SEMEX ENGCON

Compact monitoring platform for civil engineering, structural dynamics, and seismic applications

MENHIR is a high performance and versatile platform for civil engineering, structural dynamics and seismic monitoring applications requiring easy-to-use but highly reliable instrumentation solutions. Besides the outstanding measurement performance **MENHIR** is a very intuitive instrument for quick deployment and remote access and configuration.

MENHIR comes in a very compact but robust form factor for easy deployment even in harsh environments. It can be configured in modern IoT-compliant network topologies using both wired and wireless communication channels.

MENHIR comes along with the cloud based **SmartDataCenter** (SDC) for intuitive and powerful server based data management, analysis, visualization, and tailored expert report generation in compliance with a large and growing suite of standards.

Applications

Construction

- Construction, Blasting, Railways, Infrastructure monitoring in compliance with many national and international standards

Structural Dynamics

- Dams, Buildings, Bridges
- Response spectra analysis
- Modal Analysis

Seismic

- Tectonic/volcanic unrest monitoring

Features

- Embedded tri-axial Geophone (DIN 45669) or tri-axial Accelerometer (MEMS)
- Sensor Bus for external sensors (surface or borehole)
- 24-bit A/D Converters, multiple sample rates
- Versatile Connectivity (Ethernet, Wireless, GPS)
- M2M communication (GSM, UMTS, LTE)
- Power Output Relay
- Highly Secure TLS/SSL internet protocol
- Lossless Data Compression
- Precise Common Trigger for network operation
- Embedded Battery and Charger
- Transient and EMI/RFI protection
- IP-65 rugged enclosure (optionally IP-67)
- MiniSEED/SEEDLink data streaming

SEMEX-EngCon GmbH
76275 Ettlingen, Germany
info@semex-engcon.com
www.semex-engcon.com

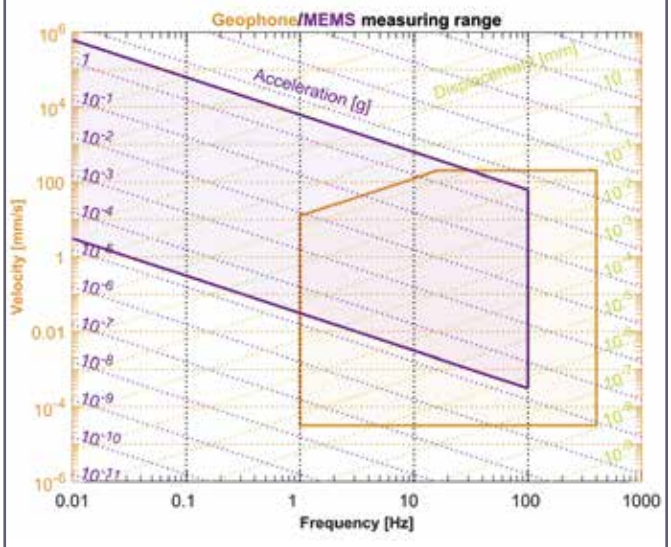
AIRCERT
Certified to DIN EN ISO 9001:2015

SEMEX ENGCON

Technical Details

Embedded Sensor Options (factory setup)

Technology	Geophone (Velocity)	MEMS (Acceleration)
Measuring Range	± 200 mm/s	± 5g
Topology	Tri-axial, orthogonally oriented	



Data Processing

Compliance	Data Processing in compliance with national and international standards, such as D: DIN-4150-2/3 CH: SN 640 312 A: ÖN S9012/20 F: Circulaire '86 UK: BS EN ISO 8041/4866 NL: SBR-A/B Others to follow
Acquisition	3 independent channels with high dynamic range (> 130 dB RMS @ 100 sps)
Sample Rates	100, 200, 400, 500, 800, 1000 sps Others on request
Trigger	Multiple, simultaneous trigger criteria selectable in time and frequency domain Flexible trigger votes with combinations across channels Common network trigger
Alarm	Multi-level alarm notification to dedicated stakeholders (SMS, Email) and to Relay Output State-Of-Health alarm
Data Storage	Internal SDHC card (4GB default) in industrial quality.
Export Format	Compressed (lossless) MKA, CSV, ASCII, XMR/BMR, SEEDLink/MiniSEED

Interfaces

LAN	1 x Ethernet 10/100Base-TX, IEEE 1588 compliant
Sensor Bus	1 x RS-485 (isolated)
Relay	1 x Power Relay (normally open), 2A
On/Off	1 x Push Button + LED
SIM-Card	1 x SIM-Card slot for cellular operation

Wireless Connectivity

Cellular (M2M)	GSM, UMTS, LTE
WLAN (short range)	802.11 b/g/n compatible, Access Point and Station mode
Sub-1 GHz (long range)	863-870 MHz SRD band with up to 2 km line of sight (LoS)
GNSS	GPS optional

Communications

Secure content delivery	Secured delivery (TLS/SSL) to SmartDataCenter™ server Optional FTP file transfer to proprietary server
Remote access	Secured access from SmartDataCenter™ cloud application
Local access	Secured WLAN access to internal web-server through graphical user interface

Power

Supply Voltage	9…36 VDC unregulated
Protections	Reverse voltage, over/under voltage, Self-resettable fuse Power supply isolated from signal ground
Autonomy	Internal Li-Ion battery with charge control
Consumption	< 3W

Physical

Mounting	3 adjustable feet with bubble level
Housing	Corrosion resistant aluminum
Dimensions	200 mm x 140 mm x 108 mm
Weight	4.5 kg

Environmental

Temperature Range	Operating: - 30°C to 60°C Storage: - 40°C to 75°C
Humidity	0-100% RH (non-condensing)
Enclosure rating	IP65 (IP67 optional)

Certification & Conformity

Electrical Safety	In compliance with DIN EN 61010-1
EMC	In compliance with DIN EN 61326-1
Conformity	CE

SEMEX-EngCon GmbH
76275 Ettlingen, Germany
info@semex-engcon.com
www.semex-engcon.com

AIRCERT
Certified to DIN EN ISO 9001:2015

Attachment Options

MENHIR can be extended with further attachments, such as AC/DC converter, external sensors (surface and borehole versions) and optical/acoustical alarm beacons (cf. dedicated datasheets).

External Surface Sensor

		
Topology	Tri-axial or Bi-axial (horizontal)	Uni-axial (vertical) Up to 3 sensors combinable through junction box
Mounting	3 adjustable feet with bubble level	
Housing	Corrosion resistant aluminum, IP65	
Dimensions Diameter Height	100 mm 75 mm	89 mm, 70 mm
Weight	1.8 kg	1.0 kg
Cable Length	3 m others on request	5 m others on request

External Downhole Sensor

		
Mounting	Eccentric disc clamping towards inclinometer tube	
Housing	Stainless steel, IP68	
Dimensions	Diameter: 70 mm, Length: 200 mm	
Weight	3.5 kg	

Opto-Acoustical Alarm Beacon

		
Connectivity	Direct wiring to MENHIR Power Relay Output	Wireless 433 MHz
Power Supply	MENHIR (9…36 VDC)	Transmitter: MENHIR, Receiver: ext. 12… 24 VDC, 85…260 VAC

Anti-Theft Lock Kit

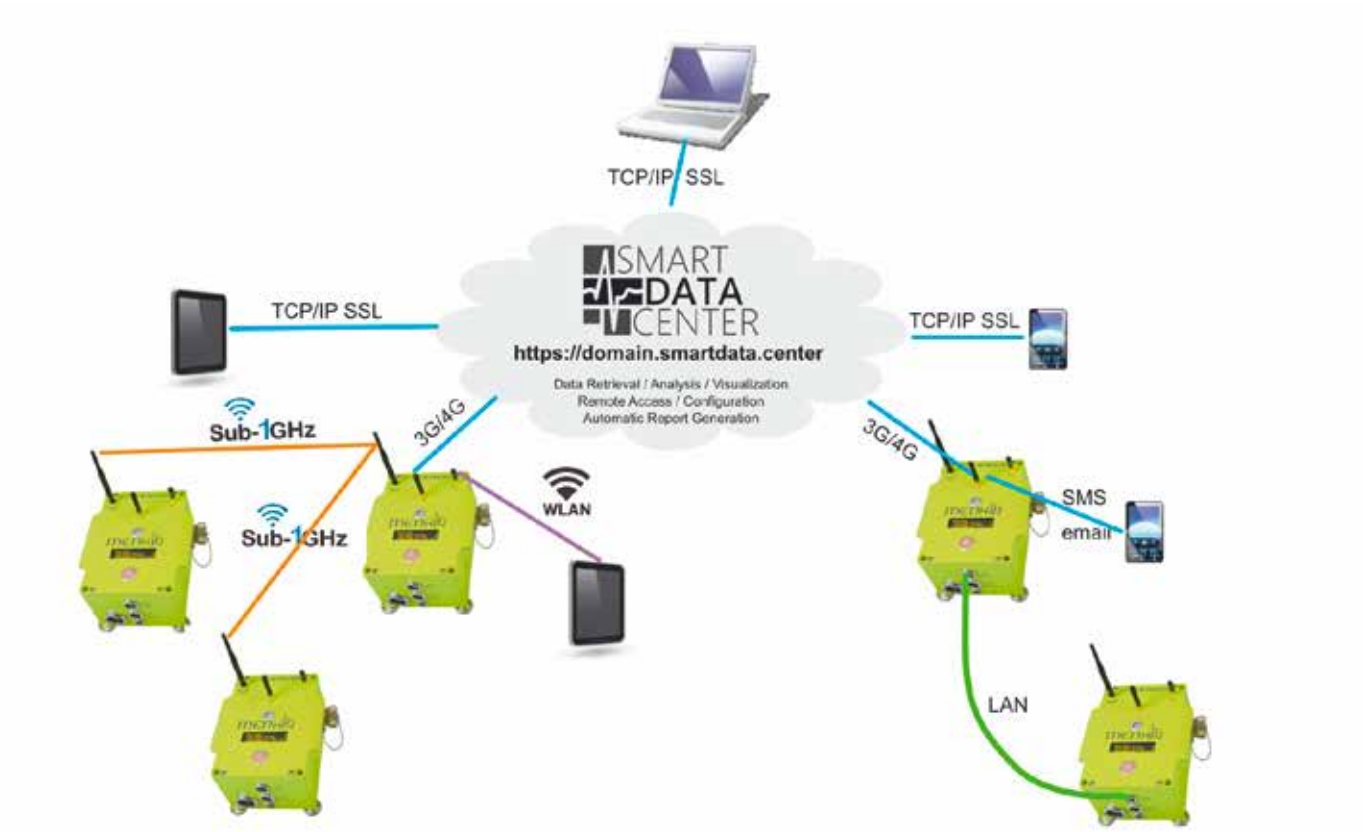
SEMEX-EngCon GmbH
76275 Ettlingen, Germany
info@semex-engcon.com
www.semex-engcon.com

AIRCERT
Certified to DIN EN ISO 9001:2015

SEMEX ENGCON

SmartDataCenter

SmartDataCenter (SDC) is a powerful cloud-based application software that is perfectly tailored to manage unlimited vibration monitoring projects.



SmartDataCenter provides unconstrained and highly secured remote access to all connected **MENHIR** devices and **MENHIR** networks. Analysis and visualization of acquired data in compliance with applicable standards allow for fast conclusion of the vibration impact. Report templates provide automatic generation of tailored reports to dedicated stakeholders.

SEMEX-EngCon GmbH
76275 Ettlingen, Germany
info@semex-engcon.com
www.semex-engcon.com

AIRCERT
Certified to DIN EN ISO 9001:2015