MCon Sigicom

SHM01

A STRUCTURAL HEALTH MONITORING SYSTEM FOR WIND TURBINE STRUCTURES

Efficiency through prediction and prevention

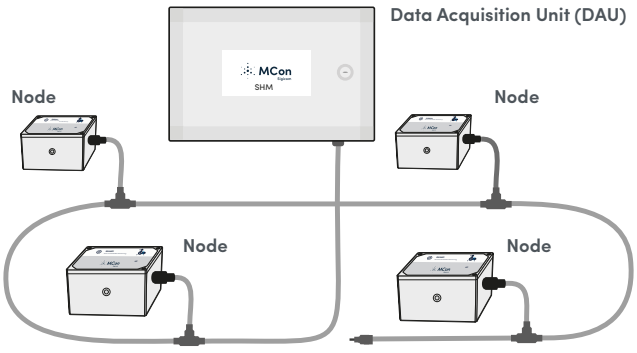
The SHM01 is a digital system for Structural Health Monitoring for wind turbine structures.

The SHM01 system is designed to make installation, data collection, and service smooth and hassle-free. Pre-existing knowledge of the equipment is not needed, and the user can start monitoring without spending much time on preparations. Analogue-to-digital conversion is done at each node while signal processing is done upon request in the cloud.
SHM01 is available for purchase or rental.

Predict, Prevent, Optimize – Save time and costs
SHM01 is customized for enabling service-life predictions, real time warnings in case of abnormal behaviour, and structural response to loads and production. The data will provide insight for decision making in all phases during the design life of the structure.
For optimal use and power production together with a sufficient baseline it is key to initiate monitoring at an early stage.

Easy Installation
SHM01 employs an installation solution that minimizes cabling, thereby saving time and reducing installation cost.

The system consists of four nodes each containing a triaxial geophone and a uniaxial inclinometer for monitoring the dynamic and static position of the tower. Utilizing a single string digital cable, the nodes are connected with minimal cabling in a



The SHM01 system

"daisy-chain" configuration. The cable goes from the Data Acquisition Unit (DAU) to the nodes in a sequence, connecting the DAU to the first node followed by the second node and so forth in a "daisy-chain" concept.

The standard system includes a total of 135 meters of cables.The four nodes should be mounted at the same height in the tower and evenly spaced 90 degrees apart for optimal performance.

Built to Last: 10+ years of reliable performance
The system is designed for a +10-year service life, provided that the annual service agreement is purchased and kept. Design life can be extended beyond the 10 years provided normal use.

The SHM01 system warranty is void if alternative solutions, services, or expansion of the system are made without previous approval from Sigicom MCon ApS. Warranty and expected lifetime are provided for normal use, namely that the installation is permanent, or otherwise an agreement is reached with Sigicom MCon ApS.

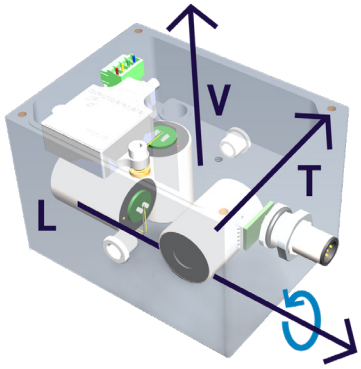
Technical Data

NODE

The node is enclosed by a milled anodized aluminum housing. The IP rating of the node is IP67.

Analog-to-digital conversion occurs directly at the node, minimizing noise and interference. Thanks to the excellent Signal-to-Noise Ratio (SNR), the geophone operates within a signal bandwidth of 0.05–10 Hz with a sampling rate of 32 Hz. The maximum vibration level depends on frequency. For detailed information on maximum vibration levels and frequency-dependent accuracy, please contact us.

The inclinometer is a solid-state MEMS with internal digital signal processing and an analogue output of the gravitational force. The range is +/- 10°. The relative accuracy (linearity) is +/- 0.01° (at 20°C). The resolution and noise are in total 0.001° with a frequency low pass at 3 Hz.



DATA ACQUISITION UNIT (DAU)

The Data Acquisition Unit (DAU) manages the communication to and from the nodes and the cloud, the latter over TLS encrypted MQTT protocol via Ethernet. Other solutions will require adjustments.

Data is collected locally and transmitted to the cloud. If the connection is lost, the data remains stored and accessible locally for a period of two months.
The DAU and sensor nodes can be managed, and the software updated remotely. This however requires that the service agreement is included.

The DAU is housed in a UL94-5VA approved and rugged polycarbonate enclosure resistant to dust and water. The DAU requires a stable internet connection, which the user must ensure is available.

CLOUD APPLICATION

The DAU provides quality data in engineering units to the customer via an API pull service. Final storage of customer data is based on agreement and needs of the customer.

DETAILS

Contact us for the specific maximum range in displacement, velocity, and acceleration together with frequency-dependent noise and accuracy.

POWER SUPPLY

100-240V AC 50-60 Hz power supply.

MOUNTING

The nodes are designed to be bolted into a threaded connection on the inner face of the tower. For a fast and secure attachment, they can also be mounted using a magnet combined with glue. This dual fastening system ensures a rigid connection, minimizing unwanted movement that could affect the signal. Additionally, the system is designed to accommodate other mounting options as needed.

SERVICE AGREEMENT

Sigicom MCon ApS service agreement is customized to the specific project. Services may include calibration, hardware replacement and update, software updates, remote system service and data error handling. The agreement will include the items purchased by the customer.

Note! Service of the system requires that Sigicom MCon ApS has remote access to the installed system. Access should preferably be constant, but service can also be provided with periodic access during time of service.

ABOUT MCON

Mcon specializes in Structural Health Monitoring (SHM) focusing on wind turbine integrity. Its flagship system, SHM1, is designed to deliver precise data collection and hassle-free installation, enabling predictive, proactive, and targeted maintenance. With deep expertise in monitoring technology, Mcon empowers wind energy professionals with reliable insights to enhance operational efficiency and extend asset lifespan. A subsidiary of Sigicom, Mcon benefits from a strong foundation in measurement technology while dedicating itself exclusively to specialized SHM solutions.

FOR MORE DETAILED INFORMATION

Simon Rex, Head of SHM
Phone: **+45 5070 2595** Email: **simon.rex@sigicom.com**
www.sigicom.mcon/com