
RC500D RCCB TESTING UNIT

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Specification



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READ INSTRUCTIONS BEFORE USE

Due to the potential hazards associated with any electrical circuit it is important that a user is fully familiar with instructions covering the capabilities, applications and operations of the instruments.

The user should ensure that all reasonable safety procedures are followed and if any doubt exists should seek advice before proceeding.

INSTRUCTIONS FOR THE RC500D

Introduction

The Seaward RC500D Tester has been designed to provide a simple safe means of checking the operation of any RCCB and measuring its speed of operation over a wide range of test currents.

The instrument includes a number of useful features:

- Simple neon indication.
- Comprehensive diagnosis.
- Accurate 3½ digit LCD display of time 0-2000mS.
- Test currents from 5-500mA.
- Zero voltage switching simulates worst condition testing.
- Polarity of the AC cycle during which the test current is initiated will be indicated on the display by a positive (+) or a negative (-) sign.
- The instrument will automatically alternate between commencement cycles with consecutive tests.

The RC500 incorporates a push button switch to select a full AC test current or half wave current to simulate half wave DC current.

The unit requires no battery and therefore practically no maintenance.

Features of the RC500D make it ideal for establishing the compliance of an RCCB with the trip time regulations of BS4293 and for checking the operation of the RCCBs as required by the 15th Edition of the IEE Wiring Regulations.

The unit is suitable for use on both single phase three wire systems (phase, neutral and earth) and three phase four wire systems where the voltage between any phase and earth does not exceed the rating of the instrument.

The RC500D is designed to comply with the current 15th Edition Wiring Regulations by applying a current test pulse of less than 1 second. The timing display will however indicate trip times up to 2 seconds. This facility is provided to enable testing of time delay breaks which may require a fault of up to 1 second duration to activate and then a further period to isolate eg 1200mS.

IMPORTANT

IN ORDER TO AVOID THE REMOTE POSSIBILITY OF A POTENTIALLY DANGEROUS VOLTAGE APPEARING BETWEEN EXPOSED AND EXTRANEIOUS CONDUCTIVE PARTS DURING PERFORMANCE OF THE TEST, IT MUST FIRST BE ENSURED THAT THE CIRCUIT PROTECTIVE CONDUCTOR IS NOT OF A HIGH IMPEDANCE, IE GREATER THAN 100 OHMS.

TEST PROCEDURES - PLEASE READ CAREFULLY

CONNECTIONS

(a) Connections to a Single Phase System.

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

If the RCCB is to be tested via a socket outlet, the Test Unit is plugged directly into the socket outlet.

If the RCCB is to be tested directly at its terminals, then suitable test leads must be used. 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 the outgoing phase terminal of the RCCB.

(b) Connection to a three Phase (4 Wire) System

Suitable test leads 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.

Important

- (1) Under no circumstances should the neutral lead be connected to a phase terminal.
- (2) All loads normally supplied through the breaker are disconnected during the test.
- (3) Never exceed the voltage rating of the instrument.

PERFORMING THE TEST

Step 1. With the Test Unit connected and the supply switched on the symbol '▲' will appear at the top left hand side of the display. The symbol will disappear after approximately 5 seconds when the unit is ready to perform a test. Allow the digital display to settle and return to zero. The indicators provide a visual display of the mains wiring condition, as shown below.

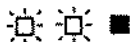
Indicators	Faults
 ■ ■	(a) Disconnected neutral conductor
■  ■	(b) Disconnected protective conductor
■  	(c) Phase and neutral reversed

 = illuminated indicator

If none of the indicators illuminate then there is either a disconnected phase conductor or a failure of the supply or the instruments internal fuse may have operated.

If a wiring fault is indicated, the Test Unit should immediately be disconnected from the supply and the fault rectified before any tests are carried out.

If the mains wiring is correct, the indicators will illuminate as follows:



The test procedure may now be continued.

Step 2. Select the AC or DC test current by depressing the left hand push button. When the latching switch is depressed the AC sign ~ will appear on the display and a full AC test current will flow during test, this is the normal test position.

When the latching switch is released the AC sign ~ will disappear from the display and a half wave test current will flow during test, the polarity being indicated by the cycle polarity sign on the LCD.

Step 3. Select the desired test current with the rotary switch.

Step 4. Press and release the test button.

If the RCCB trips, the mains wiring indicators will be extinguished and the isolation speed recorded on the display. The trip time will be displayed for approximately 5 seconds.

If the RCCB fails to trip, the neon indicators will remain illuminated and the time display will blank with the exception of the left hand digit 1 (over range indication).

Repeat the test with the breaker reset and the RC500D will automatically commence the test at the start of the alternate half cycle.

eg if the first test is conducted at 0° ie at the start of the positive cycle (the positive sign will be displayed on the display), the second test will automatically commence at 180° ie at the start of the negative cycle (the negative sign will appear on the display).

Note

- 1) 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 cycle.
- 2) If the RCCB fails to trip within 2000mS of the test current being applied or if it fails to trip at all the digit 1 will appear on the the display.
- 3) AC testing; under all normal conditions the user will be required to test the RCCB with the full wave AC test current and the AC/DC selector switch should be depressed with the AC displayed on the LCD. This applies to normal testing to BS4293 and the IEE 15th Edition.

Certain types of RCCB will operate faster when the test current is initiated on one half cycle than when initiated at the start of the other. The Polarity sign of the display indicates the polarity of the first cycle of the AC wave form ie positive; 0° negative; 180°.

- 4) Half wave DC; the RC500D is capable of simulating a half wave DC test current.

With the AC/DC latching switch released the instrument will apply a half wave test pulse, the polarity being indicated on the display. The test should be repeated with a test current of the opposite polarity.

As the type and construction of residual current circuit breakers will vary between manufacture it is not possible to provide simple guidance on the test results that will be encountered. Advice should be sought from the manufacture of the RCCB where doubt exists.

- 5) After each test has been performed and the RCCB re-energised the symbol ▲ will appear. The symbol will disappear after approximately 5 seconds and the display will return to 0, the unit is again ready to perform a test.
- 6) The RC500D is not designed for sustained connection or permanent installation in a system and should be unplugged when not in use.
- 7) Allow a cooling time after prolonged testing sequences.

Tripping Requirements of an RCD

IEE Wiring Regulations - 15th Edition

OPERATION OF RESIDUAL CURRENT DEVICES (REGULATION 613-16)

The Regulation requires that the effectiveness of an rcd shall be verified by a test simulating an appropriate fault condition and shall be independent of any test facility incorporated in the device. Item 6 appendix 15 of the Regulation defines the test as follows:

The test is made on the load side of the circuit breaker, between the phase conductor of the circuit protected and the associated circuit protective conductor, so that a suitable residual current flows. All loads normally supplied through the circuit breaker are disconnected during the test.

The rated tripping current shall cause the circuit breaker to open within 0.2s or at any delay time declared by the manufacturer of the device.

In no event should the test current be applied for a period exceeding one second.

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

Note 1: Regulation 412-14 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 471-14 requires an installation which incorporates socket outlets rated at 32A or less, which may reasonably be expected to supply equipment for use outdoors, shall have at least one such socket outlet protected by a residual current device having the characteristics specified in Regulation 412-14.

BS4293:1983

Test Current	Condition
$0.5 \times I_{\Delta n}$	RCCB must not trip
$I_{\Delta n}$	RCCB must trip within 200mS
$5 \times I_{\Delta n}$	RCCB must trip within 40mS
$10 \times I_{\Delta n}$	RCCB must trip within 40mS

($I_{\Delta n}$ ← Rated Residual Tripping Current of RCCB)

Maintenance

In the event of the Test Unit requiring maintenance it should be returned to Seaward (address below) for repair. Unless the instrument is covered by the guarantee (See Section below) a charge will be made for this service. Details are available on request.

Before use ensure the instrument is clean and dry. Check the condition of the mains cable and instrument case.

Avoid storage in damp conditions and excessive temperature variations.

Seaward reserve the right to alter specification without notice.

WARRANTY AND REPAIR

Should this instrument require repair or calibration within the UK it should be returned to:

Seaward Electronic Limited
Bracken Hill
South West Industrial Estate
Peterlee
Co. Durham
SR8 2JJ
England
Telephone: 0191 586 3511 Fax: 0191 586 0227

Overseas

If the instrument owner resides outside the UK, he may either return the instrument directly to Seaward at Peterlee, or to his local sales agent, a list of whom can be obtained from Seaward. It is important that a copy of the invoice and packing note are sent by airmail to clear the product through customs.

Estimated repair charges (where appropriate) and freight charges will be advised to the owner before work is commenced.