CANADA

DEPARTMENT OF TRADE AND COMMERCE

STANDARDS BRANCH

E-30

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NOTICE OF APPROVAL

FOR

FERRANTI TYPE "CE" ELECTRONIC SUMMATOR

Apparatus

Maximum Impulse Rate	100 per minute on each channel
Type of Input (1) Yellow card	A positive going step of voltage from -15 v to zero. Ideally obtained from a Ferranti inductive transmitter. Ferranti type "FMF2" circular E 29 has such a transmitter installed.
(2) Brown card	S.P.D.T. switch with -15v line from the summator connected to the centre blade. Input impedance 18,000 ohms.
Number of Input Channels	2, 3, or 4.
Number of Registers	One for each input channel plus either (1) two totalizing registers, or (2) one totalizing register and one maximum demand indicator.
Ratio of input/output Pulse Values	Normally 2 or 4 but can be 1 or 8. With 1/1 ratio, the minimum spacing between pulses is 75 ms, and is unsuitable for other Ferranti equipment.
Output Pulse	Electronic switches giving alternate closures to zero volts line. Two such circuits driven from either side of a totalizer flip-flop give the effect of a S.P.D.T. switch with centre blade grounded. Capacity 50v. 150ma maximum.
Power Supplies	Internal power pack supplying -15-0+15V dc from a 3-phase ac input of 110V (-10% + 20%). This power pack will supply a full summator and four inductive transmitters on impulsing meters. Input burden 13va per phase.

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Logical Circuit Cards

1 (Brown)	"Mechanical" channel card. Receives pulses from a S.P.D.T. switch on meter.
2 (Red)	Totalizer card - incorporates a "divide-by-two" stage and a circuit for driving a totalizing register.
3 (Orange)	Double relay drive card. Contains two power output circuits (50v 150ma) and may be used together as a S.P.D.T. switch or to drive separate relays from two separate total register drives.
4 (Yellow)	Channel cards. Receives pulses from inductive transmitters or devices signalling by means of a sudden step from -15 to zero volts.
5 (Green)	Output card. Similar to card No. 3 but incorporates a flip-flop and can be driven directly from highway (1/1 pulse ratio), from + 2 section of No. 2 card (2/1 pulse ratio), or from total register drive of No.2 card (4/1 pulse ratio). Output is effectively S.P.D.T. switch to zero with 50v 150ma capacity.
6 (Blue)	Reset card. This card performs the scanning function and resets the channel (input) cards after they have been "set" by receipt of a meter pulse. One card is required for a 2-circuit summator, 2 cards for a 4-circuit summator.
9 (White)	"Divide-by-two" card. Divides pulse rate by a factor of two.
0 (Black)	"Cancel" card. This is a single store subtraction device and is provided with net positive or net negative outputs.
Demand Period	15, 20, 30 and 60 minutes
Power Supply	115 volts 3 wire 3 phase 60Hz

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Description

The type CE Electronic Summator is a solid state device that will accept pulses originating from a maximum of four transmitting meters. If the transmitting meters are equipped with the equivalent of a S.P.D.T. switch such as the transistorized "flip-flop" as used on the types FMF and FMFR; the Summator will have a brown card, but if the transmitting meter is equipped with an inductive transmitter as used on the type FMF2 a yellow card is used. This latter case requires only one "pilot" wire to carry the pulse from the transmitting meter to the summator in addition to the three wires (-15, 0, 15) required to power the transmitter.

The summator is housed in a switchboard type case with stud connections at the rear. The dial registers, accompanying motors and maximum demand indicator, if used, are mounted on a hinged front plate. The electronic components are mounted on printed circuit cards grouped according to their function. These withdrawable cards have gold plated contacts and plug into multi-terminal connectors. They carry functional descriptions, are colour coded and slotted to suit the correct location. They cannot be pressed home if wrongly inserted.

A number of demand scales other than the one illustrated are available, so that by using available gear ratios it is possible to choose one that matches the load fairly closely. In any case the maximum would be 3600 pulses for full scale.

The resetting of the demand driving pointer is done by an internal timing motor operating "open-to-reset" contacts.

The indicating registers are driven by stepping motors fed from one of the printed circuits.

Through a circular cut-out at the top left of the demand dial can be seen a disc that is driven by the demand interval timing motor. A radial line on this disc indicates the progress of the demand interval.

Unlike the type PE Summator (circular E-8) which had an external power supply, the type CE Summator has in integral power supply to power the inductive transmitter on the primary meter via -15, 0, 15 volt leads, all the electronic circuits, the register stepping motors and the maximum demand indicator.

The heads of the cover screws are cross-drilled for sealing wires.

Approval granted to: Ferranti-Packard Electric Limited,
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