

**Bharat Heavy Electricals Limited**

(A Government of India Undertaking)

Electronics Division

P B NO 2606, Mysore Road, Bangalore - 560026

Tel 080 26746117 / 26998366 Fax 080 26740137

Tender document for supply of SMT PICK AND PLACE SYSTEM**R F Q Number : TRSM900011****Tender Qty : One Set****Tender Due Date and Time : 13.08.2008 13.00 Hrs****Tender Opening Date and Time : 13.08.2008 13.30 Hrs****Place of opening of Tender : SA – MM Conference hall****Scope:**

- A) Supply, Installation, Commissioning of SMT-Pick and place system consisting of 3 nos of pick and place machines as per the specification under Table A.
- B) Supply of the feeders for the SMT pick and place system as per the Table B.

1. Two part Bid - Tender shall be submitted in two parts :

- a. Part I – Techno commercial bid without prices.
- b. Part II – Price bid

Tender (quotation) shall be submitted in a sealed envelope super scribed with **RFQ NUMBER / and DUE DATE** on it and the same must reach our office on or before the due date by **13:00 hrs**. Quotation can also be dropped in the tender box with caption **“Sub Assembly - TRS”**. Late quotations are liable to be rejected.

Tender shall be addressed to **Sr.DGM / EM - ComI**, Electronics Division, Bharat Heavy Electricals Ltd., Mysore road, Bangalore 560026.

2. Earnest Money Deposit : EMD of Rs 2,00,000/- (rupees two lakhs only) shall be submitted in the form of DD along with the Techno-commercial bid in a separate sealed cover in favor of **“Bharat Heavy Electricals Limited”**. EMD in the form of DD / Pay order only is acceptable & any other form is not acceptable and the bid is liable for rejection. EMD amount doesn't carry any interest. The same will be converted as Security Deposit for the successful bidders and for unsuccessful bidders the same will be refunded after finalization of the order. For successful bidders EMD will be refunded after submission of PBG.

3. Delivery Period: Equipment shall be delivered, within 4 months from the date of placement of technically & commercially clear purchase order.

4.0 Warrantee period : Equipment shall have a comprehensive warrantee of 12 months from the date of installation / acceptance and accordingly PBG shall be for 12 months from date of acceptance.



5. Terms and conditions:

1. All the Bidders shall meet the **pre-qualification criteria** and Comply with **Technical Specification** mentioned in this specific tender.
2. Indian Bidders are required to comply with the **general terms and conditions** as per **SA – 01 (Annexure –I)**
3. Foreign Bidders are required to comply with the **general terms and conditions** as per **SA – 02. (Annexure –II)**

Pre qualification criteria

1. The vendor shall be an Original Equipment Manufacturer (OEM)
 - a. Based in India
 - b. Foreign OEM with Authorized Indian dealer(s) / representative(s) for sales & service. The authorization letter for the dealer/ representative shall be provided.
 - c. Offer can be submitted by the OEM or their authorized dealers in India along with an authorization letter. However Purchase Order will be placed on the lowest technically acceptable bidder on the OEM only.
 - d. If the offer is from an authorized representative in India , the Indian representative cannot quote for the same equipment from 2 or more different OEM's
2. The offer shall be only for new equipment and not for any refurbished / used equipment. A declaration to the above effect to be furnished.
3. All the parts used in the machine shall also be new and not used / refurbished ones. A declaration to the above effect to be furnished.
4. The vendor should have already supplied and installed 10 nos. of similar machines in India and operating satisfactorily for at least one year during the last three years. The details of the customers with contact details, machines installed, date of installations etc. to be provided.
5. The vendor shall be in a position to provide service and spares support for the installations in India.
6. The vendor or their authorized service representatives should have trained engineers in India for commissioning & service for the offered equipment. A declaration to the above effect to be furnished.
7. The vendor shall be in a position to undertake AMC for the equipment with BHEL after the expiry of the warranty/ guarantee period either directly or through a service representative. The vendor should have successfully completed AMC for similar machines for at least one year in India and necessary proof to be furnished.
8. The vendor shall arrange for a demonstration of the machine or a similar system operating in India, as required by BHEL.
9. The vendor shall furnish a comprehensive warranty for at least 12 months from the date of commissioning or 18 months from the date of delivery, whichever is early.
10. The vendor shall guarantee the performance of the equipment for at least 12 months from the date of commissioning.

NOTE:

1. Pre qualification evaluation will be carried out based on the details furnished by the vendor / feedback from their customers / inspection of the company / product if required by BHEL and at its sole discretion.
2. Pre qualification criteria are mandatory requirements and the technical bids will be evaluated only when the Pre Qualification criteria are met.

Specifications:

The pick & place machines (3 nos.) shall be corresponding to the parameters under the specifications below or better. As a mandatory requirement , the 3 machines offered shall be of the same make (OEM) and the feeders, nozzles, trolleys, spares shall be interchangeable between the machines. The 3 machines under Table A and the feeders under Table B will be considered as a single composite system.

TABLE A

Specifications for SMT PICK & PLACE system		
S No	PARAMETER	REQUIREMENT
1	PCB SIZE	
1.1	Minimum	50mm X 30mm
1.2	Maximum	400 mm X 350 mm or better
1.3	Thickness	Up to 5mm
1.4	Fiducials	a) Minimum 3 nos of standard Fiducials for board recognition. b) Multiple options of type of fiducials shall be available.
2	COMPONENT RANGE	
2.1	Minimum component size (CHIP)	01005 (10 mil x 5 mil) onwards
2.2	Lead pitch capability	10 mil (0.25 mm) or better
2.3	Maximum size of component	50mm X 50mm or more
2.4	Packages	Chip, MELF, mini MELF, SOT, DPAK, SOIC, PLCC, QFP, BGA, CSP etc.
2.5	Component leads	J TYPE , GULL WING, BGA
2.6	BGA	a) Ball Pitch- 0.25mm to 2mm or better b) Ball Diameter-0.1mm to 0.63,or better

3 FEEDER	
3.1 Feeder capacity /machine	80 feeders (8mm tape) or better
3.2 Type of feeders	a) Tapes, Stick, Waffle, JEDEC, Bulk , Tray
	b) There shall be no reduction in feeder capacity due to usage of tray feeder
3.3 Tray feeder capacity	20 tray matrix tray exchanger to be provided atleast for 2 machines
3.4 Type of tray exchanger	Shuttle type
3.5 Location of tray exchanger	Rear side of the machine
3.6 Feeder Mounting	Capable of mounting feeders directly on the machine (online) & Offline with feeder trolleys/banks.
3.7 No of feeder banks/ trolleys	a) The machines shall be provided with feeder banks/trolleys for the complete feeder capacity. b) Additionally feeder banks/trolleys to be provided for 100 % offline capability.
3.8 Feeders compatibility	The feeders shall be compatible for usage interchangeably between the 3 machines.
4 NOZZLES	
4.1 Nozzles compatibility	The nozzles shall be compatible for usage interchangeably between the 3 machines.
4.2 No of nozzles per head	Minimum 6 nozzles per head with single head or Minimum 4 nozzles per head with 2 heads
4.3 Automatic Nozzle changer	Automatic nozzle changer to be provide with provision of about 30 nozzles
4.4 Nozzles for handling components	a) Full set of nozzles for handling component covered in SI no 2. b) Additionally a full set of nozzles to be included for better optimization.
5 PLACEMENT RATE as per IPC 9850	
5.1 Chip components	15000 components per hour (cph) or above
5.2 Fine pitch components	4000 components per hour (cph) or above

6	PLACEMENT ACCURACY	
6.1	Chip components	50 microns at 3 Sigma or better
6.2	Fine pitch components	30 microns at 3 Sigma or better
6.3	Rotational accuracy for Fine Pitch components	+/-0.05 degrees or better for 50 mm component size
7	VISION SYSTEM	<p>a) A suitable vision alignment system capable of handling component size & packages specified in Sl. No. 2.shall be provided. The details of the system with significant features, no of cameras, type of camera , resolution ,vision direction etc, to be furnished.</p> <p>b) Vision system for all the nozzles</p>
8	CONVEYOR	
8.1	Rail adjustment	<p>a) Front Fixed and Automatic Rear Adjustable</p> <p>b) provision for manual width adjustment</p>
8.2	Board feed direction	Left to Right
9	BOARD HANDLING	
9.1	While component placement	Board shall be Stationary
9.2	Board Support	Supported from Underside in addition to rails by support pins
9.3	Clearance for under side components	Minimum 15 mm
10	OTHER ESSENTIAL FEATURES	
a	Component co-planarity check	Inbuilt System to check for co-planarity of component leads to be provided
b	Bad mark sensing	Bad mark sensing to be provided for paneled PCB's to prevent component placement on Bad PCB's
c	Automatic Height Measurement system	Automatic height measurement system for measuring component height to be provided
d	Automatic dimension check	Automatic component dimension checking to be provided
e	Component value verification system	Component value measurement/ verification system (before component placement) for Resistors, capacitors to be provided

f	Polarity verification system	Polarity verification systems (before component placement) for diodes, capacitors, LED's etc. to be provided
g	Direction check system	Direction check function for SOT packages to be provided.
h	Feeder position indication	Feeder position indication for easy feeder mounting to be provided
i	Feeder identification for component reel / stick replacement	LED indication of feeders for quick change during operation
j	Automatic tape cutters	Automatic tape cutters for used tapes to be provided for all the feeder trolleys
K	Reject components handling	Suitable mechanism for collection of rejected components like trash bins to be provided.
12	SOFTWARE & SYSTEM	
12.1	Operating system	Windows based (GUI)
12.2	Placement Programming	Both Offline & Online
12.3	Programming methods	a. CAD download b. Manual coordinate entry c. Teach mode
12.4	Language	English
12.5	System	A suitable PC System with about 3 GHz processor, 2 GB RAM, 250 GB HDD, 17" LCD display with network compatibility (Ethernet 10/100) , USB to be provided for data exchange.
12.6	Software library	In Built Feeder Library, component library, package library etc. for placement programming
12.7	Optimisation capability	The machine program shall be capable of optimizing for best placement rate.
12.8	Line balancing software	Line balancing software for balancing the all the pick & place machines for the best placement rate with graphical board viewing capability.
13	COMPATIBILITY	SMEMA (Both electrical and mechanical)

14	MACHINE SIZE, POWER INPUT, COMPRESSED AIR REQUIREMENTS	
14.1	Machine Size	Approx 2 m x 2m (L x W) or less without tray changer (Footprint)
14.2	Power input	415V +/-10%, 50Hz, Three Phase. Any Transformer required shall be within the machine itself.
14.3	Power failure management	Graceful Shutdown feature shall be provided as part of the system with built in UPS for the controllers. UPS for the machines will be in BHEL's scope and UPS configurations/ requirement for the machine to be spelt out.
14.4	Compressed air	a) The machine shall be capable of operating with compressed air pressure of 6 bar or less. b) The total compressed air requirement volume and quality shall be specified.
15	WORKING ENVIRONMENT	Requirement of Air conditioning shall be clearly spelt out
15.1	Humidity	RH 10 % TO 90 %
15.2	Temperature range	4 to 45 °C
15.3	Safety & other features	a)Emergency stop function with buttons provided at front & rear of the machine b)Safety cover to be provided both at front and rear c) Multi colour signal tower to be provided c)The machine shall comply with CE mark specifications d) Monitor & operation keyboard both front & rear
16	Spares	Spares for 2 years operation & maintenance to be quoted with the list of spares.

TABLE B

LIST OF FEEDERS REQUIRED:

a) Tape Feeders

Sl no	Description	Qty
1	Tape feeders 8 mm	150
2	Tape feeders 12 mm	50
3	Tape feeders 16 mm	40
4	Tape feeders 24 mm	30
5	Tape feeders 32 mm	2
6	Tape feeders 44 mm	2
7	8mm feeder for 0402 components	10
9	8mm feeder for 0201 components	10

b) Stick Feeders

Sl.No	Component Width(adjustable)	Component Height(adjustable)	Qty
1	6.0 mm to 8.0 mm	Upto 3.00 mm	20
2	8.1 mm to 10.0 mm	Upto 3.00 mm	10
3	10.1mm to15.0 mm	Upto 4.00 mm	10
4	15.0 mm and above	Upto 6.00 mm	10

Note:

1. Specify the machine parameters briefly explain features wherever applicable.
2. If more than one model is quoted, separate offers shall be submitted.
3. Additional Accessories, which will enhance the performance, shall be quoted separately.
4. The feeders, nozzles and spares shall be compatible among the pick and place machines offered as per specification under Table A.
5. All machines should be of the same make.
6. A clause wise deviation, if any, has to be brought out clearly. If there are no deviations, the vendor has to positively certify compliance to the specifications in toto.
7. The complete technical information and catalogue shall be given.

GENERAL TERMS :

1. Operation , Maintenance , Service & spare parts manual have to be supplied in hard copy and soft copy along with the equipment. Detailed Hydraulic, Pneumatic , Electrical and Electronic circuit diagram have to be provided as part of the manuals. The lubrication points are to be identified on the machine with respect to O & M manual. The schedules for lubrications are to be provided in the manual.
2. Details of service agents in India to be furnished.
3. All commissioning / service requirements such as power, compressed air, water, lubricants, coolants, any civil requirements like special foundation arrangements etc. have to be listed and intimated well in advance.
4. The equipment shall be installed & commissioned at BHEL / EDN by the vendor.
5. The vendor shall coordinate with other vendors of related equipment of SMT line, which will be installed at BHEL-EDN, during installation & commissioning.
6. Training shall be provided for operation & maintenance for BHEL personnel. The training details to be furnished.
7. Service Engineers are to be deputed during initial pilot run and commissioning period at no extra cost to BHEL.
8. Initial Calibration certificates shall be furnished. The subsequent calibration schedules, process and periodicity shall be furnished along with the authorized calibration agencies, if any.
9. Test certificates of the equipment shall be furnished to BHEL along with the equipment.
10. The software upgrades during the warranty / guarantee period shall be provided free of cost.