

**Electrical Engineering Department,  
Indian Institute of Technology Delhi**

Date: 11/01/2013

NIQ for purchase of “ Power Analyzer (Wide Band)”

Sealed quotations are invited for purchase of one in number “Power Analyzer (Wide Band)” with the following specifications:

Parameter	Specifications		
<b>Input</b>			
Number of input channels	Voltage: 4 channels Current: 4 channels		
Input channel architecture	All input channels should be isolated from each other.		
Frequency Band	DC, 0.5Hz to 130 KHz		
LPF	OFF/ 500Hz/ 5-10 KHz options should be available		
Voltage measurement range	15V to 1500V		
Current measurement range	Clamp on sensor upto 300A AC/DC		
Crest Factor	3 for both voltage and current		
Sampling rate	500KHz /16-bit		
Maximum input voltage	Voltage input part: 1500V, ±2000V peak Current sensor input part: preferably 5V, ±10 peak ( any other voltage range depending upon the specifications of the current sensor to be used with the analyser)		
Maximum rated voltage to ground	Voltage input terminal 1000 V (50/60 Hz) Measurement category III 600 V (Expected transient over-voltage 6000 V) Measurement category II 1000 V (Expected transient over-voltage 6000 V)		
Measurement Method	Voltage and current simultaneous digital sampling.		
<b>Accuracy</b>			
	Voltage	Current	Active Power
DC	±0.1%rdg,±0.1%f.s.	±0.1%rdg,±0.1%f.s.	±0.1%rdg,±0.1%f.s.
0.5Hz to 30Hz	±0.1%rdg,±0.2%f.s.	±0.1%rdg,±0.2%f.s.	±0.1%rdg,±0.2%f.s.
30Hz to 45Hz	±0.1%rdg,±0.2%f.s.	±0.1%rdg,±0.1%f.s.	±0.1%rdg,±0.1%f.s.
45Hz to 66Hz	±0.05%rdg,±0.05%f.s.	±0.05%rdg,±0.05%f.s.	±0.05%rdg,±0.05%f.s.
66 Hz to 1KHz	±0.1%rdg,±0.1%f.s.	±0.1%rdg,±0.1%f.s.	±0.1%rdg,±0.1%f.s.
1KHz to 10KHz	±0.2%rdg,±0.1%f.s.	±0.2%rdg,±0.1%f.s.	±0.2%rdg,±0.1%f.s.
10KHz to 50KHz	±0.3%rdg,±0.2%f.s.	±0.3%rdg,±0.2%f.s.	±0.4%rdg,±0.3%f.s.
50KHz to 100KHz	±1.0%rdg,±0.3%f.s.	±1.0%rdg,±0.3%f.s.	±1.5%rdg,±0.5%f.s.
100KHz to 150 KHz	±20%f.s.	±20%f.s.	±20%f.s.
Temperature Coefficient	±0.0125%f.s./°C		
Effect of external power factor	±0.15%f.s. or less		
Effective measurement range	Voltage, current, and power: 1% to 110% of		




	range
Zero adjustment	Voltage: $\pm 10\%$ f.s. Current: $\pm 10\%$ f.s.
<b>Frequency Measurement</b>	
Number of measurement channels	4 channels
Measurement source	Selects from voltage /current for each input channel
Measurement range	Within synchronization frequency range between 0.5 Hz and 5 kHz
Accuracy	$\pm 0.05\%$ rdg. $\pm 1$ dgt. (When sinusoidal waveform is 30% or more relative to the measurement range of measurement source)
<b>Harmonic Measurement</b>	
Measurement item	Harmonic voltage RMS value, harmonic voltage percentage, harmonic voltage phase angle, harmonic current RMS value, harmonic current percentage, harmonic current phase angle, harmonic active power, harmonic power percentage, harmonic voltage/ current phase difference, total harmonic voltage distortion factor, total harmonic current distortion factor.
FFT processing word length	32-bit
Maximum analysis order	100 <sup>th</sup> order for upto 80Hz
Accuracy	$\pm 0.3\%$ rdg. $\pm 0.1\%$ f.s. for upto 400Hz
<b>Noise Measurement</b>	
Number of channels	Any one channel
Measurement item	Voltage/current
FFT processing word length	32-bit
Number of FFT points	Variable from 1,000 to 50,000 points
Anti-aliasing filter	Digital filter auto
Maximum analysis frequency	Variable from 100kHz to 2 kHz
<b>Display</b>	
Display Character	English
Display	Colour LCD Display
Display Screen	Measurement, setting, file manipulation screens.
<b>External Interfaces</b>	
USB Interface	USB 2.0 or higher, data transfer, mass storage
LAN interface	Required
CF card interface	Upto 2GB
RS 232 interface	Required
Synchronization control interface	Required for synchronization with other similar units working simultaneously.
<b>Functions</b>	
Auto range	ON/OFF (Voltage and current range selectable for each channel)
Data Save interval	OFF / 50 ms / 100 ms / 200 ms / 500 ms / 1 s / 5 s / 10 s / 15 s / 30 s / 1 min / 5 min / 10 min / 15 min / 30 min / 60 min
Scaling	VT ratio: OFF / 0.01 to 9999.99 CT ratio: OFF / 0.01 to 9999.99

John Singh

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Averaging	Displays the averaged values of all instantaneously measured values including harmonic value
General functions available	Averaging, Efficiency/loss calculation, $\Delta - Y$ calculation, display hold, peak hold, harmonic screen display (Bar graph screen, list screen, vector screen), waveform and noise measurement screen, connection check screen, connection display screen, X-Y Plot screen, data save, basic measurement screen, voltage measurement screen, current measurement screen, power measurement screen.
Data Save	Auto-data save, CSV file format, waveform save in image mode, manual data save, save destination selection, screen hard copy save.
External connected equipment	Capable of working in synchronization with several similar units.
Display language	English and any other language.
<b>General Specifications</b>	
Storage Temperature and humidity ranges	-10°C to 50°C, 80%RH or less
Backup Battery Life	About 7 to 10 years
Supply Voltage	100 to 240 VAC (expected transient over voltage of 2500 V), 50/60 Hz
Rated Power	Not more than 300VA
Safety Standard	EN61010
Product warranty period	Minimum one year.
<b>Accessories</b>	
Voltage Cords	A set of four pairs, length 3m, CAT III 1000V, CAT IV 600V
Current probes	AC Clamp-ON Current Probe: rated current AC 20A/200A; Accuracy $\pm 0.3\%$ rdg ( for 45 to 65 Hz range), $\pm 1-2\%$ upto 5KHz
	AC/DC clamp-ON current probe: rated current 200A; accuracy $\pm 0.5\%$ rdg, $\pm 1-2.5\%$ upto 50KHz
	AC/DC current sensor: rated current 50A; accuracy $\pm 0.05\%$ rdg ( for 45 to 65 Hz range, DC), $\pm 1\%$ upto 10KHz
	AC/DC current sensor: rated current 200A; accuracy $\pm 0.05\%$ rdg ( for 45 to 65 Hz range, DC), $\pm 1\%$ upto 10KHz
PC Card	1 GB
PC connectivity cable	Required
User manual	Required in English
Carrying case	Dedicated hard case
All other accessories needed for satisfactory operation of the power analyser with and without computer interface.	
All necessary softwares and manuals (with English as display language).	

*Shiv Singh*

### **Important Points:**

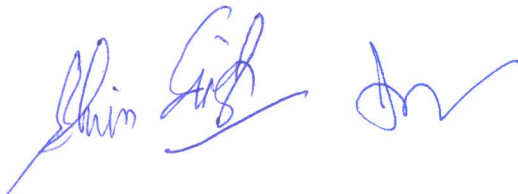
- Quote for all the mentioned current probes (if available with that make or principle) is compulsory on per piece basis.
- All the accessories to be provided with the power analyser are to be mentioned with the quote.
- Quote for all other accessories required for proper operation of the power analyser are to be provided.
- All softwares required for the operation of the power analyzer independently and for operation with computer are to be provided with the power analyser.
- Installation and demonstration to be provided.

### **TERMS & CONDITIONS**

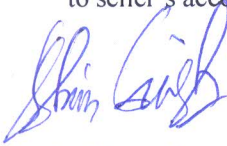
1. Please submit the TECHNICAL and FINANCIAL bids in separate sealed envelopes. Mark the two envelopes clearly as "Technical Bid" and Financial Bid". Both the sealed envelopes should be sent in a single sealed envelope, with clearly marked as "Real time controller board for Power Electronics & Motor Control applications". The quote should reach the following address on or before **7/02/2013** upto **5:00 PM**.

**Name** : Prof. Bhim Singh  
**Address** : Professor, Room No. II-118,  
Deptt. of Electrical Engineering,  
Indian Institute of Technology, Delhi  
Hauz Khas, New Delhi-110016 (India)

2. Please quote prices at FOB/ CIF New Delhi, inclusive of installation charges.
3. Quote should be in Indian Rupees as well as US Dollars and to valid for at least three months.
4. Attach all the technical literature and a list of similar installations done in India.
5. Mention the warranty period. Also mention if there are additional prices for on-site warranty.
6. Mention if you can provide any technical support like training of IIT Delhi personnel at IIT Delhi or in your factory and providing a technical person for operation of the machine for the initial period of 2 years. Kindly mention about this in technical bid.
7. If the quote is being submitted by the representative of the Principals/manufactures themselves, a valid Agency ship/Dealership Certificate authorizing the agent to quote to IIT Delhi on behalf of the Principals should be enclosed.
8. The Institute reserves the rights to accept/reject any/all quotations without assigning any reasons thereof.
9. Complete set of manuals for the operation and servicing of equipment should be given. All circuit diagrams, other mechanical and electrical schematics must be provided to Main unit, sub systems and accessories.
10. Delivery as early as possible in weeks on receipt of PO.
11. Clearly specify the installation requirements – such as space, power, frequency, environment (Temperature and humidity) etc.
12. If the items quoted are proprietary in nature, please enclose proprietary certificate from the principals stating "Certified that ----- is a proprietary item of M/s ----- and no other manufacture make these items".
13. If the bidder is Indian agent, the agency certificate should be enclosed.



14. Please produce compliance certificate for the specification.
15. Please ensure that the Indian agent has been enlisted with the Department of Expenditure, evidence may please be attached.
16. All bank charges payable in India are to buyer's account and bank charges in seller's country to seller's account.



**(Principal Investigator)**



**(Chairman, Purchase Committee)**