



## PROK DEVICES PRIVATE LIMITED

B-80, 2<sup>nd</sup> & 3<sup>rd</sup> Floor, KSSIDC Industrial estate, 4<sup>th</sup> Main Road,  
6<sup>th</sup> Block, Rajaji Nagar, Bengaluru -560010

Ph no: 080-41480777, 080-41157700, Email: [enquiry@prokdvs.com](mailto:enquiry@prokdvs.com),  
[www.prokdvs.com](http://www.prokdvs.com), [www.prokdvs.in](http://www.prokdvs.in)

### **NUMERICAL UNDER & OVER VOLTAGE RELAY (IDMT/DMT) $\mu$ P- BASED** **MPVD/DMPVD-series** **SYSTEM VOLTAGE :110VAC**

#### **Features**

- ❖ Accurate and reliable measurement of True RMS Line to Line voltages using DFT
- ❖ Display of voltage magnitudes, Healthy/Fault status and set parameters using 8 character 2 line LCD
- ❖ User friendly Setting Parameters through key pad switch
- ❖ Wide range for Selection of System voltages
- ❖ User configurable DMT or IDMT characteristic Trip selection for Under & Over voltage conditions
- ❖ Low set & High set features incorporated for IDMT with High pick up to drop out ratio
- ❖ Two Independent potential free output contacts for Faults
- ❖ Wide range of Universal input Auxiliary supply(85-275vac/dc)
- ❖ Industrial Rugged design in Din rail mounting as well as Panel Mounting.
- ❖ Healthy, Fault Pick up & Trip Status provided through LED visual indications.
- ❖ Auto Reset provided on Healthy voltage resumption

#### **Application**

- ❖ Protection of Motors and Generators
- ❖ Main or Back Up protection for Voltage abnormal condition
- ❖ For Detection of Under or Over Voltage, Phase fail, Phase Reversal, Unbalance status in power plants and distribution system.
- ❖ Protection of Transformer panel & capacitor control panel

#### **Description**

Prok Dvs an ISO 9001:2008 Company indigenously develops the power system protection relays and panel meters for power system.  $\mu$ P based voltage relays are the state of the art design, to monitor and protect the costly equipments against Over voltages, Under voltages, Phase failure, Phase reversals and Unbalance condition.

Continuously monitoring all the three phase Line to Line Voltages, if any abnormal condition persists in the system internal Relay activated with predetermined set value of Definite time or calculated time if IDMT selected IDMT Characteristic curve for Under and Over Voltage.

Display of Line to Line Voltages, System Voltage, Healthy and Fault /Trip status Information through 8 Character Two Line Display

Inside two independent relays are used for indicating the Trip status and Alarm, configured according to the Wiring diagram

#### **Tripping Characteristics**

1. IDMT Over voltage  $(t) = k / \log(\text{ovf})$  in Sec's
2. IDMT Under voltage  $(t) = k / \log(2-\text{uvf})$  in Sec's

Where, 'k' is the time dial multiplier setting ranges from 0.1 to 1.0 in steps of 0.1

Ovf = Measured value

( Set value x Rated Voltage(Un))

$$U_{vf} = \frac{\text{Measured value}}{\text{( Set value x Rated Voltage(Un))}}$$

3. High set Time: (0 to 5.0) sec's in steps of 0.1 Sec for IDMT Trip characteristics for Under and Over Voltages
4. Definite Time: (0 to 300) sec's in steps of 1 Sec

#### Technical Specifications:

**Rated System Voltage (Un):** 110V AC

**Tripping characteristic curve for Under & Over voltage:** IDMT or DMT- Default set to **DMT For IDMT** -Trip characteristic selection for Under & Over voltages

**Over voltage range low set (OVL):** 101% – 130% of Rated Voltage (Un) in steps of 1%  
Default **OVL** % set to **110%**of (Un)

**Time dial multiplier setting (k) TMS for IDMT:** Ranges from 0.1 to 1.0 in steps of 0.1  
Default TMS set to 0.5

**Over voltage range high set (OVH):** 101% – 130% of Rated Voltage (Un) in steps of 1%  
Default **OVH** % set to **120%**of (Un)

Note: OVH shall be set > than OVL in %of (Un)

**Over Voltage High set time:** (0 to 5.0) sec's in steps of 0.1 Sec – Default set to 1.0 Sec

**Under voltage range low set(UVL):** 50% – 99% of Rated Voltage (Un) in steps of 1%  
Default **UVL** % set to **90%**of (Un)

**Time dial multiplier setting (k) TMS for IDMT:** Ranges from 0.1 to 1.0 in steps of 0.1  
Default TMS set to 0.5

**Under voltage range high set(UVH):** 50% – 99% of Rated Voltage (Un) in steps of 1%  
Default **UVH** % set to **70%**of (Un)

Note: UVH shall be set < than UVL in %of (Un)

**Under Voltage High set time:** (0 to 5.0) sec's in steps of 0.1 Sec – Default set to **1.0**Sec

#### For DMT

**Definite minimum time (DMT)** for over voltage (0 to 300) sec's in steps of 1 Sec  
Default DMT set to **3.0** Sec

**Definite minimum time (DMT)** for under voltage (0 to 300) sec's in steps of 1 Sec  
Default DMT set to **3.0** Sec

**Pick up for Over voltage fixed-** Set over voltage in % of (Un) + 2% of (Un)

**Drop out for Over voltage fixed-** Set over voltage in % of (Un) – 2% of (Un)

**Pick up for Under voltage fixed-** Set under voltage in % of (Un) - 2% of (Un)

**Drop out for Under voltage fixed-** Set under voltage in % of (Un) +2% of (Un)

**Note:** Pick up & Drop out applicable for both IDMT & DMT for narrow Reset bandwidth Ranges from 3 to 6 Volts

**Trip time for phase reversal:** 2.0 Sec fixed

**Trip time delay for phase failure-** 0.1 Sec fixed.

**Un Balance voltage (line to line) Range:** 5V-25V Default: **25V**

**Trip time for Unbalance >Set Unbalance Voltage line to line-** 0 to 5.0 sec Default: **2 sec**

**Under voltage relay/phase failure/phase reversal:** By default energized (Factory setting) under healthy conditions (with AUX. voltage connected)

**Over voltage Relay:** de-energized under healthy condition (with AUX. voltage connected)

**Out put relay:** 250 V, 8 A AC, / 30V, 8A DC – two change over potential free output contacts

**AUX. Voltage:** 85-275VAC/DC Universal input

**Display:** 8 chars 2 line LCD with backlit

**LED:** For Visual indications of healthy, Fault pickup & Trip status.

**Mounting:** Flush or Din rail mounting

**Dimensions:** 96\*96\*65 mm ( w \* h \* d) (flush mounting)

79\*93\*73 mm ( l \* h \* b) (din mounting)

Default Under voltage Relay Energize & Over Voltage Relays De energize condition under Healthy condition

### Setting Procedure For MPVD/DMPVD Series Voltage Relay (DMT/IDMT)Un-110VAC

\* Refer to the wiring diagram.

Connect the Aux supply (85-275V AC/DC) & 3 Phase sensing voltage to the voltage relay.

Display shows for a while ....

Vg Rly  
3 Ph 110V

MPVD 003  
VER 2.0

And then display line to line voltages

$V_{RY}$   $V_{YB}$   
 $V_{BR}$  L-LV

110 110  
110 L-L V

Press and hold the Mode /Set Key for 3 Sec, and release  
display shows- Rated System Voltage selection 110Vac

Set the value by using **Mode/Set** key

Now the display shows over voltage Low set (**OVL**) % selection menu  
with respect to rated system voltage ( $U_n$ ) - 110VAC,

Select the required Over voltage Low set % of ( $U_n$ ) in the range from  
101% to 130% in steps of 1% using **▲** key or **▼**key

and then store the value by using **Mode/Set** key

Now the display shows over voltage trip characteristic curve  
selection menu either **DMT** or **IDMT** ( Default set to DMT)

Select the desired over voltage trip characteristic curve either DMT or IDMT  
using **▲** key or **▼**key and then store the curve by using **Mode/Set** key

Now the display shows over voltage DMT value selection menu if DMT curve  
Selected in previous menu

Select the desired DMT value in the range from 0-300 sec in steps of 1 sec  
using **▲** key or **▼**key and then store the value by using **Mode/Set** key

OR

Select the desired over voltage TMS value in the range from 0.1 to 1.0 in steps of 0.1  
using **▲** key or **▼**key and then store the TMS value by using **Mode/Set** key

Now the display shows over voltage High set (OVH) % selection menu  
with respect to rated system voltage ( $U_n$ ) - 110VAC,

Select the required Over voltage High set % of ( $U_n$ ) in the range from  
101% to 130% in steps of 1% using **▲** key or **▼**key

and then store the value by using **Mode/Set** key

Note: OVH % value shall be greater than OVL% value w.r.to ( $U_n$ )

Now the display shows over voltage High set time value selection menu

Select the desired High set time value in the range from 0.0-5.0 sec  
in steps of 0.1 sec using **▲** key or **▼**key and then store the value

by using **Mode/Set** key

Now the display shows Under voltage Low set (**UVL**) % selection menu  
with respect to rated system voltage ( $U_n$ ) - 110VAC,

Select the required Under voltage Low set % of ( $U_n$ ) in the range from  
50% to 99% in steps of 1% using **▲** key or **▼**key

and then store the value by using **Mode/Set** key

Sel Un  
110 V

OVL 110%  
101-130%

OV TRIP  
DMT

or

OV TRIP  
IDMT

DMT=003S  
[0-300]S

TMS 0.5  
[.1 - 1.0]

OVH 120%  
101-130%

OHT 1.0S  
[.0 - 5.0]

UVL 90%  
[50 - 99]%

UV TRIP  
DMT

UV TRIP  
IDMT

Now the display shows Under voltage trip characteristic curve selection menu either **DMT** or **IDMT** ( Default set to **DMT**) or  
 Select the desired under voltage trip characteristic curve either DMT or IDMT using ▲ key or ▼key and then store the curve by using **Mode/Set** key

Now the display shows Under voltage DMT value selection menu if DMT curve Selected in previous menu

DMT=003S  
[0-300]S

Select the desired DMT value in the range from 0-300 sec in steps of 1 sec using ▲ key or ▼key and then store the value by using **Mode/Set** key  
 OR

TMS 0.5  
[.1 - 1.0]

Select the desired under voltage TMS value in the range from 0.1 to 1.0 in steps of 0.1 using ▲ key or ▼key and then store the TMS value by using **Mode/Set** key

Now the display shows under voltage High set (**UVH**) % selection menu with respect to rated system voltage (Un) - 110VAC,

UVH 70%  
[50 - 99]%

Select the required under voltage High set % of (Un) in the range from 50% to 99% in steps of 1% using ▲ key or ▼key and then store the value by using **Mode/Set** key

Note: **UVH** % value shall be lesser than **UVL**% value w.r.to (Un)

Now the display shows under voltage High set time value selection menu

UHT 1.0S  
[.0 - 5.0]

Select the desired High set time value in the range from 0.0-5.0 sec in steps of 0.1 sec using ▲ key or ▼key and then store the value by using **Mode/Set** key

UBV 25  
[5 - 25]

Now the Display Shows Unbalance Voltage (line to line) **UBV** selection mode

Select the desired Unbalance Voltage in the range from 5 to 25 in steps of 1V using ▲ key or ▼key and then store the value by using **Mode/Set** key

Now the display shows Un balance trip time(**UBT**) value selection menu

Select the desired Un balance trip time value in the range from 0.0-5.0 sec in steps of 0.1 sec using ▲ key or ▼key and then store the value by using **Mode/Set** key

UBT 2.0S  
[.0 - 5.0]

Now the display shows save set parameters yes or no configuration

Press ▲ key to save the set parameters and returns to main menu

SAVE Y/N  
INC / DEC

Or

Press ▼ key to retain the previous set parameters and returns to main menu

110 110  
110 V L-L

Now the display shows main menu

In the presence of 3 Phase R, Y, B Sensing voltage

RY 118 V  
OVLT IDMT

In the absence of 3 Phase R, Y, B Sensing voltage

UV TRIP  
RY < 25V

OR

Display shows Low set fault for Over Voltage (OVL)

RY 118 V  
OVLT DMT

Display shows High set fault for Over Voltage (OVH)

RY 125V  
OVH TRIP

Display shows Low set fault for Under Voltage (UVL)

RY 98V  
UVLTIDMT

Display shows High set fault for Under Voltage (UVH)

RY 78V  
UVH TRIP

OR

Display shows for Phase fail condition in R phase

RY 98V  
UVLT DMT

R PHASE  
FAIL

Display shows for Phase Reversal condition in any two Phases

PHASE  
REVERSAL

Display shows for Unbalance condition in the system line to line voltage

UBV > 25V  
TRIP

Visual indication of Healthy voltage status-through turn on Green LED

Visual indication of Fault status provided through Red LED

Fault Pick up indicated by blinking of Red LED

Fault -Trip by latching of the Red LED and clear off Green led

Fault Dropout by clear off - Red LED