Small Instrumentation Modules

SIM970 — Quad digital voltmeter

- ***True 5½-digit performance***
- ***Four isolated channels***
- ***Bright 7-segment LED displays***
- ***3 decade autoranging to ±19.9999 V***
- ***10 MΩ input impedance***
- ***Trigger input for data synchronization***
- ***Unique continuous auto-calibration***
- ***90 dB power line frequency rejection***

- ***SIM970 ... $1390*** *(U.S. list)*

SIM970 Quad Digital Voltmeter

The SIM970 Quad Digital Voltmeter is designed to make precision, low-frequency voltage measurements with excellent long-term accuracy.

For applications in which many voltages must be monitored, up to 16 DVM channels can be put into one SIM900 mainframe. Four voltage ranges from ±199.999 mV to ±19.9999 V can be autoranged or manually selected. An external trigger input allows synchronization of voltage readings on all four channels for critical applications requiring coincidental readings. A BUSY output gives a TTL (logic high) signal when readings are being taken.

Auto-calibration is performed with every reading by sequentially measuring not only the input voltage, but also the ground and the full-scale voltages against a calibrated internal reference. This auto-calibration routine virtually eliminates offsets and scale errors, and ensures smooth range-to-range transitions.

The bright front-panel LED display shows updated readings three times per second. Computer access through the SIM900 mainframe (RS-232 or GPIB) permits data logging with 24 bits of resolution. The SIM970 uses isolated BNC connectors for inputs so coaxial cables can be used for reduced noise pickup.

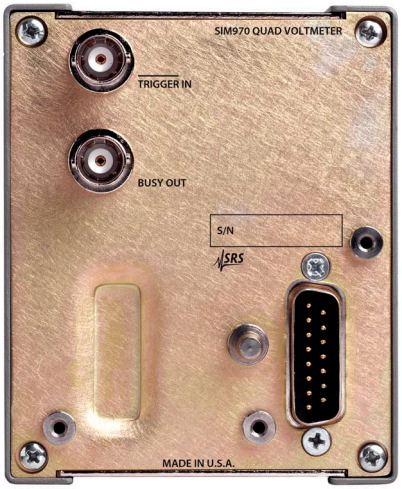
Full-scale DC voltage ranges

Range	Voltage	Resolution	Noise, counts rms [2]
1	±19.9999 V	100 µV	1.0
2	±1.99999 V	10 µV	0.6
3	±999.99 mV	10 µV	0.6
4	±199.999 mV	1 µV	1.0

Measurement accuracy, ±(% of reading + counts) [3]

Range	24 hour, (23 ± 1) °C	90 day, (23 ± 5) °C (typ.)	1 year, (23 ± 5) °C (typ.)
1 [4]	0.0004 + 1	0.0050 + 1	0.0080 + 1
2	0.0004 + 2	0.0050 + 2	0.0080 + 2
3	0.0004 + 2	0.0050 + 2	0.0080 + 2
4	0.0004 + 4	0.0050 + 6	0.0080 + 6

Number of channels	4
Number of digits	5½ (±199999 counts) [1]
Transfer accuracy	(24 hour counts error)/2 [3][5] (typ.)
Input resistance	10 MΩ ±1 %, >3 GΩ selectable on ranges 2 to 4 [6]
Input terminals	BNC (Amphenol 31-10 or similar)
Input protection	±60 V center to shield, ±200 V shield to earth
Triggering	Internal, external (TTL), or remote
BUSY output	TTL logic high when busy
Update rate at line freq. [7]	3.6/s (60 Hz), 3.0/s (50 Hz)
Normal mode rejection at line freq.	90 dB (59 to 61 Hz or 49 to 51 Hz)
CMRR at DC	125 dB (for 1 kΩ unbalance in the shield)
Settling time	1 s to within 3 counts of final reading on ranges 1 to 3, 8 s on range 4
Display	Red LED, 0.40", with polarity indication. Green LEDs for range and autorange indication.
Operating temp.	0 °C to 40 °C, non-condensing
Interface	Serial via SIM interface
Connectors	BNC (4 front, 2 rear) DB15 (male) SIM Interface
Power	+5 V (480 mA)
Dimensions	3.0" × 3.6" × 7.0" (WHD)
Weight	2.3 lbs.
Warranty	One year parts and labor on defects in materials and workmanship



SIM970 rear panel

NOTES

[1] One count is a unit change in the least-significant digit. 7½ digits of resolution available through the remote interface

[2] Measured over 360 consecutive readings

[3] Inside SIM900 mainframe following a two hour warm-up, autozero ON

[4] Scale calibration ON

[5] Within 10 minutes and ±0.5 °C, within ±10 % of the initial value, fixed range, input between 10 % and 100 % of full scale

[6] Input bias current is <1 pA at 23 °C

[7] Internal triggering, autozero ON. Rate is double for autozero OFF

Ordering Information

SIM970	4-channel digital voltmeter	$1390