

(ANNEXURE 'A-3')

SCOPES OF SUPPLY FOR VARIABLE FREQUENCY INVERTER DRIVE FOR RUSSIAN
CENTER LATHE MACHINE, MODEL - 163

1. Variable Frequency Drive of Siemens/ABB make of following specification:

- | | | |
|-----|--------------------------|--|
| 1.1 | Rating | 18.5 kW, 400V AC, $\pm 15\%$, 50 Hz with AC line Choke |
| 1.2 | Input voltage | 400V AC, $\pm 15\%$, 50 Hz, Three Phase |
| 1.3 | Duty | Continuous |
| 1.4 | Overload rating | 130% for 60 seconds |
| 1.5 | Operator Controls | Start, Stop, Reverse, Run, Jog, Parameter Setting |
| 1.6 | Digital input | Start, Stop, Reverse, Run |
| 1.7 | Braking | DC Injection or dynamic Braking |
| 1.8 | Speed Control | Through potentiometer of Bourns make or equivalent, 10k Ω log,
And six step selector switch for six pre-defined speeds. Manual
switchover system to be provided.

Single turn with suitable with Vernier dial knob. |
| 1.9 | Others | Digital display for fault conditions |

1.10 Enclosure for Drive Panel

Drive shall be mounted in a sheet metal enclosure (1500x600x400mm), with following Components fitted and connected with the drive with insulated copper wire of suitable Size:

- (i) Pushbuttons for Fwd/Stop/Rev/Reset/E-Stop for local control of drive.
- (ii) Remote terminals for Forward/Stop/Reverse operation.
- (iii) Terminals for incoming supply and Motor connection.
- (iv) Panel light with door switch.
- (v) Cooling fan of EBM make having capacity 1800 cubic meter/Hr.
- (vi) Indicating LED lamps for R, Y and B Phase, Drive Fault and Run.
- (vii) Control ON/OFF push buttons/Switch.
- (viii) Suitably rated SFU for incoming supply along with semiconductor fuses.
- (ix) Suitable glass/transparent plastic covered door/opening for access to drive Control panel.
- (x) 6 way connector, 10 A, 400V AC for connecting Forward/stop/Reverse/Reset actuators covered with sheet metal cover.
- (xi) Suitable VIF Meter
- (xii) Logarithmic potentiometer of Bourn makes.
- (xiii) Six step selector switch.
- (xiv) Speed controller change over circuit.
- (xv) All other required interfacing and circuit elements shall be supplied by party.

2. **DOCUMENTS (01set):**

- (i) Operation and service manual of Drive.
- (ii) Electrical Schematic of Panel after approval from engineer in-charge. (Hard copy and soft copy, both)
- (iii) Commissioning document and manual (including hardware and software required) of the material supplied to be given by the party.

3. **Training:**

The vendor shall provide training to one BHEL personal in the field of operation, maintenance and commissioning of drive at drive OEM/OEM Authorized training center. Vendor shall inform BHEL at least 15 days in advance for training. Boarding & lodging charges of BHEL personnel will be borne by BHEL. *Training to be carried out before dispatch of material from vendor's works.*

4. **Commissioning:**

Commissioning will be done by BHEL.

5. **Warranty:**

18 months from the date of receipt of material in BHEL Haridwar.

(ANNEXURE 'A-4')

**SCOPE OF SUPPLY FOR VARIABLE FREQUENCY INVERTER DRIVE FOR HMT MAKE
LB-20 LATHE**

1. Variable Frequency Drive of Siemens/ABB make of following specification

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|-----|--------------------------|--|
| 1.1 | Rating | 7.5 kW, 400V AC, $\pm 15\%$, 50 Hz with AC line Choke |
| 1.2 | Input voltage | 400V AC, $\pm 15\%$, 50 Hz, Three Phase |
| 1.3 | Duty | Continuous |
| 1.4 | Overload rating | 130% for 60 seconds |
| 1.5 | Operator Controls | Start, Stop, Reverse, Run, Jog, Parameter Setting |
| 1.6 | Digital input | Start, Stop, Reverse, Run |
| 1.7 | Braking | DC Injection or dynamic Braking |
| 1.8 | Speed Control | Through potentiometer of Bourns make or equivalent, 10k Ω log, And six step selector switch for six pre-defined speeds. Manual switchover system to be provided.

Single turn with suitable with Vernier dial knob. |
| 1.9 | Others | Digital display for fault conditions |

1.10 Enclosure for Drive Panel

Drive shall be mounted in a sheet metal enclosure (1200x500x400mm), with following Components fitted and connected with the drive with insulated copper wire of suitable Size:

- (i) Pushbuttons for Fwd/Stop/Rev/Reset/E-Stop for local control of drive.
- (ii) Remote terminals for Forward/Stop/Reverse operation.
- (iii) Terminals for incoming supply and Motor connection.
- (iv) Panel light with door switch.
- (v) Cooling Fan of suitable rating for drive.
- (vi) Indicating LED lamps for R, Y and B Phase, Drive Fault and Run.
- (vii) Control ON/OFF push buttons/Switch.
- (viii) Suitably rated SFU for incoming supply.
- (ix) Suitable glass/transparent plastic covered door/opening for access to drive Control panel.
- (x) 6 way connector, 10 A, 400V AC for connecting Forward/stop/Reverse/Reset actuators covered with sheet metal cover.
- (xi) Suitable VIF Meter
- (xii) Logarithmic potentiometer of Bourn makes.
- (xiii) Six step selector switch.
- (xiv) Speed controller change over circuit.
- (xv) All other required interfacing and circuit elements shall be supplied by party.

Jm
(J.K. Pandey)

21/11/17
Ramvans Yadav
SECWEX-MCR

2. DOCUMENTS (01set):

- (i) Operation and service manual of Drive.
- (ii) Electrical Schematic of Panel after approval from engineer in-charge. (Hard copy and soft copy, both)
- (iii) Commissioning document and manual (including hardware and software required) of the material supplied to be given by the party.

3. Commissioning:

Commissioning will be done by BHEL.

4. Warranty:

12 months from the date of commissioning or 18 months from the date of dispatch of material, whichever is earlier.

5. General:

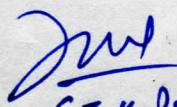
Party must get the drawing approved by BHEL before manufacturing.

Indent No: S/6399/2017/2119/U

'ANNEXURE-A5PRE-QUALIFYING CRITERIA

Sl. No.	Description
1.0.	Average Annual financial turnover of the vendor/supplier during the last 3 years, ending 31st March 2017, should be at least 5.0 Lacs. Vendor should submit Audited balance sheets for the last three years.
2.0	Party must have supplied and commissioned (on their own or through their channel partner/ System house) servo drive or VFD System in last 7 years from the date of enquiry as per following details: i) Three projects with each project costing not less than 6.5 Lacs. OR ii) Two projects with each project costing not less than 8.5 Lacs. OR iii) One project with project costing not less than 13.5 Lacs.
2.1	Party has to submit the copy of PO & commissioning certificate, along with name, address and contact details of their customer. BHEL reserves the right to verify the information provided by the vendor.

R. H. G. V.

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Sr. Engr. (WEX-MCR)
(J. K. Pundir)