

Overcurrent protection relay

# MRS13R



## Overcurrent protection relay MRS13R

- Overcurrent protection designed for railway applications
- Detects overcurrent conditions in 3.1 - 4.5 ms
- Reacts within 20 ms
- The switching status is automatically reset as soon as the fault is cleared
- Forcibly guided contacts ensure accurate feedback of the switching state
- The diagnostic input allows the relay to be switched separately to check the mechanical integrity
- Measuring range -5 ... 5 A
- Configurable scaling factor for easy integration of external current transformers

### E

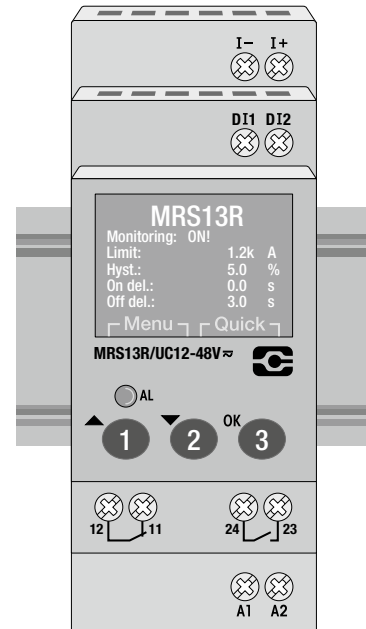
The MRS13R is an overcurrent protection relay designed for railway applications. It reliably protects electrical systems against short circuits and current overloads. It detects dangerous overcurrents rapidly – within 3.1 - 4.5 ms – and activates a switching response in less than 20 ms.

The MRS13R works either with a current transformer or can be connected directly to AC or DC loads. As soon as a defined threshold value is exceeded, the relay activates any connected switching device such as a circuit breaker and simultaneously provides an alarm signal.

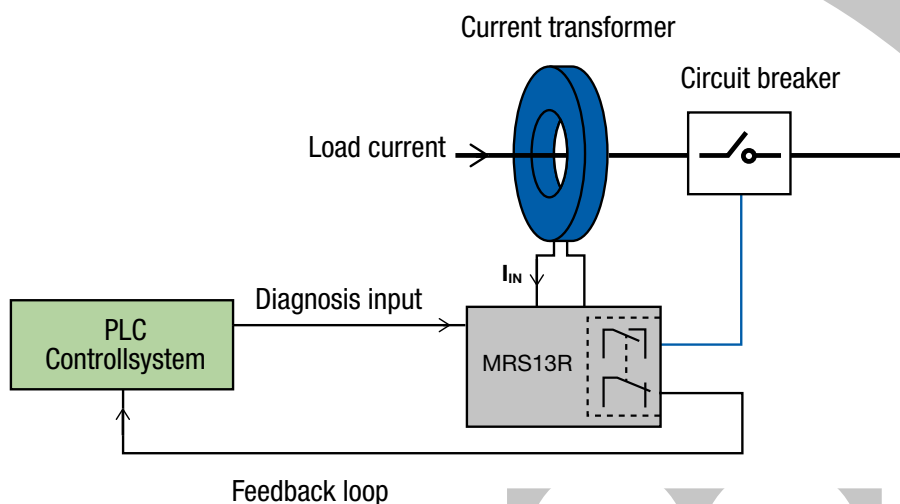
Unlike conventional fuses, the MRS13R resets automatically: as soon as the fault is cleared, it returns to its normal state without the need to replace a component. The forcibly guided contacts guarantee a reliable and clear feedback signal to the higher-level control system.

The additional diagnostic input can be used to externally trigger the relay in order to verify the mechanical switching integrity – regardless of an actual fault.

The display shows the operational status and parameters, while an LED indicates the overcurrent status. The menu-based configuration features a three-button interface for navigating menus and adjusting parameters.



### Block diagram for MRS13R overcurrent detection and load shutdown



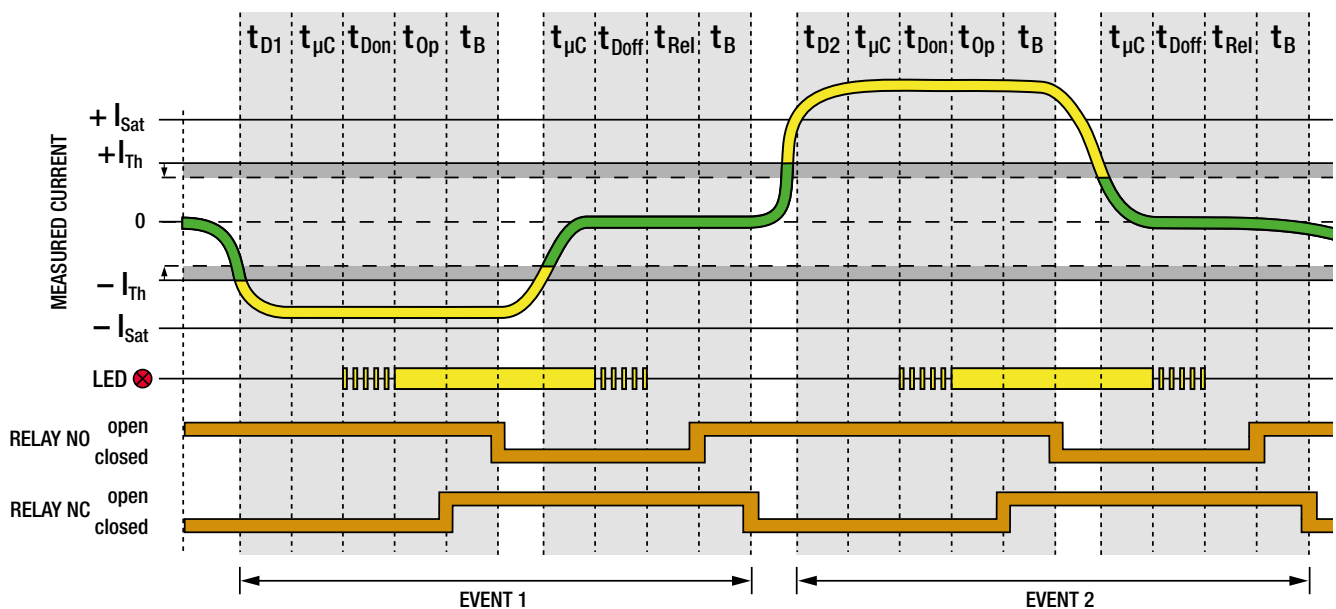
### Operating behaviour

The MRS13R measures the current every 1.5 ms. As soon as three out of five consecutive measured values are above the configured threshold value ( $I_{Th}$ ), an overcurrent event is detected. This triggers the NC contact to open and the NO contact to close. The total response time is less than 20 ms. The LED signals the overcurrent status as long as it persists.

When the current falls below the switch-back threshold, a defined switch-off delay is waited after which the relay automatically returns to its normal state. Appropriate setting of the threshold, hysteresis and switch-on and switch-off delay ensures reliable fault detection and avoids unintended switch-offs.

$I_{Sat}$	Saturation current	
$I_{Th}$	Overcurrent threshold	
$t_{D1}$	Overcurrent detection time	4.5 ms
$t_{D2}$	Saturation current detection time	3.1 ms
$t_{\mu C}$	Controller processing time	1.3 ms
$t_{Don}$	Switch-on delay	configurable
$t_{Doff}$	Switch-off delay	configurable
$t_{Op}$	Relay operation time	10 ms
$t_{Rel}$	Relay release time	3 ms
$t_{BNO}$	Relay bouncing time NO contact	2 ms
$t_{BNC}$	Relay bouncing time NC contact	15 ms

<b>EVENT 1</b>	Overcurrent detection
<b>EVENT 2</b>	Saturation current detection



### Power supply

Nominal voltage	12 ... 48 V AC / DC
Power consumption AC / DC	3.2 VA / 1.6 W
Frequency range of the power supply	0; 16 ... 63 Hz

### Relay output

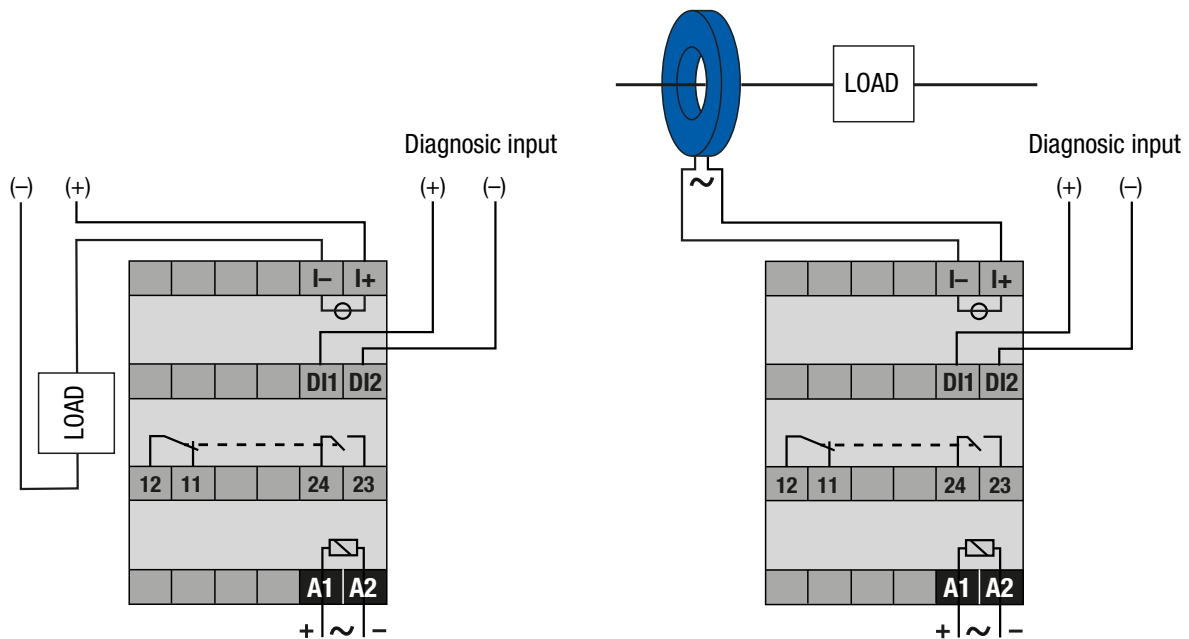
Number of forcibly guided contacts *	1 NO + 1 NC
Minimum load	3 mA, 15 V

### Measuring circuit

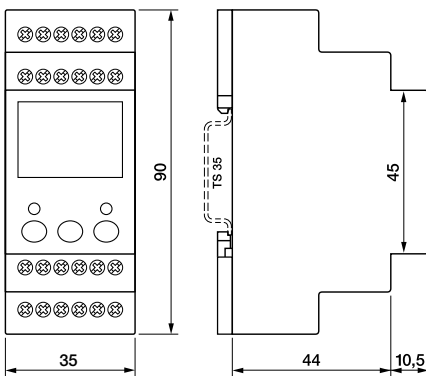
Monitoring function	Overcurrent
Measuring current range	-5 ... 5 A
Alarm switch-on delay	0 ... 999.9 s
Alarm switch-off delay	0.1 ... 999.9 s
Scaling factor	0.1 ... 1000
Response time when an overcurrent event occurs	< 20 ms

\* complies with IEC 61810-3

### Wiring diagrams



### Dimensions



### Approvals



### Product key

**MR S 1 3 R / UC 12-48 V**

#### Product family

**MR** = Monitoring relay

#### Type

**U** = Voltage monitoring  
**I** = Current monitoring  
**M** = Multi-function monitoring  
**S** = Overcurrent and short circuit protection

#### Monitoring / protection

**1** = 1-phase / 1 channel

#### Rated voltage

12-48 V  
 110-240 V

#### Power supply

**UC (Universal Current)** = AC/DC

#### Options

**None** = Standard version  
**R** = Railway version

#### Output

**1** = One change over contact  
**2** = Two change over contacts  
**3** = One NO contact, one NC contact, forcibly guided

Complete technical documentation

