Compliance sheet of IGBT based Pulsed DC Power Source with auxiliary DC power supply

This compliance sheet is necessary for evaluation of specification offered by the vendor.
Vendor has to fill all the fields and he has to specify the numerical value wherever numerical value is mentioned in our specification rather than filling the fields with yes or complied.

Sr. No.	Parameter	Specification as per IPR's requirement	Specification being offered by Vendor
A	**Specifications of Pulsed DC power supply**		
1	**Input Parameters**		
	Input Voltage	3-Phase, 415V ±10% AC, 50Hz	
	Input connections	5 wire (R,Y,B,N and Earth)	
2	**Output Parameters**		
	Voltage		
	Output voltage polarity	Pulsed DC negative output (pulsed between zero and negative peak). Important: The positive terminal of the power supply should be grounded.	
	Peak output voltage	-800 V max. Settable between 0V to -800V [Voltage control via HMI or potentiometer mounted on front panel through selector switch]	
	Voltage setting resolution	Better than 1V	
	Voltage ripple	0.5% or better (at maximum rated values)	
	Voltage regulation	0.1% or better (at maximum rated values)	
	Current		
	Output current	60A [Peak] at 90% Duty Cycle	

	Frequency		
	Pulse frequency	Settable between10KHz to 30KHz through HMI [in the step of 1KHz or better]	
	Duty cycle		
	Pulse duty cycle	Settable between 10% to 90% through HMI [in the step of 1% or better]	
	Output Waveforms	As per Annexure 3	
3	**Protections**		
	Over current protection	Whenever over current [i.e. 150% of maximum rated value] or short circuit is detected then the power supply should respond as per following: • Overcurrent Sensing Time - Within 5µs • Inhibit of the IGBT Gate Pulses - Within 20 µs • Blocking Time : 200ms • Auto restarts the IGBT gate pulses after blocking time. • If the over current occurs 10 times within a minute the power supply should shut down by giving OC Trip indication and it can be restarted by pressing the Reset push button only • If the rate of over current events is less than 10 per minute, then the overcurrent counter must be reset to zero and restart to count again.	
	Short circuit protection	10 consecutive overcurrent trips may be considered as short circuit and the power supply may be tripped	
	Output over voltage	Power supply must trip if output voltage exceeds maximum rated voltage. Indication should be on front panel.	
4	**Output load**	The final negative pulsed DC output will be	

		connected to a resistive (plasma) load and positive terminal will be connected to ground.	
5	**Front Panel Indications and Controls**		
	Mains on/off	Suitable MCCB must be provided.	
	Start/stop	Push button switches for power supply start/stop	
	Emergency switch	To turn off the supply in the event of emergency	
	Trip display	Indication Lamps (For all different trips)	
	Trip reset	Via HMI or front panel push button through selector switch	
	Selector switch	Selector switch should be provided to select the control from HMI or Front panel	
	Output voltage control	Through HMI in the step of 1V or potentiometer on Front panel	
	Output peak voltage display	Voltage should be displayed in HMI with ± 1V accuracy	
	Output peak current display	Peak pulsed current should be displayed in HMI with ± 1A	
	Output frequency control	Through HMI in the step of 1KHz	
	Output frequency display	Frequency should be displayed in HMI with ± 0.2KHz for full range of duty cycle i.e. 10% to 90%	
	Output duty cycle control	Through HMI in the step of 1% from 10% to 90%	
	Output duty cycle display	Duty cycle should be displayed in HMI provided on front panel with ± 1% accuracy	
	Timer display(digital)	Set time duration and Remaining time display	
	Temperature measurement display	1. The Nickel-Chromium (K) type grounded thermocouple will be used for the temperature measurement which will be connected with negative pulsed DC voltage (0 to -800VDC). 2. Temperature should be displayed in HMI	

		in Degree Centigrade, corresponding to mv produced at the junction of "K" type thermocouple and in addition with actual room temperature. 3. Error should be less than ± 5^{o}C. 4. Total three identical temperature measurement units required for measurement at three different locations.	
6	**Duty of operation**	Continuous duty (24 x 7 continuous operation)	
7	**HMI Display and Data logging**	1. Standard HMI for display and storage of, a) Output Frequency with graph b) Output Duty cycle with graph c) Output peak pulsed current display with graph d) Output pulsed DC Voltage display with graph e) Temperature display with graph for all three locations 2. Storage capacity: Must be capable of storing all the above parameters at an interval of 1s for 500 hours at internal devices. 3. Ports : USB as active, RS232, RS485 4. TCP/IP Communication port for data logging facility of following parameters. a) Output Frequency b) Output Duty Cycle c) Output peak pulsed current d) Pulsed DC Voltage e) Temperature-1, 2 and 3 5. Necessary graphs and parameters should be displayed through graphical user interface (GUI).	

		For reference see annexture-1 and 2. 6. Connectivity with HMI Module for Remote monitoring of all above parameters and controls of following parameters with pre-defined IP Address a) Duty cycle b) Pulsed Voltage c) Pulse frequency	
8	**Interlocks**		
	Timer	Time format should be hh:mm which can be fixed up to 99:59 hours as per process time duration. This timer will also display set and remaining time in the same format. At initial both set time and remaining time will be same, after achieving temperature equal to set parameter (temperature-1) remaining time counting should be start. On completion of time duration applied voltage should be reduced to 0V.	
9	**Input/output Terminations**		
	Terminations	Input and Output – Screw terminal blocks with proper nomenclature	
10	**Environment**		
	Ambient Temperature	Up to 50^{o}C	
	Humidity	Up to 95% RH	
B	**Specifications of auxiliary DC power supply**		
	Input voltage	230VAC, 50Hz	
	Output voltage	-700V DC	
	Output current	500 mA. (Suitable current limiting resistance should be provided)	
	Display	Auxiliary On/Off indication should be provided on HMI and on front panel also.	
	Control	ON/OFF control should be provided through HMI	

	Output polarity	Negative DC output. The positive output of this power supply to be grounded	
C	**Acceptance Criteria**		
	Factory acceptance test	The performance of the pulsed DC power supply has to be demonstrated on resistive load at the vendor's premises. The list of parameter to be tested at vendor site is provided in annexure 4. Vendor has to make all necessary arrangements for pre-dispatch inspection and testing at full rated values. The cost of all these arrangements has to be borne by the vendor.	
	Site acceptance	Vendor has to demonstrate the performance of the pulsed DC power supply on plasma load or resistive load (as per site condition) for 24 hour at FCIPT.	
D	**Installation and commissioning**	To be done by vendor at FCIPT, Gandhinagar	
E	**Manuals**	Both hard & soft copies of the operational and maintenance manual and firmware must be provided. Manuals must contain all electrical drawings and circuits. Schematic wiring diagram must be provided.	
F	**Training**	Should be imparted after installation and commissioning of the power supply at FCIPT.	
G	**Warranty**	The supplier has to provide 12 months warranty from the date of acceptance at FCIPT.	