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

No. 86/2018/EE-3/21(KM) Dated: 26/12/2018

From : The Head of the Department,
Electrical Engineering,
IIEST, 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 **21 days** from the date of publication of this advertisement in the website. The quotation should include the 5% GST only as per institute rule, delivery charges, entry tax if any, etc. to Department of Electrical Engineering, 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, GST registration, PAN, latest Income Tax / Sales Tax Statement /Return, SSI/MSME certificate, if any etc. and any other commercial credentials. The institute will provide concessional GST rate certificate with the purchase order and will pay 5% GST only.

Yours faithfully,

Please put your digital/scanned signature
Signature of the indenting Officer/
Concerned Faculty Member

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

Item No.: Specifications

PEL#1: DC-DC buck converter kits – Qnty: 2 No. (approx)

Two DC-DC buck converter (MOSFET/IGBT based) kits are required, each should have the following important features:

1) The kit will be powered from a 0-32V, 0-10A linear regulated DC power supply and this will be provided by user and is not within scope of supply of the vendor but this information should be kept in mind while designing the kit.
2) The DC-DC buck converter kit's power circuit should follow that of a wired conventional DC-DC buck converter and should contain (i) a suitable input DC capacitor bank of 1000 µF, 100V (a combination of electrolytic capacitor and high frequency snubber capacitor) of around 15A ripple current rating (ii) power MOSFET/IGBT of at least 40A/200V rating (ii) compatible ultra-fast recovery diode of 40A/200V rating (iii) high frequency ferrite based output DC choke of 400µH, 12A RMS, 14A peak rating (iv) output DC capacitor bank (electrolytic plus high frequency

snubber capacitors) of 150 μF, 80V, 12A ripple current rating. Please note that the user will connect his/her own resistive loads of 5-40Ω, 6A at the output terminals of the buck chopper for operation. These loads are not within the scope of supply of the vendor; however, these are mentioned so that the vendor can design the kit properly. Discrete devices or modules can be used to realize the power MOSFET/IGBT. The layout of the power circuit should be efficiently designed/built in an optimal way so that stray inductances of busbar are minimum. Suitable snubber has to be designed and connected across the solid state power devices, as required. Two numbers of Hall effect based current sensors, LEM 25-NP, should be provided, one to show the inductor current waveform and the other to show the MOSFET/IGBT current waveform to the user. The power circuit should be internally wired and each node should be brought out through suitable 10A terminals (with lock nut facility) on the front panel of the kit for user's access, connectivity with load and for viewing waveforms. A fast glass fuse of 6A should be provided in series with the output/load terminal of the kit for protection.

3) The control circuit of the kit should be in a PCB and should house an SG3524 discrete IC based pulse generation system for the power MOSFET/IGBT. The IGBT should be switched at a frequency of 5 kHz. Provisions should be present to adjust the switching frequency within a range of ±10% of the above rated value, without affecting the duty cycle. A POT should be mounted on the front panel for setting the frequency by the user. The duty cycle of the same pulse, on the other hand, should be adjustable in the range of 0.1 to 0.85 (approx.), without affecting the switching frequency. Another POT should be mounted on the front panel for setting this duty cycle by the user. The driver stage should be supplied from an isolated power supply. The driver stage with proper electrical isolation should be properly designed and built/connected inside with overload, short circuit and driver power supply under-voltage protection features. The (isolated) control circuit ground terminal, the switching signal for the MOSFET/IGBT with respect to the control circuit ground and the gate-cathode/emitter terminals of the MOSFET/IGBT should be all brought out through proper terminals in the front panel of the kit for access by the user for viewing waveforms. A separate switch, fuse, indicating LED/light along with plug and wires should be there in the kit which would power up the control and driver circuit. This power should be drawn from single phase 230V, 50 Hz utility available at user's premises.

4) The whole kit should be housed inside a rugged enclosure with at least one face made up of transparent material so that user can physically see the components inside. The front panel/face of the kit should be made out of a hard material and should have a silk-screen printing based drawing of the power and control circuit of the DC-DC buck converter with terminals, as mentioned earlier.

5) The offer from the vendor should be such that the customer gets a conviction that the vendor has technically performed some system engineering and preliminary design behind framing his/her offer. Upon receipt of the offer from the vendors, before deciding their technical compliance, they might be called by the customer for a presentation followed by a question/answer session to assess the technical capability of the vendor and to understand whether the vendor has understood the customer's requirements properly.

Warranty requirements: 1 year at least.

PEL#2: DC-DC boost converter kits – Qnty: 2 No. (approx)

Two DC-DC boost converter (MOSFET/IGBT based) kits are required, each should have the following important features:

1) The kit will be powered from a 0-16V, 0-10A linear regulated DC power supply and this will be provided by user and is not within scope of supply of the vendor but this information should be kept in mind while designing the kit.

2) The DC-DC boost converter kit's power circuit should follow that of a wired conventional DC-DC boost converter and should contain (i) a suitable input DC capacitor bank of 1000 μF, 100V (a combination of electrolytic capacitor and high frequency snubber capacitor) of around 15A ripple current rating (ii) power MOSFET/IGBT of at least 40A/200V rating (ii) compatible ultra-fast recovery diode of 40A/200V rating (iii) high frequency ferrite based output DC choke of 400μH, 12A RMS, 14A peak rating (iv) output DC capacitor bank (electrolytic plus high frequency snubber capacitors) of 150 μF, 200V, 12A ripple current rating. Please note that the user will connect his/her own resistive loads of 5-40Ω, 6A at the output terminals of the boost chopper for operation. Hence these loads are not within the scope of supply of the vendor; however, these are mentioned so that the vendor can design the kit properly. Discrete devices or modules can be used to realize the power MOSFET/IGBT. The layout of the power circuit should be efficiently designed/ built in an optimal way so that stray inductances of bus-bar are minimum. Suitable snubber has to be designed and connected across the solid state power devices, as required. One number of Hall effect based current sensor, LEM 25-NP, should be provided, to show the inductor current waveform. The power circuit should be internally wired and each node should be brought out through suitable 10A terminals (with lock nut facility) on the front panel of the kit for user's access, connectivity with load and for viewing waveforms. A fast glass fuse of 6A should be provided in series with the output/load terminal of the kit for protection.

3) The control circuit of the kit should be in a PCB and should house an SG3524 discrete IC based pulse generation system for the power MOSFET/IGBT. The IGBT should be switched at a frequency of 5 kHz. Provisions should be present to adjust the switching frequency within a range of ±10% of the above rated value, without affecting the duty cycle. A POT should be mounted on the front panel for setting the frequency by the user. The duty cycle of the same pulse, on the other hand, should be adjustable in the range of 0.1 to 0.85 (approx.), without affecting the switching frequency. Another POT should be mounted on the front panel for setting this duty cycle by the user. The driver stage should be supplied from an isolated power supply. The driver stage with proper electrical isolation should be properly designed and built/connected inside with overload, short circuit and driver power supply under-voltage protection features. The (isolated) control circuit ground terminal, the switching signal for the MOSFET/IGBT with respect to the control circuit ground and the gate-cathode/emitter terminals of the MOSFET/IGBT should be all brought out through proper terminals in the front panel of the kit for access by the user for viewing waveforms. A separate switch, fuse, indicating LED/light along with plug and wires should be there in the kit which would power up the control and driver circuit. This power should be drawn from single phase 230V, 50 Hz utility available at user's premises.

4) The whole kit should be housed inside a rugged enclosure with at least one face made up of transparent material so that user can physically see the components inside. The front panel/face of the kit should be made out of a hard material and should have a silk-screen printing based drawing of the power and control circuit of the DC-DC boost converter with terminals, as mentioned earlier.

5) The offer from the vendor should be such that the customer gets a conviction that the vendor has technically performed some system engineering and preliminary design behind framing his/her offer. Upon receipt of the offer from the vendors, before deciding their technical compliance, they might be called by the customer for a presentation followed by a question/answer session to assess the technical capability of the vendor and to understand whether the vendor has understood the customer's requirements properly.

Warranty requirements: 1 year at least.