

# Squirrel SQ1600 DATA LOGGER

**Grant**  
DATA LOGGING

*The Squirrel SQ1600 is a universal data logger that reliably and accurately measures inputs from a wide range of sensors making it suitable for many different applications in Industry, Research, Science and Environmental Monitoring. The SQ1600 can be used as a portable meter, standalone data logger or as a PC based data acquisition system - **one box does it all!***

## Key Features

- **Free**, easy to use setup software in a familiar spreadsheet format means no programming skills are needed.
- Real time and historical graphing for quick and easy analysis.
- 24 Universal inputs avoids application redundancy, saving you money.
- Direct connection of thermocouples, Pt100, voltage, 4 to 20mA, current, resistance, and thermistors.
- Very high accuracy (>0.025%) and repeatability for reliable and stable measurements.
- Mains or battery operated for local, remote or portable applications.
- Optional PC card slot allows memory expansion and a convenient simple way of transferring data back to your PC from remote sites.
- Four independently configurable scanning rates allow different channels to be read at different times for more efficient memory/data use.
- Proven remote operation via GSM, PSTN, radio or satellite modem links for true 'set and forget' applications.
- Sensor connection is via removable screw terminals for ease of use in the field.
- Ethernet option allows loggers to be sited anywhere you have a network port, making installation easier and more cost effective.

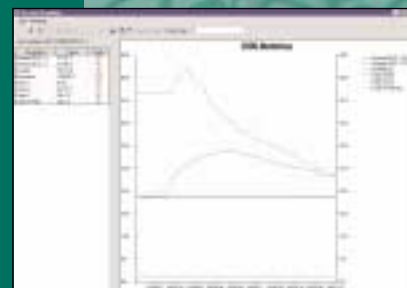


## Automatic Triggers, Samples and Actions

The SQ1600 is an intelligent data logger, which means it can do much more than just 'log' data for you. It can scan sensors, take instantaneous readings, store data to internal memory for later analysis or send it back to your PC in real time. This can be continuous, or controlled automatically, by various triggers such as channel thresholds (e.g. high/low and range alarms), external triggers (e.g. switch closure), time-clock or logger system events such as low battery.

It can even raise alarms so that when a channel goes outside limits it can trigger an action such as switch a pump on, change to a faster sampling rate or start a new run. Available actions are: Start a new run, pause, stop or continue a run, change sample rate, turn on an alarm or take a set of readings. All this in a compact unit that you can quickly set up, giving you more time to focus on your application.

*Talk to Grant for  
all your data  
logging solutions*



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## System Specification

### ANALOG INPUTS

**Channels:** Eight 3 or 4 wire inputs, or 16 differential, or 24 single ended, plus 2 reference junctions.  
**Accuracy:** better than 0.025% of span from  $\pm 50\text{mV}$  to  $\pm 25\text{V}$ .  
**Common mode range:**  $\pm 30\text{V}$ .  
**Common mode rejection:** up to 150dB.  
**Input impedance:**  $5\text{M}\Omega$ .  
**Linearity:** better than 0.0075% FSR.  
**Series mode line rejection:** up to 100dB at 50 & 60Hz each channel.

### ANALOG-DIGITAL CONVERSION

**Type:** Sigma-Delta.  
**Resolution:**  $\geq 16$ bit in Normal mode.  
**Sampling rate:**  
Up to 60 readings/second in Fast mode.  
1Hz to 365 days in Normal mode.  
Logger can automatically switch between Normal and Fast mode. In Fast mode defined channels are read at 200msec intervals e.g. 60 readings/second on 1 channel or 10 readings/second per channel for 6 channels. For Pulse and Event channels the fastest rate is 1Hz.

### ANALOG INPUT TYPES

**Voltage Ranges:** 11 software programmable ranges from  $\pm 25\text{mV}$  to  $\pm 25\text{V}$ .  
**Thermocouples:** Types J, K, N, R, S, T with cold junction compensation.  
**Thermistors:** Types U, Y, S.  
**RTDs:** Pt100, Pt1000, Ni100, Ni1000.  
**Resistance:** 4 or 3 wire up to  $10\text{K}\Omega$  and 2 wire up to  $300\text{K}\Omega$ .  
**DC Current:**  $\pm 25$  mA including 4 to 20mA loop (needs external shunt).  
**Semiconductor sensors:** AD590, LM335, LM34/35. (needs external resistors).  
**Strain Gauges:** Full, half and quarter bridges voltage excited (raw data only - data needs to be post processed to give ppm or  $\mu\text{strain}$ )

### Sensor excitation

4 outputs (3 FETs and 1 relay).  
Relay switch rating: 30Vdc, 25Vac, 250mA, 5W.  
FET outputs 1.5V up to 12.5V, in 0.05V increments, (total output 100mA through all three).  
Excitation available continuously from 1 second to 18 hours before taking readings.

### Alarm outputs

4 outputs (3 FETs, 50mA, 25Vdc and 1 relay, specifications as above), for high, low and range alarms, with programmable hysteresis.

### Digital inputs

8 way input, software selectable as 256 State inputs or 8 Event inputs.  
Input State: low = 0 to 0.5V, high = 4.5 to 5V.  
Can be used to measure logic state of individual channels or channel groups, trigger measurements or other actions.

### Pulse counters

2 high speed counters, one counter up to 2MHz and one up to 64kHz, software selectable, when operating in normal mode. Can be used as cumulative or resetting counters.

### Time and Date

Formats: DD/MM/YY, MM/DD/YY, YY/MM/DD, HH:MM:SS. Logger clock backed up by a Lithium AA battery for a minimum of eight months if power supply is disconnected. Resolution 0.1sec, accuracy better than 1 sec/day @ 25°C.

### Data memory

Internal flash memory stores 0.5 Million readings as standard. An optional PCMCIA unit holds 2 SRAM memory cards, each card is capable of storing up to 1 Million readings. Memory modes: stop when full, overwrite current run, overwrite oldest run first and overwrite downloaded runs only.

### Scaling data

Data read from input channels as electrical units can be automatically scaled to user defined engineering units.

### Logging modes

Data can be recorded at programmed time intervals or on event triggers. Statistical data available as average, max, and min.

### Data manipulation

Using SquirrelView software (included with logger) data can be exported as ASCII straight into Excel, Lotus and other software for data analysis. Data downloads straight into SquirrelView Plus for quick and easy data analysis.

### Programming/Logger Setup

Carried out by SquirrelView. Logger can be setup for 5 different program configurations allowing changes to be made without the need for a PC. Data can be stored in separate 'runs' for easy retrieval.

### Display and keypad

2 line x 20 alphanumeric back lit display showing alarm information, channel status and system information. 4 key keypad selects one of 5 pre-configured logging setups.

### Communications

RS232 full duplex autobaud selection between 2400 and 38.4k Baud. Protocol compatible with PCs, mobile phones, modems, and satellite ground terminals etc.

### Power supply

External power 8 to 28VDC, 16 Watts max. Mains Power via 16VDC AC adaptor Alkaline 'C' cells or rechargeable Lead acid gel cell (2.1Ah) can be installed in optional housing fitted to main chassis. Typically sampling 20 channels every 20 minutes gives 3 months operation with Alkaline and 3 weeks with Lead acid batteries.

### Case:

Nextel coated aluminium, which can be housed in a portable, or fixed, IP 67 weatherproof enclosure. Width 257mm, Depth 155mm, Height 90mm. Operating environment: Temperature range -30 to 65°C, Humidity 95%.

### Accessories included with the system:

SquirrelView setup, download and export software. RS232 communications cable for PC connection.

*Detailed accuracy specifications are available on a separate data sheet*

## The Total Solution

*Years of experience in solving data logging problems means Grant can help you save time by putting together the right package, starting with the sensor right through to the data analysis.*



## Software

### SquirrelView

Powerful and easy to use spreadsheet style software for configuring, downloading, displaying and analysing data from your Squirrel data logger. Upgrade to SquirrelView plus and with just a few mouse clicks you will quickly be able to view real time charts or historical data. You can also quickly download the data for use in your favorite spreadsheet, database or analysis program.

SquirrelView Plus allows you to display up to 30 channels of data, manual and automatic scaling of charts, list readings in tabular format with date and time.

Ethernet and modem connection is also supported.

## Accessories

Grant supply a full range including:

- ¥ Weatherproof enclosure / carry case
- ¥ Tamperproof wall brackets
- ¥ Test & calibration certificates
- ¥ Wide range of temperature and humidity sensors

**Guarantee** The Grant SQ1600 data acquisition system is guaranteed against faulty materials or workmanship for three years. If repairs are carried out under guarantee, no charge is made for labour or materials, and within the United Kingdom, no charge is made for carriage.  
**CE mark** The Grant SQ1600 data acquisition system bears a CE mark and meets relevant European directives.  
**Quality Statement** Grant Instruments operates a Quality Management System complying with BS EN ISO 9002: 1994. It is Grant's policy to supply customers with products which are fit for their intended purpose, safe in use, perform reliably to published specification and are backed by a fast and efficient customer support service.