

# 1/32 DIN Temperature, Process and Strain PID Controllers



## CNi32 Series



CNi3233, smaller than actual size.

- ✓ **High Accuracy:  $\pm 0.03\%$  Reading,  $0.5^{\circ}\text{C}$  ( $\pm 0.9^{\circ}\text{F}$ )**
- ✓ **Totally Programmable Color Displays**
- ✓ **User-Friendly, Simple to Configure**
- ✓ **Free Software**
- ✓ **Full Autotune PID Control**
- ✓ **Universal Inputs: Thermocouple RTD, Process Voltage/Current, Strain**
- ✓ **RS232 and RS485 Serial Communications (Optional)**
- ✓ **Built-in Excitation**
- ✓ **Temperature Stability  $\pm 0.04^{\circ}\text{C}/^{\circ}\text{C}$  RTD and  $\pm 0.05^{\circ}\text{C}/^{\circ}\text{C}$  TC @  $25^{\circ}\text{C}$  ( $77^{\circ}\text{F}$ )**
- ✓ **NEMA 4 (IP65) Front Bezel**
- ✓ **2 Control or Alarm Outputs Optional: DC Pulse, Solid State Relays, Mechanical Relays, Analog Voltage and Current**
- ✓ **Front Removable and Plug Connectors**

The OMEGA™ CNI32 is the iSeries controller in the extremely compact and increasingly popular 1/32 DIN size (22.5 x 45 mm cutout). The CNI32 is the most sophisticated and accurate instrument available in the small 1/32 DIN package, yet is still easy to configure.

The CNI32 handles more thermocouple, RTD, process voltage and current inputs than any other 1/32 DIN controller.

The CNI32 is the first 1/32 DIN controller with built-in excitation for transmitters or other devices, 24 Vdc @ 25 mA.

The CNI32 has built-in excitation for bridge transducers, 5 Vdc @ 40 mA or 10 Vdc @ 60 mA. When communications options are installed, external excitation may be used and ratiometric operation maintained by connecting the external excitation to the sense leads. Both 4- or 6-wire bridge configurations are supported for internal or external excitation. Non-ratiometric operation is supported for voltage and current transducers

and is also valuable in measuring offset and millivolt output of bridge devices during manufacturing and calibration. This model also features 10-point linearization which allows the user to linearize the signal input from extremely nonlinear transducers of all kinds.

The CNI32 introduces a number of unique features not yet found on any other 1/32 DIN instrument. The CNI32 is the first 1/32 DIN controller with a totally programmable display that can change color between **GREEN**, **AMBER**, and **RED** at any setpoint or alarm point. The unique 9-segment LED characters greatly improves alphanumeric representations.

The CNI32 is the first 1/32 DIN controller offering 2 SPDT Form C relays, instead of the single throw relays on typical 1/32 DIN controllers.

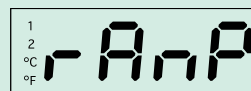
The CNI32 is the first to offer both RS232 and RS422/485 serial communications in 1 instrument (C24 option). The ASCII protocol is selectable from the menu.

The iSeries displays feature unique 9-segment LED characters, which greatly improves alphanumeric representations. The 7-segment LED characters found on most instruments are adequate for presenting numbers, but not letters.

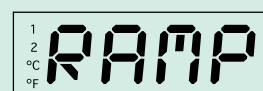
Words are easier to read with the unique 9-segment LED characters on the iSeries, which makes operating and programming simpler and easier.



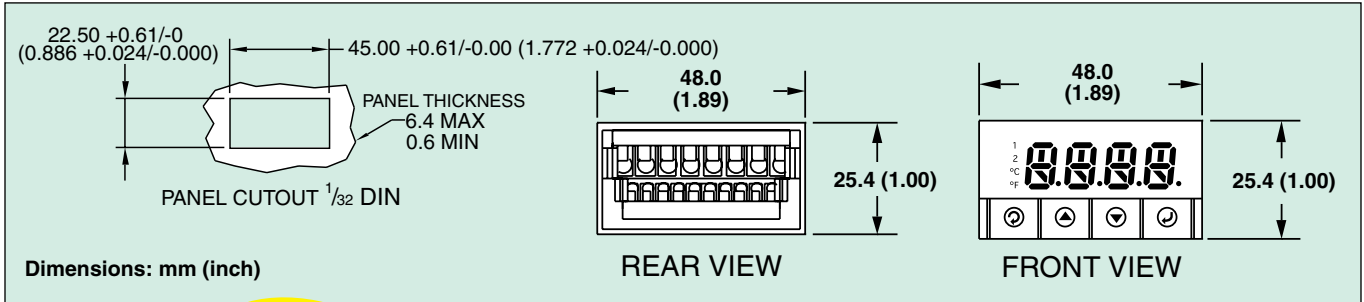
9-segment LED



7-segment display



9-segment display



**Panel punches available, visit OMEGA**

### Options

Suffix Ordering	Description
-AL	Limit alarm version (alarms only, no PID control) <sup>2</sup>
-SM	Simplified menu (on/off control or alarms, no PID) <sup>3</sup>
Network Options	
-C24	Isolated RS232 and RS485/422, 300 to 19.2 Kb <sup>1</sup>
Power Supply	
-DC	12 to 36 Vdc, 24 Vac <sup>1</sup>
Factory Setup	
-FS	Factory setup and configuration
-FS(RTD-1N)	Customized CNI <sub>S</sub> model for MIL-T-7990B nickel RTD input, 0 to 200°C (32 to 392°F)
-FS(RTD-2N)	Customized CNI <sub>S</sub> model for MIL-T-7990B nickel RTD input, -40 to 300°C (-40 to 572°F)
Software (Requires Network Option)	
Omega-Enterprise-Gateway	Logging/Alarming/Monitoring with Integration Capabilities

<sup>1</sup> Excitation not available with "-DC" or "-C24" options.

<sup>2</sup> "-AL" option not available on models with analog (option 5) output.

<sup>3</sup> "-SM" option not available on CNI<sub>S</sub> strain/process input models.

### To Order

Model No.	Output 1	Output 2
Temperature/Pressure Input		
CNI3222	0.5 A SSR	0.5 A SSR
CNI3223	0.5 A SSR	Relay
CNI3224	0.5 A SSR	DC pulse
CNI3233	Relay	Relay
CNI3242	DC pulse	0.5 A SSR
CNI3243	DC pulse	Relay
CNI3244	DC pulse	DC pulse
CNI3252	Analog	0.5 A SSR
CNI3253	Analog	Relay
CNI3254	Analog	DC pulse
Strain/Process Input		
CNiS3222	0.5 A SSR	0.5 A SSR
CNiS3223	0.5 A SSR	Relay
CNiS3224	0.5 A SSR	DC pulse
CNiS3233	Relay	Relay
CNiS3234	Relay	DC pulse
CNiS3242	DC pulse	0.5 A SSR
CNiS3243	DC pulse	Relay
CNiS3244	DC pulse	DC pulse
CNiS3252	Analog	0.5 A SSR
CNiS3253	Analog	Relay
CNiS3254	Analog	DC pulse

### Accessory

Model No.	Description
DPP-1	1/2 DIN panel punch
EIT-W-485	Industrial iServer Microserver™, serves 32 devices

Comes complete with DPI32-B-COVER and operator's manual.

**Ordering Examples:** CNI3222-C24, 1/2 DIN PID controller with 2 solid-state relays for PID control and serial communications, both RS232 and RS485.

CNiS322-AL, 1/2 DIN strain/process controller, limit alarm version with SSR output.

# Series Common Specifications (All i/8, i/16, i/32 DIN)

## Universal Temperature and Process Input (DPi/CNi Models)

**Accuracy:**  $\pm 0.5^{\circ}\text{C}$  temp; 0.03% rdg

**Resolution:**  $1^{\circ}/0.1^{\circ}$ ; 10  $\mu\text{V}$  process

### Temperature Stability:

**RTD:**  $0.04^{\circ}\text{C}/^{\circ}\text{C}$

**TC @  $25^{\circ}\text{C}$  ( $77^{\circ}\text{F}$ ):**  $0.05^{\circ}\text{C}/^{\circ}\text{C}$

**Cold Junction Compensation**

**Process:** 50 ppm/ $^{\circ}\text{C}$

**NMRR:** 60 dB

**CMRR:** 120 dB

**A/D Conversion:** Dual slope

**Reading Rate:** 3 samples/s

**Digital Filter:** Programmable

**Display:** 4-digit 9-segment LED  
10.2 mm (0.40"); i32, i16, i16D, i8DV  
21 mm (0.83"); i8 10.2 mm (0.40") and  
21 mm (0.83"); i8DH **RED, GREEN,**  
and **AMBER** programmable colors for  
process variable, setpoint and  
temperature units

**Input Types:** Thermocouple, RTD,  
analog voltage, analog current

**Thermocouple Lead Resistance:**  
100  $\Omega$  max

### Thermocouple Types (ITS 90):

J, K, T, E, R, S, B, C, N, L (J DIN)

**RTD Input (ITS 68):** 100/500/1000  $\Omega$   
Pt sensor, 2-, 3- or 4-wire; 0.00385 or  
0.00392 curve

**Voltage Input:** 0 to 100 mV, 0 to 1V,  
0 to 10 Vdc

**Input Impedance:** 10 M $\Omega$  for 100 mV  
1 M $\Omega$  for 1 or 10 Vdc

**Current Input:** 0 to 20 mA (5  $\Omega$  load)

**Configuration:** Single-ended

**Polarity:** Unipolar

**Step Response:** 0.7 sec for 99.9%

### Decimal Selection:

**Temperature:** None, 0.1

**Process:** None, 0.1, 0.01 or 0.001

### Setpoint Adjustment:

-1999 to 9999 counts

### Span Adjustment:

0.001 to 9999 counts

**Offset Adjustment:** -1999 to 9999

**Excitation (Not Included with  
Communication):** 24 Vdc @ 25 mA  
(not available for low-power option)

## Universal Strain and Process Input (DPiS/CNiS Models)

**Accuracy:** 0.03% reading

**Resolution:** 10/1 $\mu\text{V}$

**Temperature Stability:** 50 ppm/ $^{\circ}\text{C}$

**NMRR:** 60 dB

**CMRR:** 120 dB

**A/D Conversion:** Dual slope

**Reading Rate:** 3 samples/s

**Digital Filter:** Programmable

**Input Types:** Analog voltage and current

**Voltage Input:** 0 to 100 mVdc,  
-100 mVdc to 1 Vdc, 0 to 10 Vdc

**Input Impedance:** 10 M $\Omega$  for 100 mV;  
1 M $\Omega$  for 1V or 10 Vdc

**Current Input:** 0 to 20 mA (5  $\Omega$  load)

**Linearization Points:** Up to 10

**Configuration:** Single-ended

**Polarity:** Unipolar

**Step Response:** 0.7 sec for 99.9%

**Decimal Selection:** None, 0.1, 0.01  
or 0.001

### Setpoint Adjustment:

-1999 to 9999 counts

**Span Adjustment:** 0.001 to 9999 counts

**Offset Adjustment:** -1999 to 9999

**Excitation (Optional In Place Of  
Communication):** 5 Vdc @ 40 mA;  
10 Vdc @ 60 mA

## Control

**Action:** Reverse (heat) or direct (cool)

**Modes:** Time and amplitude proportional  
control; selectable manual or auto PID,  
proportional, proportional with integral,  
proportional with derivative and anti-reset  
Windup, and on/off

**Rate:** 0 to 399.9 s

**Reset:** 0 to 3999 s

**Cycle Time:** 1 to 199 s; set to 0 for on/off

**Gain:** 0.5 to 100% of span; setpoints 1 or 2

**Damping:** 0000 to 0008

**Soak:** 00.00 to 99.59 (HH:MM), or OFF

### Ramp to Setpoint:

00.00 to 99.59 (HH:MM), or OFF

**Auto Tune:** Operator initiated from  
front panel

## Control Output 1 and 2

**Relay:** 250 Vac or 30 Vdc @ 3 A (resistive  
load); configurable for on/off, PID and ramp  
and soak

**Output 1:** SPDT, can be configured as  
alarm 1 output

**Output 2:** SPDT, can be configured as  
alarm 2 output

**SSR:** 20 to 265 Vac @ 0.05 to 0.5 A  
(resistive load); continuous

**DC Pulse:** Non-isolated; 10 Vdc @ 20 mA

### Analog Output (Output 1 Only):

Non-isolated, proportional 0 to 10 Vdc or  
0 to 20 mA; 500  $\Omega$  max

### Output 3 Retransmission:

**Isolated Analog Voltage and Current**

**Current:** 10 V max @ 20 mA output

**Voltage:** 20 mA max for 0 to 10 V output

## Network and Communications

**Ethernet:** Standards compliance  
IEEE 802.3 10 Base-T

**Supported Protocols:**  
TCP/IP, ARP, HTTPGET

**RS232/RS422/RS485:** Selectable from  
menu; both ASCII and MODBUS protocol  
selectable from menu; programmable  
300 to 19.2 Kb; complete programmable  
setup capability; program to transmit  
current display, alarm status, min/max,  
actual measured input value and status

**RS485:** Addressable from 0 to 199

**Connection:** Screw terminals

## Alarm 1 and 2 (Programmable)

**Type:** Same as output 1 and 2

**Operation:** High/low, above/below,  
band, latch/unlatch, normally open/  
normally closed and process/deviation;  
front panel configurations

### Analog Output (Programmable):

Non-isolated, retransmission 0 to 10 Vdc  
or 0 to 20 mA, 500  $\Omega$  max (output 1 only);  
accuracy is  $\pm 1\%$  of FS when following  
conditions are satisfied: input is not scaled  
below 1% of input FS, analog output is not  
scaled below 3% of output FS

## General

**Power:** 90 to 240 Vac  $\pm 10\%$ , 50 to 400  
Hz\*, 110 to 300 Vdc, equivalent voltage

**Low Voltage Power Option:** 24 Vac\*\*,  
12 to 36 Vdc for DPi/CNi/DPiS/CNiS;  
20 to 36 Vdc for dual display, ethernet  
and isolated analog output from qualified  
safety approved source

## Isolation

**Power to Input/Output:** 2300 Vac  
per 1 minute test

**For Low Voltage Power Option:**

1500 Vac per 1 minute test

**Power to Relay/SSR Output:**

2300 Vac per 1 minute test

**Relay/SSR to Relay/SSR Output:**

2300 Vac per 1 minute test

**RS232/485 to Input/Output:**

500 Vac per 1 minute test

### Environmental Conditions:

**All Models:** 0 to  $55^{\circ}\text{C}$  (32 to  $131^{\circ}\text{F}$ )

90% RH non-condensing

### Dual Display Models:

0 to  $50^{\circ}\text{C}$  (32 to  $122^{\circ}\text{F}$ ), 90% RH

non-condensing (for UL only)

### Protection:

**DPi/CNi/DPiS/CNiS32,16,16D, 8C:**

NEMA 4X/Type 4 (IP65) front bezel

**DPi/CNi/DPiS/CNiS8, 8DH, 8DV:**

NEMA 1/Type 1 front bezel

**Approvals:** UL, C-UL, CE per

2014/35/EU

### Dimensions

**i/8 Series:** 48 H x 96 W x 127 mm D

(1.89 x 3.78 x 5")

**i/16 Series:** 48 H x 48 W x 127 mm D

(1.89 x 1.89 x 5")

**i/32 Series:** 25.4 H x 48 W x 127 mm D

(1.0 x 1.89 x 5")

### Panel Cutout

**i/8 Series:** 45 H x 92 mm W

(1.772 x 3.622"),  $\frac{1}{8}$  DIN

**i/16 Series:** 45 mm (1.772") square,

$\frac{1}{16}$  DIN

**i/32 Series:** 22.5 H x 45 mm W

(0.886 x 1.772"),  $\frac{1}{32}$  DIN

### Weight

**i/8 Series:** 295 g (0.65 lb)

**i/16 Series:** 159 g (0.35 lb)

**i/32 Series:** 127 g (0.28 lb)

\* No CE compliance above 60 Hz.

\*\* Units can be powered safely with 24 Vac  
power, but no certification for CE/UL are claimed.