



VOAC7510



- 5-1/2 digits, full-scale 409999
- Max. sample rate 100 times/sec. (at 4-1/2 digits mode)
- High resolution
DCV: 0.1 μ V, ACV: 1 μ V, Ω : 0.1 m Ω ,
DCA/ACA : 10 nA, $^{\circ}$ C: 0.1 $^{\circ}$ C
- TRUE RMS ACV/ACA
- 4-wire ohms measurement
- Storage of 3,000 data
- A variety of optional units enhance measuring efficiency.

Specifications

1. DC VOLTS

Accuracy

Sample rate : SLOW/MID : \pm (% of reading + digits)

Range	23 \pm 1 $^{\circ}$ C, s 24hr	23 \pm 5 $^{\circ}$ C, 90days	23 \pm 5 $^{\circ}$ C one year	Resolution		Input resistance
				Slow, Mid 5-1/2	Fast 4-1/2	
400 mV	0.0035 + 5	0.008 + 5	0.012 + 5	1 μ V	10 μ V	\geq 1000 M Ω
4 V	0.0035 + 2	0.008 + 2	0.012 + 2	10 μ V	100 μ V	
40 V	0.004 + 5	0.012 + 5	0.016 + 5	100 μ V	1 mV	
400 V	0.004 + 2	0.012 + 2	0.016 + 2	1 mV	10 mV	\geq 10 M Ω
1000 V				10 mV	100 mV	

* The accuracy at 23 \pm 1 $^{\circ}$ C, and 24 hrs. is relative to the calibration standards.

* The accuracy at 400 mV range is specified after zero compensation through the REL operation.

* Add 0.003% of reading when used with SC-306 battery unit.

* In FAST sample mode, add 5 digits to the accuracy in SLOW and MID sample modes.

Temperature coefficient (0 $^{\circ}$ C to 18 $^{\circ}$ C, 28 $^{\circ}$ C to 50 $^{\circ}$ C)
(1/10 of the accuracy for each range)/ $^{\circ}$ C

Maximum input voltage 40 mV to 4 V range : \pm 1100 V DC (5sec.)
 \pm 500 V DC (continuous)
40 V to 1000 V range : \pm 1100 V DC (continuous)

Sample rate and noise rejection

Sample rate mode	Reading rate	NMR	CMR
SLOW	4 times/sec	>55 dB	\geq 110 dB
MID	20 times/sec		
FAST	100 times/sec	0 dB	\geq 55 dB

* Reading rates are specified with math function OFF.

* NMR : 50/60 Hz : \pm 0.1%* CMR : 1 k Ω unbalance, DC, 50/60 Hz : \pm 0.1%

2. AC VOLTS

Accuracy (For sine wave only) : \pm (% of reading + digits)

400 mV to 400 V range : Accuracy is specified for 20,000 counts or more.

750 V range : Accuracy is specified for 10,000 counts or more.

Range	Resolution	Frequency	23 \pm 5 $^{\circ}$ C, 90days	23 \pm 5 $^{\circ}$ C, one year	Input resistance
400 mV	1 μ V	15 Hz~45 Hz	0.5 + 100	0.5 + 150	\geq 2 M Ω / 100 pF or below
4 V	10 μ V	45 Hz~100 Hz	0.25 + 100	0.25 + 150	
40 V	100 μ V	100 Hz~50 kHz	0.2 + 100	0.2 + 150	
400 V	1 mV	50 kHz~100 kHz	0.5 + 300	0.5 + 300	
750 V	10 mV				

* In the 750V range, accuracy is specified at 20 kHz or lower.

* In SLOW sample mode, accuracy is specified at 15 Hz or higher.

* In FAST sample mode, accuracy is specified at 200 Hz or higher.

Temperature coefficient (0 $^{\circ}$ C to 18 $^{\circ}$ C, 28 $^{\circ}$ C to 50 $^{\circ}$ C)
(1/10 of the accuracy for each range)/ $^{\circ}$ C

Maximum input voltage All range : 780 Vrms (continuous), 1100 V peak
AC converter True RMS.

Signals other than sine wave : add the following values to the accuracy of the sine wave.

Frequency	Crest factor		
	1~1.5	1.5~2	2~3
15 Hz~20 kHz	0.05%	0.15%	0.3%
20 kHz~300 kHz	0.2%	—	—

Sample rate

Sample rate mode	Reading rate	Frequency	Response time
SLOW	4 times/sec	15 Hz~100 kHz	\leq 2sec
FAST	20 times/sec	200 Hz~100 kHz	\leq 1sec

* Response time is the time for meter reading to reach within 100 counts of final value in the same range.

3. RESISTANCE Ω (2W Ω /4W Ω)

Accuracy

Sample rate : SLOW/MID : \pm (% of reading + digits)

Range	23 \pm 1 $^{\circ}$ C, s 24hr	23 \pm 5 $^{\circ}$ C, 90days	23 \pm 5 $^{\circ}$ C one year	Resolution		Test current
				Slow, Mid 5-1/2	Fast 4-1/2	
40 Ω	0.01 + 10	0.02 + 10	0.025 + 10	0.1 m Ω	1 m Ω	10 mA
400 Ω				1 m Ω	10 m Ω	10 mA
4k Ω				10 m Ω	100m Ω	1 mA
40 k Ω	0.005 + 3	0.01 + 3	0.014 + 3	100 m Ω	1 Ω	100 μ A
400 k Ω				0.006 + 3	0.011 + 3	0.015 + 3
4000 k Ω				0.012 + 10	0.03 + 10	0.033 + 10
40 M Ω	0.05 + 20	0.2 + 20	0.25 + 20	100 Ω	1 k Ω	100 nA
400 M Ω	0.5 + 50	1.5 + 50	1.5 + 50	1 k Ω	10 k Ω	10 nA

* The accuracy at 23 \pm 1 $^{\circ}$ C, and 24 hrs. is relative to the calibration standards.* The accuracy at 40 Ω to 4 k Ω ranges are specified after zero compensation through the REL operation.

* Add 0.003% of reading when used with SC-306 battery unit.

* In FAST sample mode, add the following values to the accuracy in SLOW and MID sample modes.

40 Ω to 4 k Ω ranges5 digits40 k Ω to 4000 k Ω ranges30 digits40 M Ω to 400 M Ω ranges10 digits
Temperature coefficient (0 $^{\circ}$ C to 18 $^{\circ}$ C, 28 $^{\circ}$ C to 50 $^{\circ}$ C)
(1/10 of the accuracy for each range)/ $^{\circ}$ C

Maximum input voltage \pm 500 V DC
Between V Ω and COM terminals, and between 4 W Ω SENSE H and L terminals
Open circuit test voltage 6.8 V or less

Sample rate Sample rate and noise rejection

Sample rate mode		Reading rate
SLOW		4 times/sec
MID		20 times/sec
FAST	40 Ω to 4000 k Ω	100 times/sec
	40 M Ω , 400 M Ω	20 times/sec

Response time

40 Ω to 400 k Ω	50 ms	Zero to full scale within the same range
4000 k Ω	0.1s	
40 M Ω	0.5s	
400 M Ω	5s	

4. DC CURRENT

Accuracy

Sample rate : SLOW/MID : \pm (% of reading + digits)

Range	23 \pm 5 $^{\circ}$ C, 90days	23 \pm 5 $^{\circ}$ C one year	Resolution		Voltage drop across input terminal
			Slow, Mid 5-1/2	Fast 4-1/2	
4 mA	0.05 + 5	0.08 + 7	10 nA	100 nA	\leq 600 mV
40 mA			100 nA	1 μ A	
400 mA			1 μ A	10 μ A	
4000 mA	\leq 2 A	0.05 + 5	10 μ A	100 μ A	\leq 1 V
	> 2 A	0.1 + 5			

* In FAST sample mode, add 10 digits to the accuracy in SLOW and MID sample modes.

Temperature coefficient (0 $^{\circ}$ C to 18 $^{\circ}$ C, 28 $^{\circ}$ C to 50 $^{\circ}$ C)
(1/10 of the accuracy for each range)/ $^{\circ}$ C

Maximum current Protected by a 4 A fuse.

4mA to 400 mA range : 4 A DC or rms (5 sec.)

1.5 A DC or rms (continuous)

4000 mA range : 4 A DC or rms (continuous)

Sample rate

Sample rate mode		Reading rate
SLOW		4 times/sec
MID		20 times/sec
FAST		100 times/sec

5. AC CURRENT

Accuracy 23±5°C, one year

Accuracy is specified for 20,000 counts or more: ± (% of reading + digits)

Range	Resolution	Frequency	Accuracy (Sine wave only)	Voltage drop across input terminal
4 mA	10 nA	15 Hz~45 Hz 45 Hz~1 kHz	1.0 + 200 0.4 + 200	≤ 600mVrms ≤ 1 Vrms
40 mA	100 nA			
400 mA	1 µA			
4000 mA	1 µA			

* Accuracy is specified at 15 Hz or higher in SLOW and 200 Hz or higher in FAST sample mode.

* DC component must be smaller than five times of the range.

Temperature coefficient (0°C to 18°C, 28°C to 50°C)
(1/10 of the accuracy for each range)/°C

AC converter True RMS.

Maximum current Protected by a 4 A fuse.
4 mA to 400 mA range : 4 A DC or rms (5 sec.)
1.5 A DC or rms (continuous)
4000 mA range : 4 A DC or rms (continuous)

Signals other than sine wave : Add the following values to the accuracy of the sine wave

Frequency	Crest factor		
	1~1.5	1.5~2	2~3
15 Hz~1 kHz	0.05%	0.15%	0.3%

Sample rate

Sample rate mode	Reading rate
SLOW	4 times/sec
FAST	20 times/sec

6. MATH and MISCELLANEOUS FUNCTIONS

6-1. REL and % MATH

1 REL math

$Y=X-A$

Y : Reading value

X : Measurement value.

A : Reference value.

2 % math

$Y = X/A \times 100$

Y : Reading value.

X : Measurement value.

A : Reference value.

* The function shall be same for all values.

* Full scale is + 999999 under no over-range condition.

* Math ON/OFF and reference value are stored in each function.

* The % indicator lights at % math function.

6-2. MAX/MIN math

Maximum and minimum values are stored in the internal memory in the same function and the same range.

* Data are read out in the RECALL mode.

6-3. AVG math

Moving average of 0 to 100 times (from the keys) or 0 to 255 times (via GP-IB) is available.

Setting the number of average to 0 disables AVG math function with AVG indicator off

* When used in TRIG or remote mode, the AVG math is run once up to the specified number of average.

6-4. STORE function

The internal memory stores up to 3,000 data with the address from 0 to 2999.

* Data are read out in the RECALL mode.

6-5. Continuity test

Continuity test is available by pushing the key at the 2W function.

Threshold level : 17,000 counts ±10,000 counts

Accuracy : Two times of the resistance measurement accuracy.

Sample rate : Approx. 20 times/sec.

* The resistance measurement is available in continuity test.

6-6. A/D converter

Converting method: Triple slope integration.

Integration time

SLOW/MID : 20 m sec (200 m sec) at 50 Hz power line frequency
16.67 m sec (200 m sec) at 60 Hz Power line frequency
The number in the parentheses is at DCV 40 mV range for VOAC 7512 and VOAC 7513.

FAST : 2msec at 50 Hz and 60 Hz power line frequencies.
Same specification as SLOW/ MID mode at ACV/ ACA function and 40 MΩ or higher range in 2 WΩ / 4 WΩ function.

* Integration time is automatically adjusted depends on the power line frequency, when used with AC power source.

* Manual set of integration time is available, when used with DC power source

6-7. Battery back-up

The last setup before the power off including STORE data is recalled at turning power on when SET UP function is ON..

7. GENERAL

Display : 7-segment LED of 11mm height.

Full scale : 409999 (A/D converter full scale)

999999 (REL math full scale)

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Over range display : Drift compensated triple slope integration.

Converting method : “—” indication at negative polarity.

Polarity indication : AUTO/MANUAL or remote control by using option unit.

Range selection : Range up when more than 409999 counts.

AUTO ranging : Range down when less than 036000 counts.

Function selection : MANUAL or remote control by using option unit.

Withstand voltage : ±500 V DC (between COM input and ground terminals)

Power supply : AC100V ±10% 50/60 Hz or battery operation by using SC-306 option unit.

Option : AC117V, 217V, or 234V

Power consumption : Less than 8W without option unit

Operating temperature : 0°C to 50°C

Operating humidity : Less than 80% RH (0°C to 40°C)

Less than 60% RH (40°C to 50°C)

Warm up time : 1hour after turning power on.

Dimensions : Approx. 191 (W) x 80 (H) x 260 (L) mm

Weight : Approx. 1.9 kg

Accessories : Power code (1), Test lead (1 set). Fuses (4), Alignment screw driver (1), Accessory bag (1), Instruction manual (1)