BATTERY REPLACEMENT IN IDLE STOP START VEHCILES (ISS)

SIS ACTIVE

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.

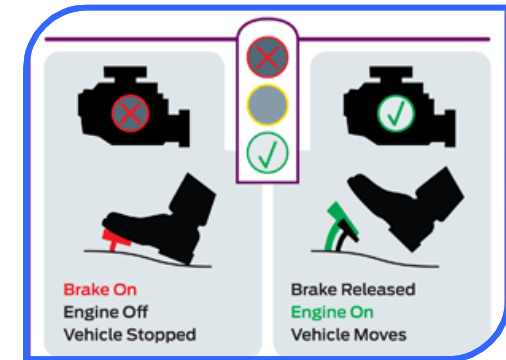- The number of vehicles featuring ISS systems is growing rapidly.

Century

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.

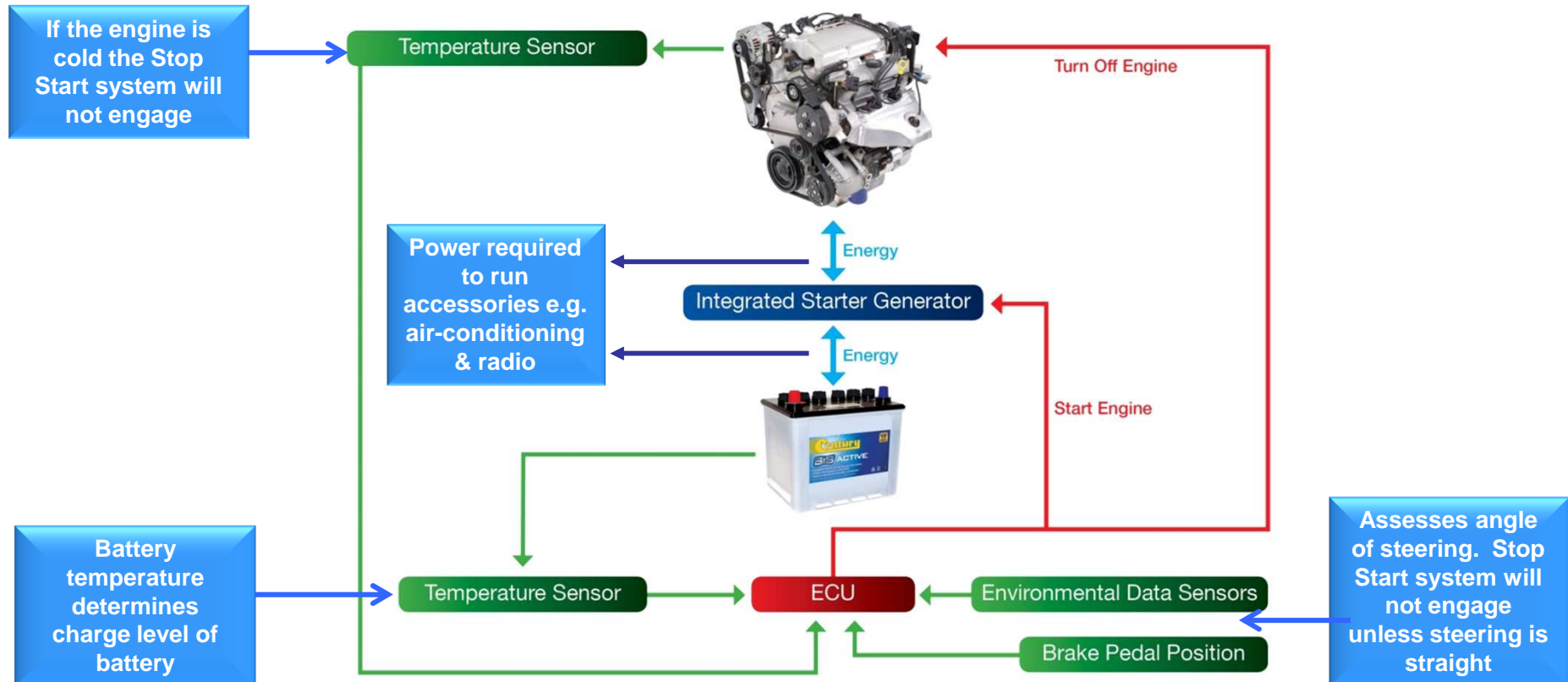- They have relatively low development costs compared with Electric and Hybrid vehicles.

How ISS systems work

Brake On
Engine Off
Vehicle Stopped

Brake Released
Engine On
Vehicle Moves

- 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.

Century

How ISS systems work

If the engine is cold the Stop Start system will not engage

Temperature Sensor

Turn Off Engine

Power required to run accessories e.g. air-conditioning & radio

Energy

Integrated Starter Generator

Energy

Start Engine

Battery temperature determines charge level of battery

Temperature Sensor

ECU

Environmental Data Sensors

Brake Pedal Position

Assesses angle of steering. Stop Start system will not engage unless steering is straight

Identifying ISS systems

SiS   It may not be possible to identify whether a vehicle incorporates ISS technology. Always ask the owner if you are unsure.

SiS   Vehicle manufacturers may include a device or icon on the dash board which enables the ISS system to be deactivated.

SiS   To avoid fitting an incorrect or conventional battery into an ISS vehicle, refer to the manufacturers handbook or visit www.centurybatteries.com.au

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

SIS ACTIVE

ISS Market Demand

- In 2016 it is estimated that 70% of cars driven in some countries will have Stop Start technology.

- In Australia 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 estimated to be around 100,000 ISS vehicles on Australian roads.

ISS Market Size

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

- Start-Stop
- HEV
- PHEV
- EV

Most OEM's are backing ISS as the early winner
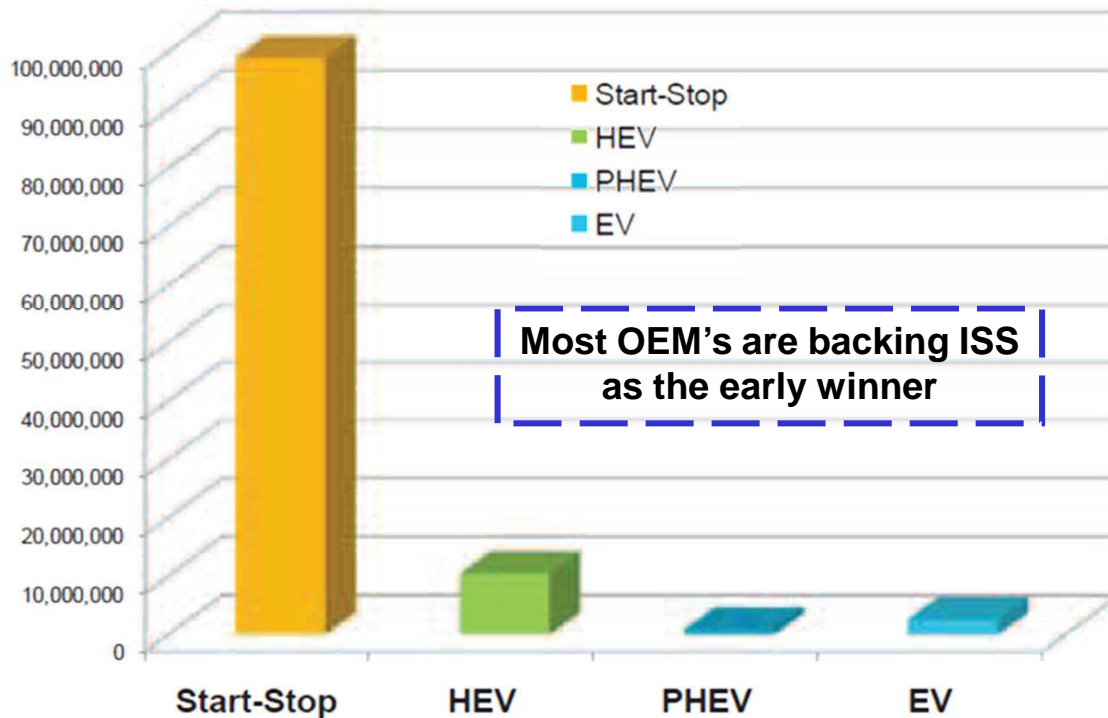
186 Million ISS vehicles to be in use Globally by 2020

Source: Forecasts Pike research Business Wire

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
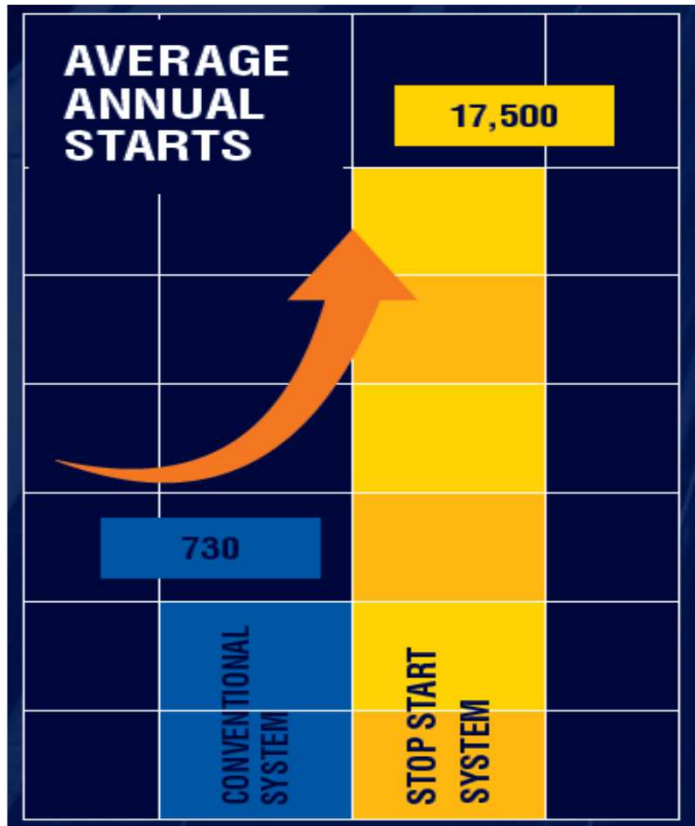
Conventional System	Stop Start System
Starts vehicle 2 to 3 times per day	Starts vehicle every 1 to 2 kilometres
730 average annual starts	17,500 average annual starts
Delivers 263,000 watt seconds of energy	Delivers 487.5 million watt seconds of energy
Minimal cycling required	Battery is constantly 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

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.

Conventional type battery

i-stop system battery

Narrow grid
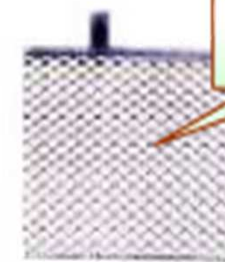
Conventional battery

i-stop system battery

More battery plates

Century
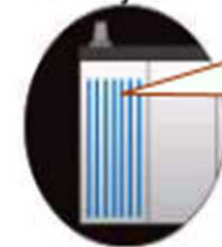
AGM Key differences

- 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).

SIS ACTIVE
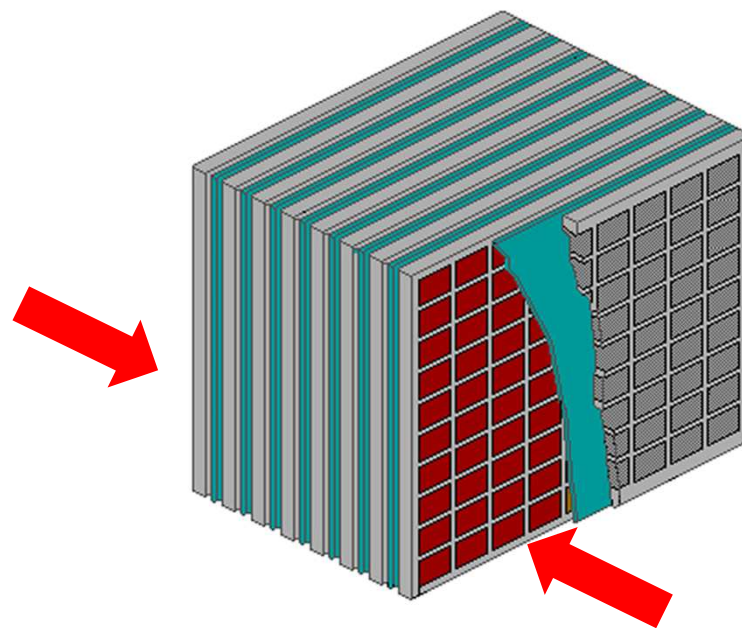
ISS Battery Replacement

- 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.

Century
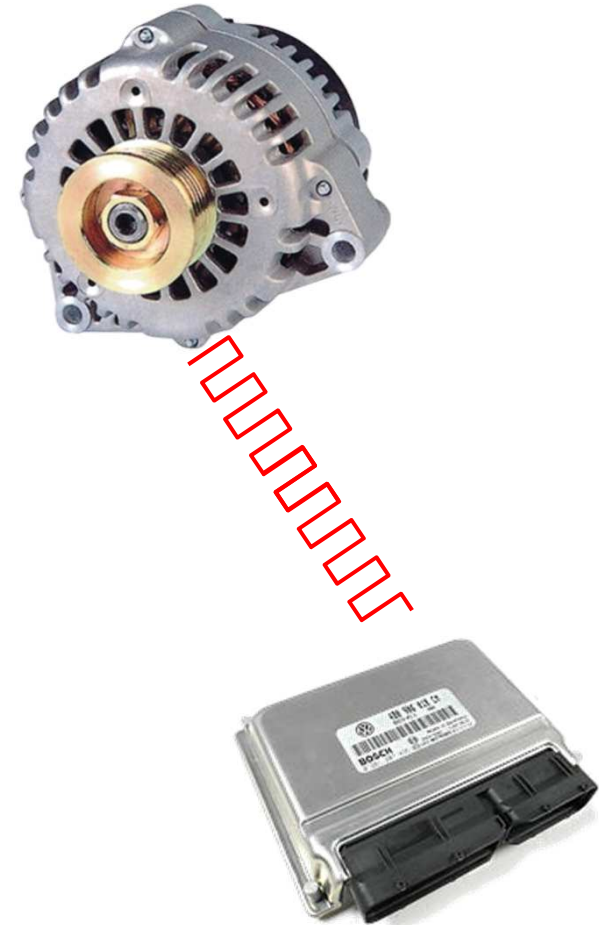
Battery Temperature, Charge Voltage & Regulation

- 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..

ALTERNATOR

Field Coil

Charge Light

Ignition Switch

Reg Box

Stator
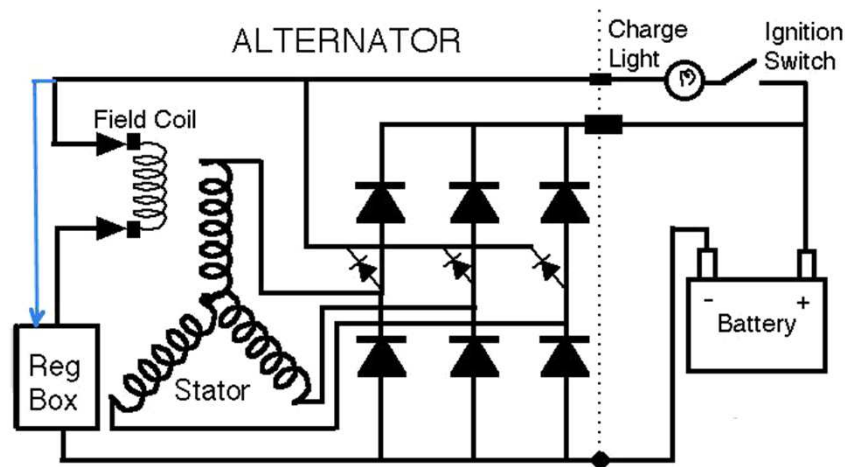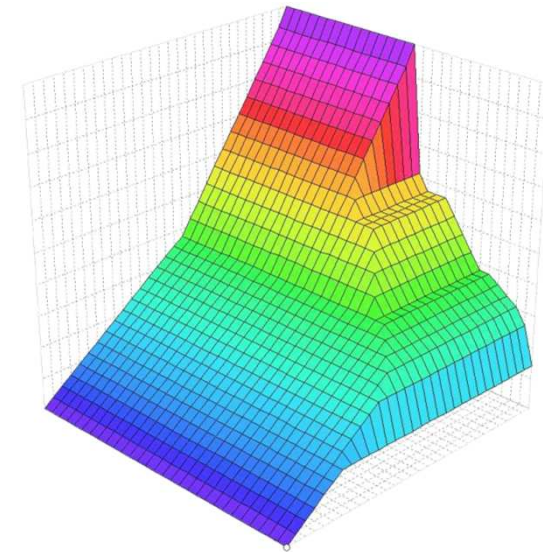
Battery

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

  - 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.

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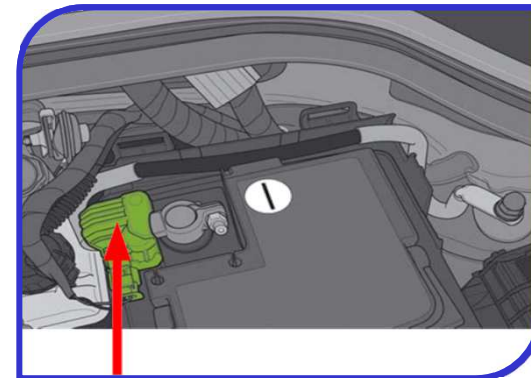
Yu-Fit battery configurator

- 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

OK
ESC

Century
Batteries that last and last

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.

SIS ACTIVE

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 Australian 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

Century

SIS ACTIVE
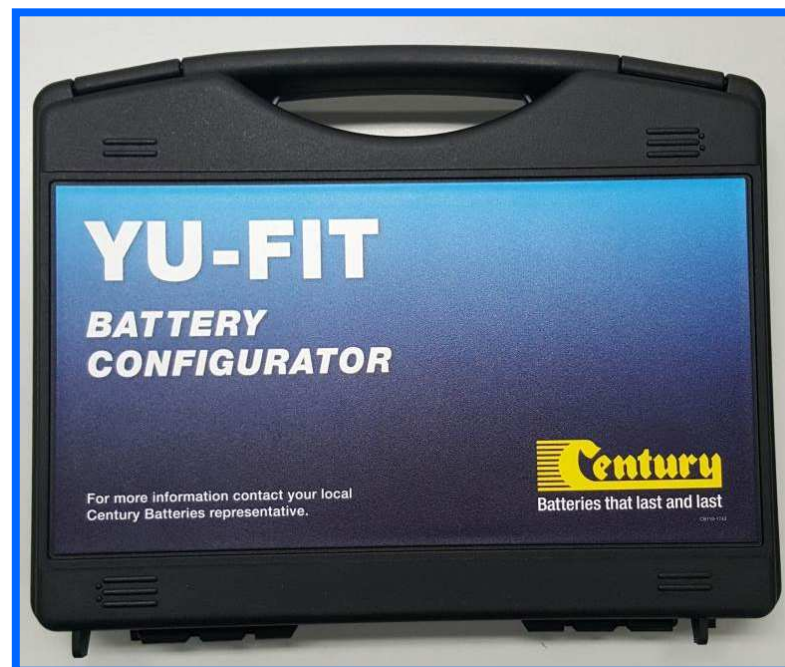
Yu Fit Battery Configurator

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

SIS Before using the Century Yu-Fit tool it must first be registered and the supporting application software downloaded.

SIS The supporting application software should be downloaded from:

www.centurybatteries.com.au

SIS Scroll to the bottom of the page or select from the menu options on the right hand panel.

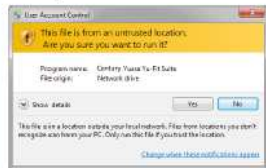**SIS** Click on the link and then select the 'RUN' option.

Yu-Fit Set up – Software Installation

Yu-Fit Set Up - Registration

Yu-Fit - Vehicle Update Procedure

Yu-Fit Update Procedure

1. Run the YU-FIT Suite Application
From the start menu, select 'Start' – 'All Programs' – 'Century Yuasa – 'Yu-Fit Suite'. (There will also be an icon installed onto your desktop).
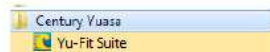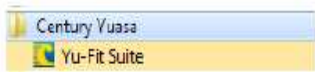
2. Select the option 'Get YU-FIT Updates'.

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.

REMEMBER
The latest list of vehicles supported by the Yu-Fit is available @ www.centurybatteries.com.au

ADVANCED TECHNOLOGY FOR IDLE STOP START SYSTEMS

Yu-Fit - Options & Help

Using the Yu-Fit Battery Configurator

YU-FIT
BATTERY CONFIGURATOR

YU-FIT
BATTERY
CONFIGURATOR

OK

ESC

Century
Batteries that last and last

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.
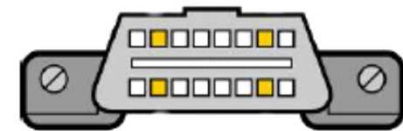
EOBD Location

Using the Yu-Fit battery Configurator

SIS Navigation around the menus and options displayed by Yu-Fit is controlled by a series of arrows and confirmation buttons as displayed.

SIS The tool also encompasses a mini USB port for connection to a PC.

OLED display

Arrows control the cursor around the screen

EOBD Diagnostic Plug

YU-FIT BATTERY CONFIGURATOR

ESC button cancels or returns from a menu

Mini USB port for connection to PC

OK button confirms the selected option

Century

Batteries that last and last

SIS ACTIVE

Using the Yu-Fit battery Configurator

Important Note

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

SIS   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

SELECT MANUFACTURER
- PEUGEOT
- SEAT
- SKODA
- ▸ VOLKSWAGEN
- VOLVO

SELECT FUNCTION
- ▸ VALIDATE BATTERY DISPLAY DATA

SELECT FUNCTION
- ▸ REPLACE BATTERY EXIT

SWITCH IGNITION ON...

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

Select **VALIDATE BATTERY** function

Select **REPLACE BATTERY** function

Await confirmation before switching on ignition

Select & Confirm Century as the correct battery data.

BATTERY VALIDATION CONCLUDED SUCCESSFULLY

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

DIAGNOSTICS
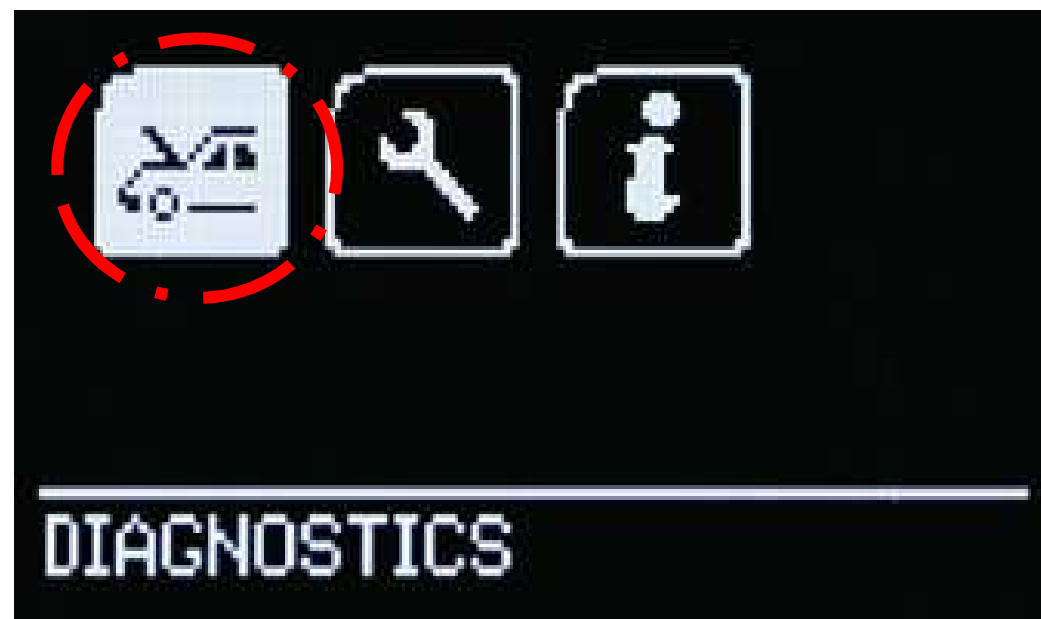
Option 1 – Step 2

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

Option 1 – Step 4

SELECT MANUFACTURER

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

SELECT MANUFACTURER

- AUDI
- BMW
- CITROEN
- PEUGEOT
- SEAT
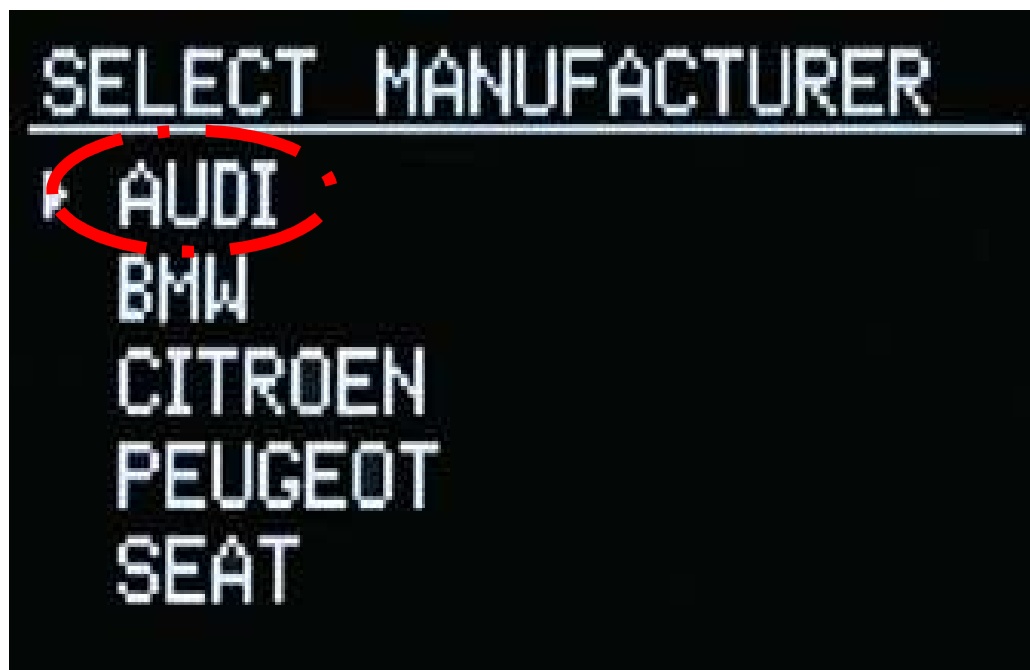
Option 1 – Step 5

TURN ON THE IGNITION

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

SWITCH IGNITION ON...

OK
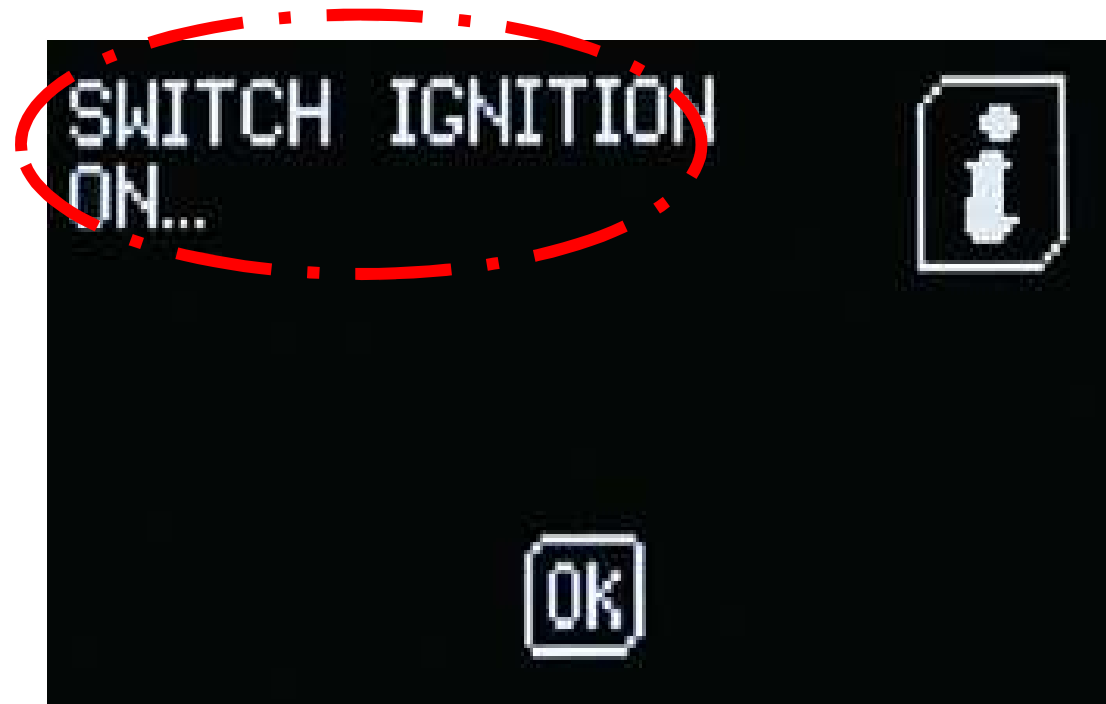
Option 1 – Step 6

INITIALISING

There will be a slight wait while the system is initialising

INITIALISING
PLEASE WAIT...

SELECT FUNCTION

Use the up & down arrows to select the
REPLACE BATTERY option and press OK
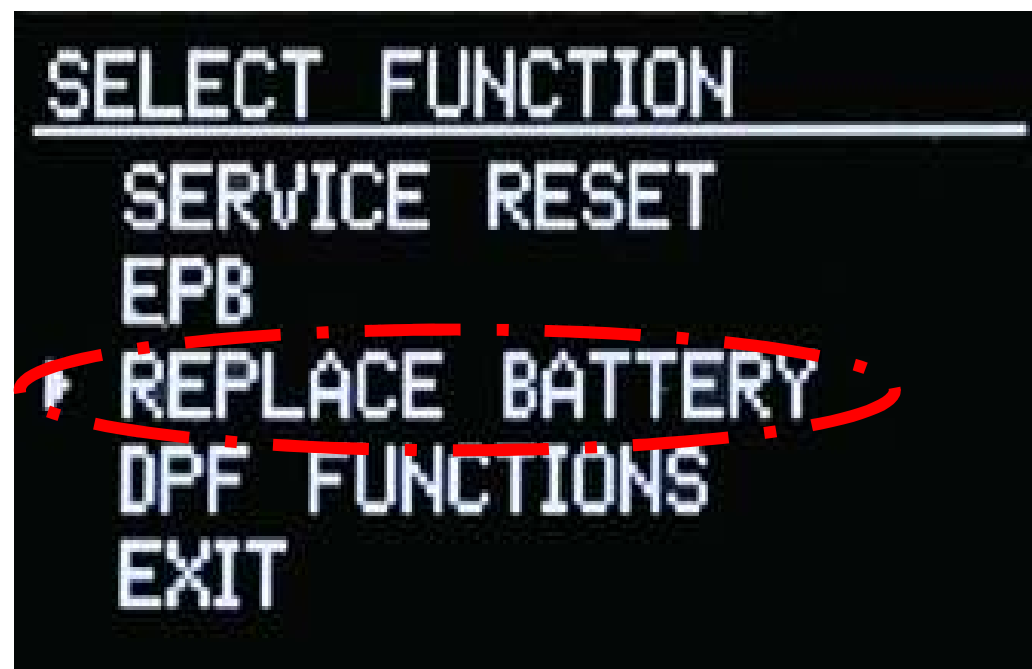
Option 1 – Step 8

SELECT FUNCTION

Use the up & down arrows to select the
VALIDATE BATTERY option and press OK
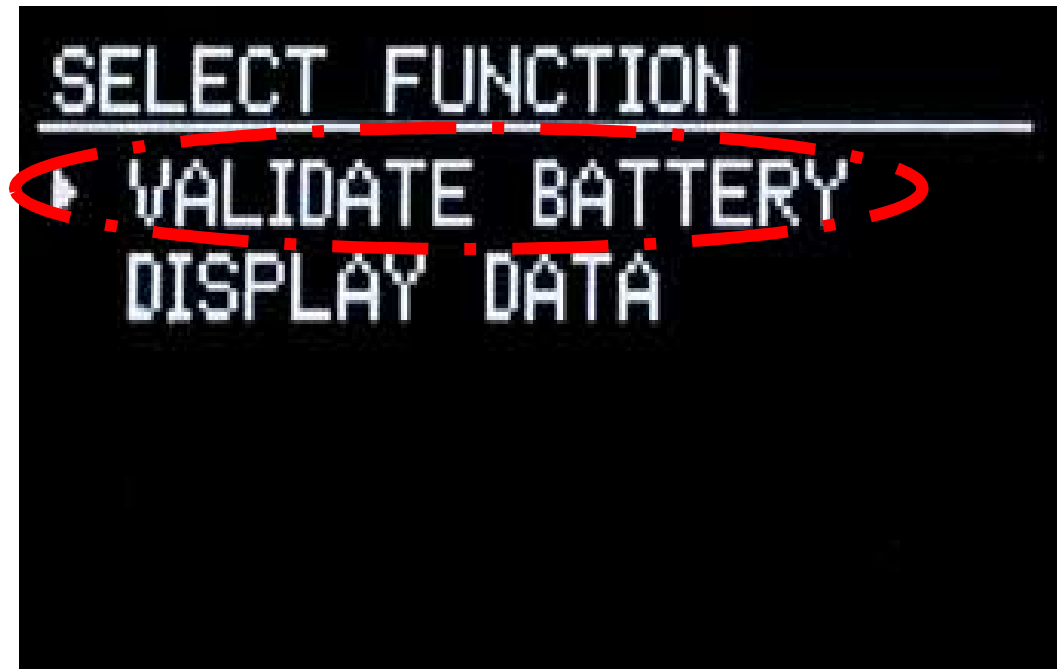
Option 1 – Step 9

INITIALISING

There will be a slight wait while the system is initialising

INITIALISING
PLEASE WAIT...

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


```
IS NEW BATTERY
EQUIVALENT TO THE OLD
ONE IN BOTH
TECHNOLOGY AND
PERFORMANCES?
    YES <OK>    NO <ESC>
```

Option 1 – Step 11

CODE RESETTING

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

CLEARING FAULT CODES, PLEASE WAIT
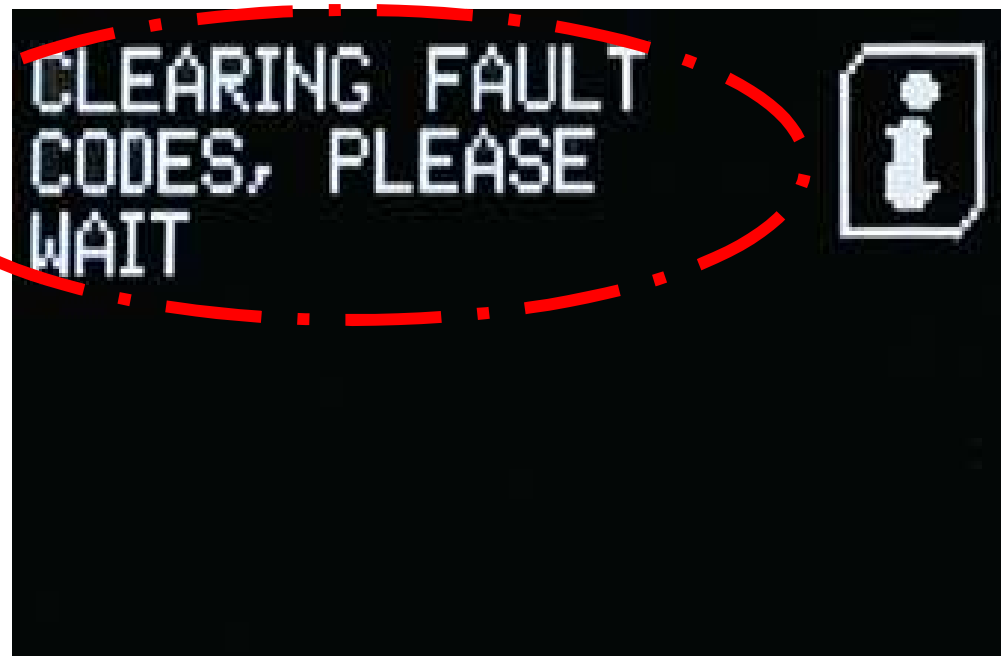
Option 1 – Step 12

BATTERY MANUFACTURER

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

```
BATTERY MANUFACTURER
  BANNER
▶ CENTURY
  CROMPTON
  EXIDE
  JCB, JCI
```

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

DIAGNOSTICS	**BATTERY MANAGEMENT**	**VEHICLE SELECTION**	**SELECT MANUFACTURER** PEUGEOT / SEAT / SKODA / ▸ VOLKSWAGEN / VOLVO
Select **DIAGNOSTICS** icon	Select **BATTERY MANAGEMENT** icon	Select **VEHICLE SELECTION** icon	Select **MANUFACTURER**

SELECT FUEL ▸ DIESEL / PETROL	**SELECT ENGINE SIZE** ▸ ALL	**SELECT TYPE** ▸ BATTERY MANAGEMENT	**SELECT MODEL** 3 SERIES (E91) / 3 SERIES (E92) / 3 SERIES (E93) / ▸ 3 SERIES (F30) / 3 SERIES (F31)
Select **FUEL**	Select **ENGINE SIZE**	Select **BATTERY MANAGEMENT**	Select **MODEL**

SELECT YEAR 2011 / 2012 / ▸ 2013	**SELECT SYSTEM** ▸ CONFIGURE BATTERY	**SELECT FUNCTION** ▸ VALIDATE BATTERY / DISPLAY DATA	IS NEW BATTERY EQUIVALENT TO THE OLD ONE IN BOTH TECHNOLOGY AND PERFORMANCES? YES <OK> NO <ESC>
Select **YEAR**	Select **SYSTEM**	Select **VALIDATE BATTERY**	**ALWAYS SELECT YES**

YU-FIT BATTERY CONFIGURATOR	BATTERY VALIDATION CONCLUDED SUCCESSFULLY [Ok] **VALIDATION COMPLETE**	Select & Confirm Century as the correct battery data.
		Wait for fault codes to be cleared & confirmation of configuration process

Option 2 – 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 2 – Step 2

BATTERY MANAGEMENT

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

BATTERY MANAGEMENT

Option 2 – Step 3

VEHICLE SELECTION

Select the vehicle bonnet raised icon and press OK

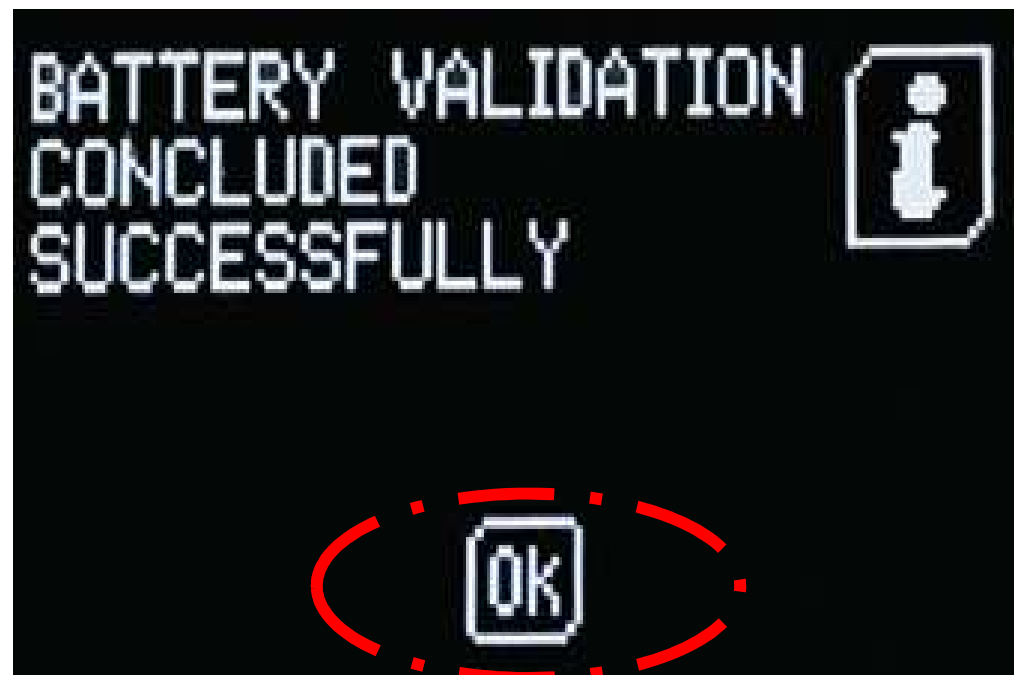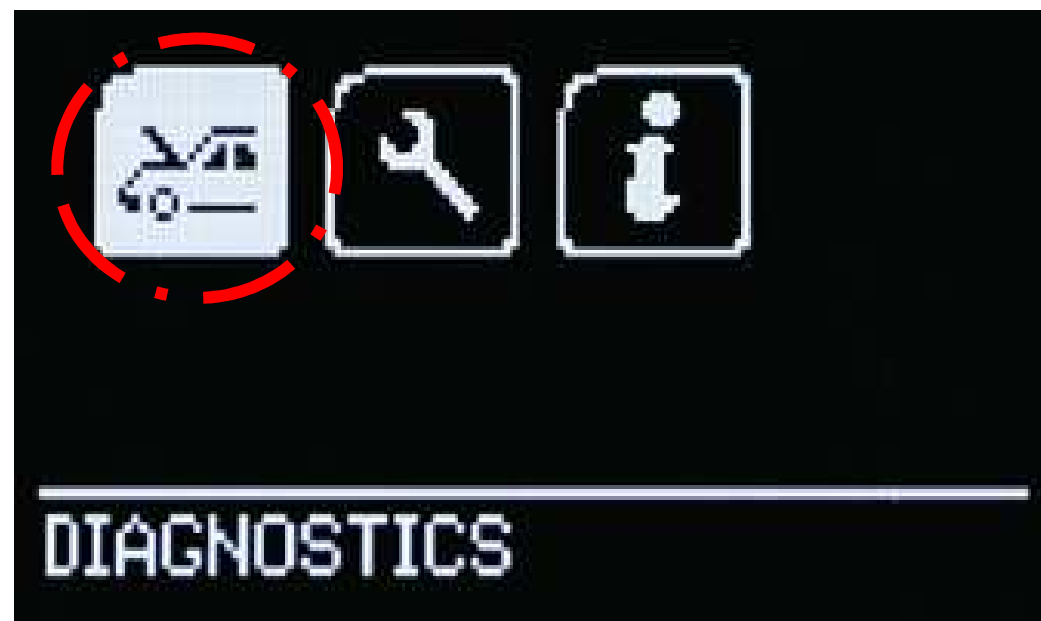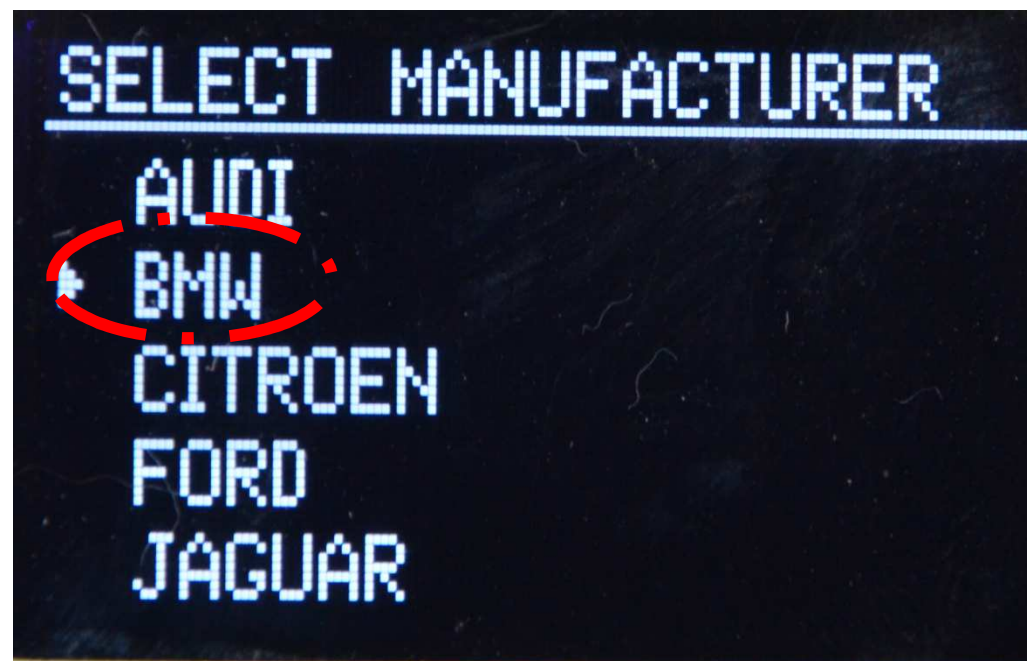VEHICLE SELECTION
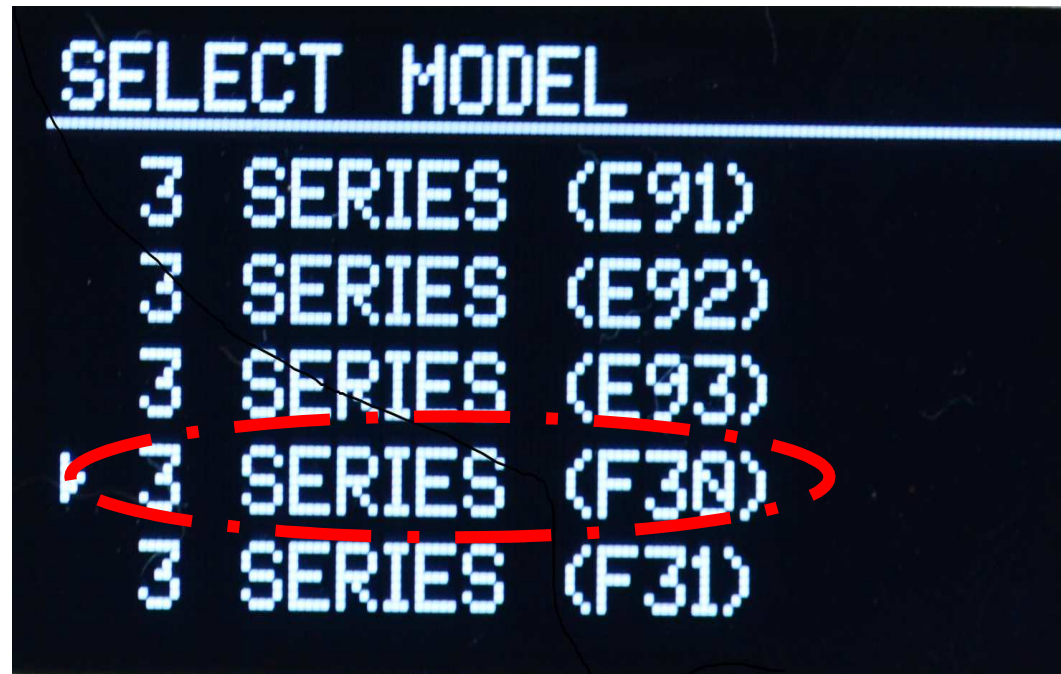
Option 2 – Step 4

SELECT MANUFACTURER

Use the up & down arrows to select the vehicle manufacturer then press OK
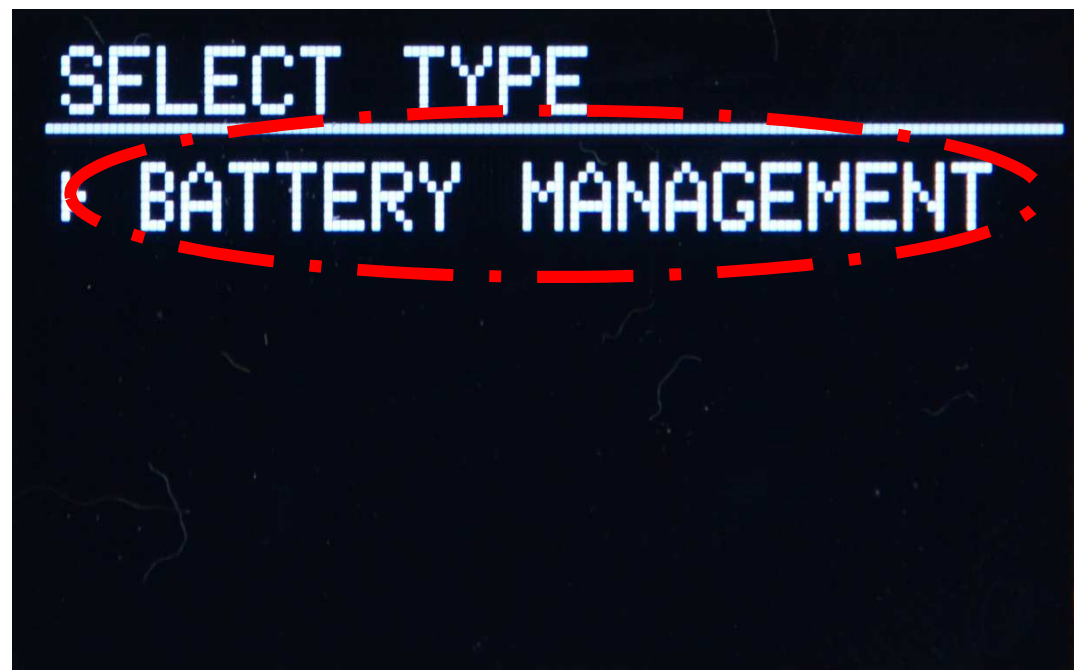
Option 2 – Step 5

SELECT MODEL

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


```
SELECT MODEL
  3 SERIES (E91)
  3 SERIES (E92)
  3 SERIES (E93)
► 3 SERIES (F30)
  3 SERIES (F31)
```
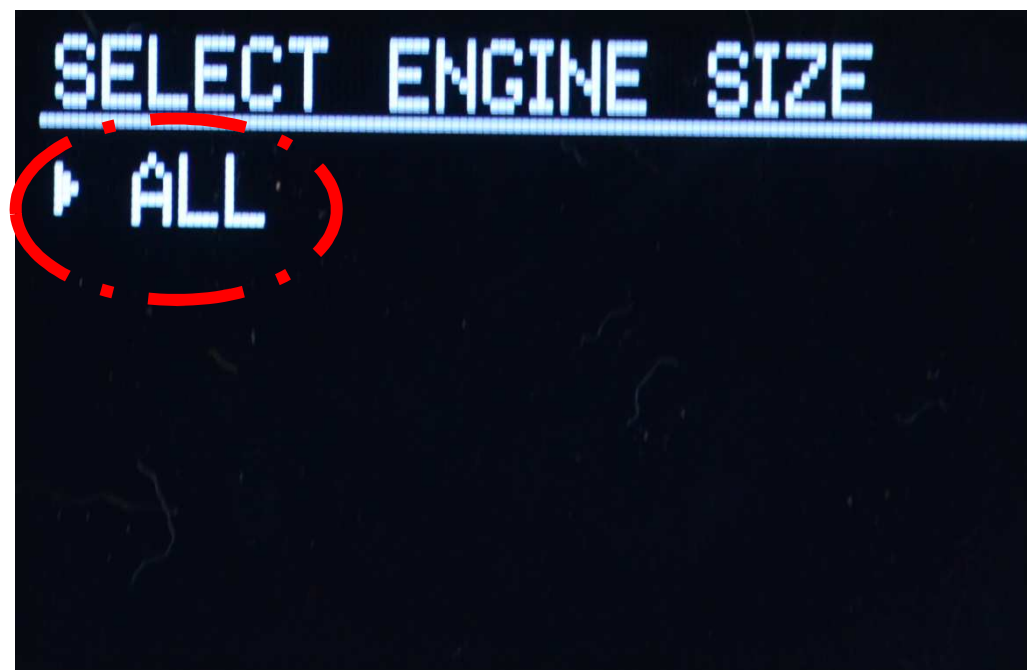
Option 2 – Step 6

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

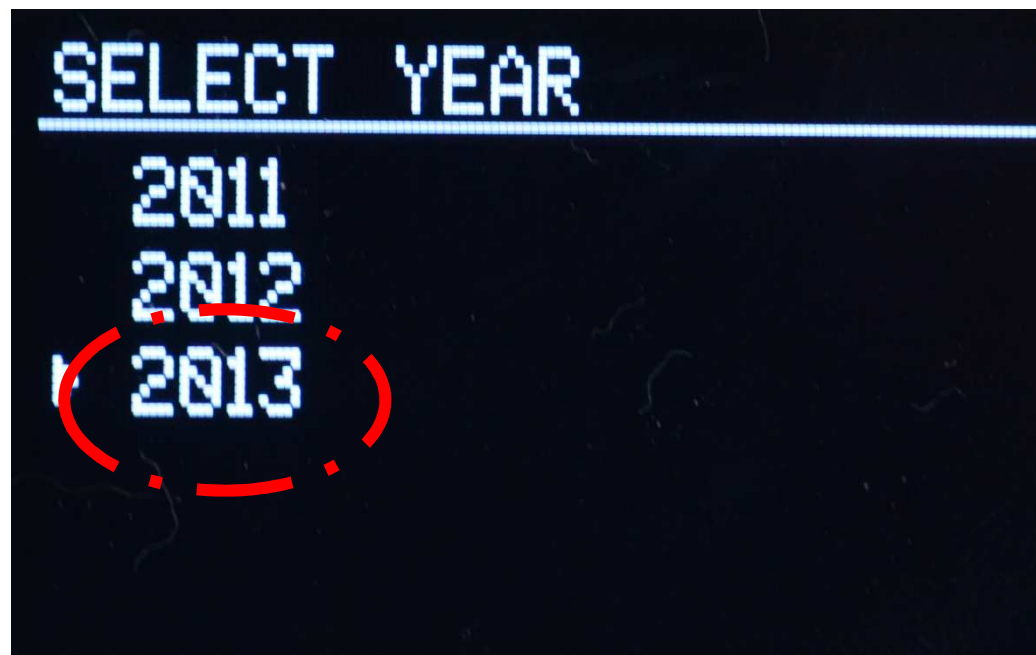## Option 2 – Step 8

SELECT FUEL

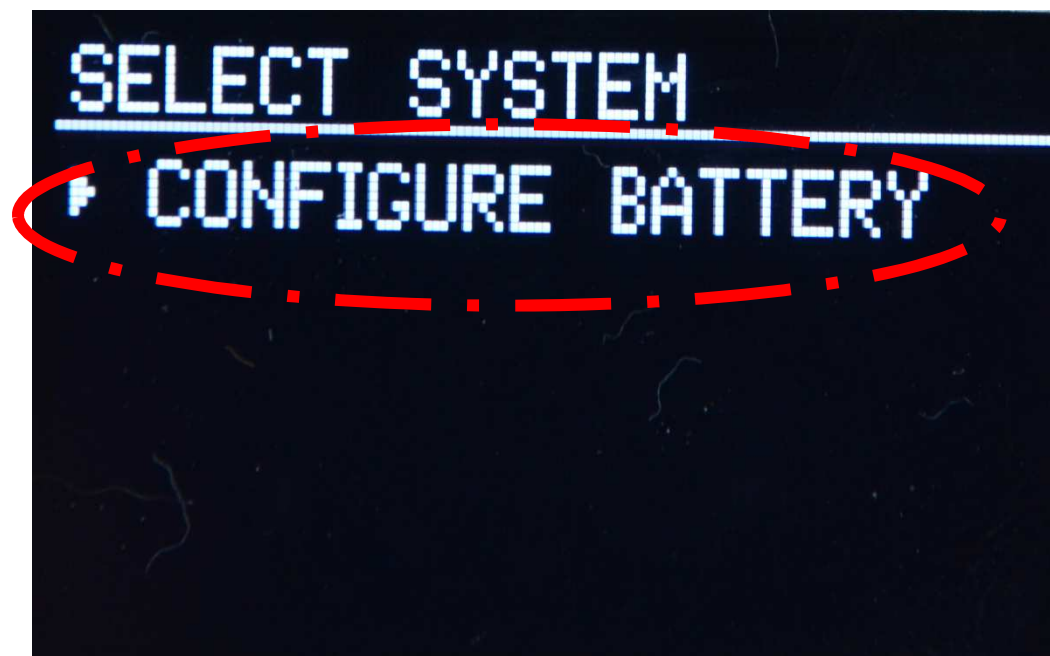Use the up & down arrows to select the fuel type and press OK

Option 2 – Step 9

SELECT YEAR

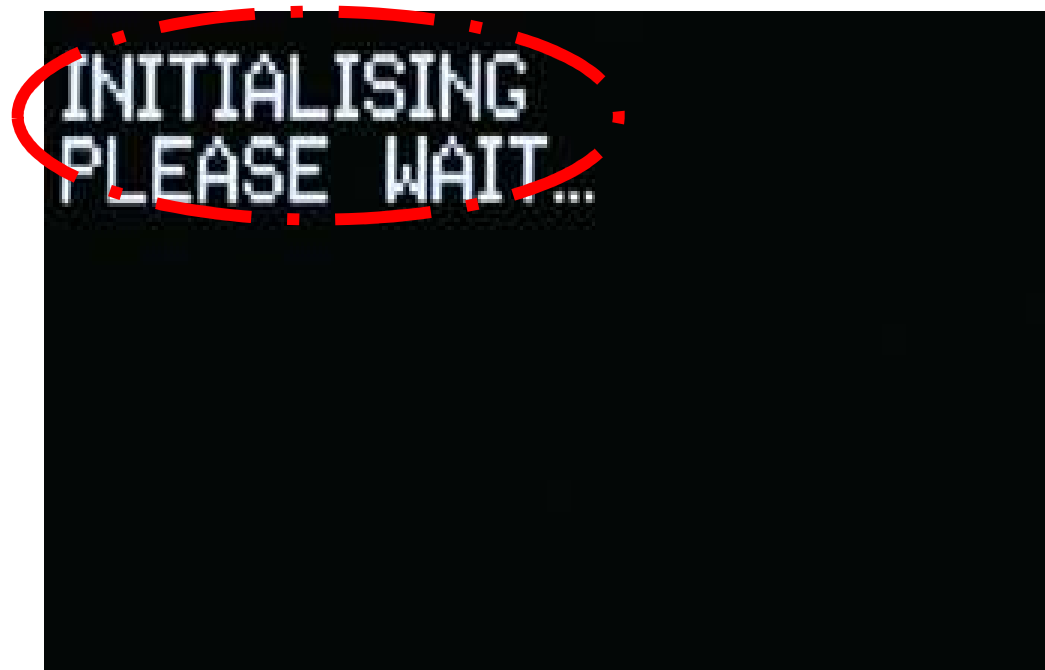Use the up & down arrows to select the Year of vehicle and press OK

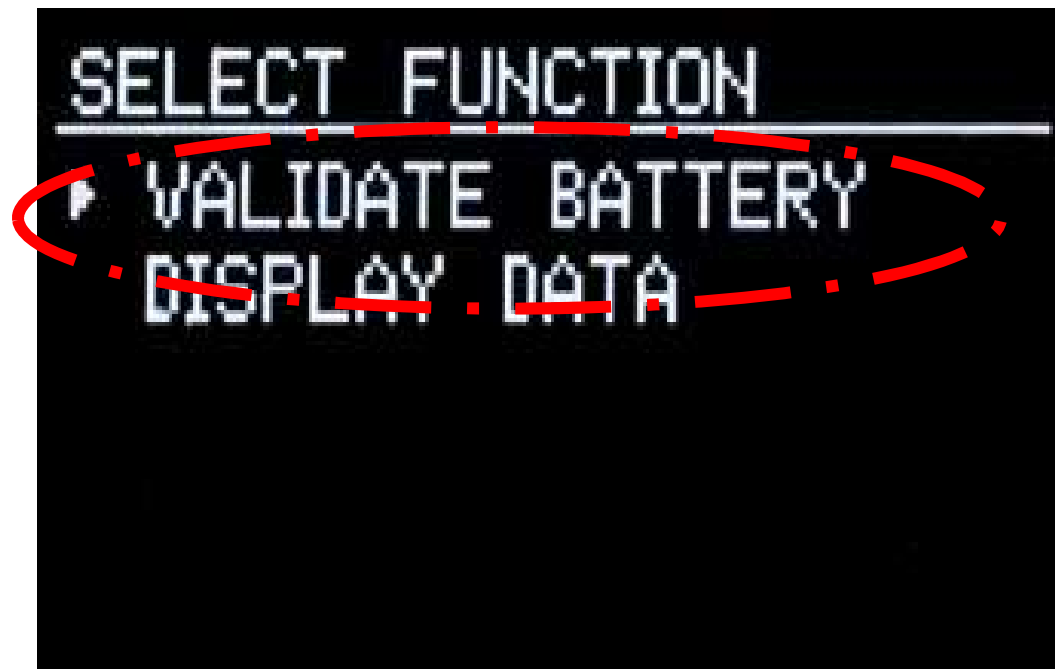**SELECT SYSTEM**

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

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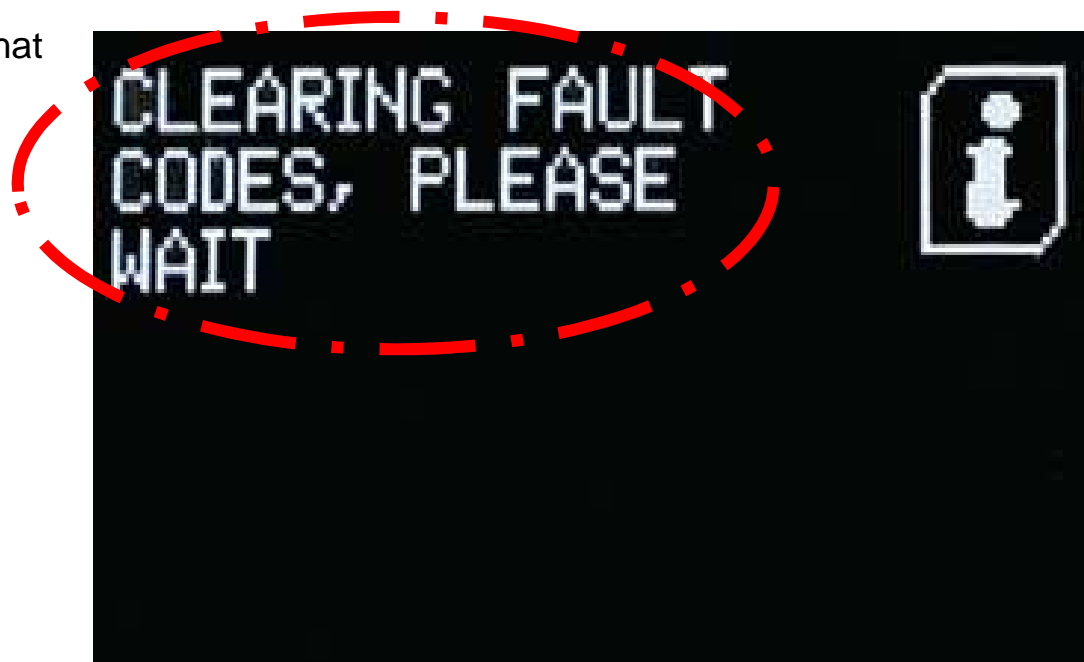
This should be the case if you have used the Century Battery Finder tool to identify the correct battery, so the answer should always be YES. Select YES and press OK

IS NEW BATTERY
EQUIVALENT TO THE OLD
ONE IN BOTH
TECHNOLOGY AND
PERFORMANCES?
YES <OK>   NO <ESC>
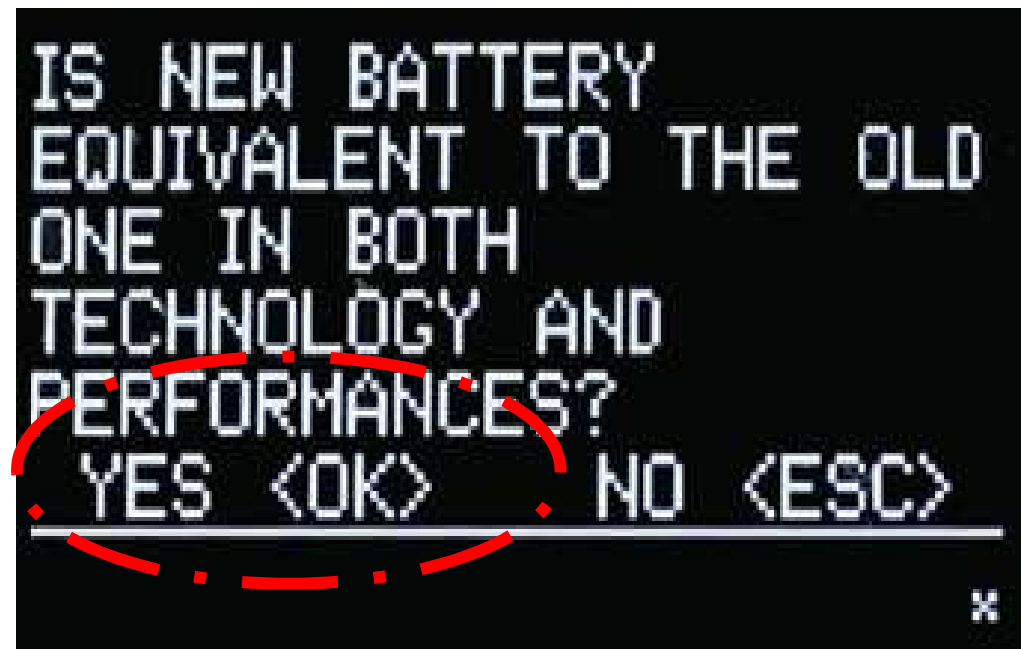
Option 2 – Step 15

CODE CLEARING

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

CLEARING FAULT CODES, PLEASE WAIT

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
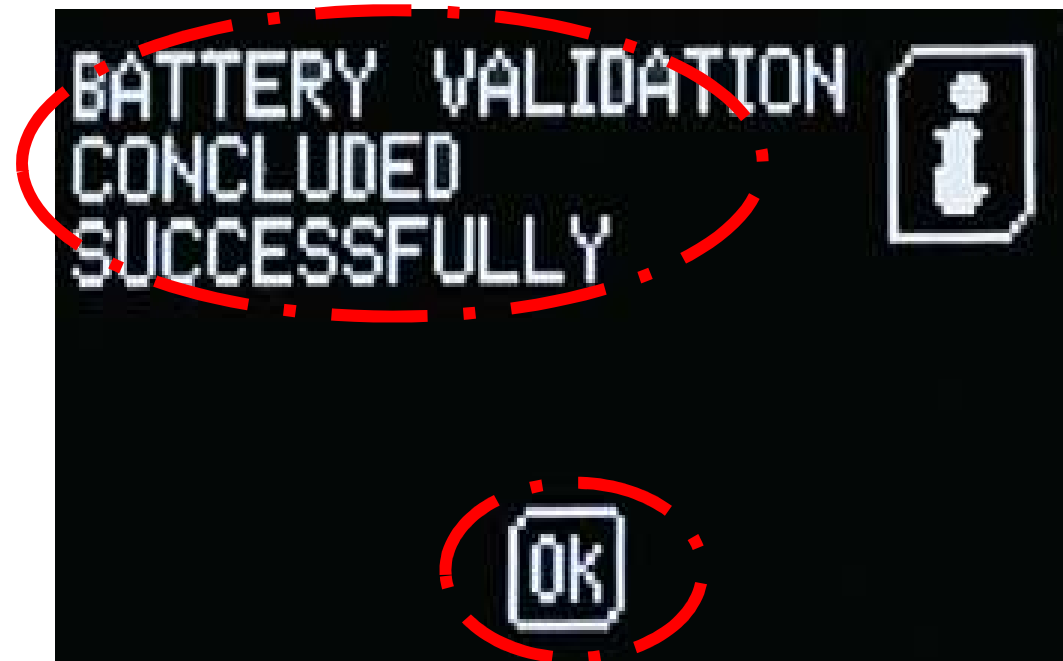


```
BATTERY MANUFACTURER
   BANNER
 ► CENTURY
   CROMPTON
   EXIDE
   JCB, JCI
```
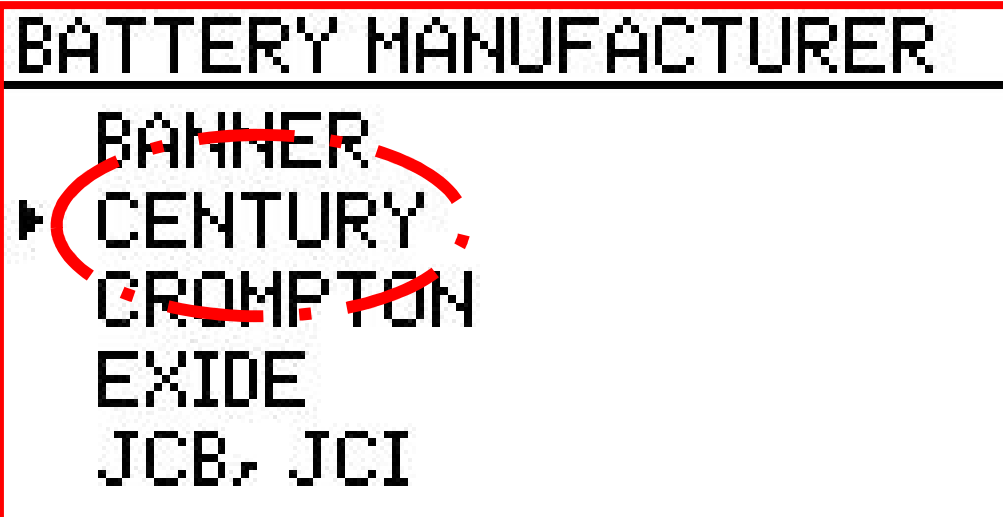
Option 2 – Step 17

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

www.centurybatteries.com.au

BATTERY REPLACEMENT IN IDLE STOP START VEHCILES (ISS)