



***INSTALLATION
AND OPERATING
MANUAL
BERTAN SERIES 205B***

WARRANTY

BERTAN warrants each of its standard products to be of sound design and free from defects in material and workmanship. Our obligation under this warranty is to repair or replace (at our option) FOB our factory:

- (a) Any STANDARD product, or part thereof, at no charge, within 3 years after shipment date, which proves defective under normal use; and
- (b) Any CUSTOM product, or part thereof, at no charge, within 1 year after shipment date, which proves defective under normal use; and
- (c) Any spare assembly, accessory or part thereof, at no charge, within 90 days after shipment date, which proves defective under normal use.

To exercise this warranty, contact the Customer Service Department at the factory (outside the U.S.A., contact your local BERTAN sales representative) to obtain a Customer Return Authorization (CRA) number and shipping instructions. Send the product, shipping prepaid, to BERTAN'S factory. Repairs will be made and the product returned - we will cover return shipping charges. All repairs are shipped UPS Ground. Upon request, we can utilize faster shipping methods at customer's expense. Repaired products are warranted for the balance of the original warranty period or at least 90 days. Replaced products will have a new 3-year warranty beginning the day unit is shipped back to customer.

LIMITATION OF WARRANTY

BERTAN does not warrant that the products can be used for any particular purpose other than those covered by the applicable specifications. This warranty does not apply to defects resulting from product modification without BERTAN'S express written consent or misuse of any product or part. BERTAN assumes no liability, in any event, for consequential damages, for anticipated or lost profits, incidental damages or loss of time or other losses incurred by purchaser or any third party in connection with products covered by this warranty.

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SECTION 1 - GENERAL INFORMATION

1.1 PURPOSE OF THE EQUIPMENT

The Series 205B is a family of regulated precision laboratory high voltage power supplies. They provide exceptional performance in critical applications such as nuclear and electro-optical instrumentation, precision CRT and electron beam applications.

1.2 DESCRIPTION

The Series 205B is a family of 19" rack-mountable power supplies with output voltages up to 50 kV. The units consist of a DC power supply that converts the AC line power to a low DC voltage and a DC to DC converter that generates the high DC output voltage. Low voltage electronic solid-state circuitry is mounted on the PCB100, and the high voltage assembly is fully encapsulated for reliable, arc-free, operation.

These stable, low noise high voltage power supplies feature front panel digital voltage and current metering, and calibrated direct-reading front panel controls. The rear panel features a HV output connector, a connector for remote analog programming and output voltage and output current monitoring, the output polarity switch, line power plug, fuse, and AC voltage selection switch. All units have arc and short circuit protection for safe, reliable, and arc-free operation. Although primarily designed for rack mounting, the unit may also be used in benchtop applications.

1.3 SPECIFICATIONS

For the Series 205B detailed specifications, refer to the Specifications section.

1.4 OPTIONS

Isolated Floating Output

Units can be provided with the output capable of floating up to ± 2 kV from ground. All controls, programming and monitoring functions operate normally, referenced to ground. The high voltage output polarity, with respect to the floating input terminal is reversible.

CBNY Binary Programming

All Series 205B can be provided with a factory-installed CBNY option for remote digital programming of the high voltage output. The programming inputs are TTL compatible and the data is positive logic. The addition of this option allows the unit to be easily interfaced to a computer or microprocessor. User-selectable modes of operation include an 8-bit data bus input, a 16-bit data bus input, latching and non-latching control. Reference the CBNY Specifications section for further details.

IEEE-488 Programming

The Model 200-C488 Interface allows a GPIB controller to program and monitor a Series 205B power supply. In addition to the output control and monitoring capability, the 200-C488 provides the user with a number of additional functions such as programming overload detection and response. Reference the Model 200-C488 specification sheet (not included within this manual but available from Bertan) for further details.

1.5 SAFETY TERMS

The **WARNING** used in this manual explains dangers that could result in personal injury or death. The **CAUTION** used in this manual explains hazards that could damage the instrument.

1.6 WARRANTY INFORMATION

The Warranty is given on the inside front cover of this Instruction Manual. If there is a need to exercise the Warranty, contact the factory to determine the proper action to be taken.

NOTE attempting to repair or tampering with the unit while still under warranty (less than 36 months since the date of shipment) will void the warranty. All in-warranty repairs should be sent to the factory.

SECTION 2 - OPERATION

2.1 INSTALLATION

WARNING! *This unit produces hazardous voltage. Do not apply line voltage input unless adequate ground is connected to the unit and the high voltage output has been properly connected.*

2.2 FRONT PANEL CONTROLS AND DISPLAYS

Power Switch:

A rocker switch turns the line power on or off to the entire instrument. The display panel will be lit when line power is applied to the unit.

Output Meter:

The digital output meter can display the output current or the output voltage. A switch below the meter allows the operator to select which output parameter to monitor. The accuracy of the meter is given in the Specification section.

Polarity Indicator:

An LED on the front panel display indicates the polarity of the output. The appropriate LED is lit as soon as line power is applied regardless of whether high voltage output is enabled or disabled. To change the polarity setting, see paragraph 2.4.

Voltage Controls:

The output voltage is the sum of the course and fine dial settings as described below.

Fine Adjust: A continuous, 10-turn, locking digital dial directly reads from 0 V to 1kV with a resolution of 0.2V on all models.

Coarse Adjust: The voltage switch sets the output voltage in increments of 1kV. In addition, a 1 kV selector switch, with up to 10 positions, is provided on all 3kV to 30kV models. A 5 kV selector switch, with up to 6 positions, is provided on all 20kV.

On 30kV & 50kV model a continuous multi-turn digital dial is used to adjust the high voltage output. The resolution and repeatability of this control is 20.0V.

2.3 REAR PANEL CONTROLS, CONNECTORS, AND TERMINALS

Gnd:

Ground is connected to the case of the Series 205B.

Output Connector:

The HV output connector mates with a shielded mating connector supplied with each unit. Refer to the specifications on page 12 to identify the mating connector. Assembly procedures for mating connectors are given at the end of this manual. Only the proper mating connector should be used with the indicated power supply and the power supply should NEVER be energized without a mating connector and suitable load connected.

Fuse:

The fuse is the ac line power fuse. It is rated for 1A, 250Vac for 105Vac-125Vac operation and 0.5A, and 250Vac for 210Vac-250Vac operation. Should a fuse ever need replacement, only these values should be used unless otherwise advised by a qualified BERTAN service technician.

Line Voltage Selector:

The line voltage selector selects the appropriate line voltage 105Vac-125Vac or 210Vac-250Vac at 50-60 Hz. By default, power supplies are shipped from the factory in the 105-125V position. Before energizing your power supply, verify that the line voltage selector switch is in the proper position for your mains input.

AC Line Plug:

The IEC 320 line plug receptacle accepts a three-wire female line plug for ac line power.

WARNING! This unit is equipped with a three-wire grounded line cord. This must be used with a three-wire receptacle where the "third wire" is connected to earth ground; otherwise personal injury or death may occur.

2.4 POLARITY REVERSING:

WARNING! Before attempting to reverse the power supply's polarity, the power supply must be turned off and the output fully discharged. Failure to follow these procedures may result in damage to the power supply, associated test equipment and/or personnel.

For 1kV to 5kV output models, a screwdriver-adjustable POLARITY SELECTOR SWITCH is accessible at the rear panel of the unit, next to the HV output connector. For 10kV to 50kV output models, the polarity of the HV output is reversible by means of an internal switching mechanism that is easily accessible upon removal of the top cover. The polarity reversal module is a clear plastic assembly identified by the exiting silicone high voltage cables. It is a two-part assembly. To change the polarity, turn off power supply, remove all cover screws holding the top cover on and:

- a. Remove the two diagonally opposed screws fastening the top portion of the module assembly to the bottom portion. NOTE: DO NOT DESOLDER WIRES OR PINS.
- b. Carefully separate the module by pulling the top portion from the bottom portion. The module portions are fitted very snugly and removal may be eased by slightly rocking the assembly.
- c. Rotate the top portion of the module assembly 180°, taking care not to unduly stress the high voltage cables.
- d. Rejoin the 2 portions of the module assembly. Make sure that the top portion is entirely seated to the bottom portion. NOTE: An interlock automatically insures that the high voltage cannot be applied until the portions of the module are properly mated.
- e. Re-secure the top portion to the bottom portion of the Polarity Reversal Module Assembly.
- f. Re-cover the power supply.

2.5 PREPARATION FOR USE

WARNING! *Before energizing your power supply, thoroughly review and follow these procedures. Failure to do so may result in damage to equipment and injury or death to personnel.*

To prepare the Series 205B for use, use the following procedure:

Set the Series 205B for the appropriate line voltage as specified in Section 2.3.

Connect a ground strap from case ground (on the rear panel) to a system common.

Select the appropriate HV output polarity for the application.

Set the front panel controls to:

- a. Power Switch - OFF
- b. Output Voltage Switch(s) – 0 (205B only).
- c. Multi Turn Digital Dial - 000 (fully counterclockwise)

Set the LOCAL/REMOTE (ANALOG/DIGITAL) rear panel switches (205B only) to:

- a. LOCAL for local front panel operation.
- b. REMOTE/ANALOG for remote analog operation. Note: Selecting the REMOTE control will override all local front panel controls of the output.
- c. REMOTE/DIGITAL for Computer Programming if equipped with a CBNY option. Reference Section 2.7.

Plug the line cord into the power line with a three-wire IEC receptacle to maintain proper case ground.

WARNING! *This unit is equipped with a three-wire grounded line cord. This must be used with a three-wire receptacle where the "third wire" is connected to earth ground; otherwise personal injury or death may occur.*

Connect the output of the Series 205B to the circuit. Use a properly rated shielded cable with the supplied HV output connector to insure good circuit connections and safe operation. Refer to Section 2.10.

WARNING! *Prior to connecting or removing any equipment from the High Voltage power supply, always return the Output Voltage Control(s) to 0V prior to applying or removing power. External circuits may retain voltage after controls are set to zero. Discharge any residual voltage before connecting or removing any equipment.*

2.6 LOCAL OPERATION

Turn POWER - ON to the instrument. Slowly increase the output voltage using the appropriate Voltage Control(s) until the desired output level is reached. Apply power to the load by switching the High Voltage - ON. The output will quickly reach the value set by the controls. Full stability will be achieved after approximately 30 minutes.

2.7 REMOTE OPERATION

PROGRAM CONTROL SWITCH:

Before the Series 205B can be remotely programmed, the instrument must be configured by setting the rear panel PROGRAM CONTROL SWITCH (S102) to the REMOTE ANALOG position. All monitoring and enable functions are active, independent of the S102 switch, as are the front panel meters. When in remote mode the front panel controls are inactive.

REMOTE PROGRAMMING:

The high voltage output can be remotely programmed from either an external voltage source or with an external potentiometer using the internal reference voltage source (Pin 4). A 0 to +5Vdc programming voltage applied to Pin 6 of J107 (PROGRAMMING/MONITOR) connector jack on the rear panel will remotely program the high voltage output from zero to maximum output. Programming can also be accomplished using a potentiometer connected between Pin 4 (+5Vdc), Pin 7 (GND) and with the wiper connected to Pin 6 (PRGM INPUT). The potentiometer should be a low temperature coefficient wirewound or cermet type, 5k Ω to 20k Ω resistance values. The power supply output will be proportional to the programming input. The programming input impedance is greater than 1M Ω . TABLE 2.1 below lists the PROGRAMMING / MONITOR connector pin designations. The accuracy of the remote programming is detailed in the Specifications section.

TABLE 2.1 - J107 PIN DESIGNATIONS

<i>PIN #</i>	<i>FUNCTION</i>
1	Output voltage monitor, buffered, 0 to +5Vdc (output impedance 10k Ω)
2	No connection
3	Enable/Disable. Input logic zero <u>disables</u> high voltage generation. Open circuit or input logic one <u>enables</u> high voltage generation.
4	Precision +5Vdc reference output referenced to analog ground.
5	Output current monitor, buffered, 0 to +5Vdc (output impedance 10k Ω)
6	Remote analog voltage programming input, 0 to +5Vdc
7	Analog Ground
8	Digital Ground
9	Polarity Indicator

REMOTE ANALOG MONITORING:

Buffered, analog output monitors, 0 to + 5Vdc, linearly proportional to the power supply's voltage and current output are provided. To monitor the output voltage, connect a high impedance meter to pin 1 and pin 7 (ground). To monitor the output current, connect a high impedance meter to pin 5 and pin 7 (ground). The accuracy of the voltage and current monitors is given in the Specifications section. The monitor output impedance is approximately 10k Ω .

ENABLE/DISABLE:

A TTL level logic TRIP input signal can be used to enable or disable the power supply output remotely. Input logic zero or grounding pin 3 disables high voltage generation. Open circuit or input logic one on pin 3 enables high voltage generation.

+5Vdc REFERENCE OUTPUT:

A precision +5Vdc reference output is provided on pin 4 for the user's convenience. This fixed output can be used for remote resistance programming (see REMOTE PROGRAMMING, above) or various control functions. This output is referenced to analog ground (pin 7).

POLARITY INDICATOR:

A TTL polarity indicator output signal is available at pin 9. An NPN open collector connection with respect to digital ground indicates the high voltage output polarity. NPN saturation denotes positive polarity.

2.8 COMPUTER PROGRAMMING (Optional)

GENERAL:

All Series 205B instruments can be provided with a factory-installed option for remote digital programming of the high voltage output. The programming inputs are TTL compatible and the data is positive logic (all data bits low yield 0 high voltage output). The addition of this option allows the unit to be easily interfaced to any computer or microprocessor utilizing one of its three user selectable modes of operation.

16 Bit Transparent: The 16 bit data is passed from the inputs directly to the DAC. This is the default mode (is 100% compatible with all previous CBNY digital programming boards).

16 Bit Register: The 16 bit data is latched into an internal 16-bit register in one write cycle.

8 Bit Register: Two 8-bit bytes (Most Significant Byte and Least Significant Byte) are latched into two 8-bit registers. The MSB and LSB registers are individually addressed and written. This allows an 8 bit data bus system to provide 16 bit programming in two write cycles.

The register modes utilize standard Chip Select and Write Enable protocol allowing the CBNY to act as a memory mapped register or an I/O port attached directly to an 8 or 16 bit microprocessor system bus. In addition, any standard unit in the Series 205B can be computer programmed and monitored using the Bertan B-HiVE minicomputer controlled enclosure with the appropriate interface module. Remote TTY or RS-232C control at selectable 110 to 9600-baud rate is possible. A separate IEEE-488 interface is also available for use with the Series 205B high voltage power supplies. See the Model 200-C488 data sheet for complete information.

FUNCTIONAL DESCRIPTION:

Connector J3 (Amphenol 57-40240) accepts the remote binary coded inputs and is located on the rear panel. When the REMOTE/LOCAL switch is in the REMOTE DIGITAL position, control of the unit is dependent upon the digital signals present at Pin 2 through Pin 17 of J3. Pin 2 is for the most significant bit, with increasing pin numbers having lower significant bits. Pin 17 is the least significant bit input. Positive logic is used, with logic 0 on all 16 data lines needed for 0 volts output.

The incremental resolution is a function of the power supply's maximum output. The resolution for different models in the Series is listed in TABLE 2.2 below.

TABLE 2.2 – SERIES 205B DIGITAL PROGRAMMING RESOLUTION

-01R	0.02V
-03R	0.05V
-05R	0.08V
-10R	0.16V
-20R	0.31V
-30R	0.50V
-50R	0.80V

OPERATION:

In addition to the 16 data lines, J3 contains ground and +5Vdc output on Pins 21 and 22 respectively, and five control lines described below. The +5Vdc and ground allow remote control via an external digitally coded switch.

The digital data at the input can continuously control the power supply output high voltage. The detailed functions of the control inputs are described below.

Pin 01: 16/8. If strapped to "1" or left open the device operates as a 16 bit parallel input. If strapped to "0" the device operates as an 8 bit parallel bus with the BS input selecting the byte being written.

Pin 18: CS-Chip Select (device select). When "0" the data on the bus may be written into the latches by the WR signal.

Pin 19: WR-Write. When "0" with CS "0" the input to the DAC the data on the bus. When the first CS or WR is returned to "1" the data present on the bus is latched into the DAC.

Pin 20: BS-Byte Select. If the 16/8 input is strapped to "0", a "1" on the BS selects the least significant byte to write data to. If BS is "0" data is written to the most significant byte. If 16/8 input is "1" or open the BS lead has no effect.

Pin 23: Enable. If strapped to "0" or open the output of the latch (input of the DAC) is at high impedance and the input of the DAC set to zero. If strapped to "1" the output of the latch is enabled and the data at the input of the DAC is dependant on the CS WR and F/L.

Pin 24: F/L-Latch/Follow. If strapped to "0" the device operates in a latching mode where data on the data bus is latched into on board latches by a write pulse. If strapped to "1" or left open, the data at the input to the D to A follows the data on the data bus regardless of the levels on CS, WR or BS. The 16/8 must be open or strapped to "1" when in the follow mode or the most significant byte to the DAC will be identical to the least significant byte input.

Byte select must be valid at least 25ns before WR goes low and remain valid at least 40ns after the first of CS or WR to go high.

All timing is from the latter of CS or WR going low and from earlier of CS or WR going high.

The minimum common low time of WR and CS is 40ns. Data must be valid at least 125ns before the earlier of CS or WR goes high and remain valid at least 20ns after that time.

2.9 INPUT POWER

Input AC line voltage required is 115Vac/230Vac \pm 10%, 50-60Hz, single phase. The recessed LINE VOLTAGE selector switch on the rear panel selects either 115 Vac or 230 Vac operation. By default, power supplies are shipped from the factory in the 115Vac position. Before energizing your power supply, verify that this switch is in the proper position for your mains input.

2.10 CURRENT LIMITING

The Series 205B includes a current limiting circuit that drops the output voltage to a safe level when the rated output current is exceeded by approximately 5%. (See specification on Current Capability when operating the unit at reduced output voltages or when operating in a current limit mode for capacitor charging).

2.11 HIGH VOLTAGE OUTPUT

The high voltage output connector is located on the rear panel. An appropriate shielded mating connector is supplied with each unit. These connectors are as listed in Table 2.3. Refer to pages 13-16 for the mating connector assembly instructions. Only the proper mating connector should be used with the indicated power supply and the power supply should never be energized without a mating connector and suitable load connected.

TABLE 2.3: SERIES 205B HIGH VOLTAGE CONNECTORS

MODEL	OUTPUT	MATING
-01R	JDK	PDB
-03R	JDK	PDB
-05R	JDK	PDB
-10R	JJA	405787
-20R	JJA	405787
-30R	JJA	405787
-50R	JJB	405786

SECTION 3 - THEORY OF OPERATION

3.1 FUNCTIONAL DESCRIPTION

The circuit uses a DC to DC converter that converts low voltage DC power to a high voltage DC output. This output voltage is highly regulated and filtered and can be varied either by the front panel controls or through the REMOTE PROGRAM input on the rear panel. The input to the DC to DC converter is obtained from internal low voltage power supplies powered by the AC line input.

An oscillator determines the frequency (approximately 20kHz) at which all amplification, high voltage transformation, rectification and filtering occurs. The amplification is a function of a control voltage that performs the function of control and regulation. A sample of the output voltage is compared against a reference voltage in the sensing circuit. The sensing circuit generates the control voltage to set and maintain a fixed high voltage output.

3.2 CIRCUIT DESCRIPTION

The input AC line is converted to the B+ (36Vdc) supply and regulated +12Vdc low voltage power supplies. The B+ supply is a filtered full wave rectifier circuit located on the chassis. The regulated low voltage power supply circuit (+12Vdc) consists of a rectifier circuit located on T1 and output regulators located on the PCB 100.

The output of the oscillator circuit is amplified in the AGC amplifier. The gain of the AGC amplifier is a function of the control voltage developed at the output of the error amplifier.

The encapsulated high voltage assembly includes a high voltage power transformer, rectifier or multiplier circuits, ripple filter and sensing circuits. These are all critical custom designed and encapsulated components.

A sample of the high voltage DC output is fed to the output voltage sensing circuit and is compared to a command voltage. Output voltage control is obtained by varying the command voltage fed to the error amplifier. The error amplifier compares the command voltage and the signal from the output voltage sense circuit. Any difference causes a correction in the gain control of the AGC amplifier. The command voltage is controlled by the front panel controls when the rear panel program switch is in the LOCAL position.

The reference and reference control and buffer provide a stable +5Vdc to the front panel output voltage controls.

The current sensing circuit monitors the output current. The buffered output of this circuit is employed for both internal and remote current monitoring.

SECTION 4 - MAINTENANCE

4.1 GENERAL

The Series 205B instrument should not require any maintenance. It is designed for reliable, trouble free operation. If any question should arise, contact the Bertan Customer Service Department for assistance or return authorization. It is suggested that the unit be returned to the factory if service should become necessary.

4.2 CLEANING

Cleaning of the power supply should *only* be performed with the supply disconnected from the ac power source. A soft cloth moistened with conventional ammonia-based cleaning agents will suffice for all exposed surfaces. The metal shell of the HV connector should be cleaned with isopropyl alcohol.

If the supply is operated in a dusty environment, an accumulation of dust/debris may build-up inside the unit which may cause noisy operation (i.e., “ticking” or minor crackling) in the area of the HV cabling on the –10R through –50R. The safest way to remove such debris is with compressed air. Ensure that no dust/debris is left behind in the insulative medium of the HV output connector after this cleaning operation. Such dust may be removed with a cotton swab moistened with isopropyl alcohol.

4.3 CALIBRATION SERVICES

Your BERTAN high voltage power supply is designed to provide many years of reliable service. For a nominal charge it can be returned to the factory for calibration and certification to its original specification. For traceability, a certificate will be issued, identifying the serial number of the unit calibrated and all test equipment used to perform the calibration. All measurements are traceable to the National Institute of Standards and Technology (NIST). Calibration is guaranteed from 1 year of issuance. Contact the factory at 1-800-966-2776 or your local sales representative for additional details. For a list of local representatives and other information go to our website at www.bertan.com. You may also email us at support@bertan.com.

4.4 SCHEMATICS

Full-size schematics are available at no cost. Please call 1-800-966-2776 or email us at support@bertan.com. All schematics of the power supply are available with the exception of the high voltage section.

SECTION 5 - SPECIFICATIONS

Output Voltage/Current Capability:

<u>MODEL:</u>	<u>OUTPUT:</u>
205B-01R	1kV@30mA
205B-03R	3kV@10mA
205B-05R	5kV@5mA
205B-10R	10kV@2.5mA
205B-20R	20kV@1mA
205B-30R	30kV@500 μ
205B-50R	50kV@300 μ A

Line Regulation:

$\pm 0.001\%$ maximum for a $\pm 10\%$ line change.

Load Regulation:

$\pm 0.005\%$ for a NL-FL or FL-NL change.

Ripple (maximum @ max Vout, max Iout):

<u>MODEL:</u>	<u>RIPPLE (pk-pk):</u>
205B-01R	10mV
205B-03R	30mV
205B-05R	50mV
205B-10R	100mV
205B-20R	300mV
205B-30R	400mV
205B-50R	2V

Temperature Coefficient:

50ppm per $^{\circ}$ C

Stability (after 30min. warm-up):

0.01% per hour, 0.02% maximum per 8 hours (of maximum rated voltage).

Ambient Temperature Requirements:

Storage: -40° C to $+85^{\circ}$ C.

Operating: 0° to $+50^{\circ}$ C.

Humidity:

<90%, non-condensate

Current Capability:

The maximum current rating for each model, as shown in the table to the left, is applicable when the unit is operated at maximum output voltage. When operated at reduced output voltage levels, or when operating in a current limit mode for charging capacitors, the output current must be

limited to reduced levels. This is required to protect against excessive power dissipation of the driver transistors.

The maximum output current must be linearly derated from maximum output voltage to 30% of maximum current at zero output voltage. Maximum output current available at any desired voltage can be calculated by applying the following formula:

$$I_{max} = V_{set}(.7I_{rated}/V_{rated})+.3I_{rated}$$

When operating the power supply as a capacitor charger (i.e., a capacitor is being continuously discharged then recharged from zero voltage by the power supply) use a charging resistor in series with the power supply output. The resistance should be equal to the power supply's maximum rated output voltage divided by the maximum rated output current.

The above derating factors are safe for all conditions and all models. Consult BERTAN for special cases before exceeding these factors.

BERTAN

**PRECISION HIGH VOLTAGE
POWER SOLUTIONS**

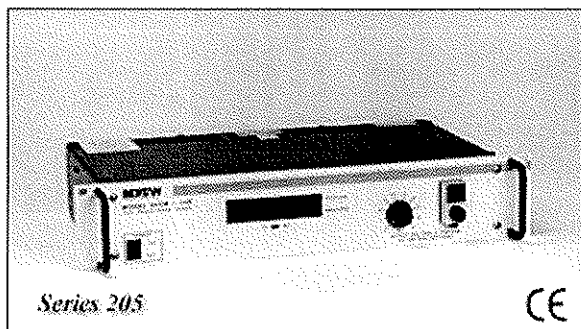


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Series 205B

**30 Watt Regulated DC Output High Voltage Power Supplies
for Laboratory or System Applications**

Operating Manual for Series 205B



- Up To 50 kV Output
- Reversible Polarity
- Digital V & I Metering
- Digital Programming Available
- Accurate Remote Analog Programming
- Short Circuit / Arc Protected
- IEEE-488 Interface Available
- Low Ripple And Noise
- Custom And OEM Designs
- CE Certified

General | Output | Input | Performance | Features | Mechanical | Accessories | Options | Custom Models

General

The Series 205B is a family of precision regulated linear power supplies with output voltages up to 50kV. The units are fully enclosed and can be operated as bench top instruments or mounted into a 19" rack. These stable, low noise high voltage power supplies feature reversible polarity, remote analog programming and monitoring, front panel digital voltage and current metering, and calibrated direct reading front panel voltage controls. All units have arc and short circuit protection for safe, reliable operation.

The output high voltage of the Series 205B can be remotely programmed or controlled via the precision front panel direct reading controls. All models can be adjusted over their full output voltage range using an analog programming 0 to +5V signal or with an external potentiometer. Units may also be ordered with remote digital 16 bit binary programming (option CBNY). This option accepts TTL compatible programming inputs applied at a rear panel digital programming connector.

Remote analog monitoring of the high voltage output is standard on all Series 205B power supplies. Signals proportional to the output voltage and output current are provided at the rear panel I/O connector. A logic output signal indicating high voltage polarity and a logic ENABLE input are also standard.

Full talker/listener capability for the Series 205B is available through an intelligent IEEE-488 interface which is offered as an accessory. This interface (the Model 200-C488) functions with all Series 205B power supplies, and allows output voltage, voltage limit, and current limit to be remotely programmed via the IEEE-488 bus. In addition, voltage and current measurements can be taken on request, and the supply can be programmed to shut down on a voltage and/or current overload condition. (For additional details see the **Model 200-C488** data specification).

Output

MODEL	OUTPUT
-------	--------

SERIES 205B	VOLTAGE	V-DISPLAY RESOLUTION	CURRENT	I-DISPLAY RESOLUTION	RIPPLE (pk-pk)
205B-01R	0 to 1kV	1V	0 to 30mA	10 μ A	10mV
205B-03R	0 to 3kV	1V	0 to 10mA	10 μ A	30mV
205B-05R	0 to 5kV	1V	0 to 5mA	1 μ A	50mV
205B-10R	0 to 10kV	10V	0 to 2.5mA	1 μ A	100mV
205B-20R	0 to 20kV	10V	0 to 1mA	1 μ A	300mV
205B-30R	0 to 30kV	10V	0 to 0.5mA	1 μ A	400mV
205B-50R	0 to 50kV	10V	0 to 0.3mA	1 μ A	2V

Polarity:

For 1kV through 5kV models polarity reversal is achieved by a screwdriver switch accessible at the rear panel of the unit. For 10kV through 50kV models polarity reversal is achieved by the reversal of an internal connector. The selected polarity is displayed by a front panel LED indicator.

Input**Power:**

115 Vac \pm 10% @ 1.0 Ampere, 50-60Hz.

230 Vac \pm 10% @ 0.5 Ampere, 50-60Hz.

Performance**Line Regulation:**

\pm 0.001% for \pm 10% input line change.

Load Regulation:

\pm 0.005% 0 to maximum rated output current change.

Ripple:

See chart above.

Temperature Coefficient (0 to 50°C):

50ppm per °C.

Storage Temperature:

-40°C to +85°C

Stability (after 1 hr warm-up):

0.01% per hr., 0.02% per 8hrs.

Features**Front Panel Meters:**

Front panel 4 digit LED meter, switch selectable for reading the output voltage or current. The meter accuracy is \pm (0.1% of reading + 0.1 % of maximum) for voltage and \pm (0.25% of reading + 0.25% of maximum) for current.

Front Panel Controls:

Calibrated front panel direct reading multi-turn precision potentiometer and switches. Accuracy is \pm (0.25% of setting + 0.05% of maximum) for models up to and including 20kV; \pm (0.25% of setting + 0.05% of maximum) for 30kV and 50kV units.

Resolution:

200mV for models up to and including 20kV; 0.2% of maximum for 30kV and 50kV models.

Remote Programming:

0 to +5 Volt dc analog input signal proportional to 0 to maximum rated output. Accuracy is $\pm(0.1\%$ of setting + 0.1% of maximum). The programming input impedance is greater than 1 megohm.

Analog Output Voltage Monitor:

0 to +5 Volts proportional to 0 to maximum output high voltage. Accuracy is $\pm(0.1\%$ of reading + 0.1% of maximum). The monitor output impedance is 10 kilohms.

Analog Output Current Monitor:

0 to +5 Volts proportional to 0 to maximum output current. Accuracy is $\pm(0.5\%$ of reading + 0.25% of maximum). The monitor output impedance is 10 kilohms.

Interlock:

Remote interlock disables (low), enables (high) the high voltage output. Signal is normally high and supply will default to an "enabled" condition.

Current Limit:

Automatic current limiting occurs at approximately 105% of maximum rated output current at maximum rated output voltage. The allowable output current at any set voltage must be derated linearly down to 30% of maximum at 0 output voltage. Supply is self-restoring upon removal of cause of limit condition.

Protection:

Arc and short circuit, self restoring.

Mechanical**Size:**

All models up to and including 20kV are 19" W x 3½" H x 9-5/8" D (483 x 89 x 244mm).

30kV and 50kV models are 19" W x 5-¼" H x 16" D (483 x 133 x 406mm).

Weight:

All models up to and including 20kV weigh 20lbs (9.1kg). 30kV and 50kV models weigh 35lbs (15.9kg).

High Voltage Connector:

All models up to and including 5kV: Bertan P/N JDK output connector, Bertan P/N PDB mating connector (MHV Type UG-932/U) included. **Preassembled HV cable** must be purchased separately.

All 10kV, 20kV and 30kV models: Bertan P/N JJA output connector, Bertan P/N 405787 mating connector kit included. **Preassembled HV cable** must be purchased separately.

50kV models: Bertan P/N JJB output connector, Bertan P/N 405786 mating connector kit. The mating high voltage connector is provided with each unit. **Preassembled HV cable** must be purchased separately.

Floating Input Connector (Option -RF only):

Bertan P/N JDK input connector. Bertan P/N PDB (MHV Type UG-932/U) mating connector is provided with each unit. **Preassembled HV cable** must be purchased separately.

Power Input Connector:

3-wire IEC line cord receptacle. Detachable line cord is included.

Low Voltage I/O Connector:

The PROGRAMMING/MONITOR connector is a standard 9 pin "D" type connector. A mating connector is provided with each unit.

Accessories

Model 200-C488, IEEE-488 Interface:

The Bertan Model 200-C488 is a separate, 19" rack-mountable intelligent interface which allows a GPIB controller to program and monitor a Series 205B high voltage power supply. In addition to output voltage control and monitoring capability, the 200-C488 provides the user with a number of additional functions such as programmable overload detection and response. Please refer to the **Series C488** data sheet for further details.

Options

CBNY, Digital Programming Interface:

All Series 205B supplies can be provided with a factory-installed option for remote digital programming of the high voltage output. The programming inputs are TTL compatible and the data is positive logic (all data bits low yield 0 high voltage output). The addition of this option allows the power supply to be easily interfaced to any computer or microprocessor. User selectable modes of operation include 8 bit data bus input, 16 bit data bus input, latching and non-latching control. Refer to the **Option CBNY** specification sheet for further details.

Installation of option CBNY does not defeat any of the standard features. Selection of front panel or remote analog programming is still available.

Isolated (Floating) Output:

Units can be provided with the output capable of floating up to $\pm 2\text{kV}$ from ground. All controls, programming and monitoring function normally, referenced to ground. The high voltage output polarity, with respect to the floating input terminal, is reversible. Specify option RF. Consult factory for additional information.

Custom Models

Series 205B can be economically and quickly modified to satisfy custom applications. Other output voltage and/or current ratings, custom control features, digital programming, or special mechanical constraints are some of the varied requirements which can be satisfied. Contact **Bertan Sales Engineering** for a prompt review of your application.

Adobe Acrobat Documents



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- **Specification (this document)**
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