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**ITER-India. Institute for Plasma Research**

Block A, Sangath SKYZ, Bhat- Motera Road, Koteswar, Ahmedabad 380005 Gujarat, India.

Ph.No. : +91-79-23269656/9575 FAX : +91-79-23269591 / 9501

Email : purchase@iter-india.org

**ENQUIRY - FOREIGN**

OFFICE COPY                      ENQUIRY NO                      : I-IEF19009  
Date                                      : 30/08/2019  
Due Date                                : 24/09/2019 by 5:00 PM (IST)

We invite your rate/s for the following item/s. The Instructions to bidders and Terms & Conditions are attached herewith.

**Important Note :**

1. Please Send your offer, ALONG WITH DESCRIPTIVE LITERATURE / CATALOGUE for the following items which we are interested to import directly against Foreign Trade Policy 2015-2020. Kindly go through the terms & conditions printed overleaf. Please ensure that your quotation reaches this office not later than above mentioned due date.
2. If Indian Agents are submitting the quotation on behalf of their Principal they should furnish the following documents without which their quotation is liable for rejection. a. Copy of Latest and Valid Authorization Certificate issued by their Principal. b. Copy of Proforma Invoice submitted by their Principal indicating the commission payable to the Indian agent, nature of after sale service to be rendered by the Indian agent. c. Copy of the Agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business. d. Indian agent who desire to quote directly on behalf of their foreign principals shall be enlisted with the Central Purchase Organisation (eg. DGS&D) under the compulsory enlistment scheme of the Ministry of Finance. Proof of enlistment to be submitted in the bid.
3. If Packing Materials are of any kind of Plant Origin, valid Phytosanitary Certificate issued by an Authorised Officer at the Country of Origin of the consignment in the format prescribed under the International Plant Protection Convention of the Food and Agricultural Organization shall be sent along with the shipping documents. This is a mandatory requirement under Law enacted by the Govt. Of India. Deviation from this may result in holding of the consignment at customs causing delays which will be the sole responsibility of supplier.
4. ITER-India, IPR is entitled to avail concessional rate of GST @ 5% (2.5% CGST and 2.5% SGST) as per Central Goods and Service Tax (CGST) Notification No. 45/2017-Central Tax (Rate) dated 14th November, 2017, State Goods and Service Tax (SGST) Notification No. 45/2017 – State Tax (Rate) dated 15th November, 2017 and IGST @ 5% as per Notification No. 47/2017-Integrated Tax (Rate) dated 14th November, 2017 for supply of Goods. Therefore, please consider GST in your quotation accordingly.
5. Customs Duty Exemption Certificate: ITER-India can provide Custom Duty Exemption Certificate (CDEC) under the notification no. 39/96 dated 23/07/1996 as amended by notification no. 5/2012 - custom dated 07/02/2012 (s. no.37) in order to avail such exemption indian party shall quote in foreign currency only on behalf of their foreign principal/supplier & purchaser shall place the order directly on foreign principal/supplier. All expenses, except customs duty, towards procurement of the imported materials should be borne by the Contractor.

Sr No.	Material Description	Quantity	Unit
1	High Voltage Solid-State Switch including accessories. Please refer the attachment for more details.	1	SET

**Note :**

- (1) Submit your quotation AT THE ABOVE ADDRESS.
- (2) Any clarification on this enquiry may be sought from the Purchase Officer, ITER-India.
- (3) Quote with complete technical details.
- (4) Quotation should invariably be submitted in the attached format (Price Bid format) ONLY else ITER-India may not consider your offer.

- (5) Refer to attached Technical Specifications, Management Specifications and Annexure-1 other details (page 1 to 8). Vendor specifications and compliance column as per table no. 2 to be filled, signed and stamped. This document needs to be submitted along with the offer.
- (6) Bidders are requested to fill the Table-2 in Technical specification (duly signed and stamped) and return back along with the enquiry documents.
- (7) In a tender, either the Indian agent on behalf of the Principal/OEM or Principal/OEM itself can bid but both cannot bid simultaneously for the same item/product in the same enquiry.
- (8) Indian agent shall bid only on behalf of one Principal/OEM
- (9) Purchaser reserves the right to order on either FOB or DAP basis.
- (10) In respect of Indigenous bidders: The price/s quoted should be on Door Delivery and freight paid basis inclusive of cost of packing & insurance.
- (11) Datasheet/Catalogue of the offered items to be submitted along with the offer.
- (12) In respect of Foreign Bidders: The price/s quoted should be on FCA (any international airport in supplier's country) basis as per Incoterms 2010. The price/s quoted should be inclusive of all applicable taxes, levies, duties applicable outside India. The bidder shall also indicate the DAP (ITER-India) charges in terms of % of FCA Price. DAP charges shall be included in the quoted FCA price for evaluation purpose.
- (13) Valid Authorised Dealer certificate to be submitted with the offer in case, the offer is submitted by the dealer.

Encl:- as above



Rakhi Dharamdasani

OFFICER-I (PURCHASE & STORES)

ITER-India (IPR)



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# SUPPLY OF HIGH VOLTAGE SOLID STATE SWITCH UNIT AND ACCESSORIES

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SPECIFICATIONS DOCUMENT



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## 1. Scope of Supply

Scope of supply under this procurement includes the following:

### 1.1. Hardware Deliverables:

S.No	Name of the item	Specifications/Part Number	Quantity
1.	High Voltage Solid State Switch Unit	HTS 651-20-GSM with following options: A. HFS Option B. Option I-FWD C. Option DLC D. Option S-TT E. Option SEP-C Of M/s BEHLKE Make OR Equivalent Model which shall comply the functional requirements as specified in Error! Reference source not found.	1 Set
1.1.	Accessories#		
1.1.1.	Pump Unit	PU-2	2 No's
1.1.2.	Active Radiator	AR-4000W	2 No's
1.1.3.	Temperature Indicators	TM-1	4 No's
1.1.4.	Temperature Sensors	TS-1	4 No's
1.1.5.	Fitting Kits	FK 8X1.0	2 No's
1.1.6.	Any Additional accessories	As Required	

Table 1: List of deliverables

**# Note 1:** All the accessories shall be supplied along with their standard fitting kits of appropriate sizes, which has to be compatible with the quoted unit.

### 1.2. Document Deliverables:

The manufacturer/supplier shall supply a set of documents, which allows the purchaser to operate and maintain the high voltage switch assembly, in either soft or hard copies. It is assumed that documentation shall be supplied in the English language.

A set of relevant documents such as the following shall preferably be included:

- Instruction and Operating manuals with trouble shooting procedure
- Datasheets (valid) along with bid
- Functional test reports against the specified specifications /Test certificates
- GA Drawings (If any)

## 2. Technical Specifications

**Technical specifications:** Following are the detailed technical specifications of solid-state high voltage switch:

Quantity: 1 Set

S.No	Parameters	Value / features	Bidder specification and compliance
1.	Maximum operating voltage	65kV DC @ $T_{case}=70C$	
2.	Isolation voltage between HV switch and control input/ ground	80kV DC	
3.	Insulation between HV terminal and body (1 min withstand)	100kV DC	
4.	<b>Turn on peak current</b>	<b>200Amp.with duty cycle &lt;1% for time period less than 200µsec.</b>	
5.	<b>Permissible operating voltage range</b>	<b>0 to 65 kV DC</b>	
6.	Continuous load current	8.25 Amp DC @ $T_{fluid}=25^{\circ}C$ ,	
7.	<b>Continuous power dissipation capability</b>	<b><math>\geq 7.8kW</math></b>	
8.	Operating temperature range	25°C to 70°C	
9.	Off state leakage current	$\leq 40\mu Amp$ @ 52kV DC	
10.	Static On state resistance	$\sim 35\Omega$	
11.	Turn On delay	$\leq 250$ nsec	
12.	Continuous switching frequency f(max)	100 kHz Continuous	
13.	Turn On rise time & Fall time (with resistive load)	47nsec.	
14.	Maximum On state time	Continuous	
15.	Minimum On state time	$\leq 300$ nsec without violating f(max)	
16.	Minimum Off state time	$\leq 250$ nsec without violating f(max)	
17.	Coupling capacitance between HV side and control side	$\leq 50pF$	
18.	Control voltage	3 to 10 VDC	
19.	Driver power supply	+ 5 VDC	
20.	HFS Supply Voltage V1	Specify	
21.	HFS Supply Voltage V2	Specify	
22.	Intrinsic diode forward voltage	52 VDC	
23.	Intrinsic diode reverse recovery time	$\leq 250$ nsec	
24.	Required Features	1. HFS Option 2. Option I-FWD 3. Option DLC 4. Option S-TT 5. Option SEP-C	
25.	Dimensions	Specify	
26.	Weight	Specify	

Table 2 Technical Specifications of HV Switch

### **3. Installation & Acceptance Tests**

The supplier shall visit the ITER-India lab and demonstrate the minimum performance tests that can verify the functionality of supplied unit basic functions of supplied unit. ITER-India will provide necessary basic circuit elements (excluding the scope of supply under this tender), which are required for the basic tests. ITER-India issues a final acceptance note after the successful completion of Basic functional tests. Issues found, if any during the transportation and/or testing of basic functions, the supplier shall repair or replace the unit at his own expenses.

### **4. Performance Bank Guarantee(PBG)**

The Contractor shall furnish to the Purchaser an interest free Performance Bank Guarantee (PBG) for 10% value of P.O. by way of providing a Bank Guarantee from one of the banks on a non-judicial stamp paper for the satisfactory performance of the Items supplied against the Contract. The Performance Bank Guarantee (PBG) will be effective from the date of final site acceptance of items and shall remain in force two months beyond the warranty period mentioned in the Contract. The PBG shall be submitted from State Bank of India (SBI)/ any nationalised Bank/ICICI/IDBI/AXIS/HDFC (For Indian bidders). In case of foreign bidder, the PBG shall be from First class Foreign bank of international reputed BG issuing bank shall send SFMS confirmation on our SBI bank having IFSC code SBIN0010864 & provide intimation of the same on email id: purchase@iter-india.org.

In the event that the Bank Guarantees needs extension, the Contractor shall extend the validity of PBG for suitable period at his expenses. On the performance and completion of all contractual obligations including warranty, the original PBG shall be returned to the Contractor without any interest on receipt of a request from the Contractor. The Performance Bank Guarantee format is given in Annexure-3.

### **5. Warranty**

The Supplier should provide at least 1-year standard warranty from the date of final acceptance and supplier shall repair/replace the unit at free of cost on DAP ITER-India basis as per Incoterms 2010 in case of a failure during the warranty period.

### **6. Delivery Period**

The Supplier should commit to the delivery period of 6 months from the date of PO.

### **7. Packing & Shipment**

The material should be appropriately packed with one set of documentation & dispatched to ITER-India Lab, IPR with the following address. If any damages are found after the receipt of the deliveries the unit will not be accepted.

EC-Lab, ITER-India Lab Building,

Institute for Plasma Research,

Near Indira Bridge, P.O. Bhat Gandhinagar -382 428, India

Prior information of the material dispatch shall be given to ITER-India Purchase Officer.

### 3. Price Bid Format

Table 3 Price-bid Format

S.No.	Name of the Item/Part Number	Quantity	Unit Price (Mention Currency)	Total Price
<ul style="list-style-type: none"> <li>Indian Bidders : Quote prices separately without including applicable taxes and duties</li> <li>Foreign Bidders: Quote prices including taxes and duties that are applicable outside India</li> </ul>				
1.	High Voltage Solid State Switch Unit	01 Set		
2.	Pump Unit-PU-2	02 Nos		
3.	Active Radiator-AR-4000W	02 Nos		
4.	Temperature Indicators-TM1	04 Nos		
5.	Temperature Sensors-TS-1	04 Nos		
6.	Fitting Kits-FK 8X1.0	02 Nos		
Total Cost				
7.	Optional feature/accessories, if any	Specify		

Agency commission shall be included in the quoted Price.

Table 4 Commercial terms, Taxes and Duties (applicable)

Commercial terms, Taxes and Duties (applicable)		Bidder Response
Delivery Basis	Delivery Period- 6 Months	Comply Yes/No (In case of No Specify deviation)
	FCA for Foreign bidders (including authorized Indian representatives)	Comply Yes/No (In case of No Specify deviation)
	DAP ITER-India charges (Lumpsum) or in terms of %of FCA Price	To specify
	Free Door Delivery Basis for Indian bidders including appropriate transit insurance (Lump sum)	Comply Yes/No (In case of No Specify deviation)
Bid Validity	90 days	Comply Yes/No (In case of No Specify deviation)
ITER-India Payment Terms	<ul style="list-style-type: none"> <li>80 % payment within 30 days from delivery date</li> <li>20 % payment against after final acceptance against submission of PBG for 10%of order value</li> </ul>	Comply Yes/No (In case of No Specify deviation)
<b>Taxes and Duties (Not Applicable for foreign bidders): Not to be included in the basic price as per Error! Reference source not found.</b>		
		<b>Bidder Compliance/Remarks</b>
Goods and Service Tax (pls. specify type of GST applicable). ITER-India, IPR is entitled to avail concessional rate of GST@5% on supply of Items (For Indian bidders)		Specify Value in %
GST Registration Number (For Indian bidders)		Specify



HSN Code of quoted item (For Indian bidders)	Specify	
Any other, Please specify		

#### Other Terms & Conditions:

1. For foreign bidders (including authorized Indian representatives), all applicable taxes & duties in the country of origin shall be included in the quoted price.
2. For Indian bidders, all applicable taxes and duties shall be quoted separately with specifying tax rates.
3. The basis for the price comparison shall be the total landed price of requirements, including taxes & duties. IGST @ 5% shall also be applicable for items imported by the purchaser.
4. Reserve Bank of India (RBI) reference Exchange rate applicable on the date of enquiry shall be applied.
5. Bidder must indicate the Currency without fail.
6. Purchaser shall consider 10% as freight & 1% as insurance over & above FCA price , in case, the foreign bidder do not provide DAP ITER-India charges separately. These charges shall be taken for price evaluation.
7. Bidder shall submit the price bid on Bidder's letterhead with official seal and sign on each page of price bid in section: 1.
8. Total amount shall be indicated both in words as well as in figures. Where there is a difference between amounts quoted in words and figures, amount quoted in words shall prevail.
9. The amount of commission if any included in the price and payable to the Indian Agent of the foreign Contractor shall be paid directly to the Indian Agent by the Purchaser in equivalent Indian Rupees on the basis of an Invoice from him applying T.T. buying rate of exchange ruling on the date of placement of the Purchaser Order/Contract and which shall not be subject to any further exchange variations. The payment will be released to the Indian Agent within 30 days from the date of receipt and Final acceptance of deliverables systems/items.
10. The Contractor shall invoice only for the net amount payable to him, after deducting the amount of Agency commission (if applicable) which would be paid to the Indian Agent directly by the Purchaser. However, the Contractor's invoice should separately reflect the amount of commission payable to his Indian Agent and the Name and address of the accredited Indian Agent, If any, should be mentioned.
11. Payment to the foreign bidders shall be made through sight draft/ wire transfer & payment to the Indian bidder shall be made through NEFT/RTGS.
12. Bank Charges :
  - 12.1 All Bank charges if applicable shall be borne by supplier only (For Indian bidder)
  - 12.2 All Bank charges within Indian shall be borne by the Purchaser & all bank charges outside India shall be borne by the supplier (For Foreign bidder)
13. Taxes & Duties
  - 13.1 In respect of Indian bidder – The Price quoted shall be exclusive of all applicable Indian taxes & duties.
  - 13.2 In respect of Foreign bidder – The Price quoted shall be inclusive of all applicable taxes & duties in bidder's country or any other country except India.
14. Each party shall bear their own expenses including travel, lodging, boarding etc, for visit to other party's end.

## 8. Annexure-1: Application Description

### 8.1. Application

Application of high voltage solid state switch is to modulate body circuit of an RF vacuum tube (Gyrotron). The nature of the load can be viewed as a parallel combination of inter-electrode capacitance and HV Cable capacitance (~2500pf) and a shunt resistance (~350 kΩ which is derived from intercepting current in the tube) as shown below in Figure 1 along with a cable (RG 220) with a length of ~10 meters.

### 8.2. Circuit Arrangement

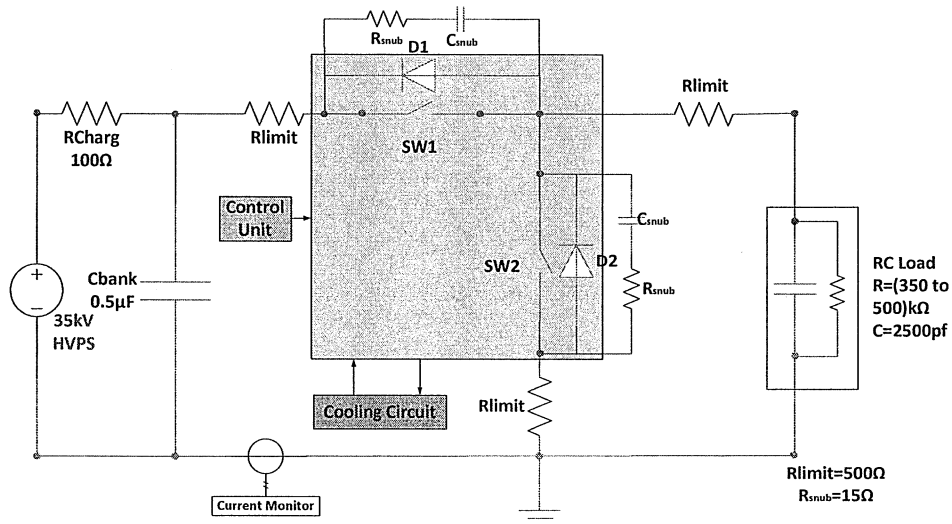


Figure 1 Typical Circuit Arrangement with the switch

**Note2:** The load bank and other circuit component/equipment are not in the scope of supply of supplier, only high voltage solid-state switch with options and associated cooling accessories are in scope of the supplier.

#### 8.2.1. Operating Scenario-1: DC Mode

Here the Switch is kept in ON state continuously as per control signal. (However, the switch has to replicate the control signal in all conditions). Despite of different operating modes, the rise and fall times of high voltage switch should be as specified as under Error! Reference source not found..

Expected Waveforms:

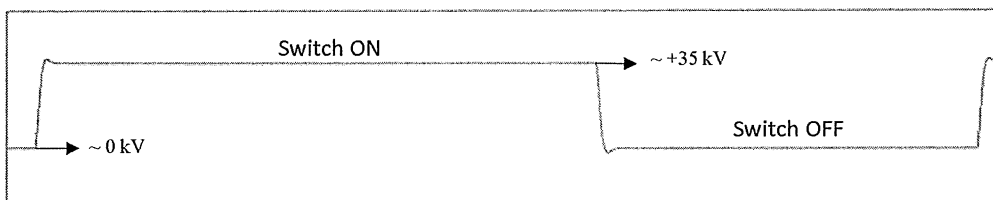


Figure 2 Expected Load Voltage in DC Mode

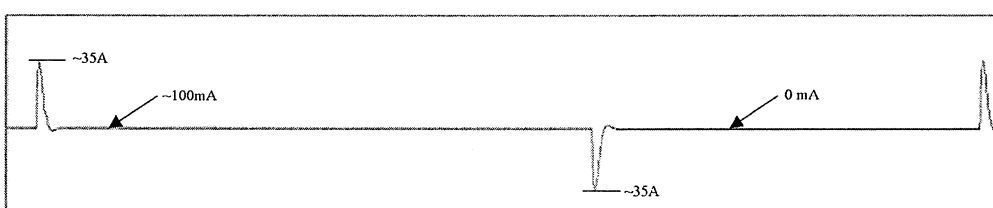


Figure 3 Expected Load Current in DC Mode

### 8.2.2. Operating Scenario-2: Modulation Mode

Here the Switch is being modulated, by means of control signal from DC to not more than 2 kHz.

Example pected Waveforms:

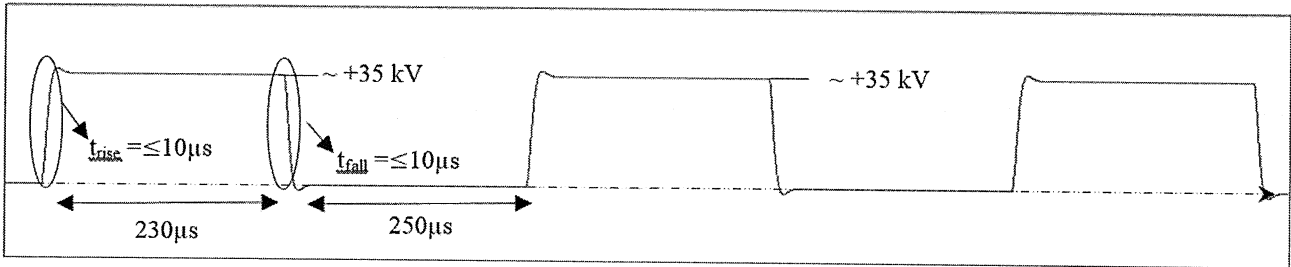


Figure 4 Expected Load Voltage in Modulation Mode

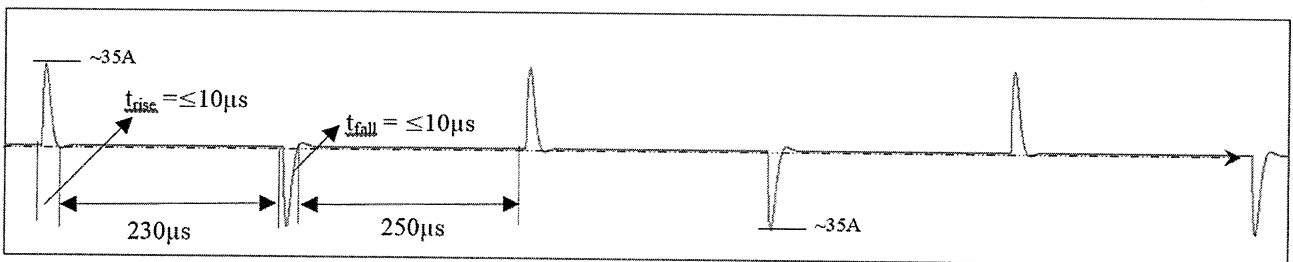


Figure 5 Expected Load Current in Modulation Mode

**Note3:** These waveforms shown above are of 2 ½ cycles only, however, the switch would be operated continuously with a frequency not more than 2 kHz and a duty cycle of 50% (subject to vary).