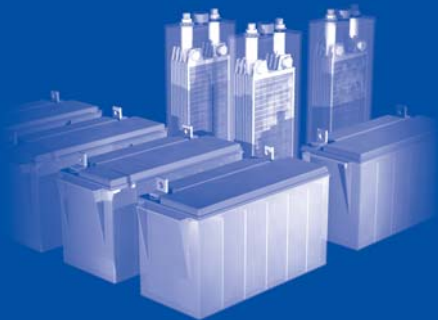


# Constant Current Formation

Model CCN

Automotive  
and  
Industrial  
Chargers



Model 30CCN330-24



**Container Charging for Multiple Strings of  
Automotive and Industrial Batteries**



**Flexible Network Control With VisualCN<sup>®</sup>  
Formation Client Software for Windows NT<sup>®</sup>**



**Circuits Available up to 330 Volts With  
Current Ranges up to 30 Amperes**



# Constant Current Formation

Model CCN

Automotive and Industrial Chargers



VisuaLCN Software - Networked circuit control and formation data reporting

## Automotive & Industrial Formation



These chargers can be built to customer specifications in current ranges up to 30 amperes and up to 330 volts with an accuracy of  $\pm 1\%$  of maximum output.

Multiple circuits are packaged into single cabinets for container formation applications, each circuit charging series strings of 12 to 18 batteries. The CCN features modular construction and easy access front and rear panels for ease of maintenance and service.

Automotive and industrial battery manufacturers count on Bitrode's Model CCN constant current charging equipment for reliable performance in container formation and boost charging. The CCN is available in a wide range of customer specified currents and voltages, and can be used for charging multiple strings of batteries over a Windows NT network, using Bitrode's VisuaLCN Formation Client software.

The Model CCN allows control of your formation process through temperature setback - current can be controlled or shut off completely based on data returned from CCN's optional STM temperature probes.

Most units designed to work under 30 amperes are convection cooled for clean and quiet operation. Units operating in high ambient temperatures may be equipped with cooling fans to ensure reliability. Cooling system may vary with circuit design and operating environment.

### What Does It Do and How?

The Model CCN is a constant current charger built around an extremely reliable saturable core reactor design, and delivers superior performance with long, low maintenance life.

**Designed for Accuracy:  
 $\pm 1\%$  of Maximum Output**

**Manufactured for Reliability and Ease of Maintenance**

**Custom Engineered Solutions for Specific Formation Environments**

**Worldwide Sales Consultation, Technical Support, and Service**

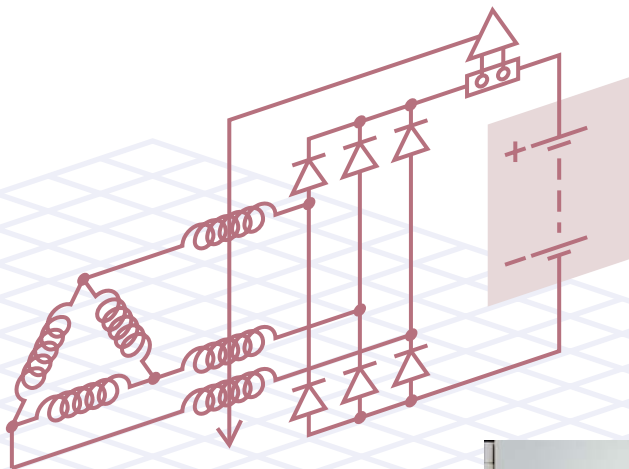
## Get In And Drive

The Model CCN is controlled by Bitrode's VisuaLCN Formation Client software package. Formation Client, written for Windows NT, is a complete circuit control and data reporting solution for Bitrode's network based production charging equipment. VisuaLCN's client-server architecture gives users control of any Bitrode CCN circuit from anywhere on the computer network.

Using software controls, an operator develops formation profiles to meet specified guidelines. Up to 99 steps of charge and rest can be programmed to user specifications. Steps can be controlled with up to 10 limit conditions, chosen from variables such as time, voltage, current, ampere- or watt-hours, or other customer-specified test parameters. Temperature compensation allows control of the charging process using temperature information - current can be automatically adjusted based on the heat produced.

Networked circuits can be monitored easily with VisuaLCN; circuit activity is viewable in both tabular and graphical formats. Test data can be sampled in user specified time increments with data acquisition available in 1 second steps. Viewable data can include information regarding voltage, current, optional temperature, and other customer determined information. Formation data is stored in a Microsoft Access format. This data can be viewed in graphic format for post-formation analysis using VisuaLCN's native graphing software or can be presented to users in an Access report of their own design.

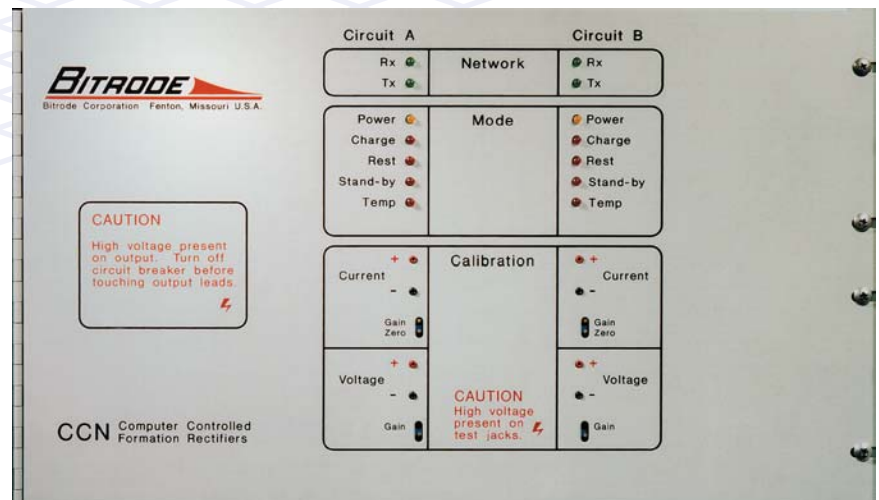
For more information about using VisuaLCN Formation Client to command the Model CCN and Bitrode's other network based formation equipment, contact a Bitrode representative.



*Simplified schematic demonstrating Model CCN's saturable core reactor design.*

*Front panel of two circuit module: shows placement of network communication activity indicators, circuit status LEDs (module power, charging program step - charge, rest and standby, with over temperature indicator).*

*Calibration controls for current and voltage are accessible at the front panel.*



# Model CCN

## Note the **Features:**

The following features are standard elements of the Model CCN. For more detail regarding how CCN's features will work with specific formation needs, contact Bitrode Corporation.

- ▶ The Model CCN can be custom built in configurations up to 330 volts
- ▶ Available in current ranges up to 30 amperes
- ▶ Saturable core reactor design - offers superior reliability and longevity
- ▶ Constant current and constant voltage control
- ▶ Microprocessor control
- ▶ Battery backed local memory for reliable restart after power outages
- ▶ Accuracy to  $\pm 1\%$  of maximum output
- ▶ Modular construction and easy access front and rear panels for ease of maintenance
- ▶ Calibration controls are available directly from the front panel
- ▶ Convection cooling for clean and quiet operation
- ▶ AC/DC over current protection

## **Beyond** the basics:

Optional features extend the functions of the Model CCN beyond the standard feature set and increase the value of this very important part of your production systems.

- ▶ Bitrode's exclusive STM thermal monitoring connections and probes for temperature setback control. STM probes measure temperature ranging from  $-50^{\circ}$  to  $150^{\circ}\text{C}$  ( $\pm 3^{\circ}\text{C}$ )
- ▶ Full shutoff contactor - reduces current to zero
- ▶ Full absorption reactors - for controlling voltage below standard rated specification (contact Bitrode representative for details)
- ▶ Remote start/stop
- ▶ Relay I/O for controlling or reading external devices
- ▶ Remote junction box for formation table connections
- ▶ Volts-per-cell or volts-per-battery profile creation - allows user to develop a single charging program for use with different battery string lengths in float charge applications

## Manual Control Options ▶ Model CC

Bitrode also offers a manual control option in the Model CC. This charger has the same saturable core reactor, constant current control and operational ranges as the Model CCN - the difference is in the operator interface. In lieu of networked VisualLCN control, the CC is operated and monitored with manual controls and indicators on the front panel of each circuit.



### Note the **Features:**

The following features are standard elements of the manually controlled Model CC.

- ▶ The Model CC can be custom built in configurations up to 330 volts
- ▶ Available in current ranges up to 30 amperes
- ▶ Accuracy to  $\pm 1\%$  of maximum output
- ▶ Saturable core reactor design for constant current control; offers superior reliability
- ▶ Ammeter on front panel
- ▶ Current and time adjustment controls on front panel
- ▶ Designed and built for ease of maintenance and service
- ▶ Isolation transformers for operator protection

### **Beyond** the basics:

Extend the functions of the Model CC with these available options.

- ▶ Automatic termination timer - reduces current to zero when timer completes cycle
- ▶ One rate or two rate charge control with two analog timers and two current adjust potentiometers - reduces the current to zero when last timer completes its cycle
- ▶ Full absorption reactors - for controlling voltage below standard rate specification
- ▶ Ampere hour meter
- ▶ Digital current or voltage displays
- ▶ AC line disconnect
- ▶ Forced fan cooling with thermostatic control for higher operating temperatures

## Specifications

Model* **	Adjustable Max. Constant Current Amperest	DC Voltage Output Ranget†	KVA Input‡
5CCN330-8	5	240-330	15
5CCN330-16	5	240-330	30
5CCN330-24	5	240-330	45
10CCN330-8	10	240-330	32
10CCN330-16	10	240-330	63
10CCN330-24	10	240-330	95
15CCN330-8	15	240-330	46
15CCN330-16	15	240-330	91
15CCN330-24	15	240-330	136
20CCN330-8	20	240-330	60
20CCN330-16	20	240-330	120
20CCN330-24	20	240-330	180
30CCN330-8	30	240-330	91
30CCN330-16	30	240-330	182
30CCN330-24	30	240-330	273

## Measures

Dimensions‡‡ In / Cm		
W	D	H
30 / 76	30 / 76	87 / 221
60 / 152	30 / 76	87 / 221
90 / 229	30 / 76	87 / 221
30 / 76	30 / 76	87 / 221
60 / 152	30 / 76	87 / 221
90 / 229	30 / 76	87 / 221
30 / 76	30 / 76	87 / 221
60 / 152	30 / 76	87 / 221
90 / 229	30 / 76	87 / 221
30 / 76	30 / 76	87 / 221
60 / 152	30 / 76	87 / 221
90 / 229	30 / 76	87 / 221
30 / 76	43 / 109	97 / 246
60 / 152	43 / 109	97 / 246
90 / 229	43 / 109	97 / 246

\*If required voltage, current, or number of circuits do not appear in this table, contact Bitrode Corporation; custom product engineering is one of our greatest strengths.

\*\*Module names are interpreted as: xxCCNyy-zz, where xx indicates amperage, yy indicates voltage and zz indicates number of circuits per cabinet.

†Minimum control current is approximately 10% of maximum rated current.

††To control voltage below the minimum standard specification, full absorption reactors are available as optional equipment - contact a Bitrode representative for details.

‡Values are approximate.

‡‡Dimensions may vary according to design requirements.



All products are subject to change in physical appearance and circuitry which will not alter performance specifications.

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