

TECHNICAL SPECIFICATIONS

**Portable Angular Universal Fully Automatic Electrically Operated
Drilling Machine.**

1.0 PURPOSE:-

The drilling machine is required for drilling/reaming the locking pin holes during the blading of steam turbine rotors during the assembly of blades. The blades will be assembled in steam turbine rotors of various rating. Blade material shall be Martensitic stainless steel grade DINX22CrMOV121 having tensile of upto 900N/mm².

NOTE:-

This is a special purpose machine and therefore the design and operation of the machine should preferably be similar to our specifications and requirement. Machine manufacturers interested in the development of the machine may study our requirement at BHEL HARIDWAR and shall give a compliance certificate.

2.0 SPECIFICATIONS:-

- | | | |
|---|-----------------------------|----------------------------------|
| - | 2.1 Capacity | :- Dia 50MM (Alloy steel) |
| - | 2.2 Spindle | :- ISO 50-MT5 |
| - | 2.3 Spindle Movement | :- 350 MM (max.) |

Special Features :-

- | | | |
|---|--|----------------------------------|
| - | Tilting of head (\pm) 180° about axis of the axis of the Arm (A) ie head Swivelling. | |
| - | Head tilting (F) | : 90° on either side |
| - | Arm can be rotated about pillar/column of the machine (D) | : 360° |
| - | Vertical movement of arm over column/pillar (B) | : 800MM |
| - | Horizontal movement of arm (C) | : 600mm |
| - | Total height of machine | : 2500mm (Approx) |
| - | Total weight of machine | : 2500Kgs (Approx) |
| - | Provision of linear scale on the column | |
| - | Range of feed | : 0.063mm/rev. to
0.60mm/rev. |

- Min. & max height of spindle nose from the floor through movement of arm : { min =300mm
: { max = 1500mm
- Size of the base of machine : Party to give size
- Horizontal travel of column/pillar (E) : 1000mm

For A, B, C, D and E refer enclosed sketch.

3.0 ESSENTIAL FEATURES/REQUIREMENTS:-

- A.** The basic machine shall have a robust and vibration free construction and high power rating to ensure accurate drilling of the blades.
- B.** All drives should be AC thyristorised /transistorized type, of Siemens/ABB or indramat make. Motors should be protected against over-heating. In electrical panel all accessories should be of Siemens or other reputed make.
- C.** Machine should have push-buttons controlling the different function of the machine. Devices should be protected against short-circuiting with proper safety measures.
- D.** Suitable lubrication system to be provided.
- E.** Standard operation and service tools shall be supplied along with the machine.
- F.** The machine shall be supplied with complete electrical equipment ready for the connection to the power mains.
- G.** Details of the civil work if any required to be done for the installation of the machine should be specified by the supplier.
- H.** Maintenance manual must contain following things.
 - 1- Assembly drawing of each sub-assemblies with indication of each components with their specification, part number and make.
 - 2- Hydraulic & lubrication circuit diagrams with description of each elements having their specification, make and part number.
 - 3- Complete electrical circuit drg. including service manual of A.C. drive, if any.
- I.** Detailed schematic diagram of the proposed machine to be submitted along with the offer.
- J.** Compliance with all safety norms must be followed.

K. Maintenance of machine at plant or at any site in India, along with necessary spares to be covered by vendor under warranty period.

L. AMC (Annual maintenance contract) after warranty period of 2 years (renewable) also to be quoted separately.

4.0 COLOUR:-

Colour of the machine shall be Apple Green.

5.0 COMMISSIONING AND ACCEPTANCE:-

- A-** Provisional acceptance of the machine can be made by BHEL's representative at supplier's work prior to dispatch. This will be at the discretion of the BHEL.
- B-** Final acceptance shall be made at BHEL, Haridwar following successful erection, assembly, test run and commissioning. Achieving specified accuracy and surface finish on a test job shall be part of successful commissioning.
- C-** It shall be the sole responsibility of the supplier to rectify any shortcomings in the design or operation of the machine observed during commissioning, free of cost.
- D-** Test/Geometrical accuracy charts as per relevant/Indian/International standard for testing the machine shall be supplied along with the technical offer.
- E-** The vendor shall impart training to BHEL personnel in operation and maintenance of the machine at vendors manufacturing plant for one week.

6.0 SPARES:-

Essential spares must contain following things.

6.1 MACHANICAL:-

- 1- One number each pumps used in hydraulic and lubrication.
- 2- One number of each type of pressure control valve, pressure reducing valve, pressure switch, flow switch, level switch direction control valves used in hydraulic & lubrication circuits.
- 3- Five numbers of each type of filter elements used in hydraulic & lubrication circuit.
- 4- One number/set of each type of oil seals used in machine.
- 5- One number of each type of rubber hydraulic hose pipes used in machine.

6.2 ELECTRICAL:-

- One number of each type of pressure switches, limit switches, push buttons, relays, contactor and other control unit used in this machine.

7.0 GUARANTEE:-

The vendor shall offer performance guarantee of the machine for 24 months from the date of final acceptance.

8.0 TECHNICAL SUPPLY CONDITION :-

The machine shall be able to operate in following technical condition.

POWER:-

Machine should be suitable to operate on 3-phase A.C. supply of 415 volts $\pm 15\%$, 50 Hz $\pm 3\%$.

ENVIRONMENT:-

Tropical environment consist of dust laden atmosphere during some part of the year.

Temperature	Minimum 3° C
	Maximum 45° C
Relative humidity	95% Maximum

9.0 GENERAL INFORMATION :-

The vendor should give agreement/comment against each and every feature/item as mentioned in the specifications. Any deviation in the offer shall be clearly highlighted against that particular item/feature.

SCHEMATIC VIEW



