

Features

- Large graphics display panel
- Instantaneous voltage display
- 20 to 130V PU setting range
- 0.1V setting resolution
- Adjustable pick up & drop out
- Adjustable reset time delay
- 63.5/110V AC nominal inputs
- Four independent voltage stages & output trip contacts
- Independent definite time delay per voltage stage
- Timing & trip indication LED's
- Relay enable input
- CPU watchdog
- Undervoltage blocking function
- Wide auxiliary supply range with fail alarm contact
- Size 4M56-S draw out case
- Made in Australia

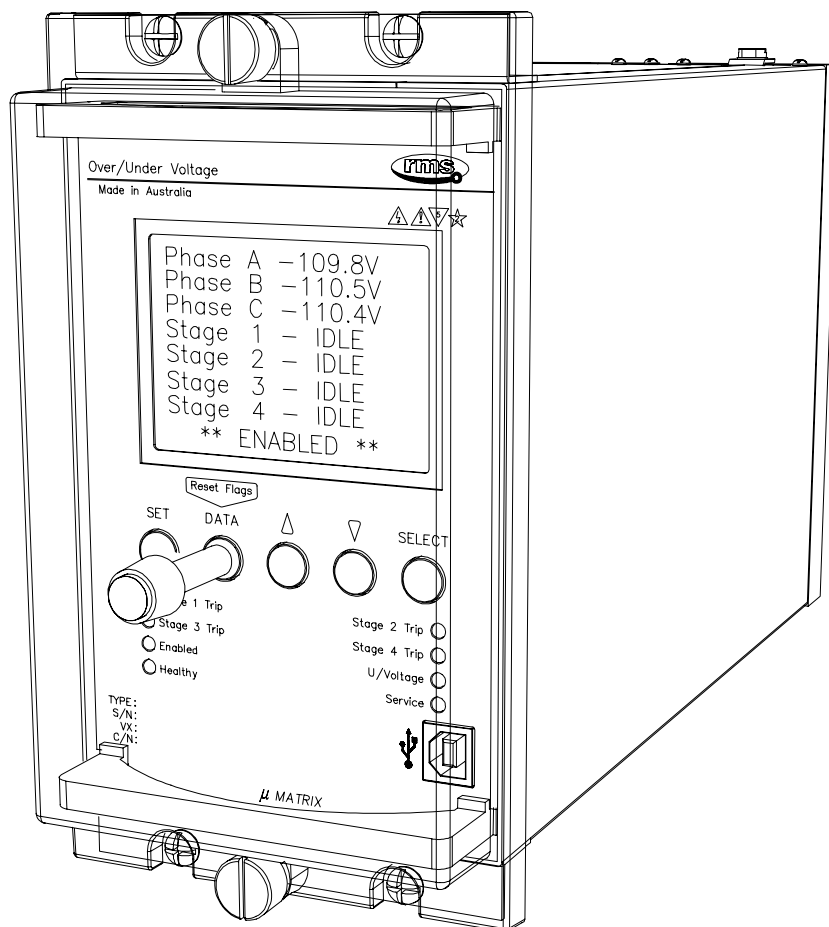
COMMUNICATION

- USB front programming port
- Non platform specific PC programming software: uMATRIXwin
- Optically isolated network communication ports
- MODBUS RTU compatible network protocol

Operation

The 2V67 Series relay is a three pole voltage monitoring relay with four stages of adjustable voltage pick up & drop out points. Each voltage set point can be set for under or overvoltage operation & has an independent time delay driving an output relay. An undervoltage lockout is used to disable the four voltage outputs when the voltage falls below a preset level. A single status input is used to enable the four voltage sensing stages.

The 2V67 relay is built on the Micro MATRIX digital platform. The standard Micro MATRIX human machine interface (HMI) is combined with fully solid-state voltage sensing & measuring circuitry to provide high accuracy, simple set up & flexible operation. Self-monitoring is carried out by hardware & software watchdogs. A CPU software watchdog records abnormal events & performs automatic periodic checks. High speed, high contact rating output relays are used.



2V67-S depicted in a 4M56-S draw out case

Application

Made in Australia

UNDervOLTAGE LOAD SHEDDING

Loss of adequate system voltage can lead to plant & equipment damage if not taken off line or the voltage level restored. The 2V67 relay can be used to provide four stages of load shedding as the voltage progressively falls through the four independent setting stages.

COGENERATION SCHEMES

At the interface between the utility & the cogenerator, undervoltage relays are installed as minimum protection to provide an operating voltage window for the cogenerator. During faulted conditions when the cogenerator may become overloaded, the 2V67 relay will detect the decline in voltage & remove the cogenerator from the system.

AUTOMATIC TRANSFER

In order to restore service within a given acceptable time period, automatic transfer switching can be applied to initiate throwover from primary power to the alternate power source. The 2V67 relay can initiate switching after a given time delay to avoid transfer switching during temporary low voltage conditions.

TRANSFORMER PROTECTION

The 2V67 relay may be used to supplement the tap changer control system & to prevent equipment damage as a result of failure of the tap change undervoltage blocking mechanism or overvoltage run away.

SENSING INPUT

Nominal VT sensing input: 3 phase 63.5 & 110V AC
Sensing supply burden: Less than 0.2VA
Thermal rating: 300V continuous

VOLTAGE SET POINTS

Setting stages: 4 independent stages
Setting range: 20 to 130V in 0.1V steps
Hysteresis: 0.2 to 5V in 0.1V steps
Overvoltage function: PU at set point
DO at set point – hysteresis
Undervoltage function: PU at set point
DO at set point + hysteresis
Undervoltage lockout: 11 to 90V in 0.1V steps

VOLTAGE MEASUREMENT ACCURACY

Precision of voltage setting: 0.1V steps
Voltage pick up repeatability: +/-0.15V from 90 to 120V
Voltage display: 4 digits from 10 to 145V
Resolution of voltage display: 0.1V
Accuracy of displayed voltage: +/-0.15V

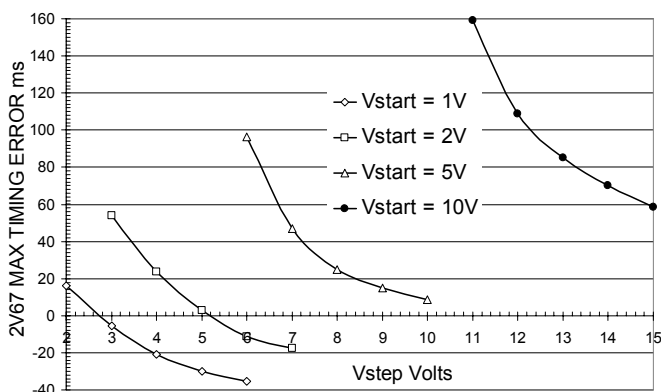
TIME SETTING RANGE

Separate time range for each of the four voltage stage set points.
Tset from 0.2s to 320s in 0.1s steps.

PICK UP TIME ERROR

The pick up time error is caused by the delay of the voltage measuring circuit to respond to sudden voltage step changes. This error is determined from the following chart:

Vref = The nominal monitored voltage
Vset = The voltage pick up setting
Vstart = The difference between Vref & Vset
Vstep = The magnitude of the actual voltage step from Vref



RELAY ENABLE STATUS INPUT

The status input on the 2V67 is used to enable the four voltage monitoring stages of the relay. The relay must be "enabled" in order for the time delay stages to operate. A front panel LED is illuminated red when the relay is disabled.

STATUS INPUT FUNCTION

The status input function is factory set for the relay to be enabled on the application of a control voltage. It is also possible for the status input to operate on the removal of a control voltage by simply changing a software flag in the PC setup program.

STATUS INPUT MINIMUM OPERATING CURRENT

10 mA P/U for 1 ms then reducing to 1.5 mA after 4 ms.

STATUS INPUT OPERATING TIME

Initiate input	Parameter	Delay
DC	P/U	<4 ms
	D/O	<16 ms
AC	P/U	<23 ms
	D/O	<33 ms

Table 1

Technical Data

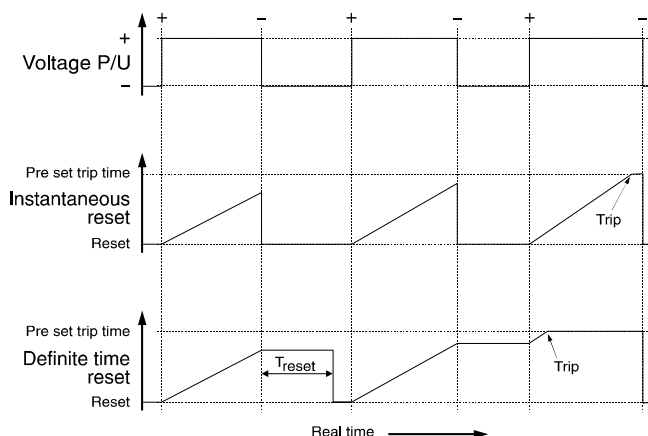
RESET TIME DELAY

An independent reset time setting (Treset), is provided for each of the four voltage stages which may be employed to emulate an induction disc reset characteristic. Treset may be adjustable between zero & 5s in 0.1s steps.

For instantaneous reset Treset should be set to zero.

When the voltage pick up & drop out points are set very close together it is advisable to set Treset with a small reset delay to avoid timer resetting due to transient voltage fluctuations.

The difference in timing performance is demonstrated in the following diagrams:



It should be noted that once the relay has timed out & the trip output initiated, the voltage element will reset instantaneously when the voltage pick up is reset irrespective of the Treset setting.

The reset characteristic for the undervoltage lockout function is instantaneous.



AUXILIARY SUPPLY

20-70V DC switchmode supply or
40-275V AC / 40-300V DC switchmode supply
Burden: Less than 7 watts at during timing

Inputs:

A high efficiency switchmode power supply is incorporated which provides a low burden to the auxiliary supply.

Input Transients:

Withstands multiple high-energy transients & ring waves in accordance with IEEE28 - ANSI C26.1 Cat. II, accordingly:

- 0.5uS 100kHz 6kV O/C, 500A S/C, 4J
- 1.2/50uS 6kV O/C
- 8/20uS 3kA S/C, 80J clamped at 1,000V

Mains conducted EMI within limits specified by AS 3548 Class B.

Isolation:

The inputs are isolated from the outputs in accordance with AS3260 Class II Limited Current Circuitry, accordingly:

- Withstand voltage of 2.5kV RMS 50Hz for one minute
- Creepage & clearance distance greater than 4mm
- Output leakage current less than 0.25A to earth

Output Protection:

Outputs will withstand continuous short circuit. Output regulators & switching control regulator are thermally protected.

RELAY FAIL ALARM

A C/O alarm contact is maintained in the energized state when all of the following conditions are met:

- The auxiliary supply is applied
- The internal 24V DC rail is within acceptable limits
- The CPU hardware watchdog maintains a pulsing output

A CPU software watchdog records "suspect" events to an assert register and if necessary performs a soft restart.

OUTPUT CONTACTS

4 C/O self reset: 1 for each time delayed voltage output stage
1 C/O self reset: Undervoltage blocking alarm
1 C/O self reset: Relay enabled indication
1 C/C self reset: Power supply fail / CPU watchdog alarm

CASE

4M56-S Size 4 draw out with 56 M4 screw terminals
Mounting Flush panel or 4U high 1/4 width 19 inch rack mount

ACCESSORIES SUPPLIED

1 x M4 self threading mounting screw kit P/N 290-406-151
2 x M4 terminal screw kit (28 per kit) P/N 290-407-153
1 x uMATRIX User Guide per order
1 x CD - uMATRIXwin software, setting files & applications per order

Technical Data

OUTPUT CONTACT RATINGS

IEC60255-0-2

Carry continuously	5A AC or DC
Make & carry	0.5 s 20 A AC or DC
L/R $\leq$ 40ms & V $\leq$ 300V	0.2 s 30 A AC or DC
	AC resistive 1,250 VA
Break capacity	AC inductive 250 VA @ PF $\leq$ 0.4
I $\leq$ 5A & V $\leq$ 300V	DC resistive 75 W
	DC inductive 30 W @ L/R $\leq$ 40 ms
	50 W @ L/R $\leq$ 10 ms
	10 ⁶ at maximum load
Minimum number of operations	0.5W limit 10mA / 5 V
Minimum recommended load	

TRANSIENT OVERVOLTAGE

IEC60255-5 CLASS III

Between all terminals & earth	5 kV 1.2/50 us 0.5 J
Between independent circuits without damage or flashover	5 kV 1.2/50 us 0.5 J

INSULATION COORDINATION

IEC60255-5 CLASS III

Between all terminals & earth	2.0 kV rms for 1 min.
Between independent circuits	2.0 kV rms for 1 min.
Across normally open contacts	1.0 kV rms for 1 min.

AUXILIARY SUPPLY

IEC60255-11

Allowable breaks / dips in supply	$\leq$ 20 ms
Collapse to zero from nominal voltage	

HIGH FREQUENCY DISTURBANCE

IEC60255-22-1 CLASS III

2.5 kV 1MHz common mode	
1.0 kV 1MHz differential mode	$\leq$ 3% variation

ELECTROSTATIC DISCHARGE

IEC60255-22-2 CLASS III

6 kV contact discharge	$\leq$ 5% variation
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RADIO FREQUENCY INTERFERENCE

IEC60255-22-3

10 V/m, 80 TO 1,000 MHz	$\leq$ 5% variation
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FAST TRANSIENT

IEC60255-22-4

4 kV, 5/50 ns, 100 KHz repetitive	$\leq$ 3% variation
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CONDUCTED RFI

IEC60255-22-6

10 V, 0.15 to 80 MHz	$\leq$ 5% variation
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TEMPERATURE RANGE

Operating:	-5 to +55°C
Storage:	-25 to +75°C

HUMIDITY

IEC68-2-1/2

40°C & 95% RH non condensing	
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Visit www.rmspl.com.au for the latest product information.

Due to RMS continuous product improvement policy this information is subject to change without notice. 2V67-S/Issue B/19/08/09 - 3/5

RELAY CONFIGURATION USING μ MATRIXwin

The purpose of the μ MATRIXwin application is to provide display, configuration and diagnostic facilities required to support the entire family of μ MATRIX digital relays. The prime functions of the application are:

Create a setting file off line

To create & view relay setting files at your PC without the need for a relay;

Relay setting

To download a setting file (UMP) into a relay connected to a PC;

To display & change settings in a connected relay;

Relay status

To display the Status of nominated inputs and outputs of a connected relay;

Commissioning

To export reports of setting parameters & status screen to confirm correct functionality during commissioning;

Upgrade relay software

To configure a μ MATRIX relay for a specific customer application;

To upgrade the operational software (UMX) of a μ MATRIX relay;

All current UMX software applications may be downloaded from:

www.rmspl.com.au/umatrix

Maintenance

To provide utility and diagnostic facilities at a technical level.

COMMUNICATION PORTS

Two (2) communications ports are available. The front USB programming port is provided as standard while the rear RS485 network port is available as an option.

Programming port

The programming port is accessible from the front panel of the relay via a USB physical link & PC configuration program supplied with the relay. The μ MATRIXwin configuration program is designed to operate with all relays from the μ MATRIX range & with all installed firmware version.

Network port

The network port is intended for applications where permanent connection to a master control system is required. An optically isolated RS485 physical layer is provided for this function.

The RS485 connection is intended for applications where multiple μ MATRIX relays are to be connected on a common communications bus.

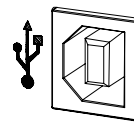
Network Port Terminating Resistor

Where multiple relays are connected in a multi-drop configuration the RS485 comms. bus must have a 120 ohm terminating resistor fitted at each end. If the μ MATRIX-S relay is at one end of the transmission line a terminating resistor can be added by placing SW100-3 and SW100-4 in the ON position as depicted in the wiring diagram.

Network Port BIAS Resistors

Where a single relay is connected to the network, or where the relay is a long distance from other devices on the comms. bus, BIAS resistors may need to be fitted to ensure reliable operation. To simplify this configuration, BIAS resistors are fitted to each μ MATRIX-S relay and may be selected IN by setting switches SW100-1 and SW100-2 to the ON position as depicted in the wiring diagram. This bank of four switches can be accessed by withdrawing the relay module from its case, turning upside down and looking at the centre PCB near the rear terminal blocks.

PC TO μ MATRIX USB CONNECTION

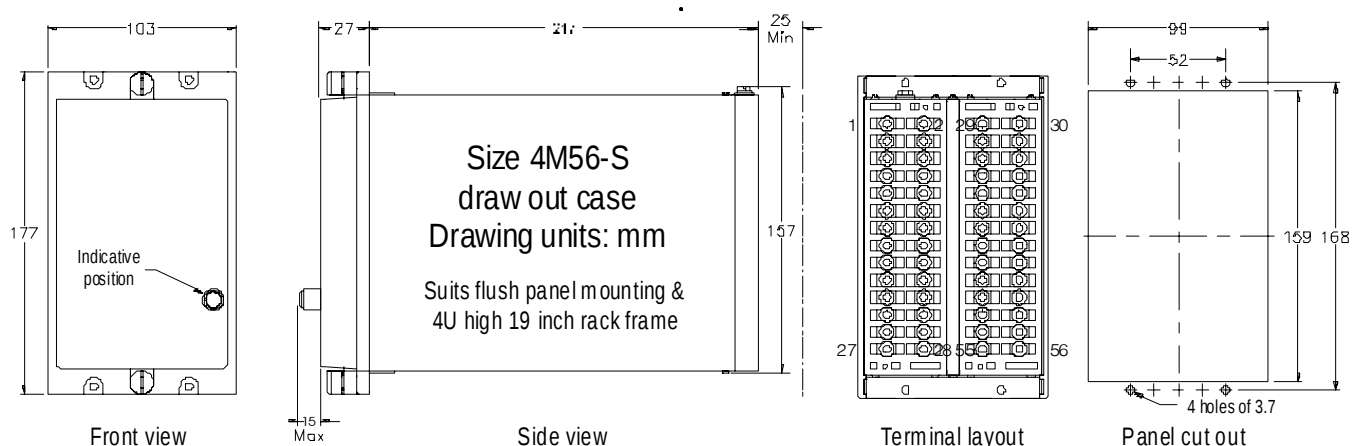


2V164-S front panel USB programming port

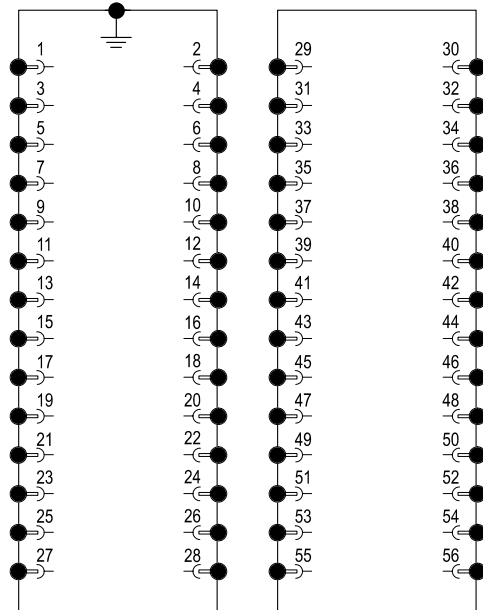
USB DRIVERS

The μ MATRIX-S USB port is configured as a Virtual Communications Port (VCP) & is operated through a PC COM port. USB drivers must be installed on the PC to enable correct communication. A ZIP file containing the driver files needed for this process may be downloaded from:

www.rmspl.com.au/umatrix



Case Earth



4M56 Case terminations (REAR VIEW)

Ordering Information

Generate the required ordering code as follows: e.g. 2V67-S-BDDAA

General Type

2V67-S

Order Code

1	2	3	4	5

1 AUXILIARY SUPPLY RANGE

A 20-70V DC B 40-275V AC (300V DC)

2 RELAY INITIATE INPUT

A 24-80V AC/DC B 80-150V AC/DC
C 150-275V AC (300V DC) D 18-275V AC (300V DC)

3 REMOTE FLAG RESET INPUT

A 24-80V AC/DC B 80-150V AC/DC
C 150-275V AC (300V DC) D 18-275V AC (300V DC)

4 VOLTAGE INPUTS

A 3 Pole Version B 1 Pole Version

5 REAR COMMUNICATIONS PORT

A Not required
B Required – Modbus protocol

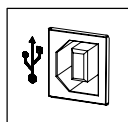


REQUEST DEFAULT APPLICATION SOFTWARE

A UMX2V067A 3 phase 4 stage under / over voltage
H UMX2V067H 1 phase 4 stage under / over voltage

*Note: The status inputs & some relay outputs are assigned by the software (UMX) loaded on the relay.

Shown here are the standard assignments of the A UMX. Other UMX versions may differ. Consult the UMX data sheets for specific I/O assignments.



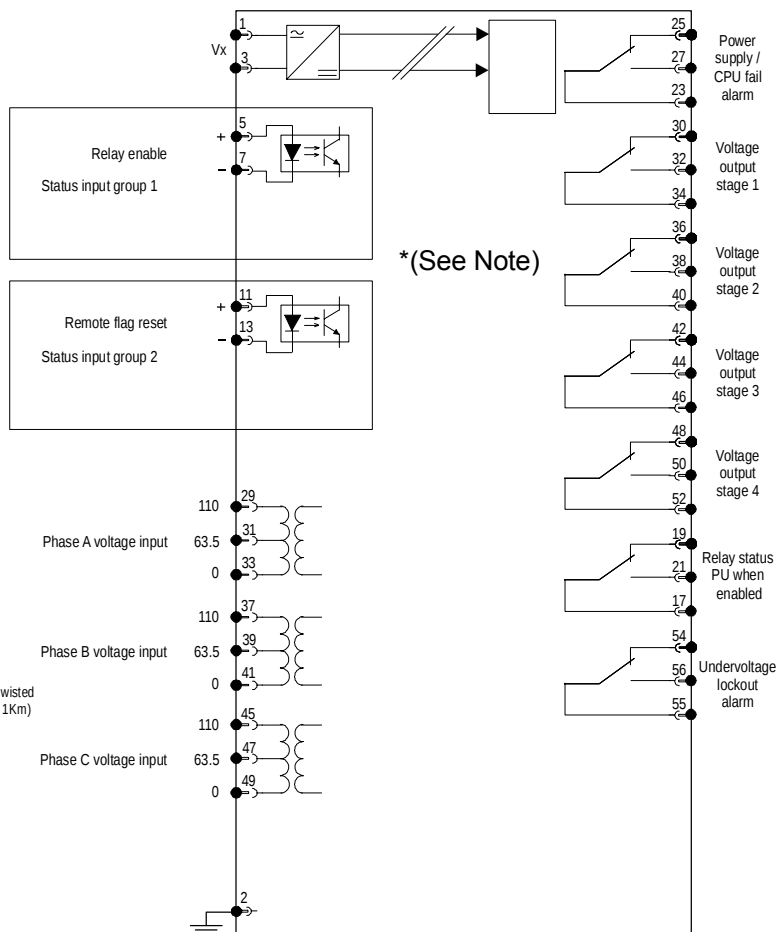
FRONT PANEL
USB PROGRAMMING
PORT

SCADA
COMMUNICATIONS
PORT RS485
Network port



To other uMATRIX relays (Up to 32 units)
Invoke terminating 120R resistor to end of BUS relay only.
To do this set SW100-1&2 ON.

Invoke BIAS resistors for single relay connection only.
To do this set SW100-3&4 ON.



2V67wiring diagram - Relay shown in de-energised condition

Australian Content

Unless otherwise stated the product(s) quoted are manufactured by RMS at our production facility in Melbourne Australia. Approximately 60% of our sales volume is derived from equipment manufactured in house with a local content close to 90%. Imported components such as semi-conductors are sourced from local suppliers & preference is given for reasonable stock holding to support our build requirements.

Quality Assurance

RMS holds NCSI (NATA Certification Services International), registration number 6869 for the certification of a quality assurance system to AS/NZS ISO9001-2000. Quality plans for all products involve 100% inspection and testing carried out before despatch. Further details on specific test plans, quality policy & procedures may be found in section A4 of the RMS product catalogue.

Product Packaging

Protection relays are supplied in secure individual packing cardboard boxes with moulded styrene inserts suitable for recycling. Each product & packing box is labeled with the product part number, customer name & order details.

Design References

The products & components produced by RMS are based on many years of field experience since Relays Pty Ltd was formed in 1955. A large population of equipment is in service throughout Australia, New Zealand, South Africa & South East Asia attesting to this fact. Specific product & customer reference sites may be provided on application.

Product Warranty

All utility grade protection & auxiliary relay products, unless otherwise stated, are warranted for a period of 24 months from shipment for materials & labour on a return to factory basis. Repair of products damaged through poor application or circumstances outside the product ratings will be carried out at the customer's expense.

Standard Conditions of Sale

Unless otherwise agreed RMS Standard Terms & Conditions (QF 907) shall apply to all sales. These are available on request or from our web site.



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