

RelayDoc User Manual

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RelayDoc[™] User Manual

For Models:

RelayDoc

RelayDoc-HV





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	EU Declaration	www.mrd.com.au\dl\ RelayDoc-DoC.pdf		

RelayDoc[™] User Manual

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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-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

Feature	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	Returns the device to locally stored Factory Settings

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/dl/RelayDocUM.pdf



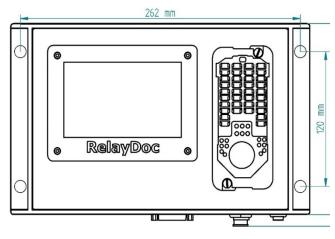
4. INSTALLATION

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.

Portable usage 4.1.2

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).

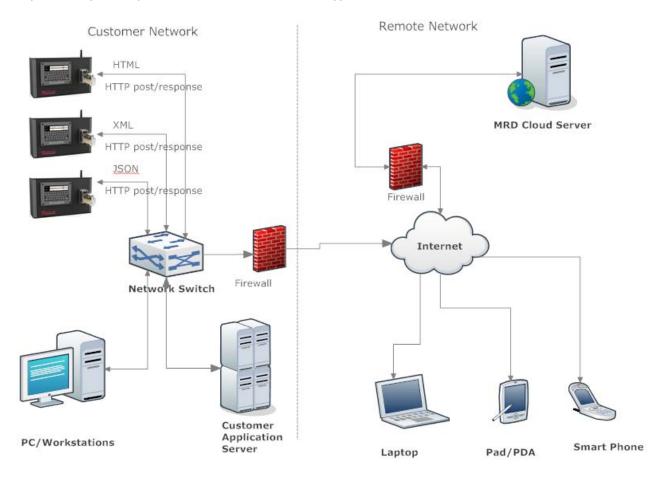
The data can be sent to an active Serial Number text box.





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.

Profile updates 5.1.2

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.

Application upgrades 5.1.3

The RelayDoc Application software can be updated from the Internet or USB device, noting:

- Usually, only the application only is updated
- Occasionally, the firmware will also be automatically upgraded •
- Full system upgrades are completed using the Web Server, as described in Section 8.10. •

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.

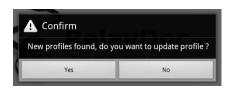
Report upload to RelayDoc Web Server 5.1.4

Relay Doc 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.

Calibration Report upload to RelayDoc Web Server 5.1.5

The most recent Calibration Report is uploaded to the RelayDoc Web Server when internet is available.



Confirm	
New profiles found in usb o profile ?	disk, do you want to update
Yes	No





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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. To change the PIN:

- Touch the Settings Icon on the Home Page and enter the current PIN
 - o 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

*	Date: 20/05/2016 17:11 Version: 1.22 Unit ID: 00006188718B	Input PIN				م	🔶 Back	🕌 Save
3	IP Address: 10.0.0.198			`			Please select language	English
Rel	ayDoc ™						Please select timezone	Australian Eastern Standard Time(Australia/Brisbane)
							Please set date	20/05/2016
Know the	condition of your relays!	1	2	3	4	5	Please set time	17:06
-		6	7	8	9	0		
Reports	Test Relay		ب				PSET PIN	

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
 - o Language- Select from the scrollable list
 - o Time zone- Select from the scrollable list
 - o Date- Set using the Rollover
 - o Time- set 24hr time using the Rollover

e Back Please select language	← Back Australian Eastern Standard Tim		🛇 Friday	, May 20	0, 2016	Hease select	⊙ 5:08 PM		Save
Please select Australian Eastern St	Brisbane)	Please select timezone	+	+	+	Please select timezone	+	+	(ibane)
English 简体中文	Australian Central Standard Tim Broken_Hill)		May	20	2016		17	08	
繁體中文	Australian Eastern Standard Tin Canberra)	Please set time	17 —	_	-	Please set time		-	-
	Australian Eastern Standard Tim		Set		Cancel	SET PIN	Set	Cancel	

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.



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6. TESTING RELAYS

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.

To test a relay:

1	Insert Relay into Relay Base. Secure with wire clip if the RelayDoc is wall mounted	clavoor
2	Touch "Test Relay" on the Home Page	Date: 10/06/2016 16:50 Version: 1.23 Unit ID: 00006188718B IP Address: 10.0.0.229 Relay Doc тм Know the condition of your relays! Reports Test Relay
3	 RelayDoc will attempt to select a matching Relay Profile according to the Code Pins detected: If no match exists, testing is not possible. RelayDoc will request a profile be added to the database If there is more than one matching profile, RelayDoc will prompt to select from a list 	Info No profile found for Code Hole: BCEGX ,Please add profile first ок Select Relay Type: QNHX1 110V A.C. 8F4B ZJ QPS 24V ?F?B
4	Select the correct Coil Resistance (if prompted)	Select coil resistance CoilRes:950.0 CoilRes:720.0 CoilRes:625.0



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5	Enter the Relay Serial Number using the Virtual Keyboard or Bar Code Reader. Touch "Test" to continue or "Home" to abort	Select Relay QT1 500mA 2F ~ Home Enter Serial 9556089895200 > > > Test 1 2 3 4 5 6 7 8 9 0 Q W E R T Y U I O P A S D F G H J K L OK Z X C V B N M DEL
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.	Test Image: Second s
6	If the Contact Configuration does not match the selected Relay Profile, RelayDoc will prompt the user to select from a list	Contact config not found, please select one below, or add new contact config in profile 2F - 0085/000200 OK Cancel
7	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	Coll Resistance PA55 Contact Conditioning PA55 Operate Contact Resistance PA55 Release Contact Resistance PA55 Operate/Release Time PA55 Operate Current FA1C Release Current Measuring Release Current A
8	At successful completion, the RelayDoc will beep three times. Touch "OK" to return to the Test Results	Coll Resistance Contact Condi Operate Conta Release Conta Operate/Relea
9	Touch "Report" to view the Test Results, or touch "Home" to Exit.	Report Report Coil Resistance PASS Contact Conditioning PASS Operate Contact Resistance PASS Release Contact Resistance PASS Operate/Release Time N/A Operate Current FAIL Release Current FAIL

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	$0-500 \ \Omega$	1 Ω
2	1mA	$500 - 10 \text{ k}\Omega$	1Ω

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 $\mathrm{500}\Omega$ is defined to be OPEN state.

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.

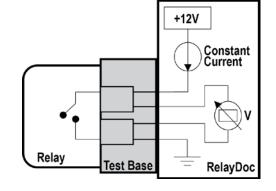
7.4 CONTACT SWITCHING TIME

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.



Stage	Current	Range	Precision
1	100mA	0-5 Ω	0.001Ω
2	10mA	5-50 Ω	0.01 Ω
3	1mA	50-500 Ω	0.1 Ω

Cancel	
🚹 Error	
Operate/Release contact res want to retest all the contac	sistance test failed. Do you ts after contact conditioning?
Yes	No



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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.

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8. TEST REPORTS (VIEWED ON DEVICE)

8.1 VIEWING SAVED REPORTS

rechnologies

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



← Back	RelayDo	c Te	st Rep	oort	횐 Note:
Report Number: Date: RelayDoc ID: Relay Type: Test Specification: Contact Config: CoilType: Coil Current(mA): Coil Resistance(Ω): Code: Code Holes:	5 20/05/2016 0000618871 QT1 500mA BR938A 2F - 0085/00 CURRENT 400.0 4.0 101 ACFGK	2F			
Serial Number: Notes	1235				
Serial Number: Notes:		t Resu	ılts		
Notes:	Tes	t Resu Min	ılts Max	Result	Pass/Fail
Notes: Parameter	Tes			Result 4.1	Pass/Fail PASS
Notes: Parameter Coil Resistance Α(Ω)	Tes	Min	Мах		
Notes: Parameter Coil Resistance A(Ω) Coil Power A(W)	Tes	Min 3.6	Max 4.4	4.1	PASS
	Tes	Min 3.6 0	Max 4.4 3	4.1 0.656	PASS PASS N/A
Notes: Parameter Coil Resistance A(Ω) Coil Power A(W) Operate Time A(s)	Tes	Min 3.6 0	Max 4.4 3 0	4.1 0.656 See table below	PASS PASS N/A N/A

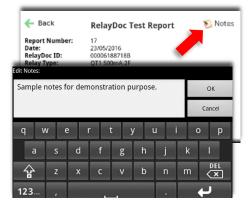
				Conta	ict Res	ults			
Contact	Туре		te Cont ance A(Avg			e Conta ance A(Avg		Operate Time A(s	Release Time A(s)
A1/A2	Front	0.092	0.092	0.092	OPEN	OPEN	OPEN	0.04	0.063
D1/D2	Front	0.063	0.063	0.063	OPEN	OPEN	OPEN	0.038	0.042
🔶 Bac	k			E	Detai	I			🖹 Save
Contact	Туре	Co	il		erate) istano،	Contac ce(Ω)	t	Release C Resistanc	
A1/A2	Front	А		0.0)92			OPEN	
A1/A2	Front	А		0.0)92			OPEN	
D1/D2	Front	A		0.0)63			OPEN	
D1/D2	Front	A		0.0	063			OPEN	
듲 Bac	k				Hide				💾 Save

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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



/05/201

2016 17:42:17

ACEGK

ACEG

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8.3 **FILTERING REPORTS**

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.

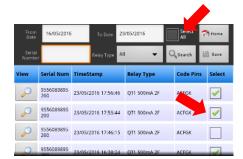


8.4 SAVING REPORTS TO USB DEVICE

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.



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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
 - o RelayDoc is turned ON and connected to the intranet

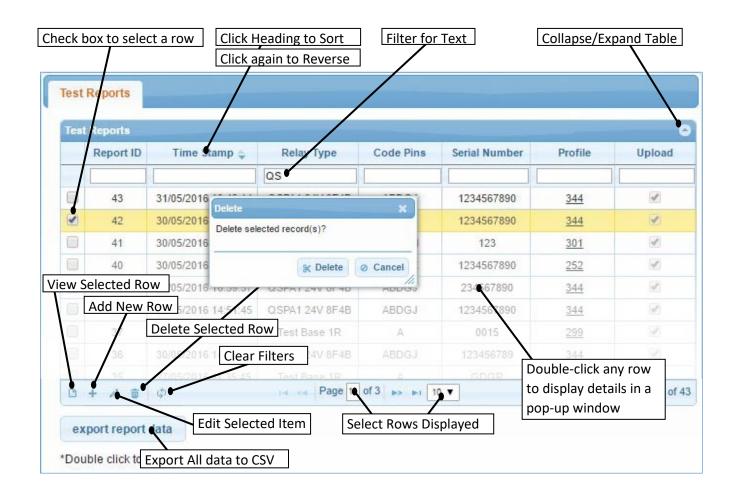
Note: There is no benefit in Bookmarking the RelayDoc Web Server. In most installations, the RelayDoc has a dynamic IP address that renews when the device is turned ON, or reconnected to a network.

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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.

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.

Test	Reports	_					_	Relay	Doc Test Report					
-	Report ID	1	Report N	lumber:		37	40 44 50		see heet nopent				_	Upload
-			Date: RelayDo Relay Ty	pe:				L	Rail Technolo	gies				
	44	02/0	Contact		1:		ALC: THE		RelayD		act Pa	nort		
	43	31/0	Coil Typ Coil Volt			Report	Mumba		37	00 10	estre	port		
	42	30/0		istance(f	2):	Date:		r.	30/05/2016 14	:50:56				
	41	30/0	Code Ho Serial N			RelayDo Relay T	ype:		00006188718B Test Base 1R					
	40	30/0	Comme		_	Test Sp Contact	ecificat		Test Base 1R 16B					
0	39	30/0		Param	eter	Coil Typ Coil Vo	pe:		TEST_BASE					
	38	30/0		Coil Resista		Coil Re:			2200					
	37			Coil Resista	nce B	Code: Code H	oles:		A					
1000			Releas	e Contact F	Resista	Serial Number: Comments:			0015					
	36	30/0	Contact R	lesuits		Comme	Paran	natar	Min		Max		Result	PASS/FAIL
	35	27/0	Contact Num	Contact Type	Rele			ance A(Ω)	1980		2420		2193.3	PASS
B	<u>ه</u> ه	_	A1/A2	Back				ance B(Ω)	900		1100		994.4	PASS
			A3/A4	Back		Release	Contact	Resistance A(Ω)	0.9		1.1	See	table below	PASS
exp	port report data		A5/A6	Back		ontact NG	ontact Tv	Release Contact	Resistance A Min(Ω)	Release Cor	tart Resistance		Release Contar	t Resistance A Ma
			A7/A8	Back		A1/A2	Back		1.096		1.096			1.096
Doui	ble click to view re	ecord	B1/B2	Back		A3/A4	Back	-	1.023		1.023			1.023
		-	B3/B4	Back		A5/A6	Back	No.	1.057		1.057			1.057
			B5/B6	Back		A7/A8	Back		1.018		1.018			1.018
			Export	Pdf		B1/B2	Back		1.077		1.077			1.077
			-			B3/B4	Back		1.048		1.048			1.048
						B5/B6	Back		1.018		1.018			1.018
						B7/B8	Back		1.028		1.028			1.028



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User Name		
Password		
	Login	



Filename: RelayDoc User Manual v1.25.docx

9.7 **PROFILE PAGE**

The Profile Page has two tabs.

Relay Profiles Tab 9.7.1

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.

Profile												
10	Relay Type	Siyle	Code	Code Pins	Test Specifications	Coil Config	Config Coil A+	Config Coil A-	Config Coil 8+	Config Coil B-		Description
_												
6	GRJ1 22-30V 1F18	MORSBR830		DFGHJ	BR945.5	SINGLE	RI	R2				, neutral time delay relay.
8	ONN Special 24V 4F4B	MORSBR930	T025	ABCM	BR960	DUAL	R1	R3	R2		Special for Ab	
9	Test Base 1R	MORSBR930		1	Tati Data 1D	TEST BACE	D f	P2	P1	PI I	This is a test	have loaded with 19 is all contact one
a.	Q541 24V 7F78	MORSBER30			iew Record							
1	QBA1 50V 2F2B	MORSBR930	28	ACD			Cours.)			
2	QBBA1 12V 2x7F7B	MORSBR930 MORSBR930	-	ASD ID	5		315		J			
-	Q86AJ 24V 2x7F7B	MORSBR930		ACE R	elay Type		QSPA1 50V	8F4B	Style			MORSBR930
4	QBBA1 24V 2x8F2B QBBA1 50V 2x7F7B	MORSBR330		ABO								
8	GN1 24V 7F7B	MORSBR930		ABC	ode		43		Code Pir	15		ABDGJ
7	QN1 50V 7F7B	MORSER930			ant Consellection		000004		CallCon	6.0		CHICLE
0	GN1 50V 7F4B	MORSDR830		400	est Specification:	9	BR933A		Coil Con	Joing		SINGLE
9	QNA124V 7F78	MORSBR930	-		onfig Coil A+		R1		Config C	-A lio		R2
0	QTA2 400mA 2F	MORSBR930		400	-	-			, ,			
3	Q5RA1 59V 8F48	MORSBR830		ADE S	kip Coil Resistan	ice Test	No 🔻		Is Heavy	/ Contact		No V
5	QSPA1 50V 8F48	MORSBR930	45		faximum Switch	Time(s)	1.6		Nominal	Working Volt	tage (V)	50.0
7	QNNA1 50V 2x7F7B	MORSBR930	210	CEB								
8	QNN1 24V 2x7778	MORSBR830	57	AGE R	Rampup Step(V) Rampdown Step(V)		0.1		Rampup	Rampup Time(ms) Rampdown Time(ms)		100
9	ONINA1 24V 2x7F7B	MORSBR930	963	COM			0.4		Damada			400
3	ONNI SIV 2x7F7B	MORSBR930	211	CFG R			-0.1		Rampuo			100
a .	QNA150V 7F76	MORSHES30	24	ARE D	escription		This is a slow	v operate, A	C. immune,	D.C. neutral	ine relay	6
3	ZJ OPS 50V 1F18	MORSBR930	16	ABC								1
4	QN3 12V 6F2B	MORSBR830		ADF					0.00			
a'	WU - GN3 375mA 4P2B	MDRSHR930	77	ABD	Contact Config				•			
7	WU - ONX1 S00mA 4F2B	MORSBR930		BCH	Contact C	onfig		Contacts				
0	QTA2 400mA 2F	MORSBR830	110	ADE				FFBSFFBSFFBSFFBSSSSS				
10	WU - QH1 - 50v 2X4F4B	MORSBR930			F4B - 0085/0009	960	FFBSFF	BSFFBSFF	BSSSSS			
2	QBA1 24V 7F4B	MORSBR930		ABF(6	F-68		000960					
4	QSBA1 24V 6F45	MORSBR830		ABD		1120100	-	(**********				
0	AU - ON1 12V 8F88 SPECIL	MORSBR930	SPECIAL	ABC	14 4	Page	1 of 1	10 🔻	View 1			
lick to	view record				Coil Resistance				•			
					Coil		Coil	Manu	facturer			
					ResistanceA(Ω	1) Re	sistanceB(Ω)	Manu	racturer			
				1	200.0	0.0		MSUK				
					1.5							
				8	60.0	0.0		Siemens				
				6	25.0	0.0		GEC				
									387000			
					14.1	Page	a 1 of 1 and	10 🔻	View 1 -			

Test Specification Tab 9.7.2

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 ٠

ID ±	Test Specification	Coll Resistance Tolerance(%)	Operate Time Voltage Rate(%)	Release T Voltage Ratel N	* Devention	Nacemum Con	Minimum Contact	Maximum Contact	Minimum Operate Time(s)	Maximum Operate Time(s)	Minimum Release Time(s)	Maximum Release Time(s)	Descriptio
		Toterance(s)	Receival.	Protect 1	1		erecaricato	/ Reselection callery	1				
63	6R933	10.0	100	100		3.6		10	0.000	0.000	0.030	0.030	60000
64	BR931A	10.0	80		View Record								×
65 66	BR932A BR933A	10.0	100	100	ID		64			Tes	t Specification		BR931.
67	BR934A	10.0	80	80	Coil Resistanc	e Tolerance(%)		0					
					Operate Time	Voltage Rate(%) 80			Rel	ease Time Volta	ge Rate(%)	100
spec in	sation Voltagea/Cun	enta		-	Minimum Coil I	Power(W)	1.0			Ma	cimum Coll Pow	er(W)	3.0
	st Specification	Voltage(V)A	Working Current(mA)	Mox mur Voltage(V	Minimum Cont	act Resistance	Ω) 0.0			Ma	kimum Contact	Resistance(Q)	1.0
R834A	1	24.0		18.200								-	
#831A		59.9		40.000	Minimum Oper	rate Time(s)	0.00	00		Ma	kimum Operate	Time(s)	0.000
	cic to view record				Minimum Rele	ase Time(s)	0.00	00		Ma	kimum Release	Time(s)	0.000
this cl					Description		BR	931A					
bia ci												11	

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9.8 **CONFIGURATION PAGE**

rechnologies

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

- RelayDoc Configuration
 - o Static or Dynamic IP Selection
 - o Screen Brightness
 - o Coil and Contact Check Override
 - o Report upload to Cloud Server
 - o 1R Base Test frequency
 - o Time zone, date, time

Config Report Co	onfig L	.ogo Config	Change L	.ogin
IP Type:	DHCP	•		
IP Address:	0.0.0.0			
Netmask:	0.0.0.0			
Gateway:	0.0.0.0			
Brightness:	180			
Skip Coil Check:	NO V			
Skip Contact Check:	NO V			
Upload Report:	YES V			
Do Base Test, Every	1		Day(s)	•
Timezone:	Australi	a/Brisbane		۲
Date:	03/06/20	016		
Time:	11:40			
	Save			

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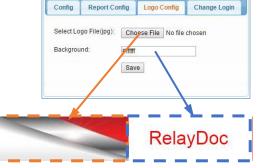


ECHNOLOGIES

- 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
 - o 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

User Name		
User Maine	User	
Password	••••	
Reset R	elaydoc Pin	

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: OR (0 Ω); 1R (1 Ω); 4.7R (4.7 Ω); 22R (22 Ω); 47R (47 Ω); 27OR (270 Ω); 47OR (470 Ω).

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: OR (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 <u>maximum</u> anticipated Voltage is 50V, and 5, 12, 24V are common operating voltages.

Maximum allowable voltages

<u> </u>
JV
30V

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.

Contact Resistance			•				
Name		Value					
0R	0.004						
1R	0.994	0.994					
4R7	4.732	4.732					
22R	21.755						
47R	47.329						
220R	216.815						
470R	471.649						

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Coil Resistance	
Name	Value
0R	0.004
270R	270.984
470R	471.65
1K	1000.799
2K7	2695.754
4K7	4692.968
9K1	9134 228

ontact Resistance	Coil Resistance	Voltage	Current	1
Voltage Resistance			0	
Name		Value 🔶		
5V	5			
12V	12			
24V	24			
50V	50			

Contact Resistance	Coil Resistance	Voltage	Current
Current Resistance			0
Name		Value 🔶	
200mA	200		
400mA	400		
600mA	600		
800mA	800		
1000mA	1000		

age	Current	Calibration Equipments	Calibration Report
		Certificate Rep	port
		00006188718	B 02-01-2012.pdf
		00006188718	B 03-05-2016.pdf
		00006188718	B 03-12-2015.pdf

Calibration Equipment 9.9.6

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.

Calibration Equi	ipments		•
Model	Description	Serial Number 🚖	Cal Due Date
CR-0R	Calibration Resistor 0R	0031	15/10/2016
CR-1R	Calibration Resistor 1R	0032	15/10/2016
CR-4R7	Calibration Resistor 4R7	0033	15/10/2016
CR-22R	Calibration Resistor 22R	0034	15/10/2016
CR-47R	Calibration Resistor 47R	0035	15/10/2016
CR-220R	Calibration Resistor 220R	0036	15/10/2016
CR-270R	Calibration Resistor 270R	0037	15/10/2016
CR-470R	Calibration Resistor 470R	0038	15/10/2016
CR-1K	Calibration Resistor 1K	0039	15/10/2016
CR-2K7	Calibration Resistor 2K7	0040	15/10/2016
CR-4K7	Calibration Resistor 4K7	0041	15/10/2016
CR-9K1	Calibration Resistor 9K1	0042	15/10/2016
Fluke-8846A	6-1/2 Digit Precision Multimeter	1257011	29/07/2016

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.

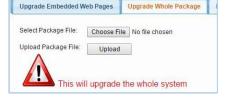
9.10.4.6 Sync Profile

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.

Select Web File:	Choose File	No file chosen
Upload Web File:	Upload	
opiouu rreb rite.	Upload	





ide Whole Package	Recover	Firmware	Manage Loca	l Database
Database O	perations:			
		Sync Profile		Submit
			eport Upload	
		Clear Test F		
		Backup Da		
		Restore Da		
		Remove Da	atabase	
		Sync Profile	9	
	This wi	II CHANG	E database t	ables





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 1R 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 Relay Doc 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 RDCK). RDCK is available for purchase from MRD, otherwise return the unit annually for calibration.



10.4 Reset to Factory Settings

ECHNOLOGIES

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.



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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

Inte	rface
muc	inace

internate	
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	ТВА		
3.2 Transport	TBA		
3.3 Stationary	ТВА		
Class- Mechanical conditions to IEC60721			
3.1 Storage	ТВА		
3.2 Transport	TBA		
3.3 Stationary use	TBA		

EMC Performance	Standard Test	ard Test Result				
Immunity						
ESD	IEC 61000-4-2	B 6kV/8kV				
Radiated	IEC 61000-4-3	А				
Radio Frequency						
Electromagnetic Field	IEC 61000-4-3	А				
Fast Transient/Burst	IEC 61000-4-4	В				
Surge	IEC 61000-4-5	В				
Conducted disturbance	IEC 61000-4-6	-4-6 A				
Interference emission						
HF Radiation	EN 50121-4 &	Pass				
HF Conducted	EN61000-6-3	Pass				

Warranty	
Duration	Twelve Months
Туре	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
RelayDoc-HV			//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.



This warranty is offered by: **MRD Rail Technologies Pty Ltd** 235 South St, Cleveland. QLD. 4163. Australia. +61 7 3821 5151 support@mrd.com.au

WWW.MRD.COM.AU



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END OF MANUAL