



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY		Phone: +91 431 257 7653	
NOTICE INVITING TENDER		Email : skaruna@bheltry.co.in	
		ajay@bheltry.co.in	
		Web : www.bhel.com	
TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2631700092	16.11.2017	08.12.2017

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.

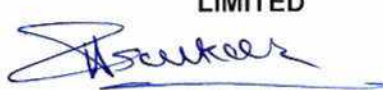
Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity
10	IGBT based Inverter Controlled Welding Power source with full digital control for SMAW & Pulsed TIG welding (400 amps) with TIG torch cable length 8 meters	11 Nos.
20	IGBT based Inverter Controlled Welding Power source with full digital control for SMAW & Pulsed TIG welding (400 amps) with TIG torch cable length 16 meters	02 Nos.
30	IGBT based Inverter Controlled Welding Power source with full digital control for SMAW & Pulsed TIG welding (400 amps) with TIG torch cable length 20 meters	01 No.
	as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or https://eprocure.gov.in/epublish/app)	

Important points to be taken care during submission of offer.

1. Compliance Form No: TRY / IMP/02 or TRY/ IND/ 02A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
2. Delivery period required is 4 months from the date of P.O.
3. Commissioning and performance prove out shall be done at BHEL Trichy by the supplier
4. Time period required for commissioning and performance prove out shall be 1 Month from the date of intimation by BHEL
5. EMD for this tender Rs.1,50,000/-
6. 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.

BHEL's General guidelines / instructions (refer MM/CE/GENL/001- EMD), compliance form and technical specification can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <https://eprocure.gov.in/epublish/app> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference.

(This is not an E-tender, please submit your offer in hard copies)	
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  AJAY V. ASALKAR Sr. MANAGER MM / Capital Equipment BHEL, Tiruchirappalli - 620 014 Sr. Manager / Capital Equipment / MM

IGBT BASED INVERTER CONTROLLED WELDING POWER SOURCE WITH FULL DIGITAL CONTROL FOR SMAW & PULSED TIG WELDING (400 Amps), Qty – 11 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 FOUR Years (as on the initial date of opening of tender) of Continuous Experience in Design, Manufacture & Supply of “IGBT based Inverter controlled Welding Power Sources with Full Digital control” 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 4 years (as on the initial date of opening of tender), at least 10 Nos. of the model quoted against this tender or a model with higher rating of “IGBT based Inverter controlled Welding Power Source with Full Digital Control for SMAW & Pulsed TIG welding” to any of the customers. 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 with full digital control for SMAW & Pulsed TIG welding” supplied & commissioned till date.	
1.4	Year of Launch of the Model quoted 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 should submit at least one Performance Certificate from any of the customers (especially from Heavy Engineering / Fabrication, Public/Private sector companies like Utility Boiler Manufacturers, Ship Building etc.) for satisfactory performance of the model quoted against this tender or a model with higher rating for a minimum period of one year from the date of commissioning (as on the initial date of opening of tender), supplied to such customers in the last four years. Full contact details of the customers from whom the performance certificate is obtained are to be provided. For obtaining the Performance certificate, a suggestive format is provided in Annexure A.	
1.7	Service centre to be available in India. Details on Service-After-Sales Set-Up in India (Address of Agents / Service Centres), to be furnished compulsorily.	
1.8	BHEL reserves the right to accept or reject the BIDDER /VENDOR (OEM) offer 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.	

S. No.	REQUIREMENTS	VENDOR's RESPONSE
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.	

ANNEXURE A

(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 :
 - d) TIG torch cable length in metres :
6. Application of the welding power sources:
7. Performance of the Machine : Satisfactory / Not Satisfactory
(Strike off whichever is not applicable)
8. After sales service : Satisfactory / 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 FULL DIGITAL CONTROL FOR SMAW & PULSED TIG WELDING (400 Amps), Qty – 11 nos.

Part B - Technical Specification

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
1.0	APPLICATION: The Full Digitally controlled 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), Groove Fillet joints, Butt joint, Double V Joint, Sheet Welding, Tube Fillet Joints, Plate Butt Joints, Tube Butt joints. The power source should be capable of welding the following materials: (i) Carbon Steel (ii) Alloy Steel (iii) Stainless Steel (iv) Titanium and its alloys (v) Nickel based alloys		
2.0	POWER SOURCE FEATURES		
2.1	Type	Power source shall be IGBT based Inverter controlled through microprocessor with full digital control 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 Amps @ 60 % Duty Cycle. Vendor to confirm and specify the duration of the duty cycle in minutes	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.4	Operating Range for Welding Current	5 to 400 Amps (with step less variation continuously adjustable) for SMAW & TIG welding	
2.5	Open Circuit Voltage	Preferred OCV is 80 to 90 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%.	
2.7	Power Source Control	Welding power source shall be fully digitally controlled, with suitable display and setting features. The power source shall have a microprocessor based control system. The digital control feature to be explained by the vendor.	
2.8	Inbuilt Memory	The welding power source shall have inbuilt memory storage for storing the TIG welding parameters and function selection. It shall be able to store at least 10 welding programs for TIG function with easy recall of stored programs. Vendor to confirm and specify	
2.9	Memory Resetting	The power source should have a provision to reset/restore the Microprocessor memory to the design/factory settings in case of the memory / system software gets corrupted or shows an error OR A Program loader/suitable kit for the same shall be supplied. Vendor to provide details.	
2.10	Digital display meters	Factory Installed Digital display meters on the front panel with easy removal and replacement for periodic instrument calibration: (a) For display of Current and voltage simultaneously. (b) The accuracy of the Digital meters shall be +/-1% of FSV (c) For display of the set current value as well as the actual value during welding, either concurrently (or) through a selective function. (d) For display of the process conditions / pulsed TIG welding parameters and other alarms / warning messages or the same shall be displayed on LCD or other type of display. Vendor to specify.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.10.1	Calibration of digital display meters	a) The welding machine shall have the capability for onsite calibration facility. b) Details of Input Source like voltage or current, full scale reading shall be furnished along with the offer which is necessary for calibration. c) If the input connections to the display meters are taken from PCB, then the detailed procedure for calibration of display meters in the welding machine shall be provided by the vendor d) The display meters shall have error correction facility	
2.11	SMAW Arc Strike	Selection for Instantaneous Arc Strike with Hot Start for SMAW Process.	
2.12	TIG Arc ignition	TIG Arc ignition through an “In-Built” High Frequency unit. Vendor to confirm	
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 Titanium, Stainless Steel, 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. Vendor to confirm and specify	
2.16	Alarms / Indicators on panel	Power ON/OFF. Vendor to specify	
2.17	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.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.18	Functional / Elemental Design Protection/ operator safety	a) Inbuilt protection for the IGBT/Power source against Thermal / Overload / Short-Circuit / Single or Three 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.	
2.19	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.	
2.20	Power source terminals	The power source should have Heavy Duty terminals male and female socket type quick fix connectors to connect Welding Cable (for SMAW & TIG Electrode Holder) and Return Current Cable. Vendor to specify	
2.21	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.	
2.22	Return Current Cable	Welding Current return Cable, 20 m in length, with one end connected to the Power source and the other end provided with a Screw Type Earth Clamp.	
2.23	Load Compensation	Output variation in terms of fluctuation in line voltage, cable heating or drift caused due to usage of 20 m long welding cable, shall be compensated suitably.	
2.24	Torch connection	Facility to connect water cooled TIG Torch through suitable adapters to prevent leakage of water/Coolant for GTAW.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.25	Inbuilt Auxiliary Power	Power supply to aux. units such as Pulse control unit, Water cooling unit, High Frequency unit, etc. shall be fed & regulated from the welding power source itself.	
2.26	Input Power Cable	15 metre long, 4 core electric cable with protective sheathing (for 3 phase & potential earth) to be provided with each power source.	
2.27	Power Rating	Bidder to indicate the Maximum Power Rating (kVA) of the Power source and the no-load Power Consumption in Watts.	
2.28	Power Source Make and Model	Vendor to Specify the Make and 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.)	
2.29	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.	
2.30	Ambient Conditions	Temperature up to 50°C; Humidity up to 90% but both upper limits do not occur simultaneously.	
2.31	Input Power Supply	3 Phase AC 415 V $\pm$ 10%, 50 Hz $\pm$ 2%, through a 3 Wire System (4 th wire for Earthing) – No Neutral Conductor.	
3.0	REMOTE CONTROL FEATURES		
3.1	Application	Remote control unit shall be provided for setting welding current from a distant work place.	
3.2	Type 1 – Hand operated	Hand Operated type Remote control unit for Step less regulation of Welding Current. The remote control shall be provided with cable of around 10 m length with quick fix end connectors.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
3.3	Type 2 – Foot operated	Foot Operated pedal type Remote control unit to vary the current from minimum to maximum set value by pedalling action. The maximum current value shall be set at the control panel only. Any Knob type control in the foot operated remote control is not acceptable. The remote control shall be provided with cable of around 10 m length with quick fix end connectors.	
3.4	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 FEATURES		
4.1	Pulse range	Preferred 0 to 200 pulses per second. Vendor to specify	
4.2	Current up-slope	Preferred 0.1 to 10 seconds. Vendor to specify	
4.3	Current down slope	Preferred 0.1 to 10 seconds. Vendor to specify	
4.4	Purge gas pre-flow	Preferred 0.1 to 10 seconds. Vendor to specify	
4.5	Purge gas post-flow	Preferred 1 to 30 seconds. Vendor to specify	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
5.0	Front Panel Controls (GTAW and SMAW modes)	The following welding parameters shall be displayed on the digital display meters or on an LCD kind of display for setting:- a) Peak amperage adjustment. b) Background amperage adjustment. c) Pulses per second adjustment. d) Gas Pre-flow & Post flow time control. e) Welding current up-slope and down-slope Time control. f) Pulse On / Off. g) Power On / Off. h) Amperage Remote/Panel Control. i) TIG / SMAW selection j) 2T / 4T selection k) Arc force l) Hot start Vendor to provide the list of all the controls available.	
6.0	WATER COOLING UNIT FEATURES		
6.1	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.	
6.2	Type	Water cooling unit shall be of air cooled radiator type. Vendor to confirm.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
6.3	Coolant tank capacity	a) Tank capacity shall be sufficient enough not less than 3 litres to circulate water to the TIG Torch fitted with cables & hoses (as per S No. 7.0) and with required buffer quantity to meet the continuous welding applications. Bidder to specify the tank capacity b) The water cooling unit shall be provided with external filter and easy fill spout. c) Type of coolant: Demineralised water. Vendor to specify if any special coolant is recommended.	
6.4	Make and Model	Vendor to specify	
6.5	Alarm indicators	To be provided with an alarm indicator for failure of coolant circulating pump, radiator fan, low level of coolant, failure of coolant flow etc. Bidder to specify the type of alarm indicator.	
6.6	Inter connecting hoses	Well reinforced water circulation hoses are to be provided for the inter connection between welding power source and water cooling unit.	
7.0	TIG WELDING TORCHES - Water Cooled Type		
7.1	Application	Light weight water cooled TIG torches 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.	
7.2	Type 1 TIG torch	TIG torch of any of the following makes KEMPPI, WELD CRAFT, ABICOR BINZEL or any other reputed make acceptable to BHEL with the following parameters: a) Current rating: 220 to 250 A @100% Duty cycle. b) Cable length: Around 8m Quantity:- 11 nos.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
7.2.1	Torch configuration	(a) The torch shall be light in weight. (b) The joint between TIG Torch head and the cables shall be flexible type preferably with bellows / ball joint type etc. for easy manoeuvring of the torch during TIG welding in confined jobs where all position welding is involved. Vendor to specify (c) 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. 3.2 mm (max.)	
7.3	Type 2 TIG torch	The torch shall be with a Long flexible neck with approx. dimensions as per the sketch given in the Annexure 1 of any reputed make acceptable to BHEL with the following parameters: (a) Current rating: 220 to 250 A @100% Duty cycle. (b) Cable length: Around 8m Quantity:- 2 nos.	
7.4	Type 3 TIG torch (OPTIONAL)	The torch shall be with approx. dimensions as per the sketch given in the Annexure 2 of any reputed make acceptable to BHEL with the following parameters: (c) Current rating: Around 200 A @100% Duty cycle. (d) Cable length: Around 8m Quantity:- 2 nos.	
7.5	Cable sheathing	Protective sheathing to be provided for the entire length of TIG Torch cables & Hoses, to withstand shopfloor rough usage.	
8.0	SCOPE OF SUPPLY: The scope of supply shall consist of the following:		
8.1	Welding Power source with Transport Trolley with wheels and integrated Argon gas Cylinder Cart (for one argon gas cylinder only), gas hose for connecting the Argon cylinder regulator to the welding power source (Argon gas cylinder and regulator – BHEL scope) and with 5m long input power cable with protective sheathing.		

S. No.	BHEL SPECIFICATION	OFFER BY BIDDER
8.2	Control Unit Integrated with Power source.	
8.3	Power source shall be integrated with TIG control unit for GTAW featuring high frequency Arc ignition, Pulsed TIG & Non-pulsed TIG options.	
8.4	Hand Operated Remote Control Unit.	
8.5	Foot operated Remote Control Unit.	
8.6	Set of Inter-Connecting Cables, Adapters , hoses etc.	
8.7	Closed circuit water cooling unit for use with water cooled TIG welding torch with 8m length cables.	
8.8	SMAW Welding Cable with Electrode Holder.	
8.9	Return Current Cable with Screw Type Earth Clamp.	
8.10	Water cooled TIG welding Torch Type 1	
8.11	Water cooled TIG welding Torch Type 2	
8.12	Optional: Water cooled TIG welding Torch Type 3	
8.13	IGBT batch test certificate from the manufacturer	
8.14	Interconnecting gas hose with necessary adaptors to connect the inlet point of the power source to the argon gas cylinders.	
8.15	Program loader / suitable kit if necessary.	
8.16	Electrical & Mechanical Spares for Power source & Control Unit.	
9.0	SPARES :	

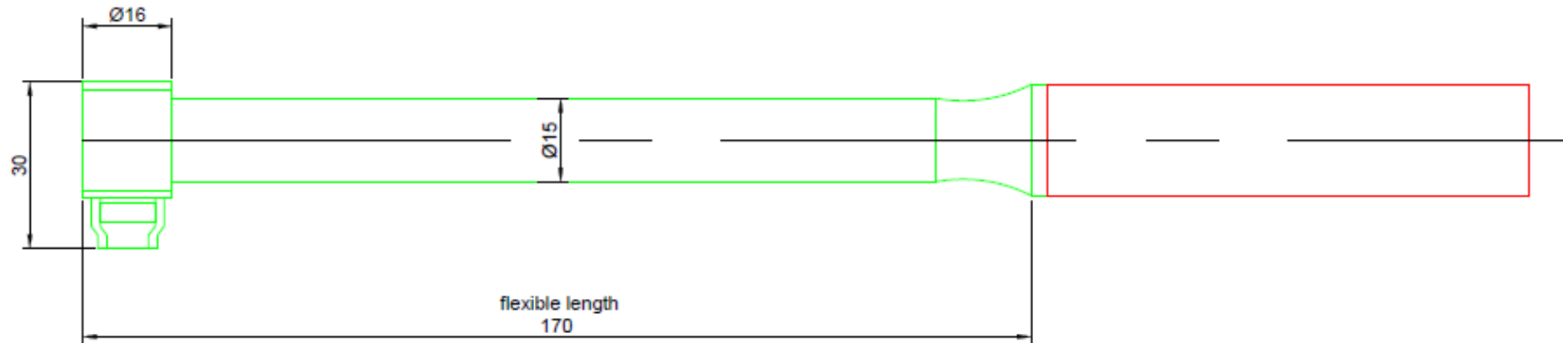
S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
9.1	Power Source	All type of Spare Parts required for 2 years of trouble free operation on three shift basis including the following items shall be quoted (with qty and Unit Rate): IGBT Kit, All Types of Fuses, Control Transformers, Printed Circuit Boards / 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.	
9.2	TIG Torch consumables	Complete set of consumable spares for ø 2.4 mm and 3.2 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	Remote Control Unit	Complete Set of Spares for Remote Control Unit to be offered.	
10.0	O & M MANUALS (in English Language) :		

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
10.1	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 alarm list, troubleshooting chart, weld parameters selection for various base metals, welding programming, memory resetting procedure etc. d) Master List of Parts & Spares used in the machine with Make, Model, Rating, Part number etc. e) The OEM specified calibration procedure for the measuring instruments in the welding machine and the calibration certificate for the display meters.	
10.2	No. of Copies	3 sets (Hard copies) for Each Machine.	
10.3	Soft Copy	One soft copy in CD-ROM or pen drive is to be given for each machine, containing the details mentioned under Manual details	
11.0	GENERAL POINTS :		
11.1	Bought-Out Items	a) 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. b) Bidder to furnish the makes of Bought-Out Items, along with the offer.	
11.2	Weight	Bidder to specify the Weight of the power source	
11.3	Pre-dispatch Inspection	The welding machines shall be offered for inspection by BHEL Engineers at supplier's works for performance evaluation prior to despatch.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
11.4	Installation & Commissioning	Installation, Commissioning and performance prove out of the offered equipment at BHEL works, by the supplier's representative.	
11.5	Performance prove out at BHEL works	Welding Trials are to be taken on butt joints of a) Tube OD x Thick:- 17.0 mm x 2.0 mm (S.S. tubes), 18 mm x 2.5 mm (Titanium Tubes), Titanium Plate Welding (Thk 14 mm), & Titanium Sheet Welding (Thick 1.5-2mm) and subjected to radiographic tests for acceptance. b) BHEL will provide necessary jobs and electrodes for SMAW and TIG welding trials. c) The welding machine meters shall be tested on site at BHEL Trichy works with the resistive load and the accuracy of the meter readings will be compared with the BHEL's reference master instruments.	
11.6	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.	
11.7	Guarantee	The machine shall be guaranteed for a minimum of 24 months from the date of commissioning at BHEL.	

ANNEXURE 1

Water cooled Torch with Long flexible neck

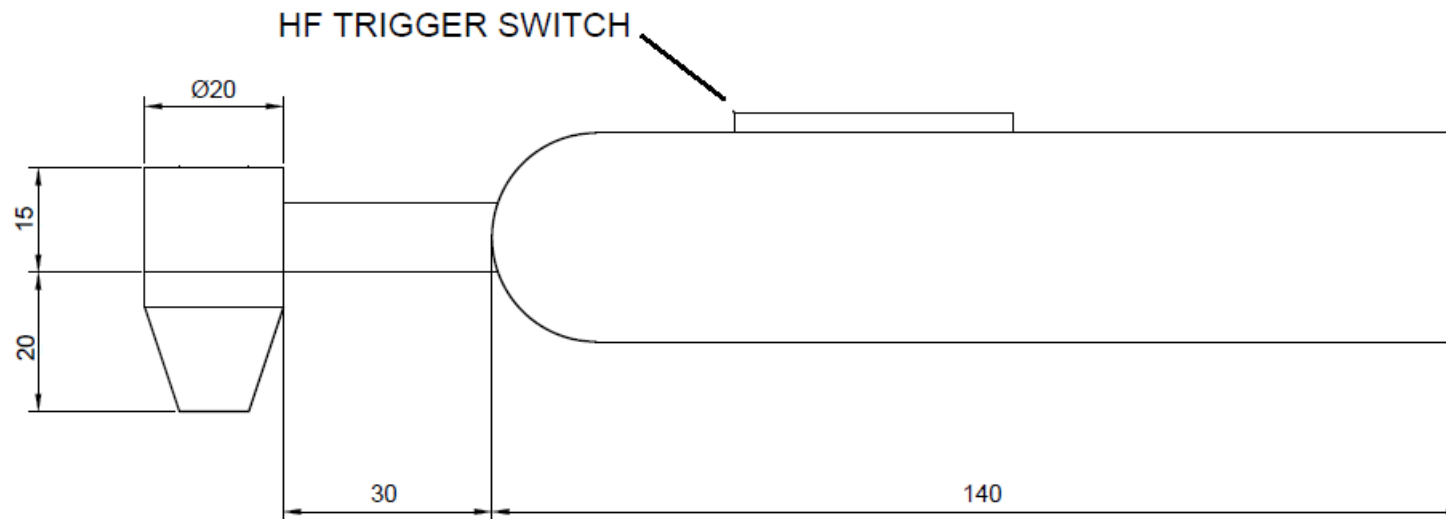


All dimensions are in mm

The dimensions shown are approximate values only

ANNEXURE 2

Water cooled Torch – small type



All dimensions are in mm

The dimensions shown are approximate values only



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY		Phone: +91 431 257 7653	
NOTICE INVITING TENDER		Email : skaruna@bheltry.co.in	
		ajay@bheltry.co.in	
		Web : www.bhel.com	
TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2631700092	16.11.2017	08.12.2017

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 full digital control for SMAW & Pulsed TIG welding (400 amps) with TIG torch cable length 8 meters	11 Nos.
20	IGBT based Inverter Controlled Welding Power source with full digital control for SMAW & Pulsed TIG welding (400 amps) with TIG torch cable length 16 meters	02 Nos.
30	IGBT based Inverter Controlled Welding Power source with full digital control for SMAW & Pulsed TIG welding (400 amps) with TIG torch cable length 20 meters	01 No.
	as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or https://eprocure.gov.in/epublish/app)	

Important points to be taken care during submission of offer.

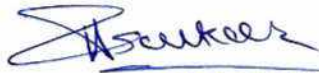
1. Compliance Form No: TRY / IMP/02 or TRY/ IND/ 02A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
2. Delivery period required is 4 months from the date of P.O.
3. Commissioning and performance prove out shall be done at BHEL Trichy by the supplier
4. Time period required for commissioning and performance prove out shall be 1 Month from the date of intimation by BHEL
5. EMD for this tender Rs.1,50,000/-
6. 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.

BHEL's General guidelines / instructions (refer MM/CE/GENL/001- EMD), compliance form and technical specification can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <https://eprocure.gov.in/epublish/app> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference.

(This is not an E-tender, please submit your offer in hard copies)

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**



AJAY V. ASALKAR

Sr. MANAGER

MM / Capital Equipment

BHEL, Tiruchirappalli - 620 014
Sr. Manager / Capital Equipment / MM

IGBT BASED INVERTER CONTROLLED WELDING POWER SOURCE WITH FULL DIGITAL CONTROL FOR SMAW & PULSED TIG WELDING (400 Amps), Qty – 2 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 FOUR Years (as on the initial date of opening of tender) of Continuous Experience in Design, Manufacture & Supply of “IGBT based Inverter controlled Welding Power Sources with Full Digital control” 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 4 years (as on the initial date of opening of tender), at least 10 Nos. of the model quoted against this tender or a model with higher rating of “IGBT based Inverter controlled Welding Power Source with Full Digital Control for SMAW & Pulsed TIG welding” to any of the customers. 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 with full digital control for SMAW & Pulsed TIG welding” supplied & commissioned till date.	
1.4	Year of Launch of the Model quoted 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 should submit at least one Performance Certificate from any of the customers (especially from Heavy Engineering / Fabrication, Public/Private sector companies like Utility Boiler Manufacturers, Ship Building etc.) for satisfactory performance of the model quoted against this tender or a model with higher rating for a minimum period of one year from the date of commissioning (as on the initial date of opening of tender), supplied to such customers in the last four years. Full contact details of the customers from whom the performance certificate is obtained are to be provided. For obtaining the Performance certificate, a suggestive format is provided in Annexure A.	
1.7	Service centre to be available in India. Details on Service-After-Sales Set-Up in India (Address of Agents / Service Centres), to be furnished compulsorily.	
1.8	BHEL reserves the right to accept or reject the BIDDER /VENDOR (OEM) offer 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)	

S. No.	REQUIREMENTS	VENDOR's RESPONSE
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.	

ANNEXURE A

(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 :
 - d) TIG torch cable length in metres :
6. Application of the welding power sources:
7. Performance of the Machine : Satisfactory / Not Satisfactory
(Strike off whichever is not applicable)
8. After sales service : Satisfactory / 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 FULL DIGITAL CONTROL FOR SMAW & PULSED TIG WELDING (400 Amps), Qty – 2 nos.

Part B - Technical Specification

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
1.0	APPLICATION: The Full Digitally controlled 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), Groove Fillet joints, Butt joint, Double V Joint, Sheet Welding, Tube Fillet Joints, Plate Butt Joints, Tube Butt joints. The power source should be capable of welding the following materials: (i) Carbon Steel (ii) Alloy Steel (iii) Stainless Steel (iv) Titanium and its alloys (v) Nickel based alloys		
2.0	POWER SOURCE FEATURES		
2.1	Type	Power source shall be IGBT based Inverter controlled through microprocessor with full digital control 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 Amps @ 60 % Duty Cycle. Vendor to confirm and specify the duration of the duty cycle in minutes	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.4	Operating Range for Welding Current	5 to 400 Amps (with step less variation continuously adjustable) for SMAW & TIG welding	
2.5	Open Circuit Voltage	Preferred OCV is 80 to 90 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%.	
2.7	Power Source Control	Welding power source shall be fully digitally controlled, with suitable display and setting features. The power source shall have a microprocessor based control system. The digital control feature to be explained by the vendor.	
2.8	Inbuilt Memory	The welding power source shall have inbuilt memory storage for storing the TIG welding parameters and function selection. It shall be able to store at least 10 welding programs for TIG function with easy recall of stored programs. Vendor to confirm and specify	
2.9	Memory Resetting	The power source should have a provision to reset/restore the Microprocessor memory to the design/factory settings in case of the memory / system software gets corrupted or shows an error OR A Program loader/suitable kit for the same shall be supplied. Vendor to provide details.	
2.10	Digital display meters	Factory Installed Digital display meters on the front panel with easy removal and replacement for periodic instrument calibration: (a) For display of Current and voltage simultaneously. (b) The accuracy of the Digital meters shall be +/-1% of FSV (c) For display of the set current value as well as the actual value during welding, either concurrently (or) through a selective function. (d) For display of the process conditions / pulsed TIG welding parameters and other alarms / warning messages or the same shall be displayed on LCD or other type of display. Vendor to specify.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.10.1	Calibration of digital display meters	a) The welding machine shall have the capability for onsite calibration facility. b) Details of Input Source like voltage or current, full scale reading shall be furnished along with the offer which is necessary for calibration. c) If the input connections to the display meters are taken from PCB, then the detailed procedure for calibration of display meters in the welding machine shall be provided by the vendor d) The display meters shall have error correction facility	
2.11	SMAW Arc Strike	Selection for Instantaneous Arc Strike with Hot Start for SMAW Process.	
2.12	TIG Arc ignition	TIG Arc ignition through an “In-Built” High Frequency unit. Vendor to confirm	
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 Titanium, Stainless Steel, 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. Vendor to confirm and specify	
2.16	Alarms / Indicators on panel	Power ON/OFF, Vendor to specify	
2.17	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.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.18	Functional / Elemental Design Protection/ operator safety	a) Inbuilt protection for the IGBT/Power source against Thermal / Overload / Short-Circuit / Single or Three 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.	
2.19	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.	
2.20	Power source terminals	The power source should have Heavy Duty terminals - male and female socket type quick fix connectors to connect Welding Cable (for SMAW & TIG Electrode Holder) and Return Current Cable. Vendor to specify	
2.21	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.	
2.22	Return Current Cable	Welding Current return Cable, 20 m in length, with one end connected to the Power source and the other end provided with a Screw Type Earth Clamp.	
2.23	Load Compensation	Output variation in terms of fluctuation in line voltage, cable heating or drift caused due to usage of 20 m long welding cable, shall be compensated suitably.	
2.24	Torch connection	Facility to connect water cooled TIG Torch through suitable adapters to prevent leakage of water/Coolant for GTAW.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.25	Inbuilt Auxiliary Power	Power supply to aux. units such as Pulse control unit, Water cooling unit, High Frequency unit, etc. shall be fed & regulated from the welding power source itself.	
2.26	Input Power Cable	15 metre long, 4 core electric cable with protective sheathing (for 3 phase & potential earth) to be provided with each power source.	
2.27	Power Rating	Bidder to indicate the Maximum Power Rating (kVA) of the Power source and the no-load Power Consumption in Watts.	
2.28	Power Source Make and Model	Vendor to Specify the Make and 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.)	
2.29	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.	
2.30	Ambient Conditions	Temperature up to 50°C; Humidity up to 90% but both upper limits do not occur simultaneously.	
2.31	Input Power Supply	3 Phase AC 415 V $\pm$ 10%, 50 Hz $\pm$ 2%, through a 3 Wire System (4 th wire for Earthing) – No Neutral Conductor.	
3.0	REMOTE CONTROL FEATURES		
3.1	Application	Remote control unit shall be provided for setting welding current from a distant work place.	
3.2	Type 1 – Hand operated	Hand Operated type Remote control unit for Step less regulation of Welding Current. The remote control shall be provided with cable preferably of around 20 m length with quick fix end connectors.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
3.3	Type 2 – Foot operated	Foot Operated pedal type Remote control unit to vary the current from minimum to maximum set value by pedalling action. The maximum current value shall be set at the control panel only. Any Knob type control in the foot operated remote control is not acceptable. The remote control shall be provided with cable preferably of around 20 m length with quick fix end connectors.	
3.4	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 FEATURES		
4.1	Pulse range	Preferred 0 to 200 pulses per second. Vendor to specify	
4.2	Current up-slope	Preferred 0.1 to 10 seconds. Vendor to specify	
4.3	Current down slope	Preferred 0.1 to 10 seconds. Vendor to specify	
4.4	Purge gas pre-flow	Preferred 0.1 to 10 seconds. Vendor to specify	
4.5	Purge gas post-flow	Preferred 1 to 30 seconds. Vendor to specify	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
5.0	Front Panel Controls (GTAW and SMAW modes)	The following welding parameters shall be displayed on the digital display meters or on an LCD kind of display for setting:- a) Peak amperage adjustment. b) Background amperage adjustment. c) Pulses per second adjustment. d) Gas Pre-flow & Post flow time control. e) Welding current up-slope and down-slope Time control. f) Pulse On / Off. g) Power On / Off. h) Amperage Remote/Panel Control. i) TIG / SMAW selection j) 2T / 4T selection k) Arc force l) Hot start Vendor to provide the list of all the controls available.	
6.0	WATER COOLING UNIT FEATURES		
6.1	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.	
6.2	Type	Water cooling unit shall be of air cooled radiator type. Vendor to confirm.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
6.3	Coolant tank capacity	a) Tank capacity shall be sufficient enough not less than 3 litres to circulate water to the TIG Torch fitted with cables & hoses (as per S No. 7.0) and with required buffer quantity to meet the continuous welding applications. Bidder to specify the tank capacity b) The water cooling unit shall be provided with external filter and easy fill spout. c) Type of coolant: Demineralised water. Vendor to specify if any special coolant is recommended.	
6.4	Make and Model	Vendor to specify	
6.5	Alarm indicators	To be provided with an alarm indicator for failure of coolant circulating pump, radiator fan, low level of coolant, failure of coolant flow etc. Bidder to specify the type of alarm indicator.	
6.6	Inter connecting hoses	Well reinforced water circulation hoses are to be provided for the inter connection between welding power source and water cooling unit.	
7.0	TIG WELDING TORCHES - Water Cooled Type		
7.1	Application	Light weight water cooled TIG torches 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.	
7.2	TIG torch	TIG torch of any of the following makes KEMPPI, WELD CRAFT, ABICOR BINZEL or any other reputed make acceptable to BHEL with the following parameters: a) Current rating: 220 to 250 A @100% Duty cycle. b) Cable length: Around 16m	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
7.2.1	Torch configuration	(a) The torch shall be light in weight. (b) The joint between TIG Torch head and the cables shall be flexible type preferably with bellows / ball joint type etc. for easy manoeuvring of the torch during TIG welding in confined jobs where all position welding is involved. Vendor to specify. (c) 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. 3.2 mm (max.)	
7.3	Cable sheathing	Protective sheathing to be provided for the entire length of TIG Torch cables & Hoses, to withstand shopfloor rough usage.	
8.0	SCOPE OF SUPPLY: The scope of supply shall consist of the following:		
8.1	Welding Power source with Transport Trolley with wheels and integrated Argon gas Cylinder Cart (for one argon gas cylinder only), gas hose for connecting the Argon cylinder regulator to the welding power source (Argon gas cylinder and regulator – BHEL scope) and with 5m long input power cable with protective sheathing.		
8.2	Control Unit Integrated with Power source.		
8.3	Power source shall be integrated with TIG control unit for GTAW featuring high frequency Arc ignition, Pulsed TIG & Non-pulsed TIG options.		
8.4	Hand Operated Remote Control Unit.		
8.5	Foot operated Remote Control Unit.		
8.6	Set of Inter-Connecting Cables, Adapters , hoses etc.		
8.7	Closed circuit water cooling unit for use with water cooled TIG welding torch with 8m length cables.		
8.8	SMAW Welding Cable with Electrode Holder.		

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
8.9	Return Current Cable with Screw Type Earth Clamp.		
8.10	Water cooled TIG welding Torch		
8.11	IGBT batch test certificate from the manufacturer		
8.12	Interconnecting gas hose with necessary adaptors to connect the inlet point of the power source to the argon gas cylinders.		
8.13	Program loader / suitable kit if necessary.		
8.14	Electrical & Mechanical Spares for Power source & Control Unit.		
9.0	SPARES :		
9.1	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.	
9.2	TIG Torch consumables	Complete set of consumable spares for ø 2.4 mm and 3.2 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	Remote Control Unit	Complete Set of Spares for Remote Control Unit to be offered.	
10.0	O & M MANUALS (in English Language) :		

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
10.1	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 alarm list, troubleshooting chart, weld parameters selection for various base metals, welding programming, memory resetting procedure etc. d) Master List of Parts & Spares used in the machine with Make, Model, Rating, Part number etc. e) The OEM specified calibration procedure for the measuring instruments in the welding machine and the calibration certificate for the display meters.	
10.2	No. of Copies	3 sets (Hard copies) for Each Machine.	
10.3	Soft Copy	One soft copy in CD-ROM or pen drive is to be given for each machine, containing the details mentioned under Manual details	
11.0	GENERAL POINTS :		
11.1	Bought-Out Items	a) 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. b) Bidder to furnish the makes of Bought-Out Items, along with the offer.	
11.2	Weight	Bidder to specify the Weight of the power source	
11.3	Pre-dispatch Inspection	The welding machines shall be offered for inspection by BHEL Engineers at supplier's works for performance evaluation prior to despatch.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
11.4	Installation & Commissioning	Installation, Commissioning and performance prove out of the offered equipment at BHEL works, by the supplier's representative.	
11.5	Performance prove out at BHEL works	Welding Trials are to be taken on butt joints of a) Tube OD x Thick:- 38.1 mm x 4-10 mm (carbon & alloy steel tubes), 69.85 mm x 4.57 mm (T12), 44.45 mm x 7.1 mm (super304H), 57.15 mm x 12.05 mm (T22), 38.1 mm x 9.1 mm (T91) and subjected to radiographic tests for acceptance. b) BHEL will provide necessary jobs and electrodes for SMAW and TIG welding trials. c) The welding machine meters shall be tested on site at BHEL Trichy works with the resistive load and the accuracy of the meter readings will be compared with the BHEL's reference master instruments.	
11.6	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.	
11.7	Guarantee	The machine shall be guaranteed for a minimum of 24 months from the date of commissioning at BHEL.	



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY		Phone: +91 431 257 7653	
NOTICE INVITING TENDER		Email : skaruna@bheltry.co.in	
		ajay@bheltry.co.in	
		Web : www.bhel.com	
TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2631700092	16.11.2017	08.12.2017

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.

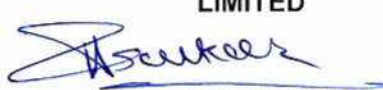
Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity
10	IGBT based Inverter Controlled Welding Power source with full digital control for SMAW & Pulsed TIG welding (400 amps) with TIG torch cable length 8 meters	11 Nos.
20	IGBT based Inverter Controlled Welding Power source with full digital control for SMAW & Pulsed TIG welding (400 amps) with TIG torch cable length 16 meters	02 Nos.
30	IGBT based Inverter Controlled Welding Power source with full digital control for SMAW & Pulsed TIG welding (400 amps) with TIG torch cable length 20 meters	01 No.
	as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or https://eprocure.gov.in/epublish/app)	

Important points to be taken care during submission of offer.

1. Compliance Form No: TRY / IMP/02 or TRY/ IND/ 02A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
2. Delivery period required is 4 months from the date of P.O.
3. Commissioning and performance prove out shall be done at BHEL Trichy by the supplier
4. Time period required for commissioning and performance prove out shall be 1 Month from the date of intimation by BHEL
5. EMD for this tender Rs.1,50,000/-
6. 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.

BHEL's General guidelines / instructions (refer MM/CE/GENL/001- EMD), compliance form and technical specification can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <https://eprocure.gov.in/epublish/app> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference.

(This is not an E-tender, please submit your offer in hard copies)	Yours faithfully, For BHARAT HEAVY ELECTRICALS LIMITED
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	 AJAY V. ASALKAR Sr. MANAGER MM / Capital Equipment BHEL, Tiruchirappalli - 620 014 Sr. Manager / Capital Equipment / MM

IGBT BASED INVERTER CONTROLLED WELDING POWER SOURCE WITH FULL DIGITAL CONTROL FOR SMAW & PULSED TIG WELDING (400 Amps), Qty – 1 no.

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 FOUR Years (as on the initial date of opening of tender) of Continuous Experience in Design, Manufacture & Supply of “IGBT based Inverter controlled Welding Power Sources with Full Digital control” 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 4 years (as on the initial date of opening of tender), at least 10 Nos. of the model quoted against this tender or a model with higher rating of “IGBT based Inverter controlled Welding Power Source with Full Digital Control for SMAW & Pulsed TIG welding” to any of the customers. 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 with full digital control for SMAW & Pulsed TIG welding” supplied & commissioned till date.	
1.4	Year of Launch of the Model quoted 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 should submit at least one Performance Certificate from any of the customers (especially from Heavy Engineering / Fabrication, Public/Private sector companies like Utility Boiler Manufacturers, Ship Building etc.) for satisfactory performance of the model quoted against this tender or a model with higher rating for a minimum period of one year from the date of commissioning (as on the initial date of opening of tender), supplied to such customers in the last four years. Full contact details of the customers from whom the performance certificate is obtained are to be provided. For obtaining the Performance certificate, a suggestive format is provided in Annexure A.	
1.7	Service centre to be available in India. Details on Service-After-Sales Set-Up in India (Address of Agents / Service Centres), to be furnished compulsorily.	
1.8	BHEL reserves the right to accept or reject the BIDDER /VENDOR (OEM) offer 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)	

S. No.	REQUIREMENTS	VENDOR's RESPONSE
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.	

ANNEXURE A

(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 :
 - d) TIG torch cable length in metres :
6. Application of the welding power sources:
7. Performance of the Machine : Satisfactory / Not Satisfactory
(Strike off whichever is not applicable)
8. After sales service : Satisfactory / 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 FULLY DIGITAL CONTROL FOR SMAW & PULSED TIG WELDING (400 Amps), Qty – 1 no.

Part B - Technical Specification

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
1.0	APPLICATION: The Full Digitally controlled 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), Groove Fillet joints, Butt joint, Double V Joint, Sheet Welding, Tube Fillet Joints, Plate Butt Joints, Tube Butt joints. The power source should be capable of welding the following materials: (i) Carbon Steel (ii) Alloy Steel (iii) Stainless Steel (iv) Titanium and its alloys (v) Nickel based alloys		
2.0	POWER SOURCE FEATURES		
2.1	Type	Power source shall be IGBT based Inverter controlled through microprocessor with full digital control 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 Amps @ 60 % Duty Cycle. Vendor to confirm and specify the duration of the duty cycle in minutes	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.4	Operating Range for Welding Current	5 to 400 Amps (with step less variation continuously adjustable) for SMAW & TIG welding	
2.5	Open Circuit Voltage	Preferred OCV is 80 to 90 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%.	
2.7	Power Source Control	Welding power source shall be fully digitally controlled, with suitable display and setting features. The power source shall have a microprocessor based control system. The digital control feature to be explained by the vendor.	
2.8	Inbuilt Memory	The welding power source shall have inbuilt memory storage for storing the TIG welding parameters and function selection. It shall be able to store at least 10 welding programs for TIG function with easy recall of stored programs. Vendor to confirm and specify	
2.9	Memory Resetting	The power source should have a provision to reset/restore the Microprocessor memory to the design/factory settings in case of the memory / system software gets corrupted or shows an error OR A Program loader/suitable kit for the same shall be supplied. Vendor to provide details.	
2.10	Digital display meters	Factory Installed Digital display meters on the front panel with easy removal and replacement for periodic instrument calibration: (a) For display of Current and voltage simultaneously. (b) The accuracy of the Digital meters shall be +/-1% of FSV (c) For display of the set current value as well as the actual value during welding, either concurrently (or) through a selective function. (d) For display of the process conditions / pulsed TIG welding parameters and other alarms / warning messages or the same shall be displayed on LCD or other type of display. Vendor to specify.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.10.1	Calibration of digital display meters	a) The welding machine shall have the capability for onsite calibration facility. b) Details of Input Source like voltage or current, full scale reading shall be furnished along with the offer which is necessary for calibration. c) If the input connections to the display meters are taken from PCB, then the detailed procedure for calibration of display meters in the welding machine shall be provided by the vendor d) The display meters shall have error correction facility	
2.11	SMAW Arc Strike	Selection for Instantaneous Arc Strike with Hot Start for SMAW Process.	
2.12	TIG Arc ignition	TIG Arc ignition through an “In-Built” High Frequency unit. Vendor to confirm	
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 Titanium, Stainless Steel, 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. Vendor to confirm and specify	
2.16	Alarms / Indicators on panel	Power ON/OFF, Vendor to specify	
2.17	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.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.18	Functional / Elemental Design Protection/ operator safety	a) Inbuilt protection for the IGBT/Power source against Thermal / Overload / Short-Circuit / Single or Three 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.	
2.19	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.	
2.20	Power source terminals	The power source should have Heavy Duty terminals - male and female socket type quick fix connectors to connect Welding Cable (for SMAW & TIG Electrode Holder) and Return Current Cable. Vendor to specify	
2.21	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.	
2.22	Return Current Cable	Welding Current return Cable, 20 m in length, with one end connected to the Power source and the other end provided with a Screw Type Earth Clamp.	
2.23	Load Compensation	Output variation in terms of fluctuation in line voltage, cable heating or drift caused due to usage of 20 m long welding cable, shall be compensated suitably.	
2.24	Torch connection	Facility to connect water cooled TIG Torch through suitable adapters to prevent leakage of water/Coolant for GTAW.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
2.25	Inbuilt Auxiliary Power	Power supply to aux. units such as Pulse control unit, Water cooling unit, High Frequency unit, etc. shall be fed & regulated from the welding power source itself.	
2.26	Input Power Cable	15 metre long, 4 core electric cable with protective sheathing (for 3 phase & potential earth) to be provided with each power source.	
2.27	Power Rating	Bidder to indicate the Maximum Power Rating (kVA) of the Power source and the no-load Power Consumption in Watts.	
2.28	Power Source Make and Model	Vendor to Specify the Make and 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.)	
2.29	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.	
2.30	Ambient Conditions	Temperature up to 50°C; Humidity up to 90% but both upper limits do not occur simultaneously.	
2.31	Input Power Supply	3 Phase AC 415 V $\pm$ 10%, 50 Hz $\pm$ 2%, through a 3 Wire System (4 th wire for Earthing) – No Neutral Conductor.	
3.0	REMOTE CONTROL FEATURES		
3.1	Application	Remote control unit shall be provided for setting welding current from a distant work place.	
3.2	Type 1 – Hand operated	Hand Operated type Remote control unit for Step less regulation of Welding Current. The remote control shall be provided with cable preferably of around 20 m length with quick fix end connectors.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
3.3	Type 2 – Foot operated	Foot Operated pedal type Remote control unit to vary the current from minimum to maximum set value by pedalling action. The maximum current value shall be set at the control panel only. Any Knob type control in the foot operated remote control is not acceptable. The remote control shall be provided with cable preferably of around 20 m length with quick fix end connectors.	
3.4	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 FEATURES		
4.1	Pulse range	Preferred 0 to 200 pulses per second. Vendor to specify	
4.2	Current up-slope	Preferred 0.1 to 10 seconds. Vendor to specify	
4.3	Current down slope	Preferred 0.1 to 10 seconds. Vendor to specify	
4.4	Purge gas pre-flow	Preferred 0.1 to 10 seconds. Vendor to specify	
4.5	Purge gas post-flow	Preferred 1 to 30 seconds. Vendor to specify	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
5.0	Front Panel Controls (GTAW and SMAW modes)	The following welding parameters shall be displayed on the digital display meters or on an LCD kind of display for setting:- a) Peak amperage adjustment. b) Background amperage adjustment. c) Pulses per second adjustment. d) Gas Pre-flow & Post flow time control. e) Welding current up-slope and down-slope Time control. f) Pulse On / Off. g) Power On / Off. h) Amperage Remote/Panel Control. i) TIG / SMAW selection j) 2T / 4T selection k) Arc force l) Hot start Vendor to provide the list of all the controls available.	
6.0	WATER COOLING UNIT FEATURES		
6.1	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.	
6.2	Type	Water cooling unit shall be of air cooled radiator type. Vendor to confirm.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
6.3	Coolant tank capacity	a) Tank capacity shall be sufficient enough not less than 3 litres to circulate water to the TIG Torch fitted with cables & hoses (as per S No. 7.0) and with required buffer quantity to meet the continuous welding applications. Bidder to specify the tank capacity b) The water cooling unit shall be provided with external filter and easy fill spout. c) Type of coolant: Demineralised water. Vendor to specify if any special coolant is recommended.	
6.4	Make and Model	Vendor to specify	
6.5	Alarm indicators	To be provided with an alarm indicator for failure of coolant circulating pump, radiator fan, low level of coolant, failure of coolant flow etc. Bidder to specify the type of alarm indicator.	
6.6	Inter connecting hoses	Well reinforced water circulation hoses are to be provided for the inter connection between welding power source and water cooling unit.	
7.0	TIG WELDING TORCHES - Water Cooled Type		
7.1	Application	Light weight water cooled TIG torches 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.	
7.2	TIG torch	TIG torch of any of the following makes KEMPPI, WELD CRAFT, ABICOR BINZEL, SAP or any other reputed make acceptable to BHEL with the following parameters: a) Current rating: 220 to 250 A @100% Duty cycle. b) Cable length: Around 20m	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
7.2.1	Torch configuration	(a) The torch shall be light in weight. (b) The joint between TIG Torch head and the cables shall be flexible type preferably with bellows / ball joint type etc. for easy manoeuvring of the torch during TIG welding in confined jobs where all position welding is involved. Vendor to specify (c) 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. 3.2 mm (max.)	
7.3	Cable sheathing	Protective sheathing to be provided for the entire length of TIG Torch cables & Hoses, to withstand shopfloor rough usage.	
8.0	SCOPE OF SUPPLY: The scope of supply shall consist of the following:		
8.1	Welding Power source with Transport Trolley with wheels and integrated Argon gas Cylinder Cart (for one argon gas cylinder only), gas hose for connecting the Argon cylinder regulator to the welding power source (Argon gas cylinder and regulator – BHEL scope) and with 5m long input power cable with protective sheathing.		
8.2	Control Unit Integrated with Power source.		
8.3	Power source shall be integrated with TIG control unit for GTAW featuring high frequency Arc ignition, Pulsed TIG & Non-pulsed TIG options.		
8.4	Hand Operated Remote Control Unit.		
8.5	Foot operated Remote Control Unit.		
8.6	Set of Inter-Connecting Cables, Adapters , hoses etc.		
8.7	Closed circuit water cooling unit for use with water cooled TIG welding torch with 8m length cables.		
8.8	SMAW Welding Cable with Electrode Holder.		

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
8.9	Return Current Cable with Screw Type Earth Clamp.		
8.10	Water cooled TIG welding Torch		
8.11	IGBT batch test certificate from the manufacturer		
8.12	Interconnecting gas hose with necessary adaptors to connect the inlet point of the power source to the argon gas cylinders.		
8.13	Program loader / suitable kit if necessary.		
8.14	Electrical & Mechanical Spares for Power source & Control Unit.		
9.0	SPARES :		
9.1	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.	
9.2	TIG Torch consumables	Complete set of consumable spares for $\varnothing$ 2.4 mm and 3.2 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	Remote Control Unit	Complete Set of Spares for Remote Control Unit to be offered.	
10.0	O & M MANUALS (in English Language) :		

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
10.1	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 alarm list, troubleshooting chart, weld parameters selection for various base metals, welding programming, memory resetting procedure etc. d) Master List of Parts & Spares used in the machine with Make, Model, Rating, Part number etc. e) The OEM specified calibration procedure for the measuring instruments in the welding machine and the calibration certificate for the display meters.	
10.2	No. of Copies	3 sets (Hard copies) for Each Machine.	
10.3	Soft Copy	One soft copy in CD-ROM or pen drive is to be given for each machine, containing the details mentioned under Manual details	
11.0	GENERAL POINTS :		
11.1	Bought-Out Items	a) 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. b) Bidder to furnish the makes of Bought-Out Items, along with the offer.	
11.2	Weight	Bidder to specify the Weight of the power source	
11.3	Pre-dispatch Inspection	The welding machines shall be offered for inspection by BHEL Engineers at supplier's works for performance evaluation prior to despatch.	

S. No.	BHEL SPECIFICATION		OFFER BY BIDDER
11.4	Installation & Commissioning	Installation, Commissioning and performance prove out of the offered equipment at BHEL works, by the supplier's representative.	
11.5	Performance prove out at BHEL works	Welding Trials are to be taken on butt joints of a) Tube OD x Thick:- 18 mm x 2.5 mm (Titanium Tubes), Titanium Plate Welding (Thk 14 mm), & Titanium Sheet Welding (Thick 1.5-2mm) and subjected to radiographic tests for acceptance. b) BHEL will provide necessary jobs and electrodes for SMAW and TIG welding trials. c) The welding machine meters shall be tested on site at BHEL Trichy works with the resistive load and the accuracy of the meter readings will be compared with the BHEL's reference master instruments.	
11.6	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.	
11.7	Guarantee	The machine shall be guaranteed for a minimum of 24 months from the date of commissioning at BHEL.	