



SERVICE STATION MANUAL

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TUAREG 660



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THE VALUE OF SERVICE

Due to continuous updates and technical training programmes specific to Aprilia products, only **Aprilia Official Network** mechanics know this vehicle fully and have the specific tools necessary to carry out maintenance and repair operations correctly.

The reliability of the vehicle also depends on its mechanical conditions. Checking the vehicle before riding it, performing maintenance correctly and using only **original Aprilia spare parts** are essential factors for the reliability of your vehicle!

For information on the nearest **Official Dealer and/or Service Centre** consult our website:
www.aprilia.com

Only by requesting original Aprilia spare parts can you be of purchasing products that were developed and tested during the design and development of the vehicle itself. All Aprilia 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.

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Not all versions/models shown in this publication are available in all countries. The availability of individual versions/models should be confirmed with the official Aprilia sales network.

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SERVICE STATION MANUAL

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This manual provides the main information to carry out regular maintenance operations on your vehicle. This manual is intended to **Aprilia Dealers** and their qualified mechanics; several concepts have been deliberately omitted as they are considered unnecessary. As it is not possible to include complete mechanical notions in this manual, users should have basic mechanical knowledge or minimum knowledge about the procedures involved when repairing scooters. Without this knowledge, repairing or checking the vehicle may be inefficient or even dangerous. As the vehicle repair and check procedures are not described in detail, be extremely cautious so as not to damage components or injure individuals. In order to optimise customer satisfaction when using our vehicles, **Piaggio & C. S.p.a.** commits itself to continually improve its products and the relative documentation. The main technical modifications and changes in repair procedures are communicated to all **Aprilia Sales Outlets and its International Subsidiaries**. These changes will be introduced in the subsequent editions of the manual. In case of need or further queries on repair and check procedures, consult **Aprilia CUSTOMER DEPARTMENT**, which will be prepared to provide any information on the subject and any further communications on updates and technical changes related to the vehicle.

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

CAUTION 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.



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



Vehicle intactness The incomplete or non-observance of these regulations leads to the risk of serious damage to the vehicle and sometimes even the invalidity of the guarantee



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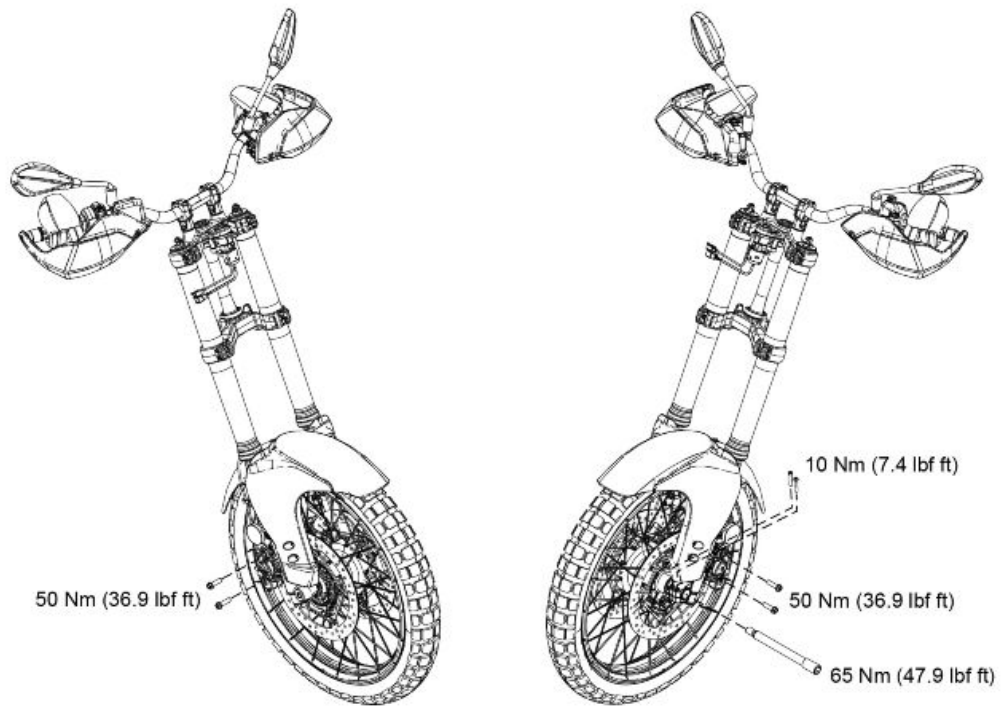
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INDEX OF TOPICS

PRE-DELIVERY

PRE DE

Unpacking procedure of the vehicle and assembly of the accompanying components



- Remove the protective cardboard box by pulling it out from above.



- Position a hoist on the front of the vehicle and connect it to the handlebar using straps.



- Loosen the rear straps securing the vehicle to the pallet, so that the front can be raised just enough to install the front wheel.



- Remove the wooden support of the forks.



- Disassemble both brake callipers by removing the four M10 screws (2 per calliper).



- From the left side of the vehicle, unscrew the front wheel pin and remove it. (the two safety screws of the front wheel pin, on the clamp of the left stanchion, are already loosened).



- Remove the front wheel from the box complete with spacers from both sides and install it on the vehicle by inserting the wheel pin and fixing it at a torque of 65 Nm (47.9 lbf ft).



- Tighten the two front wheel pin safety screws to a torque of 10 Nm (7.4 lbf ft).



- Remove the protection present between the pads inside the brake callipers.
- Fit the two front brake callipers and tighten the four M10 screws to a torque of 50 Nm (36.9 lbf ft).



- Lower the vehicle and remove the hoist with its lifting straps previously positioned on the handlebar.



- Remove the rear straps.



- Remove the vehicle from the pallet.
- For greater safety, carry out the operation with two people.



HANDGUARD INSTALLATION PROCEDURE

The following operations refer to one handguard but are valid for both.

- Position the handlebar anti-vibration weight and the handguards. Using the appropriate fixing screw complete with "T" bush, fasten everything in place.



- Then insert the fixing screw of the handguard to the mount.
- Tighten both screws to a torque of 4 Nm (2.95 lbf ft).



REAR-VIEW MIRRORS INSTALLATION PROCEDURE

- To install the left rear-view mirror, remove the toothed pin protecting the threaded seat.



- Insert the threaded base complete with washer on the clutch lever mount, tightening it to a torque of 50 Nm (36.87 lbf ft).



- Insert the rear-view mirror complete with protective rubber and lock nut on the mount.
- Adjust the angle of the rear view mirror and tighten the lock nut.



- To install the right rear-view mirror, insert the threaded base complete with spacer on the U-bolt of the brake master cylinder, tightening it to a torque of 50 Nm (36.87 lbf ft).



- Insert the rear-view mirror complete with protective rubber and lock nut on the mount.
- Adjust the angle of the rear view mirror and tighten the lock nut.



WINDSCREEN INSTALLATION PROCEDURE

- Remove the screws together with bushes and grommets, paying attention to recover the bushes positioned on the support.



- Insert the rubber grommets on the windscreen.



- Position the windscreen on the support, insert the four screws complete with bushings and, making sure that the bushings are correctly inserted in the support, tighten the windscreen screws to a torque of 9 Nm (6.63 lbf ft).



Aesthetic inspection

- Paintwork
- Fitting of Plastic Parts
- 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, low beam, daylight running lights (front and rear), fog lights (where provided) and relative warning lights
- Headlight adjustment according to regulations in force
- Rear brake light push-button
- Turn indicators and their warning lights
- Instrument cluster
- 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.

CAUTION



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

CAUTION



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

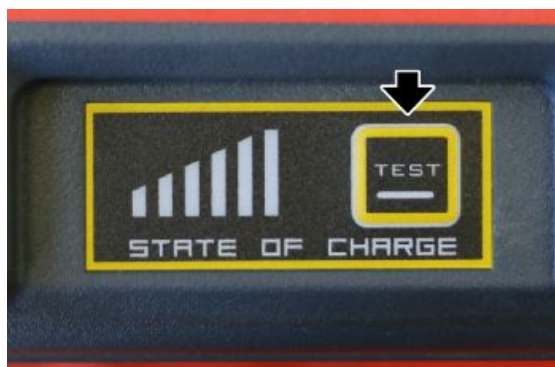
CAUTION



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.

- Check the battery charge by holding down the TEST button on the BATTERY CAPACITY INDICATOR located between the terminals on the top of the battery.

Depending on the present indication and consulting the table, if necessary charge the battery.



CHARGE LEVEL

ACTION	NUMBER OF BARS
Ready for use	5 - 6
Charging recommended	3 - 4
Charging necessary	1 - 2
Fault	0

RECHARGE

- Always use a specific charger for lithium batteries to recharge the battery.
- To avoid damage to the battery, the charging voltage must NEVER be higher than 15 volts.
- Do not charge the battery with a charger with automatic DESULPHATION MODE using a voltage higher than 15 volts.
- Always remove the battery from the vehicle before connecting it to the charger.
- Stop charging if the battery feels warm to the touch. Allow the battery to cool before resuming charging.
- After recharging the battery, leave it to stand for 1 hour before pressing the TEST button on the BATTERY CAPACITY INDICATOR. If the indicator is between 1 and 4 notches, the battery should be further charged.

CHARGE MODES

Normal recharge

- Electric current: 2,0 A
- Time: 2 hours

Quick charge

- Electric current: 8 A
- Time: 0,5 hours

WARNING

THE CHARGE VOLTAGE MUST NEVER EXCEED 15V.

WARNINGS

- Do not knock, throw or subject the battery to violent shocks.
- Do not carry the battery together with flammable, explosive or sharp objects.
- NEVER attempt to open the battery.
- Keep the connecting poles clean and firmly secured at all times.

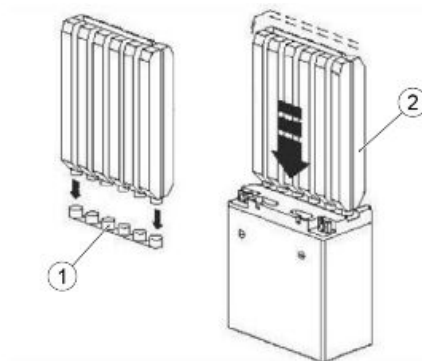
- Do not immerse the battery in water, or leave it exposed to moisture.
- Do not connect the battery directly to wall outlets.
- Do not subject the battery to short circuit by connecting cables or other metallic objects to the positive and negative terminals.
- Do not pierce the battery casing with nails or other sharp objects, do not try to forcibly open it or step on it.
- Do not perform welds on the battery terminals.
- Do not use the battery in combination with primary batteries (such as dry batteries) or batteries of different capacity, type and brand.
- Do not use the battery if it emits a strange odour, emits heat, changes colour or deforms, or if it presents any anomaly. Stop use immediately if the battery is in use or under charge.

THE BATTERY DOES NOT CONTAIN HARMFUL POLLUTANTS, CORROSIVE ACIDS OR TOXIC HEAVY METALS

(IF APPLICABLE)

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

- Hydraulic braking system fluid level
 - Clutch system fluid level
 - Engine coolant level
 - Engine oil level
-

Road test

- Cold start
 - Instrument panel operation
 - Response to throttle control
 - Stability when accelerating 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
 - Idling
 - Uniform turning of the steering
 - Possible leaks
 - Radiator electric fans operation
-
-

Functional inspection

- Hydraulic braking system
- Brake and clutch lever travel
- Clutch - Check for correct operation
- Engine - Check for correct general operation and absence of abnormal noise
- Other
- Documentation check:
- Check the frame and engine numbers

Check included tools (where applicable)

- 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.

CAUTION



CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

INDEX OF TOPICS

CHARACTERISTICS

CHAR

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.

CAUTION



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

Fuel

CAUTION



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.

Coolant

The coolant contains ethylene glycol which, under certain conditions, can become flammable.

When it burns, ethylene glycol produces an invisible flame which however can cause burns.

CAUTION



TAKE PARTICULAR CARE NOT TO SPILL COOLANT ONTO HOT PARTS OR THE ENGINE AND EXHAUST SYSTEM; THE FLUID MAY CATCH FIRE AND BURN WITH INVISIBLE FLAMES. WHEN CARRYING OUT MAINTENANCE OPERATIONS, IT IS ADVISABLE TO WEAR LATEX GLOVES. WHILE POISONOUS, COOLANT HAS A SWEET TASTE WHICH MAKES IT EXTREMELY APPEALING TO ANIMALS. NEVER LEAVE COOLANT IN OPEN CONTAINERS WHERE IT MAY BE REACHED AND DRUNK BY AN ANIMAL.

**KEEP OUT OF THE REACH OF CHILDREN.
NEVER REMOVE THE RADIATOR CAP WHILE THE ENGINE IS STILL HOT. COOLANT IS UNDER PRESSURE AND MAY CAUSE BURNS.**

Used engine oil and transmission oil

CAUTION



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

KEEP OUT OF THE REACH OF CHILDREN.

Battery electrolyte and hydrogen gas (WHERE REQUIRED)

CAUTION



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.

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

CAUTION

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

- Use only aprilia ORIGINAL 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").

CAUTION

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**CAUTION**

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

CAUTION

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 in is essential to ensure the durability of the vehicle. During the first 1,000 Km (621 mi), observe the following rules to ensure the reliability and performance of the vehicle throughout its lifetime:

- Avoid full throttle starts and hard acceleration;
- Avoid hard or prolonged braking;
- Do not ride for prolonged periods at sustained high speed;
- preferably ride the motorcycle on varied routes with frequent, gentle acceleration and deceleration;
- Ride prudently to gradually gain familiarity with the motorcycle, testing progressively higher throttle apertures only as you gain confidence

CAUTION

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.

- It is advisable not to exceed 7000 rpm for the first 1000 km (621 mi) and then not to exceed 9000 rpm up until 2000 km (1242 mi).

CAUTION

AFTER THE SPECIFIED MILEAGE, TAKE YOUR VEHICLE TO AN Authorised Aprilia Dealer FOR THE CHECKS INDICATED IN THE "SCHEDULED MAINTENANCE TABLE" IN THE SCHEDULED MAINTENANCE SECTION, TO AVOID INJURING YOURSELF, OTHERS AND /OR DAMAGING THE VEHICLE.

Vehicle identification

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.

ZD4XBA000YSXXXXXX

KEY:

ZD4: WMI (World Manufacturer Identifier) code;

XB: model;

A00: Europe; **UA0:** USA

0: digit free;

Y: year of manufacture;

S: production plant (S= Scorzè);

XXXXXX: serial number (6 digits);

FRAME NUMBER

The frame number is stamped on the frame cross-bar under the seat.

Frame no.



ENGINE NUMBER

The engine number is stamped on the engine crankcase, at the rear near the shock absorber.

Engine No.



Dimensions and mass

DIMENSIONS AND MASS

Specification	Desc./Quantity
Max. length	2220 mm (87.40 in)
Max. width (at handlebar)	965 mm (37.99 in)
Max. height (to top fairing)	1,140 mm (44.88 in)
Wheelbase	1525 mm (60.03 in)
Kerb weight	204 kg (449.74 lb)
Weight fully loaded	279 kg (615.08 lb)

Engine

ENGINE

Specification	Desc./Quantity
Type	2 cylinder in line (transverse), 4 stroke, 4 valves per cylinder, double overhead camshafts
Engine capacity	659 cc (40.21 cu in)
Bore / stroke	81 mm / 63.93 mm (3.19 in / 2.52 in)
Compression ratio	13.5 +/- 0.5: 1
Idle engine speed	1400 +/- 100 rpm
Engine revs at maximum speed	9250 +/- 100 rpm
Clutch	Multi plate wet clutch with mechanical control lever on left side of the handlebar. Anti-juddering and slipper clutch systems
Starting	Electric
Timing	Morse chain on intake and exhaust camshafts, bucket tappets and valve clearance adjustment with calibrated pads
Lubrication system	Wet sump with pump
Oil pump	Trochoidal pump
Oil filter	With external cartridge filter
Cooling	Liquid
Cooling system	3-way thermostatic valve, cooling radiator with electric fan and expansion tank
Coolant pump	Centrifugal bearingless aspirating pump with integrated aluminium gasket
Air filter	Paper

Transmission

DRIVE RATIOS

Specification	Desc./Quantity
Primary drive ratio	39 / 80 (with gears)
Drive ratio, 1st gear	13 / 37 (secondary)
Drive ratio, 2nd gear	16 / 33 (secondary)

Specification	Desc./Quantity
Drive ratio, 3rd gear	24 / 39 (secondary)
Drive ratio, 4th gear	19 / 26 (secondary)
Drive ratio, 5th gear	21 / 25 (secondary)
Drive ratio, 6th gear	22 / 23 (secondary)
Final drive ratio	15 / 42

ELECTRONIC CONTROL SYSTEMS

Specification	Desc./Quantity
a-PRC system	(Aprilia Performance Ride Control) which includes: AEM (engine map management system), AEB (engine brake map management system), ABS (Anti-lock braking system), ATC (traction control), AQS (Assisted shifting system without clutch assistance for both up-shifting and down-shifting) (where provided)

Capacities

CAPACITY

Specification	Desc./Quantity
Fuel tank capacity (including reserve)	18 l (3.95 UK gal; 4.75 US gal)
Fuel tank reserve capacity	2.7 l (0.59 UK gal; 0.71 US gal)
Engine oil	oil change and oil filter replacement: 2300 cc in (140.35 cu in)
Coolant	2 +/- 0.2 l (0.43 +/- 0.04 UK gal; 0.52 +/- 0.05 US gal)
Seats	2
Maximum weight limit	414 kg (912.71 lb)

Drive chain

DRIVE CHAIN

Specification	Desc./Quantity
Type	Regina 120 links With sealed master link
Model	520 - ZRA

Electrical system

ELECTRICAL SYSTEM

Specification	Desc./Quantity
Spark plugs	NGK IR MR9DI-7
Electrode gap	0.7 - 0.8 mm (0.027 - 0.031 in)
Battery	BS BATTERY LITIO BSLi-04, 12V 48Wh 280A Alternative solution: YUASA YT12A-BS, 12V 10 Ah
Coils	Stick coil
Recharging system	Flywheel with rare earth magnets
Generator	360 W
Main fuses	30A
Secondary fuses	2A, 5A (6) - 7.5A (4) - 15A - 20A

INDICATOR LAMPS

Specification	Desc./Quantity
Neutral	LED
High beam headlight	LED
Cruise control	LED
ABS	LED
MI	LED
Turn indicators	LED

Specification	Desc./Quantity
Overspeed threshold/shift light	LED
Immobilizer	LED
Fuel reserve	LED
a-PRC	LED
General warning	LED
DRL	LED
Side stand	LED

Frame and suspensions

CHASSIS

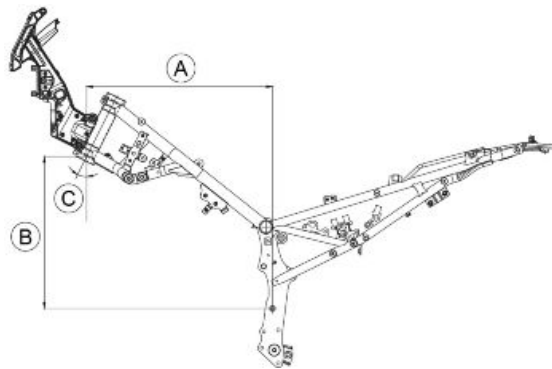
Specification	Desc./Quantity
Type	Welded tubular double cradle steel frame.
Steering rake angle	26.7° (measurements with respect to bare chassis)

SUSPENSION

Specification	Desc./Quantity
Front fork	Adjustable upside-down hydraulic fork with 43 mm (1.69 in) stanchions
Front stroke	240 mm (9.44 in)
Rear shock absorber	Progressive linkage with piggy-back. Adjustable spring preload, hydraulic compression and rebound damping.
Rear stroke	106,5 mm (4.19 in)

FRAME DIMENSIONS

Specification	Desc./Quantity
Size "A"	559.1 mm (22.01 in) (measurements refer to the bare chassis)
Size "B"	456.9 mm (17.98 in) (measurements refer to the bare chassis)
Angle "C"	26.7° +/- 0.25° (measurements refer to the "naked" frame)



Brakes

BRAKES

Specification	Desc./Quantity
Front	Discs Ø 300 mm (11.81 in), two-piston floating callipers - Ø 30-32 mm (1.18-1.25 in) and 2 pads - axial pump with integrated reservoir.
Rear	Disc brake - Ø 260 mm (10.23 in), single-piston floating calliper - Ø 34 mm (1.34 in) - pump with separate reservoir.

Wheels and tyres

WHEEL RIMS

Specification	Desc./Quantity
Front wheel	2,15 x 21" with spokes, alloy rim channel
Rear wheel	4,25 x 18" with spokes, alloy rim channel

TYRES

Specification	Desc./Quantity
Front tire	90/90 - 21 M/C 54V (permitted use category M + S) Alternative solution: 90/90 - 21 M/C 54R M+S (Vmax: 170 km/h) (105 mph)
Inflation pressure	Rider: 2 bar (200 KPa) (29 PSI) Rider + Passenger: 2.2 bar (220 KPa) (31.90 PSI) Off-road: 2 bar (200 KPa) (29 PSI)
Rear tire	150/70 R18 M/C 70V (permitted use category M + S) Alternative solution: 150/70 - 18 M/C 70R M+S (Vmax: 170 km/h) (105 mph)
Inflation pressure	Rider: 2.5 bar (250 KPa) (36.25 PSI) Rider + Passenger: 2.7 bar (270 KPa) (39.16 PSI) Off-road: 2 bar (200 KPa) (29 PSI)

WARNING



RESPECT THE INFLATION PRESSURE INDICATED IN EVERY DRIVING / ROUTE CONDITION. FAILURE TO COMPLY WITH THIS PRESCRIPTION CAN CAUSE SERIOUS DAMAGE TO THE WHEELS AND TO THE VEHICLE IN GENERAL. IN PARTICULAR, RIDING WITH INFLATION PRESSURES LOWER THAN THOSE PRESCRIBED IS HIGHLY UNRECOMMENDED.

Supply

FUEL SYSTEM

Specification	Desc./Quantity
Fuel	Unleaded gasoline E10 (95 R.O.N.)

Tightening Torques

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

SELF-TAPPING SCREW TORQUES FOR PLASTIC

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

METRIC SCREW TIGHTENING TORQUES

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

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

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

CAUTION

THE SCREWS WITH THREAD-LOCK SEALANT (PRE-IMPREGNATED) MUST BE REPLACED WITH NEW SCREWS AFTER THEY HAVE BEEN LOOSENED. BEFORE FITTING THE NEW SCREWS, CLEAN THE THREADED HOLES CAREFULLY, MAKING SURE THAT ALL TRACES OF THE OLD THREAD-LOCK SEALANT HAVE BEEN ELIMINATED.

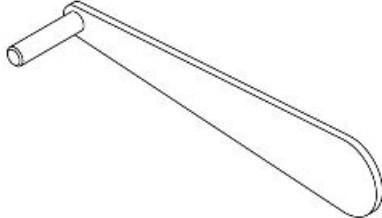
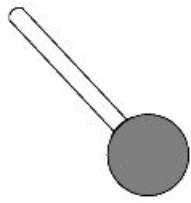
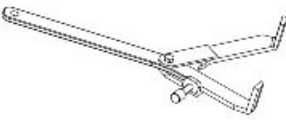
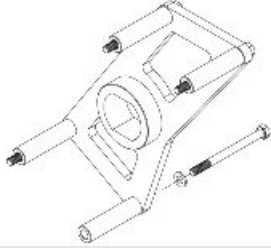
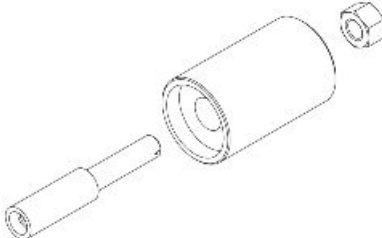
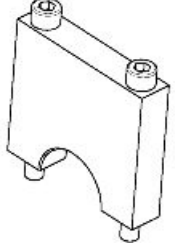
Chassis


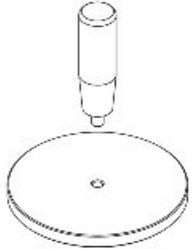
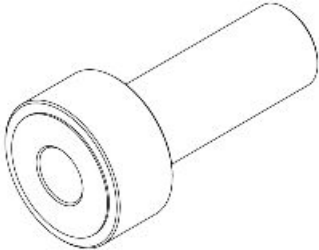
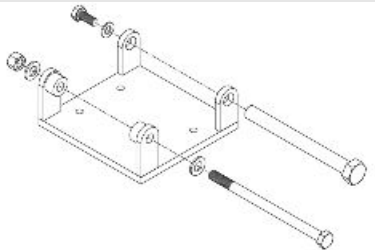

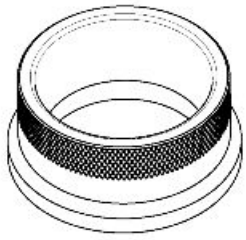
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SPECIAL TOOLS

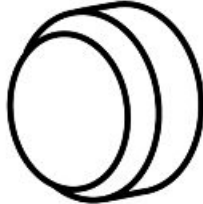
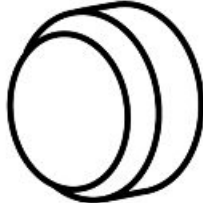

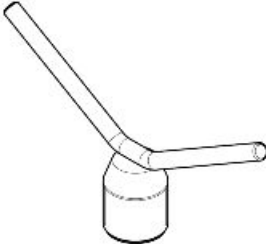
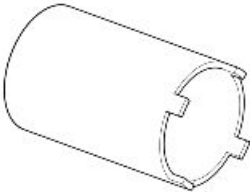
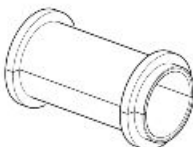
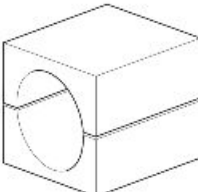
S-TOOLS

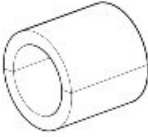
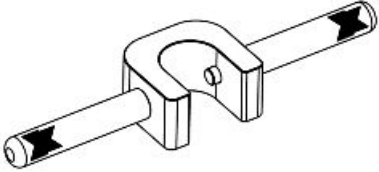
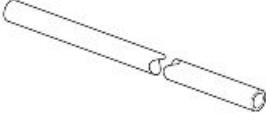


SPECIAL TOOLS

Stores code	Description	
021047Y	Tuareg 660 engine timing wrench	
021043Y	Camshaft timing pin	
020851Y	Camshaft timing pin	
9100896	Clutch bell stopper	
021036Y	Flywheel side crankshaft locking tool	
021037Y	Water pump seal insertion tool	
021038Y	Crankshaft support U-bolt	

Stores code	Description	
020431Y	Valve oil seal extractor	
021039Y	Pick-up distance template	
021040Y	Transmission shaft oil seal press-fit punch on front sprocket side	
021041Y	Engine fixing bracket to mount	
021042Y	Oil seal and clutch shaft bearing and gear shaft punch	
020980Y	Piston assembly ring	

Stores code	Description	
AP8140179	Valve fitting/removal support	
020853Y	Compresses intake valve springs	
020854Y	Compresses exhaust valve springs	
020713Y	Flywheel puller tool	
020376Y	Adaptor handle	
020655Y	Adaptor 62x68 mm	

Stores code	Description	
020359Y	42 x 47 mm punch	
020360Y	52x55 mm punch	
020414Y	28 mm punch	
020712Y	Handle for removing the flywheel cover	
AP8140190	Steering tightening tool	
AP8140189	Tool for mounting the oil seal for holes with diam. 43 mm (1.69 in)	
AP8140149	Guard for assembly operations	

Stores code	Description	
AP8140146	Weight	
020888Y	Pre-load tube clamp	
AP8140150	Bored shaft for bleeding plunger air	
020922Y	Diagnostic tool	
021017Y	OBD cable for E5 vehicles	

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MAINTENANCE

MAIN

Scheduled maintenance table

NOTE

THE MAINTENANCE INTERVALS PRESCRIBED BY THE SCHEDULED MAINTENANCE TABLE MUST BE CONSIDERED AS A GENERAL GUIDE FOR USING THE VEHICLE IN NORMAL RUNNING CONDITIONS.

IT MAY BE NECESSARY TO REDUCE THE MAINTENANCE INTERVALS UNDER SOME PARTICULAR CONDITIONS. ESPECIALLY WHEN USED IN GEOGRAPHICAL LOCATIONS WITH ADVERSE CLIMATIC CONDITIONS, USE ON UNEVEN GROUND OR SEVERE INDIVIDUAL 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) Check and clean and adjust or replace, if necessary, before every journey.
- (2) Check and clean, adjust or replace if necessary every 1,000 km (621.37 mi).
- (3) Replace at whichever of the following occurs first: 40,000 km (24,854.85 mi) or 4 years.
- (4) Maintenance interval halved in the event of off-road use.

SCHEDULED MAINTENANCE TABLE

km x 1,000 (mi x 1,000)	1 (0.6)	10 (6.2)	20 (12.4)	30 (18.6)	40 (24.9)	12 months	24 months
Rear shock absorber (bearings - linkage systems) (4)			I		I	I	I
Engine oil filler plug O-ring	I	I	I	I	I	I	I
Flywheel cover cap O-Ring			I		I		
Fork plug O-ring					I		
Motorcycle set up	I	I	I	I	I		
Spark plug			R		R		
Drive chain (2) (4)	I - L	I - L	I - L	I - L	I - L	I	I
Clutch cable (4)	L	L	L	L	L	L	L
Front sprocket - rear sprocket - Chain slider - chain tensioner roller		I	I	I	I		
Steering bearings and steering play	I	I	I	I	I	I	I
Wheel bearings - Wheels (4)	I	I	I	I	I	I	I
Diagnosis by tool	I	I	I	I	I	I	I
Brake discs - Brake pads wear (1)	I	I	I	I	I	I	I
Air filter (4)		I	R	I	R		
Engine oil filter	R	R	R	R	R	R	R
Vehicle general operation	I	I	I	I	I	I	I
Valve clearance			A		A		
Head cover gasket			I		I		
Engine oil discharge plug aluminium gasket	R	R	R	R	R	R	R
Coolant drain screw aluminium gasket							R
Spark plug shanks gasket			R		R		
Cooling system		I	I	I	I		
Brake systems	I	I	I	I	I	I	I
Safety switches (stand, stop, clutch, extra negative stroke, gas control)	I	I	I	I	I	I	I
Brake fluid	I	I	I	I	I	I	R
Coolant	I	I	I	I	I	I	R
Fork oil (3) (4)					R		
Engine oil	R	R	R	R	R	R	R
Headlight aiming		I	I	I	I		
Fork oil seals (4)	I	I	I	I	R		
Tyres - pressure / wear (1)	I	I	I	I	I	I	I
Nut/bolt tightness (4)	I	I	I	I	I		
Head cover fastening screws dampers			I		I		

km x 1,000 (mi x 1,000)	1 (0.6)	10 (6.2)	20 (12.4)	30 (18.6)	40 (24.9)	12 months	24 months
Labour time (minutes)	0	0	0	0	0	0	0

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.



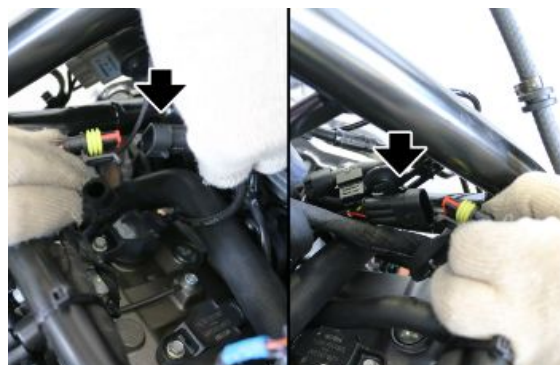
TABLE OF RECOMMENDED PRODUCTS

Product	Description	Specifications
Engine oil 10W -50	Synthetic-based lubricant for high performance four-stroke engines.	SAE 10W 50; API SL; JASO MA2
Lithium-based grease	Lithium-calcium soap based grease	colour - black, contains EP (Extreme Pressure) additives, excellent water-repellent properties
Anti-freeze liquid, ready to use, colour red	Ethylene glycol antifreeze liquid with organic inhibition additives. Red, ready to use.	ASTM D 3306 - ASTM D 4656 - ASTM D 4985 - CUNA NC 956-16
DOT 4 brake fluid	Synthetic brake fluid.	SAE J 1703; FMVSS 116; ISO 4925; CUNA NC 956 DOT4
Fork oil 7.5W	Fork oil.	SAE 7.5W

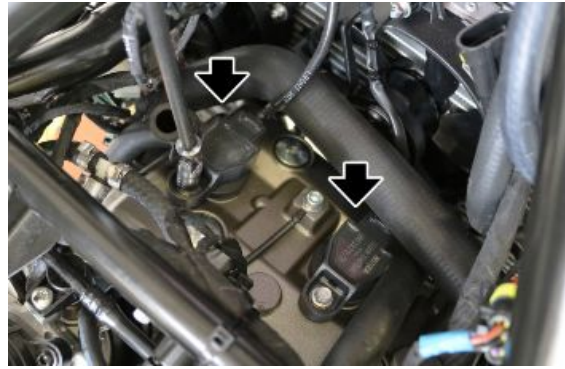
Spark plug

To remove the spark plugs, the fuel tank and the complete filter box must first be removed. Then proceed as described:

- After releasing the coil connectors from the supports, disconnect them.



- After removing the screws holding the coils, disconnect them from the spark plugs and remove them.



- Using a special spark plug wrench, unscrew and remove them.



- Check the efficiency and check the electrode gap. If they are not within the parameters, replace them.

Engine oil

Check



THE OIL LEVEL MUST BE CHECKED WHEN THE ENGINE IS WARM.

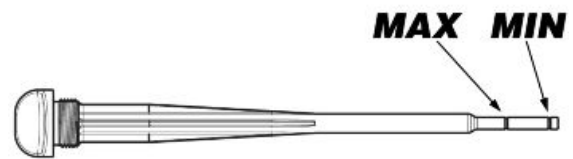
CAUTION

DO NOT LET THE ENGINE IDLE WITH THE VEHICLE AT A STANDSTILL TO WARM UP THE ENGINE AND OBTAIN THE OPERATING TEMPERATURE OF ENGINE OIL. PREFERABLY CHECK THE OIL AFTER A JOURNEY OF AFTER TRAVELLING APPROXIMATELY 15 Km (10 miles) IN EXTRA-URBAN CONDITIONS (ENOUGH TO WARM UP THE ENGINE OIL TO OPERATING TEMPERATURE).

- Shut off the engine and wait a few seconds
- Keep the vehicle upright with both wheels on the earth
- Ensure that you are on a flat surface
- Unscrew the engine oil level dipstick (1)



- Clean the engine oil level dipstick (1) and put it back in without screwing it in
- Remove it again and check the engine oil level
- The level is correct if it reaches the "MAX" level approximately. Otherwise top off the engine oil

**CAUTION**

THE OIL LEVEL MUST NEVER DROP BELOW THE MINIMUM MARKING OR EXCEED THE MAXIMUM MARKING; AN OIL LEVEL NOT WITHIN THE MINIMUM AND MAXIMUM MARKINGS MAY CAUSE SEVERE ENGINE DAMAGE

Replacement

NOTE

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

For the replacement of the engine oil, the sump guard must be removed beforehand. Then proceed as described:

- Place a container with suitable capacity under the drainage plug.
- Unscrew and remove the drain cap.



- Unscrew and remove the filler cap.



- Drain the oil into the container; allow several minutes for oil to drain out completely.
- Check and, if necessary, replace the drainage plug sealing washers.
- Remove the oil filter.
- Spread a thin layer of oil on the sealing ring of the new engine oil filter.
- Insert and screw the new engine oil filter in the seat, filling the filter to 1/3 of its capacity with engine oil before fitting.



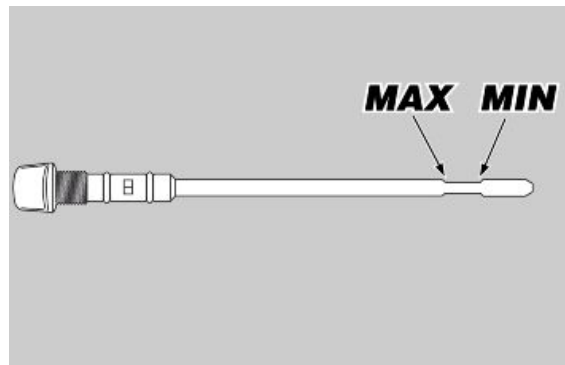
- Screw and tighten the drainage plug.
- Add 2700 cc (164.76 cu in) of new engine oil of the specified type.
- Screw on the filler cap.



- Warm up the engine up by running it for a few minutes, then switch it off. After thirty seconds, check the level with a oil level dipstick. Top up if necessary.

CAUTION

THE OIL LEVEL MUST NEVER DROP BELOW THE MINIMUM MARKING OR EXCEED THE MAXIMUM MARKING; AN OIL LEVEL NOT WITHIN THE MINIMUM AND MAXIMUM MARKINGS MAY CAUSE SEVERE ENGINE DAMAGE



Engine oil filter

Replace the engine oil filter each time you change the engine oil.

- Drain the engine oil completely.
- Unscrew and remove the engine oil filter from its seat.

NOTE

NEVER REUSE AN OLD FILTER.



- Spread a thin layer of oil on the sealing ring of the new engine oil filter.
- Insert and screw the new engine oil filter in the seat, filling the filter to 1/3 of its capacity with engine oil before fitting.

See also

[Replacement](#)

Air filter

To remove the air filter, the fuel tank upper cover must be removed beforehand. Then proceed as described:

- Working from both sides, remove the four fixing screws of the filter box cover.



- Remove the filter housing cover.



- Remove the air filter.



Throttle body

Throttle body removal

To remove the throttle body, the fuel tank and the complete filter housing must first be removed.

Then proceed as described:

- Remove the fixing screw (1) of the air pressure sensor and disconnect the connector (2) from the sensor itself.
- After disconnecting the connectors (3) from the ECU, free the VEHICLE wiring harness and the rear stop switch wiring harness (4) from the cable guide.
- Remove the ECU (5).



- Remove the two upper fixing screws (6) of the ECU support, freeing the cable grommet that secures the tank breather pipe.



- Remove the side fixing screw (7) of the ECU support.



- Disconnect the fuel tank breather pipe (8) from the cable grommets on the ECU support.
- Disconnect the pick-up connector support (9) from the ECU support.



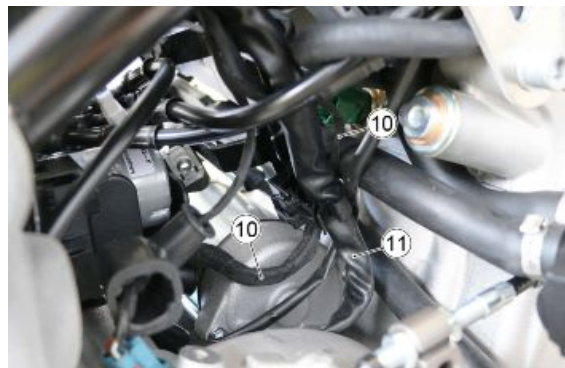
- Remove the fastening screw of the SAS valve support.



- After removing the protective cap, disconnect the SAS valve connector and move it sideways to access the cables connected to the filter box support.



- Disconnect the two pick-up/generator sensor wiring harnesses (10) and the ABS modulator wiring harness (11) from the cable grommet on the ECU support.



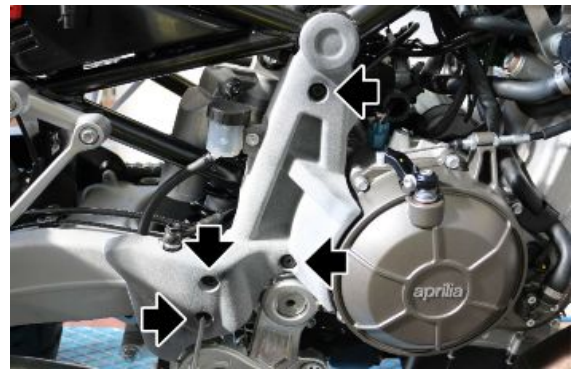
- Remove the ECU support.



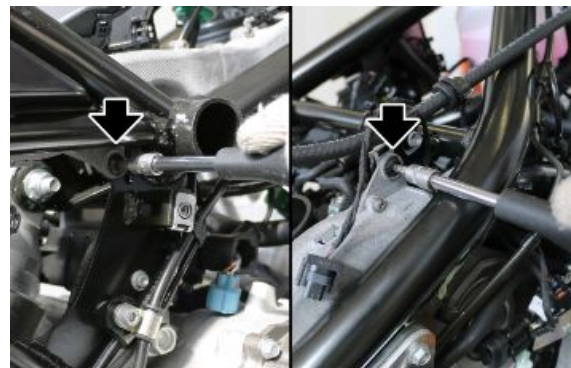
- Disconnect the connector of the fuel pipe and remove it.



- Undo the four screws and remove the right frame cover.



- Unscrew and remove the two fixing screws of the conduit to be able to move it far enough, to facilitate the removal of the throttle body.



- Remove the clamp and disconnect the pipe from the purge valve.

CAUTION

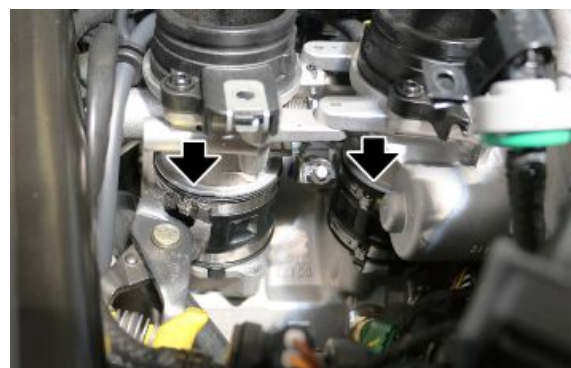
DURING REASSEMBLY, USE A NEW METAL CLAMP.



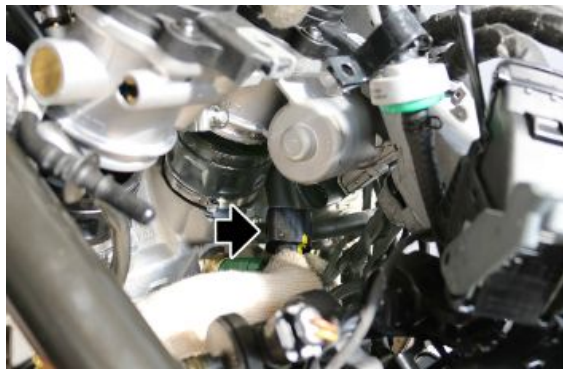
- Remove the two metal clamps securing the throttle body to the rubber manifolds.
- Disconnect the throttle body.

CAUTION

USE NEW METALLIC CLAMPS DURING REASSEMBLY.



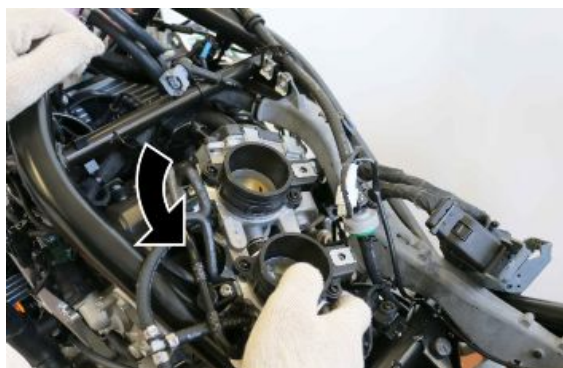
- Disconnect the connector of the throttle body.



- Disconnect the two injectors from the throttle body.



- Rotate the throttle body as indicated to help removal and extract it.



Throttle body installation

To install the throttle body, carry out the procedures described in paragraph "**Throttle body removal**" in reverse order, paying attention to use new metal clamps where indicated.

Air filter housing

Air filter housing removal

To remove the filter housing, firstly remove the fuel tank and then proceed as described:

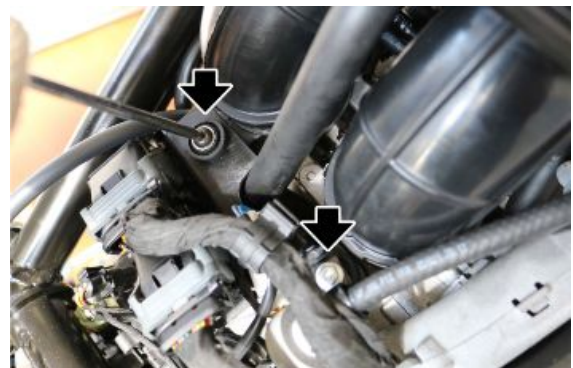
- Disconnect the tank breather pipes from the filter box.



- Disconnect the intake air temperature sensor connector.



- Undo and remove the two upper fixing screws of the ECU support.



- Remove the metal clamp and disconnect the breather pipe.



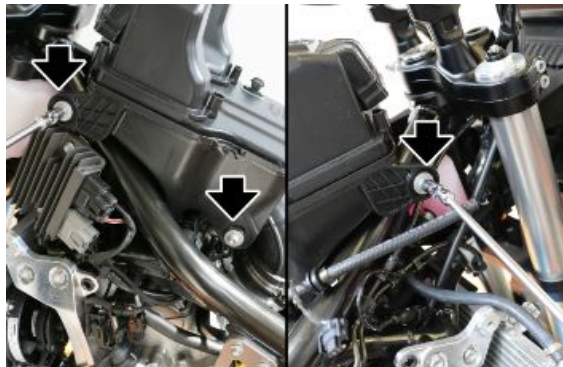
- Disconnect and remove the two metal clamps of the manifolds.

CAUTION

USE NEW METALLIC CLAMPS DURING REASSEMBLY.



- Unscrew and remove the three side fixing screws.



- Partially raise the filter box, remove the metal clamp and disconnect the breather pipe.



- Remove the filter box.



- To remove the air filter inside the filter box, carry out the procedure described in paragraph "air filter" in the "maintenance" chapter.

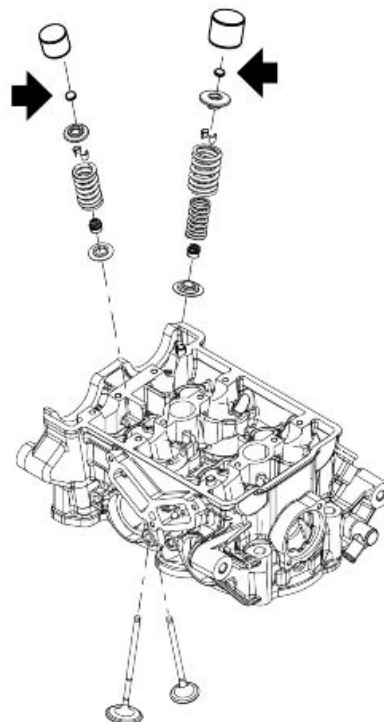
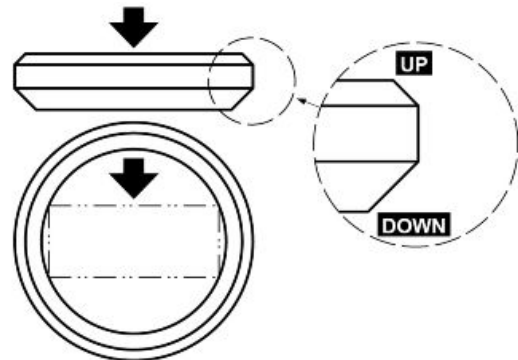
See also

Air filter

Calibrated pad thickness

CAUTION

THE CALIBRATED PAD MUST BE ASSEMBLED KEEPING THE PRINTING OF THE THICKNESS UPWARDS.



Pad thickness for adjusting valve clearance correctly:

- 1.75 mm (0.0689 in)
- 1.77 mm (0.0697 in)
- 1.80 mm (0.0709 in)
- 1.82 mm (0.0716 in)
- 1.85 mm (0.0728 in)
- 1.87 mm (0.0736 in)
- 1.90 mm (0.0748 in)
- 1.92 mm (0.0756 in)
- 1.95 mm (0.0768 in)
- 1.97 mm (0.0775 in)
- 2 mm (0.0787 in)

2.02 mm (0.0795 in)
2.05 mm (0.0807 in)
2.07 mm (0.0815 in)
2.1 mm (0.0827 in)
2.12 mm (0.0835 in)
2.15 mm (0.0846 in)
2.17 mm (0.0854 in)
2.2 mm (0.0866 in)
2.22 mm (0.0874 in)
2.25 mm (0.0886 in)
2.27 mm (0.0894 in)
2.3 mm (0.0905 in)
2.32 mm (0.0913 in)
2.35 mm (0.0925 in)
2.37 mm (0.0933 in)
2.4 mm (0.0945 in)
2.42 mm (0.0953 in)
2.45 mm (0.0964 in)
2.47 mm (0.0972 in)
2.50 mm (0.0984 in)
2.52 mm (0.0992 in)
2.55 mm (0.1004 in)
2.57 mm (0.1012 in)
2.6 mm (0.1024 in)
2.62 mm (0.1031 in)
2.65 mm (0.1043 in)
2.67 mm (0.1051 in)
2.7 mm (0.1063 in)
2.72 mm (0.1071 in)
2.75 mm (0.1083 in)
2.77 mm (0.1090 in)
2.8 mm (0.1102 in)
2.82 mm (0.1110 in)
2.85 mm (0.1122 in)
2.87 mm (0.1129 in)
2.9 mm (0.1142 in)
2.92 mm (0.1150 in)
2.95 mm (0.1161 in)

- 2.97 mm (0.1169 in)
- 3 mm (0.1181 in)
- 3.02 mm (0.1189 in)
- 3.05 mm (0.1201 in)
- 3.07 mm (0.1209 in)
- 3.10 mm (0.1220 in)
- 3.12 mm (0.1228 in)
- 3.15 mm (0.1240 in)

Cooling system

Level check

- Shut off the engine and wait until it cools off.
- Keep the vehicle upright with both wheels on a flat surface.
- Make sure, looking from the left side of the vehicle, under the steering headstock, that the fluid level in the expansion tank is between the "MIN" (minimum) and "MAX" (maximum) marks.



WARNING

CARRY OUT THE CHECK AND TOP UP THE REFRIGERANT LIQUID WITH THE ENGINE SWITCHED OFF AND COLD.

Top-up

- Remove the expansion tank cap.
- Top up with the recommended liquid until reaching an intermediate level between the "MIN" bar and the "MAX" bar of the expansion tank, visible from the left side under the steering headstock.



Braking system

Level check

Checking brake fluid

- Rest the vehicle on its stand.
- For the front brake, turn the handlebar all the way to the left.
- For the rear brake, keep the vehicle upright so that the fluid in the reservoir is at the same level as the plug.
- Make sure that the fluid level in the reservoir is above the "MIN" reference mark:



MIN = minimum level

MAX = maximum level

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

- Check brake pads and discs for wear.
- If the pads and/or the disc do not need replacing, top up the fluid.
- If the pads and/or the disc have to be replaced, check the brake fluid and top up if necessary.

Top-up



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

CAUTION



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 LEVEL OF THE FLUID IN THE RESERVOIR PARALLEL WITH THE EDGE OF THE RESERVOIR ITSELF (IN HORIZONTAL POSITION). DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID. FUNNELS OR ANY OTHER IMPLEMENTS USED MUST BE PERFECTLY CLEAN.



BRAKE FLUID IS HIGHLY CORROSIVE. AVOID CONTACT WITH THE SKIN, EYES AND PARTS OF THE MOTORCYCLE.

WHEN TOPPING UP, PROTECT PARTS OF THE MOTORCYCLE IN THE VICINITY OF THE RESERVOIR WITH ABSORBENT MATERIAL.

Recommended products

DOT 4 brake fluid Synthetic brake fluid.

SAE J 1703; FMVSS 116; ISO 4925; CUNA NC 956 DOT4

Front braking system

- Use a short cross-head screwdriver to undo the screws (1) of the front braking system fluid reservoir (2).
- Lift and remove the cover (3), complete with screws (1) and the gasket (4).
- Top up the reservoir (2) with recommended brake fluid to above the minimum level marking "MIN".



CAUTION



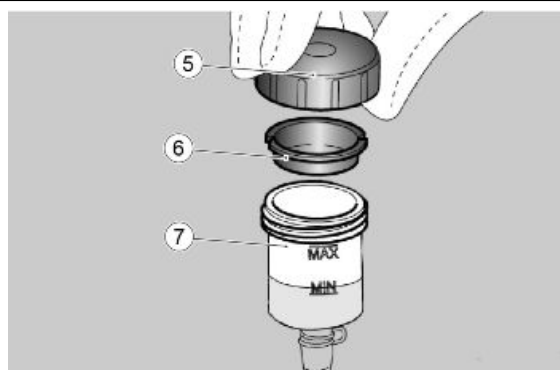
ONLY FILL TO THE "MAX" LEVEL AFTER FITTING NEW BRAKE PADS. DO NOT FILL TO THE "MAX" LEVEL WITH WORN PADS, AS THIS WILL CAUSE FLUID TO ESCAPE WHEN REPLACING BRAKE PADS.

CHECK BRAKING EFFICIENCY.

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

Rear braking system

- Unscrew the cap (5) and remove together with the gasket (6).
- Top up the reservoir (7) with recommended brake fluid to above the minimum level marking "MIN".



CAUTION



ONLY FILL TO THE "MAX" LEVEL AFTER FITTING NEW BRAKE PADS. DO NOT FILL TO THE "MAX" LEVEL WITH WORN PADS, AS THIS WILL CAUSE FLUID TO ESCAPE WHEN REPLACING BRAKE PADS.

CHECK BRAKING EFFICIENCY.

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

Adjusting the levers

FRONT BRAKE LEVER

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

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



REAR BRAKE LEVER

The control lever is set to the correct ergonomic position during assembly of the vehicle.

To adjust the play of the lever:

- Position the vehicle on its stand and remove the right frame cover.
- Unscrew the lock nut (4) partially.
- Turn the pin (5) checking with a thickness gauge the correct play in the indicated point - 1.5 mm (0.05 in).
- Finish the adjustment by tightening the lock nut.



Regolazione leva frizione

Adjust the clutch lever if the engine stalls or if the vehicle creeps forward when the lever is pulled, or if the clutch slips, causing a lag in acceleration relative to increases in engine speed.

Minor adjustments can be realized by acting on the clutch lever adjuster operating as follows:

- Turn the adjuster (1) clockwise to increase the play of the lever (2) and check the operation of the lever sitting on the vehicle and grasping the hand grip (3) as when in the riding position.



In the event that the adjustment of the adjuster screw on the lever is not sufficient, act on the register located on the right side of the vehicle:

- Loosen the nut (4)
- Turn the adjuster (5) until the correct clearance is obtained.
- Tighten the nut (4), locking the adjuster (5).
- Check the play on the clutch lever.
- Start the engine.
- Fully engage the clutch and engage first gear.
- Make sure that the engine does not stop or that the vehicle does not tend to move, or that the clutch does not "slip" during acceleration or while riding.

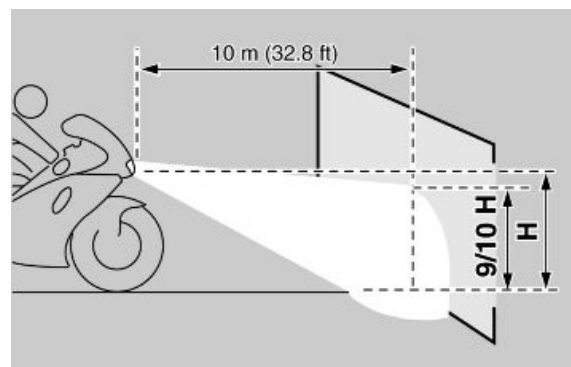


Headlight adjustment

NOTE

IN COMPLIANCE WITH LOCAL LEGISLATION, SPECIFIC PROCEDURES MUST BE FOLLOWED WHEN ALIGNING THE LIGHTS.

To quickly check if the headlamp is aimed correctly, place the vehicle on a level surface 10 m (32.8 ft) from a vertical wall. 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 horizontal straight line of the headlight (about 9/10 of the total height).



To carry out vertical adjustment of the light beam:

(LOW BEAM HEADLIGHTS)

- Operating from the rear side of the fairing, under the internal bodywork, act on the adjuster ("1" left side / "2" right side). SCREWING (clockwise) the light beam is lowers; UNDO the screw (anticlockwise) to raise the light beam.
- These two adjuster screws may be used to adjust the vertical alignment of the low beam headlight beam.

NOTE

CHECK THAT THE VERTICAL ALIGNMENT OF THE BEAM IS CORRECT.



(HIGH BEAM HEADLIGHT)

From under the light using a Phillips-head screwdriver, act on the adjuster (3) at the point indicated:

- Turn the screwdriver clockwise to raise the beam;
- Turn the screwdriver anticlockwise to lower the beam.

This adjuster screw may be used to adjust the vertical alignment of the high beam headlight beam.

NOTE

CHECK THAT THE VERTICAL ALIGNMENT OF THE BEAM IS CORRECT.



INDEX OF TOPICS

ELECTRICAL SYSTEM

ELE SYS

Electrical system installation

Scope and applicability

This document defines the position of the vehicle wiring harness, how it is routed and fixed to the chassis, instrument holder arch brace and saddle post, any problems and special checks to be made on the cable connections and routing in order to achieve vehicle reliability.

Materials used and corresponding quantities

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

- 1 main wiring harness
- 1 x Engine-Battery Earth Cable
- 5 x Edge clip Sheet Ø10mm
- 1 x Edge clip Sheet Ø20mm
- 1 x Edge clip Sheet Ø10mm
- 5 x AMP connector support
- 1 x Front ABS sensor support
- 1 x Rear ABS sensor support
- 2 x Small cable glands
- 3 x Large cable glands
- 11 x Brake line guides
- 2 x Edge cable guides
- 1 x Fuel Pump cable guide
- 5 x Edge clamps
- 1 x Cable glands
- 1 x Int. support Rear Stop

Small parts and mountings

- 3 x large black clamps 290x4 mm
- 9 x Small black clamps 160x2.5 mm

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.

Vehicle side:

- Check the ECU connections.
- Check Map Sensor connection.
- Check the side stand connection.
- Check that the engine oil cap has been inserted correctly.
- Check that the starter motor's positive cable and the cover are properly fastened (with torque wrench).
- Check the taillight connection.
- Check fuel pump connection and cable position on right side of tank.
- Check Regulator-Wiring connection (Black connector).
- Check the flywheel-regulator connection (Grey connector).
- Check fastening of ground cable on the engine (with torque wrench).
- Lambda connection check (1 and 2).
- Check that lambda probe cable (1 and 2) is correctly connected.
- Check that the "ABS" connector is correctly inserted.
- Check that the "ABS" sensors are correctly connected (front and rear).
- Check connection of Fan connectors (1 and 2).
- Check the starter relay connection with the main wiring harness (red 4-way connector).
- Check correct connection of the starter relay cables and fastening of screws (with torque wrench).
- Check the rear stop switch connection.
- Check the RbW connector connection.
- Check that all the connectors inside the instrument support arch have been connected correctly.
- Check ignition connection and ignition antenna connection.
- Check the positive passage of the starter motor.
- Check filter box temperature sensor connection.

Engine side:

- Check coil connections (1 and 2).
- Check injectors connection (1 and 2).
- Check throttle valve connection.
- Check engine temperature sensor connection.
- Check the purge valve connection.
- Check the gear sensor connection.

CAUTION



THESE CONNECTORS HAVE BEEN LISTED AS THEY ARE MORE CRITICAL THAN OTHERS, AND THEIR DISCONNECTION MAY CAUSE VEHICLE BREAKDOWN OR MALFUNCTION. NATURALLY, IT IS ALSO NECESSARY THAT ALL OTHER CONNECTORS CONNECTED CORRECTLY TO ENSURE THAT THE VEHICLE FUNCTIONS CORRECTLY. THE INSTRUCTIONS FOR ROUTING AND FASTENING THE WIRING HARNESS THROUGHOUT THE VEHICLE MUST BE FOLLOWED PRECISELY TO ENSURE THAT THE VEHICLE FUNCTIONS CORRECTLY AND RELIABLY.

Front side

TABLE A - USB PRE-ASSEMBLY

- Insert the USB port on the left side support of the instrument cluster, making sure that the slot in the cap is facing upwards.



TABLE B - OUTSIDE AIR TEMPERATURE SENSOR PRE-ASSEMBLY

- Insert the outside air temperature sensor on the right side support of the instrument cluster.

**TABLE C - PRE-ASSEMBLY OF THE EDGE FIXING TIES ON THE INSTRUMENT CLUSTER SUPPORT**

- Position the three edge ties as indicated on the right instrument cluster support.

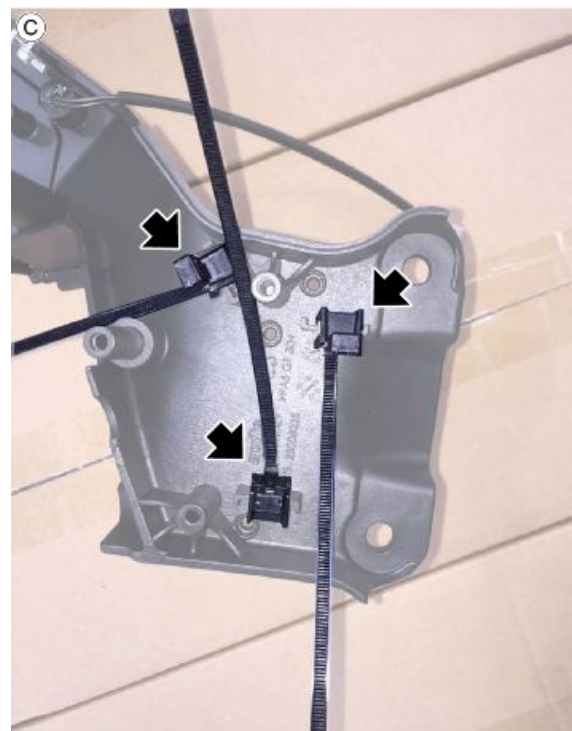


TABLE D - PRE-ASSEMBLY OF THE FRONT INSTRUMENT CLUSTER SUPPORT

- Position the cable guide in the point indicated on the central instrument cluster support.

**TABLE E - HEADLIGHT PRE-ASSEMBLY**

- Insert the connector mount on the headlight.

**TABLE E1 - HEADLIGHT PRE-ASSEMBLY**

- Connect the headlight connector to the mount as indicated.



TABLE F - IGNITION BLOCK PRE-ASSEMBLY

- Secure the immobilizer wiring harness with a tie as indicated.

**TABLE G - RIGHT SWITCH CLUSTER PRE-ASSEMBLY**

- Position the right switch cluster as indicated.



TABLE H - LEFT SWITCH CLUSTER PRE-ASSEMBLY

- Position the right switch cluster as indicated.

**TABLE H1 - LEFT SWITCH CLUSTER PRE-ASSEMBLY**

- Always check that the wiring harnesses of the switch clusters are not pinched when fastening the clutch lever.



TABLE I - CLUTCH SWITCH PRE-ASSEMBLY

- After inserting the clutch switch in its seat routing the wiring harness as indicated, secure the switch using the nut so as to obtain a 4 mm protrusion of the thread, as indicated.

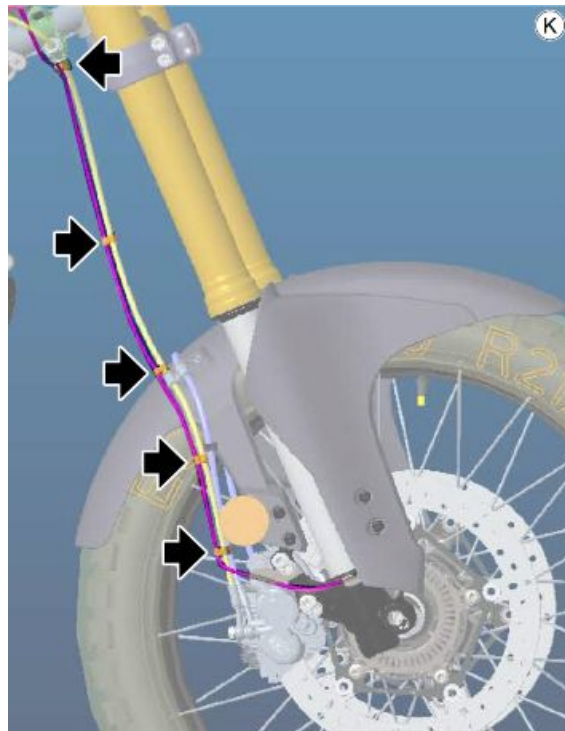
**TABLE J - FRONT ABS SENSOR PRE-ASSEMBLY**

- After connecting the ABS sensor to the right stanchion, arrange the wiring as shown and secure it using the special metal plate.



FIGURE K - FRONT ABS SENSOR

- Secure the wiring harness of the front ABS sensor to the front brake line using five cable guides at the points shown.

**FIGURE K1 - FRONT ABS SENSOR**

- Position the connector socket on the bracket at the point indicated.

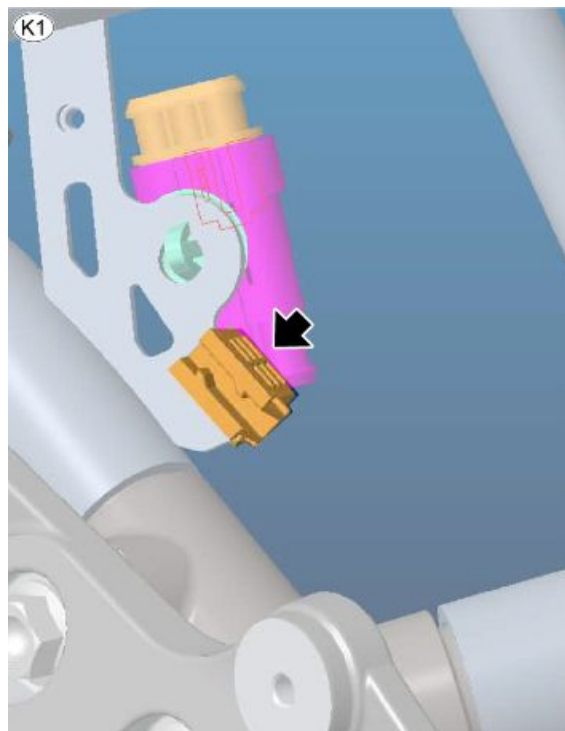
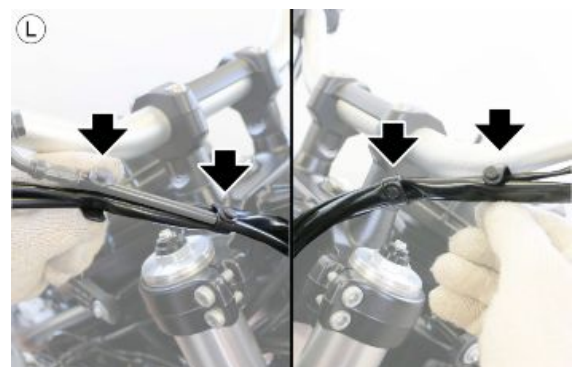


FIGURE K2 - FRONT ABS SENSOR

- Connect the ABS sensor connector and hook it to the socket positioned previously.
- Using a cable clamp, secure the front ABS sensor wiring harness to the front brake line at the point indicated.

**TABLE L - HANDLEBAR AND IGNITION
BLOCK AREA CABLE ROUTING**

- Using rubber cable clamps, secure the handlebar wiring harnesses as shown.



**TABLE L1 - HANDLEBAR AND IGNITION
BLOCK AREA CABLE ROUTING**

- Position the wiring harness of the throttle control and the right switch cluster to the right of the steering headstock.

**TABLE L2 - HANDLEBAR AND IGNITION
BLOCK AREA CABLE ROUTING**

- Route the clutch switch and left switch cluster wiring harness behind the ignition block and position it to the right of the steering headstock along with the previously positioned harnesses.



**TABLE L3 - HANDLEBAR AND IGNITION
BLOCK AREA CABLE ROUTING**

- Route the immobilizer and ignition block wiring harness to the right of the steering headstock along with the previously positioned harnesses.

**TABLE M - ROUTING THE CABLES IN THE IN-
STRUMENT PANEL SUPPORT AREA**

- Position the right instrument panel support taking care to insert all the handlebar wiring and the branch of the main wiring harness.



TABLE M1 - ROUTING THE CABLES IN THE INSTRUMENT PANEL SUPPORT AREA

- After passing all the cables and fixing the right instrument panel support, pull and hold the following cables: throttle control, right switch cluster, left switch cluster, clutch switch, ignition wiring and antenna wiring. Once they have all been pulled, fasten the clamp highlighted by the arrow in the photo. Once fastened, let go of the cables and position them for the next step.

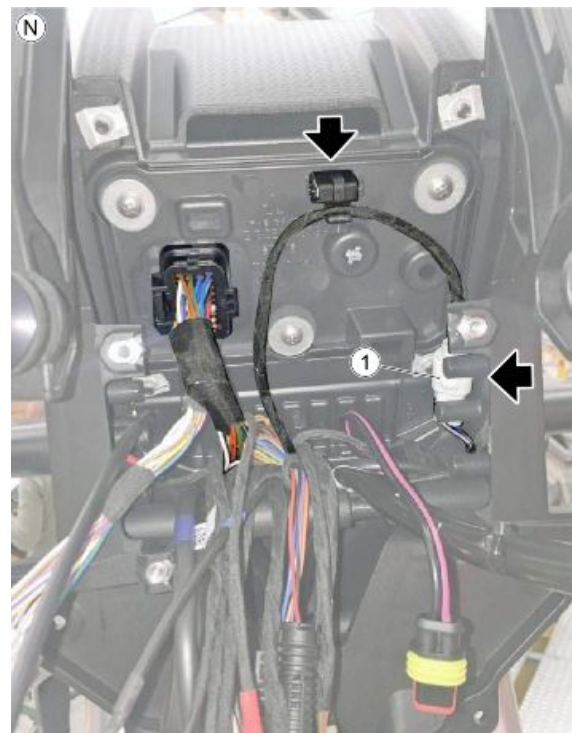
**TABLE M2 - ROUTING THE CABLES IN THE INSTRUMENT PANEL SUPPORT AREA**

- Keep the wiring harness of the left switch cluster (1) as far to the left as possible
- Position the rest of the cables as in the photo and fasten the other two clamps indicated.



TABLE N - INSTRUMENT PANEL AREA CONNECTORS CONNECTION SEQUENCE

- Connect the clutch switch connector (1) positioning it in the indicated point and insert the wiring harness on the cable guide.

**TABLE N1 - INSTRUMENT PANEL AREA CONNECTORS CONNECTION SEQUENCE**

- Connect the USB port connector (2) by positioning it in the indicated connector holder.

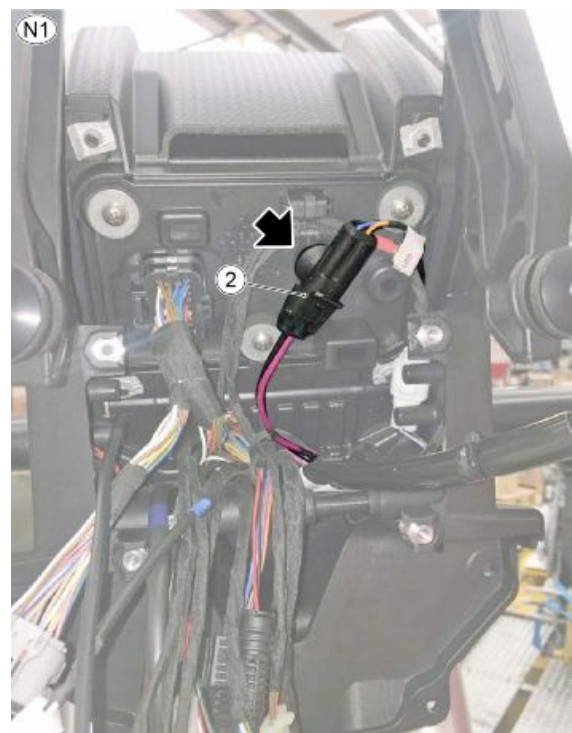
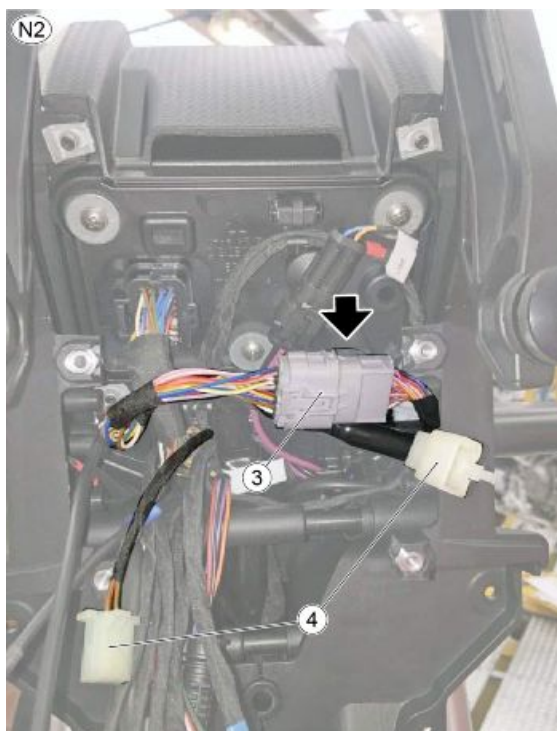


TABLE N2 - INSTRUMENT PANEL AREA CONNECTORS CONNECTION SEQUENCE

- Connect the left switch cluster connector (3) by positioning it in the indicated connector holder.
- Connect the switch cluster connector (4) and position it under the connector (3).

**TABLE N3 - INSTRUMENT PANEL AREA CONNECTORS CONNECTION SEQUENCE**

- Connect the right switch cluster connector (5) by positioning it in the indicated connector holder.

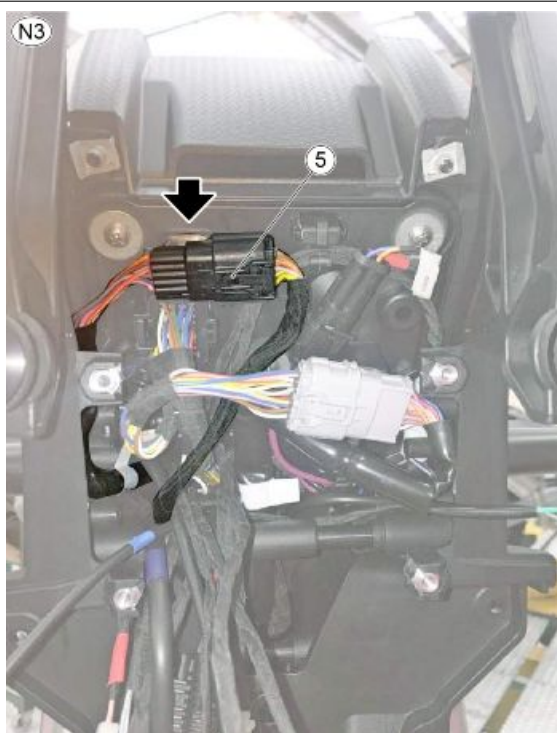
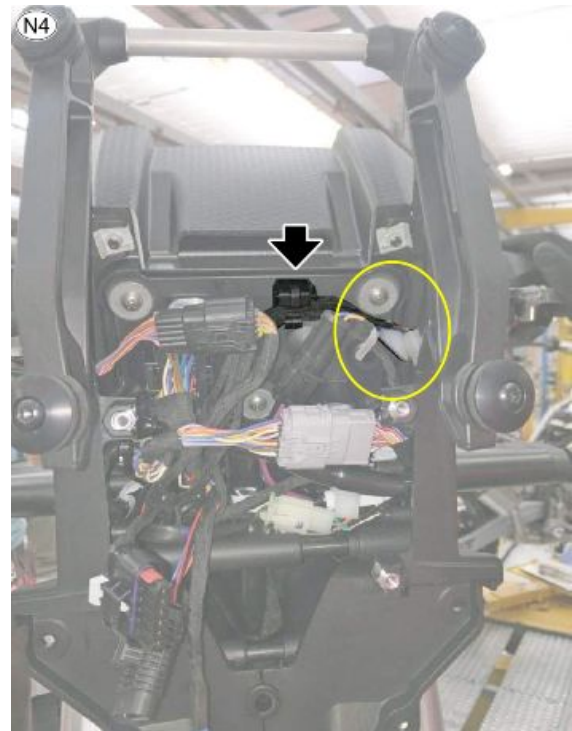


TABLE N4 - INSTRUMENT PANEL AREA CONNECTORS CONNECTION SEQUENCE

- The connectors of the following accessories: heated grips and anti-theft LED connector, must be positioned in the area highlighted by the circle and all passed through the indicated cable gland.

**TABLE N5 - INSTRUMENT PANEL AREA CONNECTORS CONNECTION SEQUENCE**

- Connect the throttle control connector (6) and position it where indicated.



TABLE N6 - INSTRUMENT PANEL AREA CONNECTORS CONNECTION SEQUENCE

- Check the correct connection of all connectors, especially the ignition connector and the antenna connector.

**TABLE N7 - INSTRUMENT PANEL AREA CONNECTORS CONNECTION SEQUENCE**

- After having made all the connections and fastened everything, the curves of the cables that enter the instrument panel support must be as in the photo. If they are too long, they hinder the movement of the handlebar to the right.



Central part

TABLE A - REAR BRAKE SWITCH PRE-ASSEMBLY

- Secure the rear brake switch using the special support and secure the wiring harness by means of the cable guide at the point indicated.



TABLE B - SIDE-STAND SENSOR PRE-ASSEMBLY

- Fix the side stand sensor to the support paying attention to the correct positioning.



TABLE C - RADIATOR FAN PRE-ASSEMBLY

- The small fan should have the cables facing down and the large fan facing up.

**TABLE C1 - RADIATOR FAN PRE-ASSEMBLY**

- Use a clamp at the point indicated to hold the wiring harness in place.



TABLE D - PRE-ASSEMBLY OF THE CABLE GUIDES FOR THE PASSAGE OF THE STARTER CABLES ON THE FRAME

- Position the three cable guides on the frame as shown.

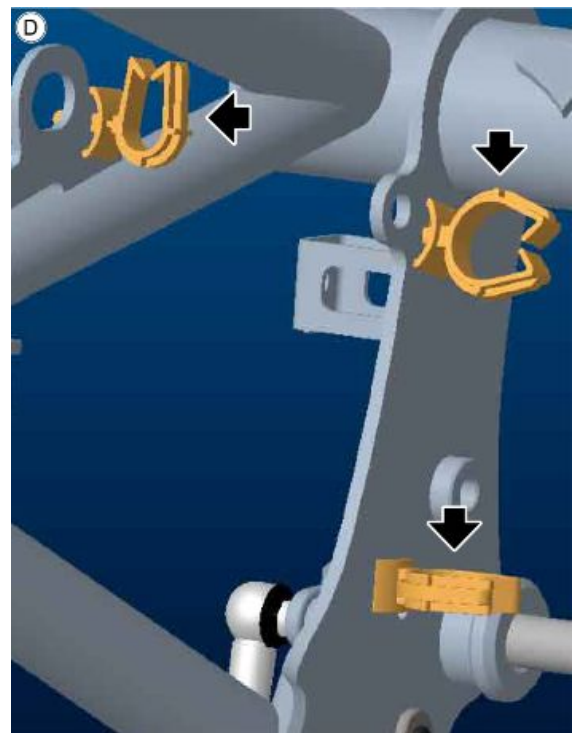


TABLE D1 - PRE-ASSEMBLY OF THE CABLE GUIDES FOR THE PASSAGE OF THE STARTER CABLES ON THE FRAME

- Position the two cable guides on the frame as shown.

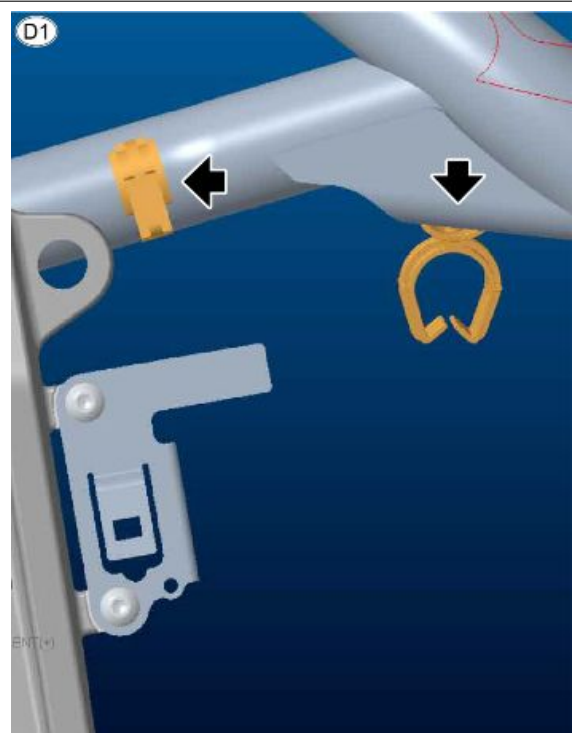


TABLE E - PRE-ASSEMBLY OF THE CABLE GUIDE ON THE TANK

- Fix the cable guide to the tank as shown.

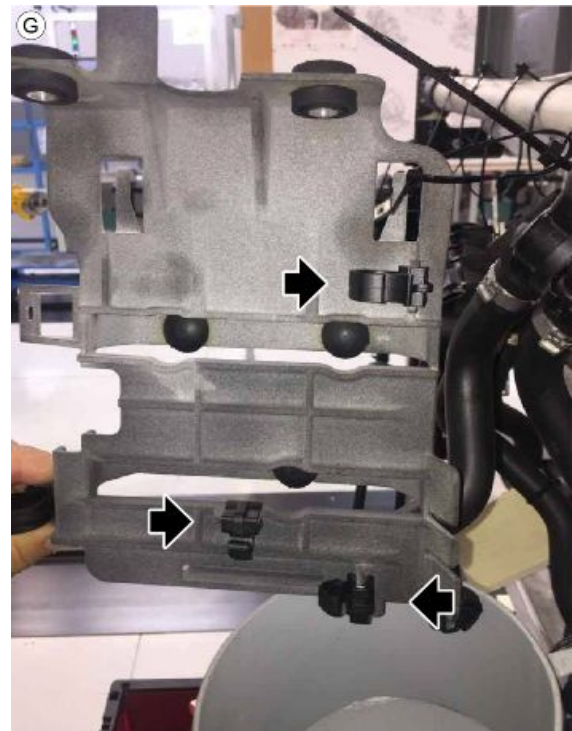
**TABLE F - PRE-ASSEMBLY OF THE FUEL LEVEL PROBE ON THE TANK**

- The fuel level sensor wiring harness output must face the rear of the vehicle.



TABLE G - ENGINE ECU BRACKET PRE-ASSEMBLY

- Pre-assemble the three edge cable guides in the indicated points on the rear part of the ECU support.

**TABLE H - GEAR SENSOR CABLE PASSAGE**

- The cable must pass adherent to the base of the engine as indicated and remain below the starter motor fixing screw.

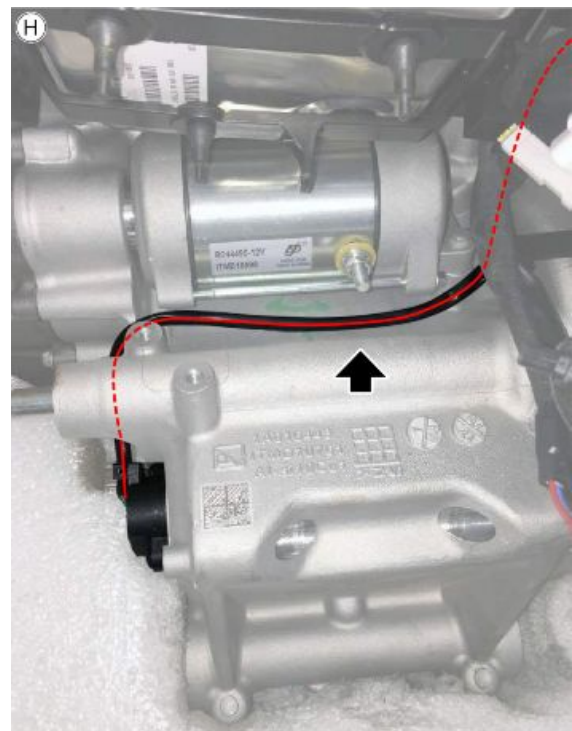
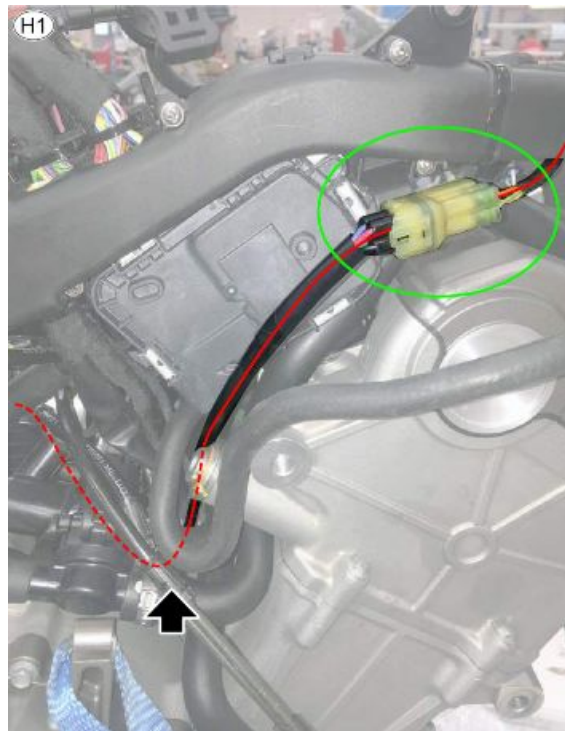


TABLE H1 - GEAR SENSOR CABLE PASSAGE

- The wiring harness must pass between the rubber tube and the head of the engine as in the photo.

**TABLE H2 - GEAR SENSOR CABLE PASSAGE**

- The wiring harness must pass as in the photo.

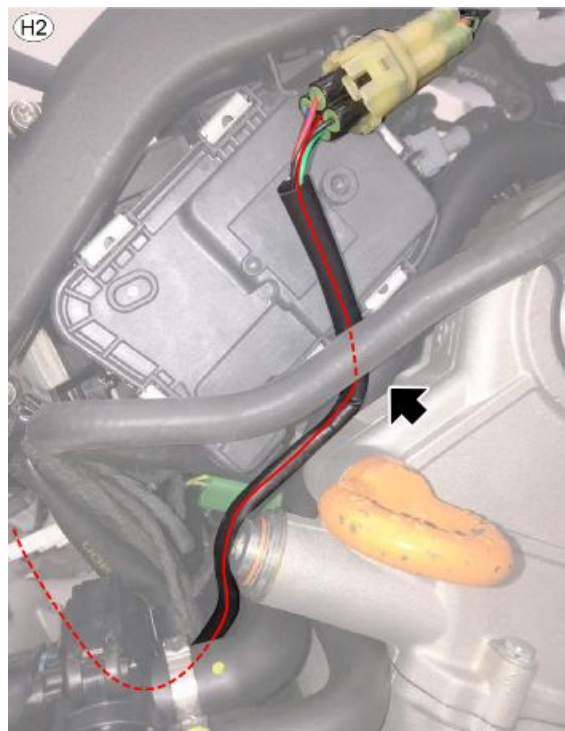


TABLE I - GROUND AND ABS CABLE ON ENGINE

- Position the ground cable and the ABS connector as shown in the photo

**TABLE J - CONNECTION OF THROTTLE VALVE , ENGINE WATER TEMPERATURE, SECONDARY AIR VALVE**

- Connect the connector of the throttle valve (1), of the engine water temperature (2) and of the secondary air valve (3) making sure they are correctly inserted.

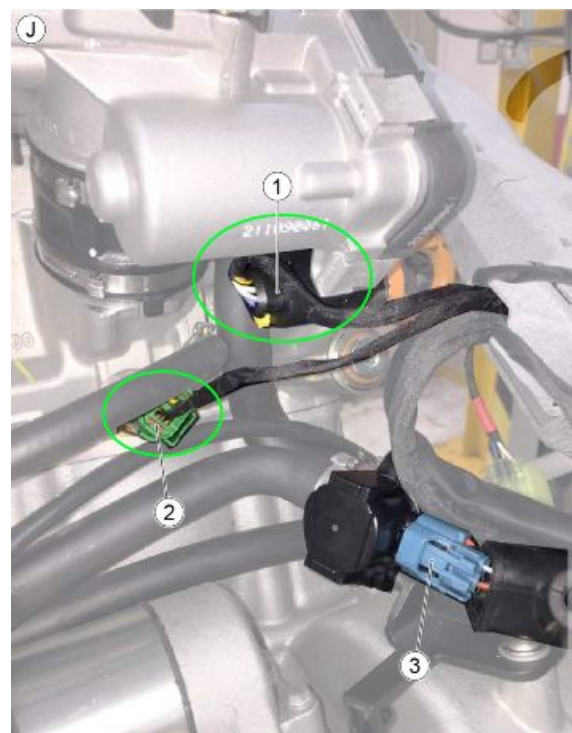
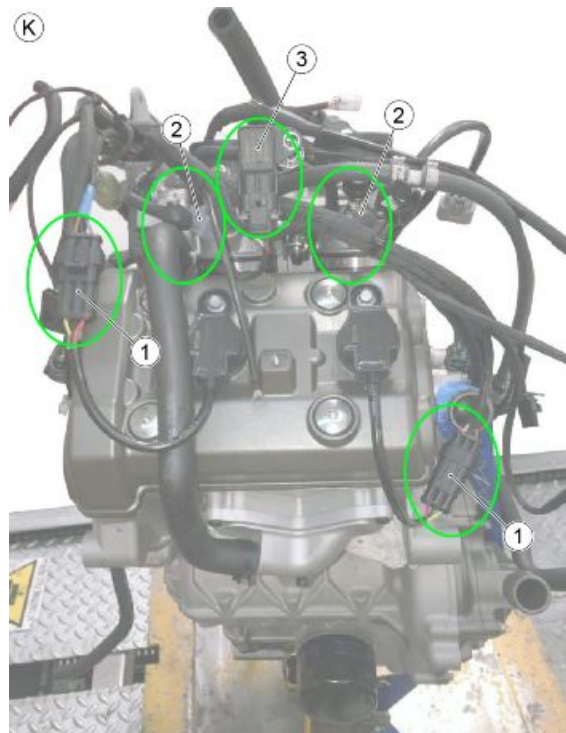


TABLE K - ENGINE HEAD AREA CONNECTIONS

- Connect the connectors of the coils (1), of the injectors (2) and of the map sensor (3) making sure they are correctly inserted.

**TABLE K1 - ENGINE HEAD AREA CONNECTIONS**

- Connect the ground cable at the point indicated



TABLE K2 - ENGINE HEAD AREA CONNECTIONS

- Connect the purge valve connector.



TABLE L - PROCEDURE FOR THE CORRECT FITTING OF THE ABS CONTROL UNIT CONNECTOR

- The initial position of the connector coupling lever must be as indicated in the figures.

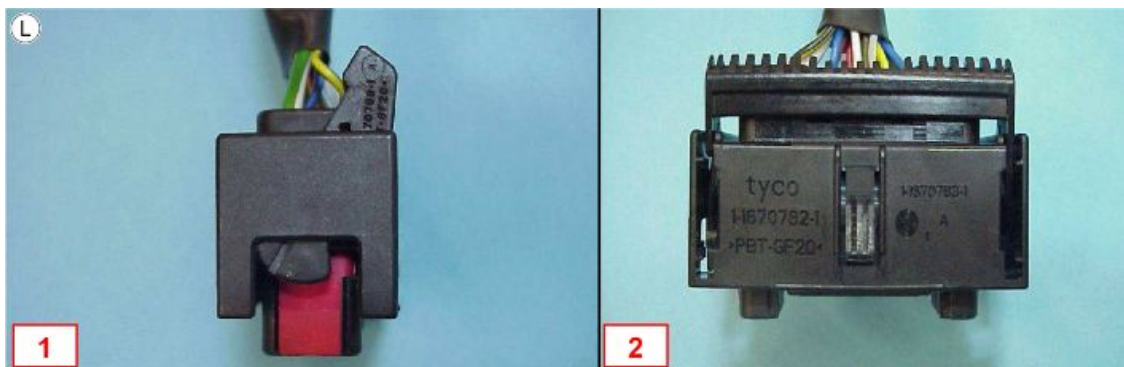


TABLE L1 - PROCEDURE FOR THE CORRECT FITTING OF THE ABS CONTROL UNIT CONNECTOR

- 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.

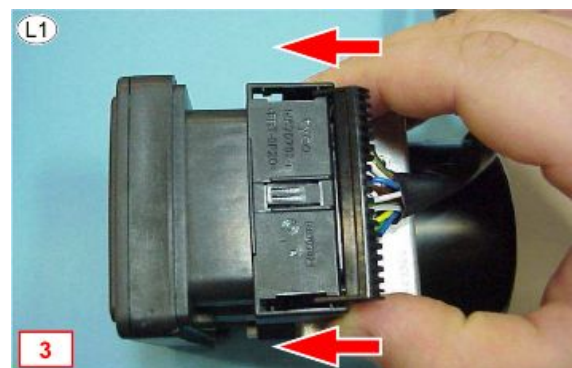


TABLE L2 - PROCEDURE FOR THE CORRECT FITTING OF THE ABS CONTROL UNIT CONNECTOR

- When the connector is fully inserted, the distance between the connector and the ABS control unit must be 7.5 mm.

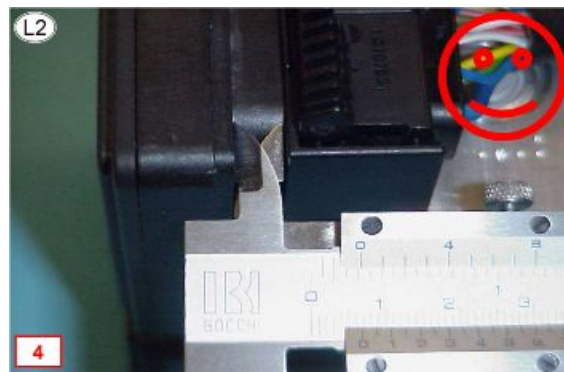


TABLE L3 - PROCEDURE FOR THE CORRECT FITTING OF THE ABS CONTROL UNIT CONNECTOR

- If the initial position of the connector and lever is not as indicated in the "TABLE L", the connector will not couple correctly and the distance measurement will be greater (approx. 12 mm).
- In this case, repeat the operation described in "TABLES L1/L2".
- We recommend creating a template in order to ensure that the connector is inserted correctly.

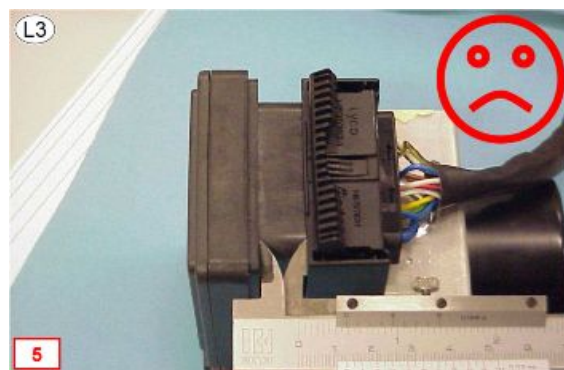


TABLE L4 - PROCEDURE FOR THE CORRECT FITTING OF THE ABS CONTROL UNIT CONNECTOR

- It is possible to check the correct insertion of the connector on the motorcycle by verifying that the yellow line is "Flush" with the connector.

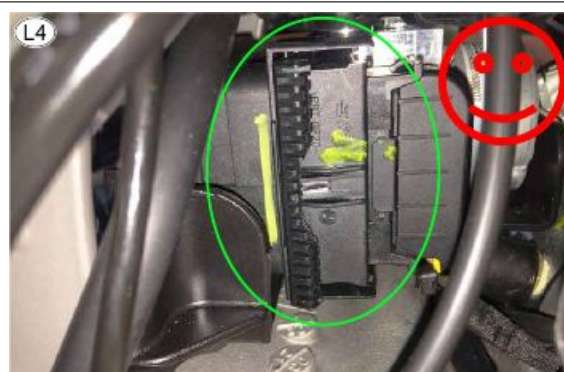
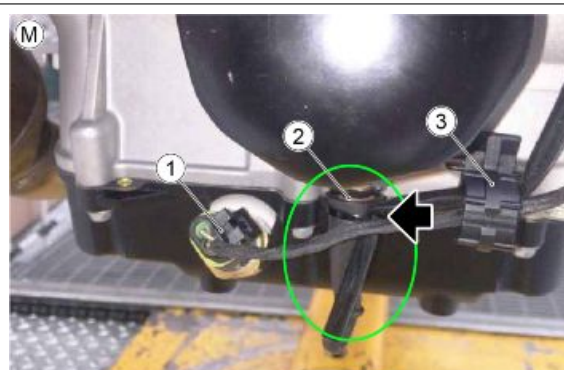


TABLE M - OIL TEMPERATURE SENSOR AND OIL PRESSURE SENSOR

- Correctly connect the connector (1) of the oil temperature sensor and of the oil pressure sensor (2) securing the wiring harness by means of a clamp in the point indicated.



- The wiring harness must pass through the cable guide (3).

TABLE M1 - OIL TEMPERATURE SENSOR AND OIL PRESSURE SENSOR

- The wiring harness must be routed as indicated.



TABLE M2 - OIL TEMPERATURE SENSOR AND OIL PRESSURE SENSOR

- Position a large clamp about 25 mm from the "Y" of the horn output.

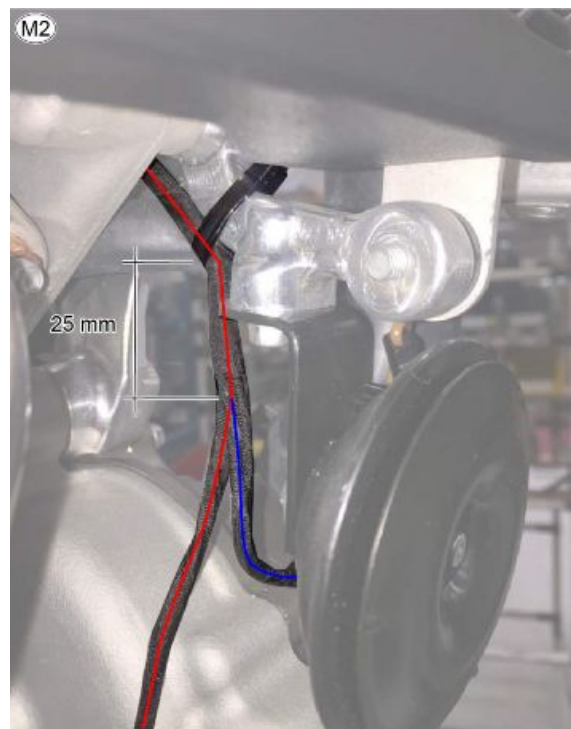


TABLE N - HORN CONNECTION

- Connect the horn connectors as shown.

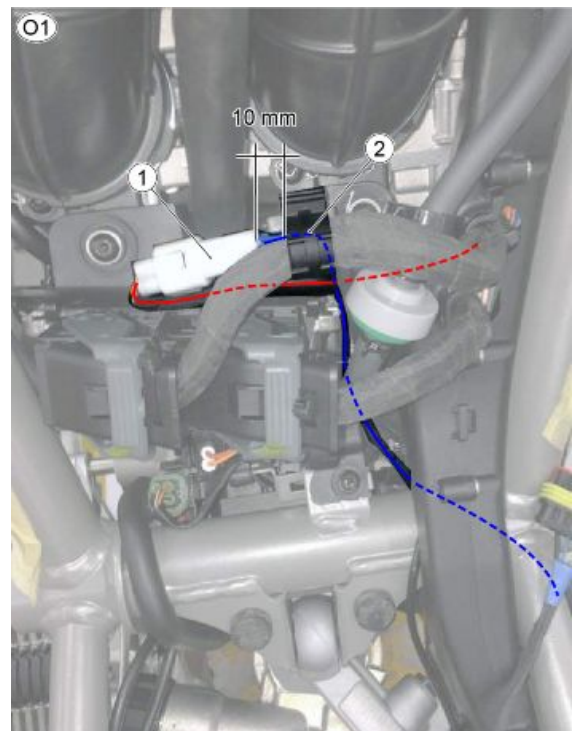
**TABLE O - MAIN WIRING HARNESS**

- The main wiring harness must be positioned as indicated.



TABLE O1 - MAIN WIRING HARNESS

- Check that the connector (1) of the rear brake switch is correctly hooked and objectified to the support. It must be positioned approximately 10 mm from the cable guide (2).

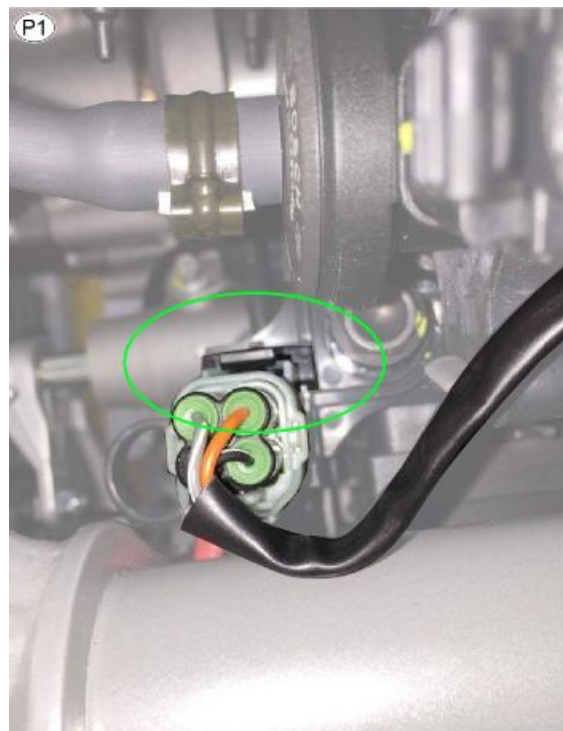
**TABLE P - FALL SENSOR**

- After fixing the fall sensor (1) connect the connector (2).



TABLE P1 - FALL SENSOR

- Check that the fall sensor connector is correctly objectified on the ABS control unit support.

**TABLE Q - ECU**

- Always check the correct connection of the ECU.
- Pull the grey levers that should not move in the direction of the arrow with your finger.

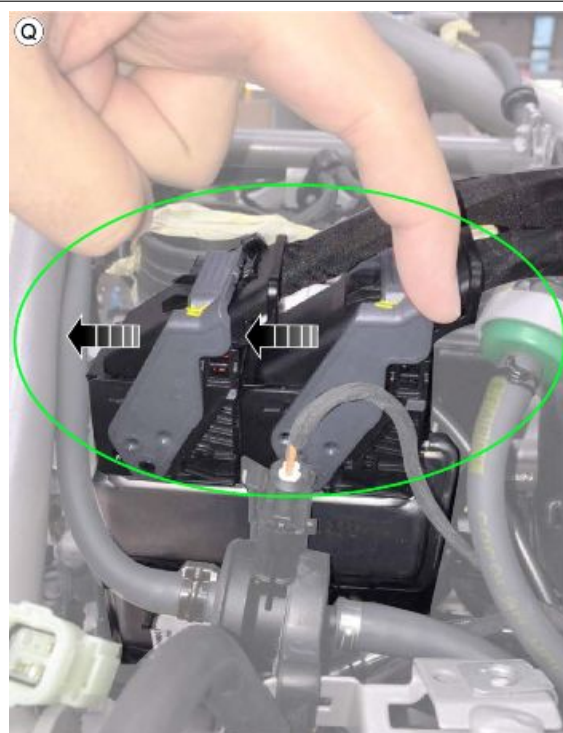
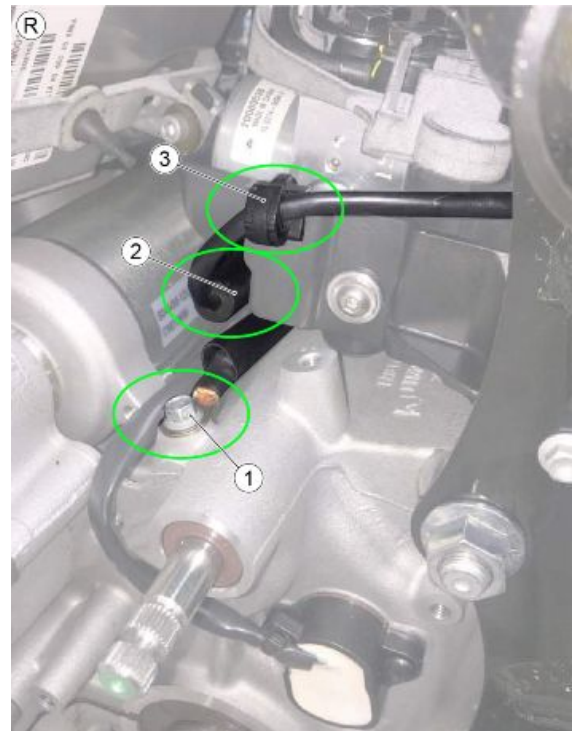


TABLE R - STARTER MOTOR AND GROUND LEAD

- Check the fastening torque of the starter motor screw (2) and that the cap is properly inserted.
- Check that the ground cable screw (1) is correctly tightened and check the correct tightening torque.
- Check the correct passage of the starter motor cable which must be inserted in the cable guide (3) as in the photo.

**TABLE S - LEFT LAMBDA PROBE**

- After having correctly fixed the left lambda probe, route the wiring harness between the engine/frame and behind the cooling hose as indicated.



TABLE S1 - LEFT LAMBDA PROBE

- Check if the left lambda connector is correctly connected and objectified as indicated

**TABLE S2 - RIGHT LAMBDA PROBE**

- After connecting the right lambda probe, pass the wiring harness between the engine and the engine mount.



TABLE S3 - RIGHT LAMBDA PROBE

- Correctly connect the right lambda probe connector and objectify it to the appropriate support.

**TABLE T - LEFT ELECTRIC FAN**

- The wiring harness of the left electric fan (1) must pass externally to the engine mount as indicated and the connector (2) objectified in the indicated point.
- Secure the wiring harness using an edge clamp (3).
- Using a clamp (4) secure the wiring harness, paying attention to obtain a distance greater than 20 mm at the point indicated.

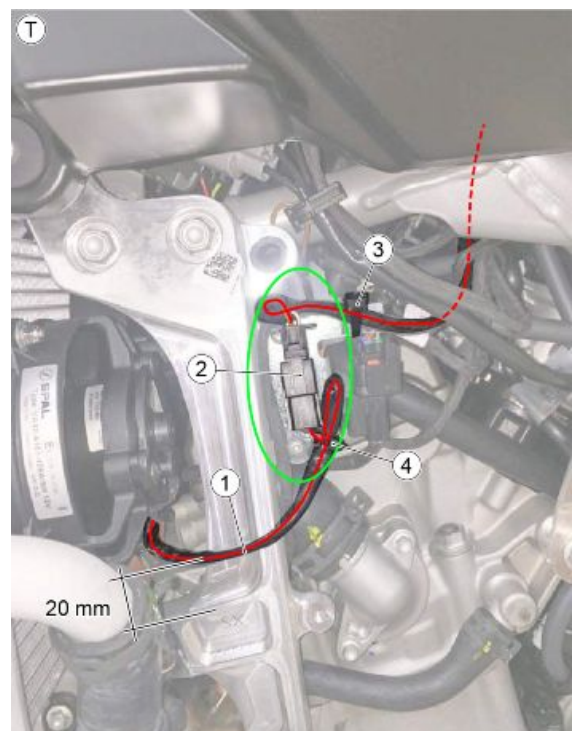
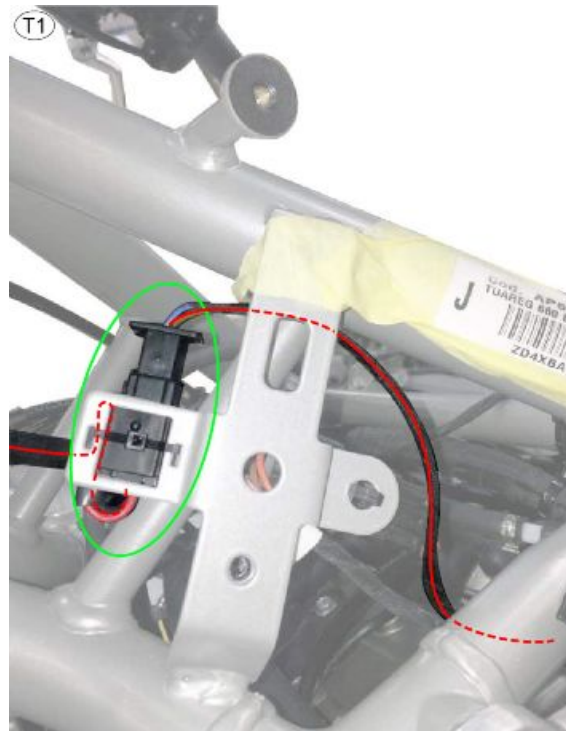


TABLE T1 - RIGHT ELECTRIC FAN

- The wiring harness of the right electric fan must pass internally, between the frame and the engine.
- After checking the correct connection of the connector, insert it in the special housing on the left side of the frame.

**TABLE T2 - RIGHT ELECTRIC FAN**

- Using a clamp, secure the wiring harness and the connector.

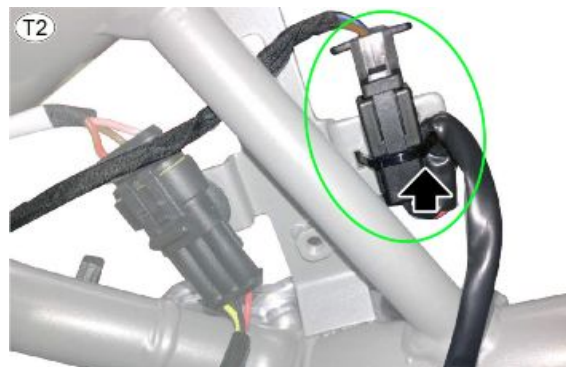


TABLE U - VOLTAGE REGULATOR

- After passing the wiring harness inside the cable guide, connect the two connectors to the voltage regulator

**TABLE V - FILTER BOX AIR TEMPERATURE SENSOR**

- Route the air temperature sensor wiring harness behind the breather pipe and inside the slot on the filter box.
- Check that the filter box air temperature connector is correctly connected.



TABLE W - MAIN WIRING HARNESS

- The branch of the main wiring harness must be secured to the cross member of the frame by means of a clamp.

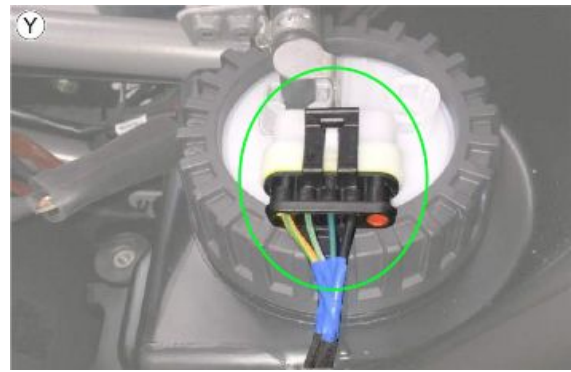
**TABLE X - FUEL LEVEL PROBE**

- Correctly connect the connector of the fuel level probe and mark it on the appropriate support.
- Using two clamps, secure the wiring harness together with the right lambda probe and auxiliary lights provision wiring harnesses.

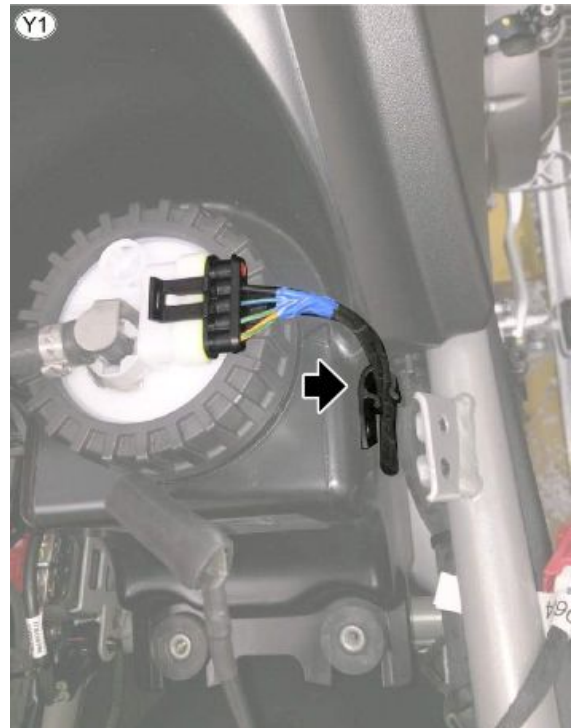


TABLE Y - FUEL LEVEL PROBE

- Check that the fuel pump connector is correctly connected.

**TABLE Y1 - FUEL LEVEL PROBE**

- Check that the fuel pump wiring harness is inserted in the cable guide.



Back side

TABLE A - UNDER SEAT COMPARTMENT PRE-ASSEMBLY

- Position an edge clamp (1) and two edge cable grommets (2) on the under-seat compartment.



TABLE B - PRE-ASSEMBLY OF TURN INDICATORS ON LICENSE PLATE HOLDER

- Connect the turn indicators to the license plate holder passing the cables as indicated.

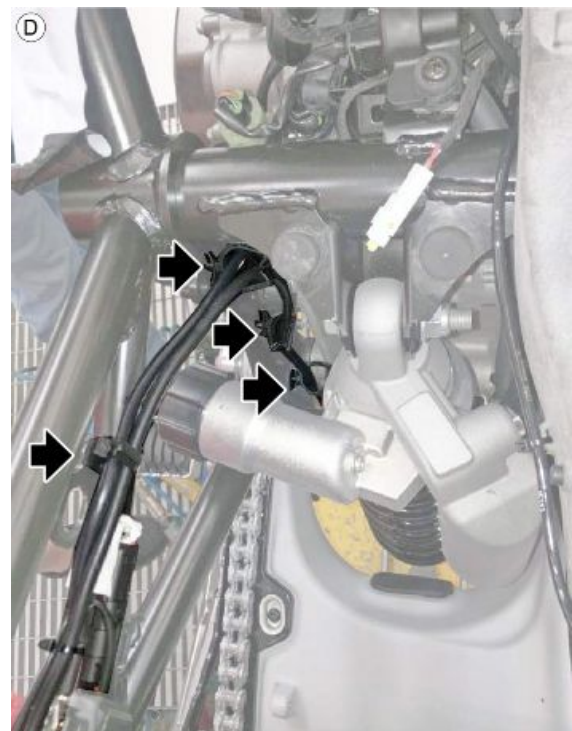


TABLE C - TAIL-LIGHT PRE-ASSEMBLY

- Connect the taillight to the centre tail fairing.

**TABLE D - STARTER RELAY AREA CABLE PASSAGE ON LEFT SIDE OF SEAT POST**

- Arrange the cables on the left side and insert them in the indicated cable glands.



**TABLE D1 - STARTER RELAY AREA CABLE
PASSAGE ON LEFT SIDE OF SEAT POST**

D1

- Use two zip ties at the points shown to secure all wiring harnesses.

**TABLE D2 - STARTER RELAY AREA CABLE
PASSAGE ON LEFT SIDE OF SEAT POST**

D2

- Check the correct tightening torque of the starter relay screws.

**TABLE D3 - STARTER RELAY AREA CABLE
PASSAGE ON LEFT SIDE OF SEAT POST**

D3

- Check the correct connection of the starter relay connector.



TABLE E - SIDE STAND CABLE ROUTE

- The side stand sensor harness must pass as shown.

**TABLE E1 - SIDE STAND CABLE ROUTE**

- The side stand sensor harness must pass as shown.

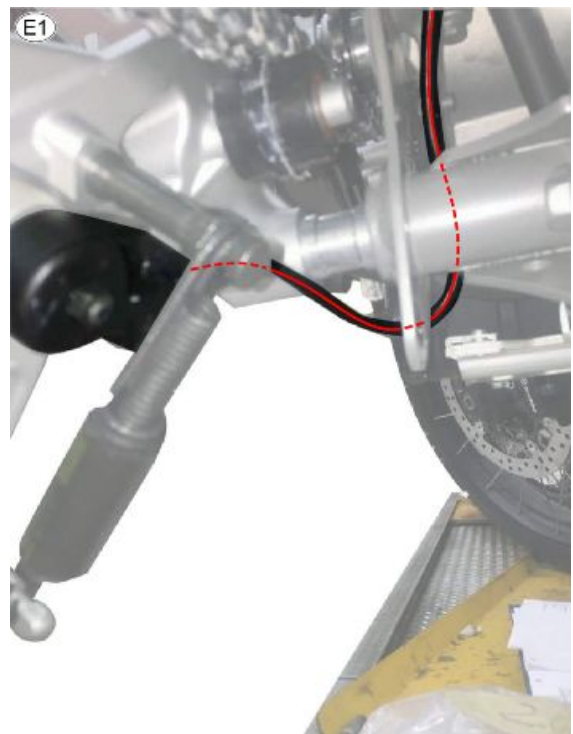
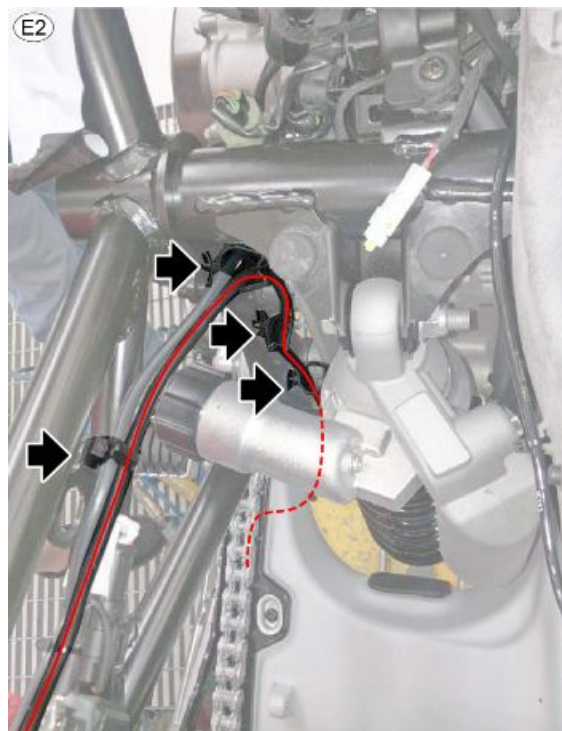


TABLE E2 - SIDE STAND CABLE ROUTE

- The side stand sensor harness must pass through the indicated cable glands.

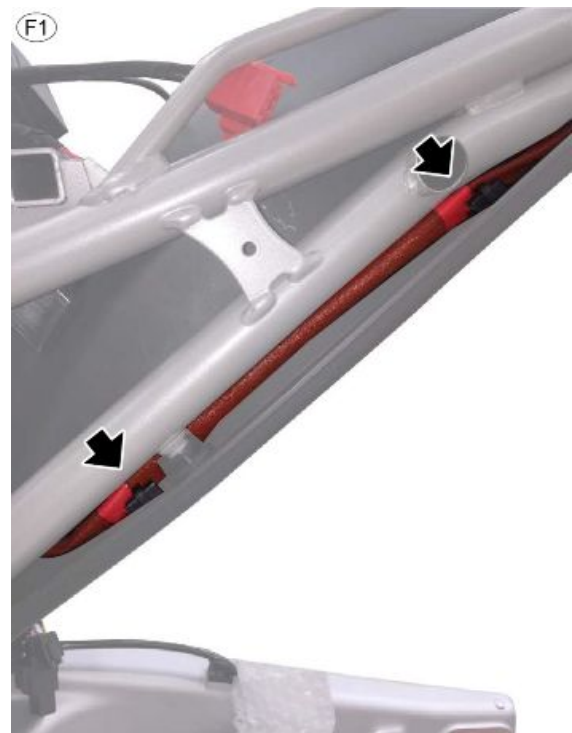
**TABLE F - TAIL-LIGHTS AND TURN INDICATORS**

- Secure the branch of the main wiring harness for the rear connections using a tie at the point indicated.



TABLE F1 - TAIL-LIGHTS AND TURN INDICATORS

- The taillight wiring harness must pass on the left side of the seat post and inserted in the cable glands.
- The red taping must coincide with the cable glands.

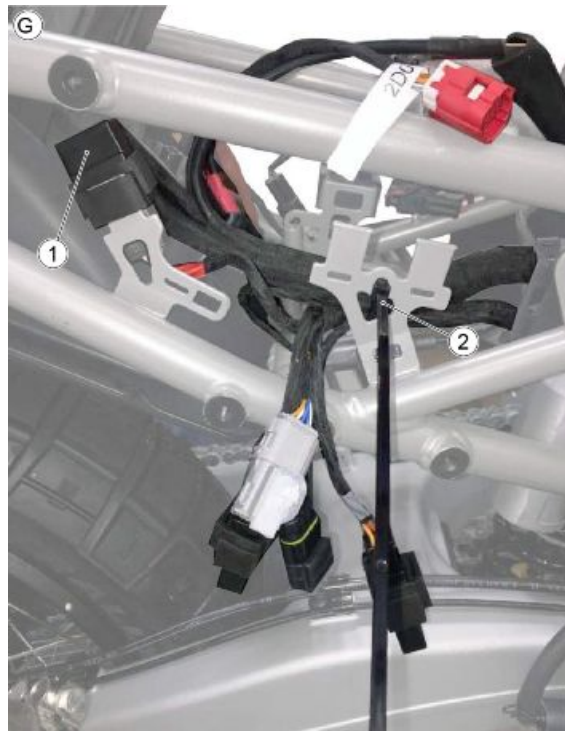
**TABLE F2 - TAIL-LIGHTS AND TURN INDICATORS**

- Correctly connect the connectors of the taillight unit and the turn indicators and then proceed with the installation of the license plate holder.



TABLE G - RELAY AREA CABLE ROUTING ON RIGHT SIDE

- Position the relay (1) facing the inside of the motorcycle with the "RED" marking on the cable.
- The large tie (2) must gather 3 of the 4 branches that exit the duct. It must not gather the connector for the fuel pump.

**TABLE G1 - RELAY AREA CABLE ROUTING ON RIGHT SIDE**

- Position the grey connector facing towards the inside of the motorcycle.



**TABLE G2 - RELAY AREA CABLE ROUTING
ON RIGHT SIDE**

- Position the relay without the marking on the wiring harness, facing towards the outside of the vehicle.

**TABLE G3 - RELAY AREA CABLE ROUTING
ON RIGHT SIDE**

- Position the relay with the "GREY" marking on the wiring harness, facing towards the outside of the vehicle.



**TABLE G4 - RELAY AREA CABLE ROUTING
ON RIGHT SIDE**

G4

- Position the connector with cap and rubber grommet on the tab provided on the frame.



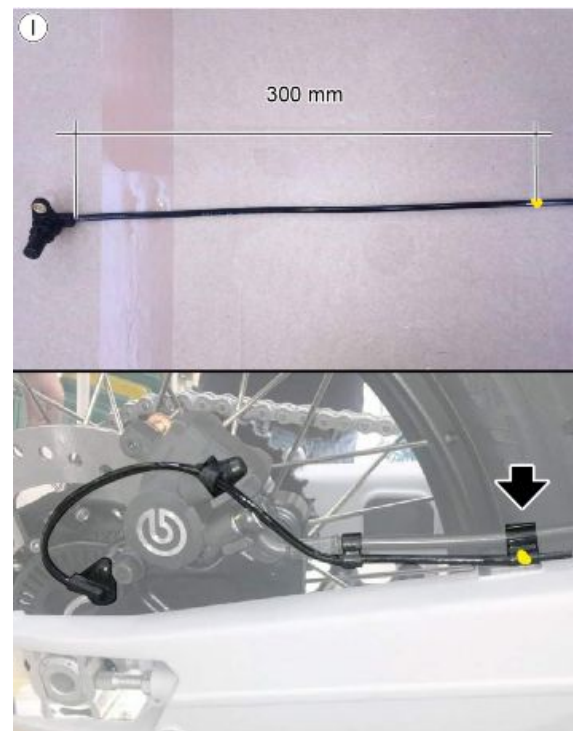
TABLE H - FUSE BOXES

- Arrange the fuse boxes on the wheel arch and secure the wiring harness at the point indicated.



WIRING TABLE I - REAR ABS SENSOR

- The wiring must be secured in the indicated cable gland at a distance of 300 mm from the sensor.
- Secure the wiring harness using the slot in the brake calliper bleeder cap.

**TABLE I1 - REAR ABS SENSOR**

- The rear ABS sensor wiring must pass through the cable grommets (1) on the swingarm and fastened to the brake line by means of a cable gland (2).

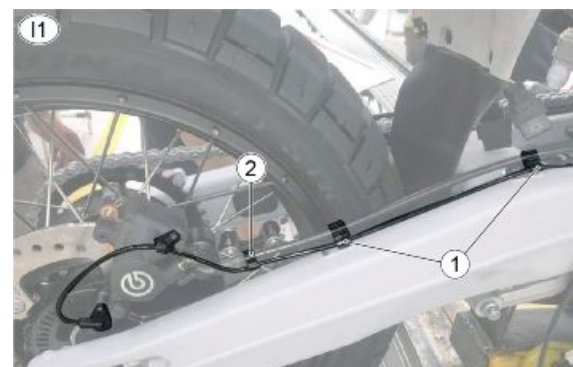
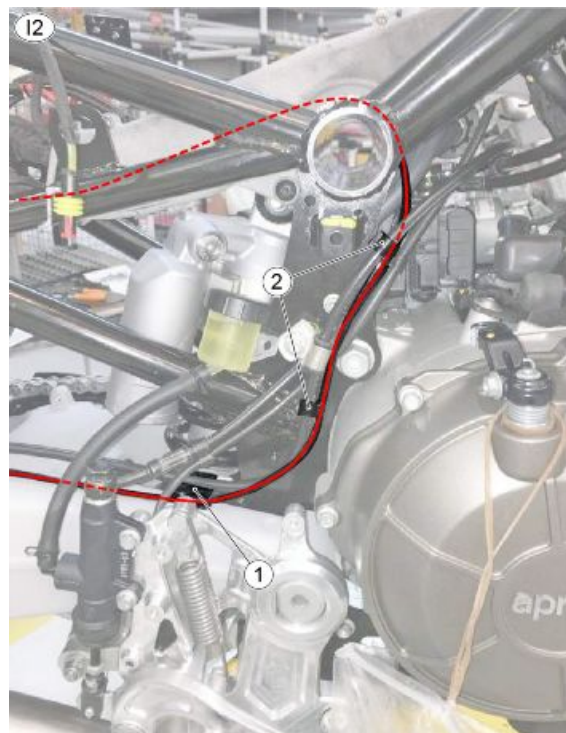


TABLE I2 - REAR ABS SENSOR

- The rear ABS sensor wiring harness must pass through the cable gland (1) on the swingarm and fastened to the brake line by means of two cable glands (2).

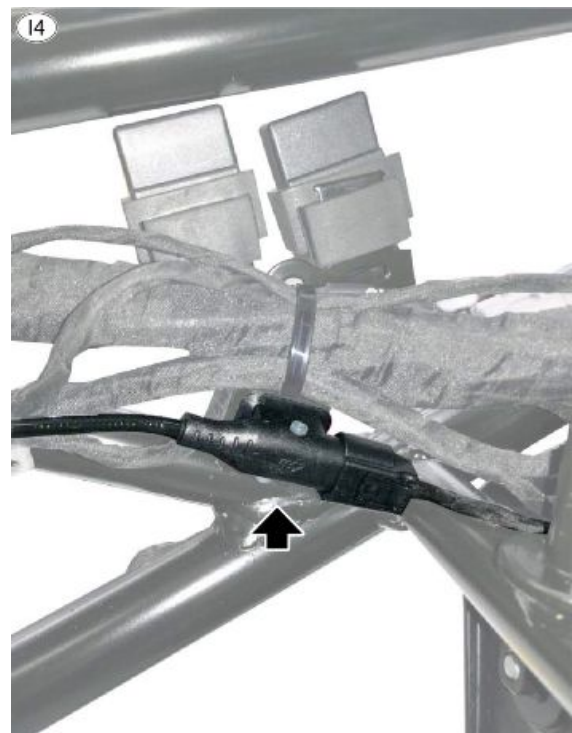
**TABLE I3 - REAR ABS SENSOR**

- The ABS sensor wiring harness must be fastened to the main wiring harness duct with a tie at the point indicated.

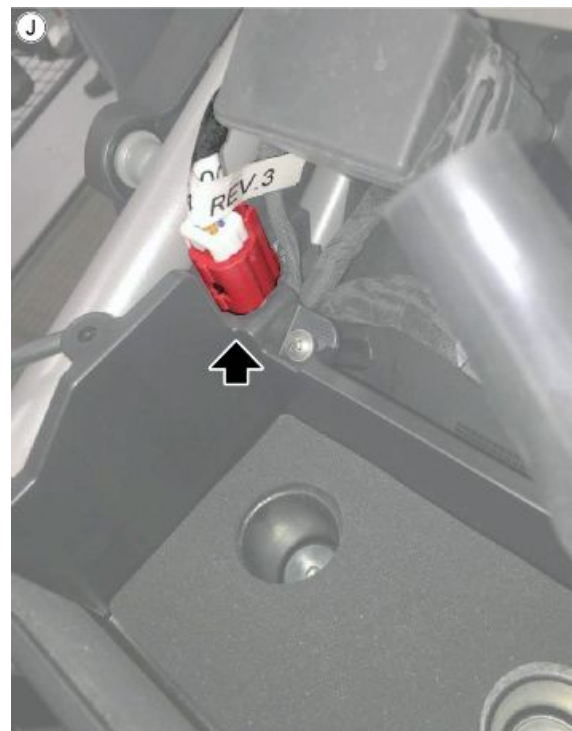


TABLE I4 - REAR ABS SENSOR

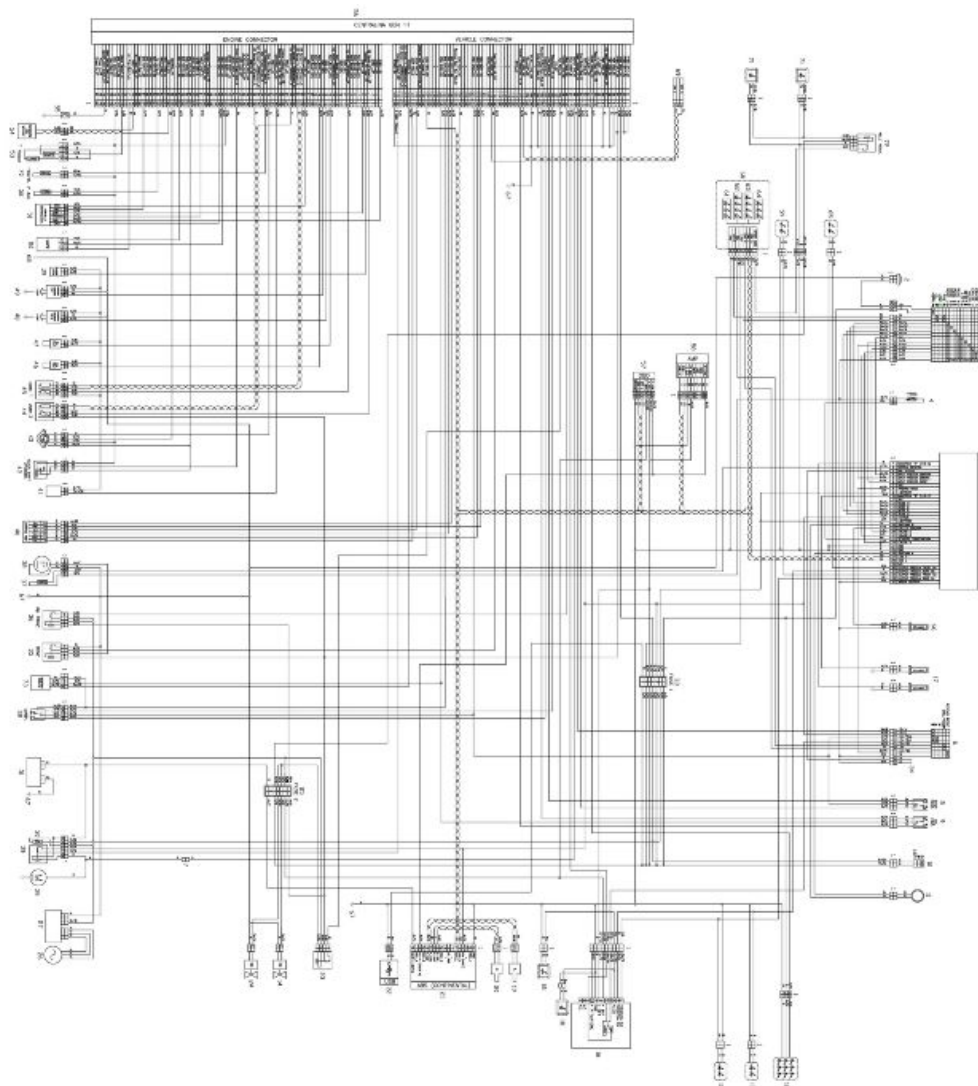
- Correctly connect the rear ABS sensor connector and mark it at the point indicated.

**TABLE J - OBDII CONNECTOR**

- The OBDII connector must be connected into the special holder on the battery support box.



General wiring diagram



Key:

1. Multiple connectors
2. Horn
3. LH light switch
4. ambient air temperature sensor
5. Instrument cluster
6. RH Column light switch
7. Starter motor sensor connector
8. Rear brake switch
9. Clutch switch
10. Ignition switch
11. Immobilizer antenna
12. Tail-light with integrated license plate light

- 13.Right rear turn indicator
- 14.Right-hand fan
- 15.Rear turn indicator LH
- 16.Anti-theft system (not standard)
- 17.Heated handgrips (optional)
- 18.Anti-theft system LED
- 19.Front ABS sensor
- 20.Rear ABS sensor
- 21.ABS control unit
- 22.USB power socket (not standard)
- 23.Fan relay
- 24.Left-hand fan
- 25.Auxiliary fuses 2 (2 fuses)
- 26.Alternator
- 27.Voltage regulator
- 28.Starter motor
- 29.Main starter relay
- 30.Main fuse
- 31.Battery
- 32.Stand switch
- 33.Auxiliary fuses 1 (1 fuse)
- 34.Bridge on "no DRL" versions only
- 35.Fuel pump relay
- 36.Injection relay
- 37.Fuel reserve sensor
- 38.Fuel pump
- 39.Purge valve
- 40.GAS R&W hand grip
- 41.Secondary air system
- 42.Quick Shift switch (UP/DOWN)
- 43.Neutral/gear sensor
- 44.Lambda cylinder 2
- 45.Lambda cylinder 1
- 46.Injector cylinder 2
- 47.Injector cylinder 1
- 48.Coil cylinder 2
- 49.Coil cylinder 1
- 50.MAP sensor

- 51.Motorised throttle valve
 - 52.Intake air temperature sensor
 - 53.Engine water temperature T sensor
 - 54.Engine speed sensor
 - 55.Oil pressure sensor
 - 56.GEN 11 engine control unit
 - 57.OBD connector
 - 58.AMP provision (not standard)
 - 59.Front turn indicator LH
 - 60.Front LED headlight
 - 61.DRL
 - 62.High beam LED module
 - 63.Low beam LED module
 - 64.DRL
 - 65.Front turn indicator RH
 - 66.Fuel level probe
 - 67.Engine ground point
 - 68.Engine head ground point
 - 69.Diagnostics (CAN 2)
 - 70.T-derating sensor
 - 71.RH/LH fog lights (optional)
 - 72.Fog light relay (optional)
 - 73.Fall sensor
-

Checks and inspections

Immobiliser

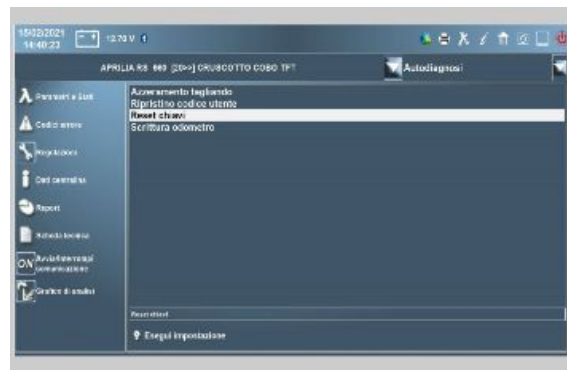
System not programmed

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-diagnosis 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".



CAUTION

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.



Battery recharge circuit

FOREWORD

The recharge systems may show functional anomalies of two types:

- Excessive recharge.
- Missing or partial recharge.

For problems related to excessive charge (frequent bulb burns, excessive water consumption for the conventional batteries, activation of the high voltage warning lamp), check the set voltage.

For anomalies related to missing or partial recharge, in most cases, the diagnostic need is generated due to the start-up difficulty experienced by the user, due to reduced start-up rpm.

The recharge system is involved in maintaining the optimal battery charge; however, it is not the only factor, because the use methods (reduced mileage, idle stop and high number of start-ups), together with the self-discharge are important negative variables as well.

Regarding these aspects relating to the energy balance of the vehicle, it is important to guarantee the correct idle speed, especially for those versions with carburettor, for which the system does not establish a value.

For vehicles that have been used for a long time at idle speed, a speed close to maximum speed within the accepted range is preferred (1650-1700 rpm for 2 cylinders in "V" and 1800-1850 rpm for engines with 4 cylinders in "V").

Proceeding with the functional checks of the recharge system and battery, it is recommended to start with the static checks with the vehicle cooled down.

BATTERY VOLTAGE

Check the battery voltage using a digital multimeter.

The zero load voltage analysis with the battery in standby (15 min.) may offer useful information, but not a certain evaluation of the good performance of the battery.

- ≥ 12.8 V voltage: The battery has been recently completely charged.
- 12.5-12.7 V voltage: The battery is normally charged.
- 11.5-12.4 V voltage: The battery is more or less discharged and needs to be recharged.

- ≤ 11.4 V voltage: The battery is very discharged and may also be damaged.

To avoid permanent damage, the batteries without recombination maintenance should not remain completely discharged for a long time.

For more details regarding the real performance of the battery, it is recommended to use the dedicated instruments that provide indications regarding the battery capacity, based on the analysis of the internal resistance.

If insufficient charge levels are detected on a potentially good battery, check the recharge system as follows.

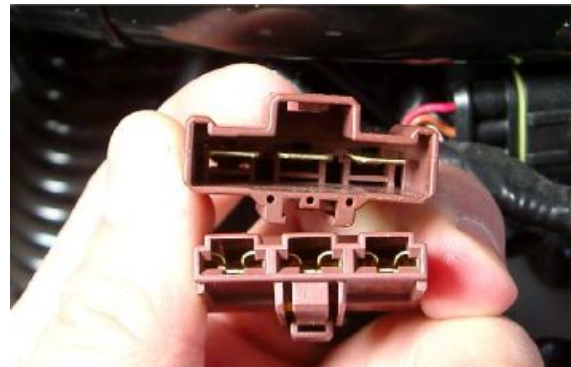
RECHARGE SYSTEM CONNECTIONS

The first useful intervention is the correct coupling of the connectors of the recharge system (stator-regulator or stator-vehicle system and the vehicle system-regulator).

For this check, try to separate the connections, without operating the retaining devices.

Also check that the cable terminals are inserted in the connector until the stopper/fastener.

If there are anomalies, disconnect the connections related to the recharge system and check the lack of overheating, oxidation or connection uncertainties.



CONTINUITY OF THE THREE PHASES OF THE STATOR

Using a multimeter, check the individual continuity/resistance between each of the three phases of the stator and the other two.

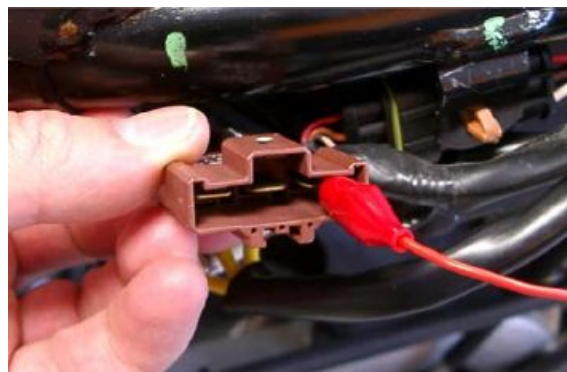


If required, repeat the check, also including the connection system to the regulator's connector. Check that all measurements provide equal resistance values and that they are below 1 ohm. If you detect the opening of a phase or resistance values higher than the ones specified, check/replace the stator.



ISOLATION OF THE GENERATOR'S PHASES

Using a multimeter, check the ground insulation of each phase ($R \geq 1 \text{ M}\Omega$).



If the stator and its cable harness are compliant in terms of continuity, any short-circuit to the ground of one phase will be identified on the three phases. If a short-circuit to ground is detected, repair the wiring harness or replace the stator.



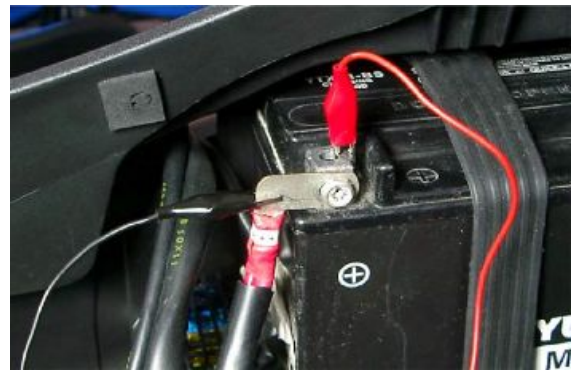
CONSUMPTION CHECK WITH THE SWITCH TO OFF

The battery's life may be short due to abnormal energy consumption during stops.

To check the residual consumption of the system, use a multimeter with milliammeter function.

Prepare the multimeter with alligator clips instead of conventional tips and select the full scale of 40 mA for direct current (DC).

With the battery connected as usual to the system, connect the alligator clips to a battery pole and to the corresponding wiring harness terminal.



With the ignition switch to Off and the electric loads inhibited, remove the fixing screw and disconnect the terminal from the battery pole, creating thus the conditions of a milliammeter in series with the system load.



For the versions with immobilizer, the load will be pulsed with the deterrent flashing frequency. The normal values are comprised between 2 mA with the LED off and 15 mA with the LED on.



If significantly higher consumption is detected, it is necessary to progressively disconnect the consumers with direct power supply from the battery, until identifying the component, the portion of the wiring harness or any water infiltrations in the connectors that may cause the abnormal consumption.

In any case, it is important to check that, while closing the saddle, the light of the compartment underneath goes off before the saddle arrives in contact with the lock.



ERROR RELATED TO THE BATTERY VOLTAGE

For vehicles provided with injection, it is recommended to check if there are any errors related to the battery voltage.

The errors can be detected during the "Actual" state but, more likely, they will be in the "Memo-rised" state and thus with the warning lamp off.

If the error is "Battery voltage higher than the specified value", replace the voltage regulator.

If following the static checks no anomaly is detected, it is recommended to proceed with the dynamic checks.



PRELIMINARY CHECK OF THE RECHARGE SYSTEM

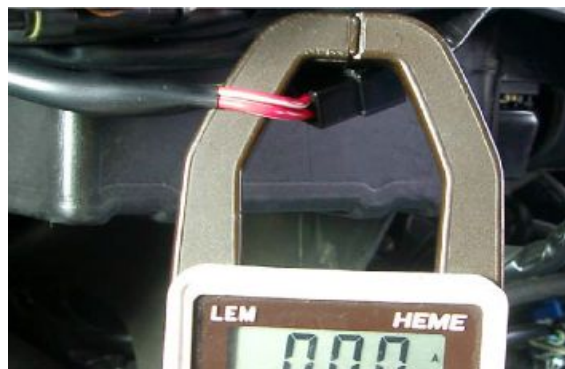
A summary check of the recharge performance can be performed by connecting the multimeter with voltmeter function to the battery poles.

Observe the battery voltage during standby and then start the engine and progressively accelerate until 3000 rpm.

If the recharge system is efficient, the battery voltage increases progressively until 13.5-14.5V.



Connect an induction ammeter clamp to the positive (or negative) cables at the regulator's output. Prepare an additional load of 140W (e.g. 4 12V 35W bulbs in parallel).



Start the engine and then connect the additional load to the battery.



Accelerate progressively until 5000 rpm and observe the maximum output current when the engine/generator is cold.

Decrease the speed to approximately 3000 rpm or anyway to close speeds that ensure stable rotation.

During these checks, the generator is loaded with the total power consumption of the vehicle and the additional load until the total maximum output power is reached.

Wait a few minutes, checking that no sudden current variations occur.

When the voltage regulator reaches the temperature, repeat the check at 5000 rpm, observing the maximum output power with the hot generator and stop the engine.



With the generator still hot, disconnect the additional load and check if the battery voltage or that the regulator's output does not exceed 15 V for any engine rpm.

If incorrect voltage values are detected, replace the voltage regulator.

For vehicles with the voltage regulator placed far from the battery, it is important to check both voltage values during the maximum output of the generator (the regulator's voltage and the battery voltage).

Any difference of a few tenths of Volt must be considered normal, while more significant voltage drops require checking and if necessary restoring the proper conductivity of the wiring harness.

A significant voltage drop affects the proper recharge of the battery, while other components maintain reasonable performance.

Regarding the voltage regulators, it is important to remember that slight variations at the beginning of the adjustment range are not considered faults



Fuses

To check the fuses it is necessary to remove the seats to access the auxiliary fuses and the left side panel to access the main fuse

It is necessary to check the fuses whenever an electrical component fails to operate or malfunctions or when the engine does not start.

Start by checking the secondary fuses in order of size (from the lowest amperage fuse to the highest), and then check the 30A main fuse.

CAUTION



**DO NOT ATTEMPT TO REPAIR FAULTY FUSES.
NEVER USE A FUSE THAT IS DIFFERENT THAN WHAT IS SPECIFIED TO PREVENT DAMAGES TO THE ELECTRICAL SYSTEM OR SHORT CIRCUITS, AND THE RISK OF FIRE.**

CAUTION

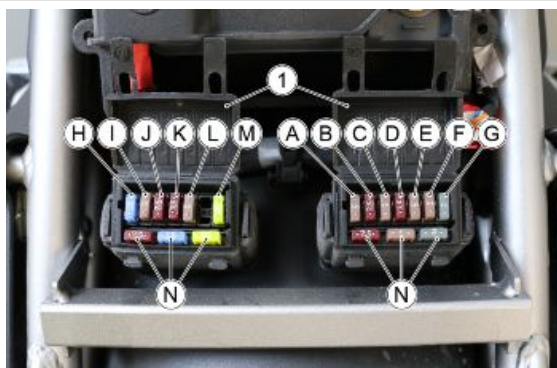
A FUSE THAT BLOWS FREQUENTLY MAY INDICATE A SHORT CIRCUIT OR OVERLOAD. CONTACT AN authorised aprilia Dealer.

To check:

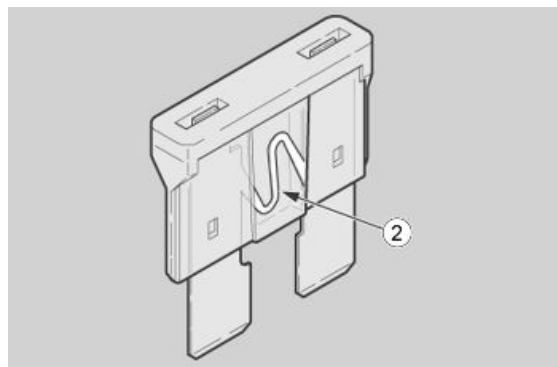
- To avoid an accidental short-circuit, place the power switch to "OFF".



- Remove the passenger and rider saddles.
- Open the covers of the secondary fuse boxes (1).



- Take out one fuse at a time and check whether the filament (2) is broken.
- Before replacing the fuse, find and solve, if possible, the reason that caused the problem.
- If the fuse is damaged, replace it with one of the same current rating.



NOTE

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

AUXILIARY FUSES DISTRIBUTION

Specification	Desc./Quantity
A) 5A fuse	Running lights/Rear number plate light, horn
B) 7.5A fuse	instrument panel, turn indicators, heated grips (where provided) power supply
C) 5A fuse	ECU positive switched live, ABS positive switched live, instrument panel positive switched live, left handlebar control set positive switched live, main starter relay
D) 7.5A fuse	ECU permanent positive lead
E) 5A fuse	Positive key-on power for AMP, positive key-on power for OBD, positive key-on power for anti-theft system
F) 5A fuse	Positive key-on power for headlamp (load)
G) 2A fuse	Positive key-on power for USB
H) 15A fuse	Fan relay power supply, ECU power supply, fuel pump relay power supply, lambda probe power supply, injector power supply, coil power supply, secondary air valve power supply
I) 5A fuse	Power feed for provision for anti-theft system, OBD power feed
J) 7.5A fuse	Right fan power supply
K) 7.5A fuse	Left fan power supply
L) 5A fuse	Fog lights live positive lead (where provided)
M) fuse of 20A	ABS power feed
N) Spare fuses	

Auxiliary fuses are placed in the central part of the motorcycle, under the rider saddle.

To access the main fuse, remove the side fairing as follows:

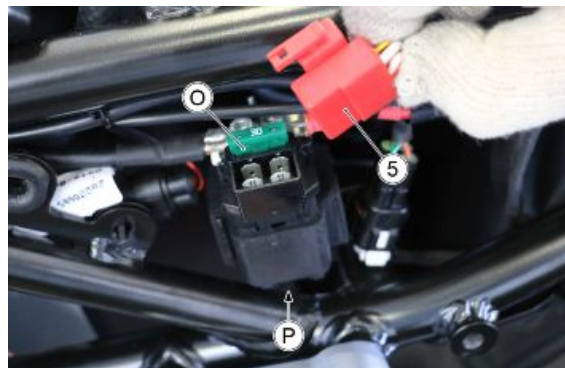
- Remove the four fixing screws (3).



- Unhook the front part of the side panel (4) to move it out of the way and access the main fuse.



- Disconnect the connector (5) to access the main fuse (O).
- Remove the fuse and check whether the filament (2) is broken.
- Before replacing the fuse, find and solve, if possible, the reason that caused the problem.
- If the fuse is damaged, replace it with one of the same current rating.



NOTE

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

CAUTION

REMOVING THE 30A FUSE WILL RESET THE: DIGITAL CLOCK AND TRIP INFORMATION.

LOCATION OF THE MAIN FUSE

Specification	Desc./Quantity
O) 30A fuse	Battery charging, all vehicle utilities
P) spare fuse	

The main fuse is located behind the left hand side fairing of the motorcycle, under the rider saddle.

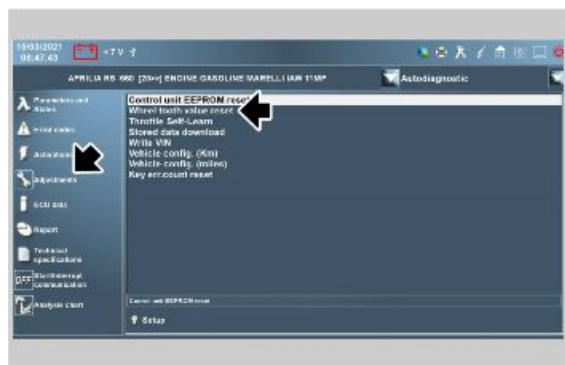
Control unit

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).

CAUTION

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.

CAUTION

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.

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ENGINE FROM VEHICLE

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POWER SUPPLY

P SUPP

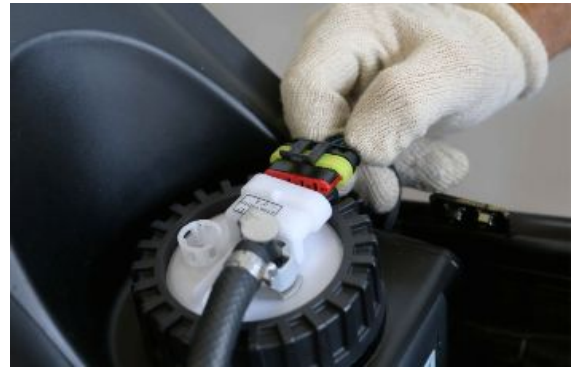
Fuel pump

Removing

To remove the fuel pump it is not necessary to remove the fuel tank from the vehicle, but the operation with the fuel tank removed is the same.

Proceed as described:

- Disconnect the electrical connector of the fuel pump.



- Disconnect and remove the safety plate of the fuel pipe.



- Disconnect the fuel pipe from the fuel pump.



- Unscrew and remove the ring nut of the fuel pump.



- Remove the fuel pump complete with seal.



INDEX OF TOPICS

SUSPENSIONS

SUSP

Front

Handlebar

Removing

To remove the handlebar after removing the handguards, proceed as follows:

- Remove the cable guides (1).



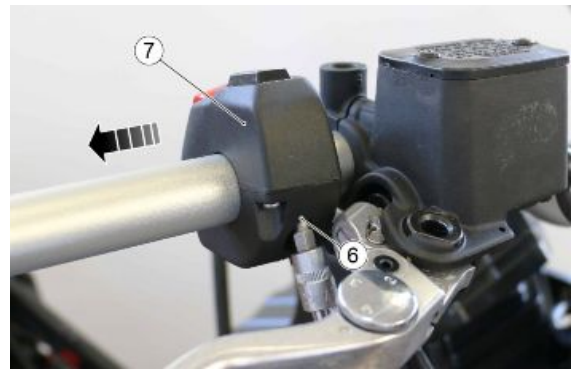
- Undo the four screws (2) and remove the U-bolt (3).



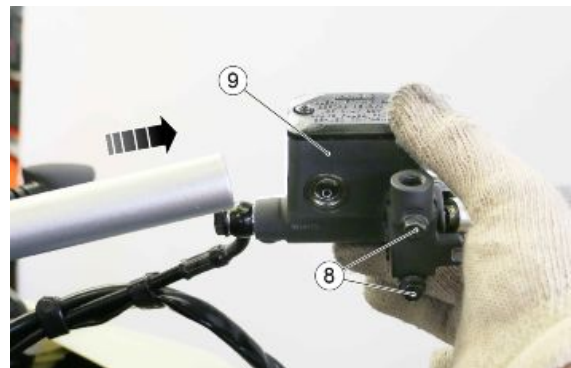
- Unscrew the screw (4), move the handlebar to the left and remove the throttle control (5).



- Unscrew the screw (6), move the handlebar to the left and remove the right switch cluster (7).



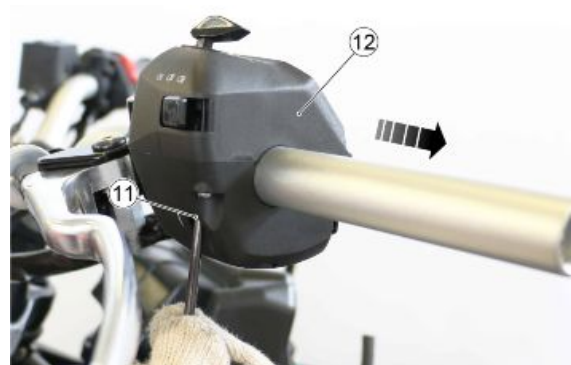
- Unscrew the screws (8), move the handlebar to the left and remove the brake master cylinder (9).



- Remove the left hand grip (10).



- Unscrew the screw (11), move the handlebar to the right and remove the left switch cluster (12).



- After disconnecting the clutch cable from the lever, unscrew the screw (13), move the handlebar to the right and remove the clutch lever (14).



- Remove the handlebars.



Front fork

Adjustment

The front suspension consists of a hydraulic fork connected to the headstock by means of two plates.

For the settings of the vehicle set-up:

- Each stanchion has an upper nut (1) to adjust the spring pre-load.
- An upper adjuster screw (2) on the left stanchion for setting the hydraulic compression damping.
- An upper adjuster screw (3) on the right stanchion for setting the hydraulic rebound damping.



TO AVOID DAMAGE, DO NOT FORCE THE ADJUSTERS BEYOND THE MAXIMUM SETTING POSITION IN EITHER DIRECTION. SET BOTH STANCHIONS WITH THE SAME SPRING PRE-LOAD CALIBRATION.

RIDING THE VEHICLE WITH DIFFERENT SETTINGS FOR THE TWO STANCHIONS REDUCES STABILITY. WHEN SPRING PRE-LOAD IS INCREASED, REBOUND DAMPING MUST ALSO BE INCREASED TO PREVENT EXCESSIVE SUSPENSION KICKBACK WHEN RIDING.



TO COUNT THE NUMBER OF CLICKS AND/OR REVOLUTIONS OF ADJUSTMENT SETTINGS ALWAYS START FROM THE MOST RIGID SETTING (WHOLE CLOCKWISE ROTATION OF THE SETTING).

The standard front fork setting is adjusted to suit most high and low speed riding conditions, whether the vehicle is partially or fully loaded.

However, the setting can be modified for specific needs according to vehicle use.



STANDARD ADJUSTMENT (RIDER ONLY)

Specification	Desc./Quantity
Spring pre-loading, nut (1)	from fully closed (*) unscrew (**) 6 mm (0.23 in)
Hydraulic compression adjustment, adjuster screw (2)	Unscrew (**) 8 clicks from fully closed (*)
Hydraulic rebound adjustment, adjuster (3)	Unscrew (**) 8 clicks from fully closed (*)
Stanchion protrusion (A) (***) from top yoke (excluding cover)	1 notches

STANDARD ADJUSTMENT (RIDER+PASSENGER) (RIDER+LUGGAGE) (RIDER+PASSENGER+LUGGAGE)

Specification	Desc./Quantity
Spring pre-loading, nut (1)	From fully closed (*) unscrew (**) 7 mm (0.27 in)
Hydraulic compression adjustment, adjuster screw (2)	Unscrew (**) 3 clicks from fully closed (*)
Hydraulic rebound adjustment, adjuster (3)	Unscrew (**) 7 clicks from fully closed (*)
Stanchion protrusion (A) (***) from top yoke (excluding cover)	1 notch

(*) - Clockwise

(**) - Anticlockwise

(***) - this type of adjustment may only be made by an **Authorised Aprilia Dealer**.

Removing the fork legs

To remove the stanchions it is necessary to remove the sump guard, lift the front wheel using a scissor lift, disconnect the front brake callipers, remove the wheel and the mudguard. Then proceed as described:

THE FOLLOWING OPERATIONS REFER TO A STANCHION BUT APPLY TO BOTH.

(IF APPLICABLE)

- Unscrew the fixing screw of the ABS wiring harness plate and remove it.
- Undo the fixing screw of the ABS sensor and remove it.



- Unscrew the two locking screws of the stanchion on the lower triple tree clamp.



- Unscrew the two locking screws of the stanchion on the upper triple tree clamp.



- Extract and remove the stanchion.



- During reassembly, pay attention to the adjustment of the stanchion protrusion, referring to the "Adjustment" paragraph in the "Suspensions" chapter.

Draining oil

NOTE

THE FOLLOWING OPERATIONS REFER TO A SINGLE STANCHION BUT APPLY TO BOTH.

- Clamp the fork in a vice with the specific protective jaws, taking care not to damage them.
- Completely unscrew the cap (1) and lift the stanchion placing a support under it.



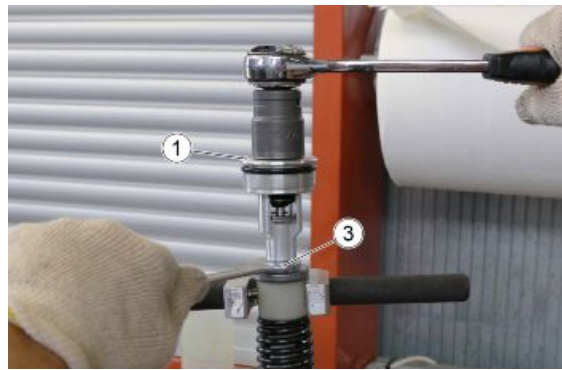
Specific tooling

AP8140149 Guard for assembly operations

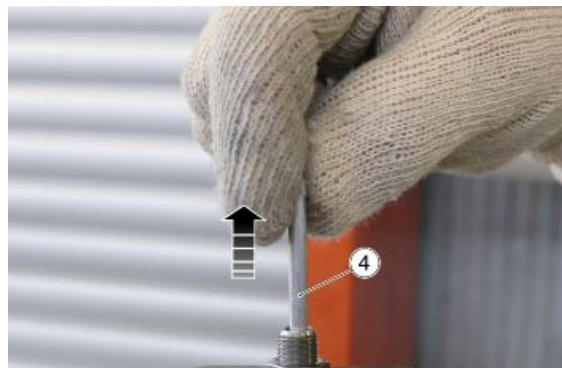
- Using the specific tool (2) fixed to the pre-load tube, compress the spring and insert a wrench on the locking nut (3) of the cap (1).



- Ensure that the cap (1) cannot rotate, and unscrew the nut (3).
- With the help of a second operator while compressing the pre-load spring again, unscrew and remove the cap (1).



- Extract the hydraulic braking control rod (4).



- After removing the specific tool for compressing the pre-load spring, remove the upper plate (5).



- Remove the pre-loading tube (6).



- Remove the spring (7).



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



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.

Disassembling the fork

To proceed with the disassembly of the fork, proceed as described:

- Extract the dust seal (8) from the sleeve.



- Disconnect the snap ring (9) from inside the sleeve.



- Separate the sleeve from the stanchion.
- Remove the sliding bush (10), the guide bush (11), the ring (12), the oil seal (13), the snap ring (9) and the dust seal (8) from the stanchion.



- Using the special protective jaws, block the stanchion horizontally in a vice.
- Undo and remove the damper rod fastening screw (14) taking care to collect the brass washer (15).



- Remove the complete damper rod from the stanchion.



Checking the components

stanchion

Check that the sliding surface is not scratched or scored.

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

If the scratches are deep, replace the stanchion .

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

If it is over the limit, replace the stanchion .

CAUTION

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

Characteristic

Bending limit:

0.2 mm (0.00787 in)

Sleeve

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

Springs

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

If not, replace the springs.

MINIMUM LENGTH OF FREE SPRING: 454.2 mm (17.88 in)

Reassembling the fork**NOTE**

THE FOLLOWING OPERATIONS REFER TO A SINGLE STANCHION BUT APPLY TO BOTH.

To reassemble the fork, proceed as follows:

- Insert the dust guard (1), the seeger ring (2), the oil seal (3), the ring (4), the guide bushing (5) and the slider bushing (6) on the stanchion.



- Using the special protective jaws, block the stanchion horizontally in a vice.
- Insert the complete damper rod (7) on the stanchion.



- Insert a new seal washer (8) on the fixing screw (9) of the damper rod and tighten it to torque.



- Insert the sleeve on the stanchion and using the special tool complete with striker fully insert the guide bush (5), the ring (4) and the oil seal (3).



Specific tooling

AP8140189 Tool for mounting the oil seal for holes with diam. 43 mm (1.69 in)

AP8140146 Weight

- Position the safety seeger ring in its seat (2).



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



Filling oil

NOTE

THE FOLLOWING OPERATIONS REFER TO A SINGLE STANCHION BUT APPLY TO BOTH.

- Place the sleeve upright in a vice fitted with protection shoes.
- Compress the sleeve in the stanchion. Place a support under the stanchion in order to leave it compressed.
- Remove the white spacer of the damper rod and the locking nut of the fork cap screwed on the damper rod itself.
- 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 of the stanchion.



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

Specific tooling

AP8140149 Guard for assembly operations

Oil level: 90 mm (3.54 in) (from the stanchion edge, without a spring, pre-load tube, spacer and nut).



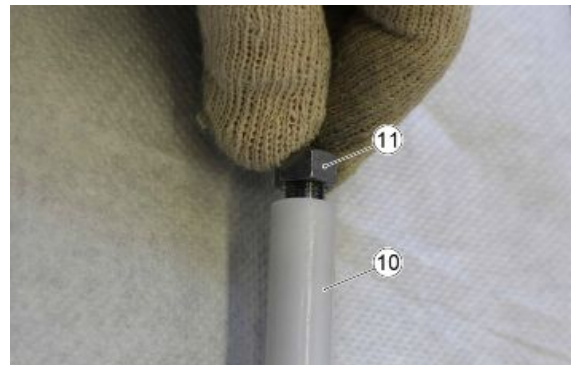
THE SLEEVE MUST BE PERFECTLY UPRIGHT IN ORDER TO MEASURE THE CORRECT OIL LEVEL. THE OIL LEVEL MUST BE THE SAME IN BOTH STANCHIONS.

Characteristic

Fork oil

577 cm³ (35.21 cu.in) (for each stanchion)

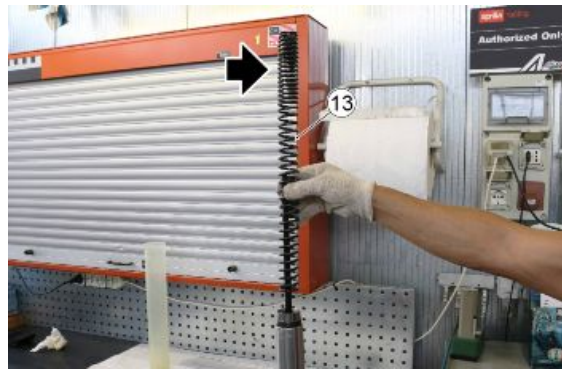
- Insert the spacer (10) and fully tighten the cap locking nut (11).



- Insert the hydraulic braking control rod (12) in the damper rod.



- After having screwed the specific tool on the damper rod, insert the spring (13) paying attention to the correct alignment. The end where the spirals are more compressed should be facing upwards.



Specific tooling

AP8140150 Bored shaft for bleeding plunger air

- Position the pre-load tube (14) on the spring, making sure that it is aligned correctly. The narrower part must be inserted into the spring.
- Position the upper plate (15) on the pre-load tube.



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



- Position the specific tool to compress the spring and with the help of a second operator, after compressing the spring, manually screw the cap (16) until in contact with the control rod. Tighten the nut (17) on the damper rod to fasten the cap.



Specific tooling

020888Y Pre-load tube clamp

- Remove the supports positioned under the stanchion allowing it to lower and tighten the cap to torque.



Upper steering yoke

Removal

To remove the upper triple clamp it is necessary to first remove the handlebar complete with grips, throttle control, light switches, clutch lever and front brake master cylinder.

- To carry out this operation, after having unscrewed the four screws (1), remove the U-bolt (2).



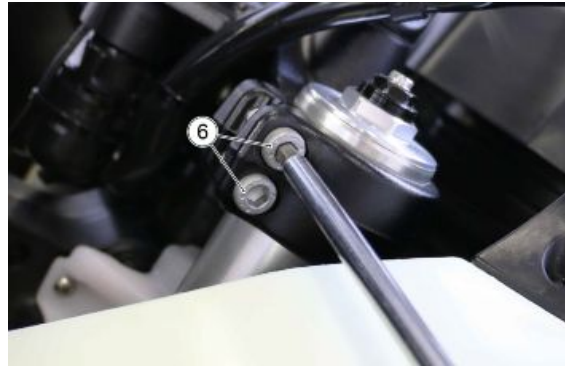
- Adequately protect the instrument cluster, disconnect the handlebar (3) and place it on the front as indicated.



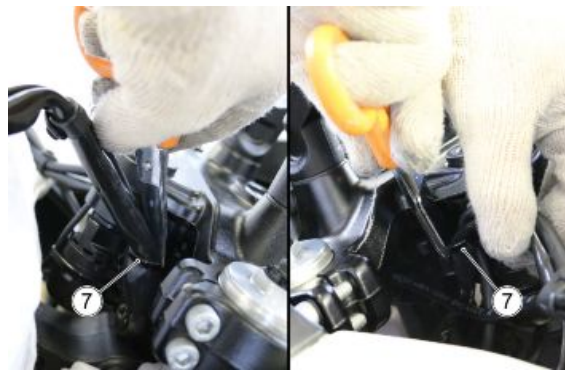
- Remove the fixing bush (4) and the washer (5).



- Working from both sides, loosen the screws (6) securing the stanchions to the upper triple tree clamp.



- Remove the two ties (7) that fasten the wiring harness of the handlebar components to the triple tree clamp.



- Extract the upper triple clamp (8) from the pin.

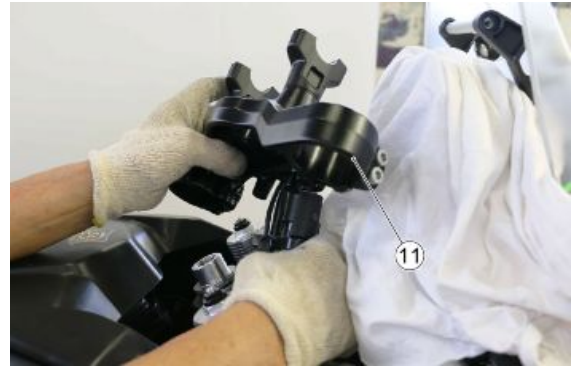


- Remove the two screws (9) securing the ignition assembly (10).

USE A NEW SHEAR HEAD SCREW DURING REASSEMBLY.



- Remove the upper steering yoke (11).



Installation

To install the upper steering triple clamp, proceed as described:

- Position the ignition assembly (1) on the upper steering triple clamp (2) and secure it by tightening the two screws (3) to torque.



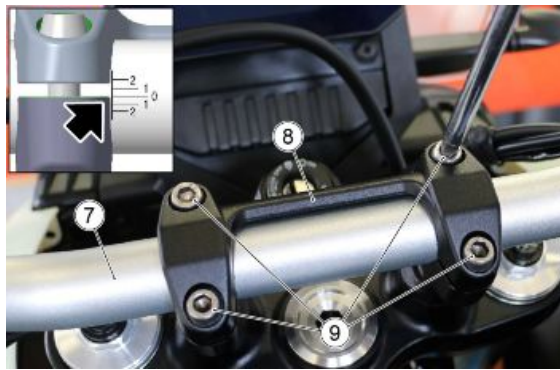
- Position the upper steering triple clamp (2) in its seat, insert the bush (4) complete with washer (5) and tighten it to torque.



- Working from both sides, tighten the screws (6) securing the stanchions to the upper triple clamp to torque.



- Place the handlebar (7) on the lower U-bolts.
- Position the upper U-bolt (8) with the four fixing screws (9).
- Adjust the handlebar with the "0" reference mark aligned with the lower U-bolt and tighten the screws (9) to torque.



- Working from both sides, secure the electrical component wiring harnesses of the handlebars to the steering triple clamp with two clamps.

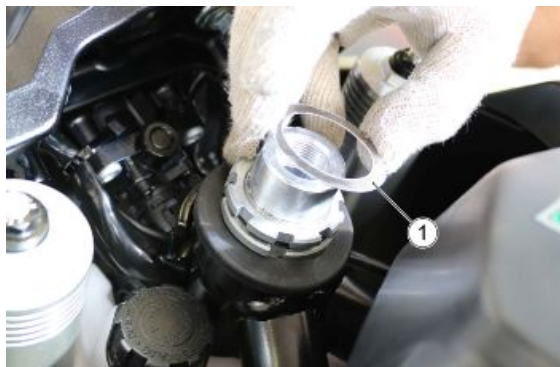


Steering bottom yoke

Removing

To remove the lower triple clamp it is necessary to first remove the front wheel complete with mud-guard, the upper triple clamp and the stanchions. Then proceed as described:

- Remove the steering safety plate (1).



- Remove the upper steering ring nut (2) using the special tool.



Specific tooling

AP8140190 Steering tightening tool

- Remove the rubber shim (3).



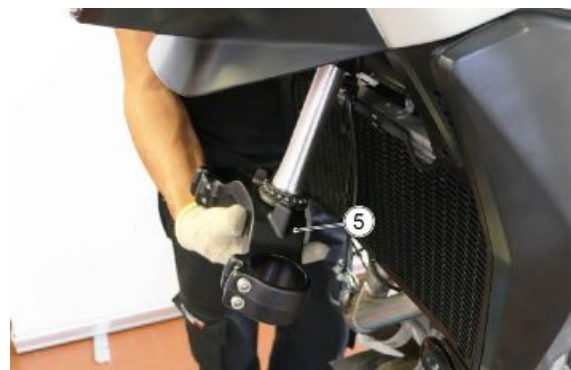
- Remove the lower steering ring nut (4) using the special tool, supporting the lower clamp.

Specific tooling

AP8140190 Steering tightening tool



- Extract the lower triple clamp (5) from below.



Installing

- Insert the lower triple clamp (1) from below.



- Position the lower steering ring nut (2) and use the special tool to pre-tighten to a torque of 60 Nm (44.25 lbf ft).
- Turn the handlebar to the left and right as far as it will go to seat the bearings.
- Unscrew the ring nut and tighten it to a torque of 40 +/- 5 Nm (29.50 +/- 3.68 lbf ft).
- Rotate the steering yoke all the way to the left and right to check that the rotation is smooth and without jamming.
- In the event of particular resistance or jamming, remove the steering yoke and check the integrity of the bearings inside the steering headstock.



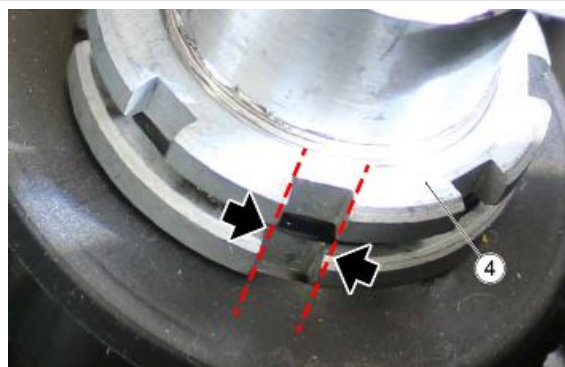
Specific tooling

AP8140190 Steering tightening tool

- Insert the rubber shim (3).



- Screw the upper steering ring nut (4) and align the grooves to be able to insert the safety plate.



- Insert the safety plate (5).



Steering bearing

Adjusting play

To adjust the steering play, follow the procedure described below:

- 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 handlebar resistance to rotation must be of 250 +/- 100 g (0.55 +/- 0.22 lb) in both directions.
- Adjust if clearance is detected.

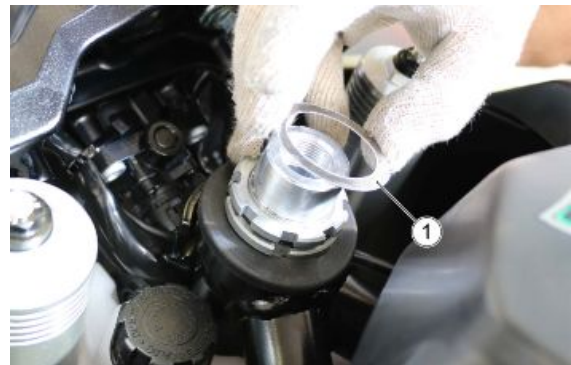
NOTE

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

- Remove the handlebars and upper steering triple clamp.

Then proceed as described:

- Remove the steering safety plate (1).



- Remove the upper steering ring nut (2) using the special tool.

Specific tooling

AP8140190 Steering tightening tool



- Remove the rubber shim (3).



- Unscrew the lower ring nut (4) using the special tool.

Repeat the steering assembly tightening procedure in the correct manner as described:

- Pre-tighten the ring nut (4) to 60 Nm (44.25 lbf ft).
- Turn the handlebar to the left and right as far as it will go to seat the bearings.
- Unscrew the ring nut and tighten it again to 40 +/- 5 Nm (29.50 +/- 3.68 lbf ft).
- Reassemble the previously removed components and check the handlebar resistance to rotation that must be 250 +/- 100 g (0.55 +/- 0.22 lb) in both directions.



Disassembling

Place the motorcycle on a lifting jack in correspondence of the oil sump and secure it with straps to the footrest.

Remove the upper triple clamp, front wheel, mud-guard and stanchions beforehand.

Then proceed as described:

- Unscrew and remove the safety plate (1).



- Unscrew and remove the counter-lock ring (2) using the appropriate tool.

Specific tooling**AP8140190 Steering tightening tool**

- Remove the rubber shim (3).



- Unscrew and remove the ring nut (4) using the special tool, supporting the lower triple clamp.

Specific tooling**AP8140190 Steering tightening tool**

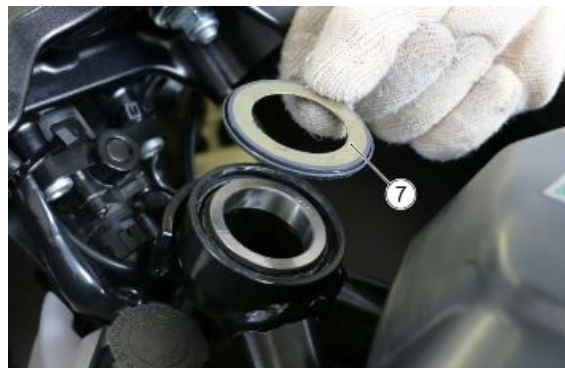
- Remove the complete lower triple clamp (5).



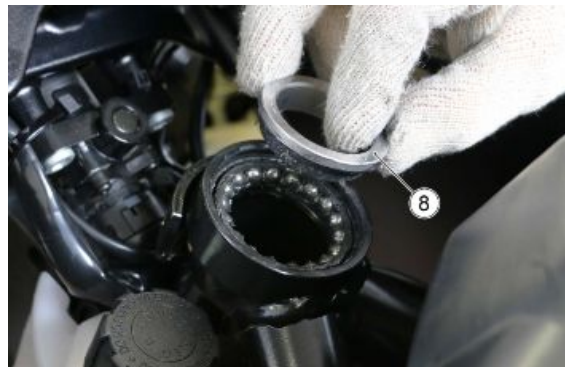
- Remove the rubber dust ring (6).



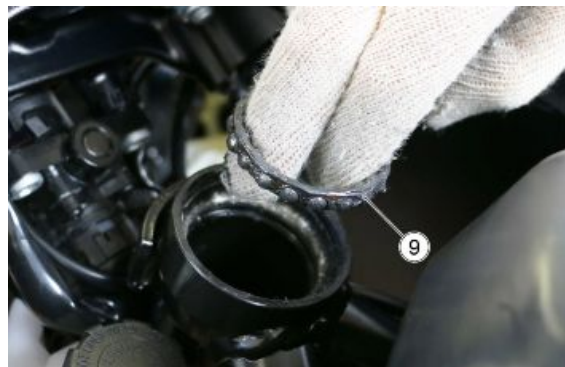
- Remove the dust seal ring (7).



- Remove the bearing upper seat (8).



- Remove the inner ring of the bearing (9) complete with balls.



- Remove the lower seat of the bearing (10) using a standard bearing extractor



To remove the lower steering bearing:

- After removing the inner bearing ring (11) complete with balls from the headstock tube, heat the lower bearing seat (12) with a hot air gun to remove it and then slide off the dust cover (13).



- Remove the upper seat of the lower bearing (14) from below using a standard bearing extractor.



DURING THE INSTALLATION OF THE BEARINGS, IT IS NECESSARY TO GREASE THEM BEFORE INSERTING THEM IN THE STEERING HEADSTOCK.

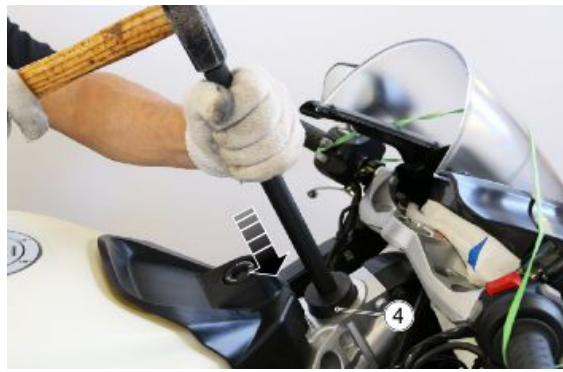
Assembling

To assemble the steering assembly, proceed as described:

- Place the dust cover (1) on the steering headstock.
- Insert the lower seat of the bearing (2) and the inner ring of the bearing (3) complete with balls, sprinkling them with grease



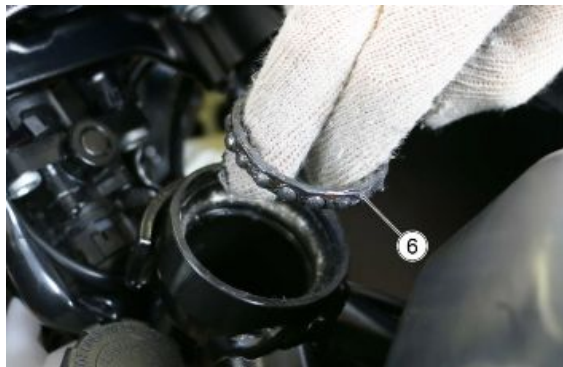
- Working both on the upper and lower part of the steering headstock, insert the rotation seats of the bearings (4) up to the stop using the appropriate punch.
- Lubricate the inserted seats with grease.



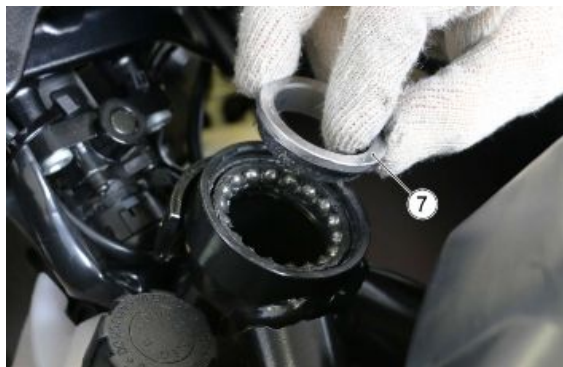
- Insert the complete triple clamp (5) into the headstock.



- Supporting the lower triple clamp, insert the inner ring of the bearing (6) complete with balls on the headstock and lubricate it.



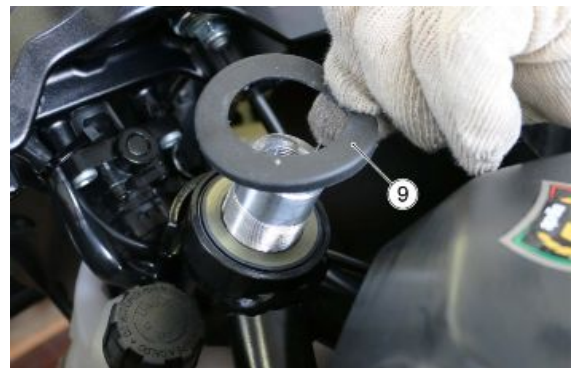
- Supporting the lower triple clamp, lubricate the upper seat (7) of the bearing and insert it on the headstock.



- Supporting the lower triple clamp, insert the dust seal ring (8) on the headstock.



- Supporting the lower triple clamp, insert the rubber dust seal (9) on the headstock.



- Supporting the lower triple clamp, insert the ring nut (10) on the headstock and tighten it fully by hand.

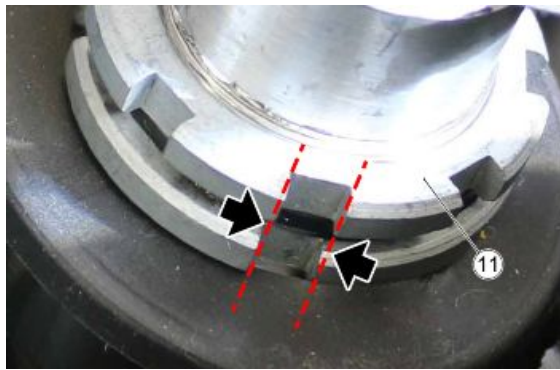
- Using the special tool, pre-tighten the ring nut to 60 Nm (44.25 lbf ft).
- Turn the handlebar to the left and right as far as it will go to seat the bearings.
- Unscrew the ring nut and tighten it to a torque of 40 +/- 5 Nm (29.50 +/- 3.68 lbf ft).
- Rotate the steering yoke all the way to the left and right to check that the rotation is smooth and without jamming.



Specific tooling

AP8140190 Steering tightening tool

- Screw the upper steering ring nut (11) and align the grooves to be able to insert the safety plate.



- Insert the safety plate (12).



Rear

Shock absorbers

Adjusting

The rear suspension consists of a spring-shock absorber unit connected to the frame by silent block joints.

To adjust the setting, the shock absorber has:

- A knob (1) for adjusting spring preload.
- A screw adjuster (2) for adjusting the hydraulic compression damping.
- A screw adjuster (3) for adjusting the hydraulic rebound damping.

CAUTION

THE MAINTENANCE INTERVALS PRESCRIBED BY THE SCHEDULED MAINTENANCE TABLE MUST BE CONSIDERED AS A GENERAL GUIDE FOR USING THE VEHICLE IN NORMAL RUNNING CONDITIONS.

IT MAY BE NECESSARY TO REDUCE THE MAINTENANCE INTERVALS UNDER SOME PARTICULAR CONDITIONS. ESPECIALLY WHEN USED IN GEOGRAPHICAL LOCATIONS WITH ADVERSE CLIMATIC CONDITIONS, USE ON UNEVEN GROUND OR SEVERE INDIVIDUAL USE. CHECK AND IF NECESSARY, ADJUST THE REAR SHOCK ABSORBER.

THE STANDARD REGULATION OF THE REAR SHOCK ABSORBER IS INTENDED TO SATISFY NORMAL TOUR DRIVING CONDITIONS.

IN ANY CASE IT IS POSSIBLE TO INSERT PERSONAL SETTINGS, DEPENDING ON VEHICLE UTILIZATION.



TO COUNT THE NUMBER OF TURNS OF THE ADJUSTERS (2)(3) ALWAYS START FROM THE MOST LOADED SETTING (COMPLETE CLOCKWISE ROTATION OF THE ADJUSTER).

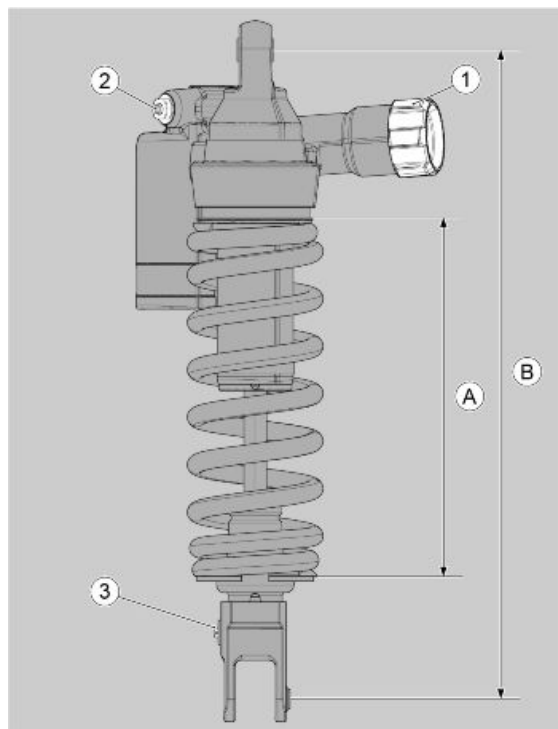
TO PREVENT DAMAGE TO THE ADJUSTERS (2)(3), NEVER FORCE THEM BEYOND THE END OF TRAVEL IN EITHER DIRECTION.



SET THE SPRING PRE-LOAD AND THE HYDRAULIC DAMPING OF THE SHOCK ABSORBER ACCORDING TO THE VEHICLE USE CONDITIONS.

IF THE SPRING PRE-LOAD IS INCREASED, IT IS NECESSARY TO INCREASE THE DAMPING OF THE SHOCK ABSORBER ACCORDINGLY TO AVOID SUDDEN JERKS WHEN RIDING.

IF NECESSARY, CONTACT AN OFFICIAL APRILIA DEALER. TRY RIDING THE VEHICLE ON THE STREET UNTIL THE OPTIMUM ADJUSTMENT IS OBTAINED.



Operating on the left side of the vehicle, it is possible to access the spring pre-load adjustment knob:

- Turning clockwise the pre-load increases, vice versa by turning anti-clockwise it decreases.



Operating on the right side of the vehicle, in correspondence with the rear brake fluid reservoir, it is possible to access the hydraulic compression damping adjuster (2):

- Turning clockwise the hydraulic compression damping increases, vice versa by turning anti-clockwise it decreases.



Operating on the right side of the vehicle, in correspondence with the linkages, it is possible to access the hydraulic rebound damping adjuster (3):

- Turning clockwise the hydraulic rebound damping increases, vice versa by turning anti-clockwise it decreases.



STANDARD ADJUSTMENT (FOR ROAD USE)

Specification	Desc./Quantity
Spring length (A)	145.5 +/- 2 mm (5.72 +/- 0.078 in)
Shock absorber length (B)	306 +/- 2 mm (12.04 +/- 0.078 in)
Rebound adjustment, adjuster (1)	open (**) 5 clicks from fully closed (*)

SETTING FOR SPORTS USE

Specification	Desc./Quantity
Spring length (A)	with standard adjustment 145.5 mm (5.72 in) screw (*) 2 turns
Shock absorber length (B)	306 +/- 2 mm (12.04 +/- 0.078 in)
Rebound adjustment, adjuster (1)	open (**) 2 clicks from fully closed (*)

(*) = clockwise

(**) = anticlockwise

Removing

To remove the shock absorber it is necessary to first remove the fuel tank and unload the weight from the shock absorber itself. Then proceed as described:

- Unscrew the locking nut of the lower screw and remove it.



- Unscrew the locking nut of the upper screw and remove it.



- Slide the shock absorber from above to remove it.



Installing

To install the shock absorber, proceed as described:

- Position the shock absorber in place inserting it from above.



- Insert the upper screw from the left side of the vehicle and the nut, tightening it to torque.



- Insert the lower screw from the left side of the vehicle and the nut, tightening it to torque.



Linkages

Removing

To remove the linkages, after securing the front of the vehicle with straps, use a scissor lift to support the centre of the vehicle and keep the rear shock absorber unloaded.

Then proceed as described:

SINGLE LINKAGE

- Working on the right hand side of the vehicle, unscrew the nut fastening the single linkage to the dual linkage, pulling the screw out from the left hand side to remove it.



- Working on the right hand side of the vehicle, unscrew the nut fastening the single linkage to the frame, pulling the screw out from the left hand side to remove it.
- Remove the single linkage.



DUAL LINKAGE

- Unscrew and remove the screw fastening the shock absorber to the dual linkage.



- Working from the left side of the vehicle, unscrew the nut fastening the dual linkage to the swingarm and remove the screw from the right side.



Checking

CAUTION

CHECK THAT NO COMPONENT IS NOTICEABLY DISTORTED, DAMAGED, CRACKED AND/OR DENTED.

REPLACE ALL DAMAGED COMPONENTS.

ROLLER BEARING CAGE

Turn the roller bearings by hand. The bearings must turn smoothly without impediment or noise.

No endfloat is permitted.

Replace any roller bearings with any of the problems described above.

Apply grease to the rollers.

SEALS

Check the condition of the oil seals; replace if damaged or excessively worn.

ALWAYS REPLACE THE OIL SEALS WITH NEW COMPONENTS AFTER DISASSEMBLING THE COMPONENTS OF THE SINGLE LINKAGE

Installing

To install the linkages, after securing the front of the vehicle with straps, use a scissor lift to support the centre of the vehicle and keep the rear shock absorber unloaded.

Then proceed as described:

DUAL LINKAGE

- Insert the fixing screw of the dual linkage to the swingarm from the right side and the lock nut from the opposite side, tightening it to the prescribed torque.
- Insert the screw fastening the shock absorber to the dual linkage and tighten it to the prescribed torque.



SINGLE LINKAGE

- Insert the fixing screw of the single linkage to the swingarm from the left side and the lock nut from the opposite side, tightening it to the prescribed torque.



- Insert the fixing screw of the single linkage to the dual linkage from the left side and the lock nut from the opposite side, tightening it to the prescribed torque.



INDEX OF TOPICS

CHASSIS

CHAS

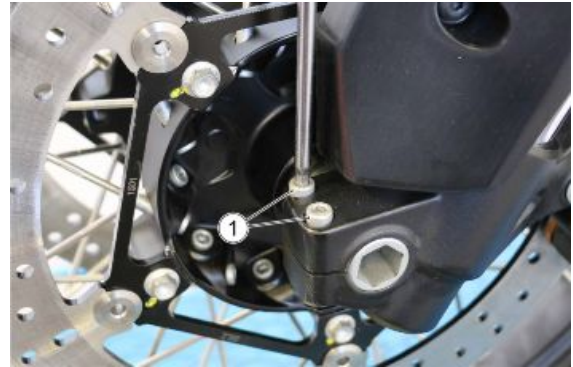
Wheels

Front wheel

Removal

To proceed with the removal of the front wheel, lift the motorcycle using an appropriate centre stand, remove the brake callipers and proceed as described:

- Loosen the two screws (1) on the clamp of the left stanchion.



- Remove the wheel pin (2).



- Keeping the wheel raised, extract the wheel pin (2).



- Remove the complete wheel (3).



- Remove the spacer (4) on the right side of the wheel.



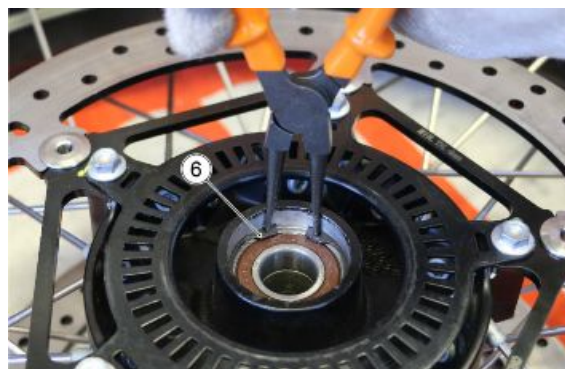
REMOVAL OF INTERNAL WHEEL COMPONENTS

To proceed with the removal of the internal wheel components, proceed as described:

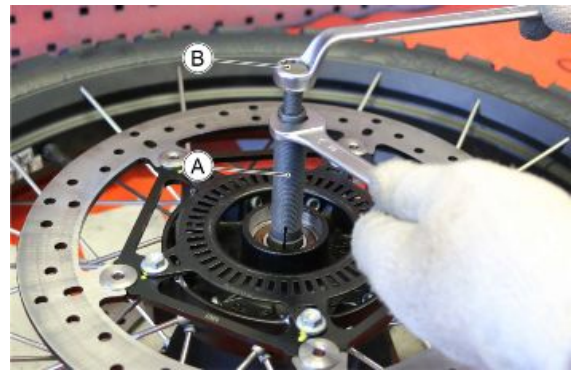
- Working on the right side of the wheel, remove the oil seal (5).



- Using special pliers, remove the circlip (6).



- Using a generic puller, proceed with the extraction of the bearing as described:
- Insert the first part of the tool (A) on the bearing and screw the pin (B).



- Insert the second part (C) and the nut (D).
- Tighten the nut while keeping the pin (A) still, to extract the bearing.

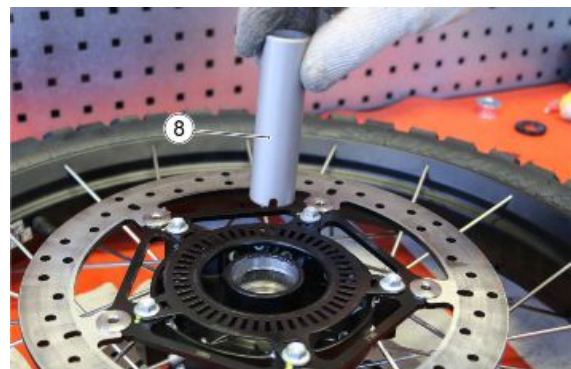


- Remove the bearing (7).

**NOTE**

REPEAT THE OPERATION DESCRIBED ABOVE, TO REMOVE THE BEARING ON THE OPPOSITE SIDE OF THE WHEEL.

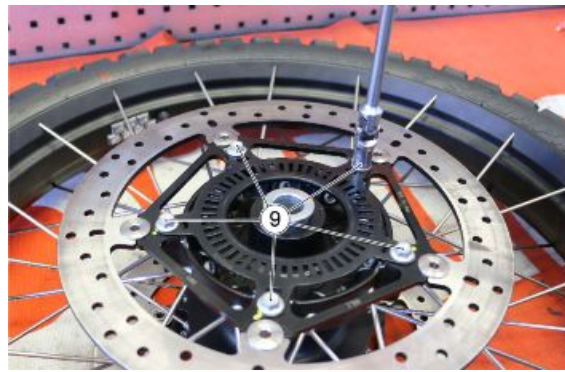
- Remove the internal spacer (8).



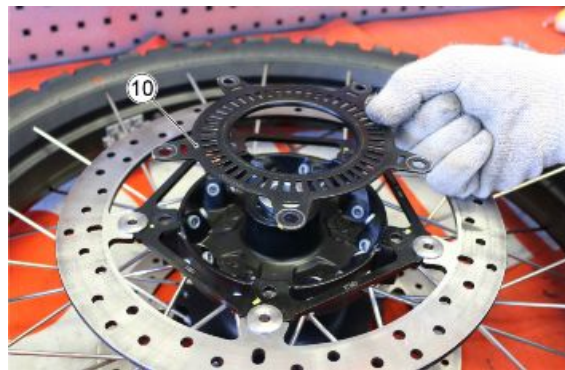
REMOVAL OF EXTERNAL WHEEL COMPONENTS

To proceed with the removal of the external wheel components, proceed as described:

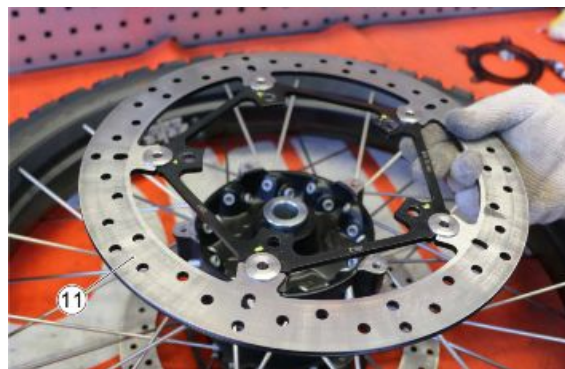
- Remove the six fixing screws (9) of the tone wheel / front disc.



- Remove the tone wheel (10) (if present).



- Remove the brake disc (11).



Checking

FRONT WHEEL BEARINGS

Check the bearings installed on the wheel.



CHECK THE CONDITION OF ALL COMPONENTS AND OF THE COMPONENTS INDICATED AS FOLLOWS IN PARTICULAR.

CHECKING ROTATION

- Manually rotate the inner race of each bearing. The race must turn smoothly without impediment or noise.

If one or both bearings do not fall within the control parameters:

- Replace both wheel bearings.

CHECKING RADIAL AND AXIAL PLAY

- Check the radial and axial play.

Axial play: minimal axial play is permitted.

Radial: none.

If one or both bearings do not fall within the control parameters:

- Replace both wheel bearings.



ALWAYS REPLACE BOTH BEARINGS.

ALWAYS REPLACE THE BEARINGS WITH COMPONENTS OF THE SAME TYPE.

SEALS

- Check the condition of the seals; replace if damaged or excessively worn.

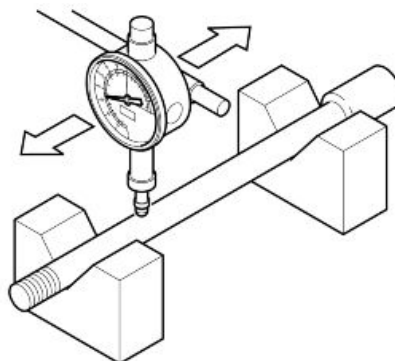


ALWAYS REPLACE BOTH SEALS TOGETHER.

ALWAYS REPLACE THE SEALS WITH COMPONENTS OF THE SAME TYPE.

WHEEL AXLE

- Use a dial gauge to check the wheel axle eccentricity. Replace the wheel axle if the eccentricity exceeds the limit value.

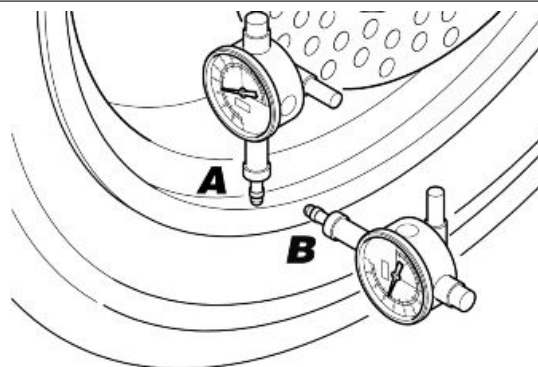


Characteristic

Maximum eccentricity:

0.25 mm (0.0098 in)

- Using a dial gauge, check that the radial (A) and the axial (B) eccentricities of the rim do not exceed the limit value. An excessive eccentricity is usually caused by worn or damaged bearings. Replace the rim if, after replacing the bearings, the value is not within the specified limit.



Characteristic

Maximum radial and axial eccentricity:

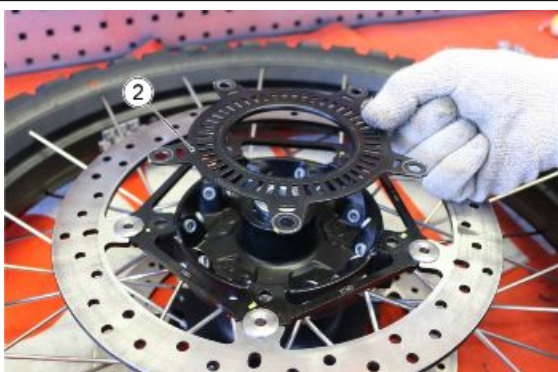
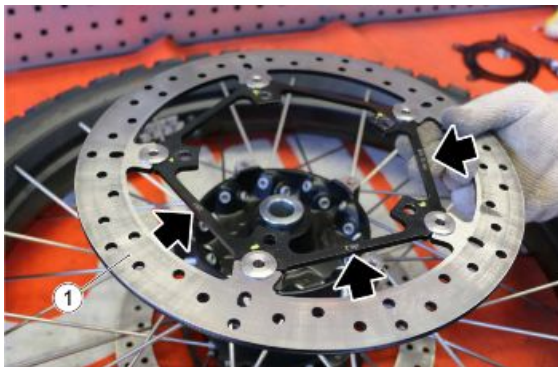
0.8 mm (0.031 in)

Installing

For the assembly and installation of the front wheel, follow the sequence indicated and proceed as described:

INSTALLATION OF EXTERNAL COMPONENTS

- Position the brake disc (1) on the hub making sure of the correct alignment, determined by the markings which must face outwards, as indicated.
- Position the tone wheel (2) (if present) on the rim.

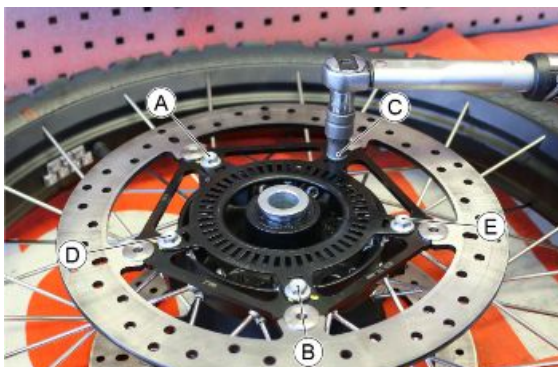


- Carefully and progressively, screw the five screws securing the tone ring/brake disc following the order A-B-C-D-E.

CAUTION

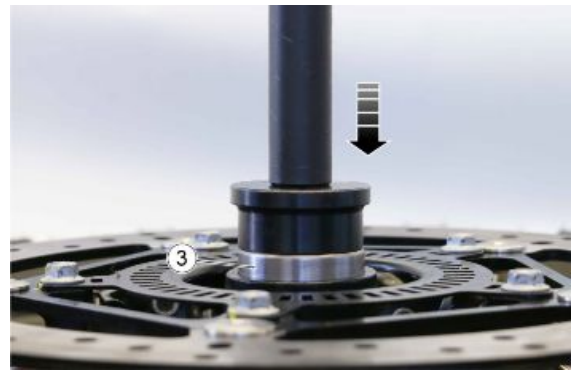
PAY CAREFUL ATTENTION TO TIGHTENING THE FIVE SCREWS. ALWAYS PROCEED GRADUALLY AND PROGRESSIVELY ON EACH SCREW.

- Torque tighten the five screws in the order A-B-C-D-E.

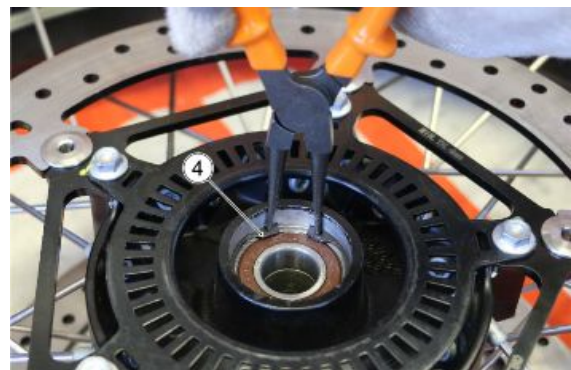


INSTALLATION OF INTERNAL COMPONENTS

- Working on the right side of the rim, using the appropriate punch, insert the bearing (3) as far as it will go.

Specific tooling**020376Y Adaptor handle****020359Y 42 x 47 mm Adaptor**

- Insert the circlip (4).



- Insert the oil seal (5) flush with the outside of the hub.



- Insert the spacer (6).



- Insert the internal spacer (7) in the direction indicated on the left side of the rim.



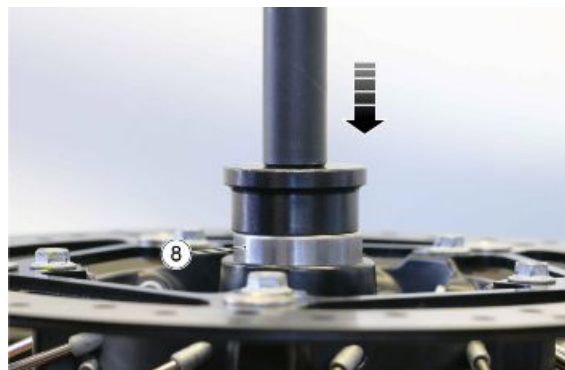
- Having positioned the bearing (8) in its seat, insert it as far as it will go using the appropriate punch.

CHECK THE FREE ROTATION OF BOTH BEARINGS

Specific tooling

020376Y Adaptor handle

020359Y 42 x 47 mm Adaptor



- Insert the oil seal (9) flush with the outside of the hub.



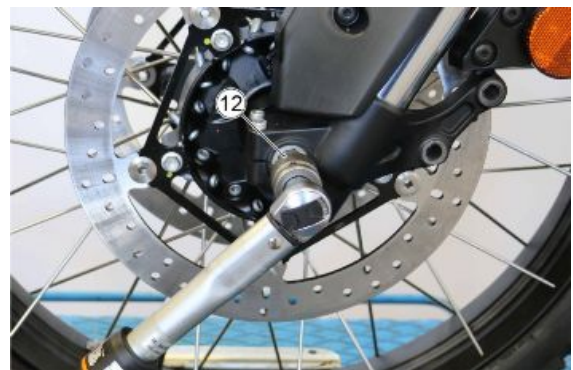
- Insert the spacer (10).



- Position the wheel (11) and insert the pin (12).



- Tighten the pin (12) to the prescribed torque.



- Tighten the two screws (13) on the clamp of the right stanchion to the prescribed torque.



- Rotate the wheel a few times to check that it does not stick.

Rear wheel

Rimozione

To proceed with the removal of the rear wheel, lift the motorcycle using an appropriate rear stand, and proceed as described:

- Working from both sides, loosen the locking nut (1) of the adjuster (2) and then screw the adjuster to eliminate tension on the chain tensioner.



- Undo the fastening nut (3) of the wheel.



- Remove the nut (3) and the washer (4).



- Supporting the wheel and working from the right side, remove the wheel pin (5) complete with both chain tensioners (6).



- Adequately protect the swingarm and remove the chain (7) from the rear sprocket and remove the rear wheel (8).



REMOVAL OF EXTERNAL WHEEL COMPONENTS

To proceed with the removal of the external wheel components, proceed as described:

- Remove the sprocket support (9) from the wheel (8).



- Remove the spacer (10) present between the rear sprocket and the flange.



- Remove the flexible coupling rubber inserts (11).



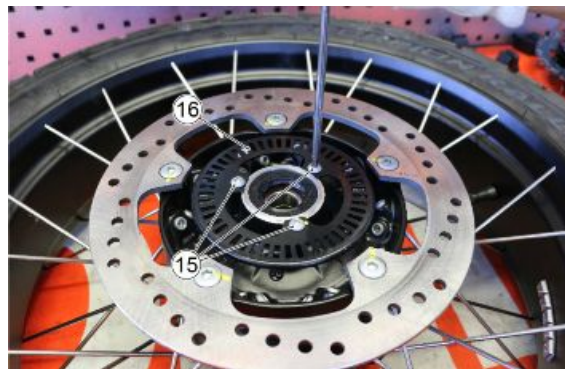
- Unscrew the five screws (12) and remove the flange (13).



- Remove the spacer (14).



- Unscrew the three screws (15) and remove the tone ring (16).



- Undo the five screws (17) and remove the brake disc (18).



REMOVAL OF INTERNAL WHEEL COMPONENTS

To proceed with the removal of the internal wheel components, proceed as described:

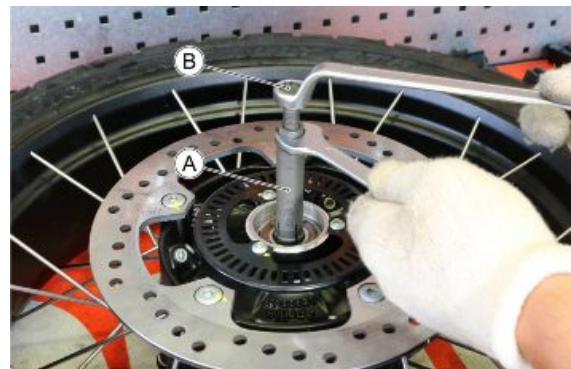
- Working on the right side of the wheel, remove the oil seal (19).



- Using special pliers, remove the circlip (20).



- Using a generic puller, proceed with the extraction of the bearing as described:
- Insert the first part of the tool (A) on the bearing and screw the pin (B).



- Insert the second part (C) and the nut (D).
- Tighten the nut while keeping the pin (A) still, to extract the bearing.



- Remove the bearing (21).

**NOTE**

REPEAT THE OPERATION DESCRIBED ABOVE, TO REMOVE THE BEARING ON THE OPPOSITE SIDE OF THE WHEEL.

- Remove the internal spacer (22).

**REAR SPROCKET SUPPORT DISASSEMBLY**

- Having removed the sprocket support from the wheel, remove the external spacer (23).



- Block the sprocket support in a vice provided with protective jaws and remove the five fixing screws (24) of the chain/sprocket guard.



Remove the five spring washers (25).



- Remove the chain guard (26).



- Remove the sprocket (27).



- Remove the oil seal (28).



- Remove the seeger ring (29).



- Following the procedure described above for bearing removal, and remove the bearing (30) present in the sprocket support.



Checking



CHECK THE CONDITION OF ALL COMPONENTS AND OF THE COMPONENTS INDICATED AS FOLLOWS IN PARTICULAR.

REAR WHEEL BEARINGS

Check the bearings installed on the wheel.

CHECKING ROTATION

- Manually rotate the inner race of each bearing. The race must turn smoothly without impediment or noise.

If one or both bearings do not fall within the control parameters:

- Replace both wheel bearings.



**ALWAYS REPLACE BOTH BEARINGS.
ALWAYS REPLACE THE BEARINGS WITH COMPONENTS OF THE SAME TYPE.**

- Check the radial and axial play.

Axial play: minimal axial play is permitted.

Radial: none.

If one or both bearings do not fall within the control parameters:

- Replace both wheel bearings.

REAR WHEEL GASKETS

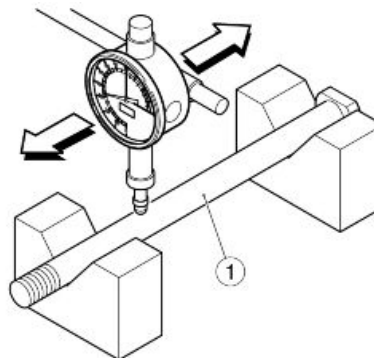
- Check the condition of the seals; replace if damaged or excessively worn.



**ALWAYS REPLACE BOTH SEALS TOGETHER.
ALWAYS REPLACE THE SEALS WITH COMPONENTS OF THE SAME TYPE.**

REAR WHEEL AXLE

- Use a dial gauge to check the wheel axle eccentricity (1). Replace the wheel axle if the eccentricity exceeds the limit value (1).



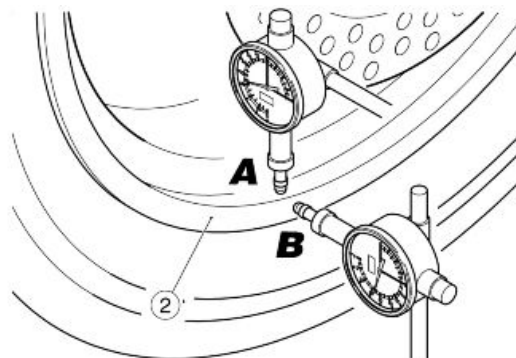
Characteristic

Maximum eccentricity:

0.25 mm (0.0098 in)

REAR WHEEL RIM

- Using a dial gauge, check that the radial (A) and the axial eccentricity (B) of the rim (2) do not exceed the limit value.



An excessive eccentricity is usually caused by worn or damaged bearings. Replace the rim (2) if after replacing the bearings, the value is not within the specified limit.

Characteristic

Maximum radial and axial eccentricity:

0.8 mm (0.031 in)

Installing

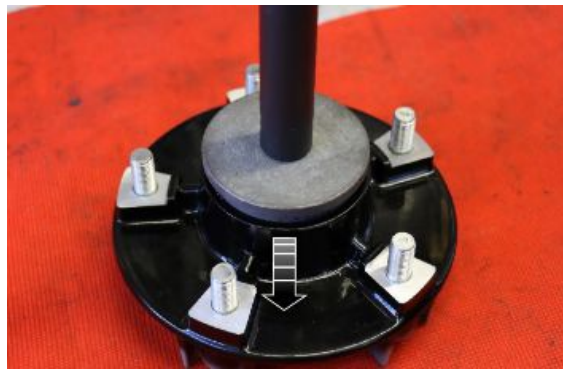
To mount the rear wheel, proceed as described:

REAR SPROCKET SUPPORT ASSEMBLY

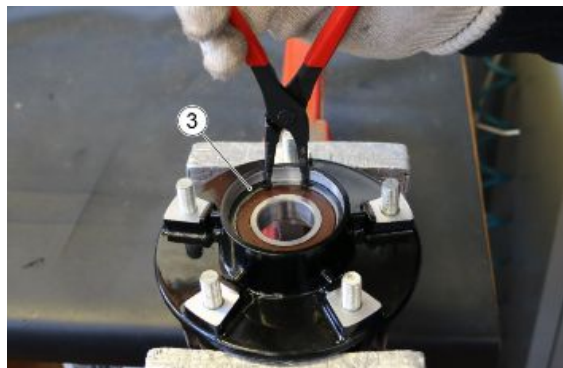
- Position the bearing (1) on the sprocket support (2).



- Using the appropriate punch, insert the bearing as far as it will go.

Specific tooling**020376Y Adaptor handle****020655Y Adaptor 62x68 mm**

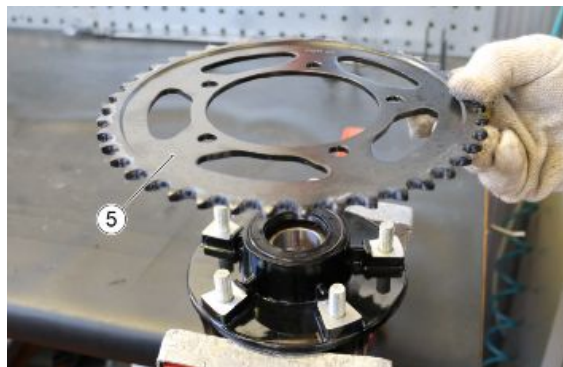
- Insert the circlip (3).



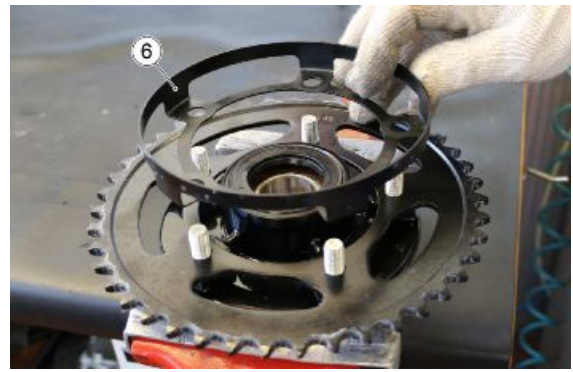
- Position the oil seal (4) flush with the outside of the rear sprocket support.



- Position the sprocket (5) on the sprocket support.



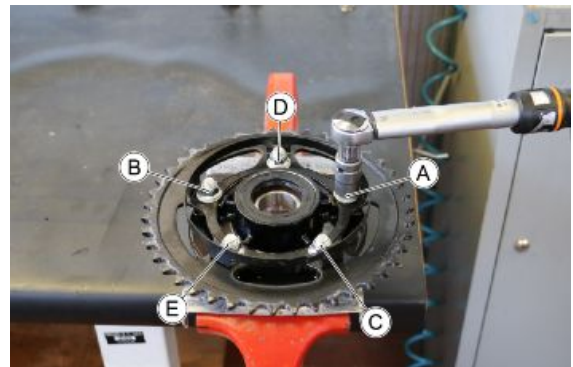
- Position the chain guard (6) on the sprocket support.



- Position the five spring washers (7) on the sprocket support.



- Torque tighten the five chain/rear sprocket guard fixing nuts in the order A-B-C-D-E.



- Insert the external spacer (9).



INSTALLATION OF INTERNAL WHEEL COMPONENTS

To proceed with the installation of the internal wheel components, initially proceed from the right side as described:

- Position the bearing (10) in its seat and use the appropriate punch to insert as far as it will go.



Specific tooling

020376Y Adaptor handle

020359Y 42 x 47 mm Adaptor

- Insert the circlip (11).



- Insert the oil seal (12) flush with the outside of the hub.



- Insert the spacer (13).



- Fit the internal spacer (14) from the opposite side.



- Position the bearing (15) in its seat and use the appropriate punch to insert as far as it will go.



Specific tooling

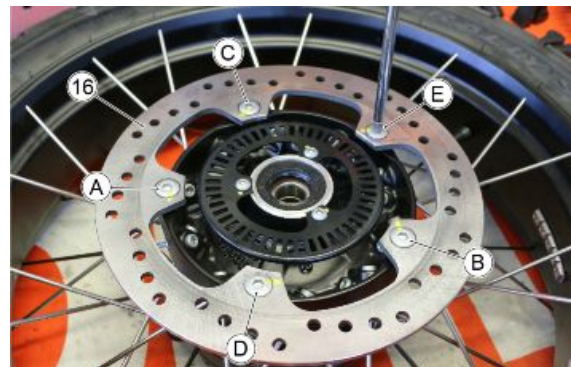
020376Y Adaptor handle

020359Y 42 x 47 mm Adaptor

INSTALLATION OF EXTERNAL WHEEL COMPONENTS

To proceed with the installation of the internal wheel components, proceed as described:

- Position the brake disc (16) on the hub making sure of the correct orientation, determined by the markings which must face outwards.
- Carefully and progressively, screw the five screws securing the tone ring/ clutch plate following the order A-B-C-D-E.



CAUTION

PAY CAREFUL ATTENTION TO TIGHTENING THE FIVE SCREWS. ALWAYS PROCEED GRADUALLY AND PROGRESSIVELY ON EACH SCREW.

- Torque tighten the five screws in the order A-B-C-D-E.

- Position the tone ring (17) on the hub and torque tighten the three fixing screws.



- Working from the left side, position the flange (18) on the hub, insert the five screws and tighten them to the specified torque in the following order A-B-C-D-E.



- Position the flexible coupling rubber inserts (19) on the flange.



- Insert the spacer (20) in the flange in the direction indicated.



- Position the sprocket support (21) on the flange.



- Position the wheel (22) in its seat inserting the chain (23) on the sprocket.



- Working from the right side of the motorcycle, lift the wheel and insert the pin (24) complete with the chain tensioner (25).



- Insert the left chain tensioner (26).



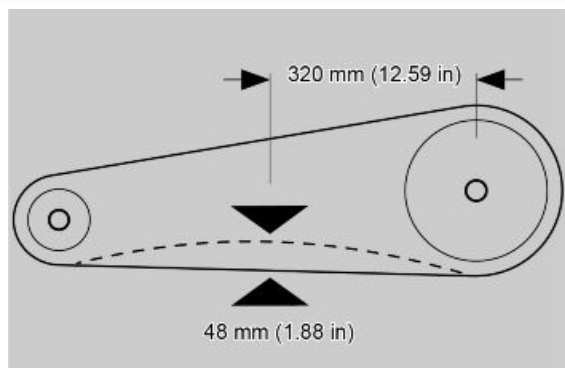
- Insert the washer (27), the nut (28) and tighten it by hand.



- Working from both sides, use the adjustment register screw (29) to bring the chain to the correct tension and tighten the locking nuts (30).



- Check that the vertical deflection of the bottom section of the chain, measured at a distance of 320 mm (12.59 in) from the centre of the rear wheel axle (along imaginary line between centres of front and rear sprockets), is approximately 48 mm (1.88 in).



- Check that the distance set is the same on both sides.



- Tighten the rear wheel locking nut to the prescribed torque.



- Rotate the wheel a few times to check that it does not stick.

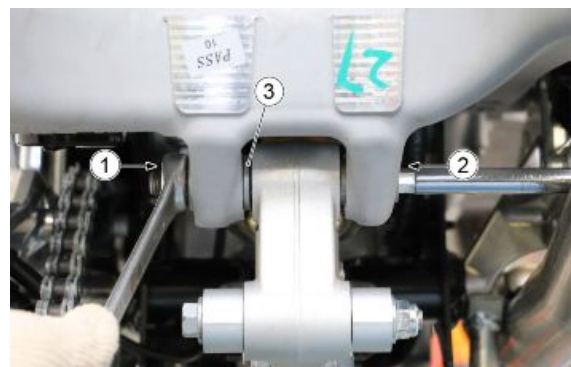
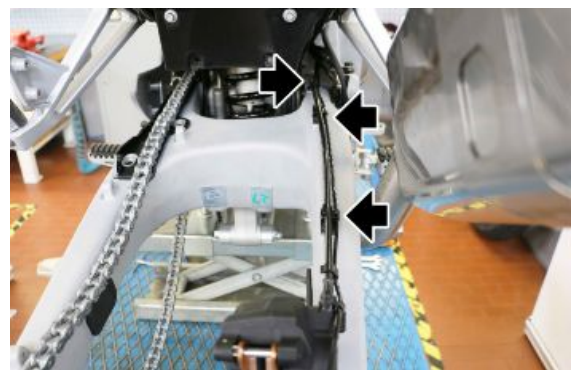
Swinging arm

Removing

Using straps, block the front part, position a scissor lift centrally to keep the rear part raised when removing the swingarm.

To proceed with the removal of the swingarm, it is necessary to first remove the rear wheel, rear mudguard and chain cover.

- Then proceed with the removal of the rear brake calliper complete with support by disconnecting the brake line and the rear ABS sensor wiring harness from the three cable guides on the swingarm.
- Position a rear stand to support the swingarm and unscrew the nut (1) and remove the screw (2) fixing the dual linkage to the swingarm.
- Then if necessary remove the bush (3).



- Unscrew then fixing nut (4) from the swingarm pin and the relative washer (5).



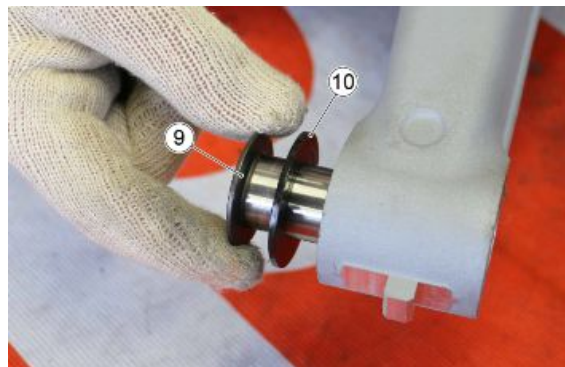
- Operating from the right side of the vehicle and supporting the swingarm, extract the swingarm pin (6).



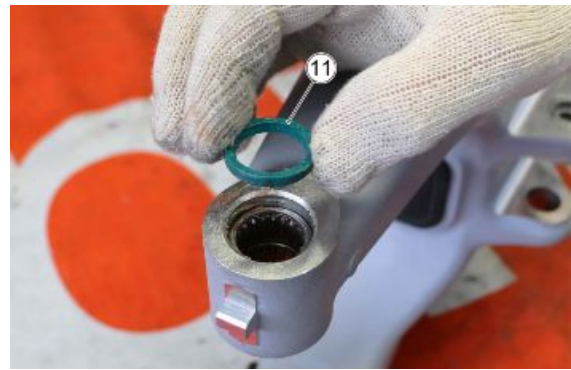
- Remove the swingarm (7) taking care to recover the flat washers on both sides (8).



- If necessary, to check or eventually replace the roller bearings in the swingarm, working from both sides, remove the "T" bush (9) and the shoulder ring (10).



- Remove the 4 gaskets (11).

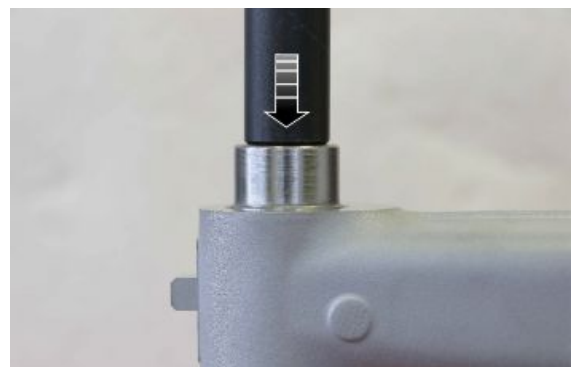


- Using a suitable punch, remove the roller bearings.

Specific tooling

020376Y Adaptor handle

020441Y 26 x 28 mm adaptor



- To remove the chain guide, refer to the specific procedure in the "chain guide sliders" paragraph, in the "frame and suspension" chapter.

See also

Chain sliders

Checking

CAUTION

CHECK THAT NO COMPONENT IS NOTICEABLY DISTORTED, DAMAGED, CRACKED AND/OR DENTED.

REPLACE ALL DAMAGED COMPONENTS.

ROLLER CASINGS

Turn the roller casings manually; they must rotate smoothly, continuously and silently.

There must be no axial clearance.

Replace the roller casings that present these problems.

Apply grease on the rollers.

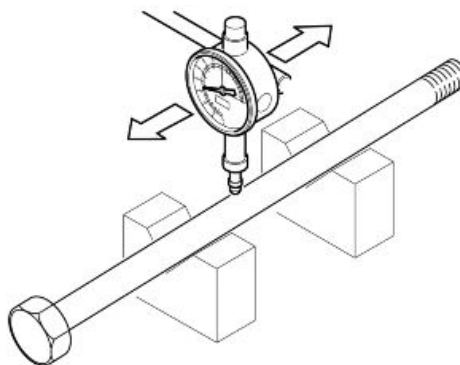
GASKETS

Check that the gaskets are in good conditions; replace them if they show signs of damage or excessive wear.

PERNO FORCELLONE

Con un comparatore controllare che l'eccentricita' del perno non superi il valore limite. In caso contrario sostituire il perno.

Eccentricita' massima del perno: 0,2 mm (0.0078 in).

**Installing**

To proceed with the installation of the swingarm, proceed as described:

- If the roller bearings have been removed during the disassembly phase for a check or replacement, proceed with the insertion by means of a special punch, respecting the following measurements, after having greased the contact parts:

LEFT SIDE:

- The roller bearings (1-2) must be positioned as per detail "A", resting one on top of the other on the inner face in the centre line.

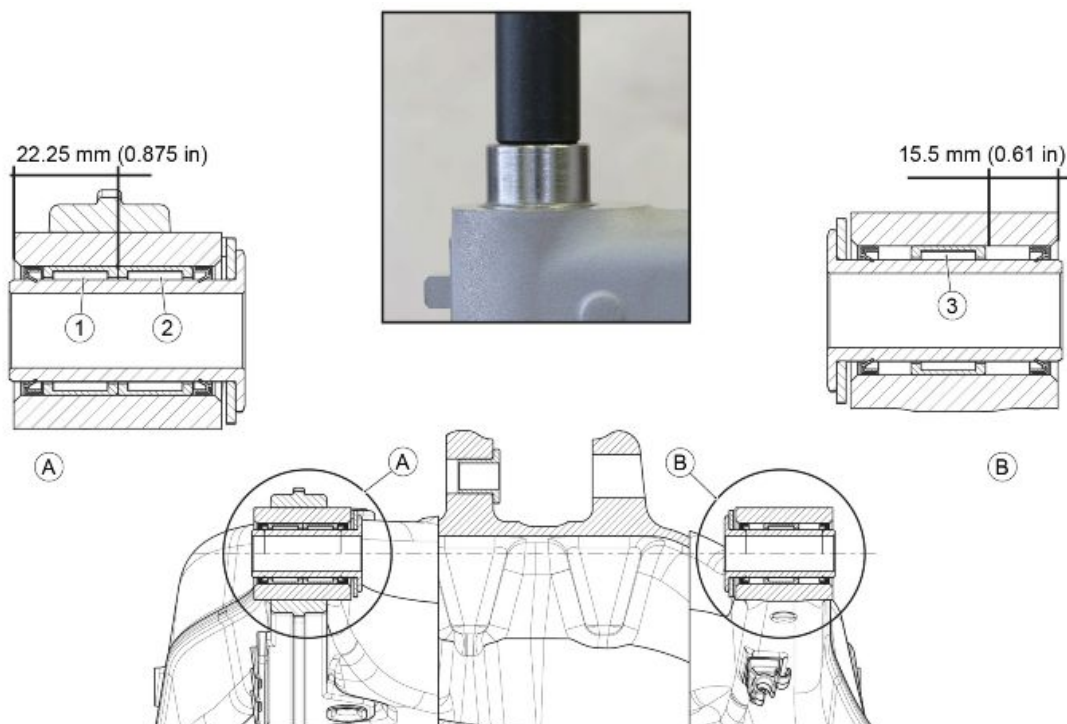
RIGHT SIDE:

- The roller bearing (3) must be positioned as per detail "B" at a depth of 15.5 mm (0.61 in) from the outer surface.

Specific tooling

020441Y 26 x 28 mm adaptor

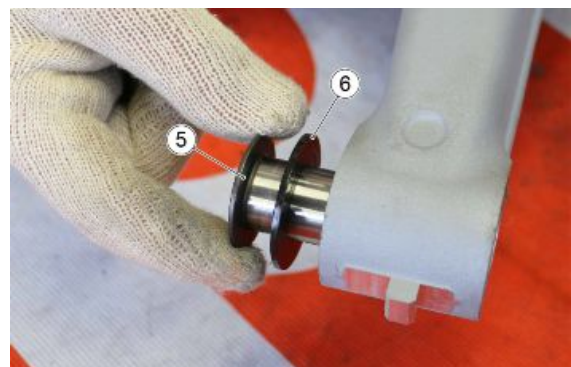
020376Y Adaptor handle



- Position the 4 gaskets (4) on the swingarm to the level of the internal machining as shown in the image.



- Working from both sides, insert the "T" bush (5) complete with shoulder washer (6).



- Working from both sides, position the flat washers (8) on the swingarm (7) paying attention to the correct alignment. The machined part must be facing the swingarm.
- Then insert the swingarm into its seat.



- Working from the right side of the vehicle, supporting the swingarm, insert the swingarm pin (9) making sure that it is inserted as far as it will go.
- Position a rear stand to support the swingarm



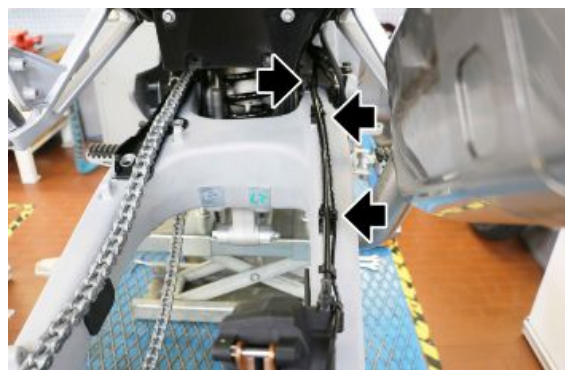
- Insert the washer (10) and the nut (11) on the pin, tightening it to torque.



- Position the "T" bush (12) on the swing-arm if previously removed.
- Connect the dual linkage to the swing-arm and fasten it using the appropriate screw (13) and relative nut (14) tightening it to torque.



- Reassemble the rear brake calliper on the swingarm connecting the brake hose and the rear ABS sensor wiring harness to the three indicated cable guides.



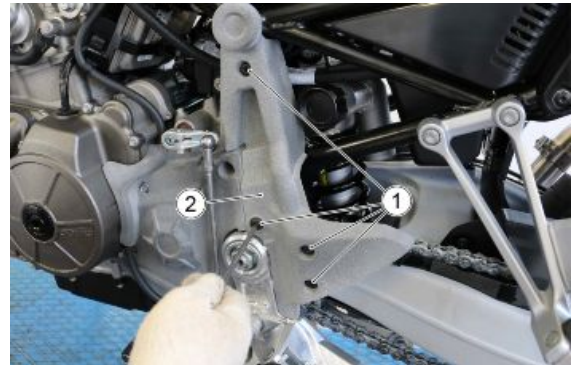
- reassemble the rear mudguard, the chain guard and the rear wheel, checking the correct tension of the chain.

Pinion

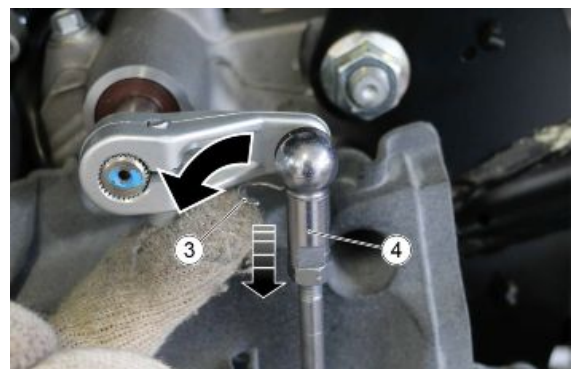
Removing

In order to remove the front sprocket, having slackened the tension of the final drive chain, proceed as follows:

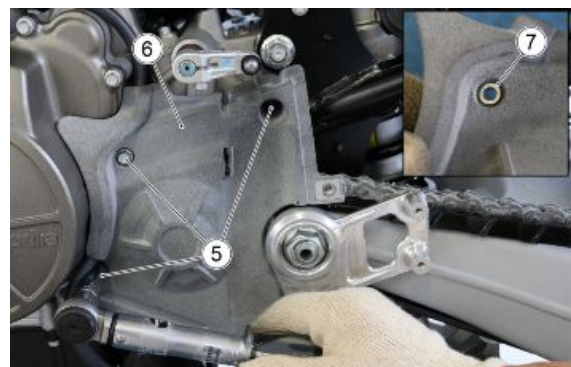
- Unscrew the four fixing screws (1) of the left frame protection (2) and remove it.



- Turn the retainer (3) outward anti-clockwise and remove it to disconnect the gear shift lever tie-rod (4) from the transmission lever.



- Unscrew the three fixing screws (5) of the front sprocket casing (6) taking care to recover the "T" bushes (7).



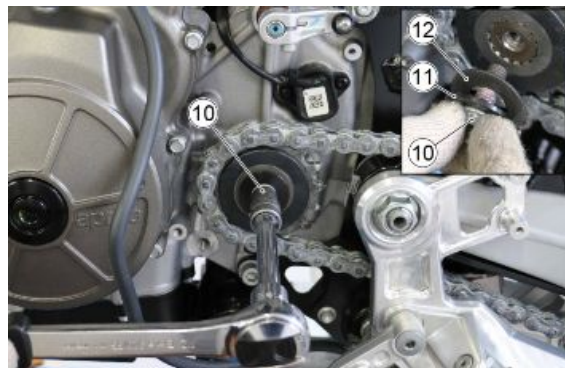
- Remove the front sprocket casing (6) after having disconnected the breather pipe (8).



- Remove the chain guide (9).



- Remove the fastener screw (10) of the sprocket complete with the "T" bush (11) and the cup spring washer (12).



- Remove the front sprocket (13) from the transmission shaft and free it from the drive chain.



- Remove the spacer (14) from the transmission shaft.



- During reassembly, pay attention to the correct orientation of the front sprocket.

Inspection

To check the state of wear of the front sprocket, simply check that the teeth of the sprocket are not worn or damaged. In this case, replace the rear sprocket and the final drive chain also.

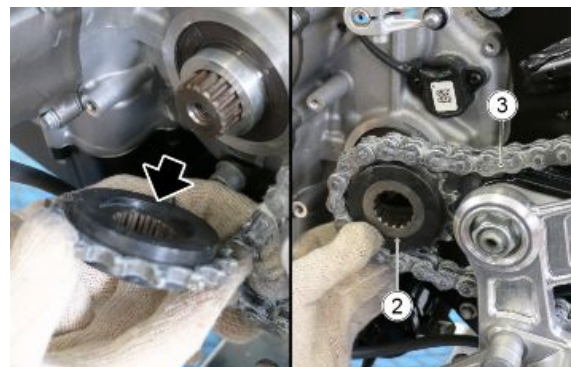
Installing

To proceed with the installation of the front sprocket, proceed as described:

- Insert the spacer (1) on the transmission shaft.



- Assemble the front sprocket (2) with the drive chain (3) and insert it on the transmission shaft making sure of the correct orientation.
- The machined part must be facing the engine as indicated.



- Insert the chain guide.



- Having positioned the new pre-impregnated M10x25 screw (4) used to fasten the pinion, along with the "T" bush (5) and the spring washer (6), tighten it to the prescribed torque.



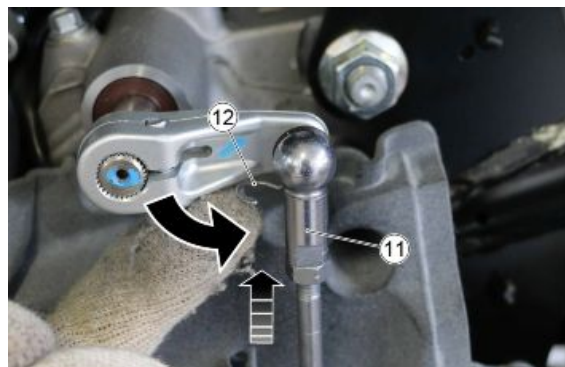
- Position the breather pipe (7) in the sprocket cover (8) as indicated.



- After positioning the sprocket cover (8), insert the three screws (9) complete with "T" bushes (10) and tighten them to the prescribed torque.



- Connect the gear shift rod (11), insert the retainer (12) and turn it clockwise to fasten it.



- Position the frame cover (13) and after having positioned the four screws (14) tighten them to torque.



- Restore the drive chain to the correct tension, following the specific procedure described in the "Adjustment" paragraph.

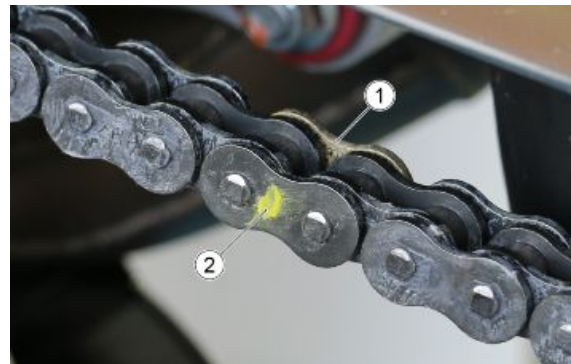
Drive chain

Removing

The transmission chain, although "closed", has a different coloured hammerlock (where provided), which should be used to perform opening / disassembling procedures.

NOTE

WHERE PRESENT, THE HAMMERLOCK (1) MAY ALSO BE IDENTIFIED BY A SIGN (2) APPLIED IN THE MOUNTING LINES DURING MANUFACTURING.



To dismantle and remove the chain, proceed as follows:

- Partially remove the pins (3) using a generic chain breaker.



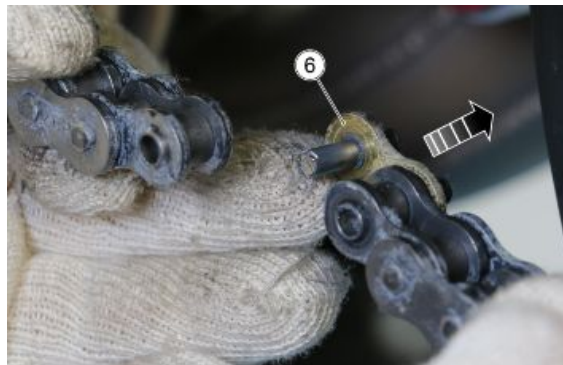
- Remove the outer plate (4).



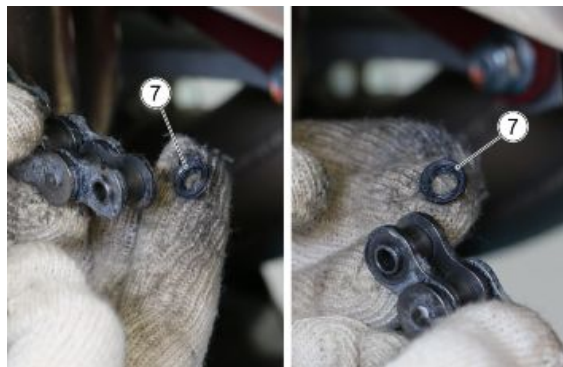
- Remove the outer O-ring rings (5).



- Remove the inner plate (6).



- Collect the inner O-ring rings (7) and completely remove the transmission chain.



inspection

To check the wear of the drive chain, use the chain checking instrument, P/N: **Ognibene - 529510001**.

The different chain pitches which may be checked with the instrument are indicated on the instrument itself. There are three reference markings for each chain pitch indicated on the instrument. These indicate (from right to left) the correct measurements for:

1. New chain with length near nominal value;
2. Chain with chain stretch of 1.5%;
3. Chain with chain stretch of 3%, which must therefore be replaced in accordance with applicable legislation.

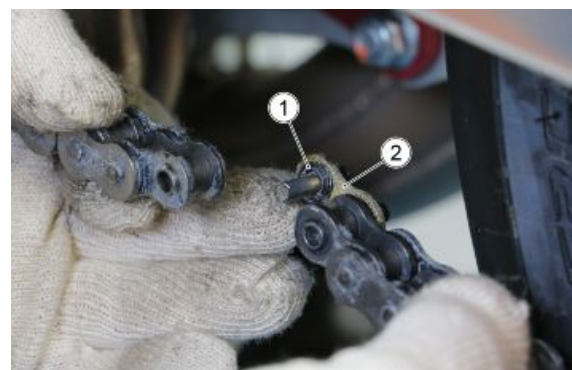


Perform the procedure described as follows to check chain wear:

- Tauten the chain.
- Place the jaws of the tool on the rollers at the opposite ends of a STRAIGHT length of chain consisting of 8 chain links.
- Check that the notch on the sliding jaw matches the correct marking on the instrument.

Installing

- After fitting the chain on the pinion and on the crown, put the inner O-rings (1) back onto the hammerlock pins (2) and connect the two ends of the transmission chain.



- Place the outer O-rings (3) on the pins.



- Compress the outer plate (4) using the appropriate generic tool.

CAUTION

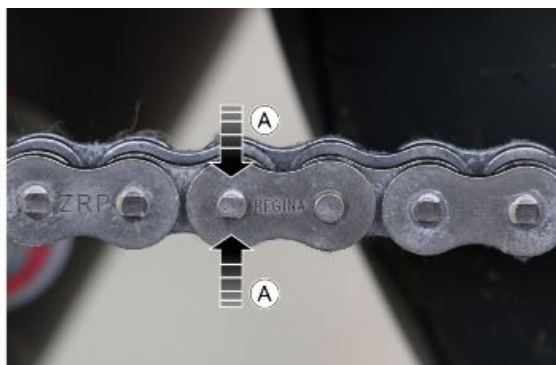
BE CAREFUL NOT TO COMPRESS TOO THE OUTER PLATE TOO MUCH AS THIS COULD SEIZE THE CHAIN.



- Check that the links in the transmission chain are not seized and that it can move in both directions.



- Use a generic clincher to re-tighten the pins of the link (checking riveting at points "A").



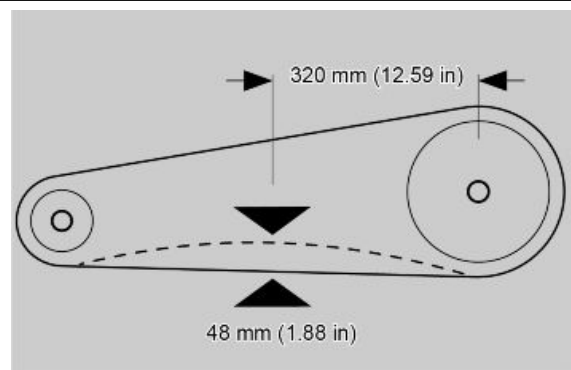
- Turn the pin of the specific tool 90° and re-engage the link pin again (checking riveting at points "B").
- Grease the chain and record the clearance.



Adjusting

To check the clearance:

- Shut off the engine.
- Rest the vehicle on the side stand.
- Select neutral.
- Check that the vertical deflection of the bottom section of the chain, measured at a distance of 320 mm (12.59 in) from the centre of the rear wheel axle (along imaginary line between centres of front and rear sprockets), is approximately 48 mm (1.88 in).
- Move the vehicle forwards to check the vertical deflection of the chain in other positions; the chain deflection must be constant throughout the entire rotation of the wheel.



if the clearance is uniform, but greater or less than **48 mm (1.88 in)**, carry out the adjustment.

CAUTION

IF THE CLEARANCE IS GREATER IN SOME POSITIONS IT MEANS THAT SOME ELEMENTS OF THE CHAIN ARE CRUSHED OR HAVE SEIZED UP. IN THIS CASE THE CHAIN SHOULD BE REPLACED.

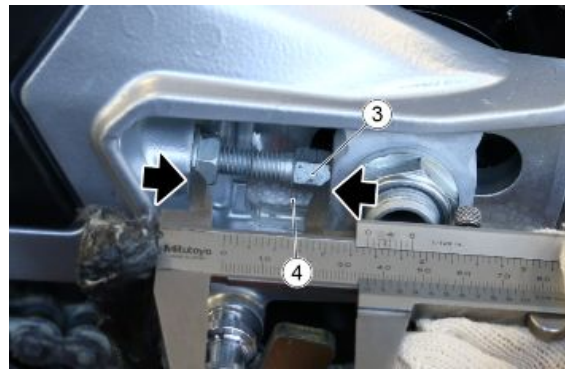
LUBRICATE THE CHAIN REGULARLY TO PREVENT THE RISK OF SEIZURE.

For the adjustment of the chain tension:

- Place the vehicle on its rear service stand.
- After completely loosening the nut (1), operating from both sides, loosen the two locknuts (2).



- Use the adjuster screw (3) to adjust the chain clearance checking that the references (4) match on both sides of the vehicle.
- Using a gauge make sure that the distance is the same on both sides.



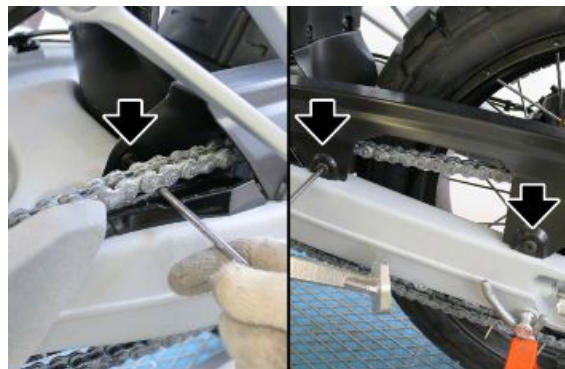
- Tighten the two lock nuts (2).
- Tighten the nut (1).
- Check the chain clearance.

Chain sliders

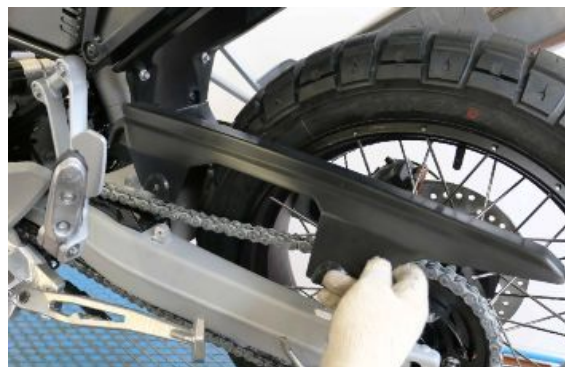
To remove the chain sliders, follow the procedure described below:

CHAIN GUARD

- Place the vehicle on the specific rear support stand (optional).
- Remove the three fixing screws.



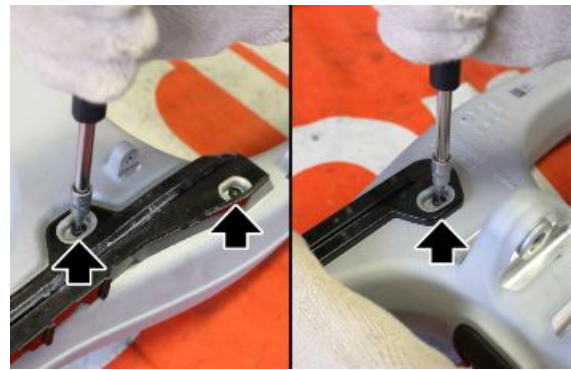
- Remove the chain guard.



CHAIN GUIDE

In order to remove the chain guide, the swingarm must be removed beforehand. Then proceed as described:

- Remove the three fixing screws chain guide, along with the cups.



- Remove the chain guide.



CHAIN ROLLER

- It is not necessary to remove the support plate in order to remove the chain roller. Unscrew the fixing screw to remove the roller.



- To assemble the chain sliders, carry out the procedures described above in reverse order.

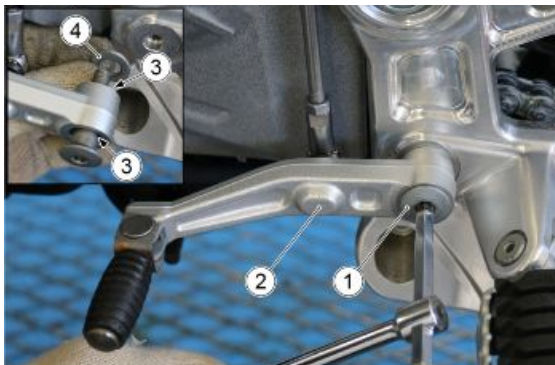
Pedaline

Rimozione

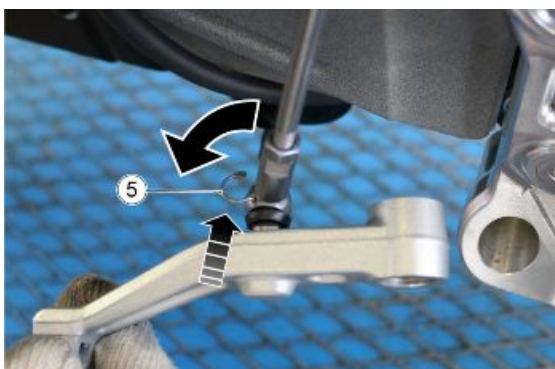
LEFT RIDER FOOTREST

To disassemble and remove the left rider footrest it is necessary to first remove the frame protection and the side stand. Then proceed as described:

- Unscrew the fixing screw (1) of the shift lever (2) taking care to retain the two rubber o-rings (3) and the washer (4).



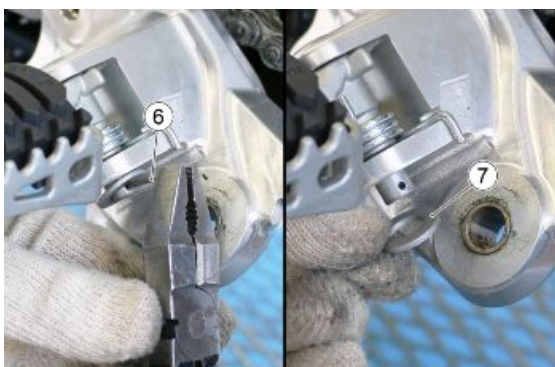
- Turn the retainer (5) outward anti-clockwise and remove it to disconnect the transmission lever from the shift lever.
- Remove the gear shift lever.



- Remove the split pin (6) of the pin and the washer (7).

CAUTION

ALWAYS USE A NEW SLIT PIN DURING REASSEMBLY .



- After removing the pin (8) extract the foot rest (9) complete with spring (10).

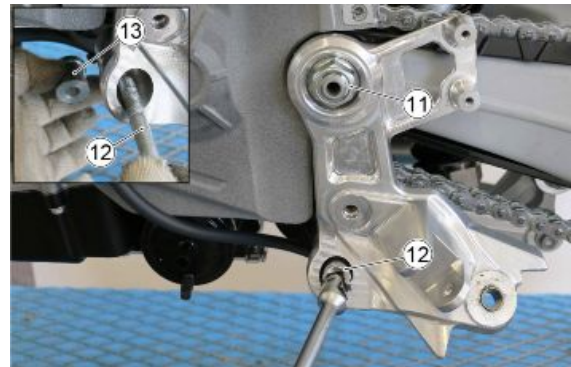


- Separate the rubber part from the foot rest.

THE RUBBER PART CAN ALSO BE REMOVED WITHOUT REMOVING THE FOOT REST FROM THE SUPPORT PLATE.



- Loosen the fixing nut (11) of the swing-arm pin.
- Unscrew and remove the lower screw (12) and collect the spacer (13).



- Completely unscrew the nut (11), collect the flat washer (14) and remove the support plate (15).



- Unscrew the screw (16) in order to remove the chain roller (17).

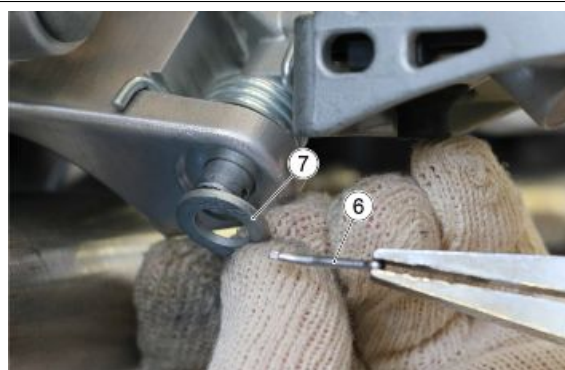
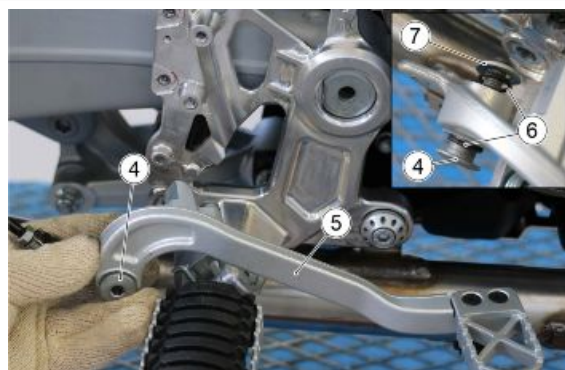


RH RIDER FOOTREST

To disassemble and remove the right rider footrest it is necessary to first remove the frame protection.

Then proceed as described:

- Unscrew the two fixing screws (1) of the rear brake master cylinder (2).
- Release the brake lever return spring (3) and remove it.
- Unscrew the fixing screw (4) of the brake lever (5) taking care to retain the two rubber o-rings (6) and the washer (7).
- Remove the split pin (6) of the pin and the washer (7).

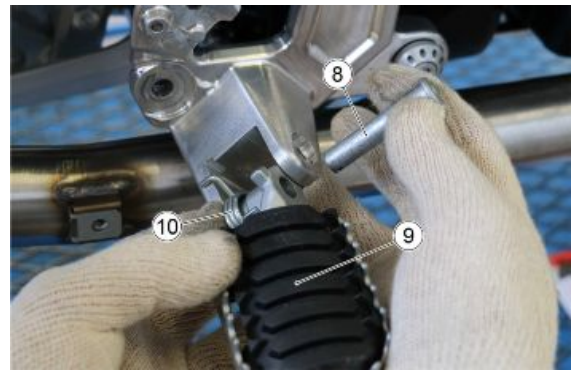
**CAUTION**

ALWAYS USE A NEW SLIT PIN DURING REASSEMBLY .

- After removing the pin (8) extract the foot rest (9) complete with spring (10).

CAUTION

ALWAYS USE A NEW SLIT PIN DURING REASSEMBLY .

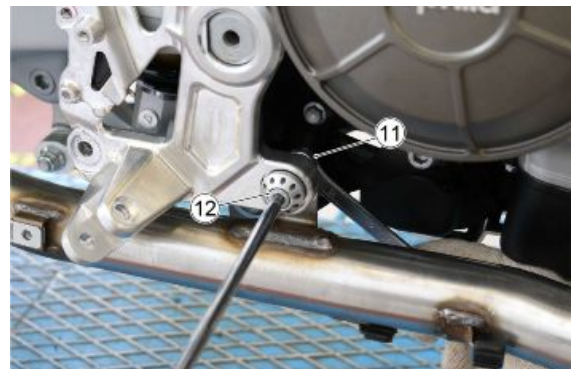


- Separate the rubber part from the foot rest.

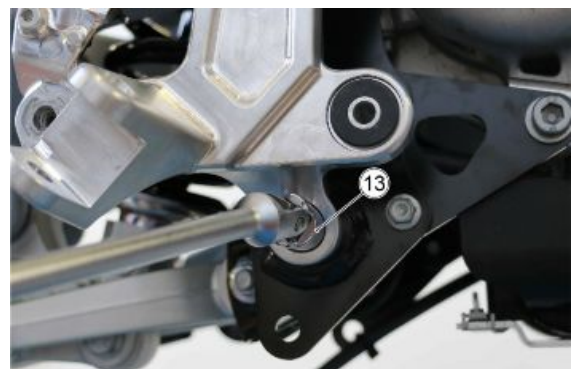
THE RUBBER PART CAN ALSO BE REMOVED WITHOUT REMOVING THE FOOT REST FROM THE SUPPORT PLATE.



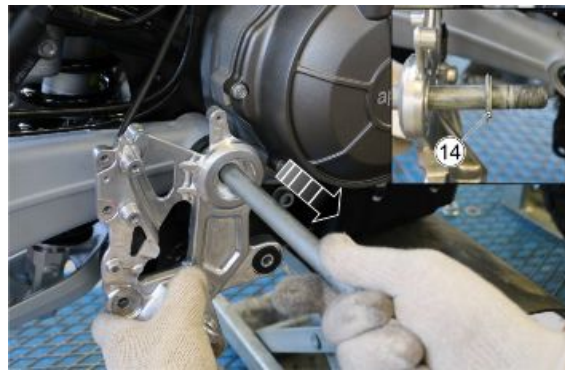
- Keeping the nut (11) still, unscrew and remove the screw (12) that secures the exhaust manifold to the support plate.
- Proceed with the complete removal of the exhaust to access the screw underneath the support plate.



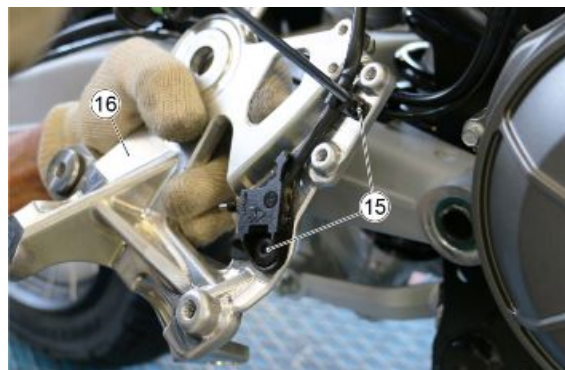
- Undo and remove the screw (13).



- Using a pin with adequate dimensions (length greater than 350 mm and diameter less than/equal to 30 mm), push the swingarm pin from left to right out of its seat so that the pin used replaces the swingarm pin.
- Take care to collect the spacers (14) on both sides



- Unscrew the two fixing screws (15) of the rear brake switch to remove the right support plate (16).



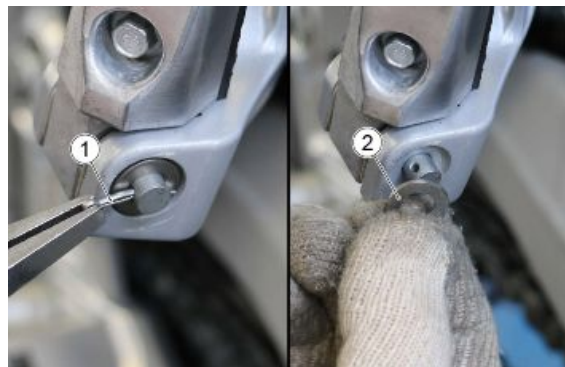
PASSENGER FOOTRESTS

THE OPERATIONS DESCRIBED BELOW REFER TO A SINGLE FOOTREST, BUT ARE VALID FOR BOTH

- Remove the split pin (1) of the pin and the washer (2).

CAUTION

ALWAYS USE A NEW SLIT PIN DURING REASSEMBLY .



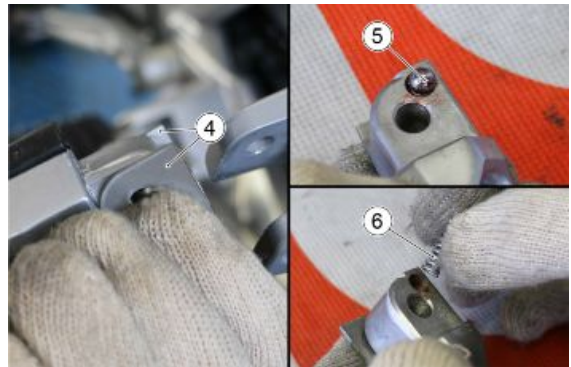
- Remove the pin (3).



- While pressing the side plates, remove the complete pedal.



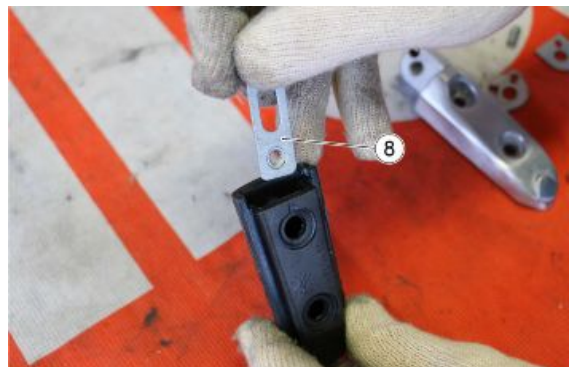
- Check that the plates (4) are aligned correctly before dismantling the pedal, taking care not to lose the ball (5) and the spring (6).



- Unscrew and remove the two screws (7) to separate the rubber part from the footrest.



- Remove the retainer plate (8) of the screws from the rubber part.



- To remove the footrest support, remove the two screws (9).



- Remove the footrest support (10).

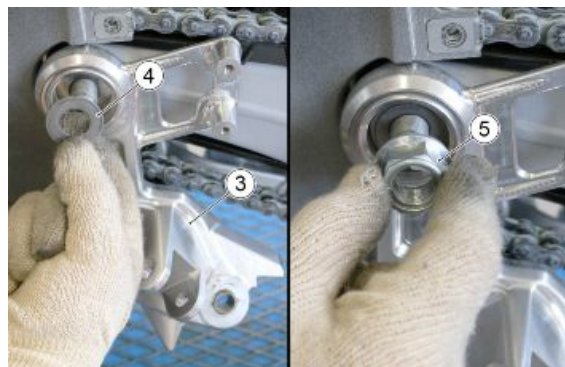


Installazione

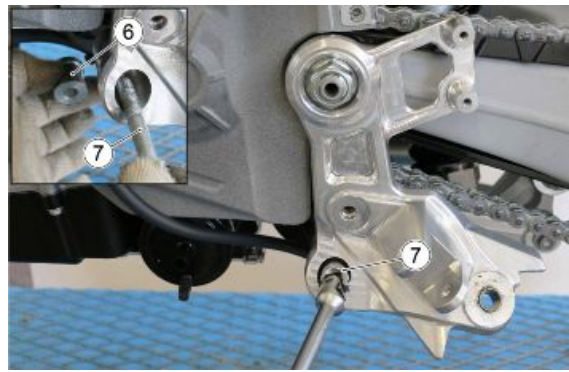
LEFT RIDER FOOTREST

To assemble and install the left rider footrest, proceed as follows:

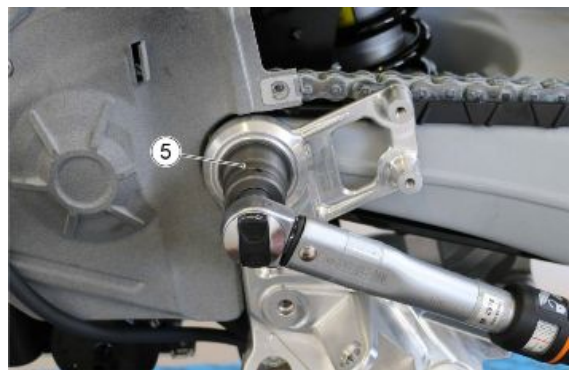
- Position the chain roller (1) and tighten the screw (2) to the prescribed torque.
- Position the support plate (3), insert the flat washer (4) and manually screw the nut (5).



- Position the spacer (6) between the plate and the frame, insert the screw (7) screwing it manually.



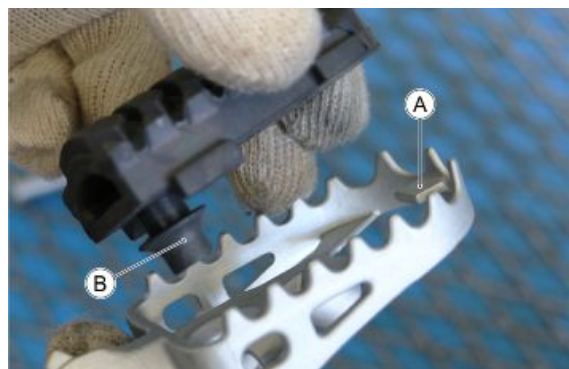
- Tighten part the nut (5) to the prescribed torque.



- Tighten the screw (7) to the prescribed torque.



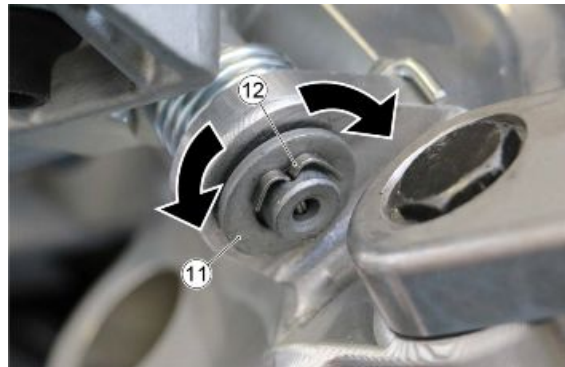
- Assemble the rubber part on the footrest paying attention to insert it correctly in point "A" and then point "B".



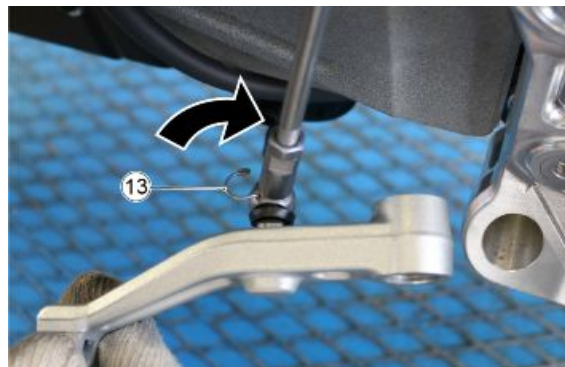
- Insert the spring (8) on the footrest (9) checking the correct orientation and insert the pin (10).



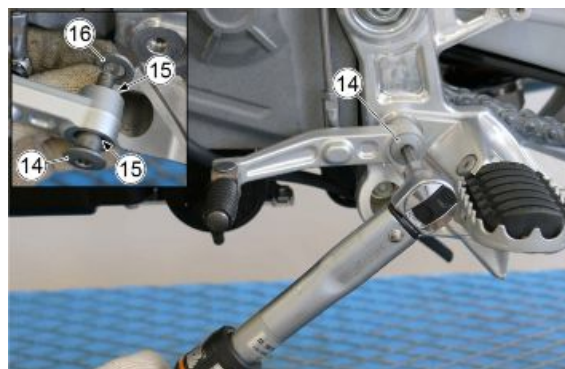
- Position the washer (11) on the pin and insert a new split pin (12) locking it by bending the ends as shown.



- Connect the transmission lever to the gear shift lever and after inserting the retainer (13) turn it clockwise to secure it.



- Insert the gear shift lever fixing pin (14) complete with the two rubber o-rings (15) and washer (16).
- Tighten the pin to the prescribed torque.



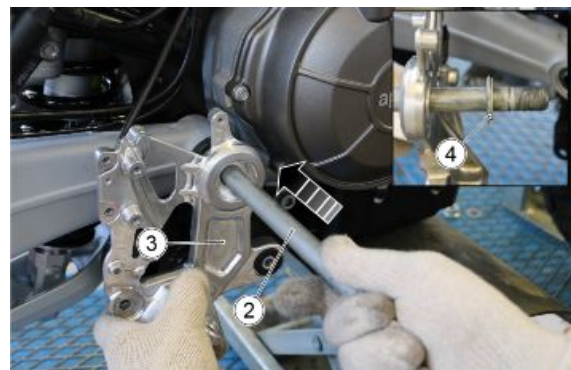
RH RIDER FOOTREST

To assemble and install the right rider footrest, proceed as follows:

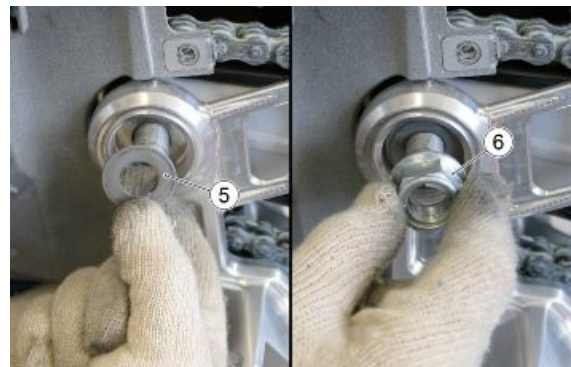
- Position the rear brake switch on the support plate and tighten the two screws (1).



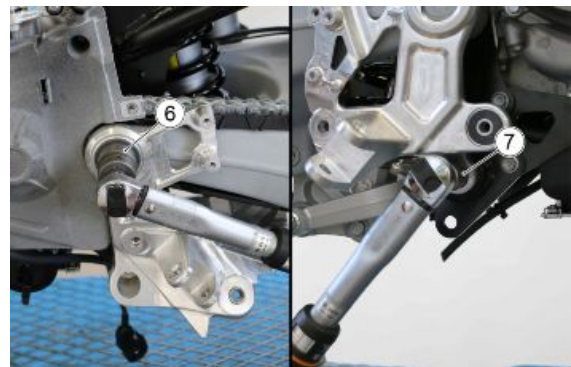
- Insert the swingarm pin (2) into the support plate (3) taking care to insert the spacers (4) on both sides, checking the correct orientation, as in the photo.



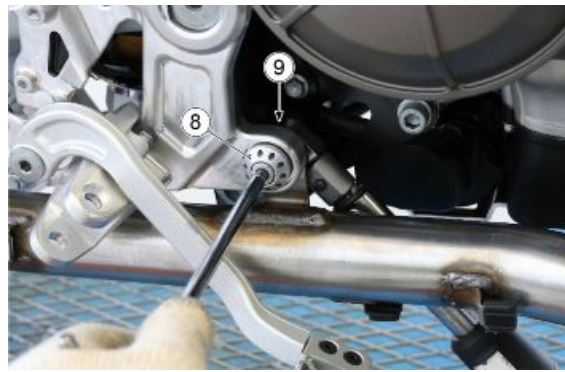
- Insert the flat washer (5) and manually screw the nut (6).



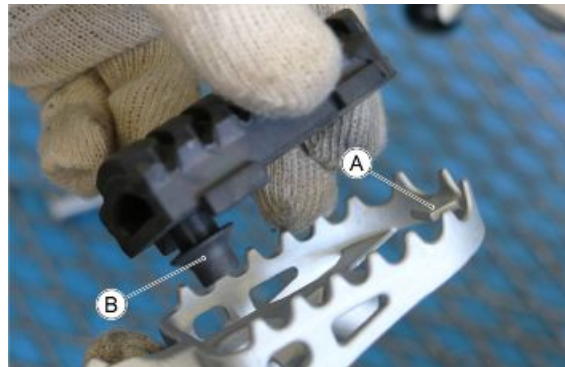
- Insert the lower fixing screw (7) of the plate to the frame and screw it manually.
- Then tighten the nut (6), swingarm pin and then of the screw (7) to the prescribed torque.



- Reassemble the exhaust and after inserting the screw (8), tighten the nut (9) to torque.



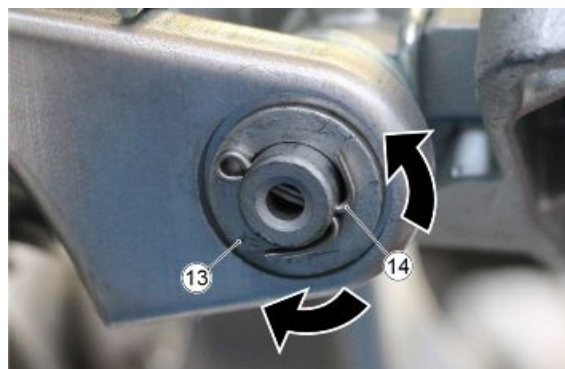
- Assemble the rubber part on the footrest paying attention to insert it correctly in point "A" and then point "B".



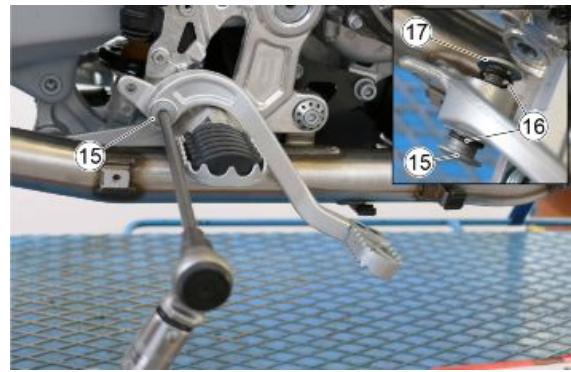
- Insert the spring (10) on the footrest (11) checking the correct orientation and insert the pin (12).



- Position the washer (13) on the pin and insert a new split pin (14) locking it by bending the ends as shown.



- Insert the brake lever fixing pin (15) complete with the two rubber o-rings (16) and washer (17).
- Tighten the pin to the prescribed torque.



- Connect the brake lever return spring (18).



- Reposition the rear brake master cylinder in its seat and tighten the two fixing screws (19) to torque.



PASSENGER FOOTRESTS

THE OPERATIONS DESCRIBED BELOW REFER TO A SINGLE FOOTREST, BUT ARE VALID FOR BOTH

To assemble and install the passenger footrest, proceed as follows:

- Position the footrest support (1) and secure by tightening the two screws (2) to torque.



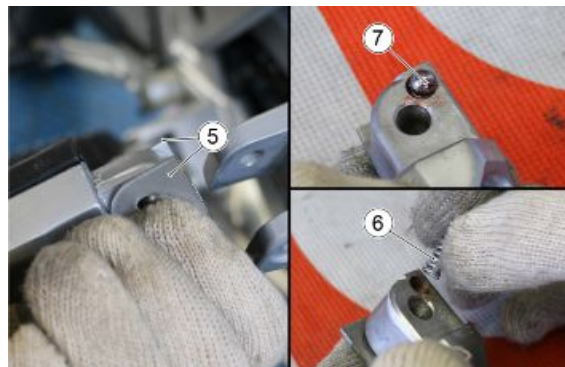
- Insert the retainer plate (3) in the rubber part.



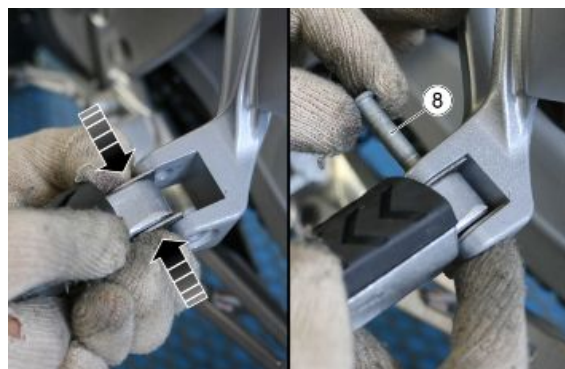
- Join the rubber part with the footrest by tightening the two screws (4) to torque.



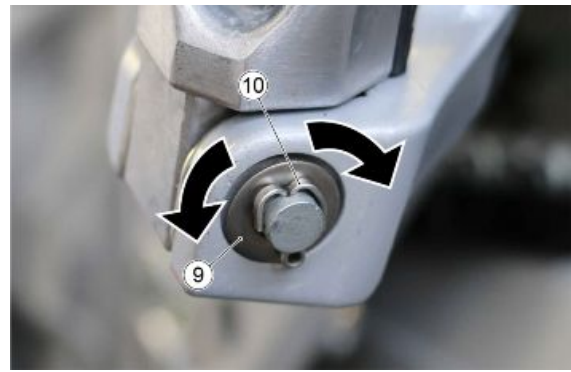
- Assemble the footrest opening/closing components, checking the correct orientation of the plates (5) before inserting the spring (6) and the ball (7).



- While pressing the side plates, position the complete footrest on the support and insert the pin (8).



- Position the washer (9) on the pin and insert a new split pin (10) locking it by bending the ends as shown.



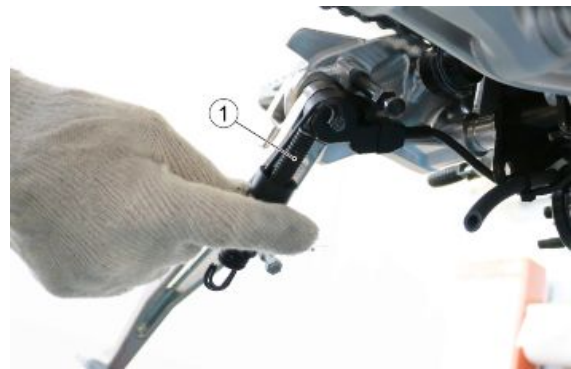
Stand

Side stand

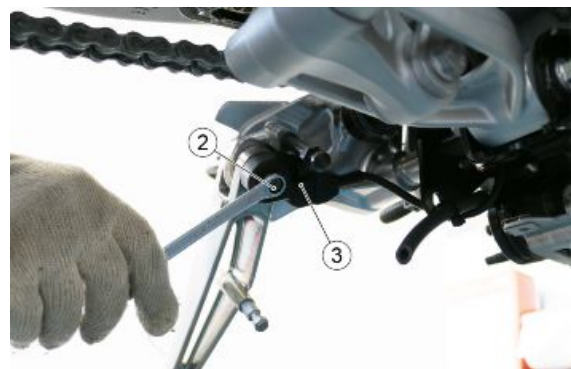
REMOVAL

To remove the side stand, proceed as described:

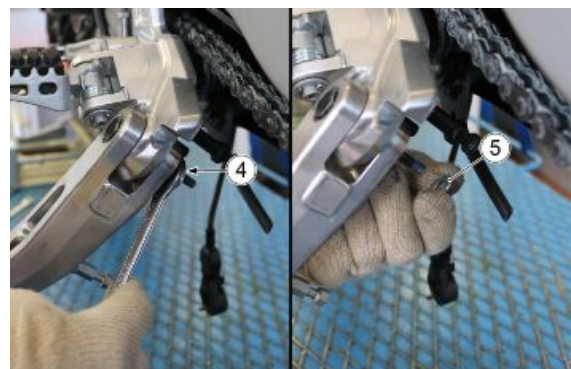
- Disconnect and remove the two return springs (1) from the stand.



- Unscrew the nut (2) and remove the stand sensor (3).



- Remove the fastening nut (4) from the centre stand screw taking care to collect the washer (5).



- Remove the special screw (6) used to fasten the centre stand and then separate it from the plate.



- Remove the washer (7).

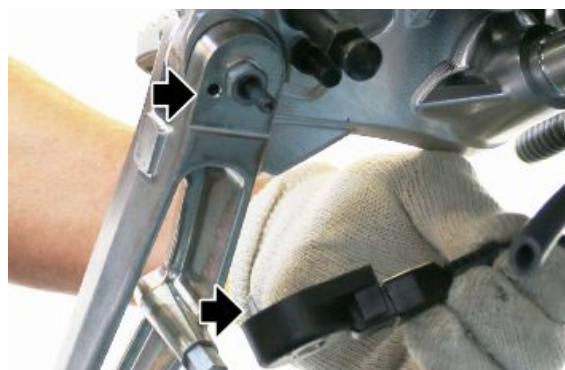


NOTES FOR THE REFIT PHASE:

- Check the correct positioning of the side stand sensor, in particular that the sensor pin is engaged in the hole on the stand.

CAUTION

INCORRECT POSITIONING OF THE SIDE STAND SENSOR CAN GENERATE THE "STAND OPEN" SIGNAL, THEREFORE INHIBIT THE START.



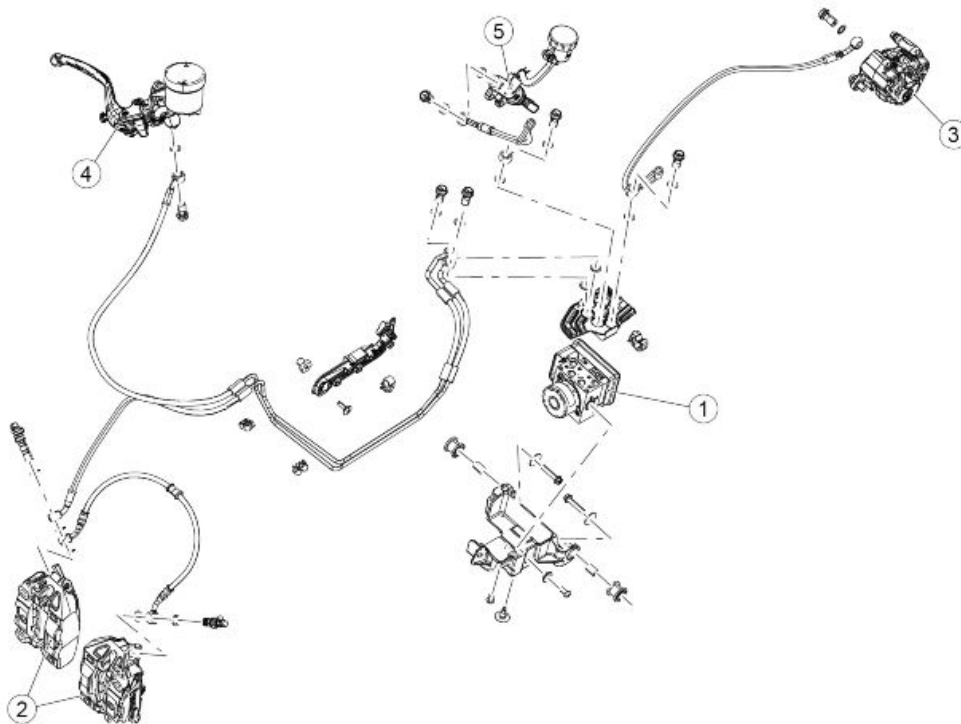
INDEX OF TOPICS

BRAKING SYSTEM

BRAK SYS

ABS

Foreword



The ABS system consists of the following elements:

1. ABS Modulator.
2. Front brake callipers.
3. Rear brake calliper.
4. Front brake master cylinder.
5. Rear brake master cylinder.

The ABS system is a device that prevents wheel locking in case of an emergency braking, thus increasing vehicle stability when braking, compared with a conventional braking system. The ABS system improves vehicle control provided that the physical limits of vehicle grip on the road are not exceeded. The rider is fully responsible for riding at a suitable speed based on weather and road conditions, always leaving an appropriate safety margin.

Under no circumstances can the ABS system compensate for the rider's misjudgement or improper use of brakes.

The ABS system can be deactivated (only when the vehicle is stationary and in the OFF ROAD riding mode) or active. If active the system may be set to three different levels from 1 (minimum slip control) to 2 (maximum slip control), from the specific setting screen (see paragraph in the "SELECTING MAPS" in the "Use and Maintenance Manual").

Level "1" is suitable for off-road use by expert riders under poor grip conditions. ABS is effective on the front wheel only.

Level 2 is suitable for day-to-day usage of the vehicle in all conditions - e.g. on urban or extra-urban roads, in wet surface conditions.

CAUTION

BEFORE RIDING OFF, CHECK THE ABS LEVEL OF CONTROL SELECTED. SWITCHING OFF THE VEHICLE (KEY OFF/ON) OR CHANGING THE RIDING MODE REACTIVATES THE SYSTEM (IF DEACTIVATED) AND RETURNS THE ABS OPERATION TO THE LAST ABS LEVEL USED.

NOTE

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

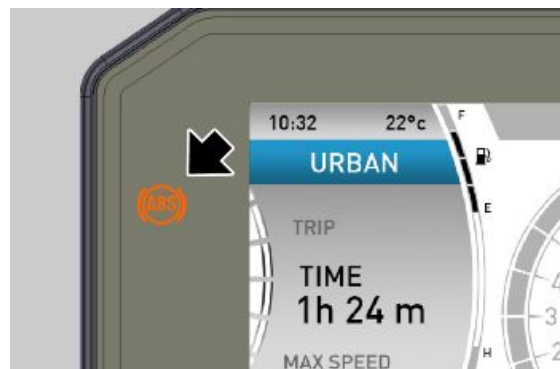


THE ANTI-LOCK BRAKING SYSTEM OF THE WHEEL DOES NOT PREVENT FALLS WHILE CORNERING.

AN EMERGENCY BRAKING WITH THE VEHICLE INCLINED, HANDLEBAR TURNED, ON UNEVEN OR SLIPPERY ROADS, OR WITH POOR GRIP, CREATES A LACK OF STABILITY DIFFICULT TO HANDLE. RIDE CAREFULLY AND SENSIBLY AND ALWAYS BRAKE GRADUALLY.

DO NOT SPEED RECKLESSLY. THE VEHICLE GRIP ON THE ROAD IS SUBJECT TO LAWS OF PHYSICS WHICH NOT EVEN THE ABS SYSTEM CAN ELIMINATE.

When the vehicle is started, after the initial instrument panel check cycle, the ABS warning lamp flashes until the vehicle reaches a speed of 3.1 mph (5 km/h), after which it goes out.



If, with the ABS system activated (level 1, 2), the ABS warning lamp lights steadily or continues to flash even after exceeding a speed of 5 km/h (3.1 mph), this means that a fault has been detected and that the ABS system has been disabled.

In this case carry out the following operations:

- stop the vehicle;
- Key OFF-ON;
- ride the vehicle to a speed above 5 km/h (3.1 mph): the ABS warning light must be turned off;
- the ABS system is working.

If the ABS disabled indication remains:

NOTE

SHOULD THIS OCCUR, CONTACT AN Aprilia Approved Dealer.

NOTE

IN CASE OF EXTENDED REAR WHEEL ROTATION WITH THE FRONT ONE LOCKED (BURNOUT, MOTORCYCLE ON THE CENTRE STAND, ETC.) THE SYSTEM CAN BE DEACTIVATED AUTOMATICALLY WHEN THE ABS and a-PRC INDICATOR LIGHT STAYS ON.

TO REACTIVATE, TURN THE IGNITION SWITCH OFF AND THEN ON AGAIN AND SELECT THE REQUIRED SETTING.

NOTE

THE SAFETY PROVIDED BY THE ABS DOES NOT, IN ANY CASE, JUSTIFY RISKY MANOEUVRES. EVEN THOUGH THE ABS SYSTEM ENSURES GREATER VEHICLE CONTROL IN THE EVENT OF EMERGENCY BRAKING, ALWAYS OBSERVE THE CORRECT MINIMUM SAFETY DISTANCE FROM THE VEHICLE IN FRONT OF YOU.



THE ABS SYSTEM ACTS ON BOTH THE FRONT AND REAR WHEELS BY OBTAINING INFORMATION FROM THE ROTATION/ LOCKING TONE WHEELS. ALWAYS CHECK THAT THE TONE WHEEL IS CLEAN, AND REGULARLY CHECK THAT THE DISTANCE FROM THE SENSOR IS CONSTANT ON ALL 360 DEGREES. SHOULD THE WHEELS BE REMOVED AND REFITTED, IT IS VERY IMPORTANT TO CHECK THAT THE DISTANCE BETWEEN TONE WHEEL AND SENSOR IS THE ONE SPECIFIED. FOR CHECKING AND ADJUSTMENT, CONTACT AN Authorised Aprilia Workshop.



WHERE THE MOTORCYCLE HAS AN ABS SYSTEM, NON-APPROVED BRAKE PADS AND TYRES COMPROMISE SMOOTH BRAKING, DRASTICALLY REDUCING DRIVING SAFETY.

NOTE

THE SYSTEM'S SENSORS, HAVING A SIGNIFICANT ACCURACY OF READING THE TONE WHEELS, MAY GENERATE, A MOTORCYCLE STOPPED AND THE ENGINE RUNNING, INDICATION OF SPEED OF SOME km / h (mph) ON THE DIGITAL DISPLAY. SUCH BEHAVIOUR IS TO BE CONSIDERED NORMAL AND DOES NOT CREATE MALFUNCTIONS IN THE SYSTEM.



IF THE GAP FOR ONE OR BOTH SENSORS IS NOT WITHIN THE TOLERANCE INDICATED BELOW, TAKE THE MOTORCYCLE TO AN Approved Aprilia Dealer

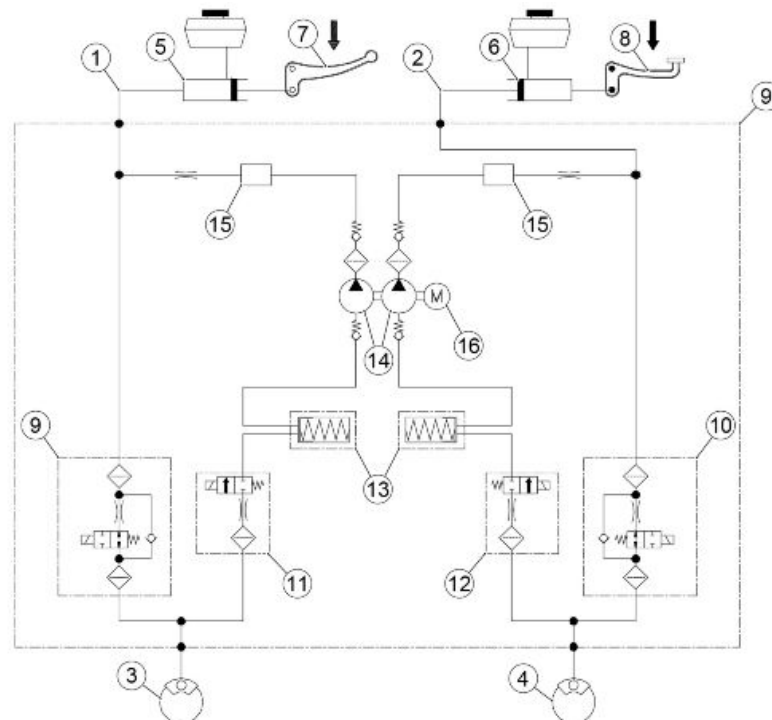
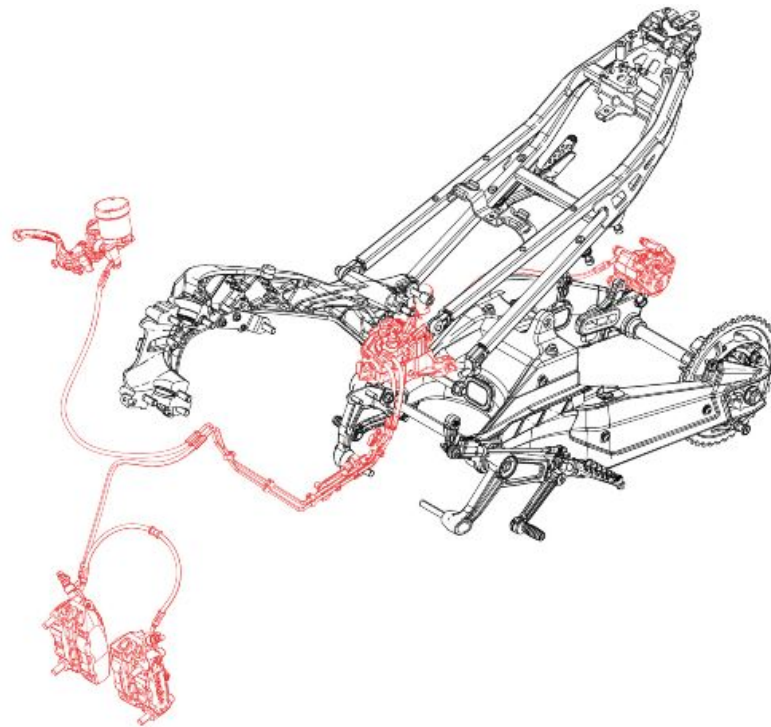
Characteristic**Distance between tone wheel and front sensor**

0.5 - 2.00 mm (0.020 - 0.079 in)

Distance between tone wheel and the rear sensor

0.5 - 2.00 mm (0.020 - 0.079 in)

Operating diagram



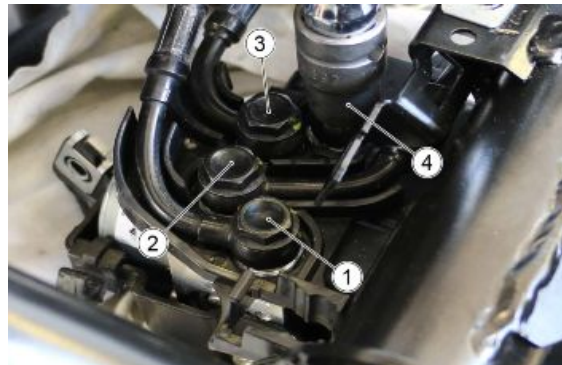
ABS functional diagram key

- 1. Front system circuit
- 2. Rear system circuit
- 3. Front brake callipers
- 4. Rear brake calliper

5. Front brake master cylinder
6. Rear brake pump
7. Front brake control lever
8. Rear brake pedal
9. Front brake circuit inlet solenoid valve (normally open)
10. Rear brake circuit inlet solenoid valve (normally open)
11. Front brake circuit outlet solenoid valve (normally closed)
12. Rear brake circuit outlet solenoid valve (normally closed)
13. Rear/front brake circuit low pressure accumulator
14. Dual hydraulic circuit pump (ABS)
15. Hydraulic circuit motor
16. DC electric motor

Inlets and outlets:

1. Supply to the rear brake calliper.
2. Intake from the rear brake pump.
3. Inlet from front brake master cylinder.
4. Outlet to front brake calliper.



ABS OPERATION

General specifications:

The front circuit is the same as the rear one.

- The ABS inlet valve (9 - 10) is normally open and it is closed only when the system intervenes to avoid wheel locking.
- The exhaust valve (11 - 12) 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 (9-10) and opens the outlet valve (11-12) temporarily.

At this stage the rider cannot increase the pressure on the callipers (3-4) and the system reduces the pressure on the callipers partially. Excess fluid temporarily fills the "reservoir" located inside the ABS modulator until the ABS pump (14) automatically activates to direct the fluid to the brake master (5 -6).

C - Maintaining pressure: the pressure in the callipers (3-4) remains low until total recovery of speed / wheel grip.

The system restores the fluid taken from the calliper (3-4) in the section of the system between the brake pump (5-6) and the ABS inlet valve (9-10).

D - Pressure restoration: by opening the inlet valve (9-10) momentarily, the pressure of the callipers (3-4) 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.

The ABS system improves vehicle control provided that the physical limits of vehicle grip on the road are not exceeded. The rider is fully responsible for riding at a suitable speed based on weather and road conditions, always leaving an appropriate safety margin. Under no circumstances can the ABS system compensate for the rider's misjudgement or improper use of brakes.

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.

CAUTION

WHEN THE ABS STARTS WORKING, A VIBRATION 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 UN-EVEN 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.



Modulator

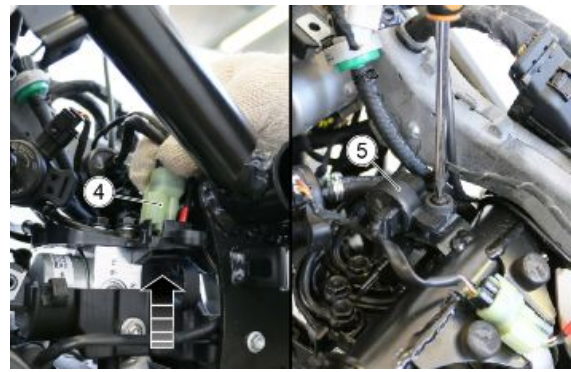
ABS MODULATOR REPLACEMENT

To replace the ABS modulator it is necessary to remove the fuel tank, the side protections of the frame, the ECU and its support. Then proceed as described:

- Disconnect the purge valve (1) from the frame.
- Disconnect the fuel pipe (2) from the cable guide.
- Disconnect the wiring harness (3) of the starter motor from the two cable guides.

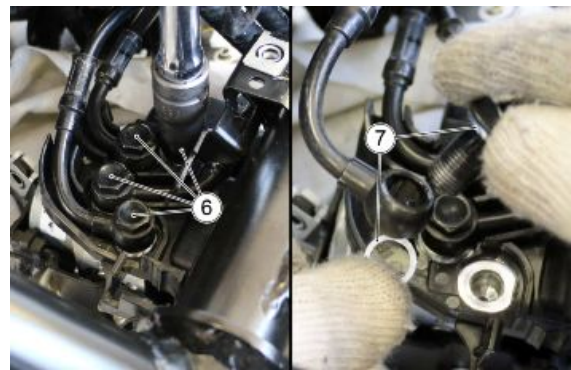


- Disconnect the connector (4) of the fall sensor from the cable guide. Unscrew the fixing screw and move the sensor (5) aside to aid the removal procedure of the ABS modulator.



- Unscrew and remove the four fixing screws (6) of the brake lines to the modulator, taking care to recover the washers (7).

EACH SCREW IS EQUIPPED WITH TWO WASHERS



- Remove the cover (8).



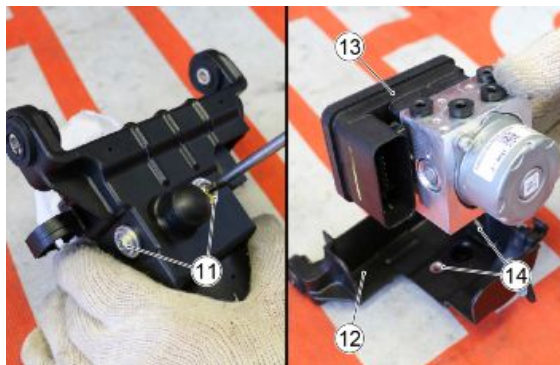
- Working from both sides, unscrew the nut (9), recovering the washer, and remove the screw (10).



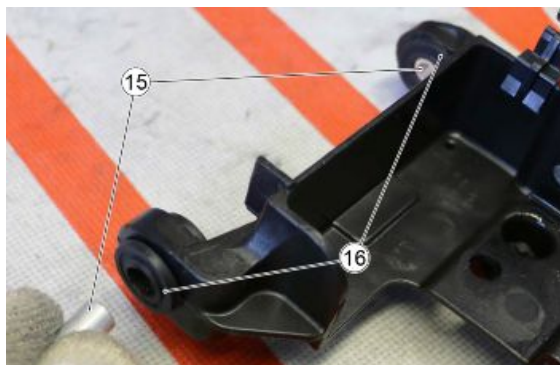
- Remove the ABS modulator with support and disconnect the connector.



- Remove the two screws (11) and separate the support (12) from the ABS modulator (13). Pay attention to recover the two bushes (14).



- If necessary, working from both sides of the support, remove the spacers (15) and the rubber mounts (16).



If replacing the pipes or the modulator, it is necessary to bleed the entire ABS system.

To bleed the ABS system optimally, it is advisable to use devices such as vacuum pumps or similar.

WARNING

WE RECOMMEND MARKING THE PIPES SO THAT THEY ARE REFITTED CORRECTLY ON THE NEW MODULATOR/CONTROL UNIT.

AFTER REPLACING THE MODULATOR/CONTROL UNIT, THE ABS SYSTEM MUST BE BLED. MORE OIL IS REQUIRED TO BLEED THE ABS SYSTEM THAN A CONVENTIONAL SYSTEM. FOR THIS REASON, CAREFULLY CHECK THE OIL LEVEL IN THE BRAKE TANK.

- If even after bleeding, the front brake lever feels "spongy", the secondary circuit in the ABS control unit must be bled. To do this, perform a road test and repeatedly activate the ABS system.
- Bleed and using the diagnostic tool, delete any errors on the ABS and on the "vehicle" control unit.
- Before handing back the vehicle, perform a functional road test.

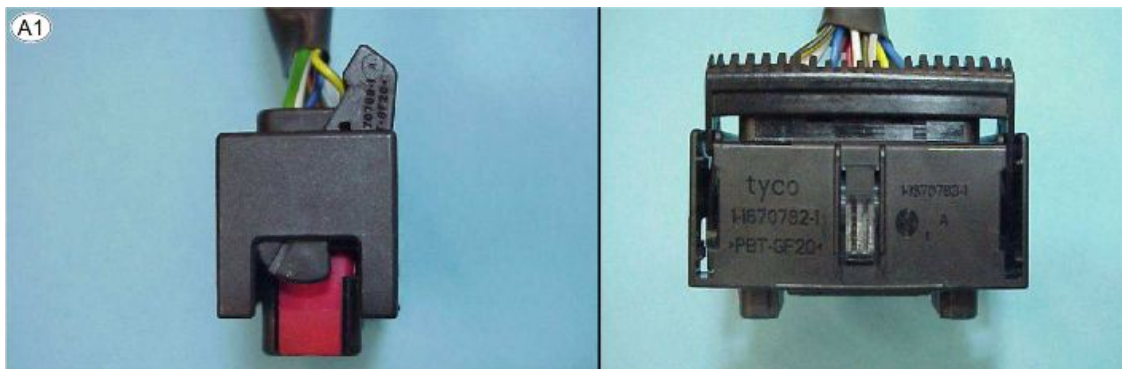
REPLACING/ACTIVATING NEW ABS CONTROL UNIT

In case of replacement of the ABS control unit, ensure that the new one has caps on all four hydraulic connections and then proceed as follows:

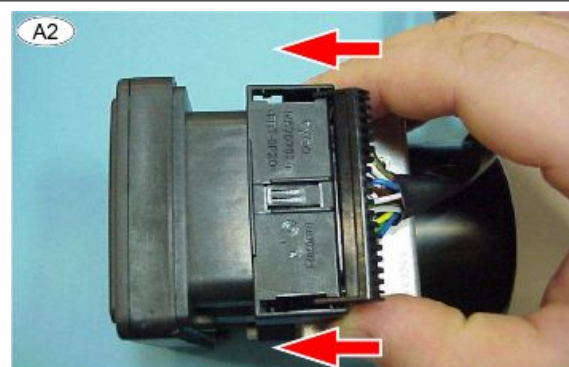
- After connecting the new ABS control unit hydraulically and electrically, it must be activated/recognised.
- Do a "KEY ON".
- Check that the ABS warning light flashes rapidly.
- Do a "KEY OFF" followed by a "KEY ON".
- If activation has been successful, the warning light should come on and flash slowly.
- In the event of a fault, with the diagnostic tool disconnected, the warning light should be permanently lit.
- Connect the diagnostic tool and check for errors.

ABS CONTROL UNIT CONNECTOR INSERTION PROCEDURE

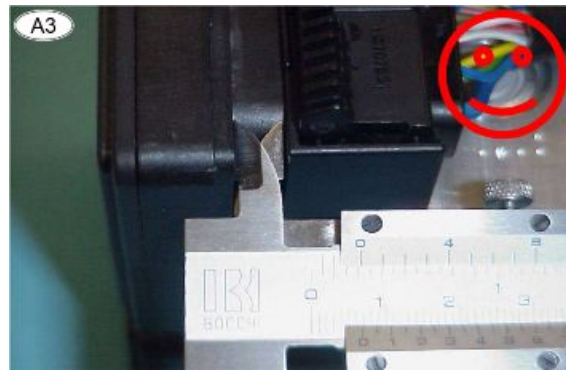
- The initial position of the connector coupling lever must be as indicated in the figures.



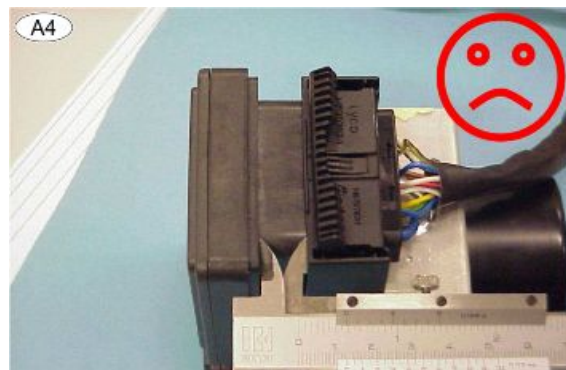
- Place the connector on the opposite side of the control unit and lower the driving lever until the "click" that signals the end of the stroke is heard.



- When the connector is fully inserted, the distance between the connector and the ABS control unit must be 7.5 mm.



- If the initial position of the connector and of the driving lever is not as shown in the "A1" image, the connector will not engage properly and the measured distance will be greater (approximately 12 mm).
- In this case, repeat the operation as described in the A2/A3 images.
- We recommend creating a template in order to ensure that the connector is inserted correctly.



- It is possible to check the correct insertion of the connector on the motorcycle by verifying that the yellow line is "Flush" with the connector.



Removal

To remove the rear brake calliper it is necessary to first remove the rear wheel and drain the rear brake system. Then proceed as described:

- Remove the fastening screw of the rear ABS sensor and extract it.



- Disconnect the ABS sensor wiring from the two cable glands.



- Suitably protect the swingarm to prevent it from coming into contact with the brake fluid when removing the rear brake calliper.
- Unscrew and remove the special screw complete with washers fixing the brake hose to the calliper.

**CAUTION**

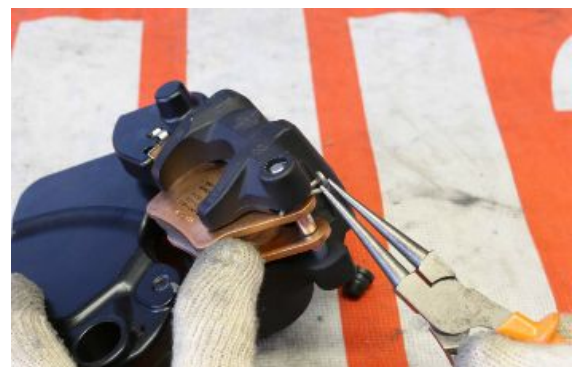
ALWAYS USE NEW SEALING WASHERS DURING REASSEMBLY.

- Remove the brake calliper complete with support from the swingarm.



To separate the brake calliper from the support, follow the procedure described below:

- Remove the cotter pin from the pin



- Using a punch, extract the locking pin of the pads.



- Remove the brake pads.



- Separate the brake calliper from the support.



- Remove the rubber grommet from the calliper.



- Remove the rubber grommet from the support.



- Remove the metal plate from the brake calliper.



- Remove the metal plate from the support.

**NOTE**

DURING REASSEMBLY, LUBRICATE THE RUBBER GROMMETS ENOUGH TO INSERT THEM IN THEIR SEATS AND THE SLIDING PINS.

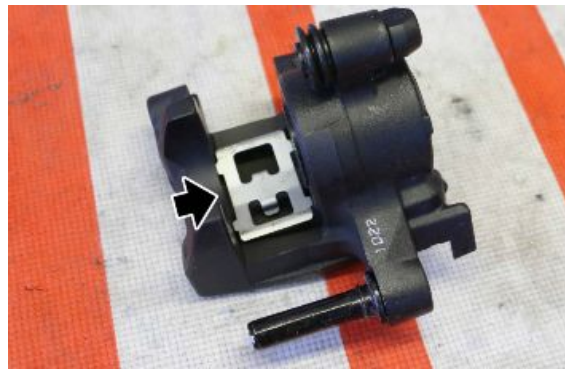
Installing

To install the rear brake calliper it must be assembled before positioning it in place.

- Position the metal plate on the support, checking for correct orientation.



- Position the metal plate on the brake calliper, checking for correct orientation.



- Lubricate the rubber grommet as necessary and insert it on the support.

NOTE

CHECK THE CONDITION BEFORE POSITIONING THE RUBBER GROMMET. IF DETERIORATED OR HAS CRACKS, REPLACE IT WITH A NEW ONE.



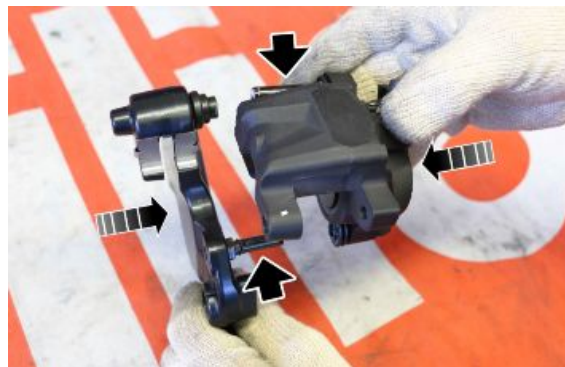
- Lubricate the rubber grommet as necessary and insert it on the brake calliper.

NOTE

CHECK THE CONDITION BEFORE POSITIONING THE RUBBER GROMMET. IF DETERIORATED OR HAS CRACKS, REPLACE IT WITH A NEW ONE.



- Lubricate the two pins sufficiently and connect the brake calliper to the support.



- Position the brake pads in the calliper and check they have been fitted correctly.



- Insert the brake pads retaining pin.



- Insert the split pin in the retaining pin of the brake pads.



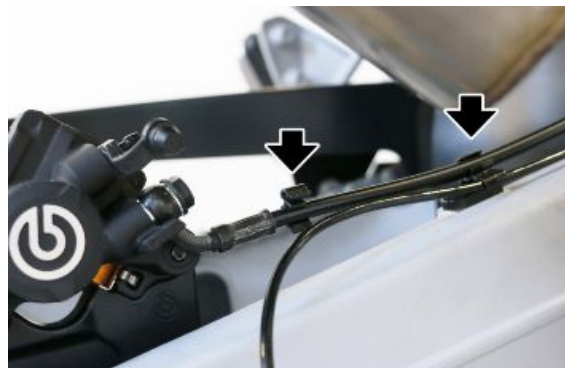
- Position the brake calliper complete with support on the swingarm.



- Suitably protect the swingarm to prevent it from coming into contact with the brake fluid when connecting the brake line.
- Insert the special screw complete with new washers fixing the brake line and tighten it to the prescribed torque.



- Connect the ABS sensor wiring to the two cable glands.



- Insert the ABS sensor in its seat and secure it by tightening the screw to the prescribed torque.



- Fill the rear brake system checking its level and restore the correct positioning of the wiring harness near the breather screw, blocking it with the protection cap as indicated.



- After reassembling the rear wheel, check the distance between the tone wheel and the ABS sensor.

Characteristic

Distance between tone wheel and the rear sensor

0.5 - 2.00 mm (0.020 - 0.079 in)

Removal

NOTE

THE FOLLOWING OPERATIONS REFER TO A SINGLE BRAKE CALLIPER BUT ARE VALID FOR BOTH.

To remove the front brake calliper, after having adequately protected the rim to prevent it from coming into contact with the brake fluid when removing the front brake calliper, it is necessary to drain the front brake system. Then proceed as described:

- Unscrew and remove the special screw complete with washers fixing the brake hose to the calliper.

**CAUTION**

ALWAYS USE NEW SEALING WASHERS DURING REASSEMBLY.

- Undo and remove the two screws fixing the front brake calliper to the stanchion of the fork.



- Remove the brake calliper together with the support.



To separate the brake calliper from the support, follow the procedure described below:

- Remove the cotter pin from the pin



- Using a punch, extract the locking pin of the pads.



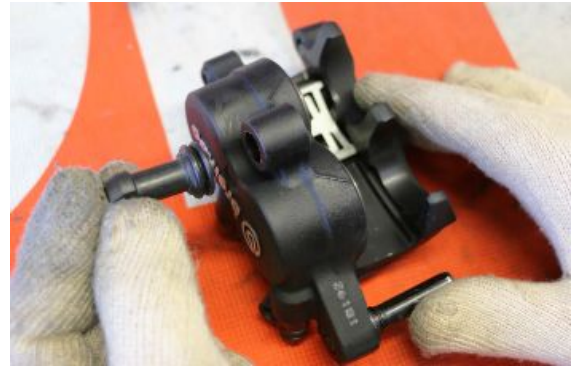
- Remove the brake pads.



- Separate the brake calliper from the support.



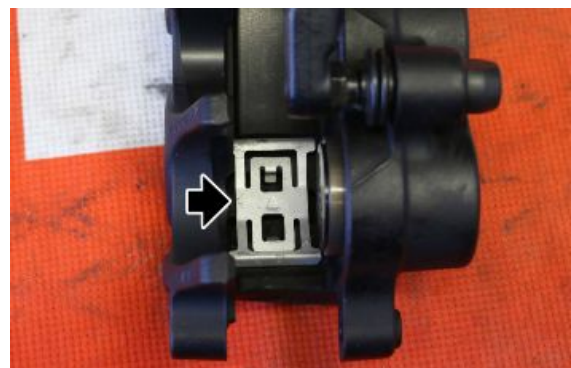
- Remove the rubber grommet from the calliper.



- Remove the rubber grommet from the support.



- Remove the metal plate from the brake calliper.



- Remove the metal plate from the support.

**NOTE**

DURING REASSEMBLY, LUBRICATE THE RUBBER GROMMETS ENOUGH TO INSERT THEM IN THEIR SEATS AND THE SLIDING PINS.

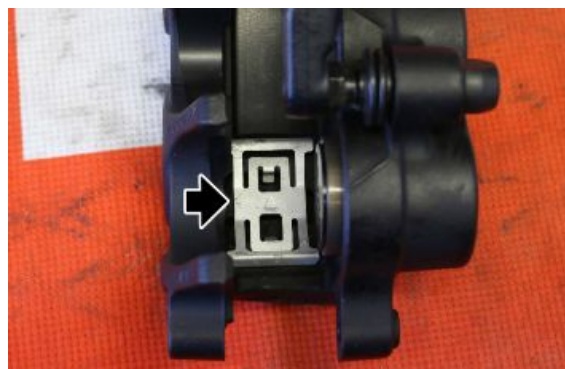
Installing

To install the front brake calliper it must be assembled before positioning it in place.

- Position the metal plate on the support, checking for correct orientation.



- Position the metal plate on the brake calliper, checking for correct orientation.



- Lubricate the rubber grommet as necessary and insert it on the support.

NOTE

CHECK THE CONDITION BEFORE POSITIONING THE RUBBER GROMMET. IF DETERIORATED OR HAS CRACKS, REPLACE IT WITH A NEW ONE.



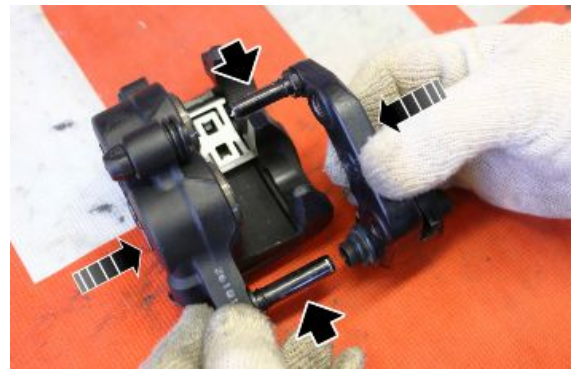
- Lubricate the rubber grommet as necessary and insert it on the brake calliper.

NOTE

CHECK THE CONDITION BEFORE POSITIONING THE RUBBER GROMMET. IF DETERIORATED OR HAS CRACKS, REPLACE IT WITH A NEW ONE.



- Lubricate the two pins sufficiently and connect the brake calliper to the support.



- Position the brake pads in the calliper and check they have been fitted correctly.



- Insert the brake pads retaining pin.



- Insert the split pin in the retaining pin of the brake pads.



- Position the front brake calliper complete with support on the fork stanchion and fasten it by tightening the two fixing screws to the prescribed torque.



- Suitably protect the rim to prevent it from coming into contact with the brake fluid when connecting the brake line.
- Insert the special screw complete with new washers fixing the brake line and tighten it to the prescribed torque.

**WARNING**

PAY ATTENTION WHEN CONNECTING THE BRAKE LINES ON THE RIGHT CALLIPER. THE BRAKE LINE (1) THAT CONNECTS THE TWO CALLIPERS MUST BE INSERTED FIRST AND THEN THE LINE (2) THAT CONNECTS THE RIGHT CALLIPER TO THE MODULATOR.



- Fill the front brake system, and check the level.

Rear brake disc

Removal

To remove the rear brake disc, after removing the wheel, simply remove the five screws.



Disc Inspection

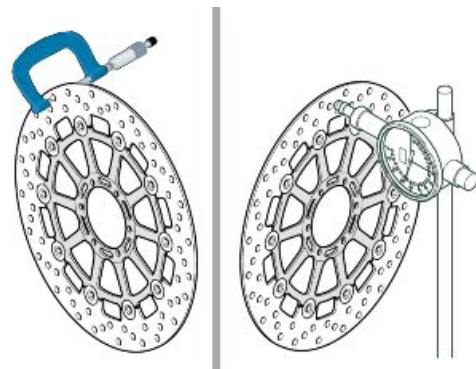
The operations must be carried out with the brake disc fitted on the wheel.

- 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)

- Using a dial gauge, check that the maximum oscillation of the disc does not exceed the tolerance; otherwise, replace it.

Disc oscillation tolerance: 0.1 mm (0.0039 in)



Installing

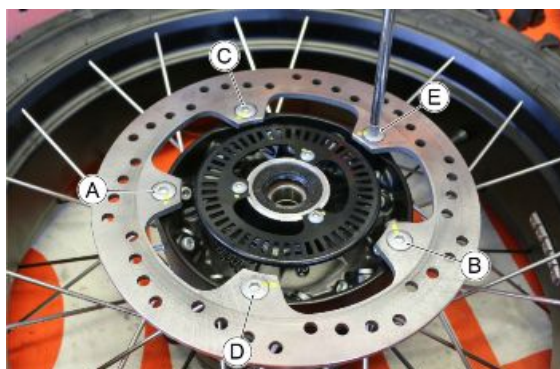
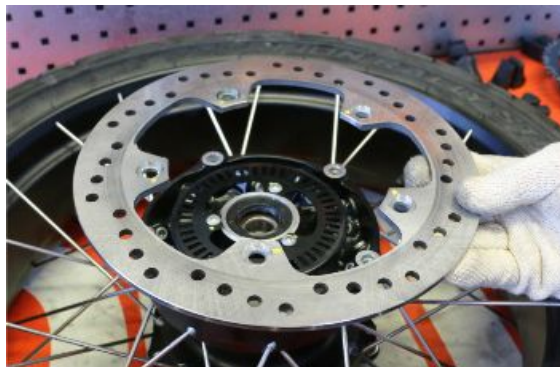
After checking the integrity and the state of wear of the brake disc, if it is not replaced with a new disc, proceed as described to carry out the fitting:

- Position the brake disc on the rim, making sure it is in the correct direction of installation.

WARNING

THE FLAT SURFACE MUST BE IN CONTACT WITH THE RIM WHILE THE MILLED SURFACE MUST BE FACING OUTWARDS.

- Insert the five screws and tighten them to torque in the order shown (A-B-C-D-E).



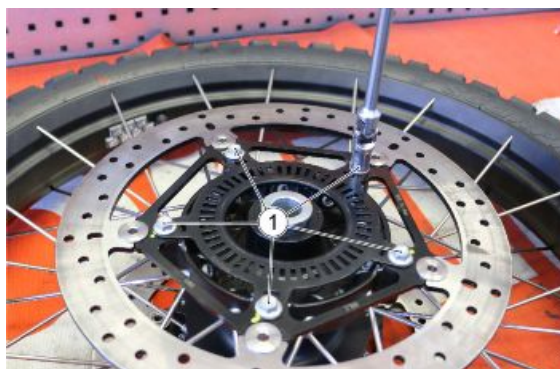
Front brake disc

Removal

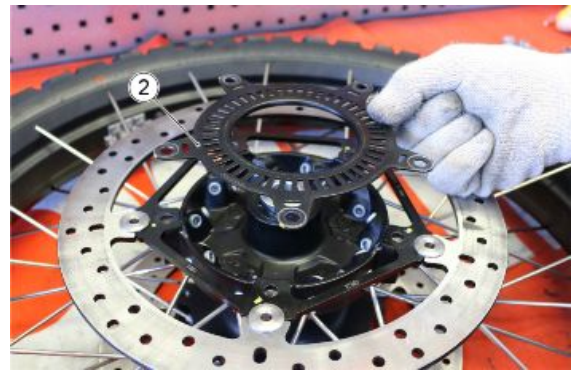
To remove the front brake disc, after removing the wheel, proceed as described:

THE FOLLOWING OPERATIONS REFER TO ONE DISC BUT APPLY TO BOTH

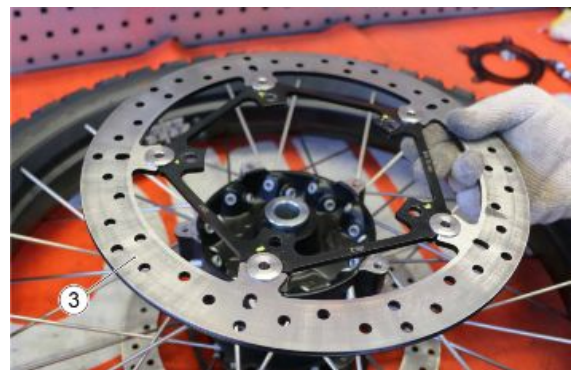
- Remove the five fixing screws (1) of the tone wheel (if applicable) and of the brake disc on the rim.



- Remove the tone wheel (2) (if applicable).

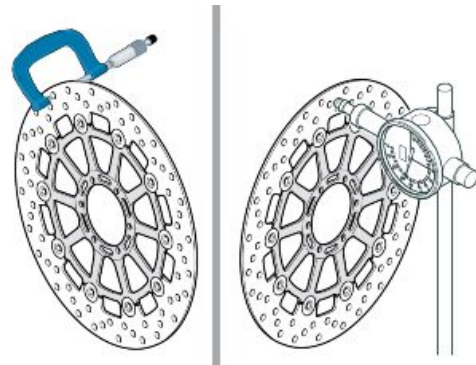


- Remove the brake disc (3).



Disc Inspection

- 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.

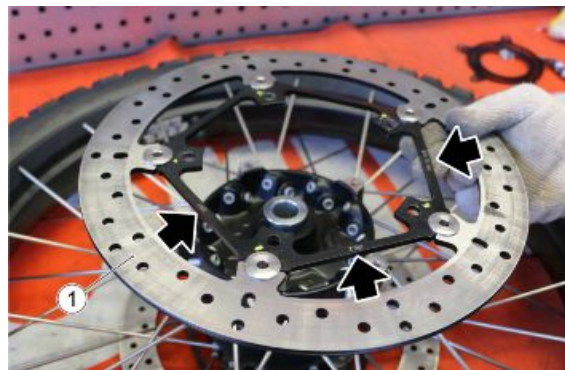
Disc oscillation tolerance: 0.15 mm (0.0059 in)

Installing

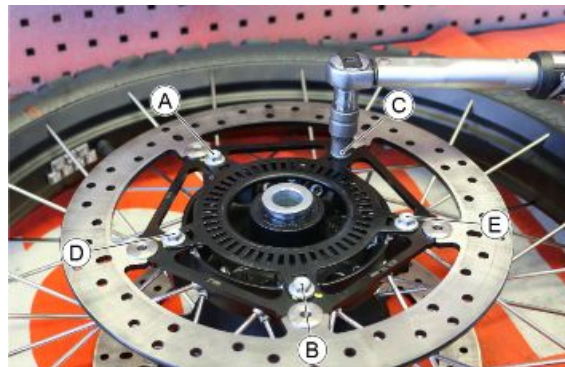
After checking the integrity and the state of wear of the brake discs, if they are not replaced with new discs, proceed as described to carry out the fitting:

THE FOLLOWING OPERATIONS REFER TO A SINGLE DISC BUT APPLY TO BOTH.

- Position the brake disc (1) on the hub making sure of the correct alignment, determined by the markings which must face outwards, as indicated.
- Position the tone wheel (2) on the rim (if present), making sure it is in the correct direction of installation.



- Carefully and progressively, screw the five screws securing the tone ring/brake disc following the order A-B-C-D-E.



CAUTION

PAY CAREFUL ATTENTION TO TIGHTENING THE FIVE SCREWS. ALWAYS PROCEED GRADUALLY AND PROGRESSIVELY ON EACH SCREW.

Front brake pads

Removal



THIS VEHICLE IS FITTED WITH A DOUBLE DISC FRONT BRAKING SYSTEM (RIGHT AND LEFT SIDE).

ALWAYS REPLACE ALL THE PADS FROM BOTH FRONT BRAKE CALLIPERS. REPLACING THE PADS OF ONLY ONE FRONT CALLIPER MAY JEOPARDISE THE VEHICLE STABILITY AND SAFETY, POSING SERIOUS DANGER FOR PEOPLE, OBJECTS AND THE VEHICLE ITSELF.

CAUTION

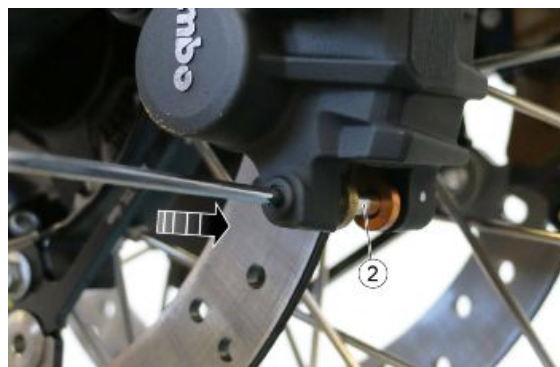
THE FOLLOWING OPERATIONS REFER TO A SINGLE CALLIPER, BUT APPLY TO BOTH.

To remove the front brake pads proceed as described:

- Remove the cotter pin (1) from the pin.



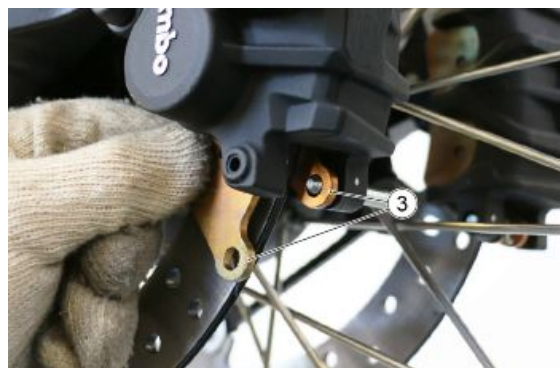
- Remove the pin (2).



- Remove the two brake pads (3).



DO NOT OPERATE THE BRAKE LEVER ONCE THE BRAKE PADS HAVE BEEN REMOVED, AS THIS MAY FORCE THE PISTONS OUT FROM THEIR SEATS AND ALLOW BRAKE FLUID TO ESCAPE.



Installing



THIS VEHICLE IS FITTED WITH A DOUBLE DISC FRONT BRAKING SYSTEM (RIGHT AND LEFT SIDE).

ALWAYS REPLACE ALL THE PADS FROM BOTH FRONT BRAKE CALLIPERS.

REPLACING THE PADS OF ONLY ONE FRONT CALLIPER MAY JEOPARDISE THE VEHICLE STABILITY AND SAFETY, POSING SERIOUS DANGER FOR PEOPLE, OBJECTS AND THE VEHICLE ITSELF.

CAUTION

THE FOLLOWING OPERATIONS REFER TO A SINGLE CALLIPER, BUT APPLY TO BOTH.

- Insert the brake pads (1) in the calliper and check they have been fitted correctly.



- Insert the locking pin (2).



- Insert split pin (3) in the pin.
- Check the correct operation of the brake system.



Rear brake pads

Removal

To remove the rear brake pads, follow the procedure described below:

- Remove the cotter pin (1).



- Remove the pin (2).



- Remove the pads (3).



DO NOT OPERATE THE BRAKE LEVER ONCE THE BRAKE PADS HAVE BEEN REMOVED, AS THIS MAY FORCE THE PISTONS OUT FROM THEIR SEATS AND ALLOW BRAKE FLUID TO ESCAPE.

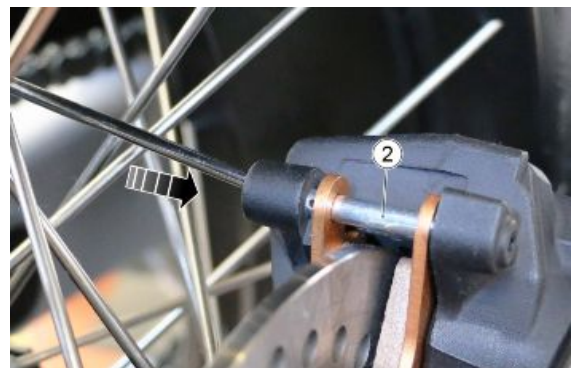


Installing

- Insert the brake pads (1) in the calliper and check they have been fitted correctly.



- Insert the locking pin (2).



- Insert split pin (3) in the pin.
- Check the correct operation of the brake system.



Bleeding the braking system

PREPARATION OF THE VEHICLE

- It is important to ensure that there is always a sufficient quantity of brake fluid in the tank.
- These operations may be simplified by using a bleeding device when carrying out the "Replacing the brake fluid" operations.
- In this case, when performing the bleeding procedure, it is also necessary to operate the brake pedal a few times with the bleeder device connected (approximately five times for each wheel circuit).

Front

TRADITIONAL BLEEDING SYSTEM

WARNING

BLEED BOTH FRONT BRAKE CALLIPERS

Any air trapped in the hydraulic circuit acts as a cushion, absorbing much of the pressure applied by the brake pump and minimising the braking power of the calliper.

The presence of air is signalled by the "sponginess" of the brake and by poor braking.



CONSIDERING THE DANGER FOR VEHICLE AND RIDER, IT IS STRICTLY NECESSARY, AFTER REFITTING THE BRAKE CALLIPERS AND RESTORING THE BREAKING SYSTEM TO ITS REGULAR USE CONDITIONS, SO THAT THE HYDRAULIC CIRCUIT IS AIR PURGED.

NOTE

THE FOLLOWING OPERATIONS REFER TO ONE FRONT BRAKE CALLIPER ONLY, BUT ARE VALID FOR BOTH. THE VEHICLE MUST BE ON LEVEL GROUND TO BE BLED. WHILE PURGING THE HYDRAULIC SYSTEM, FILL THE 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 of the bleed valve.
- Insert the transparent plastic pipe in the front brake calliper bleed valve and slide the other end of this pipe in a container to collect the fluid.
- Remove the front brake fluid reservoir cap.
- Quickly press and release the front brake lever several times and then keep it fully pressed.
- Loosen the bleed valve by a 1/4 turn so that the brake fluid flows into the container, this will release the tension on the brake lever and it will make it arrive at the end stop.
- Close the bleed valve before arriving at the end of the stroke with the lever.
- Repeat the operation until there are no air bubbles in the fluid going into the container.

**NOTE**

WHILE PURGING 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.

- 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.

**BLEEDING SYSTEM WITH DIAGNOSTIC INSTRUMENT**

If the brake lever still feels "spongy" after completing all checks, it is necessary to bleed the brakes using this type of procedure.

- With the diagnostic tool properly connected, select the function "FRONT BLEEDING" in the section "SETTINGS".

- The pump starts running.
- While the pump is performing a rotation cycle, operate and release the front brake lever until the message diagnostic tool cycle completion is received.
- This procedure allows the air to circulate and accumulate.
- Once the procedure with diagnostic tool is finished, perform again the REGULAR PURGING to remove the air from the system completely.

Rear

TRADITIONAL BLEEDING SYSTEM

Any air trapped in the hydraulic circuit acts as a cushion, absorbing much of the pressure applied by the brake pump and minimising the braking power of the calliper.

The presence of air is signalled by the "sponginess" of the brake and by poor braking.



CONSIDERING THE DANGER FOR VEHICLE AND RIDER, IT IS STRICTLY NECESSARY, AFTER REFITTING THE BRAKE CALLIPER TO RESTORE THE BRAKING SYSTEM TO ITS REGULAR USE CONDITIONS, SO THAT THE HYDRAULIC CIRCUIT IS AIR PURGED.

NOTE

THE VEHICLE MUST BE ON LEVEL GROUND TO BE BLED. WHILE PURGING 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 of 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.
- Repeatedly and quickly press and release the rear brake pedal, then keep it fully pressed.
- Loosen the bleed valve by a 1/4 turn so that the brake fluid flows into the container, this will release the tension on the brake pedal and it will make it arrive at the end stop.
- Close the bleed valve before arriving at the end of the stroke with the pedal.



- Repeat the operation until there are no air bubbles in the fluid going into the container.

NOTE

WHILE PURGING 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.

- 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.

**BLEEDING SYSTEM WITH DIAGNOSTIC INSTRUMENT**

If the brake lever still feels "spongy" after completing all checks, it is necessary to bleed the brakes using this type of procedure.

- With the diagnostic tool properly connected, select the function "REAR BLEEDING" in the section "SETTINGS".
- The pump starts running.
- While the pump is performing a rotation cycle, operate and release the rear brake pedal until the message of diagnostic tool cycle completion is received.
- This procedure allows the air to circulate and accumulate.
- Once the procedure with diagnostic tool is finished, perform again the REGULAR PURGING to remove the air from the system completely.

Front brake pump

Removal

To remove the front brake master cylinder it is necessary to previously drain the front system, remove the rear view mirror and handguard complete with support. Then proceed as described:

- Remove the rubber grommets that fasten the brake line to the wiring harness.



- Unscrew the fixing screw of the brake line complete with the two washers.



- Unscrew the two fixing screws of the U-bolt to completely remove the brake master cylinder.



Installing

To install the front master cylinder, carry out the procedures described above in reverse order. Then fill the system and bleed it.

PAY ATTENTION TO USE NEW WASHERS TO FASTEN THE SCREW OF THE BRAKE LINE.

Rear brake pump

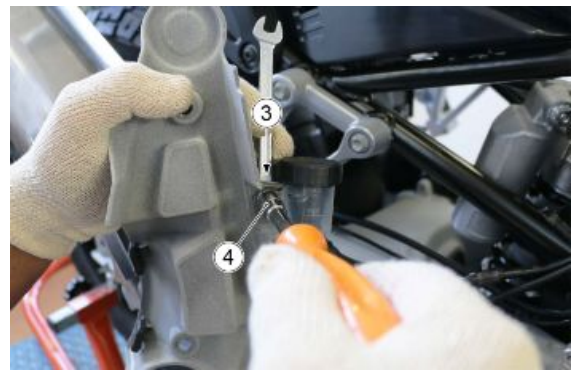
Rimozione

To remove the rear brake pump it is necessary to previously empty the oil from the system. Then proceed as described:

- Unscrew the four screws (1) and remove the frame cover (2) to access the fixing screw of the rear brake fluid reservoir.



- Keeping the screw (3) still, unscrew the nut (4) to disconnect the rear brake fluid reservoir and remove the right frame cover.



- Unscrew the fixing screw (5) of the brake line complete with the two washers (6).



- Remove the safety O-ring (7) from the pin that blocks the brake pump control rod.



- Rotate the pin (8) to release the brake pump control rod and slide it out in order to remove it.



- Unscrew the two fastening screws (9) of the rear brake master cylinder and remove it.



Installazione

To install the rear master cylinder, carry out the procedures described above in reverse order. Then fill the system and bleed it.

PAY ATTENTION TO USE NEW WASHERS TO FASTEN THE SCREW OF THE BRAKE LINE.

Brake system lines

Removal

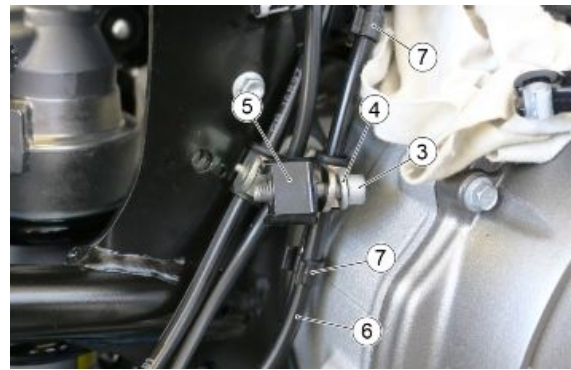
To remove the fuel pipes it is necessary to first remove the fuel tank, the side fairings and the right side protection of the frame. Then drain the entire brake system and proceed as described:

MODULATOR - REAR BRAKE CALLIPER BRAKE LINE

- Unscrew the fixing screw (1) with the two washers (2).



- Unscrew the fixing screw (3) complete with washer (4) of the rear brake system cable guides, taking care to recover the spacer (5).



THE MODULATOR-REAR BRAKE CALLIPER BRAKE LINE (6) IS POSITIONED EXTERNALLY.

- Disconnect the brake line from the two cable guides (7).
- Disconnect the brake line from the three cable guides (7).

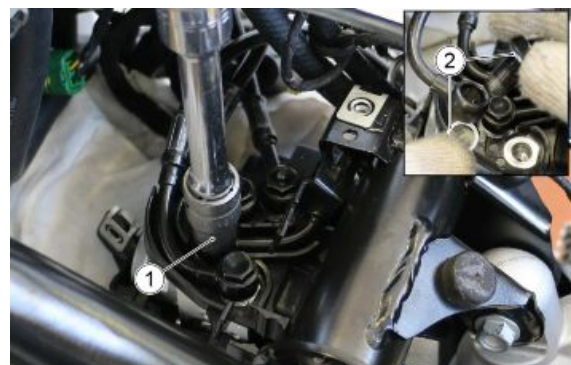


- Unscrew the fixing screw (9) complete with the two washers (10) and remove the brake line (11).

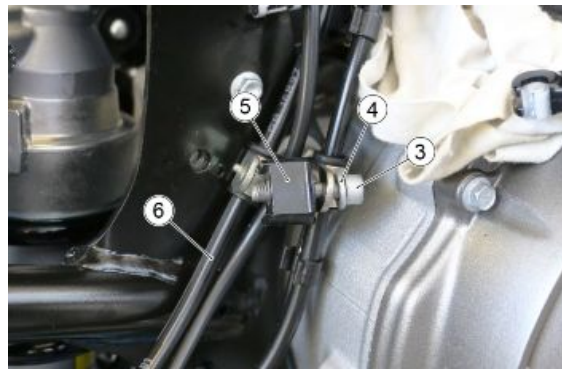


MODULATOR - REAR BRAKE MASTER CYLINDER BRAKE LINE

- Unscrew the fixing screw (1) with the two washers (2).



- Unscrew the fixing screw (3) complete with washer (4) of the rear brake system cable guides, taking care to recover the spacer (5).



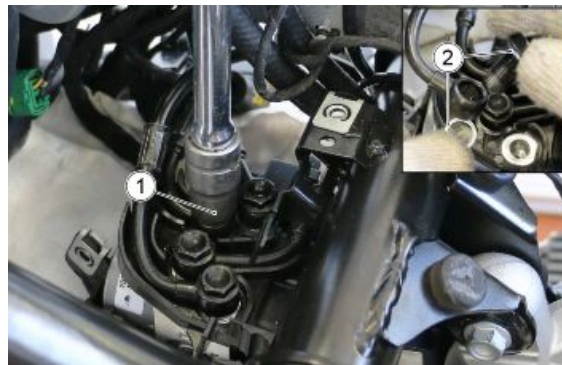
THE MODULATOR-REAR BRAKE MASTER CYLINDER BRAKE LINE (6) IS POSITIONED INTERNALLY.

- Unscrew the fixing screw (7) complete with the two washers (8) and remove the brake line (9).



MODULATOR - FRONT BRAKE MASTER CYLINDER BRAKE LINE

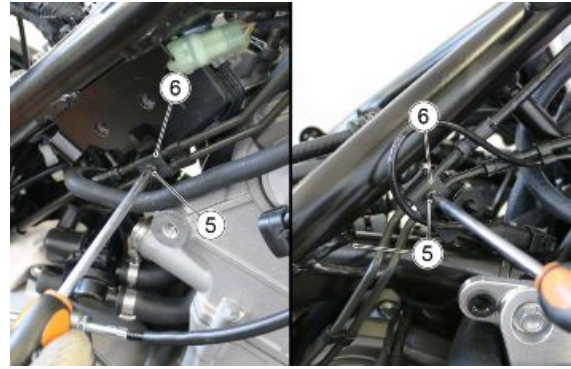
- Unscrew the fixing screw (1) with the two washers (2).



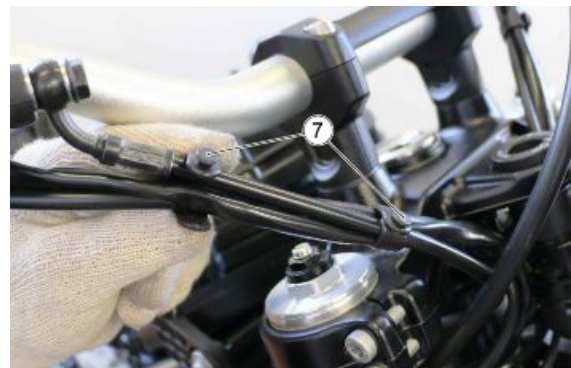
- Unscrew the three screws (3) and remove the support plate (4) of the engine to the frame to facilitate the removal of the cable clamp underneath.



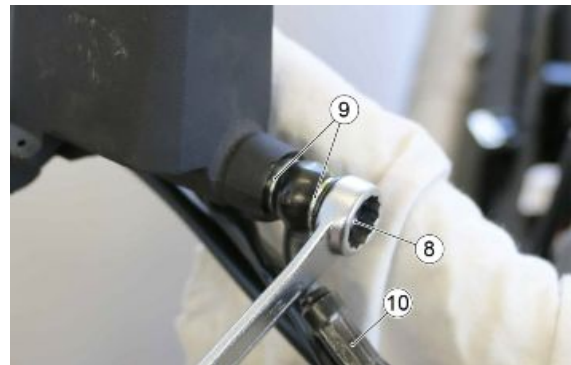
- Unscrew the two screws (5) and remove the retainer plates (6) of the front brake lines.



- Remove the two rubber grommets (7) that fasten the brake line to the wiring harness.

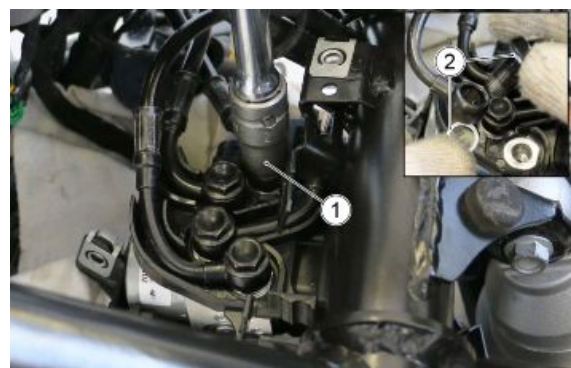


- Unscrew the fixing screw (8) complete with the two washers (9) and remove the brake line (10).



MODULATOR - FRONT BRAKE CALLIPER BRAKE LINE

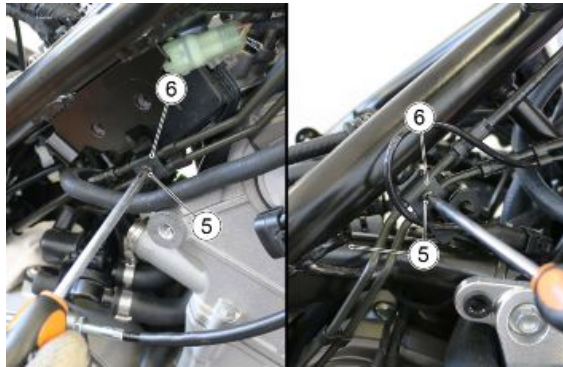
- Unscrew the fixing screw (1) with the two washers (2).



- Unscrew the three screws (3) and remove the support plate (4) of the engine to the frame to facilitate the removal of the cable clamp underneath.



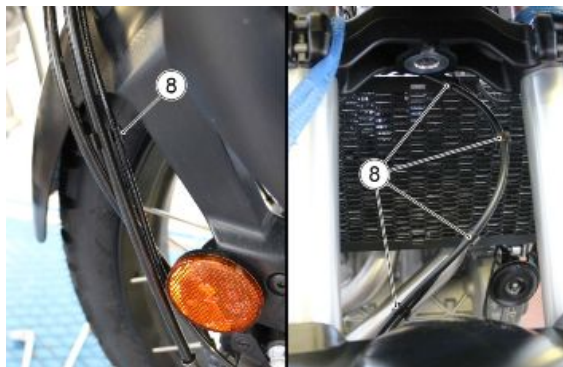
- Unscrew the two screws (5) and remove the retainer plates (6) of the front brake lines.



- Remove the metal cable guide (7) on the front mudguard to free the brake lines.



- Remove the cable guides (8) that secure the front brake line with the wiring harness of the ABS sensor.



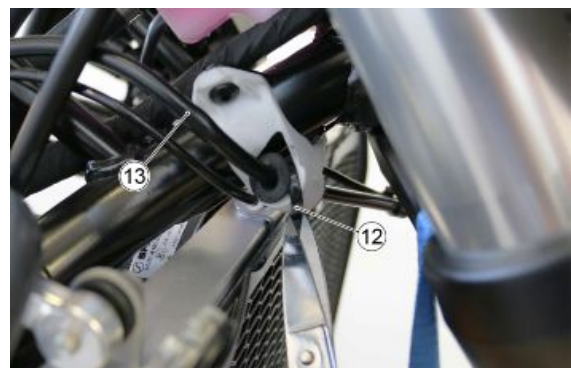
- Working on both front brake callipers, remove the screws (9) complete with washers (10).



- Remove the connecting pipe of the two callipers (11).



- Cut the clamp (12) and remove the brake line (13).



Assembly

To install the brake lines, carry out the procedures described above in reverse order. Then fill the system and bleed it.

PAY ATTENTION TO USE NEW WASHERS TO FASTEN THE SCREWS OF THE BRAKE LINES.

INDEX OF TOPICS

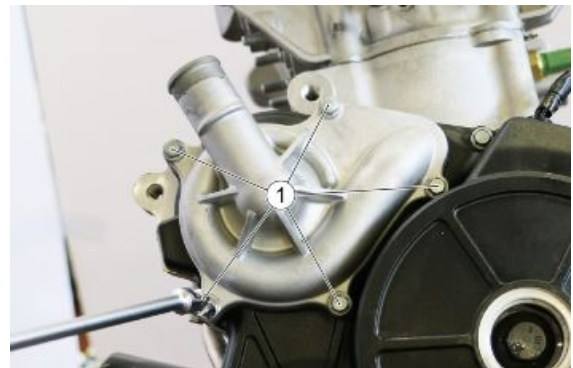
COOLING SYSTEM

COOL SYS

Removal

To proceed with the removal of the water pump, proceed as described:

- Remove the five fixing screws (1) of the water pump cover.



- Remove the water pump cover (2) complete with gasket (3).



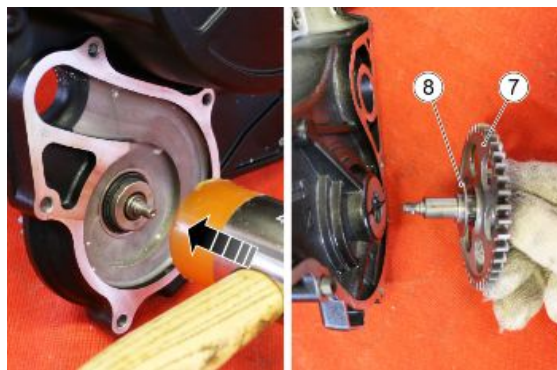
- Unscrew the rotor (4) and remove it.



- Remove the flywheel cover (5) complete with gasket (6).



- Using a rubber hammer, remove the gear of the water pump (7) complete with washer (8).



- From the outside of the cover, using a punch remove the sealing ring (9).



- Remove the oil seal (10).



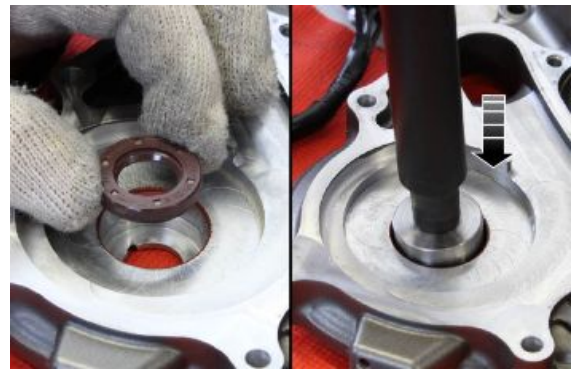
Installing

To proceed with the installation of the water pump, proceed as described:

- Apply a light coat of grease to the inside of the oil seal (1).



- Using the special punch, fully seat the oil seal on the cover.

Specific tooling**020376Y Adaptor handle****020414Y 28 mm punch**

- Apply a light coat of grease to the sliding surface of the oil pump gear (2).



- Insert the flat washer (3) on the water pump gear.



- Apply a light coat of grease to the surface of the flat washer.



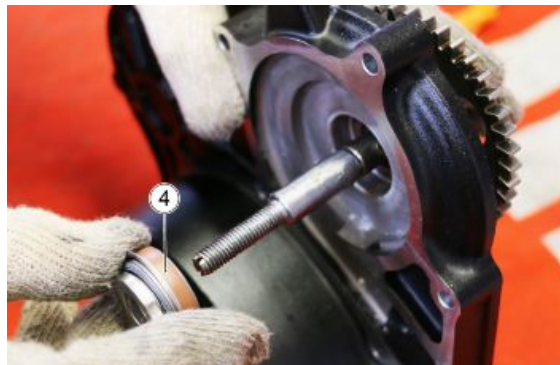
- Screw the first component of the seal ring installation tool (A) onto the gear of the water pump.

**Specific tooling****021037Y Water pump seal insertion tool**

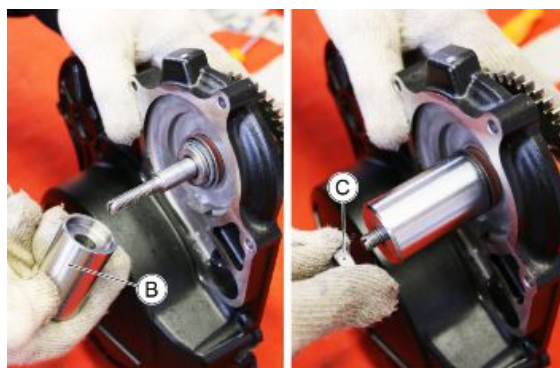
- Insert the gear complete with tool on the cover.



- Insert the sealing ring (4).



- Insert the second part of the tool (B) and the nut (C).

Specific tooling**021037Y Water pump seal insertion tool**

- Ensure that the pin (A) cannot rotate, and then tighten the nut until the sealing ring is fully seated.



- Insert the impeller (5) and tighten it to the prescribed torque.



Removing the radiator

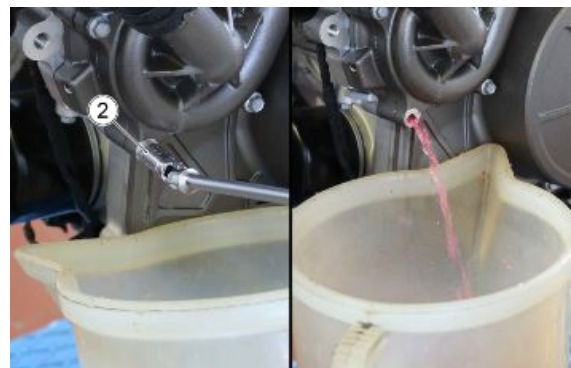
To remove the radiator it is necessary to remove the fuel tank, sump guard and the side fairings. Then proceed as described:

- Remove the expansion tank cap (1).



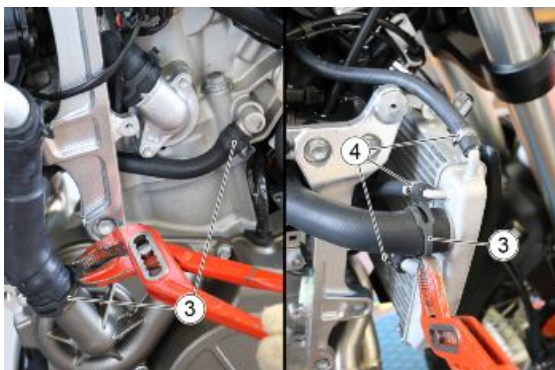
- Operating on the left side of the motorcycle, remove the screw (2) to completely drain the cooling system, taking care to collect the metal washer.

DURING REPLACEMENT, USE A NEW SEALING WASHER.

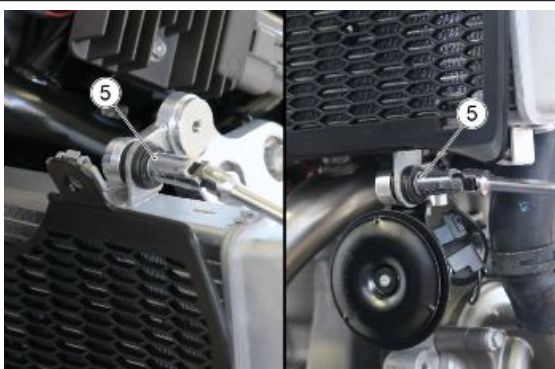


- Remove the metal clamps (3).
- Remove the metal clamps (4) and disconnect the radiator hoses.

USE NEW METALLIC CLAMPS (4) DURING RE-ASSEMBLY.



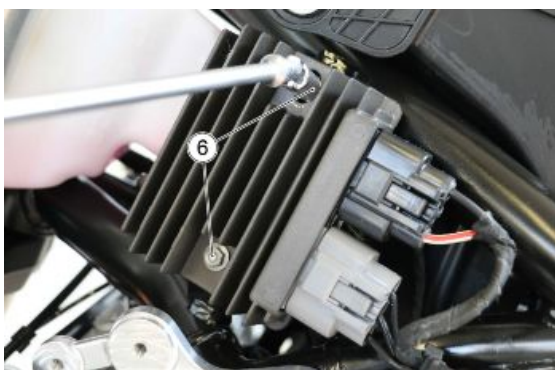
- Remove the two fastening screws (5) of the radiator to the support.



- Move the radiator towards the left side of the vehicle to disengage it from the guide pin.



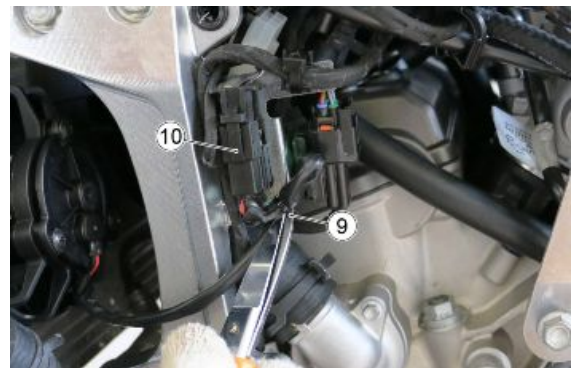
- Unscrew the two fixing screws (6) of the voltage regulator to be able to move it away and have access to the connector of the right electric fan.



- Remove the clamp (7), disconnect the connector (8) of the right electric fan.



- Remove the clamp (9), disconnect the connector of the left electric fan.



- Remove the radiator, sliding it out from the left side of the vehicle.



Removing the expansion tank

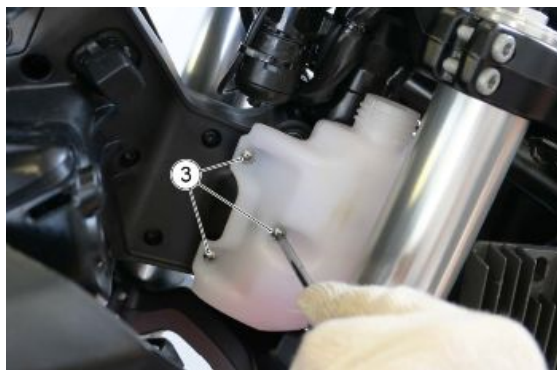
To remove the expansion tank it is necessary to remove the fuel tank, free the filter box without disconnecting it from the manifolds, remove the side fairings and drain the system. Then proceed as described:

- Remove the metal clamps (1) and disconnect the hoses (2).

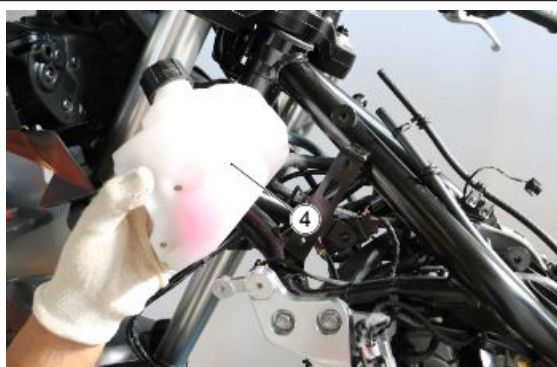


USE NEW METALLIC CLAMPS DURING INSTALLATION.

- Turn the handlebar all the way to the left and remove the three fixing screws (3) of the expansion tank.



- Remove the expansion tank (4).



- To refit the expansion tank, carry out the procedure described previously for removal in reverse order.
- After reconnecting all pipes and filling the system with the indicated quantity of coolant, check that there are no leaks in the coupling points of the pipes.

See also

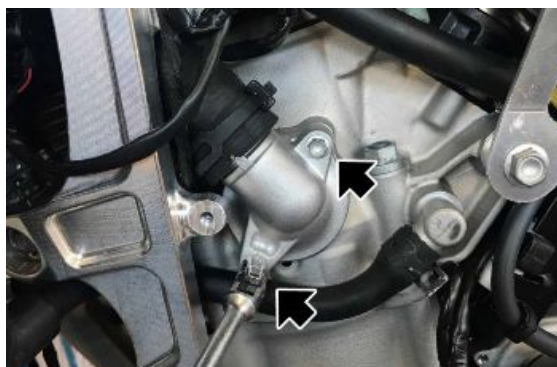
[Capacities](#)

Thermostatic valve

Removing

To remove the thermostatic valve, it is necessary to previously drain the cooling system. Then proceed as described:

- Remove the two cover fixing screws.



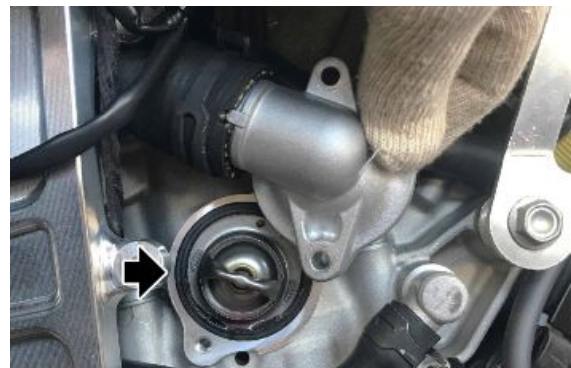
- Move the valve cover aside without disconnecting it from the hose and remove it.



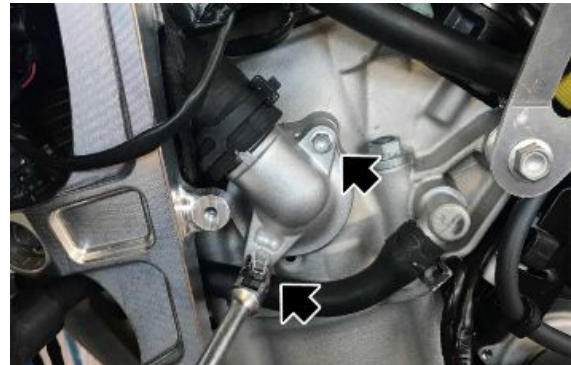
Installing

To install the thermostatic valve, proceed as described:

- After checking the integrity and effective operation, insert the thermostatic valve in its seat, taking care of its correct positioning.



- Replace the cover and tighten the two screws to the prescribed torque.



- Fill the system with the indicated quantity of coolant and check that there are no leaks in the coupling points of the pipes.

See also

[Capacities](#)

INDEX OF TOPICS

BODYWORK

BODYW

Seat

To remove the saddle, proceed as described:

- Insert the key in the lock of the saddle located on the left side fairing. Turn the key clockwise.



- Slightly press the middle of the saddle's rear part so that the hook is easily released; lift and slide off the saddle backwards.



CAUTION

BEFORE LOWERING AND LOCKING THE SADDLE, MAKE SURE THAT THE IGNITION KEY HAS NOT BEEN FORGOTTEN IN AN UNSUITABLE POSITION UNDER THE SADDLE.

Hand guards

To remove the handguards, proceed as follows:

RIGHT HAND GUARD

- Remove the front fixing screw (1).



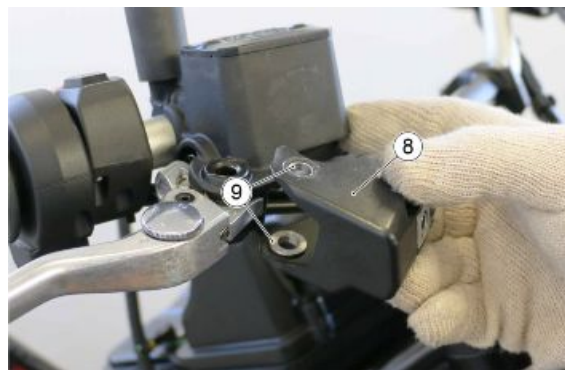
- Unscrew the screw (2) with the "T" bush (3).
- Remove the handguards (4) and the anti-vibration weight (5).



- Keeping the screw (6) still, unscrew the nut (7).



- Remove the support (8) for the handguard, taking care to recover the "T" bush (9).

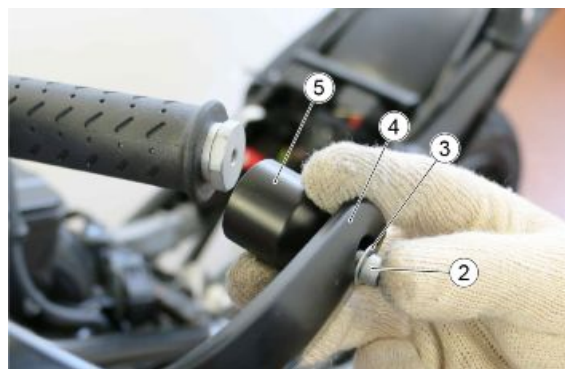


LEFT HAND GUARD

- Remove the front fixing screw (1).



- Unscrew the screw (2) with the "T" bush (3).
- Remove the handguards (4) and the anti-vibration weight (5).



- Unscrew the lock nut (6) and recover the washer (7).



- Remove the handguards support (8).



- Retrieve the inner spacer (9).



- To assemble the handguards, carry out the procedure described above in reverse order.

Devioluci

To remove the light switches it is necessary to first remove the entire front part of the motorcycle, in order to allow the instrument cluster support to be opened in order to access the various connectors. Remove the handguards and the supports of the anti-vibration weights. Then proceed as described:

RIGHT SWITCH CLUSTER - REMOVAL



- Working on the left hand side of the motorcycle, remove the five screws (1).

- Remove the two screws (2) that fasten the right instrument panel support to the chassis.



- Remove the two rubber cable clamps.



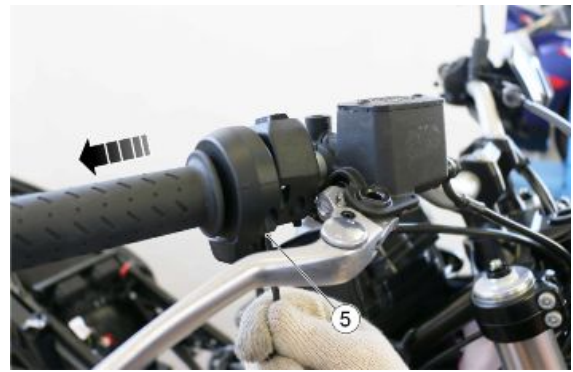
- Remove the clamps (3) to release the wiring.



- Disconnect the throttle control connector (4).



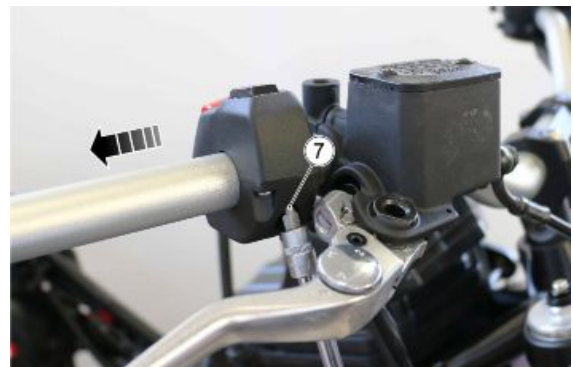
- Unscrew the fixing screw (5) of the throttle control and slide it off the handlebar to remove it.



- Disconnect the right switch cluster connector (6) from the guide on the instrument panel support and disconnect it.



- Unscrew the fixing screw (7) of the right switch cluster and slide it off the handlebar to remove it.



LEFT SWITCH CLUSTER - REMOVAL

- Working on the left hand side of the motorcycle, remove the five screws (1).



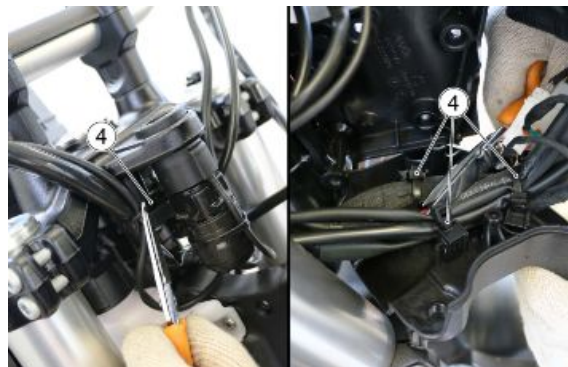
- Remove the two screws (2) that fasten the right instrument panel support to the chassis.



- Remove the two rubber cable clamps (3).



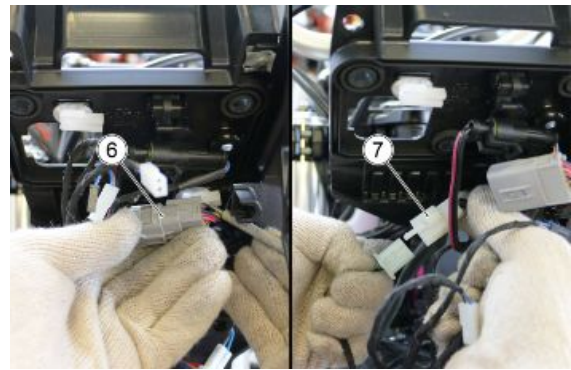
- Remove the clamps (4) to release the wiring.



- Using compressed air, remove the left hand grip (5).



- Disconnect the first connector of the left switch cluster (6) from the guide on the instrument panel support and disconnect it
- Disconnect the second connector of the left switch cluster (7).



- Unscrew the fixing screw (8) of the right switch cluster and slide it off the handlebar to remove it.

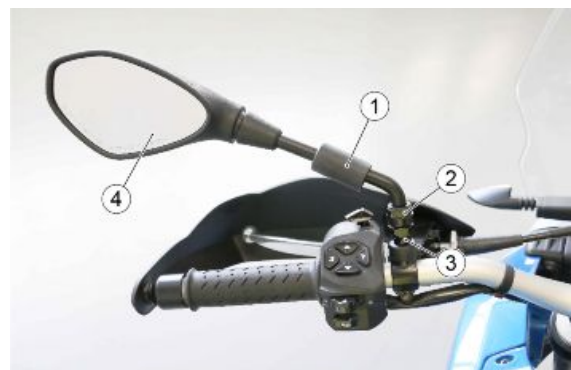


USE NEW CLAMPS DURING REASSEMBLY.

Driving mirrors

Removing the rear-view mirrors:

- Rest the vehicle on its stand.
- Lift the rubber protection (1).
- Loosen the fastening nut (2) by ensuring that the threaded clamp (3) cannot rotate.
- Slide up and remove the complete rear-view mirror unit (4).



Repeat the procedure to remove the other rear-view mirror, if necessary.



UPON REFITTING AND BEFORE TIGHTENING THE LOCKING NUT, MAKE SURE THAT THE REAR VIEW MIRROR SUPPORT STEM IS ALIGNED WITH THE HANDLEBAR.

CAUTION

THE VEHICLE MAY NOT BE RIDDEN ON PUBLIC ROADS WITH THE REAR VIEW MIRRORS REMOVED.

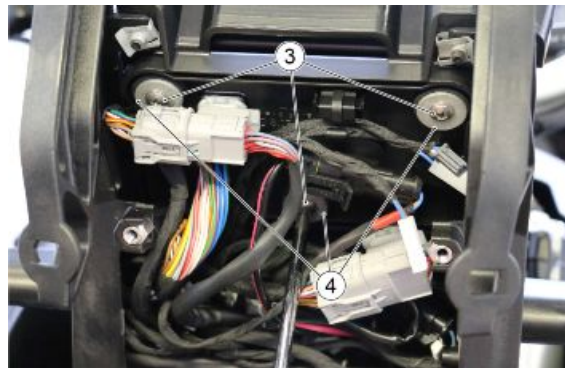
Instrument panel

To remove the instrument panel the top fairing must be removed beforehand. Then proceed as described:

- Unscrew the four fixing screws (1) of the instrument panel visor (2) and remove it



- Unscrew the three screws (3) complete with washers (4) securing the instrument panel.



- Disconnect the connector (5) of the instrument panel (6) and remove it.



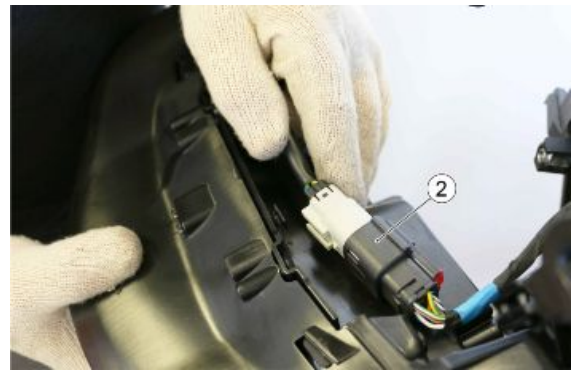
Headlight assy.

To remove the front light cluster, first remove the tank cover, the air ducts, the top fairing and the instrument panel visor. Then proceed as described:

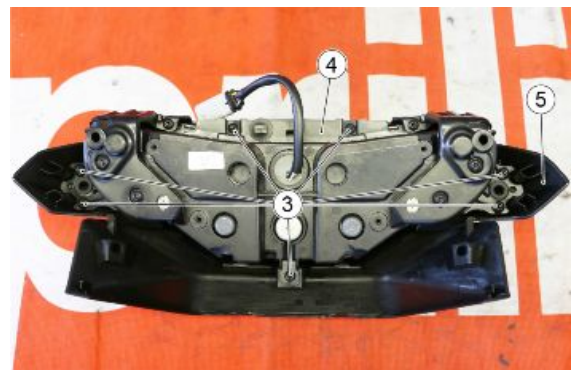
- Working on both sides of the vehicle, remove the fixing screws (1) of then headlight to the instrument panel support.



- Release the connector (2) from the guide and disconnect it to remove the light cluster.



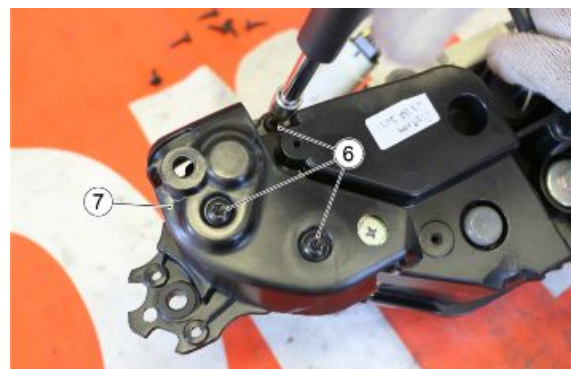
- Remove the nine screws (3) in order to separate the light cluster (4) from the headlight bezel (5).



- The two parts of the headlight bezel can be separated by unhooking them from each other.



- Working from both sides of the light cluster, unscrew the screws (6) to remove the covers (7).



- After reassembling, check that the headlight beams are aimed correctly.

See also

Headlight adjustment

Turn indicators

To remove the turn indicators, proceed as described:

FRONT TURN INDICATORS - REMOVAL THE OPERATIONS DESCRIBED BELOW REFER TO A SINGLE TURN INDICATOR, BUT ARE VALID FOR BOTH

- Undo the fixing screw and remove the turn indicator.
- Disconnect the connector and remove the turn indicator.

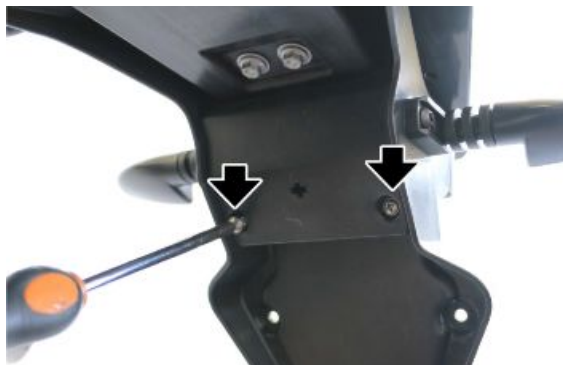


- To remove the turn indicator mount, unscrew the two fixing screws indicated.



REAR TURN INDICATORS - REMOVAL THE OPERATIONS DESCRIBED BELOW REFER TO A SINGLE TURN INDICATOR, BUT ARE VALID FOR BOTH

- Undo the two fixing screws of the licence plate holder fastener and remove it.



- Disconnect the turn indicator connector.



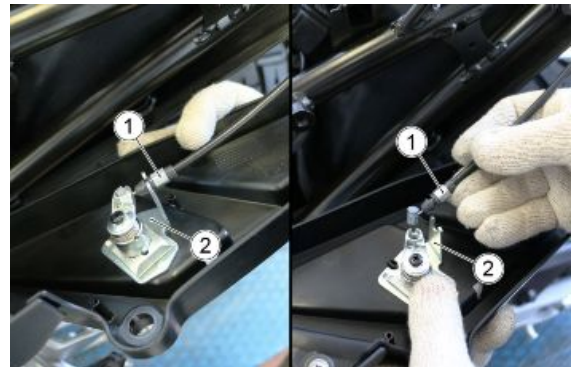
- Ensure that the screw cannot rotate and unscrew the internal nut and remove the indicator.



Disassembling the lock

To remove the saddle lock, after removing the saddle, proceed as described:

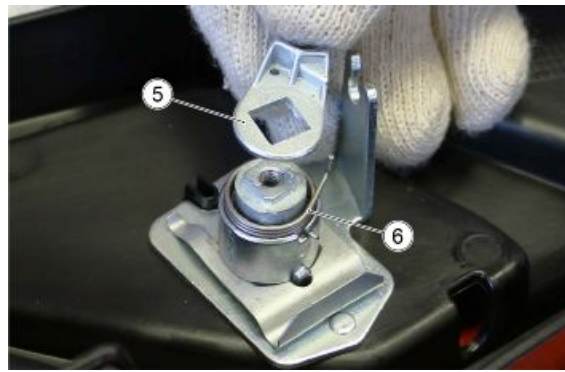
- After disconnecting the left tail fairing, disconnect the cable (1) from the lock block (2).



- Unscrew the screw (3) complete with fixing washer (4) of the lock control lever.



- Remove the lock control lever (5) and the spring (6).



- Remove the fork spring (7).



- Remove the cable support plate (8).



- Working from the external side of the left tail fairing, remove the lock block (9).



Taillight assy.

To remove the rear light cluster, after removing the saddle, proceed as described:

- Unscrew the four screws (1) that fasten the licence plate holder.



- Disconnect the connector (2) of the rear light cluster and the connectors (3) of the turn indicators to remove the license plate holder.



- Remove the screw (4) located under the tail fairing.



- On both sides of the vehicle, remove the side fixing screws (5) of the tail fairing.



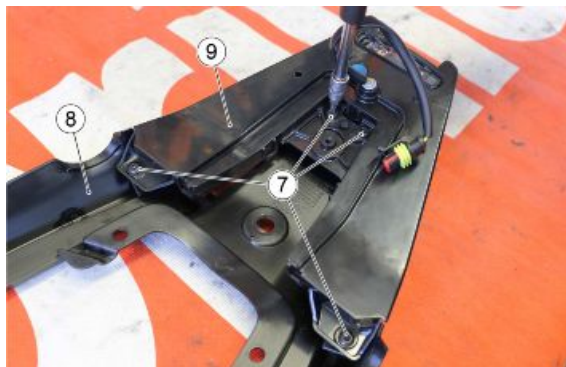
- Remove the three upper fixing screws (6) of the tail fairing.



- Remove the tail fairing complete with the rear light cluster.



- Remove the four screws (7) in order to separate the tail fairing (8) from the rear light cluster (9).



License plate light

The license plate light is incorporated inside the rear light cluster, therefore if it needs to be replaced due to a malfunction, carry out the removal procedure of the "rear light cluster".

Side body panels

To disassemble the side panels it is necessary to first remove the side tail fairings. Then proceed as described:

The operations described refer to a side panel but are valid for both

- Remove the two screws with relative washers and separate the side panel from the side tail fairing.

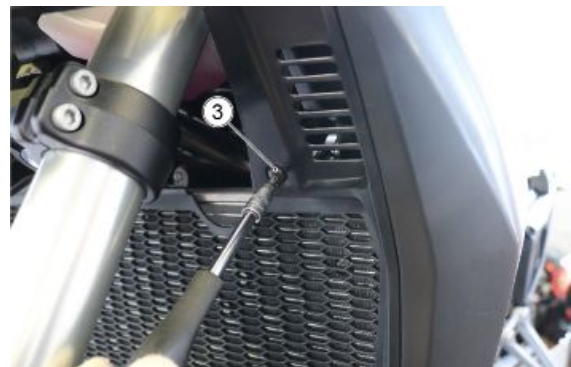


Side fairings

To remove the side fairings, proceed as described:

THE FOLLOWING OPERATIONS REFER TO ONE SIDE BUT ARE VALID FOR BOTH.

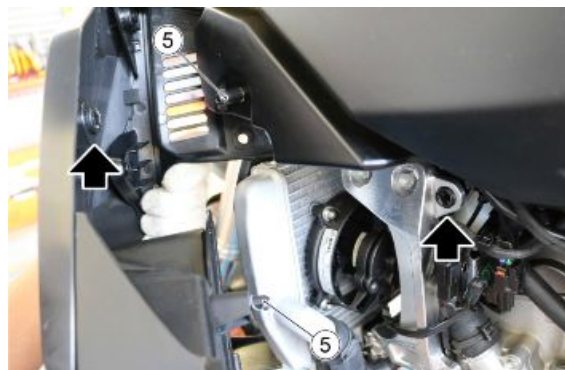
- Remove the clip (1).
- Remove the lateral fastener screw (2).
- Remove the internal screw (3) that secures the side fairing to the radiator.



- Remove the lower screw (4) that secures the side fairing to the radiator.



- Disconnect the side fairing from the pin (5) on the tank and at the same time disconnect the pin (6) on the side fairing from the engine mount.



- Unscrew the three screws (6) and remove the radiator grille closure (7).



- Unscrew the two screws (8) to separate the internal part from the external part of the side fairing.



License plate holder

To remove the license plate holder, follow the procedure described below:

- Unscrew the four screws (1) that fasten the licence plate holder.



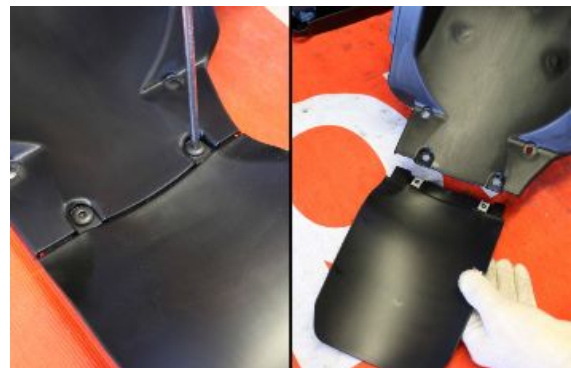
- Disconnect the connector (2) of the rear light cluster and the connectors (3) of the turn indicators to remove the license plate holder.



Splash guard

To remove the splash guard, follow the procedure described below:

- Unscrew the two fixing screws and remove the splash guard.



Sump guard

To remove the sump guard, follow the procedure described below:

- Remove the two front screws (1)



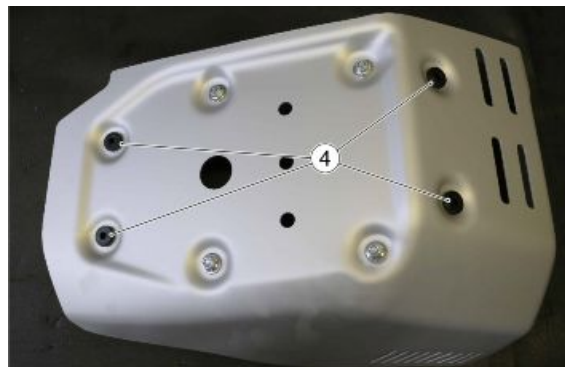
- Supporting the sump guard, remove the two rear screws (2).



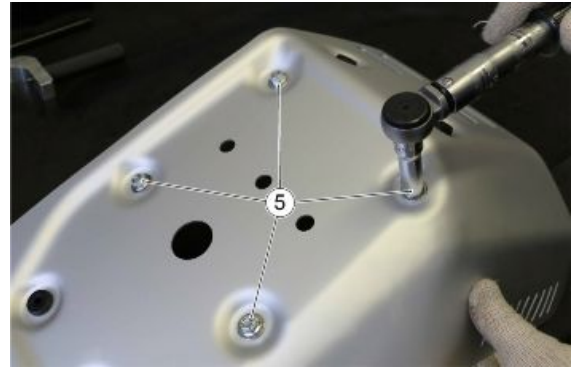
- Remove the sump guard (3).



- Remove the four rubber grommets (4).



- Keeping the spacer pads still, unscrew the locking nuts (5) and recover the washers.



Fuel tank

To remove and disassemble the fuel tank, it is necessary to remove the saddle, the battery and the side fairings. Then proceed as described:

- Remove the fuel tank cap (1).



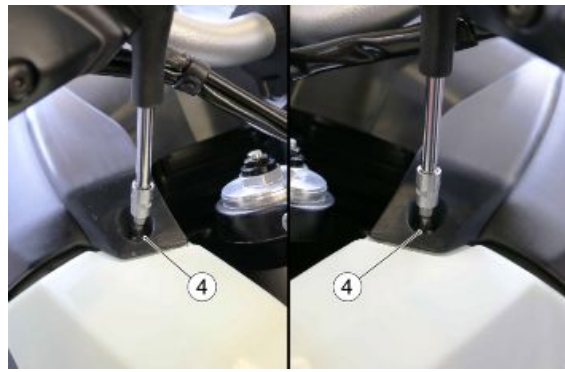
- Remove the three fixing screws (2) of the tank cover.



- Remove the two rear screws (3).



- Remove the two front screws (4).



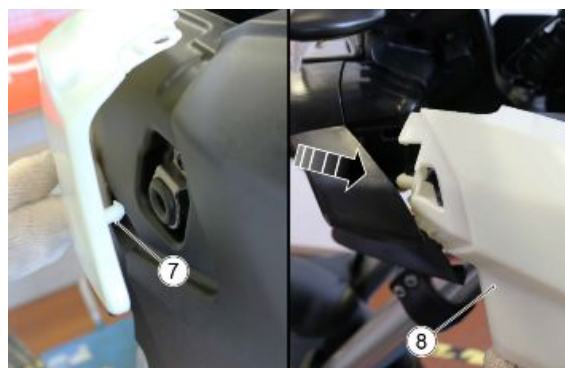
- Remove the tank cover (5).



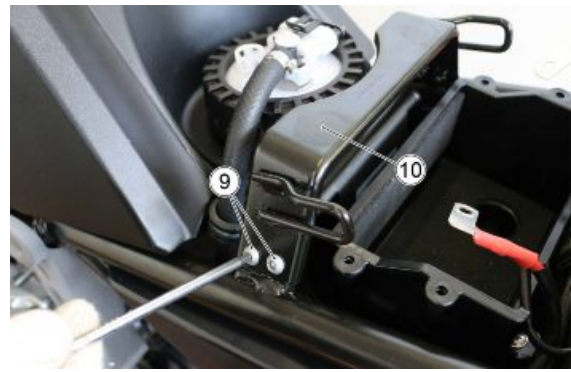
- Working on both sides, remove the two fastening clips (6) of the air ducts.



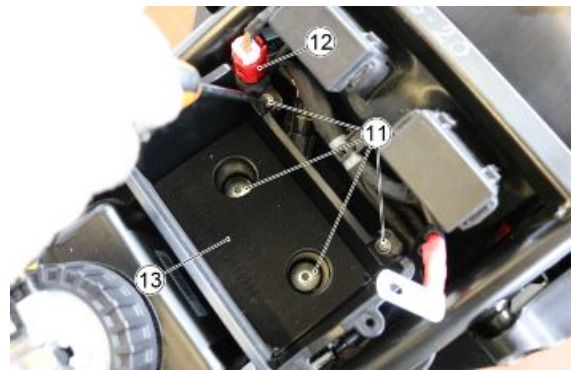
- Disconnect the pin (7) of the air duct from the tank.
- Slide off the front part of the air duct (8) to remove it.



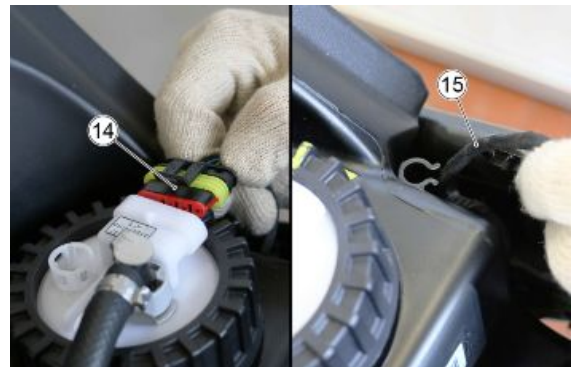
- Working from both sides, unscrew the screws (9) and remove the central crosspiece (10).



- Remove the four screws (11), disconnect the OBDII connector (12) and remove the battery box (13).



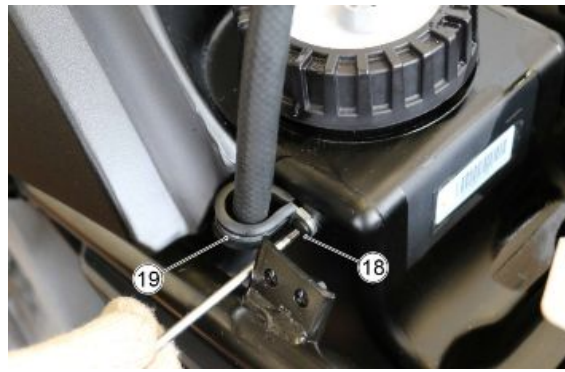
- Disconnect the electric connector (14) of the fuel pump and release the wiring harness from the cable guide (15).



- Disconnect and remove the safety plate (16) of the fuel pipe (17) and disconnect it from the fuel pump.



- Unscrew the screw (18) to remove the cable guide (19) and free the fuel pipe.



- Extract the hose clamp (20) and disconnect the breather pipe (21).
- Remove the metallic clamp (22) and disconnect the fuel vapour recovery pipe (23).



- Working from both sides, remove the front fixing screws (24) together with the washers.



- Remove the two clamps indicated and disconnect the connector of the fuel level sensor.



- Remove the fuel tank.



In order to remove the fuel level sensor:

- After unscrewing the four fixing screws, extract the fuel level sensor (25).



To remove the flange:

- After unscrewing the four screws (26) remove the flange (27).



- Remove the gasket (28).



To remove the fuel pump, proceed as described:

- Unscrew and remove the ring nut (29) of the fuel pump.



- Remove the fuel pump (30) complete with seal.



- To perform the reassembly and installation of the fuel tank, carry out the procedure described previously for removal in reverse order.

USE NEW METALLIC CLAMPS DURING REASSEMBLY

Rear wheelhouse

To remove the rear wheel arch, it is necessary to first remove the saddle, battery, the battery box, the fuel tank, the body parts that make up the side tail fairings, including the side panels and the license plate holder.

Then proceed as described:

- Disconnect the fuse boxes (1) from the mounts
- Remove the cable guide (2) by disconnecting main cable harness.



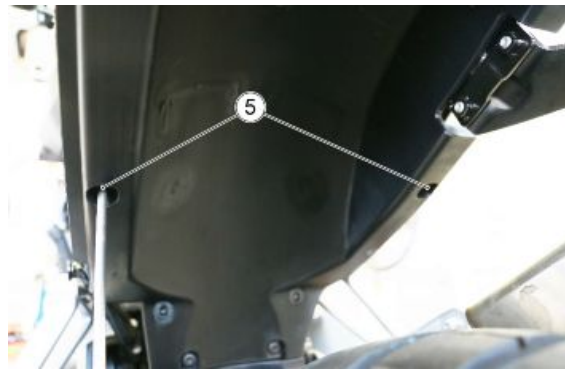
- Remove the two lower screws (3) taking care to recover the "T" bushes.



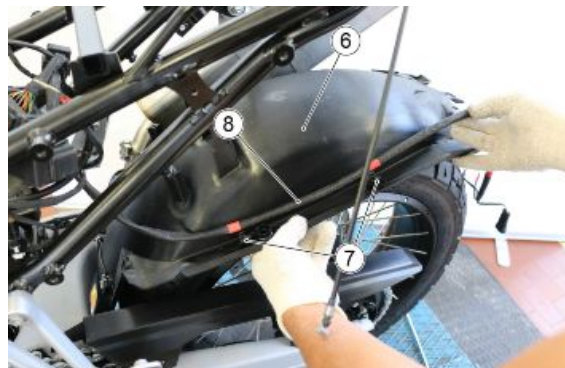
- Remove the rear screw (4).



- Remove the central screws (5).



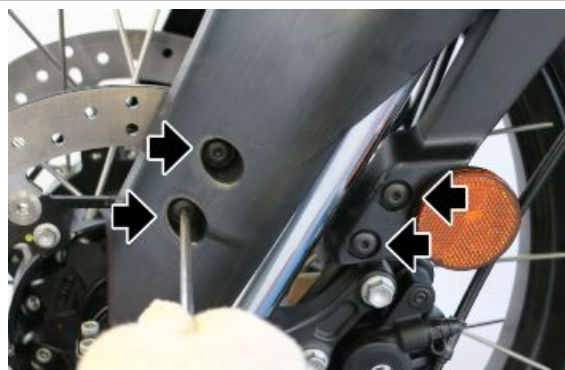
- Extract the rear wheel arch (6) far enough to be able to disconnect the wiring harness (8) from the cable guides (7).



Front mudguard

To remove the front mudguard, follow the procedure described below:

- Unscrew the fixing screw of the cable guide that fastens the brake line to the mudguard.
- Working on both sides, remove the fastener screws of the front mudguard to the stanchions.



- Remove the mudguard from the front as indicated.



- To remove the reflectors, unscrew the nut on the inside of the mudguard.



- Remove the reflector.

DURING INSTALLATION PAY ATTENTION TO THE PIN ON THE REFLECTOR THAT MUST BE INSERTED IN THE CORRESPONDING HOLE ON THE MUDGUARD.

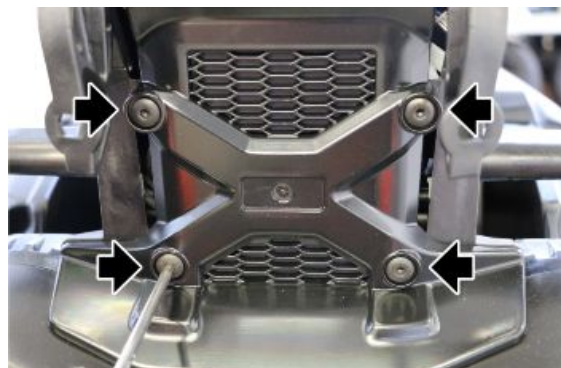


- To assemble the front mudguard, carry out the procedure described above in reverse order.

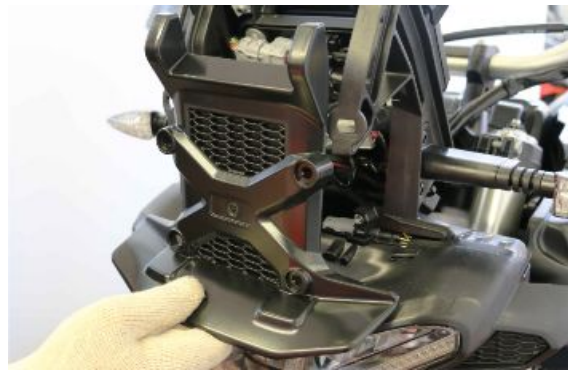
Instrument cluster cover

To remove the instrument panel cover after removing the windscreen, proceed as follows:

- Remove the four fixing screws.



- Remove the instrument panel cover.



Windscreen

To remove the windscreen, follow the procedure described below:

- Remove the four fixing screws paying attention to collect the bushes positioned on the support.



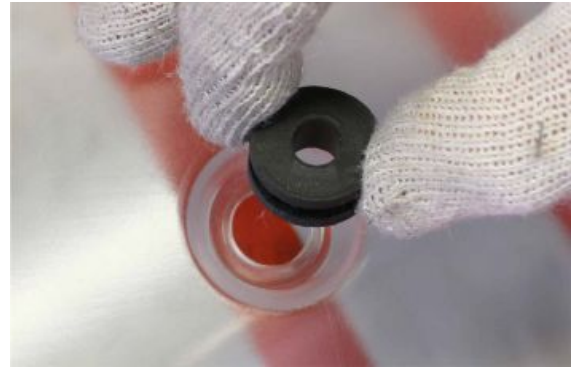
- Remove the complete windscreen.



- Remove the four bushes.



- Remove the four rubber grommets.



DURING REASSEMBLY, MAKE SURE THE BUSHES ARE CORRECTLY POSITIONED IN PLACE.



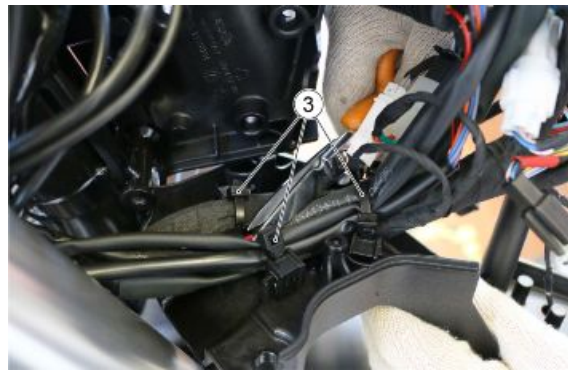
Instrument cluster support

To remove the instrument panel support, it is necessary to first remove the front fairing complete with the light unit, the side fairings, air ducts and the instrument panel. Then proceed as described:

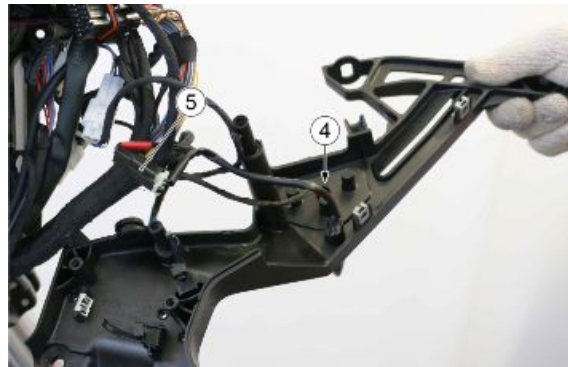
- Remove the five connection screws (1) of the instrument panel support.
- Remove the two screws (2) that fasten the right instrument panel support to the chassis.



- Remove the clamps (3) to release the wiring.



- Disconnect the connector of the right turn indicator (4) and the connector (5) of the ambient temperature sensor to remove the right instrument panel support.



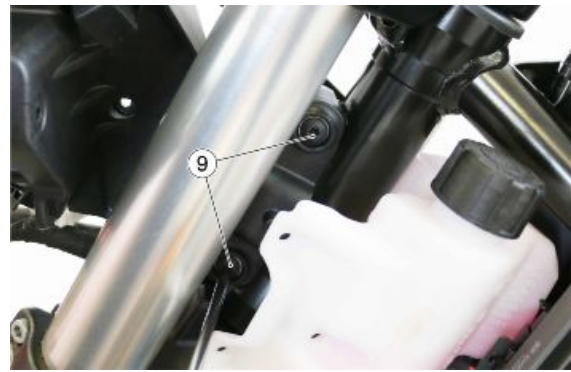
- Disconnect all the connectors to completely free the left support (6) and the instrument panel support (7).



- Unscrew the three screws (8) securing the expansion tank to the left instrument panel.



- Unscrew the two fixing screws (9) of the left instrument panel support, taking care to recover the "T" bushes.



- Remove the left instrument panel support.
- To reassemble the instrument panel support, carry out the procedures described above in reverse order, consulting the "electrical system" chapter to correctly position the wiring harnesses.

CENTRAL INSTRUMENT PANEL SUPPORT

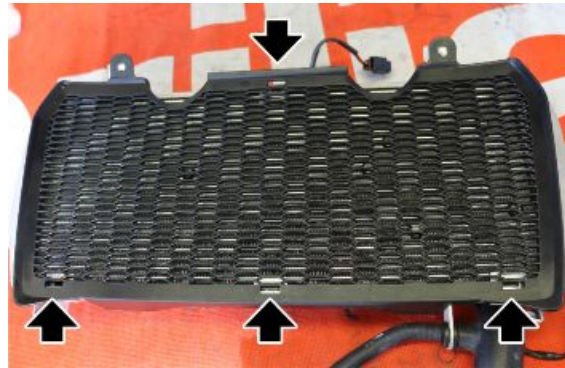
It is possible to remove the central instrument panel support without having to remove the side supports. To carry out this operation, proceed as described:

- Remove the windscreen, instrument panel and instrument panel visor to disconnect the connectors attached to the central instrument panel support.
- Unscrew the four fixing screws and remove the central instrument panel support.
- Disconnect the connectors connected to the central instrument panel support.



Radiator cover

To remove the radiator cover it is necessary to firstly remove the side and lower fairings. Unhook the hooks on the radiator cover and remove it.



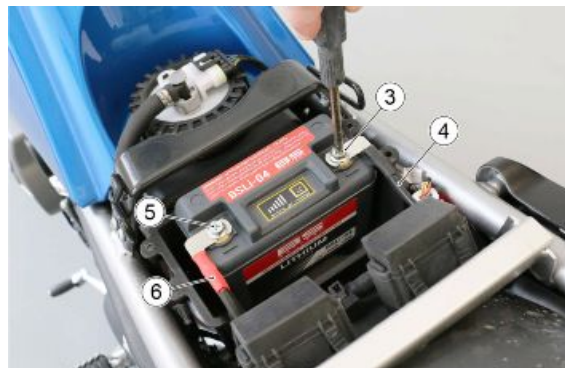
Battery

To remove the battery, proceed as described:

- Ensure that the ignition switch is turned to "OFF".
- Remove the saddle.
- Undo the two screws (1) and remove the battery cover (2).



- Unscrew and remove the screw (3) from the negative terminal (-).
- Move the negative lead (4) aside.
- Unscrew and remove the screw (5) of the positive terminal (+).
- Move the positive lead (6) aside.



TAKE UTMOST CARE AND DO NOT MAKE CONTACT BETWEEN THE BATTERY TERMINALS AND ANY METALLIC OBJECT IN ORDER TO PREVENT THE RISK OF SHORT CIRCUIT.

- Grip the battery (7) firmly and remove it from its seat, lifting it.
- Put the battery away on a level surface, in a cool and dry place.
- Refit the rider saddle.



CHECK THAT THE CABLE TERMINALS AND BATTERY LEADS ARE:
 - IN GOOD CONDITION (NOT CORRODED OR COVERED BY DEPOSITS);
 - COVERED BY NEUTRAL GREASE OR PETROLEUM JELLY.

CAUTION

UPON REFITTING, CONNECT THE LEAD TO THE POSITIVE TERMINAL (+) FIRST AND AFTERWARDS THE LEAD TO THE NEGATIVE TERMINAL (-).

Tail guard

To remove the parts that make up the tail fairing remove the saddle and licence plate holder. Then proceed as described:

THE FOLLOWING OPERATIONS REFER TO ONE SIDE BUT ARE VALID FOR BOTH.

- Remove the four side screws (1).
- After disconnecting the pin towards the front, disconnect the cable (2) from the lock block (3).



To remove the central part, proceed as described:

- Remove the screw (4) located under the tail fairing.



- On both sides of the vehicle, remove the side fixing screws (5) of the tail fairing.



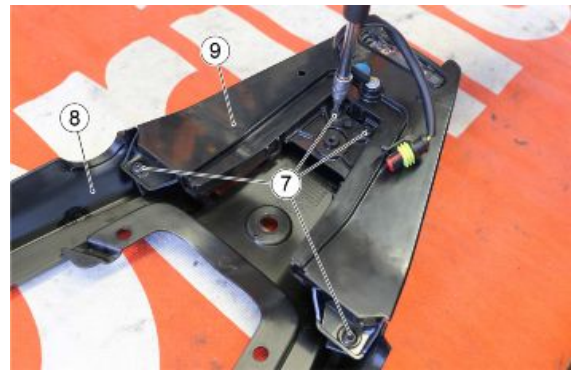
- Remove the three upper fixing screws (6) of the tail fairing.



- Remove the tail fairing complete with the rear light cluster.



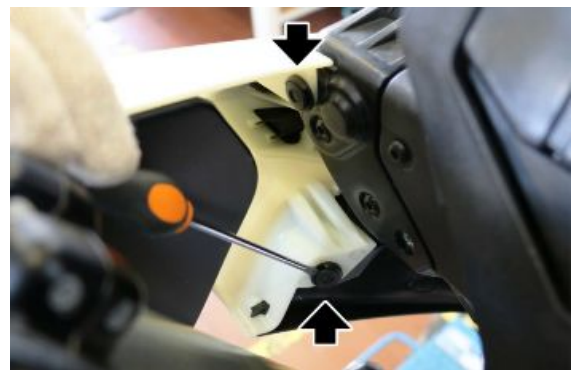
- Remove the four screws (7) in order to separate the tail fairing (8) from the rear light cluster (9).



Side air deflectors

To remove the air ducts, it is first necessary to remove the fuel tank cover. Then proceed as described:

- Working on both sides, remove the two fastening clips of the air ducts.



- Disconnect the pin of the air duct from the tank.
- Slide off the front part of the air duct to remove it.



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