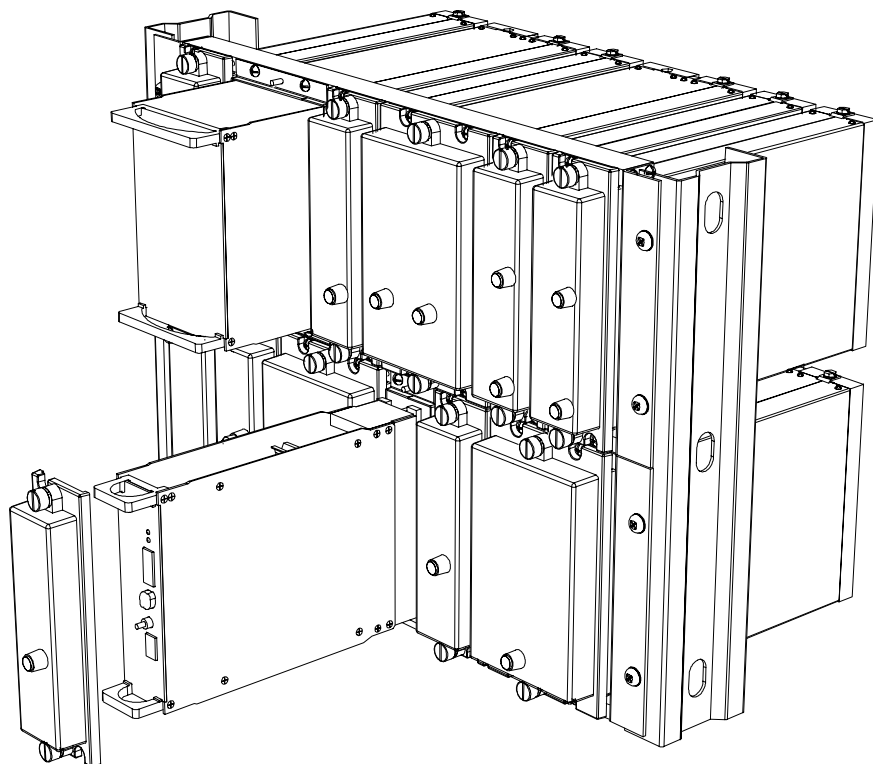


Features

- Suitable for 19 inch, 4U high rack mounting
- Suitable for flush panel mounting
- M4 screw terminations
- Stud termination possible
- Range of ring lugs available
- Simple screw (M4) mounting from front of panel (Supplied)
- Semi-projection mounting kits available
- 4U, 6U, 8U high 19" rack mounting frames available
- 4U, 6U, 8U high 19" flush mounting frames available
- Size 2 with 28 terminals
- Size 4 with 28 or 56 terminals
- Size 2, 4 & 8 blanking plates
- CT shorting switches available
- Sealable front cover
- IP5X category 2 dust protected and IP4X for solid ingress to IEC60529.
- Rugged metal construction with black powder coat matt finish



Application

The M Series has been specifically designed to meet the demanding & varied requirements for protection relay applications in power utility sub-station environments. The standard 4U high 19-inch rack mounting modular configuration simplifies panel design & installation.

Mounting points & overall panel dimensions meet international standards such that the cases may be interchanged with other similar types available on the market.

Optional CT shorting switches, blanking plates & 19" rack mount frames are also available. Blanking plates may be specially fabricated with cut outs & labeling to suit control switches, fuses, pilot lamps etc.

The M Series case range supercedes the previous D & E Series models.

Description

Made in Australia

The M Series range of protection relay enclosures has been designed with flexibility in mind. Only three versions are required to meet a wide range of applications. Both the size 2 & size 4 case are suitable for either flush panel mounting or 19 inch 4U high rack mounting. The design utilizes a draw out chassis for ease of installation & maintenance. M4 screw terminals are provided with optional CT shorting switches.

The M Series cases are of metal construction for durability & screening from radiated electrical noise. Select from three versions as follows:

2M28-S	Size 2	28 terminals	1/8 width 4U high
4M28-S	Size 4	28 terminals	1/4 width 4U high
4M56-S	Size 4	56 terminals	1/4 width 4U high

Cases of different sizes may be mixed on the same rack up to the full width (19 inch) maximum. e.g. 4 x size 2 + 2 x size 4 would fill one 4U high 19 inch rack row.

Alternatively the cases may be flush or projection mounted in either orientation (Vertical or horizontal) as necessitated by the panel design.

Reduced Case Length Versions

From August 2005 the M Series case range was reduced in length by 18mm to 217mm. This is indicated in the product case drawings by the -S code (For example 2M28-S indicates a "short" case version). Refer to the specific product Technical Bulletins to determine the case length.

When purchasing replacement modules it is important to check the case length required. This can be done by quoting the old module serial number to the factory.

290-406-151	Relay mounting screw kit (4 screws)	Supplied
290-407-153	M4 terminal screw kit with captive lock washers (14 pieces per kit)	Supplied
205-103-003	Earth screw (1 piece)	Supplied

2M28 Series Case Details

- Size 2 draw out case with 28 screw terminals
- Suitable for flush panel & rack mounting

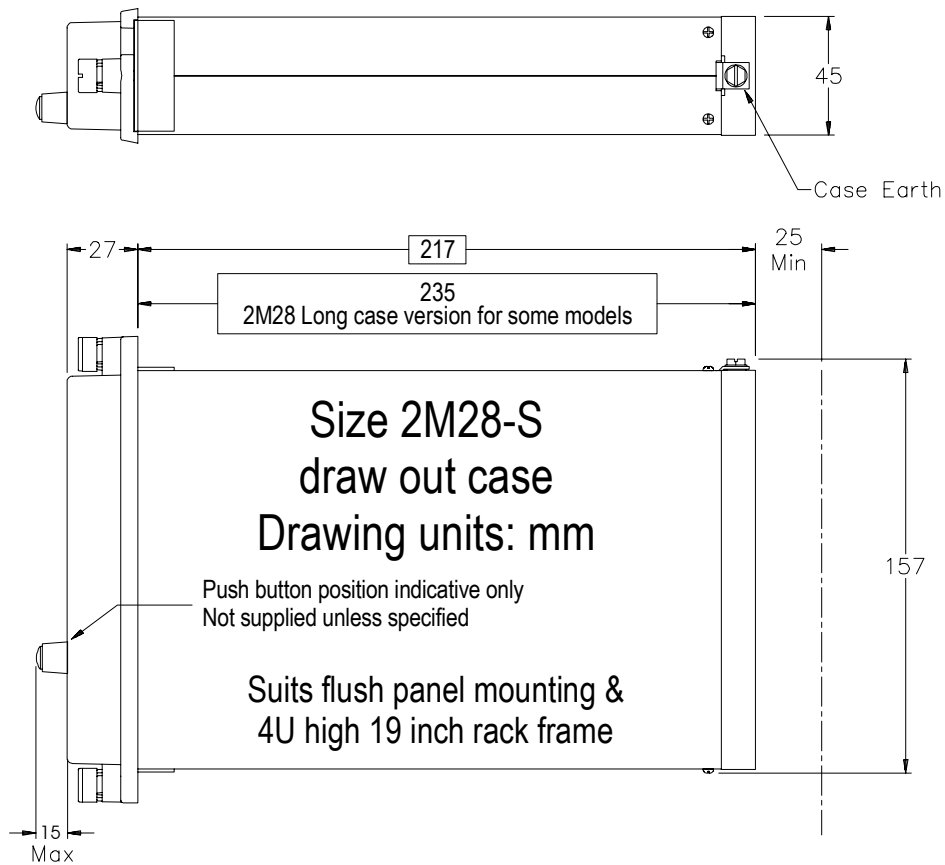
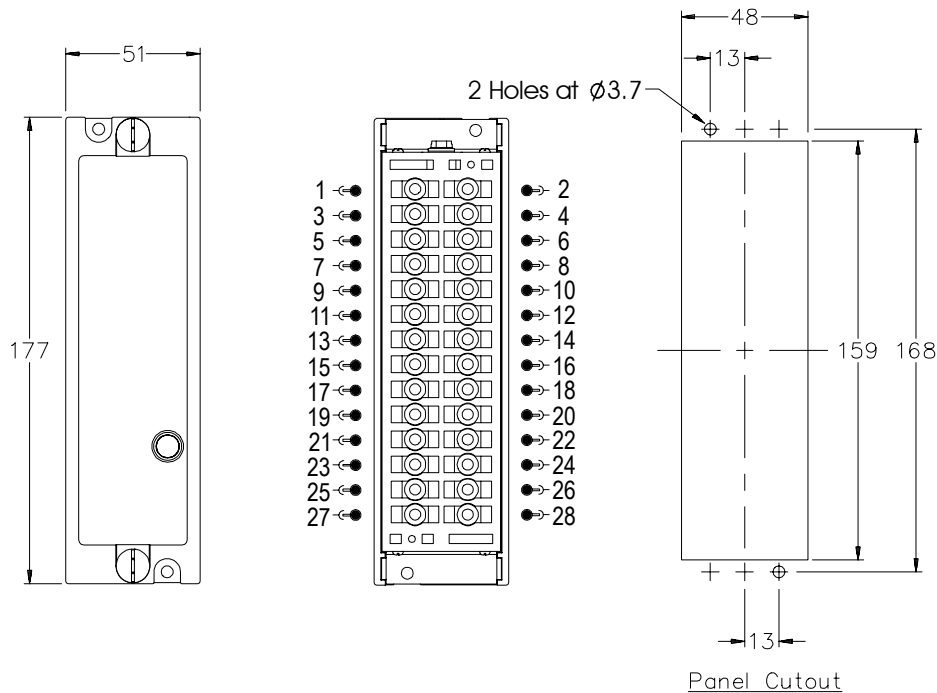


Figure 1: 2M28 Case dimensions

- | | | |
|--------------------|---|----------|
| 290-406-151 | Relay mounting screw kit (4 screws) | Supplied |
| 290-407-154 | M4 terminal screw kit with captive lock washers (14 pieces per kit) | Supplied |
| 205-103-003 | Earth screw (1 piece) | Supplied |

4M28 Series Case Details

- Size 4 draw out case with 28 screw terminals
- Suitable for flush panel & rack mounting

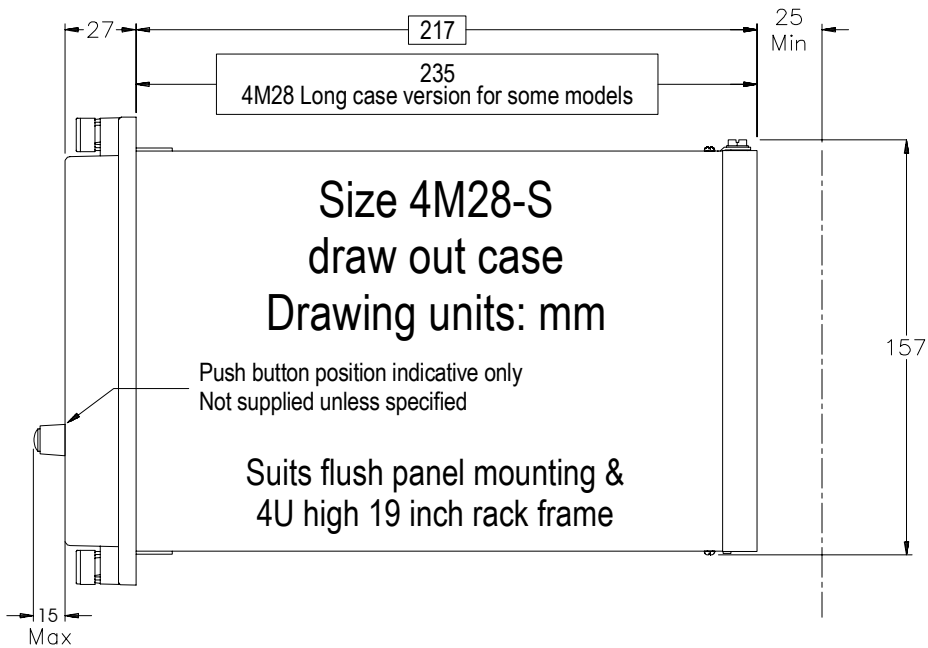
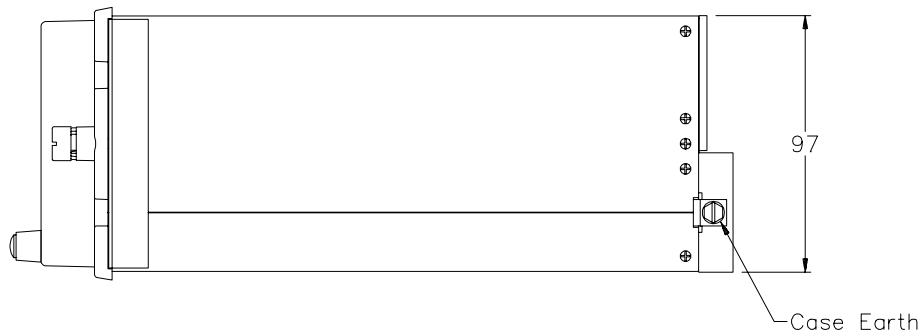
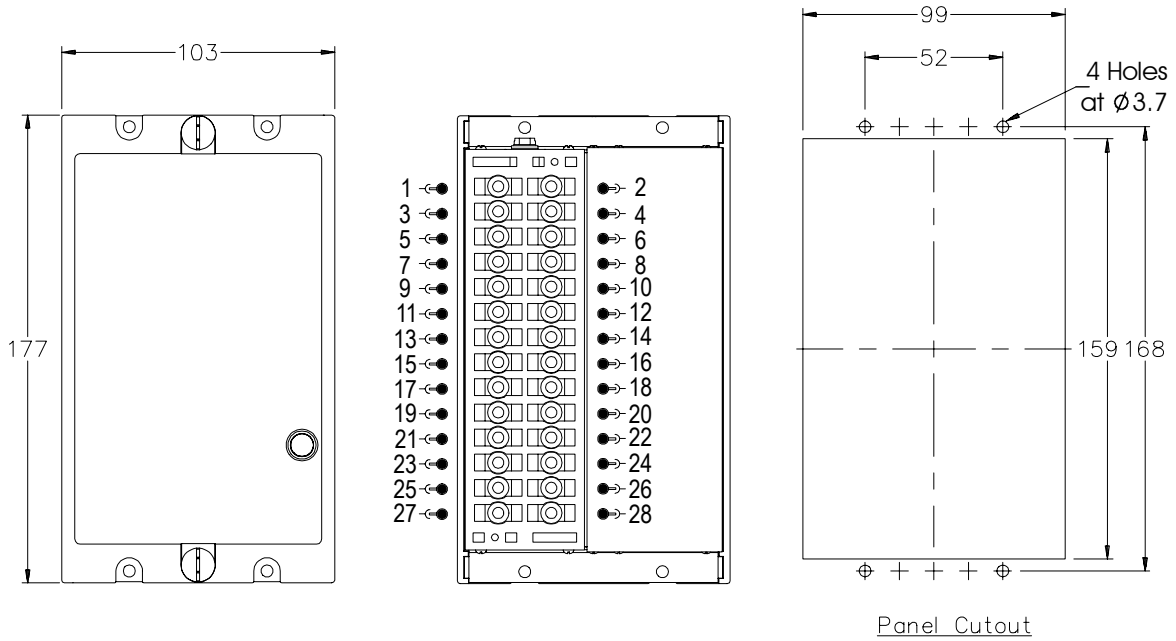


Figure 2: 4M28 Case dimensions

- | | | |
|--------------------|---|----------|
| 290-406-151 | Relay mounting screw kit (4 screws) | Supplied |
| 290-407-155 | M4 terminal screw kit with captive lock washers (14 pieces per kit) | Supplied |
| 205-103-003 | Earth screw (1 piece) | Supplied |

4M56 Series Case Details

- Size 4 draw out case with 56 screw terminals
- Suitable for flush panel & rack mounting

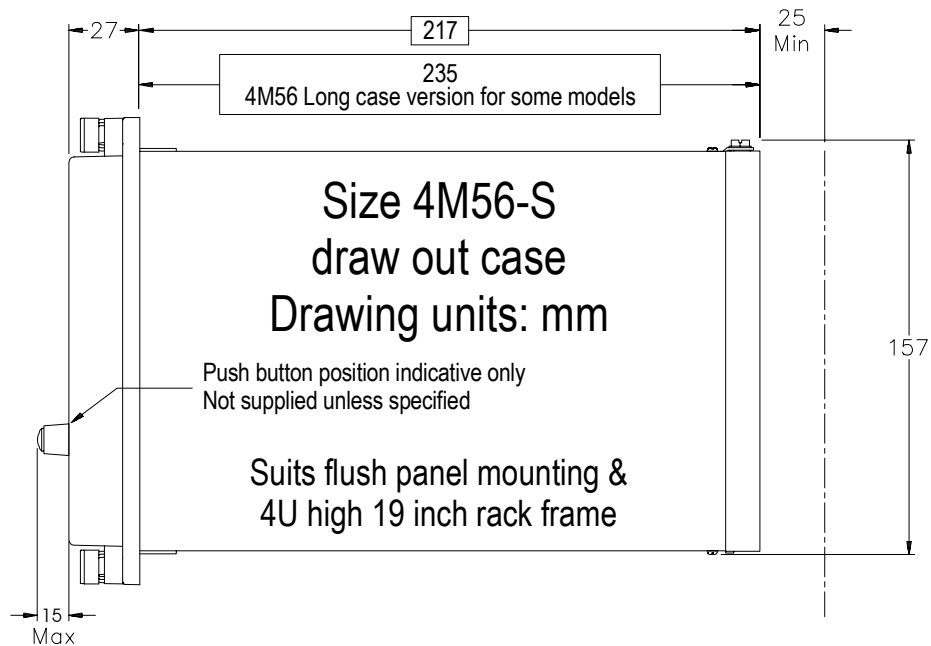
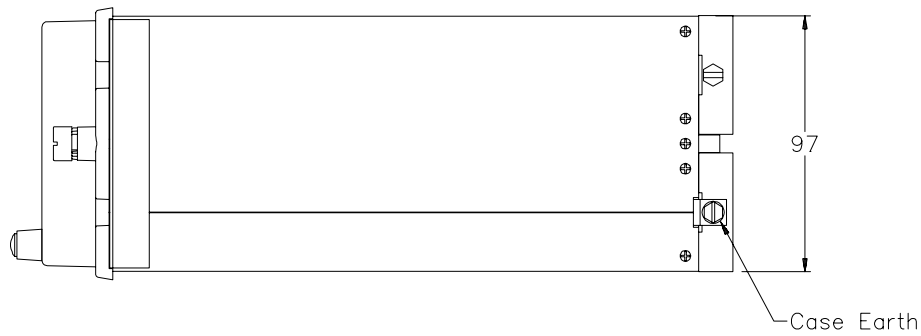
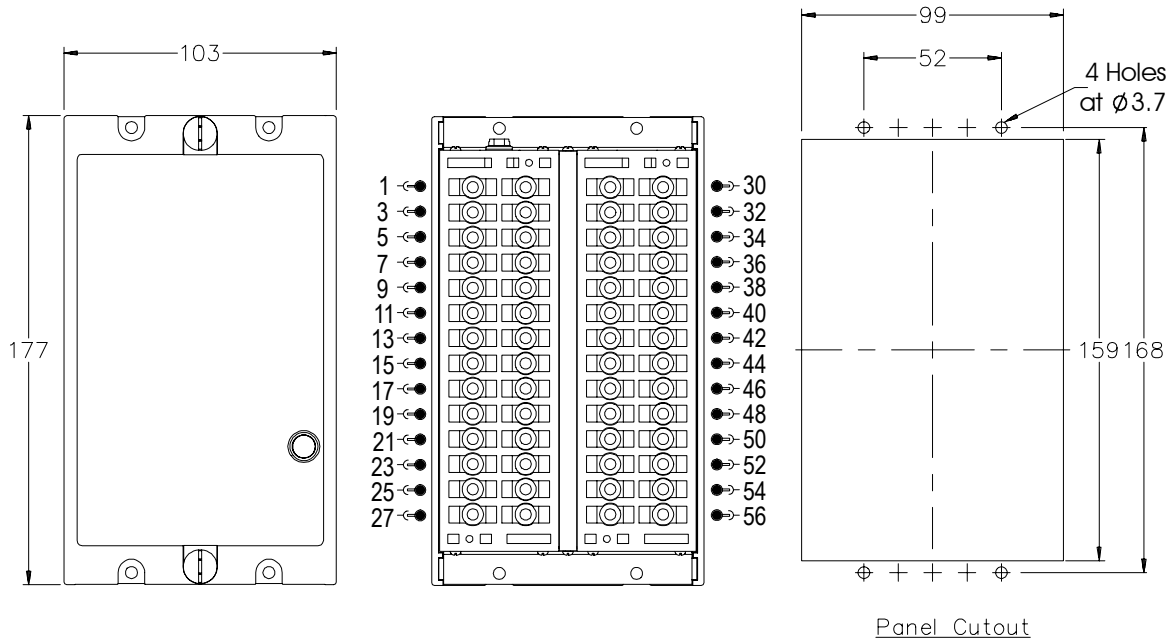


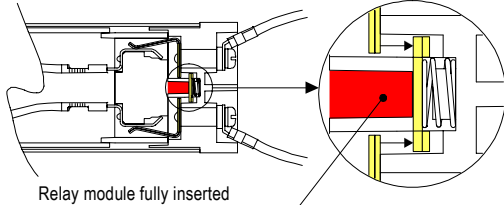
Figure 3: 4M56 Case dimensions

AUTOMATIC CT SHORTING

To avoid open circuiting external CT's when a relay module is draw out from the case, CT shorting switches are fitted. These have the effect of shorting the adjacent odd & even terminal pair before the connection to the relay module is broken during the draw out operation.

NORMAL SERVICE CONDITION

CT circuits routed through relay module CT(s)



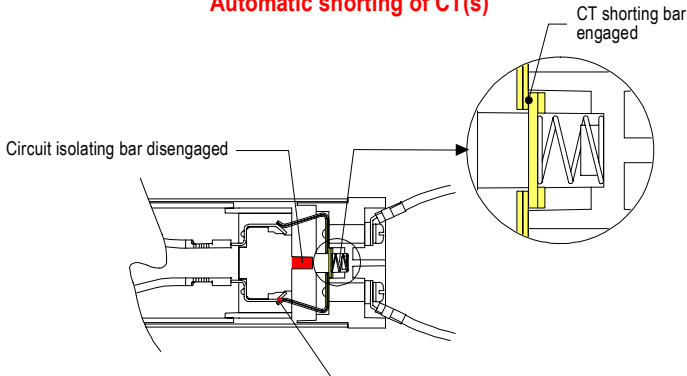
Relay module fully inserted

Circuit isolating bar engaged

Equipment side CT circuits routed through relay module CT

REMOVAL OF RELAY MODULE

Automatic shorting of CT(s)



CT shorting bar engaged

Circuit isolating bar disengaged

Relay module CT terminals remain in touch until automatic CT shorting engaged (Make before break circuit function)

Heavy duty CT terminals & shorting switches may be specified between any adjacent odd & even terminal pair.

Figure 4: CT Shorting switch function

Technical Data

CURRENT RATINGS

CT terminals:	20A	continuous
	400A	1s
Other terminals:	10A	continuous
	200A	1s

VOLTAGE RATINGS

All circuits & terminals:	600V AC continuous
	350V DC continuous

AUXILIARY INSULATION WITHSTAND

In accordance IEC 255-5:
2KV RMS between all terminals & all terminals & frame.
1.2/50 5KV impulse between all terminals & all terminals & frame.

IP RATING

IP5X category 2 dust protected and IP4X for solid ingress to IEC60529.

CASE EARTH CONNECTIONS

Case bonding to earth is critical for electrical ensure safety & EMI / EMC standards compliance.

An electrical connection from earth to the case is achieved using a dedicated earth terminal located at the rear top of the case. A hex screw suitable for ring lugs & a star washer is provided as depicted in figure 5.

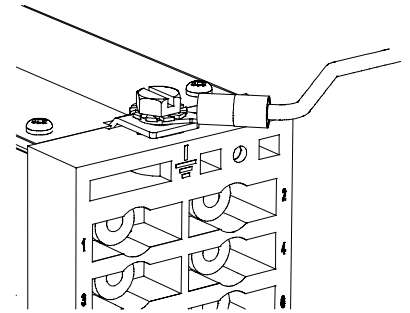


Figure 5: Case earth terminal detail

Some electronic relays are also fitted with an additional earth stud which is mounted on an earth bracket that is fitted between the case earth & terminal 2. This is useful for marshalling multiple earth connections such as arc fault sensor screen cable earths & is depicted in figure 6.

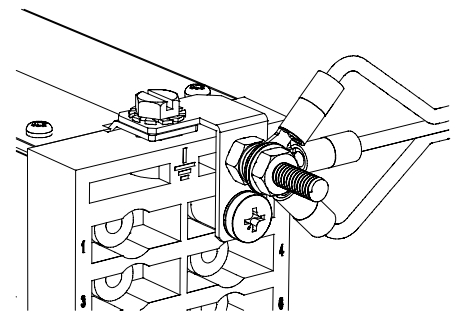


Figure 6: Earth stud detail

TERMINATION RING LUGS

Reliable electrical connection to M Series cases is achieved using M4 screws & ring lug terminals as depicted in figure 7.



Figure 7: Typical 'flat' ring terminal lugs

RING LUGS DIMENSIONS

Refer to Table 1 & 2 below for ring lug dimensional guidelines.

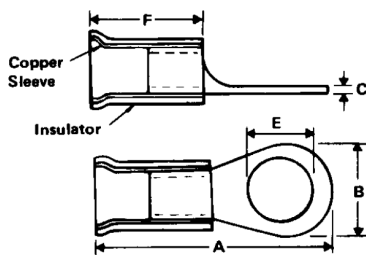


Figure 8: Ring terminal lug dimensions – Refer tables 1 & 2

STUD TERMINALS

The stud terminal mounting kit is suitable for the following situations:

- Where more than two wire terminations per point are required
- Where large profile lugs are to be used

Refer to the M Series Case Accessories section describing M4 studs & figure 13 for details.

Termination Ring Lugs

DAVICO RING LUGS WITH 90 DEGREE PRE-FORM

Davico ring lug terminals are supplied with a 90 degree pre-bend as depicted in figure 9 so that they fit the M Series terminal block without pre-forming. Termination of wires ranging in size from 0.25mm² up to 2.6mm² is possible using an appropriate ring lug terminal selected from Table 1. These ring lugs are not suitable with stud terminals.

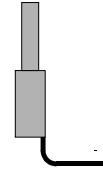


Figure 9: Davico lug with 90 degree pre-form

RING LUGS WITHOUT 90 DEGREE PRE-FORM

Ring lugs are available from various suppliers in a wide range of sizes & configurations. Termination of wires ranging from 0.5mm² up to 6mm² is possible using a ring lug terminal or equivalent selected from Table 2.

Common 'flat' lugs do not have the 90 degree pre-bend depicted in figure 9. In order to fit these lugs into the M Series terminal block, an angle must be pre-formed as depicted in figure 10.

Multi strand wire

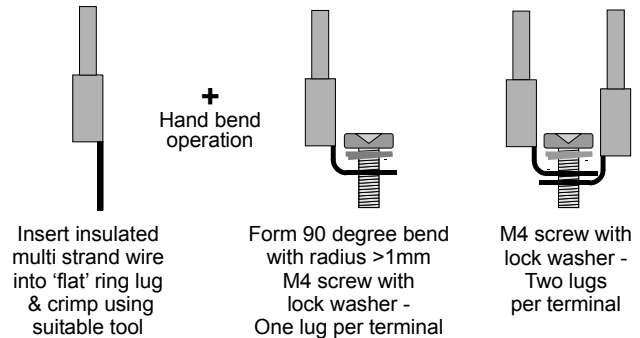


Figure 10: 'Flat' lug 90 degree pre-form & screw fitting detail

Table 1. Davico 90 Degree Pre-bend Termination Ring Lug Part Numbers

RMS Terminal Kit (100 per kit)	Lug Description	Typical Size - mm				Farnell Coding		Wire Size Range	Wires per Screw (Max)
		A	B	C	E	Description	Cat. No.		
290-407-163	Davico lug - 90 deg – RED	21.3	8.0	0.7	4.3	DVR1-4-90	1712571	0.25-1.6mm ²	2
290-407-164	Davico lug - 90 deg – BLUE	22.3	8.5	0.8	4.3	DVR2-4-90	1712572	1.0-2.6mm ²	2

Table 2. Utilux or Equivalent Termination Ring Lug Part Numbers

RMS Terminal Kit (100 per kit)	Description - Colour	Typical Size - mm				Utilux Coding		Wire Size Range	Wires per	
		A	B	C	E	Description	Cat. No.		Screw	Stud
290-407-165	Supergrip lug – RED *	21.3	8.0	0.7	4.3	RRSGM4L	H4214	0.5-1.5mm ²	2	3+
290-407-166	Supergrip lug – BLUE *	22.3	8.5	0.8	4.3	BRSGM4L	H4223	1.5-2.5mm ²	2	3+
290-407-167	Supergrip lug – YELLOW *	23.2	7.2	1.0	4.3	YRSGM4S	H4230	2.5-6.0mm ²	1	3+
290-407-168	Standard grip lug – RED *	21.3	8.0	0.7	4.3	RRM4L	H4114	0.5-1.5mm ²	2	3+
290-407-169	Standard grip lug – BLUE *	22.3	8.5	0.8	4.3	BRM4L	H4123	1.5-2.5mm ²	2	3+
290-407-170	Standard grip lug – YELLOW *	23.2	7.2	1.0	4.3	YRM4S	H4130	2.5-6.0mm ²	1	3+

NOTE: * Utilux lugs specified are supplied flat & must be pre-formed to ~90 degrees before insertion into the M Series terminal block.

M Series Case Accessories

ACCESSORIES

The following accessories are available separately:

- 4M801K1** Size 1 4U Blanking Plate 177 x 25 mm
- 4M802K1** Size 2 4U Blanking Plate 177 x 51 mm
- 4M803K1** Size 3 4U Blanking Plate 177 x 77 mm
- 4M804K1** Size 4 4U Blanking Plate 177 x 103 mm
- 4M806K1** Size 6 4U Blanking Plate 177 x 155 mm
- 4M808K1** Size 8 4U Blanking Plate 177 x 206 mm
- 290-406-151** Relay mounting screw kit (4 screws)
- 290-407-153** M4 terminal screw kit with captive lock washers (14 pieces per kit)
- 290-407-154** Stud terminal kit (28 terminals per kit)
- 290-407-158** Earth bar to suit M Series Cases mounted in a 19 inch rack mount frame (4M800K1)
- 205-103-003** Earth screw (1 piece)

CASE MOUNTING SCREWS

An M4 self threading screw kit is supplied as standard with each M Series case.

RELAY PANEL/RACK MOUNTING SCREWS
P/N 290-406-151A
 4 X M4 self threading screws
 Use for RMS "D", "E" & "M" Series relay cases

Assembly Details (mm)

	a	b
1-2	3.6	
2-3	3.7	

b (Drill)

M4 self threading screw 260-014-110B
 Mild steel relay mounting panel

M Series cases may be flush mounted to mild steel panels up to 3mm thick using the M4 self threading screws provided with the case. Panel mounting is simplified due to the location of the fixing screws at the front face of the relay. Alternatively the cases may be 19 inch rack mounted using a 4U high sub rack. The M4 self threading screws are suitable for application with the RMS type 4M800K1 sub

Figure 11: Case mounting screws

TERMINATION SCREWS

M4 Screws

An M4 screw kit is supplied as standard with each M Series case. Additional M4 screw kits may be purchased separately. M4 screws are suitable for use with the recommended ring lugs as per tables 1 & 2.

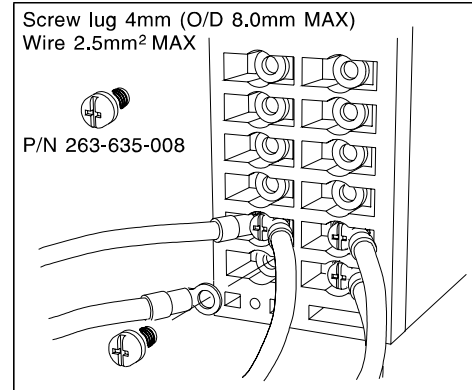


Figure 12: M4 terminal screws with captive lock washers

M4 Studs

An M4 stud kit is available as an option. This kit consists of 28 studs complete with insulating sleeves to allow

M4 studs are suitable for use with the recommended ring lugs as per table 1 & larger profile lugs that will not fit directly into the M Series terminal block.

M28 STUD TERMINAL KIT

P/N 290-407-154A

28 X M4 stud terminals
 Use for RMS "M" Series relay cases

Start with a long stud and spacer on terminal 1, then a short stud on terminal 2. Alternate stud lengths to maintain isolation.

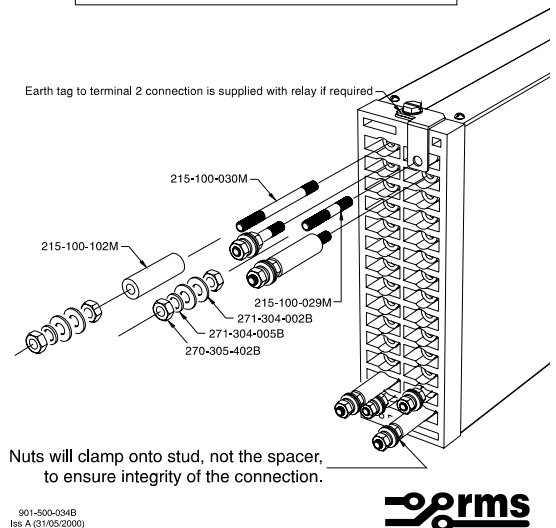


Figure 13: Stud terminal

Maximum Torque Setting

The maximum torque setting that should be applied to either M4 screws or M4 studs is 2.0 Nm. 1.8 Nm is recommended.

Sub Rack Frames

STANDARD VERSIONS AVAILABLE

- 4M800K1 4U High rack mount frame
- 4M800K6 4U High flush panel mount frame
- 4M800K9 6U High rack mount frame
- 4M800K10 6U High flush panel mount frame
- 4M800K7 2 x 4U High rack mount frame
- 4M800K8 2 x 4U High flush panel mount frame

19 INCH SUB RACK MOUNTING FRAMES

Sub rack frames are constructed from powder coated mild steel & aluminium bar. The result is a very sturdy yet cost effective solution for mounting 4U & 6U modular cases in 19 inch cabinets or for flush mounting on panels or doors.

Pre-drilled holes in the aluminium cross bars are designed for use with M4 self threading screws supplied with RMS relays or available separately.

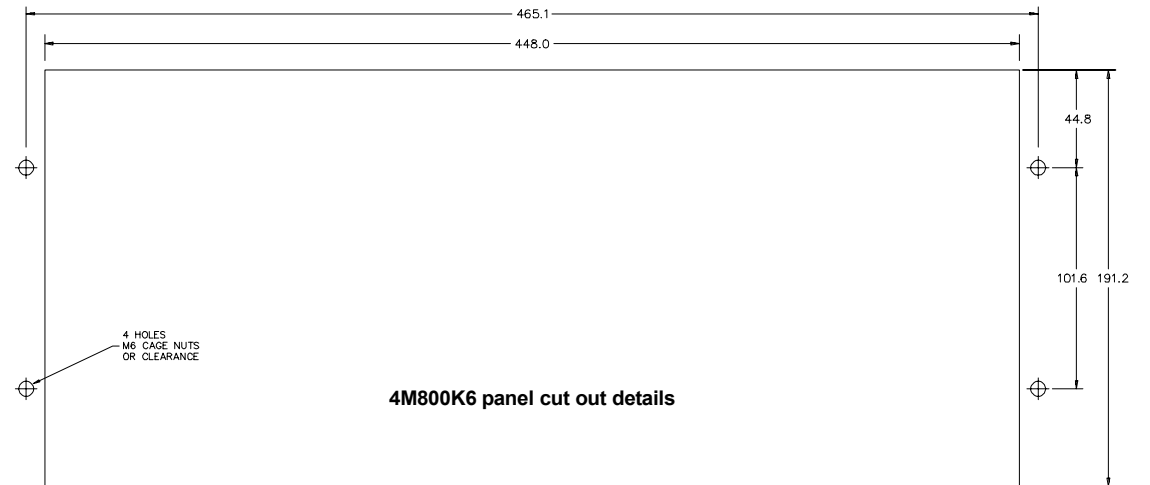
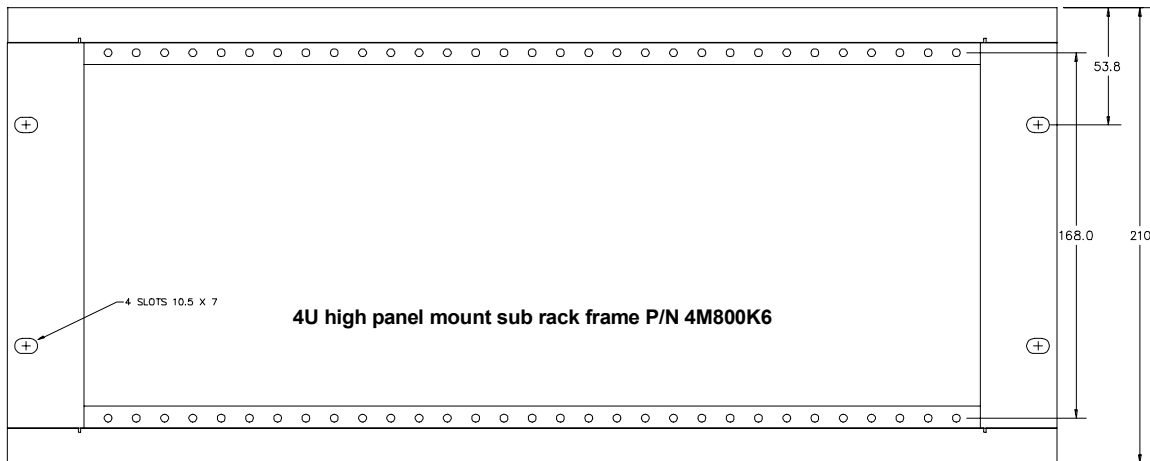
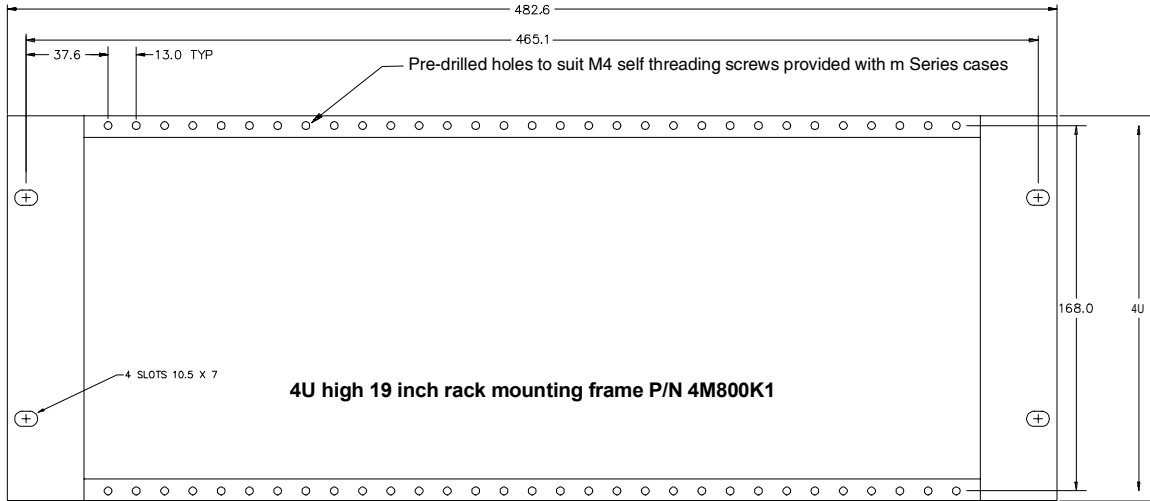


Figure 14: Rack mount frames

SEMI PROJECTION MOUNT KITS

Semi projection mount kits are available for the size 2M & 4M case. + Each kit consists of:

- 1 x semi projection mount top spacer (Acetal)
- 1 x semi projection mount bottom spacer (Acetal)
- 2 x black powder coated aluminium side panels
- Mounting screws

Semi Projection Mounting

Semi projection mount kits are available in six (6) standard sizes for the size 2M and size 4M cases as follows:

Size 2 Case

4M820K1	50mm projection
4M820K2	75mm projection
4M820K3	100mm projection
4M820K4	125mm projection
4M820K5	150mm projection
4M820K6	200mm projection

Size 4 Case

4M821K1	50mm projection
4M821K2	75mm projection
4M821K3	100mm projection
4M821K4	125mm projection
4M821K5	150mm projection
4M821K6	200mm projection

Size 6 Case

4M822K1	50mm projection
4M822K2	75mm projection
4M822K3	100mm projection
4M822K4	125mm projection
4M822K5	150mm projection
4M822K6	200mm projection

Size 8 Case

4M823K1	50mm projection
4M823K2	75mm projection
4M823K3	100mm projection
4M823K4	125mm projection
4M823K5	150mm projection
4M823K6	200mm projection

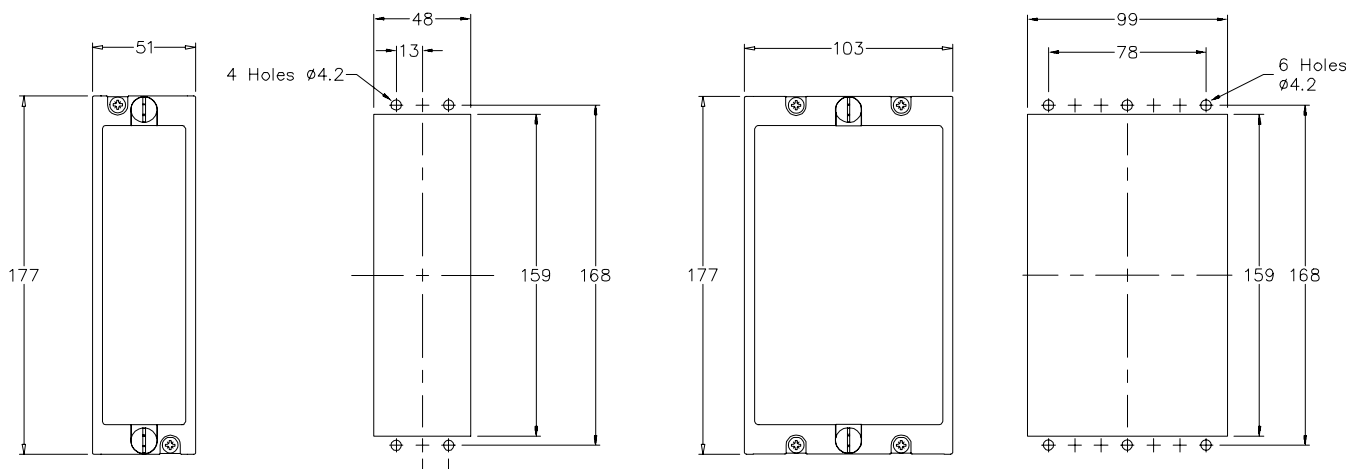
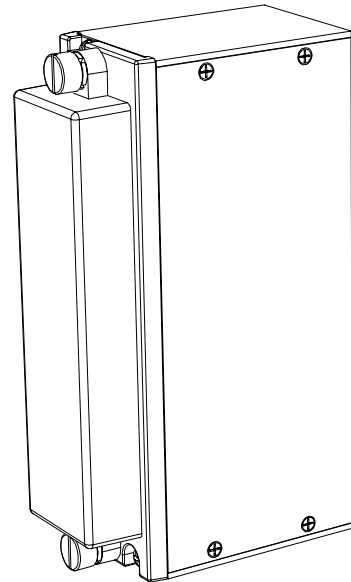
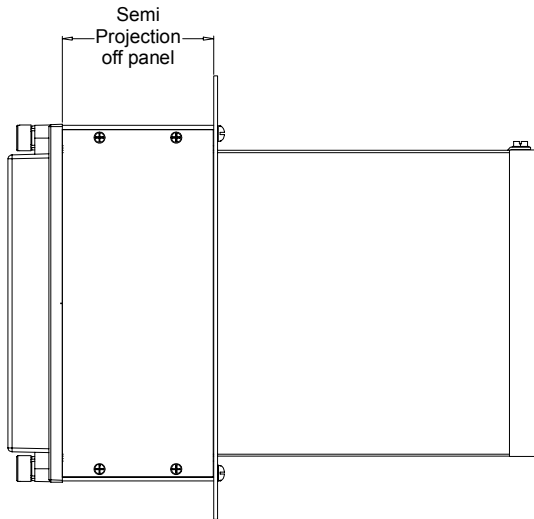


Figure 15: Semi projection mount kit details & panel cut outs

M SERIES CASE PACKING DETAILS

Relays built in the M Series case system are shipped in custom packaging suitable for air, sea or land freight.

Each relay is individually packaged complete with Product/Test Manual, Terminal Screw Kit, Mounting Screw Kit & CD if applicable. The package consists of two recyclable foam moldings to secure & protect the relay from shock during transit.

A two ply custom cardboard box is used to house the relay / foam module. A thermal label is attached to this box detailing the product type, customer, order & serial number information.

Depending on the number of relays in a consignment these box's may be shipped individually or packed into a larger carton. For bulk shipments these cartons are palletized.

SIZE 2 CASE PACKAGING DIMENSIONS

Individual shipping box

FC0100 1 x size 2 shipping box: 240 x 230 x 85mm

Multiple shipping cartons

FC0113 6 x size 2 shipping boxes: 480 x 370 x 310mm

FC0114 14 x size 2 shipping boxes: 480 x 370 x 620mm

SIZE 4 CASE PACKAGING DIMENSIONS

Individual shipping box

FC0101 1 x size 4 shipping box: 340 x 230 x 140mm

Multiple shipping cartons

FC0113 4 x size 4 shipping boxes: 480 x 370 x 310mm

FC0114 8 x size 4 shipping boxes: 480 x 370 x 620mm

TYPICAL PALLET SIZES (Add 15Kg for pallet)

FC0113 shipping cartons

2L x 3W x 2H 960 x 1,110 x 610 mm

12 x relay cartons per pallet

FC0114 shipping cartons

2L x 3W x 2H 960 x 1,110 x 1,240 mm

12 x relay cartons per pallet

WEIGHTS OF INDIVIDUAL SHIPPING BOXES

Case Size	No. of elements per case *	Nominal weight Kg
2	1	2.5
	2	3.0
4	1	3.5
	2	3.7
	3	4.0
	4	4.5
6	1	3.5
8	1	4.0

Note: * This relates to auxiliary & tripping relays where multiple relay elements may be specified per relay case which affects the final weight.

Generate the required order code as follows: e.g. 2M28-S-2

Order Code				
1		2		3
	M		- S -	

1 CASE SIZE

- 2 Size 2
- 4 Size 4

M M SERIES CASE

2 NUMBER OF TERMINALS

- 28 28 Terminals
- 56 56 Terminals

S SHORT CASE VERSION

3 CASE CONFIGURATION *

- Element only
- 1 One element per case
- 2 Two elements per case
- 3 Three elements per case
- 4 Four elements per case

Note: * Auxiliary & tripping relays only

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 80%. 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, The Middle East & 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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