

# 1/4 DIN Ramp/Soak Controller

CN2120-R1-R2,  
\$925, shown  
actual size.



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CN2120 Series  
Starts at  
**\$925**



- ✓ 200 Segments
- ✓ 90 Independent Programs
- ✓ 9 Linked Programs
- ✓ 11 Logic Inputs and 14 Digital Outputs
- ✓ Real Time Clock/Calendar Option
- ✓ Universal Inputs (TC, RTD, Linear)
- ✓ Wide Range of Outputs: Relay, DC Pulse, AC SSR, or Analog
- ✓ Special Control Functions: Output Linearization and Split Outputs
- ✓ Output Failure Detection
- ✓ NEMA 4X (IP65) Face Plate

The OMEGA® CN2120 ramp/soak controller is a fully functional controller with flexibility to meet many demanding control applications. The controller has many standard and special features that allow precise programming for any profile application.

#### Program:

The 200 segments can be used in up to 90 programs. These programs can be linked together or run separately. For each of the programs, it is possible to:

- Use up to 99 segments
- Set program repetitions
- At the end of program, either turn on an “end-of-program” digital output, turn off the control outputs, set the control output to a set value, or use the last set point of the program for control.
- Set up to 14 events
- Choose 1 of 5 PID groups/segment
- Choose 1 of 10 wait bands/segment

**Real Time Clock Option:** Allows for auto start program at specific time and on specific days.

#### Special Control Features:

The CN2120 provides special programming features that will

improve the control for some applications. The CN2120 has the capability of splitting the control output between 2 outputs in the “Split Range” feature. Another program feature allows use with quick opening and equal percentage type valves.

#### Digital Inputs:

Three digital inputs are standard on the CN2120 with options for up to 8 additional inputs. These inputs can be programmed to:

- Select between run/hold
- Abort a program
- Select a program
- Auto/manual selection
- Set output limit
- Reset alarm
- Reverse or direct control action

#### Digital Outputs:

Outputs 2, 3 and 4 can be used as digital outputs. In addition, options are available for 5 or 10 additional outputs. These outputs can be programmed as:

- Break event
- Timer event
- End-of-cycle annunciator
- Program in run, hold or wait state
- Controller in manual or auto state
- Error annunciation

## Display Indicators

- °C Process variable in degrees Centigrade.  
°F Process variable in degrees Fahrenheit.  
ST Flashing or lit, smart algorithm activated.  
RUN Lit when program is running, flashing when the time-out of the run function is complete.  
HLD Lit when program is stopped (hold mode), flashing when the time-out of hold function.  
PRG Lit in program mode, flashing during editing or testing of new program (2 digits above indicate program number).  
% Lit when the lower display shows control output value.  
SEG Lit in program mode, flashing when adding segment to a program (2 digits above indicate segment number).  
↗ Segment in progress is a ramp up, flashing slowly when fast forward in progress, flashing fast when fast backward in progress.  
→ Segment in progress is a soak, flashing slowly when fast forward in progress, flashing fast when fast backward in progress.  
↘ Segment in progress is a ramp down, flashing slowly when fast forward in progress, flashing fast when fast backward in progress.  
MAN Lit in manual mode.  
REM Lit when serial link enabled.  
RSP Lit when setpoint trim is used (auxiliary linear input).  
SPX Lit when setpoint from serial link is used.  
1 Lit when out 1 is on when programmed as control, alarm, or event output.  
2 Lit when out 2 is on when programmed as control, alarm, or event output.  
3 Lit when OUT 3 is on when programmed as a control, alarm, or event output.  
4 Lit when OUT 4 is on when programmed as a control, alarm, or event output.

IN1 to IN4  
OUT10 to OUT19

Digital inputs 1 to 4 are on.  
Digital outputs 10 to 19 are on.



OMEGACARE<sup>SM</sup> extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE<sup>SM</sup> covers parts, labor and equivalent loaners.

## Specifications

**Front Protection:** NEMA 4X (IP65) for indoor locations

**Installation:** Panel mounting

**Panel Cutout:** 92 x 92 mm (3.6 x 3.6")

**Dimensions:** 96 H x 96 W x 128 mm D (3.8 x 3.8 x 5")

**Weight:** 700 g (1.5 lb)

**Accuracy:** ± 0.2% fsv, @ 25°C and nominal power supply

**Sampling Time:** 125 ms for linear inputs; 250 ms for thermocouple or RTD

**Resolution:** 30000 counts

**Power Supply:** 100 to 240 Vac 50/60 Hz (from 10% to -15% of the nominal value) or 24 Vdc/Vac (10% of nominal value)

**Power Consumption:** 20 VA max

**Common Mode Rejection Ratio:** > 120 dB @ 50/60 Hz

**Normal Mode Rejection Ratio:** > 60 dB @ 50/60 Hz

**Electromagnetic Compatibility and Safety Requirements:** CE approved, conforming to council directives 89/336/EEC (reference harmonized standard EN 50081-2 EN 50082-2) and to council directives 73/23/EEC and 93/68/EEC (reference harmonized standard EN 61010-1)

**Operating Temperature:** 0 to 50°C (32 to 122°F)

**Storage Temperature:** -20 to 70°C (-4 to -122°F)

**Humidity:** 20% to 85% RH, non-condensing

## Measuring Input

### RTD Input:

**RTD Type:** Pt 100 Ω, 3-wire connection

**Calibration:** According to DIN 43760, = 0.00385

**Standard Ranges:** -200 to 850°C (-346 to 1562°F), -199.9 to 850°C (-330 to 1560°F) or -199.9 to 999.9°F

### Thermocouples:

**Burn Out:** Detection of open input circuit (wire or sensor) with underrange or overrange selectable indication

**Cold Junction:** Automatic compensation for an ambient temperature between 0 and 50°C (32 to 122°F)

**Cold Junction Compensation Error:** 0.1°C/°C

**Thermocouple Types:** B, C, D, E, G, L, J, K, N, Ni/NiMo, R, S, T, U

### Linear Inputs (mA and V):

**Input Linearization:** Programmable square root extraction

**Readout:** Keyboard programmable from -1999 to 9999

**Decimal Point:** Programmable in any position

**Input:** 0 to 20 mA, 4 to 20 mA; 0 to 60 mV, 12 to 60 mV; 0 to 5V, 0 to 10V, 2 to 10V

## Auxiliary Input (Optional):

**Function:** This input can be used as trim function, algebraically added between this value and the operative setpoint

**Scaling:** Programmable from -1999 to 9999

**Sampling Time:** 500 ms

**Accuracy:** ±0.2% FS ±1digit @ 25°C (76°F) and nominal power supply voltage

## Standard Range Tables

**Input:** 0 to 20 mA, 4 to 20 mA; 0 to 5V, 1 to 5V, 0 to 10V, 2 to 10V

## Outputs

**Types:** Supplied with up to 4 digital outputs (relay, DC pulse, AC SSR, or servomotor drive) and up to 2 linear outputs (mA)

### OUT 1- and 2-Relay:

SPDT, 3 A @ 250 Vac

### OUT 1- and 2-DC Pulse:

**Logic Level 1:** 14V @ 20 mA max, 24V @ 1 mA

### OUT 1- and 2-AC SSR:

Rating from 50 mA to 1 A, from 24 Vac to 250 Vac

**OUT 3- and 4-Relay:** SPST, 3 A @ 250 Vac on resistive load

### Analog Outputs:

Out 5 and 6  
**Output Type:** Isolated output programmable as: 0 to 20 mA, 4 to 20 mA

**Scaling:** Programmable from -1999 to 9999

**Maximum Load:** 600 W

## Control Action

**Algorithm:** PID + SMART

### Types:

- 1 control output (digital or analog output)
- 1 control output split into 2 outputs (split range)
- 2 control outputs

The outputs can be freely selected among analog, digital or servo

### Digital Output Types:

Relay, AC SSR, or DC pulse

**Analog Output Type:** Linear (20 mA)

**Servomotor Output:** 2 relays interlocked

**Proportional Band:** Programmable from 0.5% to 999.0% of the input span; setting a PB equal to 0 changes the control action to on/off

### Hysteresis (For On/Off Control Action):

Programmable from 0.1% to 10.0% of the input span

**Integral Time:** Programmable from 1 second to 20 minutes or excluded

**Derivative Time:** Programmable from 1 second to 10 minutes or excluded

**Integral Preload:** Programmable

- For 1 control output, from 0 to 100% of the output range
- For 2 control outputs, from -100% to 100% of the heating/cooling output range

### Main Output Cycle Time:

1 to 200 seconds

### Output Cycle Time:

1 to 200 seconds

### Relative Secondary Output Gain:

Programmable from 0.20 to 2.00 referred to proportional band

**Overlap/Dead Band:** Programmable, -20% (dead band) to 50% (overlap) of the proportional band

**Output Limiters:** For main and/or secondary control outputs it is possible to set:

- Output high limits
- Output low limits
- Output max rate of rise

**Auto/Manual Mode:** Selectable by front pushbutton or logic input

### Alarms

**Alarm Action:** Direct or reverse function programmable

**Alarm Functions:** Each alarm can be configured as process alarm, band alarm, deviation alarm or process alarm on the output value

**Alarm Reset:** Automatic or manual reset programmable for each alarm

**Alarm Masking:** Each alarm can be configured as masked alarm or standard alarm; this function ignores alarm conditions at startup and after setpoint change until the controller reaches setpoint the first time

### Output Failure Detection:

#### Model CN2121

The models equipped with this feature are able to measure, by means of a CT, load current of 1 control output:



CN2120-R1-R2, \$925, shown smaller than actual size.

- During output “on”, the control measures load current and generates an alarm condition when this current is lower than a pre-programmed threshold value (a low current shows a partial or total break down of the load or of the actuator)
- During output “off”, the control measures leakage current through the load and it generates an alarm condition when this current is higher than a pre-programmed threshold value (a high-leakage current shows a short circuit of the actuator or SCR)

**Input Range:** 50 mA

**Scaling:** Programmable from 10 to 100 A (with 1 A step)

### Active Period:

- For Relay Output: NO or NC programmable
- For DC Pulse Output: Logic level 1 or 0

**Servomotor Output Type:** 2 relays interlocked (out 3 and 4)

### Servomotor Output Type:

- Closed loop
- Open loop with valve position indication only
- Open loop without valve position indication

### Feedback Potentiometer Input:

100 to 10 kΩ

### Servomotor Travel Time:

12 seconds to 3 minutes

**Servomotor Dead Band:** 1 to 50% of the feedback span or of the valve travel time

### Serial Interface:

**Type:** RS485 isolated

**Protocol Type:** MODBUS®, JBUS

**Baud Rate:** Programmable from 600 to 19200 KB

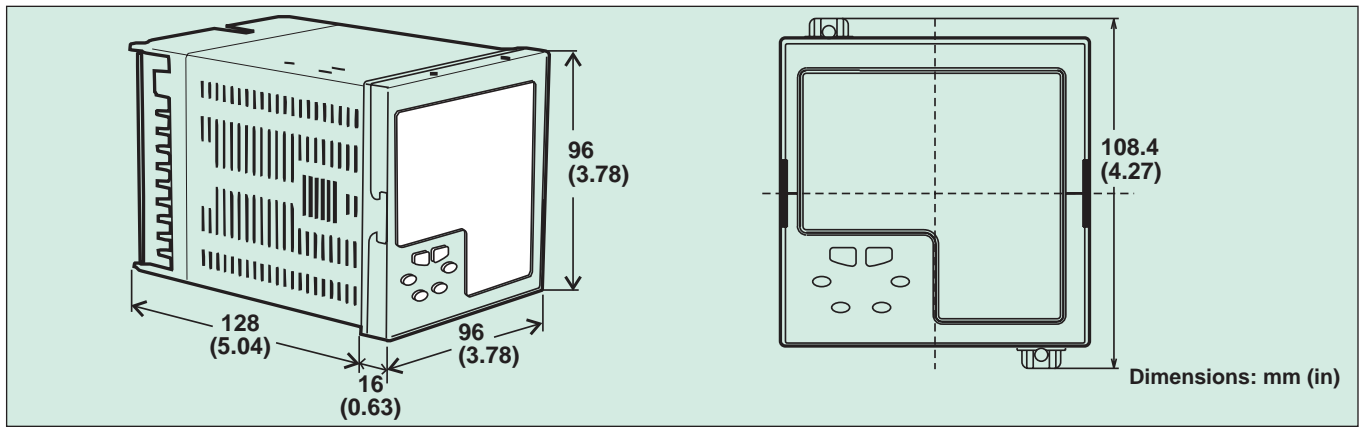
**Address:** 1 to 255

### Auxiliary Power Supply Type:

24 Vdc ± 20% not isolated

**Max Current:** 25 mA

Thermocouple Type	Range °C	Range °F
<b>B</b> PT-30% RH/PT-6% RH	0 to 1820	32 to 3300
<b>C</b> 5% RE-W/ 26% RE-W	0 to 2300	32 to 4170
<b>D</b> W3-RE/W25-RE	0 to 2300	32 to 4170
<b>E</b> CHROMEGA®-Constantan	-100 to 800	-150 to 1470
<b>G</b> W/W26-RE	0 to 2300	0 to 4170
<b>L</b> J DIN	-100 to 900	-150 to 1650
<b>J</b> Iron-Constantan	-100 to 1000	-150 to 1830
<b>K</b> CHROMEGA®-ALOMEGA®	-100 to 1370	-150 to 2500
<b>N</b> OMEGA-P, OMEGA-N	-100 to 1400	-150 to 2550
<b>Ni/NiMo</b> PT-13%	0 to 1200	32 to 2190
<b>R</b> PT-13% RH-PT	-50 to 1760	-60 to 3200
<b>S</b> PT/10% RH-PT	-50 to 1760	-60 to 3200
<b>T</b> Copper-Constantan	-200 to 400	-330 to 750
<b>U</b> T DIN	-200 to 600	-330 to 1110



**MOST POPULAR MODELS HIGHLIGHTED!**

<b>To Order (Specify Model Number)</b>		
Model Number	Price	Description
CN2120-(*)-(*)	\$925	Ramp/soak profile controller
CN2121-(*)-(*)	975	Ramp/soak profile controller with output failure detection or potentiometer feedback (field selectable)

**Outputs 1 and 2 (Insert Suffix)**

Suffix	Add'l Cost	Control, Alarm, or Event Assignable	
		Output 1	Output 2
-R1-R2	N/A	Relay	Relay
-T1-T1	N/A	AC SSR	AC SSR
-DC1-R2	N/A	DC pulse	Relay
-DC1-DC2	N/A	DC pulse	DC pulse

*Note: Outputs 3 and 4 are standard relay/relay, and are jumper selectable for control, alarm, event or servomotor output.*

**Option**

Suffix	Add'l Cost	Analog Control or Retransmit	
		Output 5	Output 6
-F5-F6	\$150	0 to 20, 4 to 20 mA	0 to 20, 4 to 20 mA
<b>Power Supply Option</b>			
-LV	\$60	24 Vac/Vdc power	

**Options (Only 1 Option Available per Unit)**

Suffix	Add'l Cost	Description
-A2	\$125	RS485, auxiliary power supply
-A4	150	RS485, auxiliary power supply, clock
-A6	225	RS485, auxiliary power supply, 4 logic inputs, 5 digital outputs
-A7	350	RS485, auxiliary power supply, 8 logic inputs, 10 digital outputs
-A8	300	RS485, auxiliary power supply, 4 logic inputs, 5 digital outputs, clock
-A9	400	RS485, auxiliary power supply, 8 logic inputs, 10 digital outputs, clock

*Comes complete with operator's manual.*

**Ordering Examples:** CN2120-R1-R2, profile controller with output 1 relay, output 2 relay, \$925.

OCW-2, OMEGACARE<sup>SM</sup> extends standard 3-year warranty to a total of 5 years (\$166), \$925 + 166 = \$1091.

CN2120-DC1-DC2, profile controller with output 1 DC pulse, output 2 DC pulse, \$925.

**Accessories**

Model No.	Price	Description
2120X-CT10	\$40	Current transformer for 0 to 10 A load current (CN2121 only)
2120X-CT25	40	Current transformer for 0 to 25 A load current (CN2121 only)
2120X-CT50	40	Current transformer for 0 to 50 A load current (CN2121 only)
2120X-CT100	40	Current transformer for 0 to 100 A load current (CN2121 only)
CN3200-SOFT-WIN2	400	Software for communications option, Windows version
CNQUENCHARC	8	Noise suppression RC snubber (2 leads), 110 to 230 Vac

Recommended Reference Book: Controller Tuning PID, GE-2117, \$25.  
See Section Y For Additional Books





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