

	INDIAN INSTITUTE OF TECHNOLOGY MADRAS Chennai 600 036 Telephone: [044] 2257 9723/9798 E-mail: tender@imail.iitm.ac.in	
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The Senior Manager (Project Purchase)

Ref: ME/1920/HARI/ROBO
Date: 16/01/2020

Open Tender No: **ME/1920/HARI/ROBO**

Due Date: 06.02.2020, 5 PM

Pre-Bid meeting: - NA

Technical Bid opening meeting on 07.02.2020, 4:00 PM at Department of Mechanical Engineering, IIT-Madras.

Dear Sir/Madam,

On behalf of the Indian Institute of Technology Madras, offers are invited for the supply of **“TWO NUMBERS OF 500KG ROBO”** conforming to the specifications given in Annexure I.

Instructions to the Bidder

- I. **Preparation of Bids:** - The tenders should be submitted under two-bid system (i.e.) Technical bid and Financial bid.
- II. **Delivery of the tender:** - The tender shall be sent to the address mentioned below, either by post or by courier so as to reach our office before the due date and time specified in our schedule. The offer/bid can also be dropped in the tender box on or before the due date and time specified in the schedule.

The tender box is kept in the office of the:

**The Senior Manager,
Project Purchase,
IC & SR Building, 2nd floor,
I.I.T. Madras,
Chennai – 600 036.**
- III. **Opening of the tender:** - The offer/bids will be opened by a committee duly constituted for this purpose. The technical bids will be opened first and will be examined by a technical committee which will decide the suitability of the bids as per our specifications and requirements. All bidders will be invited for opening of the technical bids. For opening the financial bid, only technically qualified bidders will be called.
- IV. **Prices:** - The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges to the **Department of Mechanical Engineering**. The offer/bid should be exclusive of taxes and duties. The percentage of tax & duties should be clearly indicated separately. Kindly note that IIT Madras is eligible for concessional GST and relevant certificate will be issued.

In case of import supply, the price should be quoted without custom duty. IIT Madras is exempted from levy of IGST on Imports and eligible for concessional custom duty (not exceeding 5%) and the price should be quoted on EX WORKS and CIP basis (stating the Cost, Insurance, Freight separately) and indicating the mode of shipment.

- V. Agency Commission:** - Agency commission, if any, will be paid to the Indian agents in rupees after receipt of the equipment and its satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in the tender document even in the case of 'Nil' commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent. The Foreign Principal should indicate the percentage of payment and it should be included in the basic price quoted originally (if any)..
- VI. Terms of Delivery:** - The item should be supplied to the **Department of Mechanical Engineering, IIT Madras** as per the Purchase Order. In case of import supply, the item should be delivered at the cost of the supplier to our Institution. The Installation/Commissioning should be completed as specified in our important conditions.
- VII. Technical Bid Opening:** The technical bid will be opened on **07.02.2020, 4:00 PM** at the **Department of Mechanical Engineering, IIT-Madras**. The financial bids of those tenderers who are technically qualified will be opened at a later date under intimation to them.
- VIII. IIT Madras** reserves the full right to accept / reject any tender at any stage without assigning any reason.

Yours sincerely,

The Senior Manager (Project Purchase)
IC&SR Building, I.I.T. Madras,
Chennai - 600 036.

SCHEDULE

Important Conditions of the tender

1. The due date for the submission of the tender is **06.02.2020, 5 PM.**

The offers / bids should be submitted under two bid system (i.e.) Technical bid and financial bid. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes, transportation, packing & forwarding, installation, guarantee, payment terms, pricing terms etc. The Technical bid and financial bid should be put in separate covers and sealed. Both the sealed covers should be put in a bigger cover. The Open Tender for supply of **“TWO NUMBERS OF 500KG ROBO”** should be written on the left side of the Outer bigger cover and sealed.

2. **EMD: - The EMD (Should be in INR) in the form of Account Payee Demand Draft / Banker's Cheque for 2% of the quoted value of the item; drawn in favor of The Registrar-IIT Madras, payable at Chennai should be enclosed in the cover containing financial bid.** Any offer not accompanied with the EMD shall be rejected summarily as non-responsive.

The EMD of the unsuccessful bidders shall be returned within 30 days of the end of the bid validity period. The same shall be forfeited, if the tenderers withdraw their offer after the opening during the bid validity period. The Institute shall not be liable for payment of any interest on EMD. EMD is exempted for Micro and Small Enterprises (MSE) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME).

When a foreign vendor does not have a local agent in India, he can submit a demand draft equal to 2% or wire transfer the amount to our account as detailed in the attachment (Annexure II) and enclose the proof with the financial bid.

3. **Performance Security: -** The successful bidder should submit Performance Security for an amount of 5% of the value of the contract/supply. The Performance Security may be furnished in the form of an Account Payee DD, FD Receipt from the commercial bank, Bank Guarantee from any nationalized bank in India. **The performance security should be furnished within 21 days from the delivery of the purchase order.**

Performance Security in the form of Bank Guarantee: - In case the successful bidder wishes to submit Performance Security in the form of Bank Guarantee, the Bank Guarantee should be routed through the Beneficiary Bank to the end user bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee from a Nationalized Bank of India.

The Bank Guarantee should remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including the warranty obligations.

4. **Indian agent:** If an Indian agent is involved, the following documents must be enclosed:
Foreign principal's proforma invoice indicating the commission payable to the Indian Agent and nature of after-sales service to be rendered by the Indian Agent.
 - ✓ Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.
5. The offer/bids should be sent only for a machine that is available in the market and supplied to a number of customers. A list of customers in India and abroad with details must accompany the quotations. Quotations for a prototype machine will not be accepted.

6. Original catalogue (not any photocopy) of the quoted model duly signed by the principals must accompany the quotation in the Technical bid.
7. Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.
8. **Validity:** The validity of Quotation should not be less than 90 days from the due date of tender.
9. **Delivery Schedule:** - The tenderer should indicate clearly the time required for delivery of the item (subjected to the executive committee-IITMadras approval). In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied.
If there is delay, the penalty will be @1% per week of delay subject to a max of 10% of the value of purchase order and if the delay is more than accepted time frame by IITM, the PO would be cancelled and liquidated damages will be enforced.
10. **Risk Purchase Clause:** - In the event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from other sources on the total risk of the supplier under risk purchase clause.
11. **Payment:** -
 - (i) No Advance payment will be made for Indigenous purchase. However, 90% Payment against Delivery and 10% after installation are agreed to wherever the installation is involved. In case of import supplies the payment will be made only through 100% Letter of Credit i.e. (90% payment will be released against shipping documents and 10% after successful installation wherever the installation is being done).
 - (ii) **Advance Payment:** No advance payment is generally admissible. In case of specific percentage of advance payment is required, the Foreign Vendor has to submit a Bank Guarantee equal to the amount of advance payment and it should be routed through the Beneficiary Bank to the end user Bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee through a Nationalized Bank of India.
12. **On-site Installation:** - The equipment or machinery has to be installed or commissioned by the successful bidder within number of days (as prescribed by PI) from the date of receipt of the item at site of IIT Madras
13. **Warranty/Guarantee:** - The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Any extended warranty offered for the same has to be mentioned separately (For more details please refer our Technical Specifications).
14. **Late offer:** - The offers received after the due date and time will not be considered. The Institute shall not be responsible for the late receipt of Tender on account of Postal, Courier or any other delay.
15. **Acceptance and Rejection:** - I.I.T. Madras has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.
16. **Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.**

17. Disputes and Jurisdiction:

Settlement of Disputes: Any dispute, controversy or claim arising out of or in connection with this PO including any question regarding its existence, validity, breach or termination, shall in the first instance be attempted to be resolved amicably by both the Parties. If attempts for such amicable resolution fails or no decision is reached within 30 days whichever is earlier, then such disputes shall be settled by arbitration in accordance with the Arbitration and Conciliation Act, 1996. Unless the Parties agree on a sole arbitrator, within 30 days from the receipt of a written request by one Party from the other Party to so agree, the arbitral panel shall comprise of three arbitrators. In that event, the supplier will nominate one arbitrator and the Project Coordinator of IITM shall nominate on arbitrator. The Dean IC&SR will nominate the Presiding Arbitrator of the arbitral tribunal. The arbitration proceeding shall be carried out in English language. The cost of arbitration and fees of the arbitrator(s) shall be shared equally by the Parties. The seat of arbitration shall be at IC&SR IIT Madras, Chennai.

- a. **The Applicable Law:** This Purchase Order shall be construed, Interpreted and governed by the Laws of India, Court at Chennai shall have exclusive jurisdiction subject to the arbitration clause.
- b. Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Chennai in Tamil Nadu.

18. All Amendments, time extension, clarifications etc., will be uploaded on the website only and will not be published in newspapers. Bidders should regularly visit the above website to keep themselves updated. No extension in the bid due date/ time shall be considered on account of delay in receipt of any document by mail.

Acknowledgement: - It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

**SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE
COMPANY WITH DATE**

Tender Specifications floor mounted Robots (2 no's) of minimum 5 KN payload and 2.5 m reach with force sensors and & with capability of customizing sensors & with controller in the future

We are looking for Floor Mounted (Fixed) 2 No's of minimum 6 axis Robots having ability to impart push force of minimum 5 KN using its end of arm tool. Both of these Robots should have force sensors. The vendors are requested to provide (1) the quotations as per the two bid system (i.e., submit technical specifications and financial bid in separate sealed covers) and (2) technical data sheets/factual information of individual components/items. The technical requirements of the equipment are as follows:

1. Technical Specification of Robot Arm features

- 1.1. Number of axes requirement: 6 with simultaneous motion
- 1.2. Minimum payload capacity should be 500 Kg or more at the end effector
- 1.3. Minimum Reach should be within 2350 mm - 2500 mm
- 1.4. The robot arm should be able to exert 5 KN push force at the end effector at any point in 1500 mm x1500 mm area (Sheet Dimensions) (L x H)
- 1.5. Pose Repeatability should be better than 0.10 mm
- 1.6. Pose accuracy should be better than 0.10mm
- 1.7. Path Repeatability should be better than 0.5 mm
- 1.8. Robots would be floor mounted
- 1.9. Drive system should be electric
- 1.10. Robot arms shall be equipped with servo motors and holding breaks
- 1.11. It should have minimum 6 degrees of freedom
- 1.12. Should be able to work in ambient temperature of 30 - 40 degree centigrade
- 1.13. Manipulator come with IP67 protection
- 1.14. Noise level should be lesser than 75 dB

2. Robot control system features

- 2.1 Vendor should provide complete support on digital I/O Board
- 2.2 Control system should be able to process minimum of 16 Digital Inputs and 16 Digital Outputs
- 2.3 Minimum Length of cable from robot to controller 15 m and 5 m from robot to HMI respectively.
- 2.4 System able to run efficiently at power supply 230/400 V AC, 50 Hz
- 2.5 Should be able to work in ambient temperature of 40 degree centigrade
- 2.6 The Teach Pendant should be Compact, Light Weight, should have color display and Touch Screen Options with Jogging Stick for Teaching.
- 2.7 Emergency stops should be provided on control cabinet and teach Pendant
- 2.8 Controller should have the Ethernet communication features for interacting with computer
- 2.9 Offline programming capabilities with robot software should be provided.

3. Robot motion features

- 3.1 Both the robots must be able to operate independently and in coordinated modes.
- 3.2 Both robots should be capable of concurrent cooperation. Both the robots should be synchronized and perform identical line or circle arc motions and no relative motion exists between master and slave end-effectors without any orientation constraints.
- 3.3 Both the robots should be able to perform independent motion. When the master robot performs a basic line or circle arc motion, the slave should be able to perform different motion blocks relative to the end-effector frame of the master.

4. Coupling feature required

- 4.1 The two cooperating robots should have the ability to exchange geometric information (position and its derivatives) from one robot to another which helps the robot to know where the other robot is in the work cell. Both direct and indirect mode of geometric coupling between the robots must be feasible.

5. Offline Simulation and Programming software

- 5.1 A PC software package to create and run robot controller program to be provided with major features listed below
 - 5.1.1 Virtual Robot Simulation: The software should have the feature to create and program virtual robot in its simulated environment.
- 5.2 Configuration, File and Program editor - PC Software must have provision to manage all configuration of the robot. This will include managing file system, IO system, communication settings etc.
- 5.3 There should be a comprehensive program editor with syntax highlight and auto code completion option. The PC software must support compiling and error checking of the program generated in the program editor.
- 5.4 A 3D graphical UI for Task simulation should comply to the following
 - 5.4.1 The proposed software should have a 3D graphical window where the virtual robot(s) will be placed and manipulated to generate desired moves.
 - 5.4.2 It should support importing multiple CAD objects and other robots to simulate the complete robot task in offline mode.
 - 5.4.3 Simulation should include 3D visualization of robot and other object movements, collision detection, cycle time estimation etc.
 - 5.4.4 The estimated path and cycle time in simulation mode should match more than 99% to actual.
- 5.5 Working in Offline and Online mode - The software should support uploading the designed and simulated task created in PC directly to the robot controller(s). It should also be possible to import entire robot data to PC simulation environment and do the editing, teaching and programming from PC software.

6. Force control

- 6.1 A force sensor mounted at the robot end effector, should be employed with essential accessories to communicate with the robot control system for both the robots. So that the force at the robot TCP can be measured.
- 6.2 The robot motion should be able to be controlled based on the force data within 1 sec of detection of programmed load for a given sequence.
- 6.3 The force sensor least count should be better than $\pm 5N$.
- 6.4 The force sensor measuring range should be greater than 5KN at TCP.
- 6.5 Minimum 2 Yr Warranty should be provided from the date of Supply on all components.

7. Additional accessories (optional)

A standardized motor unit package complete with cabling, drive, accessories and safety options should be supplied. These standard motor units have to be controlled by the robot and the pendant supplied. There should be an option to include this motor as an external axis in the robot control system. The motors should be equipped with brakes for positional control. The motors supplied needs to have a minimum dynamic torque of 14 Nm. The robot controller should have at least 3 free slots for adding additional motor and drive for future use.

[The final purchase may or may not include additional accessories specified above]

8. Acceptance criteria

- 8.1 The vendor should demonstrate the operation of the cooperative robots in coordinated and independent modes.
- 8.2 The vendor should demonstrate the use of the offline programming tool to develop a trajectory. The vendor must download it in to the robot supplied from the offline programming tool and demonstrate it on the robot.
- 8.3 The vendor should show the sensor data acquisition and motion control and communication with both the robots.
- 8.4 The vendor should demonstrate the working proof by performing a set of designed tasks at IIT Madras.

9. Eligibility of quote

- 9.1 Authorized Vendors by Robot OEM can participate in the Tender.
- 9.2 The vendor could be a manufacturer or an Integrator (solution provider) for Robot products.
- 9.3 The vendor should have full-fledged service and training facility that is located in India.
- 9.4 Integrator (solution provider) or Robot OEM must provide the contact details of similar supplied equipment (same make) to the government/semi-government institutions and the reputed automobile industries in India, where it is being used successfully.

10. Scope of supply

- 10.1 Two co – Operative Industrial Robot with Control Systems, Cable and Software
- 10.2 Two force sensors with accessories
- 10.3 One offline Programming Robot Software
- 10.4 Training for 6 people on cooperative operation and basics
- 10.5 Transport, installation and commissioning of Robot and Power Up.

11. General Instructions

- 1) Quotations should contain item wise price for each item of our enquiry. (Detailed cost breakup of each item viz. Equipment cost, conversion cost, testing cost, any other charges wherever applicable).
- 2) The quotations should be valid for a minimum of 90 days from the due date.
- 3) Other applicable levies if any to be specified separately like, insurance, transportation, packaging & forwarding etc. for the total supply.
- 4) The party should have a well-equipped authorized service and support center in India.
- 5) The party should have a full-fledged training facility within India.
- 6) Suppliers shall enclose the complete product sheet of the equipment along with its compliance/calibration certificate.
- 7) Offer received shall confirm the compliance to our technical requirement
- 8) All the suppliers should prove the technical compliance features before the purchaser.
- 9) All the delivered equipment's should be accompanied with their respective compliance/ calibration certificates. Equipment's supplied without valid compliance/calibration certificates are liable to be rejected.
- 10) The supplier shall indicate time required for procurement, delivery period and other duration like time required for installation very clearly.
- 11) Detailed breakup of overall cost should be clearly specified. Overall cost will be compared and should include packaging, forwarding and safe delivery to IITM.

- 12) IIT Madras is exempted from payment of import IGST and is eligible for concessional rate of customs duty. Necessary certificates will be issued accordingly at the time of clearance
- 13) All manuals in English language shall be supplied. All the necessary instruction, detailed wiring and circuit diagrams shall be supplied
- 14) The list of users of similar installations in India including contact details of similar testing machines/applications is to be provided.
- 15) The committee recommended to float open tender.



CENTRE FOR INDUSTRIAL CONSULTANCY & SPONSORED RESEARCH (IC&SR)
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI 600 036



**ELECTRONIC CLEARING SERVICE (Credit Clearing) / REAL TIME
GROSS SETTLEMENT (RTGS) FACILITY FOR RECEIVING PAYMENTS**

A. Details of Account Holder

Name of the Institution	Indian Institute of Technology - Madras
Complete Contact Address	Industrial Consultancy and Sponsored Research Indian Institute of Technology-Madras, IIT- Madras Campus Post Office, Sardar Patel Road, Guindy, CHENNAI - 600 036
Telephone No./ Fax No.	Tel - 044-22578355 / Fax - 044-22570545
E- mail ID of the FO/AO/REG/DIR	dricsr@iitm.ac.in

B. Bank Account Details:

Institution Account Name (As per Bank Record)	The Registrar, Indian Institute of Technology - Madras
Account No.	2722101001741
Account Print Name	IIT F A/C , The Registrar IIT Madras
IFSC CODE	CNRB0002722
Bank Name (in full)	Canara Bank
Branch Name	IIT-Madras Branch
Complete Branch Address	Canara Bank, IIT-Madras Branch, IIT- Madras Campus Post Office, Sardar Patel Road, Guindy, CHENNAI - 600 036
MICR No.	600015085
Account Type	Savings Account

Certified that the Institute's account is in an RTGS enabled branch.
I hereby declare that the particulars given above are correct and complete.

Date: _____ Signature of the Competent Authority
of the Institution with seal.

K. M. G. R.
DEPUTY REGISTRAR (IC&SR) (Vc)
IC & SR, I.I.T. MADRAS
CHENNAI - 600 036

Certified that the particulars furnished above are correct as per our records.

Date: _____ For **CANARA BANK**
Signature of the Authorized
Bank Official with Bank Seal.



B. Sekar
SENIOR MANAGER
I.I.T. CHENNAI-600 036.

B. SEKAR
Senior Manager
SP No 39312



CENTRE FOR INDUSTRIAL CONSULTANCY & SPONSORED RESEARCH (IC&SR)
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI 600 036



K VIJAYALAKSHMI
DEPUTY REGISTRAR (IC&SR) *KL*

Project Accounts
July 5, 2019

TO WHOMSOEVER IT MAY CONCERN

In connection with project, US currency may be transferred to CANARA BANK, IIT – MADRAS
Branch In connection with the following details.

FOR TRANSFER OF CURRENCY US DOLLAR

Please Credit in USD

(THROUGH)

JP MORGAN CHASE, NEW YORK
SWIFT CODE: CHASUS33

For credit to

USD ACCOUNT No: 001 – 1395969, of CANARA BANK INTERNATIONAL DIVISION MUMBAI

For Further Credit to

ACCOUNT NO: 2722101001741 of IIT Chennai – Swift Code: CNRBINBBIIT OF THE
REGISTRAR, IIT, MADRAS

K Vijayalakshmi
DEPUTY REGISTRAR(IC & SR) i/c

This is to certify that particulars furnished are correct.

[Signature]
Senior Manager
Canara Bank – IIT Madras branch

B. SEKAR
Senior Manager
SP No. 39312



DEPUTY REGISTRAR (IC&SR) (i/c)
IC & SR, I.I.T. MADRAS
CHENNAI - 600 036