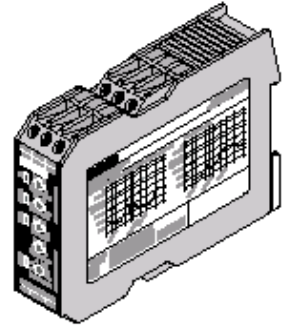


EMD-FL-C-10

Current Monitoring Relay



Data Sheet

08/2004

Functions

Current monitoring of direct and alternating current in 1-phase networks with settable threshold values, starting override and response delay that can be set separately, fault memory and the following functions that can be selected with the rotary switch:

- OVER overcurrent monitoring
- UNDER undercurrent monitoring
- WIN monitoring of the range between the thresholds MIN and MAX

Structure

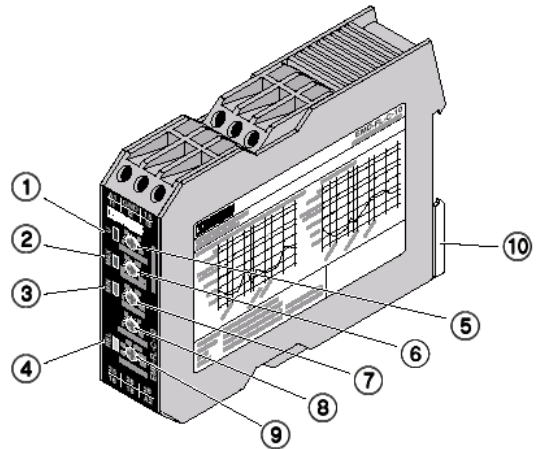


Figure 1 Structure

- 1 LED: Supply U
- 2 LED: Threshold value MAX
- 3 LED: Threshold value MIN
- 4 LED: Output relay R
- 5 Potentiometer START – starting override
- 6 Potentiometer MAX
- 7 Potentiometer MIN
- 8 Potentiometer DELAY – response delay
- 9 Rotary switch function
- 10 Snap-on foot

Technical Data

Power Supply	
Supply voltage	24 V ... 240 V AC/DC
Connection terminal blocks (electrically isolated)	A1 - A2
Tolerance	-15% ... +10% AC / -20% ... +25% DC
Nominal frequency	48 Hz ... 400 Hz
on request	16.6 Hz
Nominal operational power	4.5 VA (1.5 W)

Measuring Input			
Time setting range for starting override	0 s ... 10 s		
Time setting range for response delay	0.1 s ... 10 s		
Measured value	DC, AC sinus (16.6 Hz ... 400 Hz)		
Measuring input	100 mA AC/DC	1 A AC/DC	10 A AC/DC
Connection terminal blocks	GND - I1(+)	GND - I2(+)	GND - I3(+)
Overload capacity	800 mA	3 A	12 A
Input resistance	470 mΩ	47 mΩ	5 mΩ
Switching threshold			
– max. (relative to I_N)	10% ... 100%		
– min. (relative to I_N)	5% ... 95%		

Accuracy	
Basic accuracy of scale end value	±5%
Setting accuracy of scale end value	≤ 5%
Repeat accuracy	≤ 2%
Temperature influence	≤ 0.1%/K

Contact Side (Output)	
Contact type	Floating PDT (2x)
Rated voltage in accordance with IEC 60664-1	250 V AC
Switching capacity	
– device mounted in row (spacing < 5 mm)	750 VA (3 A/250 V AC)
– device not mounted in row (spacing > 5 mm)	1250 VA (5 A/250 V AC)
Fusing	5 A fast
Mechanical service life	20 x 10 ⁶ cycles
Electrical service life (ohmic load 1000 VA)	2 x 10 ⁵ cycles
Switching rate in accordance with IEC 60947-5-1	
– max. (with ohmic load 100 VA)	60/min.
– max. (with ohmic load 1000 VA)	6/min.

Climatic Data	
Ambient temperature	
– operation (IEC 60068-1/UL 508)	-25°C ... +55°C / -25°C ... +40°C (-13°F ... 131°F / -13°F ... 104°F)
– storage	-25°C ... +70°C (-13°F ... 158°F)
Relative humidity	15% ... 85%
Climatic class in accordance with IEC 60721-3-3	3K3
Contamination class in accordance with IEC 60664-1	3

General Data	
Duty cycle	100%
Recovery time	500 ms
Surge voltage category in accordance with IEC 60664-1	III
Rated surge voltage	4 kV

Indicators	
Supply voltage applied: green LED	ON
Starting override: green LED	Flashes
Position of output relay: yellow LED	ON / OFF
Error in corresponding threshold: red LED	ON / OFF
Response delay in corresponding threshold: red LED	Flashes

Housing	
Material	Polyamide PA 6.6, self-extinguishing
Degree of protection	IP40
Mounting	On 35 mm DIN rails in accordance with EN 60715-35
Installation position	As desired
Dimensions (W x H x D)	22.5 mm x 90 mm x 113 mm (0.886 in. x 3.543 in. x 4.449 in.)
Weight	approx. 160 g

Connection Terminal Blocks	
Touch-proof	Yes
Degree of protection	IP20
Torque, max.	1 Nm
Conductor cross section	
– with/without ferrule	1 x 0.5 ... 2.5 mm ² (AWG 20 ... 14)
– without ferrule	1 x 4 mm ² (AWG 12)
– with/without ferrule	2 x 0.5 mm ... 1.5 mm ² (AWG 20 ... 16)
– flexible without ferrule	2 x 2.5 mm ² (AWG 14)

Ordering Data

Description	Order Designation	Order No.
Current monitoring relay	EMD-FL-C-10	28 66 02 2

Installation



Danger of fatal injury!

Never carry out work on live parts!

The monitoring module can be snapped onto all 35 mm DIN rails in accordance with EN 60715-35.

An integrated wide range power supply unit allows voltage in the range of 24 V AC/DC to 240 V AC/DC to be connected.

Circuit Diagram

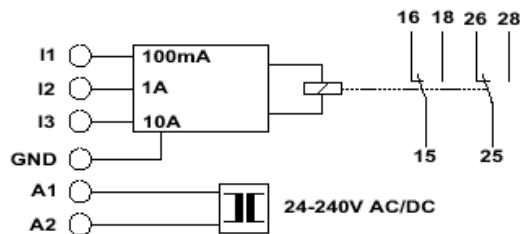


Figure 2 Circuit diagram

Connection Examples

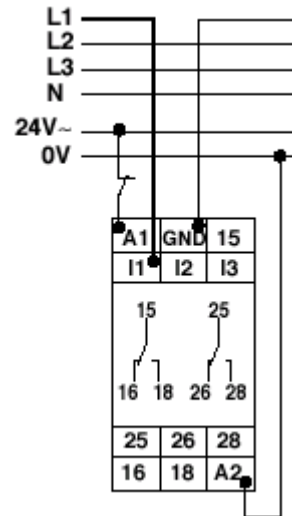


Figure 3 Measuring range 100 mA (I1)

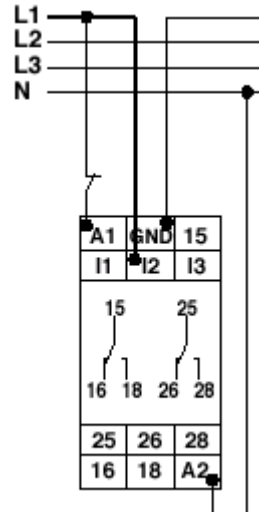


Figure 4 Measuring range 1 A (I2)

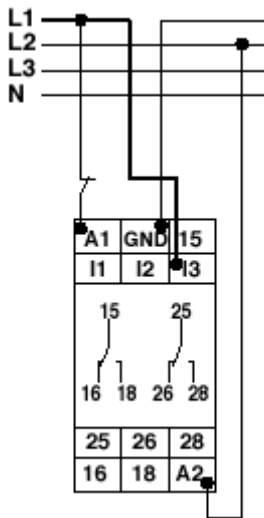


Figure 5 Measuring range 10 A (I3)

Functional Description

When supply voltage U is applied, output relay R picks up (yellow LED REL lights up) and the start override (START) begins its count down (green LED U flashes). During start override, changes in the measured current have no effect on the position of the output relay. Once the start override duration has expired, the green LED U remains permanently lit. LEDs MIN and MAX flash alternately for all functions if the minimum value selected for the measured current is greater than the maximum value.

The desired function is set with the rotary switch (Figure 6):

- O = Overcurrent monitoring OVER
- U = Undercurrent monitoring UNDER
- W = Window function WIN / monitoring of the range between the thresholds MIN and MAX
- WL = WIN + LATCH / monitoring of the range between the thresholds MIN and MAX with fault memory
- UL = UNDER + LATCH / undercurrent monitoring with fault memory
- OL = OVER + LATCH / overcurrent monitoring with fault memory



Figure 6 Rotary switch

Overcurrent Monitoring – OVER, OVER + LATCH

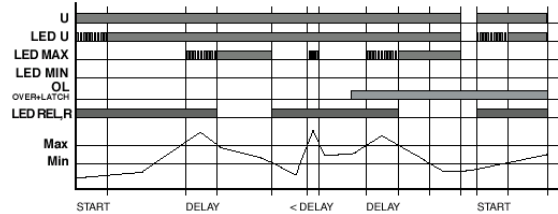


Figure 7 Overcurrent monitoring – OVER, OVER + LATCH

When the measured current exceeds the value set on the MAX regulator, the response delay (DELAY) starts to elapse (red LED MAX flashes). When the response delay has elapsed (red LED MAX lights up), output relay R drops out (yellow LED REL does not light up). If the measured current falls below the value set on the MIN regulator (red LED MAX does not light up), the output relay R picks up again (yellow LED REL lights up).

If the fault memory is activated (OVER + LATCH) and the measured current has exceeded the value set on the MAX regulator by longer than the response delay set, output relay R does not pick up if the current sinks below the value set on the MIN regulator.

After clearing the error (interrupting the supply voltage), output relay R picks up when the supply voltage is reconnected and the measuring cycle begins again after the start override duration has expired (START).

Undercurrent Monitoring – UNDER, UNDER + LATCH

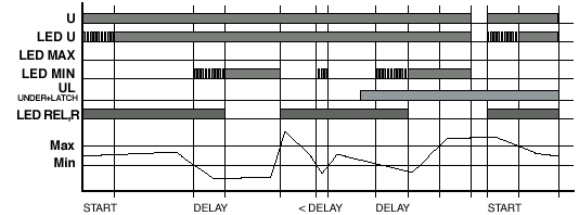


Figure 8 Undercurrent monitoring – UNDER, UNDER + LATCH

When the measured current falls below the value set on the MIN regulator, the response delay (DELAY) starts to elapse (red LED MIN flashes). When the response delay has elapsed (red LED MIN lights up), output relay R drops out (yellow LED REL does not light up). If the measured current falls below the value set on the MAX regulator, the output relay R picks up again (yellow LED REL lights up).

If the fault memory is activated (UNDER + LATCH) and the measured current has dropped below the value set on the MIN regulator for longer than the response delay set, output relay R does not pick up if the current exceeds the value set on the MAX regulator. After clearing the error (interrupting the supply voltage), output relay R picks up when the supply voltage is reconnected and the measuring cycle begins again after the start override duration has expired (START).

Window Function – WIN, WIN + LATCH

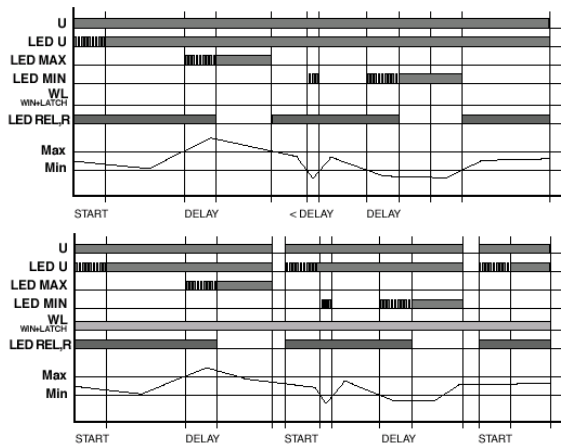


Figure 9 Window function – WIN, WIN + LATCH

The output relay R picks up (yellow LED REL lights up) if the measured current exceeds the value set on the MIN regulator. When the measured current exceeds the value set on the MAX regulator, the response delay (DELAY) starts to elapse (red LED MAX flashes). When the response delay has elapsed (red LED MAX lights up), output relay R drops out (yellow LED REL does not light up).

The output relay R picks up again (yellow LED REL lights up) when the measured current drops below the maximum value again (red LED MAX does not light up). If the measured current falls below the value set on the MIN regulator, the response delay (DELAY) starts to elapse (red LED MIN flashes). When the response delay has elapsed (red LED MIN lights up), output relay R drops out (yellow LED REL does not light up).

If the fault memory is activated (WIN + LATCH) and the measured current has dropped below the value set on the MIN regulator for longer than the response delay set, output relay R does not pick up if the minimum value is exceeded. If the measured current has exceeded the value set on the MAX regulator by longer than the response delay set, output relay R also does not pick up if the current sinks below the maximum value. After clearing the error (interrupting the supply voltage), output relay R picks up when the supply voltage is reconnected and the measuring cycle begins again after the start override duration has expired (START).



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