

for Hypermotard, Hypermotard SP, Hyperstrada 2013-2014

HYM.06 - Electric system and engine control system

- Battery charging system
 - [Checking the battery charging system](#)
 - [Recharging the battery](#)
 - [Topping up the electrolyte](#)
 - [Battery](#)
 - [Generator](#)
 - [Rectifier-regulator](#)
- Electric starting
 - [Electric starting system](#)
 - [Starter motor](#)
 - [Solenoid starter](#)
- Lights
 - [Changing bulbs](#)
 - [Headlight aim](#)

Checking the battery charging system

To check the current flow in the charging circuit, use the "DDS" diagnosis instrument, which is equipped with clamp-type amperemeter.

With the DDS diagnosis instrument you can determine the engine rpm required for the generator to produce sufficient current to charge the battery, feed the injection/ignition system and all the electrical equipment on the motorcycle.

When applied to a cable, the clamp-type ammeter detects the magnetic field generated by the current passing through that cable.

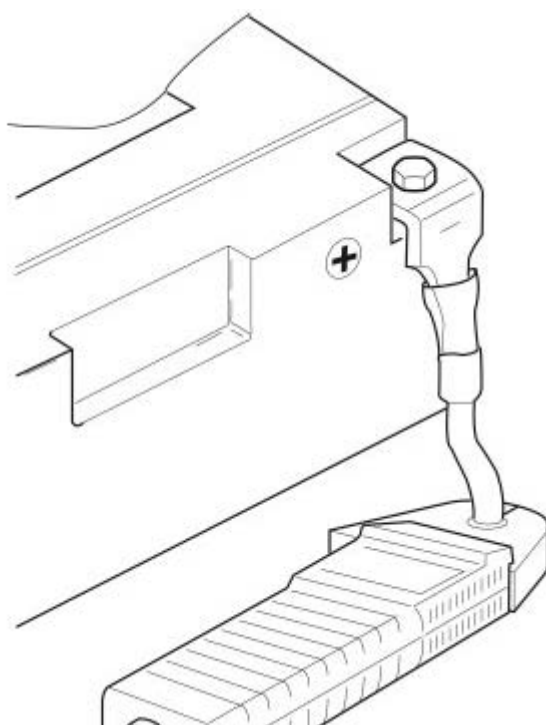
The tester performs an automatic calibration routine using its own transducer.

If the measured current is a positive quantity, it means that generator is feeding all electric items and charging the battery at the same time. A negative value means that charging system is not powering the loads and a significant amount of current must be supplied by the battery, which is discharging at the time of the measurement.

Alternatively, a multimeter can be used, connect the multimeter probes to the battery terminals, select the DC scale on the multimeter and make sure there are $14.5\text{ V} \pm 0.5$ at an engine speed of 3,000 rpm.

Important

If polarity is reversed when clamping the ammeter onto the cable, the sign of the readings will also be reversed, giving rise to incorrect diagnosis.



Recharging the battery

Refer to the label on the battery showing the inspection intervals in order to determine when to test the voltage.



Charge the battery if the open circuit voltage is lower than 12.8 V. Leaving the battery discharged for more than one month could damage it. Check the battery charge with a voltmeter. Always check the condition of the battery before recharging and 1 to 2 hours afterwards.



Warning

Pay careful attention to recharging times. Stop charging immediately if the battery becomes too hot to the touch. Leave to cool before resuming charging.

Use only constant-voltage battery chargers.

Check that battery terminals are properly connected to the battery charger.

To charge the battery, proceed as follows.

Type of charging	Volt	Ampere (A)	Time (Hours)
Normal	12	1.8	5-10
Fast	12	9	1

Use fast charging in emergencies only.

Storing the battery

If the battery voltage is less than or equal to 11.5 V, it must be recharged.

Connect the battery charger to the battery.

Use a voltage of 16-17 V.

If the ammeter shows no change, increase the voltage to maximum 25 V.

Charge for 5 minutes.

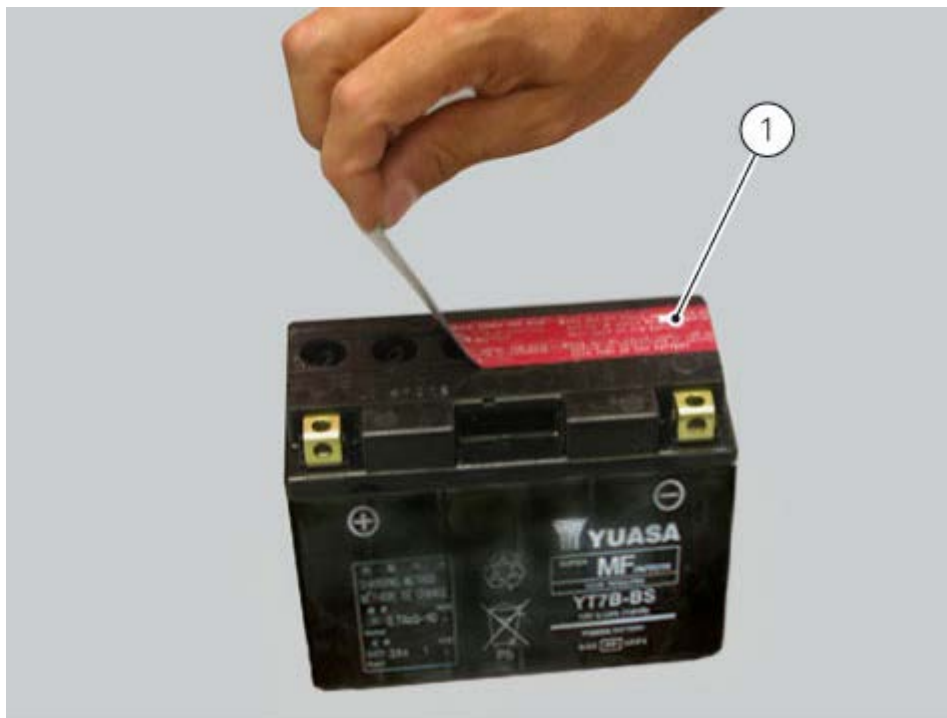
If the ammeter shows a change, restore a voltage of 16-17 V; otherwise replace the battery.

Topping up the electrolyte

Warning

Before carrying out any operations on the battery, keep in mind the safety standards (General safety rules). The electrolyte in the battery is toxic and can cause burns if it comes into contact with the skin because it contains sulphuric acid. Wear protective clothing, a face-mask and goggles when adding electrolyte. If the liquid comes into contact with the skin, wash thoroughly with fresh water. If it comes into contact with the eyes, wash thoroughly with water for 15 minutes and consult an ophthalmologist. In the event of accidental ingestion, drink large quantities of water or milk, and continue with milk of magnesia, beaten egg or vegetable oil. Do not allow sparks, flames, cigarettes or any other heat source to get near the battery, as it produces explosive gases. When recharging or using the battery indoors, make sure that the room is adequately ventilated. Do not inhale the gases produced during recharging. KEEP OUT OF REACH OF CHILDREN.

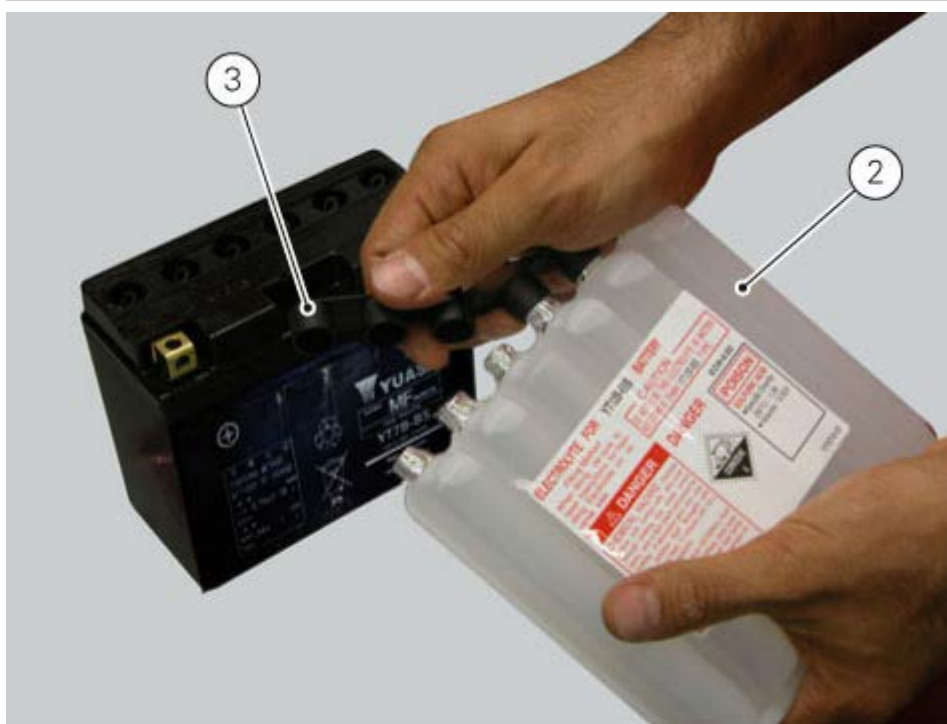
Place the battery on a flat surface. Remove the protective film (1).



Warning

Make sure that the electrolyte is of the specific type for your battery.

Remove the container with the electrolyte from the plastic bag. Remove the cap strip (3) from the container (2).



Important

Keep the cap strip (3) to hand because it will be used later to plug the battery cells.



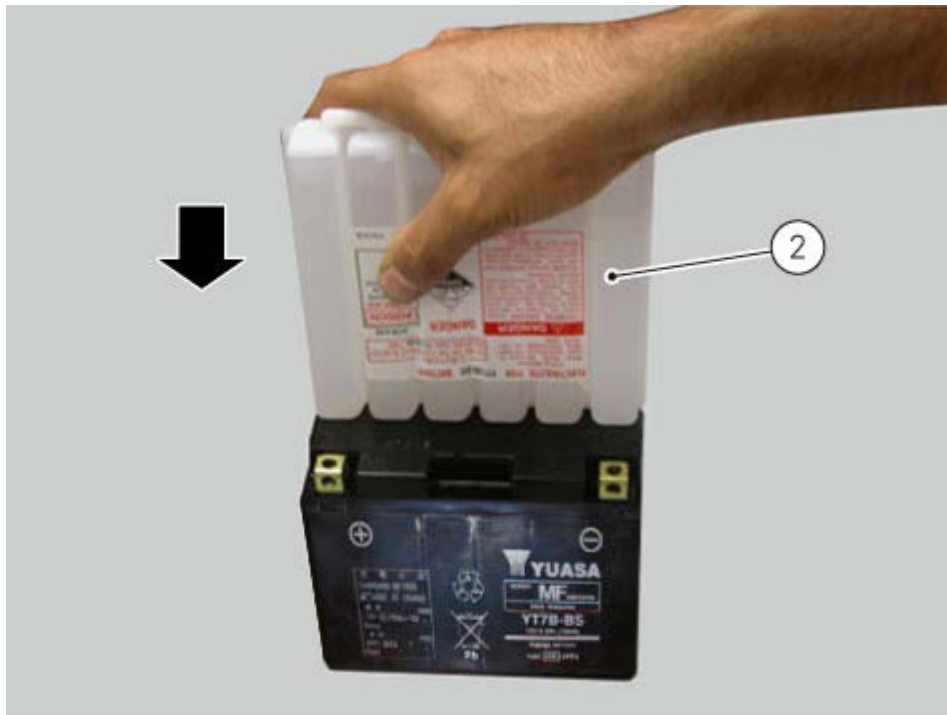
Warning

Do not peel or perforate the sealed areas.

Place the electrolyte container (2) upside down.

Align the six sealed elements with the six filler holes on the battery.

Push the container (2) downwards with sufficient force to break the seals and allow the liquid to flow out.



Note

Do not tilt the electrolyte container as this could interrupt the flow temporarily or even permanently.

Make sure that air bubbles emerge from all six filler holes. Leave the container in this position for at least twenty minutes.

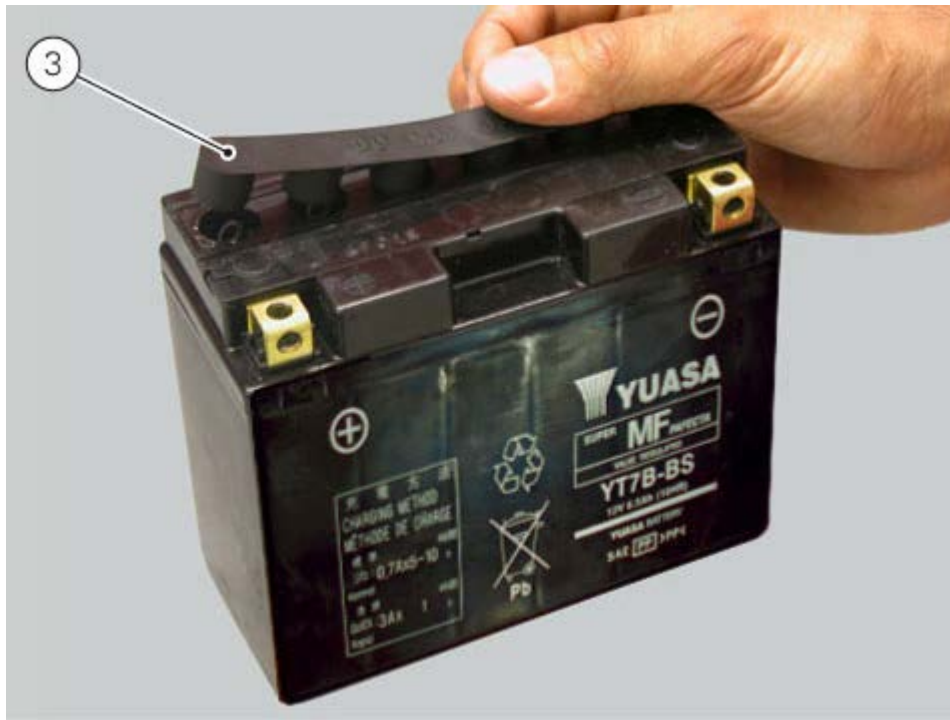
If no bubbles emerge from one of the holes, tap gently on the bottom of the respective container.



Important

Never move the container away from the battery. Do not cut or puncture the container.

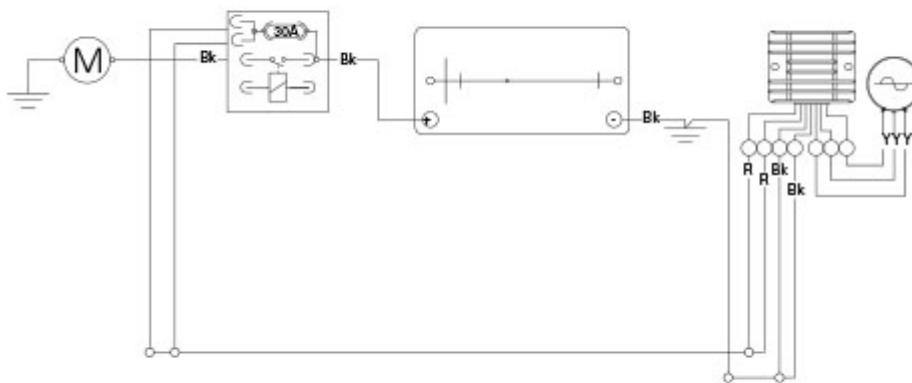
Make sure that all the electrolyte has flowed out. Carefully extract the container (2) from the battery. Fit the cap strip (3) previously removed from the electrolyte container (2) to the battery, and ensure the caps plug off all filler holes.



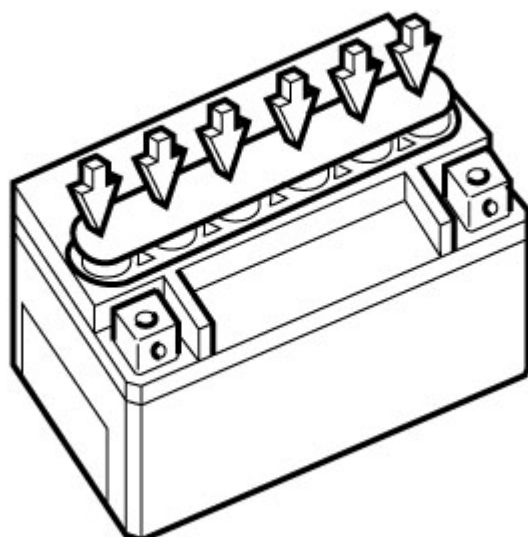
3 - 12 Ah batteries: leave to stand for at least 30 min.
 Over 12 Ah batteries: leave to stand for at least 1 hour.
 Set the cap strip on the filler holes without securing it. Recharge the battery as described in the paragraph "[Recharging the battery](#)".

Note

When using an automatic reduction battery charger, ensure that the charger current (ampere) is equal or higher than the value of the standard charging system (STD) indicated on the battery itself.



Press firmly downwards with both hands until the caps are firmly in place (do not use a hammer).



Battery

Battery safety rules



Warning

Before carrying out any operations on the battery, keep in mind the safety standards. When under charge, batteries produce explosive gases. Keep batteries away from heat sources, sparks or open flames.

Instructions for battery use

The battery is a sealed, maintenance-free type and therefore requires no special installation procedure.



Note

Always keep the battery clean. Apply grease around the battery terminals to prevent corrosion.



Warning

Never remove the valve cover located on top of the cover. If the block, cover or terminals are broken or if the valve cover has been tampered with, IT IS ABSOLUTELY NECESSARY TO REPLACE THE BATTERY.



Important

If the motorcycle is left unused for more than 30 days, remove the battery and store it in a safe, cool place.

Always charge the battery before the first operation and after long storage periods – such as before selling the vehicle.

Removing the battery

Remove the seat ([Removing the seat](#)).

Release metallic fastener (11) and the elastic band (12).



Lift the battery mount assembly without disconnecting the electrical components and fit the battery in its mount. It is recommended to lubricate the side areas of the battery with water and soap to facilitate the sliding on the rubber elements.



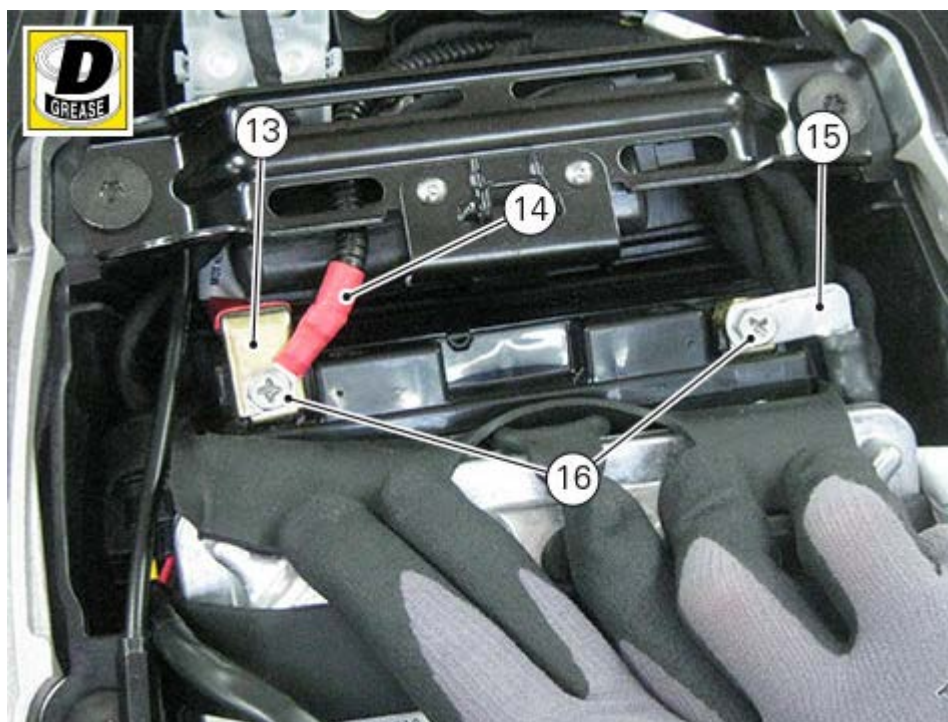
Refitting the battery

Refit the battery mount assembly in its seat.

Apply grease around the battery terminals to prevent oxidation.

Connect the battery to the motorcycle terminals to the torque of $10 \text{ Nm} \pm 10\%$.

Duly route cables (13), (14) and (15) as shown in the figure.



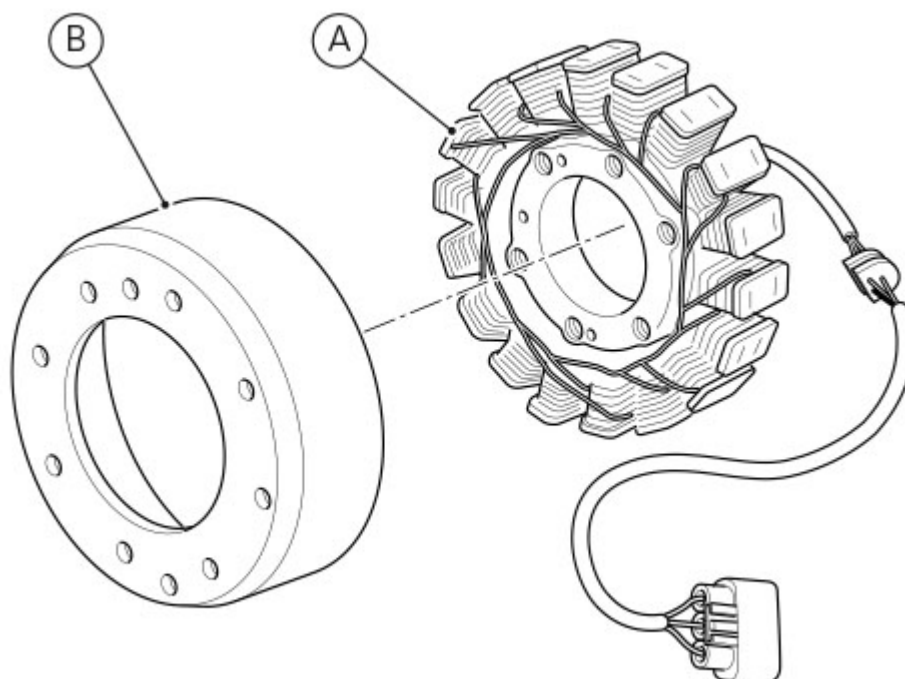
Fasten the end part of the elastic band (12) and the metallic fastener (11) one after the other.



Refit the seat ([Refitting the seat](#)).

Generator

It is equipped with a 12 V, 500 W generator, consisting of a fixed element (stator, A) located in the generator cover and of a movable element (rotor, B) fastened to the crankshaft.



To check the battery charging system for faults, use the "DDS" diagnosis instrument and follow the instructions given in the paragraph "[Checking the battery charging system](#)".

The absolute value of voltage measured across the terminals of two of the three yellow cables (the measured value will be the same whichever combination of cable is used) must be within the range indicated in the table below (ambient temperature: 20 °C).



Important

Before testing, disconnect the generator wiring from the electrical system when the ignition key is set to OFF.

Engine speed	2000	6000
Effective V	34 ± 5	104 ± 10

Values significantly lower than those indicated above can be due to:

- partially demagnetised rotor;
- short-circuited windings.

In the above cases the whole generator assembly (rotor and stator) should be replaced.

If checks have a favourable outcome, reconnect the generator to the regulator with ignition key on OFF. Make sure that no cables are damaged or disconnected.

Removing the generator

Drain the coolant ([Changing the coolant](#)).

Remove the front sprocket cover ([Removing the front sprocket cover](#)).

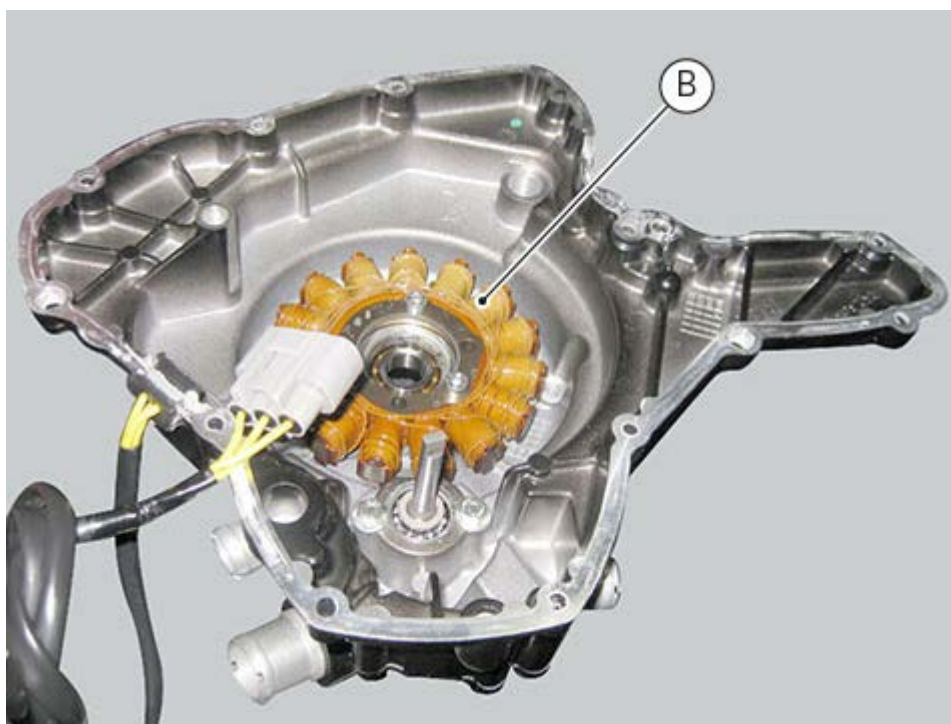
Drain the engine oil ([Changing the engine oil and filter cartridge](#)).

Remove the pump-cylinder hoses ([Removing the cylinder/piston assembly](#)).

Remove the pump-water radiator hose ([Removing cooling system hoses and unions](#)).

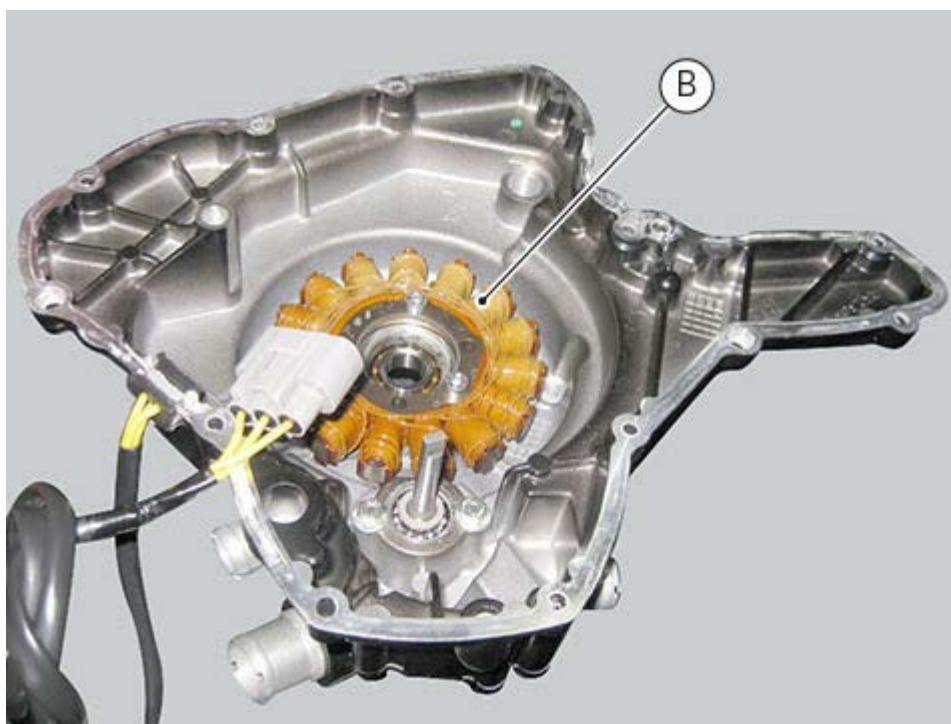
Disconnect the cables of the generator side electric system.

Remove the generator cover, the stator (A) and the rotor (B).



Refitting the generator

Fit the rotor (B), the stator (A) and the generator cover.
Connect the cables of the generator side electric system.



Refit the pump-water radiator hose ([Refitting cooling system hoses and unions](#)).
 Refit the pump-cylinder hoses ([Refitting the cylinder/piston assembly](#)).
 Refill the cooling system ([Changing the coolant](#)).
 Refit the front sprocket cover ([Refitting the front sprocket cover](#)).
 Refill the lubrication system with engine oil ([Changing the coolant](#)).

Rectifier-regulator

The regulator (1) is placed on front side of the vehicle, behind the steering tube.

The rectifier/regulator consists of an aluminium casing containing the diodes that rectify the current produced by the generator.

It also contains an electronic device that regulates the current supplied by the generator in accordance with battery voltage.

If the battery is drained, the current has the value necessary to restore optimum operating conditions of the battery itself. While, if the battery is fully charged, the current value will be lower.



Note

Check the charging current by using the "DDS" diagnosis instrument.

Removing the regulator

Remove the seat ([Removing the seat](#)).

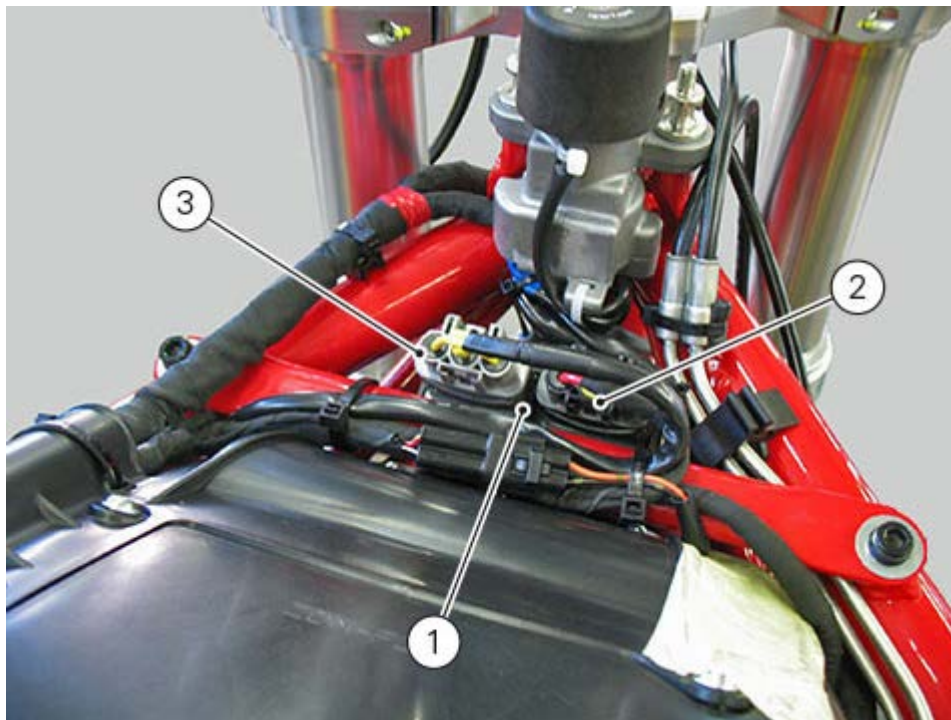
Remove the fuel tank ([Removing the fuel tank](#)).

Disconnect the voltage regulator connector (2) and the generator connector (3) from regulator (1).
Loosen the two front screws on regulator (1) and remove them together with the regulator.



Important

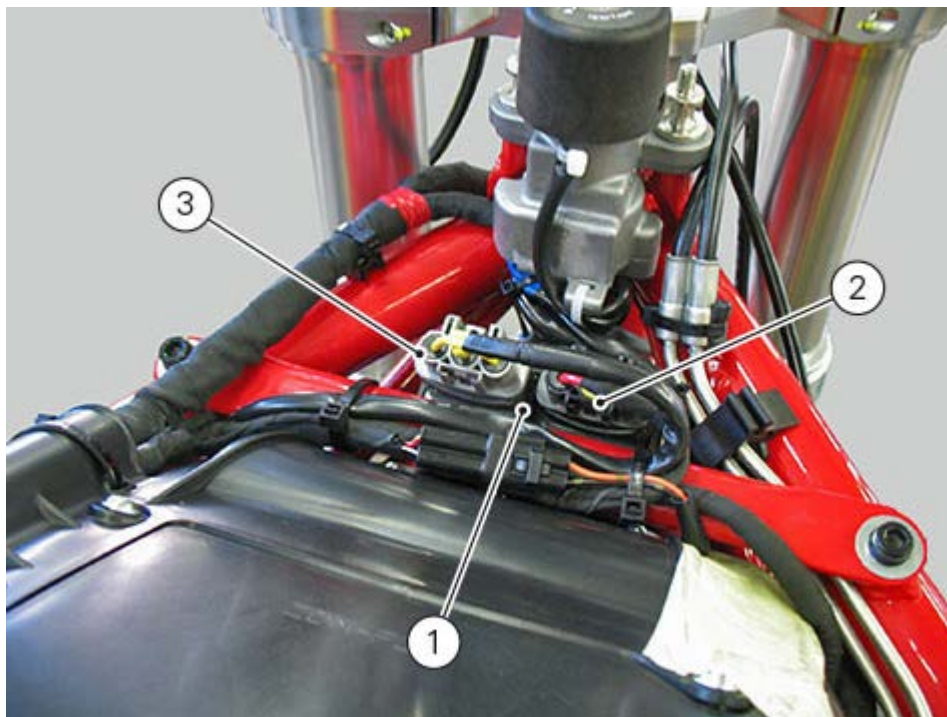
Do not disconnect the battery cables when engine is running because this would cause irreparable damage to the regulator.



Refitting the regulator

Position the regulator (1) on the support.

Tighten screws to a torque of 10 Nm \pm 10%.



Important

Do not disconnect the battery cables when engine is running because this would cause irreparable damage to the regulator.

Connect the voltage regulator connector (2) and the generator connector (3) to regulator.

Refit the fuel tank ([Refitting the fuel tank](#))

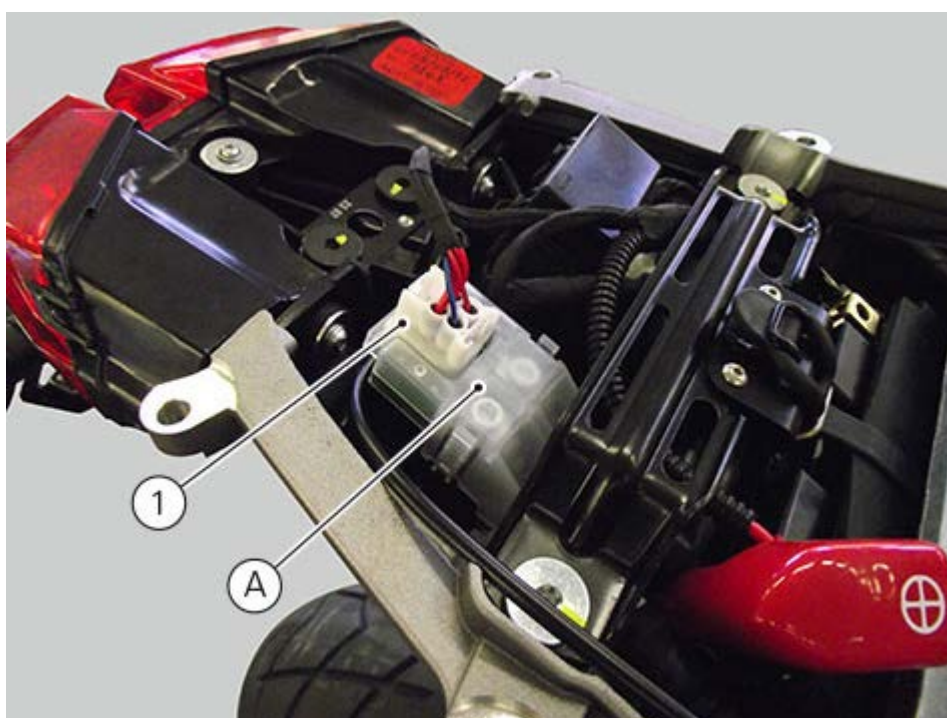
Refit the seat ([Refitting the seat](#)).

Regulator fuse

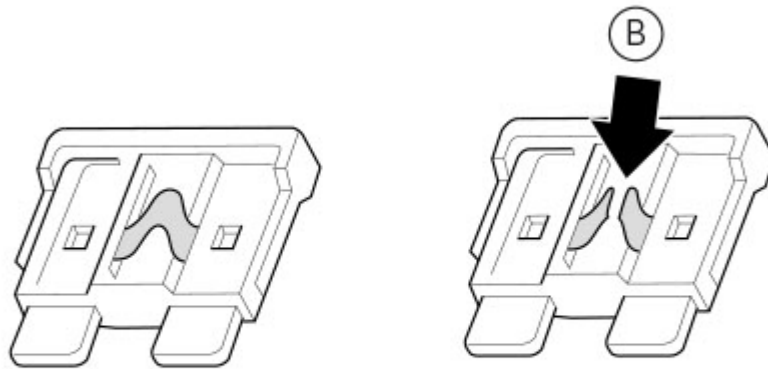
The 30 A fuse, positioned inside solenoid (1), on the rear side of the rear subframe, protects the electronic regulator.

Remove the seat ([Removing the seat](#)).

Remove the fuse cap (A) to reach it.



A blown fuse can be identified by breakage of the inner filament (B).



Important

Switch the ignition key to OFF before replacing the fuse to avoid possible short-circuits.

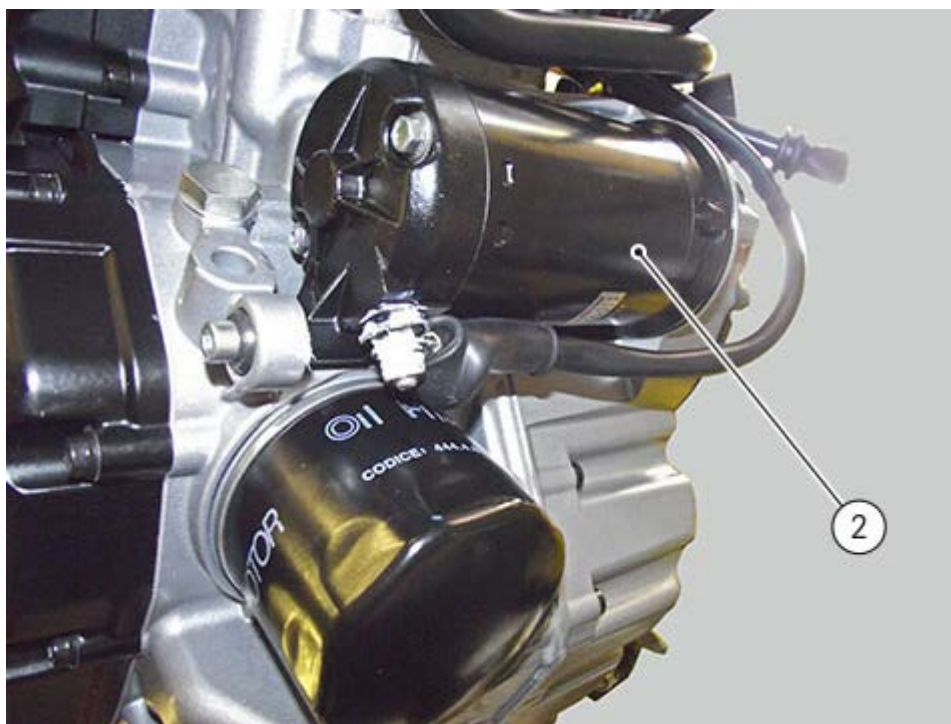
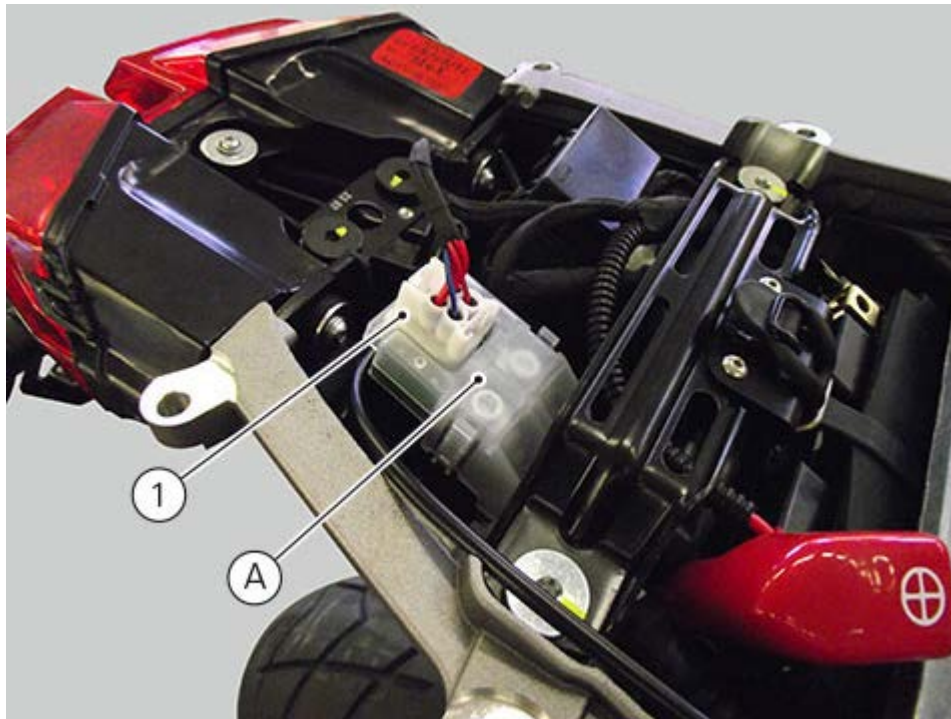


Warning

Never use a fuse with a rating other than the specified value. Failure to observe this rule may damage the electric system or even cause fire.

Electric starting system

The key components of the electric starting system are a solenoid (1) and a starter motor (2) fed by the battery.

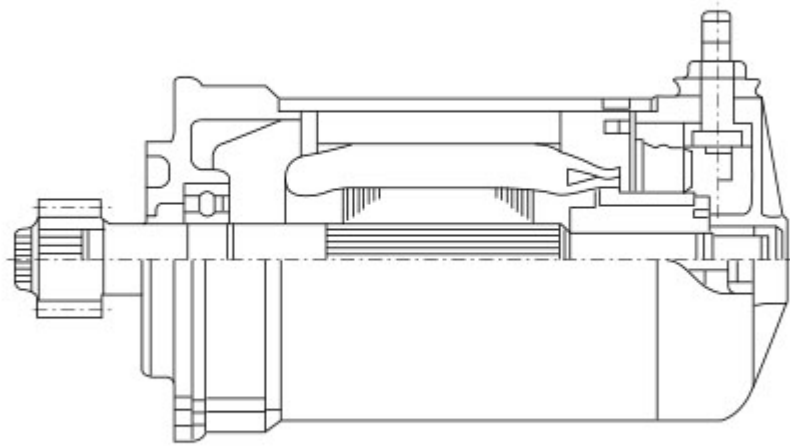


Starter motor

Power: 0.7 kW/12 V.

Direction of rotation:

counter clockwise viewed from power take-off side.



The starter motor is highly compact and reliable, therefore rarely raises any operating issue.

In case of malfunction, ensure that the starter motor wiring terminal is properly tightened under the nut and shows no sign of oxidation. If the terminal is properly tightened and free from oxidation, remove the starter motor and test it under no-load conditions (no load applied to the shaft).

Secure the starter motor to a test bench, making sure not to damage the casing.

Use a fully charged 12 V battery for the test.

Use battery-motor connection cables which are no longer than 70 cm and with the same cross-section as the cable on the motorcycle itself.

Connect the negative terminal of the battery to an unpainted area of the starter motor casing and the positive terminal to its electrical terminal. The shaft of the starter motor should rotate freely and at a high speed. Take care not to short-circuit the two cables connected to the battery.

Solenoid starter

The solenoid starter (1) is mounted to the battery mount.

Remove the seat ([Removing the seat](#)).

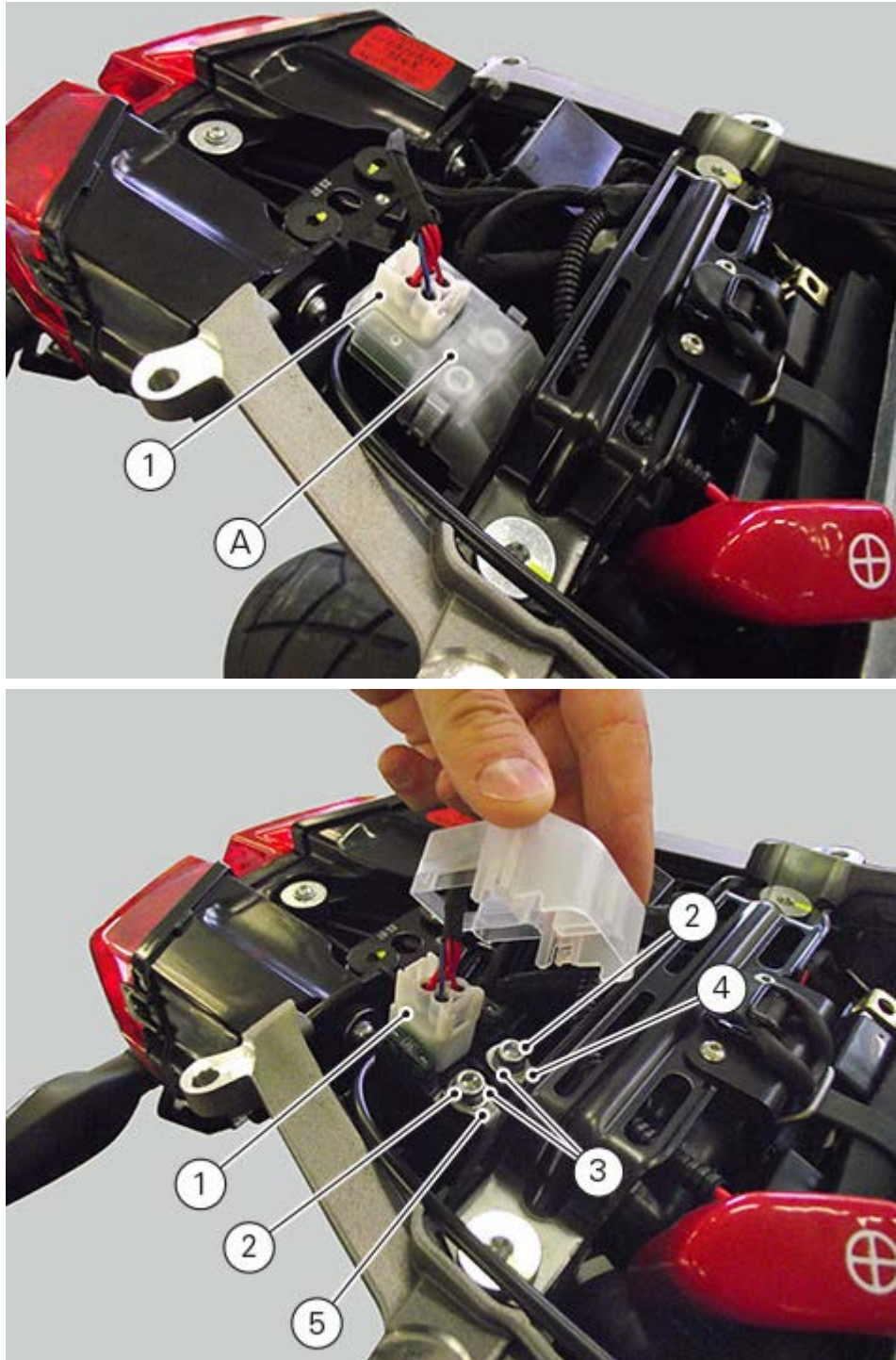
Disconnect the battery ([Battery](#)).

Remove the protection cover (A).

Undo the screws (2), taking care to collect the spring washers (3).

Remove the starter motor-solenoid starter cable (4) and the solenoid starter-battery cable (5).

Disconnect the solenoid starter connector (6) from the wiring.

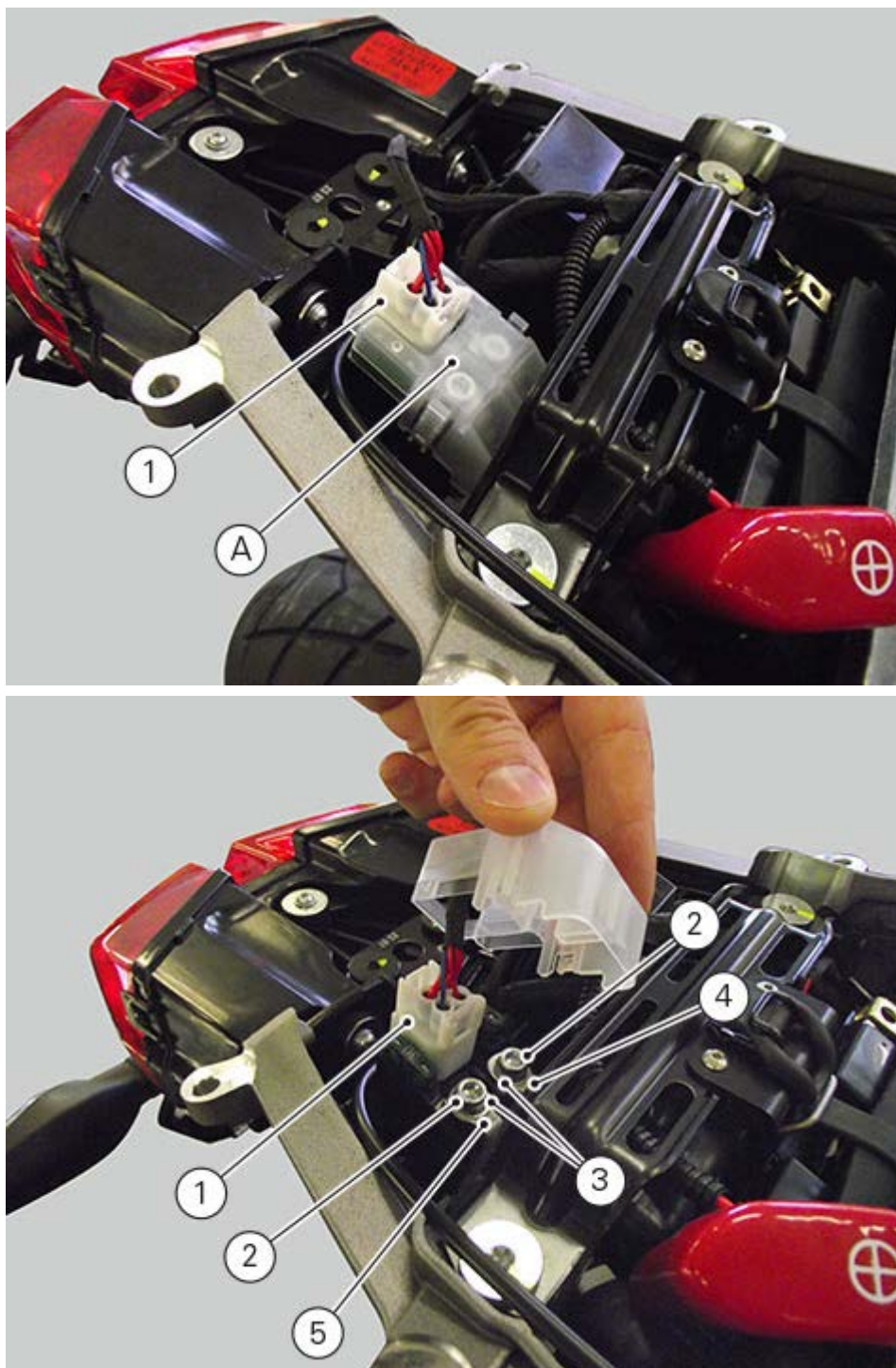


Remove solenoid starter (1) sliding it upwards.

Checking operation of the solenoid starter

To check the solenoid starter refer to section "[Starter motor](#)".

Ensure that the terminals are not oxidised and apply water repellent spray.
Position the solenoid starter-starter motor cable (4) and the solenoid starter-battery cable (5) on the solenoid starter terminals.
Start screws (2) with spring washers (3).
Tighten screws (2) to a torque of $4 \text{ Nm} \pm 10\%$.
Refit the protection cap (A).
Connect the connector (6) of the solenoid starter to the wiring harness and connect the battery ([Battery](#)).
Fasten solenoid starter (1) to battery mount by fitting it into tabs (B).



Refit the seat ([Refitting the seat](#)).

Changing bulbs

Changing the headlight bulbs

Before replacing a burnt out bulb, ensure that the replacement bulb has the same voltage and power rating as specified for the concerned lighting device ([Lights/instrument panel](#)).

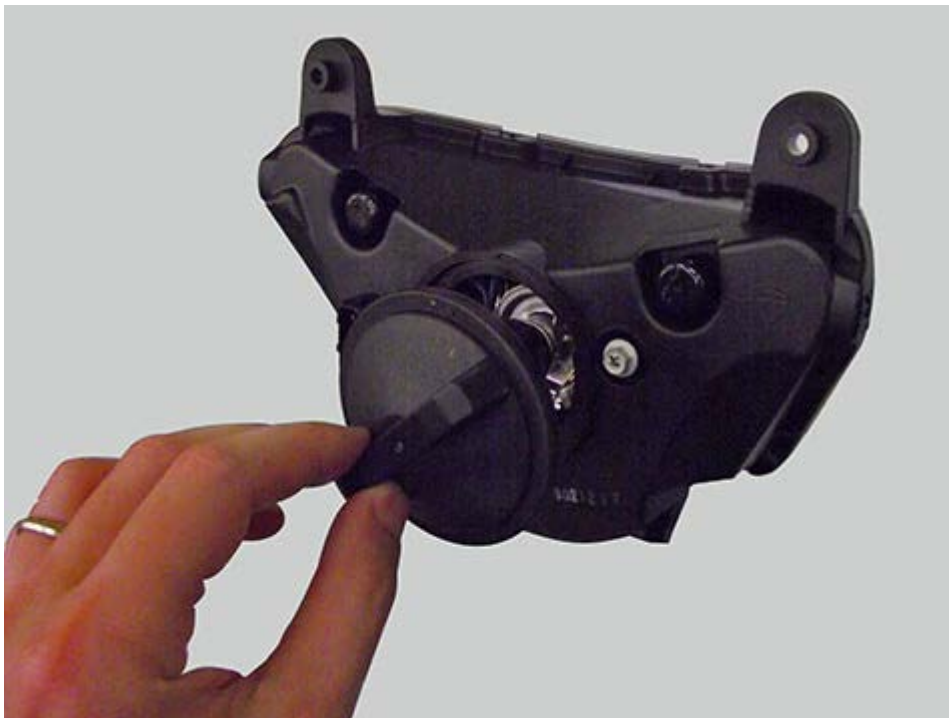


Warning

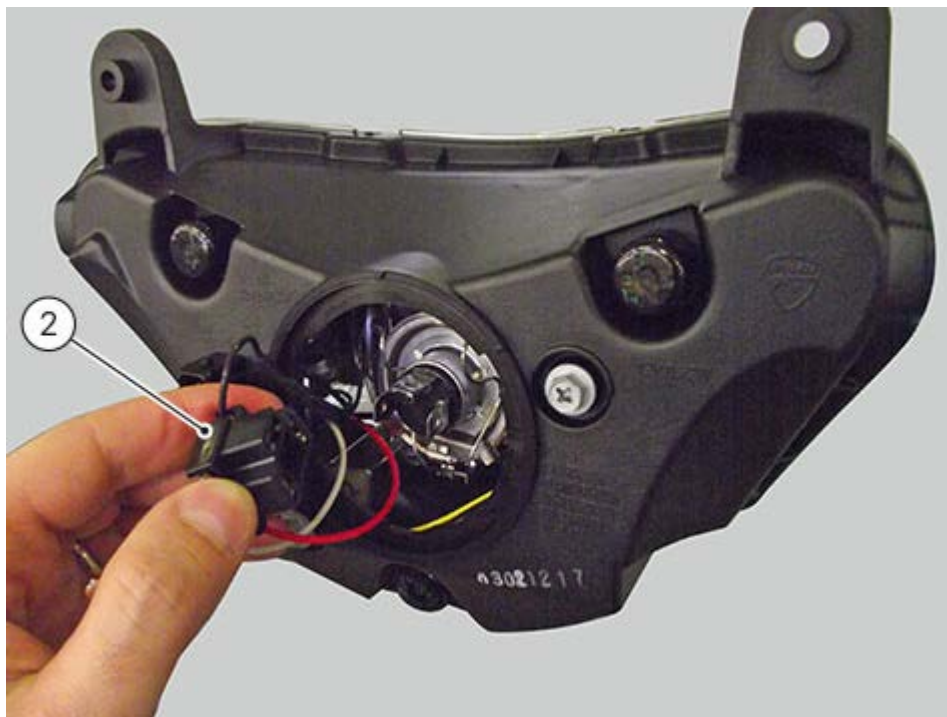
The halogen light bulbs in the headlight become hot when switched on and remain hot for some time after they are switched off. Allow bulbs to cool before replacing them.

Remove headlight fairing to reach the high and low beam bulbs remove headlight fairing ([Removing the headlight fairing](#)).

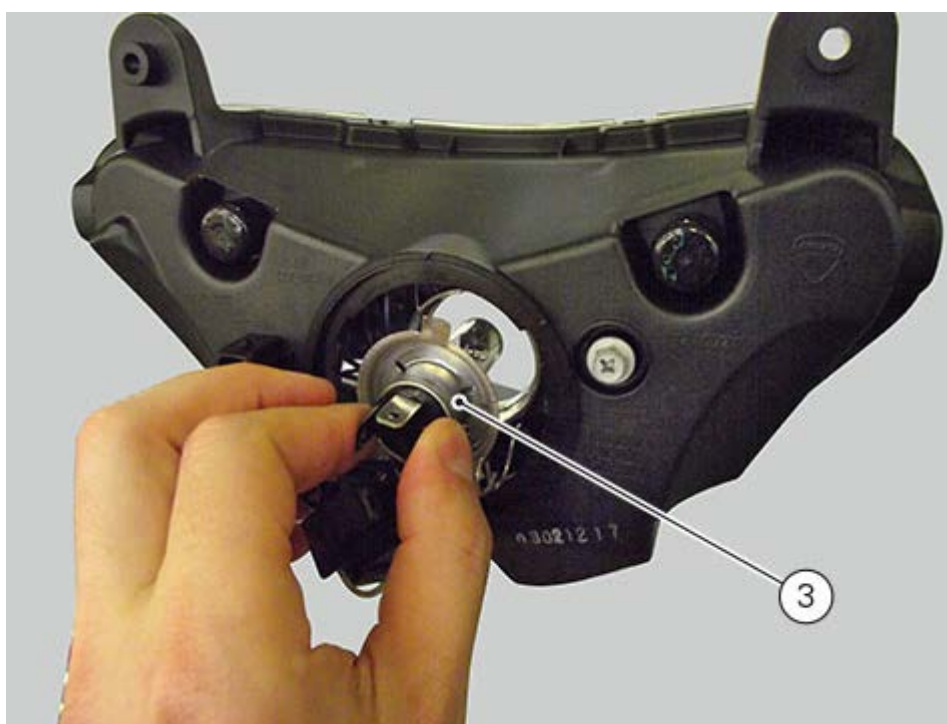
Loosen the bulb (1) cover.



Disconnect the connector (2).



Turn the high and low beam bulbs (3) anticlockwise, remove them from their seat and replace the burnt-out bulbs.



Note

Be careful to hold the new bulb at the base only. Never touch the transparent body with your fingers or it will blacken resulting in reduced bulb brilliancy.

Refit the removed components.

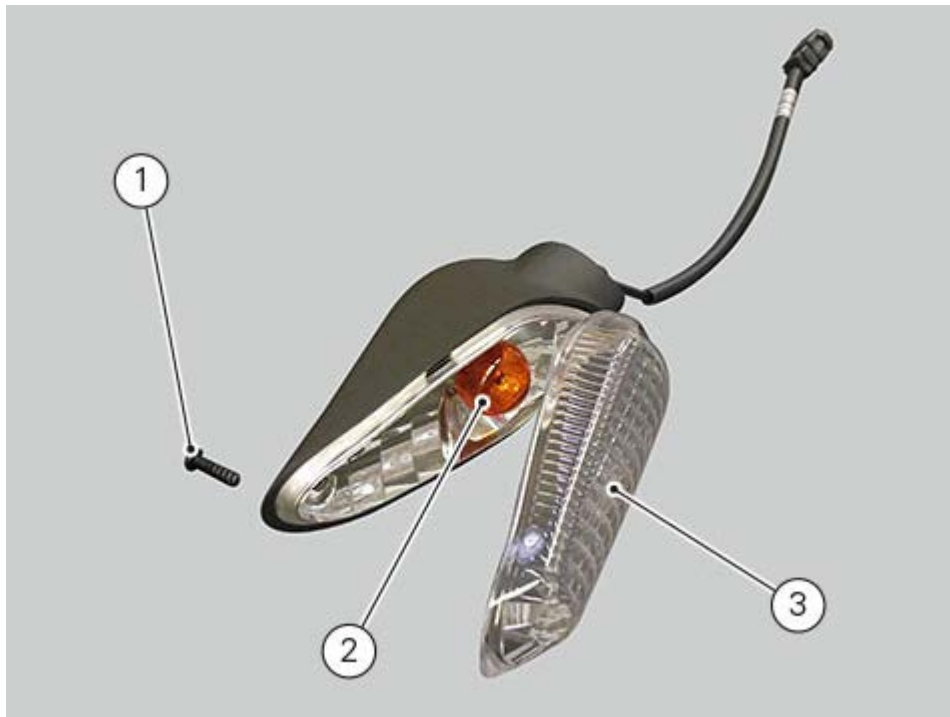
Changing the rear turn indicator light bulbs

Undo the screw (1) and detach the lens (3) from the turn indicator support.

Remove the bulb (2) by sliding it out. Then fit the new one by pressing and turning clockwise until it clicks into its seat.

Refit the lens by inserting the tab in the corresponding slot in the turn indicator support.

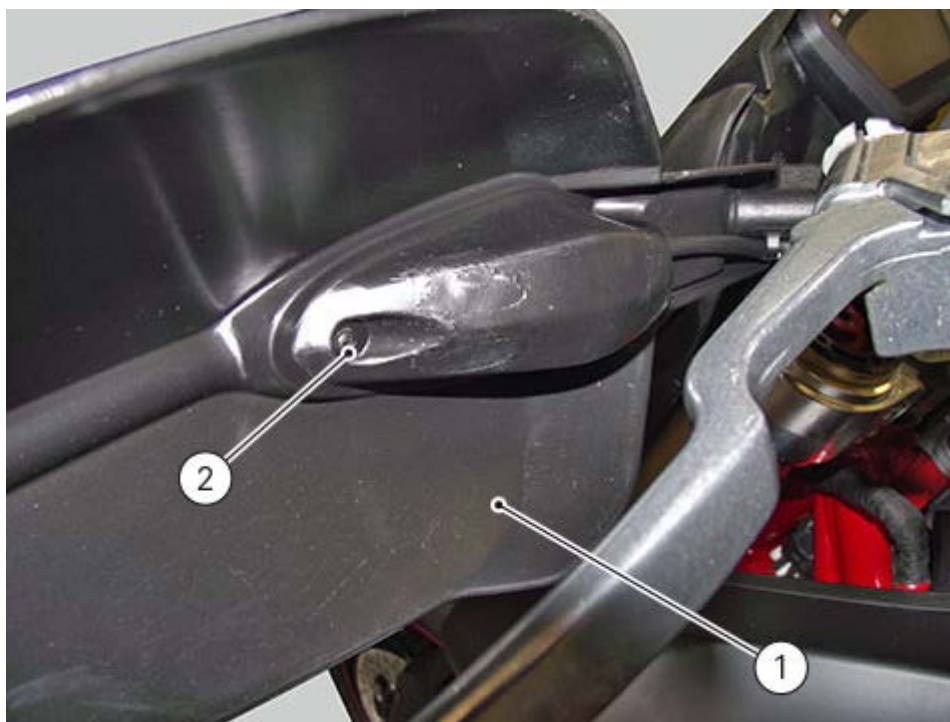
Tighten the screw (1).



Changing the front turn indicator light bulbs

Loosen screw (2) of hand guards (1).

Remove the bulb by sliding it out. Then fit the new one by pressing and turning clockwise until it clicks into its seat.



Changing the number plate light bulb

To reach the number plate light bulb (2), open the number plate light lens (1), pull the bulb out of the holder and replace it.



Aligning the headlight

The motorcycle must be perfectly upright with the tires inflated to the correct pressure and with a rider seated, perfectly perpendicular to the longitudinal axis.

Position the motorcycle 10 metres from a wall or a screen.

On the wall or surface, draw a horizontal line at the same height from the ground as the centre of the headlight and a vertical line aligned with the longitudinal axis of the motorcycle.



Note

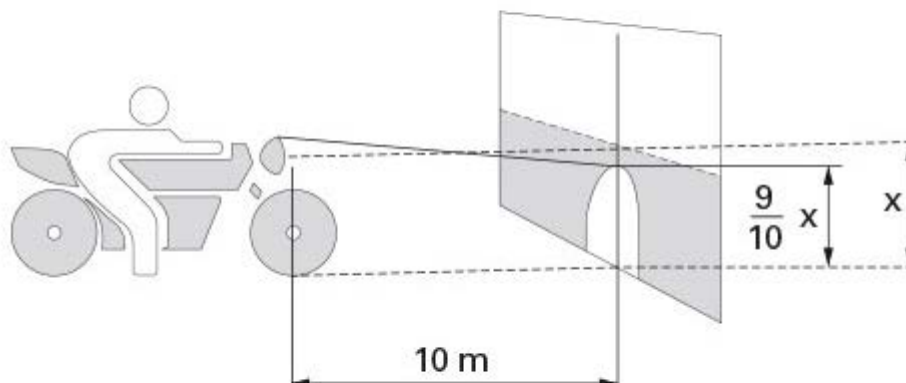
If possible, perform this check in dim light.

Switch on the low beam. The height of the upper limit between the dark area and the lit area must not be more than $\frac{9}{10}$ of the height from the ground of the headlight centre.



Note

This is the procedure specified by Italian regulations for checking the maximum height of the light beam. Please adapt said procedure to the provisions in force in your own country.



To horizontally align the headlight beam, turn the adjusting screw (1).

To vertically align the headlight beam, turn the adjusting screw (2).

