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VestasGridPanel

VGMS III

Remote Control & Monitoring

General Specification

WWW.VESTAS.COM

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1. VGMS III Description

The Vestas Grid Measuring Station (VGMS III) is designed to monitor the grid conditions at the wind power plant interconnection/substation.

The VGMS III is available for the following Vestas SCADA systems:

- VestasOnline™ Business

The power meter is connected with the SCADA Server through a copper cable or a fibre optical cable. The SCADA Server Data Collection Module (DCM) generates 10-minute data based on the grid computer input. More than one hundred 10-minute data sets are processed and stored in the central database.

The grid computer solution works furthermore as an accurate interface for the SCADA systems Power Management modules that are used to control the power plant output.
As an extra feature the standard grid computer includes a number of digital inputs and outputs, which can be used to monitor the status of a substation breaker, an intrusion alarm or similar. The events will be monitored and logged by the central SCADA Server and an alarm call can be executed by the SCADA Alarm Server.

2. Specifications

2.1 Configuration of the VGMS III panel

The VGMS III panel is equipped with the following instruments:

Default configuration

Panel for wall mounting (indoor)	1 unit
ION7650 power meter manufactured by Power Measurement	1 unit
MODBUS OPC server	1 unit
Standard I/O available (8 inputs and 7 outputs (3 relay and 4 solid state))	1 unit
Ethernet and serial (RS232) communication	1 unit
(Please note that fibre optical communication is optional equipment).	

Optional equipment

Fibre optical converter (serial or Ethernet)	1 unit
(Available fibre converters are CSL, Moxa and Hirschman)	
Add-on I/O card for the ION7650	1 unit
(Provides additional 8 digital inputs and 4 analogue in- and outputs).	
Panel for outdoor mounting (IP54)	1 unit

2.2 Environmental Specifications

2.2.1 Standard panel specification

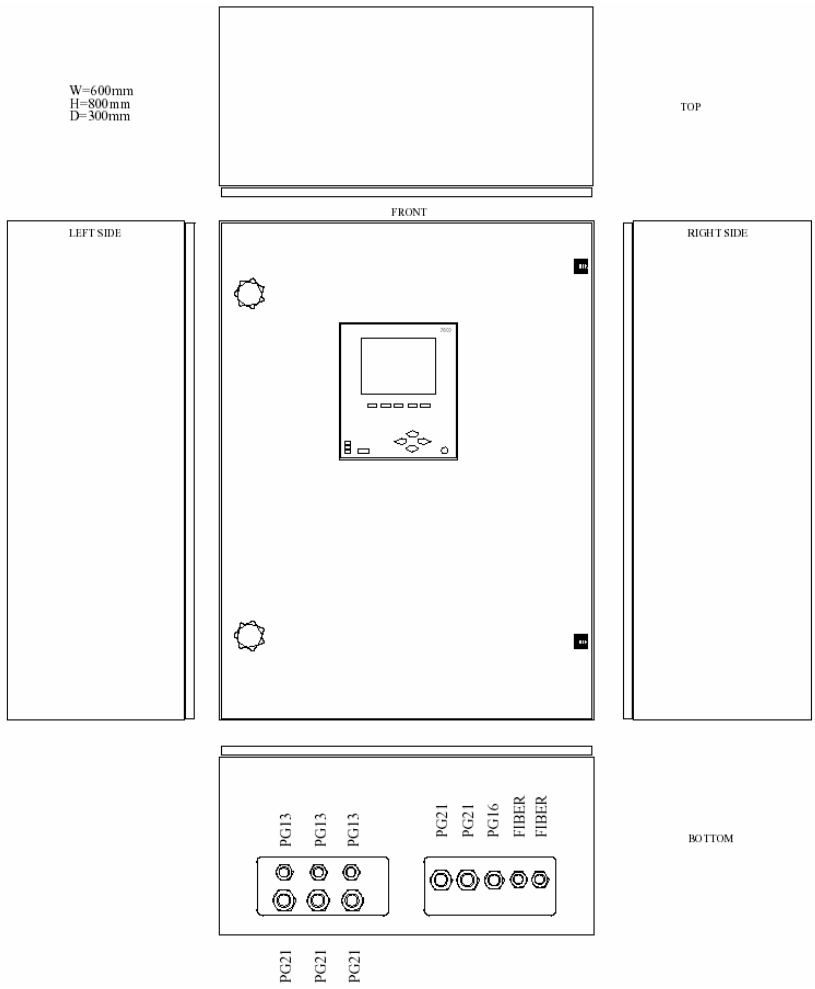
The standard designed panel is intended for indoor wall mounting e.g. in a substation.
These requirements must be fulfilled:

Environment:	Indoor
Temperature range	-20 to +60 C
Humidity	5 to 95% non-condensing
Voltage supply:	100 - 240 VAC, 50/60 Hz or 110 – 330 VDC
Dimensions:	W = 600mm, H = 800mm, D = 300mm

2.2.2 Optional panel specification

The optional panel design is intended for outdoor wall mounting.
These requirements must be fulfilled:

Environment:	Outdoor
Temperature range	-30 to +60 C
Voltage supply:	100 - 240 VAC, 50/60 Hz or 110 – 330 VDC
Dimensions:	W = 600mm, H = 800mm, D = 300mm
Panel enclosure	IP54



2.3 Power meter specifications

The power meter used for the VGMS III solution is a high accuracy quality power meter. The power meter is designed with display for graphical presentations and a web interface for configuration. For further details please go to http://www.pwrm.com

Manufacture:	Power Measurement
Type:	ION7650
Display	87x112 mm
Accuracy	Exceeds Class 0.2 revenue accuracy with true RMS 3-phase voltage, current and power

2.4 Standard Inputs and Outputs

The standard panel is designed with a number of digital in- and outputs that can be configured to monitor the status of a substation breaker, an intrusion alarm or similar.

2.4.1 Standard I/O specification

The standard panel is provided with following functions:

- 8 digital inputs for status/counter functions
- 3 relay outputs for control functions
- 4 solid state outputs for pulse functions

The external wiring for the I/O must be connected at the connector groups at X6, X7 and X8, which can be found in the electrical drawing for the VGMS III panel.

2.4.2 Optional I/O specification

As an option an extension board can be inserted into the ION7650 power meter. The extension board provides the following extra inputs and outputs:

- 8 digital inputs for status/counter functions
- 4 analogue inputs
- 4 analogue outputs

The external wiring for the I/O must be connected at the connector groups at X8, X9 and X10, which can be found in the electrical drawing for the VGMS III panel.

Please note that configuration of <u>any</u> of the I/Os is NOT included in the VGMS III price. Any configuration cost must be handled as a separate quote.

2.5 Voltage and current signal input specification

The following tables describe the available and necessary signal inputs for the VGMS III. To get the an accurate result the grid meter needs as minimum V1, V2 and V3 for the voltage measurements and the I1, I2 and I3 signals for the current measurements.

2.5.1 Voltage inputs

Specification	Description
Inputs:	V1, V2, V3, V4, VREF
Rated Input:	347 LN / 600 LL VAC RMS, Installation category III (Distribution), Pollution degree 2
Overload:	1500 VAC RMS continuous
Dielectric Withstand:	3250 VAC RMS, 60Hz for 1 minute
Impedance:	5 Mohm/phase
Fault Capture:	1400 Vpeak

2.5.2 Current inputs

Specification	Description
Inputs:	I1, I2, I3, I4, I5
Rated Inputs:	20A RMS, Max voltage:600V RMS, Installation category III (Distribution), Pollution degree 2
Fault capture:	50A RMS/70A pk.
Overload:	500 A RMS for 1 second, non-recurring.
Dielectric Withstand:	3250 VAC RMS, 60Hz for 1 minute
Starting current:	0.005 A RMS
Burden:	0.15 VA

3. Historical data collected from the power meter

The power meter processes all the relevant grid parameters based on the voltage and current inputs. The data is then collected and stored in the central SCADA database with a 10-minute resolution.

3.1 Collected 10-minute grid data

The following grid data are stored as averages, minimum and maximum values per phase (L1, L2 and L3) every 10-minutes. If relevant for the signal the phase unbalance is processed and stored as well as the average, minimum and maximum total values:

Voltage	(V)
Current	(A)
Active Production	(kW)
Reactive Consumption	(kVAr)
Apparent Power	(kVA)
Frequency	(Hz)
Power Factor	

3.2 Collected accumulated grid data

The following grid data are stored as accumulated counters. The status of each counter is stored every 10-minutes in the SCADA database:

Total	(kW, kVAr, kVA)
Total Max	(kW, kVAr, kVA)
SD Delivered M Received	(kW, kVAr, kVA)
SD Max Delivered M Received	(kW, kVAr, kVA)
Delivered	(kWh, kVArh, kVAh)
Received	(kWh, kVArh, kVAh)
Delivered P Received	(kWh, kVArh, kVAh)
Delivered M Received	(kWh, kVArh, kVAh)

4. Online data presented from the power meter

The following list of values is online information available as standard through the SCADA client mimics. The list of online values can be increased if customised mimics are part of the project scope.

Energy values:	
Active Power	(kW)
Reactive Power	(kVAr)
Exported active power	(kWh)
Exported reactive power	(kVArh)
Imported active power	(kWh)
Imported reactive power	(kVArh)
Grid values:	
Voltages per phase	(V)
Currents per phase	(A)
Power factor	
Frequency	(Hz)