

DAQ Series

Dynamic Data acquisition and logging

DAQ Series systems are used to enhance data collection in a wide array of project types, including noise and vibration monitoring, structural health monitoring and research and development. Built from components supplied by leading manufacturers, these data loggers are tailored to each application and open a new window into analyzing the state of critical structures and infrastructures. They are rugged, reliable and can add value to any project.



Why use the DAQ Series?

The DAQ Series data loggers are designed to acquire and store data from many types of instruments at a high sample rate. Standard structural health monitoring or geotechnical monitoring require only a few measurements per day due to slow changing parameters. However, some behaviours cannot be adequately followed with regular monitoring, such as sensitive clays that can be subject to bursts of overpressure after a blast or of railway tracks that can develop fatigue due to poor ballast quality. These effects can only be quantified using dynamic data acquisition synchronized with external events.

The DAQ Series offers *smart* acquisition: it allows for acquisition rates that can be changed according to events, it can control other systems such as pumps or cameras, or it can receive external triggers to acquire high-speed data.

How do they work?

A DAQ Series is built from Campbell Scientific Granite platform and allows for the simultaneous collection of multiple instruments. This data can then be stored in the expandable on-board memory as well as transferred over the Internet to a secure remote storage location.

Example applications

❑ Railway monitoring

Railway tracks that are subject to freeze-thaw cycles may be poorly supported and develop fatigue over time. Installing strain gauges at susceptible locations and monitoring at a high frequency make it possible to estimate changes in the hardness of the rail over time and intervene before critical failure occurs.

❑ Structural health monitoring

Large steel structures such as cable-stayed and steel truss bridges have natural modes of vibration that can be monitored to help detect defects and signs of fatigue over long periods of time. This application requires high-speed data acquisition and advanced calculations to extract the spectral response of the structure.

❑ Sensitive soils

The structural integrity of sensitive soils can cause landslides, sensitive clays or peatlands can be compromised by short and intense events such as blasting, seismic events or the passage of heavy vehicles. Measuring real-time transient overpressures and deformation makes it possible to obtain a thorough understanding of the soil.

Technical features

✔ Standard instruments

The DAQ Series can be configured for vibrating-wire instruments as well as analog sensors and commonly used piezometers, strain gauges and geophones. The system can be customized to integrate many other types of instruments to fulfill the needs of most projects.

✔ On-board calculations

The DAQ Series can perform on-board calculations to extract and transfer only relevant information. On-board programming can include complex trigger configurations to permit the storage of events, data filtering, the calculation of full spectral response and temperature compensation of measurements.

✔ Programmable inputs and outputs

The DAQ Series has a built-in digital I/O option that can be used to control external systems such as cameras. Conversely, fast acquisition can be triggered by an external condition such as a signal from a vehicle detector.

✔ Remotely accessible

The DAQ Series can include a high-speed cellular modem or permanent local network connection that allows for remote download of data events or summaries and maintenance of the data acquisition system.

✔ Large on-board memory

For some applications, it is preferable to obtain all the high-speed data acquired over a long period of time and store it locally on the data logger. This can be achieved by using the expandable memory capacity to match your application.

Technical information

✔ Compatible instruments

- All vibrating-wire instruments
- Geophones
- Strain gauges
- Accelerometers
- Extensometers

✔ Sampling frequency

Up to 1 kHz

✔ Power

Up to 6W. Highly dependent on acquisition frequency, communications and instrument choice.

✔ Temperature range

-55 °C + 75 °C

Options

✔ VOLT option: Resistive instruments

Resistive instruments such as foil strain gauges, potentiometers and resistive piezometers can be read with the VOLT option.

✔ VOLT option: Voltage-output instruments

Voltage-output instruments such as geophones and accelerometers can be read with the VOLT option.

✔ VWIRE option: Vibrating-wire instruments

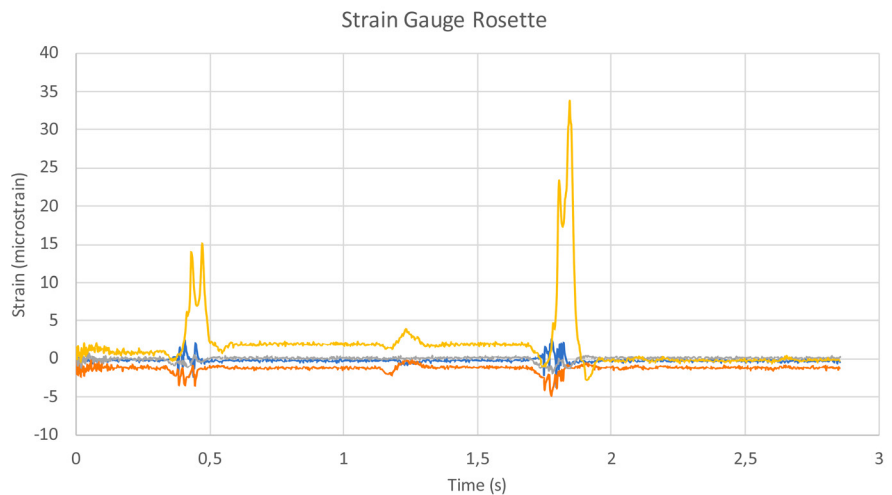
Any vibrating-wire instrument can be read with the VWIRE option. Piezometers and crackmeters are frequently used.

✔ Expanded DAQ Series

This custom-designed option can read up to hundreds of instruments. The sample rate might be constrained by the number of instruments.

✔ Solar-powered DAQ Series

The DAQ Series system can be customized with solar panels for fully autonomous deployments.



Measurements of a strain gauge rosette on an I-beam