

# Support Information Only

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### 7-1/2 Digit Sourcing LCR Multimeters

#### Features

- 7-1/2 Digit Resolution
- + 24,000,000 count A/D
- Zero Latency; 0.5rps to 20,000rps
- Programable Aperture & Interval
- Switch Function & Range < 20ms
- DC & AC Volts 10nV to 330V
- DC Current 1pA to 2.4A
- AC Current 10uA to 2.4A
- True RMS ACV & ACI
  - Fast or Slow RMS
- Crest Factor, Pk-Pk, +Pk, -Pk
- Resistance: 1mΩ to 10GΩ
  - 2-Wire
  - 4-Wire
  - 6-Wire Guarded (ICT)
  - Offset Ohms
  - 7 test currents incl. 10mA
  - V/I limited
- Capacitance: 1pF-12mF
- Loaded Capacitance
- Inductance: 20nH - 3H
- Temperature:
  - RTDs
  - Thermocouples
  - Internal
- Diode V/I Characteristics
- Series RC networks
- Leakage: 1pA to 2.4mA at ±10V
- Time & Frequency
- Voltage/Current Event counter
- Three DCV inputs
- Extensive triggering
- Source and Measure
  - 0 - to ±10V
  - DC & AC Voltage
  - DC Current to 0 to 12.5mA
  - Srce-V/Msr-I ±10V/±24mA
- Sync Output
- Pulse & Duty Cycle generator
- Component Handler interface
- Universal Software driver
  - Linux & Windows
  - Fast to install - tiny footprint
  - Comapible with most S/W
  - Stand alone – no dependencies
  - Excel, Word, MatLab, Lab View, C, C++, C#, LabWindows, VB...



The Signametrics 2064 models are truly amazing Digital Multimeters (DMMs). Their remarkable throughput and accuracy is attributable to new developments in measurement technology. They are characterized by a very gradual degradation in resolution with increased measurement speeds, making them a perfect fit for high throughput, high accuracy applications. Their on-board intelligence results in autonomous real-time operations as well as negligible demand on the host computer.

An extensive number of source and measurement operations make them the most versatile. Covering the widest range of sensors, transducers, load cells, series RC nets, and may other devices and components.

The 2064 models can be substituted for various custom and off the shelf instruments, resulting in reduction of size and cost of your test system. Sourcing DCI, DCV, ACV, pulse and Duty-Cycle, provides stimulation for sensors and emulation of a wide range of transducers, sensors and other devices.

The software package included with these DMM's is complete, and does not require any additional drivers or packages. Since it is not in Signametrics interest to constrain users to a handful of expensive S/W packages, the driver provided is universal. It is therefore compatible with the largest number of software environments and packages, from text based to graphical types. From Excel and Word, to C++, C#, Delphi, Visual Basic, Lab View, ATEasy, Lab Windows, Matlab and many more. Having no dependencies makes for a simple, fast and easy installation and operation. In less than five minutes you will be making measurements.

For less demanding requirements, look up the 2060 models. If cost is the priority, the 2055 DMM should be considered. Using an Instrumentation type switches is a must with high end DMMs. See the 4032 and 4042 switches datasheets for specifics.

### DC Voltage Measurement

- **Input Resistance** 240 mV, 2.4 V Ranges: >10 GΩ
  - **Input Resistance** 24 V, 240 V, 330V Ranges: 10.00 MΩ
- Accuracy ± (% of reading + Volts) [1]

Range	Full Scale 7-½ Digits	Resolution	24 hours 23°C ± 1°C	One Year 23°C ± 5°C
240 mV	240.00000 mV	10 nV	0.003 + 1 μV	0.005 + 2 μV
2.4 V	2.4000000 V	100 nV	0.002 + 3 μV	0.003 + 5 μV
24 V	24.000000 V	1 μV	0.004 + 120 μV	0.006 + 150 μV
240 V	240.00000 V	10 μV	0.003 + 250 μV	0.005 + 0.5 mV
330 V	330.00000 V	10 μV	0.0075 + 0.55 mV	0.015 + 0.8 mV

[1] With Aperture set to ≥ 0.5 Sec, within one hour from Self Cal.

### Resolution vs. Aperture and measurement rate

Measurement Aperture SM2060, SM2064	Maximum reading rate	Resolution	
0.5 s ≤ Aperture	2 / second	7-1/2 digits	25 bits
10 ms ≤ Aperture	100 / second	6-1/2 digits	22 bits
625 μs ≤ Aperture	1200 / second	5-1/2 digits	18 bits
2.5 μs ≤ Aperture	20,000 / second	4 digits	14 bits

**DCV Noise Rejection** Normal Mode Rejection, at 50, 60, or 400 Hz ± 0.5%; better than 95 dB (apertures ≥ 0.160s. CMRR, with 1 kΩ lead imbalance; ≥ 120 dB.

### DC Current Measurement

- **Number of shunts** Five
- **Burden Voltage** 240mV max.
- **Protected** with 2.5A Fast blow fuse

Accuracy ± (% of reading + Amps) [1]

Range	Full Scale Reading	Res.	24 hours 23°C ± 5°C	One Year 23°C ± 5°C
240 nA	240.0000 nA	0.1 pA	0.07 + 40pA	0.17 + 60pA
2.4 μA	2.400000 μA	1 pA	0.05 + 70pA	0.21 + 150pA
24 μA	24.00000 μA	10 pA	0.05 + 400pA	0.13 + 0.8nA
240 μA	240.000 μA	10 nA	0.052 + 200 nA	0.1 + 400 nA
2.4 mA	2.40000 mA	10 nA	0.05 + 300 nA	0.07 + 550 nA
24 mA	24.0000 mA	100 nA	0.05 + 350 nA	0.08 + 550 nA
240 mA	240.000 mA	1 μA	0.05 + 50 μA	0.065 + 80 μA
2.4 A	2.40000 A	10 μA	0.3 + 60 μA	0.45 + 90 μA

### Resistance Measurements

- **Number of Current Sources** seven

Range	Full Scale Reading	Resolution	Test current	Max. Test Voltage
24 Ω	24.000000 Ω	1 μΩ	10 mA	240mV
240 Ω	240.00000 Ω	10 μΩ	1 mA	240mV
2.4 kΩ	2.4000000 kΩ	100 μΩ	1 mA	2.4V
24 kΩ	24.000000 kΩ	1 mΩ	100 μA	2.4V
240 kΩ	240.00000 kΩ	10 mΩ	10 μA	2.4V
2.4 MΩ	2.4000000 MΩ	100 mΩ	1 μA	2.4V
24 MΩ	24.0000 MΩ	100 Ω	100 nA	2.4V
240 MΩ	240.000 MΩ	1 kΩ	4 nA	1.0V

### 2-Wire and 4-Wire resistance (continued)

Accuracy ± (% of reading + Ω) [1]

Range	24 hours 23°C ± 1°C	One Year 23°C ± 5°C
24 Ω	0.0038 + 0.7 mΩ [2]	0.008 + 1 mΩ [2]
240 Ω	0.0037 + 3 mΩ [2]	0.007 + 5 mΩ [2]
2.4 kΩ	0.0023 + 28 mΩ	0.006 + 33 mΩ
24 kΩ	0.0025 + 300 mΩ	0.006 + 350 mΩ
240 kΩ	0.0055 + 3.2 Ω	0.007 + 5 Ω
2.4 MΩ	0.018 + 40 Ω	0.04 + 70 Ω
24 MΩ	0.12 + 400 Ω	0.2 + 600 Ω
240 MΩ	0.8 + 20 kΩ	1.3 + 50 kΩ

[1] With Aperture set to ≥ 0.5 Sec, within one hour from Self Calibration (S-Cal).

[2] For 2-Wire measurement add 1mΩ

### 6-wire Guarded Resistance

**Additional error; in-circuit force-guarded measurement.**

Accuracy ± (% of reading + Ω) [1]

Range	Max Guard current [2]	One Year 23°C ± 5°C
24 Ω	20 mA	0.3 + 4 mΩ
240 Ω	20 mA	0.003 + 20 mΩ
2.4 kΩ	20 mA	0.005 + 100 mΩ
24 kΩ	100 μA	0.03 + 1 Ω
240 kΩ	10 μA	0.35 + 10 Ω
24 MΩ	1 μA	0.85 + 1000 Ω

[1] Add this error to the resistance specification.

[2] DMM's Guard Source and Sense lines connected at Guard point.

### Extended Resistance Function

- **Test Voltage** Adjustable -10V to +10V, 5mV steps

Accuracy ± (% of reading + Ω) [1]

Range	Measurement range	Resolution	Current Limit	One Year 23°C ± 5°C
400kΩ	1kΩ to 100MΩ	10Ω	25μA	0.33 + 90Ω
4MΩ	10kΩ to 1GΩ	100Ω	2.5μA	0.43 + 550Ω
40MΩ	100kΩ to 10GΩ	1kΩ	250nA	0.55 + 4.5kΩ

[1] With Aperture set to ≥ 0.5 Sec, and within one hour from Zero (Relative control).

- **ESR measurement (resistance in a series RC network)**

### AC Voltage Measurements

- **Input Resistance** 1 MΩ, shunted by < 300 pF
- **Max. Crest Factor** 4 at Full Scale, 7 near 10% of range
- **AC coupled** 10 Hz to 100 kHz
- **Typical Settling time** < 0.5 sec to within 0.1% of final value
- **Fast RMS Settling** < 0.05 sec to within 0.1% of final value

### AC Voltage True RMS Measurement

Range	Full Scale 7-½ Digits [2]	Lowest specified Voltage	Resolution
240 mV	240.0000 mV	5 mV [1]	100 nV
2.4 V	2.400000 V	20 mV	1 μV
24 V	24.00000 V	200 mV	10 μV
240 V	240.0000 V	2 V	100 μV
330 V	330.0000 V	2.5 V	100 μV

[2] Signal is limited to 8x10<sup>6</sup> Volt Hz Product. For instance, at 32kHz the highest input is 250 V.



**AC Voltage Measurements (Continued)**

Accuracy ± (% of reading + Volts) [1]

Range	Frequency	24 hours 23°C ± 1°C	One Year 23°C ± 5°C
240 mV	10 Hz - 20 Hz	3.0 + 350 μV	3.2 + 430 μV
	20 Hz - 47 Hz	0.37 + 150 μV	0.4 + 200 μV
	47 Hz - 10 kHz	0.13 + 100 μV	0.15 + 120 μV
	10 kHz - 50 kHz	0.25 + 160 μV	0.27 + 230 μV
	50 kHz - 100 kHz	1.9 + 350 μV	2.0 + 400 μV
2.4 V	10 Hz - 20 Hz	3.0 + 2 mV	3.2 + 2.5 mV
	20 Hz - 47 Hz	0.37 + 1.3 mV	0.4 + 1.7 mV
	47 Hz - 10 kHz	0.05 + 1 mV	0.065 + 1.2 mV
	10 kHz - 50 kHz	0.32 + 1.2 mV	0.35 + 1.5 mV
	50 kHz - 100 kHz	1.9 + 1.5 mV	2.1 + 2 mV
24 V	10 Hz - 20 Hz	3.0 + 14 mV	3.3 + 20 mV
	20 Hz - 47 Hz	0.37 + 12 mV	0.4 + 16 mV
	47 Hz - 10 kHz	0.06 + 10 mV	0.073 + 13 mV
	10 kHz - 50 kHz	0.18 + 18 mV	0.22 + 25 mV
	50 kHz - 100 kHz	1.3 + 30 mV	1.5 + 40 mV
240 V	10 Hz - 20 Hz	3.0 + 140 mV	3.3 + 200 mV
	20 Hz - 47 Hz	0.37 + 120 mV	0.4 + 150 mV
	47 Hz - 10 kHz	0.04 + 100 mV	0.06 + 130 mV
	10 kHz - 50 kHz	0.28 + 150 mV	0.30 + 200 mV
	50 kHz - 100 kHz	1.4 + 200 mV	1.6 + 300 mV
330 V	10 Hz - 20 Hz	3.0 + 200 mV	3.3 + 200 mV
	20 Hz - 47 Hz	0.43 + 180 mV	0.45 + 250 mV
	47 Hz - 10 kHz	0.07 + 150 mV	0.09 + 230 mV
	10 kHz - 50 kHz	0.28 + 200 mV	0.32 + 300 mV
	50 kHz - 100 kHz	1.3 + 270 mV	1.6 + 400 mV

[1] Between 5 mV and 10 mV, add 100 μV additional errors.

**Peak-to-Peak Measurement**

- Typical Accuracy measuring peak-to-peak value.

ACV Range	Lowest specified (Vp-p)	Full Scale (Vp-p)	Resolution	Accuracy 23°C ± 5°C One Year [1]
240 mV	0.1 V	1.900 V	1 mV	0.5 ± 3 mV
2.4 V	1.0 V	16.00 V	10 mV	0.5 ± 40 mV
24 V	10 V	190.0 V	100 mV	0.5 ± 700 mV
240 V	100 V	850 V	1 V	0.55 ± 6 V

[1] Signal frequency range 30 Hz to 60 kHz, repetitive signal.

**Crest Factor Measurement**

- Typical Accuracy measuring.

ACV Range	Lowest specified (Vp-p)	Full Scale (Vp-p)	Resolution	Accuracy 23°C ± 5°C One Year [1]
240 mV	0.1 V	1.9 V	0.01	2.2 ± 0.3
2.4 V	1.0 V	16 V	0.01	2.1 ± 0.1
24 V	10 V	190 V	0.01	2.0 ± 0.1
240 V	100 V	700 V	0.01	2.0 ± 0.1
330 V	100 V	850 V	0.01	2.0 ± 0.1

[1] Repetitive signal; frequency of 30 Hz to 60 kHz.

**Median AC Value Measurement**

ACV Range	Lowest specified input (Vp-p)	Full Scale reading	Resolution	Accuracy 23°C ± 5°C One Year [1]
240 mV	0.08 V	±0.95 V	1 mV	2.0% ± 17 mV
2.4 V	0.80 V	±9.5 V	10 mV	3% ± 160 mV
24 V	8 V	±95.0 V	100 mV	3% ± 1.4 V
240 V	80 V	±350.0 V	1 V	3% ± 12 V
330 V	80 V	±350.0 V	1 V	3% ± 12 V

[1] Typical, Repetitive signal; frequency; 30 Hz to 30 KHz.

**AC Current Measurement, True RMS**

- Crest Factor 4 at Full Scale, 10 at Lowest Specified Current
- Burden Voltage: 240mV max.
- Protected with 2.5 A Fast Blow fuse

Range	Full Scale 6 1/2 Digits	Lowest Specified	Max Burden	Resolution
2.4 mA	2.400000 mA	60 μA	25mV	1 nA
24 mA	24.00000 mA	300 μA	250mV	10 nA
240 mA	240.0000 mA	3 mA	55mV	100 nA
2.4 A	2.400000 A	30 mA	520mV	1 uA

Accuracy ± (% of reading + Amps)

Range	Frequency [1]	24 hours 23°C ± 1°C	One Year 23°C ± 10°C
2.4 mA	10 Hz - 20 Hz	3.8 + 4 μA	2.9 + 4 μA
	20 Hz - 47 Hz	0.9 + 4 μA	1.0 + 4 μA
	47 Hz - 1 kHz	0.04 + 1.5 μA	0.12 + 4 μA
	1 kHz - 10 kHz	0.12 + 4 μA	0.22 + 4 μA
24 mA	10 Hz - 20 Hz	1.8 + 30 μA	2.8 + 30 μA
	20 Hz - 47 Hz	0.6 + 30 μA	1.0 + 30 μA
	47 Hz - 1 kHz	0.07 + 10 μA	0.16 + 30 μA
	1 kHz - 10 kHz	0.21 + 30 μA	0.4 + 40 μA
240 mA	10 Hz - 20 Hz	1.8 + 400 μA	2.8 + 400 μA
	20 Hz - 47 Hz	0.6 + 400 μA	1.0 + 400 μA
	47 Hz - 1 kHz	0.1 + 100 μA	0.2 + 220 μA
	1 kHz - 10 kHz	0.3 + 300 μA	0.4 + 400 μA
2.4 A	10 Hz - 20 Hz	1.8 + 4 mA	2.7 + 5 mA
	20 Hz - 47 Hz	0.66 + 4 mA	0.9 + 6 mA
	47 Hz - 1 kHz	0.3 + 3.8mA	0.35 + 4 mA
	1 kHz - 10 kHz	0.4 + 4mA	0.5 + 5 mA

[1] Typical measurement capability of at least 20 kHz.

**Leakage Measurement**

- Burden Voltage: < 100 μV
- Test Voltage: Adjustable -10V to +10V

Accuracy ± (% of reading + Amps) [1]

Range	Full Scale	Resolution	24 hours 23°C ± 5°C	One Year 23°C ± 5°C
240 nA	240.0000 nA	0.1 pA	0.07 + 40pA	0.17 + 60pA
2.4 μA	2.400000 μA	1 pA	0.05 + 70pA	0.21 + 150pA
24 μA	24.000000 μA	10 pA	0.05 + 400pA	0.13 + 0.8nA

[1] Aperture set to ≥ 0.5 Sec and within one hour from Zero.

**RTD Temperature Measurement**

- Ro: Adjustable 2 Ω to 24 kΩ
- Measurement Method: 4-Wire

RTD Type	Resolution	range	Accuracy 23°C ± 5°C [1] One Year
pt385, pt3911, pt3916, pt3926	0.01°C	-150 to 650°C	±0.06°C
pt385, pt3911, pt3916, pt3926	0.01°C	-150 to 650°C	±0.03°C
Cu (Copper)	0.01°C	-100 to 200°C	±0.18°C at ≤ 20°C, ±0.05°C otherwise
Cu (Copper)	0.01°C	-100 to 200°C	±0.10°C at ≤ 20°C, ±0.05°C otherwise

[1] With Aperture of 0.5s and higher.

## Thermocouple Temperature Measurement

- **Cold Junction Compensation:** By Sensor or soft entry.
- **Cold Junction range:** 0°C to 50°C
- **Isothermal Blocks:** SM40T, SMX40T
- **Selectable units:** °C or °F

C Type	Resolution	Maximum Temperature	Temperature Accuracy 23°C ± 5°C One Year
B	0.01°C	2200°C	±0.38 °C
E	0.01°C	1200°C	±0.035 °C
J	0.01°C	2000°C	±0.06 °C
K	0.01°C	3000°C	±0.07 °C
N	0.01°C	3000°C	±0.10 °C
R	0.01°C	2700°C	±0.25 °C
S	0.01°C	3500°C	±0.35 °C
T	0.01°C	550°C	±0.06 °C

## Diode Characterization

- **Fixed currents** 100 nA, 1 µA, 10 µA, 100 µA, 1 mA
- **Variable test current** 10 nA to 12.5 mA
- **1yr Current Source Uncertainty** 2.5% + 2n
- **1yr Voltage Measurement Uncertainty** 0.01% + 50uV
- **Voltage measurement range** 0V to 2.4V

## Capacitance, Charge Balance

- **Measurement time** as low as 20ms (depending on value)
- Accuracy ± (% of reading + Farads)

Full Scale Reading	Range	Resolution	One Year 23°C ± 5°C
1,199.9 pF	1,200 pF	0.1 pF	1 ± 1 pF
11.999 nF	12 nF	1 pF	1.2 ± 5 pF
119.99 nF	120 nF	10 pF	1.0 [1]
1.1999 µF	1.2 µF	100 pF	1.0 [1]
11.999 µF	12 µF	1 nF	1.0 [1]
119.99 µF	120 µF	10 nF	1.0 [1]
1.1999 mF	1.2 mF	100 nF	1.2 [1]
50.000 mF	12 mF	1 µF	2 [1]

[1] Specified for values higher than 5% of the selected range.

## Capacitance, In-Circuit

- **Method** Swept frequency
- **Stimulus level** adjustable; 100mV to 5.0V
- **Parallel Load Tolerance** as low as 100Ω

Accuracy ± (% of reading + Farads) [1]

Range [2]	Full Scale 3-½ Digits	Resolution	One Year 23°C ± 5°C
24 nF	23.99 nF	10 pF	5 ± 200 pF
240 nF	239.9 nF	100 pF	5 ± 1 nF
2.4 µF	2.399 µF	1000 pF	3 ± 5 nF
24 µF	23.99 µF	10 nF	3 ± 50 nF
240 µF	239.9 µF	100 nF	5 ± 500 nF
2.4 mF	2.399 mF	1 µF	6 ± 5 µF

[1] Within one hour of AC Caps Open Cal compensation.

[2] Specified values higher than 5% range

## Inductance Measurement

Accuracy ± (% of reading + inductance) [1]

Range	Default test frequency	Full Scale 4 ½ Digits	Resolution	Accuracy 23°C ± 5°C One Year
33 µH	100 kHz	33.000 µH	1 nH	3.0% + 500 nH
330 µH	50 kHz	330.00 µH	10 nH	2.0% + 3 µH
3.3 mH	4 kHz	3.3000 mH	100 nH	1.5% + 25 µH
33 mH	1.5 kHz	33.000 mH	1 µH	1.5% + 200 µH
330 mH	1 kHz	330.00 mH	10 µH	2.5 + 3 mH
3.3 H	100 Hz	3.3000 H	100 µH	3 + 35 mH

## Time Measurements

### Threshold DAC

- **Operation** set a detection threshold for frequency and time measurements and event counter.

Accuracy ± (% of setting + volts)

Selected VAC range	Threshold level (V)	Resolution (mV)	One year setting uncertainty
240 mV	-1.0 to +1.0	0.5	0.2% + 4 mV
2.4 V	-10.0 to +10.0	5.0	0.2% + 40 mV
24 V	-100 to 100	50	0.2% + 0.4 V
240 V	-400 to 400	500	0.2% + 4 V

## Frequency and Period Measurements

- **Input Impedance** 1 MΩ with < 300 pF
- **Ranging** Auto-Ranging (default) or Range-Lock
- **Maximum acquisition time while in Auto-Ranging mode** 7s
- **Acquisition Time in Range Locked mode** 35ms to 2s

Frequency (Hz)	One Year accuracy (% of reading + Hz)	Resolution (Hz)	Minimum amplitude (RMS)
1 – 130	0.025% + 0.0015	0.001	30mV or 5% of range, (whichever is greater)
130 – 640	0.025% + 0.02	0.0065	
640 – 2.5k	0.03% + 0.075	0.025	
2.5k – 40k	0.03% + 1.2	0.4	25% of range
40k – 200k	0.05% + 7	2.5	
200k – 300k	0.07% + 5	1.5	

## Duty Cycle Measurement

Frequency Range (Hz)	2 to 100	100 to 1 k	1 k to 10 k
Resolution	0.02%	0.2%	2%
Uncertainty is ±0.03% of reading +adder:	0.03%	0.3%	3%
Full scale reading	100.00 %	100.00 %	100.00 %

## Pulse Width Measurement

- **Threshold** Set by Threshold DAC to measurement point.
  - **Polarity** Selectable positive or negative part of pulse
- (% of reading + time)

Frequency	Resolution	Width range	Typical Uncertainty
2 Hz to 100 kHz	1 µs	2 µs to 1 s	0.01 +/- 4 µs

**Totalizer**

- **Maximum count:**  $10^9$
- **Allowed rate:** 1 to 30,000 events per second
- **Threshold:** By Threshold DAC
- **Transition:** Selectable

**Trigger Functions**

**External Hardware Trigger**

Trigger Input voltage level range (at DIN-7 connector)	+3 V to +15 V activates the trigger.
Minimum Trigger Pulse Width	Aperture + 50µs when using:
Trigger input impedance	3 kΩ
Internal Reading Buffer	Circular; 80 or 120 readings depending on resolution.
Edge	Positive or negative.

**PXI Bus Trigger inputs (SMX2064)**

Trigger Input voltage level range	CMOS level (see PXI standard)
Minimum Trigger Pulse Width	1/Aperture + 50µs
Internal Reading Buffer	Circular; 80 or 120 readings depending on resolution.
Edge	Selectable positive or negative edge.

**Analog Threshold Trigger**

- **Trigger point:** Selectable threshold and transition
- **Buffer type:** Circular
- **Captures:** up to 120 post-trigger readings
- **Aperture range:** 160ms to 2.5µs
- **Read Interval range:** 1/Aperture to 65ms
- **Post-Trigger readings:** Selectable from 0 to buffer size.
- **Pre-trigger readings:** Selectable from 0 to buffer size.

**Long Trigger (with option 'R')**

- **Trigger Pulse Width:** Minimum 50µs
- **Samples per Trigger event:** 1 to 50,000
- **Number of Triggers:** 1 to 50,000
- **Sample to Sample delay:** 100µs to 3,600s
- **Aperture range:** 160ms to 2.5µs

**Delayed Trigger**

- **Measurement Delay:** 50µs to 1s
- **Resolution:** 1µs to 64ms, 20µs to 1s

**Source Functions**

- **Isolation:** to 250 V DC from the Chassis
- **Measurements:** DMM can Measures source voltage.
- **Expansion:** Increase Voltage or Current with multiple DMMs.

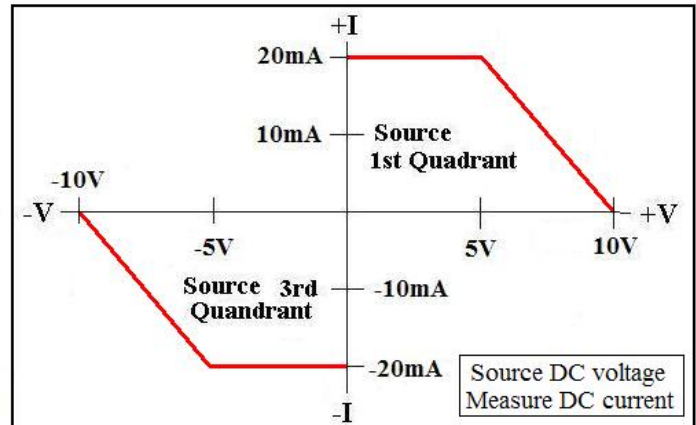
**Source DC voltage, measure DC voltage**

Mode	Closed Loop [1]	Open Loop
Output Voltage range	-10.000 V to +10.000 V	
Current source/sink at 5V output	5 mA	
DAC resolution	18 bits	12 bits
Measurement Accuracy 23°C ± 10°C One Year	0.015% ± 350 µV	1.0% ± 35 mV
Typical settling time	3 S	1 ms
Typical source resistance	200 Ω	

[1] Repetitive reading at an Aperture of 133ms or higher is required.

**Source DC voltage, measure DC current**

Parameter	
Voltage source range	-10.0 V to +10.0 V
DC Current measurement range	0 mA to +/-20mA
Voltage setting resolution	5mV
Voltage setting accuracy 23°C ± 10°C One Year	1% ± 35 mV
Typical settling time	3s [2]
DC Current measurement accuracy	0.1% + 1 µA



**AC Voltage Source**

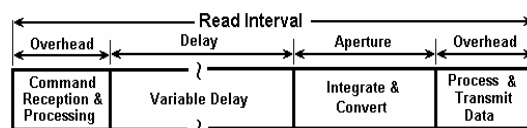
Parameter	Specification 18 C to 28 C One Year	
Ranges (2)	900mV and 8V	
Output Voltage	30mV to 7.2 V RMS (0.14 to 20.0V peak-to-peak)	
Current Drive	3 mA RMS	
Frequency resolution	2 mHz	
Frequency stability	100 ppm ± 2 mHz	
SFDR	60dBc	
THD	59dBc	
Source resistance	200 Ω	
<b>Mode</b>	<b>Closed Loop</b>	<b>Open Loop</b>
Frequency range	30 Hz to 200kHz	10Hz to 200kHz
Typical settling time	4 s	100 µs
DAC resolution	17 bits	12 bits
Amplitude accuracy	ACV spec + 0.1% ± 5 mV	ACV spec + 0.8% ± 20 mV

**DC Current Source**

- Voltage Measurement range: 0 to ±2.4V
- Compliance to 4.5V

Range	Compliance Voltage	Minimum level	Accuracy 23°C ± 10°C One Year
1.25 µA	4.2 V	10 nA	1% + 10 nA
12.5 µA	4.2 V	50 nA	1% + 100 nA
125 µA	4.2 V	100 nA	1% + 500 nA
1.25 mA	4.2 V	1 µA	1% + 5 µA
12.5 mA	1.2 V	10 µA	1% + 50 µA

**Aperture and Time Interval parameters.**



- **Available Apertures:** 2.5µs to 5s
- **Read-Interval range:** 250µs to 1s



### Additional Specifications

**Temperature Coefficient over 0°C to 50°C range** less than 0.1 x accuracy specification per °C At 23C ± 10°C

**Hardware Interface** PCI for the SM2064, PXI and Compact PCI for the SMX2064 and USB for the SMU2064

**Overload Protection** (voltage inputs) 300 VDC, 250 VAC; 2.5A PCT Fast Blow fuse for over current protection.

**Isolation** 300 VDC, 250 VAC from Earth Ground

**Maximum Input (Volt x Hertz)**  $8 \times 10^6$  Volt x Hz normal mode input (across Voltage HI & LO).  $1 \times 10^6$  Volt x Hz Common Mode input (from Voltage HI or LO relative to Earth Ground).

**Safety** Designed to IEC 1010-1, Installation Category II.

**Calibration** Calibrations are performed at ambient temperature of 23°C. All calibration constants are stored on board the DMM and backed up on a file (SM60CAL.DAT).

**Temperature Range Operating** -10°C to 65°C

**Temperature Range Storage** -40°C to 85°C

**Power** +5 volts, 200 mA from USB cable.

### Available options

**'R' – Long Trigger:** 1-50,000 trigger events, 1-50,000 triggers, 100us to 3,600s smple to sample delay.

**'L' – T/M/C/S operation:** 4k/s realtime Trigger, Measure, Compare and issue Stop signal on target crossing (Laser trim operation)



### Accessories

Several accessories are available for the SMX2055 DMM. These can be purchased directly from Signametrics, or one of its approved distributors or representatives. These are some of the accessories available:

- DMM probes SM-PRB
- DMM probe kit SM-PRK
- Deluxe probe kit SM-PRD (\$95.00).
- Shielded SMT Tweezers Probes SM-PRSMT
- Multi Stacking Double Banana shielded cable 36" SM-CBL36.
- Multi Stacking Double Banana shielded cable 48" SM-CBL48.
- Mini DIN Trigger, 6-Wire Ohms connector SM2060-CON7
- Extended 3 Year warrantee (does not cover calibration).

**Signametrics reserves the rights to change any or all of the above without notice, and at any time.**

**See manual for more detailed specifications.**