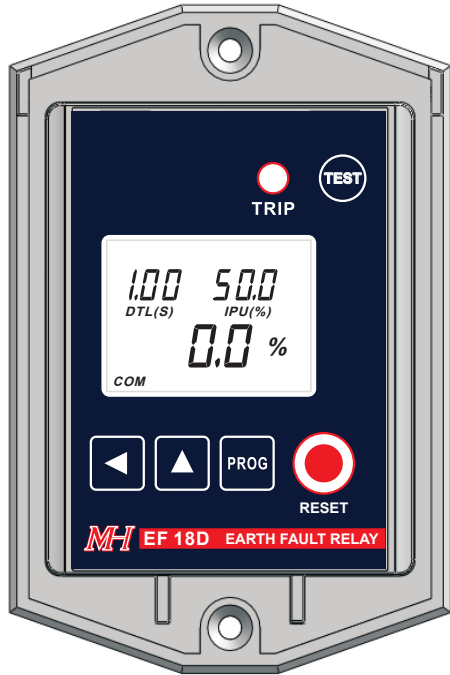


# EF-18D

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## OPERATIONAL MANUAL

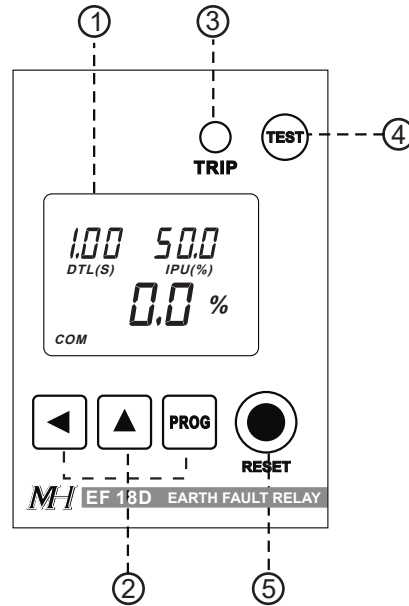


***MH*** Mun hean singapore Pte Ltd.

## 1. Hardware:

### 1.1 Front

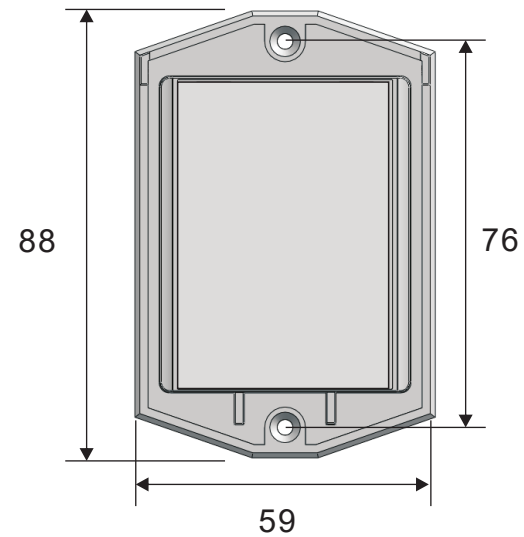
- ① LCD display  
Real time current (%),  
Pickup current and delay time setting
- ② Function buttons  
Setting and toggling between pages
- ③ Trip LED  
Lighted: Relay Trip
- ④ Test button  
Press 2 times continuously to trip  
TRIP LED lited, display show **TRIP**
- ⑤ RESET button  
Press to reset the relay and off the TRIP LED



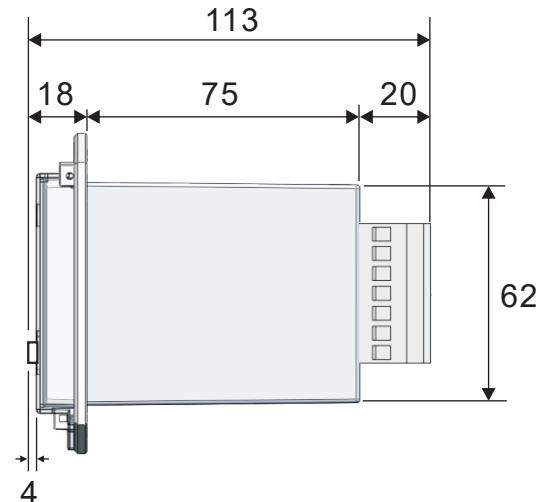
## 2. Mounting and Connection

### 2.1 Dimension and Cut out: Unit: mm

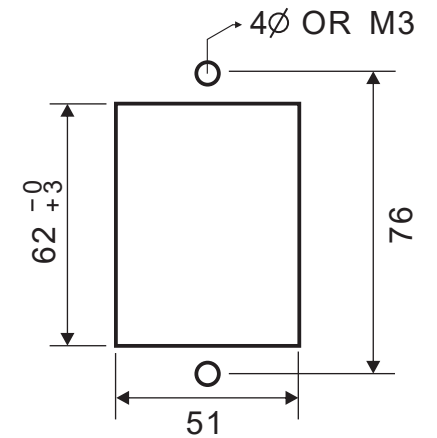
#### ● Front View



#### ● Side View

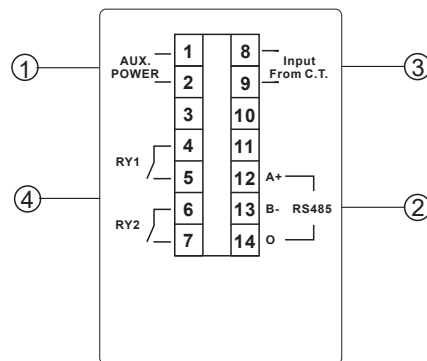


#### ● Cut out



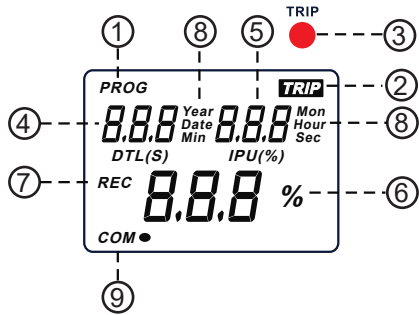
### 1.2 Terminals description

- ① Aux power
- ② RS485 communication
- ③ Current input
- ④ Trip Contacts



### 3. Display and Buttons description

#### 3.1 LCD Display and descriptions



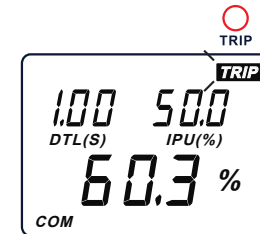
- ① **PROG** will show when in Program mode
- ④ ⑤ Setting parameters, DTL(s), IPU(%) will not show
- ② TRIP status  
Relay pickup, **TRIP** flashing  
Relay trips, **TRIP** stop flashing, <sup>TRIP</sup> TRIP LED on
- ③ TRIP LED: When Trip, it will light up  
ON constantly: Relay trip, contact close  
Display will toggle between REC and Setting
- ④ DTL(s) Time delay setting : 0.01 ~ 2.00 sec
- ⑤ IPU(%) Current threshold setting : 2.0 ~ 50.0%
- ⑥ Real time current reading (%)
- ⑦ REC: ④ ⑤ will show the trip memories
- ⑧ Combine with ④ ⑤ to show trip records Date and Time
- ⑨ COM: RS485 function is enable, communication in progress ● will come ON

#### 3.2 Display and Button descriptions

- Toggles between Real time current reading and trip records (REC is ON) (Refer to 4.1 for more info)
- Trip records: Toggles between Trip records (Rx.1 ~4)
- Program mode access (Refer to 4.1 for more info)
- Test button  
Press the first time without release the button it will show *REL ESE*  
Release the button it will show *RES REN* Press again to Trip (No effect when in program mode)  
Note: 3 sec after the button is press for the first time, the TEST command will cancel.
- Reset button  
Relay contact reset and TRIP LED OFF

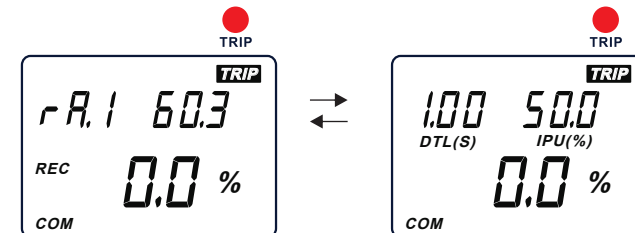
#### 3.3 Fault detection and Tripping display description

Fault detected and Timer started display



During the Timer counting, **TRIP** symbol flashing, TRIP LED not lighted.

TRIP display example, Trip record display will toggle with the setting display



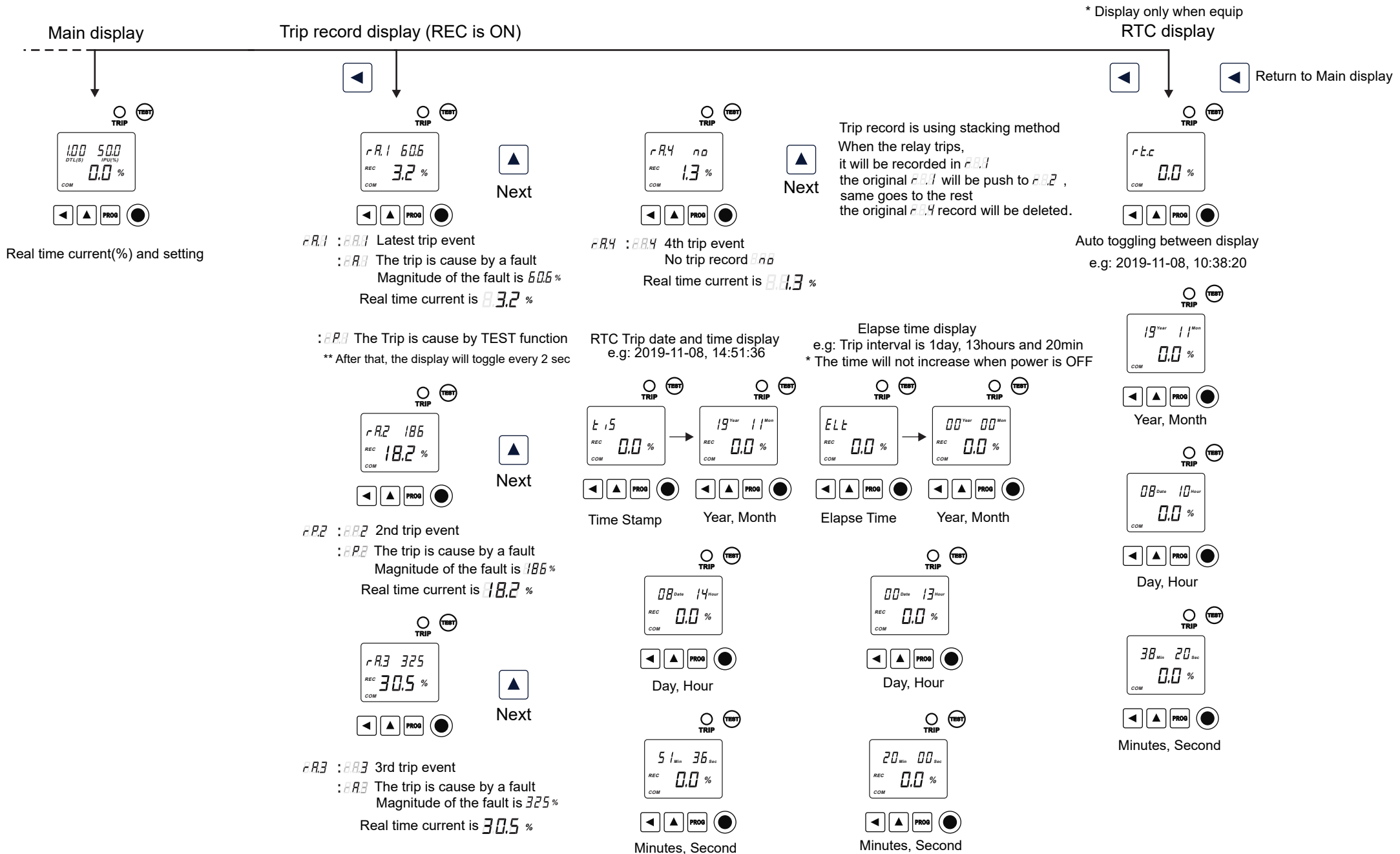
**TRIP** symbol is ON  
TRIP LED is ON  
Contact energise

Trip record will display in Magnitude, Year, month, days, hour, min

Setting display

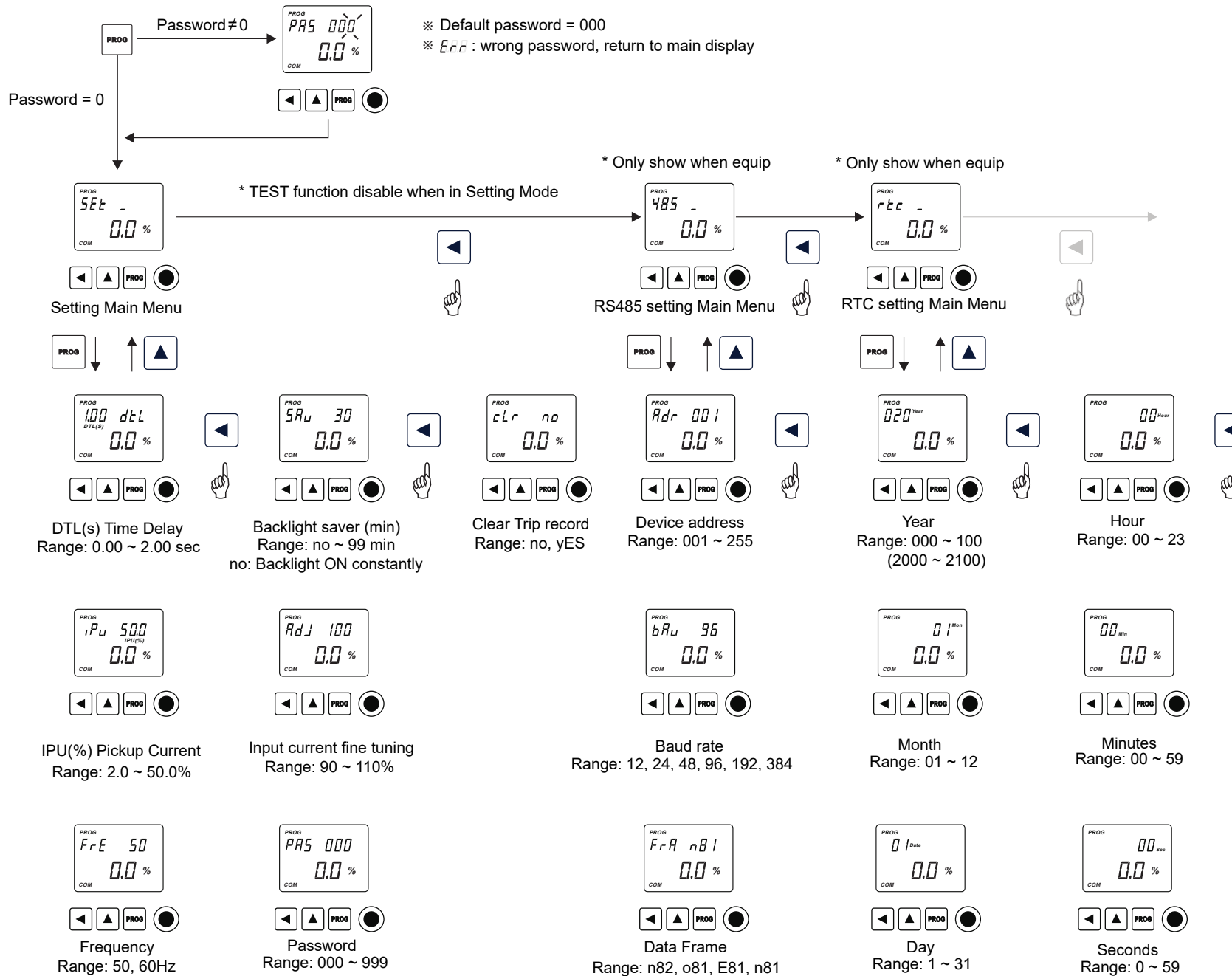
### 3. Display and Buttons description

#### 3.4 Display descriptions with example



## 4. Configuration and keys function

### 4.1 Setting Menu:



### 4.2 Button Functions

#### Main Menu

- Enter to Sub-menu
- Toggle between main menu
- Return to Main display
- No effect
- Reset

#### Sub-Menu

- Enter to parameter setting
- Toggle between Sub-menu
- Return to Main Menu
- No effect
- Reset

#### Parameter Setting

- Value increment
- Value decrement
- Move cursor
- Enter to save  
Return to Sub-menu
- No effect
- Reset

## 5. Technical specifications:

### General

Operating Voltage range	AC/DC 85 ~ 265V
Voltage burden	≤ 3.5VA
Input current	5A
Current burden	≤ 0.1VA
Sensitivity adjustment	2.0 ~ 50.0% in step of 0.1%
Delay time adjustment	0.01 ~ 2.00 sec (in step of 0.01sec)
Output relay contacts	AC250V 5A (2 x NO)
LCD backlight display	Real-time fault current: 6mm high, DTS(S), IPU(%) 4mm high
Trip Indicator	Red LED (relay tripped)
Operation temperature range	0 ~ 60°C
Storage temperature range	-10 ~ 70°C
Enclosure protection	IP31
Dimension	(59 width x 88 length x 113 depth)mm
Weight	Approximated 185g

### Electromagnetic Compatibility Test

IEC 60255-26 IEC/EN 61000-4-2:2009	Electrostatic discharge
IEC 60255-26 IEC/EN 61000-4-3:2011	Electromagnetic Radio frequency field
IEC 60255-26 IEC/EN 61000-4-4:2013	Electrical fast transient
IEC 60255-26 IEC/EN 61000-4-5:2007	Surge
IEC 60255-26 IEC/EN 61000-4-6:2009	Conducted disturbance induced by radio frequency
IEC 60255-26 IEC/EN 61000-4-8:2010	Power frequency magnetic field
IEC 60255-26 IEC/EN 61000-4-11:2005	Voltage dips, short interrupts, voltage variation and frequency changes
IEC 60255-26 EN 55011 CISPR II	Conducted emission
IEC 60255-26 EN 55011 CISPR II	Radiated emission
IEC 60255-27	Product safety requirement

## 6. Communication

### Setting Parameters

Address	(HEX)	Contents	Format	Word	Access	Range/Unit
0000	0000H	DTL(S) Time Delay	Integer	1	R	0 - 200 / 0.01sec
0001	0001H	IPU(%) Pick-up Current	Integer	1	R	20 - 500 / 0.1%
0002	0002H	Reserved	Integer	1	R	
0003	0003H	Fine tune	Integer	1	R	90 - 100%
0004	0004H	Frequency	Integer	1	R/W	0 - 1 (Note)
0005	0005H	Backlight saver	Integer	1	R/W	0 (disable) 1 - 99 min
0006	0006H	Reserved	Integer	1	R/W	
0007	0007H	Password	Integer	1	R/W	000 - 999
0008	0008H	Device address	Integer	1	R/W	1 - 255
0009	0009H	Baud rate	Integer	1	R/W	0 - 5 (Note)
0010	000AH	Data frame	Integer	1	R/W	0 - 3 (Note)
0011	000BH	Clear records	Integer	1	R/W	0 - 1 (1: Clear)
0012	000CH	Reserved	Integer	1	R/W	
0013	000DH	Reserved	Integer	1	R/W	
0014	000EH	RTC Year	Integer	1	R/W	0 - 100 (Note)
0015	000FH	RTC Month	Integer	1	R/W	1 - 12 (Note)
0016	0010H	RTC Day	Integer	1	R/W	1 - 31 (Note)
0017	0011H	RTC Hour	Integer	1	R/W	0 - 23 (Note)
0018	0012H	RTC Minutes	Integer	1	R/W	0 - 59 (Note)
0019	0013H	RTC Second	Integer	1	R/W	0 - 59 (Note)

#### Note:

Parameter	Description
Frequency	0 : 50, 1 : 60
Baud rate	0: 1200, 1: 2400, 2: 4800, 3: 9600, 4: 19200, 5: 38400
Data frame	0: n,8,2, 1: o,8,1, 2: e,8,1, 3: n,8,1
RTC	No effect if there is no RTC

### Measured values

Address	(HEX)	Contents	Format	Word	Access	Range/Unit
0512	0200H	Reserved	Integer	1	R	
0513	0201H	Input Current(%)	Integer	1	R	%
0514	0202H	Reserved	Integer	1	R	
0515	0203H	Pick-up Status	Integer	1	R	1: Limit exceed
0516	0204H	Trip Status	Integer	1	R	1: Trip
0517	0205H	Reserved	Integer	1	R	
0518	0206H	REC.1: Latest Trip record (type)	Integer	1	R	Note
0519	0207H	REC.1: Latest Trip record (Fault level)	Integer	1	R	0.1%
0520	0208H	REC.2: 2nd Trip record (type)	Integer	1	R	Note
0521	0209H	REC.2: 2nd Trip record (Fault level)	Integer	1	R	0.1%
0522	020AH	REC.3: 3rd Trip record (type)	Integer	1	R	Note
0523	020BH	REC.3: 3rd Trip record (Fault level)	Integer	1	R	0.1%
0524	020CH	REC.4: 4th Trip record (type)	Integer	1	R	Note
0525	020DH	REC.4: 4th Trip record (Fault level)	Integer	1	R	0.1%
0526	020EH	REC.1 Trip Year	Integer	1	R	Note (+2000)
0527	020FH	REC.1 Trip Month	Integer	1	R	Note
0528	0210H	REC.1 Trip Days	Integer	1	R	Note
0529	0211H	REC.1 Trip Hours	Integer	1	R	Note
0530	0212H	REC.1 Trip Minutes	Integer	1	R	Note
0531	0213H	REC.1 Trip Second	Integer	1	R	Note
0532	0214H	REC.2 Trip Year	Integer	1	R	Note (+2000)
0533	0215H	REC.2 Trip Month	Integer	1	R	Note
0534	0216H	REC.2 Trip Days	Integer	1	R	Note
0535	0217H	REC.2 Trip Hours	Integer	1	R	Note
0536	0218H	REC.2 Trip Minutes	Integer	1	R	Note
0537	0219H	REC.2 Trip Second	Integer	1	R	Note
0538	021AH	REC.3 Trip Year	Integer	1	R	Note (+2000)
0539	021BH	REC.3 Trip Month	Integer	1	R	Note
0540	021CH	REC.3 Trip Days	Integer	1	R	Note
0541	021DH	REC.3 Trip Hours	Integer	1	R	Note
0542	021EH	REC.3 Trip Minutes	Integer	1	R	Note
0543	021FH	REC.3 Trip Second	Integer	1	R	Note
0544	0220H	REC.4 Trip Year	Integer	1	R	Note (+2000)
0545	0221H	REC.4 Trip Month	Integer	1	R	Note
0546	0222H	REC.4 Trip Days	Integer	1	R	Note
0547	0223H	REC.4 Trip Hours	Integer	1	R	Note
0548	0224H	REC.4 Trip Minutes	Integer	1	R	Note
0549	0225H	REC.4 Trip Second	Integer	1	R	Note

#### Note:

Parameter	Description
Latest trip record type	0: No Rec, 1: Trip via Fault, 2: Trip via Test button
Trip record Date and Time	RTC: The record of the tripping Date and Time
	Elapse time: The record of the interval Date and Time between 2 tripping