DEPARTMENT OF TRADE AND COMMERCE

STANDARDS BRANCH

E-76

OTTAWA November 1, 1968.

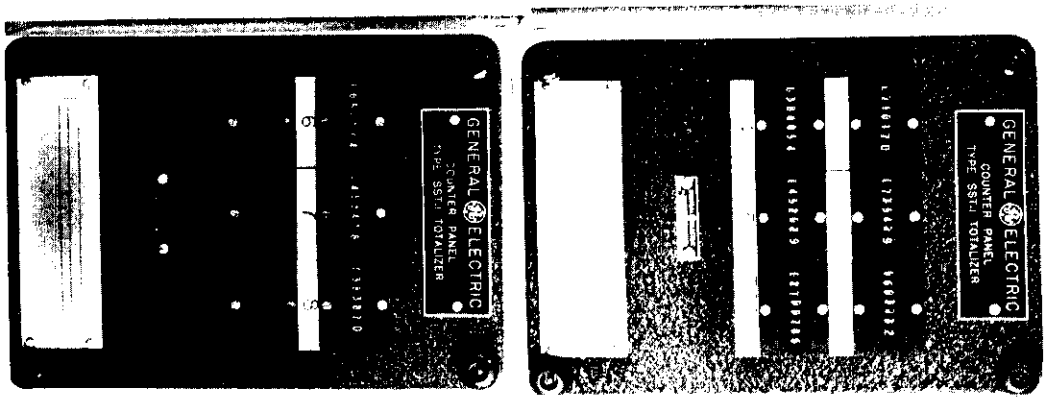
NOTICE OF APPROVAL

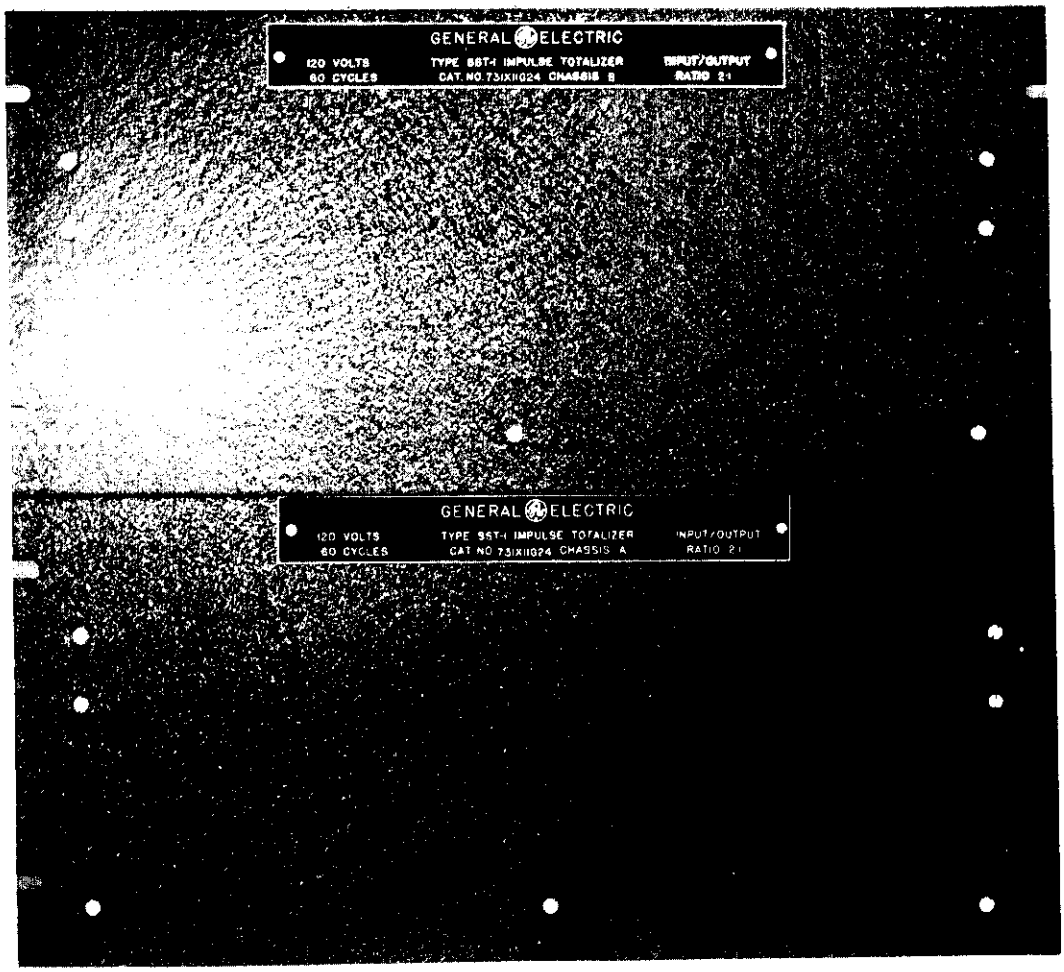
FOR

GENERAL ELECTRIC TYPES "SST-1" AND "SST-2"
SOLID STATE IMPULSE TOTALIZERS

		Apparatus
	Type of Input	Any approved SPDT isolated contacts, Form C, non-bridging one set for each input channel.
[1]	Max. Resistance in Input Circuit	50 ohms or 100 feet max. to source of impulse.
[2]	Max. Input Pulse Rate	1 ÷ Relay Time Delay, 10 per second.
	Number of Counters	1 for each input channel plus counter for total.
	Max. Counter Rate	10 per second.
	Counter Type	Sodeco TCe7E 7-digit, input, TC-e8E 8-digit, output.
[2]	Relay Ratio	1:1 to 16:1 depending upon the number of channels.
[3]	Number of Input Channels	SST-1, 3 to 16 SST-2, 2 to 6
[2]	Relay Time Delay	1/relay ratio x 1/end device acceptance rate
[2]	Max. Exit Pulse Rate	10 per second
[4]	Type of Output	
	SST-1	Solid state SPDT power gate switch 120 volts, 0.5 amp. max. 60 hz Mercury-wetted relay SPDT 100 va (with arc suppression)
	SST-2	Silver contact SPDT relay 120 volts, 0,5 amp., 60 va Mercury-wetted relay SPDT 12 to 250 volts 100 va (with proper arc suppression)
	Counter Panel to Module Chassis	SST-1 Max. 50 feet shielded
	Power Supply to Totalizer	120 volts 60 hz
	Telemetering Equipment	Type DC-1 power supply and type RP-1 polarized relay.
	Preferred initiating contact on meter	D-30 (S-EA.466) or D-41 (S-EA.487)

GENERAL ELECTRIC TYPES "SST-1" AND "SST-2" SOLID STATE IMPULSE TOTALIZERS





SST-1

Approved Modules SST-1

Identification	Designation	Number	Function
4122575-11	BiAx*	3 or more	Receives input from contact device.
4122575-18	O R	1 or more	Channels all inputs to delay circuit. One module handles 6 additive channels.
4122575-19	Delay	1	Separates output pulses in time.
4122575-20 to 24	BiC(Divide by)	1	Sets system input/output ratio.
4122575-16	BiD(Power gate)	1	Controls the state of the output solid state switch.
4122575-17	AC Power Gate	1	Solid state SPDT switch drives end device.
4122575-26	DC Power Gate	1	Solid state SPDT switch drives end device. #
4122575-11	BiAx*	Depends on proportion of subtractive to additive pulses.	Receives input from contact device subtractive.
4122575-13	Counter Drive	2 or more	Operates pulse counters. One module can drive 3 pulse counters.
4122575-31	Power Supply and Regulator	1	Provides +24V.DC regulated for all system logic, and +32V.DC unregulated to pulse counters.

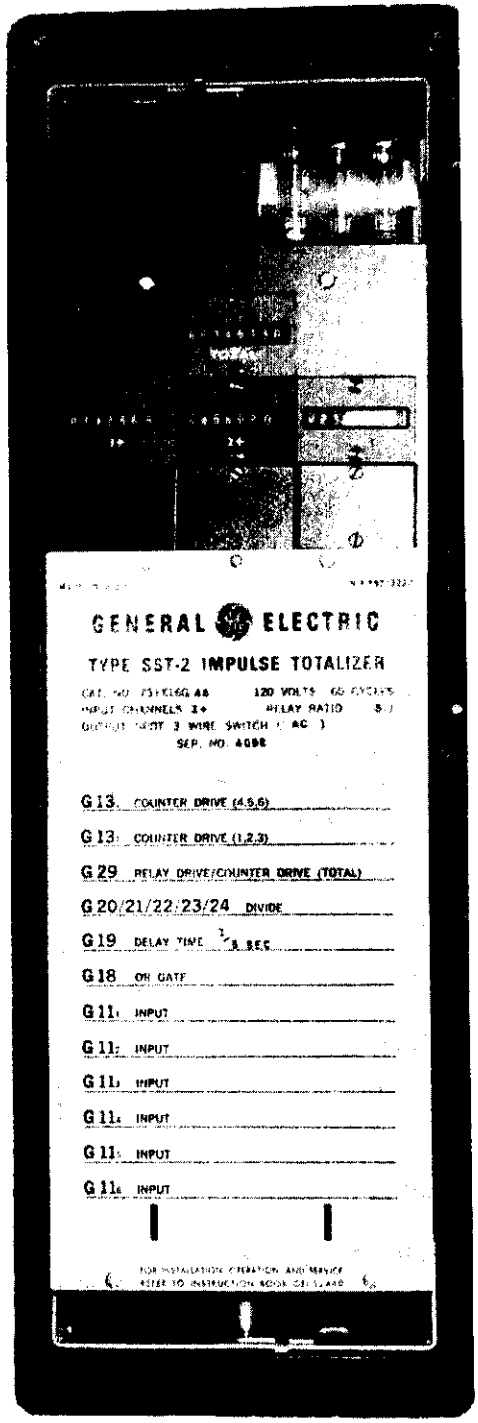
* sub-number (x) denotes channel number.

\# DC values given in Instruction Book GE1-52418.

Approved Modules SST-2

Identification	Designation	Number	Function
9927350-11	Bia(x)*	2 to 6	Receives input from contact device.
9927350-13-	Counter Drive	1 or 2	Operates input impulse counters.

SST-2


GENERAL ELECTRIC
TYPE SST-2 IMPULSE TOTALIZER
G13 COUNTER DRIVE (4,5,6)
G13 COUNTER DRIVE (1,2,3)
G29 RELAY DRIVE/COUNTER DRIVE (TOTAL)
G20/21/22/23/24 DIVIDE
G19 DELAY TIME 1/8 SEC
G18 OR GATE
G11 INPUT
G11 INPUT
G11 INPUT
G11 INPUT
G11 INPUT
G11 INPUT

Approved Modules SST-2

Identification	Designation	Number	Function
9927350-13-1			Is a one section module and drives one counter.
-13-2			Is a two section module and drives two counters.
-13-3			Is a three section module and drives three counters.
9927350-18-	O R	1	Channels all inputs to delay circuit.
-18-2			Is a two section module for additive channels. **
-18-3			Three section.
-18-4			Four section.
-18-5			Five section.
-18-6			Six section.
9927350-19	Delay	1	Separates output pulses in time
9927350-20 through 9927350-24	Bic(Divide by)	1	Sets system input/output ratio.
9927350-29	Relay drive/ Counter drive (total)	1	Two part module - 1 section drives output relay and the other section drives the "total" output counter.
9927350-31	Power Supply and Regulator	1	Provides +24V.DC regulated to all system logic, and +32V.DC unregulated to pulse counters.
9689024-20 Sigma Type 42RO-1000G-SIL	Output Relay	1	Isolated SPDT switch rated. 0.5 ampere; 120 VAC drives end device.

* Sub-number (x) denotes channel number.

* * not used in conjunction with subtractive channels.

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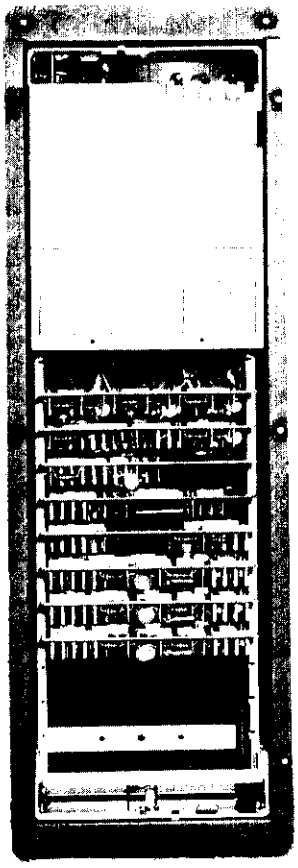
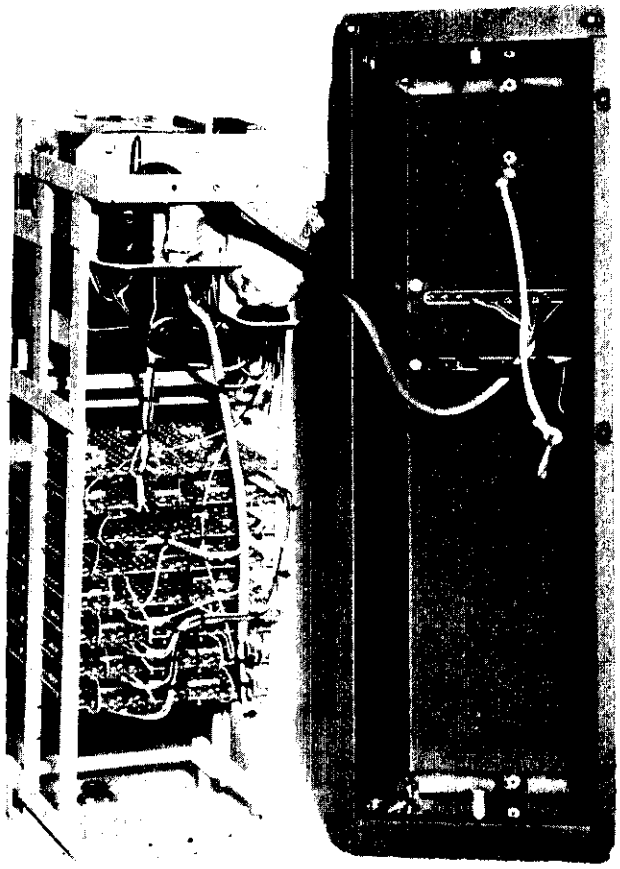
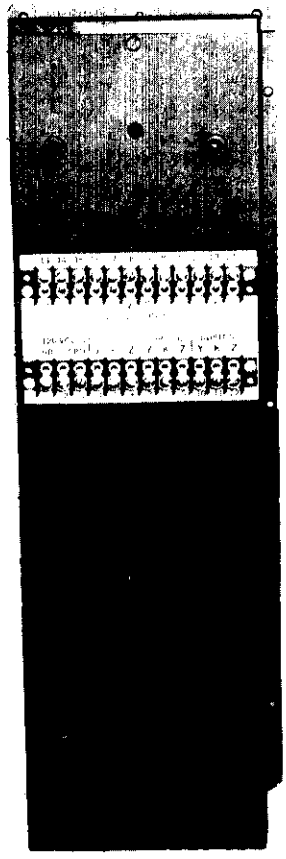
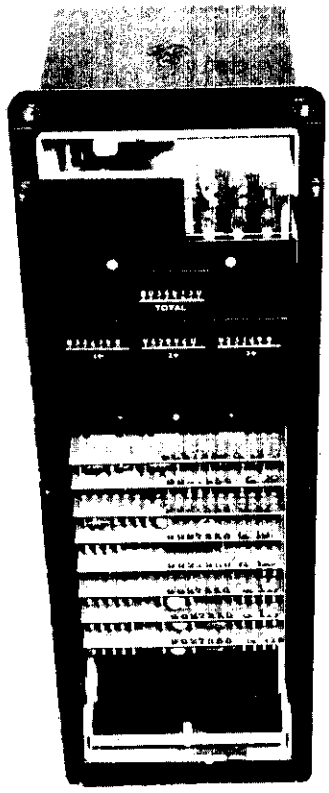








NOTES:

[1] If the resistance in the input circuit does not exceed 50 ohms, or 100 feet distance, the SPDT contacts on the watthour meter may be used to feed the totalizers directly. If the resistance exceeds this amount or if interference exists, it is permissible to use the Type DC-1 power supply adjacent to the sending meter and the Type RP-1 polarized relay adjacent to the totalizers, connected through a 2-wire metallic transmission line. The DC-1 power supply operates at 120 volts 60 hz and produces -65 dc volts and +65 dc volts which, when applied to the SPDT contacts of the transmitting meter, produces in the 2-wire transmission line, a current that changes direction, producing in the SPDT contacts of the polarized relay, contact closures that are a replica of those on the transmitting meter. The DC-1 power supply contains two 500 ohm current limiting resistors.

[2] The maximum input pulse rate is the number of pulses per second that the totalizer will accept regardless of whether the pulses originate from a single source or are the combined inputs of a number of sources.

The Relay Ratio is chosen so that the output pulses do not exceed in number or rate, the capacity of the end device to receive them. The end device could be a pulse-operated demand meter such as the PD-57F. The Relay Ratio is also termed the Input/Output Ratio, and is the ratio between the incoming and outgoing pulses.

The Delay Module spaces the output pulses sufficiently apart in time so that the end device can accept them. It is a factory setting to suit the application. The set value will be marked on the nameplate.

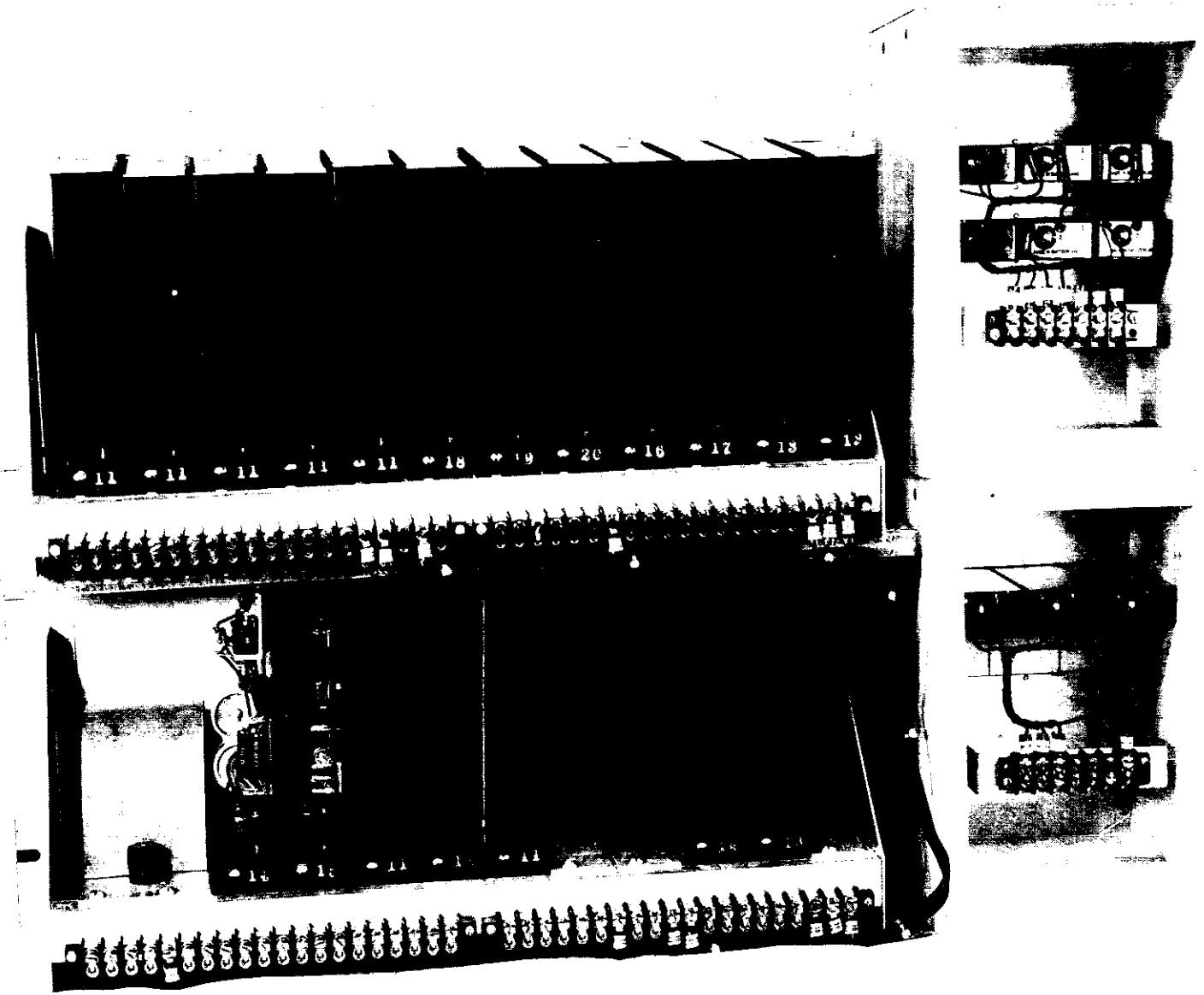
For example, assume that 800 pulses per interval are desired on the end device and a maximum of 4000 pulses per interval are transmitted to the totalizer; then the relay ratio would be 4000:800 and the value of each output pulse will be 5 times that of each input pulse. If the time interval is 15 minutes, the maximum output pulse rate will be 800 ÷ 15 or approximately 53 per minute which is within the capacity of a type PD57 printing demand meter.

In this example, using the information given in the General Electric publication "GEI-52440 Preliminary", the maximum input pulse rate with a relay ratio of 5:1 is 450 per minute or 6750 for 15 minutes.

[3] The SST-1 totalizer can be built to accommodate from 2 to 16 input channels, some of which may be subtractive. One chassis is required for 3 input channels, 2 are required for 4 to 10 channels, and 3 for 11 to 16 channels. Chassis are connected with a factory made cable assembly.

The SST-2 totalizer has all its components contained in a single metal case. The counters, one for each channel plus another counter to record the total are mounted on separate panels in the type SST-1 and inside the case for the type SST-2.

[4] The output of the SST-1 totalizer is a solid state power gate. The ac version has a capacity of 120 volts, 0.5 amperes; and the dc version has capacities ranging from 12 volts, 0.5 amperes to 150 volts, 0.5. amperes. These power gates are not interchangeable. The power gate supplies no power to the end device but functions



SST-1

merely as a solid state SPDT switch. This totalizer is also available with a mercury-wetted SPDT relay output.

The output of the SST-2 totalizer is either by means of a SPDT silver contact relay or a SPDT mercury-wetted contact relay.

Description

This circular is a re-issue of circular S-EA.628 which covered the type SST-1, together with information relating to the type SST-2.

The type SST-2 performs the same functions as the type SST-1 but differs in the number of channels it will handle, the types of modules used, and also in that all the components are contained in a single case.

This circular is also to advise that while the transmitting meters may be equipped with any approved transmitting contacts, the manufacturer recommends only their D-30 or D-41 pulse initiators.

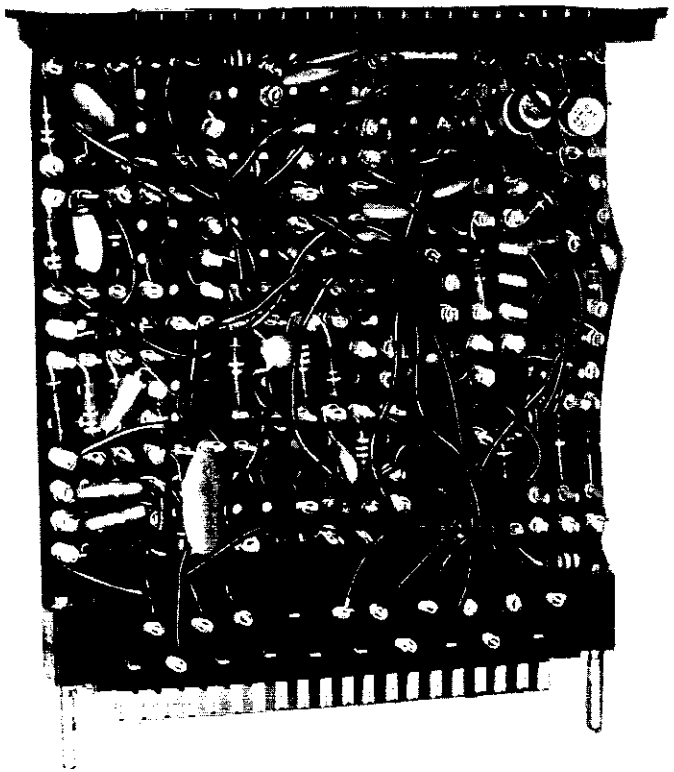
This circular also advises that all installations using either the type SST-1 or the type SST-2 solid state impulse totalizers are to be tested "in situ" as part of the verification procedure.

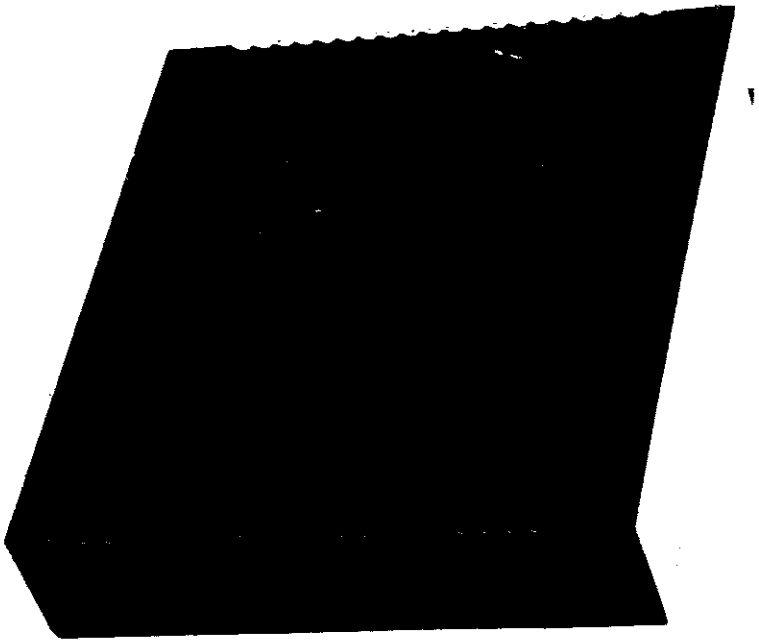
The SST-1 and SST-2 solid state impulse totalizers serve as a summational link between several measuring devices and a pulse recorder to form a system suited to revenue billing or telemetering. When applied to kilowatt demand measurement its speed is compatible with pulse recorders such as the PD-57F and photo-electric impulse generators such as the type D-41.

The incoming pulses must all have the same value but some may be "negative" such as when a quantity must be subtracted for station use. As each negative channel can store only one pulse, the system must be tailored so that the positive pulses predominate at all times. It is also a requirement that the pulse initiators be completely isolated, single pole, double throw type contacts.

The input channels are numbered starting from 1, and should be arranged so that the channel with the highest pulse rate is connected to the channel with the lowest number because channel 1 has priority followed by channel 2 et cetera.

The type DC-1 Power Supply and the type RP-1 Polarized Relay that may be used with either totalizer are not end devices, but function merely as links in the telemetering chain and hence do not require approval or verification.





SST-1

The type SST-1 Totalizers are of modular construction with each module in a separate dust-proof housing. The modules are socket-mounted on the chassis and interwired as required for the particular system. The pulse counters are mounted on a separate panel for semi-flush mounting on the switchboard face. The module chassis are designed for mounting on a 19 inch relay rack or on the back of a switchboard. Each module has an identification number painted on the top which describes its function.

The type SST-2 Totalizers have all the components mounted on a rack inside a metal case. A panel on the front of the rack holds the counters and the nameplate, and grooves in the sides of the rack hold the modules which are arranged like shelves. The rack is connected to the terminals at the rear of the case by means of a flexible multi-conductor cable and can be withdrawn from the case for servicing.

The nameplate of the SST-1 totalizer may take the form of a master nameplate or subsidiary nameplates on the individual chassis, but the SST-2 totalizer has a single nameplate only. In all cases, the number of additive and subtractive channels will be clearly indicated along with input/output relay ratio. Additional space may be provided adjacent to each counter for the customer to inscribe the identity of each and such multipliers as may be used.

The value per impulse of each meter generating pulses that feed into the totalizer should be checked to ensure that all pulses have the same value.

The types SST-1 and SST-2 impulse totalizers are approved for use unsealed.

Note: It is required as part of the verification procedure that the entire totalizing installation be checked "in situ" to ascertain that overall operation is correct. Specifically, it will be necessary to ensure that:

1. each counter records all the pulses generated by its respective meter.

2. each pulse has the same value in terms of primary units.

3. all pulses are being correctly totalized.

4. the system is tailored so that if negative pulses are being generated, none are lost.

5. the end device has received approval.

6. the pulses are being correctly recorded on the end device, paying special attention to the pulse rate and number so that neither exceed those given in the approval circular.

Approval granted to: Canadian General Electric Company Limited,
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Ref: SL-100-27(B)