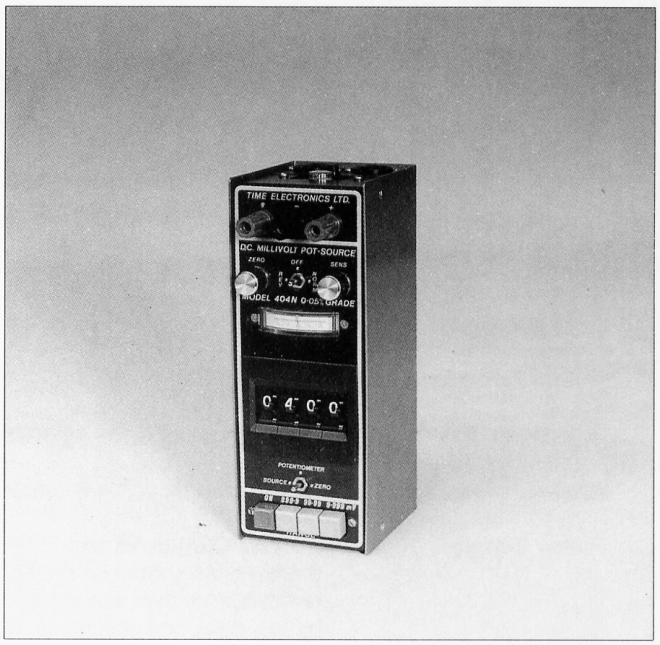
Data Sheet 1007
DC Millivolt Potentiometer Model 404N

- **3 ranges up to 1V**
- **0.05% accuracy**
- **1 Microvolt resolution null**
- **No standardisation required**
- **Millivolt source as 404S**



Introduction

The 404N includes all the features of the 404S with the addition of a microvolt null balance display. This enables it to be used for potentiometric voltage measurement in addition to its function as a calibrator. The null zero and sensitivity are adjustable via front panel controls - maximum sensitivity enables null balance to resolve 1 microvolt.

Applications are essentially those of conventional potentiometers with the following significant advantages:

1. No standardisation is required.
2. 20 mA output current.
3. Output remains stable without readjustment.
4. Electronic null with microvolt sensitivity.

The 404N is suitable for operation by unskilled personnel and does not require standardisation or calibration before use. It is only necessary to zero the null amplifier prior to making a measurement.

The 404N is particularly useful for calibration and simulation of thermocouples. Accurate voltages equivalent to the output from a thermocouple can easily be set on a 404N, enabling fast calibration of temperature measureing equipment. Alternatively, the 404N can measure thermocouple output by using the unit as a potentiometer.

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Specifications

Output	0-999.9 mV in 3 ranges 0-999.9 mV in 0.1 mV steps 0-99.99 mV in 10 μV steps 0-9.999 mV in 1 μV steps
Accuracy	± 0.05% of setting. ± 0.02% of range ± 1 μV.
Output Resistance	Less than 0.2 ohm on 1V and 100 mV ranges. 1 ohm on 10 mV range.
Maximum Output Current	1V and 100mV ranges - 20mA. 10mV range - Up to short circuit value although it should be noted that loads less than 1kΩ will give greater than 0.1% error.
Output Voltage Stability	Less than 60 ppm/°C. Less than 100 ppm per 3 months. (Non cumulative.)
Output Polarity	Positive or negative switch selected. A centre 'off' position is also provided.
Output Noise Level	Less than 30 ppm of f.s.
Reference Source	Precision zener diode selected for stability and low temperature coefficient.
Maximum Overload	The instrument can withstand continuous short circuit on the output for all ranges.
Power Supply	Six Zinc-Carbon AA size (51x14mm) batteries. A battery condition display indicates when the batteries should be changed. Alternatively, Ni-Cad cells may be used and charged without removal from the case via the charging socket on the end of the instrument. A rechargable battery pack and charger is available as an optional extra.
Null Balance Display	The null display is on a front panel meter, zero and sensitivity controls are provided. Maximum sensitivity: ± 20 μV f.s.d. (2μV/div) Minimum sensitivity: ± 200 mV f.s.d. Meter scale: 20-0-20 (20 divisions) Input resistance: greater than 1 Mohm at balance

General Information

Dimensions	195 x 75 x 85 mm
Weight	1 kg
Optional Extras	**Rechargeable Battery Packs** - 240V and 110V mains **Calibration Certificates** - traceable to N.P.L. and NAMAS

Ordering Information

Description	**Order Code**
D.C. Millivolt Potentiometer & Calibrator Model 404N (0.05% Accuracy)	**1007**
Rechargeable Battery Pack - (6 Nicad cells + 240V Mains Charger)	**1008**
Rechargeable Battery Pack - (6 Nicad Cells + 110V Mains Charger)	**1009**
N.P.L. Traceable Calibration Certificate	**1090**
NAMAS Calibration Certificate	**9100**