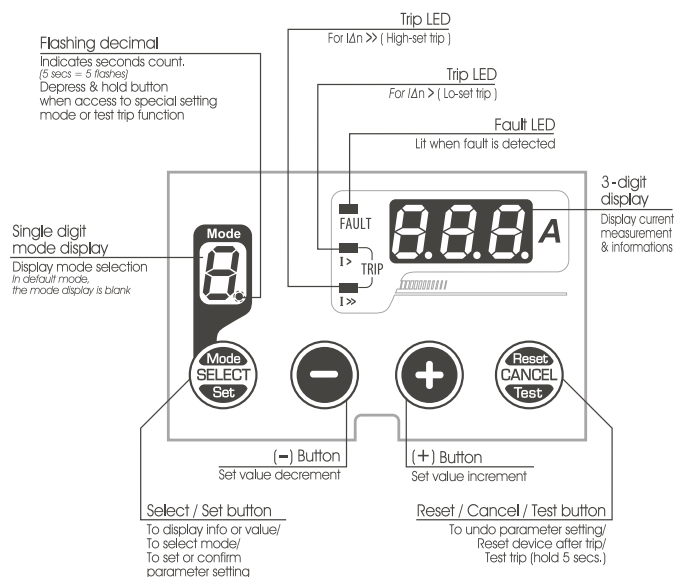# User Guide

TM-18c
Digital Earth Leakage Relay - DIN Rail Type

features

True RMS Measurement with SPARC[1] and DCOI[2] Algorithm
Fundamental Signal Detection[3]
Real Time Display of IΔn in Ampere
Fault / Io-set & hi-set Trip LED Indication
Fault Start Event Recording + Output[4]
Pre-Alarm Output[4]
Trip Event Memory (non-volatile 7 previous records)
Fault Start Event Memory (non-volatile 4 previous records)
Selectable Frequency (50/60 Hz)
Programmable Relay Output contact for K2
Last Trip Elapsed Time (up to 99days)
Auto Z.C.T. detection
Software Lock to Prevent Unauthorized Setting
35mm wide DIN Rail mount
Complies with IEC-60255-26/27 ; BS EN 50121-5 Standards

Panel Overview

Flashing decimal
Indicates seconds count.
(5 secs = 5 flashes)
Depress & hold button
when access to special setting
mode or test trip function

Trip LED
For IΔn ≫ (High-set trip)

Trip LED
For IΔn > (Lo-set trip)

Fault LED
Lit when fault is detected

3-digit display
Display current measurement & informations

Single digit mode display
Display mode selection
*In default mode,
the mode display is blank*

FAULT
I > TRIP
I ≫

Mode

(−) Button
Set value decrement

(+) Button
Set value increment

Select / Set button
To display info or value/
To select mode/
To set or confirm
parameter setting

Reset / Cancel / Test button
To undo parameter setting/
Reset device after trip/
Test trip (hold 5 secs.)

Technical Data

Aux Power	:	65 ~ 275 Vac (45 ~ 65 Hz); 90 ~ 300 Vdc or 18~72 Vdc
Fundamental Frequency	:	50 or 60 Hz (software selectable)
Current Input (IΔn)	:	ZCT (multiple sizes from ID of 30~200mm)
Measurement Range	:	0.01 ~ 30.0 A
Output Relay Rating	:	SPDT 5A, 250V AC/DC
Consumption	:	< 3 VA
Accuracy	:	Current protection threshold (±5%), Time delayed (+5% or 50ms)
Display	:	7-Segment LED (3 + 1digit)
Indication (LEDs)	:	Fault, Io / hi-set trip
Operating Temp.	:	0°C ~ +55°C
Humidity	:	56 days at 93%RH, 40°C non-condensing
IP Rating	:	IP55 (Mounted at relay front), IP52 (Mounted at relay rear)
Weight	:	200 g

Parameter Setting Range

IΔn > (A) : Io-set	0.03 ~ 1.00 A (step of 0.01 A)
0.03 ~ 30.0 A	1.00 ~ 3.00 A (step of 0.05 A)
	3.00 ~ 10.0 A (step of 0.10 A)
	10.0 ~ 30.0 A (step of 0.50 A)

t > (sec) : Io-set trip time delay	0.03 ~ 0.10 s (step of 0.01s)
0.03 ~ 20.0 s	0.10 ~ 1.00 s (step of 0.02s)
	1.0 ~ 20.0 s (step of 0.1s)

IΔn ≫ (A) : hi-set	0.10~10.0 A (step of 0.10 A)
OFF or 0.10 ~ 30.0 A	10.0 ~ 30.0 A (step of 0.50 A)

t ≫ (sec) : hi-set trip time delay	**fixed @ 30ms**

Casing (DIN Rail type)
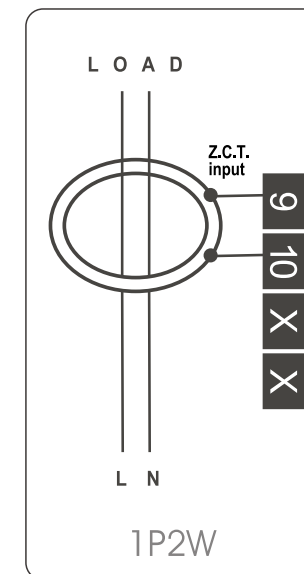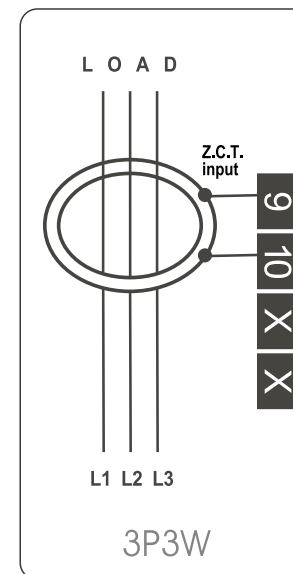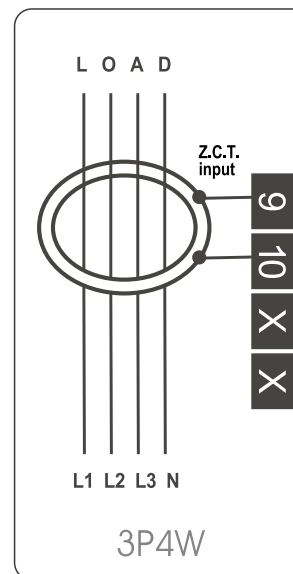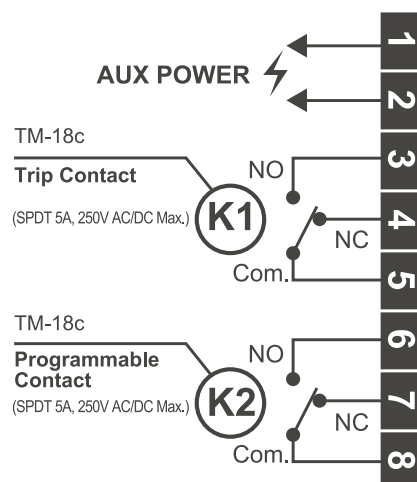

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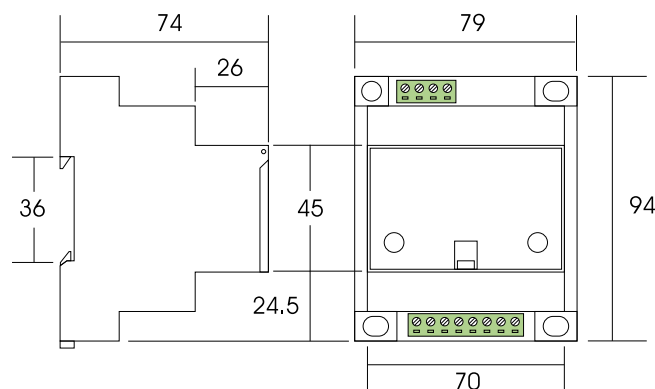
Note: All measurement in mm.

Note: Specification subject to change without prior notification
(please visit www.delab.com.my for latest specification)

Wiring

AUX POWER

1
2

TM-18c
Trip Contact
(SPDT 5A, 250V AC/DC Max.)
K1
NO
3
NC
4
Com.
5

TM-18c
Programmable Contact
(SPDT 5A, 250V AC/DC Max.)
K2
NO
6
7
NC
Com.
8

LOAD
Z.C.T. input
9
10
X
X
L1 L2 L3 N
3P4W

LOAD
Z.C.T. input
9
10
X
X
L1 L2 L3
3P3W

LOAD
Z.C.T. input
9
10
X
X
L N
1P2W

☰ Modes

⚙ SETTING

1 I∆n › (A) : Lo-set leakage current	**3** I∆n ≫ (A) : Hi-set leakage current
2 t › (sec) : Trip time delay	

ℹ INFO VIEWING

b , **c1** to **c6**	Trip memory	7 trip event memories (non-volatile)
d	Last trip elapsed time	Last trip elapsed time
E1 to **E4**	Fault start memory	4 fault start event memories (non-volatile)
F UEr	Version	Firmware version
F oPh	Operation hour	Device operated in hours (x 1000 hr.)

⚙ SPECIAL SETTING MODE

L	Software lock	Keypad lock : OFF or ON
r1	Trip relay K1 response type	Latching (Lc) or Non-latching (nLc)
r2	Output relay K2 function	Programmable relay output
r2	Trip relay K2 response type	Latching (Lc) or Non-latching (nLc)
Fr	Network frequency	Selectable as : 50 Hz or 60 Hz
-	Standby mode	Running LED bar : ON or OFF
Ct	Z.C.T. detection	Auto detection or No detection
End	End program setting	Save changes and exit setting mode

⚙ Parameters Setting

1 I∆n › (A) : *To set lo-set leakage current*

Step 1 : Press **[SELECT]** button once to enter mode **1**.
Display will show the existing set value. *(Range : 0.03 ~ 30.0 Ampere)*

Step 2 : Set the desired lo-set leakage current using the **[+] or [-]** button.
Newly selected value will flash.

Step 3 : Press **[SELECT]** button to store / confirm new value and advance to mode **2** or press **[CANCEL]** button to undo changes.

2 t › (sec) : *To set trip time delay*

Step 1 : Press **[SELECT]** button until mode **2** is displayed.
Display will show the existing set value. *(Range : 0.03 ~ 20.0 seconds)*

Step 2 : Set the desired trip time using the **[+] or [-]** button.
Newly selected value will flash.

Step 3 : Press **[SELECT]** button to store / confirm new value and advance to mode **3** or press **[CANCEL]** button to undo changes.

3 I∆n ≫ (A) : *To set hi-set leakage current*

Step 1 : Press **[SELECT]** button until mode **3** is displayed.
Display will show the existing set value. *(Range : OFF or 0.10 ~ 30.0 Ampere)*

Step 2 : Set the desired hi-set leakage current using the **[+] or [-]** button.
Newly selected value will flash.

Step 3 : Press **[SELECT]** button to store / confirm new value and advance to mode **b** or press **[CANCEL]** button to undo changes.

ℹ Info Viewing

b, c1 ~ c6 *Tripped values for last 7 events*

Press **[SELECT]** button until mode **b**.
Display will flash the tripped value for the most recent tripped event.

Single flash : Indicate a lo-set trip	To reset trip event memory, hold **[RESET]** button for 3 sec. in mode **b**.
Double flash : Indicate a high-set trip	

Manual tripped event will display a flashing **trP**.
If display shows **- - -**. (No tripping has occured)
Press **[SELECT]** button again to scroll thru mode **c1** to **c6**. *(Auto skip to mode **d** if memory is empty)*
To skip directly to mode **d**, hold **[SELECT]** button for 1 sec.
To exit, press **[CANCEL]** button.

d *View last trip elapsed time*

Press **[SELECT]** button until mode **d**.
Display will show **- - -** *(device has no tripping since last power up)*.

e.g.
hour min **00h23m** Display up to 99 hour 99 min	→	day hour **00d23h** Display up to 99 day 99 hour		over 99 day **oUr 99d**

To exit, press **[CANCEL]** button.

E1 ~ E4 *Fault start event memory*

Press **[SELECT]** button until mode **E1**. If display show **- - -** (no fault event has occured).
Press **[SELECT]** button again to scroll thru mode **E2** to **E4**. *(Auto skip to mode **F** if memory is empty)*
To reset memory, hold **[RESET]** button for 3 seconds in mode **E1**.
To exit, press **[CANCEL]** button.

F UEr *Firmware version*

This mode is not adjustable. For user to view firmware version.
Press **[SELECT]** button until mode **F UEr** is being displayed.
The display will show the firmware version of the device.
To exit, press **[CANCEL]** button.

F oPh *Total operation hour*

This mode shows the total time of the device that has been in operation.
Press **[SELECT]** button until mode **F oPh** is being displayed.
Display will show a value (x1000 hr).
To exit, press **[CANCEL]** button.

⚙ Special Setting Modes

When NO mode is selected (mode display is blank),
i) Press **[SELECT] & [RESET]** button simultaneously and hold for 5 seconds until mode **L** appears.
ii) Press **[+]** or **[–]** button to modify
iii) Press **[SET]** button to confirm and proceed to next mode

L Software keypad lock

OFF or **On**

r1 Trip relay K1 response type

Lc : Latching trip **nLc** : Non-Latching trip

r2 Output relay K2 function

trP : Tripping output (Lc / nLc)

Fault Start Output Function
LFS : Lo-set fault start signal output (Lc / nLc)
HFS : Hi-set fault start signal output (Lc / nLc)
AFS : Any fault start signal output (Lc / nLc)

To view recorded of fault start event, scroll to mode **E1**
K2 output will be on if programmed as fault start event. To latch fault events output, select **r2** to Lc in trip relay K2 response type.

Device Failure Output Function
dUF : Device failure output (nLc only)
K2 automatically turns ON when device and Z.C.T. are functioning normally.
K2 will turns OFF when device is malfunction or Z.C.T. is open-circuited.

Circuit Breaker Failure Output Function
CbF : Circuit breaker failure output (nLc only)
Activates K2 output if fault still exists after 100 ms of trip event.

Pre-Alarm Output Function
A50 : >50% of I∆n › (Lc / nLc)
A90 : >90% of I∆n › (Lc / nLc)
Set **r2** to Lc in trip relay K2 response type if need to latch pre-alarm events.
Press **[RESET]** button to clear output.

r2 Trip relay K2 response type

Lc : Latching trip **nLc** : Non-Latching trip

Fr Electrical network system frequency

Electrical network frequency setting:
50 = 50 Hz **60** = 60 Hz

- Standby option

OFF : De-activate **On** : Activate

After about 3 minutes of idle and no leakage is detected, running LED bar will be displayed instead of the real time leakage current if activated. It automatically exits on leakage detection or Z.C.T. is not connected or when any button is pressed. When device trips, standby mode is temporary de-activated until device is reset.

When Z.C.T. is open-circuited, standby mode is temporarily de-activated until Z.C.T. is connected.

To toggle this setting, user can also press **[SELECT]** button when powering up the device.

Ct Z.C.T. detection

OFF : No detection **Aut** : Auto detection

Ct is being displayed and flashing instead of the real time leakage current when auto Z.C.T. detection is activated, it means that the Z.C.T. is not connected properly. User may need to check the wiring connection with the device.

End End setting

Press **[SELECT]** button to exit and save the setting or **[CANCEL]** button to go back.