The CN3251 ¼ DIN temperature and process controller is a cost effective, high-performance, single loop controller that can be used for temperature, flow, pressure and level control applications. With universal sensor inputs and front panel operator setup, one CN3251 controller can be easily field configured for a wide variety of applications, and simply reconfigured as application needs change. This makes it an exceptional choice for applications requiring multiple control needs, manufacturing facilities, testing facilities and testing applications.

**Features**

- **Dual PID + Fuzzy Logic Control**
- **Up to 5 Outputs—Control, Alarm or Event**
- **Universal Sensor Input**
- **Switching Power Supply** 100 to 240 Vac or Optional 12 to 24 Vac/Vdc
- **16-Segment Ramp/Soak Program**
- **Optional RS232, RS422, RS485 Digital Communications**
- **Programmable Remote Setpoint Input (Standard)**

**Self-Tuning with Fuzzy Logic** optimizes PID control and minimizes overshoot

**Digital Input** for remote switching of 1 of the following:
- PID1/PID2
- Remote/local setpoint
- Main/auxiliary setpoint
- Ramp/soak operation
- Manual/auto control
- Alarm reset for latching alarms

**16-Interval Ramp/Soak Program** with guaranteed soak, event outputs and looping
- Optional programmable analog
- Programmable remote setpoint input (standard on all products)

**AUX Pushbutton and LED** for front panel switching of:
- PID1/PID2
- Remote/local setpoint
- Main/auxiliary setpoint
- Ramp/soak operation
- Manual/auto control

**Security Code Protection** prevents unauthorized access

**Setpoint Ramp Rate** provides soft start at power-up, or on setpoint changes, to prevent uneven heating and overshoot

**Control Loop Protection** provides process protection from:
- Open sensor
- Shorted sensor
- Sensor reversed
- Control output open or shorted
- Power control device open or shorted
- Load power missing and self-diagnostics

**Operating Ambient** up to 65°C (150°F)

**CN3251** ¼ DIN

**OmegecareSM extended warranty program** is available for models shown on this page. Ask your sales representative for full details when placing an order. **OMEGACARESM** covers parts, labor and equivalent loaners.
Specifications

Control Modes:
Automatic: On/off, proportional, PID, PI, PD, PID + fuzzy logic, heat/cool (dual PID)

Control Adjustments:
Control Setpoint: Sensor range
Setpoint Limits: Sensor range
Deadband: 1 to 100°F
Proportional Band: Sensor range
Manual Reset: –99.9 to 99.9
Automatic Reset: 0.00 to 99.99 repeats per minute
Rate: 0 to 500 seconds
Output Cycle Time: 0.1 to 60.0 seconds
Output Limit: 0.0 to 100.0%
Open Sensor/Out of Range Output Command: 0.0 to 100.0%
Display Offset: –100 to 100°F
Heat/Cool Adjustments:
Output Offsets: –100 to 100°F
Heat/Mass Flow:

Cooling Medium: Air, water or oil

Alarm Adjustments:
Setpoints: High and low settings for each alarm output
Alarm Types:
Absolute: High, low and high/low
Tracking: +deviation, –deviation, and ±deviation
Relay Action: Latching or non-latching, energized or de-energized
Alarm Deadband: Adjustable, –18 to 38°C (0 to 100°F)
Alarm Inhibit: On power-up, enabled or disabled
Control/Alarm Outputs: Total of 5 control/alarm outputs possible
Relay: Form A contacts, 1.0 A at 120/230 Vac (resistive load)
Solid State Relay Drive: 24 Vdc nominal at 40 mA
Triac: A continuous, 10 A in-rush
Current/Voltage: 4 to 20 mA into 0 to 800 Ω, field-changeable to 1 to 5 Vdc
Output #5 (Optional):
Relay: N.O. form “C” contact, 5 A @ 120 or 230 Vac
Sensor Input: Field-selectable thermocouple, RTD, current or voltage
Input Update Rate: 2 samples/s
Ramp/Soak Programming:
Intervals: 16
Loops: 1 loop, 0 to 255 times or continuous
Event Outputs: Up to 3
Guaranteed Soak Differential: Off, 1°F to sensor span
Time Units: Seconds, minutes, hours (1 s to 99.99 hours/segment)
Ramp to Setpoint: 1 to 9999°F/hour on power-up
Open Sensor and Out-of-Range Condition: Programmable control action with display indicating condition “OPEN SENS”
Remote Setpoint Input:
Input Signal: 4 to 20 mA, 250 Ω input impedance, 1 to 5 Vdc, 110 KΩ input impedance, voltage or current field-selectable via switch
Range: Programmable over-selected sensor span
Accuracy: ±0.3% of sensor span (initial accuracy) at 24°C (75°F) ambient temperature and rated line voltage, field calibrate to ±0.2% of sensor span
Digital Input: Accepts dry-contact closure
Analog Output Option:
Assignable Functions: Process variable, output #1 command, active setpoint, output #2 command
Output Signal: 4 to 20 mA into 0 to 800 Ω load, 1 to 5 Vdc into 100 KΩ or greater load selectable via DIP switch
Range: Programmable over selected sensor span for retransmission of process variable and active setpoint, fixed to 0 to 100% for transmission of output commands
Accuracy: ±0.2% of programmed span, ±1 LSD
Digital Communications (Optional):
RS232: Single-drop, isolated
RS422/485: Multi-drop, isolated, field selectable by switch
Baud Rates: 1200, 2400, 4800, 9600, 19.2 K
Protocols: ASCII line, computer interface
Instrument Power: 100 to 240 Vac, 10%, +15%; 12 to 24 Vac/Vdc, ±10%; 50 to 60 Hz

Operating Environment:
0 to 65°C
50 to 60 Hz
10%, -15%; 12 to 24 Vac/Vdc, ±10%;
Influence of Line Voltage Variation:
ABS plastic
Dimensions:
Overall: 97 H x 97 W x 97 mm D (3.8 x 3.8 x 3.8")
Depth Behind Panel: 97 mm (3.8")
Front Panel Projection: 20 mm (0.8")
Panel Cutout: 91 x 91 mm (3.6 x 3.6")
Weight: 454 g (1 lb)
Case Material: High-impact, black
Influence of Line Voltage Variation:
±0.1% of sensor span/10% change in nominal line voltage
Noise Rejection:
Common Mode Noise: 140 dB at 60 Hz
Series Mode Noise: ±0.1% of sensor span with 300 mV peak-to-peak, 50 or 60 Hz series mode noise
RFI: Typically less than 0.5% of sensor span at a distance of 1 m (3.1') from transmitter (4 W, 464 MHz)
### Input Types and Ranges

<table>
<thead>
<tr>
<th>Input Type</th>
<th>Range</th>
<th>Accuracy @ 25°C (77°F) Ambient (All ±% of Sensor Span)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J Iron</td>
<td>-73 to 760°C</td>
<td>0.2%</td>
</tr>
<tr>
<td>K Constantan</td>
<td>-100 to 1400°F</td>
<td>0.2%</td>
</tr>
<tr>
<td>L CHROMEGA®</td>
<td>-184 to 1316°C</td>
<td>0.2%</td>
</tr>
<tr>
<td>M ALOMEGA®</td>
<td>-300 to 2400°F</td>
<td>0.2%</td>
</tr>
<tr>
<td>T Copper</td>
<td>-212 to 399°C</td>
<td>0.4% for PV &lt; -80°C</td>
</tr>
<tr>
<td>N Constantan</td>
<td>-350 to 750°F</td>
<td>0.2% for PV &gt; 80°C</td>
</tr>
<tr>
<td>E CHROMEGA®</td>
<td>-73 to 593°C</td>
<td>0.2%</td>
</tr>
<tr>
<td>F Constantan</td>
<td>-100 to 1100°F</td>
<td>0.2%</td>
</tr>
<tr>
<td>R Pt-13%Rh/Pt</td>
<td>-18 to 1760°C</td>
<td>0.4%</td>
</tr>
<tr>
<td>S Pt-10%Rh/Pt</td>
<td>0 to 3200°F</td>
<td>0.4%</td>
</tr>
<tr>
<td>B Pt-30%Rh/Pt</td>
<td>10 to 168°C</td>
<td>0.4% for PV &gt; 538°C</td>
</tr>
<tr>
<td>C CHROMEGA®</td>
<td>-73 to 593°C</td>
<td>0.2%</td>
</tr>
<tr>
<td>D Constantan</td>
<td>-100 to 1100°F</td>
<td>0.2%</td>
</tr>
<tr>
<td>R Pt-13%Rh/Pt</td>
<td>0 to 3200°F</td>
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</tr>
</tbody>
</table>

For 4 to 20 mA, input ranges are scalable (-500 to 5000) with an accuracy of 0.2%.

For 0 to 5 Vdc, input ranges are scalable (-500 to 5000) with an accuracy of 0.2%.

For 1 to 5 Vdc, input ranges are scalable (-500 to 5000) with an accuracy of 0.2%.
**To Order** Visit [omega.com/cn3251](http://omega.com/cn3251) for Pricing and Details

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN3251(*)</td>
<td>Ramp/soak controller with fuzzy logic</td>
</tr>
</tbody>
</table>

*Comes complete with operator’s manual.*  

**Ordering Examples:** CN3251-R, ramp and soak controller with a relay/DC pulse heat output.  
OCW-2, OMEGACARE™ extends standard 3-year warranty to a total of 5 years.  
CN3251-FR, ramp and soak controller with a 4 to 20 mA heat output, relay cool output.  
OCW-2, OMEGACARE™ extends standard 3-year warranty to a total of 5 years.

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**Single Output Options (No Additional Charge)**

<table>
<thead>
<tr>
<th>Output Suffix</th>
<th>Output #1 Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>-R</td>
<td>Relay/DC pulse**</td>
</tr>
<tr>
<td>-T</td>
<td>AC SSR</td>
</tr>
<tr>
<td>-F</td>
<td>4 to 20 mA***</td>
</tr>
</tbody>
</table>

**Field selectable.**  
**Field selectable for 1 to 5 Vdc.**

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**Dual Output Options (Field Installable)**

<table>
<thead>
<tr>
<th>Order Suffix</th>
<th>Description Output #1</th>
<th>Output #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>-RR</td>
<td>Relay</td>
<td>Relay</td>
</tr>
<tr>
<td>-TT</td>
<td>AC SSR</td>
<td>AC SSR</td>
</tr>
<tr>
<td>-FF</td>
<td>4 to 20 mA***</td>
<td>4 to 20 mA***</td>
</tr>
<tr>
<td>-DD</td>
<td>DC pulse</td>
<td>DC pulse</td>
</tr>
<tr>
<td>-FR</td>
<td>4 to 20 mA***</td>
<td>Relay</td>
</tr>
<tr>
<td>-DR</td>
<td>DC pulse</td>
<td>Relay</td>
</tr>
</tbody>
</table>

**Field selectable for 1 to 5 Vdc.**

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**Accessories**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3250X-R</td>
<td>Relay/DC pulse output module</td>
</tr>
<tr>
<td>3250X-T</td>
<td>AC SSR output module</td>
</tr>
<tr>
<td>3250X-FF***</td>
<td>4 to 20 mA/4 to 20 mA output module</td>
</tr>
<tr>
<td>3250X-RR</td>
<td>Relay/relay output module</td>
</tr>
<tr>
<td>3250X-TT</td>
<td>AC SSR/AC SSR output module</td>
</tr>
<tr>
<td>3250X-DD</td>
<td>DC pulse/DC pulse output module</td>
</tr>
<tr>
<td>3250X-FR***</td>
<td>4 to 20 mA/relay output module</td>
</tr>
<tr>
<td>3250X-DR</td>
<td>DC pulse/relay output module</td>
</tr>
<tr>
<td>3250X-S2</td>
<td>RS232 digital communications board</td>
</tr>
<tr>
<td>3250X-S4</td>
<td>RS485/422 digital communications board</td>
</tr>
<tr>
<td>3250X-CASE-COMM†</td>
<td>Housing for CN3251s with digital communications</td>
</tr>
<tr>
<td>3250X-CASE</td>
<td>Housing for CN3251s without digital communications</td>
</tr>
<tr>
<td>3250X-SBKT</td>
<td>Side mounting bracket</td>
</tr>
<tr>
<td>CN3200-SOFT-WIN2</td>
<td>Software for communications option, Windows version</td>
</tr>
<tr>
<td>CNQUENCHEARC</td>
<td>Noise suppression RC snubber (2 leads), 110 to 230 Vac</td>
</tr>
</tbody>
</table>

**Field selectable for 1 to 5 Vdc.**  
†Special controller case required when adding -S2 or -S4 to controllers.