

INVITATION FOR QUOTATION

TEQIP-II/2016/WB2G02/Shopping/172

13-01-2016

To,

Sub: Invitation for Quotations for Supply of Goods

Package Code: TEQIP-II/WB/ WB2G02/172

Dear Sir,

1. You are invited to submit your most competitive quotation for the following goods with item wise detailed specifications as given at Annexure - I,

Sr. No	Brief Description	Quantity	Delivery Period (In days)	Place of Delivery	Installation Requirement (if any)
1	PLC System with SCADA System	1	45	Electrical Engineering	Yes

2. Government of India has received a credit from the International Development Association (IDA) in various currencies equivalent to **US\$ 300 Million** towards the cost of the **Technical Education Quality Improvement Programme [TEQIP]-Phase II** Project and intends to apply part of the proceeds of this credit to eligible payments under the contract for which this invitation for quotations is issued.

3. Quotation:

3.1 The contract shall be for the full quantity as described above.

3.2 Corrections, if any, shall be made by crossing out, initialing, dating and re writing.

3.3 All duties and other levies payable by the supplier under the contract shall be included in the total price.

3.4 **Applicable taxes shall be quoted separately for all items. Please note that the Excise exemption & Customs concession is applicable to Jadavpur University.**

3.5 The prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.

3.6 If you require any "waybill" for transportation of goods to Kolkata, you have to apply in advance separately with a copy of Invoice enclosing a copy of order; where Entry Tax will be paid by us for procuring way bill.

3.7 **The Prices should be quoted in Indian Rupees only.**

4. Each bidder shall submit only one quotation.

5. **Validity of quotation:** Quotation shall remain valid for a period not less than 45 days after the last date of quotation submission.

6. Evaluation of Quotations:

The Purchaser will evaluate and compare the quotations found to be substantially responsive i.e. which

6.1 are properly signed ; and

6.2 Conforming to the terms and conditions, and specifications.

7. The Quotations would be evaluated for all items together.

- Quotations will be compared on the basis of quoted price (Total Cost including all taxes) for goods at its final destination.

- Past performance & experience may be furnished to consider the credential of the bidder

8. Award of contract: The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price.

8.1 Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of contract.

8.2 The bidder whose bid is accepted will be notified for the award of contract by the Purchaser prior to expiration of the quotation validity period. The terms of the accepted offer shall be incorporated in the purchase order.

9. Payment shall be made in Indian Rupees as follows:

100% of the total cost after delivery, satisfactory installation along with demonstration and testing of the goods and also acceptance by the department.

10. All supplied items are under normal commercial warranty/ guarantee of not less than **12** months from the date of successful acceptance of items, unless specified of warranty for longer duration in the specification.

11. Rate of AMC may be furnished separately, which will be applicable at the end of the normal commercial warrant period.

12. You are requested to submit your offer on or before **15:00** hours on **02-02-2016**. Bids will be opened on the same day at **16:00 hours**.

13. Detailed specifications of the items are at Annexure I.

14. Training Clause (if any) **Demonstration at the time of Installation are to be confirmed.**

15. Testing/Installation Clause (if any) **Satisfactory Installation & Testing is required**

16. Submission of video footage of the successful installation and testing along with Model No. & SL. No. is preferred.

17. Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.

18. Sealed quotation to be submitted/ delivered, **within 15:00 hours of 02-02-2016**, at the address mentioned below,

TEQIP CELL, 2nd Floor, Aurobindo Bhavan, Jadavpur University, 188, Raja S. C. Mallick Road, Kolkata- 700 032.

19. We look forward to receive your quotation and thank you in anticipation for your interest in this project.

Prof. Sanjib Acharyya
Nodal Officer, Procurement
TEQIP, Phase-II, JU



Annexure I

Package Code: TEQIP-II/WB/ WB2G02/172

Sr. No	Item Name	Specifications
1	PLC System with SCADA System	<p>PLC with latest series CPU and IOs.</p> <p>IO count : DI/O = 72 (all configurable either as DI or DO channelwise)</p> <p>AI = 16</p> <p>AO= 16</p> <p>Encoder = 1 channel</p> <p>PLC will command a Variable Frequency Drive, which will control a 3 phase Induction Motor. There will be provision of encoder and the encoder feedback will be interfaced with PLC / VFD whence both must have encoder interface.</p> <p>There will be a separate motor which will be DOL started and will be coupled with the main motor in a certain run, where this motor will drive the main motor in generating mode. The regenerative power will be dissipated as energy across the brake resistor of the VFD. Hence VFD must have inbuilt brake chopper.</p> <p>The entire operation can be monitored and operated from a PC based SCADA.</p> <p>There will a touchscreen HMI for the operator from where the system can also be monitored and controlled.</p> <p>Please note that the system is intended to be used for multiple purposes as per requirement. Hence a sample system will have to be initially commissioned (as given by us).</p> <p>Thorough training on PLC programming and configuration, VFD parameterization, SCADA and HMI development, and hardware orientation have to be imparted and will be a part of the package scope.</p>

Scope of Supply:

THE PLC, VFD, SCADA, HMI & MOTOR MUST BE OF THE SAME MAKE

Sl. No	Item	Description	Qty
1	PLC	Complete PLC package with CPU, IOs, Software (as per specification) IO: DI/O : 72 AI: 16, AO : 16, Encoder: 1 channel min	1 set
2	VFD	4 kW VFD with Profibus DP, Modbus RTU and Encoder interface. SVC type VFD.	1 no
3	Motor	0.5 HP 4 pole Inverter duty IM, foot mounted	2 nos
4	Touchscreen HMI	7" Full color touch based	1 no
5	SCADA	PC based SCADA ES cum OS license with requisite no. of signals	1 set
6	Encoder	Incremental (TTL) type	1 no
7	Panel	Movable Stack type panel housing PLC and VFD with all necessary accessories and wiring	1 no
8	Control Desk	Housing HMI, PBs (START, STOP, RESET, Em. STOP) and LEDs	1 no
9	Commissioning and Training	Commissioning of a sample system, and thorough training on the PLC, VFD, HMI and SCADA	Services

Technical Specifications :

Variable Frequency Drives (VFD) :

- Type: Vector Drive
- Input Voltage Range : 3 phase 380-480 V AC +/- 10%
- Frequency : 48 -63 Hz
- Output Voltage: 3 phase; 0 V to supply voltage
- Output frequency: 0 – 500 Hz
- Switching Frequency : Should be ≥ 4 kHz. Upto 12 kHz selectable range should be there.
- Ambient temperature : - 10 deg to 40 deg C
- **Input DC swinging choke** should be inbuilt to reduce harmonics. External choke not accepted.
- Overall Efficiency of the drive should include input line choke also and must be $\geq 97\%$
- Drive should have inbuilt Modbus Communication facility. It should also be compatible with Profibus. Profibus card must be built-in or externally compatible as Drive to PLC communication will be via Profibus DP.
- Drive must be capable of accepting encoder feedback. The interface card should be built in or externally added.
- Alphanumeric backlit LCD display panel should be given for monitoring purpose. Normal seven segment display not accepted.
- EMC filters (category C2 & C3) and RFI filters must be built-in.
- Overloadability : 110% of I_{ND} on normal duty use for 1 min every 10 mins,
140% of I_{HD} on heavy duty use for 1 min every 10 mins,
170% of I_{HD} for 2 secs every 1 min

• **Inbuilt brake chopper needed**, as in generating mode, the regenerative power shall be measured.

• **IOs: The minimum IO that should be present in the VFD are :**

6 x DI

3 x DO

2 x AI (4-20 mA, 0-10 V)

2 x AO (mA)

Programmable Logic Controllers (PLC):

It is proposed to install a PLC panel (movable stack type) to incorporate the PLC as well as VFD module.

It will house the PLC CPU & IOs which will communicate with the VFD to control the motors, with SCADA (PC based) and HMI/Panelview (touchscreen).

The PLC and peripherals for the control & operation of the proposed system shall be built around a suitable range PLC platform, support distributed I/O system, capable of easy expansion/ up-gradation, having open communication architecture for future expansions. The PLC system shall be complete with its Central Processing Unit, Memory, Power Supply module, Communication module, Interfacemodules, Input / Output modules, Racks, Connectors etc. as required to make the PLC systems functionally complete in all respects.

a. **CPU :** minimum 512 kB memory CPU has to be offered. The memory should not be volatile, and maximum loading of the system shall not exceed 50%. Must have sufficient nos of configurable timers, counters, PID loop handling capability. It shall have real time clock and multitasking features. It shall be possible to perform latching, timing, counting, comparing, data transfer instruction, shift register instruction, program control instruction, communication and diagnostics instruction, logic controls, Arithmetic functions and PID control function. CPU shall perform all system diagnostics. All the logic circuits used shall be software based.

b. **Communication:** There must be onboard communication via Modbus RTU/RS485 & Onboard Ethernet port supporting MODBUS TCP (ie without external add-on card).

Additionally it must be compatible with Profibus DP, Profinet IO, EtherCAT, CANopen, DeviceNet, Modbus TCP and other standard communications with necessary add-on cards.

Communication with SCADA : via OPC on Ethernet network
Communication with VFD : via Profibus DP. Also Modbus RTU connectivity should be present.

Communication with Touchscreen HMI : via Modbus RTU / TCP

c. IO's :

DI/O : 72 . Pls note that all the 72 IO channels must be configurable either as DI or DO (as per will).

AI: 16 (all must be configurable as 4-20 mA / 0-10 V / RTD, channel-wise)

AO: 16 (4-20 mA, 0-10 V)

Encoder channel : 1 channel. Frequency range upto 250 kHz must be compatible.

Accepted cards :

DI/O: 16/24/32 channel

AI: 8/16 channel. Min.Resolution :12 bits with sign

AO: 8/16 Channel. Min.Resolution :12 bits with sign

Interposing relays have to be considered for all DO (exact number to be specified later).

Individual channel wise status LED's must be present in all cards. They must have diagnostic/error detection feature.

Groupwise/channelwise optical isolation in IO cards must.

d. Programming software : Must be user friendly and have all the following options for programming :

Ladder Logic (LL)

Functional Block Diagram (FBD)

Structured Text (ST)

CFC

SFC

Instruction List (IL)

Error diagnosis should be possible by software.

SCADA :

One number PC based Engineering cum Operating station of SCADA with requisite number of signals/tags.

They must be installed in the PC with minimum configuration as : Intel core i3 processor, 500 GB HDD, 4 GB RAM, 21" LCD/LED Monitor, Keyboard, Mouse with original Microsoft

Windows 7 / 10 as per compatible with SCADA and PLC development software, Microsoft Office and Antivirus.

PLC to SCADA communication must be via OPC over Ethernet medium.

The Engineering Workstation (EWS) shall be capable of displaying drive parameters , drive status , Motor status, encoder status, etc for fault diagnostic of the drives. All such displays shall be user configurable.

The HMI shall be latest version of licensed PC based software with at least 50 tags/signals. HMI station shall be Ethernet compatible (TCP/IP). The HMI software shall include the one development system & one number of run time system with facility **like trending, history data storage, free format report generation** etc. The software shall include the following:

- HMI Development software
- Control Application Software
- Graphical Editor & Generator
- Licensed operating system software complete with manuals and user guide

All the above software shall have required number of user licenses in the name Department of Electrical Engineering, Jadavpur University.

PC of latest features having the following as minimum is required as the SCADA Workstation :

Intel core i3 or above processor

4 GB Ram or higher

500 GB HDD or higher

21" Monitor (LCD/LED)

Requisite keyboard, optical mouse and other accessories. (Test certificates and Quality assurance certificates are necessary.)

Touchscreen HMI:

7" touchscreen, TFT/LED, **64kColors must**, min 32 MB SDRAM with USB connectivity.

HMI to PLC communication will be via Modbus RTU protocol.

Motor:

415 V 3 Phase 50 Hz 4 pole, 0.37 kW/ 0.5 HP Induction Motor, rated current ~ 0.8 - 1 A, Foot mounted, **Inverter Duty (with VPI)**

		<p>Encoder : Incremental Encoder (TTL) 1024 ppr, 24 VDC operating voltage. The encoder feedback can be used with both PLC and VFD. Hence both PLC and VFD must have Encoder feedback interface provision.</p> <p>Panel : Movable stack type panel to house the PLC, SMPS, and VFD. Must have proper cooling arrangement for the VFD. The relays and other accessories to be fitted in this panel too.</p> <p>Control Desk: Control station for operator with touchscreen HMI and requisite Pushbuttons for VFD (START, STOP, RESET etc), emergency STOP, and LEDs.</p> <p>Commissioning& Training The system is intended to be used for various purposes as and when required. However a sample system will be given to the supplier, to be commissioned initially. Hence after completion of commissioning, full training on the hardware and software (PLC, SCADA, HMI, VFD) needs to be imparted and is a part of the scope.</p>
--	--	---



FORMAT FOR QUOTATION SUBMISSION

(In letterhead of the supplier with seal)

Package Code: TEQIP-II/WB/ WB2G02/172

Date: _____

To: _____

Sl. No.	Description of goods (with full Specifications)	Qty.	Unit	Quoted Unit rate in Rs. (Including Ex Factory price, excise duty, packing and forwarding, transportation, insurance, other local costs incidental to delivery and warranty/ guaranty commitments)	Total Price (A)	Sales tax and other taxes payable	
						In %	In figures (B)
Total Cost							

Gross Total Cost (A+B): Rs. _____

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. _____ (Amount in figures) (Rupees _____ amount in words) within the period specified in the Invitation for Quotations.

We confirm that the normal commercial warranty/ guarantee of _____ months shall apply to the offered items and we also confirm to agree with terms and conditions as mentioned in the Invitation Letter.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Signature of Supplier

Name: _____

Address: _____

Contact No: _____