Mita-Teknik

POWER PANELS

CONTROL SYSTEMS

WIND PARK SOLUTIONS

ELECTRICAL PITCH SYSTEMS

GRID CONNECTION SYSTEMS

CONDITION MONITORING

SCADA SYSTEMS

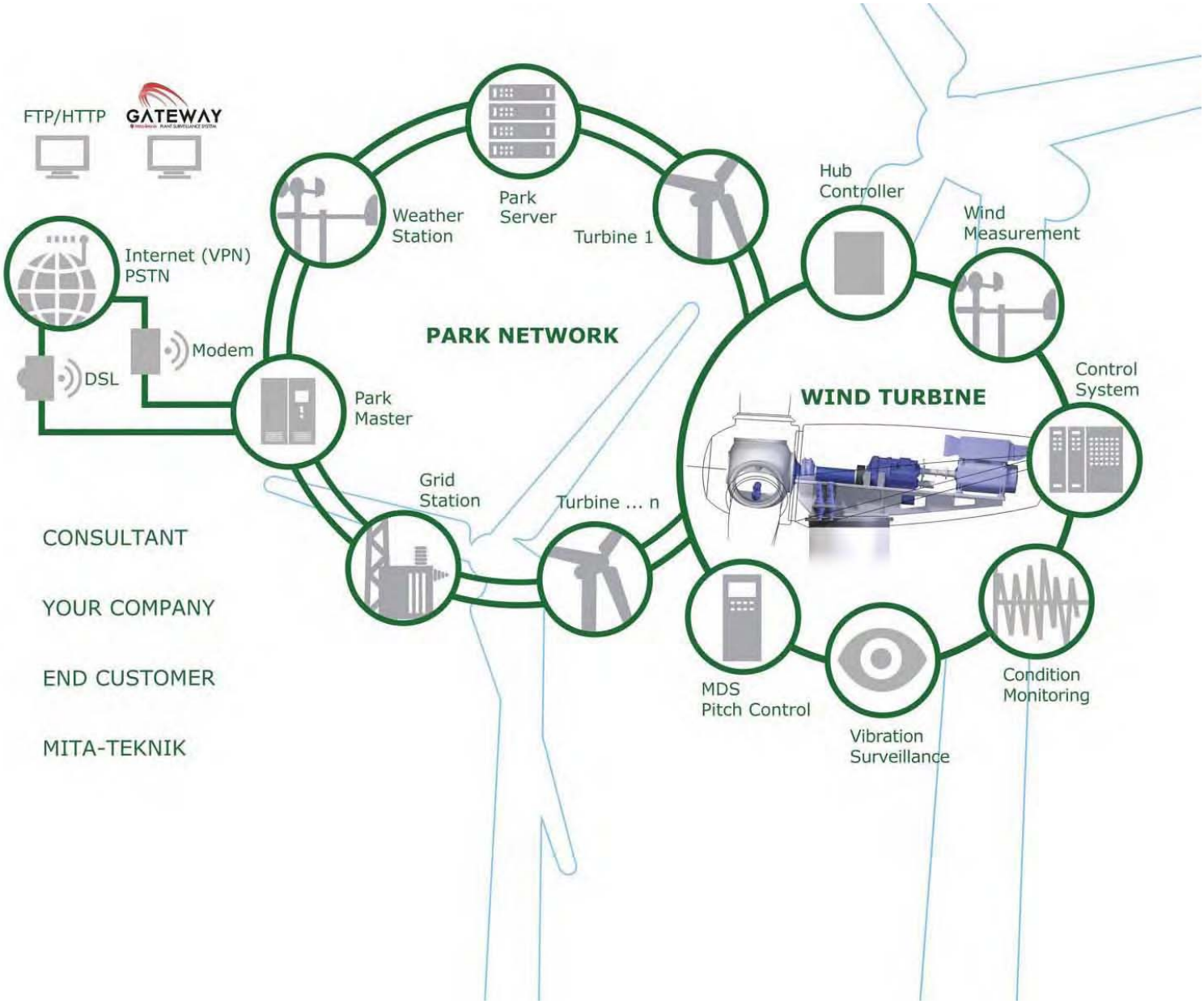
ACCESSORIES

COMPLETE CONTROL CONCEPT

Advanced Control Concept for Wind Turbines

We Make a Difference

Scope of Delivery



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Distributed WP4x00 Control System

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POWER PANELS

WIND PARK SOLUTIONS

ELECTRICAL PITCH SYSTEMS

GRID CONNECTION SYSTEMS

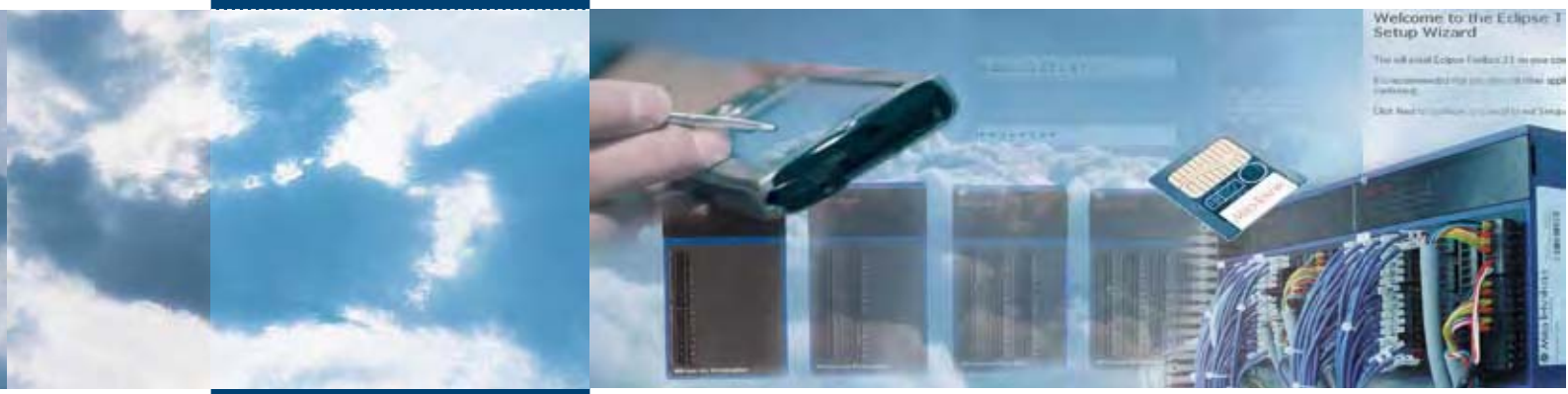
CONDITION MONITORING

SCADA SYSTEMS

COMMUNICATION

ACCESSORIES

CONTROL SYSTEMS



WP4x00 Control System

For all Types of Wind Turbines

Mita-Teknik

Intelligent Control Systems

Control Your Senses

Place your hand on your heart – and seize the moment. It's the moment that counts - be it a stormy winter night or a calm and breezy summer day.

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

Applied Technologies

- Industrial Ethernet
- CANbus 1 Mbit
- WEB Server
- FTP Server
- Remote Display Server
- Gateway Server
- IEC61131-3 and C
- Optic Fibre Backbone
- SMD Technology
- RISC, FPGA and DSP
- Flash Card Memory
- Hard Disk Connection
- Power Cap Backup
- Real Time UTC Clock

Through a skilled and devoted team of engineers and many years of experience we have developed a new system of controllers which are enhanced to suit the demands of tomorrow.

The new intelligent controller system provides you with an utmost dependable and self-detecting plug & play system. The WP4x00 offers complicated functionality made simple. Its automatic self-configurating network module system makes life easy.

Discover the opportunity to control wind turbine generators optimally and efficiently. The powerful and unique redundancy concept of the WP4x00 proves yet again that renewable energy systems will become even more competitive, lowering the ongoing operational cost

WP4x00 – data logs contain operational and corrective data stored and presented on events all displayed at the time and place of your choice. Any alteration to the system is logged and can be identified and traced.

Technical Advantages

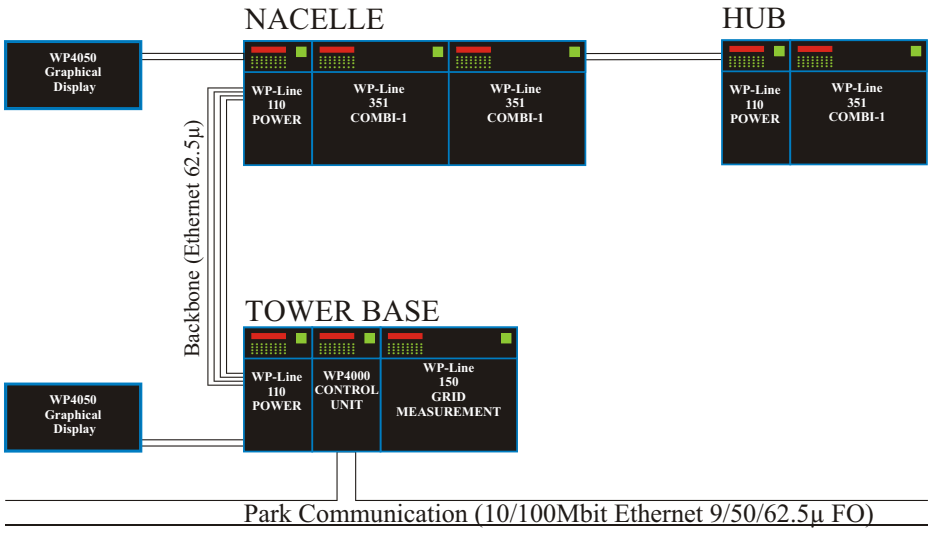
- Designed for Wind Turbines
- Flexible Distributed Design - HW & SW
- Plug and Play Configuration
- Open System Structure
- Intelligent Programmable Modules
- Real Time Multi Tasking
- Event Based Communication
- Complete Remote Control
- Condition Monitoring

Financial Advantages

- One Reliable Partner - HW & SW
- Easy to Install and Operate
- Own Software Programming
- High Reliability and Availability

The system is self-diagnostic in all controller modules for optimal operation and preventive maintenance.

WP4000 Configuration



Be in command

The WP4x00 controller system is with its future oriented solutions and features adaptable in all applications, irrespective of regulation form.

The simple add on of new modules (hardware) is easily and quickly overcome through the controller system's self-detecting functionality which our professional customers demand.

The aim of all manufacturers today is to provide fully operational wind turbines regardless of the situation. Our redundancy system is developed exactly for that purpose.

Our customer's competitive advantage lies through appliance of superior technology that constantly keeps them in command and on the forefront of evolution.

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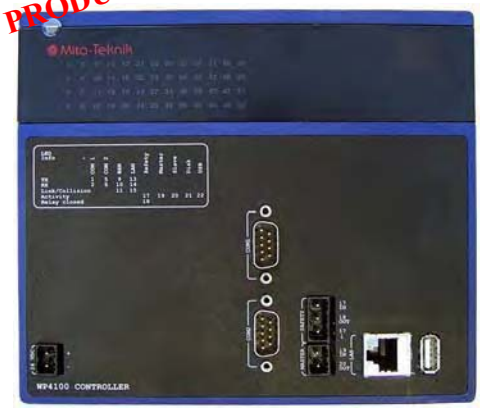
WP4100 Controller

NEW PRODUCT



- Intelligent controller for all types of wind turbines
- Advanced data collection and storage
- Onboard webserver
- Possibility of redundant use of the controller
- Park communication via RJ45 ETHERNET
- Possiblity of data up/download via USB Disk
- 2 pc. 230kBAUD RS232 COM ports

Description

In General

The WP4100 controller is part of the WP4X00 control concept, which has been specially designed to control large wind turbines - on- and offshore.
The WP4X00 control concept ensures optimal operation, high security, and advanced data collection.
The concept typical consists of a power supply/backbone module, a WP4100 controller, a grid measurement module as well as an analog/digital I/O module dependent on the specific configuration task.
The WP4X00 control concept makes it possible to have redundant solutions.
The concept is constructed as a plug and play system with automatic module detection and error reporting.

Features

The WP4100 controller is the center of the entire WP4X00 concept and is among other things equipped with two 230kBit/s RS232 COM ports for modem connection and for other purposes e.g. UPS. Furthermore, the WP4100 is equipped with 10/100Mbit ETHERNET COM port for park communication as well as backbone connection via WP-Line 110.
The WP4100 controller is part of and surveys the "hard wired" safety chain.
The WP4100 controller contains internal maintenance free power back up, so essential data will not be lost in case of a system power failure.

WP4100 is based on a high speed CPU.

The WP4100 controller contains an advanced OS4000 operation system software, that has the TCP/IP protocol stack, web server, PC compatible file system on USB Disk, plug and play identification/configuration of all WP-Line modules, status code system, summation in a 30 year structure, and log system with total log.
Possibility of easy up-/download of data/programs via USB Disk.

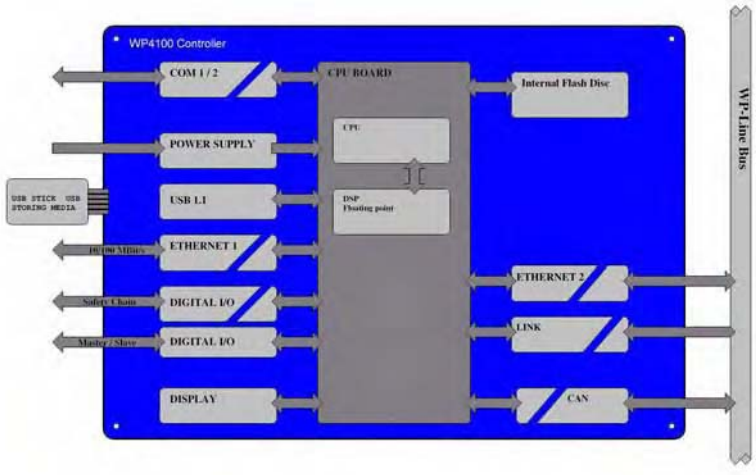
The USB Disk can also be used as storage for extended data collection.

Possibility of handling up to 10 simultaneous/ independent application programs in the controller, e.g. turbine control, park power management, dump-load control, condition monitoring, camera control, customer adapted communication protocols etc.
The WP4100 is based on event based communication, which means that only changed values are transmitted via the network.

The WP4100 controller can automatically update the program of the WP-Line modules via the network.

OPTION: The WP4100 supports the IEC 61131-3 PLC programming standard.

Build-up



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WP4100 Controller

Technical data

External Supply Voltage	
Nominal	24 V DC
Allowed range	18 to 30 V DC
Current Consumption	
Typical	0.25 A
Maximum	1 A
Digital Relay I/O	
(Safety Chain)	
Isolation	(1kVolt)
Nominal voltage	24 V DC
Input current/signal "1"	10 mA to 1A
Input impedance	Relay
Master/Slave	
Isolation	(1kVolt@ 1 sec)
Nominal voltage	24 V DC (Master/Slave)
Input impedance	1K6Ω
Port for RS232 Communication	
(Modem)	
No. of ports	1
Communication speed	300 BAUD to 230.4 kBAUD (Software configuration)
Max. cable length	30 m.
Recommended	0.25 w/shield
Connector	9-pin Sub D connector

Port for RS232 Communication with RTS/CTS	
No. of ports	1
Communication speed	300 BAUD to 230.4 kBAUD (Software configuration)
Max. cable length	30 m.
Recommended	0.25 w/shield
Connector	9-pin Sub D connector
USB for Disk	
USB type	Host, type A connector
USB Ver.	1.1
Port for ETHERNET RJ45 Communication	
Communication speed	10/100 Mbit/s
Connector	RJ45 Shielded
Permissible Ambient Conditions	
Operation temperature	-20 to 60°C
Transportation/Storage temp.	-20 to 85 °C
Max. relative humidity	max. 95% RH (non-condensing @ 40°C)
Construction	
Dimensions (WxHxD)	170 x 150 x 46 mm
Weight	0.6 Kg
Standards	EN61000-6-2 (CE) EN61000-6-4 (CE) EN61000-4-5 (Surge)

Ordering data

WP4100 controller	P/N.: 9784100
Accessories	
Cables	
WP-Line BUS flat transmission cable 2.36 cm	P/N.:9788001
WP-Cable, WP4X00 - N-Port 5.0M	P/N.: 9788106
WP-Cable, WP4X00, Modem 2.0M	P/N.: 9788108
WP-Cable, WP4X00 - PC 3.0M	P/N.: 9788109

Terminator	
WP-Line BUS Terminator	P/N.: 9788002
Connector	
Connector Kit Screw Black WP4X00	P/N.: 978904001

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WP-Line 110 Power/Backbone Module

- Power supply for the WP4000 concept
- Optical backbone ETHERNET
- Possibility of redundancy via backbone (double ring)
- ETHERNET plug for service display

Description

In General

The WP-Line 110 Power/Backbone module is part of the WP4000 control concept which has been specially designed to control large wind turbines - on- or off shore.

The WP4000 control concept ensures optimal operation, great security and advanced data collection.

The concept typical consists of a power supply/backbone module, a WP4000 controller, a grid measurement module as well as an analog/digital I/O module dependent on the specific configuration task.

The WP4000 control concept makes it possible to have redundant solutions.

The concept is constructed as a plug and play system with i.a automatic module detecting and error reporting

Features

The WP-Line 110 module functions as power supply in the WP4000 concept, that is, the WP-Line 110 is used for supplying the single module blocks. The inter-block communication (backbone) in the WP4000 control concept is carried out by the WP-Line 110 via an optical ETHERNET.

The backbone is constructed as double ring, which provide high communication safety, as this configuration allows operation despite of a defect optic fibre.

The fibre optic type is be 62.5/125µm.

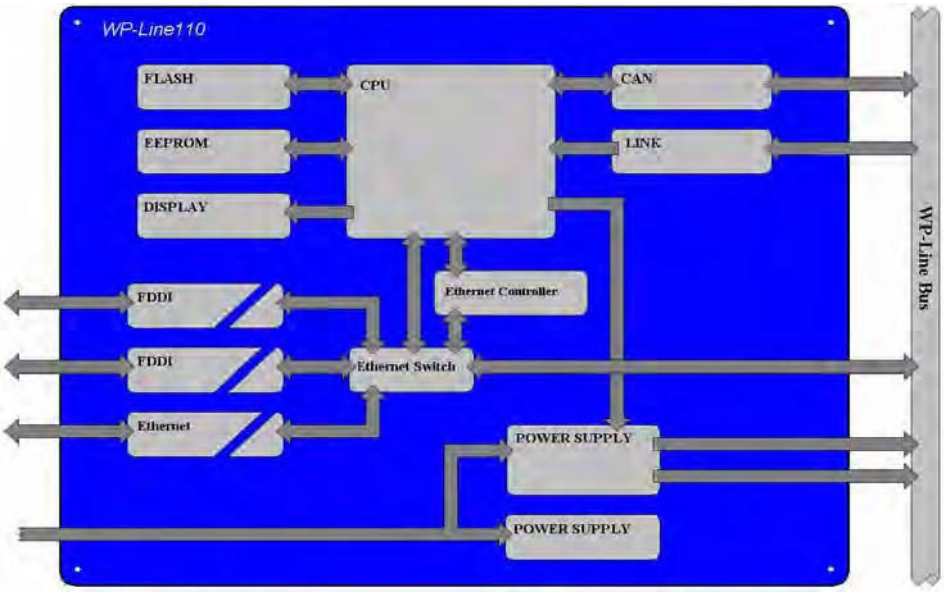
Furthermore the WP-Line 110 is equipped with 100Mbit ETHERNET RJ45 plug for connection of a graphical display/keypad or PC. This provides the possibility of operating the complete WP4000 control system at all available module blocks.

The WP4000 controller handles automatically the update of the program via the network.

The communication to the WP4000 controller is event based which means that only changed values are transmitted via the network.

Plug and Play connection to the WP4000 concept.

Build-up



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WP-Line 110 Power/Backbone Module

Technical data

Supply Voltage 1	
Nominal	24 V DC
Allowed range	18 to 30 V DC
WP Line BUS Supply Voltage Delivered 1	
Nominal	12 V DC
Allowed range	11.5 to 12.75 V DC
Current Consumption Delivered 1	
Typical	0.6A
Maximum	1A
WP Line BUS Supply Voltage Delivered 2	
Typical	12 V DC
Maximum	11.5 to 12.75 V DC
Current Consumption Delivered 2	
Typical	1A
Maximum	2A
BUS Ports for Optional Communication Cards	
No. of ports	1
	Ethernet RJ45
Optical Power Budget (OPB)	
Connector	SC

ETHERNET Optical Communication Port	
Communication speed	10/100 Mbit/s
Wave length	1300 nm
ETHERNET RJ45 Communication Port	
Communication speed	100 Mbit/s
Connector	RJ45
Permissible Ambient Conditions	
Operation temperature	-20 to 60°C
Transportation/Storage temp.	-20 to 85 °C
Max. relative humidity	95% at 40°C
Max. operation height	3000 m. above sea level
Construction	
Dimensions (WxHxD)	85 x 150 x 46 mm
Weight	0.350 Kg
Degree of Protection	IP40
Standards	EN61000-6-2 (CE)
	EN61000-6-4 (CE)
	EN61000-4-5 (Surge)

Ordering data

WP-Line 110 Power Supply/ Backbone Module	P/N.: 9780110
Accessories	
Cables	
WP-Line BUS flat transmission cable, 2.36 cm	P/N.: 9788001
WP-Line BUS flat transmission cable, 12.0 cm	P/N.: 978800101
WP-Cable, WP N-port 5 m.	P/N.: 9788106
WP-Cable,Modem, N-port 2 m.	P/N.: 9788107
WP-Cable,Modem,WP4000 2 m.	P/N.: 9788108
WP-Cable-WP4000-PC 3m.	P/N.: 9788009

Terminator	
WP-Line BUS Terminator	P/N.: 9788002
Connector	
Connector Kit	P/N.: 978911001

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WP-Line 151 Grid Measurement Module

- Realtime DSP grid measurement module
- Surveillance of 3 currents and 3 voltages
- Calculation of all grid data
- Supplies data for machine control
- Supplies data for production statistics

Description

In General

The WP-Line 151 grid measurement module is part of the WP4000 control concept which has been specially designed to control large wind turbines - on and offshore. The WP4000 control concept ensures optimal operation, high security and advanced data collection.

The concept typicaly consists of a power supply/backbone module, a WP4X00 controller, a grid measurement module as well as an analog/ digital I/O module dependent on the specific configuration task.

The WP4000 control concept makes it possible to have redundant solutions.

The concept is constructed as a plug and play system with automatic module detection and error reporting.

Features

The WP-Line 151 module is based on DSP technology which gives exact calculation of grid data. All grid data are measured and calculated i.e. 3 voltages, 3 currents, kW, cos phi, and kVAr.

The module has been designed to undertake grid voltage measurements via the interface WP3090.

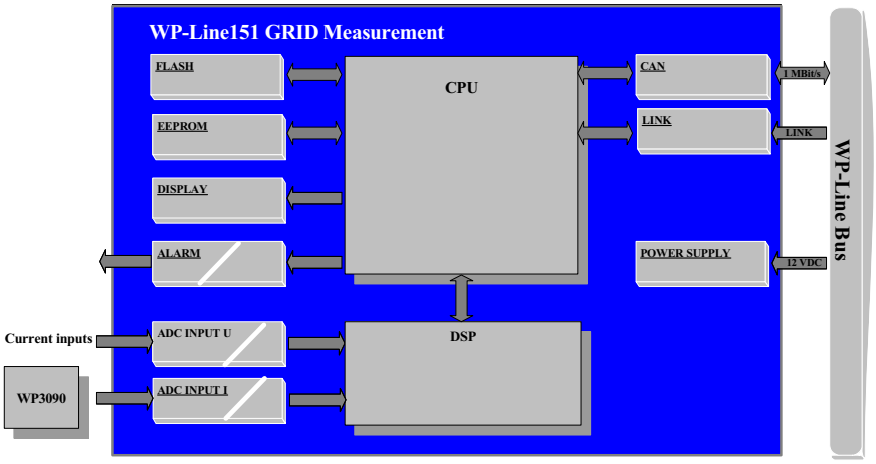
Relay output for fast switching (customer specific).

The WP4X00 controller handles automatically the update of the program via the network.

The communication to the WP4X00 controller is event based, which means that only changed values are transmitted via the network.

Plug and Play connection to the WP4000 concept.

Build-up



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WP-Line 151 Grid Measurement Module

Technical data

WP-Line BUS Supply	
Voltage	
Nominal	12V DC
Allowed range	10.5 V DC to 13.5 V DC
Current Consumption	
Typical	0.40 A
Maxium	0.45 A
Grid Measurement Input	
No. of current inputs	3
Current input range	5 A RMS
Current input impedance	10 mΩ
No. of voltage inputs	3
Voltage input range	18 V RMS
Voltage input impedance	8.3 kΩ
Resolution	16 bit
Accuracy	0.2 % of full scale
Sample speed	8 kHz
Relay output	
Max. switching current	1A
Max. switching voltage	125 V DC/AC
Max. response time	20 ms

Permissible Ambient Conditions	
Operation temperature	-20 to 60°C
Transportation/Storage temp.	-20 to 85 °C
Max. relative humidity	95% at 40°C
Max. operation height	3000 m. above sea level
Construction	
Dimensions (WxHxD)	85 x 150 x 48 mm
Weight	0.25 Kg (Incl. PlugIn Terminal Blocks)
Degree of Protection	IP40
Standards	EN61000-6-2 (CE) EN61000-6-4 (CE) EN61000-4-5 (CE)

Ordering data

WP-Line 151 Grid Measurement Module	P/N.: 9780151
Accessories	
Cables	
WP-Line BUS flat transmission cable, 2.36 cm	P/N.: 9788001
Connector Kit	P/N.: 978915101
Display Cover	P/N.: 372821001
Terminator	
WP-Line BUS Terminator	P/N.: 9788002
Grid Measurement	
Grid Measurement Interface	P/N.: 9723090

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WP-Line 351 COMBI I/O Module

- Optimized I/O COMBI module
- 2 serial COM ports
- 16 digital outputs/26 digital inputs/ 4 high speed counter inputs
- 4 analog outputs/8 analog inputs/ 8 PT100 inputs/2 thermistor inputs
- Compact design

Description

In General

The WP-Line 351 COMBI I/O module is part of the WP4000 control concept which has been specially designed to control large wind turbines - on or off shore.

The WP4000 control concept ensures optimal operation, great security and advanced data collection.

The concept typical consists of a power supply/backbone module, a WP4000 controller, a grid measurement module as well as an analog/ digital I/O module dependent on the specific configuration task. The WP4000 control concept makes it possible to have redundant solutions.

The concept is constructed as a plug and play system with i.a automatic module detecting and error reporting.

Features

The WP-Line 351 COMBI I/O module is equipped with 2 flexible COM ports, that can be configured to RS232/422/ 485 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 transistor outputs
- 26 digtial inputs
- 4 high speed counter inputs to 10 kHz

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

- 4 flexible analog output, that can be configured to -/+ 10V or 0-20 mA as per requirement.
- 4 analog inputs, -/+ 10V
- 4 analog inputs, 0-20 mA
- 8 PT100 inputs, with possiblity of ignoring the sensor cable length, -40° to +210°
- 2 thermistor inputs, with possiblity of connecting more thermistors in series.

All I/O's are galvanic separated and all outputs are short circuit protected.

The WP4000 controller handles automatically the update of the program via the network.

The communication to the WP4000 controller is event based, which means that only changed values are transmitted via the network.

Plug and Play connection to the WP4000 concept.

Build-up

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WP-Line 351 COMBI I/O Module

Technical data

WP-Line BUS Supply Voltage	
Nominal	24 V DC
Allowed range	10.5 to 13.5 V DC
External Supply Voltage	
Typical	24 V DC
Maximum	18 V DC to 30 VDC
Current Consumption	
Typical	0.16 A
Maximum	0.20 A
Digital Input	
No. of points	26
Isolation	Optocoupler (1kVolt @1 sec)
Nominal voltage	24 V DC
Signal "1"	15 to 30 V DC
Signal "0"	0 to 5 V DC
High Speed Input	
No. of points	4
Isolation	Optocoupler (1kVolt @1 sec)
Nominal voltage	24 V DC
Signal "1"	15 to 30 V DC
Signal "0"	0 to 5 V DC
Input current/signal "1"	-/+ 18 mA
Input impedance	1.4Ω
Input frequency	0 to 10 kHz
Thermistor Input	
No. of points	2
Isolation	Optocoupler (1kVolt @1 sec)
Signal "1"	>3000Ω analog measurement
Signal "0"	<1000Ω analog measurement
Input frequency	0 to 25 Hz
Digital Output	
No. of points	16
Number of groups	2
Points per group	8
Isolation	Optocoupler (1kVolt @1 sec)
Operation voltage	24 V DC +/- 2 Volt
Rated current per point	max. 500 mA
Max per group	max. 4 A
Output frequency	0 to 1 kHz
Short circuit protection	Yes
Analog Voltage Input	
No. of points	4
Isolation	Optocoupler (1kVolt @1 sec)
Input configuration	None
Input voltage	-/+ 10 V
Input frequency	0-100 Hz
Resolution	12 bit
Input impedance	100 kΩ
Analog Current Input	
No. of points	4
Isolation	Optocoupler (1kVolt @1 sec)
Input configuration	None
Input current	0-20 mA
Input frequency	0-100 Hz

Analog Current Input (cont.)	
Resolution	12 bit
Imput impedance	250Ω
PT100 Input	
No. of points	8
Isolation	Optocoupler (1kVolt @1 sec)
Input impedance	6 kΩ (PT100 current max. 1.5 mA)
Resolution	12 bit
Analog Voltage/Current Output	
No. of points	4
Isolation	Optocoupler (1 kVolt @1 sec)
Output configuration	Connection to interface
Setup as Voltage	
Output voltage	-/+10V (10 mA @RL = 1kΩ
Resolution	12 bit
Output impedance	10Ω
Short circuit protection	Yes
Setup as Current	
Output current	0 to 20 mA / max.10V@RL = 500
Resolution	12 bit
Port for RS422/RS485 Communication	
No. of ports	1
Communication speed	300 BAUD to 230.4 kBAUD (Software configuration)
Max. cable length	RS22 max. 1200 metre@2 nodes/RS485 max. 1200 meters@1.2KBAUD/ RS232 max. 30 meters
Recommended cable type	Multi wire cable with shield
Termination	Mount 120Ω at line ends
Connector	6-pin 5.08 mm plugin terminal block with EARTH
Permissible Ambient Conditions	
Operation temperature	-20 to 60°C
Transportation/Storage temp.	-20 to 85 °C
Max. relative humidity	95% at 40°C
Max. operation height	3000 m. above sea level
Construction	
Dimensions (WxHxD)	170 x 150 x 46 mm
Weight	0.6 Kg (incl. plug in Terminal blocks)
Degree of Protection	IP40
Standards	EN61000-6-2 (CE) EN61600-6-4 (CE) EN61600-4-5 (Surge)

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WP-Line 351 COMBI I/O Module

Ordering data

WP-Line 351 Combi I/O Module	P/N.: 9780351
Accessories	
Cables	
WP-Line BUS flat transmission cable, 2.36 cm	P/N.: 9788001
WP-Line BUS flat transmission cable, 12.0 cm	P/N.: 978800101
WP-Cable, WP N-port, 5 m.	P/N.: 9788106
WP-Cable,Modem, N-port, 2 m.	P/N.: 9788107
WP-Cable,Modem,WP4000 2 m.	P/N.: 9788108
WP-Cable-WP4000-PC 3m.	P/N.: 9788009
Terminator	
WP-Line BUS Terminator	P/N.: 9788002
Connector	
Connector kit	P/N.: 978911001

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WP-Line 242 PT100 Temp. Input Module

- PT100 Temperature Input Module for the WP4000 concept
- Service display showing operational status
- 16 PT100 input points
- 12 bit AD converting input
- No mechanical maintenance
- Onboard software maintenance
- Easy connection
- DIN-rail mounting

Description

In General

The WP-Line 242 PT100 Temperature Input Module is part of the WP4000 control concept which has been specially designed to control large wind turbines - on- or offshore.

The WP4000 control concept ensures optimal operation, great security and advanced data collection.

The concept typical consists of a power supply /backbone module, a WP4000 controller, a grid measurement module as well as an analog/digital I/O module dependent on the specific configuration task.

The WP4000 control concept makes it possible to have redundant solutions.

The concept is constructed as a plug and play system with i.a. automatic module detecting and error reporting.

Features

PT100 temperature input module for temperature measurement in connection with the WP4000 concept.

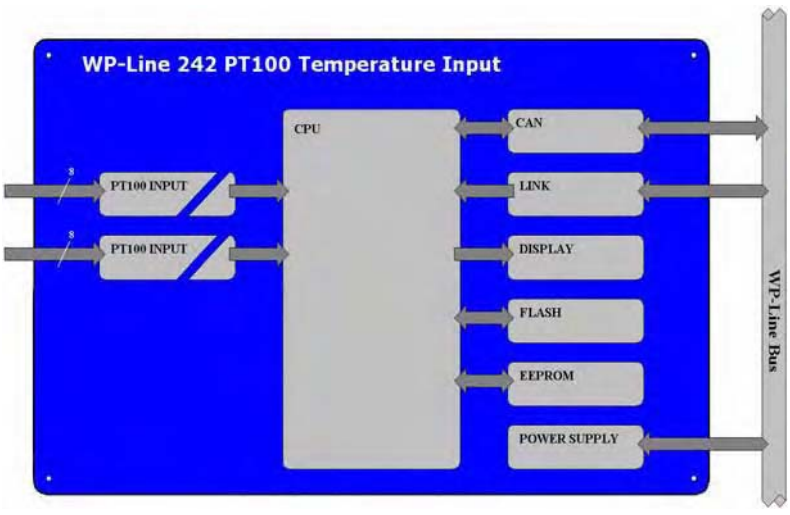
Measures 16 PT100 temperatures within the range of -40°C to 210°C.

The 7-segment display indicates the unique number of each WP-Line module on the WP-Line Bus. Furthermore it shows the WP-Line module "Power On" states and other kinds of states.

Software maintenance can be done onboard, even while the wind turbine is running/operating.

1MBit CAN communica- tion to other WP-Line modules.

Build-up



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WP-Line 242 PT100 Temp. Input Module

Technical data

Supply Voltage 1	
Nominal	12VDC
Allowed range	10.5 to 13.5VDC
Current Consumption 1	
Typical	200mA
Maximum	300mA
PT100 Input	
No. of points	16
Number of groups	2
Points per group	8
Isolation	1kVDC Optocoupler
Input impedance	>6 kOhm
Resolution	12 bit
Accuracy	-40°C to + 100°C ± 1°C
	-40°C to + 210°C ± 2°C
Range for group	-40°C to + 210°C
Conversion time	240ms

Permissible Ambient Conditions	
Operation temperature	-20 to 60°C
Transportation/Storage temp.	-20 to 85°C
Max. relative humidity	max. 95% RH (non-condensing @ 40°C)
Construction	
Dimensions (WxHxD)	85 x 150 x 46 mm
Weight	0.4 Kg
Standards	EN61000-6-2 (Immunity)
	EN61000-6-4 (Emission)

Ordering data

WP-Line 242, PT100 Temp. Input Module	P/N.: 9780242
Accessories	
Connector	
Connector Kit	P/N.: 978924201

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WP-Line 244 PT100 Temp. Input Module

- PT100 Temperature Input Module for the WP4000 concept
- Service display showing operational status
- 32 PT100 input points
- 12 bit AD converting input
- No mechanical maintenance
- Onboard software maintenance
- Easy connection
- DIN-rail mounting

Description

In General

The WP-Line 244 PT100 Tem perature Input Module is part of the WP4000 control concept which has been specially designed to control large wind turbines - on- or offshore.

The WP4000 control concept ensures optimal operation, great security and advanced data collection.

The concept typical consists of a power supply /backbone module, a WP4000 controller, a grid measurement module as well as an analog/digital I/O module dependent on the specific configuration task. The WP4000 control concept makes it possible to have redundante solutions.

The concept is constructed as a plug and play system with i.a automatic module detecting and error reporting.

Features

PT100 temperature input module for temperature measurement in connection with the WP4000 concept.

Measures 32 PT100 temperatures within the range of -40°C to 210°C

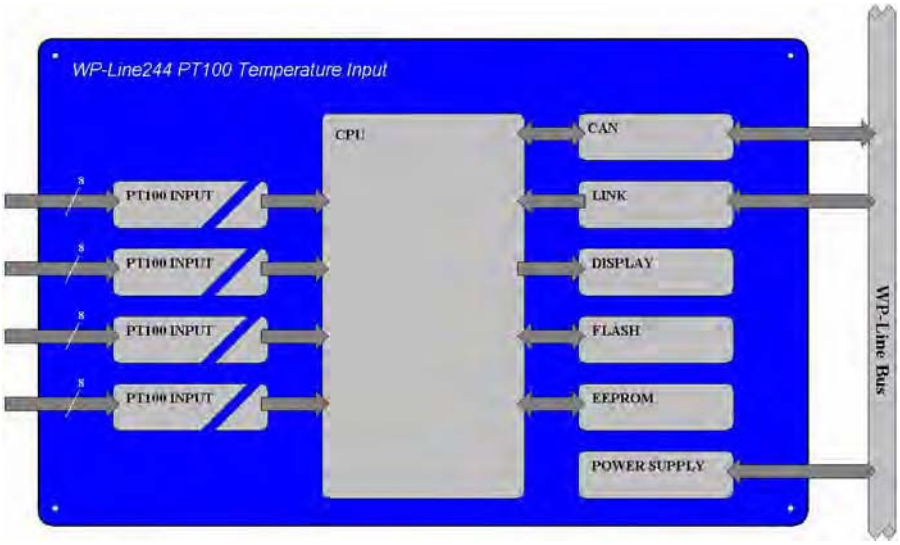
Internal condition monitoring and event based The 7-segment display indicates the unique number of each WP-Line module on the WP-Line Bus. Furthermore it shows the WP-Line module "Power On" states and other kinds of states.

Software maintenance can be done onboard, even while the wind turbine is running/operating.

1MBit CAN communication to other WP-Line modules.

2 module-loads current consumption from the WP-Line Bus.

Build-up



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WP-Line 244 PT100 Temp. Input Module

Technical data

Supply Voltage 1	
Nominal	12VDC
Allowed range	10,5 to 13,5VDC
Current Consumption 1	
Typical	200mA
Maximum	300mA
PT100 Input	
No. of points	32
Number of groups	4
Points per group	8
Isolation	1kVDC Optocoupler
Input impedance	>6 kOhm
Resolution	12 bit
Accuracy	+/- 1 grC
Range for group	40°C to +210°C
Conversion time	240ms

Permissible Ambient Conditions	
Operation temperature	-20 to 60°C
Transportation/Storage temp.	-20 to 85°C
Max. relative humidity	max. 95% RH (non-condensing @ 40°C)
Construction	
Dimensions (WxHxD)	85 x 150 x 46 mm
Weight	0.4 Kg
Standards	EN61000-6-2 (CE) EN61000-6-4 (CE) EN61000-4-5 (Surge)

Ordering data

WP-Line 244, PT100 Temp. Input Module	P/N.: 9780244
Accessories	
Connector	
Connector Kit	P/N.: 978924401

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WP4051 Graphic Display with Accessories

- Touch Screen Graphic Display for the WP4000 control concept
- 15” TFT with 1024 x 768 resolution, 16 bit colours
- Quick and reliable survey of functions and data in the wind turbine
- Maximum user comfort via the HMI principle
- Userfriendly menu structure
- Designed for easy mounting

Description

The WP4051 Graphic Color Touch Screen Display is used with our WP4000 control concept and gives access to the wind turbine. The WP4000 control concept which has been specially designed to control large wind turbines - on - or off shore.
The WP4000 control concept ensures optimal operation, great security and advanced data collection.
The concept typical consists of a power supply /backbone module, a WP4000 controller, a grid measurement module as well as an analog/ digital I/O module dependent on the specific configuration task. The WP4000 control concept makes it possible to have redundante solutions. The concept is constructed as a plug and play system with i.a automatic module detecting and error reporting.

Features
On screen keyboard and pixels display, 1024 x 768, 16 bit colours, with touch screen. LINUX operative system with WEB browser for fast and user-friendly operation.

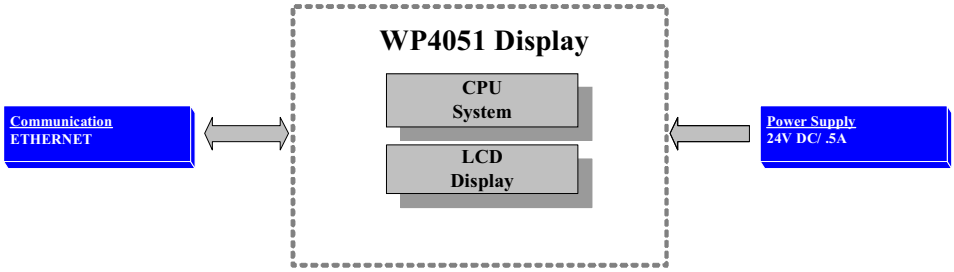
The panel is mainly designed for panel mount application. To mount the panel, the standard set of mounting kit is needed (included in the system package, P/N.: 978405101).

Possibility of connecting more displays per controller.

ETHERNET system connection.

Access and Maintenance
Second to none control of wind turbines.
Software maintenance even while the wind turbine is running - by use of JAVA applets from the WP4000 controller.

Build-up



Technical data

Supply Voltage	
Nominal	24 V DC
Allowed range	10-30 V DC
Permissible ambient conditions	
Operation temperature	0 to +50°C
Transportation/Storage temp.	-20 to +60°C
Max. relative humidity	95% at +40°C
Max. operation height	1000 m. above sea level (2000 m. according to agreement)

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WP4051 Graphic Display with Accessories

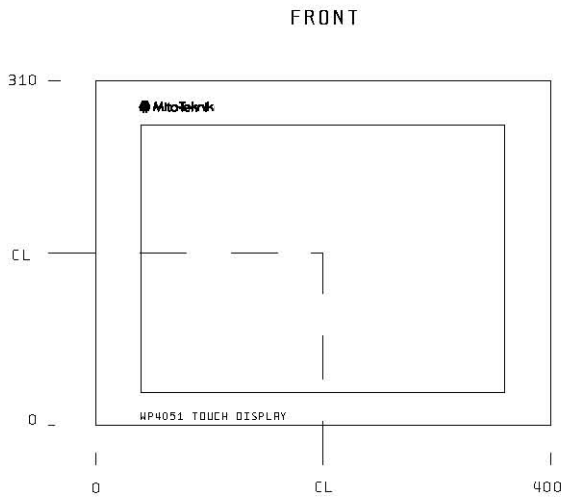
Technical data

Construction	
Dimensions (WxHxD)	400 x 310 x 95 mm
Cutout dimensions	363 x 276 x (82) mm
Weight	5.1 Kg
Degree of Protection	IP40
Standards	EN50082-2 (CE)
	EN61000-6-2 (CE)
	EN61000-4-5 (CE)

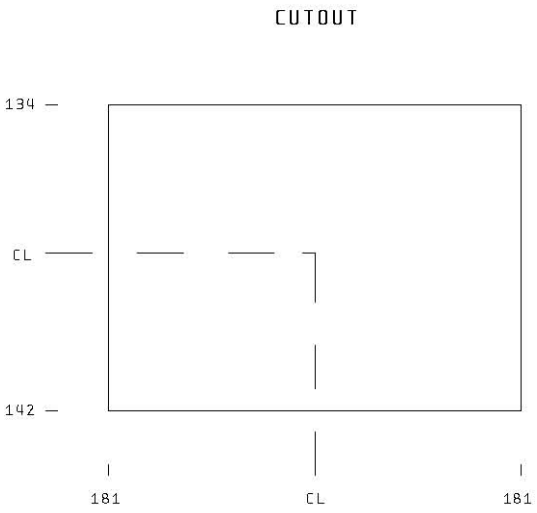
Ordering data

WP4051 Display, 15" TFT	P/N.: 978405101
Accessories	
Keyboard for mounting	P/N.: 3261510
Fittings for keyboard	P/N.: 7980770

Mounting Measurements



All measurements are in mm



Indication of mounting positions

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WP4051 Graphic Display with Accessories

Appendix: Accessories - Keyboard

- Extra Keyboard for operating the WP4051Graphic Display
- Industrial Silicone Rubber Keypad
- Secondary Legend Accessed with Mumlock Key
- Lightweight Case
- Mounting Holes in Case
- Easy mounting on Power Panel front

Technical data

Power	5V@10ma (from CPU port)	**Cable**	PS/2 Cable
Vibration		Length:	1.2 metres
Frequency range	20Hz - 2 kHz	**Humidity**	100%
Shock	3 x 11 ms pulses of 50g on each of 3 axes	**Temperature Range**	- 40°C to + 90°C
Construction		**Industrial Approvals**	NEMA 4, 4, 4x
Dimensions (WxHxD)	258.8 x 158.8 x 45.7 mm		UL-1950, CE, FCC Class 15, Part B

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WP4059 Display

- 4-line Text Display for WP4x00 Controller
- Quick survey of functions and data in the wind turbine
- Userfriendly menu structure
- Designed for easy mounting

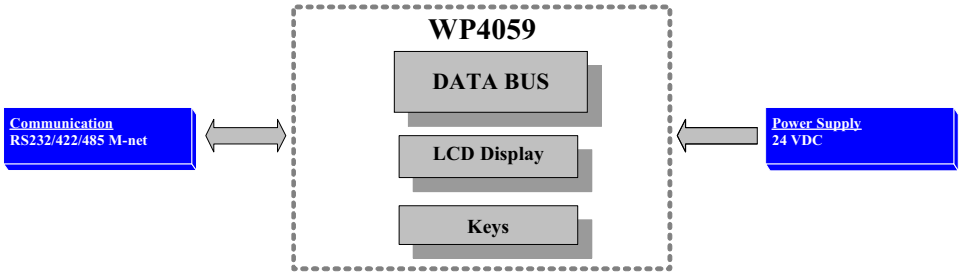
Description

The WP4059 Text Display is used with our WP4x00 controller and gives access to the wind turbine.

Features
LCD-display with four 40 character lines.
Possibility of connecting more displays per controller, e.g. at the bottom or in the top of the wind turbine.

Access to the turbine
Local access to parametrization and surveillance of the wind turbine.
Parameter and stored data are protected by passwords.

Build-up



Technical data

Supply Voltage	
Nominal	24VDC
Allowed range	19-30 VDC
Current consumption	
Typical	60mA
Maximum	150mA
Power consumption	4W max/ 1.5W standby
Serial Communication	
No. of ports	1(configurable)
Communication speed	9600-115200 BAUD
Communication configuration	RS232 RS485 RS422

RS232 Communication configuration	
Communication speed	9600-115200 BAUD
Max. cable length	10m
Recommend cabe type	3 x 2 x 0.25 w/shield
Connector	6-pin plug in terminal
RS485 Communication configuration	
Communication speed	9600-115200 BAUD
Max. cable length	1200m
Recommend cabe type	1 x 2 x 0.25 w/shield
Termination	Mount at line ends
Connector	6-pin plug in terminal

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WP4059 Display

Technical data

RS422 Communication configuration	
Communication speed	9600-115200 BAUD
Max. cable length	1200 m
Recommend cabe type	2 x 2 x 0.25 w/shield
Termination	Mount at line ends
Connector	6-pin plug in terminal

Permissible Ambient Conditions	
Operation temperature	- 20 to +60°C
Transportation/Storage temp.	- 20 to +85°C
Max. relative humidity	95% at +40°C
Max. operation height	3000 m. above sea level

Construction	
Dimensions (W x H x D)	288 x 144 x 65 mm
Weight	0.8Kg

Ordering data

WP4059 Display	P/N.: 9784059

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Example of WP4000 Configuration

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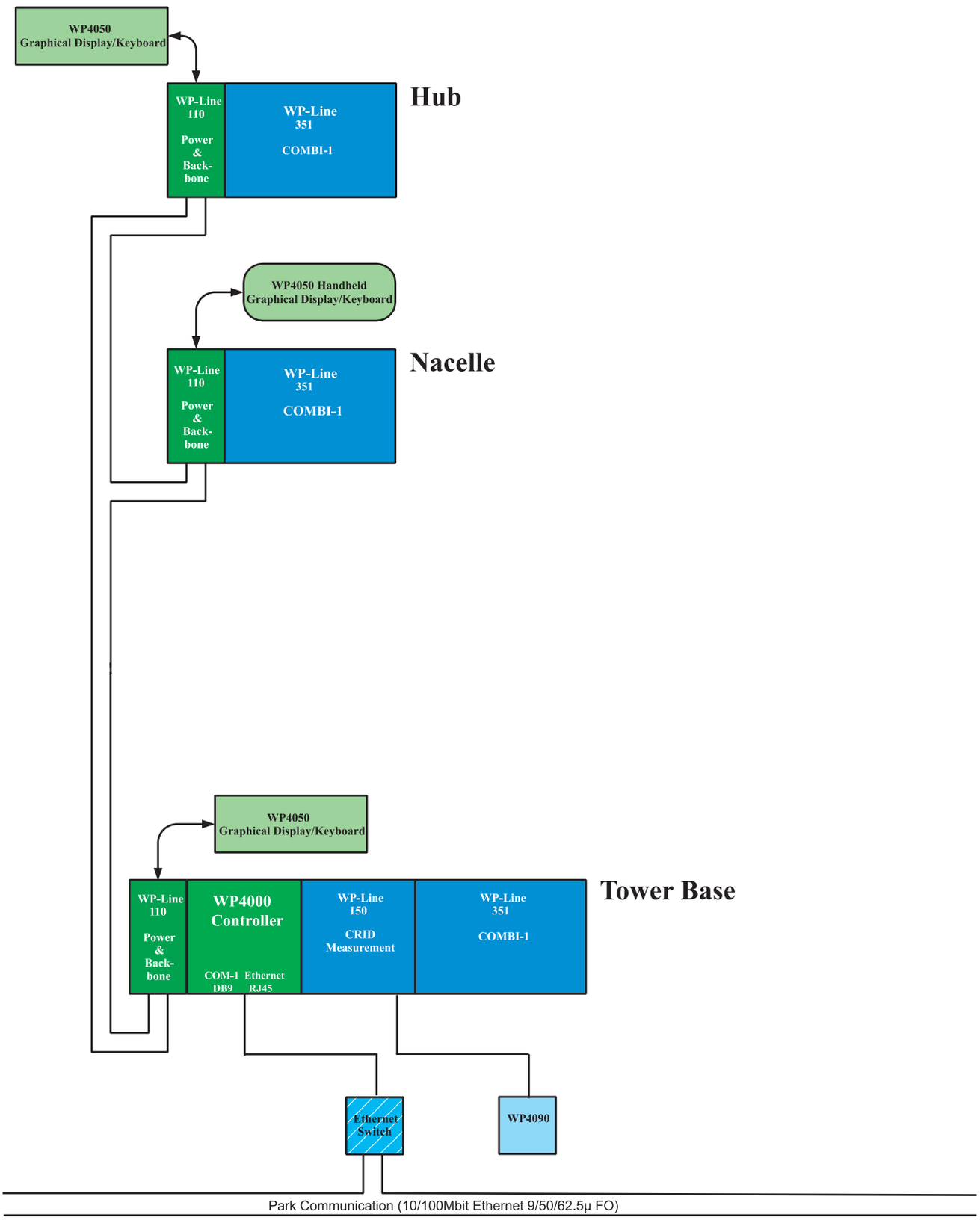
Example of WP4000 Configuration



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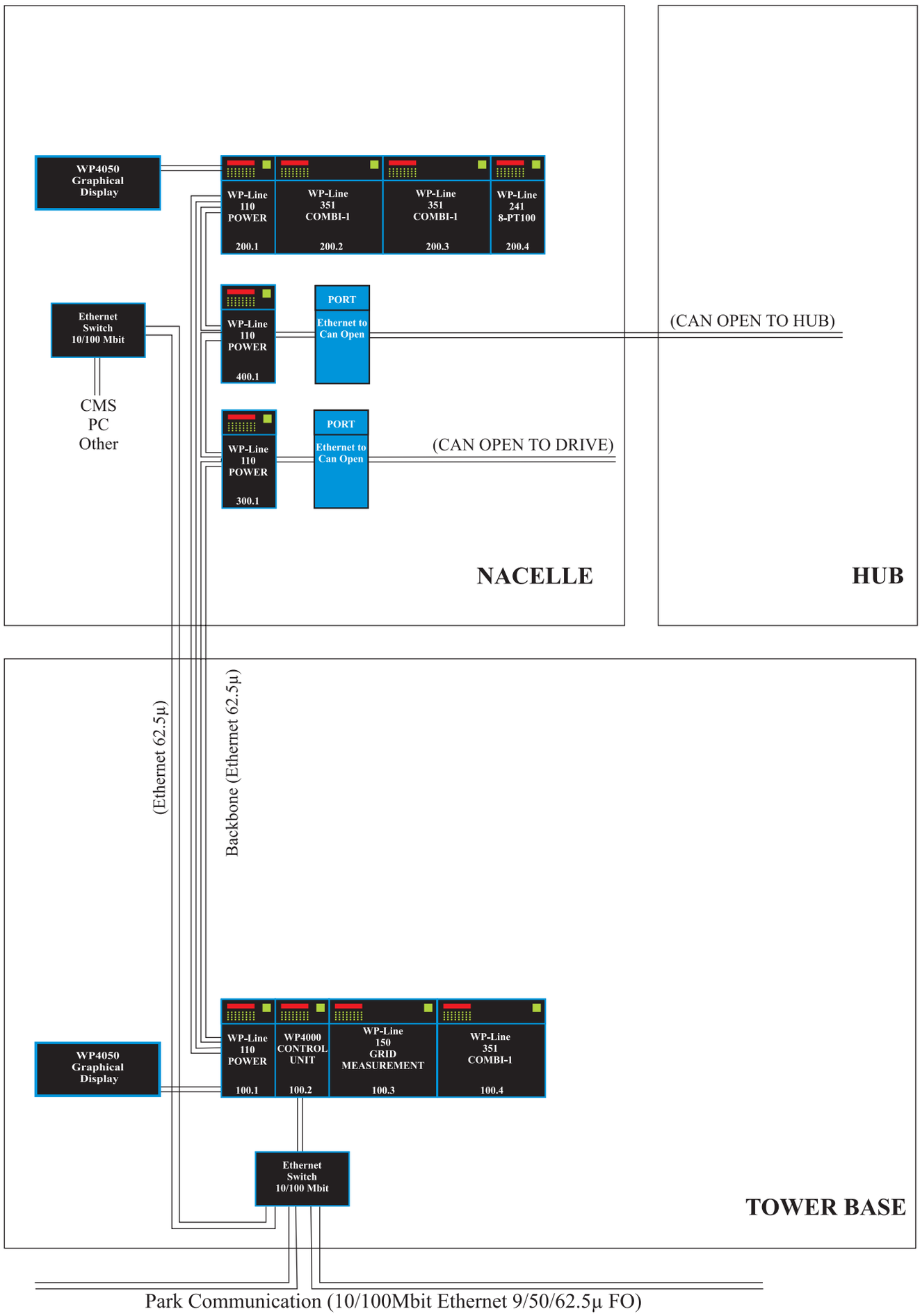
Example of WP4000 Configuration



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WP4000 CoDeSys IEC61131-3 Toolbox

- WP4000 CoDeSys Development Toolbox
- IEC61131-3 development tool
- Target specific files for a WP4000 System
- Includes full development documentation
- Possibility of test on WP4000 CodeSys Development Kit
- Easy installation

Description

In General

The WP4000 CoDeSys Tool box consists of the CoDeSys (**Co**ntroller **De**velopment **Sys**tem) programming IDE with integrated compiler from 3S.
Furthermore it is delivered with Mita-Teknik WP4000 system specific hardware files to build a complete CoDeSys application for the WP4000 Controller systems.
The installation CD includes additional documentation as user manuals, Programming manuals and Technical Manuals for all the hardware modules.
The CoDeSys Application can be build from scratch or be migrated from other IEC-61131-3 control systems, and adapted to the hardware for the WP4000 System's input/output modules.

It is possible to order a WP4000 CoDeSys Development kit to verify the application. The Development kit has a number of modules, and a feature to simulate 'not connected' WP-Line modules.

Features

CoDeSys applications can be written in IEC defined standard as Structured Text (ST), Sequential Function Chart(SFC), Continuous Function Chart (CFC), Function Block Diagram (FBD) Ladder Diagram (LD) and Instruction List (IL)

Specific hardware files for the WP4000 System's hardware modules are delivered with the Toolbox.

Support for the WP4000 Controller operating system with features as Database access, Menu system, Status code system, Statistic 31 days/12 month/30 years Energy or Service Summations, Statistic 5 minutes channel log with min, max, mean and std. deviation, Software watch dogs, Event system, Text log system.

Furthermore the CodeSys Toolbox has features to extract text from the application for translation to customers' target language.

Finally the CoDeSys application can eaily be packed in an easy way to Gateway Firmware upload packets and tested on a CoDeSys Development Kit before release and publishing to the final target control systems.

Product extent/Licence

These packages contain only free software.

All CoDeSys targets as WP4000 Controllers has to be single licenced with a CoDeSys SP Runtime system licence. This is automatic delivered from Mita-Teknik with the WP4000 Controllers.
This software is provided with NO WARRANTY, to the extent permitted by applicable law. The software is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Contact CoDeSys distributor 3S (http://www.3s-software.com) for additional information about the lack of any warranty for the CoDeSys software.

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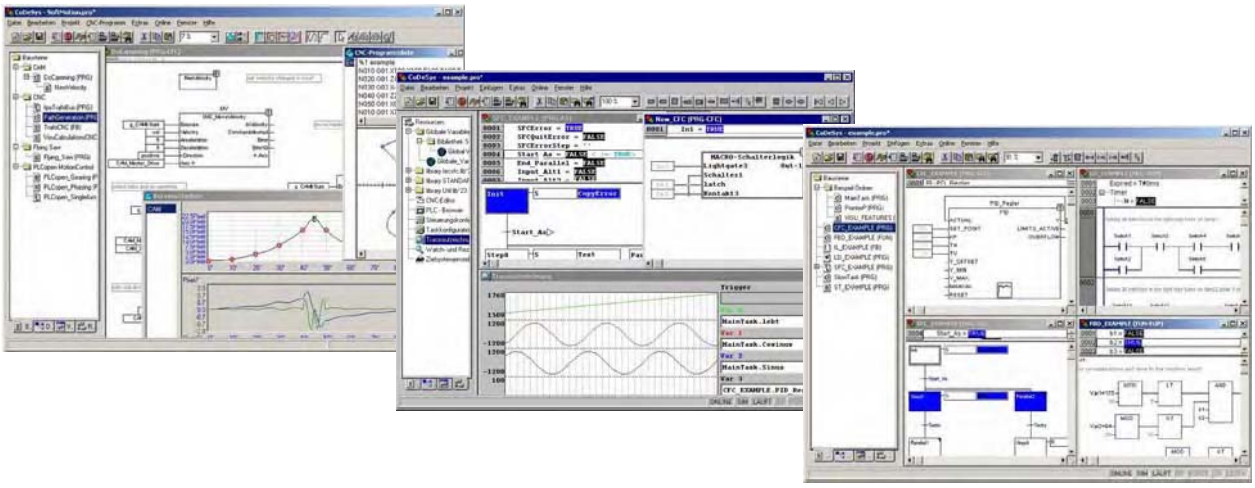
WP4000 CoDeSys IEC61131-3 Toolbox

Screen Pictures



Support

Mita-Teknik does not provide free support for this Toolbox. Mita-Teknik does provide paid support (including installation assistance, defect correction, etc.) for these packages and for the WP4000 CoDeSys Toolbox in general. Please send mail to mail@mita-teknik.com if you are interested in purchasing support for the WP4000 CoDeSys Toolbox.

Technical data

Required Platform:	Windows 2000/XP

Ordering data

WP4000 CoDeSys Development Toolbox CD-ROM	P/N: 9855000
WP4000 CoDeSys Hardware Kit	P/N: P0600902

Related Products

WP4000 Controller with CoDeSys	P/N: 9784000 01

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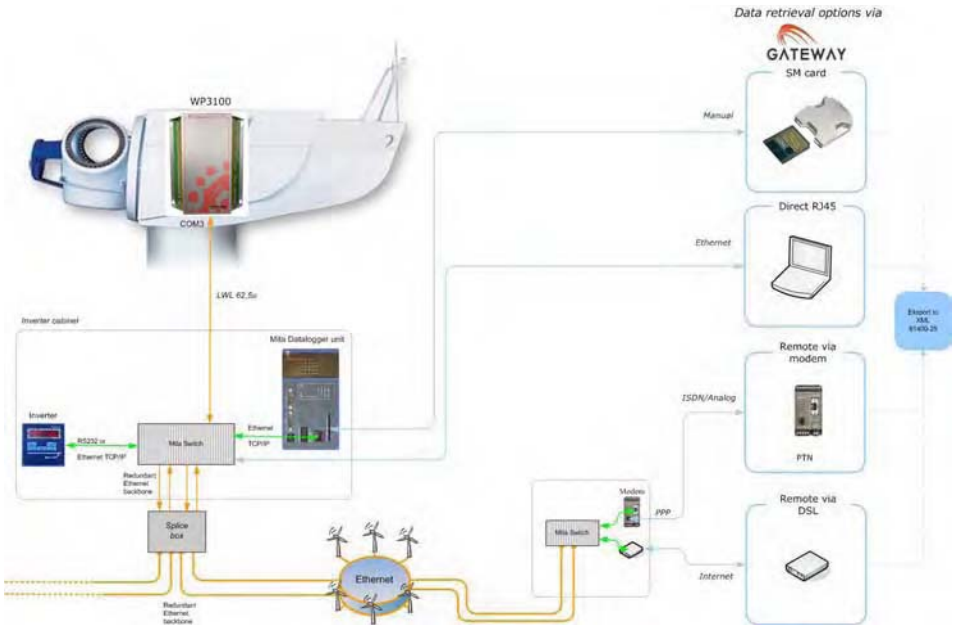
Communication



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MANAGED ETHERNET SWITCH ES100

- Standalone fibre optics and RJ45 Ethernet Switch
- Service friendly remote managing and activity LED showing operational status
- Up to 2 WAN 100Mbit/s ports (SFP or SC Optic Back bone)
- Redundant function for fibre optic ports
- Up to 6 LAN 100Mbit/s ports (RJ45 or screw terminals)
- Optional 2 x COM ports (1.200-230.400 Bit/s)
- + 24VDC supply voltage and 12VDC backup battery charger
- 2 alarm relays - battery - WAN
- 2 relays user-defined

Description

In General

The Ethernet switch ES100 was developed for all types of industrial environment, where a highly reliable communication is required. It ensures optimal operation, great security and advanced data collection.

A long with its 8 communication ports the ES100 comes with the option to add 2 serial communication ports and share them over the network.

Unlike other products, the ES100 has 2 integrated serial ports and has the ability to converse data from different communication standards, for example: RS232, RS485 or RS422, into Ethernet communication.

As an addition to that, the ES-100 regular communication cables can be replaced with fibre optics cables which provide isolated communication.

A battery can be connected to the switch which has an internal charger for battery back up, and can supply the switch for 24 hours.

The ES100 has 4 alarm outputs, where 2 out of the 4 relay signals, are potential free.

The user can program the relay and enjoy from the possibility of remote surveillance and control functions.

The Ethernet switch ES100 in the wind power industry

The ES100 is perfect for communication with controllers of wind turbine. It can be combined with all types of controllers that communicate with serial or Ethernet standards.

In a case of harsh environments conditions, like offshore environment, the user can choose to get the switch with screw connections instead of the plugs connections.

In addition to that, the optic fibre cable provides optimal lightning and over voltage protection.

The support of standard SFP (Small Form Factor Pluggable) allows the user to choose fibre according to the distance.

The ES100 can be remotely upgraded- the user can install new software to the switch via the network.

In the future

Firewall and VPN functionality will be added to the ES100 software and the user will get secure communication with the wind turbine through the public Internet.

As part of Mita-Teknik efforts to customize all her products, we are also working on making the ES100 customizable. The user will be able to develop own software and install it on the switch.

Features

The backbone redundant fibre optic Ethernet switch ES100 is designed for stand alone operation and constructed for high reliability. The redundant fibre optic pair is connected for long range communication in a double ring with one spare optic fibre for backup. This setup provides high communication safety, as this configuration allows operation despite of a defect optic fibre. The Ethernet switch uses 62.5/125µm glass optic fibre cable which provides the optimal lightning and overvoltage protection and makes the ES100 suitable for industrial use.

The Ethernet switch also supports remote managing for remote status and fast servicing.

The ES100 Ethernet switch is based on the powerful integrated ARM9 embedded processor running eight independent IEEE802.3 standard 10Base-T, 100Base-TX, or 100Base-FX Ethernet ports distributing the LAN network through either the RJ45 connectors or the screw terminals.

The Ethernet switch is extensible with two serial COM port modules for network communication with the IC500, WP3x00 family and/or WP2000 controllers and/or WP4086 CMS (Condition Monitoring) system. All ports have a diagnostic LED flashing for port activity for fast servicing.

The ES100 is powered by +24VDC and has an integrated +12VDC battery charger for backup battery.

Software parameters can be adjusted e.g. on remote, even while the wind turbine is running.

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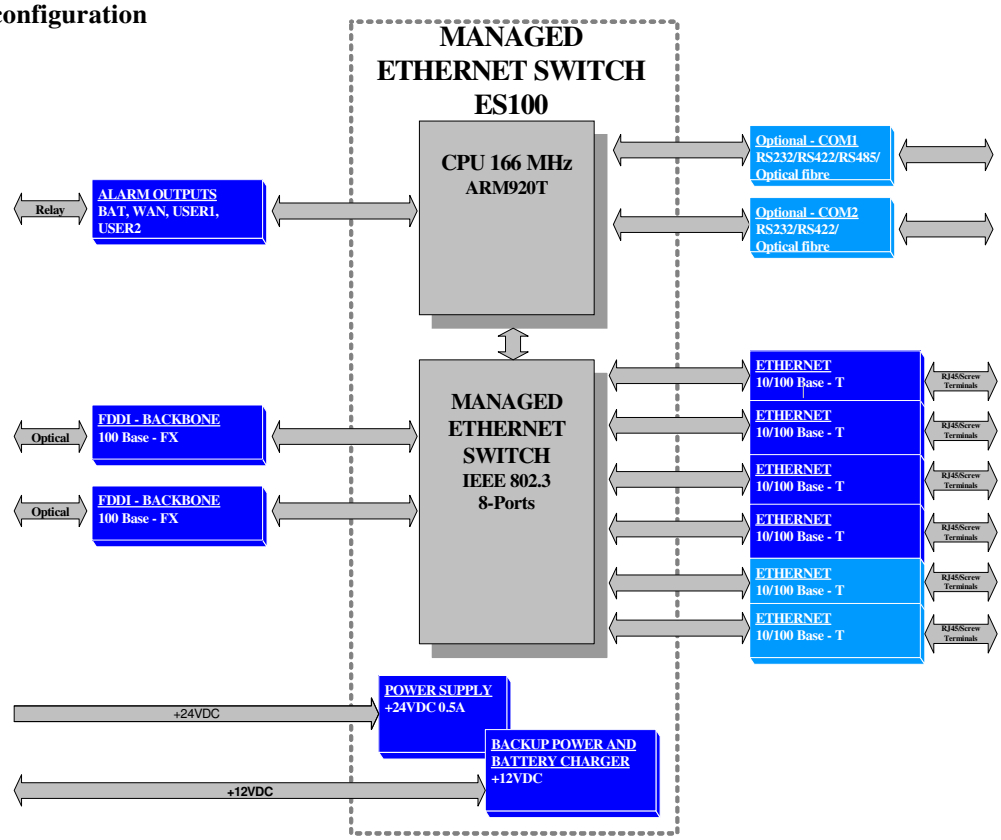
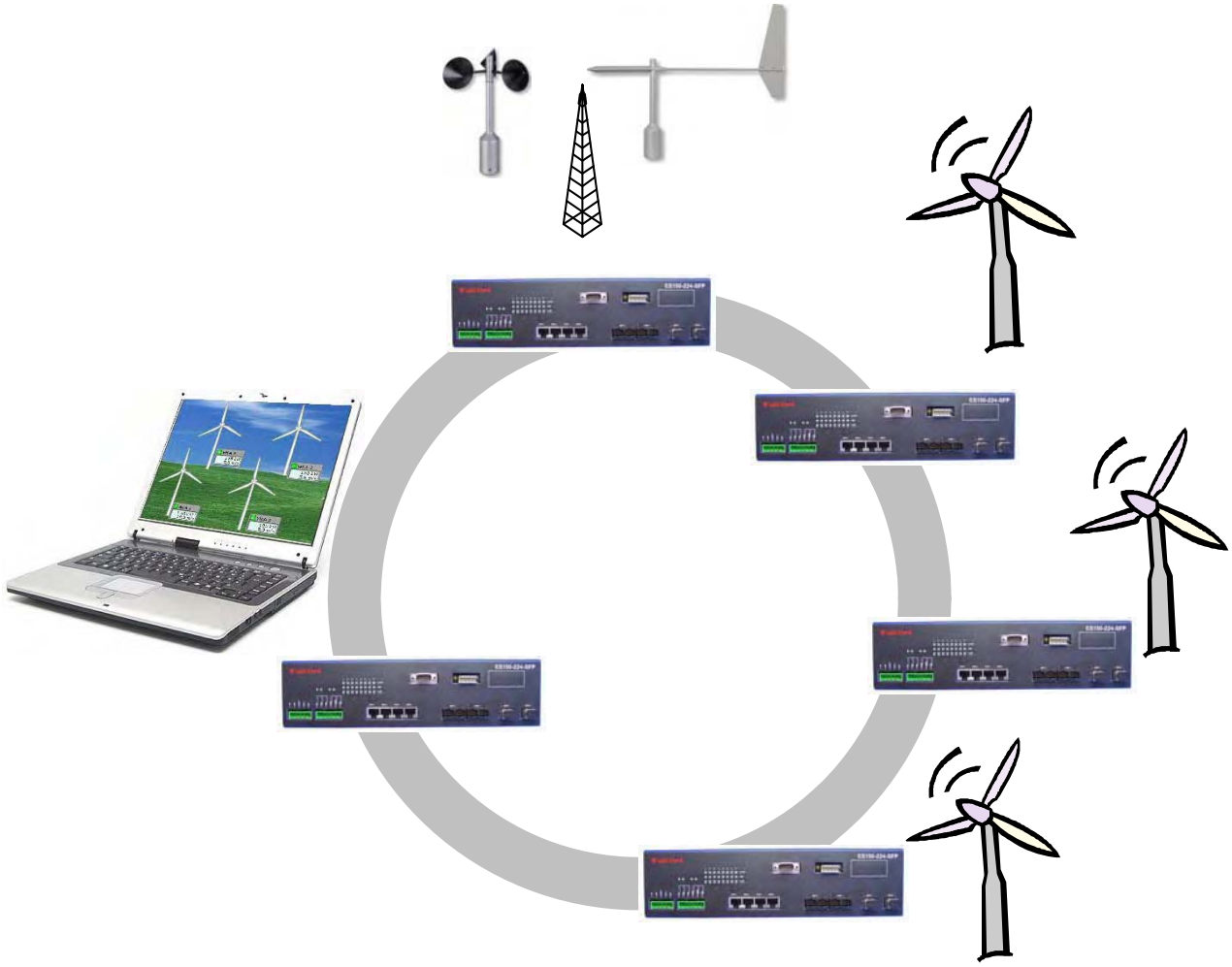
MANAGED ETHERNET SWITCH ES100

Build-up/configuration





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MANAGED ETHERNET SWITCH ES100

Technical data

Supply Voltage	
Nominal	24 VDC
Allowed range	20V to 25V
Current Consumption	
Typical supply	0.39A @ 24VDC supply
Maximum supply	0.42A @ 24VDC supply
Backup Power and Charger	
Nominal	12 VDC E.g. battery 12V 7Ah lead-Acid
Allowed range	9 VDC to 13 VDC
Power Consumption	9.7 W
WAN Fibre Communication	
Number	2
Connector	SC/SFP/LC
Speed	100Mbit/sec
Distance	(0-2000)m multimode 62.5µm
-	standard configuration
	(0-10000)m singlemode 9µm - option type LX
	(0-40000)m singlemode 9µm - option type EX
	(0-80000)m singlemode 9µm - option type ZX
LAN Fibre Communication	
Number	2 / 0
Connector	SC
Speed	100Mbit/sec
Distance	(0-2000)m multimode 62.5 µm
ETHERNET Communic.	
Number	4 / 6
Connector	Screw terminals or RJ45
Speed	100mBit/sec
Distance	(0-150)m
Serial Channel	
Number	2
Type	IDC 16 plug must use standard Mita com print WP3042 only COM1, WP3045-01/WP3046/WP3047
both	COM 1 & COM 2
Speed	12000-230400 bit/sec, configurated via software

Digital relay outputs (4)	
Relay 1	battery too low
Ralay 2	WAN - no connection
Relay 3	User 1 - programmable
Relay 4	User 2 - programmable
Permissible Ambient Conditions	
Operation temperature	-20 to +60°C
Transportation/Storage temp.	-20 to +85°C
Max. relative humidity	95% at +25°C
Humidity	
Max. operating humidity	95% RH (non-condensing @ 40°C)
Max. storage humidity	95% RH (non-condensing @ 40°C)
Vibrations	IEC68-2-6
	0.3 mm @ 20 m/
	s^2;10-500 Hz
Bump	IEC68-2-29
	1000 bumps @
	250m/s^2
Shock	IEC68-2-27
	750m/s^2
Construction	
Dimensions (WxHxD)mm	355 x 85 x 170mm
Weight	1.4 kg
Degree of protection	IP20
Standards	EN 61000-6-4
	EN 61000-6-2
	EN 61000-4-4
	EN 61000-4-5
	EN 61000-4-2

Configuration list:

ES100-224A-SFP	2 x WAN (SFP) 100 Mbit, 2 x LAN (SC), 4 x RJ45
ES100-224B-SFP	2 x WAN (SFP) 100 Mbit, 2 x LAN (SC), 4 x Screw Terminals
ES100-224A-SC*	2 x WAN (SC) 100 Mbit, 2 x LAN (SC), 4 x RJ45
ES100-224B-SC*	2 x WAN (SC) 100 Mbit, 2 x LAN (SC), 4 x Screw Terminals
ES100-206A-SFP	2 x WAN (SFP) 100 Mbit, 6 x RJ45
ES100-206B-SFP*	2 x WAN (SFP) 100 Mbit, 6 x Screw Terminals
ES100-206C-SFP	2 x WAN (SFP) 100 Mbit, 2 x RJ45, 4 x Screw Terminals

*Upon customer´s request (series)

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MANAGED ETHERNET SWITCH ES100

Ordering data:

Standard models

Ethernet Switch ES100-224A-SFP	P/N.: 9711000
Ethernet Switch ES100-224B-SFP	P/N.: 9711030
Ethernet Switch ES100-206A-SFP	P/N.: 9711010
Ethernet Switch ES100-206C-SFP	P/N.: 9711020

Upon customer´s reqest (series)

Ethernet Switch ES100-224B-SC	P/N.: 9711060*
Ethernet Switch ES100-206B-SFP	P/N.: 9711040*
Ethernet Switch ES100-224A-SC	P/N.: 9711050*

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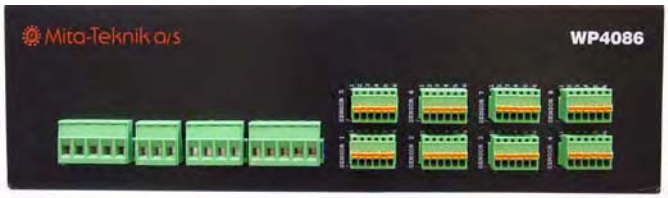
Condition Monitoring



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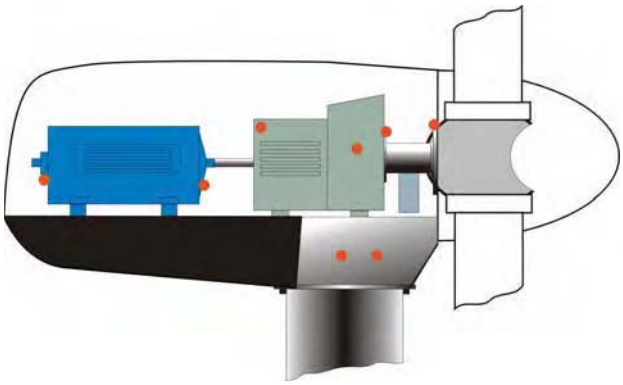
WP4086 Condition Monitor System



● = **Accelerometer Measuring Points**

WP4086 Condition Monitor

- The WP4086 condition monitoring system surveys vibrations with up to 8 external accellerometers.
- Realtime 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 Apmlitude Spectra
  - FFT Envelope Spectra
  - Frequency selctive chartacteristics
- Automatic storage of Daily Data set and Raw Data:
- Kinematic frequency configuration.
- Individual measurement task scheduler for specific wind turbine.
- Alarm or warning signal from time domain and frequency domain characteristics when exceeding predefined threshold limits.
- Advanced warning and alarm log.

Description

The WP4086 condition monitor is used for vibration analysis.
It surveys pre-determined critical vibration levels. The frequency range is 0.1-5000 Hz and the vibration range 0.01-5.000g.

The module is used for permanent surveillance of low and high frequency vibrations in wind turbines and other applications.

The measurement of vibrations is performed by means of up to 8 external accelerometers.

The realtime measurement of vibrations is controlled by a flexible measurement task scheduler, which can be individually configured with time and frequency domain calculations.

If the WP4086 is connected via communication to a Mita controller it is possible to receive wind turbine real time data which is stored with the vibration characteristics.

The WP4086 provides permanent surveillance using an internal alarm or warning level. The alarm and warning level as well as the delay time can be set by the user.

The alarm is intended to operate a remote warning system through the communication channel. The alarm can also be used to shut down the wind turbine.

The alarm and warning circuit has two additional potential free relay outputs for communication with other related controller systems.

The Mita Monitor program GATEWAY is used for configurations, bearing and gear database, and analysis of vibration characteristics. Including generation of trend curves and automatic generation of reports

The PC is used during installation and periodic maintenance. It is possible to perform new configuration of threshold and kinematic frequencies.

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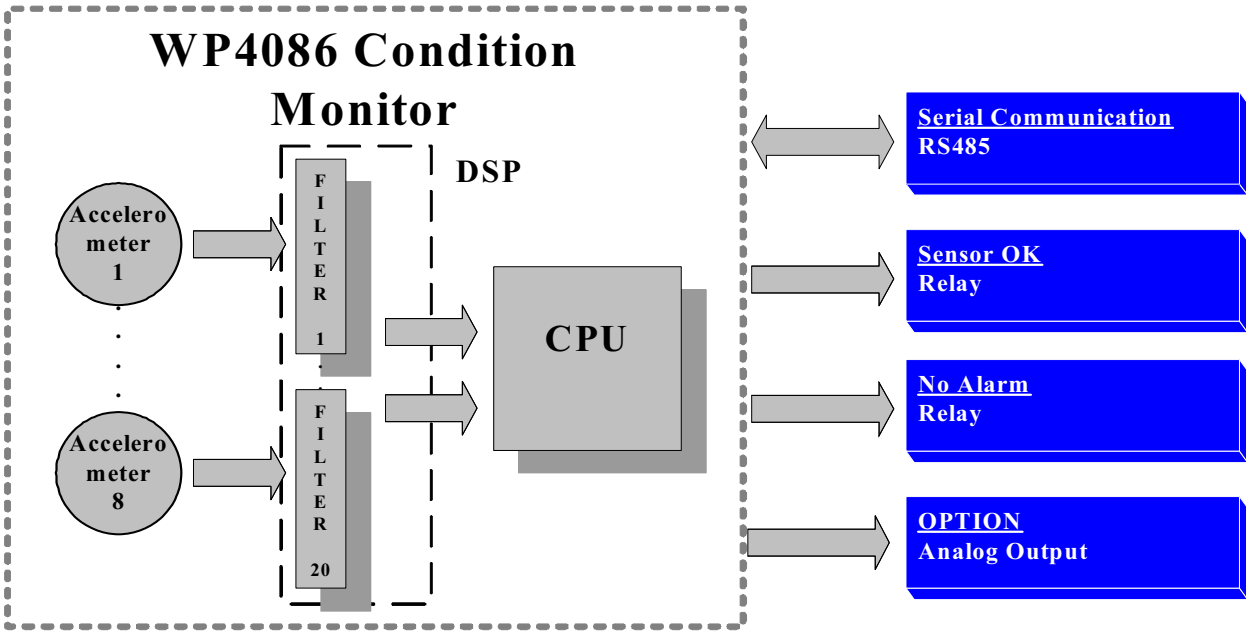
Build-up



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WP4086 Condition Monitor System

Technical data

Supply Voltage	
Nominal	24 V DC
Allowed range	21.6 to 26.4 V DC
Current Consumption	
Typical	220 mA
Maximum	300 mA
Power Consumption	
Typical	5.3 W
Maximum	8.0 W
Analog Input	
No.of points	8
Resolution	12 bit
Sample rate	24,000 bit/s
Full Scall Vibration Range Before Antialiasing filter (Automatic Range shift)	
0.3 g	0.3 g
1.0 g	1.0 g
5.0 g	5.0 g
Amplifier after Antialiasing filter (Automatic Range shift)	x1,x2,x4,x5,x8,x10,x16,x32
Resolution	0.001g
Alarm Level (accelleration)	
Minimum	0.010 g
Maximum	5.000 g
Signal Analysis	
Time domain characteristics	Broad band characteristics Vibrovelocity calculation
Frequency domain characteristics	FFT Apmlitude Spectra FFT Envelope Spectra Frequency selctive chartacteristics
FFT Analysis	
Resolution	
Range 0.1 Hz - 10.0 Hz	0.0011Hz
Range 2.0 Hz - 100.0 Hz	0.014 Hz
Range 20.0 Hz - 1000.0 Hz	0.144 Hz
Range 200.0 Hz - 5000.0 Hz	0.722 Hz
Range 200.0 Hz - 10000.0 Hz	1.445 Hz
Sample Time	
Range 0.1 Hz - 10.0 Hz	86.5 sec.
Range 2.0 Hz - 100.0 Hz	69.2 sec.
Range 20.0 Hz - 1000.0 Hz	6.92 sec.
Range 200.0 Hz - 5000.0 Hz	1.38 sec.
Range 200.0 Hz - 10000.0 Hz	0.69 sec.
Alarm Delay	
Minimum	0.0 sec.
Maximum	25.5 sec.
Digital Output	
No of points	2
Isolation	Relay
Rated Current per Point	1 A DC
Rated Voltage per Point	42 V DC
Minimum load	1.0 uW
Ports for Optional Serial Communication	
No.of Ports	1
Communication Interfaces	
M-NET Optical	M-NET Optical
Port for RS485 Communication	
Communication speed	300 - 38400 BAUD
Max. Cable Length	1 Km
Recommended Cable Type	1 x 2 x 0.25 w/shield
Termination	Built-in
Permissible Ambient Conditions	
Operation temperature	-20 to 60°C
Transportation/Storage temp.	-40 to 85 °C
Max. relative humidity	95% at 40°C
Max. operation height	3000 m. above sea level
Construction	
Dimensions (WxHxD)	70 x 150 x 295 mm
Weight	0.900 Kg
Degree of Protection	IP30
Standards	EN6100-6-4 (CE) EN61000-6-2 (CE) EN61000-4-5 (Surge)

Ordering data

WP4086 Condition Monitor, 8 channels	P/N.: 972408608
WP4086 Condition Monitor, 8 channels, 62.5µ SP	P/N.: 972408638
WP4086 Condition Monitor, 8 channels, RS232	P/N.: 972408658
Accessories	
WP4088 Accelerometer, 5g, 10 m. PVC Cable	P/N.: 972408810
P/N.: 972408810 consists of:	
WP4088 Accellerometer, 5 g, 0.5 m.Cable, PVC	P/N.: 972408801
WP4088 Cable, 9.5m., PVC	P/N.: 97240881095
WP4088 Accelerometer, 5g, 10 m.Cable, Halogen free	P/N.: 972408850
P/N.: 972408850 consists of:	
WP4088 Accellerometer, 5 g, 0.5 m. Cable, Halogen free	P/N.: 972408802
WP4088 Cable, 9.5m. Halogen free	P/N.: 97240885095

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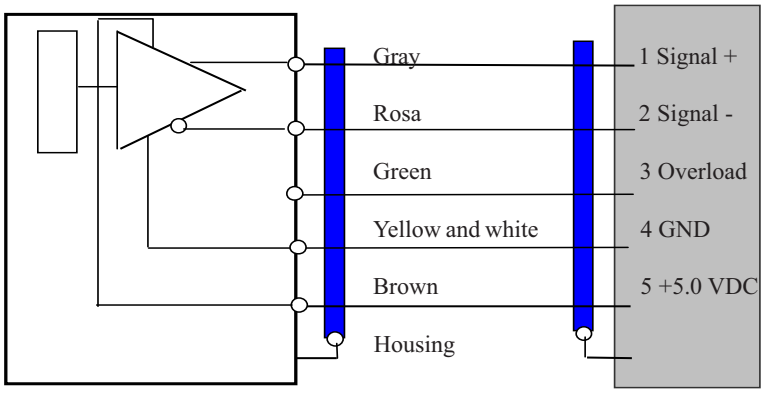
WP4088 Accelerometer

- External Accelerometer for the WP4086 Condition Monitor
- Designed for easy mounting

Connections



Frequency [hz]	Compensation value
0.10	1.3578
0.20	1.0971
0.30	1.0435
0.40	1.0220
0.50	1.0120
0.60	1.0055
0.70	1.0014
0.80	1.0014
0.90	1.0010
1.00	1.0000

It is important that the corresponding measurement equipment is epuipped with a real analog differential input.

Hardware compensation values
Due to the accelerometer internal are AC coupled, with a build-in highpass filter, the signal respons is not linear below 1 Hz.

The highpass filter have a cut-off frequency on 0.1 Hz. The following conpensation factors have to be integrated into the measuring unit.

Compensation factor: 0.1 – 1.0 Hz
The conpensation curve will follow a normal 1 pole high pass filter curve with a cut off frequency of 0.1 Hz

Technical data

Power Supply	
Typical	5V DC +/- 5%
Current	
Max.	20 mA
Measurement Range	0-5.0 g peak (Horizontal direction)
	0-4.0 g peak (Vertical direction)
Frequency Range	1.0-5000 Hz +/- 3 dB
	0.1-1.0 Hz +/-3 dB
Sensitivity	500 mV/g (differental voltage)

Permissible ambient conditions	
Operation temperature	-20 to 60°C
Transportation/Storage temp.	-40 to 80°C
Construction	
Dimensions (W)	65 mm
Diameter	30 mm hexagon
Weight	0.150 kg
Mounting	M8
Standards	EN61000-4-2 (CE)
	EN61000-6-2 (CE)
	EN61000-4-5 (Surge)

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Ordering data

WP4088 Accelerometer, 5g, 10 m. Cable, PVC	P/N.: 972408810
P/N.: 972408810 consists of: WP4088 Accellerometer, 5 g, 0.5 m.Cable, PVC	P/N.: 972408801
WP4088 Cable, 9.5m., PVC	P/N.: 97240881095

WP4088 Accelerometer, 5g, 10 m.Cable, Halogen free	P/N.: 972408850
P/N.: 972408850 consists of: WP4088 Accellerometer, 5 g, 0.5 m. Cable, Halogen free	P/N.: 972408802
WP4088 Cable, 9.5m. Halogen free	P/N.: 97240885095

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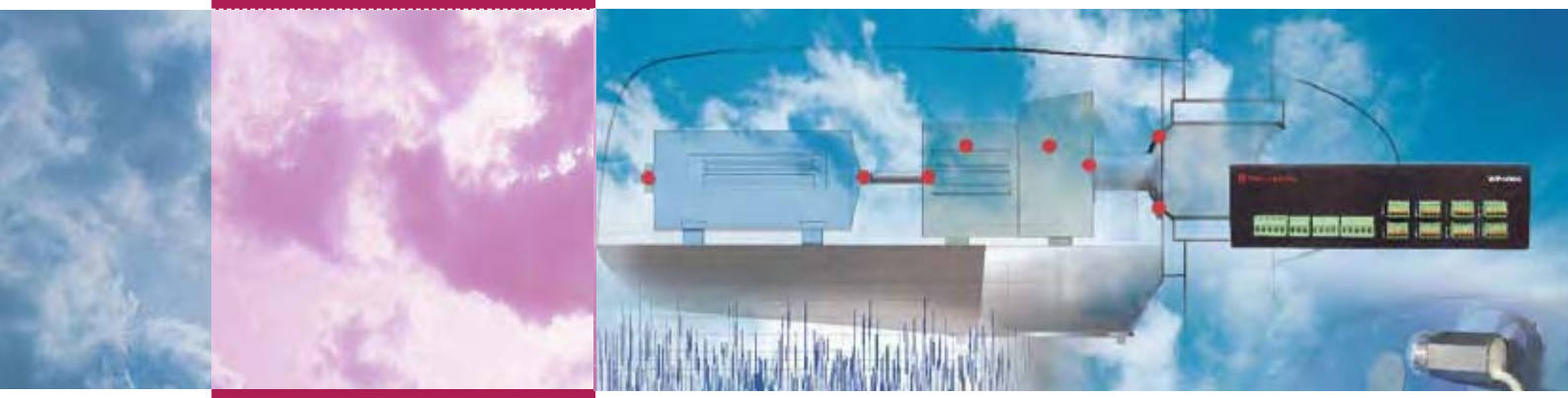


WP4086 Condition Monitoring

Efficient Vibration Control

Value Protection

Mita-Teknik

Advanced Condition Monitoring

Cost Saving System

Mita-Teknik's WP4086 Condition Monitoring System has been designed for use on typical rotating machinery such as turbines. The Condition Monitoring System is for all wind turbine types.

The system can be installed as a totally integrated part of our wind turbine control system or as a stand alone system monitoring the condition of your turbine.

The WP4086 Condition Monitor System helps to determine the relative condition of the turbine by measuring and analyzing vibrations. As the wind turbine wears, the level of vibration tends to increase. This change in vibration can be detected and appropriate maintenance measures can be taken.

The WP4086 Condition Monitoring System runs special built-in software that processes measured vibration signals. The software carries out a set of highly advanced signal analyzes that can be configured by users to suit different requirements. When the vibration parameters exceed the threshold the WP4086 emits warning or alarm and logs this event in an internal log and activates built-in relay to control external equipment.

The system also stores time series of signal processing results in internal flash memory. This historical data can be transferred to a central computer for trend analysis and automatic report generation. The WP4086 Condition Monitor is a remotely operated device.

Applied Technologies

- Internal Memory Storage
- Up to 8 External Accelerometers
- Real-time Vibration Analysis
- Measurement Task Scheduler
- Time Domain Characteristics
  - Broad Band Characteristics
  - Vibrovelocity
- Frequency Domain Characteristics
  - FFT Amplitude Spectra
  - FFT Envelope Spectra
  - Frequency Selective Characteristics
- Automatic Storage of Daily Data Set and Raw Data
- Automatic Storage of the Wind Turbine Operation Parameters
- Alarm/Warning from Time and Frequency Domain Characteristics
- Advanced Warning and Alarm Log
- Task Scheduler Data Storage

System for Lower Service Costs

Included in the delivery is a complete software analysis package. The system offers a wide range of tools for managing the WP4086 Condition Monitoring System i.e.: downloading, visualization signal processing results and automatic generation of status reports. The system visualizes live vibration data and is applicable for trend analysis.

Data is automatically stored in the WP4086 Controller, transferred and stored in the SCADA Gateway database and visualized by the SCADA Gateway Surveillance System.

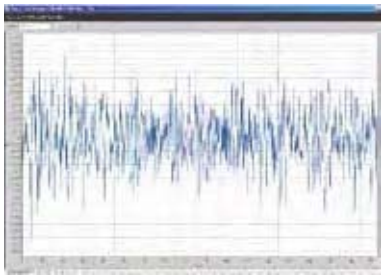
Advantages

- Designed for Monitoring of Rotating Machinery
- Easy System Integration
- Very Competitive
- Remote Access
- Prediction of Maintenance

System Features

- Powerful DSP Technology
- Advanced Onboard Data Storage
- Alarm Handling
- Automatic Status Report Generation
- Remote Configuration
- Flexible Communication Interface
- Compact design

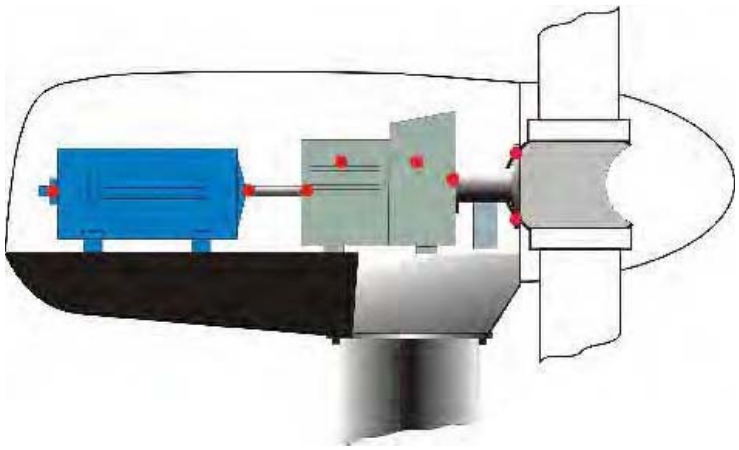
FFT Screen Pictures



By means of a hardware and software model wizard, it is easy to configure the system with kinematic frequency, production class definition and measurement task scheduler.

Our Gateway Surveillance System provides you with important operational information about your wind turbine.

The 8 measuring points are indicated by the red dots



Play Safe or Be Safe

The choice of our WP4086 Condition Monitoring System is obvious, safety and cost reduction are highly important achievements.

Our system is your watchdog.

It keeps a watchful eye on the operational conditions of your wind turbine or wind turbine park - wear and tear of gear units, generators, gears, bearings, rotors and electrical components - onshore or offshore.

Advanced analysis of easily attainable data is the way to optimize production, avoiding reduced lifetime of the main components and reducing damage and last not least - reducing service maintenance costs.

Approved by

Allianz

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Mita-Teknik

Mita-Teknik

Electrical Pitch Systems

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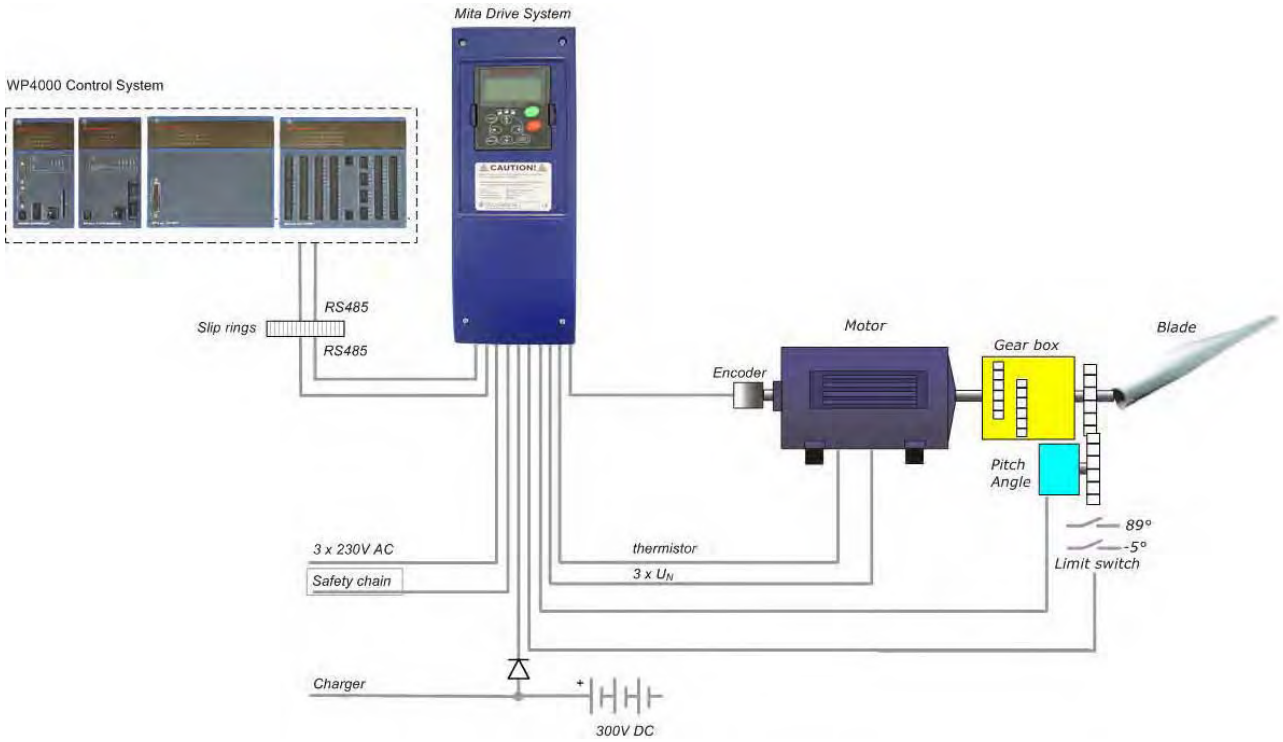

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MITA DRIVE SYSTEM - MDS 017A (4.6kW)

- The MDS module is designed for pitch control on wind turbine rotor blades
- Integrated hardware and software solution
- Integrated safety software
- Compact and user-friendly design
- Quick and easy installation

Description

In General:
The Mita Drive System- MDS - is used for pitch control of wind turbine rotor blades.
The MDS is suitable for all types of turbine controllers.

Features:
The MDS is a hard- and software solution for pitching rotor blades.

The MDS has a detachable, remote-operation seven-segment LCD keypad. It is used to communicate with the drive, set parameters and for monitoring.

The design allows a quick and easy installation.

The very sturdy Drive System is placed in the wind turbine hub, and is able to resist severe vibrations and rotations.

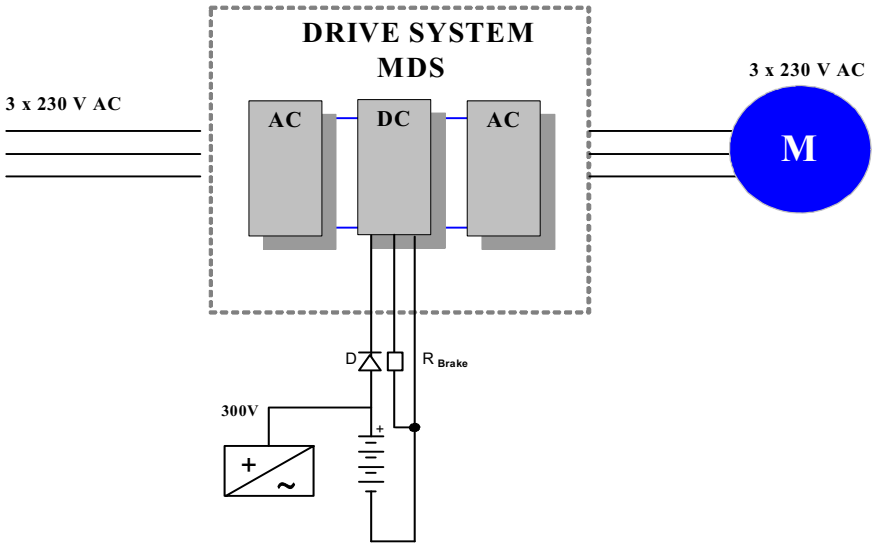
Function:
The MDS is supplied by the grid for normal operation.
A DC back-up system allows emergency operation during grid loss. The MDS controls the motor brake of the pitch motors.

Configuration:
Mita-Teknik supplies complete pitch solutions including pitch motors, brake resistor encoders, position gauges, and limit switches.

There are 2 principal configurations:
a) with hub controller controlling the MDS by analog and digital signals.
b) control of the MDS through Modbus communication (other bus-systems upon request).

Generally, each pitch drive MDS works independently and is controlled individually. This allows full interchangability and requires no individual programming.

Configuration



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MITA DRIVE SYSTEM - MDS 017A (4.6kW)

Technical data

Supply Voltage Mains	
Nominal	3 x 230 V AC
Allowed range	3 x 208 ... 240V AC - 15%..+ 10%
Connection Terminals	3 screw terminals + 1 ground terminal
Supply Voltage	
Nominal	24 VDC
Allowed range	24 VDC +/-15%
Backup Power	
Nominal	300 VDC
Allowed range	280...320VDC-15%...+ 10%
Frequency	
Main supply	45 ...66Hz
Frequency converter	
General output	
Output voltage	3*0 ... U VAC (Mains)
Output frequency	0 ...320 Hz
Output frequency resolution	0.01 Hz
Switching frequency	1 .... 16 KHz
Switching frequency, default	10 KHz
Connection to mains	1 or less/min.
Starting delay	2 sec.
Control method	Frequency control U/F, Open loop sensorless Control, closed loop Frequency control, closed Loop vector control
Acceleration time	0 ... 3000 sec.
Deceleration	0 ... 3000 sec.
Motor Connection MDS 025 A	
Power Output	4.6kW
Current, continous (I_{load})	17[A]
Temperature	50C°
Time, 10 % overload	1 min./10 min.
Current, overload (I_{high})	26[A]
50 % overload	1.5*I_{high} [A]
Temperature, 50% overload	+50C°
Time, 50 % overload	1 min./10 min.
Current, max. (I_{short})	35[A]
Current peak	2 sec./20 sec.
Staring torque	I_{short} for 2 sec.
Connection terminals motor	3 screw terminals + 1 ground terminal
Braking	
Brake chopper	Yes, internal
Brake resistor	Yes, external
Resistor	900 W or 1300 W average
Connection terminals	2 screw terminals

Basic I/O Card	
Digital Intput	
No. of points	6
Number of groups	2
Points per group	3
Isolation	none
Nominal voltage	24 VDC
Signal “1”	>=18 VDC
Signal “0”	<=10 VDC
Input current / signal “1”	5 mA max.
Input impedance	5 KΩ
Anlog Input	
No. of points	2
Number of groups	1
Points per group	2
Isolation	none
Input configurator	jumpers
Input voltage	0 ...10V (-10V ... + 10V) joystick control
Input impedance (V in)	200 KΩ
Input current	0(4) ... 20mA
Input impedance (I in)	250 Ω
Resolution	10 bit, 0.1%
Accuracy	+/- 1%
Digital Output	
Output type	Open collector output
Voltage, max	48 VDC
Current, max	50 mA
Analog Output	
No. of points	1
Number of groups	1
Points per group	1
Isolation	none
Output configurator	jumpers
Voltage	0 ... 10VDC
Load (V out)	R load >1 KΩ
Current	0(4) ... 20mA
Load (I out)	R load >500KΩ
Resolution	0.1 % (10bit)
Accuracy	+/- 2%
Voltage Supply	
Voltage supply	24Vout +/- 15% (bidirectional)
Current	150 mA
Protection	Short circuit protection
External voltage supply	24 VDC
Connection terminals	2 x 10 screw terminals, coded

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MITA DRIVE SYSTEM - MDS 017A (4.6kW)

Technical data

Relay Card with Termistor input	
Relay	
Relay 1 output	NO/NC
Switching capacity	24 VDC/8A, 250 VAC/ 8A, 125 VDC/0.4A
Switching capacity, min.	5V/10mA
Relay 2 output	NO
Switching capacity	24VDC/8A, 250 VAC/ 8A, 125 VDC/0.4A
Switching capacity, min.	5V/10mA
Thermistor Input	
No. of points	1
Number of groups	1
Points per group	1
Isolation	none
Signal "1"	>4.7KΩ (PTC)
Signal "0"	<4.7KΩ (PTC)
Connection terminals	1 x 3, 2 x 2 screw terminals, no coding
Encoder Card	
Digital input	3
Voltage input A	10...24 VDC (differential)
Voltage input B	10 ... 24 VDC differential, phase shift 90 ° compared to input A
Voltage input Z	10 ... 24 VDC (differential), 1 pulse/rev.
Frequency	< 150 KHz
Voltage Supply	
Voltage supply	15/24 VDC
Current	150mA
Short circuit protection	Yes
External voltage supply	24 VDC
Voltage configurator	jumper
Connection terminals	1 x 10 screw terminals, coded
Ports for Optional Cards	
No. of slots	2
Interfaces:	Analog/digital
Isolation	None, Optocoupler, Relay Contact
Communication interfaces	RS232, RS485, CAN OPEN(preliminary)
Encoder	Different encoder boards. Contact us.
Ports for Optional Serial Communication Cards	
No. of ports	1
RS232 Communication Port	
Communication interfaces:	RS232
Communication speed	9600 ...57600 BAUD
Connection	9 pin D-sub or terminals
RS485 Communication Port	
Communication interfaces:	RS485
Modbus RTU	
Communication speed	300 .... 38400 BAUD
Addresses	1 ...247
Connection	9 pin D-sub or terminals
Data transfer method	Half duplex
Transfer cable	Twisted pair (1 pair and shielded)
Profibus DP	
Communication speed	9.6 k ...12M BAUD
Addresses	2 126
Connection	9 pin D-sub or terminals
Data transfer method	Half duplex
Transfer cable	Twisted pair (1 pair and shielded)
Can-Open	Contact Mita-Teknik A/S
Permissible Ambient Conditions	
Operation temperature	-10 to +50°C, I_{high} -10 to +50°C, I_{load}
Transportation/Storage Temperature	-20 to +70°C
Max. relative humidity	95% at +25°C, non condensing, non-corrosive, no dripping water
Air Quality	
Chemical vapours	IEC 721-3-3, unit in operation, class 3C2
Mechanical particles	IEC 721-3-3, unit in operation, class 3S2
Altitude	
Operation height, 100% load	until 1000 m. above sea level
Max. operation height	3000m. above sea level
Derating	1% for each 1000 m. above 1000m.; max. 3000m.
Permissible Ambient Conditions	
Vibration	
EN50178, EN60068-2-6	5 .... 150 Hz Displacement amplitude 1 mm. (peak) at 3....15.8 Hz. Max. accelleration amplitude 1 G at 15.8 ...150 Hz
Shock	
EN50178, EN60068-2-27	UPS drop test (for applicable UPS weights)

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MITA DRIVE SYSTEM - MDS 017A (4.6kW)

Technical data

Permissible Ambient Conditions (cont.)	
Construction	
Dimensions for 7.5kW (WxHxD)	144 x 391 x 214 mm
Weight	8.1 Kg
Degree of protection	IP21
Standards	EN61000-6-1 EN61000-6-2 EN61000-3+11A

Ordering data:

MDS 017 230 N/Normal	P/N.: 979751001
MDS 017 230 V/Varnished	P/N.: 979751003
Accessories	
Keypad	P/N.: 8936910
Brake Resistor (900 W)	P/N.: 8936809
Brake Resistor (1300 W)	P/N.: 8936813

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MITA DRIVE SYSTEM - MDS 025A (6.9kW)

- The MDS module is designed for pitch control on wind turbine rotor blades
- Integrated hardware and software solution
- Integrated safety software
- Compact and user-friendly design
- Quick and easy installation

Description

In General:
The Mita Drive System- MDS - is used for pitch control of wind turbine rotor blades.
The MDS is suitable for all types of turbine controllers.

Features:
The MDS is a hard- and software solution for pitching rotor blades.

The MDS has a detachable, remote-operation seven-segment LCD keypad. It is used to communicate with the drive, set parameters and for monitoring.

The design allows a quick and easy installation.

The very sturdy Drive System is placed in the wind turbine hub, and is able to resist severe vibrations and rotations.

Function:
The MDS is supplied by the grid for normal operation.
A DC back-up system allows emergency operation during grid loss. The MDS controls the motor brake of the pitch motors.

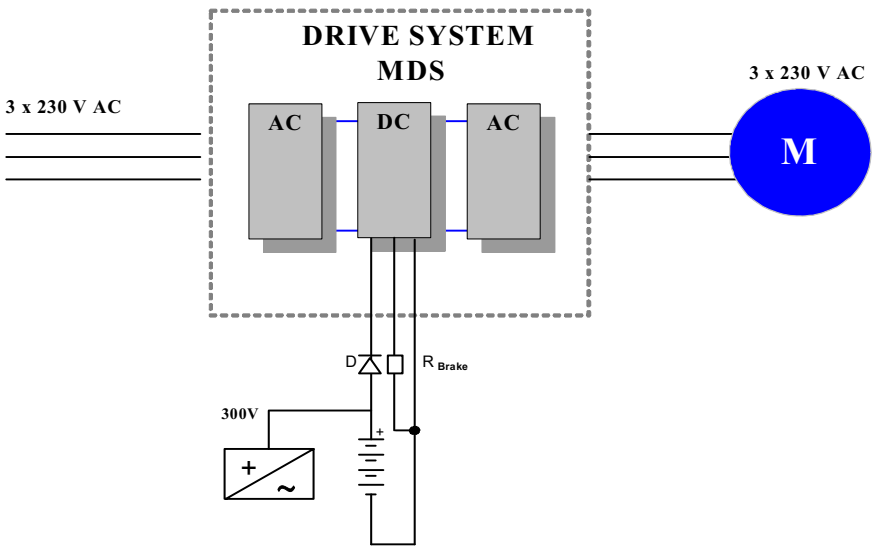
Configuration:
Mita-Teknik supplies complete pitch solutions including pitch motors, brake resistor encoders, position gauges, and limit switches.

There are 2 principal configurations:

a) with hub controller controlling the MDS by analog and digital signals.
b) control of the MDS through Modbus communication (other bus-systems upon request).

Generally, each pitch drive MDS works independently and is controlled individually. This allows full interchangability and requires no individual programming.

Configuration



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Mita-Teknik MITA DRIVE SYSTEM - MDS 025A (6.9kW)

Technical data

Supply Voltage Mains	
Nominal	3 x 230 V AC
Allowed range	3 x 208 ... 240V AC - 15%..+ 10%
Connection Terminals	3 screw terminals + 1 ground terminal
Supply Voltage	
Nominal	24 VDC
Allowed range	24 VDC +/-15%
Backup Power	
Nominal	300 VDC
Allowed range	280...320VDC-15%...+ 10%
Frequency	
Main supply	45 ...66Hz
Frequency converter	
General output	
Output voltage	3*0 ... U VAC (Mains)
Output frequency	0 ...320 Hz
Output frequency resolution	0.01 Hz
Switching frequency	1 .... 16 KHz
Switching frequency, default	10 KHz
Connection to mains	1 or less/min.
Starting delay	2 sec.
Control method	Frequency control U/F, Open loop sensorless Control, closed loop Frequency control, closed Loop vector control
Acceleration time	0 ... 3000 sec.
Deceleration	0 ... 3000 sec.
Motor Connection MDS 025 A	
Power Output	6.9kW
Current, continous (I_{load})	25 [A]
Temperature	50C°
Time, 10 % overload	1 min./10 min.
Current, overload (I_{high})	37 [A]
50 % overload	1.5*I_{high} [A]
Temperature, 50% overload	+50C°
Time, 50 % overload	1 min./10 min.
Current, max. (I_{short})	50[A]
Current peak	2 sec./20 sec.
Staring torque	I_{short} for 2 sec.
Connection terminals motor	3 screw terminals + 1 ground terminal
Braking	
Brake chopper	Yes, internal
Brake resistor	Yes, external
Resistor	900 W or 1300 W average
Connection terminals	2 screw terminals

Basic I/O Card	
Digital Intput	
No. of points	6
Number of groups	2
Points per group	3
Isolation	none
Nominal voltage	24 VDC
Signal “1”	>=18 VDC
Signal “0”	<=10 VDC
Input current / signal “1”	5 mA max.
Input impedance	5 KΩ
Anlog Input	
No. of points	2
Number of groups	1
Points per group	2
Isolation	none
Input configurator	jumpers
Input voltage	0 ...10V (-10V ... + 10V) joystick control
Input impedance (V in)	200 KΩ
Input current	0(4) ... 20mA
Input impedance (I in)	250 Ω
Resolution	10 bit, 0.1%
Accuracy	+/- 1%
Digital Output	
Output type	Open collector output
Voltage, max	48 VDC
Current, max	50 mA
Analog Output	
No. of points	1
Number of groups	1
Points per group	1
Isolation	none
Output configurator	jumpers
Voltage	0 ... 10VDC
Load (V out)	R load >1 KΩ
Current	0(4) ... 20mA
Load (I out)	R load >500KΩ
Resolution	0.1 % (10bit)
Accuracy	+/- 2%
Voltage Supply	
Voltage supply	24Vout +/- 15% (bidirectional)
Current	150 mA
Protection	Short circuit protection
External voltage supply	24 VDC
Connection terminals	2 x 10 screw terminals, coded

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MITA DRIVE SYSTEM - MDS 025A (6.9kW)

Technical data

Relay Card with Termistor input	
Relay	
Relay 1 output	NO/NC
Switching capacity	24 VDC/8A, 250 VAC/ 8A, 125 VDC/0.4A
Switching capacity, min.	5V/10mA
Relay 2 output	NO
Switching capacity	24VDC/8A, 250 VAC/ 8A, 125 VDC/0.4A
Switching capacity, min.	5V/10mA
Thermistor Input	
No. of points	1
Number of groups	1
Points per group	1
Isolation	none
Signal "1"	>4.7KΩ (PTC)
Signal "0"	<4.7KΩ (PTC)
Connection terminals	1 x 3, 2 x 2 screw terminals, no coding
Encoder Card	
Digital input	3
Voltage input A	10...24 VDC (differential)
Voltage input B	10 ... 24 VDC differential, phase shift 90 ° compared to input A
Voltage input Z	10 ... 24 VDC (differential), 1 pulse/rev.
Frequency	< 150 KHz
Voltage Supply	
Voltage supply	15/24 VDC
Current	150mA
Short circuit protection	Yes
External voltage supply	24 VDC
Voltage configurator	jumper
Connection terminals	1 x 10 screw terminals, coded
Ports for Optional Cards	
No. of slots	2
Interfaces:	Analog/digital
Isolation	None, Optocoupler, Relay Contact
Communication interfaces	RS232, RS485, CAN OPEN(preliminary)
Encoder	Different encoder boards. Contact us.
Ports for Optional Serial Communication Cards	
No. of ports	1
RS232 Communication Port	
Communication interfaces:	RS232
Communication speed	9600 ...57600 BAUD
Connection	9 pin D-sub or terminals
RS485 Communication Port	
Communication interfaces:	RS485
Modbus RTU	
Communication speed	300 .... 38400 BAUD
Addresses	1 ...247
Connection	9 pin D-sub or terminals
Data transfer method	Half duplex
Transfer cable	Twisted pair (1 pair and shielded)
Profibus DP	
Communication speed	9.6 k ...12M BAUD
Addresses	2 126
Connection	9 pin D-sub or terminals
Data transfer method	Half duplex
Transfer cable	Twisted pair (1 pair and shielded)
Can-Open	Contact Mita-Teknik A/S
Permissible Ambient Conditions	
Operation temperature	-10 to +50°C, I_{high} -10 to +50°C, I_{load}
Transportation/Storage Temperature	-20 to +70°C
Max. relative humidity	95% at +25°C, non condensing, non-corrosive, no dripping water
Air Quality	
Chemical vapours	IEC 721-3-3, unit in operation, class 3C2
Mechanical particles	IEC 721-3-3, unit in operation, class 3S2
Altitude	
Operation height, 100% load	until 1000 m. above sea level
Max. operation height	3000m. above sea level
Derating	1% for each 1000 m. above 1000m.; max. 3000m.
Permissible Ambient Conditions	
Vibration	
EN50178, EN60068-2-6	5 .... 150 Hz Displacement amplitude 1 mm. (peak) at 3....15.8 Hz. Max. accelleration amplitude 1 G at 15.8 ...150 Hz
Shock	
EN50178, EN60068-2-27	UPS drop test (for applicable UPS weights)

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MITA DRIVE SYSTEM - MDS 025A (6.9kW)

Technical data

Permissible Ambient Conditions (cont.)	
Construction	
Dimensions for 7.5kW (WxHxD)	144 x 391 x 214 mm
Weight	8.1 Kg
Degree of protection	IP21
Standards	EN61000-6-1 EN61000-6-2 EN61000-3+11A

Ordering data:

MDS 025 230 N/Normal	P/N.: 979752001
MDS 025 230 V/Varnished	P/N.: 979752003
Accessories	
Keypad	P/N.: 8936910
Brake Resistor (900 W)	P/N.: 8936809
Brake Resistor (1300 W)	P/N.: 8936813

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MITA DRIVE SYSTEM - MDS 031A (8.6kW)

- The MDS module is designed for pitch control on wind turbine rotor blades
- Integrated hardware and software solution
- Integrated safety software
- Compact and user-friendly design
- Quick and easy installation

Description

In General:
The Mita Drive System-MDS - is used for pitch control of wind turbine rotor blades.
The MDS is suitable for all types of turbine con- trollers.

Features:
The MDS is a hard- and software solution for pitching rotor blades.

The MDS has a detach- able, remote-operation seven segment LCD keypad. It is used to communicate with the drive, set parameters and for monitoring.

The design allows a quick and easy installation.

The very sturdy Drive System is placed in the wind turbine hub, and is able to resist severe vibrations and rotations.

Function:
The MDS is supplied by the grid for normal operation.
A DC back-up system allows emergency operation during grid loss. The MDS controls the motor brake of the pitch motors.

Configuration:
Mita-Teknik supplies complete pitch solutions including pitch motors, brake resistor encoders, position gauges, and limit switches.

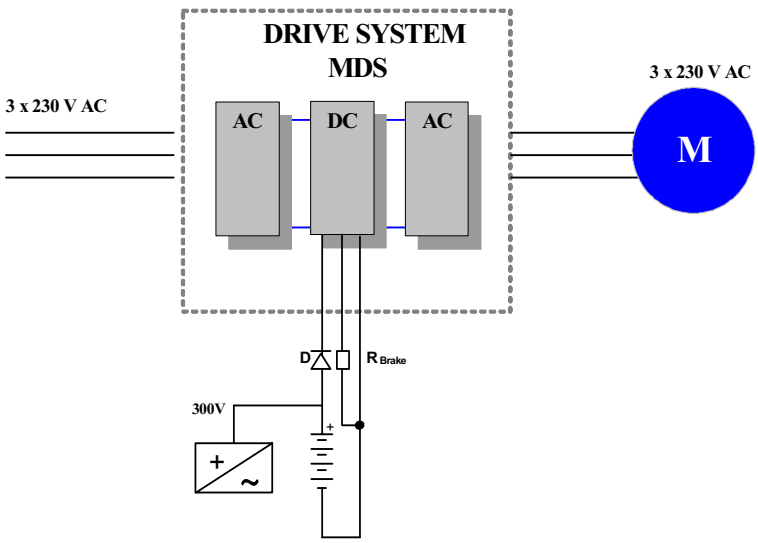
There are 2 principal configurations:

a) with hub controller controlling the MDS by analog and digital signals.
b) control of the MDS through Modbus communication. *(other bus systems can be delivered upon request).*

Generally, each MDS drive works independently and is controlled individually. This allows full interchang- ability and requires no indi- vidual programming.

Mita-Teknik offers several MDS solutions.

Configuration



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Mita-Teknik MITA DRIVE SYSTEM - MDS 031A (8.6kW)

Technical data

Supply Voltage Mains	
Nominal	3 x 230 V AC
Allowed range	3 x 208 ...240V AC - 15%..+ 10%
Connection Terminals	3 screw terminals + 1 ground terminal
Supply Voltage	
Nominal	24 VDC
Allowed range	24 VDC +/-15%
Backup Power	
Nominal	300 VDC
Allowed range	280...320VDC-15%...+ 10%
Frequency	
Main supply	45 ... 66Hz
Frequency converter	
General output	
Output voltage	3*0 ...U VAC (Mains)
Output frequency	0 ...320 Hz
Output frequency resolution	0.01 Hz
Switching frequency	1 ...16 KHz
Switching frequency, default	10 KHz
Connection to mains	1 or less/min.
Starting delay	2 sec.
Control method	Frequency control U/F, Open loop sensorless Control, closed loop Frequency control, closed Loop vector control
Acceleration time	0 ... 3000 sec.
Deceleration	0 ... 3000 sec.
Motor Connection MDS 031A	
Power output	8.6kW
Current, continous (I_{load})	31 [A]
Temperature, 10% overload	50C°
Current, overload (I_{high})	46.5 [A]
50 % overload	1.5*I_{high} [A]
Temperature, 50% overload	+ 50 C°
Time, 50 % overload	1 min./10 min.
Current, max. (I_{short})	62 [A]
Current, Peak	2 sec./20 sec.
Starting torque	I_{short} for 2 sec.
Braking	
Brake chopper	Yes, internal
Brake resistor	Yes, external
Connection terminals	2 screw terminals
Basic I/O Card	
Digital Intput	
No. of points	6
Number of groups	2

Basic I/O Card	
Digital Intput (cont.)	
Points per group	3
Isolation	none
Nominal voltage	24 VDC
Signal “1”	>=18 VDC
Signal “0”	<=10 VDC
Input current / signal “1”	5 mA max.
Input impedance	5 KΩ
Anlog Input	
No. of points	2
Number of groups	1
Points per group	2
Isolation	none
Input configurator	jumpers
Input voltage	0 ...10V (-10V ... + 10V) joystick control
Input impedance (V in)	200 KΩ
Input current	0(4) ... 20mA
Input impedance (I in)	250 Ω
Resolution	10 bit, 0.1%
Accuracy	+/- 1%
Digital Output	
Output type	Open collector output
Voltage, max	48 VDC
Current, max	50 mA
Analog Output	
No. of points	1
Number of groups	1
Points per group	1
Isolation	none
Output configurator	jumpers
Voltage	0 ...10VDC
Load (V out)	R load >1 KΩ
Current	0(4) ...20mA
Load (I out)	R load >500KΩ
Resolution	0.1 % (10bit)
Accuracy	+/- 2%
Voltage Supply	
Voltage supply	24Vout +/- 15% (bidirectional)
Current	150 mA
Protection	Short circuit protection
External voltage supply	24 VDC
Connection terminals	2 x 10 screw terminals, coded

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MITA DRIVE SYSTEM - MDS 031A (8.6kW)

Technical data

Relay Card with Termistor input	
Relay	
Relay 1 output	NO/NC
Switching capacity	24 VDC/8A, 250 VAC/ 8A, 125 VDC/0.4A
Switching capacity, min.	5V/10mA
Relay 2 output	NO
Switching capacity	24VDC/8A, 250 VAC/ 8A, 125 VDC/0.4A
Switching capacity, min.	5V/10mA
Thermistor Input	
No. of points	1
Number of groups	1
Points per group	1
Isolation	none
Signal "1"	>4.7KΩ (PTC)
Signal "0"	<4.7KΩ (PTC)
Connection terminals	1 x 3, 2 x 2 screw terminals, no coding
Encoder Card	
Digital input	3
Voltage input A	10...24 VDC (differential)
Voltage input B	10 ...24 VDC differential, phase shift 90 ° compared to input A
Voltage input Z	10 ...24 VDC (differential), 1 pulse/rev.
Frequency	< 150 KHz
Voltage Supply	
Voltage supply	15/24 VDC
Current	150mA
Short circuit protection	Yes
External voltage supply	24 VDC
Voltage configurator	jumper
Connection terminals	1 x 10 screw terminals, coded
Ports for Optional Cards	
No. of slots	2
Interfaces:	Analog/digital
Isolation	None, Optocoupler, Relay Contact
Communication interfaces	RS232, RS485, CAN open (preliminary)
Encoder	Different encoder boards. Contact us.
Ports for Optional Serial Communication Cards	
No. of ports	1

RS232 Communication Port	
Communication interfaces:	RS232
Communication speed	9600 ...57600 BAUD
Connection	9 pin D-sub or terminals
RS485 Communication Port	
Communication interfaces:	RS485
Modbus RTU	
Communication speed	300 ...38400 BAUD
Addresses	1 ...247
Connection	9 pin D-sub or terminals
Data transfer method	Half duplex
Transfer cable	Twisted pair (1 pair and shielded)
Profibus DP	
Communication speed	9.6 k ...12M BAUD
Addresses	2 ...126
Connection	9 pin D-sub or terminals
Data transfer method	Half duplex
Transfer cable	Twisted pair (1 pair and shielded)
CAN Open	Contact Mita-Teknik A/S
Permissible Ambient Conditions	
Operation temperature	-10 to +50°C, I_{high} -10 to +50°C, I_{load}
Transportation/Storage Temperature	-20 to +70°C
Max. relative humidity	95% at +25°C, non condensing, non-corrosive, no dripping water
Air Quality	
Chemical vapours	IEC 721-3-3, unit in operation, class 3C2
Mechanical particles	IEC 721-3-3, unit in operation, class 3S2
Altitude	
Operation height, 100% load	until 1000 m. above sea level
Max. operation height	3000m. above sea level
Derating	1% for each 1000 m. above 1000m.; max. 3000m.

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MITA DRIVE SYSTEM - MDS 031A (8.6kW)

Technical data

Permissible Ambient Conditions (cont.)	
Vibration	
EN50178, EN60068-2-6	5 .... 150 Hz Displacement amplitude 1 mm. (peak) at 3....15.8 Hz. Max. accelleration amplitude 1 G at 15.8 ...150 Hz
Shock	
EN50178, EN60068-2-27	UPS drop test (for
applicable UPS weights)	
Storage and shipping max.:	15G, 11ms (in package)

Construction	
Dimensions (WxHxD)	195 x 519 x 237 mm
Weight	Kg
Degree of protection	IP21
Standards	EN61000-6-1
	EN61000-6-2
	EN61000-3+11A

Ordering data

MDS 031 203 N/Normal	P/N.: 979753001
MDS 031 230 V/Varnished	P/N.: 979753003

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Mita-Teknik MITA DRIVE SYSTEM - MDS 048A (13.8kW)

- The MDS module is designed for pitch control on wind turbine rotor blades
- Integrated hardware and software solution
- Integrated safety software
- Compact and user-friendly design
- Quick and easy installation

Description

In General:
The Mita Drive System- MDS - is used for pitch control of wind turbine rotor blades.
The MDS is suitable for all types of turbine con- trollers.

Features:
The MDS is a hard- and software solution for pitching rotor blades.

The MDS has a detach- able, remote-operation seven segment LCD keypad. It is used to communicate with the drive, set parameters and for monitoring.

The design allows a quick and easy installation.

The very sturdy Drive System is placed in the wind turbine hub, and is able to resist severe vibrations and rotations.

Function:
The MDS is supplied by the grid for normal operation.
A DC back-up system allows emergency operation during grid loss. The MDS controls the motor brake of the pitch motors.

Configuration:
Mita-Teknik supplies complete pitch solutions including pitch motors, brake resistor encoders, position gauges, and limit switches.

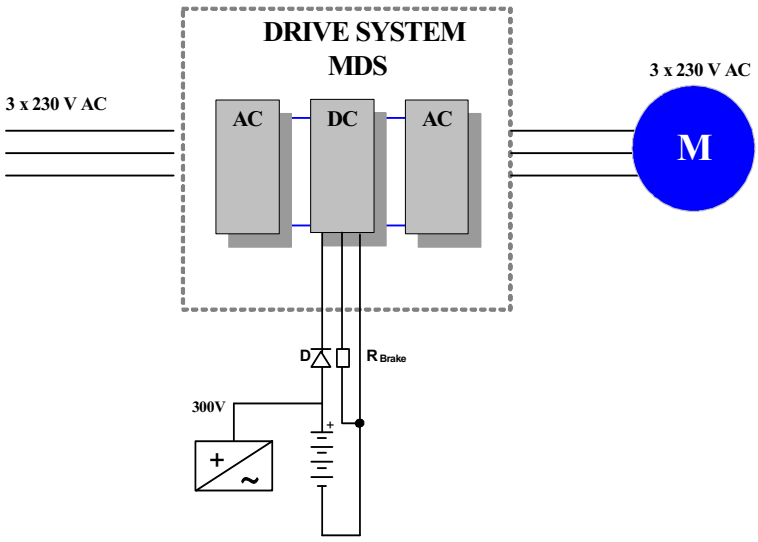
There are 2 principal configurations:

a) with hub controller controlling the MDS by analog and digital signals.
b) control of the MDS through Modbus communication. *(other bus systems can be delivered upon request).*

Generally, each MDS drive works independently and is controlled individually. This allows full interchang- ability and requires no indi- vidual programming.

Mita-Teknik offers several MDS solutions.

Configuration



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Mita-Teknik MITA DRIVE SYSTEM - MDS 048A (13.8kW)

Technical data

Supply Voltage Mains	
Nominal	3 x 230 V AC
Allowed range	3 x 208 ...240V AC - 15%..+ 10%
Connection Terminals	3 screw terminals + 1 ground terminal
Supply Voltage	
Nominal	24 VDC
Allowed range	24 VDC +/-15%
Backup Power	
Nominal	300 VDC
Allowed range	280...320VDC-15%...+ 10%
Frequency	
Main supply	45 ... 66Hz
Frequency converter	
General output	
Output voltage	3*0 ...U VAC (Mains)
Output frequency	0 ...320 Hz
Output frequency resolution	0.01 Hz
Switching frequency	1 ...16 KHz
Switching frequency, default	10 KHz
Connection to mains	1 or less/min.
Starting delay	2 sec.
Control method	Frequency control U/F, Open loop sensorless Control, closed loop Frequency control, closed Loop vector control
Acceleration time	0 ... 3000 sec.
Deceleration	0 ... 3000 sec.
Motor Connection MDS 048A	
Power output	13.8kW
Current, continous (I_{load})	48 [A]
Temperature, 10% overload	50C°
Time, 10 % overload	1 min./10 min.
Current, overload (I_{high})	72 [A]
50 % overload	1.5*I_{high} [A]
Temperature, 50% overload	+ 50 C°
Time, 50 % overload	1 min./10 min.
Current, max. (I_{short})	96 [A]
Current, Peak	2 sec./20 sec.
Starting torque	I_{short} for 2 sec.
Braking	
Brake chopper	Yes, internal
Brake resistor	Yes, external
Connection terminals	2 screw terminals
Basic I/O Card	
Digital Intput	
No. of points	6
Number of groups	2

Basic I/O Card	
Digital Intput (cont.)	
Points per group	3
Isolation	none
Nominal voltage	24 VDC
Signal "1"	>=18 VDC
Signal "0"	<=10 VDC
Input current / signal "1"	5 mA max.
Input impedance	5 KΩ
Anlog Input	
No. of points	2
Number of groups	1
Points per group	2
Isolation	none
Input configurator	jumpers
Input voltage	0 ...10V (-10V ... + 10V) joystick control
Input impedance (V in)	200 KΩ
Input current	0(4) ... 20mA
Input impedance (I in)	250 Ω
Resolution	10 bit, 0.1%
Accuracy	+/- 1%
Digital Output	
Output type	Open collector output
Voltage, max	48 VDC
Current, max	50 mA
Analog Output	
No. of points	1
Number of groups	1
Points per group	1
Isolation	none
Output configurator	jumpers
Voltage	0 ...10VDC
Load (V out)	R load >1 KΩ
Current	0(4) ...20mA
Load (I out)	R load >500KΩ
Resolution	0.1 % (10bit)
Accuracy	+/- 2%
Voltage Supply	
Voltage supply	24Vout +/- 15% (bidirectional)
Current	150 mA
Protection	Short circuit protection
External voltage supply	24 VDC
Connection terminals	2 x 10 screw terminals, coded

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Mita-Teknik MITA DRIVE SYSTEM - MDS 048A (13.8kW)

Technical data

Relay Card with Termistor input	
Relay	
Relay 1 output	NO/NC
Switching capacity	24 VDC/8A, 250 VAC/ 8A, 125 VDC/0.4A
Switching capacity, min.	5V/10mA
Relay 2 output	NO
Switching capacity	24VDC/8A, 250 VAC/ 8A, 125 VDC/0.4A
Switching capacity, min.	5V/10mA
Thermistor Input	
No. of points	1
Number of groups	1
Points per group	1
Isolation	none
Signal "1"	>4.7KΩ (PTC)
Signal "0"	<4.7KΩ (PTC)
Connection terminals	1 x 3, 2 x 2 screw terminals, no coding
Encoder Card	
Digital input	3
Voltage input A (differential)	10...24 VDC
Voltage input B	10 ...24 VDC differential, phase shift 90 ° compared to input A
Voltage input Z (differential),	10 ...24 VDC 1 pulse/rev.
Frequency	< 150 KHz
Voltage Supply	
Voltage supply	15/24 VDC Current 150mA
Short circuit protection	Yes
External voltage supply	24 VDC
Voltage configurator	jumper
Connection terminals	1 x 10 screw terminals, coded
Ports for Optional Cards	
No. of slots	2
Interfaces:	Analog/digital
Isolation	None, Optocoupler, Relay Contact
Communication interfaces	RS232, RS485, CAN open (preliminary)
Encoder boards. Contact us.	Different encoder
Ports for Optional Serial Communication Cards	
No. of ports	1

RS232 Communication Port	
Communication interfaces:	RS232
Communication speed	9600 ...57600 BAUD
Connection	9 pin D-sub or terminals
RS485 Communication Port	
Communication interfaces:	RS485
Modbus RTU	
Communication speed	300 ...38400 BAUD
Addresses	1 ...247
Connection	9 pin D-sub or terminals
Data transfer method	Half duplex
Transfer cable	Twisted pair (1 pair and shielded)
Profibus DP	
Communication speed	9.6 k ...12M BAUD
Addresses	2 ...126
Connection	9 pin D-sub or terminals
Data transfer method	Half duplex
Transfer cable	Twisted pair (1 pair and shielded)
CAN Open	Contact Mita-Teknik A/S
Permissible Ambient Conditions	
Operation temperature	-10 to +50°C, I_{high} -10 to +50°C, I_{load}
Transportation/Storage Temperature	-20 to +70°C
Max. relative humidity	95% at +25°C, non condensing, non-corrosive, no dripping water
Air Quality	
Chemical vapours	IEC 721-3-3, unit in operation, class 3C2
Mechanical particles	IEC 721-3-3, unit in operation, class 3S2
Altitude	
Operation height, 100% load	until 1000 m. above sea level
Max. operation height	3000m. above sea level
Derating	1% for each 1000 m. above 1000m.; max. 3000m.

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Mita-Teknik MITA DRIVE SYSTEM - MDS 048A (13.8kW)

Technical data

Permissible Ambient Conditions (cont.)	
Vibration	
EN50178, EN60068-2-6	5 .... 150 Hz Displacement amplitude 1 mm. (peak) at 3....15.8 Hz. Max. accelleration amplitude 1 G at 15.8 ...150 Hz
Shock	
EN50178, EN60068-2-27	UPS drop test (for applicable UPS weights)
Storage and shipping max.:	15G, 11ms (in package)

Construction	
Dimensions (WxHxD)	195 x 519 x 237 mm
Weight	Kg
Degree of protection	IP21
Standards	EN61000-6-1 EN61000-6-2 EN61000-3+11A

Ordering data

MDS 048 203 N/Normal	P/N.: 979754001
MDS 048 230 V/Varnished	P/N.: 979754003

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Mita-Teknik MITA DRIVE SYSTEM - MDS 061A (18.5kW)

- The MDS module is designed for pitch control on wind turbine rotor blades
- Integrated hardware and software solution
- Integrated safety software
- Compact and user-friendly design
- Quick and easy installation

Description

In General:
The Mita Drive System- MDS - is used for pitch control of wind turbine rotor blades.
The MDS is suitable for all types of turbine con- trollers.

Features:
The MDS is a hard- and software solution for pitching rotor blades.

The MDS has a detach- able, remote-operation seven segment LCD keypad. It is used to communicate with the drive, set parameters and for monitoring.

The design allows a quick and easy installation.

The very sturdy Drive System is placed in the wind turbine hub, and is able to resist severe vibrations and rotations.

Function:
The MDS is supplied by the grid for normal operation.
A DC back-up system allows emergency operation during grid loss. The MDS controls the motor brake of the pitch motors.

Configuration:
Mita-Teknik supplies complete pitch solutions including pitch motors, brake resistor encoders, position gauges, and limit switches.

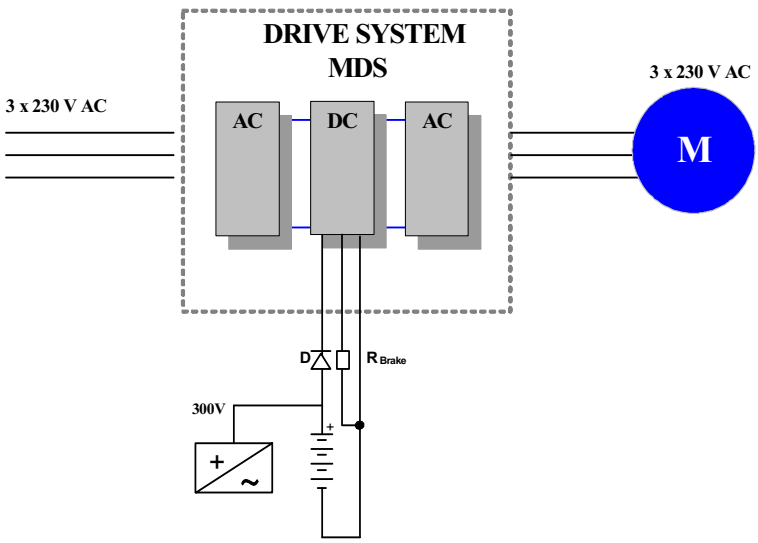
There are 2 principal configurations:

a) with hub controller controlling the MDS by analog and digital signals.
b) control of the MDS through Modbus communication. *(other bus systems can be delivered upon request).*

Generally, each MDS drive works independently and is controlled individually. This allows full interchang- ability and requires no indi- vidual programming.

Mita-Teknik offers several MDS solutions.

Configuration



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Mita-Teknik MITA DRIVE SYSTEM - MDS 061A (18.5kW)

Technical data

Supply Voltage Mains	
Nominal	3 x 230 V AC
Allowed range	3 x 208 ...240V AC - 15%..+ 10%
Connection Terminals	3 screw terminals + 1 ground terminal
Supply Voltage	
Nominal	24 VDC
Allowed range	24 VDC +/-15%
Backup Power	
Nominal	300 VDC
Allowed range	280...320VDC-15%...+ 10%
Frequency	
Main supply	45 ... 66Hz
Frequency converter	
General output	
Output voltage	3*0 ...U VAC (Mains)
Output frequency	0 ...320 Hz
Output frequency resolution	0.01 Hz
Switching frequency	1 ...16 KHz
Switching frequency, default	10 KHz
Connection to mains	1 or less/min.
Starting delay	2 sec.
Control method	Frequency control U/F, Open loop sensorless Control, closed loop Frequency control, closed Loop vector control
Acceleration time	0 ... 3000 sec.
Deceleration	0 ... 3000 sec.
Motor Connection MDS 061A	
Power output	18.5kW
Current, continous (I_{load})	61 [A]
Temperature, 10% overload	50°C
Current, overload (I_{high})	92 [A]
50 % overload	1.5*I_{high} [A]
Temperature, 50% overload	+ 50 C°
Time, 50 % overload	1 min./10 min.
Current, max. (I_{short})	122 [A]
Current, Peak	2 sec./20 sec.
Starting torque	I_{short} for 2 sec.
Braking	
Brake chopper	Yes, internal
Brake resistor	Yes, external
Connection terminals	2 screw terminals
Basic I/O Card	
Digital Intput	
No. of points	6
Number of groups	2

Basic I/O Card	
Digital Intput (cont.)	
Points per group	3
Isolation	none
Nominal voltage	24 VDC
Signal "1"	>=18 VDC
Signal "0"	<=10 VDC
Input current / signal "1"	5 mA max.
Input impedance	5 KΩ
Anlog Input	
No. of points	2
Number of groups	1
Points per group	2
Isolation	none
Input configurator	jumpers
Input voltage	0 ...10V (-10V ... + 10V) joystick control
Input impedance (V in)	200 KΩ
Input current	0(4) ... 20mA
Input impedance (I in)	250 Ω
Resolution	10 bit, 0.1%
Accuracy	+/- 1%
Digital Output	
Output type	Open collector output
Voltage, max	48 VDC
Current, max	50 mA
Analog Output	
No. of points	1
Number of groups	1
Points per group	1
Isolation	none
Output configurator	jumpers
Voltage	0 ...10VDC
Load (V out)	R load >1 KΩ
Current	0(4) ...20mA
Load (I out)	R load >500KΩ
Resolution	0.1 % (10bit)
Accuracy	+/- 2%
Voltage Supply	
Voltage supply	24Vout +/- 15% (bidirectional)
Current	150 mA
Protection	Short circuit protection
External voltage supply	24 VDC
Connection terminals	2 x 10 screw terminals, coded

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Mita-Teknik MITA DRIVE SYSTEM - MDS 061A (18.5kW)

Technical data

Relay Card with Termistor input	
Relay	
Relay 1 output	NO/NC
Switching capacity	24 VDC/8A, 250 VAC/ 8A, 125 VDC/0.4A
Switching capacity, min.	5V/10mA
Relay 2 output	NO
Switching capacity	24VDC/8A, 250 VAC/ 8A, 125 VDC/0.4A
Switching capacity, min.	5V/10mA
Thermistor Input	
No. of points	1
Number of groups	1
Points per group	1
Isolation	none
Signal "1"	>4.7KΩ (PTC)
Signal "0"	<4.7KΩ (PTC)
Connection terminals	1 x 3, 2 x 2 screw terminals, no coding
Encoder Card	
Digital input	3
Voltage input A	10...24 VDC (differential)
Voltage input B	10 ...24 VDC differential, phase shift 90 ° compared to input A
Voltage input Z	10 ...24 VDC (differential), 1 pulse/rev.
Frequency	< 150 KHz
Voltage Supply	
Voltage supply	15/24 VDC
Current	150mA
Short circuit protection	Yes
External voltage supply	24 VDC
Voltage configurator	jumper
Connection terminals	1 x 10 screw terminals, coded
Ports for Optional Cards	
No. of slots	2
Interfaces:	Analog/digital
Isolation	None, Optocoupler, Relay Contact
Communication interfaces	RS232, RS485, CAN open (preliminary)
Encoder	Different encoder boards. Contact us.
Ports for Optional Serial Communication Cards	
No. of ports	1

RS232 Communication Port	
Communication interfaces:	RS232
Communication speed	9600 ...57600 BAUD
Connection	9 pin D-sub or terminals
RS485 Communication Port	
Communication interfaces:	RS485
Modbus RTU	
Communication speed	300 ...38400 BAUD
Addresses	1 ...247
Connection	9 pin D-sub or terminals
Data transfer method	Half duplex
Transfer cable	Twisted pair (1 pair and shielded)
Profibus DP	
Communication speed	9.6 k ...12M BAUD
Addresses	2 ...126
Connection	9 pin D-sub or terminals
Data transfer method	Half duplex
Transfer cable	Twisted pair (1 pair and shielded)
CAN Open	Contact Mita-Teknik A/S
Permissible Ambient Conditions	
Operation temperature	-10 to +50°C, I_{high} -10 to +50°C, I_{load}
Transportation/Storage Temperature	-20 to +70°C
Max. relative humidity	95% at +25°C, non condensing, non-corrosive, no dripping water
Air Quality	
Chemical vapours	IEC 721-3-3, unit in operation, class 3C2
Mechanical particles	IEC 721-3-3, unit in operation, class 3S2
Altitude	
Operation height, 100% load	until 1000 m. above sea level
Max. operation height	3000m. above sea level
Derating	1% for each 1000 m. above 1000m.; max. 3000m.

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MITA DRIVE SYSTEM - MDS 061A (18.5kW)

Technical data

Permissible Ambient Conditions (cont.)	
Vibration	
EN50178, EN60068-2-6	5 .... 150 Hz Displacement amplitude 1 mm. (peak) at 3....15.8 Hz. Max. accelleration amplitude 1 G at 15.8 ...150 Hz
Shock	
EN50178, EN60068-2-27	UPS drop test (for applicable UPS weights)
Storage and shipping max.:	15G, 11ms (in package)

Construction	
Dimensions (WxHxD)	237 x 591 x 257 mm
Weight	Kg
Degree of protection	IP21
Standards	EN61000-6-1 EN61000-6-2 EN61000-3+11A

Ordering data

MDS 061 230 N/Normal	P/N.: 979755001
MDS 061 230 V/Varnished	P/N.: 979755003

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POWER PANELS

WIND PARK SOLUTIONS

CONTROL SYSTEMS

SCADA SYSTEMS

CONDITION MONITORING

GRID CONNECTION SYSTEMS

COMMUNICATION

ACCESSORIES

ELECTRICAL PITCH SYSTEM

Mita Drive System

Optimum Pitch of Rotor Blades

Mita-Teknik

Advanced Pitch Control

The Mita Drive System (MDS) is used for control of the wind turbine rotor blade angle position. The MDS system is suitable for all types and sizes of wind turbines. Maximum safety and efficiency is achieved by having a three-times independent system, where each block has a separate MDS Controller for control.

The MDS system is a hard- and software all-in-one solution and the system provides superior control combined with outstanding security.

High stability, optimal costs and control are achieved by using AC-motors.
The MDS Controller with built-in PID and motor control, the motor, resolver, and angle position encoder forms 2 closed control loops that constantly monitor and adjust the motor speed and the angle position of the blades, even when powerful and dynamic external forces are present.
The MDS Controllers are connected by a common communication link using broadcast messages which means that the blades can be positioned synchronously under supervision of the Pitch Master Controller.

Every MDS Controller continously monitors communication status, motor temperature, power supply, limit switches, motor brake status and a number of other parameters. Should anything fail, the MDS Controller will take immediate action and automatically move the blade to the Safety Stop position which will effectively stop the wind turbine. At the same time all other MDS Controllers will be notified so that all blades are moved to Safety Stop position. If communication to the main control system fails, all MDS Controllers will immediately move the blade to the Safety Stop position.

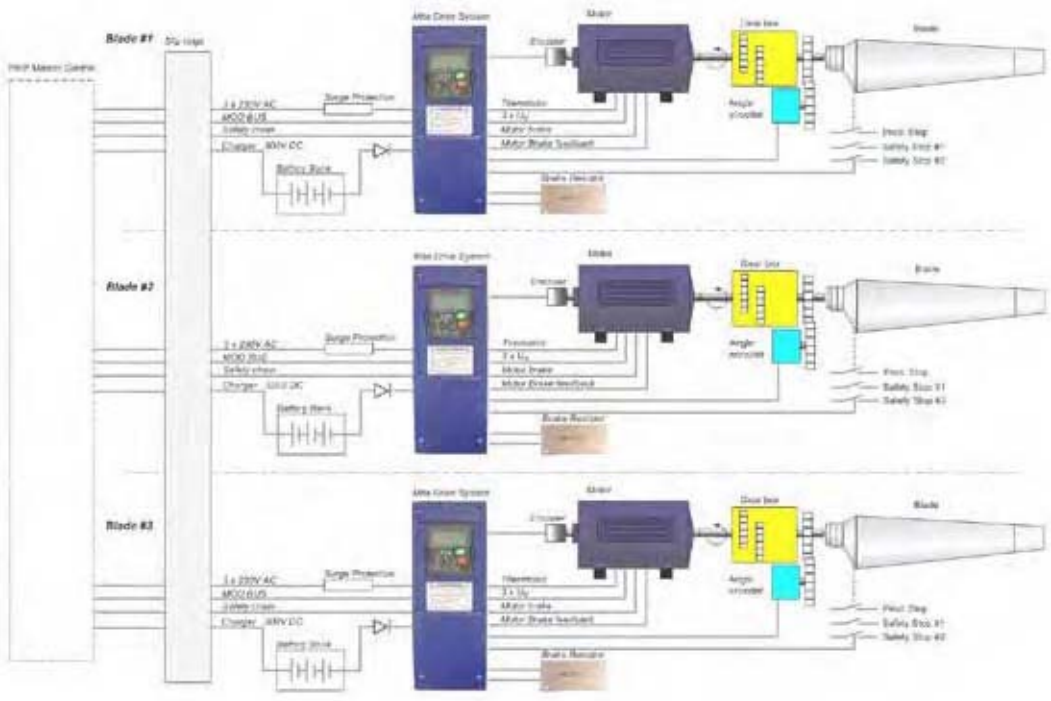
Financial Advantages

- Very competitive pricing
- Integrated HW and SW solution
- Easy to install and configure
- Higher availability for the turbine

Technical Advantages

- Easy upload of new firmware
- Easy parameter settings
- Optimum blade placement
- Optimum motor control
- Sturdy design
- Quick response
- Accurate notification

MDS Configuration



Controlled Blade Angles

Our customer's competitive advantage lies in appliance of superior technology that constantly keeps them in command and on the forefront of evolution. This is why you should choose our MDS Drive System.

Ongoing innovative developments constantly work to maintain and improve Mita-Teknik's leading position, offering our customers the competitive edge to be ahead.

Please contact our sales department for further information.

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Mita-Teknik

Mita-Teknik

SCADA Systems

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End-User Package

984504001

Platforms:

- WP4x00
- WP3000
- WP3100
- IC1000
- IC500

Intended for:

- Wind Park Owners
- Wind Park Investors
- Analysts
- Operators

Description:

The "End User Package" is designed especially for end-users like turbine owners, investors etc. The package gives the ability to analyze from top levels like power plants, wind parks and clusters down to low levels like single turbines, grid stations and weather stations. Historical data retrieved from the units are automatically stored in a MS-SQL database so you can analyze and work offline.

The tools provided give the user ability to make professional evaluations about production, weather and performance data from the turbines/parks as well as tracking the different states the turbines/parks has been in during its lifetime (status codes) and monitoring hardware variables/signals via logs functionalities.

This package gives the user the foundation for complete documentation over the total lifetime of the turbine.

Modules included:

General		MPP Functions		MNET Functions	
984522003	Plant Overview	984521000	Logon	984520000	Logon – Mnet Customer specific
984522004	Power Plant Overview	9845210xx	Live Data Access	9845200xx	Live Data Access
984522005	Database Storage	984521004	Power Curve	984520004	Power Curve
984522013	Cluster Overview	984521007	5 minutes Log	984520006	24h / 10m Log
984522014	Power Cluster Overview	984521008	Status Code Log	984520007	36h / 10m Log
984522015	Weather Station Data Panel	984521010	Status Code Summation	984520008	Status Code Log
984522016	Grid Station Data Panel	984521021	Production Overview Log	984520011	Status Code Summation
		984521022	Current Operation	984520023	Production Overview Log
		984521023	Availability Log	984520024	Current Operation
		984521024	Wind Rose Log	984520025	Availability Log
		984521025	Accumulated Operation	984520026	Wind Rose Log
		984521026	Custom Data Panel	984520027	Accumulated Operation
		984522010	WP4000 Web Site	984520028	Custom Data Panel

Monitoring Package

984504002

Platforms:

- WP4x00
- WP3x00
- IC1000
- IC500

Intended for:

- Monitoring Centers

Description:

The "Monitoring" package is designed for use in permanent monitoring centers and other purposes where keeping track of parks are essential.

The package gives the ability to monitor and analyze from top levels like power plants, wind parks and clusters down to low levels like single turbines, grid stations and weather stations. Historical data retrieved from the units are automatically stored in a SQL database so you can quickly analyze current and historical data.

The package also contains the ability to receive alarms send directly from the turbine.
The received alarm will, via the id sent with the alarm, be visible directly on the main screen as well in the global alarm log. The user can then quickly react - depending of severity of the alarm.

The tools provided gives you the big overview over several turbines so you can make professional evaluations about potential problems, production, weather and performance data from the turbines/parks as well as tracking the different states the turbines/parks.

Modules included:

General		MPP Functions		MNET Functions	
984522000	Task Scheduler	984521000	Logon	984520000	Logon – Mnet Customer specific
984522001	Firmware Report	984521001	Remote Display R/W	984520001	Remote Display R/W
984522003	Plant Overview	98452100x	Send Remote Command	98452000x	Send Remote Command
984522004	Power Plant Overview	9845210xx	Live Data Access	9845200xx	Live Data Access
984522005	Database Storage	984521004	Power Curve	984520004	Power Curve
984522013	Cluster Overview	984521007	5 minutes Log	984520006	24h / 10m Log
984522014	Power Cluster Overview	984521008	Status Code Log	984520007	36h / 10m Log
984522015	Weather Station Data Panel	984521009	Event Log	984520008	Status Code Log
		984521010	Status Code Summation	984520010	Event Log
984522016	Grid Station Data Panel	984521011	Alarm Call Log	984520011	Status Code Summation
984522000	Task Scheduler Alarm Initialization	984521013	Access Log	984520012	Alarm Call Log
		984521021	Production Overview Log	984520013	Access Log
984522021	Alarm Dispatch	984521022	Current Operation	984520023	Production Overview Log
984522023	Automatic Alarm Acknowledgement	984521023	Availability Log	984520024	Current Operation
		984521024	Wind Rose Log	984520025	Availability Log
		984521025	Accumulated Operation	984520026	Wind Rose Log
		984521026	Custom Data Panel	984520027	Accumulated Operation
		984521027	Alarm reception	984520028	Custom Data Panel
		984522010	WP4000 Web Site	984520030	Service Status Log
				984520031	Alarm reception

Service Package

984504003

Platforms:

- WP4x00
- WP3x00
- IC1000
- IC500

Intended for:

- Service and Maintenance Field Operation
- Service Centers

Description:

The "Service Package" is intended for service, planning and analyzing work to be performed on turbines and other Mita devices.
From remote as well as on site you are able to view live data, upload new programs, retrieve and set summations/parameters, analyze the power curve as well as controlling the unit over a remote display.
When operating turbines in foreign countries the user is able to read and set custom languages on controllers that support this function.
The package also contains access to statistical-, service-, status code- and signal-logs thus making it easy to do fault finding, analysis and planning from the remote.
The tool provided gives the user ability to make professional evaluations and documentation for the lifetime of the turbine. All retrieved data are stored in the Gateway SQL database for backup or later review when returning to the service office.

Modules included:

General		MPP Functions		MNET Functions	
984522001	Firmware Report	984521000	Logon	984520000	Logon – Mnet Customer specific
984522002	Power User	984521001	Remote Display R/W	984520001	Remote Display R/W
984522003	Plant Overview	98452100x	Send Remote Command	98452000x	Send Remote Command
984522004	Power Plant Overview	9845210xx	Live Data Access	9845200xx	Live Data Access
984522005	Database Storage	984521002	Menu Dump Comparison	984520002	Menu Dump Comparison
984522011	Menu Dump All Lines	984521003	Parameter Menu Dump Comparison	984520003	Parameter Menu Dump Comparison
984522012	Menu Dump Parameters	984521004	Power Curve	984520004	Power Curve
984522013	Cluster Overview	984521006	Trigger Log	984520005	1000 Lines Log
984522014	Power Cluster Overview	984521007	5 minutes Log	984520006	24h / 10m Log
984522015	Weather Station Data Panel	984521008	Status Code Log	984520007	36h / 10m Log
984522016	Grid Station Data Panel	984521009	Event Log	984520008	Status Code Log
984522018	Availability Groups	984521010	Status Code Summation	984520010	Event Log
		984521011	Alarm Call Log	984520011	Status Code Summation
		984521013	Access Log	984520012	Alarm Call Log
		984521014	Parameter Log	984520013	Access Log
		984521018	Firmware Upload	984520015	Firmware Upload
		984521019	Backup Parameters	984520016	Backup Parameters
		984521020	Backup Summations	984520017	Backup Summations
		984521021	Production Overview Log	984520019	WP4084
		984521022	Current Operation	984520023	Production Overview Log
		984521023	Availability Log	984520024	Current Operation
		984521024	Wind Rose Log	984520025	Availability Log
		984521025	Accumulated Operation	984520026	Wind Rose Log
		984521026	Custom Data Panel	984520027	Accumulated Operation
		984521028	Data logger	984520028	Custom Data Panel
				984520030	Service Status Log

Developer/Engineer Package

984504004

Platforms:

- WP4x00
- WP3x00
- IC1000
- IC500

Intended for:

- Wind turbine Developer Engineers
- Turbine Design Consultants
- Analysts
- Operators

Description:

The "Developer/Engineer Package" is mainly intended for wind turbine manufacturers engineering departments or for specialist working in cooporation with designing wind turbines. The package is the largest available and gives the ability to analyze from top levels like Power plants, wind parks and clusters down to low levels like single turbines, park masters, grid stations and weather stations. Historical data retrieved from the units are automatically stored in a SQL database so you can analyze and work offline.

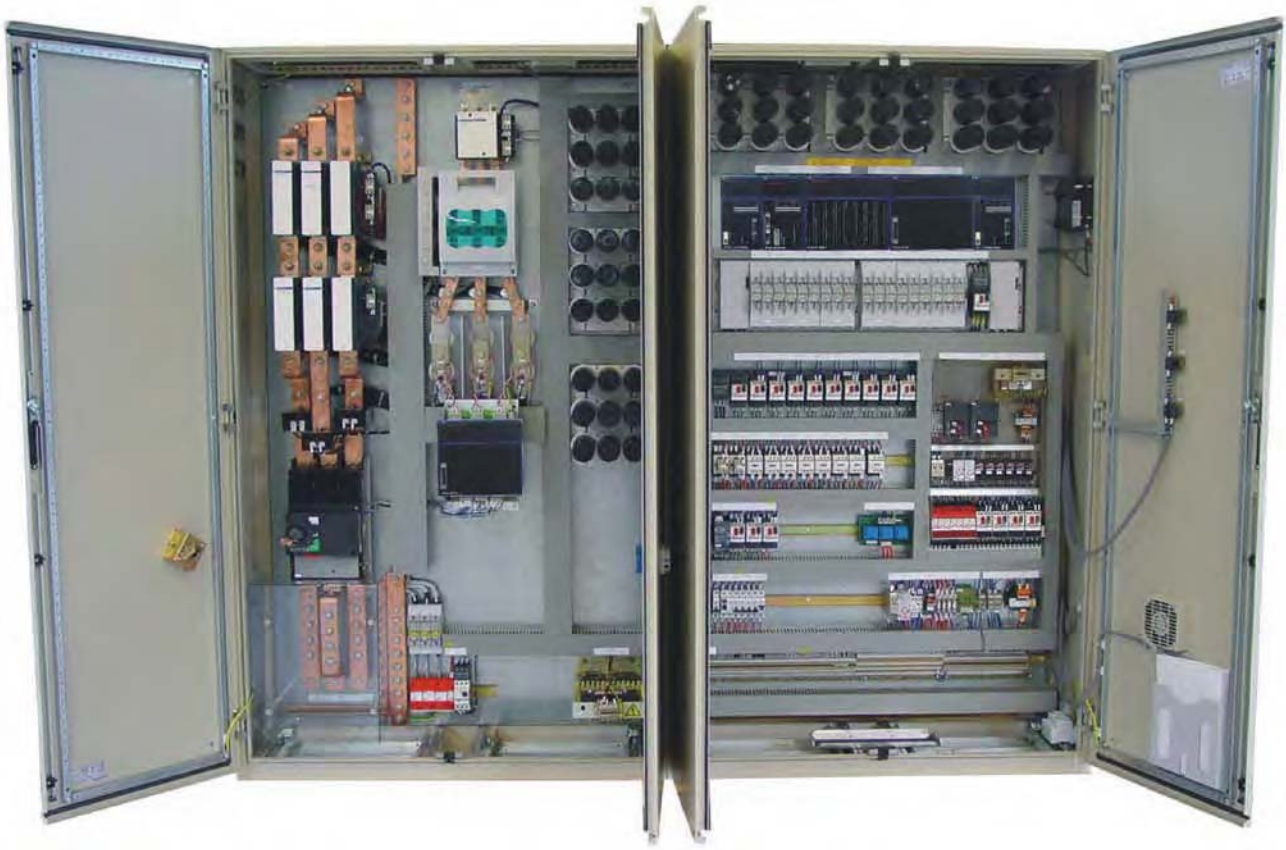
The tools provided gives the user ability to go in-depth on the technical side both online and off-line in order to optimize and resolve problems in the turbines and parks.

Modules included:

General		MPP Functions		MNET Functions	
984522000	Task Scheduler	984521000	Logon	984520000	Logon – Mnet Customer specific
984522001	Firmware Report	984521001	Remote Display R/W	984520001	Remote Display R/W
984522002	Power User	98452100x	Send Remote Command	98452000x	Send Remote Command
984522003	Plant Overview	9845210xx	Live Data Access	9845200xx	Live Data Access
984522004	Power Plant Overview	984521002	Menu Dump Comparison	984520002	Menu Dump Comparison
984522005	Database Storage	984521003	Parameter Menu Dump Comparison	984520003	Parameter Menu Dump Comparison
984522009	Task Scheduler Export	984521004	Power Curve	984520004	Power Curve
984522011	Menu Dump All Lines	984521006	Trigger Log	984520005	1000 Lines Log
984522012	Menu Dump Parameters	984521007	5 minutes Log	984520006	24h / 10m Log
984522013	Cluster Overview	984521008	Status Code Log	984520007	36h / 10m Log
984522014	Power Cluster Overview	984521009	Event Log	984520008	Status Code Log
984522015	Weather Station Data Panel	984521010	Status Code Summation	984520010	Event Log
984522016	Grid Station Data Panel	984521011	Alarm Call Log	984520011	Status Code Summation
984522018	Availability Groups	984521013	Access Log	984520012	Alarm Call Log
984522000	Task Scheduler Alarm Initialization	984521014	Parameter Log	984520013	Access Log
984522021	Alarm Dispatch	984521015	System Log	984520014	Custom Language
984522023	Automatic Alarm Acknowledgement	984521017	Custom Language	984520015	Firmware Upload
		984521018	Firmware Upload	984520016	Backup Parameters
		984521019	Backup Parameters	984520017	Backup Summations
		984521020	Backup Summations	984520019	WP4084
		984521021	Production Overview Log	984520023	Production Overview Log
		984521022	Current Operation	984520024	Current Operation
		984521023	Availability Log	984520025	Availability Log
		984521024	Wind Rose Log	984520026	Wind Rose Log
		984521025	Accumulated Operation	984520027	Accumulated Operation
		984521026	Custom Data Panel	984520028	Custom Data Panel
		984521027	Alarm Reception	984520030	Service Status Log
		984521028	Datalogger	984520031	Alarm Reception

Mita-Teknik

Power Panel



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Power Panel

Technical data

INDUSTRY	
Rated voltage	3 x 400+N+PE
Frequency	50 Hz
System (ground)	TN-S
Enclosure	
- Panel	IP54
- Operating panel	IP54
- Operation keypad	IP41
Operational conditions	
- Rated ambient temperature	30°
- Max. relative humidity (higher at lower temperature)	50 %/40°
- Level of pollution	3
- Max. height above sea level	2000 m
- EMC Environment	2 (Industry)
Conditions during transport, storage and installation	
Max. ambient temperature (Short term for 24 hours)	+ 55 (+70) °C
Min. ambient temperature	-25 °C
Main separator	Master switch
Standard	EN60439-1/ EN60204-1
Cos.phi	-
Components	Mita Std.
Documentation	English, German or Danish
Sensors	24 VDC
Magnet valve	24 VDC
Connection	Base

WIND TURBINES	
Rated voltage	3 x 690+N+PE
Frequency	50 Hz
System (ground)	TN-C-S
Enclosure	
- Panel	IP54
- Operating panel	IP54
- Operation keypad	IP41
Operational conditions	
- Rated ambient temperature	30 °C
- Max. relative humidity (higher at lower temperature)	50 %/40°
- Level of pollution	3
- Max.height above sea level	2000 m
- EMC Environment	2 (Industry)
Conditions during transport, storage and installation	
Max. ambient temperature (Short term for 24 hours)	+ 55 (+70) °C
Min. ambient temperature	-25 °C
Main separator	Circuit switch
Standard	EN60439-1/ EN60204-1
Cos.phi	0.95
Components	Mita Std.
Documentation	English, German or Danish
Sensors	24 VDC
Magnet valve	24 VDC
Connection	Gen. 1+2 = Top Control Current=Base Access=base

Ordering data

Power panels are produced according to customer requirements.

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Mita-Teknik

Various Types of Power Panels

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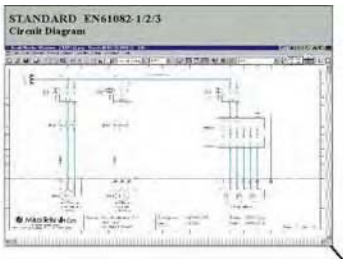
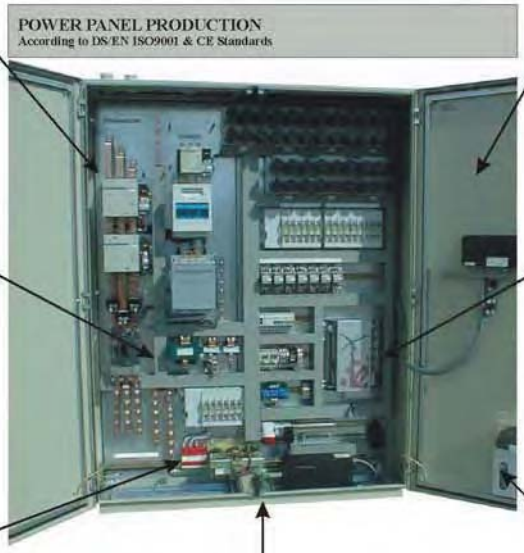
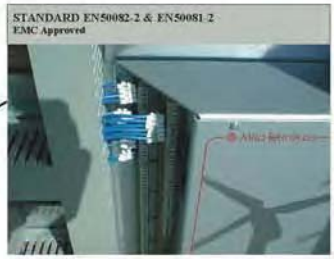
Power Panel Quality Standards

International Standards







POWER PANEL DESIGN
Standard EN60439-1 and EN60204-1
1. Wire numbering and wire bushes
2. Component marking-out
3. CE-labelling, risk estimation and storing of complete documentation for 25 years
4. - and much more - feel free to ask our staff

LIGTHNING PROTECTION
Standard IEC 1024-1
1. The lightning protection is built-up in three levels

CIRCUIT DIAGRAMS
Standard EN61082-1/2/3
1. All wires are numbered
2. Diagram symbols and text according to EN standards
3. Well-structured and user-friendly diagrams

ELECTRONICS
Standard EN50082-2 and EN50081-2
1. EMC-tested and -certified
2. Automatic testing procedures

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Accessories for Wind Turbine Control

Always the Right Accessories

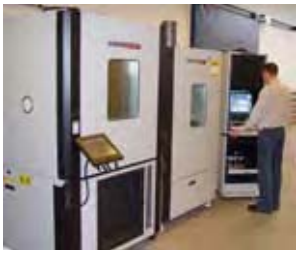
Mita-Teknik

Accessories for Wind Turbine Control

Together with Mita-Teknik s complete control concepts, we also deliver single components, systems and accessories. Our accessories product range consists of: proximity sensors, temperature sensors, vibration sensors, weather measurement, safety devices, cables and fibre optics etc.

TESTED BY THE EXPERTS!

At Mita-Teknik we always make sure that you will get the best possible accessories. We know that the wind turbine is a tougher environment than any other automation area. Therefore, all our accessories have been through EMI Electromagnetic Interference , HALT Highly Accelerated Life Test and HASS Highly Accelerated Stress Screen tests to check strength and immunity. Our accessories have been especially tested to fit into wind turbine applications and they all comply with international standards.



PROXIMITY SENSORS

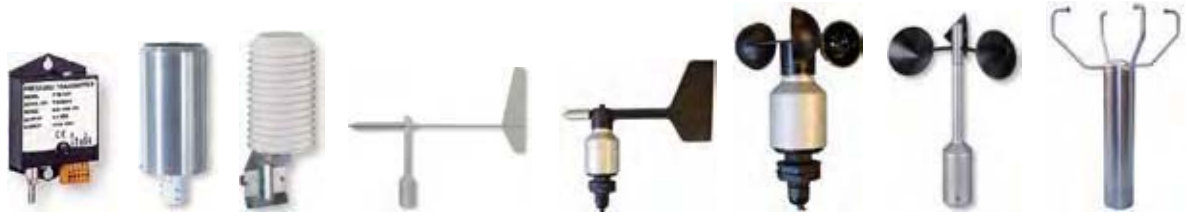
The inductive sensor is typically used for sensing speed of the wind turbine rotor, and generator.

TEMPERATURE SENSORS

Our temperature sensors are available in various mechanical designs for easy mounting at generators, bearings, gear box etc. The sensors have the ability to compensate for the cable length, so that an accurate temperature measurement is achieved.

WEATHER MEASUREMENT

Our quality weather measurement accessories consist of wind direction sensors, wind speed sensors, temperature measurement, precipitation sensors, humidity measurement, air pressure etc.
They have all been tested and found suitable for wind applications.



VIBRATION SENSORS

We have a wide range of vibration sensors to survey the magnitude and frequency of vibration in wind turbines and other applications. They all ensure safe and reliable operation in wind turbines around the world.

SAFETY DEVICES

In order to insure safe and reliable operation of your wind turbine, we deliver a wide range of accessories for the safety chain.

FIBRE OPTICS COMMUNICATION

We deliver the necessary equipment, e.g. fibre optics cables, converters, switches etc. for fibre optics communication, both within the turbine as well as for park networks.

SPECIALISED ACCESSORIES

Mita-Teknik customises the products to fit individual client needs. Upon request, Mita-Teknik delivers specialised accessories to fit your specific applications.

Complete the Concept

The technology of tomorrow is built on yesterday's experience. Mita-Teknik has the technology and the experience.

Our customers' competitive advantage lies in appliance of superior technology that constantly keeps them in command and on the forefront of evolution.
We know that the wind turbine is a tougher environment than any other automation area. Therefore, all our accessories have been especially tested to fit into wind turbine applications.

By choosing Mita-Teknik´s accessories, you are choosing the best possible accessories for your wind turbine!

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Mita-Teknik

WIND PARK SOLUTIONS

Wind Park Solutions

A Matter of Trust

Mita-Teknik has been designing and building control systems for more than a quarter of a century.

With more than 35,000 systems installed throughout the world, we have a larger installed base than any other company in this industry.

This means we already know many of the problems you might run into - and we´ve probably already developed ways of tackling most of them. Contact our Sales Department for further information.

Our systems protect the value of your wind power investments - a fact that the industry´s insurance experts clearly recognize. Mita-Teknik - if you´re in charge and want to be in control.

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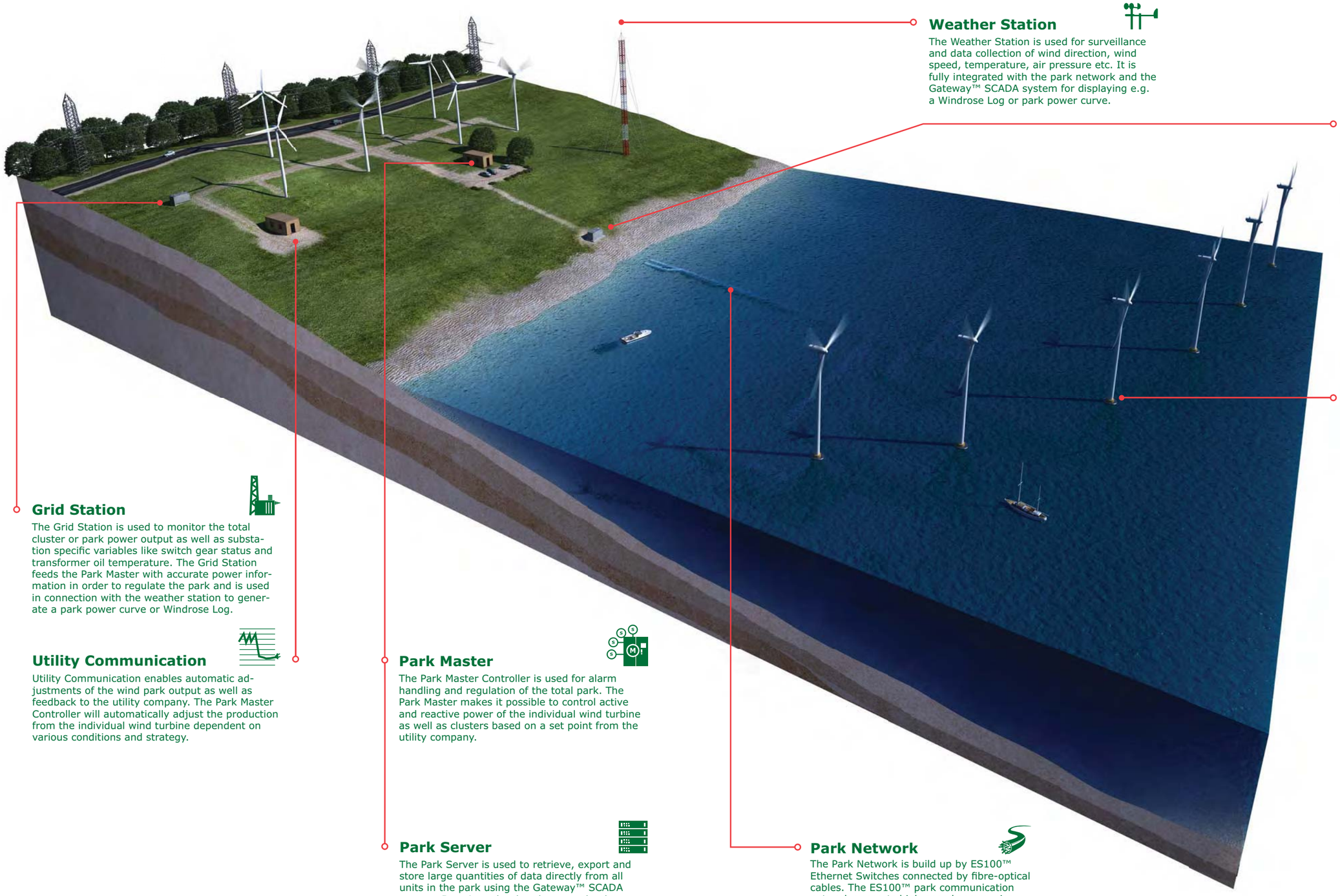
We Make a Difference

Mita-Teknik

Park Solution



Weather Station

The Weather Station is used for surveillance and data collection of wind direction, wind speed, temperature, air pressure etc. It is fully integrated with the park network and the Gateway™ SCADA system for displaying e.g. a Windrose Log or park power curve.

Cluster Controller

A wind park can be divided into a number of clusters each controlled by a Cluster Controller. The Cluster Controller is regulating the production of the individual turbine in the cluster, based on regulations from the Park Master and/or local inputs.

Wind Turbine

Each wind turbine has its own WP™ control system, which is connected to the overall park control and monitoring system. The wind turbine can be completely remote-controlled via the Gateway™ comprehensive SCADA-software. The individual wind turbine works independently if network communication is lost.

Grid Station

The Grid Station is used to monitor the total cluster or park power output as well as substation specific variables like switch gear status and transformer oil temperature. The Grid Station feeds the Park Master with accurate power information in order to regulate the park and is used in connection with the weather station to generate a park power curve or Windrose Log.

Utility Communication

Utility Communication enables automatic adjustments of the wind park output as well as feedback to the utility company. The Park Master Controller will automatically adjust the production from the individual wind turbine dependent on various conditions and strategy.

Park Master

The Park Master Controller is used for alarm handling and regulation of the total park. The Park Master makes it possible to control active and reactive power of the individual wind turbine as well as clusters based on a set point from the utility company.

Park Server

The Park Server is used to retrieve, export and store large quantities of data directly from all units in the park using the Gateway™ SCADA system. By using a local park server the data is always secure and backed up independent of Internet breakdowns and/or slow connections to the park.

Park Network

The Park Network is build up by ES100™ Ethernet Switches connected by fibre-optical cables. The ES100™ park communication network supports high-speed communication and redundancy in order to ensure high availability.

GATEWAY
Mita-Teknik PLANT SURVEILLANCE SYSTEM