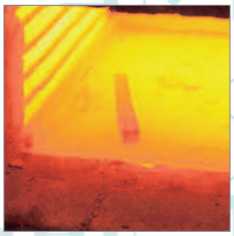
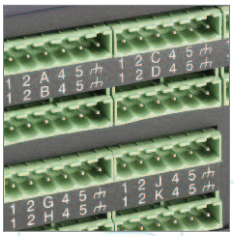
Grant
DATA ACQUISITION

Squirrel Portable Data Loggers

For research, quality assurance and production monitoring in industry, environmental sciences and in the laboratory







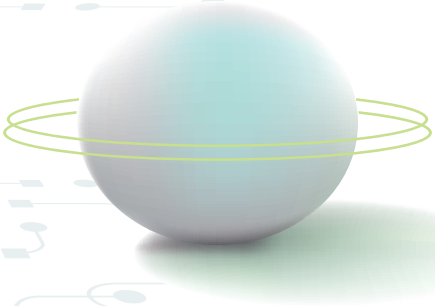


SIMPLE TO USE « » SOPHISTICATED ANALYSIS « » SOUND INFORMATION

Grant & data logging

Grant Instruments (Cambridge) Ltd has been pioneering the development of universal data loggers and systems since 1981, with over 30,000 Squirrel data loggers sold worldwide. The latest range of Squirrel data loggers continues with the same design philosophies:

- high accuracy of measurement (now with 24-bit analogue to digital converters)
- wide ranging, flexible inputs for an extensive range of sensor types
- highly reliable, with extended working lives
- very easy to use, via the data logger keyboard or from simple, comprehensive software – SquirrelView
- long battery life and low power consumption
- supported by an industry leading service and support network
- on-going technical and application support from experienced, qualified engineers
- traceable calibration services for all Grant products
- manufactured under an IS09001:2008 quality system, meeting applicable CE, UL, WEEE and RoHS directives
- standard Squirrel warranty is 3 years



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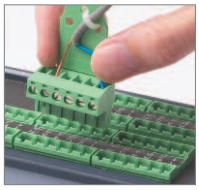



What is data logging and what is it used for?

As science and technology have developed, so the need for data collection and analysis has grown. This is fulfilled, at least in part, by dedicated, microprocessor driven data loggers. The modern data logger is typically a hand-held, battery operated device with a large memory, powered by the latest microprocessor technology and capable of acquiring, processing, storing and analysing electrical signals at high speed from a wide range of sensors – at regular intervals or in response to an event such as a threshold being crossed or a switch being activated.

Sensors can communicate with the logger through a cable or wireless link and can sense temperature, humidity, pressure, flow, wind speed, current, voltage, resistance and a host of other physical parameters that are important in monitoring and controlling processes or conducting research. Data stored by stand alone data loggers is typically downloaded into a computer for more detailed analysis and reporting, though some data loggers have sophisticated on-board processing and analysis capability and can carry out some control functions such as activating an alarm or a switch.

The advantage of using a dedicated portable data logger compared to, say, a PC, is that the logger hardware and software are specifically designed for stand alone data logging applications. This means that it is easy to connect and set up sensors and the logging system is more rugged and less power hungry, making it capable of running on batteries for longer periods of time, often in hostile environments. The advent of wireless communication and networking means that it is possible to interrogate a logger remotely which can be extremely useful for unattended or remote applications.

Data logging applications

Here are just a few examples of where and how Grant data loggers are being used. Please visit our website www.grant.co.uk for the latest application case studies.

Manufacturing

Through process monitoring of temperature for QA purposes in the paint and powder coating industries

Food processing

Monitoring cooking, pasteurization, chilling and freezing temperature within the food industry

General research

Short and long term data capture of a variety of physical parameters in scientific and industrial research projects

Monitoring in buildings

Monitoring temperature and humidity in public and commercial buildings such as museums, galleries, stately homes, warehouses, etc.

Automotive

Monitoring various physical parameters during vehicle testing

Public utilities

Monitoring river flow and discharge levels in the water and sewage treatment industries

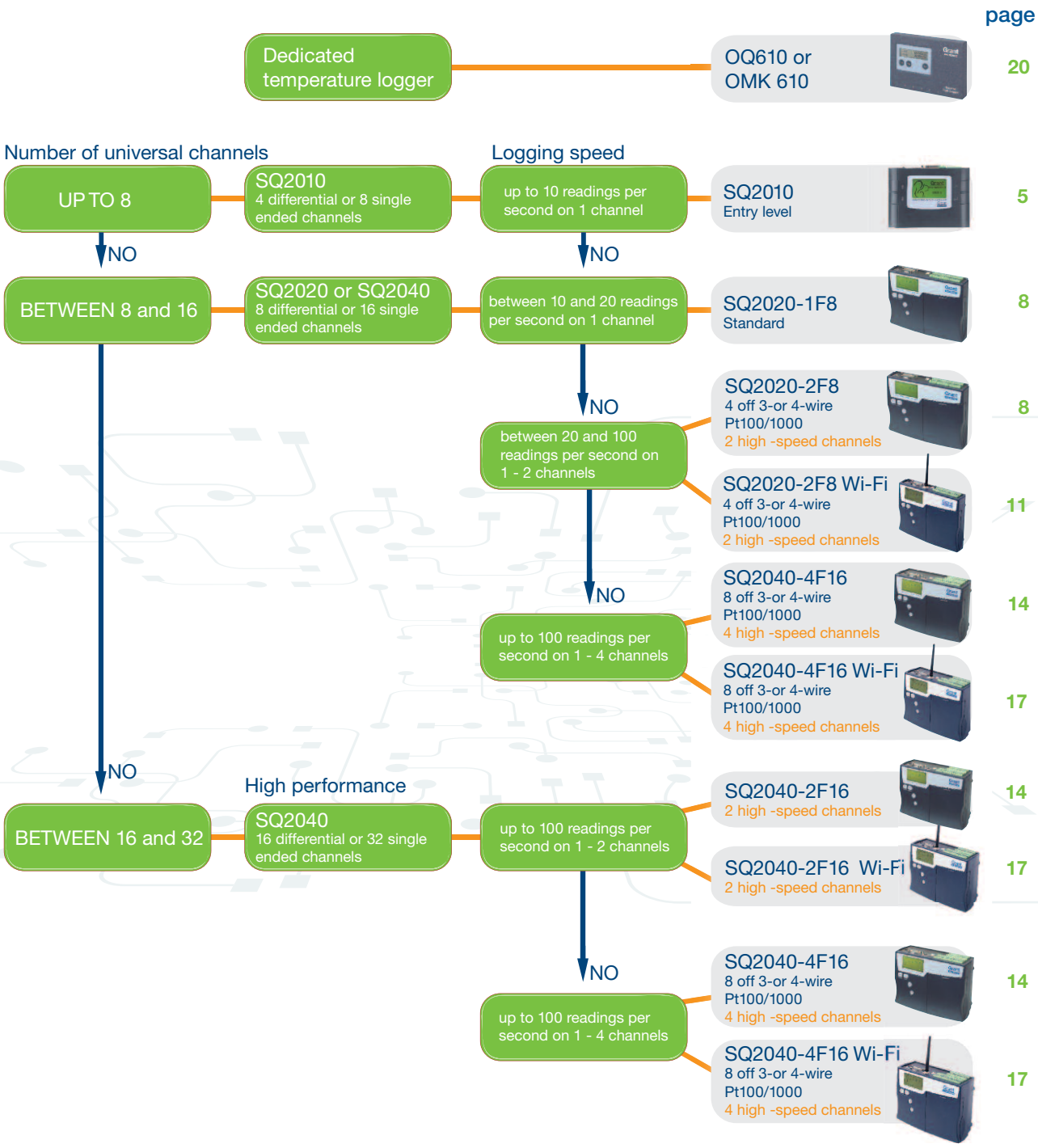
Environmental monitoring

Monitoring temperature, humidity, wind speed and direction, solar power and other environmental parameters in ecological studies

Civil engineering

Monitoring cure temperature of poured concrete structures

Selecting the right Squirrel data logger



Selecting the right Squirrel data logger
Technical Specifications

Summary of specifications	SQ2010	SQ2020-1F8	SQ2020-2F8 Including Wi-Fi version	SQ2040-2F16 Including Wi-Fi version	SQ2040-4F16 Including Wi-Fi version
	entry level	standard	high speed	high performance	extended high performance
Analogue input channels	4 to 8	8 to 16	8 to 16	16 to 32	16 to 32
High voltage channels	x	2	2	2	2
Digital channels	8	8	8	8	8
Counter channels	2	4	4	4	4
Input types: – current	●	●	●	●	●
– voltage	●	●	●	●	●
– resistance	2-wire	2-wire	2-, 3- or 4-wire	2-wire	2-, 3- or 4-wire
– 3- or 4-wire Pt100 / Pt1000	x	x	4	x	8
– temperature	●	●	●	●	●
Max no. readings per second	10 (on 1 channel)	20 (on 1 channel)	100 (on 2 channels)	100 (on 2 channels)	100 (on 4 channels)
Accuracy	0.1%	0.05%	0.05%	0.05%	0.05%
Display	128x64 dot matrix LCD	128x64 dot matrix LCD	128x64 dot matrix LCD	128x64 dot matrix LCD	128x64 dot matrix LCD
Memory capacity	14 million readings	14 million readings	14 million readings	14 million readings	14 million readings
External memory (MMC/SD card, =128MB*)	x	●	●	●	●
RS232 communications	●	●	●	●	●
USB communications	●	●	●	●	●
Ethernet *	x **	x **	●	●	●
Wi-Fi network *	x **	x **	●	●	●
Alarm outputs	2	4	4	4	4
Sensor power output	regulated 5VDC @ 50 mA and external supply voltage up to 28V on 2010 and 18V on all others @ 100 mA				
Set-up / analysis software	SquirrelView / SquirrelView Plus				

* For Ethernet or Wi-Fi networks external power pack is required.

** can use RS232 to Ethernet converter and RS232 to Wi-Fi converter, see page 31

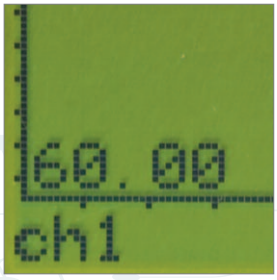
Squirrel 2010

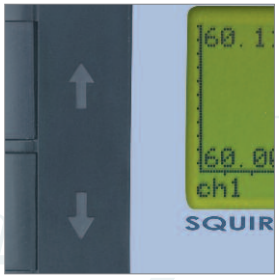
A powerful portable data logger

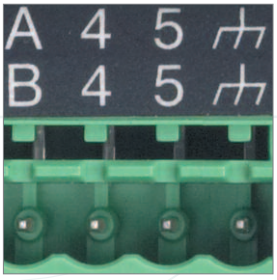
Overview

The Squirrel 2010 is a versatile, general purpose data logger, with 4 to 8 analogue input channels to measure current, voltage, resistance and temperature; plus 8 digital channels to automatically trigger or stop logging. An RS232 port is included, allowing connection to modems and other networking devices.

It is a compact, portable data logger which is also suitable for bench based and fixed installations. Easily programmed via the four integral push buttons and large graphical display and with a basic accuracy of 0.1%, the Squirrel 2010 is able to fulfil many routine data logging needs, including more demanding applications requiring up to 10 readings per second on one channel.







Key features

- Compact, truly portable data logger
- 4 to 8 universal analogue inputs (current, voltage, resistance, temperature) plus 8 digital inputs
- 16 derived / calculated channels
- 2 alarm outputs and 2 pulse counter inputs (1 at up to 64kHz, 1 at up to 100Hz)
- Configured via large easy-to-read graphical display
- 0.1% accuracy of reading
- Store up to 14 million readings
- Supplied with SquirrelView set-up / download software

Analogue inputs supported

- Thermistors
- Thermocouples
- Voltage
- Current
- Resistance
- 2-wire Pt100 / Pt1000

The Squirrel 2010 comes with:

- Squirrel 2010 portable data logger
- Fitted foam lined carry case
- Full set of sensor connection plugs with cable ties
- Small electrical screwdriver
- Pack of 4 precision resistors for 4-20mA inputs
- Set of batteries
- Getting started guide and Certificate of Conformance

If purchased as a kit, the below are included additionally:

- MPU 12V universal mains adaptor*
- SquirrelView Plus software with USB connetion cable LC80*

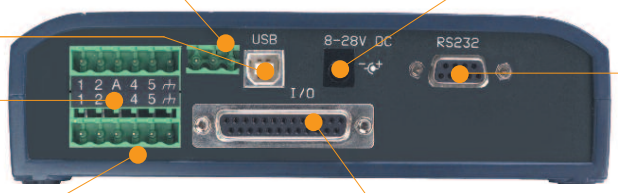
- Flexible
- Very easy to use
- Economical
- Handheld, ergonomic design
- USB connectivity
- RS232 output for modem, Ethernet and Wi-Fi connection

Power output for sensor excitation/external devices

USB connectivity for quick and easy PC communication

4 to 8 universal analogue inputs (4 differential, 8 single ended) for recording temperature, current, voltage and resistance

Easy to use, removable connector system



Power supply – internal alkaline batteries, external DC power supply or via USB

RS232 connectivity for peripherals communication e.g. Ethernet converter, wi-fi wireless converter or GSM modem

Range of trigger functions via 8 digital inputs; 2 pulse rate / counter inputs; 2 alarm / relay outputs

Use the four integral push buttons and graphical display to configure the logger – no PC required for operation

Store up to 14 million readings in the Squirrel's onboard memory

Store up to 6 logger configurations in the on-board memory

Use the convenient free SquirrelView set-up and download software to export stored data to your - application (see p. 28)

Display of real-time readings on the large clear graphical display

Icon driven software and large clear graphical display for easy logger set-up

Capabilities

- Create a wide range of triggers and alarm outputs
- Review real-time data on the integral display
- Display readings in preferred engineering units e.g. Hz, Bar, Pascals, Nm etc.
- Derive up to 16 calculated (virtual) channels from real input channels using mathematical functions

Applications

Environmental

Measurement

Remote outdoor applications

Squirrel 2010 Technical Specifications

	Squirrel SQ2010
No. of Analogue Channels	8 single ended or 4 differential inputs
Working Environment	- 30 to 65°C, RH up to 95% (non-condensing)
Universal Input	Yes
Voltage Ranges; Differential and Single Ended	-6V to 25V, -0.6V to 2.4V, ±0.3V, -0.15V to 0.15V, -0.075V to 0.075V -6V to 12V, -6V to 6V, -3V to 3V, -0.6V to 1.2V, -0.6V to 0.6V
Common Mode	25V
Current Ranges, Differential (Requires external 10Ω shunt)	4 to 20mA, -30 to +30mA
Thermocouple Ranges; Differential and Single Ended	**K-type** -200 to 1372°C **R-type** -50 to 1768°C **B-type** 250 to 1820°C **T-type** -200 to 400°C **S-type** -50 to 1768°C **C-type** 0 to 2320°C **N-type** -200 to 1300°C **J-type** -200 to 1200°C **D-type** 0 to 2320°C
Resistance Ranges, all 2 wire	0 to 1250R, 0 to 5000Ω, 0 to 300000Ω, 0 to 20000Ω
Thermistor Ranges	**U & UU-type** -50 to 150°C **Y-type** -50 to 150°C **S-type** -30 to 150°C Customer specific thermistors
Pt100/1000, 2-wire	-200 to 850°C
Internal Reference Temperature	-50 to 150°C
Pulse Count Ranges	0 to 100Hz (1 input) 0 to 64kHz (1 input) 0 to 16000000 Count
Digital State/Event Ranges	8 state inputs or 1 x 8 bit binary
Digital/Alarm Outputs	2 open drain FETs, 18V, 0.1A
A/D Resolution	24 bit
Accuracy	0.1% of range + 0.1% of reading
Clock Resolution/Accuracy	1s/10ppm Normal Mode – each input sampled at a maximum rate of 1 reading per second. Double-speed (mains reject off) – one input can be sampled at 10 readings per second and all others are sampled at a maximum rate of 1 reading per second
No of Intervals	4
Data Scaling	Yes
Data Statistics	Yes from within SquirelView Plus PC software
Calculated Channels	Yes, up to 16
Memory Internal	16Mb (up to 14 million readings)
Display/Keypad	128*64 dot graphical display, 4 button keypad
Internal Battery	2 x C cells
Battery Life	Up to 5 days with continuous usage whilst sampling all channels once per second
External Power	Yes, 8 to 28V dc & USB when plugged in
Sensor Power Output	5V at 50mA, external 8-28V at 100mA (when connected)
Networking	Via RS232 to Ethernet adaptor or RS232 to Wi-Fi adaptor
Modem Support	Via RS232 modem (GSM Modem, part no. SQ20A802)
Actions & Triggers	Two alarm outputs, fully configurable actions and triggers
PC Setup	Yes, SquirrelView compatible
Front Panel Setup	Via 4 integral 4 keys. All essential functionality available via key pad e.g. channel configuration, start / stop logging etc. Other advanced functions e.g. calculated channels and channel descriptions are available via connection to a PC running SquirrelView
Stored Setups	6
Third Party Programming	As 20xx driver suite allows
Operating Temperature	-20 to 65°C
Dimensions (w x d x h)	175 mm x 135 mm x 55 mm, Weight 0.7 kg

Note: supplied with software, SQ2010 manual, USB cable, batteries and 4 current shunt resistors.

NEW for 2011!

Squirrel 2020 series

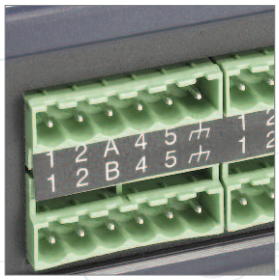
Powerful data loggers for standard and high speed applications

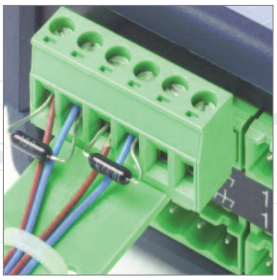
Overview

The Squirrel 2020 series offers high performance universal data loggers packed with powerful features to provide great flexibility to handle a wide range of routine and demanding applications.

Hand-held and lightweight, the Squirrel 2020 models are easy, fast and convenient to use – either as stand-alone loggers or as PC-linked data acquisition systems in industrial and scientific research and quality assurance applications.

Twin processors, multiple 24-bit analogue-to-digital converters, up to 16 universal channels and a choice of communications methods ensure that the Squirrel 2020 series provides state-of-the-art data logging and communication capability for sophisticated applications needs.



Key features

- Fully configurable via the integrated keypad
- 8 true differential or 16 single ended universal analogue inputs for voltage, current or resistance
- Analogue inputs can be used with thermistors, thermocouples, 2,3 or 4 wire RTD temperature sensors and 4-20mA signals
- Logging rates of up to 100Hz on up to 2 channels (2F8 only)
- Ethernet (2F8 only), USB and RS232 communication ports
- Large non-volatile internal memory storage for up to 14 million readings
- Removable MMC / SD card
- Sensor power and FET outputs for use with external devices
- Clear 128*68 dot graphical LCD display

Analogue inputs supported

- Thermistors
- Thermocouples
- Pt100 / Pt1000 (maximum of four 3- or 4-wire Pt100 / Pt1000 sensors — model 2F8 only)
- Voltage
- Current
- Resistance

The Squirrel 2020 series comprises two models:

- **Squirrel 2020 – 1F8**
  - Up to 20 readings per second on 1 channel
- **Squirrel 2020–2F8 (high speed model)**
  - Up to 100 readings per second on 2 channels
  - In-built Ethernet connectivity
  - Up to four 3- or 4-wire Pt100 / Pt1000 sensor inputs

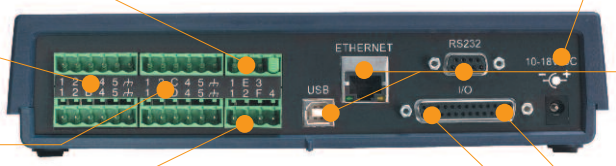
- Up to 16 universal inputs
- High precision (0.05% of reading + 0.025% of range)
- Advanced data management to MMC /SD card or PC
- Flexible communications (USB, Ethernet, Wi-Fi, RS232)
- High speed option (100Hz)

Power output for sensor excitation / external devices

8 to 16 universal analogue inputs for recording temperature, current, voltage and resistance

Easy to use, removable connector system

2 high voltage channels (up to 60V) for automotive applications



Power supply – internal alkaline batteries or external DC power supply

USB, Ethernet (2F8 only) and RS232 connectivity for quick and easy PC and remote communication and networking

Up to 8 digital and 4 pulse rate / counter inputs. Can be logged or used as triggers

4 alarm outputs for triggering external devices

Large, clear 128 * 64 dot graphical LCD display

To operate the logger simply use the four integral push buttons and display, or use the convenient SquirrelView set-up, download and export software – free with every Squirrel logger

Robust, ergonomically designed case with easy access to all user facilities

Store up to 14 million readings in the Squirrel's on board memory

Store up to 6 logger configurations. Load from a removable MMC / SD card for speed and convenience, or download data files to the card

Communications

Ethernet (2F8 only), USB and RS232 serial ports are inbuilt. This allows simple connection to either a PC based TCP/IP network, a wireless to PC connection or to a GSM modem for remote data downloading. This flexibility enables global data access and retrieval as well as complete system integration of the SQ2020 series into complex and critical applications

Multiple configurations stored in the logger:

Up to six logger configurations (channel type, names, logging speeds, triggers etc.) together with the current configuration can be held in the logger`s internal memory. Additional configuration settings can also be loaded from the external MMC/SD memory card. This allows the operator to quickly and easily switch between logger configurations without the need for a PC

Software configuration via SquirrelView:

The SquirrelView software (supplied with the SQ2020 series data loggers) allows logger configuration, data download and export whilst giving the user full control over SQ2020. The optional SquirrelView Plus gives the user access to many advanced data analyses and archiving/transfer features. Refer to SquirrelView data sheet for specifications.

Concurrent sampling:

The SQ2020 series uses multiple analogue and digital converters that enables true concurrent sampling and logging. It allows the user to configure a channel to log at a rate of 100Hz(20Hz on 1F8) whilst retaining different sample speeds on the other channels. Ideal for measuring dynamic parameters that change at different rates such as temperature and pressure.

Capabilities

- Create complex schedules of logging rates, triggers and alarm outputs
- Scale and view readings in real time on the integral display or on a PC running SquirrelView
- Select logging rates up to 100 readings per second on up to 2 channels (20Hz maximum on Squirrel model 2020-1F8)
- Derive up to 16 calculated (virtual) channels from real input channels using mathematical functions

Applications


Manufacturing


Biological Sciences


Medical Research

Squirrel 2020 Technical Specifications

	SQ2020-1F8	SQ2020-2F8
Analogue Input Channel Options	**Analogue to digital converters:** 1 **Differential:** 8 **Single Ended*:** 16 **3 or 4 wire:** 0	**Analogue to digital converters:** 2 **Differential:** 8 **Single Ended*:** 16 **3 or 4 wire:** 4
Additional Channels	**Pulse:** (2 x fast-64kHz)& (2 x slow - 100Hz) **Event/digital:** 8 state inputs or 1 x 8 bit binary	**Pulse:** (2 x fast-64kHz)& (2 x slow - 100Hz) **Event/digital:** 8 state inputs or 1 x 8 bit binary
Logging Speed	20 readings / sec on 1 channel only	100 readings / sec on 2 channels only
Communication	**Standard:** RS232 (Auto bauding to 115200 baud) USB 1.1 & 2.0 compatible **External options:** GSM, Wifi and PSTN Modems	**Standard:** RS232 (Auto bauding to 115200 baud) USB 1.1 & 2.0 compatible Ethernet 10/100 base TCP/IP (Requires external power supply) **External options:** GSM, Wi-Fi and PSTN Modems
Analogue Inputs	Accuracy: (at 25°C) voltage and resistance (± 0.05% readings + 0.025% range) Common mode rejection: 100dB Linearity: 0.015% Input impedance: > 1MΩ Series mode line rejection: 50/60Hz 100dB	
Analogue - Digital Conversion	Type: Sigma - Delta Resolution: 24bit Sampling rate: up to 10, 20* or 100* readings per sec. per ADC. No 100Hz on 1F8 (* with mains rejection off)	
Thermistor Ranges	**Y & U-type:** - 50 to 150°C **Pt100/ Pt1000:** - 200 to - 850°C (2 wire only on 1F8) **Customer specific thermistor range**	
Thermocouple Ranges; Differential and Single Ended	**K-type:** - 200 to 1372°C **R-type:** - 50 to 1768°C **B-type:** 250 to 1820°C **T-type:** - 200 to 400°C **S-type:** - 50 to 1768°C **C-type:** 0 to 2320°C **N-type:** - 200 to 1300°C **J-type:** -200 to 1200°C **D-type:** 0 to 2320°C	
Working Environment	- 30 to 65°C, RH up to 95% (non-condensing)	
Voltage Ranges; Differential and Single Ended	- 0.075V to 0.075V, - 0.15V to 0.15V, - 0.3V to 0.3V, - 0.6V to 0.6V, 0.6V to 1.2V, 0.6V to 2.4V, - 3V to 3V, - 6V to 6V, -6V to 12V, - 6V to 25V	
High Voltage Input Range	4V to 20V, 4V to 4V, 4V to 60V (max 2 may be selected)	
Current Ranges, Differential (Requires external 10Ω shunt)	-30 to 30mA, 4 to 20mA	
Resistance Ranges, all 2 wire	0 to 1250Ω, 0 to 5000Ω, 0 to 20000Ω, 0 to 300000Ω	
Resistance Range 3 and 4 wire (2F8)	0 to 500Ω, 0 to 4000Ω	
Digital/Alarm Outputs	4 open drain FET (18V 0.1A)	
Memory	Internal: up tp 128Mb (up to 14 million readings) External: Up to 1Gb - removable MMC/ SD (for transferring internal memory and storing setups only)	
Internal Memory Modes	Stop when full or overwrite	
Calculated Channels	Up to 16 virtual channels derived from physical input channels	
Resolution	Up to 6 significant digits	
Display/Keypad	128*64 dot graphical display, 4 button keypad	
Power Supply	Internal: 6 x AA alkaline batteries External: 10-18VDC. Reverse and polarity and over-voltage protected	
Power Consumption @ 9V	Sleep mode: 600µA Logging: 40 - 80 mA	
Power Output for External Device	Regulated 5VDC at 50mA or logger supply voltage at 100mA	
Time and Date	In-built clock in 3 formats	
Programming / Logger setup	SquirrelView or SquirrelView Plus Software	
Dimensions (w x d x h), Weight	235 mm x 175 mm x 55 mm, 1.2 kg, enclosure material ABS	

Note: SQ2020 is supplied with software, manual, USB cable, wall bracket, batteries and 4 current shunt resistors.

NEW for 2011!

Squirrel SQ2020 Wi-Fi

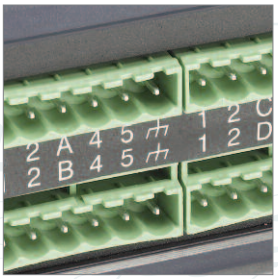
Powerful data loggers for all applications

Overview

The Squirrel 2020 Wi-Fi hand held data logger combines high performance and universal inputs with the simplicity of Wi-Fi networking in a compact and easy-to-use instrument.

Using high accuracy, 24-bit analogue to digital converters, removable memory and wireless Ethernet (Wi-Fi) networking, the SQ2020 Wi-Fi is the ideal data logger for industrial, scientific research and quality assurance applications.

Together with our comprehensive suite of software, SquirrelView, the SQ2020 provides standalone data acquisition, simple Wi-Fi networking, real-time metering and data analysis straight out-of-the-box.



Key features

- Fully configurable via the integrated keypad
- 8 true differential or 16 single ended universal analogue inputs for voltage, current or resistance measurements plus 2 high voltage, 4 pulse and 8 digital event/state inputs
- Analogue inputs can be used with thermistors, thermocouples, 2,3 or 4 wire RTD temperature sensors and 4-20mA signals
- Logging rates of up to 100Hz on up to 2 channels
- Standard (802.11b) wireless Ethernet (Wi-Fi) networking, USB and RS232 communication ports
- Large non-volatile internal memory storage for up to 14 million readings
- Download of internal data to removable MMC / SD card
- Sensor power and FET outputs for use with external devices
- Clear 128*68 dot graphical LCD display
- Calculated channels derived from real channels using advanced mathematical functions e.g. log(x); ln(x); sqrt(x)

Analogue inputs supported

- Thermistors
- Thermocouples
- Pt100 / Pt1000 (maximum of four 3- or 4-wire Pt100 / Pt1000 sensors)
- Voltage
- Current
- Resistance

- Up to 16 universal inputs
- High precision (0.05% of reading + 0.025% of range)
- Advanced data management to MMC /SD card
- Flexible communications (Wi-Fi, USB, RS232)
- High speed option (100Hz)

Large, clear 128 * 64 dot graphical LCD display

To operate the logger simply use the four integral push buttons and display, or use the convenient SquirrelView set-up, download and export software – free with every Squirrel logger

Robust, ergonomically designed case with easy access to all user facilities

Store up to 14 million readings in the Squirrel's on board memory

Store up to 6 logger configurations. Load from a removable MMC / SD card for speed and convenience, or download data files to the card

Power output for sensor excitation / external devices

8 to 16 universal analogue inputs for recording temperature, current, voltage and resistance

Easy to use, removable connector system

2 high voltage channels (up to 60V) for automotive applications

USB, Wi-Fi and RS232 connectivity for quick and easy PC and remote communication and Wi-Fi networking

Power supply – internal alkaline batteries or external DC power supply

Up to 8 digital and 4 pulse rate / counter inputs. Can be logged or used as triggers

4 alarm outputs for triggering external devices

Communications

Wi-Fi, USB and RS232 serial ports are inbuilt. This allows simple connection to either a PC based TCP/IP network, a wireless to PC connection or to a GSM modem for remote data downloading. This flexibility enables global data access and retrieval as well as complete system integration of the SQ2020 2F8 into complex and critical applications

Multiple configurations stored in the logger:

Up to six logger configurations (channel type, names, logging speeds, triggers etc.) together with the current configuration can be held in the logger`s internal memory. Additional configuration settings can also be loaded from the external MMC/SD memory card. This allows the operator to quickly and easily switch between logger configurations without the need for a PC.

Software configuration via SquirrelView:

The SquirrelView software (supplied with the SQ2020 Wi-Fi data logger) allows logger configuration, data download and export whilst giving the user full control over SQ2020. The optional SquirrelView Plus gives the user access to many advanced data analyses and archiving/transfer features. Refer to SquirrelView data sheet for specifications.

Concurrent sampling:

The SQ2020 2F8 uses multiple analogue and digital converters that enables true concurrent sampling and logging. It allows the user to configure a channel to log at a rate of 100Hz whilst retaining different sample speeds on the other channels. Ideal for measuring dynamic parameters that change at different rates such as temperature and pressure.

Capabilities

- Create complex schedules of logging rates, triggers and alarm outputs
- Scale and view readings in real time on the integral display or on a PC running SquirrelView
- Select logging rates up to 100 readings per second on up to 2 channels
- Derive up to 16 calculated (virtual) channels from real input channels using mathematical functions

Applications


HVAC


Process industry


Horticultural research

Squirrel 2020 Wi-Fi Technical Specifications

	SQ2020-2F8 Wi-Fi
Analogue Input Channel Options	**A/D converters:** 2 **Differential:** 8 **Single Ended*:** 16 **3 or 4 wire:** 4
Additional Channels	**Pulse:** (2 x fast-64kHz)& (2 x slow - 100Hz) **Event/digital:** 8 state inputs or 1 x 8 bit binary **Single Ended*:** 2
Analogue Inputs	Accuracy: (at 25°C) voltage and resistance (± 0.05% readings + 0.025% range) Common mode rejection: 100dB Linearity: 0.015% Input impedance: > 1MΩ Series mode line rejection: 50/60Hz 100dB
Analogue - Digital Conversion	Type: Sigma - Delta Resolution: 24bit Sampling rate: up to 10, 20* or 100* readings per sec. per ADC. (* with mains rejection off)
Thermistor Ranges	**Y & U-type:** - 50 to 150°C **Pt100/ Pt1000:** - 200 to - 850°C (3 or 4 wire) **Customer specific thermistor range**
Thermocouple Ranges; Differential and Single Ended	**K-type:** - 200 to 1372°C **R-type:** - 50 to 1768°C **B-type:** 250 to 1820°C **T-type:** - 200 to 400°C **S-type:** - 50 to 1768°C **C-type:** 0 to 2320°C **N-type:** - 200 to 1300°C **J-type:** -200 to 1200°C **D-type:** 0 to 2320°C
Working Environment	- 30 to 65°C, RH up to 95% (non-condensing)
Voltage Ranges; Differential and Single Ended	- 0.075V to 0.075V, - 0.15V to 0.15V, - 0.3V to 0.3V, - 0.6V to 0.6V, 0.6V to 1.2V, 0.6V to 2.4V, - 3V to 3V, - 6V to 6V, -6V to 12V, - 6V to 25V
High Voltage Input Range	4V to 20V, 4V to 40V, 4V to 60V (max 2 may be selected)
Current Ranges, Differential (Requires external 10Ω shunt)	-30.0 to 30.0mA, 4 to 20mA
Resistance Ranges, all 2 wire	0 to 1250Ω, 0 to 5000Ω, 0 to 20000Ω, 0 to 300000Ω
Resistance Range 3 and 4 wire	0 to 500Ω, 0 to 4000Ω
Digital/Alarm Outputs	4 open drain FET (18V 0.1A)
Memory	Internal: up tp 128Mb (up to 14 million readings) External: Up to 1Gb - removable MMC/ SD (for transferring internal memory and storing setups only)
Internal Memory Modes	Stop when full or overwrite
Calculated Channels	Up to 16 virtual channels derived from physical input channels
Resolution	Up to 6 significant digits
Display/Keypad	128*64 dot graphical display,4 button keypad
Power Supply	Internal: 6 x AA alkaline batteries External: 10-18VDC. Reverse and polarity and over-voltage protected
Power Consumption @ 9V	Sleep mode: 600µA Logging: 40 - 80 mA
Power Output for External device	Regulated 5VDC at 50mA or logger supply voltage at 100mA
Time and Date	In-built clock in 3 formats
Communication	Standard: **Wireless Ethernet (Wi-Fi):** 802.11b, 2.4GHz, 1 to 14 channels. Security: Open, WEP(64 or128bi encryption), WPA orWPA2/ 802.11i. Network: Infrastructure only with specified SSID(external mains power required for Wi-Fi connection) **RS232** (Auto bauding to 115200 baud) **USB** 1.1 & 2.0 compatible External options: GSM and PSTN Modems
Programming / Logger Setup	SquirrelView or SquirrelView Plus Software
Dimensions (w x d x h), Weight	235 mm x 175 mm x 55 mm, 1.2 kg, enclosure material ABS

Note: SQ2020 wi-fi is supplied with software, manual, USB cable, wall bracket, batteries, 4 current shunt resistors and MPU 12V mains adaptor.

NEW for 2011!

Squirrel 2040 series

High performance data loggers for demanding applications

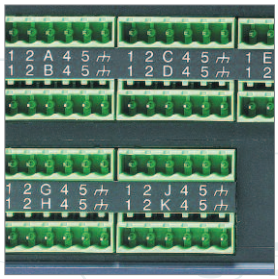
Overview

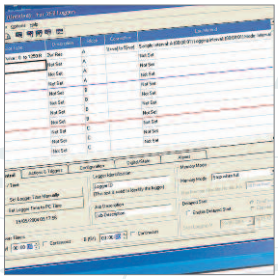
The Squirrel 2040 series combines a higher channel count with the same high performance, comprehensive features and universal inputs as the 2020 in a neat compact and portable instrument.

Using multiple 24-bit analogue to digital convertors, twin processors and removable memory options the 2040 series provides great flexibility to handle a wide range of complex and demanding multi-channel applications.

The Squirrel 2040 series are the ideal data loggers for industrial, scientific research and quality assurance applications and more!

The 2040 provides standalone data acquisition, advanced networked solutions and data analysis straight out-of-the box.





Key features

- Fully configurable via the integrated keypad
- 16 true differential or 32 single ended universal analogue inputs for voltage, current or resistance measurements plus 2 high voltage, 4 pulse and 8 digital event/state inputs
- Analogue inputs can be used with thermistors, thermocouples, 2, 3 or 4 wire RTD temperature (4F16 only) sensors and 4-20mA signals
- Logging rates of up to 100Hz on up to 4 channels
- Ethernet, USB and RS232 communication ports
- Internal memory storage for up to 14 million readings
- Download of internal data to removable MMC / SD card
- Sensor power and FET outputs for use with external devices
- Calculated channels derived from real channels using advanced mathematical functions e.g. log(x); ln(x); sqrt(x)

Analogue inputs supported

- Thermistors
- Thermocouples
- Pt100 / Pt1000 (maximum of eight 3- or 4-wire, on 4F16 only)
- Voltage
- Current
- Resistance

The Squirrel 2040 series comprises two models:

- **Squirrel 2040–2F16**
  - Up to 100 readings per second on 2 channels
  - Two 24-bit analogue to digital converters
- **Squirrel 2040–4F16 (high speed model)**
  - Up to 100 readings per second on 4 channels
  - Four 24-bit analogue to digital converters
  - 4 pulse rate / counter inputs (4 at up to 64kHz, 2 at up to 100Hz)
  - Eight 3- or 4-wire Pt100 / Pt1000

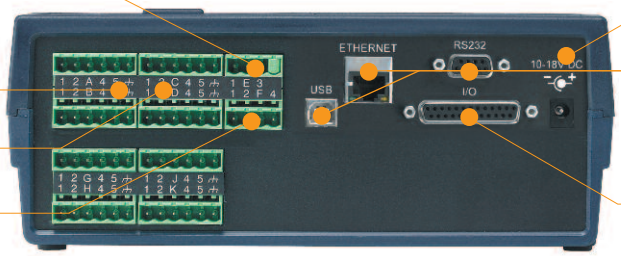
- Up to 32 universal inputs
- High precision (0.05% of reading + 0.025% of range)
- Advanced data management, to MMC / SD or PC
- Flexible communications (USB, Ethernet, RS232)
- High speed option (100Hz on 4 channels)
- Various remote connection options e.g. via Ethernet, dial up modem or wireless

Power output for sensor excitation / external devices

16 to 32 universal analogue inputs for recording temperature, current, voltage and resistance

Easy to use, removable connector system

2 high voltage channels (20, 40 or 60V) for automotive applications



Power supply – internal alkaline batteries or external DC power supply

USB, Ethernet and RS232 connectivity for quick and easy PC and remote communication and networking

Range of trigger functions via 8 digital inputs; 4 pulse rate / counter inputs

4 alarm outputs for triggering external devices

Large, clear 128 * 64 dot graphical LCD display

To operate the logger simply use the four integral push buttons and display, or use the convenient SquirrelView set-up, download and export software – free with every Squirrel logger

Robust, ergonomically designed case with easy access to all user facilities

Store up to 14 million readings in the Squirrel's on board memory

Store up to 6 logger configurations. Load from a removable MMC / SD card for speed and convenience, or download data files to the card

Communications

Ethernet, USB and RS232 serial ports are inbuilt. This allows simple connection to either a PC based TCP/IP network, a wireless to PC connection or to a GSM modem for remote data downloading. This flexibility enables global data access and retrieval as well as complete system integration of the SQ2040 series into complex and critical applications

Multiple configurations stored in the logger:

Up to six logger configurations (channel type, names, logging speeds, triggers etc.) together with the current configuration can be held in the logger`s internal memory. Additional configuration settings can also be loaded from the external MMC/SD memory card. This allows the operator to quickly and easily switch between logger configurations without the need for a PC.

Software configuration via SquirrelView:

The SquirrelView software (supplied with the SQ2040 series data logger) allows logger configuration, data download and export whilst giving the user full control over SQ2040. The optional SquirrelView Plus gives the user access to many advanced data analyses and archiving/transfer features. Refer to SquirrelView data sheet for specifications.

Concurrent sampling:

The SQ2040 series uses multiple analogue and digital converters that enables true concurrent sampling and logging. It allows the user to configure a channel to log at a rate of 100Hz whilst retaining different sample speeds on the other channels. Ideal for measuring dynamic parameters that change at different rates such as temperature and pressure.

Capabilities

- Create complex schedules of logging rates, triggers and alarm outputs
- Scale and view readings in real time on the integral display or on a PC running SquirrelView
- Select logging rates up to 100 readings per second on up to 4 channels (2 channels on Squirrel model 2040-2F16) or a combination of different logging rates
- Derive up to 16 calculated (virtual) channels from real input channels using mathematical functions

Applications


Automotive development


Engineering


Agricultural research

Squirrel SQ2040 Technical Specifications

	SQ2040-2F16	SQ2040-4F16
Analogue Input Channel Options	**Analogue to digital converters:** 2 **Differential:** 16 **Single Ended*:** 32 **3 or 4 wire:** 0	**Analogue to digital converters:** 4 **Differential:** 16 **Single Ended*:** 32 **3 or 4 wire:** 8
Logging Speed	Up to 100 readings per second on 2 channels	Up to 100 readings on 4 channels
Additional Channels	**Pulse:** (2 x fast - 64kHz)& (2 x slow - 100Hz) **Event/digital:** 8 state inputs or 1 x 8 bit binary **Single Ended*:** 2	**Pulse:** (2 x fast - 64kHz)& (2 x slow - 100Hz) **Event/digital:** 8 state inputs or 1 x 8 bit binary **Single Ended*:** 2
Analogue Inputs	Accuracy: (at 25°C) voltage and resistance (± 0.05% readings + 0.025% range) Common mode rejection: 100dB Linearity: 0.015% Input impedance: > 1MΩ Series mode line rejection: 50/60Hz 100dB	
Analogue - Digital Conversion	Type: Sigma - Delta Resolution: 24bit Sampling rate: up to 10, 20* or 100* readings per sec. per ADC. No 100Hz on 1F8 (* with mains rejection off)	
Thermistor Ranges	**Y & U-type:** - 50 to 150°C **Pt100/ Pt1000:** - 200 to - 850°C (2 wire only on 2F16, 3 or 4 wire on 4F16) **Customer specific thermistor range**	
Thermocouple Ranges; Differential and Single Ended	**K-type:** - 200 to 1372°C **R-type:** - 50 to 1768°C **B-type:** 250 to 1820°C **T-type:** - 200 to 400°C **S-type:** - 50 to 1768°C **C-type:** 0 to 2320°C **N-type:** - 200 to 1300°C **J-type:** -200 to 1200°C **D-type:** 0 to 2320°C	
Working Environment	- 30 to 65°C, RH up to 95% (non-condensing)	
Voltage Ranges; Differential and Single Ended	- 0.075V to 0.075V, - 0.15V to 0.15V, - 0.3V to 0.3V, - 0.6V to 0.6V, 0.6V to 1.2V, 0.6V to 2.4V, - 3V to 3V, - 6V to 6V, -6V to 12V, - 6 to 25V	
High Voltage Input Range	4V to 20V, 4V to 40V, 4V to 60V (max 2 may be selected)	
Current Ranges, Differential (Requires external 10Ω shunt)	-30 to 30mA, 4 to 20mA	
Resistance Ranges, all 2 wire	0 to 1250Ω, 0 to 5000Ω, 0 to 20000Ω, 0 to 300000Ω	
Resistance Range 3 and 4 wire (4F16)	0 to 500Ω, 0 to 4000Ω	
Digital/Alarm Outputs	4 open drain FET (18V 0.1A)	
Memory	Internal: up tp 128Mb (up to 14 million readings) External: Up to 1Gb - removable MMC/ SD (for transferring internal memory and storing setups only)	
Internal Memory Modes	Stop when full or overwrite	
Calculated Channels	Up to 16 virtual channels derived from physical input channels	
Resolution	Up to 6 significant digits	
Display/Keypad	128*64 dot graphical display,4 button keypad	
Power Supply	Internal: 6 x AA alkaline batteries External: 10-18VDC. Reverse and polarity and over-voltage protected	
Power Consumption @ 9V	Sleep mode: 600µA Logging: 40 - 80mA	
Power Output for External Device	Regulated 5VDC at 50mA or logger supply voltage at 100mA	
Time and Date	In-built clock in 3 formats	
Communication	Standard: RS232 (Auto bauding to 115200 baud) USB 1.1 & 2.0 compatible Ethernet 10/100 base TCP/IP. Requires external power supply. External options: GSM, Wi-Fi and PSTN Modems	
Programming / logger setup	SquirrelView or SquirrelView Plus Software	
Dimensions (w x d x h), weight	235 mm x 175 mm x 95 mm, 1.2 kg, enclosure material ABS	

Note: SQ2040 is supplied with software, manual, USB cable, wall bracket, batteries and 4 current shunt resistors.

NEW for 2011!

Squirrel SQ2040 Wi-Fi

High performance data loggers for demanding applications

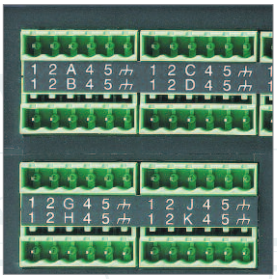
Overview

The Squirrel 2040 Wi-Fi series combines a high channel count, high performance, universal inputs with the simplicity of Wi-Fi networking in a compact and portable instrument.

Using multiple 24-bit analogue to digital convertors, twin processors and removable memory options the SQ2040 Wi-Fi provides great flexibility to handle a wide range of complex and demanding multi-channel applications.

The Squirrel SQ2040 Wi-Fi is the ideal data logger for industrial, scientific research and quality assurance applications.

The SQ2040 Wi-Fi provides standalone data acquisition, advanced networked solutions and data analysis straight out-of-the box.



Key features

- Fully configurable via the integrated key pad
- 16 true differential or 32 single ended universal analogue inputs for voltage, current or resistance measurements plus 2 high voltage, 4 pulse and 8 digital event/state inputs
- Analogue inputs can be used with thermistors, thermocouples, 2,3 or 4 wire(4F16only) RTD temperature sensors and 4-20mA signals
- Logging rates of up to 100Hz on up to 4 channels
- Standard (802.11b) wireless Ethernet (Wi-Fi), USB and RS232 communication ports
- Internal memory storage for up to 14 million readings
- Download of internal data to removable MMC / SD card
- Sensor power and FET outputs for use with external devices
- Calculated channels derived from real channels using advanced mathematical functions e.g. log(x); ln(x); sqrt(x)

Analogue inputs supported

- Thermistors
- Thermocouples
- Pt100 / Pt1000 (maximum of eight 3- or 4-wire - 4F16 only)
- Voltage
- Current
- Resistance

The Squirrel 2040 series comprises two models:

- **Squirrel 2040–2F16 Wi-Fi**
  - Up to 100 readings per second on 2 channels
  - Two 24-bit analogue to digital converters
- **Squirrel 2040–4F16 Wi-Fi (high speed model)**
  - Up to 100 readings per second on 4 channels
  - Four 24-bit analogue to digital converters
  - 4 pulse rate / counter inputs (4 at up to 64kHz, 2 at up to 100Hz)
  - Eight 3- or 4-wire Pt100 / Pt1000

- Up to 32 universal inputs
- High precision (0.05% of reading + 0.025% of range)
- Advanced data management, to MMC / SD or PC
- Flexible communications (Wi-Fi, USB, RS232)
- High speed option (100Hz on 4 channels)

Large, clear 128 * 64 dot graphical LCD display

To operate the logger simply use the four integral push buttons and display, or use the convenient SquirrelView set-up, download and export software – free with every Squirrel logger

Robust, ergonomically designed case with easy access to all user facilities

Store up to 14 million readings in the Squirrel's on board memory

Store up to 6 logger configurations. Load from a removable MMC / SD card for speed and convenience, or download data files to the card

Power output for sensor excitation / external devices

16 to 32 universal analogue inputs for recording temperature, current, voltage and resistance

Easy to use, removable connector system

2 high voltage channels (20, 40 or 60V) for automotive applications

Power supply – internal alkaline batteries or external DC power supply

USB, Wi-Fi and RS232 connectivity for quick and easy PC and remote communication and networking

Range of trigger functions via 8 digital inputs; 4 pulse rate / counter inputs

4 alarm outputs for triggering external devices

Communications

Wireless Ethernet (Wi-Fi), USB and RS232 serial ports are inbuilt. This allows simple connection to either a PC based TCP/IP network, a wireless to PC connection or to a GSM modem for remote data downloading. This flexibility enables global data access and retrieval as well as complete system integration of the SQ2040 Wi-Fi series into complex and critical applications

Multiple configurations stored in the logger:

Up to six logger configurations (channel type, names, logging speeds, triggers etc.) together with the current configuration can be held in the logger`s internal memory. Additional configuration settings can also be loaded from the external MMC/SD memory card. This allows the operator to quickly and easily switch between logger configurations without the need for a PC.

Software configuration via SquirrelView:

The SquirrelView software (supplied with the SQ2040 series data logger) allows logger configuration, data download and export whilst giving the user full control over SQ2040. The optional SquirrelView Plus gives the user access to many advanced data analyses and archiving/transfer features. Refer to SquirrelView data sheet for specifications.

Concurrent sampling:

The SQ2040 series uses multiple analogue and digital converters that enables true concurrent sampling and logging. It allows the user to configure a channel to log at a rate of 100Hz whilst retaining different sample speeds on the other channels. Ideal for measuring dynamic parameters that change at different rates such as temperature and pressure.

Capabilities

- Create complex schedules of logging rates, triggers and alarm outputs
- Scale and view readings in real time on the integral display or on a PC running SquirrelView
- Select logging rates up to 100 readings per second on up to 4 channels (2 channels on Squirrel model 2040-2F16) or a combination of different logging

Applications


R&D


Engineering


Quality assurance

Squirrel SQ2040 Wi-Fi Technical Specifications

	SQ2040-2F16 Wi-Fi	SQ2040-4F16 Wi-Fi
Analogue Input Channel Options	**Analogue to digital converters:** 2 **Differential:** 16 **Single Ended*:** 32 **3 or 4 wire:** 0	**Analogue to digital converters:** 4 **Differential:** 16 **Single Ended*:** 32 **3 or 4 wire:** 8
Logging Speed	Up to 100 readings / sec on 2 channels only	Up to 100 readings / sec on 4 channels only
Additional Channels	**Pulse:** (2 x fast - 64kHz) & (2 x slow - 100Hz) **Event/digital:** 8 state inputs or 1 x 8 bit binary **Single Ended*:** 2	**Pulse:** (2 x fast - 64kHz) & (2 x slow - 100Hz) **Event/digital:** 8 state inputs or 1 x 8 bit binary **Single Ended*:** 2
Analogue Inputs	Accuracy: (at 25°C) voltage and resistance (± 0.05% readings + 0.025% range) Common mode rejection: 100dB Linearity: 0.015% Input impedance: > 1MΩ Series mode line rejection: 50/60Hz 100dB	
Analogue - Digital Conversion	Type: Sigma - Delta Resolution: 24bit Sampling rate: up to 10, 20* or 100* readings per sec. per ADC. No 100Hz on 1F8 (* with mains rejection off)	
Thermistor Ranges	**Y & U-type:** - 50 to 150°C **Pt100/ Pt1000:** - 200 to + 850°C (2 wire only on 2F16, 3 or 4 wire on 4F16) **Customer specific thermistor range**	
Thermocouple Ranges; Differential and Single Ended	**K-type:** - 200 to 1372°C **R-type:** - 50 to 1768°C **B-type:** 250 to 1820°C **T-type:** - 200 to 400°C **S-type:** - 50 to 1768°C **C-type:** 0 to 2320°C **N-type:** - 200 to 1300°C **J-type:** -200 to 1200°C **D-type:** 0 to 2320°C	
Working Environment	- 30 to 65°C, RH up to 95% (non-condensing)	
Voltage Ranges; Differential and Single Ended	- 0.075V to 0.075V, - 0.15V to 0.15V, - 0.3V to 0.3V, - 0.6V to 0.6V, 0.6V to 1.2V, 0.6V to 2.4V, - 3V to 3V, - 6V to 6V, -6V to 12V, - 6V to 25V	
High Voltage Input Range	4V to 20V, 4V to 40V, 4V to 60V (max 2 may be selected)	
Current Ranges, Differential (Requires external 10Ω shunt)	-30 to 30mA, 4 to 20mA	
Resistance Ranges, all 2 wire	0 to 1250Ω, 0 to 5000Ω, 0 to 20000Ω, 0 to 300000Ω	
Resistance Range 3 and 4 wire (4F16)	0 to 500Ω, 0 to 4000Ω	
Digital/Alarm Outputs	4 open drain FET (18V 0.1A)	
Memory	Internal: up tp 128Mb (up to 14 million readings) External: Up to 1Gb - removable MMC/ SD (for transferring internal memory and storing setups only	
Internal Memory Modes	Stop when full or overwrite	
Calculated Channels	Up to 16 virtual channels derived from physical input channels	
Resolution	Up to 6 significant digits	
Display/Keypad	128*64 dot graphical display,4 button keypad	
Power Supply	Internal: 6 x AA alkaline batteries External: 10-18VDC. Reverse and polarity and over-voltage protected	
Power Consumption@ 9V	Sleep mode: 600µA Logging: 40 - 80 mA	
Power Output for External Device	Regulated 5VDC at 50mA or logger supply voltage at 100mA	
Time and Date	In-built clock in 3 formats	
Communication	Standard: **Wireless Ethernet (Wi-Fi):** 802.11b, 2.4GHz, 1 to 14 channels. Security: Open, WEP(64 or 128 bit encryption), WPA or WPA2/ 802.11i. Network: Infrastructure only with specified SSID (external mains power required for Wi-Fi connection) **RS232** (Auto bauding to 115200 baud) **USB** 1.1 & 2.0 compatible External options: GSM and PSTN Modems	
Programming / Logger Setup	SquirrelView or SquirrelView Plus Software	
Dimensions (w x d x h), Weight	235 mm x 175 mm x 95 mm, 1.2 kg, enclosure material ABS	

Note: SQ2040 wi-fi is supplied with software, manual, USB cable, wall bracket, batteries, 4 current shunt resistors and MPU mains adapter.

NEW for 2011!

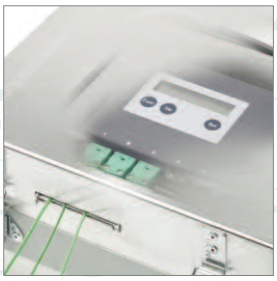
Squirrel OQ610 series temperature data logger

Dedicated data logger for temperature and through process monitoring

Overview

The OQ610 temperature data logger is suitable for a wide range of temperature recording applications in industry, research and development. It is available as a stand alone temperature data logger or as part of a complete system for through process monitoring in the food and paint industries.

With the addition of a thermal barrier the Grant OQ610 is suitable for use in through process applications where heat treatment is being used to produce a product. To ensure consistent quality of heat treated products, it is important to have proof that they have passed through the manufacturing process at the right temperature for the right amount of time. By passing the Grant OQ610 oven logger through the process along with the products, a temperature profile can be produced to show exactly what is happening to the products and the process. Benefits include improved quality of your product and increased efficiency, reduced energy costs, quality assurance reports for compliance and traceability and complete quality control for your process.



Key features

- 6 channels for use with a wide range of K or T type thermocouple probes
- Battery operated and easily portable
- Simple 3 button operation via built in display or from PC
- Can be configured to automatically start and stop logging at specific times or temperature levels
- Fast sample rates for fast process times: up to 8 samples / second
- Can provide automatic cure calculation in through process applications
- Non-volatile memory provides up to 260,000 readings of secure data
- Time and date reported with each reading
- Magnetic catch for battery compartment

The Squirrel OQ610 series comprises two models:

- **OQ610–S**
  - Supplied complete with SquirrelView for through process applications
- **OQ610**
  - Supplied complete with PaintView for paint oven monitoring applications

- 6 channels for type K or T thermocouples
- Compact and simple to use
- High accuracy
- Extended battery life

Small, lightweight, battery operated and portable

Quick and easy to program via three push buttons and display, or via PC

Start and stop logging at specific times or at certain temperature levels

Automatically detects when sensors are present – easy set-up of up to 6 channels

Squirrel OQ-610 Technical Specifications

Accuracy	-50 to 500°C - ± 0.5°C -200 to 1300°C - ± 1.0°C
Resolution	0.1°C
Sampling rate	**Fastest:** eight times per second per channel **Slowest:** once every two hours per channel
Channels	6 K or T type thermocouples
Temperature measuring range	-200°C to 1300°C (K type) -200°C to 400°C (T type)
Operating environment	Temperature range -30 to 65°C Humidity 95%
Memory	Flash memory of 260,000 readings
Maximum runs stored	8
Communication	USB 1.1 and 2.0 compatible
Display	Alphanumeric display of 2 x 16 characters shows pass/fail, battery status, probes connected, real time readings and communication to printer or PC
Power supply	Two AA cells to give 200 hours operation at default settings
Dimensions and weight (l x w x h), g	148 mm x 95 mm x 21 mm, 450g

SquirrelView Software

Powerful and easy to use spreadsheet style software for configuring, downloading, displaying and analysing data. SquirrelView Plus upgrade available including real-time charts and historical data. Further details on page 28.

Probes

Suitable for use with wide range of thermocouple sensors. Full range available in the Probes section page 34.

Applications


Food production


Pharmaceuticals


Oven logging

Capabilities

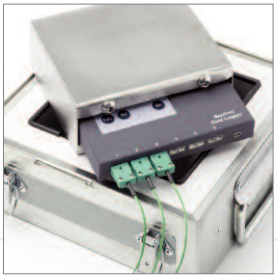
- Flexible start / stop
- Scale and review readings in real-time on the integral display or on a PC running SquirrelView or PaintView

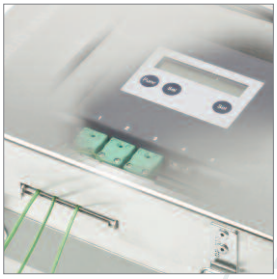
Squirrel OMK610 paint oven profiling system

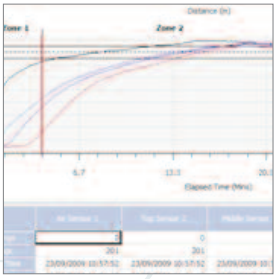
A comprehensive temperature profiling system designed for the paint and finishing industry

Overview

Everything you need for paint oven profiling and paint cure calculations in one easy-to use and convenient system. At the heart of the system is the Squirrel OQ610 temperature logger, capable of taking up to 8 readings per second and storing over 260,000 readings. The logger is protected by either the TB610 or TB612 thermal barrier specifically designed for use in paint and finishing ovens.







Key features

- Clear LCD screen indicates cure % at the end of the cycle
- Oven / process tolerance bands easily configured
- PaintView software configures, stores and allows detailed cure cycle analysis
- Enhanced thermal barrier gives maximum protection
- Up to 6 temperature channels
- Fast response probes for both air and surface temperature
- The comprehensive report generator allows fully customisable reports to be created, including company logos or digital image incorporation
- Multi-zone ovens can be easily configured
- Easy data storage and archiving within PaintView allows inclusion in audited and approved quality controlled processes

OMK610 kit comprises of:

- OQ610 data logger
- PaintView software
- Thermal barrier
- Carry case
- Quick start guide
- USB cable
- Set of batteries

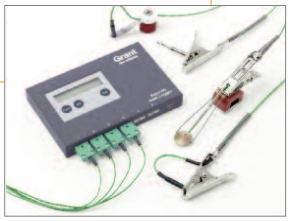
- **Thermocouple temperature probes for recording air and surface temperatures**
- **Thermal barrier to protect the Squirrel data logger during its passage through the oven**
- **PaintView software for data analysis and reporting**
- **6 channels for type K thermocouples**

At the end of a production run, the logger gives user a percentage cure result on the integral screen. Further analysis or data storage is then possible

Multi-language LCD display in English, German, French, Spanish or Italian

The Squirrel OQ610 can record up to eight readings per second from each sensor and store over 260,000 readings in its memory

Four robust, fast response type K thermocouple probes with clamp and magnet fastener can be used for both surface and air temperature measurement



Squirrel OQ610 specifications

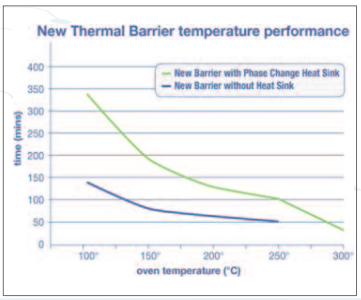
No. channels	6 K-type thermocouples
Temp range	-200°C to 1300°C
Operating temperature	-30°C to 65°C
Log interval	8 per sec to 1 per hour
Accuracy	± 0.5 °C
Memory	260,000 readings or 8 production runs
Display	LCD, alpha numeric, 2 by 16 characters
Power supply	2 x AA cells
Data transfer	USB (1.1 and 2.0)
Size	153 x 101 x 23mm (l x w x h)
Weight	450g, coated steel case

* For applications outside the paint and finishing industry SquirrelView software is used with the OQ610, and probes and thermal barrier (if required) can be selected from the relevant sections of this catalogue
** SquirrelView supplied as standard with every new Squirrel. SquirrelView Plus available at extra cost.

Stainless steel thermal barrier

The all-stainless steel construction of the barrier produces a very robust and user friendly protection for the logger. The internal heat sink (TB612) is also manufactured from stainless steel and uses advanced phase change technology, offering up to 100 minutes of protection at 250°C for the logger.

Barrier		TB612 with Heat Sink					TB610 without Heat Sink			
Temp	°C	100	150	200	250	300	100	150	200	250
Duration	mins	340	195	130	100	30	140	80	60	50
Size (l x w x h)	mm	245 x 245 x 115								
Weight	kg	6					4			



Thermocouple Probes

The K-type (NiCr-Ni) thermocouples are constructed to be flexible and durable, meeting the requirements of the DIN IEC 60584-2 standard. Full details available in the accessories section on page 34.

Probe identity tags

Numbered, brass tags (1 to 6) simply attach to the temperature probes to provide channel identification. See Accessories section for further details. Order code PT-1-6.

Paintview software

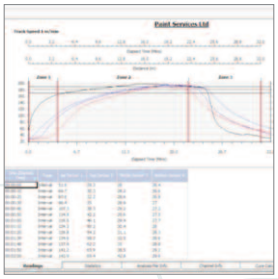
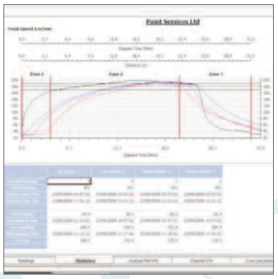
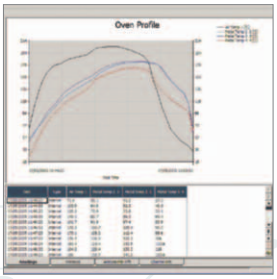
The OMK oven profiling kits are supplied with a full version of the PaintView analyses and archiving PC software. Configure the OQ610 logger, retrieve data via a USB connection, analyse, archive and create reports. Order code Paintview.

Paintview Software

for OMK 610 paint oven profiling system

PaintView – supplied with every OMK610 kit

PaintView is an easy to use software package designed for exclusive use in the paint and finishing industry and is included FREE with every OQ610 temperature logger. It enables easy setup of your logger and automatic download of your data from the logger into a meaningful measure of paint cure. For advanced paint cure calculations, it can also provide rapid interpretation of results. PaintView also gives you the additional benefits of graphically analysing your historical and on-line data, along with advanced reporting.

Key features

- User friendly spreadsheet style software for exclusive use in paint curing applications
- PaintView offers the choice of the Grant 'classic' cure and area integration cure analysis methods
- A database can be built of different paint types from various paint manufacturers
- USPaintView provides zones for optimal paint solving in your process
- With regular usage the software can pinpoint any uneven temperatures within the stoving process
- The tolerance curve feature gives the ability to draw your ideal curve and check that your data fits
- Easily view and control the logger status from one single screen
- Security function protects your data and setup configurations
- The graphing feature within the software offers fully annotated curves, zoom and cursor scrolling analysis
- All settings can be saved for reuse
- The report generator can provide standard reports on all functions of the curing process to provide your customers with proof of compliance to their stoving requirement
- Export data into Excel™ or as a CSV file for customisable data analysis

PaintView System Specifications

Setup

- Setup can be verified before it is sent to the logger
- Converts setup files from previous SquirrelView or PaintView software
- Report options for data presentation
- Hide facility allows you to tailor setup interface to your own requirements
- Printer setup information
- Facility to setup templates

Meter Mode

- Displays up to 6 channels
- 3 Plot types: line graphs, gauges & dials
- Autoscaling: X and Y axis
- Value readout: cursor position
- Saves metered data for re-use in other software packages
- Graph printout facility
- Graph can be presented in various styles

Download

- Download straight to graph
- Download directly as a CSV file

Export

- Easy to use export wizard
- Customisable data export for Excel™, Lotus™ or other applications
- Export viewer allows quickview facility of data format

Additional features

- Tips of the day – provides informative shortcuts
- Logger diagnostics
- Security features enables password setup
- Communication wizard enables easy setup of USB
- Interactive help

Analysis

- Easy analysis for OQ series loggers
- Easy to use Explorer style interface
- Fully configurable data views
- Creation of templates
- Flexibility for customisable reports
- Facility to include text comments with graphs
- Flexible zoom feature including X and Y axis
- Statistics calculator
- Autoscaling of Y axis
- Value readout at cursor position
- High and low level thresholds
- Report facility: prints out graphs, readings,etc
- Tolerance curve
- Oven profile
- Calculated channels
- User notes
- Archives
- File convertor from Paintwise and Squirrelwise
- Product cure calculation
- Append/add datafiles
- Run creator, extracting and joining data by time

Minimum computer requirements

- Microsoft Windows XP™, Vista™ or Windows 7™
- Pentium II 266 MHz
- RAM as specified by PC operating system
- 60 Mb hard disk space and 1 CD drive
- Colour SVGA monitor running at 800 x 600 (1024 x 768 recommended
- USB port

Through Process Monitoring system consists of:

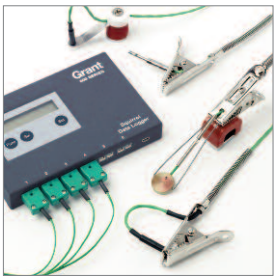
- **Squirrel OQ610 logger**
- **SquirrelView or an optional SquirrelView Plus Software for setup, download & data export.**
- **Thermal barrier**

Through Process Monitoring

A comprehensive through process monitoring system designed for data logging in extreme environments.

Overview

Grant Through Process Data Logging Systems are easy to set-up and use. They are suitable for a variety of applications including data logging in hostile environments and monitoring conditions on moving production lines. Benefits include improved efficiency and quality; reduced energy costs and increased yields; production of due diligence reports and a reduction in process set-up time and down time.



Advantages

The advantage of Through Process Monitoring is that you can make measurements at precisely the points you are interested in, even if those points are moving on a conveyor belt or with some other mechanical device, without the worry of trailing wires or complicated connection methods. If the process involves operating in an environment of extreme heat, cold, moisture or steam, then the OQ610 is placed in a protective thermal barrier.

Benefits

- Suited to a range of applications; from bread to bricks or any heat treatment
- For use in furnaces, kilns, any form of oven or cooler & conveyor systems
- Improved quality of your product and increased efficiency
- Reduced energy costs
- Provides quality assurance reports for compliance and traceability
- Complete quality control for your process
- A complete package: data logger, protective barrier, computer software and training, a protective thermal barrier.

Thermal Barriers

The performance of a thermal barrier is measured in terms of exposure time at a particular temperature for a given maximum internal temperature. See table in Accessories section for exposure times allowed over a range of temperatures.

Probes

OQ610 is suitable for use with our wide range of thermocouple sensors. Thermocouples have quick response time and are suitable for a wide range of applications from small and delicate to heavy industrial. Refer to Probes section for further information.

SquirrelView software

The SquirrelView software allows logger configuration, data download and export. The optional SquirrelView Plus gives the user access to many advanced data analysis and archiving/transfer features. Refer to SquirrelView data sheet for specifications.

Applications

Food production

Surface coatings

Kilns and furnaces

Concrete Maturity Meter system consists of:

- **Squirrel OQ610 logger**
- **SquirrelView or an optional SquirrelView Plus Software for setup, download & data export.**
- **Weatherproof heavy duty case**

Concrete Maturity Meter

Compact, versatile unit designed for data logging in concrete curing applications.

Overview

The Grant OQ610-S Concrete Maturity Meter is a compact unit, supplied in a very heavy duty, bright yellow water proof case, making it ideal for site work in all conditions and climates. The maturity meter is simple to use, finishing the job in the shortest possible time. This gives the confidence that the concrete is at its optimum strength, benefitting from the subsequent efficiency, improvements and cost savings that
this procedure brings.

Advantages

The OQ610-S has 6 temperature channels and digitally displays the value of all channels. It can be connected directly to a PC or laptop via a USB interface for fast downloading of the readings. Using the supplied Microsoft Excel™ templates, the Concrete Maturity is calculated from elapsed time versus temperature and is quoted as a “Maturity number”. The Maturity number can be used to determine when concrete has cured sufficiently for formwork to be removed.

Determining Concrete Maturity

In order to determine concrete maturity, sacrificial temperature measurement cables are ‘cast into’ the concrete and cut off at the surface when the concrete has cured. Grant supplies the temperature measurement cable in 100m rolls with separate plugs so that these individual sensors can be custom made to suit any particular job.

Probes

OQ610-S is also suitable for use with our wide range of thermocouple sensors. Refer to Probes section for further information.

SquirrelView software

The SquirrelView software allows logger configuration, data download and export. The optional SquirrelView Plus gives the user access to many advanced data analyses and archiving/transfer features. Refer to SquirrelView data sheet for specifications.

Other accessories

Type K thermocouple cable (part no 10076) Order by quanity length in meters.
Male sub miniature Thermocouple Plugs (part no 11668)
Waterproof case PC610-S

Applications

Concrete curing

The Concrete Maturity Meter kit (CMK610-S) comprises of:

- **OQ610** logger for 6 x K or T type probes
- Waterproof case and type K extension leads PC610-S
- Squirrelview software, suitable for Windows 2000, XP and Vista
- USB connecting cable LC80

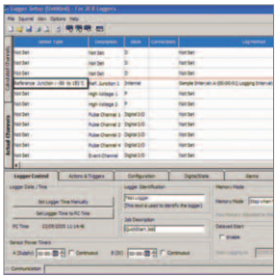
SquirrelView & SquirrelView Plus Sofware

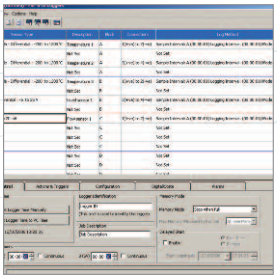
SquirrelView – supplied with every Squirrel

SquirrelView is a universal software package that is included with every new Grant Squirrel data logger.

Its intuitive, user friendly, spreadsheet style interface allows quick set-up of the data logger for any application, speedy download of data and direct export to Excel™. SquirrelView Plus gives additional benefits such as graphical data analyses and advanced reporting options.

Minimum PC specification: – Windows® XP, Vista or Windows 7; Pentium II 266MHz; 60Mb hard disk space and 1 CD drive, colour SVGA screen (1024x768 recommended), at least one RS232 or one USB port, mouse.





Key features

- Intuitive, user friendly spreadsheet style setup allows quick logger configuration in any application
- Flexible data presentation allows you to quickly display and analyse real time or historical data as a line graph, bar chart or analogue gauge
- Graphical alarm and event identification lets you easily identify occurrences around specific analogue or digital events e.g. pump coming on
- Quick Graph function lets you quickly and easily view large data files
- Export data into Excel™ in real time, or as a CSV file for customisable data analysis
- Easily view and control the logger status from one single screen
- Use the simple communication wizard for hassle free working with modems, Ethernet, GSM, etc.
- Download data by date, time or events, saving time when working via modem or looking for specific data
- Save settings on the PC for efficient re-use
- Protect your data and set-up configurations with the security function

SquirrelView Plus-Analysis

SquirrelView Plus lets you quickly and easily analyse the data from your Squirrel data logger in a familiar Explorer™ style interface. Data can be displayed with 2 different auto scaling Y-axes. This is particularly useful when displaying widely varying data from different sensors on one graph. You can also zoom in on areas of interest, use a cursor to pick out exact values, times and dates, get a statistical summary of your data, set high and low alarm thresholds and, using the calculation function, you can create new virtual channels from existing channels.

SquirrelView Plus also incorporates a report generation facility, which allows you to create custom report templates consisting of a title page with descriptive text, headers and footers, graphs, tabular list of data, statistics and data logger setup information. Templates can be setup with any of these combinations and saves time when preparing similar presentations of data.

SquirrelView & SquirrelView Plus System Specifications

- SquirrelView & SquirrelView Plus (order code: SQA100)

Setup

- Setup can be verified before it is sent to the logger
- Converts setup files from previous Setwise software to SquirrelView
- Hide facility allows you to tailor setup interface to your own requirements
- Print setup information

Meter Mode

- Displays up to 16 channels in real time
- 3 Plot types: line graphs, gauges & dials
- Auto scaling of Y axis
- Value readout at cursor position
- Saves metered data for re-use in other software packages
- Graph printout facility
- Graph can be presented in various styles

Download

- Download directly as a CSV file
- Download straight to a graph
- Download by date & time (SQ20xx only)
- Data downloader application (SQ2010, SQ2020, 2040 series)

Export

- Easy to use export wizard
- Customisable data export for Excel™, Lotus™ or other applications
- Export viewer allows quick view facility of data

Additional features

- Tips of the day - provides informative shortcuts
- Logger diagnostics
- Security feature enables password setup
- Communication wizard enables easy setup of USB (20xx only), RS232, Ethernet and Modem, Wi-Fi (Wi-Fi models only)
- Interactive Help
- Spanish and German versions available

- SquirrelView Plus Version only (order code: SQA200)

Analysis

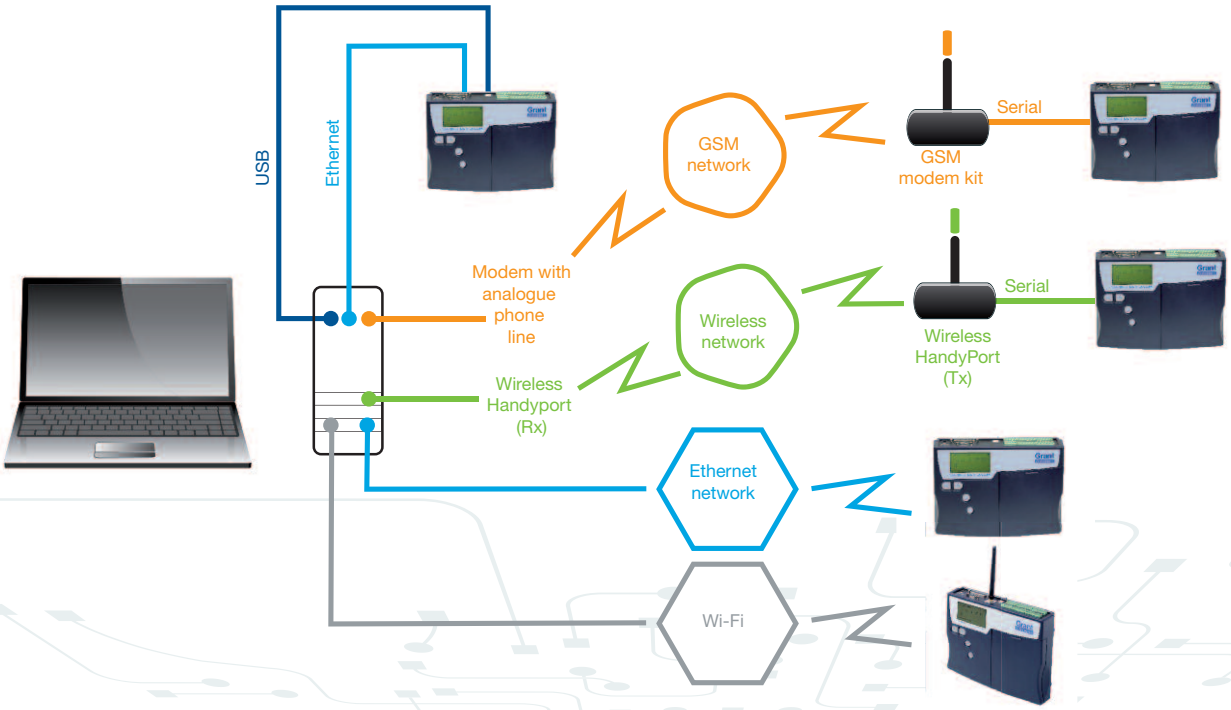
- Easy analysis for: SQ20xx, SQ400/800,SQ1000, SQ1600, SQ1200/1250 and 600 series loggers
- Easy to use Explorer style interface
- Fully configurable data views
- Creation of templates
- Flexibility for customisable reports
- Facility to include text comments with graphs
- Flexible zoom feature including X and Y axis
- Statistics calculator
- Auto scaling of Y axis
- Value readout at cursor position
- Set and view high and low level thresholds
- Customisable report facility: prints out graphs, readings,etc
- Tolerance curve
- Calculated channels
- User notes
- Archives
- File convertor from Setwise and Squirrelwise
- Product cure calculation
- Display oven profiles and oven zones
- Append/add data files
- Import CSV file

Minimum computer requirements

- Microsoft Windows XP™, Vista™ or Windows 7™
- Pentium II 266 MHz
- RAM as specified by PC operating system
- 60 Mb hard disk space and 1 CD drive
- Colour SVGA monitor running at 800 x 600(1024 x 768 recommended)
- 1 RS232 or USB port (where applicable)
- Mouse

Please note: 1200/1250 loggers require SquirrelView Plus to operate. Due to limitations of these loggers, setup, status and meter mode features are not supported.

Squirrel connectivity and communications

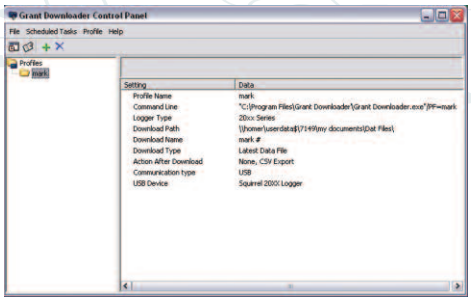


Data Downloader application

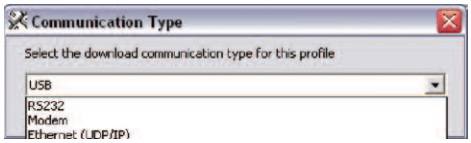
The Grant Downloader software application (supplied with SquirrelView) is designed for operation with the SQ2010, SQ2020 and SQ2040 series. It allows the user to easily download data from multiple Squirrel data loggers either by the click of an icon on the PC desktop, or via Microsoft's Windows™ Scheduler, making the whole operation fully automated.

Features

- Address each logger individually
- Download data into a specified folder / location
- Select whether to download all data or latest data files
- Set an action after download, e.g. start new job
- Integrate with Microsoft's Scheduler™ to completely automate the process – no user input is then required
- Set up a series of desktop icons for each Squirrel and download data with one click of the mouse



Top level navigation screen



Communications screen

Accessories

Communications accessories

GSM modem kit*

- Allows connection to any Squirrel data logger remotely
- Uses GSM cellular network, ideal where no land lines are available
- Operates on Quad band versions 850/900/1800 MHz and 1900 MHz
- Suitable for most applications including use at urban sites, remote sites or in mobile applications
- Collects data at speeds up to 9600 baud
- Supplied with connecting cable, power lead and antenna

Order code: SQ20A802

GSM modem kit** » specification	
Power supply (external adaptor cable included to power from optional SQ mains adapter – MPU12)	5.5 to 32 VDC
Current consumption (when transmitting)	< 480 mA @ 5.5V
Current consumption (when in standby)	< 20 mA
Environmental operating temperature	-30 to +75°C
Sensitivity (SMA antenna connector; operates on quad band versions 850/900/1800 & 1900MHz systems)	109 dB @ 900 MHz
Communication	V24 / RS232C, 9 pin sub-D 2.4, 4.8, 9.6, 14.4 kb/s
LED indicators	for CD, RI and GSM contact
Dimensions (l x w x h)	73 x 54.5 x 25.5 mm, weight 80 g

* Requires a modem with analogue phone line on receiving PC
**Grant software and data cable required (along with data enabled SIM card from mobile phone service provider)

RS232 to Ethernet converter (1-F8, Wi-Fi and SQ2010 loggers only)

- Converts the original Squirrel data logger's RS232 output into Ethernet for remote or distributed monitoring
- Allows the logger to plug in at any point on an existing Ethernet network making data easily accessible to anyone
- No modification to logger required (needs an external mains power pack for Netport to operate)
- Requires an existing Ethernet network for connection

Order code: SQ20A801

RS232 to Ethernet converter » specification	
Power requirements (external adapter cable included, powered from optional SQ mains adapter – MPU12)	7.5 to 24 VDC 240 mA @ 7.5V, 75 mA @ 24V
Environmental operating temperature	+5 to +50°C
Dimensions (l x w x h)	28 x 42 x 65 mm

Wireless RS232 converters (set of 2: for PC & logger)

- Transmits the Squirrel data logger's RS232 output wirelessly to a PC running SquirrelView
- Maximum range is 500m using an external antenna (100m as standard)
- Baud rates of up to 116 K; 2.4GHz frequency
- Plug and play configuration and via the in-built communications wizard in SquirrelView
- External adaptor cable included, powered from SQ mains power pack MPU12

Order code: SQ20A803

Accessories

Protective enclosures

Weatherproof enclosures

A range of enclosures and carrying cases to suit all Squirrel data loggers to protect them in harsh operating environments.

- Robust, plastic, waterproof cases (which can be padlocked) for maximum protection and security in harsh environments
- PEL4 for SQ2020/2040 data loggers, size: 41cm x 33cm x 18cm
- PEL1 for SQ2010 data logger, size: 34cm x 29cm x 15cm. Other sizes also available to order
- Standard enclosures with protection rating up to IP65
- Optional industrial enclosures giving protection up to IP68
- Customisable to suit specific applications

Squirrel OQ610 in weatherproof case

Thermal barriers

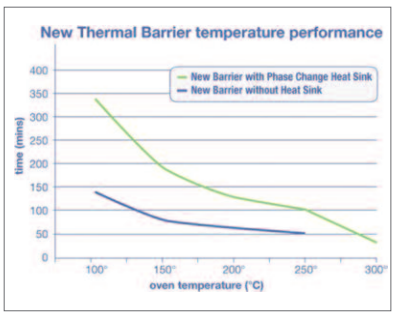
Thermal barriers are insulated containers designed to keep heat out so that the Squirrel data logger inside remains at a safe operation temperature for a specified duration.

- Provides protection to Squirrel data loggers when used in high temperature oven profiling applications (static or conveyor)
- A range of standard and customised models with different performance characteristics
- Made from stainless steel, for years of use
- Barriers available for very high temperature applications – manufactured to order
- Suitable for applications in food, powder coating, stove enamelling, ceramic, kiln and furnace
- Can be constructed using special phase change material for added protection for very high temperature applications.
- Customised barriers available to suit your specific requirements, contact acquisitionsales@ grantinstruments.com for more info.

Squirrel 2020 in an electrical enclosure

Squirrel OQ610 in thermal barrier

Barrier		TB612 with Heat Sink					TB610 without Heat Sink			
Temp	°C	100	150	200	250	300	100	150	200	250
Duration	mins	340	195	130	100	30	140	80	60	50
Size (l x w x h)	mm	245 x 245 x 115								
Weight	kg	6					4			



Accessories

Temperature and Humidity Probes

Grant manufactures a comprehensive range of robust, high quality temperature probes with a choice of sensor and in a variety of physical styles for use with Squirrel data loggers.

In addition to the standard range of temperature probes Grant is able to customise probes for special applications.

Grant is able to supply humidity probes and current transducers and to provide guidance on suitable sensors for measuring a wide variety of other physical parameters.

Grant temperature probes

- Choice of thermistors, thermocouple and platinum resistance sensors
- Wide range of physical styles
- High quality robust construction for long life
- Test and calibration traceable to national standards
- Optional UKAS certification
- Choice of cables and connectors for different applications
- 3 year guarantee against faulty materials and workmanship

Thermistors

- Larger electrical signal for a given temperature change than other sensors
- Fast response time
- High accuracy (U type 0.2°C, UU type 0.1°C)
- Preferred sensor over the operating range -50 to +150°C
- Long cable lengths possible without significant errors
- Mini thermistors available for miniature/needle probes

Code	Max Temp (°C)	Resistance (@ 25°C)	Accuracy (@ 0 to 70°C)
U	150	2K Ohms	± 0.2°C
UU	150	2K Ohms	± 0.1°C
SU	120	2K Ohms	± 0.2°C

Mains Power Adaptors

MPU 12V - universal mains adaptor (power supply) for use with the Squirrel data loggers 97-263V AC at 50 / 60Hz input. Supplied with 3 socket adaptors for use in the UK, Europe and the USA.
MPU 12VFL - as MPU 12V but supplied with a flying lead (no plug at the mains end).

Thermocouple probes for paint oven profiling systems (Squirrel OMK610)

The K-type (NiCr-Ni) thermocouples are constructed to be very flexible and durable. They are triple insulated (Teflon-copper-Teflon) and meet the strict requirements of the DIN IEC 60584-2 standard. They are terminated with a standard miniature thermocouple plug (to IEC584) and are double crimped for additional strength.

- Suitable for temperatures from -25°C up to +250°C
- Fast response time
- Moderate accuracy (0.5°C)
- Suitable for a wide range of applications from delicate to heavy industrial

Probe

Available in 1.5, 3.0 or 6.0m cable lengths. Fast response due to small mass and good air flow through the sensor tip

Clip Surface Probe

- Available in 1.5, 3.0 or 6.0m cable lengths
- Suitable to clip to a nonmagnetic component
- Curved PTFE mounted sensor ensures good surface contact

Magnetic Surface Probe

- Available in 1.5, 3.0 or 6.0m cable lengths
- PTFE probe grip for safe removal with flexible metal probe arm giving excellent surface contact

Probes			
Description Part Number / Cable Length	**1.5m (4'9'')**	**3m (9'8'')**	**6m (19'7'')**
Clamp Air Probe	CAP-K-G1.5-3	CAP-K-G3-3	CAP-K-G6-3
Magnetic Air Probe	MAP-K-G1.5-3	MAP-K-G3-3	MAP-K-G6-3
Clamp Surface Probe	CSP-K-G1.5-3	CSP-K-G3-3	CSP-K-G6-3
Magnetic Surface Probe	MSP-K-G1.5-3	MSP-K-G3-3	MSP-K-G6-3
Combined Probe Can be used as a Magnetic Air, Magnetic Surface, Clamp Air or Clamp Surface Probe	TC-K-N1.5-3	C-K-N3-3	TC-K-N6-3

Probe identity tags

These numbered, brass tags (1 to 6) simply attach to the temperature probes to provide channel identification.
Order code: PT-1-6

Thermocouple adaptors

The adaptors allow a K or T type thermocouple connection to be made to the SQ20xx series data logger via a standard miniature thermocouple plug. These are available for either differential (2 way) or single ended (4 way) thermocouple inputs.

SQ20A425 4 way, K-Type adaptor
SQ20A426 4 way, T-Type adaptor
SQ20A427 2 way, K-Type adaptor
SQ20A428 2 way, T-Type adaptor

Grant temperature probes: » summary of specifications

120°C max

Typical application	Probe	Probe ref	Thermistors			Thermocouples		Platinum Resistance			
			standard (U)	high precision (UU)	mini (SU)	type K	type T	Pt100 2-wire (P2)	Pt100 4-wire (P4)	Pt1000 2-wire (P6)	Pt1000 4-wire (P8)
General purpose: Robust, stainless steel with rounded end, fast response											
Monitoring temperature of air, vapours, liquids, powders, fridges, freezers, food, etc.		CS	VL, F, A	VL, F, A		N,M,X	N,M,Q, FG	VL, F, A	C, D	VL, F, A	C, D
		CT	VL, F, A	VL, F, A		N,M,X	N,M,Q, FG	VL, F, A	C, D	VL, F, A	C, D
		CM	VS, F	VS, F		N, M	N, M, Q	VS, F		VS, F	
Delrin handle		CH	VS, F	VS, F		N, M	N, M, Q	VS, F		VS, F	
General purpose: Exposed junction thermocouples (conductors exposed and welded at tip), fast response, low cost											
Air, vapours, liquids, powders, fridges, freezers, food, etc.		TH				N, M	N, M				
Surface temperature: Sensor mounted on either copper (EU) or stainless steel base (EUS)											
Monitoring temperature of radiators, pipes, pumps, motors, etc.		EU	VS, VL, F	VS, VL, F		N, M	N, M, Q	VS, VL, F			
		EUS	VS, VL, F	VS, VL, F		N, M	N, M, Q	VS, VL, F			
Room temperature: Sensor assembly mounted on aluminium bracket. Removable plastic globe to allow for the effect of radiant heat											
Monitoring radiant and air temperature		AG	VS, VL, F	VS, VL, F		N, M	N, M, Q				
Specialised miniature – hypodermic and catheter probes											
Hypodermic probe with handle – used in zoological, veterinary, botanical, entomology, micro-climate research		DS			VS, VL, F	N, M	N, M, Q				
		DM			VS, VL, F	N, M	N, M, Q				
Catheter probe (sensor at end of flexible nylon tubing) – used in incubation, crystallisation etc.		FF	VS, VL, F, A	VS, VL, F, A							
Insertion (solid): Stainless steel sheath with pointed end for easy insertion into / withdrawal from solid material											
For soil, frozen food, ice, etc.		CMP	VS, F	VS, F		N, M	N, M, Q	VS, F		VS, F	
Insertion (soft): Sensor sealed into smooth, flexible, translucent PVC tubing smoothly fused onto cable											
Delicate applications requiring flexible soft insertion		REC	VL	VL							
For ear		EAR	VS	VS							
Accuracy			±0.2°C	±0.1°C	±0.2°C	±1.5°C	±0.5°C	±0.3°C	±0.3°C	±0.3°C	±0.3°C
Operating range			-50 to +150°C	-50 to +150°C	-50 to +120°C	-25 to +250°C	-25 to +250°C	-50 to +250°C	-50 to +250°C	-50 to +250°C	-50 to +250°C

VL, F, A, N, M, etc = suitable cable types (see separate key below)

Cables for Grant temperature probes

	Cable operating range (°C)	Max. Ø (mm)	Max length (m)	Connector supplied	
				bare-ended	thermocouple plug
Cable for thermistors and 2-wire Pt100 and 2-wire Pt1000					
VL PVC large coaxial, general purpose, water resistant, flexible	-10 to +105	3.1	500	●	X
VS PVC small coaxial, lightweight, water resistant, flexible	-10 to +105	2.0	5	●	X
F PTFE coaxial, good mechanical strength & flexibility, resistant to oils, acids, etc	-50 to +250	2.4	500	●	X
A Polyethylene 2-core, low temperature, heavy duty waterproof	-20 to +80	4.0	300	●	X
Cable for 4-wire Pt100 and 4-wire Pt1000					
C PVC 4-core insulated, general purpose, water resistant, flexible	-10 to +105	3.5	100	●	X
D PTFE 4-core insulated, good mechanical strength & flexibility, resistant to oils, acids etc	-50 to +250	3.8	100	●	X
Cable for thermocouples					
N PTFE flat 2-core, good mechanical strength & flexibility, resistant to oils, acids, etc.	-50 to +250	2.1	50	●	optional
M PTFE twisted 2-core, good mechanical strength & flexibility, resistant to oils, acids, etc	-50 to +250	2.0	15	●	optional
Q PTFE 2-core round, good mechanical strength & flexibility, resistant to oils, acids, etc	-50 to +250	2.5	15	●	optional

Connector options	Code
No Plug	0
Thermocouple Plugs	3

Ordering codes

Ordering Grant probes is a simple selection process, from the above charts decide the Probe Ref, the sensor type, the cable and length and if a connector is required or not (see example)

Probe	Sensor	Cable/Length	Connector
CS	- U	- VL50	- 0

Thermocouple Conductor Combination Type	Extension and Compensating Cable		International Colour Code	International Colour Code	Reduntant national colour coding for insulation of thermocouple extension and compensating cable					Tolerance values to IEC 60584.3:1989 (BS EN 60584.3:2008) for extension and compensating cables when used at temperatures within the cable temperature range column shown below.				Notes
					BRITISH to BS 1843	AMERICAN to ANSI/MC96.1	GERMAN to DIN 43714	FRENCH to NFC42324	JAPANESE to JIS C 1610-1981	Tolerance class		Cable Temperature Range°C	Measuring Junction Temperature	
	Extension Cable	Compensating Cable	To IEC 60584.3:1989 BS EN 60584.3:2008	To IEC 60584.3:1989 BS EN 60584.3:2008 for Intrinsically Safe Circuits						1	2			
K	KX									±60µV (±1.5°C)	±100µV (±2.5°C)	-25°C to +200°C	900°C	Type KX Thermocouple extension cable conductors are made from the same constituent elements as the Type K thermocouple combination and therefore minimises potential errors when connecting to a sensor.
		KCA									±100µV (±2.5°C)	0°C to +150°C	900°C	This compensating cable conductor combination is little known and generally not available. It should not be confused with the more popular Type KCB as shown below.
		KCB									±100µV (±2.5°C)	0°C to +100°C	900°C	This combination(previously known as Type V) is made with Copper vs Copper-Nickel conductors, and should only be used when the ambient temperature of the interconnection point between the cable and its Type K sensor is below 100°C.
T	TX									±30µV (±0.5°C)	±60µV (±1.0°C)	-25°C to +100°C	300°C	Type TX extension cable conductors are made from the same constituent elements as the Type T thermocouples. There is no compensating cable available for Type T, however the extension cable is realtively inexpensive.
J	JX									±85µV (±1.5°C)	±140µV (±2.5°C)	-25°C to +200°C	500°C	Type JX extension cable conductors are made from the same constituent elements as the Type J thermocouples. There is no compensating cable available for Type J, however the extension cable is realtively inexpensive.
N	NX									±60µV (±1.5°C)	±100µV (±2.5°C)	-25°C to +200°C	900°C	Type NX extension cable conductors are made from the same constituent elements as the Type N thermocouples. There is a designated compensating cable for Type N, not readily available.
		NC									±100µV (±2.5°C)	0°C to +150°C	900°C	Type NC compensationg cable is not at present readily available.
E	EX									±120µV (±1.5°C)	±200µV (±2.5°C)	-25°C to +200°C	500°C	Type EX extension cable conductors are made from the same constituent elements as the Type E thermocouples. There is no compensating cable available for Type E.
R		RCA									±30µV (±2.5°C)	0°C to +100°C	1000°C	Type RCA compensating cable is suitable for connecting to Type R thermocouples where the ambient temperature of the interconnection point between the cable and Type R sensor is below 100°C.
		RCB									±60µV (±5.0°C)	0°C to +200°C	1000°C	Type RCB compensating cable is suitable for connecting to Type R thermocouples where the ambient temperature of the interconnection point between the cable and Type R sensor is below 200°C.
S		SCA									±30µV (±2.5°C)	0°C to +100°C	1000°C	Type SCA compensating cable is suitable for connecting to Type S thermocouples where the ambient temperature of the interconnection point between the cable and Type S sensor is below 100°C.
		SCB									±60µV (±5.0°C)	0°C to +200°C	1000°C	Type SCB compensating cable is suitable for connecting to Type S thermocouples where the ambient temperature of the interconnection point between the cable and Type R sensor is below 200°C.
B		BC												This compensating cable is made from Copper vs Copper conductors. The expected maximum additional deviation when the ambient interconnection point is between 0 and 100°C would be approx. 3.5°C when the measuring junction is at 1400°C.
G		GC												This compensating cable is made from Alloy 200*vs Alloy 226* and is suitable for use with Type G (formerly W) Thermocouples.
C		CC												This compensating cable is made from Alloy 405*vs Alloy 426* and is suitable for use with Type C (formerly W5) Thermocouples.
D		DC												This compensating cable is made from Alloy 203*vs Alloy 225* and is suitable for use with Type D (formerly W3) Thermocouples.

*Codes G, C and D and the cable colours shown are not officially recognised symbols.

Capacitive humidity and temperature probes

Grant provides the following combined temperature/humidity probe for use with Squirrel data loggers, these can be supplied with the following cable length: 2, 5 or 10 meters.

Rotronic HYGROMER with Pt100 sensor

- Sensors protected against dust and pollution inside a robust polycarbonate housing
- Measurement range -40 to +100°C (0 to 1V); 0 to 100% r.h. (0 to 1V)
- Fast response time: <0.7s (start-up 3s), accuracy (at +23°C): humidity 0.8% r.h, temperature 0.1°C
- Operating environment -50 to 100°C and 0 to 100%rh
- Good long term stability: <1% r.h, 0.1°C./year
- One year guarantee
- Dew Point Optional

Order Codes:
RHT-G-Z2-0 complete with 2 meters of cable
RHT-G-Z5-0 complete with 5 meters of cable
RHT-G-Z10-0 complete with 10 meters of cable

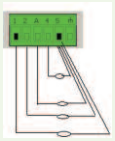
Connecting your signals

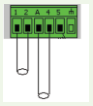
Differential or single ended inputs?

All Grant Squirrel data loggers in this catalogue are shown with a range of channel options, e.g. 8 to 16 inputs. This refers to their ability to accept either single ended or true differential signals.

Single-ended inputs – each input signal has two connection wires. One is connected to a common terminal on the logger (see diagram). This increases the number of inputs possible to the logger, but results in all the connected sensors having an input at a common potential. However, unlike many loggers, the Grant Squirrel allow these common terminals to be at different potentials (on separate connector blocks), optimising the overall system accuracy.

Differential inputs – each input signal has two connection wires and the logger measures the difference between them. One wire goes to a positive input and one to a negative input (see diagram). In this case none of the inputs needs to be at the same potential as any of the others.


Single ended connection


Differential connection

Making a choice between single-ended and differential inputs:

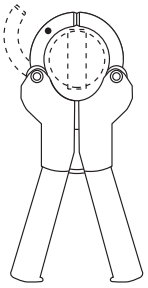
Signal leads over a few metres in length?	Choose differential to reduce noise.
Small signals under around 100 mV?	Choose differential to reduce ground and noise errors.
Signals with different grounds, e.g. when signals are remote from each other?	Choose differential to remove ground errors.
Sensors with high resistance such as strain gauges?	Choose differential to remove common mode voltage. High resistance gives greater pick up and thus higher common mode voltage.
Need twice as many inputs and have none of the above problems?	Choose single ended.

AC current transducers

These current transducers are used primarily in the building services industry for monitoring AC current. All transducers have a 0 to 1 VDC output and are compatible with all Grant Squirrel data loggers.

Miniature clip-on AC current transducers (Order codes: BSS 540, BSS 541, BSS 542)

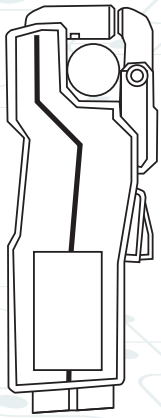
- Accommodates 15mm diameter cable or 15x17mm bus-bar
- Choice of two models: 0 to 25A, 0 to 100A
- BSS 540 accuracy is higher than BSS 541
- Basic accuracy of ±0.25 to ±3%
- Output: 0 to 1V DC for all ranges
- Output connection: 4mm safety sockets
- Operating temperature: -10 to +50°C
- Max. operating voltage: 650V
- Dimensions: BSS 540 and BSS 541 - 43x23x125mm (l x w x h)
- Weight: 125g



BSS 542

Clamp-on AC current transducers (Order codes: BSS 542)

- Accommodates 43mm diameter cable
- Three switch-selectable ranges: 0 to 250A, 0 to 500A, 0 to 1000A
- Basic accuracy of ±0.25 to ±3%
- Output: 0 to 1V DC for all ranges
- Output connection: 4mm safety sockets
- Operating temperature: -10 to +50°C
- Max. operating voltage: 650V
- Dimensions: 38x90x205mm (l x w x h)
- Weight: 550g



BSS 540 / 541

Other products and services from Grant Instruments

Eltek telemetry based data logging systems

Grant affiliate Eltek, part owned by Grant Instruments and also based near Cambridge, specialises in the design and manufacture of wireless data logging systems based on the Squirrel data logger. The Eltek GenII radio data logging system enables sensors to be connected to the Receiver Logger by means of a radio link, ideal where communications across a river, road or simply a large site need to be established quickly and effectively. Typical applications include monitoring of buildings (homes, cold stores, warehouses, museums, galleries, etc.), ground water monitoring and 'through process' monitoring in food production.

Please visit **www.eltekdataloggers.co.uk** for more information.

DataTaker industrial data acquisition systems

Grant's trading partner dataTaker, is based in Melbourne, Australia. They produce rugged multi-channel data loggers primarily for complex industrial applications which compliment the Squirrel data loggers.

Grant acts as the sole importer and distributor of dataTaker products into the United Kingdom.

Please visit **www.datataker.com** for more information.

Grant equipment for the laboratory

The Grant Scientific division designs and manufactures a wide range of high quality laboratory equipment used in routine laboratory applications for analytical, diagnostic and research purposes.

Key product groups include temperature controlled baths and circulators for heating and refrigerating, dry block heaters for incubating samples, shaking baths for agitating samples, and ultrasonic baths for cleaning.

Grant affiliate Biosan, co-owned by Grant Instruments, designs and manufactures an innovative and cost-effective range of products designed primarily for life science applications. Biosan, based in Latvia, manufactures the Grant-Bio product range and has an extensive new product development portfolio.

Calibration services, warranty, after sales support

Squirrels on the internet – www.grantinstruments.com

Please visit our web site to access all current product information and support materials. These have been produced to assist our customers with the installation, configuration and deployment of their Squirrel data logging applications. The site includes downloadable information covering the following topics:

- Technical specification data sheets for all Squirrels
- Training videos
- Application stories and notes
- FAQ's
- Technical hints and tips
- Squirrel instructions and quick start guides

Calibration services

All Squirrel data loggers manufactured by Grant Instruments Ltd are checked for accuracy using equipment with calibrations traceable to UK National Standards. Grant also provides an additional calibration service, with traceable certification, at extra cost. This service is carried out by an independent calibration laboratory certified by the British National Measurement Accreditation Service (NAMAS).

Please contact us for further information on +44 (0) 1763 260 811

Warranty

All Squirrel data loggers are warranted against faulty materials and workmanship for three years. For repairs carried out inside this warranty period, no charge is made for labour, materials or return carriage.

In the event that repairs are required, they are normally carried out within 5 working days of receipt at our UK factory. All warranty repairs require a Return Materials Authorisation document (RMA) to be issued before work can begin. Full details of this service and the process are explained on the Grant Instruments web site **www.grantinstruments.com**

Please call +44 (0) 1763 260 811 for the RMA to be logged and issued.

After sales support

Both Grant Instruments Ltd and its appointed distributors provide technical assistance over the phone and via e-mail to support customer needs.

This support is offered for both the operation and configuration of the data loggers and associated software as well as application specific advice.

Full details including a customer support web enquiry form are available on the Grant Instruments web site **www.grantinstruments.com**

Grant

World wide availability and support for Grant data loggers
Grant data loggers and specialist technical support is available world-wide. Please visit www.grant.co.uk to locate our regional offices and to download technical support materials. You will also find your locally appointed distributor and support centre.

Grant Data Acquisition products
- bear the CE mark and meet relevant European directives (EN 61326-1:2006 and EMC Directive 2004/108/EC)
- bear Australian and New Zealand C-Tick marking
- comply with USA FCC part 15

Quality statement
Grant Instruments operates a Quality Management System complying with ISO9001:2000. 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 service.

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