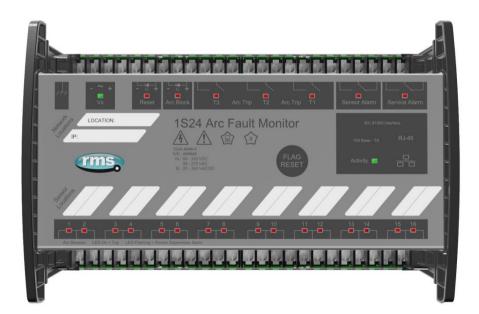




1S24 User Guide Arc Fault Monitoring System

relay monitoring systems pty Itd Advanced Protection Devices





User Guide



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1S24 User Guide

About This Manual

This User Guide covers all 1S24 relays manufactured from September 2015. Earlier relays do not necessarily incorporate all the features described. Our policy of continuous development means that extra features & functionality may have been added.

The 1S24 User Guide is designed as a generic document to describe the common operating parameters for all relays built on this platform. Some relay applications are described but for specific model information the individual "K" number Product / Test manuals should be consulted.

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To download a PDF version of this guide: http://rmspl.com.au/wordpress/wp-content/uploads/2015/08/1S24 User Guide.pdf





How this Guide is Organised

This guide is divided into three parts:

Part 1	Overview
Part 2	Documentation
Part 3	Application





Part

Documentation

Technical Bulletin

The detailed technical attributes, functional description & performance specifications for the 1S24 are described in the product Technical Bulletin. For the most up to date version go to:

http://rmspl.com.au/product/1s24/ http://rmspl.com.au/product/1s30/

The order of precedence for product information is as follows:

- Product Test Manual (PTM)
- Technical Bulletin
- User Guide

User Guide

This User Guide covers all 1S24 relay versions & describes the generic features & attributes common across all versions.

Different relay versions are required to cater for varying customer requirements such as auxiliary voltage range, I/O configuration, case style, relay functionality etc.

The product ordering code described in the Technical Bulletin is used to generate a unique version of the relay specification & is called a Type Number. This code takes the form 1S24Kxx where the Kxx is the "K" or version number. For a complete description of the RMS "K" number system refer to: <u>www.rmspl.com.au/handbook/parta3.pdf</u>

Product Test Manual

Each 1S24 version has a specific PTM which provides details on the unique attributes of the relay. Each PTM includes the following information:

- Specific technical variations from the standard model if applicable
- Wiring diagram

If you require a copy of the PTM for an RMS product the following options are available:

- Check the RMS web site at: <u>http://rmspl.com.au/product-test-manuals/</u>
- Contact RMS or a representative & request a hard copy or PDF by email.





Part

Application

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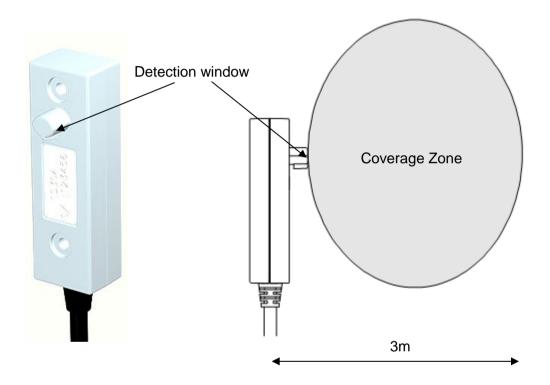


Sensor Installation

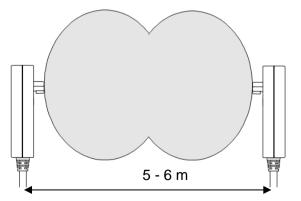
1S30 Sensors

The 1S30 sensor is available as a single detector or dual detector package.

The 1S30A single detector version is depicted below showing the location of the detection window and the approximate coverage zone :



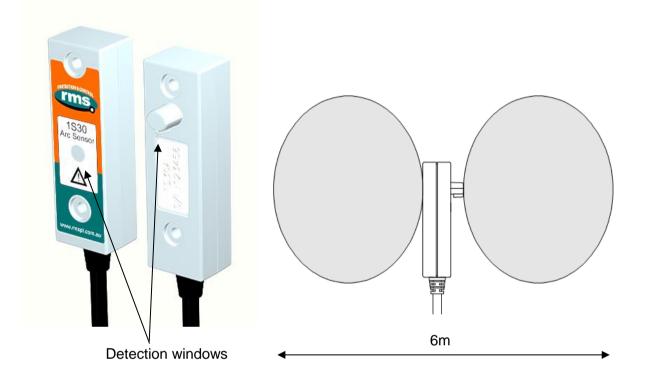
The recommended spacing for the 1S30A single detectors is approximately 5 - 6 m to ensure adequate detection overlap.



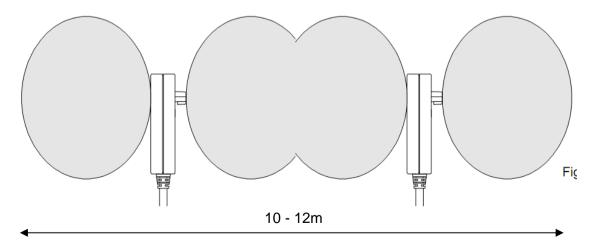




The 1S30B Dual detector version provides an additional detection window for dual zones of coverage as depicted below :



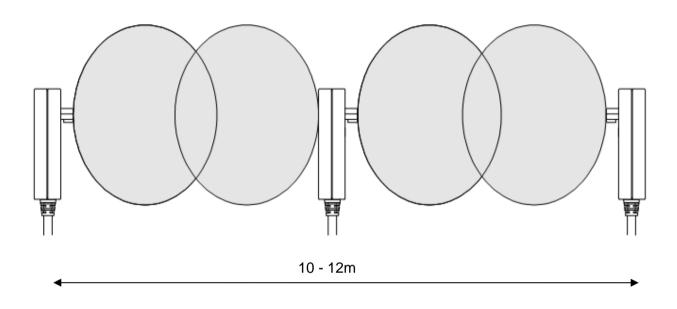
The recommended spacing for the 1S30B single detectors is approximately 5 - 6 m to ensure adequate detection overlap, this combination provides an overall coverage zone of approximately 10 - 12 m.







The 1S30A and 1S30B sensors may also be mixed to provide various coverage combinations, again spacing's of approximately 5 - 6 m should be observed to ensure adequate detection overlap.



Sensor Placement

Sensors need to be mounted to provide full coverage of the switchgear cubicles to be protected. Where the protected zone is larger than the sensor coverage then the use of multiple sensors is required.

Precise positioning of the sensors is generally not required as the light caused by the arc is reflected from the walls.

Sensor Mounting

The 1S30 is suitable for flush panel mounting in a number of configurations, for further information on mounting arrangements and mounting hardware refer to the 1S30 Technical Bulletin.





Example Sensor Placement

The following are some typical examples of sensor placement.



Sensor placement inside CB racking chamber



Sensor placement inside busbar chamber







Sensor placement inside cable termination chamber



Sensor placement for switchgear Busbar coverage (External through Hole Detector)







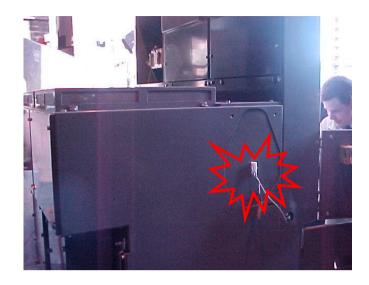
Sensor placement near Low Voltage Contactor for a Variable Speed Drive



Sensor placement for Switchgear cable termination chamber (External through Hole Detector)







Sensor placement for end of Bus chamber (External through Hole Detector)



Sensor placement for Switchgear cable termination chamber (External through Hole Detector)





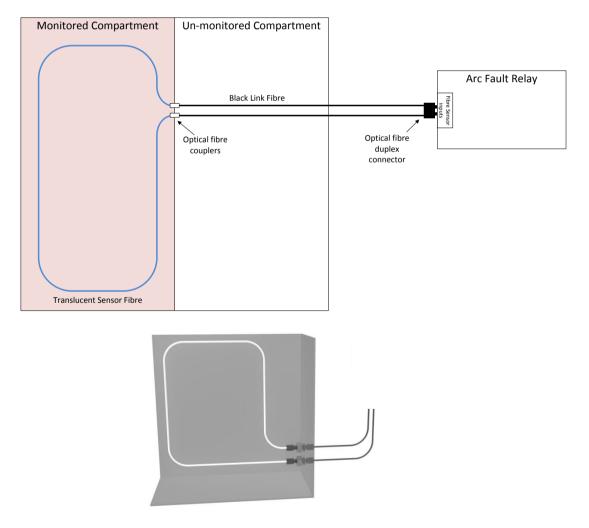
1S40 Linear Sensors

The 1S40 linear sensor may be applied to protect large volumes where multiple point sensors would otherwise be required.

A separate 1S40 linear sensor is required for each segregated protection zone.

The linear sensors kits provide both black link fibre and translucent arc sensor fibre. The translucent fibre is located within the detection zone and black link fibres allow routing of the linear sensor back to the relay.

Translucent and black link fibres are joined through the use of optical fibre couplers. An optical fibre duplex connector is utilised for relay connection

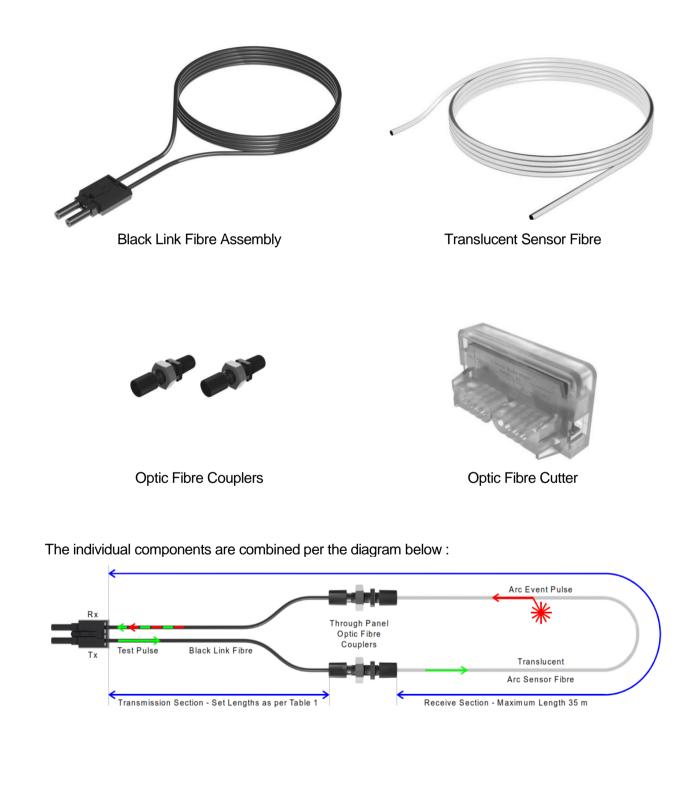


For the most effective coverage it is preferable to loop the translucent fibre within the monitored compartment or chamber as shown in the diagrams above. A light intensity of >7,500 Lux over a length of 300mm is required to cause an arc trip.





The 1S40 kit comprises of lengths of black link fibre (pre-terminated with a duplex connector for relay connection), unterminated translucent fibre, 2 x optical fibre couplers and a fibre optic fibre cutter.





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The following sensor dimensioning criteria must be satisfied for the arc fault relay linear sensor input to self calibrate and function correctly :

- 1. Transmission Section (section of clad fibre from relay Tx connection) to optic fibre coupler must be $\leq 40m$
- 2. Receive Section (section of bare and clad fibre back to the relay Rx connection) must be $\leq 35 m$

1S40 Linear Sensor Assembly

Once the lengths of black link fibre and translucent sensor fibre have been determined cut them using the optic fibre cutter provided – other cutting tools must not be used as this will lead to excessive attenuation within the fibre and result in incorrect operation.

The cut sections of black link fibre and translucent fibre are coupled using the provided optic fibre couplers. Slide the cut lengths completely into the couplers and hand tighten the coupler cinch nuts taking care not to strip the cinch nut threads.



Coupled Black Link and Translucent Sensor Fibres

1S40 Linear Sensor Compartment Fixing

The optic fibre couplers may be positioned and held in place with the provided fixing nuts at a compartment interface.

The optic fibres may be retained using cable ties or silicon adhesive. When using silicon adhesive no more than 10% of the sensor fibre shall be masked by the silicon.

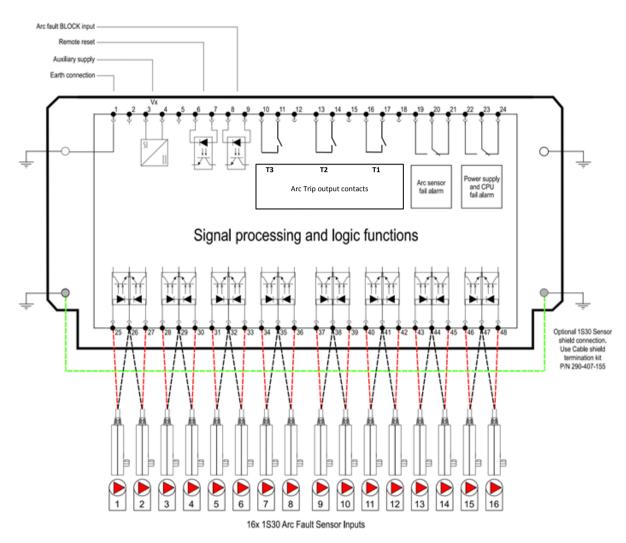
Care should be taken not to apply excessive force when fixing the 1S40 sensor. Excessive force or rough handling may result in damage to the fibre sensor.

Care should also be taken when bending the 1S40 sensor to ensure that the minimum bending radius of 50mm is adhered to.





Scheme Wiring 1S24 Connection diagram



The above diagram shows the 1S24 connections.

The connected sensor inputs need to be enabled and unused inputs disabled via the Web browser configuration tool. This is essential to:

- Allow connected sensor inputs to operate for an ARC Fault
- Allow connected sensor inputs to be supervised
- Ensure unconnected sensor inputs do not indicate an Arc sensor Alarm condition





Linear Sensor Connections

A unit with 1S24 Linear sensor connections is pictured below showing the connection points for the Linear sensors:

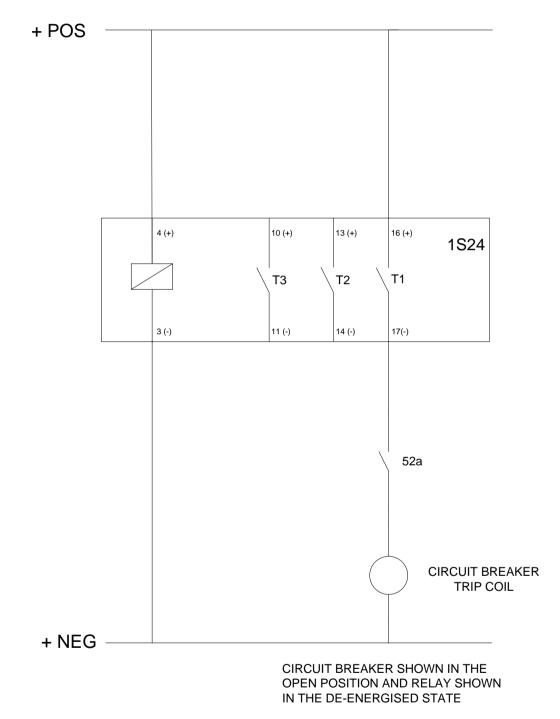


Linear Sensor equipped units provide inputs for 2 Linear sensors and 12 point sensors. Each Linear Sensor input provides a Transmit (TX) and Receive (RX) set of connections. For details of the Linear Sensor refer to the 1S40 Technical Bulletin.





Example Schematic – Direct Arc Trip Only Application



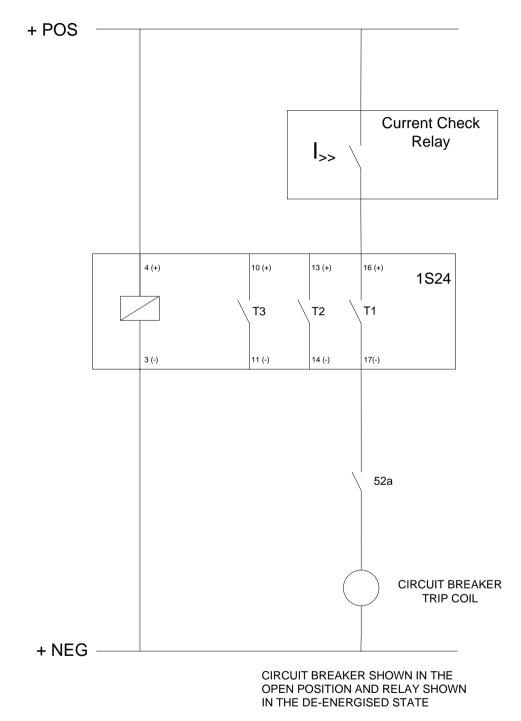
Note: When using Hybrid high speed trip outputs:

1. The polarity markings as nominated on the trip output connections must be observed to ensure correct operation.





Example Schematic – Current Checked Arc Trip Application



Note: When using Hybrid high speed trip outputs:

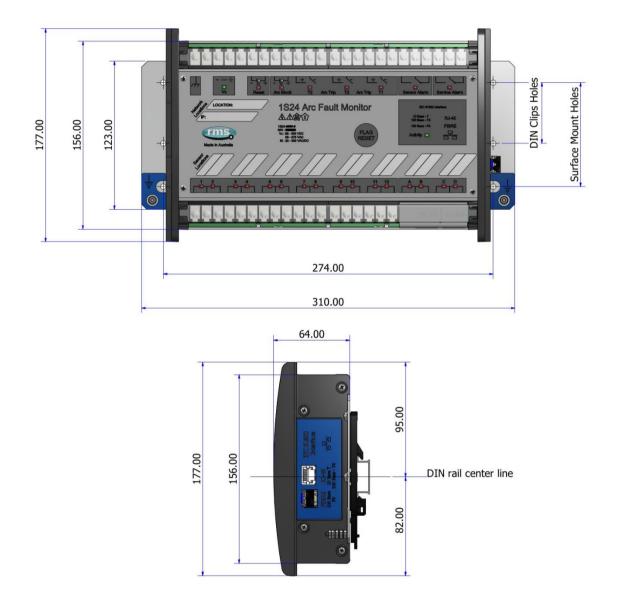
1. The polarity markings as nominated on the trip output connections must be observed to ensure correct operation.





Terminal Layout and Module Dimensions

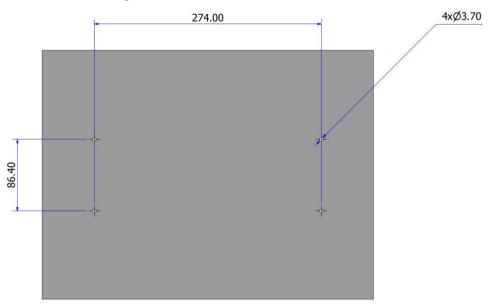
Surface or Din Rail Mounting







The drilling plan for surface mounting is shown below:



The module may alternatively be mounted on a din rail by using 2 optional din rail mounting kits (2 x RMS P/N: 290407157).

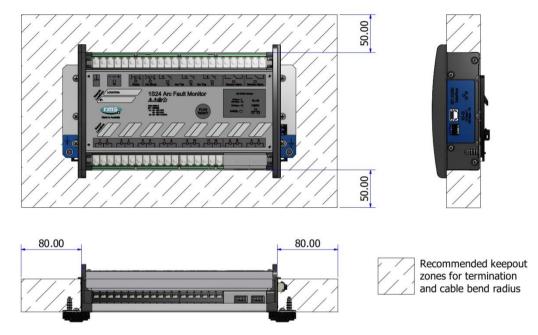




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The recommended keep out zones to allow for cable terminations are shown below:

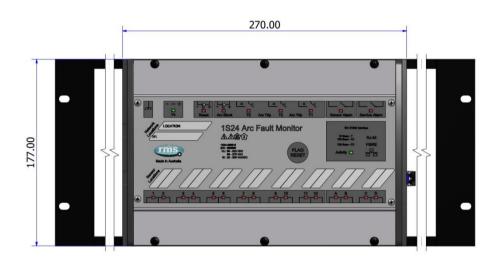






Horizontal or Vertical Flush Mounting

The Horizontal or Vertical module options allow for rack frame or flush panel mounting.

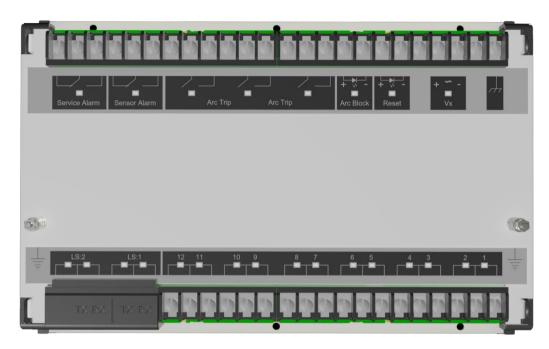




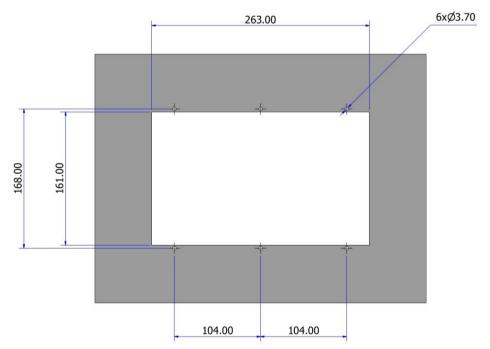




Rear view of Terminals:



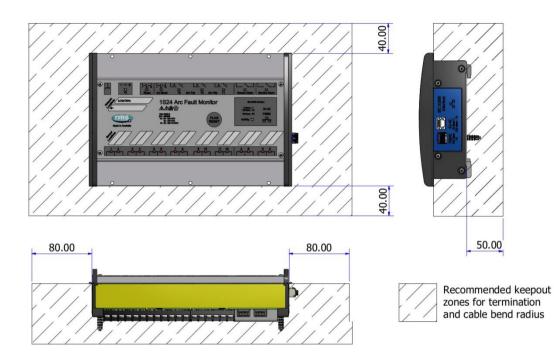
The cutout dimensions for flush mounting are shown below:



The recommended keepout zones to allow for cable terminations are shown below:







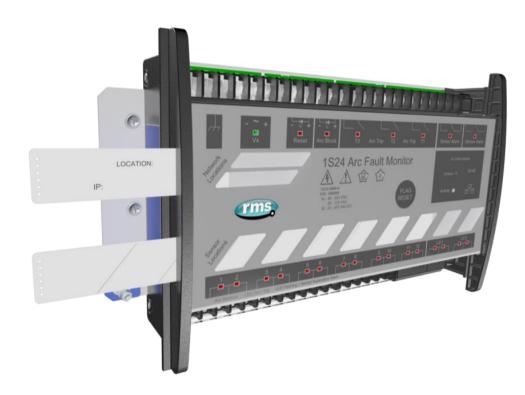




Custom Labels

The 1S24 front panel makes provision for two (2) custom labels, one label identifies the sensor location and the remaining label provides IED identification and IP address details.

The default labels supplied with the relay may be marked up by hand or alternatively custom labels may be produced using the template provided on the RMS website, printed and slipped behind the clear windows on the front panel as depicted below.



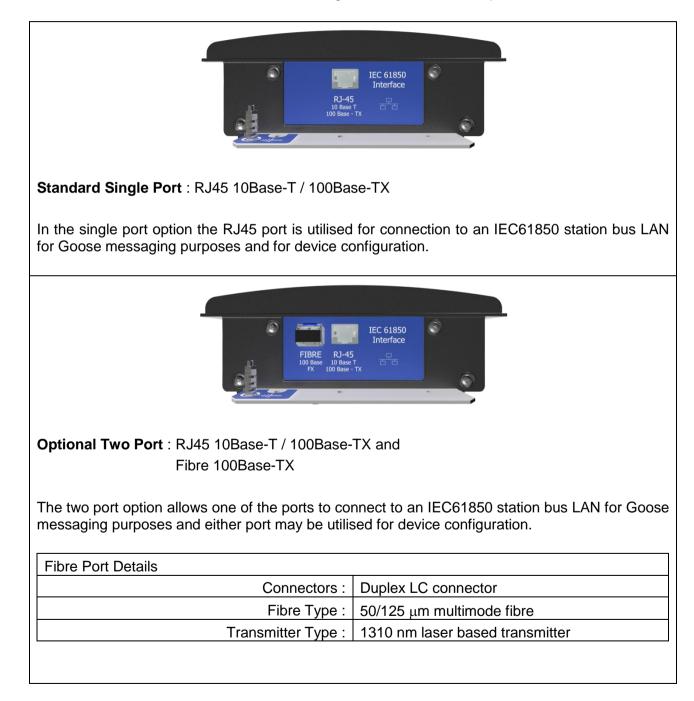




Communications

Physical Connections

The 1S24 is ordered with either of the following Ethernet connection options:



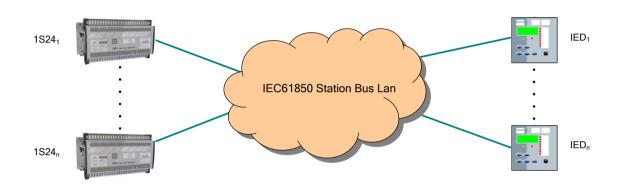




IEC61850 Communication Topologies

The 1S24 IED employs IEC61850 Goose messaging to convey the operation of ARC Fault Sensors and may be used with one or many subscribing IEDs to deploy ARC Fault protection schemes.

A 1S24 or many 1S24 Arc Fault Monitors may be connected to a Station Bus Lan as shown below:



The Station Bus Lan may be arranged using many different topologies, discussion of the various LAN topologies is beyond the scope of this user guide.





IP Addressing

The 1S24 IED comes preconfigured from the factory with the IP address 192.168.0.220. The default IP address may be used in a web browser session to undertake relay configuration. Full details of relay configuration are described in subsequent sections of the user guide.

Reconfiguration of the 1S24 IP address may be required according to the IP addressing defined in the IEC61850 substation configuration, any subsequent web browser sessions will need to utilise the reconfigured IP address.





1S24 Arc Fault Monitor Configuration

Web Browser Session

Configuration of a 1S24 can be undertaken either via direct connection to a PC or via a LAN.

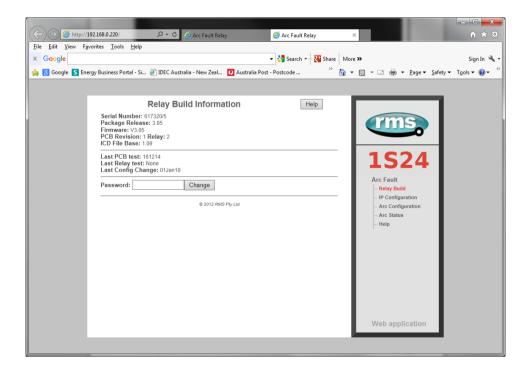
Direct connection to a PC or connection via a LAN is possible using a standard Ethernet patch lead.

Whether the communication is direct or via a LAN, both the PC and the 1S24 need to have IP addressing within the same network.

With a subnet mask of 255.255.255.0 the first 3 octets of the IP address need to be the same for the PC and the 1S24 and the last octet needs to be unique, for example:

1S24 IP Address: 192.168.0.221 PC IP Address: 192.168.0.238

In the above example entering the 1S24 IP Address (192.168.0.221) into the PC web browser address field will establish a web browser session displaying the Relay Build Information and a menu tree to navigate to the other configuration screens.



To make any changes you will be prompted for a User name and Password





Connect to 192.168.0.221
The server 192.168.0.221 at Retry requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
User name: 🙍
Password:
<u>R</u> emember my password
OK Cancel

The factory default username and password is:

Username: admin Password: RMS

The username and password need only be entered once for each web server session and allows for multiple setting changes with access automatically timing out after 2 minutes of inactivity.





Relay Build

The Relay Build screen provides device details such as the of the Serial Number and Firmware version.

The Password may be changed at this point by entering your new password and pressing the Change button, enter the user name and previous password if prompted.

(⇐) ⇐) (∅ http://	192.168.0.220/ 🔎 - C 🥥 Arc Fault Relay 🧭 Arc Fault Relay 🛛 🖉	- □ - × ↑ ★ ☆
<u>File Edit View Fa</u>	avorites Iools Help	
× Google	✓ 🚼 Search → 🛃 Share More ≫	Sign In 🔌 🕶
👍 8 Google En	iergy Business Portal - Si 🗿 IDEC Australia - New Zeal 🚺 Australia Post - Postcode 🌼 🦄 🔻 📓 👻 🖃 👼 👻 <u>P</u> ag	e ▼ <u>S</u> afety ▼ T <u>o</u> ols ▼ 🔞 ▼
	Relay Build Information Help	
	Serial Number: 61720/5 Package Relases: 3.05 F/mware: V3.05 PCB Revision: 1 Relay: 2 ICD File Base: 1.09	•
	Last PCB test: 161214 Last Relay test: None Last Config Change: 01Jan10	4
	Password: Change Arc Fault	
	© 2013 RMS Pty Ltd – Arc Configuration Arc Status Help	1
	Web application	on

IP Configuration

The IP Configuration screen displays and allows editing of the IP address parameters for the RJ45 port, Fibre port, Gateway and the SNTP Server.

To change the IP address edit the IP address field and then click the Change button and enter the user name and password if prompted.

Note that the Fibre port must be on a different IP network to the RJ45 port.

The subnet mask will need to match that of the network being connected to.





For time stamping in accordance to the IEC61850 standard an SNTP server is required. The SNTP server IP address can be set in the IP Configuration screen but if left blank the 1S24 will attempt to find a default SNTP server if available.

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× Google → Search + Sig Share More >	Sign In 🔌 🕶
🐅 🔕 Google 💁 Energy Business Portal - Si 进 IDEC Australia - New Zeal 🖸 Australia Post - Postcode 👋 🎍 💌 🗟 💌 🔄 🖷 💌 Page 💌 Safety 🕶 T	ools 🔻 🔞 👻 🧷
IP Configuration	
RJ45 IP Address: 192.168.0.220 Mask: 255.255.255.0	
Fibre IP Addess: 192.160.1220 mask: 203.233.30	
IP Gateway: 192.168.0.254 Change IP	
SNTP Server. 192.168.0.251 Resync: 600 seconds Change SNTP 1524	
SNTP Server: 192.168.0.251 Resync: 600 seconds Change SNTP	
© 2013 RMS Pty Ltd Arc Fault	
- Relay Build	
- Arc Configuration	
- Arc Status - Help	
Web application	

Arc Configuration

The Arc Configuration screen provides configuration settings for up to 16 Sensor inputs.

Arc Configuration Help Sensor State Trip1 Trip2 Zone 1 Disabled Yes Yes 1 2 Disabled Yes Yes 2 3 Disabled Yes Yes 3 4 Disabled Yes Yes 4 5 Disabled Yes Yes 5 6 Disabled Yes Yes 6 7 Disabled Yes Yes 7	1S24
1 Disabled Yes 1 2 Disabled Yes Yes 2 3 Disabled Yes Yes 2 4 Disabled Yes Yes 4 5 Disabled Yes Yes 5 6 Disabled Yes Yes 6	1S24
2 Disabled Yes Yes 2 3 Disabled Yes Yes 3 4 Disabled Yes Yes 4 5 Disabled Yes Yes 5 6 Disabled Yes Yes 6	1S24
3 Disabled Yes Yes 2 4 Disabled Yes Yes 4 5 Disabled Yes Yes 5 6 Disabled Yes Yes £	1S24
4 Disabled Yes Yes 4 5 Disabled Yes Yes 5 6 Disabled Yes Yes 6	1S24
5 Disabled Yes Yes 5 6 Disabled Yes Yes 6	1524
6 Disabled Yes 6	
7 Disabled Yes Yes 7	Arc Fault
	Relay Build
8 <u>Disabled</u> <u>Yes</u> <u>Yes</u> <u>8</u>	- IP Configuration
9 <u>Disabled</u> <u>Yes</u> <u>Yes</u> <u>9</u>	- Arc Configuration
10 <u>Disabled</u> <u>Yes</u> <u>10</u>	Fibre Loop Sensor
11 <u>Disabled</u> <u>Yes</u> <u>Yes</u> <u>11</u>	Arc Status
12 Disabled Yes Yes 12	All Status
13 <u>Disabled</u> <u>Yes</u> <u>Yes</u> <u>13</u>	- Help
14 Disabled Yes Yes 14	
15 Disabled Yes Yes 15	
IS Usadley Its Its IS 16 Disabled Yes Yes 16	





Each sensor input has 4 settable parameters:

State

Armed or disabled, defines if the Sensor input is enabled or disabled, click on the field to change the state and enter the user name and password if prompted.

Trip 1

Yes or No, determines if the Sensor input operates the Trip 1 output, click on the field to change the state and enter the user name and password if prompted.

Trip 2

Yes or No, determines if the Sensor input operates the Trip 2 output, click on the field to change the state and enter the user name and password if prompted.

Zone

The Zone Setting provides a means of improving Goose response time for simultaneous trips in a single Arc Fault tripping zone. The Zone setting ensures that a Goose is immediately broadcast without having to wait for the updating of all arc detectors in the same corresponding zone. Allowable Zone values are from 1 to 16. Set the Zone value the same for sensors located in the same zone. Click on the field to alter the Zone value.





Arc Status

🞖 Google 🚺 Energy I	Business Portal - Si 🤞	IDEC Australia - New Ze	al 🚺 Australia F	Post - Postcode	» 🟠 🔻	🔊 🔻 🖃 🖶 💌 <u>P</u> age 🕶 <u>S</u> afe	ty ▼ T <u>o</u> ols ▼ 👔
	Arc Status	Automatic refresh	Refresh		Help		
	Sensor	State	Flag	Zone Count		rime	
	1	Disabled	No	<u>0</u>		rms	
	2	Disabled	No	<u>0</u>		1524	
	3	Disabled	No	<u>0</u>			
	4	Disabled	No	<u>0</u>		1524	
	5	Disabled	No	<u>0</u>		TOTA	
	6	Disabled	No	<u>0</u>		Arc Fault	
	7	Disabled	No	<u>0</u>		Relay Build	
	8	Disabled	No	<u>0</u>		- IP Configuration	
	9	Disabled	No	<u>0</u>		Arc Configuration	
	10	Disabled	No	<u>0</u>		- Arc Status	
	11	Disabled	No	<u>0</u>		- Fibre Loop Sensor	
	12	Disabled	No	<u>0</u>		- Help	
	13	Disabled	No	<u>0</u>			
	14	Disabled	No	<u>0</u>			
	15	Disabled	No	<u>0</u>			
	16	Disabled	No	<u>0</u>			
		© 2013	RMS Pty Ltd				

The Arc Status screen provides status information on up to 16 sensors inputs.

State

The State column determines the state of each sensor input.

The following states are reported:

Disabled	ARC Sensor is disabled
Armed	ARC Sensor is armed
Tripped	ARC detected (changes for the period of the trip)
Failed	ARC sensor supervision failure
Initializing	ARC sensor initializing (transitory)
Stuck	ARC sensor stuck on

Flag

The Flag column will indicate and latch for an Arc Sensor operation, individual Flags may be reset by clicking on the sensor flag status and entering the user name and password if prompted.





Count

The Count field provides a log of ARC sensor operations since power on or the last counter reset, the individual sensor counters may be reset to 0 by clicking on the count field and entering the user name and password if prompted.

Summary of 1S24 SARC Configuration

The following steps outline the 1S24 SARC Configuration:

- ✓ Establish a Web Browser session using the default IP address
- ✓ Set up the IP addressing for the SNTP server
- ✓ Arm the ARC Sensor inputs to be utilised in the application
- ✓ Set which outputs are to be operated by the respective ARC sensors

For installations not utilising IEC61850 Goose messaging that completes the configuration process.

For installations utilising IEC61850 follow the IEC61850 Substation Configuration process in the following sections.





Example IEC61850 Substation Configuration

Application Example

The following example will demonstrate the process of implementing an ARC Fault Protection scheme using IEC61850 Goose messaging in conjunction with other IEC61850 equipped IEDs.

The example will comprise of a 1S24 Arc Fault Monitor used in conjunction with subscribing Reyrolle 7SR22 Argus relays with IEC61850 communications and implemented with the Reydisp Manager productivity tool embedded with the optional Digsi System configurator.

A similar process is equally applicable to IEC61850 equipped IEDs from alternative vendors and alternative System Configuration tools.

The steps to implement our Application Example are:

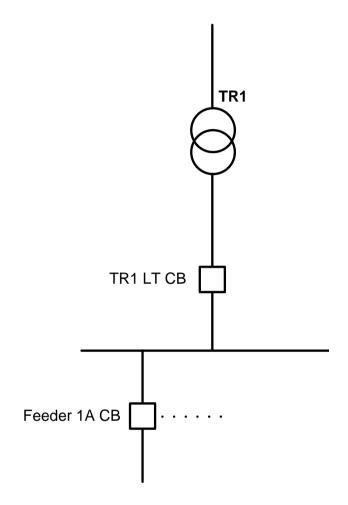
- ✓ Create an IEC61850 project in a System configurator
- ✓ Populate the project with the Application IEDs
- ✓ Populate the project with the 1S24 IEDs using the default 1S24 icd file
- ✓ Populate the project with the IEC61850 Substation
- Using the System Configurator configure the desired IP addressing of the subnet containing all of the application IEDs
- ✓ With the System Configurator create the GOOSE applications with the associated GOOSE linkages between the source IED logical nodes (in the case of the 1S24 : SARCs) and the subscribing IED (in our example we use GGIO)
- ✓ With all GOOSE mapping complete create a .cid file for the 1S24 using the export facility in the System Configurator
- ✓ FTP the 1S24 .cid file into the 1S24
- ✓ Reboot the 1S24 to invoke the GOOSE mapping
- ✓ Create the subscribing relay application logic that will make use of the status changes to the subscribed GOOSE messages from the 1S24
- ✓ Send the relay configurations as well as IEC 61850 configurations to the respective subscribing IEDs in the application





Arc Fault Scheme

The single line schematic arrangement of the application example is shown in the diagram below:

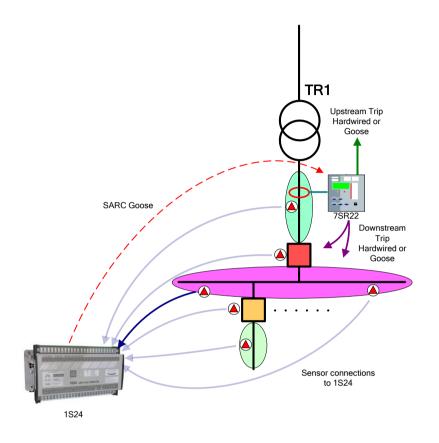


Arc Fault coverage is to be provided to the bus, circuit breaker chambers and cable termination chambers and shall be current checked with an overcurrent relay. Tripping shall be zoned to provide sectionalising and minimise affected plant.





The proposed scheme is as follows:



The scheme comprises of 1S30 sensors connected to a 1S24 Arc Fault Monitor, providing ARC Fault coverage of the coloured protection zones.

The 1S24 provides the SARC Logical Node for the operation of Arc Fault Sensors.

The 7SR22 Overcurrent relay subscribes to SARC Goose messages and initiates the required protection tripping via an Overcurrent Check.

Tripping in this case will be carried out by hardwiring to respective circuit breakers and using binary outputs from the 7SR22 IED but could also be implemented via Goose by another subscribing IED.

Flexible tripping logic may be implemented in the 7SR22 according to specific application requirements and may also accommodate different operating arrangements in more complex applications.





1S24 SARC Allocation

In the proposed scheme we have 6 Arc Fault Sensors installed providing coverage for 5 distinct protection zones. The individual SARCs are allocated as follows:

Zone Coverage	Colour	Number of Sensors	SARC Allocation
Feeder Exit Termination Chamber		1	SARC 1
Feeder CB Chamber		1	SARC 2
Bus		2	SARC 3 SARC 4
Incomer CB Chamber		1	SARC 5
Incomer Termination Chamber		1	SARC 6

Protection Zone Tripping

The required circuit breaker tripping is defined by the following tripping table:

SARC Operation	Zone Coverage	Colour	Trip
SARC 1 Feeder Exit Termination Chamber			1A CB
SARC 2	Feeder CB Chamber		TR1 LT CB
SARC 3 or SARC 4 Bus			TR1 LT CB
SARC 5	Incomer CB Chamber		Upstream
SARC 6	Incomer Termination Chamber		Upstream





1S24 Source Arc Fault Detector Points

The 1S24 will broadcast the following Arc Fault Detector Points to subscribing IEDs:

Source ARC Fault IED Goose ARC Fault Detector points						
Function	SARC	Description				
SARC1	RMS_1S24/DEV_1S24/RMS_SARC1/FADET	1S24 Arc Fault Detector 1				
SARC2	RMS_1S24/DEV_1S24/RMS_SARC2/FADET	1S24 Arc Fault Detector 2				
SARC3	RMS_1S24/DEV_1S24/RMS_SARC3/FADET	1S24 Arc Fault Detector 3				
SARC4	RMS_1S24/DEV_1S24/RMS_SARC4/FADET	1S24 Arc Fault Detector 4				
SARC5	RMS_1S24/DEV_1S24/RMS_SARC5/FADET	1S24 Arc Fault Detector 5				
SARC6	RMS_1S24/DEV_1S24/RMS_SARC6/FADET	1S24 Arc Fault Detector 6				

7SR22 Single Point Input GGIO Allocation

The 7SR22 relay will subscribe to SARC Goose messages broadcast by the 1S24 IED and shall assign subscribed SARCs to Single Point Input GGIO as follows:

Destination 7SR22 Relay Goose Single Point Inputs							
ARC Fault Dete	ctors						
Function	Single Point Input	Description					
SARC1	CBn/CTRL/SPi64GGIO1/SPCSO1	CBn Single Point Input 1 Data					
SARC2	CBn/CTRL/SPi64GGIO1/SPCSO2	CBn Single Point Input 2 Data					
SARC3	CBn/CTRL/SPi64GGIO1/SPCSO3	CBn Single Point Input 3 Data					
SARC4	CBn/CTRL/SPi64GGIO1/SPCSO4	CBn Single Point Input 4 Data					
SARC5	CBn/CTRL/SPi64GGIO1/SPCSO5	CBn Single Point Input 5 Data					
SARC6	CBn/CTRL/SPi64GGIO1/SPCSO6	CBn Single Point Input 6 Data					

Creating an IEC61850 Project

To create and configure an IEC61850 project requires an IEC61850 system configurator.

In our example Reydisp Manager with the optional embedded Digsi system configurator will be used to establish the Goose message linkages between the 1S24 and the 7SR22 Overcurrent relay.

Reydisp Manager is used as the productivity tool to manage the IEC61850 configuration process for Reyrolle relays and may also be utilised to create any required logic in Reyrolle devices.





A screenshot of Reydisp Manager is shown below:

🏫 Rey	rdisp i	Manage	r				
				Tools	Window	Help	
1 🖆	6	•	0				

To create a new project choose File and New.

🏫 New Proje	ect	
Name: Location: Directory: Project File:	Create directory for project	Browse
	OK	Cancel

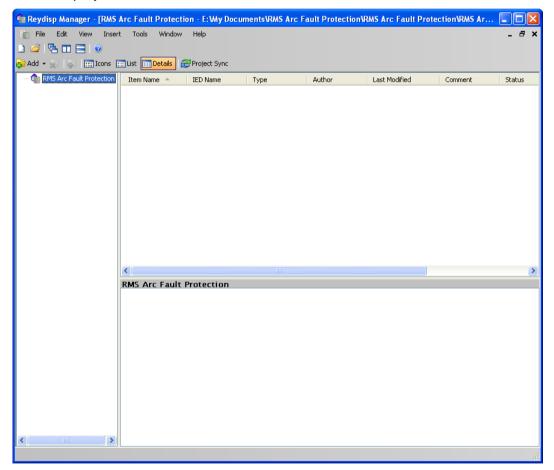




Fill in the details including where you want the project file to be stored and hit OK.

🛍 New Proje	ect	
N		
Name:	RMS Arc Fault Protection	
Location:	E:\My Documents\RMS Arc Fault Protection	Browse
Directory:	RMS Arc Fault Protection Create directory for project	
Project File:	E:\My Documents\RMS Arc Fault Protection\RMS Arc Fault Protection\RMS	
	ОК	Cancel

The new project has been created.







Populating IEDs In the IEC 61850 Project

We now need to populate the project with our IEDs, firstly the Reyrolle 7SR22. Choose Insert and Device and you will be presented with the following screen.

🖬 Select Device	
Select Device 1. Select Product Family and Software Version Devices 0. 75R210 0. 75R220 0. 75R230 0. 75R230 0. 75R230 0. 75R230 0. 75R230	Select Device by MLFB
Connected Device	Select Cancel

Select the required relay, for this example we will choose a 7SR2202-2AA77-0CA0 ensure that the MLFB code is correctly filled.

🖬 Select Device	
Select Product Family and Software Version Devices KP210 R7-7a F78220	2 Select Device by MLFB 7 S R 2 2 0 2 · 2 A A 7 7 · 0 C A 0 7 8
 F7a-7a F7a-7a F782202-2 [AB] A [1-4] 1-0CA0 F782202-2 [AB] A [1-4] 1-0DA0 F782202-2 [AB] A [1-4] 2-0CA0 F782202-2 [AB] A [1-4] 2-0CA0 F782202-2 [AB] A [1-4] 2-0CA0 F782202-2 [AB] A [78] 7-0CA0 	Rest
75R2203-2[AB]A[1-4]1-0CA0 75R2203-2[AB]A[1-4]1-0DA0 75R2203-2[AB]A[1-4]2-0CA0 75R2203-2[AB]A[1-4]2-0DA0	3. Review Selected Device Info General Device Info
78R2203-2 (AB) A (78) 7-0CA0 78R2203-2 (AB) A (78) 7-0DA0 78R2204-2 (AB) A (1-4) 1-0CA0 78R2204-2 (AB) A (1-4) 1-0CA0	Device MLFB 7SR2202-2AA77-0CA0 MLFB Info
73R2204-2[AB]A[1-4]2-0CA0 73R2204-2[AB]A[1-4]2-0DA0 73R2204-2[AB]A[1-4]2-0DA0 73R2204-2[AB]A[78]7-0CA0	7 S R
	2 2 0
Connected Device	2
	Select Cancel

Once the MLFB codes is correctly filled you can then select the device.





The 7SR22 IED has been added to your project.

🛍 Reydisp Manager - [RMS	Arc Fault Prot	ection - E:\M	y Document	tsVRMS Arc Fa	ult Protecti	ion\RMS Arc F	ault Protec	tion\RMS Arc	Fa 🔳 🗖	X
💼 File Edit View Inser	t Tools Wind	low Help							- 6	×
L) 😂 🔁 🗆 🚍 📀										
😥 Add 👻 🙀 👘 🛄 Icons 👔	🔜 List 📊 Details	Project S	iync							
	Item Name 🔺	IED Nam	е Ту	pe	Author	Last Modi	ied	Comment	Status	
	75R2202-2A	A7 TEMPLAT	E Re	yrolle Device		24/10/201	2 2:20:1		Device Sync	Re
	<									>
	RMS Arc Fau		on / 7SR2	202-2AA77	-0CA0					
	Device Confi	guration								^
	2	S	Ð	1	Ţ	\bigcirc				
	Sync Device	Configure Communica	Logic	Settings	Configure Interface	Configure Time Zone				
	Utilities									
					5	\$				
	Export Device	Reload Device Firmware	Migrate Devic	e Update Device from Template	Export ICD	Compile EN100 Binary	Import CID/SCD	Import Settings		
<										~

Continue adding Reyrolle IEDs as required using the same process.

Nominate a meaningful IED name for each IED by right clicking on the IED and choosing properties.

1 7SR220	-2AA77-0CA0 - Properties 🛛 🗙
General	C 61850
Name:	7SR2202-24A77-0CA0
Path:	E:\My Documents\RMS Arc Fault Protection\RMS Arc Fault Pr
File Name	E:\My Documents\RMS Arc Fault Protection\RMS Arc Fault Pr
Hierarchy	RMS Arc Fault Protection/7SR2202-2AA77-0CA0
Model:	7SR220\R7a-7a\7SR2202-2[AB]A[78]7-0CA0 Template R3
MLFB:	75R2202-2AA77-0CA0
Author:	
Created:	24/10/2012 2:20:17 PM
Last Modi	ed: 24/10/2012 2:20:17 PM
Comment	
	OK Cancel



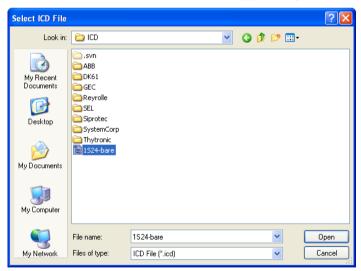


Choose the IEC 61850 tab and enter a name in the IED Name field.

1 7SR2202-2AA77-	OCAO - Properties	×
General IEC 61850		
IED Name:	0C_75R22	
ICD File:	E:\My Documents\RMS Arc Fault Protection\RMS Arc F	i I
ICD Size:	440.96 KB	
Extended Device In Manufacturer:		
Device Type:	7SR220	
Description:		
Config Version:	1.0	
Station Configuratio	n	
Station:	N/A	
IP Address:	172.16.0.1	
Subnet Address:	255.255.255.0	
Gateway Address:	172.16.0.254	
UDP Port:	50,000	
	OK Cancel	5

Next we will add the RMS 1S24 IED which is added as a Third Party ICD File. You will need to have the 1S24 ICD file which is available through RMS.

Choose Insert and Third Party ICD File and you will be presented with the following file selection, choose the ICD file that has been supplied by RMS.





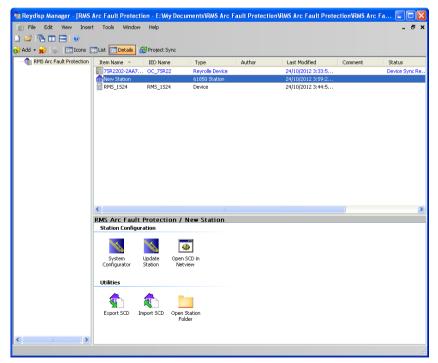


The 1S24 IED has now been added to your project.

💼 Reydisp Manager - [RMS	Arc Fault Protection - E:\My Do	cuments\RMS Arc F	ult Protectio	n\RMS Arc Fault Prote	ection\RMS Arc	: Fa 🔳 🗖 🔀
📻 File Edit View Inser	rt Tools Window Help					_ # ×
u 🐸 🗟 🖬 🖃 💿						
😥 Add 👻 🙀 👘 🔝 Icons [📰 List 🔟 Details 🔁 Project Sync					
	Item Name 🔶 IED Name	Туре	Author	Last Modified	Comment	Status
	75R2202-2AA7 OC_75R22	Reyrolle Device		24/10/2012 3:33:5		Device Sync Re
	RM5_1524 RM5_1524	Device		24/10/2012 3:44:5		
	<					>
	RMS Arc Fault Protection /	RMS_1S24				
	Utilities					
	Export ICD Open Device					
	Folder					
< >						

You can nominate a meaningful IED name for the 1S24 IED by right clicking on the IED and choosing properties.

Now we will add an IEC61850 Station, choose Insert and Station.







We can give the Station a meaningful name by editing the Item Name. We then nominate the Station Devices to be included in the Station by right clicking on the Station and choosing properties.

G	New Station	- Properties	×
ſ	General Station	n Devices	
	Name:	New Station	
	Path:	E:\My Documents\RMS Arc Fault Protection\RMS Arc Fault Pr	
	File Name:	E:\My Documents\RMS Arc Fault Protection\RMS Arc Fault Pr	
	Hierarchy:	RMS Arc Fault Protection/New Station]
	Model:]
	MLFB:]
	Author:]
	Created:	24/10/2012 3:59:25 PM	
	Last Modified:	24/10/2012 3:59:25 PM	
	Comment:	<u>^</u>	
		·	
ľ		OK Cancel	٦.
			:

Select Station Devices and you will see a selection of available unassigned IEDs

RMS - Properties		
General Station Devices		
Unassigned Devices		
Device Name A 7SR2202-2AA77-0CA0 RMS_1S24	IED Name OC_7SR22 RMS_1S24	Location RMS Arc Fault Protecti RMS Arc Fault Protecti
<	IIII	Add to Station
Assigned Devices		
Device Name 🔺	IED Name	Location
<		
No devices assigned		Remove Device
		OK Cancel





Select the IEDs

RMS - Properties		
General Station Devices		
Unassigned Devices		
Device Name 🔺	IED Name	Location
7SR2202-2AA77-0CA0 RMS_1S24	OC_7SR22 RMS_1S24	RMS Arc Fault Protection RMS Arc Fault Protection
<		
		Add to Station
Assigned Devices		
Device Name 🔺	IED Name	Location
<	Ш	
No devices assigned		Remove Device
		OK Cancel

Press Add to Station.

1 RMS - Properties		
General Station Devices		
Unassigned Devices		
Device Name 🔺	IED Name	Location
<		>
		Add to Station
Assigned Devices		
Device Name 🔺	IED Name	Location
7SR2202-2AA77-0CA0 RMS_1S24	OC_7SR22 RMS_1S24	RMS Arc Fault Protection RMS Arc Fault Protection
<		
2 devices assigned		Remove Device
		OK Cancel

Press OK to Assign the Devices to the Station.

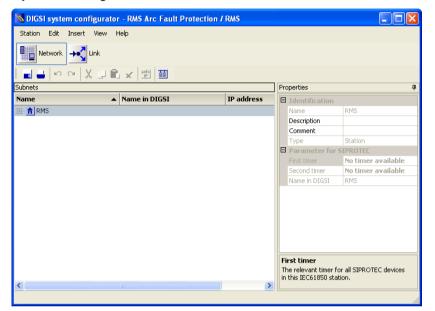




System Configuration – Network View

We now need to configure the IP Addressing for our Station LAN and the Goose Linkages for our Goose messages.

With the Station highlighted Double Click the System Configurator Button, this will start the Digsi System Configurator in the Network view.



Expanding the RMS Station will present the Subnets associated with the Station.

🔀 DIGSI system co	nfigurator - RMS Arc Fault Prote	ection / RMS		
Station Edit Inser	: View Help			
Network	Link			
	X 🛛 🛍 🗙 🖄 🛅			
Subnets			Properties	д
Name	 Name in DIGSI 	IP address	Identification	
E- 🔒 RMS		· · · · ·		RMS
🗕 🚞 New devices			Description	
🗄 🚮 Subnet1			Comment	
_			Туре	Station
			Parameter for 9	
			First timer	No timer available
			Second timer	No timer available
			Name in DIGSI	RMS
			Name	
			Name of station	
<		>		





Clicking on the Subnet will reveal the IP Start address, Subnet mask and standard gateway settings.

DIGSI system configurator - RMS Arc Fault Protection / RMS		
Station Edit Insert View Help		
ubnets	Properties	
ame 🔺 Name in DIG5I IP addr	ss 🛛 Identification	
RMS	Name Sub	net1
New devices	Description	
🕀 👪 Subnet1	Comment	
	Type Subr	net
	Parameter	
	IP start address 172	.16.0.1
		.255.255.0
	Standard gateway 172	
	Baud rate [Mbits/s] 100	
	Type 8-M	IMS
	Name Name of subnet	
	>	

We can set the IP start address for our network for convenience, in this case 192.168.0.1. The Standard Gateway may also be set at this point if one exists.

DIGSI system configurator - RMS Arc Fault Protec	tion / RMS		
Station Edit Insert View Help			
Network			
🖬 🚢 🗠 🗠 🐰 🖵 🛍 🗶 👹 🖼			
jubnets		Properties	
Name in DIG5I	IP address	Identification	
- 🔒 RMS		Name	Subnet1
New devices		Description	
🗄 🛗 Subnet1		Comment	
		Туре	Subnet
		Parameter	
		IP start address	192.168.0.1
		Subnet mask	255.255.255.0
		Standard gateway	
		Baud rate [Mbits/s	
		Туре	8-MM5
		Subnet mask Mask of the subne	
	>		





Expanding Subnet1 will reveal the IEDs that we previously assigned to the Station.

🚺 DIGSI system configurator	- RMS Arc Fault Protection	/ RMS				X
Station Edit Insert View H	łelp					
Network						
= = • • • X L =	」★ 10 m					
Subnets			Pro	operties		
Name 🔺	Name in DIGSI	IP address	Ξ	Identification		
⊟- 🔒 RMS				Name	Subnet1	
🗕 🚞 New devices				Description		
🗄 🛗 Subnet1				Comment		
	75R2202-2AA77-0CA0	172.16.0.1		Туре	Subnet	
RMS_1524	RM5_1524	172.16.0.2	Ξ	Parameter		
_				IP start address	192.168.0.1	
				Subnet mask	255.255.255.0	
				Standard gateway		
				Baud rate [Mbits/s]		
				Туре	8-MM5	
				ubnet mask ask of the subne		
<		>				
						//

The individual devices may be selected to set their IP addresses.

🚺 DIGSI system configurator	- RMS Arc Fault Protectio	n / RMS			
Station Edit Insert View H	łelp				
Network					
🗐 🚽 🗠 🛏 👗 💷 🖺	x auto 🖼				
Subnets			Pro	perties	Ф
Name 🔺	Name in DIGSI	IP address	Θ	Identification	•
🖃 📩 RMS					OC_75R22
New devices				Name in DIGSI	75R2202-2AA77-0CA0
Subnet1				Comment	
OC_75R22	75R2202-2AA77-0CA0	172.16.0.1		Туре	Device
RM5_1524	RM5_1524	172.16.0.2		Device type	75R220
	-			Device version	1.0
				Manufacturer	SIEMENS
				Parameter	
				IP address	172.16.0.1
				Subnet mask	255.255.255.0
				Standard Gateway	
				Device-device com	Possible
				Vertical communica	Possible
					No
				Timer function	No
				ame ame of device (acce:	ss point)
<		>			

Alternatively at the Subnet level the IP addressing may be automatically allocated starting at the IP start address previously set for the Subnet by pressing the auto IP button.





We'll choose to auto allocate the IP addressing, the result is shown below with the IP address of each device being incremented and unique.

Station Edit Insert View	tor - RMS Arc Fault Protect Help	non 7 KMS		
Network				
🖬 🚢 🗠 🗠 🗶 🖵	🗐 🗶 📫			
ubnets			Properties	ą
ame	▲ Name in DIGSI	IP address	Identification	
🗈 🔒 RMS			Name	Subnet1
New devices			Description	
🖻 🏭 Subnet1			Comment	
OC_75R22	75R2202-2AA77-0CA0	192.168.0.1	Туре	Subnet
RMS_1524	RM5 1524	192.168.0.2	Parameter	
	-		IP start address	192.168.0.1
			Subnet mask	255.255.255.0
			Standard gatewa	/ 172.16.0.254
			Baud rate [Mbits/:	100
			Туре	8-MM5
			Name Name of subnet	
		>		

System Configuration – Link View

With the network addressing having been completed we'll now create our GOOSE applications and associated GOOSE linkages.

The screenshot below shows the link view with the RMS Station:

S DIGSI system configurator - RMS Arc Fault Protection / RMS	s 🔲 🗖 🗙
Station Edit Insert View Help	
Network	
📄 🚢 🗠 😋 🐰 🖵 🛍 🗙 Filter No filter	•
Applications	Properties 4
Name	Descripti Comment Type Station ■ Parameter for SIPR First time No timer a Second the timer for all SIPROTEC devices in
Sources P	Destinations 4
Add source	Add target 🙀 🔆
Name Description	Name Description





The Applications window lists all the applications by Station, drilling down into the RMS station will reveal the Subnets and any associated reports or GOOSE applications.

SIGSI system configurator - RMS Arc Fault Protection / RM	5	
Station Edit Insert View Help		
Network		
📄 🚢 🗠 😋 🕺 💷 🛍 🗙 Filter No filter	•	
Applications		Properties P
Name		Identification Name Subnet1 Descripti Comment Type Subnet Name Name of subnet
Sources 4	Destinations	ф
i 📴 Add source 📴 📴	🛶 Ádd target	
Name Description	Name Description	

An existing GOOSE application may be used or alternatively a New GOOSE application created.

For our example we'll use the existing GOOSE application 1, selecting this application reveals the associated IEDs as sources and destinations.

📉 DIGSI system configurator - RMS Arc	Fault Protection / RMS			
Station Edit Insert View Help				
📔 📑 🗠 🖙 🐰 💷 🛍 🗶 Filter	No filter	•		
Applications	Interconnections			Properties 🛛 📮
Name 🔺	Source	 Description 	Destination	🗆 Identification 🛛 🔺
⊡ † RMS				Name GOOSE aj
🖻 🔠 Subnet1				Descripti
GOOSE application1				Comment Type Siemens GC
				Parameter
				Name
				Name of the application
	<	П	>	
Sources	Ф	Destinations		 ₽
🛃 Add source 🙀 👾		📲 Add target 🛛 🙀	ġ ∉	
Name 🔺 Description		Name 🔺	Description	
□ □ □ OC_75R22 75R2202-2AA77-0CA0		🖽 📕 OC_75R22	75R2202-2AA77-0CA0	
🗄 🖥 RMS_1524 RMS_1524		🗄 🖥 RMS_1524	RMS_1524	

Expanding the respective IEDs in the Sources and Destinations windows will show the Logical Nodes and their associated Data Objects.





Firstly we'll select the RMS_1S24 IED and expand RMS_SARC1 and choose FADet to Add as a Source.

🚺 DIGSI system configurator - RMS Arc	Fault Protection / RMS					
Station Edit Insert View Help						
Network						
📕 🖶 🗠 🗠 🕺 💭 🛍 🗶 Filter						
Applications J	Interconnections					Properties 4
Name 🔺	Source		 Description 	Destination	Description	Name GOOSE a
E- 🔒 RMS	RMS_1S24/DEV_1S24/RMS_SARC1/FADet	:				Descrinti 🗾
🗄 🛗 Subnet1						Name
GOOSE application1						Name of the application
Sources		4	Destinations			д
🛃 Add source			📲 Add target 🛛 🏚	4		
	Description	~		Description		
	75R2202-2AA77-0CA0			75R2202-2AA77-0CA0		
	RM5_1524			RM5_1524		
DEV_1524		=		100_1021		
CONF_GGIO1						
E LPHD1						
RMS_SARC1						
Beh						
FADet						
🔛 Health						
Mod		~				

Once Added as a source it will appear in the interconnections. In turn add all of the required source SARCs.

📕 DIGSI system configurator - RMS Arc F	ault Protection / RMS				
Station Edit Insert View Help					
Network					
🔚 🚢 🗠 🗠 🐰 🛄 🛍 🗶 Filter N					
Applications 📮	Interconnections		-		Properties 4
Name 🔺	Source	 Description 	Destination	Description	Name GOOSE ag 🔺
⊡- 🔒 RMS	RMS_1524/DEV_1524/RMS_SARC1/FADet				Descripti
🖮 👪 Subnet1	RMS_1524/DEV_1524/RMS_SARC2/FADet				Comment
GOOSE application1	RMS_1524/DEV_1524/RMS_SARC3/FADet				Type Siemens GC
	RMS_1S24/DEV_1S24/RMS_SARC4/FADet				Applicatic 1
	RMS_1524/DEV_1524/RMS_SARC5/FADet				Parameters
	RMS_1S24/DEV_1S24/RMS_SARC6/FADet				Name
					Name of the application
Sources	φ.	Destinations			џ
🛃 Add source 🙀		📲 Add target 🛛 🏚	×		
Name 🔺 [Description	Name 🔺	Description		
	'SR2202-2AA77-0CA0	⊕- 🖥 OC_75R22	75R2202-2AA77-0CA0		
	RM5_1524	🗄 🖥 RMS_1524	RM5_1524		
DEV_1524					
🗄 🗄 LLNO					
CONF_GGIO1					
EPHD1					
RMS_SARC1					
	×				
					1





The SARCs are linked to the respective 7SR22 IED Single Point Input GGIO chosen from the Destinations window (refer also to the Allocation table in the earlier part of this example).

Station Edit Insert View Help					
Network Hillink	No filter 🔹				
	Interconnections				Properties
pplications 4					
iame 🔺	Source	Description		Description	Name GOOSE a
RMS	RMS_1S24/DEV_1S24/RMS_SARC1/FADet		OC_75R22/CTRL/SPi64GGIO1/SPCSO1	75R2202-2AA77-0C	Descripti
🔄 🚻 Subnet1	RMS_1524/DEV_1S24/RMS_SARC2/FADet		OC_75R22/CTRL/SPi64GGIO1/SPCSO2	75R2202-2AA77-0C	Comment
GOOSE application1	RMS_1S24/DEV_1S24/RMS_SARC3/FADet		OC_75R22/CTRL/SPi64GGIO1/SPCSO3	75R2202-2AA77-0C	Type Siemens G
	RMS_1524/DEV_1524/RMS_SARC4/FADet		OC_75R22/CTRL/SPi64GGIO1/SPCSO4	75R2202-2AA77-0C	Parameter
	RMS_1524/DEV_1524/RMS_SARC5/FADet		OC_75R22/CTRL/SPi64GGIO1/SPCSO5	75R2202-2AA77-0C	Applicatic 1
	RMS_1S24/DEV_1S24/RMS_SARC6/FADet		OC_75R22/CTRL/SPi64GGIO1/SPC506	75R2202-2AA77-0C	
					Name Name of the application
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urces		P Destinations			
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ame 🔺	Description	Name	 Description 		
🕀 🙀 RMS_SARC14			SPDOnsGGIO4 SP Direct Operate N		
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🖶 🙀 RMS_SARC16			- 🙀 SPCSO1 Single Point Data 01		
RM5_SARC2					
RMS_SARC3			🗹 SPCSO11 Single Point Data 11		
E TRMS_SARC4		-	- SPCSO12 Single Point Data 12		
RMS_SARC5			- SPCSO13 Single Point Data 13		

With the linkages complete save the configuration.

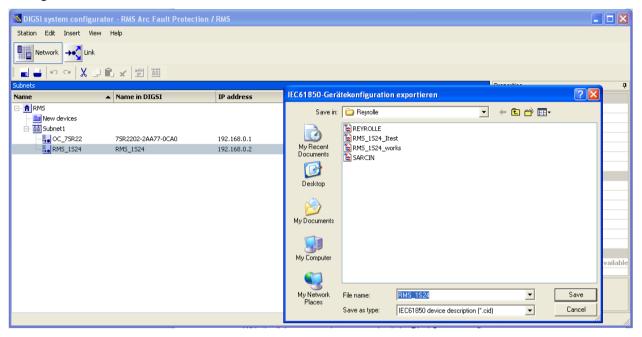




Creating the 1S24 .cid File

We know need to create a .cid file which we will use at a later stage of the IED Configuration process.

Go to the Network screen, select the 1S24 IED, right click and select Export IEC61850 device configuration.



Save the file for later 1S24 configuration. System configuration is now complete.





1S24 IEC61850 Configuration

The .cid File

The 1S24 requires a .cid file that incorporates the IEC61850 Substation Project Configuration including the Report datasets that must be sent and where they are sent to.

The Project Configuration is contained in the .cid file for the 1S24 created earlier from our Substation configuration process example and needs to be loaded into the 1S24 IED.

FTP 1S24.cid File

We will be using the Beck's @CHIPTOOL software utility to establish a terminal session with the 1S24 and to FTP the .cid file.

Download @CHIPTOOL for free from:

http://www.beck-ipc.com/en/download/licence.asp?id=chiptool_install&l=1

Run @CHIPTOOL on the PC.

The Tool will detect any 1S24 devices on the network as seen by the screen shot below:

1	● @CHIP	TOOL												- 🗆	×
Fi	le Flash	CHIP	Tools	Info											
						So	an for l	PC@CHIPs	at the netwo	ork					
!	Snr	Name			DHCP	IP	N	etmask	Gateway	Target	ID	lfldx	RTOS	lfType	
	016C1C	RMS 1	S24		No	192.168.0.2	21 2	55.255.255.0	192.168.0.1	SC143	003056A16C1C	2:0	V1.51	ETH	
F												_	1	~	
	Collect N	lode										<u>? H</u> ∈	:lp	📡 <u>S</u> top	2
Sc	anning			Sorted by	Snr		Open po	pup menu wit	h right mousecli	ick at table row	IS				11.





With the 1S24 selected in the @CHIPTOOL screen we will establish an FTP session by choosing Tools and FTP-Client.

Connect
Target- <u>I</u> P:
192.168.0.221
<u>U</u> ser:
Pass <u>w</u> ord
☑ Save User and Password
Bepresentation-Type:
🔲 Use passive mode
<u>C</u> onnect Cancel

Enter the following Username and Password for the FTP session :

User : ftp Password : ftp

Image: Size Image: Size <thimage: size<="" th=""> <thimage: size<="" th=""></thimage:></thimage:>						
No. No. No. No. No. ✓ Flename Size Time ✓ Flename Size Time Config.Mii DIFECTORY 22/10/2012.84/36 M. DIFECTORY 30/12/18911200.2 ab3948/17/88-80 DIFECTORY 7/12/2010.316.38 P HTTP DIFECTORY 30/12/2012.1302.0 Documents and Se DIFECTORY 16/06/2012.1556.00 B. 1524.od eth.1 245655 30/10/2011.17/00.021.137.00 CIC Files DIFECTORY 16/06/2012.1557.00 B. 1524.od eth.1 245655 9/10/2011.17/00.021.137.00 MS0Cache DIFECTORY 7/12/2010.1256.40 B. 1524.od eth.2 247378 30/10/2012.42.70 MS0Cache DIFECTORY 27/12/2010.1256.40 B. 1524.od eth.2 247378 30/10/2012.42.70 MS0Cache DIFECTORY 27/12/2010.125.840 B. 1524.od eth.2 247378 30/10/2012.42.70 RECYCLER DIFECTORY 27/10/2012.11.75.41 B. ECHP EIN 564 24/10/2012.12.400 Staba DIFECTORY 10/09/2012.11.13.81 B. L0E FRV T/T <th>🛯 🖷 🔒 📛 😽 🛛</th> <th>گر 🔿 🛓</th> <th></th> <th></th> <th></th> <th></th>	🛯 🖷 🔒 📛 😽 🛛	گر 🔿 🛓				
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Softweet Download DIRECTORY 8/05/2011 301:34 P Dit LOE TXT 89822 1/1/1/2012:51:500 Date DIRECTORY 12/07/2011 11:3814 Dit LOE TXT 89822 9/10/2012 11:1302 System Volume Info. DIRECTORY 12/07/2011 11:3814 Discore 833 1/01/2006 12:0000 J System Volume Info. DIRECTORY 12/07/2011 11:3814 Dire Proteinskey 833 1/01/2006 12:0000 J TEMP DIRECTORY 12/07/2011 11:3814 Dire Proteinskey 833 1/01/2006 12:0000 NINDDWS DIRECTORY 12/07/2011 11:3814 Dire Proteinskey 81 1/01/2006 12:0000 MINDDWS DIRECTORY 12/07/2011 24:328 Dire Proteinskey 21 1/01/2006 12:0000 J.md 1024 20/12/2018 28:620 Dire brainskey 25 1/01/2006 12:0000 J.MIDEVECERT 0 7/12/2011 24:348 Dire service 5133/4 1/11/2012 51:5000	Siemens	DIRECTORY	12/09/2011 5:47:02	🗎 dk3.cid	9329	11/10/2012 12:26:0
Discreto Volume Info. DIRECTORY 12/07/2011 11:381 Discreto Volume Info. DIRECTORY 7/02/2011 11:381 Discreto Volume Info. DIRECTORY 7/02/2012 45:244 P Discretors key 883 1/01/2006 12:000 TEMP DIRECTORY 12/07/2011 11:381 Discreto Volume Info. DIRECTORY 12/07/2012 45:244 P Discretors 803 1/01/2006 12:000 0 VINDOWS DIRECTORY 12/07/2011 11:381 Discreto Volume Info. DIRECTORY 11/1/2012 42:34 P Discretors 11:088 1/01/2006 12:000 0 und 1024 20/12/2010 8:362 Discreto S1304 1/11/2012 51:500	3 SiLabs	DIRECTORY	22/03/2011 3:42:36	ETH1.EXE	23744	17/10/2012 1:03:00
a System Volume IndDIRECTORY 7.702/2012 45254 P	Software Downloads	DIRECTORY	8/06/2011 3:01:34 P	LOG.TXT	89822	1/11/2012 5:16:00/
a TEMP DIRECTORY 12/07/201111:381€ PISTOKEY 21 1/01/200612.00.00 a WINDOWS DIRECTORY 1/11/2012.42:38 P B PROBE.EXE 11088 12/01/200612.00.00 a, md 1024 20/12/2010.8:36.20 B public.key 225 1/01/200612.00.00 a, JUTOEXEC.BAT 0 7/12/2010.12:454 B serve: 613344 1/11/2012.51:50.00	ៀន	DIRECTORY	12/07/2011 11:38:18	LOG_PREV.TXT	219205	9/10/2012 11:13:00
a WINDOWS DIRECTORY 1/11/2012 242:36 P P PROBE.EXE 11088 1/01/2006 12:00:00 and 1024 20/12/2010 8:36:20 P publickey 225 1/01/2006 12:00:00 AUTOEXEC.BAT 0 7/12/2010 12:454 B service.ee 613344 1/11/2012 51:50:00	System Volume Info	DIRECTORY	7/02/2012 4:52:54 P	🖹 openssh.key	883	1/01/2006 12:00:00
].md 1024 20/12/2010 8:36:20	TEMP	DIRECTORY	12/07/2011 11:38:16		21	1/01/2006 12:00:00
AUTOEXEC.BAT 0 7/12/2010 12:45:44 🗎 sarc.exe 613344 1/11/2012 5:15:00/	WINDOWS	DIRECTORY	1/11/2012 2:42:36 P	PROBE.EXE		1/01/2006 12:00:00
	👌 .md	1024	20/12/2010 8:36:20	public.key	225	1/01/2006 12:00:00
🕽 bootini 211 7/02/2012 4:43:38 P 🚽 🖺 send.exe 17264 1/01/2006 12:00:00		0	7/12/2010 12:45:44		613344	1/11/2012 5:15:00 /
	🖻 boot.ini	211	7/02/2012 4:43:38 P 🗸	🖹 send.exe	17264	1/01/2006 12:00:00

You will be presented with 2 file directories; the left side is the source directory and the right side A:/ is the 1S24.

Locate and select the saved 1S24.cid file created earlier, right click on the file and copy it to the A:/ drive.





Once copied, ensure that any existing 1S24.cid file in the A:/ drive is renamed or deleted (right click on the file for renaming deletion options).

Then select the copied file in the A:/ drive, right click and ensure it is renamed as 1S24.cid.

Renaming RMS_1S24.cid 🔀		Renaming RMS_1S24.cid 🛛 🔀
Please enter the new filename. RMS_1S24.cid OK Cancel	•	Please enter the new filename. 1S24.cid OK Cancel

Rebooting the 1S24 with the New 1S24.cid File

A reboot of the 1S24 is required once the new 1S24.cid file has been loaded.

The reboot can be done either via powering down and repowering the device or by pressing and holding the Flag Reset button for about 5 sec until all the LEDs start flashing, refer to Reboot under Monitor Indications.

Alternatively you can set up a terminal session to reboot the 1S24 using @CHIPTOOL.

Using @CHIPTOOL select the 1S24 and choose Tools and Terminal.

Connect
Connection <u>Type:</u> • Telnet C Serial
Telnet Connection:
Target- <u>I</u> P:
192.168.0.221
Port:
Telnet
🔽 Automatically login
User:
Password
Save User and Password
Serial Connection:
Port:
COM1
Baudrate:
19200
Connect Cancel

Enter the following Username and Password for the terminal session :





User : tel Password : tel

📌 @CHIPTOOL Terminal (192.168.0.221)	
File Edit View Connection	
RMS 1S24 Telnet session	
Username: tel Password: *** User logged in	
	-
Connected via Telnet to 192.168.0.221:Telnet.	1.

Use CTRL-F to check the context.

eCHIPTOOL Terminal (192.168.0.221)	
ile Edit View Connection	
	<u>_</u>
RMS 1S24 Telnet session	
Jsername: tel	
Password: *** Jser logged in	
Stdio: User	
onnected via Telnet to 192.168.0.221:Telnet.	

You need to be in Shell. CTRL-F to switch the context to Shell.





SecHIPTOOL Terminal (192.168.0.221)	
File Edit View Connection	
RMS 1S24 Telnet session	
Username: tel Password: *** User logged in	
Stdio: User	
Stdio: Both	
Stdio: Shell	
Connected via Telnet to 192.168.0.221:Telnet.	-

Press enter to make the command prompt visible.

9 @CHIPTOOL Terminal (192.168.0.221)	
File Edit View Connection	
RMS 1S24 Telnet session	
Username: tel Password: *** User logged in	
Stdio: Use r	
Stdio: Both	
Stdio: Shell	
A: \>	
	×
Connected via Telnet to 192.168.0.221:Telnet.	1





9 @CHIPTOOL Terminal (192.168.0.220)	-		
<u>File Edit View Connection</u>			
RMS 1S24 Telnet session			
Username: tel Password: *** User logged in			
Stdio: Shell			
A:\>reboot			
Connected via Telnet to 192.168.0.220:Telnet.			-

Type in Reboot at the command prompt, the 1S24 will now restart and the LEDs indicate per a normal power up, refer to Power Up - Monitor Indications.

When all the LEDs stop flashing the 1S24 configuration is complete.





Subscribing Reyrolle 7SR22 IED Configuration

Logic Configuration

Our application is to employ a current check using the pickup of an Instantaneous Overcurrent Element (50-1) to qualify an Arc Sensor operation. The following sections outline the logic implemented.

User Output Allocation

Using the previously defined ARC Fault Sensor Zones we will nominate the User Outputs that will capture the resultant SARC operation and current check logic.

Zone Coverage	Colour	SARC Allocation	User Output
Feeder Exit Termination Chamber		SARC 1	User Output 1
Feeder CB Chamber		SARC 2	User Output 2
Bus		SARC 3 SARC 4	User Output 2
Incomer CB Chamber		SARC 5	User Output 3
Incomer Termination Chamber		SARC 6	User Output 3





Current Check Logic

The SARC GOOSE Trips are qualified by the SARC quality and a current check in our current check logic. The quality bit can be used for blocking purposes such as testing or isolations.





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Binary Output Allocation for Circuit Breaker Tripping

The following User Output to Binary Output allocations completes our ARC Fault Trip with Current Check.

SARC Operation	Zone Coverage	User Output	Binary Output	Trip
SARC 1	Feeder Exit Termination Chamber	User Output 1	BO2	1A CB
SARC 2	Feeder CB Chamber	User Output 2	BO3	TR1 LT CB
SARC 3 or SARC 4	Bus	User Output 2	BO3	TR1 LT CB
SARC 5	Incomer CB Chamber	User Output 3	BO4	Upstream
SARC 6	Incomer Termination Chamber	User Output 3	BO4	Upstream

The screenshot shows the User Output to Binary Output allocation in the setting editor of Reydisp Manager.

Setting Editor - RMS Arc Fault File Edit Options Help	Protection//SK220.	2-ZAATT-	UCAU		
- 0 🖬 🖬					
System Notes Settings					
75R220x-2xAx7-0CA0	Setting	Common	G1		G2 G3 G4 G5 G6 G
SYSTEM CONFIG CT/VT CONFIG	En100 Error	\checkmark	NONE	-	
FUNCTION CONFIG CURRENT PROT'N	IEC61850 Configured	\checkmark	NONE	•	
 VOLTAGE PROT'N SUPERVISION 	User Output 1	\checkmark	BO2	•	_
CONTROL & LOGIC INPUT CONFIG	User Output 2	\checkmark	BO3	•	
OUTPUT CONFIG	User Output 3	\checkmark	BO4	-	
OUTPUT MATRIX BINARY OUTPUT CONFIG	User Output 4	\checkmark	NONE	•	
LED CONFIG PICKUP CONFIG	User Output 5	\checkmark	NONE	-	
MAINTENANCE DATA STORAGE	User Output 6	\checkmark	NONE	•	
COMMUNICATIONS	User Output 7	\checkmark	NONE	-	~
	<		111		>
75R220x-2xAx7-0CA0					

Complete any other Protection settings otherwise required and save your setting.

Device Synchronization

With all IED settings, IED Logic and IEC61850 configuration complete we now need to synchronize the device.

Reydisp Manager will manage the file transfer process to the 7SR22 IED and upon completion the 7SR22 will be able subscribe to SARC Goose messages from the 1S24 IED.

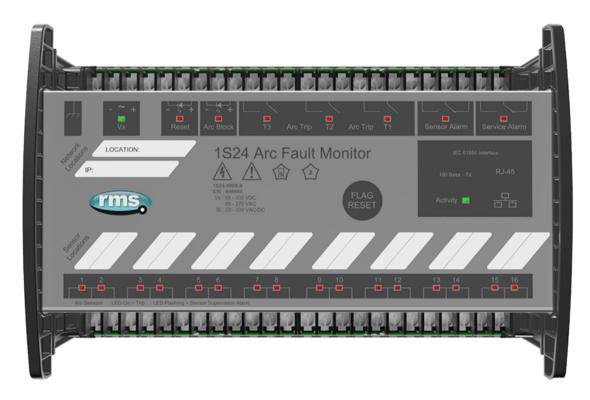




Monitor Indications

Front Layout

The picture below depicts the indications provided on the front of the Arc Fault Monitor.



Power Up

When powering up, all the Leds will flash once and then extinguish and then in turn sequentially illuminate 1 led at a time until all Leds are illuminated – the sequence takes about 30 secs during the boot cycle.

When the boot cycle is complete the 1S24 will indicate the current state.





System Status

	Auxiliary Supply	or Relay Healthy Indication	
	LED State	Meaning	
	On Solid	Healthy	
	Fast Flashing	CID loading error	
- ~ +	(approx. three times every sec)		
	Slow Flashing	SNTP sync fail	
X	(approx. once every sec)		
	Off	Internal Communications failure	
	Interpreting V	Commissioning section : x Auxiliary Supply or Relay cations for further details	
10 Base - T 100 Base - TX RJ-45 Activity ■ □	E	thernet Activity	

Service Alarm

The module self-supervision checks the following:

- Auxiliary supply failure
- Internal supply rail is outside acceptable limits
- CPU Hardware watchdog failure

Service Alarm		Service Alarm
---------------	--	---------------





Arc Sensor Indicators

Indicate solid when an Arc Sensor has detected an Arc, the LEDs are reset after pressing the Flag Reset.

	Up to 16 Arc Sensor Indicators
--	--------------------------------

A flashing Arc Sensor LED indicates a failure of the sensor; refer to the Sensor Alarm indicator description.

Arc Sensor Circuit Supervision

Indicates solid when an Arc Sensor has faulted either due to an open circuit, sustained short circuit (>10 sec) or high ambient lighting.

Sensor Alarm	Sensor Alarm
--------------	--------------

The affected sensor will be indicated by its front panel sensor LED 1-16 flashing.

The Sensor Alarm will self-reset upon the fault conditions being corrected.

Arc Trip

Indicate solid when the respective assigned self-reset Arc Trip contacts operate. The LEDs reset when the Arc Trip contacts self-reset.



Global Arc Block

Indicate solid when the Global Arc Block input is energised, all Arc Trips are blocked (both IEC61850 and Arc Trip outputs).

	Global Arc Block
--	------------------





Flag Reset

FLAG RESET	To reset the ARC Sensor LEDs
Reset	The ARC sensor LEDs may also be reset by energising the binary input

Reboot





Reset to Factory Default

FLAG RESET	With the relay unpowered, hold down the Flag Reset button and power up the relay, continue holding down the reset button until the Leds commence flashing rapidly (approx. 12 secs) then release the reset button. After releasing the reset button all of the Leds (except Service) will continue flashing rapidly and then extinguish (approx. 10 secs). The Leds will then in turn sequentially illuminate 1 led at a time until all Leds are illuminated – the sequence takes another 20 secs approx.
	When the boot cycle is complete the 1S24 will indicate the current state.
	The Cold Boot is used for reverting the IED back to factory default settings including default passwords.





Firmware Update

Introduction

An FTP tool is required to load firmware updates into the 1S24; @CHIPTOOL mentioned earlier in the manual allows HTTP, FTP and Telnet sessions.

Firmware Package

The contents of a firmware update package will contain a directory called A_drive:

♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥ ♥	oftware Package Waiting to Test PKG1S024-A	-0305 • A_drive •	✓ ⁴ → Searc	h A_drive	_	
Organize 🔻 Burn New folder				833	•	
🔆 Favorites	Name	Date modified	Туре	Size		
Recently Changed	퉬 factory	1/04/2015 2:12 PM	File folder			
🧮 Desktop	\mu http	1/04/2015 2:12 PM	File folder			
〕 Downloads	1S24.cid	2/09/2015 3:29 PM	CID File	198 KB		
🔚 Recent Places	ARC_IO.hex	14/05/2014 3:17 PM	HEX File	22 KB		
😵 Dropbox	AUTOEXEC.BAT	24/05/2012 2:36 PM	Windows Batch File	1 KB		
	BECK.GIF	7/08/2014 12:36 PM	GIF image	4 KB		
詞 Libraries	CHIP.INI	2/09/2015 3:29 PM	Configuration sett	1 KB		
Documents	eth1.exe	9/08/2012 2:05 PM	Application	24 KB		
👌 Music	hybrid.hex	26/03/2014 1:45 PM	HEX File	3 KB		
E Pictures	📄 package.txt	1/04/2015 2:14 PM	Text Document	1 KB		
M Videos	sarc.exe	1/04/2015 1:59 PM	Application	890 KB		
	test.exe	1/04/2015 2:00 PM	Application	656 KB		

Using an FTP tool transfer across all files and subdirectories to the A:/ drive of the device.

In the FTP tool select all files residing on your PC located under the software package \A_drive, right click on the selection and choose copy:

<u>File View Connection</u>							
BY 📭 🔁 🔆 🔀 🖻 🖉 💉							
🖣 🐂 Drive: N 🚽 🦣 🐂 Driv							
I:\Software Package\V	Vaiting to Test\PKG1S	024-A-0305\A_drive\	/A:/				
∠ Filename	Size	Time	A Filename	Size	Time		
D	DIRECTORY	8/09/2015 7:57:10 AM	🗅	DIRECTORY	30/12/1899 12:00:0		
💼 factory	DIRECTORY	1/04/2015 1:12:04 PM	🛱 factory	DIRECTORY	1/01/2006 12:00:00		
🛅 http	DIRECTORY	1/04/2015 1:12:04 PM	💼 http	DIRECTORY	1/01/2006 12:00:00		
1S24.cid	202191	2/09/2015 3:29:28 PM	🖹 1S24.cid	202191	27/03/2015 12:00:0		
ARC_IO.hex	22064	14/05/2014 3:17:42	🖹 AUTOEXEC.BAT	18	1/01/2006 12:00:00		
🖹 AUTOEXEC.BAT 👘		24/05/2012 2:36:18	🖹 AUTOEXEC.SAV	18	1/01/2006 12:00:00		
BECK.GIF	3211	7/08/2014 12:36:52	🖹 BECK.GIF	3211	1/01/2006 12:00:00		
CHIP.INI		2/09/2015 3:29:38 PM	🖹 CHIP.GIF	9505	1/01/2006 12:00:00		
eth1.exe	23744	9/08/2012 2:05:04 PM	🖹 CHIP.INI	581	1/01/2006 12:00:00		
🕅 hybrid.hex	2963	26/03/2014 12:45:08	🖹 CHIP.SAV	581	1/01/2006 12:00:00		
🖹 package.txt		1/04/2015 1:14:24 PM	🖹 licence.set	350	1/01/2006 12:00:00		
🕯 sarc.exe	910480	1/04/2015 12:59:52	🖹 LOG.TXT	57795	1/01/2015 12:00:00		
test.exe	670976	1/04/2015 1:00:08 PM	🖹 package.txt	6	10/04/2015 12:00:0		
			🖹 sarc.exe	910480	10/04/2015 12:00:0		





These files will then transfer across to the 1S24.

Then reboot the device.

Set up a web browser session of the device, you should get a similar screen to the following:

(<)) (</th <th>192.168.0.220/ 🔎 – C 🤄 Arc Fault Relay 🏈 Arc Fault Relay 🗙</th> <th></th>	192.168.0.220/ 🔎 – C 🤄 Arc Fault Relay 🏈 Arc Fault Relay 🗙	
<u>File Edit View Fav</u>	vorites <u>I</u> ools <u>H</u> elp	
× Google	👻 🔧 Search 🐑 🏭 Share 🛛 More 🍽	Sign In 🔌 🕶
👍 8 Google Ener	ergy Business Portal - Si 🧃 IDEC Australia - New Zeal 🚺 Australia Post - Postcode 🍼 🥻 🔻 📓	▼ 🖃 🖶 ▼ Page ▼ Safety ▼ Tools ▼ 🕡 ▼
	Relay Build Information Help Serial Number: 617320/5 Package Release: 305 Package Release: 305 Package Release: 305 DE Revision: 1 Relay: 2 Package Release: 109 Last PCB test: 161214 Package test: None Last Relay test: None Change Market Relay: 2 Change Second Change: 01Jan10 Password: Destroy Change	CONSC 1524 Arc Fault - Relay Build - Pr Configuration - Arc Configuration - Arc Satus - Help
		Web application

All is well and the 1S24 has been upgraded!





Trouble Shooting

License file not valid or present

		- • ×
(<>) (<>) (×	$\uparrow \star \ddot{x}$
<u>File E</u> dit <u>V</u> iew F <u>a</u> vorites <u>T</u> ools <u>H</u> elp		
x Google	▼ 🔧 Search 🔹 🚰 Share 🛛 More ≫	Sign In 🔌 🝷
🚕 🐰 Google 🗧 Energy Business Portal - Si 🙆 IDEC Australia - New Zeal 🚺 Au	ustralia Post - Postcode 🌼 🦄 🔻 🔝 👻 🖃 🎍 👻 Page 👻 Safety 🕶	T <u>o</u> ols ▼
Relay Build Information	Help	
Serial Number: 617320/5 Package Release: 3.05 Firmware: V3.05 PCB Revision: 1 Relay: 2 ICD File Base:	rms	
The license file is not valid or present	· 1S24	
Last PCB test: 161214 Last Relay test: None Last Config Change: 01Jan10	Arc Fault	
Password: Change	- IP Configuration - Arc Configuration - Arc Status	
© 2013 RMS Pty Ltd	Help	
	Web application	

Using an FTP tool view the \A_drive and check whether the license.set file is present.





File View Connect	ion				
B 🖻 🎦 🛱 🛙					
	≝ ∨ ∦'				
ብ ካ		Drive: N	ሞ ካ		Drive: A
4:5			/A:/		
△ Filename	Size	Time 🔺	🔺 Filename	Size	Time
ā	DIRECTORY	23/12/2015 10:41:56	🗅	DIRECTORY	30/12/1899 12:00:0
💼 3D Printer Jobs	DIRECTORY	3/07/2014 2:41:10 P	🗅 factory	DIRECTORY	1/01/2006 12:00:00
🛱 Concession Docum	DIRECTORY	19/10/2015 1:12:08	🗅 http	DIRECTORY	1/01/2006 12:00:00
🛱 Cropping Plates	DIRECTORY	4/01/2016 9:19:58 A	🖹 1S24.bak	208877	25/08/2015 12:00:0
🛅 Data Alpha-12 Cali	DIRECTORY	8/10/2013 8:04:26 P	🖹 1S24.cid	208882	3/09/2015 12:00:00
🛅 Drawings 25 Series 👘	DIRECTORY	8/10/2013 8:04:50 P 🗐	🖹 AUTOEXEC.BAT	18	25/08/2015 12:00:0
🛅 Drawings Alpha	DIRECTORY	12/11/2015 1:09:30	🖹 BECK.GIF	3211	25/08/2015 12:00:0
🗅 Drawings Customer	DIRECTORY	23/12/2015 10:41:56	🖹 CHIP.INI	581	25/08/2015 12:00:0
🗅 Drawings Matrix	DIRECTORY	17/12/2015 10:37:22	🖹 CHIP.SAV	581	24/08/2015 12:00:0
🗅 Drawings Production	DIRECTORY	13/01/2016 3:53:38	🖹 eth1.exe	23744	25/08/2015 12:00:0
🗅 Drawings PWA	DIRECTORY	1/04/2015 9:11:40 A	licence.set	350	10/09/2015 12:00:0
🗅 Drawings Test Proc	DIRECTORY	14/12/2015 2:03:40	🖹 LOG.TXT	139450	13/01/2016 10:15:0
🛅 Drawings Type	DIRECTORY	13/01/2016 3:53:06	🖹 LOG_PREV.TXT	224166	29/11/2015 12:00:0
🗅 Drawings Wiring Di	DIRECTORY	3/09/2015 12:20:02	🖹 package.txt	6	25/08/2015 12:00:0
🗅 Dymo labels	DIRECTORY	19/10/2015 3:47:22	🖹 sarc.exe	910480	25/08/2015 12:00:0
🗅 HSE	DIRECTORY	5/05/2015 3:34:28 P	🖹 test.exe	670976	25/08/2015 12:00:0
🗅 Index Creator	DIRECTORY	6/01/2016 6:59:34 A			
🗅 Inventory Data	DIRECTORY	8/10/2013 8:11:54 P			
🗅 ISO9001	DIRECTORY	20/02/2015 12:14:00			
🛅 Jig 319 Cover Drill	DIRECTORY	12/01/2016 10:25:12			
🗅 Lean Manufacturing	DIRECTORY	18/12/2015 10:18:52			
🗅 Machine Programs	DIRECTORY	14/05/2014 10:29:00 👻			
•		4			

Later 1S24 builds have introduced a license key which is installed in the factory and cannot be reinstalled by the end user.

If the licence.set file is still present it is recommended that the contents of the \A_drive be reinstalled per the Firmware Update section of the User Guide. If you need a copy of your Firmware please contact your RMS representative for further assistance.

If the licence.set file is not present please contact your RMS representative for further assistance providing the Beck Chip serial number, with this information a replacement copy of the device licence.set file can be supplied.

The Beck Chip serial number can be viewed using ChipTool :

- 🗆 🤅									TOOL	@CHIP1	5
									CHIP Tools Info	Flash	File
					at the network	or IPC@CHIPs	Scan fo				
lfType	RTOS	lfldx	ID	Target	Gateway	Netmask	IP	DHCP	ame	Shr	Y
ETH	V1.51	2:0	003056A16C1C	SC143	192.168.0.1	255.255.255.0	192.168.0.221	No	RMS 1S24	016C1C	
-											É





Invalid IP Address Specified in ICD File

	192.168.0.227/ $\mathcal{P} \neq \mathcal{O}$ 6 Arc Fault Relay ×	→ ★ ☆
<u>File Edit View Fav</u>		
	▼ 🎝 Search ▼ 🖓 Share More ≫	Sign In 🔌 🕶
👍 8 Google S Ene	argy Business Portal - Si 🤌 IDEC Australia - New Zeal 🚺 Australia Post - Postcode 🌼 🏠 🔻 🔊 👻 🖃 🖶 2age 👻 Safety 🕶	T <u>o</u> ols ▼
	Relay Build Information	
	Serial Number: 6173205 Package Release: 3.05 Firmware: V3.05 PCB Revision: 1 Relay: 2 ICD File Base: Invalid IP Address Specified in ICD File	
ح ا		
	Last PCB test: 161214 Last Relay test: None Last Config Change: 01Jan10 Arc Fault Relay Build	
	Password: Change – IP Configuration – Arc Configuration – Arc Status	
	© 2013 RMS Pty Ltd – Help	
	Web application	

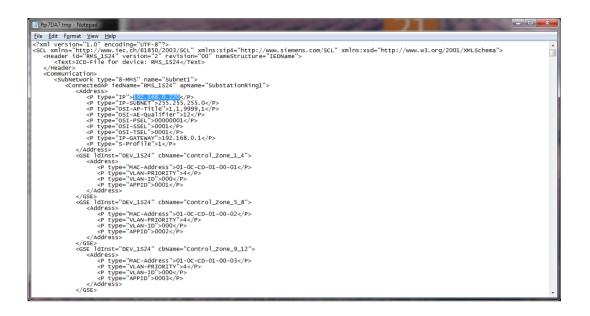
If you get the above message displayed in the relay build screen then the IP address setting in the device is not in alignment with the ip address in the 1S24.cid file.

Either edit the 1S24.cid file or amend the ip configuration in the device so that the ip addresses are in alignment – if amending the 1S24.cid file be mindful that you may disable any Goose messages created during an earlier IEC61850 system configuration!

If editing the 1S24.cid file, there should only be one instance you need to change for example:







System Status

Check the Vx LED for other useful trouble shooting information.

System Status

	Auxiliary Supply	or Relay Healthy Indication
	LED State	Meaning
	On Solid	Healthy
	Fast Flashing	CID loading error
V×	(approx three times every sec)	
	Slow Flashing	SNTP sync fail
	(approx once every sec)	
	Off	Internal Communications failure
	Interpreting V	Commissioning section : Auxiliary Supply or Relay cations for further details
Activity	Ef	hernet Activity





Commissioning

Commissioning Preliminaries

Carefully examine the module to ensure that no damage has occurred during transit. Check that the model number and rating information are correct.

Insulation

The relay, and its associated wiring, may be insulation tested between:

- all electrically isolated circuits
- all circuits and earth

An electronic or brushless insulation tester should be used, having a dc voltage not exceeding 1000V. Accessible terminals of the same circuit should first be strapped together. Deliberate circuit earthing links, removed for the tests, subsequently must be replaced.

ARC Trip Verification

ARC Trip Verification will require a flash source to initiate sensor operation.

A high powered photographic flash is the most convenient means of initiating positive sensor operation.

Note that mobile phone or small compact camera flashes may not have sufficient power to cause sensor operation.

The RMS 'Arc Flash Timing Test Guide' outlines a suggested test setup to provide a flash source and determine ARC Trip times. The 'Arc Flash Timing Test Guide' is available on the RMS website:

http://rmspl.com.au/wordpress/wp-content/uploads/2015/02/Arc_Flash_Timing_Test_Guide.pdf

Arc only tests are conducted as per the section 'Timing test of 1S25 (no current check)' substituting the wiring for the 1S25 with equivalent wiring for the 1S24.

Current check tests are conducted as per the section 'Timing test of 1S26', with the 1S30 connected to the 1S24, the current source connected to the current check relay and the 1S24 and subscribing current check relay connected via a IEC61850 Station Bus Lan for the transfer of Goose messages.

The 'Arc Flash Timing Test Guide' only requires the use of a conventional test set; end users may also find it beneficial to have access to an IEC61850 equipped test set which can aid in the observation of GOOSE traffic, undertaking GOOSE timing tests and trouble shooting.





Note that the nominated RMS test guide makes use of conventional binary outputs for flash initiation, whilst this is convenient and will work with the majority of test sets the technique will introduce some minor delays in the timing test results due to the latency of the conventional binary output.

Where more precise timing is required then specialised test equipment should be employed that utilises solid state outputs for arc flash initiation. There are commercially available test sets on the market that provide this capability.

Site Commissioning Verification Checklist

Observe all site specific standard safety procedures.

The following tests are undertaken following the completion of all 1S24 ARC Monitor and Overcurrent Relay IEC61850 Substation Configuration and associated IED configurations, scheme wiring and the wiring of all 1S30 sensors.

System Power Up

ltem	Description	Complete
1	Confirm all necessary primary equipment isolations	
2	Confirm all necessary secondary equipment isolations (including trip outputs)	
3	Check fitment of 1S30 and or 1S40 optical sensors and cable condition	
4	Check panel installation of the 1S24 monitor	
5	Check for correct case earthing	
6	Check the 1S24 is wired to the protection design schematic, connected to a Substation LAN and confirm all IEC61850 configurations	
7	Confirm Fail alarm relay is closed (Terminals 25 and 26)	
8	Apply correct Auxiliary voltage to power up the 1S24	
9	Upon power up the relay enters a relay boot cycle, all the Leds will flash once and then extinguish and then in turn sequentially illuminate 1 led at a time until all Leds are illuminated – the sequence takes about 14 secs.	
	Observe that the green power LED remains illuminated solid after the relay boot cycle.	
10	Confirm Fail alarm relay is open (Terminals 25 and 26) and the associated LED is extinguished	
11	Using a web browser check 1S24 configuration settings match protection setting specifications	





Item	Description	Complete
12	Confirm that the Arc Sensor fail alarm LED remains off and none of the sensor LEDs are flashing (Refer Sensor Failure Trouble shooting if a sensor fail is indicated)	
13	Confirm all Sensor LED's remain OFF	
14	Confirm the Ethernet LED is showing activity	

Sensor Failure Alarm Verification

ltem	Description	Complete
1	Disconnect each sensor from the associated 1S24 sensor input	
2	Confirm the associated sensor LED flashes, the Sensor Alarm LED illuminates and operation of the Relay Fail Alarm output contact	
3	Reconnect each sensor back to the associated 1S24 sensor input	
4	Confirm the associated sensor Fail indications clear and the Relay Fail Alarm output contact opens	
5	In turn short across each 1S24 sensor input (not applicable for 1S40 linear sensor inputs)	
6	Confirm the associated sensor LED flashes, the Sensor Alarm LED illuminates and operation of the Relay Fail Alarm output contact	
7	Remove the short on each 1S24 sensor input	
8	Confirm the associated sensor Fail indications clear and the Relay Fail Alarm output contact opens	

Arc Trip Testing

Item	Description	Complete
1	Initiate the operation of each sensor by the use of a suitably powered camera flash	
	* If a current check interlock is employed in your ARC Fault protection scheme ensure that current is injected into the associated Overcurrent relay to cause operation of the current check element at the same time the sensor is flashed	
2	Check operation of the corresponding sensor LED and the arc fault trip output contacts	
3	Confirm that the subscribing IED has received the GOOSE SARC from the 1S24	





Item	Description	Complete
4	View the web browser settings of the 1S24 to explain any unexpected behavior	
5	Confirm operation of Flag Reset after each tripping operation. Repeat ARC trips and confirm correct operation of remote reset using the web browser	

Refer also to the RMS 'Arc Flash Timing Test Guide' for a suggested test setup to provide a flash source and determine ARC Trip times. The 'Arc Flash Timing Test Guide' is available on the RMS website:

http://rmspl.com.au/wordpress/wp-content/uploads/2015/02/Arc_Flash_Timing_Test_Guide.pdf

Alternatively utilise commercially available test sets that provide Arc Flash testing capability.

Apply a Global ARC Fault block.

Item	Description	Complete
1	Initiate the operation of each sensor by the use of a suitably powered camera flash	
2	Confirm blocking of the arc fault trip output contacts	
3	Confirm blocking of the SARC GOOSE messages from the 1S24	

Sensor Failure Alarm Trouble Shooting

Item	Description	Complete
1	If any arc sensor LED's are flashing re-check the 1S30 wiring integrity or 1S40 linear sensor fibre and associated connections	
2	Check that the sensors are connected to the correct sensor inputs	
3	Using a web browser session check that the correct sensor inputs are enabled and any unused sensor inputs are disabled	
4	If the Sensor Alarm persists disable all of the sensor inputs and check that all Sensor Alarm indications are extinguished	





ARC Sensor Supervision Trouble Shooting

ltem	Description	Complete
1	If there is a Sensor Alarm indication re-check the 1S30 wiring integrity or the 1S40 fibre and connection integrity	
2	Check that the sensors are connected to the correct arc sensor inputs and check that the correct sensor inputs are enabled and unused inputs are disabled	
3	Check for high ambient lighting conditions for all the sensors	

ARC Trip Trouble Shooting

If an arc trip occurs without an ARC being present this indicates either:

- a very high ambient light condition is triggering a sensor

or

- short circuit wiring of a 1S30 sensor

In both cases if the condition persists the Supervision output will operate after a 10 sec delay.

ltem	Description	Complete
1	Check the 1S30 wiring integrity or check the 1S40 fibre and connection integrity	
2	Check for high ambient lighting conditions for all the sensors	

General Ethernet Communications Trouble Shooting

If you are having trouble communicating with the 1S24 IED or other subscribing IEDs check the following:

Item	Description	Complete
1	Check that the Station Bus Lan is active and functioning	
2	Check that the 1S24 IED and the subscribing IED Ethernet ports are active and communicating by checking the port activity LEDs	
3	Undertake a ping test on the 1S24 IED and the subscribing IEDs	
4	Confirm the IP addressing for each of the devices is correct as determined by the Substation topology (check the devices are on the same Subnet) and that devices connected on the same Subnet have unique addresses	





IEC61850 GOOSE Message Trouble Shooting

If a SARC GOOSE is not being received by a subscribing IED check the following:

ltem	Description	Complete
1	Check that the required SARC is enabled in the 1S24	
2	For a current check scheme is the current check element enabled and being picked up?	
3	Check the GOOSE linkages in the Substation Project and ensure that the correct sources and subscriptions have been established	
4	Check that the Subscribing IED logic is consistent with the Subscribed SARC. If required troubleshoot the logic by observing the individual incoming signals are consistent with your test conditions for example • Is the correct GGIO being received? • Is the quality bit being correctly treated? • Is the current check qualification being asserted	
5	Using the 1S24 Web Browser check for any error messages on the Status screen when you FTP the .cid file into the device	
6	In the Web Browser observe the trip status when a Sensor is triggered	
7	Using and IEC61850 browser such as IED Scout observe the trip status changes in the 1S24 ICD	

Interpreting Vx Auxiliary Supply or Relay Healthy Indications

The Healthy LED will be illuminated solid to indicate normal operation of the 1S24.

The Healthy LED is also utilised to indicate error conditions to assist in troubleshooting.





The following table summarises all Healthy LED indications:

LED State	Meaning
On Solid	Healthy
Fast Flashing (approx. three times every	CID loading error (61850 stack problem)
sec)	The .cid file is in error or possibly corrupted, open a web server session where further information is reported on the Relay Build page
	A common error is a mismatch of the ip address as set in the device compared to that entered in .cid file, refer to the section in the user guide titled: Invalid IP Address Specified in ICD File
Slow Flashing	SNTP sync fail
(approx. once every sec)	
	Check SNTP server is functioning or check that the SNTP Server address on the IP config screen is correct
Off	Internal 1S24 Communications failure
	A permanent Internal 1S24 Communications failure will assert the Service Alarm





Using IED SCOUT IEC61850 GOOSE Message Trouble Shooting

Status changes of the 1S24 ICD may be independently observed in more depth by using an IEC61850 browser such as IED Scout.

A free limited functionality version of IED Scout may be downloaded from the OMICRON website.

To view a 1S24 on a network start up IED Scout.

EDScout	
File Actions Options Help	
🔯 Open SCL 👻 🔚 Save SCL 🔍 Discover 👻 🌄 ACSI Sniffer	
🕞 Simulations 🔞 Subscriptions 🕜 Messages 🦆 Configure	
Update Report Poll Servers Configuration Read, Devices = 3	

Go to Options and Configuration.

🔓 Configuration [C:V	Documents and Settings\All Users\	Appl 🔳 🗖 🔀
File Help		
Servers Application	GSSE GOOSE RFC1006 Preferences	
Selected Server:	[00] LoopBack 127.0.0.1	New Delete
Server		Advanced
Name IP Address	LoopBack	Auvanceu
IF Address	121.0.0.1	
	OK Cancel App	y Help





In the Servers tab press the New button.

🗄 Create new server definit	ion 📃 🗖 🔀
Name of new server IP Address	1524 192.168.0.221
Initial values for new server Use existing server definition: Use default values	[00] LoopBack 127.0.0.1
	OK Cancel

Enter the name of the 1S24 and the IP address and hit OK.

🗄 Configuration [C:Wocuments and Settings\All Users\Appl 🗐 🗖 🗙					
File Help					
Servers Application GSSE GOOSE RFC1006 Preferences					
Selected Server:	[03] 1\$24 192.168.0.221	elete			
Server Name IP Address	e 1524 Advanced 192.168.0.221				
	OK Cancel Apply He	lp			

At the Servers Tab press the OK botton again.

Then at the main screen press the Discover button and choose the server you've just created and then Connect.





You will now see that the 1S24 is available for viewing.

🔚 IEDScout
Eile Actions Options Help
🔯 Open SCL 👻 🔚 Save SCL 🔍 Discover 👻 🌄 ACSI Sniffer
🕞 Simulations 🔞 Subscriptions 🚯 Messages 🦆 Configure
■ <u>■</u> Q 1524
Update Report Poll 1524: Completed

You can drill down in the Logical Node structure of the 1S24.

To view the Data for SARC1 double click RMS_SARC1

E IEDScout	
Eile <u>A</u> ctions <u>O</u> ptions <u>H</u> elp	
🚰 Open SCL 👻 🔚 Save SCL 🔍 Discover 👻 🕻 ACSI Sniffer 🛛 💽 Simulations 🛭 🔁 Subscriptions 👔 Messages 🍃 Configure	
- 📃 🔍 1524	^
🔄 Address 192.168.0.221	
🗆 📴 Data	
IN LPHD1 IN RMS_SARC1 IN RMS_SARC10	
LN RM5_SARC11 LN RM5_SARC12	
LN RM5_SARC13	
LN RM5_SARC14	
IN RMS_SARC15	~
Update Report Poll 1524: Completed	

And then further drill down in to the status data for example to view the status of FADet.

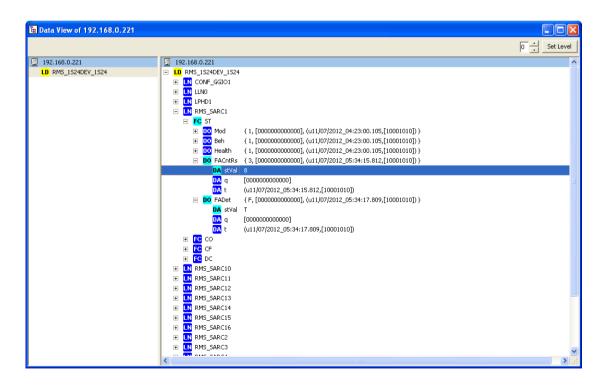




In the untripped state the stVal will show as F (false)

🔓 Data View of 1S24	
	0 Set Level
1524	1524
LD RMS_1524DEV_1524	□ LD RMS_1524DEV_1524 □ IN CONF_GGIO1 □ IN LLN0 □ IN LPHD1 □ IN RMS_SARC1 □ FC ST □ IO Mod {1, [000000000000], (u11/08/2012_01:58:59.088, [10001010])} □ IO Beh {1, [000000000000], (u11/08/2012_01:58:59.088, [10001010])} □ IO Health {1, [000000000000], (u11/08/2012_01:58:59.088, [10001010])} □ IO FACntRs {8, [00000000000], (u11/08/2012_02:01:37.468, [10001010])} □ IO FADet {F, [000000000000], (u01/01/1970_00:000.0000]}
	DA stVal F
	DA q [00000000000] DA t (u01/01/1970_00:00:00.000,[00000000])
	■ IN RMS_SARC10 ■ IN CARCIN ■ IN CARCIN

In the 2 second window of a trip the FADet status will show as T (true)



The counter will also increment with each trip.







Installation

Handling of Electronic Equipment

A person's normal movements can easily generate electrostatic potentials of several thousand volts. Discharge of these voltages into semiconductor devices when handling electronic circuits can cause serious damage, which often may not be immediately apparent but the reliability of the circuit will have been reduced.

The electronic circuits of Relay Monitoring Systems Pty Ltd products are immune to the relevant levels of electrostatic discharge when housed in the case. Do not expose them to the risk of damage by withdrawing modules unnecessarily.

Each module incorporates the highest practicable protection for its semiconductor devices. However, if it becomes necessary to withdraw a module, the following precautions should be taken to preserve the high reliability and long life for which the equipment has been designed and manufactured.

- 1. Before removing a module, ensure that you are at the same electrostatic potential as the equipment by touching the case.
- 2. Handle the module by its front-plate, frame, or edges of the printed circuit board.
- 3. Avoid touching the electronic components, printed circuit track or connectors.
- 4. Do not pass the module to any person without first ensuring that you are both at the same electrostatic potential. Shaking hands achieves equipotential.
- 5. Place the module on an antistatic surface, or on a conducting surface which is at the same potential as you.
- 6. Store or transport the module in a conductive bag.

If you are making measurements on the internal electronic circuitry of equipment in service, it is preferable that you are earthed to the case with a conductive wrist strap.

Wrist straps should have a resistance to ground between 500k – 10M ohms. If a wrist strap is not available, you should maintain regular contact with the case to prevent the build-up of static.

Instrumentation which may be used for making measurements should be earthed to the case whenever possible.



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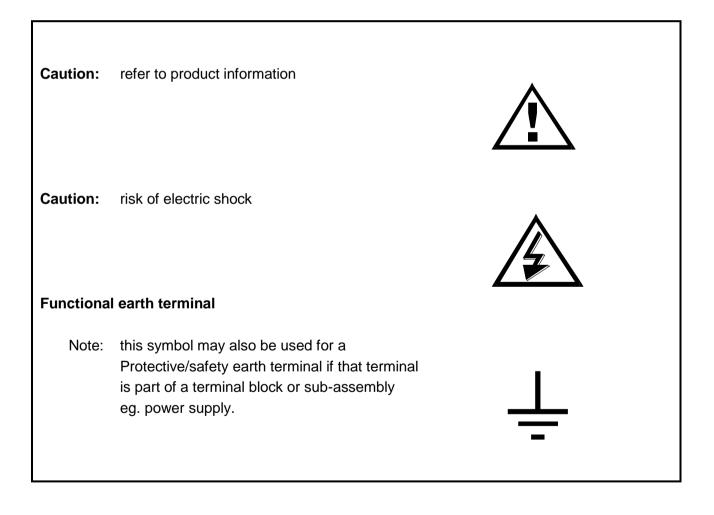
Safety Section

This Safety Section should be read before commencing any work on the equipment.

The information in the Safety Section of the product documentation is intended to ensure that products are properly installed and handled in order to maintain them in a safe condition. It is assumed that everyone who will be associated with the equipment will be familiar with the contents of the Safety Section.

Explanation of Symbols & Labels

The meaning of symbols and labels which may be used on the equipment or in the product documentation is given below.





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Unpacking

Upon receipt inspect the outer shipping carton or pallet for obvious damage.

Remove the individually packaged relays and inspect the cartons for obvious damage.

To prevent the possible ingress of dirt the carton should not be opened until the relay is to be used. Refer to the following images for unpacking the relay:



Outer packing carton showing the shipping documentation pouch. Address label on top of carton.



Example of the inner packing carton showing the front label detailing the serial number, relay part number & description.







Packing carton with lid open showing relay and packing insert.

Storage & Handling

If damage has been sustained a claim should immediately be made against the carrier, also inform Relay Monitoring Systems Pty Ltd and the nearest RMS agent

When not required for immediate use, the relay should be returned to its original carton and stored in a clean, dry place.

Relays which have been removed from their cases should not be left in situations where they are exposed to dust or damp. This particularly applies to installations which are being carried out at the same time as constructional work.

If relays are not installed immediately upon receipt they should be stored in a place free from dust and moisture in their original cartons.

Dust which collects on a carton may, on subsequent unpacking, find its way into the relay; in damp conditions the carton and packing may become impregnated with moisture and the dehumidifying agent will lose is efficiency.

Equipment Operating Conditions

The equipment should be operated within the specified electrical and environmental limits.

Protective relays, although generally of robust construction, require careful treatment prior to installation and a wise selection of site. By observing a few simple rules the possibility of premature failure is eliminated and a high degree of performance can be expected.

Care must be taken when unpacking and installing the relays so that none of the parts are damaged or their settings altered and must at all times be handled by skilled persons only.

Relays should be examined for any wedges, clamps, or rubber bands necessary to secure moving parts to prevent damage during transit and these should be removed after installation and before commissioning.

The relay should be mounted on the circuit breaker or panel to allow the operator the best access to the relay functions.



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Relay Dimensions & Other Mounting Accessories

Refer drawing in Technical Bulletin. Relevant Auto Cad files & details on other accessories such as 19 inch sub rack frames, semi projection mount kits & stud terminal kits may be down loaded from:

http://rmspl.com.au/product/m-series/

Equipment Connections

Personnel undertaking installation, commissioning or servicing work on this equipment should be aware of the correct working procedures to ensure safety. The product documentation should be consulted before installing, commissioning or servicing the equipment.

Terminals exposed during installation, commissioning and maintenance may present hazardous voltage unless the equipment is electrically isolated.

If there is unlocked access to the rear of the equipment, care should be taken by all personnel to avoid electric shock or energy hazards.

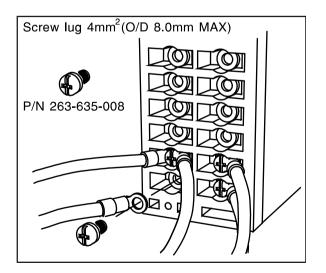
Voltage and current connections should be made using insulated crimp terminations to ensure that terminal block insulation requirements are maintained for safety. To ensure that wires are correctly terminated, the correct crimp terminal and tool for the wire size should be used.

Before energising the equipment it must be earthed using the protective earth terminal, or the appropriate termination of the supply plug in the case of plug connected equipment. Omitting or disconnecting the equipment earth may cause a safety hazard.

The recommended minimum earth wire size is 2.5mm², unless otherwise stated in the technical data section of the product documentation.

Before energising the equipment, the following should be checked:

- 1. Voltage rating and polarity;
- 2. CT circuit rating and integrity of connections;
- 3. Protective fuse rating;
- 4. Integrity of earth connection (where applicable)







Current Transformer Circuits

Do not open the secondary circuit of a live CT since the high voltage produced may be lethal to personnel and could damage insulation.

External Resistors

Where external resistors are fitted to relays, these may present a risk of electric shock or burns, if touched.

Insulation & Dielectric Strength Testing

Insulation testing may leave capacitors charged up to a hazardous voltage. At the end of each part of the test, the voltage should be gradually reduced to zero, to discharge capacitors, before the test leads are disconnected.

Insertion of Modules

These must not be inserted into or withdrawn from equipment whilst it is energised, since this may result in damage.

Electrical Adjustments

Pieces of equipment which require direct physical adjustments to their operating mechanism to change current or voltage settings should have the electrical power removed before making the change, to avoid any risk of electric shock.

Mechanical Adjustments

The electrical power to the relay contacts should be removed before checking any mechanical settings, to avoid any risk of electric shock.

Draw Out Case Relays

Removal of the cover on equipment incorporating electromechanical operating elements may expose hazardous live parts such as relay contacts.

Insertion & Withdrawal of Heavy Current Test Plugs

When using a heavy current test plug, CT shorting links must be in place before insertion or removal, to avoid potentially lethal voltages.





Commissioning Preliminaries

Carefully examine the module and case to see that no damage has occurred during transit. Check that the relay serial number on the module, case and cover are identical, and that the model number and rating information are correct.

Check that the external wiring is correct to the relevant relay diagram or scheme diagram. The relay diagram number appears inside the case.

Note that shorting switches shown on the relay diagram are fitted internally across the relevant case terminals and close when the module is withdrawn. It is essential that such switches are fitted across all CT circuits.

Earthing

Ensure that the case earthing connection above the rear terminal block is used to connect the relay to a local earth bar.

Insulation

The relay, and its associated wiring, may be insulation tested between:

- all electrically isolated circuits
- all circuits and earth

An electronic or brushless insulation tester should be used, having a dc voltage not exceeding 1000V. Accessible terminals of the same circuit should first be strapped together. Deliberate circuit earthing links, removed for the tests, subsequently must be replaced.

Commissioning Tests

If the relay is wired through a test block it is recommended that all secondary injection tests should be carried out using this block.

Ensure that the main system current transformers are shorted before isolating the relay from the current transformers in preparation for secondary injection tests.

DANGER

DO NOT OPEN CIRCUIT THE SECONDAY CIRCUIT OF A CURRENT TRANSFORMER SINCE THE HIGH VOLTAGE PRODUCED MAY BE LETHAL AND COULD DAMAGE INSULATION.

It is assumed that the initial preliminary checks have been carried out.

Relay CT shorting

Check electrically that the CT is shorted before isolating CT secondaries.





Primary injection testings

It is essential that primary injection testing is carried out to prove the correct polarity of current transformers.

Before commencing any primary injection testing it is essential to ensure that the circuit is dead, isolated from the remainder of the system and that only those earth connections associated with the primary test equipment are in position.

Decommissioning & Disposal

- Decommissioning: The auxiliary supply circuit in the relay may include capacitors across the supply or to earth. To avoid electric shock or energy hazards, after completely isolating the supplies to the relay (both poles of any dc supply), the capacitors should be safely discharged via the external terminals prior to decommissioning.
- Disposal: It is recommended that incineration and disposal to water courses is avoided. The product should be disposed of in a safe manner.





Part

Maintenance

Mechanical Inspection

Relay Assembly

Inspect the relay for obvious signs of damage or ingress of moisture or other contamination.

Relay Module

Isolate the relay, remove any securing screws where fitted and unplug the relay from the terminal base.

Inspect the relay for signs of any overheating or burn marks which may have been caused by overvoltage surge or transient conditions on the power supply.

Test Intervals

The maintenance tests required will largely depend upon experience and site conditions, but as a general rule it is recommended that the following inspection and tests are performed every twelve months.

- Mechanical Inspection
- Check of Connections
- Insulation Resistance Test





Defect Report Form

Please copy this sheet and use it to report any defect which may occur.

Customers Name & Address:	Contact Name:
	Telephone No:
	Fax No:
Supplied by:	Date when installed:
Site:	Circuit:

When Defect Found

Date:	Commissioning?	Maintenance?	Systems Fault?	Other, Please State:			
Product Part No:			Serial Number:				
Copy any message displayed by the relay:							
Describe Defect:							
Describe any other action taken:							
Signature:		Pleas	Please Print Name:		ease Print Name: Date:		Date:

For RMS use only

Date Received:	Contact Name:	Reference No:	Date Acknowledged:	Date of Reply:	Date Cleared:



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Relay Monitoring Systems Pty Ltd design, manufacture and market a wide range of electrical protection and control products for application on high voltage power systems. The company's depth of manufacturing and engineering expertise is backed up by many years of experience since the formation of its predecessor, Relays Pty Ltd (RPL), in 1955. This experience combined with a broad base of field proven product types enables RMS to service specific customer needs by producing relays on demand and with typically short lead times.

Relay Monitoring Systems Pty Ltd

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ISO9001 Quality Accreditation

RMS holds BSI (British Standards Institute) registration number 6869 for the certification of a quality system to AS/NZS ISO9001:2008.

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