



**HMQUICKSHIFTER.COM**

**HM Super Lite**

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User's Guide  
2014

## Table of Contents

HM Super Lite User's Guide.....	2
How Strain-Gauge Quickshifter Compare to Other Quickshifter.....	3
Conventional Quickshifter vs. Strain-Gauge Quickshifter .....	4
Strain-Gauge Quickshifter vs. Load-Cell Quickshifter.....	5
Features at a Glance .....	6
Installation .....	7
Installing the Sensor .....	8
Connecting to the Electrical System.....	9
Setup .....	10
Calibration .....	11
Stationary Test .....	12
Operation.....	12
Frequently Asked Questions.....	12
Specifications .....	13

As with any new technology, you must read and follow all set-up and usage instructions in the applicable user guide enclosed or provided electronically. If you fail to do so, this product may not function properly and you may not get results advertised.

While **HM Quickshifter** has made every effort at the time of publication to ensure the accuracy of the information provided herein, such information is subject to change without notice.

## HM Super Lite User's Guide

Introducing the Next Generation in Quick Shifting



Congratulations on your purchase of an HM Super Lite. **HM Quickshifters are the only strain-gauge quickshifters outside the MotoGP paddock!**

For many years the design team at the world renowned HM Quickshifter Labs have been working on the next generation of quickshifter aimed at customers who want (and/or need) to squeeze the very best in power and efficiency out of their motorcycles.

## How Strain-Gauge Quickshifter Compare to Other Quickshifter

As most readers will know, a quickshifter works by killing the ignition for a certain period of time in order to relieve stress on the gearbox, thus allowing the pressure on the gear lever to slip the transmission into the next gear without missing a gear, grinding or chipping gear teeth or engagement dogs.

However, something that is less well understood is how different quickshifter technologies compare to one another in the marketplace in terms of advantages and disadvantages.

### Conventional Quickshifter vs. Strain-Gauge Quickshifter

#### CONVENTIONAL QUICKSHIFTERS

By “conventional quickshifter” we mean all quickshifter that do not use a strain gauge to detect when the rider wants to shift. Instead, they use some type of mechanical switch, such as pressure sensors, transducers, etc.

All conventional quickshifter use some sort of mechanical switch, which has moving parts. This makes conventional quickshifter very susceptible to vibration and shock and because of this they will fail after a time. Practical testing has shown that the best conventional quickshifter expect a maximum lifetime of one season's race usage. However they often fail a lot earlier as any team mechanic will tell you. They are also completely unsuitable for road use, as the high vibration and shock experienced on public roads destroys a conventional quickshifter quickly.

Because a switch requires mechanical movement to be activated, the operation is distance based. i.e. the gear lever needs to move a certain distance for a quickshift to be initiated. A conventional quickshifter relies on a spring or other pre-tension mechanism to hold the switch open. The strength of this spring determines the amount of force required to initiate a quickshift. This is not adjustable, which is a problem since different riders, gear linkages and gearboxes require different amounts of force to shift.

#### STRAIN-GAUGE QUICKSHIFTERS

As an alternative, strain-gauge or load-cell quickshifter completely eliminate all of the problems associated with conventional quickshifter. This is because there are no moving parts at all. The quickshifter works by measuring the molecular change in the shift rod when a force is applied to it. This makes them very precise devices, and this is why high budget race teams use strain gauge quickshifter—they are far superior in every way.

Another major advantage is that since the strain gauge measures force applied to the lever, it is not distance based, but load based. So a quickshift will occur at precisely the right point every time without the need for any setup. The reason for this is that with a strain-gauge quickshifter, the selector drum is always loaded when a quickshift is initiated ensuring a perfect and smooth shift every time. This is also very gentle on the gearbox.

In addition, unlike all other quickshifter, strain-gauge quickshifter are adjustable. This ensures that the correct amount of force is required at the lever to have a perfect shift, regardless of rider preference, linkage setup or gearbox.

The major down side of strain-gauge quickshifter is cost and complexity. **COST:** Strain Gauge systems can cost thousands. **COMPLEXITY:** The actual strain gauge is useless without an external amplifier and complex electronics to interface to the motorcycle.

HM Quickshifter is unique in bringing all of the advantages of a strain-gauge quickshifter into one complete and compact package. This package includes everything required and simply plugs into any existing motorcycle loom, all at a price that is competitive with conventional quickshifters!

(See [Strain-Gauge Quickshifters vs. Load-Cell Quickshifters](#) for more information.)

And finally... ask any rider that has experienced using a strain gauge quickshifter and he will tell you that there is no comparison. Reliable smooth and slick shifts every time! Virtually indestructible.

## Strain-Gauge Quickshifters vs. Load-Cell Quickshifters

### LOAD CELLS

A load cell is simply a strain gauge with an amplifier that produces a voltage relative to the force being applied. This is typically 2.5V for no load and increases to 5V for a positive load (PUSH) or decreases to 0V for a negative load (PULL). To use a load cell as a quickshifter, external electronics are required to convert this voltage signal to a method of cutting the ignition, typically via an ignition controller.

The advantages are that the force required to initiate a quickshift is adjustable. The advantages over a conventional quickshifter are so significant that they are beyond the scope of this document. (See [Conventional Quickshifters vs. Strain Gauge Quickshifters](#) for more information.)

Load cells, however have their own disadvantages: **EXTERNAL ELECTRONICS:** An extra "box" will be required to interface the load cell to the motorcycle. **ZERO DRIFT:** This means that when the force is released, the load cell does not always return to the zero force voltage (typically 2.5V). **TEMPERATURE DRIFT:** This is a serious problem with all load cells. When the load cell changes temperature, the output voltage changes radically relative to force. Example: if a load cell produces 3V when 5kg is applied at 25°C it may produce 4V under the same load at 50°C. This means that when the motorcycle is cold, more force is required to initiate a shift, whereas when the motorcycle is hot then less force is required. **CREEP:** As the load cell ages and is used, the zero and load values will change. This means that the electronics will require recalibration at regular intervals.

### STRAIN GAUGES

As stated above, a strain gauge by itself is not usable. A common usage of a strain gauge is in load cells. These use strain gauges to produce a meaningful output, but they suffer pretty serious disadvantages as listed above. HM Quickshifter uniquely uses strain gauges together with our own electronics to produce a complete and compact quickshifter system that does not suffer the disadvantages of a load cell.

This includes:

- A powerful DSP (digital signal processor) with our own algorithms and software that automatically compensates for zero drift, temperature drift and creep. This updates itself and recalibrates at over 100 times per second, ensuring glitch free operation.
- A built in ignition controller. This allows the HM quickshifter to be plugged directly into any motorcycle loom without any cutting or splicing of cables. It also ensures that the motorcycle electronics are not affected in any way, so there are no fault or FI (fuel injection) errors.
- A custom made LCD or LED for easy setup and adjustment — simplicity itself!

In essence, HM Quickshifter has produced a quickshifter that genuinely suffers no disadvantages while at the same time has all of the advantages of a load cell — all at a price competitive with conventional quickshifters, which is why race teams around the world are using our quickshifters.

## Features at a Glance

The following is a summary of the HM Super Lite's features:

- HM Quickshifter, including the HM Super Lite, are the only strain-gauge quickshifter outside the MotoGP paddock! (See [How Strain-Gauge Quickshifter Compare to Other Quickshifter](#) for why this is such an advantage.)
- No moving parts provides the HM Super Lite with the best in long-term reliability in the quickshifter industry.
- Simple LED signals provide for simple set-up and adjustment.
- Since the HM Super Lite provides a shift trigger in both directions—compression and extension—this makes it compatible with both race-pattern and road-pattern gearboxes.
- Adjustable load sensitivity (3 settings), means you can adjust the HM Super Lite to match the ideal shift-drum loading required by your gearbox.
- Very Low power (well under 30mA)
- Resilient power supply, able to operate up to 16V, and can withstand transients up to 60V
- Very small size
- Low cost
- HM's 24/7 professional support
- Ultra light weight

## Installation

The core HM Super Lite product can be used in a number of ways with a number of different products to provide quickshifter functionality. There are also a few variations to suit particular applications. Please refer to our web site,

<http://www.hmquickshifter.com>

for a full line up.

As with any new technology, you must read and follow all set-up and usage instructions in the applicable user guide enclosed or provided electronically. If you fail to do so, this product may not function properly and you may not get the results advertised.

While **HM Quickshifter** has made every effort at the time of publication to ensure the accuracy of the information provided herein, such information is subject to change without notice.

Note: All these instructions are correct at time of print. However since motorcycles are frequently modified, it is highly recommended that you refer to our website:

<http://www.hmquickshifter.com>

and

[http://www.hmquickshifter.com/hm\\_super\\_lite\\_users\\_guide/](http://www.hmquickshifter.com/hm_super_lite_users_guide/)

for updates that could relate to your motorcycle and how you install your Quickshifter.

**Failure to do so, could really damage your motorcycle!  
Incorrect wiring damage is not covered by warranty.**

## Installing the Sensor

Remove the standard linkage arm, making a note of the position of the shift lever. Now fit together the STRAIN GAUGE with an HM Linkage Kit (available separately) to achieve the same overall length as the standard linkage.

Re-install the shift linkage making sure that the STRAIN GAUGE and the cable exiting the STRAIN GAUGE will not foul the gear lever or any other mechanism.

It is preferred to fit the STRAIN GAUGE nearest the gearbox.

**The Strain Gauge Sensor has two female threads. These are special DUAL THREADS and each of these threads will accept a LEFT or a RIGHT thread.**

### Important Points:

1. The Sensor and Shift rod must be free on the rose joints. This means that you should be able to rotate the sensor and linkage rod at least a small amount on the rose joints.
2. The sensor and linkage rod must not hit or foul anything. Move the lever through its entire range of travel and make sure that the sensor and linkage rod are free to move without touching anything or straining the attached cable.
3. The wire exiting the sensor can be damaged by pulling hard or by cable ties being too tight.

## Connecting to the Electrical System

As of this writing, the HM Super Lite, comes in several varieties, depending on the motorcycle onto which it will be installed:

Model	Motorcycle
HM Super Lite SH	Suzuki & Honda
HM Super Lite YK	Yamaha (not R6 up to 2004) and Kawasaki
HM Super Lite TRI	Triumph
HM Super Lite TRI2	Triumph Daytona 2013 and later
HM Super Lite DUCATI	Ducati
HM Super Lite PAN	Ducati Panigale
HM Super Lite KTM	KTM
HM Super Lite KTMTS	KTM twin spark models (RCR8 and RC8 2010 and later)
HM Super Lite BMW	BMW
HM Super Lite RSV4	Aprilia
HM Super Lite MV	MV Augusta F4
HM Super Lite MVF3	MV Augusta F3

Most HM Super Lite models connect directly to the plug top coils and have many benefits. One of these benefits is that it is completely independent of the ECU and motorcycle loom (wiring harness). It also shifts much better than almost any ECU.

**Wiring:** The supplied loom simply plugs in-line with the Ignition Coils. The only other connection is the ground strap which must be connected to a reliable ground (NOT the valve cover [cam cover]).

*CAUTION: The sub-loom has a label on it ("YK", "SH", etc.). It is very important that the sub-loom matches the motorcycle it is being installed on. On the BMW S1000RR, connect the sub-loom to the fuel injector plugs on the back of the air box. Refer to FAQ for full loom guide for other motorcycles.*

## Setup

The HM Super Lite is already set up for your motorcycle.

If however, you would like to fine tune the quickshifter then this is easily achieved via the LED signals emitted at power-up.

The setting that can be adjusted on the HM Super Lite is LOAD SENSITIVITY, which has 3 settings. When the HM Super Lite is powered up, it indicates the setting once by flashing the LED:

- 1 blip: Low Sensitivity
- 2 blips: Medium Sensitivity
- 3 blips: High Sensitivity

### To Enter Setup Mode:

1. Ensure power is off.
2. Press and hold shift lever firmly in either direction.
3. Power up (do not start engine).
4. Observe LED flash quickly for 4 seconds.
5. When LED stops flashing, release shift lever within 1 second.

Now you will be in Setup Mode.

### Operation In Setup Mode:

Once you are in setup mode, if you wait 10 seconds and perform no action, the HM Super Lite will exit Setup Mode automatically and enter Normal Operating Mode with the current setting.

While in Setup Mode, the current setting is signalled on the LED every 2 seconds:

- 1 blip: Low Sensitivity
- 2 blips: Medium Sensitivity
- 3 blips: High Sensitivity

To change the setting, firmly and quickly press and release the shift lever in either direction. The current setting will change in this sequence: 1, 2, 3, 1, etc.

Each time the setting is changed, it is saved automatically.

To exit Setup Mode, either press and hold the shift lever firmly (do not release it) for more than 2.5 seconds, or simply don't do anything with the shift lever for 10 seconds. In the latter case, as mentioned above, the HM Super Lite will enter Normal Operating Mode on its own after 10 seconds of inactivity. (When this happens, the current setting will stop being signalled on the LED.)

Once the HM Super Lite has entered Normal Operating Mode, it is ready for shifting.

## Calibration

The HM Super Lite does require calibration, but this is fully automatic.

A calibration is performed immediately upon power up, and the shifter re-calibrates itself continuously during operation.

## Stationary Test

Once the installation is complete, it may be desirable to do a test while the motorcycle is stationary. This is a two part test.

### PART 1

Turn the ignition on and watch the LED. The current setting will be signalled once on the LED with either 1, 2 or 3 blips. After this signal, the HM Super Lite is in Normal Operating Mode. With the engine OFF, and while watching the LED push/pull the shift lever in the direction that would shift gearbox to the next higher gear (UP for road pattern and DOWN for race pattern). The LED will turn on when a shift is initiated, and will turn off again once the lever is released. The ideal sensitivity is when the lever needs slight more force than is required to engage the next gear. If the LED does not turn on, increase sensitivity until it does, just for this test.

### PART 2

Sit on the motorcycle and put it into 6th gear. Hold the clutch in and keep it held in for the duration of this test. The motorcycle must not move. If you can, also hold the brake on. Now start the motorcycle and raise the RPM to a steady 4000 RPM or above. While holding the engine at this steady RPM, try and shift into an imaginary 7th gear. Every time you do you should hear the engine RPM dip for a split second.

## Operation

Once the installation is complete and the HM Super Lite's operation is confirmed, you are ready to enjoy limitless quickshifting. Once the clutch is fully released in 1st gear, use of the clutch is optional thereafter while up-shifting.

You will achieve the best performance by shifting using a firm, assertive motion with the shift lever. **Lower sensitivity settings tend to help achieve this.**

The HM Super Lite will only initiate an ignition cut once per quickshift. The shift lever must be released before another quickshift will be initiated.

## Frequently Asked Questions

**Q: Why does the LOOM not fit the connectors on my motorcycle?**

A: You are trying to plug the connectors into the injectors. The supplied loom fits the ignition coils (under the front of the airbox).

**Q: Why is the shifter not shifting?**

A: Turn the motorcycle on and watch the LED. Wait for the current setting to be signalled (1, 2 or 3 blips). Now push or pull the lever until the LED flashes.

If the LED does flash, then check connections to the loom to the ignition coils.

If the LED does not flash, then set the sensitivity to High (3 blips) just for this test and try again. If the LED still does not flash up then contact HM Quickshifter.

**Q: Why do I sometimes hit a false neutral?**

A: The sensitivity is too high. Reduce the sensitivity until you can feel that you are being assertive on the gear lever. Remember the lower the sensitivity, the faster and smoother the gear change!

**Q: Why does the shifter sometimes shift and sometimes not?**

A: You have the sensitivity way too high. The shifter needs to detect when you have let go of the lever so that it can allow the next shift. If the sensitivity is too high, the shifter may not detect that you have released the lever and therefore will not allow another shift.

OR

You are inadvertently leaving some pressure on the lever or resting your foot on the lever. This is common even among the best riders.

There is a fitment (connection) guide of what loom (wiring harness) you require for your type of motorcycle, please see the FAQ section on our website: <http://www.hmquickshifter.com/faq/>.

**Failure to do so, could really damage your motorcycle!  
Incorrect wiring damage is not covered by warranty.**

## Specifications

Minimum voltage	5.1V
Maximum voltage	16V
Maximum transient	60v, <100ms
Current consumption	<25mA
Output maximum current	35A
System functional temperature	-40°C to +125°C
 <i>Absolute Maximum Ratings:</i>	
 Maximum voltage	16V
 Maximum load current	250mA

The orange wire is effectively connected to 12V as supplied by the electrical supply that normally powers the plug-top coils (commonly the ECU), and the grey wire is the 12V output from the shifter. During a SHIFT, the 12V feed to the grey wire is interrupted for the duration of the Kill Time.