

# Autotune Temperature/ Process Controllers

CN9300, CN9400, CN9500  
and CN9600 Series



CN9300, CN9400, CN9500  
and CN9600 Series

- ✓ Display Engineering Units  
°C, °F, bar, psi, pH, rH,  
SET (Universal Unit)
- ✓ 4-Digit Display
- ✓ 5 Alarm Configurations
- ✓ Single Ramp and Soak
- ✓ PID Heat-Cool Control
- ✓ NEMA 4 (IP66) Faceplate
- ✓ Sleeve Mounting
- ✓ Security Lockouts
- ✓ Easy-to-Use

CN9600 Series Unique  
Features

- ✓ Multi Ramp and Soak:  
31 Programs,  
126 Segments
- ✓ Assured Soak
- ✓ mA or V Linear Inputs
- ✓ mA or V Linear Outputs
- ✓ Three Outputs Standard
- ✓ Analog Retransmission
- ✓ High Accuracy ±0.1%  
Display of Linear Input

Optional

- ✓ Factory or Field  
Installable RS232  
or RS485 (MODBUS®  
Protocol)  
Communications
- ✓ CN9-SW Charting and  
Remote Control Software
- ✓ Low Voltage Power  
(CN9300 and  
CN9500 Only)



1/6 DIN



1/6 DIN

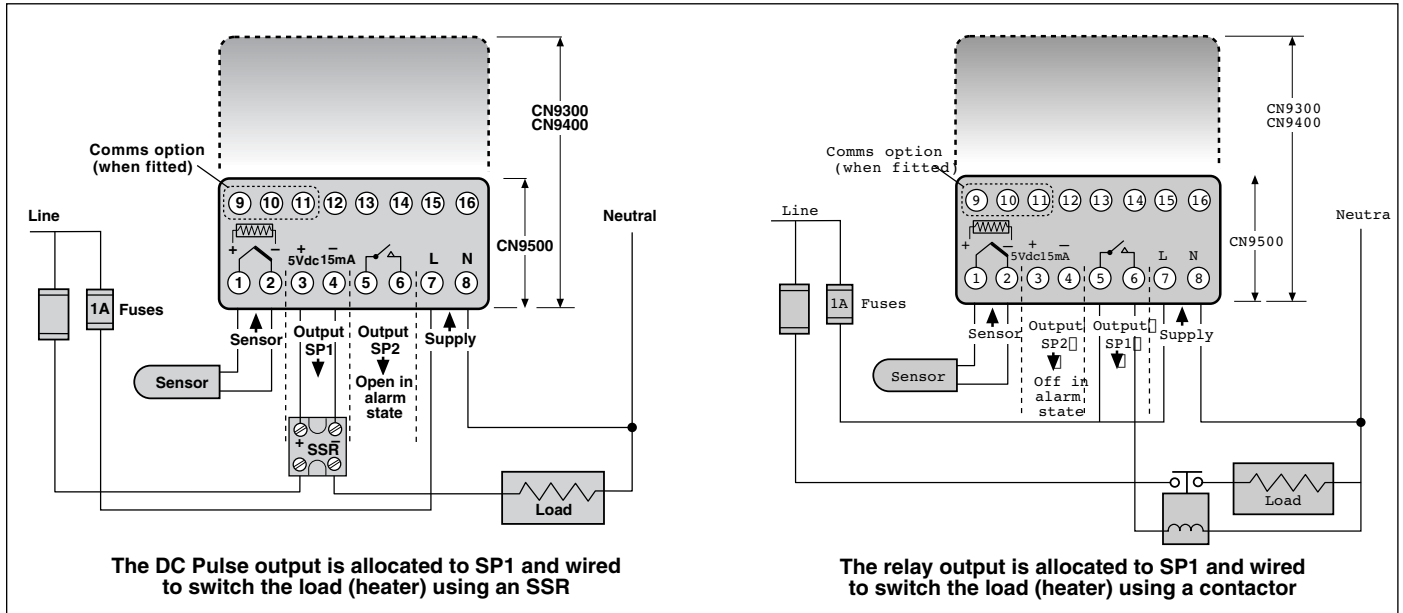


1/2 DIN

The new 1/2 DIN CN9500, 1/6 DIN CN9300 single display, 1/6 DIN CN9400 and CN9600 dual display controllers follow the OMEGA tradition of innovative design. The new CN9600 offers powerful process control and programmer capabilities. Building on the success of the CN132 and CN9000A series, the new models include several new features, the most important being the option of a low cost serial communicating system with easy to use Windows based software.

The CN9-SW series software bridges the gap between the "stand alone" system and full SCADA of Fieldbus control networks by providing a facility for remote supervision of up to 128 instruments using MODBUS protocol. It requires only a modest investment and can be operated by anyone with a medium specification PC or laptop that can be run with Windows 95, 98 or Windows NT.

## CN9300, CN9400, CN9500 and CN9600 Specifications



### Specifications

**Power:** 100 to 240 Vac,  $\pm 10\%$ , 50 to 60 Hz, 4 VA; optional 12 or 24 Vac/Vdc,  $\pm 20\%$ , 50 to 60 Hz, 4 VA polarity is not required; the controllers are fitted with an internal 250 mA time lag fuse

**Display:** 4-digit LED, 10 mm (0.4"), high brightness green display

#### CN9400/CN9600 Dual Display:

**Lower Display:** 9 mm (0.35") orange LED output indicators-flashing

**SP1:** Square green

**SP2:** Round red

**SP3:** 2<sup>nd</sup> round red (CN9600 only)

**Display Range:** -199 to 9999 counts (hi-res mode -199.9 to 999.9)

**Range:** Sensor limited 2000°C (3500°F); -99.9 to 999.9° in 0.1° resolution

#### Thermocouple Cold Junction

#### Compensation Rejection:

20:1 (0.05°/°C) typical

**Thermocouple External Resistance:** 100  $\Omega$  maximum

**Thermocouple:** 9 types

**Standards:** IPTS/68/DIN43710

**RTD Input:** Pt100 2-wire (0.00385)

**CN9600 Only:** 3-wire RTD input

#### mV Range:

**CN9300, CN9400, CN9500 Linear**

**Process Inputs:** 0 to 50 mV (1  $\Omega$  shunt resistor supplied for mA inputs)

**CN9600:** 0 to 50 mV  $\pm 0.1\%$

**Calibration Accuracy:**  $\pm 0.25\%$  of full scale  $\pm 1^\circ\text{C}$

**Sampling Frequency:** Input 10 Hz, CJC 2 seconds

#### Common Mode Rejection:

Negligible effect up to 140 dB, 240 V, 50 to 60 Hz

#### Temperature Coefficient:

150 ppm/°C sensor maximum

#### Output Device Options:

**Relay:** Form A/SPST contacts 2 A/250 Vac, resistive

**SSd (DC Pulse Driver, CN9600):** To switch a remote SSR 5 Vdc (+0/-15%) 15 mA non-isolated -6 Vdc @ 20 mA

#### Analog (CN9600): Accuracy

0 to 1% full scale typical, 4 to 20 mA (500  $\Omega$  maximum), 0 to 5 Vdc 10 mA (500  $\Omega$  minimum), 0 to 10 Vdc 10 mA (1 k $\Omega$  minimum)

#### Operating Ambient Range:

0 to 50°C (32 to 122°F)

**Case Material:** Flame retardant polycarbonate

#### Weight:

**CN9300, CN9400:** 120 g (4.3 oz)

**CN9500:** 110 g (3.9 oz)

**CN9600:** 180 g (6.4 oz)

#### $\frac{1}{32}$ DIN Panel Cutout Size:

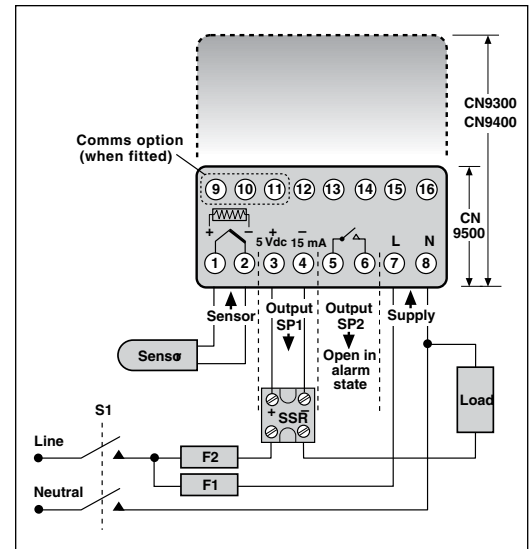
45 x 22.2 mm (1.77 x 0.87")  
9.5 mm (0.374") maximum panel thickness

$\frac{1}{16}$  DIN Panel Cutout Size: 45 mm square (1.772"), 9.5 mm (0.374") maximum panel thickness

#### Maximum Recommended

**Wire Size:** 18 AWG

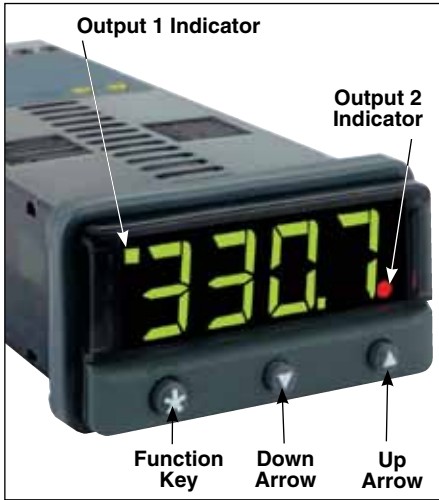
**Inductive Loads:** To prolong relay contact life and suppress interference, it is a recommended engineering practice to use a snubber circuit, such as OMEGA's CNQUENCHARC.



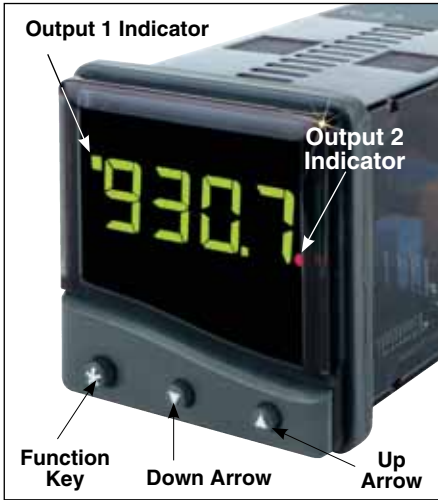
OMEGACARE<sup>SM</sup> extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE<sup>SM</sup> covers parts, labor and equivalent loaners.

For Additional Controllers and Indicators, See [omega.com](http://omega.com)

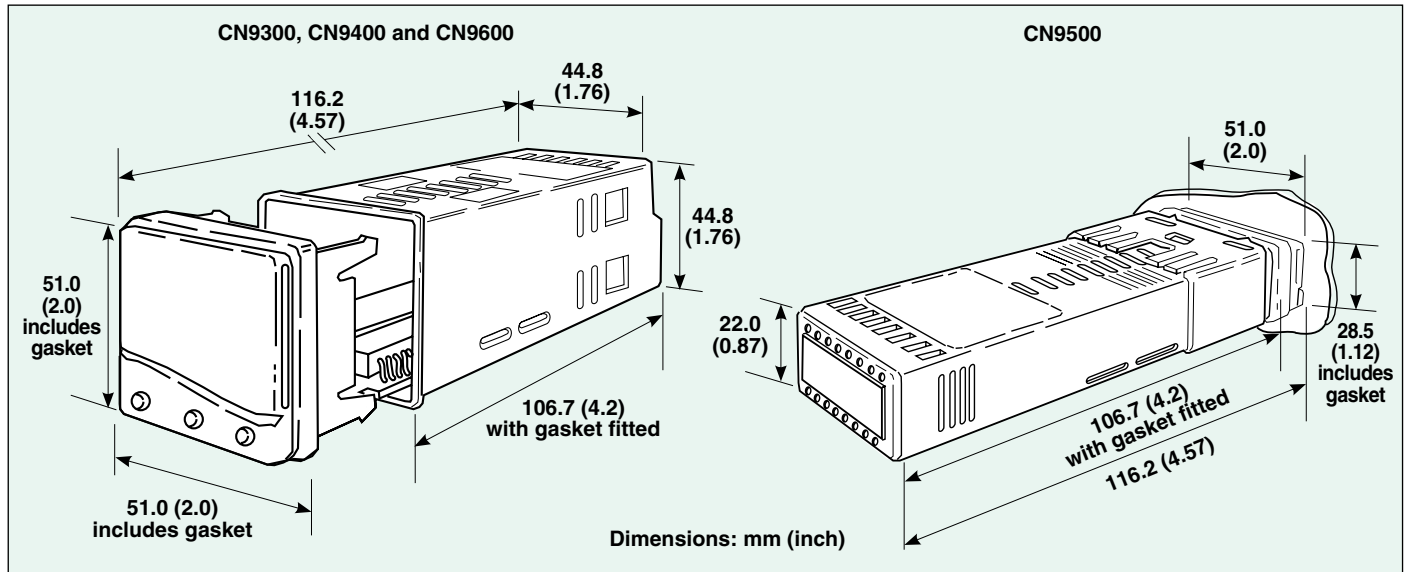
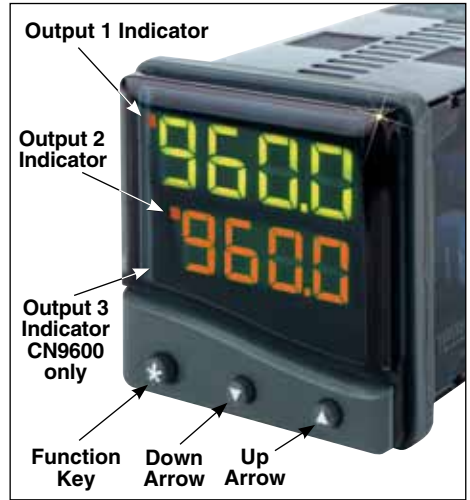
CN9500



CN9300



CN9400 and CN9600



**Input Ranges**

Thermocouple Type		Linearized Range (Units Are °C/°F Switchable)		Linearity °C
B	Pt-30%Rh/Pt-6%Rh	0 to 1800°C	32 to 3272°F	2.0
E	CHROMEPA®-Constantan	0 to 600°C	32 to 1112°F	0.5
J	Iron-Constantan	0 to 800°C	32 to 1472°F	0.5
K	CHROMEPA®-ALOMEGA®	-50 to 1200°C	-58 to 2192°F	0.25
L (J DIN)	Iron-Constantan	0 to 800°C	32 to 1472°F	0.5
N	OMEGA-P®-OMEGA-N®	-50 to 1200°C	-58 to 2192°F	0.25
S	Pt-13%Rh/Pt	0 to 1600°C	32 to 2912°F	2.0
R	Pt-10%Rh/Pt	0 to 1600°C	32 to 2912°F	2.0
T	Copper-Constantan	-200 to 250°C	-273 to 482°F	0.25

**Notes:** Type B: 5° (70 to 500°C), Types K and N: 1° >350°C. Exceptions: Types R and S: 5° <300°C, Type T: 1°, -25° or >150°C RTD/Pt100: 0.5 <-100°C.

Sensor Type	Sensor and Input Type	Linearized Range (Units are °C/°F Switchable)		Linearity* °C
RTD	2-wire, 100 ΩPt	200 to 400°C	-273 to 752°F	0.25
<b>CN9600 ONLY</b>	2- + 3-wire RTD input	200 to 400°C	-273 to 752°F	0.25

Linear Process Inputs (Input mV range: 0 to 50 mV) (1 Ω shunt resistor is supplied for mA inputs)			
Input Type	Signal Span	Maximum Scale Settings	Accuracy
Linear Process	0 to 20 mV	-250 to 3000	±0.5%
<b>CN9600 ONLY</b>	0 to 50mV	-199 to 9999	±0.1%

# Autotune Temperature/Process Controllers

(Both Outputs can be Either Reverse or Direct Acting)

**To Order Visit [omega.com/CN9300\\_9400\\_9500](http://omega.com/CN9300_9400_9500) for Pricing and Details**

Model No.	Description	Output 1	Output 2	Output 3
CN9511	1/32 DIN single display controller	Relay	Relay	—
CN9512	1/32 DIN single display controller	Relay	DC pulse	—
CN9522	1/32 DIN single display controller	DC pulse	DC pulse	—
CN9311	1/16 DIN single display controller	Relay	Relay	—
CN9312	1/16 DIN single display controller	DC pulse	Relay	—
CN9322	1/16 DIN single display controller	DC pulse	DC pulse	—
CN9411	1/16 DIN dual display controller	Relay	Relay	—
CN9412	1/16 DIN dual display controller	DC pulse	Relay	—
CN9422	1/16 DIN dual display controller	DC pulse	DC pulse	—
CN96111(*)	1/16 DIN dual display controller	Relay	Relay	Relay
CN96211(*)	1/16 DIN dual display controller	DC pulse	Relay	Relay
CN96221(*)	1/16 DIN dual display controller	DC pulse	DC pulse	Relay
CN96411(*)	1/16 DIN dual display controller	4 to 20 mA	Relay	Relay
CN96421(*)	1/16 DIN dual display controller	4 to 20 mA	DC pulse	Relay
CN96511(*)	1/16 DIN dual display controller	5 Vdc	Relay	Relay
CN96521(*)	1/16 DIN dual display controller	5 Vdc	DC pulse	Relay
CN96611(*)	1/16 DIN dual display controller	10 Vdc	Relay	Relay
CN96621(*)	1/16 DIN dual display controller	10 Vdc	DC pulse	Relay

\* To specify input type insert "TR" for standard thermocouple/RTD, or for a dedicated process input add "MA," "5V," or "10V."

**Ordering Examples:** CN9662110V, 1/16 DIN triple output ramp/soak, process 10 V input controller, 10 Vdc output, DC pulse and a mechanical relay output.

CN9311-C4, controller with relay output, and RS485 communications. OCV-2, OMEGACARE<sup>SM</sup> extends standard 3-year warranty to a total of 5 years.

## Additional Options

Suffix	Description
-C2	RS232 communications
-C4	RS485 communications
-LV*	12 to 24 Vac/Vdc low voltage power

**Note:** One communications option can be ordered per unit. Field installable communications boards can be installed in the field. \* Low voltage power option is not field installable and available only on the following models: CN9312, CN9322, CN9512 and CN9522.



## Field Installable Boards and Accessories

Model Number	Description
BD9-C2	RS232 communications board
BD9-C4	RS485 communications board
BD9-PROTOCOL*	The MODBUS protocol manual is not required when using the CN9-SW software
CN9-SW	Software for either RS232 or RS485 communications (refer to specifications), compatible with Windows 95, 98 and Windows NT
TP4	Trim plate adaptor, 1/16 to 1/4 DIN panel cutout
TP6	Trim plate adaptor, 1/16 to 1/8 DIN panel cutout
CNQUENCHARC	120/240 Vac snubber used for inductive loads
CN9-C2-CABLE-10	RS232 cable with female DB-9, 3 m (10')
CN9-C2-CABLE-25	RS232 cable with female DB-9, 8 m (25')

\* **Note:** This protocol manual provides the address information necessary to communicate with the CN9300/CN9400/CN9500 series controllers, with communications options installed, when interacting with custom or other commercially available software.

**For Additional Controllers and Indicators, See [omega.com](http://omega.com)**

# omega.co.uk<sup>®</sup>

Your One-Stop Source for Process Measurement and Control!

Freephone 0800 488 488 | International +44(0) 161 777 6622 | Fax +44(0) 161 777 6622 | Sales@omega.co.uk

[www.omega.co.uk](http://www.omega.co.uk)



#### UNITED STATES

[www.omega.com](http://www.omega.com)

1-800-TC-OMEGA  
Stamford, CT.

#### UNITED KINGDOM

[www.omega.co.uk](http://www.omega.co.uk)

Manchester, England  
0800-488-488  
+44-(0)161-777-6611

#### CANADA

[www.omega.ca](http://www.omega.ca)

Laval(Quebec)  
1-800-TC-OMEGA

#### FRANCE

[www.omega.fr](http://www.omega.fr)

0800-466-342

#### GERMANY

[www.omega.de](http://www.omega.de)

Deckenfronn, Germany  
0800-8266342

#### BENELUX

[www.omega.nl](http://www.omega.nl)

0800-099-33-44



## More than 100,000 Products Available!

### • Temperature

Calibrators, Connectors, General Test and Measurement Instruments, Handheld Instruments for Temperature Measurement, Ice Point References, Indicating Labels, Crayons, Cements and Lacquers, Infrared Temperature Measurement Instruments, Recorders, Relative Humidity Measurement Instruments, PT100 Probes, PT100 Elements, Temperature & Process Meters, Timers and Counters, Temperature and Process Controllers and Power Switching Devices, Thermistor Elements, Probes and Assemblies, Thermocouples, Thermowells and Head and Well Assemblies, Transmitters, Thermocouple Wire, RTD Probes

### • Flow and Level

Air Velocity Indicators, Doppler Flowmeters, Level Measurement, Magnetic Flowmeters, Mass Flowmeters, Pitot Tubes, Pumps, Rotameters, Turbine and Paddle Wheel Flowmeters, Ultrasonic Flowmeters, Valves, Variable Area Flowmeters, Vortex Shedding Flowmeters

### • pH and Conductivity

Conductivity Instrumentation, Dissolved Oxygen Instrumentation, Environmental Instrumentation, pH Electrodes and Instruments, Water and Soil Analysis Instrumentation

### • Data Acquisition

Communication Products and Converters, Data Acquisition and Analysis Software, Data Loggers Plug-in Cards, Signal Conditioners, USB, RS232, RS485, Ethernet and Parallel Port Data Acquisition Systems, Wireless Transmitters and Receivers

### • Pressure, Strain and Force

Displacement Transducers, Dynamic Measurement Force Sensors, Instrumentation for Pressure and Strain Measurements, Load Cells, Pressure Gauges, Pressure Reference Section, Pressure Switches, Pressure Transducers, Proximity Transducers, Regulators, Pressure Transmitters, Strain Gauges, Torque Transducers, Valves

### • Heaters

Band Heaters, Cartridge Heaters, Circulation Heaters, Comfort Heaters, Controllers, Meters and Switching Devices, Flexible Heaters, General Test and Measurement Instruments, Heater Hook-up Wire, Heating Cable Systems, Immersion Heaters, Process Air and Duct, Heaters, Radiant Heaters, Strip Heaters, Tubular Heaters