YUASA

BATTERY REPLACEMENT IN IDLE STOP START VEHICLES (ISS)

What are ISS systems

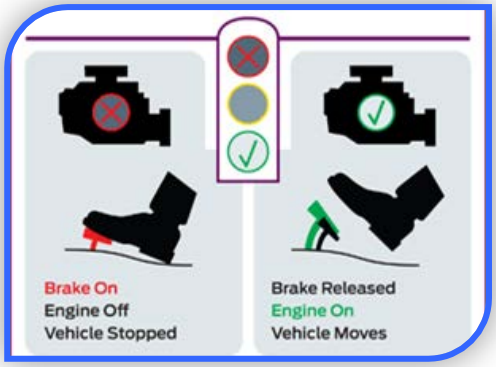
- An Idle Stop Start (ISS) system automatically shuts down and restarts the internal combustion engine to reduce the amount of time the engine spends idling.
- ISS systems were developed to improve fuel efficiency and reduce CO_2 emissions in line with global emission targets.
- ISS systems can deliver a 5-10% reduction in both fuel consumption and carbon emissions.
- The number of vehicles featuring ISS systems is growing rapidly.

Facts on ISS systems

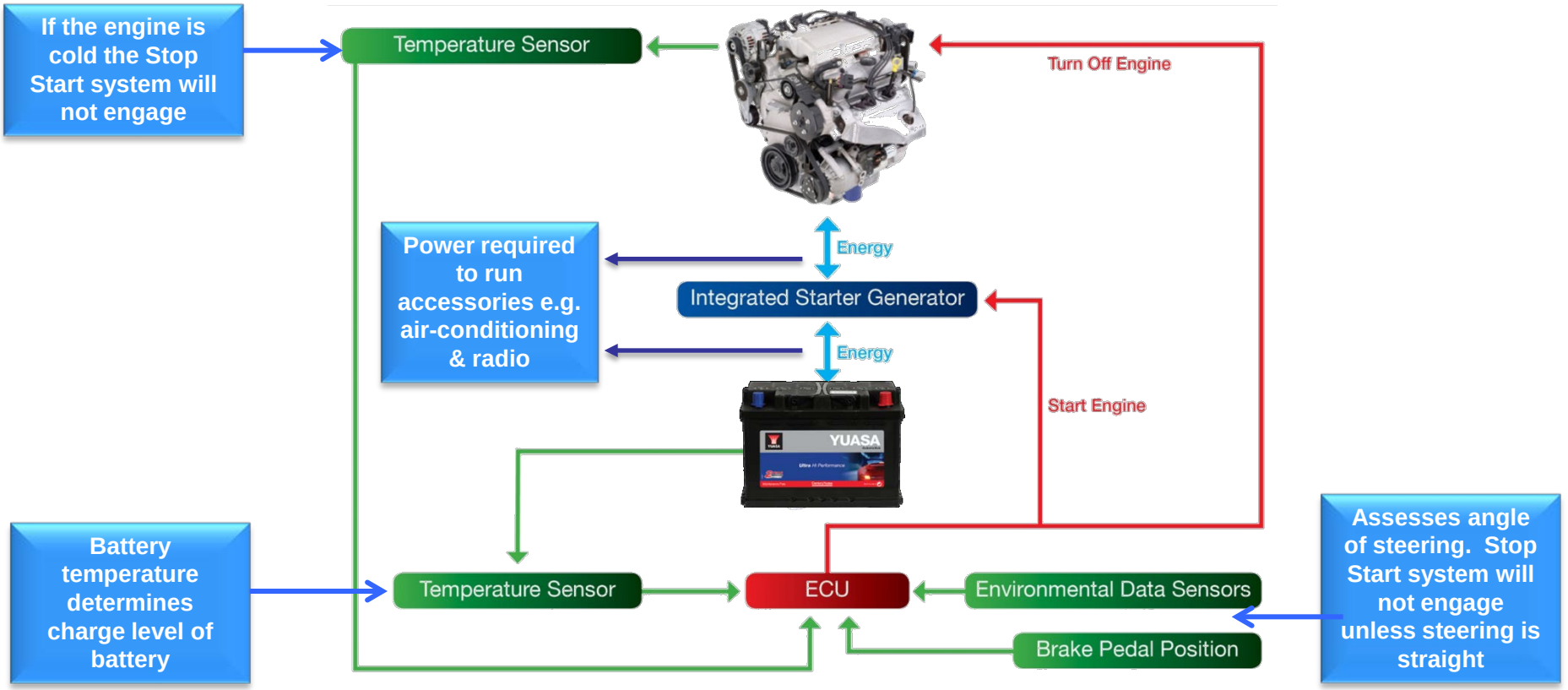
- Toyota was the first manufacturer using ISS technology in the mid 1970's, followed by Fiat & VW in the 1980's. ISS vehicles are now one of the fastest growing markets in the world.
- Vehicles fitted with ISS systems are often referred to as *'mild'* or *'micro'* hybrids.
- ISS technology can be incorporated into petrol and diesel vehicles fitted with automatic or manual transmission systems.
- They have relatively low development costs compared with Electric and Hybrid vehicles.

How ISS systems work

- Basic ISS systems work by shutting off the engine whilst the vehicle is stationary. When the brake pedal is released or the accelerator depressed, the engine quickly restarts enabling the vehicle to be driven.
- In more advanced ISS systems, the vehicle may also incorporate regenerative braking or engine power assistance technology.
- This technology has the ability to also switch off the engine whilst the vehicle is coasting or braking as well as whilst stationary.



How ISS systems work



ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

Identifying ISS systems

- It may not be possible to identify whether a vehicle incorporates ISS technology. Always ask the owner if you are unsure.
- Vehicle manufacturers may include a device or icon on the dash board which enables the ISS system to be deactivated.
- To avoid fitting an incorrect or conventional battery into an ISS vehicle, refer to the manufacturers handbook or visit www.yuasabatteries.co.nz

ISS Market Demand

- Emissions laws and increased fuel costs are creating a boom in Electric, Hybrid and Micro-hybrid vehicles.
- All manufacturers are developing a range of power trains.
- Most OEM's are backing ISS systems as the winner due to the relatively low costs compared with other systems.

Internal Combustion Engine

Idle Stop Start Systems

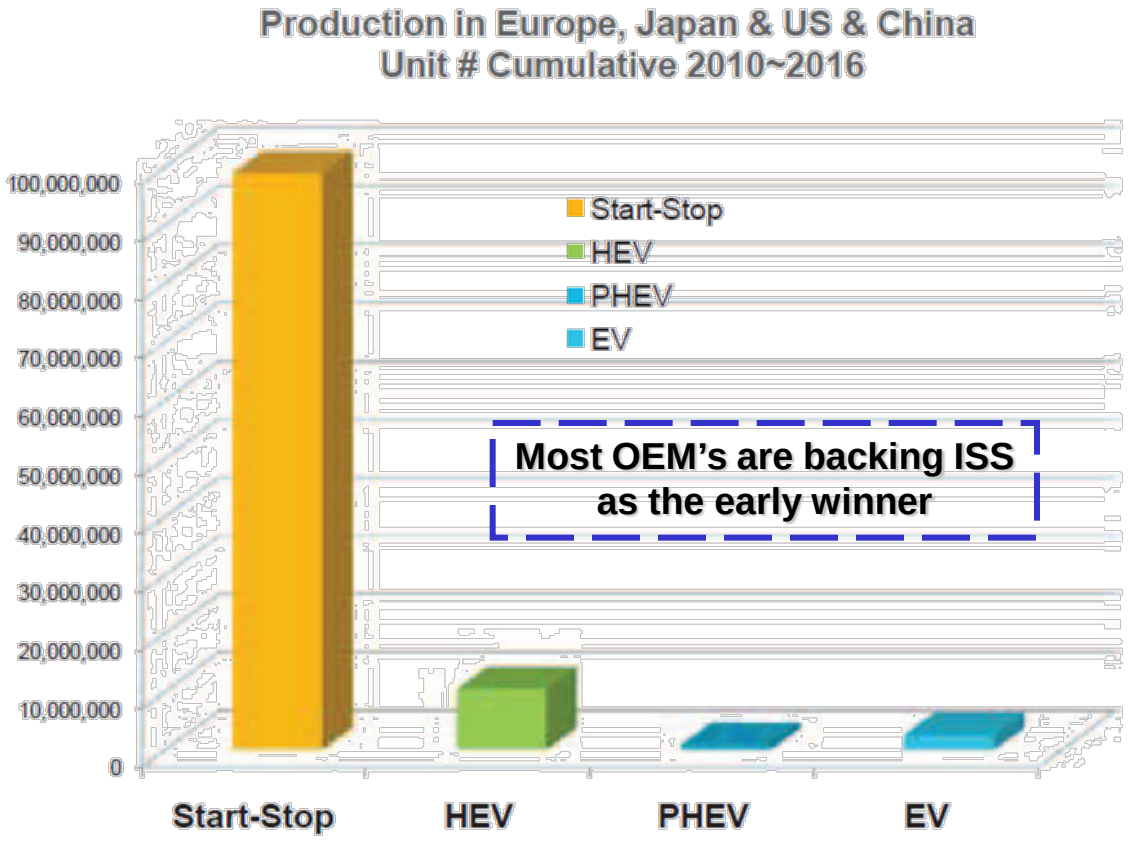
Electric vehicle - Volt
Plug In Hybrid Electric – I-Miev
Hybrid Electric Vehicle - Prius

ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

ISS Market Demand

- By 2018 it is estimated that 70% of cars driven in some countries will have Stop Start technology.
- In New Zealand leading manufacturers have already introduced vehicles featuring ISS technology.
- This includes but not limited to Mazda, Subaru, Nissan, VW, BMW, Mercedes, Volvo.

ISS Market Size



186 Million ISS vehicles to be in use Globally by 2020

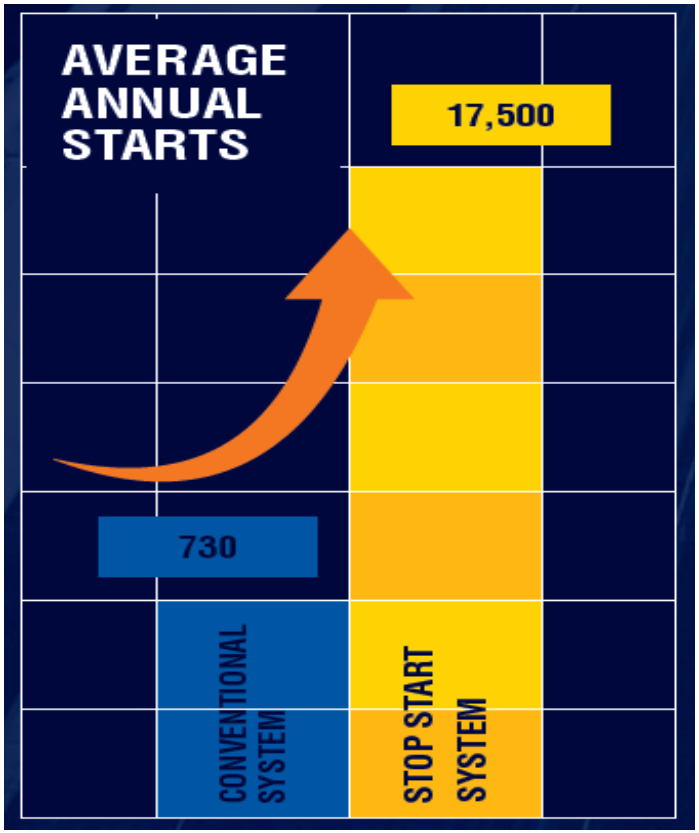
Source: Forecasts Pike research Business Wire

ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

Conventional V's ISS batteries

Stop Start Systems	Conventional Systems
Place extreme demands on battery.	Subject the battery to less stress .
In Stop Start environments such as city driving the vehicle may stop and start every Kilometre.	Start the vehicle less frequently, typically two to three times per day.
The short duration between starts will not fully recharge the battery.	Recharges the battery using the alternator to replace the capacity used to start the vehicle, during the duration of the journey.
Require the battery to be able constantly cycle and operate in partial state of charge.	Requires the battery to operate in a close to full state of charge.
Necessitate the battery to quickly recharge in between off modes and deliver power for accessories when the engine is off.	Do not cycle the battery as frequently and recharge the battery using a lower charge rate.
Require the battery to also deliver necessary cranking capacity to start the engine in a fraction of a second.	Can accommodate Stop Start batteries as a result of the improved cranking, cycling and recharge capabilities

Conventional V's ISS batteries



Conventional System	Stop Start System
Starts vehicle 2 to 3 times per day	Starts vehicle every 1 to 2 kilometres
730 average annual starts	17,500 average annual starts
Delivers 263,000 watt seconds of energy	Delivers 487.5 million watt seconds of energy
Minimal cycling required	Battery is constantly required to cycle
Accessories draw from a fully charged battery	Accessories draw from battery when engine is off
Battery maintained in a near to full state of charge	Battery operates in a partial state of charge
Battery is recharged by alternator over time during duration of the journey	Battery has to recharge rapidly in between engine off modes

ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

Battery Replacement

- Conventional batteries should not be fitted into ISS systems.
- Conventional batteries are not designed to handle the cycling and rapid recharge requirements required by these systems.
- Fitting a conventional battery into a ISS vehicle could damage the electrical system and lead to premature battery failure.
- Always ensure a like for like battery replacement. Only replace AGM with AGM and EFB with EFB ISS compatible batteries.

EFB Key differences

2 X cycle life of a conventional Battery

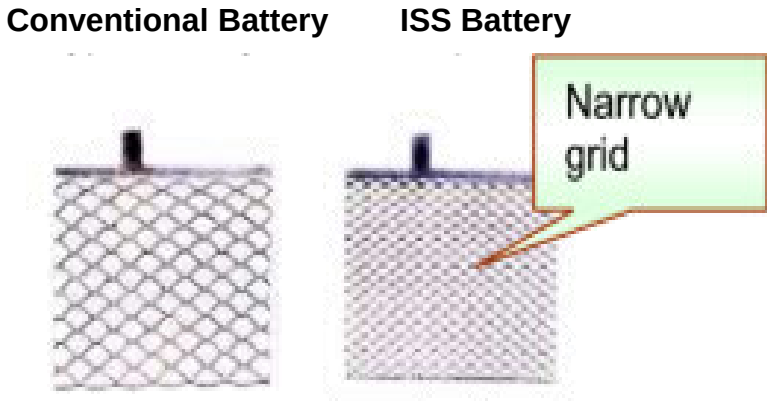
- More Plates – More Capacity
- Narrow Grid Pattern (NGP) – More Lead
- NGP - Increased current flow
- NGP - Improved Paste adhesion
- Lower SG – reduced grid corrosion

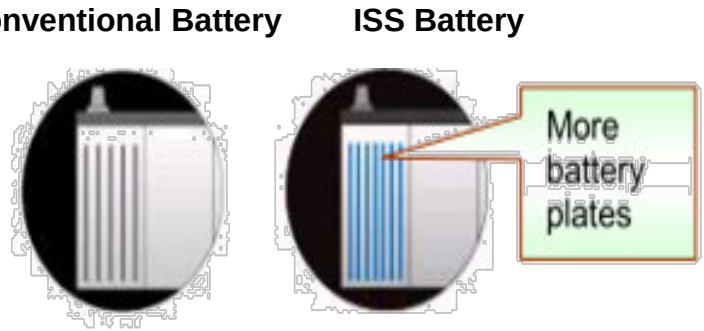
Faster recharging time

- Negative Plate – High Carbon / Lithium
- Lower SG – faster electrolyte recombination

Additional vibration resistance

- Glass mat sheet in Separator
- High density paste material





AGM Key differences

3 X cycle life of a conventional Battery

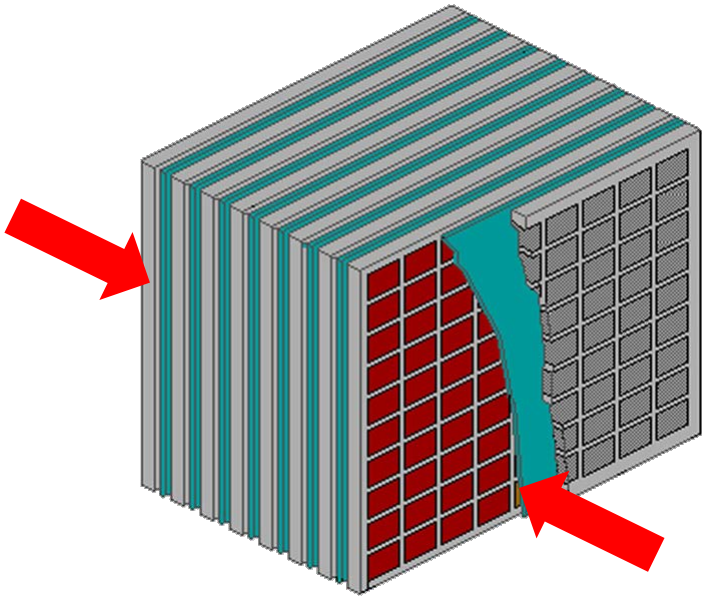
- Power Pack Positive Grid
- Cast negative Grid
- More Plates – More Capacity
- Larger Plates – More Capacity

Faster recharging time

- Negative Plate – Carbon Formulation
- Absorbed glass mat separator

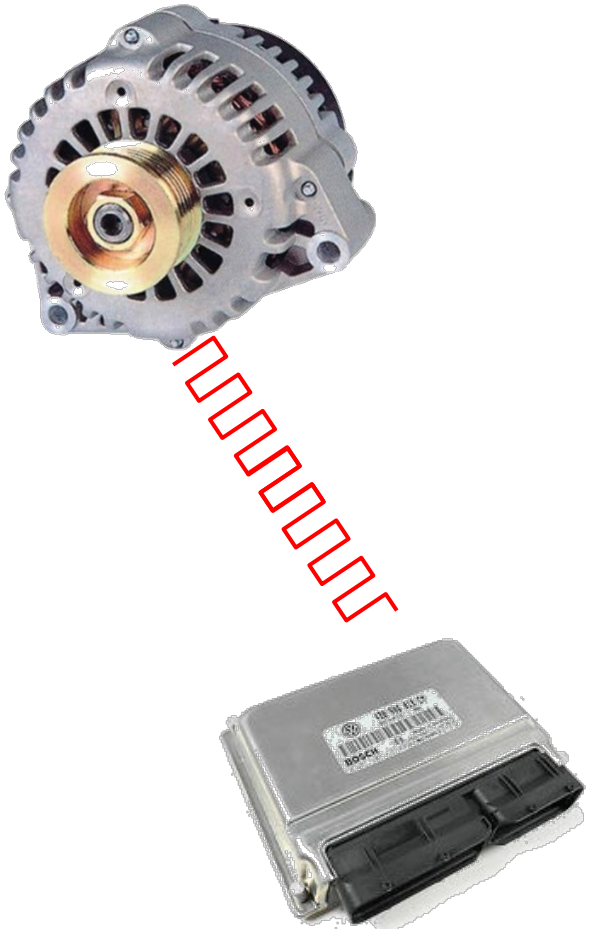
Additional vibration resistance

- Tightly packed AGM Separator
- High density paste material



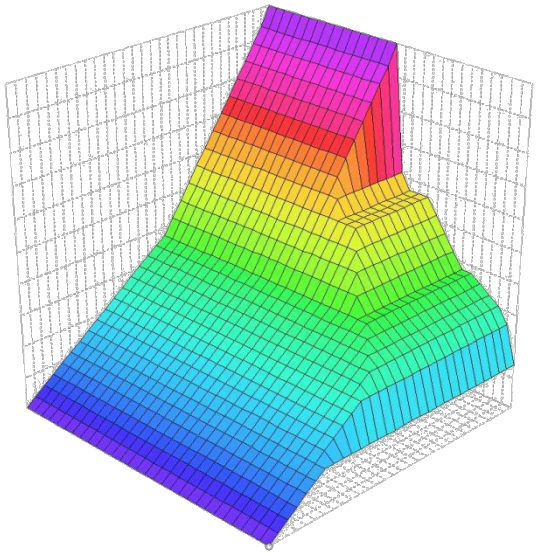
ISS Battery Replacement

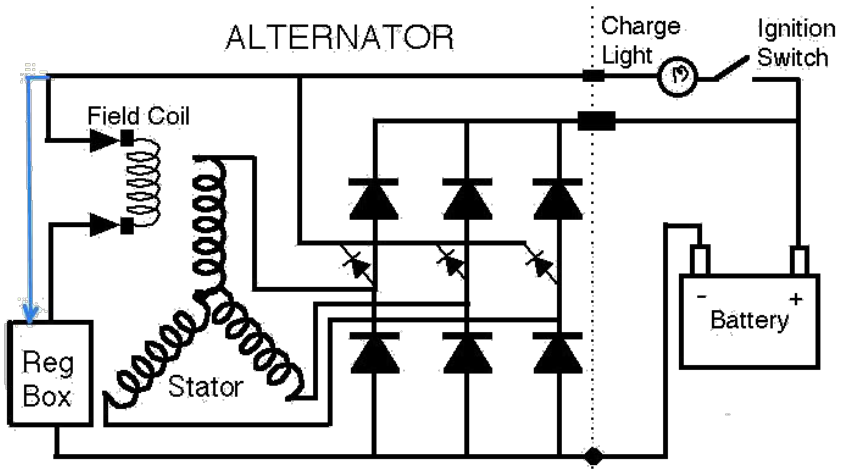
- New technology ISS vehicles equipped with emission control systems may require configuration of the active energy management system during battery replacement.
- These systems control the charging system to ensure optimum battery performance and ISS system functionality.
- The active energy management system uses information from the battery monitoring sensor to measure the battery's Current, Voltage and Temperature.
- This data is used to calculate the battery's state of health and state of charge.
- The energy management system then adapts the battery charging strategy to manage electrical loads.



Battery Temperature, Charge Voltage & Regulation

- The battery temperature is measured using a map to determine the duration of the battery load.
- The data obtained allows the charge regulation to adapt to the operating conditions.



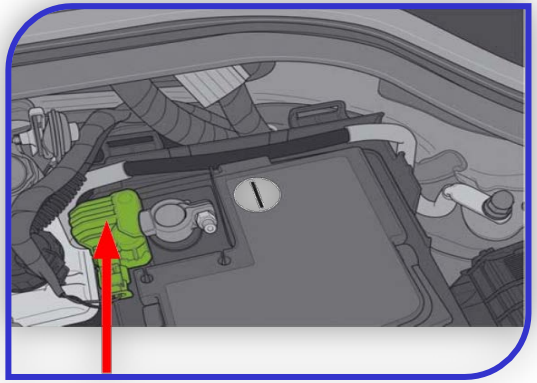


Why is battery configuration necessary?

- A replacement battery has different charging strategies to a battery that has reached the end of it's serviceable life.
- The active energy management system may need resetting when the battery is replaced to prevent the use of an incorrect charging strategy.
- An incorrect charging strategy could result in:-
  - Loss of Micro-hybrid system functionality
  - Increased CO_2 emissions
  - Increased fuel consumption
  - Loss of vehicle system functionality

Identifying Energy Management Systems

- Vehicles fitted with Energy Management Systems can be identified by the sensor located on the negative battery post as shown right.
- They are predominantly found on European brands of Idle Stop Start vehicles.
- These vehicles require configuration of the Energy Management System as part of the battery replacement procedure.



Yu-Fit Battery Configurator

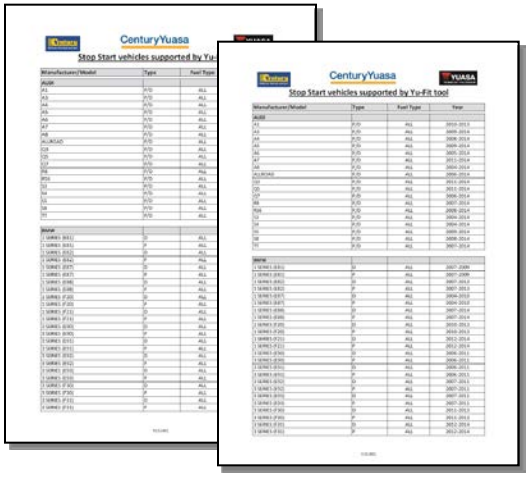
- Configuration of the active energy management system can now be carried out using the Yu-Fit battery configurator tool.
- Use of the Yu-Fit allows the provision of a complete battery replacement solution, even on vehicles featuring new emission reduction Micro-hybrid systems.
- The Yu-Fit reduces battery replacement costs and customer inconvenience, enhancing the services provided by aftermarket battery suppliers.

Yu-Fit Battery Configurator

- The Yu-Fit configures the replacement battery to the active energy management system & battery monitoring sensor.
- Informs the vehicle a new battery has been installed.
- That it is of the correct technology and performance specifications.
- Informs the charging system of the new battery characteristics.
- Ensures the use of correct charging strategy.

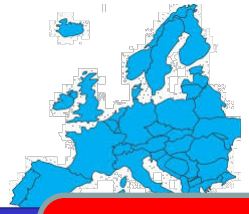
Vehicles Supported by Yu-Fit

- Battery configuration is currently only required on selected European Idle Stop Start vehicles.
- Identified with a sensor affixed to the negative battery terminal post.
- Vehicles supported by the Yu-Fit are updated regularly as new vehicles are released.
- PDF lists are stored on the supporting web site.
- Push notifications released as new vehicles are added to the support list.
- Each time the unit is connect to the PC, it will down load the latest list of vehicles supported by the Yu-Fit.
- Good practice to connect and update the tool on a monthly basis.



Vehicles Supported by Yu-Fit

European Vehicles



15-20%

Vehicle	Battery	Vehicle	
Audi A1	DIN65LHMF AGM	Freelander	DIN
Audi A3	DIN65LHMF AGM	A-Class	DIN
Audi A4	DIN65LHMF AGM	C-Class	DIN75LHMF AGM
Audi A5	DIN65LHMF AGM	E-Class	DIN92LMF AGM
Audi A6	DIN75LHMF AGM	S-Class	DIN92LMF AGM
Audi Q5	DIN65LHMF AGM	Mini Cooper	DIN65LHMF AGM
Audi Q7	DIN92LMF AGM	Mini One	DIN65LHMF AGM
BMW 1 Series	DIN75LHMF AGM	Peugeot 208	DIN65LHMF AGM
BMW 3 Series	DIN92LMF AGM	Peugeot 4008	DIN65LHMF AGM
BMW 5 Series	DIN92LMF AGM	Renault Megane	DIN65LHMF AGM
BMW X1	DIN75LHMF AGM	Volvo C30	DIN65LHMF AGM
BMW X3	DIN75LHMF AGM	Volvo V50	DIN75LHMF AGM
Citroen DS3	DIN65LHMF AGM	Volvo V60	DIN65LHMF AGM
Citroen DS5	DIN65LHMF AGM	VW Golf	DIN65LHMF AGM
Ford Focus III	DIN65LMF EFB	VW Jetta	DIN65LHMF AGM
Ford Mondeo	DIN75LMF EFB	VW Passat	DIN65LHMF AGM

Cross section only, additional vehicles also available in New Zealand market

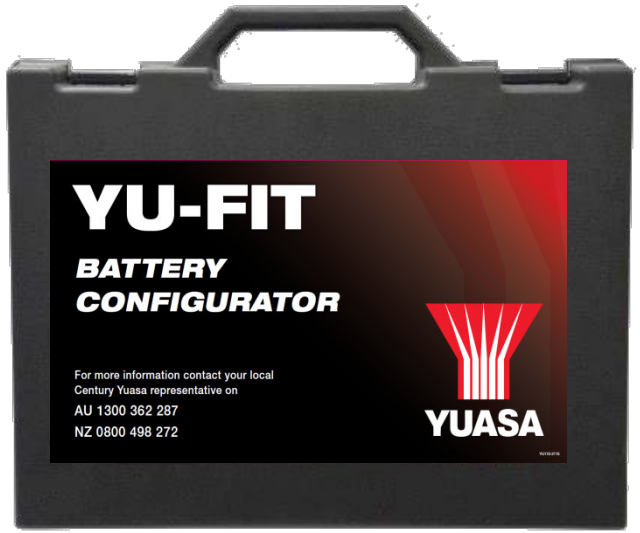
Asian Vehicles

80-85%

Make	Model	Ba
Mazda	3	Q
Mazda	6	Q85
Mazda	CX5	Q85
Mazda	CX3	Q85/ S95
Subaru	XV	Q85
Subaru	Liberty	Q85R
Subaru	Outback	Q85R
Nissan	Duallis TS	S85
Mitsubishi	ASX 1.6 / 1.8	Q85 / T110

ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

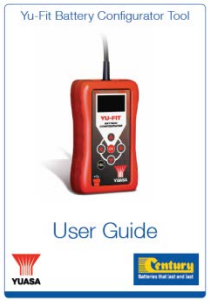
Yu-Fit Configurator Kit

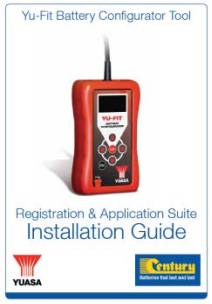


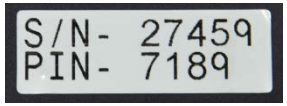
ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

Yu-Fit Configurator Kit

- Each Yu-Fit kit contains:-
  - ✓ Yu-Fit Tool
  - ✓ USB Cable
  - ✓ Registration & Software Installation Guide
  - ✓ User Guide
  - ✓ List of vehicles supported by the Yu-Fit
  - ✓ Unique serial number







ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

Setting Up the Yu-Fit Tool

- Before using the Yu-Fit tool it must first be registered and the supporting application software downloaded.
- The supporting application software should be downloaded from: www.yuasabatteries.co.nz
- Scroll to the bottom of the page or select from the menu options on the right hand panel.
- Click on the link and then select the 'RUN' option.

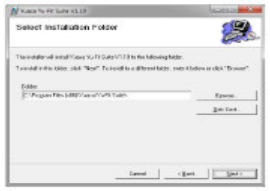
Yu-Fit Set up – Software Installation

Yu-Fit Installation Procedure

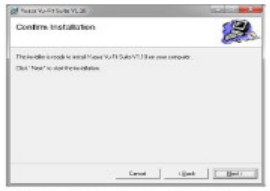
Follow this procedure if you are installing the Yu-Fit PC Suite for the first time. If you experience problems with the installation then please ensure you have Administrator rights on your PC. If you are still experiencing problems then contact Technical Support on **04 1810 3319** or **07 3361 6190**

1. After you have run the Yu-Fit suite application, the *'Welcome to the Yuasa Yu-Fit Suite'* will be displayed, select *'Next'*.

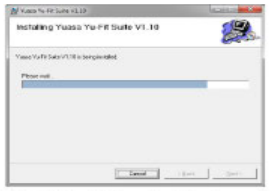
2. The *'Select Installation Folder'* screen will appear accept the folder if appropriate and select *'Next'*.



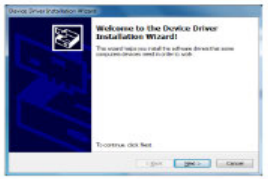
3. When the *'Confirm Installation'* screen appears select *'Next'*.



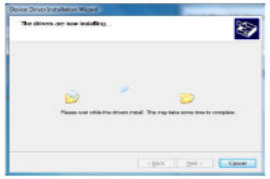
4. The *'Installing Yuasa Yu-Fit Suite'* screen will be launched, once the software has been successfully installed select *'Next'*.



5. As this is the first time that your Yu-Fit has been connected to your PC, the *'Device Driver Installation Wizard'* popup will be displayed. Select *'Next'*.

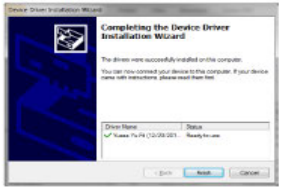


6. The installation will take a short time to complete; the screen below will be displayed during this process.



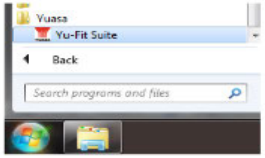
7. Your PC may give you a warning saying the Publisher is unknown. Select *'Install the driver software anyway'* to accept the changes that will be made.

8. The *'Completing the Device Driver Installation Wizard'* screen is displayed, when your Yu-Fit has been detected. Select *'Finish'*.



9. You will see the screen *'Installation Complete'* that confirms that the installation was successful, select *'Close'*.

10. Run the Yu-Fit Suite Application from the start menu, select *'Start'* – *'Programs'* – *'Yuasa – 'Yu-Fit Suite'*. (There will also be an icon installed onto your desktop).



ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

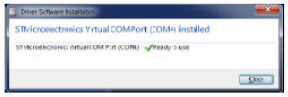
Yu-Fit Set Up - Registration

Yu-Fit Registration Procedure

1. Read the Privacy Policy and accept before continuing.

2. Connect the USB supplied to the Yu-Fit and then to a USB port on the PC. A main USB port (on the rear of the PC) opposed to an extension (on the front of the PC)

3. The Driver should indicate that it is fully installed and ready to use. If this does not happen, go to the Installing Driver section



4. When you press the *'Next'* button, the Yu-Fit will be detected by the Yu-Fit Suite.

5. The Suite will then check the internet connection is present. If you experience problems at this point you will be directed to the Tests & Checks section of the Yu-Fit Suite.

6. Complete the *'Product Registration'* ensuring you complete all sections marked with a '*'. Once complete press the *'Next'* button.

7. Once the information has been submitted, the Subscription Number, Postcode, Email Address and subscription expiry date will be displayed back. Although these details are stored on your PC, it would be worthwhile making a note of these details in case you require them in the future. Select *'Finish'*.

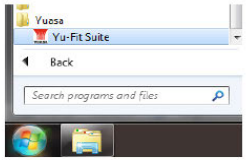
Installation Guide

ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

Yu-Fit - Vehicle Update Procedure

Yu-Fit Update Procedure

1. Run the YU-FIT Suite Application from the start menu, select *'Start'–'All Programs'–'Yuasa'–'Yu-Fit Suite'*. (There will also be an icon installed onto your desktop).



2. Select the option *'Get YU-FIT Updates'*.

3. Connect the USB supplied to the Yu-Fit and then to a USB port on the PC. A main USB port (on the rear of the PC) opposed to an extension (on the front of the PC)

4. When you press the *'Next'* button, the Yu- Fit will be detected by the Yu-Fit Suite.

5. The Suite will then check the internet connection is present. If you experience problems at this point you will be directed to the Tests & Checks section of the Yu-Fit Suite.

6. Follow the on screen instructions to update your tool to the latest version. A description of the updates will also be shown on screen.

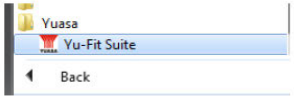
If updates are available. Press the *'download'* button. When the download is completed press the *'finish'* button which will then take you back to the main screen. Press the *'exit'* button to finish and a prompt will come up to confirm you want to exit. Press *'Yes'*.

ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

Yu-Fit - Options & Help

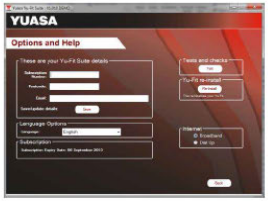
Options & Help

1. Run the YU-FIT Suite Application from the start menu select *'Start'–'All Programs'–'Yuasa'–'Yu-Fit Suite'*. (There will also be an icon installed onto your desktop).



2. Select *'Options & Help'* from the menu.

3. If you are advised to change your **Subscription Number & Postcode** you can do this from here.



4. Selecting the *'Tests and checks'* button allows you to perform tests to verify that your Yu-Fit is functioning correctly and also verifies that you are able to connect to the website and download the latest software

5. You will be asked to perform these tests, if you experience problems and need to contact our technical support team then take a screen shot of the problem as this will assist our support team in resolving your problem.

6. Selecting the *'Yu-Fit re-install'* button allows you to force the Yu-Fit to download your latest update again. This can be used if you think there is a problem with your last update.

7. Connect your Yu-Fit as per the instructions within the Yu-Fit update suite. Connect mini USB to Yu-Fit and USB to PC. Refer to the *'Yu-Fit Update Procedure'* for more information.

ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

Using the Yu-Fit Battery Configurator

ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

Using the Yu-Fit battery Configurator

- Once the battery has been replaced, the Yu-Fit should be connected to the vehicle via the 16 Pin EOBD diagnostic socket.
- This is usually located within the vicinity of the steering column.
- The Yu-Fit will then guide the user through the battery configuration process with a series of on screen options and menus.
- The length of time and steps involved in the battery configuration process will vary according the vehicle type and manufacturer.

EOBD Location

Using the Yu-Fit battery Configurator

- Navigation around the menus and options displayed by Yu-Fit is controlled by a series of arrows and confirmation buttons as displayed.
- The tool also encompasses a mini USB port for connection to a PC.

Using the Yu-Fit battery Configurator

Important Note

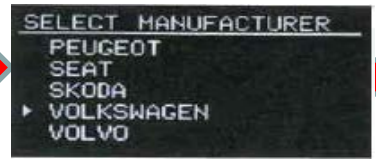
- Depending on the make & model of the vehicle, the Yu-fit will guide you through one of two possible options for battery configuration.
- Both are detailed to avoid any confusion.

Option 1: Overview

Select **DIAGNOSTICS** icon

Select **BATTERY MANAGEMENT** icon

Select **VEHICLE SELECTION** icon



Select **MANUFACTURER** from list

Await confirmation before switching on ignition

Select **REPLACE BATTERY** function

Select **VALIDATE BATTERY** function

The levels in the battery configuration procedure vary according to the vehicle & manufacturer

Select & Confirm Yuasa as the correct battery data.

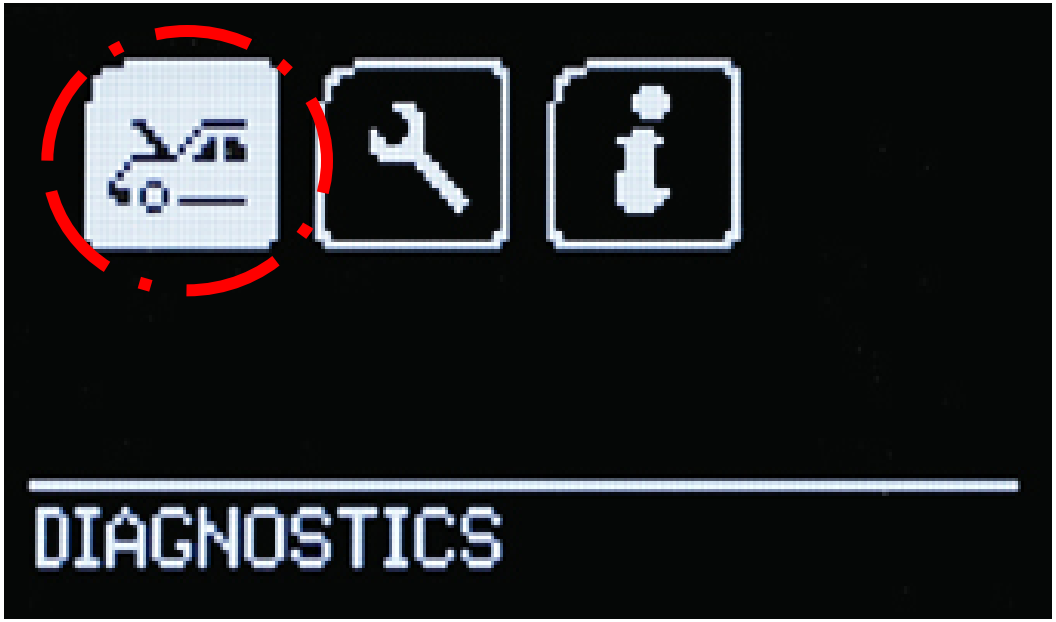
Wait for fault codes to be cleared & confirmation of configuration process

Turn off ignition & disconnect Yu Fit

Option 1 – Step 1

DIAGNOSTICS

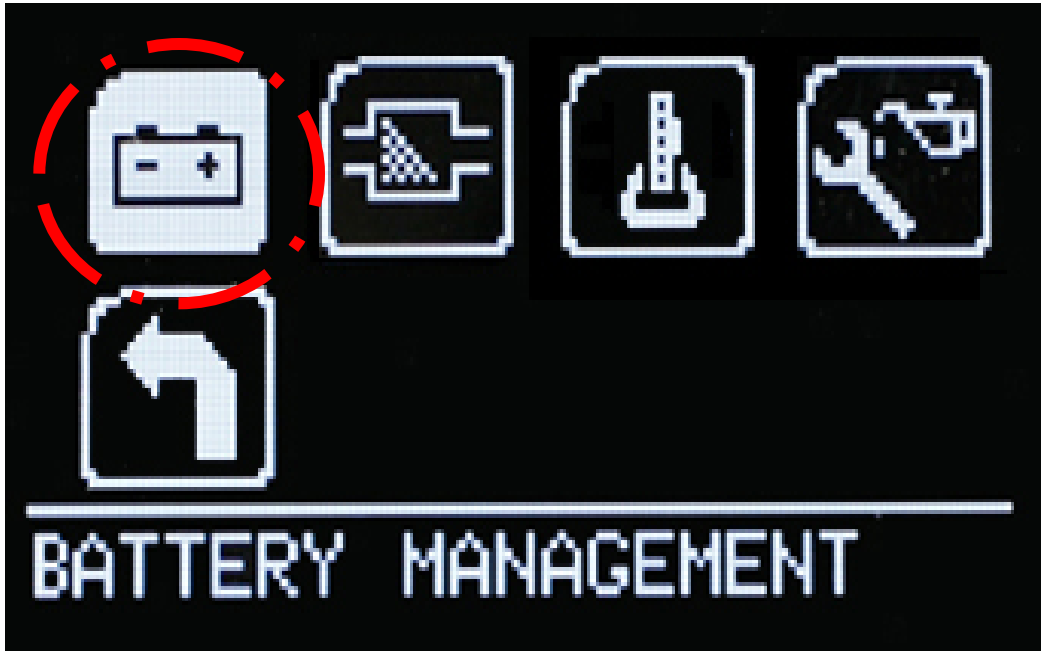
Once the Yu-Fit is connected, the diagnostic menu will be displayed. Select the icon with the vehicle bonnet raised and press ok.



Option 1 – Step 2

BATTERY MANAGEMENT

You will then need to select the battery icon, and press OK



Option 1 – Step 3

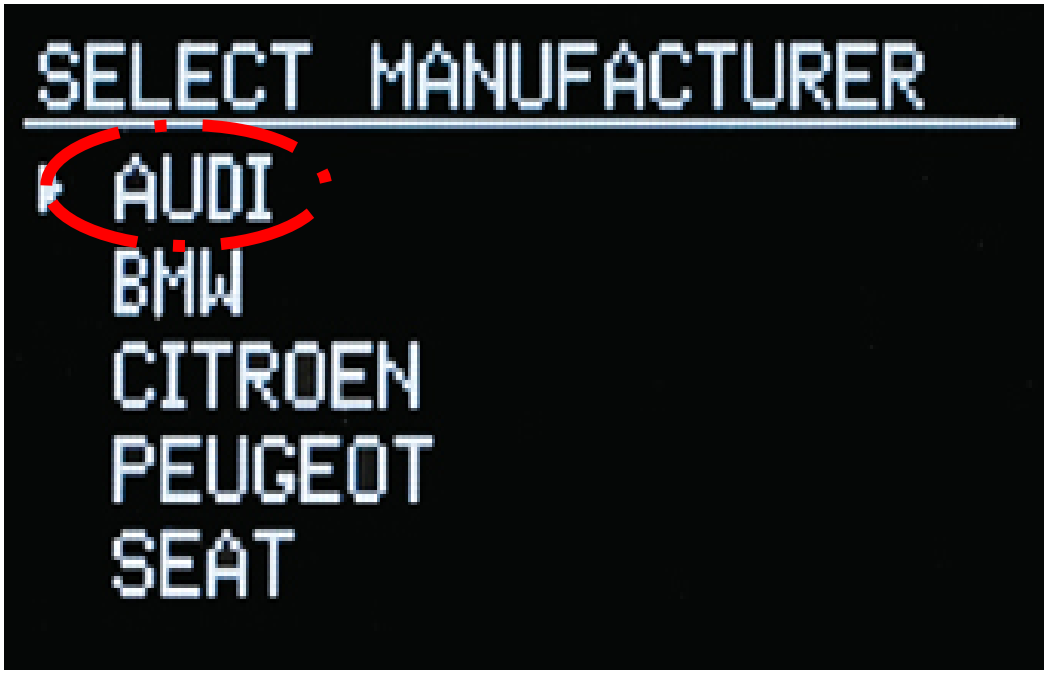
VEHICLE SELECTION

Select the vehicle bonnet raised icon and press OK

Option 1 – Step 4

SELECT MANUFACTURER

Use the up & down arrows to select the vehicle manufacturer then press OK



Option 1 – Step 5

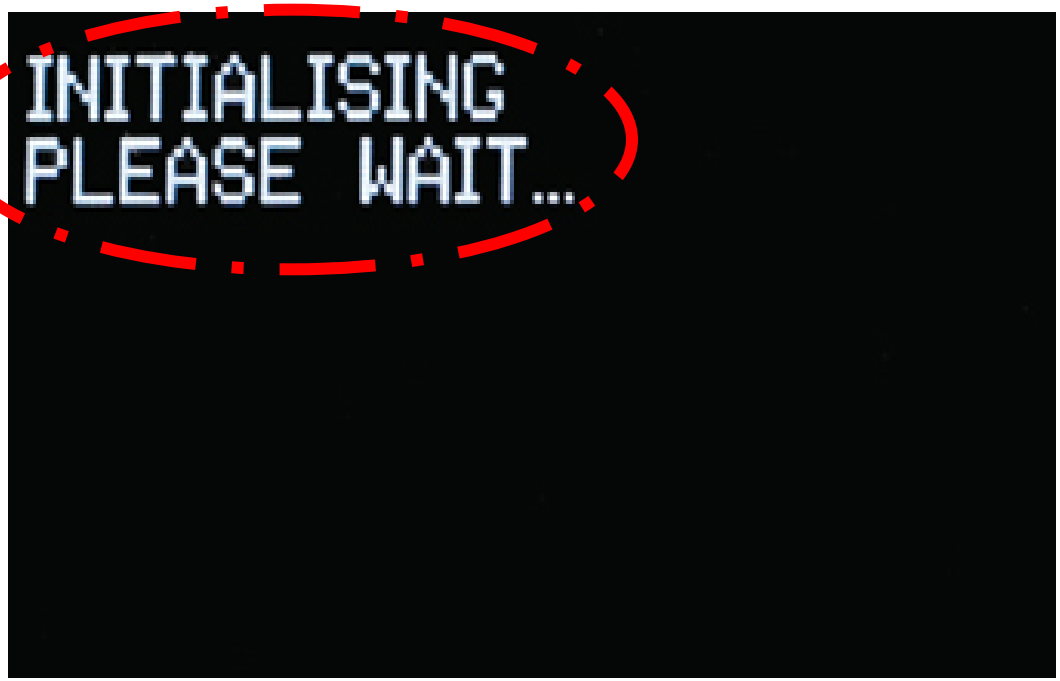
TURN ON THE IGNITION

You will be asked to switch on the ignition.
Once done press OK

Option 1 – Step 6

INITIALISING

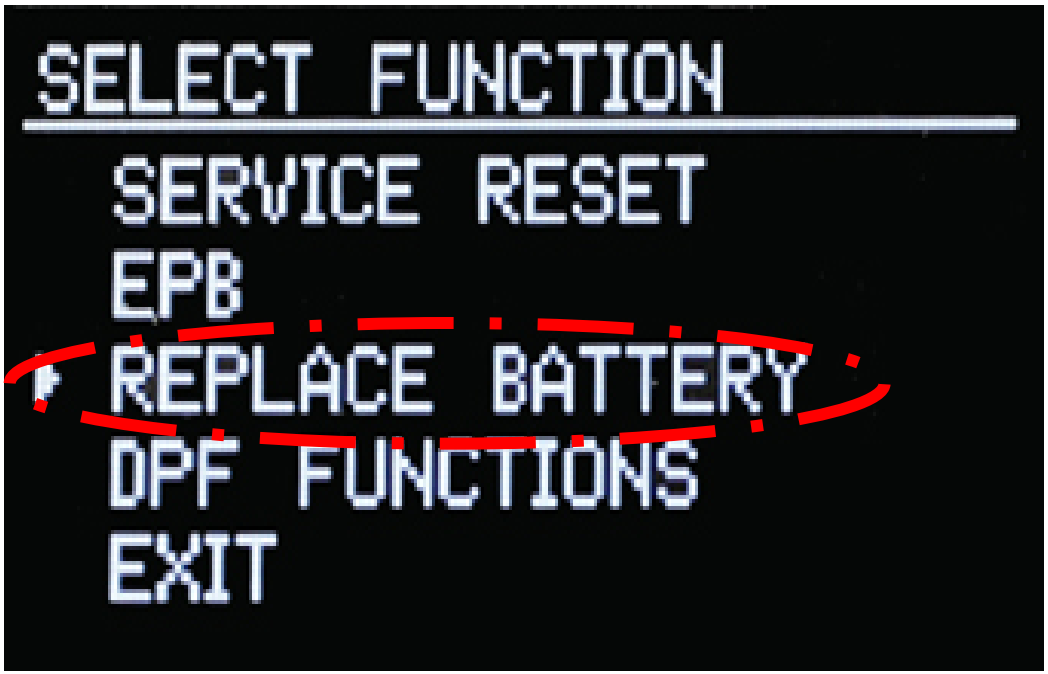
There will be a slight wait while the system is initialising



Option 1 – Step 7

SELECT FUNCTION

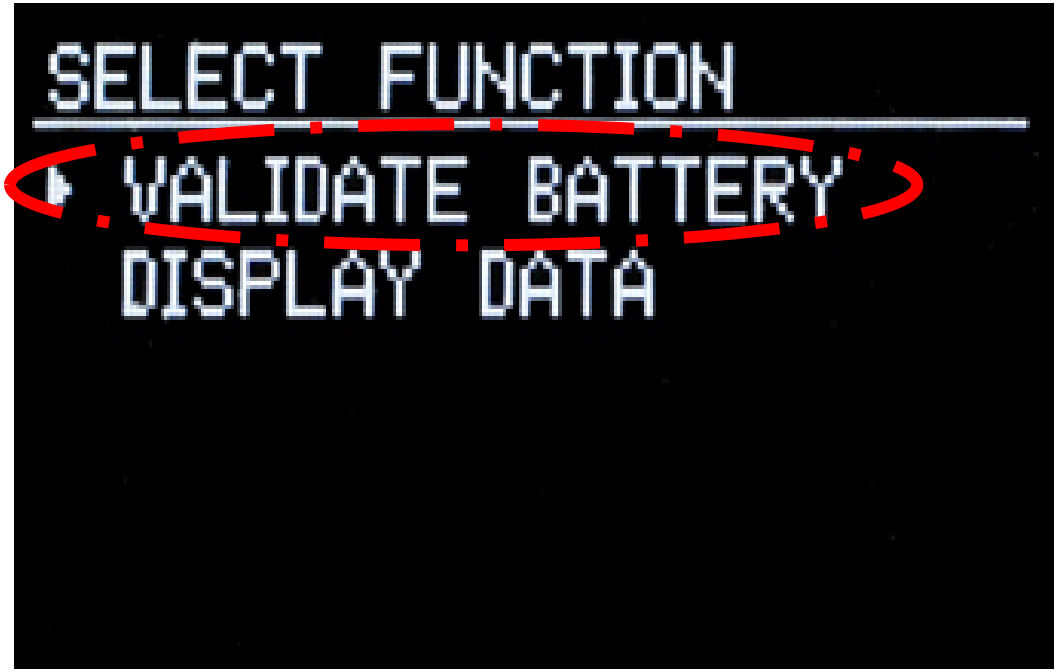
Use the up & down arrows to select the REPLACE BATTERY option and press OK



Option 1 – Step 8

SELECT FUNCTION

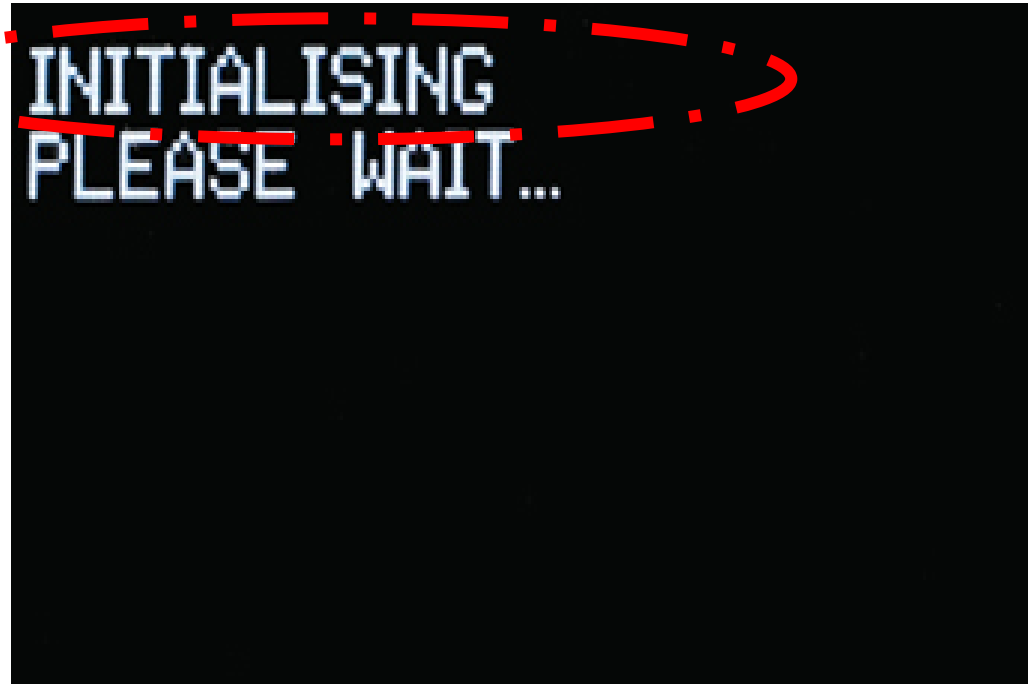
Use the up & down arrows to select the VALIDATE BATTERY option and press OK



Option 1 – Step 9

INITIALISING

There will be a slight wait while the system is initialising

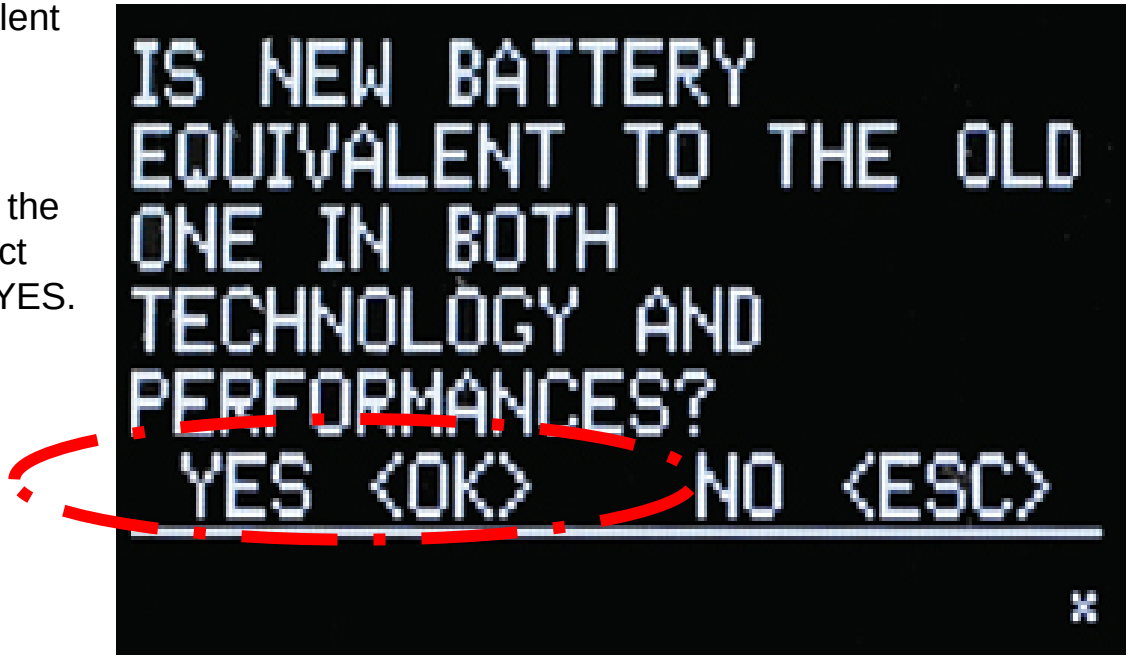


Option 1 – Step 10

BATTERY CONFIRMATION

It will then ask you if the battery is equivalent in technology and performance to the previous battery In the vehicle.

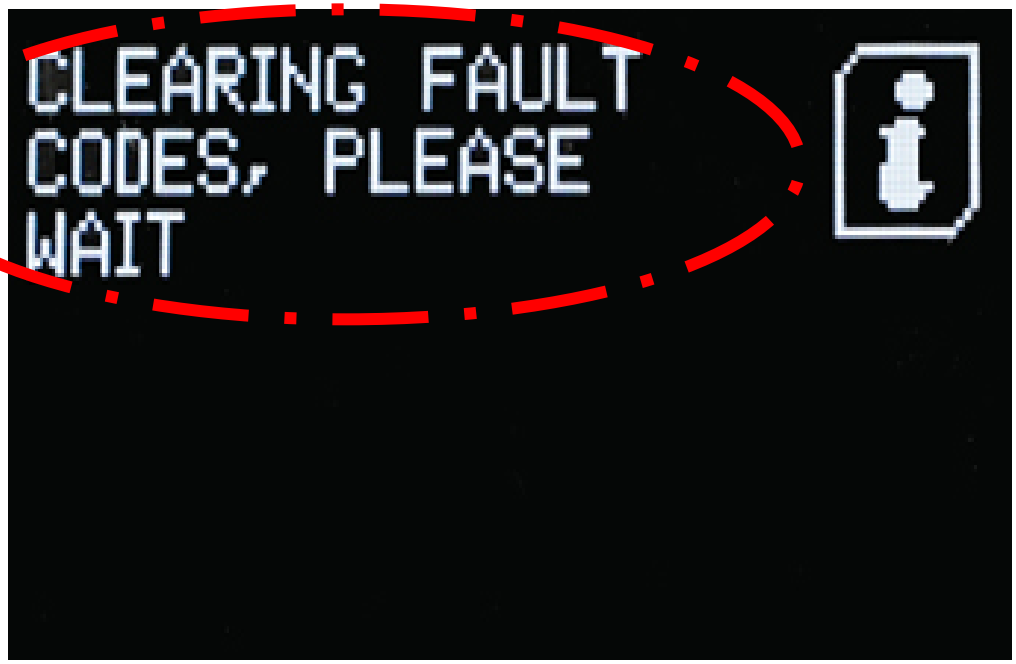
This should be the case if you have used the Yuasa Battery Finder to identify the correct battery, so the answer should always be YES. Select YES and press OK



Option 1 – Step 11

CODE RESETTING

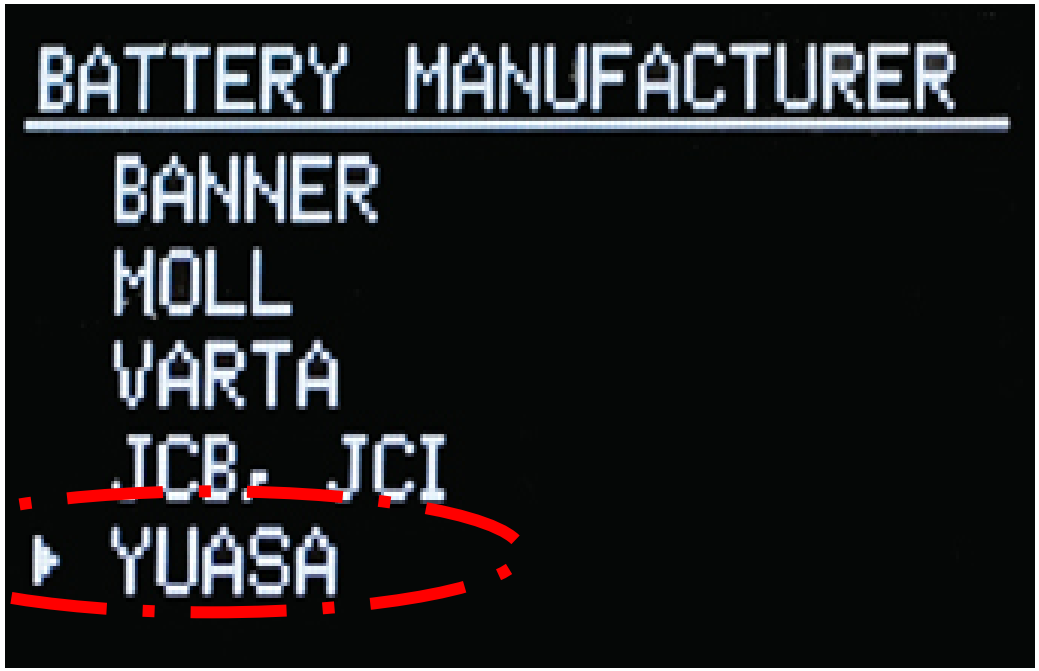
The system will then clear any fault codes that are generated from the replacement of the battery



Option 1 – Step 12

BATTERY MANUFACTURER

The system will then ask you who the battery manufacturer is. Use the up & down arrows to always select **Yuasa** and press OK

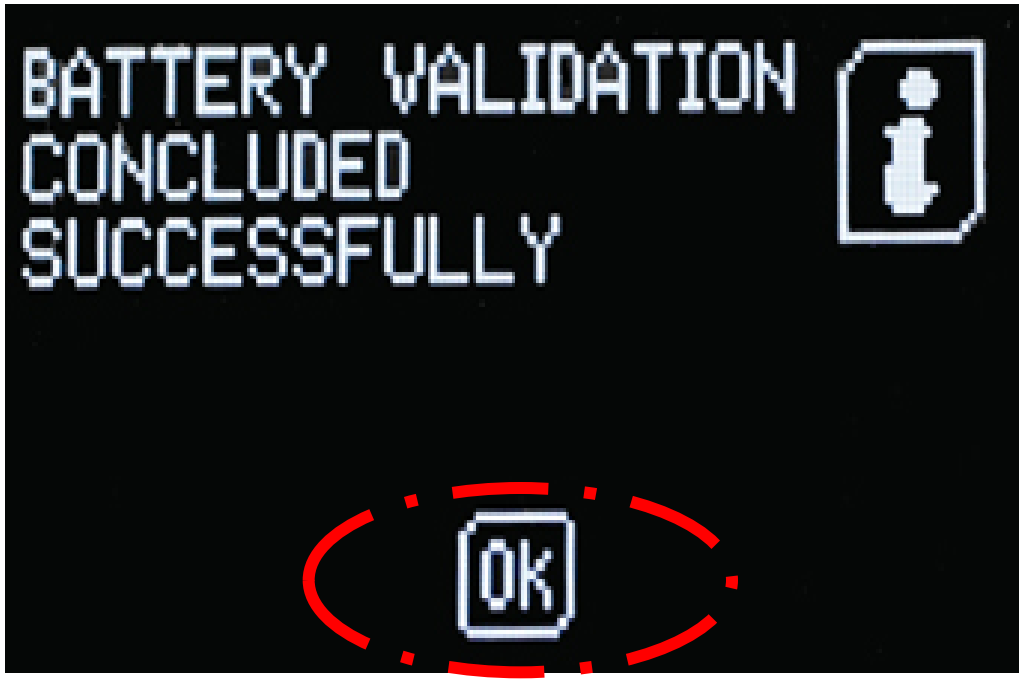


Option 1 – Step 13

BATTERY VALIDATION

After a short time a confirmation message will appear that tells you that the battery programming has been successful.

Press the OK button to exit

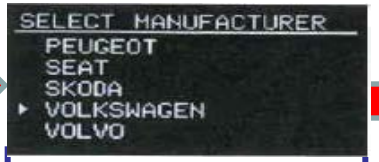


Option 2: Overview

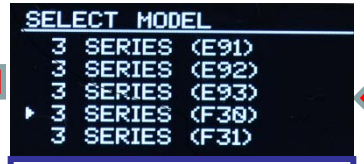
Select **DIAGNOSTICS** icon

Select **BATTERY MANAGEMENT** icon

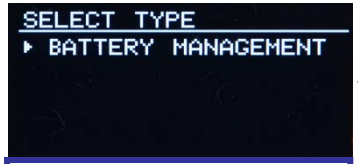
Select **VEHICLE SELECTION** icon



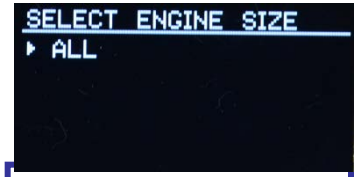
Select **MANUFACTURER**



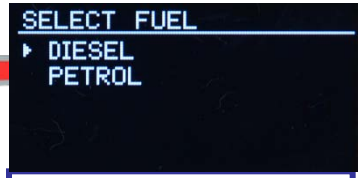
Select **MODEL**



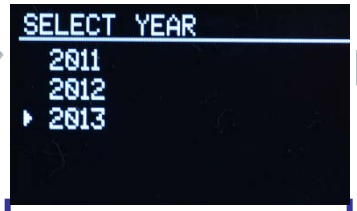
Select **BATTERY MANAGEMENT**



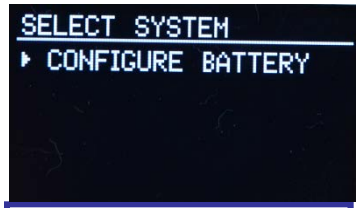
Select **ENGINE SIZE**



Select **FUEL**

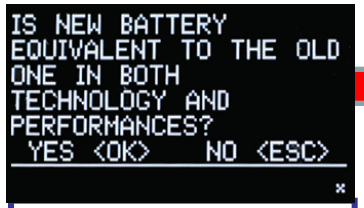


Select **YEAR**



Select **SYSTEM**

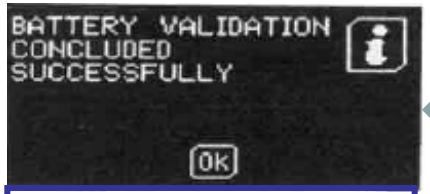
Select **VALIDATE BATTERY**



ALWAYS SELECT YES

Wait for fault codes to be cleared & confirmation of configuration process

Select & Confirm Yuasa as the correct battery data.

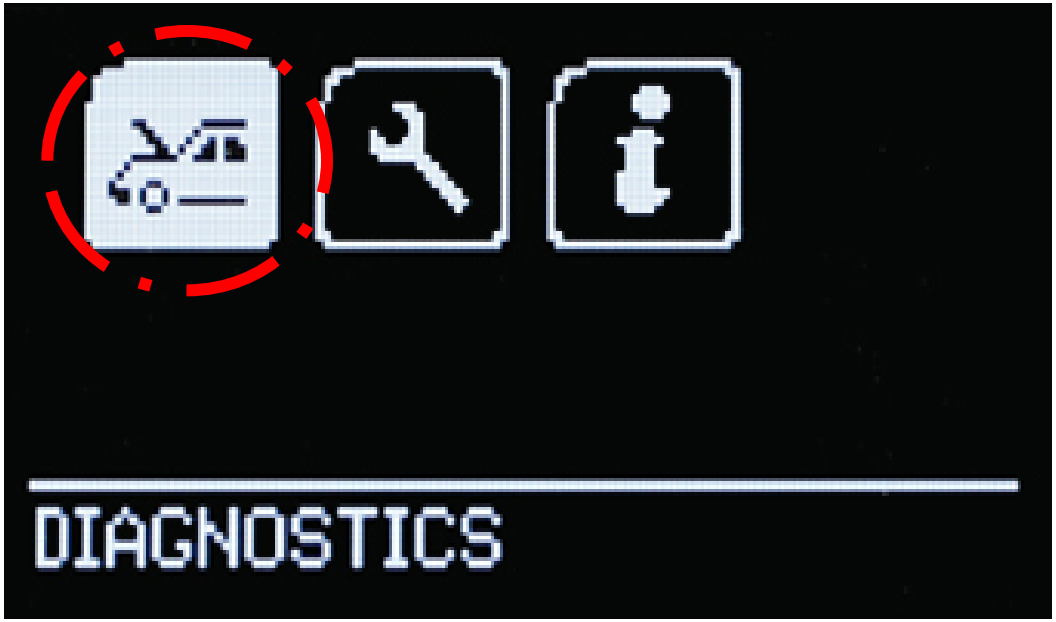


VALIDATION COMPLETE

Option 2 – Step 1

DIAGNOSTICS

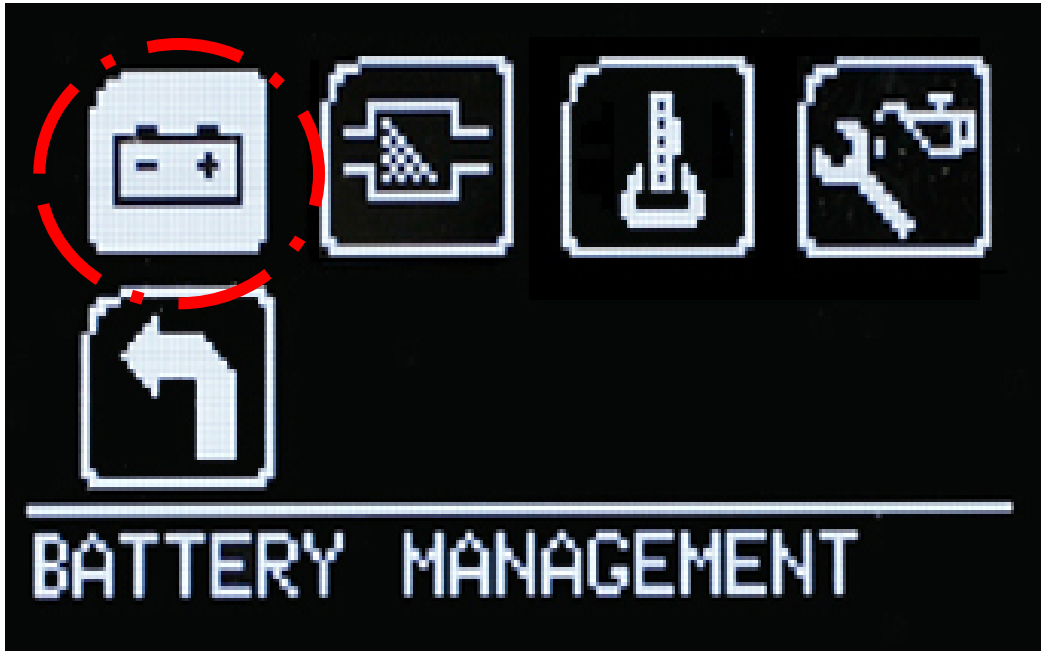
Once the Yu Fit is connected, the diagnostic menu will be displayed. Select the icon with the vehicle bonnet raised and press ok.



Option 2 – Step 2

BATTERY MANAGEMENT

You will then need to select the battery icon, and press OK



Option 2 – Step 3

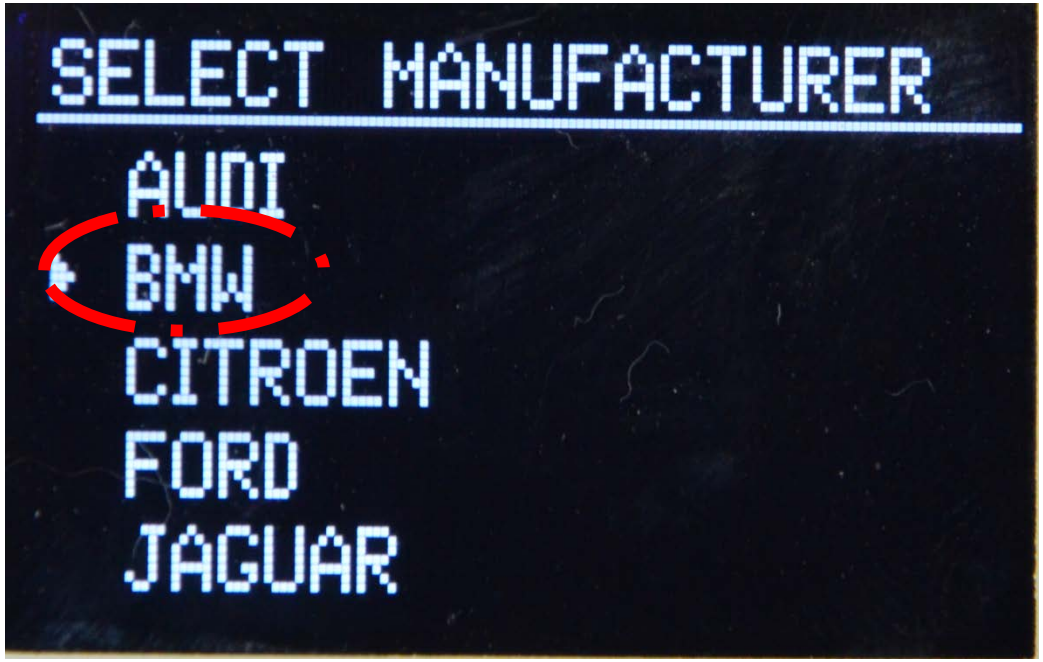
VEHICLE SELECTION

Select the vehicle bonnet raised icon and press OK

Option 2 – Step 4

SELECT MANUFACTURER

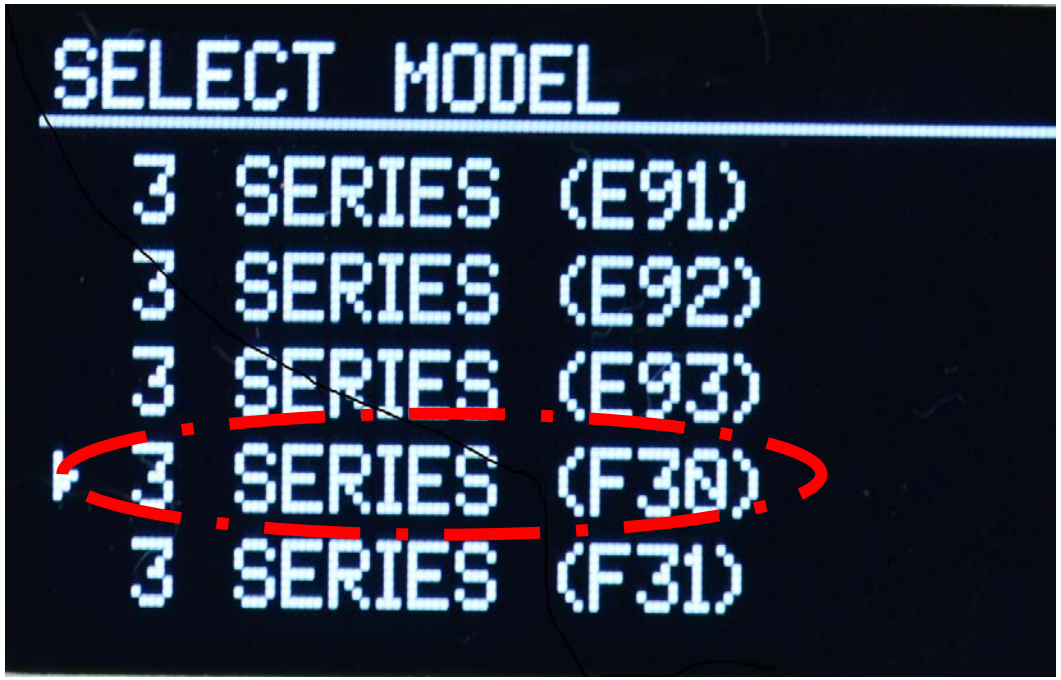
Use the up & down arrows to select the vehicle manufacturer then press OK



Option 2 – Step 5

SELECT MODEL

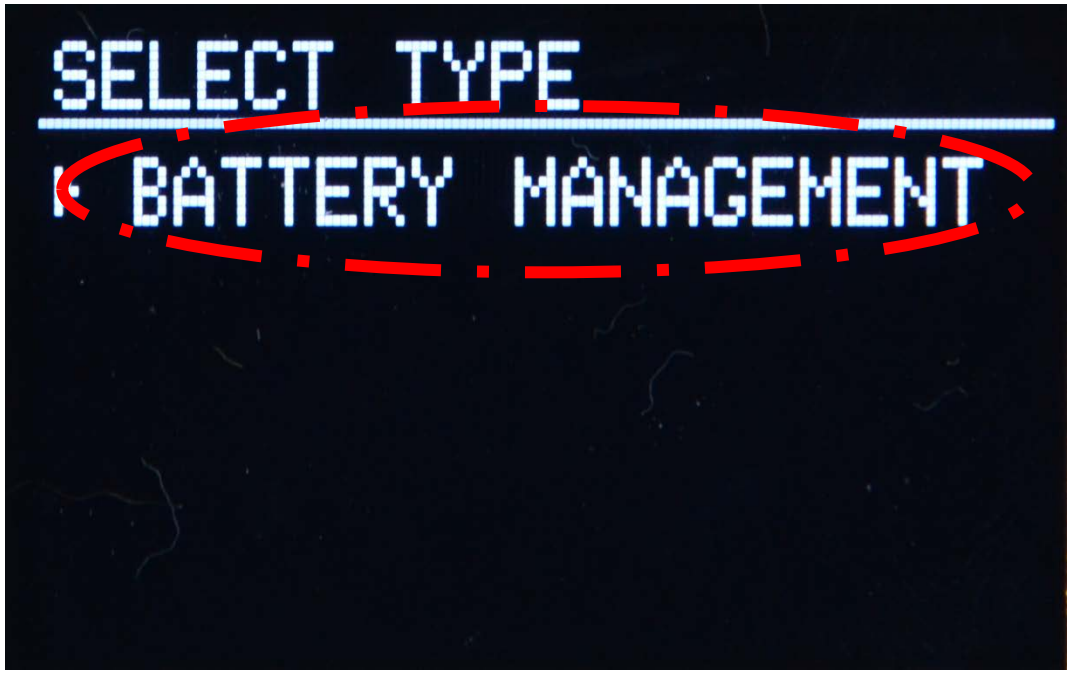
Use the up & down arrows to select the vehicle model then press OK



Option 2 – Step 6

SELECT TYPE

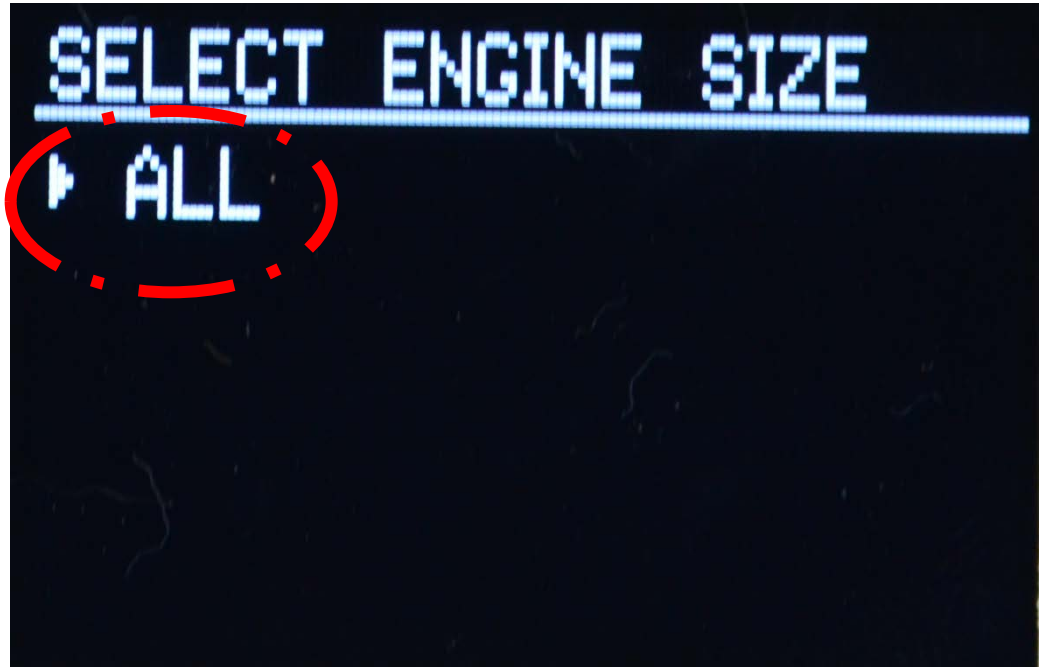
Select BATTERY MANAGEMENT then press OK



Option 2 – Step 7

SELECT ENGINE SIZE

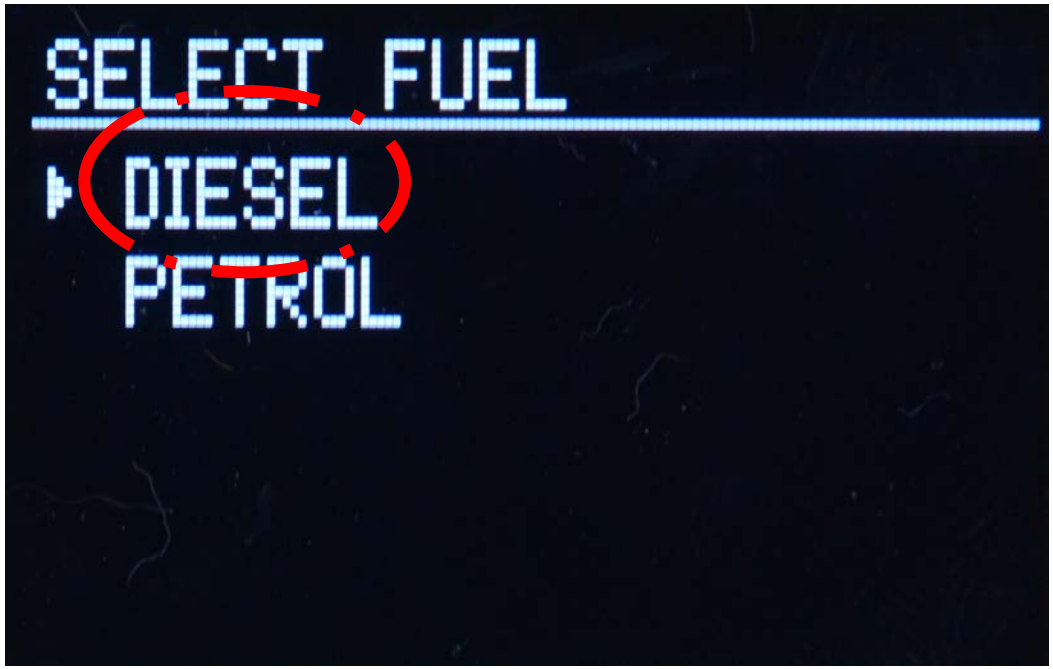
Use the up & down arrows to select the engine size then press OK



Option 2 – Step 8

SELECT FUEL

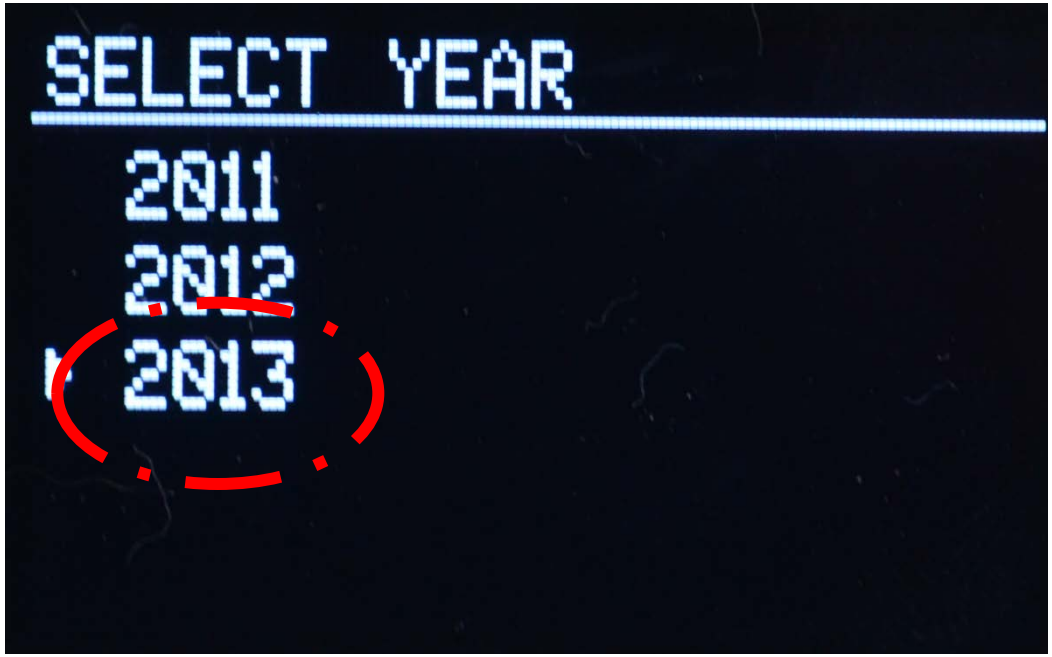
Use the up & down arrows to select the fuel type and press OK



Option 2 – Step 9

SELECT YEAR

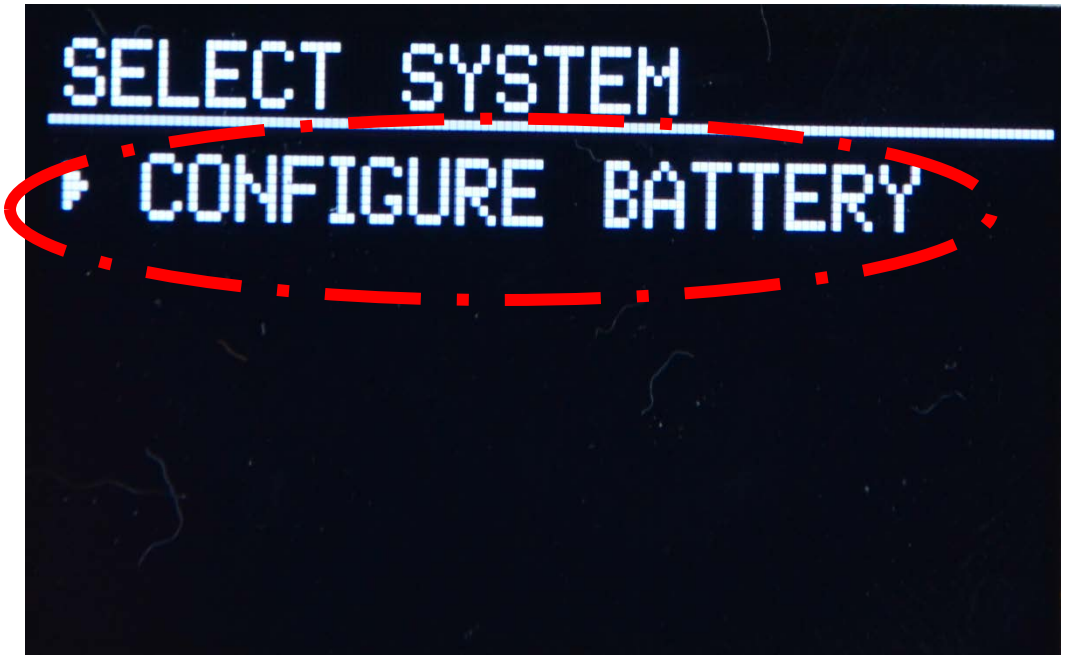
Use the up & down arrows to select the Year of vehicle and press OK



Option 2 – Step 10

SELECT SYSTEM

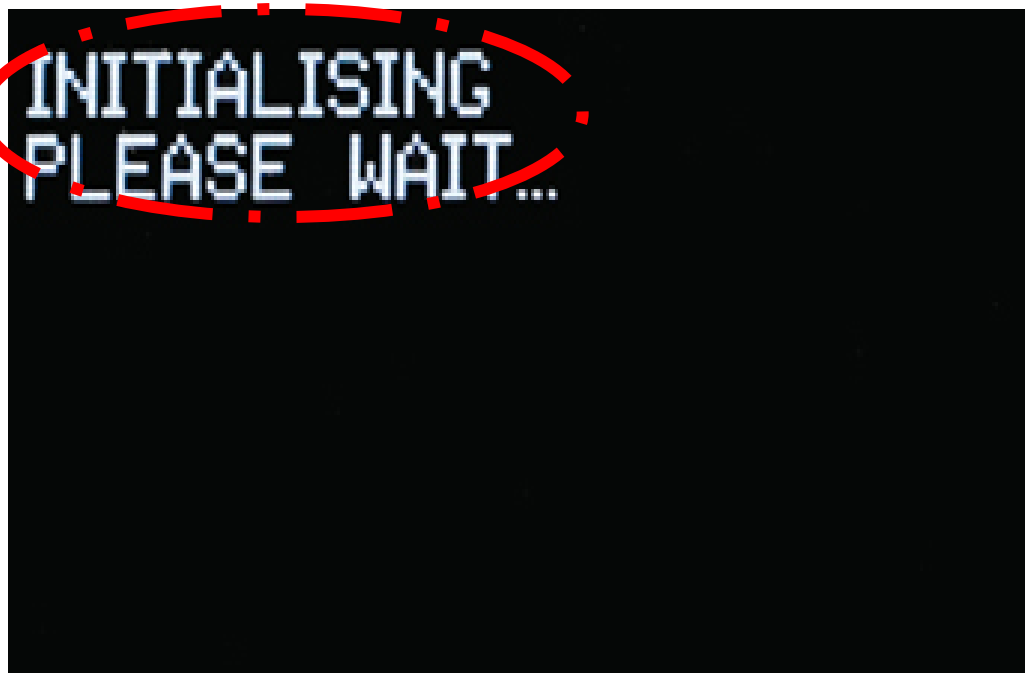
Select CONFIGURE BATTERY then press OK



Option 2 – Step 11

INITIALISING

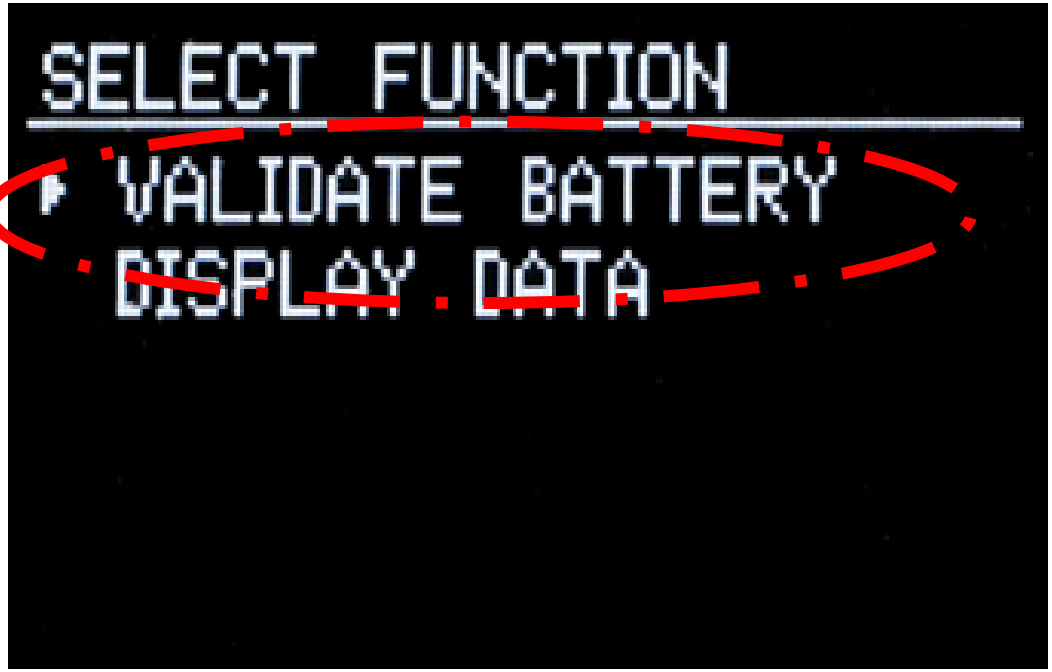
There will be a slight wait while the system is initialising



Option 2 – Step 12

SELECT FUNCTION

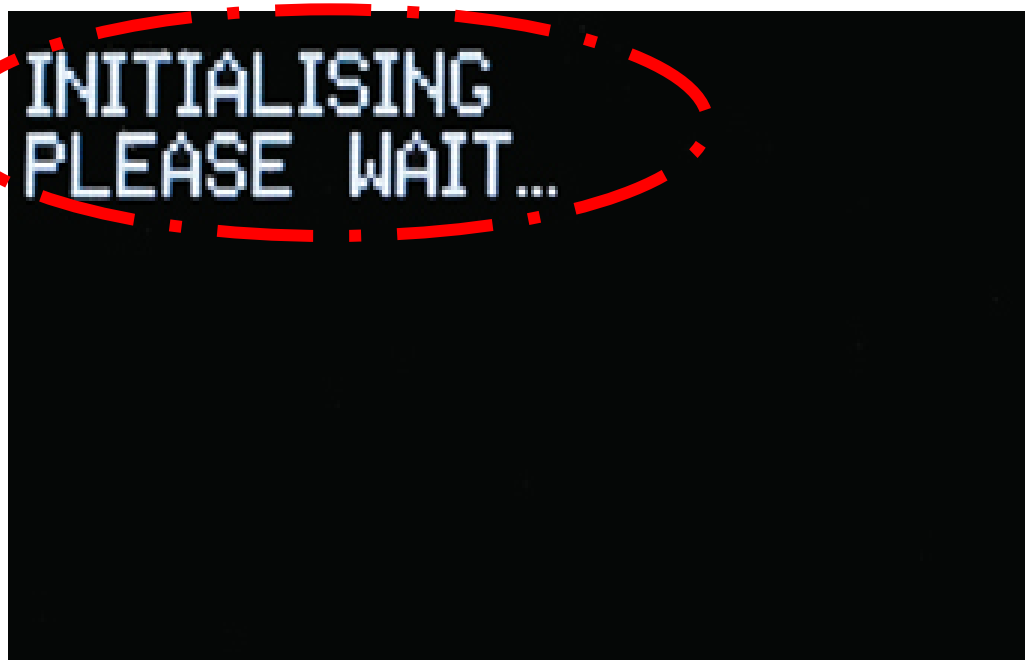
Use the up & down arrows to select the VALIDATE BATTERY option and press OK



Option 2 – Step 13

INITIALISING

There will be a slight wait while the system is initialising

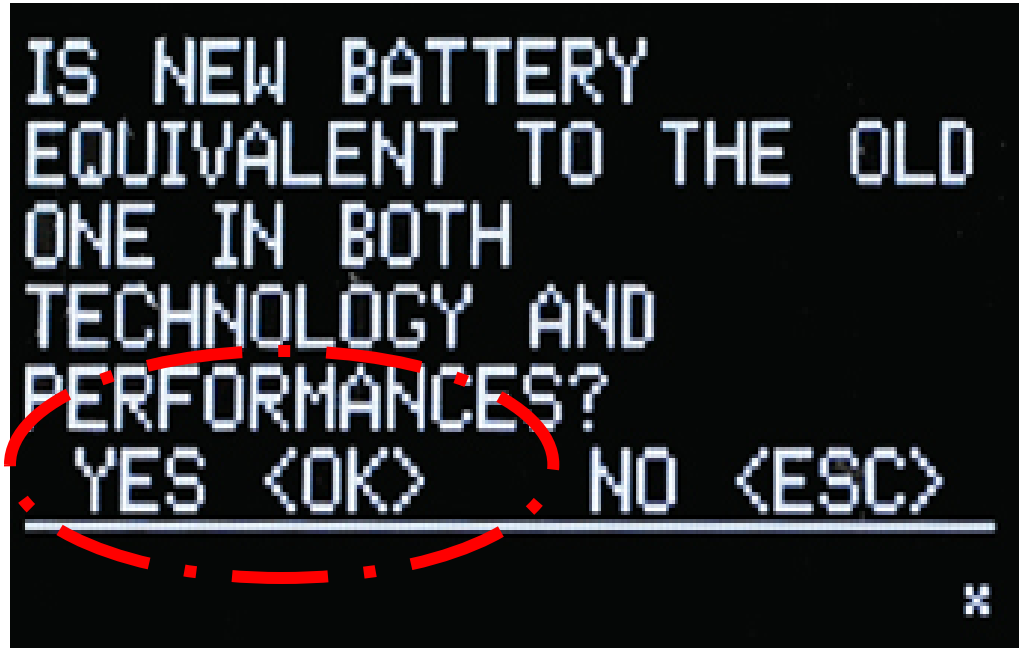


Option 2 – Step 14

BATTERY CONFIRMATION

It will then ask you if the battery is equivalent in technology and performance to the previous battery In the vehicle.

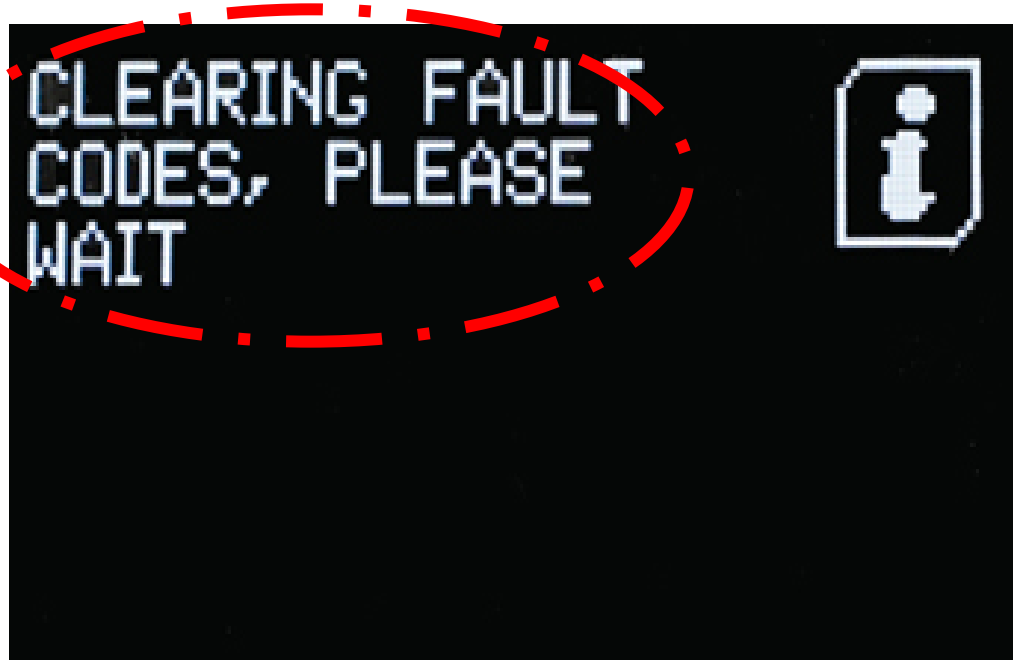
This should be the case if you have used the Yufit Battery Finder to identify the correct battery, so the answer should always be YES. Select YES and press OK



Option 2 – Step 15

CODE CLEARING

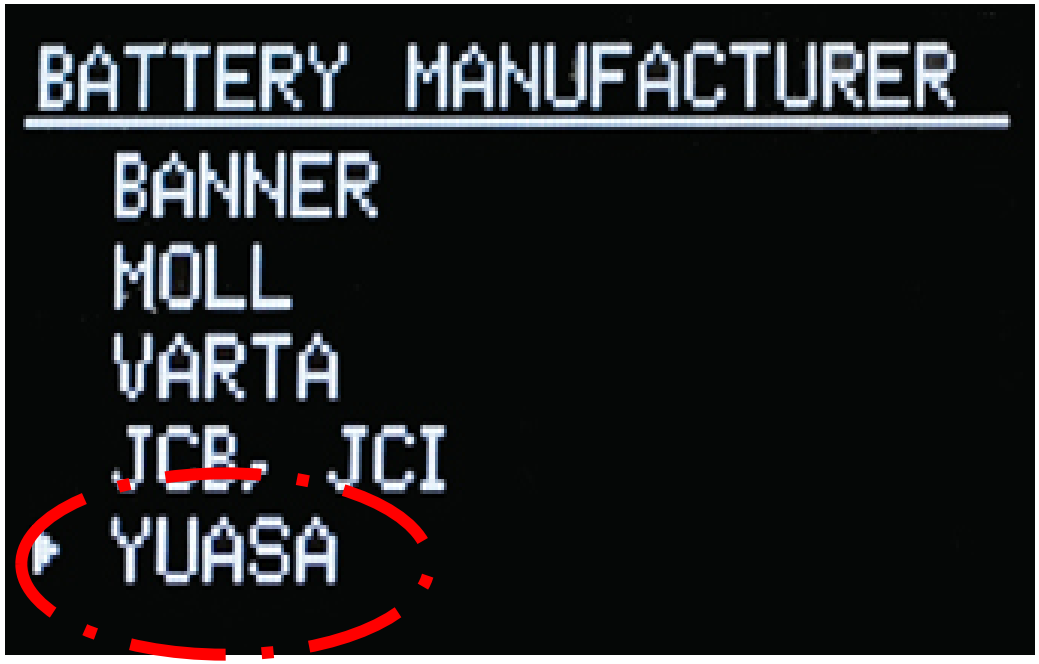
The system will then clear any fault codes that are generated from the replacement of the battery



Option 2 – Step 16

BATTERY MANUFACTURER

The system will then ask you who the battery manufacturer is. Use the up & down arrows to always select **Yuasa** and press OK

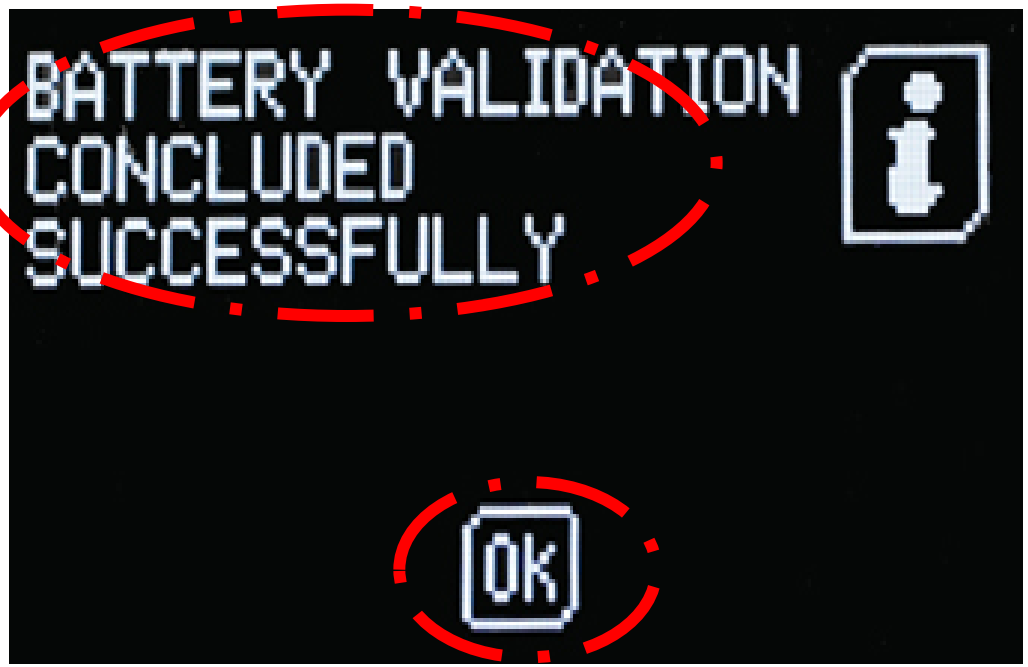


Option 2 – Step 17

BATTERY VALIDATION

After a short time a confirmation message will appear that tells you that the battery programming has been successfully.

Press the OK button to exit



If you have any further enquires about the Yu Fit configurator or need assistance please contact Yuasa Batteries on 0800 93 93 93 or visit our website at:

www.yuasabatteries.co.nz

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