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NOTICE OF APPROVAL
AVIS D'APPROBATION

E-157

Ottawa, September 19, 1977

DUNCAN STR BILLING/SURVEY TAPE RECORDER

Power Source	120/240/277 VAC ±10% 60 Hz
Burden	10 VA Maximum, 0.75 P.F.
Battery Load During Carryover	0.5 Amp. (max) full operational connection 0.15 Amp. (max) limited operational connection
Battery Type	12 volt, sealed lead-acid type
Recharge Time	48 to 96 hours
External Pulse Initiator	Any 3-wire, Form "C" (break-before-make) switching system capable of conducting 4 mA.
Maximum Pulse Rate	2 per second; 7200 per hour at tape speed of 7"/h 1 per second; 3600 per hour at tape speed of 3.5"/h 0.5 per second; 1800 per hour at tape speed of 2.33"/h
Tape Cartridge	Duncan Type MTC: contains 525 ±10 feet of magnetic tape. Sufficient for 35 days continuous running. 4" long aluminum reflective markers placed on magnetic side of tape 6 feet from each end to signal translator.
Interval Spacing	0.60" per 5 minute interval 1.75" per 15 minute interval 3.5" per 30 minute interval 7.0" per 60 minute interval

Tape Format	ABTC; channel "A" is nearest to the recorder; on 2 channel units, B and C are not used.
Operating Environment	Temperature -35°C to +64°C Relative Humidity 90% maximum, non-condensing
Maximum Line Resistance to Pulse Initiator	100 ohms
Record Period	36 days (standard) 72 days (optional) 108 days (optional)
Clock Dial	12 or 24 hour
Test Jacks	Provided to monitor correct connection and operation with high impedance headphones

External Connections:
All connections to the STR are made on the barrier strip (inside the recorder case) through a three foot pigtail or via a terminal block (bottom connected version only).

Description

This tape recorder is similar to the Duncan BTR, Billing Tape Recorders approved under Notice of Approval E-104, the main differences being;

(1) Carryover Battery integral with the tape recorder.
(2) The door has no glass window.
(3) Complete integrated circuit in the recording circuit eliminates the need to jumper unused channels, Z & K terminals.

The Duncan Billing/Survey Tape Recorder (Type STR) is a magnetic tape cartridge recorder for use in automated data collection systems. Each recorder is a 2 or 4 channel logging device. One channel records an internally-generated time pulse on the ¼ inch wide magnetic tape; the other channel or channels record data.

Each data channel of the recorder receives data from an external 3-wire break-before-make switching device (called a pulse initiator).

For each contact closure in this pulse initiator, the recorder places one data pulse on the magnetic tape. The recorder also places a time pulse on the tape at the end of each timed interval.

After logging this data for a specified period of time, the magnetic tape cartridge is removed and sent to a central location for translation. The translator converts the recorded data into computer compatible language, from this it can provide data, in the form of printouts for load survey, rate analysis, substation monitoring, totalizing and customer billing.

Approved Options

Pulse Registers: Seven-digit non-resettable pulse counters, one for each channel (including time channel "T").

Ledbite: (light emmitting diode built-in test equipment) LED's in series with the recording head indicate the presence and direction of current in the head.

Optimal Battery Carryover Circuit: The BCO option consists of a 3-wire "stepper" motor and a battery. The motor drive circuit uses an integrated asynchronous oscillator circuit operating at a frequency of 120 Hz. The natural frequency is set by a variable resistor while the circuit is operating from a battery. A synchronous network provides a synchronous voltage at twice the line frequency which synchronizes the output of the oscillator circuit to the line frequency with an AC input as low as 40% of normal. The output of the oscillator circuit is capacitively coupled to a discrete toggle flip/flop circuit. The flip/flop divides the output from the oscillator circuit by 2 resulting in a symmetrical, 60 Hz, square wave signal for the motor drive transistors. The drive transistors are alternately turned on and off, causing current to flow through the motor coil. The BCO circuit also contains a float charging circuit which maintains the final float voltage at 13.5 to 13.8 vdc. When the B+ voltage falls about 0.5 volts lower than the battery voltage a gradual shift from AC operation to battery operation is accomplished thus eliminating brown-out conditions.

Optional Master-Slave-Function: provides transfer of a time pulse from one recorder to the other. This provides sychronization of the time tracks. One master can provide timing to as many as 12 slave recorders. All recorders should be located in close proximity.

Isolate Master: In certain cases it is desirable to provide a 2-wire contact closure to the customer. This can be accomplished by the wiring of the master switch as per drawing supplied by Duncan.

Optional Power Outage Recorder: The Duncan style of power outage recorder records a full strength short duration RTB pulse in the time track for any outage longer than 10 seconds.

Optional Heater: For operation of the tape recorder at temperatures as low as -40°C, a 3300 ohm, 25 watt heater is available.

Approval granted to:

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