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-126

OTTAWA March 8, 1974

LANDIS & GYR TYPES "GAA1", "GAA2 AND "GAA3" IMPULSE OPERATED SUMMATORS

Rating of Apparatus

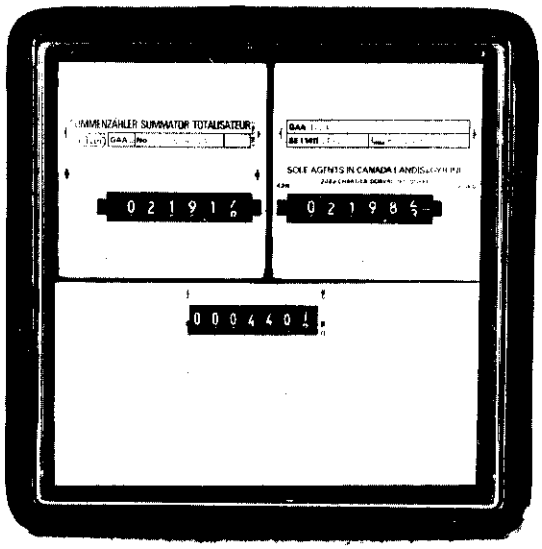
Receiver Circuit:

#Maximum impulse rate per input channel	s1, 5 pulses per second s2, s3 10 pulses per second
Supply voltage	115 volts 60 Hz
Stepping motor operating voltage	115 volts ±20% 60 Hz
°Demand intervals	10, 15, 20, 30 and 60 minutes
Nominal duration of timing impulse	1% ±0.3% of demand period
Storage capacity of excess negative pulses	Up to 18 pulses
Re-transmitting device:	Mercury-wetted SPDT monostable relay
Max. re-transmitting pulse rate	s1, 5 pulses per second (contact r) s2, s3 10 pulses per second (contact u)
*Contact rating	250 V.d.c., 250 V.a.c. 100 mA

\# Variations of input circuits with the receiving stepping motors "AMA1" and "AMA2", and their rating are given separately under "Variations of input circuits for stepping motor of summator" on page 8.

° Determined by external time switch, but will be marked on the nameplate.

* With inductive load additional spark quenching is recommended in keyed equipment.


SUMMENZAHLER SUMMATOR TOTALISATEUR
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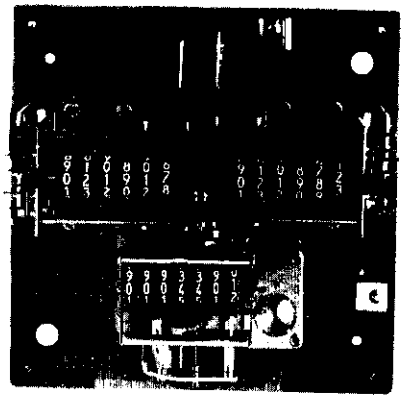
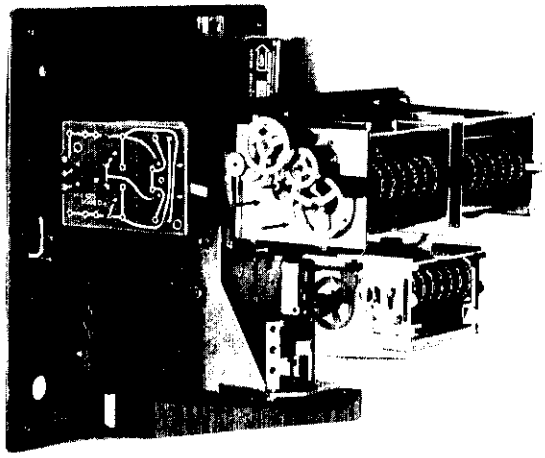
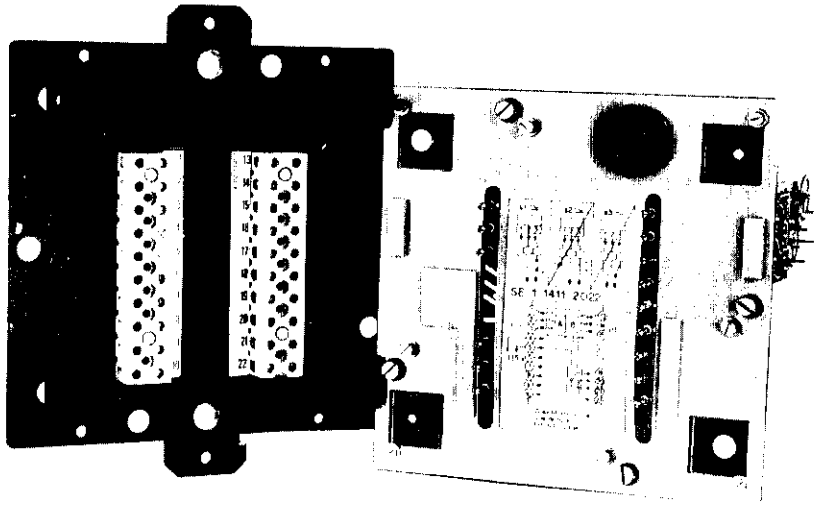






Type summary

GAA1 - 2 inputs only, each with register. 1 summating register, 1 re-transmitting contact for positive sum. Not expandable, but may have a demand indicator.

GAA2 - 1 to 8 inputs, each with register, 1 summating register, 1 re-transmitting contact. Any input may be negative but sum must be positive. May have demand indicator.

GAA3 - 1 to 8 inputs, each with register plus 2 subtotal registers, or up to 9 inputs plus 1 subtotal register. 1 or 2 subtotal re-transmitting contacts.
1 or 2 total registers and 1 or 2 total re-transmitting contacts.
Balance may be positive or negative with registration on separate registers, if so equipped. Grouping 4 ± 4 is standard but 5 ± 3, 6 ± 2 and 7 ± 1 are available. May have 1 or 2 demand indicators for totals.

Stepping motor half wave rectified D.C. from 115 volts ±20% 60Hz supplied from transmitting meter.

Types of input s1, s2 and s3, may be mixed. Will be marked on connection diagram. See page 8 for description.

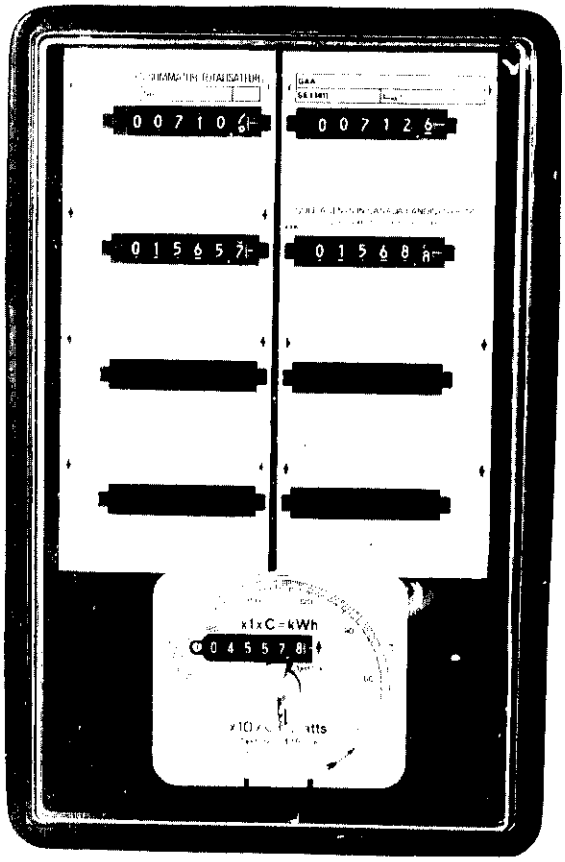
Output pulse 80 millisecond contact closure from normally open side of contacts of mercury wetted relay.
Alternatively a bi-stable 3-wire output contact is available by connecting the control contact directly to the contact terminals, bypassing the electronic board.

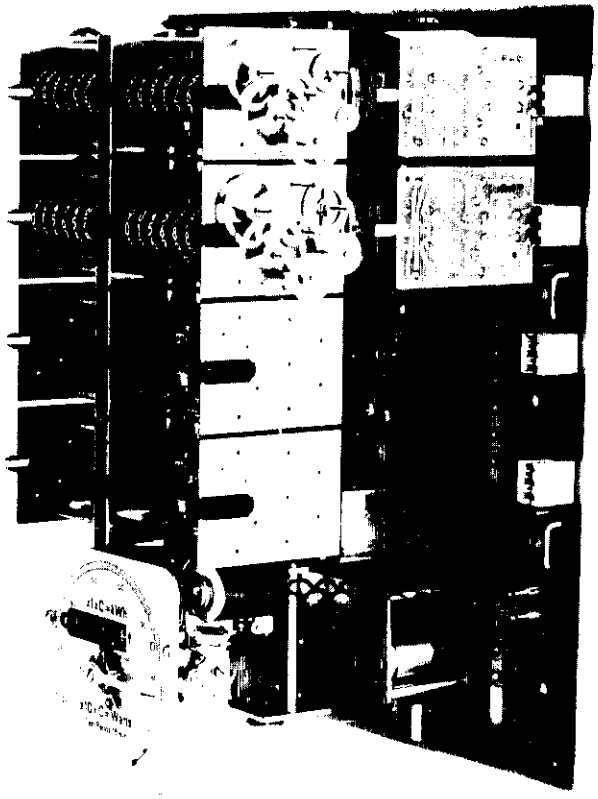
Approved suffixes may appear as part of the type designation:

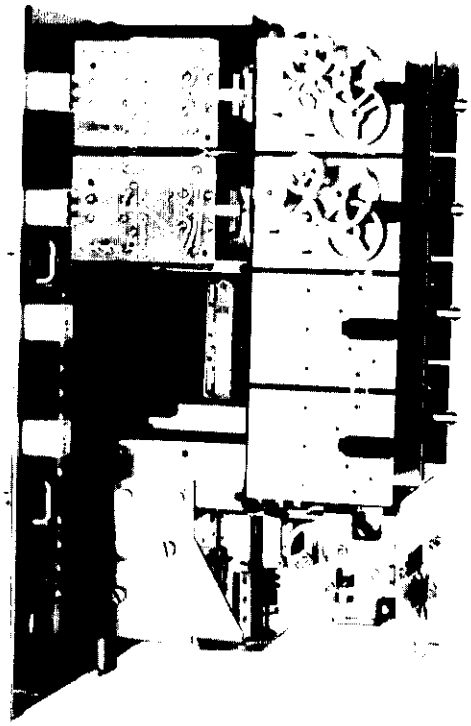
e single rate 6 digit register. Total registers may have 7 digits. One or two of the digits may be decimal as indicated by a decimal point and a red border. Direct reading in energy units (input pulses times constant).

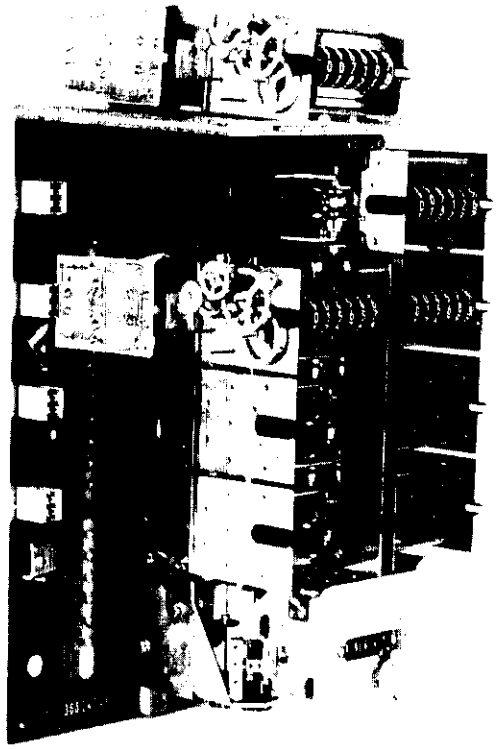
r re-transmitting contact for circuit s1. Relay with SPDT contacts.
Only the normally open contact may be used for re-transmitting.

u bi-stable 3-wire re-transmitting contact for circuits s2 and s3.
For circuits s2, external diodes must be used, type IN4585 or equivalent.


x1xC=kWh







m maximum demand indicator.

em maximum demand indicator with inset single rate register.

Example GAA3 (4er-4er) emr
Summator with:

4er 4 positive inputs with positive subtotal and re-transmitting contact for this group of four inputs

-4er 4 negative inputs, with subtotal and re-transmitting contact for this group of inputs.

em maximum demand indicator with inset single rate register for net positive sum.

r re-transmitting contacts for net energy sum.

All indications and output pulses in energy units.

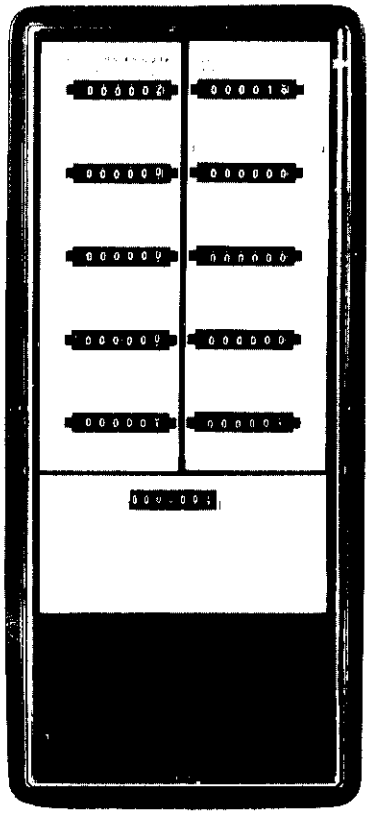
Description

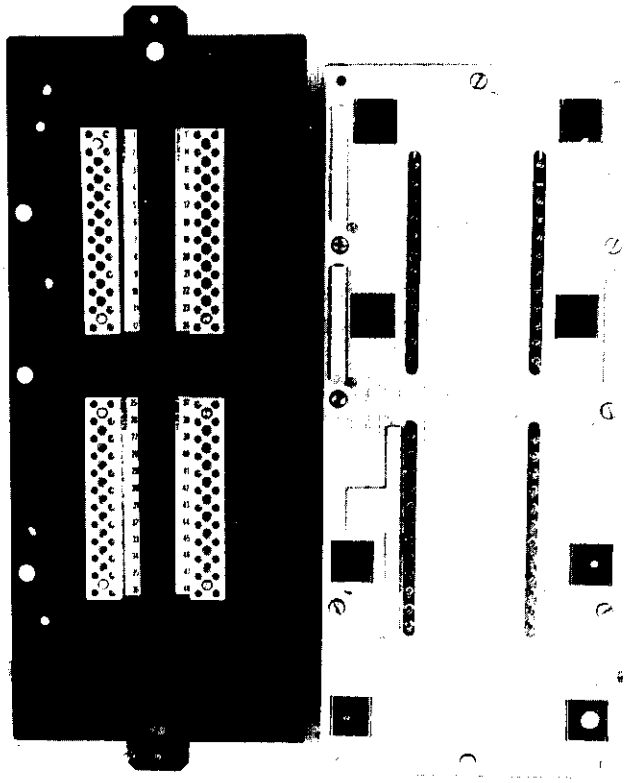
The type GAA-- summator is a pulse-operated telemetering equipment which can register the energy consumption of a number of separate lines by means of pulses generated by transmitting contacts on energy meters.

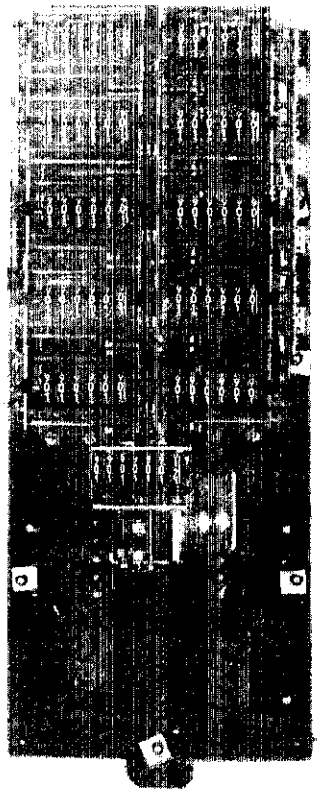
Arrangement of positive and negative input modules is free on GAA1 and GAA2, as well as on GAA3 not equipped with subtotals. In GAA3 with one or two subtotals only the following arrangements are possible.

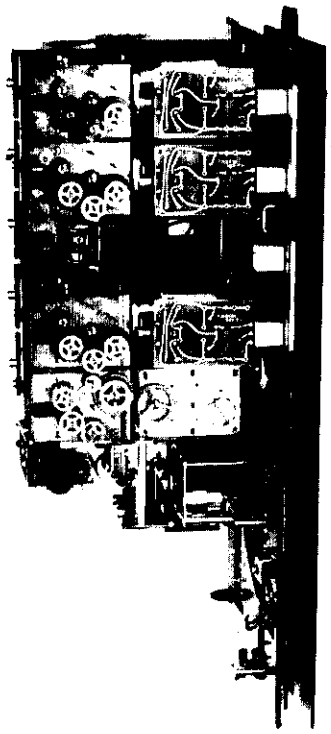
BASIC ARRANGEMENT GAA3	Inputs belonging to subtotals	
	left	right
(4 ± 4)	E,F,G,H,	A,B,C,D
(5 ± 3)	E,G,H	A,G,C,D,F
(6 ± 2)	G,H	A,B,C,D,E,F
(8 ± 1)	Input J instead of subtotal	A,B,C,D,E,F, G,H

Summators of types GAA1 and GAA 2 will display only positive totals. A negative balance will register as zero. To account for the possible short-term excess of negative impulses due to the random pattern of impulse arrivals, a back-lash gear can store up to nine impulses of value equivalent to that Ki which would be entered at a relative entry RE = 1.0.









(1 impulse of RE = 1.0 contributes 1/10 of one revolution to the final totalizing shaft).

Summators GAA3 are also equipped with the backlash drive on the totalizing shaft. They can be fitted with up to two (2) totalizing registers, one of which can be set to operate when the totalizing shaft reverses its direction, corresponding to a negative balance. (Register M = minus).

When a GAA3 is equipped with a P (plus) and a M (minus) register, the backlash drive is usually set to zero.

There is no backlash drive to the subtotals. Therefore, subtotals must consist of inputs of the same directional sign only.

GAA3 summators in arrangement (4 ± 4) can be used to totalize up to 4 each kw and kvar inputs on the 2 subtotals registers. If so used, the drive to the totals register(s) and re-transmitting contacts(s) will be disengaged, or those components will not be present at all. If present, the register(s) will carry a label "disconnected"instead of the usual data label.

All registers are direct reading in energy units which is accomplished by the selection of a series of gears to match the Ki value of each incoming pulse.

These gears are mounted on shafts extending from the side of each module and positioned in such a manner that a large variety of ratios, positive and negative are available.

Each input unit is designed as a plug-in module and comprises the stepping motor with the pertinent circuitry, the variable ratio gears for matching impulse values, the coupling wheel for the summation mechanism and the check register with the various ratios.

By plugging in the input unit, it is coupled electrically to the input terminals and mechanically to the summation mechanism.

If an input unit is removed, the relevant differential side in the summator mechanism is automatically blocked. This does not affect the operation of the modules still in place.

Each input can be treated as positive or negative. The register is equipped with an interchangeable plate which shows the impulse value and its algebraic sign.

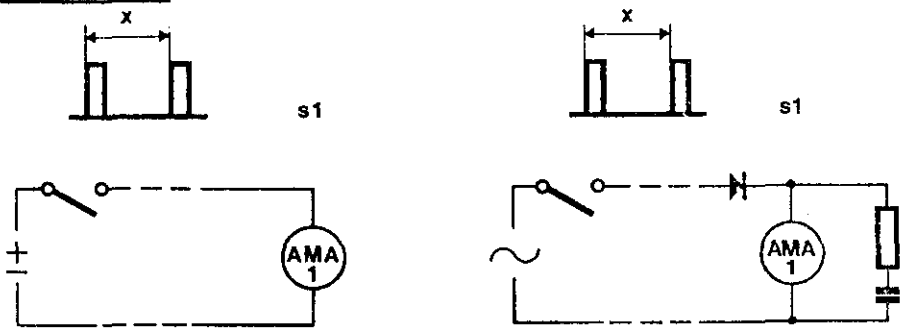
VARIATIONS OF INPUT CIRCUITS FOR STEPPING MOTOR OF SUMMATOR

s1 Impulse contact input

Impulse frequency	max. 5 imp/s
Impulse duration	min. 70 ms, continuous impulse permissible
Impulse interval	min. 100 ms
Consumption	approx. 3 W with impulse, 0 with interval

STEPPING MOTOR
A.C. Operation voltage 115 V ± 20% 60 Hz

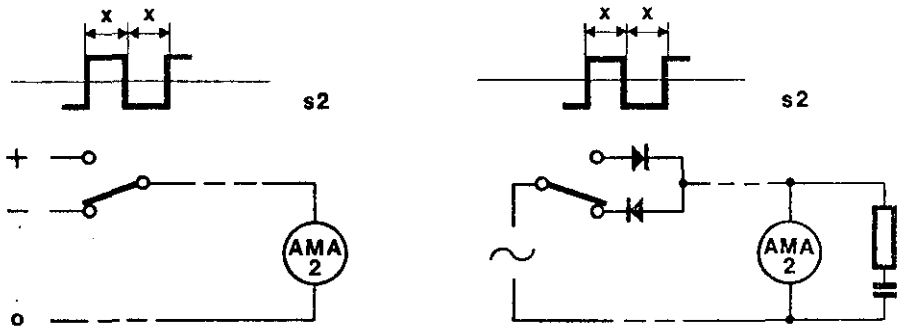
CIRCUITS AND IMPULSE VALUE DEFINITION X



s2 double-current input

Impulse frequency	max. 10 imp/s
Impulse duration	min. 50 ms, continuous impulse permissible
Impulse interval	i.e. without current; any length
Consumption	approx. 1 W with + and – impulses

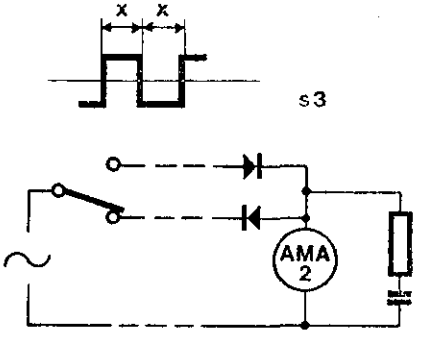
STEPPING MOTOR
A.C. Operation voltage 115 V ± 20% 60 Hz



s3 three-wire input

Impulse frequency	max. 10 imp/s
Impulse duration	min. 50 ms, continuous impulse permissible
Impulse interval	i.e. transmitting contact open; any length
Consumption	approx. 1 W with transmitting

STEPPING MOTOR
A.C. Operation voltage 115 V ± 20% 60 Hz



NOTE: The broken lines indicate transmission lines.

Left of the transmission line are transmitting contacts on the primary meter.

Right of the transmission line are the receiver circuits in the summator

Each summator may be used with s1, s2 or s3 type inputs with appropriate changes in the printed circuit boards and stepping motors.

Connections to each summator are by means of plug terminals on the back. These plugs fit into matching sockets installed on the mounting plate. A diagram of the connections is pasted on the back of each summator.

In order to verify a summator, it must first be removed from its mounting plate by removing the machine screws accessible through holes in the plate. The summator may then be lifted off.

A source of power is applied to the marked terminals and leads from a pulse generator or the transmitting contacts on an energy meter are connected to the signal input terminals. If the summator has inputs of the same kind e.g. s1, all inputs may be connected in parallel for simultaneous operation. The summator is then plugged into its base and automatically becomes energized.

As the registers read in energy units, it is necessary to apply a constant to the incoming pulses. This constant may be different in the separate circuits but it will always be marked on the dial face of each register.

For example if the constant Ki on a certain circuit is 0.4166 wh/i, the number of pulses required to change the reading of the register by 1 kilowatthour is 1000 ÷ 0.4166 or 2400.

If all the registers have the same Ki value, each register will record the same increment, but the subtotal or total registers will recognize their positive or negative signs and multipliers.

Approval granted to:

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