

Digital Multimeter (portable type)

VOAC7500H Series



Isolate 2-channel input dual function
0.1µV, 509999, 5½ digits

VOAC7523H

Isolate 2-channel input dual function
1µV, 509999, 5½ digits

VOAC7520H



4-terminal resistance measurement
dual function 0.1µV, 509999, 5½ digits

VOAC7522H

4-terminal resistance measurement
dual function 1µV, 509999, 5½ digits

VOAC7521H

Digital Multimeters VOAC7523H/7522H/7520H/7521H Specifications

* Accuracy (±XX% of reading +Y digits) indicated by X+Y

The measuring accuracy indicated below can be obtained for a year following the calibration of the instrument.

1. Typical Sample Rate and Resolution

| Sample Rate | Resolution | Reading Rate | Hum Rejection |
|-------------|------------|-----------------------|---------------|
| SLOW | 5.5-digit | approx. 4 times/sec | Yes |
| MID | 5.5-digit | approx. 20 times/sec | Yes |
| FAST | 4.5-digit | approx. 100 times/sec | N/A |

2. DC Volt (DCV) 50mV range is for the VOAC7523H / 7522H only.

| Range | Resolution | | Input Resistance | Accuracy* | |
|-------|------------|-----------|------------------|-----------|----------|
| | 5.5-digit | 4.5-digit | | SLOW/MID | FAST |
| 50mV | 0.1µV | 1µV | 100MΩ or more | 0.025+10 | 0.025+15 |
| 500mV | 1µV | 10µV | 1000MΩ or more | 0.012+5 | 0.012+10 |
| 5V | 10µV | 100µV | 0.012+2 | 0.012+7 | |
| 50V | 100µV | 1mV | 0.016+5 | 0.016+10 | |
| 500V | 1mV | 10mV | approx. 10MΩ | | |
| 1000V | 10mV | 100mV | 0.016+2 | 0.016+7 | |

The accuracy in the 50mV and 500mV ranges is specified after zero compensation through the REL operation.

Sample rate in the 50mV range

SLOW/MID: Approx. 0.5 times/sec, FAST: Approx. 50 times/sec

Max. input voltage: 50mV to 5V range ± 800V (continuous) 50V to 1000V range ± 1100V (continuous)

Resolution and noise rejection

| Resolution | Sample Rate | NMRR | CMRR |
|------------|-------------|--------------|---------------|
| 5.5-digit | SLOW | 55dB or more | 120dB or more |
| 5.5-digit | MID | 55dB or more | 120dB or more |
| 4.5-digit | FAST | 0dB | 55dB or more |

3. CH-B DC Volt (DCV) VOAC7523H / 7520H only

| Range | Resolution | Input Resistance | Accuracy* | |
|-------|------------|----------------------------|-----------|----------|
| | | | SLOW/MID | FAST |
| 5V | 100µV | CH-B:H to CH-B:L 10MΩ ± 3% | 0.025+2 | 0.025+30 |
| 50V | 1mV | CH-B:H to CH-A:L 5MΩ ± 3% | | 0.025+8 |
| 300V | 10mV | CH-B:L to CH-A:L 5MΩ ± 3% | | 0.025+5 |

Max. input voltage: ± 300V, between CH-A L and CH-B ± 300V

Resolution and noise rejection

| Resolution | Sample Rate | NMRR | CMRR | Isolation between CH-A and CH-B |
|------------|-------------|--------------|---------------|---------------------------------|
| 4.5-digit | SLOW/MID | 55dB or more | 120dB or more | 56dB or more |
| 4.5-digit | FAST | 0dB | 55dB or more | |

4. AC Volt (ACV, DC+ACV) detection of True RMS

Up to 100kHz for VOAC7521H / 7520H

| Range | Resolution | Measurement Range | | Input Resistance |
|-------|------------|-------------------|-----------------|-----------------------------------|
| | | SLOW | MID/FAST | |
| 500mV | 1µV | 15Hz to 300kHz | 200Hz to 300kHz | less than approx. 1MΩ // 100pF |
| 5V | 10µV | | | |
| 50V | 100µV | | | |
| 500V | 1mV | | | |
| 750V | 10mV | | | |

Accuracy: SLOW Sample (Sine wave Amplitude at 5% to 100% of fullscale of range)

| Frequency | Accuracy* |
|------------------|-----------|
| 15Hz to 45Hz | 0.5+150 |
| 45Hz to 100Hz | 0.25+150 |
| 100Hz to 30kHz | 0.2+150 |
| 30kHz to 100kHz | 0.5+300 |
| 100kHz to 300kHz | 2.5+1000 |

Coefficient to input other than sine wave

| Crest Factor | Crest Factor | | |
|-----------------|--------------|----------|--------|
| | 1 to 1.5 | 1.5 to 2 | 2 to 3 |
| 15Hz to 30kHz | 0.05% | 0.15% | 0.30% |
| 30kHz to 300kHz | 0.20% | - | - |

Response time

| Sample Rate | Resolution | Reading Rate | Response Time |
|-------------|------------|--------------|-----------------|
| SLOW | 5.5-digit | 4 times/sec | less than 3 sec |
| MID/FAST | 5.5-digit | 20 times/sec | less than 2 sec |

Max. input voltage: 780Vrms, ± 1100V DC (continuous)

In the case of DC+ACV, 500 (less than 45Hz) or 300 (45Hz or higher) must be added to the value of Accuracy digit in above.

Sample rate of FAST becomes the same values as MID (approx. 20 times/sec).

5. DC Current (DCA)

| Range | Resolution | | Accuracy* | | Input Resistance |
|-------|------------|-----------|-----------|---------|------------------|
| | 5.5-digit | 4.5-digit | SLOW/MID | FAST | |
| 5mA | 10nA | 100nA | 0.05+7 | 0.05+17 | 150Ω or less |
| 50mA | 100nA | 1µA | | | 15Ω or less |
| 500mA | 1µA | 10µA | | | 2Ω or less |
| 10A | 100µA | 1mA | 0.2+7 | 0.2+17 | 0.1Ω or less |

Auto range is not available between 5mA to 500mA range and 10A range because of using different input terminals.

Max. input current: 500mA at 5mA to 500mA ranges (FUSE 0.5A/250V)

10A at 10A range (FUSE 15A/250V)

6. AC Current (ACA, DC+ACA)

| Range | Resolution | Measurement Range | | Input Resistance |
|-------|------------|-------------------|---------------|------------------|
| | | SLOW/MID | FAST | |
| 5mA | 10nA | 15Hz to 5kHz | 200Hz to 5kHz | 150Ω or less |
| 50mA | 100nA | | | 15Ω or less |
| 500mA | 1µA | | | 2Ω or less |
| 10A | 100µA | 45Hz to 5kHz | | 0.1Ω or less |

Accuracy: SLOW Sample (Sine wave) amplitude at 5% to 100% of fullscale (10% to 100% for 10A range)

| Frequency | Accuracy* | Crest Factor | | |
|--------------|-----------|--------------|----------|--------|
| | | 1 to 1.5 | 1.5 to 2 | 2 to 3 |
| 15Hz to 45Hz | 1+200 | 0.05% | 0.15% | 0.30% |
| 45Hz to 1kHz | 0.4+200 | | | |
| 1kHz to 5kHz | 5.0+200 | | | |

Response time

| Sample Rate | Resolution | Reading Range | Response time |
|-------------|------------|---------------|-----------------|
| SLOW | 5.5-digit | 4 times/sec | less than 3 sec |
| MID/FAST | 5.5-digit | 20 times/sec | less than 2 sec |

Max. input current: 500mA for 5mA to 500mA ranges (FUSE 0.5A)

10A for 10A range (FUSE 15A)

DC Component on input current must be included in the Max. input current.

In the case of 10A range at 45Hz to 1kHz, 0.3 must be added to %.

In the case of DC+ACA, 500 (less than 45Hz) or 300 (45Hz or higher) must be added to the value of Accuracy in above.

Sample rate of FAST becomes the same value as MID (approx. 20 times/sec).

7. Resistance (2 Wire Ω / 4 Wire Ω) 4 Wire Ω : VOAC7522H / 7521H only

| Range | Resolution | | Accuracy* | | Test Current |
|-------|------------|------|-----------|----------|---------------|
| | SLOW/MID | FAST | SLOW/MID | FAST | |
| 50Ω | 0.1mΩ | 1mΩ | 0.025+10 | 0.025+15 | approx. 10mA |
| 500Ω | 1mΩ | 10mΩ | 0.014+3 | 0.014+8 | approx. 10mA |
| 5kΩ | 10mΩ | 0.1Ω | | | approx. 1mA |
| 50kΩ | 0.1Ω | 1Ω | | | approx. 100µA |
| 500kΩ | 1Ω | 10Ω | 0.015+3 | 0.015+33 | approx. 10µA |
| 5MΩ | 10Ω | 10Ω | 0.033+30 | 0.033+30 | approx. 1µA |
| 50MΩ | 100Ω | 100Ω | 0.25+30 | 0.25+30 | approx. 100nA |
| 500MΩ | 1kΩ | 1kΩ | 1.5+50 | 1.5+50 | approx. 10nA |

Max. input voltage: ± 500V peak Open circuit test voltage: 12V or less

The accuracy at 50Ω to 5kΩ range are specified after zero compensation through the REL operation.

Sample rate of FAST at 5MΩ to 500MΩ range becomes the same value as MID (approx. 20 times/sec).

8. Low-Power Resistance (2 Wire Ω)

| Range | Resolution | Accuracy* | | Test Current |
|-------|------------|---------------|--------|---------------|
| | | SLOW/MID/FAST | FAST | |
| 500Ω | 10mΩ | 0.1+5 | 0.1+15 | approx. 1mA |
| 5kΩ | 0.1Ω | | | approx. 100µA |
| 50kΩ | 1Ω | | | approx. 10µA |
| 500kΩ | 10Ω | 0.2+30 | 0.2+40 | approx. 1µA |
| 5MΩ | 100Ω | | 0.2+30 | approx. 100nA |
| 50MΩ | 1kΩ | 1.5+30 | 1.5+30 | approx. 10nA |

Max. input voltage: ± 500V peak Open circuit test voltage: 12V or less

The accuracy at 500Ω to 5kΩ range are specified after zero compensation through the REL operation.

Sample rate of FAST at 5MΩ to 500MΩ range becomes the same value as MID (approx. 20 times/sec).

Indications are in 4.5 digits for SLOW, MID, and FAST.

9. Diode

| Test Current | Measurement Range | Accuracy* | Open Circuit Test Voltage | Max. Input Voltage |
|---------------------|-------------------|-----------|---------------------------|--------------------|
| approx. 1mA or 10mA | 0.1mV to 5.0999V | 0.014+13 | 12V or less | ± 500V peak |

10. Temperature

| Thermocouple | Temperature Range to be Measured | Accuracy* | Resolution | Max. Input Voltage |
|--------------|----------------------------------|-----------|------------|--------------------|
| R | -50°C to 0°C | 0.2+70 | 0.1°C | ± 500V peak |
| | 0°C to +100°C | 0.2+50 | | |
| | +100°C to +1768°C | 0.2+30 | | |
| K(CA) | -200°C to -100°C | 0.15+50 | | |
| | -100°C to 0°C | 0.15+35 | | |
| | 0°C to +1372°C | 0.15+20 | | |
| T(CC) | -200°C to -100°C | 0.15+50 | | |
| | -100°C to 0°C | 0.15+35 | | |
| | 0°C to +400°C | 0.15+20 | | |
| J(IC) | -200°C to -100°C | 0.15+50 | | |
| | -100°C to 0°C | 0.15+35 | | |
| | 0°C to +1200°C | 0.15+20 | | |
| E(CRC) | -200°C to -100°C | 0.15+50 | | |
| | -100°C to 0°C | 0.15+35 | | |
| | 0°C to +1000°C | 0.15+20 | | |

11. Frequency (AC couple, Crest Factor: less than 3)

| Sample Rate | Reading Rate/Gate time | Display Digits and Measurement Range | Accuracy* |
|-------------|-----------------------------|--------------------------------------|-----------|
| SLOW | approx. 0.5 times/sec (1s) | 6-digit 15.0000Hz to 1.00000MHz | 0.02+2 |
| MID | approx. 4 times/sec (100ms) | 5-digit 15.000Hz to 1.0000MHz | |
| FAST | approx. 10 times/sec (10ms) | 4-digit 150.00Hz to 1.000MHz | |

12. Chart for combination of Dual Function

| | DCV | CH-B DCV ^(*) | ACV | DC+ACV | DCA | ACA | DC+ACA | 2 WireΩ | 4 WireΩ ^(*) | Hz | °C |
|------------------------|-----|-------------------------|-----|--------|-----|-----|--------|---------|------------------------|----|----|
| DCV | x | o | Δ | Δ | Δ | Δ | Δ | x | x | Δ | Δ |
| CH-BDCV ^(*) | o | x | Δ | Δ | Δ | Δ | Δ | - | - | o | o |
| ACV | Δ | o | x | o | o | Δ | Δ | x | x | o | x |
| DC+ACV | Δ | o | o | x | o | Δ | Δ | x | x | o | x |
| DCA | Δ | o | o | o | x | Δ | Δ | Δ | Δ | o | x |
| ACA | Δ | o | Δ | Δ | Δ | x | o | Δ | Δ | Δ | x |
| DC+ACA | Δ | o | Δ | Δ | Δ | o | x | Δ | Δ | Δ | x |
| 2 WireΩ | x | o | x | x | Δ | Δ | Δ | x | Δ | x | x |
| 4 WireΩ ^(*) | x | - | x | x | Δ | Δ | Δ | Δ | x | x | x |
| Hz | Δ | o | o | o | o | Δ | Δ | x | x | x | x |
| °C | Δ | o | x | x | x | x | x | x | x | x | x |

o: Available Δ: have a limitation x: N/A - : not provided

(*) CH-B DCV: VOAC7523H / 7520H only (**) 4 WireΩ: VOAC7522H / 7521H only