wieland


# Wind power

Electro-technical solutions for
wind energy systems

# Ready for wind.
## Renewable energy on the rise.

The utilization of renewable energy, especially wind power, has enormous growth potential coupled with a high degree of acceptance. This industry is one of the economic sectors which looks forward to a positive future. As far as electrical connectivity is concerned, safe and practical solutions are more sought-after than ever. The industry is an ideal application area for pluggable electrical installation, which Wieland offers as part of its broad product spectrum – not just for wind energy, but also for solar energy, as well as other environmentally conscious technologies.

### Greater efficiency through modularity

The return on investment of an installation depends on a range of factors: the correct location, the technology being deployed, and efficient construction. The fact is: the more pre-fabrication is carried out, the lower the installed costs become – both in the construction of the overall system as well as in the electrical installation. This is where Wieland – with its pluggable systems – can improve your return on investment.

### Reducing operational downtimes and interruptions

Investment in a wind turbine is only profitable when it operates without interruption and with as little maintenance as possible. The modularity and reliability of Wieland systems make a significant contribution to these goals. Installation times are reduced by up to 70%, on-site wiring errors are eliminated, and maintenance downtimes are reduced to a minimum. The future lies in pluggable technology.

# Knowing which way the wind blows.
## Wieland Electric – competence and expertise in green energy technology.

Wieland views itself as a reliable partner in the field of electrical installation. A company offering a vast number of components meeting the highest quality standards, including a modular system with a decisively unifying characteristic: that it is pluggable. At the same time, the system is continually growing and improving. Its reliability and flexibility make it a sound choice for virtually any application, including both fixed installations, as well as those requiring future modifications.

### Relevant for all applications

The Wieland system is ideally suited for wind turbine applications. It provides solutions and components which cover all relevant tasks: in electrical installation, as well as in automation tasks such as controlling, adjusting and safety monitoring.

### Partnership is extremely important to us

No customer requirement goes unfulfilled, thanks to more than 30 years of experience in facility management and expertise in industrial manufacturing processes. The continuous optimization of products and process makes a time saving of 70% and a cost reduction of 30% possible.

**Wieland is continually developing its pluggable technology principle - for the renewable energy sector, for example. Wieland offers solutions and components not only for wind energy systems, but also for photovoltaic systems.**

PARTNERSHIP

**For decades, Wieland has been working effectively on plug-and-play solutions, both in electrical installation and in automation technology. A broad portfolio of components makes it possible to achieve the highest level of flexibility.**

plug + play

**Whether offshore or onshore, trouble-free operation of wind turbines determines whether the investment ultimately achieves profitability. Wieland provides the best possible foundation to help achieve this.**

**An ideal way to achieve decentralized power distribution is to use the *podis*®CON energy bus. Pluggable distribution taps, which can be installed wherever they are needed, offer the utmost flexibility thanks to insulation displacement contacts.**

EFFECTIVE

# Fresh wind.
## Pluggable means maximum efficiency.

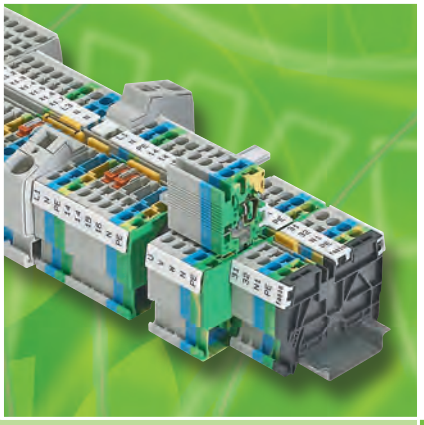
**In the field of decentralized power distribution, Wieland really shows what it can do.**

The ***gesis***®**RST**® plug connector system, the ***podis***® flat cable system and the ***revos*** heavy-duty industrial connectors make organized, space-saving cable management possible, e.g. in electrically connecting the gearbox, or lighting, or control cabinets on the ground.

Additionally, the pluggability of modules is the key principle behind devices such as relays that are used for switching and isolation. All components are designed to allow them to be connected in the shortest possible time and replaced quickly if required.

### Designed for tough conditions

Vibration and corrosion are ever present in wind energy installations. For this reason, Wieland components are designed and manufactured to ensure that they operate with the utmost reliability in even the toughest environments.



***gesis***®**RST**® **shows the way: Simply install pre-fabricated connector and cable assemblies and the connection is complete, while also maintaining a touch-safe connection. Disconnecting under load is also possible.** ▼

▲ **Wieland offers a comprehensive value-add service; its products include pre-fabricated DIN rail terminal block assemblies that help to reduce production times while minimizing logistical effort.**


**Lightning and overvoltage protection**

Using ***wietap***, the danger of a service interruption due to lightning strikes and overvoltages is reduced significantly, if not eliminated entirely.

SAFETY

# Controlling, adjusting, monitoring.
## Safely and standard compliant.

Safe processes are a decisive factor in securing the profitability of wind turbines. Even in rough climatic conditions and extreme temperature fluctuations, the system must operate reliably. Just as importantly, protection against lightning strikes is of the utmost priority. The procedures governing the tracking movement in a nacelle are no different. They must be managed in such a way as to eliminate potential hazards, both to man and machine. The safety products from Wieland are a perfectly reliable fit.

### All relevant standards are fulfilled

Wieland solutions are designed to comply with the stringent safety requirements thanks to a robust construction which accounts for tough environmental conditions and to the fulfillment of all relevant standards.

**Play it safe**

**The nacelle of a wind turbine will face the most diverse potential hazards, and must be protected by a system of reliable control and monitoring. Wieland's *safety* program performs reliably here.**

# Finger on the pulse.
## Perfect solutions for wind turbines.

Wieland offers complete solutions and components for wind turbines – both for electrical installation in towers and for all automation applications found in the nacelle.

**One system – many possibilities**

Wieland components are built upon a modular concept. Precisely designed to work together, the modules can be combined in individual installation topologies. In this way, the Wieland system is limitless. True to the motto “Perfect solutions with our finger permanently on the pulse”.

***revos***
heavy duty industrial connectors

***safety***
modular safety systems

***interface***
power supplies
relays
lightning and overvoltage protection

***wienet***
VPN industrial router

***wiecon***
PC board connectors and terminal blocks

***fasis/selos***
DIN rail terminal blocks

***podis***®CON
flat cable power bus

***gesis***®**RST**®
pluggable installation from
IP 66 / 68 (3m; 2h) / 69K

***gesis***®CON
Everything is pluggable!

1 *revos*

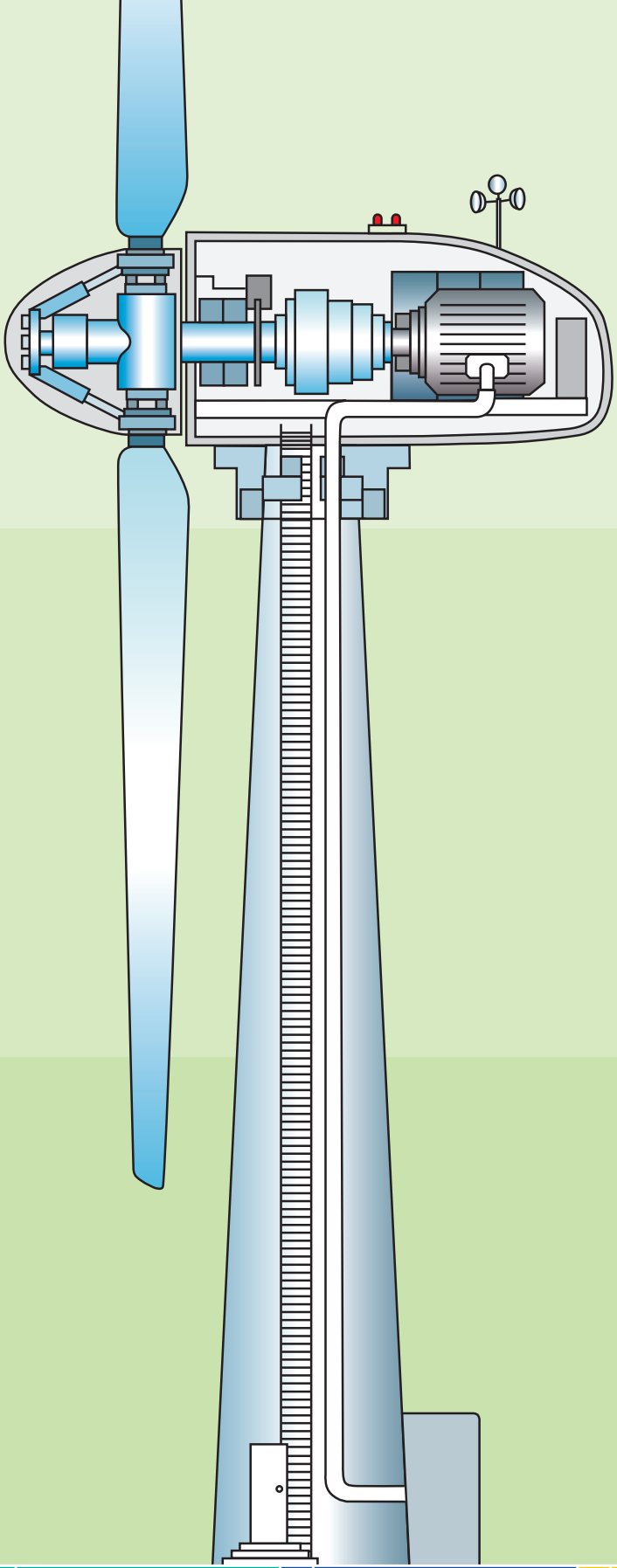
2 *safety*

3 *interface*

4 *wienet*

**Decentralized power distribution, reliable lightning and overvoltage protection, comprehensive relay technology, pluggable electrical installation –just some of the wind turbine applications for which Wieland offers highly developed solutions.**

APPLICATION

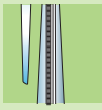


## Wieland applications in the nacelle

1 2 3 4 5 6 7 8

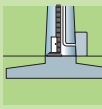
## Wieland applications in the tower

1 7 8



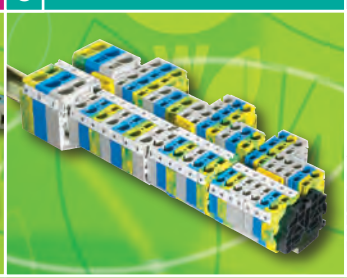
## Wieland applications in the base

1 2 3 4 5 6 8



**5 wiecon**

**6 selos/fasis**



**7 podis® CON**

**8 gesis® RST®**

***podis***® **is a modular energy bus system for decentralized energy distribution and simplifies**
**– planning**
**– procurement**
**– installation and**
**– maintenance**
**of wind energy installations.**

# Field of application: Tower.

## podis®

### Benefits for the tower builder:

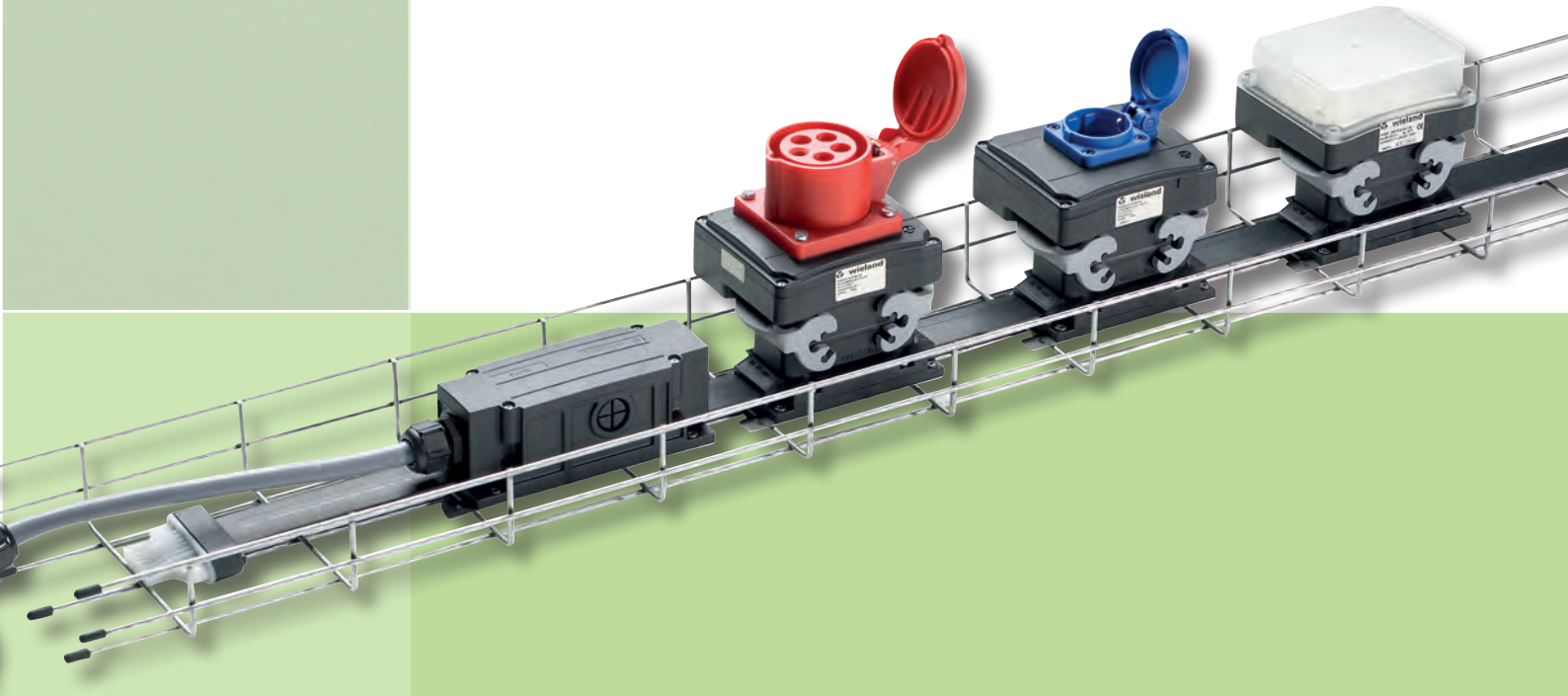
- One standard tower for all customers / regions
- Only "1" order number instead of "100"
- Create variants in last work pass
- 70 % reduction in installation time

### Benefits for the system manufacturer

- Short delivery time for towers
- Higher flexibility / fewer international variants
- Tower fittings easily adapted

### Benefits for system operator / service

- Maintenance-free lights
- Central UPS with only one battery
- Standardized, uniform non-glare and flicker-free illumination
- Faster, toolless exchange in case of failure
- Full light power immediately, even at low temperatures



**Connect without stripping wires**

**With podis, time-consuming cutting and stripping are a thing of the past. The insulation-penetrating contacts provide quick, safe and trouble-free installation.**

FLEXIBLE

# Field of application: Tower.
## *podis*® flat cables.

Hardly any other industry places such demanding requirements on the flexibility and availability of system technology as wind power. Wind energy systems must be installed and commissioned within extremely short time frames. System availability is often contractually guaranteed, and will have an influence on the profitability of the entire installation.

The energy bus solutions from Wieland fully prove their worth here. Combining the uncut ***podis*** flat cable bus with the ***podis***®CON functional modules, new installations can be completed in next to no time.

### Flexible and maintenance-friendly

***podis*** delivers the utmost flexibility inside the tower. Functional modules terminated simply and securely on the power bus cable guarantee maintenance-friendly installation of lighting fixtures and heavy-duty power receptacles.

- Cover all international norms / customer requirements with one tower projection
- 8 article numbers for one tower installation, with only one order number
- 70 % time savings for tower electrical installation

**LED-Luminaire**

**Schuko power receptacle**

**CEE Heavy-duty power receptacle**

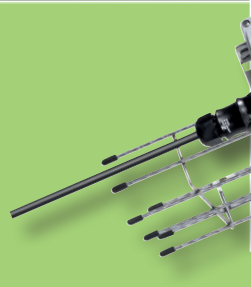
**Connection module**

**Extremely flexible**

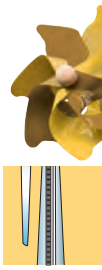
**The flat cable feature makes it possible to install drops wherever required. This allows for the utmost flexibility in tower installations.**

**Plug & Play**

**With the installation system *gesis*®RST®, factory terminated cable assemblies and junction boxes are connected to one another on site, saving both time and money.**
**The high protection class IP66/68 (3m; 2h)/69K facilitates fast installation of the illumination in outdoor applications such as lattice towers or cranes.**



# gesis®RST® – pluggable round cable power bus
# Simply plug it.



With the ***gesis***®RST® installation system, completely new possibilities arise. Entire system sub-assemblies can be factory terminated and tested, independent of their installation destination. Once on site, the individual modules simply need to be plugged together. This saves time during installation, reduces wiring errors, and improves safety.

With ***gesis***®RST®, device installation is made simply pluggable. By integrating bulkhead mount connectors into the device, an electrical gateway is established, and electrical devices can be connected simply and safely to the ***gesis***®RST® installation system. The system is so versatile that even unexpected modifications can be completed without problems. An additional advantage is a consistent and standardized quality of installation. Maintenance and repair without interruption to turbine operation are made possible, despite the difficult working conditions in the tower. Faulty devices can simply be replaced without service interruption.

## Areas of application:

- Tower lighting
- Power receptacles for maintenance
- Distribution box

## Features:

- Installation according to the Plug & Play principle
- Complete factory terminated installation kits for each tower
- Improved cable management
- Integrated lock-outs and strain reliefs
- 15 uniquely coded plug connections
- Cables and receptacles available for all countries worldwide
- High degree of protection IP65, IP66, IP67, IP68 (3m; 2h); 69K

Installation system IP 66/68 (3m; 2h)/69K
***gesis***®RST®

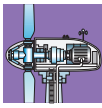

**1** Hub controller

***revos*** BASIC 690V

**2** Gear box

***revos*** FLEX

# *revos* – heavy-duty industrial connectors
# **Reliable Connections.**



Inside the nacelle there are many automation components which need to be electrically connected to each other. Drives; distributed control panels; the electrical connection of the gear box; lighting or the connection to the control panel on the ground, as well as the control panel in the hub controller. The various components are in constant interactive connection with one another, in order to control the function of the entire system.

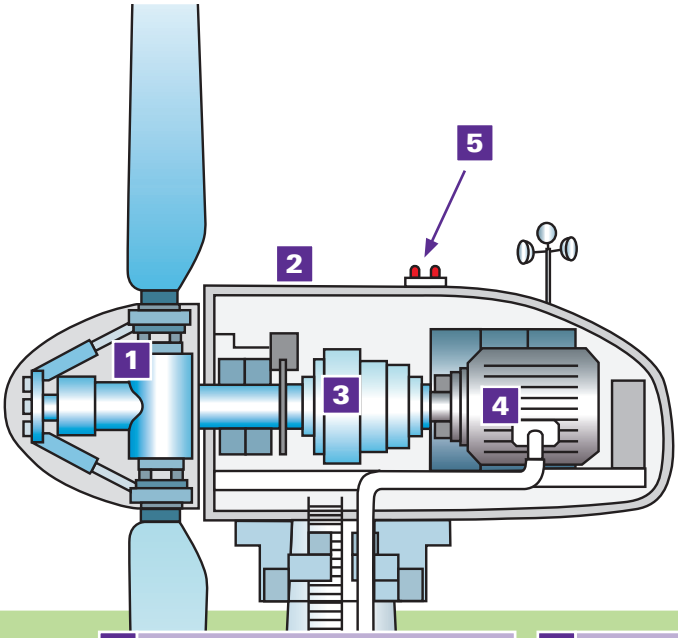
Thanks to their design, which makes them perfect for the rough operating conditions within a wind turbine (i.e. vibration, corrosive conditions), ***revos*** industrial connectors are capable of guaranteeing the reliable connection of electrical signals.

**Areas of application:**

- Connection of drives
- Pitch control
- Lighting
- Aviation warning
- Hub control
- Yaw control

**Features:**

- Maintenance-friendly
- Quick and error-free installation
- Easily modified
- IP 65 degree of protection




**5** Aviation warnings

***revos*** FLEX

**3** Yaw control

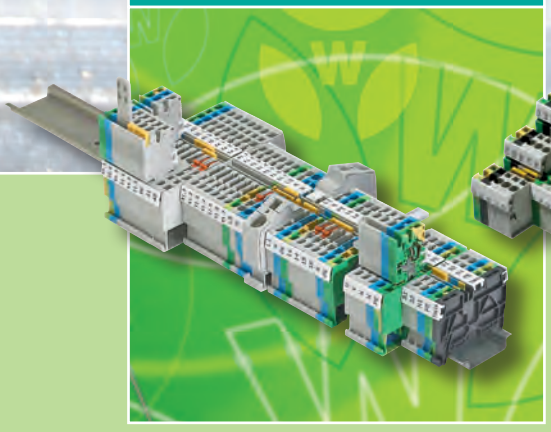
***revos*** FLEX COMPAKT 1M

**4** Hydraulic pumps

***revos*** MINI

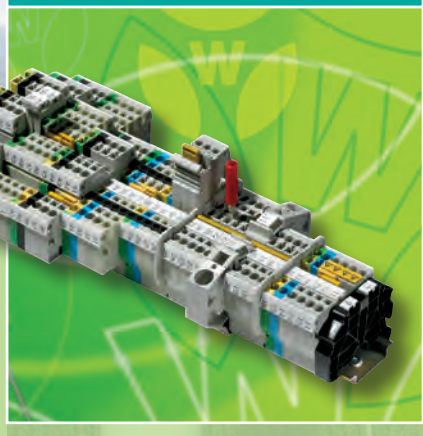
**1** Plug & Play

***fasis*** CON



**2** Spring clamp technology

***fasis***



# *selos, fasis* – DIN rail terminal blocks
# Secure and durable.

Wieland wind turbine components are versatile and durable. Whether as terminations for the generator, signal distribution of the control system, or measurement of current or voltage, DIN rail terminal blocks are standard connection devices for all facets of a wind turbine.

With the ***selos*** and ***fasis*** ranges of DIN rail terminal blocks, Wieland offers solutions for the most diverse connection points in a wind turbine.

### ***fasis*** CON **Plug & Play in the control cabinet**

The electrical connection technology used in wind turbines is based on modular wiring concepts covering a multitude of functions. With the ***fasis*** CON DIN rail terminal block system, prefabricated terminal block assemblies and wire harnesses can be installed on site with this plug-and-play system.

***fasis*** CON features a vibration-proof spring clamp connection that guarantees contact security in all climatic and environmental conditions, thereby minimizing maintenance. Due to its high-capacity contacts of up to 32 A, this system is suitable for both signal transmission in 24 V sensor circuits and for servomotor power circuits.

### ***fasis*** **WKFN Tension spring and Push In connection**

Robust, high-capacity DIN rail terminal blocks with vibration-proof spring clamp connection technology for all areas of electrical wiring.

### ***selos*** POWER LINE **High current terminals**

High current terminals are available in hybrid design with stud and rising cage connections or as simple stud connection for conductors up to 240 mm² and a maximum current of 415 A.

### ***selos*** **WKN Screw technology**

Measuring disconnect blocks for safe current and voltage transformer measuring data.

**3** High current terminals
***selos*** POWER LINE

**4** Screw technology
***selos*** WKN

**1** Safety sensors

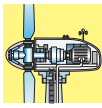
***sensor*** PRO

## Safety functions:

- Drive shaft speed monitoring with a speed monitoring device
- Emergency mode to reduce rotor speed
- End position monitoring of rotor blades
- Pressure monitoring of hydraulic system
- Temperature monitoring of hydraulic oil
- Fill level monitoring of hydraulic and lubricant system
- Emergency stop
- Additional safety circuits

**Monitoring safety functions is crucial for the safe operation of a wind power system.**

# *safety* – Safety components
# Safety at all times.



The various potential hazards in the nacelle and at the base of the wind turbine can be eliminated by reliable monitoring and control. For example, movements which endanger maintenance personnel can be eliminated by shutting down the active equipment safely and quickly.

Various sensors are used in the monitoring process (e.g. emergency stop buttons, initiators, rotary encoders and safety relays), the signals of which must be precisely processed.

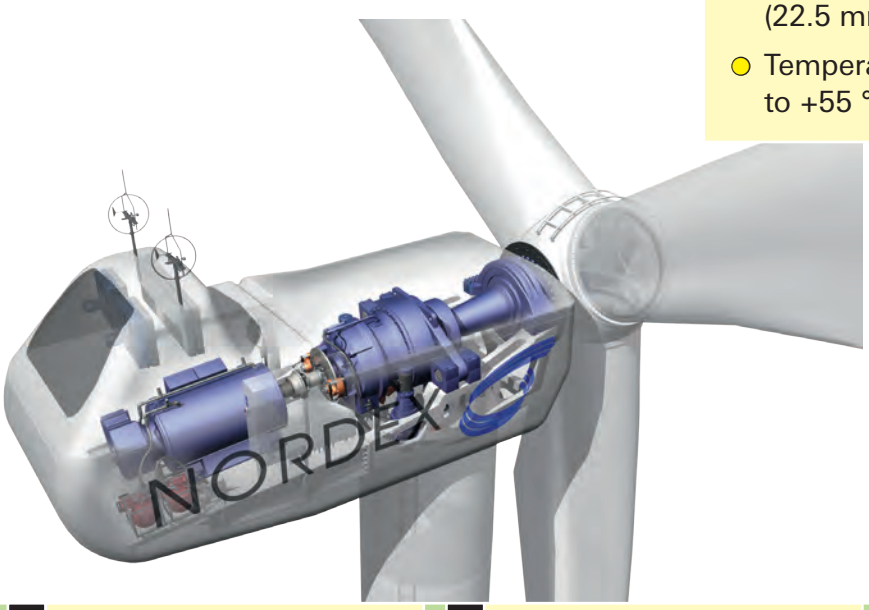
Within the scope of its ***safety*** product line-up, Wieland offers safety relay devices for all standard functions, as well as manually adjustable or openly programmable modular safety solutions, which can be connected to all standard sensors - everything you need for the protection of man and machines.

## Areas of application:

- Standstill monitoring
- Emergency stop
- Safety relays

## Features:

- Safety relay devices for all standard functions
- Modular compact safety PLC
- Modular and parameterizable safety control
- Spring-clamp or screw terminals (fixed or pluggable)
- Slim design (22.5 mm modules)
- Temperature range from –25 °C to +55 °C




**2** Universal safety relays

***safe*** RELAY

**3** Modular safety control

***samos***®

**4** Compact safety PLC

***samos***® PRO

**1** Power supplies

***wipos***


**2** DC UPS module

***wipos***


**3** Lightning and overvoltage protection

***wietap***

# ***interface*** – Electronic components
# Ready for anything.

Wherever current flows and signals are processed, the ***interface*** products from Wieland Electric display their unique strength. With its broad range of relays, power supplies and overvoltage protection units, as well as discrete interface and analog modules, every wind turbine can be advantageously equipped.

### ***wipos*** Power supplies

A 24 V control voltage can be generated using the robust ***wipos*** P1. The devices are designed and approved worldwide for a temperature range from –25°C to +70°C.

### ***wipos*** DC UPS module

Buffering the 24 V DC supply up to 30 A. Connection of standard lead batteries in range from 2 to 12 Ah. An integrated battery test and a temperature range from –40° C to +70° C round out this product.

### ***wietap*** Lightning and overvoltage protection

Lightning strikes on wind turbines are common, due to their exposed installation sites. With lightning and overvoltage protection modules from Wieland, a complete protective system can be created. The devices fulfill the most extreme demands made of their current carrying capability. The modular design feature enables quick replacement of the electronic modules, and meets the highest shock and vibration impact requirements in operation.

### ***flare*** MOVE Pluggable coupling relays

Various coupling functions can be carried out by the broad range of products in the ***flare*** MOVE series. Pluggable coupling relays are also available with high shock and vibration impact certification in various designs, and are ideally suited to the demands of a wind turbine.

### ***flare*** CONTROL Measuring and monitoring relays

Whether voltage, current, phase or temperature monitoring: Individual monitoring functions can be carried out both reliably and independently using Wieland's measuring and monitoring relays.

### ***cores*** Analog isolation amplifier

Clean galvanic isolation from control signatures can be very easily and flexibly guaranteed through the ***cores*** product series.

**4** Pluggable coupling relays
***flare*** MOVE

**5** Measuring and monitoring relays
***flare*** CONTROL

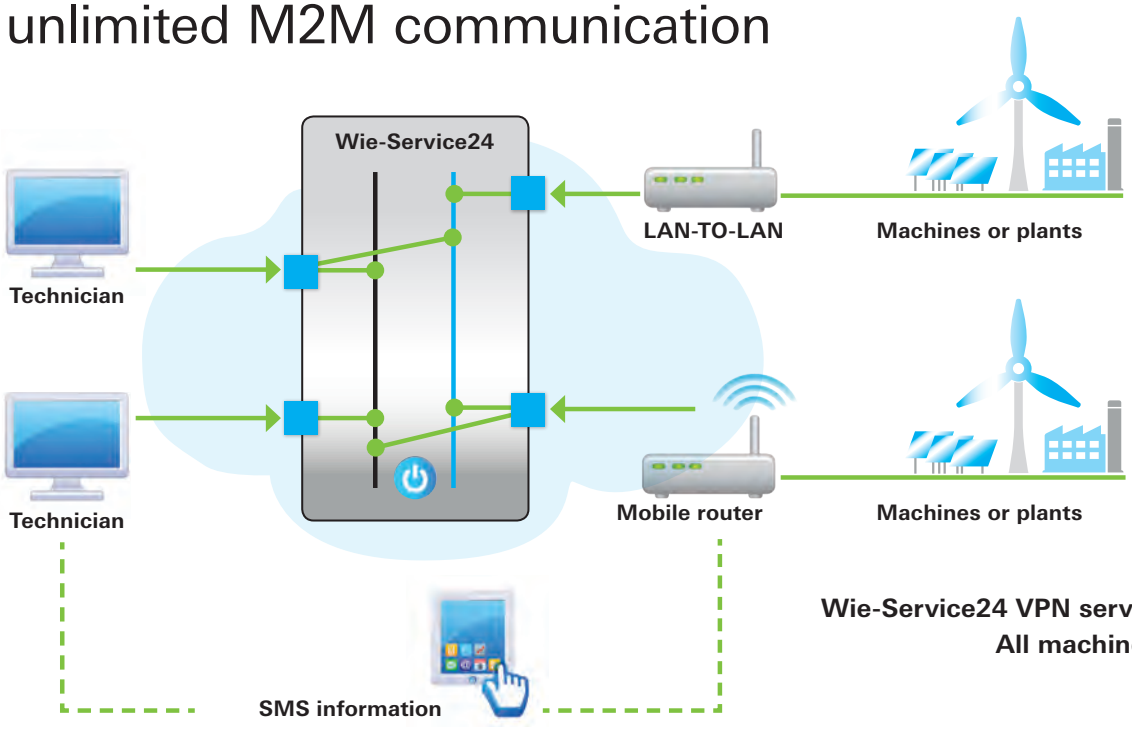
**6** Analog isolation amplifier
***cores***

**Complete remote maintenance solution from a single source**

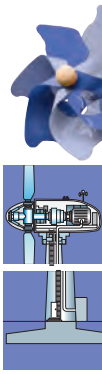
The requirements for remote maintenance are broadly diversified: data security, high bandwidths, access control and above all, simple operability without special IT skills.
The combination of VPN server portal Wie-Service24 and the ***wienet*** industrial routers fulfill precisely this requirement.

Use of the Internet makes it possible to send even greater data volumes with high security. The VPN configurations necessary to do so are automatically created by the VPN server. In the end, only one configuration file must be transmitted to the respective router and everything goes from there.

# *wienet* VPN Industrial Router – unlimited M2M communication




**Wie-Service24 VPN service portal**
**All machines online!**



**"We will extend your network line, no matter where"**

With the Wieland solution, you directly access the terminal device via 1:1 NAT. It is as though you were directly connected with your terminal device via cable. The router hardware needed matches your requirements.

Select between plastic or metal housing. If your system has an Internet connection, the LAN-to-LAN router is the right choice. If you do not have any Internet, cannot go through a customer network or generally want to be non-localized, then select one of the mobile radio routers. GSM, GPRS, EDGE, UMTS, HSDPA, HSUPA, HSPA+ and LTE are supported.

As an option, the devices are also available with additional interface modules. Variants with RS-232, RS-422/485, digital and analog in- and outputs, M-Bus and additional Ethernet ports are available.

**Advantages**

- Security by VPN
- Automatic generation of router configuration
- Only outgoing connections towards Wie-Service24 are necessary
- No changes inside the local network is necessary
- Interconnection of complete networks, without additional routing configuration
- Small need for co-ordination with IT department and easy commissioning

**More information is available from our technical support:**
Telefon +49 951 9324-995
Telefax +49 951 9326-991
wie-service24@wieland-electric.com


03-03 15:13:07
0.0 RPM Generator: 7.0 RPM
kW 2.8 m/s DP -0.5° AP -0.5°
ode: Freewheel
8
9
RESET
START
STOP
5
6
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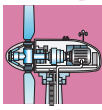
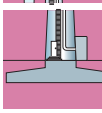
PREV.
ENTER

# wiecon
## PC board terminal blocks / PC board connectors
## **Secure connections.**





***wiecon*** is ideally suited to applications in controlling a wind turbine: with spring clamp or screw connections, pluggable or direct mount versions. Clearly marked terminations, easy to wire connections, and an integrated test point guarantee service-friendly usage and reliable connections.

***wiecon*** PC board terminal blocks and PC board connectors also score bonus points, since they are compliant with all relevant standards, and their excellent connection technology withstands – in the long term - the influences of vibration.

**Areas of application:**

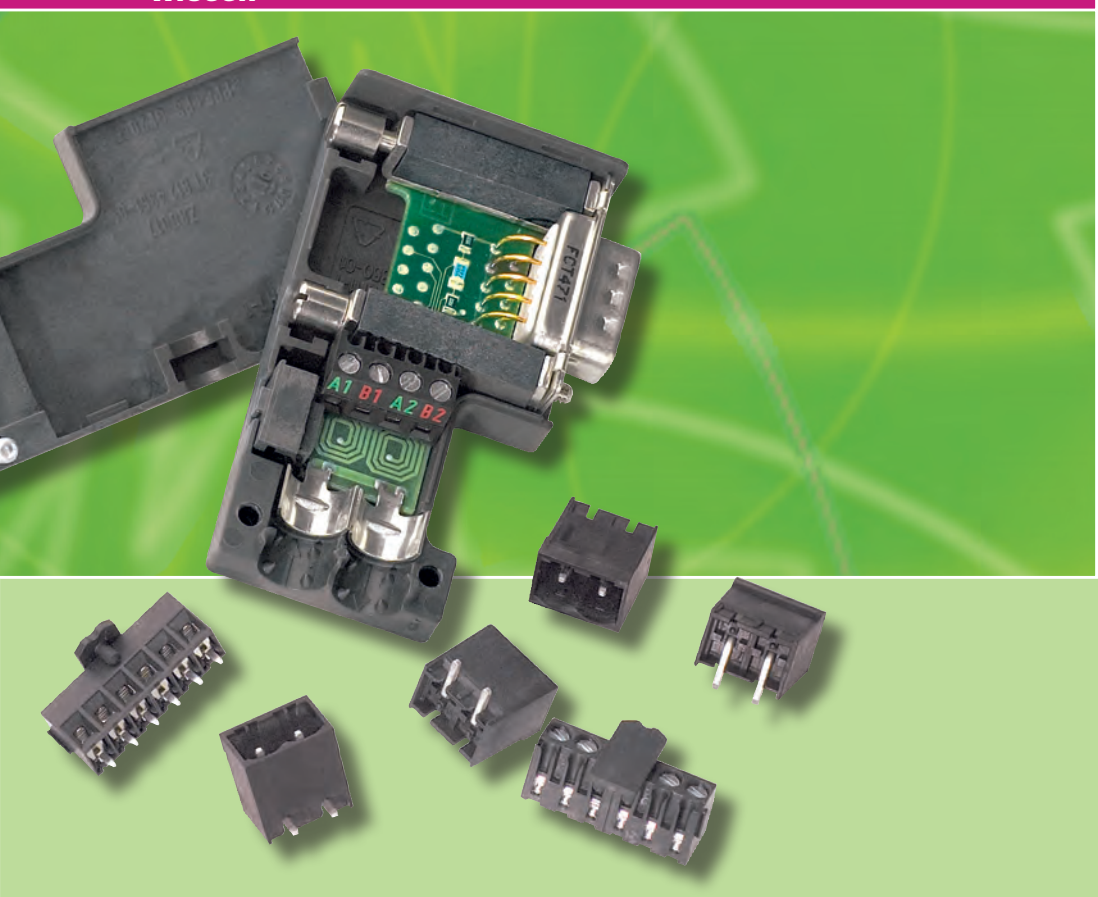
- Frequency converter
- Electronic controls

**Features:**

- Various termination technologies, in both terminal block and pluggable versions.
- Secured against shock and vibration impact
- Integrated test points

PC board terminal blocks / PC board connectors

***wiecon***



# Wieland **Hotline** and consultation

## Hotline – one call is all it takes

Naturally our service employees are available to you at any time.

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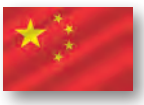

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## Industrial technology

**Solutions for the control cabinet**

- DIN rail terminal blocks
  - Screw, tension spring or push-in connection technology
  - Wire cross sections up to 300 mm²
  - Numerous special functions
  - Software solutions interfacing to CAE systems
- Safety
  - Safe signal acquisition
  - Safety switching devices
  - Modular safety modules
  - Compact safety controllers
  - Application consulting and training
- Network engineering and fieldbus systems
  - Remote maintenance via VPN industrial router and VPN service portal
  - Industrial Ethernet switches
  - PLC and I/O systems, standard and increased environmental conditions
- Interface
  - Power supply units
  - Overvoltage protection
  - Coupling relays, semiconductor switches
  - Timer relays, measuring and monitoring relays
  - Analog coupling and converter modules
  - Passive interfaces

**Solutions for field applications**

- Decentralized installation and automation technology
  - Electrical installation for wind tower
  - Fieldbus interfaces and motor starters
- Connectors for industrial applications
  - Rectangular and round connectors
  - Aluminium or plastic housings
  - Degree of protection up to IP 69K
  - Current-carrying capacity up to 100 A
  - Connectors for hazardous areas
  - Modular, application-specific technology

**PC board terminals and connectors**

- Screw or spring clamp connection technology
- Spacings: 3.5 mm to 10.16 mm
- Reflow or wave soldering process

## Building and installation technology

- Building installation systems
  - Main power supply connectors IP 20/IP 65 ... IP 69K
  - Bus connectors
  - Low-voltage connectors
  - Power distribution system with flat cables
  - Distribution systems
  - Room automation with KNX and wireless technology
  - DIN rail terminal blocks for electrical installations
  - Overvoltage protection

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contacts are green.