PowerTRONIC V4 Quick Shifter Installation and Calibration Manual

Document Version	2	Release Date	03 Jan 2023

Application information	Generic
Vehicle	**Not Applicable**
Model	**Not Applicable**
Year of manufacture	**Not Applicable**

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.
- After any updates/changes on the R-Tune software, click "Send" to update the values on the ECU.
- Quickshift may be referred to as QS in this document.

Description

The quick shifter sensor is installed on the shift lever and senses the gear shift movement of the gear shift lever/pedal, and momentarily cuts power to the engine to enable quick, seamless clutchless shifts.

Tools Required

- Phillips-Head screwdriver
- Bolt- specific Spanner
- Torque Wrench 5-25NM

Warning

- ❏ Ensure the gearbox and shift linkages are in good condition, slack in the mechanisms, excessive wear and tear, improper tightening torque, etc. may cause faulty/unpredictable triggers of the quickshifter which may result in dangerous riding conditions.
- ❏ It is advisable to turn off the quickshifter in the lower RPMs.
- ❏ Shift-down sequence will induce higher sensor readings than shift-up when calibrating to ensure the shift-up sequence is used.
- ❏ For the same amount of force applied on the lever, the output of the sensor is also dependent on the speed of the shift movement, quicker movements of the shift lever result in higher sensor values and vice versa.

Quickshifter – Instructions and Installation

1) The quick shift kit consists of (a) a **Sensor with connector** (b) **Bolt** (c) **Spacer**

2) Remove the original bolt from the gear shift mechanism.

3) Install the supplied quickshifter, in the following order as shown in the image.
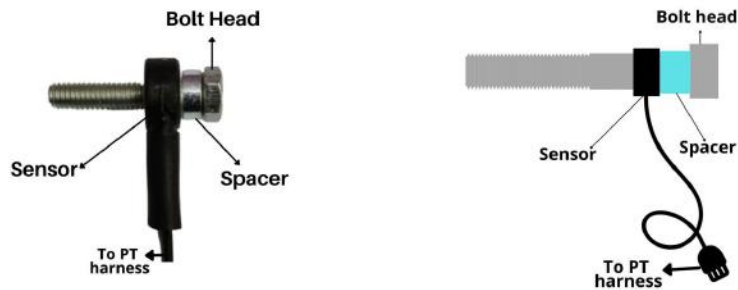

If the milling assembly on the side of the Quickshifter is curved and can not provide a flat surface with the QS sensor, then you can use it like mentioned here:
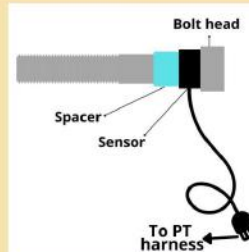
4) Tighten the bolt 5 to 6 Nm, or as specified in the original owner's manual or workshop manual (Max torque to be less than or equal to 6Nm)

Or

Tighten the bolt by $(^2/_3)^{rd}$ 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 to the images below.
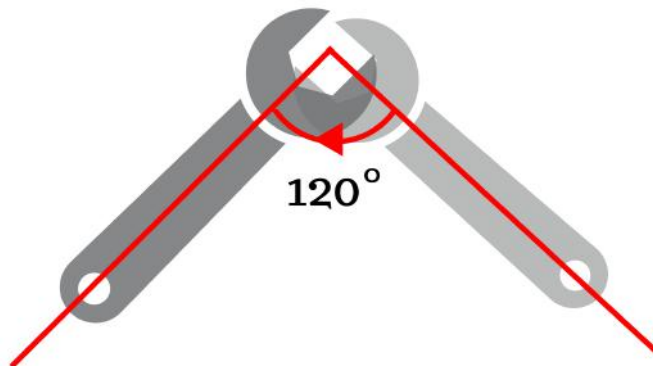
Rotate the wrench by 120° from the point of first resistance and do this twice (total 240°)

Warning: DO NOT overtighten the sensor

5) Connect the PowerTRONIC Quick shifter connector to the sensor connector and tie it to the frame.
Note: Do not lock/tighten the zip-ties completely. Use them as a guide for sensor wire.

6) Connect the R-Tune V4 software to the PowerTRONIC ECU, available at
https://powertronicecu.com/downloads/ [Refer R-Tune V4 installation manual and connect to the ECU document].

A. *Setting up the Quick shifter sensor*

1. Please do the TPS Calibration before proceeding

2. Select the Quickshifter Settings Tab

2.1. Set the following on PowerTRONIC R-Tune (or use the base map provided for the quickshifter), and click "Burn".

	Parameter	Value/Option to set in general		Description
1	Quick shifter mode	Enabled Spark Cut only		The mode at which the QS activates the cut. For Vehicles with multiple sparkplugs or with a multiple ignition system, please enable the Spark and Fuel Cut
2	Quickshifter Trigger Load %	5		The load/throttle percentage above which the QS function is activated.
3	Quickshift Sleep (ms)	500		The time in milliseconds, for which the input from the sensor is ignored each time a successful QS function is run. It is essential to have a minimum of 500 ms to prevent false triggers.
4	Quickshift Trigger Polarity	Positive Trigger		Defines the sensor output type

2.2. Sit on the bike like how you would normally do, and place your leg on the shift lever.

2.3. Move the shift lever like shifting up a gear, like going from 1st to 2nd, or 2nd to 3rd, etc.

Quickshifter Sensitivity Calibration.

The Quickshifter starts to work only after a particular value is reached at the sensor by the foot while shifting. The value from the Quickshifter sensor above which the PowerTRONIC ECU initiates the QS action is called the Sensitivity. Once the Sensitivity is reached, the PowerTRONIC ECU cuts the ignition and/or Fuel for a preset value.

If the sensitivity is too high it will be too hard to shift and sometimes shifts might not work. If the sensitivity is too low, Quickshifter will trigger for normal vibrational inputs while riding and undesirable cuts might occur.

2.4. Observe the graph on the QS settings tab and check the average value the spike reaches for the shits-up procedure.
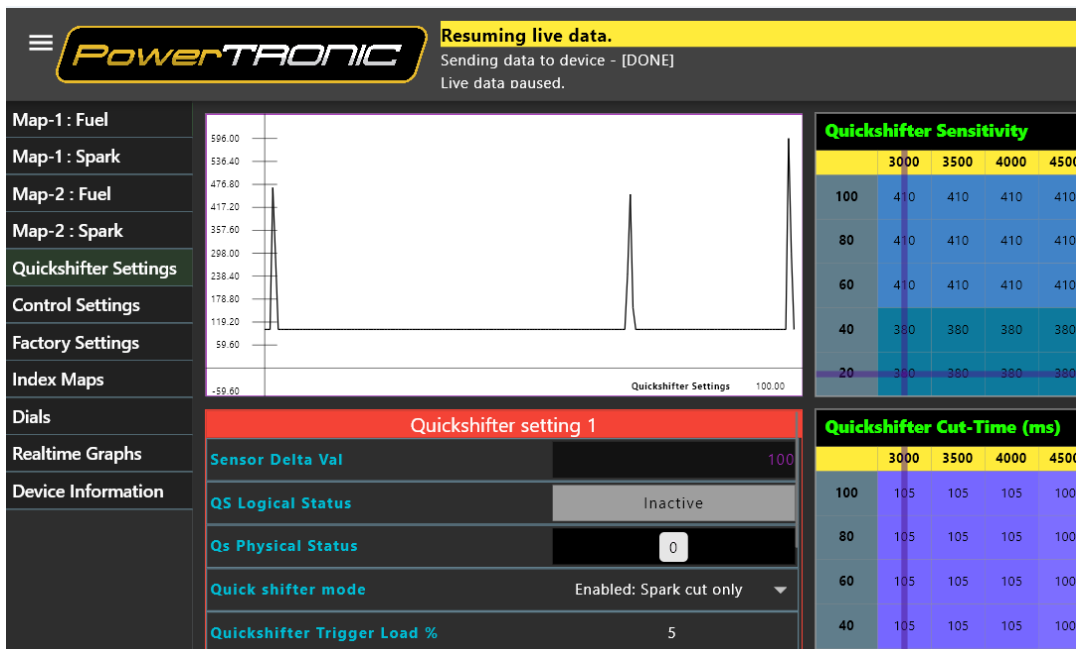
For Example, In the above image, each spike reaches around 475.

2.5. Set 80% of the average value in the Quickshifter sensitivity table.

Quickshifter Sensitivity   Live Value: 380.0

	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
100	380	380	380	380	380	380	380	380	380	380
80	380	380	380	380	380	380	380	380	380	380
60	380	380	380	380	380	380	380	380	380	380
40	380	380	380	380	380	380	380	380	380	380
20	380	380	380	380	380	380	380	380	380	380

2.6. Fine-tune the sensitivity table, on all of the Load-RPM regions, by observing the feedback from the shifting. The customer can use a dyno/road condition to get this feedback on multiple steps and occasions.

A typical fine-tuned sensitivity table is given below. Please note that the table is fine-tuned for a specific rider, on a specific vehicle. May not reflect the customer's values, as the shifting force of the rider, the tightness of the sensor, and the riding conditions may vary.

Quickshifter Sensitivity   Live Value: 380.0

	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
100	410	410	420	420	420	420	420	420	420	420
80	410	410	420	420	420	420	420	420	420	420
60	410	410	410	410	410	410	410	410	410	410
40	380	380	380	390	400	410	410	410	410	410
20	380	380	380	390	400	410	410	410	410	410

Quickshifter Cut time Calibration

The Cut time is the time in milliseconds when the ShiftX cuts the ignition while shifting.

2.7. A typical fine-tuned cut-time table is given below. Please note that the table is fine-tuned for a specific rider, on a specific vehicle. May not reflect the customer's values, as the shifting force of the rider, the tightness of the sensor, and the riding conditions may vary.

Quickshifter Cut-Time (ms)								Live Value: 110.0		
	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
100	95	90	90	85	75	60	60	60	60	60
80	100	90	90	85	75	60	60	60	60	60
60	100	90	90	85	75	60	60	60	60	60
40	105	95	90	85	75	60	60	60	60	60
20	110	105	100	90	85	70	60	60	60	60

To adjust the cut time, look up the "Quickshift RPM v Cut time (ms)". This field allows for different cut times based on engine RPMs. If the value set is 0 it means the Quickshift function is disabled in that region. If the value is too small the gears will not shift well, have false neutrals, or may not shift at all. If the value is too high, the gear will shift but will have an unnecessary delay before the power comes back on. To start with all the fields the user can use the values from the base map which can be set to 100 ms or more and start calibration from the beginning.

Test and adjust the values based on RPMs for the best cut for your riding style. Typically lower RPMs need higher cut times and higher RPMs need lower cut times. These values may vary based on (not limited to)

1. Vehicle condition and age
2. Vehicle type
3. Shift linkage slack
4. Gearbox wear and tear
5. Riding style

2.8. Shift up again and check in the QS logical status, the following message "Trig OK, NO cut" appears every time with the shifts.

2.9 The above message, indicates that the QS is set up properly and can be tested on the road or dyno.

2.10 In the actual riding session with each shift up, the message will be Active Spark Cut!