1/8 DIN Process Controller

C100

- PID controller with 'one shot' auto-tune
  - single loop, heat/cool and ramp/soak as standard

- Quick code, front face or PC configuration
  - easy commissioning and operation using our Windows™-based software

- Universal process input with transmitter power supply
  - direct connection for any process signal

- Hoseproof front panel and full noise immunity
  - reliability in the harshest environments

- RS485/Modbus serial communications
  - SCADA, PLC and open systems integration

C100 – the easy-to-use 1/8 DIN controller with extensive capabilities
The C100 Universal Process controller is a highly versatile, single loop controller designed to be exceptionally easy to operate and set up.

Universal input and integral transmitter power supply ensure that the C100 has the capabilities to measure a wide range of process signals such as temperature, pressure, flow and level.

Analog, logic and relay control outputs are all fitted as standard, with the option to add further i/o capabilities such as additional relays, remote set point and digital input, to suit your application.

The configuration of the C100 is simply achieved by moving the security switch and entering a simple code from the front panel keys. No passwords, no input links, no complications.

With hoseproof front panel protection and superior RF immunity as standard the C100 has been designed to control reliably in the harshest of today's industrial environments.
Universal Process Input
- Thermocouple
- RTD
- 4 to 20mA
- Volts, millivolts

Transmitter Power Supply

Auxiliary Inputs
- Digital
- Remote Set Point

Primary Outputs
- 1 x Analog
- 1 x Logic
- 1 x Relay

Additional Alarm Outputs
- 2 x Relays

Serial Communications
- RS485 Modbus RTU

SCADA Systems (on PC)

PID Control
Alarms
PV Retransmission
Alarm Annunciator

KEY:  
Standard Option
**PID Control**

Simple PID control is available using any of the unit’s three built-in outputs.

- 4 to 20mA analog
- Logic 18V time proportioning (to drive solid state relays)
- 5A relay for Time proportioning or On/Off control

**Heat/Cool**

Heat/Cool control strategies may be implemented on the standard C100, using a combination of the analog, logic and relay outputs.

**Ramp/Soak Set Point Profiles**

The ramp/soak facility available on every C100 provides for a single program, four-segment profile. This facility also includes guaranteed ramp/soak, repeat program, skip and reset.

**Master/Slave and Cascade**

Two or more C100s can be used in master/slave, or cascade, configuration with the addition of the remote set point option to the basic unit.

**RS485/Modbus**

Fitted with an optional RS485 serial communication board, the C100 can communicate with PLCs and SCADA systems using
**Specification**

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>P, PI, PID single loop controller</td>
</tr>
<tr>
<td>Autotune facility</td>
</tr>
<tr>
<td>Fully user configurable</td>
</tr>
<tr>
<td>Hoseproof front face</td>
</tr>
</tbody>
</table>

**Operation**

**Display**
- High-intensity 7-segment, 2 x 4-digit LED display
- Display range: -999 to +9999
- Display resolution: ±1 digit
- Display height: 10mm (0.39 in.)

**Configuration**
- User defined via front panel or PC Configurator

**Standard Functions**

**Control types**
- Programmable for manual, on/off, time proportioning, current proportioning and heat/cool control.

**Set points**
- Local
- Remote
- 4 selectable fixed value
- Ramping set point

**Profile controller**
- Number: 4 ramp/soak segments
- Features: Guaranteed ramp/soak, self seeking set point, program repeat
- Controls: Run, hold and stop from front panel switches
- Run/hold or run/stop from digital input

**Alarms**
- Number: Two user-defined
- Type: High/low process
- High/low deviation

**Operation**

**Display**
- High-intensity 7-segment, 2 x 4-digit LED display
- Display range: -999 to +9999
- Display resolution: ±1 digit
- Display height: 10mm (0.39 in.)

**Configuration**
- User defined via front panel or PC Configurator
### Analog Inputs

**Number**
- One as standard
- One optional (4 to 20mA remote set point input)

**Input sampling rate**
- 250ms per channel

**Type**
- Universally configurable to provide (Channel 1 only):
  - Thermocouple (THC)
  - Resistance Thermometer (RTD)
  - Millivolt
  - Current
  - DC voltage

**Input impedance**
- mA: 100Ω
- mV, V: >10MΩ

**Linearizer functions**
- Programmable for standard inputs:
  - Sqrt, THC types B, E, J, K, N, R, S, T or Pt100

**Broken sensor protection**
- Upscale drive on THC and RTD
- Downscale drive on milliamps and voltage

**Cold junction compensation**
- Automatic CJC incorporated as standard
- Stability: <0.05°C/°C change in ambient temperature

**Input protection**
- Common mode isolation: >120dB at 50/60Hz with 300Ω imbalance
- Series mode rejection: >60dB 50/60Hz

**Transmitter power supply**
- 24V, 30mA max. powers one 2-wire transmitter
### Standard Analog Input Ranges

<table>
<thead>
<tr>
<th>Thermocouple</th>
<th>Maximum Range °C</th>
<th>Maximum Range °F</th>
<th>Accuracy (% of reading)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>–18 to 1800</td>
<td>0 to 3270</td>
<td>0.25% or ±2°C (above 200°C)</td>
</tr>
<tr>
<td>E</td>
<td>–100 to 900</td>
<td>–140 to 1650</td>
<td>0.25% or ±0.5°C</td>
</tr>
<tr>
<td>J</td>
<td>–100 to 900</td>
<td>–140 to 1650</td>
<td>0.25% or ±0.5°C</td>
</tr>
<tr>
<td>K</td>
<td>–100 to 1300</td>
<td>–140 to 2350</td>
<td>0.25% or ±0.5°C</td>
</tr>
<tr>
<td>N</td>
<td>–200 to 1300</td>
<td>–325 to 2350</td>
<td>0.25% or ±0.5°C</td>
</tr>
<tr>
<td>R</td>
<td>–18 to 1700</td>
<td>0 to 3000</td>
<td>0.25% or ±1.0°C (above 300°C)</td>
</tr>
<tr>
<td>S</td>
<td>–18 to 1700</td>
<td>0 to 3000</td>
<td>0.25% or ±0.5°C (above 200°C)</td>
</tr>
<tr>
<td>T</td>
<td>–250 to 300</td>
<td>–400 to 550</td>
<td>0.25% or ±0.5°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RTD</th>
<th>Maximum Range °C</th>
<th>Maximum Range °F</th>
<th>Accuracy (% of reading)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT100</td>
<td>–200 to 600</td>
<td>–325 to 1100</td>
<td>0.25% or ±0.5°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Linear Inputs</th>
<th>Range</th>
<th>Accuracy (% of reading)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milliamps</td>
<td>0 to 20</td>
<td>0.25% or ±2μA</td>
</tr>
<tr>
<td>Milliamps</td>
<td>4 to 20</td>
<td>0.25% or ±2μA</td>
</tr>
<tr>
<td>Volts</td>
<td>0 to 5</td>
<td>0.25% or ±200μV</td>
</tr>
<tr>
<td>Volts</td>
<td>1 to 5</td>
<td>0.25% or ±200μV</td>
</tr>
<tr>
<td>Millivols</td>
<td>0 to 50</td>
<td>0.25% or ±20μV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Square Root Input</th>
<th>Range</th>
<th>Accuracy (% of reading)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milliamps</td>
<td>4 to 20</td>
<td>0.25% or ±2μA</td>
</tr>
</tbody>
</table>

**Notes:**
- Performance accuracy is not guaranteed at extreme low end of thermocouple and sq. root ranges.
- RTD, 3-wire platinum, 100Ω per DIN 43760 standard (IEC751), with range of 0 to 400Ω.
- Min. span below zero
  - Type T: 70°C/126°F
  - Type N: 100°C/188°F
- THC standards: DIN 43710 IEC 584
- RTD standards: DIN 43760 IEC 751
...Specification

## Outputs

### Control output/retransmission
- Analog, configurable in the range of 4 to 20mA
- Max. load 15V (750Ω at 20mA)
- Accuracy ≤0.25% of span
- Dielectric 500V DC from I/P (not isolated from logic O/P)

### Logic output
- 18V DC at 20mA
- Min. load 400Ω
- Dielectric 500V DC from I/P (not isolated from control O/P)

### Relay output
- One relay as standard (SPDT) (5A @ 115/230V AC, 5A @ 24V DC)

### Options
- One option board can be installed from:
  - **Type 1**: One relay
  - **Type 2**: Two relays + one digital input + remote set point
  - **Type 3**: One relay + one digital input + remote set point + Modbus serial communications

### Relay output
- **SPDT**: 5A @ 115/230V AC

### Digital input
- **Type**: Volt-free
- **Minimum pulse**: 250ms (not isolated form remote set point)

### Modbus serial communications
- **Connections**: RS422/485, 2 or 4-wire
- **Speed**: 2.4k or 9.6k baud rate
- **Protocol**: Modbus RTU slave

### Remote Set Point Input
- 4 to 20 mA DC, 100Ω nominal input impedance
- Preset to process variable engineering units (not isolated from digital inputs)

## Physical

### Size
- 48 wide x 96 high x 125mm
- (1.89 in. wide x 3.78 in. high x 4.92 in.)

### Weight
- 250g (0.5lb) approximate

## Electrical

### Voltage
- 85 to 265V AC (50/60Hz)
- 24V DC

### Power consumption
- < 6VA

## Environmental

### Operating limits
- 0 to 55°C (32 to 131°F)
- 5 to 95%RH non-condensing

### Temperature stability
- < 0.02% of reading or 2μV/°C (1μV/°F)

### Front face
- IP65 (NEMA3), case rear IP20

## EMC

### Emissions and Immunity
- Meets requirements of IEC 61326 for an Industrial Environment

### Design and manufacturing standards
- CE Mark

### Safety standards
- EN61010 – 1
- C22.2 No. 1010
- UL 310 – 1
- FM 3810
Dimensions

Dimensions in mm (in.)

Cut out dims. 45 $\pm 0.6$ wide x 92 $\pm 0.8$ high
(1.77 $\pm 0.02$ wide x 3.62 $\pm 0.03$ high)
### Electrical Connections

#### Remote Set Point Input
- Remote Set Point Input (–)
- Remote Set Point Input (+)

#### Digital Input
- Digital Input (–)
- Digital Input (+)

#### Relay 2
- Relay 2 Normally Open
- Relay 2 Common
- Relay 2 Normally Closed

#### Analog Input
- Analog Input (–)
- Analog Input (+)
- Analog Input (Rtd)

#### Transmitter PSU
- Transmitter PSU (+)

#### Logic / Analog Output
- Logic / Analog Output (+)
- Logic Output (–)

#### Relay 1
- Relay 1 Normally Open
- Relay 1 Common
- Relay 1 Normally Closed

#### Neutral
- Neutral

#### Relay 3
- Relay 3 Normally Open
- Relay 3 Common
- Relay 3 Normally Closed

#### RS485
- RS485
- Tx
- Rx
- Common

#### Thermocouple, Millivolts and Volts
1. (-)
2. (+)

#### 3-Lead RTD
1. Red
2. Red
3. White

#### 2-Lead RTD and Resistance
1. Red
2. White

#### Milliamps
1. (-)
2. (+)
3. (+)

#### Milliamps using internal 2-wire transmitter power supply
1. (+)
2. (+)
3. (+)
4. (+)
5. (+)
6. (+)
7. (+)
8. (+)
9. (+)
10. (+)
11. (+)

#### See below
- a.c. power
- Neutral
- Live
- Relay 3 Normally Open
- Relay 3 Common
- Relay 3 Normally Closed
### Ordering Guide

<table>
<thead>
<tr>
<th>C100 1/8 DIN Process Controller</th>
<th>C100/</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>X</th>
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<tbody>
<tr>
<td><strong>Option Board</strong></td>
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<tr>
<td>- None</td>
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<tr>
<td>- One additional relay</td>
<td>0 1</td>
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<tr>
<td>- Two additional relays + one digital input</td>
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<tr>
<td><strong>Power Supply</strong></td>
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<tr>
<td>85V to 265V AC</td>
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<td>24V DC</td>
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<td><strong>Build</strong></td>
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<td>FM approval</td>
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<tr>
<td><strong>Programming/Special Features</strong></td>
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<tr>
<td>Configured to factory standard</td>
<td>S T D</td>
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<tr>
<td>Configured to customer requirements</td>
<td>C U S</td>
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<tr>
<td>Special features</td>
<td>S P X X</td>
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</tbody>
</table>

### Instrument Coding Example

```
C100 1/8 DIN Process Controller
One additional relay
85V to 265V AC power supply
Standard build
Configured to factory standard
```

```
C100 / 01 0 0/ STD
```