



QC YK7250-A

CNC Worm Wheel Gear Grinding Machine

The largest generating grinder in the QC line, the #7250-A features 500,0mm tip diameter workpiece capacity (20"), a NUM Axium Power 1050H control system with NUM drives, conversational or g-code programming, SBS balancing and acoustics equipment and Heidenhain rotary encoders and glass scales throughout. The #7250 was a major innovation when introduced in 1998 and raised the bar for subsequent QC generating machines (like the model #7236-B) with a multitude of innovative, world-class features. With standard automatic stock sensing and dividing, lead crowning, automatic wheel dressing and grinding wheel braking, the #7250-A is a world-beating generating grinder platform.



Main Characteristics

- Compact machine design featuring a single, ribbed cast iron bed.
- Ergonomic design with complete machine access from the ground floor and through a well designed and completely lit enclosure.
- NUM (Swiss Made – USA Serviced) 1050H Axium PC Based CNC

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control.

- For improving the efficiency of gear finishing processes, the continuous shift grinding strategy QC incorporates in this line of machines replaces the reciprocating grinding method found in earlier designs. Based on earlier Csepel (Hungarian) designs, the QC #72xx series have been greatly enhanced by adopting the continuous shift grinding process successfully used in Reishauer AG brand machine designs and adopted by other builders, such as Kapp Niles. In most rough grinding operations, the single 'start' of the continuous shift grinding process can be 3 to 5 times faster than that of the reciprocating grinding process! The precision of finish grinding is typically much greater as well.
- Multi-Start (up to 3 start) worm wheel grinding is used for grinding gears with a larger teeth number to improve grinding throughput.
- The Electric Gear Box (EGB). The EGB of this CNC grinding system can carry out the continuous synchronized movement of the workpiece and grinding wheel rotational axes. This EGB also coordinates the workpiece and tangential feed axes. The indexing drive and differential drive coordination also allow for grinding of spur and helical gear designs.
- Profile and longitudinal modification. Per the requests of our customers, we can make special diamond wheels for profile dressing. The longitudinal modification is realized by the CNC system controlling simultaneous work piece radial feed axis and work piece axial feed axis movements. As a result, all manner of longitudinal profiles may be obtained.
- The special Human Machine Interface (HMI) was developed by QC according to the working characteristics of continuous shift grinding. Based on a conversational programming protocol, programming is simplified by entering work piece parameters and relevant technical parameters as called out by the operator.
- Selection of manual or automatic grinding cycles are standard. The manual grinding cycle is suitable for grinding a single workpiece, clamping and unclamping of the workpiece collet or start/stop of grinding wheel feed. The automatic grinding cycle is suitable for grinding workpieces in batch production. Wide grinding wheel and tangential shift movements ensure grinding accuracy and uniformity of workpieces.
- The on-board automatic dressing cycle of the grinding wheel improves the uptime and efficiency of this machine tool.
- Automatic Stock Sensing Unit (Standard) for stock dividing and average ambilateral tooth sensing.
- An Acoustic Emission Monitoring Sonar (AEMS) sensor is utilized to carry out the automatic stock dividing of two flanks on the workpiece.

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This system is provided by SBS of Oregon, USA. (This is standard on our stock machines). This system and programming is highly recommended for high throughput and unique for machines in this class.

- SBS – USA Dynamic internal grinding wheel balancing unit (Standard).

Technical Data

Tip Diameter	Max /Min	500/100mm	19.69”/3.94”
Number of Teeth		12-256	
Module		2-8mm	12.7 – 3.175
Max Face Width (Spur Gear)	Max	200mm	7.87”
Helix Angle		± 30°	
Maximum Part Weight Total	Spur/Helical	200/100KG	440/220lbs
Distance Between Centers	Max /Min	550/250mm	21.65”/9.85”
Tail Stock Traverse	Max	300mm	11.81”
Max. Clamping Length	Max	550mm	21.65”

Grinding Wheel

- Size	Max	400X203X100mm	15.7X8.0X3.94”
- Speed		1000-1650rpm	
- Power		25.8 KW	35.59 HP

Machine with Auxiliary Units

- Total connected load		35KVA	
- Net weight	Approx	11,000KG	24,200 lbs
- Overall dimension LXWXH	Approx	2910X1860X2400 mm	114.57”X73.23”X94.49”
- Voltage		460/480	

1 Base Machine

1.1 Assembly Group

- **Machine Base** of rigid 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 infeed 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 two slides (‘V’ and ‘U’ axis) 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

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

1.2.2 NUM 1050H CNC controller

Operator Features

- Operator station with TFT color flat screen and control panel in front of the control cabinet.
- Hand-held operating panel for more convenient set-up of the machine.
- The machining program uses standard CNC conversational programming language, 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.

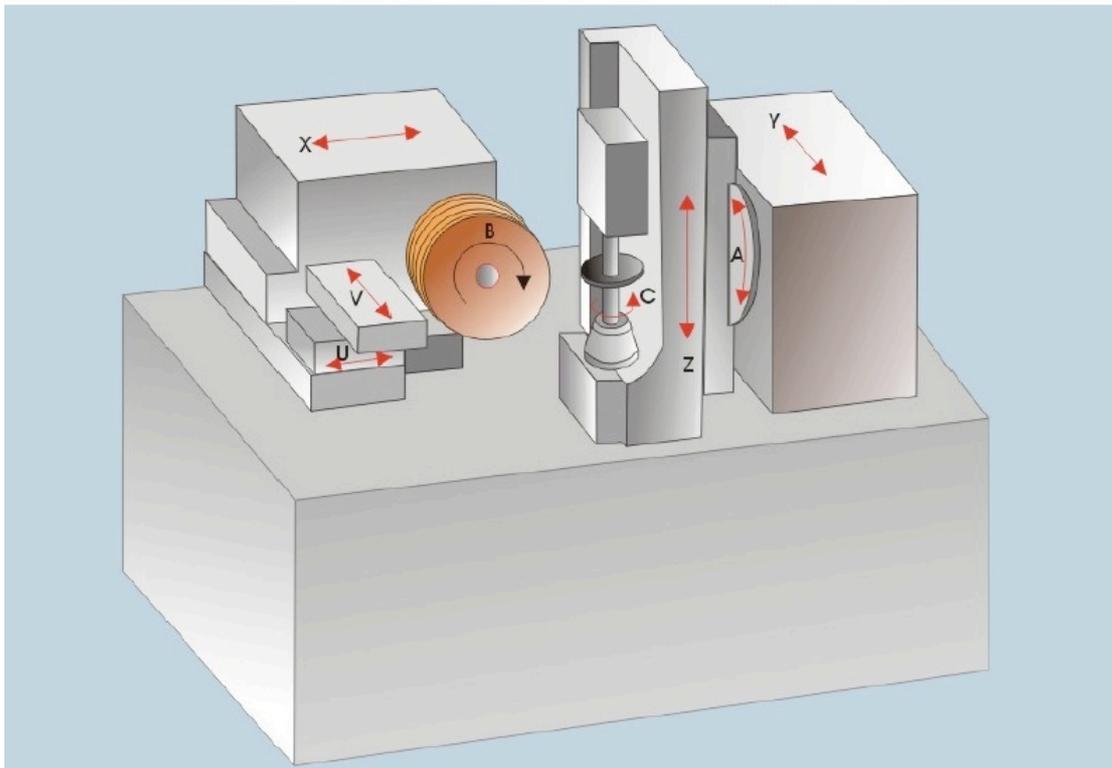
Axis Information

Eight (8) CNC Axes

- 'X'-axis with linear guideway. Radial movement of the grinding wheel slide. Heidenhain #LS477 with 0.0001mm resolution. Grease Lubrication.
- 'Z'-axis with slide guideway. Axial vertical movement of the workpiece stock stroke slide. Grease Lubrication.
- 'Y'-axis with roller/slide guideway. Tangential movement of the grinding slide. Built-in rotary encoder with .0001 degree resolution. Grease Lubrication.
- 'B'-axis. Rotary movement of the grinding wheel. Direct drive AC Motor with Heidenhain #ERN180 with .0036 Degree Resolution. Grease Lubrication.
- 'C'-axis. Indexing and rotary movement of the work piece stock. Heidenhain #RON285/9000 with 0.0001 degree resolution. Servo motor and gearbox. Oil Lubrication.
- 'U'-axis with roller guideway. Dressing axis of grinding wheel for level movement.
- 'A'-axis. Rotation of column for grinding helix gear and meshing with grinding wheel.
- 'V'-axis with linear guideway. Dressing axis of grinding wheel for fore-and-aft direction(s). Built-in rotary encoder with .0001 degree resolution. Oil Lubrication.

The positioning feedback devices of each axis utilize high precision encoders.

#YK7250 Axis Layout



Service Functions

Integrated modem for remote diagnostics connection between QC computers.

1.3 Peripherals

1.3.1 Hydraulics/Lubrication

- Complete hydraulic system for lubrication, clamping, and tailstock operation.
- Common operating hydraulic system.
- The rotation axis of part (C Axis) is oil lubrication.
- Other axes are via grease lubrication.

1.3.2 Coolant Filtration System

Machine design utilizes coolant for cooling the machine base. The coolant filtration system cleans the coolant using a centrifugal machine design and includes the following:

- Filter capacity = 200L/min.
- Multiple circuit coolant chilling equipment: With automatic temperature regulation for cooling oil.
- Oil mist recovery and electrostatic air filter.
- Multiple coolant system design options are available; please contact one of our associates

1.4 Automatic Balancing System (standard on stock machines)

Dynamic balancing system for automatic balancing of grinding wheel. Balancing system manufactured by SBS Systems of Oregon, USA.

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1.5 Acoustic Emission Monitoring System (standard on stock machines)

SBS Systems also manufactures an Acoustic Emission Monitoring System (AEMS) that facilitates automatic and rapid stock division and enhanced wheel dressing cycles. There is a sonar-type sensor for measuring the proximity of the grinding wheel to the workpiece (Option). Both the automatic balancing system and the AEMS have been fitted by SBS to the machines in stock on our floor.

1.6 Software for PC Based NUM Axium 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 into a database for later editing or processing.

Parameter	Unit	Value
Origin position of wheel	X0	+260.4573 mm
Center position of workpiece	Z0	150.0000 mm
Length of stroke	ZL	45.0 mm
Offset of Z0	ZF	0 mm
setting angle of workpiece	A	0 °
Offset of C axis	C	150.0000 mm
Origin position of profile dressing	Fa_U0	-30.0000 mm
Origin position of O.D dressing	O.D_U0	-30.0000 mm

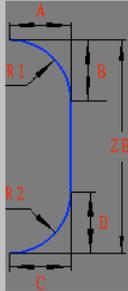
Please confirm U0

F1: return

X0 Z0 ZL ZF C Fa U0 O. D U0 Pos. CONFIRM U0

Crowning Data Input

Facewidth		<input type="text" value="35.0"/>	mm
Amount	A	<input type="text" value="0.10"/>	mm
Start point	B	<input type="text" value="15.000"/>	mm
Radius	R1	<input type="text" value="15.000"/>	m
	R1min	<input type="text" value="15.000"/>	m
Amount	C	<input type="text" value="0.10"/>	mm
Start point	D	<input type="text" value="15.000"/>	mm
Radius	R2	<input type="text" value="15.000"/>	m
	R2min	<input type="text" value="15.000"/>	m
Compensation of X	E	<input type="text" value="0"/>	mm



F1: return

A	B	R1	C	D	R2	E
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- **Profile and Lead Modification.** Profile and Lead modifications are finished by an on-board diamond dresser and automatic dressing cycle.

Dress Data Input

Rough dressing infeed	Ur	<input type="text" value="0.03"/>	mm
Rough dressing cycles	Cr	<input type="text" value="10"/>	
Finish dressing infeed	Uf	<input type="text" value="0.02"/>	mm
Finish dressing cycles	Cf	<input type="text" value="5"/>	
Pitch_Left_Number	P_L	<input type="text" value="10"/>	
Pitch_Right_Number	P_R	<input type="text" value="5"/>	
O.D dressing cycles	C_O.D	<input type="text" value="0"/>	

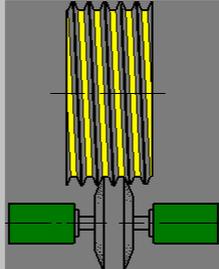
F1: return

Ur	Cr	Uf	Cf	P_L	P_R	C_O.D
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Information

Position/OM	Position/OP	
U	+30.0000	+30.0000
V	+30.0000	+30.0000
Rough dressing infeed	<input type="text" value="0.03"/>	mm
Rough dressing cycles	<input type="text" value="15"/>	
Finish dressing infeed	<input type="text" value="0.02"/>	mm
Finish dressing cycles	<input type="text" value="5"/>	

F1: return



- **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.

Standard Machine Accessories

01	Special Tools	1set	
02	Diamond Dressing Wheel M=2-4	1set	
03	Grinding Wheel Flange	3sets	
04	Grinding wheel, 400X203X100	3pcs	
05	Gauge for wheel (Total: 16pcs)	1pc	

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06	Diamond pen	1pc	
07	Cooling device for coolant tank	1set	
08	Leveling pads for machine foundation	1set	
09	Adjusting device of centre	1set	
10	Upper Live Center	1set	
11	Lower Arbor Dead Center	1set	
12	Workpiece Center for Examination	1set	
13	Operation Manual	1set	

1.7 Machine Color

Machine and peripheral units: Blue
Doors: White

We can paint the machine according to your requirement.

1.8 Power-off Protection System

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

1.9 Operator Training at QC American/Customer Facility

This program is designed in the following way: to prepare your operators to begin operating the machine directly before or after final acceptance at your facility, or at QC American Ypsilanti, Michigan USA.

1.10 Packing, Insurance and transport to Destination.

2. Special Machine Accessories (Option)

Option A	Grinding Wheel Gauge	M1-M6 (Total: 17pcs)	1pc	
Option B	Root roller	M=1-1.5 M=2-2.5 M=3 M=3.5-4 M=4.5-6	1pc 1pc 1pc 1pc 1pc	
Option C	Diamond dresser wheel set	M=1-2 M=2-4 M=4-6 Special form	1set 1set 1set 1set	
Option D	Air blowing unit		1set	
Option E	Auto meshing & stock dividing sensor	SBS –AEMS system	1set	
Option F	Grinding Wheel	400X203X100 6KS120C4VM250M2RA 400X203X100 92A100H5V111	1pc 1pc	
Option G	Grind wheel flange	160mm ID Special	1set	
Option H	Spring clamping head		1set	

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Option I	Tail stock center		1set	
Option J	High pressure cleaning machine		1set	
Option K	Special dresser	Confirm according to user's requirement		
Option L	Grinding arbor	Confirm according to user's requirement		
Option M	Balance core shaft for grinding wheel balance		1set	
Option N	Roll branch device		1set	
Option O	Balance frame for grinding wheel balance		1set	
Option P	SBS Balance device for grinding wheel		1set	
Option Q	Oil mist recovery and electrostatic air filter		1set	
Option R	Additional Change Gears for dresser system		1 set	
Option S	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).

3.5 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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