



1/16 DIN High/Low Limit Controller

CN63500 Series
Starts at
\$228

Panel Punches Available Visit omega.com/panelpunches



CN63500-R1, \$228, shown smaller than actual size.

- ✓ Dual 4-Digit LED Display
- ✓ Thermocouple or RTD Sensor Input
- ✓ Remote Reset Input
- ✓ Main Limit Output: 5 A Relay, Selectable for High or Low Trip Activation
- ✓ 5 A Relay Alarms (Optional)
- ✓ Optional NEMA 4X (IP65) Sealed Front Bezel
- ✓ Parameters Security Via Programmable Lockouts
- ✓ Dual Display



The CN63500 Series are temperature limit controllers, intended to provide an independent shutdown for thermal processes. The CN63500 accepts signals from a variety of temperature sensors (thermocouple or RTD elements), and its comprehensive programming allows it to meet a wide variety of application requirements. Dual 4-digit displays allow viewing of the process temperature and limit setpoint simultaneously. Front panel indicators inform the operator of the process and output status. The main limit output and alarm outputs are field-replaceable. The limit output is selectable for high or low trip activation. If the process temperature goes above the limit setpoint for a high trip, or below the limit setpoint for a low trip, the limit relay will de-energize to initiate a process shutdown. The limit output cannot be reset until the process temperature returns to the proper operating range; manual reset is required (local or remote). Sensor failure will initiate a process shutdown. Relay alarm(s) can be configured to activate according to a variety of actions (absolute high or low, deviation high or low and band in or out) with adjustable hysteresis. A standby feature suppresses the alarm during power-up until the process stabilizes outside the alarm region. The unit is constructed of lightweight, high-impact plastic case with a tinted front panel. The front panel meets NEMA 4X (IP65) specifications when properly installed. Multiple units can be stacked horizontally or vertically. Modern surface-mount technology, extensive testing, plush high-immunity to noise interference makes the CN63500 extremely reliable in industrial environments.

Specifications

Display: 2-line by 4-digit LED

Upper (Main) Display: 10.2 mm H (0.4") red LED

Lower (Secondary) Display:

7.6 mm H (0.3") green LED

Power:

Line Voltage Models: 85 to 250 Vac, 50/60 Hz, 8 VA

Low-Voltage Models:

DC Power: 18 to 36 Vdc, 7 W

AC Power: 24 Vac ±10%, 50/60 Hz, 9 VA

Memory: Non-volatile EEPROM

retains all programmable parameters and values

Environmental Conditions

Operating Range: FM rated @ 0 to 65°C, UL rated @ 0 to 55°C

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

Operating and Storage Humidity: 85% max relative humidity (non-condensing) from 0 to 65°C (32 to 149°F)

Altitude: Up to 2000 m (6562')

Isolation Breakdown Ratings

AC Line With Respect to All Inputs and Outputs:

2300V for 1 minute (250V working)

Relay Contacts to All Other Inputs and Outputs:

2300 Vac

DC Power With Respect to Sensor Input: 50V working

(500V for 1 minute)

Connection: Wire clamping screw terminals

Weight: 0.17 kg (0.38 lb)

Input Specifications

Sensor Input

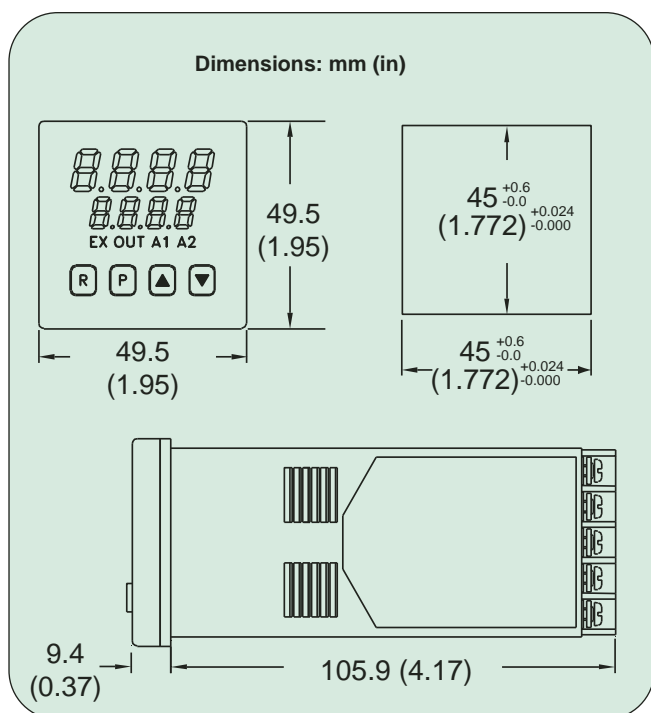
Sample Period: 100 ms

Step Response Time: Less than 300 ms typical, 400 ms max (to within 99% of final value)

Normal Mode Rejection: >40 dB @ 50/60 Hz

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

Overvoltage Protection: Input overload 120 Vac for 15 s max



Failed Sensor Response:

Main Output: Sensor failure will initiate a process shutdown

Display: "OPEN"

Alarms: Upscale

Indication Accuracy: $\pm(0.3\% \text{ of span} + 1^\circ\text{C})$ @ 23°C ambient after 20 minute warm-up (includes NIST conformity, cold-junction effect, A/D conversion errors and linearization conformity)

Span Drift (Maximum): 130 PPM/°C

Rtd Input: 2- or 3-wire, 100 Ω platinum, alpha = 0.00385 (DIN43760), alpha = 0.0039162

Excitation: 150 μA typical

Lead Resistance: 15 Ω max per input lead

Remote Resent Input: Internally pulled up to 5 Vdc 1 mΩ

V_{IL}: 0.85V max

V_{IH}: 3.65V min

V_{IN Max}: 5.25 Vdc

I_{OFF}: 1 μA max

Output Specifications

Limit and Alarm Output Relays

Contact Rating: 5 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 increases life expectancy)

Limit Output:

CN63500-R1-AL1: Form "C" relay

CN63500-R1-AL2: Form "A" relay

Selectable for high or low trip activation, if the process temperature goes above the limit setpoint for a high trip, or below the limit setpoint for a low trip, the limit relay will de-energize to initiate a process shutdown; the limit output cannot be reset until the process temperature returns to the proper operating range; manual reset is required (local or remote)

AlarmOutputs: 1 or 2 form "A" relays

Modes: Absolute high-acting, absolute low-acting, deviation high-acting, deviation low-acting, inside band-acting, outside band-acting

Reset Action: Programmable, automatic or latched; latched alarms can be reset regardless of limit exceed condition

Standby Mode: Programmable, enable or disable

Hysteresis: Programmable

Thermocouple Inputs

Types: T, E, J, K, R, S, B, N, linear mV, software selectable

Input Impedance: 20 MΩ, all types

Lead Resistance Effect: 0.25 μV/Ω

Cold-Junction Compensation: $<\pm 1^\circ\text{C}$

typical, ($\pm 1.5^\circ\text{C}$ max), error over 0 to 65°C (32 to 149°F) max ambient temperature range; defeated for linear mV indication mode

Resolution: 1° for all types, or 0.1° for T, E, J, K, and N only

Thermocouple Type	Display Range	Wire Color	
		ANSI	BS1843
T	-200 to 400°C -328 to 752°F	(+) Blue (-) Red	(+) White (-) Blue
E	-200 to 750°C -328 to 1382°F	(+) Violet (-) Red	(+) Brown (-) Blue
J	-200 to 760°C -328 to 1400°F	(+) White (-) Red	(+) Yellow (-) Blue
K	-200 to 1250°C -328 to 2282°F	(+) Yellow (-) Red	(+) Brown (-) Blue
R	0 to 1768°C 32 to 3214°F	(+) Black (-) Red	(+) White (-) Blue
S	0 to 1768°C 32 to 3214°F	(+) Black (-) Red	(+) White (-) Blue
B	149 to 1820°C 300 to 3308°F	(+) Grey (-) Red	No standard
N	-200 to 1300°C -328 to 2372°F	(+) Orange (-) Red	(+) Orange (-) Blue
mV	-5.00 to 56.00mV	No standard	No standard

RTD Type	Range
385	-200 to 600°C (-328 to 1100°F)
392	-200 to 600°C (-328 to 1100°F)
Ω	2.0 to 320.0 Ω

MOST POPULAR MODELS HIGHLIGHTED!

To Order (Specify Model Number)		
Model No.	Price	Description
Standard Power Models (85 to 250 Vac, 50 to 60 Hz)		
CN63500-R1-AL1	\$228	Single output, form "C" relay, 1 alarm
CN63500-R1-AL2	238	Single output, form "A" relay, 2 alarms
Low-Voltage Models (18 to 36 Vdc)		
CN63500-R1-AL1-LV	\$244	Single output, form "C", 1 alarm
CN63500-R1-AL2-LV	255	Single output form "A" relay, 2 alarms

Comes complete with operator's manual.

Ordering Examples: CN63500-R1 AL2, 85 to 250 Vac power, single-output relay, 2 alarms, \$238.

CN63500-R1-AL1-LV, 18 to 36 Vdc power single-output relay, 1 alarm, \$244.

Accessories (Field Installable)

Model No.	Price	Description
CN6-RBDLA210	\$63	Output module, single-output, form "C" relay, 1 alarm
CN6-48111	63	Output module, single-output, form "A" relay, 2 alarms
DPP-4	475	1/16 DIN panel punch
PE-1318	90	Reference Book: Practical Process Control





1/16 DIN Limit Controller

CN6221 Series
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\$195



- ✓ Dual Display
- ✓ Universal Input
- ✓ High or Low Limit
- ✓ Digital Input for Remote Reset
- ✓ RS485 Communications (Optional)
- ✓ Alarms (Optional)
- ✓ Retransmission Output (Optional)

The CN6221 Series is an FM approved limit controller that can be configured either as a high limit or as a low limit controller. The CN6221 features universal input, 2 alarm outputs, retransmission output, a timer to count the total time the setpoint is exceeded, and a register to retain the maximum. The RS485 communication interface is available as an option.

Specifications

Power Supply
Voltage: 100 to 240 Vac ($\pm 10\%$),
Frequency: 50 or 60 Hz

Maximum Power Consumption:
8 Va max (4 W max)

Memory: Non-volatile memory

Withstanding Voltage (Between Primary and Secondary Terminals): 1500 Vac for 1 min (see Note 1)

Insulation Resistance (Between Primary and Secondary Terminals): 20 M Ω or more at 500 Vdc (see Note 1)

Note 1: The primary terminals are the power supply terminals and relay output terminals. The secondary terminals are the analog input and output terminals, the voltage pulse output terminals, and the contact input terminals.

Contact Input

Function: Resetting "exceeded status"

Input: 1 point

Type: Non-voltage contact or transistor contact

Contact Capacity: At least 12V/10 mA

On/Off Judgment: On state for 1 k Ω or less; off state for 20 k Ω or greater

Measured Value (PV)

Input: 1 point

Type: Universal; selectable by software

Accuracy (At 23 $\pm 2^\circ\text{C}$ Ambient Temperature):

Thermocouple: $\pm 2^\circ\text{C} \pm 1$ digit

At -200 to -100°C : $\pm 4^\circ\text{C}$

At -100 to 0°C : $\pm 3^\circ\text{C}$

Types R and S: $\pm 5^\circ\text{C}$ [$\pm 9^\circ\text{C}$ for 0 to 500°C (32 to 932°F)]

Type B: $\pm 9^\circ\text{C}$ (accuracy is not guaranteed for 0 to 400°C)

RTD: $\pm 1^\circ\text{C} \pm 1$ digit

Voltage (mV, V): $\pm 0.3\% \pm 1$ digit

Sampling Period for Measured Value

Input: 500 ms

Burn-Out Detection: Functions for thermocouple or RTD input (burn-out upscale only; cannot be switched off)

Input Resistance: 1 M Ω or greater for thermocouple or DC mV inputs; approx 1 M Ω for DC V input

Maximum Allowable Signal Source

Resistance: 250 Ω for thermocouple or DC mV input; 2 k Ω for DC V input

Maximum Allowable Wiring

Resistance for RTD Input: 10 Ω /wire (resistance values of 3 wires must be the same)

Allowable Input Voltage: ± 10 Vdc for thermocouple or DC mV input; ± 20 Vdc for DC V input

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CN6221-R, \$195, shown smaller than actual size.

Noise Rejection Ratio:

Normal Mode Noise: Minimum 40 dB (50/60 Hz)

Common Mode Noise: Minimum 120 dB (90 dB for DC V input)

Reference Junction Error

Compensation: $\pm 1.5^\circ\text{C}$ (at 15 to 35°C), $\pm 2.0^\circ\text{C}$ (at 0 to 50°C)

Note: The reference junction compensation cannot be switched off

Applicable Standards: RTD, Thermocouple, JIS/IEC/DIN (ITS90)

Input Table

Input Type		Range ($^\circ\text{C}$)	Range ($^\circ\text{F}$)
Thermocouple	K	-270 to 1370	-300 to 2500
		0 to 600	32 to 999.9
		0 to 400	32 to 750
		-199.9 to 200	-300 to 400
	J	-199.9 to 999.9	-300 to 2100
	T	-199.9 to 400	-300 to 750
	E	-199.9 to 999.9	-300 to 1800
	R	0 to 1700	32 to 3100
	S	0 to 1700	32 to 3100
	B	0 to 1800	32 to 3200
	N	-200 to 1300	-300 to 2400
	L	-199.9 to 900	-300 to 1600
U	-199.9 to 400	-300 to 750	
Platinel 2		0 to 1390	32 to 2500
RTD	Pt100	-199.9 to 850	-199.9 to 999.9
		0 to 400	32 to 750
		-199.9 to 200	-300 to 400
		-19.9 to 99.9	-199.9 to 999.9
		-199.9 to 500	
DC Voltage	JPt100	0 to 100 mV	0 to 100
		0 to 5V	0 to 5
		1 to 5V	1 to 5
		0 to 10V	0 to 10



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Function: Resetting "exceeded status"

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Type: Universal; selectable by software

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RTD: $\pm 1^\circ\text{C} \pm 1$ digit

Voltage (mV, V): $\pm 0.3\% \pm 1$ digit

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Input: 500 ms

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	T	-199.9 to 400	-300 to 750
	E	-199.9 to 999.9	-300 to 1800
	R	0 to 1700	32 to 3100
	S	0 to 1700	32 to 3100
	B	0 to 1800	32 to 3200
	N	-200 to 1300	-300 to 2400
	L	-199.9 to 900	-300 to 1600
U	-199.9 to 400	-300 to 750	
Platinel 2		0 to 1390	32 to 2500
RTD	Pt100	-199.9 to 850	-199.9 to 999.9
		0 to 400	32 to 750
		-199.9 to 200	-300 to 400
		-19.9 to 99.9	-199.9 to 999.9
		-199.9 to 500	
DC Voltage	JPt100	0 to 100 mV	0 to 100
		0 to 5V	0 to 5
		1 to 5V	1 to 5
		0 to 10V	0 to 10



Control Output

Output: 1 point

Type: Relay contact

Contact Capacity: 3 A @ 240 Vac or 3 A @ 30 Vdc (with resistance load)

Note: The control output relay cannot be replaced by users.

Alarm Functions (Optional)

Alarm Types: 22 types (waiting action can be set by software): PV high-limit, PV low-limit, deviation high-limit, deviation low-limit, de-energized on deviation highlimit, deenergized on deviation low-limit, deviation high- and low-limits, high- and low-limits within deviation, de-energized on PV high-limit, de-energized on PV low-limit, fault diagnosis output, fail output

Alarm Output: 2 relay contacts

Relay Contact Capacity: 1 A @ 240 Vac or 1 A @ 30 Vdc (with resistance load)

Note: The alarm output relays cannot be replaced by users.

Retransmission Output (Optional)

The retransmission output is provided only when the "/RET" option is specified.

Output Signal: Measured value in 4 to 20 mA

Maximum Load Resistance: 600 Ω

Output Accuracy: $\pm 0.3\%$ of span (at $23 \pm 2^\circ\text{C}$ ambient temperature)

Communication Interface

Applicable Standards: Complies with EIA RS485

Number of Controllers: Up to 31

Maximum Communication Distance: 1200 m (3937')

Communication Method: 2-wire half-duplex, start-stop synchronization, non-procedural

Construction, Mounting, and Wiring Construction: Dust-proof and drip-proof front panel conforming to IP65; for side-by-side close installation, controller loses its dust-proof and drip-proof protection

Casing: ABS resin and polycarbonate

Case Color: Black

Mounting: Flush panel mounting

Environmental Conditions

Normal Operating Conditions

Warm-Up Time: At least 30 minutes

Ambient Temperature: 0 to 50°C (0 to 40°C when mounted side-by-side)

Rate of Change of Temperature: $10^\circ\text{C}/\text{h}$ or less

Ambient Humidity: 20 to 90% RH (no condensation allowed)

Magnetic Field: 400 A/m or less

Continuous Vibrations of 5 to 14 Hz: Amplitude of 1.2 mm or less

Continuous Vibrations of 14 to 150 Hz: 4.9 m/s^2 (0.5 G) or less

Short-Period Vibrations: 14.7 m/s^2 (1.5 G) for 15 seconds or less

Shock: 98 m/s^2 (10 G) for 11 ms or less

Mounting Angle: Upward incline of up to 30 degrees; no downward incline

Altitude: ≤ 2000 m above sea level

Maximum Effects from Operating Conditions

Temperature Effects

Thermocouple, mVdc and Vdc

Inputs: $\pm 2 \mu\text{V}/^\circ\text{C}$ or $\pm 0.02\%$ of FS/ $^\circ\text{C}$, whichever is the larger

Resistance Temperature

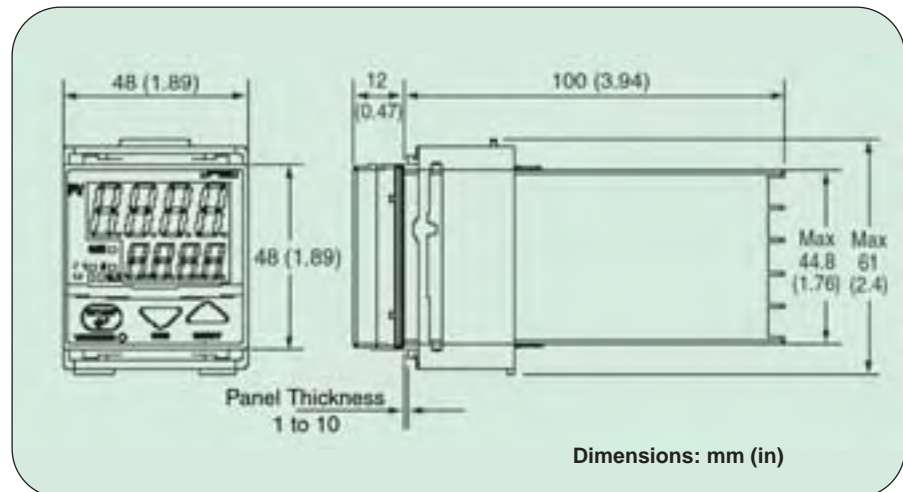
Detector: $\pm 0.05^\circ\text{C}/^\circ\text{C}$

Analog Output: $\pm 0.05\%$ of FS/ $^\circ\text{C}$

Effect from Fluctuation of Power Supply Voltage (Within Rated Voltage Range)

Analog Input: $\pm 0.2 \mu\text{V}/\text{V}$ or $\pm 0.002\%$ of FS/V, whichever is larger

Analog Output: $\pm 0.05\%$ of FS/V



AVAILABLE FOR FAST DELIVERY!

To Order (Specify Model Number)

Model No.	Price	Description
CN6221-R	\$195	Limit controller, single relay output

Options

Ordering Suffix	Add'l Price	Description
-AL	\$20	Dual alarms
-PV	40	4 to 20 mA retransmission output
-C4*	95	RS485 communications
-DI *	20	Digital input switching

* Only one option can be ordered.

Accessories (Field Installable)

Model No.	Price	Description
CNQUENCHARC	\$8	Noise suppression kit, 110 to 230 Vac
DPP-4	475	$\frac{1}{16}$ DIN panel punch
EE-1319	85	Reference Book: Grounding and Shielding Techniques

Comes complete with operator's manual.

Ordering Example: CN6221-R-C4, single output limit controller, mechanical relay, RS485 communications, \$290.

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