WHAT IS A DATA LOGGER?

DATA LOGGING 101

What is a data logger? These products are widely-used measurement and data storage tools that monitor your product or process 24/7. Using a data logger you can keep an eye on temperature, humidity, current/voltage or just about any kind of data. But as with any type of electronics, there are lots of different manufacturers and models. In this article the Application Specialists at CAS DataLoggers walk you through the basics of data logging technologies and what they can do for your business or organization.

Introduction: What is a Data Logger?

Data loggers are electronic devices—usually palm-sized and inexpensive–designed to collect and store specific or universal values, often independently of a PC. This way users can log data anywhere and then come back later to download readings to a computer via USB stick or cable. Many also support alarming capabilities to alert you whenever their user-set limits are exceeded. Data loggers are much more reliable and accurate than manual measurements and also free up workers for other duties. They're commonly used to solve a short- or long-term problem, for example when you need a way to alarm tank temperature or graph data to troubleshoot a faulty process. This can be a great way to cut costs otherwise incurred from inventory loss or process delays. Data loggers are also utilized as general tools, including current/voltage data loggers to identify energy savings areas or to monitor machines for signs of upcoming failures. Another main reason to use a data logger is to gather and archive data for regulatory purposes whether it's for a product, a piece of equipment, or environmental temperatures, say inside a surgery room or residence.

Data loggers are distinct from **data acquisition systems (DAQ)** which are used to collect data in higher-speed applications and are typically much more costly. Additionally, data loggers can record in standalone mode so they make a good portable solution unlike DAQ systems which usually need to be connected to a PC. You can use the same data logger repeatedly for different applications so they can be a great value especially for small businesses.

Typically these devices are available in both indoor and outdoor models. While some data loggers only measure a single value such as temperature or humidity, there are models for measuring nearly any value. Some of these loggers are dedicated to a certain input type, others are programmable and scalable for different types. We offer data loggers for the following types of signal inputs: Temperature, Relative Humidity, Voltage/Current, Pressure, Event/State, Frequency, PH, Pulse, Serial and more.

After determining what you need to log and where you need to log it, it helps to decide how often you need the data logger to take a reading. Some users need continual monitoring for their industrial process or healthcare inventory, while some users only need to take a reading once every 30 minutes or every hour.

How Accurate Are Data Loggers?

This depends on the model, but many data loggers are more than accurate enough to cover most applications. If you're monitoring product or room temperature, a logger that's accurate within a few degrees should be enough, which will keep the price low, but some applications benefit more from high-accuracy models accurate within one-tenths of a degree.

How Many Data Loggers Do I Need?

This depends on the number of monitoring points you have, for instance how many areas you need to cover in a given room or on a product pallet. Data loggers are available in configurations with anywhere from one to hundreds of inputs. **dataTaker's DT8x Series loggers,** for example, can be configured to monitor anywhere from a single to over 300+ inputs. Additionally the universal **Grant SQ20xx Squirrel Series** data loggers are available in 8 to 32 channel models.

Data loggers record data by connecting to sensors such as thermocouple probes, and some have their own internal sensors to log right out of the box. There are 3 main types of temperature sensors that are used with data loggers: thermocouples, thermistors and RTDs. Thermocouples are the most commonly used, RTDs have higher accuracy, and thermistors can offer even more sensitive measurements. If you're recording something other than temperature, data loggers support a wide range of sensors and transducers so you can measure just about any value.

How Long Can Data Loggers Record?

Many data logger models are durable and will continue to reliably operate for at least a few years, although cold chain data loggers are available which do the job for a single trip and a low cost. Most data loggers for industry and individual use operate on batteries, while certain models can also be powered externally. While data loggers usually consume very low power, you'll want to note the battery life which varies considerably based on the manufacturer, model and how often it's designed to take readings—this is its **sample rate**. Modern loggers can take a sample every second which is more than enough for most cold chain applications. Sample rate is inversely tied to battery life and the max sample rate depends on the logger chosen. Many data loggers nowadays have non-volatile memory which ensures that recorded data is still safe if the battery fails or power is lost. The logger's software will usually tell you when the battery's getting low but you'll cut down on hassle by choosing a model with a user-replaceable battery life of a year or more.

Where are Alarms Usually Sent?

Local alarms can consist of anything from bright LED indicators and beeps to loggers with external alarm outputs for connection to sirens, horns etc. More sophisticated models will automatically send you an email or text alarm to your smartphone so you're always on top of potentially critical changes in your product or process. Our own **Accsense wireless data loggers** send your data directly to our cloud server and will even give you a phone call at the start of an alarm event!

How Do You Retrieve the Data?

Many data loggers record data to a memory card or Flash stick for easy retrieval. More advanced models can also send the data automatically over Serial, Ethernet, or wireless communication (WiFi data loggers, etc.). Users often make selections based on their facility's wired or wireless setup.

Do You Have to Learn How to Program?

For the average user the answer is no! Data loggers commonly use Windows-based control software for setup and configuration. Simply connect the logger to a PC, follow the configuration wizard and pick your sampling rate and start time—all this normally just takes a few mouse clicks. If you need a data logger for documentation purposes, it's especially important to find software that can print out graphs and tables to show auditors proof of your best practices.

How Much do Data Loggers Usually Cost?

When shopping for a data logger, you want to be sure that the device itself can do everything you need, including the right # of inputs to cover all your points, communication options and software. While most loggers are quite affordable, check to see if that includes everything–avoid paying extra for memory cards, communication modules or software.

Where Can I Buy Data Loggers?

You'll find lots of data logger manufacturers and distributors online, so make sure you buy from a supplier offering free technical support. While data loggers are easy to use, you won't get stuck if there's a number you can call if you run into a problem, especially if you're a first-time user.