

Specifications

Purpose: Retrofitting of Inverter on *Electro heat UK* make Induction Brazing M/C in large electrical motors (LEM) for Brazing of bars with the short Circuited ring in the rotor of squirrel cage Induction Motor.

A) Details of existing M/c:

1. M/C type: Brazing machine from Electro heat U.K. ,Type: EHV - 400/3/200KW
2. Power Rating : 400/200 KW
3. Operating frequency : 3 - 4 KHz
4. INPUT Voltage : 3 phase ,415 volt ,50/60 Hz at 0.951 power factor
5. M/C Input Circuit Breaker Rating :800amp
6. KVA rating : 450 KVA
7. Maximum Input current : 603 amp
8. cooling water (demineralised water only) :10 gallons per minute
9. cooling water temperature : 20-35°C
10. maximum water pressure at inlet: 100 PSI
11. Dimension of control cabinet: 24x 78x74 (depth x height x width) inches
12. Temperature controller for RING : Model DZ 1000 digital indicator controller (Chino Make) and Infrared Radiation Thermometer Model IRCI-20T (Chino Make) having range 500 to 1300 °C
13. Temperature controller for BAR : Model DZ 1000 digital indicator controller (Chino Make) and Infrared Radiation Thermometer Model IRCI-20T (Chino Make) having range 500 to 1300 °C

The system consist of three phase diode rectifier with line choke (water cooled) and smoothing circuit capacitor and inductor (water cooled) . The inverter section consist 8 thyristors and isolation transformer of 1000KVA . The Output circuit has 4 banks of capacitors each contributing 40 microfarad in parallel , work head transformer, and load coil .

B)System Requirement:

Microprocessor based IGBT controlled Inverter for controlling the heat delivered to the SC ring and bars . ***The offered system should be able to use existing Table for job mounting and rotation along with temperature controller.*** It should be capable of brazing one end of all the bars with SC ring in a single shot as well as in segmental way , depending on the diameter of ring to be brazed .

C) Specification :

The offered system should adhere to following points :

1. A complete panel housing suitable rating circuit breaker(m/c on/off) ,converter ,inverter ,series capacitors for tuning and other protections such as semiconductor fuses for protection of inverter and converter and other auxiliary devices;
2. Microprocessor based and programmable from operator console mounted on the panel's façade . The parameters such as power delivered to load , load ringing frequency , capacitor voltage , dc bus voltage have to be displayed on the operator console or separately Its inverter section should be IGBT based;
3. Suitable for segmental as well as single shot brazing of SC ring (The details of SC ring to be brazed are enclosed);
4. Integrate existing two no. Temperature controllers for RING and Bar : Model **DZ 1000** digital indicator controller (Chino Make) and Infrared Radiation Thermometer Model **IRCI-20T** (Chino Make) having range 500 to 1300 °C;
5. Integrate existing table and its hydraulic unit for job mounting and job rotation , inductor coil resting , and exerting pressure between the job and inductor coil;
6. Integrate existing operator desk for power on/off , power control ,display of % power delivered to the load , auto power control through existing Digital indicator controller Model **DZ1000** (chino make) ,manual /auto power control , emergency off;
7. Output power rating for 10 minutes : **400 KW**;
8. continuous output rating :**200 KW**;
9. output frequency : **suitable for brazing application** ;
10. suitable for Input Supply : **415 +/- 15% ,3 phase, 50 Hz , 3 wire without neutral** ;
11. suitable for Ambient Temperature : **10 to 50 °C**;
12. output power regulation : **0 to 100 %** ;

13. Efficiency : **90% or better** ;
14. Self tuning type i.e. it must tune the inverter frequency for optimum power transfer to the load of variable impedance ;
15. built in limits like frequency , over current , load coil short circuit ; capacitor under voltage /over voltage ;
16. built in interlocks for water flow ,water temperature etcetera for power on to the load ;
17. suitable chilling unit to dissipate the heat generated during brazing operation of SC ring with the job ;
18. Proven and must have been working in India / abroad for similar application for at least a year.

D) Scope of supply :

1. A complete panel housing input circuit breaker /switch fuse unit ,converter , inverter , tuning capacitor , auxiliary transformer for sundry supplies and other devices required for the application ;
2. Number of Load inductor coils for brazing of SC ring -5 Nos
(different sizes of load inductor coils are to be supplied to cover all types of SC ring to be brazed);
3. All control cables and power cables ;
4. 4 set of as commissioned drawing and Operation and maintenance manuals ;
5. system should be guaranteed for two years from the date of commissioning;
6. Training for operation and maintenance to be provided for one week at supplier's work at free of cost (lodging and boarding to be borne by BHEL);
7. Suitable chilling unit to dissipate the heat generated during brazing operation .

E) Scope of work :

1. dismantling of old panel
2. erection of new panel
3. integration of existing operator control desk and supplied panel
4. integration of existing table and its auxiliaries such hydraulic unit , hydraulic cylinders for job mounting and job rotation , integration of two number infrared radiation thermometer **IRCI-20T** (chino make) unit : one for ring temperature and other for bar temperature .
5. proving of system for jobs - at least 5 jobs

D) Job details:- (Short Circuit Ring)

1. max cross- section – 10000 mm²
- 2: Max thickness – 100 mm
- 3: Min thickness – 20 mm
- 4: **Max** Diameter - 1250 mm
- 5: Max weight of copper SC ring – 350 Kg
- 6: Material – electrical quality copper of high purity
- 7: Max weight coming on rotary table (including weight of rotor): 20000 Kg
- 8: Brazing filler material –LAG2p/LAG5p
- 9: Flux – Ruptam –A or equivalent Brazing filler material

