Manual GP SG MX Quickshifter 725-CRF22-450, 725-CRF22-250

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This manual is possible to download at www.cordona.net/manuals .
For information and videos check out our Offroad page at
www.cordona.net/products/offroad

1. Application

This kit is plug and play for the new generation Honda CRF450R.

Honda CRF450R 2022-
Honda CRF450RX 2022-
Honda CRF250R 2022-
Honda CRF250RX 2022-

2. Product description

This quick shifter system uses an integrated strain gauge in a Cordona developed shift lever to trig the electronic module to cut either ignition or fuel injection. The strain gauge sensor measure resistance which varies with the changes of strain when bending in the aluminium shift lever. This changes in resistance amplifies in the electronic module and with help from a microprocessor and a MOSFET solid state relay, this ultimately creates the possibility to cut the ignition in a perfectly timed fashion and to make full throttle super distinct quick shifts possible.

Full throttle quick shifts can be exploited to ultimately ride faster and make shifts much easier in for example in heavy track conditions, improve gear box life and save some energy for the rider.

With parts developed and manufactured with the highest materials there are available, this system withstands and delivers consistency in the toughest conditions experienced and required in top motocross and enduro competition. All these details put together makes this system:

"The first working quickshifter for MX, Enduro and SuperMoto categories"

Includes

- Cordona 417Evo solid state module
- Cordona 725-CL01 SG shift lever, for 450R, 450RX
- Cordona 725-CL02 SG shift lever, for 250R, 250RX
- Cordona 725-FI-H01 loom
- Installation parts, 3M velcro, cable ties, P-clip, stickers

Features

- Digital switched based 'Stand-Alone' quickshifter connected to ignition or fuel injection
- Adjustable kill time and shift force
- Integrated strain gauge – load cell in Cordona MX aluminium shift lever
- Robust design developed for conditions in top level MX and Enduro racing
- Plug and play system
- Optional – Analogue output for logging of up and down shift force

The system is developed with the highest quality materials there are available.

- Shift lever and toe piece in high strength aerospace aluminium alloy
- Sensor cable and loom manufactured with Raychem Spec 55 aerospace quality wires protected with Raychem heat shrink tubes used in various top-level motorsport, aerospace, defence and marine applications.
- Digital electronic switch module with solid state technology
- Industry strain gauge load cell technology used by Cordona in quickshifters for 15 years
- The sensor cable design has been verified to withstand up and down movements of more than 180.000 gear shifts.

Technical Specification

- GP SG Digital Switch solid state quickshifter
- Model specific gear lever with integrated strain gauge/load cell
- Model specific loom connected to ignition (Yamaha YZ/WR) or fuel injection (Honda CRF), switched +12v and battery minus
- Adjustable kill time 10-99ms
- Adjustable shift force 1-40kg
- Configurable closed or open loop
- Configurable upshift direction
- Cordona designed gear lever in aerospace quality aluminium alloy
- Digital switch with solid state technology
- Plug/play system
- Waterproof IP68 class electronic module and load cell sensor

Cordona 725-CL01 Strain Gauge shift lever

Cordona 725-FI-H01 loom

417Evo Solid State Quickshifter module

Installation parts

3. Installation guidlines

The most important part of the installation is to get the sensor cable installed in the correct way. The sensor cable going from backside of the lever to the fixing point with p-clip at the gear box cover. The sensor cable needs to be in the correct length, with a loop to allow gear shifts up and down, without too much strain pulling the cable, and not to long loop which also creates an unwanted strain when up shift.

Make sure the installation is properly done with good workmanship in the details. Take care of the cables, don't squeeze the cable ties to hard, avoid the cables touching sharp edges.
Install the loom with smooth loop and without strain.

   a. **Preparations prior the quickshifter installation**
      Remove seat, side left and right fairings. Remove the fuel tank and battery cover.
      Remove oem gear shift lever.

b. Strain Gauge shift lever

Position the SG lever at the shift shaft. The Cordona shift lever is slightly offset from the OEM spline position. The shift lever tip measures approx. 9mm higher than the OEM in the 'normal' position

c. Sensor cable assembly CRF450R, CRF450RX
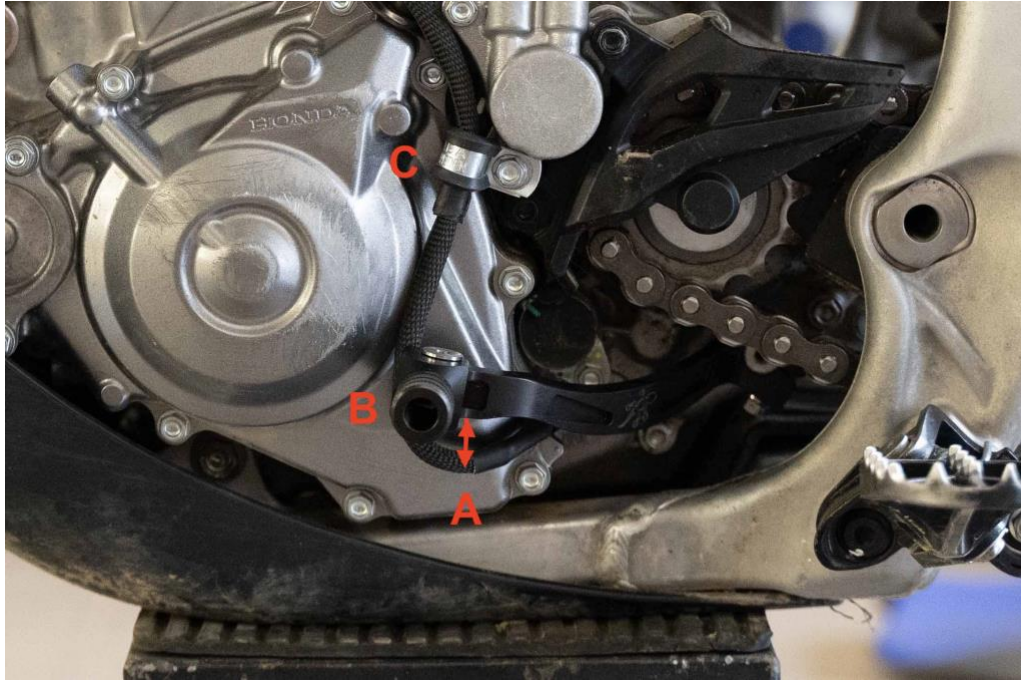
SG lever and sensor cable

A and B: Sensor cable loop at SG lever
With the shift lever at neutral position, the sensor cable going out from back of the SG lever **must** go in a loop that allows enough movement when do up and down shifts.

B. The sensor cable shall be routed behind the front top of lever. Just like as shown on the picture. The cable shall not be in front of the lever at neutral position of shift lever/gear.

C. P-Clip fixing point at clutch cylinder lower bolt.
Use the lower bolt at clutch cylinder and mount the included stainless-steel P-clip and fixate the sensor cable.
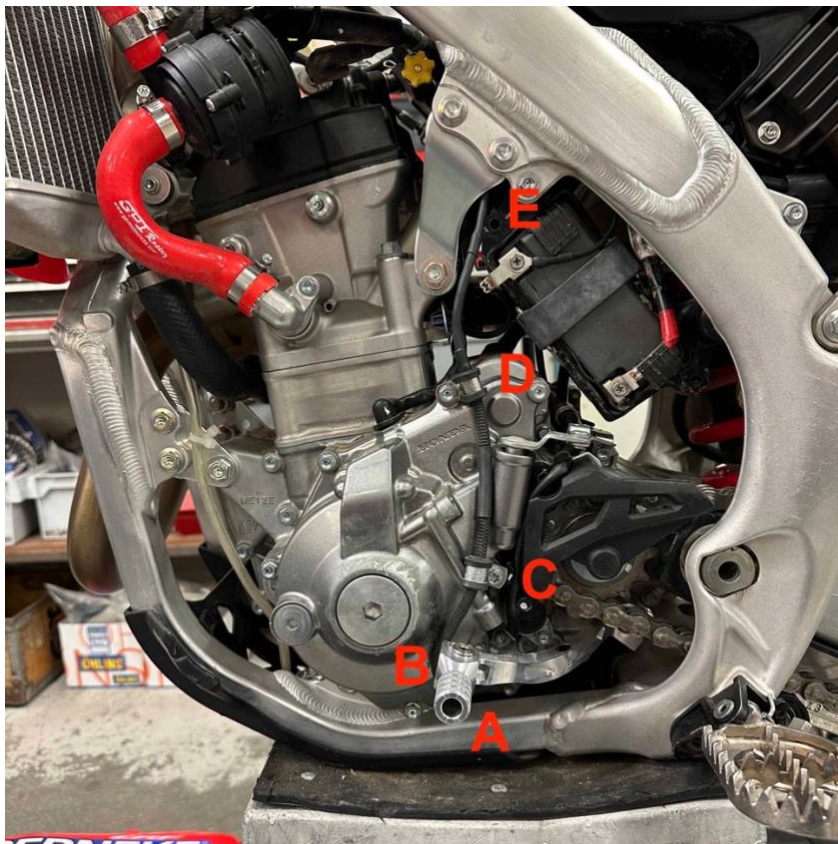
D. Sensor cable
Follow the clutch cable to route the sensor cable. Use included cable ties and clutch. Use the fastening strap for the clutch cable to secure the sensor cable.
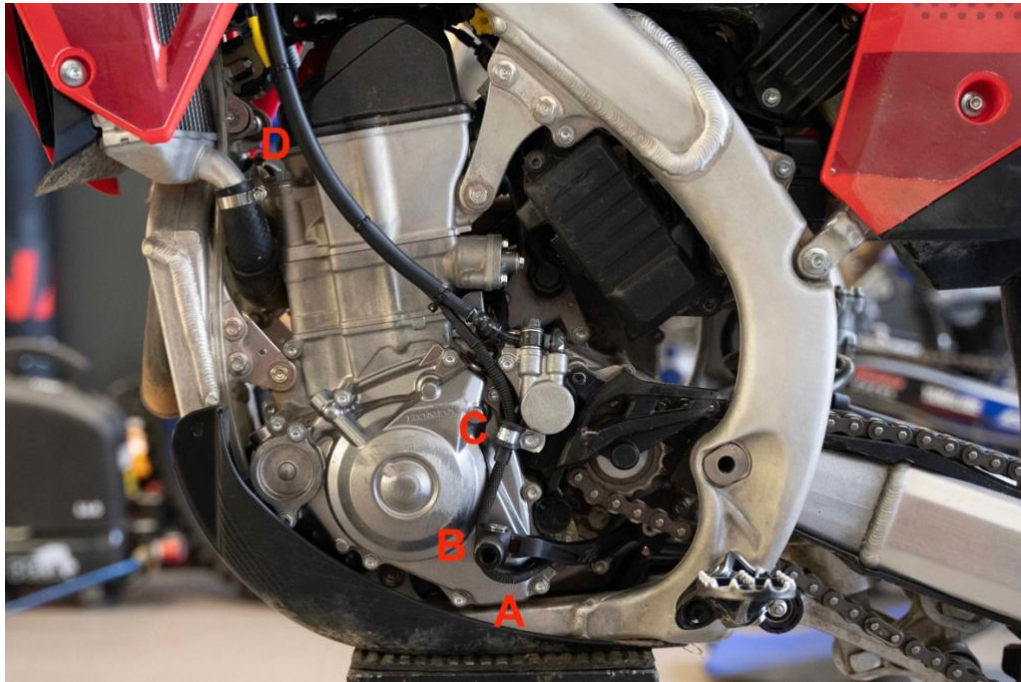
SG lever and sensor cable

d. **Sensor cable assembly CRF250R, CRF250RX**
Because of a different bike configuration compared to the 450 machines and without the hydraulic clutch pipe, the sensor cable needs a different routing.

CRF250R and CRF250RX sensor cable routing

A and B: Sensor cable loop at SG lever
With the shift lever at neutral position, the sensor cable going out from back of the SG Lever
must go in a loop that allows enough movement when do up and down shifts.
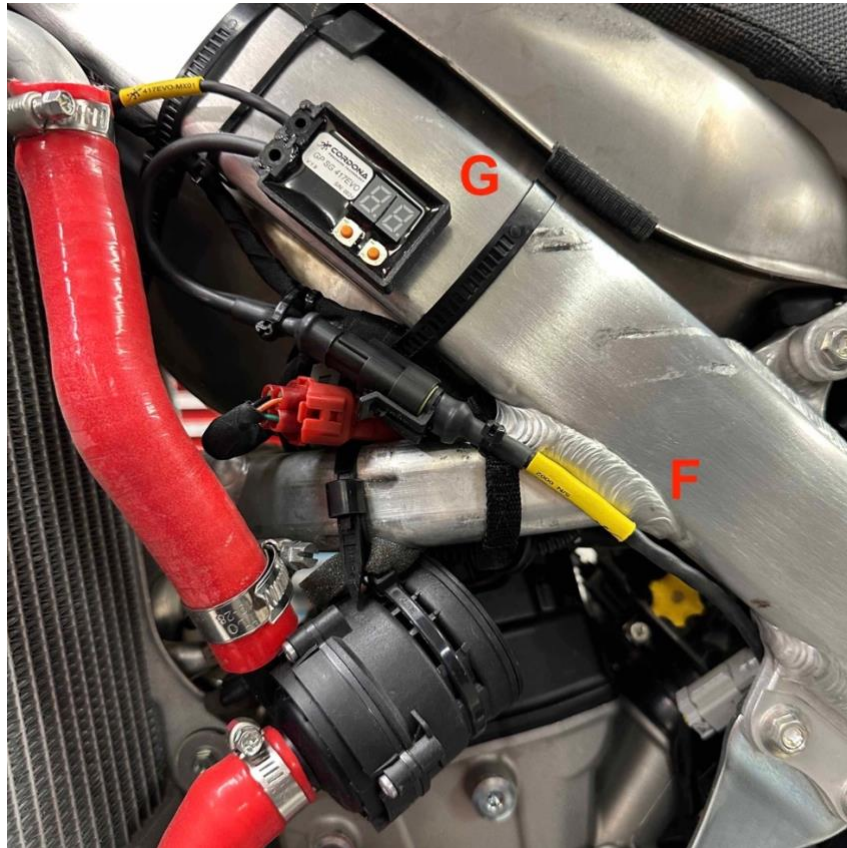(Picture below show CRF450R shift lever)
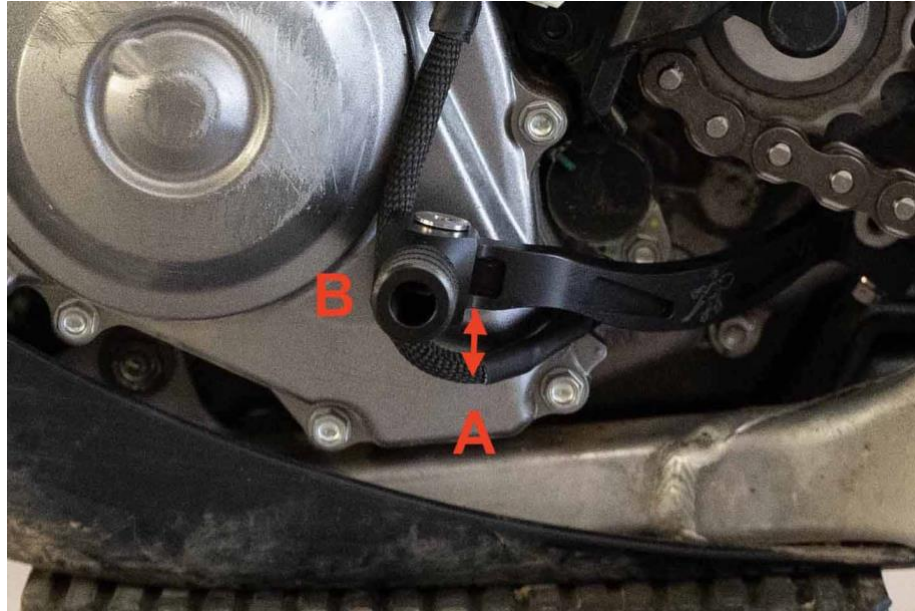
C. Replace the flange M6x40 bolt at crankcase cover with included M6x50 bolt and distance sleeve and mount the P-clip as shown at the picture.

D. Mount the stainless-steel P-clip at the upper bolt in left crankcase according to picture.
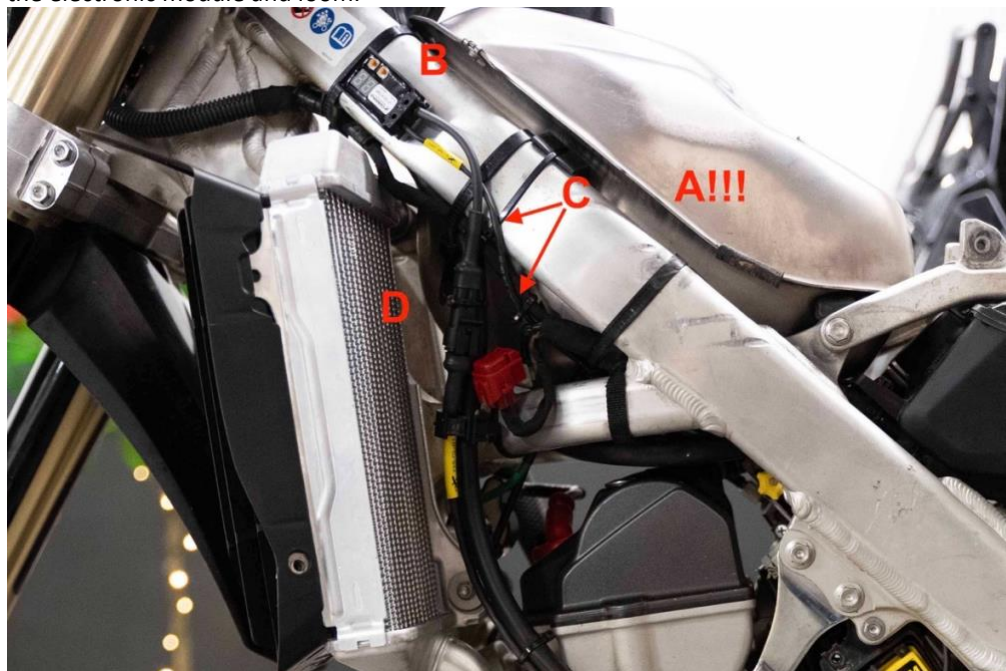
E. Route the sensor cable behind the engine bracket as shown in picture…

F. …and in front of the framework

e. **Electronic module, CRF450R, CRF250R (see segment f. for an alternatice placement)**

A !!! As first step disconnect Battery minus before start to disconnect the injector and install the electronic module and loom.

Electronic module placement. Note an alternative placement a segment **f.**

B. Clean the frame at the area where to attach the electronic module with a degreasing agent.
The included 3M velcro shall be attached to the back of the electronic module. Then place the module with attached velcro to the frame location shown at picture.

C. Route the quickshifter cable (with the 4-way white JST connector)) underneath the frame to inside of engine bay.

D. Connect the Cordona sensor cables from the electronic module and from the shift lever together.

f. **Electronic module placement CRF450RX, CRF250RX and alternative module placement for 450R and 250R**
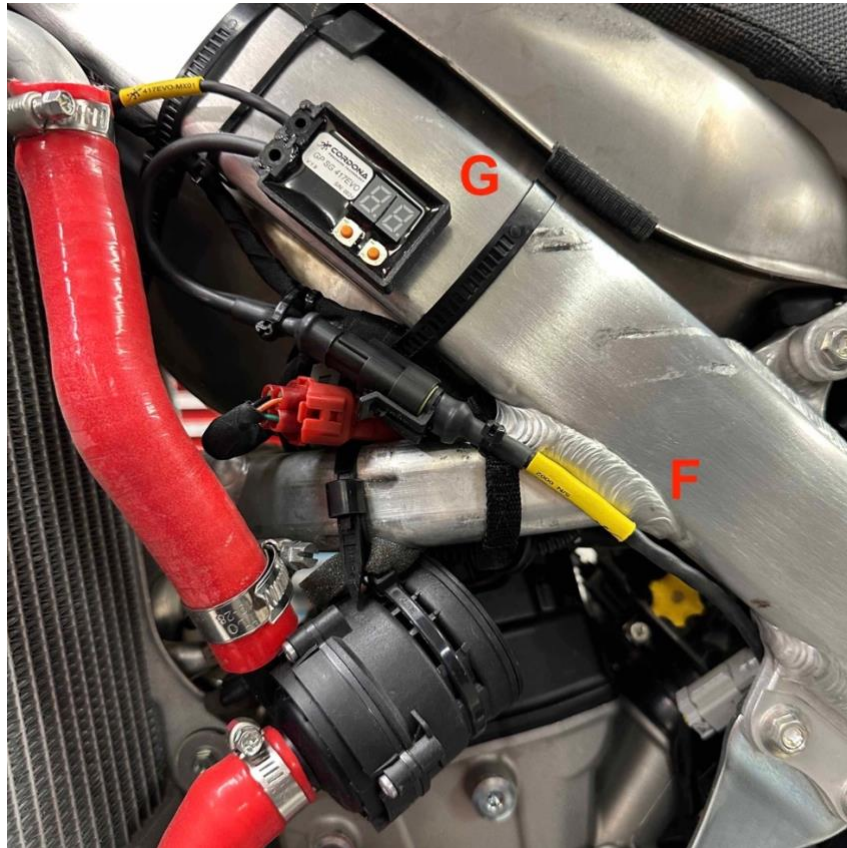Because of the larger fuel tank cover the outside of the frame for the enduro RX models, the module placement needs to be behind the radiator shroud, see picture below.

G. To access the module buttons for adjustments place the at this position.

Clean the frame at the area where to attach the electronic module with a degreasing agent.
The included 3M velcro shall be attached to the back of the electronic module. Then place the module with attached velcro to the frame location shown at picture.
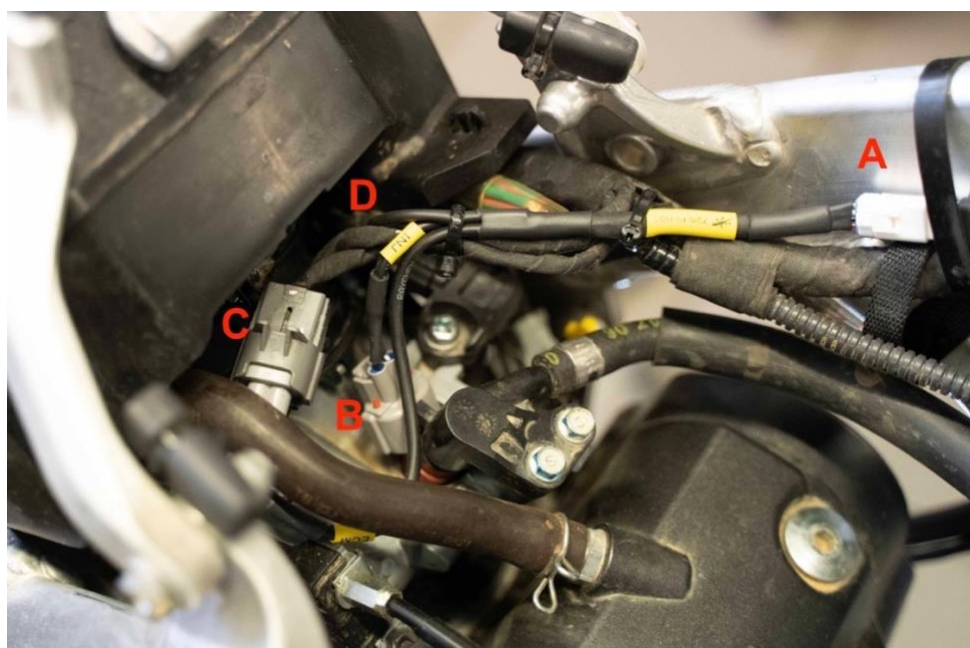

Honda CRF 250/450RX

g. **Loom**

A. Route the loom loosely above the engine as in picture. Connect the quickshifter cable coming from the electronic module at the bike main loom (white 4-way JST connectors) to the bike as in the picture.

B. Disconnect the injector connector and connect the Cordona loom, injector connector to the injector.

C. Connect the Cordona loom ECM connector to the disconnected bike injector connector. Make sure you hear a 'click' when connect.

D. Route the ground cable for battery minus underneath the air filter, inside the frame as shown in picture.

E. Pick up the loom battery minus cable behind the frame and rout it to battery minus as shown in picture.

Use cable ties to bundle together the Cordona loom with bike main cables.
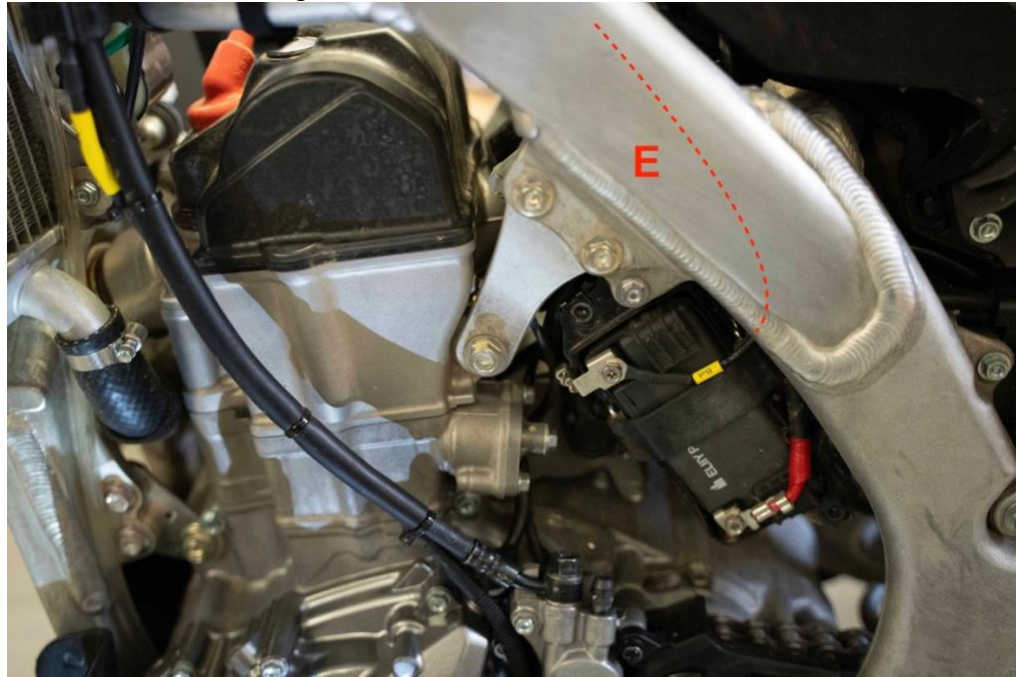
h. Finalize and start up

Inspect the installation and make sure all cables and looms are professionally routed and installed at the bike.

Do not forget to tighten the titanium bolt at Cordona SG shift lever.

Reassembly the fuel tank.

Connect to battery cable to minus including Cordona loom ground wire.

Do a quick push at bike start button and check the Cordona electronic module show 1.9. shortly. Push left and right button to check the module operates and show the set shift force and kill time.
When the module still has power (bike relay switch power off after 1 minute), check the LED display dot at electronic module, flash when do a manual upshift.

Reinstall everything, fairings, seat etc.

Start up the bike.

Helmet, boots and gloves on… Let's do some quickshifts!!!

4. Settings and adjustments guidlines

This system has fully adjustable kill time and shift force. With its very robust design with load cell/strain gauge technology, integrated in a high strength aluminium shift lever, this system delivers a very distinct and consistent quick shift function during all conditions.

This system comes pre-set with kill time and shift force settings currently used by our test and development rider in enduro and motocross. This will be a good starting point for motocross and enduro, but these settings are optimized for his riding style, bike tuning character and preferences (a strong elite MX rider with a quite hard racing style).

Pre-set values Yamaha YZ/WR
Kill time 30ms   Shift force 15kg

Setting examples used during 2023 and winter 2024

Conditions	Used kill time	Used shift force
Hard frozen soil, snow WR450 Spike tires, Enduro	35ms	17kg
Soil/loose gravel, YZ450	29ms	15kg
Sand, soil etc in MX2, YZ250	29-35ms	15-17kg

Recommendations
We strongly recommend that you learn to take advantage of the system´s flexibility and setting options to optimize the gear shifts for different track conditions and your driver preferences.
Do not be afraid of change and play with different settings and take time to understand the relationship between kill time and shift force and in which riding conditions a setting will work well for you.

This system comes pre-set with kill time and shift force settings currently used by our test and development rider in enduro and motocross. This will be a good starting point for motocross and

enduro, but these settings are optimized for his riding style and preferences (a strong elite MX rider with a quite hard racing style).

Rider Notes: Kill time and shift force relationship guide

The quickshift shall feel smooth and distinct, almost seamless.

Feedback	Possible cause	Proposal
It is hard to engage next gear	To long kill time	test 5ms longer kill time
You move forward when upshift. It feels the engine almost stalls	To sensitive shift force	test 5ms shorter kill time
It is hard to engage next gear at low speed	To low rpm with too much traction (asphalt)	Increase kill time 5ms in steps
It's hard to for the foot to engage next gear	To hard shift force	Lower shift force 5kg
Shifts in heavy bumps** without rider engage the lever	to sensitive shift force	Test min. 15kg as shift force ** with a smooth track conditions without heavy bumps lower shift force can be used
Smooth track conditions without heavy bumps		lower shift forces possible, no risk for
**If the gear lever is positioned to much upwards on the spline positions, your foot might need more force and move more upwards.		test less shift force or lower the gear lever one click

a. **FW version**
   When power up the electronic module the led display shows the current FW version '1.9.'

b. **Kill time**

   Show set value:
   When electronic module is powered up…
   Push left button it shows the kill time value.

   Change kill time:
   When electronic module is powered up…
   Push and hold <u>left</u> button, then push and hold <u>right</u> button at the same time for 3 seconds…
   - The LED display starts to flash with the set kill time value
   - Change the value up or down with the right or left button

- Set the new kill time with push both left and right button at the same time for 3 seconds.

Kill time can be set between 10 and 99ms or with default setting (df) at 150ms.

c. Shift force

Show set value:
When the electronic module is powered up…
Push right button it shows the shift force value.

Change shift force:
When the electronic module is powered up…
Push and hold <u>right</u> button, then push and hold <u>left</u> button at the same time for 3 seconds…
- The LED display starts to flash with the set shift force value.
- Change the value up or down with the right or left button.
- Set the new shift force with push both left and right button at the same time for 3 seconds.

Shift force can be set between 1 and 40 kg.

d. Upshift direction

This system comes with a pre-configured upshift direction for dirt bikes, i.e., movement of gear lever upwards for upshift. However, the upshift direction can be changed if it's used with our 403 strain gauge/load cell sensor for example.

Show the set upshift direction.
When electronic module is powered up…
At the 2nd LED display right bottom corner a small dot will flash when do an upshift.
!!! Do not forget to activate the clutch if the engine is running!!!

Change upshift direction:
Push and hold both buttons.
Power up the electronic module…
Release the <u>right</u> button, then push and hold <u>left</u> button at the same time for 3 seconds…
- The LED display starts to flash with the set shift force value.
- Change the value up or down with the right or left button
- Set the new shift force with push both left and right button at the same time for 3 seconds

e. QS loop settings
This digital switch quickshifter system works with a looped circuit connected to either the bike ignition or fuel injection +12v circuit. When doing a quick shift, the +12v circuit interrupts and stops the engine with the set kill time. This short interruption of torque of the gear box makes it possible to do shift with full throttle instead of using the clutch or 'dip' the throttle when shift.

This system comes with a pre-configured closed loop (t1) setting that opens (= cut +12v circuit to ignition or injector) when shift.

This system can also be set with an open loop (t2) that will close when do an upshift.

t1 means closed loop that opens when shift

t2 means open loop that close when shift

Change loop settings t1 / t2

When electronic module is powered up…
Push and hold <u>left</u> button, then push and hold <u>right</u> button at the same time for 6 seconds…
- The LED display starts to flash with the set kill time value after 3 seconds, continue to hold for another 3 seconds and t1 (= closed loop) starts to flash.
- Change the loop setting to t2 (= open loop) and back with the right or left button
- Set the new loop setting with push both left and right button at the same time for 3 seconds

5. Maintenance and fault finding guidelines

<u>Create a routine to check the shift lever and sensor cable after each driving session.</u>

- Always clean the shift lever after each driving session. The shift lever and electronic module withstands high pressure water washing. But avoid washing directly into loom connectors.
- Maintain and lubricate the movable shift lever tip for good operation and make sure it's no dirt in the spring mechanism.
- Inspect for damages at sensor cable. Check with extra care the sensor cable part that are closest to the shift lever.

E1 error code (flashing E1 in LED display) because of damaged strain gauge sensor or sensor cable.

E1 code explained:
- If the electronic circuit going from the electronic module to the shift lever via the cable, into the integrated strain gauge in shift lever, and back to the electronic module.

- If this circuit will be interrupted because of damages or excessive wear, the diagnostic function will measure that the signal is out of spec, the electronic module and LED display will show E1 flashing and quick shifts will not be possible.

Broken or partially broken sensor cable:
- If the sensor cable or integrated strain gauge in shift lever gets damaged and break, it will still be possible to continue to ride. <u>The engine will not stop</u>. But doing quick shifts will not be possible. The sensor cable needs to be repaired or if not possible, replaced.

- If you experience engine cuts without engage the shift lever, it is possible that the sensor cable is partially damaged but not broken off. This might cause the resistance in the wires increase and get outside the tolerances and make shifts if the sensor cable is moved. If this circumstance happens you can temporarily solve the problem with disconnect the 2-way SuperSeal connectors from Shift Lever sensor cable and from the electronic module.

Preventive measures and Fault finding

The integrated strain gauge sensor and sensor cable can be checked preventive for damages.

Check LED display when moving sensor cable.
When electronic module is powered up…
Move the sensor cable close to the shift lever and check if the LED display, and small dot at electronic module, do not flash.
This LED dot shall only flash when do an upshift with the set shift force.

- Ohm measurement. Disconnect the sensor cables from electronic module and shift lever.

Use a Digital Multimeter and the included test terminals and measure at the 2-way SuperSeal FM connector going to shift lever.
When moving the sensor cable close to the shift lever in all directions, measure the resistance between the two terminal sockets in the 2-way connector.
The measure shall be stable at 350.0 ±0.8 Ω (ohm)

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