

ENERCON Wind energy converters

Product overview

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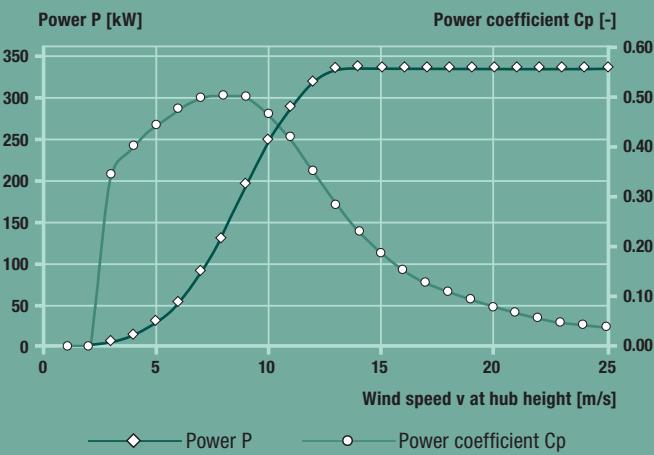
Technical information is subject to change. Version: July 2010.



E33

330 kW

Calculated power curve



Wind [m/s]	Power P [kW]	Power coefficient Cp [-]
1	0.0	0.00
2	0.0	0.00
3	5.0	0.35
4	13.7	0.40
5	30.0	0.45
6	55.0	0.47
7	92.0	0.50
8	138.0	0.50
9	196.0	0.50
10	250.0	0.47
11	292.8	0.41
12	320.0	0.35
13	335.0	0.28
14	335.0	0.23
15	335.0	0.18
16	335.0	0.15
17	335.0	0.13
18	335.0	0.11
19	335.0	0.09
20	335.0	0.08
21	335.0	0.07
22	335.0	0.06
23	335.0	0.05
24	335.0	0.05
25	335.0	0.04

$\rho = 1.225 \text{ kg/m}^3$

For more information on the ENERCON power curve, please see the last page.

Trademark note
ENERCON, Energy for the world, the ENERCON logo and the green tower shades are registered trademarks of ENERCON GmbH.



Technical specifications E-33

Rated power:	330 kW
Rotor diameter:	33.4 m
Hub height:	37 m / 44 m / 49 m / 50 m
Wind zone (DIBt):	WZ III
Wind class (IEC):	IEC/NVN IA and IEC/NVN IIA

WEC concept:	Gearless, variable speed Single blade adjustment
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Rotor

Type:	Upwind rotor with active pitch control
Rotational direction:	Clockwise
No. of blades:	3
Swept area:	876 m ²
Blade material:	GRP (epoxy resin); Built-in lightning protection
Rotational speed:	Variable, 18–45 rpm
Pitch control:	ENERCON single blade pitch system; one independent pitch system per rotor blade with allocated emergency supply

Drive train with generator

Hub:	Rigid
Main bearing:	Tapered roller bearing pair
Generator:	ENERCON direct-drive annular generator

Grid feed: ENERCON inverter

Brake systems:

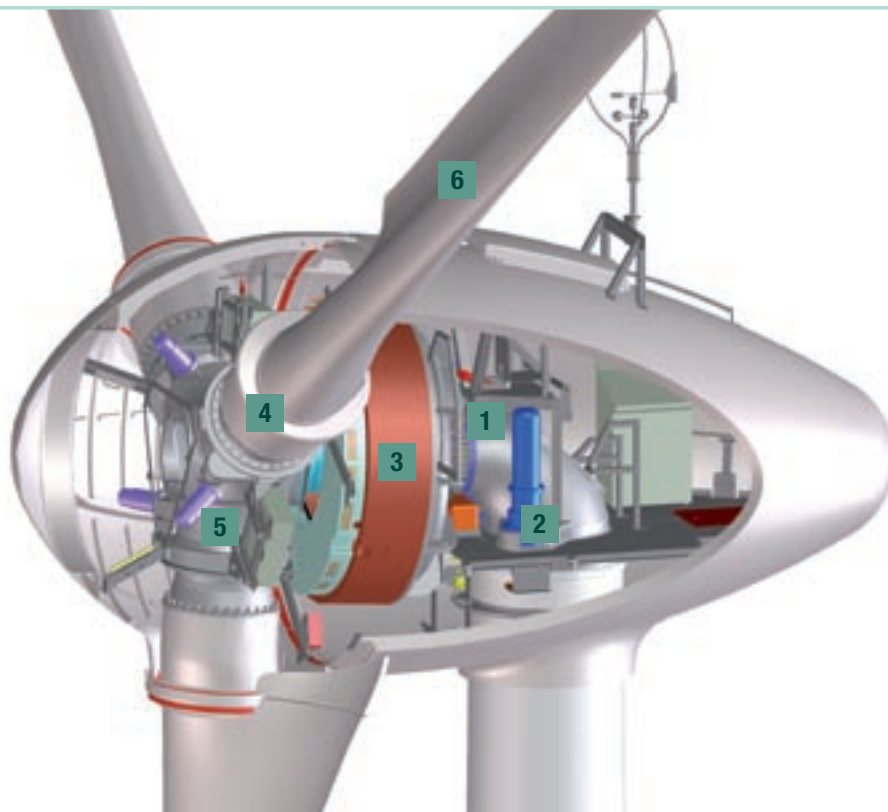
- 3 independent pitch control systems with emergency power supply
- Rotor brake
- Rotor lock

Yaw system: Active via yaw gear, load-dependent damping

Cut-out wind speed: 28–34 m/s
(with ENERCON storm control*)

Remote monitoring: ENERCON SCADA

* For more information on the ENERCON storm control feature, please see the last page.



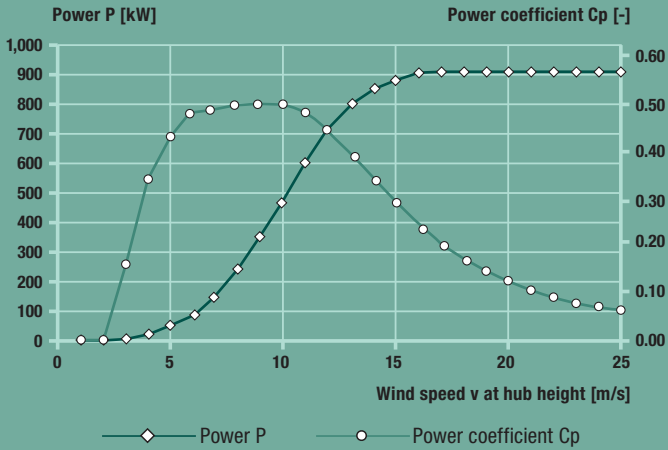
- 1** Main carrier
- 2** Yaw drive
- 3** Annular generator
- 4** Blade adapter
- 5** Rotor hub
- 6** Rotor blade

E44

900 kW



Calculated power curve



Wind [m/s]	Power P [kW]	Power coefficient Cp [-]
1	0.0	0.00
2	0.0	0.00
3	4.0	0.16
4	20.0	0.34
5	50.0	0.43
6	96.0	0.48
7	156.0	0.49
8	238.0	0.50
9	340.0	0.50
10	466.0	0.50
11	600.0	0.48
12	710.0	0.44
13	790.0	0.39
14	850.0	0.33
15	880.0	0.28
16	905.0	0.24
17	910.0	0.20
18	910.0	0.17
19	910.0	0.14
20	910.0	0.12
21	910.0	0.11
22	910.0	0.09
23	910.0	0.08
24	910.0	0.07
25	910.0	0.06

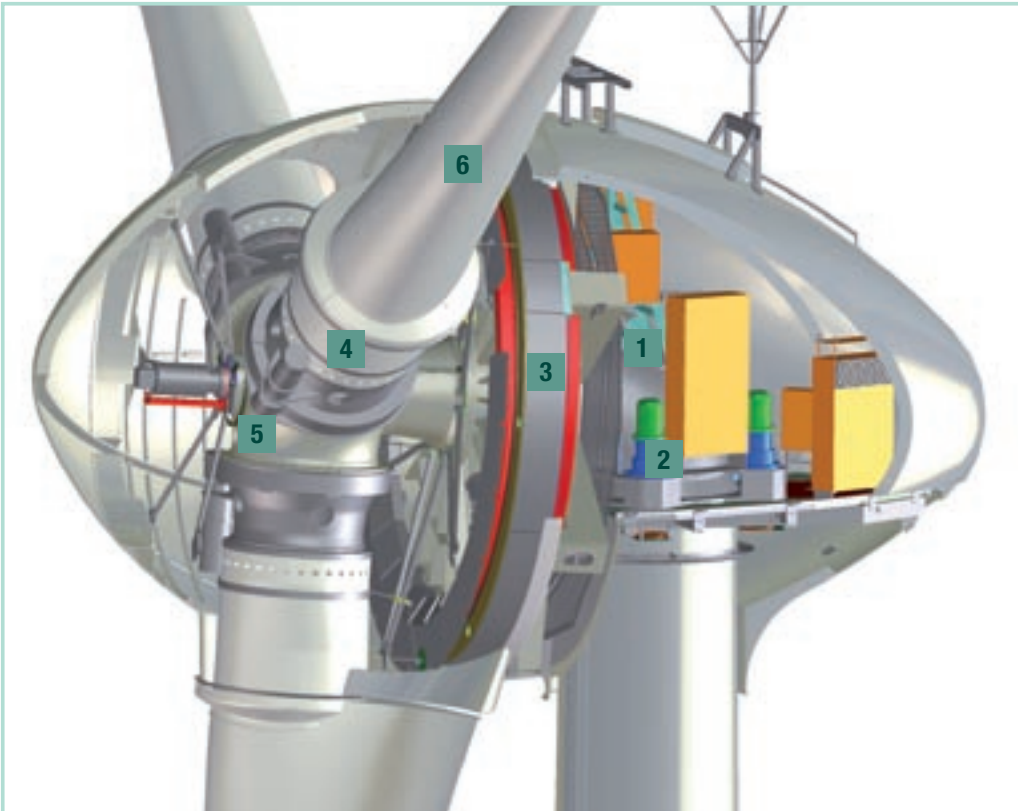
$\rho = 1.225 \text{ kg/m}^3$

For more information on the ENERCON power curve, please see the last page.

Technical specifications E-44

Rated power:	900 kW	Drive train with generator	
Rotor diameter:	44 m	Hub:	Rigid
Hub height:	45 m / 55 m / 65 m	Main bearing:	Tapered roller bearing pair
Wind class (IEC):	IEC/NVN IA	Generator:	ENERCON direct-drive annular generator
WEC concept:	Gearless, variable speed Single blade adjustment	Grid feed:	ENERCON inverter
Rotor		Brake systems:	– 3 independent pitch control systems with emergency power supply – Rotor brake – Rotor lock
Type:	Upwind rotor with active pitch control	Yaw system:	Active via yaw gear, load-dependent damping
Rotational direction:	Clockwise	Cut-out wind speed:	28–34 m/s (with ENERCON storm control*)
No. of blades:	3	Remote monitoring:	ENERCON SCADA
Swept area:	1,521 m ²		
Blade material:	GRP (epoxy resin); Built-in lightning protection		
Rotational speed:	Variable, 12–34 rpm		
Pitch control:	ENERCON single blade pitch system; one independent pitch system per rotor blade with allocated emergency supply		

* For more information on the ENERCON storm control feature, please see the last page.



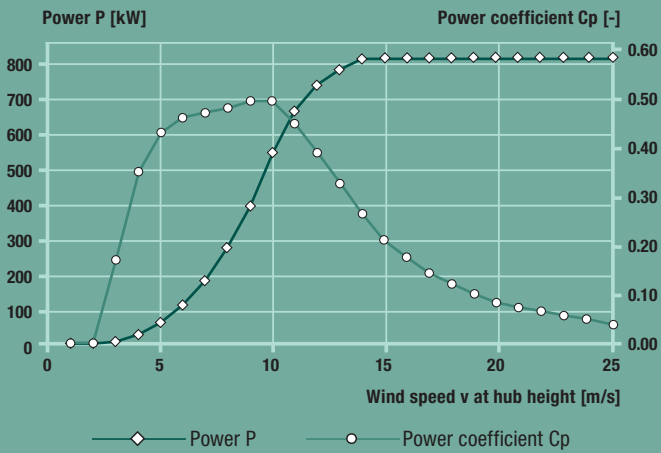
- 1 Main carrier
- 2 Yaw drive
- 3 Annular generator
- 4 Blade adapter
- 5 Rotor hub
- 6 Rotor blade

E48

800 kW



Calculated power curve



Wind [m/s]	Power P [kW]	Power coefficient Cp [-]
1	0.0	0.00
2	0.0	0.00
3	5.0	0.17
4	25.0	0.35
5	60.0	0.43
6	110.0	0.46
7	180.0	0.47
8	275.0	0.48
9	400.0	0.50
10	555.0	0.50
11	671.0	0.45
12	750.0	0.39
13	790.0	0.32
14	810.0	0.27
15	810.0	0.22
16	810.0	0.18
17	810.0	0.15
18	810.0	0.13
19	810.0	0.11
20	810.0	0.09
21	810.0	0.08
22	810.0	0.07
23	810.0	0.06
24	810.0	0.05
25	810.0	0.05

$\rho = 1.225 \text{ kg/m}^3$

For more information on the ENERCON power curve, please see the last page.

Technical specifications E-48

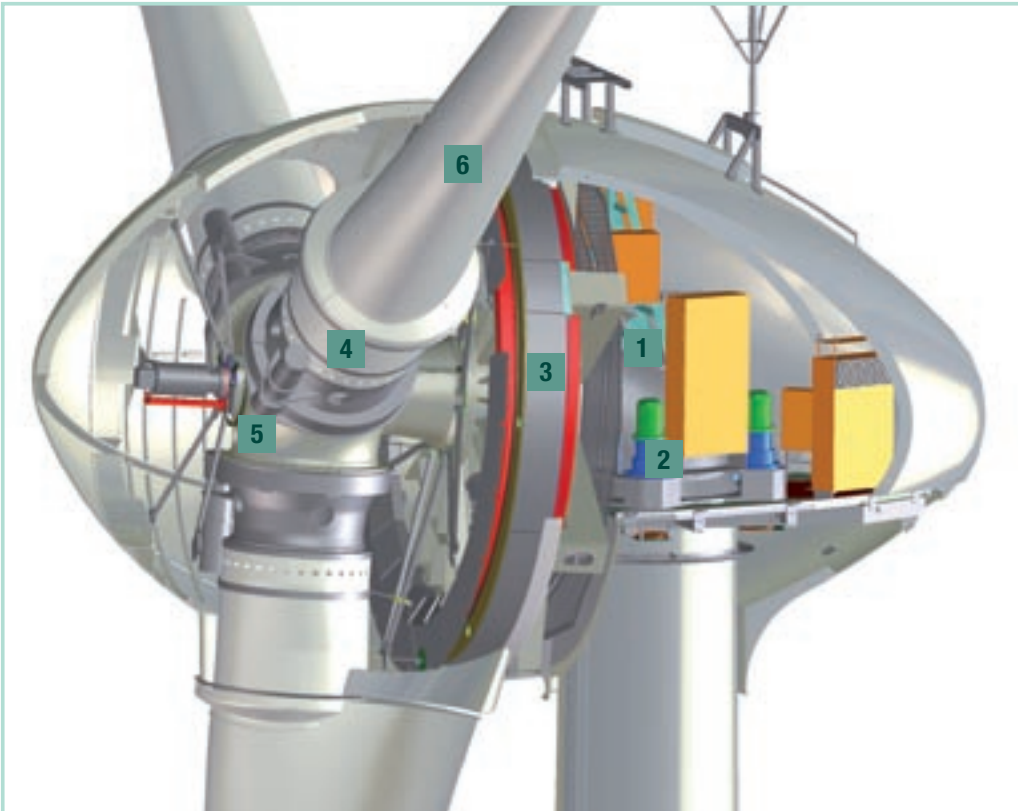
Rated power: 800 kW
Rotor diameter: 48 m
Hub height: 50 m / 60 m / 75 m / 76 m
Wind zone (DIBt): WZ III
Wind class (IEC): IEC/NVN IIA

WEC concept: Gearless, variable speed
Single blade adjustment

Rotor
Type: Upwind rotor with active pitch control
Rotational direction: Clockwise
No. of blades: 3
Swept area: 1,810 m²
Blade material: GRP (epoxy resin);
Built-in lightning protection
Rotational speed: Variable, 16–31 rpm
Pitch control: ENERCON single blade pitch system;
one independent pitch system per rotor blade with allocated emergency supply

Drive train with generator
Hub: Rigid
Main bearing: Tapered roller bearing pair
Generator: ENERCON direct-drive annular generator
Grid feed: ENERCON inverter
Brake systems: – 3 independent pitch control systems with emergency power supply
– Rotor brake
– Rotor lock
Yaw system: Active via yaw gear, load-dependent damping
Cut-out wind speed: 28–34 m/s (with ENERCON storm control*)
Remote monitoring: ENERCON SCADA

*For more information on the ENERCON storm control feature, please see the last page.



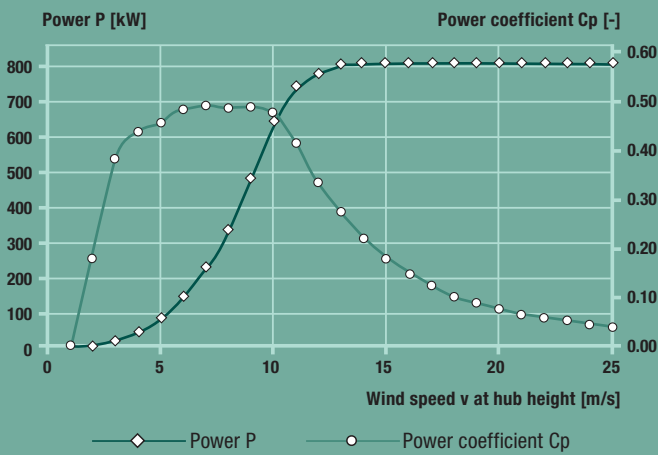
- 1 Main carrier
- 2 Yaw drive
- 3 Annular generator
- 4 Blade adapter
- 5 Rotor hub
- 6 Rotor blade

E53

800 kW



Calculated power curve



Wind [m/s]	Power P [kW]	Power coefficient C_p [-]
1	0.0	0.00
2	2.0	0.19
3	14.0	0.39
4	38.0	0.44
5	77.0	0.46
6	141.0	0.48
7	228.0	0.49
8	336.0	0.49
9	480.0	0.49
10	645.0	0.48
11	744.0	0.42
12	780.0	0.34
13	810.0	0.27
14	810.0	0.22
15	810.0	0.18
16	810.0	0.15
17	810.0	0.12
18	810.0	0.10
19	810.0	0.09
20	810.0	0.08
21	810.0	0.06
22	810.0	0.06
23	810.0	0.05
24	810.0	0.04
25	810.0	0.04

$\rho = 1.225 \text{ kg/m}^3$

For more information on the ENERCON power curve, please see the last page.

Technical specifications E-53

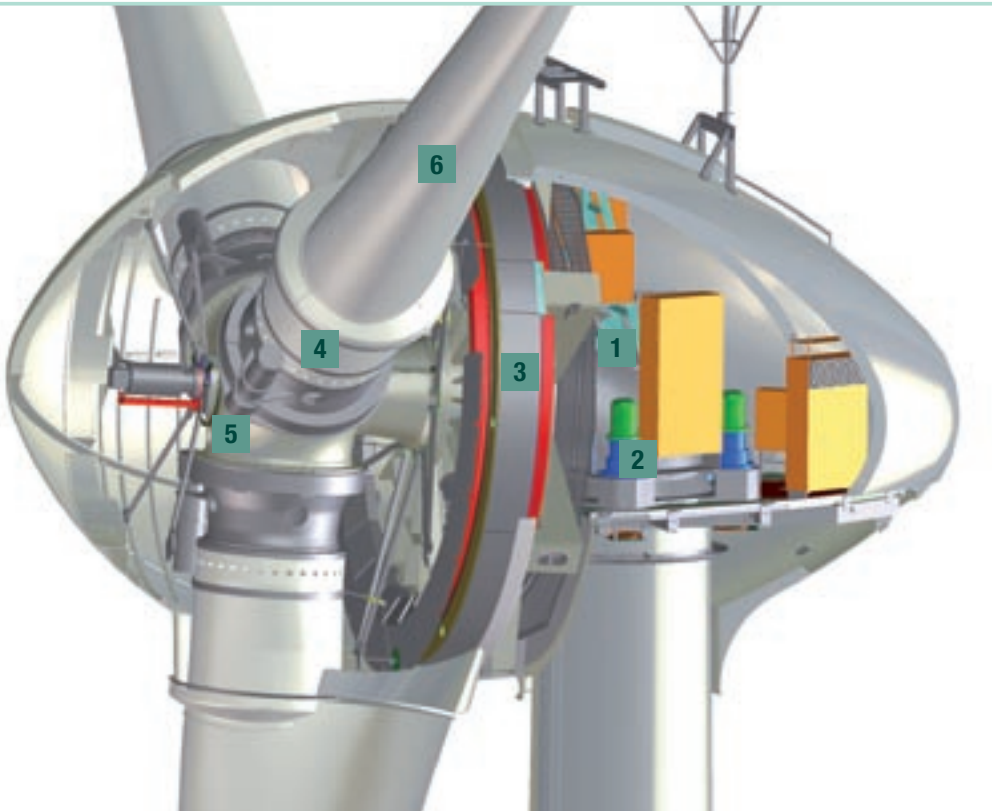
Rated power: 800 kW
Rotor diameter: 52.9 m
Hub height: 60 m / 73 m / 75 m
Wind zone (DIBt): WZ II exp
Wind class (IEC): IEC/NVN Class S
($V_{av} = 7.5 \text{ m/s}$, $V_{ext} = 57 \text{ m/s}$)

WEC concept: Gearless, variable speed
Single blade adjustment

Rotor
Type: Upwind rotor with active pitch control
Rotational direction: Clockwise
No. of blades: 3
Swept area: 2,198 m²
Blade material: GRP (epoxy resin);
Built-in lightning protection
Rotational speed: Variable, 12–28.3 rpm
Pitch control: ENERCON single blade pitch system;
one independent pitch system per rotor
blade with allocated emergency supply

Drive train with generator
Hub: Rigid
Main bearing: Tapered roller bearing pair
Generator: ENERCON direct-drive annular generator
Grid feed: ENERCON inverter
Brake systems: – 3 independent pitch control systems
with emergency power supply
– Rotor brake
– Rotor lock
Yaw system: Active via yaw gear,
load-dependent damping
Cut-out wind speed: 28–34 m/s
(with ENERCON storm control*)
Remote monitoring: ENERCON SCADA

*For more information on the ENERCON storm control feature, please see the last page.



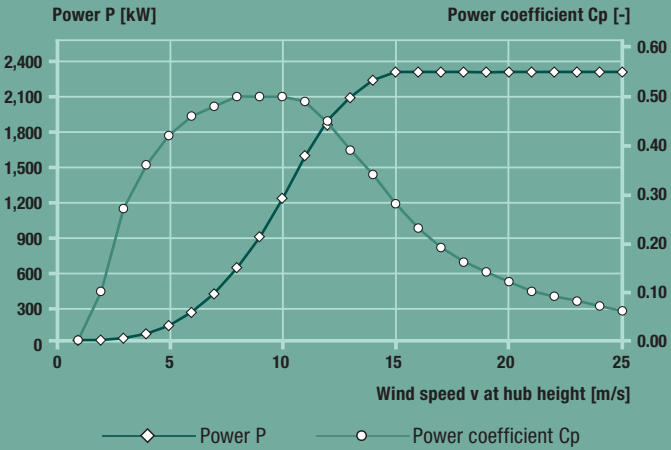
- 1 Main carrier
- 2 Yaw drive
- 3 Annular generator
- 4 Blade adapter
- 5 Rotor hub
- 6 Rotor blade

E70

2,300 kW



Calculated power curve



Wind [m/s]	Power P [kW]	Power coefficient Cp [-]
1	0.0	0.00
2	2.0	0.10
3	18.0	0.27
4	56.0	0.36
5	127.0	0.42
6	240.0	0.46
7	400.0	0.48
8	626.0	0.50
9	892.0	0.50
10	1,223.0	0.50
11	1,590.0	0.49
12	1,900.0	0.45
13	2,080.0	0.39
14	2,230.0	0.34
15	2,300.0	0.28
16	2,310.0	0.23
17	2,310.0	0.19
18	2,310.0	0.16
19	2,310.0	0.14
20	2,310.0	0.12
21	2,310.0	0.10
22	2,310.0	0.09
23	2,310.0	0.08
24	2,310.0	0.07
25	2,310.0	0.06

$\rho = 1.225 \text{ kg/m}^3$

For more information on the ENERCON power curve, please see the last page.

Technical specifications E-70 E4

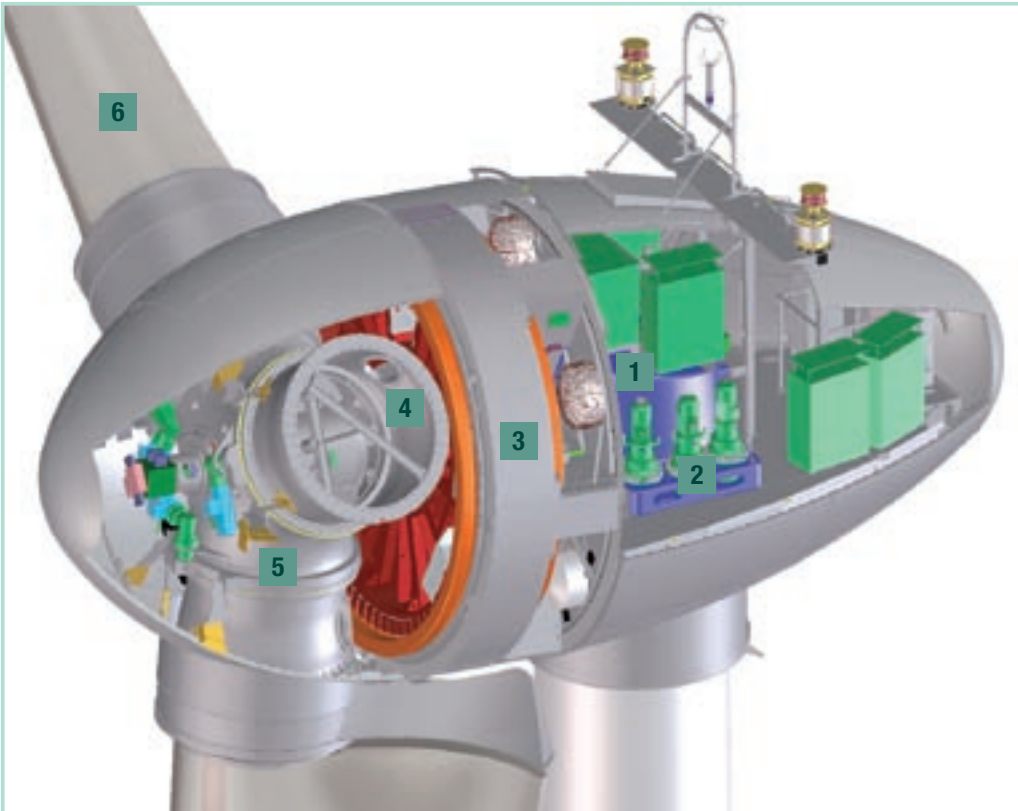
Rated power: 2,300 kW
Rotor diameter: 71 m
Hub height: 57 m / 64 m / 85 m / 98 m / 113 m
Wind zone (DIBt): WZ III
Wind class (IEC): IEC/NVN IA and IEC/NVN IIA

WEC concept: Gearless, variable speed
Single blade adjustment

Rotor
Type: Upwind rotor with active pitch control
Rotational direction: Clockwise
No. of blades: 3
Swept area: 3,959 m²
Blade material: GRP (epoxy resin);
Built-in lightning protection
Rotational speed: Variable, 6–21.5 rpm
Pitch control: ENERCON single blade pitch system;
one independent pitch system per rotor blade with allocated emergency supply

Drive train with generator
Hub: Rigid
Main bearing: Double-row tapered/cylindrical roller bearings
Generator: ENERCON direct-drive annular generator
Grid feed: ENERCON inverter
Brake systems: – 3 independent pitch control systems with emergency power supply
– Rotor brake
– Rotor lock
Yaw system: Active via yaw gear, load-dependent damping
Cut-out wind speed: 28–34 m/s (with ENERCON storm control*)
Remote monitoring: ENERCON SCADA

*For more information on the ENERCON storm control feature, please see the last page.



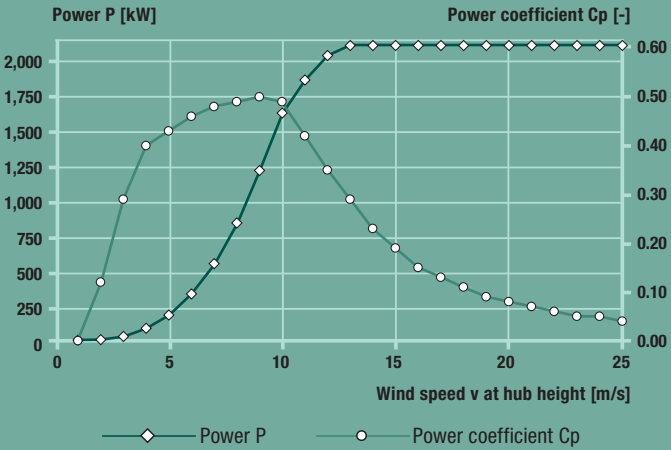
- 1 Main carrier
- 2 Yaw drive
- 3 Annular generator
- 4 Blade adapter
- 5 Rotor hub
- 6 Rotor blade

E82

2,000 kW



Calculated power curve



Wind [m/s]	Power P [kW]	Power coefficient Cp [-]
1	0.0	0.00
2	3.0	0.12
3	25.0	0.29
4	82.0	0.40
5	174.0	0.43
6	321.0	0.46
7	532.0	0.48
8	815.0	0.49
9	1,180.0	0.50
10	1,580.0	0.49
11	1,810.0	0.42
12	1,980.0	0.35
13	2,050.0	0.29
14	2,050.0	0.23
15	2,050.0	0.19
16	2,050.0	0.15
17	2,050.0	0.13
18	2,050.0	0.11
19	2,050.0	0.09
20	2,050.0	0.08
21	2,050.0	0.07
22	2,050.0	0.06
23	2,050.0	0.05
24	2,050.0	0.05
25	2,050.0	0.04

$\rho = 1.225 \text{ kg/m}^3$

For more information on the ENERCON power curve, please see the last page.

Technical specifications E-82 E2

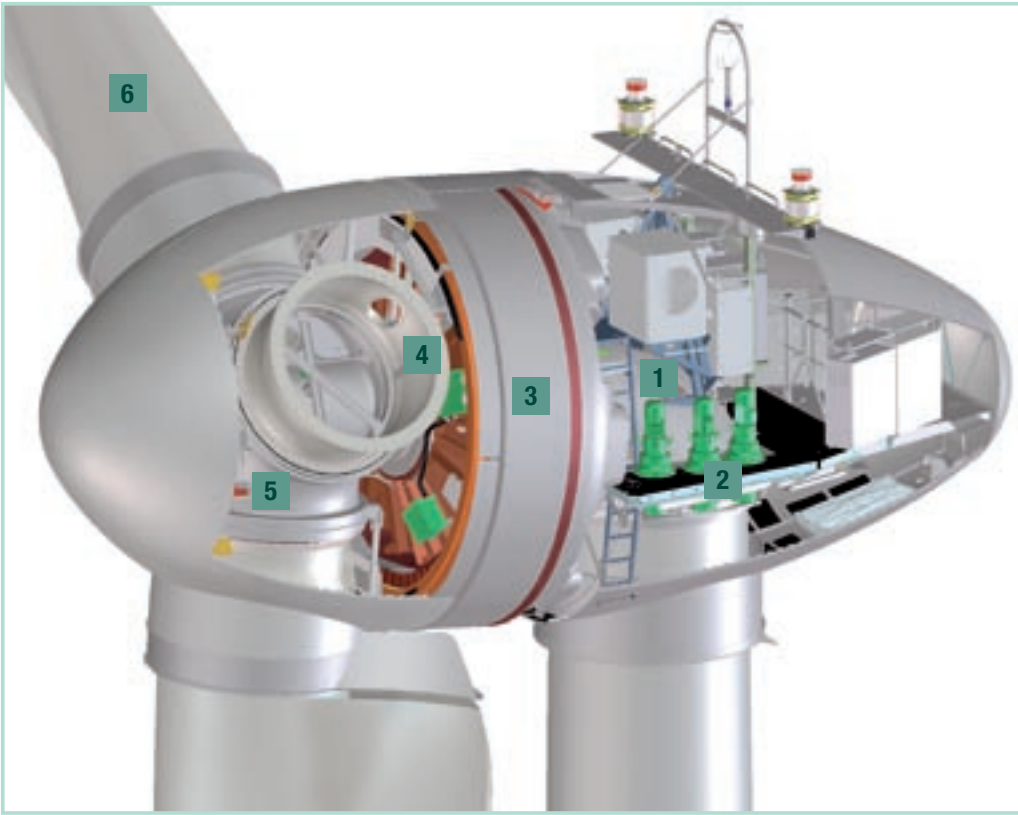
Rated power: 2,000 kW
Rotor diameter: 82 m
Hub height: 78 m / 85 m / 98 m / 108 m / 138 m
Wind zone (DIBt): WZ III
Wind class (IEC): IEC/NVN IIA

WEC concept: Gearless, variable speed
Single blade adjustment

Rotor
Type: Upwind rotor with active pitch control
Rotational direction: Clockwise
No. of blades: 3
Swept area: 5,281 m²
Blade material: GRP (epoxy resin);
Built-in lightning protection
Rotational speed: Variable, 6–18 rpm
Pitch control: ENERCON single blade pitch system;
one independent pitch system per rotor
blade with allocated emergency supply

Drive train with generator
Hub: Rigid
Main bearing: Double-row tapered/cylindrical roller bearings
Generator: ENERCON direct-drive annular generator
Grid feed: ENERCON inverter
Brake systems: – 3 independent pitch control systems with emergency power supply
– Rotor brake
– Rotor lock
Yaw system: Active via yaw gear, load-dependent damping
Cut-out wind speed: 28–34 m/s (with ENERCON storm control*)
Remote monitoring: ENERCON SCADA

* For more information on the ENERCON storm control feature, please see the last page.



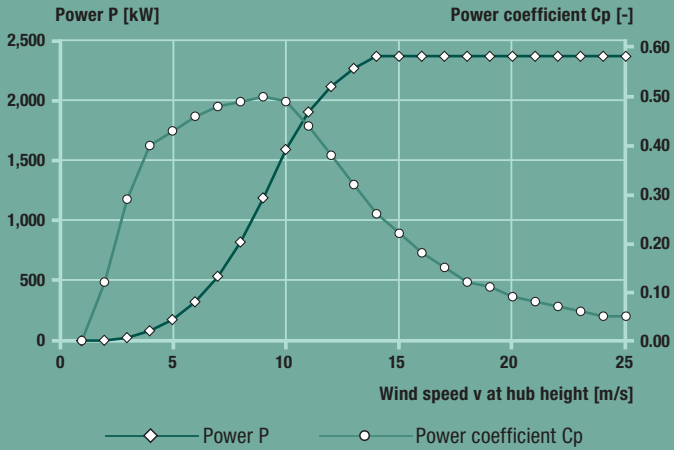
- 1 Main carrier
- 2 Yaw drive
- 3 Annular generator
- 4 Blade adapter
- 5 Rotor hub
- 6 Rotor blade

E82

2,300 kW



Calculated power curve



Wind [m/s]	Power P [kW]	Power coefficient Cp [-]
1	0.0	0.00
2	3.0	0.12
3	25.0	0.29
4	82.0	0.40
5	174.0	0.43
6	321.0	0.46
7	532.0	0.48
8	815.0	0.49
9	1,180.0	0.50
10	1,580.0	0.49
11	1,890.0	0.44
12	2,100.0	0.38
13	2,250.0	0.32
14	2,350.0	0.26
15	2,350.0	0.22
16	2,350.0	0.18
17	2,350.0	0.15
18	2,350.0	0.12
19	2,350.0	0.11
20	2,350.0	0.09
21	2,350.0	0.08
22	2,350.0	0.07
23	2,350.0	0.06
24	2,350.0	0.05
25	2,350.0	0.05

$\rho = 1.225 \text{ kg/m}^3$

For more information on the ENERCON power curve, please see the last page.

Technical specifications E-82 E2

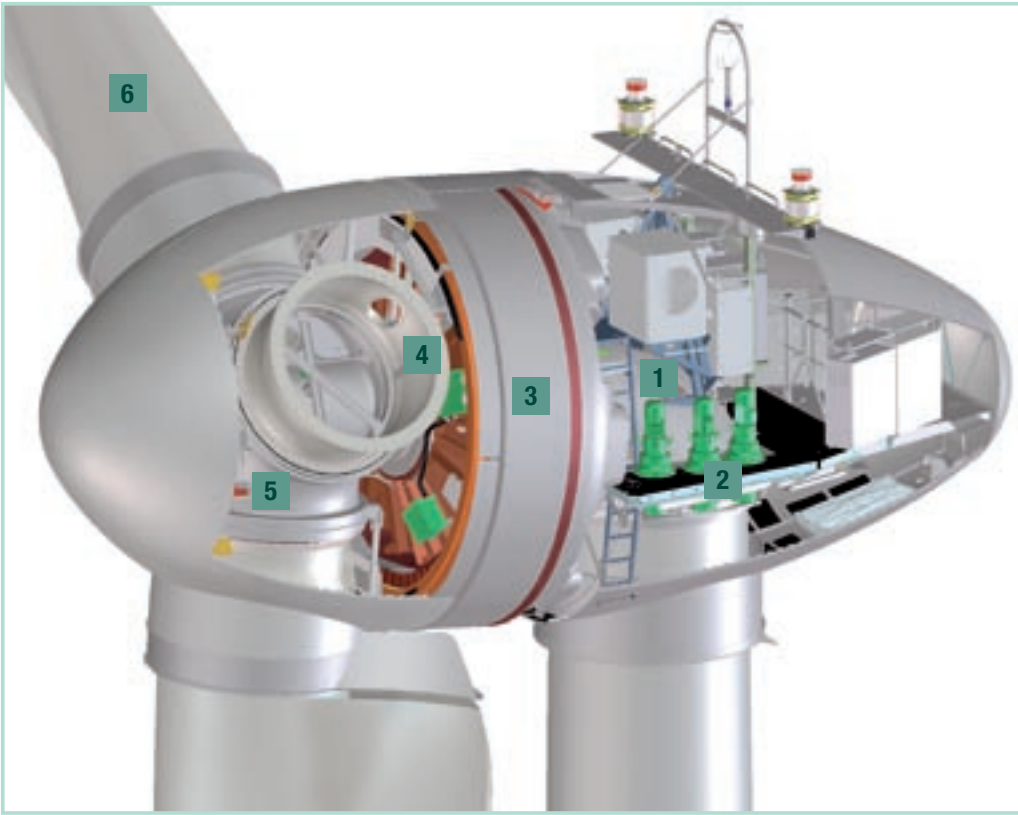
Rated power: 2,300 kW
Rotor diameter: 82 m
Hub height: 78 m / 85 m / 98 m / 108 m / 138 m
Wind zone (DIBt): WZ III
Wind class (IEC): IEC/NVN IIA

WEC concept: Gearless, variable speed
Single blade adjustment

Rotor
Type: Upwind rotor with active pitch control
Rotational direction: Clockwise
No. of blades: 3
Swept area: 5,281 m²
Blade material: GRP (epoxy resin);
Built-in lightning protection
Rotational speed: Variable, 6–18 rpm
Pitch control: ENERCON single blade pitch system;
one independent pitch system per rotor
blade with allocated emergency supply

Drive train with generator
Hub: Rigid
Main bearing: Double-row tapered/cylindrical roller bearings
Generator: ENERCON direct-drive annular generator
Grid feed: ENERCON inverter
Brake systems: – 3 independent pitch control systems
with emergency power supply
– Rotor brake
– Rotor lock
Yaw system: Active via yaw gear,
load-dependent damping
Cut-out wind speed: 28–34 m/s
(with ENERCON storm control*)
Remote monitoring: ENERCON SCADA

* For more information on the ENERCON storm control feature, please see the last page.



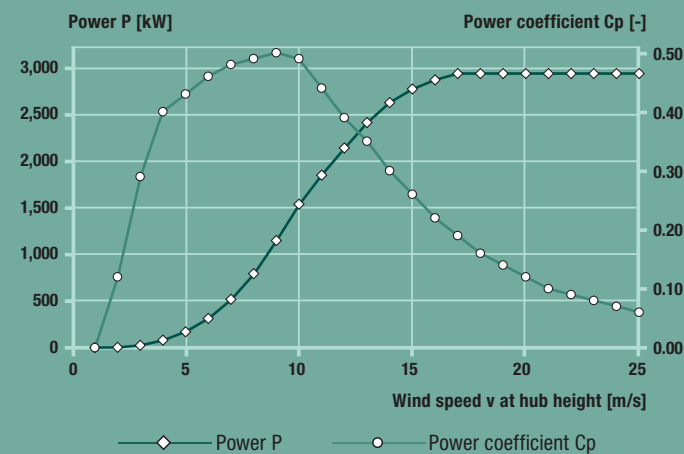
- 1 Main carrier
- 2 Yaw drive
- 3 Annular generator
- 4 Blade adapter
- 5 Rotor hub
- 6 Rotor blade

E82

3,000 kW



Calculated power curve



Wind [m/s]	Power P [kW]	Power coefficient Cp [-]
1	0.0	0.00
2	3.0	0.12
3	25.0	0.29
4	82.0	0.40
5	174.0	0.43
6	321.0	0.46
7	532.0	0.48
8	815.0	0.49
9	1,180.0	0.50
10	1,580.0	0.49
11	1,900.0	0.44
12	2,200.0	0.39
13	2,480.0	0.35
14	2,700.0	0.30
15	2,850.0	0.26
16	2,950.0	0.22
17	3,020.0	0.19
18	3,020.0	0.16
19	3,020.0	0.14
20	3,020.0	0.12
21	3,020.0	0.10
22	3,020.0	0.09
23	3,020.0	0.08
24	3,020.0	0.07
25	3,020.0	0.06

$\rho = 1.225 \text{ kg/m}^3$

For more information on the ENERCON power curve, please see the last page.

Technical specifications E-82 E3

Rated power: 3,000 kW
 Rotor diameter: 82 m
 Hub height: 78 m / 85 m / 98 m / 108 m / 138 m
 Wind class (IEC): IEC/NVN IA and IEC/NVN IIA

WEC concept: Gearless, variable speed
 Single blade adjustment

Rotor
 Type: Upwind rotor with active pitch control
 Rotational direction: Clockwise
 No. of blades: 3
 Swept area: 5,281 m²
 Blade material: GRP (epoxy resin);
 Built-in lightning protection
 Rotational speed: Variable, 6–18.5 rpm
 Pitch control: ENERCON single blade pitch system;
 one independent pitch system per rotor
 blade with allocated emergency supply

Drive train with generator
 Hub: Rigid
 Main bearing: Double-row tapered/cylindrical roller bearings
 Generator: ENERCON direct-drive annular generator
Grid feed: ENERCON inverter
Brake systems: – 3 independent pitch control systems
 with emergency power supply
 – Rotor brake
 – Rotor lock
Yaw system: Active via yaw gear,
 load-dependent damping
Cut-out wind speed: 28–34 m/s
 (with ENERCON storm control*)
Remote monitoring: ENERCON SCADA

*For more information on the ENERCON storm control feature, please see the last page.



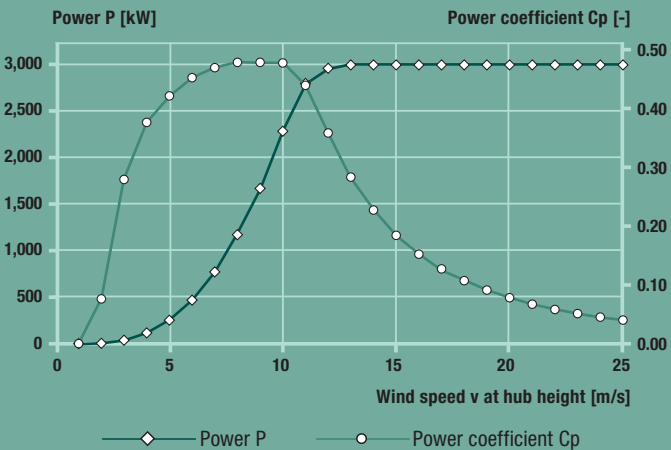
- 1 Main carrier
- 2 Yaw drive
- 3 Annular generator
- 4 Blade adapter
- 5 Rotor hub
- 6 Rotor blade

E101

3,000 kW



Calculated power curve



Wind [m/s]	Power P [kW]	Power coefficient Cp [-]
1	0.0	0.000
2	3.0	0.076
3	37.0	0.279
4	118.0	0.376
5	258.0	0.421
6	479.0	0.452
7	790.0	0.469
8	1,200.0	0.478
9	1,710.0	0.478
10	2,340.0	0.477
11	2,867.0	0.439
12	3,034.0	0.358
13	3,050.0	0.283
14	3,050.0	0.227
15	3,050.0	0.184
16	3,050.0	0.152
17	3,050.0	0.127
18	3,050.0	0.107
19	3,050.0	0.091
20	3,050.0	0.078
21	3,050.0	0.067
22	3,050.0	0.058
23	3,050.0	0.051
24	3,050.0	0.045
25	3,050.0	0.040

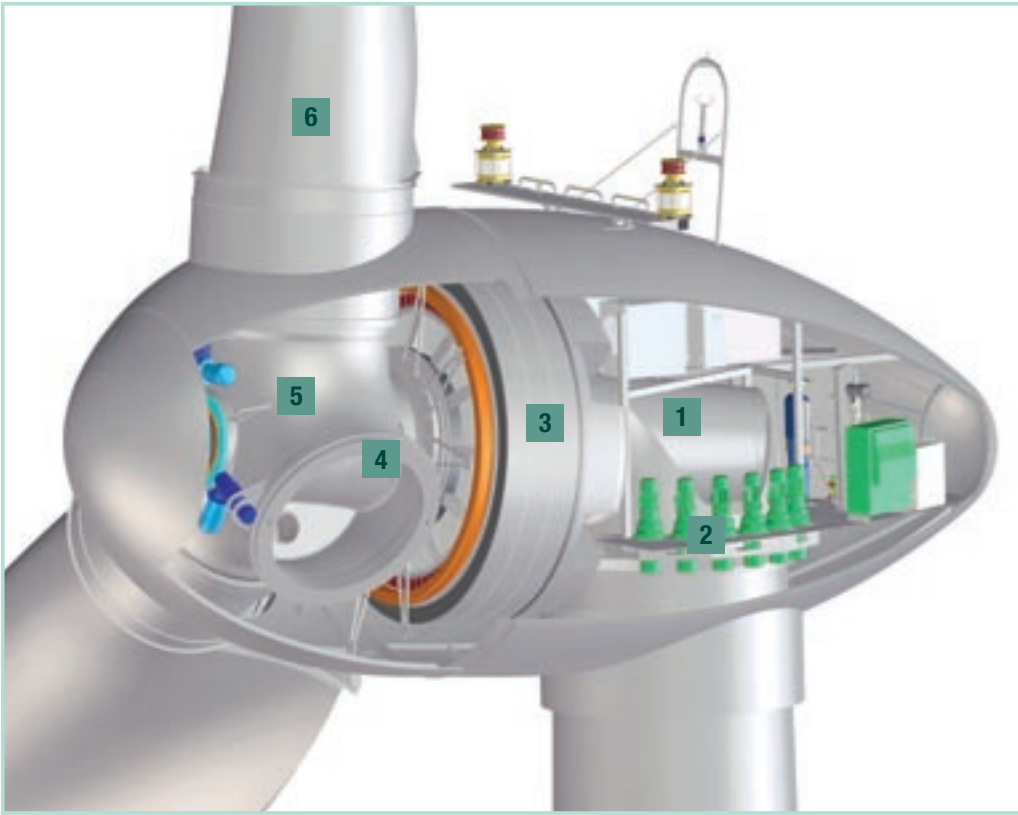
$\rho = 1.225 \text{ kg/m}^3$

For more information on the ENERCON power curve, please see the last page.

Technical specifications E-101

Rated power:	3,000 kW	Drive train with generator	
Rotor diameter:	101 m	Hub:	Rigid
Hub height:	99 m / 135 m	Main bearing:	Double-row tapered/cylindrical roller bearings
Wind zone (DIBt):	WZ III	Generator:	ENERCON direct-drive annular generator
Wind class (IEC):	IEC/NVN IIA	Grid feed:	ENERCON inverter
WEC concept:	Gearless, variable speed Single blade adjustment	Brake systems:	— 3 independent pitch control systems with emergency power supply — Rotor brake — Rotor lock, latching (15 °)
Rotor		Yaw system:	Active via yaw gear, load-dependent damping
Type:	Upwind rotor with active pitch control	Cut-out wind speed:	28–34 m/s (with ENERCON storm control*)
Rotational direction:	Clockwise	Remote monitoring:	ENERCON SCADA
No. of blades:	3		
Swept area:	8,012 m ²		
Blade material:	GRP (epoxy resin); Built-in lightning protection		
Rotational speed:	Variable, 4–14.5 rpm		
Pitch control:	ENERCON single blade pitch system; one independent pitch system per rotor blade with allocated emergency supply		

* For more information on the ENERCON storm control feature, please see the last page.



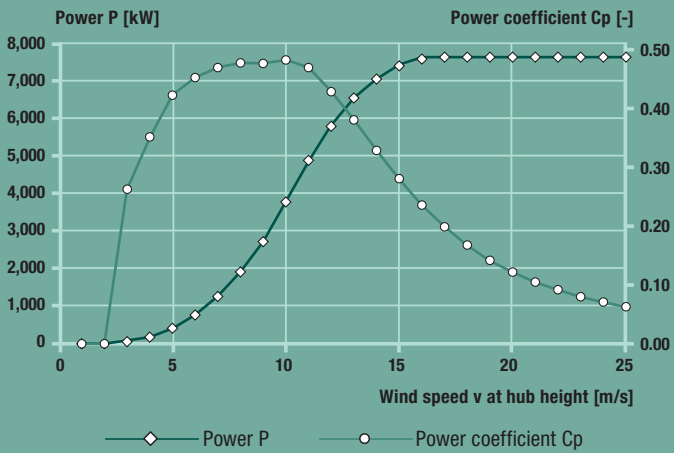
- 1 Main carrier
- 2 Yaw drive
- 3 Annular generator
- 4 Blade adapter
- 5 Rotor hub
- 6 Rotor blade

E126

7,500 kW



Calculated power curve



Wind [m/s]	Power P [kW]	Power coefficient Cp [-]
1	0.0	0.000
2	0.0	0.000
3	55.0	0.263
4	175.0	0.352
5	410.0	0.423
6	760.0	0.453
7	1,250.0	0.470
8	1,900.0	0.478
9	2,700.0	0.477
10	3,750.0	0.483
11	4,850.0	0.470
12	5,750.0	0.429
13	6,500.0	0.381
14	7,000.0	0.329
15	7,350.0	0.281
16	7,500.0	0.236
17	7,580.0	0.199
18	7,580.0	0.168
19	7,580.0	0.142
20	7,580.0	0.122
21	7,580.0	0.105
22	7,580.0	0.092
23	7,580.0	0.080
24	7,580.0	0.071
25	7,580.0	0.063

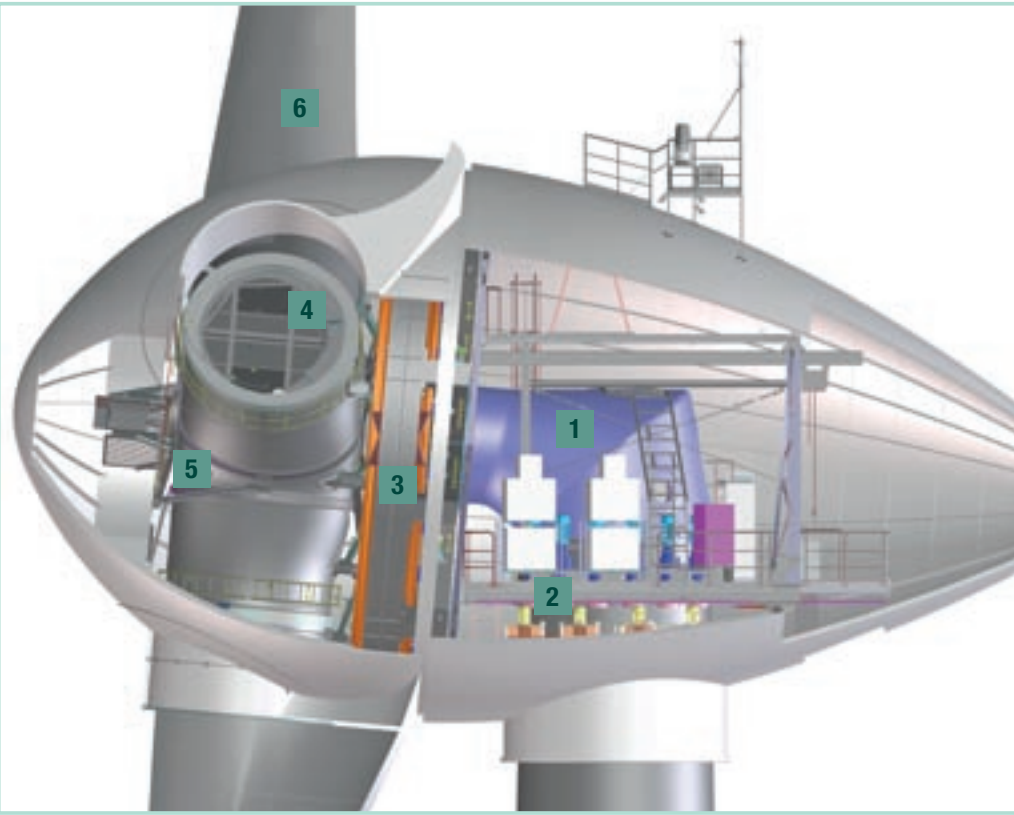
$\rho = 1.225 \text{ kg/m}^3$

For more information on the ENERCON power curve, please see the last page.

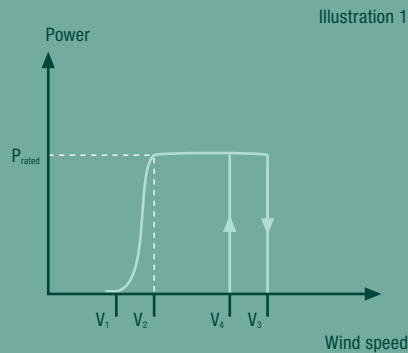
Technical specifications E-126

Rated power:	7,500 kW	Drive train with generator	
Rotor diameter:	127 m	Hub:	Rigid
Hub height:	135 m	Main bearing:	Single-row tapered roller bearing
Wind zone (DIBt):	WZ III	Generator:	ENERCON direct-drive annular generator
Wind class (IEC):	IEC/NVN IA	Grid feed:	ENERCON inverter
WEC concept:	Gearless, variable speed Single blade adjustment	Brake systems:	– 3 independent pitch control systems with emergency power supply – Rotor brake
Rotor		Yaw system:	Active via yaw gear, load-dependent damping
Type:	Upwind rotor with active pitch control	Cut-out wind speed:	28–34 m/s (with ENERCON storm control*)
Rotational direction:	Clockwise	Remote monitoring:	ENERCON SCADA
No. of blades:	3		
Swept area:	12,668 m ²		
Blade material:	GRP (epoxy resin)/GRP; GRP (epoxy resin)/steel; Built-in lightning protection		
Rotational speed:	Variable, 5–11.7 rpm		
Pitch control:	ENERCON single blade pitch system; one independent pitch system per rotor blade with allocated emergency supply		

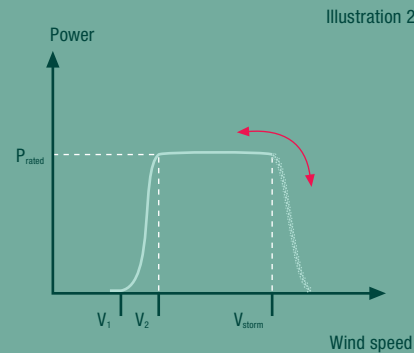
*For more information on the ENERCON storm control feature, please see the last page.



- 1 Main carrier
- 2 Yaw drive
- 3 Annular generator
- 4 Blade adapter
- 5 Rotor hub
- 6 Rotor blade



Power curve without ENERCON storm control



Power curve with ENERCON storm control

ENERCON power curves

According to current standards, power curve measurement parameters such as turbulence intensity are not taken into consideration. The results are deviating measurements on the same type of wind turbine at different locations. Again, when comparing yield using power curve measurements from different types of wind turbines, a clear picture cannot be obtained unless all measurement parameters are taken into consideration.

So in order to calculate power yield forecasts for its wind turbines, ENERCON does not use power curve measurements but calculated power curves.

These are based on the following:

- several different power curve measurements for the respective wind turbine type taken by accredited institutes with documented evidence of these measurements on the respective power curve certificates; or results from other turbine types if measurements have not yet begun or are still in progress
- average turbulence intensity of 12 %
- standard air density of 1.225 kg/m³
- realistic assumptions concerning anemometer behaviour
- wind turbine operation with ENERCON's patented storm control feature which enables operation without shutdown at high wind speeds.

Thus the power curves for ENERCON wind turbines provide highly reliable and realistic calculations for expected energy yield according to the wind conditions at the respective site.

Description of wind classes

IEC I V_{av} = 10 m/s
 V_{ext} = 70 m/s

IEC II V_{av} = 8.5 m/s
 V_{ext} = 59.5 m/s

IEC S V_{av} and V_{ext} are to be determined by the manufacturer

ENERCON storm control

ENERCON wind turbines run with a special storm control feature. Storm control enables reduced wind turbine operation in the event of extremely high wind speeds, and prevents typical shutdowns which cause considerable yield losses.

Power curve without ENERCON storm control

Illustration 1 shows that the wind turbine stops at a defined cut-out wind speed V_3 . The reason is that a specified maximum wind speed has been exceeded. In wind turbines without storm control, this occurs, for example, at a wind speed of 25 m/s within a 20-second mean. The wind turbine only starts up again when the average wind speed drops below the cut-out wind speed or an even lower restart speed (V_4 in the illustration; so-called strong wind hysteresis). In gusty wind conditions there may be a longer delay, which means that considerable yield losses are incurred.

Power curve with ENERCON storm control

The power curve diagram showing operation with ENERCON storm control (illustration 2) demonstrates clearly that the wind turbine does not shut down automatically when a certain wind speed V_{storm} is exceeded, but merely reduces power output by slowing down the rotational speed. This is achieved by slightly pitching the rotor blades out of the wind. Once the wind speed drops, the blades turn back into the wind and the turbine immediately resumes operation at full power. This prevents yield-reducing shutdown and start-up procedures.