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NOTICE OF APPROVAL
AVIS D'APPROBATION

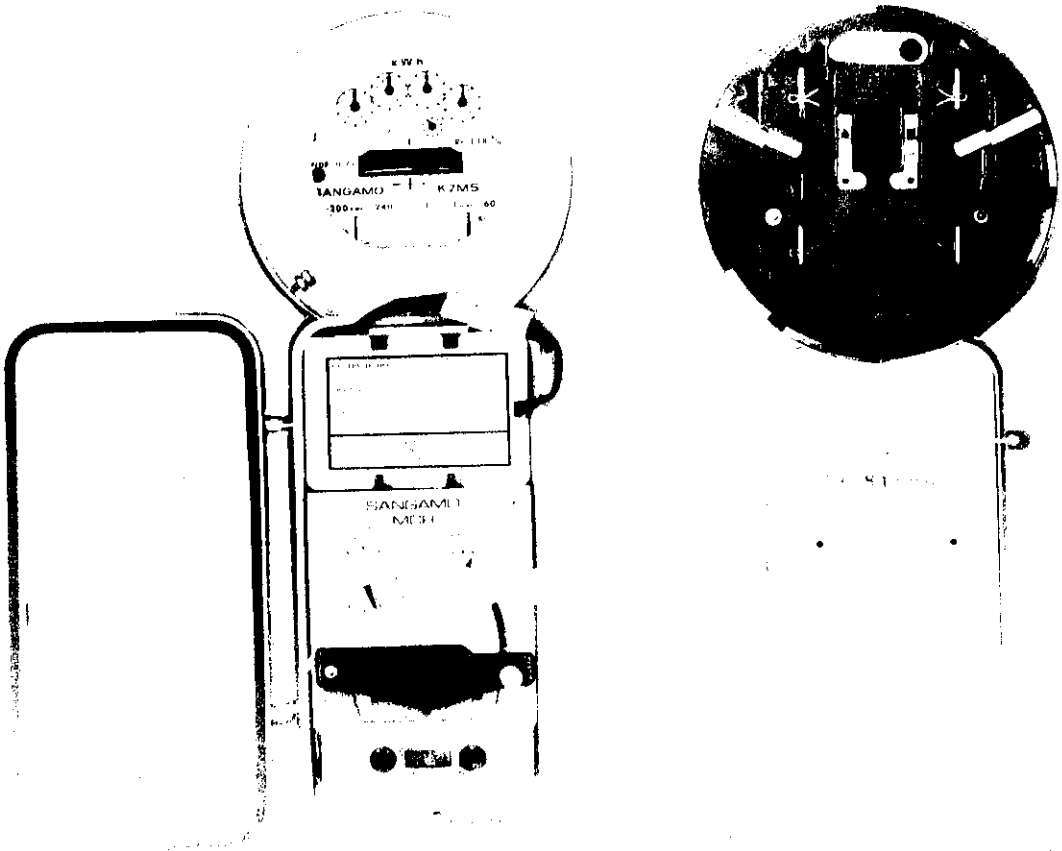
E-152

Ottawa, May 9, 1977

SANGAMO TYPE "MCR1" MINI CASSETTE RECORDER

Summary of Specifications

Input requirements (1)	Mechanical contacts or solid state types of pulse initiators with 3-wire SPDT (form C) or 2-wire (form A) outputs
Maximum burden on pulse initiator switch	5 mA at 40 volts D.C. on A.C. power 1.2 mA at 12 volts D.C. on carry over
Maximum input pulse rate	1 pulse per second
Interval duration	15 minutes
Maximum pulses per interval	1000 pulses per 15 minute interval for 35 day, 500 pulses for 65 day magnetic tape. (95 days optional)
P/DR ratios	0.25 pulse per disc revolution (standard), 0.50, 1.00 and 0.125 optional
Magnetic head	two channel magnetic recording, one for time and one for data. The NRZ recording format is used for both channels
Cassette	Digital grade magnetic tape 0.15" wide, 300 feet long, supply for 35 or 65 days (95 days optional)
Recorder burden	12 voltamps at rated voltage
Power supply (2)	120 and 240 volts, 60 Hz (277 V optional)
Operating temp. range	-40°C to 65°C
Internal carry-over battery	Hermetically sealed, lead acid, 12 volt 2.5 ampere-hour provides 8 hours minimum carry-over operation at 25°C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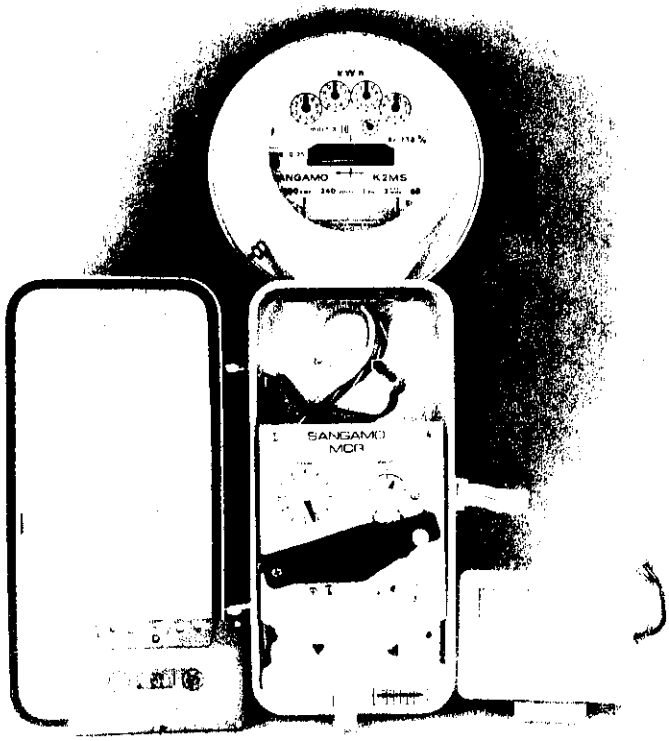
kWh
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As an option a 6-dial pulse register is available for the data channel input which indicates pulse accumulation. Actuated by a stepper motor to ensure reliable and long service.

(1) The recorder has provision for quick changeover between 2-wire system such as the type "M" pulse initiator and 3-wire system such as the type "O" pulse initiator.

The 2-wire system requires tightening the captive screw labeled "2W" on the recorder printed circuit card and loosening (or removing) the 3W screw. For operation with 3-wire initiators the operation is reversed.

(2) The recorder is a dual voltage 120/240 volt unit. The provision for change over consists of an interchangeable connecting block with four screws located at the back plate next to the connector receptacle. One with two connecting jumpers is marked 120 V and the other with one jumper is marked 240 V.

Description

The Sangamo type "MCR1" Mini Cassette Recorder is a magnetic tape recorder used to collect and store pulses proportional to the electrical energy flow in a watthour meter on which a pulse initiator is mounted.

The data pulses, pulses from the pulse initiator, are recorded on one channel of a magnetic tape and on a second channel an internally generated timing pulse is recorded to mark the corresponding time intervals. Both channels, data and time, are recorded in a NRZ tape format. The record produced on the magnetic tape permits analysis not only of customer energy consumption and demand, but also provides continuity of service data. The data on the magnetic tape is decoded by a translation system which counts the number of "data" pulses between "time" pulses and transcribes this information to a computer.

A battery within the recorder enclosure provides power for continuous time synchronization for the magnetic tape. A synchronous motor drives the time clock and the magnetic tape during power interruptions. Unique circuitry ignores momentary power interruptions of less than 20 seconds duration. Power interruptions lasting more than 40 seconds will always be recognized as a true power outage and recorded on the time track by reverting the

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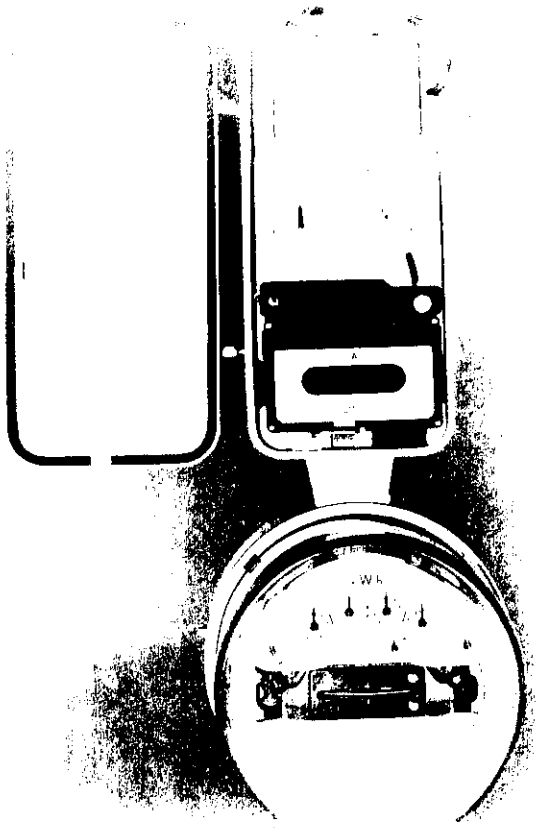
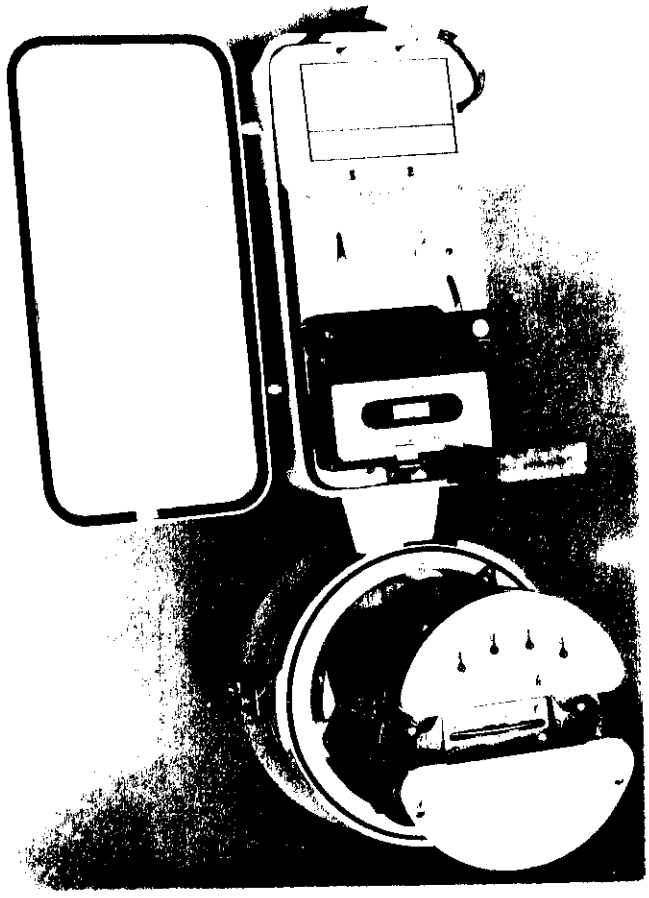
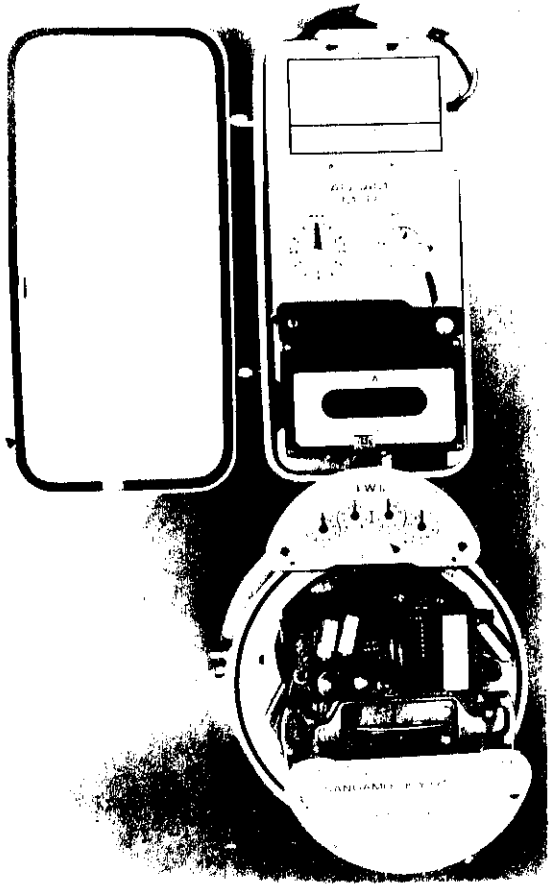
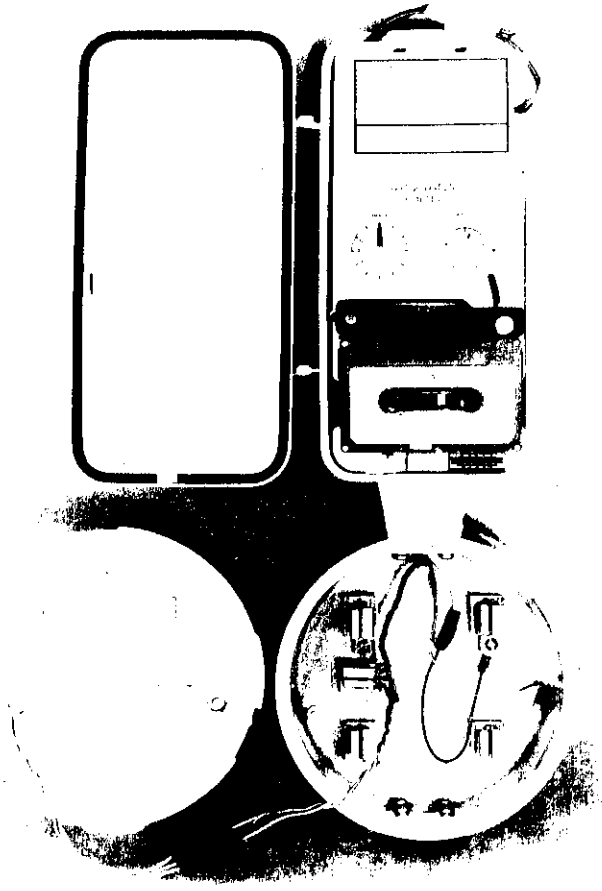








time track to an RZ tape format. Loss of battery power is indicated by a special signal polarity sequence recorded in the time channel.

A synchronous motor type clock consisting of a minute hand (0 through 15 minutes) and an hour hand (0 through 12 hours) provides for time setting manually.

When the minute hand is in the 3 minute black zone the recording mechanism should not be engaged or disengaged nor the tape cassette exchanged.

The recorder is housed in a weatherproof drawn steel sheet rectangular case with a hinged cover; knockouts in the case serve for wiring of the unit.

The power supply to the recorder is taken from the same points as the potential coil of the watthour meter- across the meter supply voltage.

An automatic trickle charger within the recorder keeps the carry-over battery fully charged under normal operating conditions and it is normally not necessary to remove the battery from recorder for charge.

The recorder consists of two principle parts; mechanical and electronic.

The mechanical provides the magnetic tape advancement (tape guides, a pressure roller), the recording head referred to as the recording mechanism and the timing clock.

The electronic system of printed circuit components incorporates - power supply circuit, time interval circuit, meter data channel circuit and power outage circuit.

The following are three basic configurations and billing applications of the type "MCR1" Mini Cassette Recorder.

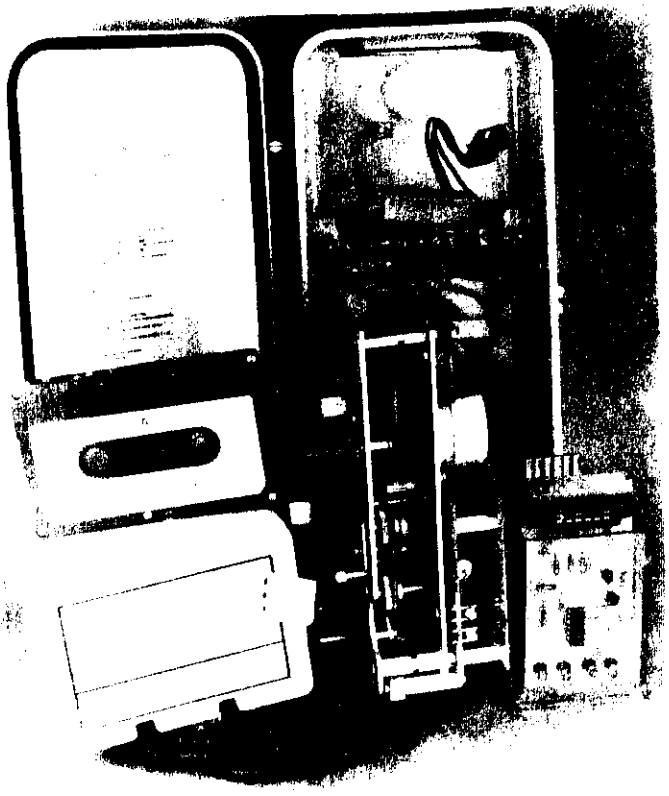
a) TYPE "MCR1-M" CAT. NO. 79717-100

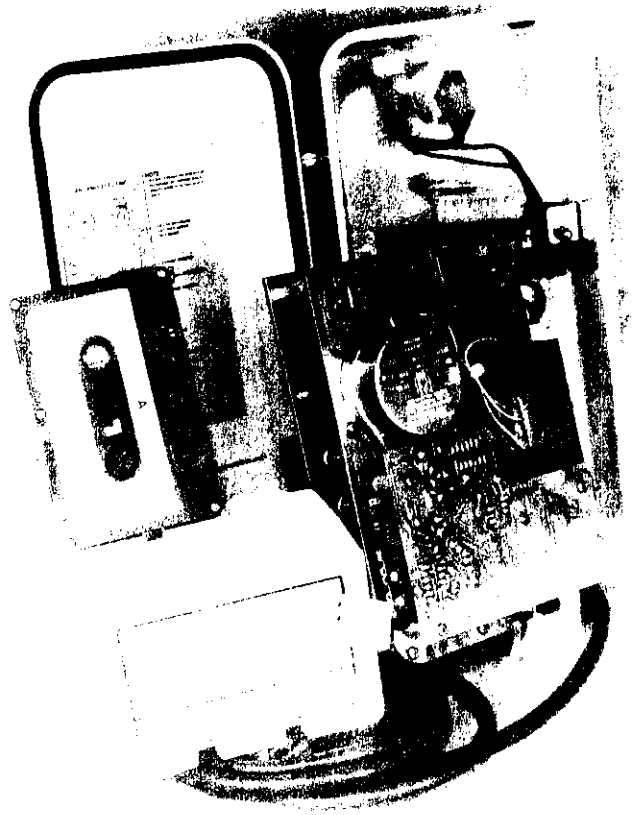
Sangamo Type "K2MS" Single Phase Watthour Meter and Type "MCR1" Recorder as a single unit. The meter cover is made of aluminum.

b) TYPE "MCR1-TE5" CAT. NO. 79787-100

Sangamo Type "KYOS" Polyphase Watthour Meter and Type "K2WMS" Single Phase Combination Watthour and Thermal


SANGAMO
MCR
HOUR
MINUTE





Demand Meter and Type "MCR1" Recorder mounted to a common socket. The extended socket type adaptor is made of plastic. The recording unit can be mounted in any relation to the meter socket.

c) TYPE "MCR1" CAT. NO. 79784-100

The Type "MCR1" Mini Cassette Recorder mounted separately and connected by a shielded cable to the type "K2M-" Single Phase Watthour Meter or the type "K2WM-" Single Phase Combination Watthour and Thermal Demand Meter or the type "KYO-" Polyphase Watthour Meter.

MAGNETIC TAPE CASSETTE

The cassettes for billing applications must be splice free to achieve the specified data accuracy.

Processed tapes must be bulk erased before they are returned for field use. No erasing within the recorder is provided.

Magnetic fields of high intensity may obliterate recorded data and therefore adequate spacing or shielding from magnetic field will reduce this possibility.

TYPE "SR1/BCO" PLUG-IN ELECTRONIC FIELD TESTER

The solid state electronic field tester plugs into the recorder and the light emitting diodes indicate proper operation of the data and time channels.

Pulses for the data channel are generated by the pulse initiator in the meter. The pulses generated are received at the recorder and are also detected by the "D+" and "D-" lights on the field tester, which indicate the direction and duration of current flow through the recording head.

A pulse for the time track is generated by a cam and microswitch arrangement in the recorder for each revolution of the minute dial and causes the proper light emitting diode "T-" or "T+" to light. By manually advancing the minute dial clockwise, extra time pulses can be generated for quick checkout. These tests are not accuracy tests but highly recommended as a periodical functional test in the field.

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Approval granted to:

Sangamo Company Limited,
Leaside, Toronto 17,
Ontario

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

D.L. Smith, P. Eng.,
Chief, Electricity & Gas Division,
Metrology and Laboratory Services

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