Bharat Heavy Electricals Limited

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

An ISO 9001 Company

ENQUIRY NOTICE INVITING TENDER	Phone: +91 431 257 76 53 Fax : +91 431 252 07 19 Email : skaruna@bheltry.co.in Web : www.bhel.com

TWO PART BID Tender to be submitted in two Parts	Enquiry Number: 2631500028	Enquiry Date: 15.10.2015	Due date for submission of quotation: 13.11.2015

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	**IGBT Based Inverter Controlled Welding Power Source with Digital Control for SMAW & Pulsed TIG Welding (300A, 60% Duty Cycle)** as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	**10 Nos.**

Important points to be taken care during submission of offer

1. **Compliance Form No: TRY/ IMP/ 02 and TRY/ IND/ 02A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.**
2. **All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.**
3. **Delivery required: 4 months from the date of Purchase Order.**
4. **Erection and Commissioning shall be done by the vendor at BHEL/ Trichy. Time period required for Erection and Commissioning shall be 2 weeks from the date of intimation from BHEL requesting supplier to depute Service Engineers about site readiness.**
5. **EMD applicable for this enquiry is Rs. 1,50,000.00**

BHEL's General guidelines / instructions (refer MM/CE/GENL/001), compliance form and technical specification 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 "2631500028".

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**

DGM / Capital Equipment / MM

S. KARUNANIDHY
Dy. General Manager
Capital Equipment / MM
BHEL, Tiruchirappalli - 620 014.

IGBT BASED INVERTER CONTROLLED WELDING POWER SOURCE WITH DIGITAL CONTROL FOR SMAW & PULSED TIG WELDING (300 A, 60% duty cycle), Qty 10 nos.

PART A

SECTION 1: Qualifying Criteria

The BIDDER has to compulsorily meet the Qualifying criteria indicated in SECTION 1 to get qualified. Otherwise the technical offer will not be considered.

S. No.	REQUIREMENTS	VENDOR's RESPONSE
1.1	Only BIDDER /VENDOR (OEM) who have a minimum of last TEN Years (as on date of opening of tender) of Continuous Experience in Design, Manufacture & Supply of "**IGBT based Inverter controlled Welding Power Sources for SMAW & Pulsed TIG Welding**" for Radiographic Quality SMAW & Pulsed TIG welding applications, are eligible to quote for this tender. Vendor shall indicate the actual no. of years of experience in the field.	
1.2	Only those vendors (OEMs) should quote, who have commissioned in the last (5) years, at least 20 Nos. of the model quoted against this tender of "IGBT based Inverter controlled Welding Power Source with Digital Control for SMAW & Pulsed TIG welding" with a rating of 300A - 60% Duty Cycle **EITHER** (i) in at least one country other than the country of origin to establish vendor's (OEM's) global business activity **OR** (ii) in India. The name and contact addresses of the customers to whom the machines have been supplied has to be furnished with details. Indicate the number of such welding machines sold in India.	
1.3	Number of "IGBT based Inverter controlled Welding Power Source for SMAW & Pulsed TIG welding" supplied & commissioned till date.	
1.4	Year of Launch of the Offered Model in this tender.	
1.5	The quoted model of Welding Power Source shall be complying with at least one of the Standards as given below: 1. IEC 60974-1:2012 Edition 4.0 2. BS EN 60974-1/2012 3. ANSI/IEC 60974-1: 2008 4. JIS C 9300-1:2006/AMENDMENT 1:2008 5. NEMA EW 9-2012 A document certifying or declaration for complying with the above standards shall be submitted with the technical offer which will be subject to verification by BHEL.	

S. No.	REQUIREMENTS	VENDOR's RESPONSE
1.6	Vendor to submit Performance certificates satisfying all the following conditions (as on original date of opening tender) (suggestive format is given as annexure): a) Performance Certificates from any TWO customers for satisfactory performance of minimum 5 Nos of the quoted model against this tender, from each of the customers, for a minimum period of one year from the date of commissioning (as on original date of opening of tender), supplied in the last five years, **EITHER** (i) in the country other than the country of origin **OR** (ii) in India, especially from Heavy Engineering / Fabrication Public/Private sector companies like Utility Boiler Manufacturers, Ship Building, Heavy duty Site fabrication, Large Heat Exchanger & Pressure Vessels manufacturers etc. b) Performance certificates to be submitted as Original Certificate or through E-mail directly from the customer. The original performance certificate may be returned after verification by BHEL, if required. c) Full contact details of the customers from whom the performance certificates are obtained are to be provided. d) For obtaining the Performance certificate, a suggestive format is provided.	
1.7	Indian bidders shall submit Audited financial results for the past three financial years (2012-13, 2013-14, 2014-15) and Foreign bidders shall submit D&B report covering past three financial years. The financial results shall be verified and evaluated to examine the financial health of the company. BHEL reserves the right to accept or reject the OEMs based on the assessment of their financial capability.	
1.8	Servicing facility to be available in India. Details on Service-After-Sales Set-Up in India (Address of Agents / Service Centres), to be furnished compulsorily.	
1.9	BHEL reserves the right to accept or reject the OEMs based on the assessment of their technical capability. BHEL reserves the right to verify the information provided by the Vendor for the referred machine at their referred customer's works. It shall be the responsibility of the vendor to facilitate the visit of BHEL's team at their referred customer works. The Travel, Board & Lodging expenses for BHEL Personnel shall be borne by BHEL. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	

SECTION 2

The BIDDER / VENDOR is requested to provide the following information:

S. No.	REQUIREMENTS	VENDOR's RESPONSE
2.1	Details of Design Set-Up and Technology Back-Up (R & D Centre) available with the OEM.	
2.2	Details on 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).	
2.3	Details of Quality System followed (Furnish the salient aspects of the Quality Assurance System followed)	
2.4	Comprehensive Details, on Performance Testing of Welding Machines carried out at the Factory, to be furnished with the Technical Offer.	
2.5	The BIDDER shall give details about supply of similar welding machines to BHEL units if any with Make, Model and Year of Supply & Commissioning etc.	
2.6	A complete reference list of Customers shall be furnished (preferably of Heavy Engg. Companies) to whom such offered model has been supplied in the last ten years with PO details, Qty., Year of commissioning with contact details of the customers.	
2.7	Any Additional Data to supplement the manufacturing capability of the BIDDER.	

SECTION 3

The BIDDER to note:

S. No.	PARTICULARS	VENDOR's RESPONSE
3.1	The BIDDER shall submit the offer in **Two Parts** – 1. Technical [with PART A & PART B] & 2. Commercial and Price Bid.	
3.2	The VENDOR's RESPONSE against each clause in PART A & B of the offer should be filled by the BIDDER compulsorily with complete details.	
3.3	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.	
3.4	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 Power sources.	
3.5	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.	

The performance certificate should be produced **on Customer's Letter Head.**

Suggestive Format of Performance Certificate

(*On Customer's letter head*)

PERFORMANCE CERTIFICATE

1. Supplier of the machine :
2. Make & Model of the m/c :
3. Month & Year of Commissioning :
4. Quantity :
5. Machine Details
   a) Type :
   b) Capacity in Amp. :
   c) Duty Cycle :
6. Application of the welding power sources:
7. Performance of the Machine : Satisfactory / Good / Average / Not Satisfactory
   (Strike off whichever is not applicable)
8. After sales service : Satisfactory / Good / Average / Not Satisfactory
   (Strike off whichever is not applicable)
9. Any Other remarks :

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

IGBT BASED INVERTER CONTROLLED WELDING POWER SOURCE WITH DIGITAL CONTROL FOR SMAW & PULSED TIG WELDING (300 A, 60% duty cycle), Qty – 10 nos.

Part B - Technical Specification

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
1.0	**APPLICATION:** The proposed Welding Machine is intended for Manual TIG (GTAW with pulsed and non-pulsed mode) & SMAW. The machine shall be useful for TIG welding and Manual Arc welding processes for producing Radiographic Quality Welds like Butt Joints (in tubes and pipes), Fillet joints, and Double Groove Weld joints in High Pressure Boiler components using 1.6mm to 4.0mm dia. basic coated stick electrodes.		
2.0	**POWERSOURCE FEATURES**		
2.1	Type	Power source shall be IGBT based Inverter controlled through Digital Signal Processor capable of delivering a Constant Direct Current (in DCEP and DCEN modes of welding operations).	
2.2	Switching Frequency & IGBT	Bidder has to indicate the Switching Frequency of the Inverter Circuit and the make of IGBT used. IGBTs used in the welding power sources shall be of HITACHI, JAPAN/ DYNEX, U.K/ FUJI, JAPAN/ IXYS, USA/ POWEREX, USA/ MITSUBISHI, JAPAN/ TOSHIBA, JAPAN / INFINEON, GERMANY/ SEMIKRON, GERMANY make only.	
2.3	Current Rating	300 A @ 60 % Duty Cycle for both SMAW & TIG welding	
2.4	Operating Range for Welding Current	10 A to 300 A (with step less variation continuously adjustable).	
2.5	Open Circuit Voltage	Preferred OCV is 70 to 75 V. Bidder to mention the Open Circuit Voltage for the offered Power source.	
2.6	Current Setting variation	The variation in the set value of the welding current to the actual value shall not exceed 1%.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.7	Power Source Control	Welding power source shall have digital control or display or setting features. Communication to user panel and welding power source shall be through DSP. The type of control shall be explained by the vendor.	
2.8	Current Control	Current control shall be provided in the Front Panel of Power source and also in the Remote Control Unit by knob control.	
2.9	Control Panel Switches	Power ON/OFF, Remote ON/OFF, Current Control, Hot Start Control, Arc Dynamics Control, GTAW/SMAW Mode selection, Gas Flow control for GTAW process, pulse setting, upslope and Downslope programming etc. are to be provided.	
2.10	Voltmeter & Ammeter	Factory Installed Digital Ammeter & Voltmeter on the front panel with easy removal and replacement (i.e., without lifting the top cover of the Welding Power source) for periodic instrument calibration. Calibration procedure: Details of Input Source like voltage or current, Full scale reading shall be furnished along with the offer which is necessary for calibration. If the input connections to the ammeter and volt meter are taken from PCB, then Calibration kit shall be supplied. The calibration kit shall be comprising of Digital Ammeter, Digital Voltmeter as per specification and a shunt which is connected to the machine output terminals in series with a Load (arranged by BHEL). The Current & Voltage Output of this calibration kit is compared with that of the meters in the Welding Machine. Calibration certificate has to be provided for the display meters.	
2.11	SMAW Arc Strike	Selection for Instantaneous Arc Strike with Hot Start for SMAW Process.	
2.12	TIG Arc ignition	Arc ignition through an “In-Built” High Frequency unit for GTAW. Vendor to confirm	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.13	Arc Dynamics Control - Electronic Inductance Variable Control	Arc dynamics Control shall be built in the machine for minimising the spatter and optimising weld-bead wetting action during welding of special materials like Stainless Steel, T91/P91, Inconel, in addition to Carbon and Low Alloy Steels.	
2.14	Insulation	"Class H" insulation shall be provided to suit Tropical Working Conditions.	
2.15	Machine Protection	IP 23 – Degree of Protection.	
2.16	Machine Cooling	The Power source shall feature a forced air cooling system that ensures adequate cooling of the components while preventing dust and metal particles from being drawn in.	
2.17	Functional / Elemental Design Protection/ operator safety	a) Inbuilt protection for the IGBT/Power source 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. d) Protection against electric shock from input supply as well as HF source for ensuring operator safety.	
2.18	Electromagnetic Interference (EMI) Suppression	a) Power source shall be equipped with a suitable Filter Network connected to the input Power Line, to prevent propagation of EMI/HF noise either into or out of the Power source. b) All metal enclosures and internal shields shall prevent radiated EMI. c) Bidder shall elaborate the Design Features to meet the above requirements.	
2.19	Power source terminals	The power source should have preferably Heavy Duty rugged lug type terminals to connect Welding Cable (for SMAW & TIG Electrode Holder) and Return Current Cable. Vendor to specify	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.20	SMAW Welding Cable	SMAW (current) Cable with a minimum cross sectional area of 50mm^2, 20m in length, with one end connected to the Power source and the free end provided with a female Connector to connect to the male Connector of the Manual Welding Electrode Holder.	
2.21	Return Current Cable	Welding Current return Cable, 20m in length, with one end connected to the Power source and the other end provided with a Screw Type Earth Clamp.	
2.22	Load Compensation	Output variation in terms of fluctuation in line voltage, cable heating or drift caused due to usage of 20m long welding cable, shall be compensated suitably.	
2.23	Torch connection	Facility to connect water cooled TIG Torch through suitable adapters to prevent leakage of water/Coolant for GTAW.	
2.24	Auxiliary Power	110 V AC or low voltage power supply points to Pulse control unit, Water cooling unit, High Frequency unit, etc. when these units are put into operation at the same time, to carry out pulsed TIG welding with water cooled TIG torch.	
2.25	Input Power Cable	5 metre long electric cable with protective sheathing (for 3 phase with potential earth) to be provided with the power source.	
2.26	Power Rating	Bidder to indicate the Maximum Power Rating (kVA) of the Power source and the no-load Power Consumption in Watts.	
2.27	Power Source Model	Vendor to Specify the Model of Power source Offered. (Metallic name plate of the machine shall also include details like name of manufacturer, Serial no, Model No., Year of Mfg. input power in kVA, input voltage, No. of phase, operating frequency, weight of the unit etc.)	
2.28	Portability & Bottle rack	Under-Carriage with hard rubber lined caster wheels for portability of the power source by manual pushing and bottle rack for holding one Argon Gas cylinder.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.29	Ambient Conditions	Temperature up to 50°C; Humidity up to 90% but both upper limits do not occur simultaneously.	
2.30	Input Power Supply	3 Phase AC 415 V ± 10%, 50 Hz ± 2%, through a 3 Wire System (4th wire for Earthing) – No Neutral Conductor.	
3.0	**REMOTE CONTROL UNIT's FEATURES**		
3.1	Application	Remote control unit shall be provided for setting welding current from a distant work place, in addition to that provided in the front panel of the welding power source.	
3.2	Type 1	Remote control unit of type 1 (Hand Operated) with a cable of around 10 m length with quick-fix end connectors shall be provided.	
3.3	Current Control	Step less regulation of Welding Current.	
3.4	Type2	Remote control unit of type 2 (Foot Operated) with a cable of around 10 m length with quick fix end connectors, shall be provided.	
3.5	Dual purpose Remote Control Unit (Optional)	The remote control units (type 1 & 2) offered shall be suitable for both GTAW and SMAW processes. If not, independent remote control units shall be offered for GTAW and SMAW, in both Types.	
4.0	**PULSE CONTROL UNIT FEATURES**		
4.1	Application	Compatible to power source described under S no 2.0 having built-in high frequency unit. To work on the auxiliary power supply from the power source.	
4.2	Pulse range	Preferred 0 to 200 pulses per second.	
4.3	Current up-slope	Preferred 0.1 to 10 seconds.	
4.4	Current down slope	Preferred 0.1 to 20 seconds.	
4.5	Purge gas pre-flow	Preferred 0.1 to 30 seconds.	
4.6	Purge gas post-flow	Preferred 1 to 60 seconds.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
4.7	Front Panel Controls	To Provide: a) Peak amperage adjustment. b) Background amperage adjustment. c) Pulses per second adjustment. d) Pulse 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 and down-slope Time control.	
5.0	**WATER COOLING UNIT FEATURES**		
5.1	Application	Compatible for the power source described under S.no. 2.0 and provided with suitable quick fix end connectors for connecting water cooled TIG welding torch. To work on the auxiliary power supply from the power source and to be provided with an ON-OFF switch.	
5.2	Type	Water cooling unit shall be of air cooled radiator type. Vendor to confirm.	
5.3	Coolant tank capacity	a) Tank capacity shall be sufficient enough to feed water cooled TIG Torch fitted with cables & hoses of length around 8m and with required buffer quantity to meet the continuous welding applications. b) The tank capacity shall not be less than 5 litres. Bidder to specify the tank capacity.	
5.4	Alarm indicators	a) To be provided with an alarm indicator 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 indicator.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
5.5	Inter connecting hoses	Well reinforced water circulation hoses are to be provided for the inter connection between welding power source and water cooling unit.	
6.0	**WATER COOLED TIG WELDING TORCHES**		
6.1	Application	Suitable for GTAW process and for the nature of welding works listed under S. no. 1.0 and compatible to the welding power source offered.	
6.2	Make	Preferred makes are Weld Craft, Abicor Binzel or any other reputed make acceptable to BHEL.	
6.3	Current Rating	a) Current rating: 200 to 250 A @100% Duty cycle. b) Cable length: Around 8m	
6.4	Torch configuration	The torch Head-gas lens & nozzles configuration shall be suitable for performing Tube butt welds in close pitch tubular panels with a minimum clear gap of 12mm between the adjacent tubes (gas nozzle end diameter is to be 11mm for a length of 25mm). Max. Tungsten electrode dia. 2.4 mm	
6.5	Cable sheathing	Protective sheathing to be provided for the entire length of TIG Torch cables & Hoses, to withstand shopfloor rough usage.	

S. No.	BHEL SPECIFICATION	OFFER BY BIDDER
7.0	**SCOPE OF SUPPLY:** The scope of supply shall consist of the following:	
7.1	Welding Power source with Transport Trolley with wheels and integrated Argon gas Cylinder Cart (for one argon gas cylinder only) along with 5m long input power cable with protective sheathing.	
7.2	Control Unit Integrated with Power source.	
7.3	Power source shall be integrated with TIG control unit for GTAW featuring high frequency Arc ignition, Pulsed TIG & Non-pulsed TIG options Upslope & Down slope.	
7.4	Hand Operated Remote Control Unit.	
7.5	Foot operated Remote Control Unit.	
7.6	Set of Inter-Connecting Cables, Adapters , hoses etc.	
7.7	Closed circuit water cooling unit for use with water cooled TIG welding torch with 8m length cables.	
7.8	SMAW Welding Cable with Electrode Holder.	
7.9	Return Current Cable with Screw Type Earth Clamp.	
7.10	Water cooled TIG welding Torch with Flexible Neck – 8m length	
7.11	IGBT test certificate	
7.12	Calibration certificate for Display meters.	
7.13	Calibration kit if necessary	
7.14	**OPTIONAL:** Program loader shall be supplied if the power source is pre-programmed.	
7.15	Electrical & Mechanical Spares for Power source & Control Unit.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
8.0	**SPARES :**		
8.1	Power Source	All type of Spare Parts required for 2 years of trouble free operation on three shift basis including the following items shall be quoted (with qty and Unit Rate): IGBT Kit, All Types of Fuses, Control Transformers, Printed Circuit Boards / PCBs – All Types, Rectifiers, Thermistors, Capacitors, Switches and Knobs, Cooling Fan Motor, Ammeter & Voltmeter, Potentiometer / other Panel components, Relays & Timers, Receptacles, Control Cable with End Connectors, Filters, Welding & Return Cable Connectors, Coolant feed pump, Auxiliary power cable with end connectors, Coolant Hose with Quick fix end connectors.	
8.2	TIG Torch consumables	Complete set of consumable spares for ø2.4mm Tungsten electrode, 'O' Rings, Gas lens, nozzle/diffusers, ceramic nozzles (both types), collet bodies, etc. are to be offered with unit price.	
8.3	Remote Control Unit	Complete Set of Spares for Remote Control Unit to be offered.	
9.0	**O & M MANUALS :**		
9.1	No. of Copies	3 for Each Machine.	
9.2	Language	English.	
9.3	Soft Copy	One soft copy in CD-ROM or pen drive is to be given for each machine, containing the details mentioned under Sl. No. 9.4.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
9.4	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, calibration procedure & certificates for digital ammeter/voltmeter etc. d) Master List of Parts & Spares used in the machine with Make, Model, Rating, Part number etc.	
10.0	**GENERAL POINTS :**		
10.1	Bought-Out Items	a) The manufacturer's original test certificate for the IGBTs used in the power sources shall be provided with the equipment. These shall be verified during pre-dispatch inspection. b) The Bought-Out Items - like Motors, ICs, Relays, Contactors, Switches, Electronic Elements, etc., used in the Power source & Control Unit shall be of reputed makes acceptable to BHEL. c) Bidder to furnish the makes of Bought-Out Items, along with the offer.	
10.2	Weight	Bidder to specify the Weight of the power source	
10.3	Pre-dispatch Inspection	The welding machines shall be offered for inspection by BHEL Engineers at supplier's works for performance evaluation prior to despatch.	
10.4	Commissioning	Commissioning and performance prove out of the offered equipment at BHEL works, by the supplier's representative.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
10.5	Performance prove out at BHEL works	a) Welding Trials are to be taken on butt joints of carbon & alloy steel tubes (Tube OD 38.1 mm x Th 4mm to 10mm wall thickness), S.S. tubes (OD 17.0mm X Th 2.0 mm) & Titanium Tubes (OD 18 mm x Th 2.5 mm) and subjected to radiographic tests for acceptance. b) BHEL will provide necessary jobs and electrodes for SMAW and TIG welding trials.	
10.6	Training	The Supplier's Service Engineer shall give training in the Operation and Maintenance (mainly on electric/electronic troubleshooting) of the Machine to BHEL Staff, during commissioning of the Welding Machines.	
10.7	Guarantee	The machine shall be guaranteed for a minimum of 24 months from the date of commissioning at BHEL.	