Section 1

Introduction & Specifications

1-1. DESCRIPTION

1-2. The Model 731A DC Transfer Standard is a versatile instrument, providing a variety of precision voltages with standard cell accuracy. It will furnish basic outputs of 1.000 volts, (1.018 + ΔE) volts, (1.019 + ΔE) volts, 10.000 volts, and ΔE (0 to 999 microvolts).

1-3. The ΔE control is a precision 10-turn linear potentiometer which has a 3-digit direct reading dial. The control is equipped with a locking lever which prevents accidental changing of the ΔE setting. Resolution of the control is 1 microvolt, thus allowing 1 microvolt steps (to 999 microvolts) to be added to the 1.018 and 1.019 volt outputs. The ΔE output may be selected independently as well.

1-4. The primary reference element in the 731A is a reference amplifier with precisely known characteristics. The device is a zener diode with active circuitry added to provide a voltage reference having a very low temperature coefficient over a 55°C temperature range. Output voltage stability is better than 10 ppm/month; transfer accuracy is 2 ppm/month between standard cells.

1-5. The 731A is powered by a rechargeable battery pack. State of charge is indicated on a front panel meter.

1-6. The 731A is supplied with non-marring feet for bench or field use. It may also be conveniently mounted in a standard 19" EIA rack using optional mounting kits.

1-7. ELECTRICAL SPECIFICATIONS

OUTPUT VOLTAGE	10.000 volts dc. 1.000 volts dc (1.018 + ΔE) volts dc. (1.019 + ΔE) volts dc. ΔE: +0.0 to 999 uv in 1 uv steps.
TRANSFER ACCURACY	2 ppm between standard cells. 3 ppm between standard cell and 1V output. 5 ppm between standard cell and 10V output.
ΔE RESOLUTION AND ACCURACY	1 uv
REFERENCE STABILITY	Better than 10 ppm per month after 30 minute warmup.
OUTPUT IMPEDANCE	Less than 1.1K for 1V, 1.018V, 1.019V, and 10V positions. Less than 150 for ΔE (0.0 to 999 uv) position.
LINE REGULATION	Less than 1 ppm/±10% line variation.
RIPPLE AND NOISE	Less than 1 ppm p-p from dc to 1 Hz. Less than 20 uv RMS from 1 Hz to 1 mHz.

COMMON MODE REJECTION	120 db at dc. 100 db at 60 Hz. 85 db at 400 Hz.
OUTPUT CURRENT	5 ma (maximum) with output shorted. No instrument damage from shorted output.
ISOLATION	Output may be floated up to 500 vdc between chassis ground and guard.
CALIBRATION ADJUSTMENT	Separate internal adjustments for the five output voltages. Front panel adjustment common to all voltages including the 10.000 volt output. Calibrate at 90-day intervals. Basic reference adjustments accessible from front panel.

1-8. ENVIRONMENTAL SPECIFICATIONS

TEMPERATURE RANGE:	+0°C to +55°C operating. –40°C to +60°C non-operating.
TEMPERATURE COEFFICIENT	Less than .5 ppm/°C, 20°C to 30°C. Less than 1 ppm/°C, 4°C to 40°C. Less than 1.5 ppm/°C, 0°C to 4°C and 40°C to 55°C.
SHOCK AND VIBRATION	Meets requirements of MIL-T-21200H.

1-9. GENERAL SPECIFICATIONS

TERMINALS	Three five-way binding posts for positive, negative and guard. All terminals solid copper with gold flash.
BATTERY OPERATION	Rechargeable nickel-cadmium batteries provide at least 30 hours of continuous operation.
INPUT POWER	115V or 230V ±10 VAC, 50 Hz to 400 Hz single phase or internal battery operation.
SIZE	3.5" high x 4.25" wide x 12" deep (Figure 1-1).
WEIGHT	5 lbs.

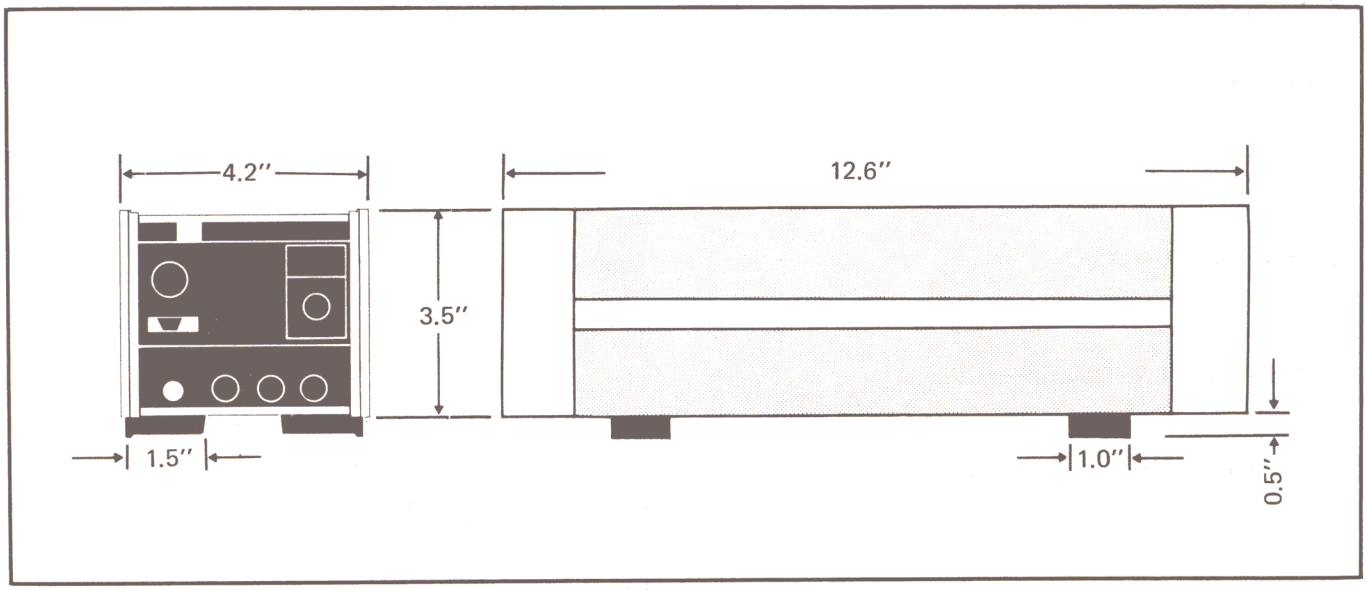

Figure 1-1. 731A OUTLINE DRAWING

1-10. ACCESSORIES

M03-201-601	Rack Mounting Kit, Single 731A, Offset Mounting.
M03-202-603	Rack Mounting Kit, Two 731A's.
M03-206-604	Rack Mounting Kit, Three 731A's.
M03-205-605	Rack Mounting Kit, Four 731A's.
M03-200-611	Rack Mounting Kit, Single 1/2-Rack Instrument plus One 731A.
M03-200-609	Rack Mounting Kit, Single 1/2-Rack Instrument plus Two 731A's.