1/32 DIN Temperature, Process and Strain PID Controllers

CNi32 Series

CNi3233, smaller than actual size.

- **High Accuracy: ±0.03% Reading, 0.5°C (±0.9°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 ±0.04°C/°C RTD and ±0.05°C/°C TC @ 25°C (77°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 CNiS32 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.

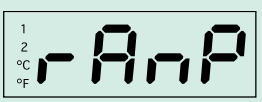
The CNi32 is the first 1/32 DIN controller offering 2 SPDT Form C relays, instead of the single throw relays on typical 1/32 DIN controllers.

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.

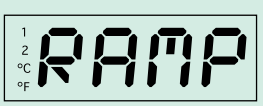
The **iSeries** displays feature unique 9-segment LED characters, which greatly improves alphanumeric representations. The 7-segment LED characters found on most instruments are adequate for presenting numbers, but not letters.

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

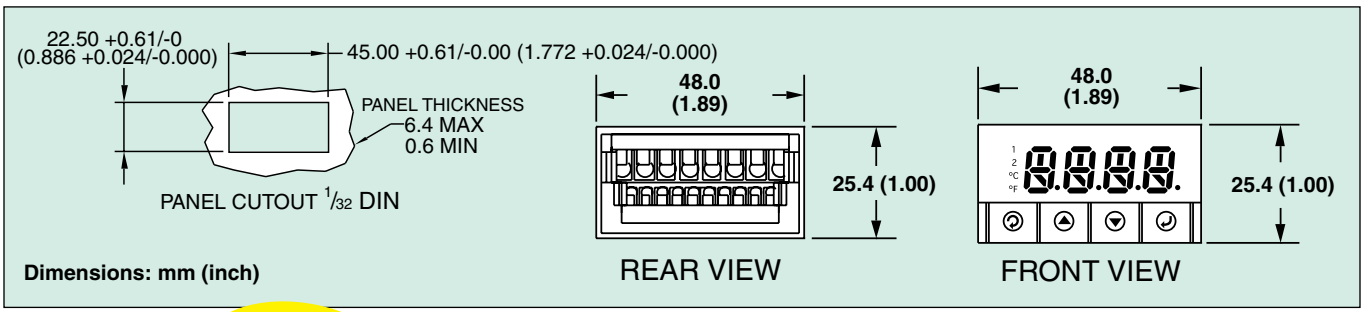


9-segment display

DPi32-B-COVER front panel button cover supplied with each unit, standard.

CNi3233, shown smaller than actual size.

CNi3244, shown smaller than actual size.



Dimensions: mm (inch)

Panel punches available, visit OMEGA

Options

Suffix Ordering	Description
-AL	Limit alarm version (alarms only, no PID control)[2]
-SM	Simplified menu (on/off control or alarms, no PID)[3]
Network Options	
-C24	Isolated RS232 and RS485/422, 300 to 19.2 Kb[1]
Power Supply	
-DC	12 to 36 Vdc, 24 Vac[1]
Factory Setup	
-FS	Factory setup and configuration
-FS(RTD-1N)	Customized CNiS model for MIL-T-7990B nickel RTD input, 0 to 200°C (32 to 392°F)
-FS(RTD-2N)	Customized CNiS 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

*[1] Excitation not available with "**-DC**" or "**-C24**" options.*
*[2] "**-AL**" option not available on models with analog (option 5) output.*
*[3] "**-SM**" option not available on CNiS 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	1/32 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,** 1/32 DIN PID controller with 2 solid-state relays for PID control and serial communications, both RS232 and RS485.*

***CNiS322-AL,** 1/32 DIN strain/process controller, limit alarm version with SSR output.*

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

Universal Temperature and Process Input (DPi/CNi Models)

Accuracy: ±0.5°C temp; 0.03% rdg

Resolution: 1°/0.1°; 10 µV process

Temperature Stability:

RTD: 0.04°C/°C

TC @ 25°C (77°F): 0.05°C/°C

Cold Junction Compensation

Process: 50 ppm/°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 Ω max

Thermocouple Types (ITS 90): J, K, T, E, R, S, B, C, N, L (J DIN)

RTD Input (ITS 68): 100/500/1000 Ω 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 MΩ for 100 mV 1 MΩ for 1 or 10 Vdc

Current Input: 0 to 20 mA (5 Ω 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: 10/1µV

Temperature Stability: 50 ppm/°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 MΩ for 100 mV; 1 MΩ for 1V or 10 Vdc

Current Input: 0 to 20 mA (5 Ω 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 Ω 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 Ω max (output 1 only); accuracy is ± 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 ±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°C (32 to 131°F) 90% RH non-condensing

Dual Display Models: 0 to 50°C (32 to 122°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, FM (temperature units only)

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"), ⅛ DIN

i/16 Series: 45 mm (1.772") square, ¼₁₆ DIN

i/32 Series: 22.5 H x 45 mm W (0.886 x 1.772"), ⅓₂ 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.*