We Make Wind Competitive
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We Make Wind Competitive

The future of the wind industry depends on making wind competitive and that is why we made it our mission.
We Make Wind Competitive

Mita-Teknik aims to be the leading control solution provider throughout the wind turbine’s life cycle. With our competencies within Wind Turbine Control, Retrofit and Optimization, we give you the power to take control – whether it is a megawatt or small wind turbine – new wind turbine setup or Retrofit project. It all comes down to earnings, availability and reliability.

Certified Conformity to Industry Standards
Internationally renowned certification bodies verify that Mita-Teknik’s systems, applications and solutions are in conformity with the industry’s most important standards.

Track Record
Mita-Teknik has been in the business of control automation since 1969. Our track record is continuously proven, as more than 47,000 wind turbines equipped with our control systems, daily deliver optimal performance and unsurpassed reliability.

Open Systems
The flexibility of our open-platform products, and their ability to blend seamlessly into any existing setup gives you the opportunity to “mix & match”, and create your own individual solution. Or you can choose to go with a complete solution where we deliver everything you need - the choice is yours.

“We want to be the preferred partner in the wind industry and we constantly work at optimizing the way We Make Wind Competitive.”

Jesper Andersen, CEO
As the wind industry - we adapt and evolve, and we continuously strive to be at the absolute forefront of control automation in order to meet the market’s demands – present and future.

Jesper Andersen, CEO

Track Record

Proven Commitment to Wind

A great “track record” is a rare and valuable commodity in any industry, but especially one as young as the wind industry. Many claim to have one, but only a few can back it up. Mita-Teknik is one of them.

With more than 45 years in the control automation business, and more than 47,000 control systems in operation worldwide, we have proved over and over again that our solutions are among the most competitive in the market.

Our engagement in wind energy started in the 1980s when the Danish Wind Industry began exporting to the US. Since then we have expanded with divisions in Europe, USA and Asia, gaining the global experience that enables us to deliver intelligent, customized solutions as global market leader in the industry for control automation solutions.

Four decades of experience in successfully delivering on- and offshore projects on time and within budget, Mita-Teknik knows exactly what it takes. We continue to maximize the value of each link in the supply chain by thoroughly understanding the complexity and challenges in the wind industry, and by developing the best technology available.
We believe in flexibility and we deliver everything from complete turnkey solutions to individual components - so whatever your setup needs we can provide.

Mita-Teknik’s ambition has always been to create the market’s best and most flexible solutions, and we have worked hard for the past +45 years to fulfill this ambition. Today our comprehensive experience and product portfolio enables us to make any solution come to life, no matter the scale and complexity.

We deliver everything in terms of hardware and software, and combined with our extensive Customer Partnering services, you are guaranteed the best solutions in the market.

Designed for You

We can first create the solution when we understand the challenge - that is a fact. Getting to know you, and being able to share insights, means that we get a deeper understanding of your specific situation, and in the end create the best solution for you.

Complete Solutions

Our mission to Make Wind Competitive applies to everything we do, and every product and service in our portfolio is designed with the primary objective to optimize your production, improve your bottom line and make you more competitive.

Flexible & Open

The flexibility of our open-platform products, and their ability to blend seamlessly into any existing setup, gives you the opportunity to “mix & match”, and create your own individual solution. Or you can choose to go with a complete solution where we deliver everything you need - the choice is yours.
We engage in productive partnerships with our customers to secure continued success for many years to come. We have unparalleled experience, and we want to share this with you.

Market Focus

Mita-Teknik’s primary focus has always been aimed towards the OEMs of the wind industry and it still is today. We have successfully handled projects ranging from a few kW to large MW setups, on- and offshore. In addition to our OEM offerings, we also offer a cost-competitive Retrofit solution that satisfies the steady growing aftermarket segment.

Megawatt Wind

The majority of our customers are OEMs within the MW wind turbine market. It is experienced and knowledgeable manufacturers, who look to Mita-Teknik to improve their overall competitiveness by entering productive partnerships.

We effectively bring down the cost of energy by providing our customers with cost-efficient solutions that offer quick and easy installation, the shortest possible learning curve, and stand out when it comes to performance and reliability.

We provide services in all stages of a project, from design to commissioning and optimization.

Retrofit

We offer a comprehensive and cost-effective solution for retrofitting older wind turbines.

Our Retrofit solution helps you upgrade the control and electrical systems in your wind turbine to new and improved systems, that are up to date with local and market requirements. With our experience and proven solutions, you can safely and easily upgrade to increase the performance of your turbines and increase your earnings.

Small Wind

Creating solutions for small wind turbines has been an important part of Mita-Teknik’s business for many years. We have handled many different demands and requirements, and we have experienced first-hand the significant growth in the Small Wind market.
Great people and great systems yield great results. It is one of the key drivers to our success and continued development.

Quality is, and has always been, a key factor in Mita-Teknik and Think Quality is one of our core values. As a proof of this dedication to quality, our Quality Management System is certified by renowned certification body TÜV NORD according to the ISO 9001:2008 standard.

It is the Quality Policy of Mita-Teknik to continuously optimize the experience of our customers. We aim to meet our customers' expectations and requirements by building our solutions on know-how and experience, and working with a high level of integrity.

Quality Goals
In order to live by our Quality Policy, we have set ourselves in the Quality Policy, we have set ourselves three objectives that correspond to each of the three elements in the Quality Policy. These serve as an important basis for internal improvement action plans and suggestions for improvement from our customers.

Optimize Experience – on a regular basis, we survey our customers in order to understand their most important needs and quality. And that is with one of the market’s shortest lead times.

We meet Customer Expectations & Requirements – we also measure our own delivery of supply in order to ensure that 99% of our orders are delivered on time in the right quantity and quality. And that is with one of the market’s shortest lead times.

We work with Integrity – working with a high level of integrity is of the highest importance to us. This also means continuously improving and listening to all feedback from customers and employees alike.

Engineering Quality
With our high-level technological automated testing system, we ensure the quality of our hardware and software. We expose our hardware to HW verification, EMC, Vibration, Climate and HAL T Test Standards. Our software is tested in three steps:

- **Functional Test**: Our developers test all of their code on functionality, compatibility and performance. For this, the software is run in a functional test environment and then, as the code is developed, it is tested regularly.

- **Integration Test**: The functional test environment is accessed and the functional test is repeated as new parts are added to the project. This ensures that the system works as intended.

- **System Test**: The system test is carried out in a real environment. The system is tested as a whole, and any potential issues are identified and addressed.

We work with Integrity – working with a high level of integrity is of the highest importance to us. This also means continuously improving and listening to all feedback from customers and employees alike.

Think Quality
Complete Solutions

We cover everything from Complete Control Solutions and Systems to individual Components - all made to optimize your setup.
Our extensive product portfolio enables us to deliver solutions for all setups, ranging from small wind turbines to large on- and offshore wind turbines.

Making Wind Competitive

The control system is the central brain of the wind turbine. It has two primary functions; 1. to ensure safe and reliable automatic operation, and optimize output by regulation of yaw and pitch according to the weather conditions, and 2. to handle all communication interfaces, and make collected and stored operation data available for further analysis and optimization.

Our extensive product portfolio enables us to deliver solutions for all setups, ranging from small wind turbines to large on- and offshore wind turbines. All of our solutions are custom-made to fit the customer’s exact setup.

The Platforms

WP4200 Platform - The WP4200 Control System Platform offers superior performance and is perfectly suited for use in all on- and offshore megawatt wind turbines. With enhanced features such as onboard condition monitoring, onboard grid measurement and a powerful 1.2 GHz processor, the controller ensures high performance and the utmost in flexibility.

WP100 Platform - The WP100 Control System Platform is designed to control small and medium sized wind turbines with a production capacity of up to 1.5 MW, making it the optimal choice if you are looking to retrofit older turbines. Like the WP4200, the WP100 is built with a focus on compatibility and flexibility.

Operation Monitoring

With the MiConnect Mobile Diagnostic App, monitoring and visualization of your wind turbine’s operation process is now possible via your smartphone and tablet. MiConnect makes service easy, and gives you the overview you need to ensure optimal operation and performance of your wind turbine.

With MiConnect you can:

› Manage profiles for quick access to preconfigured wind turbines
› Navigate intuitively through data
› View overall system status, principal mechanical and electrical characteristics
› Monitor data changes in real-time

Wind Turbine Control
Total control of wind turbines in all weather conditions is vital in supplying reliable and high quality renewable energy.

The WP4200 Control System Platform offers superior performance and is perfectly suited for use in all large on- and offshore megawatt wind turbines.

The WP4200 Control System Platform benefits from the experience of more than 47,000 installed systems, and incorporates a number of enhanced features, such as:

› Onboard Condition Monitoring System
› Onboard I/O Extension
› Backward Compatibility
› Graphic HMI Interfaces
› Grid Quality Analyzer
› Ethernet Port (10/100/1000 Mbit/s)
› Possibility for Onboard Grid Measurement
› Multiple Programming Options

These enhanced features make the WP4200 Control System Platform our most powerful and advanced control system to date. It allows us to incorporate new wind turbine optimization technologies, such as advanced control algorithms, providing for optimal power production and substantially reduced loads on the wind turbine.

Application of the WP4200 in combination with our Advanced Control platform assures a cost effective wind turbine design, as the advanced control algorithms reduces the loads on the wind turbine’s structural components by reacting immediately to changes in wind conditions. At the same time, the power production of the turbine is optimized by constantly operating the rotor speed and blade pitch angle at its optimum, according to the given wind conditions.

Advantages

› High-speed multi core processor (CPU & DSP)
› Well suited for Individual Pitch Control (IPC)
› FAILSAFE FLASH file system
› Gigabit Ethernet Communication
› Fast floating points for running advanced algorithms
› High level of HW/SW flexibility
› Tailor-made for wind turbines
› Maintenance free – no batteries or fans that needs replacing

The WP4200 Control System Platform is delivered as a turnkey solution, featuring a wide selection of standard and customized operating programs created to suit your particular needs and ensure optimal and effective operation.

The WP4200 Controller logs all data and makes it available for onsite surveillance, or by remote access through your preferred SCADA System. All relevant data and information is logged and stored for use in the daily optimization of the wind turbine or for easy call-back for historical performance review.
The WP100 Control System Platform is designed for control of small and medium sized wind turbines with a production capacity of up to 1.5 MW, making it the optimal control solution choice if you are looking to retrofit older turbines. It features:

› Advanced Control
› Onboard Grid Interface
› Dualport Gigabit Ethernet
› Graphic HMI Interfaces
› Onboard I/O
› Onboard CAN/CANopen
› Mobile App’s Interface
› Backward Compatibility
› Multiple Programming Options

The WP100 Controller is built with a focus on compatibility and flexibility and has various on-board I/O channels that make it possible to use the controller as standalone (without additional I/O modules) to control systems with limited complexity. At the same time it is possible to connect up to three WP-Line I/O modules when more I/O channels are needed.

With the WP100, the user gets access to two Gigabit Ethernet interfaces with separate network functionality. The interfaces may be used in any desirable way. Additionally, there is one serial interface (RS232/RS422/RS485) and one CAN interface available, which can be used e.g. for communicating with the pitch or inverter systems.

The OS1xx Operating System API is 100% backwards compatible with the OS4x00 operating system family – this ensures that existing applications that run on WP4x00 Platforms can be used with the WP100 Platform without any modification or recompilation when the hardware setup is compatible.

The WP100 Controller - 30 is furthermore equipped with onboard grid interface, which makes it possible to calculate main grid parameters by precise and reliable DSP algorithms according to the IEC 61400-21 standard.

Advantages

› Powerful processor
› Cost efficient
› FAILSAFE FLASH file system
› Gigabit Ethernet Communication
› 1 Grid Interface (3 current and 3 voltage inputs)
› 1 CAN/CANopen Interface
› Maintenance free – no batteries or fans that needs replacing

Our extensive know-how is a result of more than 30 years of experience in the wind industry and more than 47,000 installed systems.
The Value of Optimizing

Wind Turbine Optimization is an important part of Mita-Teknik’s business setup, and an important means to reach our overall mission to Make Wind Competitive.

We constantly strive to improve the competitiveness of our customers’ products, and by applying advanced control integration know-how and services, we are able to reduce loads and/or improve energy production and hereby reduce the cost of energy (CoE).

Cost and Production benefits to be gained using advanced controls:

We provide outstanding value through quality engineering solutions focusing on high efficiency, low cost of energy, world-class product innovation and robust strategic implementation.

The Right Know-how

Our Optimization team has more than 60 years of combined experience in the wind industry, and we apply this experience to every project.

We prioritize Wind Turbine Optimization as a separate business area, and deliver a wide range of different services to accommodate the specific customer’s project needs.

Our services include:

- Load calculation and optimization
- Control algorithm design and optimization
- Feasibility studies
- Project Management
- Cost of Energy analysis
- Wind Turbine concept studies
- Wind Turbine Cost of Energy optimization

Our experts in Load- and Control Optimization, engage in close dialogue and interactive process with our customers in order to take all factors and possibilities into account. In this way we find the optimal turbine level solution - tailored to your specific needs and market.
In a wind park in Palm Springs, 400 wind turbines are equipped with our CS System. The wind turbines have been in operation for more than 25 years and are still producing power.

Today’s wind turbines and wind parks grow increasingly larger as the demand for flexible controlled power in the grid increases. In order to control these wind parks and ensure that they are balanced and able to comply with the grid codes all over the world, Mita-Teknik offers an open, reliable, flexible and intelligent Wind Park Control Solution that gives our customers the edge when selling their wind turbines for wind parks.

What Do You Get?

Our Wind Park Control Solution consists of our field-proven hardware, developed for harsh on- and offshore environments, as well as multiple software packages optimized specifically to your location. All units are interconnected by an Ethernet network running the reliable M-Link protocol.

How It Works

The wind park is controlled by a Park Controller that dispatches the active and reactive power set points as ordered by the Transmission System Operator (TSO) either directly to the Wind Turbine unit or via a Cluster Controller that can be introduced in large wind parks.

A Grid Monitor is used for accurately measuring the grid, for precise control and monitoring. A Weather Monitor can be installed to supply the system with meteorological data as well.

Complete Solution or Tailor-made

We have compiled a Wind Park Control Solution that will fit most grid codes and needs concerning e.g.:

- Park/Cluster Controller
- Grid/Weather Monitor
- Fully tested software for controlling the individual wind park components
- Installation and commissioning services
- Integration services
- Training services
- Accessories

However, should you require solutions for special purposes we are always prepared to compile a tailor-made solution that fits your specific needs.
Wind Park Control

Wind Park Control Setup

Transmission System Operator (TSO) interfaces to the park via Modbus TCP, digital in- and outputs, analog in- and outputs.

The Park Controller handles up to 50 turbines or up to 50 Cluster Controllers (which handles up to 50 turbines each). Grid Monitor is available as a combined Park Controller and measurement unit or as a remote substation Grid Monitor.

The Cluster Controller handles up to 50 turbines. The Grid Monitor is available as a combined Cluster Controller and measurement unit or as a remote substation Grid Monitor.

A Weather Monitor can be added either on park or cluster level to supply the system with meteorological data.

Advantages

› Long lifespan – no moving parts ensures high reliability
› Open and flexible – supporting open configurable standards for control and supervision
› Control of 2 to 2500 wind turbines in 0 to 50 clusters
› Our SCADA system enables you to control and monitor all local, regional and global wind parks from the same office

Mita-Teknik Wind Park Control Concept enables you to control and monitor up to 2500 wind turbines as a single unit.
Connecting wind turbines and wind parks to the Internet is a security risk. Our ER1000 makes it secure to connect wind turbines and wind parks to the Internet. Our SCADA system, Gateway combined with ER1000 and ES1000 makes park monitoring safe, easy and secure.

ER1000 VPN protects your wind turbine and wind park from unauthorized access. ES1000 is especially designed for creating a communication network between the wind turbines in a wind park. The redundant concept and the option for battery backup, ensure reliable communication in the wind park despite ongoing service or installations.

Ethernet has become a standard for communication between devices in the industry today. Especially fiber optic Ethernet switches are used. More and more switches are used for both communication in the wind turbine, between wind turbines (park communication) and as connection point to the Internet.

Mita-Teknik’s ES1000 (Managed Ethernet switch) and ER1000 (Managed Ethernet router) switches are robust and highly optimized for the harsh environmental challenges of today’s wind industry.

ES/ER1000 has 12 10/100/1000 MBit Ethernet ports where 4 ports are fiber optic ports. Fiber optic ports are either with SC connector multi-mode or SFP module with LC connector. SFP modules are delivered as default for multi-mode cable, but can easily be exchanged to be used with single-mode cables.

Multi-mode fiber optic cable length can be up to 2000 meters – while the single mode cable length can be up to 80 kilometers.

ER1000 and ES1000 give you the benefit of connecting wind turbines in a wind park, and making them online accessible from anywhere in the world.

Advantages
› Handle all past, current and future controller needs
› Connects your wind turbine safely to the Internet
› Ensure reliable communication in the park
› Improved safety with Access Control List (ACL)
› Ultra-fast network recovery with R3 Ring Protection
› Cut Through Switch/Non-blocking
› Web Configuration for remote managing of status, software updates and fast servicing
› Bandwidth Management
› Battery backup - ensures reliable operation

Reliable Communication
Connecting wind turbines and wind parks to the Internet is a security risk. Our ER1000 makes it secure to connect wind turbines and wind parks to the internet.
The ER1000/ES1000 setup supports remote managing for remote status, software updates and fast servicing.

**Connection Stability**

The ER1000/ES1000 setup ensures optimal operation, great security and advanced data collection.

**Internet Connection**

The setup supports several redundant connections to the Internet, which are activated if the main Internet connection is lost. This ensures a more reliable connection to the wind park.

The ER1000 can detect Internet connection loss and will in such an event fallback to a modem to restore connection to the Internet.

**Wireless Access**

The setup supports IEEE 802.11 b/g/n standards and allows you to securely access Wind Park LAN via Wi-Fi.

**Serial COM-ports**

ER1000 and ES1000 are both equipped with two serial COM-Ports ensuring communication with Mita-Teknik controllers, meters and sensors, e.g. MiCMS.

**Mita-Teknik R3 Ring Protection**

Specifically designed to handle the demands of the wind industry, the R3 Ring Protection protocol offers ultra-fast network recovery (faster than 10 ms) with no limitations to wind park size.
Advanced analysis of wind turbine condition data is the best way to optimize production and reduce service maintenance costs.

MiCMS Condition Monitoring

Wind turbines are remote power plants, which unlike conventional power stations, are very much exposed to highly variable, harsh weather conditions both on- and offshore. Moreover, wind turbines are unmanned and often located in remote locations; therefore, it is critical to detect and service faulty equipment in time. A broken gear tooth or a metal fatigue ridden bearing can cause irreparable damage if not fixed in time.

What Do You Get?

Our Condition Monitoring System, MiCMS consists of the remotely operated controller and our SCADA system, Gateway. With up to 16 IEPE type accelerometers strategically placed on the drive train, MiCMS monitors the drive train components, such as the gearbox, generator, main bearings as well as the tower.

One of the advantages of using vibration monitoring is that you are able to pinpoint exactly the defected component within e.g. the gearbox. MiCMS provides visual indication of the wind turbine’s current condition and can be installed as part of the wind turbine control system or as a stand-alone system.

SCADA Integration

MiCMS is an integrated part of Gateway, the Mita-Teknik SCADA system used for complete monitoring and operation of wind turbines and wind parks.

Advantages

› Remote access for monitoring and reporting
› Remote configuration
› Reduce wind turbine down-time
› Lower maintenance costs
› Prevent damages
› Optimize wind turbine efficiency
› Maximize revenue generation

MiCMS eliminates equipment run-to-failure situations and allows you to perform predictive maintenance - effectively optimizing the overall output of the turbine.

Combined with weather forecasts, MiCMS allows you to plan onsite maintenance visits most optimally making predictive maintenance easier than ever before.
MiCMS
Condition Monitoring

Live Data Storage and Visualization
MiCMS is used for vibration analysis. It surveys predetermined critical vibration levels. The frequency range is 0.1 -10000 Hz and the vibration range is 0.001 - 25G.

The measurement of vibrations is performed by up to 16 external accelerometers. The real-time measurement of vibrations is controlled by a flexible measurement task scheduler, which can be individually configured with time and frequency domain calculations.

When the MiCMS is connected to the controller it is possible to receive wind turbine real-time data.

Loaded with Features
- MiCMS surveys vibrations with up to 16 external accelerometers
- Real-time sample, calculation and storage of vibration signals, including wind turbine operation parameters
- Calculation of time domain characteristics:
  - Broad band characteristics
  - Vibrovelocity calculation
- Calculation of frequency domain characteristics
  - FFT Amplitude Spectra
  - FFT Envelope Spectra
- Frequency selective characteristics
- Advanced warning and alarm handling
- Automatic storage of daily set and raw data

Gateway and the Algorithm Toolbox analyzing system are capable of trending and data browsing.

The Gateway software will access the CMS controller through the Internet or modem connection.

Downloaded data is stored in a central database in the surveillance center.

The database can be shared.
Great at Control

Precise control of individual rotor blade pitch angle ensures optimum power-production and minimum loads.

The Mita-Teknik Drive System (MDS) is a range of complete electrical pitch systems designed for on- and offshore wind turbines up to 10 MW.

To optimize the wind turbine power curve and to apply minimum load to the structure, it is necessary to regulate the aerodynamic power. This is done by pitching the rotor blades collectively (CPC) or individually (IPC) to maintain rotor speed at optimum, while at the same time keep the rotor speed below maximum. The blades can also be pitched at such an angle that the turbine come to a full stop, which for larger wind turbines is often the only way to stop the turbine. This requires the pitch system to be part of the turbine safety system.

Safety

Maximum safety for the wind turbine is achieved with three separate and independent MDS, working as an integrated part of the wind turbine safety system. This gives the individual MDS both the possibility to activate the safety system in case of failure in the pitch system, and the possibility to pitch the blade to feathering position in case the safety system is activated.

MDS continuously monitors the communication from the wind turbine controller and the health of all pitch system components, including pitch motor and power backup, and it ensures the wind turbine is stopped even if the wind turbine control system is failing.

Advantages

› Cost-competitive, well proven and certified system
› Battery or Capacitor Backup Power
› Individual Pitch Control (IPC) and/or Collective Pitch Control (CPC)
› Communication to main control system via common field busses
› Integration with either Mita-Teknik or 3rd party wind turbine control system
› Communication support library for 3rd party wind turbine control system on request

LVRT and Grid Drop

In case of grid fault or grid drop, the MDS is powered by the backup power, which is either batteries or capacitors.

During LVRT, the MDS will continue normal operation, only powered by the backup power, allowing the wind turbine controller to pitch the blades in both directions.

During grid drop, the MDS will continue normal operation, only powered by the backup power, allowing the wind turbine controller to control the pitch speed in the direction of the feathering position only.
MDS
Pitch Control

Customizable, Strong and Durable

The MDS can be customized to fit into any type of wind turbine, and the design allows for a quick and easy installation. The immensely sturdy design of the MDS enables it to resist severe vibrations and forces induced during constant rotation, emergency stops, as well as withstand the weight of the service personnel.

Combined with optimal blade-positioning and individual blade-control, this makes it a perfect fit for the modern wind turbine.

Advanced features

› Adaptation to all types and sizes of wind turbines
› Easy to install and configure
› Customizable cabinet design
› Build-in self-test procedure
› Optimal closed loop motor control
› Optimal blade positioning
› Easy parameters setting
› Event and fault tracing via log functionality

Compliance Platforms

› MDS V3 complying with GL2003 Guideline and NB/T 31018-2011
› MDS V4 complying with GL2010 Guideline and NB/T 31018-2011

Maximum safety for the wind turbine is achieved with three separate and independent MDS, working as an integrated part of the wind turbine safety system.
Gateway SCADA System

Gateway offers remote access to the controller(s) of a single wind turbine, several clusters of turbines or one or more wind parks. It offers an intuitive overview of the current state, productivity and the availability regardless of physical location. The Gateway system is directly connected to the CMS system of each turbine, constantly monitoring the health of the turbine and immediately sends a notification to the service technician in case of faults. This allows for pre-emptive planning of maintenance, which is cost saving - especially for offshore installations and wind turbines situated in remote locations with costly travel expenditures.

Gateway can be integrated into any system you desire through open communication protocols OPC DA and MODBUS. Combined with customizable screens that make data available in a user friendly format, Gateway stands out as a very powerful tool for managing and monitoring wind turbines and parks.

Gateway is capable of both starting and stopping wind turbines, as well as applying individual parameters from one turbine to another, regardless of the physical distance between them. This makes testing new algorithms easy, and quick to implement across a large number of wind turbines. In addition, the Gateway system can be fully integrated with local utility companies, allowing them to better control the flow of production from your wind park to the grid.

The latest version of Gateway offers extended report functionality that gives you the complete overview of the performance of each individual wind turbine.

The data is continuously accumulated, and can be illustrated through intuitive graphics, making analysis of historical production output across clusters very easy. Reports can be extended or created by the customers using Report Designer Tool, which is also part of the Gateway system. Gateway can be scheduled to automatically generate and dispatch this data as reports to any number of specified recipients. When you acquire the Gateway system we will customize each system’s functionality to match your setup, needs and expectations.

Advantages

› Complete Information Access
› Customization on all levels
› Alarm Management
› Performance Monitoring
› Availability Monitoring
› User-friendly Operation
› Data Export/Import
› Easy and quick to setup in both small and large setups
› Packages for individual groups and end users

Gateway collects, handles, analyzes and illustrates the data from any number of wind parks and turbines with intuitive graphics and text.
Our SCADA solutions provide you with the features, flexibility and services you need to gain greater control of your wind park.

MiScout Web SCADA System

MiScout Web enable you to connect to your turbine or wind park 24/7 and monitor production, availability, alarms, weather conditions and more via a standard web-browser. It allows you to instantly react to alarms and shifts in weather conditions – ensuring increased availability, decreased OPEX and ultimately, higher profits.

Cloud Solution

MiScout Web is a Cloud solution for our SCADA system, Gateway. You can choose MiScout Web as a hosted solution or host the solution yourself.

The customer-hosted solution is ideal for customers with large setups that require complete control and therefore need the full Gateway SCADA system installed on their local server. This solution offers the utmost in flexibility and user-customization.

Having Mita-Teknik host the solution means that Mita-Teknik provides access to the Gateway SCADA system through the Cloud. This solution is well-suited for customers with smaller setups, who value cost-efficiency over in-depth surveillance.

We want to ensure that our customers get the highest possible ROI when investing in our solutions, and with MiScout Web we provide a very powerful tool to help achieve this.

Advantages

› Power curve and wind distribution view
› Current park status view
› Production and availability view
› Wind rose view
› Live turbine status
› Instant alarm handling
› Live data trends and comparison of trends between units
› 5 min log/24h log and 36h log
› User-friendly interface
› User customized solution
› Remote start, stop and reset of your wind turbine

MiScout Web is designed to provide useful information to turbine owners, turbine operators and engineers.
MiScout App
SCADA System

The MiScout App enable you to connect to your wind turbine or wind park and monitor production, availability, alarms, weather conditions and more via your smartphone. It allows you to instantly react to alarms and shifts in weather conditions – ensuring you increased availability and ultimately, higher profits.

MiScout App is an addition to MiScout Web, our Cloud solution for our SCADA system, and the app can be downloaded to your Android or iOS smartphone. It provides the information you need to stay on top of your operation 24/7, with instant alarm notification and view of selected vital production data, e.g. detailed map views, production logs and intuitive user-interface with easy to read graphs for quick overview on park and unit level.

Advantages

› 24/7 access to turbines/wind park
› Instant alarm notification
› User-friendly interface
› View selected turbine/wind park data

MiScout App will effectively help you cost-optimize your service maintenance expenses, as you or your service technician will always have access to the relevant data.

MiScout App will effectively help you cost-optimize your service maintenance expenses, as you or your service technician will always have access to the relevant data and be notified with alarms in time to avoid potentially expensive and time consuming breakdowns. In other words - MiScout App keeps you one step ahead.
Advanced Grid Connection

Our patented Grid Connection Module WP4060 is developed for soft connection of asynchronous wind turbine generators to the grid. The WP4060 ensures effective current control before, during and after the synchronous point. The soft connection principle ensures a remarkable reduction in net disturbances and wind turbine wear, and the controlled connection can be configured for both strong and weak net conditions.

The connection current is chosen as a parameter on the control unit and the thyristors can be connected during low production. The parameters for the opening of the thyristors are set on the control unit and the WP4060 measures whether the generator consumes or produces power. Furthermore, the module has a built-in phase detecting circuit which prevents connection if the phase sequence is incorrect.

Advantages

- Soft connection of generators to the grid
- WP4060 measures whether the generator consumes or produces power
- Ensures effective current control before, during and after the synchronous point
- Extends the gearbox life-time
- Reduces load on the drive train

Our WP4060 Connection Module is developed for soft connection of wind turbine generators to the grid.
Great at Control

Tailored to the Wind Industry

With our experience in the wind industry we know what potential challenges your equipment will face, and we have tailored solutions for handling them. Our competent engineers, technicians and supply chain are dedicated to ensure high quality and cost-effective power panels.

Scope of supply:
- Control panels for wind turbines
- Wind park control panels
- Customized pitch boxes for wind turbines
- PC climate racks for SCADA equipment
- LVDP-Low Voltage Distribution Panels for wind turbines

Manufacturing & Supply Chain Services

Mita-Teknik’s supply chain services helps you reduce costs and lower risks while ensuring a high manufacturing quality and outstanding delivery performance.

Our highly specialized supply chain provides everything from strategic sourcing to assembly and delivery. We design and manufacture all power panels in compliance with international standards (CE and UL), and run automated test procedures on all products before it leaves the factory.

Advantages
- Reduced costs and lowered risks
- Global logistics and service
- Tailored to the wind industry
- Automatic testing of all products
- Designed and documented using modern tools
- Constructed of high quality components only

Customers benefit from our large, very experienced and highly flexible supply chain, with production units in Europe and Asia, guaranteeing local supply and service.
Mita-Teknik Accessories

High Quality and Reliable Accessories

Mita-Teknik offers a range of accessories designed for the wind industry. We find the accessories necessary to ensure that your wind turbine is stable and efficient, based on your specifications and experience. The accessories from Mita-Teknik are all developed, tested and certified for the wind industry and are fully integrable with all Mita-Teknik Control Systems.

Proximity Sensors
The inductive proximity sensor is typically used for measuring the speed of the wind turbine rotor and generator, but can also be used to measure other moving components such as yaw and pitch.

Temperature Sensors
Our PT100 temperature sensors are available in various mechanical designs for easy mounting on generators, bearings, gear box etc. The sensors have the ability to compensate for the cable length to achieve an accurate temperature measurement.

Weather Measurement
Our weather measurement accessories consist of wind direction sensors, wind speed sensors, temperature measurement, precipitation sensors, humidity measurement and air pressure. The sensors come in versions for cold climate, on- and offshore.

Vibration Sensors
We have a wide range of vibration sensors to survey the magnitude and frequency of vibration in wind turbines.

Safety Devices
In order to ensure safe and reliable operation of the wind turbine, we deliver a wide range of safety devices.

Fiber Optic Communication
We deliver the necessary equipment, e.g. fiber optic cables, converters, switches etc., for fiber optic communication, within the wind turbine as well as for wind park networks.

Specialized Accessories
We customize our products to fit individual client needs. Upon request, we deliver specialized accessories to fit your specific applications.

We find the accessories necessary to ensure that your wind turbine is stable and efficient, based on your specifications.
Control Components

We believe in flexibility and deliver everything from complete solutions and systems to individual components - whatever your setup needs we can provide.
WP4200 Platform

WP4200 Controller – 00, – 08, – 09

- High performing CPU designed for large wind turbines
- Safe operation in harsh environments
- Advanced event based data logging and storage
- Direct integration with safety system
- Integrated FAILSAFE FLASH file system
- High-speed multi-core processor (CPU and DSP)
- Built-in floating point unit (FPU) for fast advanced mathematical calculations
- Gigabit Ethernet, Serial RS232/RS422/RS485 and USB 2.0 port
- Maintenance free - no fans and no batteries that needs replacing

The WP4200 Platform

The WP4200 Platform offers superior performance and is perfectly suited for high demanding control- and regulation applications. It is equipped with two high-speed gigabit interfaces, and features safety chain relay logic that integrates with the safety system to fulfill the requirements in the ISO 18849-1 standard.

The internal maintenance-free power back-up, ensures that all data is stored in the event of system power failure (UPS shutdown/failure) and program update.

The USB 2.0 port can be used with USB devices complying with the USB Mass Storage Class Specification, like USB FLASH drives and hard disc drives, allowing storage of up to 2 TB of data.

The WP4200 Platform uses the advanced OS42xx Operating System software, featuring FAILSAFE FLASH file system, TCP/IP protocol stack, WEB-server, plug-and-play identification/configuration of all WP-Line modules, status code system, 30-year summation structure, menu system and log systems. The OS42xx Operating System API is 100% backwards compatible with the OS4000 and OS4100 operating systems.

Integrated Condition Monitoring

The WP4200 Controller Platform has up to 16 integrated SMA accelerometer input for ICP sensors, which can be used for advanced condition monitoring measurements.

WP4200 Controller – 08 = 8 accelerometer input
WP4200 Controller – 09 = 16 accelerometer input

WP100 Platform

WP100 Controller – 00, – 30, – 31, – 32

- CPU module for small and medium sized wind turbines
- Safe operation in harsh environments
- Advanced event based data logging and storage
- Gigabit Ethernet, Serial RS232/RS422/RS485 and USB 2.0 port
- 16 digital inputs/outputs, 4 high speed digital counters
- 4 PT100 inputs, 4 analog inputs and 1 analog output
- 1 CAN/Canopen interface
- Direct integration with safety system
- 1 Grid measurement (3 current and 3 voltage inputs)
- Built-in multiprotocol Ethernet switch
- Built-in GPS receiver (WP100 Controller - 32)
- Maintenance free - no fans and no batteries that needs replacement

The WP100 Platform

The WP100 has a set of various on-board I/O channels that makes it possible to use the controller as standalone (w/o additional I/O modules) to control less complex systems. At the same time, it is possible to connect up to 3 WP-Line I/O modules when more I/O channels are needed.

The internal maintenance-free power back-up, ensures that all data is stored in the event of system power failure (UPS shutdown/failure) and program update.

The on-board grid interface makes it possible to calculate main grid parameters by precise and reliable DSP algorithms according to IEC 61400-21 standard. The controller is equipped with two high-speed gigabit interfaces that work as separate network interfaces. The controller features safety chain relay logic.

The WP100 Controller – 31 with built-in multiprotocol Ethernet switch (among others, includes fiber optic 100BASE-FX port) can be extended with more I/O groups via Backbone interface. The WP100 Controller – 32 has built-in GPS receiver and can provide geographic coordinates and accurate time for the system.

The WP100 Platform uses the advanced OS1xx Operating System software, featuring the FAILSAFE Flash file system, TCP/IP protocol stack, WEB-server, plug-and-play identification/configuration of all WP-Line modules, status code system, 30-year summation structure, menu system and log systems. The OS1xx Operating System API is 100% backwards compatible with the OS4x00 operating systems family.

WP100 Controller

- CPU 720 MHz ARM A8
- Memory DRAM, onboard 128 MB
- Flash Disk, onboard 512 MB
- USB, optional
- External Supply Voltage Nominal 24 VDC
- Allowed range 19 to 30 VDC
- Port for RS232 Communication (Modem) No of ports 1 Communication speed 1.2 to 230.4 kBAUD
- Port for RS232 Communication with RTS/CTS No of ports 1 Communication speed 1.2 to 230.4 kBAUD
- Port for Ethernet Communication Communication speed 10/100/1000 Mbit/s
- Permissible Ambient Conditions Operation temperature -30 to +60 °C
- Transportation temperature -40 to +85 °C
- Max. relative humidity (non-condensing at 40 °C) Max. 95 % RH
- Max operation height 2000 m above sea level

Standards
- ENE1000-6-2 (IE)
- ENE1000-6-4 (IE)
- ENE1000-6-5 (Surge)

Test Standards
- HW verification, EMC, Vibration, Climate and HALT tests.
- Programming standards The WP100 CPU supports the IEC61131-3 PLC programming standard as well as programming in ANSI C and C++.
WP3x00 MK II Platform

- All control functions are integrated
- Integrated real-time grid measurement
- Gigabit Ethernet, Serial RS232/RS422/RS485
- Direct integration with safety system
- Advanced data collection and storage
- Mechanically compatible with WP3x00
- Maintenance free - no fans and no batteries that needs replacement

WP3000 MK II, WP3100 MK II

The WP3x00 MK II controller is specifically designed to replace existing WP3x00 controllers in the market, and to give our customers the benefits of state-of-art communication interfaces and protocols. The WP3x00 MK II controller ensures optimal operation, active security and advanced data collection.

The on-board grid interface makes it possible to calculate main grid parameters by precise and reliable DSP algorithms, according to IEC 61400-21 standard. The controller is equipped with two high-speed gigabit Ethernet interfaces working as separate network interfaces. The controller also features safety chain relay logic.

The controller handles the executing of up to 10 different synchronous/asynchronous applications running in parallel. As an example this can be: turbine control application, standard synchronous/asynchronous applications running in parallel. As an example this can be: turbine control application, standard synchronous/asynchronous applications running in parallel. As an example this can be: turbine control application, standard synchronous/asynchronous applications running in parallel. As an example this can be: turbine control application, standard synchronous/asynchronous applications running in parallel. As an example this can be: turbine control application, standard synchronous/asynchronous applications running in parallel.

The controller is equipped with internal maintenance-free power back-up, ensuring that all data is stored in the event of system power failure (UPS shutdown/Failure) and program update.

The controller uses the advanced OS1xx Operating System software, featuring the Failsafe Flash file system, TCP/IP protocol stack, WEB-server, plug-and-play identification/ configuration of all WP-Line modules, status code system, menu system and log systems.

The controller handles the executing of up to 10 different synchronous/asynchronous applications running in parallel. As an example this can be: turbine control application, standard synchronous/asynchronous applications running in parallel. As an example this can be: turbine control application, standard synchronous/asynchronous applications running in parallel. As an example this can be: turbine control application, standard synchronous/asynchronous applications running in parallel. As an example this can be: turbine control application, standard synchronous/asynchronous applications running in parallel. As an example this can be: turbine control application, standard synchronous/asynchronous applications running in parallel.

WP-Line 111

Power Supply/Backbone

- High-efficiency power supply for the WP4x00 Control Concept
- Optical redundant Ethernet backbone
- 2 RJ45 Ethernet plugs for display and service
- Activity LED showing operational status
- Supports removable LED matrix display
- New Flexible serial COM-Port
- Intelligent thermal control
- Fast and easy DIN-rail mounting

The WP-Line 111 Power Supply/Backbone module is an upgrade from the well-proven WP-Line 110 and functions as power supply for the single module blocks in the WP4x00 Control Concept. The inter-block communication (backbone) in the WP4x00 Control Concept is carried out by the WP-Line 111 via an optical Ethernet. The backbone Ethernet communication can be connected with fiber optic cables as double ring. The fiber optic type is 62.5/125µm.

Furthermore, the WP-Line 111 is equipped with 2 x 100Mbit Ethernet RJ45 plugs for connection of a graphical display/ keypad or PC. This enables operating the complete WP4x00 Control System at all available module blocks.

### Processors
- CPU: 700 MHz ARM A8

### Memory
- DRAM onboard: 128 MB
- Flash Disk: 512 MB

### External Supply Voltage
- Nominal: 24 VDC
- Allowed range: 19 to 30 VDC

### Port for RS232 Communication (Modem)
- No of ports: 1
- Communication speed: 300 BAUD to 230.4 kBAUD

### Port for RS232 Communication with RTS/CTS
- No of ports: 1
- Communication speed: 300 BAUD to 230.4 kBAUD

### Port for Ethernet Communication
- Communication speed: 10/100/1000 Mbit/s

### Permissible Ambient Conditions
- Operation temperature: -50 to +60 °C
- Transportation temperature: -40 to +85 °C
- Max. relative humidity (non-condensing at 40 °C): Max. 95 % RH
- Max operation height: 2000 m above sea level

### Standards
- EN61000-6-2 (IEC)
- EN61000-6-4 (IEC)
- EN61000-4-5 (Surge)

### Test Standards
- HW verification, EMC, Vibration, Climate and HALT tests.

### Programming standards
- The WP3x00 MK II platform supports the IEC61131-3 PLC programming standard as well as programming in ANSI C and C++.
WP-Line 151

Grid Measurement

The WP-Line 151 Grid Measurement

The WP-Line 151 module has three voltage and three current analog inputs. The module is powered from the WP-Line BUS. The WP4x00 controller can automatically update the programs via the network. The communication to the WP4x00 controller is event-based, which means that only changed values are transmitted via the network. Analog part is based on 16bit precision ADC.

The WP-Line 151 module performs three basic functions:

- Calculates main grid parameters
- Calculates grid quality parameters
- Provides WP4x00 controller with these data

Main grid parameters like voltage, current, active and reactive powers, etc. are used by WP4x00 control application for turbine overall control. Calculation of main grid parameters by precise and reliable DSP algorithms has the following features:

- Frequency calculation algorithm assures measurement accuracy 0.01 Hz and higher
- Voltage and currents are calculated using FFT algorithms
- Powers and energies are measured according to IEC 61400-21 standard

WP-Line 351

Combi I/O

The WP-Line 351 is a Combi I/O module developed to optimize the competitiveness and signal handling of the control system. The WP-Line 351 Combi I/O module is equipped with 2 flexible COM-ports that can be configured to RS232/422/485 orSSI via the software - as per requirement. The module also consists of various I/O’s.

The digital I/O’s are based on 24 Volt and consist of the following:

- 16 high current digital solid state outputs
- 26 digital inputs
- 4 high-speed counter inputs to 10 kHz
- 4 flexible analog inputs

The analog section is based on 12 bit analog conversion and contains:

- 4 high-speed counter inputs
- 4 flexible analog outputs that can be configured to -/+10 V or 0-20 mA as per requirement
- 4 analog inputs -/+/10 V
- 4 analog inputs -0-20 mA
- 8 PT100 inputs -60° to +230°C
- 2 thermistor inputs, with the possibility of connecting more thermistors in series

All I/O’s are galvanically separated and all outputs are short-circuit protected.
WP-Line 4xx

Combi I/O Modules

- Cost optimized I/O Combi module
- Flexible and easy to service
- Integrated Condition Monitoring
- Customized Configuration
- Clear LED status indication
- Data processing on module

The WP-Line 4xx Module Range

The WP-Line 411
The WP-Line 411 PT100/PT1000 Input module has 16 x PT100/PT1000 inputs with extended temperature measuring range from -60 to +230 °C. PT100 or PT1000 sensor mode is configured with software.

The WP-Line 412
The WP-Line 412 PT100/PT1000 Input module has 32 x PT100/PT1000 inputs with extended temperature measuring range from -60 to +230 °C. PT100 or PT1000 sensor mode is configured with software.

The WP-Line 413
The WP-Line 413 Analog Current Output module manages 16 x 0–20 mA software calibrated outputs.

The WP-Line 414
The WP-Line 414 Digital Input/Output, PT100/PT1000 Input module is equipped with both digital input/outputs and PT100/PT1000 inputs. The digital I/O’s are based on 24 Volt.

The WP-Line 415
The WP-Line 415 Analog Input module manages 16 x 0 - 20 mA and 16 x 0 - 10V software calibrated inputs.

The WP-Line 416
The WP-Line 416 Digital Input module is equipped with 64 digital inputs. Digital inputs are based on 24 Volt.

The WP-Line 417
The WP-Line 417 Digital Output module is equipped with 64 digital outputs. Digital outputs are based on 24 Volt.

The WP-Line 418
The WP-Line 418 module is equipped with digital inputs, digital outputs, analog current inputs and PT100/PT1000 inputs. The digital I/O’s consist of the following:
- 16 digital inputs
- Digital inputs: 24 VDC
- 16 digital outputs
- Digital outputs: 24 VDC/0.5 A

The analog section contains:
- 8 PT100/PT1000 inputs

The WP-Line 511 CANopen Interface

- Stand-alone Ethernet to CANopen Master Interface, designed for the WP4x00 concept
- Up to 1MBit/s CANopen
- 2 x Ethernet 100 Base-FX (SC Optic Backbone with redundant option)
- Flexible serial COM-Port (RS232/RS422/RS485)
- Supports removable LED matrix display
- Intelligent thermal control
- +24 VDC supply voltage

The WP-Line 511 CANopen Interface

The WP-Line 511 is designed for stand alone operation and as a part of the WP4x00 Control Concept.

Internal 10/100 Ethernet switch for routing and interfacing. Backbone Ethernet communication can be connected with fiber optic cables as double ring with one spare fiber cable for backup. This setup provides high communication safety, as this configuration allows operation despite of a defect optic fiber. The fiber optic cable type is 62.5/125µm or 50/125µm. Additional 2 x 10/100 Ethernet (RJ45) are on the module.

Up to 1MBit/s CANopen Master communication to other CANopen based devices. Galvanic isolated CANbus interface.

Internal condition monitoring, 7-segment display showing group number and 3-LED status indication facilitates fast servicing.

The module can easily be programmed as a CANopen Master, interfacing WP4x00 controller to any CANopen device (frequency Converter, Pitch controller, etc.). Via generic CANopen application (in compliance with CiA301 and CiA DSP 302 standard protocols) and user-friendly interface of Mita-Teknik “CANopen Configuration Tool” all CANopen network parameters can be easily configured and adjusted to meet the preset requirements.

- Supply Voltage
  - Typical
    - 24 VDC
  - Maximum
    - 18 to 30 VDC
  - Maximum
    - 7.2 W

- BUS Port Connectors
  - CANopen
  - Ethernet
  - Serial COM-port

- Ethernet RJ45 Communication Port
  - Communication speed
    - 10/100 mbit/s
  - Max. cable length
    - 50 m

- Port for RS232/RS422/RS485 Communication
  - Isolation
    - Digital isolator
  - Communication speed
    - 9.6 kBAUD to 115.2 kBAUD

- Permissible Ambient Conditions
  - Operation temperature
    - -30 to +60 °C
  - Transportation temperature
    - -40 to +85 °C
  - Max. relative humidity
    - non-condensing at 40 °C
    - 95 % RH
  - Max operation height
    - 2000 m above sea level

- Standards
  - EN61000-6-2 (CE)
  - EN61000-6-4 (CE)
  - EN61000-4-6 (Surge)

- Test Standards
  - HW verification, EMC, Vibration, Climate and HALT tests.
WP4052

The WP4052 Graphic Color Touch Screen Display is used with the WP4x00 Control Concept and provides access to the wind turbine.

- Touch screen graphic display for the WP4x00 Control Concept
- 15" TFT with 1024 x 768 resolution, 16 bit colors
- USB Port in front
- Quick and reliable survey of functions and data in the wind turbine
- Maximum user comfort via the HMI principle
- User-friendly menu structure
- Designed for easy mounting
- Pressure sensitive touch screen; responds to finger, gloved hand or pen
- Fast response time
- Maintenance free (no fan or battery)
- User-friendly 3 LED status
- Degree of protection IP55
- Condensation and salt resistant
- Sleepmode/screen saver
- Sleep mode

The WP4052 is also available in a cold climate version with an internal heater for cold climate operation.

External Supply Voltage
- Nominal 24 VDC
- Maximum 19 to 30 VDC

Current Consumption (External 24 V)
- Typical 1.0 A
- Maximum 1.3 A at 19 VDC

Module Power Dissipation
- Typical 24 W
- Maximum 30 W

Display
- Size 15”
- Resolution 1024 x 768
- Color resolution 16 bit

Permissible Ambient Conditions
- Operation temperature - Basic version
  - Front (outside control panel) -30 to +60 °C
  - Back (inside control panel) 0 to +60 °C
- Operation temperature - cold climate version
  -40 to +65 °C
- Transportation temperature -40 to +85 °C
- Max. relative humidity (non-condensing at 40 °C) Max. 95 % RH
- Max operation height 2000 m above sea level

Standards
- EN61000-6-2 (CE)
- EN61000-6-4 (CE)
- EN61000-4-5 (Surge)

Test Standards
- HW verification, EMC, Vibration, Climate and HALT tests.

ES1000 & ER1000

Gigabit Managed Ethernet Switch and Router

The ES1000 is perfect for communication with wind turbine controllers. It can be combined with all types of controllers that communicate with Serial or Ethernet standards.

- The backbone redundant fiber optic Ethernet Switch is designed for stand-alone operation and constructed for high reliability.
- The redundant fiber optic pair is connected for long range communication in a double ring with one spare fiber optic for backup.
- This setup provides high communication safety as this configuration allows operation despite of a defect fiber optic.

The ES1000 supports remote managing for remote status and fast servicing.

The ER1000 Gigabit Managed Ethernet Router is designed for stand-alone operation and is constructed for high reliability. The ER1000 can detect Internet connection loss and will in such an event fall-back to a modem to restore connection to the Internet.

The ER1000 supports remote managing for remote status and fast servicing.

Supply Voltage
- Nominal 24 VDC
- Allowed range 19 to 30 VDC

Current Consumption
- Typical 850 mA
- Maximum 1900 mA

Power Consumption
- Typical 20 W
- Maximum 25 W

RS232 Communication Port
- No. of ports 2
- Communication speed 1200 - 115200 BAUD
- Max. cable length 30 m
- Recommended cable type 2 x 2 x 0.25 w/shield
- Connector 9-pin sub D connector

Wi-Fi Communication Port
- Communication speed 108 Mbit/s
- Frequency range 2400 - 2483.5 MHz
- Supported modes IEEE 802.11b/g/n
- Output power 18 dbm
- Input sensitivity -80 dbm

Permissible Ambient Conditions
- Operation temperature -30 to 60 °C
- Transportation temperature -40 to 85 °C
- Max. relative humidity (non-condensing at 40 °C) Max. 95 % RH

Standards
- EN61000-6-2 (CE EMC immunity)
- EN61000-6-4 (IEC G22476 Emission)
- EN61000-4-5 (Surge)

Test Standards
- HW verification, EMC, Vibration, Climate and HALT tests.

Industrial 12 Port Gigabit managed switch and router with Wi-Fi (optional)
- 12 x 10/100/1000 Mbps ports (4 fiber optics)
- Cut through/Non blocking (ES1000)
- Mita-Teknik R3 Ring Protection Protocol
- 2 x Serial COM-ports (ES232/485 also RS422)
- Supports: RSTP, LACP, VLAN (IEEE 802.1Q), LLDP, ICMP, DHCP, DNS, SNMP, HTTP, FTP, SFTP, IGMP, FC2217, RMON
- 3 x digital inputs/outputs
- Web Configuration
- Support ACL (Access Control List)
- Bandwidth Management
- Direct connection of backup battery
Take Control

The power is yours. Take control of your investment and we guarantee that you will become Great at Control.
Mita-Teknik offers open platform control systems, and we can provide the customer with access to the application source code. This grants you complete control over the system; and will let you customize its functionality to fit into any product mix, regardless if your setup is produced by Mita-Teknik or another manufacturer.

The source code is a compilation of software objects, where each object represents a particular function in the application:

- Operate object
- Pitch control object
- Torque control object
- Yaw control object
- Power curve object
- Wind rose object

These objects can be changed, either partially or completely, compiled and linked into an application and then uploaded to the controller. The WP4200 and WP100 product lines offer compatibility with a long range of industry standard simulation- and development tools, including:

- PEPTOOL
- Eclipse
- CoDeSys® (IEC61131-3)
- Bladed
- Simulink®
- SIMPACK
- Genlogic

Applications for the controllers can be built from scratch or adapted from already existing IEC61131 compliant PLC’s, enabling the control system to fit into any current or future wind turbine setup.

**Programming Options**

We offer five different options tailored to your particular needs, ranging from no- to full source code access, depending on our customers decision for involvement. This is done to allow for maximum flexibility and to make sure that our customers get the optimal value from their investment:

- No programming
- Modifications
- Develop new objects
- You get the Source Code
- You program all

**Transparent & Open Software**

Access to the source code grants you complete control of the system, and will let you customize its functionality to fit into any product mix.
Regardless of which option you find most suitable, you always retain the option of handing over control of development and maintenance to Mita-Teknik, should it become necessary.

## Programming Options

### Option 1 – No Programming

With option 1 we partner up with you to identify your specific needs. Mita-Teknik will then program and test the software, which, along with all software documentation and manuals, will be handed over to you. The application will be delivered in a binary format (.crc) and you are free to install it on any number of control systems.

### Option 2 – Modifications

Option 2 expands upon option 1 by providing you with the PEPTOOL software. PEPTOOL is our own proprietary compiler for the different control systems. Mita-Teknik will provide you with training in the use of PEPTOOL to make sure you get the optimal output from your investment. Furthermore, you will be given access to all objects available for PEPTOOL, which can be used to modify default values and user access levels of the application. With option 2 you have access to everything needed to build, test and release updated application programs as well as automated manual generation and translation into other languages.

### Option 3 – Develop New Objects

With option 3 we offer even more in-depth training courses on the use of PEPTOOL, extensively covering the aspect of creating your own specific applications. You can pick and choose which parts of the development process you want to manage in-house, and which parts you want Mita-Teknik to control – the decision is entirely up to you.

### Option 4 – You Get the Source Code

With option 4 you will be given access to the source code of one or more objects developed by Mita-Teknik. This means that you will be able to:

- Change everything regarding the object
- Create new versions of an object
- Add new features and functionalities to the objects
- Import source code created by simulation tools directly to the application
- Make new objects by copying source code from other objects

Option 4 is bound by the license agreement issued by Mita-Teknik, specifying in detail the exact agreement.

### Option 5 – You Program All

With option 5, you are in charge of creating your own software for the control system based on new or existing source code. You will receive the PEPTOOL tool, receive training in its use, as well as one basic sample object and one basic sample project.

Regardless of which option you find most suitable to your organization, you always retain the option of handing over control of development and maintenance to Mita-Teknik, should it become necessary. You can also get additional objects and source code on other objects after your project has started. If you choose to program your own objects or applications, you can keep the source code a secret to Mita-Teknik, and still retain your maintenance agreement with us.
Great at Control

PEPTOOL
Development Tool

While our solutions are often delivered as turnkey packages, future modifications or expansions of your wind turbine or wind park, might require changes or enhancements in the application software. To this end we provide our unique and open development environment, the PEPTOOL software suite.

With PEPTOOL, you assume complete control of your wind turbine and wind park and gain the power to rapidly change the application source code controlling the behavior of the control system. This lets you respond quickly to changes and new requirements and lets you continuously expand your facility extending the potential and life-time of your investment.

Development

PEPTOOL allows your engineers and technicians to customize the software controlling the behavior of the applications - in an intuitive environment built around the standard Microsoft Windows platform.

In addition, PEPTOOL allows you to create new additional applications for the controller including generation of detailed documentation.

PEPTOOL supports the programming languages ANSI C/C++ and Structured Text and compiles ready-to-use applications for the Mita-Teknik controllers and DLL’s for the Emulator and simulation tools. PEPTOOL supports the generation of application manuals in pdf-format and is based on the advanced document preparation system LaTeX.

Testing and Translation

PEPTOOL enables you to design your own test module where you can perform tests without affecting the development process. With PEPTOOL, testing becomes more efficient and adds value to your overall investment.

PEPTOOL enables you to translate all control applications into many different languages – including Chinese, Korean and Japanese – enabling the user of the touch display to work in his or her native language.

Free up time from mundane tasks, reduce programming mistakes and have development in control with PEPTOOL.

Advantages

› Auto-generation of the source code
› Auto-generation of documentation
› Well-structured repository
› Supports many programming languages
› The ability to emulate Control System on PC running Microsoft Windows
› Integrated testing module
› Translation of the applications and manuals into multiple languages
› Decreased development time
› Added value to the investment

PEPTOOL ensures that key information is retained in your organization, and allows for collaboration with your external partners on developing and optimizing your application.
We offer an open development environment and give you the freedom to develop your own know-how.

CoDeSys Development Tool

CoDeSys Toolbox

The Mita-Teknik WP4200 and WP100 Control Platforms combine unique technical and financial advantages. Unlike some controllers that include all functions in a single cabinet, Mita-Teknik’s control systems are divided into several modules, which allow you to select different modules according to the specific task.

The control systems come with advanced operation system software that has advanced data collection storage, web server and the possibility of handling up to 10 simultaneous - independent or dependent synchronous - application programs.

Basically it consists of two parts; the programming system CoDeSys and the run-time system CoDeSys RTS. The run-time system turns the controller into an IEC61131-3 controller programmable with CoDeSys. Integrated compilers in the CoDeSys ensure that the program code is processed with optimal speed.

Advantages

› Complete support of the standard IEC61131-3 (IL, ST, LD, SPC, FBD & CPC)
› Simple interface
› Targets specific files for the control system
› Full development documentation
› Easy programming
› High compatibility
› Powerful IEC61161-3 programming tool
› Platform (hardware) independent
› Integrated compiler for CPU platforms
› Future safe programming
› Possibility of test with CoDeSys Development Kit

CoDeSys is a comprehensive software tool for industrial automation technology.

High User-friendliness

The CoDeSys Toolbox is delivered with Mita-Teknik’s system-specific hardware files to build a complete CoDeSys application for the control system. The application can be built from scratch or migrated from other IEC61131-3 control systems and adapted to the control system.

The CoDeSys application can be packed in an easy way to Gateway firmware upload packets and tested on a CoDeSys Development Kit, before releasing and publishing to the final target control system.

With CoDeSys, we offer you an open development environment and give you the freedom to develop your own know-how. With interfaces to all common standards, CoDeSys provides you with a high level of user-friendliness.
Customer Partnering

Cooperating with our customers helps us stay on top of our game, it inspires us and it guarantees that we think customer benefits into every solution.
“We think the customer’s needs and demands into every solution – from development and on-site installation to after sale support. Every layer of the organization is dedicated to always deliver best-in-class products and services.”

Jesper Andersen, CEO

Customer Partnering

Partnering with our Customers
The best solutions are created when we join forces and design and customize a solution that fits your individual needs perfectly. With a wide range of different services we provide professional support for our customers as a part of our Customer Partnering Concept. We take our customers’ needs into consideration before, during and after the deal.

Project Start
Know-how Based Needs Assessment
Choosing the right system design is the basis for safe and reliable operation of your wind turbines. Through open communication we advise our customers in the fields of both hardware and software.

Design & Engineering
We offer consultancy in the fields of both hardware and software. The flexibility of our module-based, plug-and-play system makes it possible to customize solutions for your specific needs. Through close dialog, we offer you solutions for safe and reliable operation of your wind turbines. With our advanced testing system, all of our products are fully tested in-house before delivery.

Project Execution
Side-by-side Development
We offer complete software support. You can choose different approaches; either we build the complete software for you or we do it in cooperation – or you do it yourself. Whatever you prefer, we offer our full support.

Service & Support
World Wide Field Service
We have a team of highly-skilled engineers ready to service you with onsite participation during various jobs like: application development, workshop test, commissioning, performance analysis, LVRT test, upgrades, support and troubleshooting.

Customers can rely on Mita-Teknik to deliver spare parts for the total turbine lifetime. If 100% identical spare parts are not available, we are committed to supply an alternative solution that keeps the turbine running.

Repair & Service
Fast and competent repair and service is crucial for optimal operation and reliability, in order for you to get the maximum output from your investment. All of our repairs are carried out in our in-house service facilities available in Denmark, China and India.

Customer Support
With our special Customer Support team we support you in all matters of hardware and software problems. Our Customer Support team can be reached by phone, Skype or e-mail.

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We offer a range of extensive training courses specifically designed to ensure you get optimal performance from your wind turbine and the best return on your investment.

As a part of our Customer Partnering Concept we offer our customers and suppliers a range of training courses in the use of our products.

Our experienced instructors will take your employees through useful tools, best practice cases and frequently asked questions, all aimed at making you Great at Control. This is done in order to ensure you get the most out of your wind turbine and the best return on your investment.

We provide tailor-made courses in:
- Wind Turbine Control Systems
- Electrical Pitch System (MDS)
- Condition Monitoring System (CMS)
- Wind Park Control Concept
- Power Panel System
- Commissioning Training
- Gateway and MiScout SCADA Systems
- Application Development with PEPTool

We provide both in-depth training as well as broad introductions to general wind turbine control; regardless of your needs, we are capable of delivering exactly what you require. We can go into the specific technical details and show you how to work and operate our advanced control systems, or we can take a field trip and visit a real, live wind turbine for a first-hand experience. It’s all up to you.

Our experienced instructors take your employees through useful tools, best practice cases and frequently asked questions, aimed to make you Great at Control.

Training - Worldwide

Our training facilities are located at our headquarters in Rødkærøbro, Denmark, where we can teach classes of up to 8 people. Our skilled instructors can also host the training event at a location of your choosing.

Regardless of what you choose, our training sessions will directly benefit your setup and organization. Please consult your Mita-Teknik sales representative for more information.