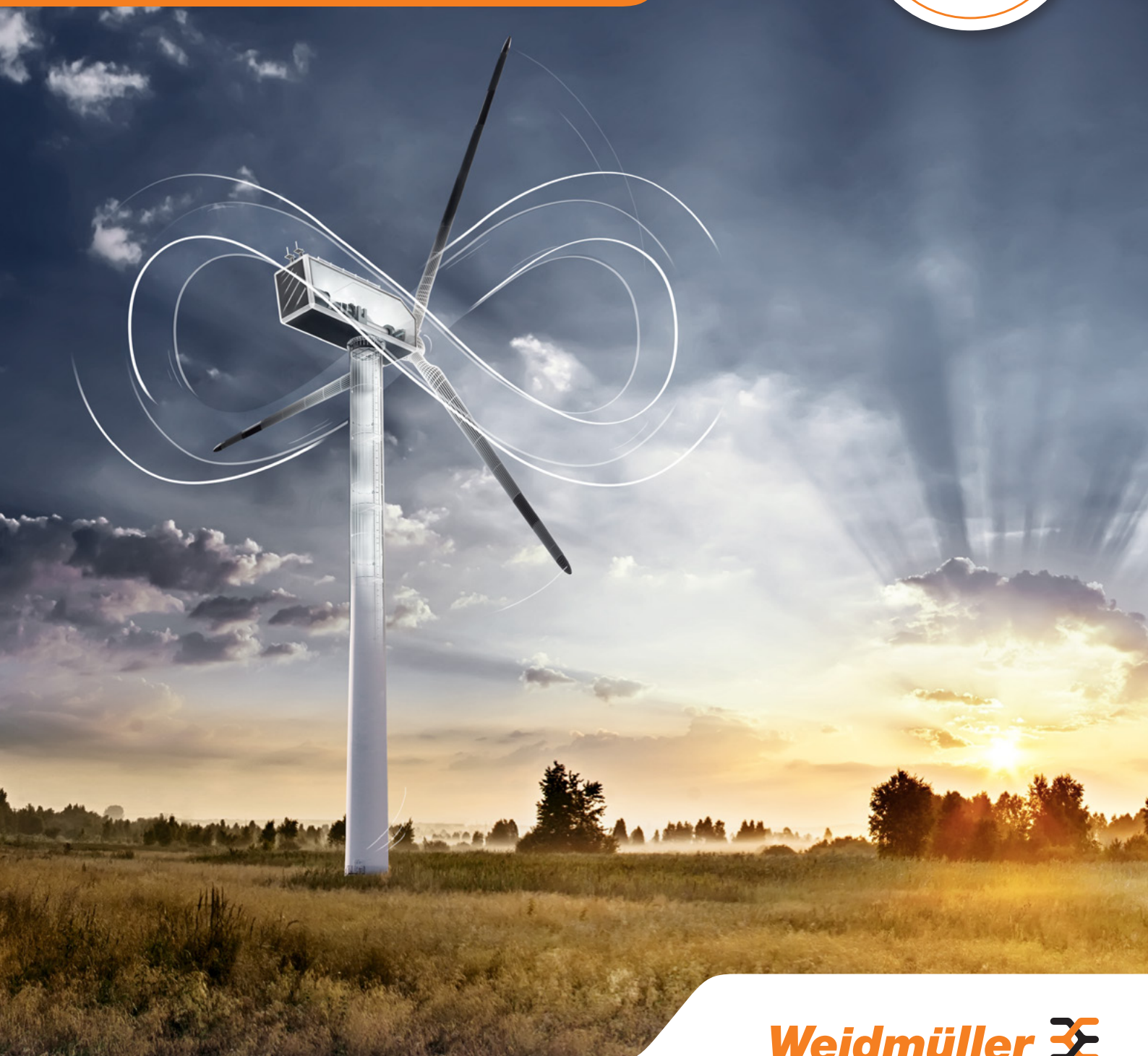


Operating wind turbines efficiently
Optimum results with our automation solutions
Let's connect.

Wind energy





You rely on the wind energy of the future You can achieve your goals with our solutions

Wind energy is currently a highly innovative segment within the field of renewable energy generation and is one of the most important energy sources in the world. Because wind turbines have to be cost-efficient independent of state subsidies, short construction times are increasingly playing a key role in minimising times until commissioning. Costs of energy (CoE) need to be reduced, while the cost-efficiency of wind turbines needs to be increased. This not only applies to investment in the plant itself, but to the times required for construction and commissioning too. It is also becoming increasingly important to reduce downtimes to ensure efficient operation.

Nowadays, the wind energy sector is faced with the challenge of meeting growing profitability requirements, which means that plant performance requirements are becoming ever greater. A great deal of importance is therefore being attached to powerful control and communication technologies, an aspect that needs to be taken into consideration from as early as the planning stage through the use of modern development tools. The engineering process is becoming increasingly efficient as hardware and software design become standardised and therefore closely integrated.

For wind turbine operators, it is becoming ever more important to be inordinately familiar with the plant's status and to analyse it for errors and wear. The keyword in this regard is condition monitoring using appropriate solutions – a key trend in the industry and extremely attractive too, because cracks forming or damage caused by severe loads on the transmission shaft, nacelle, tower, blade and other parts, for instance, can be detected in good time. To this end, the user requires a continuous flow of information on the plant's current condition and its functions.



The earlier the irregularities are detected, the sooner counter-measures can be taken. In addition, csuppliers will increasingly play the role of system partners in the value creation chain, taking a reflective view of their own systems and components, as well as their suitability in the function chain. They offer innovative products and systems according to the integrated roadmaps that coordinate the requirements of the partners involved. Experience obtained from research projects conducted with universities and other technology carriers are contributing to success. As a long-standing partner of the energy industry, we have identified these trends and are responding to the market's requirements. With our tailor-made automation solutions, we offer a complete package or individual components for the wind energy of the future. What option you choose is entirely up to you. In offering such solutions, we make servicing measures simpler, commissioning faster and downtimes a far less frequent occurrence. We call the concept of efficient and flawless plant operation "Never stop!".



**The Weidmüller quality promise
for innovative and future-proof
automation solutions**

Wind energy needs innovative ideas

We are on hand to help you with our experience and our needs-based automation technology

Wind has always been our passion. Indeed, we have been acquiring experience since the “pioneering times” and incorporated it into our products and solutions. We have seen ourselves as being a partner to our customers from the very outset. We wanted to create added value for them, which is why we are continuously developing ourselves – making the move from being a component supplier to an application-specific solution provider.

We also regularly anticipate new trends and technologies such as the IOT, sensor systems or cloud services. We take up and further develop innovations and offer innovative solutions. From assembling enclosures for sub-applications to creating a complete automation solution for a wind turbine. We are continuously further developing ourselves in line with our motto “Never stop!” – and all the while keeping an eye on the essentials and our customers’ needs.



1980

Pioneering work with Jas Howden

Weidmüller supplies products for wind turbine assembly to Jas Howden in Glasgow, one of the pioneers in the series production of modern wind turbines.



1990

100-metre wind turbine

Back in 1990, Weidmüller helped create a power supply concept for the island of Heligoland, where there is a 100-metre-tall wind turbine right in the centre.



2000

Know-how for China

The wind energy market is booming in China too. The Chinese manufacturer Dongfang incorporates heavy-duty connectors from Weidmüller’s RockStar® series into its pitch systems for wind turbines.



2008

Offshore use

Offshore wind farms promise major energy potential. Customers use Weidmüller’s WeiCoS pluggable and robust modular terminal block for their top box connections. This reduces the number of variants and supports the modular automation and wiring concept.



2012

Assembled solutions

Weidmüller offers customer-specific solutions for the wind industry. From engineering and assembly, to delivery and subsequent servicing, Weidmüller offers tailor-made added value.



2015

Tower installation system for the tower and nacelle

Launch of an integrated system for the LED lighting and powering of the tower and nacelle of a wind turbine. Developed precisely in line with customer requirements and individually assembled.



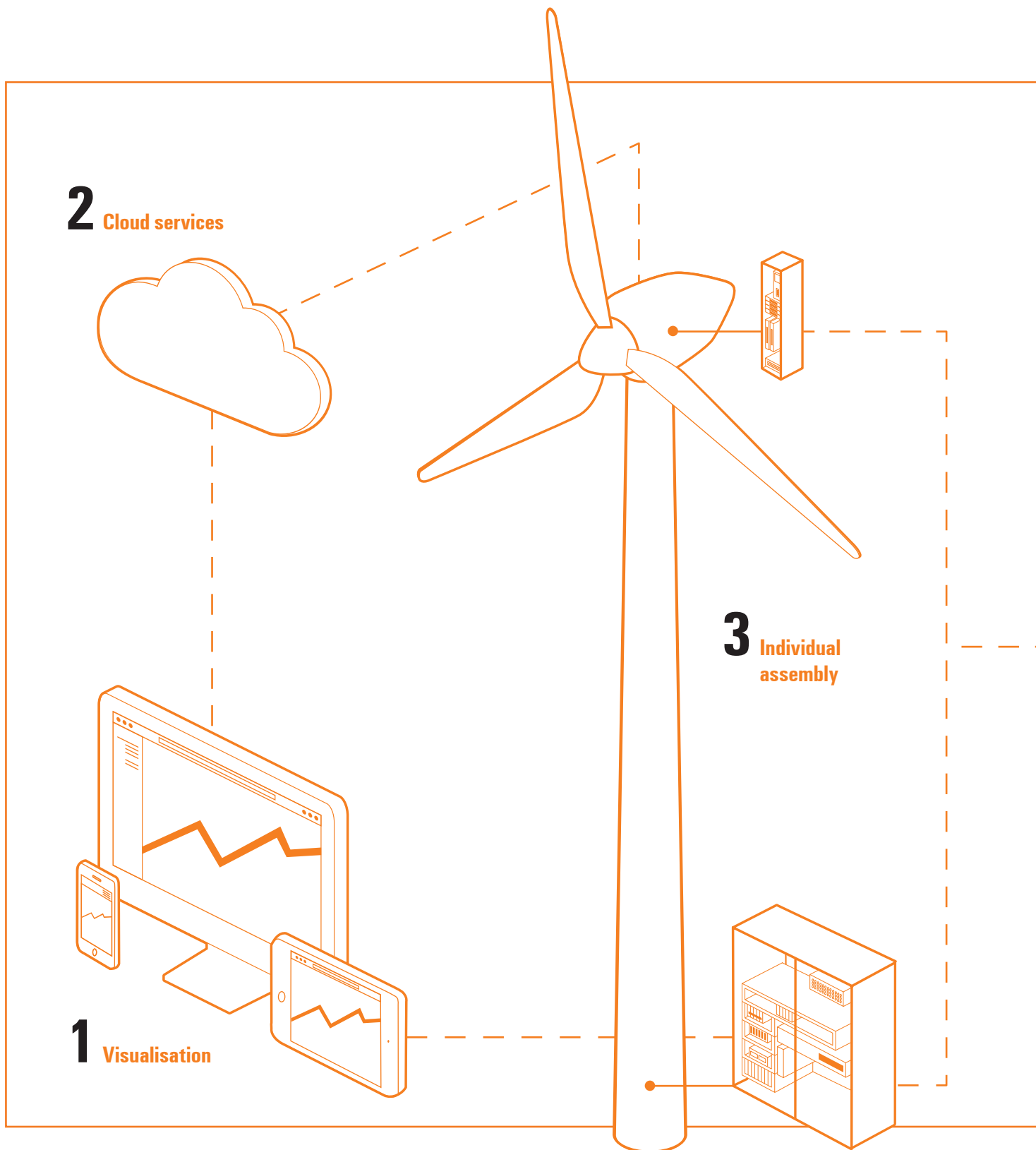
2016

Automation

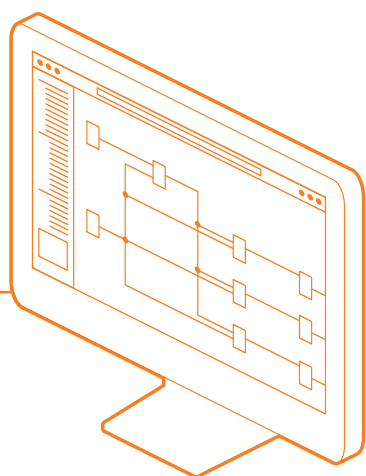
For the first time ever, Weidmüller develops an automation solution for small wind turbines. The solution on offer, comprising hardware, software, engineering and services, is showcased at WindEnergy Hamburg and provides a platform for other applications (such as megawatt plants).

You wish for an all-inclusive supplier

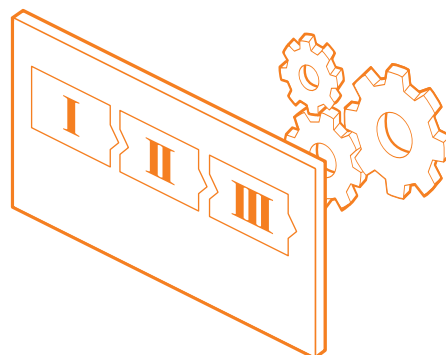
Our complete solution meets all requirements



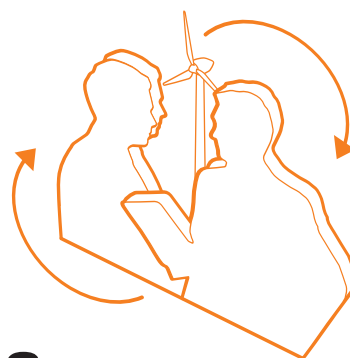
We will show you the complete range we have to offer, using a small wind turbine as an example. The solution includes hardware, software, engineering for the tower and nacelle, as well as services such as plant project planning and services.



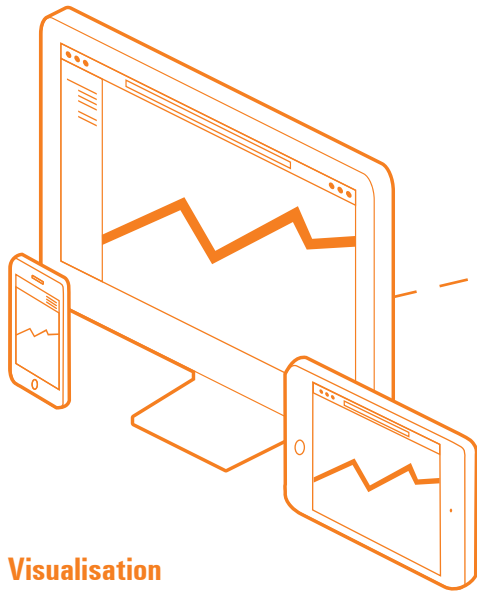
4 Plant automation



5 Plant project planning



6 Full service



1 Visualisation

Both in terms of its look and its contents, our solution cuts an impressive figure with an attractive visualisation package. It not only offers visualisation in the control room, but also quickly and intuitively gives the service technician access to all the relevant information and test routines:

- Monitoring and analysis of data or faults
- Control over the plant during maintenance, servicing and emergency situations
- Setting of relevant plant parameters

A flexible end customer package is available too. It provides plant information in an individually scalable manner – SCADA solutions are possible too – on all common terminal devices via remote access.



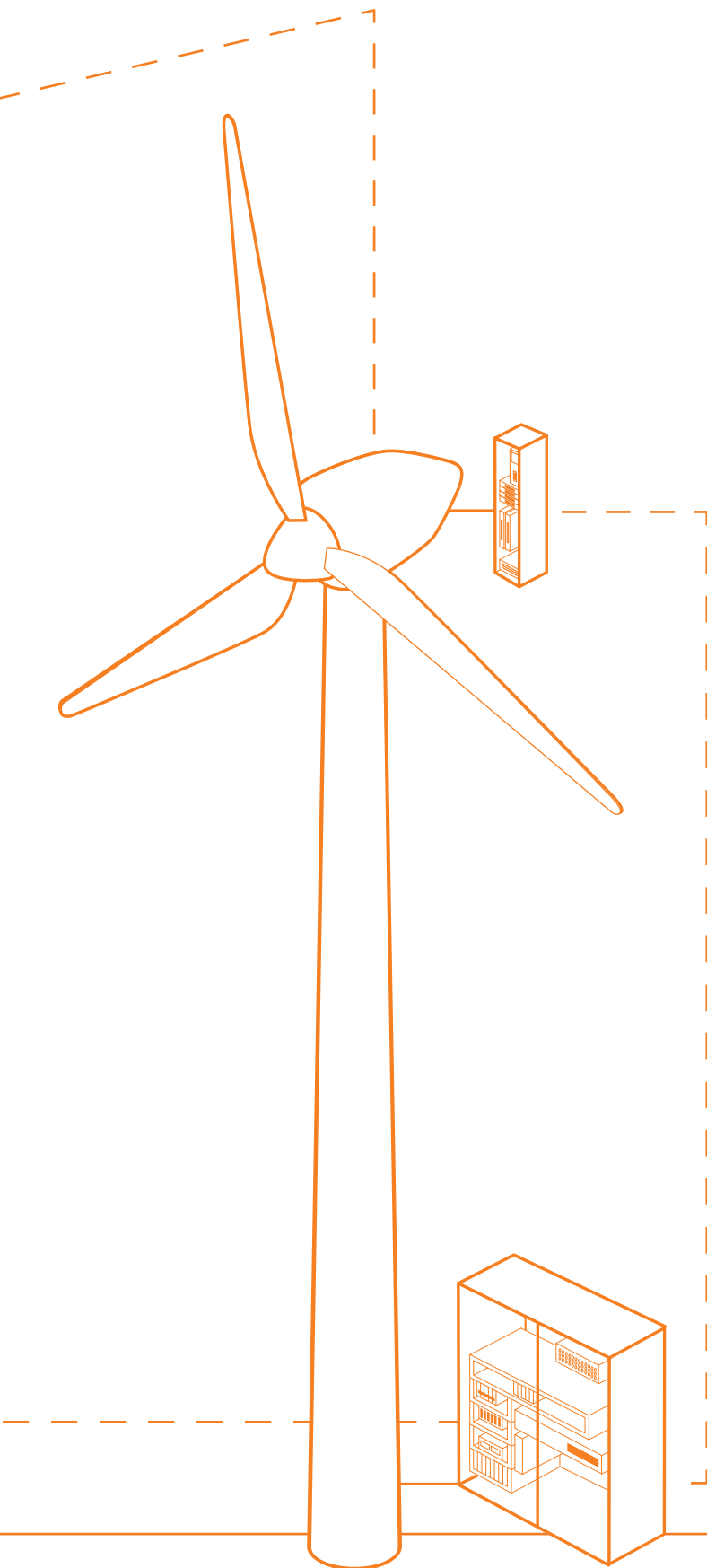
2 Cloud services

Flexibility is also guaranteed when control rooms, service technicians and end customers need to access plants and farms. Our solution for cloud-based plant communication forms the basis of rapid and reliable access – whether you're working on a PC or on the move.

Benefit from:

- Structured and secure access control via the user and role concepts
- High degree of comfort using optionally available communication protocols
- Secure VPN connections via u-link from Weidmüller



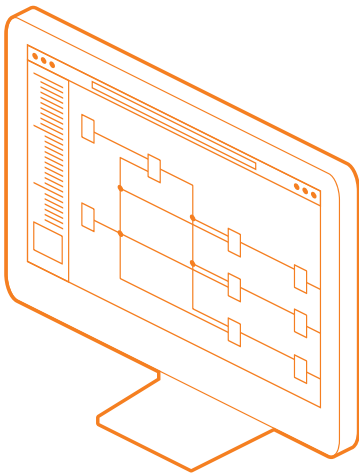


3 Individual assembly

The control system is the heart of a small wind turbine. We conceptualise and produce specifically designed boxes and control cabinets – such as top and bottom boxes – to automate your small wind turbine. You are guaranteed safety due to production being in line with industrial standards. The particular benefits for you:

- Planning and implementation to suit your requirements
- Outsourced assembly carried out by specialists
- Switching boxes delivered once they have been subjected to a final test so they can be commissioned immediately

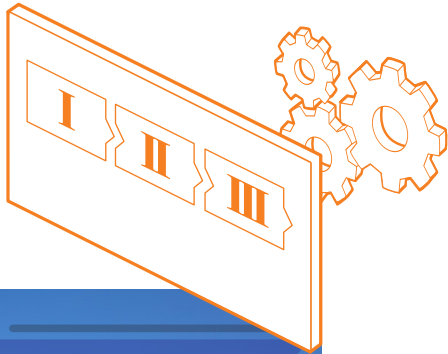




4 Plant automation

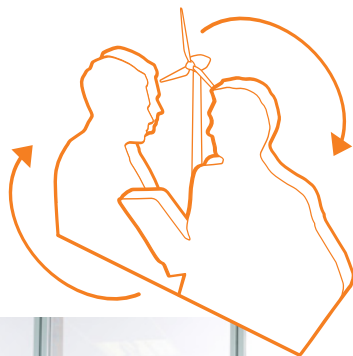
For convenient plant automation and operation management, we work in cooperation with Copa-Data to offer a modern computer-aided software engineering tool comprising a software development environment with a functional module library. The benefits for you:

- Engineering from the controller logic to visualisation of interfaces with simulation tools
- Project-specific parameterisation
- Highest possible level of comfort when creating function logics
- Standardised programming in accordance with IEC 61131-3



5 Plant project planning

Providing our customers with continuous support is a matter of course for us. When it comes to controlling a small wind turbine, we support your project at all stages – starting with the conceptual planning of an initial idea via engineering through to the final integration test. Our experienced project managers impress with their know-how and use of modern document and project management systems. By closely connecting the hardware and software engineering processes, we ensure that all the stages in the project lifecycle are efficient and implemented to your satisfaction.



6 Full service

“Never stop!” – in line with our motto, we provide you with continuous support when implementing your ambitious projects. We want your wind turbines to be built and operated efficiently. High profitability and low energy production costs for your customers are particularly important to us. We are always there for you. In addition to the appropriate use of hardware and software, we give you technical, commercial and conceptual support by providing you with comprehensive services relating to any issues you might have:

- Support during commissioning
- Training sessions and consulting services
- After-sales service
- Briefings
- Personal support



You control a simple and swift plant project planning process

We accompany you through the automation process one step at a time

Our project management team supports you from the initial small wind turbine idea via concept and engineering through to the final integration test, and ensures that all the stages are implemented efficiently.

1. Idea

The type of plant is discussed together with the customer. This discussion covers aspects such as size, performance, functions and costs. All the parameters are adapted to the customer-specific strategy and the framework conditions are clarified.

2. Concept

An initial concept is created for the requirements based on a rough idea. Possibilities for implementation are illustrated with block diagrams, plant sketches and an initial regulation concept.

3. Technical specification

Functions are defined in the technical specification, which is used to derive hardware and software needs. Generally, the technical specification describes the “what” in the context of the automation solution.

4. Functional specification

The functional specification picks up on the points made in the technical specification and describes the functions, components and necessary hardware and software in detail. At the same time, it answers the “how” question asked during the implementation process.

5. Engineering

Hardware and software engineering take place during this step. Hardware includes the design of the control cabinets using modern tools such as EPLAN and SolidWorks. The basic software package includes pre-assembled function libraries. But individual software solutions can also be created at the request of the customer.

6. Integration test

All the relevant hardware and software components are tested with respect to their functionality and stability. The customer receives a functional product that meets their specific requirements.

Your advantages:

- Transparency with regard to the project’s tasks and feasibility in terms of time and costs
- Reliability through initiating the project team and working in line with defined and standardised rules
- High engineering quality due to clear software structures and distinct module and system tests
- High level of reliability due to realistic integration and function tests performed on our own laboratory and test rig



Smart remote access to your wind turbine

Possible from anywhere with our intuitive interface

Fast, simple and aligned with your requirements: our modern visualisation package for wind turbines. The intuitive user interface gives you access to the wind turbine's various functions and data – no matter where you are at a specific point in time.

As a service technician, you have quick access to all the relevant information and test routines – even directly at the plant's site. You can select the various wind turbines in a targeted manner and gain access to the data. In the dynamic area, you have all the plant and operator information at a glance in an instant. The Google Maps connection, meanwhile, shows the position of both the wind turbine and other related plants.

The end customer can also reach the plant by means of remote access in order to query information and analyses –

in an entirely customised way and from absolutely anywhere via their computer, tablet or smartphone. The plant's data can also be shared using social media or used to issue an alarm using the plant's alarm function.

Pioneering visualisation package

- Monitoring and analysis of data or faults
- Control over the plant during maintenance, servicing and emergency situations
- Changing of relevant plant parameters

The modern user interface is designed such that a multitude of parameters can be adapted in a customer-specific way. This makes it possible to use customer logos, change a background colour or integrate other desired functions.

Tailor-made to suit individual needs

Our application-specific solutions for wind turbines and wind farms

In addition to complete solutions, we also offer application-specific sub-solutions such as box assembly, screw connection condition monitoring, the tower installation system for lighting and powering the tower and nacelle, as well as intelligent sub-systems.

Customer-specific assembly

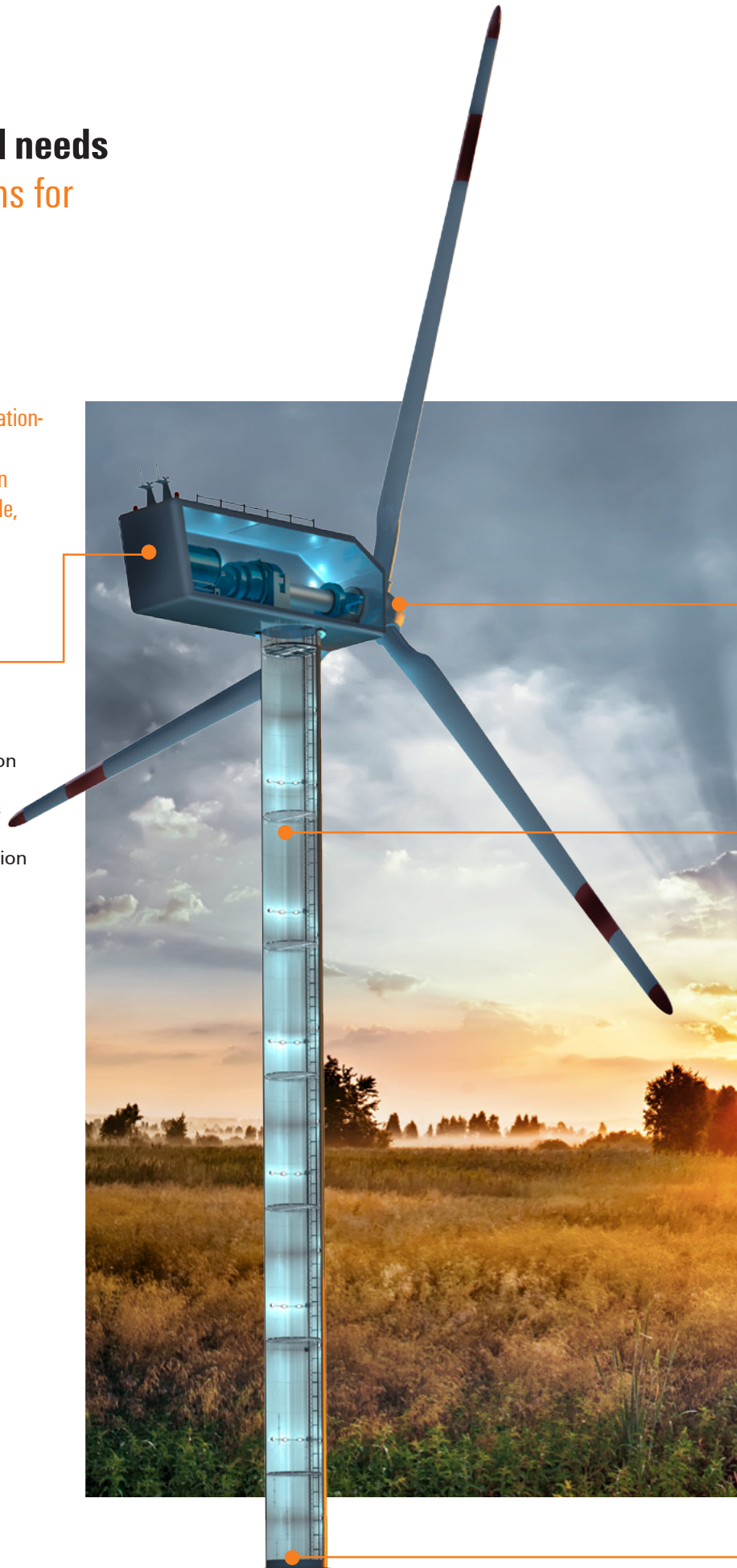
- Connection boxes with connectivity components
- Electronic function boxes including connectivity, electronics, small control systems, surge protection and communication-capable components
- Enclosure made of plastic, aluminium or stainless steel – flexible dimensions to suit the customer’s requirements depending on the installation situation
- Designed to be resistant for the environmental situation in question
- Service-friendly and low-maintenance



Anemometer connection box



Acoustic alarm connection box





Condition monitoring for screw connections

- Continuous screw connection monitoring
- Plant-specific design and function
- Designed specifically for the customer's application
- Corrosion-resistant stainless steel enclosure
- Operational safety even when faced with significant mechanical and climatic environmental influences



Tower installation system

- Integrated lighting and power supply system for the tower and nacelle
- Battery-backed lighting system
- Plug-and-play concept for quick installation
- Robust, power-saving and low-maintenance LED technology
- Developed in a customised way to suit any plant type



Intelligent sub systems

- Smart control and regulation systems for auxiliary applications in wind turbines such as tower lighting
- Pre-assembled software modules for metrological tasks, control and regulation purposes
- Including PLC control, remote I/O system and industrial security router for remote access



Modbus-IDA
the architecture for distributed automation

High standards are the deciding factor for you
We can satisfy all specifications worldwide with our products



Laboratory requirements

Wind turbines have to adhere to the most stringent of quality, safety and performance standards. That's why, during the product development phase, we precisely check in our laboratory which components, materials and systems are worth considering for the application in question. That way, we ensure that our solutions are absolutely reliable and can be used internationally. Satisfied customers confirm the high quality of our work and place their trust in the competent advice provided by our employees.



Certificates

Wind turbines are directly exposed to changing weather conditions and therefore have to withstand high stresses. That's precisely why we have tested our wind energy solutions several times over. They satisfy all standards, laws, provisions and guidelines and have the relevant approvals and certificates to guarantee faultless plant operation even under the toughest conditions.





Consistent support

Benefit from the specialist expertise of our application engineers, who develop needs-based solutions that deliver added value for you. From actual analysis via project support and the development of an individual solution to use on site.

Application laboratory

We have an extensively equipped application room for the automation solutions in the wind segment. It is here that all the programmed functions are tested on real models prior to delivery. So you can rest assured that the plant will work faultlessly even during operation.



You expect consistent support

Our range of full services at a glance



International presence

We're there for you no matter where in the world you're based and can draw on an extensive wind energy network comprising both service and sales sites.

Our Global and Local Wind Managers provide you with project-specific support – such as when dealing with national standards and guidelines.

Support during commissioning

Our engineers give you on-site support by providing valuable information and test procedures – to ensure that your systems deliver optimum performance and reliability.

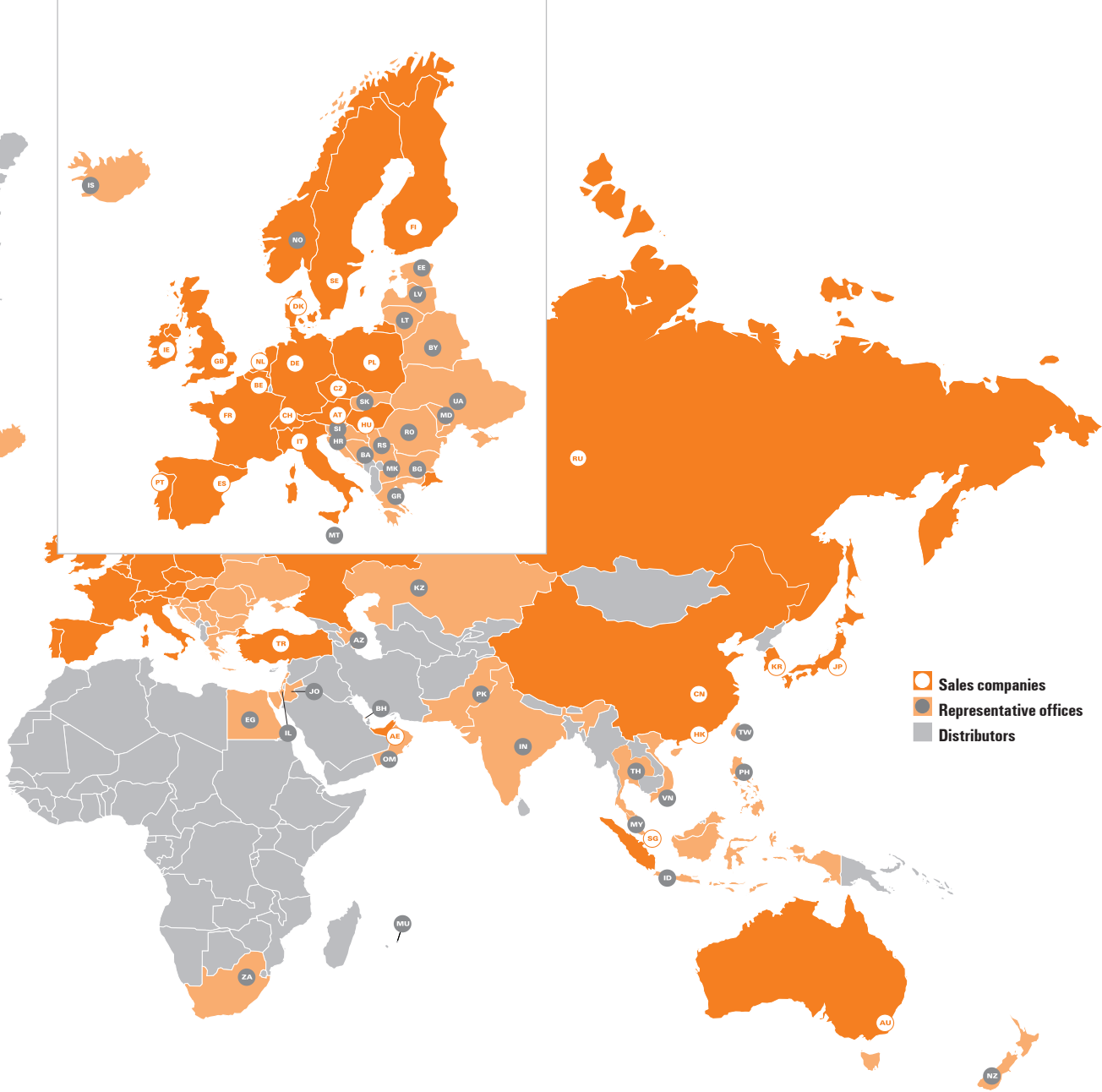
Training sessions and consulting services

Our experts help you to plan, commission and maintain your small wind turbine as well as holding training sessions with your employees both online and on site.

After-sales – a service that goes the extra mile

We want you to be – and remain – satisfied with your customised solution for a long time to come. That's why we also offer a comprehensive after-sales service once your project is complete:

- Support with commissioning
- Provision of assembly instructions in several languages
- On-site system analyses
- Remote diagnostics and support during troubleshooting
- Spare parts service



Briefings

Nowadays, you don't just need to continuously further develop technologies; you need people who are capable of working with ever more complex technology too. Make the most of our versatile technology and application briefings to qualify your employees – either on site at your premises or online.

Personal support

We're more than happy to answer your questions – in person, quickly and easily. Do you prefer to have technical questions answered by a direct contact? Our specialists are there for you in your local language around the globe.



Weidmüller – Your partner in Industrial Connectivity

As experienced experts we support our customers and partners around the world with products, solutions and services in the industrial environment of power, signal and data. We are at home in their industries and markets and know the technological challenges of tomorrow. We are therefore continuously developing innovative, sustainable and useful solutions for their individual needs. Together we set standards in Industrial Connectivity.

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