



QC YK7380

Vertical CNC Profile/Form Gear Grinding

Machine

The QC American #YK7380 is a world-class, high-precision external form grinding machine with 800mm (32") capacity utilized for all manner of gears with face widths up to 550,0mm (22"). The #7380 Features on-board wheel dressing, a PC-Based NUM Axium Power 1050 Total Numerical Control conversational control system, on-board inspection measurement with printing capability and a large, flexible grinding area. The #7380 can compete with the best form grinding machines available on the market today in speed and accuracy. A somewhat close cousin to the venerable #7332 and #7340 series horizontal machines, the #7380 is a vertically oriented entry-level machine with a flexible rotary table configuration suitable for a wide variety of different workpieces and any number of workholding systems. Starting with a clean sheet of paper, QC has enhanced the proven vertical form gear grinder design approach with a simple and rugged, yet accurate approach made to world standards using the best available components. With a 20KW (27 HP) grinding spindle, hydrostatic ways and enclosures designed to be loaded via overhead cranes, there are just shy of 100 #7380's operating around the world as you read this.

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The working principle of this machine is form grinding. The profile of the grinding wheel is modified via an on-board wheel dressing system and software package designed with a graphical interface to simplify complex profiling requirements.

Main Characteristics

- **Compact machine design featuring a ribbed, one-piece cast iron bed.**
- **Column, carriage and workpiece table utilize a constant flow hydrostatic guideway system.**
- **Ergonomic design with complete machine access from the ground floor and through a well designed and completely lit enclosure.**
- **Flexible workholding area to accommodate all manner of customer workpieces up to 1200,0mm in height (47.24”).**
- **The on-board automatic dressing cycle of the grinding wheel improves the uptime and efficiency of this machine tool. Using customized QC Software with a conversational format, profiles of the grinding wheel are easily modified.**
- **NUM (Swiss Made – USA Serviced) 1050H PC Based CNC control with eight (8) axes of control.**
- **Integrated Schmitt Industries (SBS – USA) dynamic grinding wheel balancing system for greater control of the grinding and dressing process.**
- **The special Human Machine Interface (HMI) was developed by QC according to the working characteristics of North American gear processing. Based on a conversational programming protocol, programming is simplified by entering work piece parameters and relevant technical parameters as called out by the operator.**

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Technical Data

Tip Diameter	Max.	800mm	31.50"
Root Diameter	Min.	100mm	3.94"
Number of Teeth		Any	
Profile depth	Max.	45mm	1.77"
Module (Diametral Pitch)	Min./Max.	2-20mm	12.7 – 1.27DP
Helix Angle		± 45°	
Maximum Face Width (Spur)	Max.	550mm	21.65"
Stroke Length @ 45 Degrees	Max.	550mm	21.65"
Rotary Table Load	Max.	2000KG	4400 lbs
Rotary Table Diameter		650mm	25.60"
Rotary Table Speed	Max.	1.5RPM	
Height between Tailstock Center and Table	Min./max.	700/1200mm	27.56"/47.25"

Grinding Wheel

Diameter	Min./max.	300/400mm	11.81"/15.75"
Dressable Diameter	Min.	180mm	7.09"
Width	Max.	63mm	2.48"
Speed	Max.	50m/sec.	9840SFPM
Drive Power	Max.	20KW	26.8 hp

Machine with Auxiliary Units

Total connected load		75KVA	75KVA
Amp Draw			100 Amps
Net weight	Approx.	18,000KG	39,600 lbs
Space requirement LxWxH	Approx	7000X6000X3700 mm	275.6"X236.2"X145.7"
Voltage		460/480	460/480

1. Base Machine

1.1 Assembly Groups

- **Machine Base** of a ribbed cast iron design; carries the column, rotary table and outer column. Installation on leveling/vibration isolation pads.
- **Column** made of cast iron with constant flow hydrostatic guide ways. Radial infeed using precision ball screw, powered directly by an AC servo motor.
- **Rotary table** with constant flow hydrostatic bearing. Driven by AC servo motor through backlash free worm wheel.
- **Stroke slide** with constant flow hydrostatic guide ways. Stroke motion through precision ball screw, powered directly by an AC servo motor.
- **Grinding slide** with tangential movement using precision ball screw, powered directly by an AC servo motor.
- **Grinding spindle** is a direct drive high-speed spindle.
- **CNC dressing device** is a stationary unit for dressing grinding wheels with dressing spindle and diamond dressing wheels. The dressing paths are generated by the vertical and the tangential grinding slide movement.

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- **Outer column** for clamping pinions between centers. Tailstock height adjusted through a screw and nut assembly.

1.2 Electrical Equipment

1.2.1 Power Supply

Operating voltage is 460/480 Volt/3Phase/60Hz.

1.2.2 Operator Interface Features: NUM Power 1050 Axiom CNC Control

- Operator station with TFT color flat screen and control panel in front of the control cabinet. Integrated keyboard with a team of horizontal and vertical soft keys.
- Hand-held operating panel for more convenient set-up of the machine.
- The machining program uses standard CNC conversational programming language fully developed by QC, and the interface program uses NUM standard MMI TOOL software.
- Swiss-owned NUM is serviced out of Naperville, IL. QC American provides front-line service regardless.

Control Interface Features

- Windows XP Professional Operating System
- 586MB Pentium processor
- 30GB hard drive
- 128M RAM
- 56K modem
- Two USB Ports for archiving user and machine data.
- 3.5" floppy drive.
- Parallel interface for connecting a printer.
- Serial interface for common use.
- Ethernet interface.

Service Functions

- Integrated modem and ethernet ports for remote diagnostics connection between QC computers.
- Graphical display of processing data.

1.0 Software for PC Based NUM Axiom Power 1050H Control

This QC Developed software package enables the user to generate, edit and optimize grinding programs and analyze processing data on the PC on the machine or a remote PC. The software interface is identical with the machine control menu and may even be used for rudimentary training purposes.

- **Gear parameters calculation module – Input and storage of workpiece data.** This module consists of a conversational interface for geometrical parameter data entry, technical parameters and measuring parameters to facilitate computing of standard gears, gears with addendum modification, modified spur (helical) cylindrical gears. Basic work piece data is recorded

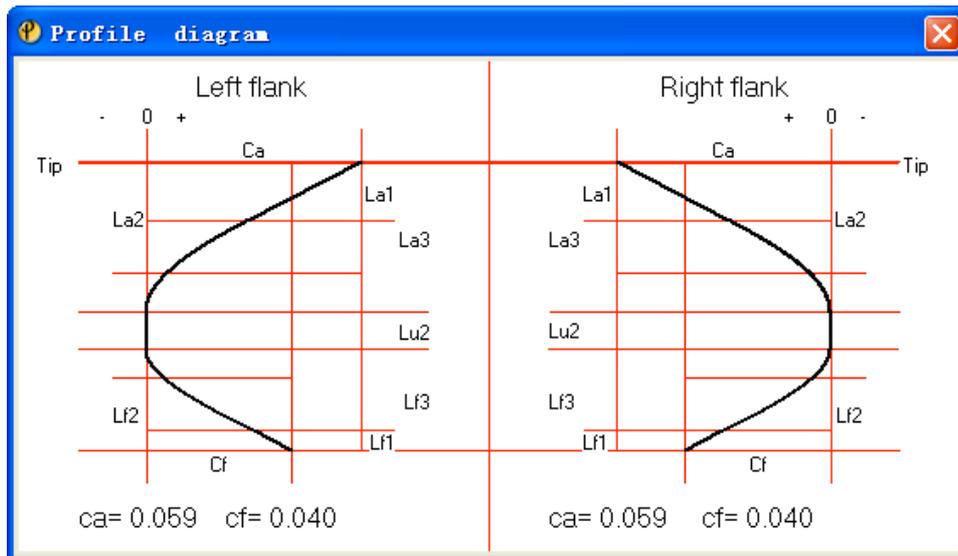
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into a database for later editing or processing.

- **Profile computing module for grinding wheel – Profile and Lead modification.** This module serves to gather data in order to generate the correct wheel profile through an editable series of dressing cycles using the on-board dressing wheel system. Based on data entered about the workpiece and special requirements on gears to be machined; including profile, lead modification and fillet curve parameters, the profile of the grinding wheel can be automatically computed to meet the task at hand.



- **Conversational Control Design.** The G code will be automatically created based on the gear processing and grinding parameters entered by the user. In addition, the customers can even directly use and upload straight G code if desired.
- **Customer can add specific modifications to suit their applications.**

1.5 Axis Information

Eight (8) CNC Controlled-Axes

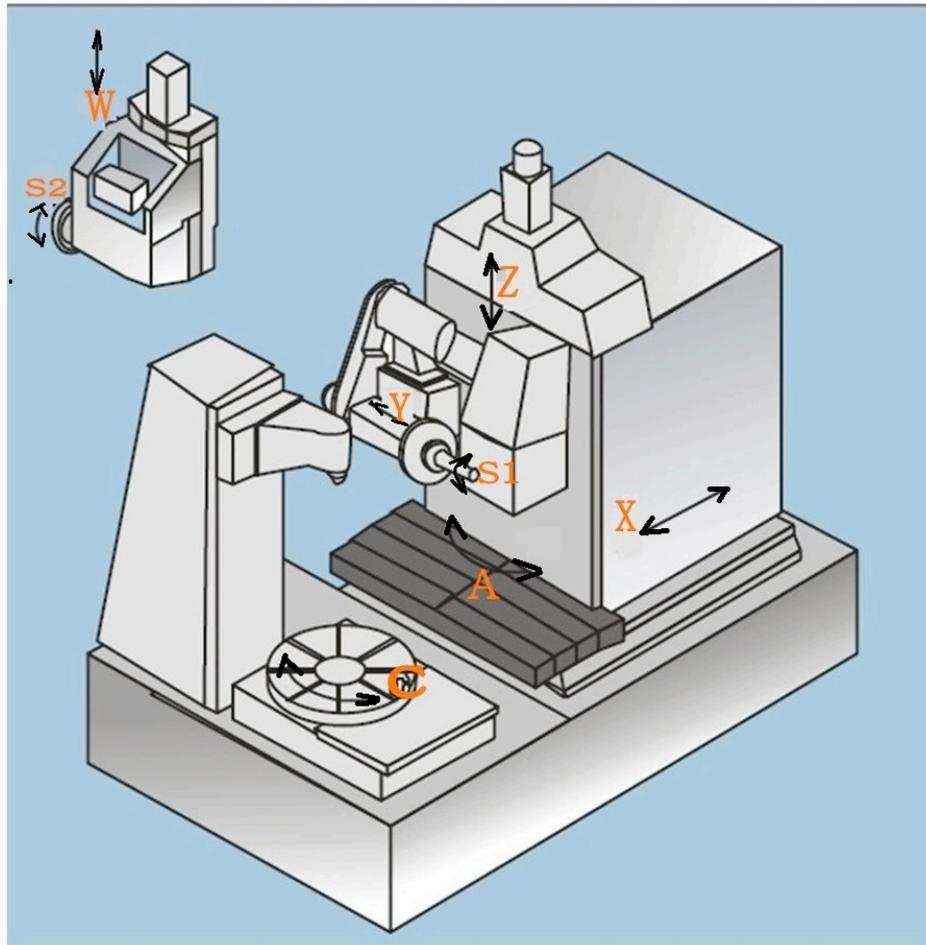
- 'X'-Axis. Radial (feed) movement of the column. Constant Flow Hydrostatic Guideway. AC Servo motor with precision ball screw.
- 'Z'-Axis. Axial (vertical) movement of the grinding stroke slide. Constant Flow Hydrostatic Guideway. AC Servo motor with precision ball screw.
- 'Y'-Axis. Tangential (horizontal) movement of the grinding slide. Schneeberger Needle Type Linear guideway. AC Servo motor with precision ball screw.
- 'A'-Axis. Rotary movement of grinding wheel head for grinding helix angles. Rotary positioning encoder – Heidenhain.
- 'C'-Axis. Indexing and rotary movement of the rotary table. Constant Flow Hydrostatic Guideway. Heidenhain +/-0,001mm Resolution.
- 'W'-Axis. Dressing axis of grinding wheel. Schneeberger Needle-Type Linear guideway.
- 'S1'-axis. Rotation of grinding wheel.
- 'S2'-axis. Rotation of diamond dressing wheel.

All CNC axes utilize closed-loop controls. The positioning feedback devices of each axis utilize HEIDENHAIN high precision encoders and scales.

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1.6 On-Board, Integrated Measuring System (*Option*)

The machine can be equipped with a Renishaw measuring system on-board the machine. Including the #LP-2 measuring probe, cables, adapter card and a QC software integration module. It is very easy to connect with your printer through one of the USB ports on the control. You can store or print measurement reports at any time. Based on the measuring data, the on-board inspection system can draw out a diagram of profile, lead, pitch, cumulative pitch of gear tooth and print and/or store the measuring data to allow for analysis of the previous grind cycle's effect on the workpiece. The program can automatically analyze and judge the measuring results, correct the machine parameters and the profile data of the grinding wheel.

This system has long been perfected on the #YK7380 & #YK73125 machines. There is an electrically operated moveable arm carrying the measuring probe. The arm automatically rotates as the machine moves to the measuring position, which is located close to the grinding wheel. See picture, on page 1.

2.0 Peripherals

2.1 Hydraulics/Lubrication

Complete hydraulic system for lubrication, clamping, and tailstock stroke.

2.2 Hydrostatic System

Complete constant flow hydrostatic system for 'X', 'Z' and 'C' Axes.

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2.3 Coolant Filtration System

The coolant filtration system cleans used coolant using paper filtration media and includes the following:

- Temperature controlled for grinding fluid utilizing a chiller-type oil cooler.
- Filter capacity=120L/min.
- Multiple circuit coolant chilling equipment: With automatic temperature regulation for cooling oil.
- Oil mist recovery and electrostatic air filter system.

3.0 Standard Machine Accessories

01	Leveling & Vibration Isolation Pads for Machine Foundation.	1set	
02	Special tools; wrenches & tools specific to the machine.	1set	
03	Balance Blocks, Set	40pcs	
04	Grinding Wheels – To Suit Application	2pcs	
05	Diamond Dressing Wheel (2pc)	1set	
06	Grinding Wheel Flanges, 150,0mm	6sets	
07	Workpiece Centers (2pcs per Set)	1set	
08	Dressing Wheel Assembly	1set	
09	Standard Gear	1pc	
10	Tools for Aligning Table & Column	1set	
11	Operation Manual, Set	1set	

4.0 Machine Color

Machine and peripheral units: Blue

Doors: White

4.1 Power-off Protection System

For controlled retreat of the machine into a safety parking position in case of a power outage to protect workpiece and tools. Included.

4.2 Operator Training at Customer Facility

Our program is designed to prepare your operators to begin operating the machine directly before or after final acceptance at your facility, or a QC American LLC in Ypsilanti, MI.

5.0 Special Accessories (Options)

Option A	Balance core shaft for grinding wheel		1set	
Option B	Balance frame for grinding wheel balance		1set	
Option C	Measure bar		1set	
Option D	Standard gear		1set	

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Option E	Oil mist recovery and electrostatic air filter		1set	
Option F	On-Board Measuring System and Machine Integration.	Renishaw #LP-2	1set	
Option G	Printer	Print Measuring Reports	1set	
Option H	Ebbco Metalworking Filtration System – 80psi @ 100GPM Cartridge-Type System	#PMF-MWF5-623-T-FP BFH-FP-24K J-8705	1 Each	

6.0 Machine Warranty

A warranty period of 12 months on entire machine and accessories from time of final acceptance or 5,000 hours of use – whichever occurs first. An extended warranty is available per further negotiation(s).

7.0 Spare Parts Warranty

Spare Parts availability is guaranteed for 10 years from the date of machine commissioning with deliveries under current market conditions.



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