An ISO 9001 Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
CAPITAL EQUIPMENT/ MATERIALS MANAGEMENT

ENQUIRY **NOTICE INVITING TENDER**	Phone: +91 431 257 70 49 Fax : +91 431 252 07 19 Email : csguna@bheltry.co.in Web : www.bhel.com

TWO PART BID Tender to be submitted in two parts.	**Enquiry Number:** **2620900160**	**Enquiry Date:** **29.08.2009**	**Due date for submission of quotation:** **13.10.2009**

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.
Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity
10	**300 A Manual Pulsed TIG welding Power Source** as per the technical specification, general guidelines instructions & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	**7 Nos.**

Important points to be taken care during submission of offer

1. **Delivery required 6 months from the date of purchase order.**
2. **Grace period of 2 months beyond the above delivery period will be considered.**
3. **Checklist to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.**

BHEL's General guidelines / instructions (refer MM/CE/GT/001) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2620900160".

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 Sr.Manager / MM / Capital Equipment

PART A

QUALIFYING CRITERIA FOR THE SUPPLY OF *INVERTER CONTROLLED PULSED TIG/ARC WELDING POWERSOURCES – 300 Amps.*

[60% Duty Cycle]

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	VENDOR's RESPONSE
1.0	Number of Years of Experience of the BIDDER (Original Equipment Supplier) in the field of design, manufacture and supply of 'INVERTER CONTROLLED TIG cum ARC WELDING MACHINES' [with the option for Pulsed TIG Welding also] for Radiographic Quality TIG and SMAW Welding Applications for Pressure Parts Fabrication	
2.0	YEAR of LAUNCH of the MODEL quoted against this ENQUIRY	
3.0	Number of 'Inverter Controlled Pulsed TIG & Manual Arc Welding Machines' supplied, till date in the QUOTED MODEL	
4.0	Number of 'Inverter Controlled Pulsed TIG & SMAW Welding Machines – 300 Amps. Rating with 60 % Duty Cycle' supplied and commissioned till date for the following category of CUSTOMERS a) High Pressure Boiler Industries b) Nuclear & Space Applications c) Heat Exchangers / Pressure Vessels	
5.0	Details on International Standards followed in Design and Testing of Welding Machines	
6.0	Comprehensive Details, on Performance Testing of Welding Machines carried out at the Factory, to be furnished with the Technical Offer.	
7.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centres in India, to be furnished compulsorily.	
8.0	BIDDER to indicate the Country of Origin for the supply of welding machines. Machines manufactured in Countries like TAIWAN/CHINA/KOREA are not preferred.	

SECTION – II

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

S. No.	REQUIREMENTS	VENDOR's COMMENTS
9.0	The BIDDER shall have a minimum of TEN Years of Continuous Experience in the Design, Manufacture & Supply of Inverter Controlled Pulsed TIG & SMAW Welding Machines.	
10.0	The BIDDER should have supplied a minimum of 50 number of Inverter Controlled Pulsed TIG & SMAW Welding Machines with rating 300 Amps. (@ 60 % Duty Cycle) and above to Customers in India. Indicate the number of such welding machines sold in India.	
11.0	Reference List of Customers and Performance Certificate from minimum THREE CUSTOMERS [Heavy Engineering Companies] with full contact details of CONTACT PERSON, who are the End Users of the MODEL (given under Clause No.10.0) of Inverter Controlled Pulsed TIG and 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	VENDOR's COMPLIANCE
12.0	The BIDDER shall submit the offer in TWO PARTS - Technical **[**with **PART A** & **PART B]** & Commercial and Price Bid.	
13.0	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 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
14.0	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.	
15.0	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	
16.0	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 for the scope of supply.	
17.0	Earlier performance & field experience (service support) with BHEL (if any) will be a reckoning factor for the technical qualification of the OFFER.	
18.0	The expected delivery period (including the time for Pre-Dispatch Inspection clearance by BHEL) for the welding machines is not more than six months from the date of issue of BHEL Purchase Order. In case the quoted delivery period extends beyond six months, an additional grace period of two months is permitted, but with a loading for arriving at the PRICE COMPETITIVENESS of the Offer (if the OFFER is technically acceptable on all accounts). Details are given in the commercial terms of the this tender	

PART B

TECHNICAL SPECIFICATIONS FOR INVERTER CONTROLLED PULSED TIG WELDING POWERSOURCES [300 AMPS.]

1.0.0. APPLICATION :			
Sl.No.	**FEATURES /BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
1.1.0	The proposed Welding Machine is intended for use with Manual TIG (GTAW – with and without pulsing mode) Welding Process and Manual Arc Welding (SMAW) Process for Radiographic Quality Welds like Butt Joints (coming in tubes and pipes), Fillet Welds, and Single Groove Welds coming in High Pressure Vessels using ϕ 2.5 mm to ϕ 4.0 mm basic coated stick electrodes .		
2.0.0. MACHINE CONFIGURATION : [The scope of supply shall consist of the following, for each Machine]			
Sl.No.	**FEATURES /BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
2.1.0	Welding Powersource with Transport Trolley with integrated Argon Gas Cylinder Cart [one gas cylinder/bottle only]		
2.2.0	Manual Arc Welding Control Unit Integrated with Powersource (for Hot Start & Arc Dynamics Control)		
2.3.0	Powersource integrated with TIG Control Unit for GTAW featuring High Frequency Arc Ignition, Pulsed TIG & Non-Pulsed TIG Options and Upslope & Downslope		
2.4.0	Hand Operated Remote Control Unit for Current Variation		
2.5.0	Foot Operated Remote Control for Weld Start and Current Variation		
2.6.0	Closed Circuit Water/Coolant Chilling Unit for use with Water Cooled TIG Welding Torch		
2.7.0	Set of Inter-Connecting Cables, Adaptors , etc.		
2.8.0	Welding Cable and Welding Holder (multiples of 5 mtrs. in length)		
2.9.0	Return Current Cable with Screw Type Earth Clamp.		
2.10.0	Water Cooled TIG Welding Torch		
2.11.0	Gas Cooled TIG Welding Torch		
2.12.0	Electrical & Mechanical Spares for Powersource & Control Unit		
2.13.0	Operation & Maintenance Manuals – Three Copies per Machine		

3.0.0. EQUIPMENT SPECIFICATION : POWERSOURCE FEATURES				
S.No.	**FEATURES**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
3.1.0	Type	Powersource shall be Inverter Controlled with IGBT and capable of delivering a smooth Constant Direct Current (suitable for DCEP and DCEN modes of welding operations) even with a fluctuation of ±10 % in the Input Voltage		
3.2.0	Switching Frequency	BIDDER has to indicate the Switching Frequency of the Inverter Circuit and the make of IGBT used		
3.3.0	Current Rating	300 Amps. @ 60 % Duty Cycle **OR** Around 220 Amps. at 100% Duty Cycle.		
3.4.0	Current Range	10 Amps. to 300 Amps. (with stepless variation)		
3.5.0	Open Circuit Voltage	BIDDER to mention the Open Circuit Voltage for the offered Powersource [Preferred OCV is 70 to 75 V]		
3.6.0	Current Setting	The variation in the set value of the welding current to the actual value, shall not exceed 1 %.		
3.7.0	Current Control	Preferably through a LOCAL VARIATOR [with the help of a 3 inch diameter KNOB] provided in the Front Panel of Powersource and the REMOTE CONTROL Unit.		
3.8.0	Power Input	415 ± 10% V AC, 3 Phase, 50 ± 2% Hz, through a 3 Wire System [4th wire for EARTHING] – No Neutral Conductor		
3.9.0	Input Power Cable	A 10 metre long electric input power cable with protective sheathing to be given with each machine		
3.10.0	Control Panel Switches	Power ON/OFF, Remote ON/OFF, Voltage & Ampere Control, Hot Start Control, Arc Dynamics Control, GTAW/SMAW Mode Selection, Gas Flow Control for GTAW Process, Pulse Setting, Upslope & Downslope Programming, etc.		
3.11.0	Voltmeter & Ammeter	Factory Installed Ammeter & Voltmeter on the front panel with easy removal and replacement (i.e., without lifting the top cover of the Welding Powersource) for periodic instrument calibration		

CC. EQUIPMENT SPECIFICATION : POWERSOURCE FEATURES [....contd.....]				
Sl.No.	**FEATURES**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
3.12.0	Arc Dynamics Control - Electronic Inductance Variable Control	To minimise spatter and optimise weld-bead wetting action, during welding of materials special materials like Stainless Steel, T 91/P 91, Inconel, in addition to Carbon and Low Alloy Steels.		
3.13.0	Insulation	Class "H" – to suit Tropical Working Conditions		
3.14.0	Machine Protection	IP 23 – Degree of Protection		
3.15.0	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.		
3.16.0	Functional / Elemental Design Protection	a) Inbuilt protection for the IGBT/Powersource against Thermal / Overload / Short-Circuit / Single or Two Phase Power 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	***[BIDDER has to specifically furnish technical details on how these protective measures are addressed in the Machine Design]***	
3.17.0	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.		
3.18.0	Portability	Under-Carriage with hard rubber lined wheels for portability of the powersource by manual pushing and bottle rack for holding one Argon Gas Cylinder		
3.19.0	Ambient Conditions	Temperature upto + 50 ° C ; Humidity upto 90 % but both upper limits do not occur simultaneously.		

CC. EQUIPMENT SPECIFICATION : POWERSOURCE FEATURES [….contd……..]				
Sl.No.	**FEATURES**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
3.20.0	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 in SMAW Mode] to be eliminated.		
3.21.0	Arc Strike	Selection for Instantaneous Arc Strike with HOT START for SMAW Process.		
3.22.0	Electrode Holder & Return Current Connection	Heavy Duty rugged LUG type terminals to connect 50 mm^2 Welding Cable for SMAW Electrode Holder and Return Current Cable for SMAW Process		
3.23.0	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 Cable of the Manual Welding Electrode Holder.		
3.24.0	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		
3.25.0	Arc Ignition	Through an ‘In-Built’ High Frequency Unit for GTAW		
3.26.0	Torch Connection	Facility to connect Water Cooled TIG Torch and Gas Cooled TIG Torch through suitable adopters to prevent leakage of Gas or Water/Coolant for GTAW		
3.27.0	Auxiliary Power	110 V AC or further low voltage power supply points to Pulse Control Unit, Water Chilling Unit, High-Frequency Unit, etc. when these units are in put into operation at the same time, to carry-out pulsed TIG welding with water cooled TIG torch.		
3.28.0	Power Rating	BIDDER to indicate the Maximum Power Rating [in kVA] of the Powersource and the NO-LOAD Power Consumption in Watts.		
3.29.0	Power Source Model	To Specify the Model of Powersource Offered		

4.0.0. EQUIPMENT SPECIFICATION : PULSE CONTROL UNIT FEATURES				
Sl.No.	**FEATURES**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
4.1.0	Application	Compatible to the Powersource described under Clause 3.0.0 having built-in/external High Frequency Unit.		
4.2.0	Power Supply	To work on the auxiliary power supply from the powersource .		
4.3.0	Front Panel Controls	To provide : a. Peak Amperage adjustment b. Back-ground Amperage adjustment c. Pulses per Second adjustment d. Pulser-Unit On/Off e. Power On/Off f. Amperage Remote/Panel Control g. Remote Control Receptacle h. Gas Pre-flow & Post-flow Time Control i. Welding Current Up-slope & Down-slope Time Control		
4.4.0	Pulse Time Control	Preferred 0 to 200 Pulses per second		
4.5.0	Current Up-slope	Preferred 0.1 to 10 seconds		
4.6.0	Current Down-slope	Preferred 0.1 to 20 seconds		
4.7.0	Purge Gas Pre-flow	Preferred 1.0 to 30 seconds		
4.8.0	Purge Gas Post-flow	Preferred 1.0 to 60 seconds		
5.0.0. EQUIPMENT SPECIFICATION : REMOTE CONTROL UNIT FEATURES				
Sl.No.	**FEATURES**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
5.1.0	Application	For welding current variation from a distant work place, in addition to that provided in the front panel of the welding powersource.		
5.2.0	Type - 1	Hand Operated [Box Type] with 10 mtrs. long control cable with end quick-fix end connectors		

5.0.0. EQUIPMENT SPECIFICATION : REMOTE CONTROL UNIT FEATURES [……contd…….]				
Sl.No.	**FEATURES**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
5.3.0	Type – 2	Foot Operated [Accelerator Type for Current variation] with 10 mtrs. long control cable with end quick-fix end connectors, suitable for "Weld-Start" function also.		
5.4.0	Current Control	Stepless Variation of Welding Current		
5.5.0	Operation Mode	The Remote Control Units (Type 1 & 2) offered shall be suitable for both GTAW and MMAW processes. If not, independent Remote Control Units shall be offered for GTAW and MMAW, in two Types (1 & 2).		
6.0.0. EQUIPMENT SPECIFICATION : WATER COOLING UNIT FEATURES				
Sl.No.	**FEATURES**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
6.1.0	Application	Compatible for the Powersource described under Clause Sl.No. 3.0.0 and provided with suitable quick-fix end connectors, for connecting water cooled TIG Welding Torch.		
6.2.0	Power Supply	To work on auxiliary power supply drawn from the welding powersource and to be provided with an ON/OFF Switch. [Additional power supply cable of suitable length and fitted with end-connectors are to be quoted under SPARES Head]		
6.3.0	Coolant Capacity	a. Tank Capacity sufficient enough to feed a water cooled TIG Torch fitted with 15 metre long cables & hoses and with required buffer quantity to meet the continuous welding applications. b. BIDDER to specify the Tank Capacity [not to be less than 3.0 litres].		

6.0.0. EQUIPMENT SPECIFICATION : WATER COOLING UNIT FEATURES				
S.No.	**FEATURES**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
6.4.0	Type of Chilling Unit	BIDDER to specify the type of chilling unit (viz., radiator – air cooled type or refrigerant cooler type)		
6.5.0	Alarm Indicators	a. To be provided with alarm indicators for failure of coolant circulating pump, radiator fan, low level of coolant, failure of coolant flow, etc. b. BIDDER to specify the type of alarm indicators provided.		
6.6.0	Inter-Connecting Hoses	Well reinforced water / coolant circulation hoses are to be provided for the inter-connection between welding powersource and water cooling unit. [Additional hoses with quick fix end connectors are to be quoted under SPARES Head].		
7.0.0. EQUIPMENT SPECIFICATION : TIG WELDING TORCHES' FEATURES				
S.No.	**FEATURES**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
7.1.0	Application	Suitable for GTAW Process and for the nature of welding works listed under Clause Sl. No. 1.0.0 and compatible to the welding powersource offered.		
7.2.0	Make	Preferred makes are WELD-CRAFT of USA, KEMPPI of FINLAND or OTC/DAIHEN CORPN. Of JAPAN		
7.3.0	Torch Configuration	The Torch Head – Gas Lens & Nozzle configuration shall be suitable for performing the following : a. Tube Butt Welds in close pitch tubular panels with a minimum clear gap of 12 mm between the adjacent tubes [Gas Nozzle End Diameter is to be 11 mm for a length of 25 mm] b. Root GTAW pass welding in a 140 mm (wall thickness) Pipe Butt Welds [Gas Nozzle End diameter is to be 11 mm for a length of 45/65 mm]		

7.0.0.	EQUIPMENT SPECIFICATION : TIG WELDING TORCHES' FEATURES [….contd……..]			
S.No.	**FEATURES**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
7.4.0	Cable Sheathing	Protective Sheathing to be provided for the TIG Torch Cables & Hoses, to withstand shopfloor rough use for the entire length of the cables/hoses.		
7.5.0	Gas Cooled Torch	a. Current Rating :- 140 to 180 Amps. @ 100 % Duty Cycle b. Cable Length :- 7.5 Metres and 15.0 Metres.		
7.6.0	Water Cooled Torch	a. Current Rating :- 220 to 250 Amps. @ 100 % Duty Cycle b. Cable Length :- 7.5 Metres and 15.0 Metres.		
8.0.0.	**O & M MANUALS :**			
S.No.	**PARTICULARS**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
8.1.0	No. of Copies	3 (Three) for Each Machine		
8.2.0	Language	English		
8.3.0	Soft Copy	One SOFT COPY in DC-ROM is to be given for each machine, containing the details mentioned under **Clause Sl. No. 7.4.0**		
8.4.0	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 & ratings. 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.		

9.0.0. SPARES :				
S.No.	**ITEMS**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
9.1.0	Power Source	All type of Spare Parts including the following items : a. IGBT 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. Coolant Feed Pimp q. Auxiliary Power Cable with End Connectors r. Coolant Hose with Quick Fix End Connectors 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.		
9.2.0	TIG TORCH Consumables	Complete Set of Consumable Spares for ϕ 2.4 mm Tungsten Electrode, “O” Rings, Gas Lens, Nozzle / Diffusers, Ceramic Nozzles (both types), Collet Bodies, etc. are to be OFFERED with unit price.		
9.3.0	Remote Control Unit	Complete Set of Remote Control Unit and its Spares like Knob, Potentiometer, etc. to be **OFFERED**		

10.0.0. GENERAL POINTS :				
S.No.	**PARTICULARS**	**BHEL SPECIFICATION**	**OFFER BY BIDDER**	**DEVIATIONS**
10.1.0	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 butt joints of carbon & alloy steel tubes [size: ϕ51.0 mm & 4 mm wall thickness] and subjected to Radiographic Tests, for acceptance. c. Supplier to arrange for Tubes & Electrodes of ϕ 2.5/3.15 mm of Class E-7018-1/E-9018-B3 for SMAW and ϕ 2.4 mm x 1000 mm Filler Wires of Class ER 90 S-G (2.25 % Cr-1% Mo) and ER 80 S-G (½ Mo) for TIG Welding		
10.2.0	Commissioning	The equipment shall be commissioned, free of cost by the supplier's representative at BHEL Works.		
10.3.0	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		
10.4.0	Guarantee	The machine shall be guaranteed for a minimum of 12 (twelve) months from the date of commissioning & performance prove-out at BHEL.		
10.5.0	Bought-Out Items	a) The Bought-Out Items - like Motors, IGBTs, ICs, Relays, 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 proposed to be used in the Welding Machine, with the OFFER .		