

**BHARAT HEAVY ELECTRICALS LTD.  
CENTRAL FOUNDRY FORGE PLANT  
RANIPUR, HARDWAR  
MAINTENANCE & SERVICES DEPARTMENT  
MAINTENANCE-MACHINE SHOP**

CFF/M&S/MS/REC/2K14/PMA/NIT/01

Dt. 25/08/2014

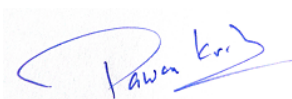
**TENDER NOTICE – OPEN TENDER**

Two part Tenders in Sealed Envelopes are invited from technically and financially capable parties, having experience in work similar to- and interested in- the under mentioned works. The tender documents are available at website [www.bhel.com/www.bhelhwr.co.in](http://www.bhel.com/www.bhelhwr.co.in) in Tender Notification Section which can be downloaded. Tender cost, as mentioned in the Tender Documents is to be deposited along with the tender itself. The tender should reach the office of the undersigned on or before **18/09/2014** at **2:30PM**, which will be opened on the same day in the office of under-signed at **3:00 PM** in presence of the bidders who wish to be present.

Bidders are advised to inspect the site/machines before quoting their rates. Bidders are also advised to go through the Special Instructions attached to this notice. (Placed at attachment-A.)

BHEL reserves the right to reject any or all of the tenders without assigning any reason thereto.

<b>Tender No. &amp; Date</b>	<b>Description of Work</b>	<b>Earnest Money</b>	<b>Total Time of completion</b>	<b>Tender Cost (Rs.)</b>
CFF/M&S/MS/REC/2K14/ PMA/NIT/01 Dt. 25/08/2014	Retrofitting of Electrical System of Plano Miller PMA in Machine Shop	2.0 Lakhs	26 Weeks	300/-



(Pawan Kumar Yadav)  
Sr. Engineer/M&S  
CFFP, BHEL  
Ranipur, Haridwar-249403  
(Uttarakhand)  
Contact No. 01334-284507  
E-mail ID: pkyadav@bhelhwr.co.in

Copy To. :DGM (works) : for deputing finance representative for tender opening.

**SPECIAL INSTRUCTIONS**

1. Kindly read this set of Special Instructions carefully before filling up the tender form.
2. **Pre Qualification Requirements placed at Annexure F must be fulfilled by the vendor to participate in the tender and submitted along with Techno-Commercial Bid.**
3. Kindly read carefully Annexure-A, B,C, D and F which form the “Details of Scope of Supply”, “Scope of Work”, “Special Terms & Conditions” & “Verification Parameters” respectively.
4. The bidders are to submit the tender form along with all Annexures as well as this set of Special Instructions (Attachment-A); all pages duly signed.
5. The tender is to be submitted in two parts, viz.: i) Techno Commercial Bid and ii) Price Bid. Documents related with Pre-Qualification Requirements i.e. Annexure-F must be submitted along with Techno-Commercial Bid.
6. Both the Techno Commercial Bid and Price Bid are to be sealed separately in separate envelopes super-scribed with “**Techno Commercial Bid for Tender no. : CFF/M&S/MS/REC/2K14/PMA/NIT/01**” and “**Price Bid for Tender no. : CFF/M&S/MS/REC/2K14/PMA/NIT/01**” respectively and then placed in a common envelope super-scribed with “**Tender for Tender No.: CFF/M&S/MS/REC/2K14/PMA/NIT/01**”. The Techno Commercial Bid must also contain an unpriced copy of Price Bid.
7. Vendors have to submit clause wise confirmation of Annexure A, B, C, D & F.
8. Only the Techno Commercial bid will be opened on the day of tender opening. The Priced Bid will be opened only if Techno Commercial Bid(s) are found Technically Suitable & Acceptable. Date of opening of Price Bid will be intimated to all technically suitable and acceptable bidders at a suitable time.
9. **It is strongly recommended to all potential bidders to visit the site and the machine under consideration. Any presumption by the bidders in this regard will not be entertained after opening of the tender.**
10. No accommodation facilities will be provided by BHEL to any of the staff of the contractors
11. Apart from the “Special Terms & Conditions”, placed at Annexure-C, the contractor will have to comply with other Terms & Conditions including “General Terms & Conditions” & “Safety Norms” as stipulated in BHEL’s Works Policy as modified from time to time and Government rules.
12. Once Price Bids are opened and accepted by BHEL, the same cannot be withdrawn by the bidder for whatsoever reasons. In case a bidder withdraws his/her/their tender, suitable action may be taken by BHEL as deemed fit. This may include black listing of bidder or legal action.
13. If there is a difference found in the figures & words of the offered price. The price given in the words will be considered.



**(Issuing Officer)**

**BHARAT HEAVY ELECTRICALS LTD.**  
**CENTRAL FOUNDRY FORGE PLANT**  
**RANIPUR, HARDWAR**  
 MAINTENANCE & SERVICES DEPARTMENT  
 MAINTENANCE-MACHINE SHOP

TENDER FORM FOR “RETROFITTING OF MACHINE TOOLS IN MACHINE SHOP”

**(PRICE BID)**

**PRICED/UNPRICED**

(PRICED PRICE BID TO BE SEALED IN SEPARATE ENVELOP)

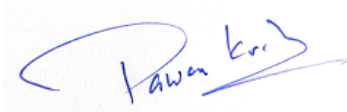
Name & Address of Bidder	:	
Tender Notice No.	:	CFF/M&S/MS/REC/2K14/PMA/NIT/01 Dt. 25/08/2014
Last Date & Time for receipt of Tender	:	14:30 hrs on 18/09/2014
Date & Time for opening of Tenders	:	15:00 hrs on 18/09/2014
Place for opening of Tenders	:	Office of Sr.Engr. (M&S)
Nature of Contract	:	Retrofitting of Electrical System of Plano Miller
Period of Contract	:	PMA in Machine Shop 26 Weeks (18 Weeks for Supplies, 8 Weeks for Works)

Description of Work

“Retrofitting of Electrical System of Plano Miller PMA in Machine Shop” consisting of :	Period of Contract	Cost excluding Duties & Taxes (To be quoted by the Contractor) Decision of price competitiveness will be based on Combined Price of Items A and B along with loading as applicable.	
	Weeks	Figure	Words
A. Supply of Material as per Annexure-A (PMA)			
B. Erection & Commissioning Work as per Annexure-B (PMA)			
Total			

Enclosures:

1. Annexure-A (PMA) : Detailed Scope of Supply for the retrofitting of Plano Miller PMA
2. Annexure-B (PMA) : Scope of Work
3. Annexure-C (PMA) : Special Terms & Conditions
4. Annexure-D (PMA) : Verification Parameters
5. Annexure-F (PMA) : Pre-Qualification Requirements



Signature of Issuing Officer

Signature of Bidder/Tenderer

**Declaration by Bidder**

I/We hereby confirm that I/we have carefully read and understood “Special Instructions”, “Details of Scope of Supply”, “Scope of Work,” “Pre-Qualification Requirement”, “Special Terms & Conditions” and “Verification Parameters” placed at Attachment-A to the Tender Notice and Annexures-A (PMA), B(PMA), C(PMA), D(PMA) & F(PMA) respectively and have complied/will comply with the same.

Signature of Bidder/Tenderer



(Accounts Officer)

(Opening Officer)

(Issuing Officer)

**DETAILS OF ELECTRICAL ITEMS TO BE SUPPLIED BY THE CONTRACTOR FOR RETROFITTING WORK OF PLANO MILLER (PM-A)**

ITEM	BHEL Requirement	QTTY	Acceptable Makes	SUPPLIER'S COMMENTS
1	<b><u>Control Panel</u></b>			
1.1	Cabinet	01 Set	Rittal/ Schneider	
	Made of min 2mm Thick sheet steel painted first with corrosion resistant paint followed by suitable no. of coats (min 2) of industrial grey/off-white paint. Cabinet to be provided with protection against reptile/rodent entry and is to be made Dust & Vermin Proof. Suitable Cooling Arrangement to be provided for each individual section of the Cabinet. <b>Cabinet Section should be specific to each Head &amp; Table. Other common Electric Circuits including incomer switch will be in separate section.</b>			
1.2	Incomer Switch	01 No.	Siemens/L&T	
	MCCB of suitable rating (Min 125% of peak load of panel, 50kA Short Circuit Current) with Thermal and Magnetic over current trip (adjustable overload and fixed short circuit), Ground fault protection, tripping relay and Extended rotary drive. Incoming supply will be 415V,3- $\phi$ ,50 Hz with or without Neutral			
1.3	Switchgear	01 Set	Siemens/L&T	
	MCCBs, MPCBs, Contactors, Fuses, Switches including all selector switches and push button actuators (which shall be self illuminated type), O/L Relays (if used) of suitable ratings. Min Power Contactor rating : one step higher than the current rating required considering 25% overload. Only Semiconductor Fuses are to be used with semiconductor devices, all other circuits to be protected through MPCBs/MCCBs/MCBs of suitable rating. <b>HRC Fuses must not be used.</b>			
1.4	Meters			
1.4.1	Energy Meter	01 No.	Reputed	
1.4.2	Ammeters for Incomer	03 Nos.	AE/MECO	
1.4.3	CTs	03 Sets	AE/KAPPA	
1.4.4	Voltmeters for Incomer	03 Nos.	AE/MECO	
	Analog Voltmeters of suitable rating; one for each phase			

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1.4.5	Indicators	High Luminosity LED Based indicators for Phase live, Motor Run-Off-Trip and Various Faults of Machine, Drives & PLC	01 Set	Reputed
1.5	Power Outlet Sockets	220V, 5/15 Amp Switch Socket, 01 No in five sections (All Heads & Table)	05 Sets	Reputed
1.6	Panel Illumination	CFL based, Door switch operated, Panel Illumination of rating suitable for sufficient illumination of the panel during maintenance work, in each section.	01 Set	CFL: Philips/GE/ Crompton Greaves Door/Sw: Reputed
1.7	Terminals & Wiring			
1.7.1	Terminals	All Power and Control Terminals arranged in different sections (Power & Control), including atleast 10% extra Terminals in each section. All control Terminals to be suitable for pin type Lugs unless otherwise specified by the manufacturer of particular control components	01 Set	lapp/IGUS/WAGO/ PHOENIX
1.7.2	Wiring (Wires and Cables)	All wiring including wires/cables within panel and from panel to the field devices. Within panel, all wires to be laid in suitable covered wiring (troughs/channels/trays). Between panel and field devices, all wires/cables are to be laid through suitable covered cable trays/drag chains/flexible reinforced conduits etc. All drag chains to be fully covered metallic drag chains. Between Panel and Field devices, atleast 10% extra wires must be laid. Distributed I/Os & Profibus communication are to be used to minimize no. of control wires.	01 Set	General purpose Wires/Cables:lapp/I GUS/ Finolex, Special Purpose Wires/Cables: lapp/IGUS or as specified by drive/PLC/ Encoder manufacturer
1.7.3	Cable Lugs	All wiring termination to be through appropriately sized Copper Crimping Lugs.	01 Set	Reputed
1.7.4	Cable Marking Ferrules	All wires (Power & Control) to be suitably marked with marking ferrules of appropriate size at each end.	01 Set	Reputed
1.7.5	Cable Glands	All cabling to be done through Cable Glands, suitable for each individual cable. All cable entry to be through removable gland plate provided at the bottom of the panel.	01 Set	Reputed

**DETAILS OF ELECTRICAL ITEMS TO BE SUPPLIED BY THE CONTRACTOR FOR RETROFITTING WORK OF PLANO MILLER (PM-A)**

1.7.6	Cable Trays/Troughs/ Channels/ Drag Chains /Flexible or Fixed Conduits etc.	Ref 1.7.2 above	01 Set	Reputed
1.8	Control Supply	All Control and Auxilary Supplies to be derived from incomer 3-Ø, 3-Wire, 415VAC supply using suitable transformers / Rectifiers / Converters / Regulators / Power Supply Units etc. All contactors and relays except relays driven directly by PLC O/P to be at 220V AC. Relays driven by PLC O/P to be of 24V DC. All solenoids / electromagnets in existing machines and not being replaced, are to be driven by voltages as per existing scheme. <b>The machine consists of 110V AC operated solenoids.</b>		
1.8.1	Control Transformers	Control Transformers of rating equal to min 125% of total control/auxiliary load connected to the transformer.	As per Need	Reputed
1.8.2	Rectifiers/Converters/ Regulators	To provide various DC Power Supplies, including supplies to existing electromagnetic devices/ breaks as per existing scheme are to be installed in the panel. All such devices to be protected through suitable protective devices in accordance with 1.3 above	As per Need	Reputed
1.8.3	DC Supply (SMPS) 24VDC	This supply will be required for operation of Electromagnetic Solenoid Coils/Valve Controllers. There are around 5 nos. such electromagnetic coils working at voltage 24VDC with a nominal load of 5 Amps each. Supply to each such coil will be through a separate combination of MCB & Contactor.	01 Set	Reputed
2	<b><u>PLC</u></b>	Profibus enabled Siemens make Simatic S7-300 PLC including CPU, Centralized (for devices within panel) and Distributed (for devices in field) IO Cards, 144DI, 100DO, 8AI, 8AO, Power Supply Cards, Relay Cards, Profibus Cables. All hardware to be of same basic type. Hardwares with mixed basic types (e.g. CPU S7-300 with I/Os of S7-200) will not be accepted.	01 Set	Siemens

**DETAILS OF ELECTRICAL ITEMS TO BE SUPPLIED BY THE CONTRACTOR FOR RETROFITTING WORK OF PLANO MILLER (PM-A)**

2.1		All the wiring, from PLC Section to the other sections of the panel will be through terminal blocks only.		
2.2		One extra module each of DI, DO, AI and AO will be provided in the PLC section, pre-wired to the Terminal Blocks/Relay Boards (Refer 2.4 also). One Spare Power supply Module identical to the module used in the PLC above will also be provided in the panel.		
2.3		There will be at least 15% extra terminal blocks provided in the section		
2.4	Relay Board	8-Channel, 2-Pole (2NO+2NC), relay boards, prewired to the terminal blocks & DO Modules mentioned at 2 & 2.2 above.	14 Nos.	Same as make of PLC or Phoenix
3	<b><u>Motors</u></b>	The supplies will include following motors:		
3.1	Spindle Motor	Separately (forced) cooled, Flange Mounted, min 30KW rated Power at 1500 RPM, AC Spindle Motor (1PH) along with cooling blower, speed feedback device (Incremental Pulse Encoder)	04 Nos.	Motor: Siemens Encoder: Siemens/Hubner Cables: Siemens/lapp/IGUS
3.2	Table Feed Motor	Permanent magnet excited, Flange Mounted, synchronous, three phase AC Servo motor: Rated torque as specified below or higher, over load torque capacity $\geq 300\%$ and incremental pulse encoder Rated torque 44 NM , 2000 RPM with natural cooling	01 No.	Motor: Siemens Encoder: Siemens/Hubner Cables: Siemens/lapp/IGUS
3.3	Head Feed Motors	Permanent magnet excited, Flange Mounted, synchronous, three phase AC Servo motor: Rated torque as specified below or higher, over load torque capacity $\geq 300\%$ and incremental pulse encoder Rated torque 25 NM , 2000 RPM with natural cooling	04 Nos.	Motor: Siemens Encoder: Siemens/Hubner Cables: Siemens/lapp/IGUS
3.4	Mounting Accessories for Motor	All the accessories like couplings/coupling Extension to suit existing driven shaft, motor mounting accessories including any motor mounting saddle, locators, fasteners, keys etc. to be supplied with motor. Mounting of motor to be done by party	01 Set for each motor	

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3.5	Auxiliary Motors	The following Auxiliary motors are to be supplied and installed. All the motors are to be supplied with the mounting, coupling and wiring accessories. All the motors to be installed by the suppliers All the power ratings mentioned below are minimum ratings.	Siemens/ABB/ BBL/ Crompton Greaves/ Kirlosker
3.5.1	CROSS SLIDE HYDROLIC PUMP ( Motor. M5)	1.5 KW, 380 V, 3-Ø, 50Hz, AC, 940 RPM Squirrel Cage Induction Motor.	01 No.
3.5.2	CROSS SLIDE LUBRICATION PUMP ( M6)	0.27 KW, 380 V, 3-Ø, 50Hz, AC, 1400 RPM Squirrel Cage Induction Motor.	01 No.
3.5.3	CROSS SLIDE ADJUSTMENT MOTOR ( M7)	15 KW, 380 V, 3-Ø, 50Hz, AC, 1350 RPM Squirrel Cage Induction Motor.	01 No.
3.5.4	VIBRATION CONVEYER MOTOR ( M8,M9)	4 KW, 380 V, 3-Ø, 50Hz, AC, 1000 RPM Squirrel Cage Induction Motor.	02 No.
3.5.5	TABLE FAST TRAVEL ( M10)	17 KW, 380 V, 3-Ø, 50Hz, AC, 450 RPM Squirrel Cage Induction Motor.	01 No.
3.5.6	HEAD HYDROLIC PUMP ( Motor. M11,M12,M13 , M14)	1.1 KW, 380 V, 3-Ø, 50Hz, AC, 920 RPM Squirrel Cage Induction Motor.	04 Nos.
3.5.7	HEAD LUBRICATION PUMP	0.27 KW, 380 V, 3-Ø, 50Hz, AC, 1400 RPM Squirrel Cage Induction Motor.	04 Nos.
3.5.8	COOLING SYSTEM(M19, M25)	1.5 KW, 380 V, 3-Ø, 50Hz, AC, 3000 RPM Squirrel Cage Induction Motor.	02 Nos.

**DETAILS OF ELECTRICAL ITEMS TO BE SUPPLIED BY THE CONTRACTOR FOR RETROFITTING WORK OF PLANO MILLER (PM-A)**

3.5.9	AUXILARY MECHANISM HYDROLIC STATION FOR BACKLASH(M20)	1.5 KW, 380 V, 3-Ø, 50Hz, AC, 940 RPM Squirrel Cage Induction Motor.	01 No.	
3.5.10	TOOL CLAMP/UNCLAMP( M21,M22,M23,M24)	0.75 KW, 380 V, 3-Ø, 50Hz, AC, 1500 RPM Squirrel Cage Induction Motor.	04 Nos.	
3.5.11	PANDENT UP/DOWN(M26)	0.75 KW, 380 V, 3-Ø, 50Hz, AC, 1500 RPM Squirrel Cage Induction Motor.	01 No.	
3.5.12	TABLE LUBRICATION PUMP(M28)	1.5 KW, 380 V, 3-Ø, 50Hz, AC, 940 RPM Squirrel Cage Induction Motor.	01 No.	
4	<b><u>DRIVE SECTION</u></b>	Consisting of Spindle and Servo Drives including all hardwares like Control Unit, Line Modules, Chokes, SMM/DMM, Switchgear, Controlgear, Protectivegear as per following details etc.	One set	
4.1	Spindle & Head Feed Drive	Single-Axis,A.C. Fully Digital Universal Drive with regenerative braking capacity capable of driving motors as per 3.1 & 3.3 in Open loop & Closed loop system which can handle both vector and servo control as well as V/f control and must be profibus enabled and having suitable cooling arrangement. For all drive axes, they also handle the speed and torque control.	04 Sets	Siemens: Sinamics
4.2	Table Feed Drive	Single-Axis, A.C. Fully Digital Universal Drive with regenerative braking capacity capable of driving motors as per 3.2 in Open loop & Closed loop system which can handle both vector and servo control as well as V/f control and must be profibus enabled and having suitable cooling arrangement.This can also handle speed and torque control.	01 Set	Siemens: Sinamics

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4.3	All of above drive groups for four heads & table are to be totally independent of each other physically, having no common circuit component and must be installed in separate cabinet sections for each Head & Table. Available input supply 415V,3- $\phi$ ,50 Hz	All switchgear and protectivegear to be Siemens/L&T make only.	
5	<b><u>Starter Section</u></b>	This will include MPCB-Power Contactor based DOL/RDOL starters for Auxilary Motors as per following details. No motor circuit is to be provided with Fuse. All motors to be protected through MPCBs only.	Siemens/L&T
5.1	CROSS SLIDE DOL Starter suitable for 1.5 KW, 380 V, 3- $\emptyset$ , 50Hz, AC, 940 RPM HYDROLIC PUMP ( Squirrel Cage Induction Motor. M5)	01 Set	
5.2	CROSS SLIDE DOL Starter suitable for 0.27 KW, 380 V, 3- $\emptyset$ , 50Hz, AC, 1400 RPM LUBRICATION Squirrel Cage Induction Motor. PUMP ( M6)	01 Set	
5.3	CROSS SLIDE RDOL Starter suitable for 15 KW, 380 V, 3- $\emptyset$ , 50Hz, AC, 1350 RPM ADJUSTMENT Squirrel Cage Induction Motor. MOTOR ( M7)	01 Set	
5.4	VIBRATION DOL Starter suitable for 4 KW, 380 V, 3- $\emptyset$ , 50Hz, AC, 1000 RPM CONVEYER MOTOR Squirrel Cage Induction Motor. ( M8,M9)	02 Sets	
5.5	TABLE FAST RDOL Starter suitable for 17 KW, 380 V, 3- $\emptyset$ , 50Hz, AC, 450 RPM TRAVEL ( M10) Squirrel Cage Induction Motor.	01 Set	
5.6	HEAD HYDROLIC DOL Starter suitable for 1.1 KW, 380 V, 3- $\emptyset$ , 50Hz, AC, 920 RPM PUMP Squirrel Cage Induction Motor. (M11,M12,M13 ,M14)	04 Sets	
5.7	HEAD DOL Starter suitable for 0.27 KW, 380 V, 3- $\emptyset$ , 50Hz, AC, 1400 RPM LUBRICATION Squirrel Cage Induction Motor. PUMP ( M15.M16,17,M18)	04 Sets	

**DETAILS OF ELECTRICAL ITEMS TO BE SUPPLIED BY THE CONTRACTOR FOR RETROFITTING WORK OF PLANO MILLER (PM-A)**

5.8	COOLING SYSTEM(M19, M25)	DOL Starter suitable for 1.5 KW, 380 V, 3-Ø, 50Hz, AC, 3000 RPM Squirrel Cage Induction Motor.	02 Sets	
5.9	AUXILARY MECHANISM HYDROLIC STATION FOR BACKLASH(M20)	DOL Starter suitable for 1.5 KW, 380 V, 3-Ø, 50Hz, AC, 940 RPM Squirrel Cage Induction Motor.	01 Set	
5.1	TOOL CLAMP/UNCLAMP( M21,M22,M23,M24)	RDOL Starter suitable for 0.75 KW, 380 V, 3-Ø, 50Hz, AC, 1500 RPM Squirrel Cage Induction Motor.	04 Sets	
5.11	PANDENT UP/DOWN(M26)	RDOL Starter suitable for 0.75 KW, 380 V, 3-Ø, 50Hz, AC, 1500 RPM Squirrel Cage Induction Motor.	01 Set	
5.12	TABLE LUBRICATION PUMP(M28)	DOL Starter suitable for 1.5 KW, 380 V, 3-Ø, 50Hz, AC, 940 RPM Squirrel Cage Induction Motor.	01 Set	
6	<b>Position Feedback Devices</b>	DRO system for indicating positions of all four Heads & Table including Display units ,Scales,Cables,Connectors with necessary mounting accessories will be supplied & installed by the vendor along with any modification required. System is to be provided with zeroing at any position in all the Axes. Travel for X1 & X2 Axes (Head Horizontal Feed): 2500 mm Travel for Y1, Y2 & Y5 Axes (Head & CrossRail Vertical Feed) : 2000 mm Travel for Z Axes (Table Feed): 8000 mm Resolution: 5 micron Accuracy: + - 20 micron Note: Scale for X1& X2 may be common.Scale for Y5 will be common with Y1 or Y2.	01 Set	Electronica/ Hubner/ Heidenhein/ Fagor/Elgo Electric /Electronica

**DETAILS OF ELECTRICAL ITEMS TO BE SUPPLIED BY THE CONTRACTOR FOR RETROFITTING WORK OF PLANO MILLER (PM-A)**

7	<b><u>Limit Switches</u></b>	All the existing limit switches are to be replaced with equivalent new limit switches with required necessary modification work.	80 Nos.	Reputed
8	<b><u>Pressure/Flow Switches</u></b>	All the existing pressure/flow switches are to be replaced with equivalent new pressure/flow switches with required necessary modification work.	06 Nos.	Reputed
9	<b><u>Pendant Panel</u></b>	Hanging Type Control Pendant for operation and control of the complete machine, including Cabinet, Distributed IOs, Push Button Actuators, Switches, Including Multi-Position Selector Switches, Any Control POTs, Indicators, Emergency Switch, etc. The Pendant Panel is to be supported using Wire Rope Sling, suitable for carrying the load of Pendant and Cables to Pendant. The cable entry to the pendant will be through top and through suitable cable hose. Pendant Panel must be able to move Up-Down and swing side-ways through the respective motors with control switches provided at the Pendant itself. The pendant panel will be able to give access to the operator over total control of the machine and also will include all indications related with operation and major faults in the machine. One 12" Touch Panel is to be provided for faults & alarms of different sections of the machine. It may also be used for the display of RPM & Feed Rates.	01 Set	Panel Body: Rittal/ Schneider. Dist IOs and 12" Touch Panel: Same as PLC Switches etc.: Siemens/L&T Indicators: Reputed. The required material for pendant support mechanism to be supplied alongwith the pendant and to be installed.
10	<b><u>Control Boards</u></b>	Four New Control Boards will be mounted on existing heads. The Control Boards will include all necessary components, housed in a suitable enclosure, ergonomically designed and matching the existing control Boards to the extent possible. These will include all necessary Control Devices for Spindle Rotation & Feeds of individual Head, Tilting of Heads, Emergency Stop Push Buttons, Distributed IOs, Push Button Actuators, Switches, Including Multi-Position Selector Switches etc.	4 sets	Reputed

**DETAILS OF ELECTRICAL ITEMS TO BE SUPPLIED BY THE CONTRACTOR FOR RETROFITTING WORK OF PLANO MILLER (PM-A)**

- |      |   |   |  |
|------|---|---|--|
| 11   | <b><u>Machine Light</u></b>             | The machine is to be provided with enough light using High Discharge Metal Halide Lamps of suitable rating (minimum 70W) for sufficient illumination of Job. Light fittings are to be provided with proper protection against chips.  | 02 Sets Crompton<br>Greaves/Philips/<br>Bajaj/GE |
| 12   | <b><u>Safety Arrangements:</u></b>      | Following safety features in addition to other standard safety features should be provided on the machine:  |  |
| 12.1 |   | 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. Machine functions should be continuously monitored and alarm / warning indications through lights/ alarm should be available. |  |
| 12.2 |   | A detailed list of all alarms / indications provided on machine should be submitted by the contractor.  |  |
| 12.3 |   | All the cables on the machine should be well supported and protected. These should not create any hinderance to machine operator's movement for effective use of machine.   |  |
| 12.4 |   | All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations.   |  |
| 12.5 |   | Emergency Switches at suitable locations as per International Norms should be provided.   |  |
| 12.6 |   | Oil lines should not run with electrical cable in the same tray / trench.   |  |
| 13   | <b><u>Environmental Performance</u></b> | The Machine shall confirm to following factors related to environment :   |  |
| 13.1 |   | Maximum noise level shall be 85 dB(A) at normal load condition, 1 meter away from the 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.  |  |
| 13.2 |   | There shall not be any emissions from the machine   |  |

**DETAILS OF ELECTRICAL ITEMS TO BE SUPPLIED BY THE CONTRACTOR FOR RETROFITTING WORK OF PLANO MILLER (PM-A)**

- 13.3 There should not be any effluent from the machine. In case there are any effluents from the machine, requisite effluent treatment plant or pollution control device should be built into the machine by the supplier.
- 13.4 No hazardous chemicals shall be required to be used in the machine.
- 14 **Tools & Tackles** All the tools and tackles for installing the system including any special tools shall be arranged by the supplier. All the special tools and tackles will be retained by BHEL for the maintenance purposes. BHEL will provide if the need be and subject to availability, only EOT crane facilities, power and water for use during installation of the system
- 15 **Training** Vendor shall provide adequate training to BHEL persons for the Operation & Maintenance of retrofitted machine. The training must be given for the fault diagnosis of machine using PLC & Drive through Software & Hardware. One person from the BHEL maintenance staff shall be trained on PLC/Drive/HMI/CNC at any authorized training centre of supplied make of PLC & Drive. This is to be done within one year from the date of Purchase/Work Order. Boarding-Lodging & Travel expenses of BHEL staff for this purpose will be borne by BHEL.
- 16 **General Comments**
- 16.1 The supplier shall provide a list of spares required for trouble free operation of the machine after completion of the work.
- 16.2 All the switchgear components including MPCBs, Contactors, Overload relays, Push Buttons etc. shall be of Siemens/L&T make only unless otherwise specified.

**DETAILS OF ELECTRICAL ITEMS TO BE SUPPLIED BY THE CONTRACTOR FOR RETROFITTING WORK OF PLANO MILLER (PM-A)**

- 16.3 All other components shall be of reputed make if not specified above. Vendor to mention exact make(s) for all the items for which specific make is not specified. CFFP reserves the right to select one or more make out of the offered ones. Any deviation from specified makes will render the offer rejected.
- 16.4 All the drawings including structural and tentative circuit diagrams, shall be approved by BHEL, prior to commencement of manufacturing of the Panel/Desks/Stations etc. Drawings will be approved within 15 days of their submission to BHEL. However, increase in total time for drawing approval on account of incorrect drawings will not form a basis for increase in delivery time. Please also refer special terms and conditions.
- 16.5 Mounting & position for the placement of Control Panel, DROs & 12" Display must be approved by BHEL before start of the installation work.
- 16.6 **The offer must include detailed BOM including makes, types and ratings of all the components. Offers without detailed BOM will be liable to be rejected**
- 16.7 After dismantling work of the old components from the machine, cleaning & painting of machine will be arranged by the contractor. New wiring & installation work of other components will be done then after only.
- 16.8 **IT IS STRONGLY RECOMMENDED TO ALL POTENTIAL BIDDERS TO VISIT THE PLANT AND THE MACHINE BEFORE BIDDING. ANY PRESUMPTION BY THE BIDDER REGARDING THE CONDITION OF THE MACHINE, ITS COMPONENTS ETC. SHALL NOT BE ENTERTAINED BY BHEL ONCE THE PRICES ARE FIRMED UP.**

**DETAILS OF ELECTRICAL ITEMS TO BE SUPPLIED BY THE CONTRACTOR FOR RETROFITTING WORK OF PLANO MILLER (PM-A)**

- 16.9 **In Clause 2 (PLC), Clause 3 (Motors) & Clause 4 (Drives Section) equivalent to Siemens Make ABB Baldor/Bosch Rexroth/Allen Bradely/Fanuc makes will also be acceptable. PLC, Drive & Motor shall be of same make.**
- 16.10 Vendor Shall provide necessary software & Communication Cable for PLC & Drive after commissioning of machine .
- 17 **Documents:** Soft copy in a pendrive and Three sets of hard Copy of final circuit diagram & PLC Programm will be submitted after commissioning of the Machine.
- 18 **Ambient Conditions**
- 18.1 Max temperature 50°C
- 18.2 Min temperature 0°C
- 18.3 Relative Humidity 97% max
- 18.4 Altitude 300M above MSL

## **SCOPE OF WORK**

### **For the Electrical Retrofitting of Plano Miller (PMA)**

The scope of work will consist of Design, Selection of Components, Procurement, Assembly, Supply and Installation of required material as per Specifications placed at Annexure A. The installation will consist of:

1. Dispatch of all the required material to Machine Shop, CFFP.
2. Civil work required, if any, should be communicated atleast 4 weeks in advance & before supply of material. All necessary construction drawings will also have to be supplied by the contractor along with this communication.
3. Dismantling, removal & shifting to a place, designated by the executive in-charge, Maintenance –Machine Shop, of all the existing Panels, Motors, MG-Sets, Control Desks, Pendants, Cables etc. at BHEL Hardwar and handing over the same to the executive in-charge, Maintenance –Machine Shop.
4. Painting of Machine similar to existing shade.
5. Mounting of all supplied Motors, Panels, Drives, Control Panels, Control Desks, Control Pendants, etc. at appropriate locations.
6. Laying of New Cables, including Power, Control & Signal Cables at appropriate locations and through proper Cable Routing Accessories like Drag Chains/Cable Hoses/Cable Laying Trays etc.
7. Inter connection of Panels, Cables and Field Devices including motors, drives, feedback devices etc.
8. Modifications of any nature including modifications in mounting devices of motors, encoders etc. as and wherever required, in a manner suitable for the best performance of machine in its present mechanical condition.
9. Cleaning of the work area after total installation work is completed.
10. Testing and proving out. This will include no load trial run, idle running for 24Hours as per BHEL requirement at the time of commissioning, load test etc.
11. Drawing and Supply of 4 Sets (3 Hard Copies and One Soft Copy in a suitable Media, preferably USB Flash Storage Device) of All the relevant drawings including but not limited to:
  - a. Complete List of Components used along with their designation in the circuit diagrams,
  - b. Complete Circuit Diagram, preferably in Standard German Format,
  - c. Complete Wiring Diagram, including Termination Details, Cable Identification Details, Cable/Wire Lengths & Locations and Cable/Wire Route etc.,
  - d. List of Parameters for each drive, individually,
  - e. Complete PLC Program in Ladder / STL Format including Process Logic, Input/Output/Flag Lists, Cross References etc.
  - f. Configuration Details of all special connectors etc.
  - g. Panel/Pendant/Desk Layout including layout of components within Panel/Pendant/Desk. Etc.

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## SPECIAL TERMS & CONDITIONS

This section details Special Terms & Conditions under which the contract is to be executed. These Terms & Conditions are in addition to the General, Safety and Other Terms & Conditions of BHEL, applicable to the Works Contracts, as per BHEL Works Policy. The Special Terms and Conditions applicable are as below:

A. For acceptance of the tender submitted by BHEL:

- a. All the bidders are recommended to visit the plant (CFFP) for a first hand appraisal of the machines. Any presumption regarding the condition of the machine, by the bidder, shall not be entertained at a later stage.
- b. It is necessary for all the bidders to submit their bids in two parts viz. i. Techno-Commercial bid and, ii. Price Bid.
- c. No Earnest Money Deposit is required to be submitted for this tender.
- d. For all material part, all the components are to be of same make as specified under Annexure A. **Complete and detailed Bill of Material is to be submitted by the bidder** along with reference of Annexure A. Any deviation from the specified makes may result into rejection of the tender without any further communication.
- e. All the bidders have to specify the delivery schedule of material part of the contract in the technical bid. Normally accepted delivery period will be 18 Weeks from the date of issue of work order. Any deviation will attract loading as specified in Part I of this annexure. Also, this will form the basis for finalizing the date of handing over the machine to contractor, by BHEL, for the purpose of start of work.
- f. Bidders have to specify the time period required for dismantling of old and installation of new system, from the date of handing over the machine to them for the purpose of installation work, separately. The upper limit to this period will be 8 weeks. Any deviation will attract loading as specified in Part I of this annexure.

B. At the award of contract:

- a. The successful bidder will have to submit a security deposit as per BHEL Works Policy, within 15 days of award of work. The rates are as here under:
  - i. Up to Rs. 10Lakhs : 10%
  - ii. Above Rs. 10Lakhs up to Rs. 50Lakhs : Rs. 1Lakh+7.5% of amount above Rs. 10Lakh.
  - iii. Above Rs. 50Lakhs : Rs. 4Lakhs+5% of amount exceeding Rs. 50Lakhs.

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- b. Alternatively the 50% of Security Deposit must have to be submitted before start of the work. Balance 50% will be deducted from the first payment.
  - c. Security Deposit is to be made in the form of Demand Draft/pay order drawn in favour of CFFP, BHEL, Haridwar, payable at Haridwar. This can also be submitted through Electronic Transfer (ECS)/ Bank Guarantee/ Fixed Deposit Receipt (FDR). The Bank Guarantee format should have the approval of BHEL. The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.
  - d. EMD of the successful tenderer can be converted and adjusted against the security deposit.
  - e. If vendor fails to submit the Security Deposit within in specified time frame the Work Order may be treated as cancelled.
  - f. The security deposit shall not carry any interest.
  - g. The machine will be handed over to the contractor for a period not exceeding 3 days (including intervening Sundays/Holidays) for the purpose of getting measurements for development of such mounting devices. This activity will necessary have to be carried out by the contractor within 12 weeks of award of the Work Order or before dispatch of material from their end, whichever is earlier.
  - h. The exact time of handing over the machine to the successful bidder (contractor) by BHEL for the purpose of work, will be intimated to the contractor along with the work order or at a later stage after confirmation from the contractor regarding readiness of all mechanical items as required for mounting of motors, feedback devices etc. and the contractor will have to start the work within a week's time from the stipulated date of start of work. The work can be started only after deposit of the Security Deposit as mentioned at B.b above. The time of handing over the machine for retrofitting/reconditioning work by BHEL will however not bear any implication on the supply of material part.
- C. For the purpose of execution of work at BHEL:
- a. All the bidders have to ensure that all their workmen, proposed to be engaged for the work within BHEL Premises are covered under PF & ESI for the duration for which work is to be carried out or the Vendor must have to submit a notarized affidavit to the effect that by virtue of no of employees being less ( less than 20 for PF & less than 10 for ESI) exemption from PF and/or ESI is applicable.

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In such a case, the vendor will not be allowed to deploy employees, in number, more than the numbers as applicable at any point of time during the execution of the work in BHEL Premises and Vendor will also ascertain the same in the same affidavit. **While execution of the work all the labor laws will be followed by the vendor.**

- b. All the material required for the execution of work will have to be supplied by the contractor to CFFP, BHEL before handing over of the machine to the contractor. All such material is liable to be inspected by BHEL either at the works of the contractor (before dispatch) or at CFFP after receipt of material. In case the material is inspected at CFFP, the same will be done within a week's time from the date of receipt of complete set of material.
- c. BHEL, for the works being carried out within BHEL factory premises, will provide only following facilities to the contractor, free of cost:
  - i. EOT Crane along with crane operator, as per requirement and availability,
  - ii. Electricity & Water
  - iii. Welding Machine, Maximum one no., subject to availability,

Welders and all consumables will have to be arranged by the contractor at their own cost.

- d. All the dismantling work of machine will be carried out by the contractor in presence of the executive in charge of Maintenance-Machine Shop or other BHEL representative, deputed by Head of Department, Maintenance & Services Department.
- e. BHEL, at its discretion, may inspect some or all the components before their dispatch from the contractor's works.
- f. While working within BHEL factory area, the contractor will use their own tools and tackles except EOT Crane and Welding Machine. Any Tool or Tackle which may be required for maintenance of the reconditioned/retrofitted machine in future will be retained by BHEL after acceptance of machine by BHEL.

### D. Payment Terms:

- a. 70% of material cost after receipt of material at CFFP, BHEL, and its inspection and acceptance at CFFP. Balance 30% of material cost along with Security Deposit & Cost of installation & proving out will be paid after completion of commissioning work & acceptance of machine by BHEL (Also refer Clause E below) after submission of Performance Bank (PBG) Guarantee of 10% of contract

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value. If vendor fails to provide the PBG for the required value, the payment will be made deducting the PBG amount.

- b. Invoices will be raised separately for material & commissioning.
- c. Form "C" will be issued against CST after acceptance of Material at BHEL.
- d. No advance payment will be made by BHEL.
- e. Proof for Service Tax deposit is must to submit for the payment of commissioning charges.

**E. Penalty Clause:**

- a. A delay in handing over the machine to BHEL, by the contractor, beyond scheduled date as specified in the Work Order or otherwise shall attract a penalty of 0.5% per fortnight or part of that, subject to a maximum of 10% of contract value. Penalty will be calculated based on total time period taken by the contractor for supply of material and execution of the installation work. The total period of execution will be calculated from issue of work order to handing over the machine to BHEL less any time taken by BHEL for handing over the machine to contractor for installation work.

**F. Guarantee/Warranty:**

- a. The contractor will provide a guarantee/warranty of minimum 24 months for all the material supplied under this contract and also the retrofitted system as whole. Any deviation from the specified period will attract loading as detailed in part I of this annexure. In any case, guarantee/warranty less than 12months will not be acceptable. The guarantee/warranty will be supported by submission of a Performance Bank Guarantee of 10% of contract value. The guarantee/warranty period will start immediately after the acceptance of machine by BHEL.
- b. If breakdown of the machine is not responded within 48 hrs during the guarantee/warranty period, the guarantee/warranty period will stand extended for double the corresponding period.
- c. Breakdowns not attended during the guarantee/warranty period will lead forfeiting of PBG.

**G. Acceptance of Machine as commissioned:**

- a. The machine will be verified through joint inspection by BHEL & Contractor for the acceptance of the machine as per the verification parameters placed at Annexure F.

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- b. The machine, after commissioning will be put to production activities for a period of one week during which the machine must be able to operate uninterruptedly. During this period, the contractor will ensure that any snag in the machine is rectified immediately.
- c. The contractor will have to submit a bank guarantee of 10% of total contract value for a period equal to guarantee/warranty period from the date of final acceptance of the machine as performance guarantee for the reconditioned/retrofitted machine.

**H. Risk Purchase:**

- a. In case the L-1 bidder refuses to accept the work order or after acceptance of work order, refuses to or is unable to execute the contract successfully, BHEL reserves the right to award the work to any other participating vendor at their offered price and the difference will have to be borne by the L-1 vendor.

**I. Deviations and Loading:**

- a. Loading will be calculated on the total price offered by the bidder and the total loaded price will be used for identifying the L-1 bidder.
- b. In case, after loading, two bidders are found to be at exactly same price, the actual offered price will be considered for comparison.
- c. The loaded price will be used only for comparison purposes. Loading will not affect the work order price which will be the quoted price or the negotiated price whichever is less.
- d. Deviations other than those mentioned at I.e below will not be accepted by BHEL.
- e. Loading against various deviations will be as detailed below, the total loading will be sum of all the three loading factors:

Sl. No.	Clause No.	Deviation allowed with Loading	Rate of Loading	Remarks
1.	A.e	Bidder may offer a delivery longer than 18 weeks for material supply part but in no case more than 24 weeks	@1.25% per week (or part thereof) above 18 weeks subject to a maximum of 5%	Delivery period more than 24 weeks will not be acceptable in any case.
2.	A.f	Bidder may offer Execution period of	@1.50% per week (or	Execution period more

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		more than 8 weeks for work part but in no case more than 12 weeks	part thereof) above 10 weeks subject to a maximum of 5%	than 12 weeks will not be acceptable in any case.
3.	F.a	Bidder may offer a guarantee/ warrantee period of less than 24months but in no case less than 12months from the date of acceptance of machine by BHEL.	@0.5% per month (or part thereof) below 24 months subject to a maximum of 5%	Guarantee/Warrantee of less than 12months from the date of acceptance of machine by BHEL will not be acceptable in any case.

**VERIFICATION PARAMETERS FOR PLANO MILLER (PMA)**

Following points will be verified through joint inspection by BHEL & Contractor for the acceptance of the machine.

A. Different functionality of Machine as per following list is to be demonstrated by the contractor in idle & load running condition.

Sl. No.	Function
A.1	Movement of 1 <sup>st</sup> Milling stock in Y- Axis through Feed Motor & position display on DRO
A.2	Movement of 2 <sup>nd</sup> Milling stock in X- Axis through Feed Motor & position display on DRO
A.3	Movement of 3 <sup>rd</sup> Milling stock in X- Axis through Feed Motor & position display on DRO
A.4	Movement of 4 <sup>th</sup> Milling stock in Y- Axis through Feed Motor & position display on DRO
A.5	Angular Rotation of all four Heads & position display on DRO
A.6	Movement of Table in Z- Axis through Feed & Rapid Motor & position display on DRO
A.7	Spindle Rotation of all four Milling stocks
A.8	Clamping & unclamping of cross rail
A.9	Movement of Cross Rail
A.10	Movement of pendant panel in up & down direction
A.11	Running of all the lubrication & hydraulic motors
A.12	Machine Lights on/off

B. The contractor will have to demonstrate all the feed rates & RPM as per the following table in idle & load running condition.

Sl. No.	Feed Rates/RPM	Range
B.1	Feed for 1 <sup>st</sup> Milling stock in Y-Axis	10-2000 mm/min
B.2	Feed for 2 <sup>nd</sup> Milling stock in X-Axis	10-2000 mm/min
B.3	Feed for 3 <sup>rd</sup> Milling stock in X-Axis	10-2000 mm/min
B.4	Feed for 4 <sup>th</sup> Milling stock in X-Axis	10-2000 mm/min
B.5	Feed for Table in Z-Axis	5-1000 mm/min (with gear train) 10-2000 mm/min (without gear train)
B.6	RPM of 1 <sup>st</sup> Milling stock Spindle	20-1000
B.7	RPM of 2 <sup>nd</sup> Milling stock Spindle	20-1000
B.8	RPM of 3 <sup>rd</sup> Milling stock Spindle	20-1000
B.9	RPM of 4 <sup>th</sup> Milling stock Spindle	20-1000
B.10	Table rapid	6000-7000 mm/min
B.11	Milling Stock fast travel	3000 mm/min
B.12	Spindle Step less axial feed	5-1000 mm/min
B.13	Spindle fast travel	1000 mm/min

- C. All the wiring with ferrules & proper dressing of cables & wires.
- D. Interlocking of limit switches, pressure switches & lubrication motors.
- E. Compatibility of display with actual feed rates & Spindle RPM.
- F. All the Meters & Indicators in working condition

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**PRE-QUALIFYING CRITERIA**

This section details minimum requirement on part of the bidder for the Electrical Retrofitting of Plano Miller (PMA) in Machine Shop. In general, the bidder must satisfy following criteria:

1. Average annual financial turnover for the last 3 financial years ending 31st March (i.e. for the financial years 2011-12, 2012-13 and 2013-14), must be not less than Rs. 50 Lakhs.
2. Bidder must submit proof of having carried out successfully work of similar nature during last 7 years ending last date of the month previous to the one in which NIT for this work is issued. Similar work means “Retrofitting of Machine Tools” OR “Reconditioning of Machine Tools” OR “Renovation of Machine Tools” OR “Modernization of Machine Tools” where Thyristor Drive & PLC must be a part of the above work.
3. The value of such works must be:  
Not less than Rs. 51 Lakhs for each of minimum three similar completed works with any organization of repute but not the bidders own organization  
OR  
Not less than Rs. 63 Lakhs for each of minimum two similar completed works with any organization of repute but not the bidders own organization  
OR  
Not less than Rs. 101 Lakhs for each of minimum one similar completed works with any organization of repute but not the bidders own organization  
**As a proof, Purchase Order /Work Order Copy and completion/commissioning/performance certificate(s) from the original client(s) must be submitted. Any work supporting or facilitating to above work will not be considered.**
4. **Compliance to Govt. Rules:** The bidder must have proper registration for PF, ESI, Income Tax, Service Tax etc. as per Govt. Rule. The bidder shall also have to comply with the Government as well as BHEL rules and regulations. Bidder has to fill & submit the enclosed Performa.
5. Documents supporting the aforementioned qualifying criteria **MUST** be submitted by the bidders along with the Techno-Commercial Bid. **If it is found at any time that the particulars submitted by the contractor are false, suitable action will be taken. This may lead to cancellation of contract/registration from all the BHEL units & forfeiting of Earnest Money Deposit (EMD) /Security Deposit (SD).**
6. Bidder must submit tender cost & Earnest Money Deposit (EMD) along with Techno-Commercial offer. In case the tender cost/EMD is not submitted with techno-commercial offer or less than that specified in NIT, tender will be rejected without any prior notice and any amount deposited will be forfeited.
7. Bidder’s acceptance for opening price bid through reverse auction process must be submitted. However, BHEL may opt to decide L-1 through Reverse Auctioning or by opening the price bid.
8. **Following checklist to be filled by the bidder.**

<b>Sl. No.</b>	<b>Required Data</b>	<b>To be filled by the bidder</b>	<b>Remarks of Bidder for supporting documents (Enclosed/Not Enclosed)</b>
1.	PF Registration No		
2.	Service Tax Registration No		
3.	PAN No.		
4.	ESI Registration No		
5.	Documents as per clause 1		
6.	Documents as per clause 2		
7.	Documents as per clause 3		
8.	Average Turnover of last three years 2011-12 2012-13 2013-14		
9.	Value & Year of Similar Contract/s Work Order as per clause 3		
10.	Earnest Money (DD No.)		
11.	Tender Fee (DD No.)		
12.	Acceptance for Reverse Auctioning		