

DEPARTMENT OF ELECTRICAL ENGINEERING  
INDIAN INSTITUTE OF ENGINEERING SCIENCE AND TECHNOLOGY,  
SHIBPUR, HOWRAH-711 103.

No. 173/2020/EE-3/21(KM\_MCL)

Dated: 28/02/2020

From : The Head of the Department,  
Electrical Engineering,  
IEST, Shibpur, Howrah-711 103

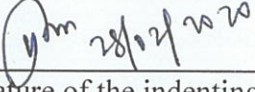
To : Enlisted vendors of the institute and other interested parties/ For Website Tender.

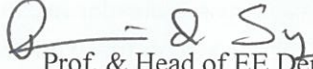
Dear Sir(s),

Sealed quotations are invited for supply of the following item(s) within 12/03/2020. The quotation should include the taxes as per rule, delivery charges, entry tax if any, etc. to Indian Institute of Engineering Science and Technology, Shibpur and should mention a firm delivery period. Preferences will be given to the suppliers who can supply ex-stock.

The vendors, who are not enlisted in the Institute register, should submit the copies of their valid Trade License, PAN, latest Income Tax / Sales Tax Statement /Return, SSI/MSME certificate, GST certificate if any etc. and any other commercial credentials.

Yours faithfully,

  
Signature of the indenting Officer/  
Concerned Faculty Member

  
Prof. & Head of EE Dept.  
IEST, Shibpur, Howrah – 711 103

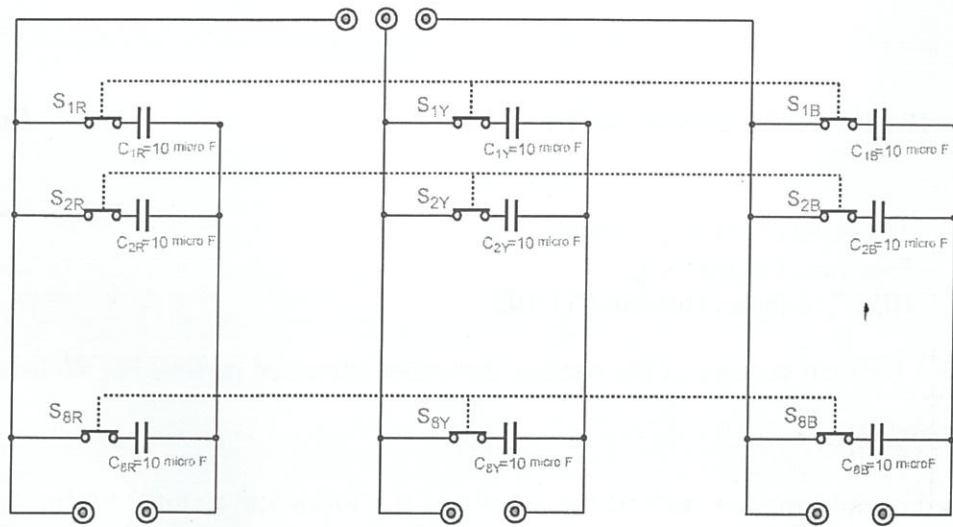
**List of Items:** Required for Electrical Machines laboratory, IEST Shibpur:



Prasid Syam  
Professor & Head  
Electrical Engineering Deptt.  
Indian Institute of Engineering Science  
and Technology, Shibpur  
Howrah-711 103

THREE sets (Final quantity may vary as per fund available, quote must be provided on a per unit basis) of Switched AC Capacitor bank, 50 Hz, 3-phase, 12 kVA, 400V per phase, are to be supplied as per the following specifications:

- (1) The said bank should be made as per the circuit diagram given in Fig. SW\_CAP\_BANK below:  
(indoor installation inside a laboratory environment with room temperature of about 40 deg C)



3-PHASE CAPACITOR BANK

Fig. SW\_CAP\_BANK : Power circuit diagram of the Switched AC Capacitor bank

As given in Fig. SW\_CAP\_BANK, the switched AC capacitor bank should consist of 3 legs (corresponding to 3 phases) , namely, R, Y and B. Each leg should have 8 AC capacitors, in parallel with each other. Therefore, totally 24 such capacitors are required. Across each capacitor, a bleeder resistor of 33k, 10W should be connected. With each capacitor, a switchgear normally open (NO) contact should be present in series, as shown. The switchgear contact in series with the first capacitor for the 'R' leg has been named as  $S_{1R}$  in the figure. Similarly, the switchgear contact in series with the first capacitor for the 'Y' leg has been named as  $S_{1Y}$  and the switchgear contact in series with the first capacitor for the 'B' leg has been named as  $S_{1B}$  in the figure. Now, the switchgear contacts  $S_{1R}$ ,  $S_{1Y}$ ,  $S_{1B}$  should be switched on or off at the same time, i.e. they should be poles of a 3-pole MCB (miniature circuit breaker). Similarly,  $S_{2R}$ ,  $S_{2Y}$ ,  $S_{2B}$  should be switched on or off at the same time, i.e. they should be poles of a second 3-pole MCB;  $S_{3R}$ ,  $S_{3Y}$ ,  $S_{3B}$  should be switched on or off at the same time, i.e. they should be poles of a third 3-pole MCB and so on. As there are 8 numbers of parallel paths for each leg, totally, 8 no.s of MCBs, to be named as  $MCB_1$ ,  $MCB_2$ , ..... $MCB_8$ , should be provided. The whole wiring has to be done as per given Fig. SW\_CAP\_BANK with PVC copper wire of requisite cross-sectional area. Terminals shown in the figure as I/P1, I/P2, I/P3 and R1, R2, Y1, Y2, B1, B2 should be 15A rugged terminals which should be brought out for customer's access.

- (2) The whole setup should be provided within a rugged enclosure with the above-mentioned circuit diagram engraved/silk-screen printed on it. Proper care must be taken to insulate the casing/enclosure body from the electrical components placed inside so that the



setup is safe from shock hazards. The enclosure should be provided with rugged wheels for ease of transportation. The electrical items inside the enclosure should be firmly fitted with clamp structures inside. Two Earthing bolts/nuts should be provided on the enclosure.

- (3) The specifications of each AC capacitor should be as follows:  
EPCOS/TDK make type number B32330 / B32332 or equivalent reputed make,  $10 \mu\text{F} \pm 5\%$ , 450V RMS AC, 50/60 Hz sinewave AC applications, metallized polypropylene film capacitors, with Aluminium can and plastic top, with self-healing properties, low dissipation factor, with overpressure disconnection safety device, S2 safety class as per IEC-60252-1(ed-2)am1, with high insulation resistance, as per reference standards DIN EN 60252-1:2014-07, IEC 60252-1 (ed 2) am1 UL 810. Maximum permissible voltage and currents should be at least 10% more than declared rated values. AC test voltages terminal-to-terminal should be two times rated voltage, AC test voltages terminal-to-can should be 2kV AC at least, maximum rate of  $dv/dt$  should be  $10\text{V}/\mu\text{s}$ .
- (4) The specifications of each miniature circuit breaker (MCB) should be as follows:  
Legrand make,DX3 triple pole (TP) MCB suitable for capacitor switching/equivalent, 6A, C-type, 400V, suitable for switching 1 kVAR capacitor bank, 50/60 Hz, 20000 operations (minimum) without load mechanical endurance, 10000 operations (minimum) with load electrical endurance, as per IS/IEC 60898-1 2002 standard, breaking capacity at least 10 kA as per IS/IEC 60898. Manufacturer's test certificate must be provided during supply, if order placed on vendor.
- (5) Internal wiring should be done by employing FINOLEX/EVERSHINE KDK/HAVELLS/reputed make 1.1 kV grade PVC stranded copper wires of 1.5 sq.mm and 4 sq.mm size.
- (6) During supply of items, load test, megger and high voltage test will be performed by the customer before final acceptance.
- (7) The whole setup with its components must have a warranty of at least one year.