

Morgan Advanced Materials (Group)

Established in 1856
A global advanced materials company
Headquartered in Windsor, United Kingdom
Listed on the London Stock Exchange

Morgan AM&T(Shanghai) Co.,Ltd.

Morgan AM&T(Shanghai) Co.,Ltd.
Established in 1992
Joint venture between
Morgan Advanced Materials plc.
and Shanghai Prime Machinery Co., Ltd.

What differentiates us?

Advanced materials science and processing capabilities
Extensive applications engineering experience
Consistent and reliable performance
A strong history of innovation and reinvention
A truly global footprint

You can contact us or our authorized distributor through the following channels:

SALES/CUSTOMER SERVICE:

021-64343350 Ext 280
chinasales@morganplc.com

DISTRIBUTOR POLICY:

021-64343350 Ext 260
ecchina.channel@morganplc.com

ANTI-COUNTERFEITING ISSUES:

ecchina.antifake@morganplc.com

OTHER SUGGESTIONS:

ecchina.suggestions@morganplc.com

WECHAT ACCOUNT:

Morgan1856

ONLINE FLAGSHIP STORE:

<https://morgancarbon.1688.com>



Innovative and customized solutions for wind power generation





Solutions for Wind Power Products

-40°C, 90% humidity, and sea salt corrosion
50°C, 5% humidity, and heat wave attack

These may be extreme condition for human survival, but they are the normal daily environment for wind turbine operation. By understanding the specific needs of the wind power industry, as well as the opportunities and challenges you face, Morgan is committed to innovating value-added solutions to improve the wind turbine productivity and running time to fully meet your needs

Based on our high quality engineering applications and a service system with global coverage, with numerous wind turbine real life application experience, we provide customers with wind power products which will be suitable for harsh environment (including carbon brushes, brush holders and components, slip rings, maintenance grinding stones, etc.) and application knowledge.



Wind Power Products Selection Guide

Carbon Brush Selection Guide				
Collecting ring	Material hardness	Application	Carbon brush current density	Applicable Morgan brush grade
Steel slip rings	150-250	Main carbon brush	8-13A/cm ² 13-18A/cm ²	MG1127 MG1147 (General), MG1157 (Plateau), MG1167 (Marine)
		Grounding carbon brush	< 15A/cm ²	MA1147 (General), MA1157 (Plateau), MA1167 (Marine)
Copper slip rings	90-150	Main carbon brush	8-13A/cm ² 13-18A/cm ² 18-25A/cm ²	MG1127 M50BR S4149 (silver included)
		Grounding carbon brush	< 15A/cm ²	MA1147 (General), MA1157 (Plateau), MA1167 (Marine), MG1127
Other carbon brushes in the nacelle		Lightning protection carbon brush	-	MG1165
		Pitch control carbon brush	6-12A/cm ²	CE50

Calculation example of carbon brush current density

Rotor current	560A
Number of single-phase carbon brushes	6 pcs
Carbon brush thickness	20 mm
Carbon brush width	40 mm
Carbon brush current density	11.7 A/cm ² (11.7=560/6/(2X4))

Notes:

Please keep a proper safety margin to cope with various harsh conditions in practical applications when selecting carbon brushes based on theoretical calculations for current density.

Contents

Selection Guide	02
Wind Power Slip Rings	03-04
Wind Power Carbon Brush	05-06

Slip rings of wind turbine generator

Morgan wind power slip ring has become an industry model by virtue of reliable performance that relies on its scientific research experience over 160 years in carbon and graphite materials, its global operation network, advanced testing equipment and instruments, and rich material knowledge and application experience. Morgan can provide various types of slip rings and components, such as general type, plateau type and marine type for different application conditions.

We not only sell products, but also participate in the design stage of customers, providing customers with a whole set of solutions in the slip rings to help customers reduce costs and improve the adaptability of wind turbine generators to the environment. Morgan products can be found in the freezing Mongolia and scorching desert in western America. We deeply understand the challenges you face in the wind turbine operation and provide customized solutions in time to optimize your wind turbine performance.



Product features:

- Integral or assembled manufacturing
- Range of materials to choose from
- Rich product portfolio to satisfy different power rating ranges
- Tested under harsh conditions such as high pressure, overspeed, and extreme temperature to adapt to different operating environments

Main advantages:

- Rich manufacturing and application experience
- Advanced slip rings type testing laboratory
- Global technical support and application platform
- Independent and complete overall production process
- Can be customized according to specific requirements
- Product reliability proven by years of practical operation

Benefits to customers:

- A better overall solution
- More reliable manufacturing quality of slip rings to reduce operation and maintenance costs
- More timely pre-sales and after-sales services, and higher return on investment
- More stable product performance and longer service life in harsh environment

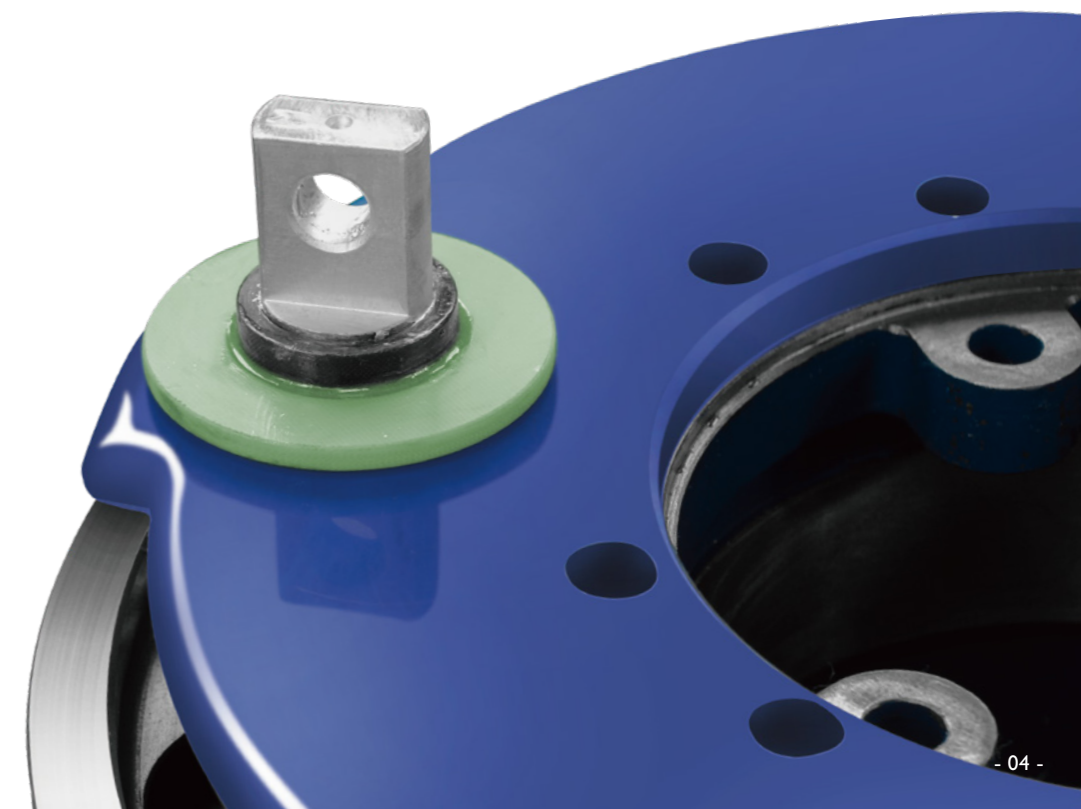
Performance parameters of slip rings of wind turbine generator

Type	Power	Rotational speed rpm	Outside diameter mm	Internal control installation dimensions mm
DH240	850KW	1000-2000	Φ240	Φ79/80
DH280	1.5MW	1000-2000	Φ280	Φ119/120
DH300	1.5MW	1000-2000	Φ300	Φ119/120
DH320	1.5MW	1000-2000	Φ320	Φ138/139
DH320	1.65MW	700-2000	Φ320	Φ119/120
DH320	2.0MW	930-2070	Φ320	Φ138/139
DH350	2.5MW	612-1380	Φ350	Φ149/150
DH350	3.0MW	665-1344	Φ350	Φ159/160
DH450	6.0MW	900-1170	Φ450	Φ188/190



Disclaimer

The product technical parameters are subject to change without prior notice. Please consult the sales representative for the specifications of actual shipment. The user takes sole charge of the safe use of the product as the actual use conditions of the product are beyond the control of Morgan Advanced Materials (Shanghai) Co., Ltd. This product manual has no legal effect, nor is it regarded as any patent invention license or suggestion under the condition of no license. It is only for reference, research and verification.



Carbon brush for wind turbine generator

Morgan carbon brush has become an industry model by virtue of reliable performance that relies on its scientific research experience over 160 years in carbon and graphite materials, its global operation network, advanced testing equipment and instruments, and rich material knowledge and application experience. Morgan can provide main carbon brushes, grounding carbon brushes and nacelle lightning protection carbon brushes (wheel hub, yaw, pitch control, etc.) for different application conditions.

Choosing the right carbon brush material based on your application conditions can reduce the wear of slip rings and extend the service life of carbon brush, which is also the decisive factor of the generator operation performance. Our application engineers can help you choose the correct carbon brush grade and make special design based on your needs. You can also select materials that meet your specific needs for different application conditions with reference to our selection chart.



Product features:

- Reliable performance through unique formula
- Stable patina formation to achieve low friction
- Suitable for different application conditions through various processes treatment

Main advantages:

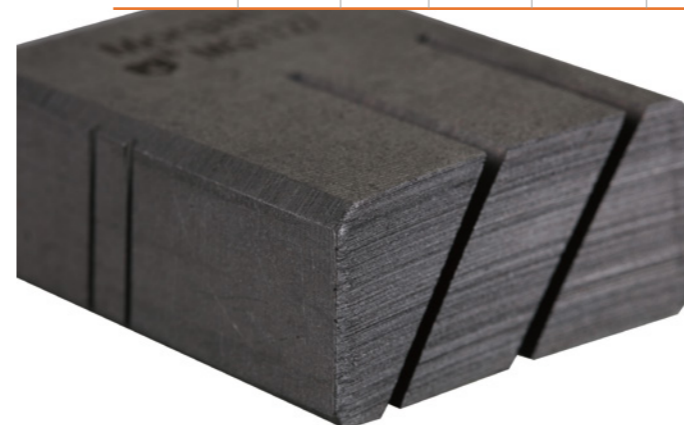
- Century of professional experience in manufacture and application of carbon brushes
- Advanced R&D and design capabilities
- Independent and complete overall production process
- Technical and application support of a global expert team
- Optional carbon brush grade suitable for various complex environments
- Customized according to the specific needs of customers

Benefits to customers:

- A better overall solution
- Less wear of slip rings
- Less wind turbine repair

Typical values of physical properties of carbon brushes for wind turbine generator

	Grade	Resistivity	Flexural strength	Rockwell hardness	Volume density	Coefficient of Friction	Maximum linear velocity	Recommended operating electric density	Recommended application conditions
		$\mu\Omega\text{m}$	MPa	HR10/588	g/cm^3	L-H	m/s	A/cm^2	
Main carbon brush	MG1127	3.80	28	80	2.44	L	45	8~13	Small capacity unit
	MG1147	3.20	30	75	2.95	M	40	13~18	Common environmental unit
	MG1157	3.30	24	72	2.96	M	40	13~18	Plateau environment (including pro-oxidant)
	MG1167	3.30	26	77	2.98	M	40	13~18	Marine environment (including abrasives)
	M50BR	2.00	24	-	3.20	L	30	13~18	Suitable for copper slip rings
	S4149	0.30	47	-	3.20	L	30	18~25	Carbon brush with high silver content, suitable for copper slip rings
Grounding carbon brush	MA1147	1.94	29	95/70	2.65	M	45	≤ 15	Common environment (usually block A and block B are used in pairs)
	MA1157	1.80	28	93/70	2.70	M	45	≤ 15	Plateau environment-including pro-oxidant (usually block A and block B are used in pairs)
	MA1167	1.85	26	90/70	2.63	M	45	≤ 15	Marine environment-including abrasives (usually block A and block B are used in pairs)
Other carbon brushes in the nacelle	MG1165	0.30	30	89	3.80	L	30	-	Lightning protection carbon brush
	MG1190	0.06	65	63	6.50	M	25	-	Lightning protection carbon brush with higher current-carrying capacity
	CE50	520	22	95	1.60	L	41	6~12	Pitch control carbon brush



Definition of coefficient of friction

H	High	Above 0.4
M	Medium	0.22-0.4
L	Low	Below 0.22

Beware of imitations

Counterfeit and shoddy products will not only cause direct economic losses to you and the company, but also immeasurable damage and safety hazards to machinery and equipment! Therefore, we remind you to identify Morgan's trademarks and products and choose proper channels. Please be wary of products with "too low" prices, beware of similar trademarks or grades, scan the code on the goods upon arrival, and beware of imitations!

The product technical parameters are subject to change without prior notice. Please consult the sales representative for the specifications of actual shipment. The user takes sole charge of the safe use of the product as the actual use conditions of the product are beyond the control of Morgan Advanced Materials (Shanghai) Co., Ltd. This product manual has no legal effect, nor is it regarded as any patent invention license or suggestion under the condition of no license. It is only for reference, research and verification.