



Diagnostics

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Automotive Diagnostics

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Smart: 33020100



Table of contents

Smart: 33020100	1
Table of contents	2
Introduction	4
Smart 33020100: Kit contents.....	4
Care and Usage.....	5
Do's	5
Don'ts	5
Connection Panels.....	6
Touch Screen	8
Powering Up	10
Set Up.....	11
General note.....	12
Screen Calibration	14
Setting the Time and Date	15
Help	16
Help: methods.....	16
Help: tutorials	16
Help: glossary	16
Help: instructions.....	16
Help: cables	16
Help: about	16
General Note about Help	17
Screen Layout and Menu Structure	18
Tests.....	20
Using Ignition test options.....	21
Using the Digital Multimeter.....	24
Introduction.....	24
Display screen.....	25
Volts.....	28
Using the Labscope	29
Overview.....	31
General Operation.....	31
Yellow Voltage Scale	31
Yellow Timebase Scale.....	32
Using the Sensor Simulator	34
Introduction.....	34
General Information.....	35
Warnings.....	35
Using the ACR (Advanced Code Reader) Function.....	36
Set-up	40
Controls.....	40
General Functions	40
Read Codes	40
Clear Codes.....	40

Actuators 41
Components 41
Shutting Down 41
APPENDIX 1: Smart Warranty conditions 42
APPENDIX 2: Service and Support 43

Introduction

Congratulations on your purchase of the SMART integrated tester: to ensure safe and correct operation please spend a few moments of your time reading the following instructions and becoming familiar with the contents, features and operation of the kit.

Smart 33020100: Kit contents

Table 1: Kit contents		
Smart kit contents: 33020100		
SMART unit	1	33010000
12 V dc Battery power cable (Red plug)	1	33011100
Mains adaptor/charger (Red plug)	1	33011200
Sensor simulator cable (Green plug)	1	33011000
Low Tension cable (Grey plug)	1	33010700
High Tension clips and cable (Yellow plug)	1	33010500
Cylinder 1 clamp and cable (Yellow plug)	1	33010400
Labscope lead (BNC to 4 mm plug) channel A & B	2	33010200
K-Type temperature thermocouple	1	30089200
Current clamp	1	30064500
SMART to PC software	1	33030000
SMART to PC link cable	1	33012100
2 way mini-bob x 1 3 way mini-bob x 1 4 way mini-bob x 1 5 way mini-bob x 1	Standard shrouded	1 30080000
2 way mini-bob x 1 3 way mini-bob x 1 4 way mini-bob x 1 5 way mini-bob x 1	Modified non-shrouded	1 30082000
Case with insert	1	33011900
Accessories case containing assortment of probes/cables	1	33012300
33010100	DMM Leads (pair)	
33012500	4mm patch lead red 2M	
33012600	4mm patch lead black 2M	
33012700	Croc clip red x2	
33012800	Croc clip black x2	
33012900	Insulation piercing probe black	
33013000	Insulation piercing probe red	
33013100	Hook probe red	
33013200	Hook probe black	
33013300	Accessory box (empty)	

Care and Usage

SMART is a sophisticated electronic product of approximately the same complexity as a laptop computer and as such should be treated with care.

If you drop it onto the floor you will almost certainly damage it internally.

On the other hand SMART is designed for the Garage Environment, unlike most laptop computers, and it has been extensively tested in a garage situation. If you remember the following do's and don'ts you will get many years of trouble free operation from your SMART.

Do's

- Always connect the power cable (RED) to the vehicle battery *even if the vehicle battery is flat.*
- Always pack SMART and all cables securely in the carrying case at the end of a job.
- Keep the cables as tidy as possible using the clamp bars provided.
- Put SMART on a stable surface whilst not holding it, *generally speaking an engine is not a stable surface.*
- Clean the screen with a soft dry, cloth, rubbing lightly.
- Press the screen gently, if there is no response remove your finger and touch again.
- Read the instructions and remember the HELP key and HELP menus, SMART contains a lot of useful help text.
- Charge the internal battery periodically with the charger provided.

Don'ts

- Do not operate SMART using the internal battery during normal use.
- Never try to operate the touch screen with a sharp or hard object (such as a screwdriver!) you will almost certainly damage it.
- Do not drop a hard object onto the screen since it could crack.
- Do not drop the Cylinder 1 clamp or the Current Clamp onto a hard surface as they both contain brittle components.
- Never clean the SMART screen with any kind of solvent or liquid.
- Do not place the SMART on top of the radiator or cylinder head of a hot engine.
- Never use SMART for measuring *directly* voltages in excess of 400V.
- Do not attempt to use the Sensor Simulator to drive actuators or coils, it is intended for low current only.
- Never connect to the LT or HT outputs of a vehicle ignition system other than with the supplied cables.

Connection Panels



Figure 1: Smart connection panel

Table 2: Top connection panel		
Top Panel	Colour Code	Description
12 V dc	Red	Battery power-supply lead (33011100), or Mains adaptor/Charger (33011200)
Simulator A + B	Green	Sensor simulator lead, incorporates channel 1 and 2 (33011000)
LT	Grey	Low tension, or Primary ignition, connection lead (33010700) Green to -ve and Yellow to +ve

HT	Yellow	High tension, or secondary ignition, pick-up. During CIS testing only the black clamp is used. For DIS testing both the black and red clamps would be used. (33010500)
Interchangeable		
Cyl. 1	Yellow	Single pick up clamp and cable used on number 1 Cyl. during CIS testing and alongside the black 'HT' clamp during DIS testing. (33010400)
Trans	Blue	No cable supplied. Ready for future expansion
Temp	K-Type	Temperature input from the supplied, or other, K-type thermocouple (30089200)
Lab B	BNC	Lab scope input for channel B (33010200)
Lab A	BNC	Lab scope input for channel A (33010200)
Diesel	BNC	Diesel Transducer input. No cable supplied, ready for future expansion.
ACR	Mini-DIN	Advanced code reader harness connection point to be used in conjunction with ACR application pods (optional extra: none supplied)
Start	Red	Initial power up button.

Table 3: Front connection panel

Front Panel	Description
Red/Black 4 mm sockets	Digital multimeter +ve and -ve inputs.

Table 4: Side connection panel

Side Panel	Description
PCMCIA slots	Under protective boot Ready for future upgrades

Table 5: Bottom connection panel

Bottom Panel	Description
RJ45	For PC connection using lead 33012100

Table 6: Back connection panel

Back Panel	Description
ACR pod connection slot	Accepts any blue or black ACR software pod (optional extra: none supplied)

Reset button	Recessed red button (left hand side under ACR pod housing) to be used only in the unlikely event of the SMART crashing during operation or boot up sequence. Once pressed, using a pen or similar, the SMART will be left ready to be re-started.
Manual power button	Recessed red button (right hand side under ACR pod housing) can be used to manually down power the SMART in the event that a soft power down is not possible. (Not present on earlier models)

Touch Screen

SMART has a sophisticated but robust touch screen that allows a flexible and powerful user interface by only having active controls available which are appropriate for the functions available at any particular time. The controls are formed by pictures or icons on the screen that resemble conventional buttons in some cases, in others, taking the form of active areas or hotspots, but in either case they are operated by touching lightly the area indicated.

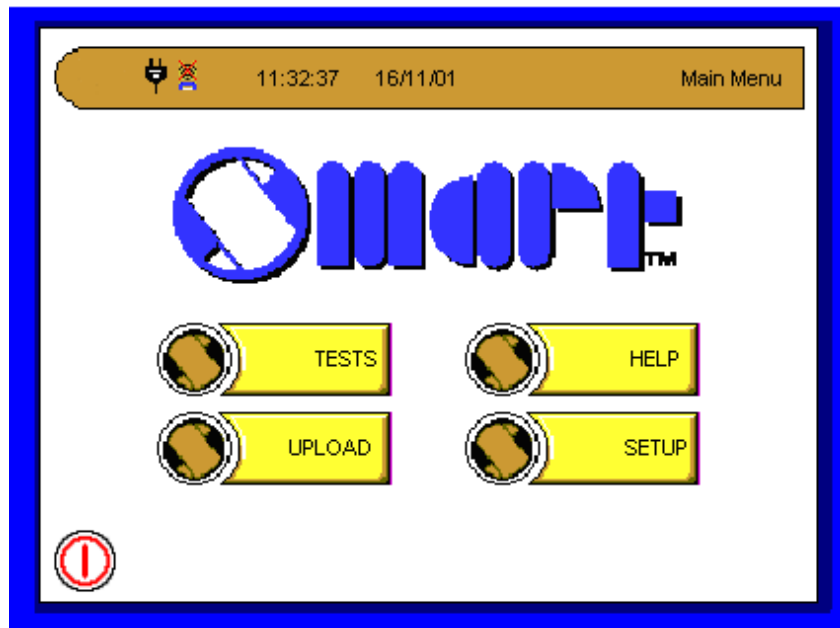


Figure 2: Typical touch screen layout

In fact, the action will not take place until you touch and remove your finger, which may seem strange at first but don't worry, you will soon be accustomed to it. As there is no physical movement within a touchscreen an acknowledgement of touch is given by an audible tone or change of icon colour, once again this seems natural after only a few minutes of use.

It is important to press the screen lightly, but positively, do not press too hard or stab at the screen, and do not forget that it is when the finger is removed that the action is completed.

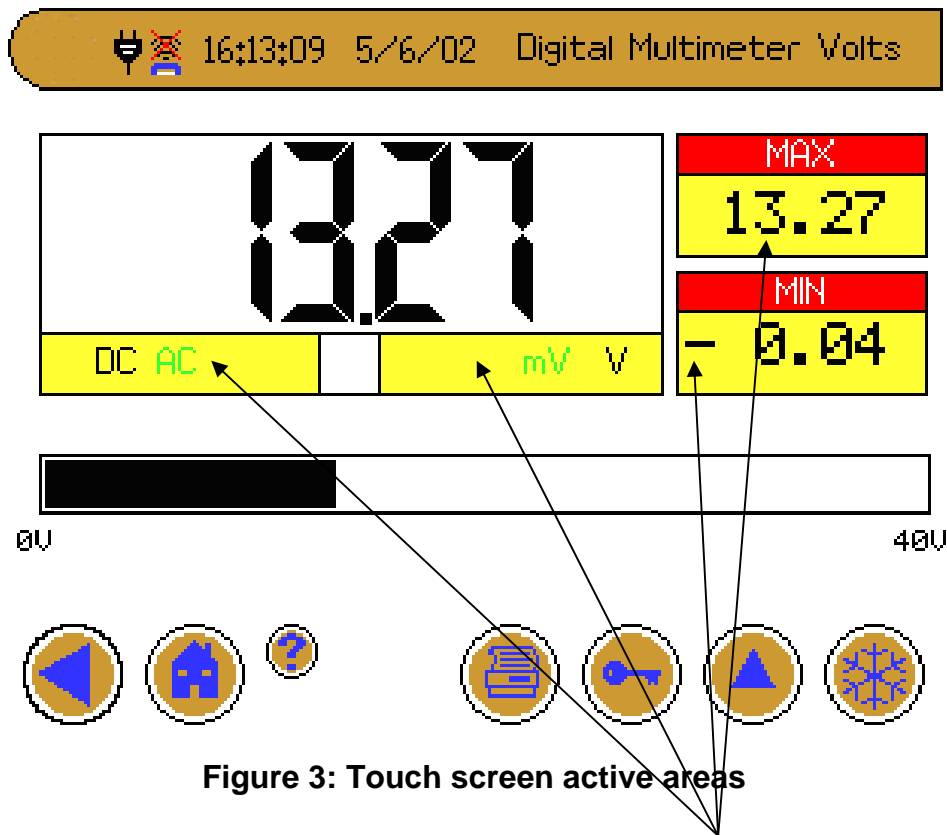


Figure 3: Touch screen active areas

Generally speaking, it is the areas on screen that are **YELLOW** that are *active* and respond to touch and we have tried to make their function obvious by their relative position to the task they perform.

Powering Up

SMART is capable of functioning in a number of ways of varying complexity depending on what level of testing you are trying to achieve. The number of connections you therefore require at any one time will change, from just a couple, to the maximum that are available, although we cannot think of a situation where all would be needed at the same time.

We have tried to prevent incorrect cable connection to the SMART unit by careful selection of pin configurations alongside the obvious colour coding on the unit and cabling.

To begin testing you must provide the SMART '12 V dc' socket with power from the vehicle battery using the relevant lead (Red connector), remember, the mains adapter is for unit charging and off vehicle use only. Also note, the internal battery of the SMART is not designed to provide power during testing. Now press the 'Start' button, a beep will be heard followed by some clicks and a further beep. After a brief (approximately 20 second) boot up process you will see a picture of the SMART on the screen with a progress bar above, once this progress bar has completed its sweep you will automatically enter the following opening menu screen.

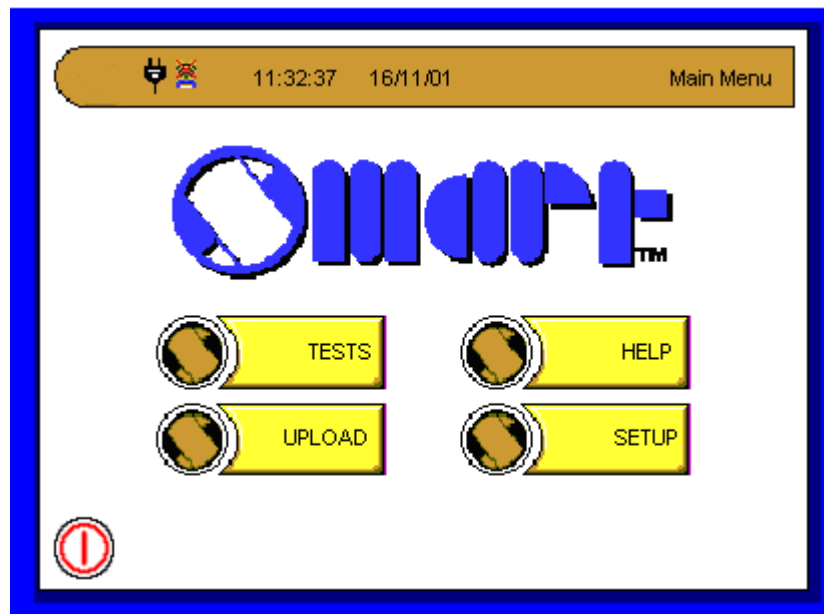


Figure 4: Opening menu screen

Set Up

Prior to the initial use it is advised that this option is entered, to do so touch the 'Set up' icon that will bring up a sub-menu displaying

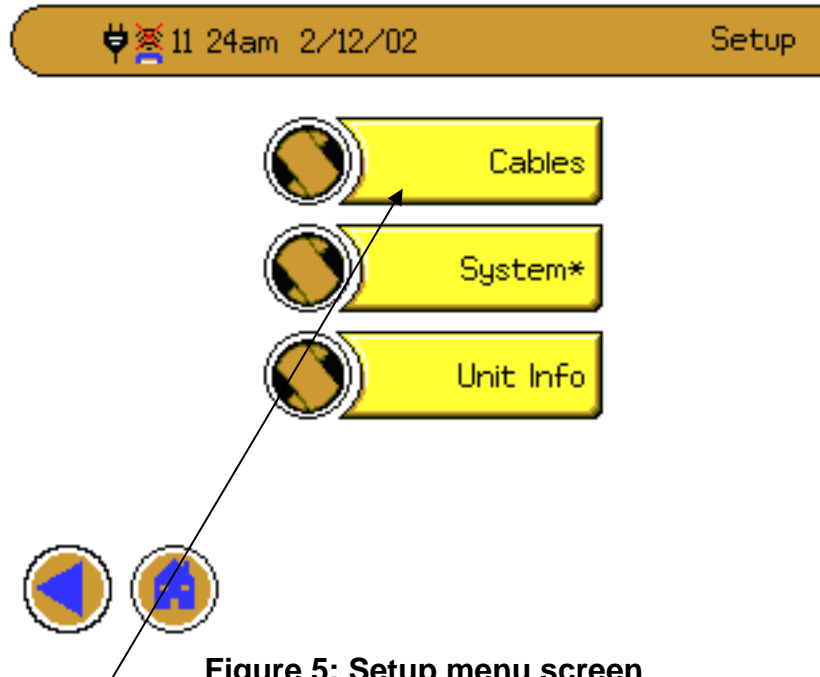


Figure 5: Setup menu screen

Touching the 'Cables' icon would reveal a top view of the SMART.

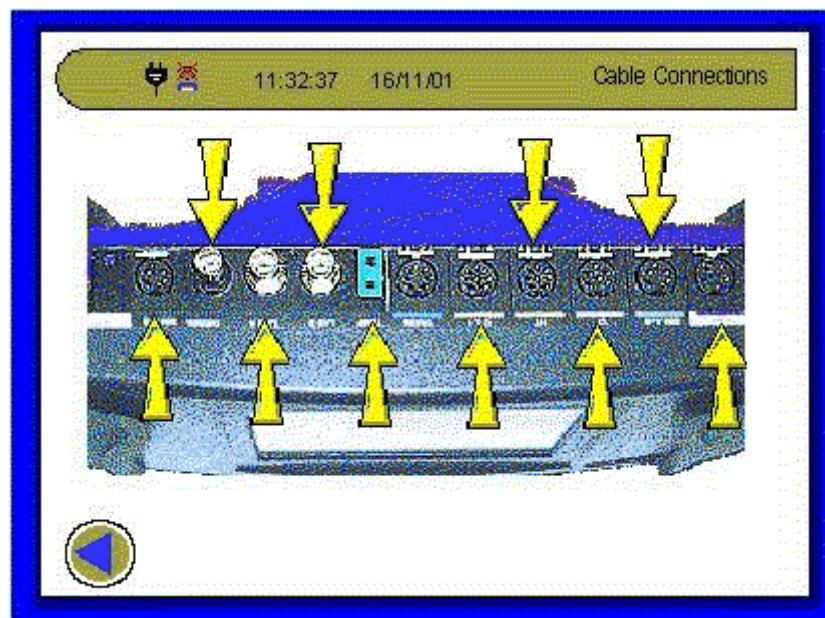


Figure 6: Top panel connections

Touch any of the **arrows** to see a picture of the cable required for the relevant socket.

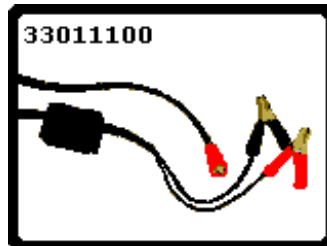


Figure 7: Cable connection pictures

Press  to close this window and  again to exit the help screen.

General note



When touched will take you back page by page.



When touched will take you back to the 'Home' menu page.

Touching the **'System'** icon would reveal a further menu as follows:

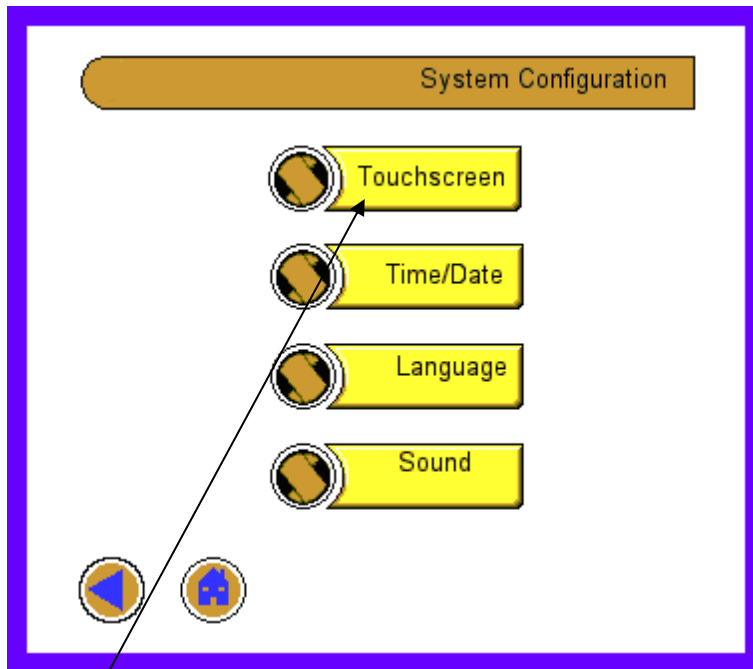



Figure 8: System Menu

Touching the **'Touchscreen'** allows the screen contrast to be altered and set.

Touch **Contrast** in the next screen and adjust

using the up  and down  icons.

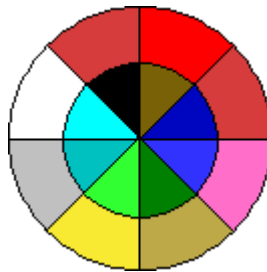



Figure 9: Colour contrast and range

Press  to confirm the setting.

Screen Calibration

This process is only required if you update your software from the Internet or a CD. When you first power up or if you select the Calibration function, you will be prompted with the following screen.

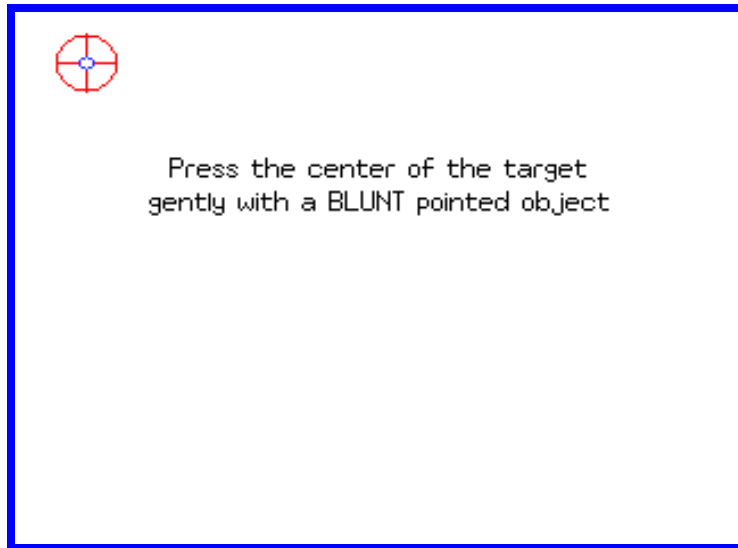


Figure 10: Screen calibration start

Use a pen or a blunt pencil and gently touch the small blue circle in the target.

DO NOT USE A SCREWDRIVER OR OTHER SHARP METAL OBJECT.

Follow this procedure for the 4 corners of the display and then finally in the centre at which point you should see the following screen.

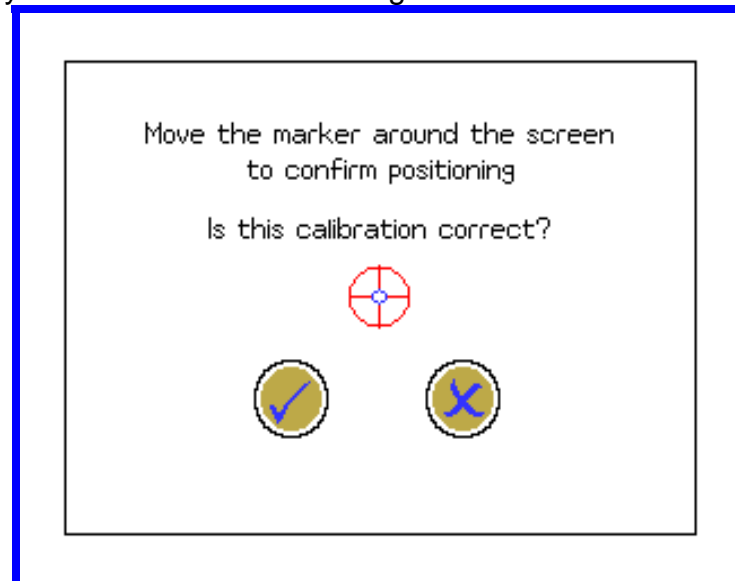


Figure 11: Screen calibration finish

If the calibration fails for any reason, don't worry just repeat the procedure again.

Setting the Time and Date.

Select Time/Date and you will see the foillowing screen.

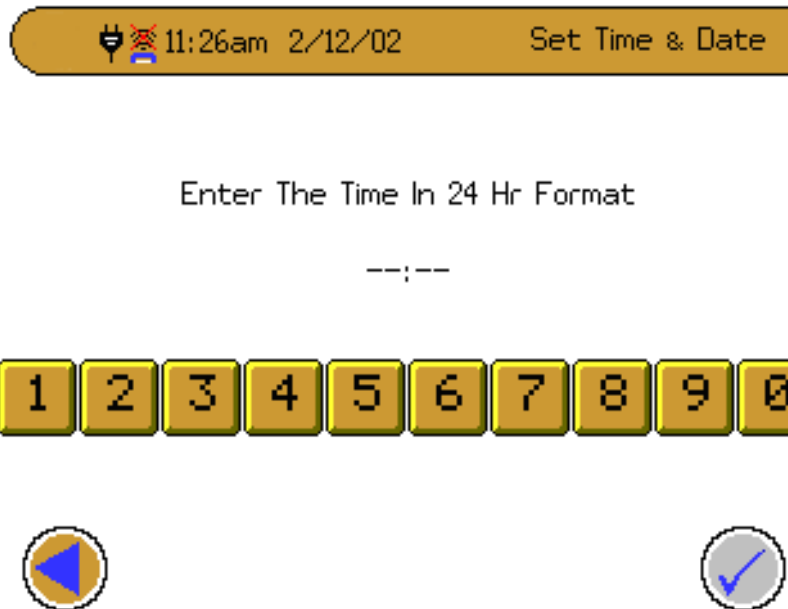


Figure 12: Enter time


Touch the yellow numeric keys to input the current time and then touch . Now input the current date in the same way.



Figure 13: Enter date

Touching the **Language** icon allows the language to be changed

Sound allows a sound test to be done.

Touch anywhere on screen to close.

Help

Tour around the various 'Help' screens following the on screen prompts by entering any of the following headings:

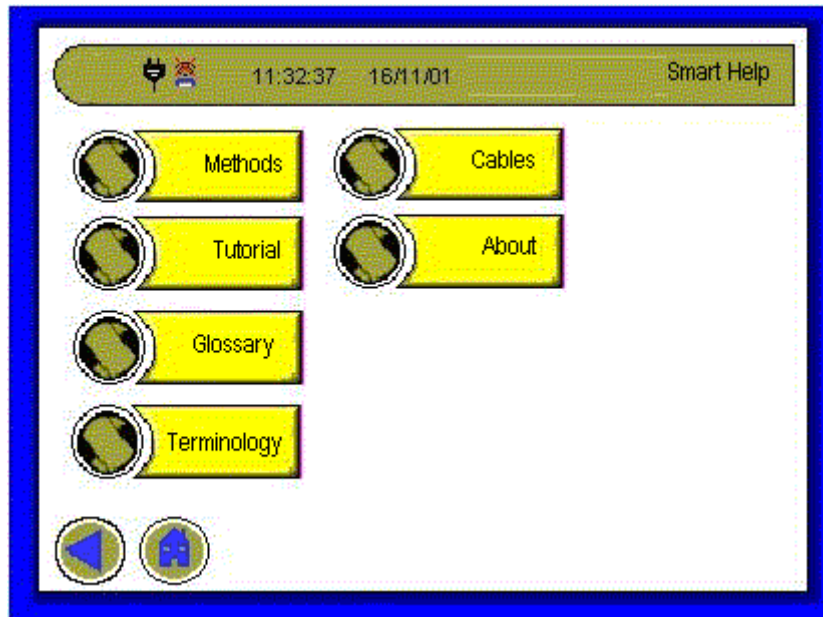


Figure 14: Help menu screen

Help: methods

This series of pages gives a general description of methods that can be used to test vehicle systems from mechanical systems to electronic control systems.

Help: tutorials

This series of pages give some background knowledge about vehicle systems.

Help: glossary

This index gives a brief summary of the meaning of abbreviations, technical terms, ISO standards for wiring.

Help: instructions

This section provides a short version of these instructions.



Help: cables



This sections provides a guide to the cables and their connections

Help: about

This section is an acknowledgement for all the engineers and specialists that have contributed to the Smart.

General Note about Help

 and  Moves the text line by line

 and  Moves the text page by page

Each section is listed and followed by this symbol  .

For example:

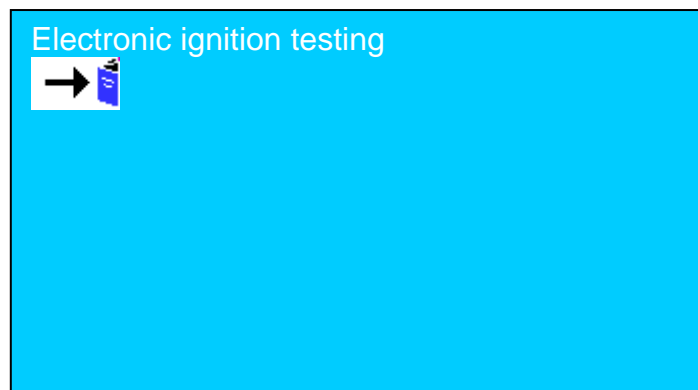


Figure 15: Help section symbol

Screen Layout and Menu Structure

The following page shows the overall layout of the screen menu choices. This is a general guide to the links between each screen and the menu choices.

Remember that you can always step back one screen at a time or even jump to the first page in one step by using the buttons on the bottom row of each screen.

The diagram shows where “images”, “text” and “choices” arise from selection of a particular menu button. Some screens jump from one menu area to an adjacent area, for example choosing Meter in Analyst will result in the same menu as Meter chosen from Basic.

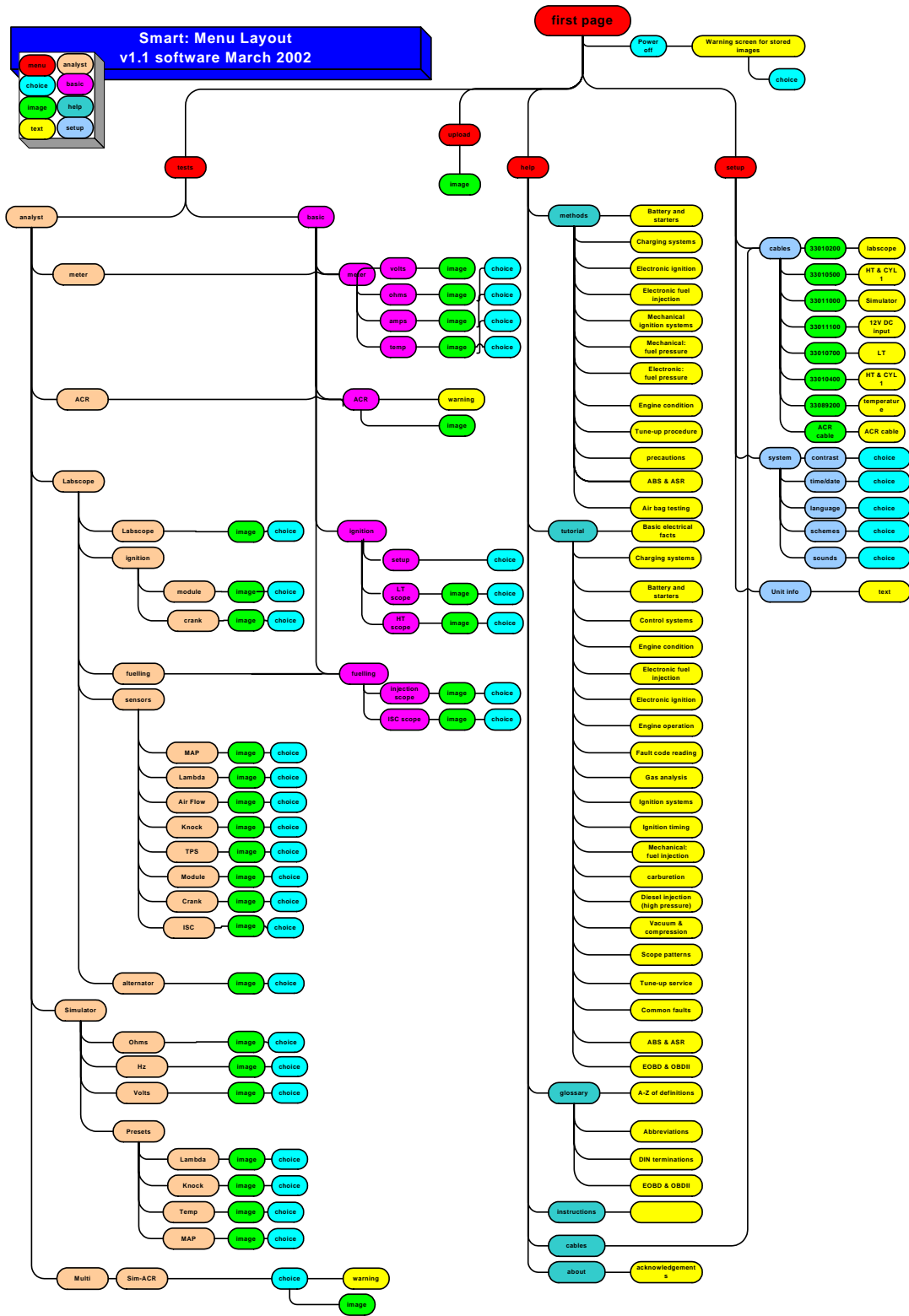


Figure 16: Menu layout

Tests

Touching the 'Tests' icon from the home page allows the user access to the various diagnostic functions incorporated within the SMART. Initially a sub menu will be displayed as follows:

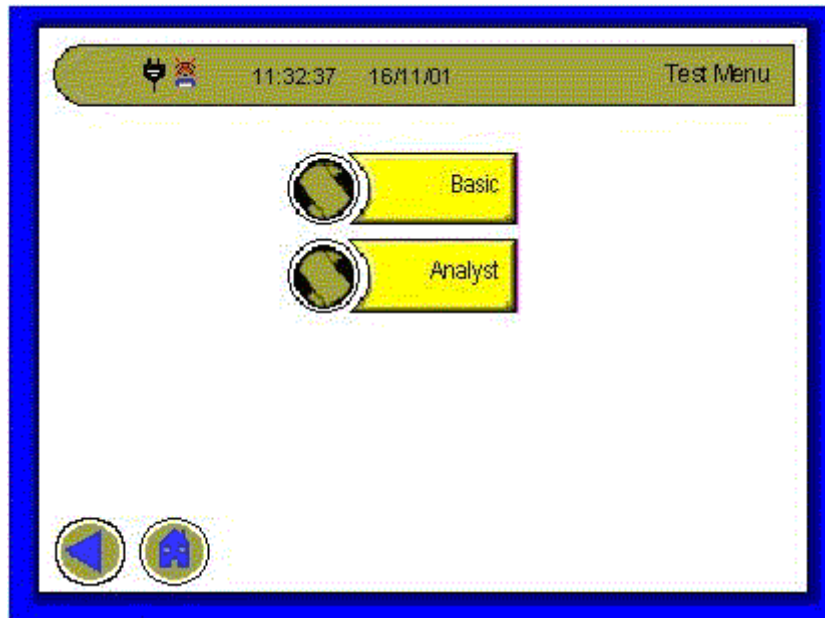


Figure 17: Test menu screen

As we have already explained, the SMART is capable of operating at many different levels of complexity, allowing users of all abilities to achieve the test results that they have set out to. This is why we have split the options into two groups of tests, 'Basic' and 'Analyst'.

Following the 'Basic' test route allows you to achieve these results often within preset or outlined guidelines, whereas the 'Analyst' route gives the more experienced technician access to more involved test procedures, where an advanced level of understanding in the use and set up of a Labscope is required.

Generally the connections and control of the various test options are self explanatory, but special mention must be given to the Ignition System connections especially where a DIS (Distributorless Ignition System) is concerned.

Using Ignition test options

SMART uses an intelligent process for testing ignition systems that means that triggering of the ignition scope will take place from either LT or HT signals. Priority is given to LT if present but perfectly good scope traces and HT measurement can be obtained by connection to HT only. Accessibility to ignition leads on modern vehicles is an increasing problem but the flexible approach taken by SMART will help you to cope better with difficult situations.

SMART uses a novel strategy for DIS, treating a multi-cylinder engine as a number of 2 cylinder engines and testing them one at a time. Each coil in a DIS system has an LT signal and a pair of HT leads of opposite polarity (+ and -) and these coils are largely independent of one another and can be tested independently. SMART requires that you connect a Red clamp to the HT(+ve) and a Black clamp to the HT(-ve). To help you find out which is which there are a series of indicators at the top of the scope screen which show you the quality of the signal from the clamps as follows.

Traffic Light definitions for Conventional Ignition systems:		
	GN101	Good HT signal received
	GN102	HT Tracking - bad sync
	GN103	No HT signal received
	GN115	Good LT signal received
	GN116	LT Tracking - bad sync
	GN117	No LT signal detected
	GN120	Cylinder reference signal detected
	GN121	Temporary loss of cylinder reference signal
	GN122	Cylinder reference signal not detected
Traffic Light definitions for Distributerless Ignition systems:		
	GN105	Good HT+ signal received
	GN106	Intermittent HT+ signal received
	GN107	No or very poor HT+ signal received
	GN110	Good HT- signal received
	GN111	Intermittent HT- signal received
	GN112	No or very poor HT- signal received
	GN115	Good LT signal received
	GN116	LT out of phase with one or more HT signals
	GN117	No LT signal detected
	GN125	LT/HT synchronisation good
	GN126	LT/HT synchronisation not possible
	GN127	HT+ and HT- signals out of phase
	GN120	Cylinder reference signal detected
	GN122	Cylinder reference signal not detected

Table 7: Ignition connection signals

Each of the engine analyser screens has a set of indicators that show the status of the engine connection. These indicators have three states, red, yellow and green, and for this reason are known as the traffic light indicators. The indicators available, and the way they in which they work, varies according to the ignitions system selected. The function of the traffic lights is to assist the operator when getting connected and to provide a simple visual reference to the quality of the connection and the signals available.

Take the Black Clamp and attach it to any spark plug lead and try each lead until you get a green or a yellow indication. Now do the same with the Red Clamp, at this point you should have both HT+ and HT- indicators showing Green or Yellow. Finally, attach the CYL 1 clamp to the same lead as the Black Clamp; you should now have all indicators Green (except LT).

On the screen you will have a stable HT trace for HT+ or HT- and you can flip between the 2 by pressing the button at the bottom of the screen. You will have to repeat this procedure for the other coils on the vehicle, if you already know the numbering and polarity of the spark plug leads then you can connect up straight away.

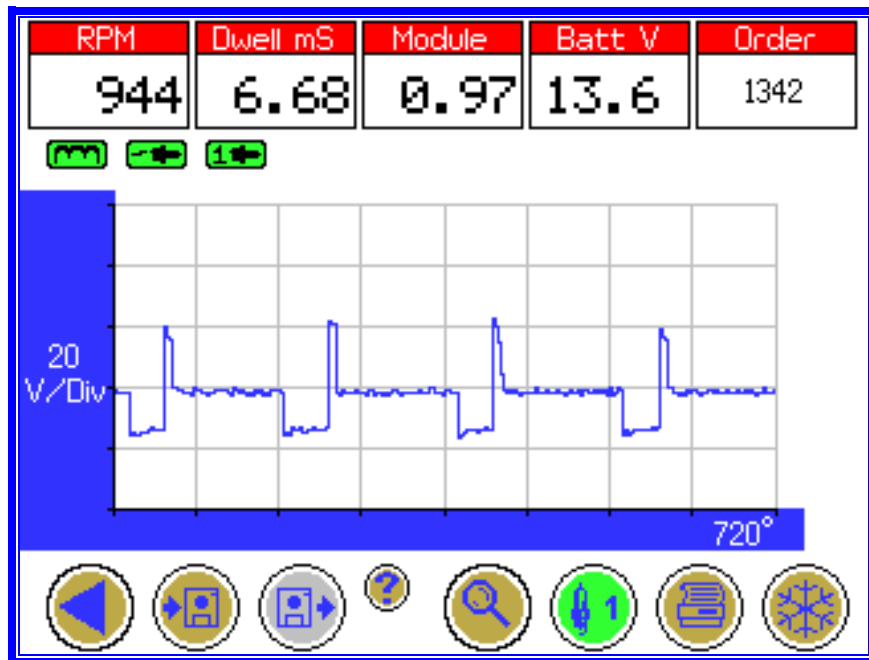


Figure 18: Typical LT ignition trace all cylinders.

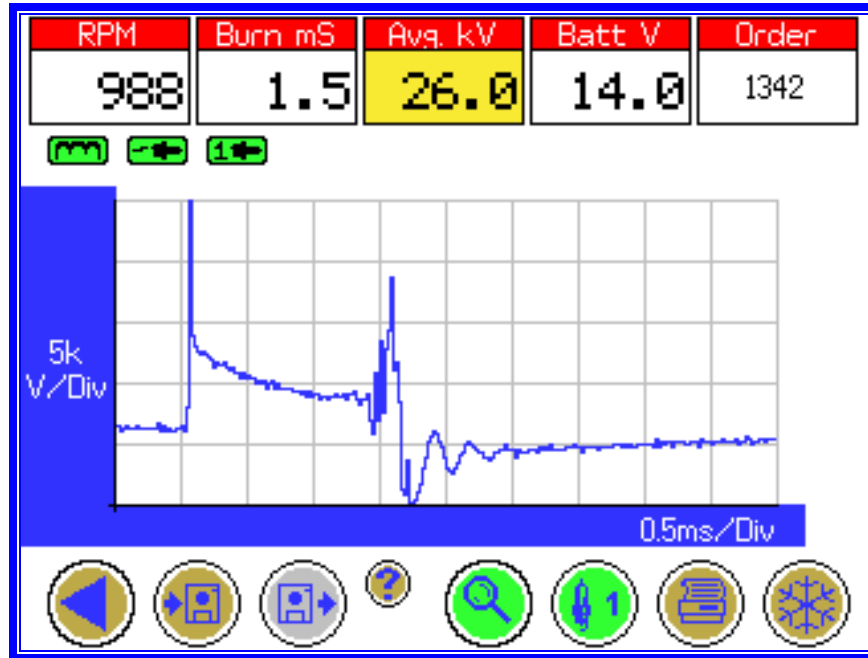


Figure 19: Typical HT ignition trace for a single cylinder (zoom)

Notice that the HT box is in yellow signifying that it is an active area which allows you to select two different types of reading. The first, called “Av kV” for average kV has been scaled to agree more closely with conventional wisdom. The second, called “Peak kV”, is the absolute maximum value detected by our input circuit and will be anything up to twice the value of “Av kV”. Press the yellow area to switch between the two values. What you use depends on your personal preference since in most cases it is the comparison of values between cylinders which is of most significance rather than the absolute value of an individual cylinder. Indeed, many experts would say that the value of the spark-line and the duration of the burn are the most significant parameters together with the detailed shape of the trace.

Using the Digital Multimeter

Introduction

By following the 'Test' route from the SMART main menu through to either the 'Basic' or the 'Analyst' mode you will find the sub-heading of 'Meter', once entering this section you will be able to select from one of four further options:

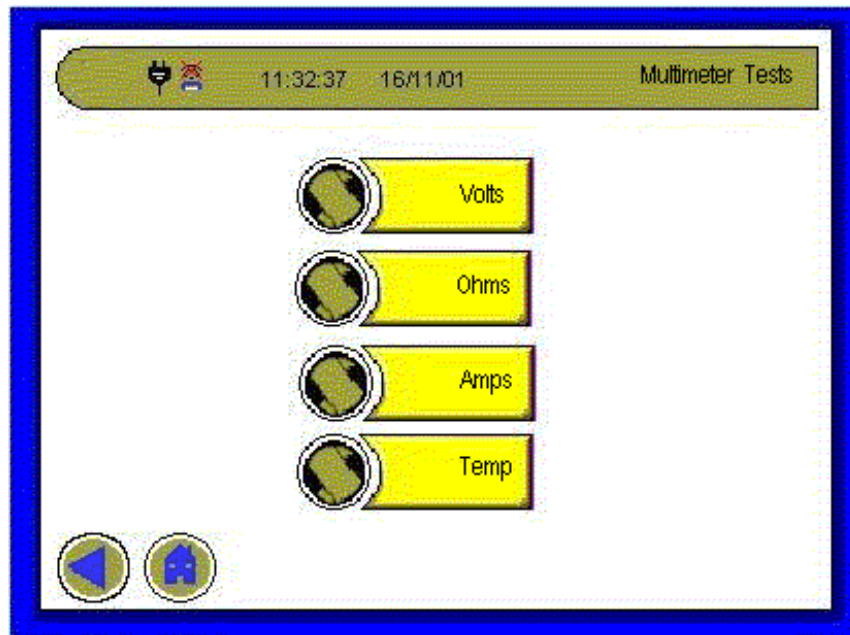


Figure 20: Multimeter Tests screen

This test function allows conclusive testing to be achieved with a minimal amount of user set-up, with all* of the test inputs being made via the twin 4 mm sockets on the front fascia of the SMART unit, using standard multi-meter test leads (supplied) or Amps clamp (supplied).

***Note:** Temperature measurement inputs are made through the 'K' type socket found on the top panel of the SMART unit.

Display screen

Main display area

This area will display the value of input at any given time; therefore values can fluctuate quickly as the input level varies.

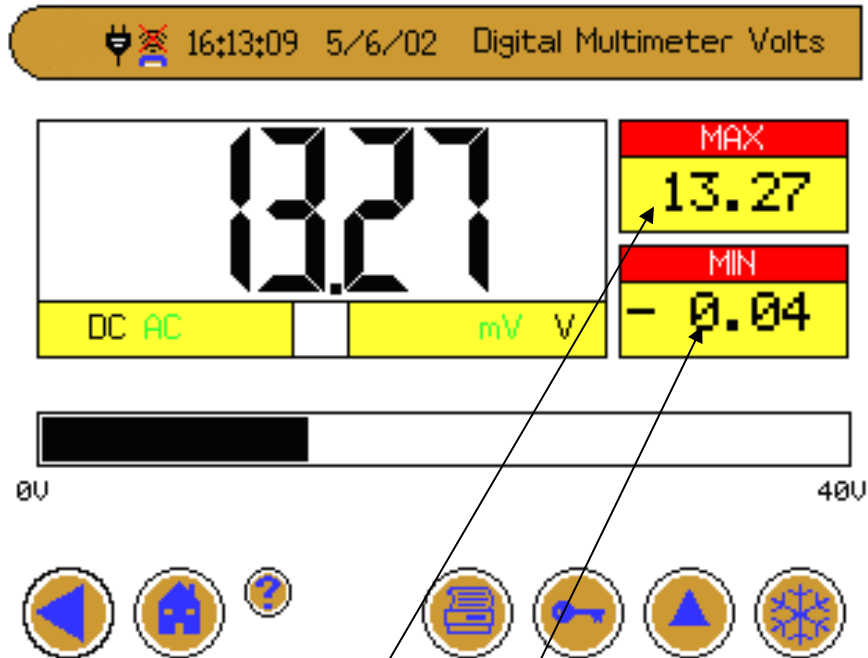


Figure 21: Typical voltmeter display

Max. display area

This area will display the maximum achieved input value throughout any single test sequence. If the active (yellow) area within this section is touched the value displayed will either reset to zero (if no input is present) or to that displayed within the main display area.




Min. display area

This area will display the minimum achieved input value throughout any single test sequence. If the active (yellow) area within this section is touched the value displayed will either reset to zero (if no input is present) or to that displayed within the main display area.



Relative function

This function should be used if, during a test sequence, there is a need to calculate the value of change in the input data over a given time.

Once activated, by touching the control, the symbol turns green .

The SMART will zero the min and max displays and begin to calculate, and subsequently display, any change in the data being measured.


Freeze function

When the freeze button is activated, the symbol turns green .

All displayed values (main, max and min) will be 'locked' on the screen. To 'unlock' simply re-activate the display by again touching the freeze button.

The multimeter function is very straightforward and in most cases familiar to anyone who has used a digital meter.


Autoranging

Autoranging is the default although pressing the  button allows you to freeze the current range.

Since the maximum and minimum readings are in **Yellow** boxes they will reset if you touch them.

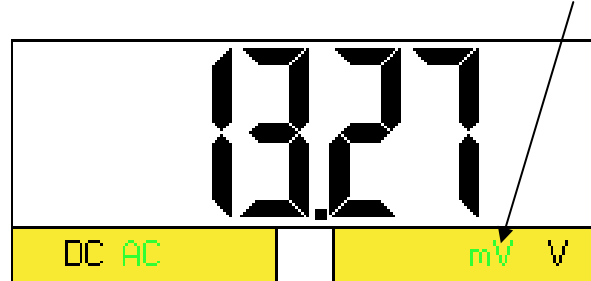
Relative readings



The  button subtracts the value present when the button was pressed from the current value to give relative reading.

Millivolts range

The 400 mV range can only be accessed manually, press **mV**, to enable it.



You should note that this setting will not autorange if you apply a voltage higher than 400 mV. If a large over-range input is applied whilst in this range, an alarm will be given.

Volts

The voltage measuring section of this meter has two areas of user active controls, the **AC/DC** selection, and the **V/ mV** (400 mV+/0-400 mV) selection. When either of these control areas is touched the selected function will toggle between the two choices.

It is the highlighted **BLACK** selection that is active.

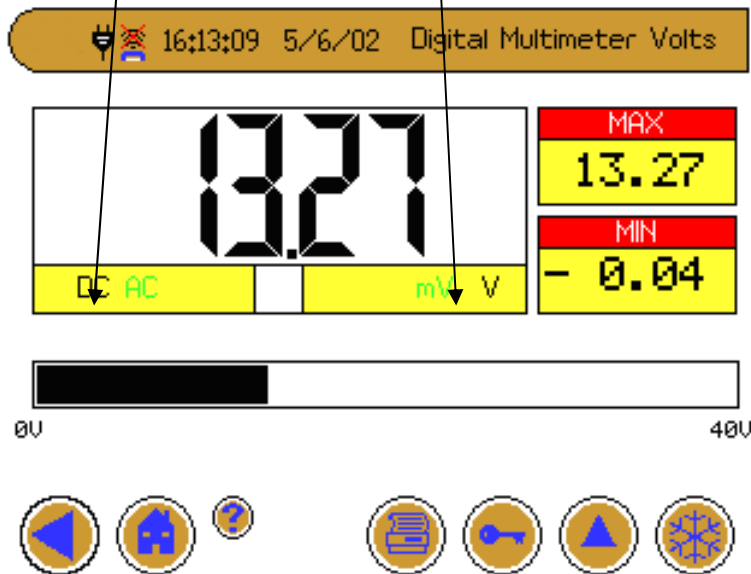


Figure 22: Volts measuring screen

Test principles : All voltage tests should be carried out using test leads connected into the 4 mm sockets located on the front panel of the SMART, black for negative input (ground) and the red for positive.

Using the Labscope

As with many things the Labscope function is as simple or as complicated as you want to make it. In order to satisfy the demands of the most technically minded, the SMART Labscope has many flexible and sophisticated facilities for triggering and display of complex waveforms.

At a more basic level a number of typical set-ups are pre-programmed enabling you to quickly get a trace without having to remember what vertical and horizontal scales you need to set. Access to these is via the Sensors menu item that will give you a list of common sensors from which to choose.

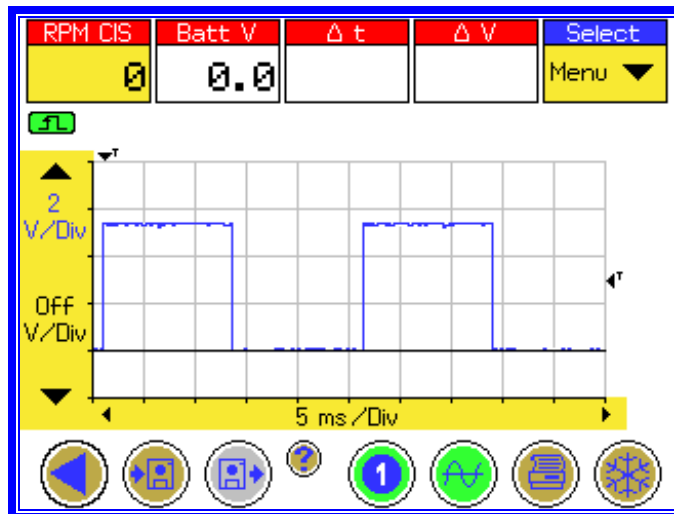


Figure 23: Typical idle speed control display

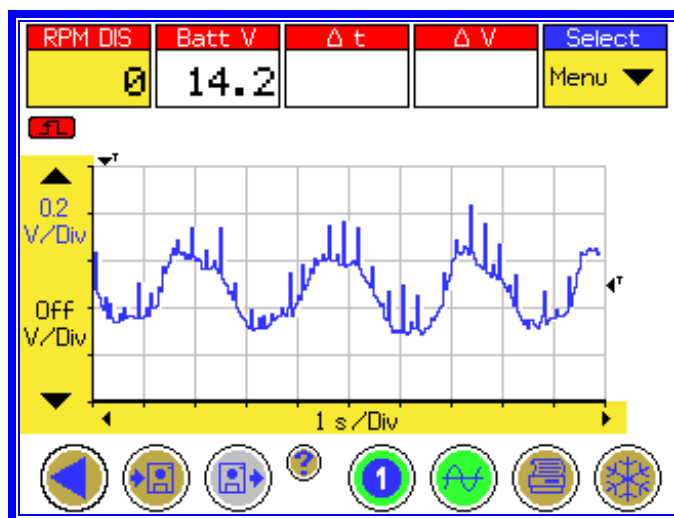


Figure 24: Typical lambda display (Ford Zetec engine)

We cannot guarantee that you will always get a properly triggered waveform because of the variety of different signal levels but the preset settings provide a useful starting point in most cases.

If you are a more advanced user and you choose to explore the many options for triggering and set-up you should find much of the terminology familiar. In all cases to get the best results you will have to set the source and mode for triggering and the source for each channel.

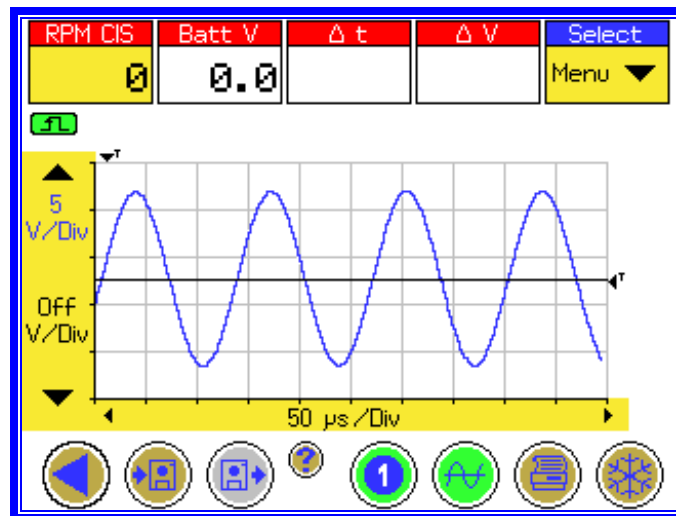


Figure 25: Typical sine wave display

Also remember that SMART will store the current setting and apply them when you power up again. This can be confusing if you have, for instance, set scope channel A to be LT and then you power up next time and connect a different signal to that channel. If there is no trace it may be because you forgot to reset the source to Scope A again.

Overview

The Labscope function enables you to view two channels of data from the Labscope inputs (a+b) at the rear of the unit.

Both the Time bases and the Voltage scales can be adjusted to suit the signal you are connected to, preset functions are available for the scope, which setup default settings for that type of signal.

General Operation

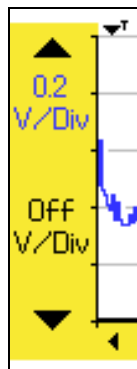
Starting from the left hand side of the screen.

Yellow Voltage Scale

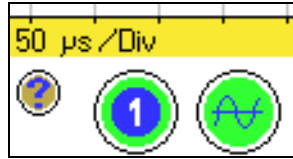
This portion of the Labscope trace displays and allows you to change the voltage 'range' for the current selected trace.

If this 'area' is not yellow then the voltage range for the selected trace cannot be changed.

Remember yellow areas are areas you can press!



Pressing the screen around the two arrows lets you change the voltage range, either up or down. The two voltage readings between these arrows show the current voltage range for each trace. These are displayed in Blue for Trace 1 and Red for Trace 2. These indicate the amount of volts for each division on the graph.

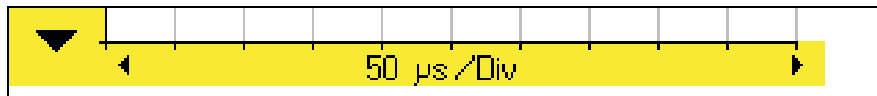


Press the channel select button to alternate control between channel 1 and channel 2. The channel selected is indicated by the colour and number displayed by the button. The channel selected corresponds to the highlighted Voltage Range.

If one of the traces is switched off via the ON/OFF button the voltage range will display OFF.

Yellow Timebase Scale

At the bottom of the graph is another yellow area, this is used for displaying the timebase (speed) of the traces and for adjusting them.



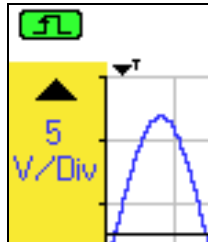
Pressing the screen around the two arrows lets you change the current timebase setting, this is always the same for both trace channels.

The Timebase reading between the two arrows indicates the speed of the Labscope, the units are displayed in the amount of time for each division on the graph.

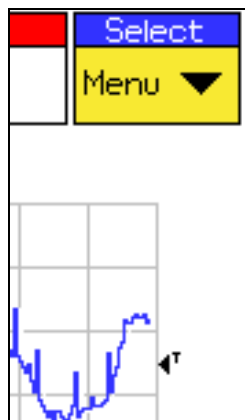
Please note that the two fastest timebase settings (5μS/Div and 10μS/Div) only operate in single channel mode. Channel 2 will automatically switch off if you select either of these 2 timebases. To enable Channel 2 you have to select a timebase slower than 10μS/Div and switch the Channel back on manually.



Top of the graph is the trigger point, this indicates where the trace is triggering, by adjusting the trigger point in the drop down menu, you can see more of the signal before it triggers (pre-trigger) or more after the trigger point. You can view up to one whole screen before the trigger point.



On the right side of this is the trigger level, this indicates the voltage the trace is triggering, by adjusting the trigger level in the drop down menu, you can trigger on a different part of the signal.



Using the Sensor Simulator

This function has 2 separate outputs via the cable with the GREEN plug.

- One is for voltage (RED and BLACK pair marked with a 1).
- The other is for resistance (RED and BLACK pair labelled with a 2)

Operation of the function is quite simple, follow the on screen menus to select the function and adjust the output. You can exit the function once you have set the correct level and the outputs will still be active allowing you to enter another SMART function simultaneously. The sensor simulator will then remain active until you turn it off in the menu or power down.

A typical use for the resistance simulator would be as a substitute for a temperature sensor to determine if the sensor or the wiring to the ECU is faulty. Using the ACR for instance you can observe the effect of varying the resistance on the Coolant Temperature reading reported by the diagnostic DataStream.

Introduction

This function is designed to simulate the inputs to an ECU, as normally provided by the system's components, in order that the system's response can be checked, in other words the unit can be set-up to become a substitute component.

With the various options available to the user, DC Volts, Resistance, waveforms etc, it is possible to create the signals commonly output by different sensors, at different operating conditions, around a vehicle. Sensors such as Throttle position, Airflow, Map, Temperature and Speed sensors to name but a few of the common applications can be simulated.

To be able to carry out successful 'Simulation' an emphasis at this point should be made on the data that the user has available. To correctly set the Simulator to emulate the component in question it is important to have the expected values of signal inputs at the relevant operating conditions.

Using the Sensor Simulator with Code Reading function (see 'Multi' option) will provide a larger picture of how the circuit being tested is coping with the information being provided, as well as how the ECU is reacting to that information.

By following the 'Test' route from the SMART main menu through to the 'Analyst' mode you will find the sub-heading of 'Simulator', once entering this section you will be able to select from one of four further options:

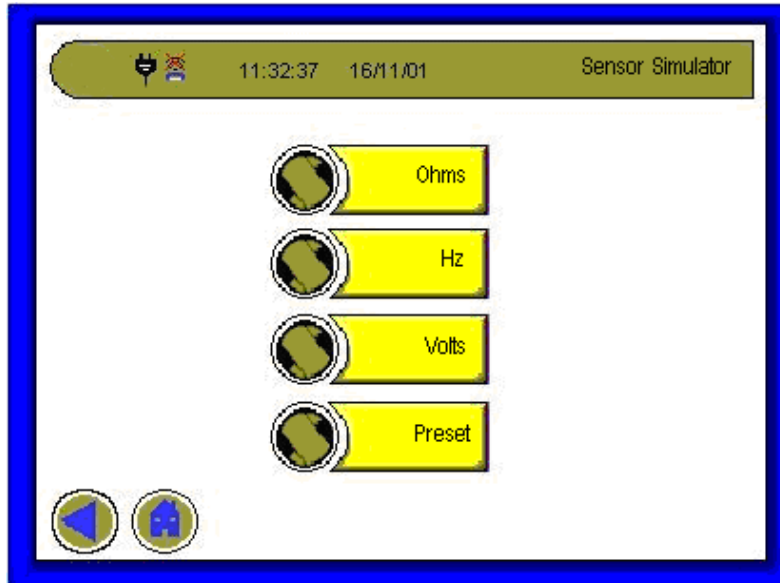


Figure 26: Simulator menu screen

General Information

It is advisable at this point, prior to any Simulation that the user has all the relevant information required to carry out a successful test, e.g. wiring diagrams and expected signal data etc. This essential, but basic, preparation could prevent two problems occurring:

- False diagnosis
- System damage

Warnings

The maximum current output is 100 mA. This is NOT to be used to drive (or power) actuators such as injectors, coils, idle valves etc.

The maximum voltage output is 12 V DC. Take care NOT to exceed 5 volts DC when simulating sensor inputs where the expected operating voltage is a maximum of 5 volts DC.

To prevent damage, ensure vehicle ignition is off when disconnecting/connecting components.

Using the ACR (Advanced Code Reader) Function

Firstly, connect the Smart power cable to the vehicle battery and power up the Smart as normal . To select the Serial diagnostics facility from the opening screen touch **TESTS** > **Basic**> **Code Reader**, you will then see the screen below.

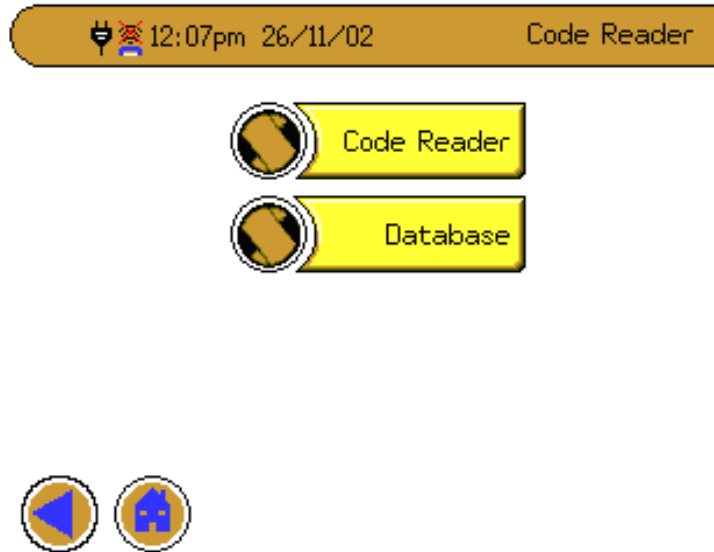


Figure 27: Code reader menu

If you already know how to connect to the vehicle then do so and touch **Code Reader** to begin. If you want help in deciding on which pod and harness are required then touch **Database**, after a short pause you will see the following.

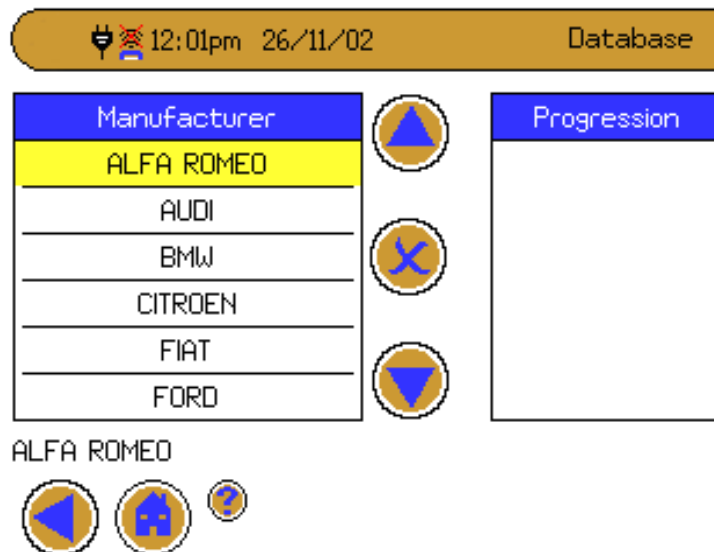


Figure 28: Manufacturer selection

Touch the up and down arrows until the yellow bar is on the manufacturer you want and then touch it to display a list of models.

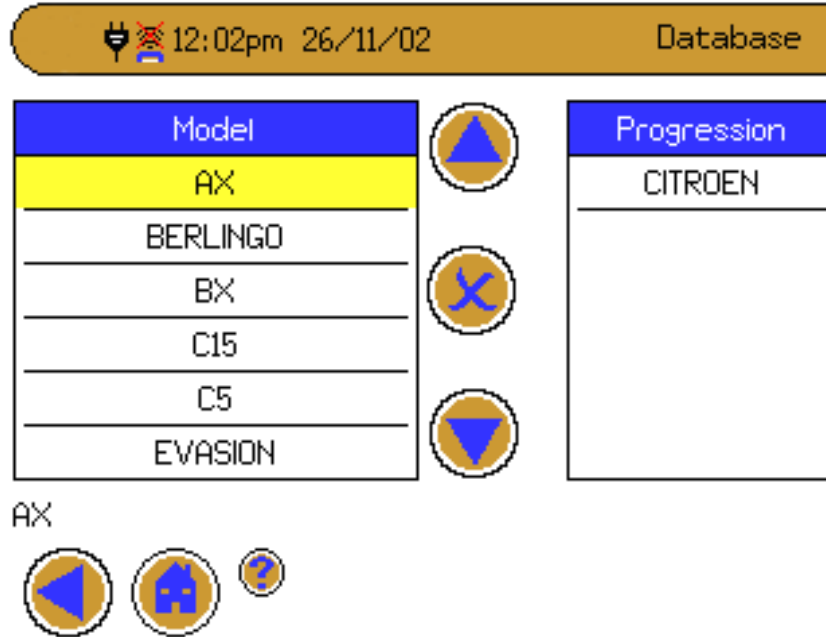


Figure 29: Model selection

Now use the up and down arrows to place the yellow bar on the desired model and touch it to move to the next level. If for any reason you want to return to the previous level, press the cross key. Now follow the same procedure for Engine Size, Engine Code, Model Year and Injection System at which point you should see a screen similar to the one below.




Figure 30: Vehicle information

This is just a summary of the vehicle information which you have selected. Touch



for details of the pod and harness Part Numbers, insert the pod into the SP Diagnostics

Smart and connect the harness to the rear panel connector marked. Touch  to display a diagram of the position of the diagnostic connector.

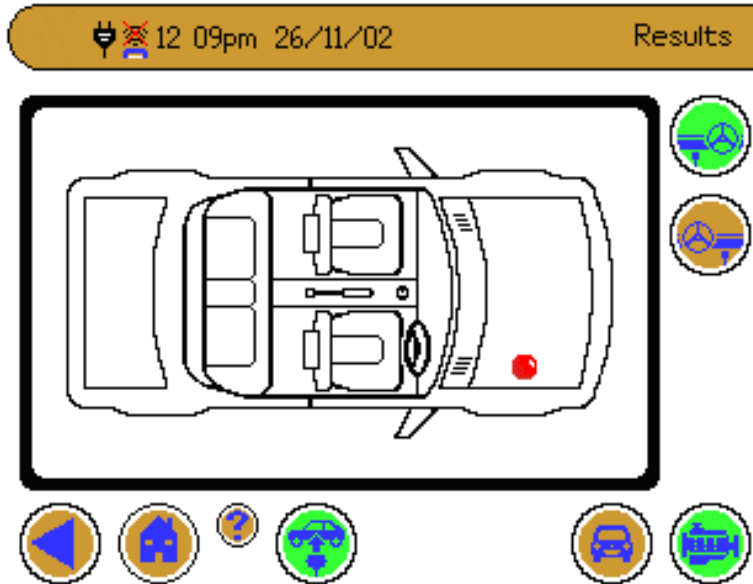





Figure 31: Connector location

Touch  for Left Hand Drive or  for Right Hand Drive. Locate the vehicle connector and plug the harness into it, now touch  to return to the original menu and touch **Code Reader** to begin the diagnostic session.

If you try to select the ACR display before fitting the application pod and harness, you will get the following warning message:

SMART HELP ACR
 !WARNING!
 NO ACR POWER WAS DETECTED
 To use the ACR function the ACR memory pod and power lead should both be connected !!

The next screen you see will depend on the application pod which you are using, below is an example from a Vauxhall system select menu. To understand how to use the pod, consult the appropriate ACR manual.

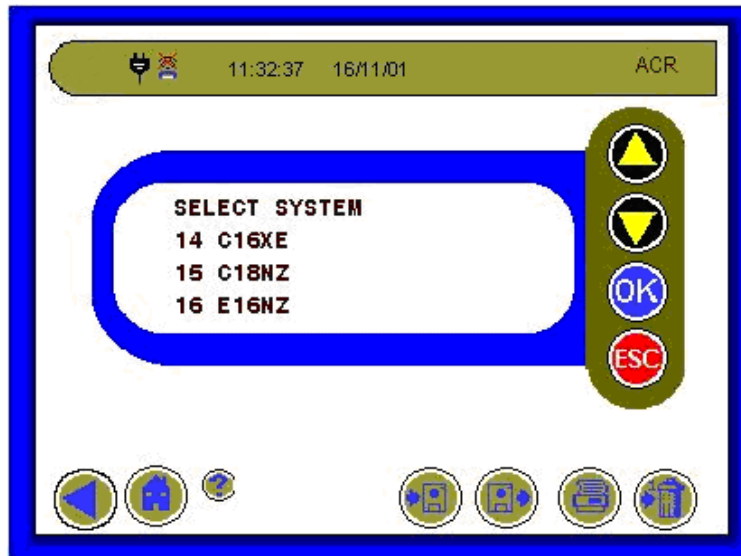


Figure 32 Typical ACR Screen

General Information

- 1) The level of 'code reading' functions available on a vehicle is heavily dependant on the capabilities of the specific management system that is being tested. Whereas many ECU's will allow fault codes to be read and erased, alongside actuator control and 'live' component data display, some may only allow the retrieval and clearing of fault codes.
- 2) Code reading equipment is a means of viewing the information stored within a systems management system, it can only display information that is present within the particular ECU, therefore the message 'NO FAULTS STORED' should not be interpreted as a fault free system. If a drivability problem exists, and no codes are stored it is important to check and compare any 'live' component data available
- 3) As signal values differ greatly from system to system, it is important to compare any given information with reliable sources of data, never eliminate anything until it can be proved good.

Set-up

To ensure the correct combination of pod and harness is used for a particular vehicle, it is important to spend a few moments prior to testing making the correct selection from the SP Diagnostics range. In order to do so, it is essential to have accurate vehicle information available to make sure the choice is right, information such as make, model, engine capacity and code along with year of manufacture are required. By cross-referring this information with either the SP Diagnostics ACR applications booklet, or individual pod handbooks, a pod and harness reference number should be finalised, along with the management system type.

Controls



UP arrow allows navigation through screen menu's and data

DOWN arrow allows navigation through screen menu's and data

OK confirms or accepts actions or selections

ESCape allows backward movement through screens

General Functions

Note: The level of functionality depends on vehicle and system type being tested; see individual pod handbooks for details.

Read Codes

This function will display any stored fault code numbers, along with the meaning. Remember, for a fault code to be present on a particular component, the ECU has to recognise a problem. As most components operate across a wide span of conditions (e.g. CTS which may work between -20 deg and 120 deg C) fault codes will only be stored when the information suggest a condition which is out side of that deemed plausible.

Clear Codes

This function will attempt to erase all stored fault codes. The ECU can only clear such a fault codes if the problem it relates to has been fixed, if not then the code(s) will again be found in the Read codes section.

Actuators

This function allows vehicle actuators (Fuel pump, EGR valve, Fan etc) to be controlled. By commanding the relevant part to operate, tests can be made on its response, thus proving the quality of the unit in question, and the wires/signal connecting it to the ECU. If, during the 'Driving' sequence, no activity is seen at the valve/motor, then tests should be made on the connecting wires to check for the correct control signal being present.

Components

The information found within the component section will provide 'Live' information that is travelling between the ECU and the particular sensor or actuator. Checks can be made either 'Key on' or whilst the engine is running, this may depend on the fault/sensor and when the reported problem is occurring. By viewing this 'Live' data the technician is not relying upon the ECU to decide if a fault is present, but, is able to check and compare the information for its integrity against a known good source of information.

Shutting Down

To enter the shutdown menu from the Home page press:



This gives you a choice of two icons:



Touch the icon to return to the Home page



Touch the icon to shut the SMART down

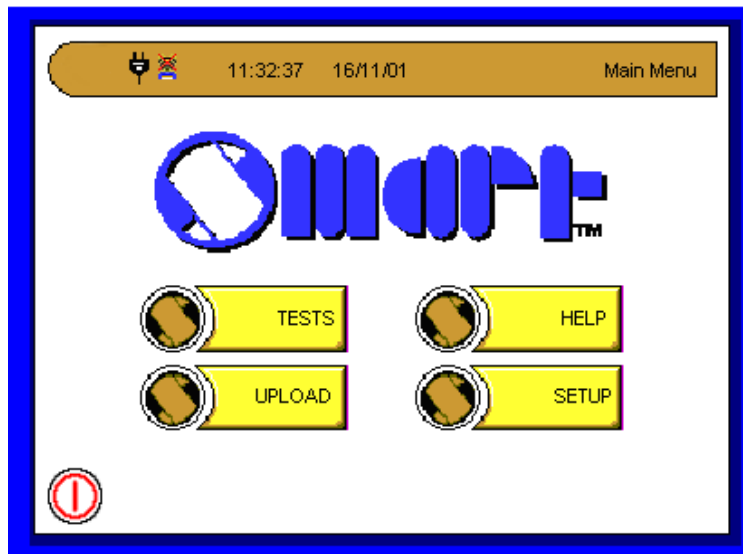


Figure 33: Main menu screen

APPENDIX 1: Smart Warranty conditions

INCLUSIONS

1. 1 year warranty against faulty materials, construction, or software [*]
2. Repair or replace is SP Diagnostics option
3. Unit must be returned to source, complete with all cables and fittings in the original storage box
4. If no fault is found, the user pays all carriage
5. If repaired or replaced, SP Diagnostics pays carriage

[*] SOFTWARE

Malfunctions of the software will be rectified by the issue of an UPDATE

UPDATES will be free and available on CD or by download from the supporting web site.

They are installed by the user from his own PC

UPGRADED software is only available by purchase

Software will be replaced in warranty “like for like”

EXCLUSIONS

1. Fair wear and tear
2. Touch screen damaged by scratches or solvents
3. Cracked or broken display screen
4. Cracked or broken mouldings/housings/enclosures
5. Burnt, melted or abraded cables and pickups
6. Bent, broken or missing pins in cable connectors
7. Any user modification
8. Any un-authorized installations of software
9. Internal batteries
10. Consequential loss

APPENDIX 2: Service and Support

1. Users have free access to the Telephone Hotline at 0844 561 7861
2. Users can access the web site <http://www.spsupport.com> and by a secure login procedure with a password, users have access to technical support and special advice.
3. The web site also allows the user to download the latest updated versions of the Smart OS, PC Printing Software, and a copy of this extended User Manual. These services are free of charge.
4. The web site also allows the user to send copies of saved Smart images which will form part of the library of images for the benefit of all users.
5. Users have access to training courses held at the Training School in Cannock; contact 0844 561 7861
6. To contact SP Diagnostics by email: support@spsupport.com
7. To contact SP Diagnostics by mail:

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