

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 CO₂ 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.

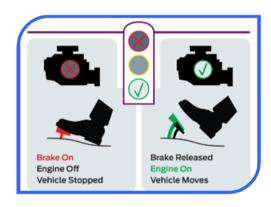






How ISS systems work

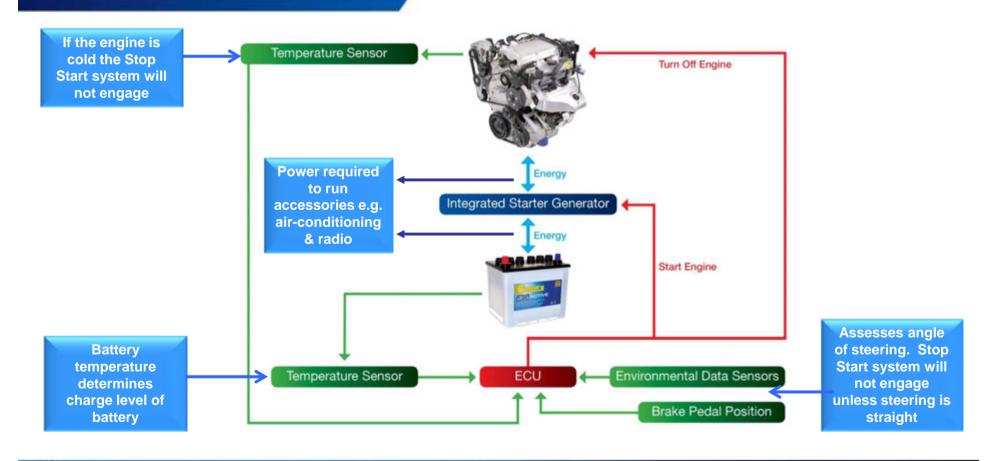
- Basic ISS systems work by shutting off the engine whilst the vehicle is stationary. When the brake pedal is released or the accelerator depressed, the engine quickly restarts enabling the vehicle to be driven.
- In more advanced ISS systems, the vehicle may also incorporate regenerative braking or 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





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.centurybatteries.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



ISS Market Demand

- In 2016 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.
- At present there is an estimated 40,000 ISS vehicles on New Zealand's roads.













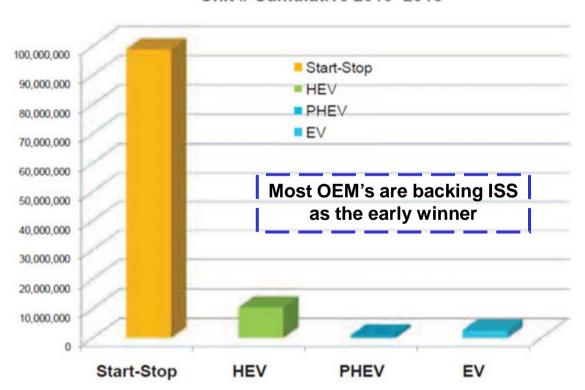






ISS Market Size

Production in Europe, Japan & US & China Unit # Cumulative 2010~2016



vehicles to be in use Globally by 2020

Source: Forecasts Pike research Business Wire

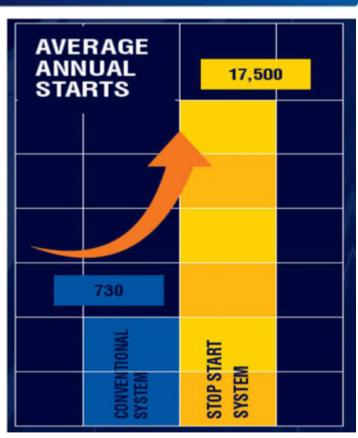


Conventional versus ISS batteries

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 versus 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



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.

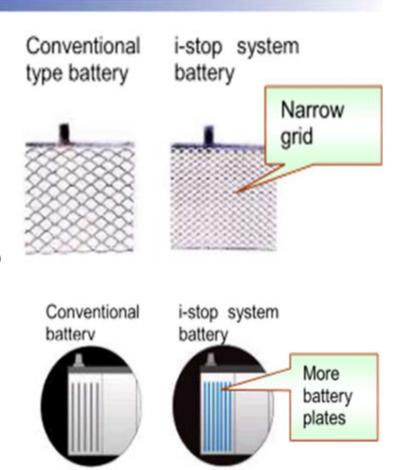






EFB Key differences

- Expanded grid plate manufacturing process to improve durability.
- Negative plate active material features
 Carbon/Lithium additives to improve charge acceptance.
- Positive plate features a polyester covering sheet to resist plate damage from cyclic stress.
- High density positive plate active material featuring special additives to increase surface area and improve durability.
- Low Specific Gravity (SG) electrolyte to improve charge acceptance and increase life.

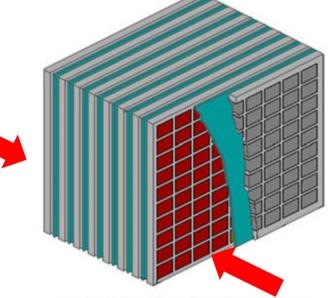




AGM Key differences

- Increased number of plates more capacity.
- Thinner separators less internal resistance.
- High CCA performance.
- Excellent cyclic capacity.
- Increased starting capability.

 (approximately 360,000 start cycles)
- Superior vibration resistance.
- Fast recharge characteristics.
- Improved operation when in a low State of Charge (SOC).







ISS Battery Replacement

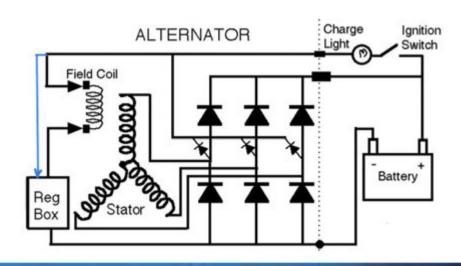
- New technology ISS vehicles equipped with emission control systems may require configuration of the active energy management system during battery replacement.
- These systems control the charging system to ensure optimum battery performance and ISS system functionality.
- The active energy management 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.

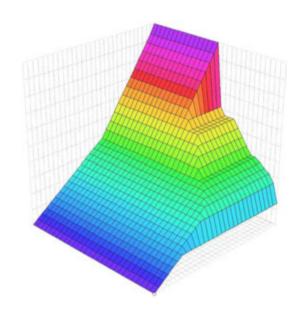




Battery Temperature, Charge Voltage & Regulation

- 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 CO2 emissions
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 - Loss of vehicle system functionality



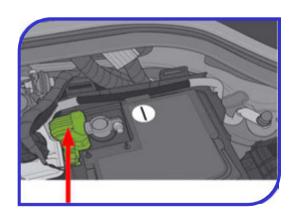




Identifying Energy Management Systems

- 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.
- Until recently, battery configuration could only be carried out by main dealer diagnostic tools at considerable expense.







Yu-Fit battery configurator

- Configuration of the active energy management system can now be carried out using the Yu-Fit battery configuration tool.
- Use of the Yu-Fit tool allows the provision of a complete battery replacement solution, even on vehicles featuring new emission reduction Micro-hybrid systems.
- The Yu-Fit tool 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 page.
- 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.







Yu Fit Battery Configurator







Yu-Fit Configurator Kit



Each Century Yu-Fit kit contains:-

- ✓ Yu-Fit Tool
- ✓ USB Cable
- Registration & Software Installation Guide
- User Guide
- ✓ List of vehicles supported by the Yu-Fit













Setting Up the Yu-Fit Tool

- Before using the Century Yu-Fit tool it must first be registered and the supporting application software downloaded.
- The supporting application software should be downloaded from:

www.centurybatteries.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

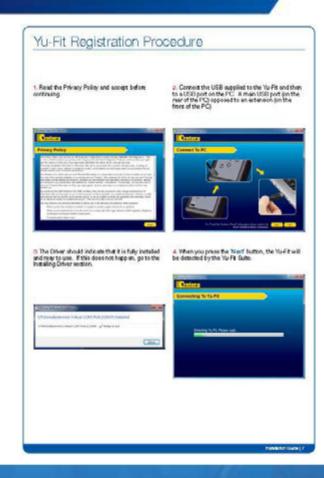








Yu-Fit Set Up - Registration

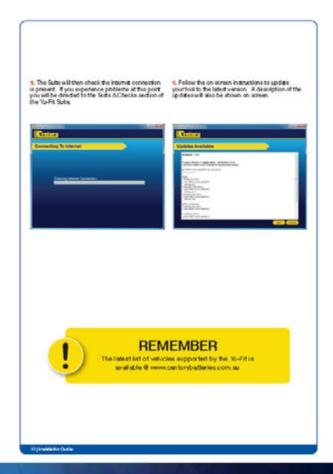






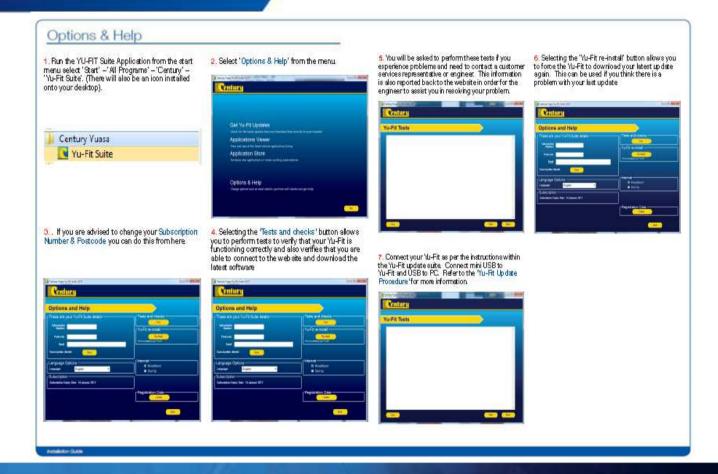
Yu-Fit - Vehicle Update Procedure







Yu-Fit - Options & Help





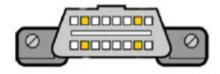
YU-FIT BATTERY CONFIGURATOR





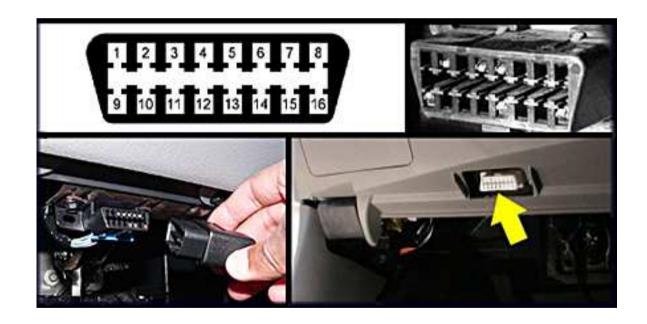
- Once the battery has been replaced, the Yu-Fit should be connected to the vehicle via the 16 Pin EOBD diagnostic socket.
- This is usually located within the vicinity of the steering column.
- The Yu-Fit will then guide the user through the battery configuration process with a series of on screen options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







EOBD Location





- 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.





Important Note

Depending on the make & model of the vehicle, the Yu-fit tool will guide you through one of two possible options for battery configuration.

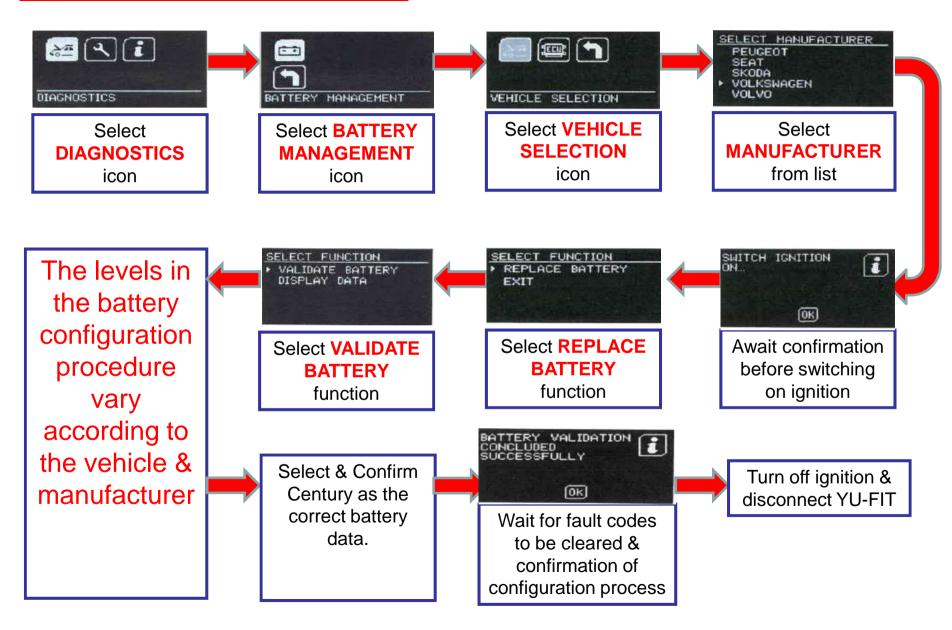
Both are detailed to avoid any confusion.







Option 1: Overview



Option 1 - Step 1

DIAGNOSTICS

Once the Yu-Fit Tool 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







VEHICLE SELECTION

Select the vehicle bonnet raised icon and press OK



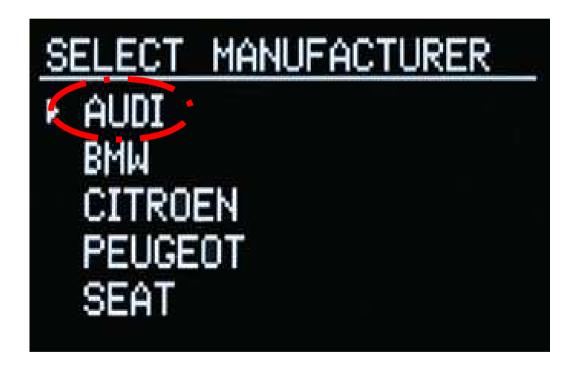




SELECT MANUFACTURER

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







TURN ON THE IGNITION

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







INITIALISING

There will be a slight wait while the system

is initialising



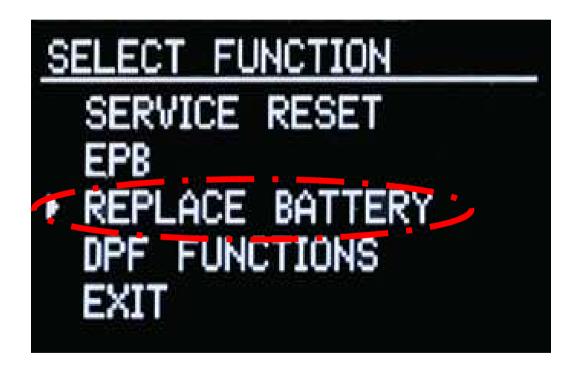




SELECT FUNCTION

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



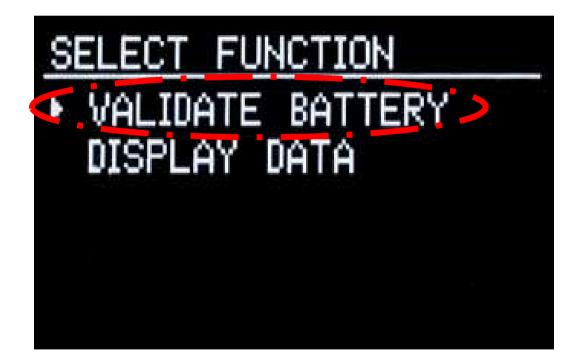




SELECT FUNCTION

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







INITIALISING

There will be a slight wait while the system is initialising





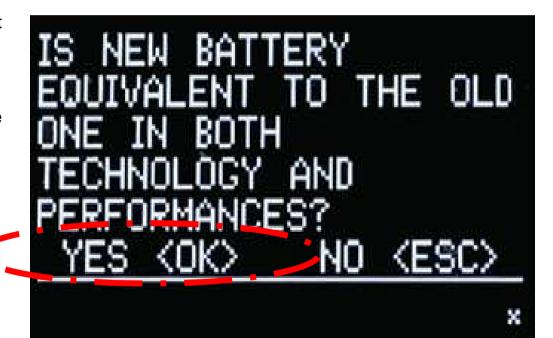


BATTERY CONFIRMATION

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 Century Battery Finder tool to identify the correct battery, so the answer should always be YES. Select YES and press OK







CODE RESETTING

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

battery

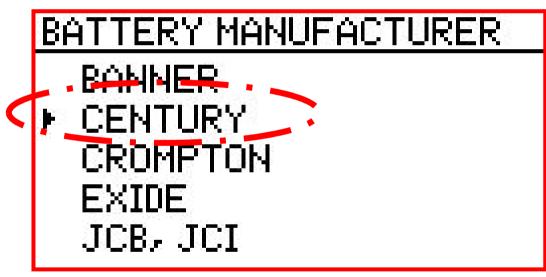




BATTERY MANUFACTURER

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





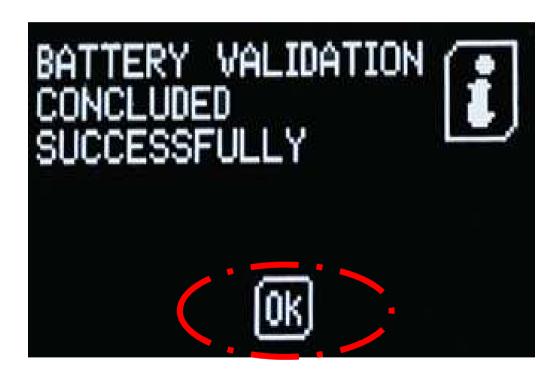


BATTERY VALIDATION

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

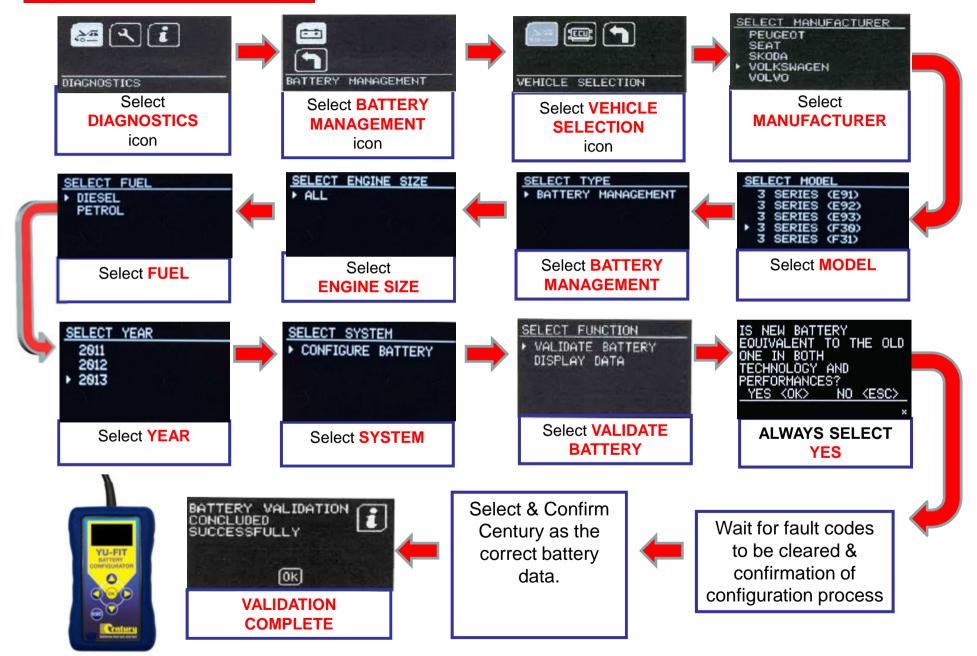
Press the OK button to exit







Option 2: Overview



DIAGNOSTICS

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







BATTERY MANAGEMENT

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







VEHICLE SELECTION

Select the vehicle bonnet raised icon and press OK



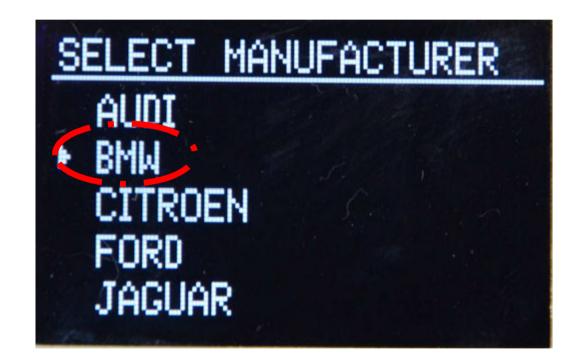




SELECT MANUFACTURER

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



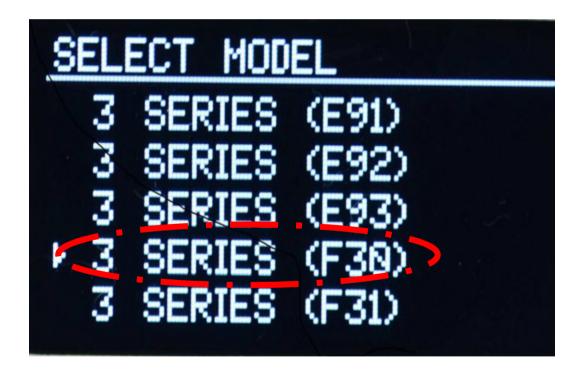




SELECT MODEL

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







SELECT TYPE

Select BATTERY MANAGEMENT then press OK



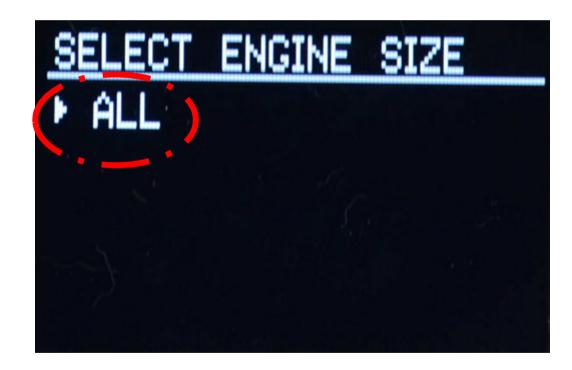




SELECT ENGINE SIZE

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



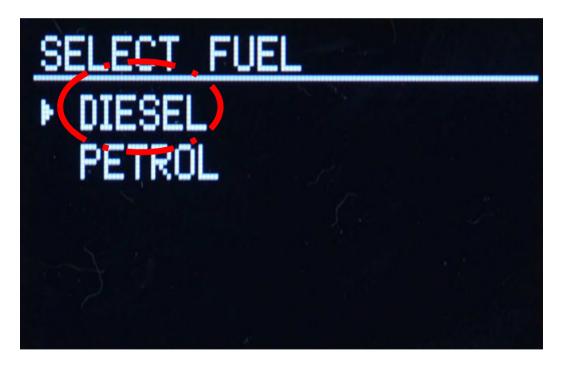




SELECT FUEL

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



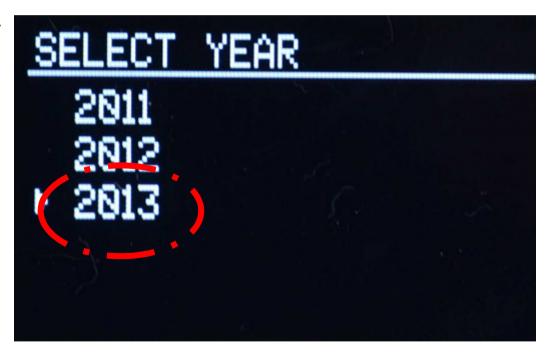




SELECT YEAR

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



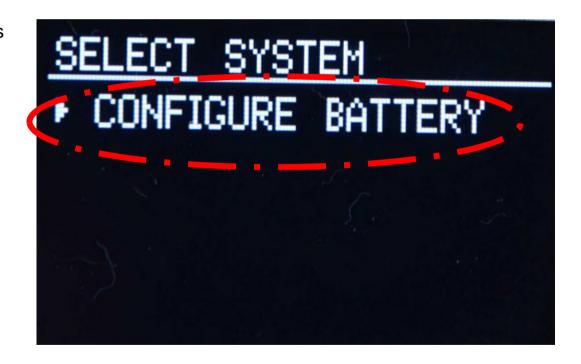




SELECT SYSTEM

Select CONFIGURE BATTERY then press OK







INITIALISING

There will be a slight wait while the system is initialising



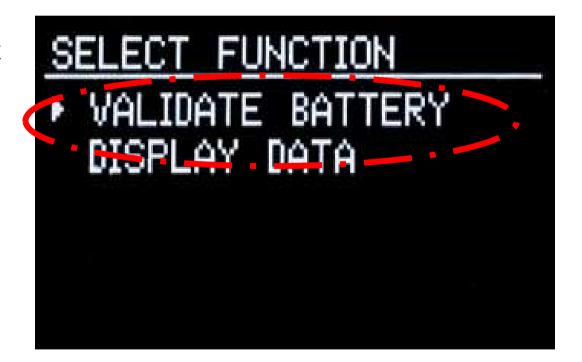




SELECT FUNCTION

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







INITIALISING

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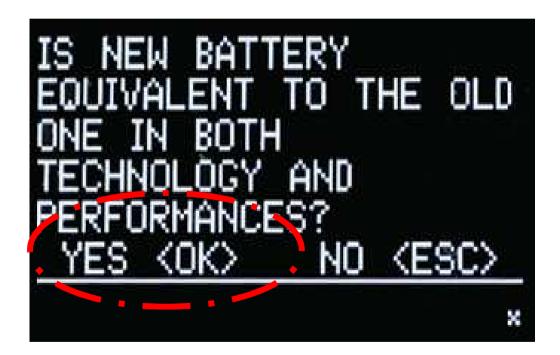


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CODE CLEARING

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

battery

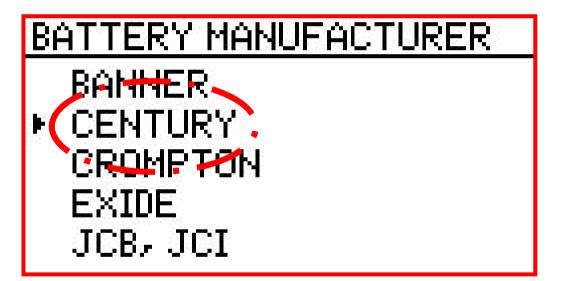




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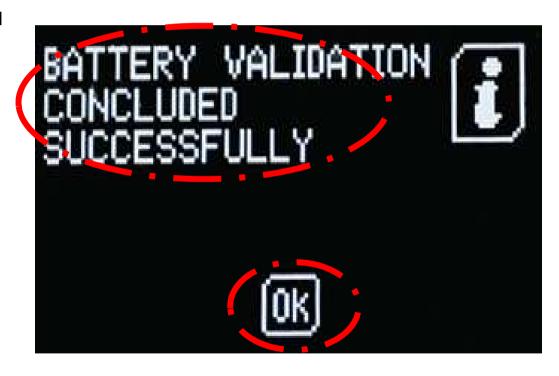


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If you have and further enquires about the Century YU-FIT tool or need assistance please contact Century batteries or visit our website at:

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