

USER'S MANUAL

VAF POWER METER

This document contains the latest technical information about VAF which is a micro-controller based Power Meter. The unit is tested against the latest "MTE" Standard Model PRS400.3 having basic accuracy of 0.02% that is traceable upto International Standards derived using appropriate ratio techniques.

The product, VAF is sophisticated electronic equipment and, the user is advised to read this User's Manual carefully before attempting to install or operate the equipment.

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Introduction

VAF is a microcontroller based power meter which measures basic parameters and displays on a red seven segment. VAF is a host of low cost, easy to use individually that offers for the basic measurement capabilities required to monitor electricity over and above basic metering. In addition to 3P4W and 1P2W electrical installation, the unit can also be installed to 3P3W electrical installation according to user's ordering option. The unit is able to measure parameters such as phase to phase Voltage, individual Current and Frequency.

The entire range is very rugged and cost-effective solution. The unit is field proven and more than 100,000 units are active in service.

The Main Features Available in This Model

- True rms readings
- Measurements of phase to neutral voltage (VPN), phase to phase voltage (VPP), individual current in three phases (A) and frequency (Hz)
- 3P4W and 1P2W selectable
- 3P3W (ordering option)
- Run Time display and resettable
- Display with 0.4" Red Seven Segment
- LED indicator for each parameter
- All parameters with default accuracy class 1.0S.



Technical Specification

| SR. NO | PARAMETERS & OPTIONS | STATISTICS | |
|--------|----------------------|--|---------------|
| 1 | Volts R-N | Direct Voltage Input : Up to 300V L-N Burden : 0.5VA Secondary Voltage Input : 63.5V* | |
| 2 | Volts Y-N | | |
| 3 | Volts B-N | | |
| 4 | Volts RY | Direct Voltage Input : Up to 500V L-L Burden : 0.5VA Secondary Voltage Input : 110V* | |
| 5 | Volts YB | | |
| 6 | Volts BR | | |
| 7 | Current R | Secondary Current Input : 5A or 1A (To be specified at the time of Ordering) CT- Primary : Site Selectable Range of Reading : 5 – 5000A Burden : < 1.0VA Overload(Through CT) : 5A CT = 6A RMS Continuous 1A CT = 1.2A RMS Continuous (Whole Current) : 120% of I _{max} continuous. | |
| 8 | Current Y | | |
| 9 | Current B | | |
| 10 | Frequency | 45 to 55 Hz, Accuracy : 0.3% of Reading | |
| 11 | DISPLAY | 0.4" Red Seven Segment. | |
| 12 | Installation | (a) 3P4W and 1P2W (b) 3P3W (optional) | |
| 13 | Bezel | 96x96 mm | DIN enclosure |
| 14 | Depth | 55 mm | |

* To be specified at the time of ordering along with PT-Primary.

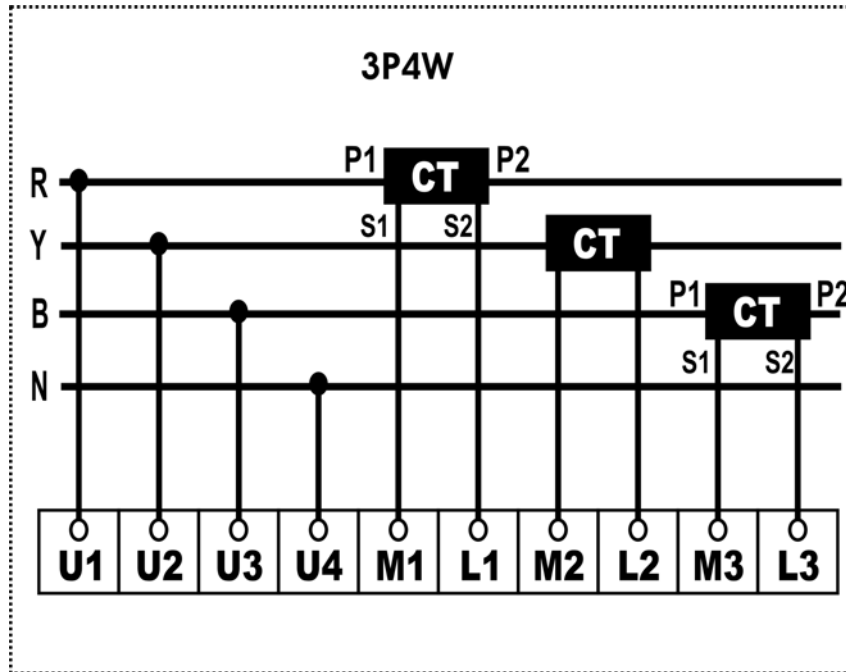
Installation and Commissioning

The unit can be used only for 3P4W and 1P2W or 3P3W according to user's requirement for an electrical installation.

3P4W Mode Installation

To install and commission for 3P4W, proceed the following instructions:

1. Push the unit into the panel and mount using the clamps provided on it.



2. Connect the auxiliary supply (80V AC to 270V AC) to the terminals marked P and N.
3. Connect the three phases with the phase sequence being R-Y-B to the terminals marked U1, U2 and U3 respectively. Make sure that the phases coming to the unit come through control fuses of 1.0A rating. This will protect the electronic inside from damage due to severe over voltage or phase faults in the system.
4. Connect the neutral wire to the terminal marked U4.
5. Connect the two wires from the R-phase CT to the terminals marked M1 and L1 such that S1 from CT goes to M1. Connect the two wires from the Y-phase CT to the terminals marked M2 and L2 such that S1 from the CT goes to M2. Connect the two wires from the B-phase CT to the terminals marked M3 and L3 such that S1 from the CT goes to terminal marked M3.
6. Switch on the auxiliary supply as well as three phase supply, and then the unit

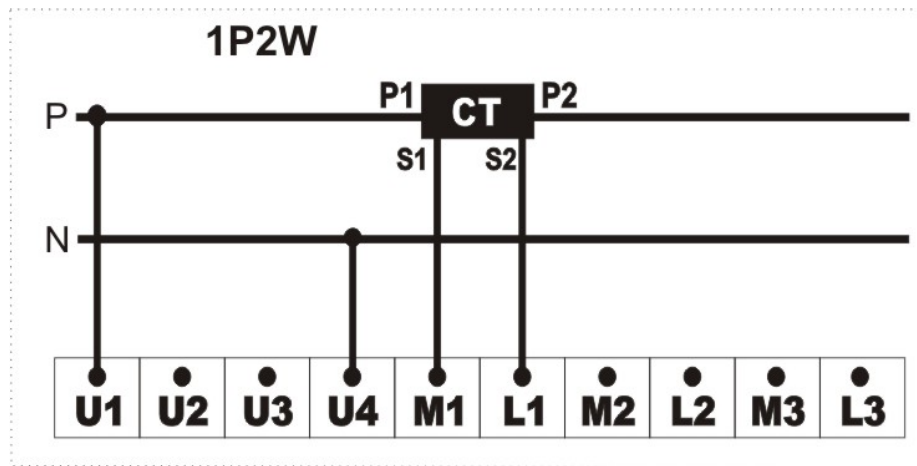
will come alive in order to display such as CT-Ratio, Installation type and enter into Run Mode respectively.

7. Firstly, user should program the settable parameters, CT-Primary and Installation type. (*Refer Operational Details in the next section*).
8. Now the unit is ready for operation.

1P2W Mode Installation

To install and commission for 1P2W, proceed the following instructions:

1. Push the unit into the panel and mount using the clamps provided on it.

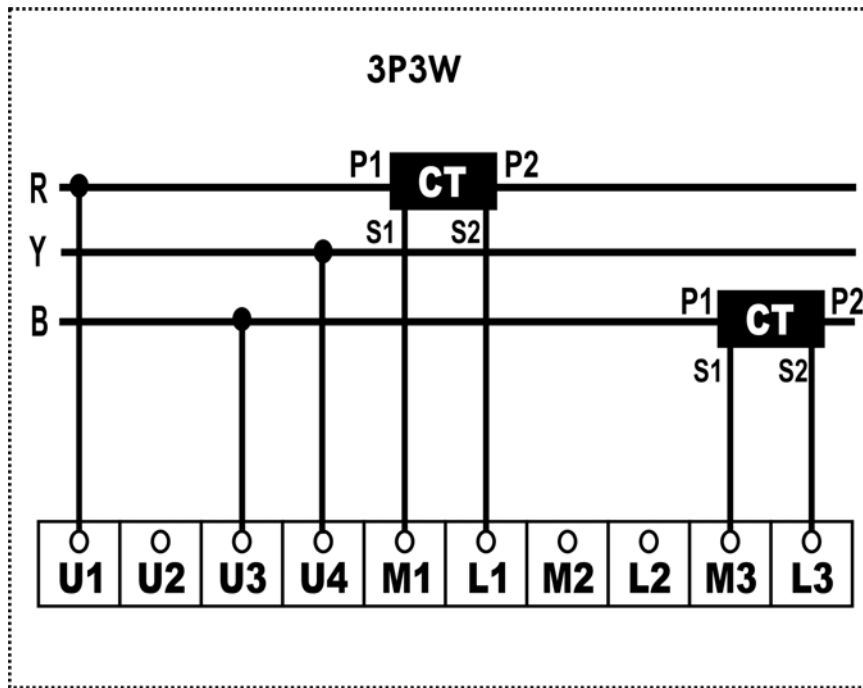


2. Connect the auxiliary supply (80V AC to 270V AC) to the terminals marked P and N.
3. Connect the single phase to the terminal marked U1. Make sure that the phases coming to the unit come through control fuse of 1.0A rating. This will protect the electronic inside from damage due to severe over voltage or phase faults in the system.
4. Connect the neutral wire to the terminal marked U4.
5. Connect the two wires from the phase CT to the terminal marked M1 and L1 such that S1 from CT goes to M1.
6. Switch on the auxiliary supply as well as phase supply, and then the unit will come alive and display such as CT- Ratio, Installation type, and then enter into Run Mode.
7. Firstly, user should program the settable parameter; CT-Primary to give a CT operated true result. (*Refer Operational Details in the next section*).
8. Now the unit is ready for operation.

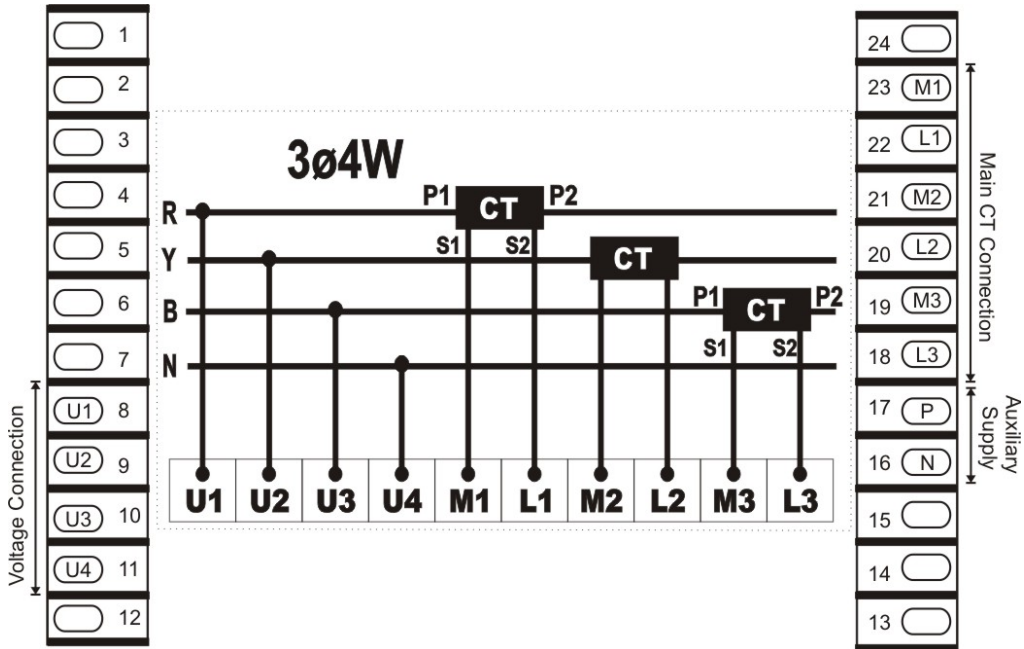
3P3W Mode of Installation

To install and commission for 3P3W, proceed the following instructions:

1. Push the unit into the panel and mount using the clamps provided on it.
2. Connect the auxiliary supply (80V AC to 270V AC) to the terminals marked P and N.



3. Connect the three phases with the phase sequence being R-Y-B to the terminals marked U1, U4 and U3 respectively. Make sure that the phases coming to the unit come through control fuses of 1.0A rating. This will protect the electronic inside from damage due to severe over voltage or phase faults in the system.
4. Connect the two wires from the R-phase CT to the terminals marked M1 and L1 such that S1 from CT goes to M1. Connect the two wires from the B-phase CT to the terminals marked M3 and L3 such that S1 from the CT goes to the terminal marked M3.
9. Switch on the auxiliary supply as well as three phases supply, and then the unit will come alive in order to display such as CT- Ratio, Installation type, and then enter into Run Mode.
10. Firstly, user should program the settable parameter, CT-Primary to give a CT operated true result. (*Refer Operational Details in the next section*).
5. Now, the unit is ready for operation.



Connection Scheme

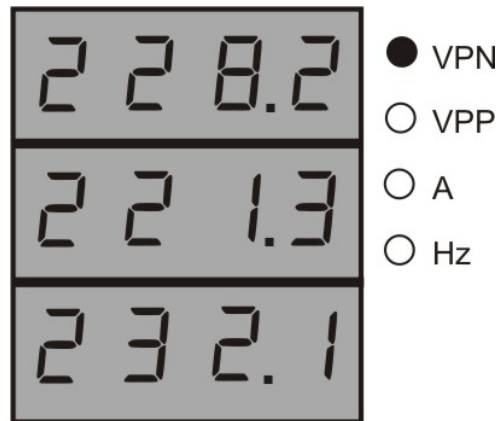
Operational Details

The Power Meter, VAF is a versatile meter, with all the features needed to implement for a robust electrical load management system. It can be configured to monitor electrical parameters, and is also achieved by making field programmable parameters.



There are basically two modes of operation in VAF:

1. Programming Mode
2. Run Mode

After supplying power (80 VAC - 415 VAC), the unit displays immediately power receiving information, CT-Ratio, Installation Type, and then by default, the display comes into Run Mode such as shown below.




Programming Mode

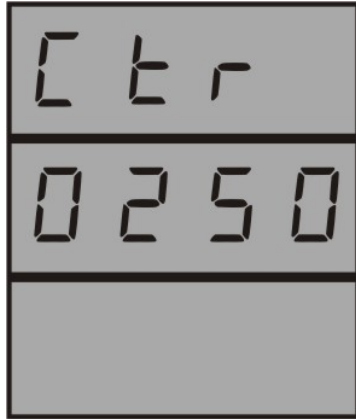
Now, the unit can be operated by using  key for both the Programming Mode and Run Mode. There are two programmable parameters CT-Ratio and Installation types which can also be operated by pressing  key.


Setting CT-Ratio

The CT-Primary is settable from 5 to 5000 and, should be set so as to give actual current values in an Electrical Installation.

To set the CT-Primary, proceed the following instruction:

1. Keep pressing  key in Run Mode till the unit enters into settable CT-Ratio with the following display.




2. As soon as the unit enters into the above display, stop pressing the key. Now, set CT-Ratio by pressing  key again till your desired value is received.
3. If your setting is completed, stop pressing the key. The unit will therefore return into Run Mode after 9 to 10 seconds.


Selecting Installation Type

The unit consists of both 3P4W and 1P2W for an electrical installation. However, the unit can also be specified for 3P3W electrical installation according to user's ordering option.


To select the Types of Installation, proceed the following instruction.

1. Keep pressing  key in Run Mode till the unit enters programmable Installation type across the CT-Primary with the following display.



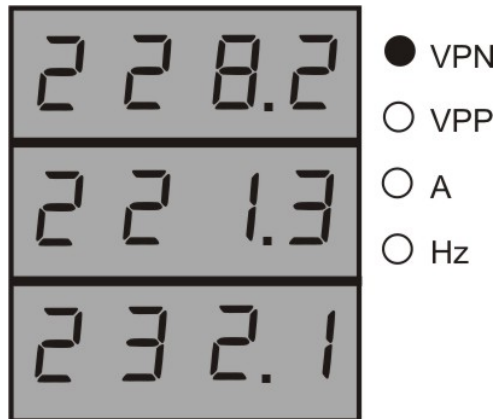
2. As soon as the unit enters the above display, stop pressing the key. Now, select the Installation type by pressing  key again.
3. If your setting is completed, stop pressing the key. The unit will therefore return into Run Mode after 9 to 10 seconds.

Run Mode

In the Run Mode, the various parameters calculated by the VAF are displayed on different pages along with three lines of 0.4" Red Seven Segment. The Run Mode displays will autoscroll by default and can also be stayed for each page by pressing  key. The parameters can therefore be analyzed one by one.

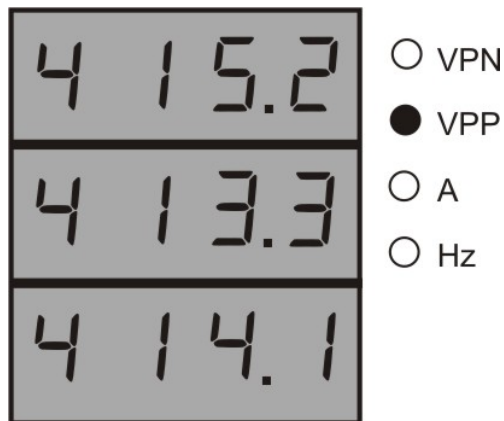
Run Mode Displays

Page 1



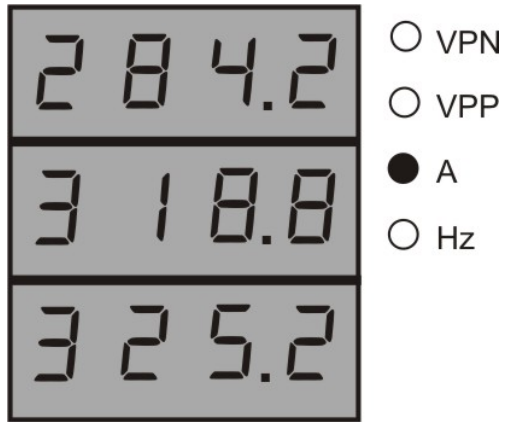
The LED indicator glows on VOLT which shows individual phase to neutral voltage of R-Y-B on first row, second row and third row display respectively. (In case of 3P3W, this page is not there).

Page 2



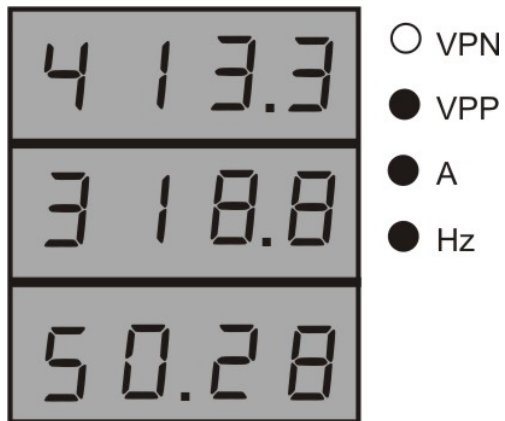
The LED indicator glows on VPP which shows individual phase to phase voltage of R-Y-B on first row, second row and third row display respectively.

Page 3



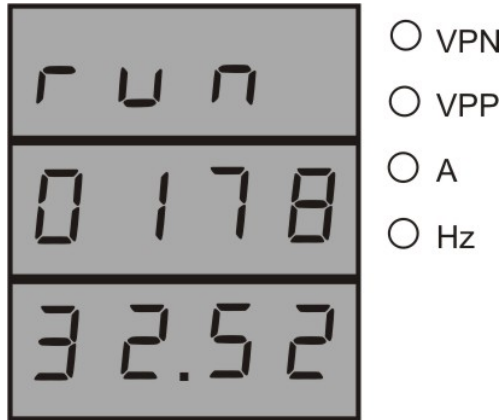
The LED indicator glows on current (i.e., A) which shows the three phase currents on first row, second row and third row.

Page 4



The LED indicator glows on VPP, A and Hz which indicate that first row, second row and third row are showing for average voltage in phase to phase, average current and frequency respectively.

Page 5



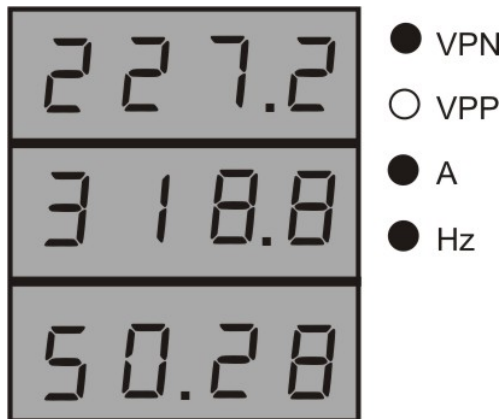
The display shows the Run Time of the unit along with the format of hours and minutes (i.e., hhhhhh.mm).

Resetting the Run Time

The Run Time of the unit can be reset. In Run Mode, press  key continuously for about 1 minute to reset the Run Time.

1P2W Run Mode Display

Page



The LED indicator glows on VPN, A and Hz which indicate that first row, second row and third row are showing for average voltage in phase to neutral, average current and frequency respectively.

Ordering Options

VAF can be ordered with the following options according to user's requirements.

| VAF Power Meter | |
|--------------------------------------|--|
| Technical Specification | Options |
| Installation | <input type="checkbox"/> 3P4W and 1P2W installation <input type="checkbox"/> 3P3W installation |
| PT-Ratio $\left(\frac{KV}{V}\right)$ | <input type="checkbox"/> 11 KV/110V <input type="checkbox"/> 22 KV/110V <input type="checkbox"/> 33KV/110V <input type="checkbox"/> 66KV/110V |
| CT secondary (Current) | <input type="checkbox"/> 5A <input type="checkbox"/> 1A |

P.O No. :

Customer :

Sr. No. :

Routine and function tests conducted to relevant standards and our Specifications/Literature/O & M Manual.

Traceability: tested against "MTE" Standard Model PRS400.3 having basic accuracy of 0.02%, traceable upto International Standards derived using appropriate ratio techniques.

Result of Test :

Remarks :

Test engineer :

Date :
