

# INNOVATIVE TECHNOLOGY FOR THE POWER GENERATION INDUSTRY

Whatever your power source we have the technology to optimize the performance of your brush/brush-holder application.



ISO 9001: 2000 | ISO 14001

# A NEW FORCE in POWER

## Natural Graphite Grade - LFC554

*Developed specifically for use on high speed slip ring excitation applications*

- ▶ Low friction coefficient at 100m/sec
- ▶ Low contact drop
- ▶ Low losses/Higher load capabilities/ Cooler running
- ▶ Long life and friendly to slip ring
- ▶ Ability to handle high current densities up to 13A/cm<sup>2</sup> (80A/inch<sup>2</sup>)
- ▶ Speed capabilities up to 100m/s (20,000 fpm)
- ▶ Brush pressures of 130-180g/cm<sup>2</sup> (1.85 – 2.55 psi)
- ▶ ABB, Alstom & GE approved
- ▶ Internationally renowned

## G. Dietrich Brush Holder Plug Sets

- ▶ GE Power, Alstom and ABB approved
- ▶ Robust versatile design
- ▶ Modular construction
- ▶ Silver 'multi-contact' socket transfers the current to the bus
- ▶ Optional integral brush hold-off device
- ▶ Two units available of 400 & 600 Amp capacity
- ▶ Constant Force springs
- ▶ Brush wear indication and safety system
- ▶ "Magazine" and "Single" brush style plug-sets available



# GENERATION

## A WORLD-WIDE Market

### Wind power - New generation grades

- ▶ Complete range of products for your brush, brush-holder, slip-ring and signal transfer system needs
- ▶ New generation of Silver Impregnated grades for traditional ring applications
- ▶ Carbon/Carbon technology – a major break-through in the search for extended brush life
- ▶ State of the art brush-holder technology utilizing:
  - Corrosion resistant materials of construction
  - Remote brush wear indication facility
  - Minimal service requirement
- ▶ Outstanding brush life
- ▶ Minimal wear of both rings and brushes
- ▶ Excellent no-load and low load current carrying capacity
- ▶ High peripheral speed capability
- ▶ Lower operating costs
- ▶ Dual grade ground brush and modular holders



### MAJOR OEM APPROVAL

– ABB/Elin/GE Power/GE Wind/Loher/  
Nordex/Suzlon/VEM/Yongji

# BRUSH HOLDERS, SLIP RINGS & SIGNAL TRANSFER SYSTEMS

## High speed on line plug set – ATE/DIETRICH/FERRAZ types

- ▶ EST version
- ▶ Spares and Refurbishment

## Standard Brush Holders for Hydro-Electric Applications

- ▶ Dietrich/Ferraz - Bung & "V" type holders - slip rings
- ▶ Dietrich/Ferraz - Dng & "V" type holders - commutators
- ▶ Custom made holders

## Wind Generator Brush Holders – G. DIETRICH

- ▶ Corrosion resistant - for offshore applications
- ▶ Long life designs

## Wind Generator Graphite Slip-rings

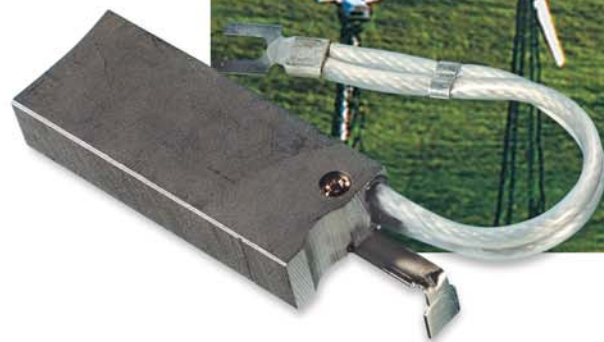
- ▶ Innovative technology
- ▶ Extended brush life
- ▶ Minimal wear of both rings and brushes

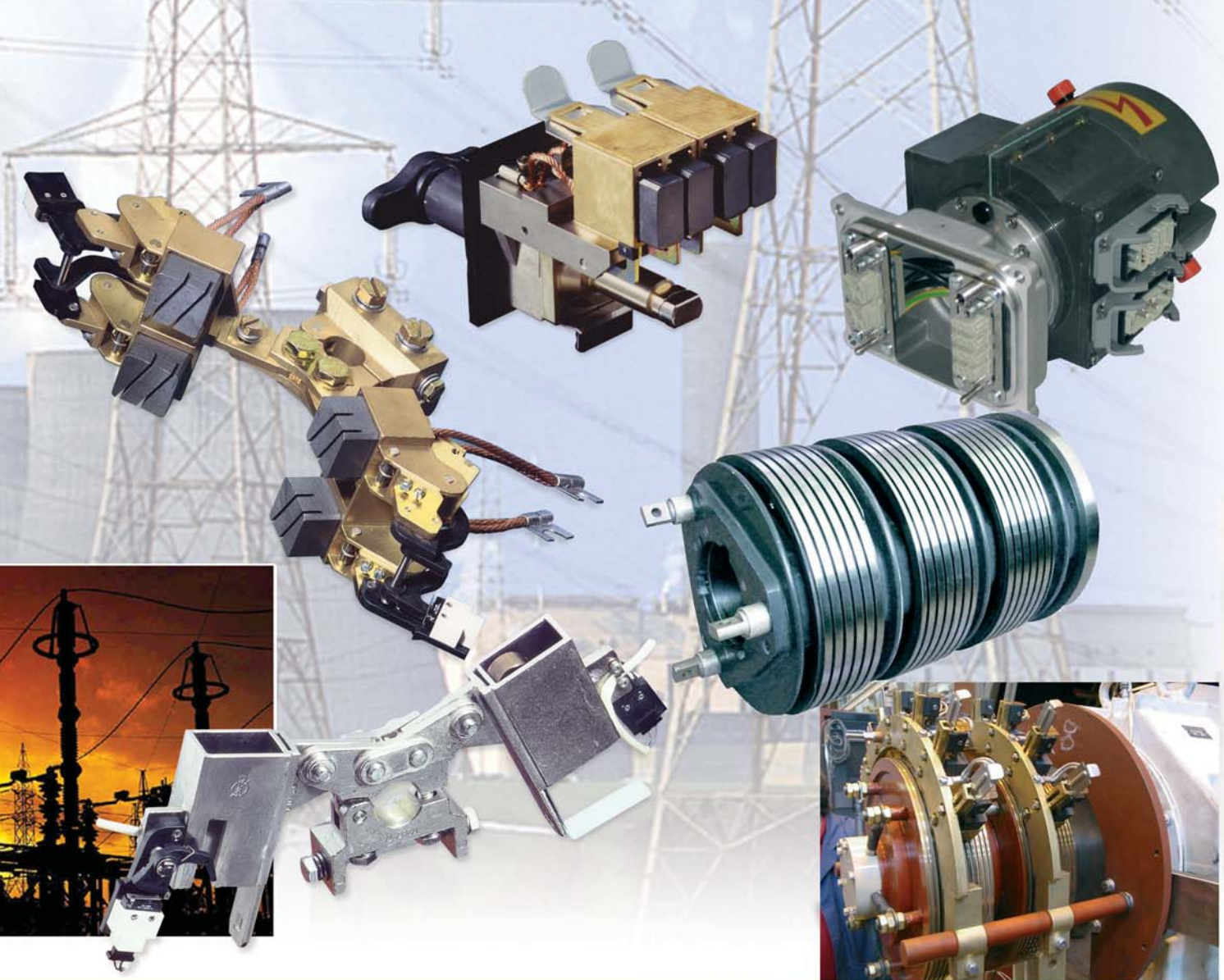
## Wind Generator Signal Transfer Systems

- ▶ Long lifetime
- ▶ High reliability
- ▶ Robustness

## Standard Industrial Style Brushes & Holders

- ▶ Typically for Hydro-electric applications and old High speed generators
- ▶ Full range
- ▶ Large inventory
- ▶ Quick response





# ENGINEERING SERVICE & TECHNICAL SUPPORT

## Engineering Maintenance Service

- ▶ On-site repair of slip-rings and commutators on large machines
  - Cutting, grinding, beveling and undercutting of commutators and slip rings
- ▶ Customer Training
- ▶ Diagnostic Measurement of machine and brush performance
  - Commutator and slip ring profile analysis
  - Surface Roughness
  - Brush pressure measurement
  - Axial & Circumferential stagger analysis
  - Grade application studies compare to the machine and environment
- ▶ Performance evaluation and optimization
- ▶ Feasibility study and investment justification
- ▶ Proto-type engineering and development
- ▶ International training (Extelec or Stagelec)



# APPLICATIONS

GRADE GROUP	GRADE	High Speed Excitation Slip-rings Stainless / Steel	Slow Speed Excitation Slip-rings (Hydro) Iron/Copper	High & Low Speed DC Exciters	Shaft Grounding High Speed	AC Slip-rings Iron/Copper	Graphite Slip-rings
Soft Graphite	LFC554	●			●		
Bakelite Graphite	BG469			●			
Electro-graphite	2065		●	●			
	EG389P		●	●			
	EG34D		●	●			
	EG98			●			
	EG367			●			
	EG313			●			
	2192			●			
Impregnated Electro-graphite	CB86			●			
	EG8098			●			
	EG9117		●	●			
	EG9599		●	●		●	
	EG7099		●	●		●	
	EG8067			●			
Metal Impregnated	M9426				●	●	
	M8295				●	●	●
Metal Graphite	CG33				●	●	
	CG651				●	●	
	CG665				●	●	
	CG75				●	●	
	CG626				●	●	
	MK20				●	●	
Carbon Graphite	A368						●

# GRADE PROPERTIES

GRADE GROUP	GRADE	Apparent Density	Resistivity uohmcm / uohminch	Shore Hardness	Flexural Strength	Contact Drop	Friction	Maximum Current Density A/cm <sup>2</sup> (A/inch <sup>2</sup> )	Upper Speed Limit m/s (fpm)	Metal Content %
Soft Graphite	LFC554	1,26	2000		10,5	M	L	13	100	nil
Electro-graphite	2065	1,67	1524	40	21	L	L	12,4	30,5	nil
	EG389P	1,49	1600	24	19	M	M	12	50	nil
	EG34D	1,61	1100	35	25	M	L	12	50	nil
	L1	1,61	1270	35	23	L	L	12,4	61	nil
	EG98	1,60	3400	60	33	M	M	12	50	nil
	2192	1,56	5182	55	24	H	L	15	50	nil
	EG313	1,70	4700	54	21	M	M	12	50	nil
Impregnated Electro-graphite	EG367	1,53	4100	48	21	M	M	12	50	nil
	EG8098	1,65	3925	76	35	M	L	12	50	nil
	EG9599	1,61	1585	33	28	M	L	12	50	nil
	EG7099	1,72	1185	40	34	M	L	12	50	nil
	EG9117	1,69	3350	77	36	M	L	12	50	nil
	CB86	1,66	5080	65	32	H	L	15	50	nil
	EG8067	1,65	3825	77	36	M	M	12	50	nil
Metal Impregnated	M9426	1,62	1623	24	20	VVL	H	15	40	9
	M8295	1,85	1900	24	32	VL	M	15	50	9
Metal Graphite	CG33	2,3	570	25	25	VL/L	L	12	40	30
	CG651	2,9	130	26	30	VL	L	15	35	49
	CG665	4,05	28	17	50	VL	L	20	30	67
	CG626	2,88	180	26	42	VL	L	15	45	50
	MK20	2,00	1000	33	13	VL	L	12	50	20
Carbon Graphite	A368	1,5	1100	30	27	M	L	12	45	nil
Bakelite Graphite	BG469	1,80	9500		34,5	H	M	10	35	nil

# CUSTOMER-ORIENTED INTERNATIONAL NETWORK



## PARTNER IN INNOVATION

Carbone Lorraine harnesses prime expertise in industrial applications to deliver innovative solutions — involving graphite, other high-performance materials, and key components for electric motors and electronic equipment — for many high-technology markets.

As world number-one in its main business specialities, Carbone Lorraine fields an extensive industrial and commercial network covering around 40 countries, working hand in hand with its clients to pursue permanent innovation through a broad range of top-class products and services.



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