



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY

NOTICE INVITING TENDER

Phone: +91 431 257 7360

Email : 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	2601700042	08.07.2017	02.08.2017

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	CNC Deep Hole EDM Drilling Machine as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No.

Important points to be taken care during submission of offer

1. Delivery terms shall be FOR BHEL Stores, Trichy for indigenous vendors and CFR Chennai Airport / Seaport for foreign vendors.
2. Compliance Form No: TRY/ IMP/ 02 (foreign vendors) and TRY/ IND/ 02A (indigenous vendors) to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
3. Delivery period required is 5 months including pre-despatch inspection.
4. Erection and commissioning shall be done at BHEL Trichy by the supplier
5. Time period required for Erection and Commissioning shall be 3 weeks from the date of intimation by BHEL
6. EMD applicable for this enquiry is INR 60,000/-
7. 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 <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2601700042".

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 VASALKAR

Sr. MANAGER

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

TECHNICAL SPECIFICATIONS FOR DEEP HOLE EDM DRILLING MACHINE**PART- A****QUALIFYING CRITERIA FOR THE DESIGN & SUPPLY OF DEEP HOLE DRILLING EDM****SECTION – I**

The BIDDER/OEM (Original Equipment Manufacturer) 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, asked for .

S.No.	PARTICULARS	BIDDER's RESPONSE
1	Number of Years of Experience, the BIDDER/OEM has in the field of design, manufacture and supply of 'CNC DEEP HOLE EDM DRILLING MACHINES' for dedicated high precision drilling applications.	
2	YEAR of LAUNCH of the MODEL quoted against this BHEL TENDER / ENQUIRY	
3	BIDDER to indicate the Country of Origin for the supply of the offered 'CNC DEEP HOLE EDM DRILLING MACHINES'	
4	Number of 'CNC Deep Hole EDM Drilling Machines' supplied to High Precision Component Manufacturing Industries, across the GLOBE and in INDIA - till date and the technical details on such systems, to ascertain the competency.	
5	Details on International Standards followed in Design, Manufacture and Testing of the subject model of 'CNC Deep Hole EDM Drilling Machines' – copies of the relevant standards (IEC/EN/ISO) are to be furnished with the TECHNICAL BID compulsorily.	
6	The Machine Manufacturing Firm/OEM should have an ISO 9001:2008 certificate issued by internationally reputed QMS auditing organization.	

SECTION – II

The BIDDER / OEM has to compulsorily meet the following requirements to get qualified for submitting an offer for the 'CNC Deep Hole EDM Drilling Machines':

S.No.	PARTICULARS	BIDDER's RESPONSE
7	The BIDDER / OEM shall have a minimum of FIVE Years of Continuous Experience in the Design, Manufacturing and Supplying of 'CNC DEEP HOLE EDM DRILLING MACHINES'	
8	Number of 'CNC Deep Hole EDM Drilling Machines' supplied, till date in the QUOTED MODEL / NEAR TO QUOTED MODEL, to Premium Class Industries shall be NOT LESS THAN two in the last FIVE years – To furnish the list of those customers with contact details for reference.	

S.No.	PARTICULARS	BIDDER's RESPONSE
9	BIDDER / OEM has to provide Performance Certificate with full contact details of CONTACT PERSON, who are the End Users of the QUOTED MODEL of "CNC Deep Hole EDM Drilling Machines" – (in the suggestive format as given in the ANNEXURE-A on Page No.3).	
10	Details on SERVICE-AFTER-SALES Set-Up in India including the Address of Agents / Service Centres, for providing technical assistance / spares supply.	
11	BHEL reserves the right to verify the information / data provided by the BIDDER / OEM. In case the information provided by BIDDER / OEM is found to be false / incorrect, the offer shall be summarily rejected.	

SECTION – III

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

S.No.	PARTICULARS	VENDOR's COMPLIANCE
12	The BIDDER / OEM shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial Terms and Price Bid in separate covers.	
13	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the BIDDER / OEM, against each clause. A just 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical offer may lead to disqualification of the Technical Offer	
14	The BIDDER / OEM shall assure a continuous support for SPARES and SERVICE for TEN Years, from the date of commissioning of the equipment at BHEL Works. This will be an undertaking by the OEM at the time of release of Purchase Order on the successful bidder.	
15	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details / literature on the QUOTED MODEL of "CNC Deep Hole EDM Drilling Machines"	
16	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation for the scope of supply – with UNIT RATE.	
17	The expected delivery period (including the time for Pre-Dispatch Inspection clearance by BHEL) for the 'CNC Deep Hole EDM Drilling Machines' is not more than 20 weeks from the date of issue of BHEL Purchase Order.	

Enclosure : **ANNEXURE – A (Performance Certificate)**

ANNEXURE-A

PERFORMANCE CERTIFICATE

The Performance of the subject model 'CNC Deep Hole EDM Drilling Machines' should be certified by the customer of the OEM/BIDDER on Customer's Letter Head, in the following pattern/format and submitted along with the TECHNICAL OFFER positively.

- 1.0 Name of the Machine Supplier (OEM) :
- 2.0 MODEL/MAKE, Serial No. 'CNC Deep Hole Drilling EDM' :
- 3.0 Month & Year of Commissioning of the Equipment :
- 4.0 Details on the Application/Use of the subject machine :

- 5.0 Performance of the CNC Deep Hole Drilling EDM' stated above : Very Good /
Satisfactory /
Not Good
- 6.0 Availability of the 'CNC Deep Hole Drilling EDM' stated above : Good / Poor
- 7.0 Service After Sales support given by the OEM /
Indian Representative, including spares supply : Satisfactory /
Not Satisfactory
- 8.0 Special Remarks / Recommendations :

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

PART - B**TECHNICAL SPECIFICATIONS FOR THE CNC DEEP HOLE EDM DRILLING MACHINE**

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION	VENDOR'S OFFER [with Complete Technical Details]
1.0	MACHINE CONFIGURATION	a) The CNC Deep Hole EDM Drilling Machine shall be with rigid machine bed and column. b) The machine shall have X,Y, Z, A & C simultaneously controlled axes c) To have e-pulse technology, CNC Pulse Generator, Part Programming Software, Dielectric Unit with Mineral Bed and Precision LM Guide ways for all axes d) To have an Isolation Transformer & Servo Stabilizer (can be sourced from INDIA through the LOCAL Representative of the OEM/BIDDER)	[Bidder to give details, how these requirements are met with and to substantiate the claim.]
2.0	MACHINE TOOL SPECIFICATIONS		
2.1	Job Materials	Inconel, Nimonic, Niobium, Titanium, High Alloy Steels, Copper, Tungsten, Aluminum Alloys, etc.	
2.2	X axis Traverse	Minimum 350 mm	
2.3	Y axis Traverse	Minimum 200 mm	
2.4	Table size (X-axis)	Minimum 450 mm	
2.5	Table size (Y-axis)	Minimum 300 mm	
2.6	Z axis Traverse	200 mm	
2.7	Z axis Motorised Traverse	150 mm	
2.8	Measuring System	High Precision Optical Glass Scale	
2.9	X , Y & Z axis feed rate (maximum)	600 mm/min or more	

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION	VENDOR'S OFFER [with Complete Technical Details]
2.10	Resolution of X, Y & Z axes	≤ 0.1 µm	
2.11	Work piece height (Min.)	250 mm	
2.12	Work piece weight (Min.)	50 kg	
2.13	Electrode diameter	0.10 to 3.0 mm [Provision for higher diameter upto 10 mm should be possible with special electrode/electrode holder]	
2.14	Hole Depth/Hole Diameter Ratio	100 or more for hole diameter 1 to 3 mm 20 or more for hole diameter 0.1 to 1.0 mm	
2.15	Surface Finish of Drilled Hole	0.4 µm or better	
2.16	Table rotation (C-Axis) range :	360 degree	
2.17	Tilting axis (A-Axis) range	120 degrees or above	
2.18	Resolution of C-Axis and A-Axis (tilting) with direct encoder	≤ 0.01 degree with CNC	
3.0	POSITIONAL ACCURACIES - as per ISO 230-2 (Bi-directional)		
3.1	Positional Accuracy of X- Axis	≤ 5 µm	
3.2	Positional Accuracy of Y- Axis	≤ 5 µm	
3.3	Positional Accuracy of Z- Axis	≤ 5 µm	
3.4	Repeatability of X- Axis	≤ 3 µm	
3.5	Repeatability of Y- Axis	≤ 3 µm	
3.6	Repeatability of Z- Axis	≤ 3 µm	
3.7	Accuracy of C- Axis and A- Axis	: ≤ 0.02 degrees	
3.8	Repeatability of C- Axis and A- Axis	: ≤ 0.01 degrees	

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION	VENDOR'S OFFER [with Complete Technical Details]
4.0	ACCURACIES on DRILLED HOLES		
4.1	Hole roundness accuracy	$\leq 5 \mu\text{m}$	
4.2	Concentricity of through hole	i) For job height $\leq 50 \text{ mm}$: $\leq 15 \mu\text{m}$ ii) For job height ≥ 50 and $\leq 200 \text{ mm}$: $\leq 30 \mu\text{m}$	
4.3	Diameter accuracy	$\leq 5 \mu\text{m}$	
4.4	Straightness of through hole	i) For job height $\leq 50 \text{ mm}$: $\leq 15 \mu\text{m}$ ii) For job height ≥ 50 and $\leq 200 \text{ mm}$: $\leq 30 \mu\text{m}$	
5.0	PULSE GENERATOR		
5.1	Pulse Generator Type	MOSFET or equivalent or latest version	
5.2	Controlled axes	X, Y, Z, A, C Simultaneous and Independent	
5.3	Interpolation	Linear & Circular	
5.4	Maximum programmable dimension	Bidder to specify	
5.5	Data input/output	RS232 interface OR EQUIVALENT, Special function sealed ASCII keyboard & USB port	
5.6	Pulse peak current	Bidder to specify	
5.7	Pulse ON time	Bidder to specify	
5.8	Pulse OFF Time	Bidder to specify	
5.9	Servo System & Closed Loop type	Close loop A.C or D.C servo system with encoder feedback. X, Y, Z, A and C axes with Servo Drive	
5.10	CNC Controller	Siemens 810D or EMT100W-5 or FANUC (Latest Version)	
5.11	Monitor type	Colour 15" LCD monitor	

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION	VENDOR'S OFFER [with Complete Technical Details]
6.0	CNC FUNCTIONS		
6.1	NC Operational Functions desired to be provided	a. Windows based editor b. Auto reference c. Auto tool vertically d. Edge & centre finding e. On line edit facility f. Rotation of program, mirror image of programme g. Backlash and pitch error compensation h. Tool / electrode path simulation for verification of NC data i. Pre-spark & no man function j. Auto alignment of the work piece k. 3 point centre finding l. Monitoring of consumables m. On screen maintenance Check	
6.2	Control Features	To compulsorily have the following facilities (in addition to the standard features – which are to be listed): a) shall be user friendly b) back edit facility c) Electronic hand wheel for manual axes movement. d) depth control (for blind holes) e) electrode break detection features.	
7.0	DIELECTRIC SYSTEM		
7.1	Type	Continuous circulation with filtration System and leak tight reservoir	
7.2	Flushing	Internal flushing through rotating spidle	
7.3	Dielectric Fluid	Deionised Water	

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION	VENDOR'S OFFER [with Complete Technical Details]
7.4	Dielectric Fluid Tank Capacity	Bidder to specify	
7.5	Fluid Pressure	60 Bar or above	
7.6	Fluid Temperature	Dielectric temperature control through heat exchanger : 15-20 Deg. C	
7.7	Cooling System Capacity	Bidder to specify	
7.8	Filtration	Paper type and filtering capacity upto 1 micron	
7.9	Dielectric Maintenance	a) Dielectric shall have Automatic deionising, filtration and flushing through separate pumps. b) Automation of Dielectric conductivity monitoring. c) Dielectric Cooling unit with temperature control.	[BIDDER to give complete technical details to meet the requirements.]
7.10	Tank Construction	a. Dielectric unit shall be Stainless Steel Construction. b. All the piping and filters valves shall be of SS c. Tank should have corrosion resistance to Deionised water & EDM Oil	
8.0	ACCURACIES		
8.1	Repeatability	< 5 micron	
8.2	Position Accuracy	< 5 micron	
8.3	Circularity	< 6 micron	
8.4	Alignment Checks	Machine Geometrical Checks as per IMTMA-8 - 1989 chart	
8.5	Positioning accuracies	As per IMTMA-81989 Chart based on ISO 230 Part I&II detail test chart to be furnished	

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION	VENDOR'S OFFER [with Complete Technical Details]
9.0	ACCESSORIES & CONSUMABLES		
9.1	Essential & Optional Machine Accessories	All the types of tool holders, job holding blocks, standard and other special accessories and consumables, etc. shall be offered with technical details and unit rates.	
9.2	Compulsorily Listed Items	a) High precision rotating spindle with chuck adapter, manual electrode feeding and internal flushing b) Manual chuck , size range diameters : 0.1 to 3 mm c) High precision collet for electrode size range dia. 0.1 to 0.5 mm in steps of 0.05mm (each size:1No.) d) High precision collet for electrode size range dia. 0.6 to 3 mm in steps of 0.1mm (each size: 1 No.). e) Precision guide holder for size range diameters : 0.1 to 3 mm f) High precision ceramic guide for electrode size range diameters 0.1 to 0.5 mm in steps of 0.05mm (each size: 1 No.). g) High precision ceramic guide for electrode size range diameters 0.6 to 3 mm in steps of 0.1mm (each size: 1 No.). h) High Precision solid carbide tubes for size range 0.1 to 0.5 mm in steps of 0.05mm (each size:5 Nos.) i) Brass Electrode tubes for size range 0.6- 3 mm in steps of 0.1mm (each size:10 Nos.) j) Filter for dielectric- 1 µm k) Test mandrel for geometrical accuracy test of the machine	

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION		VENDOR'S OFFER [with Complete Technical Details]
10.0	ISOLATION TRANSFORMER			
10.1	Model	Double Wound, Isolation Transformer		
10.2	Type and Cooling	Closed, Dry Type Vacuum Pressure Impregnated (VPI) Transformer, Natural Air Cooled.		
10.3	Phases	No.	3 Phases	
10.4	Rated Capacity	kVA	60 kVA or 20% more than the power rating of the suggested model whichever is HIGHER.	
10.5	Voltage			
10.5.1	Input	V	415 ± 10%	
10.5.2	Output	V	415 ± 10%	
10.5.3	Tappings	V	Nil	
10.6	Frequency	Hz	50 ± 2 %	
10.7	Vector Group		Dyn 11	
10.8	Insulation resistance			
10.8.1	Primary to Secondary	MΩ	> 1000	
10.8.2	Primary to Core	MΩ	> 1000	
10.8.3	Secondary to Core	MΩ	> 1000	
10.9	HV Test			
10.9.1	Primary to Secondary	kV rms	2.5 kV/ 1min	

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION		VENDOR'S OFFER [with Complete Technical Details]
10.9.2	Primary to Core	kV rms	2.5 kV/ 1min	
10.9.3	Secondary to Core	kV rms	2.5 kV/ 1min	
10.10	Core Material		CRGO Mitered Core M6 Grade	
10.11	Winding Material	Copper	99.9 % Electrolytic Grade Super Enamelled Class H insulation	
10.12	Noise Level – CMNR	dB	< 80 dB (Transients, Spikes & Surges)	
10.13	Coupling Capacitance	F	0.1 pF	
10.14	Leakage Current	A	< 20 µA	
10.15	Shielding		Aluminium foil Electrostatic Shield	
10.16	Temperature Rise		Ambient Temperature is 20 °C to 45°C	
10.17	Core (at No Load)	°C	70°C including ambient temperature	
10.18	Winding (at full load)	°C	< 115 °C over and above ambient temperature	
10.19	Losses			
10.19.1	No Load Losses	W	< 350 W	
10.19.2	Load Loss	W	< 1100 W	
10.20	Impedance Voltage	%	< 3.75 %	
10.21	Percentage Reactance	%	< 3.20 %	
10.22	Percentage Resistance	%	< 1.95 %	

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION		VENDOR'S OFFER [with Complete Technical Details]
10.23	Regulation			
10.23.1	@ 0.8 PF	%	< 3.35 %	
10.23.1	@ 1.0 PF	%	< 2.00 %	
10.24	Efficiency			
10.24.1	@ 100 % Load	%	➤ 97.55 %	
10.24.2	@ 75% Load	%	➤ 97.8 %	
10.25	Maximum Efficiency	%	Vendor to specify	
10.26	Load at Maximum	KVA	Vendor to specify (at peak efficiency)	
10.27	Terminal Arrangement	HV and LV	Termination Board with bolts and nuts	
10.28	Enclosure	Sheet Metal Enclosure IP 32 compliant		
10.29	General	a. Tolerances in all values are to be with respect to IS clauses b. Applicable reference standards are IS 2026 and IS 11171. c. Two years onsite warranty from the date the successful commissioning at BHEL, Trichy. d. Any spares that are required for first two years of operation is be quoted mandatorily		
11.0	SERVO STABILIZER			
11.1	Input Voltage range	V	360 V – 460 V	
11.2	Output Voltage	V	415 V ± 1%	
11.3	Rated Supply Frequency	Hz	50 Hz	
11.4	Reference Ambient Temperature	C	20 - 50° C	

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION		VENDOR'S OFFER [with Complete Technical Details]
11.5	Temperature Rise	C	< 110°C over and above the ambient temperature	
11.6	No load losses	W	< 500 W	
11.7	Full Load Losses	W	<1800 W	
11.8	Maximum Efficiency	%	> 97%	
11.9	Indication Meters			
11.10	Voltmeter	V	LCD display to read both input and output voltages	
11.11	Ammeter	A	LCD display to read output current	
11.12	Indications	Pilot LEDs for each Phase with indications for 3 Phase ON, Phase reversal, Overload, Menu, Start and Stop indications. In addition, all operational requirements for the suggested model should be made available on the indication panel.		
11.13	Voltage Sensing	No.	Voltage sensing transformers for each phase - 03 Nos.	
11.14	Power Rating	kVA	60 kVA or 20% more than the power rating of the suggested model whichever is HIGHER.	
11.15	Input MCCB	200 A 3 Pole MCCB of ABB/Schneider/L&T make only.		
11.16	Output Contactor	A	150 A, of ABB/Schneider/L&T make only.	
11.17	Input Changeover Switch	160 A 3 pole of reputed make		

S. No.	PARTICULARS	SPECIFICATIONS/DESCRIPTION	VENDOR'S OFFER [with Complete Technical Details]
11.18	Variac	35 A 1 PH – 03 Nos. The winding material is to be copper wound.	
11.19	Enclosure	Steel metal enclosure IP32 compliant	
11.20	General Requirements	1. Single Phase Inverter should be included. 2. Waveform Distortion: Nil 3. Detailed catalogue should be attached with the offer. 4. Two years onsite warranty from the date the successful commissioning at BHEL, Trichy. 5. The applicable standard for reference is IS 9815. 6. Any spares that are required for first two years of operation are to be quoted mandatorily.	
12.0	PNEUMATIC SYSTEM:		
12.1	The pneumatic operated elements of the machine shall work efficiently with BHEL compressed air supply at a pressure of 4.5 to 5.0 kg/cm ² in ¾ inch line.	Bidder to Confirm	
12.2	If higher air pressure is required for efficient operation of the machine, Bidder shall furnish the information for Air Compressor/Booster of suitable capacity.	Bidder to Specify	
12.3	Bidder to Specify the total air volume required for efficient operation of the complete machine.	Bidder to Confirm	
12.4	Refrigerated Air Drier to be provided to eliminate moisture content from the compressed air at the designed flow and pressure rating.	Bidder to Confirm	
12.5	BHEL will provide compressed air at only one point near / on the machine. Bidder shall provide suitable filter-regulator-lubrication (FRL) unit and in addition a hand wheel valve at this point	Bidder to Confirm	
12.6	Hydraulic, Pneumatic & Lubricating oil piping should be preferably metallic except places where flexible piping is essential. All the pipes required for the same shall be included in the standard scope of the machine.	Bidder to Confirm	
12.7	Pneumatic components shall be of FESTO/SMC/PARKER.		Bidder to Specify

S. No.	SPECIFICATIONS / DESCRIPTION	VENDOR'S OFFER / CONFIRMATION [with Complete Technical Details]
13.0	ELECTRICAL & ELECTRONICS SYSTEMS	
13.1	415 V with a voltage fluctuation of +/- 10%, 50HZ with a fluctuation of +/-2%, 3 Phase AC (3 wire system without neutral) power supply will be provided by BHEL at a single point near the machine, as per layout recommended by Bidder. All cables, connections, circuit breakers etc. required for connecting BHEL's power supply to the machine shall be in the scope of Bidder.	Bidder to Confirm
13.2	Tropicalization : All electrical / electronic equipment shall be tropicalized.	Bidder to Confirm
13.3	Control circuit voltage shall not exceed 24V DC	Bidder to Confirm
13.4	All electrical components in the cabinets should be mounted on DIN Rail	Bidder to Confirm
13.5	All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220Volts, 5/15 Amp AC. All adapters /receptacles should have compatibility with Indian equivalents.	Bidder to Confirm
13.6	All cables moving with traversing axes should be installed in Caterpillar / Drag chain. Additionally, all the cable trays required for laying of cables should be included in the offer.	Bidder to Confirm
13.7	Bidder should ensure the proper earthing for the machine and its peripherals.	Bidder to Confirm
13.8	Cables shall be routed through totally enclosed cable trays. There shall not be cable trenches.	Bidder to Confirm
13.9	All electrical & electronic control cabinets & panels should be vermin and dust proof. All Electric enclosures shall have IP 54 protection	Bidder to Confirm
13.10	Motors and drives shall be of Fanuc / Siemens / Allen Bradley / ABB / Indramat / SEW or any other reputed makes acceptable to BHEL conforming to IS / IEC Standards (Bidder should indicate make and type in the offer- Energy Efficient Motor)	Bidder to Confirm

S. No.	SPECIFICATIONS / DESCRIPTION		VENDOR'S OFFER / CONFIRMATION [with Complete Technical Details]
13.11	All electrical items shall be of from SEW / ROCKWELL Allen Bradley/ Telemecanique/Siemens/L&T/ABB or reputed makes acceptable to BHEL.	Bidder to Confirm	
13.12	All indication lamps should be provided with LED Indication Lamp.	Bidder to Confirm	
13.13	All components/devices/terminals are to be incorporated with numbered ferrules.	Bidder to Confirm	
13.14	External wiring from / to control panel, control desk, external motors etc shall be by means of screened multi-core cables.	Bidder to Confirm	
13.15	All electrical motors, limit switches etc, on the machine shall be wired using PVC sheathed cable running in conduits and converging to common terminal block.	Bidder to Confirm	
13.16	All feedback systems & field sensors, limit switches, proximity switches, pressure switches, temperature controllers, should be for heavy duty application and wired up with flexible PVC insulated screened cables. All field elements shall have easy accessibility for maintenance.	Bidder to Confirm	
14.17	Air Conditioners with Dehumidifiers of suitable capacity to be provided for all Electrical / Electronic Panels / Cabinets including Operator's Panel considering specified ambient conditions. Make : Rittal / Warner & Finley or any other reputed make acceptable to BHEL. Detailed specifications are to be submitted with the offer.	Bidder to Specify	
15.0	MACHINE LIGHTS		
15.1	Machine Spot Lights and suitable fluorescent light or metal halide lamps to be provided for sufficient illumination in the machining zone.	Bidder to Confirm	
15.2	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents	Bidder to Confirm	

S. No	SPECIFICATIONS / DESCRIPTION	VENDOR'S OFFER / CONFIRMATION [with Complete Technical Details]	
16.0	MACHINE FOUNDATION & DRAWING APPROVAL		
16.1	GA drawings, Machine constructional drawings with dimensions, Civil Foundation layout drawings, Hydraulic / Pneumatic / Electrical / Electronic circuits with BOM, are to be submitted within 30 days from the date of ordering (in case of an order) for approval by BHEL.	Bidder to Confirm	
16.2	Bidder shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI). Complete details like static and dynamic loads etc. required for foundation design shall be submitted by the Bidder within three months after getting BHEL's approval.	Bidder to Confirm	
16.3	BHEL shall design and construct complete foundation for the machine as per the Bidder's recommendation	Bidder to Confirm	
16.4	Complete anchoring system including foundation bolts, anchoring materials, fixators, levelling shoes, chemical for anchoring etc should be supplied	Bidder to Specify	
17.0	MACHINE SPARES		
17.1	List of spares with itemized break-up of mechanical, hydraulic, pneumatic, electrical and electronic spares used in the machine in sufficient quantity as per recommendation of Bidder for 2 years of trouble free operation on three shifts continuous running basis shall be furnished by Bidder along with offer. The list is to include following, in addition to other recommended spares: (Unit Price for each item of spare shall be offered)	Bidder to Confirm	
17.2	Mechanical/Hydraulic/Pneumatic Spares: All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses, bearings, sprockets, chains etc.	Bidder to Confirm	
17.3	Electrical / Electronic / PLC Spares: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Power Switch, Encoders, Spares for PLC, Servo Motors for Feed Drives, Power Module & Control Cards for all type of Drives, etc.	Bidder to Confirm	

S. No.	SPECIFICATIONS / DESCRIPTION		VENDOR'S OFFER / CONFIRMATION [with Complete Technical Details]
17.4	A set of Service Tools for dismantling and assembling of machine components such as roller sets etc. may be quoted.	Bidder to Confirm	
17.5	Bidder to Confirm that complete list of spares for machine and accessories, along with item part no / specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the machine	Bidder to Confirm	
18.0	MACHINE PRE-DISPATCH INSPECTION & ACCEPTANCE AT SUPPLIER'S WORKS		
18.1	Complete EDM with all sub-systems and accessories shall be assembled and offered for inspection by BHEL Engineers at supplier's works.	Bidder to Confirm	
18.2	All systems of the machine have to be operated and demonstrated to the BHEL Engineers in proper working condition.	Bidder to Confirm	
18.3	Supplier has to establish parameters for carrying out EDM drilling of components based on the mutually agreed pattern of job sizes, number and the material specifications – all falling within the operating domain of the finalised machine specifications given with the BHEL Purchase Order. - Accuracy Tests Certificates as per as per ISO 230-1 & ISO 230-2, to be submitted by the OEM with the Technical Offer. - Machine inspection will be as per the test chart, which includes Geometrical, accuracy, repeatability and performance tests. Positional accuracy test will be carried out with the Laser interferometer at the supplier's site. - Standard test specimen drawing shall be enclosed along with the quotation and Standard Test Specimen need to be produced.	Bidder to Confirm	
18.4	The EDM drilled jobs taken for the machine capability prove-out are to be given to BHEL along with the machine consignment.	Bidder to Confirm	

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19.0	DOCUMENTATION	
19.1	The following documents in English language should be supplied along with the machine: Hard Copies - 3 Sets Bidder to Confirm In CD form - 1 Set 1. GA Drawing of the complete EDM 2. GA Drawing of Individual Mechanisms 3. GA & Sub-Assembly Drawings for sub-systems for maintenance purpose. 4. Operating manuals of Machine & its CNC System 5. Programming manuals of Machine & its CNC System 6. Maintenance manuals with all drawings of machine assemblies / sub-assemblies with parts list 7. All Electrical circuit diagrams with bill of materials 8. Pneumatic circuit diagrams with bill of materials 9. Maintenance & Interface manuals for Machine Control System 10. Preventive Maintenance check list for Electrical and Mechanical System 11. Trouble shooting chart for Main and all sub systems 12. Complete PCB Schematics indicating check points for Electronic controls. 13. Catalogues, O&M manuals for all bought out items used in the machine. 14. Operating Manuals, Maintenance Manuals & Catalogues for all supplied Accessories. 15. Detailed specification of all rubber items /pneumatic / lubrication fittings 16. CNC program print-outs with comments in English 17. CNC program and data on CD, Flash Memory Card. 18. Complete back up of hard disk on GHOST CD and clear written Instructions (3 copies) to take back up and reloading of a new hard disk. 19. Complete list of Alarm log, Error code, error messages & remedies and on line fault diagnostics to be provided by the Bidder. 20. Complete list of spares for machine, along with item part no /specification / type / model and make & address of the sub-vendors. 21. Anything else recommended by the OEM for an effective utilization of the equipment.	

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20.0	PROVE-OUT AND ACCEPTANCE AT BHEL WORKS		
20.1	After the machine Erection is completed and Energizing the machine at BHEL works, all systems of the machine have to be operated and demonstrated in proper working condition.	Bidder to Confirm	
20.2	Supplier has to carry out the machine performance prove-out at BHEL Works also on the components based on the mutually agreed pattern of job sizes, number and the material specifications – all falling within the operating domain of the finalised machine specifications given with the BHEL Purchase Order.		
20.3	a. Trial drilling of components is to be based on the standard test drawing and pass the performance tests for ensuring the capability of the machine. b. Standard test specimen drilling has to be done at BHEL Works. c. Positional accuracy tests have to be carried out with the VENDOR's Laser interferometer		
20.4	Minimum 10 Nos. of the each set of holes of diameter 0.1 mm of deep 4 mm, diameter 1.0 mm of deep 50 mm and diameter 2.0 / 3.0 mm of 200 mm deep are to be drilled on components, made of hardened steel (50- 60 HRC) , High Nickel Alloys, etc. and the drilled holes have to be inspected to check functional accuracy of the machine. All the drilled holes parameters (diameter, roundness, concentricity, straightness) should be within acceptable limit described in the BHEL Technical Specifications.		
21.0	TRAINING		
21.1	The supplier shall train TWO BHEL Engineers in Operation and Maintenance (Mechanical, Electrical/ Electronics and Programming) of the Machine for a minimum period of FOUR working days at supplier's works after the pre-dispatch inspection.	Bidder to Confirm	
21.2	Bidder to mention whether the training is offered free of cost or chargeable. If chargeable, Bidder has to quote on man-day basis.	Bidder to Specify	

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21.3	Airfare, board & lodging for the BHEL Engineers who will be visiting supplier's works for pre-dispatch inspection and training, will be borne by BHEL.	Bidder to note
21.4	The Supplier shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance (Mechanical, Electrical/ Electronics and PLC System) during commissioning of the Machine at BHEL works for FIVE working days.	Bidder to Confirm
21.5	The training shall include specialized coaching in i) Safety ii) Operation of the machine iii) PC based System & Operation, iv) Trouble-Shooting, v) Software Application vi) All special features of the machine vii) Electrical / Mechanical / Electronics systems	Bidder to Confirm
22.0	ERECTION & COMMISSIONING	
22.1	Supplier to take full responsibility for Supervision and Skilled Labour for the erection and for startup, testing and commissioning of machine, its controls and accessories. Supplier shall send suitable qualified Engineers and Erection crew for the Erection and Commissioning at BHEL/TRICHY.	Bidder to Confirm
22.2	Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by Bidder in their foundation/layout drawings. Other requirements like crane and helping personnel shall also be provided by BHEL.	Bidder to Confirm
22.3	Successful proving of BHEL components by the Bidder shall be considered as part of commissioning. All tests, as mentioned (Machine Acceptance) shall form part of the commissioning activity.	Bidder to Confirm
22.4	Commissioning spares, required for commissioning of the machine shall be supplied free of cost, by the Bidder / OEM.	Bidder to Confirm

S. No	SPECIFICATIONS / DESCRIPTION		VENDOR'S OFFER / CONFIRMATION [with Complete Technical Details]
	THERMAL STABILITY FOR AMBIENT CONDITIONS & ENVIRONMENTAL PERFORMANCE OF THE MACHINE		
23.0			
23.1	The machine shall be suitable for an ambient temperature of +48 deg C and relative humidity of 85% respectively, but both do not occur at the same time / simultaneously.	Bidder to Confirm	
23.2	The Bidder should ensure trouble free operation of the machine with Thermal Stability of the complete machine and accuracy requirements of BHEL components, keeping in view of ambient conditions as mentioned above.	Bidder to Confirm	
23.3	The machine, including sub-systems, attachments and accessories, should be suitable for continuous operation on three shifts a day.	Bidder to Confirm	
23.4	If any safety / environmental protection enclosure is required it shall be built in the machine by the Bidder.	Bidder to Confirm	
23.5	Paint of the machine should be oil / coolant resistant and should not peel off – preferred to be polyurethane	Bidder to Confirm	
23.6	Maximum noise level shall be 80 dB (A) at normal load condition.	Bidder to Confirm	
24.0	MACHINE PACKING		
24.1	Sea worthy & rigid packing for all items of complete machine, PLC System, all accessories and other supplied items to avoid any damage/loss in transit. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes	Bidder to Confirm	
25.0	GUARANTEE		
25.1	Performance Guarantee to be given for 12 months from the date of commissioning OR 18 months from the date of dispatch whichever is earlier, for the total machine or any sub-systems, components forming part of the machine for rendering the prescribed performance / rating values.	Bidder to Confirm	

S. No	SPECIFICATIONS / DESCRIPTION	VENDOR'S OFFER / CONFIRMATION [with Complete Technical Details]
26.0	GENERAL POINTS	
26.1	Machine Model No.	Bidder to Specify
26.2	Total connected load (kVA):	Bidder to Specify
26.3	Total air volume in cu.m/min	Bidder to Specify
26.4	Floor area required (Length, Width, Height) for complete machine & accessories	Bidder to Specify
26.5	Total weight of the machine (approx)	Bidder to Specify
26.6	The general arrangement drawing showing the machine & associated systems with salient dimensions shall be submitted along with the offer. The drawing should be clear and legible	Bidder to provide compulsorily
27.0	ANNUAL MAINTENANCE CONTRACT (AMC) - OPTIONAL	
27.1	It is envisaged that the supplier has to offer the after sales maintenance of the machine for a period of THREE years (comprehensive maintenance) after the guarantee period of one year. The cost for the AMC shall be quoted year wise for three years after the warranty period. The AMC cost shall be given in separate sealed bid.	