

Features

- Direct access to the protection or measurement scheme
- 14 independent test groups fully configurable to the customer's application at the time of order
- Staged sequential operation of the test circuits
- Automatic shorting of CT circuits completed in the test block - No test links or operator intervention required
- Clear and concise front panel circuit identification
- Compatible with industry standard MMLB and 2RMLB Test Plugs
- Extraction tabs to avoid accidental tripping during circuit isolation
- High current / voltage rating
- Rack or panel mounting

Application

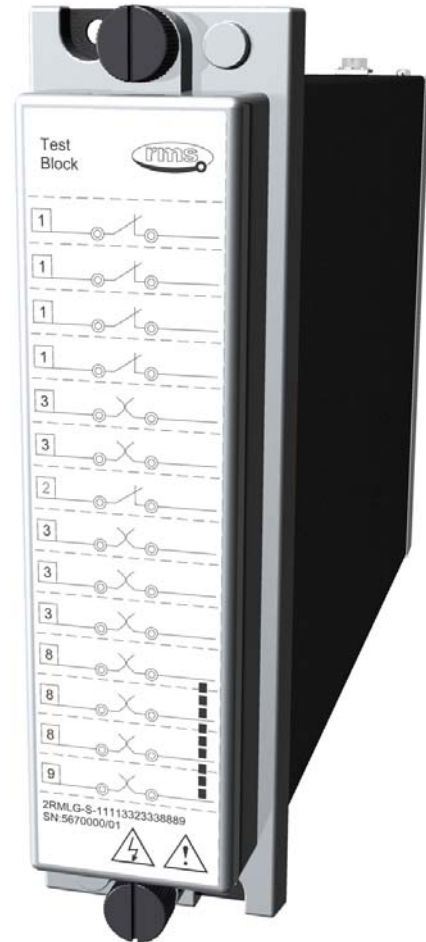
Test links are an important accessory for protection, metering and control panels. They enable test technicians to quickly and safely isolate protection relays so that test signals may be injected and system performance verified.

There are a number of advantages in performing injection tests at the protection relay panel:

- Reduction in down time of the equipment under test
- Testing does not cause disturbance to wiring, terminals or equipment settings
- Existing auxiliary supply to the equipment under test may be isolated

The 2RMLG-S Test Link Panel has been designed as a general-purpose isolation and test signal injection point. While compatible with industry standard MMLB and 2RMLB test plugs, the latest 2RMLB-S test plug with 'Finger safe' sockets are recommended.

Equipment under test need only be removed for servicing if problems are detected.



2RMLG-S Test Block

Description

Made in Australia

The 2RMLG-S Test Block is an evolution of the 2RMLG system. The main difference is that each of the fourteen (14) test groups may be specified at the time of order to suit a different circuit type:

- Tripping circuit isolation and Out of service indication
- Auxiliary supply isolation
- CT shorting
- CT and VT circuit isolation

The main advantage of this approach is the improved level of safety and security afforded to CT circuits. This is because the CT shorting function takes place within the 2RMLG-S Test Block irrespective of the CT circuit position. In many test block systems the CT shorting is only accomplished when the Test Plug is inserted which leaves open the possibility of a CT circuit becoming open circuit due to the CT shorting links being omitted or in the wrong position. This potential problem is negated in the 2RMLG-S and allows a single model 2RMLB Test Plug to be employed for all 2RMLG-S Test Block configurations.

Each test circuit is connected to a separate pair of terminals at the rear of the case. During normal operation of the associated protection equipment, each terminal pair is connected.

Changing the 2RMLG-S Test Block from the normal service condition occurs in four (4) stages as depicted in the timing diagram figure 2.

2RMLG-S Test block - 14 test circuits may be specified in any configuration

2RMLB-S Multi finger test plug - 'Finger safe' test sockets
 - One standard model suits all 2RMLG-S Test Blocks
 - Older MMLB-01 and 2RMLB-01 test plugs may be used
 - Refer to the 2RMLB-S Technical Bulletin for details

Where more than 14 test circuits are required such as in EHV transmission protection panels, two 2RMLG-S Test Blocks may be employed.

OVERVIEW

While providing considerable convenience and efficiencies to system testing, test block systems must provide a high degree of safety. This section describes the key design features employed in the 2RMLG-S test block system to enhance operator safety.

TEST LEAD INSERTION

Before use the insulation of the flying leads should be visibly checked for damage.

Flexible banana test leads with shrouded plugs are recommended for operator safety. 2.5mm² multi-strand wire with PVC insulation is recommended for adequate current rating and flexibility.

TEST PLUG INSERTION



To avoid high voltage shock hazard external CT circuits must NOT be open circuited.

Insertion of the 2RMLB-S connects the live side circuits to the YELLOW test sockets on the front panel. The equipment side circuits are connected to the BLACK test sockets on the front panel. Each test socket is identified by a number, which corresponds to the numbered terminal on the rear of the case when the Test Plug is inserted.

FINGER SAFE TEST SOCKETS

BLACK - even numbered
- equipment side sockets

YELLOW - odd numbered
- live side sockets



Figure 1: Close up view of the 'finger safe' test plug sockets that accept standard 4mm shrouded test plugs

AUTOMATIC CT SHORTING

An open circuit CT will result in the generation of high voltages and if allowed to persist potentially cause damage to the CT and other equipment. For this reason it is imperative that appropriate CT shorting links are fitted before CT circuits are isolated. In traditional test block systems this is achieved by the operator manually fitting shorting links to the appropriate positions before inserting the test plug. This can lead to serious errors due to incorrect or poorly interpreted wiring diagrams.

More recent test plugs have become available with permanent CT shorting links fitted which avoids the possibility of inadvertent dislodgement during testing. This system, however, can only be effective where a standard CT wiring and terminal numbering format is employed. Unfortunately this level of standardization is difficult to achieve and not always possible.

The 2RMLG-S Test Block system employs an automatic and secure method of CT shorting. When the 2RMLG-S front cover is removed the CT shorting is accomplished automatically *within* the test block irrespective of the CT position or test block configuration. The 2RMLB-S Test Plug does not require any special configuration before insertion as the CT shorting positions have already been specified at the time of order to suit a particular wiring arrangement.

Provided the installation and commissioning of the system is completed correctly correct CT shorting is assured. As the test block front cover must be removed before the test plug can be inserted the potential for error and generation of a potentially hazardous condition is eliminated.

2RMLB-S TEST PLUG - FINGER SAFE TEST SOCKETS

High voltages present on test circuits are a potential hazard to operators and adequate safety isolation must be maintained to avoid the possibility of electric shock. Standard 4mm test sockets are in themselves 'finger safe'. A problem arises however when a standard banana plug is inserted as this can leave the top end of the conductor exposed until it is fully inserted. The possibility of electrical shock to the operator is therefore possible during banana plug insertion into a live test socket or if it is dislodged during testing.

The solution to this problem is to employ 'finger safe' test sockets in the 2RMLB-S Test Plug. This allows the use of shrouded 'finger safe' banana plugs to greatly reduce the possibility of an operator coming into contact with any part of the test circuit.

Refer to the 2RMLB-S Technical Bulletin for details.

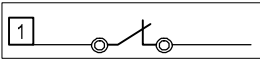
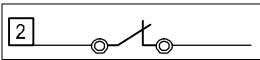
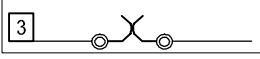
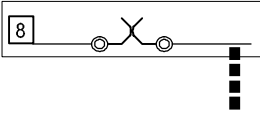
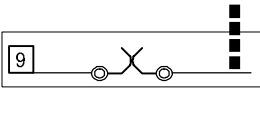
Test Circuit Cassettes

The 2RMLG-S test block is made up of 14 individual cassette modules. Different types of cassettes are available to suit specific protection circuit requirements.

This section describes the different circuit cassettes that may be specified for each of the 14 test circuits available on the 2RMLG-S test block.

Refer to the ordering information section to build up a specific order code for the circuit combination required.

Examples of test block configurations and order codes for typical protection scheme applications are shown in figures 3 to 6.

Type	Description	Function	Timing Stage	Front Panel Labeling
0	Blank circuit	To allow additional space for labeling on the front panel and isolation to adjacent test circuits. May be specified where less than 14 test circuits are required.	N/A	CUSTOM TEXT (2 lines x 15 characters)
1	Stage 1 isolation cassette	<p>This circuit type is isolated at Stage 1 as the front cover is removed from the Test Block. Use to provide:</p> <ul style="list-style-type: none"> Isolation of trip circuits Remote 'Out of Service' indication Isolation of inter-tripping circuits Isolation of watchdog alarms Isolation of I/O circuits 	1	
2	Stage 2 isolation cassette	<p>This circuit type is isolated at Stage 2 as the front cover is removed from the Test Block. Use to provide:</p> <ul style="list-style-type: none"> Isolation of auxiliary supply Isolation of VT circuits Isolation of I/O circuits 	2	
3	Stage 3 isolation cassette	<p>This circuit type is isolated at Stage 3 as the test plug is inserted into the Test Block. Use to provide:</p> <ul style="list-style-type: none"> Isolation of VT circuits Isolation of I/O circuits 	3	
8	CT cassette with shorting bar to the adjacent circuit below	Use for CT connections so that they will be automatically shorted to the adjacent circuit below. After shorting, this circuit is isolated at Stage 3 as the test plug is inserted.	Refer Figure 2	
9	Last CT cassette on a CT group *	Use for the last CT connection in a group so that it will be automatically shorted to the adjacent circuit above. After shorting, this circuit is isolated at Stage 3 as the test plug is inserted.	Refer Figure 2	

Note: * The minimum number of cassettes in any CT circuit group is 2.
The cassette code is engraved in a box on the front panel to indicate the circuit function.

DWELL POSITION

When inserting the test block cover back into the service position, an intermediate dwell position is provided. This position is to allow time for the protection relay to power up and stabilize so that correct function can be observed before the trip isolation contacts are closed.

The dwell function employs a spring loaded mechanism to allow the operator to feel when this position has been reached. Momentary additional insertion force is required to push the cover home beyond this point.

TEST CIRCUIT ACCESS

Access to the circuits, for testing purposes, is gained by first removing the front cover which isolates stage 1 and 2 circuits and safely shorts all CT circuits in accordance with the specific configuration of the test block.

This process occurs in two (2) steps as described below and depicted in the timing diagram as per figure 2.

STEP ONE - TEST BLOCK COVER EXTRACTION

- Stage 1: Isolation of all stage 1 circuits
- CT Shorting: Automatic shorting of all CT circuits
- Stage 2: Isolation of all stage 2 circuits

STEP TWO - TEST PLUG INSERTION

- CT Isolation: Isolation of all CT circuits
- Stage 3: Isolation of all stage 3 circuits

The above procedure should be completed in the reverse order to place the protection system back in service.

Insertion of the **Test Plug** type 2RMLB-S connects the live side circuits to the 4mm yellow test sockets. The equipment side circuits are connected to the 4mm black test sockets. Each test socket is identified by a number, which corresponds to the numbered terminal on the rear of the case when the Test Plug is inserted. Refer to figure 8.

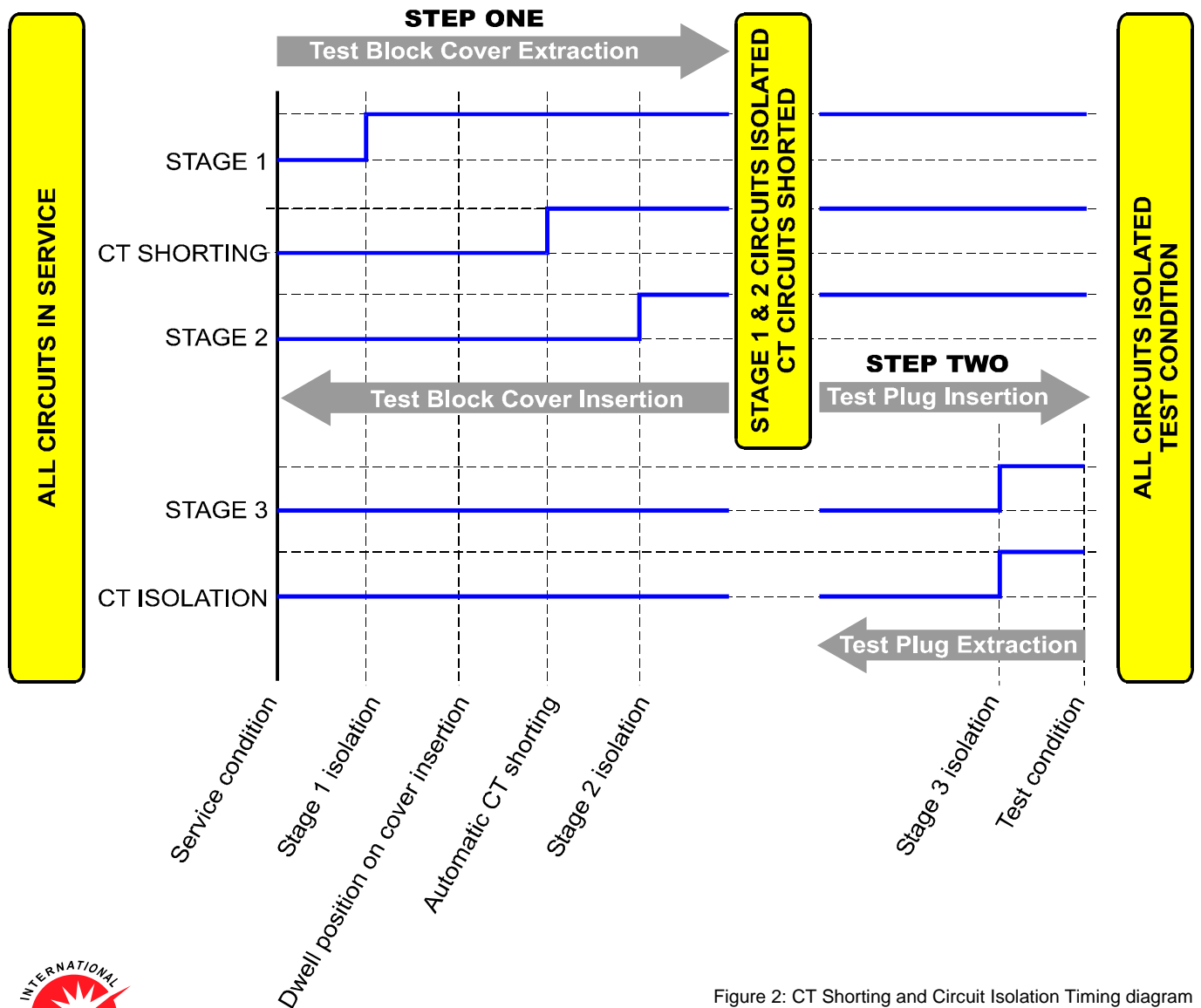


Figure 2: CT Shorting and Circuit Isolation Timing diagram

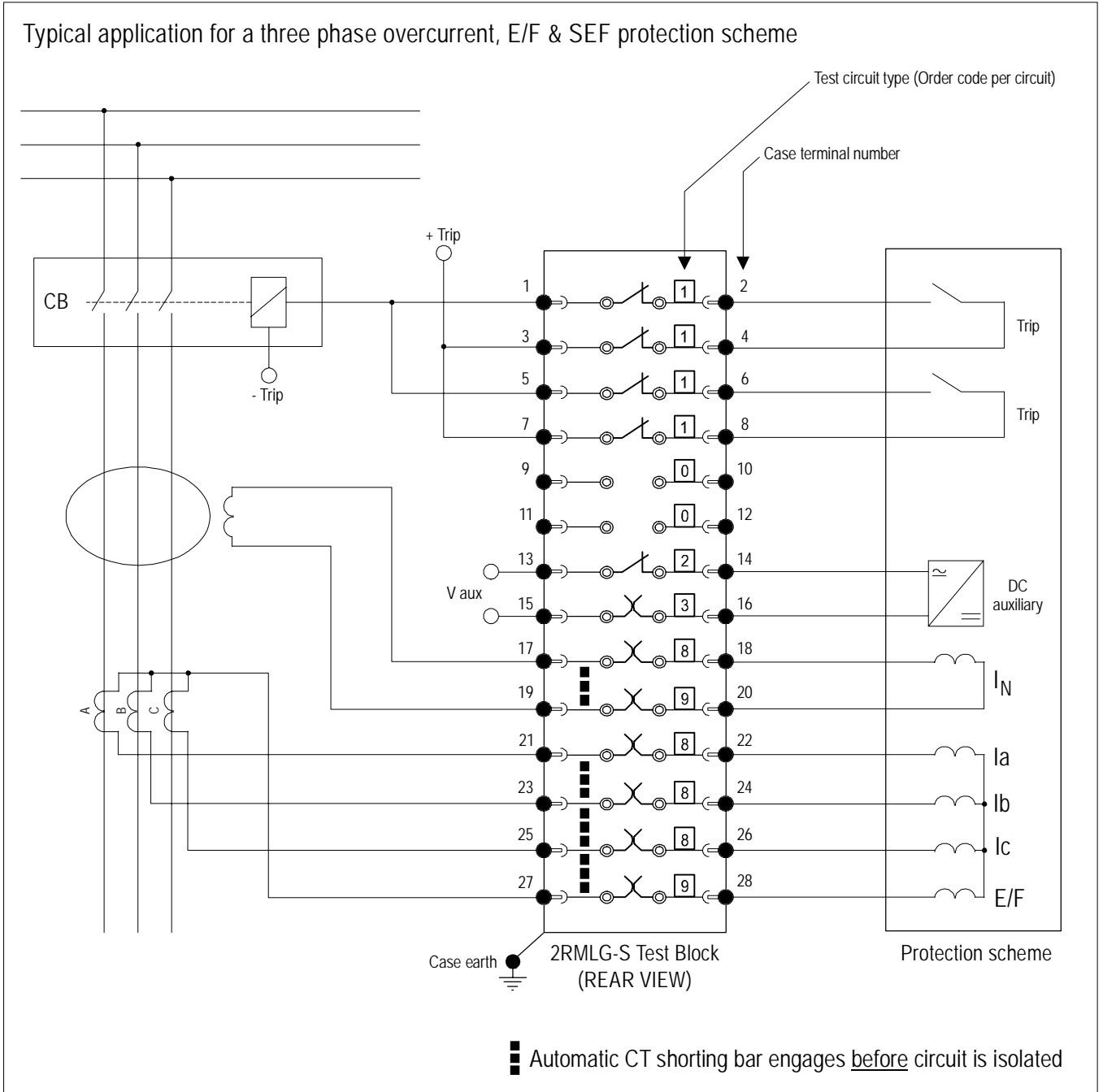


Figure 4: Application wiring example for a three phase O/C, E/F and SEF protection scheme

Order code: 2RMLG-S-11110023898889

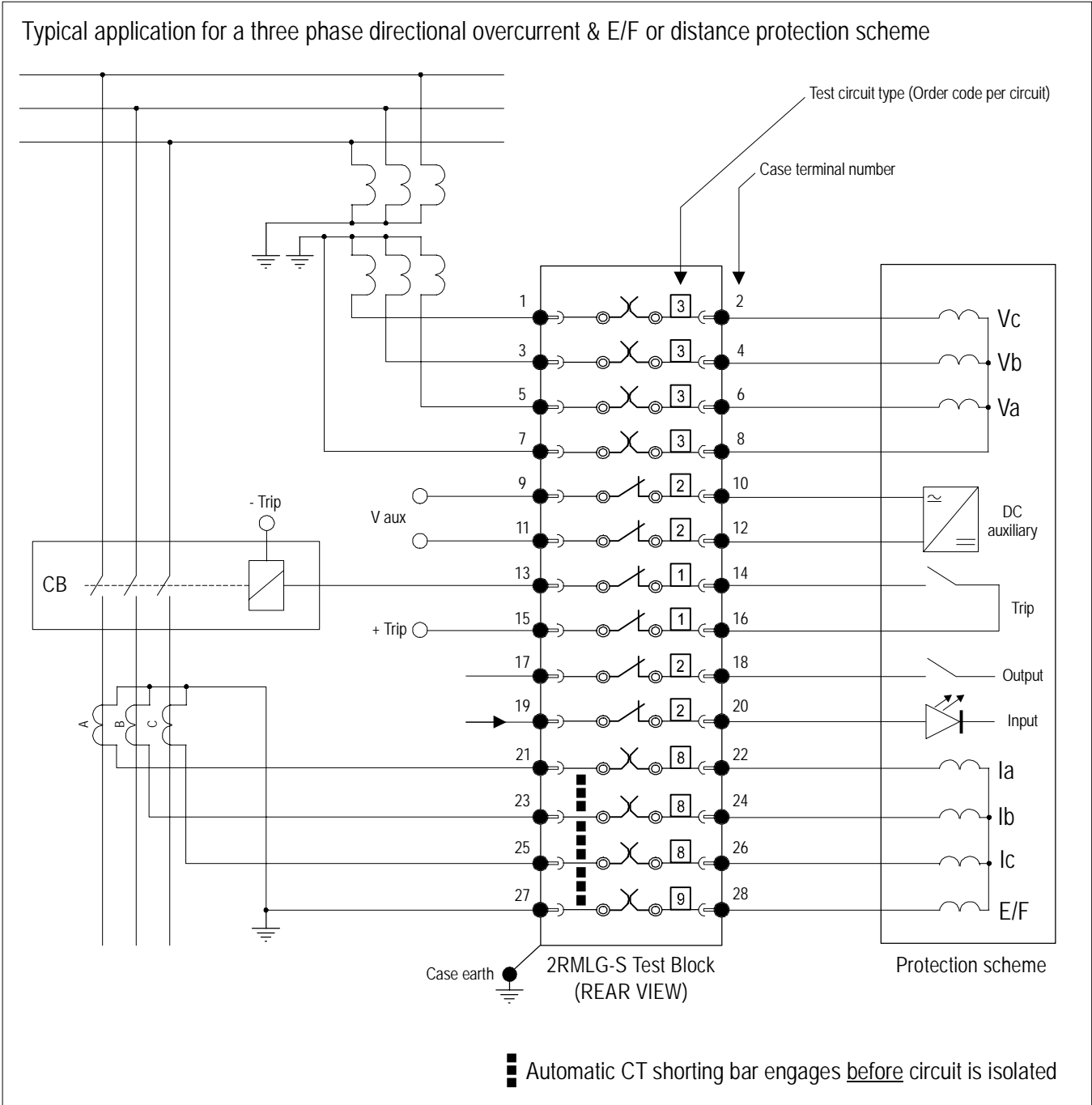


Figure 5: Application wiring example for a three phase directional O/C and E/F or distance protection scheme

Order code: 2RMLG-S-33332211228889

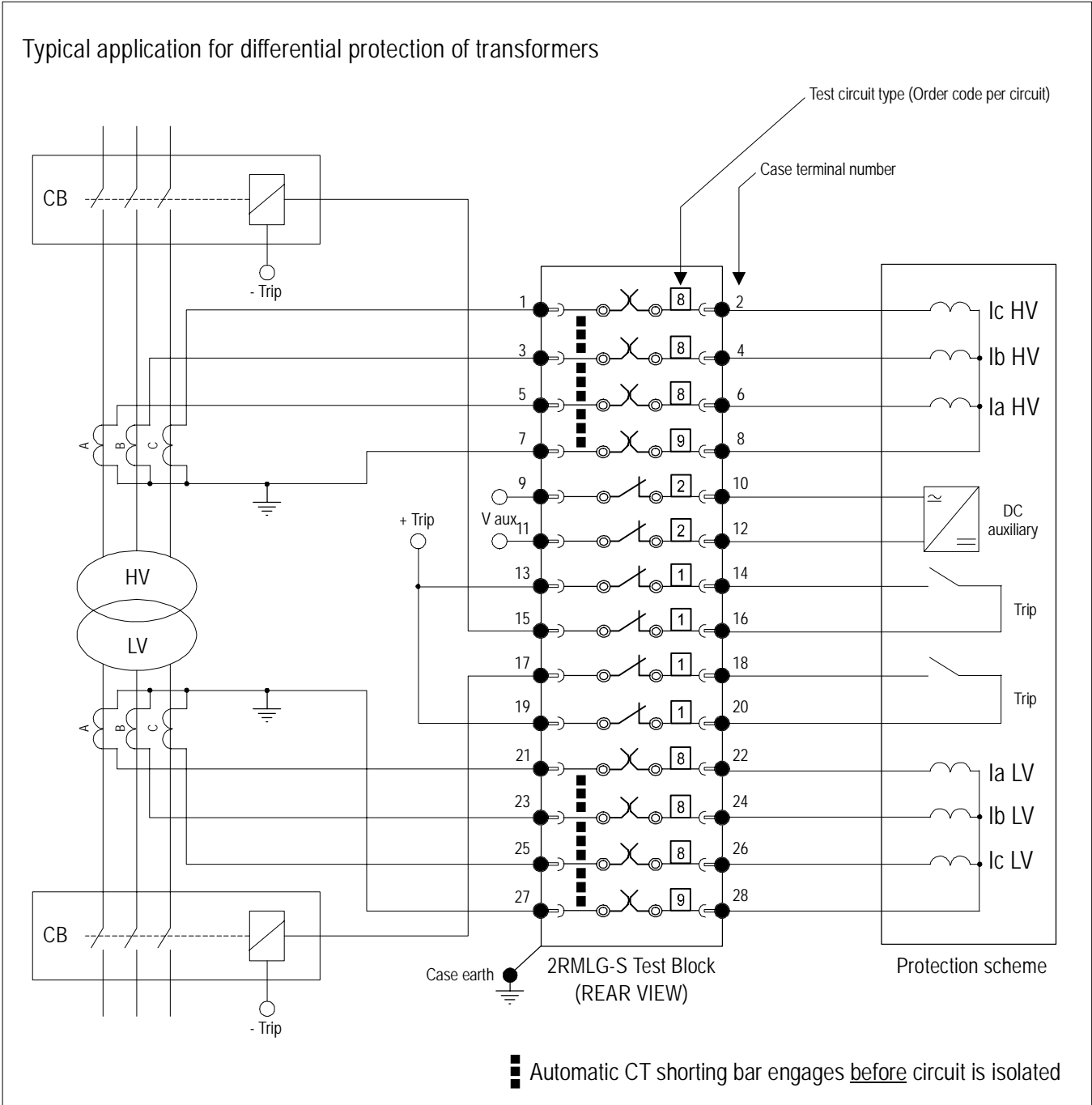


Figure 6: Application wiring example for differential protection of transformers

Order code: 2RMLG-S-88892211118889

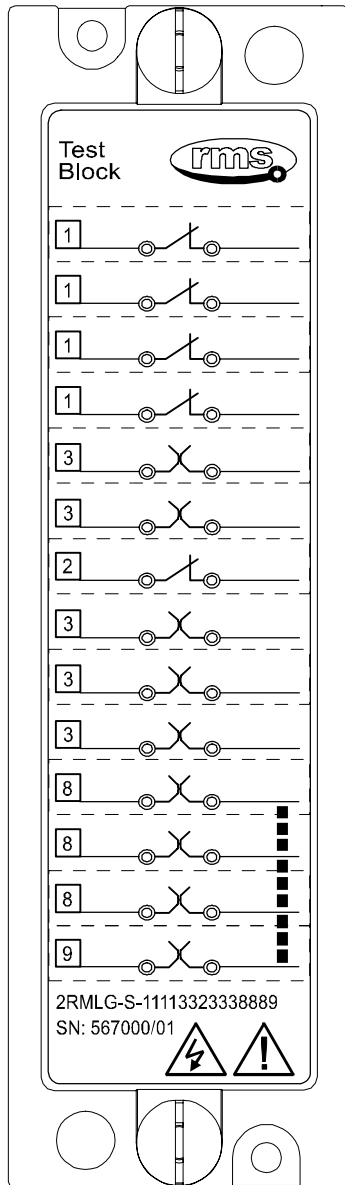


Figure 7: Front Panel Layout

2RMLG-S Test Block for a 3 Ph O/C & E/F application.

Depicted in the normal service condition with the test block front cover in position.

The front label identifies each cassette type.

Removal of the cover will cause:

- Circuits on cassette type 1 to be isolated
- CT circuits to be automatically shorted
- Circuits on cassette type 2 to be isolated

Insertion of the 2RMLB Test Plug will cause:

- Circuits on cassette type 3 to be isolated
- CT circuits to be isolated

Technical Data

2RMLG-S TEST BLOCK

- 14 Equipment side terminals (Even terminal numbers).
- 14 Live side terminals (Odd terminal numbers).
- 14 Live side to equipment side shorting links.

This arrangement provides for up to 14 independent circuits to be connected.

2RMLB-S MULTI FINGER TEST PLUG

28 test sockets suitable for 4mm shrouded 'finger safe' type or standard banana plugs.

Securing screws to retain the Test Plug during testing operations.

Refer to the 2RMLB-S Technical Bulletin for details.

CURRENT RATINGS

All CT circuits and terminals: 20A Continuous
400A 1s

2RMLG-S CASE TYPE

2M28 Size 2 28 terminals

INSULATION WITHSTAND

All Models

In accordance IEC 255-5:

2KV RMS for 1 min. between all circuit groups and between all terminals and frame.

1.2/50 5KV impulse between all circuit groups and between all terminals and frame.

AMBIENT OPERATING TEMPERATURE RANGE

-5 to 55 degrees C.



Figure 8: 2RMLB-S Test Plug front panel

Note 'finger safe' test sockets to accept 4mm shrouded test plugs

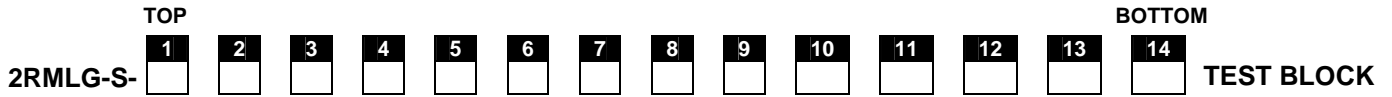
Ordering Information

CONFIGURATION

The required configuration for the 2RMLG-S Test Block must be specified at the time of order.

Specify the cassette type for each test circuit: **1** to **14**

(Refer to the detailed circuit descriptions on page 3)



CODE	DESCRIPTION	TYPICAL FUNCTION
<u>0</u>	<u>Blank circuit</u>	Custom text – 2 x 15 characters maximum
<u>1</u>	<u>Stage 1 isolation cassette</u>	Use for trip circuits
<u>2</u>	<u>Stage 2 isolation cassette</u>	Use for auxiliary supply isolation
<u>3</u>	<u>Stage 3 isolation cassette</u>	Use for other circuits
<u>8</u>	<u>CT Cassette</u>	CT circuit with shorting bar to the adjacent circuit below
<u>9</u>	<u>CT Cassette</u>	The last CT circuit on a CT group

Note: The minimum number of CT type circuits in any group is 2.

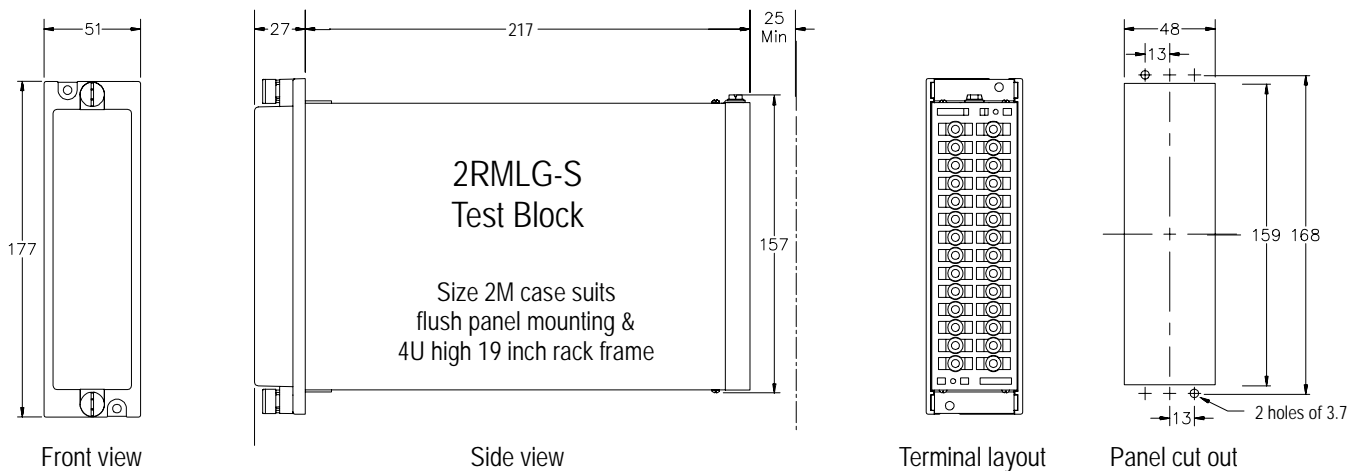


Figure 9: 2RMLG-S Case

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 ISO9001-2008. 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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