

TEMPERATURE CONTROLLER WITH GRAPHIC DISPLAY, + REMOTE CONTROL

FEATURES

- ATEX IECEx Hazardous area protected, safe in Zone 1 environment
- Remote control
- 2, 3 or 4 wire PRT Thermometer probe input
- Temperature range -200°C to +550°C (-328°F to +1022°F)
- Operates with sensors from 100Ω to 1kΩ Platinum RTDs (PT100 to PT1000)
- Total accuracy $\pm 0.5^{\circ}\text{C}$ max
- Simple 16 Amp relay output for heat control, with open contacts or line voltage output.
- Universal operating voltage: 85 – 265 Volts AC
85 – 370 Volts DC
- Adjustable mounting bracket

APPLICATIONS

Trace heating control - Process control - Thermostat control – Heating control



Specification

Input:

Type:	Platinum Resistance thermometer	
Maximum range:	Typical temperature range -200°C to +550°C (PRT100) RTD 0 to 10000Ω*	
Standard RTDs:	PT100, PT500*, PT1000* *special order	
Accuracy:	EXTC100: ±0.5°C maximum + probe error	(see PRT selection)
Display Resolution:	1°C	

Output:

Type:	RELAY 1, RELAY 3 SPST relay (FORM A) contacts.	
Rated Current:	Max 16A continuous, 230Vac	
Maximum breaking capacity:	4000 VA	
Mechanical endurance:	20 x 10 ⁶ cycles	
Contact endurance	>3 x 10 ⁵ cycles (250VAC@10A) resistive load >1 x 10 ⁵ cycles (250VAC@10A) inductive load	

Supply:

	85 – 265 Volts AC	
	85 – 370 Volts DC	
No load input current:	~6mA @ 236Vac	
No load input power:	<1.5W	

Environment:

Storage temperature range:	-65°C to +75°C
Operating temperature range:	-40°C to +75°C
Hazardous area:	Zone 1 Ex d enclosure

ATEX specification ...

IECEX specification ...

Physical:

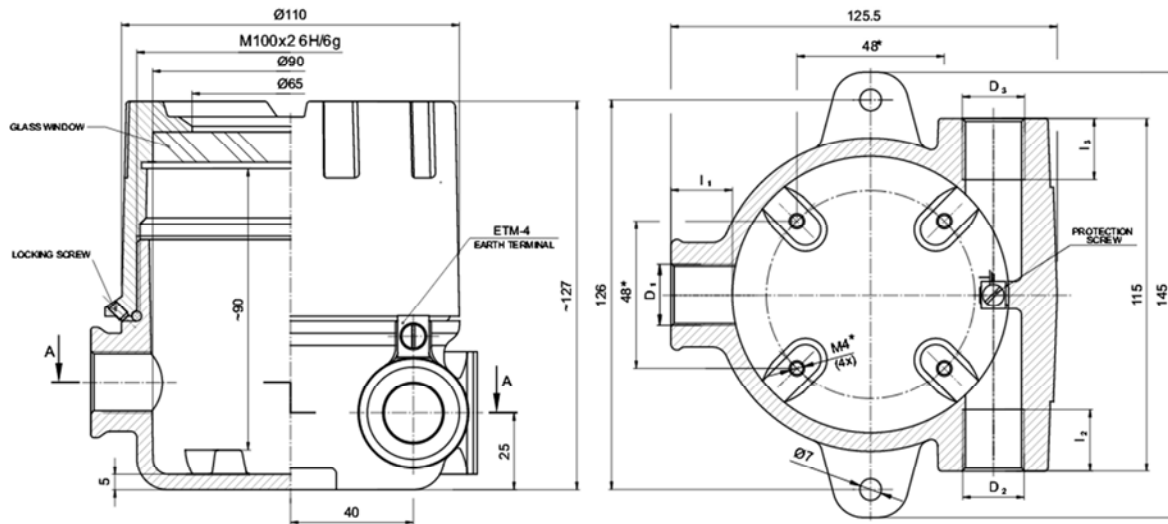
Weight:	2kg	
Size:	150mm wide by 130 mm x 130 mm	
External connection ports:	3 x 20mm M20 threaded sockets* *Must be fitted with ATEX/IECEX approved Ex d cable glands for use in hazardous areas	
Internal terminals:	10 Amp rated pluggable terminal block for line and Relay inputs / outputs 4 way + screen terminal block for RTD connection	
Display:	128x64 Pixel White backlit graphic LCD	
Enclosure:	Glass fronted Ex d enclosure. Painted Aluminium body. Stainless steel version is available on request.	
Mounting:	2 x M6 Holes.	
Optional bracket:	Stainless steel, two way adjustable bracket. Suitable for wall, ceiling or unistrut type mounting.	

Remote control unit:

Intrinsically safe	ATEX EN 60079-0:2012	Size: 112mm x 62mm x 31mm
	EN 60079-11:2012	Battery: B135
	Cert No: Baseefa 03ATEX0187	
	IECEX Cert No: IECEX BAS 12.0126	

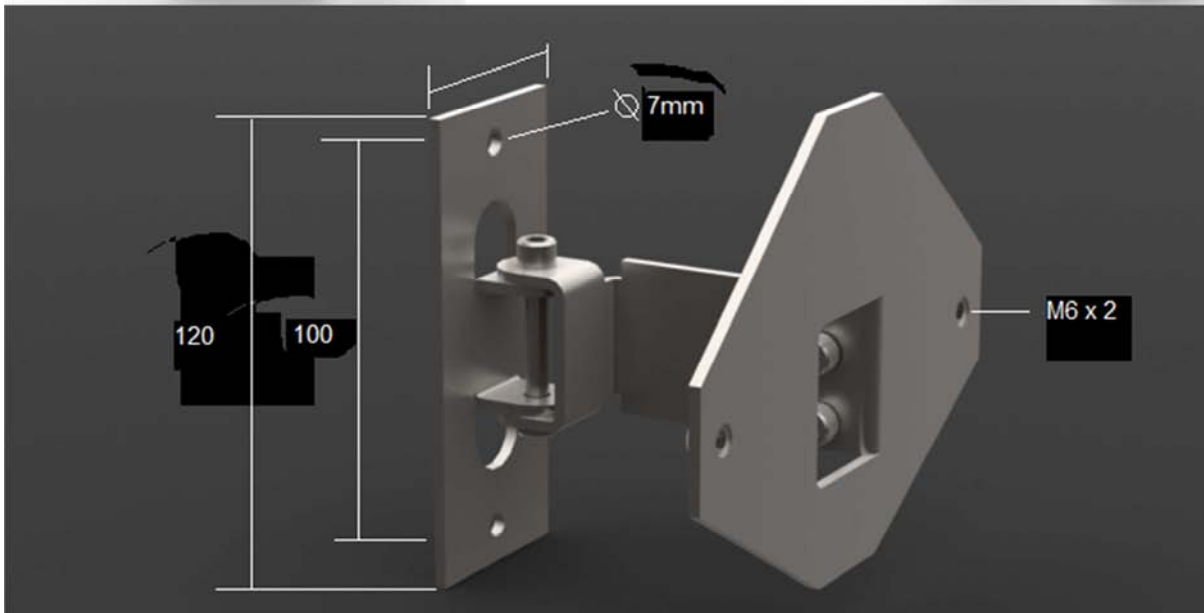


Enclosure dimensions



Bracket dimensions

3mm stainless steel, EN316 material
2 way adjustable angle.



SETUP AND INSTALLATION

The cover is removed using 1.5mm hex key and hands unscrewing the lid.

The two foam packing pieces should be discarded. The top circuit board is removed by gently unclipping the two prongs.

Note: The enclosure can be mounted either way up, and the top board can be rotated to ensure the writing is the correct way up.

Removing the green terminal plug from the lower board facilitates easier wiring. Using long nose pliers is recommended. The lower board can remain in place.

Power Connection diagram

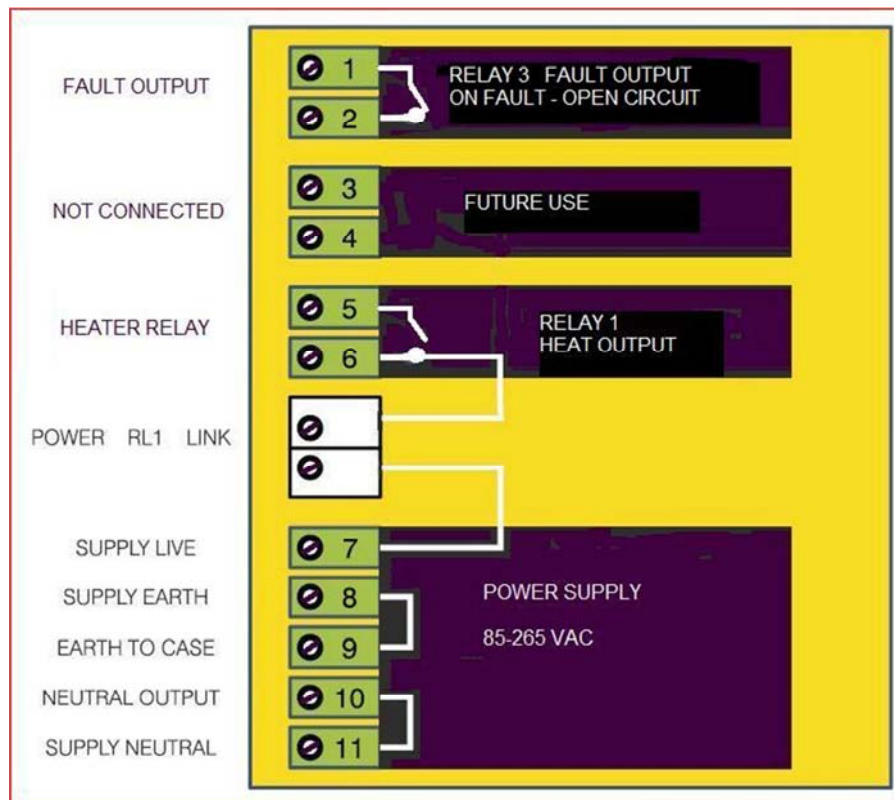
Power connection and heat output relay.

The heat output is controlled by RL1. The line voltage can be provided via the RL1 terminal if the RL1-LINK is fitted.

Warning: Mains voltages will be present on the heat output terminals if the link is fitted. Take precautions if using the line voltage output and use double insulated wiring where required by local regulations and legislation.

Connect supply to terminals 7 live, 8 Earth, 11 Neutral. 85-265VAC, 85 – 370 Volts DC.

Terminal 9 should already connect to the enclosure Earth screw in the base.



Remote controller



The IR900 is an Infra-red remote control, operating the temperature controller through the front glass .

It has an intrinsically safe design with membrane keypad. ATEX and IECEx approved.

One remote can operate all temperature controllers that are in range.

Password protection can be applied to individual temperature control units.

PRT CONNECTION

PRT Selection

The EXTC will measure 2,3 and 4 wire PRT thermometers. 4 wire are the best recommended, 3 wire less accurate often used in industrial applications and 2 wire thermometers should be avoided.

The RTD calibration is performed in software within the EXTC100 and in accordance with IEC 60751 using the Callendar Van Dusen equations. For accuracies refer to this standard, and the tolerances within the CLASS A or CLASS B probes available. Also referred to as DIN standard probes also available in 1/3 or 1/10th DIN.

Tolerance chart for PRT thermometers

Tolerance class	Temperature range of validity °C		Tolerance values ^a °C
	Wire wound resistors	Film resistors	
AA	-50 to +250	0 to +150	$\pm (0.1 + 0.0017 t)$
A	-100 to +450	-30 to +300	$\pm (0.15 + 0.002 t)$
B	-196 to +600	-50 to +500	$\pm (0.3 + 0.005 t)$
C	-196 to +600	-50 to +600	$\pm (0.6 + 0.01 t)$

^a | t | = modulus of temperature in °C without regard to sign.

The total accuracy will be determined by the combination of the probe, plus the ADC measurement plus the reference resistor (internal).

The EXTC will measure 2, 3 and 4 wire PRT thermometers. The standard range is for 100 Ohm PRT (at 0.01°C)

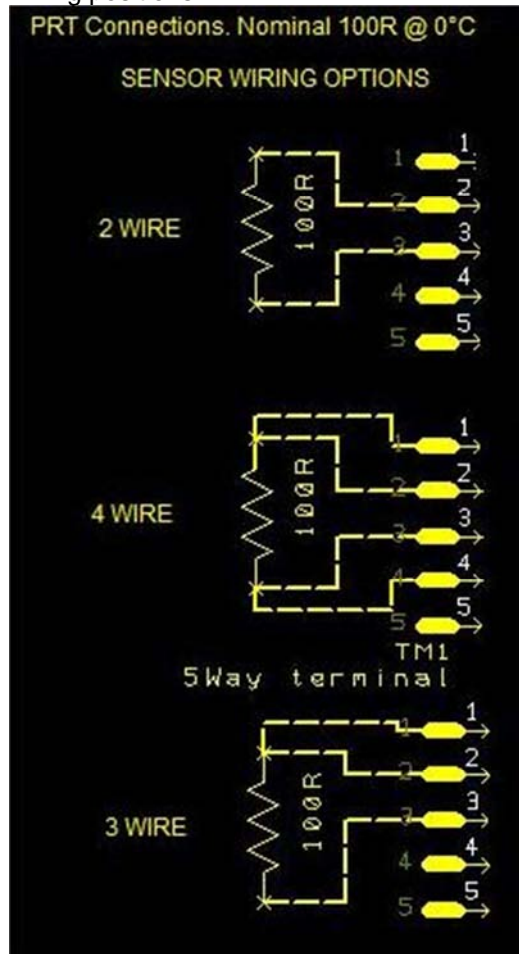
To set the type of thermometer set the jumper links on the upper circuit board according to the following table:

J1-4 jumper link table for PRT selection

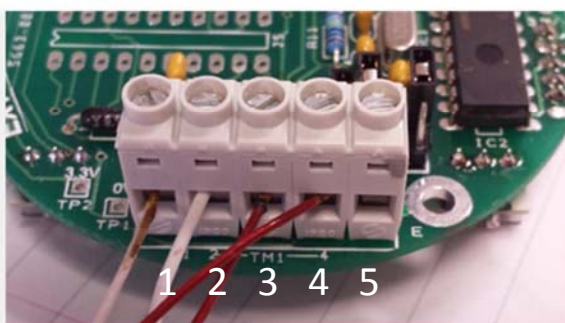
JUMPER	4 wire*	3 wire	2 wire
J1	X		X
J2			X
J3		X	X
J4		X	

(X= fit link) *Factory default

Wiring positions:



**Note 2: In addition to the jumpers, be sure to set the type of probe in the software menu screens.



Physical connector positions.
Numbered 1 to 5 left to right.

Note:

Terminal 5 can be used to connect a screen from the cable, if E (PCB ring tab, shown) is connected to Earth.

OPERATION

The EXT100 has a 16A rated heat output relay. Set the "SETPOINT" temperature on the display, the controller will measure the RTD / PRT and apply heat output if necessary.

Three LEDs on the controller indicate the status of the unit.

'ACTIVE' Red LED slow flashing indicates the unit is powered on and operating. Multiple flashes indicate the remote control is being detected.

'HEAT' Green LED indicates that the measured temperature is lower than the setpoint and heating is on.

'FAULT' white LED flashed to draw attention that something is wrong. RL3 relay will now be open circuit.







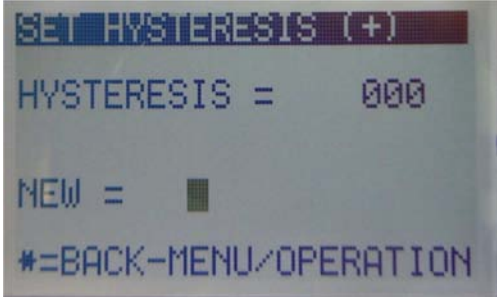

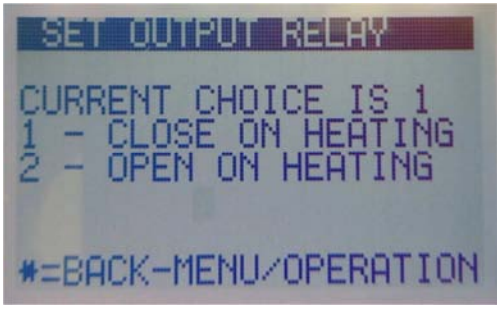

Menus





All settings are retained in memory including when power is removed.

Use "*" to exit the menu.

The menus with  must be set on installation.

 <p>The normal operating screen shows the QUINT Ex logo at the top, followed by the setpoint "038" and the current temperature "22°C". Below this, it reads "SETPOINT TEMPERATURE" and "HEATING" with a small indicator.</p>	Normal operating screen.
 <p>The passcode entry screen displays "ENTER CONFIG. MODE" and "ENTER PASSCODE..." followed by three asterisks "***". At the bottom, it states "DISPLAY REVERTS IN 005 SECONDS".</p>	Press <u>any</u> key to display the passcode entry screen
 <p>The configuration menu is titled "CONFIGURATION MENU" and lists three options: "1 - SET TEMPERATURE", "2 - SET HYSTERESIS", and "3 - SETUP MENU". At the bottom, it says "#=BACK-MENU/OPERATION".</p>	Top level menu, press 1,2 or 3 or *to exit

	<p>Set the desired set temperature. Enter the number and use '#' to input a negative number. The number is not dependant on the units set and will remain as that number even if the units are changed.</p> <p>△</p>
	<p>HYSTERESIS Enter hysteresis in degrees. Applies <u>only</u> to positive values above the setpoint. Range 0-99.</p> <p>Default: 0 <i>Example: Set a Hysteresis of 1. Setpoint 25. The heater will turn off as the temp changes from 26 to 27, and will switch on as the temp drops from 25 to 24.</i></p>
	<p>TOP LEVEL SETUP MENU To Configure the unit for installation. All these parameters need to be set upon installation. Default values are as follows:</p> <ol style="list-style-type: none"> 1. Output sense: 1 2. Temp fail mode: 2 3. Set Calibration: 0 4. Set Passcode: 1111 5. Set units: 1 6. 2,3 or 4 wire RTD: 2 (4 wire)
	<p>RL1 RELAY 1 Relay can be set to open to heat or close to heat.</p> <p>RL1 can have line voltage output by linking 'RL1-Link' with a wire.</p> <p>Default:1</p> <p>△</p>
	<p>RL3 RELAY 3 Relay 3 can be set to open or close on a fault detected. RTD probe failure or short etc. Usual to have 'fail open', so a complete power down situation can be detected remotely.</p> <p>Default:2</p>

 <p>MANUAL CALIBRATION 1 + 0.1 Deg(C/K) INC 2 - 0.1 Deg(C/K) DEC 3 - RESET TO FACTORY Temperature 22 OFFSET R0 = 000 Press key * to exit</p>	<p>OFFSET Calibration This menu inputs an offset for the measured temperature. Use with the correct sensor fitted and a reference probe and meter or a fixed point calibration to compare readings. Offset value only. The calibration curve is defined by IEC 60751 and a suitable Class A or Class B probe is necessary for high accuracy. *</p> <p>Default: 0</p>
 <p>SET CONFIG PASSCODE SET NEW CODE 4 DIGITS OR * TO EXIT * = BACK-MENU/OPERATION</p>	<p>Replace the default passcode 111 1 with a different number. Store a record in a safe place, the new number cannot be retrieved.</p>
 <p>UNITS DISPLAY 1 - DEGREES C 2 - DEGREES F 3 - DEGREES K * = BACK-MENU/OPERATION</p>	<p>Set the units to be displayed. Press 1 for Celsius 2 for Fahrenheit 3 for Kelvin Default: degrees C</p>
 <p>SET RTD TYPE CURRENT CHOICE IS 2 1 - 3 WIRE 2 - 4 or 2 WIRE * = BACK-MENU/OPERATION</p>	<p>Set the RTD type to match the hardware installed. As well as setting the software here, the jumper links must be adjusted on the upper circuit board, see chapter J1-4 "PRT CONNECTION"</p> <p>Default 2. (4-wire) ▲</p>

FAULT FINDING

<u>Problem:</u>	<u>Possible Causes</u>
Fault light flashing: 'TEMP PROBE FAILURE'	<ol style="list-style-type: none"> 1. The thermometer probe has a broken connection 2. The thermometer probe has a shorted connection 3. The thermometer probe resistance has gone outside range (<10 Ω >390 Ω) 4. The 2,3-4 wire screen software selection is wrong for the type of probe 5. wiring fault

Red light not flashing: No power to unit
Disconnected yellow interconnection lead in unit.

Green "HEAT" light on while RL1 off:

1. Screen setting. The green light shows when heating is applied. RL1 could be set to open on heat. Set menu 'SET OUTPUT RELAY' if relay is incorrect.