

Canadian Standards Association

REPORT

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LABORATORY 178 REXDALE BLVD., REXDALE, ONTARIO.	REPORT No. LR 45322-3
DATE <u>January 21, 1981</u>	GUIDE No. 540-I-0.8
SUBMITTOR Dynalco Corp., P. O. Box 8187, 5200 N.W. 37th Ave., Ft. Lauderdale, Fla. 33310 Attention: Mr. Blas Mazzeo	APPLICABLE REQUIREMENTS CSA Std. C22.2 No 0-1975 157-1979 Elect. Bull. 584A-1968
EQUIPMENT Miscellaneous - For Hazardous Locations, Class I, Groups C and D. Digital Phrometer, Model TMP100, multipoint, battery operated, intrinsically safe when connected to thermocouples and/or RTD's and powered only by two of the following battery types connected in Series: Eveready No 1222; Mallory No M1604HD; or Ray-O-Vac No D1604.	
MARKINGS As shown in Fig 9 (Dwg No 8003290). It is the Submitter's responsibility to ensure that the CSA Mark is only applied to this equipment when it complies with the "Applicable Requirements"	
ALTERATIONS Markings as above.	
FACTORY TEST N/A	

This "Equipment", when incorporating the "Alterations" described (if any), complies with the "Applicable Requirements".

Report by: L.J. Ballantyne,
 Reviewed by: K.M. Collins, P. Eng., Senior Engineer,
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LJB/wc

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DESCRIPTION

General: The subject device is a digital readout temperature measuring instrument. For appearance and constructional details as shown in Fig 1 (Dynaform No TMP100, October 1, 1978), Fig 2 (Manual, October 1, 1978), Fig 3 through Fig 10 (Drawings Nos B8002917, B8002909, B8002911, D8002806, C8002913, B8002853, 8003290, Rev A, and A8002914 (Sheets 4 through 10 respectively) and as follows:

Nomenclature: Basic Model No TMP100- followed by one of: 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 indicating range and thermocouple types.

Enclosure: High impact plastic ABS 1/8 in thick, nominal, see Fig 3.

Bezel measures 5-1/2 in by 5-3/8 in by 1-1/2 in deep overall, comprising:

- (a) PC Board assembly compartment, 5-1/2 in by 3-7/8 in by 3/4 in deep with acrylic face plate, 1/16 in thick epoxied inside the bezel;
- (b) Battery compartment inside dimensions 4-7/8 in by 1-1/8 in by 3/4 in deep, fitted with a clip-on cover.

Back cover, moulded in shape, 5-1/2 in by 5-5/16 in by 1-3/8 in overall including cylinder portion 3/32 in thick, 4-1/4 in id by 1-3/16 in deep, secured to Bezel by four screws. Mounts temperature sensor terminals and multi-point selection switch as shown in Figs 4 and 5.

Multi-Point Switch: Made by "Unidex" P/N 249 soldered on the back cover circuit tracings.

PC Board Assembly: Fibreglass cloth reinforced epoxy copper printed both sides, 1/16 in thick by 5-3/16 in by 3-11/16 in mounted on integral stand-offs and secured by epoxy. Mounts components as shown in Fig 7.

Note: Certain resistor values vary for the different type of thermocouples and temperature ranges as shown in Fig 10.

Batteries: Supply comprises two series connected 9V battery cells identified as follows:

1. Eveready No 1222 (Neda 1604D) - made in U.S.A.
2. Mallory No M1604HD - made in U.S.A.
3. Ray-O-Vac No D1604 - made in U.S.A.



The following were measured as indicated below:

1. OCV 10.0V SCC 500 mA.
2. OCV 9.35V SCC 160 mA.
3. OCV 9.4V SCC 400 mA.

Internal Wiring: Seven strands wire, 0.010 in each strand, thermoplastic insulated.

TESTS

Spark Ignition: Spec 157, Clause 6.2.

Battery Eveready No 1222 was considered representative and used for spark ignition tests.

The circuitry of the device was investigated under conditions as indicated below using a contact mechanism located in an explosive Ethylene/air mixture fresh batteries were used for each test.

1. Two batteries connected in series.

OCV	19.5V	SCC	0.500A	beginng of test.
	16.5V		0.550A	End of test.

2. Two batteries connected in parallel.

OCV	10V	SCC	1.0A	Beginning of test.
	8.1V		1.05A	End of test.

No other tests were considered necessary for the following reasons:

- (a) Capacitor C1, 12 μ F is connected in series with R4, 100 ohms metal film resistor, with actual operating voltage of 5V.
- (b) Capacitor C6, 82 μ F/3V is shunted by two diodes in parallel maintaining the voltage across the capacitor at approximately 1 volt level.

No ignition occurred as a result of test No 1 and 2.

Temperature Code Rating: Spec 157, Clause 6.3.

The possibility of thermal ignition by circuit components due to fault currents was investigated and only the following test was considered necessary, and Eveready No 1222 batteries were used.



3. - Q1 shorted - component fault.
- U2, LM358, shorted pins 4 and 8 - component fault.
- Maximum diode CR5 surface temperature as measured by a thermocouple:

- 45C at 25C ambient.
- 60C at 40C ambient.
4. One battery Eveready No 1222 - shorted.

Max temperature - 53C, at 25C ambient.
- 68C at 40C.
5. One battery Mallory No M1604HD - shorted.

Max temperature - 36C at 25C ambient.
- 41C at 40C ambient.
6. One battery Ray-O-Vac No D1604 - shorted.

Max temperature - 42C at 25C ambient.
57C at 40C.