

PowerTRONIC V4 Installation Manual

Royal Enfield Interceptor 650 EFI - (2018-2023)

Document Version	2	Release Date	02 June 2023
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Application information	Vehicle Specific
Vehicle	Royal Enfield
Model	Interceptor 650 - [EU 4 and EU 5 included for international models]
Year of manufacture	2018 -2023
PowerTRONIC application	All PowerTRONIC ECUs

Note:

- Read through all instructions before installation and use.
- Ensure that the bike is switched off and the key is out of the ignition before proceeding with the installation.
- Some parts of the bikes might be hot/sharp and may cause burns/cuts. Proceed with extreme caution or wait until the bike has cooled down. Always wear safety gloves.
- When the installation is complete, make sure to secure the wiring loom away from the movable parts or components which tend to heat up during the normal operation of the vehicle at any chance.
- PowerTRONIC is intended for motorsport use on a closed course, please check with your local laws before using this product. Race Dynamics / PowerTRONIC is not liable for consequences arising out of using the product.

Support:

North & South America : +1 267 214 9292 (Call) +91 9606 044 178 (WhatsApp)

India, Bangladesh, Bhutan, Srilanka & Nepal : +91 9916 229 292 (Call & WhatsApp)

Rest of the world : +91 9606 044 177 (Call & WhatsApp)

Email : support@powertronicecu.com

Website : www.powertronicECU.com

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1. Parts list

1	PowerTRONIC	Piggyback ECU <ul style="list-style-type: none"> ● Modulator Connectors
2	Stock Coupler	Stand by unit <ul style="list-style-type: none"> ● Can be connected in place of the PowerTRONIC to run the bike in stock mode if need be. ● Used for the verification of the connections.
3	Harness	Bike specific harness contains the following connectors <ul style="list-style-type: none"> ● Fuel injector connector ● Spark/Ignition coil connector ● Throttle position sensor connector (TPS) ● Ignition modulator Connector ● Map selection connector ● Quickshifter connector ● Ground terminal
4	USB cable	Can be used to connect the PowerTRONIC to a laptop for throttle calibration or changing maps
5	Nylon Tags	To secure wiring harness
6	User guide and Warranty card	Instructions

2. Tools required

Serial No	Main tools	Optional tools
1	M8, M10, M12 Hexagonal socket	Spinner handle
2	M10, 12 T bar Hexagonal Socket wrench	Ratchet handle
3	Wire cutter	M4 hex bit

3. Installation procedure

3.1 Removing panels, fairing

Begin at the right side of the bike.

Park the bike using the centre stand on a level surface (Or a paddock stand).



Image 1

Locate the connections/hoses/wires

Top

- Ground Terminal
- Fuel line
- Vacuum hoses
- Fuel Gauge connector

Right

- Ignition coil
- Fuel Injector



Left

- Ignition coil
- Fuel Injector
- TPS
- Relays

Image 2

3.1.1 Unlock and detach the right side panel. Refer **Image 3**.



Image 3

3.1.2 Gently detach the panel after unlocking it. Refer **Image 4**.



Image 4

3.1.3 Locate and pull the knob to unlock the seat lock. Refer **Image 5**.

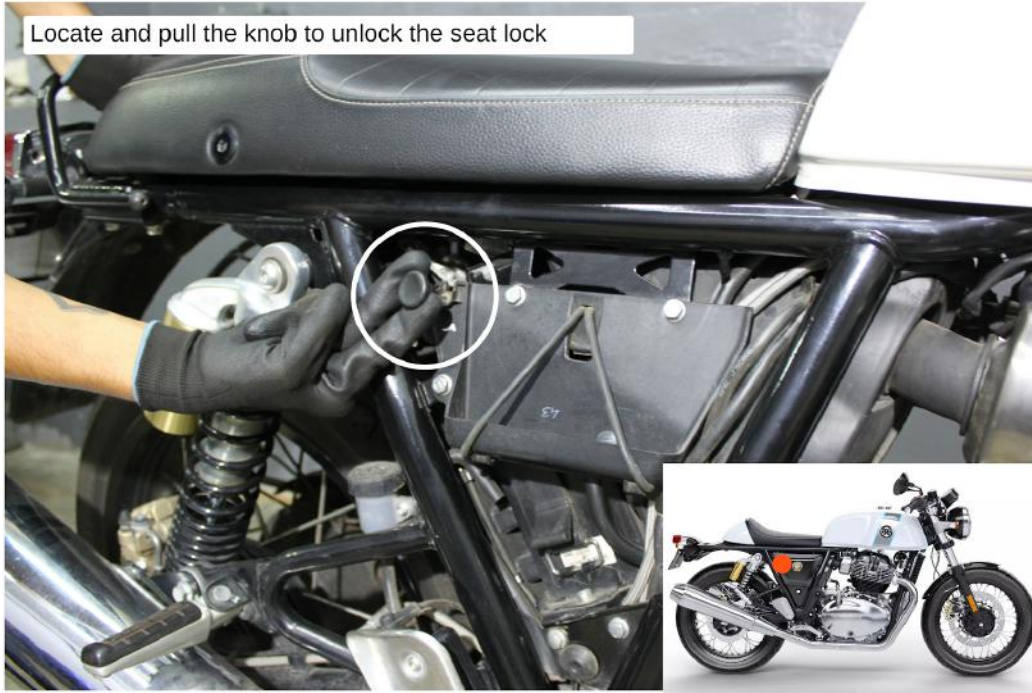


Image 5

3.1.4 **Image 6** shows how the seat is unlocked.



Image 6

3.1.5 Detach the seat carefully. Refer [Image 7](#).



Image 7

3.1.6 Locate and remove the tank bolts using M10 hexagonal T socket. Refer [Image 8](#) and [Image 9](#)



Image 8



Image 9

3.1.7 After removing the bolts, gently lift the rear end of the tank a little. Refer [Image 10](#).



Image 10

3.1.8 Disconnect the vacuum hose 1 carefully. Refer **Image 11**.

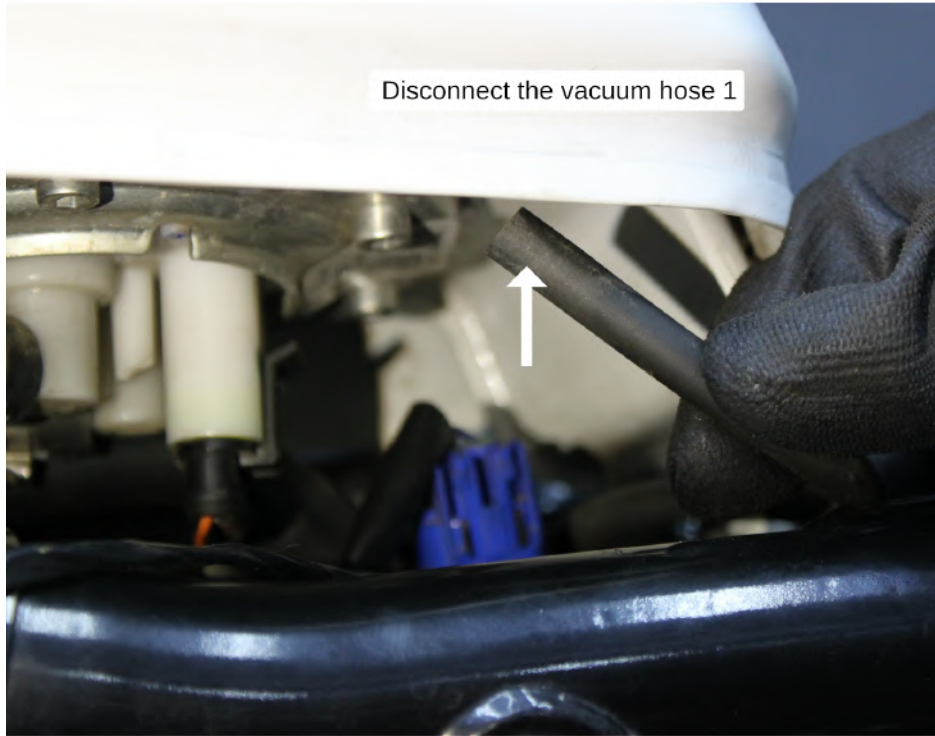


Image 11

3.1.9 Disconnect the vacuum hose 2 carefully. Refer **Image 12**

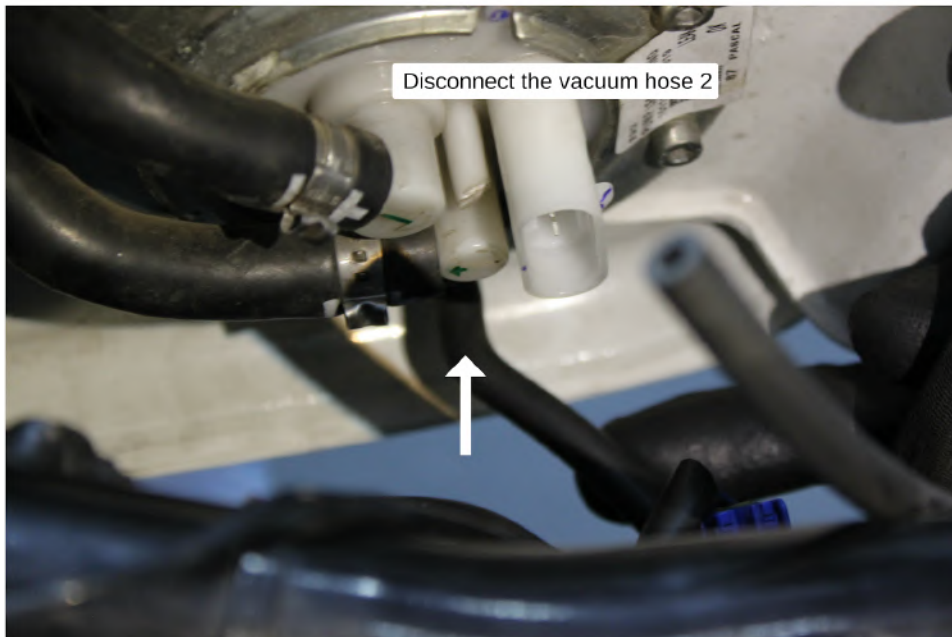


Image 12

3.1.10 Disconnect the fuel pump connector carefully. Refer **Image 13**.

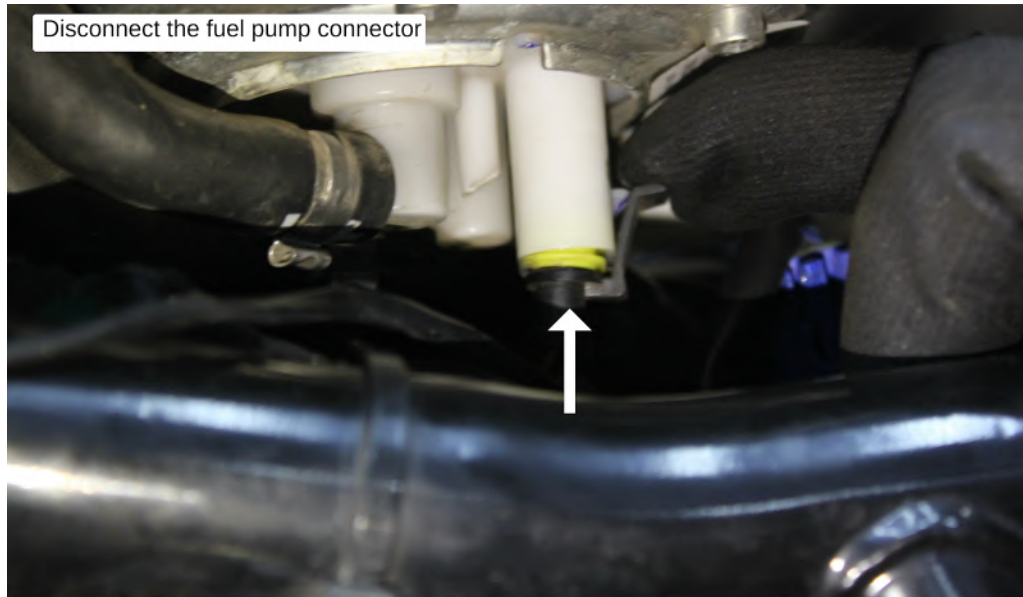


Image 13

3.1.11 Identify and disconnect the fuel gauge connector. Refer **Image 14**

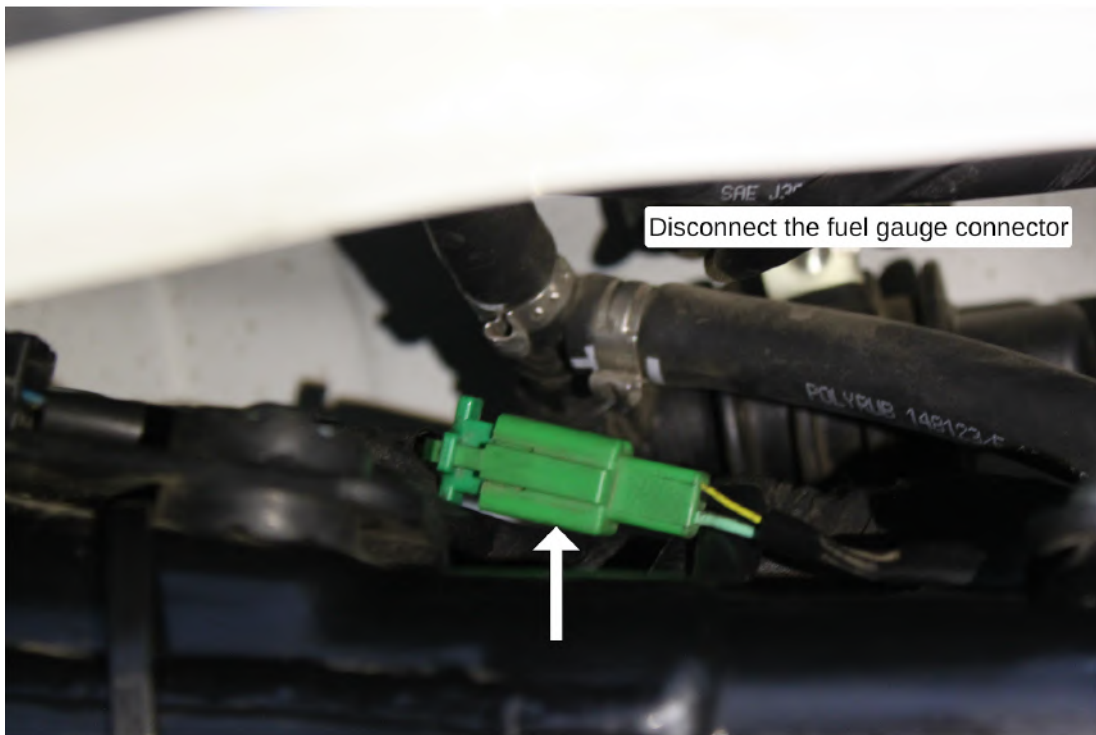


Image 14

3.1.12 Locate and carefully disconnect the fuel line. Refer [Image 15](#)



Image 15

3.1.13 Gently lift the tank from tank seating after disconnecting the connections. Refer [Image 16](#).



Image 16

3.1.14 Refer the **Image 17** for disconnected view of the connections.

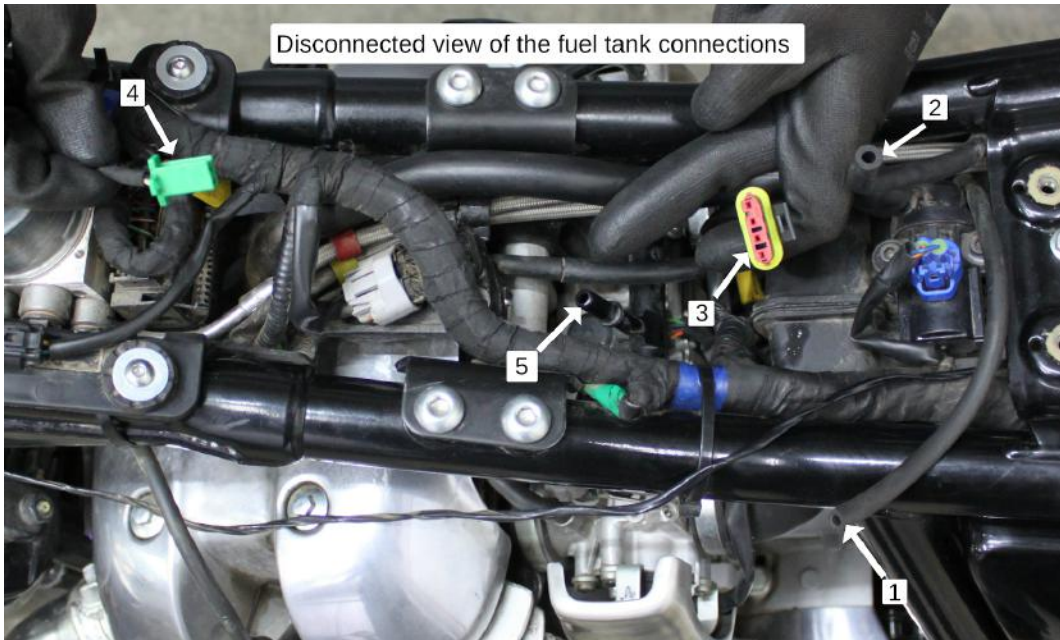


Image 17

3.1.15 Remove the bolts using M4 Hex bit from the casing as shown in **Image 18** below.



Image 18

3.1.16 Unscrew the relay box panel bolt using M4 Hex bit. Refer **Image 19**.



Image 19

3.1.17 Detach the relay box panel carefully. Refer **Image 20**.



Image 20

3.2 Routing the harness

3.2.1 Start from the tool compartment. Remove the tool box and place the main connector in it. Refer [Image 21](#).



Image 21

3.2.2 Make sure the map switch connector is also in the tool box. Refer [Image 22](#).



Image 22

3.2.3 Route each connector terminals from in-between the frame and the side panel. Refer [Images 23](#) & [Image 24](#).

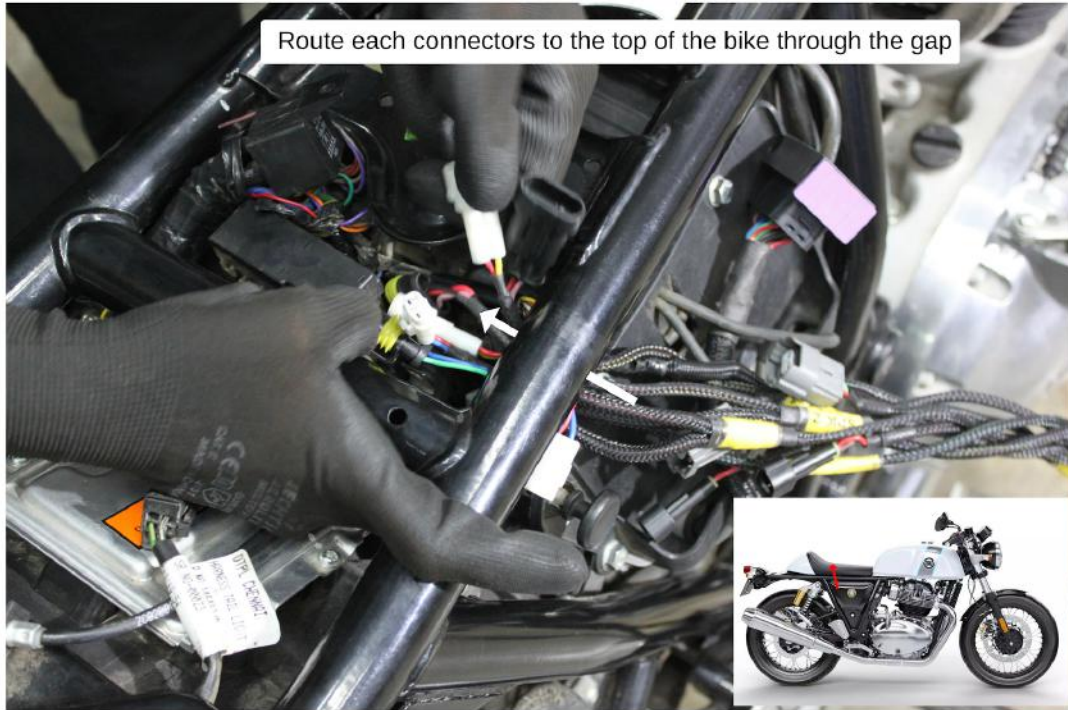


Image 23

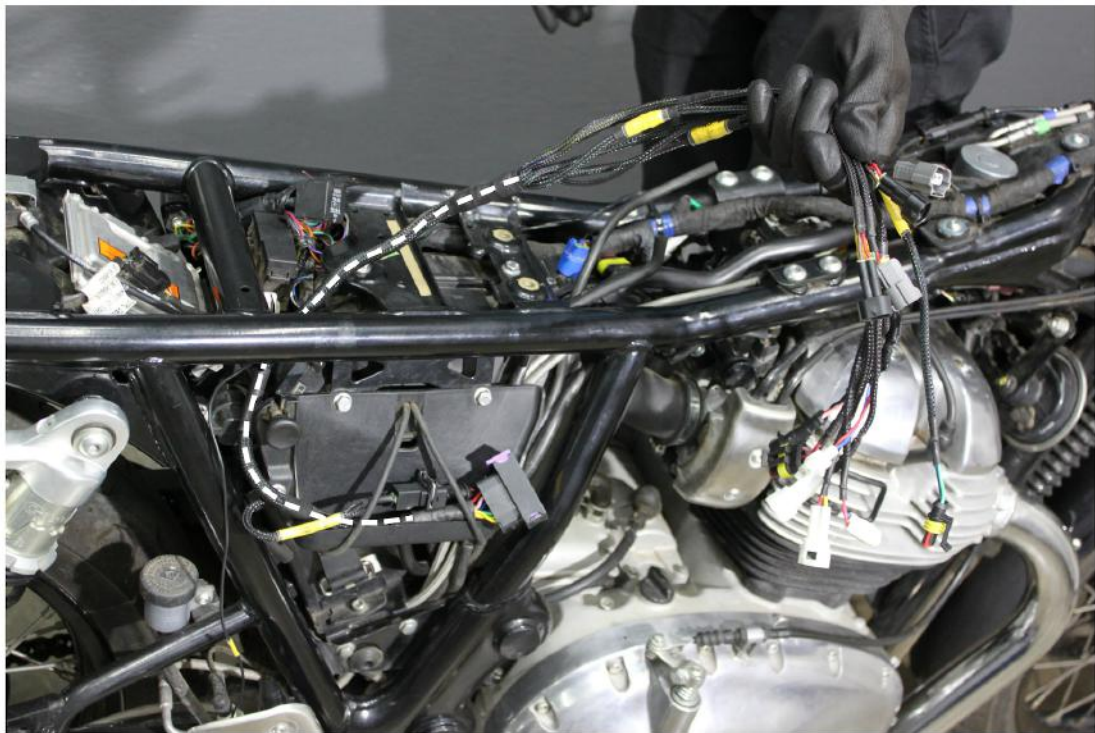


Image 24

3.2.4 Route the 2 ignition modulator connectors. Refer **Image 25**

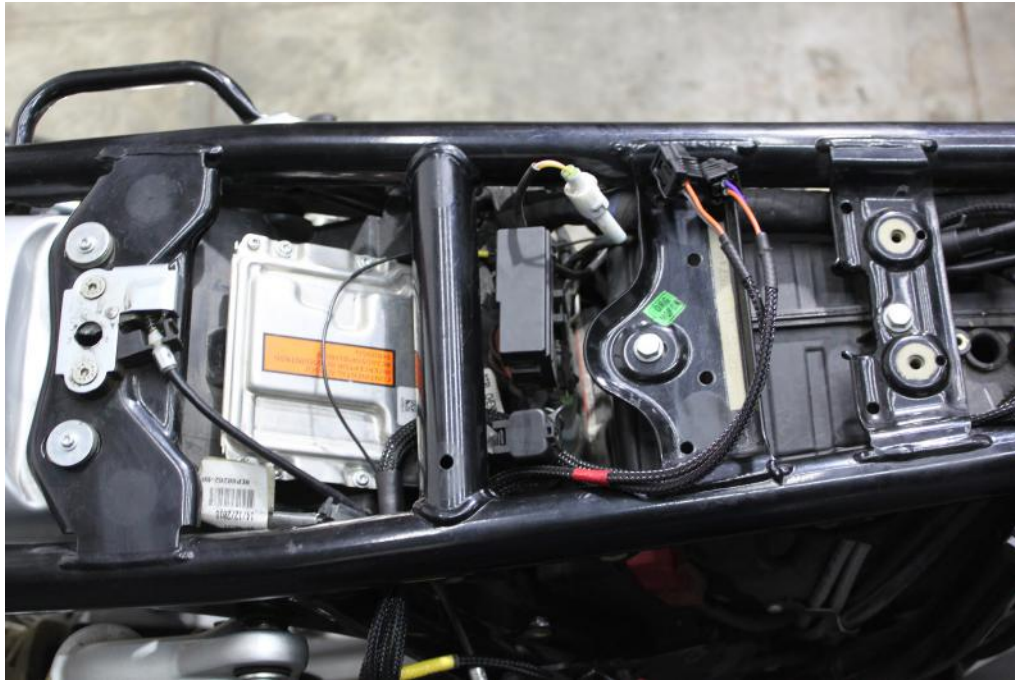


Image 25

3.2.5 Route rest of the connectors under the welded plates on the bike's frame as shown in **Images 26**

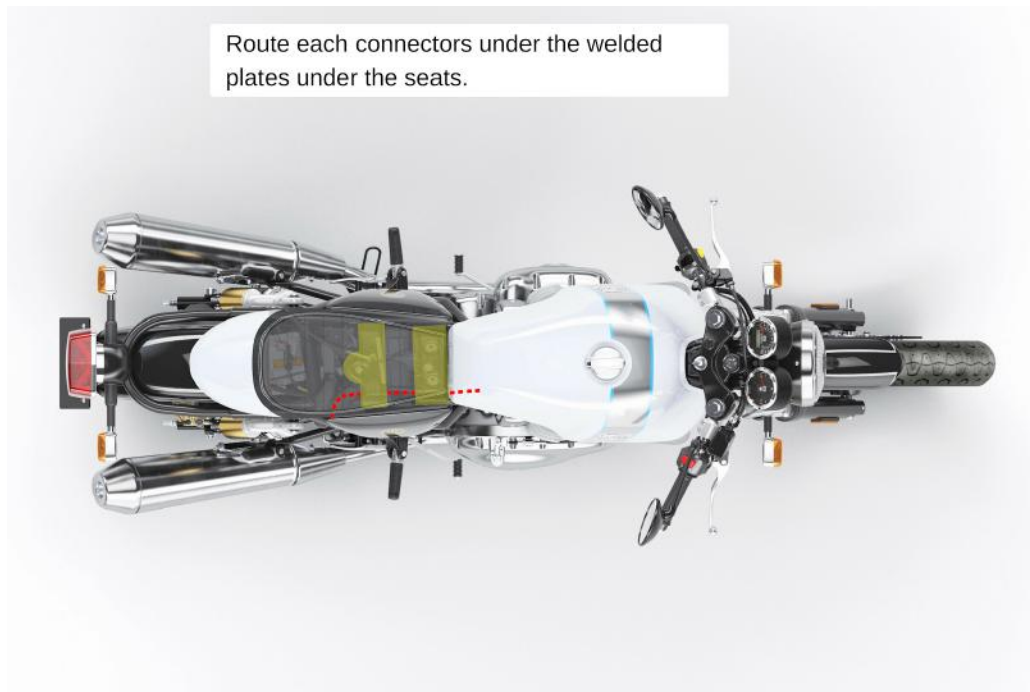


Image 26

3.2.6 Apply slight pressure, if necessary, for routing the connectors as shown in Images 27

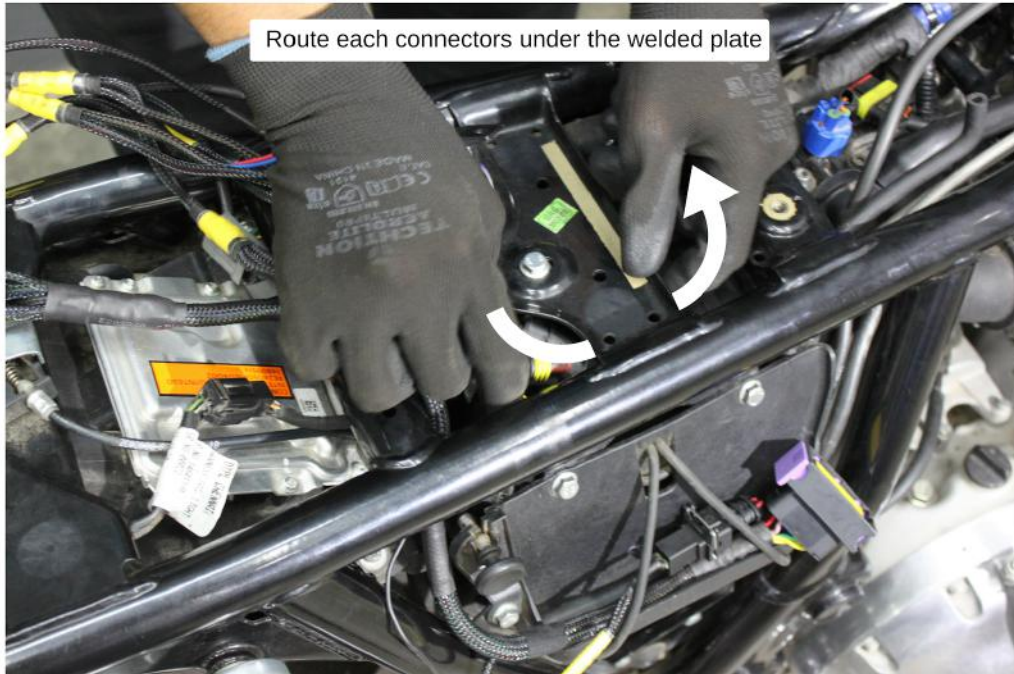


Image 27

3.2.7 Once all the connectors are through, route the Ground terminal connector to the left side. If you have a Quickshifter, you can route the QS connector also to the left side. Refer Images 28

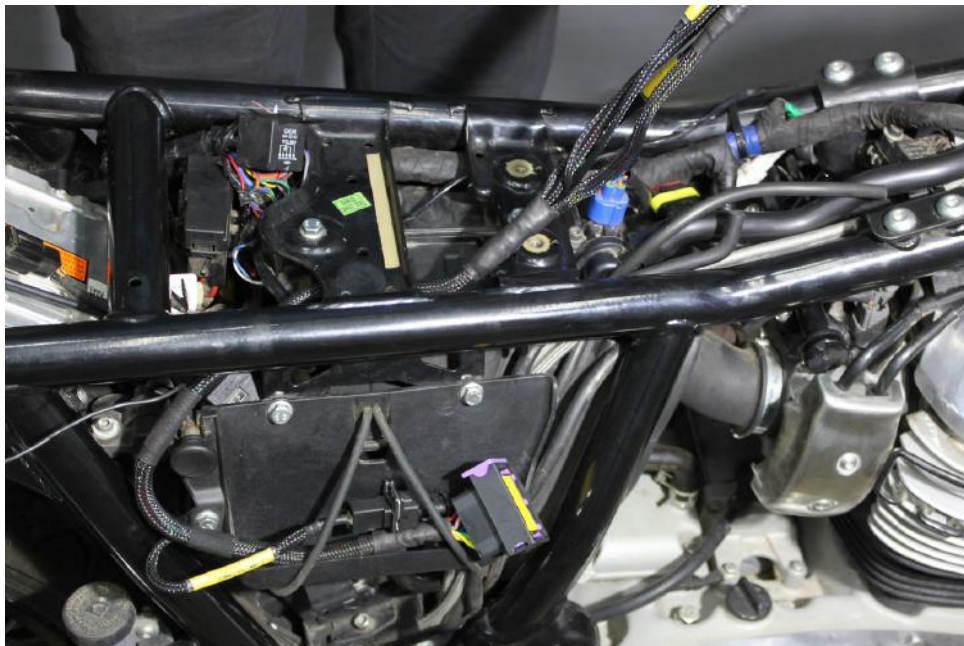


Image 28

3.2.8 Route rest of each connector under the welded plates on the bike's frame as shown in **Images 29**.

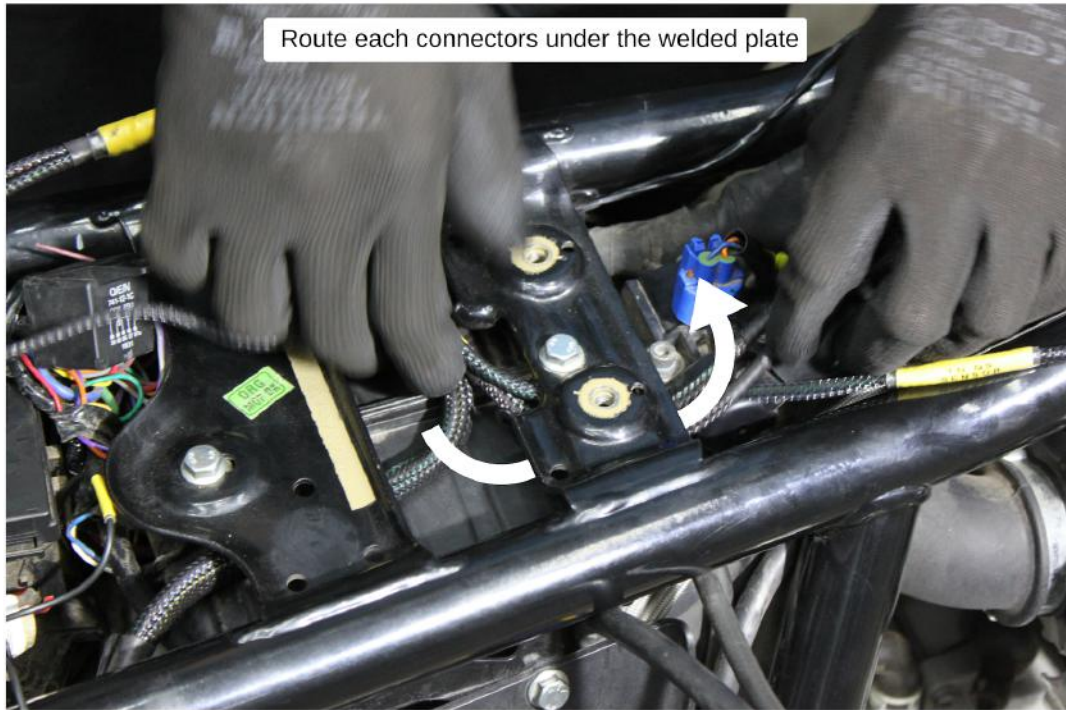


Image 29

3.2.9 Once all the connectors are through, route the ignition coil connectors to the front end of the bike. Route the Fuel Injector connectors and TPS connectors to the top of the engine with the TPS goes to the left side of the engine. Refer **Images 30**



Image 30

3.3 Fuel Injector Connector (both sides of the bike)

3.3.1 Locate the stock injector connector of your bike. Refer [Image 31](#) and [Image 32](#) below



Image 31



Image 32

3.3.2 Identify the fuel injector connector in the PowerTRONIC wiring harness. The connectors are labeled 'INJ'.

3.3.3 Disconnect the injector connector on your bike. Refer the zoomed view (**Image 33**).

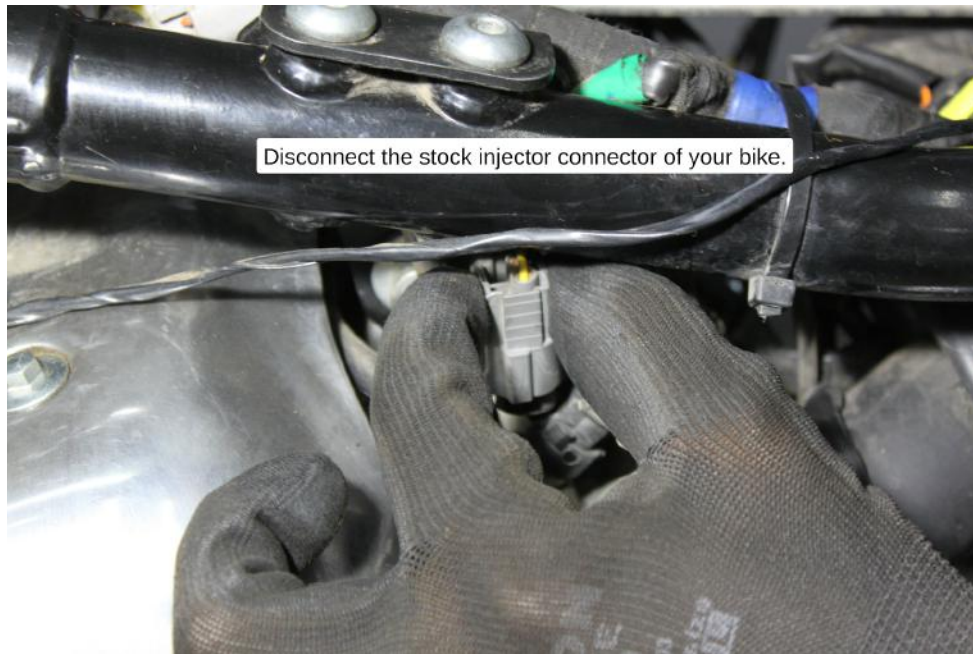


Image 33

3.3.4 Connect the female PowerTRONIC injector connector to the stock male injector connector. Refer **Image 34**.

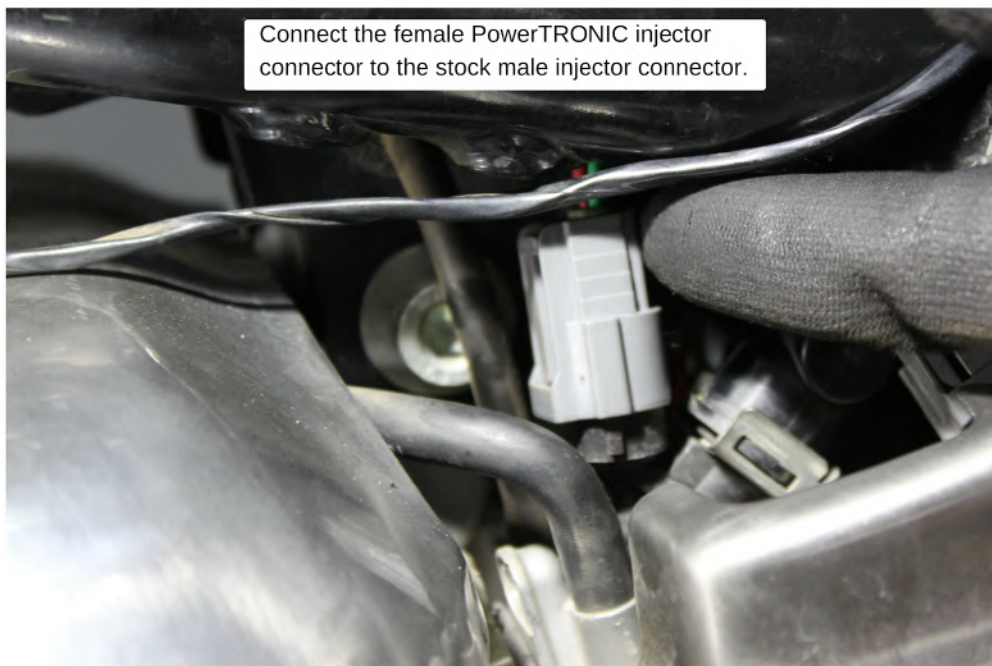


Image 34

3.3.5 Connect the stock female injector connector to the PowerTRONIC male injector connector. Refer **Image 35**.



Image 35

3.3.6 Repeat the steps on the right side of the bike.

3.4 Ignition Coil Connector (Both sides of the bike)

3.4.1 Locate the stock Spark/Ignition coil connector on the ignition coil, located right above the engine. Refer [Image 36](#) and [Image 37](#).

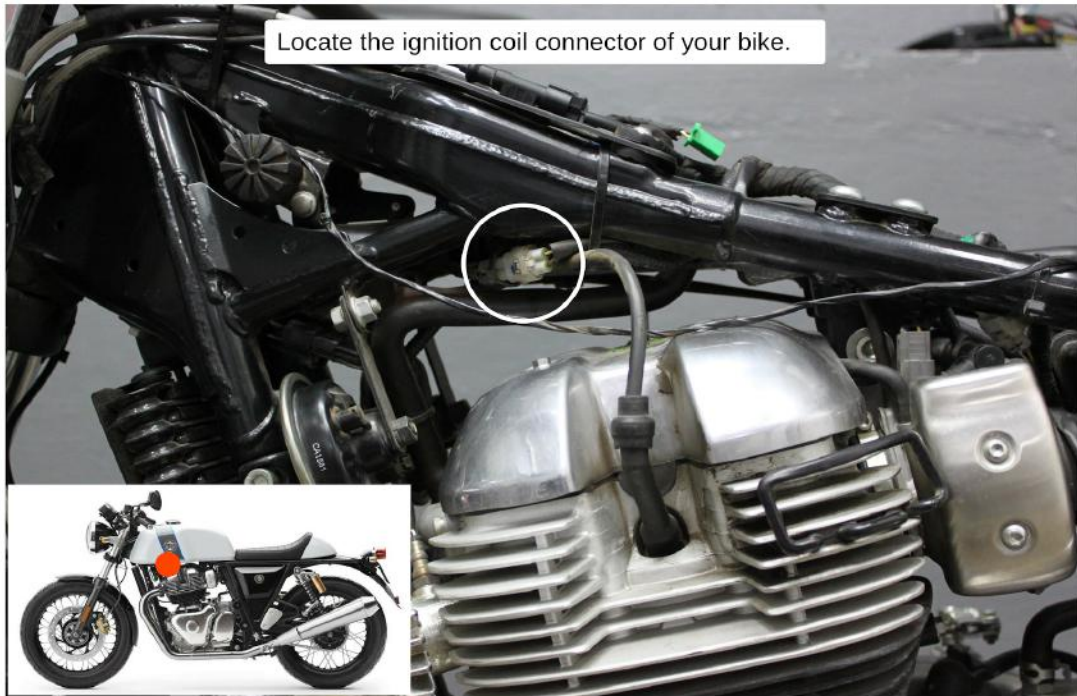


Image 36

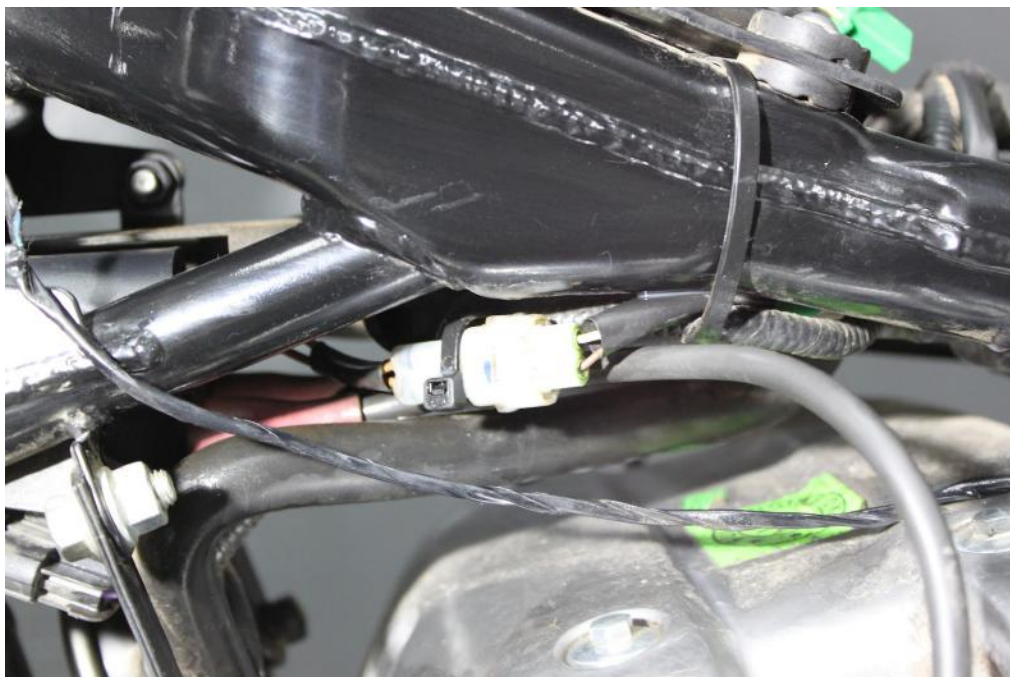


Image 37

3.4.2 Identify the Spark/Ignition coil connector in the PowerTRONIC wiring harness. The connectors are labelled 'SPK'.

3.4.3 Detach the stock ignition coil connectors. Refer [Image 38](#).



Image 38

3.4.4 Connect the PowerTRONIC Ignition coil male connector to the stock ignition coil female connector. Refer [Image 39](#).

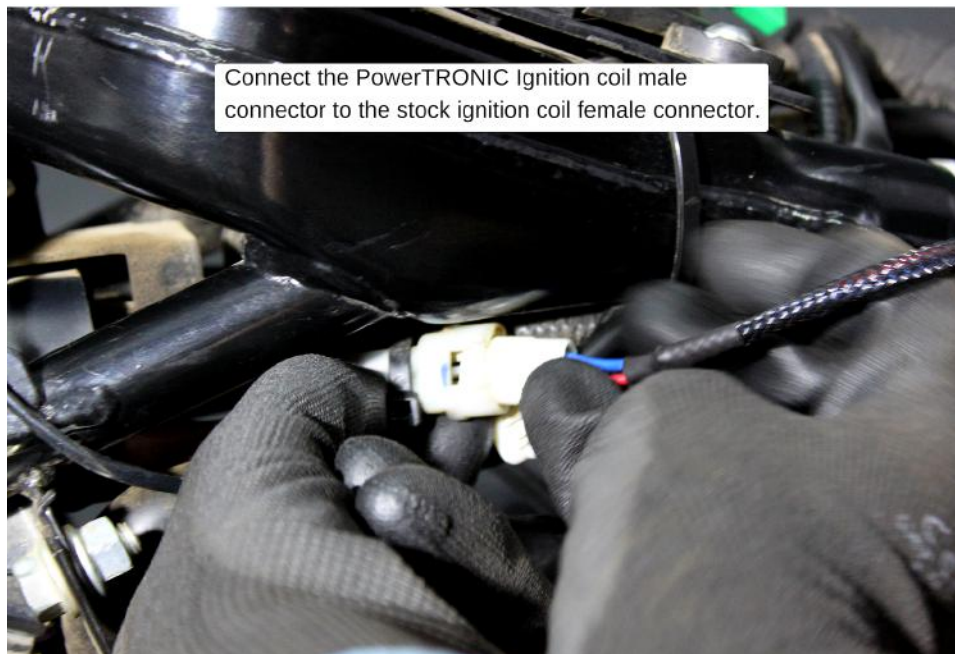


Image 39

3.4.5 Connect the PowerTRONIC Ignition coil female connector to the stock ignition coil male connector. Refer [Image 40](#).

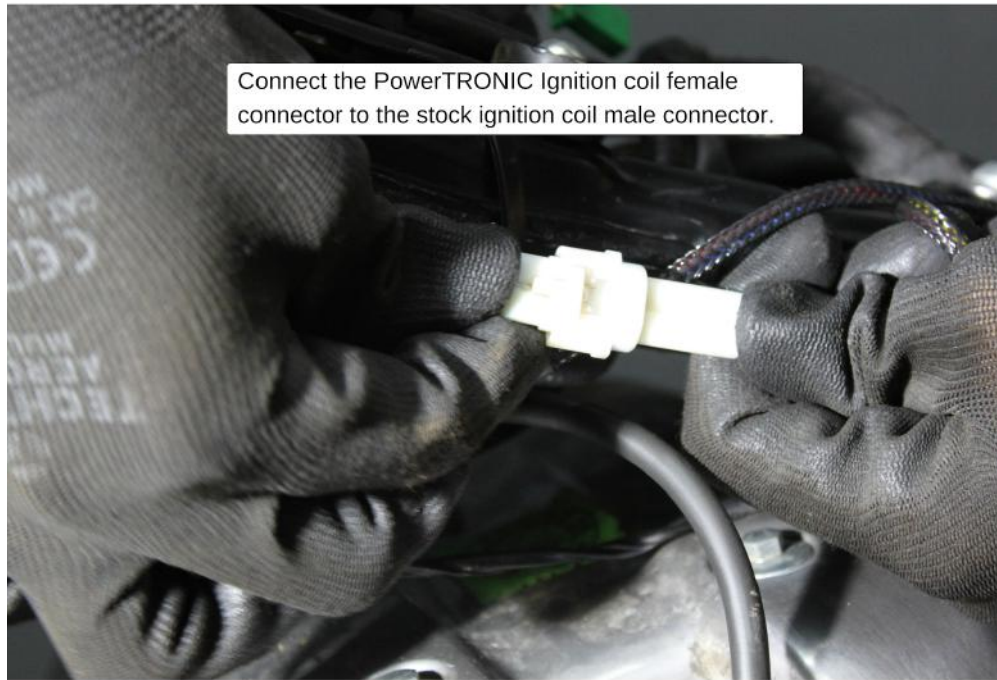


Image 40

3.4.6 Refer [Image 41- 1,2, and 3](#) for the ignition coil connections on the right side.

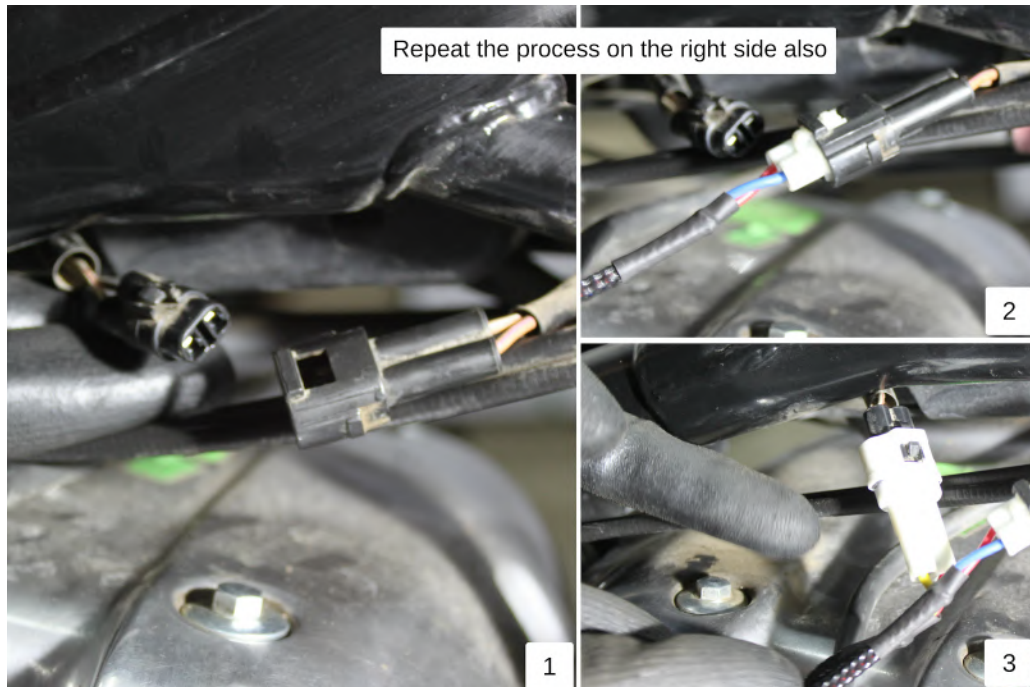


Image 41

3.4.7 For models with the Ignition coils placed perpendicular to the chassis, please refer to the following image for the configuration.

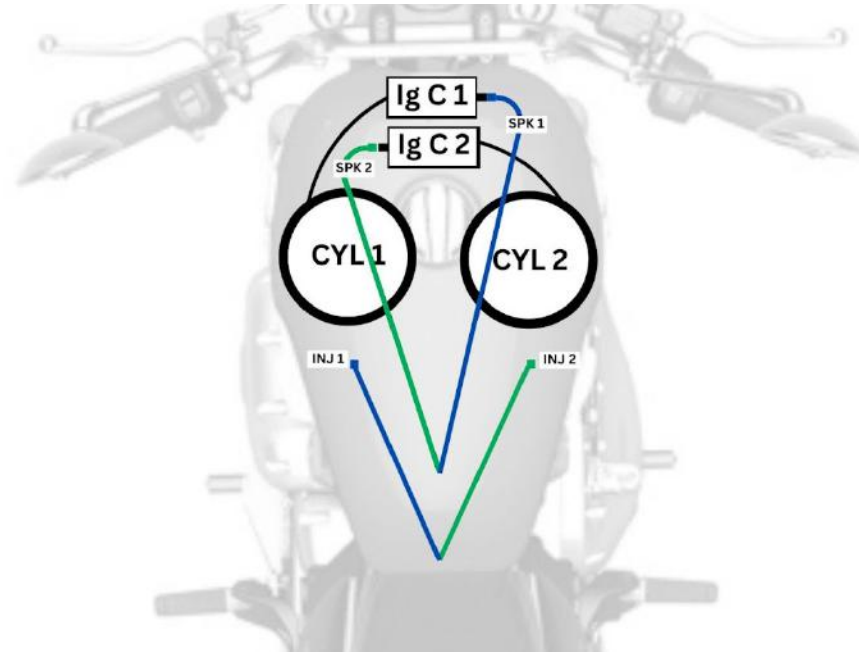


Image 42

3.4.8 Refer Image 43- 1, and 2 for the ignition coil connections on the right and right side and left side

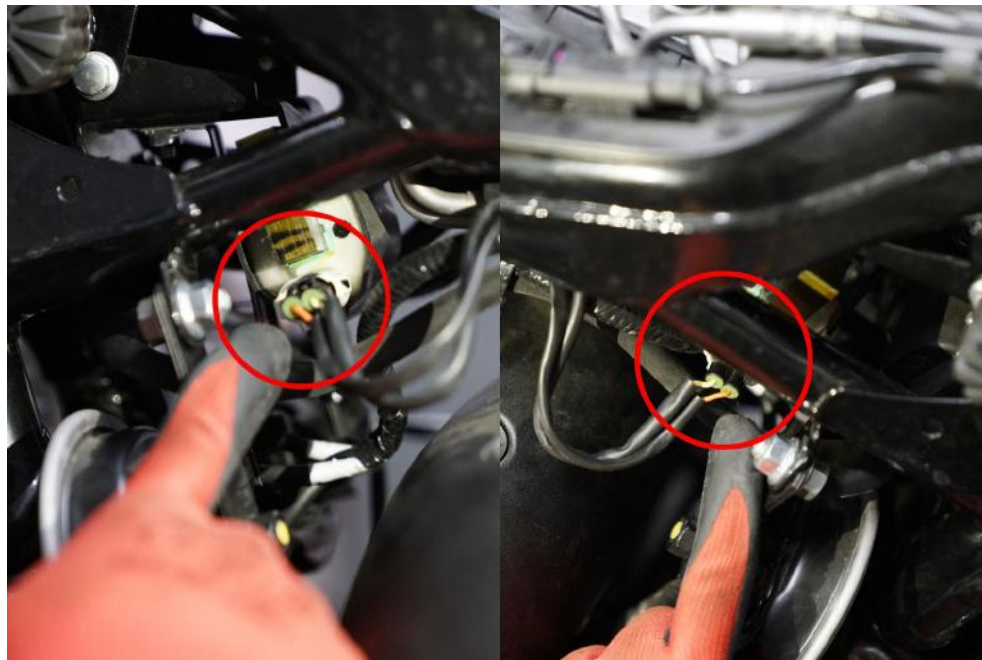


Image 43 -1, 43-2

3.4.9 Unplug the ignition coil connector on the left side and connect the PowerTRONIC male and female connector for the ignition coil connections on the left side. Refer to the **Image 44**



Image 44

3.4.10 Unplug the ignition coil connector on the right side and connect the PowerTRONIC male and female connector for the ignition coil connections on the right side. Refer to the **Image 45**



Image 45

3.5 Throttle position sensor connector (Left side of the bike)

3.5.1 Locate the TPS connector of your bike. It is generally located on the throttle body, parallel to the throttle cable return springs. Refer [Image 46](#) and [Image 47](#).



Image 46

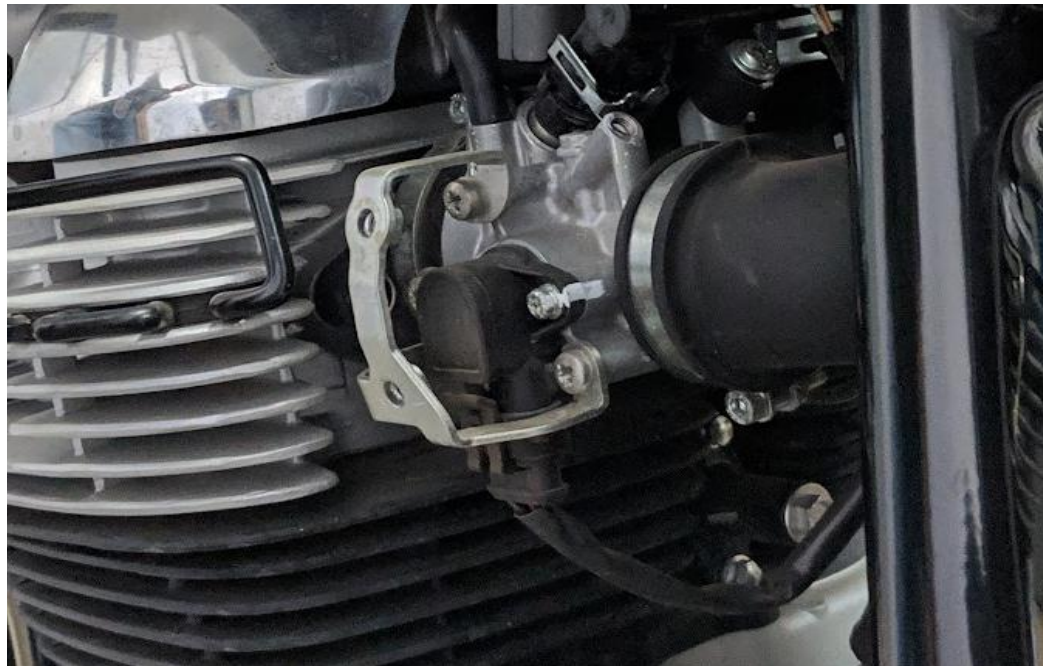


Image 47

3.5.2 Identify the Throttle Position sensor connector in the PowerTRONIC wiring harness, labeled as 'TPS'.

3.5.3 Disconnect the stock TPS connector. Refer **Image 48**



Image 48

3.5.4 Connect the PowerTRONIC male TPS connector to stock female connector. Refer **Image 49**.

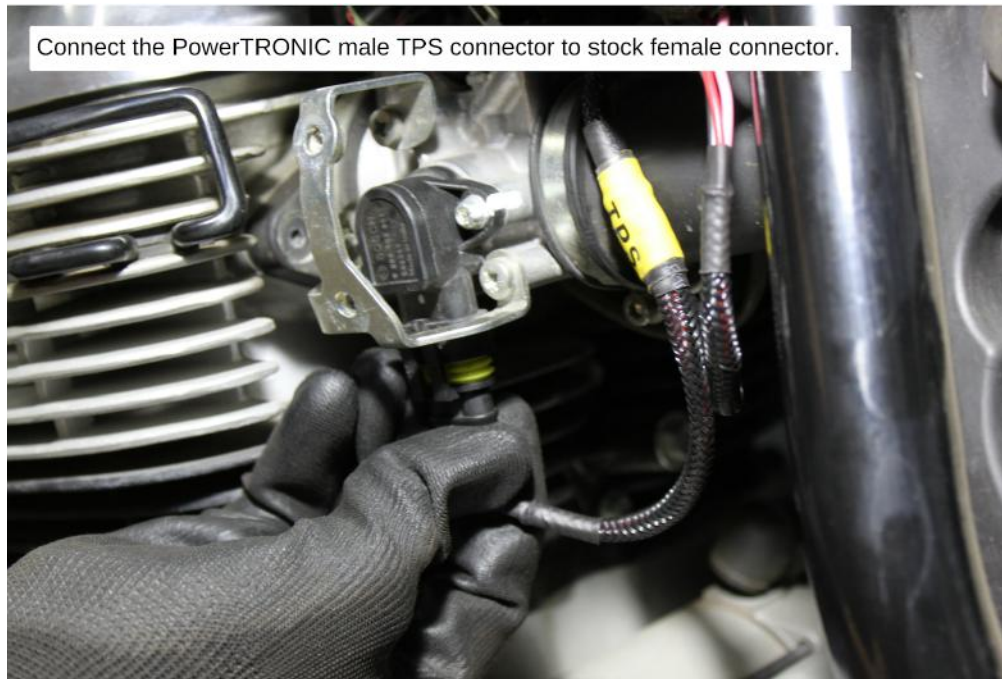


Image 49

3.5.5 Connect the PowerTRONIC female TPS connector to stock male connector. Refer [Image 50](#).



Image 50

3.5.6 We advise you to perform a TPS calibration after the installation of PowerTRONIC ECU.

3.6 Ground Terminal Connector (Right side of the bike)

3.6.1 Locate battery negative terminal. Refer [Image 51](#).

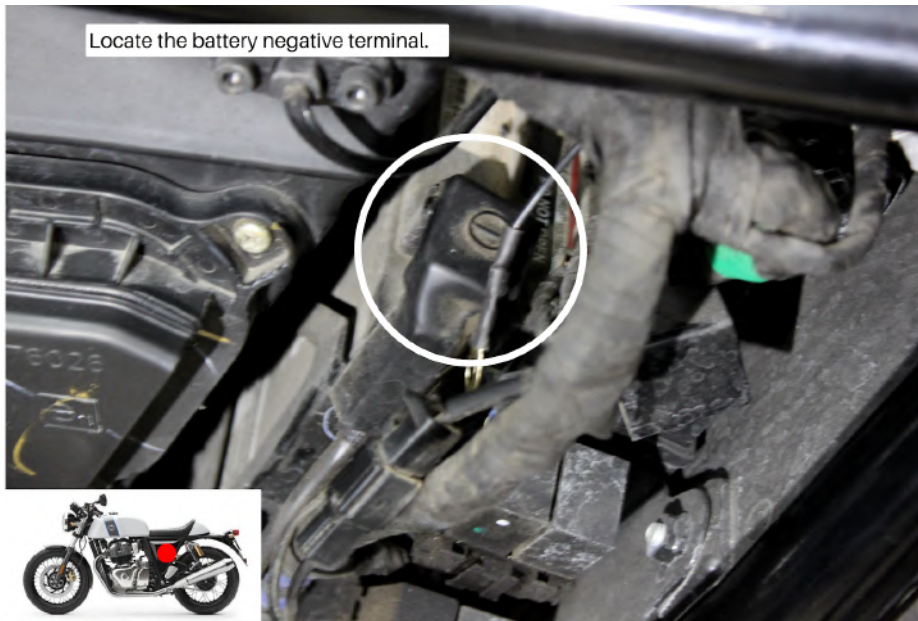


Image 51

3.6.2 Unscrew the battery negative terminal using a Phillips head screwdriver. Refer [Image 52](#)



Image 52

3.6.3 Connect the PowerTRONIC ground terminal connector to battery negative terminal. Refer [Image 53](#)



Connect the PowerTRONIC ground terminal connector to battery negative terminal.

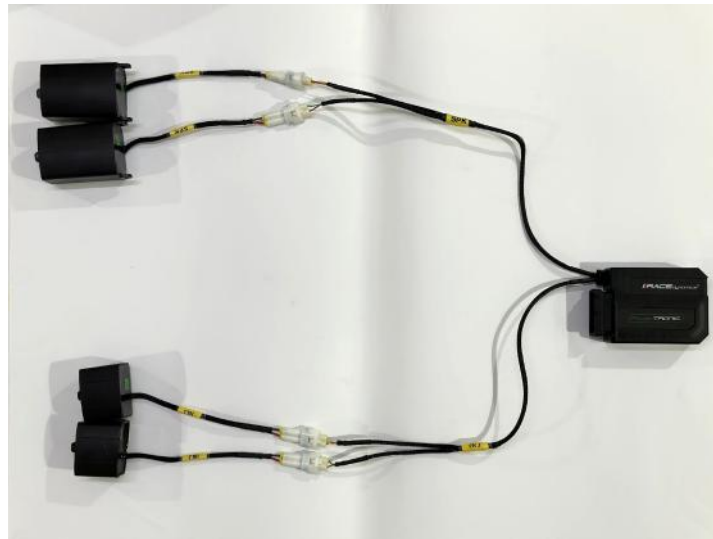
Image 53

3.7 Ignition and Injector modulator connectors

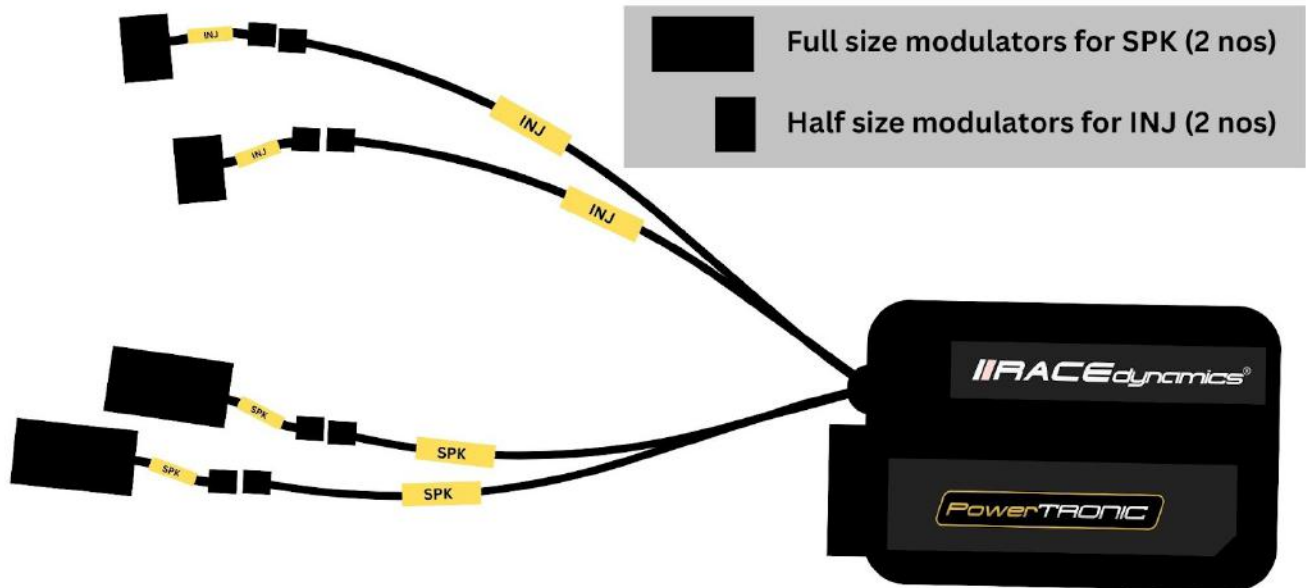
There are ignition and injector modulators for the PowerTRONIC ECU. They are denoted by SPK and INJ respectively. The ignition modulators are bigger (Full size) and Injector modulators are smaller (half size).

Refer the configuration images (54 A, 54 B and 55 A, 55 B) of the modulators in the following image before proceeding.

For international models, the configuration is as follows for the Euro 4 spec vehicles.

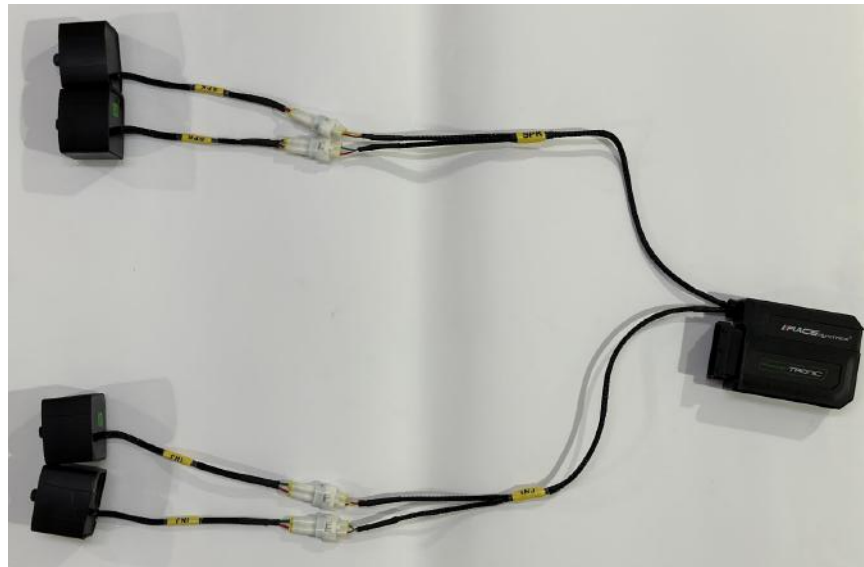


54 A

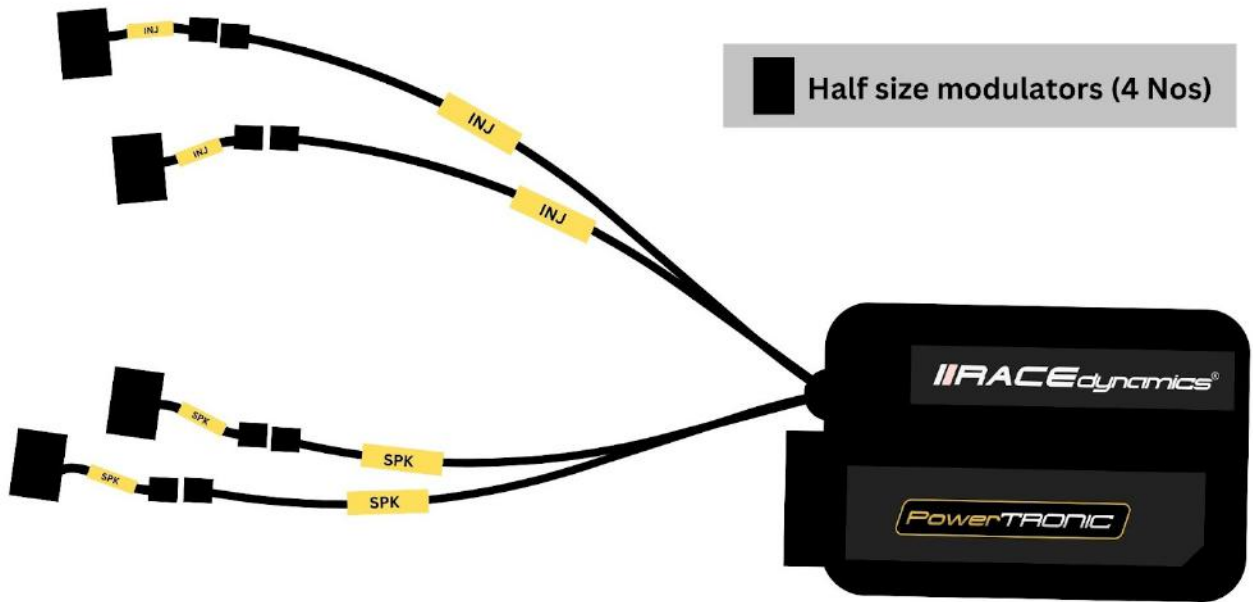


54 B

For international models, the configuration is as follows for the Euro 5 spec vehicles.



55 A



55 B

3.7.1 Place the Ignition and injector modulators (arrange the connector wire placing inward) above the space between battery and seat, and pull the connector wire out to the top of the bike. Refer **Image 56**



Image 56

3.7.2 Route the connector wire of the Ignition modulator to the top of the bike. Refer **Image 57**

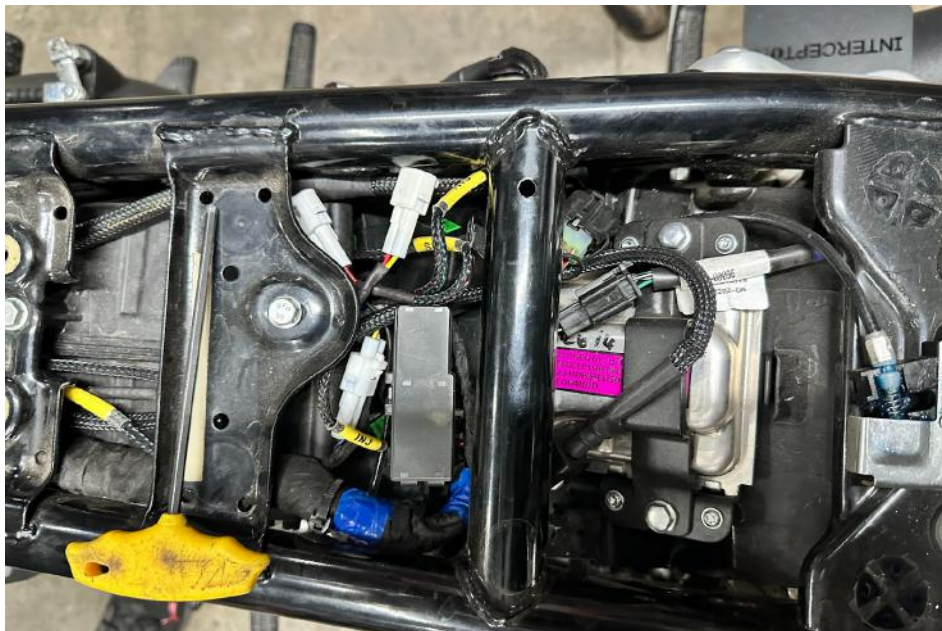


Image 57

3.7.3 Repeat the process on the other side of the bike as well. Refer **Image 58.**



Image 58

3.7.4 Connect the male connector of Ignition modulator connector to the female terminals of powerTRONIC connector. SPK modulators go to the SPK branch of the ECU and INJ modulators goes to the INJ branch of the ECU Refer **Image 59.**

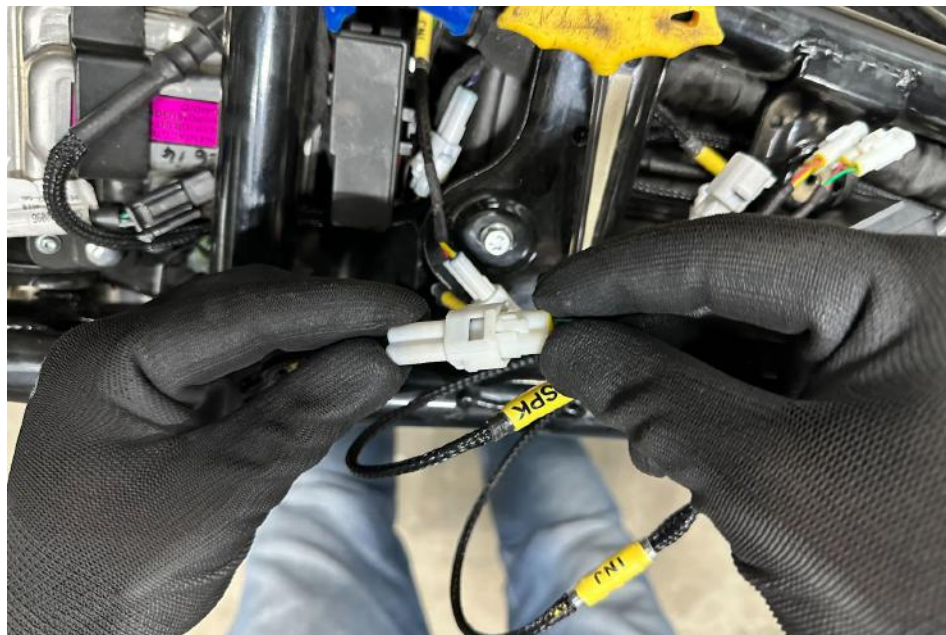


Image 59

3.8 Changing Relays

3.8.1 Locate the stock relays. Refer [Image 60](#).

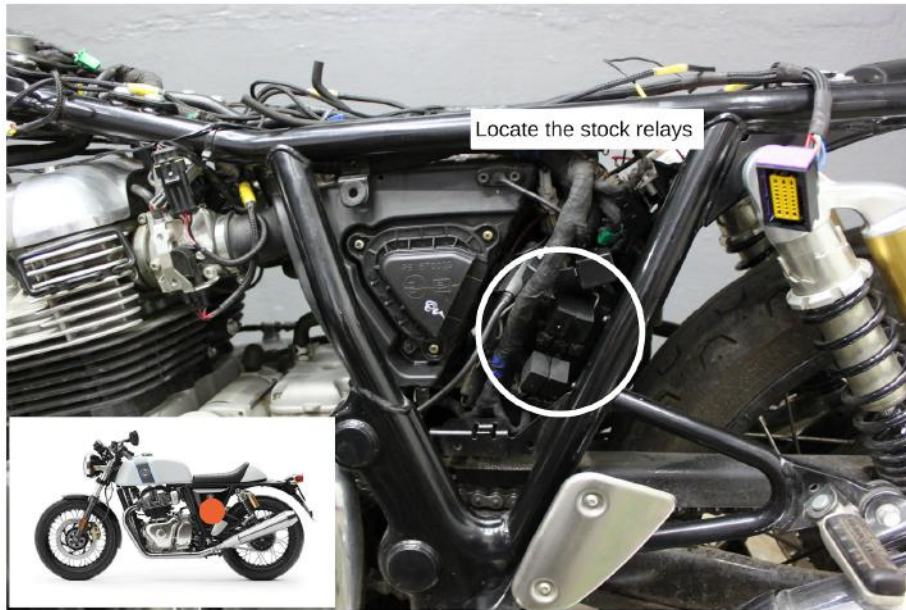


Image 60

3.8.2 Remove the stock relays from the relay kit. Refer [Image 61](#).



Image 61

3.9 Securing the harness using ties

3.9.1 Secure the harness away from hot moving/parts by attaching it to the chassis/frame using the zip ties provided wherever necessary. Refer the **Image 62**.

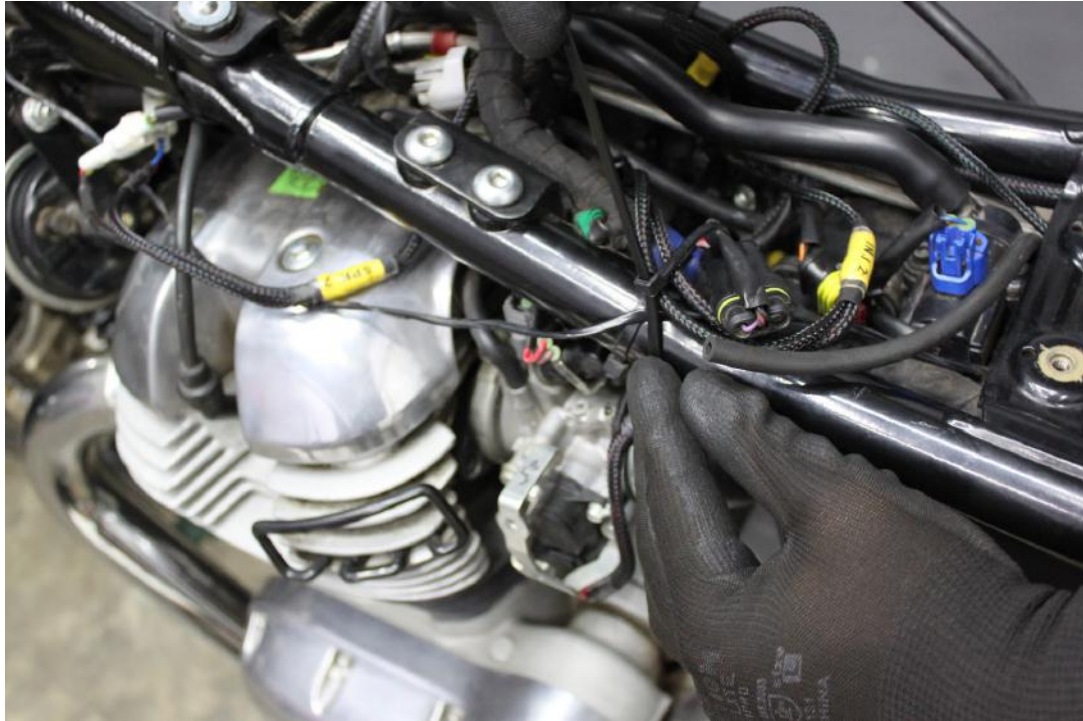


Image 62

Important note: The PowerTRONIC harness contains Quick shifter connector. If you have bought the Quickshifter please attach the connector to it. [Please refer Quick shifter installation manual]

If you have not bought the Quickshifter, you can leave it disconnected but make sure the harness is secured using zip ties provided.

3.10 Testing with the stock coupler

3.10.1 Attach the fuel tank.

3.10.2 You can verify the connections by attaching the stock coupler. Refer detailed Stock coupler test document. Refer [Image 63](#)



Image 63

DO NOT proceed with the PowerTRONIC ECU without first verifying the connections with stock coupler.

3.11 Plugging in the PowerTRONIC

Remove the key from the ignition, unplug the stock coupler and connect the PowerTRONIC to the harness by connecting it to the 24 pin connector. Secure it in the glove box. Refer [Image 64](#).



Image 64

3.12 Attaching the panels fairing etc

Attach the panels, fairing as removed from the bike. You can keep the tool box under the seat. Refer [Image 65](#)



Image 65

Quickshifter installation procedure

- 1) To install quick shifter, the exhaust line is to be removed. Begin at the left side of the bike. Park the bike using the centre stand on a level surface (Or a paddock stand). Refer **Image 1**



Image 1

- 2) Locate the exhaust mounting bolt at rear end near the suspension. Refer **Image 2**



Image 2

3) Unscrew the bolt using M12 Hexagonal socket and 12 spanner.

4) Locate the saree guard fixing bolts. Refer **Image 3**



Image 3

5) Unscrew the bolts using M12 Hexagonal socket and 12 spanner. Refer **Image 4**



Image 4

6) Carefully detach the saree guard. Refer **Image 5**



Image 5

7) Locate the exhaust mounted bolt near the foot rest. Refer **Image 6**



Image 6

8) Unscrew the bolts using M12 Hexagonal T. Refer [Image 7](#)

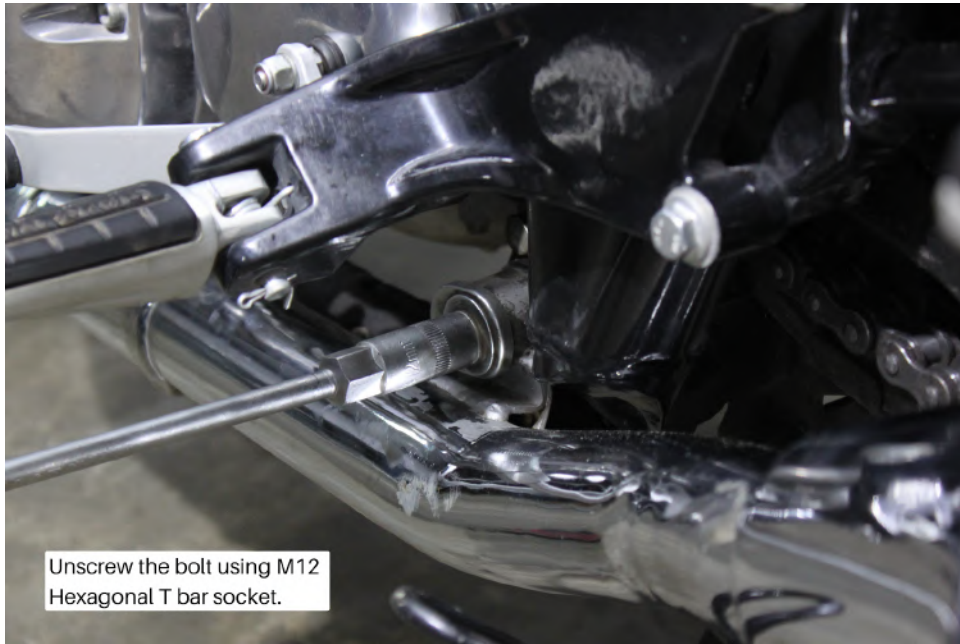


Image 7

9) Detach the left side horn by removing the bolts using M13 spanner. Refer [Image 8](#)

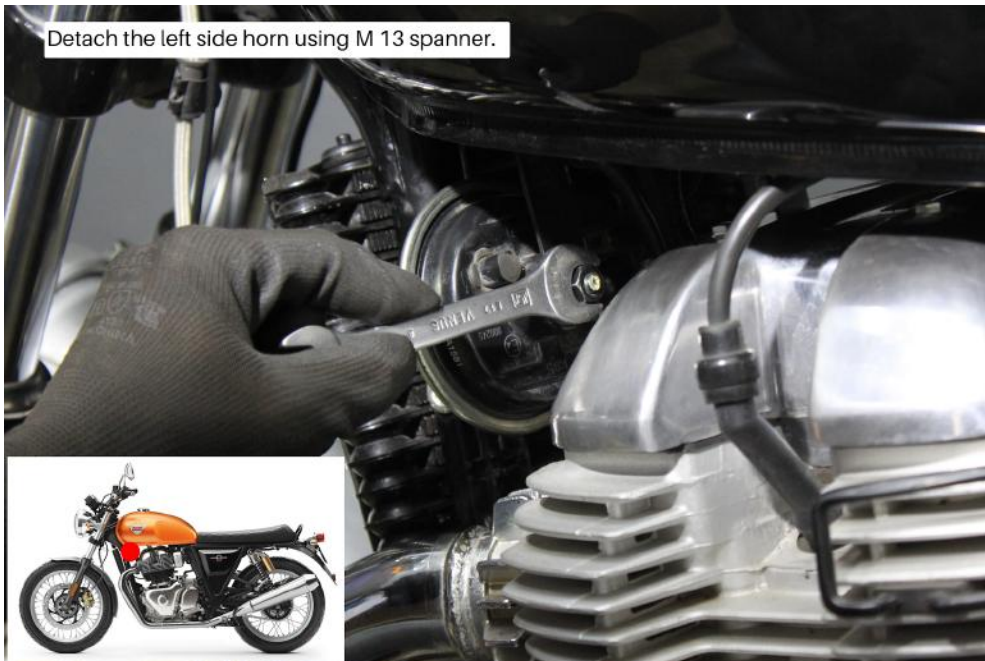


Image 8

10) Disconnect the Oxygen sensor connector. Refer **Image 9**



Image 9

11) Locate the bolts mounting exhaust to the engine. Refer **Image 10**



Image 10

12) Unscrew both the bolts using M12 Hexagonal T bar socket. Refer [Image 11](#)

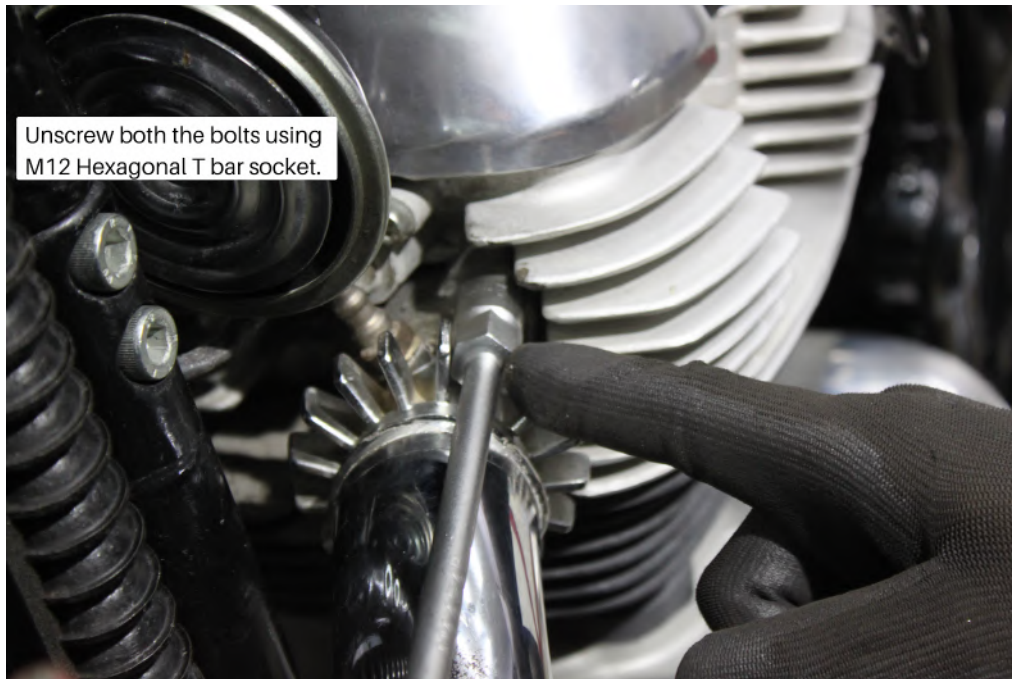


Image 11

13) After removing the bolts, detach the exhaust pipe carefully and place it safe. Refer [Image 12](#)



Image 12

14) Unscrew the gear lever bolt using M8 Hex socket. Refer [Image 13](#)



Image 13

15) Take the bolt provided within the kit, place the sensors and washers to the bolt head side. Refer [Image 14](#) and [Image 15](#) (schematic diagram) also.

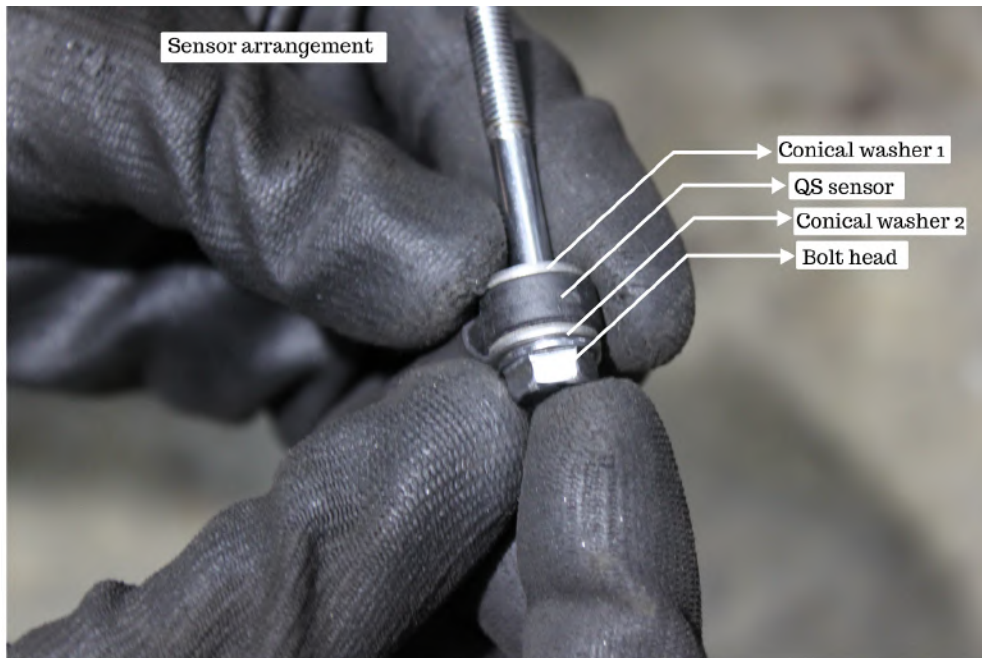


Image 14

Refer the schematic diagram before installing the QS sensor on the bike.



Image 15

16) Hand tighten the bolt initially. Visually inspect the sensor and check whether the sensor has touched the gear lever.
Use a torque wrench and tighten the bolt by fixing at 5Nm value.

Or

Tighten the bolt by $(\frac{2}{3})^{\text{rd}}$ of a full rotation of wrench from the point of feeling resistance for the first time. The maximum degree of rotation is limited to 240 degrees. Refer [Image 16](#) and [Image 17](#) (schematic diagram) also.

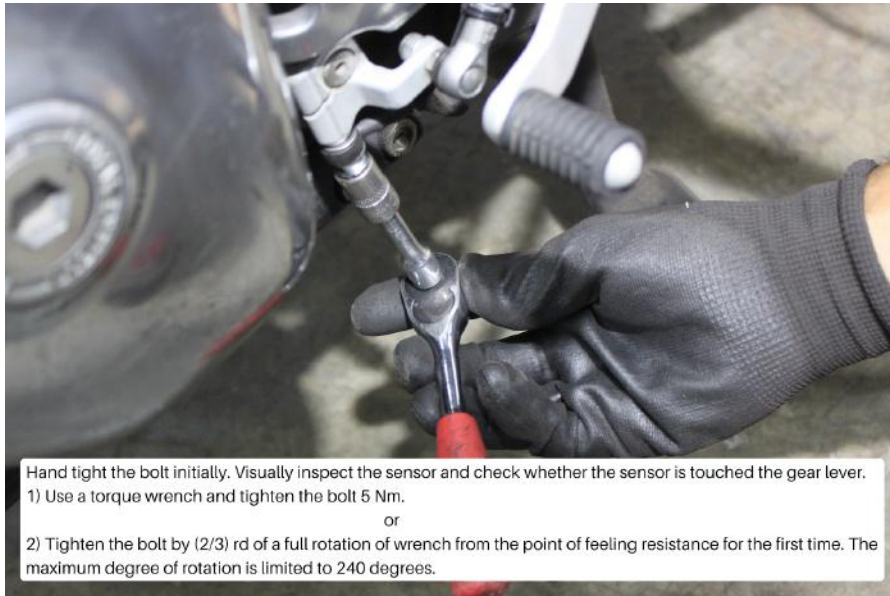
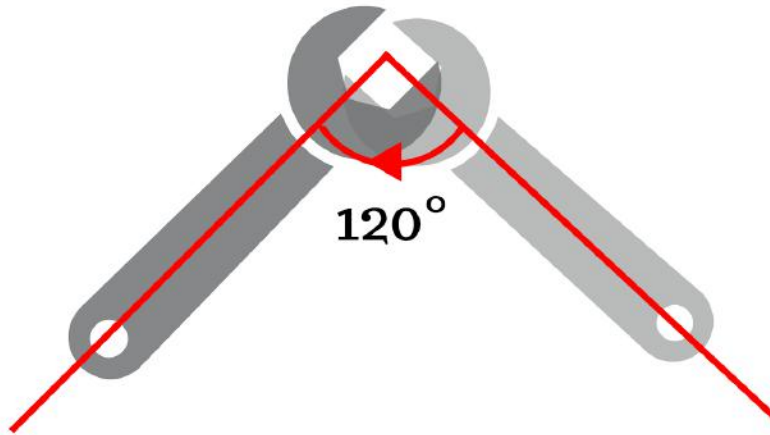


Image 16



Rotate the wrench by 120° from the point of first resistance and do this twice (total 240°)

Warning: DO NOT overtighten the sensor

Image 17

17) Attach exhaust pipe and saree guard back to the bike.

18) Connect the PowerTRONIC Quick shifter connector to sensor connector and tie it with the frame.



Image 18

18) Refer the completed view below. Do not overtighten the QS wire using zip ties. Use the Zip ties as wire guide only.



Image 19