



# MVAJ 11 to 34

## Tripping and Control Relays

The MVAJ 11 to 34 range complements the more cost-effective range of MVAJ 051 to MVAJ 205 tripping relays catering for the preferences of historical users.

MVAJ general characteristics can be found in table 1 that includes information on how the relay burden is modified at, or just after operation. 'Economy' indicates that the burden is reduced to a low value.

Instantaneous cut-off is a feature of some hand and electrical-reset elements and reduces the burden to zero, whilst others incorporate a time delay to enable series elements to operate. This time delay is 40 ms to 60 ms in all cases, except that of type MVAJ 26 where the delay is 2 s. All low burden relays are suitable for AC or DC operation. All high burden relays are for DC operation only.

### High Burden Tripping Types MVAJ 21, 23, 25, 26, and 29

These relays are suitable for use in high security circuit breaker tripping circuits. In particular they can be used in distributed tripping or control relay contact logic schemes, where the initiating contact may be remote from the relay. The relays have a high burden which is either cut-off at operation or economized to a low figure, either instantaneously or after a time delay.

The high burden provides immunity to capacitance discharge currents, which can result at the inception of an earth fault on battery wiring and immunity to the subsequent leakage current.

The high burden also permits the use of supervision relays such as type MVAX where the wiring is at risk and provides reliable operation of series elements such as repeat relays type MCAA. For the latter purpose, type MVAJ relays can be provided with a time delayed economizing feature.

## Type MVAJ Relays

- High burden tripping relays complying with ESI 48-4 Class EB2
- Low burden tripping relays which comply with ESI 48-4 Class EB1
- Control relays which meet the requirements of National Grid Company SPEC.NGTS 2.19:1996

## Key Benefits

- High speed operation
- High and low burden alternatives
- Models surge proof against high capacitance discharge currents in the dc supply system, are available
- Control relays immune to AC can be supplied



Relay Type	Contact mechanism	AC/DC operation	Operation indicator	Cut-off	Specifications	Group	Outgoing Contacts		Case Size	
							Single	Double	Single	Double
							Stack	Stack	Stack	Stack
MVAJ 11	SR	AC/DC	H/R	Economy	ESI48-4 EB1	Low burden	5	10	4	4
MVAJ 13	HR	AC/DC	H/R	Instantaneous	ESI48-4EB1	Low burden	5	10	2	4
MVAJ 14	ER	AC/DC	H/SR	Instantaneous	ESI48-4EB1	Low burden	5*	10*	2	4
MVAJ 21	SR	DC	H/R	Economy	ESI48-4EB2	High burden	5	10	4	4
MVAJ 23	HR	DC	H/R	Instantaneous	ESI48-4EB2	High burden	4	10	2	4
MVAJ 25	H/ER	DC	H/R	Instantaneous	ESI48-4EB2	High burden	4*	9	2	4
MVAJ 26	SR	DC	H/R	Time delay Economy	ESI48-4EB2	High burden	5	10	4	4
MVAJ 27	HR	DC	H/R	Time delay	ESI48-4EB2	High burden		9		4
MVAJ 34	ER	DC	S/R	Instantaneous	NGC SPEC NGTS 2.19:1996	Control in/out		7		4

Key SR – Self-reset, HR – Hand-reset, ER – Electrical-reset, H/ER - Hand / electrical-reset, H/SR – Hand / self-reset

Note : Relay types indicated \* do not have continuously rated reset coils or internally wired cut-off contacts. If required, one pair of outgoing contacts may be wired externally for this duty: this will obviously reduce the number of available contacts.

Table 1 List of MVAJ types available

## Description

### Low Burden Tripping Relay Types MVAJ 11, 13, 14

These relays are suitable for applications where immunity to capacitance discharge and high minimum operation currents are not required.

### Control Relay Type MVAJ 34

This is a dual-rated electrical-reset relay, the main function of which is to switch protection and autoreclosing equipment in and out of service from a remote point via pilot wires. It complies with NGC SPEC. NGTS2.19:1996.

### High Burden Tripping Relay Types MVAJ 21, 23, 25, 26, 27

Versions have one or two contact stacks depending on the number of output contacts required.

### Type MVAJ 21 High Burden Self-resetting Relay

This uses a contact on the main contact stack to energize a separate, rear-mounted economizing element. After operation, this reduces the burden by switching in resistance in series with the main element and switching out shunt resistance.

Figure 2 shows a typical circuit diagram for self-resetting relays of this type with high speed economy. When the main attracted armature unit RL1 is energized by the protection contact PR, a contact RL1-a energizes auxiliary element RL2. When contacts RL2-a and RL2-b open, resistor R4 is put in series with RL1 while the circuit to resistor R2 is broken.

### Types MVAJ 23, 25 High Burden Tripping Relays with Instantaneous Cut-off

These relays incorporate a break contact in series with the operate coil. Located on the main contact stack, it is arranged to break the coil circuit once the relay mechanism has completely operated. This reduces the relay burden to zero as soon as mechanical latching of the contacts has occurred.

**Type MVAJ 26 Time Delay on Drop-off Relay**

The MVAJ 26 is specially designed for applications requiring a tripping relay which is self-resetting after a nominal delay of 2 seconds. This relay may be used, for example, for intertripping between the higher voltage and lower voltage circuit breakers of a large 3-phase power transformer. This may become necessary when the higher voltage circuit breaker is tripped after a heavy internal fault, by protection which cannot conveniently provide an auxiliary contact with a dwell time long enough to ensure correct tripping of the lower voltage circuit breaker.

The MVAJ 26 can accept either a fleeting or persistent initiation. With the latter, the relay will provide a tripping signal of corresponding duration plus the 2 second delay.

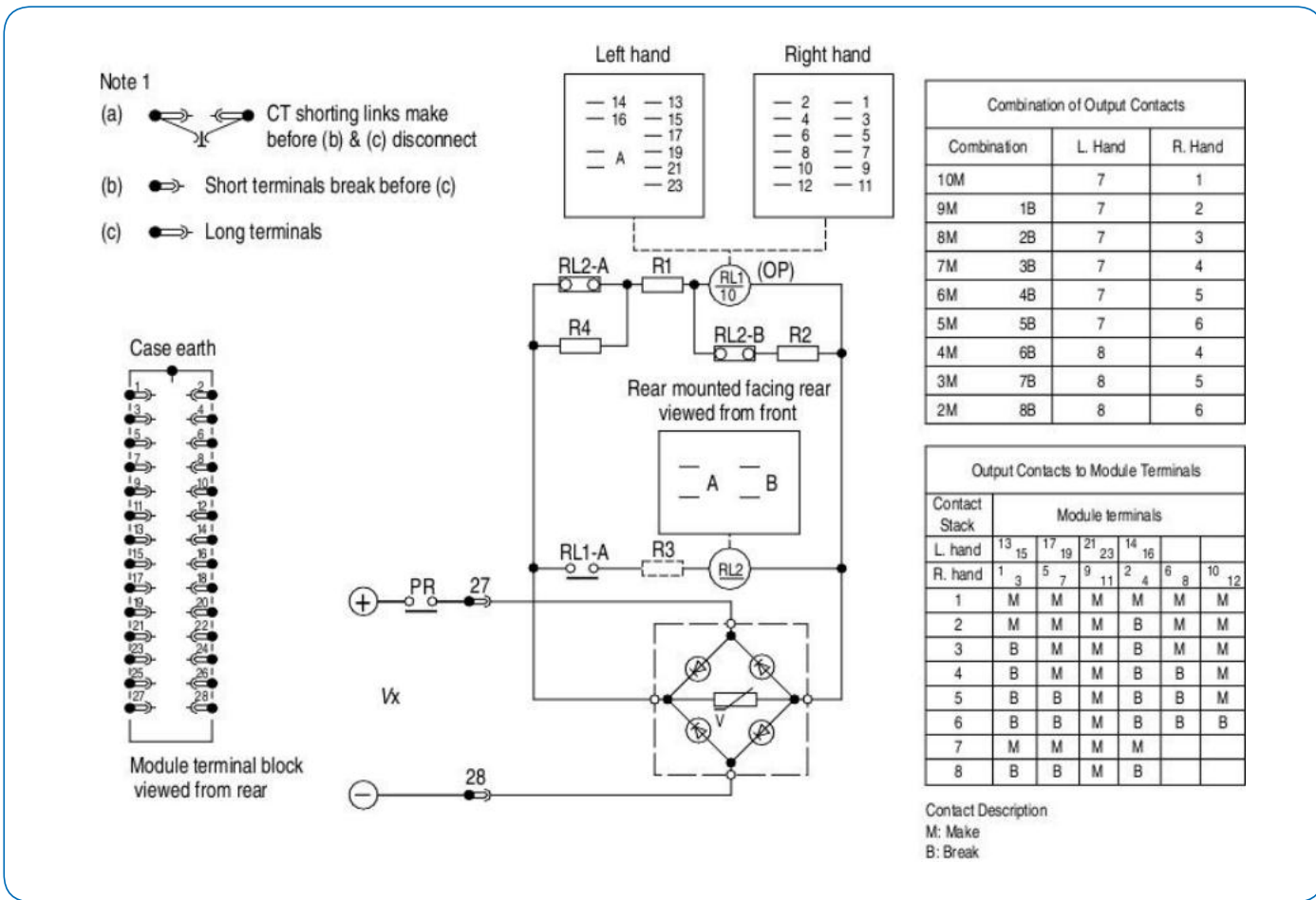


Figure 2 MVAJ 21 self-reset with instantaneous economy (high burden)

Huge worldwide installed base of MVAJ relays - a reliable tripping pedigree

### Type MVAJ 27 Relay with Time Delayed Drop-off

These relays are hand-reset, electrical-reset and hand/electrical-reset respectively and all have time delayed cut-off circuits. The burden is reduced to zero 40/60 ms after energization by the use of a second attracted armature element mounted in the rear of the case. This time delay allows ample time for any flagging or auxiliary element in series with the tripping relay to operate before cut-off.

Figure 3 shows a typical circuit diagram for an electrical-reset trip relay with time delayed cut-off feature. When the contact PR is closed, relays RL1 (operate) and RL2(t) operate. After operation, the current in the coil of RL1 (operate) is maintained by contact RL2-a: contacts RL1-a and RL1-b open, whilst RL1-c closes.

The opening of RL1-a causes relay RL2(t) to start to reset. This resetting is delayed by 40-60 ms by means of a copper slug fitted to the front of RL2(t). When RL2(t) resets, RL2-a opens, reducing the current through the RL1 (operate) coil to zero. The relay is now latched mechanically into the operate state. It may now be reset via an external contact or push-button which energizes the RL1 (reset) coil via the closed contact RL1-c.

### Low Burden Tripping Relay Types MVAJ 11, 13, 14

These are low burden versions of the MVAJ 21, 23, 25, relays (respectively). They comply with the less onerous requirements of ESI 48-4, Class EB1.

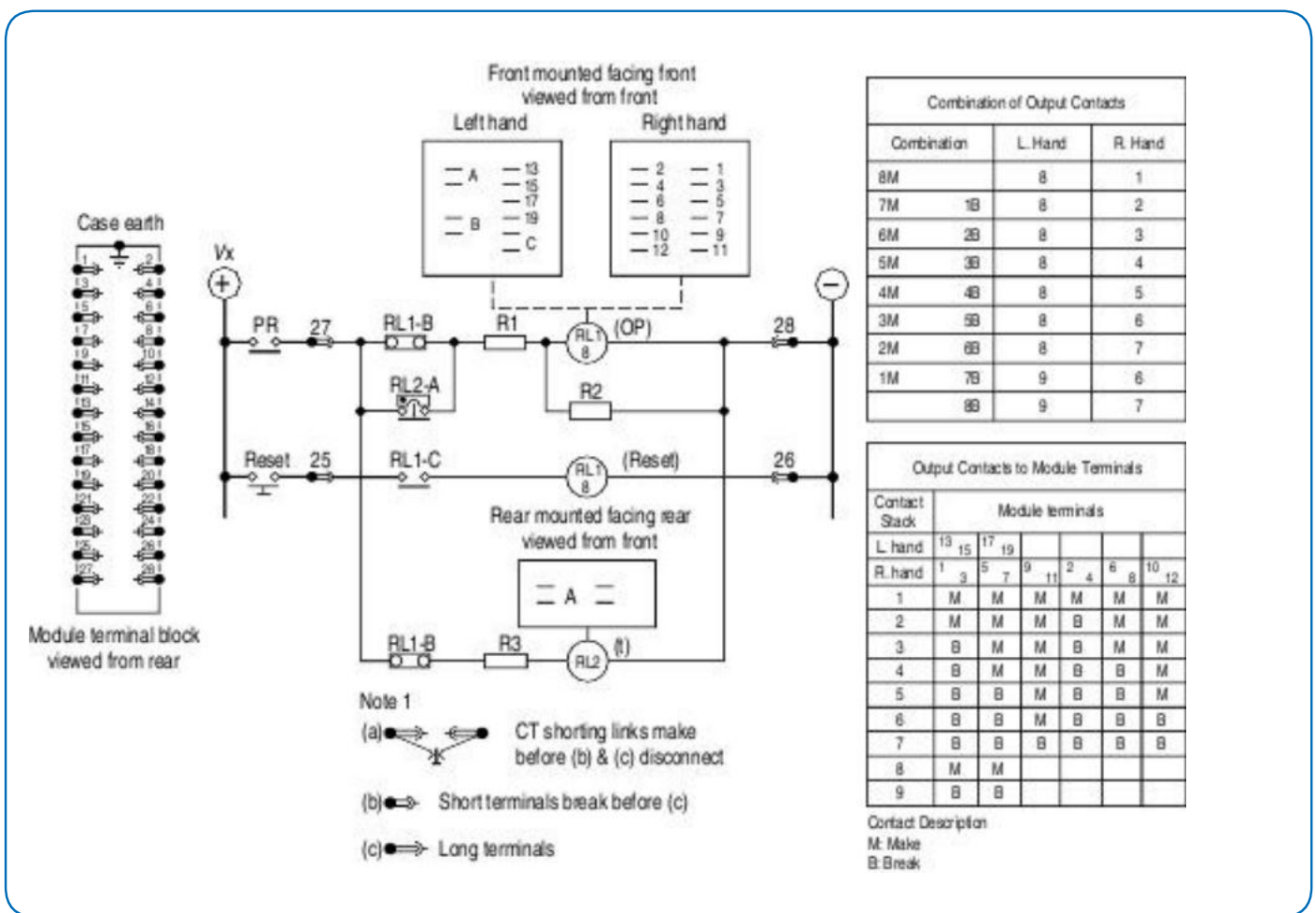


Figure 3 MVAJ 27 electrical-reset with time delayed cut-off (high burden)

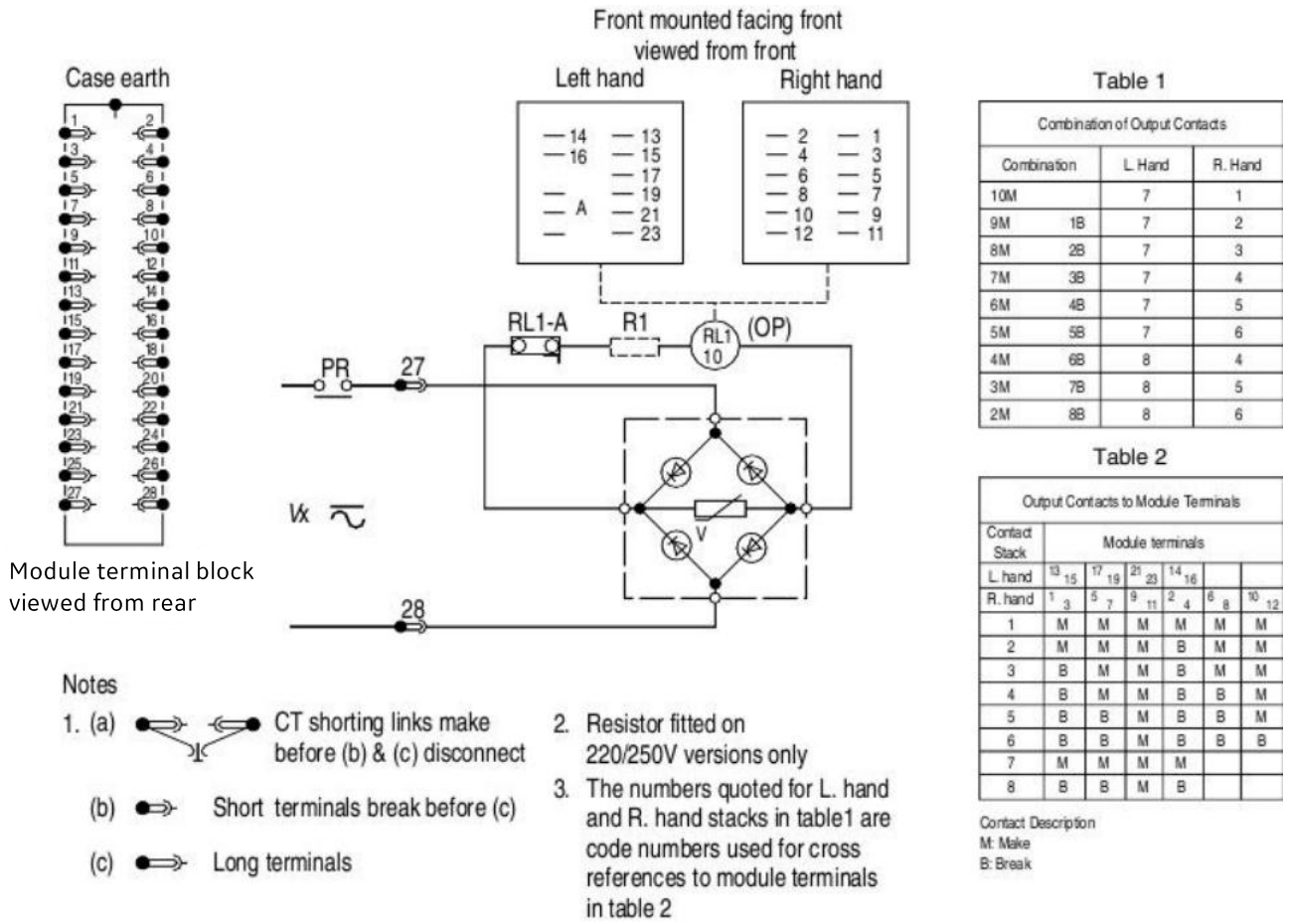


Figure 4 MVAJ 13 hand-reset (low burden)

Technical Data

	Rated Voltage (Vx)	Operative range (V)
All relays except MVAJ 17 and MVAJ 34	24/27 30/34* 48/54* 110/125* 220/250	14.4 - 32.4 18 - 40.8 28.8 - 64.8 66 - 150 122 - 300
MVAJ 17	110/125	66 - 150
MVAJ 34	0 Ωpilot	200 Ωpilot
dual rated		
48/54	37.5 - 60	46 - 56
110/125	87.5 - 137.5	87.5 - 137.5
220/250	122 - 286	175 - 275

\*These ranges only are applicable to ESI 48-4

## Burdens

Relay type	Burden (W) to operate		Operated	To reset		Minimum Operating current (mA)
	Single stack	Double stack		Single stack	Double stack	
MVAJ 11	25	50	10	-	-	25
MVAJ 13	25	50	-	-	-	25
MVAJ 14	25	50	-	15	25	25
MVAJ 21	150	150	10	-	-	100
MVAJ 23	150	150	-	-	-	100
MVAJ 25	150	150	-	50	50	100
MVAJ 26	150	150	12.5	-	-	100
MVAJ 27	-	150	-	-	-	100
MVAJ 29	-	150	-	-	50	100
MVAJ 34		10	-		10	25
See Note 2 Below		25	-		25	25
		50			25	25

Note 1: Minimum operating current for relays specified in ESI 48-4 Class EB1 is 25 mA and in EB2 is 50 mA for 110 V dc rating.

Note 2: The 3 sets of burdens quoted for MVAJ 34 apply to the 48/54, 110/125 and 220/250 V versions respectively.

### Operating Times

- MVAJ 34 (0 Wpilot) Not greater than 50 ms
- MVAJ 34 (200 Wpilot) Not greater than 75 ms
- All other types: Not greater than 10 ms at rated voltage

### Contacts

The number of contacts available is shown in Table 1. They may be any combination of make type and break type, but with a maximum of 8 breaks.

### Contact Ratings

#### Make and Carry for 3 s

AC	7500 VA with maxima of 30 A and 660 V
DC	7500 W with maxima of 30 A and 660 V

#### Make and Carry Continuously

AC	1250 VA with maxima of 5 A and 660 V
DC	1250 W with maxima of 5 A and 660 V

#### Break

AC	1250 V with maxima of 5 A and 660 V
DC	100 W resistive 50 W inductive with maxima of 5 A and 660 V

MVAJ offers contact ratings for breaker tripping duties, and general contact multiplication

Cases

MVAJ relays are housed in size 2 or 4 cases as indicated in Table 1. Dimensions for these cases are shown in Figures 5 and 6 respectively.

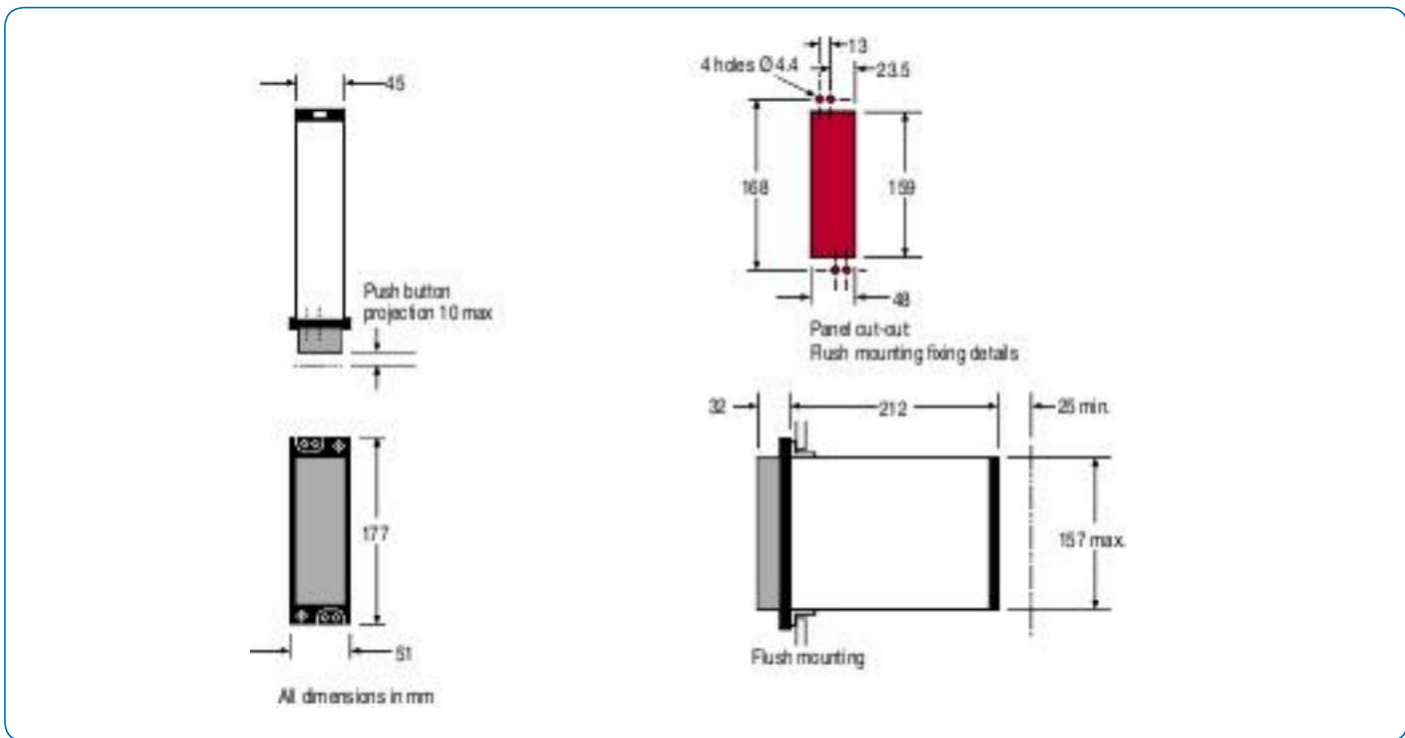


Figure 5: Case outline size 2

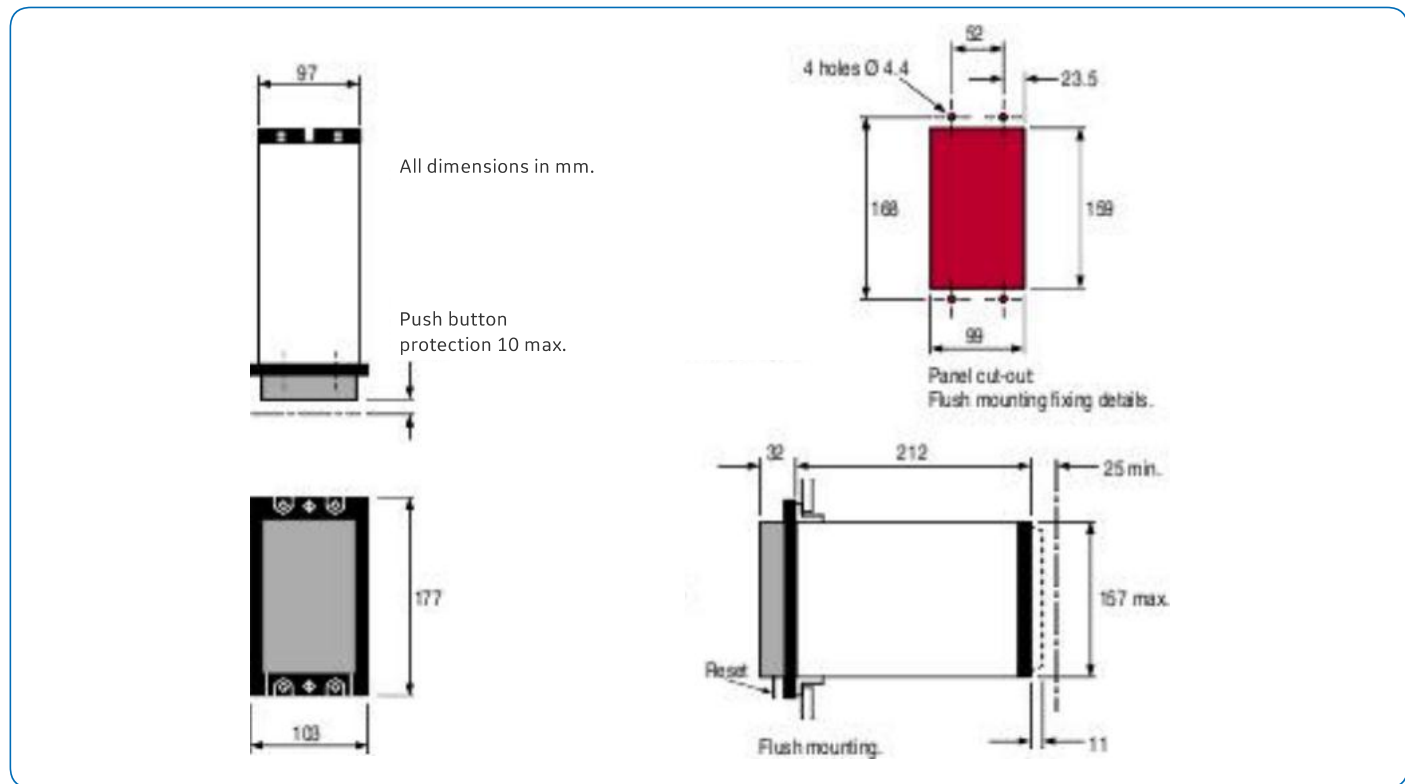


Figure 6: Case outline size 4

## Device Track Record - Auxiliary Relays

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Over 180,000 MVAJ tripping relays delivered since launch in 1983

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Over 150,000 MVAA auxiliary relays delivered since launch in 1983

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Over 330,000 PRiMA auxiliaries delivered since launch in 1994

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Underlines Grid Solutions' commitment to the supply of quality electromechanical devices

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### Information Required with your Order

- Relay type
- Voltage rating
- Number and combination of contacts for tripping duties
- Hand reset operation indicator required
- Instantaneous or time delayed cut-off contact

For more information please contact  
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