

# Portable Engine Analyser

No 300620



## Sykes-Pickavant

## PLEASE NOTE:

The methods outlined in these instructions are intended as a guide only. Always follow the vehicle manufacturers recommendations for the particular vehicle or system under test. Danger and damage can result if correct procedures are not followed. In addition to manufacturers workshop manuals a useful source of specifications and data are the series of publications produced in the UK by Autodata Ltd.



## HEALTH AND SAFETY

### AVOID THE RISK OF FIRE:

Keep a fire extinguisher close to hand. (Foam, CO<sub>2</sub>, Powder and/or Halon (BCF) are suitable). Rags and flammable liquids should be stored only in fireproof, closed metal containers. Petrol soaked rags should be allowed to dry thoroughly before being discarded.

Do not smoke or allow naked flames or sparks; fuel vapour is highly inflammable and the gas formed when charging a battery is explosive. Take care when working on the fuel system that HT sparks are not accidentally emitted; disconnect the coil if necessary.

### AVOID THE RISK OF FUME INHALATION

Fuel and exhaust fumes are harmful; always work in a well ventilated area. Never run an engine in a closed garage.

### AVOID MOVING PARTS

Be careful not to get hands, hair or clothing near fan blades and belts, pulleys, transmission and throttle linkages etc. Do not wear ties, loose clothing, jewellery, watches or other loose articles when working on a vehicle; they can get caught on moving parts and can also cause short circuits.

### AVOID ELECTRICAL SHOCKS AND BURNS

High voltages are present in the ignition coil, distributor cap, HT leads and spark plugs; a violent shock can cause involuntary movements resulting in injury. Use insulated pliers when handling HT leads whilst the engine is running. Take care not to lay or drop tools on the battery; accidental earthing, or direct contact between the terminals can shock and burn you, and cause damage to the electrical systems. Avoid contact with battery acid; it can burn your skin, eyes and clothing.

Avoid contact with hot exhaust systems, radiators, and hoses. Never remove the radiator cap whilst the engine is hot; escaping coolant under pressure could scald you.

### AVOID THE RISK OF EYE DAMAGE

Always wear eye protection when working on a vehicle to protect against battery acid, fuel, dirt and dust flying off moving engine parts etc. Do NOT look into the throat of the carburettor while the engine is cranking as a backfire can cause burns.

WHEN WORKING ON A VEHICLE ALWAYS ENSURE IT IS SECURELY PARKED WITH THE BRAKE ON AND GEAR IN NEUTRAL. IF THE VEHICLE IS JACKED, USE SUITABLE EQUIPMENT (NOT THE WHEEL CHANGE JACK SUPPLIED WITH THE VEHICLE) AND DOUBLE CHECK THAT IT CANNOT SLIP.

## SPECIFICATION

### RANGES

**TACHO:** 0-19990rpm resolution 10rpm  
Suitable for 4,5,6,& 8 cylinder engines, and for both conventional and electronic ignition systems.

**DWELL:** 0-199.9 degrees, or 0-100%  
resolution 0.1 degrees

**DC VOLTAGE:** 0-199.9v  
resolution 0.1v

**KILOVOLTS:** 0-49.9 KV

**DC CURRENT:** 0-199.9 amps using shunt (optional inductive pick-up available)

**RESISTANCE:** 0-199.9K ohms

**POINTS CONDITION:** Good/Bad

**POWER BALANCE:** 0-100%

**POWER SUPPLY** 12v DC

**DISPLAY** 20mm Fluorescent

Special indications show:-  
faulty connection = flashing "0"  
test lead polarity reversed = "-" (Note: analyser does not indicate negative volts or amps)

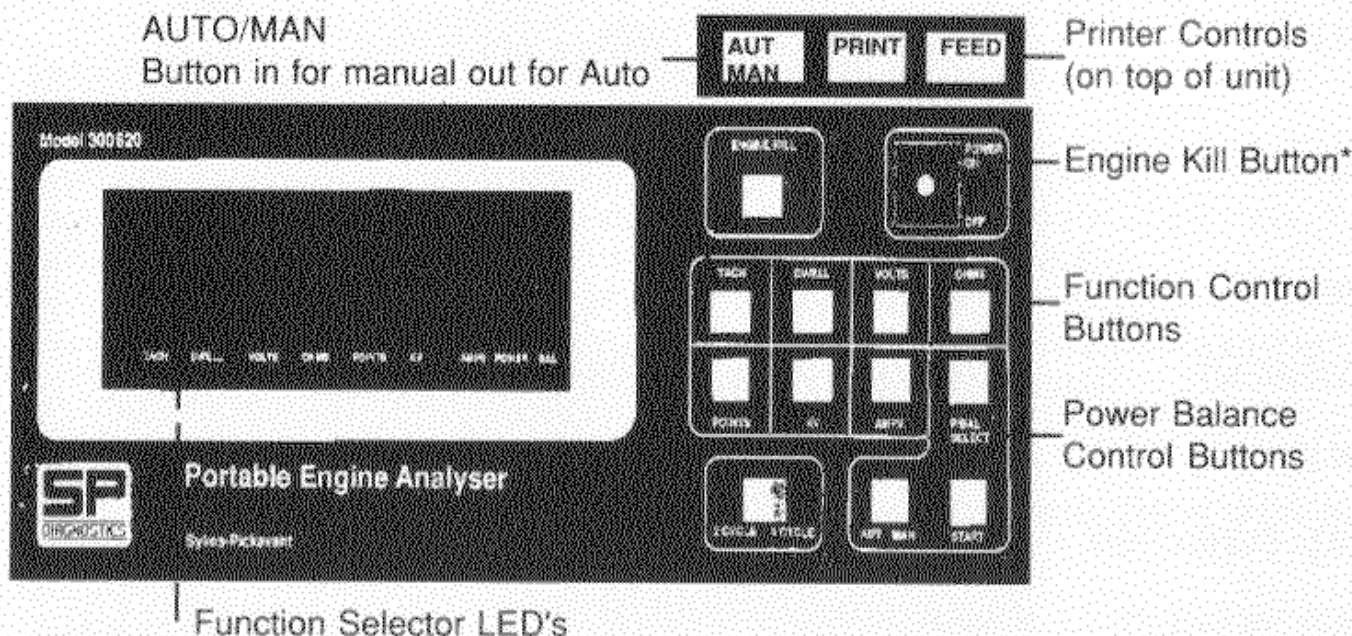
**MANUAL CONTROLS** Power on/off switch.  
Push button function selectors (see illustration below)  
Printer Auto/Man, Print and Feed  
Engine kill button

**ACCESSORIES** Lead set- 3m nominal length, with inductive pick-up, KV pick-up, battery clips, and test lead clips.  
Shunt for amp measurements (optional inductive pick-up available)

**DIMENSIONS** 280mm x 320mm x 150mm  
weight 6.5kg

**OTHER FEATURES**

Strong mechanical design.  
Automatic zeroing.  
Automatic ranging.  
Rugged screw-in lead connectors.  
Over range protection.  
2 amp fuse



\*Engine Kill Button will stop engine if held in. Red Test Lead must be connected to the negative side of the coil (or other specified connection) and the Black Lead to earth.

**BASIC OPERATING INSTRUCTIONS AND TEST LEAD HOOK UP.**

The Sykes-Pickavant Portable Engine Analyser No 300620 has been designed as a general purpose automotive diagnostic aid, incorporating the electrical test functions of volts, amps and ohms measurement.

These basic multimeter functions are described below, followed by specific applications guidance for the automotive service engineer.

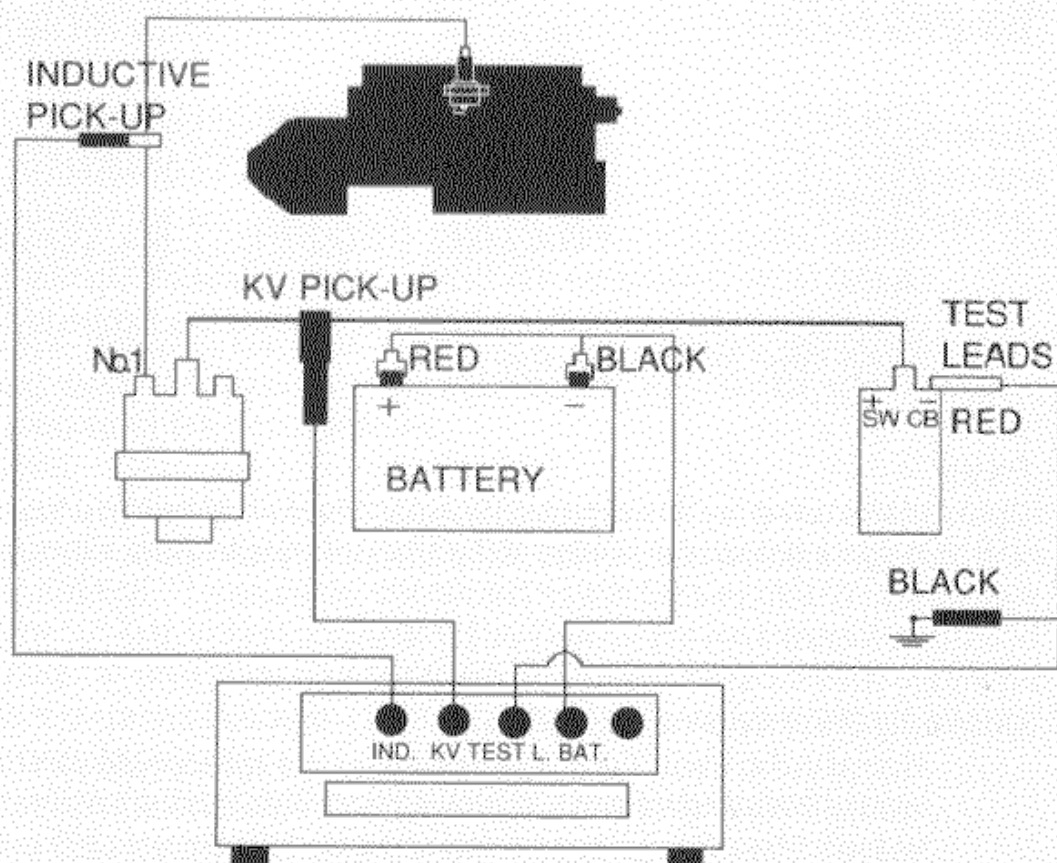
**LEAD CONNECTIONS**

**NOTE.** When attaching the Battery Power Leads check that the Power switch is OFF FIRST.

Connect leads as shown in the illustration below (diag 1). Ensure that where leads plug into the Analyser the metal collars are screwed finger tight to prevent the leads from becoming accidentally detached during testing.

## DIAG 1

Test Lead Hook Up



Note: See instructions overleaf when using Analyser with Scope 300630 through interface cable.

Ensure the jaws of the Inductive clamp are fully closed over the No1 plug lead. Note that during testing the clamp may become heated due to the proximity of hot engine components, so take care to avoid burns.

The KV pick-up should be clamped onto the HT lead running from the coil centre to the distributor centre.

For many situations the "Test Leads" are connected as shown in the illustration with the black clip to earth and the red one to the negative, or CB\*, coil terminal- eg testing dwell, RPM etc. When using the Analyser for Volt, Amp and Ohm tests the Test Leads will be connected as indicated below.

NOTE. When testing Ohms the Analyser will produce its own current to pass through the object being tested, so DO NOT attach the Test Leads to a source of power or the unit may be damaged.

\*Many European manufacturers now describe the coil terminals as "no 1" for the CB/negative terminal and "no 15" for the SW/positive terminal.

NOTE: If the Tach, Dwell or Power Balance functions indicate the number of cylinders incorrectly it may be due to a bad spark plug lead; run the kv test on each plug lead to determine their condition.

Also if the display shows a flashing "0" recheck all connections, particularly that the inductive pick-up is correctly seated; move the pick-up to another lead if the flashing persists after all connections have been rechecked.

## Using the Portable Engine Analyser No 300620 with Scope No 300630

The Sykes-Pickavant Portable Analyser has been designed to interface directly with the Scope, and all that is required is to plug in the connecting Interface Lead provided between the two units.

When using the Interface Lead, DISCONNECT ALL LEADS EXCEPT THE FUEL INJECTION LEAD from the Scope as all necessary signals for Scope operation can be supplied via the Interface. NEVER connect the Scope to the Power Supply at the same time: as damage may result.

### Printer

Open printer cover by unscrewing the knob. Remove protective foam insert, and feed paper end through window slot. Press Auto/Manual button in for manual operation and out for automatic.

### Measuring Electrical Potential (Volts)

Connect the black Test Lead to earth or the appropriate point for the test and the red lead to the point in the circuit at which you wish to determine the voltage (or as detailed below). Press the Volts button and check the indicator LED is illuminated. Switch the Analyser on by pressing the "Power" button.

Voltage checks can now be made on either batteries or live DC circuits:-

1. On a battery place the red probe to the + terminal and the black to the negative, and simply read off the voltage.
2. On a live circuit place or clip the black probe to a suitable earthing point (eg vehicle bodywork) and the red probe to a "hot" wire.
3. If checking voltage drop between different points on a circuit, eg if checking drop across a component or connection, place the probes either side of the component being checked.

Voltage Drop Tests are an extremely useful indicator of the efficiency of a circuit. In a "perfect" circuit voltage would remain constant, but in practice all of the components and connections introduce resistances or barriers which mean that the voltage will drop as you move further away from the source (battery). Voltage Drop Tests can be used to check that circuit efficiency has not fallen to an unacceptable level. For example if voltage drop is checked across a switch as shown in diagram 1 and a large drop is observed then either the connections to the switch, or the switch itself, are not making an efficient contact and should be checked.

### Measuring Resistance (Ohms)

Connect the Test Leads either side of the component to be tested and press the Ohms button, checking the indicator LED is illuminated.

Note that resistance is measured by the Analyser generating a small current which is passed through the component to be tested, the Analyser sensing the resistance encountered. For this reason it is important to isolate the component to be tested from the live circuit to avoid false readings and possible damage to the instrument.

Press the Power button and take the ohm reading by placing the probes either side of the component.

When the probes are shorted together a reading of around 0.2 or 0.3 ohms will show- this represents the resistance of the test leads themselves. If making tests on low resistance components the test lead figure must be subtracted to get a true reading. Over, say, 10 ohms this correction can be ignored.

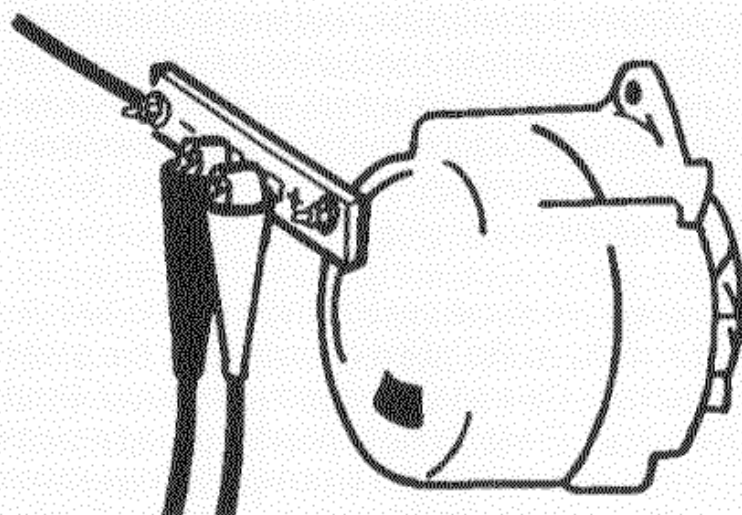
With Ohm readings, and with many other functions, the Analyser will automatically choose the correct range for the value of the reading, and will indicate which range is selected by the placing of the decimal point.

#### Measuring Current (AMPS)

For these tests a shunt needs to be connected in series with the component to be tested, as shown in the diagram below, which illustrates a test on an alternator. The side of the shunt marked "-" should be connected to the battery side of the broken connection, and the "+" side to the component. The Test Leads are connected with the red connector to the "+" shunt tab, and the black one to the "-" tab. Press the Amps button and check the correct indicator LED is showing. Allow current to pass through the circuit and check the reading.

NOTE: During the testing the shunt may get hot so take care to avoid burns.

DIAG 2



#### INSTRUCTIONS FOR AUTOMOTIVE APPLICATIONS

This Analyser will be found of great value to the service engineer in diagnosing problems in many of the vehicle operating systems, such as:-

- Electrical Supply System
- Charging System
- Starting System
- Ignition System
- Fuel Management System
- Mechanical Combustion System

Generalised diagnostic procedures for each of these Systems are described in more detail below, but users are reminded of the need to always consult vehicle manufacturers procedures and specifications before conducting tests and making adjustments.

## ELECTRICAL SUPPLY SYSTEM

This system includes all the electrical wiring and earthing points. The battery could also be regarded as part of this system, however tests relating to the battery are dealt with in the section on the Charging System.

The main requirement for testing within the Electrical Supply System is to verify that the correct current or voltage is reaching a suspect part of the system. Tests may therefore be straightforward continuity tests, voltage tests, or amp tests, and the general instructions provided above indicate how the Analyser should be used. Voltage drop tests can also be useful in assessing circuit efficiency, checking whether joints and connections are good etc.

## CHARGING SYSTEM

This system comprises the battery, the generator/alternator, the voltage regulator and associated wiring.

### Battery

The battery is obviously a primary component which has a direct relationship with three of the major vehicle systems, Electrical Supply, Charging and Starting. For the sake of simplicity testing related to the battery is included in this section.

A number of tests are available to check battery condition and performance, and those applicable to Portable Engine Analyser 300620 are listed below.

**Battery voltage** a simple test using the Analyser to check the state of charge. Select the voltage function and place the Test Leads on the terminals (red to positive, black to negative) and the voltage read off.

A 12v battery should read 12.4v or higher when fully charged. If a low reading is obtained check the terminals for corrosion and for loose connections.

**Cranking Load (or cranking voltage, or battery capacity)** various terms are used to describe this test which is simply to check the ability of the battery to withstand the power drain sustained in starting. Select the voltage function and disable the vehicle from starting. Place the Test Leads on the terminals (red+, black-) and crank the engine for 15 seconds. Voltage should not drop below 9.6V at 70 degF (21 degC), or 9.1V at 32 degF (0degC). If lower voltages are observed recharge the battery and retest.

**Voltage drain** batteries can lose their charge or fail to gain a full charge for several reasons, plates in poor condition, undercharged due to slipping belt or poor connections, and because of a voltage drain. A drain from the surface of the battery can be detected by connecting the red Lead to the positive terminal, and by using the black Lead to "search" around the surface, corrosion may allow a current to flow in which case the Analyser should detect a voltage. A drain may also occur through the electrical system because of a short circuit. When all accessories are switched off disconnect the positive cable to the battery and touch the positive terminal with one Lead and the cable with the other. If there are no shorts then no voltage will be indicated, but any voltage reading suggests there's a short circuit. (NB if a clock is fitted this will need to be disconnected prior to this test)

These simple tests provide some guidance on battery condition but more thorough testing is possible by using the Sykes-Pickavant Battery Tester. The Battery Tester provides a more convenient test which does not involve disconnection of the battery, or a substantial power drain and recharge which is usually necessary with a Load Tester.

Battery voltage (system charging)	<p>in this test the battery voltage is again measured, but with the engine running and the generator/alternator charging. This will confirm that the charging system is producing enough voltage to keep the battery charged. Again select the voltage function and touch the Leads to the battery to confirm the state of charge. Then start the engine, and at idle the voltage should now read about 2V higher, ie 13.5-15.0V</p> <p>The test can proceed to a second stage in which the engine speed is brought upto a fast idle, say, 1800-2800rpm. (NB use the tachometer function on the Analyser if required). At this speed the voltage should not have changed by more than about 0.5. Load the electrical system by switching on lights, heater fan etc and check that voltage doesn't drop below about 13V.</p>
Circuit Resistance	<p>Voltage drop tests can be used to check the efficiency of both the live and earthed sides of the circuits to the alternator. High resistances in these circuits can occur due to poor, corroded or loose connections and often these faults can be detected by checking the voltage either side of a connection and checking for any unusual drop.</p>
Charging System	<p>If the output of the charging system is up to its rated capacity, it will be capable of balancing the drain on the battery from the ignition system, lights etc. To test this it is necessary to install the shunt on the earth side of the battery, between the negative terminal and the earth cable. The Test Leads are attached to the shunt as previously described, and the Amps function selected. When the engine is run the amp reading should be zero if the battery is fully charged. If an amp reading shows the battery is being charged and with time this reading should decrease until a full state of charge is achieved. If no decrease is apparent after 10/15 minutes suspect either a poor battery or overcharging due to a faulty regulator. Increase the electrical demand by switching on all lights, radio, heater etc, and increase RPM to 2000. The amp reading should remain at zero if the alternator is balancing the load.</p>
Alternator Capacity	<p>It is possible to check the maximum output of an alternator by "full fielding" it and running the engine at 2000rpm with the lights and all accessories on. The maximum output of the alternator should be within 10% of the alternator's rated capacity. Check manufacturers recommended technique for carrying out this procedure, and for checking the output characteristics of the alternator as engine speed is increased.</p>

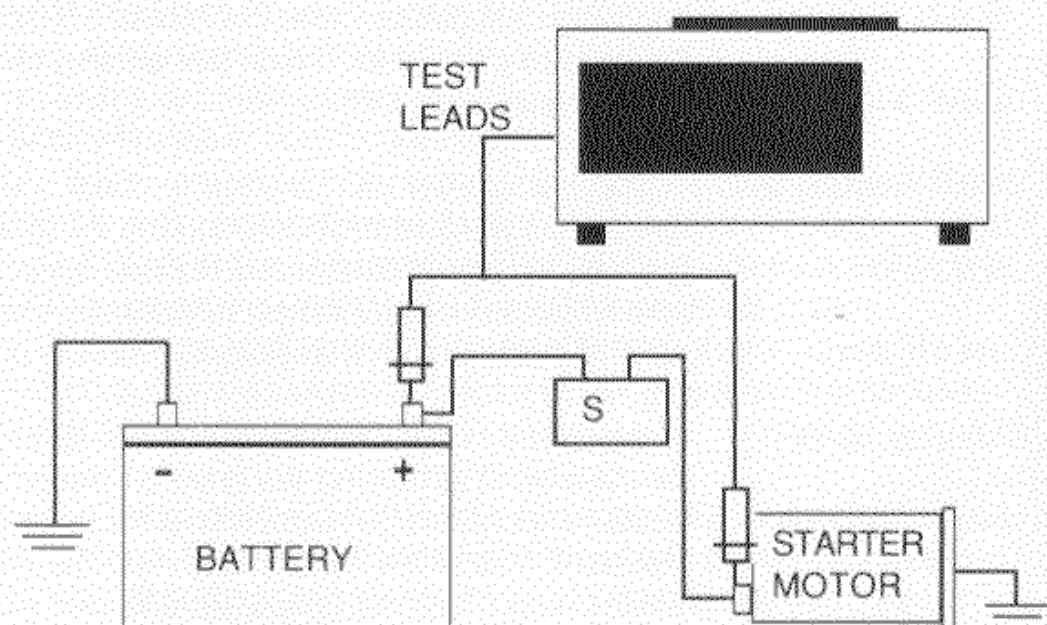
## STARTING SYSTEM

Excessive resistance in the Starting System will result in slow cranking and hard starting. The prime components are of course the Starter Motor and Solenoid although before proceeding with any tests on this unit the condition, suitability and performance of the battery must be verified. It is not possible to diagnose a starter problem without a good battery.

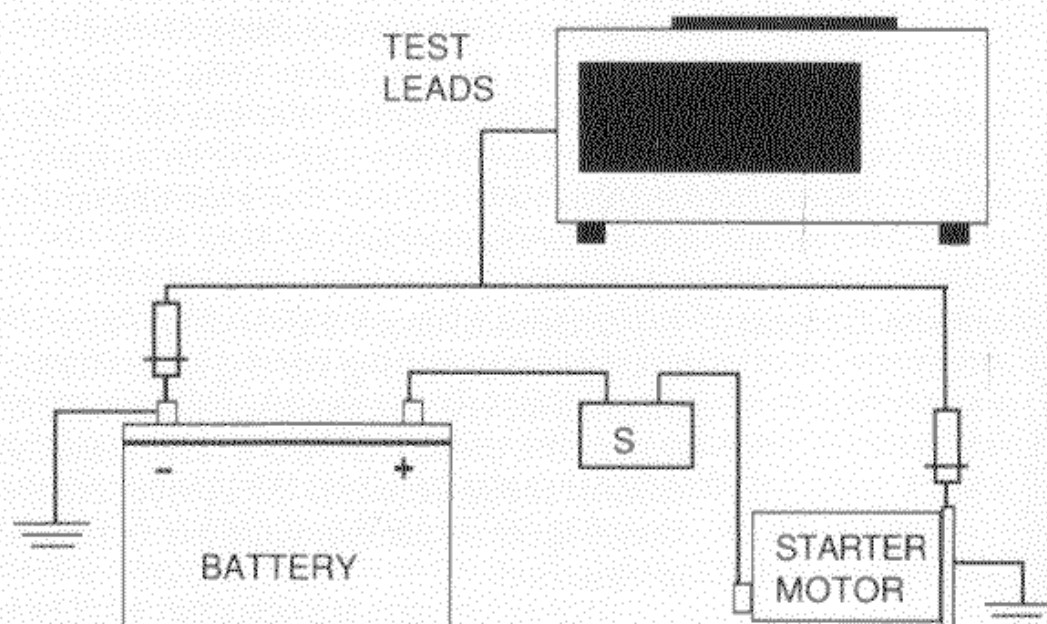
Voltage Drop on live circuit

Voltage drop in this situation is measured by connecting the voltmeter across the circuit under test (diag.3). Disable the vehicle from starting by grounding the CB terminal on the coil. Crank the engine and observe the volt readings, which should be no more than 0.3v. A higher reading than this indicates excessive drop. A useful way to locate the cause is to progressively move the voltmeter lead from the starter back towards the battery. In each position crank the engine and look for a decrease in voltage readings. This will indicate the area at fault, eg. damaged cable, bad connection or worn contacts in the solenoid.

DIAG 3



DIAG 4



Voltage Drop on  
earth circuit

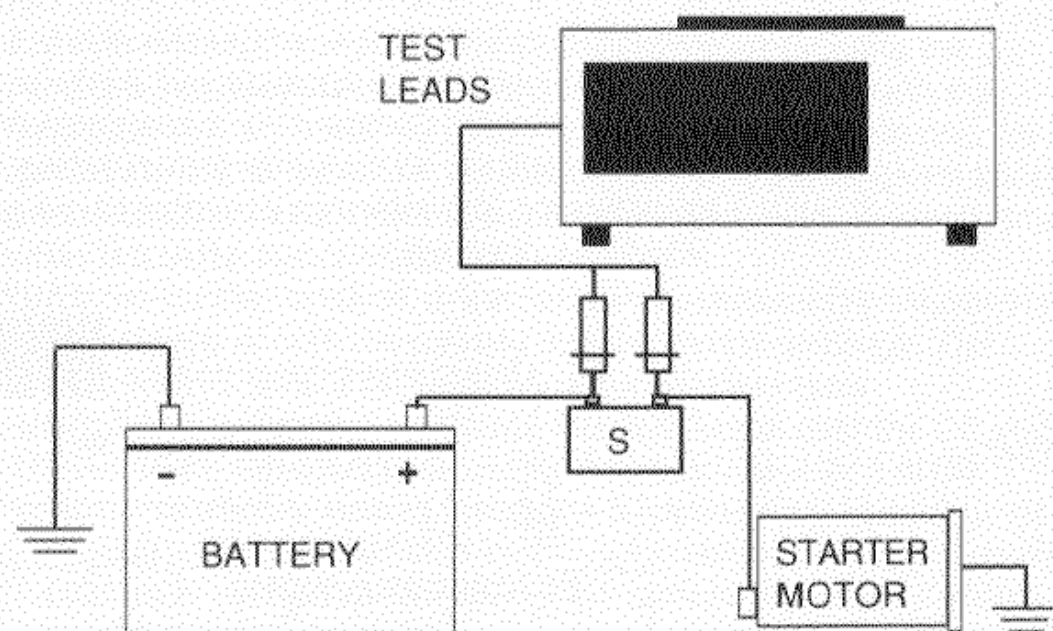
If the results in the above test are acceptable the next step is to check for voltage drop in the earth circuits. Connect the leads to battery earth (-) and starter motor case (diag 4). Crank the engine and observe the readings, which should be no more than 0.2v. If in excess of this suspect bad battery terminal connection, damaged battery earth cable or loose starter motor bolts.

Voltage Drop on  
solenoid

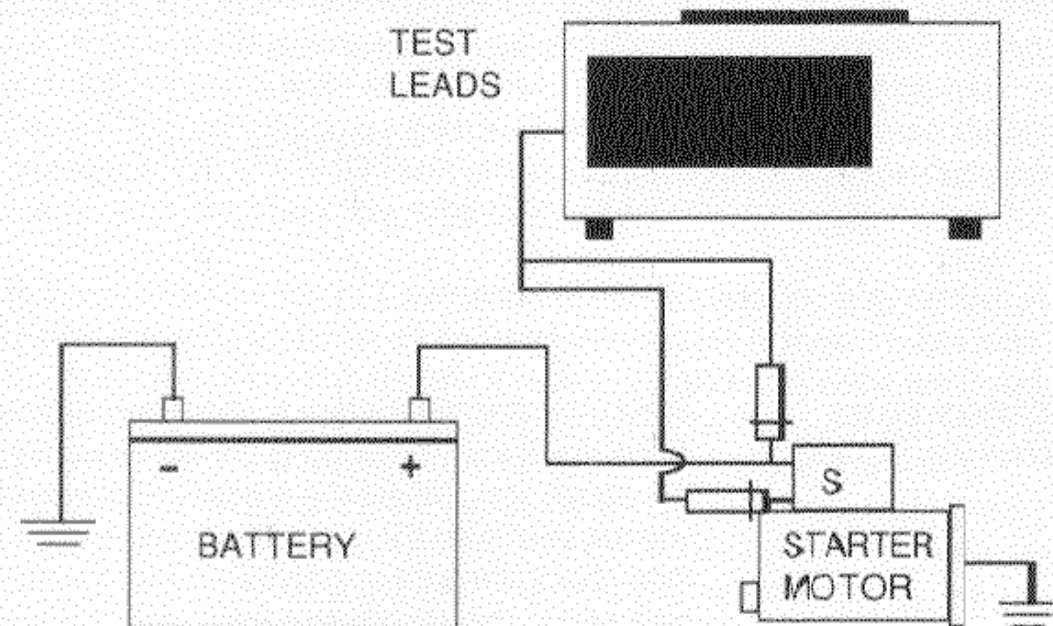
Connect Analyser across solenoid terminals (diags 5A & 5B). If the solenoid is remote from the starter the maximum voltage drop should be 0.2v. Where a solenoid is incorporated with the starter the maximum reading should be 0.3v. On automatic transmission vehicles the neutral safety switch (inhibitor switch) should be checked in the same way.

NOTE: Ensure the transmission selector is in neutral or park. If high readings are obtained check manufacturers specifications as some switches are adjustable.

DIAG 5A



DIAG 5B



**Cranking current**

Measurement of the current drain on the battery when cranking can provide a good indication of a problem in the starter, when the drain is excessive. Install the shunt between the earth cable and the negative battery terminal and connect the Test Leads as previously described. Disable the vehicle from starting. With the amps function selected operate the starter and note the amp reading. If this is higher than recommended tolerances the starter should be removed for further examination.

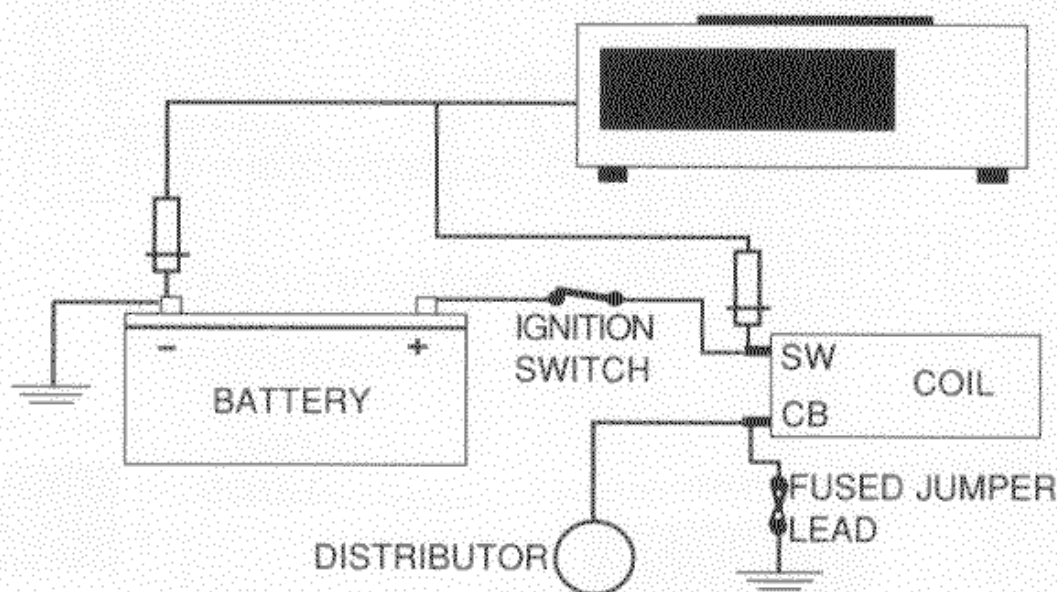
**IGNITION SYSTEM**

Apart from the battery the major components in this system are the Ignition Switch, the Coil, the Distributor, the Spark Plugs and the HT Leads.

**Primary circuit voltage drop**

This check is to ensure that the power feed from the battery to the primary coil winding is not suffering any undue loss as a result of poor connections. First check the battery voltage by placing the black and red Leads onto the battery terminals and operate the starter to remove any surface charge on the battery. Connect a fused jump lead to the CB coil terminal or ensure the distributor contacts are closed. Note the voltage then move the red Analyser Lead to the coil SW terminal (diag 6). Compare the reading with the ignition on. The drop should usually be no more than 0.5V but check against manufacturers specification. If greater than allowable all connections along the circuit should be checked.

DIAG 6

**Primary circuit cranking voltage**

To ensure that the battery is delivering sufficient current to the coil whilst the starter is operating the Analyser can be left connected as in the above test. When the starter is operated for about 5 seconds a voltage of at least 9V should be maintained at the SW terminal; if not then check the battery condition, and also that the battery has been matched to the vehicle correctly. A further cause may be a faulty starter drawing too much current.

Distributor volt drop and Point Condition	<p>The next step is to verify that there are no excess resistances within the distributor as this can have the effect of reducing the HT output from the coil and give inefficient spark plug burn. Misfiring can also occur. Move the red lead from the SW to the CB terminal and check the points are closed. If battery voltage is indicated then the points are open. On this side of the coil the primary winding will take up most of the circuit voltage, and any left will be attributable to resistance in the distributor, and checks should be made that points, connecting leads, earthing straps etc are sound. Look for a voltage of 0.2v or less. Check also the battery earth lead.</p>
Ballast Resistors	<p>Certain ignition systems include ballast resistors, of various types, whose purpose is to provide a voltage boost to the primary coil circuit as an aid to cold starting. These resistors are often connected between the starter switch and the coil (SW) and may necessitate a modified test routine; check manufacturers recommendations.</p>
Breaker Point Condition	<p>A simple Points Condition check can be achieved by using the standard Test Lead hook up arrangement (diag.1), and with the distributor cap and rotor removed, the Points function selected, the ignition can be turned on. A Good/Bad indication will be given along with a condition value: 0-249=Good, 250 or more=Bad. The lower the value the better the condition.</p>
Coil Resistance	<p>Guidance on the condition of the coil can be obtained by measuring the resistance of both the primary and secondary windings. The ignition system should be inoperative during these tests. Select the ohm function and place the Test Leads onto the CB and SW terminals. Resistance should be no more than 1 or 2 ohms. Measure secondary winding resistance by placing one Lead onto the CB (-) terminal and the other in the HT outlet socket. Expect values in the 1000's of ohms, and for high energy ignition coils in the 10000's.</p>
HT Lead Resistance	<p>HT leads are often identified with their resistance value-eg 5000 ohms per inch, and these values can be checked by the Analyser. During testing it can be useful to gently flex the wire whilst watching the display. Any deviations suggest a suspect wire. Remove the distributor cap and touch one test probe to the plug terminal inside the cap and the other to the spark plug end of the lead.</p>
Dwell	<p>With the Analyser set to Dwell and the Leads hooked up as shown in diag.1 the engine can be started and warmed for at least 15 seconds. Confirm the correct number of cylinders are shown. Check the Dwell angle and confirm if it is within specification. Note that if any adjustment is made then it will probably be necessary to recheck the timing. If % Dwell is required follow the general lead hook up arrangement, but do not connect the inductive pick-up. Do not turn the Analyser on until after the engine is started. The Analyser will not display the number of cylinders when using this method, and the printer will print a "?" instead of the number of cylinders.</p>

Dwell variation	Set up the Analyser as for the Dwell test above and run the engine at idle for about 15 seconds and again at about 1500rpm. If a difference of more than about 3 degrees is noted then suspect excessive wear in the distributor- shaft, breaker point plate etc.
Cranking Dwell	<p>Use the general lead hook up arrangement and press the Dwell button. Start the engine and allow it to idle for about 15 seconds, during which time the Analyser will memorise the cylinder number. (This is not required if the normal running dwell test was performed immediately prior to this further test- with the inductive pick-up connected.) Check the dwell function indicator is illuminated and number of cylinders are displayed.</p> <p>Crank the engine for 5 seconds or more, and check the display/print out.</p> <p>For reading % Dwell again use the general lead hook up, without the inductive pick-up connected. It is not necessary to idle the engine whilst the Analyser memorises the cylinder number. Instead turn the power off for a few seconds and then back on.</p>
Duty Cycle	Use the general lead hook up arrangement and press the Dwell button. Start the engine and allow it to idle for about 15 seconds, (not necessary if running dwell test performed immediately beforehand with inductive pick-up attached.) Detach the red Test Lead from the coil and connect to the point defined in the vehicle's workshop manual for duty cycle testing. Start the engine and confirm the dwell indicator LED and number of cylinders are displayed.
Spark Plug Firing Voltage	<p>The ability of the Sykes-Pickavant Portable Engine Analyser to measure high kilovolt values provides an invaluable extension to the diagnostic capabilities of this product. A variety of tests become possible, allowing the user to investigate more thoroughly the functioning of the HT system, particularly the plug firing voltages. However, even greater depth of diagnosis is possible when the Analyser is used in conjunction with the Portable Scope which is also available, and is described within the S-P catalogue.</p> <p>Plug firing voltages normally fall within the range 5-15kv, sometimes higher on electronic ignition systems, with a 2/3kv variation between cylinders. Higher voltages can be generated when the spark is forced to jump a larger gap or resistance. eg wide plug gaps, poor electrode shape, wide rotor gap. Also a weak mixture can raise the plug kv's. Low plug kv's are less usual, and are often attributable to a rich mixture or over advanced ignition.</p> <p>To conduct this test use the general lead hook up, with the inductive pick-up placed on the lead of the plug you wish to test. Press the kv button and check the correct LED indicator is displayed. The kv reading will take a few seconds to stabilise before a reading should be taken. The test can be conducted at idle, and under snap acceleration load. Under acceleration the rise, and uniformity of rise between</p>

cylinders should be checked- expect a normal rise of 3/4kv.

**RPM** The Analyser should be connected with the red Test Lead to the coil (CB) and black to earth. Select RPM, start the engine and read off RPM.

## **MECHANICAL COMBUSTION SYSTEM**

The Portable Engine Analyser can perform a useful overall "health check" on the functioning of the engine by conducting either an automatic or manual Power Balance check. This type of check allows a comparison to be made between the relative performance of each cylinder, which is a reflection of the total condition of all the mechanical (and electrical) factors at work, ie. valve condition and sealing, piston and ring condition, compression, plus ignition timing etc. To understand how the test works think of a situation in which 4 men are rowing a boat, and their speed is measured. By stopping one man at a time from rowing and checking the effect on boat speed the man who isn't "pulling his weight" can be identified.

Use the general lead hook up and press the Power Balance button. Select Auto for an automatic check, and set the printer to Auto. Start the engine and check the Power Balance LED is illuminated and the RPM displayed. Press Start and the Analyser will proceed with an automatic check through each cylinder.

Initially the engine RPM will be shown with all cylinders operating. Then engine RPM will be shown with the test cylinder disabled. Finally a Power Balance value for that cylinder will be shown. This value will be given as a % drop. When the Analyser has worked through the cylinder sequence, in firing order, the printer will produce a print out showing the values for each cylinder.

A manual Power Balance check is possible by switching to "Man". The number of cylinders display will show 1, 2, 3, 4 etc representing the first, second, third etc in the firing sequence. When the cylinder number you wish to test is showing, immediately press the Start button. At the conclusion of each cylinder test the Analyser will again show engine RPM, disabled RPM, and then a % value. The printer will print the value and disabled RPM, and then the Analyser will return to the cylinder "count", for another to be selected.

**NOTE 1:** If the vehicle is fitted with a thermostatically controlled cooling fan and/or an electronic idle speed control, these devices must be prevented from operating during the test otherwise the results will be invalidated.

**NOTE 2:** If the vehicle is fitted with a Catalytic Exhaust System it is possible that the Power Balance check will cause very high temperatures in the exhaust system; allow sufficient cooling time before repeating tests.

## **SPARES**

Your Sykes-Pickavant Portable Engine Analyser should require little in service maintenance, and few parts are replaceable by the user. If you suspect your unit requires service please refer to the Guarantee section which explains the procedure in detail. Under no circumstances should the unit be repaired by an unauthorised person.

Battery/Power Lead	No 300621
Inductive Pick-Up and Lead	No 300623
KV Pick-Up and Lead	No 300625
Test Leads	No 300627
Thermal Paper Rolls (packs of 10)	No 300629

## **S.P. DIAGNOSTICS GUARANTEE**

Sykes-Pickavant guarantee to the original purchaser that this product will be free of defects in material and workmanship for a period of 12 months from the date of purchase, providing it has not been damaged by accident, negligence, alteration, improper installation maintenance or repair.

Any product which fails during the guarantee period will be repaired or replaced, without charge, providing it has been carefully packed to avoid transit damage, and that proof of purchase is supplied with the returned goods. Consumable items such as batteries, fuses, bulbs etc are excluded from the scope of this guarantee.

A written description of the problem should be sent to the Company as soon as reasonably practicable after a defect is noticed, and no further use should be made of the product before the Company is given the opportunity of inspecting it.

Products from the S-P Diagnostics range are also subject to the general Conditions of Sale published by Sykes-Pickavant in both the Company's Price List and Catalogue.

## **SERVICE PROCEDURE**

### **A) Guarantee Registration**

Please return the postage paid Guarantee Card within one week of purchase. This will enable our Service Department to quickly process any guarantee claim that may be necessary, and will also ensure that you are kept up to date with new products introduced by Sykes-Pickavant.

### **B) Guarantee Claims**

Return the unit direct to your supplier, with a written description of the problem, and proof of purchase (eg. original invoice). Your supplier will contact Sykes-Pickavant and ensure the product is packed and returned safely.

### **C) Out of Guarantee service**

You can either return the unit to the Sykes-Pickavant Service Department directly, or through your normal supplier. Products within the S-P Diagnostics range can be repaired for a fixed charge, which includes a thorough condition check, and service. During this service all faults are repaired and excessively worn components replaced. After servicing, products are fully guaranteed against faulty materials and workmanship for 6 months, unless otherwise stated.

If you return your product through your normal supplier, they will undertake to return the goods safely and will advise the Service Charge payable to them.

If you wish to return goods directly to Sykes-Pickavant you should telephone or write to the Service Department who will advise the Service Charge and carriage payable. Your

cheque, made payable to Sykes-Pickavant Ltd, should accompany the goods. Please note that if you are returning goods directly you must ensure they are correctly packed as Sykes-Pickavant cannot be held responsible for damage in transit.

D)Service outside the U.K.

As servicing arrangements may vary from one overseas market to another you should check with your local supplier for full details of both "In" and "Out" of Guarantee servicing.

E)Transit Packaging

If possible you should retain the packaging in which the product was first supplied as it can often prove difficult to find suitable material when it is necessary to return a product for service.

F)Service Return Number

Before returning any product,both distributors and users are requested to telephone,fax or write to the address below to obtain a Service Return Number. This will help us to ensure your returns are dealt with in a speedy and efficient manner.

SYKES-PICKAVANT LTD  
SERVICE DEPARTMENT  
KILNHOUSE LANE  
LYTHAM ST ANNES  
LANCASHIRE FY8 3DU  
ENGLAND  
TEL.0253 721291  
FAX.0253 713076



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# Sykes-Pickavant Ltd.

Kilnhouse Lane, Lytham St. Annes, Lancs, FY8 3DU England  
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