The CB Series is a new line of miniature, well-regulated high voltage power supplies providing clean and reliable high voltage in a shielded, PC-mount package. Offering precision 0 to 100% programmability and very low ripple and EMI/RFI, these cost-effective power supplies are ideal for integration into compact, sensitive equipment. The CB Series features current and voltage monitoring, built-in protection against programming overvoltage, and thermal shutdown. These modules come in a positive or negative output voltage of 10kV. For voltages ranging from 100V to 8kV, see the C series.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>OUTPUT VOLTAGE</th>
<th>OUTPUT CURRENT*1</th>
<th>RIPPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB101</td>
<td>0 to +10kV</td>
<td>0 to 100 µA</td>
<td>&lt;0.1%</td>
</tr>
<tr>
<td>CB101N</td>
<td>0 to -10kV</td>
<td>0 to 100 µA</td>
<td>&lt;0.1%</td>
</tr>
</tbody>
</table>

**FEATURES**
- Regulated
- Low Noise, Quasi-Sinewave Oscillator
- Miniature Size
- 0 to 100% Programmable Output
- High Stability
- Wide Input Voltage Range, 11.5 to 16V
- Very Low EMI/RFI
- High Reliability: MTBF >2.6 Million Hours per Bellcore TR-332
- Plated Steel Case with Isolated Case Ground
- Sealed to Withstand Immersion Cleaning Process
- External Gain Adjust for Calibration
- Built-in Programming Voltage Overvoltage Protection
- Built-in 5V Reference Voltage
- Built-in Thermal Shutdown
- Voltage Monitor: 0 – 5V = 0 – 100% Vout
- Current Monitor: 0 – 5V = 0 – 100% Iout
- UL Certified Encapsulant, Meets 94V-0 Flammability
- RoHS Compliant
- Extended Operating Temperature - Consult Factory

**APPLICATIONS**
- Electrophoresis
- Capacitor Charging
- Field Generation
- Spectrometry
- Deflection Plates
- Test Instrumentation
- Image Intensifier
### Electrical Specifications

**CB SERIES**

#### CB101 (10,000V)

<table>
<thead>
<tr>
<th>Output Voltage</th>
<th>Model</th>
<th>Output Current</th>
<th>Ripple P-P</th>
<th>Regulation LOAD 0 TO 100%</th>
<th>Regulation Line 11.5 TO 16.0V</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to +10kV</td>
<td>CB101</td>
<td>0 to 100 µA</td>
<td>&lt;0.1%</td>
<td>&lt;0.1%</td>
<td>&lt;0.1%</td>
<td>100 - 150kHz</td>
</tr>
<tr>
<td>0 to -10kV</td>
<td>CB101N</td>
<td>0 to 100 µA</td>
<td>&lt;0.1%</td>
<td>&lt;0.1%</td>
<td>&lt;0.1%</td>
<td>100 - 150kHz</td>
</tr>
</tbody>
</table>

#### Output Voltage vs Voltage Monitor

![Diagram showing the relationship between output voltage and voltage monitor.]

#### Output Current vs Current Monitor

![Diagram showing the relationship between output current and current monitor.]

---

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5B09J PAGE 2
### ELECTRICAL SPECIFICATIONS CB101 (10,000V)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT VOLTAGE</td>
<td>+11.5 to +16 VDC</td>
</tr>
<tr>
<td>INPUT CURRENT</td>
<td>&lt;100 mA, No Load</td>
</tr>
<tr>
<td></td>
<td>&lt;225 mA, Full Load</td>
</tr>
<tr>
<td>INPUT CAPACITANCE</td>
<td>440 uF low ESR</td>
</tr>
<tr>
<td>PROGRAMMING VOLTAGE</td>
<td>0 to +5VDC, &lt;100uA</td>
</tr>
<tr>
<td>PROGRAMMING VOLTAGE OVERVOLTAGE</td>
<td>&lt;5.25VDC</td>
</tr>
<tr>
<td>REFERENCE VOLTAGE</td>
<td>5VDC, 2mA</td>
</tr>
<tr>
<td>CURRENT MONITOR</td>
<td>0 to +5VDC (Load current 0 to 100%), Error &lt;0.5%*6</td>
</tr>
<tr>
<td>VOLTAGE MONITOR</td>
<td>0 to +5VDC (Load voltage 0 to 100%), Error &lt;0.5%*6</td>
</tr>
<tr>
<td>RESPONSE TIME</td>
<td>&lt;250msec (Full Load, full scale response) (10–90%)</td>
</tr>
<tr>
<td>SETPOINT ACCURACY*7</td>
<td>Adjustable +/- 1% (using gain adjust)</td>
</tr>
<tr>
<td>LINEARITY*7</td>
<td>&lt;1 % (20% to 100% Vout)</td>
</tr>
<tr>
<td>STABILITY</td>
<td>&lt;0.01%/hr/8hrs</td>
</tr>
<tr>
<td>TEMPDC</td>
<td>&lt;50 ppm/°C<em>C</em></td>
</tr>
<tr>
<td>THERMAL SHOCK LIMIT</td>
<td>1°C /10 seconds</td>
</tr>
<tr>
<td>OPERATING TEMPERATURE</td>
<td>-10 to +60°C (CASE) (For wider range consult factory)</td>
</tr>
<tr>
<td>STORAGE TEMPERATURE</td>
<td>-20 to +100°C</td>
</tr>
<tr>
<td>THERMAL SHUTDOWN</td>
<td>&gt; 85°C (CASE)</td>
</tr>
</tbody>
</table>

### DETAILED PRODUCT DESCRIPTION

The CB Series is a new line of miniature, well-regulated high voltage power supplies. The modules are programmed from 0 to 100% of rated output via a 0 to +5 volt DAC compatible high impedance programming input voltage. The CB Series features current and voltage monitoring, built-in protection against programming overvoltage, and thermal shutdown. Temperature drift is typically less than 50 PPM/°C. A built-in reference voltage source can be used in lieu of the programming voltage. The CB Series exhibits very low ripple, noise, and EMI/RFI by utilizing a quasi-sinewave oscillator, shielded transformer, excellent filtering techniques, and an isolated steel enclosure featuring a separate grounding pin. An externally accessible potentiometer provides adjustable gain trim, allowing for individual calibration of units. A proprietary encapsulation process and high performance formula are used to achieve excellent high voltage and thermal properties. Positive and negative outputs are offered.
Output Voltage vs. Output Power Derating Curve

Output Voltage (100 to 0%)

Output Power (0 to 100%)
### Pin # | Function
--- | ---
1 | (+) INPUT
2 | GND
3 | CASE GND
4 | PROGRAMING VOLTAGE
5 | 5VDC REFERENCE VOLTAGE
6 | CURRENT MONITOR
7 | VOLTAGE MONITOR
8 | HV RTN
| LEAD | HV OUT

### Parameter | Value
--- | ---
WEIGHT | 3 oz (85 grams)
VOLUME | 2.25 IN³ (36.87 CM³)
DIMENSIONS | 3.00 L(76.2L) x 1.25W (31.75W) x 0.60H (15.24H)
CASE MATERIAL | ZINC PLATED STEEL
Operate with 5VDC Reference Voltage

Variable output

\[ V_{\text{IN}} = \frac{R_1}{R_1 + R_2} \quad (5) \]

\[ V_{\text{OUT}} = \frac{R_1}{R_1 + R_2} \quad (10000) \]

R1 can be replaced with a potentiometer
**INPUT** 11.5 – 16 VDC

**PROGRAMMING**

**INVERTER RECTIFIER FILTER**

**CONTROL**

**CURRENT MONITOR**

**VOLTAGE MONITOR**

5VDC REFERENCE

GND

CASE GND

**INVERTER**

**RECTIFIER**

**FILTER**

**HV OUTPUT** 0 – 10KV

**HV RETURN**

**INVERTER RECTIFIER FILTER**

**CONTROL**

**CURRENT MONITOR**

**VOLTAGE MONITOR**

5VDC REFERENCE

GND

CASE GND

**INVERTER**

**RECTIFIER**

**FILTER**

**HV OUTPUT** 0 – 10KV

**HV RETURN**

**PART NUMBER SELECTOR:**

**Model Number:**

**CB 101 N**

Output Voltage (See table) [Blank or N]

Polarity Designator (Blank or N)

**HOW TO ORDER**

**Notes:**

1. At Maximum Rated Output Voltage.
2. Specifications after 1 hour warm-up, full load, at 25°C unless otherwise indicated.
3. Typical Performance.
4. All grounds internally connected, except case. There should not be more than 50 volts potential between the case ground (pin 3) and the circuit ground (pins 2 and 8). Isolated case assists low noise design efforts. Case pin must be connected to ground for proper operation.
5. Proper thermal management techniques are required to maintain safe case temperature at maximum power output.
6. 20–100%.
7. SET POINT ACCURACY refers to the ability of the unit to accurately deliver the voltage intended by the applied programming. The resultant output voltage will be within +/-1% of that programmed.
8. LINEARITY refers to how much the transfer function can deviate from a straight line in the absence of any set point error.
9. GAIN ADJUSTMENT refers to the ability to alter the gain of the circuit to bring the resultant output voltage to the programmed setpoint. This is intended to allow compensation for set point accuracy error.

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