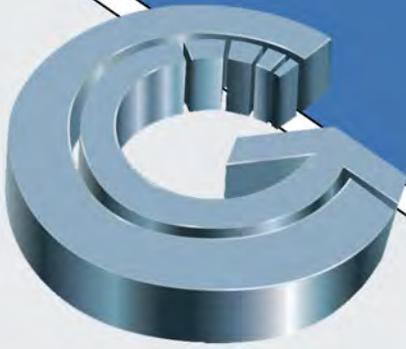


CRG4000 SERIES

HORIZONTAL CYLINDRICAL GRINDING MACHINE



The Campbell Grinder Company's Horizontal Model CRG-4000 (Cylindrical OD Grinder) which is a heavy-duty grinder specialized for cylindrical grinding, is extremely compact. Campbell Grinder designed this machine to OD cylindrical grind, profile grinds, OD related to cylindrical features. The machine's internal environment is controlled for optimum grinding conditions. This machine can be optioned with Infinite B-Axis, C-Axis, ID Spindles, Automatic Tool Changer and Wheel Balancing.

The CRG4000 Horizontal Cylindrical Series

Campbell Grinder Company in its design criteria for the Model CRG-4000 utilizes the latest structural design technology, including assembly based FEA and model analysis software, allowing complex constraints to very accurately predict central, as well as localized, deformations in components and connections. Extensive analysis ensures maximum geometric and positioning precision through all the machines axis, taking into consideration every aspect of machine motion; structures, guide way spacing and preload, servo drive and position measurement locations, etc. Through years of grinding research, special projects, and close work with vendors, Campbell Grinder has gained an advanced understanding of the loads (static and dynamic) involved in grinding processes, and has continually incorporated this knowledge into the machine's design.

Headstock

The headstock is comprised of a heavy-duty precision spindle and mounting system. There are 3 type of Headstock: Live, Dead and Combination. The spindle is supplied with high precision bearings that are permanently grease lubricated with high speed, high temperature grease. Actual spindle speed and load are monitored on the control. Furthermore, the end of the spindle is protected by a patented air shield technology insuring long spindle life. The face of the spindle is supplied with a faceplate that has standard mounting features for accepting the customer supplied driving fixture and includes a removable 60-degree center for use with grinding 12:1 tapered bearing journals. The headstock assembly is mounted to a fixed mounting bracket that raises the spindle CL to the height required to swing the part diameter listed above. Indicator tracks will be supplied for taper measurements. The headstock will be mounted on the same slide rails as the tailstock.

Tailstock Base Slide

The tailstock is supported by a slide that allows the tailstock to be moved into position for various part lengths. The tailstock assembly rides on a recirculating roller guideway system for maximum support. The assembly can be manually moved by a precision gear rack and pinion and hand wheel. This tailstock assembly slide is supplied with manual clamps to lock it in place once it is in the correct location.

Linear Axis (Z and Y Axes)

The Model CRG-4000 and individual axis are designed, without compromise, for stiffness and accuracy. Guideway mating surfaces are ground directly into the steel fabrications, capitalizing on the structures large cross section and thick-wall construction for the stiffest connection between moving components. Optimized component locations allow for the highest degree of controllability and geometric accuracy.

The guideways on each axis is a preloaded recirculating roller system.

“Extensive analysis ensures maximum geometric and positioning precision through all the machines axes, taking into consideration every aspect of machine motion.”

This cylindrical grinder consists of three main sections: 1) Bed section consisting of the X-Axis and Z-Axis, 2) Fixed Headstock for part rotation and 3) Tailstock.

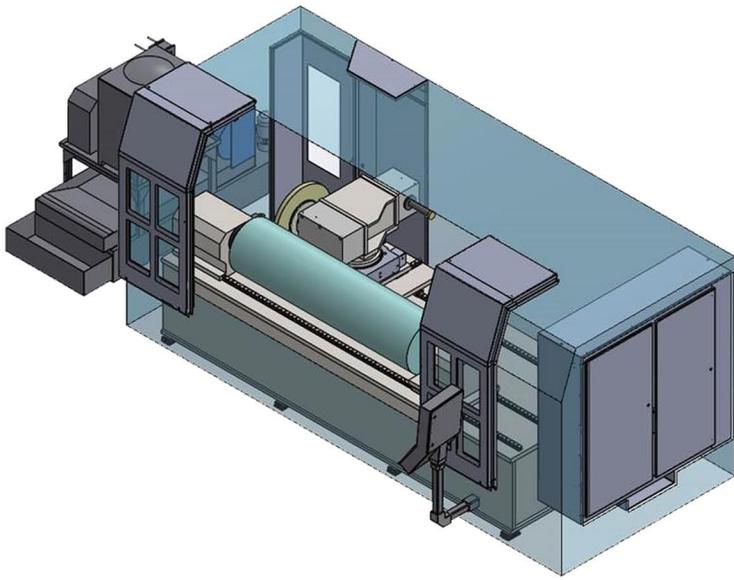
The main bed section is equipped with a belt driven headstock spindle and non-driven tailstock spindle. The tailstock will be of a split design, allowing for taper adjustment during grinding with a live center.

Headstock Drive

The headstock spindle is driven by a separate drive spindle and motor assembly. The headstock drive is comprised of the drive motor driving a drive spindle through a large belt reduction assembly. The drive spindle drives the headstock spindle through a final belt reduction. The drive motor is a synchronous type that is liquid cooled for long life and quiet, reliable operation. Headstock

Each axis is driven by state-of-the-art linear drives that includes the optimal technology for the application.

The machine includes direct feedback systems for each axis via the drive systems which is measured through air-purged absolute scale. This combined with meticulous care and attention to structural design details aimed at limiting geometric tolerances, with high performing CNC software featuring high resolution and data processing capacity, makes this machine ideal for grinding any Cylindrical part configuration.



Axis Control:

- Advanced High-Resolution Vector Control (HRV2)
- Simultaneously control of Multi Axis
- Least command increment of, 0.0001 mm, (0.00001-inch)
- 0.0001 degrees
- Hardware and software over travel protection
- Absolute position detection
- Quick Stop function upon E-Stop

Part Programming Features:

- 2Mb part program storage
- Extended part program editing
- Part program protection
- Custom Macro with expanded variables
- Inch/metric conversion
- Memory card or Ethernet input/output of programs

Feed Function:

- Rapid traverse bell shaped acceleration / deceleration
- Separate, more precise acc/dec ramps for grinding
- Feedrate overrides

Display:

- Custom display for compact viewing of all data
- Alarm history display
- Servo adjustment display

Machine Control

The machine is supplied with the Fanuc CNC control. This control combines speed, precision, and user-friendliness to better satisfy multiple user needs. The world's most advanced CNC, with its performance and functionality, is an optimum system for the latest high-end machines requiring multi-axis, multi-path, complex and ultra-high-speed features.

This control features simplified servo control and I/O connectivity. Servos are controlled through a single fiber optic called the Fanuc Serial Servo Bus (FSSB), which runs between the control and Servo rack. The servos are digitally controlled; further adding to reliability. A built-in ladder control display allows for easy maintenance.

Universally accepted CNC control modes and operations along with industry accepted G-Code part programming is a standard feature on this machine. It also includes an on-board PCMCIA slot and USB port on the front of the control to further ease programming and backup. A remote hand pendant is supplied.

SPECIFICATIONS

PRECISION

X-Axis Accuracy 5 Microns (0.0002")
 Y-Axis Accuracy 5 Microns (0.0002")
 Z-Axis Accuracy 5 Microns (0.0002")
 Rotary Work Table (Table Spindle)

STANDARD FEATURES

FANUC CNC Control
 Panel Precision Roller Ways – All Axes
 Ability to Use Any Abrasive
 Linear Scales - All Axes
 Full Machine Enclosure
 (Other Options Available)
 ID Grinding Spindle
 Single Point Dresser

CAPACITIES & TRAVELS

4530 kg (10,000 lbs) Part Weight
 Up to 1000 mm (40") Part Diameter
 Up to 5080 mm (200") Grind Length

OPTIONAL EQUIPMENT

Gravity Bed (MGF) System with Mag Separator

A water based coolant gravity bed filter can be provided. It allows the machine to operate under high stock removal rates with conventional abrasives. This option filters particles between 20-30 microns and automatically deposits grinding swarf in a hopper for easy disposal.



Vacuum Filter (MVF) System with Mag Separator

A water based coolant vacuum filter can be provided. It allows the machine to operate under high stock removal rates with conventional abrasives. This option filters particles between 10-15 microns and automatically deposits grinding swarf in a hopper for easy disposal.

Coolant Chiller System

A chiller system cools the main clean coolant reservoir, the grinding spindle and table in order to provide constant grinding conditions and to make the machine more stable. Chilling these components allows the machine to run for long periods of time without offset or size adjustments.



Mist Collector

A mist collection system is provided with this option. The system is selected and sized for water-soluble coolants.

C-Axis Headstock Positioning

This machine can be supplied with a precision NC Positioning headstock table. The table is driven by a direct drive servo motor insuring zero backlash enabling the machine to run in both a rotary or contouring mode.

B-Axis Spindle Turret Indexer

The servo driven indexer can position to any of 360 positions around its full rotation. Position feedback is via a servo mounted encoder.

ID Spindle

The ID Spindle/s are specifically designed for this machine.

Headstock Mounted Disk Dresser

The direct motorized dressing spindle is capable of disk or roll dressing of conventional or super abrasive wheels.

Wheel Balancer System

The wheel balance system operates on a principle of mass compensation for wheel imbalance. The balance head contains two movable eccentric weights; each weight is driven by electric motors through a precision gear train.

Automatic Steady Rests

The basic idea of a steady rest is to counteract the forces of the grinding wheel. A properly placed steady rest can stabilize the part to improve roundness, size control and concentricity.

Probing Systems

Part Probing and Wheel Probing Systems are available.

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