S-EA.531

TRADE AND COMMERCE
CANADA

STANDARDS BRANCH

OTTAWA December 6, 1961

TYPE APPROVAL

GENERAL ELECTRIC TYPE "HF" SINGLE-PEN AND TYPE "HL" TWO-PEN RECORDING POTENTIOMETERS

The apparatus specified and illustrated herein has been duly approved by the Standards Branch under the provisions of the Electricity Inspection Act, Chapter 94, R.S. 1952, and may be admitted to verification in Canada.

Apparatus Approved: Type "HF" Single-Pen and Type "HL" Two-Pen Recording Potentiometers, manufactured by the General Electric Company, Schenectady, New York, U.S.A. and distributed in Canada by the Canadian General Electric Company Limited, Quebec 8, P. Q.

Rating of Apparatus:

*Millivolt Input or Inputs	Ranges up to 1500 millivolts
#Record	One or two continuous lines
Standardization	Zener Diode regulated voltage reference source
Pen Speeds	1, 2, 4, 10 or 24 seconds for full scale travel
°Chart Speeds:	
Group 2 - 5 r.p.m. motor	5, 10, 15, 20, 30, 60 inches per hour
Group 3 - 30 r.p.m. motor	30, 60, 90, 120, 180, 360 inches per hour
Group 4 - 1 r.p.m. motor	1, 2, 3, 4, 6, 12 inches per hour
Chart	12 inches wide, 10¾ inches calibrated width
Supply Voltage	120 or 240 volts
Supply Frequency	50 or 60 cycles
Maximum External Resistance	3000 ohms
xFailure Protection	Optional

*The kilowatts that the millivolts represent shall be shown on the nameplate scale. In the case of type "HL" each input may have a different value.

#In the type "HL" one measuring system drives the red pointer and the pen drawing the red inked line, and the other drives the black pointer and the pen drawing the black inked line.

°Each recorder is supplied with change gears to enable conversion to any chart speed within any one group.

xFailure protection, when incorporated, causes the recorder to be driven off scale (either up or down scale) in the event of a break in the primary detector circuit or a component failure.

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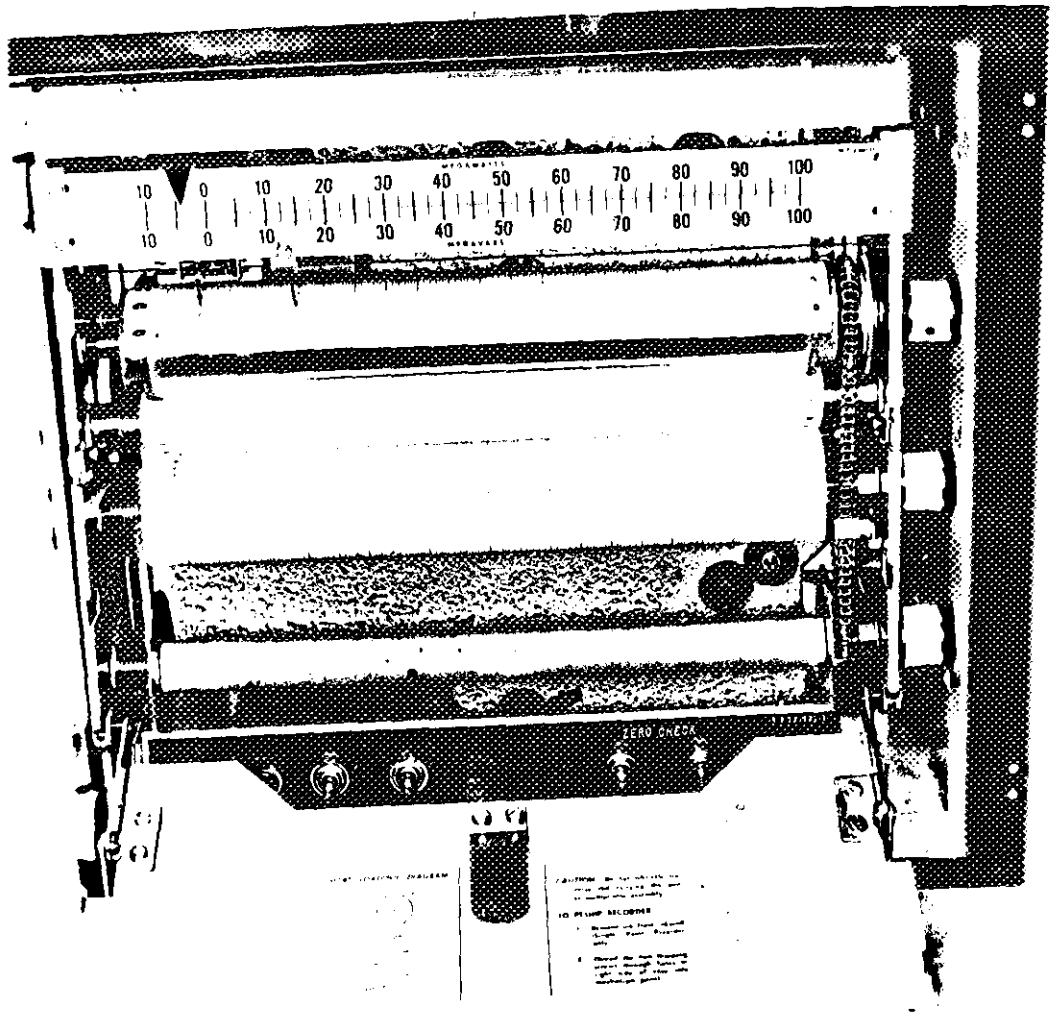
CHART USED WITH GENERAL ELECTRIC TYPES "HF" AND "HL"
RECORDING POTENTIOMETERS



Description: The types "HF" and "HL" recorders are of the wide chart, electronic servo-operated type. The former has one and the latter two independent measuring and recording systems that can simultaneously measure and record on a single chart the variations in output millivolts of two primary detectors. One, or two pens as the case may be, trace continuous curves on a moving paper chart.

In these instruments the DC millivolt input is compared with the voltage across a standardized resistor, any difference being converted to AC by a converter (chopper), the phase being determined by the relative DC voltages. This AC voltage is amplified and applied to one winding of a two-phase motor which, through gearing, moves an arm on a circular slide wire in a direction to reduce the difference between the applied and reference voltages to zero, simultaneously moving the pointer over the scale and the pen over the chart.

The power supply and amplifier chassis are mounted on the rear wall of the cabinet, the plug-in voltage reference unit being mounted alongside. The sensitivity or gain control is on the top of the amplifier chassis and is accessible, after removing the cover, through a slotted hole. The optimum adjustment of this control is just below the point where hunting or oscillation starts with a millivolt input equivalent to either end of the scale. A toggle switch just inside the door of the cabinet returns the pointer to zero for checking.

This recorder can be supplied with one of three motor speeds, giving, by means of the change gears supplied, any chart speed within the motor speed group.

This approval covers an instrument arranged for left-hand zero, centre zero, or raised zero up to half scale.

This approval covers the DC potentiometer-type recorder only and does not cover the bridge-type.

Because clearance is needed for the full scale sweep of each pointer and pen assembly, the 'black' pen marks the chart about 1/8" above the 'red' pen. This dimensional difference must be taken into account when interpreting the curves on the chart.

These instruments are approved for use unsealed.

E. F. Power,
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