C1300 – dependable recording in a rugged, functional instrument

**High-definition backlit display**
— latest LCD panel display technology ensures instrument operation and configuration is as easy as possible

**Simple-to-configure totalizers**
— automatic calculation of the relationship between units of measure and volume flow units

**Designed to survive**
— environmental protection options up to NEMA 4X for the entire recorder, providing reliable operation for wall-, panel- and pipe-mount versions

**Data logging**
— logging of totalizer and instantaneous readings to a Compact Flash card

**Fully field-upgradeable**
— additional options easy to add

**Configuration backup**
— ability to backup and restore configurations from a PC
C1300
Advanced Circular Chart Recorder

C1300

The C1300 is an advanced, programmable circular chart recorder for up to four process signals. It combines traditional circular chart values with data logging technology from ABB’s award-winning SM Series videographic recorders to create a labour-saving recording solution. The C1300’s straightforward operator controls and robust construction make it suitable for a variety of industrial environments. With many features supplied as standard and a powerful range of options, the C1300 is a truly flexible unit that can adapt to match your process requirements.

Comprehensive Process Information

The C1300 incorporates up to two graphical display panels to keep the operator informed of process status. Each panel is capable of displaying up to eight lines of descriptive text to simplify both configuration and operation of the recorder. The display technology used increases visibility in high ambient light conditions.

Simple Operation

The clearly-labelled tactile keypad gives direct access for operator adjustments and configuration, without the need to open the recorder’s door. Clear text prompts on the digital displays guide the user through the various menus. A password-protected security system prevents unauthorized access to configuration adjustment menus.

Clear, Intuitive Display Menus

Standard Hardware per Pen

- Universal Input
  - Thermocouple
  - RTD
  - mA
  - V, mV
- 2-wire transmitter PSU
- 1 Relay Output
- 1 Analog Output
- 2 Digital Inputs

Software Functions

- Up to 16 Process Alarms
- 8 Logic Equations

Optional Software Functions

- Up to 4 Totalizers
- 2 Real-time Alarms (Timers)
- 4 Math Blocks
Advanced Totalizer Technology

The C1300 features some of the most advanced totalizing features of any recording instrument, giving it the ability to autoconfigure totalizers to specific requirements. For example, it is possible to measure flow in one volumetric unit and totalize in another; the C1300 automatically calculates the relationship between the two volume units and configures this information. No longer is it necessary to deal with unit conversion tables and timebases.

Totalizer control is enhanced further by reset functionality that is set in real-time. If the totalizer is required to reset at midnight every Sunday simply set it to do so. Totalizer logs also eliminate the requirement for the operator to go to the recorder at the same time each day to take readings. The totalizer log contains historical information of the date, time and individual totalizer values; enabling comparison of process volumes directly from the front panel of the recorder.

Comprehensive Flow Totalizer Displays

PC Configuration Backup

Fitted as standard to every C1300 is a PC Configuration Backup port. Using this port, an instrument’s configuration can be both uploaded and downloaded to a PC, enabling a backup of a recorder’s configuration to be saved for future use. Configuration time of multiple units with similar configurations is also greatly reduced via use of this feature.

Timers and Clock

The C1300 provides two event timers driven by the recorder’s real-time clock. The timers can be configured to operate relays, start/stop the chart or trigger other actions within the recorder; such as allowing alarm annunciation only during night hours.

Alarm Annunciation Enabled During Night Hours Only

Connecting Your PC to the Recorder
Math and Logic
Optional math functions, mass flow calculations and RH tables are available, enabling the solving of real process problems, quickly and simply. Math functions include addition, subtraction, multiplication and division.

Logic capability is provided as standard, for interlocking and integration of discrete and continuous functions to address a wide range of process criteria.

Boolean logic functions enable the grouping of alarms to a single ‘common-trouble’ relay, saving time and money or allowing interlocking to create almost infinite combinations of ‘if…Then’ scenarios.

Built to Meet Your Needs
The C1300’s modular architecture enables a high level of hardware choice.

The standard input/output module supplied with every pen comes complete with a fully isolated universal analog input, a relay output, transmitter power supply, an isolated analog output and two digital inputs.

Further input and output capability is provided by a range of plug-in modules:
- Four relays – channel alarm outputs
- Eight digital inputs – linked using logic equations
- Eight digital outputs – TTL level alarm outputs
- True-time event pen (Violet) – event pen is additional to standard pens
- Modbus RS485 communications – interfaces with PCs
- Data logging – to Compact Flash card

Expandable for the Future
The C1300 can be upgraded quickly to meet your changing process requirements.

Additional recording channels, math capability or input and output functions can be retrofitted on-site using plug-in modules and easily-fitted pen arms. Input calibration data is stored on each card, enabling quick changes of input modules without the need for recalibration.

Changes to input sensors or recording requirements are accommodated by reconfiguration using the keypad.

Modbus RS485 Communications
Communications with PCs or PLCs are achieved via the RS485 serial communications link, enabling the C1300 to serve as the front end of plant-wide data acquisition systems. Using Modbus RTU protocol all process inputs and other variables can be read continuously by a host PC running any of a wide range of standard SCADA packages.
**4-Pen Recording**

Available with up to four trending pens, the C1300 enables pen ranges to be configured independently from each other and their corresponding inputs. This enables the pens to be scaled to the best effect and potentially minimizes the requirement for costly multiple-scaled consumables. The C1300 also offers a true-time event-pen facility that ensures that process actions are logged on the same timeline as Pen 1.

![4-pen Recorder with Two Graphical Display Panels](image)

**Data Logging**

The C1300 can be fitted with a data logging option that automatically stores the totalizer log entries and instantaneous channel data to a Compact Flash card. Once logged to a card, ABB’s DataManager software can be used to analyze the totalizer log and create graphs of the instantaneous data.

Simple operation is ensured due to the automatic initiation of logging upon the insertion of a Compact Flash card and extremely simple card removal procedure.

As a result of the large capacity of Compact Flash cards, exceptionally long recording durations can be achieved which minimizes the requirement for operator intervention to retrieve data.

The Compact Flash card is located behind the door of the recorder and can be protected by the optional door lock.

![Removing Compact Flash Card](image)

**Designed to Survive**

Optional NEMA 4X protection ensures the C1300 can survive in the harshest environments and makes the recorder ideal for use in panels that are hosed down regularly. The tough, acid-resistant case provides NEMA 4X rating for all mounting options.

**Easy to Install**

A choice of mounting options enables simple installation of the recorder in a panel, on a wall or on a pipe. Detachable terminal blocks provide trouble-free connection of input and output wiring. Mains isolation can be provided by an optional power switch within the instrument.

![Choice of Mounting Options](image)

**Summary**

1, 2, 3 or 4 pens  
10 in. or 105mm chart size  
Standard I/O with each pen includes:  
- analog input, analog output, transmitter power supply, relay output and 2 digital inputs
C1300
Advanced Circular Chart Recorder

Specification

Construction
Size 15.23 in. (h) x 15.04 in. (w) x 5.57 in. (d) (386.8 x 382.0 x 135mm)
Weight 18lb (8.2kg)
Case material Glassfiber-filled reinforced polyester
Window material Polycarbonate or glass
Door latch High-compression with optional lock

Environmental
Operational temperature range 0° to 55°C (32° to 130°F)
Operational humidity range 5 to 95%RH (non-condensing) 5 to 80%RH (chart only)
Case sealing NEMA 3 (IP54) NEMA 4X (IP66) (optional)

Installation
Mounting options Panel, wall or pipe
Terminal type Screw
Wire size (max) 14 AWG (I/O), 12 AWG (power)

Operation and Configuration
Programming method Via front panel keys
Security Password-protected menus

Safety
General safety EN61010
Installation category II
Pollution degree 2
Dielectric 500V DC (channel/channel) 2kV DC (channel/ground)
Memory protection Nonvolatile FRAM
Approvals CE CSA General Safety (option) UL General Safety (option)

Power Supply
Voltage 100 to 240V AC ±10% (90V min. to 264V AC max.), 50/60Hz
Consumption <30 VA (typical for full spec. unit)
Line interruption Up to 60ms

Process Inputs and Outputs
General
Noise Rejection Common mode >120dB at 50/60Hz
Normal (series) mode >60dB at 50/60Hz
CJC rejection ratio <0.05°C/°C (0.1°F/°F)
Sensor break protection Upscale or downscale drive
Out of range detection 0 to 100% of engineering span
Temperature stability <0.02% of reading/°C (0.04% of reading/F) or 1µV/°C
Long-term drift <0.01% of reading or 10µV annually
Input impedance >10MΩ (mV and V inputs) 39Ω (mA input)

Analog Inputs
Signal types mV, V, mA, Ω
Thermocouple types B, E, J, K, N, R, S, T
Resistance thermometer Pt 100
Other linearizations x¹/², x², x³, linear
Sample interval 250ms per channel
Dielectric 500V DC channel/channel
Digital Filter 0 to 60s (programmable)

<table>
<thead>
<tr>
<th>Type</th>
<th>Range Low</th>
<th>Range High</th>
<th>Minimum Span</th>
<th>Accuracy</th>
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<td>mV</td>
<td>0</td>
<td>150</td>
<td>5</td>
<td>±0.1% reading or 10µV</td>
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<tr>
<td>V</td>
<td>0</td>
<td>5</td>
<td>0.1</td>
<td>±0.1% reading or 20mV</td>
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<tr>
<td>mA</td>
<td>0</td>
<td>50</td>
<td>1</td>
<td>±0.2% reading or 0.2µA</td>
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<tr>
<td>Ohms (low)</td>
<td>0</td>
<td>750</td>
<td>20</td>
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<td>Ohms (high)</td>
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<td>10k</td>
<td>400</td>
<td>±0.5% reading or 10Ω</td>
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Analog Input Performance
Advanced Circular Chart Recorder

2-Wire Transmitter Power Supplies

- **Number**: 1 per channel
- **Voltage**: 24V DC nominal
- **Drive**: Up to 25mA
- **Isolation**: 500V DC channel-to-channel

Analog Outputs

- **Type**: 4 to 20mA
- **Accuracy**: ±0.1%
- **Maximum load**: 750Ω
- **Dielectric**: 500V DC

Relay Outputs

- **Type**: SPDT
- **Rating (with non-inductive load)**: 5A at 115/230V AC

Digital Outputs

- **Type**: 5V TTL
- **Rating**: 5mA per output
- **Dielectric**: 500V DC between modules, no isolation within module

Serial Communications

- **Connections**: RS485, 4-wire
- **Protocol**: Modbus RTU

Data Logging

- **Memory card type**: Compact Flash Type 1
- **Card size**: Max. 1Gb
- **Recording Duration**: See table below

Digital Inputs

- **Type**: TTL or volt-free
- **Minimum pulse**: 250ms
- **Dielectric**: 500V DC between modules, no isolation within module

### Thermocouple Performance

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<th>°C</th>
<th>Range Low</th>
<th>Range High</th>
<th>°F</th>
<th>Range Low</th>
<th>Range High</th>
<th>Accuracy (excluding CJC)</th>
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<td>B</td>
<td>–18</td>
<td>1800</td>
<td>0</td>
<td>3270</td>
<td>3.6°F</td>
<td>±2.0°C (above 200°C)</td>
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<tr>
<td>E</td>
<td>–100</td>
<td>900</td>
<td>–140</td>
<td>1650</td>
<td>±0.5°C</td>
<td>±0.5°C (0.9°F)</td>
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<tr>
<td>J</td>
<td>–100</td>
<td>900</td>
<td>–140</td>
<td>1650</td>
<td>±0.5°C</td>
<td>±0.5°C (0.9°F)</td>
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<tr>
<td>K</td>
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<td>1300</td>
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<td>2350</td>
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<td>±0.5°C (0.9°F)</td>
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<td>1300</td>
<td>–325</td>
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<td>±0.5°C (0.9°F)</td>
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### Recording Duration

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<th>(4 Channels)</th>
<th>128Mb</th>
<th>256Mb</th>
<th>512Mb</th>
<th>1Gb</th>
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<tr>
<td>1 s</td>
<td>1.1 months</td>
<td>2.3 months</td>
<td>4.5 months</td>
<td>8.8 months</td>
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<tr>
<td>5 s</td>
<td>5.6 months</td>
<td>11.3 months</td>
<td>1.9 years</td>
<td>3.6 years</td>
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<tr>
<td>10 s</td>
<td>11.3 months</td>
<td>1.9 years</td>
<td>3.7 years</td>
<td>7.2 years</td>
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<tr>
<td>30 s</td>
<td>2.8 years</td>
<td>5.6 years</td>
<td>11.1 years</td>
<td>21.7 years</td>
</tr>
<tr>
<td>60 s</td>
<td>5.6 years</td>
<td>11.1 years</td>
<td>22.2 years</td>
<td>43.4 years</td>
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<tr>
<td>5 min.</td>
<td>27.8 years</td>
<td>55.5 years</td>
<td>111.0 years</td>
<td>216.8 years</td>
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<tr>
<td>10 min.</td>
<td>55.5 years</td>
<td>111.0 years</td>
<td>222.1 years</td>
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<td>30 min.</td>
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<td>333.1 years</td>
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<td>666.2 years</td>
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<tr>
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<td>1998.5 years</td>
<td>3996.9 years</td>
<td>7993.9 years</td>
<td>15613.1 years</td>
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</table>
**C1300**

**Advanced Circular Chart Recorder**

**Recording System**

**Pens**
- **Number**: 1, 2, 3, or 4 (red, green, blue, black)
- **Response**: 7 seconds (full scale)
- **Resolution**: 0.1% steps
- **Pen lift**: Motor-driven, with optional autodrop

**Event Pens**
- **Standard**: 3-position event recording on any channel
- **Real time**: 3-position event recording on the same time line as Pen 1

**Chart**
- **Chart size**: 10 in. or 105mm
- **Chart speed**: 1 to 167 hours or 7 to 32 days per revolution

**Graphical Display Panels**

**Displays**
- **Number**: 1 (1 or 2 pens) or 2 (3 or 4 pens)
- **Type**: High contrast 128 x 64 STN dot matrix LCD (graphics) module
- **Status indicators**: Indicate channel number on display
- **Alarm indicators**: Indicate channel with active alarms

**Panel keys**
- **Function**: Programming access, increment/decrement, pen lift and menu key

**Alarms and Logic**

**Alarms**
- **Number**: 4 per channel
- **Type**: High/low process, fast/slow rate of change, time delay
- **Adjustments**: Hysteresis, time delay
- **Alarm indicators**: Indicate channel with active alarms

**Logic Equations**
- **Number**: 4
- **Function**: OR, AND
- **Inputs**: Alarm states, digital inputs, totalizers, logic
- **Outputs**: Relays, digital outputs, chart stop, alarm acknowledge

**Advanced Software Functions**

**Totalizers**
- **Number**: Up to 4
- **Size**: 999,999,999 max.
- **Output**: External counter driver, ‘wrap’ pulse signal
- **Totalizer log**: Max. 21 entries per totalizer

**Math**
- **Number of equations**: 4
- **Type**: +, –, x, ÷, low & high select, maximum, minimum, average, mass flow, RH

**Timers**
- **Number**: 2
- **Type**: Real-time clock driven event, adjustable duration
- **Output**: Relay, digital output, logic equation

**EMC**

**Emissions and Immunity**

Meets requirements of:
- EN50081-2
- EN50082-2
- EN61326 for an industrial environment
- CE Mark

<table>
<thead>
<tr>
<th>Module Type</th>
<th>Analog I/P</th>
<th>Analog O/P</th>
<th>Trans. PSU</th>
<th>Relays</th>
<th>Digital I/P</th>
<th>Digital O/P</th>
<th>Comms.</th>
<th>Max. No. Per Instrument</th>
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<td>2</td>
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<td>4 relays</td>
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<td>8 digital I/P</td>
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<td>8 digital O/P</td>
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**Option Module Types**
Electrical Connections

Summary of Connections

b – Voltage
c – Current (non 2-wire Transmitters)

Standard Input/Output Modules

Four-Relay Output Module

Digital Input/Output Module

Power Supply Connections
Overall Dimensions

Dimensions in mm (in.)

Panel Cut-out Size

Wall-mount Dimensions

36.6 (1.44) – Typical Space Between Adjacent Knockout Centers

4 holes 7.14 (0.281) dia. or tap for 1/4 in. thread
## Ordering Information

<table>
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<th>C1300 Advanced Circular Chart Recorder</th>
<th>131</th>
<th>X</th>
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<td>Four Pens (Red, Green, Blue, Black)</td>
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* On 2, 3 or 4 pen instruments, a standard I/O module is always fitted in the corresponding module position (enter ‘0’ in the corresponding order code field)
### Standard Accessories (supplied with each recorder)

- Set of pens
- Pack of 10 charts (0 to 100, 24 hour)
- Wall-mount kit

### Optional Accessories

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<td>C1900/1713</td>
<td>Pipe-mount kit</td>
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<td>Card Reader</td>
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<td>B11867</td>
<td>Compact Flash Card</td>
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…Ordering Information

Module Positions

0  No module fitted/pen input channel
1  Standard input/output
3  Four relays
4  Eight digital inputs
5  Eight digital outputs
6  True-time event pen –Violet (additional to standard pens)
8  Modbus RS485 communications
L  Data logging

Key to Module Types