

| S.No | Item | BHEL specification | Offered specification |
|-------------|--|--|------------------------------|
| 1 | Stack Configuration | 3-phase diode bridge rectifier, brake chopper and 3-phase IGBT based inverter. The IGBTs should be connected in three phase bridge configuration on suitable heat sinks with cooling fans for forced air cooling. | |
| 2 | Inverter Topology | Two level | |
| 3 | Power rating of Rectifier and Inverter | 1100KW at 0.8 p.f i.e. 1375 kVA | |
| 4 | Rated DC link voltage | 930 V +10%/-15% | |
| 5 | DC link Capacitance | Type: Polypropylene Value: Offer should specify the required capacitance to meet the ripple current. It should be supported with calculations. | |
| 6 | Required voltage rating of the dc link capacitor bank | Minimum 1250V | |
| 7 | Maximum dc voltage withstand capability | The supplier should mention the maximum value of the dc voltage that the offered stack can withstand without damage to any component. | |
| 8 | Current rating of the dc link capacitor bank | The capacitor bank of the offered 1375kVA stack should be able to supply harmonic current when operating at switching frequency of 2 kHz. | |
| 9 | Normal output AC current | 1150A RMS continuous | |
| 10 | Over load capacity | 150% of the normal output current for 60sec for every 10 min | |
| 11 | Output AC voltage | The offered stack should be suitable to generate ac output voltage of 690V, 3-phase, 50Hz from the 930V dc with switching signals from the controller | |
| 12 | Brake chopper | Brake chopper should operate for DC voltage of 1200V with a duty ratio from zero to unity with switching frequency 2khz at an ambient of 50 degree C. | |
| 13 | Switching frequency | The offered stack should be able switch at 2kHz and also should supply 1150A RMS current at this switching without exceeding the allowable junction temperatures of the IGBTs and diodes | |
| 14 | Stack should include gate drivers | Specify yes or no | |
| 15 | Specifications of gate drivers | The gate drivers should have optical inputs to receive inputs and should give IGBT healthy status through | |

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| | | optical output. It should have in-built protections against shoot through fault, over current and high di/dt. Also it should generate isolated power supply from the control power supply. | |
| 16 | Connections between capacitors and IGBTs | The dc capacitors should be connected to IGBTs through laminated bus bars to achieve very low stray inductance between capacitor and IGBT connections | |
| 17 | Thermal calculations | Detailed temperature-rise calculations for the assembled power stacks (Rectifier, Inverter and brake chopper) for both continuous operation and also for 150% operation for 60sec for every 10 min, should be submitted along with the offer, by clearly indicating the junction temperatures of IGBT, built-in diode, heat sink, outlet Air temperature...etc for an ambient temperature of 50 degrees C. (Please note that brake chopper draws a current of 1000A at dc link voltage of 1200V for 10 sec only) | |
| 18 | Type of cooling | Forced air | |
| 19 | Thermal Trip switch | Thermal trip switch with potential free contacts should be mounted on heat sink for the purpose of thermal protection. | |
| 20 | Mechanical design of the stack | The mechanical design of the stack should be maintenance and replacement friendly. | |
| 21 | OGA of the stack | The offer should include OGA of the stack | |
| 22 | Data sheets | The offer should include data sheets of IGBT, diodes, gate driver, heat sink, dc link capacitor, cooling fan and thermal trip switch. | |
| 23 | Stack configuration | There should not be paralleling of stacks to meet the requirement. (if required, devices can be paralleled.) Specify yes/no | |
| 24 | Tests | The offer should include list of type and routine tests that will be carried out at supplier's premises before dispatch clearance. | |