

RTM 270



Crankshaft grinder

A Company
of ThyssenKrupp

BERCO S.p.A.



RTM 270/B - 1300 - 1600 - 2000

- 1 Lever and knob for adjustment of the belts.
- 2 Headstock spindle rotation control lever, 3-position: start, neutral, braking.
- 3 Faceplate lock pin control knob.
- 4 Table traverse handwheel.
- 5 Lever for fast traversing the table in either direction, equipped with electromechanical safety device against unintentional maneuvers.
- 6 One-shot pump for table feed gearing lubrication.
- 7 Wheelhead micrometer feed control unit, for plunge grinding.
- 8 Pedal control to actuate faceplate lock pins.
- 9 Hydraulic wheel dresser: opening and shutoff of coolant as well as automatic return of the diamond slide are automatic.
- 10 Levers for shifting and locking the tailstock quill.

- 11 Signal light fixture for journal lineup.
- 12 Hydraulic steady rest with mechanical lock, in working position.
- 13 Wheelhead traverse control lever, 2-positions: fast return, slow and fast approach.
- 14 Wheelhead infeed control handwheel.
- 15 Centralized, low-tension electric controls box, with main switch which can be blocked via a padlock.
- 16 Hydraulic pedal control for actuating tailstock quill retraction.

Fig. 1

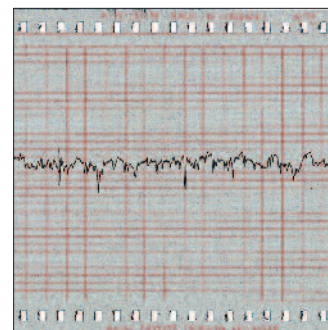
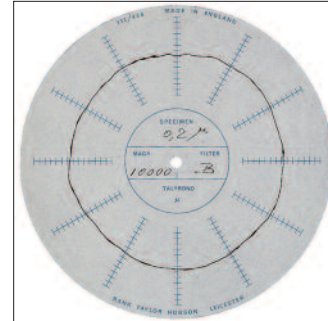


Fig. 2

Fig. 1,2
Diagrams showing, respectively, top roundness and surface finish degree obtainable with the RTM 270.

Fig. 3
General view of the machine in the "B" execution, the most complete because of specific devices and automatics.

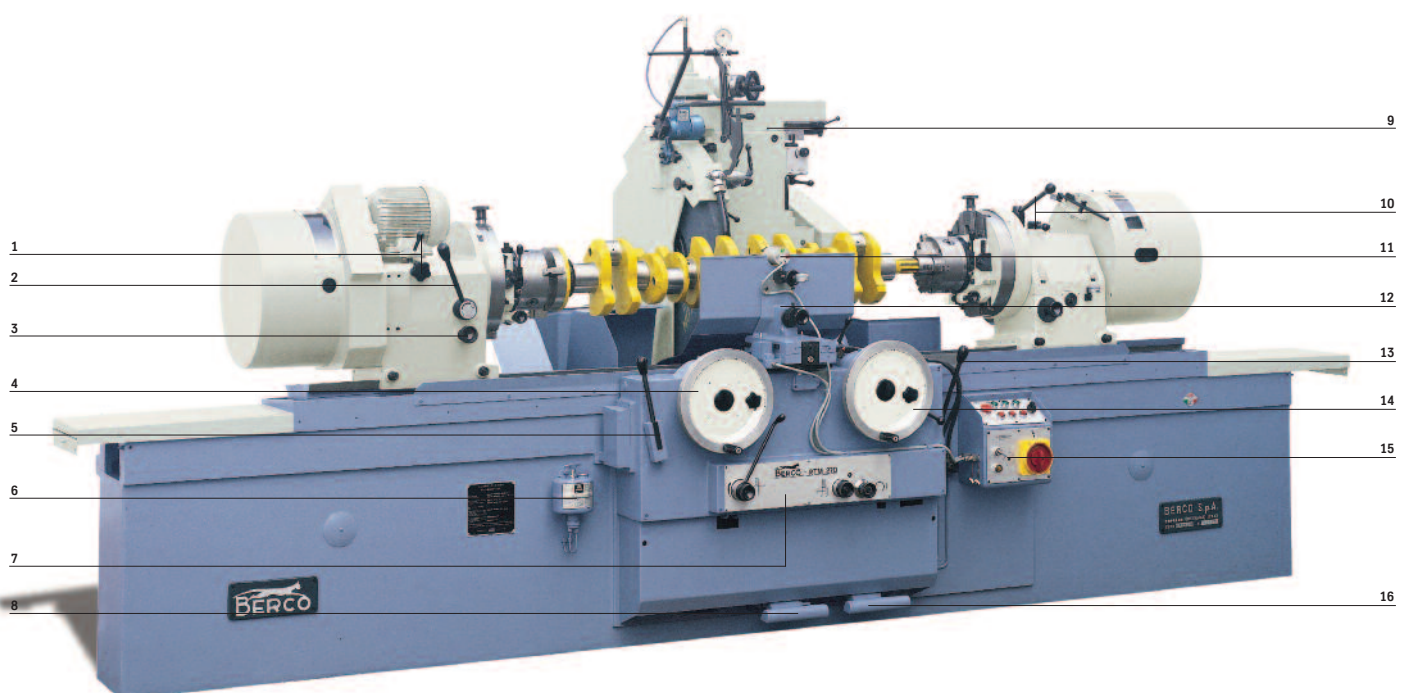


Fig. 3

Fig. 4

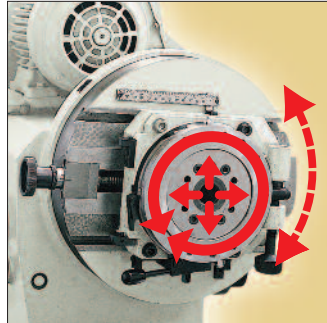


Fig. 5

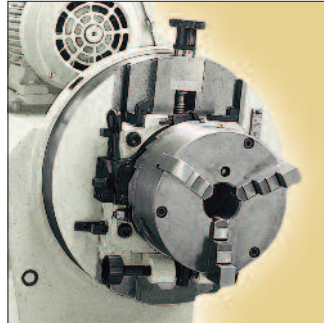


Fig. 6



Fig. 4
Workhead where the four
movements stand out in full relief.
Fig. 5
Workhead equipped with 180 mm
(7¹/₃₂”) dia. selfcentering chuck.
Fig. 6
Workhead equipped with driving
collar and center with ring nut.

The Berco RTM 270 is a crankshaft grinder which has been designed to meet the manifold requirements of those people who must handle both unit and production regrinding of small and medium runs of crankshafts.

If view of this, the RTM 270 has been realized in three different executions, each one having three different distances between centers.

Execution “A”

It is the simplest execution and can thus be regarded to as the basic execution.

No automatics are provided for in the standard outfit of this machine, the machine being suitable only for regrinding of crankshafts with different dimensions and specifications.

Execution “B”

It is the most complete execution, being featured by

specific devices and automatics which allow profitable and timesaving regrinding of small and medium runs of crankshafts.

Execution “D”

Essentially similar to the “A” execution, it is furthermore equipped with a unit for actuating table traverse and reverse thus allowing cylindrical grinding.

The customer will thus be able to choose, out of these executions, the one which better suits his specific requirements and add the several optionals available in the extra outfit.

Other technical and construction features of the RTM 270 are set forth hereunder:

- Self-locking counterweights, radially adjustable and protected by safety guards in compliance with the accident

prevention regulations.

- Drive via high-resistance, high-flexible cogged belts, to assure an even and surging-free rotation of workpiece.
 - Clutch located direct on the main spindle, to obtain fast and precise balancing of mass in rotation.
 - Air-float headstock and tailstock.
 - Tailstock quill with 50 mm (1³¹/₃₂”) travel, to make loading and unloading of the crankshafts easier and faster.
 - Workheads with four movements:
 - radial movement
 - cross movement
 - 360° rotary motion, with fast indexing for 2, 3, 4, 5 and 6 cylinder engine crankshafts
 - micrometer swing movement.
- All versions can be supplied also with stepless variable speed workhead motor.

Other executions of the machine

RTM 270/A - 1300 - 1600 - 2000

In this execution, the machine is equipped with:

- 2-pole motor for headstock spindle rotation
- hydraulic system for slow and fast wheelhead traverse
- 4-way cross slide swing heads
- unit for fast traversing the table in either direction

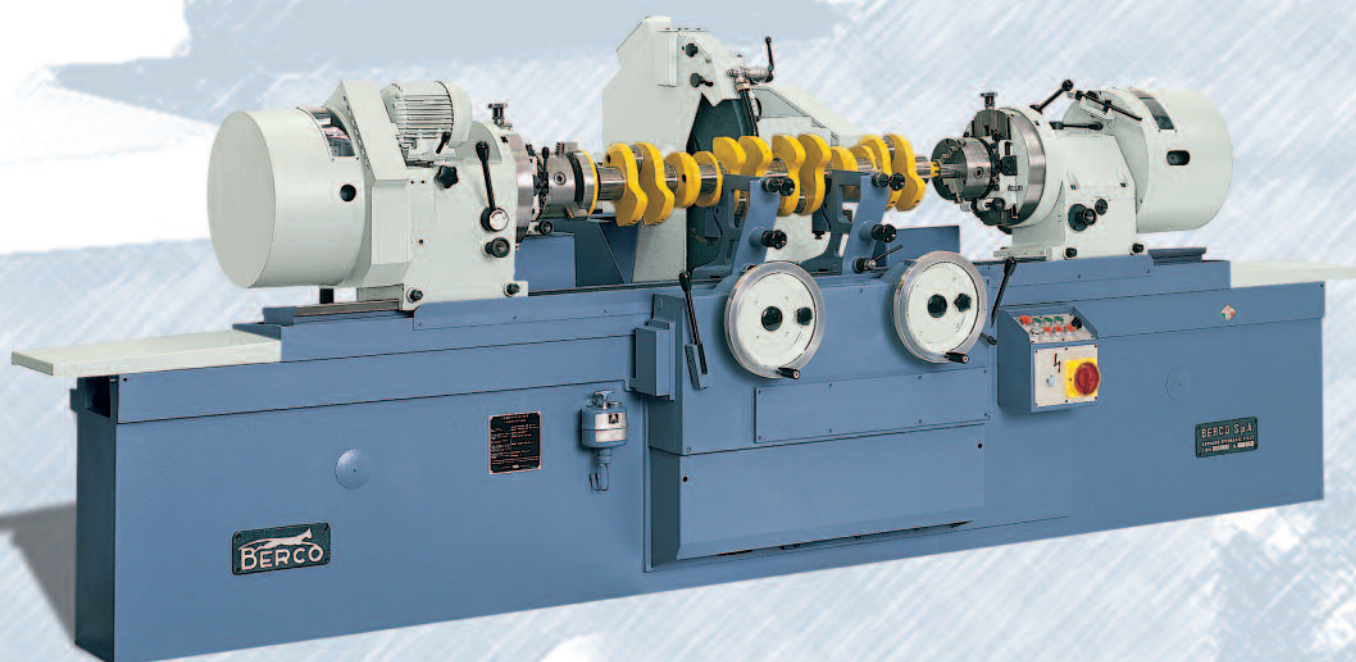


Fig. 7
General view of the machine in the "A" execution.

RTM 270/D - 1300 - 1600 - 2000

Similar, as far as standard outfit is concerned, to the "A" execution, this machine differs for having the possibility to regrind both crankshaft and cylindrical shafts.

The table, in fact, besides fast traverse, is featured by work traverse, with automatic and manual reversal of the feed direction.

Travel of the tables is adjustable via trip limit stops and the traverse speed is steplessly adjustable via the potentiometer mounted in the electric controls box.

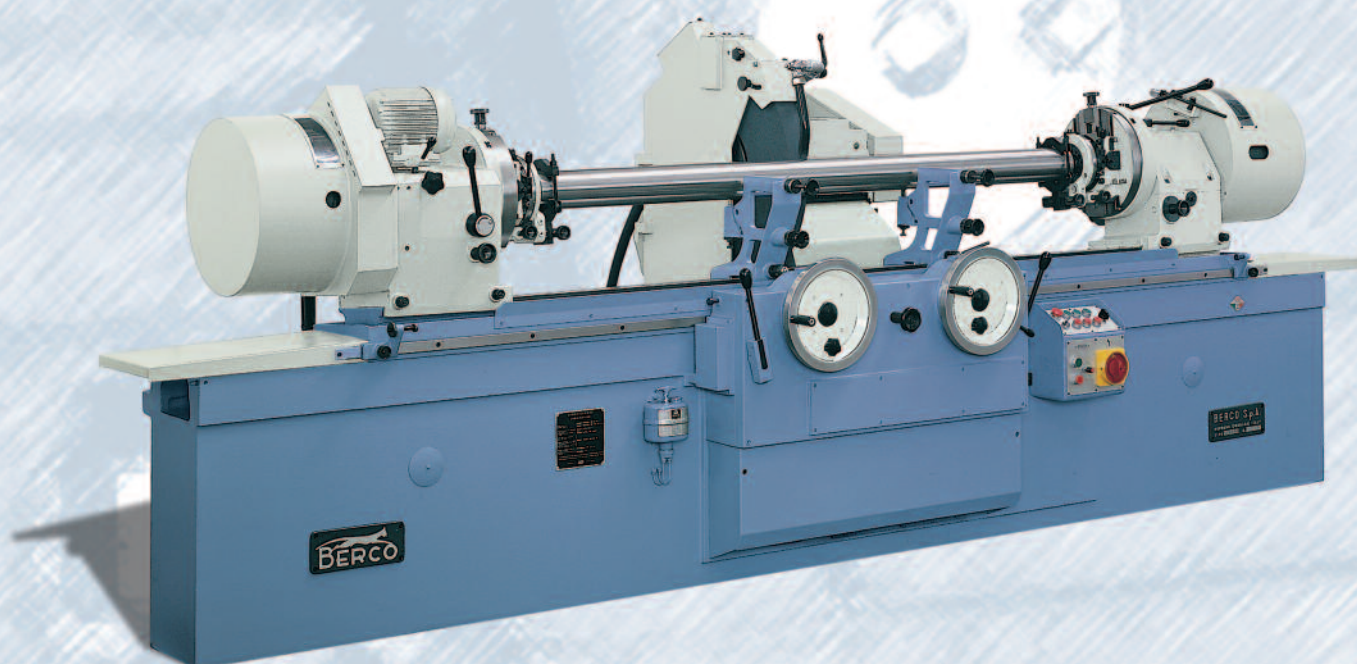


Fig. 8
General view of the machine in the "D" execution.

Specific devices and automatics



Each execution of the RTM 270 is featured by its own specific devices and automatics; others are available on request as schematically shown at right.

Executions			devices and automatics
A	B	D	
			Hydraulic wheel dresser P/No. A00A17750
			Wheel dresser
			Hydraulic pedal control for actuating tailstock quill retraction
			Hydraulic pedal control for actuating the workhead locking pins
			Hydraulic steady rest
			DPA/L signal light fixture for journal lineup
			Wheel dresser for hydraulic steady rest
			Plunge feed device for grinding fillets and diameter of crankshaft journals - P/No. A00A17725
			Unit for actuating the automatic table traverse and reverse

 Standard outfit

 Extra outfit

 Not provided for

Fig. 9
Rear view of tailstock showing the
tailstock quill actuating cylinder
and the actuator which controls the
workhead faceplate locking pin.
Fig. 10
Hydraulic wheel dresser.
Fig. 11
Wheel dresser.

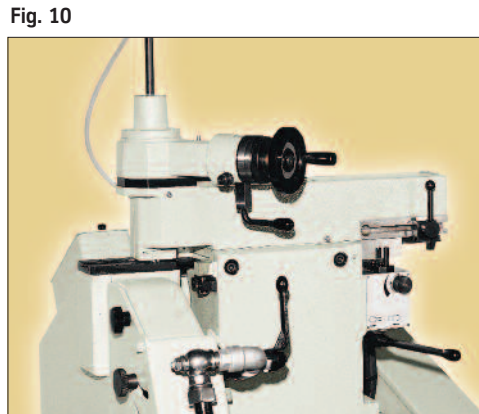
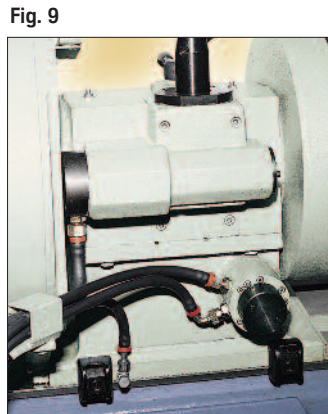


Fig. 11

Wheel dresser



Unit for dressing the face and the edges of the grinding wheel, with the possibility to adjust radius of the crankshaft journal fillet. The dressing diamond is supplied only on request.

Hydraulic wheel dresser



It is installed on the top of wheelhead and allows fast dressing of the grinding wheel face with uniform movement, even if the crankshaft is mounted in the machine. The diamond slide speed is adjustable at will and movement can be reversed automatically. A handwheel with indexed ring allows the adjustment of the diamond cutting depth as well as the compensation for reduction in grinding wheel diameter after each dressing. A ratchet lever allows obtaining the micrometer work jogging of the diamond holder, with constant increments. Unless clearly required when placing the order, no diamond will equip the wheel dresser.



Hydraulic pedal control for actuating tailstock quill retraction



The device actuates, through the hydraulic cylinder in fig. 9 the tailstock quill retraction. The pedal control (16 fig. 3) leaves the operator free hands thus facilitating the crankshaft setup. A built-in contrivance prevents the tailstock quill from retraction when the grinding wheel is in working position.

Hydraulic pedal control for actuating the workhead locking pins



This device allows, through the hydraulic swinging actuators shown in fig. 9, the locking pins to enter their seats in the workheads in the positions which were preset for centering crankshaft journals. It actuates the locking pins of both headstock and tailstock at the same time through the pedal (8 fig. 3) located in the lower part of machine bed, thus speeding up centering.

Specific devices and automatics

Fig. 12



Hydraulic steady rest

A B D

It is small-sized steady rest and can practically be used with all crankshaft types.

It is fitted with a device, linked to the upper shoe, for checking centering of crankshaft journals. Approach to and return from the workpiece are hydraulic and controlled manually, by actuating a lever.

Safety microswitches prevent fast automatic traverse of the table when the hydraulic steady rest is in working position.

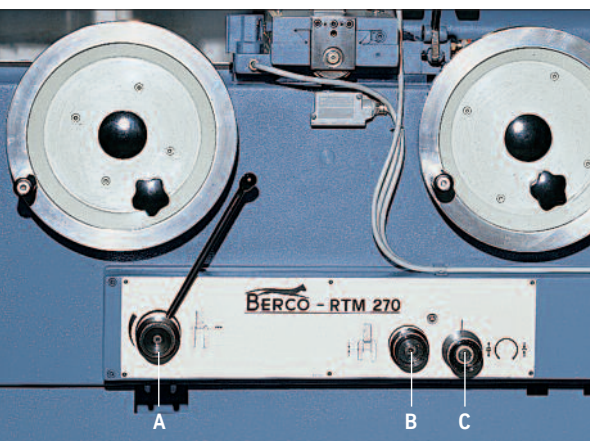


Fig. 13



Fig. 14

Wheel dresser for hydraulic steady rest

A B D

Shape and dimensions of this grinding wheel face and radius dresser have specifically been designed for use on the "B" execution of the machine.

It is mounted on the table, opposite the hydraulic steady rest, leaving the crankshaft in the machine. The dressing diamond is supplied only on request.

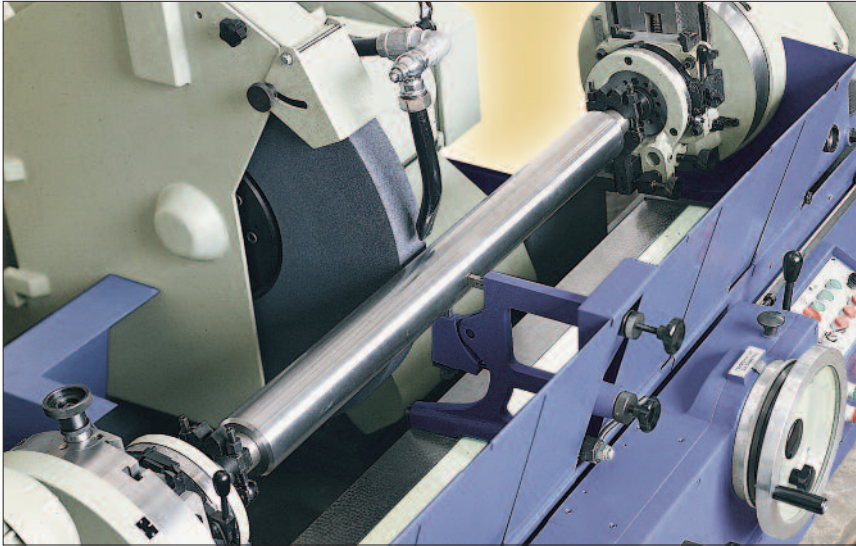
DPA/L signal light fixture for journal lineup

A B D

It is mounted on the top of the hydraulic steady rest and is fitted with a stylus that, once correct journal wheel lineup is obtained, switches on a signal light.

- Standard outfit
- Extra outfit
- Not provided for

Fig. 15



Plunge feed device for grinding fillets and diameter of the journals



This hydraulically-operated device allows to obtain the wheelhead work feed, with preset speed and travel, for grinding the fillets and diameter of crankshaft journals (fig. 13).

Oleomechanical table traverse and reverse unit



This unit, which gives the machine the features of a cylindrical grinder, is most profitably used in engine rebuilding shops in as much as it is often necessary to grind parts other than crankshafts such as bars, rods, etc.

It consists essentially of:

- a d.c. motor with electronic speed adjustment for the automatic work feed of the table (traverse speed is adjustable from 5 to 300 mm/min $-2''+11^{13}/_{16}''$ per minute)
- an oleomechanical unit for reversing table traverse, either manual or automatic via limit stops sliding onto a scale secured to the table.

Fig. 16

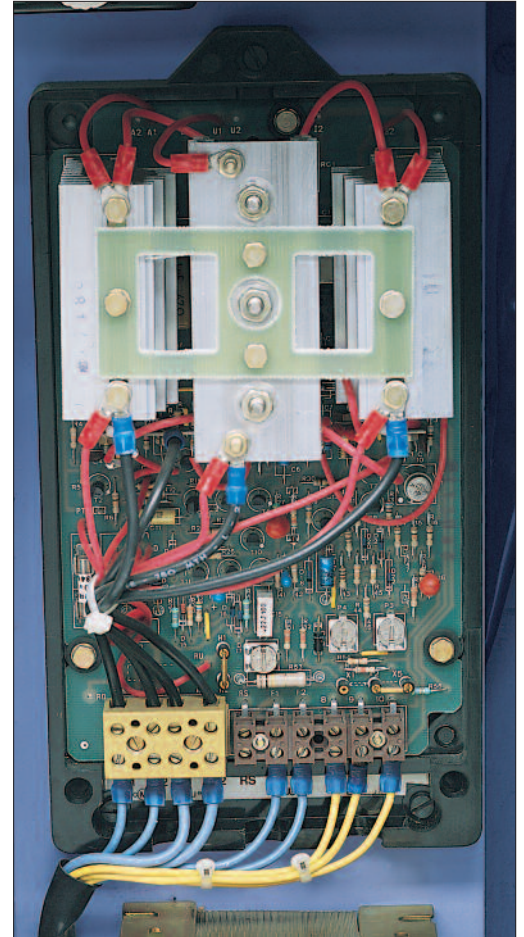


Fig. 12 Hydraulic steady rest and DPA/L signal light fixture mounted on its top.

Fig. 13 Wheelhead work feed device controls panel.
a) Feed speed adjustment knob (for grinding the crankshaft journals) with fast approach lever;
b) Wheelhead travel adjustment knob;
c) Knob for engaging and disengaging the wheelhead automatic feed.

Fig. 14 Wheel dresser for hydraulic steady rest.

Fig. 15 Cylindrical grinding on the Berco RTM 270, "D" execution.

Fig. 16 Electronic converter for the automatic table work feed.

Standard outfit

Fig. 17

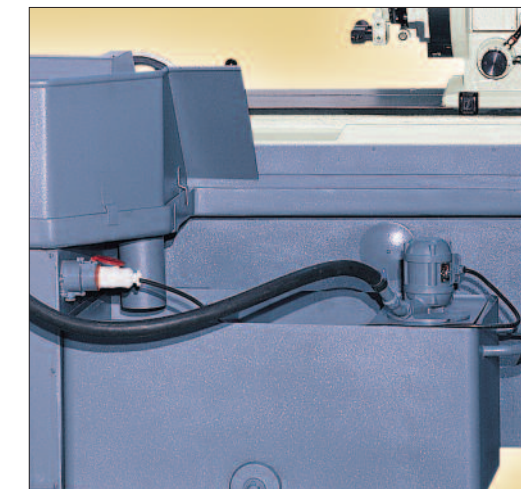
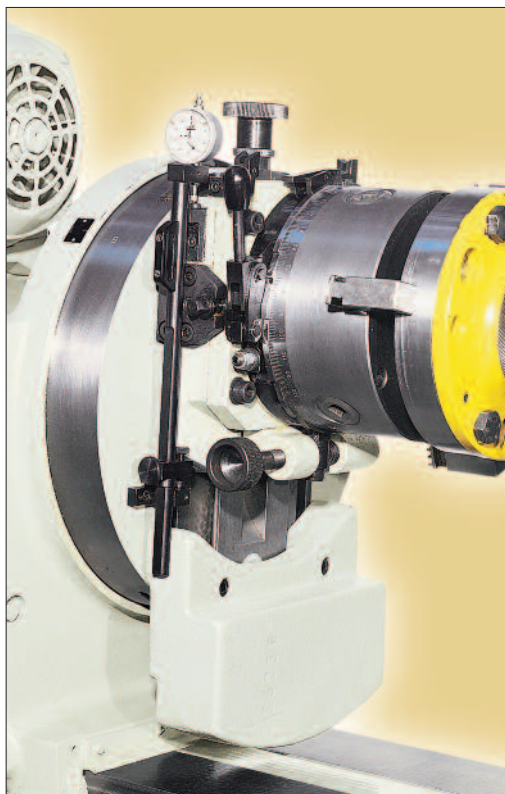


Fig. 19

Fig. 18

- safety guards
- cooling system, complete with power pump and tank on the back of machine, with standard $\frac{1}{2}$ " gas thread nozzle (fig. 19)
- set of splash guards
- 1 grinding wheel, 710 mm (28") dia. 25 mm (1") thick, mounted on wheelhub
- 1 dummy shaft wheel balancing
- 1 wheelhub puller
- 1 oversize motor pulley, for worm wheel
- 1 truncated center for workhead
- 2 centers with ring nuts for workheads
- 1 center puller
- 2 180 mm ($7 \frac{3}{32}$ ") dia. self-centering chucks, with chuck spanner
- 2 driving dogs, 20 ÷ 60 mm ($\frac{31}{64}$ " - $2 \frac{3}{8}$ ") capacity
- 2 driving dogs 60 ÷ 115 mm ($2 \frac{3}{8}$ " - $4 \frac{12}{32}$ ") capacity
- 2 driving collars
- 2 normal steady rests (fig. 17)
- 2 auxiliary counterweights (fig. 18)
- 1 tool kit complete (fig. 22), with:
 - 1 center position checking attachment,
 - 1 centering rod,
 - 2 dial gauges for ditto
- 1 square for centering rod (fig. 21)
- 1 feeler gauge for the centering rod (fig. 23)
- DMI - attachment for taking crank throw (fig. 20)
- 7 adjustable wedges for machine levelling
- 1 grease gun
- set of service spanners
- kg 2 oil for wheelhead lubrication.

Fig. 20

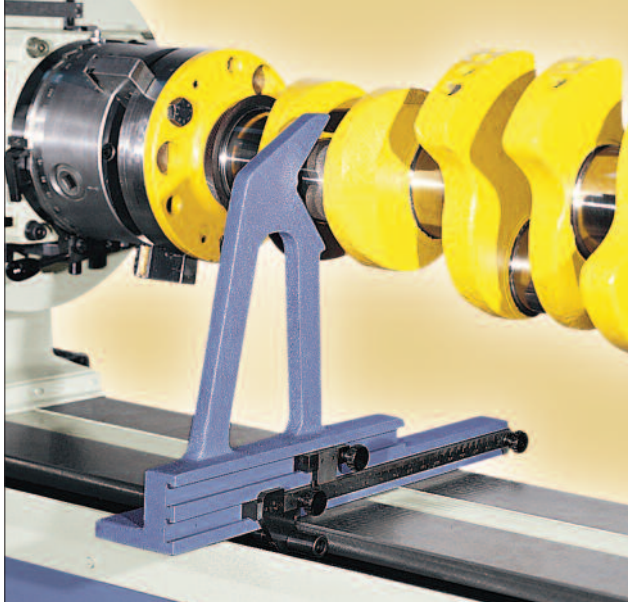


Fig. 21

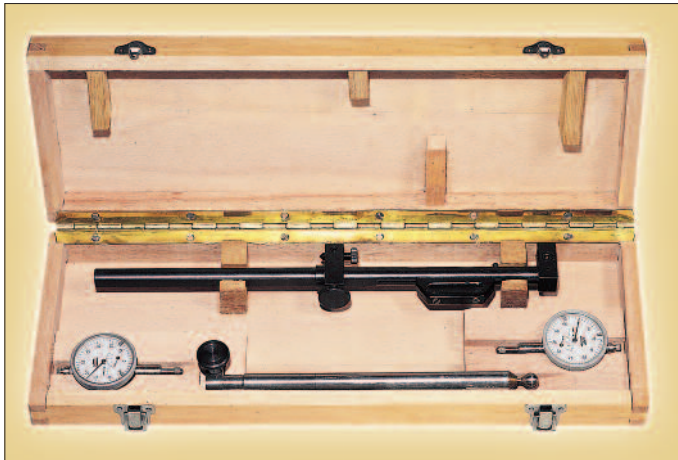


Fig. 22



Fig. 23

Fig. 17
Normal steady rests onto the table.

Fig. 18
Workhead position checking attachment. The crankshaft is held between chucks. Auxiliary counterweights fitted to workhead faceplate.

Fig. 19
Coolant tank and power pump.

Fig. 20
"DMI" attachment for taking crank throw.

Fig. 21
Centering rod mounted on square, for centering crankshaft journals. The crankshaft is held between centers.

Fig. 22
Tool kit with attachment, centering rod and indicators.

Fig. 23
Centering rod mounted via a surface gauge on the DMI attachment, for truing the centers.

All items in the standard outfit are common to the different executions of the machine.

Extra outfit

Fig. 24

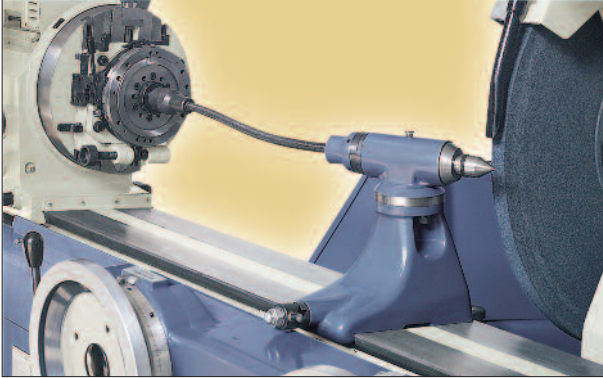


Fig. 25

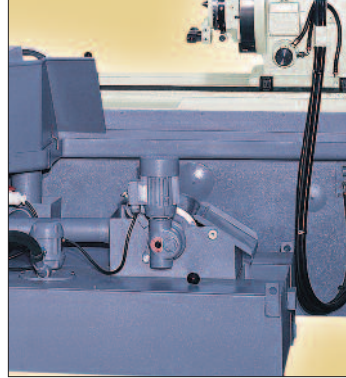
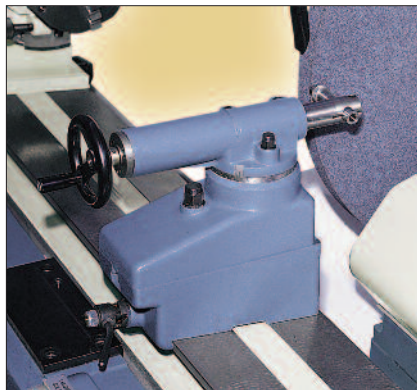


Fig. 26



Fig. 27



- grinding wheels, 710 mm (28") dia. 203 mm (8") hole, thicknesses:
 - 20 mm $\frac{51}{64}$ " code **U812140040**
 - 32 mm $1\frac{1}{4}$ " code **U812140060**
 - 40 mm $1\frac{9}{16}$ " code **U806140030**
 - 50 mm 2" code **U811140000**
 - 63 mm $2\frac{31}{64}$ " code **U811140010**
- $\frac{1}{4}$ " gas thread nozzle (for wheel thickness more than 20 mm - $\frac{51}{64}$ "")
 - code **A01.26703**
- $\frac{3}{4}$ " gas thread nozzle (for wheel thickness more than 25 mm - 1")
 - code **A01.26704**
- DRFM attachment for dressing and chamfering wheel face and for dressing and tapering wheels sides (fig. 27), less diamond
 - code **A00A17800**
- DRP center grinding attachment (fig. 24)
 - code **A00A17825**
- LU/DC normal steady rest with built-in centering fixture (fig. 26), less dial gauge
 - code **A00A17700**
- LU/S narrow steady rest for narrow journals
 - code **A00A17650**
- LU/S/DC narrow steady rest with built-in centering fixture, less dial gauge
 - code **A00A17675**
- self-centering chuck 180 mm ($7\frac{3}{32}$ "") dia. complete with three sets of three jaws, max. external capacity 245 mm ($9\frac{41}{64}$ "")
 - code **A00A17217**
- pair of collapsible way covers, in replacement of the standard covers
 - code **V05A17002**
- magnetic coolant clarifier with tank in replacement of the standard tank (fig. 25), for cooling system
 - code **V08A17010**
- gravity filtering clarifier with tank, in replacement of the standard coolant tank
 - code **V08A14002**
- diamond for the wheel dressers
 - code **C465904010**
- SFN2/B portable belt type superfinisher. Please refer to the loose leaflet (fig. 31)
- AES 500 static balancer (please refer to the loose leaflet)
- AEM electronic sizing unit (fig. 30)
- PSM 127 continuous measurement attachment (fig. 28)
- unit for checking tailstock cross traverse (fig. 29)
 - code **V11A17002**
- pair of knobs with indexed bushing, for shifting the workheads radially
 - code **V04A17002**

The items listed in the extra outfit can be used with any of the three executions of the machine.

Fig. 28

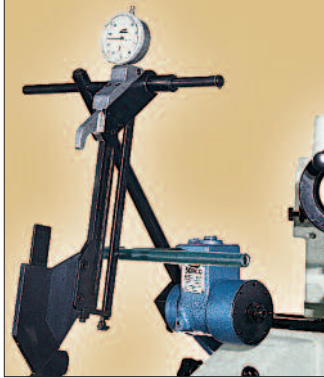


Fig. 24
Grinding a center with the DRP attachment.

Fig. 25
Cooling system with magnetic coolant clarifier and tank.

Fig. 26
Steady rest with built-in centering fixture.

Fig. 27
DRFM attachment for dressing and chamfering wheel face and for dressing and tapering wheel sides.

Fig. 28
PSM 127 continuous measurement attachment.

Fig. 29
Unit for direct check of the tailstock cross traverse; the dial gauge is the one in the standard outfit.

Fig. 30
AEM electronic sizing and control unit. To be used in conjunction with Berco PSM 127.

Fig. 31
SFN/2B portable belt type superfinisher.



Fig. 29



Fig. 30



Fig. 31

Technical data

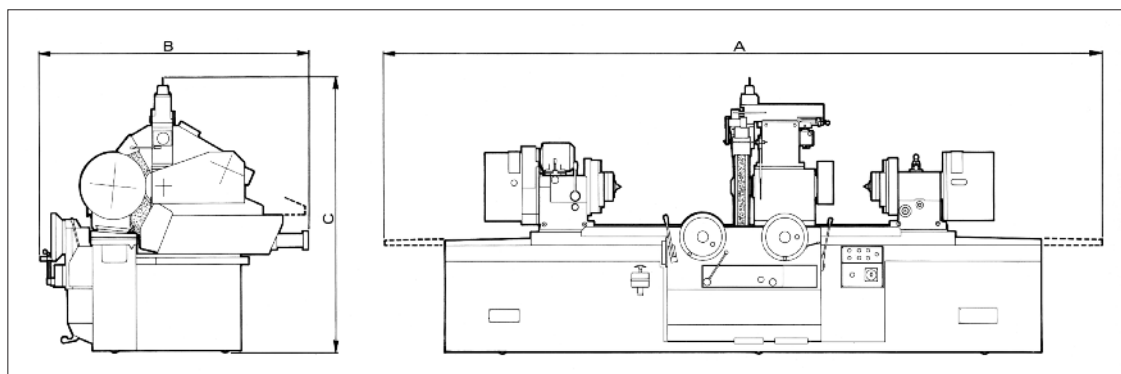


Fig. 32

Working capacity

Max. diameter ground with full-size wheel	mm	150	5 ²⁹ / ₃₂ "
Max. swing over table	mm	540	21 ¹ / ₄ "
Min. diameter admitted in steady rests	mm	30	1 ¹¹ / ₆₄ "
Max. diameter admitted in steady rests	mm	140	5 ³³ / ₆₄ "
Max. eccentricity of workheads (throw)	mm	120	4 ²³ / ₃₂ "
Max. mass admitted between centers	kg	300	661 lb

Geometric features

Height of center over table	mm	270	10 ⁵ / ₈ "
Max. distance between centers (2 executions)	mm	1300 - 1600 - 1950	51" - 63" - 76 ²⁵ / ₃₂ "
Max. distance between chucks (2 executions)	mm	1270 - 1569 - 1919	50" - 61 ²⁵ / ₃₂ " - 75 ⁹ / ₁₆ "
Self-centering chuck diameter	mm	180	7 ³ / ₃₂ "
Max. grinding wheel diameter	mm	710	28"
Min. grinding wheel thickness	mm	20	²⁵ / ₃₂ "
Standard grinding wheel thickness	mm	25	1"
Max. grinding wheel thickness	mm	63	2 ³¹ / ₆₄ "

Wheelhead

Travel, fast	mm	180	7 ⁵ / ₆₄ "
Travel, fine	mm	165	6 ³¹ / ₆₄ "
Max. travel for plunge grinding	mm	1,5	.060"
Feed per turn of the handwheel	mm	1	.040"

Headstock

Workpiece rotation speed (6)	r.p.m.	16 - 22 - 30 - 40 - 52 - 70
*Workpiece rotation speed (stepless variable)	r.p.m.	12 ÷ 60

Table

Micrometer feed per turn of the handwheel	mm	5,84	.23"
Fast traverse speed, per minute	m/min	6	236" in/min
Slow traverse speed, steplessly adjustable (only for D execution), per minute	m/min	0,05 - 0,35	2 - 13 ⁹ / ₁₆ " in/min

Motor rating

Wheelhead	kW	4 (5,50 CV)
Headstock	kW	0,45 ÷ 0,24 (0,6 ÷ 0,32 CV)
* Headstock	kW	0,24 ÷ 1,45 (0,32 ÷ 2 CV)
Fast table traverse	kW	0,55 (0,75 CV)
Slow table traverse (only for D execution)	kW	0,62 (0,84 CV)
Hydraulic system	kW	0,55 (0,75 CV)
Cooling system	kW	0,15 (0,20 CV)

Dimensions and masses

Length A (see fig. 32)	mm	4500 - 5500 - 6219	177" - 216 ¹⁷ / ₃₂ " - 244 ²⁷ / ₃₂ "
Width B (see fig. 32)	mm	1760	69 ¹ / ₈ "
Height C (see fig. 32)	mm	1837	72 ²¹ / ₆₄ "
Approx. mass, unpacked (exec. 1300)	kg	3250	7150lb
Approx. mass, ocean packed (exec. 1300)	kg	3820	8404lb
Approx. mass, unpacked (exec. 1600)	kg	3400	7496lb
Approx. mass, ocean packed (exec. 1600)	kg	4100	9039lb
Approx. mass, unpacked (exec. 1950)	kg	3450	7606lb
Approx. mass, oceanpacked (exec. 1950)	kg	4150	9140lb

Measurements, masses and executions can be changed without previous notice. Motor rating is referred to 50 Hz frequency.

*Data valid for machines with stepless variable speed workhead motor.

Others crankshaft grinders of the RTM series

Besides the RTM 270 Berco is manufacturing other crankshaft grinder models; their main specifications are set forth hereunder:

RTM 351

Center height over table
350 mm ($13\frac{3}{4}$ ").

Max. swing over table 700 mm
($27\frac{9}{16}$ ").

Max. distance between centers
2400-3000 mm
($94\frac{31}{64}$ " - $118\frac{7}{64}$ ").

Max. mass admitted between
centers 800 kg (1760 lb).

RTM 425A

Center height over table
425 mm ($16\frac{3}{4}$ ").

Max. swing over table 850 mm
($33\frac{1}{2}$ ").

Max. distance between centers
4020 mm ($158\frac{1}{64}$ ").

Max. mass admitted between
centers 1200 kg (2645 lb).

RTM 575

Center height over table
575 mm ($22\frac{5}{8}$ ").

Max. swing over table
1150 mm ($45\frac{9}{32}$ ").

Max. distance between centers
4020 mm ($158\frac{1}{64}$ ").

Max. mass admitted between
centers 1200 kg (2645 lb).

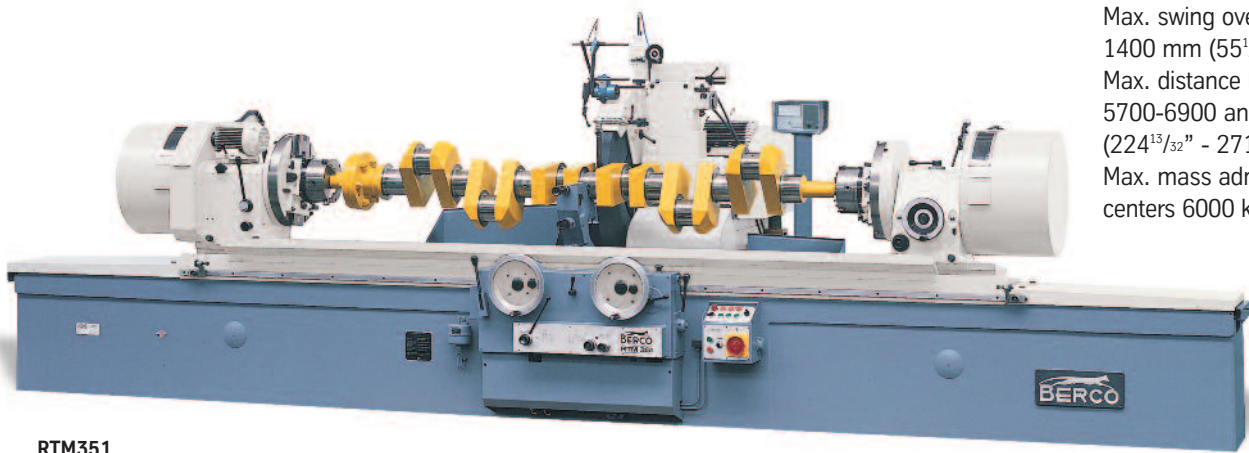
RTM 700

Center height over table
700 mm ($27\frac{9}{16}$ ").

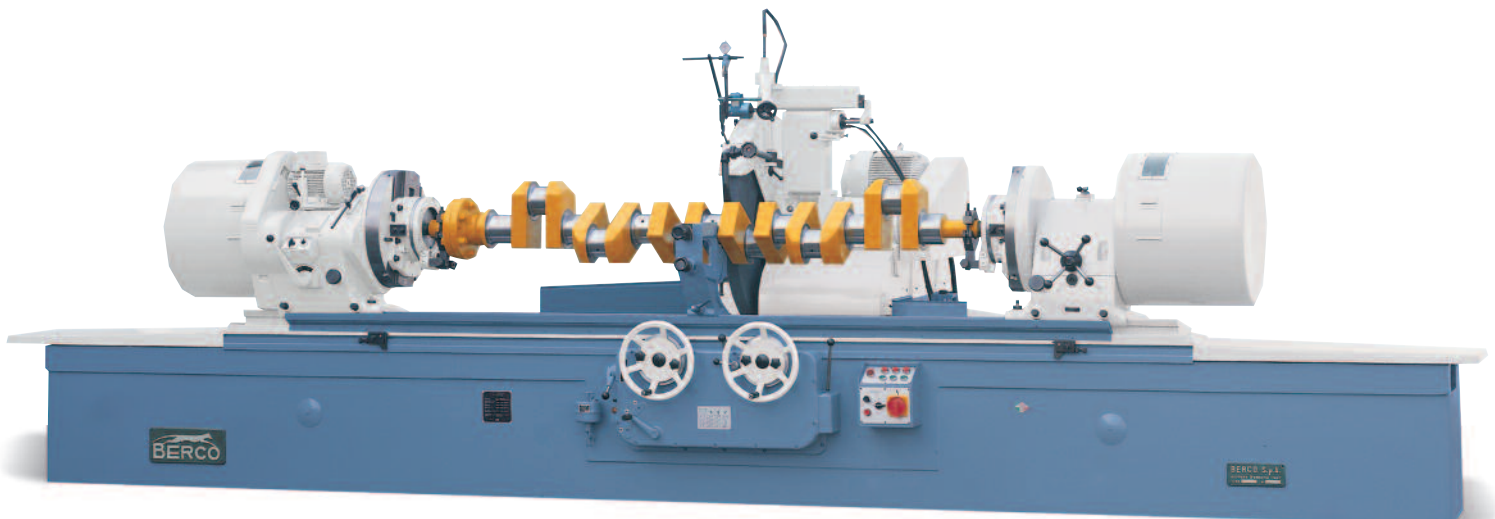
Max. swing over table
1400 mm ($55\frac{1}{8}$ ").

Max. distance between centers
5700-6900 and 8000 mm
($224\frac{13}{32}$ " - $271\frac{21}{32}$ " e 315").

Max. mass admitted between
centers 6000 kg (13200 lb).



RTM351



RTM575

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