

1/16 DIN Temperature, Process and Strain PID Controllers

OMEGA MONOGRAM®

iSeries

CNi16 Series



CNi1633 shown larger than actual size.



CNi16D33 shown larger than actual size.

- ✓ Universal Inputs
- ✓ High Accuracy: 0.5°C (±0.9°F), 0.03% Reading
- ✓ Totally Programmable Color Displays (Visual Alarms)
- ✓ User-Friendly, Simple to Configure
- ✓ Free Software Download
- ✓ Full Autotune PID Control
- ✓ Embedded Ethernet Connectivity Optional
- ✓ RS232 and RS485 Serial Communications Optional
- ✓ Built-In Excitation
- ✓ 2 Control or Alarm Outputs Optional: DC Pulse, Solid State Relays, Mechanical Relays, Analog Voltage and Current
- ✓ Output 3: Isolated Analog Voltage and Current Optional
- ✓ NEMA 4 (IP65) Front Bezel
- ✓ Temperature Stability: ±0.04°C/°C RTD and ±0.05°C/°C Thermocouple @ 25°C (77°F)
- ✓ Front Removable and Plug Connectors
- ✓ AC or DC Powered Units
- ✓ Ratiometric Mode for Strain Gages
- ✓ Programmable Digital Filter

The OMEGA® CNi16 is the popular 1/16 DIN size (48 mm²) controller. It is available with a single (model CNi16) or dual display (model CNi16D) that displays a setpoint along with the process value. The CNi16 display can be programmed to change color between **GREEN**, **AMBER**, and **RED** at any setpoint or alarm point. The CNi16 is the first 1/16 DIN controller with the option of both RS232 and RS485 in 1 instrument with straightforward OMEGA® ASCII protocol. And of

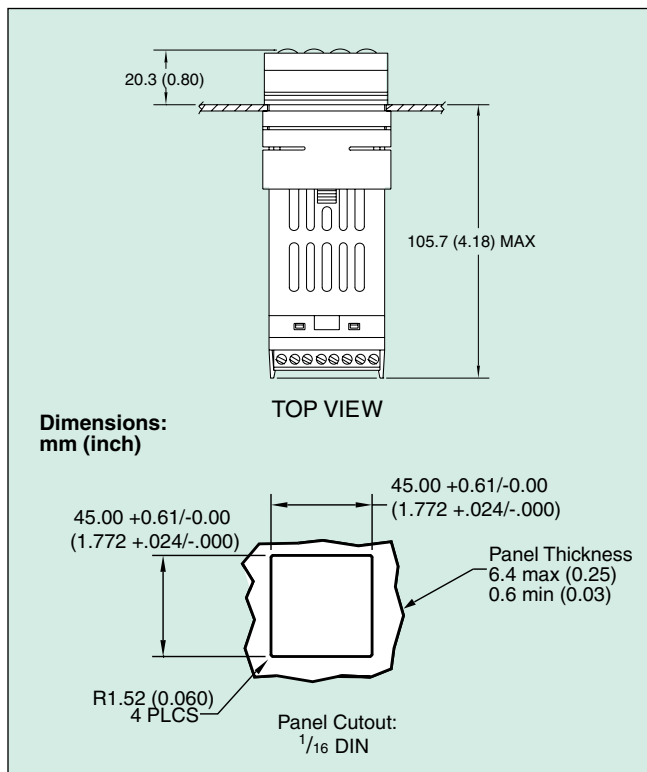
course the CNi16 is the first 1/16 DIN controller that can connect directly to an Ethernet network and features an embedded Web server. OMEGA® provides free configuration and data acquisition software downloaded off of the Web.

The CNi16 enclosure has a NEMA 4 (IP65) rated front bezel. The electronics are removable from the front panel.

Access Vital information Anytime, Anywhere, On the Internet!



1/16 DIN controller with embedded Web server, dual control outputs, dual display.



Options

Ordering Suffix	Description
-AL	Limit alarm version (alarms only, no PID control)*2*3*7
-SM	Simplified menu (on/off control or alarms, no PID)*5
Network Options	
-EIT	Ethernet with embedded Web server*1*6
-C24	Isolated RS232 and RS485/422, 300 to 19.2 Kb*2
-C4EIT	Ethernet with embedded Web server + isolated RS485/422 hub for up to 31 devices*1*2*6
Power Supply	
-DC	12 to 36 Vdc, 24 Vac*2*4
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)	
OPC-SERVER LICENSE	OPC server/driver software license

*1 Ethernet options are available for the CNI16D and CNiS16D controllers only.

*2 "-DC", "-C24", and "-C4EIT" not available with excitation.

*3 Analog output (option 5) is not available with "-AL" units or CNI16A models.

*4 20 to 36 Vdc for CNI16D, CNI16D-C4EIT, CNI16D-EIT and CNI16A.

*5 "-SM" option not available on CNiS16 or CNI16A models.

*6 Ethernet options are not available for CNI16A models.

*7 For CNI16A0x-AL: one alarm and one analog retransmission.

To Order

Model No.	Output 1	Output 2
Single Display with 2 Control Outputs		
CNI1633	Relay	Relay
CNI1644	DC pulse	DC pulse
CNI1643	DC pulse	Relay
CNI1642	DC pulse	0.5 A SSR
CNI1622	0.5 A SSR	0.5 A SSR
CNI1623	0.5 A SSR	Relay
CNI1624	0.5 A SSR	DC pulse
CNI1653	Analog	Relay
CNI1654	Analog	DC pulse
CNI1652	Analog	0.5 A SSR
Dual Display with 2 Control Outputs		
CNI16D33	Relay	Relay
CNI16D44	DC pulse	DC pulse
CNI16D43	DC pulse	Relay
CNI16D42	DC pulse	0.5 A SSR
CNI16D22	0.5 A SSR	0.5 A SSR
CNI16D23	0.5 A SSR	Relay
CNI16D24	0.5 A SSR	DC pulse
CNI16D53	Analog	Relay
CNI16D54	Analog	DC pulse
CNI16D52	Analog	0.5 A SSR
Single Display Strain/Process Input with 2 Control Outputs		
CNiS1633	Relay	Relay
CNiS1644	DC pulse	DC pulse
CNiS1643	DC pulse	Relay
CNiS1642	DC pulse	0.5 A SSR
CNiS1622	0.5 A SSR	0.5 A SSR
CNiS1623	0.5 A SSR	Relay
CNiS1624	0.5 A SSR	DC pulse
CNiS1653	Analog	Relay
CNiS1654	Analog	DC pulse
CNiS1652	Analog	0.5 A SSR
Single Display with 2 Control Outputs and Isolated Analog Output		
CNI16A33	Relay	Relay
CNI16A24	0.5 A SSR	DC pulse
CNI16A42	DC pulse	0.5 A SSR
CNI16A43	DC pulse	Relay
Dual Display Strain/Process Input with 2 Control Outputs		
CNiS16D33	Relay	Relay
CNiS16D44	DC pulse	DC pulse
CNiS16D43	DC pulse	Relay
CNiS16D42	DC pulse	0.5 A SSR
CNiS16D22	0.5 A SSR	0.5 A SSR
CNiS16D23	0.5 A SSR	Relay
CNiS16D24	0.5 A SSR	DC pulse
CNiS16D53	Analog	Relay
CNiS16D54	Analog	DC pulse
CNiS16D52	Analog	0.5 A SSR

Comes complete with operator's manual.

Ordering Examples: CNI1633, temperature/process controller, output 1 relay, output 2 relay single display, 90 to 240 Vac power. CNiS1643, strain/process controller, output 1 DC pulse, output 2 relay, single display, 90 to 240 Vac power.

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 μV process

Temperature Stability:

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

TC @ 25°C (77°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 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 M Ω for 100 mV
1 M Ω 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: 10/1 μV

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 Ω for 100 mV;

1 M Ω 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 $\pm 1\%$ 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°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"), $\frac{1}{8}$ 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.