



An ISO 9001
Company

Bharat Heavy Electricals Limited
(High Pressure Boiler Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA
CAPITAL PURCHASE / MATERIALS MANAGEMENT / MANUFACTURING

ENQUIRY	Phone: +91 431 257 75 75 Fax : +91 431 252 07 19 Email : rmanohar@bheltry.co.in Web : www.bhel.com
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	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
	2620600069	03.10.2006	07.11.2006

Your are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order

Item	Description	Quantity	Delivery Schedule
10	600 Amps (100% Duty Cycle Manual Arc Welding Machine) as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com)	16 Nos.	31.03.2007

Note:

- (1) The detailed Technical Specification along with technical point-by-point confirmation, Commercial Terms & Conditions applicable for this Enquiry, Confirmation of acceptance for BHEL commercial terms & conditions and Price Bid formats have been posted in BHEL Corporate web site www.bhel.com under Enquiry reference “2620600069”. Your offer should be based on all the above documents.
- (2) Also, you are requested to fill in the Supplier Registration formats available in www.bhel.com (under Advancement – Supplier Registration) and send it along with your offer.

Tenders should reach us before 14:00 hours on the due date Tenders will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present	Yours faithfully, For BHARAT HEAVY ELECTRICALS LIMITED Dy. Genl. Manager / Capital Purchase / MM / Manufacturing
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PART A**QUALIFYING CRITERIA FOR THE SUPPLY OF
600 Amps. *INVERTER CONTROLLED SMAW POWERSOURCES*
[POWERSOURCE IN SINGLE or IN COMBINATION]****SECTION – I**

The BIDDER is expected to give complete details against each clause in the table given below and wherever necessary an additional sheet may be attached (giving clear reference number) to cover the required details.

S. No.	PARTICULARS	BIDDER's RESPONSE
1.0	Profile of the Company bringing-out the years of Experience of the BIDDER in the field of design, manufacture and supply of 'INVERTER CONTROLLED WELDING MACHINES' for Heavy Duty SMAW Welding Applications	
2.0	Number of 'INVERTER CONTROLLED WELDING MACHINES' supplied till date, in the following category a) up to 400 Amps. rating and b) above 400 Amps. rating [both for 60 % & above Duty Cycle]	
3.0	YEAR of LAUNCH of the MODEL quoted against this ENQUIRY	
4.0	Number of 'Inverter Controlled SMAW Welding Machines – 600 Amps. Rating with 100 % Duty Cycle' (single powersource or with the specified/quoted configuration) supplied and commissioned till date for the following category of CUSTOMERS a) Heavy Engineering Fabricators b) Foundry & Mining Sector c) Ship Building Industries	
5.0	Details on International Standards followed in Design and Testing of Welding Machines [Copy of English Version of Standards / Design Codes followed shall be furnished with the Technical Offer]	
6.0	Details of Quality System followed (Furnish the salient aspects of the Quality Assurance System followed) in the various stages of machine building to final machine testing.	

S. No.	PARTICULARS	BIDDER's RESPONSE
7.0	Comprehensive Details (including Test Charts) on Performance Prove-Out Testing (which will be conducted at the time of INSPECTION by CUSTOMER ENGINEERS) - of the Equipment Offered, to be given with the Technical Offer.	
8.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centres in India, to be furnished compulsorily.	
9.0	Details on the Firm's Registration and the FINANCIAL STRENGTH of the COMPANY (Balance Sheet for the last 3 years) shall be submitted with the TECHNICAL OFFER	
10.0	Details of Design Set-Up and Technology Back-Up assured for the PRINCIPAL Equipment Manufacturer & Supplier [Details on Experience of Design Personnel, Technology Tie-Up, R & D Facilities, etc. have to be furnished]	
11.0	Any Additional Data to supplement the manufacturing capability of the BIDDER	

SECTION – II

The BIDDER has to compulsorily meet the following requirements to get qualified for submitting an offer for the Inverter Controlled SMAW Welding Machine .

S. No.	REQUIREMENTS	BIDDER's COMMENTS
12.0	The BIDDER shall have a minimum of TEN Years of Continuous Experience in the Design, Manufacture & Supply of Inverter Controlled SMAW Welding Machines.	
13.0	The BIDDER shall have supplied a minimum of 100 number of Inverter Controlled SMAW Welding Machines with rating 400 Amps. and above. Indicate the number of such welding machines sold in India, till date.	
14.0	Reference List of Customers and Performance Certificate for a period not less than two years , from CUSTOMERS [minimum 2 Customers – Government Organisations and / or Heavy Engg. Companies in Private Sector in INDIA] with full contact details of CONTACT PERSON, who are the End Users of the QUOTED MODEL of Inverter Controlled SMAW Welding Machines.	

SECTION – III

The BIDDER has to comply with the following, for accepting the Technical Offer for scrutiny by the Purchaser :

S.No.	REQUIREMENTS	BIDDER's COMPLIANCE
15.0	The BIDDER shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial and Price Bid.	
16.0	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A just 'YES' or 'CONFIRMED' or 'NO-DEVIATION' or 'COMPLIES' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
17.0	The BIDDER shall assure a continuous support for SPARES and SERVICE for TEN Years, from the date of commissioning of the equipment at BHEL Works.	
18.0	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details / literature on the QUOTED MODELS of Welding Powersources	
19.0	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation	
20.0	The reference List of Customers shall be accompanied with the details (Phone Number /E-Mail ID) of the CONTACT PERSON for cross reference by BHEL	
21.0	BIDDER has to co-ordinate for the visit of BHEL Team (at BHEL Cost) to the Customer's Works (preferably Power Utility Boiler Manufacturer), to witness capability of an existing AUTOMATIC STRAIGHT TUBE BUTT WELDING STATION, if warranted.	
22.0	In case of preliminary qualification of the OFFERED MODEL, the BIDDER has to demonstrate the capability of OFFERED POWERSOURCE at BHEL/TRICHY Works, at the cost of the BIDDER, with a notice period of two weeks.	
23.0	Earlier performance & filed experience (service support) with BHEL (if any) will be a reckoning factor for the technical qualification of the OFFER.	

PART B**TECHNICAL SPECIFICATIONS FOR INVERTER CONTROLLED SMAW POWERSOURCES
[600 AMPS. @ 100 % Duty Cycle] – SINGLE UNIT / MULTIPLE UNIT CONFIGURATION**

AA. APPLICATION :			
SI.No.	FEATURES /BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
AA.1	The proposed Welding Powersource is intended for continuous duty in SMAW Process for Radiographic Quality Welds like Butt Joints, Fillet Welds, Deep Groove Weld coming in Full Throat Nozzle Welding Applications, in High Pressure Vessels using ϕ 6.3 mm basic coated stick electrodes .		
AA.2	A Typical Application involves continuous welding of 400 numbers of ϕ 6.3 mm x 450 mm long E 7018-1 SMAW Electrodes using current in the range of 450 to 540 amps. in a time period of around 14 hours [arcing time works out to 800 minutes in a total time duration of 840 minutes.].		
AA.3	The Offered Welding Machine shall be PORTABLE in Nature and a CONSTANT CURRENT DC Powersource.		
BB. MACHINE CONFIGURATION : [The scope of supply shall consist of the following, for each machine]			
SI.No.	FEATURES /BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
BB.1	Welding Powersource with Transport Trolley and Wheels		
BB.2	Control Unit Integrated with Powersource (for Hot Start & Arc Dynamics Control)		
BB.3	Hand Operated Remote Control Unit for Current Variation		
BB.4	Optional – Wire Less Remote Current Control Unit		
BB.5	Set of Inter-Connecting Cables, Adapters , etc.		
BB.6	Welding Cable and Welding Holder (multiples of 5 mtrs. in length)		
BB.7	Return Current Cable with Screw Type Earth Clamp.		
BB.8	Electrical & Mechanical Spares for Powersource & Control Unit		
BB.9	Operation & Maintenance Manuals – Three Copies per Machine		
BB.10	Commissioning of Equipment and Performance Prove-out of the offered equipment at BHEL Works, by Supplier's Representative, free of cost.		

CC. EQUIPMENT SPECIFICATION : POWERSOURCE FEATURES				
SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
CC.1	Type	Powersource shall be Inverter Controlled with IGBT / MOSFET and capable of delivering a smooth Constant Direct Current, even with a fluctuation of $\pm 10\%$ in the Input Voltage		
CC.2	Switching Frequency	BIDDER has to indicate the Switching Frequency of the Inverter Circuit and the make of IGBT / MOSFET used		
CC.3	Output Current Rating	600 Amps. @ 100 % Duty Cycle (continuous duty) [with a SINGLE Unit or through COMBINATION]		
CC.4	Operating Range for Welding Current	Bidder to specify the range (range shall be in stepless variation mode)		
CC.5	Open Circuit Voltage	BIDDER to mention the Open Circuit Voltage for the offered Powersource [Preferred OCV is above 75 V]		
CC.6	Current Setting	The variation in the set value of the welding current to the actual value, shall not exceed 1 %.		
CC.7	Current Control	Through the LOCAL VARIATOR [with the help of a 3 inch diameter KNOB] provided in the Front Panel of Powersource and the REMOTE CONTROL Unit.		
CC.8	Power Input	415 \pm 10% V AC, 3 Phase, 50 \pm 2% Hz, through a 3 Wire System [4 th wire for EARTHING] – No Neutral Conductor		
CC.9	Input Power Cable	A 10 metre long electric input power cable with protective sheathing to be provided with the powersource.		
CC.10	Control Panel Switches	Power ON/OFF, Remote ON/OFF, Voltage & Ampere Control, Hot Start Control, Arc Dynamics Control		
CC.11	Voltmeter & Ammeter	Factory Installed Ammeter & Voltmeter on the front panel with easy removal and replacement (i.e., without lifting the top cover of the Powersource) for instrument calibration		

CC. EQUIPMENT SPECIFICATION : POWERSOURCE FEATURES				
Sl.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
CC.12	Arc Strike	Selection for Instantaneous Arc Strike with HOT START for SMAW Process.		
CC.13	Arc Dynamics Control - Electronic Inductance Variable Control	To minimise spatter and optimise weld-bead wetting action, during welding of materials like Stainless Steel, T 91/P 91, Inconel, etc.		
CC.14	Insulation	Class "H" – to suit Tropical Working Conditions		
CC.15	Machine Protection	IP 23 – Degree of Protection		
CC.16	Machine Cooling	The Powersource shall feature a 'state of art' forced air cooling system that ensures adequate cooling of the components while preventing dust and metal particles from being drawn in.		
CC.17	Functional / Elemental Design Protection	a) Inbuilt protection for the IGBT/Powersource against Thermal / Overload / Short-Circuit / Single or Two Phase Input Conditions. b) All PCBs shall be sprayed with mould coating to prevent damage from dust and grinding particles. c) Machine Design to ensure proper earthing for the machine and its peripherals	<i>[BIDDER has to specifically furnish technical details on how these protective measures are addressed in the Machine Design]</i>	
CC.18	EMI Suppression	a) Powersource shall be equipped with a suitable Filter Network connected to the INPUT Power Line, to prevent propagation of EMI either into or out of the Powersource. b) All metal enclosures and internal shields shall prevent radiated EMI. c) BIDDER has to elaborate the DESIGN FEATURES to meet the above requirements.		

CC. EQUIPMENT SPECIFICATION : POWERSOURCE FEATURES				
Sl.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
CC.19	Portability	Under-Carriage with hard rubber lined wheels for portability of the powersource by manual pushing		
CC.20	Ambient Conditions	Temperature upto + 50 ° C ; Humidity upto 90 % but both upper limits do not occur simultaneously.		
CC.21	Powersource Configuration	<p>The offered machine configuration can be</p> <p>a. SINGLE Powersource capable of meeting the output current requirement as given under Specification Clause No. CC.3</p> <p style="text-align: center;">O R</p> <p>b. Combination of Powersources (not more than TWO in NUMBER) of equal output current rating connected in parallel and synchronised</p>		
CC.22	Operational Features of Combination Powersources	<p>a. Output terminal shall be only one [output welding current cable shall be only one]</p> <p>b. Both the powersources shall be mounted in a single housing or on a single trolley, to be handled as a SINGLE UNIT</p> <p>c. Both the powersources shall be controlled from a SINGLE CONTROL PANEL, such that Single Knob Control is possible for varying the welding parameters [viz., current and voltage] and ON/OFF Controls.</p> <p>d. Both the powersources shall be synchronised in such a way that always the output load is equally shared by these two powersources</p> <p>e. Remote Control Operations shall also be in such a way that a SINGLE CONTROL activates both the powersources.</p>	[The BIDDER has to elaborate on the TECHNICAL DETAILS - of provisions made in the OFFERED EQUIPMENT - to achieve these UNIQUE FEATURES, compulsorily with the TECHNICAL OFFER – Otherwise the OFFER will be DISQUALIFIED]	
CC.23	Load Compensation	Output variation due to line voltage fluctuation, cable heating or drift due to the use of long cable, [20 metres long welding cable] to be eliminated.		

SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
CC.24	Electrode Holder Connection	Heavy Duty rugged LUG type terminals to connect > 70 mm ² Welding Cable for SMAW Electrode Holder and Return Current Cable for SMAW Process		
CC.25	Welding Current Cable	SMAW Welding (current) Cable, 20 mtrs. in length, with one end connected to the Powersource and the free end provided with a FEMALE Connector to connect a MALE Connector with 50 mm ² to 70 mm ² Cable of the Electrode Holder.		
CC.26	Return Current Cable	Welding Current RETURN Cable , 20 mtrs. in length, with one end connected to the Powersource and the other end provided with a Screw Type Earth Clamp		
CC.27	Power Rating	BIDDER to indicate the Maximum Power Rating [in kVA] of the Powersource(s) and the NO-LOAD Power Consumption in Watts.		
CC.28	Power Source Model	To Specify the Model of Powersource s) Offered		
DD. EQUIPMENT SPECIFICATION : REMOTE CONTROL UNIT FEATURES				
SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
DD.1	Type	Hand Operated with 10 mtrs. long control cable with end connectors		
DD.2	Control	Stepless Variation of Welding Current		
DD.3	OPTIONAL REMOTE CONTROL UNIT	To quote for a suitable Remote Control Unit , which operates on Wire-Less (Cord Less) mode.		

EE. SPARES :				
S.No.	ITEMS	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
EE.1	Power Source	<p>All type of Spare Parts including the following items :</p> <ul style="list-style-type: none"> a. IGBT / MOSFET Kit b. All Types of Fuses c. Control – Transformers d. Printed Circuit Boards / PCBs – All Types e. Rectifiers, Thermistors, Capacitors f. Switches and Knobs g. Cooling Fan Motor h. Ammeter & Voltmeter i. Potentiometer j. Relays & Timers k. Receptacles l. Control Cable with End Connectors n. Filters o. Welding & Return Cable Connectors <p>are to be COMPULSORILY QUOTED (with Unit Rate) for one powersource required for 2 years of operation on THREE shift basis for 365 Days in an year.</p>		
EE.2	Remote Control Unit	Complete Set of Remote Control Unit and its Spares like Knob, Potentiometer, etc. to be OFFERED		
FF. O & M MANUALS :				
S.No.	PARTICULARS	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
FF.1	No. of Copies	3 (Three) for Each Machine		
FF.2	Language	English		
FF.3	Soft Copy	One SOFT COPY in DC-ROM is to be given for each machine, containing the details mentioned under Clause SI.No. FF.4.		

S.No.	PARTICULARS	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
FF.4	Manual Details :	a. Manual shall contain all instructions for machine installation and welding trial testing, in sequence. b. Manual to give general circuit diagrams, showing the interconnection of various elements and also details on PCBs [Printed Circuit Board] like tapping voltages, main electronic elements' specifications and ratings, etc. c. Manual to give other details like trouble shooting chart, weld parameters selection for various base metals, etc. d. Master List of Parts & Spares used in the machine with Make, Model, Rating, etc.		
GG. GENERAL POINTS :				
S.No.	PARTICULARS	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
GG.1	FIELD TRIALS	In case of technical qualification on preliminary grounds, the BIDDER has to make arrangements (at the cost of the BIDDER) to provide ONE NUMBER of POWERSOURCE [of the offered configuration either with a single unit or combined unit of powersources) for a Field Demonstration at BHEL/TRICHY Works, to prove-out the capability of the offered equipment, to meet the specification requirements		
GG.2	Inspection	a. The welding machines shall be offered for inspection by BHEL Engineers at supplier's works for performance evaluation prior to despatch. b. Welding Trials are to be taken on 25 mm thick Plate Butt Joints with ϕ 6.3 mm SMAW Electrodes of Class E 7018-1		

GG. GENERAL POINTS :				
S.No.	PARTICULARS	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
GG.3	Commissioning	The equipment shall be commissioned at free of cost by the supplier's representative at BHEL Works.		
GG.4	Training	The Supplier's SERVICE ENGINEER shall give training in the Operation and Maintenance (mainly on electric/electronic troubleshooting) of the Machine for BHEL Staff, after the successful commissioning of the Welding Machines		
GG.5	Guarantee	The equipment shall be guaranteed for a minimum of twenty-four months from the date of commissioning.		
GG.6	Bought-Out Items	a) The Bought-Out Items - like Motors, ICs, IGBT/MOSFET, Contactors, Switches, Electronic Elements, etc., used in the Powersource & Control Unit shall be of Internationally Reputed Manufacturers only. b) BIDDER has to furnish the MAKE of Bought-Out Items used in the Welding Machine, with the OFFER .		