



भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(मानव संसाधन विकास मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD

DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of H.R.D., Govt. of India)

STORES & PURCHASE SECTION Phone:(0326) 2235678 || Email : purchase@iitism.ac.in || Website : www.iitism.ac.in

File No. TEQIP/500404/17-18

Date: 22 Feb 2018

Request For Quotation

To,

Subject: **Supply & Installation of Setup for speed control of DC motor using Micro Controller and Study of IGBT**

Sirs,

The Indian Institute of Technology (Indian School of Mines), Dhanbad is interested for the purchase of the materials/ equipment listed below:

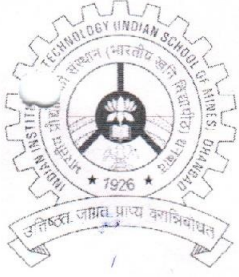
S No	Description of item(s)	Quantity	Remarks
1	Supply & Installation of Setup for speed control of DC motor using Micro Controller and Study of IGBT (Detail specification in Annexure I)	01 No.	At the earliest/ Ex-stock

INSTRUCTIONS:

- 1) Please attach relevant technical literature of the item.
- 2) Please mention warranty/ guarantee period in your offer.
- 3) Please mention after sales service information in your offer.
- 4) Price should be in F.O.R. IIT(ISM), Dhanbad basis only.
- 5) **Please attach a certificate that the quoted price is not more than that of any other Govt. organization/ institution in India. This has to be mentioned in the offer letter clearly.**
- 6) The rates should be quoted for each item separately.
- 7) Rates quoted will be taken as inclusive of all taxes unless given separately. IIT (ISM) does not issue any Form 'C' or 'D' towards sales tax concessional rate. Hence, full rate of sales tax/ VAT, GST applicable should be quoted.
- 8) The items/ materials shall be required to be delivered at Mining Machinery Engineering Department of IIT (ISM) Dhanbad at the risk and cost of the tenderer.
- 9) Your tender must be **valid for minimum 55 days** from the date of opening of tender.
- 10) The stores are required to be delivered within **30 days**, late delivery may not be accepted.
- 11) Full details of stores offered should be given in the tender along with supporting & relevant literatures/ Technical Literature.
- 12) Sales Tax/ VAT Registration Number, GSTIN should be clearly mentioned in your offer, failing which your offer may not be considered.
- 13) The items offered should be of good quality confirming to BIS standards, wherever applicable.
- 14) **Advance payment is not admissible.** Payment shall normally be made within 3-4 weeks subject to receipt and acceptance & installation (as per Purchase Order Terms) of the ordered materials/items.
- 15) In the event of the supplier failed to supply the materials or install the same as contractual condition, IIT (ISM) shall have the right to deploy suitable agency/ third party to get the job completed at the risk and cost of the supplier.
- 16) Tender may please be submitted **in sealed cover only superscribed with Enquiry No. TEQIP-500404-2017-18 and due date** as is **IMMEDIATELY**.
- 17) Your bid should reach our office preferably latest by **23.3.2018**.
- 18) Any other information that you may like to obtain, you are free to contact IIT(ISM) before submission of tender.
- 19) IIT (ISM) reserves the right to accept and/or to reject any/all tenders without assigning any reason.

Assistant Registrar

gsh
22/02/2018



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Annexure I

Setup for speed control of DC motor using Micro Controller and Study of IGBT

1. Input voltage: 230V, 50Hz with MCCB of Siemens/Havells/L&T/ABB make.
2. DC Bus: 325V, directly rectified (using rectifier diode) from the ac mains.
3. DC motor: 1 HP, 1450 rpm, 220V, field separate.
4. Load generator: 1 HP DC motor acting as generator coupled with the test motor, resistive load arrangement for generator loading.
5. Loading arrangement: Speed variation will be from Zero R.P.M. to rated R.P.M. with armature voltage control and beyond rated speed preferably twice the rated speed with field control. Set points using a push button. (Speed of the DC motor can be controlled at any desired speed using microcontroller). Resistive loading of the generator will be controlled smoothly from no load to full load.
6. Voltage Control: both Armature voltage control and Field voltage/current control, select using push button in real time.
7. Converter: two Full bridge converters with high-speed PWM control: one in the armature side and the other on the field side.
8. Switching device: high-speed IGBT/MOSFET.
9. Torque sensor to be provided for the measurement of torque from zero to rated speed and beyond rated speed (preferably upto twice the rated speed) during field control of the motor and also to provide torque feedback.
10. Switching frequency: 5-12 KHz with a step of 1 kHz selectable using a push button.
11. Gate driver: Suitable isolated gate driver for PWM control for IGBT.
12. Power supply: SMPS based power supply to high-speed micro-controller, gate driver, LCD display etc.
13. Controller: advanced high speed TMS320F2000 series micro-controller based IGBT ON/OFF duty generation through pulse width modulator (PWM), 12-bit ADC sampling at switching frequency, high-speed SPI for display data etc.
14. PWM Control: high-resolution digital PWM generation with the capability of changing PWM duty at switching frequency.
15. Speed feedback: feedback using proximity sensor, option for selection of closed loop and open loop speed control directly reflecting required PWM duty.
16. Armature current sensing: Hall effect based high band width current sensor.
17. A 4 line 20-character LCD display showing PWM duty, motor voltage, motor current, field voltage, motor speed, fault (if any) etc.
18. Terminals to observe PWM gating pulse and IGBT voltage: study of IGBT switching characteristics.
19. Front panel push button to increase and decrease speed of the motor: closed loop/open loop.
20. Protection: Over voltage, over speed, over current, over temperature etc.
21. Total instruments of the above system should be fitted within the cabinet as picture (fig. 2) attached.
22. Vibration pad and lifting "EYE BOLT" arrangement to be provided on the motor unit.
23. All types of wiring for (a) power connection to be made by 5 square m.m. ISI marked wire, (b) control connection to be made by 2 square m.m. ISI marked wire with proper identification and ISI marked lugs.
24. Flexible/jaw coupling system to be provided for motor and generator coupling.
25. Certificate of the motor and generator as per BIS standard must be provided at the time of supply.
26. Complete circuit diagram must be provided with the quotation.
27. The supplier may be asked for a technical discussion/presentation before issuing the purchase order if required.
28. The experimental manual must be provided at the time of supply.
29. The complete circuit diagram must be engraved on the front of the control panel of the setup.
30. Schematic diagram of the setup has been provided, for reference only.
31. List of experiments have been provided for reference which will be performed with the help of this setup:
 - Study of IGBT characteristics
 - i. Turn-On
 - ii. Turn-Off
 - iii. V-I characteristics

22/2/18



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- Setup for speed control of DC motor using Micro Controller
 - a. Speed of DC motor can be controlled by the following methods
 - i. Armature voltage control
 - ii. Field current control
 - b. While changing the speed of the DC motor, port arrangement for DSO to view the Voltage and Current waveform of each IGBT output and bridge convertor output of motor armature and field of DC motor.
- Speed-Torque characteristics of DC Motor for armature voltage control and field control

Arrangement for the study of speed-torque characteristics (from No-load to Full-Load) of DC motor by variation of

 - i. Field control and
 - ii. Armature voltage control.

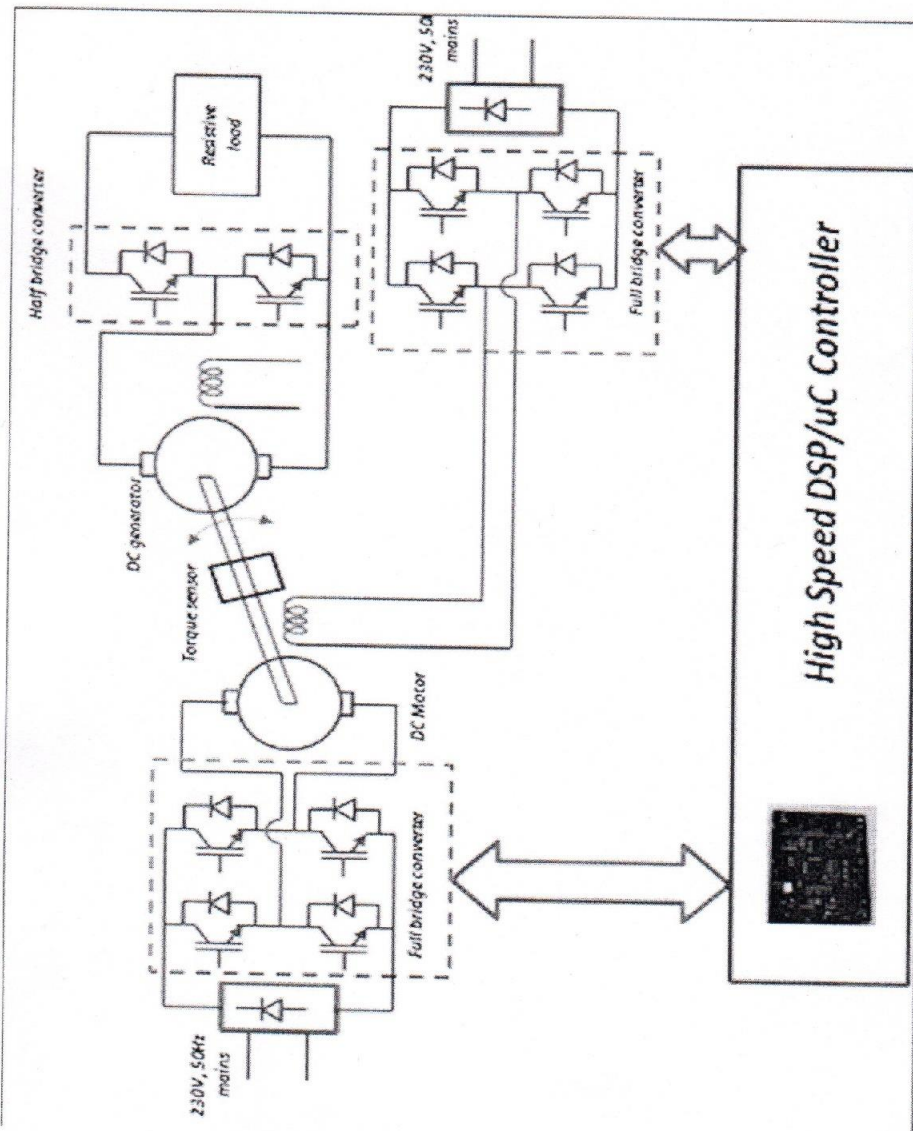


Fig. 1 Schematic diagram of the system.



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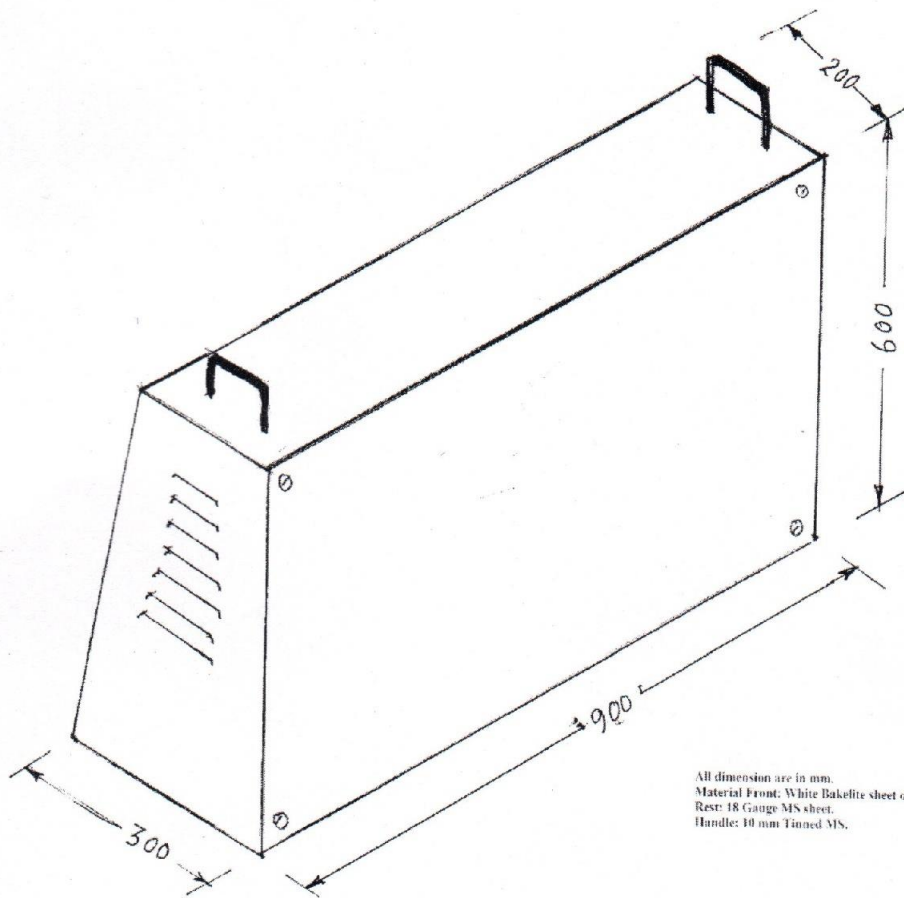
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All dimension are in mm.
Material Front: White Bakelite sheet of 3 mm.
Rest: 18 Gauge MS sheet.
Handle: 10 mm Tinned MS.

Fig. 2 Schematic diagram of the cabinet.

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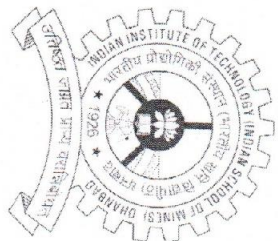
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FORMAT FOR QUOTATION SUBMISSION

(In letterhead of the supplier with seal)

To: _____

Date: _____

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)	Sales tax and other taxes payable	
					Total Price (A)	In % In figures (B)
Total Cost						
Gross Total Cost (A+B): Rs. _____						
(Amount in figures) (Rupees) _____						

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. _____

(Amount in figures) (Rupees) _____

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: _____

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