

## Type MCRI Instantaneous Overcurrent Relay

### Features

- High speed operation
- Not slowed by dc transients
- Settings readily adjustable on relay front plate
- Two phase and earth fault relay



Figure 1: Type MCRI relay withdrawn from case

### Application

The MCRI type relay, as shown in Figure 1, is designed for use as a starting or check relay in protection schemes where high speed operation is necessary, typically, the Translay S differential feeder protection scheme. It can also be used in conjunction with a timing relay to provide definite time overcurrent protection.

### Description

A connection diagram for this relay is shown in Figure 2. A reed relay, one per pole, is used as the current detecting component, each is inserted into a coil which is connected to the relay input terminals.

The reed relays measure the A and C phase and neutral currents. Below setting the contacts remain open, but when the instantaneous value of current reaches the setting, the contacts close and remain closed until the current falls below the drop-off value. When the reed relay contacts close, the dc supply energises an integrator, which operates an output

relay ensuring that even with vibrating reed contacts, the output relay remains in the operated condition.

To adjust the setting, the reed relays can be moved relative to the coil by means of a threaded rod which can be rotated via a screwdriver slot in the front of the relay. A system of cams moves a pointer on the relay front plate to correspond to the position of the reed relay, thereby indicating the setting.

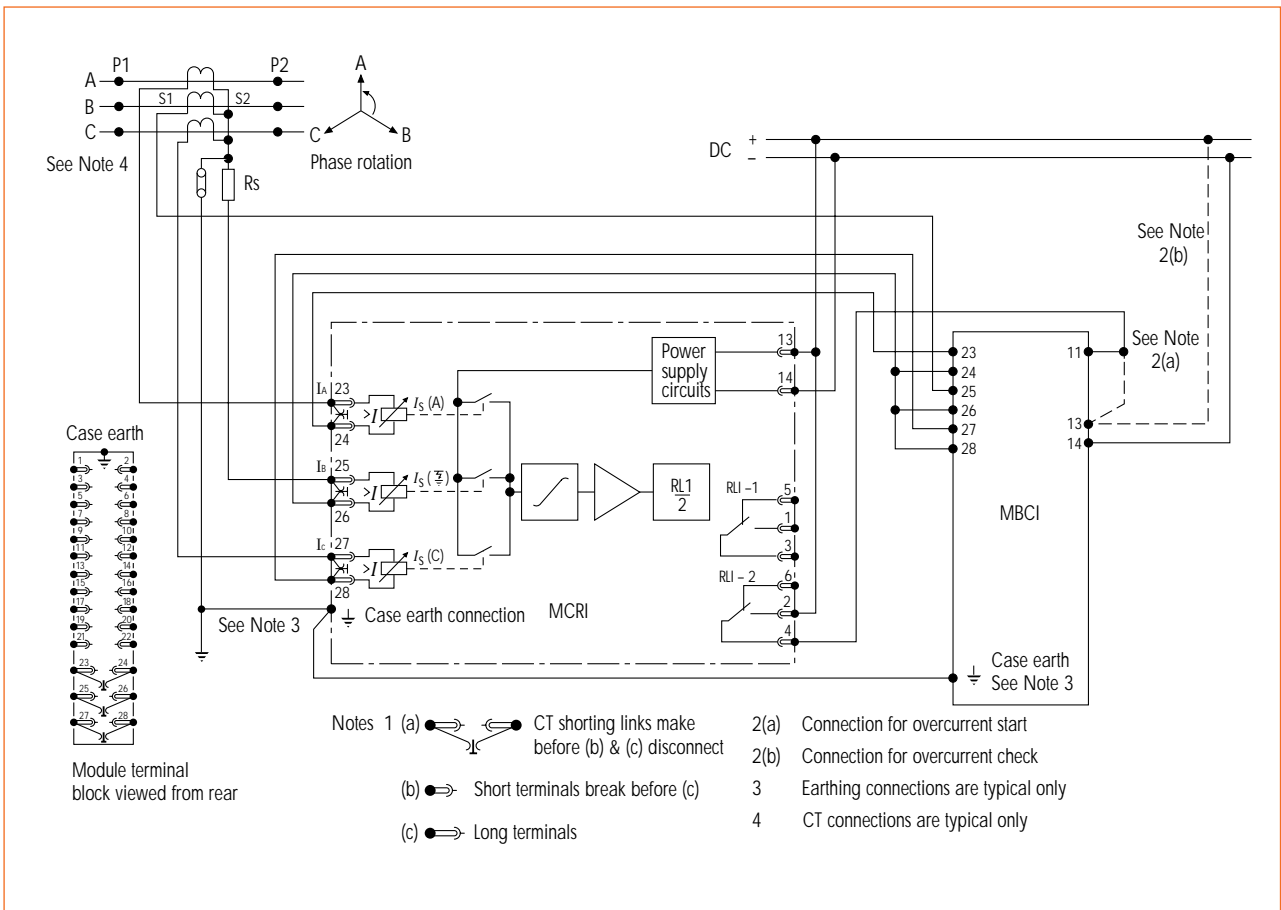


Figure 2: Application diagram - overcurrent relay type MCRI 01

## Settings

The maximum resetting value of the overcurrent elements is not less than 98% of the operating value. Thus to ensure that they will reset when the current is restored to the full load level the setting should be at least 1.2 times the maximum anticipated through load current.

The setting of the earth fault elements should be at least 1.2 times any standing zero sequence current and not higher than 80% of the minimum earth fault current.

The value chosen as an assessment of the minimum earth fault current must be conservative, due allowance being made for all aspects of minimum system operating conditions and fault impedance; alternatively, a large tolerance below the nominal minimum fault current value is advisable.

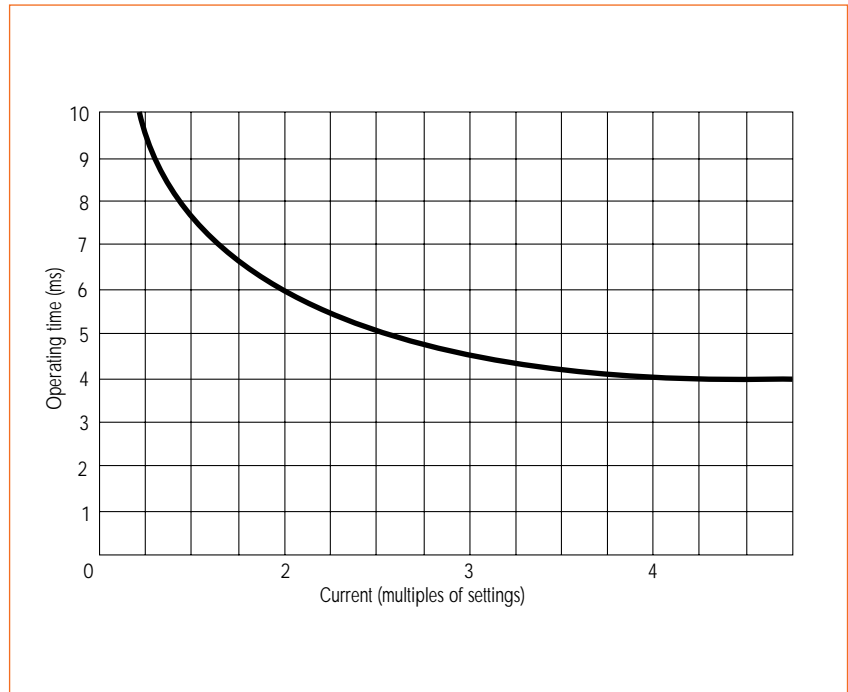


Figure 3: Typical operating time characteristics

## Technical Data

### Ratings

AC current (In)	1A, 2A or 5A	
Frequency	50 or 60 Hz	
DC supply	Rated voltage (Vx)	Operating range (V)
	30/34	24.0 - 41.0
	48/54	37.5 - 66.0
	110/125	87.5 - 150.0

### Burdens

AC	Phase element at rated current 1 VA
	Earth fault element at rated current 2 VA

DC	Rated voltage (V)	Burden at rated voltage (W)	
		Quiescent	Operated
	24/27	0.05	7.0
	30/34	0.05	5.5
	48/54	0.05	3.5
	110/125	0.05	4.5

### Setting ranges

Phase elements (Is) continuously adjustable 40% to 240% In  
 Earth fault element (Is) continuously adjustable 20% to 120% In

### Operating time

4ms at 4 times setting (See Figure 3)

### Accuracy

±10% over the setting range

### Contacts

2 changeover

### Contact rating

Make and carry for 0.2s	7500VA subject to maxima of 30A and 300V ac or dc
Carry continuously	5A ac or dc
Break	ac 1250VA dc 50W resistive 25W, L/R = 0.04s subject to maxima of 5A and 300V

### Durability

Loaded contact	10,000 operations minimum
Unloaded contact	100,000 operations minimum

### Transient overreach

Because the relay detects peaks, it will respond to any peak current above setting. It therefore has high transient overreach

### Resetting ratio

98%

### Thermal withstand

Phase	Current element		Duration (s)
	90% Is	90% Is	Continuous
	30 x In	24 x In	3
	40 x In	30 x In	2
	55 x In	42 x In	1
	75 x In	60 x In	0.5

## High Voltage Withstand

Dielectric withstand  
IEC 255-5:1977

2kV rms for 1 minute between all terminals and case earth.

2kV rms for 1 minute between terminals of independent circuits including contact circuits, with terminals on each independent circuit connected together.

1kV rms for 1 minute across open contacts of output relays.

High voltage impulse  
IEC 255-5:1977

5kV peak, 1.2/50 $\mu$ s, 0.5J between all terminals and case earth and between adjacent terminals.

## Electrical Environment

High Frequency Disturbance  
EC 255-22-1:1988 Class III

2.5kV peak between independent circuits and case.

1.0kV peak across terminals of the same circuit.

No additional tolerances are required for the operating time or the unit's thresholds.

Electrostatic Discharge  
IEC 255-22-2:1989 Class II

4.0kV discharge in air with cover in place.

IEC 801-2:1991 Level 2

4.0kV point contact discharge with cover removed.

No additional tolerances are required for the operating time of the unit's thresholds.

Fast Transient Disturbance  
IEC 255-22-4:1992 Class IV

4.0V, 2.5kHz applied directly to auxiliary supply and watch-dog relay.

IEC 801-4:1988 Level 4

4.0kV, 2.5kHz applied directly to all inputs.

No additional tolerances are required for the operating time or the unit's thresholds.

EMC Compliance 89/336/EEC  
EN 50081-2:1994  
EN 50082-2:1995

Compliance to the European Commission Directive on EMC is claimed via the Technical Construction File route. Generic Standards were used to establish conformity.

### Atmospheric environment

Temperature

EC 255-6:1988

IEC 68-2-1:1990

IEC 68-2-2:1974

Humidity

IEC 68-2-3:1969

Enclosure Protection

IEC 529:1989

Storage and transit -25°C to +70°C

Operating -25°C to +55°C

Cold

Dry Heat

56 days at 93% RH and 40°C

IP50 (dust protected)

### Mechanical environment

Vibration

IEC 255-21-1:1988

Response Class 1

Endurance Class 1

### Cases

The MCRI relay is housed in a size 4 case as shown in Figure 4.

### Information Required with Order

AC current rating

Frequency rating

DC voltage rating

### Additional Information

Associated publications

R6001 MIDOS system

R6004 Test plug/block

R6011 Translay 'S' differential feeder protection.

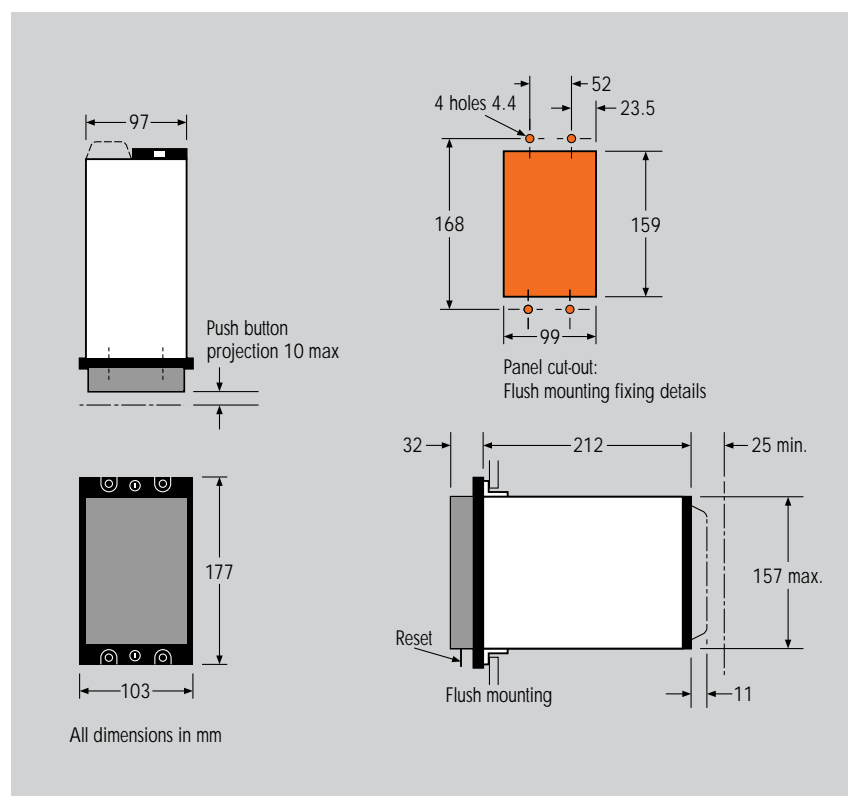


Figure 4: Case outline size 4

