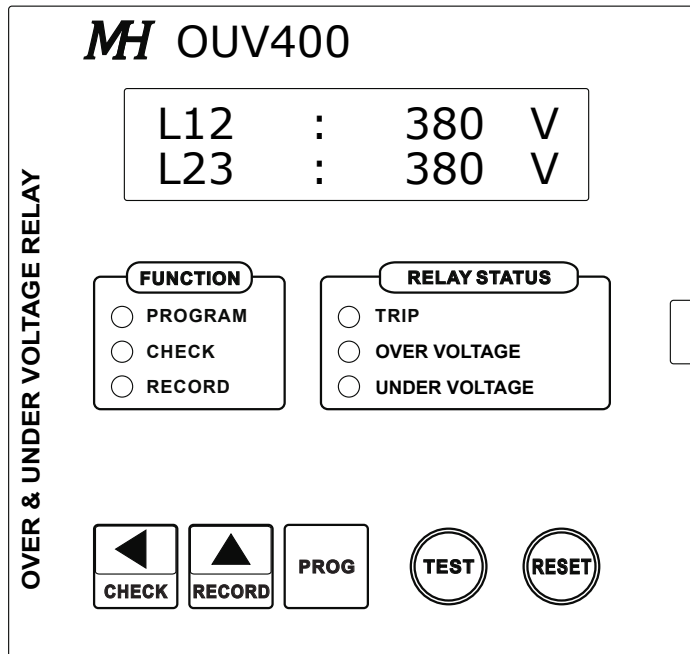


OUV-400

OPERATION MANUAL

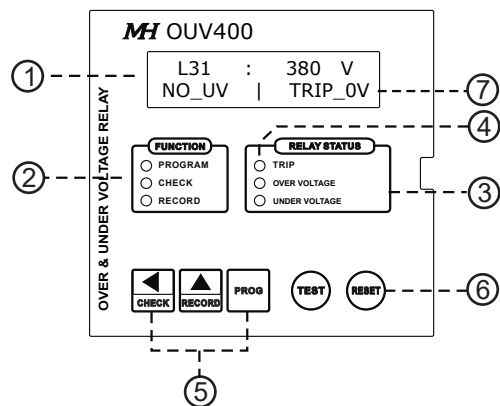


MH Mun hean singapore Pte Ltd.

1. Hardware

1.1 Front

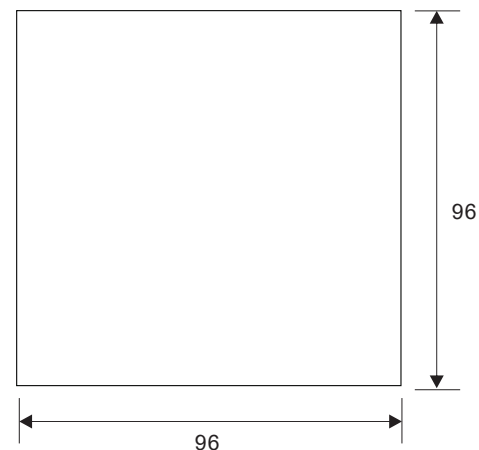
- ① Real time system voltage reading
- ② Function Indicators
 - Program : Programming mode
 - Check : Display of setting
 - Record : Display of memory records
- ③ Type of Fault indicator
 - Over Voltage
 - Under Voltage
- ④ Trip status indicator
- ⑤ Function buttons
- ⑥ Test and Reset buttons
- ⑦ Trip Info display



2. Installation and Connections

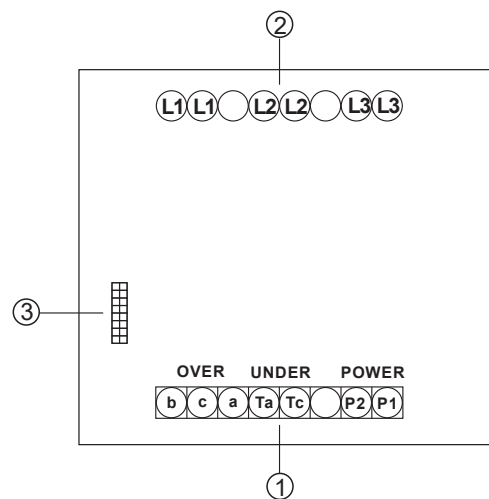
2.1 Outlook and Cut out dimension (mm)

● Back View

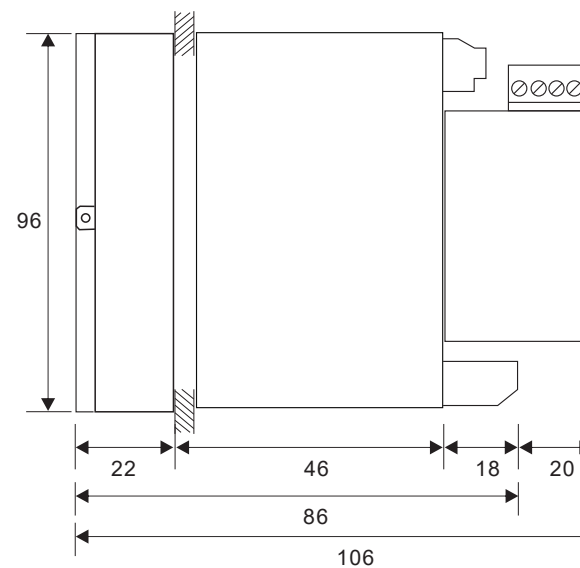


1.2 Terminals description

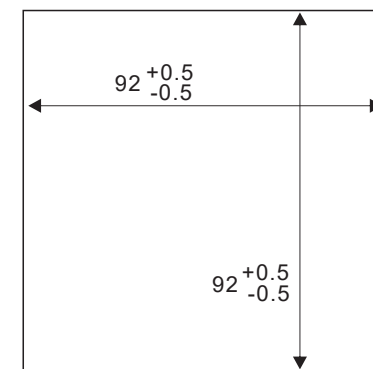
- ① Aux power and Contacts
- ② Voltage Input
- Plug in Module
- ③ Module terminal



● Side View

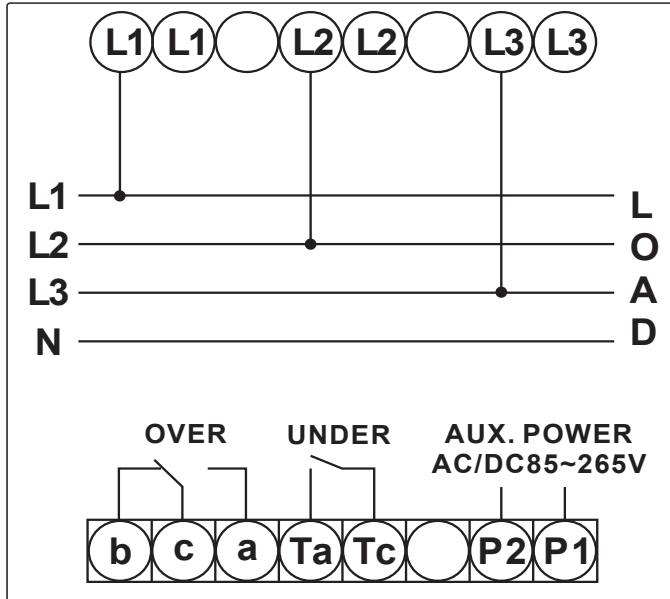


● Cut Out



2.2 Connection diagram

Both L1-L1, L2-L2, L3-L3
terminals are internal linked



3. Display and button functions

3.1 Display screen button functions description



Display of setting values; (CHECK)

Short press to move next page (refer to 3.2)

Long press to return to the numeric display screen



Display of Trip records; (RECORD)

Short press to move next page (refer to 3.2)

Long press to return to the numeric display screen



Enter the setting main menu (refer to 4.1)



Trip test function keys

Normal Non trip condition:

Press once to show 'PRESS TEST AGAIN TO CONFIRM'

Press once again to confirm

Display 'TEST OK', Relay trip LED on and contact close.



Reset button

Trip condition

Trip via TEST button, Trip info area display 'TR_PB'

Press RESET, display 'RST TEST TRIP'. Relay reset

Trip via OV or UV, Relay reset when fault is removed (Relay = AUTO)

Trip info display 'TR_O' or 'TR_U' or 'TR_OU'

Press RESET, Trip info display will be clear.

** Relay will only reset via RESET when Relay = LATCH.

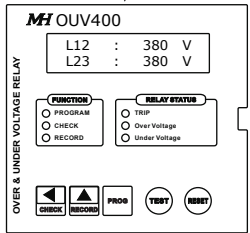
** TEST function is not possible when the relay is in trip condition

Refer to 3.2

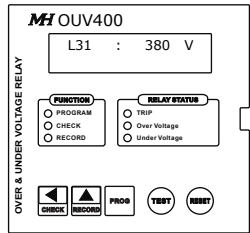
3. Display and button functions

3.2 Display screen descriptions

Input value display



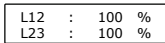
L12, L23 Input value Display



L31 Input value Display

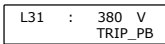
Press to change between % or V

Example



Trip information display area

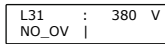
Relay trips using TEST button
Screen display TRIP_PB, respective LED will ON



Relay trips by OVER VOLTAGE or UNDER VOLTAGE
Screen display TPIP_OV or TRIP_UV, respective LED will ON



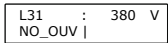
** Refer to setting 'O/V SETTING'
If O/V contact operation setting: OFF
Screen display NO_UV



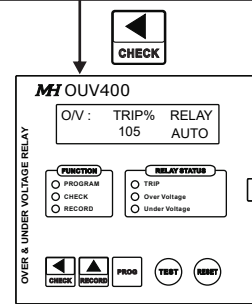
** Refer to setting 'U/V SETTING'
If U/V contact operation setting: OFF
Screen display NO_UV



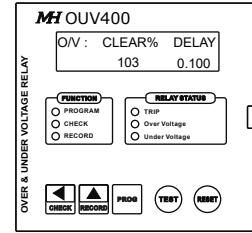
If O/V and U/V contact operation setting: OFF
Screen display NO_OUV



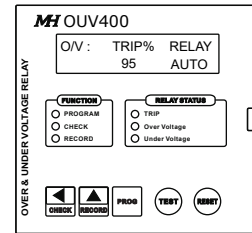
Setting parameter display (CHECK LED ON)



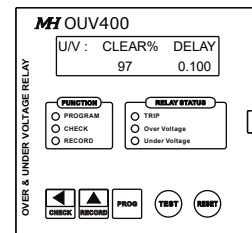
O/V threshold setting (%), Relay Reset



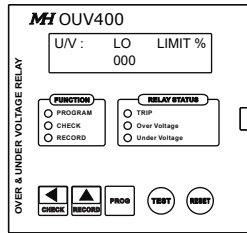
O/V Reset level setting (%), Delay time (sec)



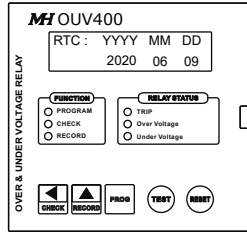
UV threshold setting (%), Relay Reset



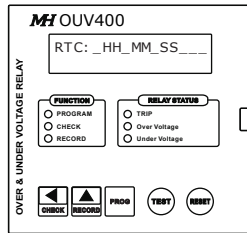
O/V Reset level setting (%), Delay time (sec)



UV non operating zone setting (%)

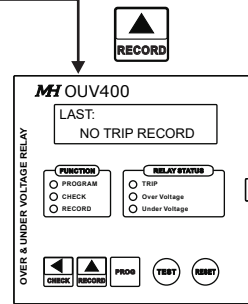


RTC (Real Time Clock) setting
* Available for model with RTC

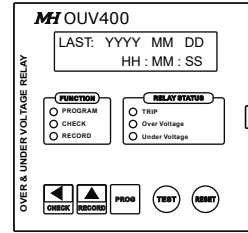


RTC (Real Time Clock) setting
* Available for model with RTC

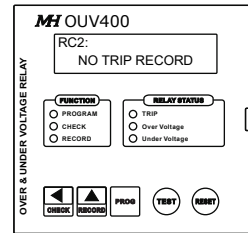
Trip record display (RECORD LED ON)



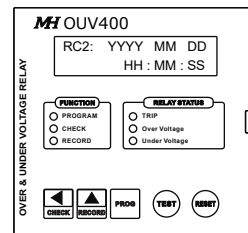
Last trip record memory



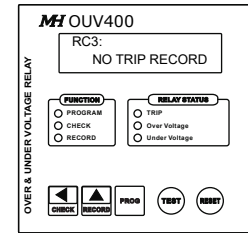
Latest trip time and date stamping
* Available for model with RTC



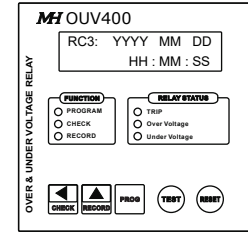
2nd trip record memory



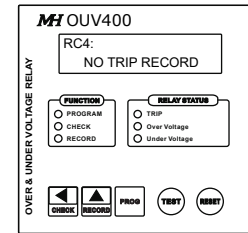
2nd trip time and date stamping
* Available for model with RTC



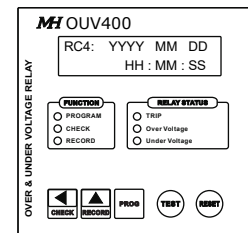
3rd trip record memory



3rd trip time and date stamping
* Available for model with RTC



4th trip record memory



4th trip time and date stamping
* Available for model with RTC

Memory records base on FIFO;
example:
When the relay trip due to OV the record will be save in LAST and the memory which is in the LAST will be push to RC2, same will be as RC3 and RC4.

The record in RC4 will be deleted when new record is being push from RC3.

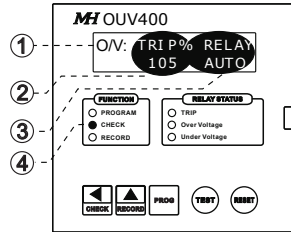
Refer to 3.4 for details

*Will show only if there is trip record

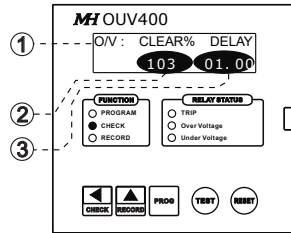
*Will show only if there is trip record

3. Display and button functions

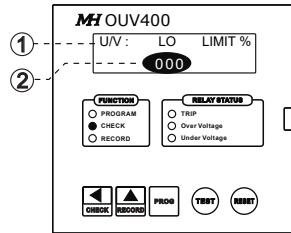
3.3 Setting parameters (CHECK mode) display example descriptions



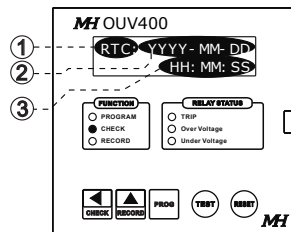
- ① O/V: Over Voltage setting
- ② Over Voltage threshold setting at 105%
- ③ Over Voltage contact operation setting: AUTO (Auto reset)
- ④ CHECK mode ON indication



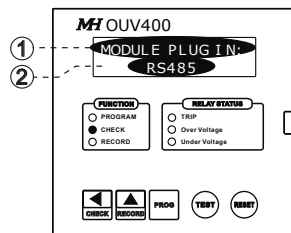
- ① O/V: Over Voltage setting
- ② Over Voltage Reset value setting at 103%
- ③ Trip time delay setting at 1 sec



- ① U/V: Under Voltage setting
- ② UV non operating zone setting at 0%

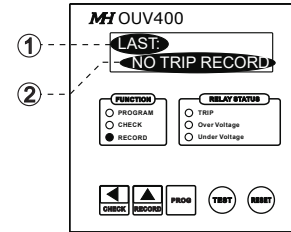


- ① RTC: Date and Time stamping (If equip)
 - ② Year-Month-Day
 - ③ Hour-Minutes-Second
- E.g: Year-2020 Month-06 Day-10
Hour-08 Minutes-10 Second-15
RTC: 2020-06-10 08:10:15

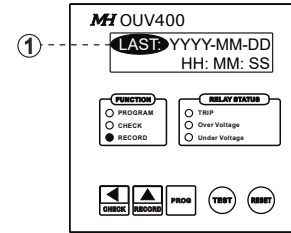


- ① Plug in module: only will display when the module is plug in
- ② RS485: Module plug in is for RS485

3.4 Trip Record (Record) display example descriptions

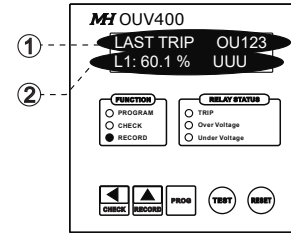


- ① LAST: Most recent Tirp record
- ② No Trip record: No tripping is detected

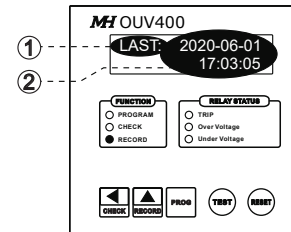


- ① LAST: Most recent Tirp record date and Time stamping (Must equip with RTC function)

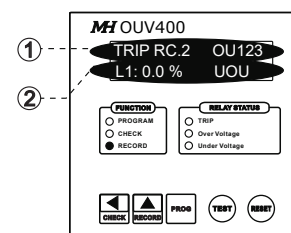
Not show if there is no record



- ① LAST TRIP. OU123
 - ② L1: 60.1% UUU
- Description: Trip at 60.1% at L1, L1L2L3 undervoltage pickup Tripping record in %
- Note: O mean Over Voltage
U mean Under Voltage



- ① LAST: Most recent trip date and time stamping (If equip)
- ② 2020 (Year)- 06 (Month)-01 (Day) 17 (Hour):03 (Minutes):05 (Second)



- ① TRIP RC.2 OU123
 - ② L1: 0.0% UOU
- Description: Trip at 0.0% at L1, L1, L3 undervoltage and L2 overvoltage pickup Tripping record in %
- Note: O mean Over Voltage
U mean Under Voltage

3. Display and button functions

3.5 Abnormal, Trip, Test and Check functions

3.5.1 Abnormal display descriptions

During abnormality,
the display will switch back to the main display

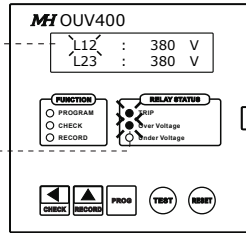
The Phase Number

will flash when abnormality is detected

(Setting: OVER FLASH=YES)

The detected fault (Overvoltage) LED and

Trip LED will flash.



L1, L2 detected abnormality (Overvoltage)

3.5.2 Tripping display descriptions

After trip, if the fault is clear,
the display will switch to memory record page

Trip memory record display

Refer to 3.4

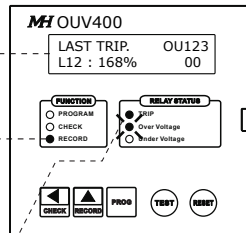
Record LED indicates it is in

Record memory page

Present status

Trip LED indicates the relay had trip

Overvoltage LED indicates Overvoltage fault



Latest trip record memory

3.5.3 Test and Reset function

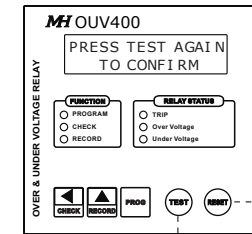
Normal status:

Press **TEST** the display will show 'PRESS TEST AGAIN TO CONFIRM'

Press **TEST** again to trip the relay, the display will show 'TEST OK'

Trip status:

Press **RESET** to reset the relay to normal status, the display will show 'RST TEST TRIP'



RESET BUTTON

TEST BUTTON

3.5.4 Check function description

1. Press **CHECK** button to check the setting of the relay (Refer to 3.2 for detail)

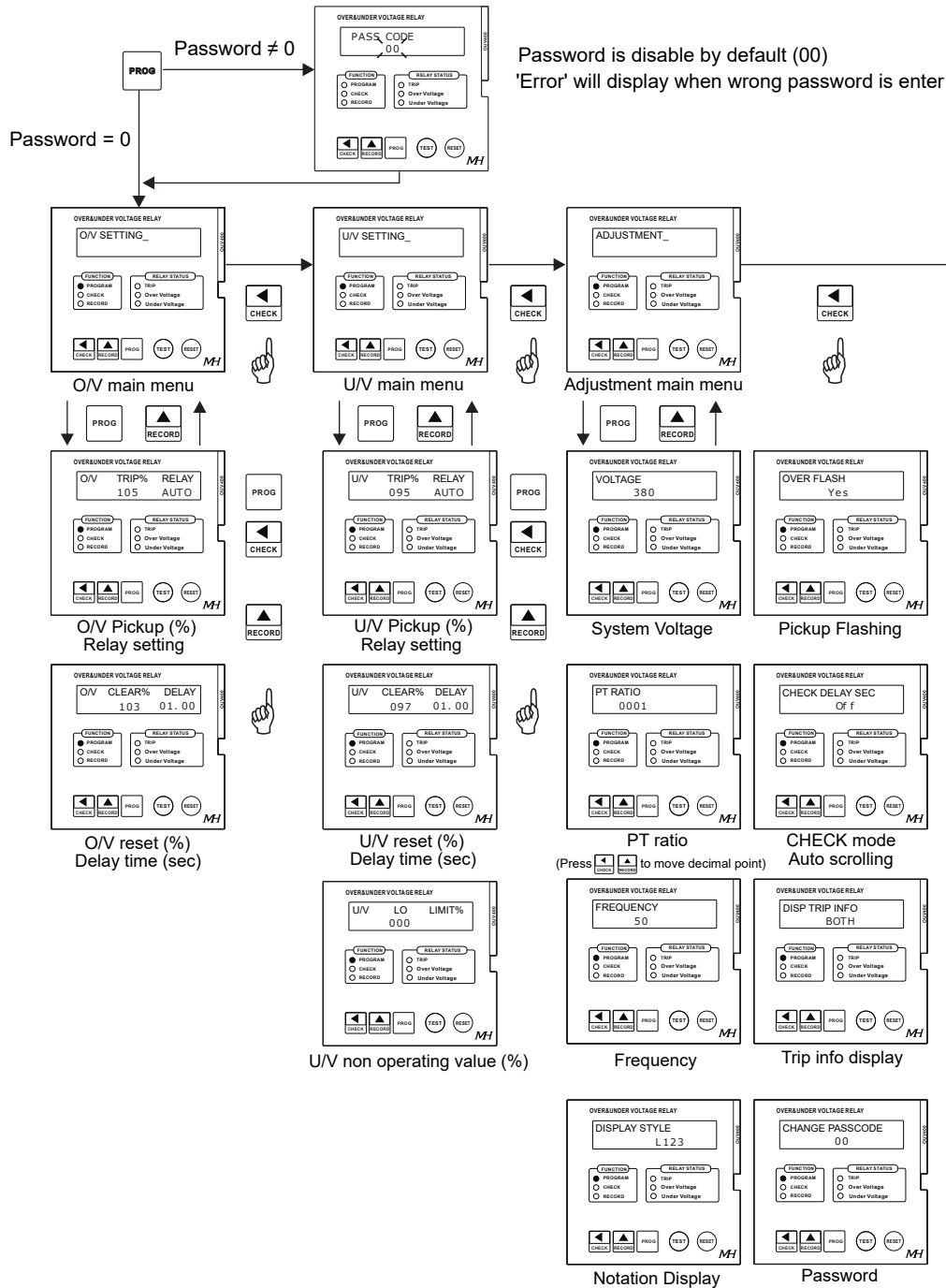
Press **RECORD** button to check the record memory of the relay (Refer to 3.2 for detail)

Long Press of either **CHECK** or **RECORD** will return back to main display

2. If no button is press for 3 mins, the display will automatically toggles between the CHECK and RECORD (CHECK and RECORD LED on respectively and show its content.

4. Setting Configurations and Button function

4.1: Setting menu (Refer 4.3 for detail)



4.2 Buttons Function:

Descriptions:

Main menu

- Enter into Sub menu
- Switch between main menus
- Return to main display menu
- No effect
- Reset

Sub menu

- Enter into Setting
- Switch between Sub menus
- Return to Main menu
- No effect
- Reset

Setting

- Increase value
Press 2s + 5, 4s +10
- Decrease value
Press 2s - 5, 4s -10
- Move between digits
- Save and return to sub menu
- No effect
- Reset

4.3 Configuration descriptions: 'PROGRAM' LED is ON

- Enter Password: 00 = Password disable
Range: 00 - 99

PASS CODE
00

- Enter into value setting, digit flashing
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting, enter into Setting if password is right 'ERROR' will show if it is wrong password.

O/V SETTING_

O/V Setting main menu _____

- O/V Trip % and Relay setting
Range: Trip%: 100-130%, Relay: OFF, AUTO, LATCH

O/V TRIP% RELAY
105 AUTO



Move the cursor to next digit

- Enter into value setting, digit flashing
- Move the cursor to next digit
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

RELAY: OFF (Non operation), AUTO: Auto reset, LATCH: Manual reset (Press reset button to reset)

- U/V Reset % and Delay setting
Range: Reset%: 100-130%, Delay time: 00-60sec

O/V CLEAR% DELAY
103 01.00

- Enter into value setting, digit flashing
- Move the cursor to next digit
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

U/V SETTING_

U/V Setting main menu _____

- U/V Trip % and Relay setting
Range: Trip%: 70-100%, Relay: OFF, AUTO, LATCH

U/V TRIP% RELAY
095 AUTO

- Enter into value setting, digit flashing
- Move the cursor to next digit
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

RELAY: OFF (Non operation), AUTO: Auto reset, LATCH: Manual reset (Press reset button to reset)

- U/V Reset % and Delay setting
Range: Reset%: 70-100%, Delay time: 00-60sec

U/V CLEAR% DELAY
097 01.00

- Enter into value setting, digit flashing
- Move the cursor to next digit
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

- U/V Low limit % setting
Range: 000-100%

U/V LO LIMIT%
000

- Enter into value setting, digit flashing
- Move the cursor to next digit
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

ADJUSTMENT_

Adjustment setting main menu _____

- System Voltage setting
Range: 60-480V

VOLTAGE
380

- Enter into value setting, digit flashing
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

- PT ratio setting
Range: 0.001-9999, Press to change decimal place

PT RATIO
0001

- Enter into value setting, digit flashing
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

- Frequency setting
Range: 50 or 60Hz

FREQUENCY
50

- Enter into value setting, digit flashing
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

● Scroll Delay Time

Range: 1 - 3 sec

SCROLL DELAY SEC
3

- Enter into value setting, digit flashing
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

● Over threshold Flashing

Range: No - Yes

OVER FLASH
Yes

- Enter into value setting, digit flashing
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

● CHECK mode auto scroll time

Range: Off - 240sec

CHECK DELAY SEC
Of f

- Enter into value setting, digit flashing
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

● Trip info display setting

Range: NO, OULED, INFO, BOTH

DISP TRIP INFO
BOTH

NO: Disable
OULED: Over Voltage or Under Voltage LED ON
INFO: Display TR_O or TR_U or TR_OU
BOTH: Equip with both OULED AND INFO function

- Enter into value setting, digit flashing
- Value increase
- Value decrease
- Confirm setting and return to sub menu

● Changing Password (0 = disable)

Range: 01 - 99

CHANGE PASSCODE
00

- Enter into value setting, digit flashing
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

CLEAR RECORD_

Clear Record Setting main menu

● Clear Trip Record

Range: No - Yes

CLEAR RECORD
No

- Enter into value setting, digit flashing
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

RTC SETTING_

RTC Setting main menu (Available if equip)

● RTC Year-Month-Days, Hour-Min-Sec Setting

RTC YYYY-MM-DD
2018 11 01

- Enter into value setting, digit flashing
- Move cursor to next digit.
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

RTC HH:MM:SS
08 00 01

RS485_

RS485 main menu (Enable when module is plug in)

● Address, Baud rate, Frame Setting

Range: Address: 1 - 255, Baud rate: 1200 - 38400, Frame: n,8,1 - n,8,2

ADR BAUDR FRAME
001 9600 n, 8, 1

- Enter into value setting, digit flashing
- Move cursor to next digit.
- Value increase, long press to increase speed
- Value decrease, long press to increase speed
- Confirm setting and return to sub menu

5. Specifications

1. Protection and Funcationalilty description (ANSI)
 - Timed and instantaneous Overvoltage ----- 59T/59I
 - Timed and instantaneous Undervoltage ----- 27T/27I
2. Maximum Delay Time: 60 sec
3. Digital Measurement ----- True RMS at 64 samples per cycle
4. Supply Voltage -----AC85-265V (Other voltages are available upon request)
5. Power consumption ----- $\leq 4VA$
6. System Voltage setting ----- 60~480V (L-L)
7. Pick up voltage level
 - Overvoltage ----- 100~130% of System voltage
 - Undervoltage ----- 70~100% of System voltage
8. Time & Relay Reset voltage level
 - Overvoltage -----100~130% of System voltage
 - Undervoltage ----- 70~100% of System voltage
9. Pickup accuracy ----- $\pm 0.5\%$ of full scale
 - Reset accuracy ----- $\pm 1\%$ of full scale
 - Time accuracy ----- $\pm 3\%$ of trip time or $\pm 20ms$ (Whichever is greater)
10. Tripping Relay ----- (overvoltage) Contact : 1c 250Vac, 5A
(undervoltage) Contact: 1a 250Vac, 5A
11. LCD indication ----- 16 x 2 display
Real time 3 digits display (L-L voltage)
12. Trip indication -----Red LED for trip
13. Communication -----RS485 (Optional)
14. Operating temperature range -----0~60 deg C
15. Storage temperature range ----- -10~70 deg C
16. Max. relative humidity -----95%
17. Dielectric strength (IEC 688) ----- AC2kV / 1 min Input / Output / Power / Case
18. Electrical fast transient / burst ----- According to IEC 61000-4-4
19. Withstanding impluse voltage ----- According to IEC 61000-4-5
20. Voltage dips and short interruptions ----- According to IEC 61000-4-11
21. Electromagnetic wave ----- Non-operation for radio frequency at 130~180MHz
and 400~500MHz (by walkie-talkie of 5W)
22. Enclosure protection ----- IP54
23. Connection ----- Plug-in terminal block

6. Communication

6.1 Protocol

Using MODBUS communication protocol,
30 devices/loop (Repeater is need for > 30 devices)

6.2 Transmission

RTU mode, Half-Duplex

6.3 Message Format

6.3.1 Basic Format

Start of frame	Address Field	Function Code	Data Field	Error Check	End of Frame
----------------	---------------	---------------	------------	-------------	--------------

Start of Frame : Interval of no transmission equal to or in excess of the time corresponding to 4 characters

Address Field : Address of all terminals (Range: 1~255)

Function Code : 03H;Read, 06H;Write

Data Field : This field contains information that the slave will use to carry out the command from the master unit

Error Check : 16 bits CRC

End of Frame : Internal of no transmission equal to or in excess of the time corresponding to 4 characters

6.3.2 Bit Per Byte: Able to set in the RS485 setting menu

Start Bit	DataBit	Parity	Stop	Frame
1	8	None	2	n, 8, 2
1	8	Odd	1	o, 8, 1
1	8	Even	1	E, 8, 1
1	8	None	1	n, 8, 1

6.4 Read Data Register

Query:

Start of Frame	Address Field	Function Code	Start Address Hi	Start Address Lo	Number of Word Hi	Number of Word Lo	Error Check	End of Frame
	01H~FFH	03H	0~nnH	0~nnH	0H	1~nnH	CRC Lo CRC Hi	
	1 Byte	1 Byte	2 Bytes		2 Bytes		2 Bytes	

Response: (no error received)

Start of Frame	Address Field	Function Code	Number of Data Bytes count	D0, D1....Dn (Hi, Lo, Hi, Lo...)	Error Check	End of Frame
	01H~FFH	03H			CRC Lo CRC Hi	
	1 Byte	1 Byte	1 Byte		2 Bytes	

6.5 Write Data register

Query

Start of Frame	Address Field	Function Code	Start Address Hi	Start Address Lo	Value Hi..	Value ..Lo	Error Check	End of Frame
	01H~FFH	06H	0~nnH	0~nnH	Setting Value		CRC Lo CRC Hi	
	1 Byte	1 Byte	2 Bytes		2 or 4 Byte		2 Bytes	

Response: Single message

Start of Frame	Address Field	Function Code	Start Address Hi	Start Address Lo	Value Hi..	Value ..Lo	Error Check	End of Frame
	01H~FFH	06H	0~nnH	0~nnH	Setting Value		CRC Lo CRC Hi	
	1 Byte	1 Byte	2 Bytes		2 or 4 Bytes		2 Bytes	

6.6 Error Response (Error message received)

Start of Frame	Address Field	Function Code	Error Code	Error Check	End of Frame
	01H~FFH	83H or 86H		CRC Lo CRC Hi	
	1 Byte	1 Byte	1 Byte	2 Bytes	

Function Code: The function code requested with MSB set to 1

Error Code: 01: Error Function

02: Error Data Address

03: Error Data Value

6.7 CRC calculation

CRC check field is formed by 2bytes containing a 16bit binary value. The CRC is calculated by the transmitting device, which adds it to the end of the message. The receiving device calculates it once more and compares it to the value received. If the two values do not coincide, an error occurs.

Calculating process:

1. Load a 16bit data register (CRC register) with 0xFFFF
2. Exclusive OR the first byte of the message with the low order byte of the CRC register and leave the result in the register itself.
3. Shift the CRC register one bit to the right (by inserting a 0 on the left)
4. If the bit shifted out to the right is 0 repeat step 3. If the bit is 1, exclusive OR the CRC register with the 0XA001.
5. Repeat step 3 and 4 unit 8 shifts had been carried out.
6. Repeat step 3 - 5 for the bytes of the message. The final content of the CRC register is the CRC value.
7. When adding the CRC to the message, first enter the lower part of the CRC register, follow by the upper part of the CRC register

CRC calculation program

```
/*CRC generation Function with "C" language*/
/*Msg:*message to calculate CRC upon*/
/* usDatalen: number of bytes in message*/
unsigned int CRC16 (char *Msg, unsigned char usDatalen)
{
    unsigned char uchCRCHi=0xFF;/*CRC highbyte*/
    unsigned char uchCRCLo=0xFF;/*CRC lowbyte*/
    unsigned char ulIndex;
    While (usDatalen--)*pass through message buffer*
    {
        ulIndex=uchCRCHi^*Msg++;/*calculate the CRC*/
        uchCRCHi=uchCRCLo^auchCRCHi[ulIndex];
        uchCRCLo=auchCRCLo[ulIndex];
    }
}
return (uchCRCHi<< 8 | uchCRCLo);
```

```
static unsigned char auchCRCHi[]={
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,
0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x00,0xc1,
0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,0x80,0x41,
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
0x01,0xc0,0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,
0x81,0x40,0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,
0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,
0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,
0x01,0xc0,0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,
0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40};
```

```
static unsigned char auchCRCLo[]={
0x00,0xc0,0xc1,0x01,0xc3,0x03,0x02,0xc2,0xc6,0x06,
0x07,0xc7,0x05,0xc5,0xc4,0x04,0xcc,0x0c,0x0d,0xcd,
0x0f,0xcf,0xce,0x0e,0x0a,0xca,0xcb,0x0b,0xc9,0x09,
0x08,0xc8,0xd8,0x18,0x19,0xd9,0x1b,0xdb,0xda,0x1a,
0x1e,0xde,0xdf,0x1f,0xdd,0x1d,0x1c,0xdc,0x14,0xd4,
0xd5,0x15,0xd7,0x17,0x16,0xd6,0xd2,0x12,0x13,0xd3,
0x11,0xd1,0xd0,0x10,0xf0,0x30,0x31,0xf1,0x33,0xf3,
0xf2,0x32,0x36,0xf6,0xf7,0x37,0xf5,0x35,0x34,0xf4,
0x3c,0xfc,0xfd,0x3d,0xff,0x3f,0x3e,0xfe,0x3a,0x3a,
0x3b,0xfb,0x39,0xf9,0xf8,0x38,0x28,0xe8,0xe9,0x29,
0xeb,0x2b,0x2a,0xea,0xee,0x2e,0x2f,0xef,0x2d,0xed,
0xec,0x2c,0xe4,0x24,0x25,0xe5,0x27,0xe7,0xe6,0x26,
0x22,0xe2,0xe3,0x23,0xe1,0x21,0x20,0xe0,0xa0,0x60,
0x61,0xa1,0x63,0xa3,0xa2,0x62,0x66,0xa6,0xa7,0x67,
0xa5,0x65,0x64,0xa4,0x6c,0xac,0xad,0x6d,0xaf,0x6f,
0x6e,0xae,0xaa,0x6a,0x6b,0xab,0x69,0xa9,0xa8,0x68,
0x78,0xb8,0xb9,0x79,0xbb,0x7b,0x7a,0xba,0xbe,0x7e,
0x7f,0xbf,0x7d,0xbd,0xbc,0x7c,0xb4,0x74,0x75,0xb5,
0x77,0xb7,0xb6,0x76,0x72,0xb2,0xb3,0x73,0xb1,0x71,
0x70,0xb0,0x50,0x90,0x91,0x51,0x93,0x53,0x52,0x92,
0x96,0x56,0x57,0x97,0x55,0x95,0x94,0x54,0x9c,0x5c,
0x5d,0x9d,0x5f,0x9f,0x9e,0x5e,0x5a,0x9a,0x9b,0x5b,
0x99,0x59,0x58,0x98,0x88,0x48,0x49,0x89,0x4b,0x8b,
0x8a,0x4a,0x4e,0x8e,0x8f,0x4f,0x8d,0x4d,0x4c,0x8c,
0x44,0x84,0x85,0x45,0x87,0x47,0x46,0x86,0x82,0x42,
0x43,0x83,0x41,0x81,0x80,0x40};
```

6.8 Data register: (Integer format)

Setting parameter (*) see Legend

Address	(Hex)	Contents	Format	Word	Access	Range & Unit
0000	0000H	OV Relay	Integer	1	R	0-2 (*)
0001	0001H	OV Trip Thershold	Integer	1	R	100-130%
0002	0002H	OV Reset	Integer	1	R	100-130%
0003	0003H	OV Trip Delay Time	Integer	1	R	0-6000 (0.01s)
0004	0004H	UV Relay	Integer	1	R	0-2 (*)
0005	0005H	UV Trip Thershold	Integer	1	R	70-100%
0006	0006H	UV Reset	Integer	1	R	70-100%
0007	0007H	UV Low limit	Integer	1	R	0-6000 (0.01s)
0008	0008H	UV Trip Delay Time	Integer	1	R	60-480V
0009	0009H	System Voltage	Integer	1	R/W	0-1 (0:50, 1:60)
0010	000AH	Frequency	Integer	1	R/W	1-255
0011	000BH	Device Address	Integer	1	R/W	0-5 (*)
0012	000CH	Baud rate	Integer	1	R/W	0-3 (*)
0013	000DH	Frame	Integer	1	R/W	0-99
0014	000EH	Password	Integer	1	R/W	0-1 (1: Clear)
0015	000FH	Clear memory	Integer	1	R/W	0001-9999,
0016	0010H	PT ratio	Integer	1	R/W	1 - 255
0017	0011H	PT ratio decimal point	Integer	1	R/W	0-3 (*)
0018	0012H	Year	Integer	1	R/W	0-100 (*)
0019	0013H	Month	Integer	1	R/W	1 - 12
0020	0014H	Day	Integer	1	R/W	1 - 31
0021	0015H	Hour	Integer	1	R/W	0 - 23
0022	0016H	Minutes	Integer	1	R/W	0 - 59
0023	0017H	Second	Integer	1	R/W	0 - 59
0024	0018H	Over Flash	Integer	1	R/W	0-1 (1: Flash)
0025	0019H	Reverse	Integer	1	R/W	0-2 (*)
0026	001AH	Check mode interval	Integer	1	R/W	29-240 (29:Off)
0027	001BH	Trip Info display	Integer	1	R/W	0-2

Legend:

Description	Defination
OV, UV Relay	0: Off, 1: Auto, 2: Latch
PT Ratio decimal	0: No, 1: Tenth, 2: Hundredth, 3: Thousandth,
Baud rate	0: 1200, 1: 2400, 2: 4800, 3: 9600, 4: 19200, 5: 38400
Frame	0: n,8,2 ; 1: o,8,1 ; 2: e,8,1 ; 3: n,8,1
Year setting	0~100 = year 2000~2100

Measured values:

Address	(Hex)	Contents	Format	Word	Access	Range & Unit
0510	01FEH	Voltage SI Unit	Integer	1	R	0: No, 3: k
0511	01FFH	Voltage decimal point	Integer	1	R	0-3
0512	0200H	L1-L2 Voltage	Integer	1	R	V
0513	0201H	L2-L3 Voltage	Integer	1	R	V
0514	0202H	L3-L1 Voltage	Integer	1	R	V
0515	0203H	L1-L2 Voltage %	Integer	1	R	0.1%
0516	0204H	L2-L3 Voltage %	Integer	1	R	0.1%
0517	0205H	L3-L1 Voltage %	Integer	1	R	0.1%
0518	0206H	Latest Trip Voltage	Integer	1	R	0.1%
0519	0207H	Latest Trip types	Integer	1	R	(*)
0520	0208H	REC.2 Trip Voltage	Integer	1	R	0.1%
0521	0209H	REC.2 Trip types	Integer	1	R	(*)
0522	020AH	REC.3 Trip Voltage	Integer	1	R	0.1%
0523	020BH	REC.3 Trip types	Integer	1	R	(*)
0524	020CH	REC.4 Trip Voltage	Integer	1	R	0.1%
0525	020DH	REC.4 Trip types	Integer	1	R	(*)
0526	020EH	Latest trip (Year)	Integer	1	R	0~100(*)
0527	020FH	Latest trip (Month)	Integer	1	R	1 ~ 12
0528	0210H	Latest trip (Day)	Integer	1	R	1 ~ 31
0529	0211H	Latest trip (Hour)	Integer	1	R	0 ~ 23
0530	0212H	Latest trip (Minutes)	Integer	1	R	0 ~ 59
0531	0213H	Latest trip (Sec)	Integer	1	R	0 ~ 59
0532	0214H	Latest tripping record	Integer	1	R	(*)
0533	0215H	REC.2 trip (Year)	Integer	1	R	0~100(*)
0534	0216H	REC.2 trip (Month)	Integer	1	R	1 ~ 12
0535	0217H	REC.2 trip (Day)	Integer	1	R	1 ~ 31
0536	0218H	REC.2 trip (Hour)	Integer	1	R	0 ~ 23
0537	0219H	REC.2 trip (Minutes)	Integer	1	R	0 ~ 59
0538	021AH	REC.2 trip (Sec)	Integer	1	R	0 ~ 59
0539	021BH	REC.2 tripping record	Integer	1	R	(*)
0540	021CH	REC.3 trip (Year)	Integer	1	R	0~100(*)
0541	021DH	REC.3 trip (Month)	Integer	1	R	1 ~ 12
0542	021EH	REC.3 trip (Day)	Integer	1	R	1 ~ 31
0543	021FH	REC.3 trip (Hour)	Integer	1	R	0 ~ 23
0544	0220H	REC.3 trip (Minutes)	Integer	1	R	0 ~ 59
0545	0221H	REC.3 trip (Sec)	Integer	1	R	0 ~ 59
0546	0222H	REC.3 tripping record	Integer	1	R	(*)
0547	0223H	REC.4 trip (Year)	Integer	1	R	0~100(*)
0548	0224H	REC.4 trip (Month)	Integer	1	R	1 ~ 12
0549	0225H	REC.4 trip (Day)	Integer	1	R	1 ~ 31
0550	0226H	REC.4 trip (Hour)	Integer	1	R	0 ~ 23
0551	0227H	REC.4 trip (Minutes)	Integer	1	R	0 ~ 59
0552	0228H	REC.4 trip (Sec)	Integer	1	R	0 ~ 59
0553	0229H	REC.4 tripping record	Integer	1	R	(*)

Measured Values:

Address	(Hex)	Contents	Format	Word	Access	Range & Unit
0554	022AH	OV Relay Status	Integer	1	R	(*)
0555	022BH	UV Relay Status	Integer	1	R	(*)
0556	022CH	OV Trip Status	Integer	1	R	(*)
0557	022DH	UV Trip Status	Integer	1	R	(*)

Legend (*):

Descriptions	Defination
OV and UV Relay Status	0: Nil, 1: L1-L2, 2: L2-L3, 4: L3-L1. (Multiple phase tripping is possible) If reading is 3 (2+1), it will indicate that L1-L2 and L2-L3 are having fault.
OV and UV Trip Status	0: Nil, 1: L1-L2, 2: L2-L3, 4: L3-L1, 8: Test
Trip Record Type of fault	0: Nil 1: L1-L2 UV, 2: L2-L3 UV, 4: L3-L1 UV 16: L1-L2 OV, 32: L2-L3 OV, 64: L3-L1 OV If reading is 4, it indicates L3-L1 UV trips If reading is 20 (4+16), it indicates L3-L1 UV and L1-L2 OV
Trip Record (Year)	0 - 100 indicates Year 2000 - 2100
Trip Record (Phases)	0: Nil, 1: L1-L2 UV, 2: L2-L3 UV, 4: L3-L1 UV 16: L1-L2 OV, 32: L2-L3 OV, 64: L3-L1 OV If reading is 1, it indicates that L1-L2 UV trip is recorded If reading is 33 (1+32), it indicates L1-L2 UV, L2-L3 OV trip are recorded