6. Electrical system components 12V

6.1. General instructions

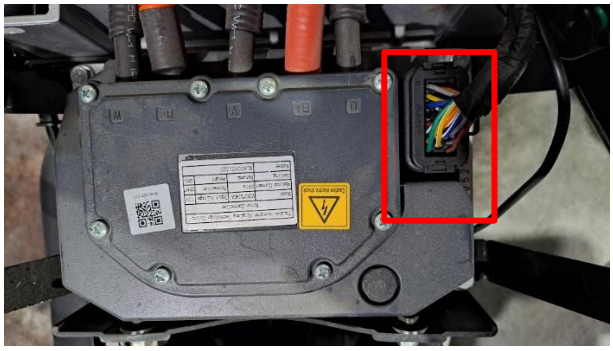
- To check if a control is working properly, perform a continuity test with a multimeter on the terminals of the connector corresponding to that control.
- This chapter shows the connectors that correspond to all the controls by showing a drawing of the connector as seen from the control side (not the main wiring).
- The drawing of the connector also shows the colours of the wires connected to its terminals.
- When a cable is indicated with two colours, the first colour corresponds to the dominant colour while the second is the minority colour which is identified by a line on the cable.
- For the continuity test it is not necessary to turn the ignition key to ON.
- Continuity occurs when the corresponding knob is operated: by holding down the button during the test or by switching to the required position.
- The electrical circuit of the switches and controls is low voltage so it is not necessary to use PPE (Personal Protective Equipment).
- The accelerator works by Hall effect so it must measure DC voltages and not continuities or resistances.
- Replace the component with a new one if continuity (buttons, switches, or selectors) or the voltmeter reading (throttle) is not correct. If the component does not work when injecting an external power supply, it must be replaced with a new one. If it complies with the specifications, you should check the main wiring or check for loose or misconnected connectors.
- Do not confuse polarity when checking lighting components.
- Replace the fuse with one of the same type and amperage.
- First find the cause of the blown fuse, otherwise the fuse will blow again.
- Do not replace the fuse with a higher amperage fuse or with a wire or other metal object as this may overheat the circuit and cause a fire.

6.2. 12V system measurement from the controller connector

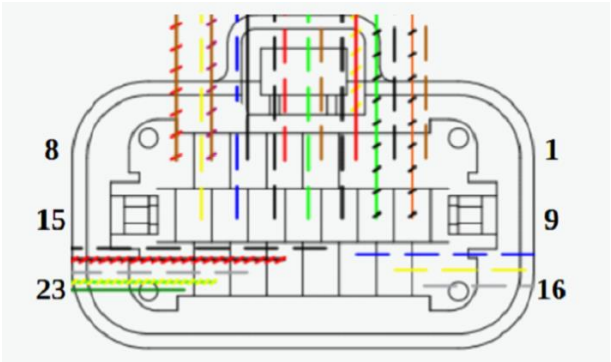
Required prior operations:

- Hull boot removal (→ See 1.4.1. Helmet boot. No need to remove the seat

Identify the connector of the analogue signals of the controller.

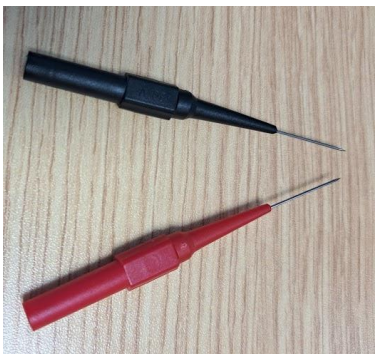


Identify the cable numbering as shown in the picture on the right.



Without removing the connector, and with the vehicle activated, the voltage of each signal must be measured with a fine-tipped multimeter probe.

For this purpose, the multimeter must be configured to measure DC voltage and scale 0-20V.



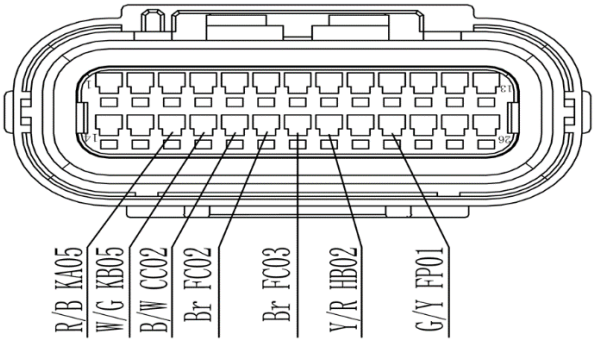
The definitions of each cable are as follows:

Code	Colours	Definition	Values
1	Brown	Power supply for hall sensor	5V
2	Black	Ground for hall sensor	
3	Red/orange	Power supply for hall sensor	5V
4	Brown/white	Ready button	Pressed: 0.8V Not pressed: 0V
5	Red	Accelerator power supply	5V
6	Black	Power supply for the controller	12V
7	Grey/blue	CAN L	
8	Brown/red	CAN H	
9	Orange	Power supply for hall sensor	5V
10	Green	Hall sensor square signal	0–5V
11	White	Hall sensor square signal	0–5V
12	White/green	Throttle signal	0.85–4.25V
13	Orange/white	Side kickstand sensor	2.8V
14	White/blue	Driving modes	Pressed: 0V Not pressed: 2.8V
15	Yellow/white	Diagnosis and programming	
16	Grey	Ground for hall sensor	
17	Yellow	Hall sensor square signal	0–5V
18	Blue	Hall sensor square signal	0–5V
19	Brown	Throttle ground	
20	No terminal		
21	White/grey	Reversing button	Pressed: 0.8V Not pressed: 0V
22	Yellow/Green	Brake button signal	Not active: 0.8V Activated: 12V
23	Green	Controller ground	

6.3. Connector wiring

The wiring of all 12V and CAN BUS electrical system connectors is detailed below. The drawings represent the female connectors.

6.3.1. TFT screen



Colours

❶ to ⓯ no terminal

⓰ KA05: Red/Black. CAN H.

⓱ KB05: White/Green. CAN L.

⓲ CC02: Black/White. Ground

⓳ FC02: Brown. Instrument panel power supply.

⓴ FC03: Brown. Instrument panel power supply.

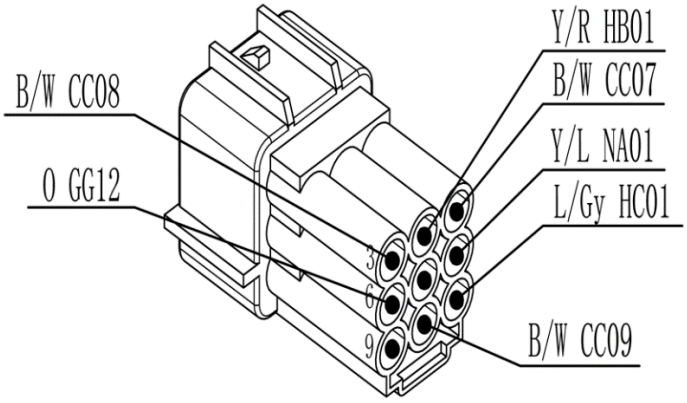
(21) HB02: Yellow/Red. Signal P (parking)

(22) No Terminal

(23) FP01: Green/Yellow. Trip odometer reset signal.

(24) to (26) no terminal

6.3.2. Right handlebar switch assembly 1



Colours

❶ CC07: Black/White. Ground

❷ HB01: Yellow/Red Signal P (parking).

❸ CC08: Black/White. Ground

❹ NA01: Yellow/Blue. Emergency lighting.

❺ No terminal

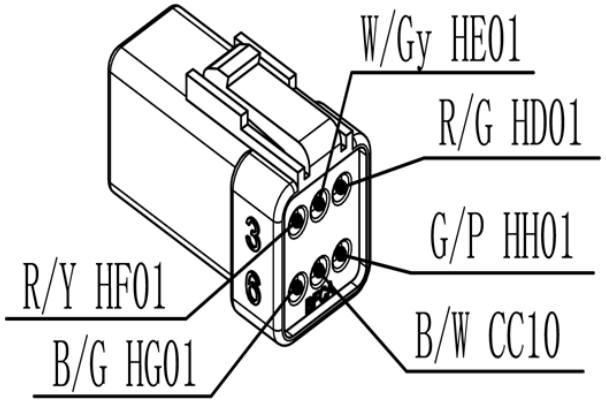
❻ GG12: Orange 12V DC converter.

❼ HC01: Blue/Grey Reverse gear.

❽ CC09: Black/White Ground

❾ No terminal

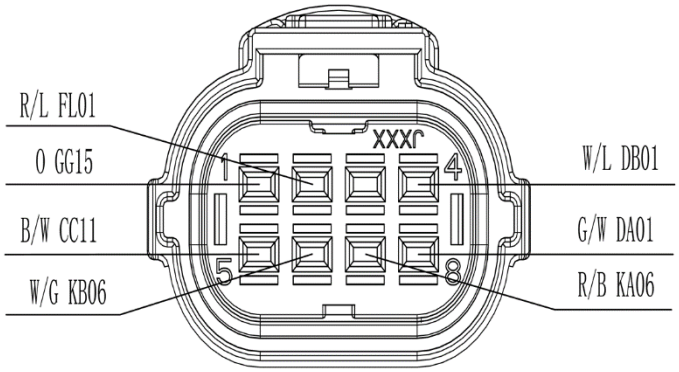
6.3.3. Right handlebar switch assembly 2



Colours

1. HD01: Red/Green. Throttle power supply
2. HE01: White/Grey Throttle ground.
3. HF01: Red/Yellow. Throttle signal.
4. HH01: Green/Pink. Eco driving mode.
5. CC10: Black/White. Ground
6. HG01: Black/Green. Sport driving mode.

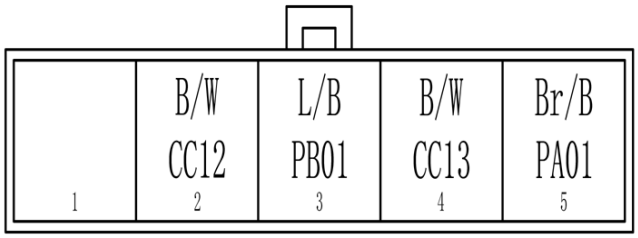
6.3.4. BDU



Colours

1. GG15: Orange 12V DC converter.
2. FL01: Red/Blue. BMS activation signal.
3. No terminal
4. DB01: White/Blue. Battery communication COMH_N.
5. CC11: Black/White Ground
6. KB06: White/Green. CAN L.
7. KA06: Red/Black. CAN H.
8. DA01: Green/White. Battery communication COMH_P.

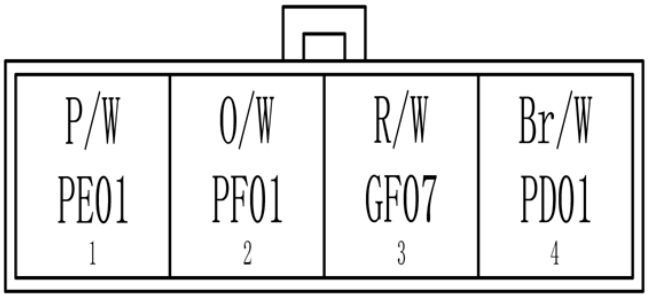
6.3.5. Charging indicators



Colours

1. No terminal
2. CC12: Black/White Ground
3. PB01: Blue/Black. Red signal from the charging port.
4. CC13: Black/White. Ground
5. PA01: Brown/Black. Green signal from the charging port.

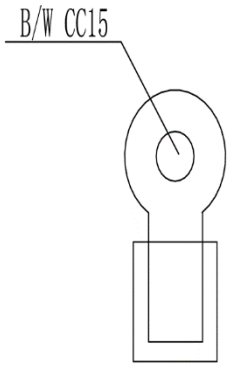
6.3.6. Charging signal



Colours

1. PE01: Pink/White. Positive signal from the charging socket.
2. PF01: Orange/White. Negative signal from the charging socket.
3. GF07: Red/White. Positive battery terminal.
4. PD01: Brown/White. Charging signal.

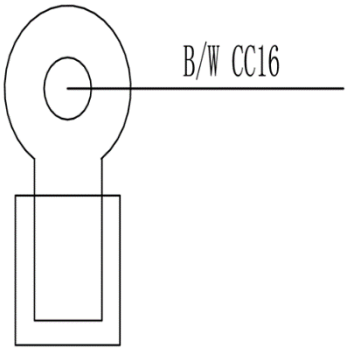
6.3.7. Ground cable



Colours

1. CC15: Black/White Ground

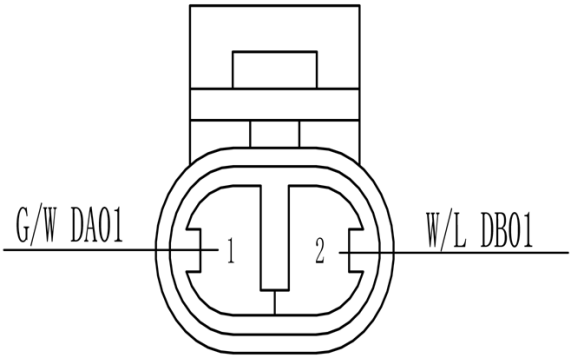
6.3.8. Negative terminal DCDC output



Colours

1. CC16: Black/White Ground

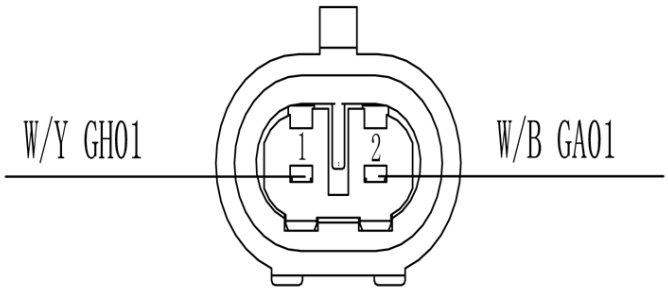
6.3.9. Battery pack communication



Colours

1. DA01: Green/White. Battery communication COMH_P
2. DB01. White/Blue. Battery communication COMH_N

6.3.10. Charge confirmation

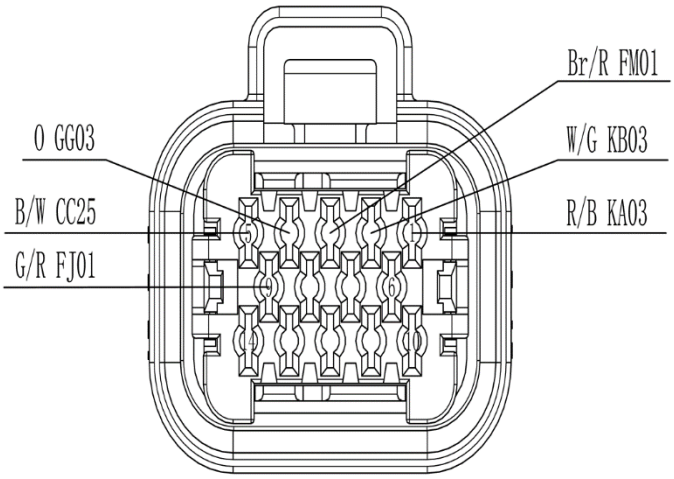


Colours

❶ GH01: White/Yellow. CP signal.

❷ GA01: White/Black. PE signal.

6.3.11. Charger



Colours

❶ KA03: Red/Black. CAN H.

❷ KB03: White/Green. CAN L.

❸ FM01: Brown/Red. DC-DC activated signal.

❹ GG03: Orange 12V DC converter.

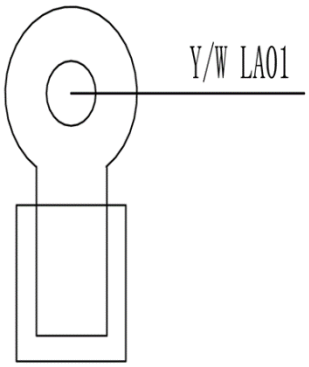
❺ CC25: Black/White Ground

❻ to ❽ No terminal

❾ FJ01: Green/Red. Charger activated signal.

❿ to ⓮ No terminal

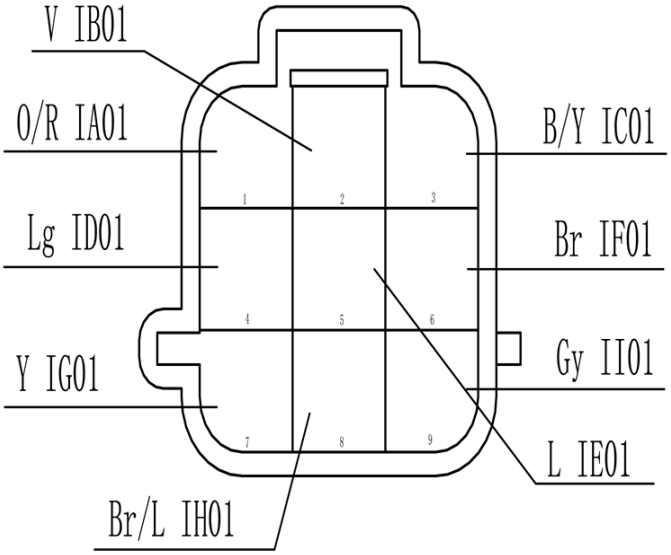
6.3.12. DC-DC output positive terminal



Colours

❶ LA01: Yellow/White. 12V DC converter.

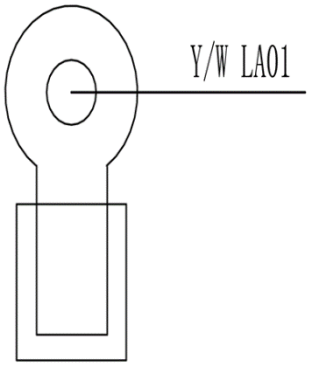
6.3.13. Magnetic encoder



Colours

1. IC01: Black/Yellow. Encoder 5V negative signal.
2. IB01: Violet Magnetic encoder temperature signal.
3. IA01: Orange/Red. Encoder 5V positive signal.
4. IF01: Brown Magnetic encoder B-.
5. IE01: Blue. Magnetic encoder Z-.
6. ID01: Light green. Magnetic encoder A-.
7. II01: Grey. Magnetic encoder B+.
8. IH01: Brown/Blue. Magnetic encoder Z+.
9. IG01: Yellow. Magnetic encoder A+.

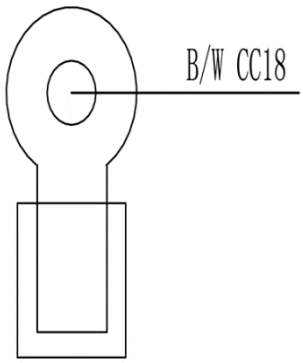
6.3.14. Positive battery terminal



Colours

1. LA01: Yellow/White. 12V DC converter.

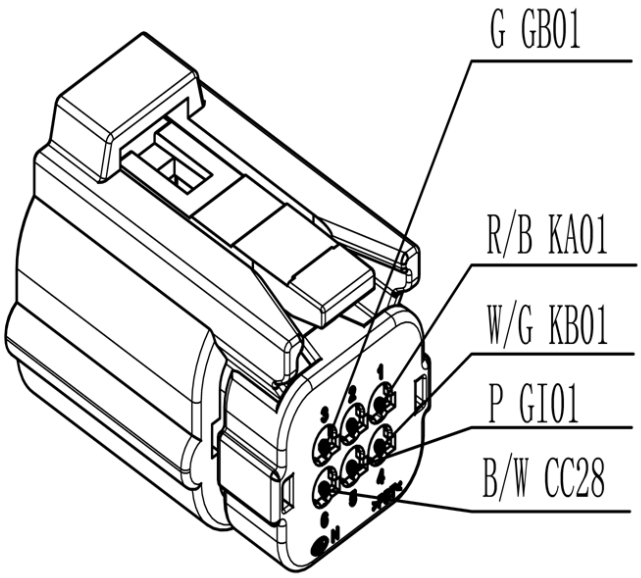
6.3.15. Negative battery terminal



Colours

1. CC18: Black/White: Ground

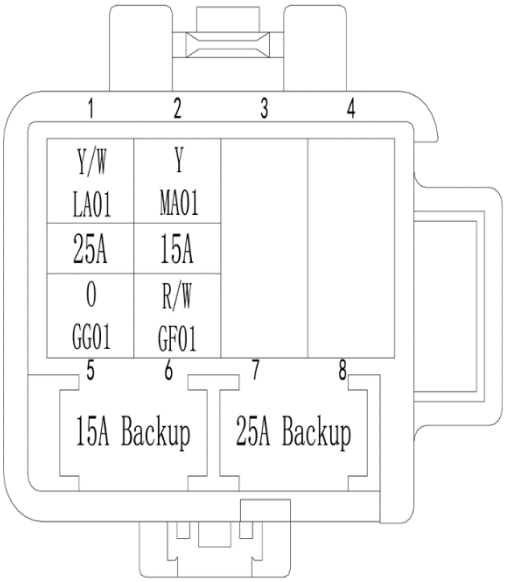
6.3.16. OBD



Colours

1. KA01: Red/Black. CAN H.
2. No terminal
3. GB01: Green. D+.
4. KB01: White/Green. CAN L.
5. GI01: Pink. D-.
6. CC28: Black/White Ground

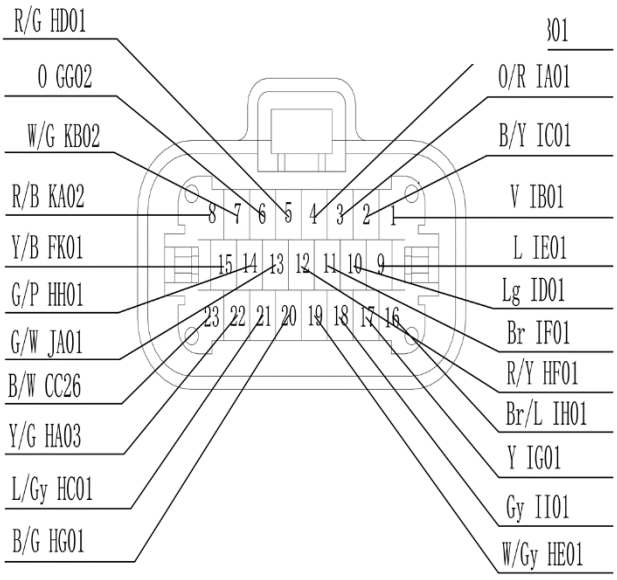
6.3.17. Fuse box



Colours

1. LA01: Yellow/White. Terminal 1 Fuse 25 A
2. MA01: Yellow. Terminal 1 Fuse 15 A
3. No terminal
4. No terminal
5. GG01: Orange Terminal 2 Fuse 25 A
6. GF01: Red/White. Terminal 2 Fuse 15 A
7. No terminal
8. No terminal

6.3.18. MCU



Colours

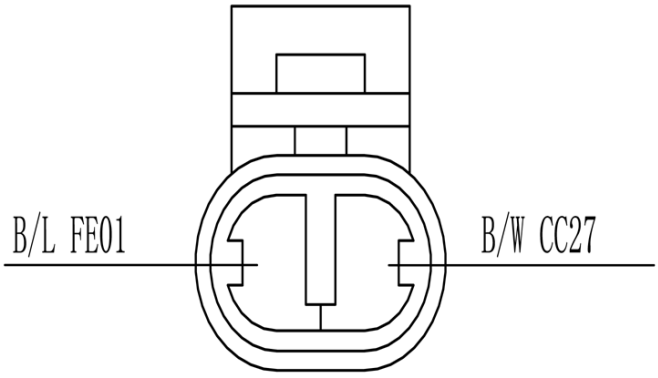
1. IB01: Black. Yellow/Red. Magnetic encoder temperature signal.
2. IC01: Black/Yellow. Encoder 5V negative signal.
3. IA01: Orange/Red. Encoder 5V positive signal.
4. HB01: Yellow/Red. Signal P (parking)
5. HD01: Red/Green. Throttle power supply.
6. GG02: Orange 12V DC converter
7. KB02: Red/Black. CAN L.
8. KA02: Red/Black. CAN H.
9. IE01: Blue. Magnetic encoder Z-.
10. ID01: Light green. Magnetic encoder A-.
11. IF01: Brown Magnetic encoder B-
12. HF01: Red/Yellow. Throttle signal.
13. JA01: Green/White. Side stand sensor.
14. HH01: Green/Pink. ECO driving mode.
15. FK01: Yellow/Black. Engine calibration signal.
16. IH01: Brown/Blue. Magnetic encoder Z+.
17. IG01: Yellow. Magnetic encoder A+.
18. II01: Grey. Magnetic encoder B+.
19. HE01: White/Grey. Throttle mass.
20. HG01: Black/Green. Sport driving mode.

(21) HC01: Blue/Grey. Reverse gear.

(22) HA03: Yellow/Green. Brake signal.

(23) CC26: Black/White Ground

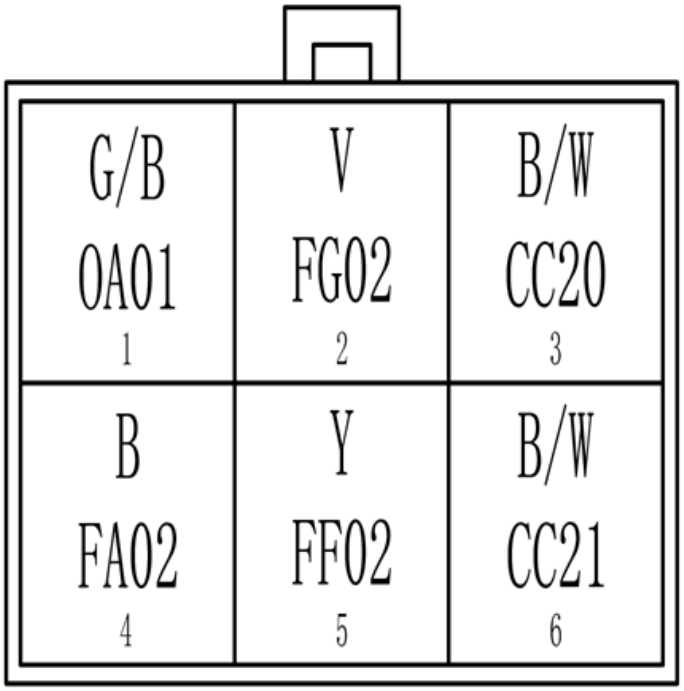
6.3.19. Fan



Colours

1. CC27: Black/White. Ground
2. FE01: Black/Blue. Fan power supply.

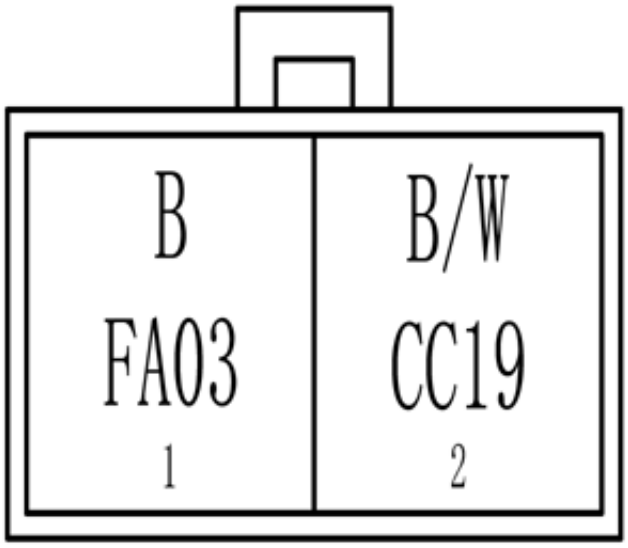
6.3.20. Rear lamp



Colours

1. OA01: Green/Black. Brake light power supply.
2. FG02: Violet Right indicator power supply.
3. CC20: Black/White. Ground
4. FA02: Yellow. Position light power supply.
5. FF02: Yellow. Left indicator power supply.
6. CC21: Black/White Ground

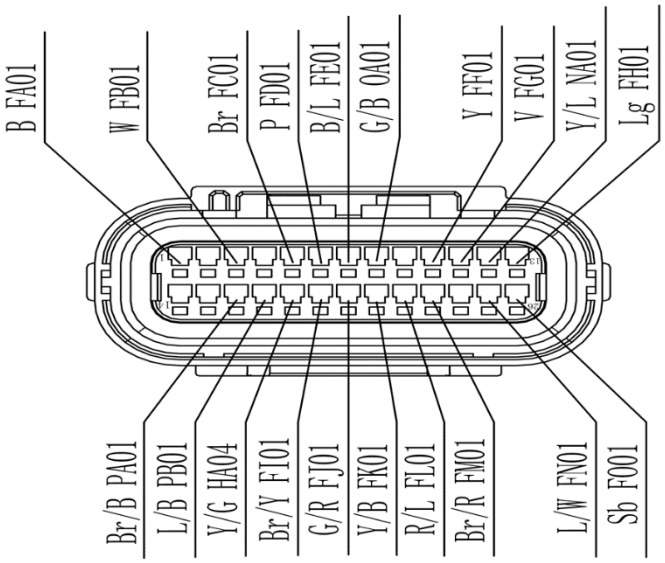
6.3.21. Number plate light



Colours

1. FA03: Black. Low beam power supply.
2. CC19: Black/White Ground

6.3.22. VCU 2



Colours

❶ FA01: Black. Low beam power supply.

❷ No terminal

❸ FB01: White. Main beam power supply.

❹ No terminal

❺ FC01: Brown Instrument panel power supply.

❻ FD01: Pink. Horn power supply.

❼ FE01: Black/Blue. Fan power supply.

❽ OA01: Green/Black. Brake light power supply.

❾ No terminal

❿ FF01: Yellow. Left indicator power supply.

⓫ FG01: Violet Right indicator power supply.

⓬ NA01: Yellow/Blue. Emergency light signal

⓭ FH01: Light green. Right indicator signal.

⓮ No terminal

⓯ No terminal

⓰ PA01: Brown/Black. Power supply green light charging socket.

⓱ PB01: Blue/Black. Power supply red light charging socket.

⓲ HA04: Yellow/Green. Brake signals.

⓳ FI01: Brown/Yellow. Signal main beam.

⓴ FJ01: Green/Red. OBD active.

(21) FK01: Yellow/Black. Engine calibration signal.

(22) FL01: Red/Blue: BMS active signal.

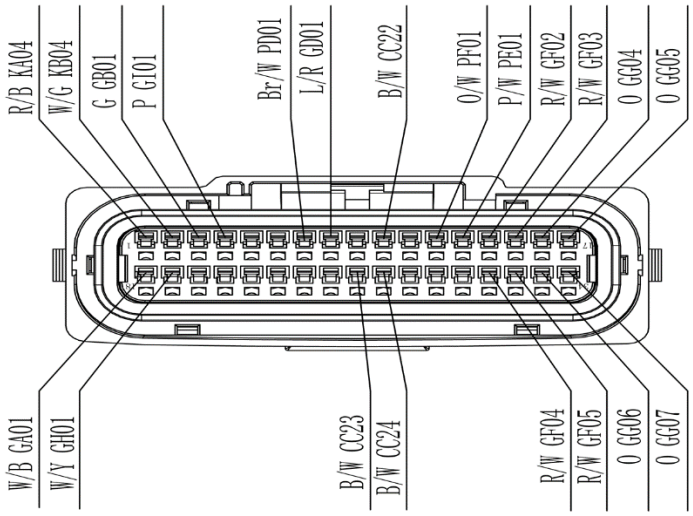
(23) FM01: Brown/Red. DC converter active signal.

(24) No terminal

(25) FN01: Blue/White. Horn signal.

(26) FO01: Cyan. Left indicator signal.

6.3.23. VCU 1



Colours

❶ KA04: Red/Black. CAN H.

❷ KB04: White/Green. CAN L.

❸ GB01: Green. D+.

❹ GI01: Pink. D-.

❺ No terminal

❻ No terminal

❼ PD01: Brown/White. Charger signal.

❽ GD01: Blue/Red. Key.

❾ No terminal

❿ CC22: Black/White Ground

⓫ No terminal

⓬ PF01: Orange/White. Negative (ground) of the electronic charging socket lock.

⓭ PE01: Light green. Positive of the electronic charging socket lock.

⓮ GF02: Red/White. Positive battery terminal.

⓯ GF03: Red/White. Positive battery terminal.

⓰ GG04: Orange 12V DC converter.

⓱ GG05: Orange 12V DC converter.

⓲ GA01: White/Black. PE.

⓳ GH01: White/Yellow. Postcode.

⓴ No terminal

(21) No terminal

(22) No terminal

(23) No terminal

(24) No terminal

(25) No terminal

(26) CC23: Black/White Ground

(27) CC24: Black/White. Ground

(28) No terminal

(29) No terminal

(30) No terminal

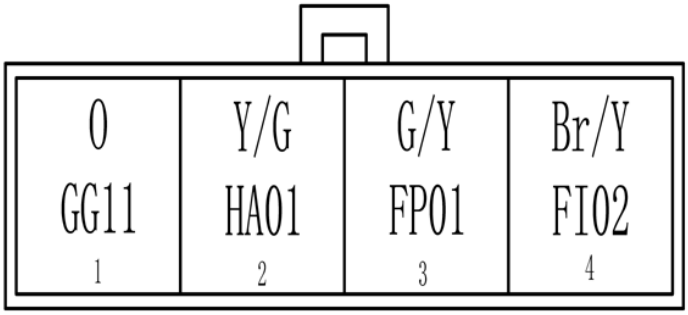
(31) GF04: Red/White. Battery positive terminal.

(32) GF05: Red/White. Battery positive terminal.

(33) GG06: Orange 12V DC converter.

(34) GG07: Orange 12V DC converter.

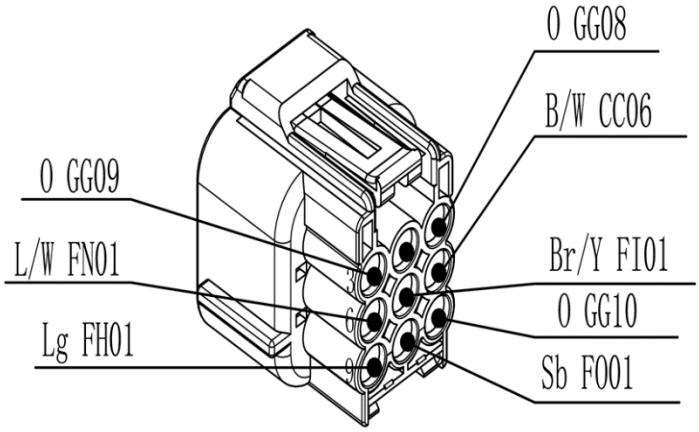
6.3.24. Left handlebar switch assembly 2.



Colours

1. GG11: Orange 12V DC converter.
2. HA01: Yellow/Green. Brake signal.
3. FP01: Green/Yellow. Trip odometer reset.
4. FI02: Brown/Yellow. Signal main beam.

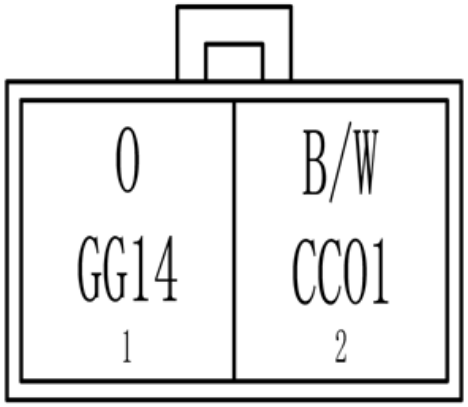
6.3.25. Left handlebar switch assembly 1.



Colours

1. GG08: Orange 12V DC converter.
2. No terminal
3. GG09: Orange 12V DC converter.
4. CC06: Black/White Ground
5. FI01: Brown/Yellow. Signal main beam.
6. FN01: Blue/White. Horn signal.
7. GG10: Orange 12V DC converter.
8. FO01: Cyan. Left indicator signal.
9. FH01: Light green. Right indicator signal.

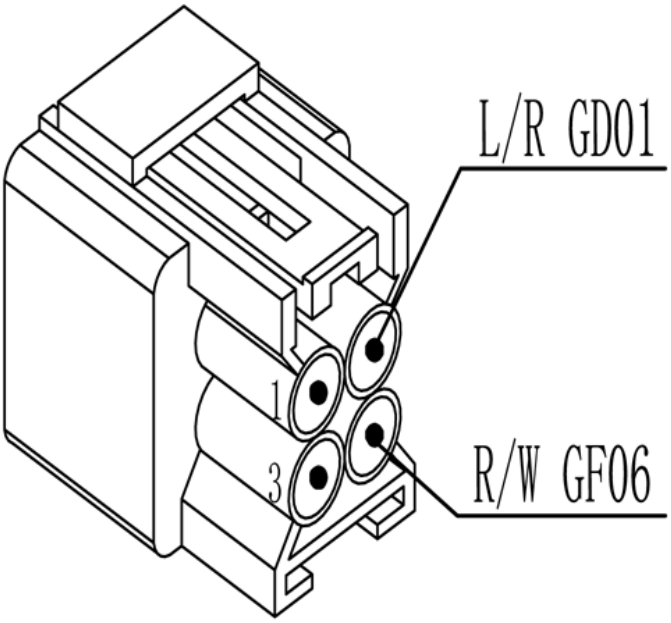
6.3.26. USB connector



Colours

1. GG14: Orange 12V DC converter.
2. CC01: Black/White Ground

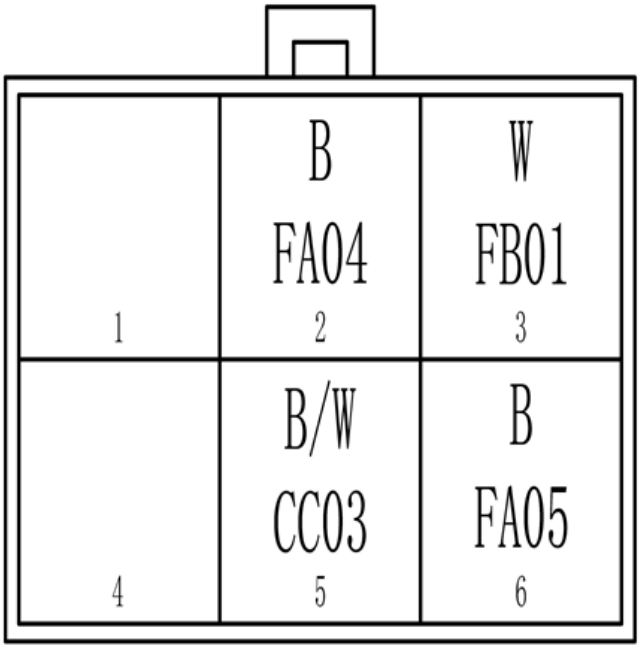
6.3.27. Contact lock



Colours

1. GD01: Blue/Red. Key.
2. GF06: Red/White. 12V extra battery.

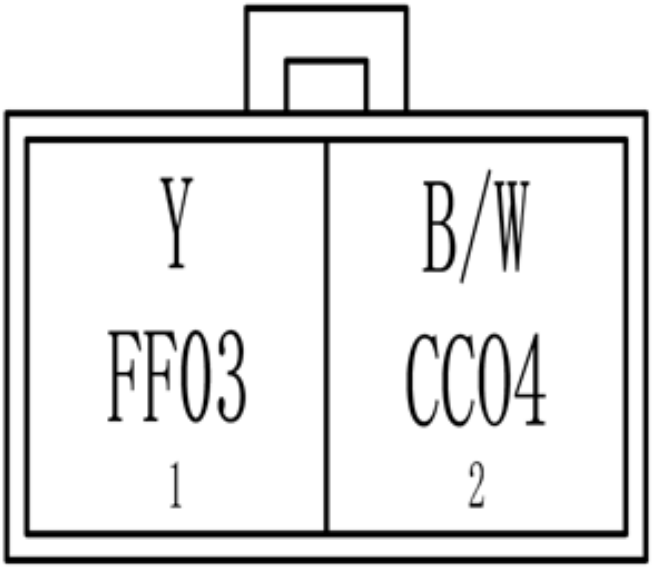
6.3.28. Headlamp



Colours

1. No terminal
2. FA04: Black. Low beam power supply.
3. FB01: White. Main beam power supply.
4. No terminal
5. CC03: Black/White Ground
6. FA05: Black. Low beam power supply.

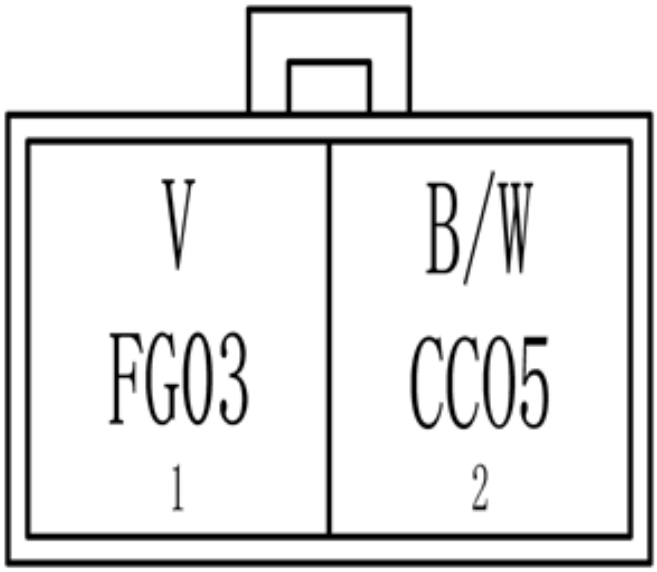
6.3.29. Left indicator



Colours

1. FF03: Yellow. Left indicator power supply.
2. CC04: Black/White Ground

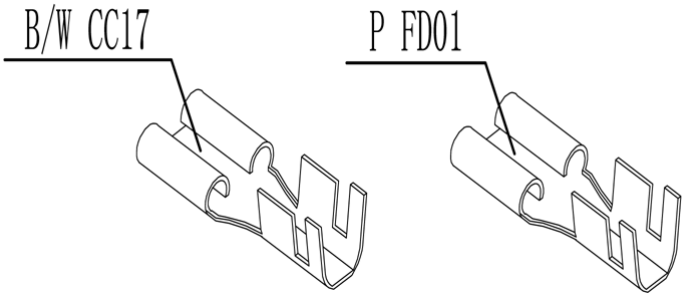
6.3.30. Right indicator



Colours

1. FG03: Yellow. Right indicator power supply.
2. CC05: Black/White Ground

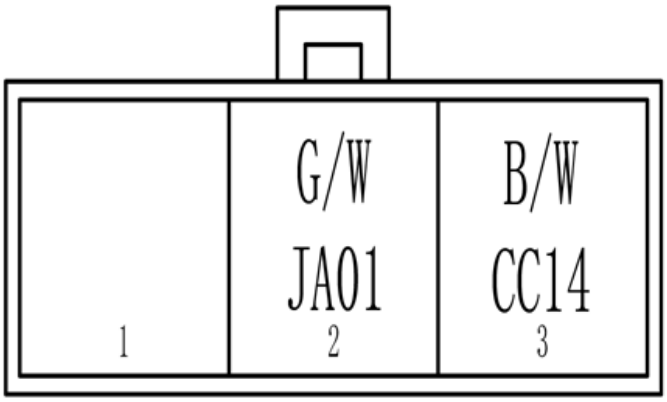
6.3.31. Horn



Colours

1. CC17: Black/White Ground
2. FD01: Pink. Horn power supply.

6.3.32. Side kickstand connector



Colours

❶ No terminal

❷ JA01: Green/Black. Side stand sensor signal.

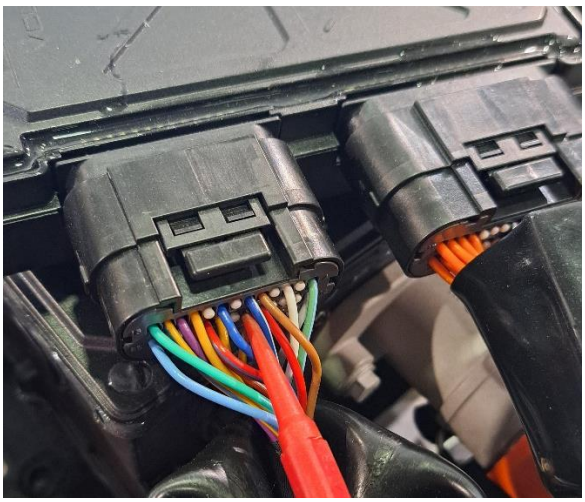
❸ CC14: Black/White Ground

6.4. Left-hand control switches switch housing

Diagnosis of the left-hand switch housing controls is carried out from the VCU. To do this, identify the VCU 2 connector in section 6.3.23. Connector wiring - VCU 2.

Using a multimeter configured to measure DC voltages, take the measurements between the corresponding pin and ground.

High beams:
Identify pin number 19
Button pressed: 14V
Button not pressed:0 V

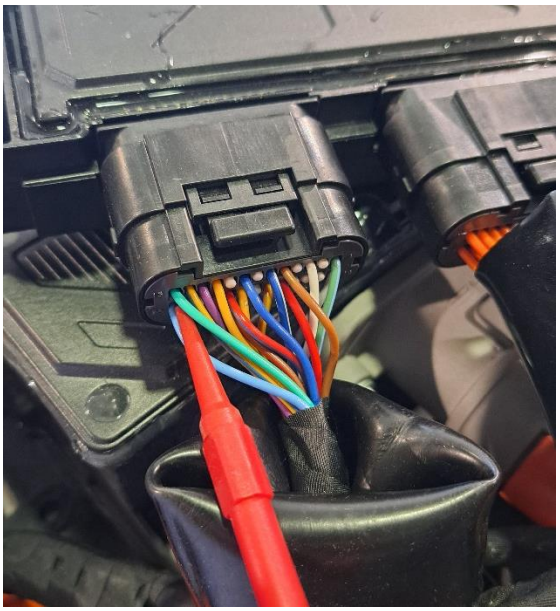


Left indicator:

Identify pin number 26

Button pressed: 14V

Button not pressed: 0V

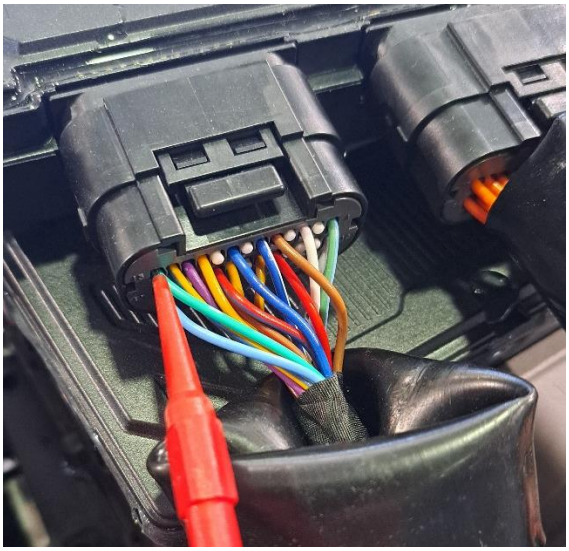


Right indicator

Identify pin number 13

Button pressed: 14V

Button not pressed: 0V

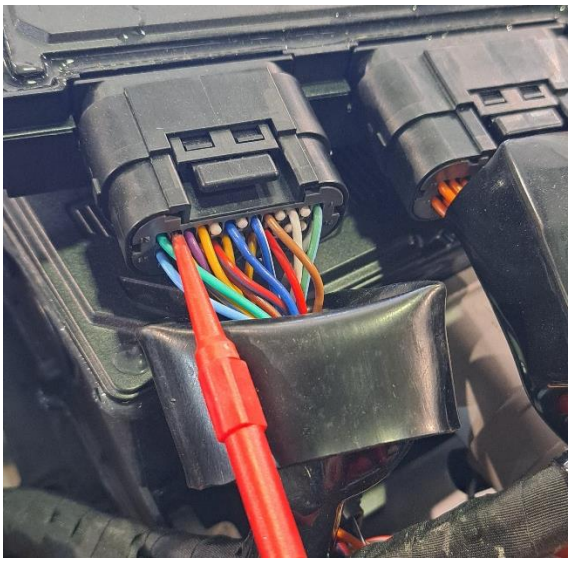


Emergency flashing lights ("Warning")

Identify pin number 12

Button pressed: 14V

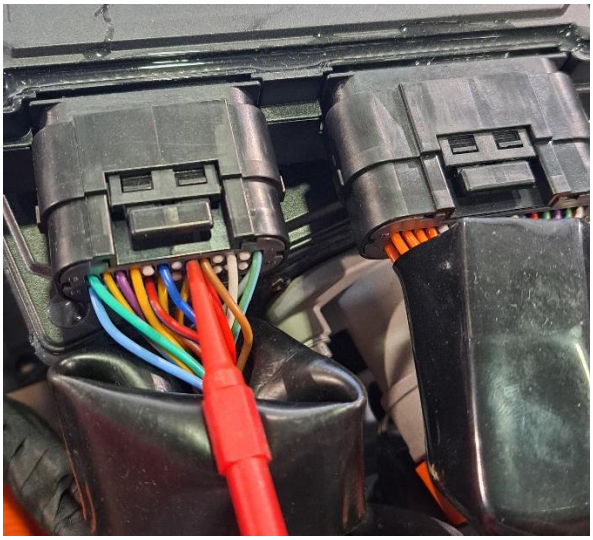
Button not pressed: 0V



Horn

With the scooter turned on, identify pin number 6: it should always have 14V.

With the scooter turned off, measure continuity between pin number 6 and the horn's pink wire.



6.5. Button "P" on the switch housing

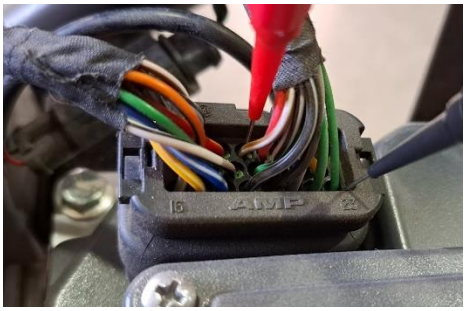
Preliminary indications:

- 6.2 12V system measurement from the controller connector

Identify pins number 4 and 23 on the controller connector.

Button pressed: 0V

Button not pressed: 0.8V



6.6. Rear or front brake light push button

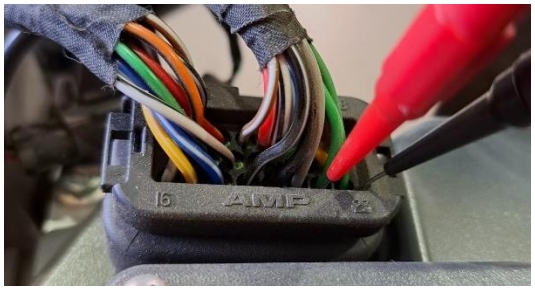
Preliminary indications:

- 6.2 12V system measurement from the controller connector

Identify pins number 22 and 23 on the controller connector.

Button pressed: 0.8V

Button not pressed: 13.5V



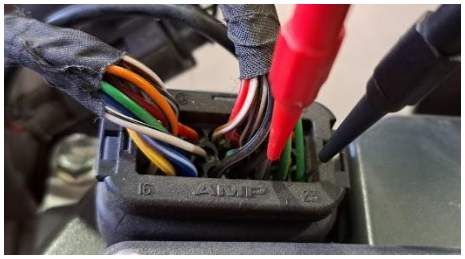
6.7. Drive mode switch

Preliminary indications:

- 6.2 12V system measurement from the controller connector

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

1. Identify connectors 21 and 23. The voltages for each switch position are as follows:
   - Eco: 2.45V
   - Normal: 2.45V
   - Sport: 0V
2. Identify connectors 14 and 23. The voltages for each switch position are as follows:
   - Eco: 0V
   - Normal: 2.45V
   - Sport: 2.45V



6.8. “R” button (Reverse gear)

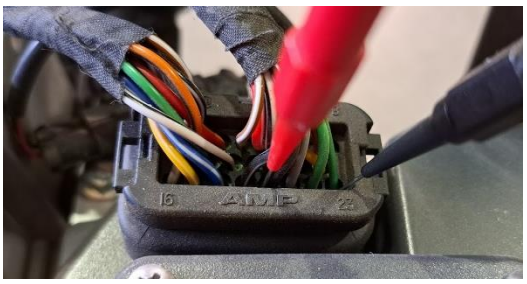
Preliminary indications:

- 6.2 12V system measurement from the controller connector

Identify pins number 21 and 23 on the controller connector.

Button pressed: 0V

Button not pressed: 0.8V



6.9. Side kickstand

Preliminary indications:

- 6.2 12V system measurement from the controller connector

Identify connectors 13 and 23 of the controller connector.

Switch pressed: 2.8V

Switch not pressed: 0V

6.10. Accelerator

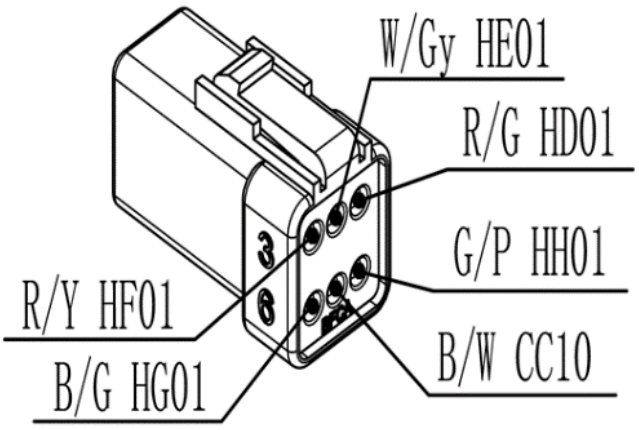
Identify pins 19 and 12 of the controller connector. The measured voltage should be approximately:

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

To measure the throttle supply voltage, identify connectors 5 and 19. The voltage must be 5V.

6.10.1. Isolated throttle signal measurement

Accelerator Connector



Cable colours

❶ HD01 (Red/Green): Positive throttle terminal

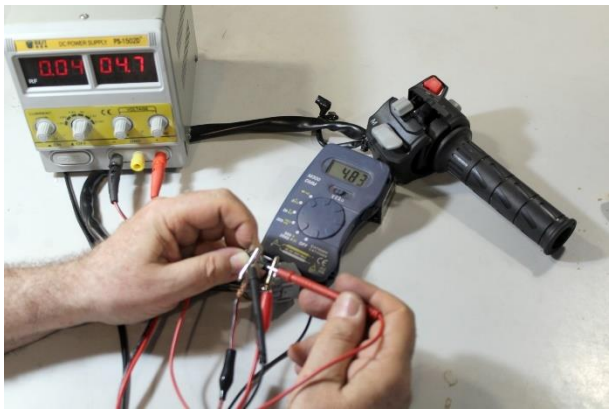
❷ HE01 (White/Grey): Negative throttle terminal

❸ HF01 (Red/Yellow) Throttle Signal

Identify the throttle connector and supply it with 5V DC voltage from a power supply:

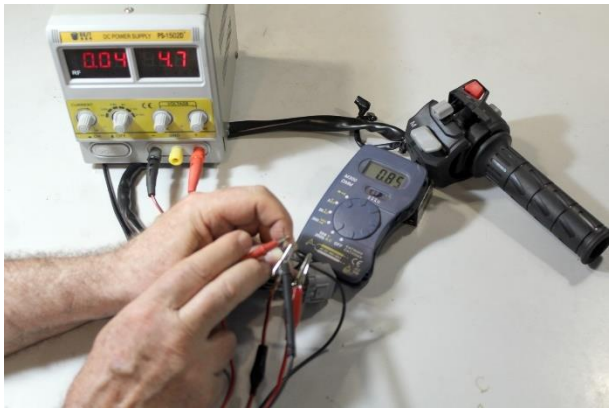
1. White/Grey cable: 0V, reference or negative terminal
2. Red/Green wire: 5V, positive terminal

Check with a multimeter (set as a DC voltmeter with 20V scale) that the voltage is that provided by the source.



The throttle signal is measured by measuring the voltage between the Red/Yellow and White/Grey wires.

Connect the red probe of the multimeter to the Red/Yellow wire while the black probe of the multimeter is connected to the White/Grey wire. At the same time, the 5V indicated in the previous step must be inserted between the Red/Green and White/Grey wires.



The signal measurement with the throttle in its idle position should be approximately 0.86 V.

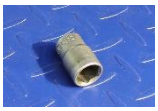
The signal measurement with the throttle in its maximum position should be approximately 4.26 V.

6.11. Dismantling of the switch housings

NOTE: In this section, the procedure for disassembly of the right-hand switch housing is explained, but it is the same for the left-hand switch housing.

Necessary tools

Phillips screwdriver with #2 tip.



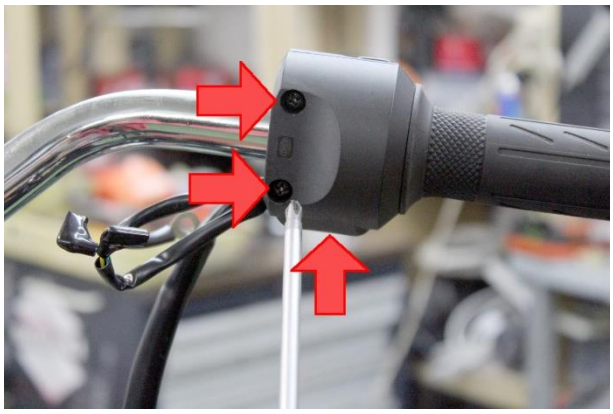
8 mm socket spanner

Disconnect the two faston terminals of the brake light button from the lever.

To remove the brake lever with its corresponding left-hand brake pump, remove the two screws securing the bracket with an 8 mm socket. During assembly, remember that the lower screw secures a grounding point for the wiring.

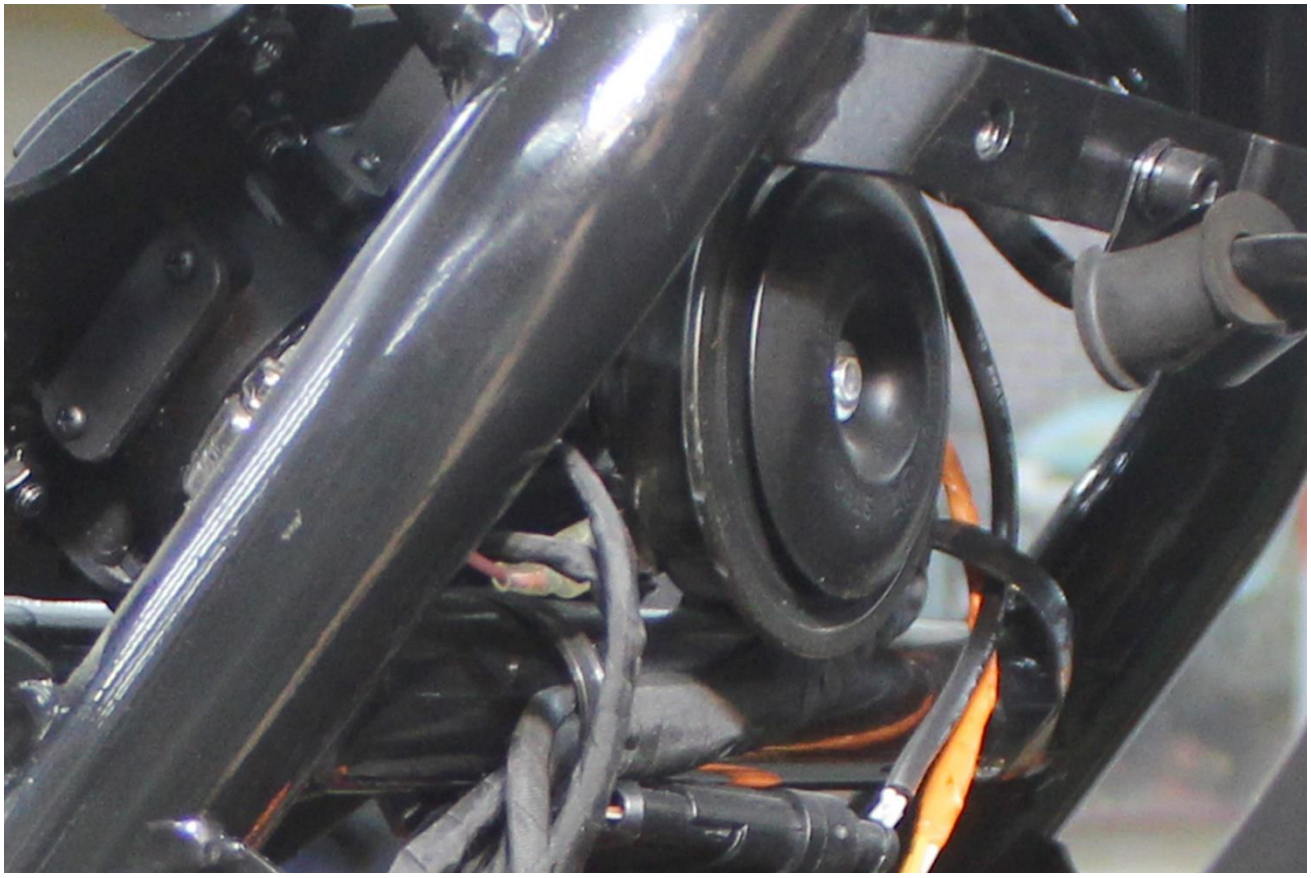
During assembly, position the bracket with the arrow mark and ‘UP’ facing upwards, aligning the inner peg with the handlebar hole (green arrows).

Using a #2 Phillips screwdriver, remove the three screws that secure the left handlebar switch assembly.



During assembly, remember to align the peg of the switch assembly with the handlebar hole (green arrows).

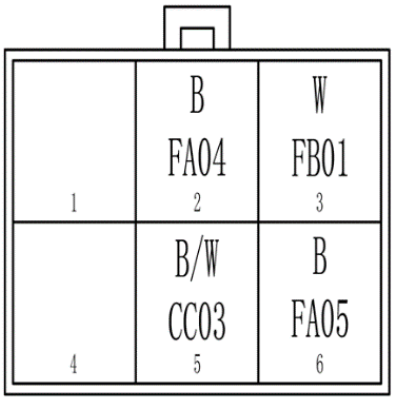
6.15. Horn



The horn is located beneath the steering head. To access your Faston connectors, you will need to remove the front wheel arch trim. (→ See 1.10.2. Disassembly of the front wheel arch). The wires at the terminals of the separate Fast-on connectors are coloured pink and black/white.

To check if the horn is working, disconnect the Fast-on terminals from the horn and connect a charged 12V battery to the horn terminals using suitable cables. Polarity does not matter. If the horn sounds, the horn is working properly. It is easier to test through the front wheel arch rather than removing the front bodywork.

6.16. Headlamp



Identification of the wires at the connector terminals

① No terminal
② Black
③ White
④ No terminal
⑤ Black/White (Ground)
⑥ Black

Connect a charged 12V battery to the following terminals of the headlamp connector (with the appropriate cables):

Negative (-) battery terminal with Black/White cable ⑤
Positive (+) battery terminal with:

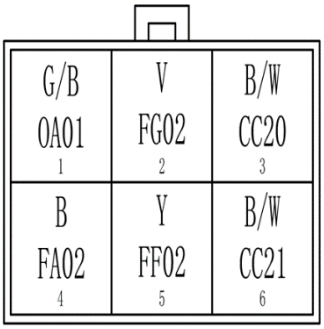
Black Wire ②: powers the low beam headlights
White Wire ③: powers the high beam headlights
Black Wire ⑥: the light guide powers the position light.

NOTE: High beams are brighter than dipped beams

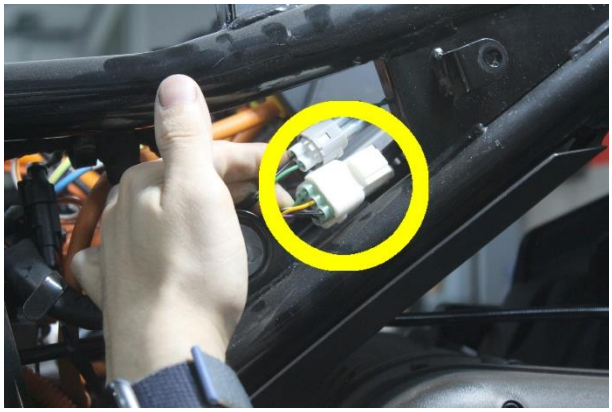
Preliminary operations to gain access to the headlamp and its connector:

- Disassembly of the windscreen (→ 1.13.1.)
- Disassembly of the headlamp (→ 1.13.2.)

6.17. Rear lamp



White connector



Preliminary operations to access the rear lamp and its connector:

- Disassembly of seat base and seat (→ 1.6.)

Identification of the wires at the connector terminals

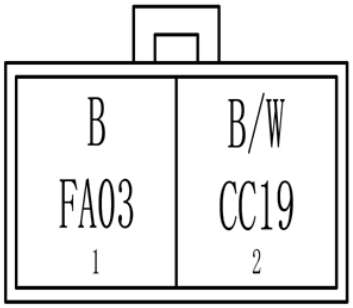
① Green/Black
② Violet
③ Black/White
④ Black
⑤ Yellow
⑥ Black/White

Connect a charged 12V battery to the following terminals of the rear lamp connector (using the appropriate cables):

Negative (-) battery terminal with Black/White wire ③ or ⑥
Positive (+) battery terminal with:
Green/Black wire ①: powers the brake light
Black wire ④: powers the position light

NOTE: Brake light is brighter

6.18. Number plate light



White connector

Preliminary operations to access the number plate lamp connector:

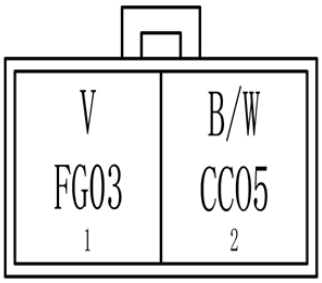
- Disassembly of seat base and seat (→ 1.6.)

Identification of the wires at the connector terminals
① Black
② Black/White

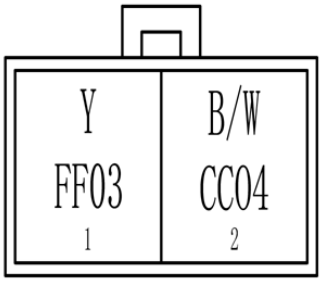
Connect a charged 12V battery to the following terminals of the rear lamp connector (using the appropriate cables):

Negative (-) battery terminal with Black/White cable ②
Positive (+) battery terminal with the Black wire ① and the number plate light will illuminate.

6.19. Indicators



Front/rear right indicator



Front/rear left indicator

Preliminary operations to access the indicator connectors:

- Front indicators (→ 1.13. Disassembly of the headlamp assembly)
- Rear indicators (→ 1.6. Disassembly of seat base and seat)

Identification of the wires at the connector terminals of the right-hand indicator connectors:
① Violet
② Black/White

Identification of the wires at the terminals of the left indicator connector:
① Yellow
② Black/White

Connect a fully charged 12 V battery to the following terminals of the rear lamp connector:

Negative (-) battery terminal with Black/White cable ①
Positive (+) battery terminal with Yellow or Violet cable ② and the indicator will illuminate.

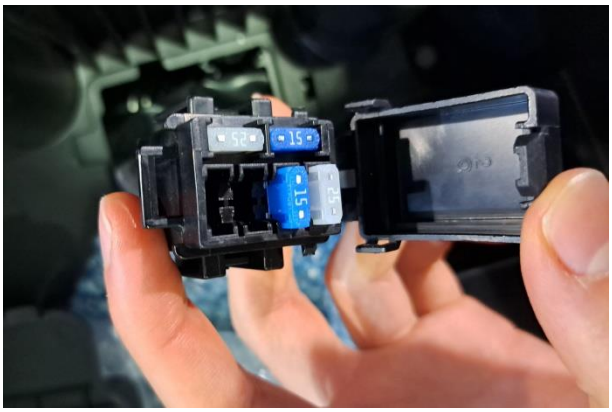
6.20. 12V circuit fuses

6.20.1. Fuse box

The fuse box is located in the storage compartment under the seat, inside a cover positioned just behind the hinge.

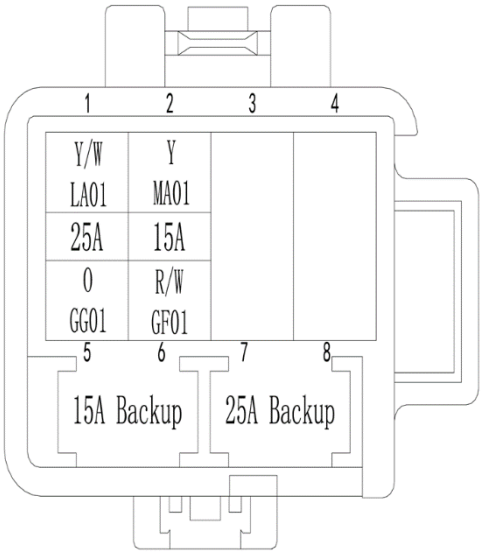
Open the cover by sliding it to the right and remove it. Remove the fuse box from its mounting by sliding it upwards out of its holder.

Open the cover and you will find two fuses, 15 A (blue) and 25 A (white), arranged vertically, along with two identical spare fuses arranged horizontally.



6.20.2. Description of fuses

Code	Protected circuit	Maximum amperage
1	Fuse output DC DC 12V	25A
2	Auxiliary battery output fuse	15A
3	Spare fuse	25A
4	Spare fuse	15A


1
2
3
4
Y/W
LA01
Y
MA01
25A
15A
O
GG01
R/W
GF01
5
6
7
8
15A Backup
25A Backup