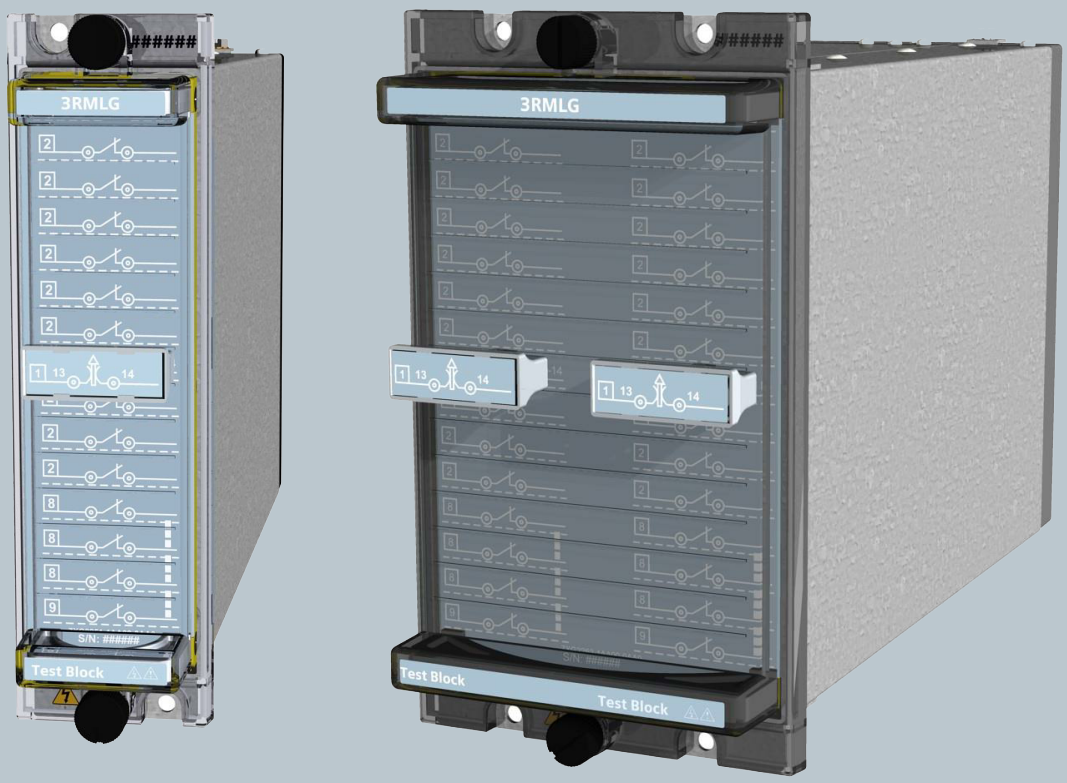


Reyrolle
Protection
Devices

7XG225 - 3RMLG

Test Block System

Answers for infrastructure & cities.

SIEMENS

7XG225 - 3RMLG

Test Block System

7XG225 is a flexible and high performance test block system with a focus on operator safety. Suitable for application on a wide range of protection relay panels.

- Finger safe test sockets
- Automatic CT shorting
- 14 or 28 independent test groups

3RMLB-S Test Plug

- 14 or 28 test circuits
- 'Finger safe' test sockets
- One test plug for all 14 way 3RMLG blocks
- One test plug for all 28 way 3RMLG blocks

Features

- Automatic shorting of CT circuits completed in the test block - No test links or operator intervention required
- Isolation plug provides sequential circuit isolation timing in three (3) stages
- 'Finger safe' test sockets suit standard or shrouded type 4mm banana plugs for direct access to the protection or measurement scheme
- Clear and concise front panel circuit identification
- Test plug fitted with insertion handle and thumb screw retention system to enhance operator safety and system security
- Side label instructions on test plug for changing from normal service to the test condition
- High current / voltage rating

Application

Test blocks 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 3RMLG Test Block system is designed as a general-purpose isolation and test signal injection point. 'Finger safe' sockets are employed to improve operator safety and suit 4mm shrouded type banana plugs.

Equipment under test need only be removed for servicing if problems are detected or for routine maintenance.
Where more than 14 test circuits are required, refer to the 3RMLG models that provide 28 test circuits.

Test Circuit Access

Access to the circuits for testing purposes is achieved in a three stage process.

STAGE ONE	Test Block Cover Extraction
Isolation:	Isolation of Stage 1 circuits
STAGE TWO	Isolation Plug Extraction
CT Shorting:	Automatic shorting of all CT circuits
Isolation:	Isolation of Stage 2
	Isolation of CT circuits
STAGE THREE	Test Plug Insertion
Insertion:	4mm test points available

The above procedure should be completed in the reverse order to place the protection system back in service.
Insertion of the Test Plug type 3RMLB 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 10.

The internal vertical CT shorting bar shorts the CT terminals on the live side only, on removal of the isolation plug. Therefore it is vital that CTs are connected to the live side terminals to avoid the CT wiring being open-circuited.

Inserting the 3RMLB test plug allows changeover in 3 stages as shown in the timing diagram Figure 1.

Description

The fourteen (14) test groups are specified to provide automatic CT shorting and sequential circuit to suit specific protection schemes:

- Stage 1 isolation
- CT shorting
- Stage 2 isolation

The main advantage of this approach is the improved level of safety and security afforded to the CT circuits. This is because the CT shorting function takes place within the 3RMLG 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 avoided in the 3RMLG and allows a single Test Plug to be employed for all 14 way 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 via a circuit-shorting link.

Where more than 14 test circuits are required such as in EHV transmission protection panels, the 3RMLG Test Block with 28 test circuits may be employed.

Safety Overview

While providing maximum convenience and efficiency to system testing, test block systems must also provide a high degree of safety. This section describes the key design features employed in the 3RMLG test block system to enhance operator safety.

Finger Safe Test Sockets

BLACK - even numbered equipment side sockets

YELLOW - odd numbered live side sockets

The 3RMLG Test Plug employs 'finger safe' test sockets. This allows the use of shrouded banana plugs to greatly reduce the possibility of an operator coming into contact with any part of the test circuit.

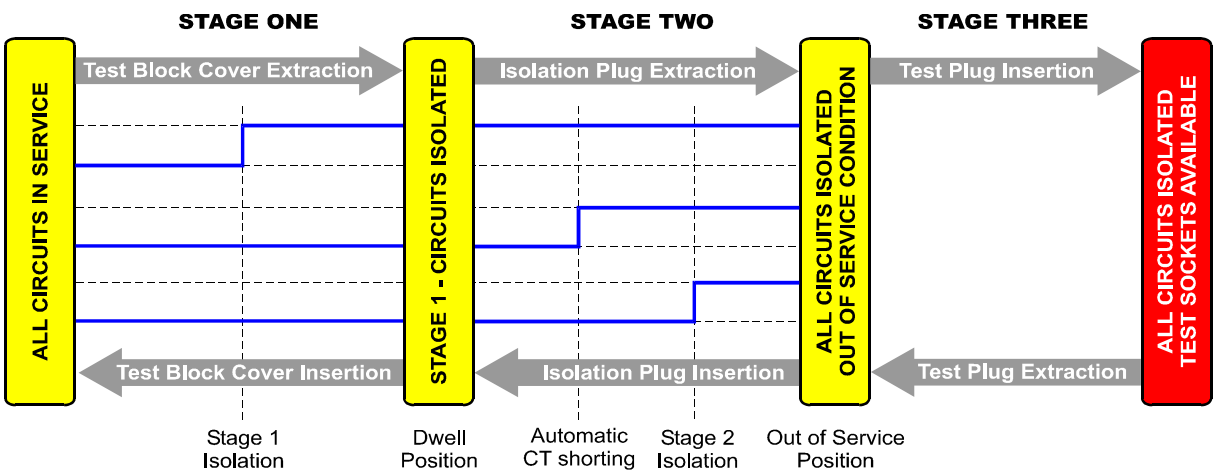


Fig. 1 Timing diagram

Test Plug Handles

The 3RMLG employs handles at the top and bottom of the plug assembly to ensure the operator's hand is well separated from the test sockets during insertion. Retention thumb screws are provided at the top and bottom of the test plug to avoid inadvertent removal of the plug during testing.

Fig. 2 VT Connections

Fig. 3 28 Test circuit versions

Test Lead Insertion

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

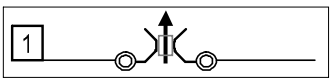
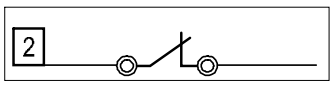
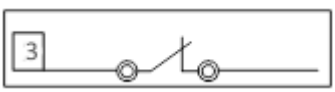
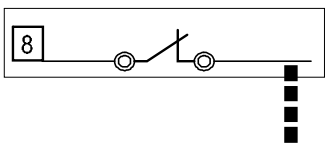
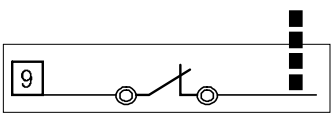
Flexible banana test leads with shrouded plugs are recommended for operator safety. 2.5mm^2 multi-strand wire with PVC insulation is recommended for adequate current rating and flexibility.

Test Plug Insertion

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

Insertion of the 3RMLB-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.

Automatic CT Shorting

Type	Description	Function	Timing Stage	Front Panel Labeling
1	Stage 1 isolation cassette	This circuit type is isolated at Stage 1 as the front cover is removed from the Test Block. Use to provide: • Isolation of auxiliary supply Isolation of trip circuits	1	
2	Stage 2 isolation cassette (General Purpose)	This circuit type is isolated later during Stage 2 as the Isolation Plug is removed from the Test Block. Use to provide: • Isolation of trip circuits • Remote 'Out of Service' indication • Isolation of inter-tripping circuits • Isolation of watchdog alarms • Isolation of VT circuits • Isolation of I/O circuits	2b	
3	Stage 2 isolation cassette (Early Break)	This circuit type is isolated early during Stage 2 as the Isolation Plug is removed from the Test Block. Use to provide: • Isolation of trip circuits • Isolation of inter-tripping circuits • Isolation of watchdog alarms	2a	
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 CT circuit below. After shorting, this circuit is isolated at Stage 2.	Refer to 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 CT circuit above. After shorting, this circuit is isolated at Stage 2.	Refer to Figure 2	

Recommended Wiring Layout

It is recommended that the Test Block is always wired with connections to the protective relay or scheme made to the EVEN numbered equipment side terminals. Connections to other equipment, e.g. CT's, VT's and DC supplies, should be made to the ODD numbered live side terminals on the Test Block. This ensures that when the Test Plug is inserted, the black sockets are connected to the isolated relay circuits and the yellow sockets are connected to the potentially live supplies. This is vital as the automatic CT shorting is only applied to the live side.

- This image shows the 3RMLG with the front cover removed to isolate the Stage 1 circuits.
- The Isolation Plug is in place so the CTs and Stage 2 circuits are still connected.
- The front label identifies each cassette type.

Figure 4: Front Panel Layout

3RMLG-01 Test Block for a 3 Ph O/C and E/F application.

CT Circuits

CT circuits must only be wired to cassette type 8 or 9.

CT circuits must not be wired to cassette types 1, 2 or 3 as this will result in open circuit CT's as the isolation plug is removed.

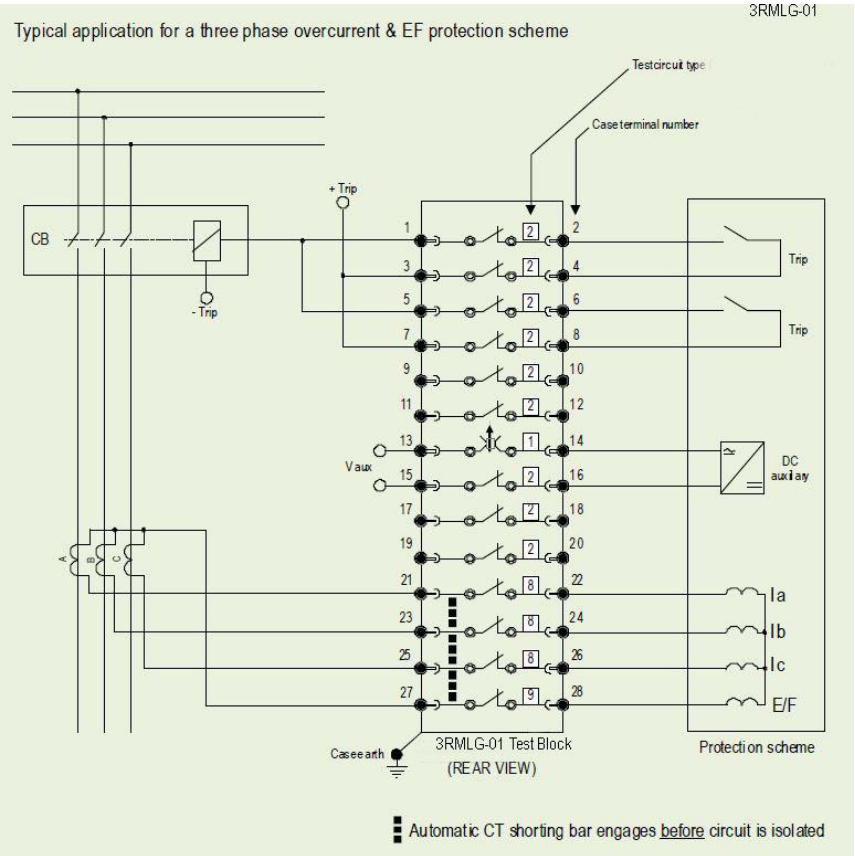


Figure 5: Application wiring example for a three phase overcurrent and EF protection scheme with auto CT shorting. Order Code – 3RMLG01

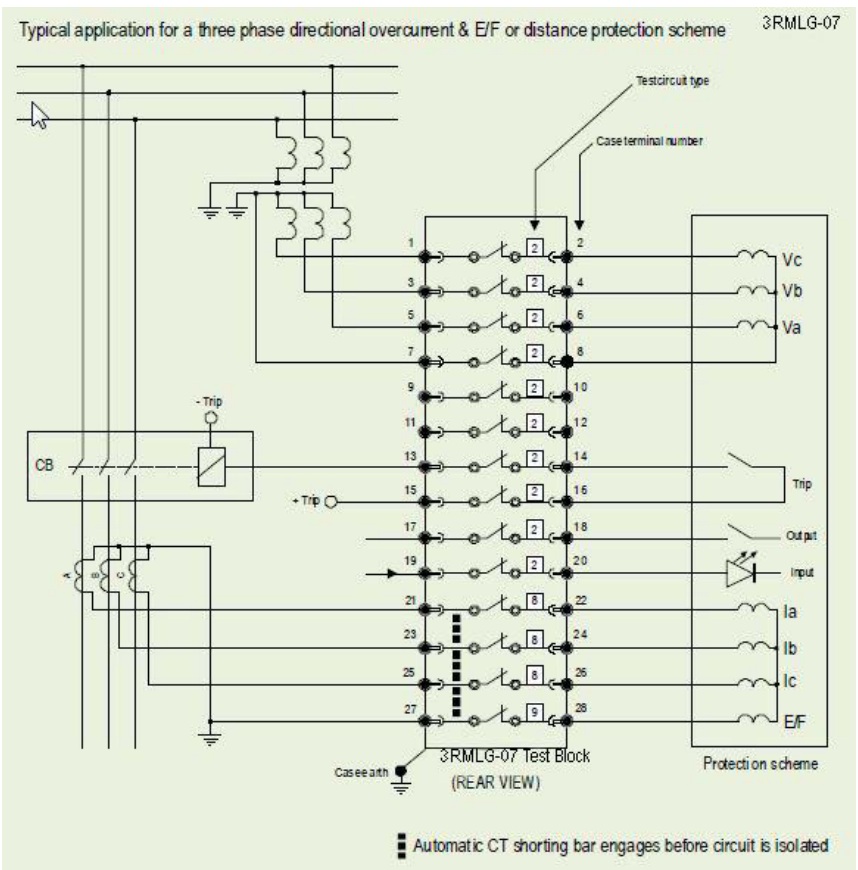


Figure 6: Application wiring example for a three phase directional O/C and E/F or distance protection scheme with auto CT shorting. Order Code – 3RMLG07

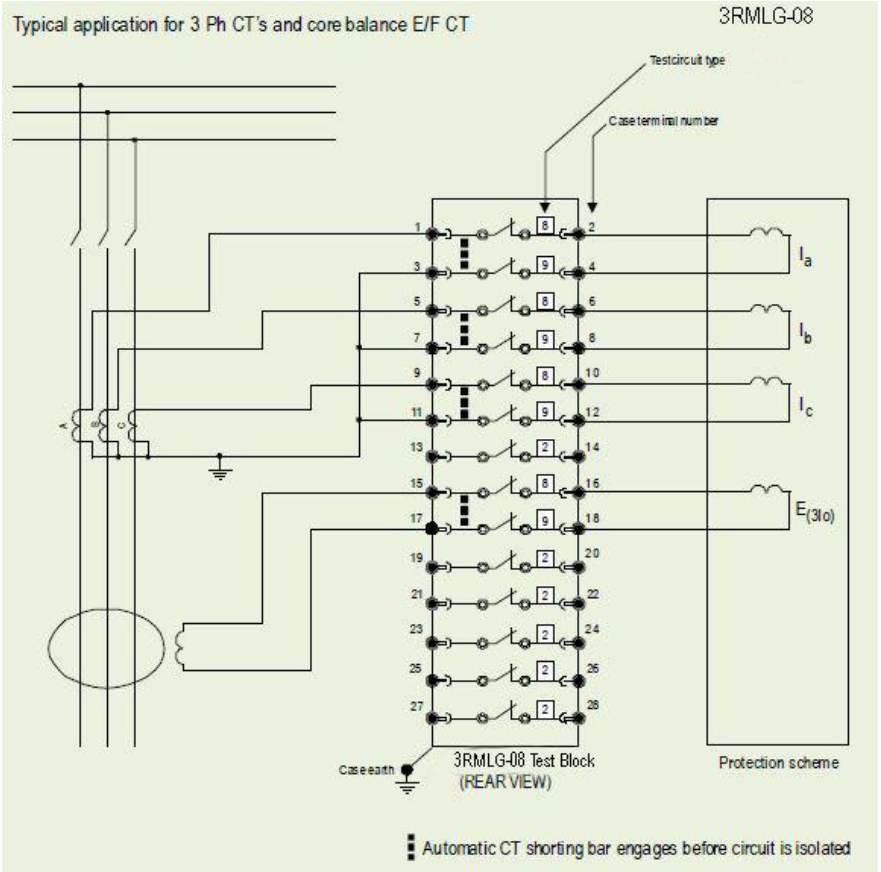


Figure 7: Application wiring example for three phase CT's and core balance E/F CT with auto CT shorting.
Order Code – 3RMLG08

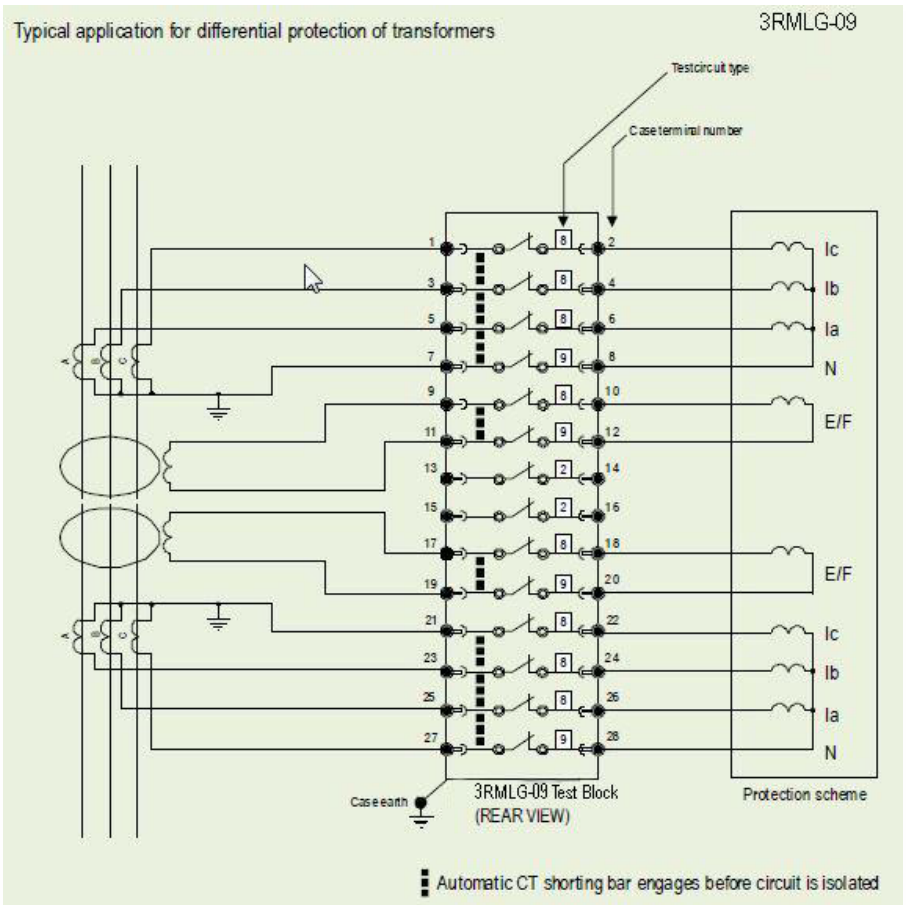
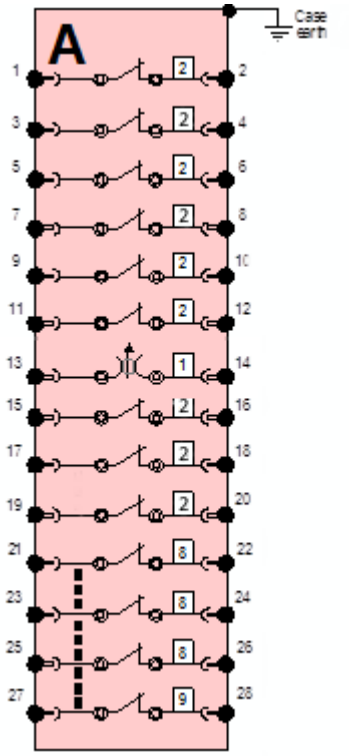


Figure 8: Application wiring example for differential protection of transformers with auto CT shorting
Order Code – 3RMLG09

14 WAY TEST BLOCKS

3RMLG – 01



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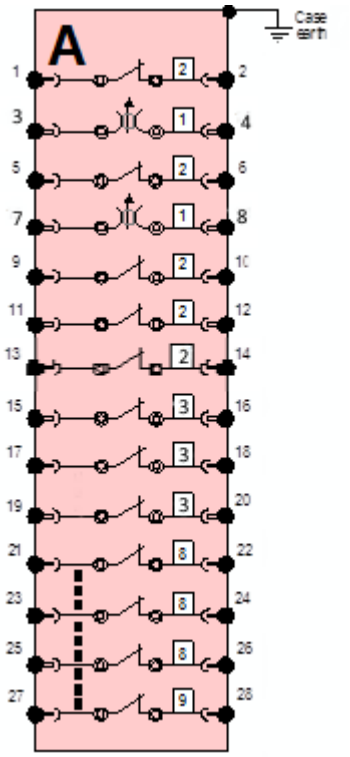

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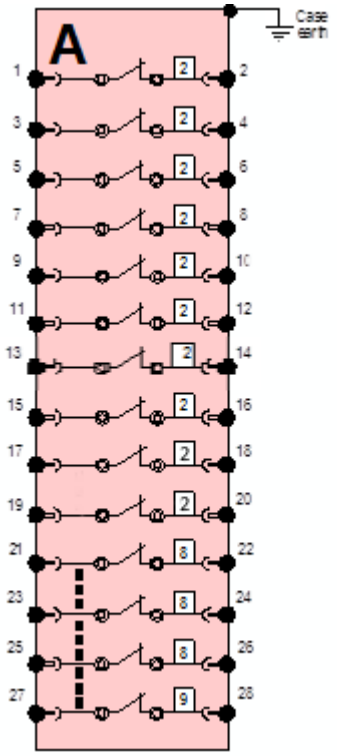

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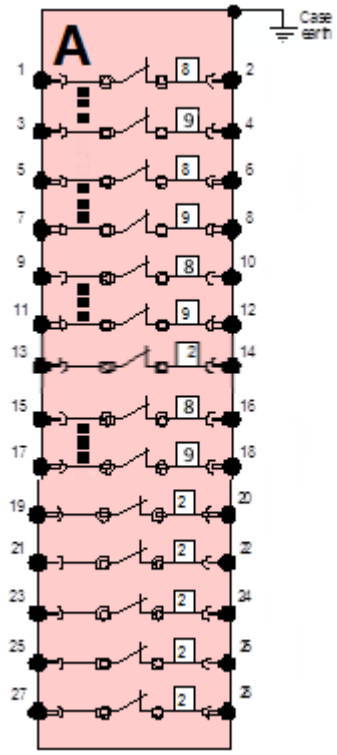

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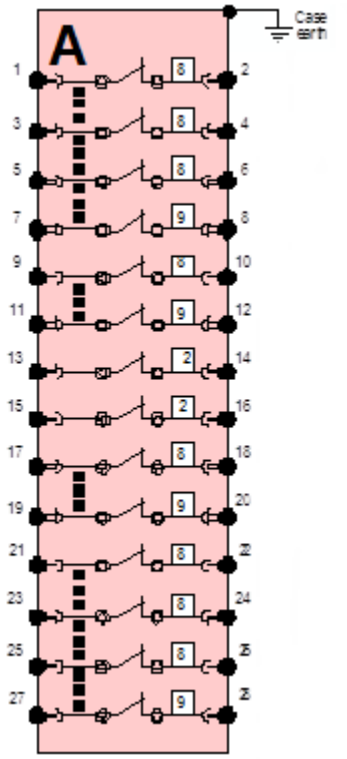

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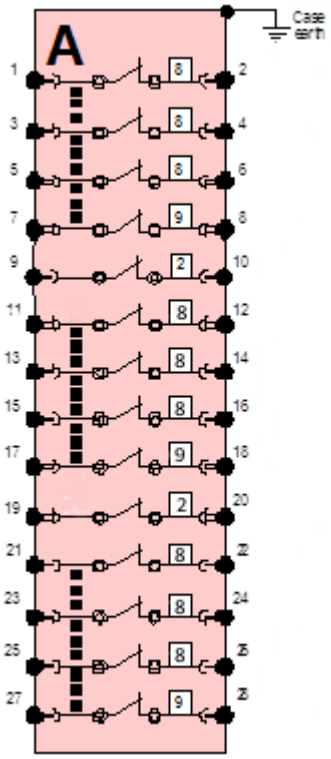

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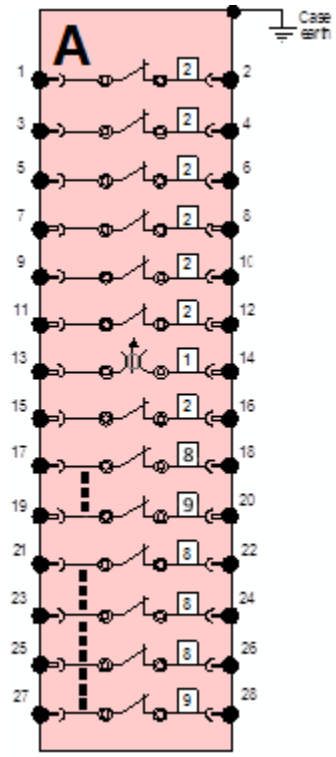

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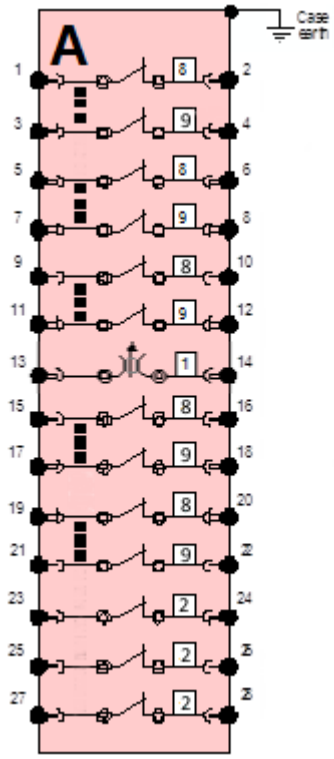

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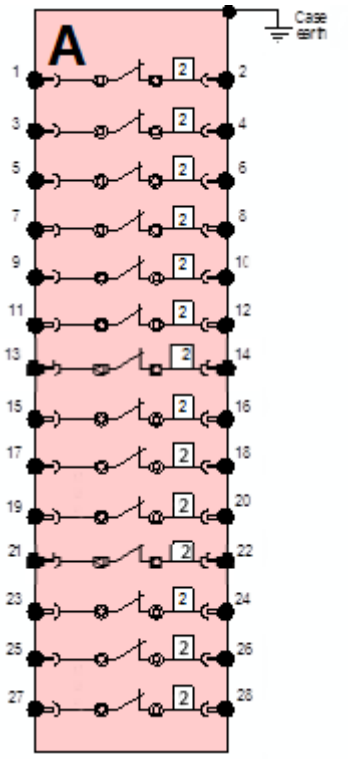
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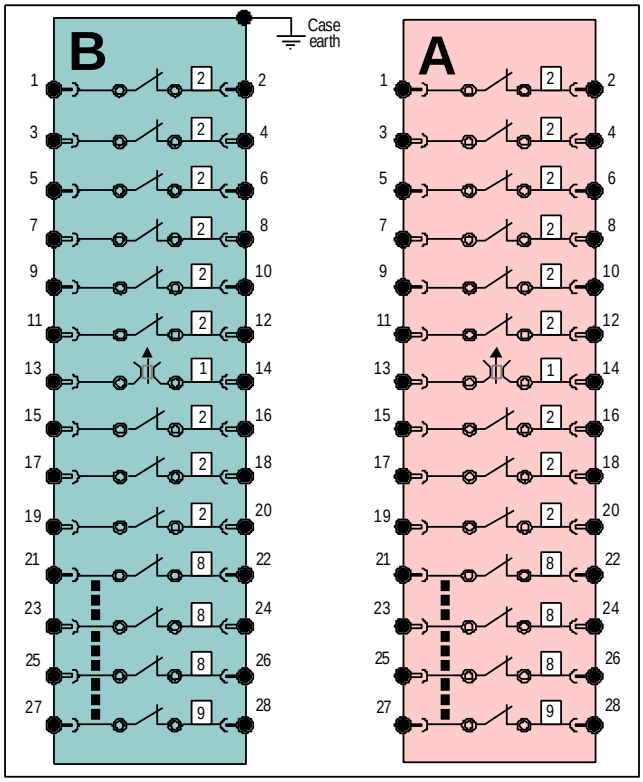
28 WAY TEST BLOCKS

3RMLG – 11



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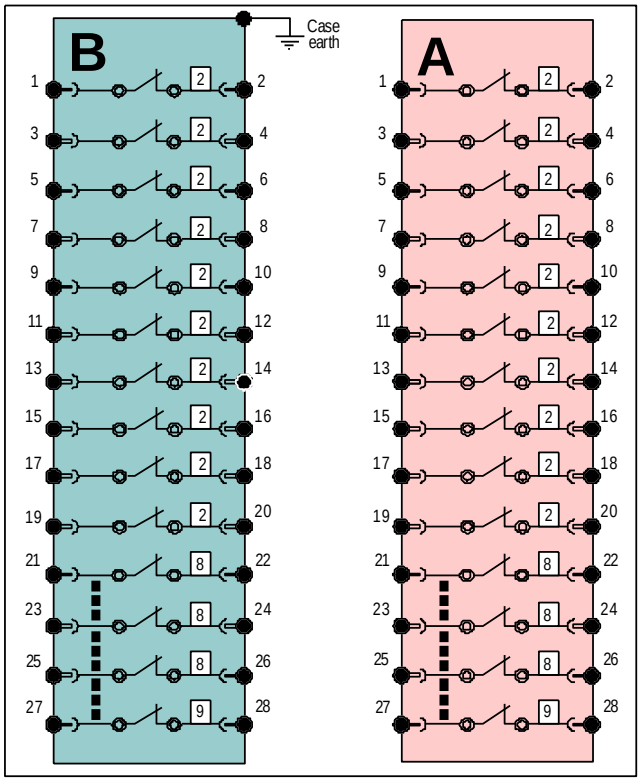

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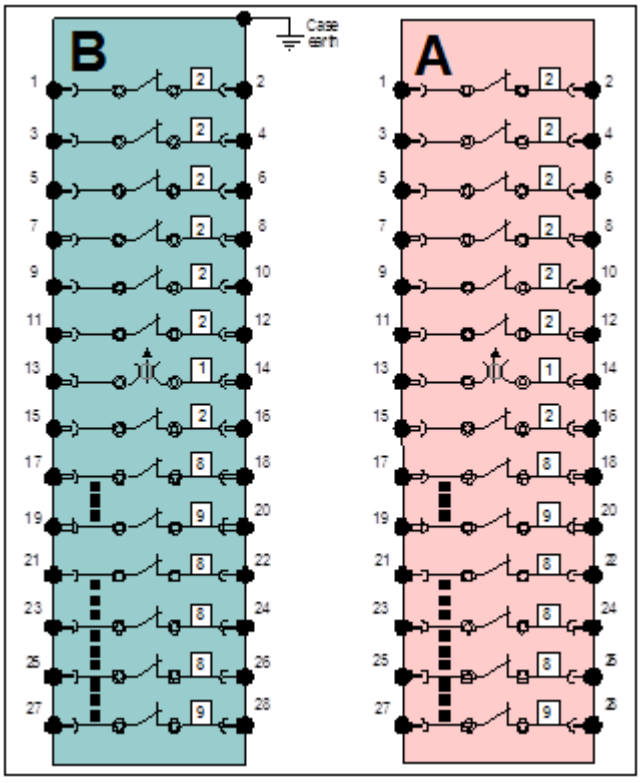

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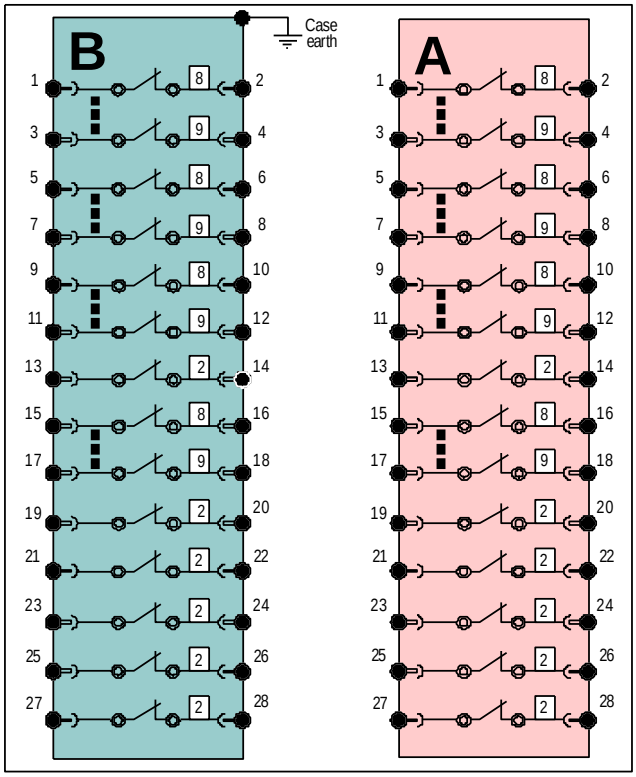

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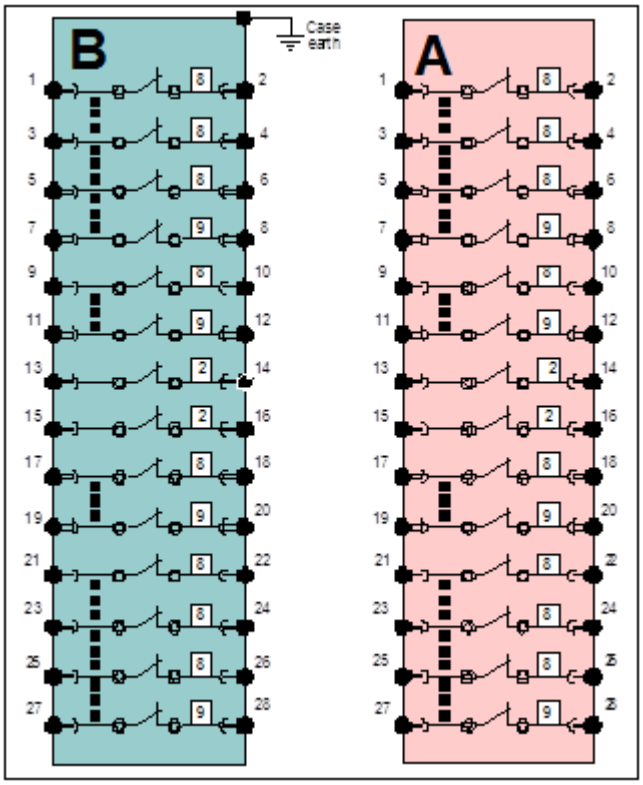

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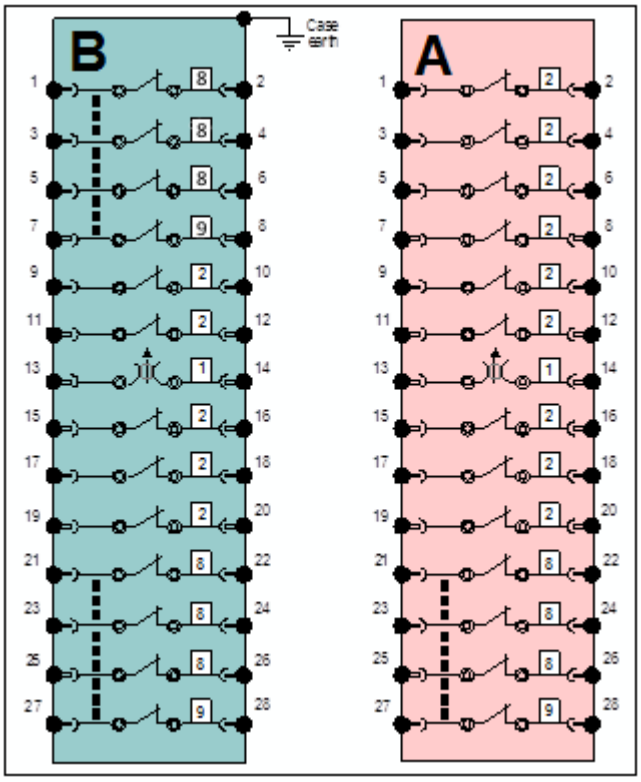

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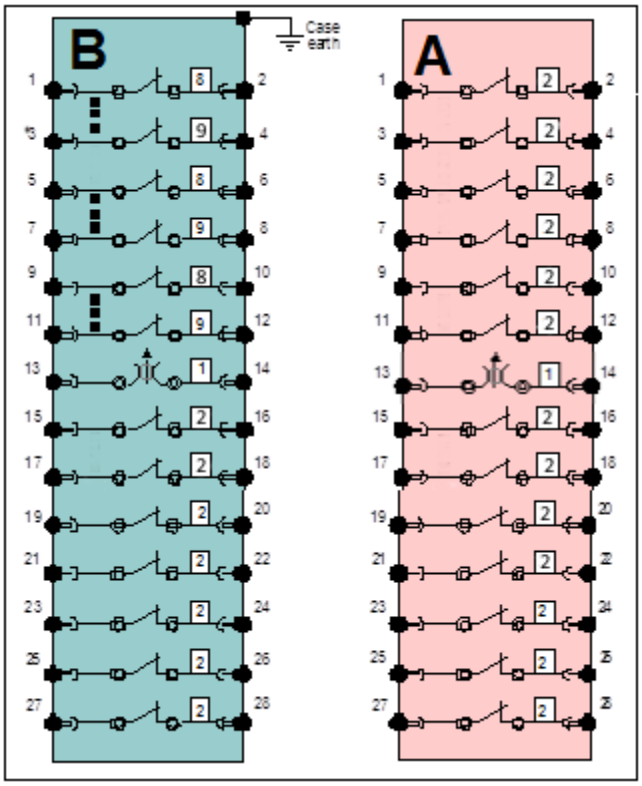

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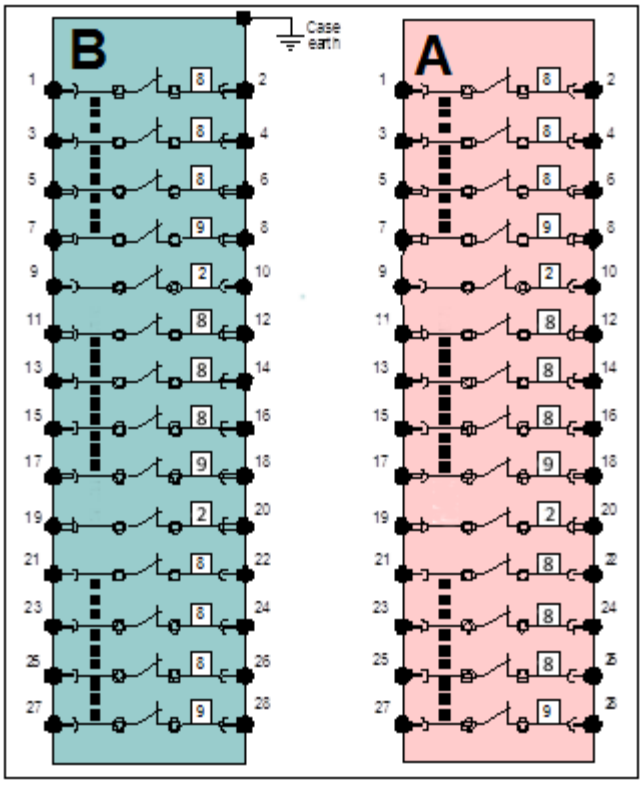

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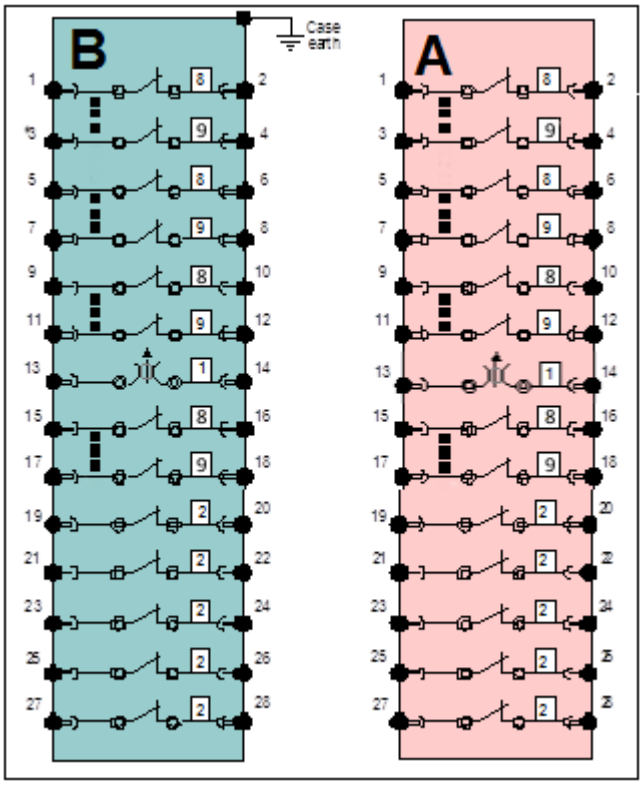

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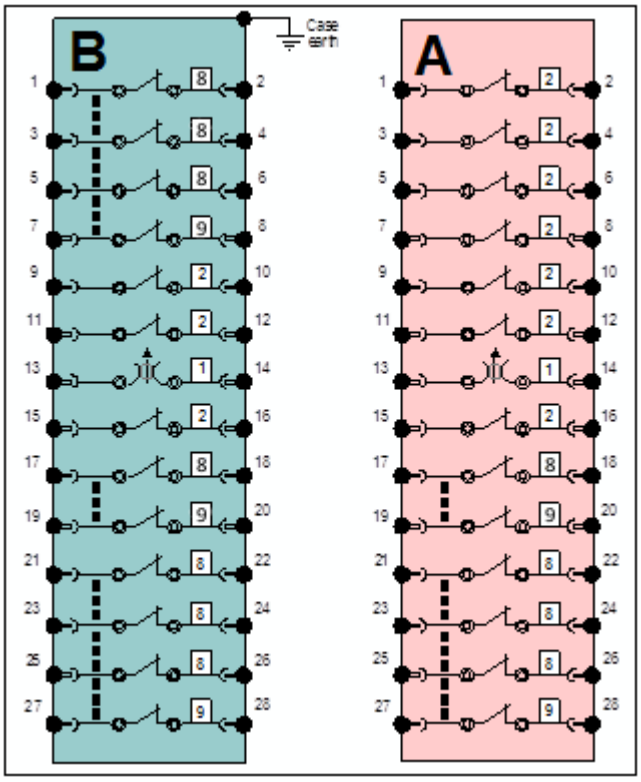

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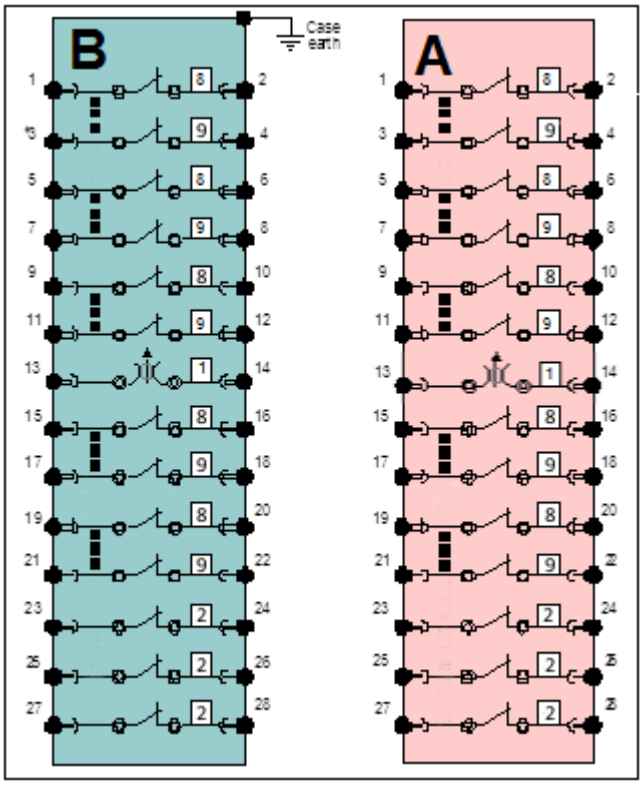


Shrouded Test Leads

Two types of shrouded 'finger safe' test leads are available:

Description
Two-ended test lead short - 75mm
Two-ended test lead long - 180mm

Test Lead Plugs

Single Plug

The single plug is the most compact and may be plugged into any test socket.

Dual Plug

The dual or 'piggy back' plug is larger and should be plugged into the test sockets on the outside edge of the 3RMLG.

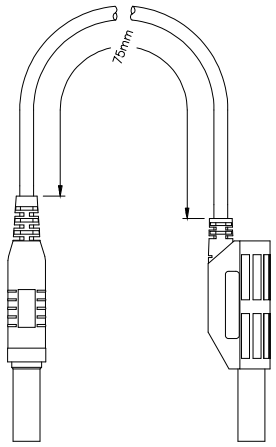


Figure 9: Two-ended test lead - short
75mm wire length version depicted

3RMLG Test Block

14/28 Equipment side terminals (Even terminal numbers).

14/28 Live side terminals (Odd terminal numbers).

14/28 Live sides to equipment side shorting links.

This arrangement provides for up to 14/28 independent circuits to be connected.

3RMLB Multi-Finger Test Plug

28/56 test sockets suitable for 4mm shrouded or standard banana plugs.

Securing screws are built-in to retain the Test Plug during testing operations.

Ratings

Current: CT circuits and terminals	20A continuous 400A 1s
Current: Other circuits	10A continuous 200A 1s
Voltage: All circuits	600V AC continuous 320V DC continuous

Case Type

E2	Size 2 28 terminals
E4	Size 2 56 terminals
Mounting	Flush 4U high rack mount

Insulation – 3RMLG – In Service

Standard	IEC 60255-5
Type	Level
Between any contact pair & either adjacent contact pair.	2.0kV ac rms for 1 minute
Between all case terminals & the case earth	5.0kV ac rms for 1 minute
Between any alternate contact pair, provided that the intermediate pair is not used.	5.0kV ac rms for 1 minute

Insulation – 3RMLG with 3RMLB

Standard	IEC 60255-5
Type	Level
Between incoming & out-going contacts.	2.0kV ac rms for 1minute
Between all case terminals & the case earth	5.0kV ac rms for 1 minute

Temperature

Standard	IEC 60068-2-1/2
Operating Range	-10 to +55 degrees Celsius
Storage Range	-25 to +70 degrees Celsius

Humidity

Standard:	IEC 680068-2-78
Operating Range	40 degrees Celsius and 93% RH non condensing

IP Rating

Standard:	IEC 60529
Installed	IP5x

Vibration - Sinusoidal

Standard:	IEC 60255-21-1 Class I	
Vibration Response	0.5gn	≤5%
Vibration Endurance	1.0gn	≤5%

Shock and Bump

Standard:	IEC 60255-21-2 Class I	
Shock Response	5gn, 11ms	≤5%
Shock Withstand	15gn, 11ms	≤5%
Bump Test	10gn, 16ms	≤5%

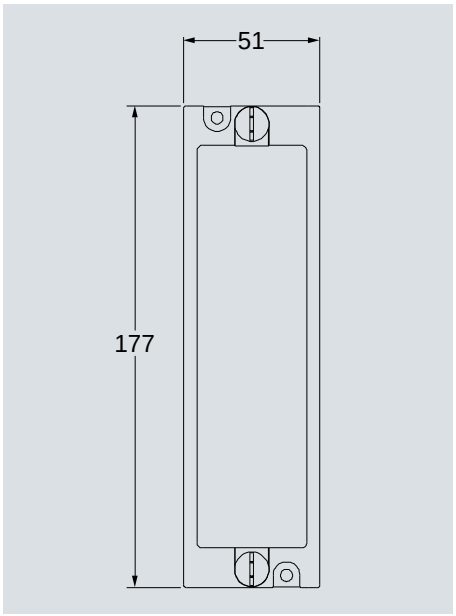
Seismic

Standard:	IEC 60255-21-3 Class I	
Seismic Response	1gn	≤5%

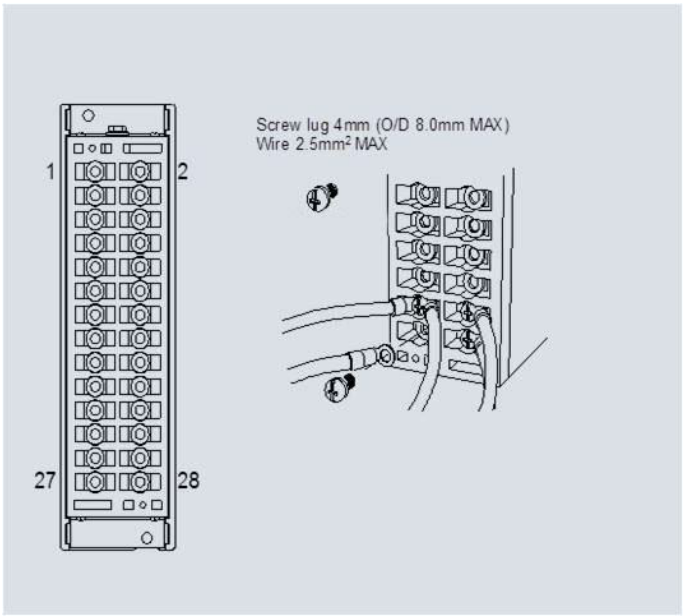
Mechanical Classification

Durability	$>10^5$ operations at no load

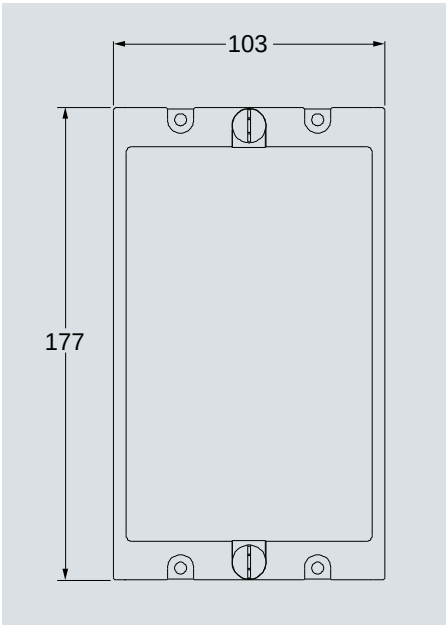
Front View



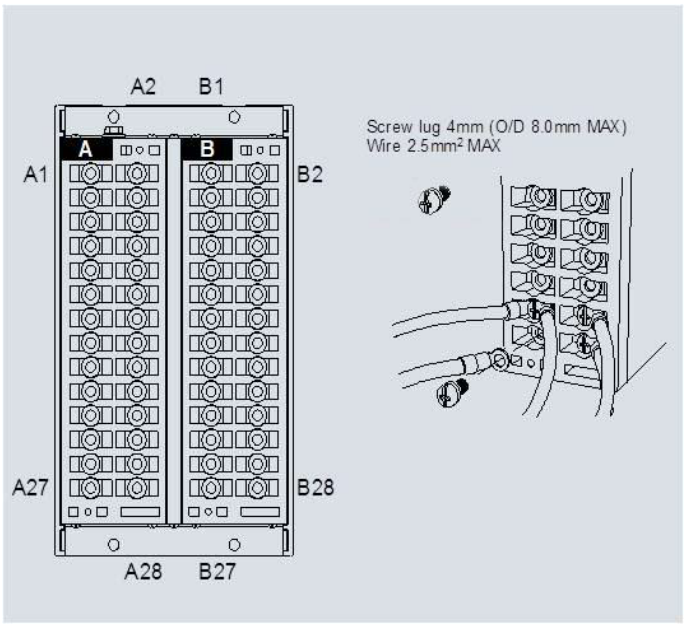
Rear View



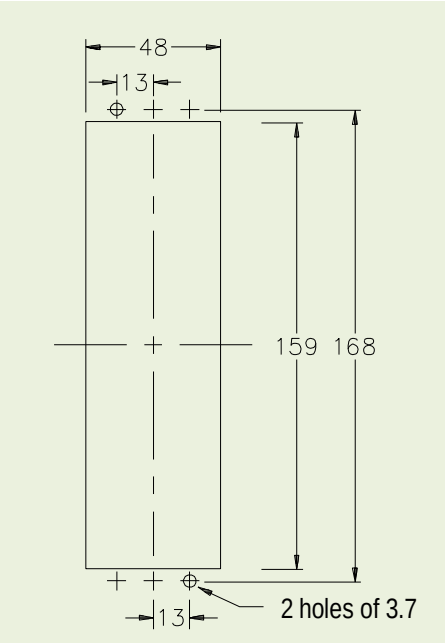
Front View

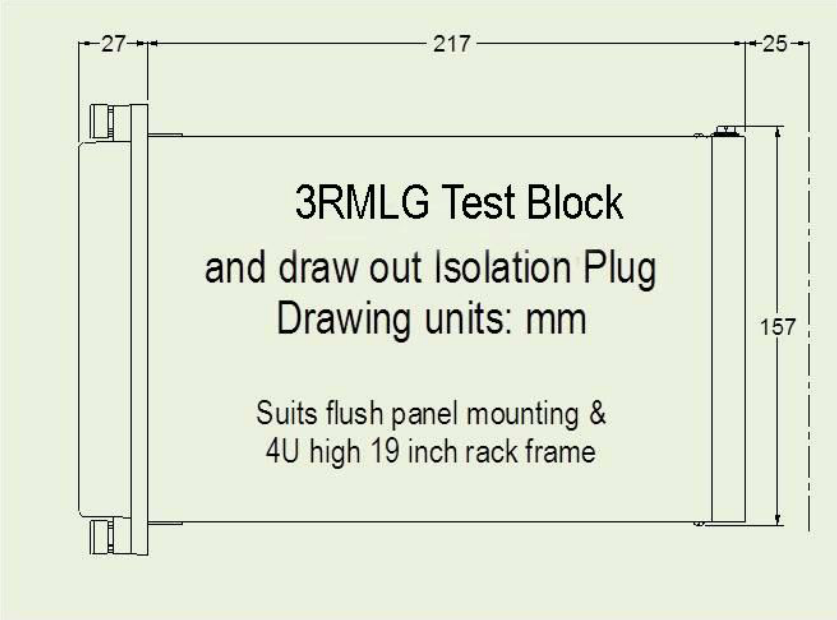


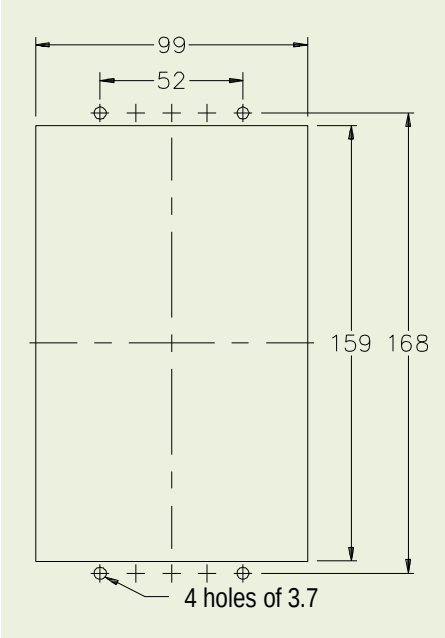
Rear View

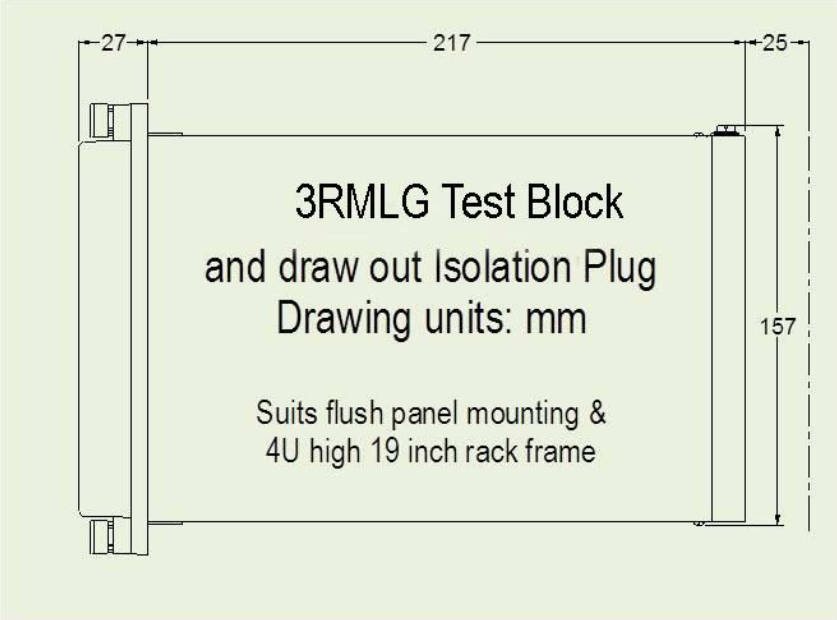


Panel Cut-Out 14 Way









Ordering Information

Product description	Variants	Order No.
Test Modules		7 X G 2 2 5 1 - □ □ □ 0 0 - 0 A A 0
14 way Test Blocks		
	Category	
	Ancillary equipment	2
	Modular case test components	2
	Test Modules 3RMLG	5
	14 way test block	1
	Standard Arrangements	
	3RMLG01. For 3 CTs.	1 A A
	3RMLG02. For 3 CTs.	2 A A
	3RMLG07. For 3 CTs.	3 A A
	3RMLG08. For 4 CTs.	4 A A
	3RMLG09. For 8 CTs.	5 A A
	Custom Arrangements	6
	3RMLG20	6 A A
	3RMLG21	6 A B
	3RMLG22	6 A C
	3RMLG23	6 A D

Test Modules		7 X G 2 2 5 2 - □ □ □ 0 0 - 0 A A 0
28 way Test Blocks		
	Category	
	Ancillary equipment	2
	Modular case test components	2
	Test Modules 3RMLG	5
	28 way test block	2
	Standard Arrangements	
	3RMLG11. For 6 CTs.	1 A A
	3RMLG12. For 8 CTs.	2 A A
	3RMLG17. For 6CTs.	3 A A
	3RMLG18. For 8CTs.	4 A A
	3RMLG19. For 16CTs.	5 A A
	Custom Arrangements	6
	3RMLG520	6 A A
	3RMLG521	6 A B
	3RMLG522	6 A C
	3RMLG523	6 A D
	3RMLG524	6 A E
	3RMLG525	6 A F

Test plugs

7 X G 2 2 6 □ - 0 A A 0 0 - 0 A A 0

14 & 28 Way
Test Plugs

Category
Ancillary equipment 2

Ancillary equipment
Modular case test components 2

Test component type
Test modules (3RMLB-S) 6

14 way (3RMLB – S14) 1
28 way (3RMLB – S28) 2

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July 2019

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