



## Fuel Gauge Driver V2

*Intuitive instrumentation for your EV*

Please read these instructions carefully for proper installation and use of this product.

## INTRODUCTION

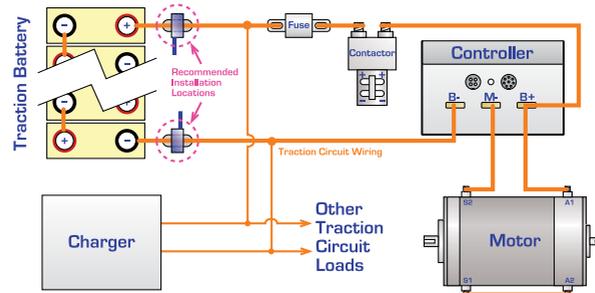
The ZEVA Fuel Gauge Driver V2 provides a simple and intuitive way to monitor the state of charge of your battery pack by displaying it on your vehicle's original fuel gauge, plus instantaneous current on the vehicle's tachometer.

Version 2 offers several improvements over the original Fuel Gauge Driver and FGD Plus, such as a much improved setup interface, automatic sleep and wake, simpler screw terminal connections, and a plastic enclosure for some weather protection.

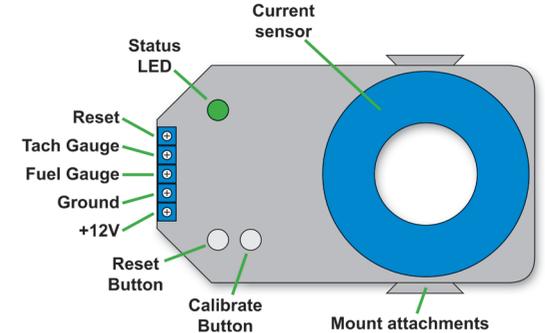
## INSTALLATION

The device should be securely fastened to the vehicle using the integrated mounting bracket. It is best to install it in a location protected from the elements. It is usually most convenient to mount it close to the positive or negative battery terminal, along the path of the power cables. The mounting foot can be attached on either side of the case.

Route the power cable from the battery through the hole in the FGD's toroidal current sensor. Ensure that all loads in your traction circuit (including charger, DC/DC converter, etc) are connected *after* the FGD, or current flowing to/from them will not be monitored. The diagram below shows recommended installation locations in a typical EV circuit:



The flow of conventional current (+ve to -ve) should go from the back to the front of the current sensor – that is, the side with the mounting bracket should be oriented towards the positive terminal.



## WIRING

The FGD+ uses 5 screw terminals for connection of wires. From top to bottom, the pins are as follows:

- **Reset** (optional): Connect to a button which momentarily connects this pin to ground/chassis to reset the SoC.
- **Tach Out** (optional): Connect to the tachometer input on your instrument cluster.
- **Fuel Gauge**: Connect to the input on your original fuel gauge, replacing the wire to the fuel tank sensor.
- **Ground**: Connect to ground / vehicle chassis.
- **+12V**: Connect to a 12VDC supply.

The Fuel Gauge Driver may be powered down when the battery is not in use. The FGD will remember the current state of charge for when it next starts up. Of course, it is important to ensure that no current flows while the FGD is powered down, or it will lose synchronisation with the battery's state of charge.

The easier option is usually to connect the FGD to a permanent 12V supply. To keep power consumption to a minimum, it will automatically switch to a low power

sleep mode if it detects no current flow for 10 seconds, and wake briefly every 2 seconds to see if current is flowing – in which case it will switch back into operation.

## CONFIGURATION

The FGD is calibrated to your battery pack and gauges using the two buttons and status LED for feedback. Simply press both buttons simultaneously to switch between the five modes described below.

LED	Description
	Normal operation. Refer to following section ( <i>State of Charge Synchronisation</i> ) for information on the normal functions of the Reset (R) and Calibrate (C) buttons.
	One red flash per 2 seconds is for setting the battery capacity. Press R to increment or C to decrement programmed capacity in 10Ah steps. The LED will flash green per ten amp hours (e.g a 100Ah setting will be indicated with 10 flashes).
	Two flashes is for setting the needle position of the fuel gauge for 100% SoC (fully charged). Press R to increment and C to decrement the gauge position. Ensure that the vehicle's key is on so that the gauge is working. Note that some older fuel gauges are very slow to respond.
	Three flashes is for setting the needle position of the fuel gauge for 0% SoC (flat battery).

	Four flashes indicates calibration of current display on the vehicle's tachometer. While in this state, the FGD will output a fixed 100A current reading, which should display as 1000rpm. Press R and C to change the scaling until the tachometer needle sits over 1000rpm.
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## STATE OF CHARGE SYNCHRONISATION

The Fuel Gauge Driver uses a hall-effect sensor for measuring current. Whilst offering good accuracy and linearity, they can suffer from a small amount of zero-point drift and inaccuracy when measuring very low levels of current over a long time. If a vehicle is not driven for a period of weeks or longer, the FGD may have accumulated some SoC error.

If the Fuel Gauge Driver appears to be inaccurate (e.g not displaying 100% after a full charge), it can be reset by pressing and holding the Reset button for over 1 second. The device can also be reset remotely using the Reset screw terminal, typically by connecting it to ground/chassis via a momentary switch.

If the state of charge seems to drift unexpectedly over time it is possible that the current sensor requires recalibration. A good indicator of the sensor being out of calibration is if the device doesn't go to sleep (as indicated by a blinking green LED) after 10 seconds of no current flow. To recalibrate the current sensor, ensure that no current is flowing through the sensor, then hold the Calibrate button for over 1 second.

This device should only be used to give an indication of the battery's SoC and can not replace a battery management system for protecting your cells from overcharging or over-discharging.

## SPECIFICATIONS

- Supply voltage: 12VDC nominal (8-20VDC max)
- Reverse voltage and fuse protected
- Current measurement range: Up to  $\pm 1200A$
- Capacity range: 1-500Ah
- Traction circuit voltage range: Limited by power cable insulation only
- Dimensions: 82x42x20mm, plus bracket

## TECHNICAL SUPPORT

If you have any queries not covered by this manual, feel free to contact us via our website: [www.zeva.com.au](http://www.zeva.com.au)

Products are covered against manufacturing faults for a period of 12 months from date of purchase. If you believe your module may be faulty, please contact us for RMA information.

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