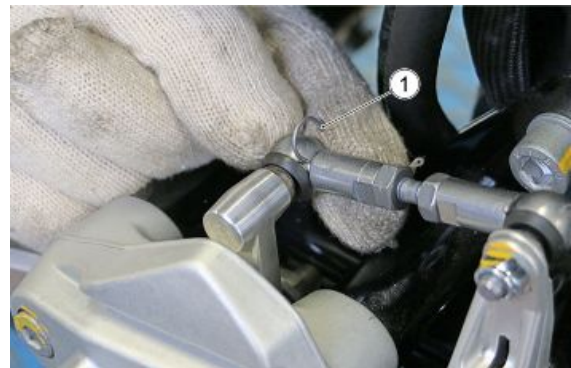


- Remove the microswitch (5) turning the footrest support in order not to damage the microswitch cabling
- Remove the complete right hand footrest support (6)



REMOVAL OF THE LEFT-HAND RIDER FOOTREST SUPPORT

- Remove the clip (1)



- Remove the gear shift lever tie-rod (2) from the ball joint



- Undo and remove the two fastening screws (3)



- Remove the footrest support (4)



(2017)

REMOVAL OF THE RIGHT-HAND RIDER FOOTREST SUPPORT

- Remove the rear brake lever return spring (1)

IMPORTANT

DISASSEMBLE THE BRAKE LEVER RETURN SPRING FROM THE FOOTREST SUPPORT, TAKING CARE NOT TO WEAKEN IT.



- Block the nut (5) so that it cannot rotate and remove the screw (2)
- Retrieve the washer (4) and the spacer (3)

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE NUT TO THE REQUIRED TORQUE VALUE.

Characteristic

Tightening torque for rear brake pump shaft retaining nut

10 Nm (7.38 lb ft)



- Block the nut (6) so that it cannot rotate and unscrew and remove the rear brake pump shaft extension (7)

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE NUT TO THE REQUIRED TORQUE VALUE.

Characteristic

Tightening torque on adjustment nuts

8 Nm (5.90 lb ft)



- Block the nuts (9) so that they cannot rotate and remove the two rear brake oil tank retaining screws (8)

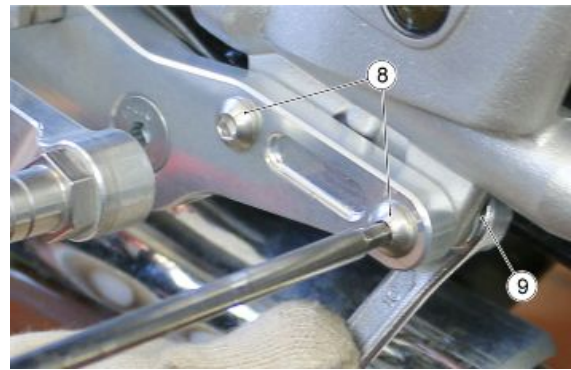
IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE NUTS TO THE REQUIRED TORQUE VALUE

Characteristic

Tightening torque for rear brake pump retaining nuts

10 Nm (7.38 lb ft)



- Undo and remove the two footrest support retaining screws (10)

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE SCREWS TO THE REQUIRED TORQUE VALUE.

Characteristic

Tightening torque for footrest support retaining screws

20 Nm (14.75 lb ft) (Loctite 243)



- Remove the clamp (11)



- Remove the micro-switch (12) by rotating the footrest support in order to avoid damaging the micro-switch wiring
- Remove the complete footrest support plate (13)

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE MICRO-SWITCH TO THE REQUIRED TORQUE VALUE

Characteristic

Tightening torque for micro-switch

10 Nm (7.38 lb ft)



REMOVAL OF THE LEFT-HAND RIDER FOOT-REST SUPPORT

- Remove the clip (1)



- Remove the gear shift lever tie-rod (2) from the ball joint

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE PIN AND THE NUT TO THE REQUIRED TORQUE VALUE.

Characteristic

Tightening torque for gear control tie-rod pin and nut

10 Nm (7.38 lb ft) (Loctite 243)



- Undo and remove the two footrest support plate retaining screws (3)

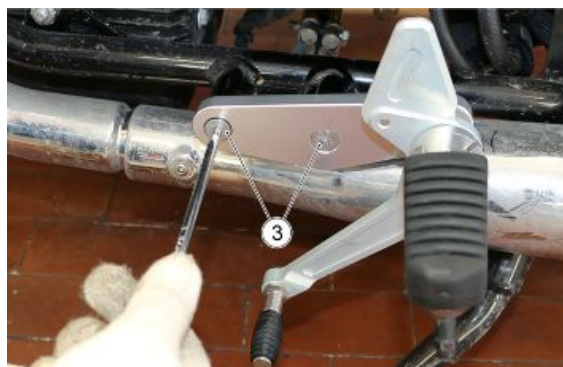
IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE SCREWS TO THE REQUIRED TORQUE VALUE.

Characteristic

Tightening torque for footrest support retaining screws

20 Nm (14.75 lb ft) (Loctite 243)



- Remove the complete left hand foot-rest support (4)



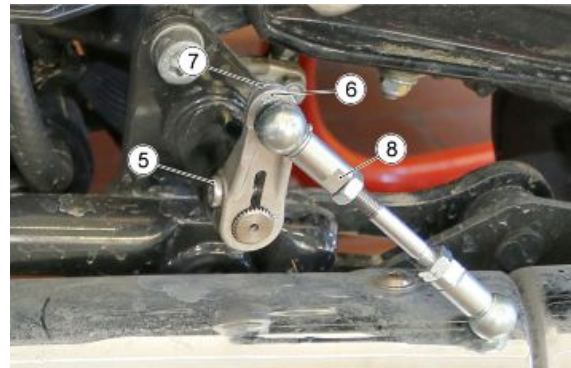
- Undo and remove the screw (5)
- Remove the gear control lever (6) complete with gear tie-rod.
- Unscrew the nut (7) and remove it
- Remove the gear tie-rod (8)

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE SCREW TO THE REQUIRED TORQUE VALUE.

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE NUT TO THE REQUIRED TORQUE VALUE. USE LOCTITE 243.

**Characteristic****Tightening torque for gear control lever screw**

10 Nm (7.38 lb ft)

Tightening torque for gear control tie-rod nut

10 Nm (7.38 lb ft)

MOUNTING THE RIGHT HAND DRIVER'S FOOTREST SUPPORT

- Replace the micro-switch in its housing, rotating the footrest support in order to avoid damaging the micro-switch wiring,

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE MICRO-SWITCH TO THE REQUIRED TORQUE VALUE

**Characteristic****Tightening torque for micro-switch**

10 Nm (7.38 lb ft)

- Insert and tighten the two fastening screws (2)

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE SCREWS TO THE REQUIRED TORQUE VALUE.

Characteristic**Tightening torque for footrest support retaining screws**

20 Nm (14.75 lb ft) (Loctite 243)



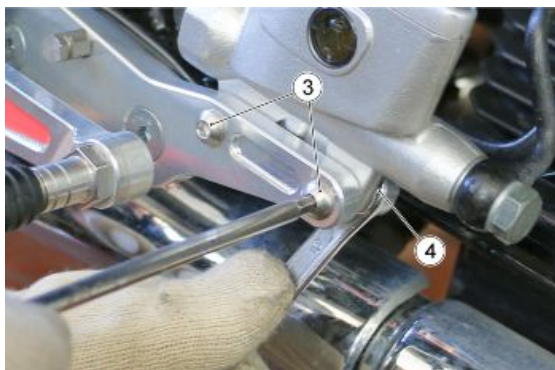
- Insert the two screws (3) and tighten the nuts (4) as illustrated in the figure, applying the pre-defined tightening torque.

IMPORTANT

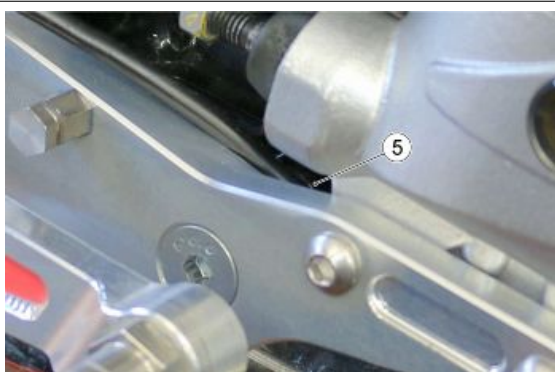
DURING THE ASSEMBLY PHASE, TIGHTEN THE NUTS TO THE REQUIRED TORQUE VALUE

Characteristic**Tightening torque for rear brake pump retaining nuts**

10 Nm (7.38 lb ft)



- Insert a clamp (5) in order to secure the micro-switch wiring in position



- Mount the rear brake pump shaft extension (10) using the retaining screws (6), the flanged spacer (7), the washer (8) and the retaining nut (9)
- Tighten the nut (9) to the prescribed torque
- Adjust the play on the rear brake pump shaft so that the pump is not pre-loaded when in the rest position

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE NUT TO THE REQUIRED TORQUE VALUE.

Characteristic**Tightening torque for rear brake pump shaft retaining nut**

10 Nm (7.38 lb ft)



- Replace the rear brake lever return spring (11)

IMPORTANT

MOUNT THE BRAKE LEVER RETURN SPRING ON THE FOOTREST SUPPORT, TAKING CARE NOT TO STRETCH IT.

**IMPORTANT**

DURING THE ASSEMBLY PHASE, TIGHTEN THE SLIDING PIN TO THE REQUIRED TORQUE VALUE.

Characteristic

Tightening torque for footrest sliding pin

10 Nm (7.38 lb ft) (Loctite 243)

IMPORTANT

CHECK THE POSITION OF THE LEVER AND REGULATE IT IF NECESSARY USING THE DEDICATED ADJUSTMENTS. ONCE THE EXACT POSITION HAS BEEN IDENTIFIED, TIGHTEN THE ADJUSTMENT NUTS TO THE REQUIRED TORQUE.

CHECK THAT THE BRAKE LEVER, REAR BRAKING SYSTEM AND BRAKE LIGHT FUNCTION CORRECTLY.

Characteristic

Tightening torque on adjustment nuts

8 Nm (5.90 lb ft)

MOUNTING THE LEFT HAND DRIVER'S FOOTREST SUPPORT

- Secure the footrest support in position by inserting and tightening the two retaining screws (1)

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE SCREWS TO THE REQUIRED TORQUE VALUE.

Characteristic

Tightening torque for footrest support retaining screws

20 Nm (14.75 lb ft) (Loctite 243)



- Connect the gear control tie-rod (2) to the pin (3)
- Tighten the nut (4)
- Insert the clip (5)

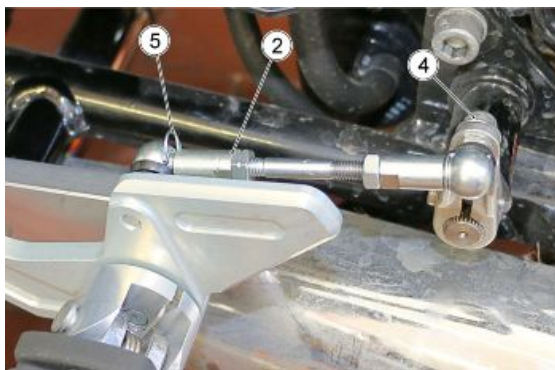
IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE PIN AND THE NUT TO THE REQUIRED TORQUE VALUE.

Characteristic

Tightening torque for gear control tie-rod pin and nut

10 Nm (7.38 lb ft) (Loctite 243)

**IMPORTANT**

CHECK THE POSITION OF THE LEVER AND REGULATE IT IF NECESSARY USING THE DEDICATED ADJUSTMENTS. ONCE THE EXACT POSITION HAS BEEN IDENTIFIED, TIGHTEN THE ADJUSTMENT NUTS TO THE REQUIRED TORQUE.

CHECK THAT THE GEAR LEVER FUNCTIONS CORRECTLY.

Characteristic

Tightening torque on adjustment nuts

8 Nm (5.90 lb ft)

ADAPTATION RIGHT HAND DRIVER'S FOOTREST SUPPORT FROM MY 2016 TO 2017 MODEL

- Block the nuts so that they cannot rotate, as illustrated in the figure, and unscrew and remove the rear brake pump retaining screws (1)
- Undo and remove the footrest support retaining screws (2)



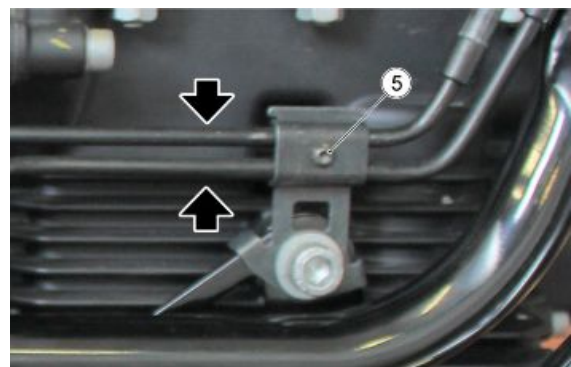
- Remove the O-ring (2)
- Detach the fork (3) and remove it



- Remove the micro-switch (4) (rotating the foot board in order to avoid damaging the micro-switch wiring)



- Undo the brake tube retaining plate fastening screw (5) and remove it
- Invert the brake tubes indicated in the figure so that the rear brake pump tube is in the high position
- Insert the brake tube retaining plate fastening screw (5) and hand tighten it
- Remove the right hand driver's footrest from the support and the sliding pin from the footrest



- Remove the rear brake lever return spring (6)

IMPORTANT

REMOVE THE BRAKE LEVER RETURN SPRING FROM THE FOOTREST SUPPORT, TAKING CARE NOT TO WEAKEN IT.



- Insert the micro-switch (7) into its housing on the new footrest support, and screw it into position

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE MICRO-SWITCH TO THE REQUIRED TORQUE VALUE

Characteristic

Tightening torque for micro-switch

10 Nm (7.38 lb ft)



- Insert the two screws (8) and tighten them

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE SCREWS TO THE REQUIRED TORQUE VALUE.

Characteristic**Tightening torque for footrest support retaining screws**

20 Nm (14.75 lb ft) (Loctite 243)



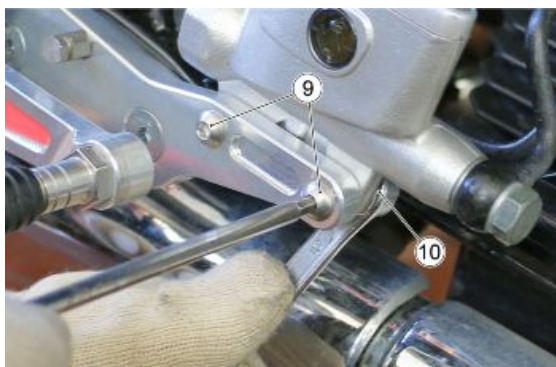
- Insert the screws (9) and tighten the two nuts (10) as indicated in the figure

IMPORTANT

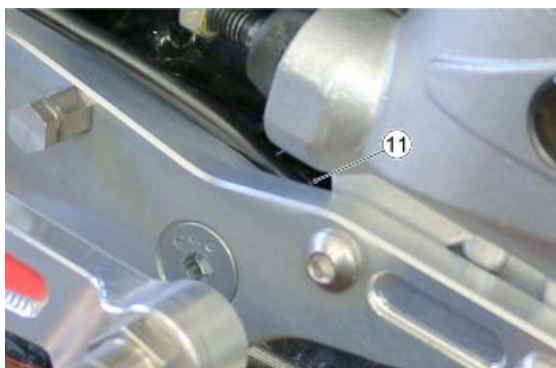
DURING THE ASSEMBLY PHASE, TIGHTEN THE NUTS TO THE REQUIRED TORQUE VALUE

Characteristic**Tightening torque for rear brake pump retaining nuts**

10 Nm (7.38 lb ft)



- Use a plastic clamp (11) to secure the micro-switch wiring in position as illustrated in the figure



- Secure the rear brake lever return spring (12)



- Secure the new brake pump shaft extension using the screw (13), the flanged spacer (14), the washer (15) and the nut (16) supplied with the kit
- Adjust the play on the shaft so that the pump is not pre-loaded when in the rest position

**IMPORTANT**

DURING THE ASSEMBLY PHASE, TIGHTEN THE NUT TO THE REQUIRED TORQUE VALUE.

Characteristic

Tightening torque for rear brake pump shaft retaining nut

10 Nm (7.38 lb ft)

- Tighten the screw (5) on the brake tube retaining plate
- Replace the driver's footrest on the new support using the spring and ring supplied with the kit



- Secure the new sliding pin (17)

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE SLIDING PIN TO THE REQUIRED TORQUE VALUE.

Characteristic

Tightening torque for footrest sliding pin

10 Nm (7.38 lb ft) (Loctite 243)

**IMPORTANT**

CHECK THE POSITION OF THE LEVER AND REGULATE IT IF NECESSARY USING THE DEDICATED ADJUSTMENTS. ONCE THE EXACT POSITION HAS BEEN IDENTIFIED, TIGHTEN THE ADJUSTMENT NUTS TO THE REQUIRED TORQUE. CHECK THAT THE BRAKE LEVER, REAR BRAKING SYSTEM AND BRAKE LIGHT FUNCTION CORRECTLY.

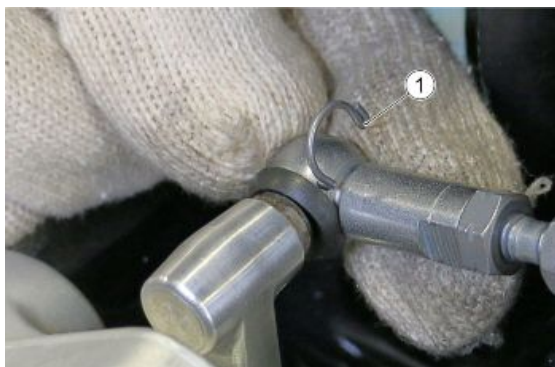
Characteristic

Tightening torque on adjustment nuts

8 Nm (5.90 lb ft)

ADAPTATION LEFT HAND DRIVER'S FOOT-REST SUPPORT FROM MY 2016 TO 2017 MODEL

- Remove the clip (1) and detach the gear tie-rod from the ball joint



- Undo and remove the two fastening screws (2)
- Remove the driver's footrest and the associated sliding pin



- Loosen the nut (3)
- Undo the gear control lever retaining screw (4) and remove it



- Remove the gear control lever (5) complete with gear tie-rod and re-insert it in the corresponding pin, inverting the position of the lever by 180° with respect to the previous position
- Re-insert the gear control lever retaining screw (4) and tighten it

**IMPORTANT**

DURING THE ASSEMBLY PHASE, TIGHTEN THE SCREW TO THE REQUIRED TORQUE VALUE.

Characteristic**Tightening torque for gear control lever screw**

10 Nm (7.38 lb ft)

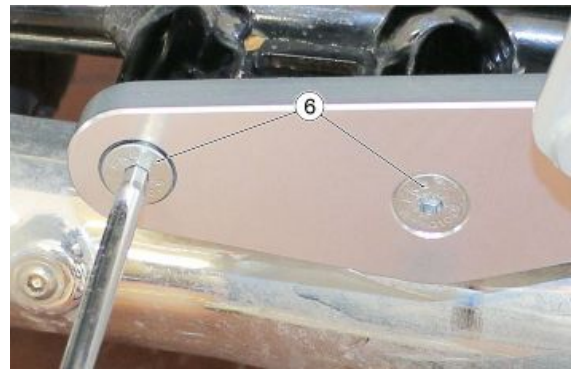
- Secure the new footrest support in position by inserting and tightening the two retaining screws (6)
- Replace the driver's footrest on the new support using the spring and ring supplied with the kit

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE SCREWS TO THE REQUIRED TORQUE VALUE.

Characteristic**Tightening torque for footrest support retaining screws**

20 Nm (14.75 lb ft) (Loctite 243)



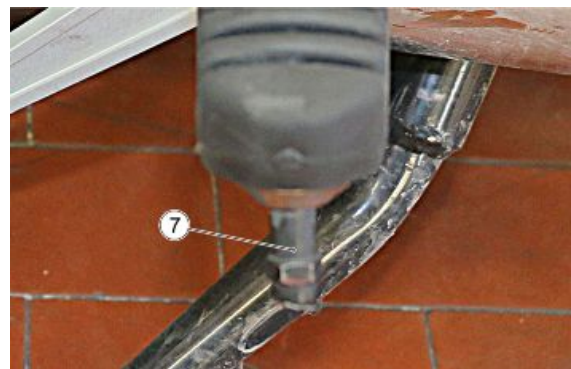
- Secure the new sliding pin (7)

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE SLIDING PIN TO THE REQUIRED TORQUE VALUE.

Characteristic**Tightening torque for footrest sliding pin**

10 Nm (7.38 lb ft) (Loctite 243)



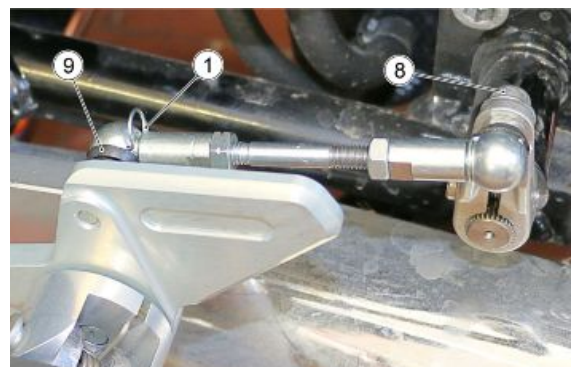
- Secure the new gear tie-rod replacing and tightening the nut (8) and the pin (9)
- Secure the clip (1)

IMPORTANT

DURING THE ASSEMBLY PHASE, TIGHTEN THE PIN AND THE NUT TO THE REQUIRED TORQUE VALUE.

Characteristic**Tightening torque for gear control tie-rod pin and nut**

10 Nm (7.38 lb ft) (Loctite 243)

**IMPORTANT**

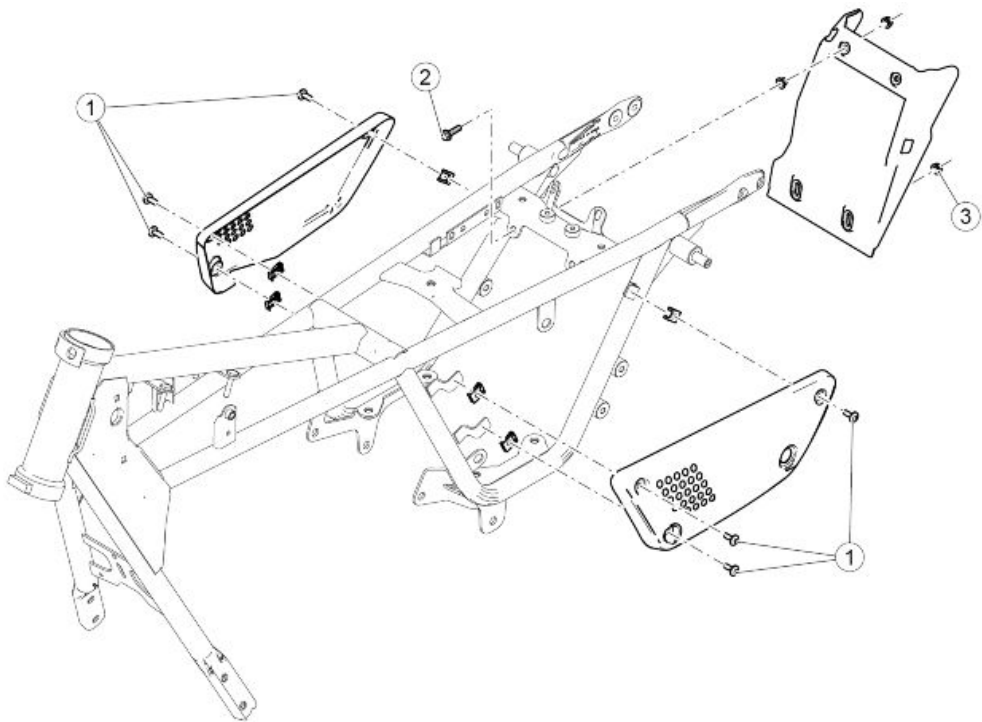
CHECK THE POSITION OF THE LEVER AND REGULATE IT IF NECESSARY USING THE DEDICATED ADJUSTMENTS. ONCE THE EXACT POSITION HAS BEEN IDENTIFIED, TIGHTEN THE ADJUSTMENT NUTS TO THE REQUIRED TORQUE. CHECK THAT THE GEAR LEVER FUNCTIONS CORRECTLY.

Characteristic**Tightening torque on adjustment nuts**

8 Nm (5.90 lb ft)

Side body panels

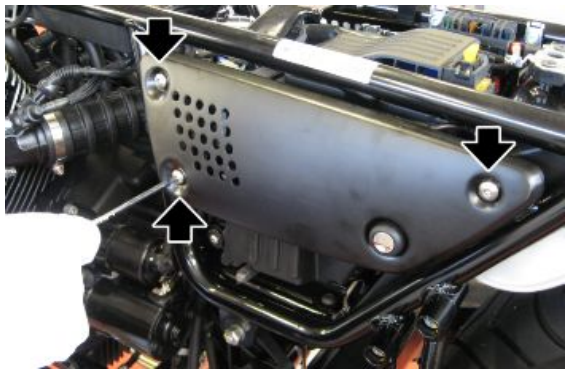
Tightening torques



CENTRAL BODYWORK					
Pos.	Description	Type	Quantity	Torque	Notes
1	TBEI screws fastening fearing	M5x15	6	4 Nm (2.95 lb ft)	-
2	TE flanged screws fastening top splash guard	M6	2	10 Nm (7.38 lb ft)	-
3	Flanged nuts fastening bottom splash guard	M6	2	10 Nm (7.38 lb ft)	-

THE OPERATIONS BELOW ARE VALID FOR
REMOVAL OF BOTH SIDE PANELS

- Remove the three side fairing fixing screws



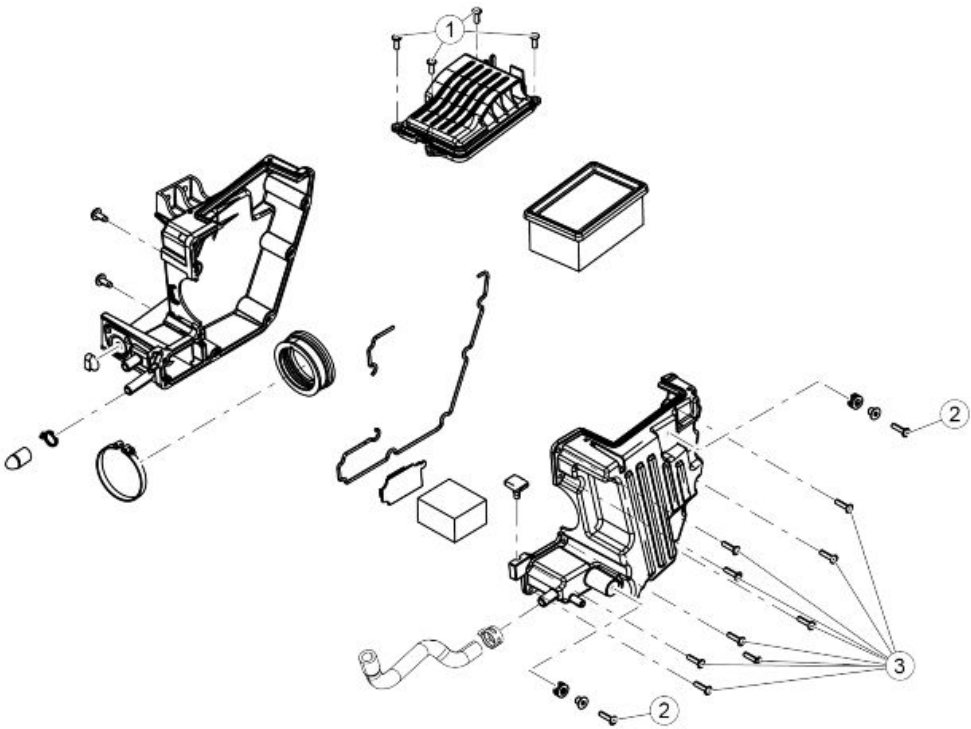
- To remove the left side fairing the saddle opening cable must be unhooked from the ignition switch assembly



License plate holder

Air box

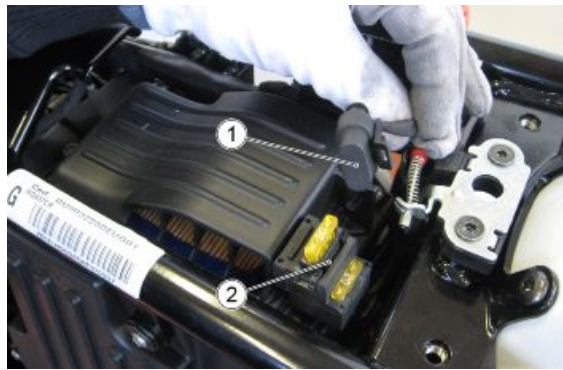
Tightening torques



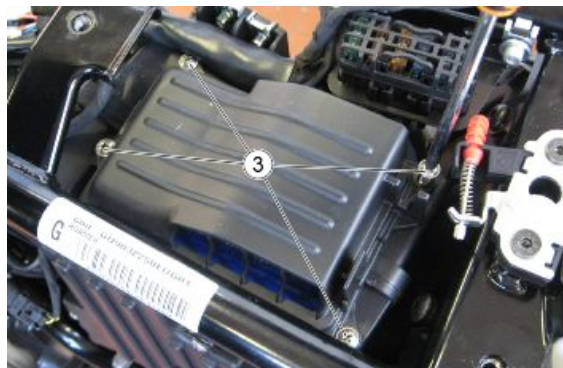
FILTER BOX

Pos.	Description	Type	Quantity	Torque	Notes
1	Air filter box cover fastening self-threading screw	M5x14	4	3 Nm (2.21 lb ft)	-
2	SWP screws fixing filter box to chassis	M5x20	2	3 Nm (2.21 lb ft)	-
3	SWP filter box locking screws	M5x20	9	3 Nm (2.21 lb ft)	-

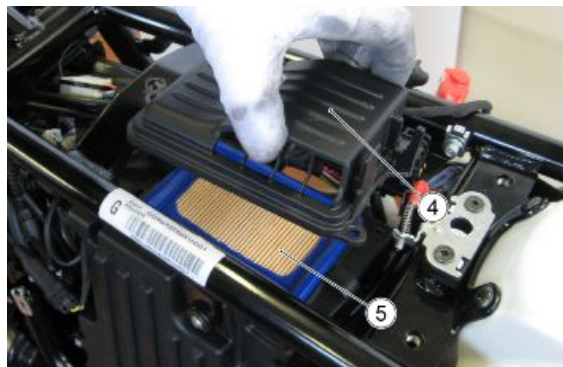
- Remove the saddle, the side panels and the battery complete with the rubber support
- Slide from the support present in the filter casing connector (1) and the ABS fuses (2)



- Remove the four fastening screws (3) of the air filter cover



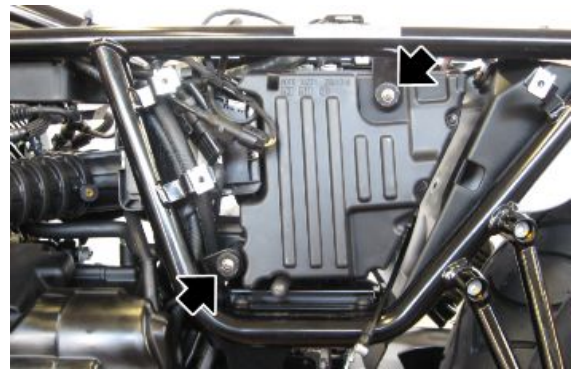
- Remove the air filter cover (4) and the filter (5)



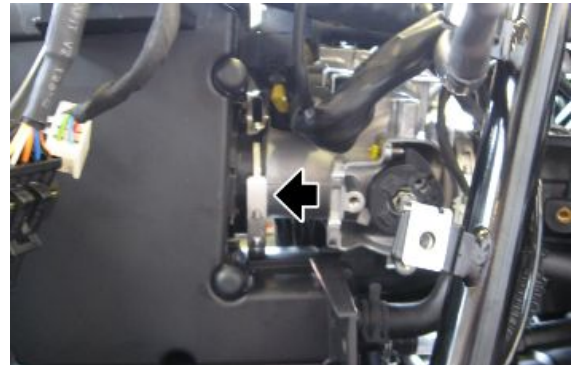
- Remove the two screws securing the fuse box support and move it to have greater freedom of movement for subsequent operations



- Remove the two screws that fasten the air filter case to the chassis



- Remove the clamp present in the collector that blocks the filter case to the throttle body



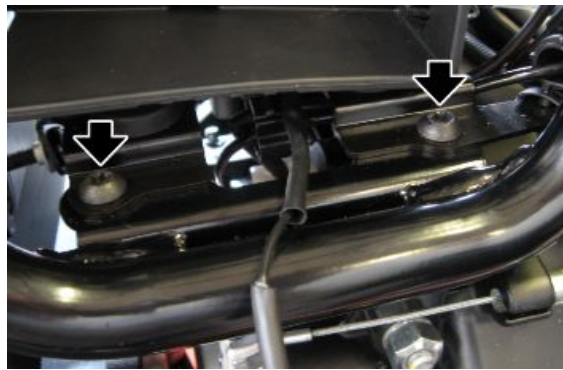
- Remove the two bottom fastening nuts of the splash guard



- Operating on the left side of the motorcycle, remove the blow-by pipe (6) from the filter case, while the right side, remove the secondary air pipe (7)



- Remove the four screws securing the filter case support bracket and remove it by slightly raising the box itself



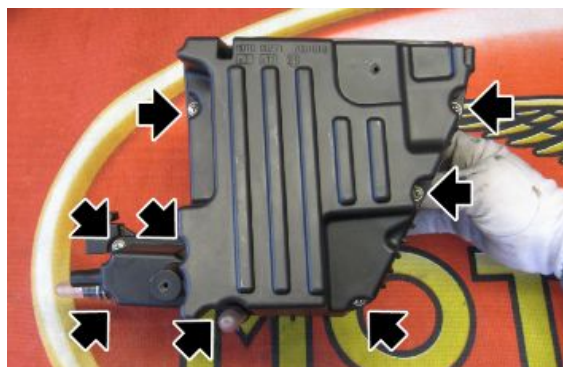
- Pull the filter case from the right side of the motorcycle



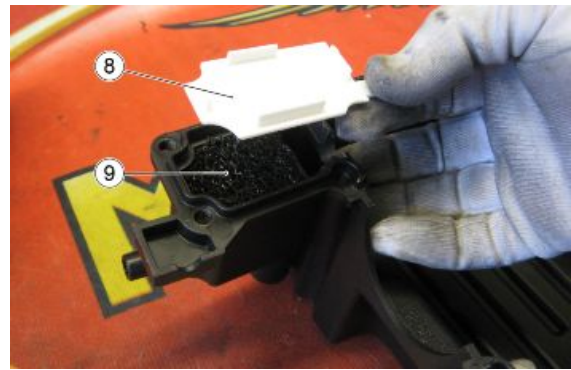
- Remove the collector from the filter case



- Remove the locking screws from the filter case



- Remove the cover (8) and the blow-by filter (9)

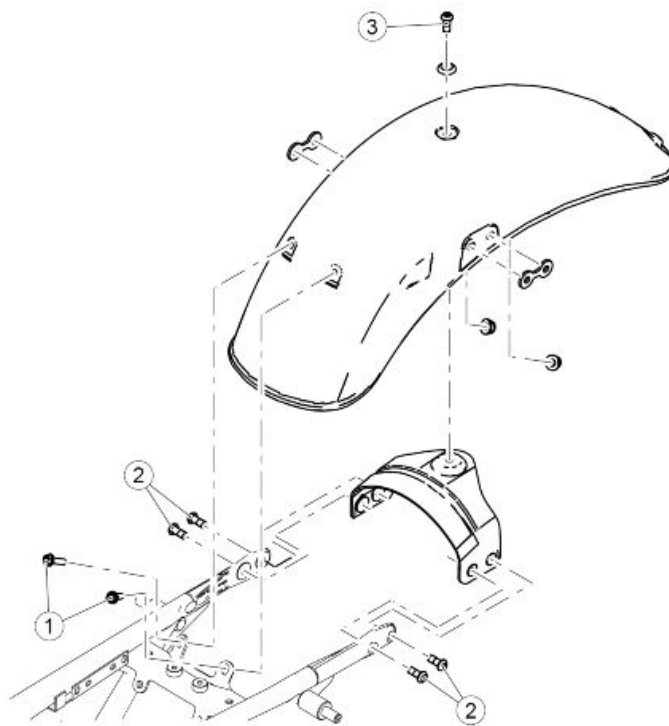


- Check and replace the two seals present in the cover



Rear mudguard

Tightening torques



REAR MUDGUARD

Pos.	Description	Type	Quantity	Torque	Notes
1	Flanged screw fixing front mudguard to chassis	M6	2	10 Nm (7.38 lbf ft)	-
2	Mudguard side fixing screws to chassis	M8x20	4	35 Nm (25.81 lb ft)	-
3	Big end rounded torx screw fastening top mudguard to chassis	M8x20	1	15 Nm (11.06 lbf ft)	-

- Disconnect the rear light assembly connector located in the battery compartment



- Remove the two front fixing screws and the corresponding self-locking nuts inside the mudguard



- Remove the four side fixing screws



- Remove the rear light assembly connector through the special hole on the splash guard



- Remove the rear mudguard complete with license plate support

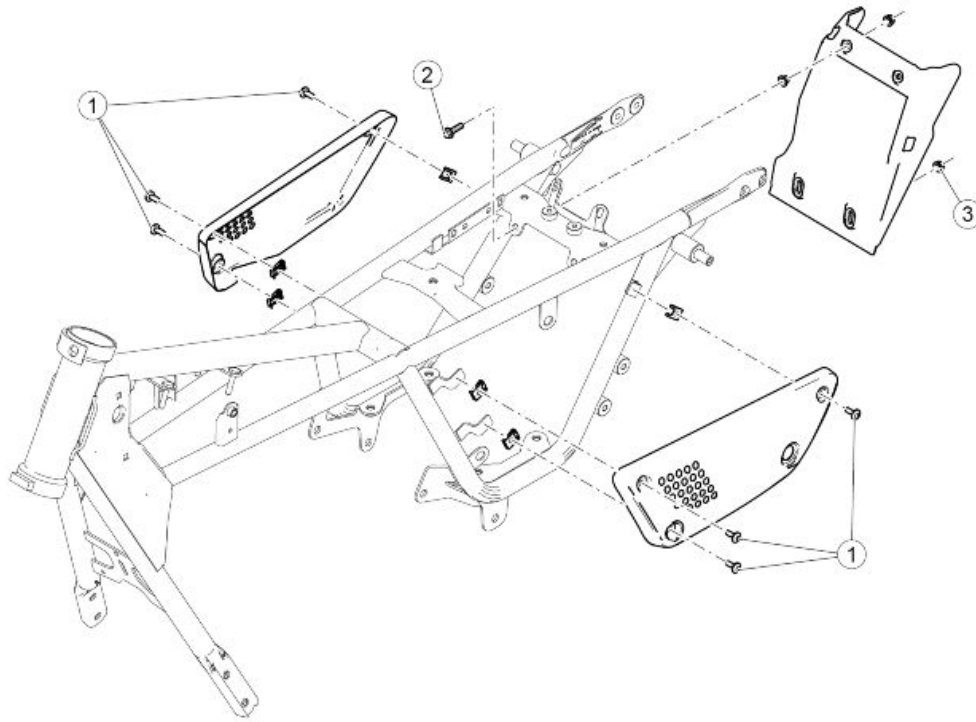


Paraspruzzi

Tightening torques

CENTRAL BODYWORK

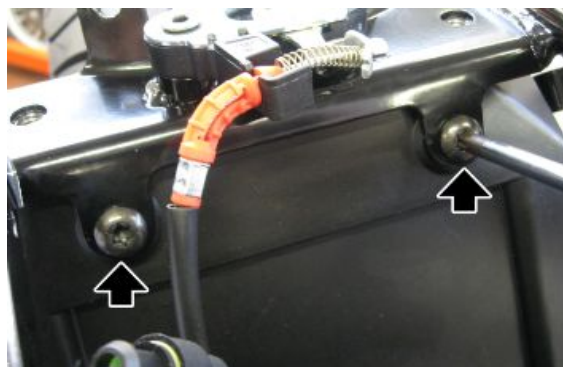
Pos.	Description	Type	Quantity	Torque	Notes
1	TBEI screws fastening fearing	M5x15	6	4 Nm (2.95 lb ft)	-
2	TE flanged screws fastening top splash guard	M6	2	10 Nm (7.38 lb ft)	-
3	Flanged nuts fastening bottom splash guard	M6	2	10 Nm (7.38 lb ft)	-



- Remove the rear mudguard
- Remove the two lower nuts



- Remove the two upper screws complete with self-locking nuts

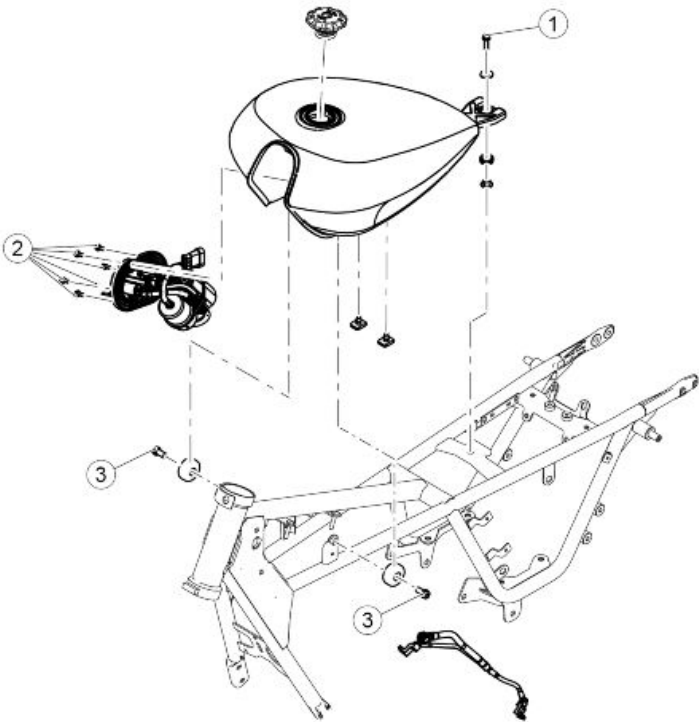


- Remove the splash guard



Fuel tank

Tightening torques



FUEL TANK

Pos.	Description	Type	Quantity	Torque	Notes
1	Tank rear fastening hexagon screw	M8	1	25 Nm (18.44 lb ft)	-
2	Fuel pump fastening hexagon screws	M5x16	6	5 Nm (3.69 lb ft)	-
3	SHC screws fastening the tank support buffers	M8x16	2	25 Nm (18.44 lb ft)	-

- Undo and remove the rear fixing screw of the fuel tank to the frame



- Partially lift the fuel tank in order to be able to disconnect the fuel hose fitting, avoiding damaging it.

IMPORTANT

PAY PARTICULAR ATTENTION DURING THE LIFTING OPERATION IN THAT THE FUEL HOSE FITTING CAN BE DAMAGED



- Disconnect the fuel pump connector



- Disconnect the fuel breather pipe

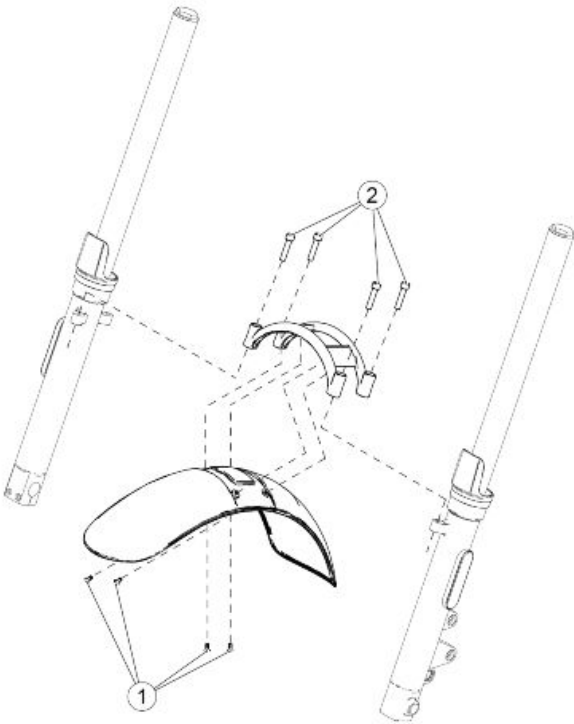


- Remove the fuel tank by sliding it off and back.



Front mudguard

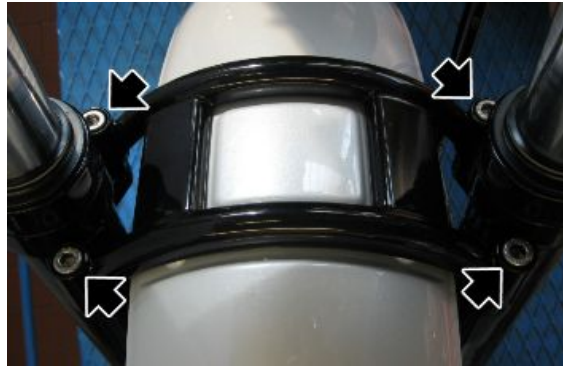
Tightening torques



FRONT MUDGUARD

Pos.	Description	Type	Quantity	Torque	Notes
1	Screws fastening the mudguard to the stabiliser plate	M5x10	4	4 Nm (2.95 lb ft)	Loct. 243
2	Screws fastening the stabiliser plate to the fork sleeves	M8x45	4	15 Nm (11.06 lb ft)	Loct. 243

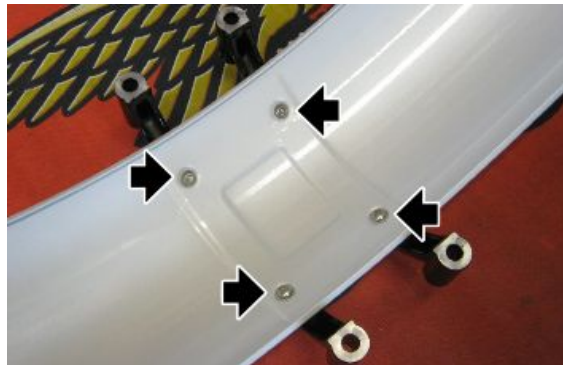
- Remove the four front mudguard support fixing screws at the fork sleeves



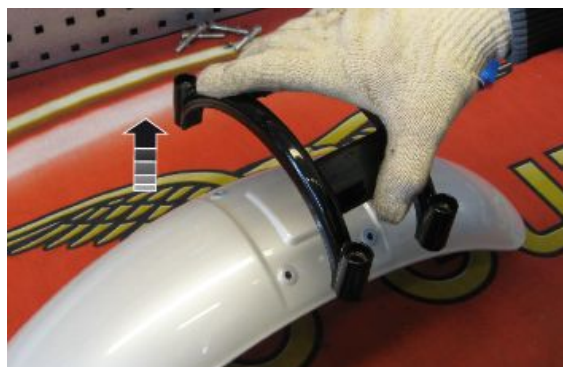
- Remove the mudguard complete



- Remove the four screws fixing the mudguard to the mudguard support



- Remove the mudguard support from the mudguard



A

ABS: *231, 239*

Air filter: *56*

B

Battery: *104, 111*

Brake: *245, 247, 249, 252, 254, 255, 258, 261*

Bulbs:

C

Clutch: *65, 133*

Clutch lever: *133*

E

Engine oil: *52*

F

Fork: *176, 178, 180, 182*

Fuel: *127, 171, 313*

Fuses: *109*

H

Headlight: *66, 281, 284*

I

Identification: *18*

K

Keys: *102*

M

Maintenance: *16, 48*

O

Oil filter: *54*

R

Recommended products: *50*

S

Shock absorbers: *190*

Spark plugs:

Stand: *134*

T

Tank: 313

Transmission: 20, 50