

1 UNPACKING

On receipt check for signs of damage and report any immediately to CAL. The following items are included with the instrument:

- Accessory kit - 1 link for changing input voltage, push on connectors (only with 8300 and models supplied with standard socket), 2 jacking screws
- Panel mounting clip

2 INSTALLATION: IMPORTANT SAFETY INFORMATION PLEASE REVIEW



Designed for use: Within Installation Category II environment and pollution degree 2 as defined in EN61010-1;

To avoid possible hazards accessible conductive parts of final installation should be protectively earthed in accordance with EN61010 for Class 1 equipment.

Output wiring should be within a grounded cabinet. Sensor sheaths should be bonded to ground or not be accessible.

Live parts should not be accessible without use of a tool.

It is the responsibility of the installation engineer to ensure that this equipment's compliance to EN61010 is not impaired when fitted to the final installation and to use this equipment as specified in this manual, failure to do so may impair the protection provided.

Follow wiring diagrams and regulations.

2.1 ELECTRICAL INSTALLATION

CAUTION RISK OF ELECTRICAL SHOCK

1. Check controller label is the correct supply voltage for your application.



2. Connections are shown on the side label.
3. For connection to socket use, 250 Faston receptacles provided in accessory kit.
4. Recommended wire size for mains voltage and outputs 32/0.2 1.0mm² (18 AWG 0.04") rated to 6 Amps/300V at 70°C.

5 IMPORTANT

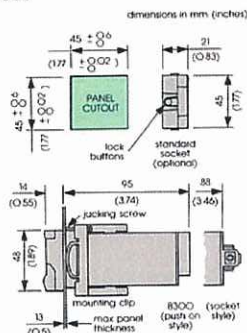
It is recommended that interference suppressors are fitted across relay contacts to prolong relay life and reduce electrical interference.

6 ULTIMATE SAFETY ALARMS

Normal safety device: Do not use SP2 as the sole alarm where personal injury or damage may be caused by equipment failure.

2.2 PANEL MOUNTING

The 8000 is mounted in the panel through a 45 x 45 mm (1/16 DIN) cut out. The mounting clip should be pushed against the panel until the ratchet holds the unit firmly in place. If necessary the mounting can be further tightened using the 2 jacking screws provided



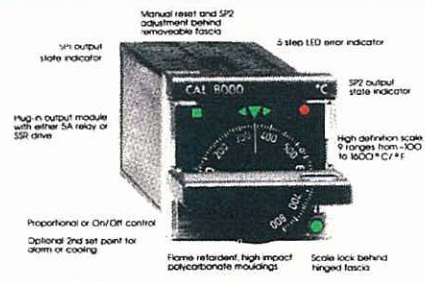
Cleaning - if required wipe with damp cloth (water only). To remove the unit from the panel press the legs of the clips in opposite directions to release ratchet.

CAL 8000 TEMPERATURE CONTROLLER INSTALLATION AND OPERATING MANUAL



CAL Controls

The 8000 uses the latest production and design techniques to provide a high quality analogue temperature controller. The advanced time proportional circuitry will give accurate and reliable control with minimum overshoot for the majority of applications



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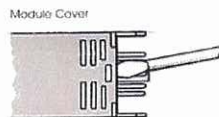
- | | |
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| 1 Unpacking | 2 Installation |
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| 5 Error Display | 6 Manual Reset |
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3 115/230V VOLTAGE CONVERSION

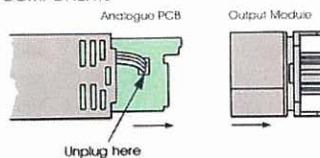
These operational modifications should be made by a qualified technician before installation.

IMPORTANT: Check your installation operating voltage before proceeding. Wrongful conversion could damage this unit.

1. Separate the output module assembly from the main module by gently levering the retaining clips from both slots in the cover with a screwdriver



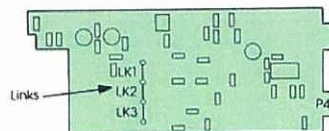
2. Remove the output module and then pull the PCB from the module cover as far as possible. Unplug the potentiometer wiring by releasing the lock. The PCB can now be completely removed. **TAKE CARE NOT TO DAMAGE OR DISTURB ANY OF THE OTHER COMPONENTS**



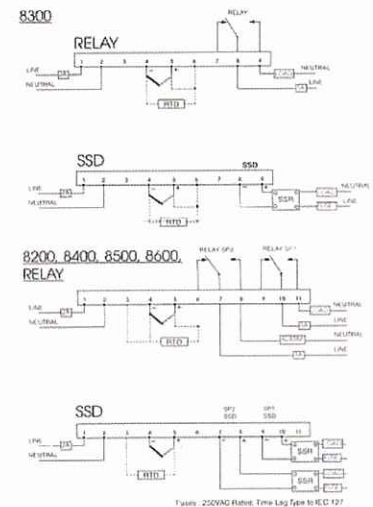
Check side label for supply voltage. This can be changed by plug in links on the main pcb. (A spare link is provided in the accessory kit)

Use pliers to remove a link, and ensure that when fitting a new link it is fully pushed into place.

For 230Vac mains supply - link 2 fitted
For 115vac mains supply - link 1 and 3 fitted



4 WIRING



5 PROCESS ERROR DISPLAY

Has a 5 step indication, each step operates for 2% of full scale. Example for a full scale of 0-300°, the LED's would be lit as shown:-

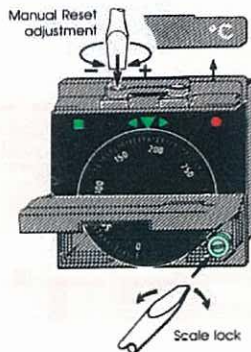
Error Display	Process Temperature
	9° OR MORE BELOW SET POINT
	9° TO 3° BELOW SET POINT
	-3° TO +3° SET POINT
	3° TO 9° ABOVE SET POINT
	9° OR MORE ABOVE SET POINT

6 MANUAL RESET (OFFSET) ADJUSTMENT

Time proportional control will normally provide good accuracy, but the actual process temperature may differ slightly from the set point. This difference is called offset.

In most applications the offset is not important and no adjustment is necessary. To remove offset:

Remove top fascia to enable access to the manual reset potentiometer.



For **over** powered loads ('actual' above 'set' temperature) adjust anti-clockwise (-)
For **under** powered loads ('actual' below 'set' temperature) adjust clockwise (+)

7 SCALE LOCK

To operate - raise the lower fascia. With a screwdriver, rotate the scale lock until the pip engages, as shown in section 6. Unlock - rotate to disengage the pip either clockwise or anti-clockwise.

8 SP2 ADJUSTMENT (IF FITTED)

Check that you have the correct unit for the application:

8400 - Low limit alarm - relay energised below SP2 setting

8500 - Deviation alarm - relay energised within the SP2 band, set equally either side of SP1

8600 - High limit alarm - relay energised above SP2 setting

All 3 modes of operation are slaved to SP1. Maximum adjustment from SP1 is 10% of full scale.

SP2 Setting

Remove top fascia to access the SP2 potentiometer (pot). A small flat bladed screwdriver is needed to adjust the pot.

Note - examples given are for an 8600 High Limit alarm, SP1 set point of 200° and SP2 to operate at 210°



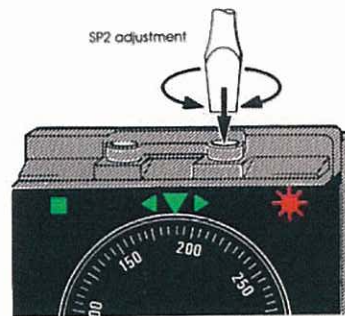
1. With the 8000 powered, allow the temperature to stabilise at SP1 set temperature (200°)



9 SPECIFICATIONS

SUPPLY VOLTAGE:	115 or 230 ± 10% 50 to 60Hz link selectable.	
POWER CONSUMPTION:	5VA maximum	
OUTPUTS:	SP1	relay 5A/250Vac resistive ssd 5V/25mA dc non isolated
(Optional)	SP2	relay 3A/250Vac resistive ssd 5V/25mA dc non isolated
INPUTS:	Thermocouples types J, K, T, R, S (specify when ordering)	
	RTD 2 or 3 wire DIN 43760	
SENSOR BREAK PROTECTION:	Upscale	
COMMON MODE REJECTION:	Negligible up to 240V	
SERIES MODE REJECTION:	Negligible up to full scale mV 50 to 60Hz	
C/JC REJECTION:	20 to 1 typical.	
CONTROL MODES (STANDARD)		
	SP1:	Proportional band 3% full scale. Proportional time 25 seconds. ON/OFF Hysteresis - Optional 2% full scale.
	SP2:	ON/OFF Hysteresis 2% full scale.
ENVIRONMENTAL		
Ambient Temperature:	0 to 50°C	
Humidity:	80% maximum	
Altitude:	Up to 2000M	
Pollution Degree:	II (inside panel)	
Installation Category:	2	
Mouldings:	Flame retardant polycarbonate	
Safety:	EN61010	
Protection:	IP50	
EMC Emissions:	EN50081-1 FCC rules 15, sub-part J, class A	
EMC Immunity:	EN50082-1	
Weight:	250g	

2. Adjust SP1 to 190° - Process temperature will remain at 200° for a period of time depending upon the thermal stability of the system
3. Quickly adjust SP2 until the LED operates



As the process temperature may have cooled down from 200° by the time that SP2 LED is lit, repeat steps 1 to 3 several times until you are confident that SP2 has the 10° differential required

An alternative method is to use appropriate instrumentation to provide the correct sensor input (compensation mV or Ω)

WARRANTY

CAL Controls warrant this product free of defects in workmanship and materials for three (3) years from date of purchase

1. Should the unit malfunction, return it to the factory. If defective it will be repaired or replaced at no charge
2. There are no user-serviceable parts in this unit. This warranty is void if the unit shows evidence of being tampered with or subjected to excessive heat, moisture, corrosion or other misuse
3. Components which wear, or damage with misuse, are excluded e.g. Relays
4. To comply with this warranty the installation and use must be by suitably qualified personnel
5. Neither CAL Controls Ltd or CAL Controls Inc shall be held responsible for any damage or loss to other equipment howsoever caused, which may be experienced as a result of the installation or use of this product
CAL Controls liability for any breach of this agreement shall not exceed the purchase price paid.



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CAL Controls policy of continuous development may cause detail changes to the enclosed information.
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8000 ORDERING CODES

Code

	8	CAL 8000 Series
Single Setpoint Models		Two Setpoint Models (11pin base only)
Type of Unit		
11-PIN BASE, DIN-Rail or Panel Mount	2	
Faston Connection, Panel Mount Only	3	
	4	SP2 Low Limit (Energised Below SP2)
	5	SP2 Out of Limits (Energised Within SP2 Band)
	6	SP2 High Limit (Energised Above SP2)
11-PIN BASE (6200 equiv. connections)	7	
Outputs		
5A/250Vac, Relay SPDT	1	
SSR Drive 5Vdc	2	
	5	SP1=5A Relay SPDT + SP2=3A Relay SPDT
	6	SP1=5A Relay SPDT + SP2=SSd 5V 25mA
	7	SP1=SSd 5V 25mA + SP2=3A Relay SPDT
	8	SP1=SSd 5V 25mA + SP2=SSd 5V 25mA
	9	Special Controller Prefix
Supply Voltage (all units)		
	1	115Vac 50-60Hz
	2	230Vac 50-60Hz
	5	24Vac 50-60Hz
Sensor Input (all units)		
	J	Type J Thermocouple
	K	Type K Thermocouple
	R	Type R Thermocouple
	S	Type S Thermocouple
	T	Type T Thermocouple
	E	Type E Thermocouple
	P	RTD PT100
Ranges		
	DEG C	DEG F
	A	-100 / +200
	B	0/100
	D	0/200
	E	0/300
	G	0/400
	H	0/500
	L	0/800
	M	0/1000
	N	0/1200
	V	0/1600
	--	0/1500
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