

## ceno Crankshaft balancing machine



- High-precision balancing of small and medium-sized crankshafts
- Integrated circular transfer for internal replacement of crankshafts
- Modern, energy-efficient drive and transport concept
- Space-saving monoblock construction
- Machine equipped with hook for quick commissioning
- Fully-automatic machine design
- Fast refitting to other types
- Ergonomic operating concept

### Application area

The CENO is a compact automatic balancing machine for small and medium-sized crankshafts up to a maximum weight of 20 Kg. By means of standardised interfaces, it can easily be integrated into customers' loading and unloading devices – even as a retrofit. For smaller numbers of parts, the overall concept allows the CENO to be loaded manually without any restrictions.

The machine is equipped with a high-precision balancing unit with end-drive, which also allows asymmetric crankshafts to be balanced without master ring weights. The unbalance correction is carried out by optimised polar drilling into the counterweights. Due to the use of minimum quantity lubrication, no cooling or lubricating agents are required, and the workpieces can be processed further without cleaning. For unbalance measurement and correction calculation, the CENO is equipped with the high-end CAB 950 measuring unit. This offers all functions important for production, from the optimum correction calculation, to accurate correction control and on to statistical process reports. The measuring unit is easy and logical in operation, and offers optimum convenience thanks to

its touch-screen operation.

### Mechanical layout

The machine is designed as a compact crane-hook machine, in which all machine elements are mounted on a common platform. This reduces the space requirement by 50 to 60% in comparison to conventional solutions. It also enables very fast and therefore cost-effective commissioning. After placement and alignment of the machine on a firm surface, all that remains to be done is to connect the electricity supply and compressed air. The CENO consists of an unbalance measurement station, the correction station with drill unit, a pneumatic circular transfer for internal transport of the crankshafts and a central air-conditioned switch cabinet, which accommodates the electrical, electronic and pneumatic components. The CE-compliant safety features enable easy access to the machine components.

An easily accessible swarf carriage is integrated in the machine bed under the clamping station, which catches



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the swarf created during unbalance correction. The machine can optionally be equipped with filling level detection.

Optional drive usage. Simple, time-saving replacement of the individual drive.

#### Safety

The CENO fulfils all current safety and health requirements of EC directives and standards. The machine is CE-compliant and carries the CE symbol. The electrical design complies with DIN EN 60204 (VDE0113).

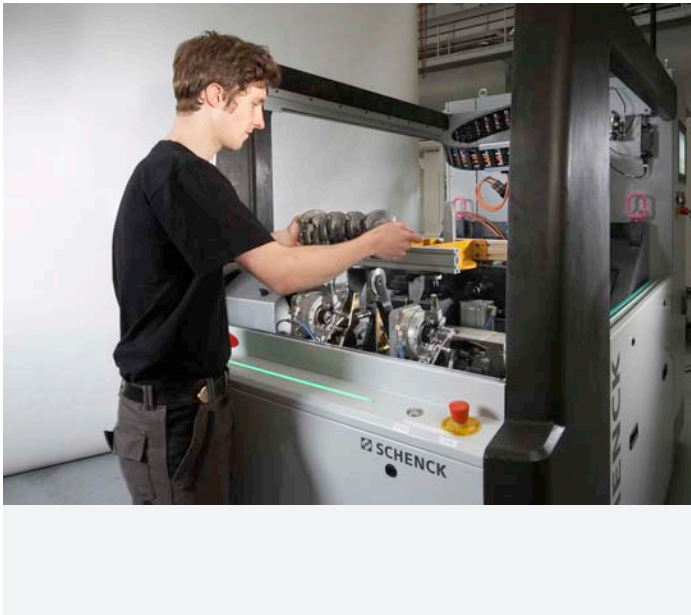
#### Energy efficiency

The CENO has been consistently designed for light construction, in order to reduce the mass to be moved. The smaller drives therefore used approx. 25 % less energy than comparable solutions.

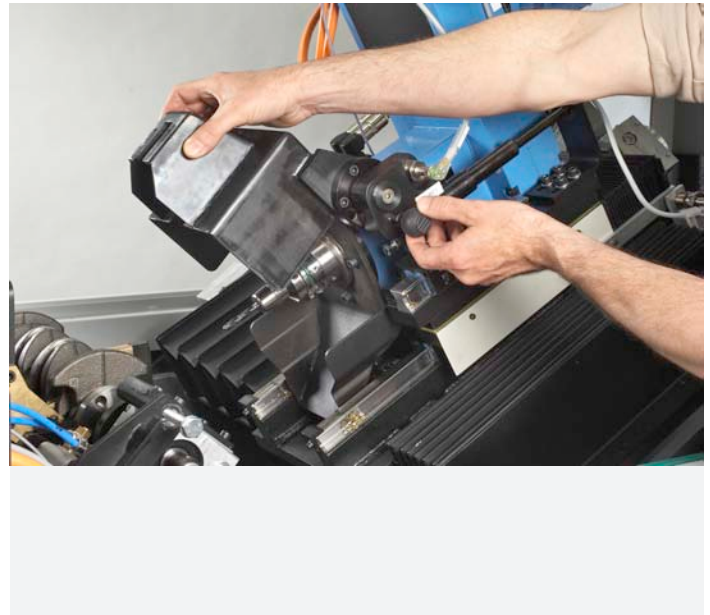
By the use of minimum quantity lubrication, it has been possible to dispense with the complete coolant supply and preparation: no pumps, no cooling, no filtering, no costly environmentally-friendly disposal. The work pieces can be processed further without cleaning, and the swarf is sent for recycling without further treatment.

The intelligent disposal concept, in which the swarf is collected directly, removes the need for an energy-intensive swarf conveyor.

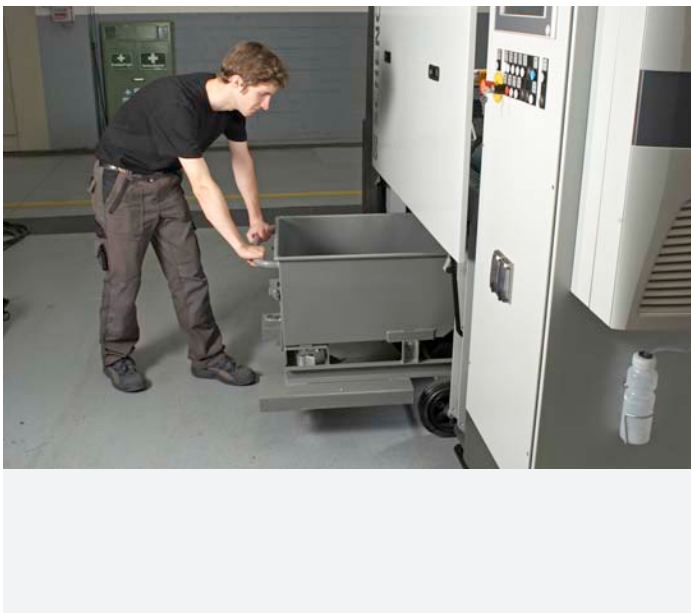
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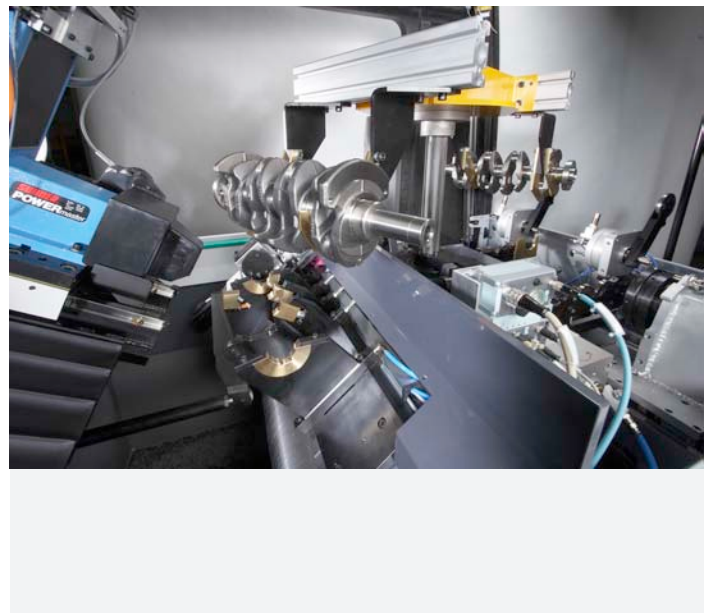
The easily accessible working area is also ideally suitable for manual loading



Easy and fast tool changing at the correction station

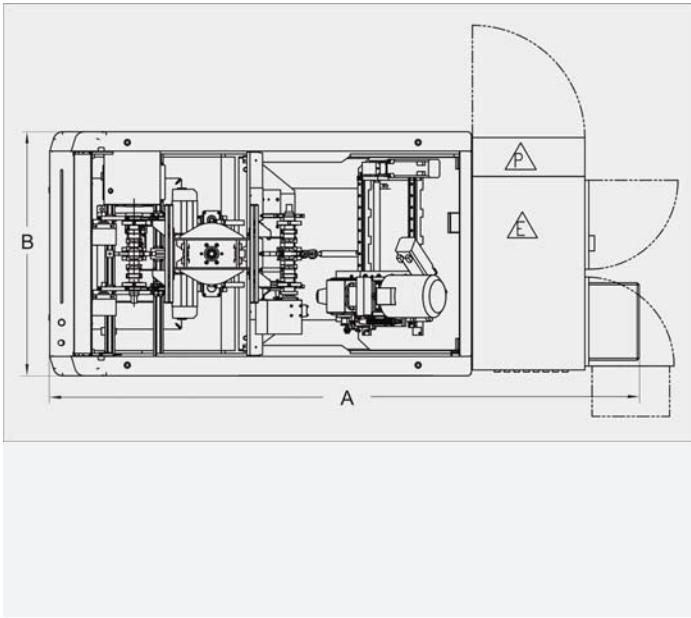


Easily accessible, integrated swarf carriage



Circular transfer of the crankshafts from the measurement station to the correction station

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Floorplan ceno

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## Crankshaft balancing machine

### Data at a glance

#### Rotor dimensions

Crankshaft weight	[kg]	20
Overall length	[mm]	500
Distance from shaft centre to drive end	[mm]	100 à   240
Main bearing spacing, max.	[mm]	(12
Correction plane spacing	[mm]	400
Main bearing diameter	[mm]	40 ... 70
Rotation diameter	[mm]	max. 180
Correction bore diameter	[mm]	VHM to 12 mm, HSS to 16 mm

#### Machine

Width	[mm]	
Depth	[mm]	
Height	[mm]	

#### Total weight

Mains connection		400V / 3Ph / 50 Hz, ??Amp.
Balancing speed, fully adjustable	[min-1]	450
Measurement uncertainty	[gmm]	10 à   25
Drive type		End-drive
2-tone painting		RAL 7035 (light grey), RAL 7024 (graphite grey)

#### Measurement units

	CAB 950 with touch-screen operation
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#### Options

	Protective cover to ISO 7475 class C (protection against ejected parts)
	Contact protection for automatic loading
	Filling level display for swarf carriage
	Master shafts with test weights