

SIEMENS



Intelligent bearing technology for powerful machines

Active magnetic bearings based on proven standard Siemens components

SIMOTICS Active Magnetic Bearing-Technology

[siemens.com/simotics-amb-technology](https://www.siemens.com/simotics-amb-technology)



Well-proven products perfectly integrated – for optimum operation

Active magnetic bearings (AMB) are used where conventional bearings reach their mechanical limits. These include machines with high power ratings with large shaft diameters that operate at high speeds. Their oil-free design ensures low maintenance costs and makes them the optimum choice if environmental and fire protection regulations or process-related reasons make it necessary to have lubricant-free operation. For example, this is the case for pipeline compressors in nature conservation areas – or when it comes to manufacturing plastics for medical applications. Remote monitoring, remote operation and predictive maintenance concepts can be simply implemented based on the embedded intelligence.



Security of investment

Bearings with no friction and no wear



Quality and availability

150 years of experience in building electrical machines – and application of proven standard Siemens industrial products used millions of times around the globe



Protection and safety

No process pollution, can be deployed in ecologically sensitive areas and lower fire hazard as oil is not used



Optimized operating costs

Predictive service concepts based on integrated intelligence



Optimum integration

Standardized products, systems and software solutions

Innovation in detail

Contactless and precise

For a drive train equipped with SIMOTICS Active Magnetic Bearing-Technology, controlled magnetic fields maintain motor and compressor rotors at the center of the bearing. There is absolutely no contact – and therefore no friction and wear. This precision is achieved by sensors that sense the shaft position 16,000 times per second. Based on this information, a controller regulates the magnetic fields so precisely that even rotors weighing several tons are held in a position window having the diameter of a human hair – and that when operating at maximum speed.

Optimum vibration behavior and active compensation of disturbing influences

The electronic controller in an active magnetic bearing allows disturbing influences to be compensated in a very focused fashion. Contrary to rotors with conventional bearings, with active magnetic bearings, vibration caused by unbalance is actively compensated and dampened. This means that even for large machines, a continuous speed operating range from standstill up to maximum speed can be implemented – without having to block speed ranges at rotor resonance points, as is the case when conventional bearings are used.





No oil

- Use in ecologically sensitive areas
- Lower fire risk
- No process pollution
- No leaks at high circumferential velocities
- Lower maintenance costs

Contactless

- High speeds for large shaft diameters
- No friction losses
- No wear

Intelligent

- Continuous speed range using active damping
- Disturbing influences are actively compensated
- Remote monitoring and remote operation
- Valuable status information is automatically supplied for data-supported service concepts

Maintenance-friendly technology based on well-proven components

Perfect interaction of well-proven components

Standard SINAMICS S120 closed-loop control technology is extremely precise, rugged and has proven itself in reliable operation millions of times over. An application-specific software extension based on SINAMICS Technology Extension (SINAMICS TEC) makes it the optimum core component of an integrated control cabinet solution for SIMOTICS Active Magnetic Bearing-Technology. The system is completed using well-proven control, communication and visualization systems from the SIMOTION, SINAMICS, SITOP and SIRIUS product families. Operation is intuitive using a customized human-machine interface solution. Remote access is also possible from a PC or a higher-level control room.

SIMOTICS AMB-Technology profits from the experience that our engineers have accumulated over decades, and who have developed a stable hardware that is simple to install. Powerful standard SINAMICS converters permit a large air gap, which additionally simplifies installation. In total, this results in an extremely rugged and reliable system. The system can be installed and commissioned in a short time.

Uniform standards along the complete drive train

SIMOTICS AMB-Technology is based on the same standard SINAMICS components as the large SINAMICS converters – with identical engineering and service interfaces. For drive trains with electric motors equipped with magnetic bearings, a standard operating and monitoring concept is created for the electrical cabinet for the magnetic bearings and the large converter itself – minimizing training costs. The same Siemens service personnel can carry out any service work, and when spare parts are required, the same hardware components can be used.

Integrated intelligence for predictive service concepts

SIMOTICS AMB-Technology automatically supplies valuable, service-relevant operating information such as

- shaft position
- currents – which represent a measure of the forces that are necessary to hold the rotor
- voltages – which represent a measure of the control reserve of the amplifier to be able to handle the dynamic forces
- operating temperatures

This data is an ideal basis for preventive and predictive service. This ranges from integration in condition monitoring concepts – such as SIPLUS CMS4000 – up to integration in cloud-based service concepts such as MindSphere – Siemens Cloud for Industry. This means that trends in operating parameters and deviations from the ideal state of the driven machine and the downstream process can be detected. As a consequence, irregularities can be resolved as part of routine maintenance work. This results in maximum machine availability.

Simple and efficient online remote monitoring and operation

As a result of the digital control technique and the standard communication components from the Siemens portfolio, machines equipped with SIMOTICS AMB-Technology can also be easily remotely monitored – for example, using a higher-level SIMATIC PCS 7 process control system. This is especially attractive for distributed plant and system concepts, such as pipelines with remote compressor stations. Also subsea applications profit enormously from the maintenance friendliness of this innovative technology.



Safety and reliability

- Intelligent closed-loop control concept supports predictive, data-supported service concepts
- Maximum reliability and precision based on Siemens products and solutions that have been proven millions of times over
- Powerful converter technology for rugged and reliable bearing design
- Global availability of spare parts and straightforward service
- Customized operation for simple handling and integration

More information:
[siemens.com/simotics-amb-technology](https://www.siemens.com/simotics-amb-technology)

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Article No: PDL-D-B10034-00-7600
Dispo 21503
D&M/79860 WS 04162.0
Printed in Germany
© Siemens AG 2016

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