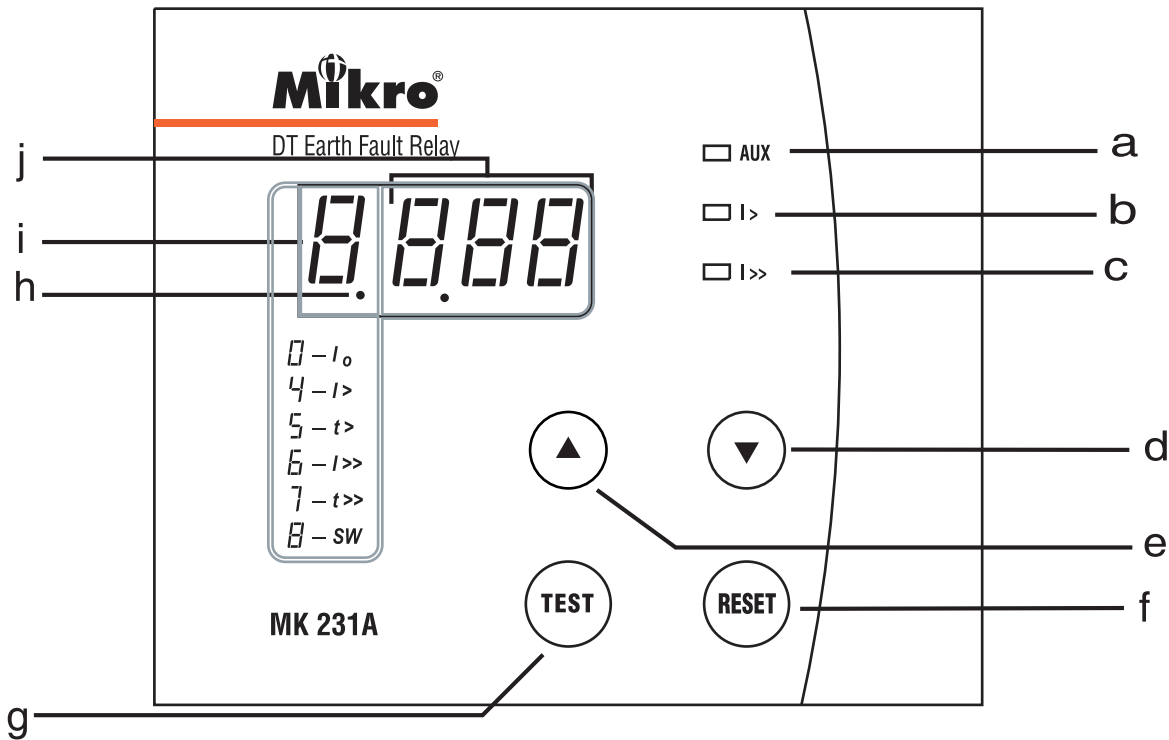


MK231A Earth-fault Relay User's Guide

A BRIEF OVERVIEW



- a - Auxiliary power supply indicator
- b - Low-set start/trip status indicator
- c - High-set start/trip status indicator
- d - Down key
- e - Up key
- f - Reset key
- g - Test key
- h - DP indicator
- i - FUNCTION indicator
- j - DATA indicator

Symbols

- I_0 - Earth-fault current
- $I>$ - Low-set
- $t>$ - Low-set delay time
- $I>>$ - High-set
- $t>>$ - High-set delay time
- SW - Soft switches

1. DESCRIPTION

The MK231A is a microprocessor based numerical earth-fault relay. It uses fundamental frequency current measurement for excellent harmonic current rejection. The relay provides two-element (low-set and high-set) earth-fault protection with definite time characteristic. The 4-digit panel display on the MK231A allows the display of present load current; recorded fault current for last tripping; and all setting of the relay.

2. LIGHT INDICATORS

The indicators display the status of the system as follow:

Indicator					Status
Aux	I>	I>>	FUNC	DT	
0	0	0	0	0	No Auxiliary power supply.
1	0	0	X	X	Normal condition, no tripping.
1	1	0	X	X	Low-set overcurrent triggered, time delay countdown started.
1	0	1	X	X	High-set overcurrent triggered, time delay countdown started.
1	B	0	B	B	Low-set tripped, DT LEDs show tripped value.
1	0	B	B	B	High-set tripped, DT LEDs show tripped value.
1	X	X	B	1	Programming mode.

Table 1: System Status

1 = ON 0 = OFF X= don't care, not blinking
B = blinking DT = DATA FUNC = FUNCTION

Indicator		
FUNCTION	DP	DATA
0	off	Earth fault current.
0	blink	Previous tripped current.
4	off	Low-set current setting.
5	off	Low-set delay time setting.
6	off	High-set current setting.
7	off	High-set delay time setting.
8	off	Soft switch setting.

Table 2: FUNCTION Code

Note: Under normal operating condition, The 4-digit display is off. When the RESET key is pressed, the 4-digit display will light up. The display will switch off automatically after 6 minutes if no further key is pressed.

3. PUSH-BUTTONS OPERATION

a) Trip test

Press the "TEST" button to simulate a trip

b) Trip reset

Press the "RESET" button to reset the relay when tripped.

c) View setting

When the relay is not under tripped condition, pressing the "RESET" button will scroll through the various functions.

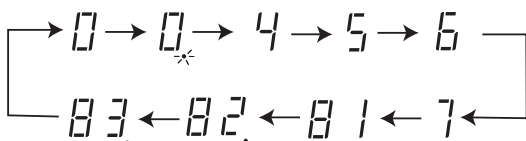


Figure 1: Scroll sequence

d) Program setting

Only function codes from 4 to 8 can be programmed.

Step 1: Press RESET key until the function digit shows required function.

Step 2: Press the UP and DOWN key simultaneously to enter programming mode. The function digit will blink to indicate the relay is in programming

Step 3: Use the UP or DOWN key to select the desired value.

Step 4: To save the selected value, press the UP and DOWN key simultaneously again. It will exit the programming mode with the data digits displaying new setting.

To exit programming mode without saving the selected setting, press the RESET key once.

4. OUTPUT CONTACTS

The MK231A has two set of output contact:

- (i) CONTACT R1 - linked to trip signal.
- (i) CONTACT R2 - linked to trip or start signal.

The output contact can be programmed to be either auto reset type or manual reset type.

For auto reset type, the contact remain activated until the fault current is removed.

For manual reset type, the contact remain activated.

5. SOFT SWITCHES

The MK231A incorporates 3 soft switches for system configuration. When the function digit shows "8", the relay is in soft switch setting mode.

8888

switch value (SVL)

switch number (SW)

SW	SVL	System configuration
1	00	Contact R1 linked to trip signal auto reset type.
	01	Contact R1 linked to trip signal manual reset type.
2	00	Contact R2 linked to trip signal auto reset type.
	01	Contact R2 linked to trip signal manual reset type.
	10	Contact R2 linked to signal auto reset type.
	11	Contact R2 linked to signal manual reset type.
3	00	High-set disabled.
	01	High-set enabled.

Table 3: Soft switch setting

6. TECHNICAL DATA

Ratings

Rated current I_n 5 A
 Frequency50 Hz or 60 Hz
 Burden< 0.3 VA at I_n

Auxiliary Supply

MK231A-240A(6).....198~265 VAC
 MK231A-110A(6).....94~127 VAC
 Supply frequency50 Hz or 60 Hz
 VA rating3 VA typical

Setting Ranges

Low-set setting $I>$0.10 - 5.00 A (2%-100%)
 Low-set definite time $t >$ 0.05- 99 sec
 High-set setting $I>>$ 0.10 - 50.0 A (2%-1000%)
 High-set definite time $t>>$0.05 - 2.5sec

Outputs

Trip Contact:

Rated voltage250 VAC
 Continuous carry5A ($\cos \varphi = 1.0$)
 Make and carry for 0.2 s30A

Contact specification

Expected electrical life 10^5 operations
 Expected mechanical life 5×10^6 operations

Indicators

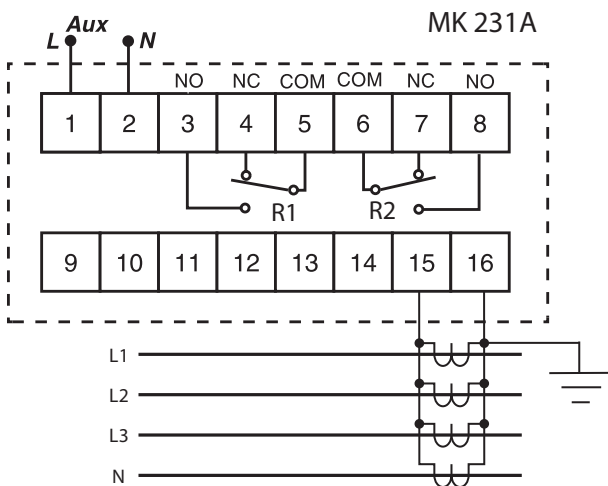
Auxiliary supplyGreen LED indicator
 Pick upRed LED indicator
 Trip7 segment LED and red LED indicators

Mechanical

MountingPanel mounting
 Front panelStandard DIN 96x96 mm
 Approximate weight0.6 kg

7. CONNECTION DIAGRAMS

Earth Fault Relay



8. CASE DIMENSION

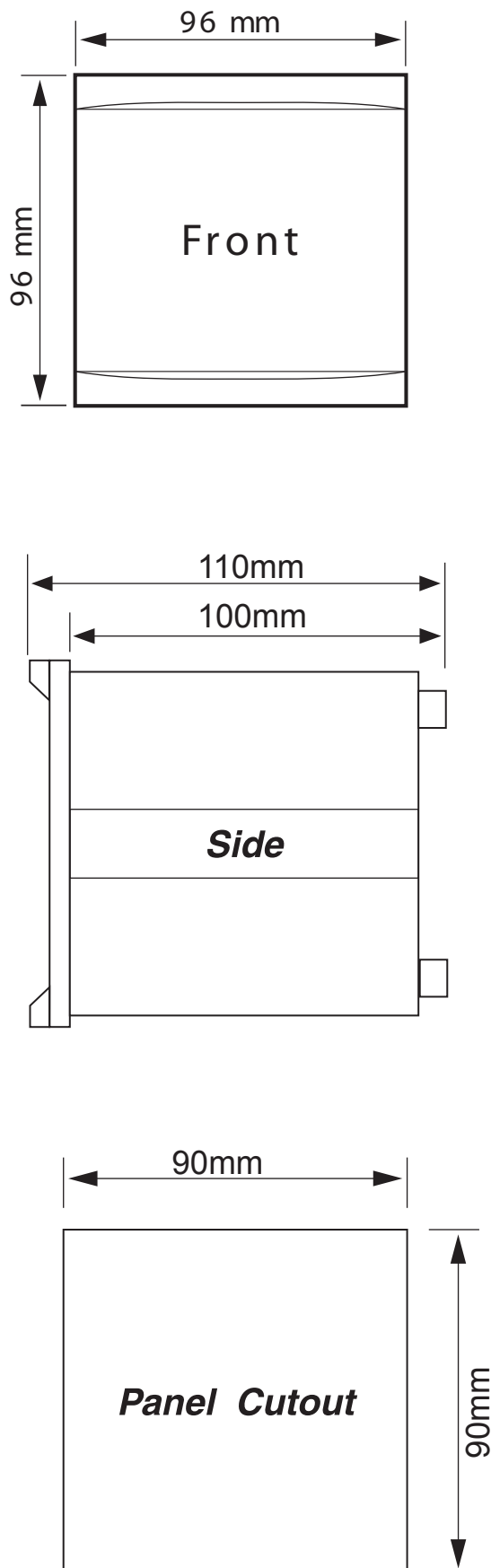


Figure 2: Case Dimension