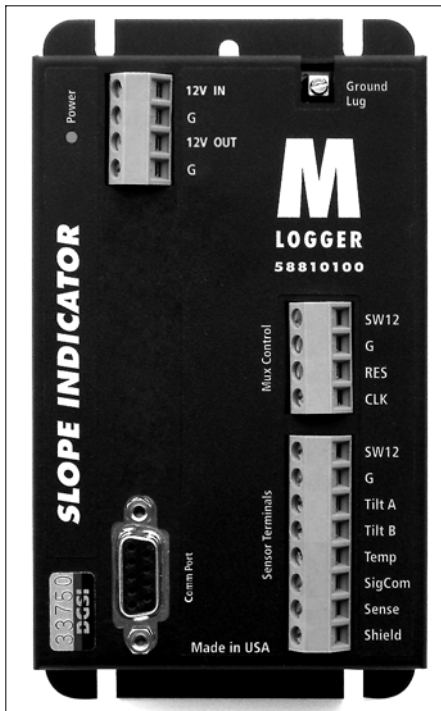


M-Logger for MEMS Sensors



Applications

M-Loggers are used to monitor Slope Indicator MEMS sensors. They are also compatible with EL-SC sensors.

Simple to use and economical to deploy, M-Loggers can be placed close to sensors, enhancing reliability and keeping cable costs down.

When M-Loggers are equipped with wireless communications modules, data can be retrieved automatically and forwarded to a web-based monitoring site, such as Atlas.

Typical applications include:

- Top-of-hole monitoring of in-place inclinometer sensors.
- Local monitoring of EL SC beam sensors, tiltmeters, and track sensors.
- Monitoring in areas where heavy traffic or electrical noise make cabling impossible.
- Monitoring sensors that are too widely distributed for connection to a centralized logging system.

M-Logger System Components

M-Logger: Each logger can monitor one chain of 16 serial sensors, or one multiplexer with 16 standard sensors connected, or one standard sensor connected directly.

Power Supply: The M-Logger is normally powered by a 12V battery. Long-term deployment or wireless communications require a charging regulator for the battery and a power source such as an AC adaptor or a solar panel.

Multiplexer: Serial sensors eliminate the need for a multiplexer. However, a multiplexer is required to connect multiple, non-serial sensors.

Weatherproof Enclosure: Small and medium size enclosures are available. The medium enclosure is required if a multiplexer is used.

Communications Modules: The M-Logger can work with point-to-point radios, cellular modems, or Wi-Fi radios. It can also be deployed with no communications module.

Windows Software: Manager software supplied with the logger is used to set up the loggers and to retrieve data from the loggers. It also offers scheduled, automatic data retrieval and can push data files to specified internet addresses.

Advantages

Simple Setup: M-Loggers are very easy to configure. The user enters a list of sensors, sets a start time, and specifies a logging interval. After that, the logger is ready for work.

Cost-Effective: Local deployment of loggers eliminates the cost of installing and protecting long runs of cable to a centralized logger.

Spreadsheet Friendly: CSV files from the logger are ready for import, with dates and numbers formatted to the regional settings in Windows.

Wireless Data Retrieval: Manager software makes wireless data retrieval easy and automatic. Data can also be retrieved via wired connections.

Push to Web: Manager software can forward data files to a web-based monitoring site, such as Atlas, for automated processing.

Automation-Ready: Data formats for automatic processing include the Campbell Scientific table format and the Slope Indicator ID format.

M-LOGGER

M-Logger58810100

The M-Logger includes Manager software and a serial interface cable for connection to a PC.

Function: The M-Logger is a data logger for Slope Indicator MEMS sensors and EL SC sensors.

Capacity: One chain of 16 serial sensors, or one Campbell Scientific multiplexer with 16 standard sensors, or 1 standard sensor connected directly.

Memory: Non-volatile flash memory holds 7,900 records for each sensor. Each record includes time and date, A and B-axis tilt readings, and temperature reading.

Logger Resolution: 0.004% FS (16-bit) for tilt readings. 0.1°C for temperature readings.

Logger Accuracy: ±0.02% of tilt reading at 20 °C or ±0.06% of tilt reading at -20 to +50 °C.

Logging Interval: 30 second minimum interval; 7 day maximum interval.

Serial Port: RS-232 serial port for connection to PC, point-to-point radio, Wi-Fi, or cellular radios.

Power In: Nominal 12Vdc (8 to 15Vdc). Power LED indicates that M-Logger is operational.

Power Out: Switched 12V output for serial sensors or multiplexer.

Environmental: Temperature rated for -20 to +50 °C. Logger normally housed in an enclosure.

Dimensions: 120 x 80 x 40 mm. (4.7 x 3 x 1.6").

MANAGER SOFTWARE

Manager Software **Download**

Function: Used to configure the logger, display real-time sensor readings, retrieve readings, and forward readings.

System Requirements: Runs on Windows XP, Vista, and Windows 7. Communicates with logger via an RS-232 serial connection. If PC has only USB ports, a USB-serial adaptor is required.

Settings: Logger ID, real-time clock, memory mode, sensor list, multiplexing mode, logging schedule, and communications parameters.

Real-Time Readings: The Manager program can display real-time readings of sensors when PC is connected to the logger. This is useful for testing at installation time.

Automated Data Retrieval: The Manager program can retrieve data on demand or automatically according to a preset schedule. Works with all communications modules.

File Formats: CSV, Campbell Scientific, and Slope ID. CSV uses Windows regional settings for date, time, and numbers and is suitable for spreadsheets. The Campbell Scientific format and Slope ID formats are useful for automation and monitoring software, such as Atlas.

MULTIPLEXER OPTION

AM16/32 Multiplexer 56702110

Terminal Board 26811615

Connection of multiple standard sensor requires a multiplexer and a terminal board. The terminal board is used to connect power wires from multiple sensors. Note that serial sensors do not require a multiplexer.

POWER OPTIONS

Battery, 12V 7ah 01940004

Battery Bracket 58810160k

Charging Regulator 58810161k

AC Adaptor 58810165

Solar Panel, 10W 56703310

Solar Panel, 20W 56703325

A battery and battery bracket are normally ordered with every system. A 12V 7ah battery can power an M-Logger taking hourly readings for about 100 days.

For longer term deployment or when wireless communications are used, the charging regulator and a power source are required.

The logger is powered by a 12 V battery. The AC charger includes various wall plugs, while the solar panel includes hardware for mounting on poles and requires the charging regulator kit.

WEATHERPROOF ENCLOSURES

Small Enclosure 56705005

Medium Enclosure 56705010

System Assembly 96700005

Weatherproof enclosures are required for outdoor applications. These strong fiberglass enclosures provide an external grounding lug and an opening for cable entry. Since enclosures are non-metallic, cell modems and radios can be used without external antenna.

The small enclosure is suitable for systems that monitor serial sensors or a single standard sensor. The medium enclosure is required for systems with a multiplexer.

The system assembly charge is required when components are mounted in the enclosures at the factory.

POINT-TO-POINT RADIOS

Logger Radio, 2.4 Ghz58810250k

Base Station Radio, 2.4 Ghz52613455

Logger Radio, 900 Mhz58810260k

Base Station Radio, 900 Mhz52613450

Point-to-point, spread-spectrum radios support line-of-sight links between a base station radio and multiple logger radios. With the included quarter-wave antenna, 2.4 Ghz radios have a range of up to 0.6 km (0.4 miles). 900 Mhz radios (North America) have a range of up to 1.12 km (0.7 miles).

Order one logger radio for each logger. Logger radios include a mounting bracket, a serial cable and power cable for connection to the logger.

Order one base station radio for the PC. Base station radios include a USB cable for connection to the PC.

CELLULAR MODEMS

GPRS IP Modem56704510k

CDMA IP Modem56704515k

Modems include power cable and serial cable for connection to the logger, a mounting bracket, a half-wave antenna, and a configuration CD.

The GPRS quad-band modem is suitable for international deployment. SIM card and data service must be obtained by the user.

The CDMA modem works with the Verizon network in the US. Modems for other CDMA providers are also available. Data service must be obtained by user.

ATLAS WEB SERVICE

Atlas Monthly Web Service58851050

Atlas Prepaid Web Service58851090

Atlas Activation Fee58851000

Atlas web-based monitoring software is offered as a hosted web service with monthly or prepaid plans. The service includes an unlimited number of projects, graphs, reports, and users, and includes 50 sensors. More sensors can be added for an additional fee. Accounts for large scale monitoring are also available.

The web service cost effective and easy to set up. Data are stored at a secure data center that provides automatic backups and multiple connections to the internet and there is no software to install and maintain. Users need only their web browsers.