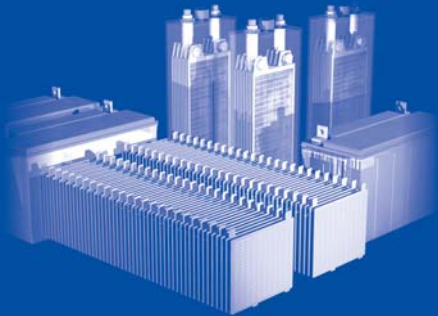


Constant Current Formation

Model CRN

Automotive
and
Industrial
Chargers



Model 60CRN365-24



**Container Charging for Multiple Battery Strings and
Tackless Formation of Automotive and Industrial Plates**



**Flexible Network Control With VisualCN®
Formation Client Software for Windows NT®**



**Circuits Available up to 500 Volts With
Current Ranges up to 1000 Amperes**



Automotive & Industrial Formation

Constant Current Formation

Model CRN

Automotive and Industrial Chargers



For constant current battery formation, Bitrode offers the Model CRN charging equipment. Available in a wide range of customer specified currents and voltages, this product is an excellent solution for container charging of multiple battery strings and tackless formation of automobile and industrial plates. The CRN provides standard or fully customized charge regimens over a Windows NT network controlled by Bitrode's VisualCN Formation Client software.

controlled rectifier (SCR) design. Using this design, the CRN can be built to customer specifications in current ranges up to 1000 amperes and up to 500 volts with accuracy of $\pm 1\%$ of maximum output.

Multiple circuits can easily be packaged in a single cabinet for container formation applications or single high current modules can be built for tank formation use. The CRN features modular construction and easy access front and rear panels for ease of maintenance and service.

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

Most units designed for operation under 50 amperes are convection cooled for clean and quiet operation. Larger units or those operating in high ambient temperatures are equipped with cooling fans to ensure reliability. Cooling system may vary with circuit design and operating environment.

Customers already using CR chargers equipped with FCM microprocessor control will find their investment in Bitrode equipment is protected; there is an upgrade path for existing chargers to Model CRN with VisualCN network control. Contact your Bitrode representative for details.

What Does It Do and How?

For constant current charging functions, the Model CRN uses Bitrode's three phase silicon

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

Manufactured for Reliability and Ease of Maintenance

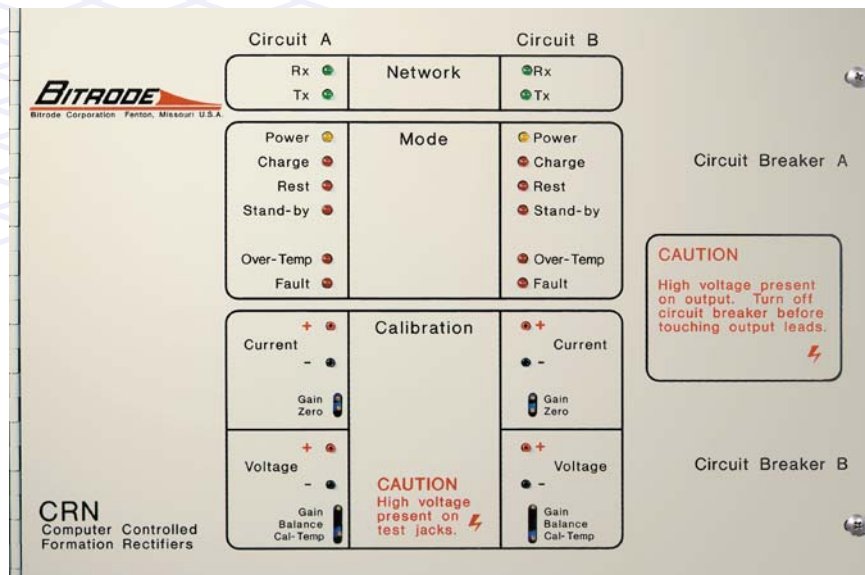
Custom Engineered Solutions for Specific Formation Environments

Worldwide Sales Consultation, Technical Support, and Service

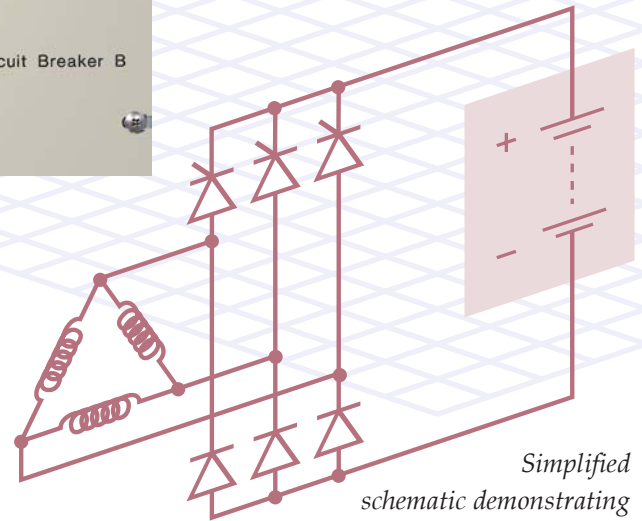


Model 300CR200 for tank formation applications





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.



Simplified schematic demonstrating Model CRN's three phase silicon controlled rectifier design.

Get In And Drive

The Model CRN is controlled by Bitrode's VisualCN[®] Formation Client software package. Formation Client, written for Windows NT[®], is a complete circuit control and formation data reporting solution for Bitrode's network based production charging equipment. VisualCN's client-server architecture gives users control of any Bitrode CRN 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, pressure, or other customer specified test parameters. For more sophisticated formation profiles, Bitrode can provide the CRN with optional ramp charge capability. 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, temperature, pressure (temperature and pressure are optional) 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 CRN and Bitrode's other network based formation equipment, contact a Bitrode representative.

Model CRN

Note the **Features:**

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

- ▶ The Model CRN can be custom built in configurations from 100 to 500 volts
- ▶ Available in current ranges from 2 to 1000 amperes
- ▶ Microprocessor control
- ▶ Battery backed local memory for reliable restart after power outages
- ▶ Accuracy to $\pm 1\%$ of maximum output
- ▶ Silicon controlled rectifier design for constant control; offers superior reliability
- ▶ Modular construction and easy access front and rear panels for ease of maintenance
- ▶ Constant current, ampere-hour, and power controls
- ▶ Convection cooling for clean and quiet operation

Beyond the basics:

Optional features extend the functions of the Model CRN 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° to 150°C ($\pm 3^{\circ}\text{C}$)
- ▶ Current limited constant potential (voltage) control: when the preset maximum voltage is reached, the current will taper to maintain the set voltage
- ▶ Ramp charge
- ▶ Remote start/stop
- ▶ Digital I/O
- ▶ Remote junction box for formation table connections
- ▶ Volts-per-cell profile creation - allows user to develop a single charging program for use with different battery string lengths

Manual Control Options ▶ Model CR

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



Note the **Features:**

- ▶ The Model CR can be custom built in configurations up to 500 volts
- ▶ Available in current ranges up to 1000 amperes
- ▶ Accuracy to $\pm 1\%$ of maximum output
- ▶ Silicon controlled rectifier design for constant current control; offers superior reliability
- ▶ Ammeter on front panel
- ▶ Current and time adjustment controls on front panel

Beyond the basics:

- ▶ Automatic termination timer - reduces current to zero when timer completes cycle
- ▶ Two rate charge control with two analog timers and two current adjust potentiometers - reduces the current to zero when last timer completes its cycle
- ▶ Three rate current control
- ▶ Current limited constant potential (voltage) control: when preset maximum voltage is reached, the current will taper to maintain the set voltage - includes voltmeter on front panel
- ▶ Digital current or voltage displays
- ▶ AC line disconnect
- ▶ For manual controlled tackless formation, see Bitrode's Model CD brochure

Specifications

Model* ** Single Circuit	Adjustable Constant Current Amperes†	Maximum DC Voltage†	KVA Input‡
50CRN125	0-50	0-125	8.0
50CRN150	0-50	0-150	9.5
50CRN250	0-50	0-250	16.0
100CRN125	0-100	0-125	16.0
100CRN150	0-100	0-150	19.0
100CRN250	0-100	0-250	48.0
150CRN125	0-150	0-125	24.0
150CRN150	0-150	0-150	28.5
150CRN250	0-150	0-250	48.0
200CRN125	0-200	0-125	32.0
200CRN150	0-200	0-150	38.0
200CRN270	0-200	0-270	85.5
250CRN150	0-250	0-150	47.5
250CRN270	0-250	0-270	85.5
300CRN125	0-300	0-125	48.0
300CRN270	0-300	0-270	103.8
400CRN125	0-400	0-125	64.0
600CRN125	0-600	0-125	98.0
800CRN150	0-800	0-150	158.0
Multi Circuit			
15CRN330-8	1-15	0-330	51.9
20CRN330-8	1-20	0-330	69.0
25CRN330-8	1-25	0-330	86.6
30CRN330-8	1-30	0-330	103.9
15CRN330-16	1-15	0-330	103.9
20CRN330-16	1-20	0-330	138.6
25CRN330-16	1-25	0-330	173.3
30CRN330-16	1-30	0-330	207.9

*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: xxCRNyy-zz, where xx indicates amperage, yy indicates voltage and zz indicates number of circuits per cabinet.

†High current ripple may result if operated below 25% of maximum voltage.

‡Values are approximate.



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

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