

MADE IN GERMANY

MONI LOG® Sensor network

SMART NETWORK SYSTEM FOR TRANSPORT MONITORING



- Radio sensor network comprising up to 8 autonomous sensor modules
- For the long-term monitoring of oversizing systems and machines
- Continuously records shock, slope, temperature, humidity, pressure and incidence of light
- Provide real-time monitoring of sensitive transports for optimum conditions in transport, packaging and storage
- Automatic transmission of GPS geo-position, data measurements, alarm and status signals by e-mail
- Centralized GSM/UMTS transmission unit with integrated GPS receiver for exact position determination
- Variable configurations for customized applications
- Individually-adjustable registration and alarm thresholds, scalable number of measuring points
- Ultra-long operating time and high reliability even under extreme environmental conditions
- Incorporates powerful, license-free PC software, password-protected and secured against malevolent attacks
- Cloud-based Web portal for convenient on-line administration and tracking of transportation route

MONI LOG[®] Sensor network



MONI LOG[®] data link sensor Radio base station with GPS receiver and GSM/UMTS transmission unit

Technical data

Housing	Housing material	Aluminium, paint-coated	
	Degree of protection	IP 65	
	Weight		1.15 kg (standard implementation including batteries)
			3.35 kg (option with external battery box, batteries, magnetic mounting feet)
	Dimensions (H x W x D)		160 x 90 x 60 mm ³ (standard implementation)
			230 x 130 x 145 mm ³ (option with external battery box and magnetic mounting feet)
Assembly type		Surface mounting (screwed connection recommended), alternatively magnetic-foot mounting	
In-service conditions	Operating / Storage conditions	-20° C to +70° C with alkaline batteries -40° to +85° C with lithium batteries	
Voltage supply	Internal	4 batteries of the type C and R14 (replaceable), alkaline batteries (each 1.5 V), lithium batteries (each 3.6 V) Operating time up to 1 year (with email interval of 24 h) or for 2 years with external battery box	
	External	5 - 15 V (max. 3 A) or battery box with 4 battery types D (R20)	
External interfaces	USB	USB 2.0 Client (Mini-USB AB)	
	Digital inputs/outputs	2 switching inlets and 2 switching outputs (M12-plug optional)	
Display and control elements	Display	Bistable monochrome display (96 x 96 pixels)	
	LED	Status-LED (red/green)	
	Keys	4 operating keys for menu navigation and user inputs	
GPS	Channels	22	
	Antenna	SMA socket for the connection of an external active antenna 50 Ω 3 - 30 mA/3 V/rod or cable antenna)	
Mobile communications	Frequency ranges	Quad Band EGSM/GPRS (850/900/1800/1900 MHz) Triple Band UMTS/HSPA (850/1900/2100 MHz)	
	SIM card	Receptacle for 1.8 or 3 SIM card Standard SIM, micro SIM (on request)	
Bluetooth	Version	Bluetooth 4.0 Low Energy (master role)	
	Encryption	AES-128	
	Radio link	Simultaneous 2.4 GHz radio link to up to 8 MONI LOG [®] sensor modules (for data synchronisation and device configuration)	
Data memory	Data reception	At least 10 years (independent of battery status)	
	Memory type/size	512 MB flash parameter and data storage	
Device certification		CE, IC, FCC, registration with Bluetooth SIG	



MONI LOG[®] sensor module

universal radio data logger to record acceleration/shock, inclination, temperature, humidity, air pressure and incidence of light

Technical Data

Housing	Housing material	PVC + aluminium	
	Degree of protection	IP65	
	Weight	0.385 kg (standard implementation including 1 battery)	
		0.455 kg (variant 2LR6 including 2 batteries)	
		38 g (each with magnetic base, 3 items per module optional)	
Dimensions (H x W x D)	120 x 72 x 41 mm ³ (standard implementation)		
	120 x 72 x 54 mm ³ (variant 2LR6)		
	Ø 25 mm x 15 mm (small magnetic base)		
Assembly type	Surface mounting (screwed connection recommended), alternatively magnetic-base mounting (on request)		
In-service conditions	Operating / Storage condition	-20° C to + 70° C with alkaline batteries	
		-40° C to + 85° C with lithium batteries	
Voltage supply	Internal	1 battery type AA or R6 lithium 3.6 (standard implementation) or	
		2 batteries type AA or R6 lithium or alkaline (variant 2LR6 or 2LR6AL) or 6 batteries type AA or alkaline R6 as a battery pack (variant 6LR6AL), Operating time dependent on the model and settings, e.g. 1 *R6: 2 years (with synchronisation interval 10 min); 2 years (2LR6, 6LR6AL)	
External interfaces	USB	USB 2.0 Client (Mini-USB OFF)	
Display and control elements	LED	1 green activity-LED + 1 red status-LED	
	Key	1 operating key	
Bluetooth	Version	Bluetooth 4.0 Low Energy (slave role)	
	Encryption	AES-128	
	Radio link	2.4 GHz to MONI LOG [®] data link sensor	
Data memory	Data reception	Minimum 10 years (independent of battery status)	
	Storage type / size	32 MB flash parameter and data storage	
Device sensors			
Measurement variable	Measuring range	Tolerance	Data records
Acceleration / Shock (Shock-sensor modules only)	±16 g (3-axes)	±0.32 g	256 curves
	In case of exceeding a registration threshold of 0.3 g, a shock curve is recorded (2 kHz, 1 s). The 256 highest shock curves are stored.		
	(optionally 100 g; from 3 g 1 kHz)	±2 g	
Temperature	-40° C - 85° C	±0.5° C	200,000
Relative humidity	0% RH - 100% RH	±2% RH	200,000
Air pressure	260 - 1260 mbar	±2 mbar	200,000
	(optional 10 - 2000 mbar)	(±4 mbar)	
Light	0 lx - 188000 lx	±10%	200,000
Slope	Slope calculation from static acceleration		
	In case of exceeding a slope threshold, a slope curve (10 Hz, 8 s) is recorded.		
		±3 degrees	320 curves
Conformity	Device certification to CE, IC, FCC		
	Registration with Bluetooth SIG		
	Shock evaluation according to EN 15433-6		
	Frequency analysis according to EN 13011		



MONI LOG[®] Sensor network

The MONI LOG[®] sensor network consists of the MONI LOG[®] data link sensor base station and up to 8 MONI LOG[®] sensor modules of radio data loggers. The compact, energy-efficient and high-sensitivity sensor modules capture data relevant to transport, such as shocks, acceleration, temperature, humidity, air pressure, inclination and light. All data are collected via a Bluetooth low-energy radio interface in the base station. It transmits them at adjustable intervals via a mobile network as an e-mail to the desired recipient or directly to the MONI LOG[®] web portal. If a configured limit value for measured data is exceeded, a message is sent to the base station. It records the current GPS position and immediately sends an alarm mail. Critical events during a transport can thus be tracked in real time and the user can react to possible risks for his sensitive freight. If a UMTS connection is not possible, the base station automatically switches to an available GPRS network. The stored GPS coordinates can be imported and displayed in Google Earth[®]. In addition to the event-controlled position determination in the event of an alarm, route tracking is also possible.

The small radio data loggers can be installed particularly well in places which are difficult to access or move. Robust housings protect the devices of the sensor network from dust and splash water. An optimised energy management ensures a long and

maintenance-free operating time. Commercially available alkaline or lithium batteries guarantee running times of more than 2 years under extremely harsh conditions.

The functions of the base station and the individual sensor modules can be intuitively adapted to the respective requirements with a license-free PC software. All collected data is displayed in the table of measured values and diagrams and can be exported to external programs such as Microsoft Excel. The analysis of the data helps to reconstruct possible damage cases, analyse and optimize shipping processes.

The MONI LOG[®] Sensor Network is an indispensable goods companion for international freight transport both on rails and on roads, on water and in the air, on transshipment points and in storage rooms.