

highest accuracy for graphic data handling...



LIBRASCOPE

XY PLOTTER

and **RECORDER**



LIBRASCOPE, INC. • 808 WESTERN AVENUE • GLENDALE, CALIFORNIA

LIBRASCOPE

XY PLOTTER

and RECORDER

LIBRASCOPE X-Y Plotters and Recorders can be most advantageously employed in any application for rapid graphic data depiction of one independent variable in terms of another.

For the rapid presentation of data, LIBRASCOPE X-Y Plotters and Recorders offer wider application possibilities, greater accuracy and faster response than heretofore attainable in instruments of this type.

The highest input impedance obtainable combined with simplified operation, makes LIBRASCOPE X-Y Plotters exceptionally flexible.

Superiority of LIBRASCOPE X-Y Plotters is achieved by meticulous attention to every detail in precision manufacture, use of the finest materials and unique, exclusive features designed and developed by Librascope.

Both Potentiometer Transducer and D.C. Input types of LIBRASCOPE X-Y Plotters are standard equipment, with each type capable of being readily modified for special applications or customer requirements.

Maximum reliability and minimum maintenance are assured through Librascope's functional designing and manufacturing techniques.

The LIBRASCOPE X-Y Plotter and Recorder is presented as a superior, functional instrument that replaces any manual plotting of curves in applications ranging from scientific laboratories to industrial and engineering offices where automatic plotting is an important adjunct for increasing production.

All Librascope X-Y desk model plotters are readily adaptable for mounting in standard RCA and RMA racks, for which accessory hardware is available without extra cost.

SERVING A GROWING NEED IN SCIENCE AND INDUSTRY

The LIBRASCOPE X-Y Plotter and Recorder is being used in the rapid plotting of curves (or point plots) in ever expanding areas of application. Today, LIBRASCOPE Plotters are operating as vital equipment in many varied applications for research facilities, computer systems, control applications

and data handling systems. In the fields of medicine and education LIBRASCOPE X-Y Plotters are being utilized in increasing volume and hundreds of LIBRASCOPE Plotters are advantageously employed daily in the laboratories of many of the nation's most outstanding organizations.



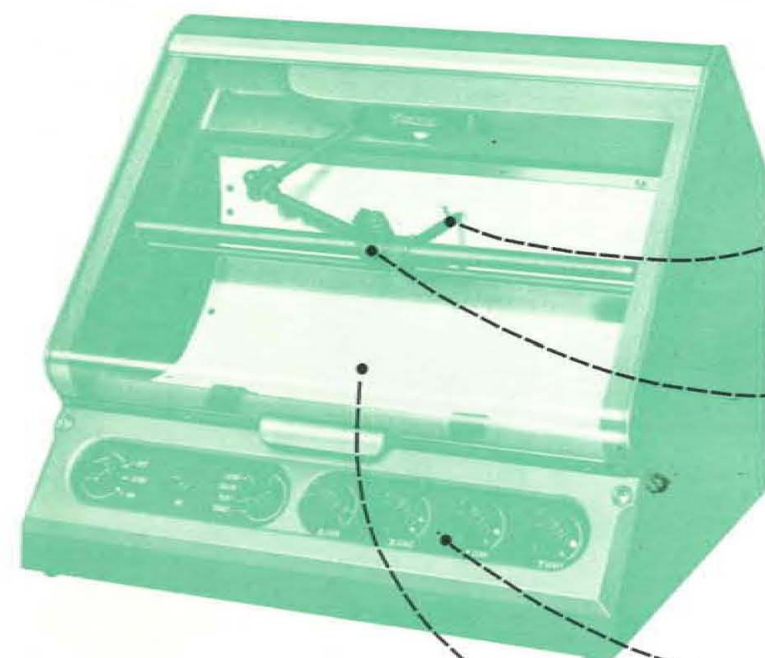
TYPICAL APPLICATIONS

Automatic Process Control Monitoring
Time Share Multi Plots
Vacuum Tubes Characteristics
Analog Computer Outputs
Digital Computer Outputs
Radiation Pattern Studies
Dilatometry Data Plotting
Transistor Characteristic Curves
Business Trend Graphing and Many others

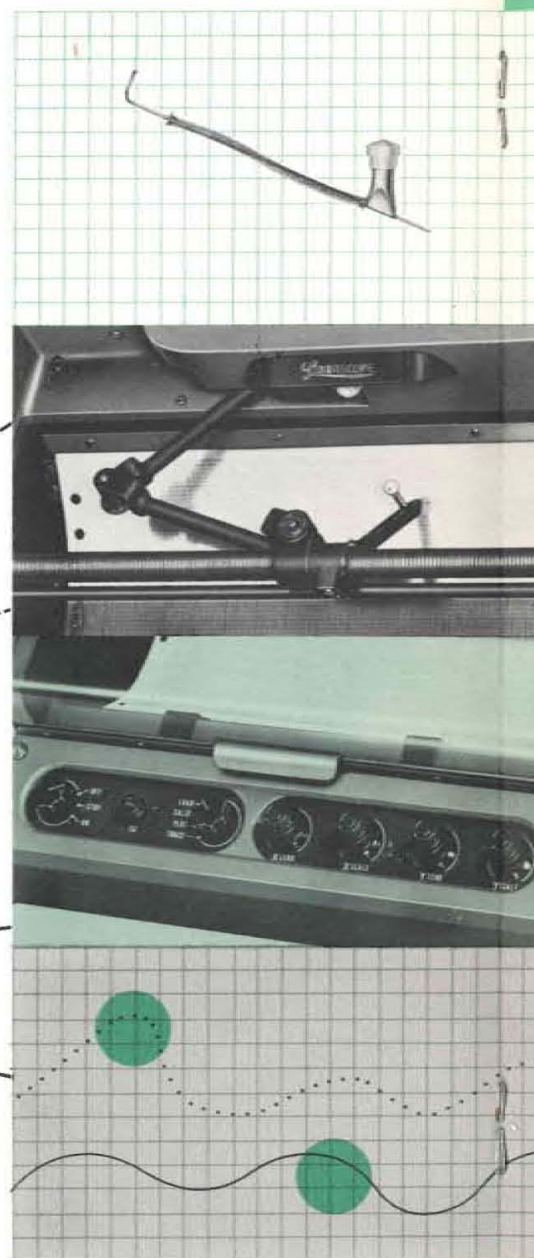
Diode Characteristic Curves
Calibration Curves
Stress Strain Diagrams
Punched Card & Punched
Tape Data Plotting
Wind Tunnel Test Data
Transducer Response Curves
Pressure Capacity Curves
Pressure Temperature Curves

Contact your nearest Librascope representative—or Librascope direct—concerning your specific requirements or applications.

FEATURES FOR SIMPLIFIED OPERATION



LIBRASCOPE X-Y PLOTTER AND RECORDER Models 200-A, 200-B are engineered for precision, accuracy, rapid response and ease of operation. Precision gears—positive action—minimum torque—1-piece frame casting—rugged construction—functional design—attractive appearance and easy access to all parts, are features that ensure long life and smooth, trouble-free operation for LIBRASCOPE X-Y Plotters.



RELIABLE INK FEED SYSTEM

The plotter is equipped with a capillary pen containing an integral ink supply that produces easy flow and uniformity of line. The pen has no moving parts and ink flows only when contact is made with the paper. Ink reservoir is sufficient for extended periods of operation—can be readily refilled with an eye dropper and is easily removed for cleaning. Same pen is used for both curve recording and point plotting.

UNIQUE FLOATING GEAR TRAIN

Translation of the pen carriage along the X axis is accomplished by Librascope's Unique Floating Gear Train, eliminating cables, tapes or lead screws that might cause lost motion or drifting out of alignment. The pen assembly is driven along a rack by a spur pinion—which is in turn driven by a bevel gear train. The pinion is stabilized with reference to the motor gear, allowing translation of the pen carriage as a linear function of rotation of the X axis servomotor.

As only 120° of arc is required to position the pen in the Y axis, a short bell crank is affixed to one end of the circular rack. The Y axis servo motor gear train drives a similar bell crank which positions the pen carriage on that axis. In this manner, complete independence of the X and Y axes are achieved.

CONVENIENT FRONT PANEL CONTROL

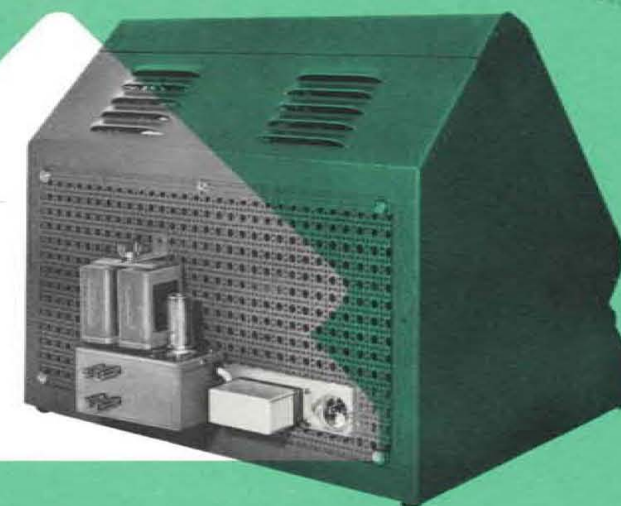
The Librascope X-Y Plotter and Recorder is operated by controls conveniently located on the front panel. All power is controlled by a three-way OFF-STANDBY-ON switch. The single switch handles plotter operations—LOAD (chart insertion); CALIBRATE; POINT PLOTTING; TRACE (curve recording). The Model 200A has scale knobs which provide for continuous independent scale expansion in each axis from approximately 1/10:1 to 10:1. Independent zero knobs permit placement of the origin at any point in the expanded chart, even though it may be outside the actual plotting area. Vernier controls are provided on both zero and scale knobs for precise adjustments. The Model 200B has zero knobs providing for placement of the origin anywhere on the chart surface. Scale attenuators for each axis provide for independent selection of 11 full scale voltage ranges from 5 millivolts to 10 volts.

FULL VISIBILITY PLOTTING

Configuration: 120° of a concave circular cylinder—easy vision of entire plotting area—stationary chart paper.

Area: Takes standard 11" x 17" or 8½" x 11" graph paper. Plotting area 10" x 15", plus ⅛" overtravel. Paper guides position chart paper quickly and accurately. A hold-down clamp is provided to secure paper in position.

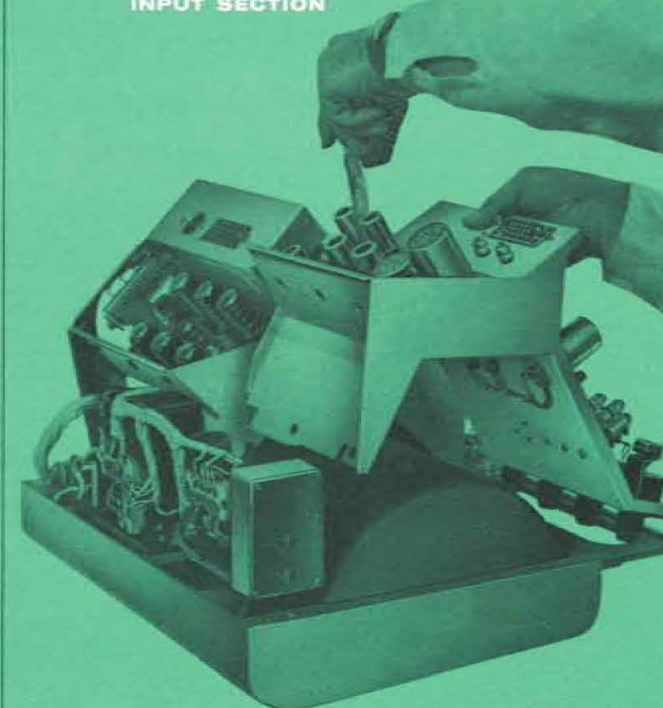
Donald G. McBrine



ISOLATION UNIT

Input isolation units are available for the Model 200B Plotter where applications require complete separation of signal source from one or both plotter input terminals. It is recommended for use on the 100 millivolt range and above and does not affect static input impedance.

REMOVABLE INPUT SECTION



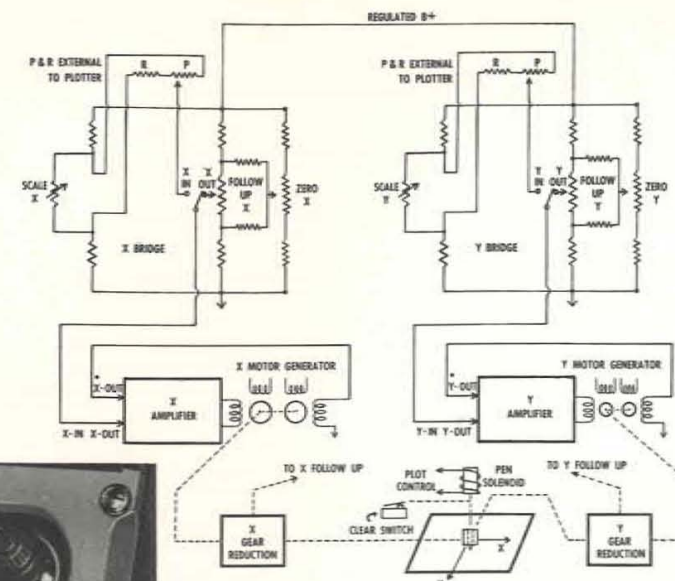
Split chassis construction and plugged connections on follow-up potentiometers and between chassis are provided to facilitate the conversion from Type "A" to Type "B" Plotter. Custom preamplifiers for accepting a variety of special inputs are also designed to facilitate conversion.

AVAILABLE IN 2 BASIC MODELS

MODEL 200A FOR RESISTANCE INPUTS



The 200A X-Y Plotter responds to analog or digital inputs transduced by two potentiometers or comparable voltage dividing devices located externally. The resistance presented by these voltage dividers completes modified Wheatstone bridge circuitry associated with each plotter axis. The completed bridge circuits, energized by an internally regulated supply, assure drift-free operation of the plotter. An external reference supply is not required. Analog functions may be plotted wherever a potentiometer can be employed for the input. Normally, a 10 K Pot is used and, for this

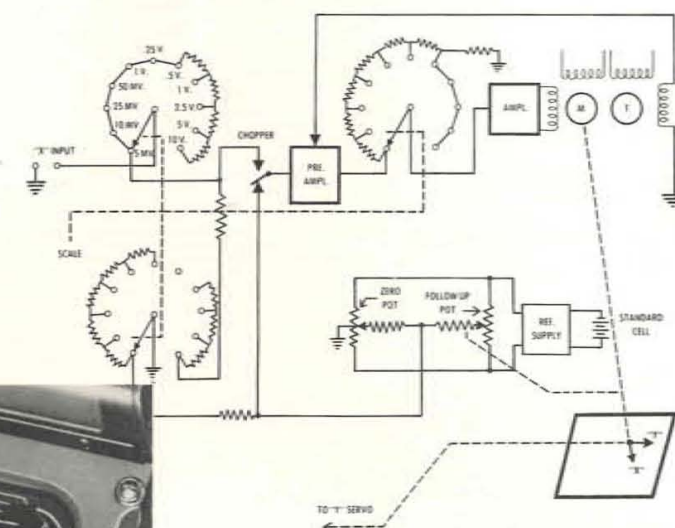


value the scale is expandable from 1/10:1 to 10:1 and the zero may be placed anywhere in the expanded chart area. Typical vacuum tube servo amplifiers are used throughout the plotter and a chopper is the sampling mechanism for each axis. Tachometer damping provides for servo stability. A rear connector provides, in addition to the X and Y input potentiometer connections, access to the following external control: servo motors disconnect; pen drop solenoid; amplifier outputs for servo null detection, B+, 6.3VAC and a "complete cycle" or clear switch (Form C) on pen solenoid.

MODEL 200B FOR DC SIGNAL INPUT



The Model 200B X-Y Plotter accepts DC voltage as its inputs and contains a regulated follow-up power supply. This supply is referenced to an Eppley Standard Cell and is chopper stabilized to eliminate adjustment and provide drift-free operation. Full scale sensitivity is varied independently in each axis by controls providing scales of 5, 10, 25, 50, 100, 250, 500 millivolts and 1, 2½, 5, 10 volts, all accurate to 0.1%. Input sensitivity for the millivolt ranges is varied by changing the voltage gradient from the follow-up potentiometers, and an input attenuator is introduced only on the one volt and higher ranges. Amplifier gain is reciprocally attenuated through the millivolt ranges, assuring a constant damping ratio. This



scaling technique makes possible the high input impedance and provides for an increased internal signal to noise ratio as the scaling increases from the 5 millivolt setting. Static input resistance for the millivolt ranges approximate 1000 megohms. Input impedance for all scale settings is 2 megohms or greater. A chopper for each axis provides the DC to AC error conversion and standard vacuum tube servo amplifiers follow. Tachometer damping provides for servo stability. A rear connector provides the same features as described for the 200A Plotter, however, the DC signals for each axis are connected to separate input plugs.

PHYSICAL DESCRIPTION

DIMENSIONS

Desk Mounting	Height	15½ inches
	Width	19 inches
	Depth	16¾ inches
Rack Mounting (For standard RCA or RMA racks)	Weight	70 pounds
	Height	19¼ inches
	Width	19 inches (with filler strip)
	Depth	12 inches behind rack, 2 inches in front.
	Weight	60 pounds

Smooth gray finish. Rust resistant throughout. Mechanically rugged. Designed and built for long life and attractive appearance. Latest dry lubrication techniques employed.

SPECIFICATIONS

- ACCURACY:** Static; 0.1%. Dynamic; 0.5% at 5"/sec. Dynamic error applies only to continuous inputs. For point plotting, only the static error applies.
- RESPONSE:** Approx. 1 sec. full scale in either axis.
- POWER CONSUMPTION:** 115-Volt—60 cycle—300 watts
- CONTROLS:** All conveniently located on front panel; OFF-ON-STANDBY-LOAD-CALIBRATE-PLOT-TRACE-XY ZERO and SCALE knobs.
- PAPER LOAD:** Pen automatically retracts, pen carrier moves to upper left hand corner of plotting area for convenience in loading paper.
- CALIBRATE:** Pen retracts, servos energized to facilitate setting of plotting limits. (Pen may be retracted and locked manually if desired.)
- PLOT:** Pen and servos controlled externally allowing discrete point plotting.
- TRACE:** Pen drops and servos energized for continuous curve recording.



WIDE CHOICE OF INPUT ACCESSORIES

The highest accuracy, speed and convenience for graphic data handling is achieved with LIBRASCOPE X-Y Plotters and Recorders used in conjunction with Librascope's selection of input accessory devices—Punched Card and Punched Tape Converters, Decimal Keyboards and Binary Converters—suited for wide data presentation applications including; laboratory tests, computers, data handling systems, wind tunnels, missile tracking and almost any form of stored digital data.

**LIBRASCOPE
PUNCHED CARD
CONVERTER
Model 251**



This relay operated converter accepts three decimal digit and sign, two channel, IBM punched card information and converts it to an analog form suitable for input to the Model 200A X-Y Plotter. Pulses from the IBM equipment set up the converter's relays to form resistance banks corresponding to the value of the IBM punched card columns selected. Converter circuitry detects the null of the plotter servos and actuates the plotter pen for a discrete point plot of the value indicated for both axes, resets and signals the IBM machine for the next set of data automatically. Cards can be manually fed through the IBM reading brushes one at a time or automatically read at rates to 50 cards per minute with an accuracy of 0.1%.

Operates with the following IBM equipment:

1. Reproducing Punch Type 519
2. Gang Summary Punch Type 523
3. Special models upon request for binary cards and other IBM types.

Mounting: Standard RCA or RMA rack mounts or in case.

**LIBRASCOPE
DECIMAL
KEYBOARD**



Model 225—For use with Model 200 A Plotter
Model 226—For use with Model 200-B Plotter
Model 228—For use with Model 251 Punched Card Converter

Description

Height 6 inches	Depth 11 inches
Width 8 $\frac{1}{4}$ inches	Weight 12 pounds

Controls

Keyboard consists of a three-decimal bank for each axis with associated plus-minus keys. Depressing of plotting bar initiates plot and clears keyboard automatically. Manual clear button also provided. Features Librascope positive-action self-wiping contacts.

**LIBRASCOPE
PUNCHED TAPE
CONVERTER
Model 253**



This relay operated converter accepts digital information from a punched paper tape and converts it to a corresponding analog resistance for use in controlling the Model 200A X-Y Plotter. Information on the tape is fed through a stepping switch to relay resistor banks. Converter will accept 3 decimal digits and sign for each axis, and can reject any additional information by programming.

Converter circuitry detects the null of the plotter servos, actuates the plotter pen for a discrete point plot of the value indicated by the punched tape for both axes, resets and signals the tape reader for the next set of data automatically. Operation is by manual advance or automatic feeding of tape. Speeds up to 80 points per minute with an accuracy of 0.1% can be obtained.

The converter can be supplied to accept any one of a number of different tape formats and tape readers such as the Flexowriter. Mounting: Standard RCA or RMA rack mounts or in case.

**LIBRASCOPE
BINARY
CONVERTER
Model 252**



Consists of two banks of relays and precision resistors simulating a precision potentiometer. The resistors weight the relays in straight binary so that each bank serves as an input to one axis of the X-Y Plotter. Total resistance is 10,000 ohms per bank. Normally, external thyratrons energize the relays and order the plot cycle. Relays within the converter control the plot cycle. 120 volts DC must be furnished at 550 milliamps as external power.

Description

Height 8 $\frac{3}{4}$ inches	Depth 8 $\frac{1}{2}$ inches
Width 19 inches	Weight 17 pounds

Mounting: Standard RCA, RMA rack mounts.

Librascope reserves the right to change specifications without notice.



Automatic control systems,
computers and components

LIBRASCOPE

A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION

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