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

STANDARDS BRANCH - DIRECTION DES NORMES

NOTICE OF APPROVAL - AVIS D'APPROBATION

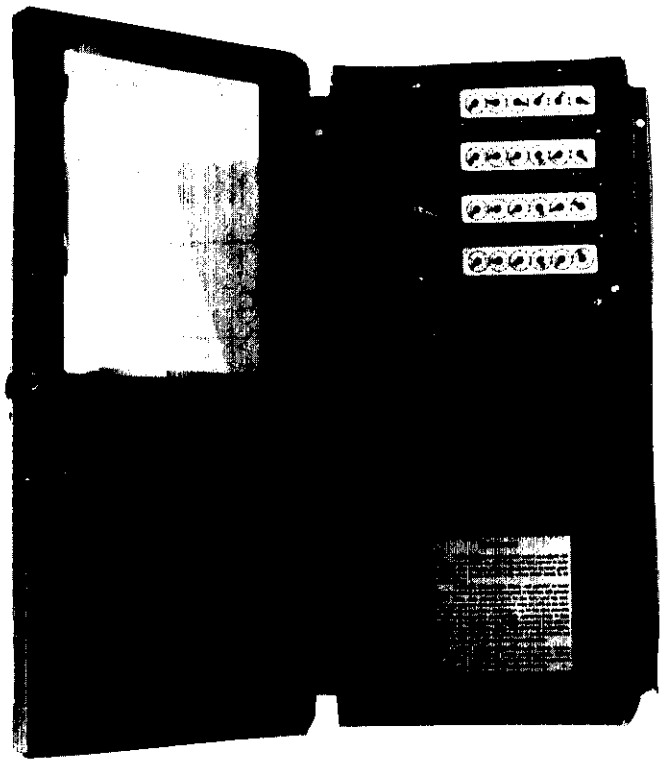
NO. E-109

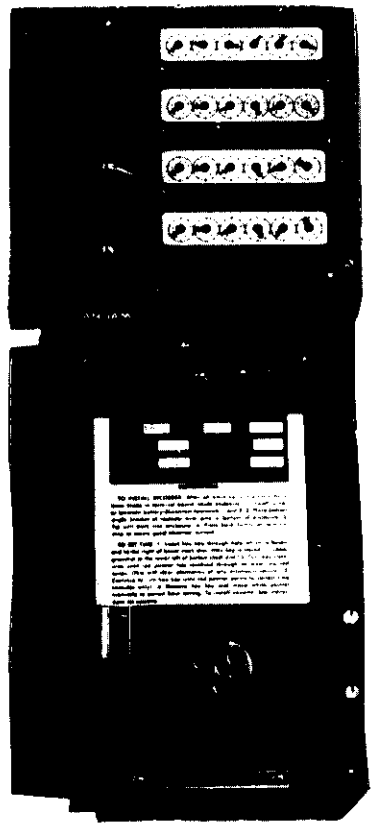
DATE January 9, 1973.

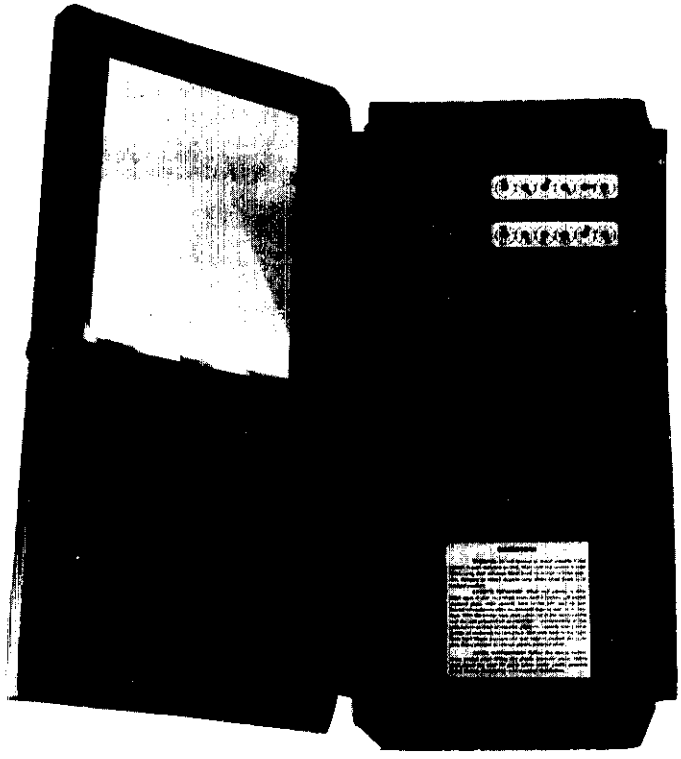
SANGAMO TYPES "DPR215", "DPR230" AND "DPR260" TWO-CHANNEL AND TYPES "DPR415", "DPR430" AND "DPR460" FOUR-CHANNEL DIGITAL PULSE RECORDERS

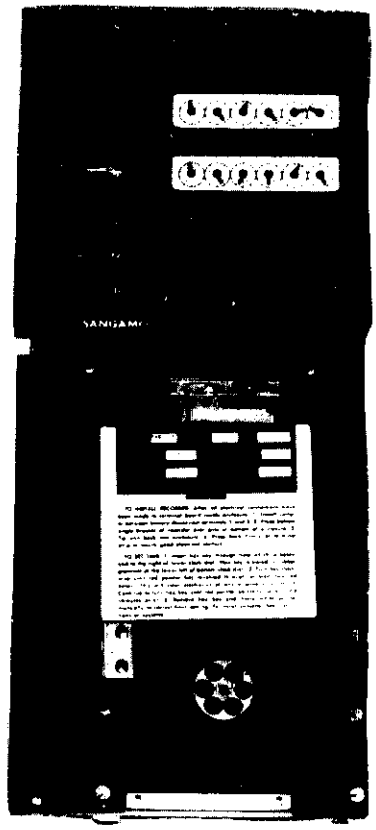
Input ①	3-wire SPDT, KYZ contact device. Form C (break before make). One set per channel
Max. Input Pulse Rate ②	10 per second per channel
Pulse Storage Capacity	4095 per channel per interval
Pulse Recording Capacity	1,000,000 per channel x 10
Register Multiplier	10
Contact Burden ③	70 volts DC 0.02 amperes
Max. Line Resistance	200 ohms
Record and Readout	Pulses
Max. Error Pulse Count	±2 pulses
Operating Temperature ④	-20°C to 50°C
Tape	120 feet 1 inch paper, 35 day supply on a 15 minute interval recorder, 4 channel
Punched Code	Binary
Internal Battery	2 Globe Rechargeable Batteries in series, type GC 680-1, 6 volt 7.5 amperehours, Gel/Cell ®
Demand Periods	15, 30 and 60 minutes. Forms part of type designation.
Pulse Input Terminals	
2 Channel	Y1, Z1; Y2, Z2
4 Channel	Y1, Z1; Y2, Z2; Y3, Z3; Y4, Z4.
Common Terminal ⑤	K
Battery Test	2.5 minutes or more, good battery 2.5 to 1.0 minute, marginal less than 1.0 minute, replace
Power Supply	120 volts 60 Hz
Mounting	Flush or back mounting

The "2" and the "4" in the type designation refer to a 2- or 4-channel recorder respectively.









① On the transmitting meter. Contacts must be capable of handling 20 milliamperes at 70 volts DC.

② If more than 4095 pulses per interval are received on any channel, all pulses are recorded on the register but the record on the tape starts over at "1" on the 4096th pulse.

③ If the transmission cable passes through an electrically noisy location, shielded cable should be used.

④ On a 30- or 60-minute or a 2 channel recorder, the tape lasts proportionally longer.

⑤ Times for a fully charged battery discharged across a 0.5 ohm 250 watt resistor to a terminal voltage of 8.0 volts. Test at room temperature with recorder removed from case. This test is primarily for utility use.

NOTE: Recorders will not operate unless battery is connected.

Description

These Digital Pulse Recorders are designed to record pulses in binary form as punched holes in a paper tape compatible with electronic computer input.

The KYZ terminals of the transmitting meters are connected via a 3-wire metallic transmission line to the corresponding terminals on the recorder.

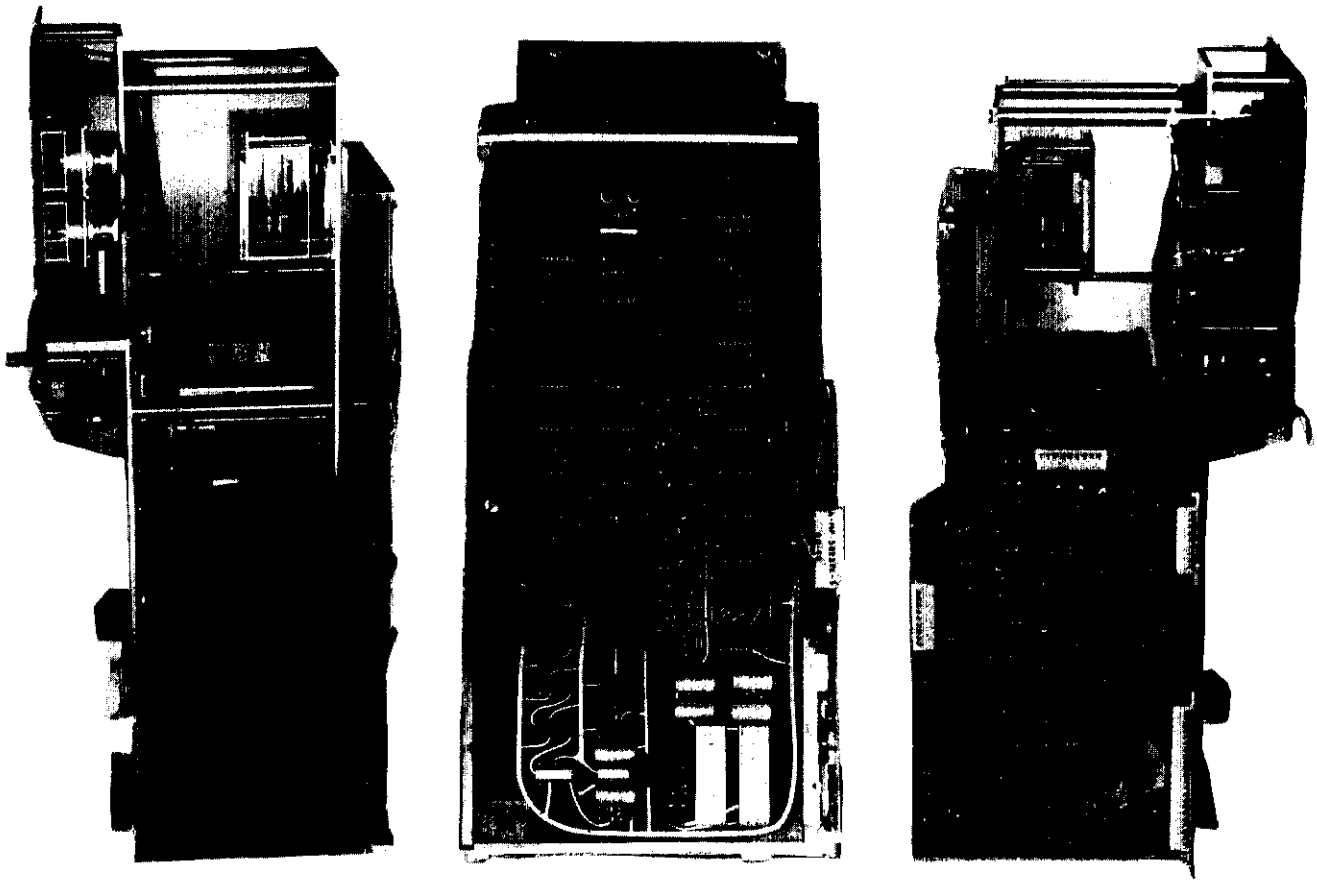
The pulses arriving at the KYZ contacts are fed to a bi-stable buffer which channels the pulses to a 2-coil stepping motor which drives the clock-type register and to the coils of a bi-stable relay.

The clock register records all the pulses and the bi-stable relay supplies the counting circuit with the correct amplitude signals for counting.

A memory circuit is coupled to the output of the counting circuit to which the count is transferred when a command is received on its clock line.

Where an end of interval occurs, a signal is produced by the timer which energizes the reset circuit and causes the following functions to take place:

a. opens the K line so that pulses will be transmitted to the bi-stable buffer but not to the counting circuit



b. energizes the clock of the memory circuit which transfers the correct information to the memory

c. resets the counting circuit to zero

d. closes the K line to allow pulses to occur on the system again

The complete cycle takes place in less than 1/30th of a second so the initiator contacts on the meter cannot change their state more than once during this time and as the bi-stable buffer has an inherent memory of one pulse, no pulses are lost even if a pulse occurs during the reset cycle.

A red interval light indicates exactly when an end of interval (or beginning of the next interval) occurs.

After the reset cycle has taken place there are a total of 12 bits of information stored in each memory circuit. The coding system requires only 6 bits (holes) of data be punched on the tape per row so that 2 rows per channel are required.

On signal from the timer the gate circuit transmits the correct 6 bits out of the memory circuit to the parity generator and output gate which prepares the punch solenoids according to the data.

A crankshaft geared to the clock motor drives the punch mechanism through 4 cycles every interval of a 2-channel recorder and 8 cycles every interval of a 4-channel recorder, punching holes in the tape in accordance with the punch solenoids that were prepared.

As only 6 bits of information out of the 12 available can be punched at one time, there will be 2 rows of holes for each channel.

Figures 1 and 2 on page 6 indicate the value in pulses of each hole in each row along with the positions of the time punch and drive holes.

The row marked "parity" has no value in terms of pulses and is used only to make the holes in each row an odd number.

The number of pulses on each channel during the interval is obtained by adding the values of the holes in the first row and multiplying by 64 and then adding to this the hole values of the second row. The same for each channel.

The total number of pulses that can be recorded per channel per interval is $64(1 + 2 + 4 + 8 + 16 + 32) + (1 + 2 + 4 + 8 + 16 + 32) = 4095$.

REAR OF CASSETTE

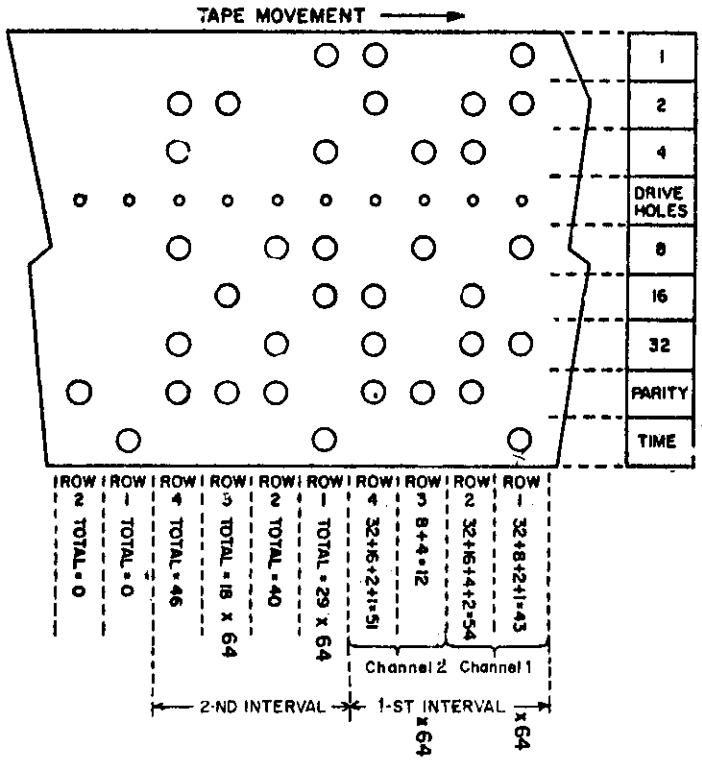
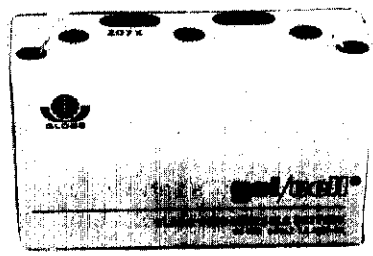
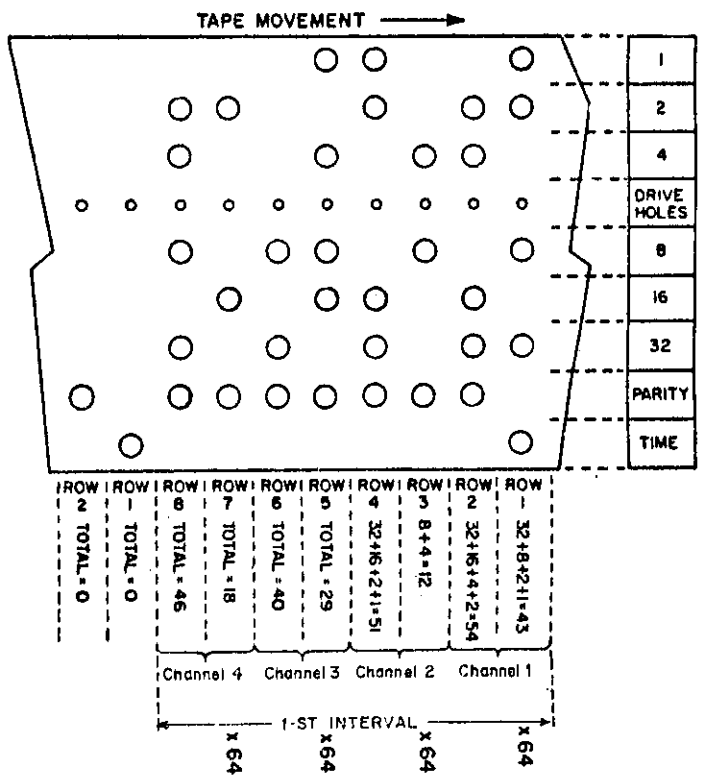


Figure 1 Punch Tape (2-Channel)



Chan. 1 43 x 64 + 54 = 2 806
Chan. 2 12 x 64 + 51 = 819

REAR OF CASSETTE



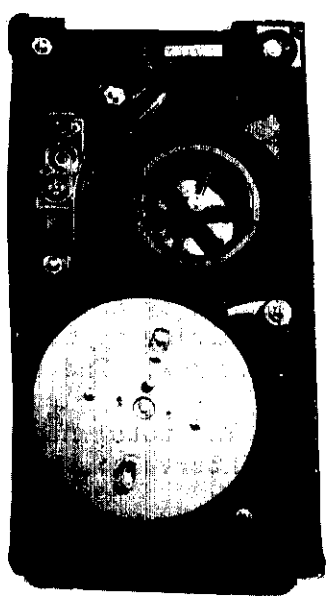


Figure 2. Punch Tape (4-Channel)

On page 6 are shown samples of tapes taken from 2- and 4-channel recorders illustrating the method of calculating the number of pulses.

The rows of punched holes are evenly spaced between the time holes and where verifying it should be noted that the pulses that were supplied to the recorder will not appear as holes in the tape until the following interval.

As long as AC power is supplied to the recorder, the internal battery will be kept charged by a charging circuit if the battery jumper is in place.

This battery is essential to the operation of the recorder as a source of power, and in the event of a power interruption, no recording takes place. The impulses from the previous interval are punched, and from then until AC power is restored, or the battery is discharged, only the time and parity holes are punched, and then all punch latches are released. If the power interruption exceeds the battery carry-over time, the recorder ceases to operate and upon restoration of AC power, all 8 holes are punched, indicating to the translator that a power failure has occurred.

On page 8 are shown the locations of the battery jumpers.

The tape is supplied in a roll which is installed in a cassette and after the tape has been threaded under the pressure plate, this cassette latches in place.

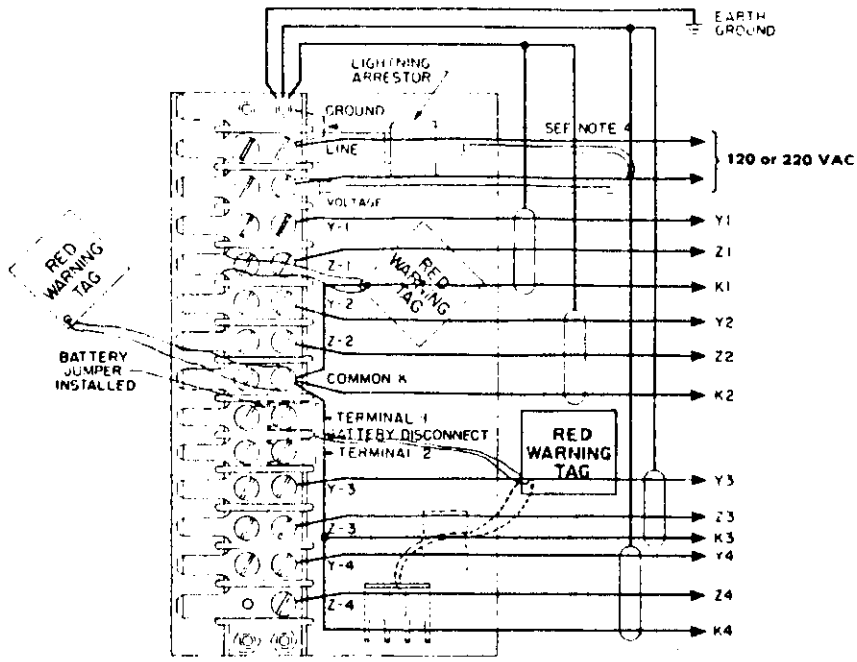
This cassette must be removed from the recorder before the mechanism is removed from the recorder enclosure.

Each recorder has a minute dial and an hour dial. The minute dial is divided into red and black zones. The red zones are equally spaced and indicate the periods of time during which the roll of tape must not be changed.

Pulses that may be stored in the recorder may be cleared by inserting the hex key in a small hole approximately one inch to the left of the manual adjust knob and rotating it clockwise until the minute clock dial hand has passed through at least two red zones. Passing the first zone clears the counting circuit and passing the second clears the memory circuit. The hex key is used to set the time on the minute dial.

The hand on the hour dial and the hands on the registers are a friction fit and may be moved by hand.

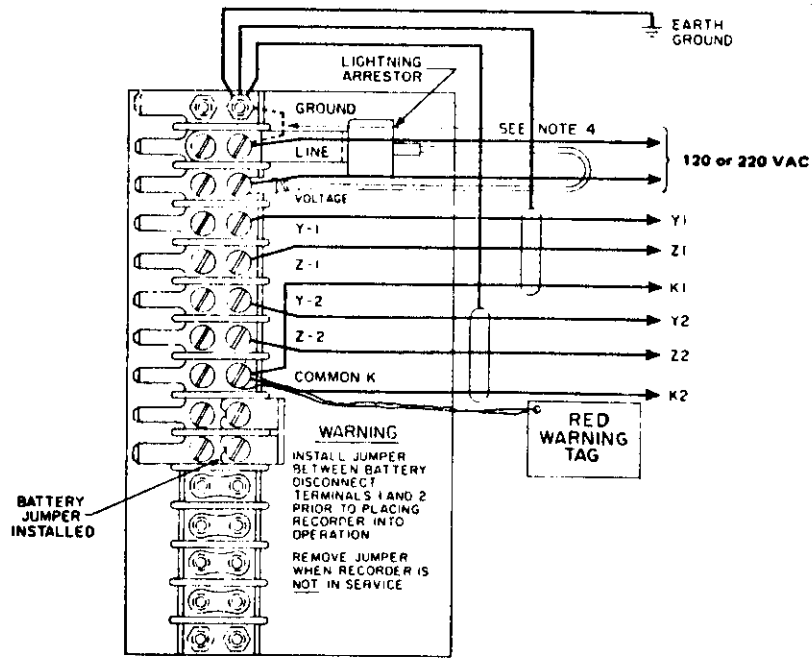
The clock motor is driven by a transistorized oscillator that is synchronized with the line when AC power is supplied to the recorder but operates on its own when input power fails in which condition it may not keep perfect time.



Enclosure Connections (4-Channel) Type 415, 430, 460

CAUTION

If recorder is to be stored for a prolonged interval of time; the battery must be recharged periodically. Refer to section IV, 11 of Service Manual.



Enclosure Connections (2-Channel) Type 215, 230, 260

Instructions for the verification of these recorders are given in Technical Electric Circular E-72/4.

Approval granted to:

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