Sparkonix

CNC NOTCH (RIB) CUTTING MACHINE

MODEL 500U

MECHANICAL / TECHNICAL DESCRIPTION

HEADSTOCK

The Head stock is a Cast Iron Double walled structure, suitably dimensioned with internal support ribs to ensure chatter free operations and maintaining maximum rigidity .The structure is designed to ensure smooth operation in severe work conditions of steel plants.

The spindle is made from SGIron casting processed and machined with maximum accuracy. The spindle is supported by 2 SKF Taper Bearings. The spindle values are directly programmed in R.P.M. with increment of each Revolution. All shafts and Gears are made from Alloy steel, hardended and ground with utmost precision in order to ensure continuous and silent operation.

Lubrication of all power transmission parts is ensured by forced manual lubrication system.

TAIL STOCK

Right dimensions ensure rigid holding of the work piece and right linear alignment.

The manual clamping arrangement of Tailstock to the machine Bed ensures stability to the work piece during machine operation.

The Tail stock movement is driven independently using a manual rack-pinion arrangement. The Tailstock is incorporated with a rotating centre.

MACHINE BED

Right size dimension, monolithic structure which is fixed to the floor over the entire length with support and leveling points, ensuring a fixed foundation to the ground.

Cast in an Electric oven of Grade FG 260, a Ferrite structure due to the hardening process. A rectangular structure appropriately cross ribbed with 2 Guide ways of large dimensions. Machine bed designed to ensure coolant flow routed to coolant pump system.

CARRIAGE

The carriage unit is of maximum importance to obtain Perfect Notching operation. The dimension of the casting guarantees maximum rigidity in most difficult working conditions. A perfect coupling between the carriage and guide ways is ensured for long lasting accuracy and operation.

Two AC Servo Brushless Motor drives transmit the movement to two work axis. With High torque and low inertia movement, these motors control the rapid two directions movement. Axis transmission is obtained by Precision Ball screws with double preloaded screw nuts. The guide ways are fixed with Anti friction material to allow accurate and precision movement of the carriage even at very low travel speed. The guide ways of the carriage and transversal slide are equipped with manual centralized lubrication system. The carriage is equipped with central command panel of the CNC system.

All control and command instruments ensure a PERFECT NOTCH.

NOTCHING DEVICE

Notching device is fitted in the middle of transversal carriage .The notching device design is ensuring quick change of tool holders and its supports. The notches are produced by a rotating tool holder with mounted cutting tool ,the combined rotation of the tool and the work piece generates notches while the number of notches ad angle of notch depend on the ratio between tool and roll work piece rotation speed. Generally the CNC control works on four axes i.e. tool rotation, roll rotation, feed axis and longitudinal axis. The control system automatically can recognize the number of principles and if the number of notches is divisible for them, the tool is automatically positioned one notch over for each roll rotation. Thanks to the longitudinal axis control different center distance of grooves centerline can be programmed .The entire notching operation is CNC controlled and with simple numerical entries ensure ease for operator.

TECHNICAL DESCRIPTION OF CNC RIB CUTTING MACHINE

Electrical Equipment: The electrical equipment is built as per international I.E.C. Standards, enclosed in a closed cabinet,with suitable ventilation for all major electrical components. All electrical components used are from renowned international manufacturers and suppliers, giving assurance of high performance,even in remote areas of operations.The electrical cabinet is mounted onto the machine tool which allows minimum utilization of operational areas and also easily accessible for eventual maintenance & repairs.The interface between the machine & numerical control is through a in-built PLC in the CNCwhich allows for best operational capacity & diagnostic of the machine.

All auxiliary circuits & cabling are of low voltage type, the connecting cables from cabinet to the CNC operating are of low voltage. All cables are enclosed in drag chain for protection.Each & every component is earthed where-ever necessary & earth common is given to a separate dedicated Earth pit specially made for the machine. We supply Safety instruction & Pre- installation handbook to every customer before dispatchto enable them to make necessary arrangements prior to installation & commissioning of the machine. All necessary drawings for positioning ,foundation,room layout, Earth-pit formation etc is given to them for guidance.

CONTROL UNIT SIEMENS SINUMERIK 802D SL

The machine is equipped with modular 32-bit microprocessor CNC Siemens Sinumeric802D SL continuous-path control for special purpose program with integrated powerful PLC & complete with operating software on PC-card ,version 802D SL .

Function overview :

- Maximum programmable acceleration
- Safety routines permanently active for measuring circuits, over temperature,voltage , memory , & EPROM
- Working area limitation.
- Software limit switch.
- Hardware limit switch.
- Diagnostic function from interface, PLC & NC with plain text display on the screen.
- SPM machine.
- Optimum complete solution with Smart Line Module .
- Feed rate & rapid traverse: 1mm/min to 999 mm/min.
- Rotating rotary axes.
- Helical interpolation.
- Acceleration with jerk limitation.
- Programmable acceleration.
- Travel to limit stop with adaptable force or limited torque.
- Advanced detection of contour violation .
- Configurable number of intermediate blocks with tool radius compensation.
- Tool radius compensation with approach & exit strategies & calculation of intersection.
- Backlash compensation.

PLC:

- Integrated C PU
- Programming language Step-7
- Max. 4096 flags , 128 or 256 timers , 64 or 256 counters 256 FBs/FCs & 399 Dbs

DISPLAYS :

- Screen text in several languages
- Program window for block display
- Positional actual values .
- Plain text display for operating status.
- Alarm number with alarm text
- Message text.

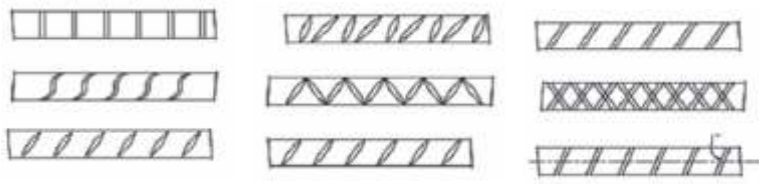
Operating Modes:

- JOG (1 INC ,10 INC , 100 INC)
- AUTOMATIC
- MDA
- OFFSET
- PROGRAMEPROGRAME MANAGER
- SYSTEM
- ALARM
- The operating modes are supplemented by the machine functions.

1.PRESET to set a new coordinate reference point

2.Simultaneous traversing of axes with up to 2 Hand wheels

3.Program selection via directory.



- **Programming:**
- User-friendly programming language .
- Dimension input metric, inch, or mixed .
- Extensive parameter technology.
- Program generation
- Reference point approach .
- Fast NC-PLC data exchange via RAM
- Contour & cycle programming
- Simulation for notching
- Configurable number of zero offsets
- Up to 205 MB NC user memory (RAM) for parts programs , tool offset .

Flat operator panel :

Operator panel front with 10.5 “TFT color display with a resolution of 640 x 480 pixels (VGA) features 10 horizontal & 8 vertical mechanical soft keys.

Machine control panel:

- Mode selection & function keys
- 12 push button with LED .
- Mode selection switch with JOG, AUTOMATIC , REF POINT, SBL ,MDA
- Coolant Auto/Man switch.
- Feed override switch
- Communication through I/O card via profibus dp cable
- Hand wheel directly connected.

Keyboard :

- Sinumeric common keyboard enables user-friendly inputs of programs & text.
- 62 Mechanical keys.
- Alpha blocks With special characters.
- Numeric block with special characters.
- Cursor block.
- NC functional keys hot keys.

The high performance SINUMERIK PCU features on board interfaces for communication via Ethernet , MPI & PROFIBUS DP leaving the integrated slots free for other cards.

The USB port at back of the device provides “ hot plug & play “functionality for a standard PC keyboard & mouse. The SINUMERIK PCU comes supplied with the operating system Linux .The HMI-Advance software included in the system.

Ports:

- Ethernet 10/100 Mb/S
- USB 2.1
- COM1 , COM2
- PS/2 Keyboard
- MPI interface
- External disk drive
- Expansion slot