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

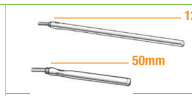
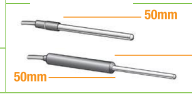
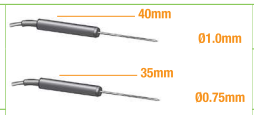
Thermocouple adaptors

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
Delrin handle		CM	VS, F	VS, F		N, M	N, M, Q	VS, F		VS, F	
		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

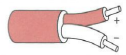
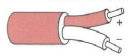
	Cable operating range (°C)	Max. Ø (mm)	Max length (m)	Connector supplied	
				bare-ended	thermocouple plug
Cable for thermistors and 2-wire Pt100 and 2-wire Pt1000					
VL PVC large coaxial, general purpose, water resistant, flexible	-10 to +105	3.1	500	●	X
VS PVC small coaxial, lightweight, water resistant, 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

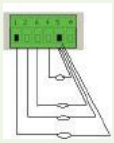
Connecting your signals

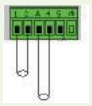
Differential or single ended inputs?

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.