CANADA

DEPARTMENT OF TRADE AND COMMERCE

STANDARDS BRANCH

E-46-1

OTTAWA AUG 21 1968 19

NOTICE OF APPROVAL

FOR

ESTERLINE-ANGUS MODEL "A601C" SINGLE PEN CURVILINEAR STRIP-CHART ELECTRODYNAMOMETER RECORDING WATTMETER

Apparatus

Voltage Rating	(1) (5)	100, 200, 500 volts, 115, 230, 575 volts or 120,240, 600 volts
Current Rating	(2) (5)	5 or 10 amperes
Frequency	(3)	25hz, 50hz or 60hz
Elements	(5)	2, or 3-element Y
Response		1-1/4 second
Inking System		Tubular pen producing a continuous ink line
Chart Drive	(3)	Synchronous motor with separate supply
Chart Motor Supply	(3)	120 volts at 25hz, 50hz or 60hz
Chart Speeds		3/4, 1½, 2, 3, 6 and 12 inches per hour or per minute
Chart	(4)	Single channel curvilinear, 4½ inches calibrated width, uniformly divided. 10% raised zero permitted.
Enclosure Styles		Flush switchboard, front switchboard, wall mounted, and Twin which incorporates two independent recorders in one case.
Full Scale Watts		500 per element (5 ampere, 100, 115 or 120 volt rating)
Test Constant	(5)	From .909 to 1.111
Calibration Adjustment	(5)	± 10% of Full Scale

(1) The nameplate may be marked in multiples of 100, 115 or 120 volts but there is no change in the measuring element.

(2) The current rating marked on the nameplate may be 5 amperes or 10 amperes. A dual current rating is not available.

(3) The nameplate on the recorder apron refers to the measuring element only. There is also a small nameplate attached to the measuring element moulded frame visible under the inkwell handle and on which are marked the type and serial numbers.

The chart drive has its own nameplate on one of the chart drive side plates.

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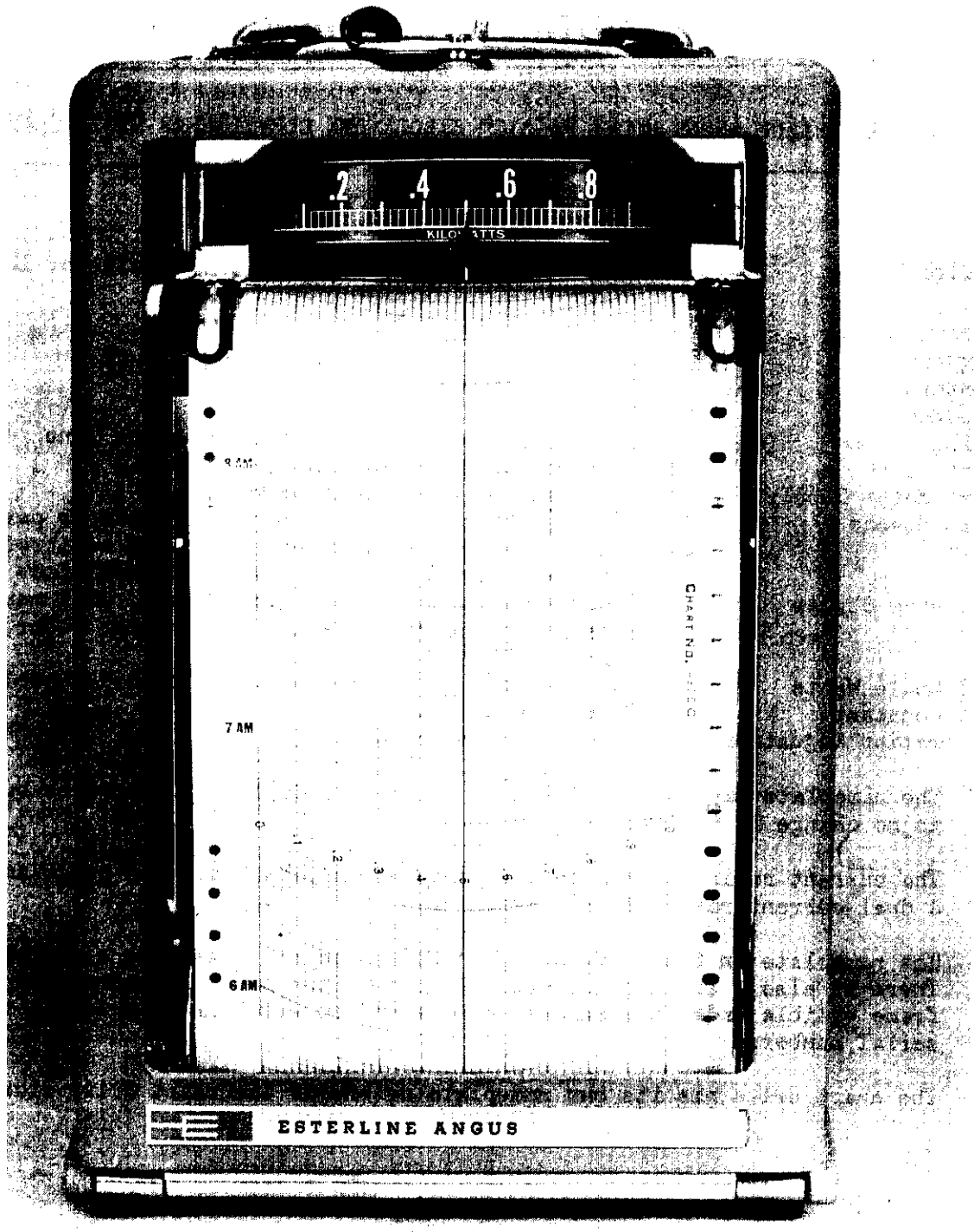

Ordinarily both the measuring element and the chart drive nameplates will be marked with the same frequency, but it is permitted for either to be marked 25hz, 50hz, or 60hz provided that the frequency marked on the chart drive agrees with the system supplying it. A spring-operated chart drive is not approved.

(4) Charts will normally be supplied with a L.H. zero, but a raised zero up to 10% of full scale is approved.

(5) Certain 2-element recorders rated at 5 amperes 115 or 120 volts will be provided with two rheostats, one in each of the two potential circuits. These rheostats are mounted in the upper part of the case behind the scale and are accessible for adjustment through holes in a covering plate. These holes are provided with plugs than can be sealed with utility seals once the rheostats have been adjusted. The resistance of these rheostats is such that a ±10% of full scale calibration adjustment is available. The purpose of these rheostats is to provide, for recorders that are supplied from the secondaries of instrument transformers, a simpler multiplier for the scale reading.

For example -

Assume a circuit having voltage transformers of 400:1 ratio and current transformers of 240:1 ratio, then the overall multiplier that would be applied to the chart reading would be 400 x 240 or 96000.

If we also assume that the load on the circuit is such as to make the pointer read full scale or 1000; then the primary load is 1000 x the multiplier of 96000 or 96000 kw.

Now if the resistances in the potential circuits of the recorder are increased by means of the rheostats, it is possible to make the pointer read 960, then if we use a new multiplier of 100,000 we get the same value of 960 x 100,000 or 96000 kw as the primary load.

However, when verifying a recorder having rheostats in the potential circuits, the change in the watts required for a certain pointer or scale indication must be taken into account.

For this reason, all recorders which incorporate rheostats in their potential circuits will be equipped with an additional label on which provision has been made for the following information, which may be marked either by the manufacturer or the utility -

1. P.T. ratio
2. C.T. ratio
3. Test constant
4. Chart multiplier

This label will be an adhesive backed aluminum foil with the necessary permanent captions printed with spaces for hand embossing by means of a ball point pen.

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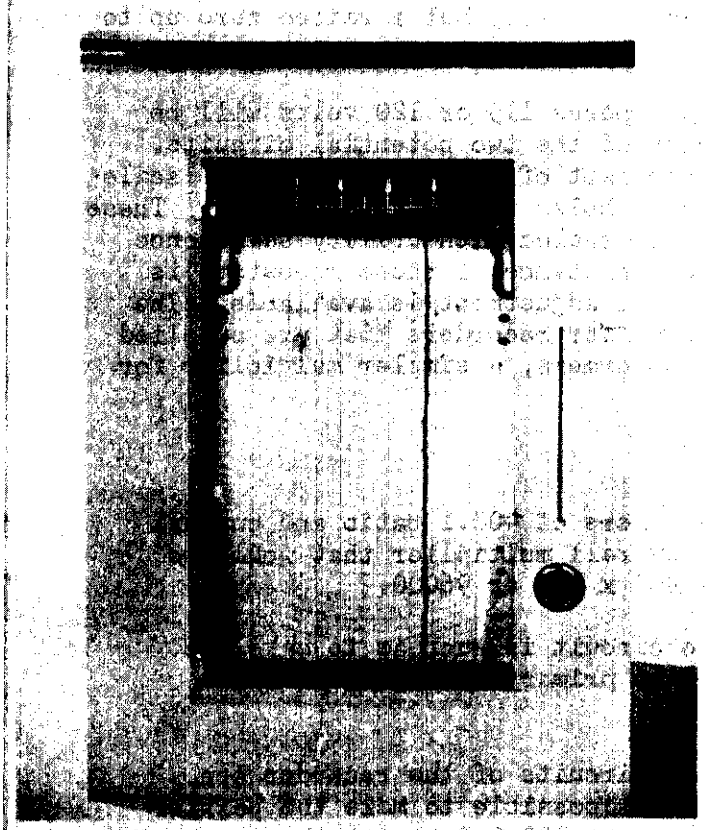
Flush Switchboard



Front Switchboard

Twin (twin flush case illustrated)

The test constant is the multiplier by which the basic 500 watts per element must be multiplied in order to get a chart reading of 1000. It is derived by dividing the chart multiplier by the product of the P.T. and C.T. ratios and in the example mentioned earlier it would be 100,000 ÷ 96,000 or 1.0416. The watts then required for a full scale indication with the elements in series would be 500 x 1.0416 or 520.8.

Description

This is a re-issue of circular E-46 of February 28, 1967 to include 2-element recorders incorporating rheostats in their potential circuits, and 2 inches per hour chart speed.

The single channel curvilinear strip chart recording electrodynamometer wattmeter was formerly designated as type "AW" Graphic Wattmeter and as such received approval under N.R.C. 163 of February 7, 1946.

The design and construction of the measuring system is the same, but the model numbering system and the enclosures have been changed.

Each element of this instrument consists of two fixed current coils and one movable potential coil. The potential coils of all the elements are mounted vertically, one above the other, on an insulated metal shaft. A pen fork is attached to the upper end of this shaft in which the writing pen is held and a steel pivot resting in a spring-loaded jewel is fitted into the lower end of the shaft.

The pen is a length of tubing having one end dipping into a plastic inkwell, and on the other end are mounted the writing point and the scale indicator.

The chart drive assembly is a self-contained unit attached to the instrument proper by four screws.

Damping of the moving element is provided by a vane fixed to the lower end of the shaft and moving in the field of two friction-mounted permanent magnets which can be pivotted to vary the degree of damping.

Zero setting is accomplished by moving the zero adjusting lever located over the nameplate and should be made with the pen correctly balanced and filled with ink.

The illustration on the back of page 1 of this circular shows an approved measuring element in a portable style case. This portable case is not covered by this approval.

The illustrations on the back of page 2 of this circular show three of the four approved styles of enclosures. The measuring elements shown in each enclosure are not covered by this approval.

All approved enclosures are equipped with door locks.

..../4

These instruments are manufactured by the Esterline-Angus Instrument Company Incorporated, Indianapolis, Indiana, U.S.A.

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