

## INSTALLATION INSTRUCTIONS FOR VPG D1

### INTRODUCTION

Thank you for selecting and purchasing MINILEC make Phase Failure Relay with Water Level Guard VPG D1.

The following installation instructions would guide you in installing your VPG D1 and making the best use of it.

VPG D1 is phase failure relay operating on negative sequence voltage sensing principle and also have a built in water level guard (for single level) operating on electrical conductivity principle.

VPG D1 offers protection against

- \* Unbalanced voltage condition.
- \* Phase failure condition.
- \* Phase sequence reversal condition.
- \* Dry running condition for submersible pumps.

Your VPG D1 is an auxiliary relay and it should be used along with the motor starter only. The effective working of VPG D1 will depend on efficient working of the motor starter. Starter should be checked before MINILEC VPG D1 is installed. It can be done in the following manner. Start the motor. Switch of the supply, Starter should trip instantaneously, If the starter does not trip instantaneously, it requires servicing. Install MINILEC VPG D1 after ensuring that the starter is set right.

### TRIP SETTING, TRIP DELAY AND RESETTING

You can set your VPG D1 model to trip the starter for unbalanced voltage between any two phases of 40V ± 6V (Fixed).

VPG D1 is to be used with MINILEC sensor Prod Only for dry running protection. You can position the sensor prod in the bore well at the desired level just above the submersible pump motor.

The trip time delay for both unbalanced voltage condition & dry running condition is within 2 to 5 seconds.

VPG D1 can be set in Auto reset mode only, VPG D1 will reset automatically when the unbalance voltage between all three phases is reduced to less than 20 V & removal of dry running condition. (i.e. sensor prod is dipped in water.)

### INPUT SENSOR

VPG D1 is to be used with MINILEC sensor prod only. The sensor prod is of stainless steel material (For specific & typical application you may use a sensor prod of suitable electrically conductive material in case MINILEC sensor prod does not suit your requirement). Consult MINILEC before using modified sensor prod. The MINILEC sensor prod has bolting arrangement for connecting a suitable cable & it is suspended from top opening of the bore Well.

### MOUNTING

Your VPG D1 can be RAIL mounted or PANEL mounted. (see Fig. 5A & 5B for mounting it on DIN RAIL & releasing it from DIN RAIL respectively. Also see Fig. 2 for Panel Mounting and Drilling Details Dimensions). It is suitable for 35 mm RAIL.

### CAUTION

1. Ensure that your VPG D1 is
  - \* Not installed near any heat sources like burner, sunlight, electric arc etc.
  - \* Not subjected to abnormal vibrations.
  - \* Not subjected to direct rains, stormy Wind and dust.
  - \* Installed as near to starter as possible.
2. Ensure that the sensor prod or its cable is not earthed.
3. Ensure that water resistance is below 150 K. Ohms (Hence your VPG D1 will not operate in Distilled Water.)
4. Terminals 7, 8, 9 should be connected to the incoming side of Automatic/ Multi speed / Reversible motor starter.

### ELECTRICAL CONNECTION

See Fig. 4 for electrical connection diagram details of VPG D1 see Fig 1A/1B for installation of VPG D1 in power & control wiring for Auto / Manual operation.

Connect R, Y, B phases at terminals 7, 8, 9 Respectively. The R-Y-B sensing should be taken from incoming points for Auto mode only or from outgoing points for Manual mode only of the motor starter / main contactor in Direct Online Starter / Star Delta Starter respectively.

Connect the sensor prod cable at terminals 1. Earth the tank body and connect a separate cable from terminal 2 at the tank body. The output relay contacts 13 & 14 are for tripping the starter.

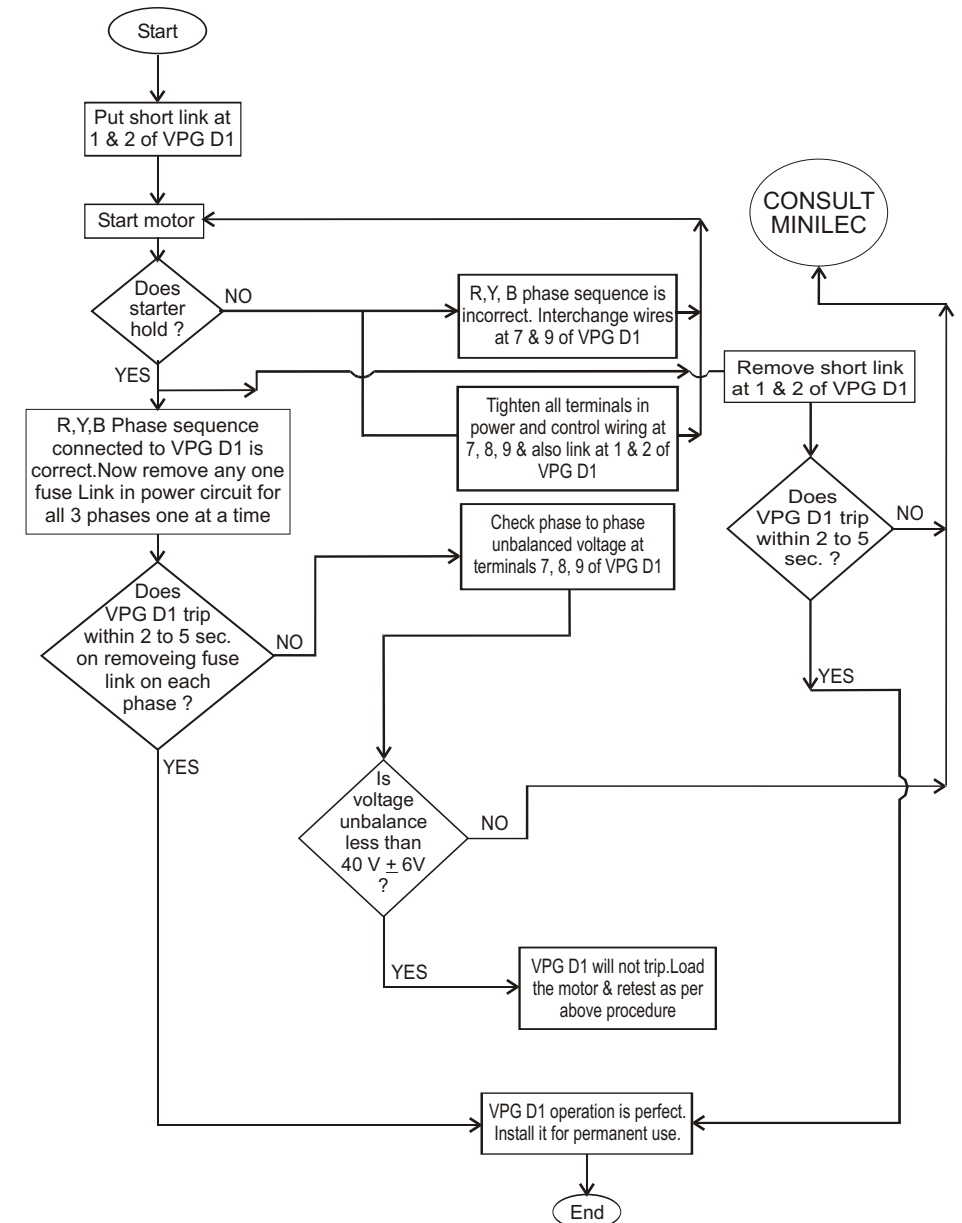
### TECHNICAL SPECIFICATIONS OF VPG D1

1. Voltage  
System Supply : 415 VAC, 3 ± 20 %
2. Frequency : 50 Hz ± 3%
3. Power Consumption : 3 VA Max.
4. Output Relay Contacts : 1 Changeover
5. Output Contact Rating :  
5 A, 240 VAC ( Resistive )
6. Trip settings :  
Phase to phase Unbalance :  
40V ± 6V (Fixed)  
Dry Running : As Per Sensor Prod Positioning
7. Trip Time Delay For Unbalance & Dry Running : 2 to 5 seconds
8. Resetting : Auto Reset
9. Unbalance Reset Gap : 10 - 18 V
10. Enclosure : ABS
11. Dimensions (mm) :  
Overall : 76 x 30.5 x 117.5  
Mounting : 68 [Center To Center]
12. Mounting :  
Panel Mounting And 35 mm Rail Mounting
13. Weight (gms) : 300
14. Level Sensor :
 

a) Quantity	1 No. Stainless Steel Prod
b) Dimensions (mm)	Ref. Fig.3
c) Weight (gms.)	15
15. Operating Conditions :  
Temperature :- -5<sup>o</sup> C to 60<sup>o</sup> C  
Humidity :- Upto 95 % R.H.
16. Life Expectancy :  
0.5 x 10<sup>6</sup> Operations At 100% Rating
17. Liquid Resistance : 150 K. Ohms

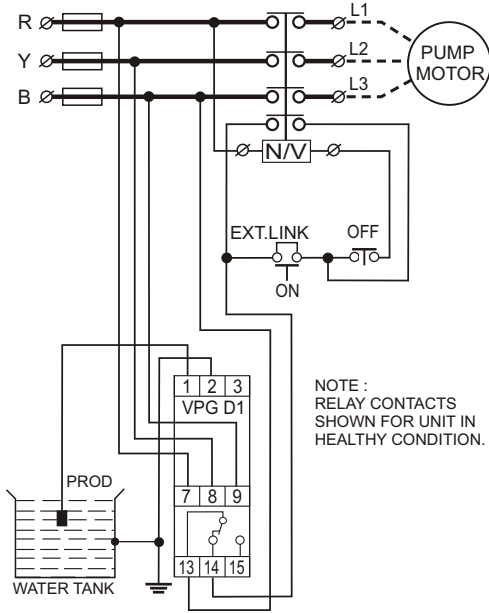
### TESTING PROCEDURE

After making electrical connections as per connection diagram functioning of VPG D1 can be checked as per following flow chart.



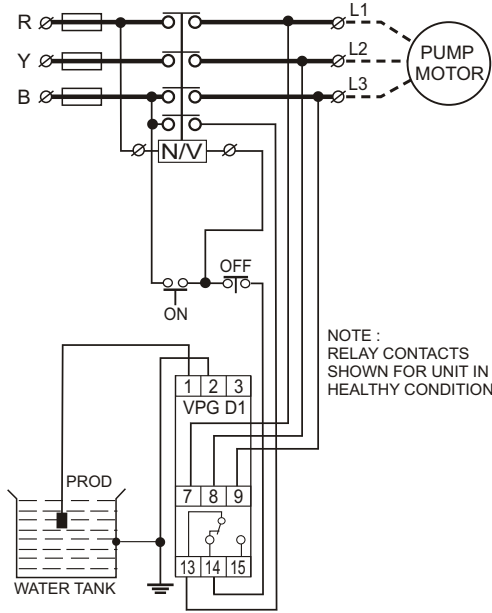
**ELECTRICAL CONNECTION IN POWER AND CONTROL WIRING**

Fig. 1A AUTO OPERATION



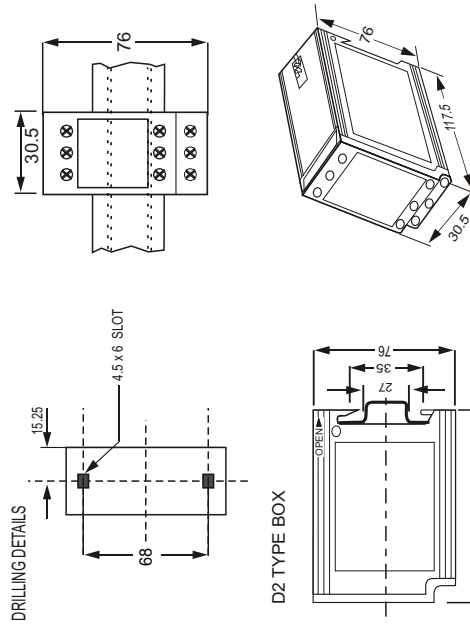
**ELECTRICAL CONNECTION IN POWER AND CONTROL WIRING**

Fig. 1B MANUAL OPERATION



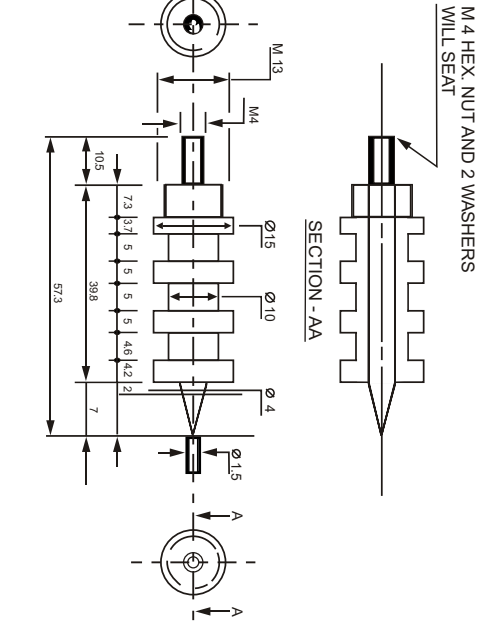
**MOUNTING DIMENSIONS**

FIG. 2



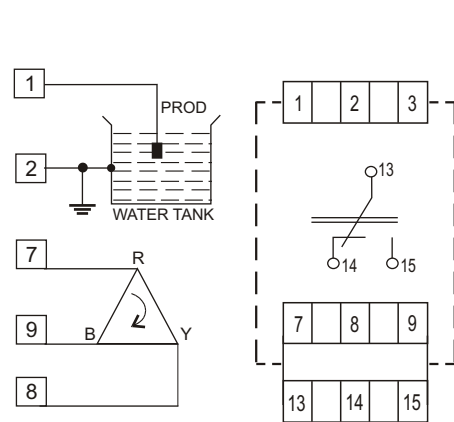
**LEVEL SENSOR PROD DIMENSIONS**

FIG. 3



**CONNECTION DIAGRAM**

FIG. 4



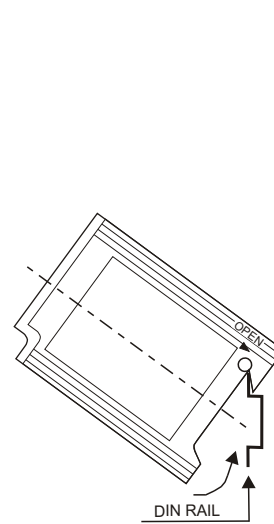
**TERMINAL DETAILS**

- 1 : LEVEL SENSOR PROD
- 2 : TANK BODY (EARTH)
- 7 - 8 - 9 : R - Y - B PHASE VOLTAGE SENSING POINTS
- 14-15-16 : 1 CHANGEOVER RELAY OUTPUT CONTACT (NO - C- NC)
- 3 : DUMMY CONTACT

NOTE : RELAY CONTACT SHOWN FOR UNIT IN HEALTHY CONDITION.

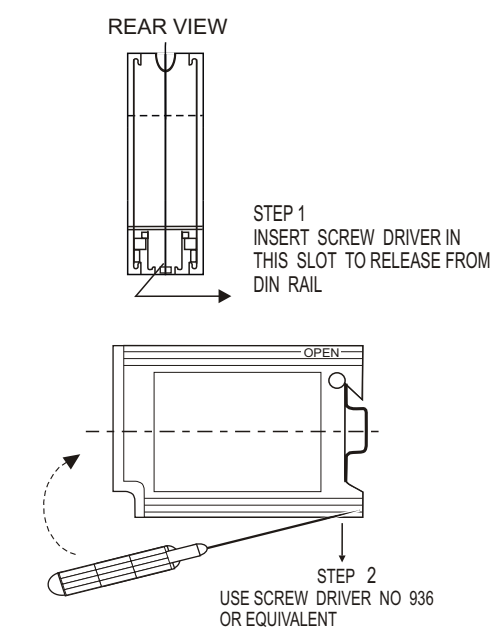
**MOUNTING ON DIN RAIL**

FIG. 5A



**RELEASING FROM DIN RAIL**

FIG. 5B



**INSTALLATION INSTRUCTION MANUAL FOR PHASE FAILURE RELAY WITH WATER LEVEL GUARD**

**VPG D1**



**WARRANTY**

**AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM INSTALLATION WHICHEVER IS EARLIER**

Manufactured by :

**minilec®**

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