O2 Connector

kevxtx MT/FZ-09 O2 controller Mod

DISCLAIMER: This instruction paper is for informational use. The O2 Controller modification is **sold only for race use.** The O2 Controller modifies the closed-loop fuel injection mapping and it may not comply with emission control regulations in some countries. This modification is installed and used at your own risk. The manufacturer assumes no liability or responsibility for the use of this modification on your own modification.

Motorcycle modifications and maintenance should only be performed by a qualified person. Some modifications may void your warranty and/or your insurance cover. Consult your motorcycle specialist if you are unsure or contact me directly for further information. Kevxtx cannot be held responsible for any modification done to your own motorcycle, and is not liable for any claim arising from the information in these instructions or the use of this O2 controller. The reader assumes all responsibility for the use of these instructions.

Background

Many owners of the newer MT & FZ-09 models have reported & are experiencing throttle "surging". More noticeable at lower RPM's, at cruising, or when using the advanced engine map, other symptoms might also include irregular throttle response.

The modern 09 motors are high-compression, fuel-injected, computer-managed engines which need to meet demanding emission and noise standards. The leaner air-fuel (A/F) mixtures needed to meet these standards will cause the occasional surges, jerkiness and flat-spots.

The Technical Explanation

There are two main circuits to a fuel map – closed-loop and open-loop circuits:

- o The **open loop circuit** is used above 6000rpm, when the ECU detects sudden throttle acceleration, and all throttle openings over 20%, whether cruising or not cruising. This circuit typically creates an A/F ratio of approx 13.4:1on the MT/FZ-09. A Power Commander or mapping program like Flash Tune can only adjust the fuel map in the open loop

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- The **closed loop** is implemented for emission control. It comes into effect after a coolant temp of 60 degrees C, and when the ECU sees a constant throttle opening of below 20% between 2000rpm & 6000rpm, This circuit creates an A/F ratio of approx 14.7:1

The ECU takes voltage readings from the O2 sensor as input to the A/F management. For closed-loop conditions, the ECU will lean the A/F ratio out until it sees an A/F ratio of 14.7:1.

Together with the lean A/F, the "switching" of this large A/F gap between open and closed loops is a major contributor to the jerking and surge behavior.

Why do we need this O2 controller?

There are Power Commander & O2 optimizers available for these new engines. Which do the job no problem if you have the funds to buy them, the kevxtx O2 controller is a stand along mod, it does not need a Power Commander or Flash Tune map for it to work, it will work no matter what mod is installed .

Resistor-type Eliminators do not work on these modern bikes; you can't just unplug the O2 sensor and ride it, from the data logging I have done & from Dyno Jet's testing, the A/F ratio will cycle or run rich at 12:1 after 3000rpm if the sensor is left unplugged & the bike is ridden at a constant cruise. If you don't believe me contact Dyno Jet directly & ask them if you can leave the O2 sensor disconnected & tune the bike correctly.

You need to control the output voltage from the O2 sensor to ECU since the ECU constantly looks for 0 to1 volt square wave signal. By unplugging the O2 sensor and fitting a resistor, it sends a constant voltage signal to the ECU. After a few minutes the ECU see this as a corrupt signal and then constantly switches the A/F ratio up and down or fixes it at 12:1. In this state the bike is not tunable.

This mod is not a resistor-type mod it controls the square wave output voltage signal from the O2 sensor to the ECU, the controller corrects this signal in real time & sends a calibrated leaner voltage signal to the ECU, the ECU then responds with a slightly richer closed loop A/F ratio the O2 sensor has to be connected for this controller to work.

Even with Yamaha's latest ECU mapping the close loop A/F ratio have not been addressed.

Kevxtx's O2 Controller Description

How it Works

By controlling the closed loop circuit we are able to reduce the surging when you are cruising. With the O2 controller, when the ECU switches between the open & closed loop circuits the transition is much smoother as the A/F ratios are closer to each other, see table below.

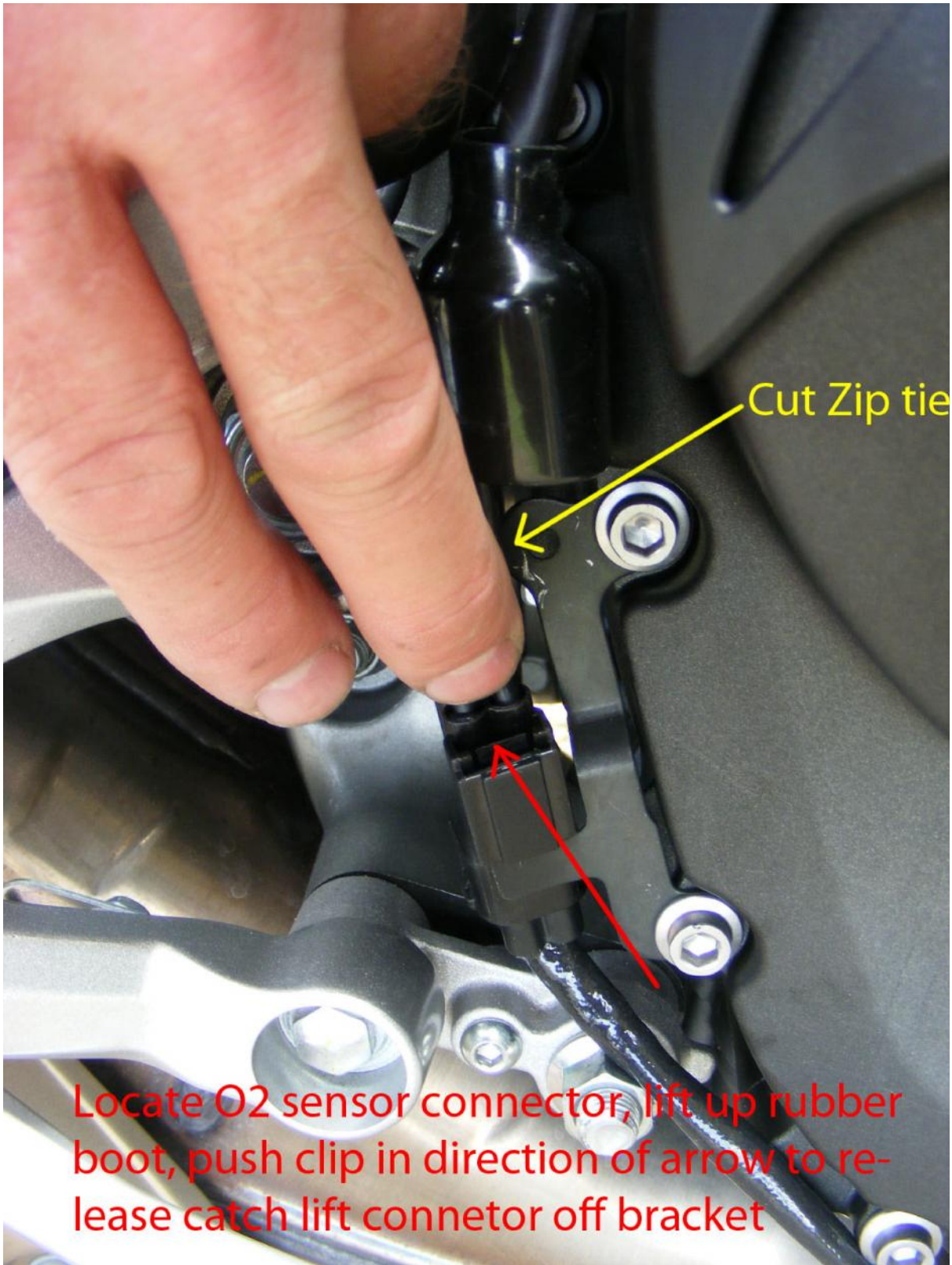| Stock O2 Sensor	Kev's O2 Controller
Closed loop A/F ratio = 14.7:1	Closed Loop A/F ratio = 13.6:1
Open loop A/F ratio = 13.4:1	Open loop A/F ratio = 13.4:1
Variation = 1.3	Variation = 0.2
• In stock form, the closed-loop runs the A/F lean. When switching to the open loop it might feel like the throttle is surging. This can also be felt at cruising speeds.	• The change in A/F ratios is reduced, and hence the surging experienced between loop changes is greatly reduced.

Suitability

This O2 Controller mod can be used on stock motorcycles, as well as any MT-FZ-09 with extra filters, pipes and map modifications. This mod is Plug & Play no modification to any of the bikes wiring is need.

2014> MT-09, FZ-09

2015> ABS MT-09, FZ-09
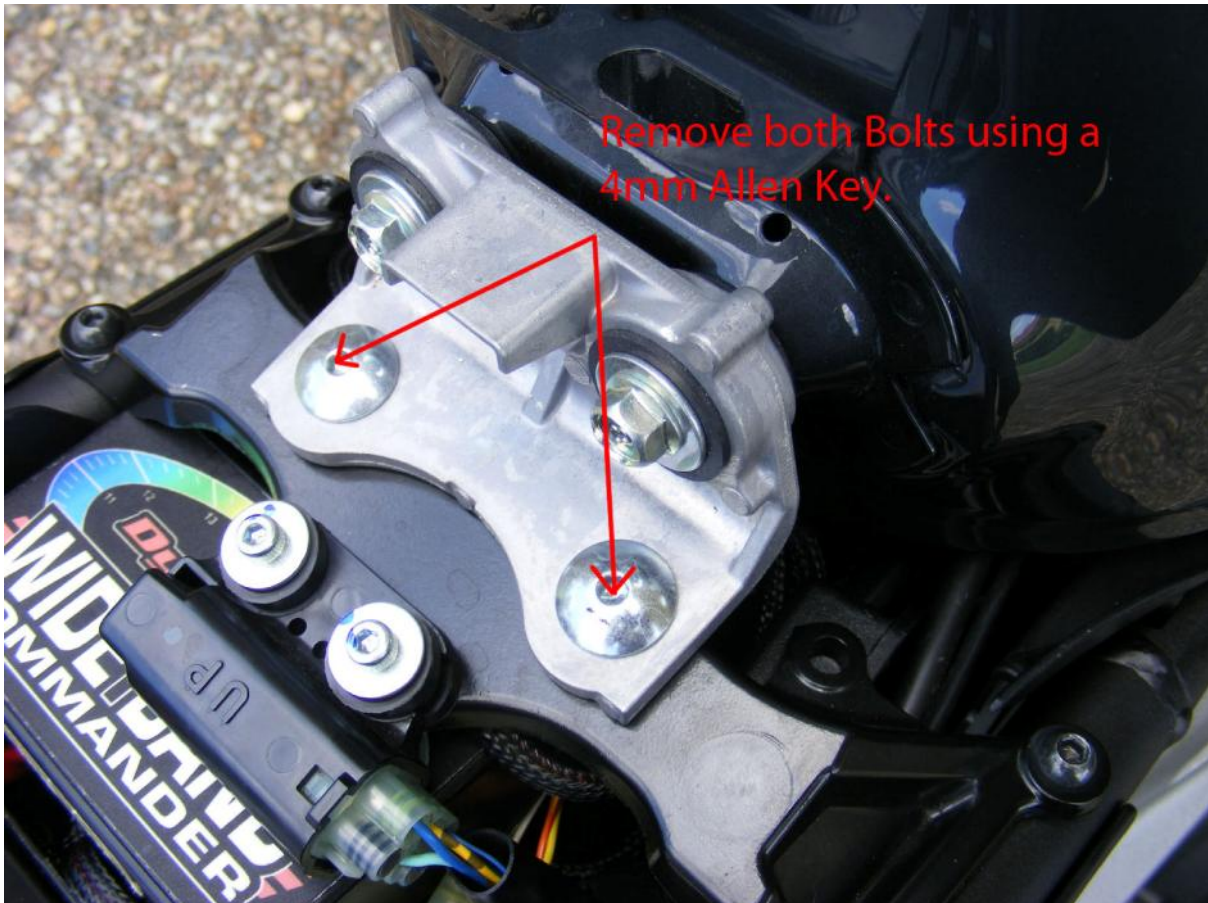
How to install the mod

1/ locate the O2 sensor connector on the right side of the bike & follow the instructions.
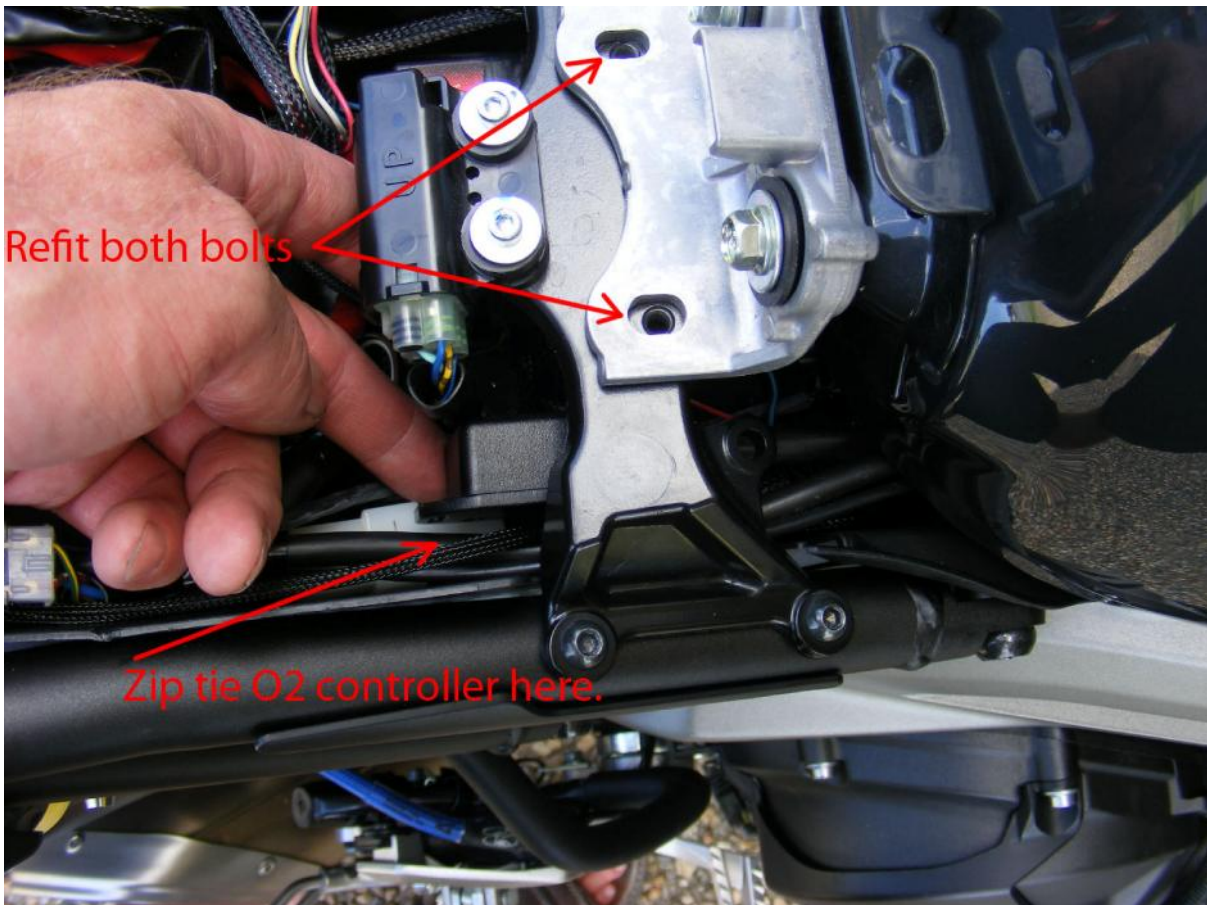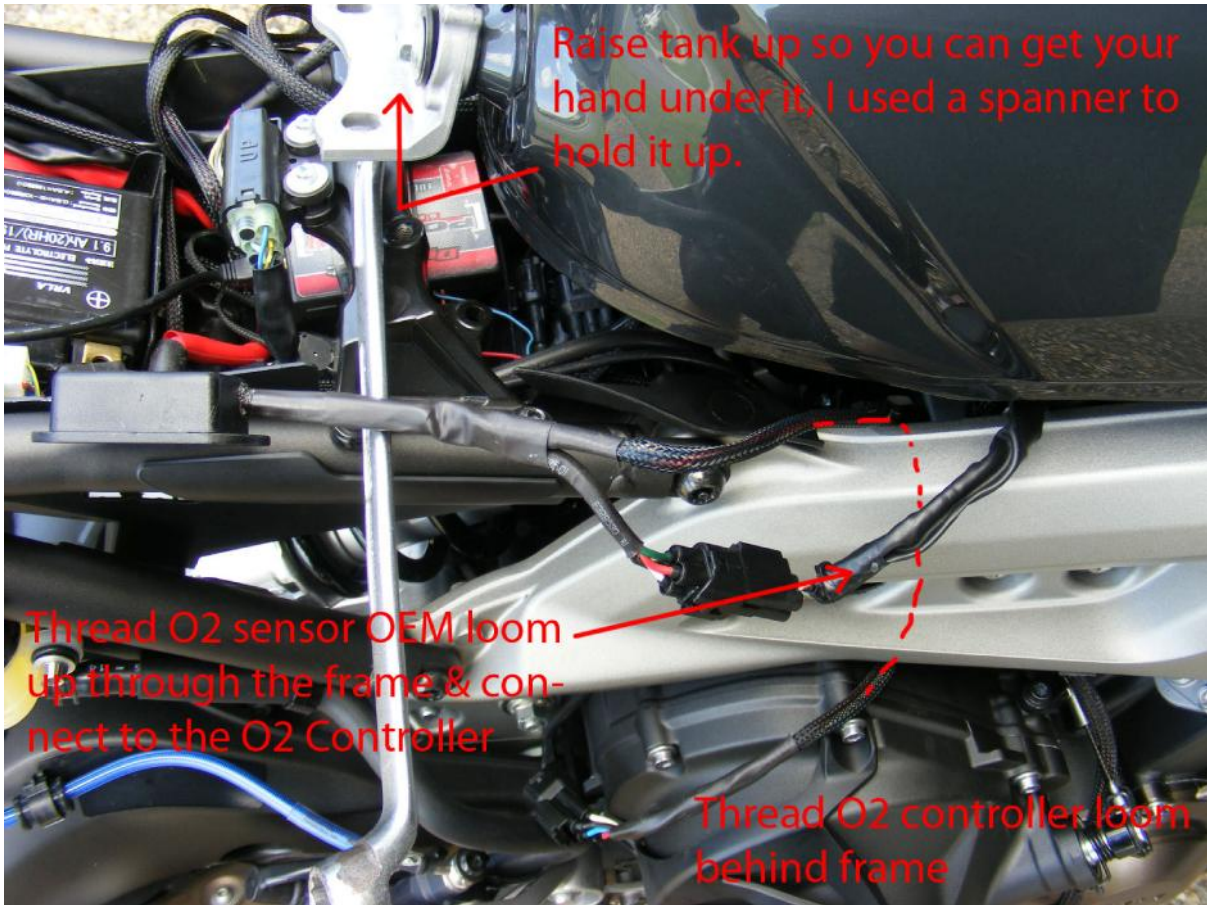
Cut Zip tie

Locate O2 sensor connector, lift up rubber boot, push clip in direction of arrow to re-lease catch lift connetor off bracket

Slide out O2 sensor loom from bracket

To unplug the O2 sensor
Pull this tab outwards with your
finger nail to release the catch,
then pull the connectors apart.

Cut the rubber boot off the OEM loom, we will re-attach it to the new O2 controller loom later.

Remove both Bolts using a 4mm Allen Key.

Raise tank up so you can get your hand under it, I used a spanner to hold it up.

Thread O2 sensor OEM loom up through the frame & connect to the O2 Controller

Thread O2 controller loom behind frame

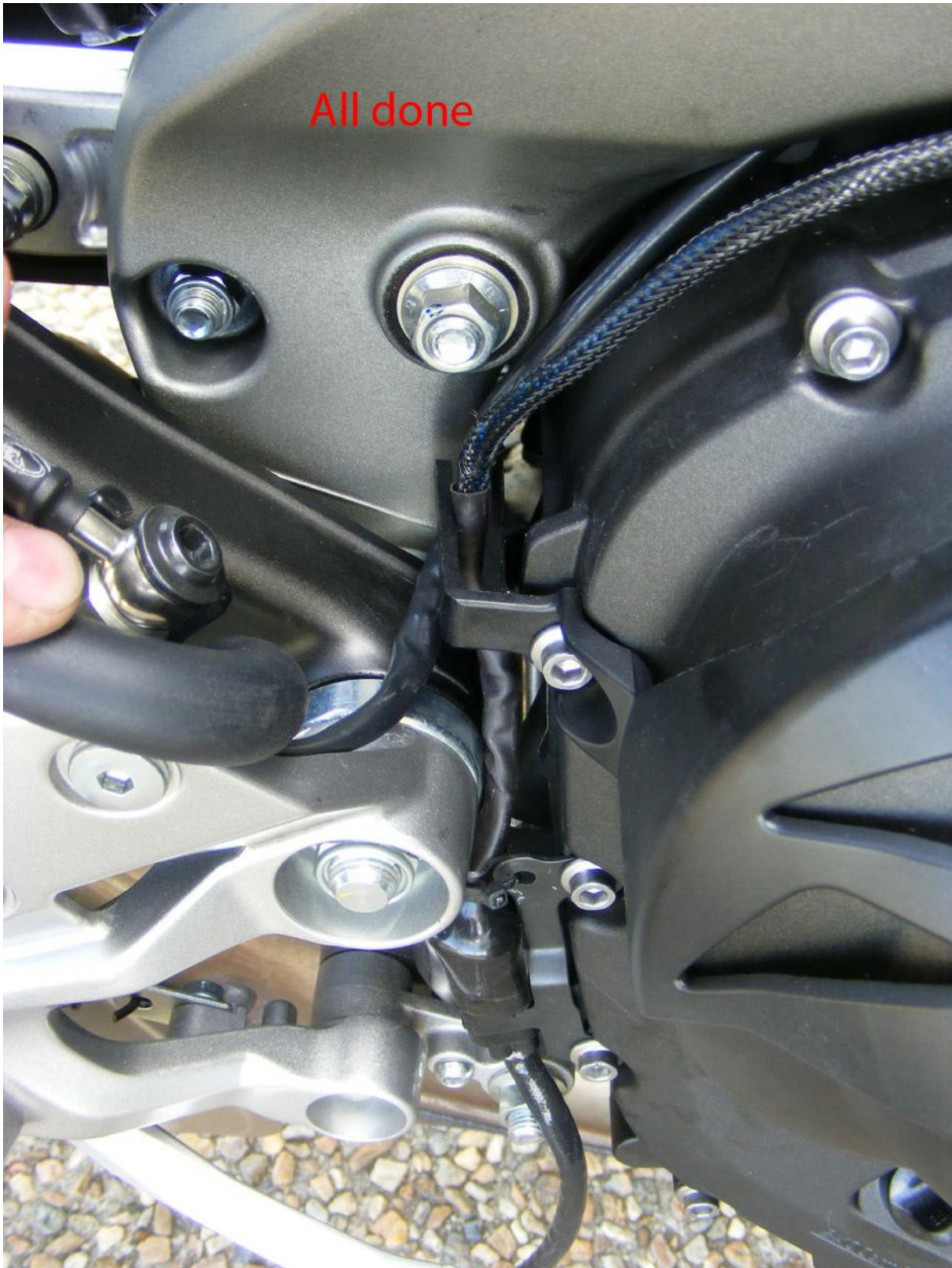

Refit both bolts

Zip tie O2 controller here.

Install O2 controller loom into bracket

Clip O2 connector back into black bracket & Zip tie loom to bracket eye. Fit rubber boot around O2 connector & zip tie inplace.

All done

You can now go for a ride, the mod is self & is constantly tuning the closed loop A/F ratio.

Enjoy.