Annexure 2

Oscilloscope and power analyzer functions combined together

Waveforms and numerical data needs to be recorded and analysed using this equipment at 1ms interval or better.

Minimum technical specifications to be met:-

<table>
<tr>
<td>List of electrical parameters to be measured:
1. Voltage (DC and AC)
2. Current (DC and AC)
3. Power (Real/ active power)
4. Power factor
5. Apparent power
6. Reactive Power
7. Phase angle between (V and I)
8. Frequency (Hz) of V and I
9. Efficiency</td>
<td>List of math computations required:-
1. Average
2. Maximum
3. Minimum
4. RMS
5. Peak to peak
6. Overshoot
7. Rise time
8. Fall time
9. Period, Frequency
10. Duty cycle width measurement
11. Standard deviation(optional)
12. Addition, subtraction, multiply and divide operations
13. Differentiation
14. Integration
15. Square root
16. Sine, cosine
17. PWM & logic signals</td>
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<tr>
<td>Wiring system configuration needed:-
1. Single phase- 2 wire
2. Single phase- 3 wire
3. Three phase- 3 wire
4. Three phase- 4 wire</td>
<td rowspan="2">Channel capacity:-
1. 1 No- DC voltage and current
2. 9 Nos. – AC voltage and current
3. DC voltage: 1000 V DC or higher
4. DC current: 1000 A DC
5. AC / DC sensors are preferred
6. High accuracy is preferred for voltage and current
7. All inputs shall be isolated
8. High voltage differential probes if required (optional)
9. AC voltage: 600 V AC rms
10. AC current: 1000 A AC rms
11. Temperature measurement (in-built of minimum 4 Nos.)
12. Temperature measurement of 16 points / channels (external instrument in sync with recorder)</td>
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<tr>
<td>Other specifications:-
1. Cursor options
2. Save options
3. Easy Channel setup
4. Scaling – vertical / horizontal
5. Zoom option during run time
6. USB, GP-IB, Ethernet
7. Trigger functions
8. Safety function</td>
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</table>