



An ISO 9001  
Company

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

<b>ENQUIRY</b>	Phone: +91 431 257 75 75 Fax : +91 431 252 07 19 Email : <a href="mailto:rmanohar@bheltry.co.in">rmanohar@bheltry.co.in</a> Web : <a href="http://www.bhel.com">www.bhel.com</a>
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	<b>Enquiry Number:</b>	<b>Enquiry Date:</b>	<b>Due date for submission of quotation:</b>
	<b>2620600025</b>	<b>19.05.2006</b>	<b>23.06.2006</b>

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

Item	Description	Quantity	Delivery Schedule
10	500 Amps MIG / MAG (CO <sub>2</sub> Gas) Welding Power Source with special welding torch as per the technical specification & commercial conditions applicable (to be downloaded from web site <a href="http://www.bhel.com">www.bhel.com</a> )	67 No.	15.02.2007

**Note:**

- (1) The detailed Technical Specification along with technical point-by-point confirmation, Commercial Terms & Conditions applicable for this Enquiry, Confirmation of acceptance for BHEL commercial terms & conditions and Price Bid formats have been posted in BHEL Corporate web site [www.bhel.com](http://www.bhel.com) under Enquiry reference “2620600025”. Your offer should be based on all the above documents.
- (2) Also, you are requested to fill in the Supplier Registration formats available in [www.bhel.com](http://www.bhel.com) (under Advancement – Supplier Registration) and send it along with your offer.

Tenders should reach us before 14:00 hours on the due date Tenders will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present	Yours faithfully, For BHARAT HEAVY ELECTRICALS LIMITED  Dy. Genl. Manager / Capital Purchase / MM / Manufacturing
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**PART A**

**QUALIFYING CRITERIA FOR THE SUPPLY OF  
INVERTER CONTROLLED MIG/MAG/FCAW  
WELDING MACHINES**

**SECTION – I**

The BIDDER / VENDOR has to necessarily provide the following details, for making an assessment of the firm's capability and competency:

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

<b>S. No.</b>	<b>PARTICULARS</b>	<b>VENDOR's RESPONSE</b>
<b>1.0</b>	Number of Years of Experience of the BIDDER/ VENDOR in the field of design, manufacture and supply of 'INVERTER CONTROLLED WELDING MACHINES' for MIG / MAG / FCAW Welding Applications	
<b>2.0</b>	Number of Welding Machines (as per Clause 1.0) supplied till date, in the following category a) up to 400 Amps. rating and b) above 400 Amps. rating [both cases for 60 % Duty Cycle]	
<b>3.0</b>	YEAR of LAUNCH of the Model quoted against this ENQUIRY	
<b>4.0</b>	Is there any other model launched after the quoted Model? Otherwise, indicate the likely year in which the next model is likely to be launched	
<b>5.0</b>	Number of 'Inverter Controlled MIG /MAG Welding Machines' supplied, till date in the QUOTED MODEL	
<b>6.0</b>	Number of 'Inverter Controlled MIG /MAG Welding Machines – 500 Amps. Rating' supplied and commissioned till date for the following category of CUSTOMERS (within INDIA): a) Government Organisations b) Private Sector Companies [Heavy Engg. Companies]	

<b>S. No.</b>	<b>PARTICULARS</b>	<b>VENDOR's RESPONSE</b>
<b>7.0</b>	Details of Design Set-Up and Technology Back-Up assured for the PRINCIPAL Equipment Maker	
<b>8.0</b>	Details on International Standards followed in Design and Testing of Welding Machines [Copy of English Version of Standards / Design Codes followed shall be furnished with the Technical Offer]	
<b>9.0</b>	Comprehensive Details, on Performance Testing of Welding Machines quoted, to be furnished with the Technical Offer.	
<b>10.0</b>	Details of Quality System followed (Furnish the salient aspects of the Quality Assurance System followed)	
<b>11.0</b>	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centres in India, to be furnished.	
<b>12.0</b>	Any Additional Data to supplement the manufacturing capability of the BIDDER	
<b>13.0</b>	BIDDER to indicate the Country of Origin [source of supply of welding machines]. Equipment manufactured in Countries like TAIWAN, CHINA and KOREA are not acceptable.	

## **SECTION – II**

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

<b>S. No.</b>	<b>REQUIREMENTS</b>	<b>VENDOR's COMMENTS</b>
<b>14.0</b>	The BIDDER / VENDOR shall have a minimum of TEN Years of Continuous Experience in the Design, Manufacture & Supply of Inverter Controlled MIG / MAG / FCAW Welding Machines.	
<b>15.0</b>	The BIDDER / VENDOR shall have supplied a minimum of 10 number of Inverter Controlled MIG/MAG/FCAW Welding Machines to Customers in India. Indicate the number of such welding machines sold in India, till date.	

S. No.	REQUIREMENTS	VENDOR's COMMENTS
16.0	Reference List of Customers and Performance Certificate from CUSTOMERS [minimum 2 Customers – Government Organisations and Heavy Engg. Companies in Private Sector in INDIA] with full contact details of CONTACT PERSON, who are the End Users of the QUOTED MODEL of Inverter Controlled MIG / MAG / FCAW Welding Machines.	

### **SECTION – III**

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

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
17.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical <b>[with PART A &amp; PART B]</b> & Commercial and Price Bid.	
18.0	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A just 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
19.0	The BIDDER / VENDOR shall assure a continuous support for SPARES and SERVICE for TEN Years, from the date of commissioning of the equipment at BHEL Works.	
20.0	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue and Selection Criteria	
21.0	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation	
22.0	The reference List of Customers shall be accompanied with the details (Phone Number /E-Mail ID) of the CONTACT PERSON for cross reference by BHEL	

**PART B**

**TECHNICAL SPECIFICATIONS FOR INVERTER CONTROLLED MIG / MAG  
FLUX CORED ARC (CO<sub>2</sub> GAS SHIELDED) WELDING MACHINE**

<b>AA. APPLICATION :</b>			
<b>Sl.No.</b>	<b>FEATURES /BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
AA.1	The offered equipment shall be portable and suitable for semi-automatic FCAW/MIG/MAG welding process using flux-cored and solid wires of carbon steel, low-alloy steel and stainless steel.		
AA.2	The equipment shall be suitable for welding in all positions with pure argon, carbon-di-oxide or argon plus carbon di-oxide gas mixture as shielding gas and also for welding with self-shielded flux-cored wires.		
<b>BB. MACHINE CONFIGURATION :</b> [The scope of supply shall consist of the following, for each machine]			
<b>Sl.No.</b>	<b>FEATURES /BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
BB.1	Welding Powersource with Transport Trolley and Wheels		
BB.2	Wire Feeder Unit		
BB.3	Welding Torch (3 Types)		
BB.4	Remote Control Unit		
BB.5	Gas Regulators for (Ar + CO <sub>2</sub> ) Gas Mixture or CO <sub>2</sub> Gas		
BB.6	CO <sub>2</sub> Gas Pressure Regulator, Flow-Meter and Heater Unit		
BB.7	Set of inter-connecting cables/hoses with quick-fix end couplings		
BB.8	Consumables & Spares for Welding Torches		
BB.9	Electrical & Mechanical Spares for Powersource and Wire-Feeder		
BB.10	Operation & Maintenance Manuals – Three Copies per Machine		
BB.11	Commissioning of Equipment at BHEL Works and Performance Prove-out of the offered equipment by Supplier's representative		

<b>CC. EQUIPMENT SPECIFICATION : POWERSOURCE FEATURES</b>				
<b>Sl.No.</b>	<b>FEATURES</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
CC.1	Type	Inverter Controlled with IGBT and Constant Potential type, even with a fluctuation of $\pm 10\%$ in the Input Voltage		
CC.2	Switching Frequency	BIDDER has to indicate the Switching Frequency of the Inverter Circuit and the make of IGBT used		
CC.3	Current Rating	500 Amps. @ 60 % Duty Cycle with suitability for working at a minimum of 350 Amps. at 100% Duty Cycle.		
CC.4	Operating Range : a) Voltage b) Current	20 Volts to 50 Volts (continuous control) 50 Amps. to 500 Amps. (continuous control)		
CC.5	Open Circuit Voltage	BIDDER to mention the Open Circuit Voltage for the offered Powersource		
CC.6	Current Setting	The variation in the set value of the welding current to the actual value, shall not exceed 1 %.		
CC.7	Voltmeter & Ammeter	Factory Installed Ammeter & Voltmeter on the front panel with easy removal and replacement (i.e., without lifting the top cover of the Powersource) for instrument calibration		
CC.8	Power Input	415 $\pm$ 10% V AC, 3 Phase, 50 $\pm$ 2% Hz, through a 3 Wire System [4 <sup>th</sup> wire for EARTHING] – No Neutral Conductor		
CC.9	Gas-Heater for CO <sub>2</sub> - Shielding Gas	Provision of one Single Phase AC tapping point in the Powersource, for the gas heater input power supply [110 V or 230 V – AC Supply]		
CC.10	Auxiliary Power for Wire-Feeder Unit	Low voltage (like 48 V/110V) auxiliary power tapping point in the Powersource		
CC.11	Arc Strike (F.A.S.)	Instantaneous Arc Striking facility (Fresh Arc Strike)		
CC.12	Weld Stop Condition	No globule formation at the wire tip , at the time of weld stopping		

<b>CC. EQUIPMENT SPECIFICATION : POWERSOURCE FEATURES</b>				
<b>Sl.No.</b>	<b>FEATURES</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
CC.13	Gas Flow Setting	Gas Flow Check Push Button for Gas Solenoid Valve actuation in weld switch in "OFF" position.		
CC.14	Compulsory Features	The Powersource shall have Features like a) Gas / Wire Inching Facility b) Spatter Control Facility c) Gas Pre-flow / Post-flow Facility d) Crater Control & Fill		
CC.15	Insulation	Class "H" preferred – Tropical Working Conditions		
CC.16	Machine Cooling	Forced Air Cooling with interlock for tripping of the welding machine.		
CC.17	Protection [BIDDER has to specifically furnish technical details on how these protective measures are addressed in the Machine Design]	a) Inbuilt protection for the IGBT/Powersource against Thermal / Overload / Short-Circuit 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) Measures to nullify the effects of EMI (Electro-Magnetic Induction) generated		
CC.18	Portability	Under-Carriage with hard rubber lined wheels for portability of the powersource by manual pushing		
CC.19	Ambient Conditions	Temperature upto + 50 ° C ; Humidity upto 90 % but both upper limits do not occur simultaneously.		
CC.20	Load Compensation	Output variation due to line voltage fluctuation, cable heating or drift due to the use of long cable, to be eliminated.		
CC.21	Power Rating	BIDDER to indicate the Maximum Power Rating [in kVA] of the Powersource and the NO-LOAD Power Consumption in Watts.		
CC.22	Power Source Model	To Specify the Model of Powersource Offered		

<b>DD. EQUIPMENT SPECIFICATION : WIRE-FEEDER UNIT FEATURES</b>				
<b>SI.No.</b>	<b>FEATURES</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
DD.1	Type	4-Roll Drive [All Powered Drive Wheels]		
DD.2	Burn-Back Control	Compulsorily to be provided		
DD.3	Wire Sizes/Solid	0.8 mm to 1.6 mm (Solid Wires)		
DD.4	Wire Sizes/Cored	1.2 mm to 2.0 mm (Self-Shielded and Flux Cored Wires also)		
DD.5	Wire Feed Speed	1.0 to 18.0 mtrs. / min.		
DD.6	Wire Feeder Motor	BIDDER has to indicate the Type of Motor used for wire feeding		
DD.7	Wire Spool Weight	Facility to hold wire spools of 15 to 20 kgs. of weight and spool diameter of 300 mm		
DD.8	Brake Torque on Wire Feeder Hub	Shall be of adjustable type.		
DD.9	2 / 4 Track Facility	Torch latching facility to be provided compulsorily		
DD.10	Feed Rolls & Guides	Suitable for 1.2mm & 1.6mm Solid/Cored wires Suitable for 2.0 mm & 2.4 mm Self-Shielded Flux- Cored Wires		
DD.11	Connector for Torch	Euro / Unitized Connector with polymedium cable		
DD.12	Inter-connecting cables/hoses assembly	10 metres long power & control cables and gas hose assembly with plug-in and quick-fix end connectors to connect the powersource and the wire-feeder.		
DD.13	Wire-feeding capacity	Shall be suitable for feeding welding wire through Welding Torches with 3.0 metre long, 4.5 metre long and 10.0 mtr. long cables [without the use of additional push or pull motor in the wire-feed line]		
DD.14	Wire Feeder Model	To specify the Wire-Feeder Model & Weight		

<b>EE. EQUIPMENT SPECIFICATION : WELDING TORCH FEATURES</b>				
<b>Sl.No.</b>	<b>FEATURES</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
EE.1	Make	Only OTC / DAIHEN / DAIDEN (JAPAN)		
EE.2	Type	Goose-Neck, Gas cooled		
EE.3	Shielding Gas	CO <sub>2</sub> , Argon or Mixture of CO <sub>2</sub> & Argon		
EE.4	Cable & Connector	Polymedium Cable, Euro / Unitized Connector Adapter to suit DAIHEN/DAIDEN make Torch		
EE.5	Wire Sizes/Solid	0.8 mm to 1.6 mm		
EE.6	Wire Sizes/Cored	1.2 mm to 2.0 mm (Self-Shielded / Flux-Cored Wires)		
EE.7	Wire Material	Carbon & Low Alloy Steel, Stainless Steel, Aluminium		
EE.8	2 / 4 Track Facility	Compulsorily to be provided in the Torch		
EE.9	Type A) – Rating	300 / 350 Amps. @ 60 % Duty Cycle Torch with 3.0 metre long cable.		
EE.10	Type B) – Rating	300 / 350 Amps. @ 60% Duty Cycle Torch with 4.5 metre long cable.		
EE.11	Type C) – Rating	Minimum 350 Amps. @ 60% Duty Cycle Torch with 10.0 metre long cable.		
EE.12	Torch Models & Weight	To specify the Models and the Torch Weight for Type A, Type B and Type C ratings, in the OFFER		
<b>FF. EQUIPMENT SPECIFICATION : REMOTE CONTROL UNIT FEATURES</b>				
<b>Sl.No.</b>	<b>FEATURES</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
FF.1	Type	Hand Operated with 10 mtrs. long control cable with end connectors		
FF.2	Control	Stepless Variation of Welding Current & Voltage		
FF.3	Connection	Remote Control Unit to be connected to the Wire-Feeder		

<b>GG. EQUIPMENT SPECIFICATION : GAS REGULATOR, FLOW METER &amp; HEATER</b>				
<b>SI.No.</b>	<b>FEATURES</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
GG.1	Function	To regulate CO <sub>2</sub> Gas Pressure, Flow Rate and for Heating the CO <sub>2</sub> Gas, to avoid ice formation.		
GG.2	Power	To draw from Single Phase AC Power Supply from Powersource (110 V or 230 V - AC) thro' a 2 M Cable		
GG.3	Pressure Gauges	Preferred to have 2 Nos. – To indicate independently cylinder pressure and gas delivery pressure		
GG.4	Accessories	Double glass covered flow-meter, power cable with end-connectors, electrical heating unit, gauges, etc.		
<b>HH. SPARES :</b>				
<b>S.No.</b>	<b>ITEMS</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
HH.1	Power Source	All type of Spares including IGBTs, PCBs (Printed Circuit Board) Control-Transformers, Cooling Fans, etc. recommended for 2 years of operation on THREE shift basis (for 365 Days) shall be offered. <b>To be LISTED ITEMWISE</b>		
HH.2	Wire-Feeder Unit	Spares such as feed-rolls (suitable for 0.8, 1.2 , 1.6 and 2.0 mm dia. suitable for Solid & Cored Wires), wire-feed motor, wire guides, control PCB cards, connectors, etc. shall be offered . <b>To be LISTED ITEMWISE</b>		
HH.3	Remote Control Unit	Complete Set of Remote Control Unit and its Spares like Knob, Potentiometer, etc. <b>to be OFFERED</b>		
HH.4	Welding Torch	Consumables & Spares such as Liners & Contact Tip (suitable for 0.8, 1.2 , 1.6 and 2.0 mm dia. Wires), Contact Tip Body, Gas Nozzles, Insulator, Orifice, 'O' Ring, Adaptor 'O' Ring, etc. shall be offered for all the three types of Torches. <b>To be LISTED ITEMWISE.</b>		

<b>II. O &amp; M MANUALS :</b>				
<b>S.No.</b>	<b>PARTICULARS</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
II.1	No. of Copies	3 (Three) for Each Machine		
II.2	Language	English		
II.3	Manual Details :	a. Manual shall contain all instructions for machine installation and welding trial testing, in sequence. b. Manual to give general circuit diagrams, showing the interconnection of various elements and also details on PCBs [Printed Circuit Board] like tapping voltages, main electronic elements' specifications and ratings, etc. c. Manual to give other details like trouble shooting chart, weld parameters selection for various base metals, etc. d. Master List of Parts & Spares used in the machine with Make, Model, Rating, etc.		
<b>JJ. GENERAL POINTS :</b>				
<b>S.No.</b>	<b>PARTICULARS</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
JJ.1	Inspection	The equipment shall be offered for inspection at supplier's works for performance evaluation by BHEL Engineers prior to despatch.		
JJ.2	Commissioning	The equipment shall be commissioned at free of cost by the supplier's representative at BHEL Works.		
JJ.3	Training	The Supplier's SERVICE ENGINEER shall give training in the Operation and Maintenance (mainly on electric/electronic troubleshooting) of the Machine for BHEL Staff, after the successful commissioning of the Welding Machines		

S.No.	PARTICULARS	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
JJ.4	Guarantee	The equipment shall be guaranteed for a minimum of twenty-four months from the date of commissioning.		
JJ.5	Bought-Out Items	a) The Bought-Out Items - like Motors, ICs, Relays, Contactors, Switches, Electronic Elements, etc., used in the Powersource & Wire-feeder shall be of Internationally Reputed Manufacturers only. b) BIDDER has to furnish the MAKE of Bought-Out Items used in the Welding Machine, with the OFFER .		
<b>KK. ANNUAL MAINTENANCE CONTRACT :</b>				
S.No.	BHEL SPECIFICATION		OFFER BY BIDDER	DEVIATIONS
KK.1	The BIDDER has to QUOTE for the Annual Maintenance Contract [AMC] for THREE YEARS, in the following two patterns, after the expiry of the ORIGINAL FREE WARRANTY PERIOD :			
KK.2	AMC Charges for the whole lot of machines, INCLUDING the Cost of Free REPLACEMENT of the MACHINE SPARES / PARTS within 72 Hours of reporting machine break-down by e-mail or telefax.			
KK.3	AMC Charges for the whole lot of machines, EXCLUDING the Cost of REPLACEMENT of the MACHINE SPARES / PARTS within 48 Hours of reporting machine break-down by e-mail or telefax. Machine Spare Parts and Consumables will be supplied by BHEL.			
KK.4	The BIDDER has to furnish the Details of the INDIAN AGENT and CONTACT ADDRESS of the nearest SERVICE CENTRE, for reporting the Machine Break-Down.			
KK.5	The BIDDER has to CONFIRM the supply of replacement machine or wire feeder in case of prolonged break-down of the welding machine during the AMC Period.			