



FC-23B

DC Amplifier

INSTRUCTION MANUAL

Serial No. _____

2009.11.02

World Precision Instruments

www.wpiinc.com



Introduction

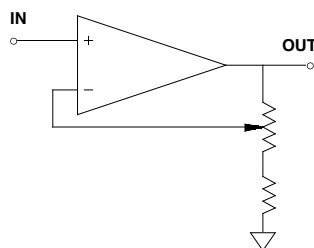
This instrument is a variable-gain non-inverting DC voltage amplifier. Gain is variable from x1 to x10. Powered by one transistor battery, the average current drain is small enough to permit several hundred hours of operation before the battery requires replacement. A simplified representation of the internal circuit is shown below.

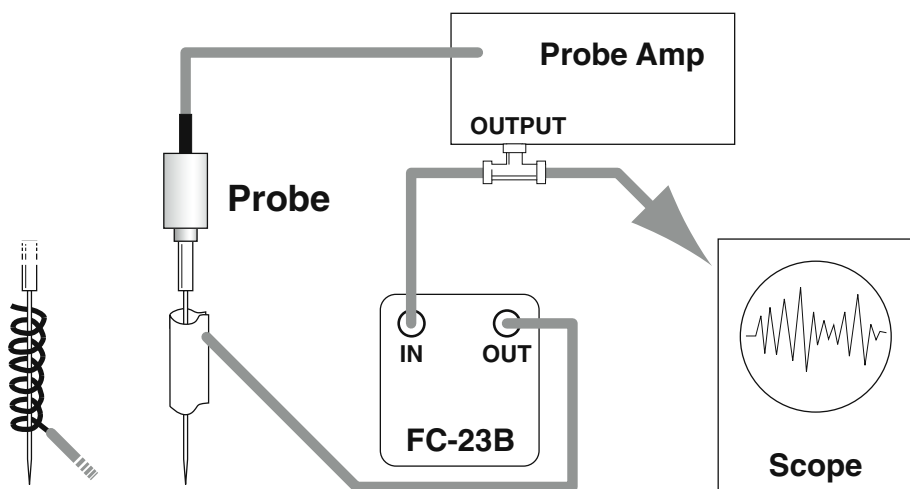
The amplifier's low noise and wide bandwidth allow it to be used as:

1. General purpose DC amplifier
2. Negative Capacity generator.

Negative Capacity Application

A Negative Capacity generator is used to cancel stray capacitance shunting high resistance microelectrodes. To use this instrument connect the output of the electrometer amplifier to the input terminal of FC-23B. Next, connect the output, as suggested in Figure 2, to a plate of copper or aluminum foil (2 or 3 cm²) close to the microelectrode of the channel selected. A single turn wire loosely encircling the electrode may also be used.





To test the adequacy of the capacitance coupling to the electrode, perform the following test: With the microelectrode touching a grounded electrolyte solution, advance the control knob until the output of the electrometer channel breaks into oscillation. Back off the control knob until the oscillation stops. If the channel will not oscillate, increase the capacity of the plate or loop by placing the plate closer to the electrode or winding more turns on the wire loop. The above procedure is one way that the user can routinely compensate for electrode stray capacity.

An alternative technique would be to apply a step current waveform to the electrode and observe the speed of the step voltage response as the FC-23B control knob is advanced. Leave the knob at the position where the step is rapid as possible without overshoot or oscillation. Do not allow the FC-23B output wire or plate to touch the surface of the electrolyte solution. Replace the 9V transistor battery every six months or as needed.

Specifications

Input resistance.....	1 Megohm
Output resistance.....	220 Ohms
Output voltage swing	± 3 volts
Small signal step voltage rise time.....	<1 microsecond @ x1 gain
Battery drain	400 microamperes

Remember to turn the amplifier off when not in use. The result will be considerably longer battery life.



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DECLARATION OF CONFORMITY

We: World Precision Instruments, Inc.
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USA

as the manufacturers of the apparatus listed, declare under sole responsibility that the product(s):

Title: FC23B (containing dry batteries)

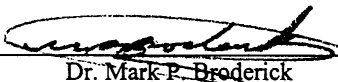
to which this declaration relates is/are in conformity with the following standards or other normative documents:

Safety: EN 61010-1:1993 (IEC 1010-1:1990)

EMC: EN 50081-1:1992
EN 50082-1:1992

and therefore conform(s) with the protection requirements of Council Directive 89/336/EEC relating to electromagnetic compatibility and Council Directive 73/23/EEC relating to safety requirements.

Issued on: 18th February 2000


Dr. Mark P. Broderick
President and COO

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Mr. Glen Carlquist
Production Manager

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Warranty

WPI (World Precision Instruments, Inc.) warrants to the original purchaser that this equipment, including its components and parts, shall be free from defects in material and workmanship for a period of one year* from the date of receipt. WPI's obligation under this warranty shall be limited to repair or replacement, at WPI's option, of the equipment or defective components or parts upon receipt thereof f.o.b. WPI, Sarasota, Florida U.S.A. Return of a repaired instrument shall be f.o.b. Sarasota.

The above warranty is contingent upon normal usage and does not cover products which have been modified without WPI's approval or which have been subjected to unusual physical or electrical stress or on which the original identification marks have been removed or altered. The above warranty will not apply if adjustment, repair or parts replacement is required because of accident, neglect, misuse, failure of electric power, air conditioning, humidity control, or causes other than normal and ordinary usage.

To the extent that any of its equipment is furnished by a manufacturer other than WPI, the foregoing warranty shall be applicable only to the extent of the warranty furnished by such other manufacturer. This warranty will not apply to appearance terms, such as knobs, handles, dials or the like.

WPI makes no warranty of any kind, express or implied or statutory, including without limitation any warranties of merchantability and/or fitness for a particular purpose. WPI shall not be liable for any damages, whether direct, indirect, special or consequential arising from a failure of this product to operate in the manner desired by the user. WPI shall not be liable for any damage to data or property that may be caused directly or indirectly by use of this product.

Claims and Returns

- Inspect all shipments upon receipt. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed loss or damage should be reported at once to the carrier and an inspection requested. All claims for shortage or damage must be made within 10 days after receipt of shipment. Claims for lost shipments must be made within 30 days of invoice or other notification of shipment. Please save damaged or pilfered cartons until claim settles. In some instances, photographic documentation may be required. Some items are time sensitive; WPI assumes no extended warranty or any liability for use beyond the date specified on the container.
- WPI cannot be held responsible for items damaged in shipment en route to us. Please enclose merchandise in its original shipping container to avoid damage from handling. We recommend that you insure merchandise when shipping. The customer is responsible for paying shipping expenses including adequate insurance on all items returned.
- Do not return any goods to WPI without obtaining prior approval and instructions (RMA#) from our returns department. Goods returned unauthorized or by collect freight may be refused. The RMA# must be clearly displayed on the outside of the box, or the package will not be accepted. Please contact the RMA department for a request form.
- Goods returned for repair must be reasonably clean and free of hazardous materials.
- A handling fee is charged for goods returned for exchange or credit. This fee may add up to 25% of the sale price depending on the condition of the item. Goods ordered in error are also subject to the handling fee.
- Equipment which was built as a special order cannot be returned.
- Always refer to the RMA# when contacting WPI to obtain a status of your returned item.
- For any other issues regarding a claim or return, please contact the RMA department.

Warning: This equipment is not designed or intended for use on humans.

** Electrodes, batteries and other consumable parts are warranted for 30 days only from the date on which the customer receives these items.*



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