



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. Please see our document *Conventional Quickshifters vs. Strain Gauge Quickshifters*.

Load cells, however have their own disadvantages: *EXTERNAL ELECTRONICS*: An extra “box” will be required to interface the load cell to the bike. *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 bike is cold, more force is required to initiate a shift, whereas when the bike 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 bike loom without any cutting or splicing of cables. It also ensures that the bike electronics are not affected in any way, so there are no fault or FI errors.
- A custom made LCD for easy setup and adjustment—simplicity itself!

In essence, we have 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.

**If you have any questions or wish to speak to our Tech Team please call us on
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