

# The CAL range of temperature controllers



# CAL Temperature Controllers

## 3300, 9300 & 9400 Controllers with RS232/485 Communication

The CAL range of temperature controllers are designed to be easy to use, low cost and reliable in the most demanding applications, including plastics, packaging, drying and laboratory equipment.

- Easy-to-use auto-tune program
- Simple menu-driven programming
- Full P.I.D. operation
- Single ramp/soak (dwell) program
- Heat/cool operation
- IP66 protection
- CE, UL, FM

Integrated auto-tune makes P.I.D. control simple and efficient, while the unique dAC function minimises overshoot problems often associated with other similar controllers.

### Inputs and Outputs:

- Thermocouple and PT100 (2 wire)
- Two outputs: SSR and/or Relay
- 5 alarm modes, full scale (high or low), deviation (high or low) & band
- RS232 or RS485 MODBUS communications RTU (retrofitable)



9400

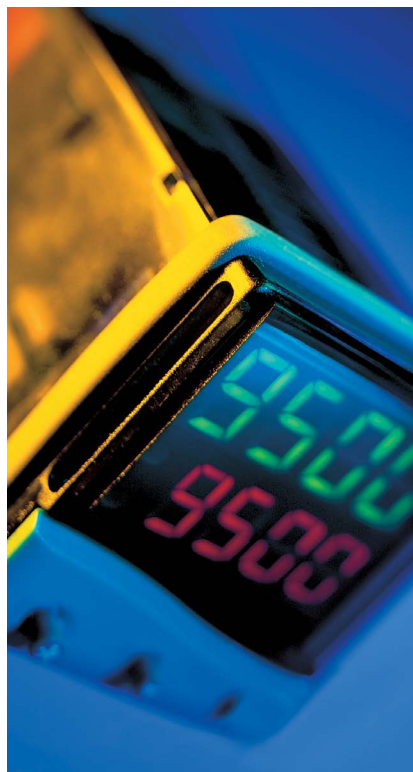


9300



3300

## 9500P - Temperature and Process Controller



The 9500P is a uniquely versatile and affordable controller with profiler for temperature and process applications. It is designed to offer the optimum functionality in a 48mmx48mm (1/16th DIN) package.

The 9500P shares the same features as the 3300, 9300 and 9400 and also offers:

### Programmer functionality

- Up to 31 programs (profiles)
- Up to 126 segments
- Event outputs via the 2nd and 3rd outputs
- Copy/Paste/Edit/Delete functions to simplify program building
- Call another program as a sub-program segment
- Up to 999 program loop cycles, or continuous loop cycling
- Hold back function, to ensure the next segment is not started until the last segment reaches the set-point
- 3 power fail recovery options, (Hold, Continue or Reset)

- Front panel interrogation of the program position
- Memory usage indication during programming

(note: program capacity is a memory function and different types of segments use more or less memory).

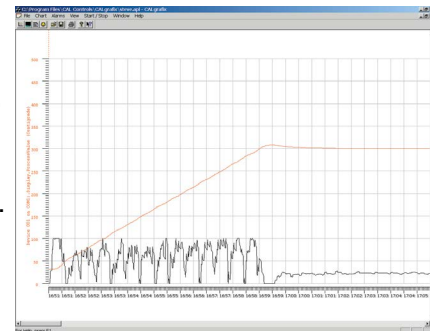
### Inputs and Outputs:

- Input: Thermocouple PT100 (2 or 3 wire), 4-20mA, 0-5V or 0 to 10V
- 3 Outputs: Relay, SSD, 4-20 mA 0-5V and 0 to 10V

## Process Monitoring and Configuration Software

Cost-effective process monitoring and controller configuration software, providing even greater value to CAL's range of temperature controllers. With powerful functions including data logging and process data archiving, chart recorder, virtual instrument display and on-screen alarm and display, CALGrafix software is the ideal solution for control of critical data, for quality control, and health and safety and machine development and build.

All features integrate seamlessly within one single user interface, providing total configuration features for ultimate control and even cloning of instrument settings.



### Advantages of using CALgrafix:

- Reduce installation time – quick and simple controller configuration
- Access to detailed process data via the charting and logging features
- Lower cost alternative to SCADA
- Simple set up, no programming skills required
- Reduce changeover time for different process recipes

### Configuration:

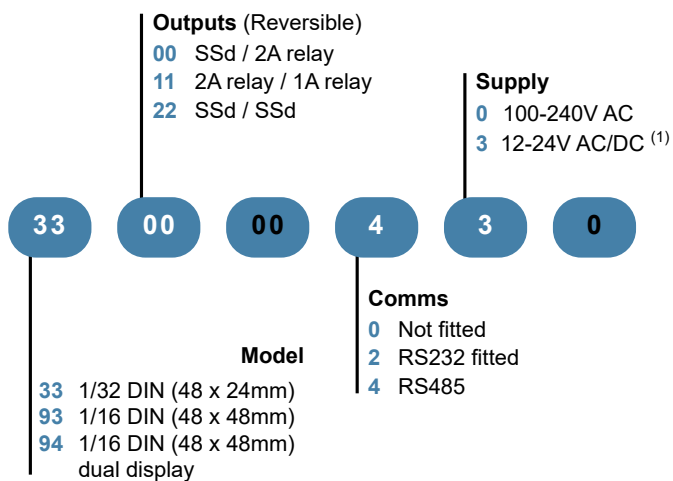
- Parameter set-up of 33/93/9400 and 9500P controllers
- Click and drag graphical profile set-up for 9500P controllers
- Multiple programs and profiles can be saved and recalled for various applications
- Instrument setting cloning reduces set up time

### CALgrafix Applications:

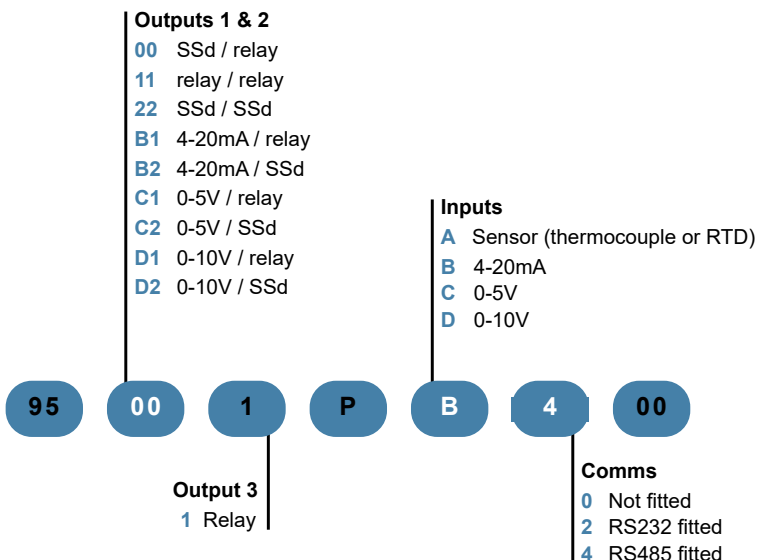
- Environmental and test chambers
  - Plastic injection and extrusion machines
  - Ovens, autoclaves, furnaces, and kilns
  - Scientific research and testing
  - Food processing equipment
- and your application .....**

## Ordering information

### 3300, 9300, 9400



### 9500P



(1) Models 3311, 9311, 9400, 9411 and 9422 are not currently available in low voltage 12-24V option.

## Accessories

### CALgrafix software



### Communications board RS485



### Communications board RS232



### RS232 to RS485 converter



# Technical Specifications

| Input   |  |
|---|--|
| <b>Thermocouple Standards</b>   | 9 types: Type B,E,J,K,L,N,R,S,T<br>IEC 584-1-1 : EN60584-1   |
| CJC rejection   | 20:1 (0.057°C) typical   |
| External resistance   | 100Ω maximum   |
| <b>Resistance Temperature Detector – (RTD)</b>                            | <b>3300 / 9300 / 9400:</b> PT100 2 wire, <b>9500P:</b> PT100 2 or 3 wire   |
| Standards   | IEC751: EN60751 (100Ω 0°C/138.5Ω 100°C Pt)   |
| Bulb current  | 0.2mA maximum  |
| <b>Linear process inputs</b>  | Analogue process inputs 0 to 50mV, +/- 0.1%. <b>9500P:</b> 0-20mA, 4-20mA, +/- 0.1%. 0-5V, +/- 0.1%. 0-10V, +/- 0.1%   |
| <b>Applicable to all Thermocouple and RTD inputs (SM =sensor maximum)</b> |  |
| Calibration accuracy  | ±0.25%SM ±1°C  |
| Sampling frequency  | Input 10Hz, CJC 2 sec  |
| Common mode rejection   | Negligible effect up to 140dB, 240V, 50-60Hz   |
| Series mode rejection   | 60dB, 50-60Hz  |
| Temperature coefficient   | <b>3300 / 9300 / 9400:</b> 150ppm/°C SM, <b>9500P:</b> 50ppm/°C SM typical   |
| Reference conditions  | 22°C ±2°C, rated voltage after 15 minutes settling times   |
| Output devices  |  |
| SSd   | SSd1 and SSd2: Solid state relay driver: To switch a remote SSR 6Vdc (nominal) 15mA non-isolated   |
| Miniature power relay   | Relay <b>1,2,3 Miniature power relay: Form A/SPST contacts (AgCdO): 2A/250Vac resistive load. 3300 / 9300 / 9400:</b> Relay 1, 2 only                                |
| Linear outputs: <b>9500P only</b>   | Analogue output: 4–20mA 500Ω max +/- 0.1% full scale typical, 0–5Vdc 10mA (500Ω min) +/- 0.1% full scale typical, 0–10Vdc 10mA (1KΩ min) +/- 0.1% full scale typical |
| General   |  |
| Displays  | Main (upper) display:, 4 digits high brightness green LED, 10mm high<br>Lower display <b>9400 / 9500P:</b> 4 digits high brightness orange LED, 9mm high             |
| LED output indicators   | Flashing SP1 square, green, SP2 round red  |
| Keypad  | 3 full travel elastomeric buttons  |
| Environmental   |  |
| Safety  | UL 873, EN 61010, CSA 22.2 No. 1010.1-92   |
| Humidity  | Max 95% non-condensing   |
| Altitude  | Up to 2000m  |
| Installation  | Categories II and III  |
| Pollution   | Degree II  |
| Protection  | NEMA 4X, IP66  |
| EMC emission  | EN50081-1, FCC Rules 15 subpart J Class A  |
| EMC immunity  | EN50082-2  |
| Ambient   | 0–50°C   |
| Mouldings   | Flame retardant polycarbonate  |
| Dimensions  |  |
| Front fascia Models   | <b>9300 / 9400 / 9500P:</b> 51.0 x 51.0mm (includes gasket). <b>3300:</b> 51.0 x 28.5 (includes gasket)  |
| Controller depth All models   | 106.7mm (with gasket fitted)   |
| Fascia dimensions   | <b>9300 / 9400 / 9500P:</b> 44.8 x 44.8mm, <b>3300:</b> 44.8 x 22.0mm  |
| Overall length  | All models – 116.2mm   |
| Weights   | <b>3300:</b> 110g, <b>9300:</b> 120g, <b>9400:</b> 130g, <b>9500P:</b> 180g (6.4oz)  |
| Supply Voltage  | 100–240Vac, 50–60Hz +/- 10% maximum permitted fluctuation, 12V - 24V (AC/DC) +/-20% 4.5 VA Polarity not required   |
| Digital range: 9500P only   | 199 to 9999. Hi-res mode -199.9 to 999.9   |
| <b>Programmer: 9500P only</b>   |  |
| Segments  | Total of 126 per program   |
| Programs  | Maximum of 31 programs   |
| Program memory  | 351 Bytes  |
| <b>Approvals</b>  | CE, UL, cUL, FM (3545)   |

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