

# USER'S MANUAL

## ORACLE PORTABLE POWER ANALYZER

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

The product, Oracle 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

The new Oracle, micro-controller based is the latest innovations of the previous successful Portable Power Quality Analyzer platform. It incorporates newly enhanced key features including a faster 32-bit CPU to support continually evolving capabilities, a complete 8 MB of nonvolatile internal memory and auxiliary power input capabilities.

Power Quality data can be copied from the instrument to PC or Laptop. The standard software utility has been enhanced to fully support the new functionality and is included at no cost with every Oracle sold.

The Oracle records power quality and power flow information simultaneously. The recorded information can be viewed via the inbuilt graphic displays and downloaded to a computer using the USB interface.

Trinity offers a comprehensive line of flexible voltage probes and clamp-on current probes for use with Oracle.

## Application

- Energy audits and forecasting
- Load balancing
- Power factor surveys
- Power quality investigations
- Billing verification
- Harmonic surveys & analysis for filter design
- Load profiling Substation monitoring



## The Main Features Available in this Model

### **Comprehensive Measurement:**

- All readings are True RMS measurements
- Fast, real-time cycle by cycle measurement, at 80 samples/cycle
- Four quadrant readings (Power and Power Factor)
- Min. /Max. Values
- KVA and KW Demands (sliding and fixed) including predictive demand with fixed window
- Odd Harmonics up to 29th of individual Voltage, and Current Waveforms including THD
- Measurement of all three voltages - phase to phase and phase to neutral, all three currents, power factors - phase wise and system, Hz, all three powers (KW, KVA & KVAR), phase wise and system, all three energies, Phase angles, Demand and Maximum Demand in KW and KVA with programmable integration period, neutral current, THD for each voltage and current.

### **Installations & Connections:**

- Single model accepts 3P4W and 3P3W connections
- Site selectable 2mA, 300mA and 1000mA CT secondary selection
- User selectable CT and PT Ratio.

### **Communication:**

- USB port for downloading of logged Data
- ON board 8 MB of Memory
- Logs all Min. /Max. Values
- Logs all electrical parameters, real-time and integrated (energies and demands) and harmonics to get complete Energy system snap-shot

### **Events Logging:**

- Programmable four events to be logged for selectable parameters to High or Low
- Date and Time for event loggings with Minimum and Maximum values

### **Display:**

- Easy user interface through Touch Screen
- Graphical color TFT display with 320x240 pixels.

## Technical Specifications

### True RMS Basic Parameters

Parameter			Mode	
Type	Statistics	Symbol	3P4W	3P3W
Voltage (Volts L-N)	Direct Voltage Input : 0 to 300V AC	Vr	✓	-
	PT Ratio : Freely Programmable up to 220KV	Vy	✓	
	Range of Reading : 0 to 220KV	Vb	✓	
	Accuracy : 0.5% of Reading			
Voltage (Volts L-L)	Direct Voltage Input : 0 to 510V AC	Vry	✓	✓
	PT Ratio : Freely Programmable up to 220KV	Vyb	✓	✓
	Range of Reading : 0 to 220KV	Vbr	✓	-
	Accuracy : 1.0% of Reading			
Current (Amps Ir, y, Ib)	Secondary Current Input : 2mA, 300mA, 1000mA	Ir	✓	✓
	CT Ratio : Freely Programmable up to 9999A	Iy	✓	
	Range of Reading : 0 to 9999A	Ib	✓	✓
	Accuracy : 0.25% of Reading			
Neutral Current	Accuracy : 0.25% of Reading	In	✓	-
Line Frequency	40 to 70 Hz, Accuracy : 0.3% of Reading	Hz	✓	✓

### Power

Parameter			Mode	
Type	Statistics	Symbol	3P4W	3P3W
Active Power (P)	Accuracy : 1.0% of Reading (Between 0.5 Lag to 0.8 Lead)	(P) R-Phase	✓	✓
		(P) Y-Phase	✓	
		(P) B-Phase	✓	✓
		System KW	✓	✓
Reactive Power (Q)	Accuracy : 1.5% of Reading (Between 0.5 Lag to 0.8 Lead)	(Q) R-Phase	✓	✓
		(Q) Y-Phase	✓	
		(Q) B-Phase	✓	✓
		System KVAR	✓	✓
Apparent Power (S)	Accuracy : 1.0% of Reading	(S) R-Phase	✓	
		(S) Y-Phase	✓	
		(S) B-Phase	✓	
		System KVA	✓	✓
Power Factor	Accuracy : 1% of Reading ( $IPFI \geq 0.5$ ) Range of Reading : 0.05 to 1.00 Lag/Lead	PF R-Phase	✓	
		PF Y-Phase	✓	
		PF B-Phase	✓	
		System PF	✓	✓

## Energy

Parameter		Mode	
Type	Statistics	3P4W	3P3W
Total Active Energy (KWh)	Range of reading : 0 to 999999.00 KWh Accuracy : 1.0S as per IS 13779.	✓	✓
Total Reactive Energy (KVARh)	Range of Reading : 0 to 999999.00 KVARh Accuracy : 1.5% of Reading (Between 0.5 Lag to 0.8 Lead)	✓	✓
Total Apparent Energy (KVAh)	Range of Reading : 0 to 999999.00 KVAh Accuracy : 1.0% of Reading	✓	✓

## Demand

Parameter		Mode	
Statistics	Symbol	3P4W	3P3W
Active Power (KW) Demand : Sliding & Fixed Selectable	KW-D	✓	✓
Apparent Power (KVA) Demand : Sliding & Fixed Selectable	KVA-D	✓	✓
Predictive Demand : Fixed Window	PKW, PKVA	✓	✓

## Power Quality

Parameter	Mode	
	3P4W	3P3W
Harmonics for Voltages(3 <sup>rd</sup> to 29 <sup>th</sup> )	✓	✓
Harmonics for Currents(3 <sup>rd</sup> to 29 <sup>th</sup> )	✓	✓
THD for each voltage	✓	✓
THD for each current	✓	✓

## Miscellaneous

Parameter	Mode	
	3P4W	3P3W
Phase angles.	✓	
Run time	✓	✓

## Input Specification

**Supply** : Three Phases and Neutral of a 3P4W system/ three phases of a 3P3W system

### **Voltage**

Direct Voltage Input : Up to 510V L-L and 300V L-N  
PT Ratio : Freely Programmable up to 220KV site selectable.  
Range of Reading : 1-220KV  
Burden : 0.5VA

### **Current**

Secondary Current  
Input : 2mA, 300mA, 1000mA  
Range of Reading : 0 – 9999A  
Burden : < 1.0VA

### **Power Supply:**

Not needed as unit has in-built 3 phase supply with an operating range of 60 VAC - 480 VAC, 50-60 Hz.

An auxiliary supply is also provided for off site use of the Oracle. It also operates on 60-480 VAC and 50-60 Hz.



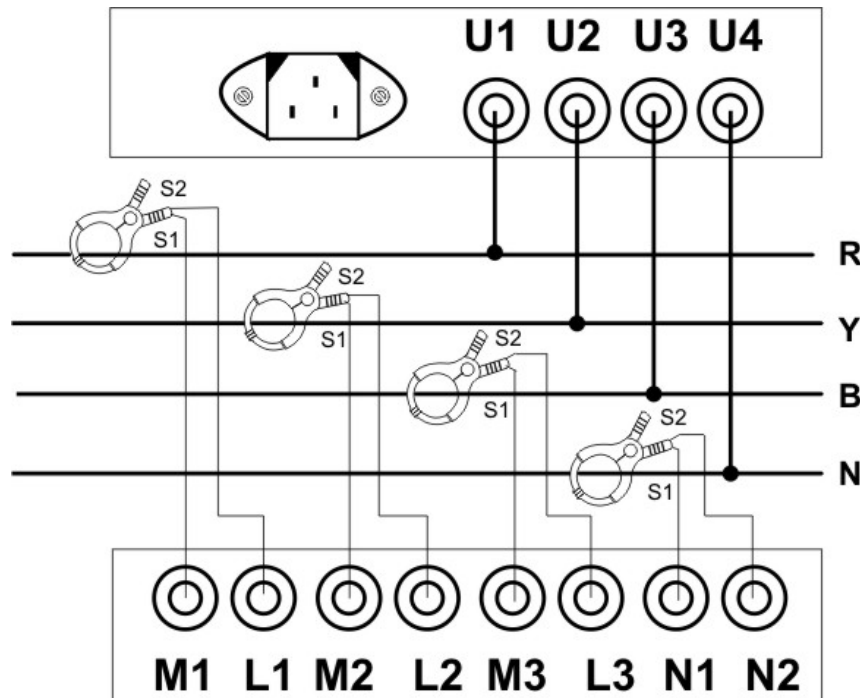
## Installation and Commissioning

The Oracle supports two installation modes – 3P4W and 3P3W. The installation processes of these modes are described below:

### 3P4W Mode Installation

To install and commission the unit, proceed the following instructions:

1. Place the unit nearby the three phases connected to EB. Unit does not required external auxiliary supply. It will be powered on from connected 3P4W system.



2. Connect the three phases and neutral wire with the sequence being R-Y-B and N to the terminals marked U1, U2, U3 and U4 such as shown above. Make sure that the three phases including neutral wire coming to the unit come through control fuses of 1.0 Amp rating. This will protect the electronics inside from damage due to severe over voltages or phase faults in the system.
3. Connect the two wires from the R-phase Clamp-On CT to the terminals marked M1 & L1 such that S1 from CT goes to M1 on the unit. Connect the two wires from the Y-phase Clamp-On CT to the terminals marked M2 & L2 such that S1 from CT goes to M2 on the unit. Connect the two wires from the B-phase Clamp-On CT to the terminals marked M3 & L3 such that S1 from CT goes to M3 on the unit. Similarly, connect the two wires from the neutral wire Clamp-On CT to the terminals marked N1 & N2 such that S1 from CT goes to N1 on the unit.
4. Switch on the three phases supply. Unit will be powered on from this three

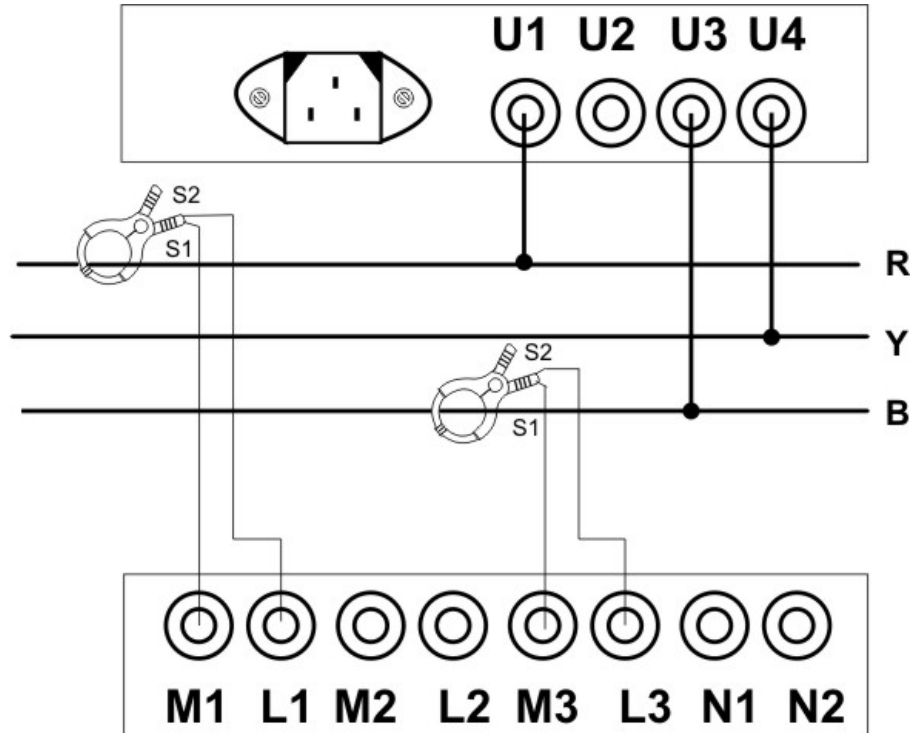
phase supply and then it will display company information for 4 to 5 seconds. After that, the unit will display the first page of Run Mode.

5. If there is no current or little current in the CT circuits, the unit may show PF as 0.999 or 1.000. This will go away as soon as the current builds up in the CURRENT TRANSFORMERS (CTs) above 0.4 % of rated CT.
6. The unit needs to be programmed for the various parameters which are field programmable, and for selecting the various options supported, refer section, '*OPERATIONAL DETAILS*' in the next section.
7. Now, the unit is ready for operation.

### 3P3W Mode Installation

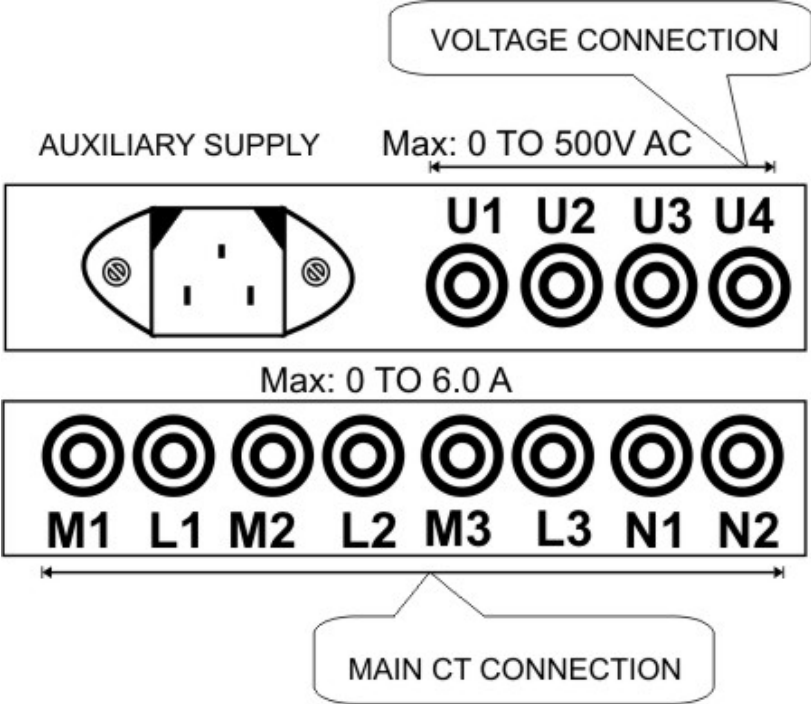
To install and commission the unit, proceed the following instructions:

1. Place the unit nearby the three phases connected to EB. Unit does not required external auxiliary supply. It will be powered on from connected 3P3W system.



2. Connect the three phases with the phase sequence being R-Y-B to the terminal marked, U1, U4 and U3 such as shown above. Make sure that the three phases coming to the unit come through control fuses of 1.0A rating. This will protect the electronics inside from damage due to severe over voltages or phase faults in the system.
3. Connect the two wires from the R-Phase Clamp-On CT to the terminals marked M1 & L1 such that S1 from CT goes to M1 on the unit. Connect the two wires from the B-phase Clamp-On CT to the terminals marked M3 & L3 such that S1 from CT goes to M3 on the unit.
4. Switch on the three phases supply. Unit will be powered on from this three phase and then it will display company information for 4 to 5 seconds. After that, the unit will display the first page of the Run Mode.
5. If there is no current or little current in the CT circuits, the unit may show PF as 0.999 or 1.000. The unit will show actual PF as soon as the current builds up in the current transformers (CTs), above 0.4 % of rated CT.

6. The unit needs to be programmed for the various parameters which are field programmable, and for selecting the various options supported, refer, '*OPERATIONAL DETAILS*' in the next section.
7. Now, the unit is ready for operation.



Connection Scheme

## Operational Details

The Portable Power Analyzer, Oracle is a versatile meter with all the features needed to implement for a robust electrical load measurement. It can be configured to analyze most electrical parameters and communication needs and, is also achieved by making field programmable parameters, as possible.

There are basically two modes of operation in Oracle:

1. Programming Mode
2. Run Mode

After supplying power (80 VAC - 500 VAC) to the three phases, the unit displays immediately power receiving information such as, ORACLE and TRINITY logo on TFT screen and by default, the display comes into Run Mode such as shown below.

INSTALLATION : 3P4W				
Date : 01/04/2010		Time : 16:49:54		
3P4W	R-Phase	Y-Phase	B-Phase	Unit
VOLTS	220.5	224.7	219.2	V
AMPS	70.3	72.6	71.4	A
W	13.59	14.35	13.72	K
VAR	7.49	7.75	7.52	K
VA	15.52	16.31	15.65	K
PF	0.875	0.880	0.877	
RUN TIME : 00000:04:03				
Page : 01				
<div> <div>PROG</div> <div>UP</div> <div>DOWN</div> </div>				

To operate for all the programmable parameters into Programming Mode, proceed the following instructions.

1. Touch **PROG** key above and then, the unit will ask you to enter a password with the keypad provided such as shown below.

Enter Password

Password: \*\*\*\*

12345LRUN

67890RENT

2. Enter a four numerical password in the password box by touching the above numerical keys and then, touch **ENTR** key to enter into Programmable parameters.
3. In case, the password is not put into service, just touch **ENTR** key to ignore the password prompted and then, the unit will prompt the following Programming Mode such as shown.

<b>Programming Mode</b>		
No.	Settable Parameters	Values
→ 1	Installation	3P4W
2	PT-Primary	000240
3	PT-Secondary	240
4	MAINS – CT Primary	0300
5	MAINS-CT Secondary	300mA
6	NEUTRAL- CT Primary	0300
7	NEUTRAL-CT Secondary	300mA

1	2	3	4	5	U	RUN
6	7	8	9	0	D	ENTR

## Programming Mode

The Programming Mode shows for all the settable parameters with three columns where the first column, second column and third column show the serial number of the parameters, settable parameter names and settable parameter values respectively. At the bottom of the display, it shows the finger touch keypad: numerical keys from **0** to **9**, **U**(up), **D**(down) keys with **RUN** key and **ENTR** (enter) key whereas **L**(left) and **R**(right) keys show as **ENTR** key is touched.

There are twenty seven parameters which are settable at sites with a desirable value such as shown below.

## Selecting Installation Types

Oracle supports two types of electrical installations: three phase three wire and three phase four wire. These installation types should be selected either according to user's requirements.

To select the installation type, proceed the following instructions:

1. Retrieve the arrow onto **Installation** by touching **U**(up) and **D**(down) keys and then, touch **ENTR** key which will start blinking the parameter value and arrow simultaneously with an interval of a one second such as shown below:

No.	Settable Parameters	Values
→ 1	Installation	3P4W

2. Immediately, **U** and **D** keys are replaced by **L** (left) and **R**(right) keys so as to select the desirable installation type. Select the Installation type to either 3P3W or 3P4W by touching **L** and **R** keys and then, touch **ENTR** key to confirm the selected value.
3. Touch **D** key to move and set for next parameter, **PT-Primary** or required parameters. Or else, touch **RUN** key to return into Run Mode if the operation is completed.

#### Setting PT-Primary and PT-Secondary

Both the PT-Primary and PT-Secondary should be set to give for the actual voltage of PT operated meter. The PT-Primary is freely programmable from 110V to 220000V whereas PT-Secondary is settable from any one of the following voltages: 110V or 240V or 415V.

To set the above parameters, retrieve the arrow onto **PT-Primary and PT-Secondary** touching **U** and **D** keys and then, set as before according to your desire with the following display.

No.	Settable Parameters	Values
→ 2	PT-Primary	000240
3	PT-Secondary	110

#### Setting Mains CT-Primary and Mains CT-Secondary

The Main CT-Primary and Main CT-Secondary should be set to get actual current of CT operated meters. The CT-Primary is settable from 1 to 9999A and the CT-Secondary is selectable from any one of the following currents: 2mA, 300mA, 1000mA. However, the settable CT secondary is applicable in programming number 28.

To set the above parameter, retrieve the arrow onto **MAINS-CT Primary**, by touching **U** and **D** keys and then, set as before according to your desire with the following display.



No.	Settable Parameters	Values
→ 4	MAINS – CT Primary	0245
5	MAINS-CT Secondary	1000mA

#### Setting Neutral-CT Primary and Neutral-CT Secondary

If there is an imbalance load or harmonic distortion in R-Y-B phase, the current flows in neutral wire. Such neutral current can be measured exactly and so the Neutral-CT Primary should be set from 1 to 9999A as well as the Neutral-CT Secondary – 2mA, 300mA, 1000mA. However, the settable Neutral CT secondary is applicable in programming number 28.

To set the above parameter, retrieve the arrow onto **NEUTRAL-CT Primary** and **NEUTRAL-CT Secondary** respectively by touching **U** and **D** keys and then, set as before according to your desire with the following display.

No.	Settable Parameters	Values
→ 6	NEUTRAL– CT Primary	0245
7	NEUTRAL-CT Secondary	1000mA

#### Setting Date and Time

The system date can be set in DD/MM/YY format and the real time can be set in HH:MM:SS format. However, hours are set in the 24 hour format, i.e. 6.00 PM is set as 18:00:00 hours. This date and time will not only represent into system real time but it will also represent into Event Logging.

To set the above parameters, retrieve the arrow onto **Date** and **Time** respectively by touching **U** and **D** keys and then, set as before according to your desire with the following display.

No.	Settable Parameters	Values
→ 8	Date	10/01/20010
9	Time	16:53:31

#### Setting Log Duration

For logging of electrical parameters, the Log Duration is freely programmable from 20 seconds to 999 seconds. Oracle enables to record most data on its own Non-volatile RAM of which the maximum number in 3P4W mode and 3P3W mode are upto 30520 and 46520 logs respectively. The data is recorded in an FIFO buffer. Once the buffer is full, the oldest data is discarded and the newest data is filled into the buffer. This data can then be downloaded by using a software utility onto a PC record by record through USB port.

To set the above parameter, retrieve the arrow onto **Log Duration** by touching **U** and **D** keys and then, set as before according to your desire with the following display.

No.	Settable Parameters	Values
→10	Log Duration	006

### Selecting Demand Window and Demand Interval

For KW and KVA demand, the calculation method can be selected to either SLIDING or FIXED type. For calculation of KW and KVA demand, the Demand Interval can also be selected to either 15 minutes or 30 minutes.

To select the above parameters, retrieve the arrow onto **Demand window** and **Demand Interval** respectively, by touching **U** and **D** keys and then, select as before according to your desire with the following display.

No.	Settable Parameters	Values
→11	Demand Window	FIXED
12	Demand Interval	15

### Setting a Password

The password is not compulsory for the operation of meter. In case of your meter setting protection, the password can be used. Hence, the unit accepts a four digits password from 0 to 9. If a single digit is entered and **ENTR** key is touched and then, the remaining three digits will take as zero.

To set the above parameter, retrieve the arrow onto **Change Password** by touching **U** and **D** keys and then, set as before according to your desire with the following display.

No.	Settable Parameters	Values
→13	Change Password	----

### Setting Event Number, Event Parameter, Event Value, Event Seconds, Event On to High or Low

The minimum and maximum threshold values to be logged for a selected parameter to each 4 events can be described as.

#### 14. Event Number

Oracle supports four user defined events to be logged of which any one of the events can be specified to either HIGH or LOW for your required parameter.

#### 15. Event Parameter

There are seven parameters for which Event Parameter can be defined to any of the following: average volt (AVG\_V), average amps (AVG\_I), KW, KVA, KVAR, PF, and HZ.

## 16. Event Value

The event value is freely programmable from 000001 to 999999. The event value of PF should be entered with a multiplying factor of 1000, i.e if the value is to be set to 0.855, 855 is to be entered. In case of HZ, there is no resolution and hence two digits should be entered. e.g. 48 or 49.

## 17. Event Seconds

Event Seconds is freely programmable from 001 to 999 seconds for a selected event parameter. e.g if the event parameter is KW, and event value is 300, the event type is High, and the event seconds is 6, then, if KW exceeds 300 and stays there for 6 seconds or more, then this is considered a valid event, and logged in the event memory.

## 18. Event On

The Event On can be selected to **Low** or **High** so that the minimum or maximum system values could be logged.

To program the above events parameters, retrieve the arrow onto **Event Number** by touching **U** and **D** keys and then, set as before according to your desire with the following display.

No.	Settable Parameters	Values
→14	Event Number	1
15	Event 1 Parameter	KVA
16	Event 1 Value	002500
17	Event 1 Seconds	060
18	Event 1 On	Low

In order to set for all four types of events, after completing event 1, repeat the parameter number from 14 to 18 to specify for all four events. When event number is set to 2, Event 2 will prompt on each above parameters. Likewise, event number 3 and 4 will also prompt. Such four events setting can be viewed in Run Mode page number 24 including event LOG and OVERFLOW.

### Setting Back light On Time

This is to determine the On Time of the Back Light of graphical LCD, in Run Mode. Such parameter is programmable from 5 to 59 seconds. In Run Mode, when user touches the screen, the back light will turn on for the programmed duration. In Programming Mode the back light will always be on.

To program the above parameter, retrieve the arrow onto **Back Light On Time** by touching **U** and **D** keys and then, set as before according to your desire such as shown below.

No.	Settable Parameters	Values
→19	Back Light On Time	59

### Resetting Energies

The energies such as KWh, KVAh and KVARh can be reset where the energies become zero if Reset Energies is set to Yes.

To reset the above parameter, retrieve the arrow onto **Reset Energies** by touching **U** and **D** keys and then, set as before according to your desire with the following display.

No.	Settable Parameters	Values
→20	Reset Energies	No

### Resetting Demands

The maximum Demand power values such as MD-KW and MD-KVA will be overwritten with the threshold values of KW-D and KVA-D after reset. The date and time of MD-KW and MD-KVA occurrence will also be replaced by the current time and date. (Refer Run Mode page 2 and 3)

To reset the above parameter, retrieve the arrow onto **Reset Demands** by touching **U** and **D** keys and then, reset as before according to your desire with the following display.

No.	Settable Parameters	Values
→21	Reset Demands	Yes

### Resetting Logs

The previous logged data can be reset if Reset Logs is set to Yes.

To reset the above parameter, retrieve the arrow onto **Reset Logs** by touching **U** and **D** keys and then, reset as before according to your desire with the following display.

No.	Settable Parameters	Values
→22	Reset Logs	Yes

### Resetting the Run Time

To reset run time, The Reset Run Time should be set to Yes and then, The Run Time will display 0 H, i.e., 00000:00:00.

To reset the above parameter, retrieve the arrow onto **Reset Run Time** by touching

**U** and **D** keys and then, reset as before according to your desire with the following display.

No.	Settable Parameters	Values
→23	Reset Run Time	Yes

### Resetting Events

The logged data under which four events has been specified for the event occurrence of the user defined parameter can be reset to zero.

To reset the above parameter, retrieve the arrow onto **Reset Events** by touching **U** and **D** keys and then, reset as before according to your desire with the following display.

No.	Settable Parameters	Values
→24	Reset Events	Yes

### Resetting Minimum/Maximum Values

The Minimum and Maximum parameters values such as average voltage, current, KW, KVA, KVAR, PF and Hz can be reset as zeroes. (refer Run Mode page: 4 & 5).

To reset the above parameter, retrieve the arrow onto **Reset Min/Max** by touching **U** and **D** keys and then, reset as before according to your desire with the following display.

No.	Settable Parameters	Values
→25	Reset Min/Max	Yes

### Selecting the Master Reset for all the Parameter Values

All the programmable parameters for Reset as defined before can be reset by Master Reset only.

To reset the above parameter, retrieve the arrow onto **Master Reset** by touching **U** and **D** keys and then, reset as before according to your desire with the following display.

No.	Settable Parameters	Values
→26	Master Reset	Yes

### Setting the Scroll Page Time

The scroll page time can be set from 00 to 15 seconds. In Run Mode, the unit will autoscroll to the next page after so many seconds. Selecting zero second means, there will be no autoscroll, and hence the same page will display continuously.

To set the above parameter, retrieve the arrow onto **Scroll Page Time** by touching **U** and **D** keys and then, set as before according to your desire with the following display.

No.	Settable Parameters	Values
→27	Scroll Page Time	00

#### Setting CT Selection

The CT-Selection is programmable for both Main CT-secondary and Neutral CT-Seconds from any one of the following: 2mA, 300mA and 1000mA.

To program the above parameter, retrieve the arrow onto **CT Selection** by touching **U** and **D** keys and then, set as before according to your desire such as shown below.

No.	Settable Parameters	Values
→28	CT Selection	1000mA

#### Resetting Oracle

The unit can be restarted according to user's requirement. If **Reset Oracle** is set to Yes, the unit will restart.

To reset the unit, retrieve the arrow onto **Reset Oracle** by touching **U** and **D** keys and then, reset as before according to your desire with the following display.

No.	Settable Parameters	Values
→29	Reset Oracle	Yes

## Run Mode

In Run Mode, the various parameters measured and calculated by the meters are displayed on different page; on a 320X240 back lit graphical TFT display.

All the power values displayed will autoscale from Kilo to Mega, once the value crosses 10,000 e.g., if  $KWh \geq 10000.0$ , it will show as 10.000 MWh immediately. Oracle plots voltage and current waveforms with R-phase in Red color, Y-phase in yellow color B-phase in blue color. Individually phase wise parameters are also color coded similarly.

Hence, at the top of each page shows the type of installation, date and time stamp whereas at the bottom of the each page shows Run Time in hhhh.mm.ss format and page number including keys such as **PROG**, **UP** and **DOWN**.

### Run Mode in 3P4W

The Run Mode pages can be altered by touching **UP** and **DOWN** keys such as shown below:

INSTALLATION : 3P4W				
Date : 01/04/2010      Time : 16:49:54				
3P4W	R-Phase	Y-Phase	B-Phase	Unit
VOLTS	220.5	224.7	219.2	V
AMPS	70.3	72.6	71.4	A
W	13.59	14.35	13.72	K
VAR	7.49	7.75	7.52	K
VA	15.52	16.31	15.65	K
PF	0.875	0.880	0.877	
RUN TIME : 00000:04:03				
Page : 01				
<div>PROG    UP    DOWN</div>				

On the first page, the parameters such as voltages, currents, KW, KVAR, KVA and PF show its individual parameter values in R-Phase, Y-Phase, and B-Phase including its Units respectively.

If PT-Ratio (PT-Primary/PT-Secondary)>10.0, the voltage will autoscale to KV. If PF is on lead side, the phase wise PF values will show with a leading minus (-) sign.

---

INSTALLATION : 3P4W			
Date : 15/01/2010		Time : 16:49:54	
VRY	421	V	KW 34.53
VYB	417	V	KVA 37.86
VBR	420	V	KVAR 20.64
I – (N)	4.21		KW-D 15
HZ	49.57		KVA-D 17
Sys-PF	0.880		
RUN TIME : 00000:04:03			
Page : 02	01:34	PKW=36.24	PKVA: 42.15

The second page has two columns. First column shows phase to phase three voltages (VRY, VYB, VBR), neutral current I-(N), system frequency (Hz) and system PF. Second column shows system powers (KW, KVA, KVAR) and demand powers (KW-D, KVA-D). At the bottom of the page, it shows predictive demands (PKW, PKVA) which display if Demand Window is selected to Fixed.

---

INSTALLATION : 3P4W			
Date : 15/01/2010		Time : 16:49:54	
MD-KW	289	09/01/2009 12:38:11	
MD-KVA	325	09/01/2009 12:38:11	
KWh	2592.681		
KVAh	2597.688		
KVARh	1201.128		
RUN TIME : 00000:04:03			
Page : 03			

On the third page, the maximum demand such as MD-KW and MD-KVA show in first and second line with date and time stamp of the maximum demand occurrences. In 3<sup>rd</sup> line to 5<sup>th</sup> lines, it shows three energies such as KWh, KVAh and KVARh.

---



INSTALLATION : 3P4W			
Date : 15/01/2010		Time : 16:49:54	
Avg. V	162	05/01/2010	12:18:19
Avg. A	1410	01/01/2010	12:16:31
KW	317	07/01/2010	12:17:23
KVA	485	11/01/2010	12:48:30
KVAR	54	11/01/2010	14:14:05
PF	0.868	01/01/2010	12:17:20
HZ	49.5	04/01/2010	12:48:29
RUN TIME : 00000:04:03			[Minimum]
Page : 04			

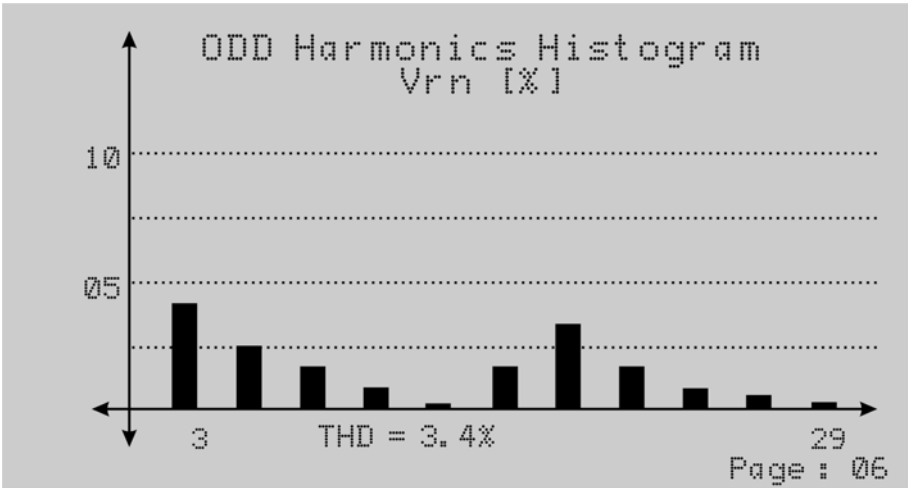
The fourth page shows the system minimum values for average voltage, average current, active power (KW), apparent power (KVA), reactive power (KVAR), PF and Hz with its date and time stamp which indicate the minimum values when to occur. In case of PF with lag side, the date and time of the minimum value will update only when the PF is smaller than the previous PF.

---

INSTALLATION : 3P4W			
Date : 15/01/2010		Time : 16:49:54	
Avg.	V 165	01/10/2009	12:18:19
Avg.	A 1417	09/12/2009	12:16:31
KW	318	09/10/2009	12:17:23
KVA	487	09/11/2009	12:48:30
KVAR	55	08/10/2009	14:14:05
PF	0.968	01/01/2010	12:17:20
HZ	50.1	09/01/2010	12:48:29
RUN TIME : 00000:04:03			[Maximum]
Page : 05			

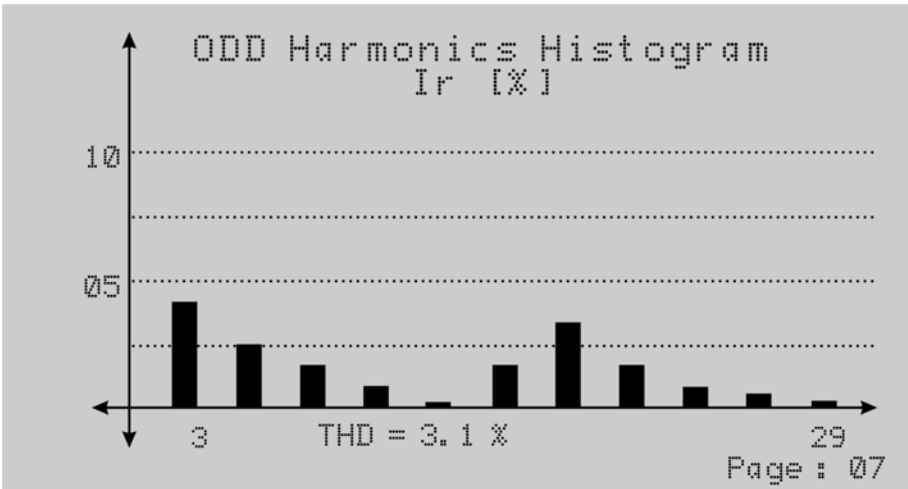
The fifth page shows the system maximum values for average voltage, average current, active power (KW), apparent power (KVA), reactive power (KVAR), PF and Hz with its date and time stamp which indicate the maximum values when to occur. In case of PF with lead side, the date and time of the maximum value will update only when the PF is bigger than the previous PF.

---



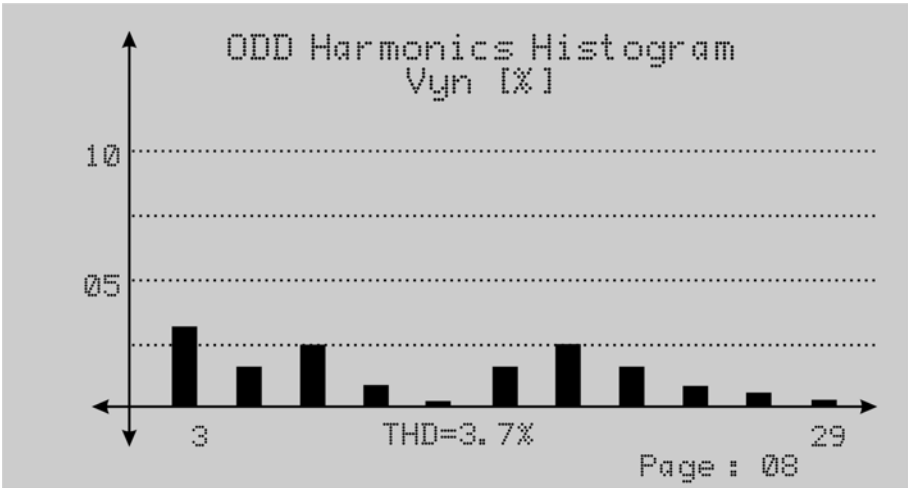
The sixth page shows the odd harmonics histogram for R-Phase voltage (Vrn) in percentage form.

---



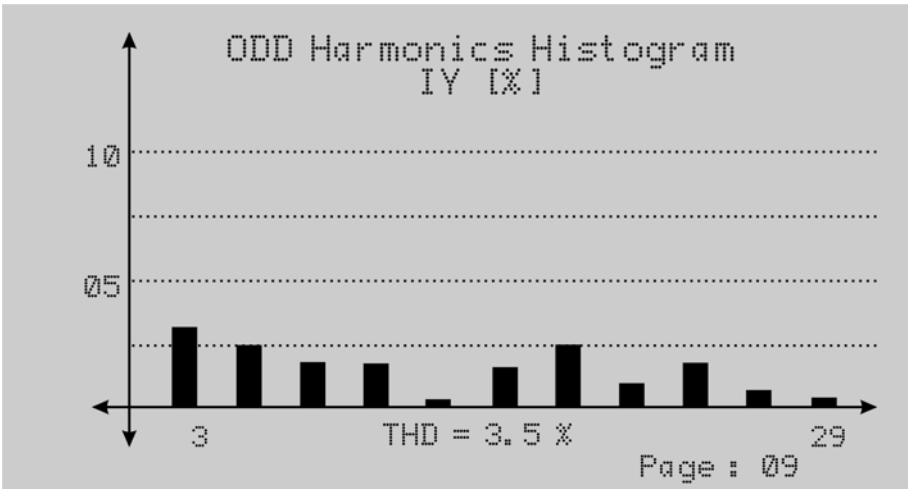
The seventh page shows the odd harmonics Histogram for R-Phase current (Ir) in percentage form.

---



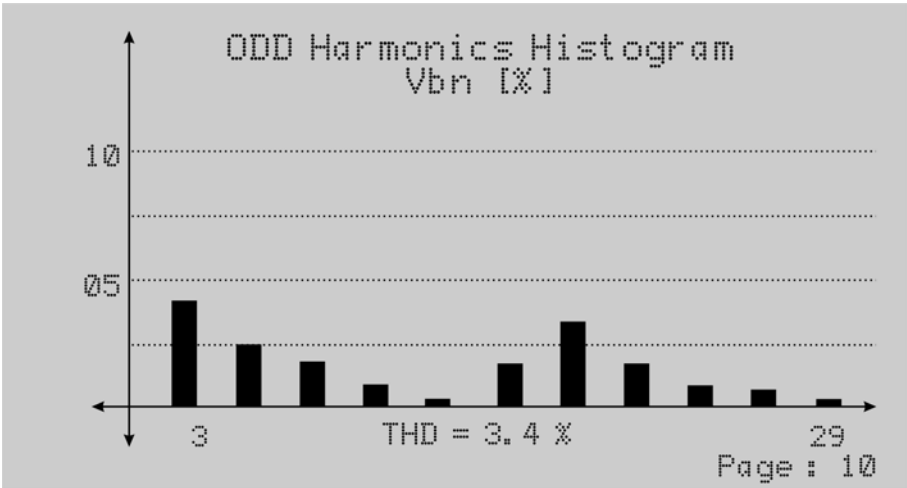
The eighth page shows the Odd Harmonics Histogram for Y-Phase voltage (Vyn) in percentage form.

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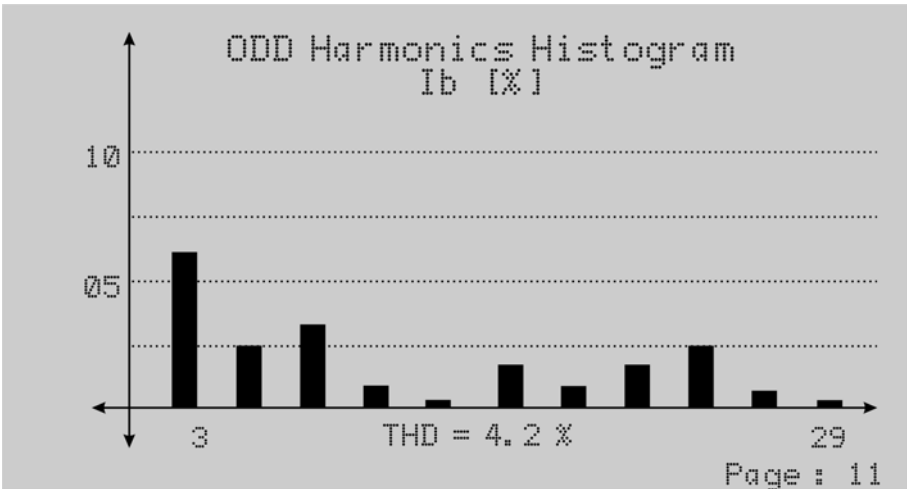
The ninth page shows the Odd Harmonics Histogram for Y-Phase current (Iy) in percentage form.

---



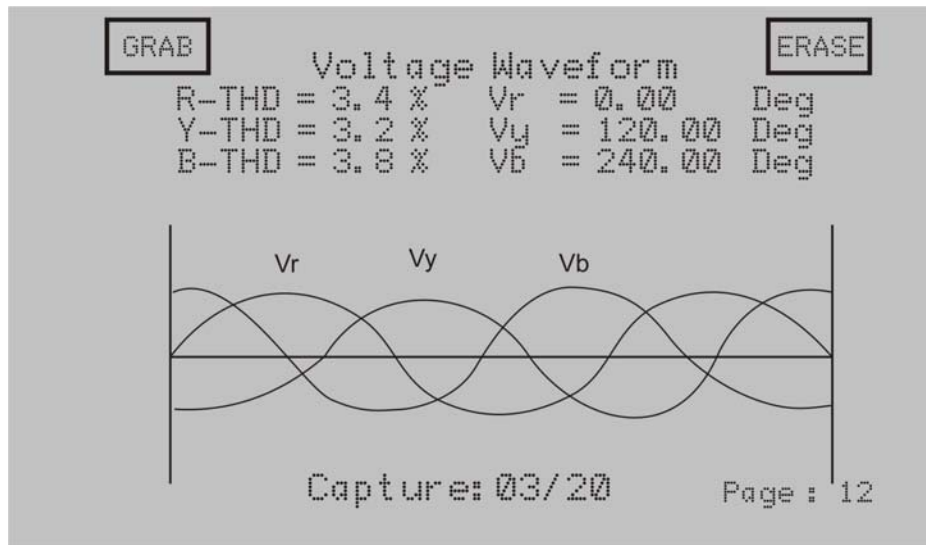
The tenth page shows the Odd Harmonics Histogram for B-Phase voltage (Vbn) in percentage form.

---



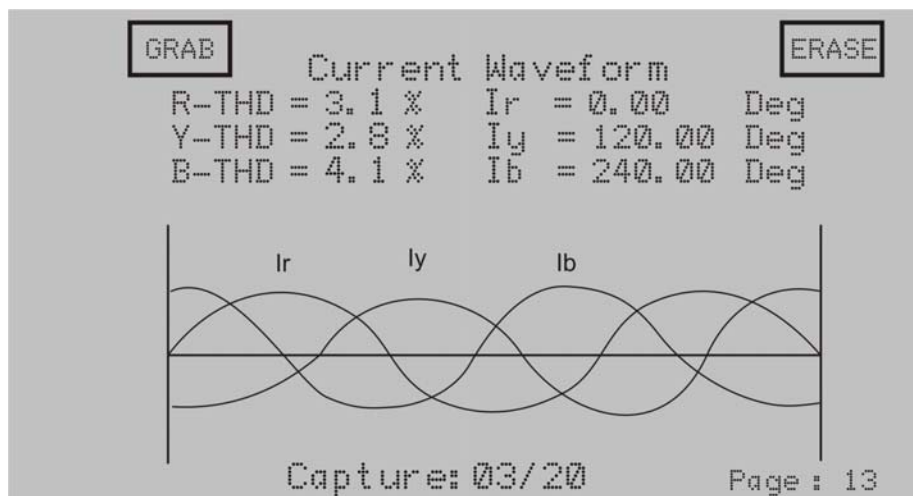
The eleventh page shows the Odd Harmonics Histogram for B-Phase current (Ib) in percentage form.

---



The twelfth page shows the Voltage Waveform. Here, user can see if any distortion is occurring in the waveforms due to non-linear loads like rectifiers, UPS drives etc. The same page also indicates that the phase angle with respect to R-Phase voltage, i.e., Vr=0.00 degree shows on top of the screen. Vy=120.00 degree indicates the phase difference (phase angle) between R-phase and Y-phase voltage. Similarly, Vb=240.00 degree indicates that the phase angle between the R-Phase and B-Phase voltage. To capture the waveform and plot into a Logger 1.0 utility, see last section “**Capturing system parameters and representing in a graph**”.

---



The thirteenth page shows Current Waveforms. The Waveform occurs to non-linear loads like rectifiers, UPS drives etc. The page also indicates phase angle with respect to R-Phase, i.e., Ir=0.00 degree shows on top of the page. Iy=120.00 degree indicates the phase difference (phase angle) between R-Phase and Y-Phase current. Similarly, Ib=240.00 degree indicates the phase angle between R-Phase and B-Phase current. To capture waveform and plot into a Logger 1.0 utility, see last section “**Capturing system parameters and representing in a graph**”.

---

INSTALLATION : 3P4W							
Date : 15/01/2010				Time : 16:49:54			
R-Phase Harmonics - Volts [%]							
No	Value		No	Value		No	Value
03	2.1		13	0.8		23	0.9
05	0.9		15	1.0		25	0.1
07	3.7		17	0.7		27	0.7
09	1.7		19	2.5		29	2.0
11	1.1		21	2.1			
RUN TIME : 000000:04:03							
Page : 14							

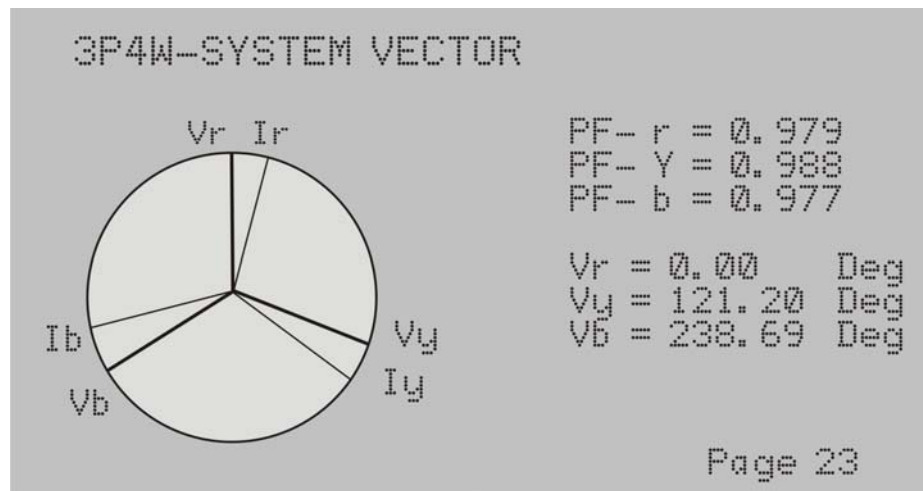
The fourteenth to nineteenth pages show Odd Harmonics values for all voltages and currents in text format.

INSTALLATION : 3P4W			
Date : 15/01/2010		Time : 16:49:54	
TYPES		LOGS	OVERFLOW
System		2276	NO
Event – 1	KW	3	NO
Event – 2	KVA	1	YES
Event – 3	KW	0	NO
Event – 4	PF	4	YES
RUN TIME : 000000:04:03			
Page : 20			

On the twenty page, it shows system logs with the overflow status for low as well as event parameters. The unit takes the snap-shot of the system parameters at interval of log duration. The maximum number of such logs in 3P4W mode is 30520 and in 3P3W mode are 46520. After this, the oldest data is discarded and the latest data is logged, and the overflow column shows YES to indicate that such an overflow has occurred.

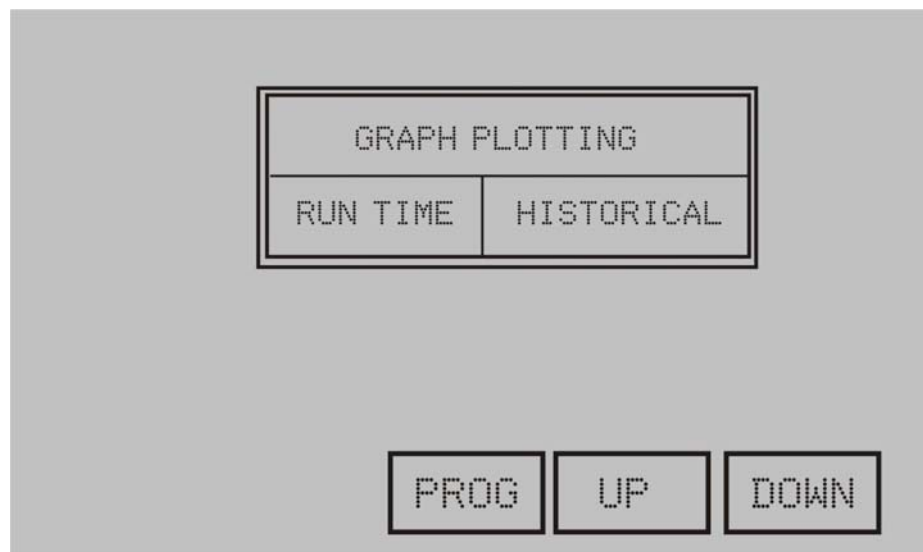
Next lines show the number of events with respect to defined event parameters, and their respective overflow status. Each of the four events can have forty event occurrences which are stored with their date & time of occurrence. After the 40<sup>th</sup> occurrence, the oldest occurrence will get replaced with a new one, and the overflow flag will indicate this.

***User can see all the event occurrences with date & time stamp only on downloading data to a PC.***



The twenty third page shows the vector diagram. The R-Phase voltage vector is used as reference to plot other voltage vectors such as Y-Phase and B-Phase voltage vectors. Hence unit will show Vr=0.00 degree always. Similarly, R-Phase current vector is also used as reference to plot other current vectors such as Y-Phase and B-Phase current vectors. **Using this vector diagram, user ensures that the CT-Terminal connections for phase sequence and polarity are correct.**

### Graph Plotting



The above page shows that the Graphs Plotting that user can represent the parameters into graph. There are two types of Graph Plotting such as, Run Time and Historical. Run Time Graph can show the graph for system parameters and hence, the Historical graph can show the graphs of the logged parameters including minimum and maximum value and date & time setting.

## Plotting Graph for Run Time

In the above Graph Plotting table, touch **Run Time** to show below page.

RANGE		MIN: 000150.0					
		MAX: 000350.0					
NO.	PARAMETER					GRAPH PLOT	
01	Vrn					NO	
02	Vyn					Yes	
03	Vbn					NO	
04	Ir					NO	
05	Iy					NO	

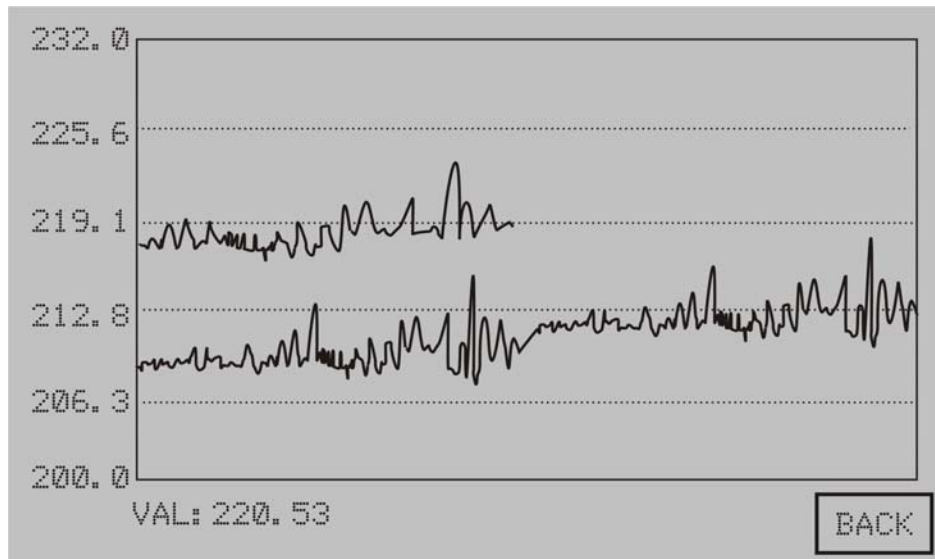
  

SHOW	1	2	3	4	5	U	BACK
	6	7	8	9	0	D	ENTR

The table shows parameter: Vrn, Vyn, Vbn, Ir, Iy, Ib, Avg. Volt, Avg. Amp, PFr, PFy, PFb, Sys PF, KW<sub>r</sub> KW<sub>y</sub>, KW<sub>b</sub>, KVA<sub>r</sub>, KVA<sub>y</sub>, KVA<sub>b</sub>, KVAR<sub>r</sub>, KVAR<sub>y</sub>, KVAR<sub>b</sub>, Sys, KW, Sys. KVA, Sys.KVAR, Sys. Hz, KW & KVA Demand, THD for each phase Voltage & Current. Now, touch on minimum and maximum to select and change the value by touching the key pad provided, and then touch **ENTR** to confirm the desired range of min-max value which will return on last parameter selected from the list. To select parameter for graph plotting, touch **D**(Down) or **U**(Up). Touch **ENTR** to change selected parameter graph plotting option. Immediately, the parameter will start blinking which shows that the parameter can be set to “Yes” by touching **L** and **R**. Now touch **ENTR** again to confirm the setting. For setting to other parameters, touch **U** or **D** to retrieve the parameter and set as mentioned before. The multiple parameters can also be selected. But, in case of PF graph plotting, don't select other parameters with PF.

After selecting the desired parameters, touch **SHOW** so as to plot such as shown below.





Touch in the above rectangular screen that will show the value of the particular co-ordinate point (say, VAL: 220.53). To return to the previous menu, touch **BACK** till the GRAPH PLOTTING is displaying.

### HISTORICAL Graph

The historical graph shows the graph for logged data for various parameters: **V<sub>rn</sub>, V<sub>yn</sub>, V<sub>bn</sub>, I<sub>r</sub>, I<sub>y</sub>, I<sub>b</sub>, PFr, PFy, PFb, Sys.KW, Sys.KVA, Sys.KVAR, Hz, KW & KVA Demand & THD s for each phase Voltage & Currents.**

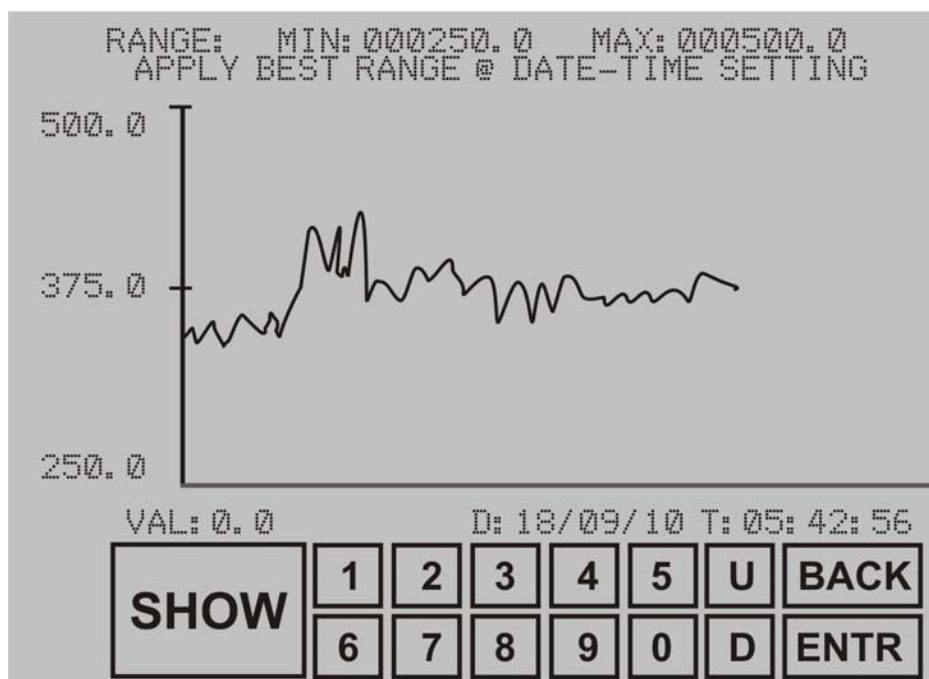
To plot the logged value of various parameters, in the previous GRAPH PLOTTING page, touch HISTORICAL to display such as shown below.

TYPE		DATE	TIME
START		17/09/10	15 : 31 : 16
END		18/09/10	12 : 14 : 56
NO.	PARAMETER	GRAPH PLOT	
01	V <sub>rn</sub>	NO	
02	V <sub>yn</sub>	Yes	
03	V <sub>bn</sub>	NO	
04	I <sub>r</sub>	NO	
05	I <sub>y</sub>	NO	

<b>SHOW</b>	1	2	3	4	5	U	BACK
	6	7	8	9	0	D	ENTR

In the above page, set date and time for START, END, and then set the desired parameters such as mentioned in RUN TIME instruction before. After setting, touch **SHOW** to give such as shown below.



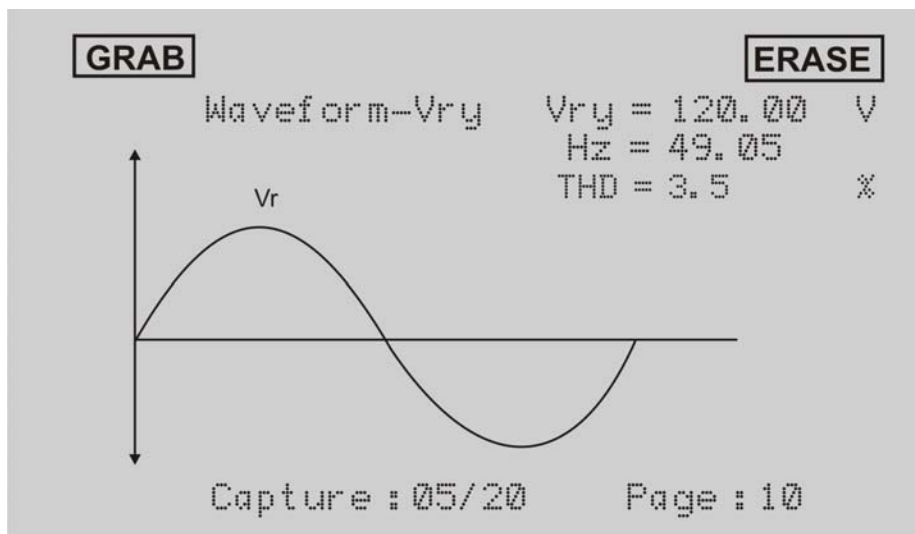
Now user's desire Minimum & Maximum range should be provided for parameters selected. In this graph, Y-Axis shows the values from Minimum to Maximum upwards, whereas, in X-axis shows the date and time. Now touch in any graph plotting area which will show the particular parameter value with date and time.

## Run Mode in 3P3W

INSTALLATION : 3P3W				
Date : 15/01/2010 Time : 16:49:54				
3P3W	R-Phase	Y-Phase	B-Phase	Unit
VOLTS	220.5	-, --	219.2	V
AMPS	70.3	-, --	71.4	A
W	13.59	-, --	13.72	K
VAR	7.49	-, --	7.52	K
VA	15.52	-, --	15.65	K
PF	0.875	-, --	0.877	
RUN TIME : 00000:04:03				
Page : 01				

The first page shows the parameters such as voltage, current, active power (KW) and reactive power (KVAR) with its individual phase values including units. Hence, this page is not only similar to Run Mode in 3P4W, but the rest of the pages are also shown similarly.

---



In case of the Waveforms, the phase to phase voltages and currents waveforms are shown such as above diagram on page 10. For capturing the waveform, see in the last section, “**Capturing system parameters and representing in a graph**”. **Capture:05/20** indicates that there are 5 waveform of voltages & currents captured out of 20 waveform.

## Communication

The electrical snapshots logged can give a good idea of the overall behavior of the entire load in an industry by using Logger Setup.exe utility. This option is possible for a user to select **Oracle** which features Event Logs including the time-stamped records of important power system occurrences that can be aligned with corresponding production effects to better understand and optimize energy use and cost.

## Data Logging and USB port

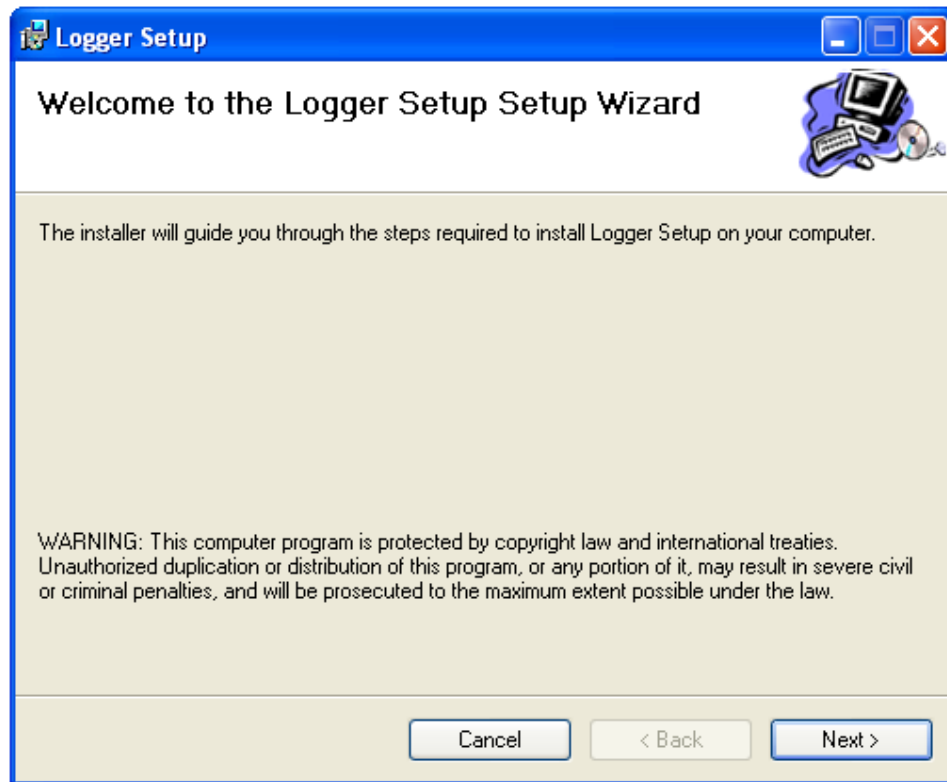
Oracle has an 8 MB non-volatile memory. This memory is used to store the minimum and maximum values of important parameters, four events as defined by the user and the snapshot of the entire electrical system where all instantaneous and integrated parameters along with Harmonic data are saved. Maximum number of such electrical snapshots in 3P4W mode can be 30520 and in 3P3W mode can be 46520.

The log maintains a time-stamped record for various parameters in both 3P3W and 3P4W. One can monitor values over a day, a week, a month or any period to record the highest and lowest values of voltage, current, or power factor including Event parameters.

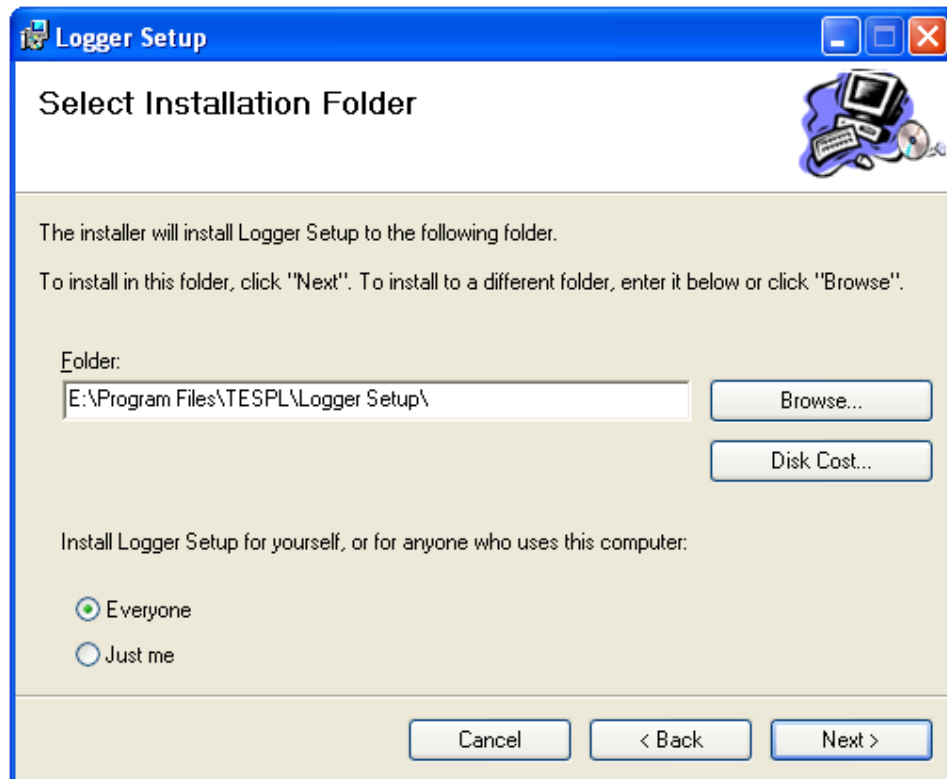
Oracle supports USB 2.0 for downloading logged data. Users are provided a CD for USB software installation along with the purchase of Oracle.

### Installing the USB Software

1. Insert the **Logger Setup** CD into the CD-ROM drive of your computer after windows is started.
2. The Logger Setup contains the following: **dotnetfx**, **others**, **Logger Setup** and **setup**. Double-click the **Logger Setup** to install and show the wizard below.



3. To proceed the installation, click **Next** and then, the wizard will show the following dialog box for the location.



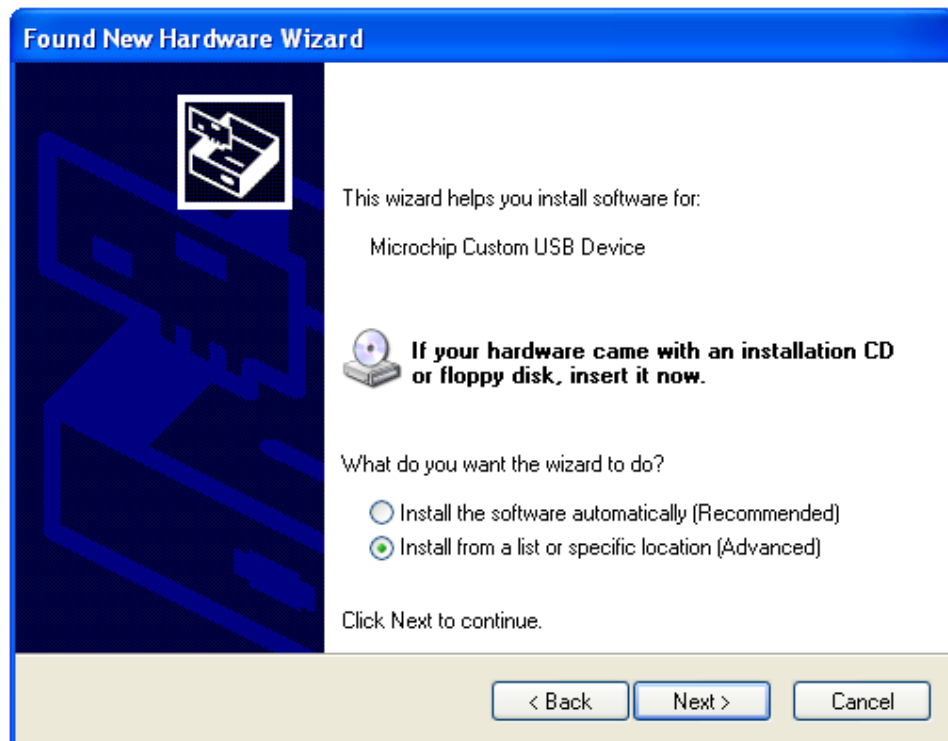
4. Click **Next** to start the installation. Before selecting the location, user can also check the disk space for each drive by clicking **Disk Cost**.
5. To confirm the installation, click **Next** in the next wizard and wait for some time while proceeding the installation. After completing the installation, the wizard will ask the Logger Setup has been installed successfully. Now click **Close** to exit the wizard.

#### Installation of USB driver

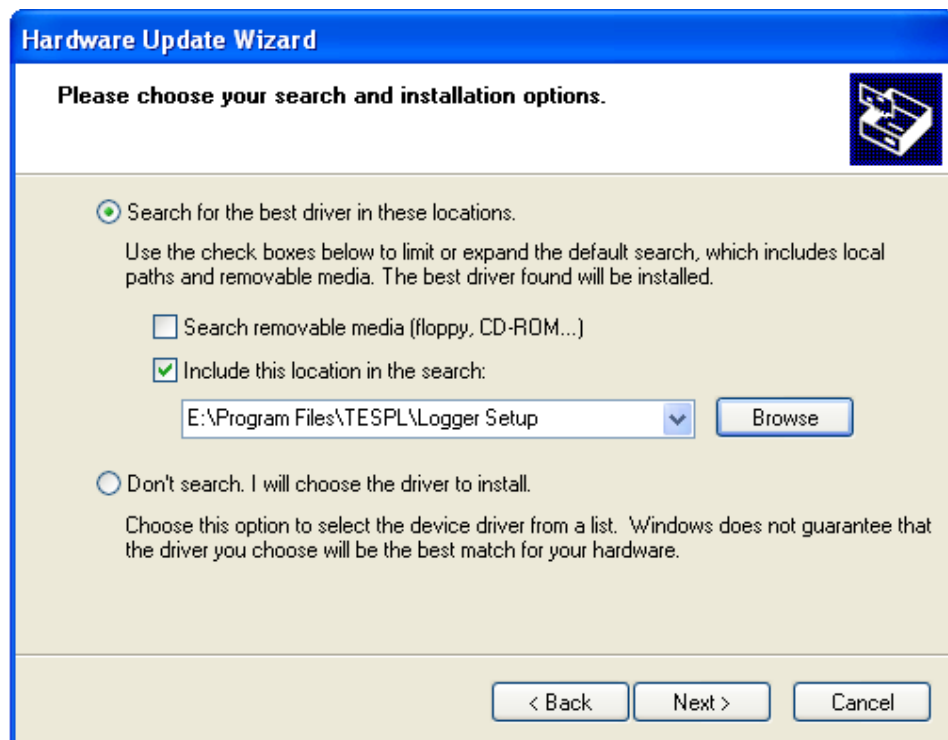
Make sure that the USB cable is connected in between the PC and Oracle. If the USB connection is not all right, remove the USB cable and connect again. If the USB is connected for the first time, the wizard will show with following option.



Select the option, **Yes, This time only** and click **Next** to proceed for the next wizard such as shown below.

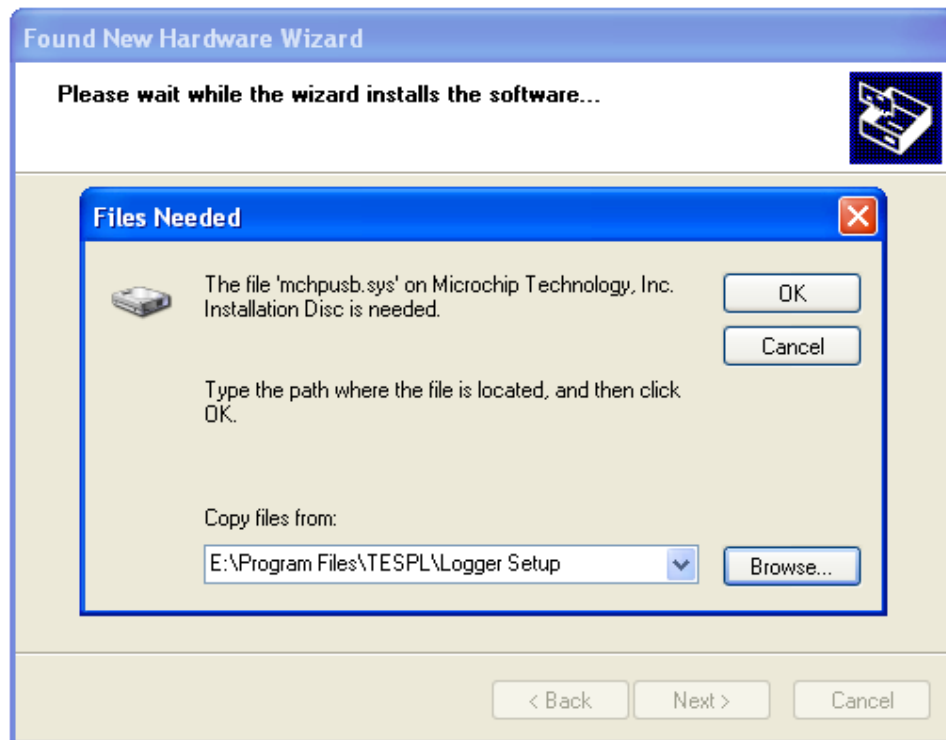


The wizard will ask if your hardware comes with an installation CD or floppy disk, insert it now. Select the wizard option, **Installation from a list or specific location** and click **Next** to give the following dialog box where the file is located.



In the above dialog box, the select **Search for the best drive in these**

**location** and **include this location in the search** are the desire are user's **option** and then click **Next** to get the location where the file is located.



6. Now click **OK**, to complete the wizard.
7. Wait for sometime while completing the wizard and then the wizard will prompt the new hardware gets completed. Now click **Finish** to complete the installation.

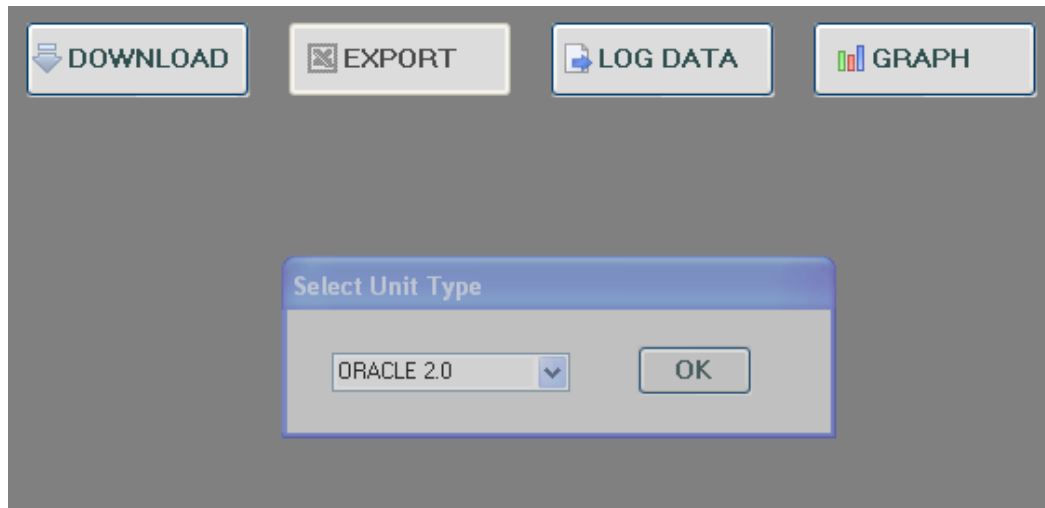
### Handling Logger Setup

The Logger window consists of the following: Downloading the system data, Exporting the Logged data in to a excel sheet, logged data including harmonic data and graph representation for both the system data and logged data.

### Downloading the Logged data

1. Click **Logger 1.0** from the location selected while installing. By default the utility will show **Logger 1.0** on desktop. Now the Logger will open with the following window.





2. In the unit type list box, select the Oracle 2.0 and click **OK** and **DOWNLOAD** to start downloading the logged data with the following window.

DOWNLOAD

EXPORT

LOG DATA

GRAPH

No.	Date	Time	Vm	Vyn	Vbn	Ir	Iy	Ib	I-Neutral	Vry	Vyb	Vbr	Syn-PF	KW	KVA	KVAR	Hz	KWh	KVAh	KVARh
1	05/03/10	11:50:07	231.9	231.3	232.8	397.0	167.7	126.6	126.6	401.1	401.9	402.4	0.895	143.5	160.4	71.7	50.00	572.0	653.5	316.1
2	05/03/10	11:50:17	231.9	231.3	232.8	396.8	167.7	126.6	126.6	401.1	401.9	402.4	0.895	143.5	160.4	71.7	50.00	572.4	654.0	316.3
3	05/03/10	11:50:27	231.9	231.4	232.8	396.9	167.7	126.6	126.6	401.2	402.0	402.4	0.895	143.5	160.4	71.7	50.00	572.8	654.4	316.5
4	05/03/10	11:50:37	231.9	231.4	232.8	396.7	167.7	126.6	126.6	401.2	402.0	402.4	0.894	143.5	160.5	71.8	50.00	573.2	654.9	316.7
5	05/03/10	11:50:47	231.9	231.4	232.8	396.4	167.9	126.6	126.6	401.2	402.0	402.4	0.894	143.4	160.4	71.8	50.00	573.6	655.3	316.9
6	05/03/10	11:50:57	231.9	231.3	232.8	396.3	167.8	126.6	126.6	401.1	401.9	402.4	0.894	143.4	160.4	71.8	50.00	574.0	655.8	317.1
7	05/03/10	11:51:07	231.9	231.4	232.8	396.1	167.9	126.6	126.6	401.2	402.0	402.4	0.894	143.4	160.3	71.7	50.00	574.4	656.2	317.3
8	05/03/10	11:51:17	231.9	231.4	232.8	396.0	167.9	126.6	126.6	401.2	402.0	402.4	0.895	143.3	160.2	71.8	50.00	574.8	656.7	317.5
9	05/03/10	11:51:27	231.9	231.4	232.8	395.7	167.9	126.6	126.6	401.2	402.0	402.4	0.895	143.3	160.2	71.6	50.00	575.2	657.1	317.7
10	05/03/10	11:51:37	231.9	231.3	232.8	395.7	167.9	126.6	126.6	401.1	401.9	402.4	0.895	143.3	160.2	71.8	50.00	575.6	657.6	317.9
11	05/03/10	11:51:47	231.9	231.4	232.8	396.0	168.0	126.6	126.6	401.2	402.0	402.4	0.894	143.4	160.3	71.7	50.00	576.0	658.0	318.1
12	05/03/10	11:51:57	231.9	231.4	232.8	395.7	167.9	126.6	126.6	401.2	402.0	402.4	0.894	143.3	160.2	71.7	50.00	576.4	658.4	318.3
13	05/03/10	11:52:07	231.4	231.0	232.2	395.2	168.0	126.6	126.6	400.4	401.1	401.5	0.895	142.9	159.7	71.4	50.00	576.7	658.7	318.3
14	05/03/10	11:52:17	231.6	231.1	232.4	395.7	168.5	126.7	126.6	400.7	401.4	401.8	0.894	143.2	160.1	71.7	50.00	577.1	659.2	318.5
15	05/03/10	11:52:27	231.8	231.2	232.6	395.6	168.5	126.6	126.6	401.0	401.7	402.2	0.894	143.3	160.2	71.7	50.00	577.5	659.6	318.7
16	05/03/10	11:52:47	231.9	231.3	232.7	395.4	168.5	126.6	126.6	401.1	401.8	402.3	0.894	143.3	160.2	71.7	50.00	577.9	660.0	318.9
17	05/03/10	11:52:57	232.0	231.4	232.8	395.6	168.6	126.6	126.6	401.3	402.0	402.5	0.895	143.5	160.4	71.7	50.00	578.3	660.5	319.1
18	05/03/10	11:53:07	231.9	231.4	232.8	395.5	168.6	126.6	126.6	401.2	402.0	402.4	0.895	143.4	160.3	71.6	50.00	578.7	660.9	319.3
19	05/03/10	11:53:17	232.0	231.4	232.8	395.6	168.6	126.5	126.5	401.3	402.0	402.5	0.894	143.4	160.3	71.7	50.00	579.1	661.4	319.5
20	05/03/10	11:53:27	231.9	231.3	232.8	395.4	168.6	126.5	126.5	401.1	401.9	402.4	0.894	143.4	160.3	71.7	50.00	579.5	661.8	319.7
21	05/03/10	11:53:37	231.9	231.4	232.9	395.2	168.6	126.5	126.5	401.2	402.1	402.5	0.894	143.3	160.2	71.7	50.00	579.9	662.2	319.9
22	05/03/10	11:53:47	231.9	231.4	232.9	396.0	168.6	126.6	126.5	401.2	402.1	402.5	0.894	143.5	160.5	71.8	50.00	580.3	662.7	320.1
23	05/03/10	11:53:57	232.0	231.4	232.8	396.2	168.7	126.5	126.5	401.3	402.0	402.5	0.894	143.6	160.5	71.8	50.00	580.7	663.2	320.3
24	05/03/10	11:54:07	231.9	231.4	232.9	396.2	168.7	126.5	126.5	401.2	402.1	402.5	0.894	143.6	160.5	71.8	50.00	581.1	663.6	320.5
25	05/03/10	11:54:17	231.9	231.4	232.9	395.7	168.6	126.6	126.6	401.2	402.1	402.5	0.894	143.4	160.3	71.7	50.00	581.5	664.1	320.7
26	05/03/10	11:54:27	232.0	231.4	232.9	395.8	168.7	126.5	126.5	401.3	402.1	402.6	0.895	143.5	160.4	71.7	50.00	581.8	664.4	320.8
27	05/03/10	11:54:37	232.0	231.4	232.8	396.5	168.7	126.5	126.5	401.3	402.0	402.5	0.894	143.6	160.5	71.8	50.00	582.3	665.0	321.1
28	05/03/10	11:54:47	232.0	231.4	232.8	397.0	168.7	126.5	126.5	401.3	402.0	402.5	0.894	143.7	160.7	71.9	49.90	582.7	665.4	321.3
29	05/03/10	11:54:57	231.9	231.4	232.8	396.8	168.7	126.6	126.5	401.2	402.0	402.4	0.894	143.7	160.7	71.9	50.00	583.1	665.9	321.5
30	05/03/10	11:55:07	232.0	231.4	232.8	397.8	167.9	126.6	126.6	401.3	402.0	402.5	0.894	143.7	160.6	71.4	50.00	583.4	666.3	321.7
START			1																	
END			157																	
			SHOW			HARMONICS DATA														

3. In this LOG DATA window, click **HARMONICS DATA** at the bottom of the window to open the harmonics data window for all current and voltage.

Exporting the Logged Data including Min/Max Events and Harmonics Data

The logged data can also be exported into excel sheet so that the Min-Max &event logs including the Harmonics can also be obtained in it such as shown below.

No.	Date	Time	Vr	Vy	Vb	Ir	Iy	Ib	I-Neutral	Vry	Vyb	Vbr	PF-r	PF-y
1	26/11/8	9:53:08	241.12	236.63	240.06	313.64	222.44	307.49	30.75	413.73	412.81	416.7	0.846 LG	0.846 LG
2	26/11/8	9:53:14	241.02	236.81	239.95	313.29	222.56	307.83	30.77	413.8	412.87	416.52	0.845 LG	0.847 LG
3	26/11/8	9:53:20	241.11	236.36	240.38	314.03	222.21	307.83	30.78	413.49	412.86	416.97	0.844 LG	0.845 LG
4	26/11/8	9:53:26	240.57	236.78	240.48	313.28	222.09	308.62	30.79	413.39	413.31	416.59	0.842 LG	0.848 LG
5	26/11/8	9:53:32	240.89	237.02	239.97	289.59	206.18	285.12	28.79	413.87	413.07	416.42	0.845 LG	0.849 LG
6	26/11/8	9:53:38	241.2	236.47	240.25	313.84	222.26	307.77	30.78	413.66	412.84	416.94	0.844 LG	0.845 LG
7	26/11/8	9:53:44	240.63	236.63	240.69	313.86	221.89	308.47	30.78	413.31	413.36	416.82	0.842 LG	0.847 LG
8	26/11/8	10:17:17	242.44	240.71	238.14	352.76	224.21	314.02	31.4	418.41	414.68	416.18	0.998 LD	0.998 LD
9	26/11/8	10:17:23	244.25	241.56	241.04	352.4	224.44	314.16	31.4	420.71	417.93	420.26	0.972 LG	0.974 LG
10	26/11/8	10:17:29	242.44	238.61	239.88	353.12	224.2	314.02	31.4	416.59	414.37	417.69	0.946 LG	0.946 LG
11	26/11/8	10:17:35	241.87	238.78	240.2	352.52	224	314.65	31.4	416.24	414.8	417.47	0.932 LG	0.937 LG
12	26/11/8	10:17:41	241.92	239.3	239.69	351.81	224.59	314.41	31.4	416.74	414.81	417.07	0.933 LG	0.937 LG
13	26/11/8	10:17:47	242.43	238.79	239.7	352.62	224.45	313.81	31.39	416.74	414.37	417.52	0.934 LG	0.936 LG
14	26/11/8	10:17:53	242	238.66	240.25	352.32	223.95	314.37	31.38	416.25	414.74	417.63	0.932 LG	0.937 LG
15	26/11/8	10:17:59	241.8	239.17	239.92	351.52	224.41	314.41	31.37	416.52	414.89	417.17	0.932 LG	0.937 LG
16	26/11/8	10:18:05	241.75	239.1	240	351.6	224.33	314.47	31.37	416.42	414.9	417.2	0.932 LG	0.938 LG
17	26/11/8	10:18:11	242.26	239.05	239.57	351.68	224.64	313.71	31.37	416.81	414.48	417.26	0.934 LG	0.936 LG
18	26/11/8	10:18:17	242.36	238.57	240.01	352.37	224.21	313.8	31.36	416.49	414.45	417.73	0.933 LG	0.936 LG
19	26/11/8	10:18:23	241.77	238.93	240.15	351.62	224.17	314.42	31.36	416.29	414.88	417.34	0.932 LG	0.937 LG
20	26/11/8	10:18:29	242.03	239.24	239.63	351.45	224.69	313.86	31.36	416.78	414.7	417.12	0.933 LG	0.937 LG
21	26/11/8	10:18:35	242.39	238.65	239.82	351.99	224.32	313.56	31.36	416.58	414.36	417.59	0.933 LG	0.935 LG
22	26/11/8	10:18:41	241.88	238.77	240.27	351.5	224.05	314.39	31.36	416.24	414.85	417.54	0.932 LG	0.937 LG
23	26/11/8	10:18:47	242.01	238.63	240.27	351.88	224.02	314.22	31.36	416.23	414.73	417.65	0.932 LG	0.936 LG
24	26/11/8	10:18:53	241.74	239.15	239.98	350.89	224.34	314.31	31.36	416.45	414.93	417.17	0.932 LG	0.938 LG
25	26/11/8	10:18:59	242.3	238.94	239.66	351.37	224.6	313.61	31.36	416.75	414.47	417.38	0.934 LG	0.936 LG
26	26/11/8	10:19:05	242.27	238.53	240.13	351.98	224.07	313.88	31.36	416.37	414.52	417.76	0.933 LG	0.936 LG
27	26/11/8	10:19:11	241.78	239.03	240.11	350.93	224.21	314.36	31.36	416.38	414.94	417.32	0.932 LG	0.938 LG
28	26/11/8	10:19:17	242.2	239.16	239.63	351	224.63	313.72	31.36	416.86	414.63	417.26	0.934 LG	0.937 LG
29	26/11/8	10:19:23	242.37	238.57	240.03	351.83	224.2	313.67	31.36	416.49	414.47	417.76	0.934 LG	0.936 LG
30	26/11/8	10:19:29	242.38	238.72	239.91	351.69	224.33	313.84	31.38	416.63	414.49	417.66	0.934 LG	0.936 LG

## Graph Representation

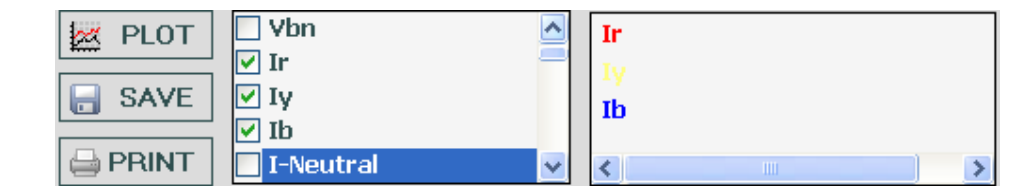
The graph plots for various selected parameters of Logged data as well as system data including harmonics distortion including data and time. Hence, the back ground color, Axis colors and Label colors can also be selectable.

### Plotting a Graph for Logged data.

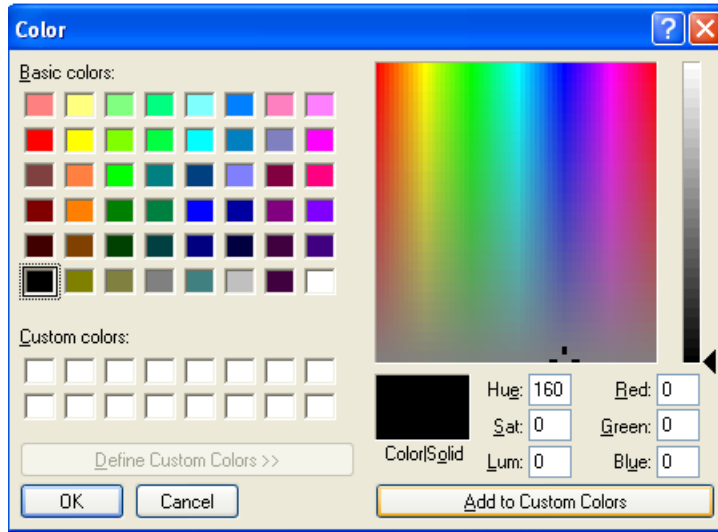
The logged data can be plotted a graph with the selected parameters, data and time.

To plot a graph, proceed the following instructions,

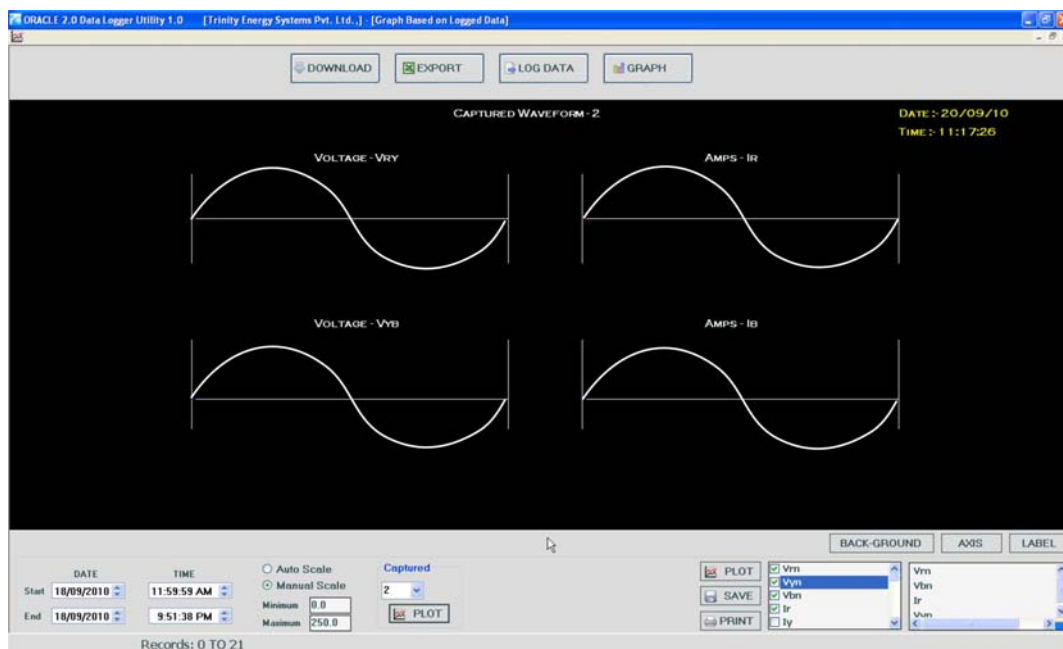
1. At the top of the Logger Windows, click **Graph** to show a graph window.
2. At the bottom of the of the graph window, enter starting date and time in the **Start** box, enter ending date and time in the **End** box under Date and Time. There are two type of Scale such as Auto scale and Manual scale. In case of Auto scale, it is already selected by default. In case of Manual scale, select Manual scale.
3. To select for the parameters to be plotted, double-click on the parameters which will select the check box such as shown below.



4. If the parameters selected are not desired, double-click at right side of the parameters showing in the box which will remove from the list.
5. To change the color of the selected parameters displayed at right side (e.g. Ir, ly, lb and KW) double-click on it, and then the color palette will show such as below.



6. Select the desired color and click **Ok**. Now, the selected parameter will plot with the selected color. Similarly, each selected parameter can also be plotted. Before plotting the parameters, the background color, axis color and label color should be specified by clicking **BACK-GROUND**, **AXIS** and **LABEL** so as to represent along with the selected colors.
7. Now, click **PLOT** to plot a graph for the selected parameters such as shown below.



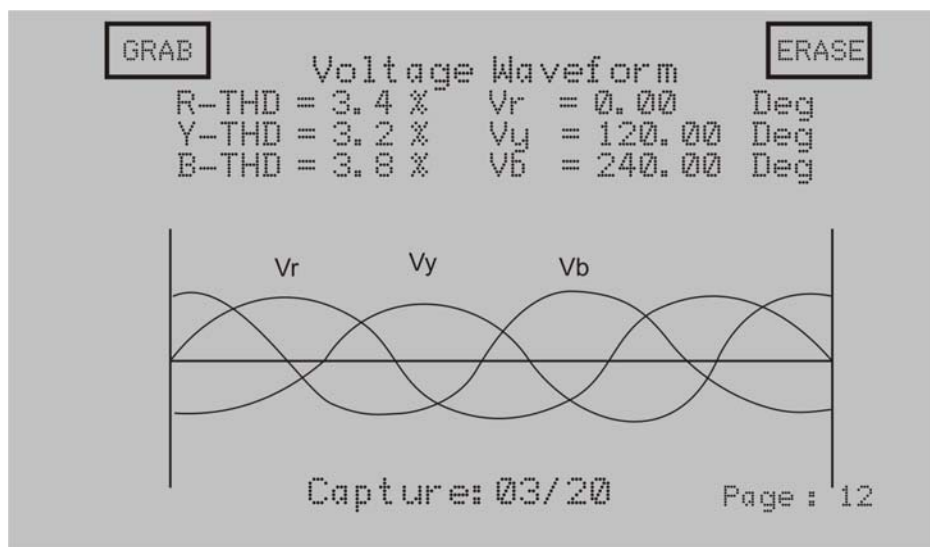
8. The plotted graphs can be saved and printed by clicking **SAVE** and **PRINT** respectively. Hence, to return into previous Logger Windows, click **LOG DATA**.

### Capture waveform

The waveform can be captured for both voltage and current in three phases and represent into a graph.

To plot a waveform of voltage and current, proceed the following instructions.

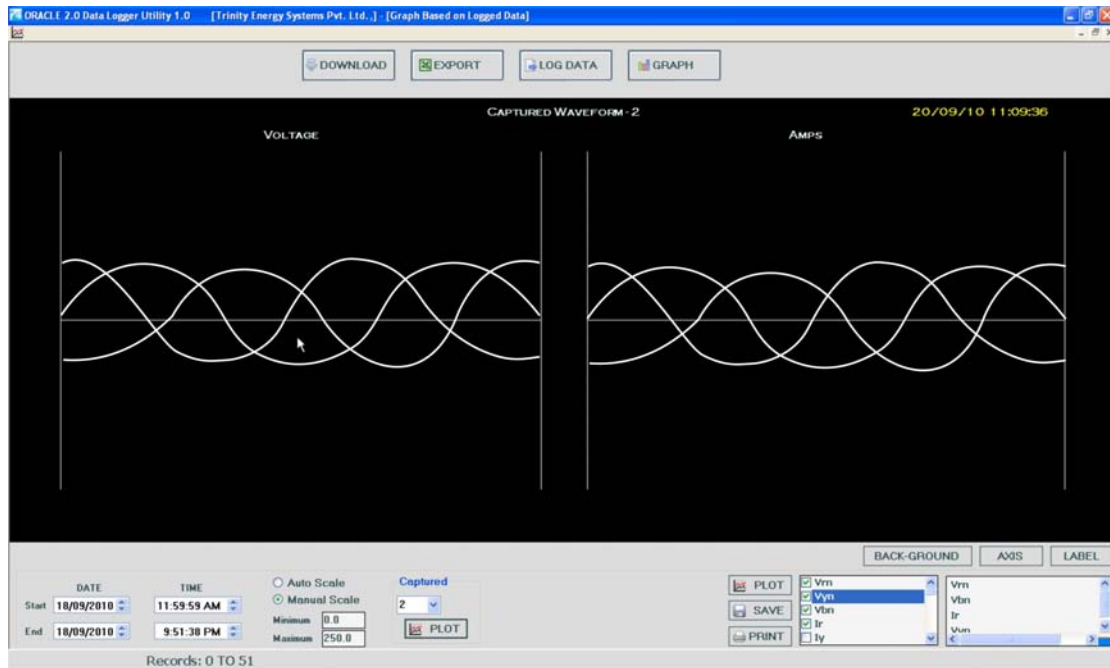
1. In Run Mode, page number 12 (for both 3P4W and 3P3W) of Oracle 2.0, touch **GRAB** to capture the system voltage and current.




2. To capture the system value upto 20 times according to your desire, touch

**GRAB** that will show number of captures (i.e., Capture: 03/20). Hence, to erase the capture, click **ERASE** where the Captured value will become decreased (i.e., Capture: 00/20).

3. In the Logger 1.0 graph window, click **GRAPH** and select number of capture in the Capture list box, and then, click  under Capture. Now, the graph will shows with the following window.



4. The above graph representation is only for 3P4W which show such as shown in the Run Mode of Oracle. Similarly, 3P3W will also represent with a single waveform such as shown in the unit. Now if the graph representation is completed, click  to close the window.

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 PRS 400.3 having basic accuracy of 0.02% traceable upto International Standards derived using appropriate ratio techniques.

Result of Test : .....

Remarks : .....

Test engineer : .....

Date : .....

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