

GS Yuasa E-Learning Support Documentation

Replacement Battery Configuration

Overview:

This support documentation has been designed to work in conjunction with the GS Yuasa e-learning course "Replacement Battery Configuration" and covers of the following subjects:

- **Battery management systems**
- **Battery configuration**
- **GS Yuasa Yu-Fit configuration tool**
- **Yu-Fit functionality**

Battery management systems

Functionality overview

New technology micro-hybrid vehicles equipped with emission reduction systems such as start-stop usually feature a Battery Management System or BMS. The BMS monitors battery conditions and adapts the charging system output to ensure best possible battery performance and ensure optimum operation of the start-stop system and on-board comfort and convenience functions.

Battery monitoring sensor

The BMS has been designed to adapt the strategy of the vehicle charging system based on the condition of the battery. The system uses information from a battery monitoring sensor and control module usually combined with the negative terminal clamp to precisely measure battery charging current and voltage as well as the temperature around it.

The data provided by the sensor allows the battery management system to calculate the State of Charge (SOC) and State of Health (SOH) of the battery and adapt the battery charging strategy to manage electrical loads.

Charge control & regulation

Vehicles with a BMS have intelligent alternators that communicate with the control module. Based on data received from the sensor and control module the BMS issues an output request to the alternator which then adapts its output to this requested voltage. The alternator then sends a feedback signal back to the control module indicating the actual charge voltage. This feature is called the request and feedback principle. This adaption of charge output to meet vehicle and battery operating conditions is continuous.

The presence of a BMS and intelligent alternator prevents traditional charging system fault diagnosis. This is because the alternator output varies and, in some cases, will in fact be zero, based on the operating state of the battery. If the vehicle has a suspected battery or charging system fault it is essential that accurate system diagnosis is carried out to ensure batteries or alternators are not replaced unnecessarily.

The only way to accurately test charging system performance is to use an oscilloscope to interrogate the feedback and request network connecting the BMS to the alternator.



Battery configuration

Why is battery configuration necessary?

A new replacement battery has very different charging requirements when compared to one that has reached the end of its service life. The BMS must therefore be reset using a configuration tool or diagnostic platform to prevent the use of an incorrect charging strategy. Configuration of a new battery to the BMS is therefore required as part of the replacement process.

Failure to configure a replacement battery will result in, loss of start-stop functionality, increased emissions, higher fuel consumption, power management system activation and the shut-down of non-critical vehicle electrical systems and consumers. Premature battery failure will also be caused by incorrect charging. Which is not covered by GS Yuasa's warranty.

The configuration process instructs the BMS that a new battery has been fitted. The BMS then adapts the charging system output to meet the operating characteristics of the new battery.

GS Yuasa Yu-Fit configuration tool

Yu-Fit configuration tool overview

Configuration of the BMS can only be carried out using a suitable diagnostic platform or configuration tool. To reduce battery replacement costs and make this process as quick and easy as possible GS Yuasa offer a simple to use hand-held configuration tool called the Yu-Fit.

Pre-requisites of battery configuration

Incorrect application of conventional flooded Lead acid battery in place of an EFB or a conventional flooded Lead acid battery or EFB in place of an AGM will result in premature battery failure caused by excessive battery cycling as conventional flooded Lead acid batteries have much lower cyclic specifications than EFB and EFB have much lower cyclic specifications than AGM, excessive plate damage caused by high battery Depth of Discharge (DOD) which conventional flooded Lead acid or EFB are not designed to support and the accelerated loss of plate surface area and resultant CCA (up to 16% in 1st week of service for conventional flooded Lead acid).

NOTE: It is therefore essential that the correct technology and specification of battery is installed on the vehicle.

Use of the GS Yuasa Battery Look-up system will ensure that the correct battery is installed on the vehicle. The Yuasa Battery Look-up System is accessed using a GS Yuasa branded USB Smart Button which automatically transfers the user to the GS Yuasa Battery Look-up web site.

GS Yuasa Yu-Fit features

With a robust and simple operation, the Yu-Fit is one of the most user friendly diagnostic tools on the market. Although many workshops may already own capable diagnostic tools it is not ideal to have these tied up on battery replacement.

The Yu-Fit is powered and communicates via a physical connection to the vehicle's 16 pin EOBD plug, has a clear display and six button multi-function key pad and features a mini USB port connection for registration, software updates and the latest vehicle parc data.



Once registered, Yu-Fit users can purchase additional applications such as electronic park brake reset, diesel particulate filter regeneration and service light reset. The Yu-Fit is also supplied with a case, user guide and USB connection cable.

YU-FUT functionality

Functionality example

Battery configuration is carried out by following a simple guided diagnostic process. Once connected to the vehicle's EOBD port a main menu screen is displayed.

Navigate to the diagnostics icon and press OK and select the battery management icon.

Navigate to vehicle selection, confirm, select the vehicle manufacturer and wait for the vehicle selection to be accepted, switch on the ignition when prompted and press OK.

Select the replace battery function, confirm and choose the validate battery option, press OK and wait for the function to initialise.

You will now be asked if you have fitted a replacement battery of the correct technology and performance. As we have learned it is critical that an AGM must be replaced with an AGM and the same applies to EFB. If you have done this select OK and wait for any fault codes to be cleared.

The Yu-Fit may then ask the battery manufacturer, which must be correctly selected before proceeding. Await confirmation that the process has been successfully concluded before turning off the ignition and disconnecting the Yu-Fit from the vehicle.

