
SBS 7671

All-in-One Tester
Operating Instructions

225A927



Bracken Hill, South West Industrial Estate,
Peterlee, Co. Durham SR8 2SW. England.
Tel: 0191-586 3511 Fax: 0191-586 0227
www.seaward.co.uk
sales@seaward.co.uk
calibration@seaward.co.uk

Table of Contents

SAFETY	1
NOTICE	1
BATTERIES	3
INTRODUCTION & DESCRIPTION	4
LAYOUT	4
Keyboard	5
DISPLAY	7
ESSENTIAL OPERATING PROCEDURE	9
Turning On & Off	9
Keyboard & Feedback	9
Selecting the Function	9
Before Any Test	9
CONTINUITY TESTS	10
Controls	10
Test Procedures:- Please Read Carefully	11
Connections	11
Voltage Indication	11
Performing the Test	11
Displayed Messages During Continuity Tests	12
IEE Wiring Regulations - 16th Edition	13
Calculating Cable Lengths	15
INSULATION RESISTANCE TESTS	16
Controls	16
Test Procedures:- Please Read Carefully	16
Connections	16
Voltage Indication	17
Performing the Test	17
Displayed Messages During Insulation Tests	18
IEE Wiring Regulations - 16th Edition	18
LOOP IMPEDANCE TESTS	20
Controls	20
Test Procedures:- Please Read Carefully	20
Connections	20
Performing the Test	21
Displayed Messages During Loop Tests	24
IEE Wiring Regulations - 16th Edition	25
RCCB TESTS	26
Controls	26
Test procedures:- Please Read Carefully	27
Connections	27
Performing the Test	28
Displayed Messages During RCCB Tests	29
IEE Wiring Regulations - 16th Edition	31

Table of Contents

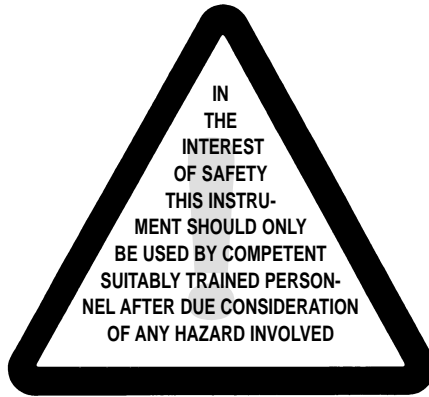
STORING RESULTS	32
Controls	32
Procedure	32
Displayed Messages During Storing Results	32
STORING A RECORD NUMBER	32
Controls	32
Procedure	33
Displayed Messages During Storing Record Numbers	33
DOWNLOADING RESULTS	34
Installing the Downloader Utility Software	34
Downloading Results from the Tester	34
Displayed Messages During Downloading Results	35
Data Output	35
MEMORY CLEAR	36
Important	36
Controls	36
Procedure	36
Displayed Messages During Memory Clear	36
SAFETY FEATURES	37
SPECIFICATION	38
MAINTENANCE	39

Section 1 - Introduction

SAFELY USING THE SBS 7671

Read Instructions fully before use.

Due to the potential hazard associated with any electrical circuit it is important that a user is fully familiar with the instructions covering the capabilities, applications and operation of this instrument. The user should ensure that all reasonable safety procedures are followed and if any doubt exists should seek advice before proceeding.



Avoid working alone

Inspect the test leads for damaged insulation or exposed metal Check test lead continuity. Damaged leads must be replaced

Do not use the Tester if it looks damaged

When using the probes, keep fingers away from the probe contacts

Place test leads in proper terminals

The SBS 7671 performs a number of electrical tests which involve high voltages and high currents. **Never touch the circuit under test or any exposed metalwork** whilst the testing procedure is followed. Ensure that any other personnel in the area of the circuit under test are prevented from exposure to hazard whilst the tests are in progress. If in doubt **do not** test.

Section 1 - Introduction

Symbols used on the SBS 7671 and in the manual:



Equipment protected throughout by double or re-inforced insulation



Caution - risk of electric shock



Caution (refer to accompanying documents).

Statement of conformity

The SBS 7671 is in conformity with Electromagnetic Compatibility Directive 89/336/EEC and Low Voltage Directive 73/23/EEC

Standards used:

EN 61010.1 (1995)

Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.

EN 50081-1 (1992)

Electromagnetic Compatibility. Generic Emission Standard EN 55022 Class B

EN 50082-1 (1992)

Electromagnetic Compatibility. Generic Immunity Standard EN 55022: IEC1000-4-2, -4-3, -4-4, -4-5


NOTICE

Data may be lost or altered in virtually any electronic memory under certain circumstances. Therefore Seaward Electronic assumes no responsibility for financial losses or claims due to data lost or otherwise rendered unusable whether as a result of abuse, improper use, defects, disregard of operating instructions or procedures, or any other allied causes.

The information contained in this manual is subject to change without notice.

Section 1 - Introduction

BATTERIES

The SBS 7671 is powered by six internal primary C cells. The unit warns the user that battery replacement is required by the  LCD annunciator. To replace the batteries the following procedure should be followed.

REMOVE ALL TEST LEADS.

Using a broad bladed screwdriver turn each battery compartment cover catch anti-clockwise by 90° and remove cover.

Remove old batteries, check compartment for any sign of leakage.

Carefully insert new batteries ensuring they are fitted with the **correct polarity**.

Replace battery compartment cover and secure by turning catches 90° clockwise.



Do not attempt to operate the SBS 7671 with the battery compartment cover removed.

On insertion of the batteries the SBS 7671 will automatically power up. However before use ***turn off the unit and then turn back on again*** in the normal manner, this ensures that the unit restarts correctly. It should be noted that replacement of the batteries will cause the SBS 7671 to lose all default range selections.

The EEPROM data memory will be unaffected.

The SBS 7671 should be turned off by depressing & holding RCCB until the display clears. The unit will automatically power down after approximately 10 minutes.

BATTERIES

Alkaline recommended

Ever-Ready Energizer LR14B2, Duracell MN1400

In an emergencies Zinc Carbon or Nickel Cadmium cells will operate the SBS 7671 but their use is not recommended by Seaward Electronic Ltd.

Section 1 - Introduction

INTRODUCTION & DESCRIPTION

The SBS 7671 is one of the most advanced portable installation testers available, performing five functions and providing a comprehensive guide to the electrical safety of installations wired to the 16th Edition of the IEE Wiring Regulation and other International Standards.

The instrument is micro-processor controlled and enables the user to quickly select the test required, review and store the results obtained. In addition to test results the SBS 7671 can record the circuit number. All test results can be downloaded to a computer using the downloader software provided. All test results are stored in an internal EEPROM memory which has essentially an infinite storage duration.

LAYOUT

The SBS 7671 is contained in a robust ABS/Polycarbonate injection moulded case which accommodates all the micro-processor controlled circuitry.

The base control panel of the instrument features a sixteen key keypad for control of the test sequence and the input of data into the test instruments memory. In the right hand section are high voltage test sockets for the Continuity & Insulation test and an IEC connector for RCCB (RCD) & Loop tests. An Earth Probe socket is also fitted.

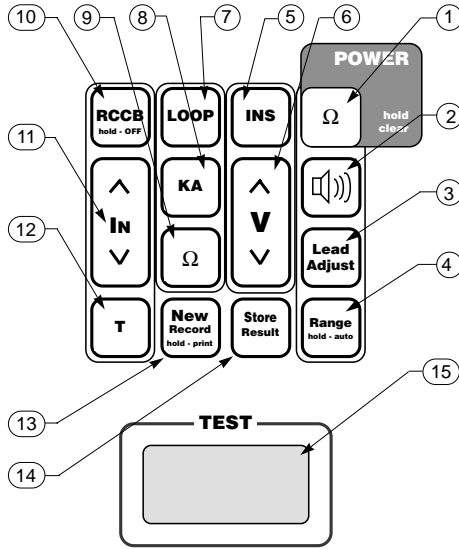
The standard SBS 7671 performs five functions which include:

- 1. Circuit Continuity Resistance**
- 2. Circuit Insulation Resistance**
- 3. Circuit Earth Loop Impedance**
- 4. Circuit Prospective Short Circuit Current**
- 5. Circuit Residual Current Breakers**

The control and use of the SBS 7671 is extremely simple with a clear explicit keypad and large custom designed liquid crystal display.

Section 1 - Introduction

KEYBOARD



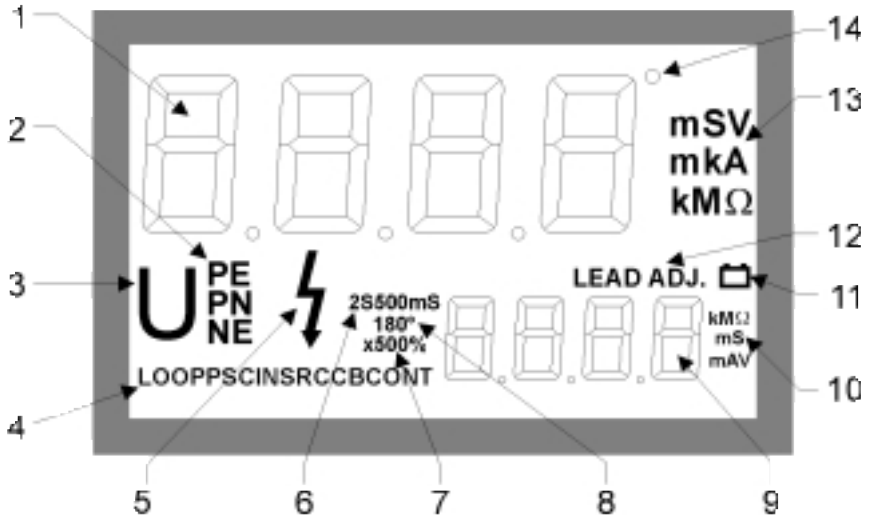
- | | |
|--|--|
| <p>1 Button Name
 Primary Function
 Secondary Function</p> <p style="text-align: center;">Caution:</p> | <p>Continuity Test. Functions in all modes.
 Selects Continuity Test function.
 Turns SBS 7671 On.</p> <p>When held down clears EEPROM data memory of all stored test results.</p> |
| <p>2 Button Name
 Primary Function
 Secondary Function</p> | <p>Sounder. Functions only in Continuity mode.
 Turns audible tone on & off.
 None.</p> |
| <p>3 Button Name
 Primary Function
 Secondary Function</p> | <p>Lead Adjust - Continuity mode only.
 Nulls out test lead resistance.
 None.</p> |
| <p>4 Button Name
 Primary Function
 Secondary Function</p> | <p>Range. Functions only in Continuity mode.
 Changes decade of ranges.
 Hold down to select Auto-ranging on Continuity test.</p> |
| <p>5 Button Name
 Primary Function
 Secondary Function</p> | <p>Insulation Test. Functions in all modes.
 Selects Insulation Test mode.
 None.</p> |
| <p>6 Button Name
 Primary Function
 Secondary Function</p> | <p>Insulation Test Voltage Select.
 Increments or decrements Insulation Test voltage.
 None.</p> |

Section 1 - Introduction

7 Button Name	Loop Test. Functions in all modes.
Primary function	Selects Earth Loop Test mode.
Secondary Function	None.
8 Button Name	KA. Functions only in Loop Test mode.
Primary Function	Selects Prospective Short Circuit Test mode.
Secondary Function	None.
9 Button Name	Ω Functions only in Loop Test mode.
Primary Function	Selects Earth Loop Resistance function.
Secondary Function	None.
10 Button Name	RCCB Test. Functions in all modes.
Primary Function	Selects RCCB test mode.
Secondary Function	Hold down to turn off the SBS 767.
11 Button Name	RCCB Test Current Select.
Primary Function	Increments or decrements RCCB test current.
Secondary Function	Record Number Editing mode - increments or decrements digit selected by edit cursor.
12 Button Name	RCCB Test Duration / Ramp Select.
Primary Function	Selects RCCB test duration or Ramp Test.
Secondary Function	Hold down to select the RCCB Auto-test mode. Record Editing Mode - sets the Record Number edit cursor position.
13 Button Name	New Record. Functions in all modes.
Primary Function	Enters/Exits Record Number Editing mode
Secondary Function	Hold down to send stored data to RS232 port.
14 Button Name	Store Result. Functions in all modes, result data memory cleared if any other buttons pressed prior to 'Store Result'.
Primary Function	Enters Review Mode and recalls last test result(s).
Secondary Function	Review Mode - Hold down to store last test result(s) in EEPROM Record Editing Mode - stores the Record Number in EEPROM.
15 Button Name	TEST. Functions in all modes.
Primary Function	Continuity and Insulation - a single press will initiate a 2s test. RCD - a single press will initiate a test Loop / PSC - Press and hold until a reading is obtained
Secondary Function	None.

Section 1 - Introduction

DISPLAY



- | | |
|---|---|
| <p>1 Display Area
Function</p> | <p>Upper Display.
Displays test conditions, error messages, results and the Record Number.</p> |
| <p>2 Display Area
Function</p> | <p>Polarity Indicators
Indicates that line potential exists on one or more of the IEC connector pins.</p> |
| <p>3 Display Area
Function</p> | <p>Voltage Indicator
Indicates that line potential exists on one or more of the IEC connector pins.</p> |
| <p>4 Display Area
Function</p> | <p>Mode Indicator
Indicates which test mode the SBS 7671 is in.</p> |
| <p>5 Display Area
Function</p> | <p>Voltage Indicator
Indicates that a potential difference greater than 30V exists between the Red & Black 4mm sockets.</p> |
| <p>6 Display Area
Function</p> | <p>RCCB Test Duration Annunciators.
During the Auto RCCB test mode it indicates the duration of the test presently being executed.</p> |

Section 1 - Introduction

- | | |
|------------------------------------|---|
| 7 Display Area
Function | RCCB Test Current Multiplier.
During the Auto RCCB Test Mode it indicates the multiplier being applied to the set test current for the test presently being executed. |
| 8 Display Area
Function | RCCB Test Phase Indicator.
Shows the starting phase angle for the RCCB test. |
| 9 Display Area
Function | Lower Display.
Displays test conditions and the Record Number. |
| 10 Display Area
Function | Lower Display Scaling
Gives scaling information for numeric information on lower display. |
| 11 Display Area
Function | Battery Warning
Gives warning of low battery. |
| 12 Display Area
Function | Lead Adj. Annunciator
Indicates that displayed continuity resistance has lead resistance nulled out. |
| 13 Display Area
Function | Upper Display Scaling
Gives scaling information for numeric information on upper display. |
| 14 Display Area
Function | Upper Display Scaling
Indicates that the Continuity Sounder is enabled. |

Section 1 - Introduction

ESSENTIAL OPERATING PROCEDURE

Turning The Tester On & Off

The SBS 7671 is turned on by pressing the key in the top right-hand corner of the pad (marked Ω). The unit will give an 'OK Beep' as it enters & exits a display test to confirm correct power up. The unit is powered off by pressing & holding the key in the top left-hand corner (marked RCCB). The unit will power-down automatically if the SBS 7671 is unused for approximately 10 minutes.

Keyboard & Feedback

The SBS 7671 is designed to give the user feedback whilst using the keypad. In any given function valid key depressions give a short high pitched 'OK beep'. Invalid key depressions result in a long low pitched 'error beep'. The keyboard has many second functions available which are accessed by pressing & holding the key for more than 1 second when the second function will be recognised and the above feedback will again apply. Not all keys operate in every test mode. The user should check the keyboard description section of the manual for confirmation of the operating modes of each key.

Selecting the Function

The test you require is selected by pressing one of the keys in the top row of the keypad. Range selection and optional modes are selected by using the keys in the column directly below the function key selected.

Before Any Test

Always:

- 1. Inspect the condition of the SBS 7671 before use. If damaged do not use. Especially ensure that the sliding cover over the test terminals is correctly in place and undamaged.**
- 2. Check the condition of the test leads by inspecting for evidence of damage to the insulation or internal conductors. Regular continuity checks of all test leads should be undertaken, any that exhibit high or intermittent impedance should be discarded.**
- 3. Ensure that the correct leads are fully inserted into the SBS 7671 before undertaking any tests.**

Section 2 - Continuity Tests

CONTINUITY TESTS

Controls



This key sets the SBS 7671 into the Continuity Test mode.



The SBS 7671 has the ability to emit a tone on test whose frequency is inversely proportional to the resistance being measured in the 20 Ω range. The tone is toggled on or off by this key. When the sounder is enabled a small circle will be shown on the LCD. It does not affect the audio feedback from key presses or other functions of the SBS 7671 operation.

Lead Adjust

This key controls the ability of the SBS 7671 to null out test lead resistances on 20 Ω and 200 Ω ranges

Range

This key determines the ranging of the continuity function. By repeatedly pressing the key the unit cycles through its measurement ranges (20 Ω , 200 Ω , 2.000k Ω , 20.00K Ω and 200.0k Ω)

Auto

By holding the key pressed for more than one second the unit will select auto-ranging. The unit will select the most appropriate range to measure & display the continuity resistance under test.

TEST

This initiates the continuity test. A single press will result in a 2s test. If the TEST button is held the test will continue for up to one minute. If the SBS 7671 detects an error of any kind then the test will be aborted with an 'Error Beep'.

Section 2 - Continuity Tests

TEST PROCEDURES:- Please Read Carefully

Connections



Ensure that the circuit under test is de-energised.

Connect the red & black test leads to the respective 4mm sockets of the SBS 7671. If necessary slide the connector cover up to reveal the sockets. All other leads should be disconnected. Connect the leads to the circuit to be tested.

Voltage Indication

If volts are present on the circuit under test the unit will give an audible warning (if over 30v) and will display the voltage (AC or DC) on the upper display. AC is indicated by a flashing '!' sign on the upper display.

Performing a Continuity Resistance Test

- 1) Check the condition of the SBS 7671 and the test leads.
- 2) Switch on the SBS 7671 by pressing 'Continuity Test' (Ω).
- 3) Connect to the circuit to be tested.
- 4) If no voltage is indicated press and release the **TEST** switch.

If volts are present then the unit will emit an 'Error Beep' when **TEST** is pressed and the unit will not enter the continuity test mode.

The upper display will show the resistance of the circuit including the test leads. The resistance display is continually updated. Resistance values exceeding the range selected (or 199.9k Ω in auto-ranging) will generate an over-range indication of **'HI'** on the upper display.

The result can be reviewed by briefly pressing **'Store Result'**. If test settings are changed then the review memory is automatically cleared.

Section 2 - Continuity Tests

Lead Adjust

To null out the test lead resistance when on the 20 Ω and 200 Ω manual ranges, short the test leads together and hold the '**Lead Adjust**' key until the measured resistance is stable. The test lead resistance is displayed on the upper display and is then stored.

Whilst the '**Lead Adjust**' annunciator is displayed this stored resistance will be used to null out the lead resistance in subsequent measurements. ***This feature is invalidated if the range is changed.***

Successive depressions of the key will then switch the test lead resistance in or out so the user can choose whether fully nulled readings are required. If a lead adjust measurement has not been stored the SBS 7671 will return an 'Error beep' to warn the user.

Notes

The resistance range includes the nulled test lead measurement. This could result in an over range indication even if the measured resistance is below the full-scale value.

The lead adjust feature has a resolution of 10m Ω . After using this feature it is not uncommon for a subsequent check to reveal a slightly different reading. This will be due to a small change in the contact resistance of the shorted leads

Displayed Messages During Continuity Tests

Upper Display

HI The resistance exceeds the presently selected range (or 200k Ω in Auto-ranging).

_ If the polarity sign flashes, an AC voltage was detected

Lower Display

AUTO The SBS 7671 is in auto-ranging mode.

Section 2 - Continuity Tests

Annunciators

CONT This shows that the SBS 7671 is in continuity resistance testing mode.

LEAD This shows that the resistance displayed on the upper
ADJ display has had the test lead resistance subtracted



This shows that the voltage across the test terminals exceeds 30v.

IEE Wiring Regulations - 16th Edition

Test requirements for continuity resistance measurements as defined in the guidance notes to the 16th Edition IEE wiring regulations are summarised as follows:

Continuity of Ring Circuit Conductors

The aspect to be noted in this test is that although the Regulation concerned calls for the continuity of all conductors in a ring to be verified to ensure there are no interconnecting multiple loops the suggested method of testing requires a measurement to be undertaken.

Method

- a) Temporarily connect a Phase conductor of one leg of the ring and the Neutral conductor of the other leg.
- b) Measure the resistance between the remaining (i.e. Inward Phase and outward Neutral) Phase and Neutral conductors.
- c) A finite reading will confirm no open circuit on the ring conductors under test.
- d) Temporarily bridge the remaining Phase/Neutral conductors.
- e) Measure and note the resistance between Phase and Neutral contacts at each socket outlet around the ring.
- f) The readings should be substantially the same providing no multiple loops exist.
- g) Where the Protective conductor is in the form of a ring carry out the procedure in (a) above but for "Neutral" conductor read "Protective" conductor.
- h) Measure the resistance between the remaining Live conductors and the remaining unconnected circuit Protective conductor at the origin of the circuit.
- i) A finite reading confirms no open circuit.

Section 2 - Continuity Tests

- j) Temporarily bridge the remaining circuit Protective conductor and Live conductor.
- k) Measure the resistance between the circuit Protective conductor and the Live contacts at each socket outlet around the ring.
- l) The readings (equal to R1 and R2 for the circuit) should be substantially the same providing no multiple loops are present.

Note

R1 is the Phase conductor and R2 is the protective conductor.

Continuity of Protective Conductors

This regulation requires that every protective conductor to be separately tested to verify that it is electrically sound and correctly connected.

It should be noted that:

- a) That any extraneous conductive part used for equipotential bonding shall be included in this test.
- b) That the test not only be carried out before the supply is connected but also before any other test involving these connectors is made. The source of energy for the test instrument should therefore be from an alternative source, e.g. a battery.
- c) The resistance of the protective conductor is required if the method, defined in Regulation 413-02-12 of limiting the impedance of the Protective conductor to the values in Table 41C, is employed to meet the required disconnection times.

Method 1

Strap Phase and Protective conductor at the Distribution Board and test between Phase & earth terminals at each outlet in the circuit.

Method 2

With one terminal of the tester connected to the installation's earth terminal and a test lead connected to the other terminal of the tester, obtain resistance measurements by making contact with the Protective conductor at various points on the circuit, e.g. lighting fittings, switches, etc. The resistance of the test leads should be deducted from any resistance readings obtained.

Section 2 - Continuity Tests

Calculating Cable Lengths

To calculate the length of cable from measured resistance values the following table should be used:

Conductor Resistances

Maximum resistance per km of copper conductor at 20° C	
Conductor area mm ²	Resistance (ohms)
1	18.1
1.5	12.1
2.5	7.41
4	4.61
6	3.08
10	1.83
16	1.15
25	0.73

Note: The above table applies to solid plain copper conductors based on BS6360

Example calculation for estimation of cable length :-

Cable area 2.5 mm² , measured loop impedance 0.43 ohms
from table, cable resistance 7.41 ohms/km
Cable length = $(0.43/2) / 7.41 = 0.029$ km (29m)

Section 3 - Insulation Resistance Tests

INSULATION RESISTANCE TESTS



Testing insulation resistance requires the application of potentially dangerous voltages to the circuit under test, this may include exposed bonded metalwork. Before proceeding ensure that the installation is correctly wired and no personnel will be endangered by any tests. The Continuity Test facility of the SBS 7671 should be used for this purpose.

Controls

- INS** This key sets the SBS 7671 into Insulation Test mode.
- V** There are two keys which select the test voltage of the insulation test mode. Pressing either of these keys increments or decrements the test voltage through the range of test voltages available (250v, 500v, 1000v). The selected test voltage appears on the lower display
- TEST** This initiates the insulation test. A single press will initiate a 2s test. If the **TEST** button is held the test will continue for up to one minute. If the SBS 7671 detects an error of any kind then the test will be aborted with an 'Error Beep'.

Test Procedures:- Please Read Carefully

Connections



Ensure that the circuit under test is de-energised.

Connect the red & black test leads to the respective 4mm sockets of the SBS 7671. If necessary slide the connector cover up to reveal the sockets. All other leads should be disconnected. Connect the leads to the circuit to be tested.

Section 3 - Insulation Resistance Tests

Voltage Indication

If volts are present the unit will give an audible warning (if over 30v) and will display the voltage (AC or DC) on the upper display. AC is indicated by a flashing '-' sign on the upper display.

Performing an Insulation Resistance Test

- 1) Check the condition of the SBS 7671 and the test leads.
- 2) Switch on the SBS 7671 by pressing 'Continuity Test' (Ω),
- 3) Select 'Insulation Test' (**INS**).
- 4) Select the required test voltage by using the “V” key.
- 5) Connect to the circuit to be tested.
- 6) If no voltage is indicated press the **TEST** switch. If volts are present then the unit will emit an 'Error Beep' when '**TEST**' is pressed and testing will be prohibited.



Whilst TEST is pressed the unit will continually emit a warning tone to remind users that the wiring is now at a high voltage. The test leads should be not be removed from the circuit under test whilst the warning tone is active. Following this procedure will allow adequate discharge of any capacitance present in the circuit under test

The upper display will show the insulation resistance of the circuit (0-1999M Ω). The resistance display is continually updated. An auto-ranging circuit in the SBS 7671 ensures maximum resolution.

Resistance values greater than 1999M Ω will generate an over-range indication of '**HI**' on the upper display. If the insulation resistance is too low for the unit to maintain the selected test voltage the unit will generate an under-range indication of '**Lo**' on the upper display.

Releasing the '**TEST**' switch returns the SBS 7671 to Voltage Measurement mode.

Section 3 - Insulation Resistance Tests

The result can be reviewed by briefly pressing 'Store Result'. If test conditions are changed then the review memory is automatically cleared.

Displayed Messages During Insulation Tests

Upper Display

- HI** The insulation resistance exceeds 2000M Ω .
- Lo** The resistance is too low to maintain the nominal test voltage (try using the continuity test mode).

Annunciators

INS This shows that the SBS 7671 is in insulation resistance testing mode.

 This shows that the voltage across the test terminals exceeds 30v.

IEE Wiring Regulations - 16th Edition

Test requirements for insulation resistance measurements as defined in the guidance notes to the 16th Edition IEE wiring regulations are summarised as follows:

Insulation Resistance

The regulation requires the resistances of conductors and electrical accessories to be measured to verify their compliance within defined standards and that electrical conductors or protective conductors are not short circuited.

The regulation details:

- a) The need to isolate voltage sensitive devices in order that they are not damaged by the test values.

Section 3 - Insulation Resistance Tests

- b) The requirement to disconnect pilot or indicator lamps and capacitors to avoid inaccurate test values.
- c) That all fuses should be in place, lamps removed and switches closed.
- d) That all resistances obtained must not be less than the minimum values detailed in the following table.

Circuit Nominal Voltage	Test Voltage DC	Minimum Insulation Resistance (M _Ω)
Extra low voltage circuits when the circuit is supplied from a safety isolating transformer	250	0.25
Up to and including 500v with the exception of above	500	0.5
Over 500v up to 1000v	1000	1.0
Between SELV circuits & associated LV circuits	500	5.0
Additional withstand test if required e.g. U _o 240v	3750 rms AC for 1 minute	

Method

	At Appropriate Switchboard	
	Single Phase	Three Phase
1) Insulation Resistance between Live conductors	Test between Phase and Neutral Conductors	Test between: Phase 1 to Phase 2 Phase 1 to Phase 3 Phase 1 to Neutral
		Phase 2 to Phase 3 Phase 2 to Neutral
		Phase 3 to Neutral (either singly or grouped)
2) Insulation Resistance to Earth	Test between Phase & Neutral conductors and Earth	Test between all phase bunched with the Neutral conductors and Earth, or test separately between each conductor to Earth where low readings are obtained.

Section 4 - Loop Impedance Tests



Care should be taken during the test phase as the SBS 7671 may cause test leads, Earth conductors and bonded metalwork to rise to line potential.

Before proceeding ensure that the installation is correctly wired and that no personnel will be endangered by any tests.

The CONTINUITY and INSULATION test facilities of the SBS 7671 should be used for this purpose.

Controls

LOOP This key sets the SBS 7671 into the **LOOP** test mode.

KA This key selects the Prospective Short-circuit Current test in the LOOP test mode.

Ω This key selects the Earth test in the **LOOP** test mode.

Test Procedures:- Please Read Carefully

Connections

The SBS 7671 should be fitted with the IEC test lead. If necessary slide the connector cover down to reveal the socket.

Three Pin Socket Outlet

Plug the SBS 7671 into a power outlet in the circuit to be tested.

Bonded Metalwork

Install the Earth Probe into the 4mm socket adjacent to the IEC connector. Plug the SBS 7671 into a power outlet in the circuit to be tested.

Ensure that the appropriate Probe, correctly fused, is used. Ensure that no person is making contact with the bonded metalwork. The Earth probe should be firmly pressed onto a clean area of metalwork under test. If the unit is poorly connected sparking may occur during the testing resulting in inaccurate results.

PSC tests are not available when the Earth Probe is installed.

Section 4 - Loop Impedance Tests

Tests on Luminaires

Replace the IEC mains lead with the optional Seaward Test Lead IPLD4.
Remove the Earth Probe if installed.
Connect the Neutral/Earth probe to the metalwork of the luminaire. Then connect the Live probe to the Live terminal of the luminaire.

Three Phase Circuits

Replace the IEC mains lead with the optional Seaward Test Lead IPLD4.
Remove the Earth Probe if installed. Ensure power is off to the installation.

Connect between Neutral and the Phase under test, ensure Earth is connected correctly.



***To avoid damage to the tester or the circuit under test -
do not connect between Phases
do not connect the Neutral lead to a Phase terminal***

Repeat tests for each phase.

Performing an Earth Loop Test

- 1) Ensure all RCCBs in the circuit are bypassed, i.e. shorted out.
- 2) Check the condition of the SBS 7671 and the test leads.
- 3) Switch on the SBS 7671 by pressing 'Continuity Test' (Ω)
- 4) Select 'LOOP Test' (**LOOP**) and 'Loop Resistance' (Ω).
- 5) Connect the SBS 7671 to the circuit under test and turn on the supply.

The upper display indicates the Phase - Neutral voltage

The lower display shows '**Auto**'.

Annunciators provide a visual display of the mains wiring condition, as shown below.

"PE" Line potential exists between Phase (Live) and Earth.

"PN" Line potential exists between Phase (Live) and Neutral.

"NE" Line potential exists between Neutral and Earth.

If the **NE** annunciator is present then testing will be inhibited.

Section 4 - Loop Impedance Tests

If a wiring fault is indicated then the SBS 7671 should immediately be disconnected from the supply and the fault rectified before any tests are carried out.

For correct mains wiring the **PE** and **PN** annunciators should be present. The test procedure may now be continued.

6) Press and hold the **TEST** button.

The SBS 7671 will display '**tEST**' briefly and the result will then be displayed on the upper display. Releasing the **TEST** button will cause the upper display to revert to Line Voltage indication.

The result can be reviewed by briefly pressing '**Store Result**'.

If test conditions are changed then the review memory is automatically cleared.

Performing Prospective Short-circuit Current Test

An important aspect of compliance with regulations is that electrical systems should be capable of coping safely with any fault condition.

Prospective short circuit measurement (**Ip**) is, as the phrase implies, the current which flows under short circuit **live to neutral** conditions.

The magnitude of the current is limited by the impedance of the circuit up to the location of the fault and comprises of both reactive and resistive components of cables, supply transformers, etc.

A new circuit designed to comply with Regulations will necessitate the measurement of **Ip** and thereby selection of a suitable protective device.

Alternatively when extending an existing system the maximum likely **Ip** will form the basis for the design of the new circuit.

In both these cases it is not necessary to establish the exact level of **Ip** merely to confirm the maximum likely **Ip**.

The SBS 7671 calculates the likely **Ip** by measuring the **Live-Neutral resistance**, adding a reactive component and dividing **240v** by the result.

The reactive component is based on a 1000kVA supply transformer and 300mm sq. cable.

Measurement Method (1Ø 220-260V AC)

- 1) Check the condition of the SBS 7671 and the test leads.
- 2) Switch on the SBS 7671 by pressing 'Continuity Test' (Ω)

Section 4 - Loop Impedance Tests

3) Select 'LOOP Test' (**LOOP**) and 'PSC' (**KA**).

4) Connect the SBS 7671 to the circuit under test and turn on the supply.

The upper display indicates the Phase - Neutral voltage

The lower display shows '**Auto**'.

Annunciators provide a visual display of the mains wiring condition, as shown below.

"PE" Line potential exists between Phase (Live) and Earth.

"PN" Line potential exists between Phase (Live) and Neutral.

"NE" Line potential exists between Neutral and Earth.

If the **NE** annunciator is present then testing will be inhibited.

If a wiring fault is indicated then the SBS 7671 should immediately be disconnected from the supply and the fault rectified before any tests are carried out.

For correct mains wiring the **PE** and **PN** annunciators should be present.

The test procedure may now be continued.

5) Press and hold the **TEST** button.

The SBS 7671 will display '**tEst**' briefly and the result will then be displayed on the upper display.

Releasing the **TEST** button will cause the upper display to revert to Line Voltage indication.

The result can be reviewed by briefly pressing '**Store Result**'.

If test conditions are changed then the review memory is automatically cleared.

It is recommended that when high readings of KA are measured that the test be repeated 2-3 times and the readings used to calculate an average.



Ensure all trips bypassed at the commencement of these tests are re-enabled when the circuit has been tested and before any access by other personnel.

The SBS 7671 is not designed for **sustained connection** or **permanent installation** in a system and should be unplugged when not in use.

Allow a cooling time after prolonged testing sequences.

Section 4 - Loop Impedance Tests

Displayed Messages During Loop Tests

Upper Display

- hot** As a result of successive tests the SBS 7671 can reach a temperature limit. Tests are prevented until the SBS 7671 has cooled. Allow a cooling time (of about 10 minutes) after prolonged testing sequences.
- tESt** Displayed whilst loop test in progress.
- noPN** The SBS 7671 is waiting for circuit power to be applied.
- noPE** Loop test aborted as Earth pin on IEC lead not at Earth potential.
- noPr** Loop test aborted as Earth Probe not at Earth potential.
- Pr** The probe test lead is fitted. This must be removed before PSC testing can commence.
- HI** During Earth Loop Impedance tests: The measured loop resistance is greater than 2000Ω.
During PSC tests: The measured PSC is greater than 24 kA

Section 4 - Loop Impedance Tests

Lower Display

Auto Indicates that the SBS 7671 will select the appropriate test load in the Loop test mode.

Annunciators

LOOP This shows that the SBS 7671 is in the LOOP mode, testing the Earth Loop Resistance.

PSC This shows that the SBS 7671 is in the LOOP mode, testing the Prospective Short-circuit Current.

U, PE,

PN, NE These are voltage indicators showing that line is present on the IEC pins or the Earth Probe. The SBS 7671 will only conduct tests if **PE & PN** are both present and **NE** is absent. In all other cases the unit will not allow tests. The **U** annunciator is displayed if any of the terminals exhibit line potential.

IEE Wiring Regulations - 16th Edition

The earth fault impedance **Zs** should be determined at the furthest point of each circuit including socket-outlets, lighting points, sub-main cables and any fixed equipment.

In an installation where the loop impedance approaches the maximum value in tables **41B1, 41B2 and 41D** precautions should be taken to prevent contact of persons (or livestock) with exposed extraneous conductive parts because potentially dangerous voltages could occur.

Section 5 - RCCB Tests

RCCB TESTS



In order to avoid the possibility of a potentially dangerous voltage appearing between exposed and extraneous conductive parts during the performance of the test, ensure first that the circuit protective conductor is not of a high impedance. The LOOP test facility of the SBS 7671 should be used for this purpose.

Note: The term **RCD (Residual Current Device)** and **RCCB** (Residual Current Circuit Breaker) are interchangeable for the purposes of this document.

Controls

RCCB This key sets the SBS 7671 into the RCCB test mode.

T This key determines the duration of the RCCB test or selects the Ramp test. By repeatedly depressing the '**T**' key the unit cycles through its range of test durations 40mS, 500mS, 2.000S and Ramp test

IN The key is used to increment or decrement the test current through the range of available values. In Auto-test the **Rated Residual Current** ($I_{\Delta N}$) of the RCCB should be selected. The available values are as follows.

Single test:- 500, 300, 250, 150, 100, 50, 30, 25, 15, 10, 5 (mA).

Auto test:- 100, 50, 30, 10 (mA).

Auto Holding the '**T**' key pressed for more than one second will select an Auto RCCB test. This sequence satisfies the test requirements of the 16th Edition. The test sequence is as follows:

50% $I_{\Delta N}$	2.000 s	0°	50% $I_{\Delta N}$	2.000 s	180°
$I_{\Delta N}$	500 ms	0°	$I_{\Delta N}$	500 ms	180°
500% $I_{\Delta N}$	50 ms	0°	50% $I_{\Delta N}$	50 ms	180°

Section 5 - RCCB Tests

The user must reset the RCCB trip several times throughout this test. The upper display will show 'noPE' to indicate that the SBS 7671 is waiting for the RCCB to be reset.

TEST A single press will initiate the RCCB test(s). If the SBS 7671 detects an error of any kind then the test will be aborted with an 'Error Beep' and an error message on the upper display.

Test procedures:- Please Read Carefully

Connections

The SBS 7671 should be fitted with the IEC test lead. All other leads (including the Earth Probe) should be disconnected. If necessary slide the connector cover down to reveal the socket.

Connections to a Single-Phase System

The SBS 7671 can be used to test an RCD on a single phase circuit, either via a socket outlet supplied through the RCCB or directly at the RCCB terminals.

If the RCCB is tested via a socket outlet, the SBS 7671 is plugged directly into the socket outlet.

If the RCCB is to be tested directly at its terminals, then suitable test leads (such as Seaward Part No. 101A914) must be used. The Earth lead should be connected to a suitable Earth. The Neutral lead is connected to the outgoing Neutral lead of the RCCB. The Phase lead is connected to the outgoing Phase terminal of the RCCB.

Connection to a Three-Phase (4-Wire) System

Suitable test leads (such as Seaward Part No. 101A914) must be used when testing an RCCB on a Three-Phase (4-Wire) system.

The Earth lead should be connected to a suitable Earth. The Neutral lead is connected to the outgoing Neutral terminal of the RCCB. The Phase lead is connected to one of the outgoing Phase terminals of the RCCB.

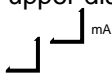


Under no circumstances should the Neutral lead be connected to a Phase terminal. All loads normally supplied through the breaker are disconnected during the test.

Never exceed the voltage rating of the instrument.

Section 5 - RCCB Tests

Performing an RCCB Test

- 1) Check the condition of the SBS 7671 and the test leads.
- 2) Switch on the SBS 7671 by pressing 'Continuity Test' (Ω)
- 3) Select 'RCCB Test' (**RCCB**).
- 4) Connect the SBS 7671 to the RCCB and turn on the supply.
In order to speed repetitive testing the SBS 7671 will recall the previously selected RCCB test conditions.
- 5) Select the type of test required using the "T" key. The upper display shows Test Duration if a trip time test has been selected,  if a trip current test selected or 'Auto' in Auto-test. The lower display shows Test Current (or $I_{\Delta N}$ in Auto-test). Annunciators provide a visual display of the mains wiring condition, as shown below.

- "PE" Line potential exists between Phase (Live) and Earth.
- "PN" Line potential exists between Phase (Live) and Neutral.
- "NE" Line potential exists between Neutral and Earth.

Note

If the **NE** annunciator is present then testing will **not** be inhibited as Neutral is not required for this test. If a wiring fault is indicated then the SBS 7671 **should immediately be disconnected from the supply** and the fault rectified before any tests are carried out. For correct mains wiring the **PE** and **PN** annunciators should be present. The test procedure may now be continued.

- 6) Select the desired test current using the ' I_N ' push-buttons.
- 7) Press and release the '**TEST**' button. Successive tests automatically alternate between 180° and 0° , as indicated by the 'RCCB Test Phase Indicator'

If the RCCB trips the isolation speed or trip current, depending on the test selected, is shown on the upper display. The result can be reviewed by briefly pressing '**Store Result**' (On Auto-Test repeatedly pressing the key will sequence through the 6 test results). If test conditions are changed then the review memory is automatically cleared.

If the RCCB fails to trip the upper display shows '**HI**'.

Section 5 - RCCB Tests

Notes

It is recommended that each breaker is tested at least twice to ensure that tests are simulated at the beginning of both the positive and negative half cycles.

Certain types of RCCB will operate faster when the test current is initiated on one half cycle than when initiated on the other. The RCCB test phase annunciator indicates the polarity of the first half cycle of the AC waveform. After testing the RCCB with the SBS 7671 as described above it is recommended that any test facilities integral with the RCCB be tested according to the manufacturers documentation supplied with the RCCB.



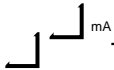
The SBS 7671 is not designed for sustained connection or permanent installation in a system and should be unplugged when not in use.

Allow a cooling time after prolonged testing sequences.

Displayed Messages During RCCB Tests

Upper Display

- hot** If as a result of successive tests the SBS 7671 has warmed up. Tests will be prevented until the SBS 7671 has cooled.
- Auto** The unit is in Auto RCCB test mode and will execute six tests based on the RCCB rated current selected on the lower display when "TEST" is pressed.
- TEST** The unit is executing an RCCB trip time test.



The unit is executing an RCCB trip current test

- noPE** The SBS 7671 is waiting for line power to be applied or the operator to reset the RCCB.
- HI** The SBS 7671 has 'timed out' during a test and the RCCB has not tripped.
- t OL** The voltage on the Protective Earth conductor > 50 Vrms. The RCCB test is disabled.

Section 5 - RCCB Tests

Annunciators

RCCB This shows that the SBS 7671 is in the RCCB testing mode.

50%,

500% These are the test current multiplier annunciators which indicate to the user during an Auto RCCB test what the selected test current on lower display is being factored by at that point in the test sequence. These annunciators are not shown during single RCCB tests.

0°,

180° These are the phase annunciators which indicate to the user during an RCCB test what the starting phase angle is at that point in the test sequence. 0° is the start of the positive half cycle.

U, PE,

PN, NE These are voltage indicators showing that line potential is present on the IEC pins. The SBS 7671 will only conduct tests if PE is present. The U annunciator is displayed if any of the terminals exhibit line potential.

Section 5 - RCCB Tests

IEE Wiring Regulations - 16th Edition Operation of Residual Current Operated Devices (Regulation 713-12-01)

The regulation requires where protection against indirect contact is provided by a residual current device its effectiveness shall be verified by a test simulating an appropriate fault condition and shall be independent of any test facility incorporated in the device.

The test shall be made on the load side of the RCCB at or near as practicable to the point of utilization between the Phase conductor of the circuit protected and the associated circuit protective conductor, so that a suitable residual current flows. Where necessary all loads normally supplied through the RCCB are disconnected during the test.

The effectiveness of the test button or other test facility integral with the RCCB is also to be tested, after application of the externally applied tests described above.

Note 1

Regulation 412-06-02 states that where a residual current device has a rated operating current not greater than 30mA has been installed for protection against indirect contact it is recognised as reducing the risk associated with direct contact provided a residual current of 150mA should cause the device to open within 40mS.

Note 2

Regulation 471-16-01 requires a socket outlet rated at 32A or less which may reasonably be expected to supply portable equipment for use outdoors shall be provided with supply protection by means of a residual current device having characteristics specified in regulation 412-06-02

BS4293 : 1983

Test Current.

50% $I\Delta_N$, RCCB must not trip.

$I\Delta_N$, RCCB must trip within 200mS.

500% $I\Delta_N$, RCCB must trip within 40mS.

Where $I\Delta_N$ = Rated residual current of RCCB.

Section 6 - Storing Results

STORING RESULTS

Controls

Store Result

This key controls the Review Result and Store Result functions of the SBS 7671.

Procedure

It is recommended that the result is reviewed by briefly pressing Store result to recall the results of the last test. This ensures that the test(s) executed was satisfactory before being committed to permanent storage. Press and hold the Store Result key until a second 'OK Beep' is emitted. This confirms that the Reviewed Result has been stored in the EEPROM data memory.

Notes

All six results of an Auto-RCCB test are stored simultaneously with a single Store Result command.

Displayed Messages During Storing Results

The Annunciators, Upper & Lower Displays will show the relevant test conditions and results being stored in the EEPROM data memory.

STORING A RECORD NUMBER

Controls

New Record

This key causes the SBS 7671 to enter or exit the Edit Record Number mode.

Store Result

When in Edit Record Number mode this key causes the SBS 7671 to store the Record Number on the display to be stored in the EEPROM data memory.

Section 6 - Storing Results

T

When in Edit Record Number mode this key causes the SBS 7671 to increment the position of the Edit Cursor (shown by a flashing digit).

I_N

When in Edit Record Number mode this key causes the SBS 7671 to increment or decrement the digit indicated by the Edit Cursor.

Procedure

Press New Record. The display will show the last edited Record Number. The edit cursor remains in the last selected position.

Press T to increment to the digit requiring editing.

Press I_N to increment or decrement the digit in the Record number.

When the Record Number is as required press and hold Store Result until the second 'OK Beep'. The Record Number has now been stored in the EEPROM data memory.

Aborting New Record

If the user decides that a new Record Number is not required at this point in time the procedure can be exited by pressing New Record a second time. The display will then revert to the previously selected test mode.

Displayed Messages During Storing Record Numbers

Upper Display

Most Significant Four Digits of Record Number.

Lower Display

Least Significant Four Digits of Record Number.

Annunciators

None

Section 7 - Downloading Results

DOWNLOADING RESULTS

Installing the Downloader Utility

- 1) Start Microsoft Windows 3.1, Windows 95 or Windows NT.
- 2) Insert Setup Disk 1, e.g., in drive A.
- 3) In Windows 3.1 Program Manager, choose **Run** from the File Menu
In Windows 95 or NT, choose **Run** from the Taskbar
- 4) In the Command Line box, type: **a:setup**
- 5) Click **OK**
- 6) Follow the instructions on the screen. The Setup process leads you through the installation and prompts you to provide information and make several choices before the software is installed.
- 7) After completion, the Downloader utility icon is displayed.

Downloading Data from the Tester

- 1) Connect a serial interface cable from the computer to the Tester.
If necessary, use a 9-way to 25-way adapter or gender changer.
- 2) Click the Downloader utility icon
- 3) Choose **Font** from the setup menu to select an appropriate font for your computer. A non-proportional font will produce a better display.
- 4) Choose **Comms Port** from the setup menu to select the serial communication port the Tester is connected to.
- 5) Choose **Start** from the Download menu to commence downloading data

Section 7 - Downloading Results

- 6) Choose a filename for the data file and click **OK**
- 7) Hold down the New Record key on the Tester until an 'OK' Beep is emitted. This confirms that the download is commencing.
- 8) Choose **View File** from the File menu to view stored download data.
- 9) To terminate the Download utility, select **End** from the Download menu.
- 10) Press the key on the Tester to return to normal operation.

Displayed Messages During Downloading Results

Upper Display

SEnd The unit is in send mode.

DATA OUTPUT

A female 9 pin D type connector is located at the lower right corner of the lid panel.

The data output uses RS232 levels using $\pm 5v$ DC.

Pin 5 0 V

Pin 3 Data Out

Pin 2 Busy

Pin 1, 2, 4, 6-9 No Connection

The data format is as follows;

Baud Rate 1200

Start Bits 1

Stop Bits 2

Data Bits 8

Parity None

Section 8 - Clearing Memory

MEMORY CLEAR

NOTE

*The Memory Clear function cannot be reversed
and all stored data will be lost.*

Controls

Ω

This key sets the SBS 7671 into the Continuity Test mode and clears the memory.

Procedure

It is recommended that the SBS 7671 is disconnected from any circuits under test.

Switch on the SBS 7671 by pressing 'Continuity Test' (Ω).

Hold down W for several seconds. The SBS 7671 will emit five 'Error Beeps' to warn the user. It will then emit a second 'OK Beep'. This confirms that the memory has been cleared.

The SBS 7671 is then ready for further tests.

Displayed Messages During Memory Clear

None

Section 9 - Safety Features

SAFETY FEATURES

Fuse Protection

To protect against misuse or internal component failure all circuits are protected by internal fuses. Under normal conditions these do not require replacement.

Thermal Protection

During normal operation the circuitry of the SBS 7671 generates heat. The unit detects when a safe limit has been reached and prevents further tests. The user is notified if testing has been suspended for this reason. A second, independent, thermal trip will switch off the SBS 7671 if for any reason the unit continues to overheat.

IEC1010

To maximise user safety the SBS 7671 has been designed to the requirements of IEC1010.

Prevention of Ω & INS Tests if Volts Present

To prevent damage to the SBS 7671 Continuity and Insulation tests are electronically prevented if voltages in excess of 30v AC/DC are present on the circuit being tested.

Audible Indication of Volts Present

If the SBS 7671 detects voltages in excess of 30v AC/DC during Continuity and Insulation tests the user is warned by an audio tone. This includes the high test voltage generated by the SBS 7671 during Insulation Tests

Prevention of RCCB & Loop Tests if PE or PN Not Present.

The SBS 7671 detects incorrect connection during Loop and RCCB tests and prevents tests.

Section 10 - Specifications

SPECIFICATION

Continuity

Range	19.99 Ω to 199.9k Ω manual or auto-ranging
Test Voltage	6V DC nominal, 200mA into 20 Ω (20 Ω range only).
Accuracy	$\pm 2\%$ ± 2 counts on all ranges.
Audio	Variable audio feedback on resistances between 0-20 Ω Audible warning if connected to voltages $>30V$ AC/DC.
Misc.	Test lead adjust to null out lead resistance (20 Ω & 200 Ω manual ranges only). Input protected to 1000V.

Insulation

Range	1.999M Ω to 1999M Ω
Test Voltage	250V, 500V and 1000V (+20% -0% @ 0 - 1mA)
Accuracy	$\pm 2\%$ ± 2 counts to 100M Ω
Misc.	Input protected to 1000V Audible warning if connected to voltages $>30V$ AC/DC. 1 minute Test Timer.

Loop

Test Current	24A RMS nominal (into 0 Ω)
Range	19.99 Ω to 1999 Ω Earth Loop 0 - 24.0 KA PSC
Accuracy	$\pm 2\%$ ± 2 counts (0.1 Ω to 2000 Ω)
Duration	2 positive half cycles
Misc.	Test prevented if incorrectly connected. Thermally protected. Automatic Probe selection. Probe locked out during PSC tests.

Section 10 - Specifications

RCCB

Test Current

Manual Tests 5, 10, 15, 25, 30, 50, 100, 150, 250, 300, 500 mA

Auto Test 10, 30, 50, 100 mA

Accuracy -0%, +10% for tests at I D N
-10%, +0% for tests at 50% I D N

Duration 50mS, 500mS, 2000mS

Measurement

Accuracy $\pm 2\%$ ± 2 counts

Resolution 1mS on time measurement, 1mA on current measurement

Misc. Test prevented if incorrectly connected.
Thermally protected.
Automatic phase alternation.

Data Storage & Download

Capacity

Tests

2700 storage locations. Each test occupies 1 storage location excepting Auto RCCB test which occupies 6 storage locations.

Records

Essentially unlimited number, record number occupies 2 test locations.

Duration

EEPROM based, essentially unlimited.

RS232 Interface

9 pin D connector, 1200 Baud, 1 start bit, 2 stop bits, 8 data bits, no parity.

Section 10 - Specifications

General

Batteries: Six 'C Size' (IEC size 14) 1.5V Alkaline Cells.

Consumption (typ.):

Standby (Off)	350 μ A
Waiting for Operator	150mA
Continuity into s/c	550mA (20 Ω range) 200mA (200k Ω range)
Insulation Test	300mA (250v into 250k Ω) 550mA (1000v into 1M Ω)

Mains Supply: 220 - 240V AC \pm 10%, 45-66 Hz (required for Loop & RCCB tests only).

Fuses:

IEC / Mains Lead	5A
Earth Wander Lead	7A, 1.25".
Continuity/Insulation Leads	500mA, 660V, Low resistance, 1.25".

Environmental:

Operating Temperature	0°C to 40°C.
Storage Temperature	-10°C to 70°C.
Calibration Temperature	20°C \pm 2°C.
Relative Humidity	Maximum 80% up to 31°C.
Decreasing to 50% at 40°C.	
For Indoor use, Altitude up to 2000m.	
Installation Category III	
Pollution Degree 2.	

Weight

1.5 Kg excluding batteries.

Size

250mm x 200mm x 150mm (approx.)

Accessories

IEC/Mains Lead	106A914
Earth Wander lead	183A915
Insulation/Continuity lead	44B075
IPLD4 lead.....	106A300
RCCB Wander lead.....	101A914

Spares

The unit contains no user serviceable parts with the exception of the internal batteries.

Section 11 - Maintenance

MAINTENANCE

The SBS 7671 is a rugged quality instrument, however care should be taken, failure to do so will reduce the instruments life and hinder its reliability.

1. Always check the SBS 7671 and all test leads for signs of damage prior to use.
2. Keep the SBS 7671 clean and dry.
3. Avoid testing in conditions of high electrostatic or electromagnetic fields.
4. No attempt should be made to gain access to the instrument while under test conditions.
5. Maintenance should only be performed by an authorised personnel.
6. The SBS 7671 contains no user serviceable parts with the exception of the internal batteries. Note: Warranty excludes internal batteries. Batteries should be removed if storing the SBS 7671 for extended periods.

Should the SBS 7671 require service, repair or calibration return the equipment to a recognised dealer or to Seaward Electronic Limited, Bracken Hill, South West Industrial Estate, Peterlee, County Durham, SR8 2JJ, England. The product should be returned post paid where, upon receipt, the owner will be advised of any costs prior to work commencing

