

# 1/16 DIN Temperature, Process and Strain PID Controllers

OMEGA MONOGRAM®

## iSeries

### CNi16 Series



- ✓ 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



CNi1633 shown larger than actual size.



CNi16D33 shown larger than actual size.

The OMEGA® CNI16 is the popular 1/16 DIN size (48 mm<sup>2</sup>) 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

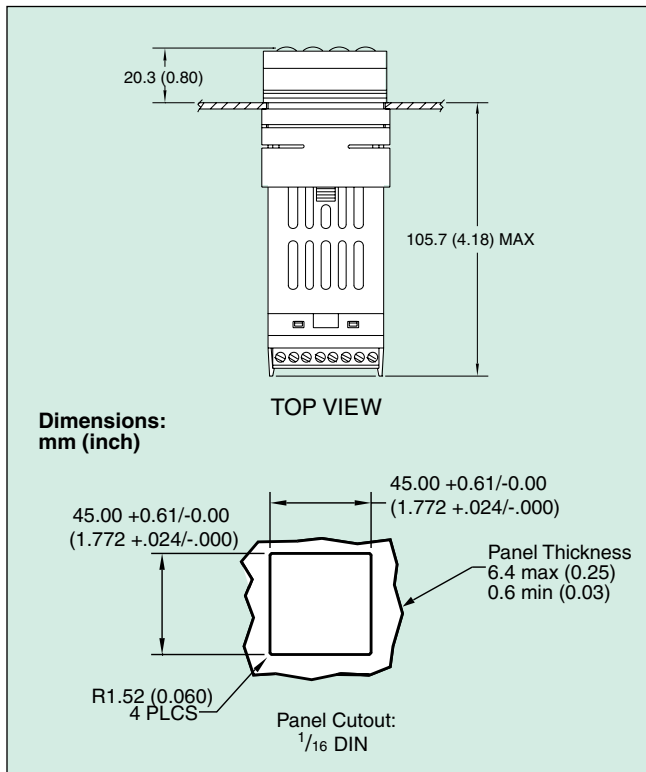
course the CNI16 is the first 1/16 DIN controller that can connect directly to an Ethernet network and features an embedded Web server. OMEGA® provides free configuration and data acquisition software downloaded off of the Web.

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
<b>-AL</b>	Limit alarm version (alarms only, no PID control) <sup>*2*3*7</sup>
<b>-SM</b>	Simplified menu (on/off control or alarms, no PID) <sup>*5</sup>
<b>Network Options</b>	
<b>-EIT</b>	Ethernet with embedded Web server <sup>*1*6</sup>
<b>-C24</b>	Isolated RS232 and RS485/422, 300 to 19.2 Kb <sup>*2</sup>
<b>-C4EIT</b>	Ethernet with embedded Web server + isolated RS485/422 hub for up to 31 devices <sup>*1*2*6</sup>
<b>Power Supply</b>	
<b>-DC</b>	12 to 36 Vdc, 24 Vac <sup>*2*4</sup>
<b>Factory Setup</b>	
<b>-FS</b>	Factory setup and configuration
<b>-FS(RTD-1N)</b>	Customized CNiS model for MIL-T-7990B nickel RTD input, 0 to 200°C (32 to 392°F)
<b>-FS(RTD-2N)</b>	Customized CNiS model for MIL-T-7990B nickel RTD input, -40 to 300°C (-40 to 572°F)
<b>Software (Requires Network Option)</b>	
<b>OPC-SERVER LICENSE</b>	OPC server/driver software license

<sup>\*1</sup> Ethernet options are available for the CNi16D and CNiS16D controllers only.

<sup>\*2</sup> "-DC", "-C24", and "-C4EIT" not available with excitation.

<sup>\*3</sup> Analog output (option 5) is not available with "-AL" units or CNi16A models.

<sup>\*4</sup> 20 to 36 Vdc for CNi16D, CNi16D-C4EIT, CNi16D-EIT and CNi16A.

<sup>\*5</sup> "-SM" option not available on CNiS16 or CNi16A models.

<sup>\*6</sup> Ethernet options are not available for CNi16A models.

<sup>\*7</sup> For CNi16A0x-AL: one alarm and one analog retransmission.

### To Order

Model No.	Output 1	Output 2
<b>Single Display with 2 Control Outputs</b>		
<b>CNi1633</b>	Relay	Relay
<b>CNi1644</b>	DC pulse	DC pulse
<b>CNi1643</b>	DC pulse	Relay
<b>CNi1642</b>	DC pulse	0.5 A SSR
<b>CNi1622</b>	0.5 A SSR	0.5 A SSR
<b>CNi1623</b>	0.5 A SSR	Relay
<b>CNi1624</b>	0.5 A SSR	DC pulse
<b>CNi1653</b>	Analog	Relay
<b>CNi1654</b>	Analog	DC pulse
<b>CNi1652</b>	Analog	0.5 A SSR
<b>Dual Display with 2 Control Outputs</b>		
<b>CNi16D33</b>	Relay	Relay
<b>CNi16D44</b>	DC pulse	DC pulse
<b>CNi16D43</b>	DC pulse	Relay
<b>CNi16D42</b>	DC pulse	0.5 A SSR
<b>CNi16D22</b>	0.5 A SSR	0.5 A SSR
<b>CNi16D23</b>	0.5 A SSR	Relay
<b>CNi16D24</b>	0.5 A SSR	DC pulse
<b>CNi16D53</b>	Analog	Relay
<b>CNi16D54</b>	Analog	DC pulse
<b>CNi16D52</b>	Analog	0.5 A SSR
<b>Single Display Strain/Process Input with 2 Control Outputs</b>		
<b>CNiS1633</b>	Relay	Relay
<b>CNiS1644</b>	DC pulse	DC pulse
<b>CNiS1643</b>	DC pulse	Relay
<b>CNiS1642</b>	DC pulse	0.5 A SSR
<b>CNiS1622</b>	0.5 A SSR	0.5 A SSR
<b>CNiS1623</b>	0.5 A SSR	Relay
<b>CNiS1624</b>	0.5 A SSR	DC pulse
<b>CNiS1653</b>	Analog	Relay
<b>CNiS1654</b>	Analog	DC pulse
<b>CNiS1652</b>	Analog	0.5 A SSR
<b>Single Display with 2 Control Outputs and Isolated Analog Output</b>		
<b>CNi16A33</b>	Relay	Relay
<b>CNi16A24</b>	0.5 A SSR	DC pulse
<b>CNi16A42</b>	DC pulse	0.5 A SSR
<b>CNi16A43</b>	DC pulse	Relay
<b>Dual Display Strain/Process Input with 2 Control Outputs</b>		
<b>CNiS16D33</b>	Relay	Relay
<b>CNiS16D44</b>	DC pulse	DC pulse
<b>CNiS16D43</b>	DC pulse	Relay
<b>CNiS16D42</b>	DC pulse	0.5 A SSR
<b>CNiS16D22</b>	0.5 A SSR	0.5 A SSR
<b>CNiS16D23</b>	0.5 A SSR	Relay
<b>CNiS16D24</b>	0.5 A SSR	DC pulse
<b>CNiS16D53</b>	Analog	Relay
<b>CNiS16D54</b>	Analog	DC pulse
<b>CNiS16D52</b>	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.

# iSeries 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.