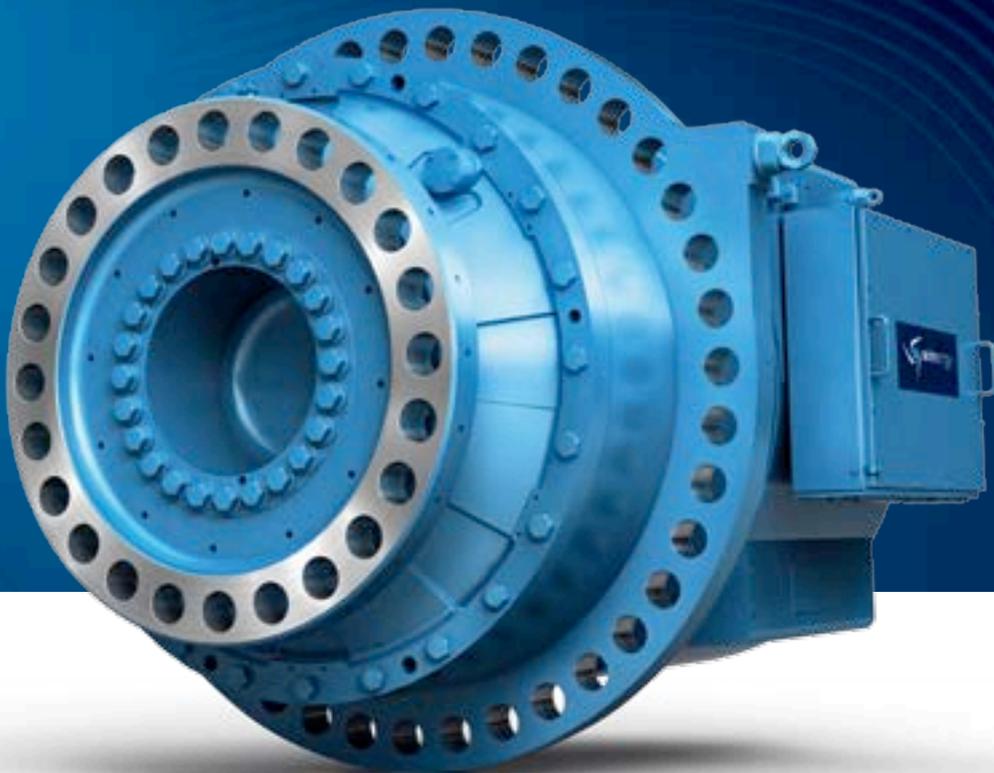




# ***Winergy HybridDrive***

*Gearbox and generator in one product*



# Winergy HybridDrive

In order to keep the costs for power generation as low as possible, the drive components for wind turbines must be designed to guarantee the highest efficiency. To be able to address the various customer requirements optimally, Winergy has now extended its product family by an additional concept: the HybridDrive. Both the mechanical as well as the electrotechnical competence of Winergy is clearly reflected in the HybridDrive. The new concept has the following advantages:

- Compact design:  
Gearbox and generator in one product
- Best possible drive train efficiency for onshore and offshore applications
- Flexible integration into every nacelle configuration
- High maintenance- and service- friendliness through a modular design
- Low dependency on raw materials
- Optional journal bearings

## **Compact design: Gearbox and generator in one product**

The HybridDrive distinguishes itself as a result of its extremely compact design. The direct connection of the two-stage gearbox with the permanent magnet generator allows to shorten the drive train length by approx. 35%. This also means that the nacelle size can be significantly reduced, which in turn reduces the weight of the complete wind turbine.

## **Best possible power efficiency for onshore and offshore applications**

Although the HybridDrive has an extremely compact design, it is highly efficient. If the efficiency of the HybridDrive is compared with other available technologies, then it comes through with a peak value of 94%. As a consequence, it has the best annual efficiency of all existing technologies.

## **Flexible integration into every nacelle configuration**

The HybridDrive can be flexibly integrated into every nacelle configuration. In existing turbine designs, for instance, this means that the freed-up space can be used to accommodate converters and transformers in the nacelle instead of in the tower. This location for the transformers means that the low-voltage cable losses are reduced, which leads to economic advantages. For new developments, this feature can be used to make the nacelle as compact as possible.

The options for the nacelle configuration in regard to main bearings, converter and transformer are unlimited.

## **High maintenance- and service- friendliness through a modular design**

The modular design of the HybridDrive comprising three components (1st gear stage, 2nd gear stage and generator) allows the individual elements to be simply removed/installed.

As a result of the low weight of the individual modules, the internal service crane of the nacelle can be used to transport these modules instead of employing an external crane. This reduces the service complexity and minimizes the costs for service operations.

## **Low dependency on raw materials**

As a result of the integrated two-stage gearbox, the HybridDrive requires a significantly smaller medium speed permanent magnet generator than comparable DirectDrives. As a consequence, 80% less rare earth materials are used than in direct driven wind turbines. This reduces the dependency on rare earth materials and long-term cost calculations can be realized more easily.

## **Optional journal bearings**

The HybridDrive is optionally available with journal bearings for the planetary gears. Customers have the choice between rolling element bearings and innovative journal bearings.



Reduction of drive train length by 35% results in compact nacelle design



Great serviceability through modular design



Available with journal or rolling element bearings for planet gears

## **Technical specifications**

<b>Power rating</b>	3000 kW	3000 kW
<b>Torque</b>	2000 kNm	2500 kNm
<b>Weight</b>	25 t	31 t
<b>Type</b>	PZFG 2456	PZFG 2535

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