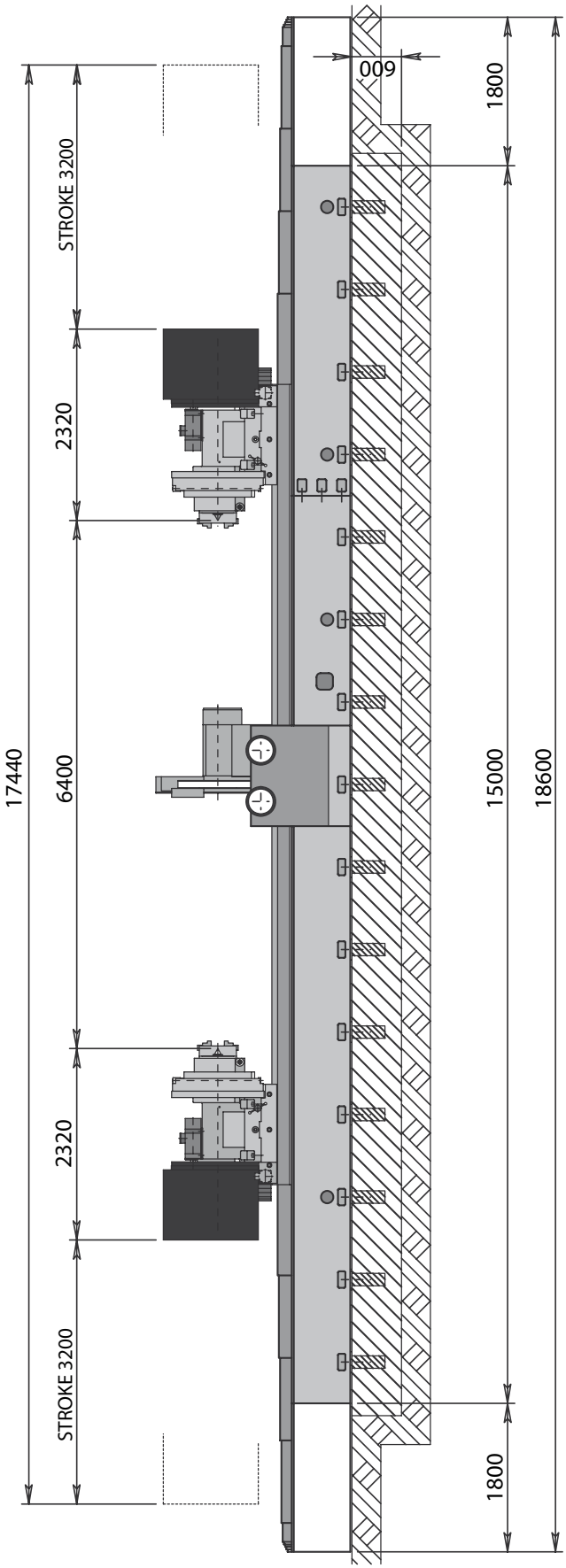
MACHINE TOOLS

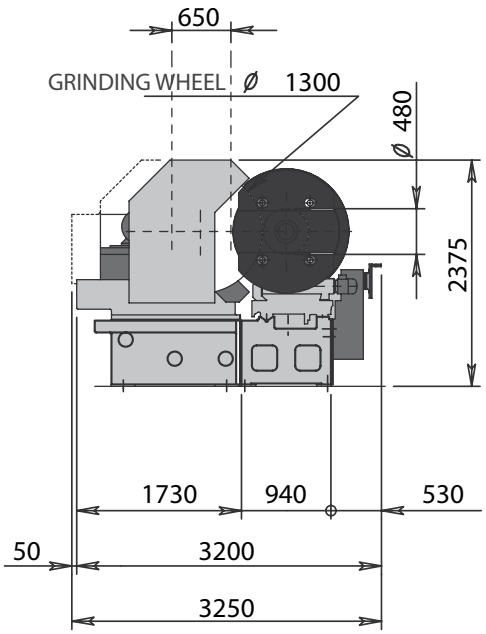
Crankshaft Grinding Machines

CG650

summary

WORKING CAPACITY	
Height of centres on table	**650 mm**
Max distance between centers	**5.400 - 6.400 mm**
Max. distance between self-centring chucks	**5.340 - 6.340 mm**
Swing over table	**1.300 mm**
Max head offset (stroke/2)	**350 mm**
Max diameter admitted on std steady rests	**300 mm**
Max weight admitted with steady rests	**7.500 kg**
MACHINE SPECIFICATIONS	
Z AXIS	
Max table speed	**0-5.000 mm/min**
Table motor power	**3.5 KW**
X AXIS	
Max speed	**5.000 mm/min**
Max stroke	**840 mm**
Ball screw (pitch x diameter)	**10 X 80 mm**
Hydraulic unit motor power	**2.4 KW**
WHEEL UNIT	
Diameter of grinding wheel	**1.300 mm**
Max grinding wheel thickness	**160 mm**
Min grinding wheel thickness	**25 mm**
Standard grinding wheel thickness	**50 mm**
Grinding wheel peripheral speed	**33 m/sec**
Wheel rotation motor power	**30 KW**
WORKHEAD	
Stepless rotation speed	**0-60 RPM**
Diameter of chucks	**450 mm**
Motor power for heads positioning	**0,55+0,755 KW**
Headstock rotation motor power	**9+9 KW**
LUBRICATION UNIT	
Operating pressure	**4 bar**
Tank capacity	**70 l**
Pump motor power	**0.37 KW**





DIMENSIONS	
Lenght	**18.000 mm**
Width	**3.450 mm**
Height	**2.850 mm**
Net weight	**58.000 kg**

3. Base and table

The base is made of high resistance monolithic cast iron, thermally stabilized, it has one flat and one "V" guide.

The table is a strong structure, thermally stabilized, with scraped surface in order to secure the highest precision of linearity and flatness in the different positions of the workheads.The guideways are covered with special anti-friction plastic material in order to: reduce the disengaging friction; reduce the coefficient of general friction; reduce the rubbing wear table movement with synchronous servomotor and rack without clearance.

Table positioning with linear encoders.



4. Different applications



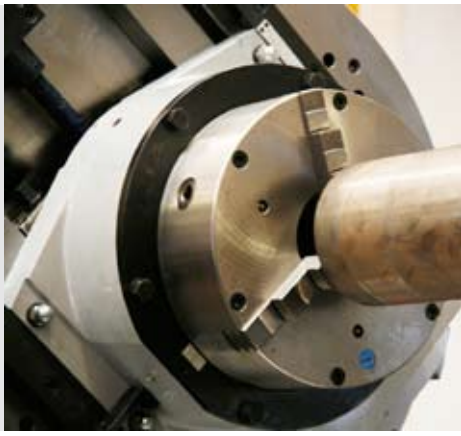

- The grinding wheel spindle rotates by means of a wheelhead spindle with high precision pre-loaded bearings
- The transmission of the motion to the spindle takes places by high power V belt
- Z axis movement is made by hydraulic piston.
- X axis movement is made by ball screws and preloaded nut controlled by oleodinamic piston for fast movement and by hand for micrometric movements.
- X axis moves on wide prismatic hydrostatic guide ways (see picture below)




Description	UNIT	
Diameter of grinding wheel	mm	1.300
Max grinding wheel thickness	mm	160 mm
Standard grinding wheel thickness	mm	50 mm
Min grinding wheel thickness	mm	25
Grinding wheel peripheral speed	mm	33 m/s
Wheel rotation motor power	KW	30

- Workheads are made of high resistance cast iron.
- The workheads-spindle is mounted on two triads of bearings of very high precision.
- The bearings are pretensioned in order to obtain the highest rigidity also in presence of high load.
- The workheads can move automatically and manually on the base by air cushion and gear and rack
- Both workheads are supplied by servomotors with electronic synchronous system.
- For crankshaft-balancing, the workheads are provided with slide with proportionate counter weights.



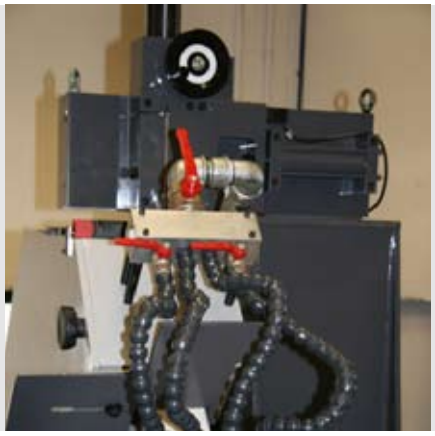


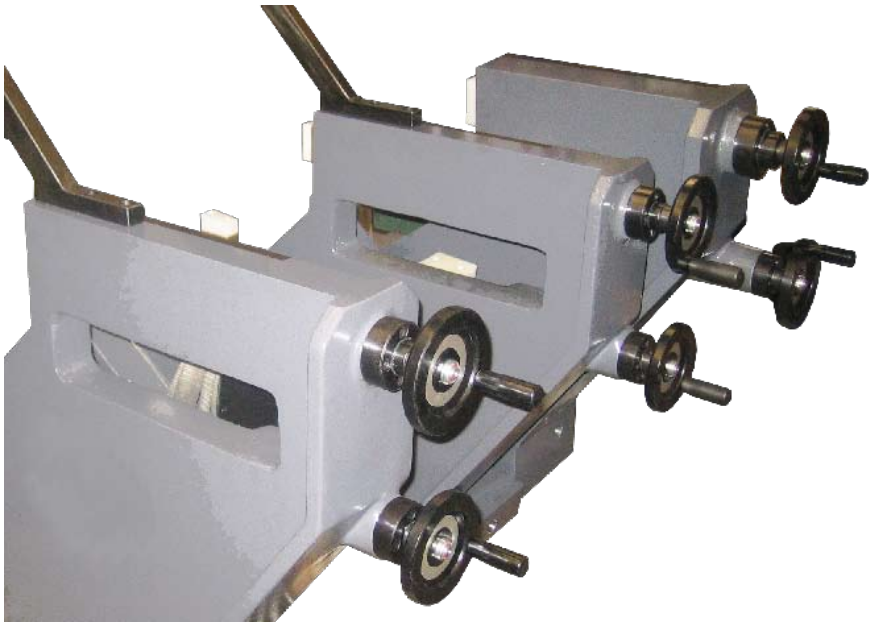
Heads

n. 2 cross slide heads installed on main axis of head stock and tail stock to permit to move the axis in 2 directions.

n. 2 self centering chucks with 3 jaws of 450 mm diameter

- The machine is equipped with 3 steady rests that control the centring of main journals and pinjournal in order to guarantee a perfect alignment with the crankshaft axis.
- The steady moves on "Z" , "X" and "Y" axis by hand wheel with high sensibility.
- The dresser will be installed for grinding wheel in automatic function





PLC control system

- PLC control system for concave and convex grinding.
- Table movement on X axis with ball-screw system.
- Z xis movement with rack and pinion system

CNC control system

The machine is equipped with:

Siemens Sinumerik 840D

Siemens Sinumerik 840D is a Digital CNC System for Complex Tasks

Main features of the Digital CNC System:

• PCU 50 Industrial PC, 1.2 GHz/256 MR RAM

• Removable Hard disk with trans-portation lock (1 Gbyte for user data)

• Microsoft Widows XP operatng system

• COM 1 (V:24/TTY), COM 2 (V.24)

• LPT 1 Parallel port

• PS/2 MOUSE, PS/2 keyboard

• Multipoint interface (MPI)

• USB, 2 channels (1 x terminal/1 x external)

Ethernet 10/100 Mbit/s

• Card bus (max. type III)

• Expansion slots: 1 x PCI/ISA + 1 x PCI o PCU 70

• Expansion slots: 1 x PCI/ISA + 3 x PCI

• Synumerik Floppy drive 3.5

• Operator panel 12.1" TFT Color Display

• Rack

• Remote unit

• Software licenses and technical manuals

• Electronic hand wheels for manual drive of the grinding wheel head and table

Drive motors

The CNC-controlled movements operate on the following set of motors:

Qty	Type	Power	
1	Asynchronous	41KW	Grinding wheel head
2	Asynchronous	7,2KW	Workheads
1	Synchronous	13 Nm	x-axis - grinding wheel carriage
1	Synchronous	20 Nm	z-axis - table
2	Synchronous	0,85 Nm	Wheel dresser
5	Synchronous	0,85 Nm	Steady rest

Linear encoders

The position on "x" and "z" axis is controlled by means of linear encoders having the following characteristics:

• Heidenhain LC 182 X 1040 mm KH ± 3 µm

• Heidenhain LB 382 C X 5640 mm KH ± 5 µm

CNC self-centering steady rests

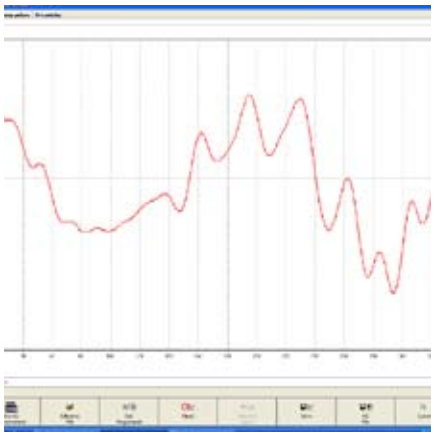
- The machine is equipped with 5 steady rests that control the automatic centering of main journals and pin-journals in order to guarantee a perfect alignment with the crankshaft axis.
- The centering is guaranteed by a pneumatic centering device controlled by CNC
- The journal diameter on grinding process is compensated

Automatic CNC wheel dresser

- The dressing of grinding wheel is programmable by means of a CNC-wheel dresser interfaced with the Sinumerik 840D
- The dressing of the grinding wheel is due to a diamond rotating forming roll
- The dressing program include dressing compensation

MARPOSS P7

The machine is equipped with MARPOSS P7 multifunction electronic system with:



Automatic wheel balancer

Acoustic detecting system

• Remote control with LCD display

• P7 electronic system is a multifunction process control device capable of managing the complete machine tool

The workpiece is continuously measured during the grinding process and the machine cycle is adjusted based on the amount of stock to be removed. Marposs In-Process systems optimize feed rates to produce parts with excellent surface finishes, very tight dimensional tolerances and maintain the best cycle time.

Other characteristics are:

• Measurement controls

• Machine vibration monitoring

• Automatic wheel balancing

Wheel balancing

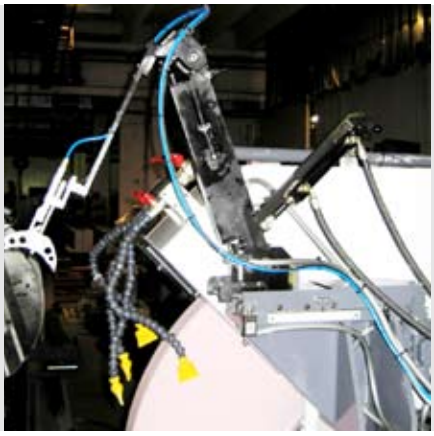
A properly balanced grinding wheel can improve the surface quality of workpiece and extend spindle life. Marposs Wheel Balancer line is the best solution to continuously monitor the grinding wheel

condition and compensate the detected imbalance condition of the grinding wheel.

Acoustic technology

Acoustic technology, to detect subtle changes in sounds produced while grinding.

This is used for preventing collisions and detecting machine and tool abnormalities.



MARPOSS FENAR L

The machine is equipped with MARPOSS "FENAR L" in-process gauging system with fork having the capacity required.

The measuring head is automatically upped onto the diameter being machined without slowing the machining process with capacity:

• From 75 to 150 mm (n. 3 snap gauges)

• From 150 to 250 mm (n. 3 snap gauges)

Fenar L and P7 detect in real time the runout and shape of the part being groung

Electrical supply

Voltage 400 Volts +/- 5%, 3 0Phases

Frequency 50 HZ, +/- 1%

Pneumatic supply

Air mains of 6 Bars

Independent compressor at 6 Bars with min.capacity of 100 lt.

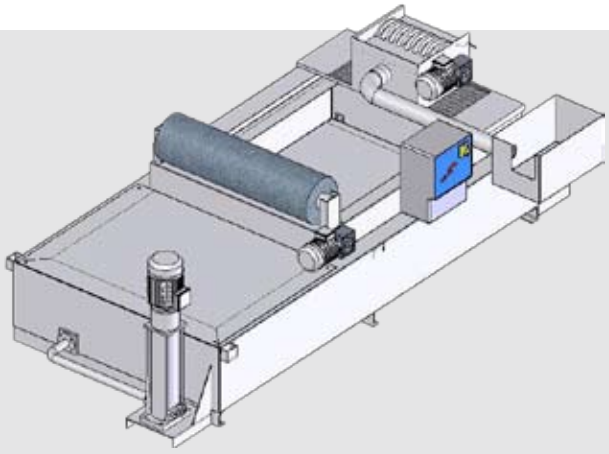
Environment conditions

Suggested working temperature from +15° C to + 40° C

Max. humidity 90%

Foundation

In order to guarantee surface quality as regards precision and finishing of the work-piece the machine must be installed following the AZ instructions



11. Plants

COOLANT UNIT

• The machine is equipped with grinding liquid coolant unit with pump with delivery of 100 lt/min. and settling tank of 800 litres, with magnetic cleaner and filtering ribbon separator

ELECTRIC PLANT

• As per International Standards

• Electrical cabinet is equipped with temperature regulation/control device

LUBRICATION PLANT

• All the guide ways are automatically lubricated by means of hydraulic unit with 70 litres oil capacity with oil supplied fully control

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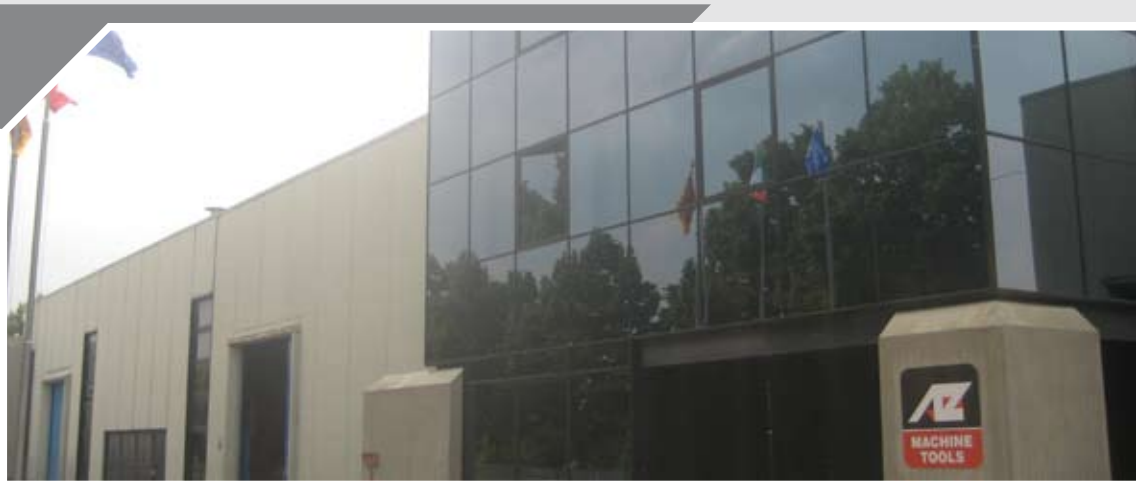

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