



# COLLEGE OF ENGINEERING MUTTATHARA

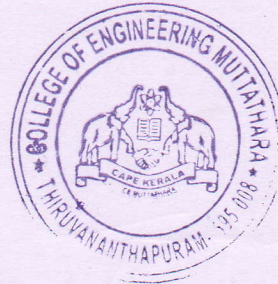
(Under the Co-operative Academy of Professional Education, Estd. by the Government of Kerala)

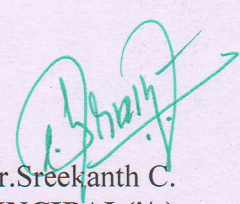
## TENDER NOTICE-EEE-01/Dec-2022

1) Tenders are invited for the supply of Equipment in Power Electronics and Drives Lab in Electrical and Electronics Engineering Department at College of Engineering, Muttathara, Thiruvananthapuram. The tender form, duly filled shall be submitted to the Principal, College of Engineering Muttathara:-

- |  |   |  |
|--|---|--|
| a. Amount of EMD                           | - | 1% of quoted value of articles (minimum Rs.1500/-) |
| b. Last date for submission of tender form | - | <u>30.01.2023</u> @ 05.00 PM                       |
| c. Date of Opening of tender form          | - | <u>31.01.2023</u> @ 03.00 PM                       |

- 2) The Principal or authorized representative will open the tender in the presence of the bidder or their authorized representatives.
- 3) The successful tenderer should execute an agreement in the prescribed format before commencing the service.
- 4) Details and specifications can be have from the office of the undersigned on all working days and from the website [www.cemuttathara.ac.in](http://www.cemuttathara.ac.in)
- 5) The Principal, College of Engineering, Muttathara have the authority in full to reject /modify the requirement as well as accept any bid or tender without assigning any reason whatsoever.



  
Dr. Sreekanth C.  
PRINCIPAL(i/c)

### Copy to

1. The Computer Programmer - for publishing in official website
2. Advertisement in News Paper / Notice Board
3. HOD, EEE



**COLLEGE OF ENGINEERING MUTTATHARA**  
(Under the Co-operative Academy of Professional Education, Estd. by Govt. of Kerala)  
St. Sebastian Church Road, Vallakkadavu P.O., Thiruvananthapuram - 695 008

**TENDER FORM**

Tender No. 'P- 511/2018/CEMT/PE & D Lab: EEE-01/Dec-2022'

Containing General Conditions or contract and schedule for supply of Equipments in Power Electronics and Drives Lab in Electrical and Electronics Engineering Department for college of Engineering, Muttathara

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Name of Tenderer :

Address :

Signature of Tenderer :

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Last date and time of receipt of tender : .....



## TERMS AND CONDITIONS

### TAXES AND DUTIES

The price shall be inclusive of all taxes, duties and levies. No additional amount on account of change in the rate of taxes, duties and levies will be allowed.

### PACKING AND FORWARDING

Inclusive, the items shall be dispatched duly assembled in a pre-fabricated metallic skid if necessary and other accessories shall be sent loose.

### FREIGHT AND INSURANCE

Included in the price. The transit insurance up to destination is covered under the open Insurance policy with State Insurance Scheme by the supplier.

### UNLOADING

Unloading of the items to be arranged by the firm using mechanized crane at the sites if necessary.

### DELIVERY

Items as mentioned in the supply order shall be delivered within 30 days from the date of technically and commercially clear order.

### WARRANTY

The items supplied shall be warranted against defective material and poor workmanship for a period mentioned in the specification of item years from the date of supply. However for Engine and Control Panel the extended warranty by the respective manufacturer shall apply.

### DOCUMENTS

One set each of the catalogues of the equipment shall be supplied along with equipment including the relevant Warranty Certificate.

### AFTER SALES SERVICE

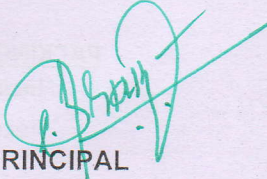
Prompt and satisfactory after sales service will be arranged by the supplier.

### FORCE MAJEURE

The offer is subject to standard Force Majeure Clause terms by which the supplier will not be responsible for delivery/ delay in delivery due to the reasons beyond their control. If the execution of the supply order is delayed the period stipulated in the order as a result of outbreak of hostilities, declaration of any embargo or fire or blockage or flood or acts of nature or any other contingencies beyond supplier's control then buyer will allow such additional time as may be considered justified by extending the delivery period without imposing liquidated damages. If and when additional time is granted by the buyer, the contract/ supply shall be read as understood, if it had contained from its inspection the delivery date as extended.



The Vendor should be original equipment manufacturer, Agent or authorized service provider of the item quoted. Proof of the same has to be provided along with the tender. The vendor should also submit an undertaking that all the components/parts/assembly etc. used in the equipment are original new components from the respective manufacturer and that no refurbished/duplicate/second hand components/parts/assembly are used. If any of this is found during the contract period, the contractor shall remit back to the Principal the money received by him.

  
PRINCIPAL



## GENERAL CONDITIONS OF CONTRACT

### 1) Introduction

The terms and conditions given below shall include the detailed technical specifications. The contract to be entered in to shall be governed by these conditions and amendments thereto, if any.

### 2) Definitions

a) **College:** Means "College of Engineering, Muttathara, St. Sebastian Church Road, Vallakkadavu P.O., Thiruvananthapuram – 695 008" which shall include the Principal of the College, duly authorized to act and sign on behalf of the College

b) **Principal:** Means the Principal of College of Engineering Muttathara, Thiruvananthapuram. All letters & other communications sent to the college in connection with the contract shall be addressed to the 'Principal'.

c) **Site:** Means the 'College of Engineering Muttathara, Thiruvananthapuram District, Kerala'.

d) **Tenderer/Supplier/Contractor:** Means the manufacturer or the person or firm authorized by the manufacturer to sell the product who is submitting the proposal/tender.

### 3) Scope of Work:

Supply, installation, testing and commissioning of the items as per the schedule attached to the tender notice or on other terms as agreed in the tender documents and subsequent orders issued / agreements executed in this regard.

### 4) TENDER FORM

Tenders should be submitted in the prescribed form in sealed covers superscribing "Tender for the Supply of Items at College of Engineering, Muttathara - against tender notification P- 511/2018/CEMT/PE & D Lab: EEE-01/Dec-2022" so as to reach the "**Principal, College of Engineering Muttathara, St. Sebastian Church Road, Vallakkadavu P.O., Thiruvananthapuram – 695 008**" on or before the last date & time as indicated in the tender notice. No tender received after the due date and time will be accepted on any reason. In case no sufficient tenders are received, the last date for receipt of tender will be extended by one or two weeks the exact date of which will be announced later.

The tenders should be submitted in the form to be downloaded from our website. All the pages in the tender shall be fully signed by an authorized signatory of the Company/Firm making the tender and stamped with Company/Firm Seal. Relevant authority of the signatories should be attached with the tender.

The quoted price shall be valid for minimum 3 months from the date of tender opening and shall include all taxes, duties and levies including cost of transportation, installation and commissioning.



#### **5) Earnest Money Deposit (EMD)**

The tenders should be accompanied by an EMD for an amount equivalent to 1% of the estimated value of tendered items subject to minimum of Rs.1500/- in the form of a D.D. drawn on State Bank of India in favour of the 'Principal, College of Engineering Muttathara' payable at Thiruvananthapuram.

The tenders not accompanied by the requisite EMD will not be accepted. The EMD of unsuccessful tenderers will be returned as soon as the formalities are completed. EMD of the successful tenderer will be adjusted against the Security Deposit if the same is required. No interest will be payable on the EMD.

If the successful tenderer fails to give Security Deposit within one week after the date of the purchase order or within a reasonable time as agreed by the purchasing officer, his EMD will be forfeited. The EMD submitted by tenderers are liable to be forfeited in case the tenderer withdraws his tender or enhances the prices during the tender validity period.

Tenderers claiming exemption from payment of EMD shall enclose the copy of the Government Order in this regard without which the tender will not be accepted.

#### **6) Acceptance**

The authority for the acceptance of the tenders rests exclusively with the Principal. The Principal does not undertake to accept the lowest or any particular tender or to assign any reason for the rejection of any tender.

#### **7) Security Deposit**

The successful tenderer shall, within a week from the date of intimation of the acceptance of his/their tender, furnish a security deposit for an amount equivalent to 5% of the value of the contract for the faithful performance of the contract and for guaranteeing the performance of the equipment in the form of demand draft drawn on SBI in favour of the Principal, College of Engineering, Muttathara payable at Thiruvananthapuram. This amount will be returned after the due fulfilment of the contract. The EMD of the successful tenderer will be adjusted against the Security Deposit.

#### **8) Agreement**

The successful tenderer shall, execute an agreement within 7 days with the College for the proper fulfillment of the contract. The accepted tender with all the enclosed schedules, copy of tender notice, conditions of contract and technical specification, letter of award and purchase order shall form part of this agreement. The cost of all stamp papers for executing the agreement and legal expenses incident thereto shall be borne by the successful tenderer.

9) The supplier shall not assign/sublet to any person or persons the execution of the supply or any part thereof without the consent of the College, who shall have absolute power to refuse such consent and or to cancel the contract at any time if not satisfied with the manner in which the contract is being executed.



### SPECIAL CONDITIONS OF CONTRACT

The last date for submission of tender and the time for opening of tender are prescribed in the tender notice. No.Tender No. P- 511/2018/CEMT/PE & D Lab: EEE-01/Dec-2022'

- 1) Bidders shall submit their offer as per the technical specification appended in their own proposal forms duly signed and sealed by the authorized signatory. The Tender form issued by us should also be enclosed to the proposal.
- 2) Prices for optional items if any should be quoted separately.
- 3) If there is any deviation in the technical specification of the offered system in comparison with the technical specification required by us, the same should be clearly mentioned in the proposal by the bidder.
- 4) Price quoted should include all taxes, transport, loading and unloading installation and commissioning charges.
- 5) The quantity required as shown in the tender notice is tentative. The final quantity to be supplied will be decided by the Principal at the time of placing orders. The Principal reserves the right to split the order for part quantity among two or more suppliers if necessary and the same rates as quoted/negotiated shall apply.
- 6) Supply shall be made at the College of Engineering Muttathara, Thiruvananthapuram.
- 7) Installation, Testing and commissioning will be supervised by the Principal, College of Engineering Muttathara or any other person designated by the Principal and on the basis of the certificate of satisfactory completion from Principal final Payment to the supplier shall be effected. Part payment will be considered on the basis of the report of the Principal of the college in unavoidable circumstances.
- 8) The entire supply shall be completed within **30 days** of date of supply order.

#### **QUALIFYING REQUIREMENT FOR BIDDERS**

Bids will be accepted from the bonafide manufactures/Agents or their direct authorized dealers only if the bidder is the original manufacturer, he should be sourcing the components/part systems. If dealer, the valid authorization/dealership certificate should be produced. For agents necessary proof of agency should be produced. The bidders, for the maintenance of supplied items should have adequate service facility in Kerala. The issue of these tender documents shall not be considered as evidence of acceptance by the College of the technical spec. and service competence of the tenderer. The decision of the Principal regarding the acceptability of the firm based on the documents submitted with the offer will be final and no correspondence will be entertained in this regard.



10) In case the tenderer/supplier fails to supply any of the items ordered within the time provided for delivery, or the supplier commits any breach of the contract, it shall be lawful to the College to arrange for the purchase of the said items and things from elsewhere or to cancel the contract at the risk and cost of the supplier.

11) No representation for enhancement of rates once accepted will be considered. The contractor/Supplier shall be responsible to make good any loss/damage of the equipment which has occurred during transportation without any extra cost to College.

12) The College reserves the right to cancel the order in part or in full by giving one week advance notice by registered post if:

The supplier fails to comply with any of the terms of the order.

The supplier becomes bankrupt or goes in to liquidation of the creditor.

Any receiver is appointed for the property owned by the supplier.

13) If upon delivery at site, it is found that the equipment/components (inspected and approved earlier or otherwise) are not in conformity with the specification, the same shall be rejected by the College and notification to this effect shall be issued to the supplier.

The supplier shall arrange removal of the rejected items within 15 days failing which the College shall be at liberty to dispose of such rejected items in any manner as it may think fit. All expenses incurred by the College in disposing of the rejected items including money paid to the supplier shall be recoverable from the supplier.

#### 14) Guarantee

The supplier shall ensure that all equipment/components/services supplied or services rendered under the contract shall conform to the College requirements and specifications. The supplier shall guarantee the equipment supplied and services rendered under the order for a minimum period as mentioned with the specification of item years for all items from the date of installation. The supplier shall replace any material, which has proved defective or failed to conform to the desired specifications, free of cost to the College, with minimum guarantee as stated above.

In case the equipment supplied and commissioned by the contractor does not meet the performance requirements as per specifications and documents, the contractor shall be liable to pay to the College, actual damages or compensation as assessed by it.

#### 15) Acceptance of Terms & Conditions

The supplier must confirm their acceptance of the terms and conditions mentioned herein above.

16) No arbitration is applicable for this purchase and connected matters. Disputes, if any, will be settled in appropriate civil courts situated in Thiruvananthapuram.

  
PRINCIPAL(i/c)



**COLLEGE OF ENGINEERING MUTTATHARA**  
(Under the Co-operative Academy of Professional Education, Estd. by Govt. of Kerala)  
St. Sebastian Church Road, Vallakkadavu P.O., Thiruvananthapuram - 695 008

**TENDER FORM**

Tender No. P- 511/2018/CEMT/PE & D Lab: EEE-01/Dec-2022"

Tender Documents for supply of Equipment in Power Electronics Lab in Electrical and Electronics Engineering  
Department at College of Engineering Muttathara

ISSUED TO:

ISSUED ON:

TO BE SUBMITTED ON OR BEFORE .....

*(To be filled by the Tenderer and to be attached along with their price offer including GST)*

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NAME OF TENDERER IN FULL :

ADDRESS OF THE TENDERER :

TIN No. of the Tenderer :

PAN No. of the Tenderer :

Phone :

Fax:

TENDER SUBMISSION ON :

Contd....



I / We hereby agree to supply, under the annexed general conditions of contract, the whole or the articles referred to and described in the attached specification and schedule, or a part thereof as may be decided by the purchaser at the rates quoted against the item. The articles will be delivered within the time and at the place specified in the schedule published vide "P- 511/2018/CEMT/PE & D Lab: EEE-01/Dec-2022"

I /.We am / are remitting / have separately remitted the required amount of Rs. .... as earnest money deposit.

(Name) ..... (Signature) .....

(Address) ..... (Seal of the firm)  
.....  
.....  
.....

Date .....

LIST OF ENCLOSURES:

1. EMD
  2. Agreement
  3. Others
-



## ITEM FINANCIAL PROPOSAL

Bidder Name								
Price Schedule								
Sl. No.	Items	Specifications	Quantity	Unit	Rate (including GST)	% of GST	Total	Total amount in words
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Grand Total: .....

Amount in words: .....

Whether samples essential: to be produced on request

Period within which goods should be delivered: ..... days from the date of supply order.

Rates should be quoted for delivery: As per special condition and specification attached.

Other special conditions: Attached

Date

Signature of Tenderer



## College of Engineering Muttathara

Department of Electrical & Electronics Engineering - Power Electronics Lab items list

SL. NO.	ITEM DESCRIPTION	QTY.	RATE / UNIT	TOTAL (Including GST)
1	<b>DC REGULATED DUAL POWER SUPPLY (0- 30V,2A)</b> <ul style="list-style-type: none"><li>• Input : 220-230V AC 50/60Hz</li><li>• Dual DC Output : 0-30V/ 2A</li><li>• Continously variable by means of course and fine controls</li><li>• DC Current : 100Ma to 2A Continously adjustable current limiting facility</li><li>• Ripple and Noise : 1mv RMS</li><li>• Over load Indication</li><li>• Built in over voltage , over load and short circuit protection</li><li>• Two numbers of 3 digit display</li></ul>	2		



2	<p><b>DC REGULATED SINGLE POWER SUPPLY (0-30 V, 3A, ±15V,1A, +5V,3A)</b></p> <ul style="list-style-type: none"> <li>• Input : 220-230V AC 50/60Hz</li> <li>• Dual DC Output : 0-30V/ 3A , ±15V,1A, +5V,3A</li> <li>• Course and fine controls</li> <li>• DC Current : 100Ma to 2A Continously adjustable current limiting facility</li> <li>• Ripple and Noise : 1mv RMS</li> <li>• Over load Indication</li> <li>• Built in over voltage , over load and short circuit protection</li> <li>• One number of 3 Digits displays</li> <li>• side,Knob terminals for AC (3Ph+N), AC MCB (32A) on panel,Digital LCD Speed indicator with encoder interface</li> </ul>	2		
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3	<b>FUNCTION GENERATOR (3MHz)</b> <ul style="list-style-type: none"> <li>• Frequency Range 0.3Hz to 3MHz</li> <li>• Digital Frequency</li> <li>• LCD Readout for frequency &amp; mode</li> <li>• Waveforms : Sine, Square, Triangle, DC</li> <li>• DC-Offset Adjustment</li> <li>• Trigger Output</li> <li>• Internal Sweep &amp; External FM-Modulation</li> </ul>	2		
4	<b>DIGITAL STORAGE OSCILLOSCOPE 70MHz</b> <ul style="list-style-type: none"> <li>• Signal Bandwidth : 70 MHz</li> <li>• Real time sampling:Max 1 GSa/s</li> <li>• Equivalent sampling rate: Max 50 GSa/s</li> <li>• 7.0" TFT LCD Color display</li> <li>• 32 parameters of automatic measurements</li> <li>• Unique Digital Filter &amp; waveform recorder function.</li> <li>• Advanced cursor modes: Manual, Auto &amp; Track</li> <li>• Built-in 70 MHz hardware frequency counter</li> <li>• Save/recall types: Setups, Waveforms, CSV file, Picture, Standard</li> </ul>	1		



5	<b>DUAL TRACE CRO 30MHz</b> <ul style="list-style-type: none"> <li>• Dual Channel, DC to 30MHz Time Base: 20ns- 0.2s</li> <li>• Triggering DC-60MHz (typ.)</li> <li>• Alternate Triggering</li> <li>• Active Sync separator for video signal triggering</li> <li>• Single touch Component Tester for quick testing</li> <li>• semiconductors, individual or in-circuit</li> <li>• Accuracy : <math>\pm 3\%</math></li> <li>• Band Width: DC - 30MHz</li> <li>• Input Impedance: <math>1M\Omega/25pF</math>(approx)</li> <li>• Cathode Ray Tube: 140mm rect. Flat face</li> </ul>		2		
6	Moving Coil Ammeter (0-100 $\mu$ A)	Accuracy : Class 1.0 (1% of full scale value) as per IS 1248/84 between 10% - 100% of the scale	2		
7	Moving Coil Ammeter (0-100mA)		2		
8	Moving Coil Ammeter (0-500mA)		2		
9	<b>AUTO TRANSFORMER (1 Phase 10A, 270V, 50HZ)</b> <ul style="list-style-type: none"> <li>• Continuously Variable With 0-270V</li> <li>• Enclosed Type</li> </ul>		1		



10	<p><b>STATIC CHARACTERISTICS OF SCR</b></p> <ul style="list-style-type: none"> <li>• Built in 0-12V Power Supply in the input side and 0-30V Power Supply in the output side</li> <li>• Provision to connect necessary desk top meters externally</li> <li>• To carryout experiment on VI Characteristics of SCR</li> <li>• To find latching and holding currents</li> <li>• Built in Power Supplies</li> <li>• Fully mounted on a quality cabinet</li> </ul>	1		
11	<p><b>LINE SYNCHRONISED TRIGGER CIRCUIT</b></p> <ul style="list-style-type: none"> <li>• Line Synchronization DC Power Supply Circuit</li> <li>• UJT Relaxation Oscillator Circuit</li> <li>• Provision to add DC Pedestal Voltage to the Capacitor in the Circuit</li> <li>• Triggering Circuit for 2 SCRs using Pulse Transformer</li> <li>• 24V Lamp AC Load using 2 SCRs</li> </ul>	1		
12	<p><b>STATIC CHARACTERISTICS OF MOSFET</b></p> <ul style="list-style-type: none"> <li>• Built in 0-12V Power Supply in the input side and 0-30V Power Supply in the output side</li> <li>• To carryout MOSFET VI Characteristics experiment</li> <li>• Provision to connect necessary desk top meters externally</li> <li>• Fully mounted on a quality cabinet</li> </ul>	1		



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**SINGLE PHASE FULLY CONTROLLED SCR BRIDGE CIRCUIT**

- Four number of TYN612 SCR with heat-sink for Power circuit
- Two number of Power diode
- One number of Digital- Firing circuits with firing angle adjustments (180-0degree)
- Keys for firing angle adjustments
- Four Numbers of Pulse outputs are terminated for external Patching.
- 24V,3Amp AC for power circuit inputs
- One number of power resistor as fixed R Load with terminations for External patching
- One number of Fixed inductor ,as fixed L Load with terminations for External patching
- All necessary test points for external patching
- All are mounted on a nice cabinet with sticker front panel with mimic diagram
- Power circuit Input is 24VAC &230VAC input with power ON/OFF Switch

1

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**SINGLE PHASE SINE PWM INVERTER WITH LC FILTER**

- Carrier wave generation 8 KHz (variable)
- Modulation signal 1 KHz
- PWM Generation according to the Sine Wave
- Modulation index
- Driver Circuit
- 4 nos. of Individual Power Supply for Gate Trigger Circuit
- H Bridge Power Circuit using IGBT
- 24V AC output variable frequency output in resistive load

1



15

**IGBT BASED THREE PHASE PWM INVERTER**

- Digital IC (Dspic4011) based Single phase & 3 Phase PWM generation
- 6 Numbers of PWM Outputs with Frequency & Modulation index variation
- Digital keys for PWM adjustment
- LCD is provided to display PWM Details
- 5 khz Switching frequency operation
- PWM outputs are terminated by front panel Connector
- IGBT power module (Voltage source Inverter)
- 3 Phase Voltage source inverter Power circuit using 6 number of IGBT Rating @ 600V , 20A
- IGBT is fixed with suitable heat sink and snubber circuit for protection
- IGBT Power circuit input and outputs are terminated by suitable rating banana connectors in front panel with necessary indication
- One number of diode rectifier ( 600V @ 35A ) to converter input AC voltage to DC Bus voltage
- DC Capacitor ( centre point type) at diode rectifier output side for Filter.



<ul style="list-style-type: none"> <li>• Six Number of PWM Isolator IC (6N137) is used to isolate All the six PWM signals input</li> <li>• One number of +15V@1amp fixed dc power supply is provided for PWM Isolator input side for power excitation</li> <li>• Built in IGBT Gate Driver (IR2112)is provided in SPM for IGBT Gate signal amplification</li> <li>• Power Circuit Input 0-30V DC</li> <li>• Output : 3 Ø 20V @ 2A , Variable Voltage , Variable frequency</li> <li>• DC Power supply</li> <li>• 0-30V /2A DC Power supply for Power circuit Input</li> <li>• RL Load</li> <li>• 3 Numbers of fixed R &amp; Fixed L load is provided</li> </ul>			
<b>TOTAL</b>			

Re

Smt. Deepthi P.S., Computer operator



Principal  
College of Engineering  
Muttathara  
Thiruvananthapuram