

Active Balancing

Electromagnetic Ring Balancer AB 9000

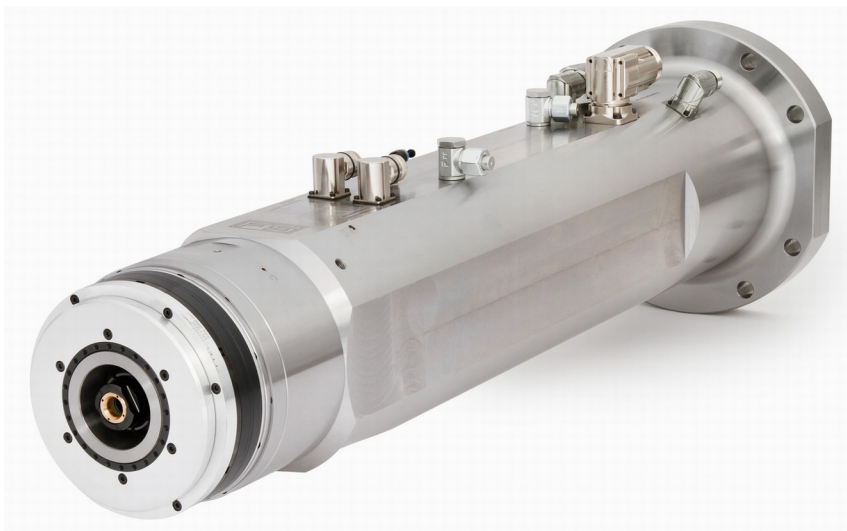


Advantages

- Achieving perfect running condition
- Ring design for universal adaptation
- Time savings through fast electromagnetic drive and adaptive balancing methods
- Increased product quality and machine availability
- Suitable for very high speeds
- Permanent vibration monitoring
- Neutral position for manual pre-balancing
- Automatical generating unbalance for system identification
- Windows based visualisation software
- Field balancing software

Applications

- Balancing during machine operation
- Monitoring unbalance vibrations
- Compensation of process unbalance



Grinding spindle (design type Heinz Fiege GmbH/Röllbach/Germany) with AB 9000 balancing unit

Description

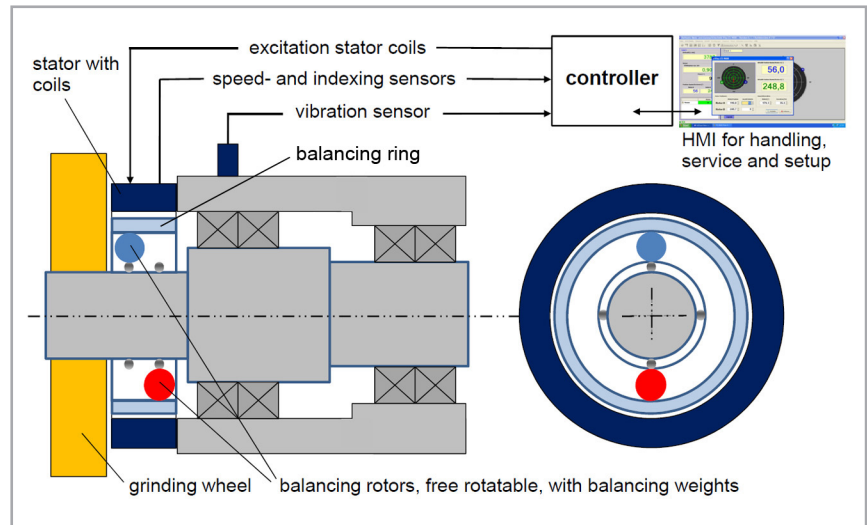
Principles of operation

The active balancing system AB 9000 automatically compensates unbalance during the operation of a machine. Therefore two balancing rotors are built into the rotating part of the balancing unit. These rotors rotate freely on the rotational axis.

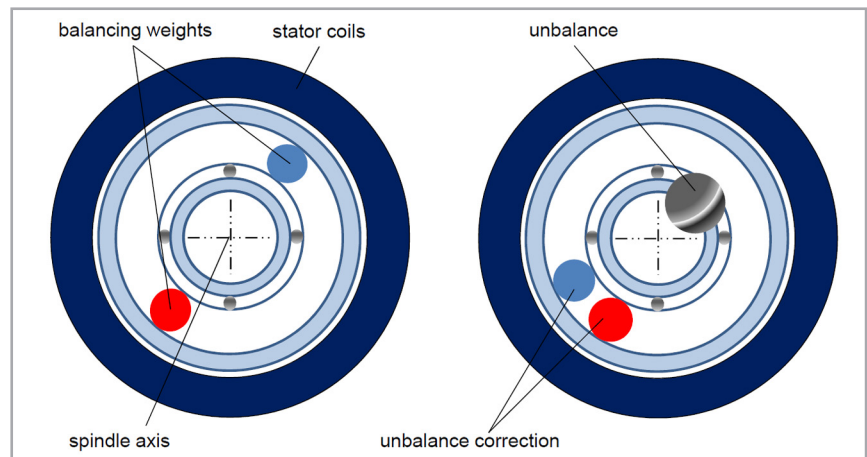
If the rotors' balancing weights are positioned directly opposing each other, their effect is neutralised. The entire balancing capacity is obtained by placing the weights at the same angular position.

The measured information - rotor speed, angular position of balancing rotors and vibrations - are captured by a fast controller unit using adaptive algorithms. If the vibration exceeds preset limits, an automatic balancing run is started. The balancing rotors are moved via non contact transmission by activation of the stator coils so the drive system is wearless.

The setting and operation of the AB 9000 as well as the visualisation of the automatic balancing process is handled by a PC software. The software runs on a PC/laptop or is directly installed on the PC of a machine control. The software also includes field- or pre-balancing in case the rotor unbalance exceeds the balancing unit's capacity. For the pre-balancing run, the balancing rotors are moved in neutral position to correct only rotor unbalance; thus, preventing the consumption of balancing capacity.



Components of the balancing system AB 9000



Principle of operation

System characteristics

AB 9000 balances using a direct adaptive procedure. The positions of the balancing rotors required to compensate the unbalance are calculated based on the actual measuring data. Thus, only a minimum number of balancing steps are required not only for one plane balancing but especially if two planes need to be balanced automatically.

As the system adapts to new boundary conditions after each corrective step, changes of a machine's dynamic transfer properties due to temperature or speed changes pose no problem whatsoever.

The innovative active balancing system AB 9000 is a device that very effectively reduces the unbalance vibration.

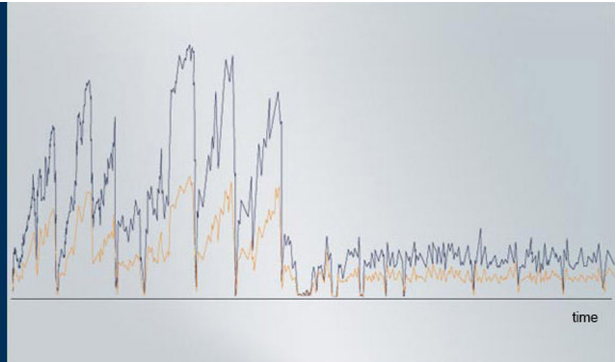
Because of this the availability of machines will be increased significantly. Also maintenance intervals will be extended, production downtimes will be avoided.

With its ring design, the AB 9000 can be easily integrated in new or existing machine designs.

Long-term monitoring of a fan in the cement industry

The diagram shows the long-term behavior of bearing vibrations of an approx. 12 ton fan impeller before and after the installation of an AB 9000 system.

The vibration amplitude of the floating bearing side (blue) and the fixed bearing side (orange) is shown over a period of 9 months without AB 9000 and with AB 9000 respectively.



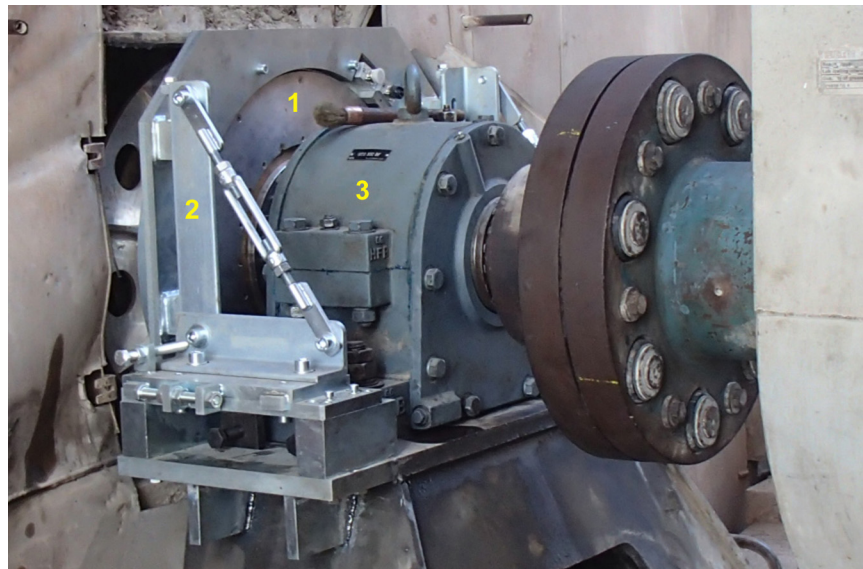
Application examples

Machine tools (examples)

- Automatic balancing of grinding wheels and grinding spindles.
- Automatic balancing of high speed milling spindles.
- Automatic unbalance correction at MillTurn machining of unsymmetrical parts, with compensation of the clamping device unbalance.

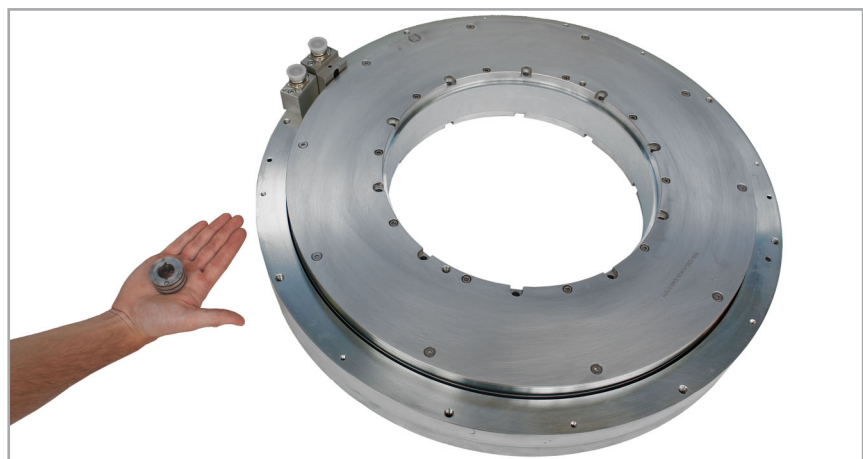
Process industry (examples)

- Fans; correction of the unbalance due to the coating of powder and chipping of powder parts.
- Paper rolls; correction of the unbalance because of termical deformation.
- Correction of hydraulic pump unbalance.
- Separators and centrifuges; correction of the variable unbalance during the process.

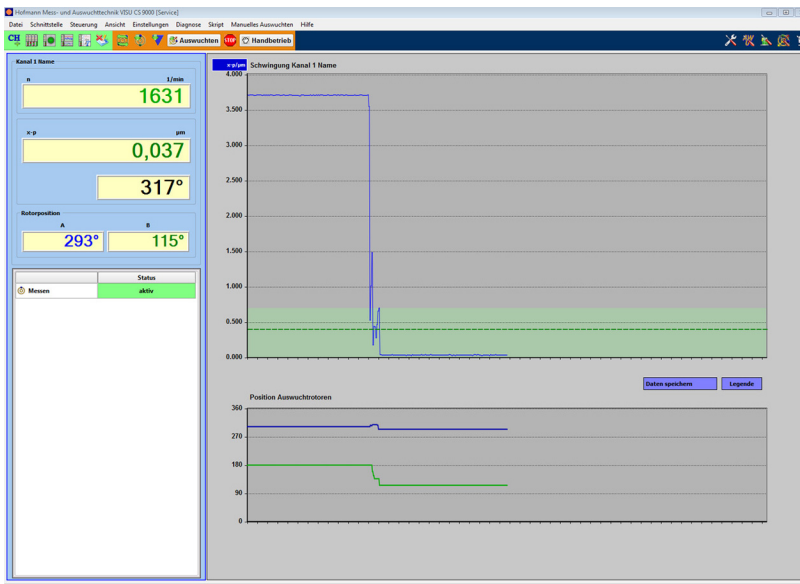


Large radial fan with installed balancing unit

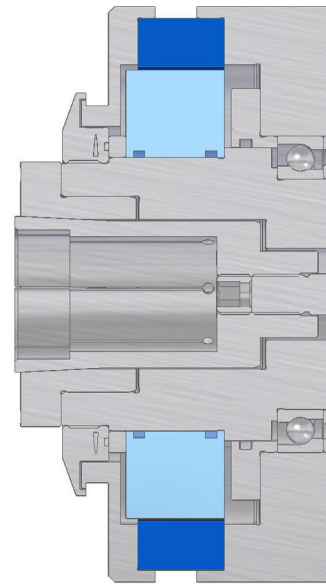
1 Balancing ring, 2 Stator mounting adapter, 3 Bearing housing



Ring balancing systems BU 9000 smallest and largest version of the model series



CS 9000 - HMI-software



BU 9000 - spindle installation

Technical data

Ring balancing units BU 9000 - Details and application data on request

Controller AB 9000	2 Channel	4 Channel
Max. no. of controllable balancing units	2	4
Balancing planes	1 or 2	
Speed range	200 to 50,000 1/min	
Vibration sensor		
Accelerometer	e.g. HMA 1840	
Velocimeter	e.g. PMG 81	
Vibration display	μm , mm/s, m/s ² , g	
Range	0,01 to 1,000 μm depending on speed and used vibration sensor	
PC interface	RJ 45	
PLC interface	analog, digital, PROFIBUS, PROFINET	
Dimensions (BxHxT) in mm	210 x 120 x 280	483 x 120 x 280
Power supply	230 V, 50 - 60 Hz, 400 W	

Scope of supply

- Balancing unit BU 9000 consisting of balancing ring and stator with sensors
- Cable set
- PC software CS 9000
- Controller AB 9000
- Operating instructions
- Vibration sensor

All information without obligation,
subject to change without notice!