

DEPARTMENT OF ELECTRICAL ENGINEERING, IIT DELHI

Minutes of the meeting of the purchase committee to purchase "Solar Array Simulator" to decide specifications and NIQ:

Members Present: Prof. Bhim Singh, Prof. G. Bhuvaneswari, Dr. S. Mishra and Dr. B. K. Panigrahi

The following specifications were decided for the Solar Array Simulator to be purchased under project no. RP02583:

Parameters	Specification
Output Ratings	
Output Voltage	0-600V
Output Current	0-16.7A
Output Power	10KW
Input Specification	
AC Input Voltage 3 phase, 3 Wire + ground	380/400 (operating range: 342V to 440V)
AC Frequency Range	47-63 Hz
Output Noise & Ripple	
Voltage Noise	2000mVpk-pk (max)
Current Ripple (rms)	300mA (max)
Over Voltage Protection Adjustment Range	
Range	0-110% programmable from front panel or digital
Accuracy	±1% of full-scale output
Efficiency	0.87(Typical)
Programming & Measurement Resolution	
Voltage (Digital Interface)	0.002% of V _{max}
Current (Digital Interface)	0.002% of I _{max}
Stability	±0.07% of full scale value after 30-minute warm-up and over 8Hrs at fixed line, load and temperature
Temperature Coefficient	
Voltage	0.04% of V _{max} /°C
Current	0.06% of I _{max} /°C
Operating Temperature range	0-50° C
Storage Temperature range	-25° C to 65° C
Programming Accuracy	
Voltage Programming	0.2% of V _{max}
Current Programming	0.5% of I _{max}

Bhim Singh
4/10/2012

G. Bhuvaneswari
4/10/12

S. Mishra
4/10/12

B. K. Panigrahi
4/10/12

Accuracy	
Voltage Readback	0.3% of rated max. Voltage
Current Readback	0.5% of max current.
Voltage slew rate Range	0.001V/ms - 20V/ms
Current slew rate Range	0.001A/ms - 0.1A/ms,
Available Input/output	
Analog Irradiance/Temperature inputs	
Standard USB and RS-232 Interface or Ethernet or GPIB or all of the mentioned interfaces.	
Programmable Parameters	
Temperature	-35°C to 80°C
Irradiance Level	0 to 2000W/m ²
Fill Factor	0.5 to 0.95
Simulation Time	Minimum 15,000 seconds.
PV Curve	Minimum number of data points should be 128 with 16-bit linear interpolation to generate the required I-V curve accurately.
MPPT Tracking	Up to 75Hz (minimum)
Dynamic Simulation	The system should be capable of Dynamic simulation for simulation of various irradiance and temperature profiles for various conditions such as clear Sky, partly cloudy or mostly cloudy Conditions.
Programming	The system should have ability to program I-V curves, it also should support loading of the I-V characteristics. It also should support custom input data including "multiple hump" characteristics to create complex I-V curves.

Other Requirements:

- The solar array simulator (SAS) supporting software is to be provided with the equipment.
- The PV array simulator should have facility to simulate the I-V curves/data of any kind of PV array's operating conditions, such as partial/ complete shadowing of solar cell(s), PV module, panel, bypass diode failure etc. Simulation of dynamic irradiation intensity and temperature level from clear day to cloud cover conditions.
- Solar Array Simulator should have a feature of future expandability in terms of output power.
- Some preloaded Photovoltaic current vs voltage (I-V) curves and programs need to be provided with the equipment software.
- The simulator should have a built-in 16 bit digital control and precision voltage & current measurement circuits with a voltage accuracy of 0.05% and a current accuracy of 0.1%.
- Proper cooling arrangement for the equipment should be provided (if required).
- Any other features should be clearly mentioned in the technical bid.
- All sorts of precautions and protections needed while the operation should be informed beforehand.

Shin Singh
04/10/2012

John
4/10/12

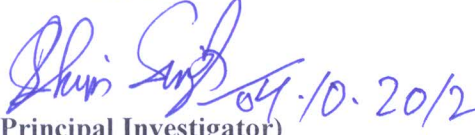
John
4/10/12
John
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TERMS & CONDITIONS

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 "Solar Array Simulator (10KW)". The quote should reach the following address on or before **24/10/2012** upto **5:00 PM**.

Name : Dr. 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 any 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 Purchase Order.
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)

Purchase Committee Members:

Prof. Bhim Singh

Prof. G. Bhuvaneswari


Dr. S. Mishra


Dr. B. K. Panigrahi