

# 1/16 DIN Process Controllers

CN63300 Series  
Starts at  
**\$197**



- ✓ PID Control with Reduced Overshoot
- ✓ On Demand Auto-Tuning of PID Control Settings
- ✓ NEMA 4 X (IP65) Bezel
- ✓ Dual LED Displays for Simultaneous Indication of Temperature and Setpoint
- ✓ Status Indicators for Outputs and Control Modes
- ✓ Accepts 0 to 10 Vdc or 0/4 to 20 mA dc inputs
- ✓ Optional Dual Alarm Outputs
- ✓ Optional Linear DC Output, Control Retransmission (0 to 10 mV, 0/4 to 20 mA)
- ✓ Manual/Automatic Control Modes
- ✓ Setpoint Ramping For Process Security Via Programmable Lock-Outs
- ✓ Field-Replaceable Output Board (Relay or DC Pulse)
- ✓ Optional RS485 Serial Communication

The CN63300 Series accepts either a 0 to 10 Vdc or a 0/4 to 20 mA dc signal, precisely displays the input process signal according to the programmable scaling points, and provides an accurate output control signal (time proportional or linear DC) to maintain the process at the desired control point. The controller's comprehensive yet simple programming allows it to meet a wide variety of application requirements. In the PID control mode, the controller operates with on-demand auto-tune, which will establish the tuning constants. The PID tuning constants may be finetuned by the operator at any



CN63300-R1, \$197.

time and then locked out from further modification. The controller employs a unique overshoot suppression feature, which allows the quickest response without excessive overshoot. The unit can be transferred to operate in the manual mode, providing the operator with direct control of the output. The controller may also operate in the "ON/OFF" control mode with adjustable hysteresis. A second setpoint is available to allow quick selection of a different setpoint setting.

Dual 4-digit displays allow viewing of the process temperature and setpoint simultaneously. Front panel indicators inform the operator of the controller and output status. On many models the main control output and the alarm outputs are field-replaceable. Optional alarm(s) can be configured to activate according to a variety of actions (absolute high or low, deviation high or low, band in or out, with adjustable hysteresis. A standby feature suppresses the alarm during power-up until the temperature stabilizes outside the alarm region. The second alarm can be configured as a secondary PID output (heat/cool applications).

The optional main linear DC output (10 V or 20 mA) can be used for control or temperature re-transmission purposes. Programmable output update timer reduces valve or actuator activity. The output range can be scaled independent of the input range. The optional remote setpoint input (0/4 to 20 mA) allows for cascade control loops and remotely driven setpoint signals from computers or similar equipment. Straightforward end-point scaling with independent filtering and local/remote transfer option expand the controller's flexibility.

## Specifications

**Display:** Dual 4-digit  
**Upper Temperature Display:**

10.2 mm H (0.4") red LED

**Lower Auxiliary Display:**  
7.6 mm H (0.3") green LED

### Power:

**AC Versions:** 85 Vac min to 250 Vac max, 50 to 60 Hz, 8 VA max

### Low Voltage:

**DC Power:** 18 to 36 Vdc, 7 W

**AC Power:** 24 Vac  $\pm$ 10%,  
50 to 60 Hz, 9 VA

**Controls:** 4 front panel push buttons for modification and setup of controller functions and one external user input for parameter lockout or other functions

**Memory:** Nonvolatile E<sup>2</sup>PROM retains all programmable parameters and values

### Main Signal Input:

**Sample Period:** 100 ms  
**Response Time:** Less than 300 ms typical, 400 ms max (to within 99% of final value w/step input; typically, response is limited to response time of sensor)

**Normal Mode Rejection:** 40 dB @ 50/60 Hz (improves with increased digital filtering)

**Common Mode Rejection:** >120 dB, DC to 60 Hz

**Protection:** Input overload 120 Vac max for 15 s max

**User Input:** Internally pulled up to 5 Vdc (1 M $\Omega$ )

**V<sub>IN</sub> Max:** 5.25 Vdc

**V<sub>IL</sub>:** 0.85 V max

**V<sub>IH</sub>:** 3.65 V min

**I<sub>OFF</sub>:** 1 $\mu$ A max

**Response Time:** 120 ms max

**Functions:** Program lock, integral action lock, auto/manual mode select, setpoint ramp enable, reset alarms, setpoint 1/setpoint 2 select, local/remote setpoint select, serial block print

### Control and Alarm Outputs

#### Relay Outputs with Form "A" Contacts:

**Contact Rating:** 3 A @ 250 Vac or 30 Vdc (resistive load), 1/10 HP @ 120 Vac (inductive load)

**Life Expectancy:** 100,000 cycles at max load rating (decreasing load and/or increasing cycle time, increases life expectancy)

#### Main Control:

**Control:** PID or on/off

**Output:** Time proportioning or linear DC

**Cycle time:** Programmable

**Auto-Tune:** When selected, sets proportional band, integral time, and derivative time values

**Alarms:** 1 or 2 alarms

#### Modes:

**Reset Action:** Programmable, automatic or latched

**Standby Mode:** Programmable, enable or disable

**Hysteresis:** Programmable

**Secondary Output:** Software selectable (overrides alarm 2)

**Control:** PID or on/off

#### Output (Time Proportioning):

**Cycle Time:** Programmable

**Proportional Gain Adjust:** Programmable

**Deadband /Overlap:** Programmable

#### Linear DC Output:

**Main:** Control or re-transmission, programmable update rate from 0.1 to 250 seconds

#### Remote Setpoint Input:

**Input Type:** 0/4 to 20 mA

**Input Resistance:** 10  $\Omega$

**Overrange:** -5 to 105%

**Overload:** 100 mA (continuous)

**Scale Range:** -999 to 9999 degrees or -99.9 to 999.9 degrees

**Resolution:** 1 part in 10,000

### Accuracy:

**At 25°C:**  $\pm(0.1\%$  of FS + 1/2 LSD)

**Over 0 to 50°C Range:**  $\pm(0.2\%$  of FS + 1/2 LSD)

**Reading Rate:** 10/s

**Setpoint Filtering:** Programmable, digital

**Setpoint Ramping:** Programmable, 0.1 to 999.9 degrees/minute

### Serial Communications (Optional)

**Type:** RS485 multipoint, balanced interface

**Baud Rate:** 300 to 9600

**Data Format:** 7O1, 7E1, 7N2, 8N1

**Node Address:** 0 to 99, max of 32 units per line

**Transmit Delay:** 2 to 100 ms or 100 to 2 ms

**Data Encoding:** ASCII

#### Isolation W.R.T Main Input Common:

500 Vrms for 1 min (50V working) (not isolated W.R.T. remote setpoint or heater current inputs, or analog output common)

*Note: RS485 and the analog output commons are not internally isolated within the controller. The terminating equipment of these outputs must not share the same common (i.e. earth ground).*

### Environmental Conditions

**Operating Range:** 0 to 50°C (32 to 122°F)

**Storage Range:** -40 to 80°C (-40 to 176°F)

**Span Drift (Max):** 130 ppm/°C, main input

**Zero Drift (Max):** 1 $\mu$ V/°C, main input

### Operating and Storage Humidity:

85% max relative humidity (non-condensing) from 0 to 50°C (32 to 122°F)

**Altitude:** Up to 2000 meters

### Isolation Breakdown Ratings AC Line With Respect to All Inputs and Outputs:

250V working (2300V for 1 minute)

#### Main Input with Respect to Analog

**Outputs, Remote Setpoint Input,**

**Heater Current Input:** 50V working (2300V for 1 minute)

#### All Other Inputs and Outputs with

**Respect to Relay Contacts:** 2000 Vac (not isolated between analog outputs or remote setpoint commons)

**Connection:** Wire-clamping screw terminals

**Construction:** Black plastic alloy case and collar style panel latch; panel latch can be installed for vertical or horizontal instrument stacking; 1-piece tinted plastic bezel; bezel assembly with circuit boards can be removed from the case to change the output board without removing the case from the panel or disconnecting wiring; unit meets NEMA 4X (IP65) requirements for indoor use, when properly installed; Installation Category II, Pollution Degree 2

**Weight:** 0.17 kg (0.38 lb)

### Main Signal Input Range and Accuracy

Input Range	Accuracy* (18 to 28°C)	Accuracy* (0 to 50°C)	Impedance	Maximum Continuous Overload	Resolution
10 Vdc (-1 to 11)	0.10% of rdg + 0.02 V	0.30% of rdg + 0.03 V	1 M $\Omega$	300V	10 mV
20 mAdc (-2 to 22)	0.10% of rdg + 0.03 mA	0.30% of rdg + 0.04 mA	10 $\Omega$	100 mA	10 $\mu$ A

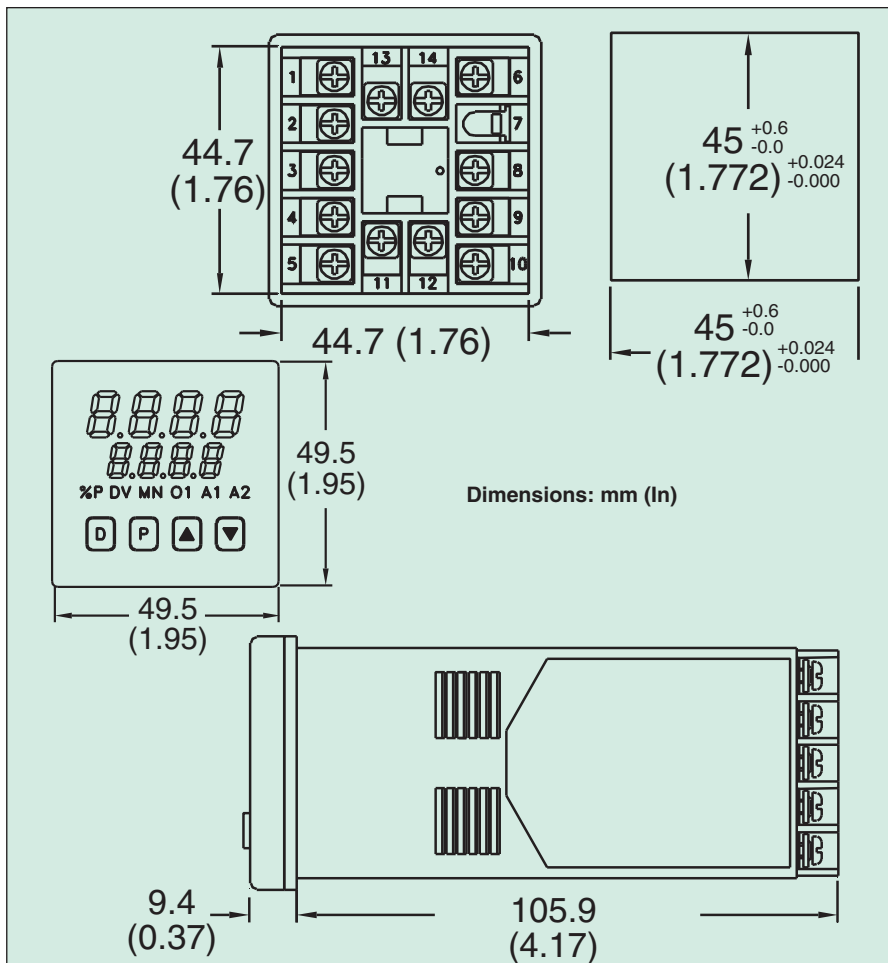
\* Accuracies are expressed as  $\pm$  percentages after 20 minutes warm-up. The controller's accuracy is specified in two ways: accuracy over an 18 to 28°C (64 to 82°F) range at 10 to 75% RH environment; and accuracy over a 0 to 50°C (32 to 122°F) range at 0 to 85% RH (non-condensing) environment. Accuracy over the wide sensor range reflects the coefficient of the internal circuitry.

### Linear DC Output Range and Accuracy

Output Range**	Accuracy* (18 to 28°C)	Accuracy* (0 to 50°C)	Compliance	Resolution
0 to 10V	0.10% of FS + 1/2 LSD	0.30% of FS + 1/2 LSD	10 k $\Omega$ min	1/3500
0 to 20 mA	0.10% of FS + 1/2 LSD	0.30% of FS + 1/2 LSD	500 $\Omega$ max	1/3500
4 to 20 mA	0.10% of FS + 1/2 LSD	0.30% of FS + 1/2 LSD	500 $\Omega$ max	1/2800

\* Accuracies are expressed as  $\pm$  percentages after 20 minutes warm-up. The controller's accuracy is specified in 2 ways: accuracy over an 18 to 28°C (64 to 82°F) range at 10 to 75% RH environment; and accuracy over a 0 to 50°C (32 to 122°F) range at 0 to 85% RH (non-condensing) environment. Accuracy over the wide sensor range reflects the coefficient of the internal circuitry.

\*\* Outputs are independently jumper selectable for either 10V or 20 mA. The output range may be field-calibrated to yield approximately 10% over-range and a small underrange (negative) signal.



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### To Order (Specify Model Number)

Model No.	Price	Description
<b>Standard Power Models (85 Vac to 250 Vac, 50 to 60 Hz, 8 VA max)</b>		
CN63300-R1	\$197	Single output
CN63300-R1-R2-AL	238	Dual output, relay/relay, alarm
CN63300-R1-R2-AL-C4	285	Dual output, relay/relay, alarm, RS485
CN63300-R1-R2-F3	269	Dual output, relay/relay, analog control or re-transmission
CN63300-R1-R2-F3-RSP	301	Dual output, relay/relay, analog control or re-transmission, remote setpoint
CN63300-R1-R2-F3-C4	316	Dual output, relay/relay, analog control or re-transmission, RS485
<b>Low-Voltage Models (18 to 36 Vdc, 7 W)</b>		
CN63300-R1-LV	\$224	Single output, relay
CN63300-R1-R2-AL-LV	255	Dual output, relay/relay, alarm
CN63300-R1-R2-AL-C4-LV	302	Dual output, relay/relay, alarm, RS485
CN63300-R1-R2-F3-LV	286	Dual output, relay/relay, analog control or re-transmission
CN63300-R1-R2-F3-RSP-LV	317	Dual output, relay/relay, analog control or re-transmission, remote setpoint
CN63300-R1-R2-F3-C4-LV	333	Dual output, relay/relay, analog control or re-transmission, RS485

Comes complete with operator's manual.

For "-C4" RS485 option, software is a free download from [omega.com/cn63300](http://omega.com/cn63300)

Ordering Examples: CN63300-R1-R2-AL, 85 to 250 Vac, dual output, relay/relay, with alarm, \$238.

CN63300-R1-LV, 18 to 36 Vdc, single output, relay, \$224.

### Accessories (Field-Installable)

Model No.	Price	Description
CN6-48100	\$32	Single relay output module
CN6-48111	63	Output module, single-output, form "A" relay, 2 alarms
CNQUENCHARC	\$8	Noise suppression RC snubber (2 leads), 110 to 230 Vac

Recommended Reference Book: Controller Tuning/PID, GE-2117, \$25.  
See Section Y For Additional Books





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[www.omega.com](http://www.omega.com)  
1-800-TC-OMEGA  
Stamford, CT.

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