ITEM 1

Homag Gantry
CNC Processing Center,
Model BOF 712/48/13/K Optimat

The BOF 712 processing center features rigid gantry-frame construction over two (2) moving flexible K-type console tables with manually adjustable vacuum pods, and includes an innovative computer numeric control (CNC). This design offers efficient, cost effective, high-speed batch size production with the ability to process a variety of work pieces on the same machine with minimum down time. And with Intelligent Process Optimization (IPO), the two (2) spindles are capable of processing two (2) different workpieces simultaneously.

Main Router Spindles - 12 kW Current-Controlled Router Spindles

Homag Unit #7434 (2 of)

- HSK-63F - DIN 69893 spindle taper
- speed regulated (closed-loop current-controlled), three-phase asynchronous **12 kW (16 hp) motor - *S1 rated,*** (15 kW (20 hp) - *S6 rated*), with constant torque from 1,000 to 12,000 rpm, and full nominal power from 12,000 rpm for exceptional power output
- number of revolutions is programmable from 1,000 to 24,000 rpm
- liquid cooled ceramic bearings
- maximum rotating tool weight of 6 kg (13.23 lbs.) including tool holder
- maximum tool length of 200 mm (7-7/8") calculated from lower edge of motor spindle
- tool diameter:
  - ~ maximum 180 mm (7-3/32") for routing tools
  - ~ maximum 200 mm (7-7/8") for sanding tools
- supplied with one (1) tool holder and collet for each spindle
- tool holder and collet to be balanced to G2.5 at 24,000 rpm
- supplied without cutting tools
- includes dust collection hood

Extension for Additional Main Spindle

Homag Unit #7445 (1 of)

- additional longitudinal axis with cross slide and Z-axis for installation and actuation of a 2nd main spindle assembly

Spindle Return Traverse Stroke For Main Router Spindles

Homag Unit #7427 (2 of)

- enables use of the boring heads with a router bit remaining in the main spindles for a total length of up to 150 mm, including tool holder

C-Axis with Unit Interface for Main Router Spindle

Homag Unit #7443 (2 of)

- for connection of aggregate processing attachments to router spindles
- including interface pneumatic and swiveling drive C-axis at main spindle with 3-point support device
- drive for all units with swiveling axis
- 0° to 360° unlimited swiveling range, tubeless compressed air supply for aggregate use

12-Position HSK-63F Tool Changer

Homag Unit #7451 (2 of)

- maximum tool weight of 6 kg (13.23 lbs.) including tool holder
- maximum tool length of 200 mm (7-7/8") calculated from lower edge of motor spindle
- following tool combinations are possible:
  - 12 x maximum diameter of 135 mm (5-5/16") or
  - 6 x maximum diameter of 180 mm (7-3/32") and
    6 x maximum diameter of 85 mm (3-11/32")
- maximum tool diameter for sanding tools is 200 mm (7-7/8")
- supplied without tool holders or tools

Lock Case Routing Aggregate Attachment, 2 Spindles D=16/20

Homag Unit #7529 (2 of)

- for automatic change-over into the main spindle
- each with two (2) spindles e.g. for cutting out lock cases and face plates horizontally (90°), suitable for doors, paling borings etc.
- with integrated blow off nozzle
- spindle exits to 2 sides with opposite rotation:
  - one (1) Weldon adapter chuck, diameter 20 mm (25/32")
    including reducing sleeve for tool diameter 16 mm (5/8")
    total tool length max. 180 mm (7-5/64")
    tool projection max. 135 mm (5-5/16")
  - one (1) collet chuck ER16 DIN 6499, with diameter 10 mm (25/64")
    total tool length max. 70 mm (2-3/4")
    tool projection max. 40 mm (1-7/32")
- rotation max. 12,000 rpm
- swiveling by C-axis 0° to 360°
- supplied without tools or collets

17-Spindle "T" Shape Vertical Boring Head

Homag Unit #7407 (2 of)

- each with one (1) frequency-controlled 4 kW, 4,500 to 6,000 rpm programmable motor
- for vertical drilling with a stroke of 50 mm (1-31/32")
- seventeen (17) spindles with up to a maximum of 35 mm (1-3/8") hole diameter (alternating positions)
- individual spindle selection
- seven (7) spindles in the X-direction
- eleven (11) spindles in the Y-direction
- distance between spindles is 32 mm (1-1/4") pitch
  drill length is 70 mm (2-3/4")
  shank diameter is 10 mm (13/32")
- rotation direction: left/right-hand rotation, alternately
- supplied without tooling
- prepared for the optional installation of up to two (2) adapter units, such as additional vertical drills, an auxiliary router spindle, or horizontal boring units with a grooving saw

4-Spindle Horizontal Boring Adapter with 0°/90° Grooving Saw

Homag Unit #7418 (2 of)

- for mounting on either the 12 or 17 vertical spindle boring unit
- for horizontal drilling in four (4) directions (X+, X-, Y+, and Y-)
- both X+ and Y+ spindles have the option of mounting a grooving saw
- driven by the drilling head; pneumatically swiveling from 0° to 90°

adjusting stroke 100 mm (3-15/16") in Z-direction drill chuck diameter	10 mm (13/32")
drill length	70 mm (2-3/4")
maximum drill diameter	10 mm (13/32")
effective length	38 mm (1-1/2")
maximum grooving saw diameter	125 mm (4-29/32")
maximum grooving saw width	6 mm (7/32")
rotations	4500 to 6000 rpm

- drill adapter supplied with clamping surface and adjusting screw
- the saw mounting flange is 30 mm diameter with four (4) M5 countersunk head screws
- supplied without tools

Twin Console-Clamping Tables B700/48/K

- twin clamping tables with four (4) processing positions for synchronous operation in alternate operation (two (2) per table), i.e., in alternate operation, the operator can load/unload on one table, while a workpiece is being machined on the other table
- fixturing table integrated in the machine base as a torsion-free steel construction, with clamping/vacuum consoles of high strength extruded aluminum with a tubeless vacuum supply to the clamping/vacuum pods
- linear guide-ways in the longitudinal (X) direction for manual positioning of the vacuum/fixturing consoles, with:
  - **twelve (12)** vacuum consoles (**six (6)** consoles per table)
  - **twenty-four (24)** vacuum pods, 160 mm x 115 mm, 100 mm high, **twelve (12)** of these with an integrated lifting device
  - **twelve (12)** vacuum pods, 125 mm x 75 mm, 100 mm high
  - **twelve (12)** recessed longitudinal locating (pop-up) stops, elevation 140 mm
  - **two (2) consoles for adjustable lateral stops**
  - **ten (10)** recessed lateral locating (pop-up) stops for 2 x 2 processing positions and mirror position (right table)
  - four (4) plug-type connections with single-circuit compressed air system for connecting pneumatic clamping elements
- the machine's zero point is placed at the front, left side
- workpieces are placed manually into the machine from the front side
- working height to the lower edge of the workpiece is 950 mm (37-3/8")
- depending of the workpieces to be processed, additional consoles, vacuum pods, or mechanical clamps may be necessary (optional)
- the clamping tables move with reduced feed (max. of 25 M/min.) in the safety area of the operator

Lifting Rail for Clamping Bar (K) Table – Roller Type

Homag Unit #7208 (8 of)

- lifting rail with integrated transport rollers, laterally installed at console for aid of loading and unloading large panels
- lifting device for 100 mm (3-15/16") free space below the workpiece support (retracts to vacuum console height)
- total stroke approx. 105 mm (4-1/8") extends to 5 mm (3/16") above vacuum cup
- lifting power of each lifting rail is 35 kg (77 lbs.)
- the position at the consoles must be appointed according to the Technical Data
- not suitable for solid wood or veneered surfaces due to pressure marks

Vacuum System

Homag Unit #7075 (2 of)

- two (2) water-ring vacuum pumps approximately 100 M^3/hr (59 cfm)
- in case of large open surfaces on porous workpieces, an optional, more powerful vacuum system may be necessary

LED Position Indication System for 1300-1600 mm Consoles

Homag Unit #7877 (12 of)

- optical LED indication system for manual positioning of vacuum clamps and consoles
- the consoles which have been programmed in WoodWOP and the vacuum pod positions are optically indicated in an LED grid from 5 mm in the X and Y directions on the table
- with the aid of intermediate distances, a position accuracy of ± 2.5 mm can be achieved

Scrap Removal Conveyor (Main) for B700/48+58/K

Homag Unit #7396

- machine-integrated system consisting of sliders, with a chip conveyor belt behind the processing tables for automatic removal of chips and residual pieces
- for chips and small waste products; removal of larger remaining pieces must be done manually by the operator
- suction hood or ascending conveyor at the end of this conveyor belt must be provided by the customer
- conveying direction to the right outer edge of the machine bed
- only in connection with console type table

Panel Specifications

maximum workpiece length (single operation – left spindle), for all router processing units, with workpiece aligned with stop pins	4950 mm (194-7/8")
maximum workpiece length (alternating/pendulum operation for left spindle/left table & right spindle/right table) for all router processing units, with workpiece aligned with stop pins	2870 mm (112-31/32")*
maximum workpiece length (4-fold operation – synchronous processing)	1300 mm (51-5/32")*
maximum workpiece length (quick-change operation), using "inside" work zones	1750 mm (68-7/8")
maximum workpiece length (independent operation for left spindle/left table & right spindle/right table) for all router processing units, with workpiece aligned with stop pins	2080 mm (81-7/8")
maximum workpiece width for vertical router diameter of 25 mm (1"), with workpiece aligned with front stop pins & overhanging the rear edge of the table by 225 mm (8-27/32")	1525 mm (60")
maximum workpiece width for all router processing units, with workpiece aligned with front stop pins	1300 mm (51-5/32")
maximum workpiece thickness including clamping devices or vacuum pods (to the top of the consoles)	300 mm (11-13/16")
maximum workpiece thickness with standard 100 mm clamps (pods), without restriction for units & suction	60 mm (2-11/32")
minimum workpiece size	depends on clamping devices, workpiece surface and contour
working height to lower panel edge	950 mm (37-3/8")

* *Depending on processing units being used*

Machine Technical Specifications

controlled axes	eight (8) X1, X2, Y1, Y2, Z1, Z2, C1, C2
axis rapid traverse rate	X-axes - 80 M/min (3150 in./min.) Y-axes - 60 M/min (2362 in./min.) Z-axes - 44 M/min (1732 in./min.)
table size	(2) 2870 mm x 1300 mm (112-31/32" x 51-5/32")
tooling shank size (router)	25 mm (1") maximum
tooling length (from spindle nose)	200 mm (7-7/8")
cutter diameter	max. 180 mm (7-3/32") for routing tools max. 200 mm (7-7/8") for sanding tools
tool holder* - HSK-63F	twenty-four (24) right-hand
collet* - RDO-35	twenty-four (24) size TBD
main spindle power	12 kW (16 hp) – *SI rated*
spindle speed (variable)	1,000 to 24,000 rpm
spindle speed control	two (2) solid-state frequency inverters with closed-loop current-control
boring unit adapter (size/type)	10 mm (straight)
boring unit drill length	70 mm (2-3/4")
boring unit power	4 kW (5.3 hp)
boring unit speed	4,500 to 6,000 rpm

* *Combination of tool holder and collet balanced to G2.5 at 24,000 rpm.*

Facility Requirements of Processing Center

floor	10"to 12" min. concrete with rebar reinforcements *(Note: A single, level pad is required for maintaining machine levelness over time.)*
compressed air	103 psi and 42 cfm
dust extraction for working spindle	volume - approx. 5880 cfm total (2940 cfm x 2) air velocity - 92 ft/sec negative air pressure in - 7.87 in/WS outlet diameter - 250 mm (9-27/32") x 2 *(Note: Please contact your dust extraction supplier to determine exact requirements for your facility.)*
machine power*	voltage: 480 volt; 3-phase, 4-wire grounded, 60 cycle amps required: 94

* *Note: Customer voltage supplied must not fluctuate in excess of ± 5% of its stated value, otherwise a voltage stabilizer will need to be installed at the customer's expense.*

Homatic Control Equipment

- Homatic CNC system Power Control PC85 with Windows® XP operating system
- industrial PC (Pentium) with 2 GHz and 512 Mbytes of RAM
- one (1) hard disk solidly installed
- one (1) hard disk in a change frame for data securing
- USB connection
- TFT flat-panel color monitor with PC keyboard and mouse
- eight (8) axis control (X1, X2, Y1, Y2, Z1, Z2, C1, C2)
- digital drive technology
- field bus via optical fiber cable
- no-break power supply (USV)
- EtherNET network connection via network card & software

EtherNET Network Connection

Homag Unit #6530

- enables the connection of a computer local EtherNET network
- Hardware:
  - ~ EtherNET card with RJ45 connection (10/100 Base-T) (without cable) for PC- based control
- Data communication types:
  - ~ data communication via FTP, with the machine representing the FTP server; the TCP/IP protocol is installed on machine; IP-address of machine & address of a possible gateway-PC are configured on-site or via modem
  - ~ for PC-based controls, data communication can also be effected by the Microsoft network; a drive of the machine can be connected with an office PC, or a shared drive of a server can be connected by the machine; the configuration of sharing a drive and/or connecting a server drive is effected on-site or via modem
  - ~ customer provides PC network connection

Control Software

- Windows® XP and virus protection
- 1:1 securing (Cloning)
- operation with Windows® standard via selection menu
- PC85 CNC-kernel with:
  - ~ control for continuous line operation in all axes
  - ~ look-ahead function, to achieve optimum feed speed at transition points
  - ~ dynamic look-ahead control for accurate contours
- PC85 software kit with graphic operating programs, including:
  - ~ WoodWOP for graphic and interactive creation of CNC programs, including the post-processor (details below)
  - ~ a graphic tool database
  - ~ CNC operation
  - ~ graphic representation of clamping locations
  - ~ error messages in clear text
  - ~ up to 24-digit alphanumeric program names
  - ~ Schuler MDE Basic
  - ~ WoodSCOUT, Homag's diagnostic software system is included as described below.

WoodScout Diagnosis System

Homag Unit #6383

A software kit for the graphical diagnosis of the machine's condition. With the WoodScout system, it is possible to systematically eliminated troubles, which can lead to a considerable increase in the factory's productivity. Features include:

- graphical PLC diagnosis in different levels
- a "learning" system, due to the ability of entering the reason of a fault, and then the corrective action(s) that remove it
- optimum support for the elimination of machine down-time

Bar Code Reading System for Optimat

Homag Unit #6448

- includes cable-free hand scanner Datalogic DLL6010, and necessary software
- for memorizing an 8-digit NC program number in the form of a bar code, formatted in 2/5-Interleaved or Code 39
- bar code contains either all data necessary for production of a particular part, or a reference number to call up a particular program

Customer-Specific Programming According to CNC Drawings

Homag Unit #8218 (1 of)

- this position includes programming and running of two (2) workpieces on the condition that exact CNC-dimensioned workpiece drawings, as well as test material (raw material, tooling, special fixtures, etc.) are provided by the customer
- workpiece must be able to be completed in one (1) cycle

Remote Diagnostics

- using the analog telephone modem, supplied with the machine; customer to install telephone line to modem
- the customer is to provide a voice telephone at the machine for communication with the central office for remote services
- the performances of the central office for remote services are specified in the tele-service contract
- failure to maintain a tele-service contract with Stiles will require the customer's return of the modem and associated software

Electric Equipment

- machine wired to U.L. specification
- 180° swiveling control panel installed at switch cabinet
- **switch cabinet air conditioning unit (Homag Unit #6172) included**
- control voltage 24 volt
- FI-safety switching only permitted in connection with an all-mains sensitive/-selective FI-safety switch; if the performance of this device is not sufficient, a differential current monitor is recommended to be provided by the customer

Basic Equipment

- rigid processing center in heavy, stress-relieved construction with a high-precision linear guide system
- working unit beam with linear THK guide system
- precision rack and pinion for X and Y-axes
- re-circulating ball screw and digital AC servo motor for positioning of the Z-axis, stroke 535 mm (21-1/16")
- **automatic centralized lubrication (Homag Unit #7004) for all drives and linear guides**

Safety Features

- safety barrier (fence) for the left-front and right side of the machine includes the safety door and an integrated switch cabinet
- photo-eye light barrier for each table
- wood dust protection maximum 2 mg/m^3 subject to the required extraction capacity to be provided by the customer according to the suction plan

Safety Fence - Lateral Wall Left-Hand

Homag Unit #7011

- supports with mesh fence secured to floor
- height is 1800 mm (70-7/8")

Safety Fence - Back Wall B../52+60+72/..

Homag Unit #7015

- supports with mesh fence secured to floor
- height is 1800 mm (70-7/8")

Note: It is not allowed to run this machine without full safety barriers.

Dimensions

All equipment offered is made to metric standards. Dimensions shown in English measure are approximate and for comparison purposes only.

Exceptions

Items not covered in this proposal include:

- electrical and pneumatic service, including wiring and piping
- cabling and connections from office computers to the machine
- post processors to link the machine to any other CAD/CAM software, other than WoodWOP
- networking software other than that provided for the machine control (Microsoft Windows Networking Software)
- integration of office network system (existing or newly installed) to the machine
- application-specific fixturing or work-holding, (unless quoted optionally)
- tooling for the machine (drill bits, router bits, saw blades)