### 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



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### **Technical Details**

Measuring Range Topology Tri-axial, orthogonally oriented Geophone/MEMS measuring range	echnology	Geophone (Velocity)	MEMS (Acceleration)													
Tri-axial, orthogonally oriented	leasuring	± 200 mm/s	± 5g													
Geophone/MEMS measuring range	lange															
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0.01 0.1 1 10 100 Frequency [Hz]	0.01 0.1	1 Frequency (														

Data Proces	sing								
Compliance	Data Processing in compliance with national and international standards, such asD:DIN-4150-2/3CH:SN 640 312A:ÖN S9012/20F:Circulaire '86UK:BS EN ISO 8041/4866NL:SBR-A/BOthers 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 selecta- ble in time and frequency domain Flexible trigger votes with combinations across channels Common network trigger								
Alarm	Multi-level alarm notification to dedicated sta- keholders (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								

Testenformen	
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 Co	onnectivity
Cellular	GSM, UMTS, LTE
(M2M)	
WLAN	802.11 b/g/n compatible,
(short range) Sub-1 GHz	Access Point and Station mode 863-870 MHz SRD band with up to 2 km
(long range)	line of sight (LoS)
GNSS	GPS optional
Communico	
Secure content	Secured delivery (TLS/SSL) to SmartDataCenter™ server
delivery	Optional FTP file transfer to proprietary server
Remote	Secured access from SmartDataCenter™
access	cloud application
Local access	Secured WLAN access to internal web-
	server through graphical user interface
Power	
Supply Voltage	936 VDC unregulated
Protections	Reverse voltage, over/under voltage,
	Self-resettable fuse
	Power supply isolated from signal ground
Autonomy	Internal Li-lon 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
Environmen	ıtal
Temperature Range	Operating: - 30°C to 60°C Storage: - 40°C to 75°C
Humidity	0-100% RH (non-condensing)
Enclosure	IP65 (IP67 optional)
rating	
Certification	n & Conformity
Electrical Safety	In compliance with DIN EN 61010-1
EMC	In compliance with DIN EN 61326-1
Conformity	CE

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### **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 Su	rfαce Sensor					
		<del>,</del>				
Topology	Tri-axial or Bi-axial (horizontal)	Uni-axial (vertical) Up to 3 sensors combinable through junction box				
Mounting	3 adjustable feet with I	oubble level				
Housing	Corrosion resistant alu	minum, 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 Do	wnhole Sensor					
Mounting	Eccentric disc clampir	g towards inclinometer				

Mounting	Eccentric disc clampin tube	g towards inclinometer
Housing	Stainless steel, IP68	
Dimensions	Diameter: 70 mm, Len	gth: 200 mm
Weight	3.5 kg	

Opto-Acous	tical Alarm Beaco	on			
	P	<b>?</b> .			
Connectivity	Direct wiring to MENHIR Power Relay Output	Wireless 433 MHz			
Power Supply	MENHIR (936 VDC)	Transmitter: MENHIR, Receiver: ext. 12 24 VDC, 85260 VAC			
Anti-Theft I	ock Kit	·			







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# 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.

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