SECTION I

MODEL 1040,GENERAL DESCRIPTION

1.1 DESCRIPTION:

The Transmation® Model 1040 Digital Calibrator is a pocket-sized, high accuracy test instrument intended for field use. It will directly measure unknown voltages and currents with a 4-1/2 numeral digital voltmeter.

The instrument generates and displays test signals in the range of 0 to 11 V, 0 to 110 mV, 0 to 22 mA, and 0 to 54 mA, for use in calibrating process signaling instruments, and simulates a two-wire transmitter in the 0 to 22 mA and 0 to 54 mA mode. The instrument is battery powered and uses rechargeable nickel-cadmium batteries with a built-in recharger.

Fuses and internal barrier circuitry protect the instrument against misconnections and overloads. The instrument housing has a watersealed switch and gasketing to protect against light rain or mist. The rotary switches have rolled gold contacts instead of the more common gold flashed contacts for increased resistance to corrosive atmospheres. Silicon solid-state electronics and integrated circuits assure long term reliability in industrial environments.

SECTION II

1040 DIGITAL CALIBRATOR

SPECIFICATIONS

(Part No. 100724-000)

2.1 INPUT: By means of 5-way color-coded binding posts

0-11 volts DC with 10 megohms min. input impedance, constant input bias current of 70 nA max.
0-110 nV DC with 2 megohm min. input impedance, constant input bias current of 50 nA max. equivalent to 1°F error with 1000 feet of 20 gauge J thermocouple wire.
0-22 mA DC with 100 ohms input impedance.
0-54 mA DC with 100 ohms input impedance.

2.2 MEASUREMENT CALIBRATED ACCURACY:

0-11 V:	±0.04% of range	±0.03% of reading max.
0-110 mV:	±0.06% of range	±0.06% of reading max.
0-22 mA:	±0.12% of range	±0.06% of reading max.
0-54 mA:	±0.06% of range	±0.06% of reading max.

2.3 MEASUREMENT METHOD: 4-1/2 Numeral Integrating digital voltmeter with 5-digit LED display to 11,000 counts max.

2.4 OUTPUT: By means of 5-way color-coded binding posts

0-11 V DC:	5 ohm output impedance max.
0-110 mV DC:	25 ohm output impedance max.
0-22 mA:	0 to 1300 ohms load
0-52 mA:	0 to 500 ohms load
0-22 mA:	Two-wire transmitter simulator. Exceeds all power and load requirements of ISA S-50.1 with 100 V maximum DC supply voltage

2.5 OUTPUT CALIBRATED ACCURACY:

0-11 V:	±0.04% of range	±0.03% of reading max.
0-110 mV:	±0.06% of range	±0.06% of reading max.
0-22 mA:	±0.12% of range	±0.06% of reading max.
0-54 mA:	±0.06% of range	±0.06% of reading max.
XMTR SIM:	same as 0-22 mA and 0-54 mA	

2.6 REFERENCE: Stabilized Zener Diode

2.7 RECOMMENDED OPERATING TEMPERATURE RANGE: 0 to 110°F.

Storage Temp: -40 to +120°F.

2.8 TEMPERATURE EFFECT: ± 4 μV/°F typ., ±6 μV/°F max. mV IN. 0.0015 /°F all other ranges

2.9 SENSITIVITY: 0-110 V IN/OUT, 0-110 mV IN/OUT: 0.01 F.S.
0-22 mA IN/OUT: 0.05 F.S.
0-54 mA IN/OUT: 0.02 F.S.

2.10 REPEATABILITY: 0.02% of range

2.11 POWER REQUIREMENTS: Built-in rechargeable nickel cadmium batteries. Built-in Charger operates from 115 VAC, 50/60 Hz. supply.

2.12 BATTERY LIFE: 1.9 hours - 50 mA continuous output
2.7 hours - 20 mA continuous output
3.1 hours - Volt and mV Ranges continuous input/output

2.13 WARMUP TIME TO RATED ACCURACY: 30 sec mV n; 5 sec max. all other ranges

2.14 AREA CLASSIFICATION: Designed for Class I, Group D, Div. 2 service except for recharging

2.15 PROTECTION: Zener diode and fuse-protected on all ranges against misconnection and overload up to 110 volts.

2.16 WEIGHT: 3 lb. including battery

2.17 SIZE: 8.25" high x 2.67" deep x 4.5" wide

2.18 RANGE SELECTION: Manual, with decimal point switching and leading-zero blanking built-in

2.19 BATTERY CHECK: Built into on-off switch. Display indicates battery voltage

2.20 POWER SUPPLY EFFECT: Less than ±2-count shift from 5.3-4.7 V battery voltage

2.21 NORMAL MODE REJECTION: 70 DB 0-11 V input, 101 DB 0-110 mV input, 60Hz

2.22 COMMON MODE REJECTION: No effect up to 140 VAC, 60 Hz

2.23 READING RATE: 700 MS/reading

SECTION III

OPERATION

3.1 DESCRIPTION OF OPERATING CONTROLS (Refer to figure 1, page 16)

A. Function Switch "A"

This switch selects the desired mode and range of operation. There are seven positions.

1. 0-11 V In: In this position an unknown DC voltage in the range of 0-11 V may be measured.

2. 0-110 mV In: In this position an unknown DC voltage in the range of 0-110 mV may be measured.

3. mA In: In this position, an unknown DC current in the range of 0-54 mA may be measured.

4. 0-11 V Out: In this position, the instrument provides a DC voltage output in the range of 0-11 volts.

5. 0-110 mV Out: In this position, the instrument provides a DC voltage output in the range of 0-110 mV.