SPECIFICATIONS FOR HYDRAULIC VERTICAL POWER PRESS CAPACITY 200 TON
Specification No. Mech/M&P/3100/GM/07

1.0 IMPORTANT INSTRUCTIONS TO TENDERERS FOR FILLING TECHNICAL BID

1.1 Bidders are required to give clause wise comments on the technical specifications, confirming compliance/non-compliance with details of deviations if any along with their effect on the performance. Back references to be avoided, offers are likely to be ignored in case of non-compliance of these instructions for furnishing the information.

1.2 Unless otherwise stated, latest alterations/ revisions of specifications/ standards/ drawings shall be applicable. In respect of safety standards and environmental standards relevant to the machine, the machine manufacturers shall ensure compliance with international (CE/ISO/DIN/JIS)/National standards (IS) (where applicable).

1.3 Tenderers should offer and quote for all the specified concomitant accessories, as these are considered essential for commissioning and utilization of the machine. Even if bidder does not recommend the purchase any of these accessories, the price must be quoted for comparison purposes and their recommendation/suggestion indicated in the offer. Tenderers should also quote for optional accessories, spares and consumable spares as asked in the specifications.

1.4 In case, any item is required in sets, please specify nos./pieces per set. This is essential for proper technical evaluation of the offer. Offers received without this may be considered as incomplete and liable to be rejected.

1.5 The bidder should quote only for the specified make of sub-assemblies and equipment wherever specified. Makes of sub-systems other than the specified ones will normally not be acceptable. In case, some other make is quoted, specific reasons for the same including its features/advantages over specified makes must be brought out in the offer.

1.6 In case there is a contradiction in any information provided (some parametric values given in the specification and those given in the brochure or some other document enclosed by the tenderer), unless specifically mentioned in the deviation cum confirmation statement the values as given in the specification shall be taken as confirmed by the tenderer and offer evaluated accordingly.

1.7 The Purchaser may accept internationally accepted alternative specifications which ensure equal or higher quality than the specifications mentioned in the Technical Specification. However, the decision of the Purchaser in this regard shall be final.

1.8 Purchaser reserves the right to verify the details submitted by the bidder by actual site visits.

1.9 Other terms & condition of the contract will be as per Indian Railway Standard conditions of contract.

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2.0 **DESCRIPTION :**

One Hydraulic Vertical Power Press Cap–200T with tooling suitable for EOT Crane section. The press shall be capable of:

i) Fitting of Wheel of traversor, dismantling the defective/used wheel assembly and other fitting work as required in Material handling section by RCF.

ii) It shall be possible to preset the ram stroke with an accuracy of at least +/- 0.5mm.

iii) The press shall be rigid and of robust design to withstand the normal workshop environment of Indian Railway's repair workshops.

3.0 SCOPE OF SUPPLY:

The scope of supply shall include design, manufacturing, supply, installation, testing, commissioning and proving of machine on turnkey basis. It includes all the concomitant accessories/ equipments as detailed in the specification and other concomitant accessories/ equipment, which the manufacturer considers essential to make the machine fully operational, when installed and commissioned. It shall also include installation and commissioning of related equipment, training of personnel in operation and maintenance of machine and supply of technical documentation.

4.0 CAPABILITY OF MACHINE

The Hydraulic Vertical Power Press Cap–200T should be capable of Fitting of Wheel of traversor, dismantling the defective/used wheel assembly and other fitting work . The Press should have load handling capacity and leading parameters as mentioned under technical data in Schedule -I.

5.0 OPERATING ENVIRONMENT

5.1 The machine shall be capable of working in a non-air conditioned normal workshop environment The ambient temperature at the site at which the machine will be installed may vary from -4ºC to +50ºC over the year. The relative humidity may be as high as 98%.

5.2 The atmosphere is expected to be dusty. The machines offered shall be suitably tropicalised to work under these atmospheric conditions without any adverse effect on their performance.

5.3 The temperature rise shall not reach such a value that there is a risk of injury to any insulating material or adjacent parts.

6.0 ACCESSORIES/EQUIPMENTS

6.1 Standard Accessories

6.1.1 First fill of oils and lubricants (Quantity of each item shall be indicated in the bid).

6.1.2 Suitable rating electrical cables for connecting main supply and control panel to press.

6.1.3 Maintenance tools (List of tools shall be furnished in the bid)

6.1.4 Compatible voltage stabilizer-60 KVA (make Servomax, Neel, Integ, Powerware only)

6.1.5 Any other accessory which in the opinion of the bidder is essential or operation of Hydraulic press shall be quoted clearly in the offer.

6.2 Optional Accessories

Any other accessory, which can provide enhanced capability or productivity of the machine, may be quoted as optional accessory giving full description and advantages.

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7.0 EVALUATION CRITERIA

7.1 The cost of the basic machine.

7.2 Cost of the accessories according to tender specifications.

7.3 Cost of any other accessory which in the opinion of supplier is essentially require for making the machine fully functional.

7.4 Cost of Turnkey Charges viz. foundation, installation & commissioning etc.

7.5 Applicable duties and taxes, insurance, freight, installation & commissioning charges, training etc.

8.0 BASIC DESIGN FEATURE

8.1 It should have high grade hydraulic cylinder made up of seamless Steel Tubes. The piston rod should be grinded and hard chromium plated.

8.2 It should have compact hydraulic unit.

8.3 The down/up operation should be controlled by handle. It can be locked when the handle released at any position.

8.4 The press should be designed for easy servicing and should have durability

8.5 The machine shall be suitably protected by necessary safety features against any accidental operation, overload, power fluctuations, power failure etc. Suitable interlocks,alarms and warning lights must be provided.

8.6 The press and its accessories must ensure safety of the operator and the system at alltimes. Details of the safety features shall be furnished in the bid.

8.7 Mushroom type emergency stop push buttons shall be provided at convenient locations to switch off the machine in case of emergency.

8.8 Clearly visible indication lamp showing status of working of press to be provided near the machine, for all the workers to see, who are working near the machine.

9.0 TECHNICAL SPECIFICATION

9.1 Press Frame

The press frame shall be a weld fabricated structure; duly stress relieved, designed to withstand a force of 1.5 times the normal developed force. All welds shall be checked for weld defects. The design of the press frame shall be such that there is minimum deflection in the press frame under full load. A cross-sectional drawing shall be submitted clearly showing the various stiffeners provided for structural strength.

9.2 Working Table

The weld fabricated, stress relieved and accurately machined working table shall be of robust design to withstand full working load. Press shall accommodate tool bolster for which T-slots shall be provided on the working table. Extra ribbing shall be provided to avoid any deflection during operation.

9.3 Ram-Cylinder Assembly:

9.3.1 The press shall have one main cylinder. The cylinder shall be machined from steel forgings, accurately bored, ultrasonically tested and honed to 0.3 microns or better.

9.3.2 The cylinder shall be of double acting with proper rear guiding arrangement for the ram.

9.3.3 The piston cylinder assembly shall be effectively pressure sealed at both ends to prevent oil leakage and metal to metal contact between the piston and cylinder. The cylinder gland packing shall be designed for almost dry rod operation. Arrangement provided for reliving the piston seals of any lateral loading shall be explained in the

bid. The sealing arrangement in the ram-cylinder assembly shall be explained in the bid with a schematic diagram.

9.3.4 Hydraulic seals, `O' rings and packings under compression shall be made from Viton/Teflon/PTFE/PU/Neoprene. The average life of the proposed material shall be indicated in the offer.

9.3.5 The ram cylinders shall be forged out of alloy steel, machined, ground and hard chrome plated. The surface hardness shall be HRC-60 or better. These shall be ultrasonically tested for cracks. Material specification, actual hardness, surface finish and thickness of chrome plating of the ram cylinder shall be indicated in the bid. Thickness of chrome plating shall not be less than 25 microns.

9.3.6 The ram shall be able to generate an effective force of atleast 200 tonnes. Design calculations, taking into consideration, frictional losses in the hydraulic circuit as well as in the ram-cylinder assembly shall be explained in the bid. Design calculations for horse power, speeds, pump capacity and motor power shall be furnished in the bid.

9.3.7 The up & down movement of the slide (Ram) should be controlled by foot pedal.

9.4 Hydraulic system:

9.4.1 The hydraulic fluids used shall be non-corrosive, stable and safe. It shall be available indigenously in India. Particulars of the hydraulic fluid used shall be indicated in the offer. The successful bidder shall be required to indicate reputed Indian source of supply for the hydraulic fluid. The first fill of the hydraulic fluid shall form a part of the supply as concomitant accessory.

9.4.2 The hydraulics shall be of modular construction (with logic control valves/solenoid valves).The drive of the press shall be through hydraulic pumps.

9.4.3 The working pressure shall not exceed 25 MPa. The hydraulic system along with the hydraulic elements shall be designed to withstand 150% of the normal working pressure.

9.4.4 It shall be possible to limit pressure through relief valves.

9.4.5 The hydraulic system shall be provided with double safety pressure relief valves. The first setting shall be at the maximum working pressure while the second setting shall be at a pressure approximately 5% higher than the maximum working pressure. In the event of failure of the first system, the second system shall take over automatically, disconnect the pump output to the cylinder and allow discharge to the hydraulic tank. The system shall be explained in the offer with a line diagram of the hydraulic circuit.

9.4.6 The hydraulic system shall be sealed for protection against contamination.

9.4.7 Filters for full capacity of pressurized oil shall be placed in between the circuit and the pump, having filtering capacity of 25 microns or better. A return line filter of 25 microns or better shall be provided. The type, make and model no. of each filter element shall be indicated in the bid. The hydraulic oil filtration shall further be provided with an off-line filtration system suitable for removal of both water particles and contaminants.

9.4.8 The filtering system shall be provided with a by-pass valve which shall operate in case of clogged filters. The filters shall have a clogging indicator. Details of the clogging indicator shall be furnished in the bid.

9.4.9 A temperature sensor shall be provided to indicate hydraulic oil temperature on the control panel. The press shall stop functioning if oil temperature exceeds nearly 60 degree C. A suitable heat exchanger complete with all accessories shall be provided to ensure that oil is not overheated under local weather conditions at continuous normal working of the machine.

9.4.10 Oil level sight gauge to show maximum and minimum oil levels shall be provided on the oil tank. In case of low oil level, the press shall stop automatically with an audio visual indication.

9.4.11 A pressure relief valve should be provided on control panel/operator panel for setting the max. tonnage (pressure) according to components.

9.4.12 Return of the ram should be automatic when released the push button or paddle.

9.4.13 Pressure gauge of standard make should be dual type marking i.e pressure & tonnage.

9.4.14 A digital load cell indicator shall be provided which shows the actual value of tonnage (load) applying on the component. The accuracy of load indicator shall be± 10% as per requirement of the job. This system should be such as on bogie testing machines.

9.4.15 The firm should give a list of two years maintenance spares i.e seals, filters and O-rings etc. required to be changed with in two years.

9.5 Lubrication:

9.5.1 The press shall be provided with an automatic adjustable centralized pressure oil lubrication system to supply a measured quantity of lubricant to each lubrication point. The lubricating oil pump shall be independently driven and interlocked with the main drive so as to ensure pre-lubrication of the press. The make of the components in the circuit shall also be indicated in the bid.

9.6 Rigidity-Control-Safety

9.6.1 The machine shall be suitably protected by necessary safety features against any Accidental operation, overload, power fluctuations, power failure etc. Suitable interlocks, alarms and warning lights must be provided.

9.6.2 The press and its accessories must ensure safety of the operator and the system at all times. Details of the safety features shall be furnished in the bid.

9.6.3 Emergency stop push buttons shall be provided at convenient locations to switch off the machine in case of emergency.

9.6.4 Clearly visible indication lamp showing status of working of press to be provided near the machine, for all the workers to see, who are working near the machine.

10.0 GENERAL CHARACTERISTIC

10.1 RIGIDITY AND STABILITY

10.1.1 The machine shall be robust, rigid and of sturdy construction. It shall be designed to meet heavy duty demands of various operations on the machine under normal Workshop environment for such machines. It shall be free for vibrations even when working at full capacity.

10.1.2 All machine castings shall be made of close grained high grade cast iron like Meehanite or equivalent materials to ensure durability and rigidity. The casting shall be thermal stress relieved to ensure stability and continued accuracy.

10.1.3 All machine fabrications of critical load bearing assemblies like beds, columns etc. shall be adequately strengthened and stress relieved.

10.1.4 Change in ambient temperature shall not affect the performance of the machine.

10.1.5 There shall be no change in the performance of the machine either on switching on the machine or after continuous running.

10.1.6 There shall be no resonant vibrations throughout the working range of the machine at all load levels.

10.2 SAFETY CONTROLS

10.2.1 The machine shall incorporate safety devices to provide protection to the operator and machine against all possible operational and machinery failures.

10.2.2 Suitable interlock shall be provided to prevent machine operations in the event of:

i) Faulty sequence of operation.
ii) Fluctuation in supply voltage.
iii) Resumption of power supply after power failure.
iv) Non-positioning of safety guards.
v) Failure of hydraulic system (where applicable)
vi) Failure of lubricating system (In case of automatic including drop in pressure lubrication)

10.2.3 A fault or damage in the control circuit or interruption re-establishment after an interruption of fluctuation in whatever manner in the power supply to the machinery must not lead to dangerous situations in particular.

10.2.4 The machinery must not start unexpectedly.

10.2.5 The machinery must not be prevented from stopping if command has already been given.

10.2.6 No moving part of the machinery or piece held by the machinery shall fall or be ejected.

10.2.7 The protection devices must remain effective.

10.2.8 The machine shall be fitted with an emergency stop (Mushroom type) device to enable actual or impending danger to be averted. This device must be conveniently located. & clearly identifiable.

10.2.9 A load meter shall be provided to indicate the load on the machine. The meter shall have a suitable mark to indicate the maximum load the machine can take. Full details of the above and other safety features indicating how each one functions must be explained in the offer.

11.0 GENERAL ELECTRICAL CHARACTERSTICS

General electrical characteristics of Hydraulic Vertical Power Press capacity 200 Ton with tooling should be as per schedule –II

12.0 SPARES, CONSUMABLES AND MAINTAINABILITY

12.1 Following list of spares shall be supplied along with the machine:

S.no.	Description	Qty.
1.	Standard Block 150 x 150 x150 mm (L x W x H)	2 nos.
2.	Round Bar 50 mm dia, 150 mm length	2 nos.
3.	Round Bar 40 mm dia, 150 mm length	2 nos.

12.2 List of recommended spares for 2 years normal maintenance to cover the complete range of mechanical and electrical Equipment should be quoted separately.

12.3 List of recommended consumables, oil & lubricant for two years shall be quoted separately.

12.4 List of recommended spares for normal maintenance after expiry of warranty period to till useful life of the equipment as per annexure-A.

12.5 Life estimated/expected for each equipment and its sub assembly.

12.6 The design of equipment will ensure that all the important equipments like hydraulic equipment, electric motor etc. are so positioned as to ensure easy accessibility for normal maintenance and removal for repairs etc. Grease nipples/oil cups should be provided to ensure positive lubrication at required locations.

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13.0 SPECIAL FEATURES

The tenderer should separately explain the special feature, if any, of the equipment offered by him.

14.0 SERVICING AND WAREHOUSING FACILITIES

14.1 The tenderer will clearly spell out in the offer the facilities available with him or his agent for providing adequate after-sales service in India during warranty period. The complete details such as organization for after sales service, availability of technically competent engineers and warehousing facilities for spares should be clearly indicated. Bidders not offering complete servicing/repair facilities in India to ensure quick response to maintenance/ servicing calls are not likely to be considered.

14.2 After the warranty period and AMC period, if any, the manufacturer or his agent shall agree to provide service supports for trouble shooting and obtaining spare parts. The manufacturer shall be obliged to provide spare parts required by the Purchasers for a period of 15 years from the date of delivery of the machine at the ultimate destination to safeguard against obsolescence.

14.3 Tenderer who are OEM, shall undertake to supply spare parts for a period of expected life of machine. Alternatively, tenderers shall also submit undertaking from OEM for supply of spare parts for a period of expected life of the machine

14.4 Tenderers shall indicate the list of spares required for maintenance of the machine beyond warranty period. Current cost of such spares and current service charges for the items of work of repair of machine shall also be indicated

14.5 During warranty period, the supplier or his authorized agent shall attend for break down as soon as possible, but in no case later than 72 hours of receipt of intimation of the breakdown. The supplier has to furnish proper guarantee to this effect.

15.0 SCHEDULE OF ANNUAL MAINTENANCE CONTRACT (AMC) FOR PERIOD OF 5 YEARS AFTER COMPLETION OF WARRANTY PERIOD

15.1 Tenderer shall provide proposal for 5 year Annual Preventive Maintenance. Schedule to be executed after completion of warranty period in the format as per annexure-B.

15.2 Annual maintenance contract is entered into with the contractor with an intention to maintain the machine in good working condition and to ensure that the machine shall be available for production/operation with full capacity with a minimum up time of 85% during the first year of AMC and with 90% up time with full capacity during the second year of AMC. The uptime for the machines shallbe calculated on monthly basis against available machine hours. [up time for the machine = available machine hours –(scheduled down time for maintenance+ duration of machine stoppage on account of RCF)]. If the break down period of the machine exceeds the allowed limits during the AMC period, RCF administration shall take an appropriate decision on further course of action.

15.3 The firm shall maintain the machine in good working condition during the contract period and shall correct the fault or failures, repair or replace the worn or defective parts/equipment during the normal working hours of shop where the equipment has been installed. Unserviceable parts/equipment need to be replaced at no extra cost with brand new parts/equivalent or superior specification.

15.4 The firm shall respond by deputing service personal to oral / telephonic/ or other modes of intimation for repair and maintenance of the said machines within 2 hours.

15.5 The firm shall ensure that the machine is in proper working condition, to the full capacity, after repair and maintenance.

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15.6 To have a timely supply of spares during AMC, the contractor shall furnish a total list of spares which should contain list of spares that shall be arranged by the firm, both chargeable, duly mentioning the charge against each item, and spares which shall be non-chargeable, and list of spares to be held by RCF.

15.7 The contractor shall clearly list-out the list of consumables required for day-to-day operation of the machine. It shall be the scope of RCF to arrange the consumables once the completion certificate is issued for the retrofitted machine.

15.8 The tenderer/contractor shall provide suitable standby when repairs exceeds 2 hours. When any equipment is taken for repair to the tenderer/contractor's premises suitable standby equipment should be provided.

15.9 Besides attending the breakdown calls, the firm shall attend to the corrective and preventive maintenance of the machines once in a month.

15.10 The AMC is valid for five years from the date of completion of the warranty period . No freight is admissible.

15.11 During the AMC period, whatever equipment is defective shall be handed over to RCF. During completion of the AMC period the machines should be handed over in full working condition to its full capacity.

15.12 The firm should maintain a register duly indicating the nature of defects and repair attended and got signed by RCF authority. Preventive maintenance schedule should be made. The schedule should be made in such a way that more than one machine should not be attended on the same day. A copy of the schedule should be given to RCF at the beginning of the AMC and the schedule should be strictly followed and on carrying out the preventive maintenance the same should be entered in the register and got signed by RCF authority.

15.13 AMC charges shall be paid quarterly as one quarter of the total AMC charges applicable for that year on submission of bills duly certified by the engineers in charge with regard to the satisfactory execution of AMC during the period for which the bill is claimed. Income tax @ 2% or service tax as applicable at the time of payment shall be deducted at source.

15.0 BOUGHT OUT

The bidder shall furnish along with the offer a list of all critical items/ sub-assemblies which are bought out by the bidder and proposed to be used, along with the manufacturer's name, brand model etc. The successful bidder may be required to produce invoices to ensure genuineness of such products / verification by the Inspecting agency.

16.0 TECHNICAL LITERATURE

16.1 One copy of the printed illustrative catalogue showing features of the machine and its elements must be enclosed with each copy of the bid.

16.2 The successful tenderer will have to furnish, for each machine, 2 sets each of operational manual of the machine, maintenance manual, trouble shooting guide, spare parts catalogue giving the part list number of each component with exploded views and assembly drawings of major assemblies, and all electrical circuit diagrams to the consignee directly along with the machine. The bidders should provide a list of literature indicating the number of hard/soft copies of each manual that they will supply along with the machine. The technical literature shall be provided for the complete machine, including imported and indigenously purchased components/sub-assemblies. The supplier shall furnish per equipment ordered 4 copies each of the relevant operating manuals, maintenance manual, instructions for both electrical and mechanical equipment, trouble shooting guide, spare parts, catalogue with price-list, laminated detailed electrical wiring diagram, hydraulic

circuit diagram, lubrication diagram with schedule of lubrication and lubricants to be used. In case of imported machines equivalent indigenously available brands of lubricants/hydraulic oils should be indicated.

17.0 SUBMISSION OF GA, FOUNDATION & RELATED DRAWINGS:

17.1 For each machine, the supplier shall first submit 01 copy of foundation drawings with details of construction of foundations, & GA drawings with complete layout of machine elements along with machine weight, overall dimensions, electrical load for approval within 04 weeks of the receipt of Purchase Order to consignee for approval and to enable the consignee for making necessary arrangements for Installation & Commissioning of Machine on receipt.

17.2 The consignee shall either approve the GA drawings or if necessary return them to the supplier/contractor for correction within 02 weeks of its receipt from the supplier/contractor, under clear signatures with date. The complete process for the approval & supply of correct GA drawings shall not exceed six weeks from the date of first submission.

18.0 **INSPECTION AT MANUFACTURERS PREMISES**

The tenderer shall offer the machine alongwith its accessories to Inspection agency as per Purchase order for inspection at manufacturers premises before dispatch.

19.0 COMMISSIONING AND PROVING OUT TESTS

19.1 The tenderer or his agent will be required to inspect the consignment at the consignee's premises before unpacking is done and carry out a joint check of the receipt of components to avoid subsequent complaints regarding short shipment or transit damages.

19.2 For the purpose of erection, testing and commissioning of the equipments at site at Rail Coach Factory, Kapurthala (Punjab) India, the tenderer will arrange his own adequate number of personnel, material including consumables, tools and equipments etc. However, RCF shall provide necessary compressed air, water and electric supplies free of cost for the installation, commissioning and prove out of the machine. The tenderer shall arrange erection, commissioning and testing of the equipment at site at Rail Coach Factory, Kapurthala (Punjab) India-144 602, within 30 days from the date of receipt of supplies.

19.3 The firm shall demonstrate the 200 Ton Hydraulic Vertical Power press machine capability and prove out the claimed productivity during commissioning of machine on the wheels to be fitted or dismantled in the EOT crane section to the consignee at Rail Coach Factory, Kapurthala. The M&P shall be deemed to be "commissioned" at consignee premises when it is tested and meets with the specified capabilities/functions according to the technical specifications.

20.0 TRAINING

Technical experts from the manufacturer will fully and adequately provide training to operators and maintenance staff nominated by the consignee at the time of commissioning of the machine. Duration of the Training will be adequate to ensure through training to the Railway personnel to make them capable of operating and maintaining (including repairing) the machinery independently and satisfactorily.

21.0 WARRANTY

As per IRS terms and condition of the contract or as quoted by the bidder whichever is later.

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ANNEXURE-A

S.N.	ITEM	PART NO.	SERVICE LIFE	PRICE

ANNEXURE –B

S.N.	YEAR	AMC CHARGES
1.	IST YEAR	
2.	IIND YEAR	
3.	IIIRD YEAR	
4.	IVTH YEAR	
5.	*VTH YEAR*	

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SCHEDULE-I

A	MAJOR PARAMETERS	
S.NO	**Description**	**Value**
1	Type of press	Hydraulic Vertical Power Press
2	Pressing force	200 T (minimum) (In downward direction)
B	**OTHER PARAMETERS**	
3	Ram Stroke (adjustable)	500 mm
4	Working table size (L x W)	750 mm x 1300 mm
5	Daylight	1000 mm
6	Pressing Speed	125 mm/min
7	Speed/Approach/Return	1500 mm/min
C	**BOUGHT ITEM MECHANICAL**	
	Sub-assembly	**Make**
8	Hydraulic system	Rexroth/Vickers/Yuken/Atos/Parker
9	Lubrication System	Cenlub/Dropco/Vogel/ Rexroth
10	'O' Rings & rubber seals	Merlin/Parker/Busak/Hunger/Merkel/Soloseal/ Walkersolo/Halite
11	Hydraulic seamless tubes	Parker/Maharashtra seamless/Indian seamless

Note: Tenderer to furnish following detail of the Hydraulic Vertical Power Press Cap–200T offered

S.no.	Technical Parameter	Offered by Tenderer

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SCHEDULE-II

ELECTRICAL SPECIFICATIONS FOR HYDRAULIC VERTICAL POWER PRESS CAPACITY-200 TON

1.0 POWER SUPPLY

1.1 Machine shall be suitable for operation on 415 Volts, 3 phase, 50 Cycles AC 3 wire or 4 wire system with neutral solidity earthed. The supply voltage may vary up to +10% -20%. However , full rated power of the motor shall be available at the lower voltage. Firm should confirm satisfactory performance of the machine at incoming power supply in the range 415 Volt +10% -20% and frequency 50 Hz +/- 3% or should provide Voltage stabilizer of required capacity.

The voltage stabilizer, if required shall confirm to:

(i) Input voltage : 320 – 460 volt 3 phase 4 wire system

(ii) Output voltage : 415 Volts

(iii) Regulation +/- 1% from no load to full load

(iv) Efficiency : Not less than 97%

(v) Wave form Distortion: NIL

(vi) Winding and Class of Insulation: Copper wire wound with 'B' Class of insulation or better.

(vii) Make : Neel, Servomax, Powerware, Integ only.

2.0 BOUGHT OUT ITEMS

Machine shall be equipped with reputed make components / Sub Assemblies as given below:

S.No	Sub-assembly	Make
1	Electrical Control Cabinet	RITTAL/ Siemens or of other reputed make with IP55 Protection level
2	Servo Controlled Voltage Stabilizer	Neel/Servomax/ Integ/ Powerware only.
3	Ultra Isolation Transformer	Neel/Servomax/ Integ/ Powerware only.
4	A.C. Motors	NGEF/BBL/ABB/KEC/Crompton/ Siemens/ Allen Bradley only.
5	Proximity Switch	Elap/Schneider/Sick/Baluff only.
6	Contactors	Siemens/BCH/ABB/Schneider/L&T
7	Limit switches	BCH/Siemens/L&T/Honeywell,USA/ Schneider
8	Push button	Siemens/ Schneider/BCH only.
9	Cable/wire	Finolex /Lapp/IGUS only.
10	PLC	Siemens/Fanuc/MItsubhishi/ABB/Allenbr

		adley only.
11	Air circuit breaker	Siemens/L&T
12	Connectors	Harting/Kontact/L&T/ Lapp/IGUS only.
13	MCCB	Schneider/ABB/Siemens/L&T/ Klockner Moeller
14	Solenoid Valve	Rexroth/Vickers/Yuken
15	Miniature Circuit Breaker	ABB/Siemens/Merlin & Gerlin/Klockner Moeller
16	DC Power Supply	Siemens/Phoenix
17	Conduits & Glands	IGUS/Lapp
18	Emergency Switch	Siemens / Schneider/BCH only.
19	Timers	Siemens/ L&T/ Schneider/ BCH only

3.0 The control gear for AC motors shall incorporate the following protection devices:

(i) **NO VOLTAGE PROTECTION:** No voltage protection shall be provided so that machine will not start up again by itself when, following an interruption the supply is restored.

(ii) **SHORT CIRCUIT PROTECTION**: To protect against short circuits due to insulation failure of faulty connections HRC fuses shall be provided for each motor. The rating of the fuse shall be such as to take care of the over current due to motor starting.

(iii) **OVER LOAD PROTECTION:** To prevent motors from overloading, overload protection shall be provided separately for each motor. Three Phase motors shall be protected by overload tripping devices on each phase.

(iv) **SINGLE PHASE PROTECTION:** A separate current sensitive delayed action single phasing preventor shall be provided for each motor separately. Overload protection shall not be treated as single phasing preventor.

4.0 Control equipment shall be mounted in separate drip proof enclosure. Control enclosure and compartment are to be so arranged as to give adequate protection against ingress of dust, oil, coolant or chips. All control devices like contactors shall be DIN rail mounted. All other electric devices shall be installed that they are readily accessible when the doors and covers are opened. Enclosure shall be provided with cooling fans. Electrical control cabinet should be mounted 1 meter above from the ground level for easy maintenance.

5.0 All AC motors should have IP65 protection.

6.0 The electrical equipments, wirings etc shall comply with the requirement of Indian electricity act and rules (Latest).

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7.0 Two earthing terminals shall be provided on all electric motors including the control gear. Earthing pit with maintenance free compound shall be in scope of tenderer.

8.0 Sufficient Lighting arrangement should be provided in Electrical cabinet / Panel for proper visibility and one 3-pin socket with 220-volt supply for maintenance purpose.

9.0 The machine shall be fitted with a Mushroom type emergency stop devices/ switches to enable actual or impending danger to be averted. This device must be conveniently located and should be clearly identifiable.

10.0 Moulded case circuit breaker (MCCB) shall be provided on machine to disconnect the Three Phase power supply during maintenance and preventive maintenance.

11.0 The machine shall incorporate safety devices to provide protection to the operator and machine against all possible operational and machinery failures.

12.0 Each end of every cable shall be identified with a numbered cable tag in accordance with the Electrical Circuit diagram and also each cable must be provided with cable ends/thimbles for its termination.

13.0 Four sets of Complete Electrical circuit diagram, Spare parts list, trouble shooting manual, Maintenance and troubleshooting manuals for Servo Voltage stabilizer should be provided.

14.0 MACHINE MAINTAINABILITY

14.1 The machine & stabilizer shall be so designed as to require minimum possible maintenance and to give trouble free service.

14.2 All assemblies/parts of the machine & stabilizer shall be easily accessible for maintenance.

14.3 The machine & stabilizer shall not require major dis-assembly for checking and replacement of a particular part, especially for parts requiring periodical check up and replacement.

14.4 The manufacturer must provide means of access e.g stairs, ladders, cut walks etc. to allow access safety to all areas used for production, adjustments and maintenance operations.

15.0 Successful bidder shall provide electrical diagnostic device Digital Multimeter of make Fluke.

16.0 Tenderer shall arrange to provide digital Energy Meters for metering energy consumption.

Note: Tenderer to furnish following detail of the Hydraulic Vertical Power Press Cap–200T offered

S.no.	Technical Parameter	Offered by Tenderer

PREPARED BY	CHECKED BY	APPROVED BY
JE/M&P	SSE/M&P	DY.CPE-I