

TECHNICAL BID

Technical Specification for DC Power Supply of maximum 300 Volt, 50-500 Amp.

1. Scope of work

The scope of this tender includes design, manufacturing, factory testing, delivery, installation, commissioning, site testing and documentation of Arc Discharge Power Supply as per in the detailed specifications.

2. Delivery

The power supply should be supplied at CPP-IPR, Sonapur 782 402, within 4 (four) months from approval of design.

3. Application Note:

It will be used to operate a cascaded plasma torch, with gases like argon, hydrogen, helium etc. The cascaded plasma torch consists of a thoriated tungsten cathode, an anode, separated by four numbers of floating rings. All these copper rings are intensely water cooled, except the cathode all rings have a central hole of 10 mm diameter for the passage of the plasma jet, having about 90 mm diameter and 15 mm thickness.

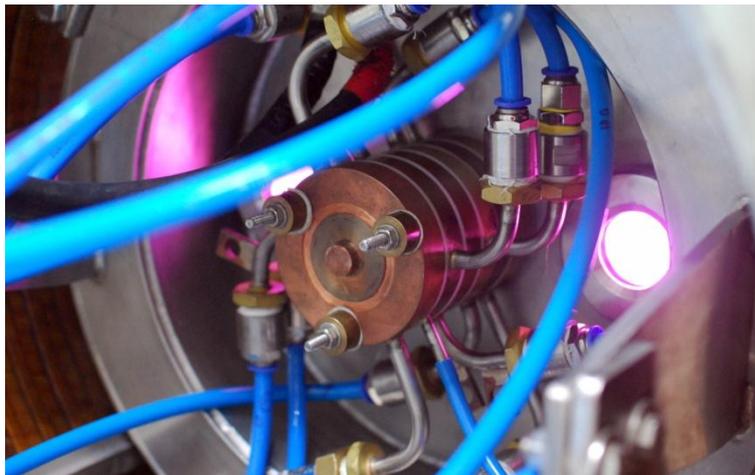


Figure 1: Photograph of a six ring cascaded plasma torch

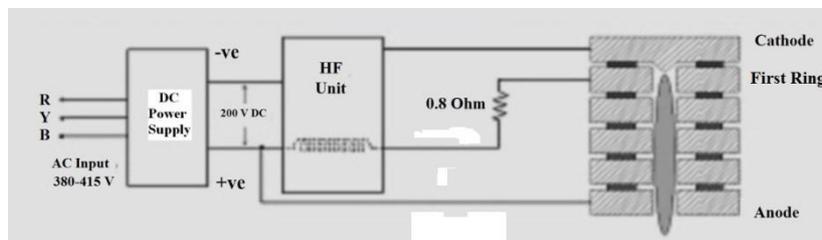


Figure 2: Electrical connections for the cascaded plasma torch

4. Arc initiation:

High voltage high frequency (typically few kV at few MHz, figure 2) pulses are to be applied between the cathode and the first ring (at a distance of < 0.5 mm to 3 mm), which initiates a pilot arc between them.

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| | <p>The discharge current flows through a 0.8 ohm resistance and a potential is dropped across it, which lowers the potential of the first ring. Due to the potential difference between the first ring and the anode, the arc is transferred to the anode and produces a plasma flame coming out from the opening of the anode ring segment. The HVHF is put off once the arc is transferred to the anode.</p> <p>The plasma torch will be operated with gases like argon, helium, hydrogen and deuterium. At the time of ignition, the pressure inside the torch will be in the range of 50 mbar to 1 bar.</p> <p>It is in the scope of the supplier to choose appropriate HVHF specifications.</p> |
| 5. Input Supply: | 415± 10%V, 3-phase, 50Hz |
| 6. Load current: | 50-500 A DC continuously adjustable |
| 7. Load voltage: | 300 V DC at maximum load |
| 8. Ripple (rms) | 0.5% (Resistive Load) |
| 9. Accuracy: | 0.5% |
| 10. Linearity: | 0.5% |
| 11. Stability: | 0.5% |
| 12. Mode: | Constant current |
| 13. Protections | <p>Front panel potentiometers:</p> <ol style="list-style-type: none"> 1. Current limit: settable (100-600 A) 2. Over voltage protection at 300 volt |
| 14. Metering: | <p>Digital Display</p> <ol style="list-style-type: none"> 1. Output DC voltage, 0-350 V 2. Output DC current, 0-600 A |
| 15. Remote monitoring: | 4-20 mA signals for DC output voltage and current, main status signals of the power supply as potential free contacts. |
| 16. Indication: | <ol style="list-style-type: none"> i. On/OFF / TRIP (LED / Indication lamps) ii. Power Supply Healthy <ul style="list-style-type: none"> : TTL high for Healthy : TTL low for Supply Fail |
| 17. Termination: | Suitable for cable or bus bar connection. |
| 18. Maximum Ambient temperature: | 40 ⁰ C |
| 19. Design ambient temperature: | 50 ⁰ C |

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| 20. Control | |
| i) External Programming: Signal: | 4-20mA and 0-10 volt analog signal for linear control corresponding to 0 to 1100A output. |
| ii) Local: | Front panel ten turn potentiometer for current and voltage |
| iii) Enable Disable | : Potential free contacts : Close: Supply enable : Open: Supply disable |
| 21. Size: | Height preferably less than 1.9 meters. |
| 22. Factory Acceptance Testing: In presence of CPP-IPR representative | i. Visual inspection and Routine tests ii. Ripple measurement test with resistive load. iii. Full load test for 1.5 Hr on resistive load iv. 0 to 10 V external control operation and output current linearity test. |
| 23. Site Acceptance Tests: | i. Visual inspection and Routine tests ii. Ripple measurement test with actual load. iii. Rated continuous current test for 1Hr on actual load. iv. 0 to 10V external control operation and output current linearity test |
| 24. Documentation Requirements: | The following documents shall be furnished during the delivery of the system i. Complete functional drawing ii. Constructional drawing iii. Internal layout and wiring drawing iv. Bill of material with details part numbers, make, type and quantities with brief description about their functions v. Recommended spare part list. vi. Functional description document vii. Operational manual (3 sets) viii. Installation manual (3 sets) ix. Trouble shooting manual x. Maintenance manual for power supply (3 sets) xi. Factory testing and site testing record including key oscilloscope waveforms. |