Grant
DATA ACQUISITION

Squirrel Data Logger
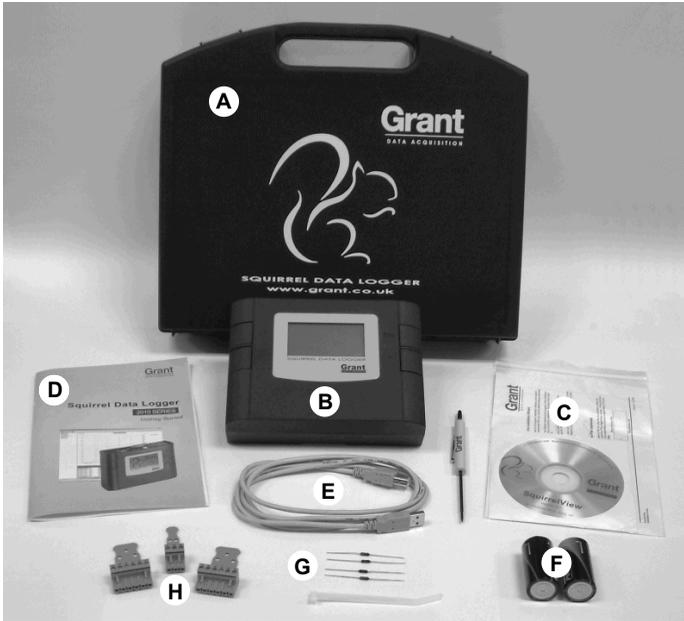
2010 SERIES

Getting Started

Contents

> ⓘ After reading this guide please refer to the Help contents within SquirrelView (press F1) for further details on your logger and how to use it with the software.

1. Hardware Checklist

SQ2010 Standard contents

A) Carry case
B) SQ2010 Logger
C) CD containing software (SQA100)
D) Getting Started manual (this booklet)
E) USB Cable (LC77)
F) Batteries, 2 x C
G) Current shunt resistors for 4 to 20mA inputs, 10R x 4 (CS202)
H) Connectors: 6 way x 2 (18097), 3 way x 1 (14174) with cable ties

2.1 Installing the batteries

The 2010 uses two C size alkaline batteries located under the removable cover on the rear of the unit as shown below. To insert new or change the existing batteries:

1. Open the battery cover by releasing the clip (highlighted)
2. Insert 2 C* batteries, ensuring the correct polarity
3. Refit the battery cover

* It is recommended that all replacement batteries are of the same manufacturer, type and condition.
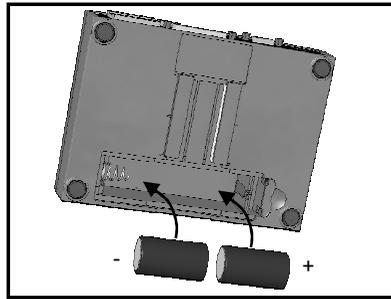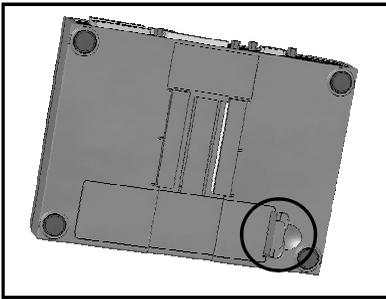
2.2 Power indicator

Battery indicator
When logging please ensure that the batteries in the unit have sufficient capacity to complete the logging task. This can be checked via the battery indicator located in the top right of the display.

HIGH
CAPACITY

LOW
CAPACITY

External power indicator
The logger may be powered from an external source (8-28V DC or USB)

Important: To ensure data protection in the case of an unexpected power loss, please ensure that batteries are fitted whilst the unit is operational.

3. Installing Software and USB drivers

⚠ **Important: Please ensure the required software is installed before connecting the logger (refer to the Software Installation Guide)**

After installing the software connect the logger to the PC, on detection the PC will launch the driver installation wizard.

Win 2000/XP - During the installation the USB drivers were pre-installed so the wizard will automatically locate the driver. On the 'Found New Hardware Wizard' select 'No, not this time' and for all the other screens select 'Next' to complete the installation.

Win 98SE - Select **Search for the best driver for your device. (Recommended)**, Click **Next** and follow the instructions illustrated below.
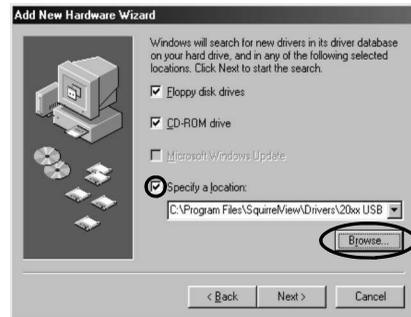
Select **Continue Anyway** on the Hardware Installation warning which refers to Windows Logo testing. If you experience any problems refer to Troubleshooting->20xx USB Drivers in SquirrelView help

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After installing SquirrelView an example setfile will be installed within the SquirrelView installation directory. The example file will log the internal temperature of the logger. In order to familiarise yourself with the logger the novice user may find this example Setup useful.

4.1   Startup SquirrelView and Select Logger Type
Click on the shortcut icon on your desktop to launch SquirrelView or select it from your start menu. When the SquirrelView Assistant is loaded, ensure the correct logger type and communication method is selected.
Logger type can be viewed from the SquirrelView assistant, if you need to make any changes select Logger Selection from the toolbar or run the Communication Wizard.

4.2   Synchronise Logger & PC
It is advisable to start by synchronising the Logger clock with the PC clock. See step 1 and 2 below:

Synchronise clocks:

❶ From SquirrelView Assistant click on Logger Setup.

❷ From the Logger Setup screen select the Logger Control tab.
       Click on Set Logger Time to PC Time, click OK on the confirmation screen.
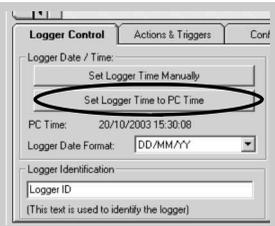
4.3   Running Quick Start Demo

❶ In the SquirrelView Assistant click 'Logger Setup' to enter the Logger Setup screen. From here open the demo setfile using **File -> Open** and select the appropriate file for your logger type.
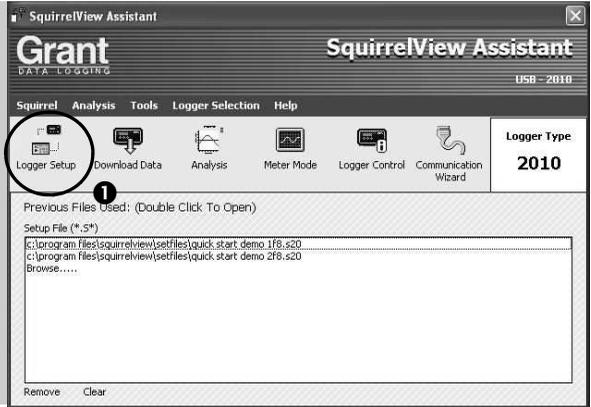
❷ The Logger Setup screen is now visible, from here you will be able to set up your logging requirements.
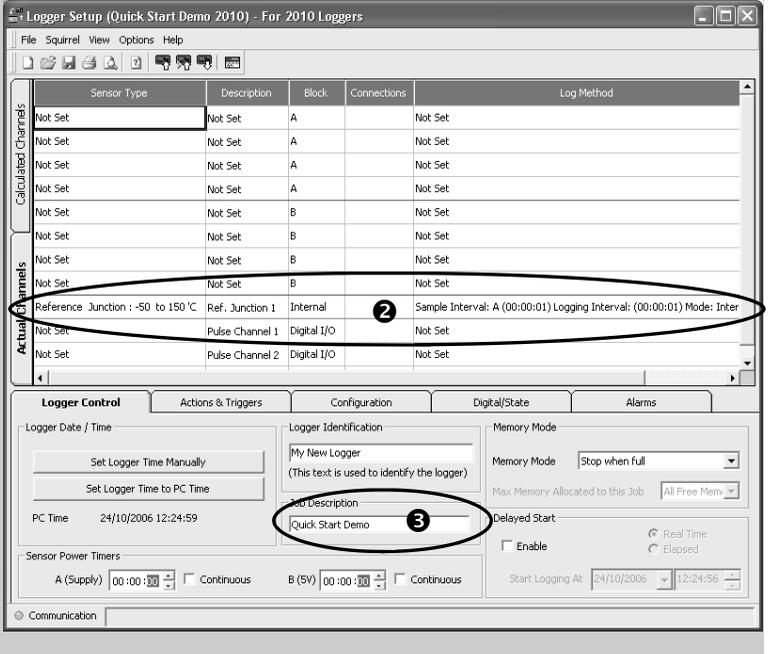
Within the Actual Channels tab scroll down the Sensor Type column to Ref. Junction 1. This is the input you will be reading in this example.

❸ The Job Description can be used to describe your setup.

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❹ Click to send setup to logger and start logging. Let the unit log for a few minutes.

❺ Click for **Squirrel-View Assistant.**

❻ Click if you wish to meter the input in Real Time.

❼ Click on Logger Control icon to pause or stop the logging process.

❽ In the Logger Control window you can view relevant information on the state of the logger. To stop logging click on the stop button.

Logger Control

Squirrel   View

Logger Information

Logger ID	Logger ID
Serial Number	KP0637004
Logger Type	2010
Logger State	Disarmed

Memory

Internal Memory Total	15616 KB
Internal Memory Used	384 KB
Internal Memory Free	15232 KB

Date and Time

Logger Time	19/10/2006 08:48:33
Status Last Updated	19/10/2006 08:48:34
PC Time	19/10/2006 08:48:34

Power Supply

Internal Supply	2.8 V
External Supply	0.0 V

❾ To Download the logger click on the 'Download Data' icon from the SquirrelView Assistant.

Download Data

www.grant.co.uk
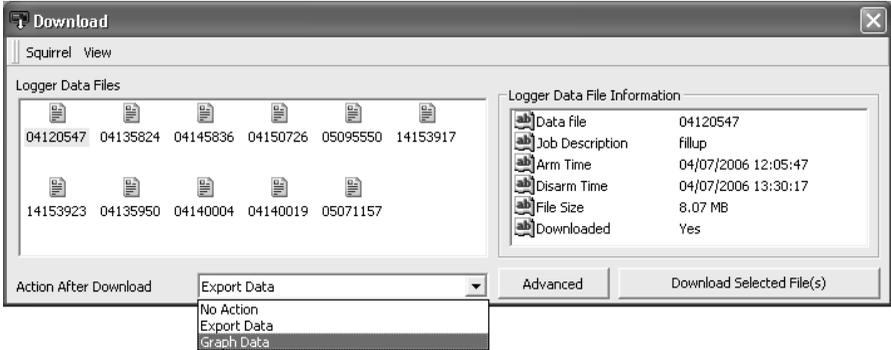
❿ In this screen you can now download the Data File and invoke the Export Wizard or download the Data File via Analysis* (See page 10 for further information).

The data File is given a unique name (e.g. 28162735.D20). An explanation of the file name is shown on the right; this shows the date and start time
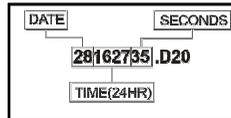
In this example you will download and view the Data in the Analysis* window. Start by selecting the Data File and Graph Data action, then click Download Selected File(s). You will be prompted to save the Data file, then the data will be converted for viewing.

⓫ Once the decoding has taken place the Analysis File Description window will be presented, click OK to view your Data.

*Available with SquirrelView Plus only.

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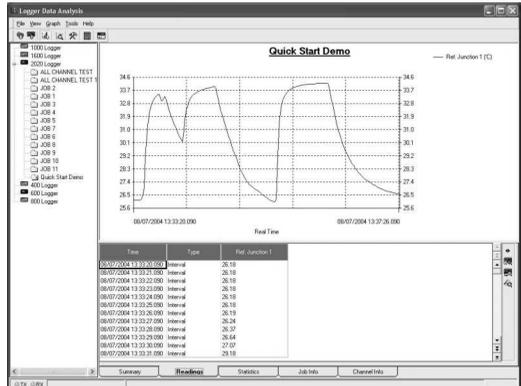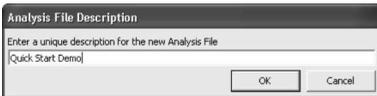
5. Download Process Explained
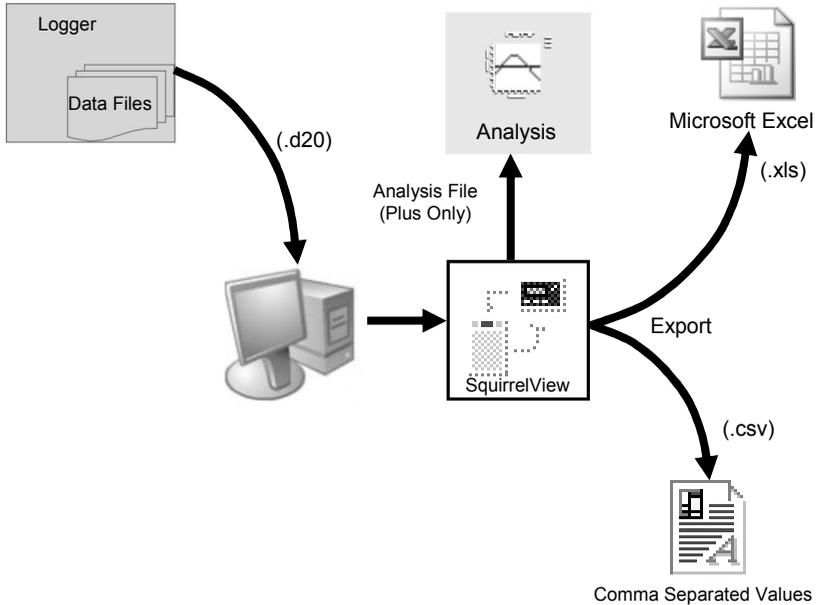
The Diagram above shows the download process. Data in the logger is written to the internal memory and may be downloaded by SquirrelView.

Before the data can be viewed it must be converted by SquirrelView for Analysis or exported to .csv or .xls format depending on the PC software being used.

The conversion process can be performed in one of three ways within SquirrelView:

− from SquirrelView assistant->Analysis->Export Data File
− automatically when using the download Data button from SquirrelView*
− or from the Logger Data Analysis screen by selecting File->Import Data*

Once the file has been downloaded it can be double clicked to open it with the program specified under 'Tools', 'Preferences', 'File Association Action'.

*Available with SquirrelView Plus only.

6.1   Control Panel
The illustration below shows the navigation controls in more detail.

UP NAVIGATION

ESCAPE/BACK (reverts to previous Menu)

DOWN NAVIGATION

ENTER/CONFIRM & POWER ON
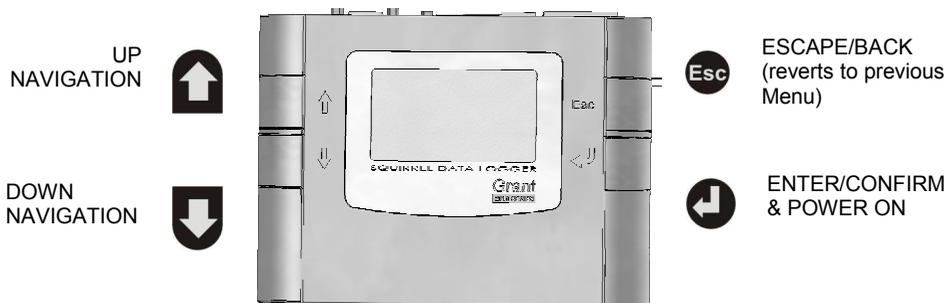
To use the 2010 control panel press ⏎, the opening display will be shown (see right). The display timeout is preset to 10 seconds, however this can be changed by selecting the Configuration tab within the Logger Setup window of SquirrelView.

```
--Main Menu-------
▶▮  ⋀  i  ✎  ▱
⇅⇵
Log Control
```

6.2   Control panel menu

Detailed below is a basic explanation of the top menu structure. For more information on the whole menu structure please refer to the Help->Help Content->Loggers within SquirrelView.

6.2.1   Log Control
In this menu you can Arm (activate) or Disarm (deactivate) the logger.

```
--Main Menu-------
[▶▪ᴵᴵ] ᴸⱽ  i  ᴮⱮ  ▭
▲▼
Log Control
```
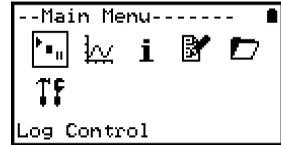
6.2.2   Meter
Here you can view each channel in Real Time (at 1-2Hz). Use the enter key for a graphical view of a channel.

```
--Main Menu-------
▶▪ᴵᴵ [ᴸⱽ]  i  ᴮⱮ  ▭
▲▼
Meter
```
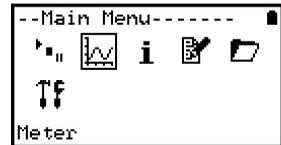
6.2.3   Status
The Status menu gives you access to information relating to the logger, such as available memory and the power supply voltage. It is also possible to override the alarm outputs from here.

```
--Main Menu-------
▶▪ᴵᴵ  ᴸⱽ [i] ᴮⱮ  ▭
▲▼
Status
```

6.2.4   Setup
This contains menus for setting the Language, Time, Date, basic Channel Setup, storing and recalling setups and Delayed start.

See 6.3 for more details on basic setup

```
--Main Menu-------
▶▪ᴵᴵ  ᴸⱽ  i [ᴮⱮ] ▭
▲▼
Setup
```

6.2.5   Data Files
This menu allows you delete the data files held within the loggers memory.

```
--Main Menu-------
▶▪ᴵᴵ  ᴸⱽ  i  ᴮⱮ [▭]
▲▼
Data Files
```

6.2.6   Tools
The Tools menu contains maintenance type functions such as querying the software version of the logger, performing a self test and resetting the logger.

```
--Main Menu-------
▶▪ᴵᴵ  ᴸⱽ  i  ᴮⱮ  ▭
[▲▼]
Tools
```

6.3   Creating a basic Setup

The 2010 allows for the creation of a basic channel setup including logging interval, sensor type and sensor power (excitation) if required via the graphical interface, A full setup including more advanced features can be performed using the SquirrelView software included. Below is a brief explanation of how to create a basic channel using the graphical interface

6.3.1   Channel Setup
From the 'Main Menu' choose the option 'Setup' then the option 'Channel Setup'.

```
--Setup----------
Sensor Power
Intervals
Channel Setup
Stored Setups
Delayed-Start
Date/Time
Configuration
```
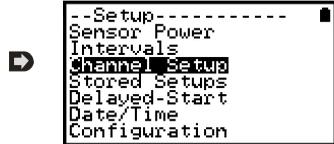
6.3.2   Adding or Editing a Channel
Once in 'Channel Setup' you can clear all channels, add/edit a channel, view channel details or delete a channel. Select 'Add/Edit Channel'.

```
--Channel Setup---
Clear Channels
Add/Edit Channel
View Channel
Delete Channel
```

6.3.3   Adding a New Channel
The 'Add/Edit Channel' menu shows channels currently set as well as giving you the option to add others. Select 'Add Channel'

```
--Add/Edit--------
Add Channel
```

6.3.4   Channel Setup
Select the channel Sensor Type, Range and, if required, which Sensor Power (excitation) time is to be used .

```
--Channel Setup---
Sensor Type
Range
Sensor Power Timer
```
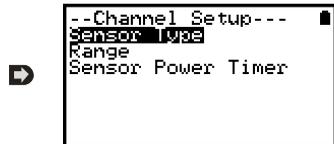
6.3.5   Viewing Channels Setup
Once you have finished adding your required channels and details the wiring configuration can be viewed using the 'View Channels' option.
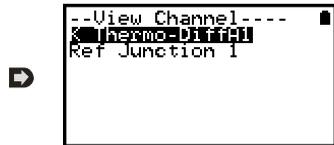
Note that Channel Descriptions are automatically assigned based upon the Sensor Type of the channel. This description can be modified using SquirrelView if required.

```
--View Channel----
X Thermo-DiffAl
Ref Junction 1
```

```
--View Channel----
Sensor Power
·Not Used
Block:A
 1  2  3  4  5
 + -
```
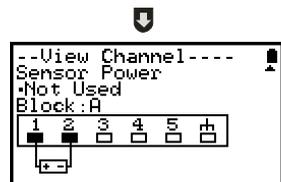
6.3.6 Interval Setup
A setup created from the control panel will assign all channels to the same logging interval. To change or view this interval choose 'Intervals' from the main 'Setup' menu.

```
--Intervals-------    ■
Interval A
View All
```

6.3.6 Sensor Power Setup
The sensor power setup can be changed by going to 'Sensor Power' from within the main 'Setup' menu.

```
--Sensor Timer A--   ■
Set
Off
Continuous
Wiring
```

⚠ **Important Notes on Setup using the Control Panel**

Full setup capabilities of the SQ2010 are provide using the SquirrelView software provide. When using the control panel a few important points should noted:-

• Whilst all channels are assigned to the same interval, Interval A, all intervals can be viewed in the case of a more complex setup from SquirrelView

• To avoid problems with wiring configuration, sensor types are not editable once set but their range and sensor power requirements can be. Delete a channel if you require to change its Sensor Type

• Calculated channels setup from SquirrelView will no be shown on the view channels option

• The reference junction can not be deleted while a sensor type that requires it for correct operation is set up, e.g. A thermocouple.

• You cannot change a setup whilst the logger is armed

Analogue Inputs

Rear view of
ANALOGUE
connectors
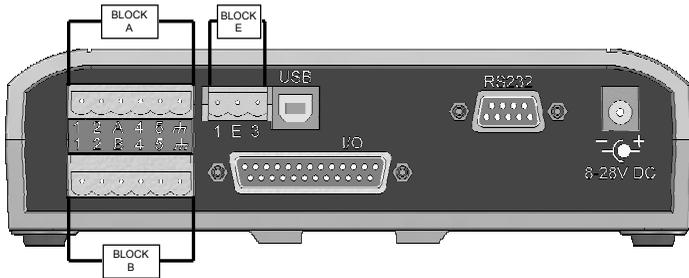
As the wiring configuration is dependant upon the sensor type used, it is displayed in SquirrelView during the setup. Follow the wiring diagram to attach the required sensor. If you would like to print the diagrams in more detail or view at a later stage select 'File > Print from Logger Setup'.

The example below shows the actual K type differential thermocouple sensor connected to the 20xx logger from the wiring diagram to the left.

Sensor Power Wiring

Block E

Unregulated Logger Supply Output

Negative

Regulated 5V Output

I/O Socket Wiring

ALARM O/P

EVENT/STATE I/P 1-8

PIN 1

1 E 3

I/O

SLOW PULSE I/P

FAST PULSE I/P
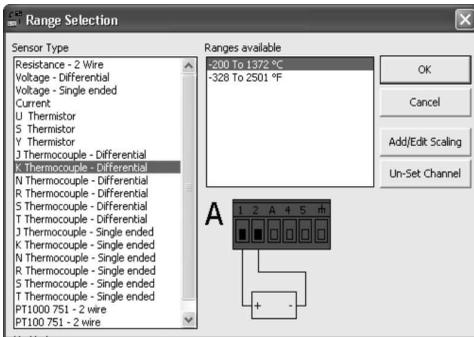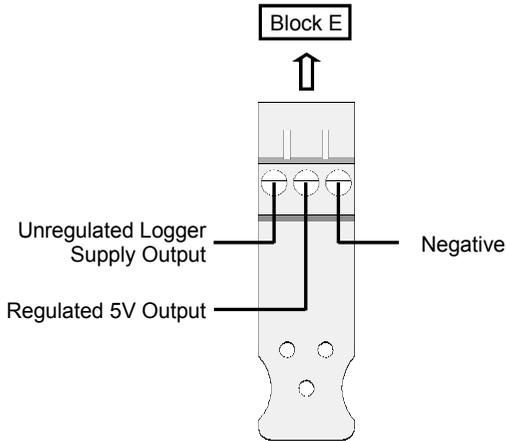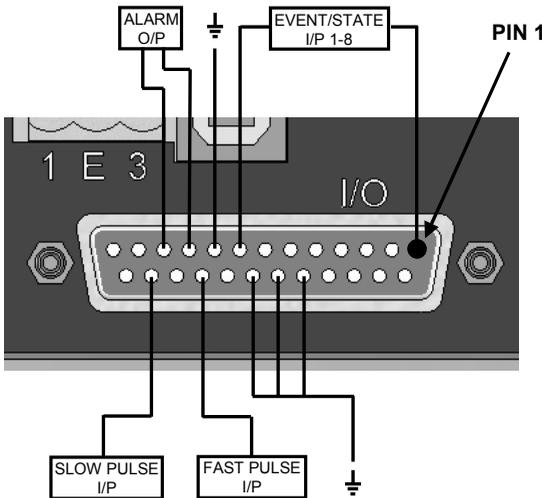
Pin	Connection
1	Event/State Input 1
2	Event/State Input 2
3	Event/State Input 3
4	Event/State Input 4
5	Event/State Input 5
6	Event/State Input 6
7	Event/State Input 7
8	Event/State Input 8
9	Ground
10	Alarm Output A
11	Alarm Output B
12	No Connection
13	No Connection
14	No Connection
15	No Connection
16	No Connection
17	No Connection
18	Ground
19	Ground
20	Ground
21	No Connection
22	Fast Pulse Input
23	No Connection
24	Slow Pulse Input
25	No Connection

Grant Instruments supply a wide range of accessories to compliment the range of Squirrel data loggers. These include GSM Modem and Ethernet converters and wireless adapter as shown below, all of which allow you to contact any Squirrel data logger remotely or where no land line exists. All are very easy to install and connect directly to the logger via RS232. If you need any further details or wish to make a purchase please contact Grant or your local supplier for more details.

Ethernet

GSM

Wireless
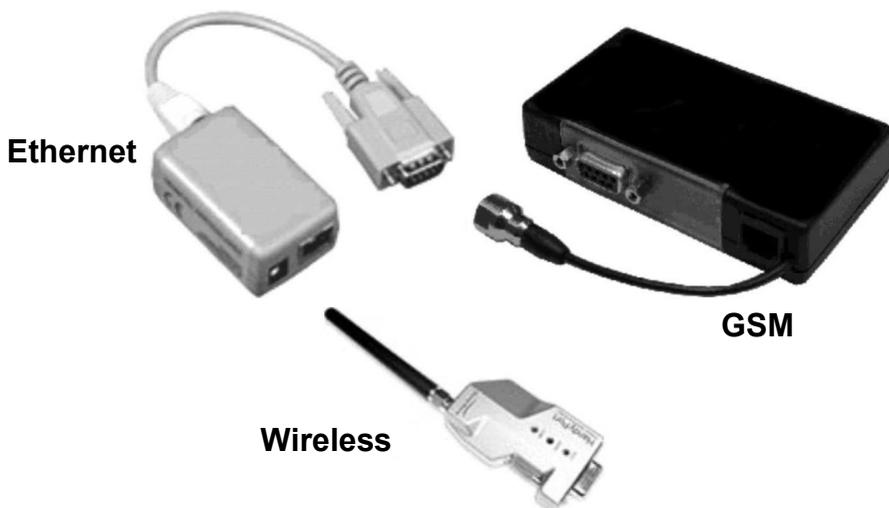
	Part No:
RS232 to Ethernet Converter consisting of adaptor box and modem setup Cable. Ethernet configuration software is suitable for Windows 2000 and XP only.	SQ20A801
GSM Modem kit comprising of modem , Squirrel connection cable, power lead and antenna with 3m lead. A data-enabled SIM card will also be required from your network service provider.	SQ20A802
Wireless Adaptor comprising of an RS232 adaptor for connecting the logger to the PC at baud rates up to 115K2 with a range of up to 200 metres using the 2.4GHz frequency band. The kit is supplied with all connecting leads. Note: power supplies (MPU 12V) need to be ordered separately	SQ20A803

	Part No:

Software packages for set-up, transfer and data analysis:
SquirrelView Plus
Provides full data analysis, on-line graphing, meter to Excel and export to Excel — SQA200
SquirrelView Plus Multi-User License
Unlimited use of SquirrelView within a single organisation. — SQA300

Calibration Certificates for Squirrel 2010 series (all ranges)
Note: Test and Calibration Certificates from Grant Instruments are traceable to
National Standards
SQ2010 — CAL2010

Weatherproof box
Robust plastic weatherproof box — PEL4

Power supplies
100-240V AC 50/60Hz supplied with 3-single fit mains plugs for UK, Euro, and US — MPU 12V
As MPU 12V but supplied with 1m flying lead — MPU 12VFL
Rechargeable battery (12V, 6Ah) — SQ20RB12-6
Rechargeable battery (12V, 15Ah) — SQ20RB12-15
Digital I/O interface connector
25 way D connector type sub miniature solder connection with cover for digital
inputs, alarm and pulse inputs — SB102

Current Shunts
Pack of 4 precision resistors for 4-20mA inputs — CS202

Cables for connecting data loggers to computers/modems.
Squirrel to PC serial port — LC71
Squirrel to PC USB port — LC77
Squirrel to modem — LC73

12V DC power lead
2.1mm DC connector and fused with 1.8M lead — LC76

Terminal blocks
Plug-in terminal blocks with cable restraint
3-way — 14174
6-way — 18097

Temperature and Humidity probes
Grant offers a range of temperature and humidity probes suitable for use with its data loggers and
other compatible measurement systems. Bespoke or specialist probes are also available. Please
enquire if you have specialist probe needs.

9. Specifications

ANALOGUE INPUTS
   Basic accuracy (5-45°C): ....± (0.10% readings + 0.1% range)
   Common mode rejection: 100dB
   Input impedance: ....> 1MOHM
   Linearity: 0.0015%
   Series mode line rejection:...50/60Hz 100dB

DIGITAL INPUTS
   Zero input voltage.. 0 to 0.5V (or shorted input)
   One input voltage..2.7 to 5V (or open circuit input)
   Input protection......................................will turn on below about -0.5V and above about 6V

ANALOGUE-DIGITAL CONVERSION
   Type: ....Sigma-Delta
   Resolution: 24bit
   Sampling rate: ....Up to 10 readings per second

ALARM OUTPUTS..2 x open drain FET (18V 0.1A Max)

SENSOR POWER SUPPLY.............................Regulated 5 VDC (50mA) or supply voltage (100mA)

TIME AND DATE..In built clock in 3 formats

SCALING DATA..Displays readings in preferred engineering units

MEMORY...Internal: 16Mb (Up to 1,800,000 readings)

RESOLUTION..Up to 6 significant digits

PROGRAMMING/LOGGER SET-UP..................... ....SquirrelView or SquirrelView Plus software

COMMUNICATION
   Internal: ....RS232 & USB 1.1/2.0
   External options: ....GSM, Ethernet and Wireless Ethernet

POWER SUPPLY
   Internal:..2 x C Alkaline batteries*
   External: ....8-28V DC Reverse polarity and over-voltage protected

⚠ *** Maximum operating temperature for supplied alkaline batteries is 50°C**

POWER CONSUMPTION @ 12V
      Sleep mode: ....<600µA
      Logging: ....Approx 10 - 30mA

DIMENSIONS AND WEIGHT
      Dimensions (excluding probes):..W175 x D135 x H55 mm
      Weight: ....Approx 0.7kgs
      Enclosure material: .... ABS

MEMORY MODES ....Stop when full or overwrite

DISPLAY AND KEYPAD
      128 x 64 pixel LCD

OPERATING ENVIRONMENT ....-30°C to +65°C
      Using Supplied Batteries:...-20°C to +50°C

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Corporation in the United States and other countries.

Declaration of Conformity

Manufacturer:-	GRANT INSTRUMENTS (CAMBRIDGE) LTD, Shepreth, Cambridgeshire SG8 6GB
Equipment Name/Type Number:-	2010
Description of Equipment:-	Squirrel 2010 Data Logger
Directives:-	EMC Directive 89/336/EEC
Including Accessories:-	MPU 12V Universal power supply LC71 RS232 serial lead LC77 USB lead

This product complies with the requirements of the above Directive(s) when used with sensor leads up to 3m long, compliance may be affected by using longer leads.

Applied Standards:-	EN 61326:1997(+A1/A2)
Harmonized Standards:-	Electrical Equipment for measurement, control and laboratory use - EMC requirements

USA
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

AUSTRALIA & NEW ZEALAND

ANC
006 134 863

This product complies with the requirements of the European EMC standards indicated above which meet the requirements for C-Tick marking.

Personal Notes:

Grant