¹⁄₁₆ DIN Temperature, Process and Strain PID Controllers

®ΩΕ MONOGRAM®

i.Series

CNi16 Series

5 YEAR WARRANTY **CE** **c(UL)us**

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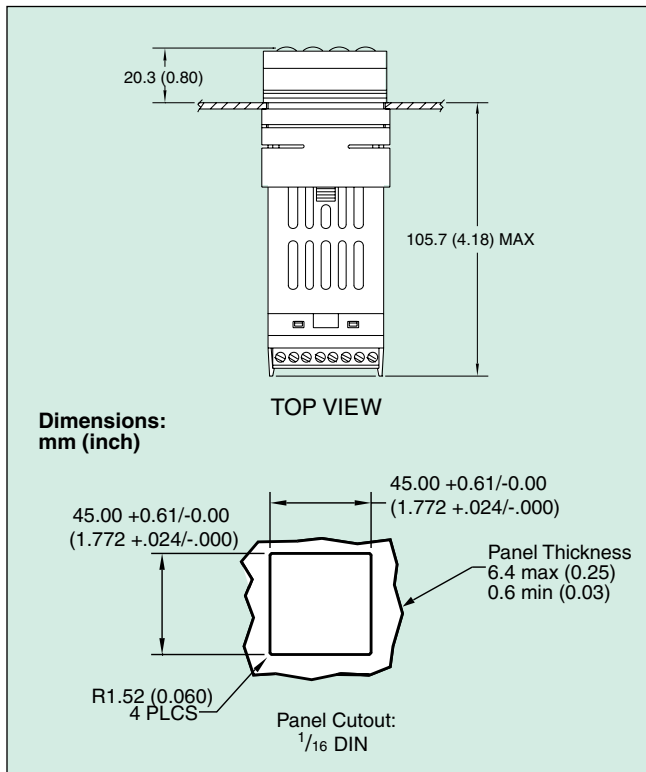rward OMEGA® ASCII protocol. And of course the CNi16 is the first ¹⁄₁₆ DIN controller that can connect directly to an Ethernet network and features an embedded Web server. OMEGA® provides free configuration and data acquisition software downloaded off of the Web.

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.**

Dimensions: mm (inch)

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20.3 (0.80)

TOP VIEW

105.7 (4.18) MAX
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45.00 +0.61/-0.00
(1.772 +.024/-.000)

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Panel Thickness
6.4 max (0.25)
0.6 min (0.03)

R1.52 (0.060)
4 PLCS

Panel Cutout:
$1/16$ DIN

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.

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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

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, ¹⁄₁₆ DIN
  i/32 Series: 22.5 H x 45 mm W (0.886 x 1.772"), 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.

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