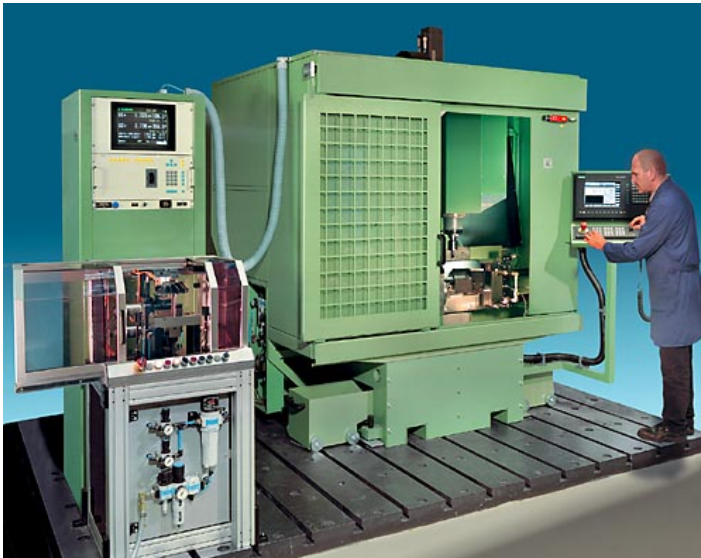


210 FBLS, 410 FBLS Balancing Machines for Turbocharger Turbine Rotors



- Automatic balancing
- Short cycle times with extremely high initial unbalance
- Air-bearing support for extreme measurement accuracy
- Digital measured data processing and numerically controlled unbalance correction
- Effective milling correction in machining center
- Easy change over to other rotor types

Range of application

Measurement and correction of unbalance in machined turbocharger turbine rotors. Use of the machine in mid- to high-volume production. Fully automatic unbalance measurement and correction in two planes and in up to two correction steps. Manual loading and unloading.

Design

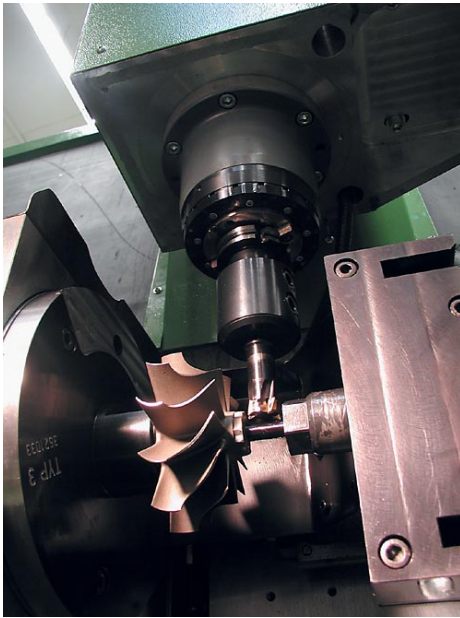
Two-station machine with measuring and correction station and fully automatic operating sequence. Vertical balancing unit on a vibration-optimized machine frame of aluminium profile, type-dependent, exchangeable precision air-bearing support for the turbine rotor, drive through a drive-plate with air-jet adapted to the rotor diameter.

Measured data processing by CAB 750 measuring unit. Correction station configured as a vertical traversing-stand machining center, with CNC machining unit for unbalance correction by polar milling on the hub-side and at the rear of the turbine rotor. Integrated tool changer with 12 tool positions.

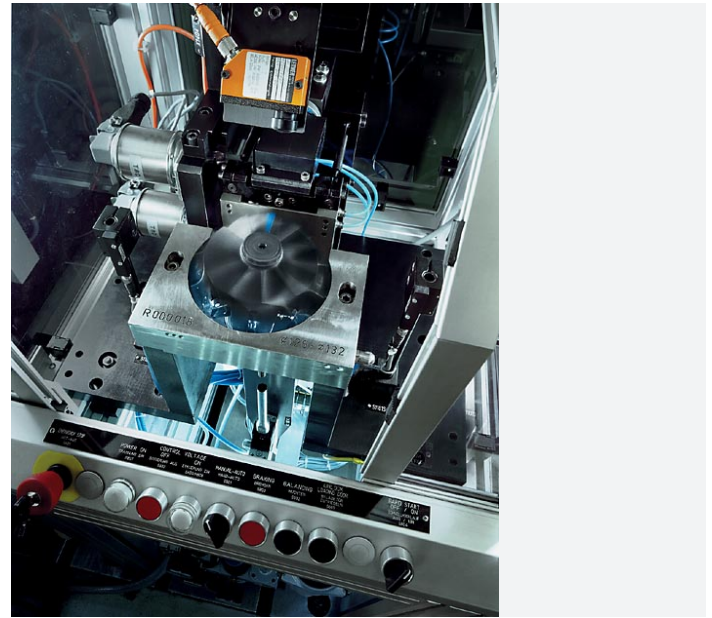
Sequence of operations

- The work-pieces are removed from the conveying equipment, provided with a reference mark and inserted into the measuring station
- Automatic measuring run. Calculate and transfer the processing values to the correction station, brake to a stop
- Remove the rotor from the measuring station and load it into the correction station, align the reference mark
- Automatic correction: clamp, select the right correction tool, index to the correction position and mill the 1st plane. Index to the correction position for the 2nd plane, repeat the milling process and unclamp
- Transfer the rotor to the measuring station and start the check run. If the unbalance after the 1st correction step is not in tolerance, a 2nd correction step can be carried out
- Remove the work-piece and place it on the conveyor

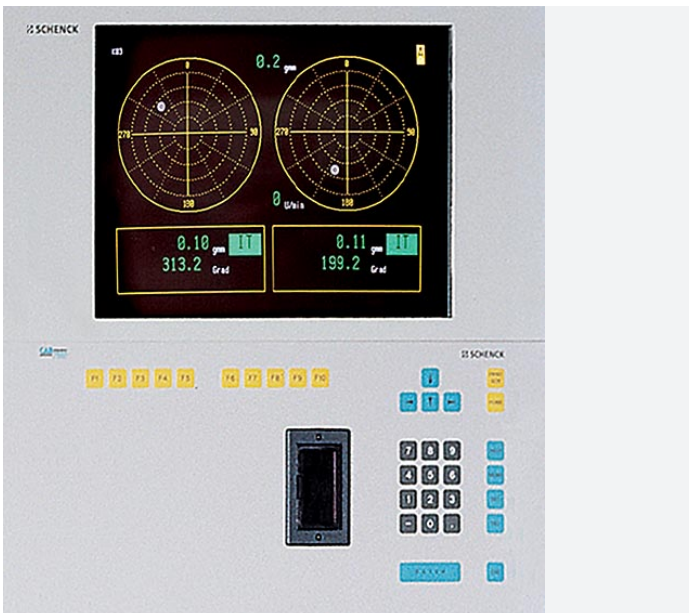
210 FBLS, 410 FBLS Balancing Machines for Turbocharger Turbine Rotors



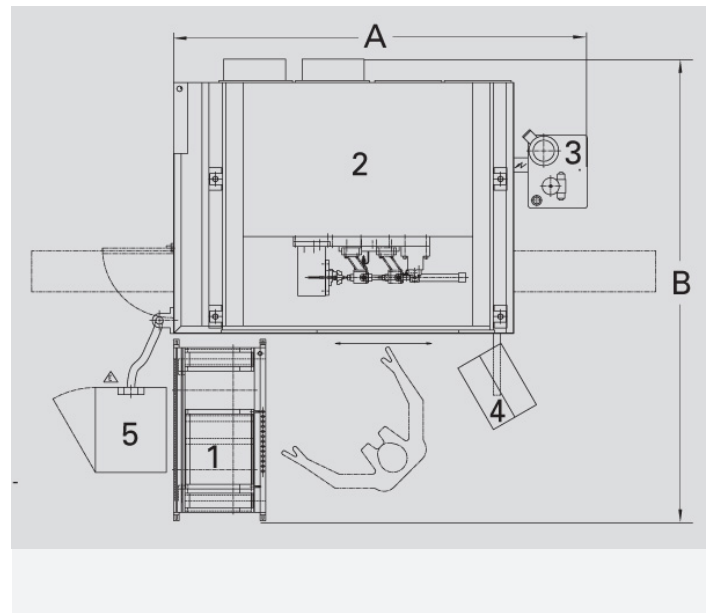
Fully automatic unbalance correction in two planes by milling on the hub and at the rear of the turbine rotor. This allows a large amount of material to be removed in a short time in case of high initial unbalance.



The rotor is supported by an air-bearing support system and driven by non-contacting means with the air-jets. A lifting-loader is integrated for simple and gentle loading and unloading of the rotor.



The measuring unit with digital signal processor has an ergonomic, graphics-capable monitor and an integrated keyboard. An easy-to-use operator interface, largely automated set-up procedure and diagnostic programs simplify the operation. Software modules for calculating standard and complex correction methods are installed. Further features are: large rotor data memory, statistics software, external interfaces.



1 Measuring station 2 Correction station 3 Switch cabinet 4 Dust extractor

Plan view (non-binding example of 200 FBLS: dimensions and set-up of the switch cabinet depend on the relevant application)

210 FBLS, 410 FBLS Balancing Machines for Turbocharger Turbine Rotors

Technical data at a glance		210 FBLS	410 FBLS
Measurement unit		CAB 750	CAB 750
Automatic unbalance measurement		•	
Automatic unbalance correction		•	
Manual rotot handling			•
Turbine rotor			•
Compressor rotor		•	
Rotor			
Weight	[g]	100 - 600	400 - 1600
Diameter	[mm]	45 - 95	65 - 125
Machine			
Width A	[mm]	3500	3500
Depth B	[mm]	3000	3000
Height C	[mm]	2800	2800
Balancing speed, max.	[min ⁻¹]	2200	2200
Measurement uncertainty	[gmm]	0,01 - 0,1	0,05 - 0,3
Cycle time	[s]	60 - 120	70 - 120
Air pressure	[kPa]	600	600
Air consumption	[m ³ /h]	18	18
Power consumption	[kVA]	20	20

	Order No.	R0400100.01	R0400200.01
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	Order No.	o.r.	o.r.
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Control cabinet cooling device	Order No.	R0400101.01	R0400201.01
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Remote Control	Order No.	o.r.	o.r.
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- 2) Acc. to Din 1319, 95% probability, work-piece dependent
- 3) Dependent on the initial unbalance
- 4) Data non-binding, dependent on the respective equipment
- 5) Polar milling at the hub and at the rear
- o.r. on request

A large industrial balancing machine is shown in a factory setting. A large, complex turbine rotor is mounted on the machine's spindle. The machine has a blue and white color scheme. The background is slightly blurred, showing other parts of the factory.

210 FBLS, 410 FBLS
Balancing Machines for Turbocharger Turbine Rotors