

SERIES 5000 CONTROLLERS

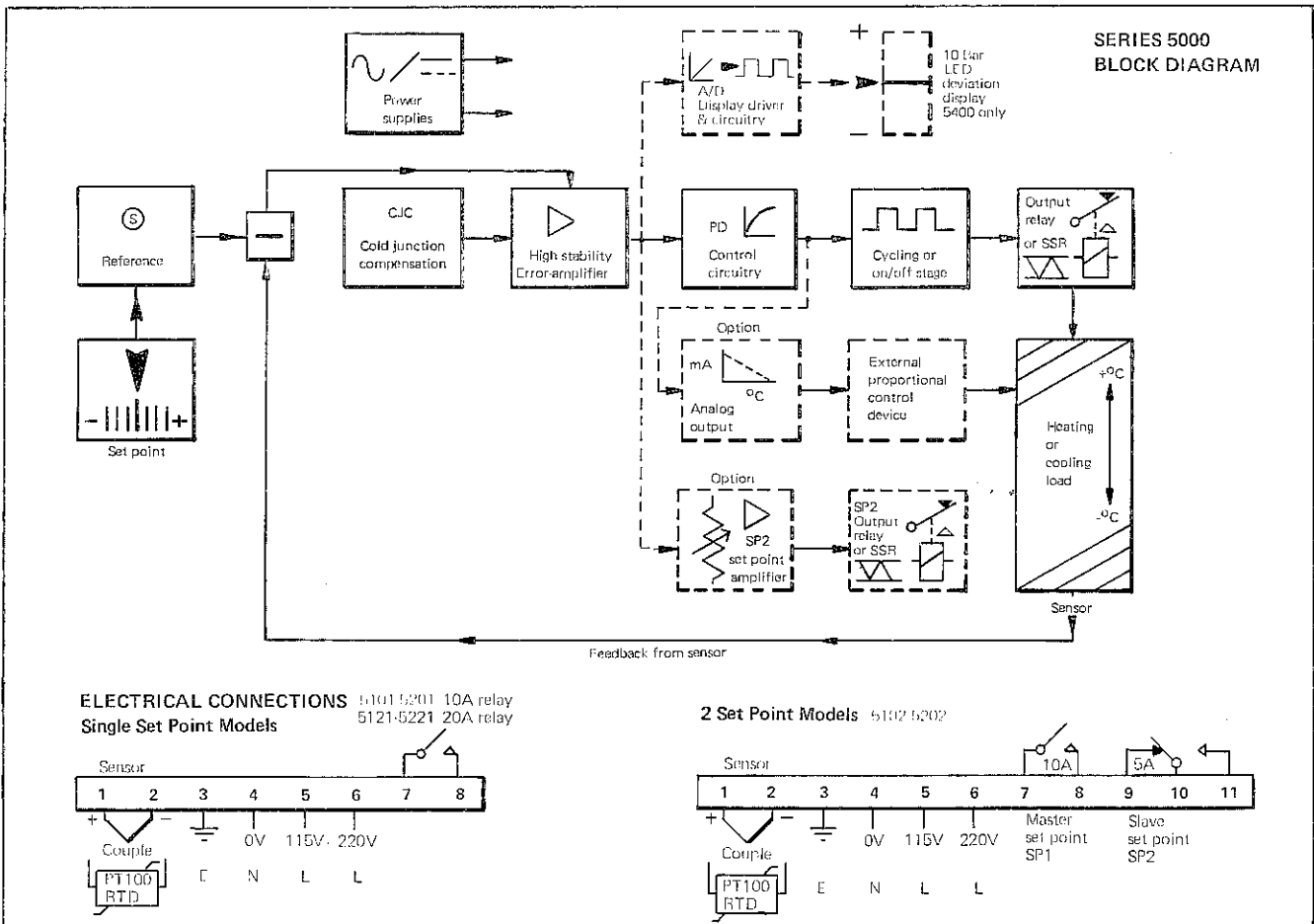
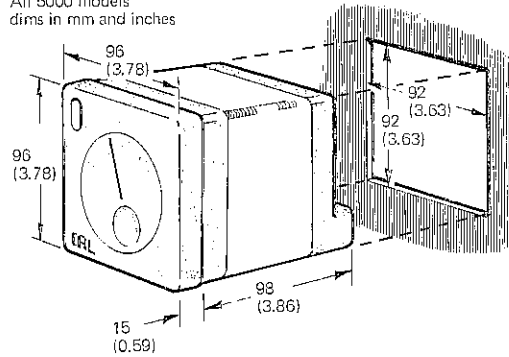
The popular Series 5000 range of 96 x 96mm Temperature Controllers now have improved circuitry, displays and many other important features. Holding the competitive prices has been helped by the use of 100% modular construction and attention to detail at every stage in design and manufacture.

Styling has always played an important part in the appeal of CAL products – 'a well designed product that works well'; this model is a further example of that approach.

The complete case, front and rear is moulded in flame retardant tinted polycarbonate and ABS. The smart new brown finish enhances the appearance of the controllers when installed on machines with no loss of clarity of scale and other graphics. The Nextel coating is fully proof against oil and general industrial wear and tear.

DIMENSIONS

All 5000 models
dims in mm and inches



Features:

- * **PD (proportional and derivative)** with time proportioning control action, universally accepted as the best general purpose mode of operation, for all but the tightest control requirements. Typical control accuracy $\pm 0.5^{\circ}\text{C}$.
- * **Any standard sensor**, thermocouple or resistance thermometer may be used, 10 standard Centigrade and 6 Fahrenheit ranges, see 'Sensors and Ranges'.

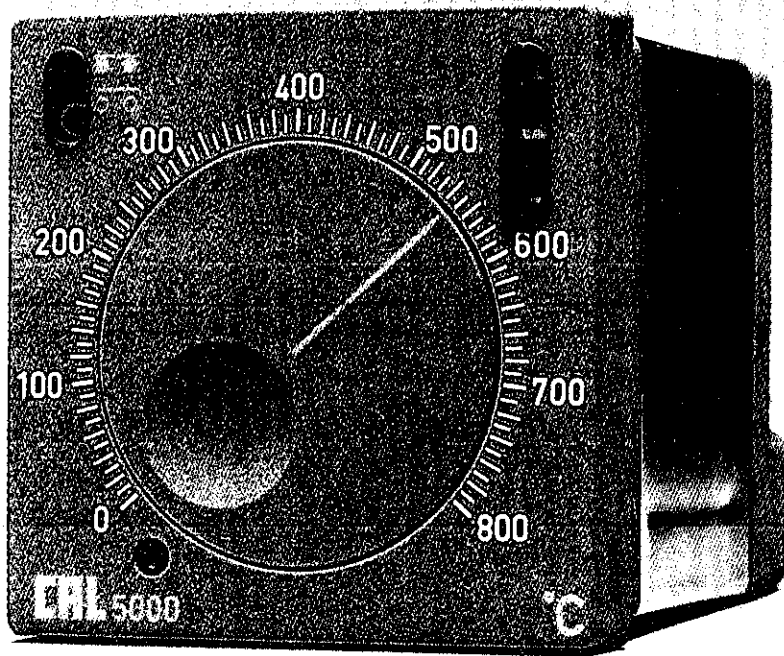
- * **Increased accuracy** has been achieved with a new control circuit, shared with the 7000 controllers; and is based on the use of an ultra low drift input amplifier, together with semiconductor cold junction compensation. These controllers will maintain the set temperatures precisely, **over long periods and under varying conditions.**

- * **96 x 96mm international 1/4 DIN size**, with a compact depth of only 98mm behind the panel, ideally suited to both OEM and replacement markets.

- * **Dual 220/115 voltage**, 50-60Hz. An essential feature due to CAL's increasing share in International markets and invaluable to exporting OEM's; also many safety authorities are now insisting on 115V control circuits on 220/240V machines.

- * **2 Set point controllers**
Due to the increased need for 2 set point models, the Series 5000 re-design enables conversion from single set point models by a simple P.C. module change with connections to an 11 way terminal block.

5200

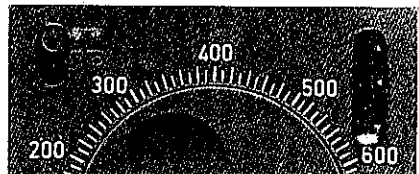
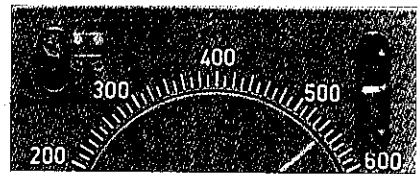
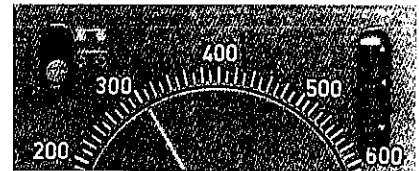


The clean design, clear scale and indication enhance both machine and control panel. Features of all 5000 models:

- * A clear 150mm-6" lockable scale.
- * The unique design of bezel and knob minimises accidental movement, even when unlocked.
- * Front adjustable manual reset, to match load and reduce offset.

At-a-glance deviation indication

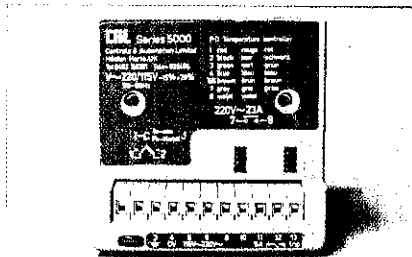
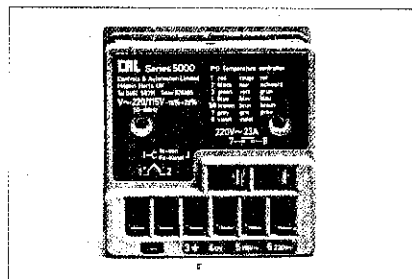
On 5200 models a bright 10 bar LED display shows from 6% and below set point, to 4% and above.



Warming up/at set point/above set point.

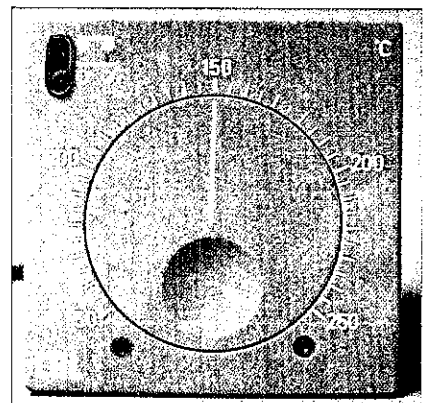
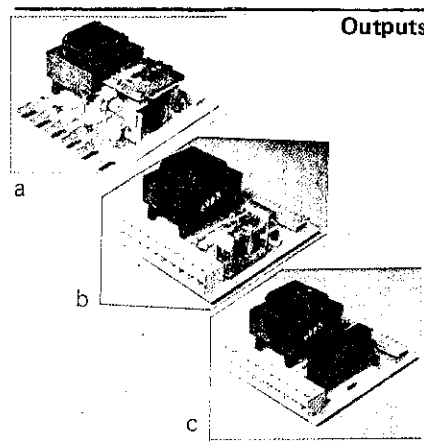
Ease of connection and replacement

- a Shows the rear of the 20A relay Models 5121-5221. 8 Faston connectors with colour coded boots.
- b Shows the rear and connection terminals of all other single set point models. Clear 'International' labelling. The CJC transistor, positioned close to the sensor connections ensures accurate cold junction correction.



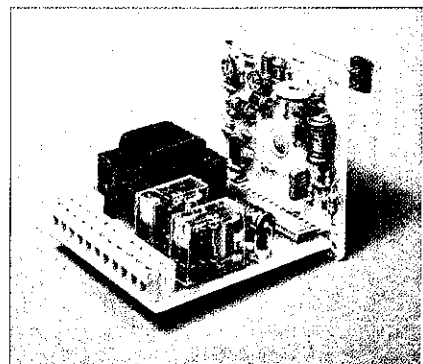
Outputs

- a Relay 20A/250Vac. (5kW) on 5121-5221 often removes the need for an external contactor.
- b Relay 10A/250Vac. (2.5kW) standard on all other models.
- c SSR 2A/250Vac. solid state relay for switching contractors, solenoids or small heaters. Essential for applications needing rapid switching.
- SSR drive for an external SSR.
- 4-20mA for proportioning devices, SCR power controllers, motor positioners and electro-pneumatic actuators. (20mA at bottom of proportioning band, linearly decreased to 4mA at top end).



5100

Identical to the 5200, but without the deviation LED bar display.



Mother-daughter PCB construction

Different modules are simply plugged together to give the control function and options required.

7000
HEAT
COOL
SENSORS
RANGES
TO
ORDER
NOTES
1700

SERIES 5000 CONTROLLER – MODEL AND OPTION SUMMARY

MODEL	SET POINT		CONTROL		OUTPUT	
	Channel		Std.	Option	Std.	Option
5101	1 master		PD	on/off	10A relay	SSR SSd 4-20mA
5121	1 master		PD	on/off	20A relay	
5102	1 master		PD	on/off	10A relay	SSR SSd 4-20mA
	1 slave		on/off		5A relay	SSR SSd
Models with 10 bar deviation display						
5201	1 master		PD	on/off	10A relay	SSR SSd 4-20mA
5221	1 master		PD	on/off	20A relay	
5202	1 master		PD	on/off	10A relay	SSR SSd 4-20mA
	1 slave		on/off		5A relay	SSR SSd

SERIES 5000 SPECIFICATION

ELECTRICAL

Supply voltage	Dual	220/115V	-15% + 20% = 187 – 264V/98 – 138V	50-60Hz
Power consumption		5VA		
Output	<i>Master set point</i>	Std	RL20 Relay	20A/250V ac. SPST = 5kW at 250V/2.4kW at 120V resistive load Relay contacts rated at 30A, max 20A gives extended life
		Std	RL10 Relay	10A/250V ac. SPDT = 2.5kW at 250V/1.2kW at 120V resistive load Relay contacts rated at 16A, max 10A gives extended life
		or	SSR	2A/250V ac. SPST solid state relay, opto isolated, zero volt switched
		or	SSd	5V at 25mA max, unisolated DC output for remote SSR
		or	mA	4-20mA DC into 500 ohm max
	<i>Set point 2</i>	Std	RL5 Relay	5A/250V ac. SPDT (see summary for options)

CONTROL *Master set point*

Calibration accuracy	± 1% of scale span (from 10 – 90% of scale span)
Linearity – Resolution	Linearity 4%, resolution 0.3% of scale span (dependent on sensor/range)
Control accuracy	Dependent on application, <i>see Technical Notes</i> For guidance only ± 0.2% of full scale = ± 0.5°C with full scale of 200°C 22°C ± 2°C, rated voltage, after 30 minutes settling time Temperature influence on accuracy 3µ V/°C or 0.02% whichever is the greater

*Reference conditions

CONTROL MODES

PD	Std	Proportional and Derivative
Prop band/gain	Xp	Factory set at optimum. Available 1-15% of full scale
Prop time/cycle rate	Tp	30s nominal; OR 1-60s, specify when ordering. <i>See Technical Notes</i>
Derivative time/rate	Td	30s
Manual reset		Front adjustable. To match load and reduce offset

ON/OFF *Optional on all models*

Differential/hysteresis	Xsd	1-50°C, specify when ordering (in °C or °F)
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SET POINT 2

High or low limit alarm	Std	Front adjustable, 0-10% of scale span either side of set point
Out of limit alarm	option	Front adjustable, 2-12% of scale span about set point

INPUT *See Technical Notes*

Thermocouple	All types, <i>see 'Ranges and Sensors'</i>
External resistance	Max 100 ohms
Cold junction compensation	Automatic
Resistance thermometer	PT100/RTD 100 ohms at 0°C, Plat. Other types to order
External resistance	2 wire std. 3 wire option compensates for lead resistance error
Common mode	Negligible effect up to 270V 50-60Hz
Series mode	Negligible effect up to scale spread mV equivalent at 50-60Hz
Sensor burnout protection	Automatic – upscale, downscale optional

INDICATION

All models	5000	2 High brightness LEDs show: supply voltage ON; heat ON
Deviation display	5200	10 bar LED display shows deviation from set point, -6% to +4%

GENERAL

Ambient temperature	0-50°C (32 - 130°F)
Suppression	Filtering is provided for mains and sensor borne interference
Dimensions and weight	96 x 96 x 113mm overall, 98mm behind panel. Weight 600g (21 oz)
Construction	Flame retardant polycarbonate and ABS. Bezel and knob coated in Nextel
Connections	5121-5221 Faston 250/6.35mm. Other models – screw terminal.