

**Fully automatic balancing of crankshafts**

**Special flexibility and short change-over times**

**Short cycle times due to high speed drilling and optimised correction**

**Environmentally friendly operation with minimum lubrication without the necessity for drill coolant is possible**

**High reliability due to the application of proven components**

**Efficient measuring device CAB 850 with industrial PC and touch screen**

**Integrated operation of measuring device and machine**

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## Balancing machines for crankshafts

**Type 320/520 SBRK**

### Areas of application

Measuring and correction of the unbalance of completely machined crankshafts of passenger and commercial vehicles. The machine can be used for the production of medium scale series, even with a large number of different types. Loading is effected manually by means of a lifting device or automatically by means of the gantry loader. The machine is available for various size ranges.

### Correction method

Unbalance correction by means of drilling into the counterweights in one or two correction steps. Optimised polar single spindle drilling into all counterweights permitted for such drilling, whereby any sectors can be protected or selected. In case of 2-step correction, separate areas can be selected for the 1st and the 2nd step.

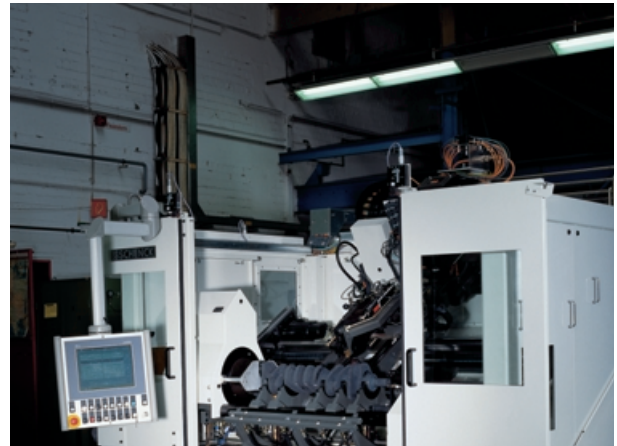
If different drilling diameters are required the machine can be equipped with a drilling unit including two drilling spindles and with a selection function.

## Principle of operation

- Load the workpiece either manually into the lifting device or by automatic operation immediately into the half shell bearing of the balancing unit.
- Close the protective door and start the automatic run:
  - complete measuring run, application of correction drilling, check run, indexing in home position.
- Open the protective door and unload the workpiece.

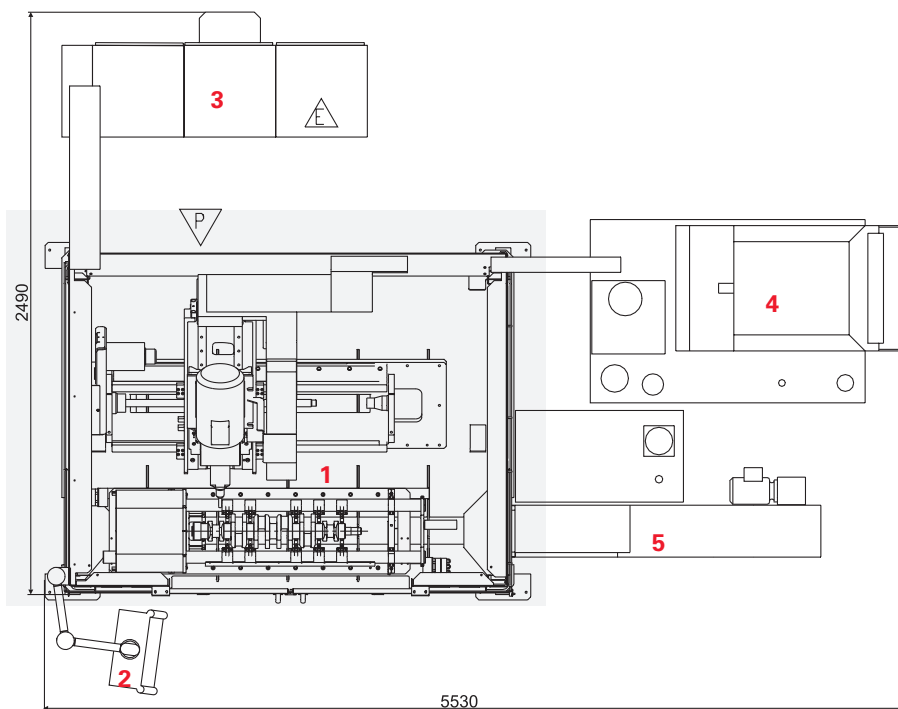
## Layout

Single station machine with solid balancing frame and hydrodynamic multiple bearing. Hook drive for driving the crankshafts at the crank journal. Offset drilling unit arranged at the rear with NC-controlled drilling machine.



Welded machine bed with funnel shaped opening for discharging the drill chips to the swarf extractor. The indexing of the crankshaft, the

positioning of the drilling unit and the drilling depth control is effected by means of a microprocessor measuring device.



- 1 Machine
- 2 Control panel
- 3 Control cabinet
- 4 Cooling agent preparation unit
- 5 Swarf extractor

Cooling agent preparation unit with 30µ band filter and high pressure pump for operation with lubricant emulsions or oil and high pressure pumps for internal cooling of the drilling tool.

Lifting device: as intermediate place of deposit in case of manual loading in order to protect the main bearings of the crankshaft, consisting of brass V-block inserts.

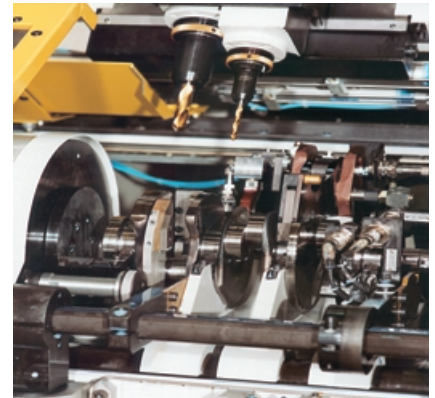
## Optional equipment

- The unbalance is measured and corrected in one station so that less operating steps are required
- Due to the vibrating frame with multiple half shell bearings the load per surface unit arising during drilling is reduced and less strain is put on the main bearings. The bearings are lubricated and optionally flushed.
- The design is made for the use of carbide tools. The sturdy construction allows for using the tools in accordance with their specification. All forward feed data are entered at the control panel and saved for each crankshaft type. Applying this method, the drilling parameters can be adapted to the requirements of the tool. As a consequence the tools have a long service life at best possible exploitation of the performance data.

The drilling spindle with bearing as per DIN 69002 is sufficiently dimensioned and offers reserves for future cutting materials.

- Changeover: All workpiece specific components are easily accessible and the majority of them is equipped with quick action clamping devices. A changeover takes clearly less than one hour.
- Drive by means of a precision spindle and a hook driver that locates a crank pin. This ensures easy loading and creates a defined connection between crankshaft and drive. When asymmetric crankshafts are balanced their free moment is compensated for at the drive spindle. Hold down devices prevent the crankshaft from lifting off during the rotation.

## Technical specialties



Optional equipment with twin-spindle drilling head. For applications that require two drilling diameters for one crankshaft, e.g. in case of 2 step correction of asymmetric crankshafts.

### CAB 850

Efficient measuring device of industrial PC standard with 15" touch screen, digital signal processing, software module for calculating the crankshaft correction, large type data memory, comfortable operator guidance, diagnosis programs and statistics software.

The CDM program (Centering Data Manager) included in the measuring device can determine bias values for the centering operation on the basis of the initial unbalance data and the process description.



## Data at a glance

Type	320 SBRK	320 SBRK-2	520 SBRK	520 SBRK-2
Measuring unit	CAB 850	CAB 850	CAB 850	CAB 850
Passenger vehicle crankshafts	•	•		
Light commercial vehicle crankshafts		•	•	•
Heavy commercial vehicle crankshafts			•	•
Asymmetric crankshafts	•	•	•	•
Journal sleeve shell and hook drive	•	•	•	•
NC-controlled drilling	•	•	•	•
Minimal lubrication possible	•	•	•	•
Chip conveyor	•	•	•	•

### Crankshaft

Weight, max. <sup>1)</sup>	kg	4 - 10	8 - 40	30 - 100	30 - 160
Total length	mm	200 - 420	350 - 790	500 - 1000	500 - 1400
Journal distance, max.	mm	60 - 320	240 - 660	350 - 750	350 - 1100
Correction plane distance	mm	30 - 280	200 - 600	300 - 700	300 - 1050
Main journal diameter	mm	30 - 60	40 - 80	65 - 125	65 - 125
Outside diameter	mm	80 - 150	120 - 200	160 - 310	160 - 310
Crank-pin diameter	mm	20 - 45	30 - 60	50 - 90	50 - 90
Stroke	mm	40 - 80	55 - 95	100 - 160	100 - 160

### Machine

Width <sup>4)</sup>	mm	3 000		
Depth <sup>4)</sup>	mm	2 200		
Height <sup>4)</sup>	mm	2 520		
Balancing speed	min <sup>-1</sup>	400	265	
Measurement uncertainty <sup>2)</sup>	gmm	30	50 - 80	
Cycle time <sup>3)</sup>	sec	90 - 240		
Air pressure	kPa	600		
Power consumption	kVA	18		

- 1) Without bob weights, with manual loading max. 15 kg
- 2) Acc. to DIN 1319, 95% probability, work-piece dependent, (without uncoupling and unloading)
- 3) Minimum achievable times, dependent on crankshaft
- 4) Plus control cabinet, chip-conveyor and optional coolant preparation, data non-binding, dep. on equipment



### Balancing and Diagnostic Systems

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