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|  | | BHARAT HEAVY ELECTRICALS LIMITED | | | | Enquiry No. : | |
| | | PIPLANI BHOPAL 462022 (M.P.) INDIA | | | | Due Date : | |
| | | <u>CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPTT.)</u> | | | | Supplier Qtn. No.: | |
| | | | | | | Date : | |
| SPECIFICATION CUM COMPLIANCE CERTIFICATE OF ' 20 KW INDUCTION BRAZING MACHINE' | | | | | | | |
| | | NOTE:- | | | | | |
| 1. Vendor must submit complete information against clause no.12(i.e. Qualifying Conditions). The offer meeting this clause would only be processed. | | | | | | | |
| 2. The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance. | | | | | | | |
| 3. The offer and all documents enclosed with offer should be in English language only. | | | | | | | |
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| | | NAME & ADDRESS OF THE SUPPLIER : | | NAME & ADDRESS OF THE INDIAN AGENT : | | | |
| | | TELEPHONE NOS.: | | TELEPHONE NOS.: | | | |
| | | FAX NOS.: | | FAX NOS.: | | | |
| | | E-MAIL ADDRESS : | | E-MAIL ADDRESS : | | | |
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| SCOPE: SUPPLY, ERECTION & COMMISSIONING OF ' 20 KW INDUCTION BRAZING MACHINE ' WITH SPECIFICATIONS AS BELOW | | | | | | | |
| SNO | DESCRIPTION FOR BHEL REQUIREMENT | SPECIFIED / TO BE CONFIRMED BY | OFFERED | DEVIATIONS | REMARKS | | |
| 1.0 PURPOSE | | | | | | | |
| 1.1 | The equipment is required for induction brazing of coil ends of stator coils of Motors | Vendor to confirm | | | | | |

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| 1.2 | Job details:- a) Max cross- section of one conductor– 10 mm x 50 mm . b) Material of Conductors – High purity electrical grade copper c) Brazing filler material –LAG2p / LAG5p d) Brazing Flux – Ruptam –A or equivalent | | | | Vendor to confirm | |
| | 2.0 SPECIFICATIONS: | | | | | |
| | 2.1 MACHINE CONFIGURATION: | | | | | |
| 2.1.1 | The machine should be portable and have the following major components suitably interconnected | | | | Vendor to Confirm | |
| | a) Compensated air cooled (with suitable fan and filter) frequency converter with controlled thyristor rectifier. Cooling shall be by integral air blower fitted with dust filter. | | | | Vendor to Confirm | |
| | b) Full bridge IGBT inverter | | | | Vendor to Confirm | |
| | c) Compensator circuit | | | | Vendor to Confirm | |
| | d) Digital microprocessor based control system with LCD display of various parameters | | | | Vendor to Confirm | |
| | e) Water cooling system | | | | Vendor to Confirm | |
| | f) 1 Nos water cooled Hand Held Transformer (HHT) with suitable suspension system for each | | | | Vendor to Confirm | |
| | g) 3 nos. Inductors | | | | Vendor to | |
| 2.1.2 | It should be a machine with one Hand Held Tarnsformers permanently connected but with suitable interlocks so that only one is working at a time | | | | Vendor to confirm | |
| 2.1.3 | Machine should be mounted on suitable trolley / wheels, with handle to facilitate easy movement | | | | Vendor to confirm | |
| | 2.2 Frequency Converter: | | | | | |
| 2.2.1 | Max output power for continuous operation | | | | 20 kW | |

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| 2.2.2 | Max. output power for 10 minutes | Vendor to specify | | | |
| 2.2.3 | Output frequency | 10-25 kHz | | | |
| 2.2.4 | Power regulation range | 0-100 % | | | |
| 2.2.5 | Efficiency 90% or better | Vendor to Specify | | | |
| 2.2.6 | Power factor: 0.9 or better | Vendor to Specify | | | |
| 2.2.7 | The converter to have auto tuning features with load matching capacitors | Vendor to Confirm | | | |
| 2.2.8 | The converter shall be protected from short-circuit and no-load conditions (Details should be furnished) | Vendor to Confirm | | | |
| 2.2.8 | Input supply voltage | 415 VAC +/- 10 %, 50 Hz +/- 1.5 Hz, 3 phase, 3-wire, no neutral | | | |
| 2.2.9 | Moulded Case Circuit Breaker should be provided at incomer | Vendor to Confirm | | | |
| 2.3 | Controller & Output Transformer :- | Vendor to confirm | | | |
| 2.3.1 | Integral Solid State Digital Microprocessor based controller (Complete details should be provided) | Vendor to Confirm | | | |
| 2.3.2 | Controls for power to be given. | Vendor to Confirm | | | |
| 2.3.3 | Output power, voltage, frequency; and input voltage & current to be displayed on a LCD display unit.(Details to be given) | Vendor to Specify | | | |
| 2.3.4 | On/Off and reset push buttons for starting / stopping / resetting the output power to be provided. | Vendor to Confirm | | | |
| 2.3.5 | Provision of remote control of power supply should be there. | Vendor to Confirm | | | |

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| 2.3.7 | Protective thermal switches and inter locking to be provided to prevent operation of the power supply without adequate / normal cooling water flow. (Details should be furnished) | Vendor to confirm | | | |
| | Indication lamps to show the operation of the equipment | Vendor to confirm | | | |
| 2.3.8 | Diagnostic features to be provided for visual indication of overload / abnormal operating conditions of the equipment and internal fault conditions. (Details should be furnished) | Vendor to confirm | | | |
| 2.3.9 | Output transformer shall be light in weight | Vendor to Specify | | | |
| 2.3.10 | Weight of Hand Held Transformer (HHT) to be mentioned. | Vendor to Specify | | | |
| 2.3.11 | Water flow switch for HHT & Inductor should be provided | Vendor to confirm | | | |
| 2.3.12 | Adequately rated 10 m long interconnecting cable should be provided between the Frequency Converter Output and the Hand Held Transformer | Vendor to Confirm | | | |
| 2.4 | Water cooling system :- | | | | |
| 2.4.1 | Water Chiller Unit with hermetically sealed compressor, Heat Exchanger, Fan etc to be provided. (Details of chiller unit should be furnished. Compressor shall be with non-CFC refrigerant) | Vendor to Confirm | | | |
| 2.4.2 | Water input to chilling unit will be at ambient temp as top-up water. Return water from inductor coil will be at a higher temperature. (Complete details of the Water Cooling System should be furnished) | Vendor to Confirm | | | |
| 2.4.3 | Cooling capacity of Chillier (min 9000 Kcal/Hr) | Vendor to Specify | | | |
| 2.4.4 | Stainless steel water tank with high pressure pump for water circulation to be provided. | Vendor to Confirm | | | |
| 2.4.5 | Tank should be provided with inlet for top-up water controlled by a float switch | Vendor to Confirm | | | |

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| 2.4.6 | Cooling Water Flow | Vendor to specify | | | |
| 2.4.7 | Cooling Water Pressure | Vendor to specify | | | |
| 2.4.8 | Cooling Water Temperature | 30 deg. Centigrade max. | | | |
| 2.4.9 | System should be complete with instrumentation, cables, interconnecting pipes, fittings, valves etc | Vendor to Confirm | | | |
| 2.5 | Suspension System for HHT: | | | | |
| | A pole stand with radial arm and a suitable capacity spring balancer is to be provided for each HHT. The structure should be stable and should not fall down. | Vendor to Confirm | | | |
| 2.6 | Inductor : | | | | |
| 2.6.1 | Inductor should be made from hollow copper sections for circulation of cooling water inside. The design should be robust and of adequate section thickness for long life, suitable for the heavy amount of current drawn and for continuous duty application. Actual shape/ dwg to be made as per requirement after the placement of P.O., as per BHEL's specified job. (Vendor to provide dimensioned drawing and details subsequently for approval) | Vendor to confirm | | | |
| 2.6.2 | 3 nos of inductors are to be provided with each set | Vendor to confirm | | | |

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| 2.7 | ELECTRICAL SYSTEM: | | | | |
| 2.7.1 | 415V +/- 10% , 50Hz +/- 1.5 Hz, 3 Phase AC (3 wire system without Neutral) Power supply source will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of the vendor. Requirement of grounding/earthing should be furnished by vendor. | Vendor to confirm | | | |
| 2.7.2 | Tropicalisation: All electrical / electronic equipment shall be tropicalized | Vendor to confirm | | | |
| 2.7.3 | All power & control cabinets should be dust proof | Vendor to confirm | | | |
| 2.7.4 | Vendor should ensure the proper earthing for the machine and its peripherals. | Vendor to confirm | | | |
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| 2.8 | SAFETY ARRANGEMENTS: | | | | |
| | Following safety features in addition to other standard safety features should be provided on the machine: | | | | |
| 2.8.1 | Machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, workpiece and the operator due to the malfunctioning or mistakes. Machine functions should be continuously monitored and alarm / warning indications through lights/ alarm numbers with message display should be available. | Vendor to confirm | | | |
| 2.8.2 | All the pipes, cables etc. on the machine should be well supported and protected. | Vendor to confirm | | | |
| 2.8.3 | All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations. | Vendor to confirm | | | |
| 2.8.4 | Emergency switches at suitable locations as per International safety norms are to be provided. | Vendor to confirm | | | |

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| 3.0 | AMBIENT CONDITIONS & THERMAL STABILITY : | | | | |
| 3.1 | Total machine and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. Power Supply: Voltage: 415 V - 10% to +10% Frequency: 50 Hz, +/- 1.5 Hz No. of phases : 3 (3 wire without Neutral) Ambient Conditions: Temperature : 5 to 50 degree celsius Relative Humidity : 95% max. | Vendor to confirm | | | |
| 3.2 | Weather conditions are tropical. Atmosphere may be dust laden during some part of the year. Machine shall be kept in the normal shop floor condition. Max. temperature variation is up to 25 deg Celsius in 24 hours. (Details of provisions on the machine for the same are required) | Vendor to confirm | | | |
| 4.0 | SPARES: | | | | |
| 4.1 | A list of recommended spares for 2 years normal working to be quoted with relevant details. Itemised breakup of electrical spares, chilling unit spares, spare dust filters, and electronic spares including control boards, displays etc used on the machine in sufficient quantity for 2 years of trouble free operation on three shifts continuous running basis should be offered by vendor. (Unit price of each item of spare should be offered in the price bid) | Vendor to Specify | | | |
| 4.2 | A list of commissioning spares should be furnished | Vendor to Specify | | | |
| 5.0 | DOCUMENTATION : | | | | |
| | Four sets of following documents (Hard copies) in English language should be supplied along with the machine | Vendor to confirm | | | |
| | Operation & Maintenance Manual | Vendor to confirm | | | |

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| | Electrical & Electronic Drawings | Vendor to confirm | | | |
| | Manufacturing drawings for all supplied Inductors. | Vendor to confirm | | | |
| | Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable. | Vendor to confirm | | | |
| | One additional set of all the above documentation on CD ROM, wherever possible. | Vendor to confirm | | | |

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| 6.0 TRAINING: | | | | | |
| 6.1 | 3 days duration training should be imparted to BHEL personnel in the following areas after erection and commissioning. (a) Operation of the machine including safety aspects (b) Electrical, Electronic & Mechanical maintenance of the machine & accessories | Vendor to confirm | | | |
| 7.0 PRE-DISPATCH INSPECTION: | | | | | |
| 7.1 | Machine shall be inspected before dispatch for workmanship, completeness and suitability of operation. One trial job shall be done at supplier's works | Vendor to confirm | | | |
| 8.0 GUARANTEE: | | | | | |
| 8.1 | The equipment should be guaranteed for a period of 12 months from date of commissioning or 18 months from the date of dispatch | Vendor to confirm | | | |
| 9.0 COMMISSIONING & PROVEOUT: | | | | | |
| 9.1 | The equipment shall be commissioned by the vendor at BHEL works | Vendor to confirm | | | |
| 9.2 | Jobs for the proveout at BHEL works shall be provided by BHEL. Vendor shall be fully responsible for prove-out of components as | Vendor to confirm | | | |
| 10.0 PACKING: | | | | | |
| 10.1 | Sea worthy (in case of imported goods) & rigid packing for all items of complete machine, all accessories and other supplied items | Vendor to confirm | | | |
| 11.0 GENERAL : The vendor should submit the following | | | | | |
| | Machine model | Vendor to specify | | | |
| | Total connected load (KVA): | Vendor to specify | | | |
| | Floor area required (Length, Width, Height) for complete machine & accessories | Vendor to specify | | | |

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| | Total weight of the machine | | | | | |
| | Vendor to submit, along with offer, the reference list of customers where similar machines have been supplied mentioning the customer, machine model, major specifications of the supplied machine, year of supply etc. | Vendor to specify | | | | |
| | Detailed catalogues , photographs of the machine and accessories should be submitted with the offer. | Vendor to specify | | | | |
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| | 12.0 QUALIFYING CONDITIONS : | | | | | |
| | Only those vendors, who have supplied and commissioned at least one 20 kW or higher rating IGBT Transistor based Induction Brazing machine for similar applications in the past ten years and such machine is presently working satisfactorily for more than one year (more than six months if supplied to BHEL) after commissioning, should quote. The following information is to be submitted by the vendor about the companies where similar machines have been supplied. This is required from all the vendors for qualification of their offer. | Vendor to confirm | | | | |
| | 1. Name of the customer / company where similar machine is installed. (Copy of Purchase Order without price information should be furnished) | Vendor to confirm | | | | |
| | 2. Complete postal address of the customer. | Vendor to confirm | | | | |
| | 3. Year of commissioning. (Copy of Commissioning Report should be furnished) | Vendor to confirm | | | | |
| | 4. Application for which the machine is supplied | Vendor to confirm | | | | |
| | 5. Name and designation of the contact person of the customer. | Vendor to confirm | | | | |

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| | 6. Phone, FAX no. and email address of the contact person of the customer. | | | | | |
| | 7. Performance certificate from the customers, on their letter head, regarding satisfactory performance of machine supplied to them | | | | | |
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13 **Scope of Supply for each machine**

Description

Quantity

- Frequency converter with 10 m cable and 1 no timer
1 no
- Inductor Coils
3 Nos
- HHT with Cable Length
1 No
- Interconnecting Cables and Pipes
1 set
- Set of fuses including high speed fuses
2 sets
- Dust Filter sets
2 nos
- Water Chiller with Pipes & Fittings
1 No
- Documentation (Manuals as per pt 5 of this spec) with Circuit diagram
4 sets
- Pole stand, arm, Spring Balancer for HHT
2 sets