

**HIGH RELIABILITY - EASY INSTALLATION
INTERCONNECT SOLUTIONS FOR WIND ENERGY**

HIGH PERFORMANCE INTERCONNECT SOLUTIONS FOR WIND ENERGY

ABOUT US

Hypertac is a world leading provider of high performance electrical connectors and interconnect solutions for the most demanding applications and is part of the Connector Technology Group of Smiths Group – a global technology business listed on the London Stock Exchange.

OFFERING VALUE ADDED CUSTOMER SOLUTIONS

Hypertac utilises the superior Hyperboloid Contact Technology providing unrivalled performance in harsh environments encountered in wind energy applications.

We add value to our customers by offering:

- Unique technically superior and flexible solutions that utilise the ultimate in contact performance and reliability,
- Products which are fully project managed from initial concept through to final development,
- Expert application knowledge ranging from specific products to system architecture,
- Collective knowledge and expertise to maximise the value of our solutions to our customers.



SYSTEM RELIABILITY IS KEY TO WIND POWER GENERATION

Wind turbines face some of the harshest environments both inland and offshore. Their reliability ultimately depends on the applied interconnect system.

Hypertac's robust connectors can withstand:

- Vibration
- Humidity *
- Dust
- Salt spray *
- Temperature extremes
- EMI/EMC

* depending on material

QUALITY AND ENVIRONMENT

First-class material, state-of-the-art development methods, advanced know how and exact processing are the essential ingredients of our quality. Our focus on growth is balanced by a respect for the environment. We try to find ways to minimise our impact on the environment by keeping our energy, water consumption and waste to a minimum through our working practices and indeed through our products. Active quality and commitment to continuous improvement, including the prevention of pollution, rank first and foremost in all respects.

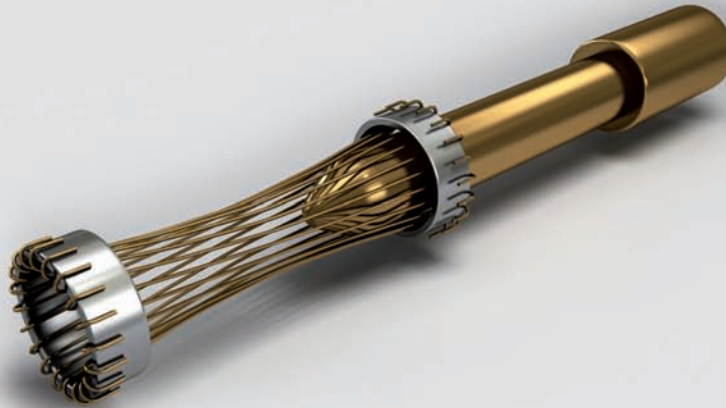
Hypertac has been awarded the ISO 9001, ISO 14001 and OHSAS 18001 quality, environment and health & safety assurance certifications.



SUPERIOR CONTACT TECHNOLOGY

UNRIVALLED SYSTEM PERFORMANCE

OUR INTERCONNECT SOLUTIONS FOR WIND TURBINES ARE BUILT UPON OUR UNIQUE HYPERBOLOID CONTACT TECHNOLOGY



THE HYPERTAC HYPERBOLOID CONTACT

The Hyperboloid socket has a number of spring wires, the position of which is defined by a wire carrier. This is fitted to an outer sleeve or shank that carries the termination of the socket.

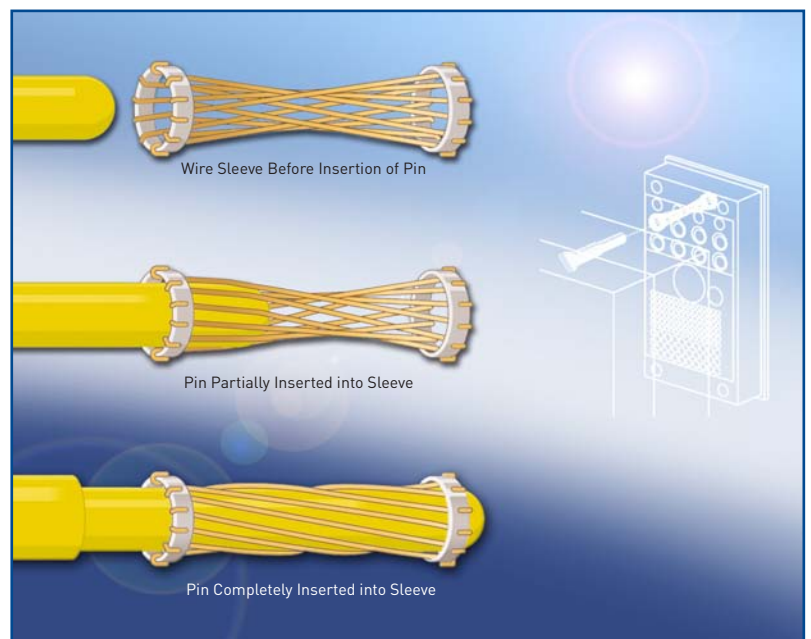
The spring wires within the socket are set at a small angle to the centre line and are deflected when the mating pin contact enters. Each spring wire is deflected within its elastic limit and makes a line contact with the pin. A smooth wiping action reduces wear of the plating surfaces of the pin and socket wires. This construction allows a very tight control of the spring forces and hence the insertion and withdrawal forces.

The Hypertac Hyperboloid contact design ensures unrivalled performance in terms of:

- Multiple line contacts of low resistance maintained under high levels of shock and vibration,
- During shock and vibration tests no discontinuity when measured down to 2 ns,
- Low insertion forces,
- Low wear of plating surfaces for long life,
- Uniform electrical and mechanical characteristics over a high number of mating operations,
- High current rating,
- No contact heating, therefore no degradation of the insulator and no electrical and electronic equipment system failure.

The Hypertac Hyperboloid contact provides the following commercial benefits:

- Low cost of ownership – no need to replace during equipment life,
- Reduced system costs – equipment design is less critical,
- Reduced qualification costs – no re-testing due to contact failures.

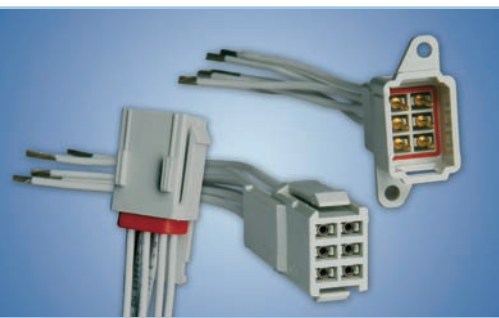


COST EFFECTIVE

INTERCONNECT SOLUTIONS

Wind turbines are difficult to access so they require long life cycle connector systems. Hypertac's self-cleaning and vibration proof interconnect solutions are designed to "fit and forget" so that maintenance work can be reduced to a minimum throughout the long life span of a wind turbine.

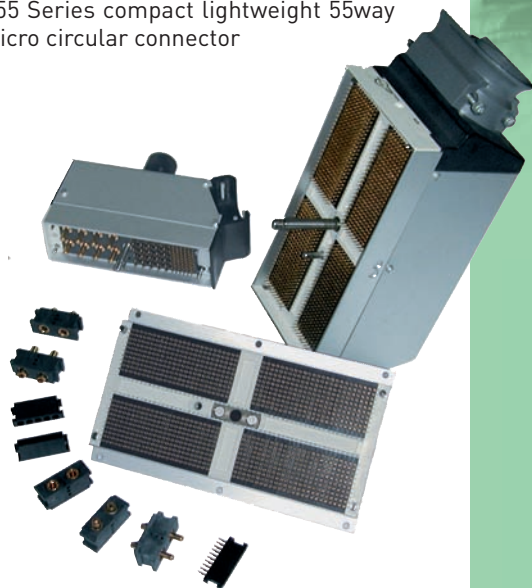
The complex structure of a wind turbine requires an expansive area of cable solutions for various functional areas: e.g. control systems, sensors for wind speed and wind direction, humidity, temperature and vibrations.



REP Series environmentally sealed quick interconnect solution



C55 Series compact lightweight 55way micro circular connector



H Series high density mini modular cable/rack and panel connectors



Heavy Duty modular connectors for signal, power, fibre optics, coax and high speed contacts



Modular L Series for rack and panel applications

RELIABILITY IS PARAMOUNT

HIGH POWER

Gauging stations on the nacelle are the control centre of the wind turbine. These stations have to withstand extreme weather conditions including high wind speed, humidity, salt spray, dust and temperature extremes on a daily basis. A contact interruption could lead to a breakdown and become hazardous for the wind turbine. For this reason the use of high reliability, high power and long life interconnect solutions is essential.

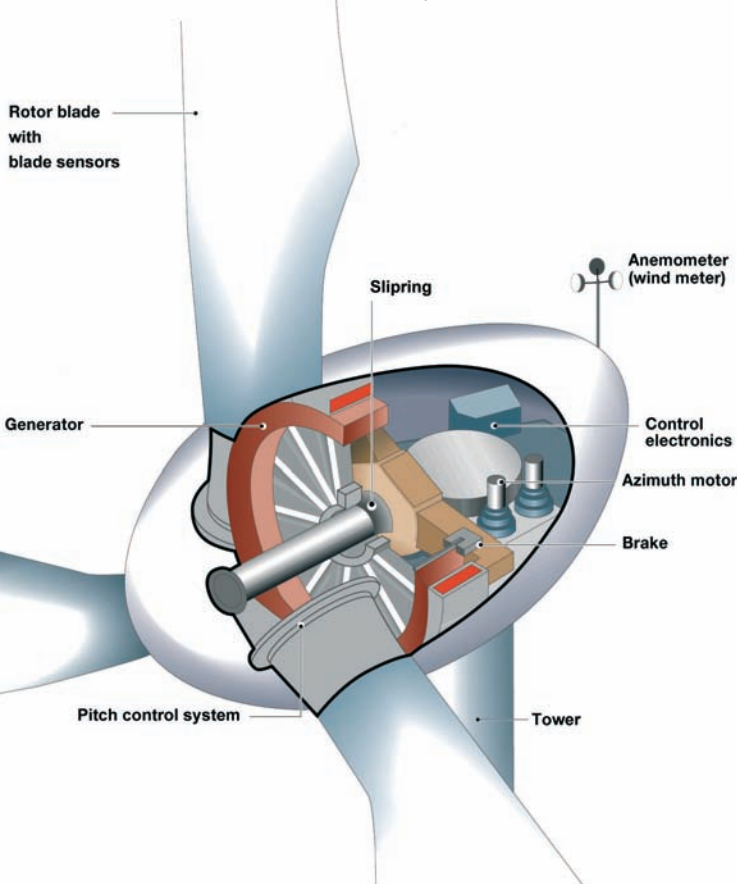
Hypertac's background in producing connectors for the harshest environments gives us the unique experience needed to produce cost effective, high power connectors for wind energy engineering to be used in generator, inverter, transformer and slip ring applications.



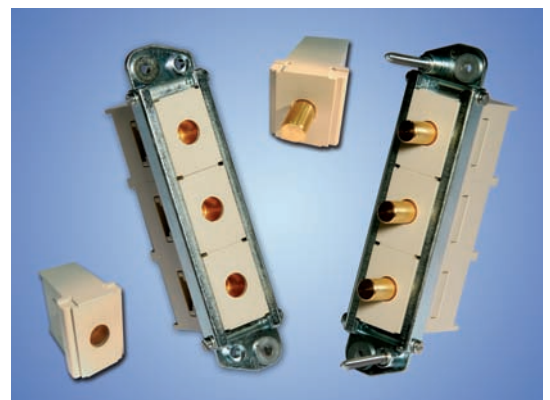
HBB Series 2/3 pole, 300 amp

Example of a wind turbine without gearbox

Power: 5,0 megawatt
Rotor diameter: 114 metres
Tower height: around 124 metres
Number of rotation: 8 to 13 revolutions per minute



HBC Series versions
300 amp and 500 amp



L-Series 300 amp modules

INDUSTRIAL STANDARD CONNECTORS

As the wind power industry has developed, so has product standardisation. Hypertac's industrial connector series provides interconnect solutions for wind energy applications and environments, including internal power supplies, rack and panel connections and motor control units.



M23 Stainless Steel Series signal and power



M23 multibus for all fieldbus systems



Circular Connectors M23, M40, M58 signal and power



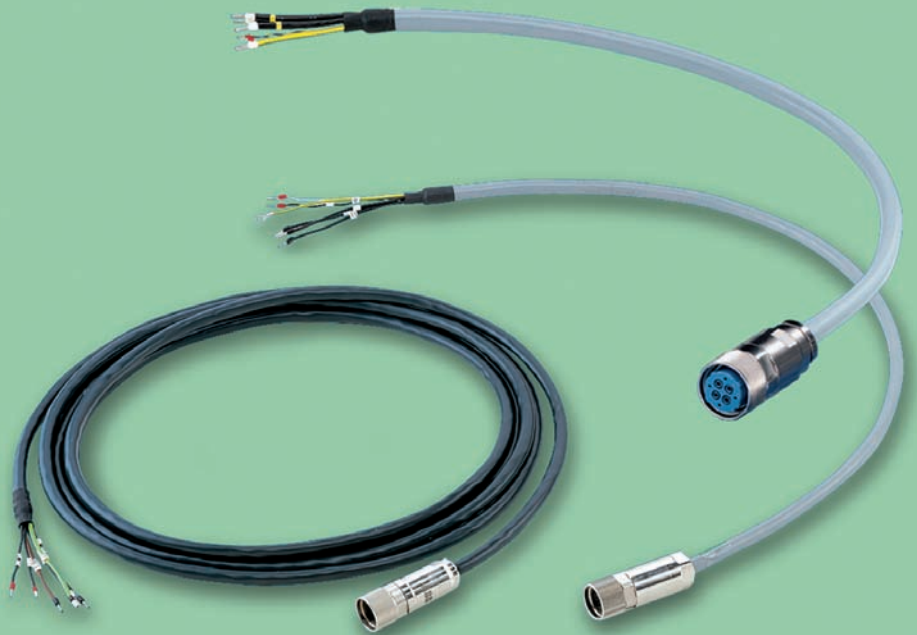
M12 Series up to 6 amp



GS Series D-Sub rectangular I/O



Motion Control Cables 100% tested pre-fabricated wiring systems



Hypertac offers the benefits of a large global business while maintaining its geographic presence. The customer is supported by design and manufacturing sites in America, Europe, Africa and Asia and by a global network of agents and distributors. This structure ensures that customers are able to interact with engineers and sales colleagues who speak their own language, have a comprehensive knowledge of the range of products available throughout the group and can draw on experience from working in particular application environments.

RF & HIGH SPEED

FILTER & TRANSIENT SUPPRESSION

OUR RF & HIGH SPEED KNOWLEDGE ENABLES US TO:

- Design and manufacture contacts operating at frequencies up to 40 GHz and above 4Gbps,
- Optimise contact design for specific cable characteristics,
- Provide insertion loss, VWR and Eye Pattern and S Parameter simulations,
- Verify high frequency and data transmission performance across entire frequency range.

Modular connectors are becoming more common within the tower of the wind turbine. These connectors allow a flexible mix of cable styles for signal, power and optical terminations.

Within a single connector it is possible to have:

- Coax, Triax, Quadrx contacts alongside signal and power contacts,
- Transient protection and EMI filtering,
- All cable shields grounded directly to connector shell.



Micro twinax and quadrx connectors



Coax, triax and quadrx connectors and contacts



RF Lightning Protection / 24 VDC Surge Suppression



Fibre optic connectors and contacts

OUR EMI FILTER KNOWLEDGE ENABLES US TO:

- Specify/recommend optimum filter style (e.g. C, LC, Pi) and value (up to 1microFarad) on receipt of signal type and data rate,
- Provide insertion loss simulations/prediction that account for actual source and load impedances,
- Verify insertion loss performance across entire frequency range,
- Combine EMI Filter and Transient Protection within a single connector,
- Provide Transient Protection in accordance with RTCA D 160F waveform and level specifications. Higher customers expectations and severe application requirements have helped drive new levels of integrated product solutions between Hypertac and the sister organisation Polyphaser|Transtector,
- Adopt the most appropriate filtering technology for the application.

Optical fibre cables are the favoured choice for communicating from the wind turbine to the wind farm central monitoring controls due to high bandwidth, long transmission distances and noise immunity. Fibre optic connectors are also available in sealed interfaces.

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