DIGITAL OVER & UNDER VOLTAGE RELAY[DOU-D33D-N]

Front View

1. 4X20 DISPLAY LCD
– State and information Display

3. CONTROL KEY
– Use to setting and check the state

5. CPU RESET
– Use to CPU rest

2. L.E.D INDICATOR
– Trip phase and state indication

4. CLEAR / VIEW
– LAMP CLEAR & LCD BACKLIGHT

Feature

The multi–OUVR is a microprocessor based digital type protective relay that has 3 phases over voltage and under voltage element which are provided with inverse and definite time curves. OCR and OUVR can set the functions independently. The relay may be supplied in drawout type case or fixed type case according to customer's requirement. Its protective coordination is configured with (1) one of time inverse curvesand instananuouse setting, or (2) definite time setting. The relay works more precisely and correctly than mechanical type or static type, because of applied advanced digital converting technology.

Application

The relay is suitable for solid or resistance grounded distribution feeder of utility company or cosumer's substation. Since the relay has multi–funtions and wide range settings. it is no necessary for engineer to calculate in detail at the beginning of design.

Menu Specification

1. 4X20 LCD DISPLAY WINDOW

DISPLAY all information about state of setting and input current value of each phase.

2. L.E.D INDICATOR

Indication for the running state.
– RUN : MAIN CPU.
– PICKUP : Turn on when over current be inputted
– COMM : RS 485 Comm. state
– R, S, T, N : Indication for the fault phase
– INST : Instantaneous fault
– POWER : Power state.

3. Control Key

Use for setting and check the state
– MODE : Use to enter MAIN SETUP menu.
– ENTER : Use to settle the SETTING Value.
– ESC : Cancel the setting value or go up the higher Menu.
– ◀, ▲, ▼, ▶ Key : Use for MENU scroll and modulation setting Value, also change
the cursor position.

4. CPU RESET

Use for CPU reset.

5. CLEAR / VIEW

Use for LAMP RESET and running LCD backlight.
– Push one time : Turn on the LCD backlight
– Push two times : Lamp clear after running the backlight

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Main Specification

MAIN MENU

INITIAL MENU

```
            DIGITAL
       OVER VOLTAGE &
    UNDER VOLTAGE RELAY
            v.XX
```

NORMAL MEASURE MENU

```
         A: XX.XX
         B: XX.XX
         C: XX.XX
         D: XX.XX
```

Push the direction Key (▼, ▲) at Normal menu.

TIME MENU

```
       YYYY.MM.DD//
       //hh.mm.ss
```

DISPLAY THIS MENU AFTER PUSH MODE BUTTON

```
         [MAIN MENU] #1/3
    * 1. SYSTEM SETUP
    2. RELAY SETUP
    3. COMM SETUP
```

```
         [MAIN MENU] #2/3
    * 4. FAULT MEMORY
    5. SECURITY SET
    6. TIME SET
```

```
         [MAIN MENU] #3/3
    * 7. SELF TEST
```

Select and check for using Enter key selected items with Cursor(*) after move curse as using direction key(▲, ▼).

1. SYSTEM SETUP
Setting frequency, CT ratio on electric power.

2. RELAY SETUP
Parameter setting related to the relays as like operation value, Lever etc.

3. COMM SETUP
Setting comm. speed and comm.. address(ID)

4. FAULT MEMORY
Check the fault data when the accident be happened.

5. SECURITY SET
Setting PASSWORD.

6. TIME SET
setting current time.

7. SELF TEST
Check the state of LAMP and RELAY.

SYSTEM SETUP

Detailed Menu for SYSTEM SETUP

```
    SYS Freq          [XX]Hz
    P/T Rat        [380]/110[V]
```

1. SYS Freq
Setting the frequency of input current and voltage.
- Use up and down key (▼, ▲), change the frequency to 50/60Hz.

2. P/T Rat
Setting of Potential Transformer Ratio.
- Setting value of PT for using direction Key (▲,▼,◄,►).
- Setting PT ratio is display on front LCD.

4. FAULT MEMORY
check the data when the accidents.

5. SECURITY SET
Setting PASSWORD.

6. TIME SET
Setting time.

7. SELF TEST
Check the state of LAMP and RELAY.

RELAY SETUP

Detailed Menu for RELAY SETUP

```
         [RELAY SETUP] #1/2
    *1. Time delayed UVR
    2. Inst UVR
    3. Time Delayed OVR
```

```
         [RELAY SETUP] #1/2
    4. Inst OVR
```

Select and check for using Enter key selected items with Cursor(*) after move curse as using direction key(▲, ▼).

1. Time delayed UVR

```
         [Time UVR set]
    CURV [DI]      TUV [16.0]
    LEVER             [10.0]
```

Setup parameters TUVR
- Setting Curve, TUV, Lever vale to use direction key (▲,▼,◄,►)

2. Inst UVR

```
         [Inst UVR set]
    IUV [120]         LOCK?[N]
```

Setup parameters IUVR
- Setting Curve, IUV , Lever vale to use direction key (▲,▼,◄,►)

Main Specification

3. Time Delayed OVR

```
              [Time OVR set]
    CURV [DI]              TOVR [0.0]
    LEVER [10.0]           LOCK?[N]
```

Setup parameters TOVR
– Setting Curve, TOVR , Lever vale to use direction key (▲,▼,◀,▶)

4. Inst OVR

```
              [Inst OVR set]
    IOVR [120]                  LOCK?[N]
```

Setup parameters lOVR
– Setting Curve, lOVR , Lever vale to use direction key (▲,▼,◀,▶)

COMM SETUP

```
              [COMM Set Menu]
    DEVICE ID [XX]
    COMM SPEED [XXXX]
```

1. DEVICE ID
   Assigned device address when use RS 485 communication.
   – Input setting value to use direction key(▲, ▼, ◀, ▶)

2. COMM SPEED
   control communication speed when use RS 485
   communication.
   – Setting 9600bps/19200bps to use direction Key (▲,▼)

FAULT MEMORY

Detailed Menu for RELAY SETUP

```
              [FAULT MEMORY]
    1. FAULT RECORD
    2. CLEAR FAULT MEM
```

Select and check for using Enter key selected items with
Cursor(*) after move curse as using direction key(▲, ▼).

1. FAULT RECORD
   – Up to 48 records of fault data.
   – FAULT MEMORY detail item

```
    [Fault Rec] #01/48
    Op Relay = Time OVR
    Phase_X = XXXXX [V]
    〈YY.MM.DD.hh.mm.ss〉
```

– [Fault Rec] : Display as # NO/MAX. No.:number of fault data.
             Early data is recent record. MAX : present Fault
             quantities. Old data is taken off the records when
             over 48 records of accident data and is recorded
             again new data.
– Op Relay : acting Relay Type of Relay when the trouble.

– Phase_X : display the fault phase when happened the
             accident and accident current(A).
– Accdent Time : Display as Year, Month, date, Hour, min., Sec.

2.CLEAR FAULT MEM

```
              [FAULT CLEAR]
          Clear Fault REC? [N]
```

It can be selected "Y" , "N" to use direction Key(▲, ▼),
if can selected "Y" , it' can be deleted all of recording data

SECURITY SET

Detailed Menu for SECURITY SET

```
              [SECURITY PASSWORD]
    PASSWORD [****]
    set '0000' to disable
```

Set to password of Relay
   – If don not use password : Set to "0000"
   – If use password : Set to between "0001" ~ "9999"
   – If password is active, ask password when push MODE button.
   – If lost password : Set to "1183"
   – If set to "1183" , password is initialize to "0000"

TIME SET

```
              [TIME SET]
    yy–mm–dd–hh–mm–ss
    xx–xx–xx–xx–xx–xx
```

Input setting value to use direction Key (▲, ▼, ◀, ▶).

SELF TEST

```
              [SELF TEST]
    1. TEST LAMP
    2. TEST RELAY
    3. TEST SWITCH
```

1. TEST LAMP
   Check the defect of L.E.D on front panel.

```
              [LAMP TEST]
    [ENTER] to ALL LAMP
    [ESC] to QUIT TEST
```

2. TEST RELAY

```
              [RELAY TEST]
    [LEFT] to OV TRIP
    [RIGHT] to UV TRIP
    [ESC] to QUIT TEST
```

   – If push enter button, All of the LED is on
     If push ESC button, escape to the test menu

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3.TEST SWITCH

```
            [SWITSH TEST]
 [ENTER] 〈- Key Input
 Press & check switch
 [ESC] TO  QUIT TEST
```
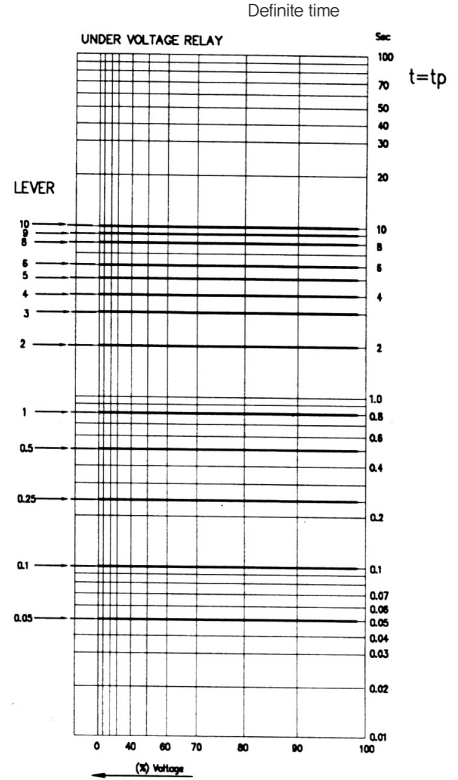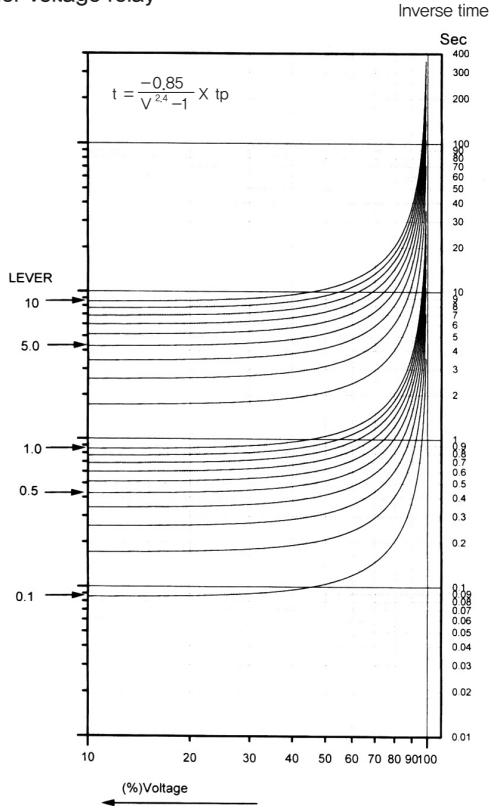
– Except CPU RESET and MODE key, check the defect each of the key It will be displayed the value of each of the keys in the area of ' [] ' ,
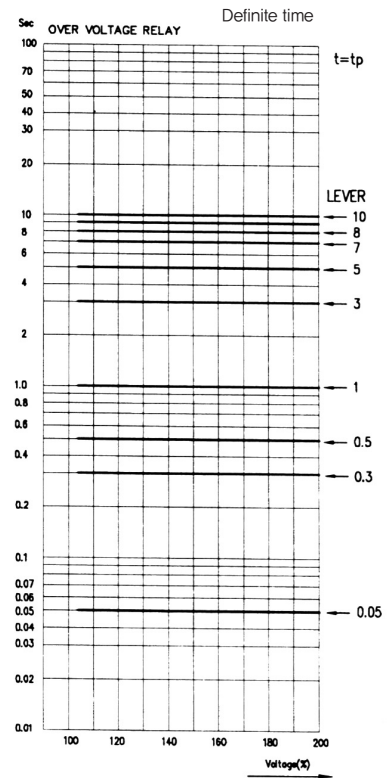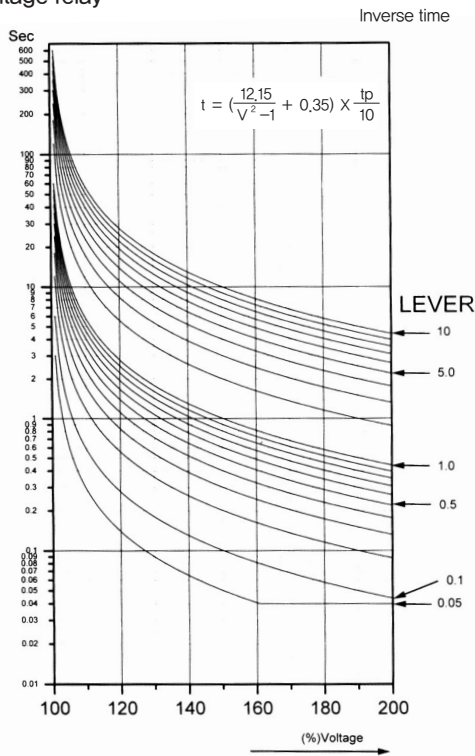If push ESC key, Escape Test Menu.

Specifications

RATING	
Rated Voltage	AC 110V
Frequency	50/60Hz ± 5%
Auxiliary Voltage	AC/DC 80～260V
Ambient Temperature	−10˚ ～ 60˚ (with no icing)

VOLTAGE SETTING RANGE		
O.V	Time Over Voltage	100～160V (1.0V step)
U.V	Time Under Voltage	50～120V (1.0V step)
	Instantaneous	20～90V (1.0V step)

TIME SETTING & CURVE IEC255	
OV / UV Lever	0.1 ～ 40 Lever (0.1 step)
Instantaneous Time	Less than 60ms
Resetting Value	OV : V 〈 95% / UV : V 〉 105%
Reset Time	Less than 100ms
UV Inverse Time	$t = -0.85/V2.4 -1 \times tp$ *V : % Voltage (80%→0.8), (120%→1.2)
OV / UV Definite Time	$t = (12.15/V2 -1 + 0.35) \times tp/10$ *tp = Time Lever

OPERATING TIME	
Over Voltage	Inverse or Definite Time
Under Voltage	Inverse or Definite Time

INDICATOR	
Run (Green)	C.P.U State
Comm (Yellow)	Signal output
Pickup (Red)	Flicker when input Over Voltage
AB,BC,CA / OV,UV / INST (RED)	Display Fault Phase/Instantaneous
Memory	Max.48Records of Fault data (Accident, Current, Phase, Acting Relays, Accident Time)
RS 485 Communication	
Protocol	Modbus
Comm Speed	9600 / 19200bps
Parity	None

Operating time curves

Under voltage relay

Inverse time

$$t = \frac{-0.85}{V^{2.4}-1} \times tp$$

Definite time

UNDER VOLTAGE RELAY

$t=tp$

Over voltage relay

Inverse time

$$t = \left(\frac{12.15}{V^2-1} + 0.35\right) \times \frac{tp}{10}$$

Definite time

OVER VOLTAGE RELAY
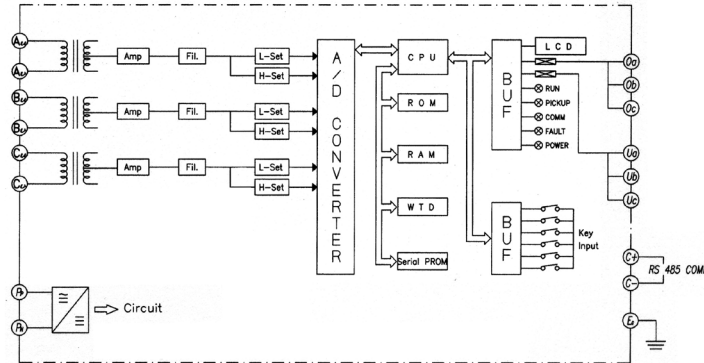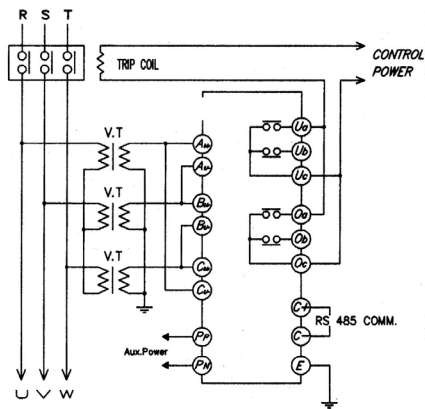
$t=tp$

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Block diagram

Wiring

Terminal arrangement