6. 12 V electrical system components

6.1. General instructions

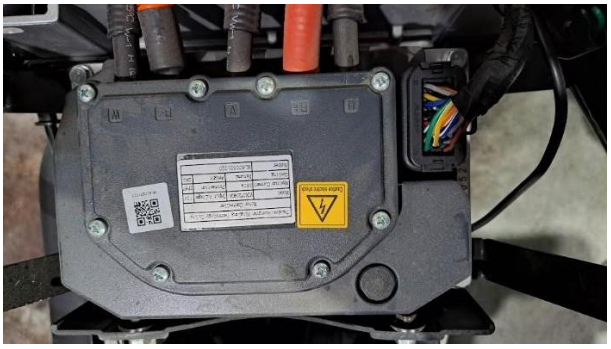
- To check if a command is working correctly, run a continuity test using a multimeter on the terminals of the connector corresponding to this command.
- This chapter presents the connectors that correspond to all the controls by providing a drawing of the connector from the perspective of the control (not the main wiring).
- The connector design also indicates the colours of the cables connected to its terminals.
- When two colours are indicated for a cable, the first corresponds to the dominant colour while the second is the minority colour identified by a line on the cable.
- For the continuity test, the ignition key does not have to be turned to ON.
- Continuity occurs when the corresponding control is actuated: by holding the button down during the test or by switching to the required position.
- The electrical circuit of the switches and controls is low voltage, so there is no need to use PPE (personal protective equipment).
- The accelerator works by Hall effect, it is therefore necessary to measure direct current voltages and not continuities or resistances.
- Replace the component with a new one if the continuity (buttons, switches or switches) or voltmeter (throttle) reading is not satisfactory. If the component does not work when injected from an external power source, it will need to be replaced with a new one. If it meets the specifications, it will be necessary to check the main wiring or check that no connector is loose or if there is the presence of false contact on its terminals.
- Do not confuse polarity when checking lighting components.
- Replace the fuse with one of the same type and rating.
- Find the cause of the blown fuse first, otherwise the fuse will blow again.
- Do not replace the fuse with one of higher amperage or with a wire or other metal object, as the circuit could overheat and cause a fire.

6.2. 12V system measurement from controller connector

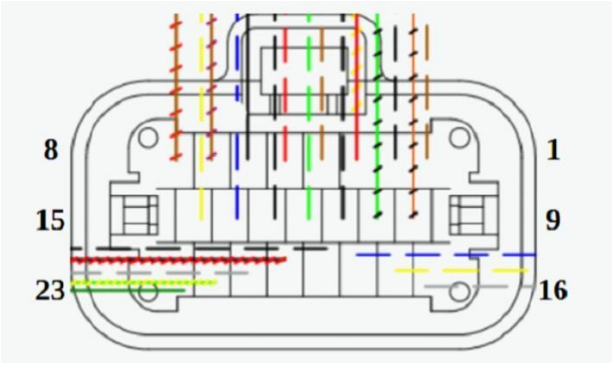
Preliminary operations:

- Extracting the helmet box (→ See 1.4.1. Helmet box. Disassembly of the base is not necessary

Identify the controller's analogue signal connector.



Identify the cable enumeration as shown in the image to the right.



Without removing the connector and with the motorcycle on, the voltage of each signal is taken with a fine multimeter tip.

The definitions of each cable are:

Index	Colours	Definition	Values
1	Brown	Sensor power supply Hall	5V
2	Black	Ground for hall sensor	
3	Red/orange	Sensor power supply Hall	5V
4	Brown/white	RESET push button:	Engaged: 0.8V Not engaged: 0V
5	Red	Power supply for accelerator	5V
6	Black	Power supply for controller	12V
7	Grey/blue	CAN L	
8	Brown/red	CAN H	
9	Orange	Sensor power supply Hall	5V
10	Green	Sensor square signal Hall	0 – 5V
11	White	Sensor square signal Hall	0 – 5V
12	White/green	Accelerator signal	0.85 – 4.25V
13	Orange/white	Side bridge sensor	2.8V
14	White/blue	Operation modes	Eco: 2.8V Sport: 2.8V
15	Yellow/white	Diagnosis and programming	
16	Grey	Ground for hall sensor	
17	Yellow	Sensor square signal Hall	0 – 5V
18	Blue	Sensor square signal Hall	0 – 5V
19	Brown	Mass for the accelerator	
20	Red/black	Operation modes	Eco: 2.8V Normal: 2.8V
21	White/grey	Push button start for conveyor belt	Engaged: 0.8V Not engaged: 0V
22	Yellow/green	Signal from push buttons of the brake	Inactive: 0.8V Activated: 12V
23	Green	Ground for controller	

6.3. Access to connectors

Preliminary operations:

- Removal of the windshield (→ See 1.3.3. Windshield removal)

Necessary tools

Plastic disassembly tool

#2 Phillips screwdriver

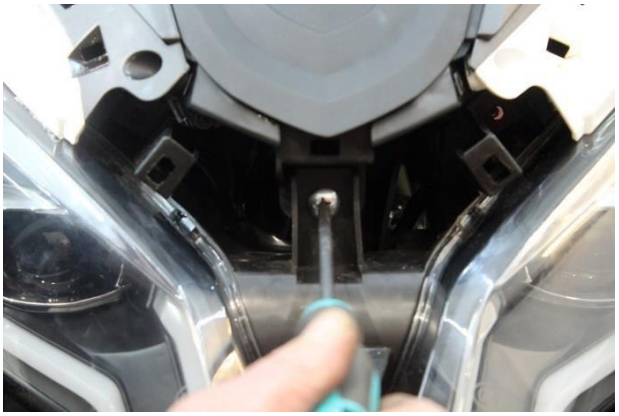
Peel off the central covering by separating its nipples. Use a plastic removal tool to make it easier to separate the nipples.

Remove the covering towards the front so as not to damage the rear end claws

Remove the left and right elongated mouldings. Remove them by pulling on them.

Remove the top three screws from the right side of the front cover using a #2 Phillips screwdriver. Repeat the process for the left side.

Remove the screw holding the bottom of the top centre piece using a #2 Phillips screwdriver.



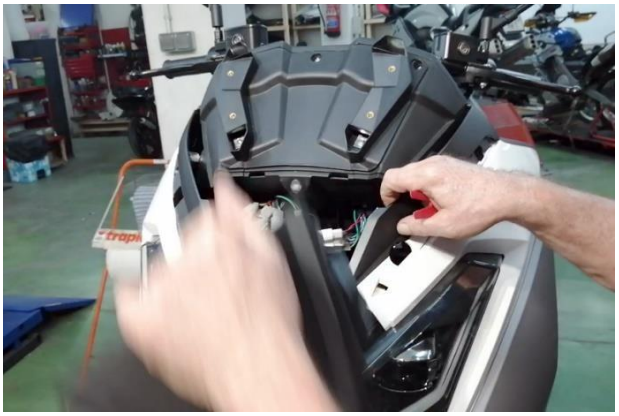
Remove the two screws marked with an arrow using a #2 Phillips screwdriver, freeing the centre piece from the rest of the body.

The two nipples located under the orange coloured circles on each side should be peeled off.

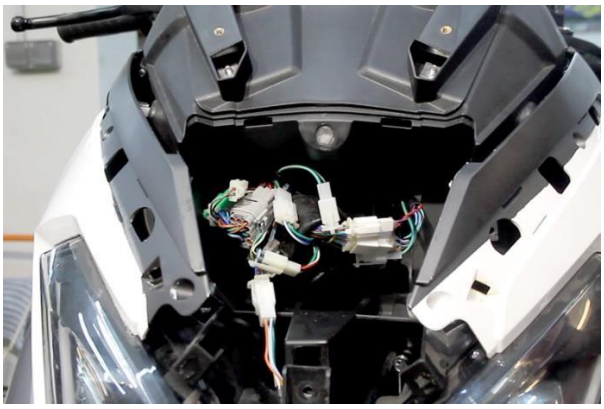
Use a plastic disassembly tool to separate them on each side.

Being careful not to damage the sides of the front protection, open them from their front side to release the upper central piece.

Move the top centre piece and take it out.



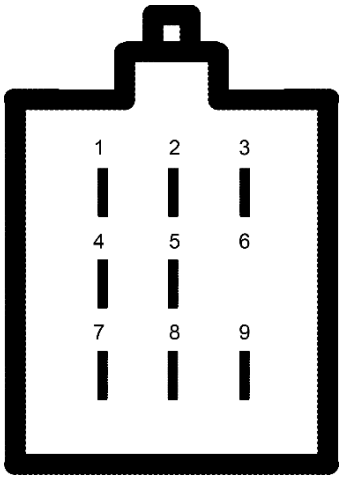
The connectors of the 12 V circuit components will be fully accessible.



6.5. Wiring connectors edition 2 and 3

Here is the connection of all the connectors of the 12 V and CAN BUS electrical system. The drawings show the female connectors.

Left lever connector



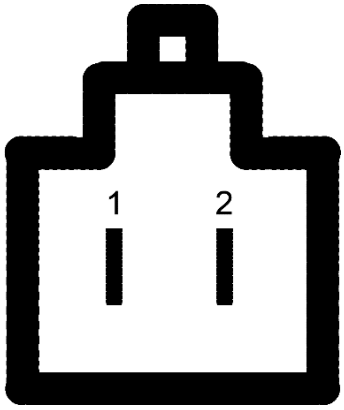
Colours on the female side:

① Black
② White
③ White
④ Green
⑤ Blue
⑥ Limitless
⑦ Light blue
⑧ Orange
⑨ Grey

Male side colours:

① Black
② White
③ Black
④ Green
⑤ Blue
⑥ Limitless
⑦ Light blue
⑧ Orange
⑨ Grey

“P” button connector



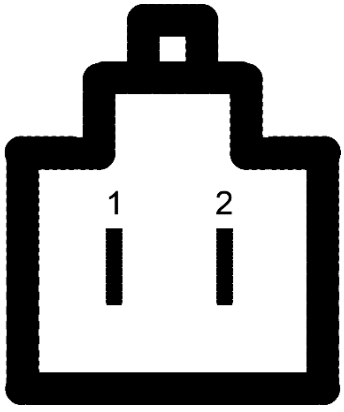
Colours on the female side:

① Purple
② Red

Male side colours:

① Brown/white
② Green

Brake light connector



Colours on the female side:

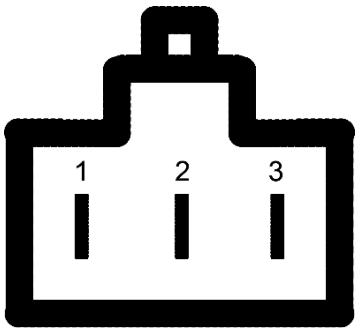
① Green/yellow
② Black

NOTE:
These are two identical male and female connectors. You can connect them indifferently.

Male side colours:

① Black
② Yellow/green

Driving mode connector



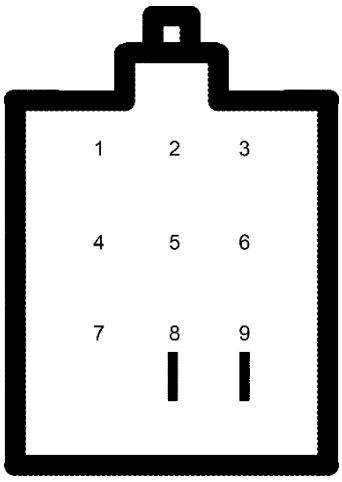
Colours on the female side:

① Brown
② Black/red
③ Pink

Male side colours:

① Blue
② Green
③ Red/black

“R” (reverse) button



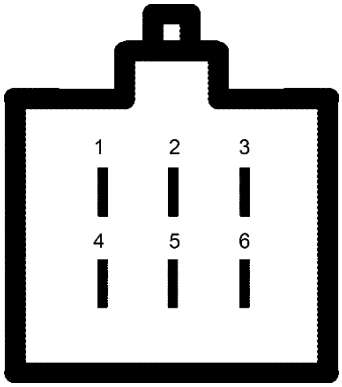
Colours on the female side:

① Limitless
② Limitless
③ Limitless
④ Limitless
⑤ Limitless
⑥ Limitless
⑦ Limitless
⑧ Black
⑨ Purple

Male side colours:

① Limitless
② Limitless
③ Limitless
④ Limitless
⑤ Limitless
⑥ Limitless
⑦ Limitless
⑧ Green
⑨ Grey/white

Headlight connector



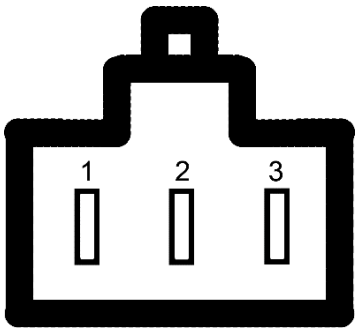
Colours on the female side:

① Orange
② White
③ Blue
④ Light blue
⑤ Green
⑥ Brown

Male side colours:

① Orange
② White
③ Green
④ Light blue
⑤ Green
⑥ Brown

Accelerator connector



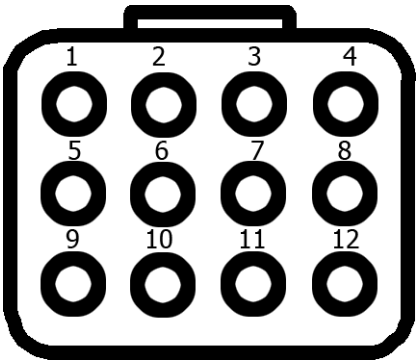
Colours on the female side:

① Red/white
② Black/white
③ Green/white

Male side colours:

① Green
② Black
③ Red

Dashboard connector



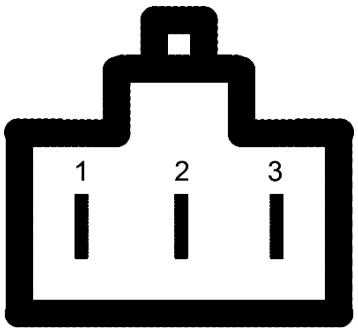
Colours on the female side:

① Red
② Black
③ Green
④ Light green/pink
⑤ Limitless
⑥ Brown
⑦ Limitless
⑧ Light blue
⑨ Limitless
⑩ Orange
(11) Blue
(12) Green

Male side colours:

① Orange/black
② Black
③ Green
④ Limitless
⑤ Limitless
⑥ Black
⑦ Limitless
⑧ Light blue
⑨ Limitless
⑩ Orange
(11) Blue
(12) Limitless

Speed sensor connector



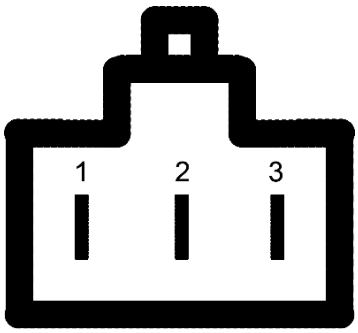
Colours on the female side:

① Brown/black
② Green
③ White

Male side colours:

① Brown/white
② Black
③ Green/yellow

Flasher connector



Colours on the female side:

① Green

② Grey

③ Black

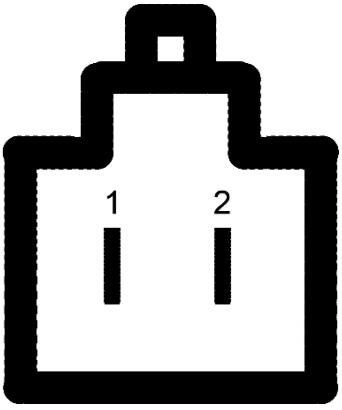
Male side colours:

① Green

② Grey

③ Black

Dashboard CAN connector



Colours on the female side:

① Red/brown

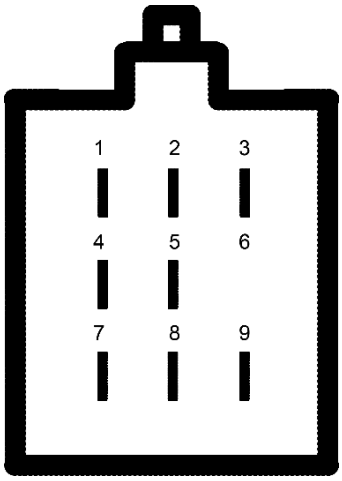
② Purple/brown

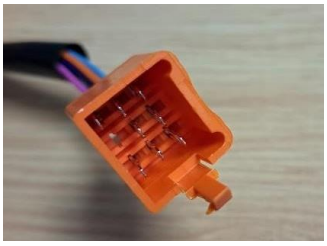
Male side colours:

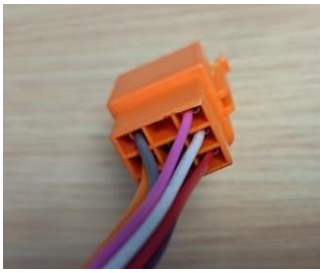
① Red/brown

② Purple/grey

6.7. Left switch lever edition 2 and 3







Orange colour connector

Identifying the cables on the connector terminals

① Red/black

② White
③ Pink
④ Purple
⑤ Blue
⑥ Limitless
⑦ Light blue

⑧ Orange
⑨ Grey

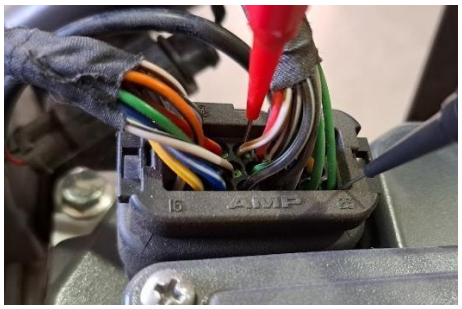
Headlights : Continuity between white cables② and pink③
Redlights: Continuity between blue cables⑤ and pink③
Left turn signal ⇦: Continuity between orange cables⑧ and grey⑨
Right turn signal ⇨: Continuity between light blue cables⑦ and grey⑨
Horn: Continuity between black cables① and purple④
Warning⚠: Continuity between light blue cables⑦, orange⑧ and grey⑨

6.8. Switch Lever “P” Button

Identify pin numbers 4 and 23 of the controller connector.

Button engaged: 0V

Button not engaged: 0.8V

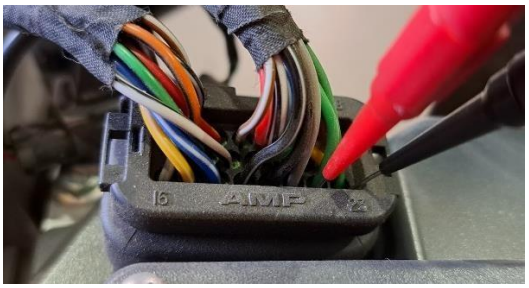


6.9. Rear or front brake light push button

Identify pin numbers 22 and 23 of the controller connector.

Button engaged: 0.8V

Button not engaged: 13.5V



6.10. Driving mode switch on the right lever

The measurement of driving modes must be carried out on two points. Both measurements must be correct:

1. Identify connectors 21 and 23. The voltages for each switch position are:
   - Eco : 2.45V
   - Normal: 2.45V
   - Sport: 0V

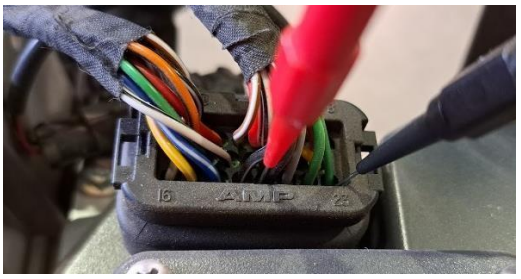
2. Identify connectors 14 and 23. The voltages for each switch position are:
   - Eco: 0V
   - Normal: 2.45V
   - Sport: 2.45V

6.11. “R” (reverse) button on the right lever

Identify pin numbers 21 and 23 of the controller connector.

Button engaged: 0V

Button not engaged: 0.8V



6.11.1. Disassembly of switch levers

Preliminary operations:

- Removing the handlebar covers (→ See 1.3.6. Removing the handlebar covers)

NOTE: This section explains the procedure for disassembling the right switch lever, but it is the same for the left switch lever.

Necessary tools

#2 Phillips screwdriver

Socket wrench, counter-angled or an 8 mm ratchet wrench

To remove the switch lever, you will first need to remove the brake pump, as it prevents access to the lever screws. Use an 8mm ratchet, offset or socket wrench to remove the screws holding the brake pump on the handlebars.

After removing the brake pump and pressing on a place that does not interfere with or hold the cable in tension. Remove the two screws securing the lever to the front with a Phillips no.2 tip screwdriver.

Tightening torques:

Switch lever fixing screw 1-3 Nm.

To disassemble the lever, you will need half of the lever with its buttons towards the end of the handlebars including the accelerator if it is the right lever.

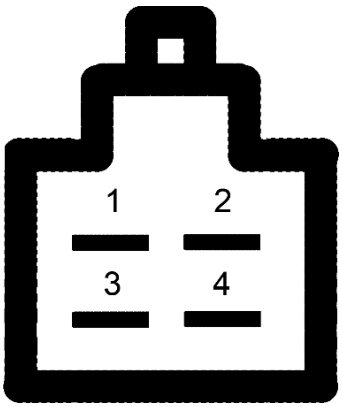
When reassembling the handlebars, start by placing the front half of the lever on the handlebars, aligning the nipple of the handlebar lever with the hole in the handlebars. Then, guide the rear half of the lever (the one with the buttons) onto the front rails from the end toward the centre of the handlebars.

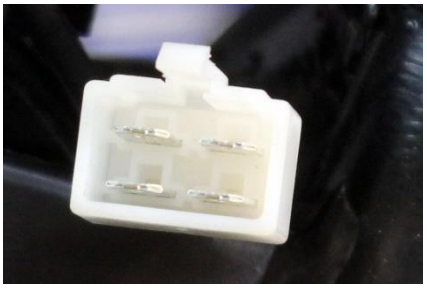
Additionally, position the bracket with the “UP” mark facing up.

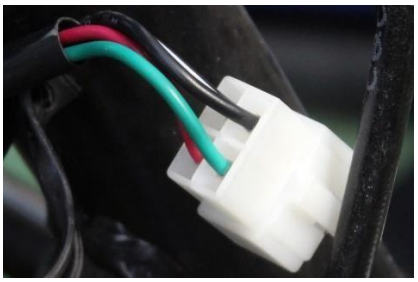
Tightening torques:

Brake pump support screw 3-5 Nm.

6.12. Ignition lock







White colour connector

Preliminary operations to access the connector:

- Front wheel arch grille removal (→ 1.3.1.)
- Disassembly of the front right side (→ 1.3.2.)
- Removal of the windshield (→ See 1.3.3.)

Identifying the cables on the connector terminals
① Green (no match with main wiring connector)
② Black
③ Red
④ Black/white (no match with main wiring connector)

NOTE: To access this connector, remove the leg cover.

Key in ON position: Continuity between red cables③ and black②

6.13. Side stand

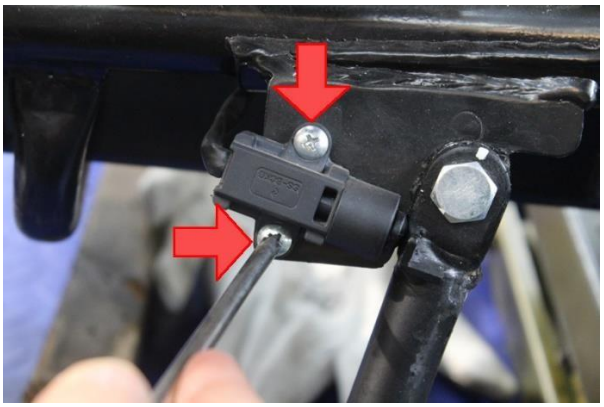
Identify connectors 13 and 23 of the controller connector.

Switch on: 2.8V

Switch not on: 0V

NOTE: This connector is located on the left side of the scooter near the main safety switch.

To disassemble the main switch from the side stand, remove the two screws securing it to the bracket with a no.2 Phillips screwdriver.



6.14. Accelerator

Identify pins 19 and 12 of the controller connector. The measured voltage should be approximately:

1. Accelerator in minimum position: 0.86V
2. Accelerator in maximum position: 4.26V

To measure the accelerator supply voltage, identify the connectors 5 and 19. The voltage should be 5V.

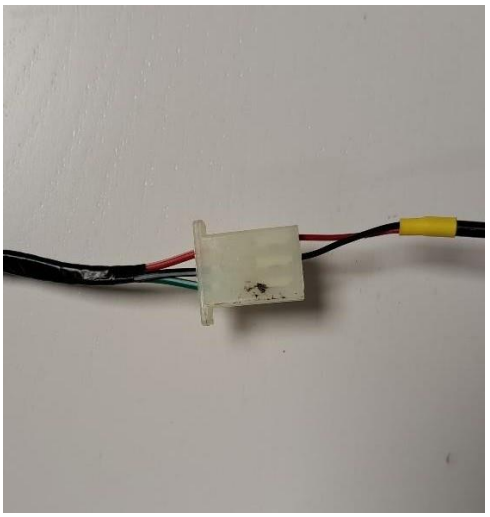
6.14.1. Measurement of isolated accelerator signal

Prior indications:

- 6.3. Access to the connectors

Identify the accelerator connector and supply it with a direct current voltage of 5V:

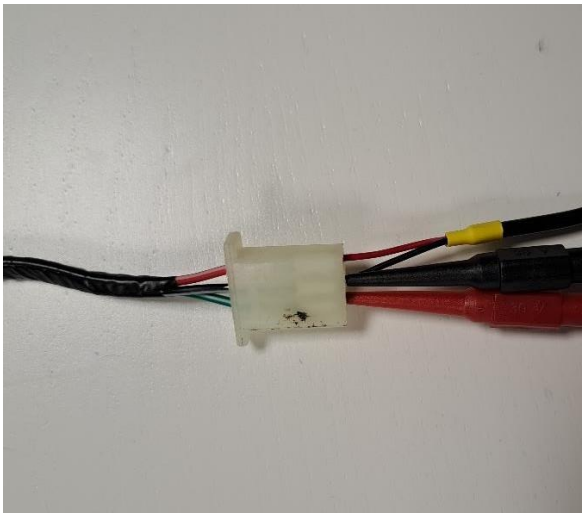
1. Black cable: 0 V or reference
2. Red cable: 5 V



The accelerator signal is measured by measuring the voltage between the green and black cable.

Connect the red terminal of the multimeter to the green cable and the black terminal to the black cable.

Configure the multimeter to read direct current voltages.



The measurement with the accelerator in its minimum position must be approximately 0.86 V.

The measurement with the accelerator in its maximum position must be approximately 4.26 V.

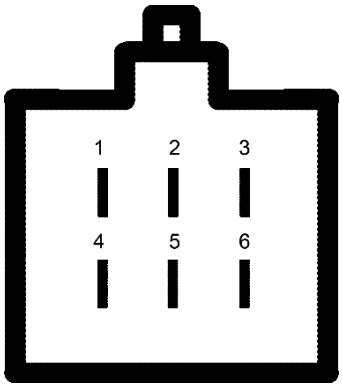
6.15. Horn

Cable identification on green independent Faston connector terminals
Light blue

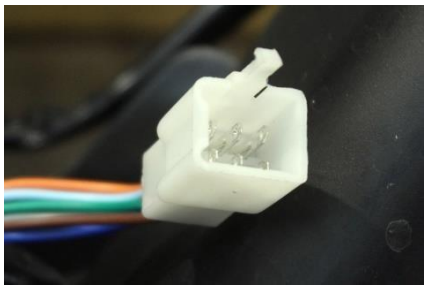
NOTE: The horn is located inside the tubular frame that joins the steering column

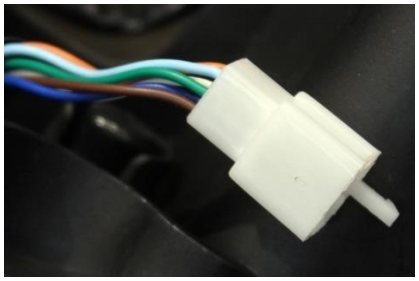
To check if the horn is working, disconnect the Faston terminals from the horn and connect, using the appropriate cables, a charged 12 V battery to the horn terminals. Polarity doesn't matter. If the horn sounds, it is working properly. To carry out the test it will be easier to access through the front wheel arch instead of removing the front bodywork.

6.16. Headlight



White colour connector





Identifying the cables on the connector terminals

① Orange	④ Light blue
② White	⑤ Green
③ Blue	⑥ Brown

NOTE: Orange ① and light blue ④ cables are directed towards the front indicators.

Connect, with the appropriate cables, a charged 12V battery to the following headlight

connector terminals:

Negative (-) battery terminal to green cable⑤

Positive (+) battery terminal to:

Blue cable③: both full beams come on

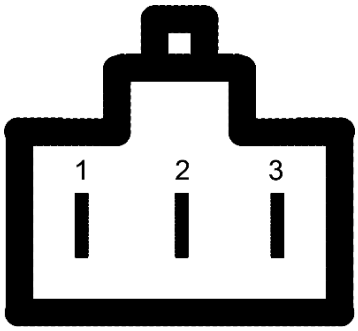
White cable②: both dipped headlights come on

Brown cable⑥: the two light guides with position light come on

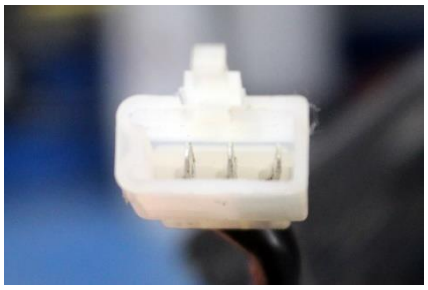
NOTE: Full beams are more intense than dipped beams

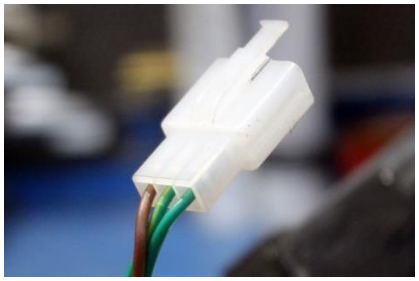
NOTE: To dismantle the headlight, consult→ 1.3.6. Disassembly of the front protection and headlight

6.17. Taillight



White colour connector





Preliminary operations to access the connector:

- Dismantling the helmet box (→ 1.4.1.). The seat extraction explained in the first step of the process is not necessary.

Identifying the cables on the connector terminals
① Green
② Green/yellow
③ Brown

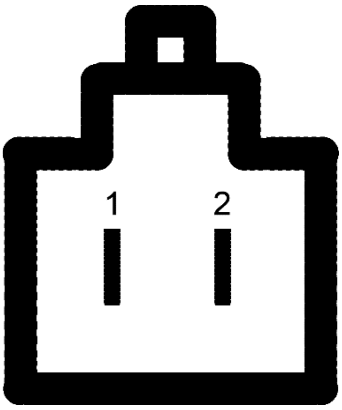
Using the appropriate cables, connect a charged 12 V battery to the following terminals of the tail light connector:

Negative (-) battery terminal to green cable①
Positive (+) battery terminal to:
Green/yellow cable②: the brake light comes on
Brown cable③: the position light comes on

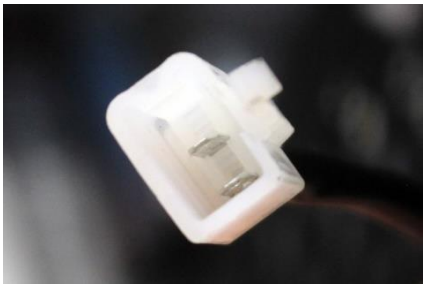
NOTE: The brake light is more intense and is located in the centre of the “V” formed by the position light

NOTE: To remove the rear light, consult→ 1.4.3. Removing the tail light/rear fender skirt

6.18. Licence plate lighting



White colour connector



Preliminary operations to access the connector:

- Dismantling the helmet box (→ 1.4.1.). The seat extraction explained in the first step of the process is not necessary.

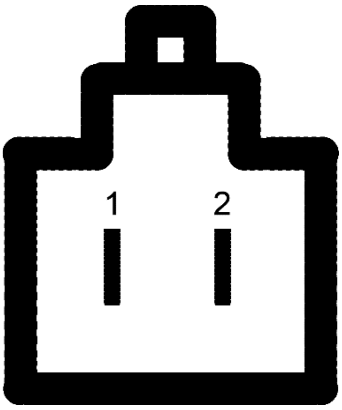
Identifying the cables on the connector terminals
① Green
② Brown

Using the appropriate cables, connect a charged 12 V battery to the following terminals of the tail light connector:

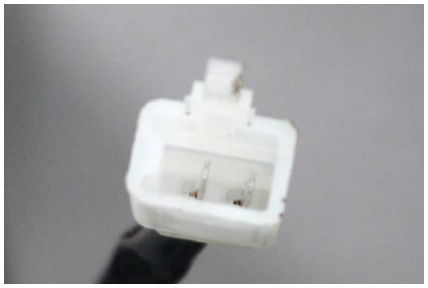
Negative (-) battery terminal to green cable①
Positive (+) battery terminal to brown cable② and the licence plate light will come on

NOTE: To remove the licence plate light, consult→ 1.4.3. Removing the tail light/rear fender skirt

6.19. Front indicators



White colour connector



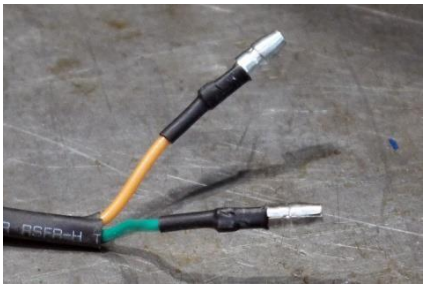
Identifying the cables on the connector terminals
① Green
② Orange (left turn signal)/light blue (right turn signal)

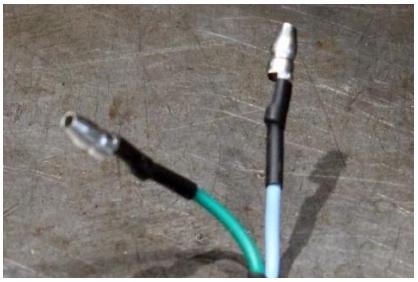
Using the appropriate cables, connect a charged 12 V battery to the following terminals of the tail light connector:

Negative (-) battery terminal to green cable①
Positive (+) battery terminal to orange/light blue cable② and the indicator will turn on

NOTE: Access through the front wheel arch will allow access to the indicator connectors without having to remove the front bodywork

6.20. Rear indicators





Preliminary operations to access the connector:

- Dismantling the helmet box (→ 1.4.1.). The seat extraction explained in the first step of the process is not necessary.
- Dismantling the plastic tray under the seat hinge (→ 1.4.2.). Complete only the first three steps of this process.

NOTE: Before connecting a battery to the turn signal terminals, check that the connectors make good contact. If they make contact, but they do not work, use the following procedure:

Cable identification on independent green bullet connector terminals
Orange (left turn signal)/light blue (right turn signal)

Using the appropriate cables, connect a charged 12 V battery to the following terminals of the tail light connector:

Negative (-) battery terminal to green cable
Positive (+) battery terminal to orange/light blue cable and the indicator will turn on

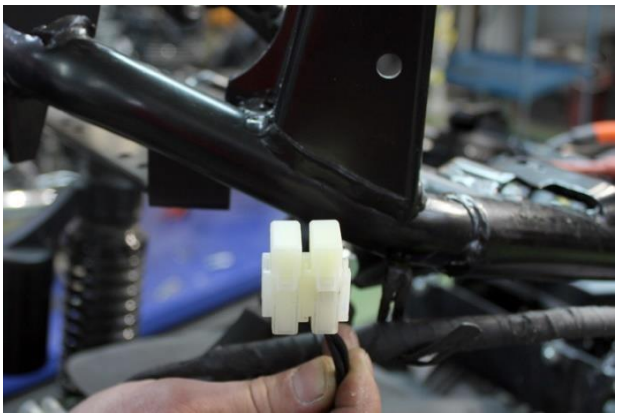
If the tested indicator still does not work, replace it with a new one.

6.21. 12 V circuit fuse

Preliminary operations:

- Remove the helmet box (→ 1.4.1.). Removing the seat as explained in step one is not necessary.

Locate the fuse box at the end of the main 12V circuit wiring near the taillight.



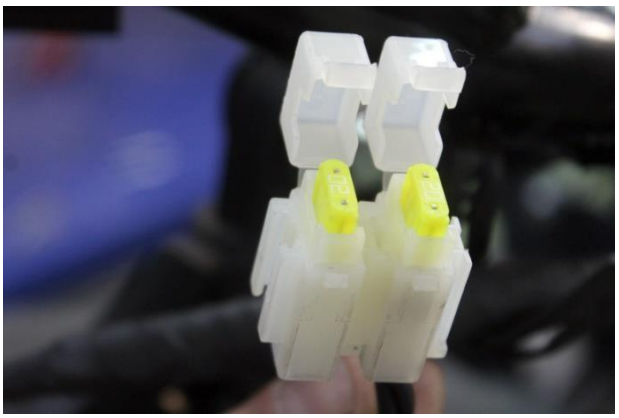
Open the covers to access the fuses. The fuse connected to the wiring corresponds to the circuit fuse. The other serves as a spare.

Extract the fuse by pulling it with your fingers and replace it with the spare one.

Remember to replace the spare fuse.

12 V circuit fuse: 20A (Yellow)

Fuse type: Mini Blade



6.22. Dashboard disassembly

NOTE: In chapter 1 devoted to the bodywork, the dismantling of the dashboard is explained in section 1.3.7. However, if you need to access the dashboard to replace it without having to change the tray on which it rests, we suggest the following procedure which only requires the dismantling of the front side body parts.

Preliminary operations:

- Removing the right front protection (→ See 1.3.5. Disassembly of the front protection

Necessary tools

#2 Phillips screwdriver

8 mm socket, counter-angled or ratchet wrench

5 mm Allen key.

Plastic disassembly tool

Small screwdriver or punch

10mm socket wrench

Remove the front wheel arch grille. See section 1.3.1.

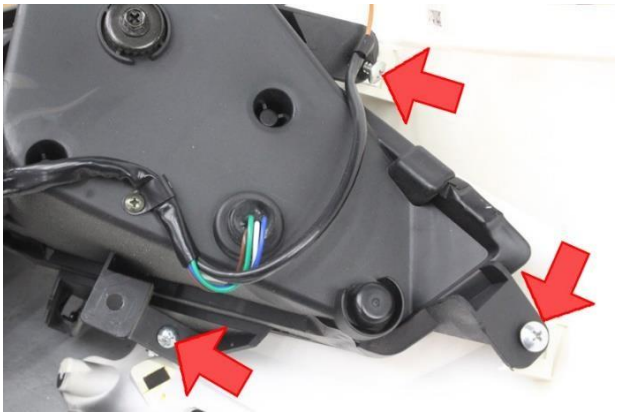
Remove only one side of the front lateral part, for example, the right. See section 1.3.2.

Remove the windshield. See section 1.3.3.

Remove the front centre liner and right side extended moulding

See section 1.3.4.

Before removing the right side cover, you will need to remove the three screws marked with arrows that connect it to the headlight. Access these screws from inside the front wheel well using a no.2 Phillips screwdriver.



Remove the upper right side cover and centre piece.

See section 1.3.4.

The figure illustrates what the scooter will look like without the right side and centre front parts.

Through the top gap, access the frame connection marked in the yellow circle and the 10mm nuts that secure the frame to the plastic tray using a 10 mm socket wrench with its corresponding ratchet.

Tightening torques: 10-12 Nm

6.23. Checking charger 12V output

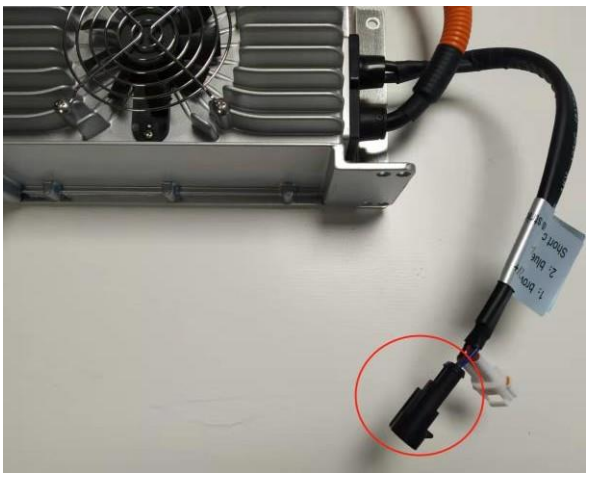
NOTE: The figures appear on a white background to better see the connectors. None should be unplugged.

Preliminary operations:

- Remove the helmet box (→ 1.4.1.). Removing the seat as explained in step one is not necessary.

Locate the 12V connector on the right side of the charger. The wiring is identified with an explanatory sticker.

The 12V connector is indicated by a red circle in the photo on the right. The connector is black in colour.



At the back, insert the multimeter terminals into each hole.

The positive terminal of the multimeter should go with the brown cable and the negative terminal of the multimeter with the blue cable.

Make sure the terminals make good contact with the metal inside the connector.

Configure the multimeter for reading the voltage continuously.

Finally, put the motorcycle to charge and see the multimeter reading.

6.24. Changing the accelerator connectors

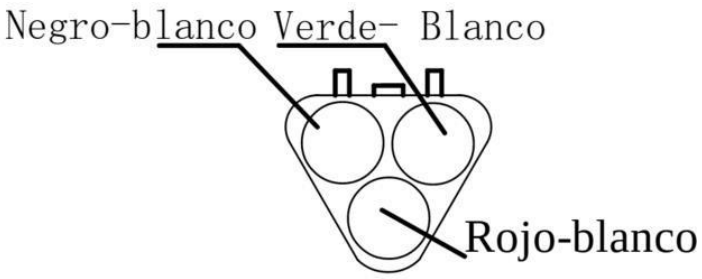
Operations prior to accessing the connector:

- Access to the connectors (❼ 6.3.).

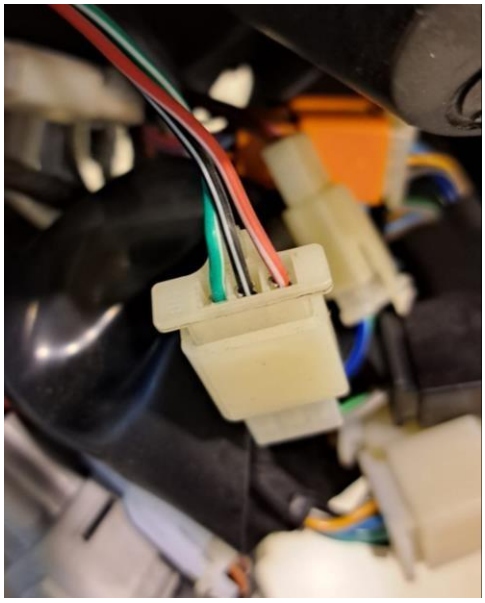
Necessary tools

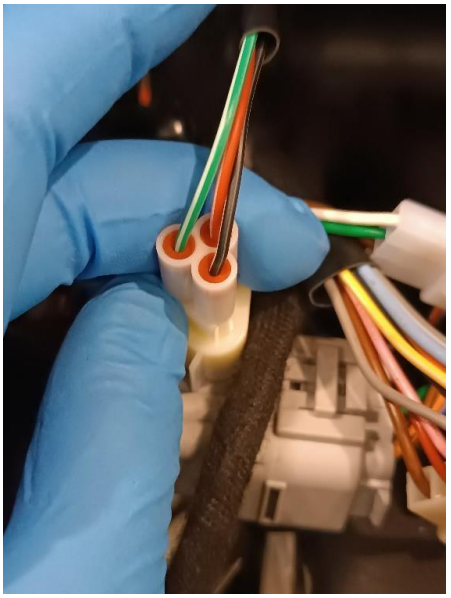
Pliers for non-insulated terminals

Locate the accelerator connector. Replace this connector according to the definition for the accelerator side:

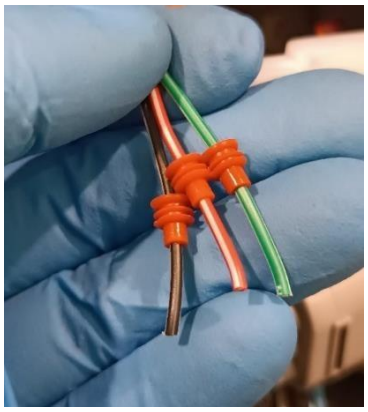


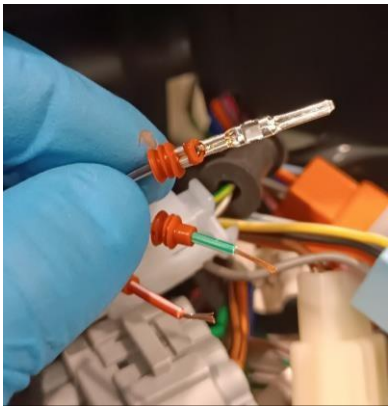
This connector is used to seal the exposed parts:





For this, the current pins must be cut off and replaced by new ones The rubber sleeve prevents the ingress of moisture to the connector. The hose is fastened by means of the pin itself as shown in the following sequence of images:



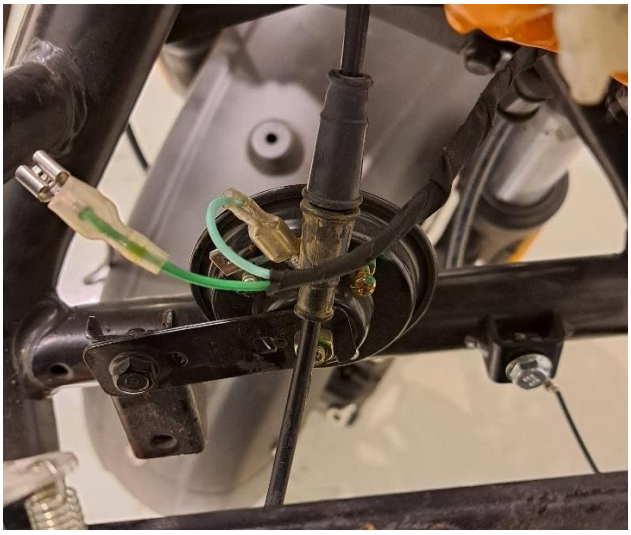


It is important that the pin is above the sleeve's 3 rubber rings.

6.25. Earth connection installation

Locate the two horn connections. The horn is accessible from the upper part of the front lower faring or front ventilation grille.

Disconnect the green cable from the horn leaving the turquoise blue cable connected.



Connect the provided cable to the green cable and to the horn. Lastly, connect the cable washer to the chassis by means of the bolt located to the right of the horn.