

Annexure-I

**RECONDITIONING, UPGRADATION AND CNC RETROFITTING OF KOPP LP
ROTOR FIR-TREE ROOT MACHINING CENTRE, MODEL KF 56, PLAN NO. 2-
389, BLOCK-III**

A. MACHINE DESCRIPTION:

Two-axes milling head
Make: Kopp, Germany
Model: KF 56

A.1 Machine Size:

Length of the machine bed: 2700 mm
Width of the machine bed: 1650 mm
Height of the machine: 3500 mm

A.2 Weight of the machine: Approx. 17 T

A.3 Movements: 2-axes (X and Y)

X-axis: Horizontal movement of machine saddle and column over the machine bed; traverse length is 940 mm

Y-axis: Vertical movement of machine headstock along the column; traverse length: 740 mm

Both the axes have ball screws.

A.4 Spindle Dia: 300 mm

A.5 Spindle Motor power: 11 kW, 1500 RPM

A.6 Control : Machine has got a master slave copying system control in which one axis is the master and the other follows it at a feed which is based on the deflection of the LVDT tracer.

A.7: Drives: Existing spindle drive is Franz Kessler DC motor with BBC drive. X- and Y-axis motors are Indramat-make DC motors with Indramat drives.

A.8 Existing hydraulic system:

1. Spindle quill forward and backward movement is hydraulically controlled.
2. Y-axis is hydraulically counterbalanced.
3. Machine lift is hydraulic (Entire machine is lifted through a cylinder at the machine base.)
4. All the valves are 220V DC

A.9 Lubrication system: All the guideways of X-and Y-axes, ball screws, spindle gearbox and spindle are given metered lubrication. Both the lubrication and the hydraulic systems use the same oil tank. Machine saddle itself acts as the oil reservoir.

A.10 Tool clamping: Existing tool clamping and unclamping is done manually.

B. BROAD SCOPE OF WORK:

1. Reconditioning and upgradation of the complete machine to suit for CNC operation and restoration of accuracies as per original test chart of the m/c.
2. Machining out the existing X-axis guide ways for fitment of LM guide ways and LM blocks (X-axis has got dovetail guideways on spindle side and flat guideways on the opposite side)
Other alternatives may also be considered.
3. Replacement of ball screws of X-and Y-axes and their nuts.
4. Spindle bearings shall be replaced, *if required*, to eliminate run out of spindle.
5. Hydraulic system shall be renovated by installation of new hydraulic pump, motor, pressure relief valve, non-return valves, pressure switches, solenoid valves, their manifolds, piping, nipples etc.

All seals and O-rings shall be replaced

Hydraulic elements like pumps, valves etc. shall be replaced by latest version of Vickers/Rexroth/Hydac/Parker-make only.

Vendor shall ensure that there shall be no leakage of oil from the system.

6. Present arrangement of manual clamping/unclamping of tool in the spindle will be upgraded with the installation of a hydraulic Push Button-operated tool clamping/unclamping.
7. Centralized lubrication system of adequate capacity shall be provided and installed at a suitable place along with electronic control device.
Lubrication system shall be modified with the inclusion of necessary pump, piping, controls and dosing nipples etc. to meet the requirements.
8. New Bellow covers for headstock on both sides of vertical traverse shall be provided.

9. Other Works:

All activities related to

- 9.1 Dismantling of existing master-slave system
- 9.2 Installation and commissioning of Sinumerik 840D sl configured for min of two-axes interpolation and one spindle.
- 9.3 Mounting and cabling of AC spindle motor 1PH7 (11 kW, 1500 RPM) and axes AC servomotors 1FT6 (27 Nm, 2000 RPM).
- 9.4 Installation and commissioning of Simodrive 611 U/D with new AC spindle and axes motors.
- 9.5 Installation and commissioning of Siemens S7-300 PLC system
- 9.6 Interfacing the spindle and axes with the CNC.

9.7 New operator Panel having the new Machine control panel, required Push buttons, selector switches, and a new electrical cabinet having contactors, MPCBs, MCB's, Cable lugs, ferrules, plug sockets, relay modules, DC SMPS power supply, etc. shall be replaced with new versions of reputed make

9.8 Heidenhain Absolute Linear scales LC 183 of suitable length for X- & Y-axes.

9.9 Job Prove-out

10.0 All the material including CNC system, servodrives, servomotors, new ball screws, LM guideways etc for completing the above mentioned activities shall be in the scope of supply of vendor.

Note: **Party may suggest any other work for further improvement and productivity enhancement of the machine**