Department of consumer and corporate affairs / Ministère de la consommation et des corporations

STANDARDS BRANCH - DIRECTION DES NORMES

NOTICE OF APPROVAL
AVIS D'APPROBATION

E - 112

OTTAWA July 12, 1974

LANDIS & GYR TYPE ZFR1-- 2-ELEMENT, AND TYPE ZMR1---
3-ELEMENT ELECTRONIC WATTHOUR METER

Voltage	120
Current Range	0.5-5A
Frequency	60 Hz
K_f (watthours per impulse of LED test device)	
ZFR1	0.002604
ZFR1	0.005208

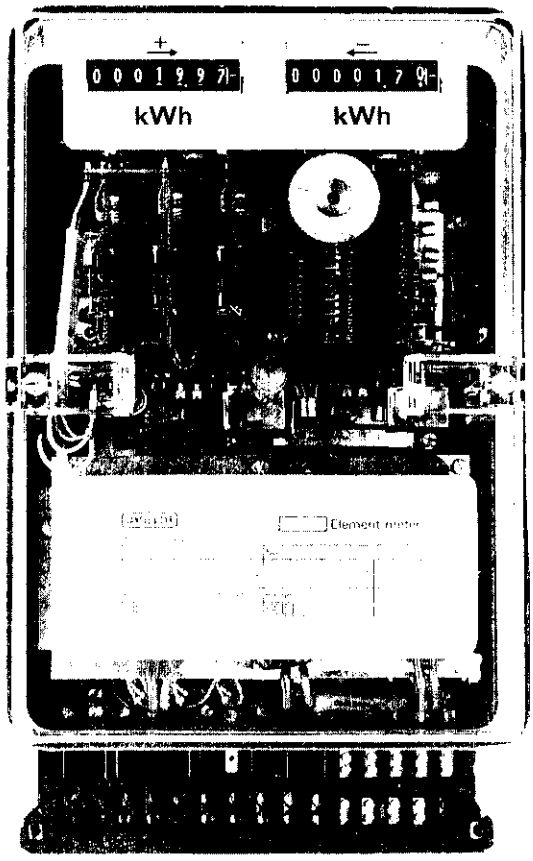
Ki (watthours per impulse of transmitting contact)
According to following table (based on r14 contact)

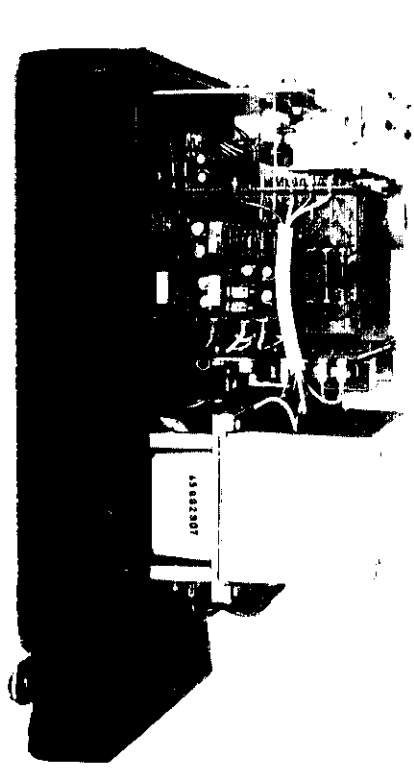
METER	ZFR		ZMR	
Ki(Wh/i) for r14	fQ	NPR	fQ	NPR
1.0	---	---	100	1800
0.833	---	---	120	2160
0.5	100	2000	100	3600
0.4166	120	2400	120	4320
0.25	100	4000	100	7200
0.20833	120	4800	120	8640
0.125	100	8000	---	----
0.104166	120	9600	---	----

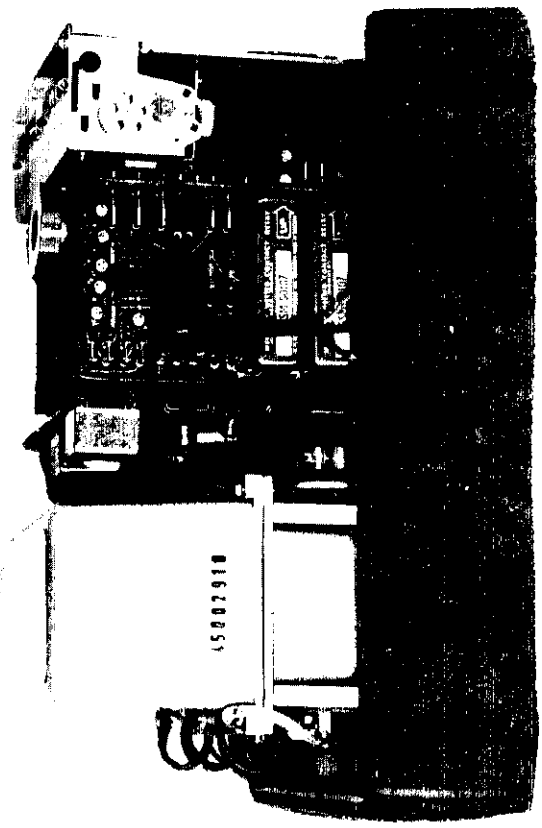
Power supply 120V, 60Hz, 9W

Approved options:

.1	uni-directional, single register
.2	bi-directional, with import & export register
r14	SPST transmitting contact


kWh
kWh





Description

These solid state watthour meters have some features in common with the solid state telemeter transducers receiving approval under E-94 in that they are completely transistorized and operate on what is termed the mark-space-amplitude multiplication principle.

The current and voltage inputs to the watthour meter feed separate small transformers giving complete isolation.

A small internal transistorized multivibrator produces a continuous crystal controlled 120 KHz square wave which is acted upon by the secondaries of the internal transformers in such a way that the applied circuit current of each element affects the amplitude of the square wave and the applied circuit voltage of each element changes the duration on one half of the square wave in relation to the other according to the relative polarities of the circuit current and voltage.

The resultant square wave is amplified, rectified and filtered and appears as a DC voltage proportional to the instantaneous product of the amperes and volts of each element with the correct sign.

The DC voltages from each element are added and are then applied to a "voltage to frequency" converter which produces a frequency proportion to the sum of the instantaneous power in each element.

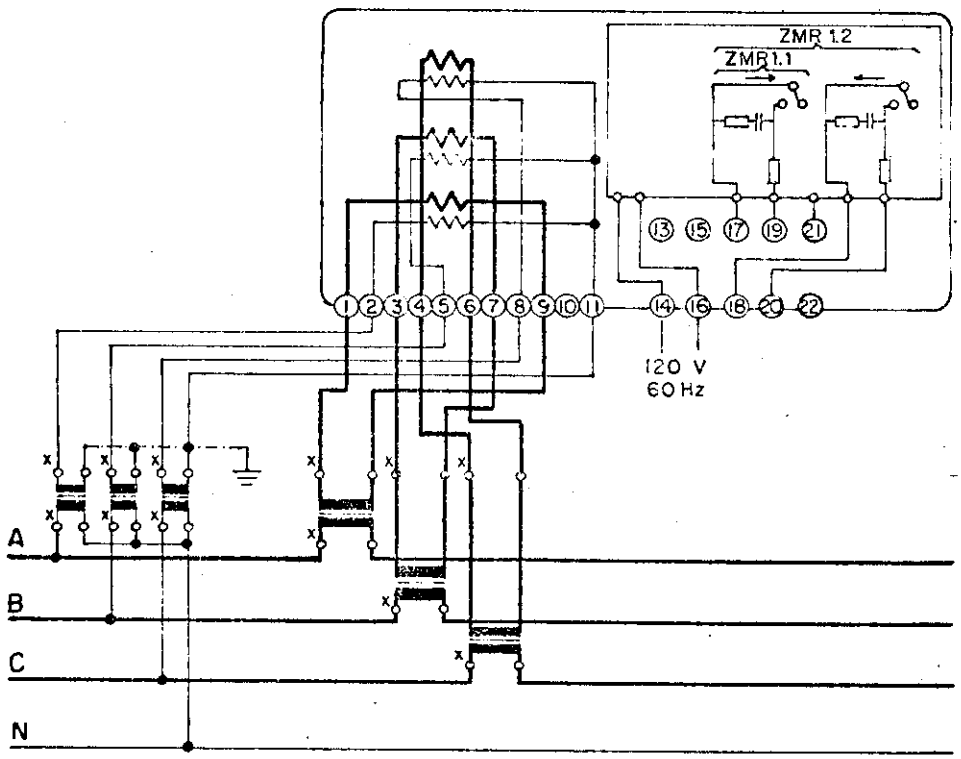
A part of this output frequency is amplified and fed to the LED on the front of the meter where it appears as miniature orange-coloured flashes at a rate proportional to the frequency and hence to the power measured by the meter.

On all except extremely low loads, these flashes occur so close together as to appear as a steady glow.

The LED is placed in the centre of an circular-shaped permanent magnet whose purpose is to hold the sensing head containing light sensitive diode, which is used to count the flashes, against the meter face.

THREE-ELEMENT ELECTRONIC
METER ZMR1.2
FOR THREE-PHASE, FOUR-WIRE Y
CIRCUITS

DIAGRAM OF CONNECTIONS **ZMR1**



CURRENT	A	1 – 9
	B	3 – 7
	C	4 – 6
POT	A	2 – 11
	B	5 – 11
	C	8 – 11

Another part of the output frequency is fed into logic circuits and frequency reducers which channel the reduced pulse rate to one or other of the registers and to the coil of the transmitting relay according to the direction of power flow.

Instructions for verifying these solid state watthour meters will be issued at a later date.

Approval granted to: Landis & Gyr,
Dorval 760, Que.

J.L. Armstrong, P. Eng.,
Chief, Standards Laboratory

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Ref: G 1145-57/L1-153
GL 1145-57/L1-153

DIAGRAM OF CONNECTIONS ZFR1.