

COLLEGE OF ENGINEERING, CHENGANNUR, KERALA - 689 121.
(Managed by IHRD, A Govt. of Kerala undertaking)

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No. D₂/630/18
01.08.18

Dated :

SHORT TENDER NOTICE

Tender No. 02/2018-19, Setting up of Power System Lab

Last date and time for receipt of : 10.08.18, 2.00 pm
tender
Date and time for opening of : 10.08.18, 3.00 pm
tender
Date upto which the rates are to be : 30.03.19
firm
Price of tender form : Rs. 1,000/- + ST Rs. 180/-
Price of Duplicate copy : Rs. 500/- + ST Rs. 90/-
Address of Purchasing Officer from : The Principal
whom tender forms are to be : College of Engineering,
obtained and to whom tenders are : Chengannur
to be sent : Kerala 689 121
EMD : 1% of amount quoted

Tender documents can be had from the Principal on payment of the prescribed cost at the counter in cash or by post (postage extra Rs. 35/- for one tender form) sending a DD for the amount payable at Chengannur in favour of the Principal, College of Engineering, Chengannur - 689 121. Details will be available in College website: <http://www.ceconline.edu>

P R I N C I P A L

Tender No. 02/2018-19, Setting up of Power System Lab

Sl · N o	Item	Specification	Quantity required
1	IDMT over current relay	<p>Electromechanical type IDMT over current relay test set-up consists of</p> <ol style="list-style-type: none"> 1. One no current source set up. 2. One no Electromechanical based IDMT over current relay. <p>Current source test setup:</p> <ol style="list-style-type: none"> 1. One no of current Source provided (0 to 50A). 2. Continuous variable. 3. 50A ammeter provided for measure relay current. 4. One no of 1 phase auto transformer provided. 5. One no of fuse provided. <p>Electromechanical based IDMT over current relay:</p> <p>Features:</p> <ul style="list-style-type: none"> ❖ Single phase non directional over current relay with inverse definite minimum time (IDMT) characteristics. ❖ Current rating :5A ❖ Current Multiplier plug setting. ❖ Time multiplier setting provided. ❖ One no of 50/5A CT provided for measure the current. ❖ Single phase non directional over current relay with inverse definite minimum time (DMT) characteristics. ❖ One no of digital timer provided. <p>Specification:</p> <ul style="list-style-type: none"> ❖ Auxiliary voltage range :230v AC ❖ Relay make: megawin ,alstorm, areva. ❖ Relay rated current: 5A ❖ Contact rating :ac 250v@10A <p>Experiment details:</p>	1 set

		<ul style="list-style-type: none"> ❖ Study & testing of over current relay IDMT type with different current & time setting multiplier. <p>Plotting of IDMT characteristics of over current relay.</p>	
2	Electromechanical based IDMT under voltage relay	<p>Electromechanical type IDMT under voltage relay test set-up consists of</p> <ol style="list-style-type: none"> 1. One number of voltage source set up. 2. One number of Electromechanical based IDMT under voltage relay. <p>Voltage source test setup:</p> <ol style="list-style-type: none"> 1. One number of voltage Source provided (0 to 270 V). 2. Continuous variable. 3. 300v voltmeter provided for measure relay voltage. 4. One number of 1 phase auto transformer provided. 5. One number of fuse provided. <p>➤ Electromechanical based IDMT under voltage relay:</p> <p>Features:</p> <ul style="list-style-type: none"> ❖ Single phase non directional under voltage relay with inverse definite minimum time (IDMT) characteristics. ❖ Voltage rating :110v ❖ Voltage Multiplier plug setting. ❖ Time multiplier setting provided. ❖ One number of 230/110V CT provided for measure the voltage. ❖ Single phase non directional under voltage relay with inverse definite minimum time (IDMT) characteristics. ❖ One number of digital timer provided. <p>Specification:</p> <ul style="list-style-type: none"> ❖ Auxiliary voltage range :230v AC ❖ Relay make: megawin , alstorm, areva. ❖ Relay rated voltage: 110v 	1 set

		<ul style="list-style-type: none"> ❖ Contact rating :ac 250v@10A <p>Experiment details:</p> <ul style="list-style-type: none"> ❖ Study &testing of under voltage relay IDMT type with different voltage & time setting multiplier. <p>Plotting of IDMT characteristics of under voltage relay</p>	
3	Electromechanical based IDMT over voltage relay	<p>Electromechanical type IDMT over voltage relay test set-up consists of</p> <ol style="list-style-type: none"> 1. One no of voltage source set up. 2. One no of Electromechanical based IDMT over voltage relay. <p>➤ Voltage source test setup:</p> <ol style="list-style-type: none"> 1. One no of voltage Source provided (0 to 270 V). 2. Continuous variable. 3. 300v voltmeter provided for measure relay voltage. 4. One no of 1 phase auto transformer provided. 5. One no of fuse provided. <p>Electromechanical based IDMT over voltage relay: Features:</p> <ul style="list-style-type: none"> ❖ Single phase non directional over voltage relay with inverse definite minimum time (IDMT) characteristics. ❖ Voltage rating :110v ❖ Voltage Multiplier plug setting. ❖ Time multiplier setting provided. ❖ One no of 230/110V CT provided for measure the voltage. ❖ Single phase non directional over voltage relay with inverse definite minimum time (IDMT) characteristics. ❖ One no of digital timer provided. <p>Specification:</p> <ul style="list-style-type: none"> ❖ Auxiliary voltage range :230v AC ❖ Relay make: megawin ,alstom, areva. 	1 set

		<ul style="list-style-type: none"> ❖ Relay rated voltage: 110v ❖ Contact rating :ac 250v@10A <p>Experiment details:</p> <ul style="list-style-type: none"> ❖ Study &testing of over voltage relay IDMT type with different voltage & time setting multiplier. Plotting of IDMT characteristics of over voltage 	
4	Ferranti Effect demonstration trainer:	<ol style="list-style-type: none"> 1. Generating station module. 2. Transmission line module (short,medium,long). 3. RLC loading module. 4. Protection relay and ABCD parameter calculating module. 5. PC interface <p>1. Generating station module:</p> <ul style="list-style-type: none"> ❖ Input voltage: 230v AC 1 phase . ❖ Output voltage :110v Ac/2A. ❖ One no of 1 phase 2A autotransformer provided. ❖ One no of digital voltmeter provided. ❖ One no of digital ammeter provided. <p>2. Transmission line module:</p> <ul style="list-style-type: none"> ❖ 180km long transmission line used this line. ❖ Medium transmission line T network & PI network provided. ❖ Long transmission line PI network provided. <p>3. Loading module:</p> <ul style="list-style-type: none"> ❖ One no of lamb load provided. ❖ One no of inductive load provided. ❖ One no of digital voltmeter provided. ❖ One no of digital ammeter provided. <p>4. Protection and ABCD parameter calculating module:</p> <ul style="list-style-type: none"> ❖ One no of over current relay provided. ❖ One no of over voltage relay provided. ❖ Transmission line A,B,C,D values calculated using by microcontroller. <p>5. Pc interface module:</p>	1 set

- ❖ Mention above the all the modules control by VEE pro software through computer.

Experiment details:

- Demonstration of Ferranti Effect.
- ABCD parameter.
- Determination of surge impedance load (SIL).
- Demonstration of power factor improvement.
- Line Efficiency and Losses.
- Voltage regulation.
- Study of over current relay.
- Study of over voltage relay.

(OR)

3 phase transmission line:

250Watts Power transmission line consists of

1. Generating station module.
2. 220KV simulated transmission line module.
3. Receiving station module.
4. Fixed VAR compensation module.
5. RLC loading module.
6. Protection relay and ABCD parameter calculating module.
7. PC interface module.

1. Generating station module:

- ❖ Output voltage: 415v AC 3 phase (line voltage).
- ❖ Input voltage: (0-110- 230) v 3 phase (phase voltage) .
- ❖ One no of MFM provided for measure input electrical parameters.

2. 220KV simulated transmission line module:

- ❖ 180 km long transmission line provided (RLC combination).
- ❖ 6 no of pi section provided.
- ❖ Each 30 km 1 pi section.
- ❖ Short , medium , long transmission line used this line.
- ❖ Each 30 km termination provided.
- ❖ Two no's of multifunction meter provided for measure

sending end and receiving end electrical parameter (V,I,F,PF,KW,KVAr).

3. Receiving station module:(distribution)

- ❖ Output voltage: (55-110-180-230v)/1.6 A 3 phase AC.
- ❖ Input voltage: 415v 3 phase.
- ❖ One no of frequency and over voltage relay provided.
- ❖ Voltage setting and time setting user changeable.
- ❖ DMT and IDMT time settings provided.

4. Fixed VAR compensation module:

- ❖ Three no's of shunt reactor compensation.
- ❖ Three no's of series reactor compensation.
- ❖ Three no's of shunt capacitor compensation.

5. Loading module:

- ❖ Three phase resistive load provided.
- ❖ Three phase 0.5HP AC induction motor with loading setup provided.

6. Protection and ABCD parameter calculating module:

- ❖ One no of over current relay provided.
- ❖ One no of over voltage relay provided.
- ❖ One no frequency relay provided.
- ❖ Transmission line A,B,C,D values calculated using by microcontroller.

7. Pc interface module:

- ❖ Mention above the all the modules control by VEE pro software through computer.

Experiment details:

- Demonstration of Ferranti Effect.
- ABCD parameter.
- Determination of surge impedance load (SIL).
- Line Efficiency and Losses.
- Voltage regulation.
- Line Compensation and Load Compensation

		<p>Studies.</p> <ul style="list-style-type: none"> ➤ Demonstration of power factor improvement. ➤ Study of over current relay. ➤ Study of over voltage relay. ➤ Study of under voltage relay. ➤ Study of frequency relay. ➤ Fault analyzes the transmission line. ➤ Draw the characteristics of IDMTtime for all relays. 	
5	Power factor improvement setup: SEPERATE TRAINER	<p>Microcontroller based power factor correction consists of</p> <ol style="list-style-type: none"> 1. One no of microcontroller based power factor correction module <p>Load setup</p> <ol style="list-style-type: none"> 2. One no of 3 phase o.5 hp ac induction motor with loading arrangements provided. <p>Micro controller based power factor correction module: Features:</p> <ul style="list-style-type: none"> ❖ One no of multi function meter provided for measure power factor. ❖ Power factor range: lead 0.7 to lag 0.7 pf. ❖ Contact terminal provide front panel. ❖ One no of dspic 4011 controller used. ❖ One no of LCD provided for show the digital values. ❖ Five no's of key's used for select options. ❖ One no of MCB provided. ❖ Mention the all components inside the metal cabinet. <p>Specification:</p> <ul style="list-style-type: none"> ❖ Auxiliary voltage range :85v-275v ac/dc ❖ Rated power factor : -0.7 to +0.7 PF ❖ Contact rating :ac 250v@10A 	1 set
6	Single phase chopper drive	<p>a)Four Quadrant Chopper FED DC Drive</p> <p>Specification</p> <ul style="list-style-type: none"> ❖ 600V/ 15A, Peak, IGBT with driver circuit with 	1 set

proper

heatsink and snubber circuit used to form power circuit

- ❖ 600v/30A diode with heatsink used for freewheeling
 - ❖ One no hall effect current sensor used to sense the dc link current
 - ❖ One no hall effect current sensor used to sense the Armature current
 - ❖ Over Current Protection .
 - ❖ Fixed Field supply
 - ❖ Single Phase Input
 - ❖ All I/p and O/P connectors terminated in front panel
 - ❖ Pwm and current signals terminated in test points.
user can view the waveforms
 - ❖ 60V/35A Bridge rectifier for convert Ac into DC Rail
 - ❖ One no of 2200microfarad/450v dc link capacitor will be used
 - ❖ Igbt switching frequency----20khz max
- INPUT VOLTAGE-----1PH 230V AC OR 300V

DC

OUTPUT VOLTAGE-----0-220V VARIABLE DC

O/P POWER -----1000W

DSPIC30F4011 MICRO CONTROLLER:

The dsPIC30F has many peripherals that allow the device

to be interfaced to the external world. The external peripherals are,

1. I/O Ports
2. Timers
3. Input Capture Module
4. Output Compare Module
5. Quadrature Encoder Interface (QEI)
6. 10-bit A/D Converter

Device Configuration

- ❖ Operating Voltage: +5v
- ❖ Operating Frequency:40MHz
- ❖ On chip 48k flash Memory
- ❖ Four compare unit
- ❖ Six PWM pulses to control the switching devices that are connected with RMC connector.

Four channels ADC With 10bit.16x2 LCD display

- Motor speed can run in both direction

PMDC MOTOR SPECIFICATIONS:

- # Power : 1hp PMDC motor

		<ul style="list-style-type: none"> ➤ # Armature voltage : 180VDC, Amp ➤ # Speed : 1500 rpm ➤ # Double side shaft extension. <p># Make : Pranshu SPEED SENSOR----- Proximity sensor used.</p>	
7	V/F CONTROL OF 3PH AC INDUCTION MOTOR	<p>V/F control will be used to control speed of the motor.</p> <p>a)1KW IGBT BASED THREE PHASE VOLTAGE SOURCE INVERTER</p> <p style="text-align: center;"><i>This three phase voltage source inverter is capable to run the three phase induction motor, BLDC motor, PMSM motor and DC motor.</i></p> <p>MODEL NUMBER: FEATURES:</p> <ul style="list-style-type: none"> ❖ Six numbers of IGBT s are used to form the power circuit. ❖ One number of uncontrolled diode bridge rectifier will convert the input AC voltage into DC voltage, this DC voltage is displayed in the front panel with the help of voltmeter. ❖ The three phase IGBT based Voltage source inverter circuit is displayed in the front panel. ❖ This power module consists of over current protection. ❖ The protection circuit is enabled with one number of LED indications to indicate the over current. ❖ One number of reset key is provided to reset the power module for over current protection. ❖ One no of fuse is provided to avoid the over current problem. ❖ Over load trip circuit is provided to prevent the power module and the motor drive. ❖ All the test points are provided in the front panel so that the viewer can easily absorb all the waveforms. ❖ The PWM pulses are terminated in the front panel, so we can see the PWM pulses easily. ❖ Four number of Hall Effect current sensors are provided to sense the input DC link current and the three phase output current. 	1 set

		<ul style="list-style-type: none"> ❖ The driver circuit is used and the six opto isolators are used to separate the low voltage and high voltage ground. ❖ The FRC connector is provided in the front panel to interface the PWM output from the digital processors like Micro controller/DSP/FPGA controllers. ❖ The banana connectors are terminated in the power module to connect the input and Output terminals. ❖ Igbt switching frequency----20khz max. <p style="text-align: center;">INPUT 230V,50Hz,AC Supply or 300vDC OUTPUT:200V/5A (MAX), AC/DC on each Leg of 3 phase Bridge</p> <p>DSPIC30F4011 MICRO CONTROLLER: The dsPIC30F has many peripherals that allow the device to be interfaced to the external world. The external peripherals are,</p> <ol style="list-style-type: none"> 1. I/O Ports 2. Timers 3. Input Capture Module 4. Output Compare Module 5. Quadrature Encoder Interface (QEI) 6. 10-bit A/D Converter <p>Device Configuration</p> <ul style="list-style-type: none"> ❖ Operating Voltage: +5v ❖ Operating Frequency:40MHz ❖ On chip 48k flash Memory ❖ Four compare unit ❖ Six PWM pulses to control the switching devices that are connected with RMC connector. ❖ Four channels ADC With 10bit. ❖ 16x2 LCD display. <p>*V/F control program will be given for control the ac induction motor</p> <p>AC INDUCTION MOTOR WITH SPRING BALANCE LOAD</p> <p style="text-align: center;">POWER-----1HP VOLTAGE----200V DELTA CONNECTION SPEED-----1440rpm LOAD-----spring balance load Speed sensor----PROXIMATEY sensor used</p>	
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1. Rate: Should be inclusive of all taxes and duties.
2. Delivery should be made at site College of Engineering, Chengannur
3. Warranty :- 1 year with after sales support
4. Payment : 100% after successful testing
5. Security Deposit : 5% of the contract amount

PRINCIPAL