

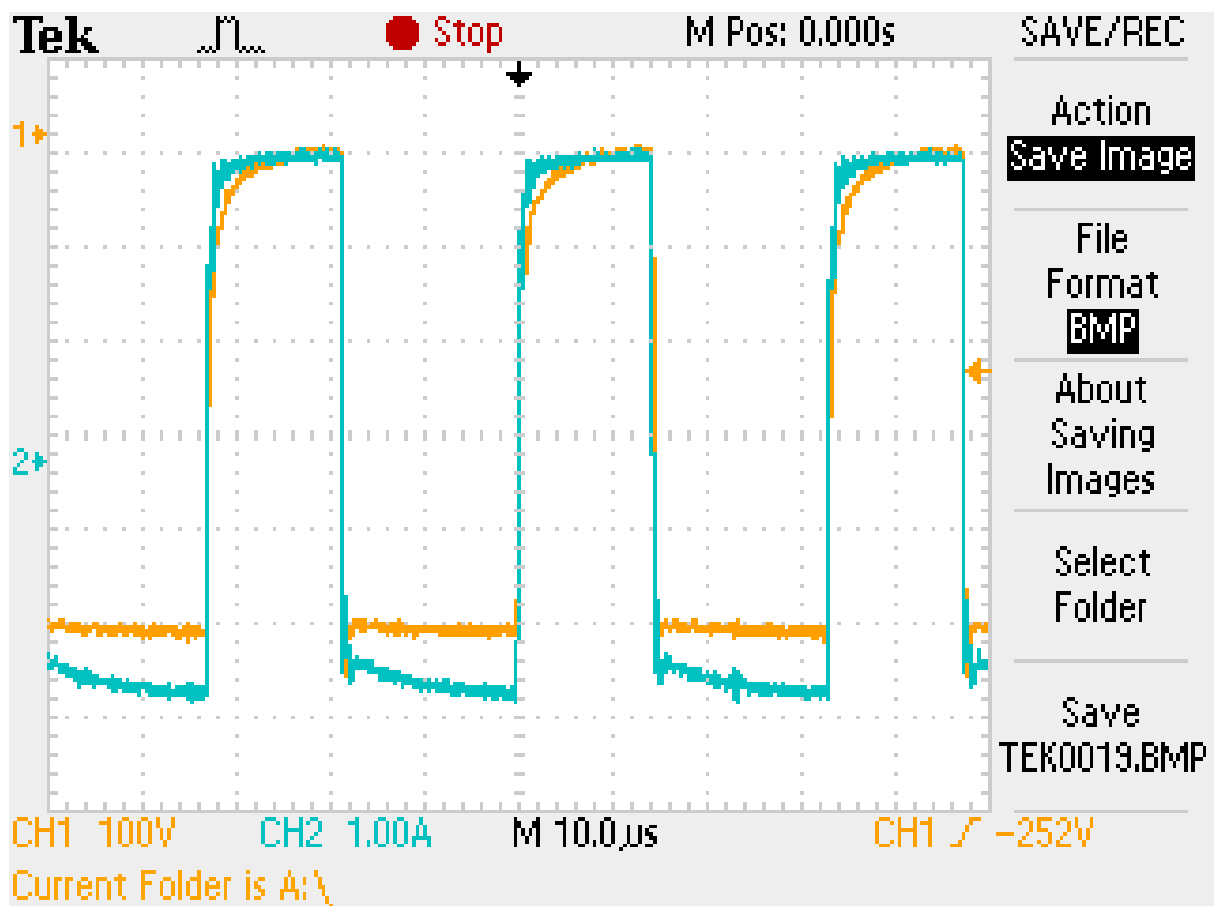
SECTION 'C'

**TECHNICAL SPECIFICATIONS
OF
STORES AND DRAWINGS**

Application Note

The pulsating DC power source of 125A with auxiliary power supply will be used to generate plasma in the plasma nitriding system, which is used as job shop.

During the plasma nitriding process, arcing is observed initially on the components due to the dust particles present on it. The arcing has to be suppressed so that if the plasma goes to the arc mode, it may damage the components. Hence, active arc suppression should be provided in the power supply. As mentioned in the specification, the power source will be tested on plasma load. A typical plasma load behavior [Characteristics] can be interpreted from the following voltage and current wave forms (as shown below) taken during plasma nitriding process.



Specifications of Pulsating DC Power Source with auxiliary power supply

Sr. No.	Parameter	Specification
A	Specifications of Pulsed DC power supply	
1	Input Parameters	
	Input Voltage	3-Phase, 415V \pm 10% AC
	Input Frequency	50Hz,+/- 1 Hz
	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 output of the power supply to be grounded.
	Peak output voltage	1000 V max. (Settable between -20V(or less, kindly specify) to -1000V)
	Voltage setting resolution	Better than 1V
	Voltage ripple	0.1% or better (at maximum rated values)
	Voltage regulation	0.1% or better (at maximum rated values)
	Current	
	Output current	125A [Peak] at 80% Duty Cycle
	Frequency	
	Pulse frequency	Settable between 10KHz to 30KHz [in the step of 1KHz or better]
	Duty cycle	
	Pulse duty cycle	Settable between 10% to 80% [in the step of 1% or better]
3	Protections	
(a)	Arc current suppression	Power supply should be able to withstand arcing events during plasma load condition
(b)	Output short circuit	Power supply must trip in the event of a load short circuit condition.
(c)	Output over voltage	Power supply must trip if output voltage exceeds maximum rated voltage.
4	Output load	
		The final pulsed DC output will be connected to a plasma load. <u>-The power supply must satisfactorily work in this configuration i. e. plasma load</u>
5	Front Panel Indications and Controls	
	Mains on/off	Suitable MCCB must be provided.

	Start/stop	Push button switches for power supply start/stop
	Trip display	Indication Lamp (For all different trips)
	Trip reset	Push button switch
	Output voltage control	A 10 turn pot control must be provided on front panel
	Output voltage display	Voltage display (digital) must be provided on front panel with 0.1% or better accuracy
	Output current display	Current display (digital) must be provided on front panel with 0.1% or better accuracy
	Output frequency control	A 10 turn pot control must be provided on front panel
	Output frequency display	Frequency display (digital) must be provided on front panel with 0.1% or better accuracy for full range of duty cycle i.e. 10% to 80%
	Output duty cycle control	A 10 turn pot control must be provided on front panel
	Output duty cycle display	Duty cycle display (digital) must be provided on front panel with 0.1% or better accuracy
	Timer display(digital)	Total time and elapsed time display
	Temperature measurement display	Temperature should be displayed on the front panel in Degree centigrade. The thermocouple used will be grounded “J” type floating at high voltage (maximum -1000V pulsating DC).
6	Duty of operation	Continuous duty (24 x 7 continuous operation)
7	Interlocks	
	Timer	To shut down the power supply automatically, a 100 hours timer must be provided to set process time and it should be interlocked with the pulsed power supply. The pulsed power supply must switched off automatically after the completion of process time cycle.
	Grounding	An interlock must be provided which should indicates that the chamber has been properly connected with ground connection before starting the power supply.
8	Input/output Terminations	
	Terminations	Input and Output – Screw terminal blocks with proper nomenclature
9	Cooling System	Forced air-cooling.
10	Environment	
	Ambient temperature	0 to 50°C
11	Enclosure	
	Type	Suitable powder coated MS structure with lifting lugs and non-metallic wheels
	Ingress Protection class	IP20 (vender has to provide IP20 test results reports for the enclosure)
12	Operating Manual	A hardcopy of the operational and maintenance manual and firmware must be provided.
B	Specifications of auxiliary DC power supply	

1	Input voltage	230VAC, 50Hz
2	Output voltage	-700V DC
3	Output current	1 A DC
4	Control	Auxiliary On/Off switch with indication to be provided on front panel
5	Output polarity	Negative DC output. The positive output of this power supply to be grounded
C	Acceptance Criteria	
1	Pre dispatch inspection	The performance of the pulsed power supply has to be demonstrated on resistive load at vendor's premises. The vendor has to make all necessary arrangements (resistive load, input power etc.) for pre dispatch inspection and testing at full rated values.
2	Final acceptance	The vendor has to install the power supply at FCIPT, IPR and demonstrate the satisfactory working at full ratings on plasma load.
D	Installation and commissioning	To be done by vendor of cost at FCIPT, Gandhinagar
F	Manuals	Manuals of the operation of the power supply with all electrical drawings should be given to us at the time of delivery
G	Training	Should be imparted after installation and commissioning of the power supply
H	Warranty	
1	Warranty	The supplier has to provide 12 months warranty from the date of acceptance.
I	Recommended Spare	
	Optional	Party should suggest important spares for a period of one year along with their prices.