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4.3	The machine shall be capable of winding coil loops (boats) from pre-insulated copper conductors.	Vender to Confirm			
4.4	Machine structure shall be of cast iron or fabricated mild steel.	Vender to Confirm			
4.5	Face plate of Machine: Dia 800 with 4 Nos 'Tee' slots at 90 degree to hold winding fixture.	Vender to Confirm			
4.6	Centre height of face plate from ground level shall be 1600mm.	Vender to Confirm			
4.7	The machine to provide chuck speed 0-30 r.p.m. infinitely variable.	Vender to Confirm			
4.8	Loop former should have friction less Vertical and Horizontal guide rollers to guide the copper wire.	Vender to Confirm			
4.9	Numbers of starts/stops per minutes -10. The M/C shall stop every half turn for inserting interturn insulation in nose portion. Next half rotation shall be activated by operator through foot switch.	Vender to Confirm			
5.0	LOOP - FORMER (ADJUSTABLE)				
5.1	Max. Loop length centre of bolt./ centre of bolt with pit in front of m/c.				
5.2	Length = 4000 mm (maximum), 500 mm (Minimum)				
5.3	Nose pin Dia = 20mm, 30 mm and 50 mm. Horizontal				
5.4	Setting of loop length and desired pin diameter should be automatic as per programme. However Loop former should have adequate scale marking in mm to set loop length of required dimension for manual operation.	Vender to Confirm			
6.0	CONDUCTOR CUTTING DEVICE Qty = 1 No.	Vender to Confirm			
6.1	Close to the winding machine a suitable cutting device to be provided for cutting the conductors, after winding the loops. This cutting device may be operated hydraulically or pneumatically. Size of the conductors: Min: 2.5x1.3 mm Max: 10x4mm	Vender to Confirm			

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6.2	Cross section of conductor to be cut = 320 sq. mm (maximum)	Vender to Confirm			
7.0	CONDUCTOR BOBBIN HOLDING STAND Qty = 1 No.	Vender to Confirm			
7.1	The machine should be provided with suitable conductor drum holding stand and tensioning device, which should be automatically adjustable as per conductor size. However arrangement for manual operation should also be provided. This should be able to take maximum of 8 conductors.	Vender to Confirm			
7.2	Provision to load Bobbins = 8 Nos Size of Bobbins :- Max. Dia-600mm Max.: width = 500mm Height of stand = Max 1600mm Min. 600mm Width of stand = Max. 650mm Bobbin bore dia = 30 mm Weight of Bobbins = 150kgs with conductor	Vender to Confirm			
7.3	Hydraulic brake for individual bobbin holder.	Vender to Confirm			
8.0	ELECTRICAL SYSTEM :	Vender to Confirm			
8.1	415V + 10%, - 15%Hz, 50 Hz, + 3 %, 3 Phase AC (3 wire system with out neutral) Power Supply Source will be provided by BHEL at a single point near the winding machine as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the loop machine / control cabinets, shall be the responsibility of vendor. Requirement of grounding/earthing with required material details is to be informed by vendor well in advance so that same could be incorporated during construction of foundation Machine control supply to be of 220 V AC. Necessary isolation/ step down transformers for machine control including CVT/UPS if required to be provided.	Vender to Confirm			
8.2	Tropicalisation: All electrical / electronic equipment shall be tropicalized	Vender to Confirm			
8.3	All electrical & electronic control cabinets & panels should be dust and vermin proof	Vender to Confirm			
8.4	All electrical components in the cabinets should be mounted on DIN Rail	Vender to Confirm			

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8.5	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.	Vendor to Confirm			
8.6	Motors shall conform to IEC Standards	Vendor to Confirm			
8.7	All cables moving with traversing equipment should be installed in Caterpillar/ Drag chain. Additionally, all the Cable trays, hoses, cable drag chains etc required for laying of cables should be included in the offer.	Vendor to Confirm			
8.8	Vendor should ensure the proper earthing for loop machine and its auxiliaries peripherals.	Vendor to Confirm			
8.9	Additionally turn counting facility with suitable LED counter with least count of 0.1 turn with directional sensing to be provided	Vendor to Confirm			
9.0	SAFETY ARRANGEMENTS: Following safety features in addition to other standard safety features should be provided for the loop machine and its auxiliaries: (Complete description of Safety features should be furnished)				
9.1	1.loop machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, workpiece and the operator due to the malfunctioning or mistakes. loop machine functions should be continuously monitored and alarm / warning indications through lights (on Control Panels) / alarm number with messages (on HMI Display) should be available.	Vendor to Confirm			
9.2	2. A detailed list of all alarms / indications provided on loop machine should be submitted by the supplier.	Vendor to Confirm			
9.3	3. All the pipes, cables etc. on the loop machine should be well supported and protected.	Vendor to Confirm			
9.4	4. All the rotating parts used on loop machine should be statically & dynamically balanced to avoid undue vibrations. All rotating parts should be provided with suitable guards	Vendor to Confirm			

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9.5	5. Emergency Switches at suitable locations as per International norms are to be provided.	Vendor to Confirm			
10.0	ENVIRONMENTAL PERFORMANCE				
10.1	The loop machine shall conform to following factors related to environment :				
10.2	(a) Maximum noise level shall be 85 dB(A) at normal load condition, 1 M away from the loop machine with correction factor for back ground noise, if necessary. This will be measured as per international standards like DIN 45635-16. Supplier to demonstrate compliance to noise level, if so required.	Vendor to Confirm			
10.3	(b) If any safety / environmental protection enclosure is required it should be built in the loop machine by the vendor.	Vendor to Confirm			
10.4	(c) Paint of the loop machine should be heat resistant and should not peel off.	Vendor to Confirm			
11.0	DIAGNOSTIC SYSTEM:				
11.1	TELE-DIAGNOSTIC SERVICE :				
11.2	Tele-diagnostic service should be provided through International telephone lines along with required Hardware / Software package for the supplied PLCsystem for remote diagnosis and correction of the problems in PLC of the tapping machine. This should be provided free of charge for the guarantee period. Terms and conditions for the service after guarantee period should be informed by vendor. Subsequently, it should be possible to use other platforms, such as Internet or ISDN, subject to their availability in ^{future}	Vendor to Confirm			
11.3	Help guide should be provided to use the diagnostic system.	Vendor to Confirm			
12.0	LEVELING & ANCHORING SYSTEM				
12.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc shall be supplied for the machine and all allied equipment.	Vendor to Confirm			

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13.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE				
13.1	Special tools and equipment required for erection of the machine shall be brought by the vendor. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer	Vender to Confirm			
14.0	ELECTRONICS CONTROLS				
	(A) PLC and HMI Shall be Allen Brodely GE-FANUC/MODICON /MITSUBIHI/SIEMENS make only (Make, Model and details to be furnished) (B) Drive for rotation shall be of reputed make like Siemens /Allen Bradely/ABB/BALDOR. It Should be digital type drive with feature like auto- Tuning parameters programming and display.	Vender to Confirm			
15.0	SPARES /ACCESSORIES				
15.1	Item wise breakup of mechanical, hydraulic, electrical and electronic spares used in the machine in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on three shifts continuous running basis should be offered by vendor. The list to include following, in addition to other recommended spares: (Unit Price of each item of spare should be offered)	Vender to Furnish			
15.2	a) Electrical /Electronic / PLC Spares: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, Operator's panel with Display Unit, I/O Cards for PLC etc.	Vender to Furnish			
15.3	Complete list of spares for machine and accessories, along with specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the Machine.	Vender to Furnish			
16.0	DOCUMENTATION :				
16.1	Four sets of following documents (Hard copies) in English language should be supplied along with the loop machine.				
16.2	Operating manuals of loop winding machine, PLC system.	Vender to Confirm			
16.3	Programming Manuals for PLC system.	Vender to Confirm			
16.4	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub assemblies/parts including Electrical / Pneumatic/ Hydraulic circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list also.	Vender to Confirm			

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16.5	Maintenance, Interface & commissioning manuals for Drive and PLC system.	Vender to Confirm			
16.6	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vender to Confirm			
16.7	Operating Manuals, Maintenance Manuals & Catalogues for supplied Pumps and all supplied Accessories.				
16.8	PLC program print-outs with comments & cross references in English.				
16.9	PLC and HMI program backup on CD /Floppy.	Vender to Confirm			
16.10	Complete original programme software, PLC & HMI Programmer software with authorisation and communication cable, necessary programming Laptop PC for fault diagnosis, reprogramming etc to be provided..	Vender to Confirm			
16.11	Complete Master List of parts used in the loop winding machine shall be submitted by the vendor.	Vender to Confirm			
16.12	One additional set of all the above documentation on CD ROM, wherever possible.	Vender to Confirm			
17.0	TRAINING:				
17.1	BHEL Persons should be trained at supplier's Works for mutually agreed period in the area of (a) Operation of the loop winding machine & other supplied equipment. (b) Electrical, Electronic & PLC maintenance of Loop Winding Machine & other supplied equipments. (c) Mechanical maintenance. (d) Programming of the machine.	Vender to Confirm			
17.2	Air-fare, boarding & lodging for the trainees shall be borne by BHEL.				
17.3	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.				

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17.4	Vendor to quote for training on man / week basis				
18.0	FOUNDATION:				
18.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI)/ P.O. Complete Foundation Design including details, like Static/ Dynamic load details etc. and final Layout Drawings shall be submitted by the supplier within three months after getting BHEL's approval. The Layout should consist of all requirements pertaining to complete machine and all accessories, including space requirement. BHEL will construct complete foundation for the machine after receipt of complete foundation drawing from the vendor. The vendor shall also indicate detailed specifications of grouting compound and grouting procedure etc. for foundation bolts of various items of the loop winding machine.	Vendor to Confirm			
19.0	ERECTION & COMMISSIONING				
19.1	Supplier to take full responsibility for carrying out the erection, start up, testing of machine, it's control system & all other supplied equipment. Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by supplier in their foundation/layout drawings. Other requirements like crane and helping personnel shall also be provided by BHEL. Details of these requirements should be informed by vendor in advance.	Vendor to Confirm			
19.2	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at clause 23 (Machine Acceptance) shall form part of the commissioning activity.	Vendor to Confirm			
19.3	Tools, Tackles, instruments and other necessary equipment required to carry out all above activities should be brought by the supplier.	Vendor to Confirm			
19.4	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to Confirm			
19.5	All Cover Plates required for the machine and its peripherals including pits, if any, shall be supplied and installed by the vendor. The plates should be sourced from India	Vendor to Confirm			

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19.6	Portion, if any, of the loop winding machine, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colours of paint used.	Vendor to Confirm			
19.7	Laying of pipelines, fittings, interconnecting cables; fixing and interconnection of the instruments / sensors etc shall form part of the erection to be carried out by vendor.	Vendor to Confirm			
19.8	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to Confirm			
19.9	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to Confirm			
20.0	ACCURACY TESTS:				
20.1	Accuracy test for required parameters mentioned in the specification shall be done and the machine supplied should be proved for the required parameters. Accuracy of loop length setting should be within ± 0.5 mm. Accuracy test report shall be submitted.	Vendor to Confirm			
21.0	OPERATING CONDITIONS & THERMAL STABILITY :				
21.1	Total machine including CNC system and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. Power Supply: Voltage: 415 V - 10%, +15 %, Frequency: 50 Hz +3%, - 3% No. of phases = 3 Ambient Conditions: Temperature = 5 to 45 degree celsius Relative Humidity = 95% max. (Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same are to be furnished by Vendor)	Vendor to Confirm			

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21.2	Weather conditions are tropical, Atmosphere may be dust laden during some part of the year. Machine shall be kept in the normal shop floor condition. Max. temperature variation is up to 25 deg Celsius in 24 hours. (Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same are to be furnished by Vendor)				
21.3	Thermal Stability of the complete machine keeping in view specified Ambient Conditions and accuracy requirements of BHEL components and trouble free operation of the machine should be ensured by vendor. (Confirm that machine is suitable for above and details of provisions on the machine for the same should be furnished)				
22.0	PROVEOUT OF BHEL COMPONENTS :				
22.1	Vendor to submit preliminary process, time study recommended by them along with the offer. Complete prove out shall be done by Vendor at BHEL works to the specified process accuracy. Component for proveout-shall be provided by BHEL. Vendor should submit-settings, process sheets, time studies etc. in advance for the prove out components (100 nos). Vendor shall be fully responsible for proveout of components as per requirements specified by BHEL to the full satisfaction of BHEL. Clarifications, if any, required by vendor, regarding accuracy requirements of the proveout components, whether specified or not, should be discussed and cleared by vendor during initial technical discussions. Vendor to prove the process-time committed.	Vendor to Confirm			
23.0	MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)	Vendor to Confirm			
23.1	Tests / Activities to be carried out at supplier's works on the Loop winding machine before dispatch:				
23.2	Geometrical Accuracy Tests as per specification.				

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23.3	Positioning Accuracy Tests as per specification.				
23.4	The machine should be tested for continuous running of 48 hrs. If any break down occurs during this test, the test should be repeated for 48 hrs from that time.				
23.5	Demonstration of all features of the machine, CNC system and all Accessories.				
23.6	Demonstration of all features of the Loop winding machine, PLC system & all accessories to the satisfaction of BHEL for their efficient and effective use.				
23.7	Demonstration by actual use of all supplied accessories to their full capacity.				
23.8	Job prove out (100 loops).				
23.9	Two weeks supervision of independent operation of the machine by BHEL after job proveout.				
23.10	Training of BHEL personnel in operation & maintenance of complete Loop winding machine & accessories by the supplier's experts / engineers during their stay at BHEL works.				
23.1.1	All components of the machine shall be offered for a physical check of dimensions and completeness of supply.				
23.1.2	Test / Activities to be carried out at BHEL works while commissioning the machine :				
23.1.3	The Loop winding machine should be tested for continuous running of 24 hrs. If any break down occurs during this test, the test should be repeated for few more cycles.				
23.1.4	Demonstration of all features of the Loop winding machine, PLC system & all accessories to the satisfaction of BHEL for their efficient and effective use.				
23.1.5	Demonstration by actual use of all supplied accessories to their full capacity.				
23.1.6	Job prove out (100 loops).				
23.1.7	Two weeks supervision of independent operation of the machine by BHEL after job proveout.				

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23.1.8	Training of BHEL personnel in operation & maintenance of complete Loop winding machine & accessories by the supplier's experts / engineers during their stay at BHEL works.	Vender to Confirm			
24.0	PACKING:				
24.1	Sea worthy & rigid packing for all items of the machine Control System, all Accessories and other supplied items to avoid any damage/loss in transit. When the equipment is despatched in containers, all small loose items shall be suitably packed in boxes	Vender to Confirm			
25.0	GUARANTEE :				
25.1	24 months from the date of acceptance of the machine after commissioning.	Vender to Confirm			
26.0	GENERAL : The vendor should submit the following information:	Vender to Confirm			
26.1	Machine Model	Vender to Confirm			
26.2	Total connected load (KVA):	Vender to Specify			
26.3	Floor area required (Length, Width, Height) for complete Loop winding machine & accessories	Vender to Confirm			
26.4	Painting of Machine Equipment / Electrical Panels: RAL 6011 Apple Green (Polyurethane Paint)	Vender to Confirm			
26.5	Total weight of the machine and equipment.	Vender to Confirm			
26.6	Weight of heaviest part	Vender to Confirm			
26.7	Dimensions of largest part	Vender to Confirm			

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27.0	OTHER FEATURES: (To be Included only if required)				
28.0	NETWORKING:	Vendor to Confirm			
28.1	Machine control should have necessary hardware and software for interfacing with gigabit Ethernet Local Area Network with 100 MB/sec through UTP cables for related data transfer. This network will also be connected to wide area network/Internet. The networking should have following capabilities:	Vendor to Confirm			
28.2	a) The machine shall appear as a node in the Entire Network. (Network Neighborhood)	Vendor to Confirm			
28.3	b) The data transfer shall be simple, provided sharing access is allowed between any PC and the loop winding machine across the network.	Vendor to Confirm			
28.4	c) The program transfer between PLC system and network should also be possible.				
29.0	MACHINE MONITORING SYSTEM (MMS) SIGNALS	Vendor to Confirm			
29.1	Following MMS signals would be made available on a specifically earmarked terminal strip. These MMS signals would be sourced from a PLC output card separately.	Vendor to Confirm			
29.2	a) Control ON	Vendor to Confirm			
29.3	b) Cycle ON	Vendor to Confirm			
30.0	QUALIFYING CONDITIONS				
30.1	Only those vendors, who have supplied and commissioned (i) at least one programmable coil loop winding machine for min coil dimension of 1500 mm, or (ii) at least one coil loop winding machine for min coil dimension of 1500 mm and one other machine with programmable features and such machine are presently working satisfactorily for more than one year (more than six months if supplied to BHEL) after commissioning should quote.	Vendor to Confirm			
30.2	The following information is to be submitted by the vendor about the companies where above machine (s) have supplied. This is required from all the vendors for qualification of their offer	Vendor to Furnish			

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		1. Name of the customer / company where similar loop winding machine is installed. (Copy of purchase Order without price information should be furnished)				
		2. Complete postal address of the customer.				
		3. Month & year of commissioning. (Copy of commissioning report should be furnished.)				
		4. Application for which the loop winding machine is supplied.				
		5. Name and designation of the contact person of the customer.				
		6. Phone, FAX no. and email address of the contact person of the customer.				
		7. Performance certificate from the regarding satisfactory performance of the machine supplied to them.				
		Approved by				