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RelayDoc User Manual

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**Note: RelayDocs in service may not have the latest software.

RelayDoc™ User Manual

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This manual, and the product it relates to, might include unintentional technical or typographical errors. From time to time, MRD corrects such errors, and these changes are included in the latest version.

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	Datasheet	www.mrd.com.au/dl/RelayDoc-DS.pdf
	Supported Relays	www.mrd.com.au/dl/RelayDoc-Profiles.pdf
	EU Declaration	www.mrd.com.au/dl/RelayDoc-DoC.pdf

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1. Introduction

This document provides information on the specification, installation and operation of the MRD RelayDoc and RelayDoc-HV automatic relay testers. The differences between the two models are very slight: in this document "RelayDoc" means either model, unless the RelayDoc-HV is specifically mentioned.

The standard RelayDoc configuration is suitable for testing variants of BR930 Relays (a.k.a. Q-Style), including:

- Single & Twin Coil Relays
- Heavy Contact Relays
- Current Relays.

The RelayDoc can be custom built to suit other common industrial relays.

2. Product Description

2.1 Model Identification

The original RelayDoc tests relays requiring a supply voltage <50V DC.

RelayDoc-HV production commenced in July 2016. RelayDoc-HV tests relays requiring a supply voltage <130V DC. It is otherwise identical to the original RelayDoc, including embedded application and web server.

RelayDoc and RelayDoc-HV are externally identical, and run the same software. To identify your model, inspect the serial number tag. If the tag includes hardware version, and the hardware version is C1 or higher, it is a RelayDoc-HV. See sample tags at right.

RelayDoc Serial Number

RelayDoc-HV Serial Number

2.2 Function

RelayDoc automates the process of relay testing, and the recording and management of Test Reports.

A Test Profile is stored for each unique relay type. The profile specifies the method for the individual tests listed below. When a relay is inserted, RelayDoc:

- Identifies the relay type using pin configuration
- Identifies the apparent contact configuration (normally open and normally closed contacts)
- Attempts to match the relay to a stored Profile, and requests user confirmation if none or more than one match is found
- Requests selection of the correct coil resistance if more than one option exists

The RelayDoc stores one default relay test process, which is restored at Power ON. The default test process is changeable within usage sessions, selecting from the following tests:

- Coil Resistance
- Contact Conditioning (cannot be stored as default)
- Contact Resistance
- Contact Switching Time
- Operating Voltage and Current
- Release Voltage and Current

Test Reports can be stored and viewed locally, or copied to a remote server. RelayDoc uses a built-in Web Server to enable remote examination and control of the device and stored report.

2.3 Setup Options

Prior to use, the operator/installer must consider the following setup options:

ITEM	COMMENT
Permanent Installation	Four holes are for wall or panel mounting. What hardware will be required?
Default Test Process	What is the most commonly used or standard process?
IP Address Required	Static or Dynamic? The RelayDoc defaults to a dynamic IP address
Time Zone, Time and Date	Where is the unit to be used?
Interface Language	What language will the operator use?
PIN	A PIN is required to access on-device settings
User ID and Password	One named user can access the web-server settings
Company Logo	A company logo can be added to the Web-server Pages and Test Reports

2.4 Features

*For Clarity, Power Cable has been electronically removed from image

EATURE	BENEFIT
Full colour, backlit, 5" touch screen	Easy to use controls Easy navigation On-device Report viewing
Audible alerts	Event alerts following lengthy test processes
Network connected	Simple connection to a local network using Ethernet
Built-in web server	Remote viewing of on-device reports data downloads to remote databases Access to advanced device settings
12-24vdc Input Power	Easily connect to any mains supply using a suitable power supply unit
Wall mountable	Easy to permanently install
Robust enclosure	Can be used as a relocatable device
Default Relay Test	Easily revert to a standard test method
PIN security	Limits user access to on-device settings
Password security	Limits user access to web-server and device settings
Reset switch	

CONNECTORS	
DESCRIPTION	**PURPOSE**
USB Type A	Saving reports; Upgrade software; Bar code reader;
Ethernet RJ45 10/1000mbps	Device configuration, network communication
D-Sub 15 pin Female	Verification; Calibration
Power Input Amphemol LTW BD-02	(12-24 VDC, ≤10W)

3. Package Contents

Your new RelayDoc includes:

- RelayDoc
- Power Supply 19.5V
- 1R Test Base
- User Manual
- Warranty Statement
- EU Declaration of Conformity

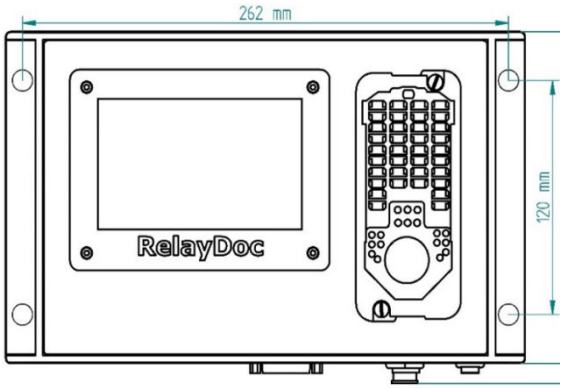
If any items are missing, please contact your RelayDoc supplier. Download the latest user manual at www.mrd.com.au/relay-testing/#relaydoc

4. Installation

4.1 Options

4.1.1 Wall Mount

MRD recommends permanent installation of the RelayDoc, and the enclosure is easily wall mounted. The enclosure includes four concealed mounting points, suitable for fasteners of thread diameter ≤5mm, head diameter ≤8mm.



- To access the mounting points, pry the left and right hand snap-fitted covers from the front panel
- Screw holes are spaced 262mm horizontally and 120mm vertically as shown right
- Ensure sufficient clearance below the RelayDoc to connect cables
- Minimise interference when changing relays; Ensure sufficient clearance from walls or shelves
- The device should be mounted at eye level, typically 140-160cm above floor level.

Note: Relays must be retained in the base using the wire clip provided.

4.1.2 Portable Usage

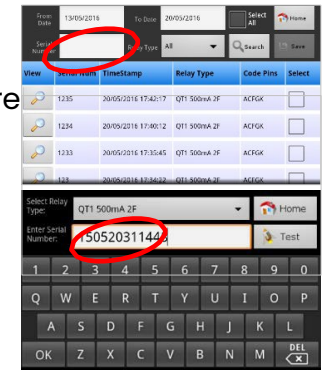
The RelayDoc contains electronic assemblies, and an exposed LCD screen. The enclosure is a robust product, made from aluminium. There are no moving parts.

The RelayDoc has a nominal protection rating of IP30.

- Do not expose the RelayDoc to liquids: The device is not water resistant.
- Drops, vibration, or rough handling may damage the RelayDoc.
- External ports and switches must be protected from damage and contamination from dust and dirt.

MRD recommends using a shock-resistance carry case if the RelayDoc is moved frequently. Contact MRD to arrange the supply of a suitable case.

4.1.3 Bar Code Reader

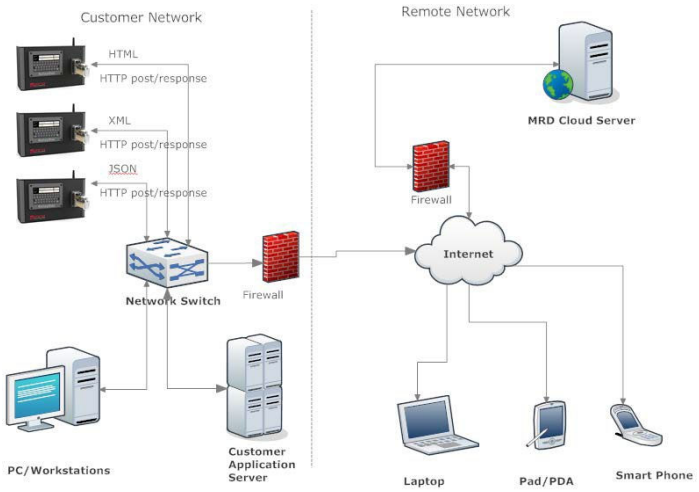


A bar code reader can be connected to the USB port, to capture the serial number of Equipment Under Test (EUT).

The data can be sent to an active serial number text box.

4.2 Network Communication Architecture

RelayDoc supports XML/HTML/JSON protocols to exchange data with external application servers, if installed. RelayDoc also posts reports to the MRD cloud server. Typical installation architecture is:



5. Setup

5.1 Automatic Configurations

When RelayDoc can connect to the internet or a local network, it will attempt several upgrades.

5.1.1 IP Address

When an ethernet cable is plugged in, RelayDoc will try to obtain an IP address by sending a DHCP request. RelayDoc will revert to any previously saved static IP if an IP address is not assigned after three attempts.

5.1.2 Profile Updates

5.1.2.1 Internet Connected Devices

If RelayDoc has access to the MRD web server unapplied profile updates will be detected, and RelayDoc will prompt the operator.

- Touch “Yes” to download and install updates
- Touch “No” to ignore

5.1.2.2 Profile Updates From USB

RelayDoc supports profile updates from USB storage. When a USB Device is connected, RelayDoc will scan for \relaydoc_upgrade\profile\profile_updates.txt in the root directory. If found, the user will be prompted to update the profile.

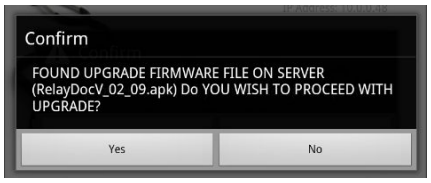
5.1.3 Application Upgrades

The RelayDoc application software can be updated from the internet or USB device, noting:

- Usually, only the application is updated
- Occasionally, the firmware will also be automatically upgraded
- Full system upgrades are completed using the web server, as described in Section 9.

5.1.3.1 Internet Connected Devices

If RelayDoc has access to the MRD Web Server unapplied application updates will be detected, and RelayDoc will prompt the operator to update.



5.1.3.2 Application Updates From USB

RelayDoc supports application updates from USB storage. When a USB Device is connected, RelayDoc will scan for update files in root\\:relaydoc_upgrade\application\.

If found, the user will be prompted to update the application.

5.1.4 Report Upload To RelayDoc Web Server

RelayDoc supports the HTTP/HTTPS protocol for data interface. If RelayDoc is connected to the internet, and it is configured to upload the report, the test reports will be automatically uploaded to the MRD cloud server.

Uploaded reports are in JSON format, including the test report data and an array of test detailed results data.

5.1.5 Calibration Report Upload To RelayDoc Web Server

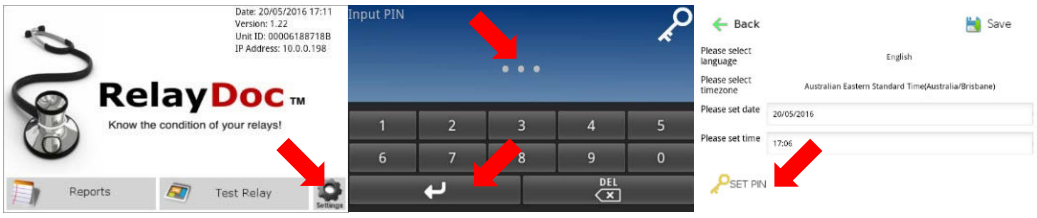
The most recent calibration report is uploaded to the RelayDoc Web Server when internet is available.

5.2 General Setup

5.2.1 Personal Identification Number (PIN)

A four digit PIN is required to view or change any settings on the RelayDoc. By default, the PIN is set to '0000'. To change the PIN:

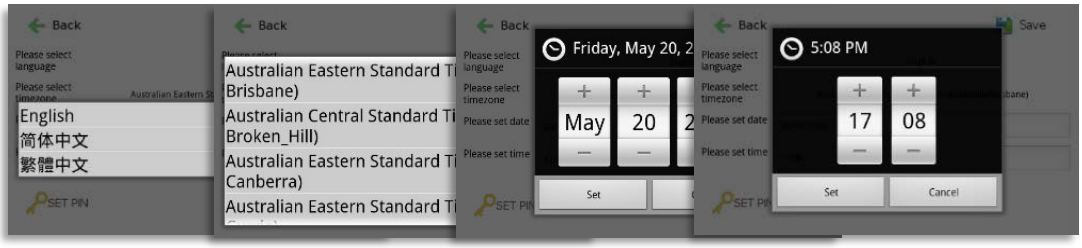
- Touch the Settings icon on the Home Page and enter the current PIN
  - Correct PIN will advance to Settings page
  - Incorrect PIN will "shake" the dots
  - To exit, touch Carriage Return arrow anytime
- Touch "Advanced" icon
- Touch "Set PIN" icon
- Set & confirm the new PIN
  - The new PIN must differ from the current PIN
  - The dots will "shake" if the PIN is not different



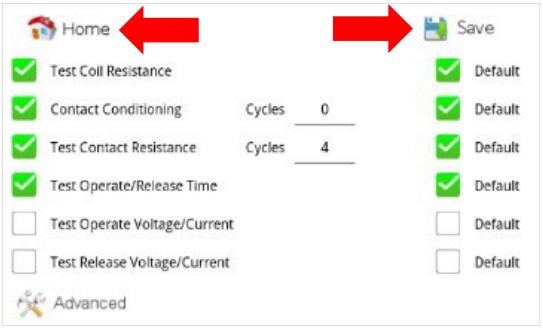
5.2.2 Advanced Settings

RelayDoc has settable Language, Location, Date and Time. To change settings:

- Touch the Settings Icon on the Home Page
- Enter the current PIN
- Touch "Advanced" icon
- A menu of settings will appear. Touch the item to be changed
  - Language - Select from the scrollable list
  - Time zone - Select from the scrollable list
  - Date - Set using the rollover
  - Time - Set 24hr time using the rollover



5.3 Relay Test Process Settings



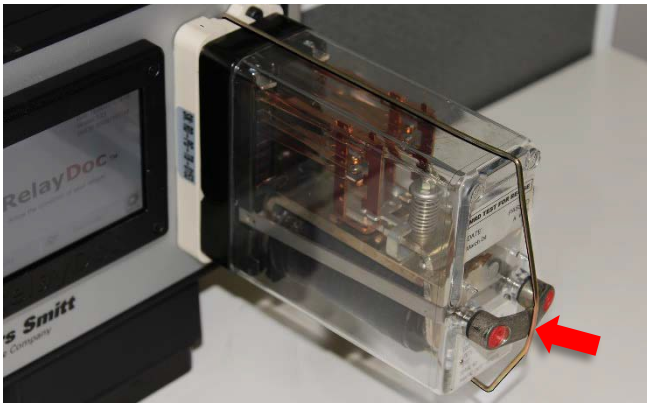
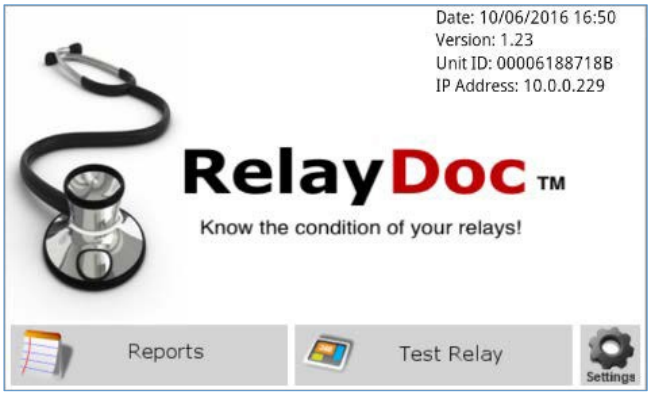
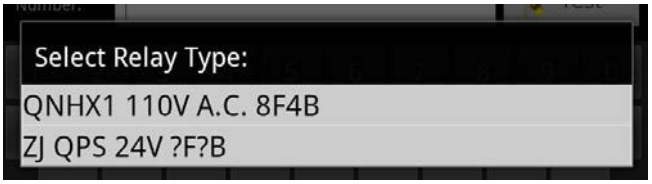
RelayDoc stores the last used process as the Default Relay Test Process. To change and save the Default Test Process:

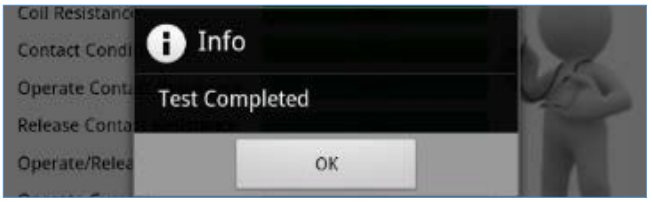
- Touch the Settings Icon on the Home Page
- Enter the current PIN. The Settings page will appear
- On the left side of page, select the tests to be completed
- Enter the number of cycles if requested (Note: Contact Conditioning default is 20 cycles)
- On the right hand side of page, select the tests to be included in the Default Test Process (Note: Contact Conditioning cannot be saved in the Default Process)
- To save- Touch “Save”; “OK” on the confirmation screen; “Home” to exit
- To exit without saving- Touch “Home”. The current and default test processes will not be changed.

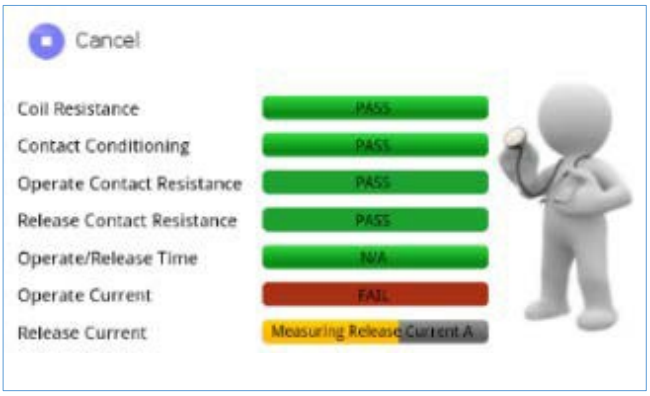
RelayDoc automatically completes testing according to the Saved Test Process (Section 4.2). Some relays share a common base configuration: the RelayDoc will request selection of the correct test profile.

6. Testing Relays

To Test A Relay:

1	Insert relay into relay base. Secure with wire clip if the RelayDoc is wall mounted	
2	Touch "Test Relay" on the Home Page	
3	RelayDoc will attempt to select a matching relay profile according to the code pins detected: If no match exists, testing is not possible. Please contact MRD to add a new profile to the database. If there is more than one matching profile, RelayDoc will prompt to select from a list.	 

4	Select the correct coil resistance (if prompted).	
5	Enter the relay serial number using the virtual keyboard or bar code reader. Touch “Test” to continue or “Home” to abort	
6	If a latching relay is detected, the “Latch off” Checkbox will be displayed: Turn Coil Latching ON or OFF as required. Touch the check box.	
7	If the contact configuration does not match the selected Relay Profile, RelayDoc will prompt the user to select from a list	
8	At successful completion, the RelayDoc will beep three times. Touch “OK” to return to the test results	

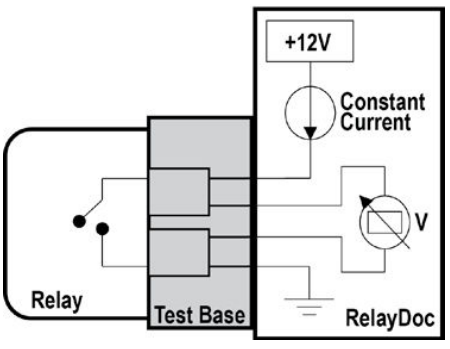
9	Touch "Report" to view the Test Results, or touch "Home" to Exit.	
10	As each test occurs, progress and status are displayed. Touch "Cancel" to abort any test. The RelayDoc will beep three times. Note: The report is written incrementally: results are added as each test is completed	

7. Test Functionality

7.1 Coil Resistance

The coil resistance test passes a precise constant current through the coil. The voltage drop across the coil is measured and the coil resistance is calculated. The result is recorded.

The coil resistance measurement uses two different scales to generate high precision results.



SCALE	CURRENT	RANGE	PRECISION
1	10mA	0 – 500 Ω	1 Ω
2	1mA	500 – 10 kΩ	1 Ω

7.2 Contact Resistance

The contact resistance test passes a precise constant current through each contact. The voltage drop across each contact is measured and the contact resistance is calculated. Accurate results are the result of using a Four Wire Kelvin measurement method up to the test base contact. This eliminates any resistance error from cables or connections between the RelayDoc and the EUT.

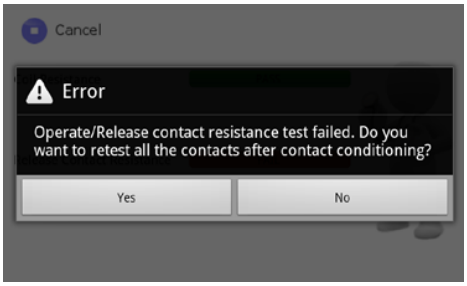
The RelayDoc manages the contact resistance measurement, automatically increasing the applied current in stages until the measured resistance is in one of the ranges shown right.

Measured resistance over 500Ω is defined to be OPEN state.

STAGE	CURRENT	RANGE	PRECISION
1	100mA	0 – 5 Ω	0,001 Ω
2	10mA	5 – 50 Ω	0,01 Ω
3	1mA	50 – 500 Ω	0,1 Ω

7.3 Contact Conditioning

Contact Conditioning is a flash cleaning method. In the RelayDoc implementation, a Constant Current Source (CCS) provides 100mA as the relay contacts. There is a short current surge as the contact opens or closes and the resulting plasma arc cleans the contact surface.



RelayDoc prevents contact conditioning being included in any default test process. If EUT fails an initial resistance test, RelayDoc will ask the operator to authorise contact cleaning and re-test of any failed relays, prior to creating the Test Report. Only Relays that fail the initial test will be conditioned and re-tested.

The operator may select contact conditioning to be included in the current test process, in which case the software will not offer conditioning following a resistance test failure.

7.4 Contact Switching Time

This test is performed by measuring the time it takes for a relay contact to change state from Open to Close or vice versa. Open and Close values are factory set. Users cannot adjust the settings.

7.5 Operating Voltage And Current

The relay operate voltage is measured using a ramp method: The coil supply voltage is swept from zero up to nominal rated voltage, while monitoring from an open to closed contact state.

The ramp parameters are factory set and cannot be changed by the user.

7.6 Release Voltage And Current

The relay release voltage is measured using a ramp method: The coil supply voltage is swept from the nominal rated voltage to zero, while monitoring from an open to closed contact state.

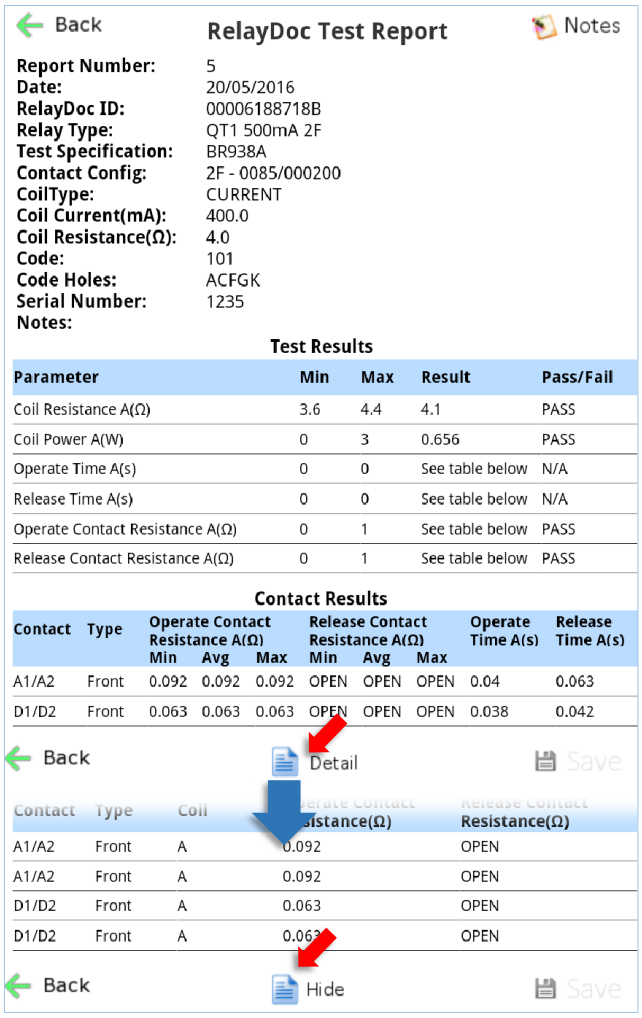
The ramp parameters are factory set and cannot be changed by the user.

8. Test Reports (Viewed On Device)

8.1 Viewing Saved Reports

To view a saved report:

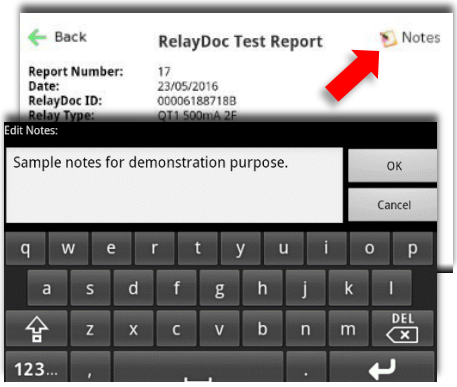
- Touch “Reports” on the Home Page
- Find the required report in the list
- Touch the “magnifying Glass” icon to open the report. The report will open
- Scroll to the bottom of the report. Touch “Detail” to reveal the complete Contact Resistance Test details
- Touch “Hide” to collapse the details
- Touch “Back” to return to the Reports Page



8.2 Adding Notes To Reports

To add notes to a report:

- Open the required report
- Touch “Notes” in the top right corner of the page
- Type Notes using the virtual keyboard
- Touch “OK” to return to the report



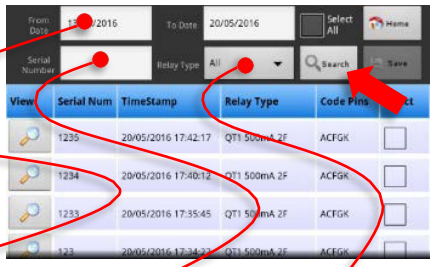
8.3 Filtering Report

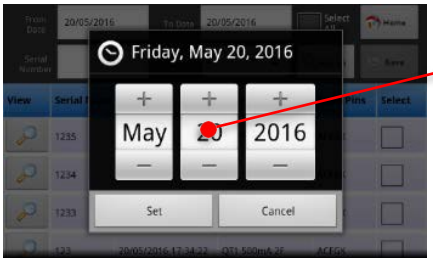
Reports can be isolated from long lists using filtering. Filter reports by:

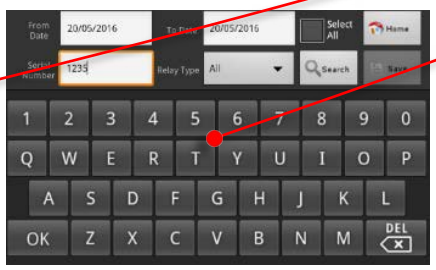
- Relay Type
- Relay Serial Number
- Range of Test Dates

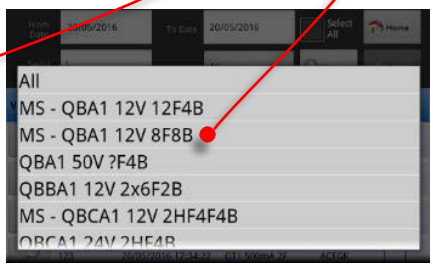
To filter reports:

- Open the Reports Menu
- Select a Relay Type from the drop down list, or
- Enter a serial number into the text box, or
- Enter a range of dates, using the rollovers
- Touch “Search” to complete the search. Found items are displayed in the Report List.



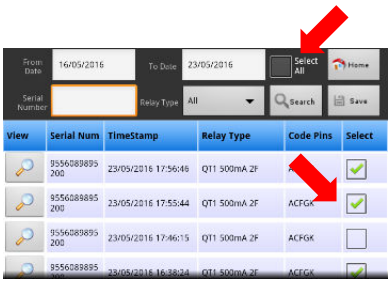






8.4 Saving Reports To USB Device

Reports and test data can be saved to a USB device for storage or other processing. To save data to a USB device:



- Insert a USB storage device into the USB port. The RelayDoc will advise “Mounting USB Storage Device”
- Select reports to be saved
- Touch the “Select All” checkbox, or
- Touch the checkboxes of individual reports
- To deselect reports, touch the checkbox again
- To deselect ALL reports, touch “Select All” twice
- Touch “Save” to copy the selected reports to the USB device

Reports are saved in PDF format. Contact results are saved as CSV files. All files appear in a root directory called “RelayDoc_TestReport”. Saving reports does not remove the original data.

9. Web Server (Embedded On Device)

9.1 Web Server Features

RelayDoc includes an embedded Web Server. Any user can:

- Identify software and firmware versions, and the RelayDoc serial number
- Search and filter reports, and save as PDF
- Export all reports to .CSV format, suitable for Spreadsheet or Database Import
- Search, filter and view relay profiles and test specifications
- View activity logs

Password access is required to:

- Delete reports
- Change device configuration
- Change appearance of web server and reports
- Change the web server login
- Reset the RelayDoc PIN
- Modify calibration information
- Perform system and database maintenance

Users of the web server are not able to modify relay profiles or test specifications.

9.2 Accessing The Web Server

The web server is located at the IP address assigned to the RelayDoc, and supports popular browsers including Internet Explorer and Edge, Firefox, Chrome, Safari etc.. To open the web server on an intranet:

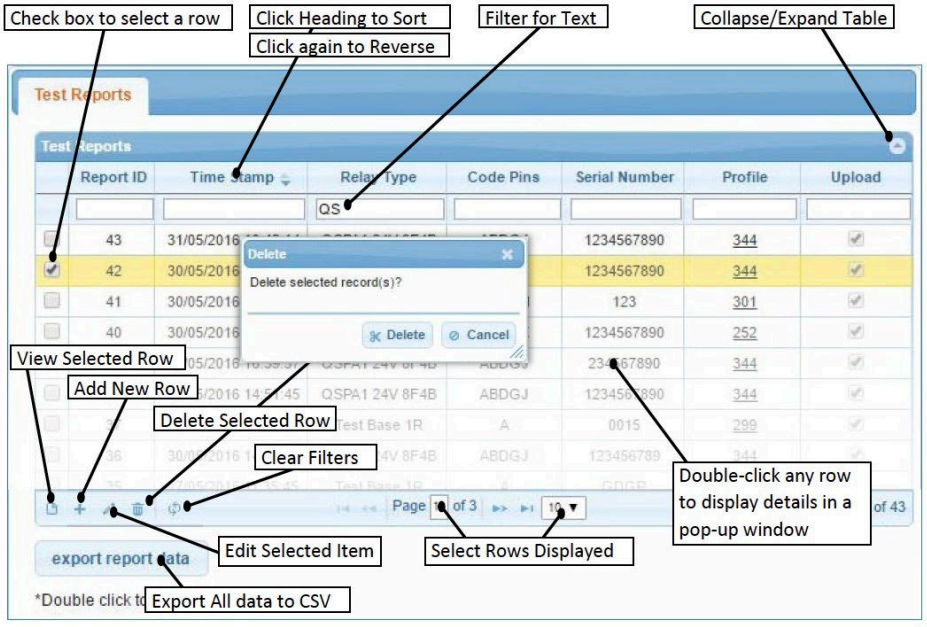
- Note IP address from RelayDoc home page
- Enter address to the browser search bar and press Enter.
- If the web server does not appear, check
  - Your intranet connection
  - RelayDoc is turned ON and connected to the intranet

Note: There is no benefit in Bookmarking the RelayDoc web server. In most installations, the RelayDoc has a dynamic IP address that renews when the device is turned ON, or reconnected to a network.

9.3 Web Server Navigation And Functions

The web server displays most information in tables. There are universal handling tools, as shown below:

- Some tools are not available in all windows
- Some tools are not available to all users
- Not all columns can be filtered or sorted
- Users must confirm changes. There is no UNDO function.



9.4 Home Page

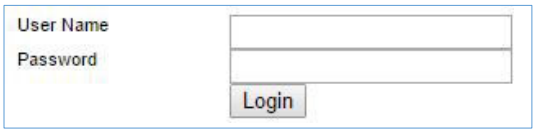
The Web Server Home Page displays device information including:

- Device identity
- IP address
- Software versions
- Database version

All menu items are listed, including items only available to authenticated users.

9.5 Login

Modification of reports or settings is by authenticated users only. There is no direct login process: Password request occurs as required.

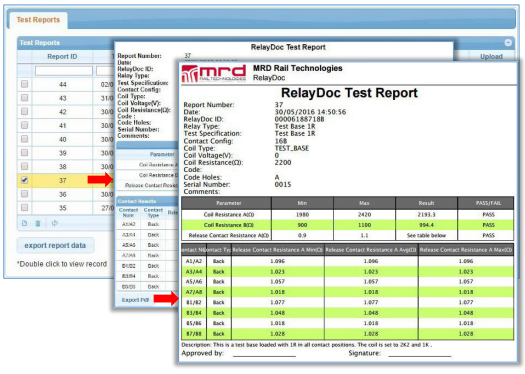


By default, the login credentials are:
Username: User
Password: User

Logout using the Logout Menu Item, or turn the power OFF.

9.6 Report Page

The Report Page provides access to all test reports stored on the RelayDoc. All users can:



- View reports
- Print individual reports to PDF
- Export all report data to CSV formatted file

Authenticated users can also delete reports.

9.7 Profile Page

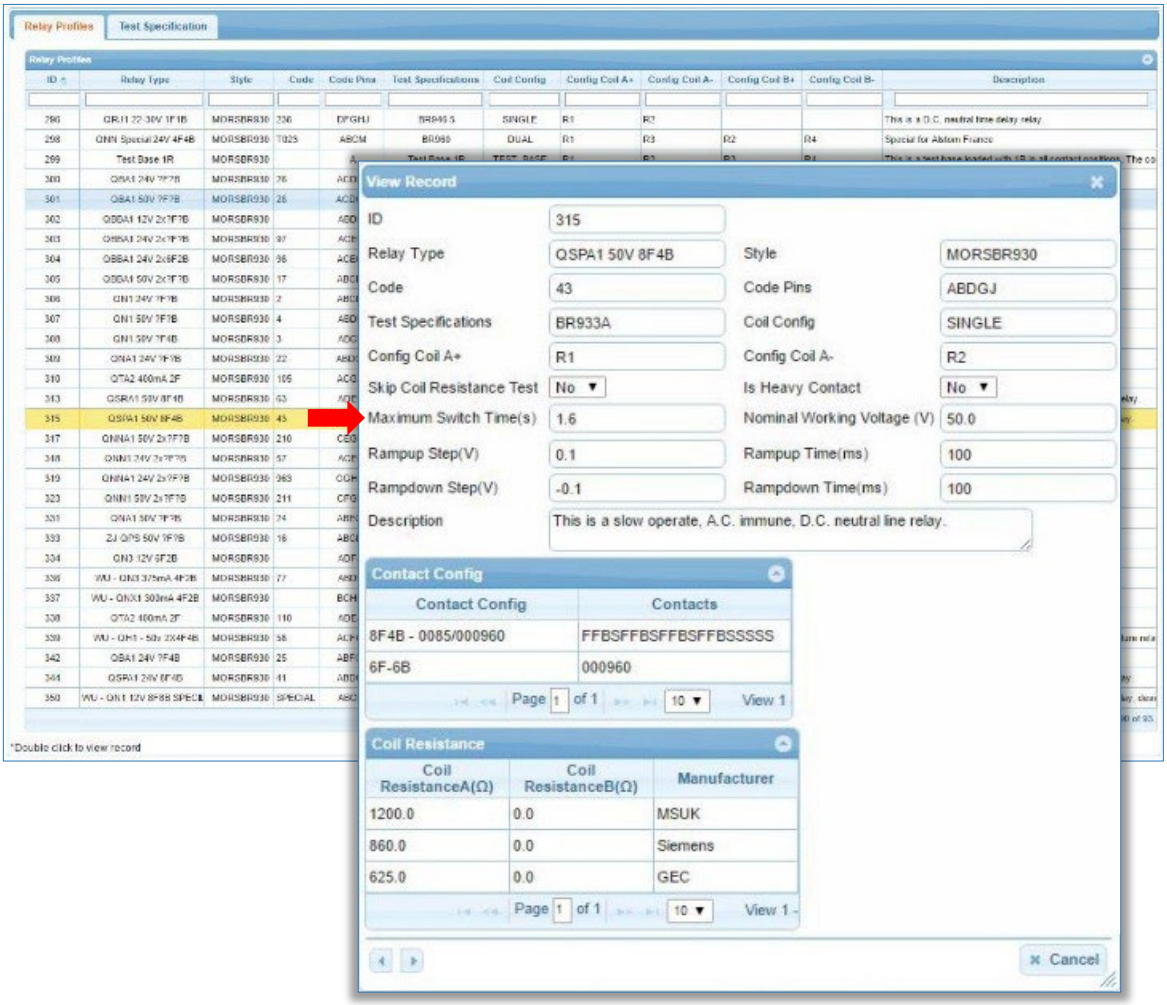
The Profile Page has two tabs.

9.7.1 Relay Profiles Tab

The Relay Profiles tab displays the profiles that are available on your RelayDoc. Profiles may have variants due to contact configuration and/or coil resistance, shown in the detailed record. To view the record:

- Double-click any row
- Select “X” or “Cancel” or click away to close the pop-up.

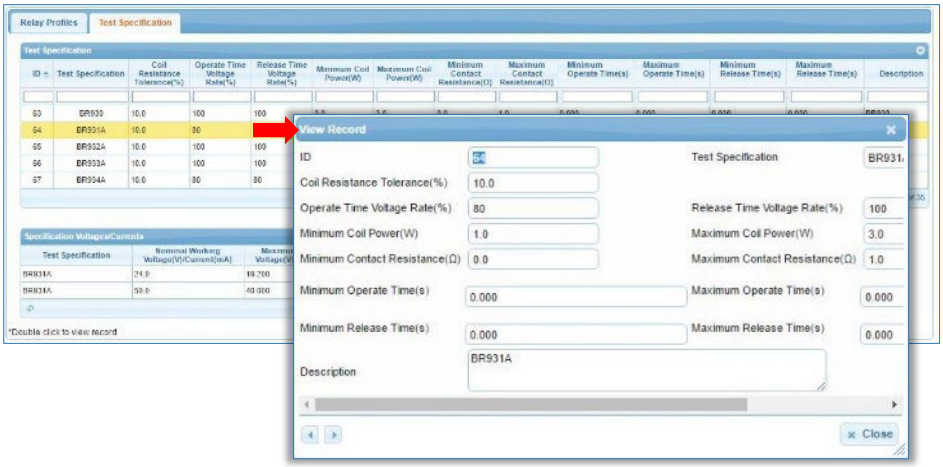
The relay profiles are not editable. Contact your RelayDoc supplier or asset manager to arrange for profiles to be added, modified or deleted.



9.7.2 Test Specification Tab

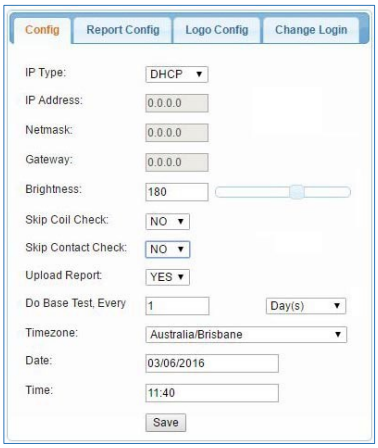
The Test Specification tab displays the available tests and variants. The specifications are not editable. Contact the RelayDoc supplier to arrange for specifications to be added, modified or deleted. The parameters shown are the minimum requirements to pass a test.

- Double-click any row to display the specification in an easy-to-read panel



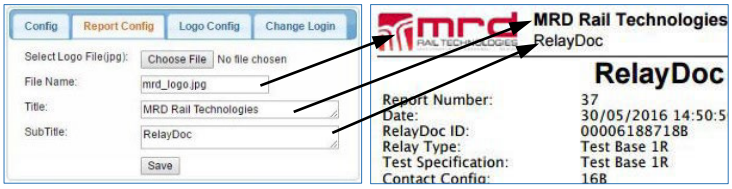
9.8 Configuration Page

The Configuration Page is password protected. Authenticated users are able to make changes to:

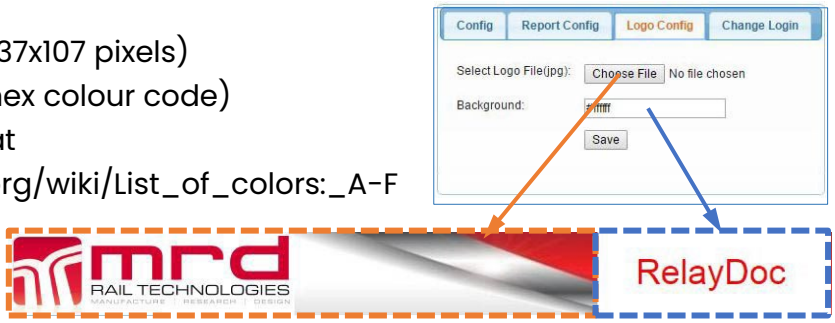


- RelayDoc Configuration
  - Static or dynamic IP selection
  - Screen brightness
  - Coil and contact check override
  - Report upload to cloud server
  - 1R Base test frequency
  - Time zone, date, time

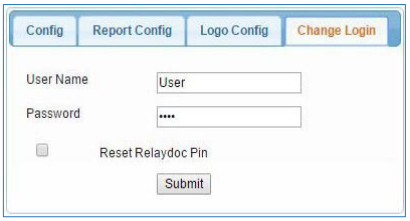
- PDF Report Header
  - Logo
  - Title & subtitle



- Web Server Header
  - Page header logo (1037x107 pixels)
  - Background colour (hex colour code)
    hex codes available at
    https://en.wikipedia.org/wiki/List_of_colors:_A-F



- Login
  - Reset web server Username and Password
  - Reset RelayDoc on-device PIN to “0000”
  - Users will be automatically logged OFF after 10 minutes of inactivity, or when the browser window is closed



9.9 Calibration

Caution: RelayDoc Calibration requires the use of a certified Calibration Kit. The Calibration Kit resistor values must be transposed to the Web Server Calibration tabs before RelayDoc calibration is attempted. Failure to update the resistor values will result in a loss of traceability, and reduction in testing confidence.

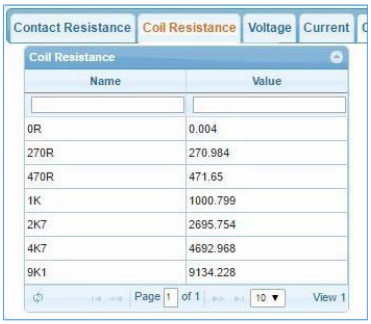
9.9.1 Contact Resistance

Double click a row to adjust the value. Calibration points include:

- Theoretic value (fixed)
- Practical value (the measured value of the calibration tool kit)

Contact resistance calibration points are: 0R (0Ω); 1R (1Ω); 4.7R (4.7Ω); 22R (22Ω); 47R (47Ω); 270R (270Ω); 470R (470Ω).

9.9.2 Coil Resistance



Double click a row to adjust the value. Calibration point includes:

- Theoretic value (fixed)
- Practical value (the measured value of the calibration tool kit)

Coil resistance calibration points are: 0R (0 Ω); 270R (270 Ω); 470R (470Ω); 1K (1000Ω); 2K7 (2700Ω); 4K7 (4700Ω); 9K1 (9100Ω)

9.9.3 Voltage

Up to four voltage calibration points are typically set to cover from zero to the normal operating voltage of the relays being tested. The spread should be equal, or at commonly used voltages.

A typical voltage setup is shown right: The maximum anticipated voltage is 50V, and 5, 12, 24V are common operating voltages.

Maximum allowable voltages

RelayDoc	50V
RelayDoc HV	130V

9.9.4 Current

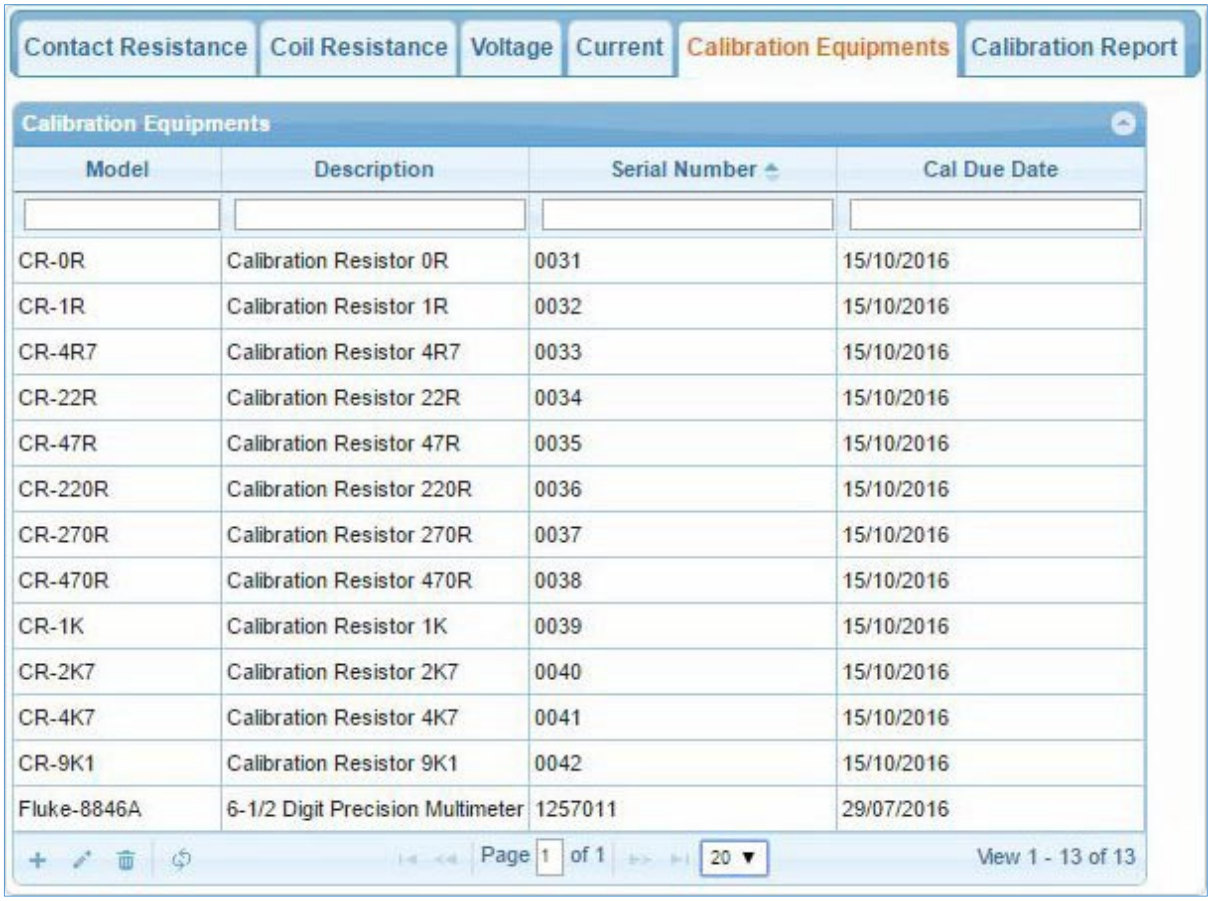
Current calibration points are typically set to cover from zero to the normal operating current of the relays being tested. The spread should be equal, or at commonly used currents. For example, if the maximum expected current is 1A, the spread might be set at 200mA; 400mA; 600mA; 800mA and 1000mA.

9.9.5 Calibration Report

This tab lists the calibration reports stored on the RelayDoc. This is the complete calibration history since new.

9.9.6 Calibration Equipment

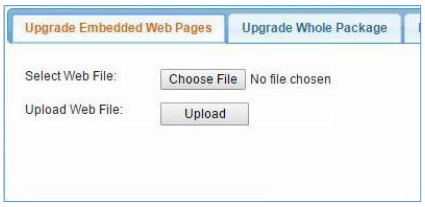
The calibration equipment tab lists the equipment used to calibrate the RelayDoc including serial numbers and calibration due date. Equipment can be added, deleted or modified. All entries are manual: there is no automatic update during calibration.



9.10 System Upgrade

Caution: The functions available on the System Upgrade page are used only when serious system errors have occurred. DO NOT use these functions unless instructed by MRD. Damage may occur to your software or data, and recovery may not be possible.

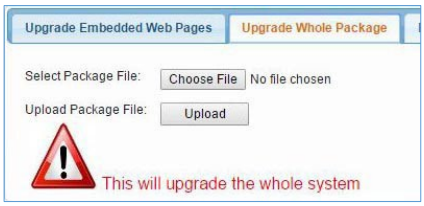
9.10.1 Upgrade Embedded Web Pages



Use this tab to update or revert the embedded web server software.

- Select “Choose File”, and retrieve the upgrade file from your computer or network. The name of the selected file will be displayed
- Click “Upload”. Software installation will begin.

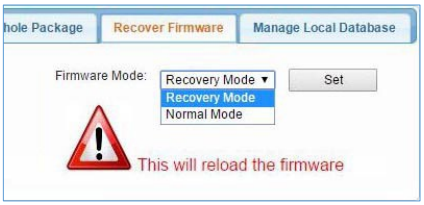
9.10.2 Upgrade Whole Package



The whole package includes the firmware, application software and embedded web server. This process:

- Selects the required RelayDocV*.apk file on your PC or network
- Uploads the file to the RelayDoc SD card, overwriting any existing .apk file
- The RelayDoc will automatically detect the new package and attempt to upgrade the system.

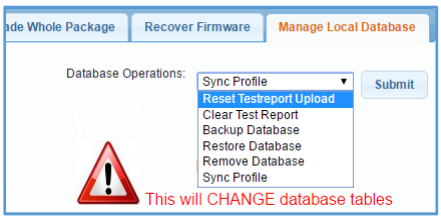
9.10.3 Recover Firmware



Normal Mode (Default). Device will continue to work with the installed firmware, even if an upgrade is available.

Recovery Mode. For Emergency Repairs Only! DO NOT save this setting unless instructed by MRD. The RelayDoc will automatically detect and install any available firmware upgrade.

9.10.4 Manage Local Database



9.10.4.1 Reset Test Report Upload
Refreshes the server reports, *excluding* duplicates.

9.10.4.2 Clear Test Report
Deletes all reports from the RelayDoc. The report numbering (ID) can be reset to zero, if required, noting that this may cause a conflict with reports on the server.

9.10.4.3 Backup Database
Creates a backup file at a user specified name and location on their computer or network

9.10.4.4 Restore Database
Restores a saved database to the RelayDoc (*.db file)

9.10.4.5 Remove Database
Reinstates the original, blank database. All existing reports, profiles and test specifications are lost.

9.10.4.6 Sync Profile
Refreshes the profile database from the MRD database, including:

- Updates all existing profiles
- Add new profiles
- Remove any deleted or withdrawn profiles from the RelayDoc

Existing Reports are not affected. Internet access is required to sync profiles.

9.11 Download Logs

RelayDoc writes three activity logs for each session of use, and these are useful for troubleshooting. Right-click the link to show View and Save options.

Fciserver.log This is a web server log.
Lighttpd.log This is a web server log.
Logcat.log This is an Android application log.

9.12 Logout

Click "Logout" to logout of the device: The RelayDoc will return to the un-authenticated state.
Turning the device OFF/ON also cancels any active authentication.

10. Maintenance

WARNING: The RelayDoc contains no user serviceable parts! Do not open the case. Opening the case will void warranty, void calibration, and may result in damage to the unit.

10.1 General Maintenance

The RelayDoc requires very little maintenance. Complete the following items on an as required basis.

- Store the IR base on the unit when not in use. This reduces build-up of dust or dirt on the contacts
- Clean relay contacts with contact cleaner and cotton buds
- Wipe down the external surfaces with a just-damp soft cloth

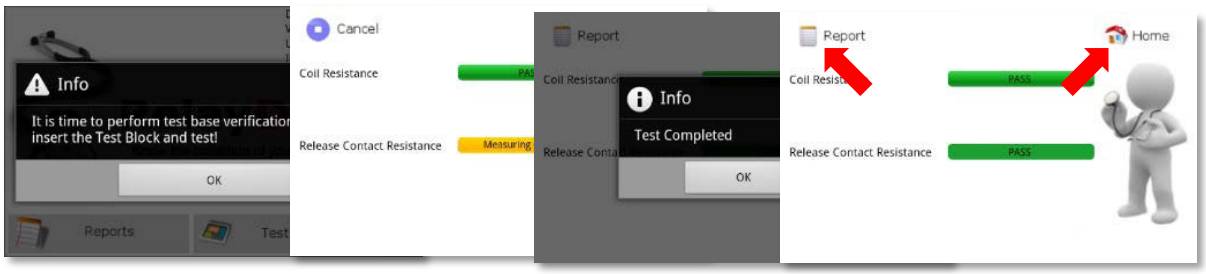
10.2 Test Base Verification Test

At pre-set intervals, the RelayDoc will require the user to perform a test base verification test. The purpose of this test is to confirm that relay base contacts have not developed resistance that may affect test results. The test quickly checks the resistance across each contact, using a known resistor.

Poor test results are usually the result of dirty or corroded contacts. Set the test frequency using the embedded web server.

To complete the test:

- When requested, fit a RDTB test base
- Touch “Test” to begin the test (coil resistance test)
- Test result will be PASS or FAIL
- At completion, touch “OK”
- Touch “Report” to view the test result, or “Home” to exit.



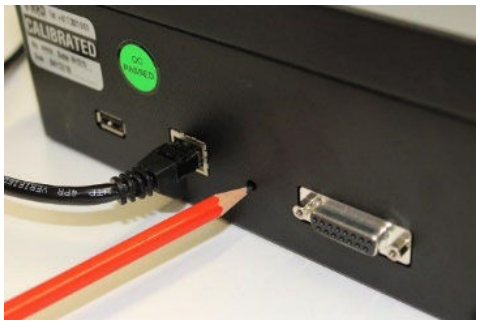
10.3 Calibration

Calibration is required every 12 months. The calibration status of the RelayDoc may be determined by:

- Checking the calibration label, attached to the device
- Checking the calibration certificate, either printed, or on the RelayDoc web server (see Section 8).

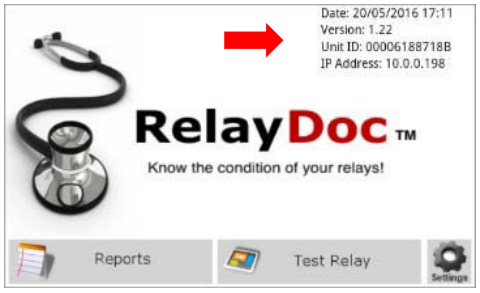
Calibration must be done by trained Operators, using the RelayDoc Calibration Kit (part number RD CK). RD CK is available for purchase from MRD, otherwise return the unit annually for calibration.

10.4 Reset Factory Settings



The most recent factory settings are stored in rewritable internal memory, including application software and web server.

To restore the factory settings:



- Turn the RelayDoc OFF
- Use a suitable pin to press the concealed reset switch. A paper clip is good for this task. Tactile feedback will confirm the switch has been activated
- Turn the RelayDoc ON. Wait for the home page to appear.
- Version number will appear in the top right hand corner of display

Note: RESET does not affect stored data, such as reports.

11. Technical Data

POWER SUPPLY	
Supply Voltage	12-24V DC
Power consumption (Typical)	<10W
Power consumption (Peak)	<45W
Power Connector	Amphemol LTW BD-02

OUTPUT TO RELAY	
Maximum Power	35W
Maximum Current	1A
Voltage- RelayDoc	50V DC maximum
Voltage- RelayDoc-HV	130V DC maximum

INTERFACE	
Display	5" Backlit Colour LCD 800x600
Touch Screen	Capacitive
Embedded menus	Yes
Authentication	Required
Authentication method	PIN

CONNECTIVITY	
USB	USB Type A
Network	Ethernet 10/100Mb
Calibration	DB9
PHYSICAL PROPERTIES	
Enclosure	Aluminium
Dimensions, mm	280x180x120 typical
Installation Clearance	50mm, all round
Weight (Device only)	2.7kg typical
Wall Mount	Recommended
Mounting System	Using 4x fasteners
Tabletop usage	Optional
Operating position	Vertical or Horizontal
Operating environment	0°C - 45°C
IP Rating (Internal/Terminals)	IP30
Flammability Rating (Enclosure)	UL94-V0

MEASUREMENT TOLERANCE	
Contact Resistance	1% +0.01Ω
Coil Resistance	1% +1Ω
Coil Voltage	1% +0.1V
Coil Current	1% +1mA

DESIGN & TEST STANDARDS	
See CE Declaration of Conformity	
Environmental performance	
Climatic categories to IEC60721	
3.1 Storage	TBA
3.2 Transport	TBA
3.3 Stationary	TBA
Class- Mechanical conditions to IEC60721	
3.1 Storage	TBA
3.2 Transport	TBA
3.3 Stationary use	TBA

EMC PERFORMANCE	STANDARD TEST	RESULT
Immunity		
ESD	IEC 61000-4-2	B 6kV/8kV
Radiated Radio Frequency	IEC 61000-4-3	A
Electromagnetic Field	IEC 61000-4-3	A
Fast Transient/Burst	IEC 61000-4-4	B
Surge	IEC 61000-4-5	B
Conducted disturbance	IEC 61000-4-6	A
Interference emission		
HF Radiation	EN 50121-4 &	Pass
HF Conducted	EN61000-6-3	Pass

WARRANTY	
Duration	Twelve Months
Type	Parts & Labour, Return to Supplier
Other	Unlimited Support by Telephone & Email

12. Warranty

Congratulations on choosing an MRD RelayDoc-HV.
MRD products are designed and manufactured to the highest standards: your RelayDoc-HV is backed with a ONE YEAR Warranty covering materials or manufacturing defects, commencing on the date of customer receipt.

Please record your product details below.

MODEL	SERIAL NUMBER	HW VERSION	DATE OF PURCHASE	SUPPLIER
RD-HV BR930	— — — — — — — — — —	— — — — —	__/__/20__	

Conditions

MRD warrants your new RelayDoc-HV device shall be free of material or manufacturing defects and shall operate as designed, when installed, used, and maintained according to the applicable Installation Guide, Technical Data Sheet, and User Manual.

This warranty does not cover:

- Normal wear and tear
- Problems not caused by materials or manufacturing defects
- Damage caused in-transit, by fluid ingress, by accident, or intentionally
- Damage resulting from installations or applications not expressly approved by MRD
- Devices that are altered in any way, including software or removal of the serial number
- Any other event, act, default or omission beyond MRD's control.

In the event of a possible warranty claim, immediately stop using the device and contact your supplier for assistance. It may be possible to solve the problem without returning the device.

Returns
Do not return the device unless authorised by your supplier. If a return is required, it is your responsibility to pack the device for safe shipping, and to ship the device as instructed by your supplier. Return shipping is at your expense.

MRD will inspect returned devices. We will repair or replace devices or parts of devices that are found defective due to material or manufacturing faults. We will quote to repair other problems, if requested. We will return devices determined to be No Fault Found, at your expense.

Limited Liability
The benefits provided by this warranty are in addition to other rights and remedies available to the consumer under the law. In no instance shall MRD be liable for consequential damages.

For Australia Only
MRD Rail Technologies Pty Ltd goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

END OF MANUAL

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mrd
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MANUFACTURE | RESEARCH | DESIGN

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