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

STANDARDS BRANCH - DIRECTION DES NORMES

NOTICE OF APPROVAL

F-64-1

OTTAWA July 23, 1969

SANGAMO TYPE "LY-" POLYPHASE THERMAL KVA DEMAND METERS

Apparatus

Types LYA and LYS

Network for use on 2 wires and Neutral of 3-phase 4-wire Y service

Voltages	120, 240, 277 and 345 volts		
Max. Current Amperes	50	100	200
*Full Scale (KVA)	12	24	48
*Multiplier	10	20	40
Scale	1200 voltamperes and 1.2 kva		
Single Phase KVA Test Constant	1.0		

Note: Network meter must not be used on a 3-phase 3-wire service

Types LYP# and LYS

For use on 3-phase 3-wire service

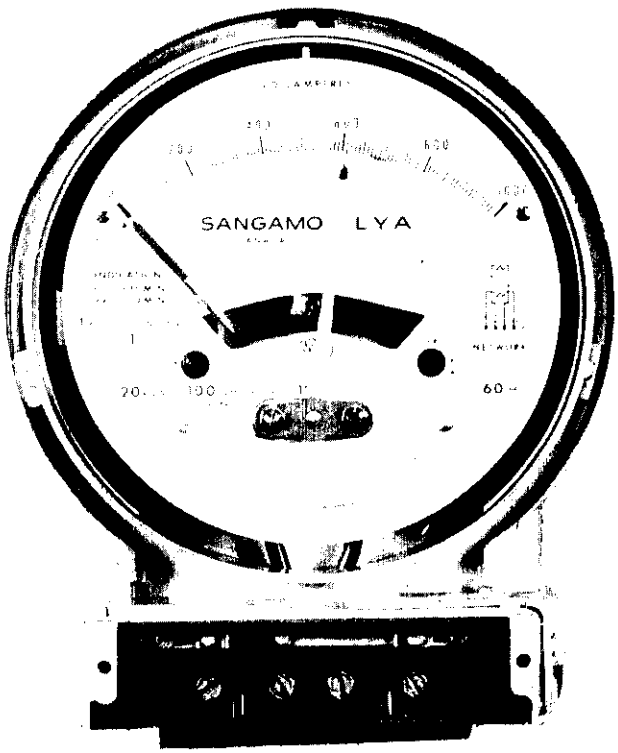
Voltages	120, 240, 480 and 600 volts			
Max. Current Amperes	25	50	100	200
*Full Scale (KVA)	5	10	20	40
*Multiplier	5	10	20	40
Scale	1000 voltamperes and 1.0 kva on all ratings			
Single Phase KVA Test Constant	0.866			

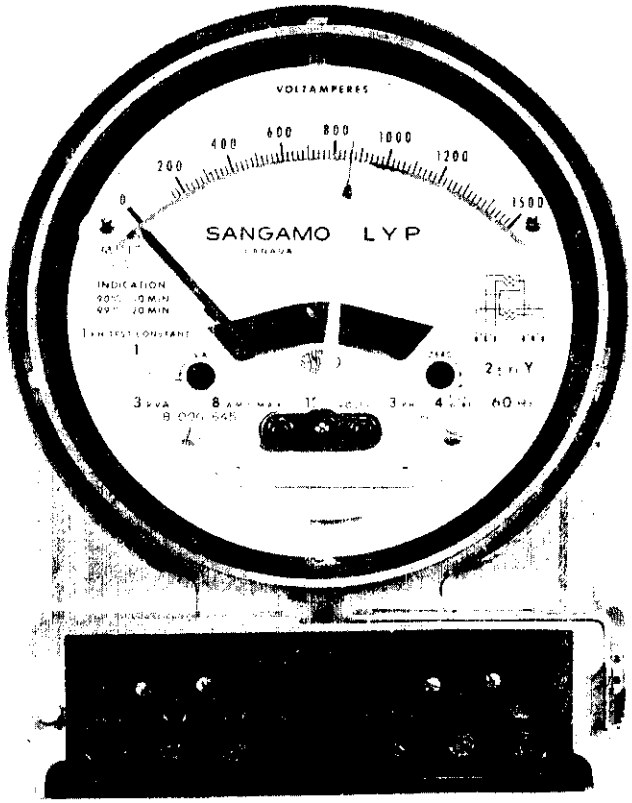
Note: 3-phase 3-wire meter must not be used on network service or on a 3-phase 4-wire Y service with delta connected CT's

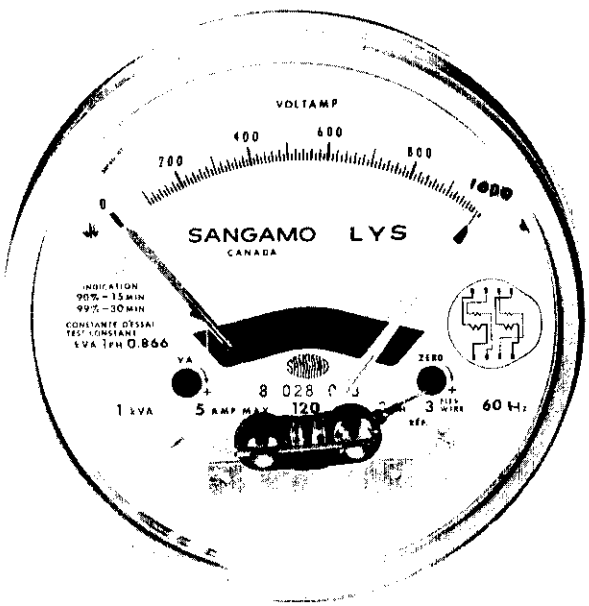
2½ Element Y for use on a 3-phase 4-wire Y service

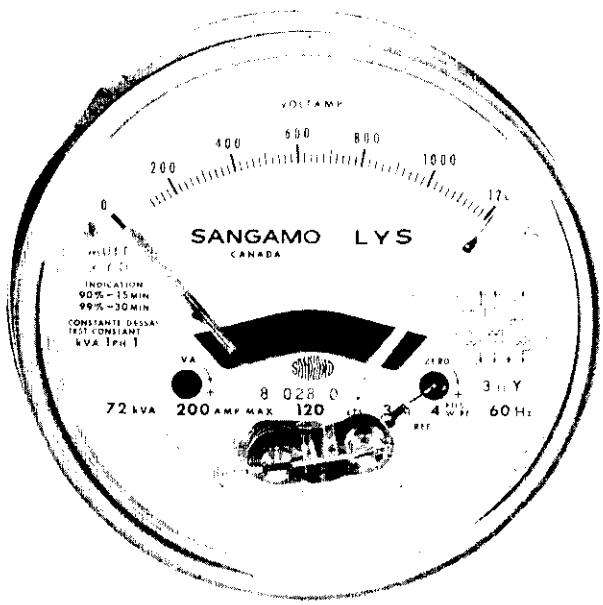
Voltages	120, 240, 277 and 345 volts			
Max. Current Amperes	25	50	100	200
*Full Scale (KVA)	9	18	36	72
*Multiplier	7.5	15	30	60
Scale	1200 voltamperes and 1.2 kva on all ratings			
Single Phase KVA Test Constant	1.0			

SANGAMO TYPE "LY-" POLYPHASE THERMAL KVA DEMAND METERS









3 Element Y for use on 3-phase 4-wire Y service

Voltages	120, 240, 277 and 345 volts			
Max. Current Amperes	25	50	100	200
*Full Scale (KVA)	9	18	36	72
*Multiplier	7.5	15	30	60
Scale	1200 voltamperes and 1.2 kva on all ratings			
Single Phase KVA Test Constant	1.0			

Maximum current of P base meters is 100 amperes

Types LYP, LYS and LYF (transformer type)

Network for 2 wires and neutral of 3-phase 4-wire Y service

Voltages	120, 240, 277 and 345 volts	
Max. Current Amperes	5	8
*Full Scale (KVA)	1	1.5
*Multiplier	1	1
Scale	1000 voltamperes and 1.0 kva on 5 ampere meter	
	1500 voltamperes and 1.5 kva on 8 ampere meter	
Single Phase KVA Test Constant	1.0	

Note: Network meters must not be used on a 3-phase 3-wire service

For use on a 3-Phase 3-Wire Service

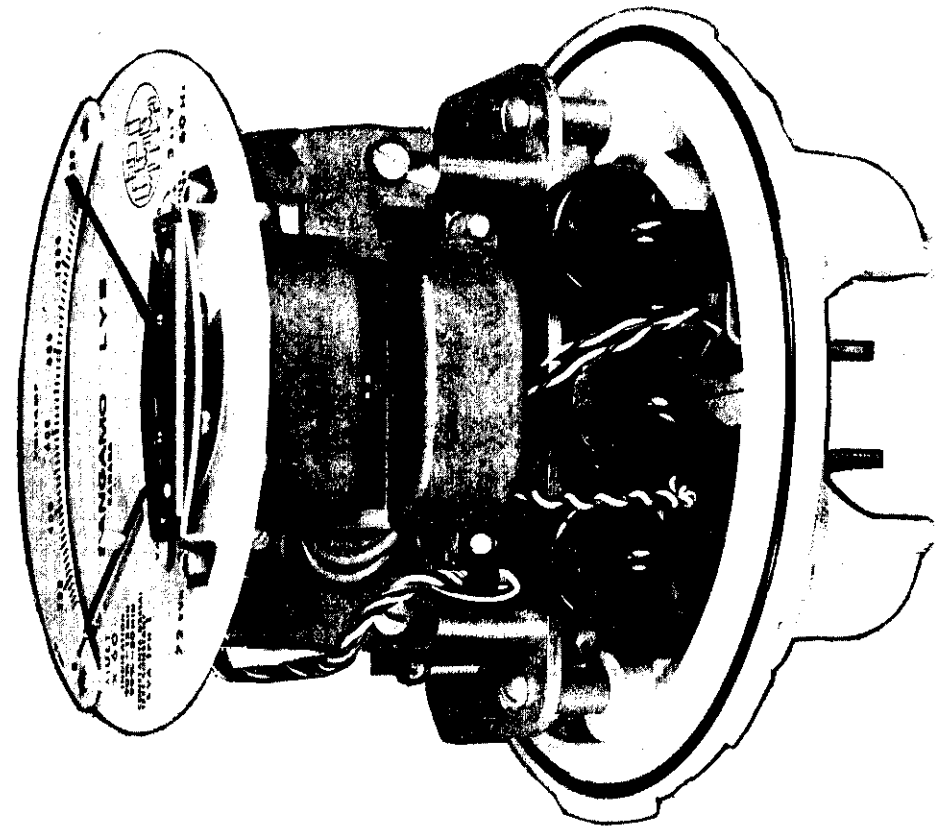
Voltages	120, 240, 480 and 600 volts	
Max. Current Amperes	5	8
*Full Scale (KVA)	1	1.5
*Multiplier	1	1
Scale	1000 voltamperes and 1.0 kva on 5 ampere meter	
	1500 voltamperes and 1.5 kva on 8 ampere meter	
Single Phase KVA Test Constant	0.866	

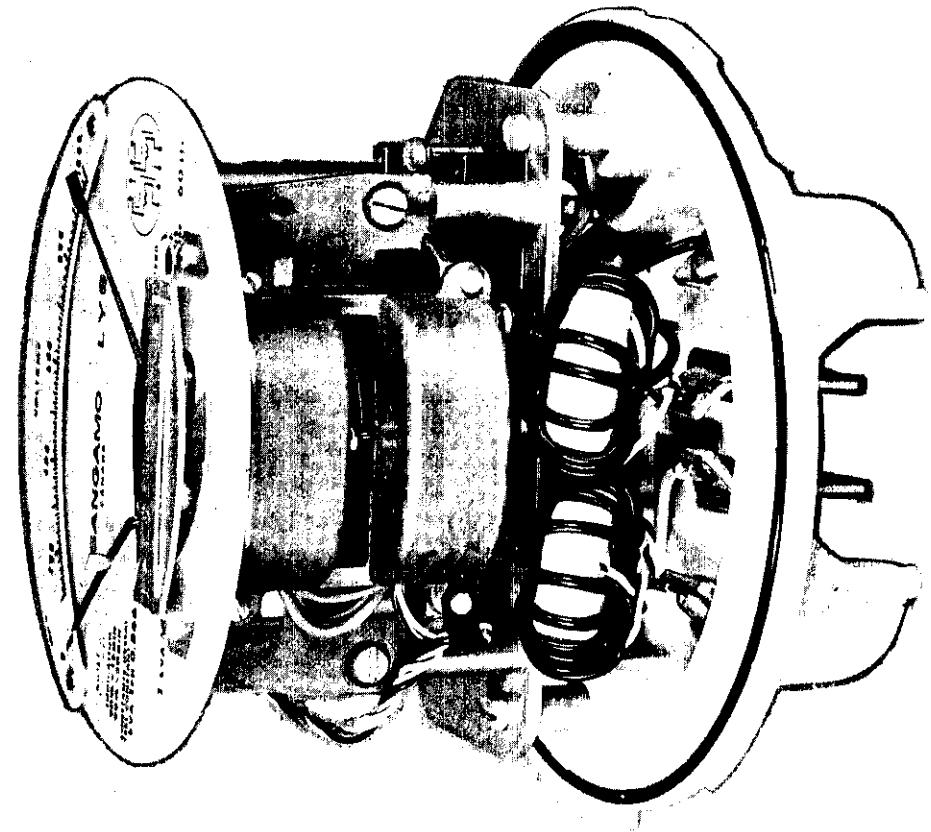
Note: 3-phase 3-wire meter must not be used on network service or on a 3-phase 4-wire Y service with delta connected CT's

2½ Eleement Y for use on 3-phase 4-wire Y service

Voltages	120, 240, 277 and 345 volts	
Max. Current Amperes	6	8
*Full Scale (KVA)	2	3
*Multiplier	2,1	2
Scale	1000 or 2000 voltamperes and 1.0 or 2.0 kva on 6 ampere meter	
	1500 voltamperes and 1.5 kva on 8 ampere meter	
Single Phase KVA Test Constant	1.0	

SANGAMO TYPE "LY-" POLYPHASE THERMAL KVA DEMAND METERS





3 Element Y for use on 3-phase 4-wire service

Voltages	120, 240, 277 and 345 volts	
Max. Current Amperes	6	8
* Full Scale (KVA)	2	3
* Multiplier	2,1	2
Scale	1000 or 2000 voltamperes and 1.0 or 2.0 kva on 6 ampere meter 1500 voltamperes and 1.5 kva on 8 ampere meter	

Single Phase KVA Test Constant 1.0

Frequency	50 hz and 60 hz (all types and ratings)
Indication (all ratings)	90% in 15 minutes, 99% in 30 minutes

Potential coil burden (each coil at 120 volts 60 hz)

Network, 3-phase 3-wire, 2 1/2-element Y	0.8w, 0.6 rva, 1.0 va
3-element 3-phase 4-wire Y	0.6w, 0.6 rva, 0.85 va

Current coil burden (each coil of 8 amp. meter) at 5 amp., 60 hz

Network, 3-phase 3-wire	1.1w, 0.2 rva, 1.1 va
2 1/2-element Y & 3-element 3-phase 4-wire Y	0.7w, 0.1 rva, 0.7 va

* Full scale value and mulitplier are given for 120 volts. For other voltages multiply by the voltage ratio (for 277 volts use 2.5).

Description

This is a reissue of circular E-64 to include 3-element meters and additional transformer type ratings.

The mechanical details of construction of the type LY-are the same as those used in the type "WY-" thermal KW demand meter, circular E-63-1, but because the pointer indication is in arithmetic voltamperes, the internal circuitry is different.

The heaters have resistances of 100 ohms.

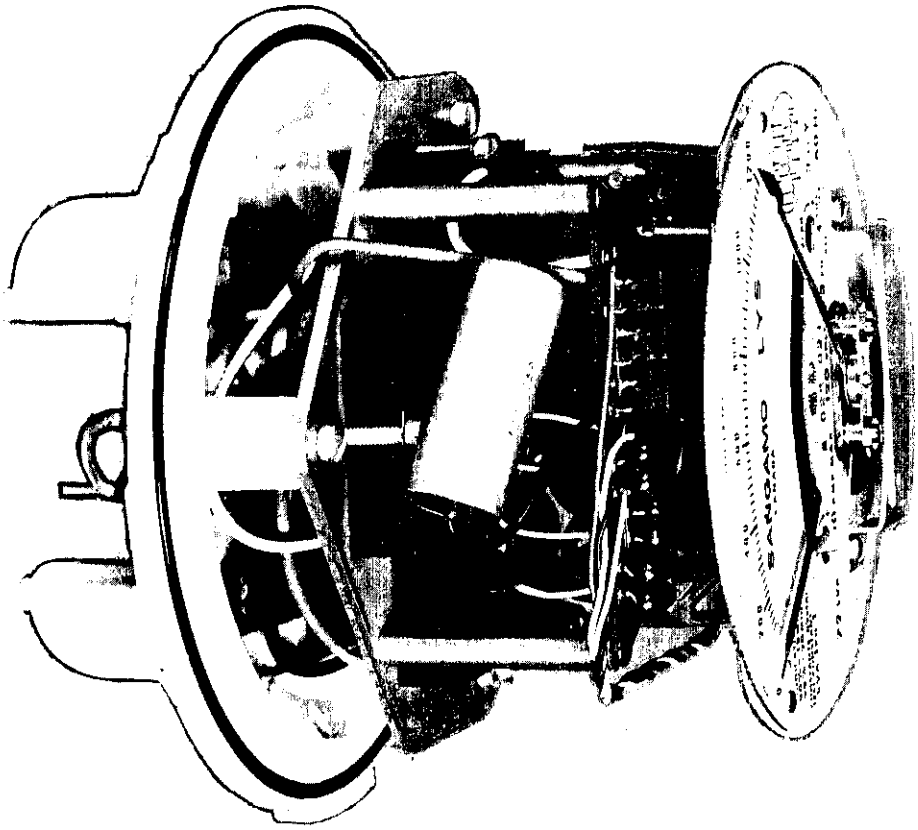
These heaters are connected in the conventional bridge circuit, and are supplied with rectified DC obtained from moulded diffused silicon diodes, and where a full wave bridge rectifier is employed, the four diodes are moulded in one package.

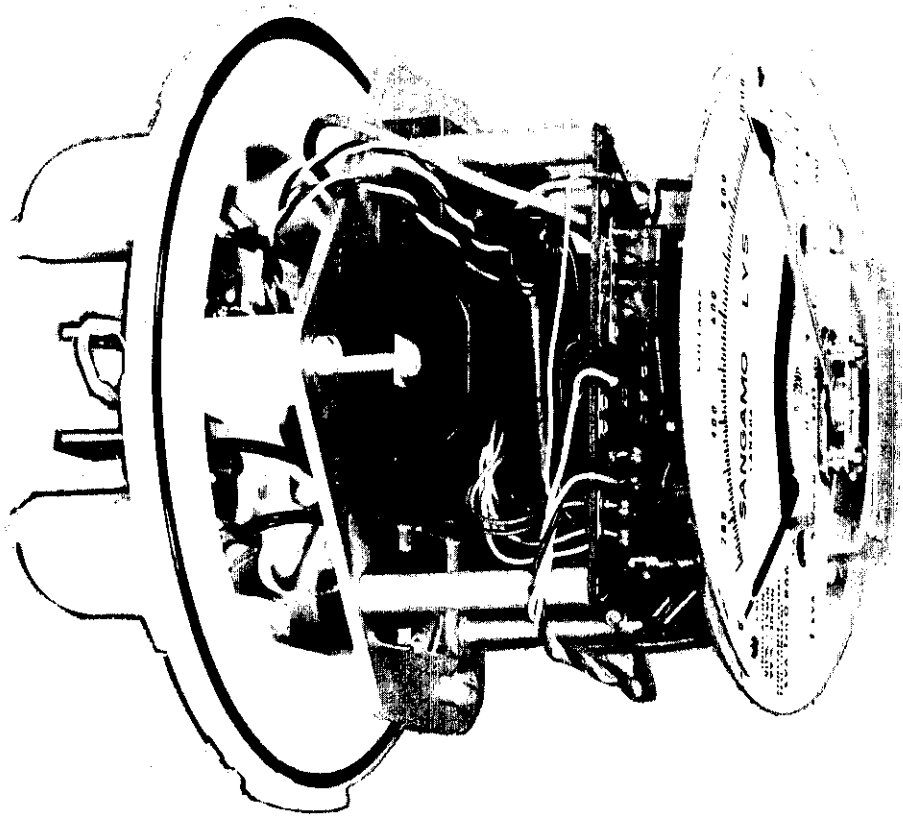
The potential circuit is a centre-tapped full wave rectifier circuit with each potential added in series before it is applied to the heater bridge.

The current circuit is a straight full wave rectifier circuit with four diodes in one moulded package. There is one rectifier circuit for each current and the output currents are added and pass through a reactor/capacitor filter before they are applied to the heaters.

The network and 3-phase 3-wire meters each contain two such current rectifier circuits and the 2 1/2 element Y and 3 element meters each contain three. In all cases the currents after rectification are added in parallel.

SANGAMO TYPE "LY-" POLYPHASE THERMAL KVA DEMAND METERS





The 3 phase 3 wire meter current circuit is identical to that of the network meter except for the addition of a connection that derives the third line current by the vector addition of the other two. This gives the single phase test constant of $\sqrt{3}/2$ or .866.

For this reason although they are both 2-element meters they are not interchangeable and must only be used on the circuits for which they are designed. Thus the customary designation "2-element" will not appear on the nameplate because of possible misapplication.

In both the $2\frac{1}{2}$-element Y and 3-element meters, equal currents in each of the current coils separately produce the same pointer indication.

The single phase test constant shown in the illustrations will be changed to "Constant d'essai, Test Constant KVA 1ph."

Also covered by this approval are the addition of a ground lug on all "P" base meters and the enlargement of the potential terminal hole to accommodate two #12 wires on transformer type "P" base meters.

The filter capacitor is being changed to a round hermetic sealed type, and the toroidal current transformers are mounted on the current coils using heat shrinkable cross linked polyethylene tubing over anchor washers. (see illustrations)

The potential transformers are miniature type using grain oriented silicon steel with moulded primary coils to improve the insulation level.

All KVA demand elements have four heaters, one on each side of the two bi-metal coils. These are connected in a bridge circuit. The secondary currents from the toroidal current transformers in each phase are added in parallel after rectification and are fed to this heater bridge circuit. Since this KVA thermal element is measuring dc it can sum the output electrically from the phases instead of thermally as is the case with a watts thermal demand where phase angles are involved.

The auxiliary wiring panel formerly mounted on the left hand side of the thermal casting has been eliminated, and these connections are now made on the existing panel mounted behind the dial plate.

Approval granted to:

Sangamo Company Limited,
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