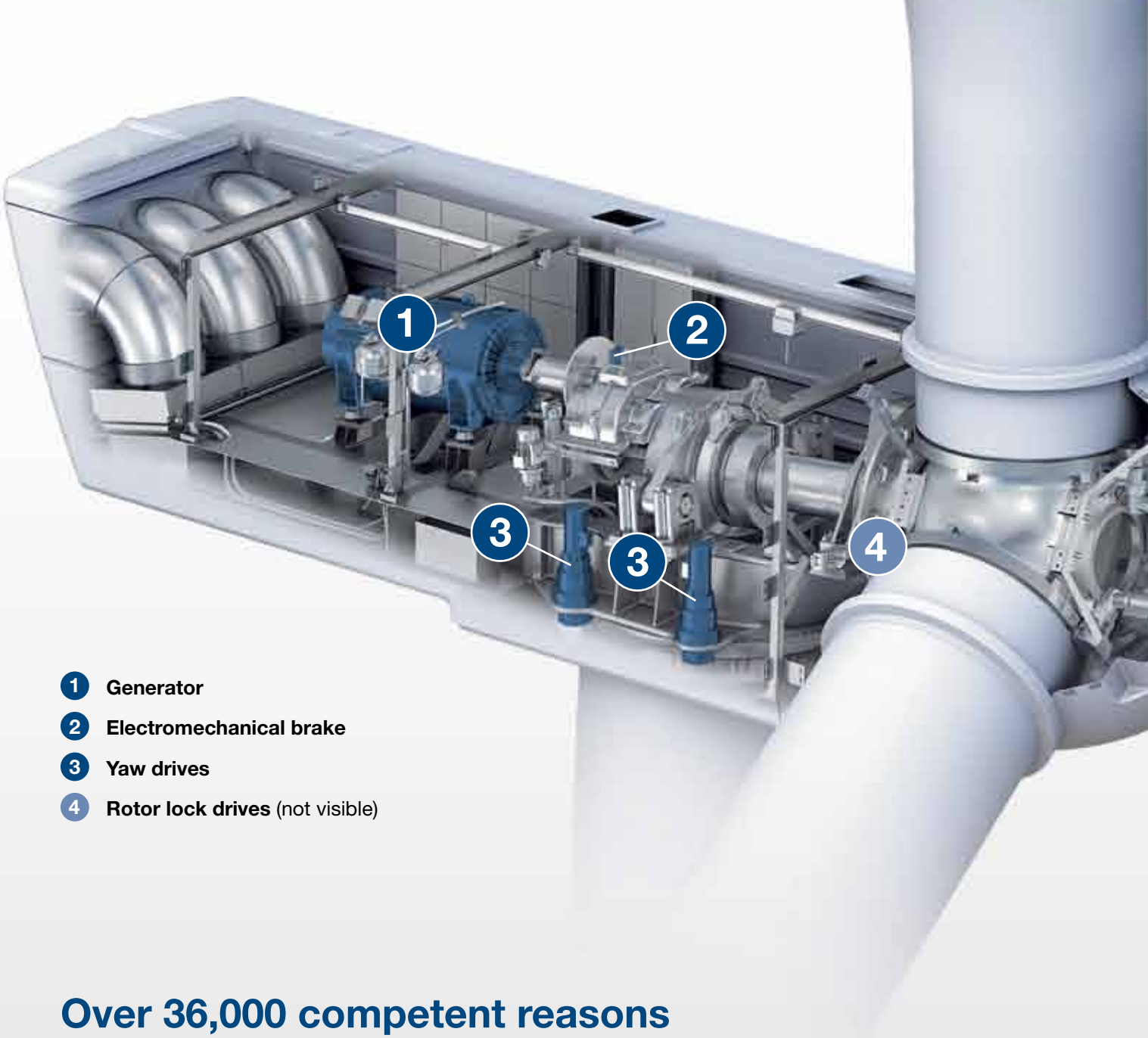
CEDS DURADRIVE
Customised Electrical Drive Systems

There is a perfect drive for every environment.

Individual drive solutions for wind turbine generator systems.



1. **Generator**
2. **Electromechanical brake**
3. **Yaw drives**
4. **Rotor lock drives** (not visible)

Over 36,000 competent reasons for wind energy solutions by CEDS DURADRIVE.

Admittedly, we do not build any rotor blades or even entire rotors or nacelles. So where does our competence in the wind energy sector come from? We develop and construct exactly the drives and solutions, which operate all of the above and keep them running in the long term. From main generators to yaw drives and drives for electromechanical brakes. Because when 40 years of know-how in drive techno-logy are combined with 10 years of experience in the wind energy sector you can quite rightly expect more. More, because of, for instance, experience gained from over 36,000 pitch motors already developed and built by us for numerous manufacturers as their system partner. And we would naturally also be happy to provide solutions for your requirements. Irrespective of the make and obviously, durable solutions. That's what our company and our name – CEDS DURADRIVE – stands for.

New ideas must flow instead of used oil.

Oil changes, oil disposal, defective hydraulic hoses, leaking valves and much more. Nice not to have to think about these things in future. Because nearly everything that operates hydraulically on a wind turbine, we can also solve electrically, increasing both operational reliability and efficiency. And because this is also a decisive factor for older wind turbines, we also offer complete sets for a hydraulic to electric conversion.

Optimum braking ensuring increased durability: Drives for electromechanical brakes.

It should be possible to stop a wind turbine at any time. And not just by accident. Electromechanical brakes (EMB) provide an important contribution to the safe operation and availability of a turbine. A loss of braking power or even system failures that can result from hydraulic problems are nearly impossible with EMBs.

And the respective drive only uses energy to build up the braking force. No further power is required for holding the full braking force for any time. We develop and build the drives for the most reliable and efficient braking system of WTGs.

Optimum movement for perfect standstill: Drives for electromechanical locking bolts.

We, too, cannot stop the wind from blowing. But we can stop the rotor of a wind turbine and keep it from moving. Using drives specially designed for the functioning of a rotor lock. This not only prevents spinning of the turbine but also guarantees at all times safety levels specified for maintenance work.

More than just a question of technology: Reliability.

We develop motors and drives according to individual customer requirements. AC and DC motors can in this way be easily installed in all areas of a turbine, making an important contribution to operational reliability. A reliability that we also ensure by providing a technical service, offering our customers peace of mind also in the long-term.

Whether it is by supplying spare parts, individually produced where required or by optimising parameters of drive systems, ensuring optimum running performance. And as we develop all our service concepts together with our customers, you can be certain that our drives will always deliver what we promise.

100% safe:
CEDS DURADRIVE's yaw drives.

Turning around on the spot can cause you to loose your balance. You can therefore imagine to a certain extent what forces are acting on a turbine at nacelle height. But just as natural as bending moments and other mechanical stresses can also be the solutions used for solving these problems. Using, for example, CEDS DURADRIVE's yaw drives.

These drives run as uniformly as their neat arrangement suggests and that already during start-up. With a constant torque and even distribution of force, ensuring a particularly smooth operation. This reduces wear and prevents unnecessary downtimes caused by overloading of individual components. There is therefore no need to worry about the strength of the wind, leaving you free to make optimum use of it.

Individuality is our standard: Our generators.

Their size is not the only reason why generators cannot be purchased from us off the shelf. More importantly it is our principle of providing solutions developed entirely for your individual requirements. A principle that is also achieved due to our considerable experience gained over the last decades and which is naturally utilised for every CEDS DURADRIVE wind project.

As a result, we can today build generators from 400 V and 690 V to at least 2.5 MW in all conceivable models. Such as 4-pole asynchronous generators with approx. 1,500 rpm or synchronous generators. Using the latest permanent magnet technology, ensuring that we are always at the forefront of technology as regards materials, alloys and their processing.

Better than our individual design: Our high levels of efficiency.

Although the generators are individually designed and constructed, they all offer high levels of efficiency, not least achieved by using the latest materials for the construction of individual components – from electrical steel sheet to insulation. Together with the world-wide market leader for insulation products, we employ, for instance, the latest VPI insulation technology. This, too, guarantees maximum durability and resistance against environmental influences. It therefore goes without saying that our generators are used at temperatures of –25°C to +50°C in Onshore and Offshore turbines. Because we know from experience that wind does not simply stop blowing when reaching the sea.

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