



# GREEN ENERGY

*YAW and PITCH DRIVES*







### ***Brevini Power Transmission***

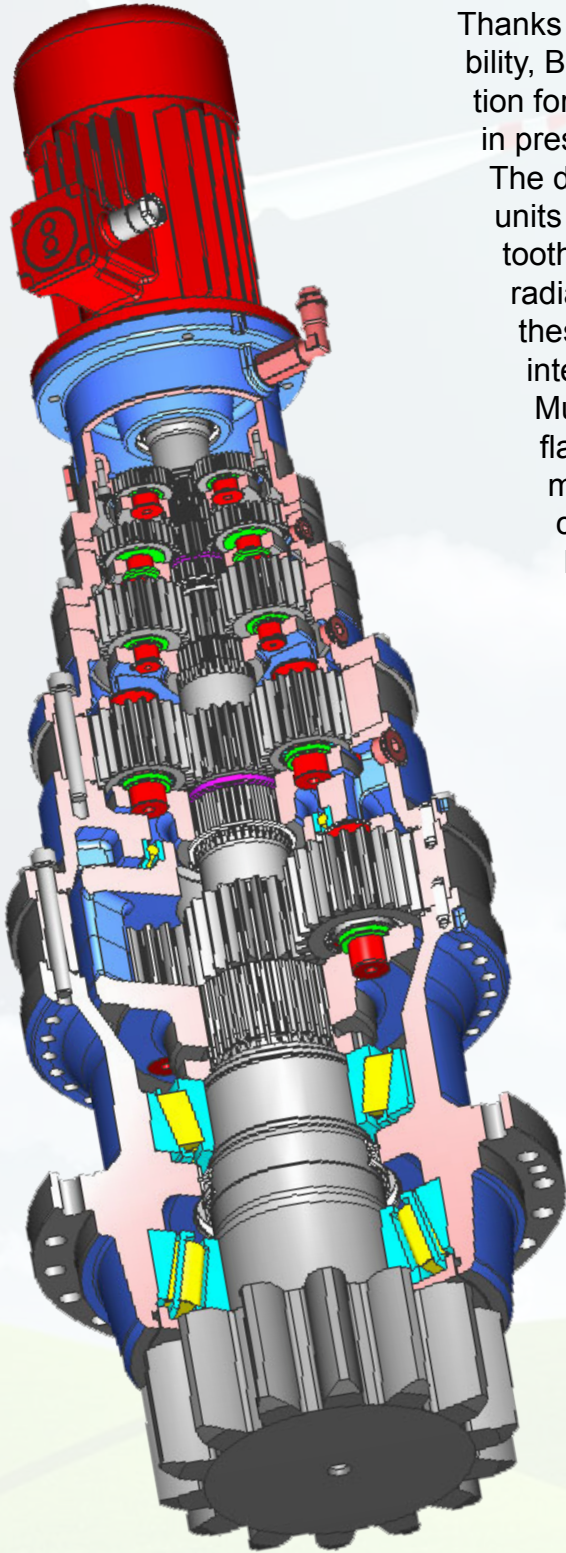
Our innovative and global Company, established in 1960, focuses on the engineering, production and distribution of mechanical power transmissions: Brevini offers a complete range of planetary gear units, helical gearboxes and winches.

Brevini Power Transmission is a growing organization, with a consolidated turnover of 300 million Euros and with 150,000 gearboxes produced per year. Our direct network of 24 Subsidiaries and 4 Service Centers provide excellent service and after sales support.

Brevini Power Transmission has 15 years of experience in the wind power industry. More than 60,000 yaw and pitch systems have been installed with all the global players in the wind power industry, which guarantees the high quality and reliable operation of our products: all over the world. Brevini's planetary gearboxes have become a standard for wind turbines due to many factors:

- our planetary drive is extremely efficient and is able to provide low speeds without any loss of performance;
- we are able to deliver high reduction ratios in small packages, and to transmit several times the torque of similarly sized, conventional gear units;
- Brevini's planetary gearboxes are compact and lightweight, and require little installation space;
- finally, high levels of reliability are a feature of our planetary design, thanks to the heat treatment done in-house and the distribution of stress among several load-bearing components.





### **Brevini planetary drives**

Thanks to their reduced size and weight, and to their reliability, Brevini planetary gear units are an excellent solution for wind turbines: also in difficult environments and in presence of low temperatures.

The design of this complete range of planetary gear units is based upon a system of pinion gears and toothed bearings. Engineered to withstand the strong radial loads that are generated in this application, these units either have a pinion gear inserted or integrated on the output shaft.

Multi-disc failsafe brakes on the input side and a flange system for mounting hydraulic or electric motors are some of the accessories that complete this series of yaw and pitch drives.

Brevini can easily provide a complete package with motor and gearbox.

### **Technical data**

Torque range: 7,000 to 195,000 Nm

Transmission ratio: up to 3,100

From 2 up to 5 reduction stages

High torque capacity with heavy duty bearings.

Flange mounted with pinion

### **Main features**

In line or right angle configuration

Modular design to increase the torque transmissible

Each stage with 3 up to 5 planet gears

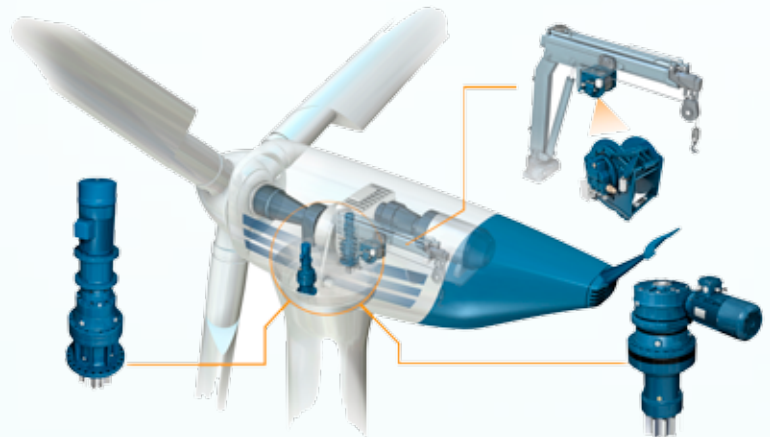
Customised output versions

Output housing in cast iron, designed to hold heavy loads

Input for any type of electric motor and brake motor.

## Brevini inside the nacelle of the wind turbines.

The nacelle, this element at the top of the tower, is connected to the rotor and houses the Brevini gearbox, the electrical generator, the yaw system, and the control system.

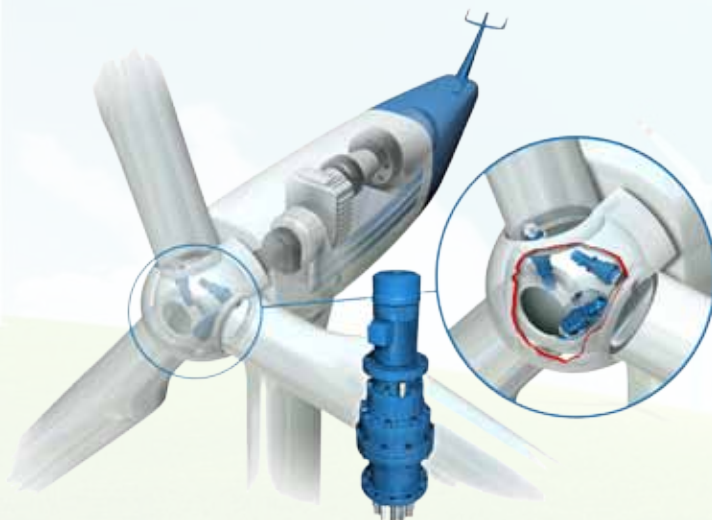


## The yaw system

To make sure that the rotor axis is constantly aligned with the wind direction for maximum energy

output, wind turbines are equipped with a yaw system that allows the nacelle to adjust its position according to the direction and force of the wind.

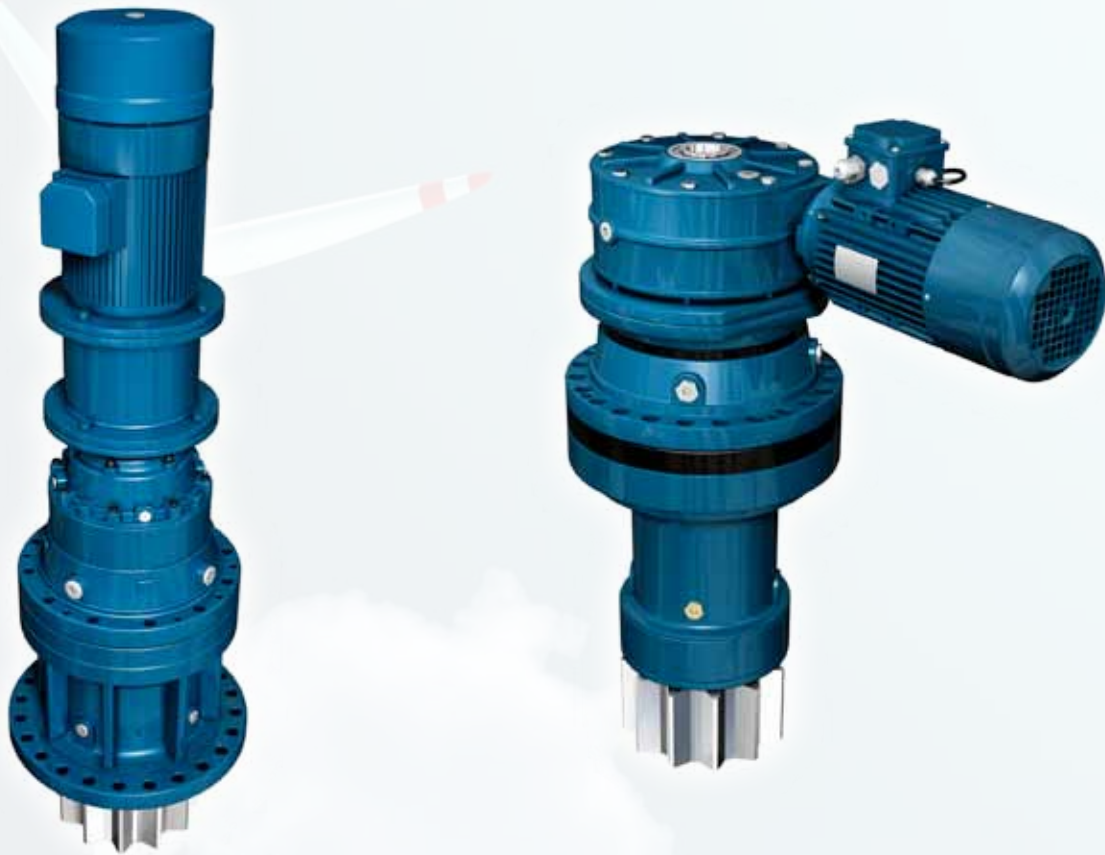
Nacelle rotation is controlled by a planetary gear unit with electric brake motor, which is one of Brevini's most successful and popular products. Each wind turbine can have between two and eight gear units, depending on the size, and the motor can be electric or hydraulic. Two or three-stage Brevini gear units combined with a worm gearbox on the input side (nominal torque up to 50,000 Nm), or four or five-stage Brevini gear units (nominal torque up to 100,000 Nm), from the slewing drive series or the industrial series, are normally used. Output pinions can be integrated or inserted.



## The pitch system

The rotor transforms the kinetic energy of the wind into mechanical energy.

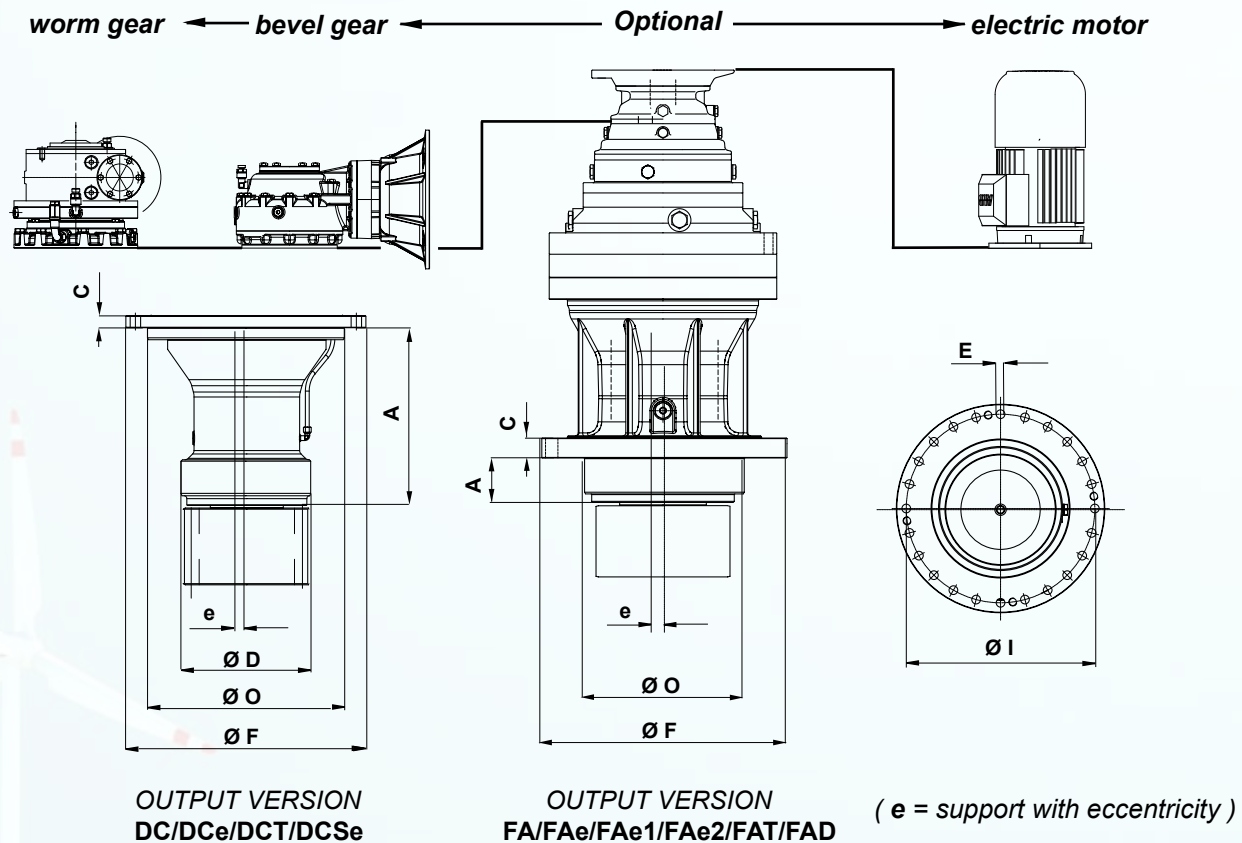
It is completed by a Pitch system, which is composed of pitch bearings in combination with one or more planetary gear units and an electric brake motor, in order to adjust the blade angle to take advantage of the wind speed. Brevini's three-stage slewing planetary gear units (nominal torque up to 40,000 Nm) are normally used to control blade pitch.



Type	Nominal Torque (Nm)	Peak static Torque * (Nm)	Range of Ratios (4 stages) 1:	Range of Pinion module mm	Weight Kg
RPR046DC	5000	6000	405 ÷ 3300	6 ÷ 8	132
RPR065DC	7500	12000	322 ÷ 3170	10 ÷ 14	140
RPR065DCT	7500	12000	322 ÷ 3170	10 ÷ 14	140
RPR065FAT	7500	15000	322 ÷ 3170	10 ÷ 14	125
RPR065FAD	7500	12000	322 ÷ 3170	10 ÷ 14	125
RPR150DC	16000	28000	360 ÷ 3460	12 ÷ 16	320
RPR150DCT	16000	40000	360 ÷ 3460	12 ÷ 16	320
RPR150DCSe	16000	40000	360 ÷ 3460	12 ÷ 16	320
ELS150FA	18000	45000	360 ÷ 3460	12 ÷ 16	300
ELS150FAe1	18000	40000	360 ÷ 3460	12 ÷ 16	300
ELS150FAe2	18000	40000	360 ÷ 3460	12 ÷ 16	300
ELS150FAZe	18000	40000	360 ÷ 3460	12 ÷ 16	300
RPR250/255DC	25000	54000	282 ÷ 2744	14 ÷ 18	360
RPR250/255FAe	25000	54000	282 ÷ 2744	14 ÷ 18	360
RPR320FAe	35000	80000	236 ÷ 2576	16 ÷ 20	365
SLS301DCe	38000	94000	195 ÷ 2697	16 ÷ 20	400
SLS301FAe1	38000	100000	195 ÷ 2697	16 ÷ 20	380
SLS400DCe	54000	115000	178 ÷ 1958	18 ÷ 24	450
SLS400FAe	54000	130000	178 ÷ 1958	18 ÷ 24	450
SLS400FAe1	54000	130000	178 ÷ 1958	18 ÷ 24	450
SLS400FAe2	54000	130000	178 ÷ 1958	18 ÷ 24	450
SLS600DCe	82000	165000	241 ÷ 2785	18 ÷ 25	700
SLS850DCe	98000	200000	233 ÷ 1987	20 ÷ 25	950

\* Peak static torque could change with pinion sizes



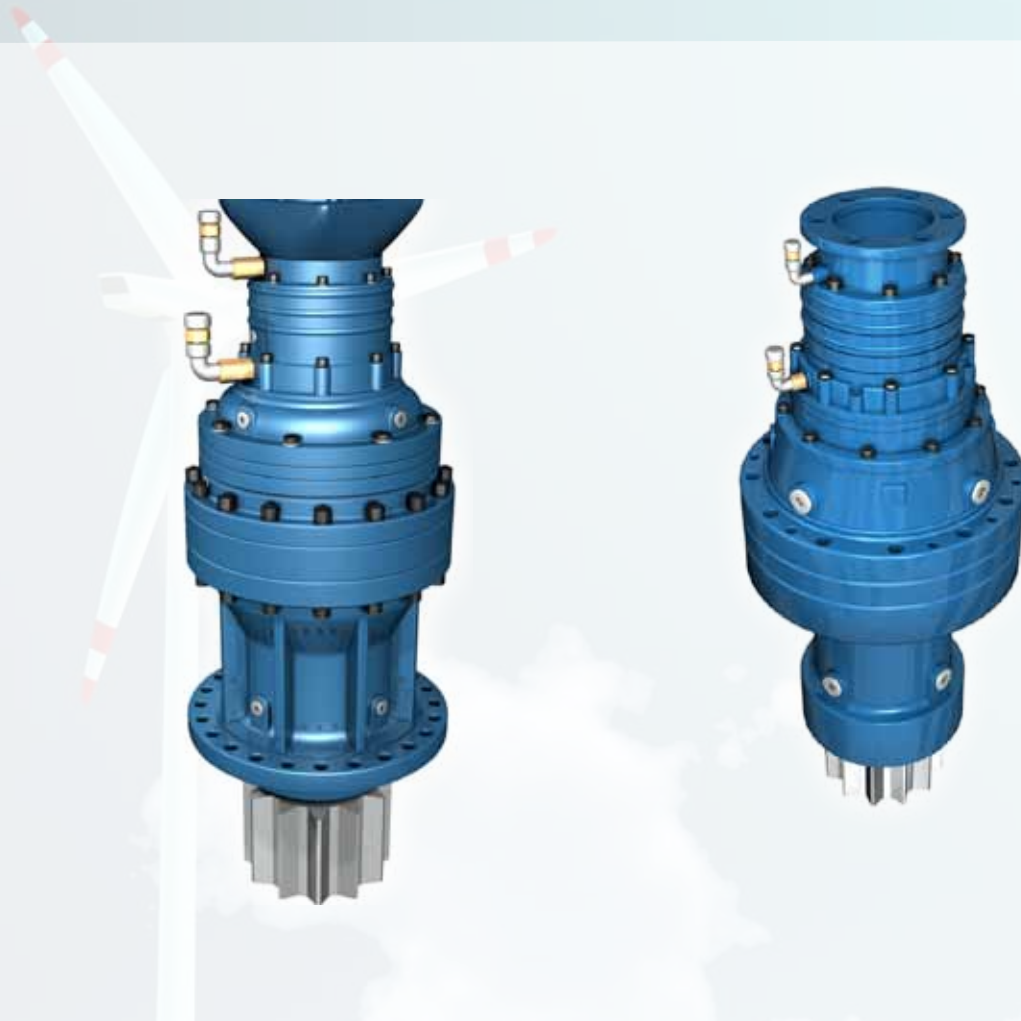


Type	A	C	Ø D	Ø O	Ø F	Ø I	E
RPR046DC	121,6	25	160	180	290	265	Ø 14 N12X30°
RPR065DC	247	25	242	246	340	310	Ø 21 N12X30°
RPR065DCT	222	25	200	250	360	325	Ø 17 N10X36°
RPR065FAT	31	25		220	280	250	Ø 18 N12X30°
RPR065FAD	47	20		250	340	310	Ø 17,5 N12X30°
RPR150DC	233	145	240	278	340	314	Ø 16 N21X15°
RPR150DCT	295	110	230	280	340	314	Ø 17,5 N24X15°
RPR150DCSe	295	44	250	280	420	380	Ø 17,5 N24X15°
ELS150FA	51	30		300	400	350	Ø 18 N18X20°
ELS150FAe1	78	30		300	375	345	Ø 17,5 N24X15°
ELS150FAe2	78	40		257	375	295	Ø 13,5 N24X15°
ELS150FAZe	78	30		255	375	345	Ø 17,5 N24X15°
RPR250/255DC	370	25	270	410	500	460	Ø 22 N24X15°
RPR250/255FAe	78	35		280	430	395	Ø 22 N24X15°
RPR320FAe	82	31		287	430	390	Ø 26 N24X15°
SLS301DCe	347	30	325	410	530	490	Ø 22 N24X15°
SLS301FAe1	84	50		365	437	400	Ø 22 N24X15°
SLS400DCe	347	30	325	410	530	490	Ø 22 N24X15°
SLS400FAe	78	37		365	490	445	Ø 21 N24X15°
SLS400FAe1	117	37		410	490	450	Ø 21 N24X15°
SLS400FAe2	104	37		400	490	445	Ø 21 N24X15°
SLS600DCe	510	30	380	575	680	630	Ø 26 N29X11°15'
SLS850DCe	505	30	395	595	685	650	Ø 22 N24X15°

output pinion details (module/number of theet etc.); on request and depending on yaw bearing

For Gears variations contact our offices



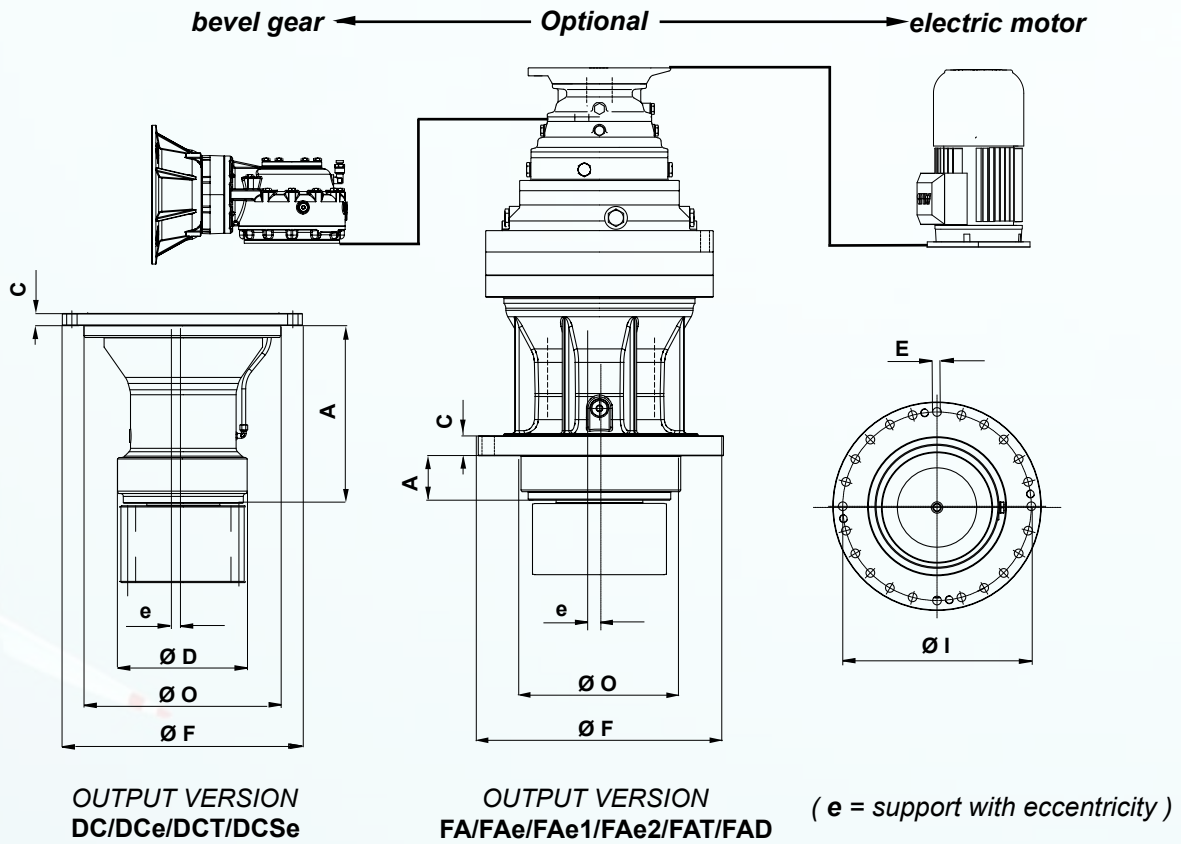


Type	Nominal Torque (Nm)	Peak static Torque * (Nm)	Range of Ratios (3 stages) 1:	Range of Pinion module mm	Weight Kg
RPR046DC	5000	6000	53 ÷ 314	6 ÷ 8	132
RPR065DC	7500	12000	51 ÷ 251	10 ÷ 14	140
RPR065DCT	7500	12000	51 ÷ 251	10 ÷ 14	140
RPR065FAT	7500	15000	51 ÷ 251	10 ÷ 14	125
RPR065FAD	7500	12000	51 ÷ 251	10 ÷ 14	125
RPR080FAe	8000	20000	47 ÷ 252	10 ÷ 14	150
RPR150DC	16000	28000	47 ÷ 329	12 ÷ 16	320
RPR150DCT	16000	40000	47 ÷ 329	12 ÷ 16	320
RPR150DCSe	16000	40000	47 ÷ 329	12 ÷ 16	320
ELS150FA	18000	45000	47 ÷ 381	12 ÷ 16	300
ELS150FAe1	18000	40000	47 ÷ 381	12 ÷ 16	300
ELS150FAe2	18000	40000	47 ÷ 381	12 ÷ 16	300
ELS150FAZe	18000	40000	47 ÷ 381	12 ÷ 16	300
ELS200DCe	23000	50000	47 ÷ 192	12 ÷ 16	345
ELS200FAe	23000	50000	47 ÷ 192	12 ÷ 16	345
RPR250/255DC	25000	54000	45 ÷ 250	14 ÷ 18	360
RPR250/255FAe	25000	54000	45 ÷ 250	14 ÷ 18	360
RPR320FAe	35000	80000	70 ÷ 245	16 ÷ 20	365
SLS300DCe	38000	94000	55 ÷ 162	16 ÷ 20	400
SLS300DCe	38000	94000	55 ÷ 162	16 ÷ 20	380

\* Peak static torque could change with pinion sizes







Type	A	C	Ø D	Ø O	Ø F	Ø I	E
RPR046DC	121,6	25	160	180	290	265	Ø 14 N12X30°
RPR065DC	247	25	242	246	340	310	Ø 21 N12X30°
RPR065DCT	222	25	200	250	360	325	Ø 17 N10X36°
RPR065FAT	31	25		220	280	250	Ø 18 N12X30°
RPR065FAD	47	20		250	340	310	Ø 17,5 N12X30°
RPR080FAe	219,5	27		320	420	380	Ø 13,5 N12X30°
RPR150DC	233	145	240	278	340	314	Ø 16 N21X15°
RPR150DCT	295	110	230	280	340	314	Ø 17,5 N24X15°
RPR150DCSe	295	44	250	280	420	380	Ø 17,5 N24X15°
ELS200DCe	355	30	300	425	503	460	Ø 22 N12X30°
ELS200FAe	48	32		320	400	370	Ø 17 N20X18°
ELS150FA	51	30		300	400	350	Ø 18 N18X20°
ELS150FAe1	78	30		300	375	345	Ø 17,5 N24X15°
ELS150FAe2	78	40		257	375	295	Ø 13,5 N24X15°
ELS150FAZe	78	30		255	375	345	Ø 17,5 N24X15°
RPR250/255DC	370	25	270	410	500	460	Ø 22 N24X15°
RPR250/255FAe	78	35		280	430	395	Ø 22 N24X15°
RPR320FAe	82	31		287	430	390	Ø 26 N24X15°
SLS301DCe	347	30	325	410	530	490	Ø 22 N24X15°
SLS301FAe1	84	50		365	437	400	Ø 22 N24X15°

output pinion details (module/number of theet etc.)  
 on request and depending on yaw bearing

For Gears variations contact our offices





***The Brevini factories  
and Service centers***



# Main Gearbox for generators



The global market for Wind power is growing, and Brevini provides the know-how in industrial planetary gearboxes and in heavy duty applications with helical and bevel-helical gear reducers. Combined with our competence in service and design, we now present a complete range of reliable and innovative main gearboxes for wind turbines.

Brevini Wind main gearboxes for wind generators range from 0.9 MW to 3.5 MW, with added safety features, helping to reduce maintenance costs and service time.

## ***The Brevini Wind concept at a glance***

- Product range: from 0.9 MW to 3.5 MW
- Weight reduction
- Easy maintenance and substitution of single components
- Fast disassembling including planetary stages
- Optimized oil and cooling system
- Longer lifetime of bearings and gears by avoiding grey-staining and micropittings
- Cost advantages compared to existing solutions

Our new design concept means cost savings (up to 75% ) and easy maintenance based on a modular system and on our reliable technology.

In the long run the advantages are clear: we save your time and money!

Brevini Wind has production facilities in Yorktown, Indiana, USA and in Bad Homburg, Germany. More than 1,000 main gearboxes per year are going to be manufactured and tested through 6 MW test benches in our production facilities.

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Brevini Norge  
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