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HELITRONIC MINI PLUS - RAPID version

Tool grinding machine with 5 CNC controlled axes especially for the production of end mills, drills, step drills, step tools, woodworking tools, profile blades and profile tools.

1.0 TECHNICAL SPECIFICATION

1.1 MECHANICAL SYSTEM

Cast iron machine bed in gantry design.

1.1.1 Drives/Axes

All CNC-axes are driven by identical, digital AC servo motors. Each motor is provided with an absolute value system thus hardware limit switches on the axis are not required.

- **Linear Axes:**

- Maximum travels:
 - X axis (longitudinal slide): 320 mm / 12.6"
 - Y axis (vertical column): 200 mm / 7.9"
 - Z axis (cross slide): 470 mm / 18.5"
- Maximum travel speeds: 15 m/min / 600 IPM
- Maximum control resolution for linear axes: 0.0001 mm

- **Rotational Axes:**

- Revolving range C axis (rotary table): $\pm 200^\circ$
- Max. travel speed: 20 1/min
- Max. control resolution for rotational axes: 0.0001 degree

- Optionally, this axis is also available as a torque drive.
- **Workpiece (A Axis):**
 - Tool attachment: ISO 50
 - Height of centers with upper table: 130 mm / 5.12"
 - Height of centers without upper table: 160 mm / 6.30"
 - Speed range, for tool grinding: 0-50 r.p.m
 - Max. control resolution for A axis: 0.0001 degree
 - The workhead cannot be used for cylindrical grinding tasks.
 - Optionally, this axis is also available as a torque drive.
- **Grinding Head:**
 - Grinding spindle with 2 spindle ends with HSK 50 spindle nose.
 - Diameter of grinding spindle: 80 mm / 3.15"
 - Max. grinding wheel diameter: 150 mm / 5.91"
 - Progressively adjustable grinding spindle drive, digitally controlled through servomotor.
 - Peak performance max. 9 kW / 12.24 HP
 - Spindle speed, infinitely variable: 0 - 10,500 r.p.m.
 - Spindle lock
 - 3 coolant valves per grinding spindle end, controlled by grinding program
 - Automatic central lubrication system

1.2 TOOL DIMENSIONS

- Minimum tool diameter: 3.0 mm / 0.12" (for working with loading system and regrinding)

- Minimum tool diameter: 1.0 mm / 0.04" (square end mills at max. spiral angle 60°)
- Minimum tool diameter: 2.0 mm / 0.08" (end mills with corner, minimum corner radius 0.2 mm at max. spiral angle 30°)
- Minimum tool diameter: 2.0 mm / 0.08" (end mills with ball nose at max. spiral angle 30°)
- Maximum tool diameter: 100 mm / 3.94" (complete grinding)
- Maximum tool length: 185 mm / 7.28" (complete grinding)
- Maximum tool length: 255 mm / 10.04" (for peripheral grinding)
- Maximum tool length: 185 mm / 7.28" (for end teeth grinding)
- The tool length is measured from the theoretical gauge line of the workhead.
- Max. tool weight: 30 kg / 66 lbs
- The tool dimensions and weights are dependent on the type of tool, the tool geometry, and the nature of the processing, for example the use of certain equipment options.

1.3 CONTROL

GE Fanuc Series 31i - B5

- **C.O.R.E. PANEL:**
 - UNITED GRINDING Group Control Panel. Serves as user interface in connection with C.O.R.E. HMI and C.O.R.E. OS.
 - Features: 24 inch full HD multitouch display, ergonomic design, integrated electronic key system, integrated proximity sensor, integrated HD front camera for video telephony with customer care technicians, override switch with integrated cycle start button.
- **E-Key Set for C.O.R.E. PANEL:**
 - UNITED GRINDING Group E-Key Set to detect the active user role on the control panel.

- Set consisting of E-Key green OPERATOR and E-Key yellow SETUP.

1.4 SOFTWARE

Standard software in the scope of supply:

- **C.O.R.E. OS:** UNITED GRINDING Group Operating System. Serves as software infrastructure for Digital Products and C.O.R.E. APPS, such as C.O.R.E. HMI. Enables technology- and control-independent communication between machines of the UNITED GRINDING Group.
- **C.O.R.E. IPC:** UNITED GRINDING Group Standalone Industrial-PC. Windows 10 Enterprise LTSC Version 1809. Serves as hardware infrastructure for C.O.R.E. OS.
 - *General note on PC:* The personal computer is supplied ex works with the software components in accordance with the work order. The basic operating system is Windows including native virus protection, supplemented with the technology-specific manufacturer operating system. Any subsequent installations require written consent and are the responsibility of the customer. Any adverse effects on the function and performance of the machine system are excluded from the warranty. The customer is also responsible for updates and for ensuring effective ongoing virus protection after delivery.
- **C.O.R.E. HMI:** UNITED GRINDING Group User Interface. Enables control- and technology-independent operation of UNITED GRINDING Group machines. Operator-centric and intuitive HMI with gesture control in combination with a multi-touch display. Supports user-specific display and arrangement of control elements.

1.4.1 Helitronic Tool Studio

The New Software Generation for producing cylindrical, tapered and stepped shank-type tools. Using Helitronic Tool Studio every processing and work cycle for highly complex special tools or standard tools which are currently available on the market, can be performed with a minimum input of time, work or costs. The tool displayed on the screen and viewed by the operator is exactly the tool which is produced by the machine. Therefore, the operator is able to verify and optimize, if necessary, the required grinding results already in this stage. The new software featuring Wizard technology quickly creates the required tool in a reliable way, since only the data relevant for the production of tool needs to be entered.

- **1.4.1.1 Helitronic Tool Studio Standard License**
- **1.4.1.2 Helitronic Tool Studio Advanced License**
- **Calibration Software:** For the automatic calibration of the machine with loader. In the loader program menu it is possible to choose the moment of the calibration. On machines without loading system the calibration can be done manually.
- **Grinding Wheel Data Bank:** The different electrodes and grinding wheel sets are also stored with all dimensions, separate for each grinding spindle.
- **Program Sequence Changed to Open the Bond of Grinding Wheels**
- **Service Operations:**
 - Warm up cycle
 - Automatic wheel opening operation (holder for sharpening stones required)
 - Cut off operation (Y-axis plunging, A-axis turning)
 - Optional solutions for remote maintenance of the machine (see SERVICES).
 - Software program packages for WALTER WINDOW MODE (WWM) can be ordered as an option.

1.4.2 Patent Rights

Please attend to our technical notes and remarks for Software within our terms of delivery and payment.

1.5 MACHINE COMPONENTS

- **Work Table:** Swivelling with the C-axis, with 2 T-slots for mounting auxiliary equipment such as tailstock or steady rest.

- **Pneumatic Clamping Device with Quick Clamping System:** Built-in in the workpiece holder, for automatic clamping of tools with ISO 50 tapers according to DIN 69871 and retention knob DIN 69872, form A (foot switch activation and tool gripper SK50 are option). Required air pressure: 6 bar (87 PSI).
- **Integral Wet-Grinding Housing:**
 - 1 circular sliding door and 1 assembly door with polycarbonate glazing and automatic door lock.
 - Lighting of internal working area with fluorescent lamp.
 - Explosion lid with emergency stop.
- **Coolant Supply:** Installed on the machine side: Coolant valve to the connection of machine on the central coolant supply system. The delivery is done without a coolant cleaning equipment / tank. A suitable system is to be installed for the coolant supply. In addition, if necessary a coolant cooling unit is recommended (depending on the intended use of machine). Suitable systems are offered as an option (see VARIOUS OPTIONS). Discharge height of the waste oil: approx. 580 mm / 22.8".
- **Heli-Probe:** Automatic positioning and measuring system for:
 - Radial and axial tool positioning
 - Measurement of the pitch
 - Helical pitch
 - Measurement of the cutting insert position depending on the grinding program.
 - Smallest possible tool diameter depending on the tool geometry.

1.6 CONNECTION VALUES, DIMENSIONS, WEIGHT, PAINTING

1.6.1 Electrical System

- Protective System IP 54
- Operating voltage: 400 V / 3Ph / 50 cycles
- Max. permissible voltage fluctuation: +/- 5%

- Max. permissible frequency fluctuation: +/- 1%
- Connected load at 400 V / 50 Hz: 25 kVA max.
- Max. ambient temperature: +45°C (113°F)
- Max. relative humidity: 90%
- Air conditioner integrated in the control cabinet (CFC free)
- Interruption of the power supply is inadmissible.
- For connecting the machine to power, a three-wire network earthed neutral should be used. For connecting the machine to a different network, an isolating transformer is necessary.
- Connecting a machine to an electrical network with earth-leakage circuit-breakers: Within the frequency converters for the axis drives capacitive and inductive leakage currents occur, due to the used transistor bridge circuits. These leakage currents will be recognized by the earth-leakage circuit-breakers and cause cutoffs. For connecting the machine to a network with earth-leakage circuit-breakers, an isolating transformer is necessary.

1.6.2 Compressed Air

- Air pressure: 6 bar (87 PSI)
- Air consumption: approx. 10,000 l/h (5.9 SCFM)
- The compressed air is to be provided in the following quality: ISO 8573-1: 2010 [5:6:4]
 - Permitted solid contaminations less than 100,000 particles 1 to 5 µm in size per m³
 - Maximum pressure dew point lies at 10°C
- With this supply, the installed filters are able to ensure the required air purity, e.g. for sealing air at spindles and measurement systems.

1.6.3 Dimensions and Weight

- Depth = 3061 mm / 121"

- Width = 2129 mm / 84"
- Height = 2274 mm / 90"
- Space requirements of the basic machine with the doors open. The dimensions mentioned serve as a guide. The exact space requirement can be determined after clarification of the final machine equipment. For the exact calculation of the space requirement, local legal regulations for machine installation must also be taken into account.
- Weight: 3300 kg / 7275 lbs approx.

1.6.4 Painting

- Machine base color: Signal white RAL 9003

PARTS & OPTIONS LIST

- **10143191 — Foot operated switch:** The foot-operated switch is standardly used for clamping and unclamping the collet. Automatically operated tool support systems can be operated as well (if installed).
- **92106689 — Dynamometric Key / torque wrench 20-100 NM**
- **92146277 — Dynamometric Key 01-012 NM**
- **92136151 — Mounting wrench for grinding wheel adapters:** For mounting grinding wheels with bore: 20 mm.
- **60008217 — Sensor:** Monitoring of the coolant level inside the machine housing.
- **60025156 — Coolant unit, bandfilter with manual paper feed suitable for Helitronic Mini Plus:**
 - Capacity of coolant tank: 350 l (92.4 US GAL).
 - Capacity of pump: 120 l/min (31.7 US GAL/min) at 6 bar (87 PSI) (pump capacity depending on the dimension of the cross-section of the nozzles).
 - 1 roll of filter mat Paramoll N260/100, width 900 mm, length 30 m.

- Recommended max. viscosity of the coolant at 40°C: 8 mm²/s. When using coolants with higher viscosity, loss in flow rates related to the cleaning capacity and pump capacity may occur. Grade and capacity of cleaning are related to the filter slush built up on the filter fleece.
- **92147120 — Coupling for the connection of the machine to a central vapor extraction system:**
 - Equipped with an automatic protection lid against fire.
 - Mounting dimensions, see machine documentation.
- **60017123 — Fire extinguishing system DIMES:**
 - Using CO₂ as extinguishing agent with integrated control system.
 - Includes safety device system DIMES.
 - Recognition in fluctuation of CO₂.
 - Solenoid valve with fading signaling device for extinguishing agent.
 - Electronic availability control for CO₂.