

1.2.0 Features and Applications

1.2.1 Features:

Accuracies based on one full year calibration cycle and conservatively specified by using the "Limit of Error" (or Worst - Case) methods.

E Mode: $\pm(0.002\% \text{ of setting} + 0.0005\% \text{ of range} + 3 \mu\text{V})$

I Mode: $\pm(0.005\% \text{ of setting} + 1 \mu\text{A})$

Programming: IEEE-488 (GP-IB) and local/manual control. (Note: Operator has control of local/remote mode i.e., shutdown not required to re-establish "local" control.)

3 Voltage ranges (1 ppm resolution or 6 decades)

$\pm 100 \text{ Vdc}$ resolved to $100 \mu\text{V}$

$\pm 10 \text{ Vdc}$ resolved to $10 \mu\text{V}$

$\pm 100 \text{ mVdc}$ resolved to $0.1 \mu\text{V}$

2 Current ranges (1 ppm resolution or 6 decades)

$\pm 100 \text{ mAdc}$ resolved to $0.1 \mu\text{A}$

$\pm 10 \text{ mAdc}$ resolved to $0.01 \mu\text{A}$

(Note: 100 Vdc Compliance with variable control.)

Floating output. Optically isolated between analog output and digital input lines.

True bipolar control with balance zero.

Magnitude is maintained during polarity changes, and scaled on function changes and range changes in the manual mode. i.e., this eliminates the requirement of reentering the magnitude.

A "crowbar", or short circuit, of the output may be selected.

1.2.2 Applications:

Calibration of DVMs, DMM, meters, chart recorders, A/D converters, ATE, monitors, controllers, logging systems, etc.

Simulation of thermocouple and strain gages. (4 to 20 mA and 10 to 50 mA) and other transducers.

NOTE: Compliance voltage from 1V to 100 Vdc. Lower compliance limits are selectable. Linearity check of amplifiers and function modules.

1.3.0 Output Specifications

1.3.1 Voltage Mode

Range (full scale)	<u>100 mVdc</u> ±111.111 0 mVdc	<u>10 Vdc</u> ±11.111 10 Vdc	<u>100 Vdc</u> ±111.111 0 Vdc
Resolution (1 ppm)	100 nV	10 µV	100 µV
Compliance Current	EMF into 1 meg Ohms	100 mA	100 mA
Output Impedance	20 Ohms	10 milliohms	10 milliohms

Accuracy (Basis for accuracy statement):

The Accuracy Statement is based on the "Limit of Error" (or "worst case") method. All other specifications noted hereafter, which effect accuracy, e.g., line, load, temperature, and drift changes are included in the accuracy statement. Thus, all other specifications are listed as *non-Additive.

±(0.002% of setting + 0.0005% of range + 3 µV)

Note: The "+ 3 µV" specified above applies primarily to the 100 mV range where measurements at these low levels should be stated conservatively. It becomes insignificant on the higher ranges.

Note: The accuracy statement above is based on the "Limit of Error" method and is VALID FOR ONE YEAR calibration cycles. The "Limit of Error" accuracy may be increased to tighten tolerances by:

- A) Shortening re-calibration cycle, i.e., more frequently than the suggested 1 year cycle. and/or
- B) Elimination of "worst case" conditions by implementing carefully monitored, standards laboratory procedures.

Stability: 8 hrs: ±0.00075%; 24 hrs: ±0.001%
(*non-additive) 90 days: ±0.0015%; 1 year: ±0.002%

Line & Load Regulation: ±0.0005% No load to full load
(*non-additive) ±10.0% line fluctuation

Noise & Ripple: rms: ±0.0005% of range + 2 µV
In a band pass of 0.1 Hz to 100 kHz

1.3.2 Current Mode

Range	10 mAdc	100 mA
Full Scale	± 11.111 1. mAdc	± 111.111 0 mAdc
Resolution (1 ppm)	10 nA	100 nA
* Compliance Voltage	$\pm 0 - 100$ Vdc	$\pm 0 - 100$ Vdc
Output Conductance	0.1 μ s	0.1 μ s

* Note: Voltage Compliance Limit Control

The compliance voltage may be limited via a jumper.

The limits are: $>\pm 100$ V, ± 46 V, ± 32 V, ± 18 V, ± 4 V and ± 1 V.

Accuracy: (See definitions under Voltage mode)

$\pm 0.005\%$ of setting + 1 μ A

Stability: 8 hrs: $\pm 0.001\%$; 24 hrs: $\pm 0.002\%$

(*non-additive) 90 days: $\pm 0.0025\%$; 1 year: $\pm 0.005\%$

1.4.0 General Specifications

Isolation:

Power Transformer to analog output:

2.5×10^4 Megohms, 300 pF

Control logic to analog output; optically isolated.

10^9 Ohms, 130 pF, 500 Vdc

Temperature Coefficient:

Ambient: $\pm 0.0005\%/^{\circ}\text{C}$

Operating Limit: $\pm 0.001\%^{\circ}\text{C}$

Switching and Settling Times:

Step Changes: 5 ms

Range Changes: 1 s

Protection: Voltage mode: Short-circuit and overload protection.

Current mode: Open-circuit protection.

Front panel enunciator will indicate malfunction condition.

Warm-up Time: 2 hours