

# Squirrel SQ2020

Powerful data loggers for all applications

**Grant**  
DATA ACQUISITION

## Overview

The Squirrel 2020 series of hand held data loggers combines high performance, powerful features and universal inputs in a compact and easy to use instrument.

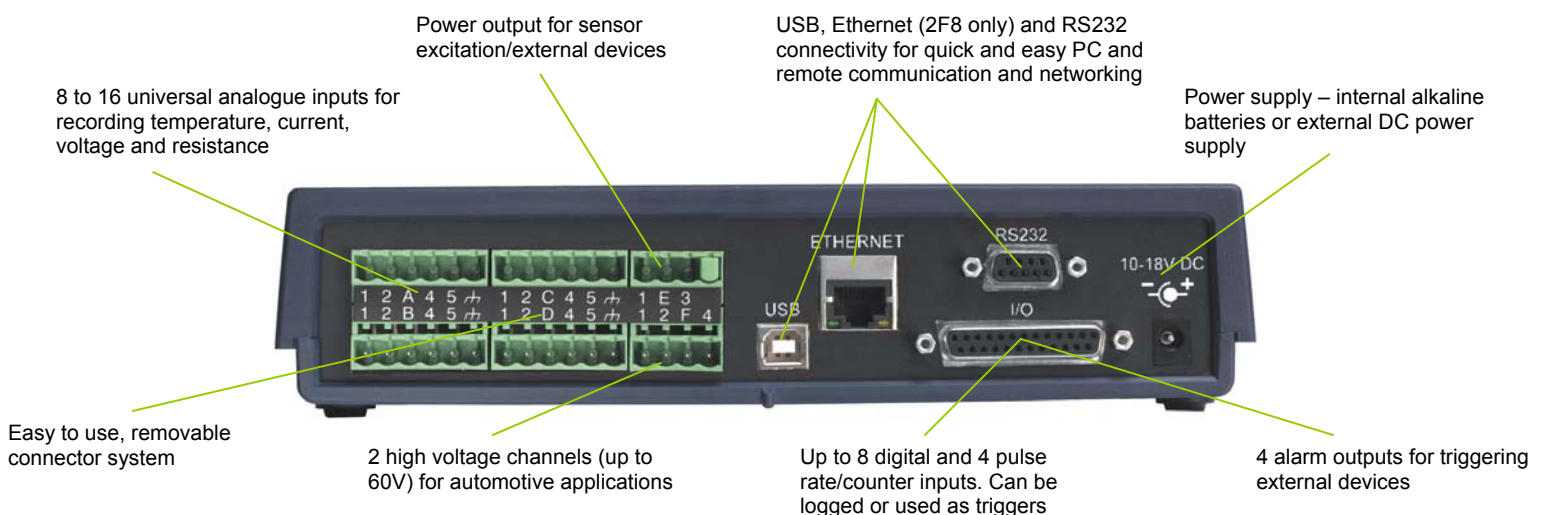
Using high accuracy 24-bit analogue to digital converters, removable memory and Ethernet networking (on the 2F8), the SQ2020 series is the ideal data logger for industrial, scientific research and quality assurance applications. Together with our comprehensive suite of software, SquirrelView, the SQ2020 provides standalone data acquisition, real-time metering and data analysis straight out-of-the-box.



**3 Year  
Warranty**

## Key features

- 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 two channels (on the 2F8)
- Large non-volatile internal memory storage for up to 1.8 million readings
- Ethernet (on the 2F8), USB and RS232 communication ports
- Download of internal data to removable MMC/SD (Multi Media Card / Secure Digital) memory
- Sensor power and FET outputs for use with external devices
- Easy to read LCD and simple 4 button user interface
- Up to 16 calculated / derived channels may be created using mathematical functions



## Communications:

Ethernet (on 2F8), 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.

**Comprehensive software configuration via SquirrelView:**

The SquirrelView software (supplied with the SQ2020 series data loggers) allows logger configuration, data download and data export whilst giving the user full control over the SQ 2020. The optional SquirrelView Plus gives the user access to many advanced data analysis and data archiving/transfer features. Please refer to our separate SquirrelView data sheet for all its advanced features.

**Concurrent sampling:**

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

**System specifications:**

**Input channels:**

|                                |                                | SQ2020 - 1F8                            | SQ2020 - 2F8                            |
|--------------------------------|--------------------------------|---|---|
| Analogue input channel options | Analogue to digital converters | 1                                       | 2                                       |
|                                | Differential                   | 8                                       | 8                                       |
|                                | Single ended*                  | 16                                      | 16                                      |
|                                | 3 or 4 wire                    | 0                                       | 4                                       |
| Additional channels            | Pulse                          | (2 x fast – 64kHz) & (2 x slow – 100Hz) | (2 x fast – 64kHz) & (2 x slow – 100Hz) |
|                                | Event/digital                  | 8 state inputs or 1 x 8 bit binary      | 8 state inputs or 1 x 8 bit binary      |
|                                | High voltage                   | 2                                       | 2                                       |
|                                | Internal channels              | 1 temperature                           | 1 temperature                           |

\*Please refer to our Technical Note for the configuration of these inputs

**Standard ranges for temperature channels:**

Each channel can be individually set to any of the ranges listed below. Pt100 to IEC751 and JIS1604 and Pt1000 to IEC751.

| Input type        | Ranges °C  | Ranges °F    |
|-------------------|------------|--------------|
| Y & U: Thermistor | -50 to 150 | -58 to 302   |
| Pt100/Pt1000*     | -200 - 850 | -328 to 1562 |

\*2 wire only on 1F8

| Input type          | Ranges °C    | Ranges °F    |
|---------------------|--------------|--------------|
| K: Thermocouple     | -200 to 1372 | -328 to 2501 |
| T: Thermocouple     | -200 to 400  | -328 to 752  |
| J: Thermocouple     | -200 to 1200 | -328 to 2192 |
| N: Thermocouple     | -200 to 1300 | -328 to 2372 |
| R & S: Thermocouple | -50 to 1768  | -58 to 3214  |

**Standard ranges for d.c. voltage:**

Each voltage channel can be any of the voltage ranges below. Mixed differential and single ended configurations are permitted. Please refer to our Technical Note for the permitted combinations of inputs.

| Voltage range    | Voltage range  | High voltage input range* |
|------------------|----------------|---------------------------|
| -0.075 to 0.075V | -3.0 to 3.0V   | 4.0 to 20.0V              |
| -0.15 to 0.15V   | -6.0 to 6.0V   | 4.0 to 40.0V              |
| -0.3 to 0.3V     | - 6.0 to 12.0V | 4.0 to 60.0V              |
| -0.6 to 0.6V     | -6.0 to 25.0V  |                           |
| -0.6 to 1.2V     |                |                           |
| -0.6 to 2.4V     |                |                           |

\*max of 2 may be selected

**Standard ranges for current and resistance channels:**

Each current channel can be any of the current ranges below. Current ranges use differential input channels.

| Current range<br>(External 10Ω shunt) | Resistance range<br>2 wire | Resistance range<br>3 and 4 wire (2F8 version) |
|---------------------------------------|----------------------------|--|
| -30.0 to 30.0mA                       | 0.0 to 1250.0Ω             | 0.0 to 500.0Ω                                  |
| 4 to 20mA                             | 0.0 to 5000.0Ω             | 0.0 to 4000.0Ω                                 |
|                                       | 0.0 to 20000.0Ω            |  |
|                                       | 0.0 to 300000.0Ω           |  |

**Analogue inputs**

Accuracy: (at 25°C) voltage and resistance  
± (0.05% readings + 0.025% range)  
Common mode rejection: 100dB  
Input impedance: > 1M Ω  
Linearity: 0.015%  
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 second per ADC. No  
100Hz on 1F8

\* With mains rejection off

**Alarm outputs**

4 x open drain FET (18V 0.1A)

**Power output for external device**

Regulated 5 VDC at 50mA or  
logger supply voltage at 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)  
External: Up to 1Gb - removable  
MMC/SD (For transferring internal  
memory and storing setups only)

**Calculated channels**

Up to 16 virtual channels derived  
from physical input channels

**Resolution**

Up to 6 significant digits

**Programming/logger setup**

SquirrelView or SquirrelView Plus  
software

**Communication**

Standard: RS232 (Auto bauding to  
115200 baud)  
Ethernet 10/100 base TCP/IP  
USB 1.1 and 2.0 compatible  
External options: GSM, WIFI and  
PSTN Modems

**Power supply**

Internal: 6 x AA Alkaline batteries  
External: 10-18VDC  
Reverse polarity and over-voltage  
protected

**Power consumption @ 9V**

Sleep mode: 600µA  
Logging: 40-80mA

**Dimensions and weight**

Dimensions: W235 x D175 x  
H55mm  
Weight: Approx 1.2kgs  
Enclosure material: ABS

**Memory modes (internal only)**

Stop when full or overwrite

**Display and keypad**

2 line x 20 character LCD display  
Battery state and external power  
indicator  
Keypad lock  
Navigate to:  
Arm/disarm/pause/continue  
Meter any channel or alarm  
Select from up to 6 x pre-stored  
setups  
Status/diagnostics/memory/time  
and date  
Download to MMC/SD

**Operating environment**

-30°C to +65°C  
Humidity: 90% at 40°C non-  
condensing

**Accessories**

MPU 12V: Universal (97-263V  
AC) power supply  
LC76: DC lead  
SQ20RB12-6: External  
rechargeable battery (12V, 6Ah)  
SB102: 25 way digital I/O  
connector  
CS202: Current shunt kit (4 x 10Ω  
0.125W)  
PEL4: Rugged weather proof  
enclosure  
CAL2020: Test and Calibration  
certificates  
SQ20A802: External GSM  
communications kit  
MMC64: Multi Media Card  
(Please see price list for additional  
accessories)

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