SP ELECTRONICS
Via Ca' Fusa, 1
36030 Sarcedo

QUICK SHIFTER CGS4 INSTALLATION MANUAL

Index :

INTRODUCTION

The CGS (Clutchless Gear System) is a device that allows the rider, during fast sports use, to shift up a gear without closing the throttle or using the clutch. The controlled loss of power during the gear shift phase causes the torque released to the gearbox to cease for a controlled period of time (Cut-Off time), allowing for a quick and precise up-shift. It was developed to speed up gear changes on the track and allow the rider to concentrate more, both physically and mentally.

The kit consists of a single electronic control unit (eBox CGS4), an electromechanical sensor to be applied to the gear shift mechanism or directly to the lever depending on the application and a Plug&Play wiring harness for connection to the vehicle's original electrical system, specific for each make and model.

Thanks to the 0-100% auto-recognition of the throttle position sensor, the device is active ONLY above 5% throttle opening. Thanks to "ZEROPOWER" technology, the device consumes minimal energy to operate ONLY when the engine is running. The control electronics case is made of billet, anodized aluminum. Waterproof wiring and connectors for automotive applications make the device resistant to engine temperatures, oil and hydrocarbons, as well as to water spray, even under pressure (NOT for immersion), and vibrations.

This device is designed for 2/4 stroke injection engines, from 1 to 4 cylinders.

ADVANTAGES QUICKSHIFTER

- Faster up-shifts compared to traditional gear changes.
- Reduced pitching motion during acceleration shifts.
- Improved traction thanks to reduced load transfer during gear changes.
- Allows the driver to maintain physical strength on the vehicle and concentrate more on driving.
- Reduced tire wear… which is always a plus in racing!
- The pleasure of smoother, more fun road riding!

...but also some 'DISADVANTAGES'

- Increased vehicle weight (even if minimal, we're talking about 300 g!).
- *It's addictive! …(It happens that… everyone complains… when they find themselves driving vehicles without Quick Shifter!).*

WARNINGS

- The device increases stress on your vehicle's mechanical components.
- Incorrect installation of the device may cause damage to the device and the vehicle.
- The installation of the device must be carried out by competent personnel.
- **The device is not approved for use on public roads.**
- The device is designed in accordance with European directives on electronic devices.
- The device does not contain any substances or parts that are hazardous or harmful to surrounding objects.
- The device does not pose a risk of explosion or fire.

!!! SP Electronics declines all responsibility for the points listed above in relation to damages caused to things or people including third parties involved, resulting from the use of the device !!!

!!! SP Electronics and its suppliers assume no liability to the purchaser or anyone else for any damages, expenses, loss of profits or any other damages arising out of the use of this device !!!

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DEICE WAARRANTY

SP Electronics devices are covered by a 2-year warranty (1-year commercial warranty provided by the manufacturer and 1-year warranty provided by the seller/distributor by law). The warranty period begins on the date of issue of the invoice or receipt, which, in the event of a device failure, must be sent with the device. The following devices are excluded from the warranty:

- Damage caused by a fall.
- Tampering by the user.
- Damage caused by fire and/or heat beyond the limits indicated in this manual.
- Electrical damage caused by incorrect installation.

Returns Management

- Returns of material are accepted no later than 10 days from the shipping/invoicing date if coinciding.
- SP Electronics reserves the right to accept or reject the return after checking its integrity.

ELECTRICAL INSTALLATION

!!! WARNING !!! Installation of this device must be performed by a technician competent in electrical circuits and components. It is dangerous to modify the vehicle's original wiring without adequate experience. We recommend disconnecting the positive battery terminal before beginning the installation procedure and throughout the entire installation process.

Thanks to specific Plug&Play solutions for each vehicle model, the device allows for the controlled interruption of the positive +12V power supply to the ignition coil (COIL) **or** injector (INJ) using appropriate control logic. The individual branches are identified on the wiring harness, and their specific functions are listed below:

BRANCH	DESTINATION
GND	Battery Negative or Chassis Ground Connection
INJ	Plug&Play fuel injector connection
COIL	Plug&Play ignition coil connection
TPS	Throttle position signal connection (optional)
sMec	Connection to the electromechanical sensor
SwB	Handlebar switch connection for Quick Shifter exclusion (optional)
AUX	Connection to our RACELIGHTS accessory device (optional)

GND Connection : If the device's location in the vehicle allows it, connect this cable directly to the negative pole of the battery, otherwise connect it to a more convenient ground point. In this case, it is recommended to use an electronics tester in continuity test mode and check the electrical connection between the negative battery terminal and the chosen ground point.

INJ Connection : If this type of connection is provided for in the Quick Shifter wiring harness, locate the original fuel injector connector and disconnect it. Place the Plug-Socket pair of the Quick Shifter wiring harness between the original connector just disconnected and the fuel injector. In the case of an engine with 2 or more cylinders, repeat the operation for as many “INJ” branches as there are in the Quick Shifter wiring harness (from 1 to 4). *There is no need to follow a connection sequence!*

COIL Connection : If this type of connection is provided in the Quick Shifter wiring harness, locate the original ignition coil connector and disconnect it. Place the Quick Shifter wiring harness plug-socket pair between the original connector you just disconnected and the ignition coil. For engines with 2 or more cylinders, repeat the operation for as many "COIL" branches as there are in the wiring harness of the Quick Shifter (from 1 to 4). *There is no need to follow a connection sequence!*

!!! ATTENCTION !!!! *Pay close attention to the connection polarity: once the Plug&Play connection has been made to the vehicle's original connector, for correct operation and to avoid damaging the device itself and/or the vehicle, it is necessary to identify the +12V power supply to the injector or ignition coil depending on the Plug&Play solution provided. This must correspond, once the Plug-Socket pair is connected, to the RED wire of the Quick Shifter wiring harness. If this is not the case, it is necessary to reverse the position of the cables on the relevant connector or on the corresponding connector on the Quick Shifter wiring harness. To identify the +12V power supply, we recommend using the wiring diagram provided by the manufacturer and/or an electronics tester in "ON" mode. DC voltage measurement set to full scale 20V. Therefore, place the black terminal of the tester on the negative pole of the vehicle battery and on the previously identified and disconnected connector. With the ignition on, check with the red terminal of the tester on which of the two cables there is a direct voltage of approximately 12V. This voltage should disappear approximately 5-10 seconds after the ignition is turned off. In the case of multi-cylinder engines, it is sufficient to identify which color of wire is repeated in all the other connectors involved in the application.*

TPS Connection : Electrical connection is optional but necessary to fully exploit the potential of this device. Locate and disconnect the connector, usually three-way, of the accelerator position sensor, keyed to the engine's throttle body (in the case of a ride-by-wire system, and therefore with an electronically controlled accelerator equipped with a double position sensor, preferably connect to the one referring to the secondary valve). Using a current-tapping connector provided in the kit, connect the green wire of the Quick Shifter wiring harness to the throttle position signal (0-5V). If you have the skills and expertise, you can opt for a soldering connection: expose 1 cm of copper and do NOT cut the affected wire. Using an electronics soldering iron and tin, electrically solder the two wires and insulate the connection with duct tape for wiring.

!!! ATTENCTION !!! *To locate the accelerator position signal, we recommend using the wiring diagram provided by the manufacturer and/or an electronics tester in mode DC voltage measurement set to full scale 20V. Therefore, place the black terminal of the Tester on the negative pole of the vehicle battery and with the connector previously identified and disconnected, check with the ignition on with the red terminal of the Tester, on which of the three cables of the connector there is a fixed and continuous voltage of approximately 5V: this is the supply voltage of the sensor! Now with the ignition off and with the Tester in mode continuity test Always check the electrical connection between the negative battery terminal and one of the two previously unconnected cables: this is the sensor's ground reference! By exclusion, the wire to connect to is the discarded result of the two previous electrical tests. In the case of a four-way or more sensor, the signal that varies as a function of the accelerator opening must always be identified in a range from 0V to 5V and NOT vice versa.*

sMec Connection : Plug & Play connection to our family of electromechanical sensors specifically for applications on the gearshift rod or directly on the gear lever. For correct installation of this device, which is part of the Quick Shifter kit, please consult the relevant manual available on our website in the CUSTOMER CARE - MANUALS category.

SwB Connection : optional Plug&Play connection to our handlebar switch device to disable the electronic gear shifting at will. This device is not included in the kit but can be purchased on our website in the ACCESSORIES category.

AUX connection : optional Plug&Play connection to our RACELIGHTS gear shift indicator and starting aid. This device is not included in the kit but can be purchased on our website in the ACCESSORIES category.

All our Plug & Play solutions are based on wiring diagrams provided by the manufacturers and verified through direct experience on many vehicle models from the 2000s to the present. Unfortunately, these have not always proven to be reliable in all cases and across the many different vehicle models produced over the years. We are constantly committed to verifying and updating our internal databases. We apologize in advance if any construction inconsistencies may arise. For any questions and/or clarifications, please do not hesitate to contact us!

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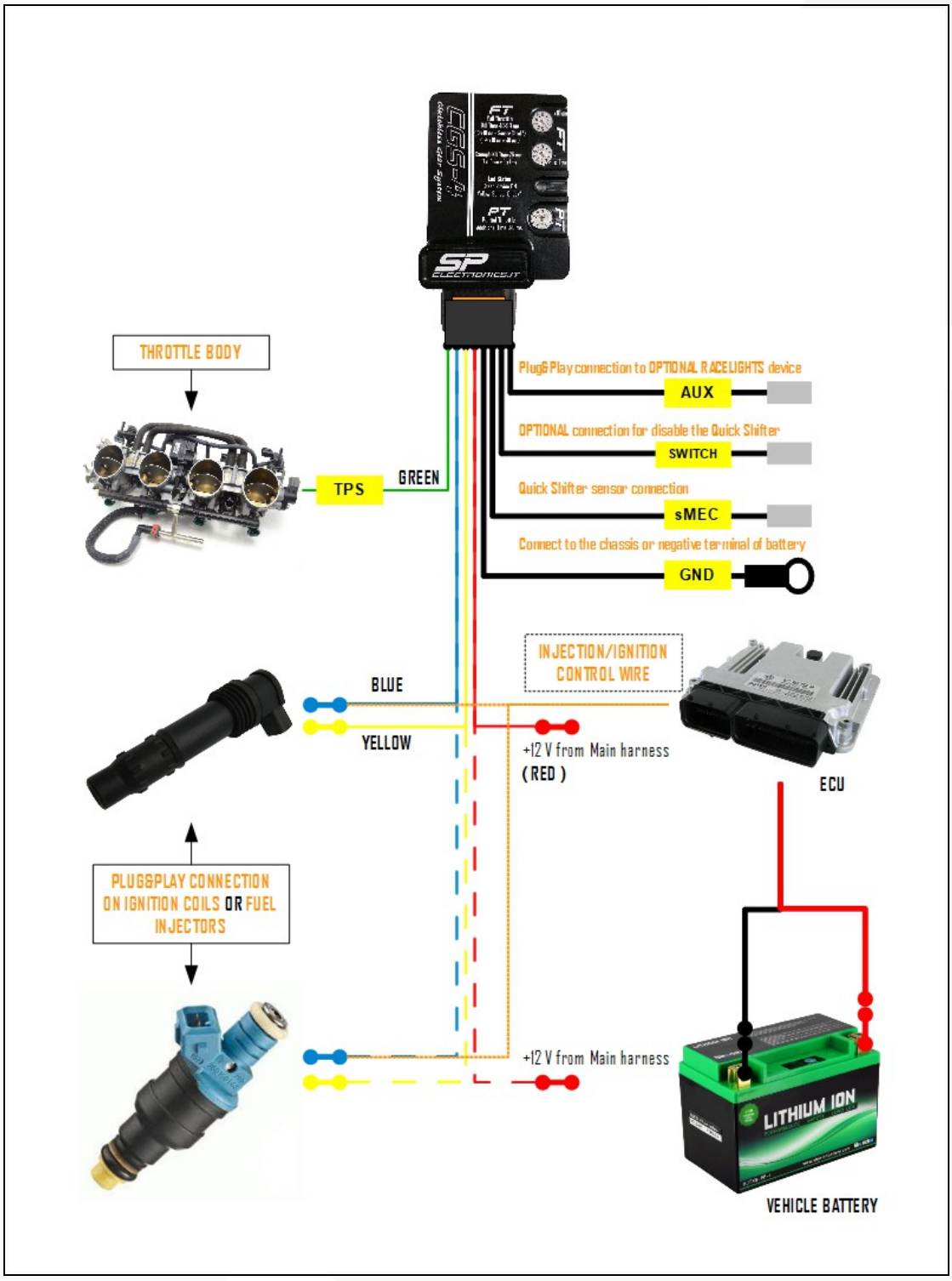
WIRING DIAGRAM



MECHANICAL INSTALLATION

CGS4 electronic unit : to mechanically attach the electronics unit to your vehicle, use the supplied mechanical bracket, which has four external mechanical attachment points. The electronics unit must be secured to the bracket using the two sets of 3M adhesive Velcro strips and the safety O-ring provided. It is recommended to clean the adhesive Velcro bonding areas with a non-aggressive decreasing agent on both bonding surfaces.

Generally, in applications on off-road and supermoto racing motorcycles, the electronic unit is positioned at the front under the number plate. Where this mechanical support is not possible, simply use the pair of adhesive Velcro strips to attach the electronic unit directly to the vehicle frame, provided it is away from heat sources above the operating temperature indicated in this manual (exhaust/engine head cover) and/or other moving parts that could compromise the normal operation of the vehicle and the device itself.

Electromechanical sensor : for the correct mechanical installation of this device that makes up the Quick Shifter kit, consult the relevant manual available on our web page in the CUSTOMER CARE - MANUALS category.

Plug&Play wiring : for proper mechanical installation of this device, which is part of the Quick Shifter Kit, please pay attention to the cable routing so that it is not subjected to tension/rubbing and/or contact with engine parts whose operating temperatures could damage it. Secure the cable bundle with plastic cable ties, without overtightening them. Under no circumstances should the cables coming out of a connector bent 90°; keep them in line with the connector itself.

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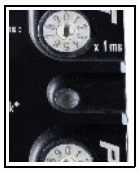
CORRECT CONFIGURATION OF THE ENGINE CUT-OFF TIME

Configuration is manual via 3 position selectors, so no external device such as a PC or Smartphone is required. The engine cut-off time can be configured both in the "Full Gas" condition, with the "FT" parameter selectable from 40 to 99 thousandths of a second with precision in 1 millisecond steps, and in the "Partial Throttle" condition, with the "PT" parameter settable from 1 to 9, necessary to increase the "FT" time as a function of the accelerator opening through an internal algorithm.

Cut-Off too high : If, when using the Quick Shifter, the up shift is accompanied by a power gap, whether long or short, similar to a lack of current in the spark plugs or a lack of fuel supply, it means that the engine cut-off time needs to be reduced.

Cut-Off too short : If, when using the Quick Shifter, the engagement of a higher gear is accompanied by an impulsive metallic noise, similar to a strong blow to the transmission components, resulting in the engine regaining power before the next gear is fully and perfectly engaged, means that the Engine Cut-Off time must be increased to avoid damage to the transmission.

LIGHT INDICATIONS



Two-color LED light (Green/Yellow) :
When the vehicle is started, the green light turns on approximately 1 second every 3 seconds, indicating that the device is working.
If the device is configured in modes **" SENSOR TEST (*) "** As explained below, the yellow light turns on each time the sensor is manually activated.

!! ATTENTION !!! A steady green light or fast flashing green light indicates that the device is connected incorrectly. The vehicle must be turned off immediately to avoid damaging the device.

(*) SENSOR TEST (only possible with the engine running at idle)
By setting the first FTx10 ms selector to the "0" position, the device deactivates the motor cut-off function and activates the sensor test mode. Each time the sensor is manually activated, the yellow light turns on. *If this does not happen, it means that the sensor is not working properly.*

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CONFIGURATION PARAMETERS

FT parameter (Full Throttle / ms=thousands of a second): using a small flat screwdriver of adequate size to avoid damaging the selector, configure for **first this parameter** for the engine cut-off time when shifting up gear at high engine speeds in a full throttle situation. The minimum configurable time is 40 ms, the maximum is 99 ms, with the possibility of increments in 1 ms steps. The first rotary selector (x10 ms) configures the time in 10 ms steps (from 40 to 90 ms), while the second configures the units in 1 ms steps (from 0 to 9 ms). If times below the value "40" are selected, the device always works with the minimum configurable time of 40 ms. **The device is configured by the manufacturer (SP Electronics) during the final testing phase, always on the maximum time of "9 9". The recommended starting configuration is 70 ms.** The "0" position of the first selector (x10 ms) deactivates the engine Cut-Off function and activates the sensor test mode (*).

PT parameter (Partial Throttle / ms=thousands of a second): To use this function, it is essential to electrically connect the green wire (TPS) of the Quick Shifter kit wiring harness to the accelerator position signal. If the vehicle does not have this function or if you do not wish to use this function, it is essential to set the selector to position "0".

Using a small flat screwdriver of adequate size to avoid damaging the selector, configure this **second parameter** for increasing the engine cut-off time in the up shift condition for medium engine speeds in partial/transient throttle conditions. The minimum configurable increment its 1 ms, the maximun is 9 ms, with the possibility of increments of 1 ms steps. Its function is to increase the set Cut-Off time "FT" proportionally to the accelerator position through an internal algorithm that makes the gear change smooth and precise in any condition of use of the vehicle and therefore not only at full throttle.
The device is configured by the manufacturer (SP Electronics) during the final testing phase, always on " 0 ". The recommended starting position is " 5 ".

!!! ATTENTION !!! An initial calibration must be performed with the engine running: set the PT parameter to a position other than "0", start the engine and after reaching the optimum engine operating temperature, with Neutral engaged, open the throttle fully for 1 second and then release, repeat the operation a couple of times and check that the engine Cut-Off is active only above a certain rotation speed, generally around 3,000 rpm. If this does not happen, repeat the operation or check the electrical connection to the accelerator position sensor.

TECHNICAL FEATURES

Supply Voltage		9 – 16 Vdc
Maximum consummation (Test power supply 12 Vdc)	Running Mode	100 mA
	Sleep Mode	0 mA
ebox material		Light alloy
ebox dimensions		110x 64 x 23 mm
Quick Shifter kit average weight		380 g
Operating temperature		-20/+70 °C
Water resistant (not immersion) and vibration resistant		IP66

TECHNICAL CHECKS (...in case of malfunction)

If the engine does not start It is necessary to check the electrical connections as explained on page 5 of this manual. It is advisable to start the engine only after having carried out the necessary checks.

If the engine starts but the CUT-OFF does not occur during the gear change phase, the causes could be the following:

1. **Sensor not working.** It is necessary to perform the sensor test as explained on page 9 of this manual.

2. **TPS throttle position signal connection incorrect or missing.** It is necessary to check the electrical connections as explained on page 5 of this manual.

!!! ATTENTION !!! If the malfunction persists, you must open a support case available on our web page in the CUSTOMER CARE - CONTACTS category.