

KBTK, RBTK, TBTK, SBTK Modular Crankshaft Balancing Machine



Crankshaft balancing is a processing step that is best left in the hands of experts due to the high level of know-how and experience that is required.

In addition to the specific features of the crankshaft - such as limited correction possibilities, and free forces and moments that are related to the shaft ever-increasing quality requirements and efficiency objectives must be considered and made compatible with one another. Precision unbalance measurement techniques, complex correction calculations and state-of the art manufacturing technology must be brought together to achieve optimal results.

Because of continuous development, every crankshaft is different from the last so comparing manufacturing processes is impossible. The differences in design, manufacturing

Modular concept

Schenck RoTec has set up a consistent modular concept of individual system elements for high-production crankshaft balancing machines.

Unbalance and geometric measuring stations, correction units, work-piece handling systems and peripheral automation can be combined to optimally meet the respective production line requirements.

Whether it's a compact manufacturing island, flexible plant with tangential gate or an integrated transfer line, every solution is designed using modular components. Thus various production capacity requirements, correction methods and manufacturing philosophies can be realized in a short time. In addition, the scale of production is guaranteed because the system can be extended later by further modules.

Machine series

- 200 KBTK: This two-station machine is especially suited for medium-volume production. It is operated as a manufacturing island and can be loaded manually or by hand-operated loading device.
- 200 RBTK: This multi-station machine is used when high flexibility regarding functionality and integration with the production line is needed. It is ideal for large production volumes and is linked to the manufacturing line by a tangential loading gantry.
- 200 TBTK: This in-line transfer machine is the correct

solution when maximum productivity is required and the station will be directly integrated into the manufacturing line.

- 200 SBTK: The basic concept is identical to the TBTK. By extension with suitable modules, crankshafts which will require a second correction step because of their high initial unbalance can also be balanced in this machine.

Correction methods

The classic method of unbalance correction in crankshafts is by drilling into the counterweights in predefined components and one or two correction steps. This method is fast, the control system required is relatively straightforward and the calculation of corrections by the measuring unit is relatively simple.

Weight-optimized polar correction methods require complex calculation methods, but on the other hand minimize the amount of weight removed. This saves not only material and tool costs but also increases the quality of the crankshaft. In addition the weight of the counterweights is retained, thus internal weight correction is improved and the result is an engine with less vibration and noise.

With optimized correction mostly sintered-carbide drills with aerosol minimum quantity lubrication, oil or emulsion internal high-pressure emulsion lubrication are used. For both methods the corresponding correction modules are available.

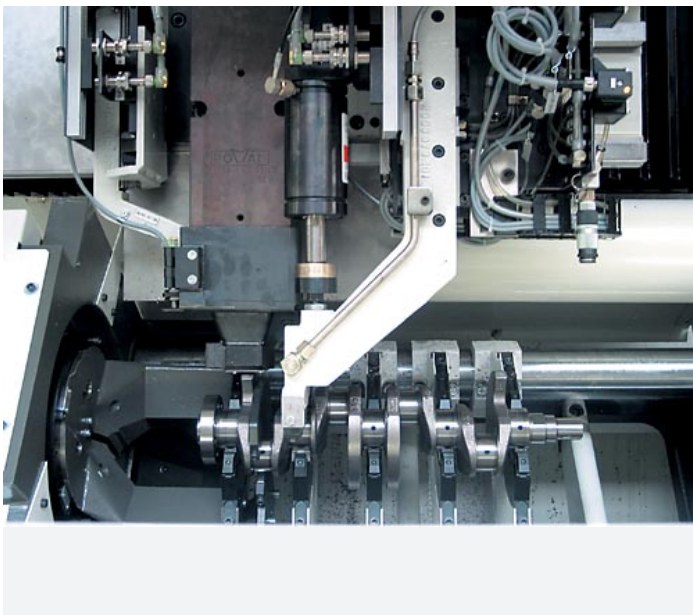
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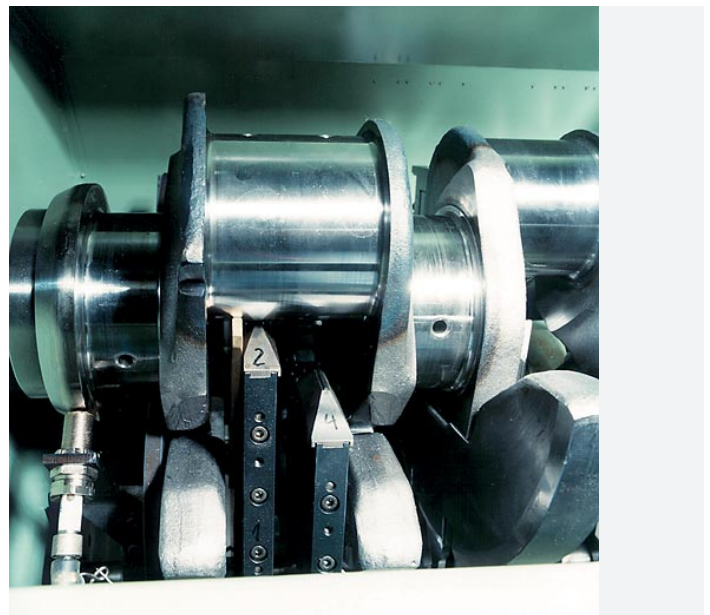
Unbalance measurement



Work-piece handling

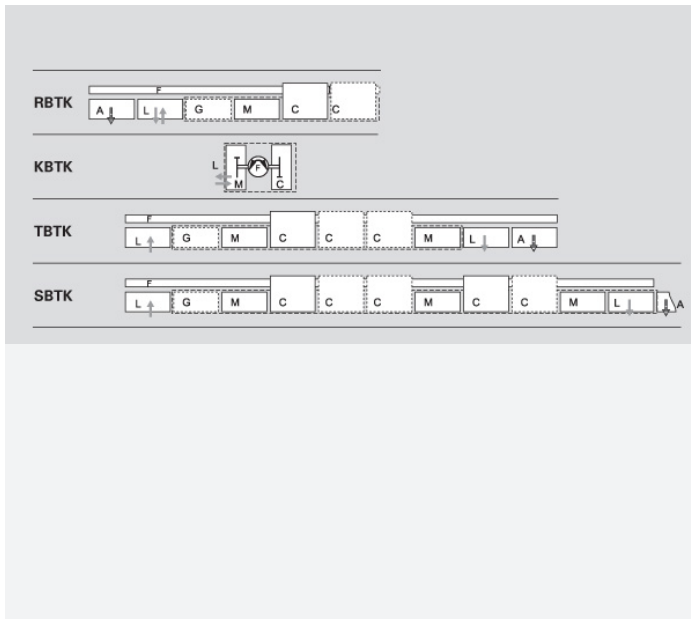


Unbalance correction



Geometric measurements

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Modules:

- M Unbalance measurement
- C Unbalance correction
- G Geometry measurement
- F Transport device
- A Place of deposit, out of tolerance
- L Loading and unloading

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Crankshafts / Sizes		2	2	3	3	4.1	4.2
Symmetrical crankshafts		•	•	•	•	•	•
Asymmetrical crankshafts		•		•	•	•	
Weight, without master rings	[kg]	2 - 10	2 - 10	6 - 50	8 - 40	30 - 100	30 - 160
Weight, with master rings	[kg]	-	12	-	50	140	200
Total length	[mm]	200 - 420	200 - 420	320 - 790	350 - 790	500 - 1000	500 - 1500
Journal distance, max.	[mm]	60 - 320	60 - 320	220 - 660	240 - 660	350 - 750	350 - 1100
Correction planes distance	[mm]	30 - 280	30 - 280	170 - 600	200 - 600	300 - 700	300 - 1050
Main journal diameter	[mm]	30 - 60	30 - 60	40 - 75	40 - 80	65 - 125	65 - 125
Rotating outside diameter	[mm]	80 - 150	80 - 150	120 - 195	120 - 200	160 - 310	160 - 310
Diff. Main journal to							
outside diameter	[mm]	max. 100	max. 100	max.120	max.130	max. 200	max. 200
Crank pin diameter	[mm]	20 - 45	20 - 45	30 - 60	30 - 60	50 - 90	50 - 90
Stroke	[mm]	40 - 80	40 - 80	55 - 90	55 - 95	100 - 160	100 - 160
Machine							
Measuring station with roller-drive		•		•		•	
Measuring station with spindle-drive/							
hook adapter			•		•		•
Measurement uncertainty	[gmm]	5 - 15	8 - 20	5 - 15	8 - 20	15 - 30	15 - 40
Achievable tolerance	[gmm]	60 - 150	60 - 150	60 - 150	60 - 150	100 - 400	100 - 400

2) e.g. V-engines

3) Max. support pedestal distances 510 mm

4) Acc. To DIN 1319, 95% probability, work-piece dependent (without uncoupling and unloading)

5) Dependent on crankshaft and correction setup