



## QC YK7340

### Horizontal CNC Form Gear Grinding Machine

The Model #YK7340A CNC Profile (Form) Wheel Gear Grinding Machine is used for grinding precise, special cylindrical gears with an outside diameter of less than 400mm (15.75"). These types of gears are more commonly used in the automotive, rail transport, aviation and machine tool industries. This machine is especially suitable for grinding high-speed gears and clusters with requirements for profile and lead modification, as well as special fillet requirements for tip and root. These machines can also be used for grinding components *without* involute forms as well, such as cycloid gears, precision splines and worm workpieces. Indeed, the YK7340 was specially developed to encompass these special workpieces.



The working principle of this machine is form grinding. The profile of the grinding wheel is modified via an on-board wheel dressing system utilizing a diamond dressing wheel to facilitate grinding of the workpiece tooth forms precisely. The movements and operations of the machine are relatively simple and straightforward (especially when compared to

generational-type grinding); but can be characterized by extremely high machining accuracy and efficiency. The model #YK7340 orients the workpiece horizontally between centers for maximum workpiece design flexibility. This design philosophy more easily allows for spline and worm gear forms.

QC American, LLC • 575 S. Mansfield Street • Ypsilanti, MI 48197-5157

PH: (734)961-0300 • FX: (734)961-9999

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The Model #YK73xx Series form grinding machine designs from QC American are known for their remarkable reliability, thermal stability and they are adaptable to automation. Featuring a full CNC-based control, these machines are capable of performing well in a variety of gear finishing applications, as well as being quite flexible where modifications are concerned. The #YK73xx Series feature high power grinding spindles, standard precision components utilized from around the globe and closed loop feedback systems for high geometrical and positioning accuracy.

## Main Characteristics

- **Compact machine design featuring a ribbed, one-piece cast iron bed.**
- **Ergonomic design with complete machine access from the ground floor and through a well designed and completely lit enclosure.**
- **The on-board automatic dressing cycle of the grinding wheel improves the uptime and efficiency of this machine tool.**
- **Siemens 840D CNC Controls and Drives – controlling six (6) axes.**
- **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 workpiece parameters and relevant technical parameters as called out by the operator.**

## Technical Data

<b>Tip Diameter</b>	<b>Max./min.</b>	<b>400/30mm</b>	<b>15.75”/1.18”</b>
<b>Distance Between Centers</b>	<b>Max.</b>	<b>900mm</b>	<b>35.43”</b>
<b>Number of Teeth</b>		<b>Any</b>	
<b>Module (Diametral Pitch)</b>		<b>1-10mm</b>	<b>25.4 – 2.12”</b>
<b>Helix Angle</b>		<b>± 45°</b>	
<b>Stroke Length</b>	<b>Max.</b>	<b>650mm</b>	<b>25.60”</b>
<b>Workpiece Load - Total</b>	<b>Max.</b>	<b>80KG</b>	<b>180 lbs</b>
<b>Workpiece Face Width</b>	<b>Max</b>	<b>600mm</b>	<b>23.625”</b>
<b>Grinding Head Travel</b>	<b>Max</b>	<b>300mm</b>	<b>11.81”</b>
<b>Grinding Head Feed</b>	<b>Max</b>	<b>10m/minute</b>	<b>32.8FPM</b>

## Grinding Wheel

<b>Diameter</b>	<b>Min/Max</b>	<b>200/140mm</b>	<b>7.87”/5.5”</b>
<b>Wheel Width</b>	<b>Max</b>	<b>35mm</b>	<b>1.38”</b>
<b>Speed</b>	<b>Max</b>	<b>50m/s</b>	<b>164SFPM</b>
<b>Drive Power</b>	<b>Max.</b>	<b>11.5KW</b>	<b>15.41 hp</b>

## Machine with Auxiliary Units

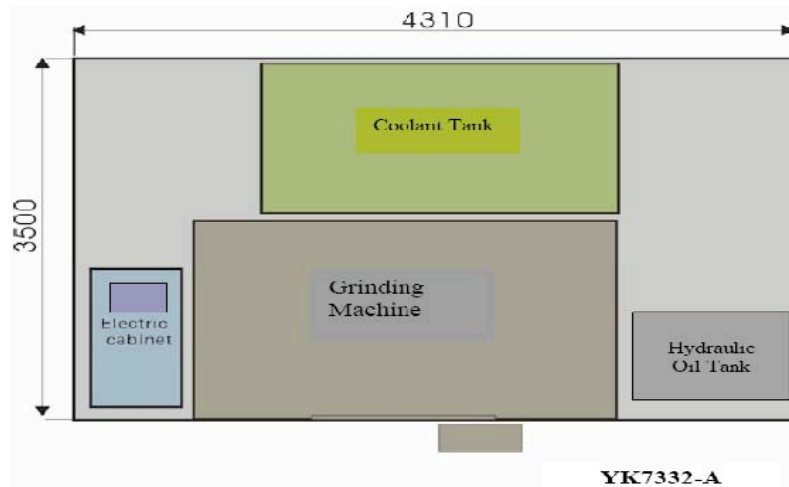
<b>Total Connected Load</b>		<b>30KVA</b>	<b>30KVA</b>
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<b>Net Weight</b>	<b>Approx</b>	<b>10,000 KG</b>	<b>22,000 lbs</b>
<b>Space Requirement LXWXH</b>	<b>Approx</b>	<b>4700X3600X2600 mm</b>	<b>185"X142"X103"</b>
<b>Voltage</b>		<b>460/480</b>	<b>460/480</b>



#YK7340 Machine Layout is Identical to Model #YK7332-A

## 1 Base Machine

### 1.1 Assembly Groups

- **Machine Base** of ribbed design, made of cast iron. Installation on leveling/vibration isolation pads.
- **Column** made of cast iron with slide guideway.
- **Wheel Stock** made of cast iron. Wheel stock radial in feed utilizes precision ball screw, powered directly by an AC servo motor.
- **CNC Dressing Device** Automatic dressing by an on-board diamond dresser. The dressing paths are generated by the horizontal and the tangential grinding slide movement.
- **Enclosure (Full)** Multiple access points through enclosure to key areas of machine facilitates easy dresser, grinding wheel and workpiece changeovers.

### 1.2 Electrical Equipment

#### 1.2.1 Power Supply

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

#### 1.2.2 SIEMENS 840D CNC Control

##### Operator Features

- Operator station with 12" 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.

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- German-Owned Siemens service is out of New York, USA. QC American provides front-line service regardless.

## Control Interface Features

- Windows 2000 Operating System.
- 586MB Pentium processor.
- 30GB hard drive.
- 128M RAM.
- 56K modem.
- Two USB Ports for archiving user and machine data or running peripherals.
- 3.5" floppy drive.
- Parallel interface for connecting a printer.
- Serial interface for common use.
- Ethernet interface.

## Service Functions

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

### 1.3 Software for Siemens 840D Control

This QC Developed software package enables the user to generate, edit and optimize grinding programs and analyze processing data on the control of 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 into a database for later editing or processing.

- **Profile computing module for grinding wheel – Profile and Lead**

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**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.

CAI system Gear form grinding machine[Part No.]

Data input Data diagnosis Other parameters Data maintenance Operation Wizard

Calculate the basic calibration error base on the profile measuring diagram

Start radius of evaluation range(R2) 116.5

End radius of evaluation range(R1) 129

Error of profile(left flank)[JL] 0.021

Error of profile(Right flank)[JR] -0.01

Calculated results

Error of infeed[H] -0.01773

Error of grinding wheel centre[A] -0.13645

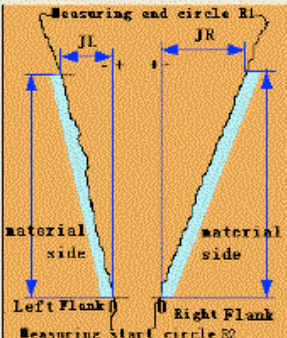
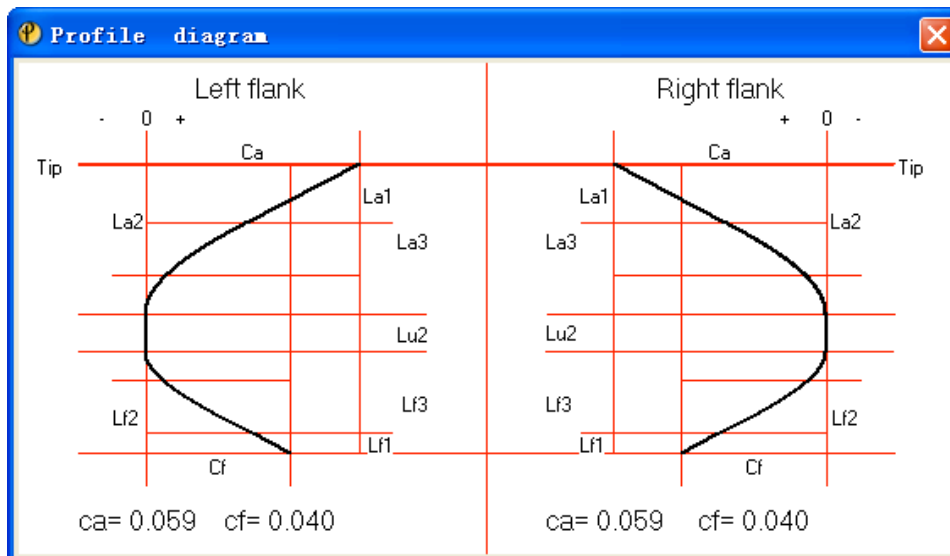
Correction the machine data

XDAT2=XDAT2 - -0.0177

[TRINZDAT]=[TRINZDAT]- -0.1364

Change the correction value: Correct machine data

Close - - Error calculate Edit Save

- **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.**

### 1.3.1 Functions for Grinding of Worm and Spline Forms.

On-board software supports these two forms, along with wheel stock and grinding wheel changeovers. Please see section 1.3.

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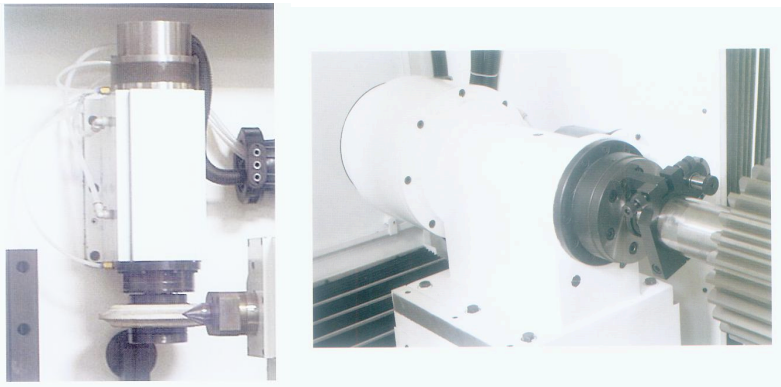
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### 1.3.2 Axis Information

- **Six (6) CNC Axes**
- 'X'-Axis. Radial movement of main wheelhead column relative to workpiece, 300,0mm total travel, with Linear guide way. Powered directly by an AC servo motor and driven by ball screw. Linear scale Type: LS486 Heidenhain; Resolution: .0001mm.
- 'Z'-Axis. Axial movement of worktable in workpiece direction in length. 650,0mm with Linear guide way. Powered directly by an AC servo motor and driven by ball screw. Linear scale Type: LS486 Heidenhain; Resolution: .0001mm.
- 'A'-Axis. Rotary movement of the grinding wheel headstock, Type and resolution of rotary axis by Heidenhain RON785 @ .0001mm.
- 'C'-Axis. Rotary movement of workpiece headstock. Type and resolution of rotary axis by Heidenhain, RON785 @ .0001mm.
- 'S1'-Axis. Rotation of grinding wheel.
- 'S2'-Axis. Rotation of diamond dressing wheel.



## 1.4 Peripherals

### 1.4.1 Hydraulics/Lubrication

- Complete hydraulic system for lubrication, clamping, and tailstock stroke.
- S-axis with oil mist lubrication.
- Z, X-axes with grease lubrication.
- C, A-axes with oil lubrication.

### 1.4.2 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.

## 1.5 Standard Machine Accessories

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01	High speed spindle for 200mm Dia. Wheel	1ea	
02	Special tools; wrenches & tools specific to the machine.	1set	
03	Balance blocks, Set	40pcs	
04	Grinding wheel – To Suit Application	2pcs	
05	Diamond dressing wheel (2pc)	1set	
06	Grinding Wheel Flange, 200mm Dia. Wheel	2sets	
07	Workpiece Centers (2pcs per Set) 5 Morse	1set	
08	Dressing Wheel Assembly	1set	
09	Leveling pads for machine foundation	1set	
10	Standard gear	1pc	
11	Operation manual, set	1set	

## 1.6 Machine Color

Machine and peripheral units: Blue  
Doors: White

We can paint the machine according to your requirement.

## 1.7 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 at QC American llc in Ypsilanti, MI USA.

## 2. Special Accessories (Option)

Option A	Balance core shaft for grinding wheel		1set	
Option B	Balance frame for grinding wheel balance		1set	
Option F	Oil mist recovery and electrostatic air filter		1set	
Option G	Ebbco Metalworking Filtration System – 80psi @ 100GPM Cartridge-Type System	#PMF-MWF5-623-T-FP BFH-FP-24K J-8705	1 Each	

## 3. 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).

## 4. 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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