The new OMEGA® CT1000A microprocessor-based circular recorder offers a wide range of measurement and control capabilities. The recorder is available as a one-, two-, or three-channel recorder offering up to 12 output relays allocated to six setpoints which in turn can be allocated to any channel or channels. The unit can be supplied for flow indication and recording with totalization on up to three channels. Flow indication and recording with totalization on all channels is also available. Each channel has two totalizers, one of which can be used for a batch total resettable from the front panel, and displayed in sequence with flow rate. The other is used for display of a secure total accessible only by operating the appropriate channel select buttons.

**Specifications**

**Inputs**

- **No. of Inputs:** 1, 2, or 3
- **Input Impedance:**
  - Millivolt inputs >10 Ω
  - Voltage inputs 500 Ω
  - Current inputs 10 Ω
- **Temperature:**
  - Thermocouple: 1700°C (3090°F) max.
  - Resistance thermometer: 600°C (1000°F) max.
  - Minimum span 100°C (180°F)
  - Resistance thermometer: 600°C (1000°F) max.
  - Minimum span 50°C (90°F)

**Cold Junction:** Automatic cold junction compensation (ACJC) fitted

**Model CT1000A**

**Price:** $1525

**Base Unit**
Circular Recorders
Wide Range of Measurement and Control Capabilities

Linearization: Programmable for all inputs. State whether linear, square root, power 2/3, 2/5 law, or type of thermocouple or RTD.

Broken Sensor Protection: Programmable, upscale or downscale drive or none (not available on mA and V inputs).

Filter Time: Programmable from 0 to 60 sec in 1-sec steps.

Event Marker: Voltage free contacts or 0-5 V logic level.

Change of Input Mode: By repositioning plug-in link.

Change of Input Range/Scan: Programmable.

Program Modification: By user-operated membrane switches above chart.

Floating Inputs-Isolation: 2.5 Vdc max between channels upon removal of terminal block links.

Insulation, Inputs to Ground: 500 Vdc.

Interference Suppression (based on 0-1000 mV range input): Radiated (r.f.): F.S. <±2% over range 20 MHz to 1000 MHz at field strength of 5 V.

Line Interruption: <100 msec loss, no effect, >110 ms loss instrument returns to operation after automatic reset.

Line Interference: <500 V input, pulse width up to 125 µs, no effect.

Common Mode: <1% span error max for 250 V rms 50 Hz.

Series Mode: <1% span error for 200% span, 50 Hz.

Outputs and Setpoints

No. of Setpoints: Up to two setpoints per channel.

Setpoint Adjustment: Programmable.

No. of Relays: Up to two per channel.

Relay Contacts: Single pole changeover.

Voltage: 250 Vac, 250 Vdc max.

Current: 5 Aac, 5 Adc max.

Loading (non-inductive): 1250 VA, 50 W max.

Insulation, Contacts to Ground: 2 kV rms.

Relay Action (programmable): Energized above (EA) setpoint or energized below (EB) setpoint, 3 state or latching; external counter drive option (module 5) 50 msec pulse 24 V max current 150 mA.

Analog Outputs

Output module (module 8) is isolated and includes a relay. The maximum isolation voltage is 1000 V between input and output.

Retransmission: Programmable min (zero) and max (full scale) values from 0-20 mA in 0.1 mA steps, up to 20 mA into 1 kΩ max.

Control: P, PI or PID.

Analog Output: Up to 20 mA at 15 V; channel 1 reverse or direct.

Analog Controller Output: Up to 20 mA 1 kΩ max (reverse or direct).

Time Proportioning Controller Action: Time proportioning, reverse or direct programmable.

Time Proportioning Cycle Time: 5 to 60 sec, programmable in 1 sec steps.

Proportional Band: 2 to 500%, programmable in 1% steps.

Integral Action Time: 1 to 1800 sec, programmable in 1 sec steps and OFF.

Derivative Action Time: 0 to 600 sec, programmable in 1 sec steps and OFF.

Approach Band: 0.1 to 3.0 proportional bands, programmable in 0.1 steps.

Setpoint Change: No erroneous generation of derivative response.

Accuracy: ±0.25% span max for all zero-based ranges within permitted limits. Ref. conditions 20°C (68°F) and 115 V or 230 V apply.

Linearizer Accuracy: ±0.1°C typical.

Resolution

Measurement: mV, V, mA, TC.

Ranges: 0.1% span, for all zero-based ranges within permitted limits.

R/T: 0.06 Ω.

Pen: ≤0.13% full scale travel.

Display: ±1 digit.

Pens Response Time: 6 sec for 10% to 90% typical. Input signals can be averaged over a 0 to 60 sec (filter) time, programmable in 1 sec steps.

Ramp/Soak Option: Allows four "menus"; each menu can contain up to 30 segments that can be split into 1 to 9 profiles.

Solid State Relay Option (Module J): Provides two solid state switching 24 Vdc at 30 mA drive outputs used to drive externally mounted solid state relays.

Isolated Input Option (Module K): Provides up to 2 kV isolation channel-to-channel and channel-to-ground. Up to two allowed, position 2 for channel 2 and/or position 3 for channel 3.

Displays and Records

Display: 20 character, dot matrix vacuum fluorescent with blue filter.

Process variable 4 digit.

Programming: Up, down scroll switches above chart.

Chart: Circular with linear graduations.

Chart Speed: 1 rev per hour up to 1 rev per week (168 hr), programmable in 1-hour steps.

Pens: Red: channel 1; Green: channel 2; Blue: channel 3, disposable.

Event Pen: Pen 3, 3 positions: center, off, at chart rim. Time line coincident with pen 1; contact closure or 0-5 V logic.
Microprocessor-Based Circular Recorders

Flow Input Version
General
Flow Total: Programmable ON or OFF
Count Rate Zero: Programmable from 0 to 0.999 in 0.001 pps steps then 1.0 to 9.99 in 0.01 steps
Count Rate Cut Off: Totalization can be stopped if flow rate falls below preset value. Preset value adjustable over full span
Count Rate Full Scale: Programmable from 0.001 to 0.999 then 1.00 to 10.00 pps

Analog Inputs
Mathematical Function Accuracy
\( x^{1/2} \) 0 to 100\% 0.1\% of reading
\( x^{3/2} \) 7 to 100\% 0.2\% of reading
\( x^{5/2} \) 18 to 100\% 0.3\% of reading
Below these values, the error increases asymptotically as input approaches zero

Frequency Inputs:
Module C accuracy \( \pm 0.1\% \) or 1 digit, whichever is greater for zero-based ranges

High Level Input:
Frequency Range: Between 0-0.1 Hz and 0-4 kHz
a. TTL level square wave
b. Open collector to accept current level 2 mA at 5 V
c. Volt free contacts to accept current level 2 mA at 5 V
d. Voltage square wave. When the peak value lies between 2 V and +50 and the trough value lies between −50 V and 1 V

Low Level Inputs:
a. Vortex and Electromagnetic Flowmeters:
   Amplitude: 4 mA or greater square wave, with an offset up to 20 mA, 0-4 mA, 16-20 mA or 4-20 mA
   Volt drop: Maximum 2 V at 20 mA
   Frequency Range: 0.1 Hz to 4 kHz
b. Turbine and Rotary Shunt Meters
   Amplitude: 1 mV/Hz
   Frequency Range: 3 Hz to 4 kHz
c. General Purpose ac Coupled Amplitude:
   Fixed or variable between the limits of 5 mV peak to peak to 50 V peak to peak
   Frequency Range: 3 Hz to 4 kHz on inputs where the amplitude is proportional to frequency, automatic variable gain (maximum sensitivity 1 mV/Hz) can be achieved by link positioning
d. General Purpose dc Coupled Frequency Range: 0.1 Hz to 4 kHz

Physical Specifications Power Voltage Requirements: 110 V (min 93 V, max 127 V), or 230 V (min 195 V, max 265 V), 50 or 60 Hz Alternatively 10 to 30 Vdc
Power Requirements: <28 VA
Warm-up Time: approx. 10 s
Error Due to Power Supply Voltage Fluctuation: ±0.1\% span for ±15\% fluctuation
Insulation:
Mains to ground 2 kV rms
Transmitter Power Supply
Output Voltage: 25 V ±0.5 V at 0 or 60 mA (loaded with 3 transmitters)
Output Ripple: 100 mV peak to peak max.
Load Regulation: ±0.1 V for output change 4-20 mA
Output Voltage Variation with Supply Voltage: ±1 V for ±15% supply voltage
Environmental Data
Operating Temperature Limits:
0 to 55°C (32 to 130°F)
Operating Humidity Limits:
0 to 80% RH (paper and ink system, 0 to 95% RH electronics)
Error Due to Ambient Temperature Variation
(unsuppressed ranges): ±0.02% span/°C typical

Range Limits

<table>
<thead>
<tr>
<th>Electrical Input Type</th>
<th>Min. Start Value</th>
<th>Min. Span</th>
<th>Max. Span &amp; Range Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>mV</td>
<td>-999</td>
<td>5.00</td>
<td>1000</td>
</tr>
<tr>
<td>V</td>
<td>-20.0</td>
<td>0.50</td>
<td>20.0</td>
</tr>
<tr>
<td>mA</td>
<td>-99.9</td>
<td>0.50</td>
<td>100.0</td>
</tr>
<tr>
<td>J T/C*</td>
<td>-100°C (-148°F)</td>
<td>100°C (180°F)</td>
<td>900°C (1620°F)</td>
</tr>
<tr>
<td>K T/C*</td>
<td>-100°C (-148°F)</td>
<td>150°C (270°F)</td>
<td>1300°C (2340°F)</td>
</tr>
<tr>
<td>R, S T/C*</td>
<td>-15°C (5°F)</td>
<td>600°C (1080°F)</td>
<td>1700°C (3060°F)</td>
</tr>
<tr>
<td>T/C</td>
<td>-250°C (-418°F)</td>
<td>170°C (306°F)</td>
<td>300°C (540°F)</td>
</tr>
<tr>
<td>E T/C*</td>
<td>-100°C (-148°F)</td>
<td>100°C (180°F)</td>
<td>900°C (1620°F)</td>
</tr>
<tr>
<td>B T/C*</td>
<td>-18°C (0°F)</td>
<td>1100°C (1980°F)</td>
<td>1800°C (3240°F)</td>
</tr>
<tr>
<td>N T/C*</td>
<td>-200°C (-328°F)</td>
<td>180°C (324°F)</td>
<td>1300°C (2340°F)</td>
</tr>
<tr>
<td>RTD*</td>
<td>-200°C (-328°F)</td>
<td>50°C (90°F)</td>
<td>600°C (1080°F)</td>
</tr>
</tbody>
</table>

*Temperature inputs are °C/°F switchable

To Order (Specify Model Number)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Price</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT1100A</td>
<td>$1525</td>
<td>1-pen recorder, base unit</td>
</tr>
<tr>
<td>CT1200A</td>
<td>1875</td>
<td>2-pen recorder, base unit</td>
</tr>
<tr>
<td>CT1300A</td>
<td>2250</td>
<td>3-pen recorder, base unit</td>
</tr>
<tr>
<td>CT1205A-MB</td>
<td>2725</td>
<td>2-pen recorder, 1 analog, 1 event</td>
</tr>
<tr>
<td>CT1205A-MB</td>
<td>2925</td>
<td>3-pen recorder, 1 analog, 1 event</td>
</tr>
</tbody>
</table>

Each unit comes complete with one package of chart paper, pen(s), and complete operator’s manual.
For options, see table at right.

Ordering Example: CT1140A-M8 is a one-pen recorder with control option, analog output and relay, + CT1000-RED, extra pens for channel 1 and CT-1000C-100/7, pkg. of 500 charts, $1525 + 475 + 325 + 250 = $2475

Options for Base Units
Options can be added to the base units by changing the third and/or fourth (i.e.: last two) digits in the part number and adding the appropriate modules and prices.
1) Flow option: change the third digit in the model number to a “5” and add $255 to base price. No modules required. Example: CT1150A is a 1-pen unit with flow option, $1525 + 255 = $1780
2) Control option (supports control on channel 1 and/or 2): change the third digit in the model number to a “4” and add $475 to base price. This option also requires you to purchase additional module(s) for the required output(s). Example: CT1240A-M8-M8 is a two-pen recorder with control option on both channels and two isolated analog outputs, $1875 + 475 + 325 + 325 = $3000
3) Ramp/soak control option (supports control on channel 1 and/or 2): change the third and fourth digits to “44” and add $1030 to base price. This option also requires you to purchase additional modules for the required output(s). Example: CT1244A-M8-M8 is a two-pen recorder with ramp/soak control option and one isolated analog output (control on 1 channel), $1875 + 1030 + 325 + 325 = $3480

Model No. | Price | Description |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CT1000A-M1</td>
<td>$240</td>
<td>Single relay modules</td>
</tr>
<tr>
<td>CT1000A-M2</td>
<td>480</td>
<td>Dual relay modules</td>
</tr>
<tr>
<td>CT1000A-MA</td>
<td>400</td>
<td>Transmitter power supply module</td>
</tr>
</tbody>
</table>

Note: Up to six I/O modules can be installed. The -M1, -M2 and -MA modules can be installed and ordered as CT1000A-M1, etc. Other modules may require options added to base recorder.

Mechanical Data
Mounting: Wall or panel by 3 brackets (supplied)
Dimensions:
360 H x 370 W x 170 mm D (14.18 x 14.58 x 6.7”)
Panel Cutout:
342 H x 348 mm W (13.5 H x 13.7” W)
Panel Space Requirement:
410 W x 400 H x 150 mm D (16.15 x 15.76 x 5.9”)
Case and Door:
Sheet steel case with hinged chart plate.
Foam-molded door with glass window (polycarbonate available as special order)
Weight: 10.5 kg (23.2 lb) approx.

Accessories
Remember to Purchase Extra Pens and Paper!

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Price</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT-1000-RED</td>
<td>$19</td>
<td>5 red pens, channel 1</td>
</tr>
<tr>
<td>CT-1000-GREEN</td>
<td>19</td>
<td>5 green pens, channel 2</td>
</tr>
<tr>
<td>CT-1000-BLUE</td>
<td>19</td>
<td>5 blue pens, channel 3</td>
</tr>
<tr>
<td>CT-1000C-100/7</td>
<td>140</td>
<td>500 charts, 0-100 range, 7 day</td>
</tr>
<tr>
<td>CT-1000C-100/24</td>
<td>140</td>
<td>500 charts, 0-100 range, 24 hr</td>
</tr>
<tr>
<td>CT-1000C-0-100/8HRS</td>
<td>140</td>
<td>500 charts, 0-100 range, 8 hr</td>
</tr>
<tr>
<td>CT-1000C-0-14PH/24HRS</td>
<td>140</td>
<td>500 charts, 0-14 range, 24 hr</td>
</tr>
<tr>
<td>CT-1000C-0-50/7</td>
<td>140</td>
<td>500 charts, 0-50 range, 7 day</td>
</tr>
<tr>
<td>CT-1000C-0-200/24</td>
<td>140</td>
<td>500 charts, 0-200 range, 24 hr</td>
</tr>
<tr>
<td>CT-1000C-0-200/7</td>
<td>140</td>
<td>500 charts, 0-200 range, 7 day</td>
</tr>
<tr>
<td>CT-1000C-0-300/24</td>
<td>140</td>
<td>500 charts, 0-300 range, 24 hr</td>
</tr>
<tr>
<td>CT-1000C-0-800F/1</td>
<td>140</td>
<td>500 charts, 0-800 range, 24 hr</td>
</tr>
<tr>
<td>CT-1000C-200-400F/1</td>
<td>140</td>
<td>500 charts, 200-400 range, 24 hr</td>
</tr>
<tr>
<td>CT-1000C--100C-100/24</td>
<td>140</td>
<td>500 charts, -100-100 range, 24 hr</td>
</tr>
</tbody>
</table>

Custom charts available by special order. Consult Sales.
More than 100,000 Products Available!

- **Temperature**

- **Flow and Level**
  Air Velocity Indicators, Doppler Flowmeters, Level Measurement, Magnetic Flowmeters, Mass Flowmeters, Pitot Tubes, Pumps, Rotameters, Turbine and Paddle Wheel Flowmeters, Ultrasonic Flowmeters, Valves, Variable Area Flowmeters, Vortex Shedding Flowmeters

- **pH and Conductivity**
  Conductivity Instrumentation, Dissolved Oxygen Instrumentation, Environmental Instrumentation, pH Electrodes and Instruments, Water and Soil Analysis Instrumentation

- **Data Acquisition**

- **Pressure, Strain and Force**
  Displacement Transducers, Dynamic Measurement Force Sensors, Instrumentation for Pressure and Strain Measurements, Load Cells, Pressure Gauges, Pressure Reference Section, Pressure Switches, Pressure Transducers, Proximity Transducers, Regulators, Strain Gages, Torque Transducers, Valves

- **Heaters**