DEPARTMENT OF TRADE AND COMMERCE

STANDARDS BRANCH

CANADA

E-39

OTTAWA November 2 19 66.

NOTICE OF APPROVAL

FOR

LANDIS & GYR TYPES "FF3w/FFD4.12" 2-ELEMENT ACTIVE ENERGY, "MF3w/FFD4.12" 3-ELEMENT ACTIVE ENERGY, "FF1Øw/FFD4.12" 2-ELEMENT REACTIVE ENERGY, AND "MF1Øw/FFD4.12" 3-ELEMENT REACTIVE ENERGY, TORQUE BALANCE TELEMETER TRANSMITTERS

Apparatus

Rated Voltage	115 or 120 volts
Nominal Current	5 amperes
Maximum Current	10 amperes
* Nominal Inputs	
FF3w/FFD4.12	± 1200 watts
MF3w/FFD4.12	± 2000 watts
FF1Øw/FFD4.12	± 1200 vars
MF1Øw/FFD4.12	± 2000 vars
* Output	± 5 milliamperes DC
° Maximum Output Resistance	1000 ohms
Power Supply to Torque Balance Unit	115 volts 60 cycles
# External Filter Converter	Type LGM 1A10042

* All these meters will handle bi-directional inputs, so that the output DC milliamperes will reverse if the flow of current is reversed.

° This is the maximum line resistance between the telemeter transmitter and the filter converter.

These meters are approved for use only if the DC output milliamperes is fed into this particular filter converter which converts it to millivolts feeding a potentiometer null type recorder.

Description

The primary measuring elements in these Torque Balance Telemeters are similar electrically and mechanically to the types FF8, FF8Ø, MF8 and MF8Ø already approved

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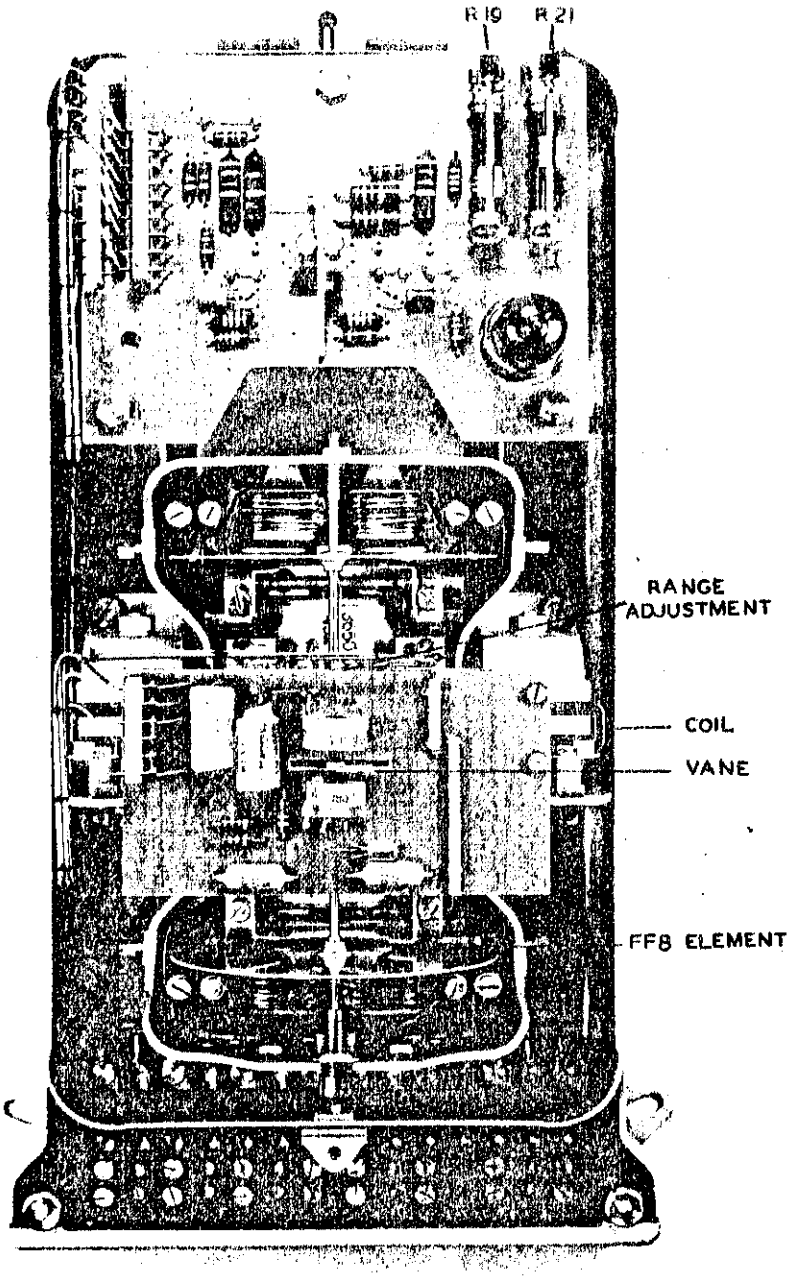
R 19
R 21
RANGE ADJUSTMENT
COIL
VANE
FF8 ELEMENT

They differ in that the discs are restrained to a small angle of movement and therefore do not rotate so that there is no register.

The unit that supplies the force required to balance the rotational torque of the disc is the torque balance described in circular S-EA.605 (amended) modified to fit a meter element. The DC output milliamperes is proportional to the load on the meter element with a polarity matching the direction of the current flow.

The active energy types FF3w and MF3w may be supplied with centre-tapped current coils so that the current can pass through all or half the number of turns. The 2-element units have the three leads from each current coil brought to terminals in the base but the 3-element units because of limitations in the number of available terminals have one end of each current coil unconnected so that the current passes through half the winding.

With the full winding, the nominal current is $2\frac{1}{2}$ amperes and with half the winding, 5 amperes.

This approval covers only the half winding or 5 ampere connection.

Rheostat R19 is in series with the output millivolts and in conjunction with the maximum permissible line resistance of 1000 can be increased up to a maximum of 4000 ohms where it will provide a degree of damping when there is a rapidly fluctuating load.

The other adjustment "R21" is a balance adjustment which affects the symmetry of the output milliamperes, so that maximum excursion of the moving system produces approximately equal positive and negative values of output milliamperes.

Unlike the Torque Balance Converter receiving approval under S-EA.605 (amended) which had no calibration adjustment, this present Torque Balance Converter is provided with an adjustment resistor network so that the output milliamperes may be varied with a fixed load. This resistor network has terminals marked 1, 2, 3, 4, 5, and has a potentiometer adjustable from the R.H. side. This last item is labelled "Range Adjustment" in the illustration.

Connections are made to terminals 1 and 3 permanently and a third wire may be connected to terminals 2, 4 or 5.

<u>This approval</u> covers the connection of this third wire to <u>terminal 2 only</u>, as this connection gives 5 milliamperes with the nominal input applied to each element. The potentiometer labelled "Range Adjustment" is used to calibrate to this value.

The output DC milliamperes has a superimposed complex ripple due to the local oscillator and disc vibration which, while satisfactory for a series telemeter transmission circuit cannot be directly applied to a recorder. It will therefore be necessary to filter out the ripple and pass it through a precision calibrated resistor where it is converted to ripple-free millivolts.

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The only filter-converter approved for use with the Torque Balance Telemeter Transmitter is the Type "LGM 1A10042" produced by Landis & Gyr which is covered by circular "E40".

Approval granted to: Landis & Gyr Incorporated,
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