SMT & HYBRID

Security for alternative energies

Alstom Grid secures the first German offshore wind farm of the power utility provider EnBW (Baltic 1 and 2 in the Baltic Sea) with shock monitoring systems MONI LOG® ShockDisplay curve plus Offshore from SMT & HYBRID GmbH based in Dresden.

Germany is extending its network of alternative energies. In the North Sea there are already four offshore wind farms, in the Baltic Sea two. A total of 87 further systems for both seas are already in the process of construction or are planned.The wind energy comes to land from transformer substations via undersea cables.These platforms combine the power of the wind turbines and transform the voltage from 33 kV to 150 kV for efficient transmission. Here efficiency and reliability are decisive factors in the overall installation. However cold, storms, wave impact, ice and docked ships load the platforms and their electrical equipment. In order to preclude damage, shocks, vibrations, humidity and temperature must be checked carefully and documented.

The MONI LOG® ShockDisplay curve Offshore alarm system is designed for such employment. Highly sensitive sensors monitor and register mechanical shocks, providing information on direction, strength, time, duration, minimum and maximum levels. The presettings are adjustable. In case of limit-value violations, an alarm signal is triggered. The system also stores all procedures with verification, including characteristic curves. In this way, all measurement results can be evaluated in detail. Every platform is equipped with several measuring devices at shock-sensitive locations.

If the values of the devices displayed in real time are compared, it can be identified how a shock spreads from a determined location and influences the equipment. This enables rapid reaction in case of faults - for example the shutdown of components. Consistent monitoring and properly processed measuring data ensure quality and verification in the construction and operating phases.

The wind farm Baltic 1, 15 km north of the Darss Peninsula, has been in operation since 2011 and already supplies electrical energy to 50,000 households. The data loggers have proved themselves so well that Baltic 2, an offshore park 30 km off Ruegen with 80 wind systems and a power capacity for 340,000 households, will also be equipped.

In the constructing of MONI LOG® data logger the SMT & HYBRID GmbH benefit from the practical know-how they had gathered as developer and producer of electronical units for industry, automotive, medicin, transportation and aerospace.

Substation OSS off EnBW wind farm
Baltic 1 in the Baltic Sea Picture 1

Offshore data logger
MONI LOG® ShockDisplay curve *plus* Picture 2

Highly sensitive but extremly robust -
data logger in stainless steel case Picture 3

to data sheet

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MONI LOG®

Offshore alarm system
ShockDisplay curve *plus* MADE IN GERMANY

RUGGED SHOCK MONITORING FOR PLATFORMS

- Registers mechanical influences with the installation / operation of offshore plants
- Highly sensitive and long-term stable acceleration sensors
- Measures and analyses directions, strength, time, signal response of shock and vibration loading
- Alarm and operating indicator contacts for the integration of the system into the control technology
- Multi-purpose sensor for temperature / humidity / pressure
- Rugged and reliable, even under extreme climatic conditions
- Ease of operation, display, alarm function and long operating time
- Including powerful analysis software
- Secure against manipulation with multi-stage password protection
- Internal batteries for automatic function retention in case of grid failure

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Offshore alarm system ShockDisplay curve *plus*

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MONI LOG®

Cold, storms, wave impact and docked ships place extreme loading on the platforms and the electrical equipment of offshore wind parks. The transformer substation as a core item decides the efficiency and reliability of the overall system. Shocks, vibrations, air humidity and temperature must be monitored continuously in order to preclude damage.

The MONI LOG® ShockDisplay curve *plus* Offshore Alarm System is designed for such employment. Highly sensitive sensors monitor and register mechanical influences in real time, with direction, strength, time, duration, minimum and maximum levels. The minimum shock duration is configurable and registration and alarm thresholds can be adjusted separately for each of the 3 space axes. The number of cases of shock and extraordinary loading can be read off directly on the logger, where limit overshoots are indicated by alarm and operating signals, as well as live contacts (Protection Class III), on the control technology of the platform. The system is fixed-installed and works network-linked. Internal batteries guarantee function in case of grid failure. All stored measured values are maintained for years. The MONI LOG® ShockDisplay curve *plus*, with consistent monitoring and properly processed measuring data, ensures quality and verification, both in the installation as well as the operating phases of transformer substations. It enables rapid reaction in case of faults, for example the shutdown of components in case of overshooting limit values. The electronics in the stainless steel housing are installed at the node points of the platform and directly at important shock-sensitive, electrically-operated resources. Measured data indicates how a shock expands from a predetermined location of the offshore platform and influences the equipment. With 4 keys the device is simple to control. A USB interface makes possible fine configuration and data transfer to the PC/laptop. The device status is exactly reproducible because every activity which is relevant for the measured value recording is registered. Manipulations on the device are excluded with password protection, internal storage support, checksums and the protocolling of all procedures. The convenient SYCUR software for the adaptation and analysis of the data is included.

Technical data

Shock measured value recording:	100 events with the largest amplitude, 3-dimensional (X/Y/Z), storage also as a signal response with 1024 ms duration at 2 kHz sampling rate, measuring range 5, 10 20 or 50 G, as well as special design, frequency range 1 ... 512 Hz (3dB, digital frequency filter, 4th Order Bessel), registration threshold adjustable for minimum shock duration and for every shock direction
Inclination measured value recording:	-1g to +1g corresponds to -90° to +90° angle of inclination, in addition 64 acceleration curves in the range -6g to +6g in 3 space axes, dynamic range 0 - 1 Hz, measurement interval adjustable in minutes, recording duration up to 16,000 measurement intervals, self-calibrating with respect to earth axis
Measured value recording Temperature: Humidity: Pressure:	Factory-calibrated, multi-purpose sensor -40 to +85° C, resolution 0.1 K, precision ±1 K, 0.2 - 100 % rH, resolution 0.1 % rH, precision ±3% rH (20 - 80 % rH), ±5% rH (0 - 100% rH), 260 - 1260 mbar, resolution 1 mbar, precision ±1 mbar (T = 25°C), ±2 mbar (0°C to +80°C)
Display and control elements:	illuminated display and four function keys, multilingual (DE, EN, FR), password-protected menu
Interfaces:	USB 1.1 and RS-232 for connection with a PC for configuration and assessment
Housing, weight and dimensions:	lockable stainless steel casing, Protection Level IP 65, 11 kg, 300 x 300 x 190 mm
Operating / Storage conditions:	-20 ... +40°C, max. 95 % relative humidity, non-thawing, special solutions for higher demands on request
Interface conditions:	Voltage supply: 90 - 250 V AC or 120 - 250 V DC, 100 mA, 47...63 Hz, fuse T 1 A L 250 V, connection to N and L polarity-independent Add. consumer: maximum permissible continuous current 8 A (loop through) Fusing: 6 A l.v.h.b.c. supply line fuse-protection required Relay contacts: Coil contact insulation voltage 2.5 kVrms Switching capacities max. 300 V DC, 250 V AC 6 A max. AC current rating Connection cable: 0,25 mm² to 4 mm²
Power supply internal:	2 cells of construction design D (R 20) of type alkaline or lithium, operating time up to 6000 h
Fixed parameters:	Measuring ranges 5, 10, 20, 50 G (special design on request), filter characteristic of the digital frequency filter to 512 Hz
Programmable measuring parameters:	Registration threshold from 5% of the measuring-range end value, min. period of event from 1 ms, alarm threshold for shock amplitude, registration threshold for inclination measurement, password, switch on/off protection, time
Software:	For operating systems Windows 2000/XP/7/8, signal analysis graphic and tabular with export functions, frequency analysis according to DIN EN 13011, parameterization of the devices, indication of the status data and active time periods of the device, help function, multilingual DE, EN, FR