

Safety Brakes

For Wind Power Plants



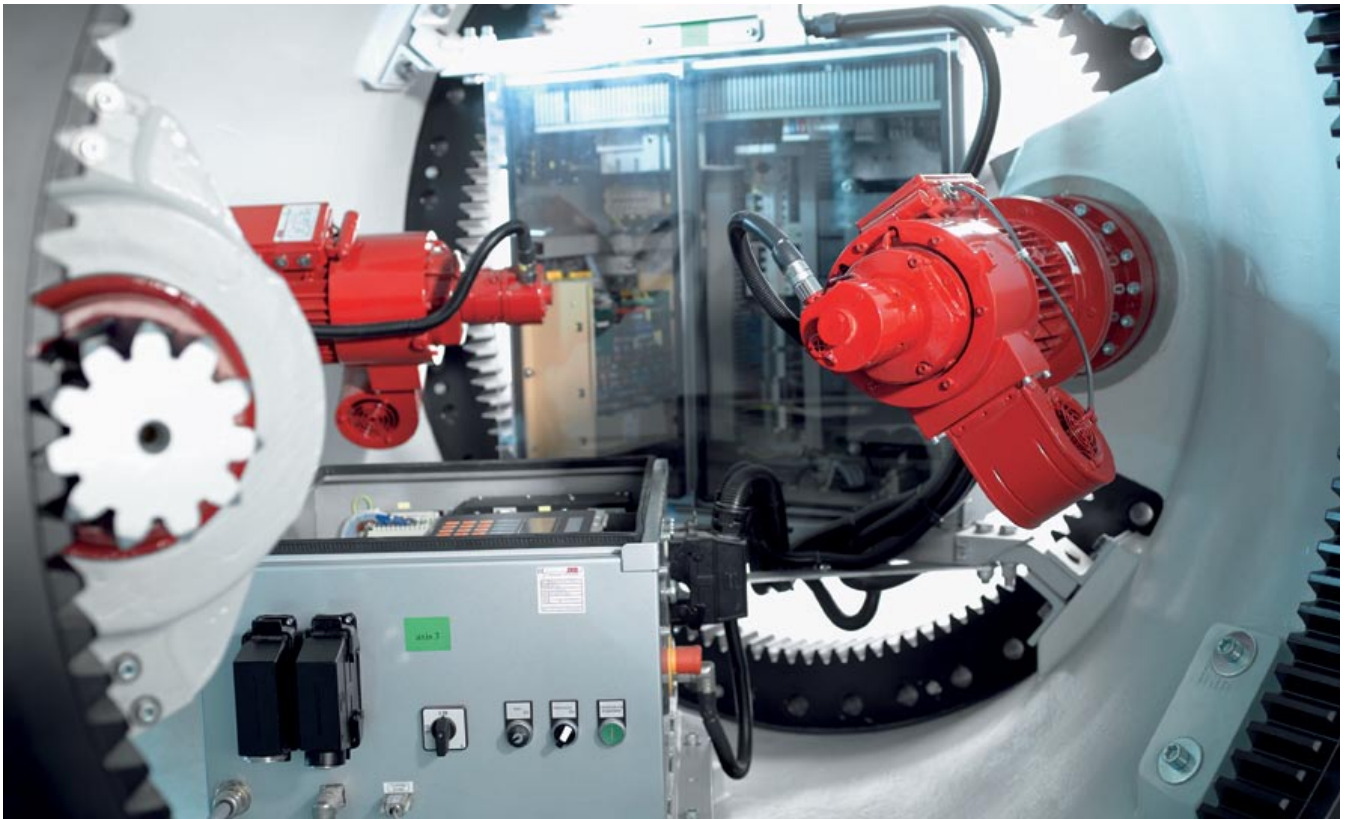
*Perfect solutions for pitch
and azimuth drives*



www.mayr.de

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mayr[®]
your reliable partner



A mayr® wind power brake in operation

Operating reliability around the clock

The profitability of wind power plants, above all in the offshore sector, is determined by the wind conditions as well as operating reliability and any resulting downtimes. These downtimes can be substantially minimised by correct selection of the individual drive components.

As well as good dimensioning, the use of high-quality long-life products already tried and tested on this application are absolutely essential.

Using our ROBA-stop®-M safety brakes for pitch and azimuth drives, you can profit from the years of experience with wind power gained by us in collaboration with renowned drive manufacturers.

- **Maximum reliability** due to application-oriented product design.
Over 10 years of experience in wind power went into the development of our maintenance-free wind power brake.
- **Minimum downtimes** due to fast delivery and support from our worldwide network of representatives and subsidiaries.
- **Better competitive ability** thanks to maximum product performance:
Due to constant further development and specific load tests in our own testing department, our products are always in line with the latest advancements in technology.
- **Low procurement costs** due to use of our wind power standard brake.
- **Reduction of operating costs** due to reducing the holding power by up to 88 %. With this energy-saving wind power brake design, you can reduce not only your costs, but also produce a complete environmental concept.
- **Constructional freedom of design** due to our readiness to provide customer-specific special solutions. In collaboration with our design engineers, we are able to realise customer-tailored special constructions within a short period of time.

Offshore – Our know-how

For 20 years, the company *mayr*[®] power transmission has supplied a seawater brake, the ROBA-stop[®]-S, especially developed for these ambient conditions. This product is used in maritime applications such as on ship's winches and harbour cranes.

This know-how and the experience thus gained has flowed into our pitch and azimuth brake, the ROBA-stop[®]-M for offshore wind power plants, which come in high-quality corrosion protection designs, and in versions with high protection classes such as IP65.

100 % Quality Assurance

A comprehensive, 100 % initial inspection is carried out for all brakes on technical characteristics such as the spring force, air gap and tightening and drop-out voltages in order to guarantee immediate and reliable use of all brakes on delivery.

Short-term availability

The standard-design wind power brake is available at extremely short notice and can secure you competitive advantages for projects which are critical in terms of time, as well as for spare parts deliveries.

Pitch drive with angular gear and *mayr*[®] wind power brake

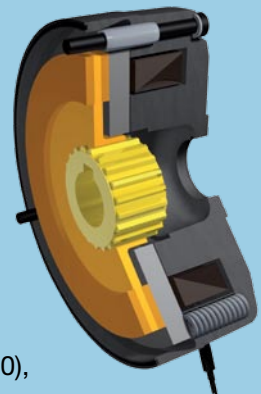


ROBA-stop® wind power brake
 – the perfect safety brake
 for pitch and azimuth drives



Motor for pitch and azimuth drives with integrated ROBA-stop® wind power brake

- Braking torque 8 to 250 Nm (Sizes 16 – 150)
- Phosphated armature disk
- Protection IP54 - IP65
- Metal rotor
- Insulation class F (155 °C)
- Relative switch-on time 100 %
- CSA approval
- Cable length 400 mm (600 mm from Size 100), other lengths available on request
- Power supply possible from the frequency converter intermediate circuit
- Easy installation and high operating reliability due to enclosed housing
- 100 % quality control



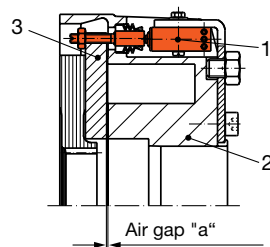
We regard your special requirements as options

We offer a wide range of supplements and options for our ROBA-stop®-M safety brakes. They make adaptation of our brakes to the requirements for your application much easier. The following are some of the most frequently-requested "special fittings":

- Extended corrosion protection
- Mounting preparation for encoders
- Anti-condensation heating (recommended at temperatures below 0 °C)
- Continuous shaft
- Adjustable torque
- UL approval
- Maximum torque tolerance accuracy due to individually-adapted friction lining characteristics
- Microswitch for status monitoring
- Hand release
- Damped rotor

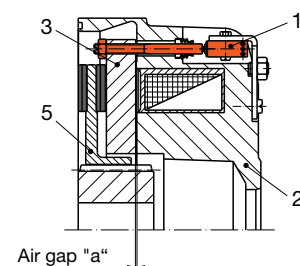
Release inspection

When the magnetic coil in the coil carrier (2) is energised, the armature disk (3) is attracted towards it. A microswitch (1) signals that the brake is released.



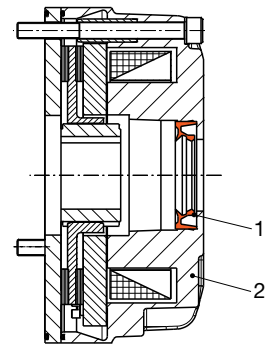
Wear inspection

Due to wear on the rotor (5), the air gap between the coil carrier (2) and the armature disk (3) is increased. Once the maximum permitted air gap has been reached, the microswitch contact (1) switches over and emits a signal. The rotor (5) must be replaced.



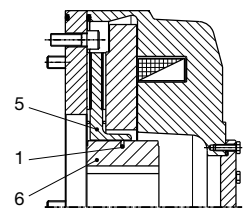
Continuous shaft

The enclosed design (IP65) is equipped with a sealing plug or lid in standard delivery. For continuous shafts, a radial shaft sealing ring (1) is installed in the coil carrier (2).



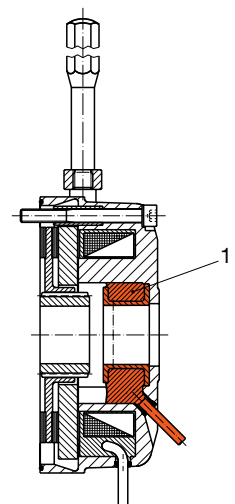
Damped rotor

If vibrations in the drive line prove unavoidable, an O-ring (1) between the tooth hub (6) and the rotor (5) damps any backlash.



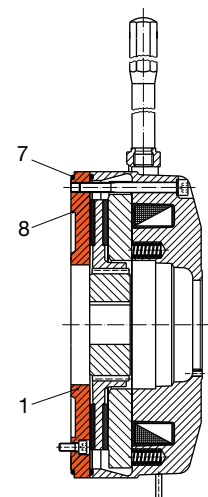
Heating against condensation

The anti-condensation heating (1) serves to prevent condensate raining down into the brake interior. This is especially useful at temperatures below zero degrees Celsius or in high air humidity.



Special flange plate

Flange plates can be adapted to almost any specific requirements, for example as shown here with a customer-specific centring (8) and seal (7).



Consistent energy efficiency



Optimum construction saves resources and reduces the coil capacity

On electromagnetic ROBA-stop® safety brakes, the magnetic flow is optimised by constructional design and material selection so that the required magnetic traction force can be achieved with as low a coil capacity as possible. Optimum dimensioning of the magnetic coils and construction designed to aid magnetic flow are important aspects for energy savings.

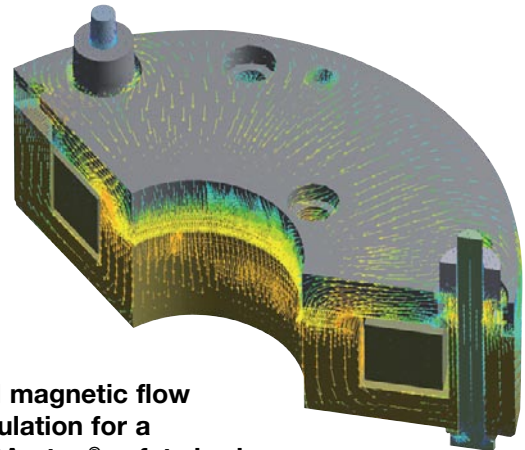
75 % lower energy requirements in operation due to lower voltage requirements

Operating the brake provides far larger potential for making savings than the construction. Up to 75 % of the energy can be saved via optimum control of the brake.

ROBA-stop® safety brakes are generally dimensioned so that they will release at coil nominal voltage even with maximum permitted wear of the friction linings. After release, a far lower voltage is quite sufficient to hold the brake open reliably.

This physical effect is used consistently on ROBA-stop® brakes by controlling them using the ROBA®-switch. Due to the reduction to 50 % of the coil nominal voltage, the electrical power is reduced and therefore the energy requirement by 25 %.

Responsible environmental protection is deeply rooted in our company philosophy. We develop our products according to the maxim of highest possible power density. This saves material and energy over the entire lifetime of the product. Of course we also manufacture using environmentally-friendly processes. This is confirmed by our DIN EN ISO 14001 certification.



FEM magnetic flow calculation for a ROBA-stop® safety brake



ROBA®-switch fast-acting rectifier specially-tailored electrical accessory developed at mayr®

ROBA®-DS *wind power module*

The *mayr*® company's decades of experience with shaft couplings and overload systems for all fields of mechanical engineering form a well-founded basis for our wind power module.

The following characteristics are unified in our wind power module:

● **Safe overload protection**

An integrated ROBA®-slip bushing with specially-developed bushing materials guarantees you secure overload protection against short-circuit torques due to the minimum possible torque tolerance.

● **Electrical insulation**

The electrical insulation via the sleeve made of glass fibre reinforced plastic prevents damage to bearings and tooting.

● **Alignment of shaft misalignments**

Specially-developed, rustproof steel lamellae allow reliable compensation for extremely high axial, radial and angular shaft misalignments. Only low restoring forces occur.

● **Integrated brake disk**

A brake disk can be integrated into the wind power module acc. customer-specific requirements.

● **Ease of installation**

The disk packs and the intermediate sleeve can be radially installed and removed without axial displacement of the hubs being required.

The use of special clamping nuts makes it possible to install the disk packs with low tightening torques.





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