

# Keysight Technologies U3400 Series 4½ and 5½ Digit Digital Multimeters

Data Sheet



## Simply Right For Your Basic Needs, Without Compromising Quality

The U3400 Series digital multimeters (DMMs) come with functions vital for your everyday measurements: DC, AC and AC+ DC voltage and current, 2- and 4-wire resistance, frequency, continuity and diode tests.

Math functions dBm, Min/Max, Relative, Compare, Hold and Percentage\*\* are also available to ease your measurement analysis.

Not only are the U3400 Series built robust for lasting reliability over the long haul, these DMMs also ensure dependable measurements with up to 0.012% basic DCV accuracy.

## Efficient Testing With Dual Display and Selectable Resolutions\*

Dual display on the U3400 Series lets you view two parameters simultaneously as you measure, and further enhances your troubleshooting tasks. For example, the ability to see both AC voltage and frequency simultaneously would help you to measure the frequency response of amplifier circuits more efficiently and effectively. Refer to Page 3 for more typical dual display combinations and applications.

Up to three measurement speeds are available on the U3402A: Slow, Medium and Fast. This means greater flexibility in catering to different testing needs: a faster measurement speed at lower resolution or a higher resolution at slower measurement speed.

## Physical Security

Your instruments may be at risk of theft or misplacement whenever you leave them unattended on the bench. With the U3400 Series' rear Kensington lock slot, you can secure your DMM and be assured that it is where you expect it to be for your continued testing the next day.

### Features

- Up to 120,000 counts resolution
- Up to 0.012% basic DCV accuracy
- 11 basic measurements and up to six built-in math functions
- Dual display on bright VFD
- Selectable resolutions for variable measurement speeds\*
- Kensington lock slot security

\* U3402A only

\*\* U3401A only

## Take a Closer Look

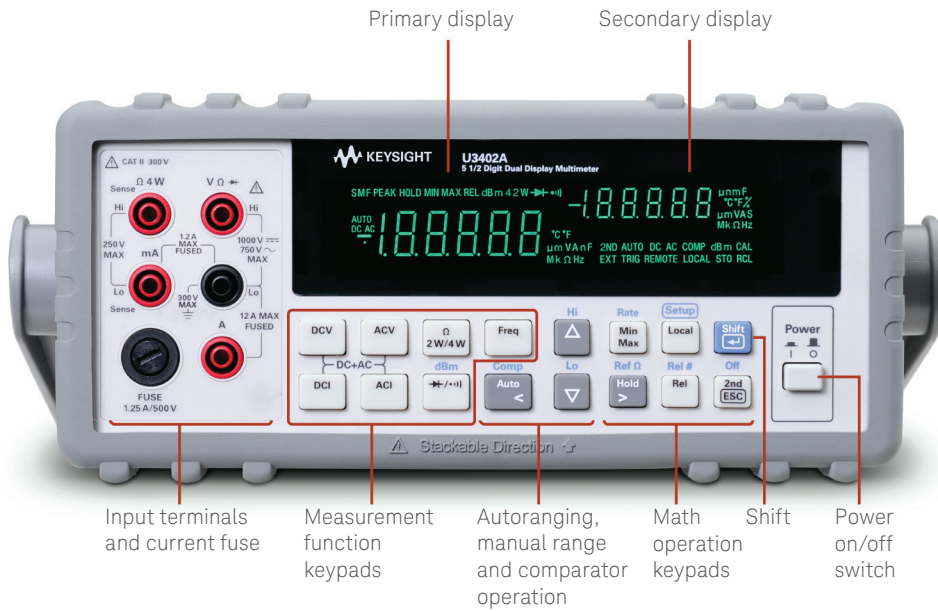


Figure 1. Front panel of the U3402A. The front panel of the U3401A is similar with slight differences in the position of certain functions. Please refer to the U3401A's User's and Service Guide U3401-90001 for details.

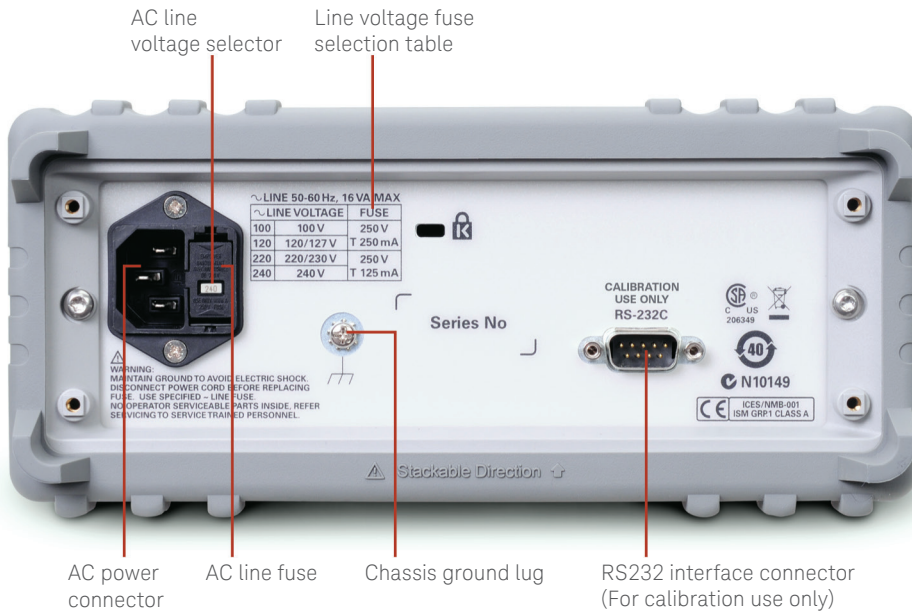


Figure 2. Rear panel of the U3401A/U3402A

## Typical Dual Display Combinations and Applications

| Primary display | Secondary display  | Application   | Available in   |
|-----------------|--------------------|---|----------------|
| DCV             | ACV                | Testing of DC-to-AC or AC-to-DC converter circuit     | U3402A, U3401A |
| ACV + DCV       | DCV                | Power supply DC level and AC ripple measurement       | U3402A, U3401A |
| DCV             | DCI                | Testing of power supply load regulation               | U3402A         |
| DCV             | ACI                | Loop current and voltage drop level checking          | U3402A         |
| ACI + DCI       | DCV                | Testing of line and load regulation                   | U3402A         |
| ACV             | DCI                | Testing of AC-to-DC or DC-to-AC converter             | U3402A         |
| ACI + DCI       | ACV                | Power supply DC level and AC ripple measurement       | U3402A         |
| ACV             | ACI                | Transformer testing                                   | U3402A         |
| ACV             | Hz                 | Amplifier circuit's AC frequency response measurement | U3402A, U3401A |
| ACI             | Hz                 | Adjustment of AC motor control                        | U3402A, U3401A |
| DCI             | ACI                | Power supply AC ripple and DC current measurement     | U3402A, U3401A |
| ACI + DCI       | DCI                | Current dissipation measurement                       | U3402A, U3401A |
| dBm             | Reference $\Omega$ |   | U3401A         |
| dBm             | DCV                | RF frequency measurement                              | U3402A, U3401A |
| dBm             | ACV                |   | U3402A, U3401A |
| dBm             | Hz                 | Frequency response checking                           | U3402A         |

## U3400 Series Specifications

### DC voltage

DCV resolution, full-scale reading and accuracy [ $\pm$  (% of reading + count)]

#### U3401A 4.5-digit DMM

| Range     | Resolution  | Maximum reading     | Accuracy (1 year; 23 °C $\pm$ 5 °C) | Typical input impedance <sup>1</sup> |
|-----------|-------------|---------------------|-------------------------------------|--------------------------------------|
| 500.00 mV | 10 $\mu$ V  | 510.00              | 0.02% + 4                           | 10.0 M $\Omega$                      |
| 5.0000 V  | 100 $\mu$ V | 5.1000              | 0.02% + 4                           | 11.1 M $\Omega$                      |
| 50.000 V  | 1 mV        | 51.000              | 0.02% + 4                           | 10.1 M $\Omega$                      |
| 500.00 V  | 10 mV       | 510.00              | 0.02% + 4                           | 10.0 M $\Omega$                      |
| 1000.0 V  | 100 mV      | 1200.0 <sup>2</sup> | 0.02% + 4                           | 10.0 M $\Omega$                      |

1. Input impedance is in parallel with capacitance <100 pF.
2. In VDC 1000 V range, 1200 V is readable with audio warning.

| Rate   | Range      | Resolution  | Maximum reading      | Accuracy (1 year; 23 °C $\pm$ 5 °C) | Typical input impedance <sup>1</sup> |
|--------|------------|-------------|----------------------|-------------------------------------|--------------------------------------|
| Slow   | 120.000 mV | 1 $\mu$ V   | 119.999              | 0.012% + 8 <sup>2</sup>             | 10.0 M $\Omega$                      |
|        | 1.20000 V  | 10 $\mu$ V  | 1.19999              | 0.012% + 5                          | 10.0 M $\Omega$                      |
|        | 12.0000 V  | 100 $\mu$ V | 11.9999              | 0.012% + 5                          | 11.1 M $\Omega$                      |
|        | 120.000 V  | 1 mV        | 119.999              | 0.012% + 5                          | 10.1 M $\Omega$                      |
|        | 1000.00 V  | 10 mV       | 1000.00 <sup>3</sup> | 0.012% + 5                          | 10.0 M $\Omega$                      |
| Medium | 400.00 mV  | 10 $\mu$ V  | 399.99               | 0.012% + 5                          | 10.0 M $\Omega$                      |
|        | 4.0000 V   | 100 $\mu$ V | 3.9999               | 0.012% + 5                          | 11.1 M $\Omega$                      |
|        | 40.000 V   | 1 mV        | 39.999               | 0.012% + 5                          | 10.1 M $\Omega$                      |
|        | 400.00 V   | 10 mV       | 399.99               | 0.012% + 5                          | 10.0 M $\Omega$                      |
|        | 1000.0 V   | 100 mV      | 1000.0 <sup>3</sup>  | 0.012% + 5                          | 10.0 M $\Omega$                      |
| Fast   | 400.0 mV   | 100 $\mu$ V | 399.9                | 0.012% + 2                          | 10.0 M $\Omega$                      |
|        | 4.000 V    | 1 mV        | 3.999                | 0.012% + 2                          | 11.1 M $\Omega$                      |
|        | 40.00 V    | 10 mV       | 39.99                | 0.012% + 2                          | 10.1 M $\Omega$                      |
|        | 400.0 V    | 100 mV      | 399.9                | 0.012% + 2                          | 10.0 M $\Omega$                      |
|        | 1000 V     | 1 V         | 1000 <sup>3</sup>    | 0.012% + 2                          | 10.0 M $\Omega$                      |

1. Input impedance is in parallel with capacitance <120 pF.
2. Relative (REL) operation is used.
3. In VDC 1000 V range, 1050 V is readable.

## AC voltage (true RMS, AC coupling mode)

ACV resolution, full-scale reading and accuracy [ $\pm$  (% of reading + count)]

### U3401A 4.5-digit DMM

| Range     | Resolution  | Maximum reading | Accuracy (1 year; 23 °C $\pm$ 5 °C) <sup>1</sup> |                        |                      |                      |
|-----------|-------------|-----------------|--|------------------------|----------------------|----------------------|
|           |             |                 | 30 Hz to 50 Hz                                   | 50 Hz to 10 kHz        | 10 kHz to 30 kHz     | 30 kHz to 100 kHz    |
| 500.00 mV | 10 $\mu$ V  | 510.00          | 1% + 40  | 0.05% + 40             | 2% + 60              | 3% + 20              |
| 5.0000 V  | 100 $\mu$ V | 5.1000          | 1% + 20  | 0.35% + 15             | 1% + 20              | 3% + 50              |
| 50.000 V  | 1 mV        | 51.000          | 1% + 20  | 0.35% + 15             | 1% + 20              | 3% + 50              |
| 500.00 V  | 10 mV       | 510.00          | Not specified                                    | 0.5% + 15              | 1% + 20 <sup>2</sup> | 3% + 50 <sup>2</sup> |
| 750.0 V   | 100 mV      | 1000.0          | Not specified                                    | 0.5% + 15 <sup>3</sup> | 1% + 20 <sup>2</sup> | Not specified        |

1. Accuracy specified at input >5% of full scale.
2. Input voltage <200 V RMS.
3. For 5 kHz to 10 kHz, accuracy is 0.7% + 15.
4. In VAC 750 V range, 1000.0 V RMS is readable with audio warning.

### U3402A 5½-digit DMM

| Rate   | Range      | Resolution  | Maximum reading     | Accuracy (1 year; 23 °C $\pm$ 5 °C) <sup>1</sup> |                 |                  |                       |
|--------|------------|-------------|---------------------|--|-----------------|------------------|-----------------------|
|        |            |             |                     | 20 Hz to 45 Hz                                   | 45 Hz to 10 kHz | 10 kHz to 30 kHz | 30 kHz to 100 kHz     |
| Slow   | 120.000 mV | 1 $\mu$ V   | 119.999             | 1% + 100   | 0.2% + 100      | 1.5% + 100       | 5% + 300 <sup>2</sup> |
|        | 1.20000 V  | 10 $\mu$ V  | 1.19999             | 1% + 100   | 0.2% + 100      | 1% + 100         | 3% + 200 <sup>2</sup> |
|        | 12.0000 V  | 100 $\mu$ V | 11.9999             | 1% + 100   | 0.2% + 100      | 1% + 100         | 3% + 200 <sup>2</sup> |
|        | 120.000 V  | 1 mV        | 119.999             | 1% + 100   | 0.2% + 100      | 1% + 100         | 3% + 200 <sup>2</sup> |
|        | 750.00 V   | 10 mV       | 750.00 <sup>4</sup> | 1% + 100 <sup>2</sup>                            | 0.2% + 100      | 1% + 100         | 3% + 200 <sup>3</sup> |
| Medium | 400.00 mV  | 10 $\mu$ V  | 399.99              | 1% + 40  | 0.2% + 40       | 1.5% + 80        | 5% + 120 <sup>2</sup> |
|        | 4.0000 V   | 100 $\mu$ V | 3.9999              | 1% + 40  | 0.2% + 40       | 1% + 40          | 3% + 80 <sup>2</sup>  |
|        | 40.000 V   | 1 mV        | 39.999              | 1% + 40  | 0.2% + 40       | 1% + 40          | 3% + 80 <sup>2</sup>  |
|        | 400.00 V   | 10 mV       | 399.99              | 1% + 40 <sup>2</sup>                             | 0.2% + 40       | 1% + 40          | 3% + 80 <sup>2</sup>  |
|        | 750.0 V    | 100 mV      | 750.0               | 1% + 40 <sup>2</sup>                             | 0.2% + 40       | 1% + 40          | 3% + 80 <sup>3</sup>  |
| Fast   | 400.0 mV   | 100 $\mu$ V | 399.9               | 1% + 5   | 0.2% + 5        | 1.5% + 10        | 5% + 15 <sup>2</sup>  |
|        | 4.000 V    | 1 mV        | 3.999               | 1% + 5   | 0.2% + 5        | 1% + 5           | 3% + 10 <sup>2</sup>  |
|        | 40.00 V    | 10 mV       | 39.99               | 1% + 5   | 0.2% + 5        | 1% + 5           | 3% + 10 <sup>2</sup>  |
|        | 400.0 V    | 100 mV      | 399.9               | 1% + 5 <sup>2</sup>                              | 0.2% + 5        | 1% + 5           | 3% + 10 <sup>2</sup>  |
|        | 750 V      | 1 V         | 750                 | 1% + 5 <sup>2</sup>                              | 0.2% + 5        | 1% + 5           | 3% + 10 <sup>3</sup>  |

1. Accuracy specified at input >5% of full scale.
2. Input voltage <200 V RMS.
3. Input voltage <500 V RMS.
4. In VAC 750 V range, 787.5 V RMS is readable.

**AC voltage (true RMS, AC+DC coupling mode)**AC+DC voltage resolution, full-scale reading and accuracy [ $\pm$  (% of reading + count)]

## U3401A 4.5-digit DMM

| Range     | Resolution  | Maximum reading     | Accuracy (1 year; 23 °C $\pm$ 5 °C) <sup>1</sup> |                      |                      |
|-----------|-------------|---------------------|--|----------------------|----------------------|
|           |             |                     | 50 Hz to 10 kHz                                  | 10 kHz to 30 kHz     | 30 kHz to 100 kHz    |
| 500.00 mV | 10 $\mu$ V  | 510.00              | 0.5% + 50  | 2% + 70              | 3% + 130             |
| 5.0000 V  | 100 $\mu$ V | 5.1000              | 0.5% + 25  | 1% + 30              | 3% + 60              |
| 50.000 V  | 1 mV        | 51.000              | 0.5% + 25  | 1% + 30              | 3% + 60              |
| 500.00 V  | 10 mV       | 510.00              | 0.5% + 25  | 1% + 30 <sup>2</sup> | 3% + 60 <sup>2</sup> |
| 750.0 V   | 100 mV      | 1000.0 <sup>3</sup> | 0.5% + 25 <sup>4</sup>                           | 1% + 30 <sup>2</sup> | Not specified        |

1. Accuracy specified at input >5% of full scale.
2. Input voltage <200 V RMS.
3. In VAC 750 V range, 1000.0 V RMS is readable with audio warning.
4. For 5 kHz to 10 kHz, accuracy is 0.7% + 25.

## U3402A 5.5-digit DMM

| Rate   | Range      | Resolution  | Maximum reading      | Accuracy (1 year; 23 °C $\pm$ 5 °C) <sup>1</sup> |                  |                       |
|--------|------------|-------------|----------------------|--|------------------|-----------------------|
|        |            |             |                      | 45 Hz to 10 kHz                                  | 10 kHz to 30 kHz | 30 kHz to 100 kHz     |
| Slow   | 120.000 mV | 1 $\mu$ V   | 119.999              | 0.2% + 100                                       | 1.5% + 300       | 5% + 300              |
|        | 1.20000 V  | 10 $\mu$ V  | 1.19999              | 0.2% + 100                                       | 1% + 100         | 3% + 200              |
|        | 12.0000 V  | 100 $\mu$ V | 11.9999              | 0.2% + 100                                       | 1% + 100         | 3% + 200              |
|        | 120.000 V  | 1 mV        | 119.999              | 0.2% + 100                                       | 1% + 100         | 3% + 200              |
|        | 750.00 V   | 10 mV       | 750.000 <sup>2</sup> | 0.2% + 100                                       | 1% + 100         | 3% + 200 <sup>3</sup> |
| Medium | 400.00 mV  | 10 $\mu$ V  | 399.99               | 0.2% + 45  | 1.5% + 83        | 5% + 125              |
|        | 4.0000 V   | 100 $\mu$ V | 3.9999               | 0.2% + 43  | 1% + 43          | 3% + 83               |
|        | 40.000 V   | 1 mV        | 39.999               | 0.2% + 43  | 1% + 43          | 3% + 83               |
|        | 400.00 V   | 10 mV       | 399.99               | 0.2% + 43  | 1% + 43          | 3% + 83               |
|        | 750.0 V    | 100 mV      | 750.00               | 0.2% + 43  | 1% + 43          | 3% + 83 <sup>3</sup>  |
| Fast   | 400.0 mV   | 100 $\mu$ V | 399.9                | 0.2% + 7   | 1.5% + 12        | 5% + 18               |
|        | 4.000 V    | 1 mV        | 3.999                | 0.2% + 7   | 1% + 7           | 3% + 12               |
|        | 40.00 V    | 10 mV       | 39.99                | 0.2% + 7   | 1% + 7           | 3% + 12               |
|        | 400.0 V    | 100 mV      | 399.9                | 0.2% + 7   | 1% + 7           | 3% + 12               |
|        | 750 V      | 1 V         | 750.0                | 0.2% + 7   | 1% + 7           | 3% + 12 <sup>3</sup>  |

1. Accuracy specified at input >5% of full scale.
2. In VAC 750 V range, 787.5 V RMS is readable.
3. Input voltage <500 V RMS.

## DC current

DCI resolution, full-scale reading and accuracy [ $\pm$  (% of reading + count)]

### U3401A 4.5-digit DMM

| Range          | Resolution  | Maximum reading     | Accuracy (1 year; 23 °C $\pm$ 5 °C) | Burden voltage <sup>1</sup> and shunt resistor |
|----------------|-------------|---------------------|-------------------------------------|--|
| 500.00 $\mu$ A | 10 nA       | 510.00              | 0.05% + 5                           | <0.06 V/100 $\Omega$                           |
| 5.0000 mA      | 100 nA      | 5.1000              | 0.05% + 4                           | <0.6 V/100 $\Omega$                            |
| 50.000 mA      | 1 $\mu$ A   | 51.000              | 0.05% + 4                           | <0.08 V/1 $\Omega$                             |
| 500.00 mA      | 10 $\mu$ A  | 510.00              | 0.05% + 4                           | <0.8 V/1 $\Omega$                              |
| 5.0000 A       | 100 $\mu$ A | 5.1000              | 0.25% + 5                           | <0.3 V/0.01 $\Omega$                           |
| 10.000 A       | 1 mA        | 20.000 <sup>2</sup> | 0.25% + 5                           | <0.6 V/0.01 $\Omega$                           |

1. Typical at full-scale reading and voltage across the input terminals.

2. In 10 A range, >10 to 20 ADC is readable for 20 seconds maximum with audio warning.

### U3402A 5.5-digit DMM

| Rate   | Range      | Resolution  | Maximum reading | Accuracy (1 year; 23 °C $\pm$ 5 °C) | Burden voltage <sup>1</sup> and shunt resistor |
|--------|------------|-------------|-----------------|-------------------------------------|--|
| Slow   | 12.0000 mA | 0.1 $\mu$ A | 11.9999         | 0.05% + 15 <sup>2</sup>             | <0.15 V/10 $\Omega$                            |
|        | 120.000 mA | 1 $\mu$ A   | 119.999         | 0.05% + 5                           | <1.5 V/10 $\Omega$                             |
|        | 1200.00 mA | 10 $\mu$ A  | 1199.99         | 0.2% + 5                            | <0.3 V/0.1 $\Omega$                            |
|        | 12.0000 A  | 100 $\mu$ A | 11.9999         | 0.2% + 5                            | <0.6 V/0.01 $\Omega$                           |
| Medium | 40.000 mA  | 1 $\mu$ A   | 39.999          | 0.1% + 6                            | <0.5 V/10 $\Omega$                             |
|        | 120.00 mA  | 10 $\mu$ A  | 119.99          | 0.1% + 3                            | <1.5 V/10 $\Omega$                             |
|        | 1200.0 mA  | 100 $\mu$ A | 1199.9          | 0.2% + 3                            | <0.3 V/0.1 $\Omega$                            |
|        | 12.000 A   | 1 mA        | 11.999          | 0.2% + 3                            | <0.6 V/0.01 $\Omega$                           |
| Fast   | 40.00 mA   | 10 $\mu$ A  | 39.99           | 0.1% + 2                            | <0.5 V/10 $\Omega$                             |
|        | 120.0 mA   | 100 $\mu$ A | 119.9           | 0.1% + 2                            | <1.5 V/10 $\Omega$                             |
|        | 1200 mA    | 1 mA        | 1199            | 0.2% + 2                            | <0.3 V/0.1 $\Omega$                            |
|        | 12.00 A    | 10 mA       | 11.99           | 0.2% + 2                            | <0.6 V/0.01 $\Omega$                           |

1. Typical at full-scale reading and voltage across the input terminals.

2. Relative (REL) operation is used.



## AC current (true RMS, AC coupling mode)

ACI resolution, full-scale reading and accuracy [ $\pm$  (% of reading + count)]

### U3401A 4.5-digit DMM

| Range          | Resolution  | Maximum reading     | Accuracy (1 year; 23 °C $\pm$ 5 °C) <sup>1</sup> |                       |                |                      | Burden voltage <sup>2</sup> and shunt resistor |
|----------------|-------------|---------------------|--|-----------------------|----------------|----------------------|--|
|                |             |                     | 30 Hz to 50 Hz                                   | 50 Hz to 2 kHz        | 2 kHz to 5 kHz | 5 kHz to 20 kHz      |  |
| 500.00 $\mu$ A | 10 nA       | 510.00              | 1.5% + 50  | 0.5% + 20             | 1.5% + 50      | 3% + 75 <sup>3</sup> | <0.06 V/100 $\Omega$                           |
| 5.0000 mA      | 100 nA      | 5.1000              | 1.5% + 40  | 0.5% + 20             | 1.5% + 40      | 3% + 60              | <0.6 V/100 $\Omega$                            |
| 50.000 mA      | 1 $\mu$ A   | 51.000              | 1.5% + 40  | 0.5% + 20             | 1.5% + 40      | 3% + 60              | <0.08 V/1 $\Omega$                             |
| 500.00 mA      | 10 $\mu$ A  | 510.00              | 1.5% + 40  | 0.5% + 20             | 1.5% + 40      | 3% + 60              | <0.8 V/1 $\Omega$                              |
| 5.0000 A       | 100 $\mu$ A | 5.1000              | 2% + 40 <sup>4</sup>                             | 0.5% + 20             | Not specified  | Not specified        | <0.3 V/0.01 $\Omega$                           |
| 10.000 A       | 1 mA        | 20.000 <sup>5</sup> | 2% + 40 <sup>4</sup>                             | 0.5% + 30<br>(<1 kHz) | Not specified  | Not specified        | <0.6 V/0.01 $\Omega$                           |

1. Accuracy specified at input >5% of full scale and >1 A for 10 A range unless otherwise stated.

2. Typical at full-scale reading and voltage across the input terminals.

3. Input current >35  $\mu$ A RMS.

4. Input current <3 A RMS.

5. In 10 A range, >10 to 20 ADC is readable for 20 seconds maximum with audio warning.

### U3402A 5.5-digit DMM

| Rate   | Range      | Resolution  | Maximum reading | Accuracy (1 year; 23 °C $\pm$ 5 °C) <sup>1</sup> |                |                 | Burden voltage <sup>2</sup> and shunt resistor |
|--------|------------|-------------|-----------------|--|----------------|-----------------|--|
|        |            |             |                 | 20 Hz to 45 Hz                                   | 45 Hz to 2 kHz | 2 kHz to 10 kHz |  |
| Slow   | 12.0000 mA | 0.1 $\mu$ A | 11.9999         | 1.5% + 100                                       | 0.5% + 100     | 2% + 200        | <0.15 V/10 $\Omega$                            |
|        | 120.000 mA | 1 $\mu$ A   | 119.999         | 1.5% + 100                                       | 0.5% + 100     | 2% + 200        | <1.5 V/10 $\Omega$                             |
|        | 1200.00 mA | 10 $\mu$ A  | 1199.99         | 1.5% + 100                                       | 0.5% + 100     | 2% + 200        | <0.3 V/0.1 $\Omega$                            |
|        | 12.0000 A  | 100 $\mu$ A | 11.9999         | 2% + 100 (<1.2 A)                                | 1% + 100       | Not specified   | <0.6 V/0.01 $\Omega$                           |
| Medium | 40.000 mA  | 1 $\mu$ A   | 39.999          | 1.5% + 40  | 0.5% + 40      | 2% + 80         | <0.5 V/10 $\Omega$                             |
|        | 120.00 mA  | 10 $\mu$ A  | 119.99          | 1.5% + 12  | 0.5% + 12      | 2% + 30         | <1.5 V/10 $\Omega$                             |
|        | 1200.0 mA  | 100 $\mu$ A | 1199.9          | 1.5% + 12  | 0.5% + 12      | 2% + 30         | <0.3 V/0.1 $\Omega$                            |
|        | 12.000 A   | 1 mA        | 11.999          | 1.5% + 12 (<1.2 A)                               | 1% + 12        | Not specified   | <0.6 V/0.01 $\Omega$                           |
| Fast   | 40.00 mA   | 10 $\mu$ A  | 39.99           | 1.5% + 5   | 0.5% + 5       | 2% + 10         | <0.5 V/10 $\Omega$                             |
|        | 120.0 mA   | 100 $\mu$ A | 119.9           | 1.5% + 2   | 0.5% + 2       | 2.2% + 5        | <1.5 V/10 $\Omega$                             |
|        | 1200 mA    | 1 mA        | 1199            | 1.5% + 2   | 0.5% + 2       | 2.2% + 5        | <0.3 V/0.1 $\Omega$                            |
|        | 12.00 A    | 10 mA       | 11.99           | 2% + 2 (<1.2 A)                                  | 1% + 2         | Not specified   | <0.6 V/0.01 $\Omega$                           |

1. Accuracy specified at input >5% of full scale.

2. Typical at full-scale reading and voltage across the input terminals.

## AC current (true RMS, AC+DC coupling mode)

AC+DC current resolution, full-scale reading and accuracy [ $\pm$  (% of reading + count)]

### U3401A 4.5-digit DMM

| Range          | Resolution  | Maximum reading     | Accuracy (1 year; 23 °C $\pm$ 5 °C) <sup>1</sup> |                |                      | Burden voltage <sup>2</sup><br>and shunt resistor |
|----------------|-------------|---------------------|--|----------------|----------------------|---|
|                |             |                     | 50 Hz to 2 kHz                                   | 2 kHz to 5 kHz | 5 kHz to 20 kHz      |   |
| 500.00 $\mu$ A | 10 nA       | 510.00              | 0.5% + 30  | 1.5% + 60      | 3% + 85 <sup>3</sup> | <0.06 V/100 $\Omega$                              |
| 5.0000 mA      | 100 nA      | 5.1000              | 0.5% + 30  | 1.5% + 50      | 3% + 70              | <0.6 V/100 $\Omega$                               |
| 50.000 mA      | 1 $\mu$ A   | 51.000              | 0.5% + 30  | 1.5% + 50      | 3% + 70              | <0.08 V/1 $\Omega$                                |
| 500.00 mA      | 10 $\mu$ A  | 510.00              | 0.5% + 30  | 1.5% + 50      | 3% + 70              | <0.8 V/1 $\Omega$                                 |
| 5.0000 A       | 100 $\mu$ A | 5.1000              | 0.5% + 30  | Not specified  | Not specified        | <0.3 V/0.01 $\Omega$                              |
| 10.000 A       | 1 mA        | 20.000 <sup>4</sup> | 0.5% + 40 (<1 kHz)                               | Not specified  | Not specified        | <0.6 V/0.01 $\Omega$                              |

1. Accuracy specified at input >5% of full scale and >1 A for 10 A range unless otherwise stated.
2. Typical at full-scale reading and voltage across the input terminals.
3. Input current >35  $\mu$ A RMS.
4. In 10 A range, >10 to 20 ADC is readable for 20 seconds maximum with audio warning.

### U3402A 5.5-digit DMM

| Rate   | Range      | Resolution  | Maximum reading | Accuracy (1 year; 23 °C $\pm$ 5 °C) <sup>1</sup> |                 | Burden voltage <sup>2</sup><br>and shunt resistor |
|--------|------------|-------------|-----------------|--|-----------------|---|
|        |            |             |                 | 45 Hz to 2 kHz                                   | 2 kHz to 10 kHz |   |
| Slow   | 12.0000 mA | 0.1 $\mu$ A | 11.9999         | 0.5% + 100                                       | 2% + 200        | <0.15 V/10 $\Omega$                               |
|        | 120.000 mA | 1 $\mu$ A   | 119.999         | 0.5% + 100                                       | 2% + 200        | <1.5 V/10 $\Omega$                                |
|        | 1200.00 mA | 10 $\mu$ A  | 1199.99         | 0.5% + 100                                       | 2% + 200        | <0.3 V/0.1 $\Omega$                               |
|        | 12.0000 A  | 100 $\mu$ A | 11.9999         | 1% + 100   | Not specified   | <0.6 V/0.01 $\Omega$                              |
| Medium | 40.000 mA  | 1 $\mu$ A   | 39.999          | 0.5% + 42  | 2% + 80         | <0.5 V/10 $\Omega$                                |
|        | 120.00 mA  | 10 $\mu$ A  | 119.99          | 0.5% + 15  | 2% + 30         | <1.5 V/10 $\Omega$                                |
|        | 1200.0 mA  | 100 $\mu$ A | 1199.9          | 0.5% + 15  | 2% + 30         | <0.3 V/0.1 $\Omega$                               |
|        | 12.000 A   | 1 mA        | 11.999          | 1% + 15  | Not specified   | <0.6 V/0.01 $\Omega$                              |
| Fast   | 40.00 mA   | 10 $\mu$ A  | 39.99           | 0.5% + 7   | 2% + 12         | <0.5 V/10 $\Omega$                                |
|        | 120.0 mA   | 100 $\mu$ A | 119.9           | 0.5% + 4   | 2% + 7          | <1.5 V/10 $\Omega$                                |
|        | 1200 mA    | 1 mA        | 1199            | 0.5% + 4   | 2% + 7          | <0.3 V/0.1 $\Omega$                               |
|        | 12.00 A    | 10 mA       | 11.99           | 1% + 4   | Not specified   | <0.6 V/0.01 $\Omega$                              |

1. Accuracy specified at input >5% of full scale.
2. Typical at full-scale reading and voltage across the input terminals.

## Resistance

Resistance resolution, full scale reading, and accuracy [ $\pm$  (% of reading + count)]

### U3401A 4.5-digit DMM

| Range <sup>1</sup> | Resolution | Maximum reading | Test current | Accuracy (1 year; 23 °C ± 5 °C) |
|--------------------|------------|-----------------|--------------|---------------------------------|
| 500.00 Ω           | 10 mΩ      | 510.00          | 0.5 mA       | 0.1% + 5 <sup>2</sup>           |
| 5.0000 kΩ          | 100 mΩ     | 5.1000          | 0.45 mA      | 0.1% + 3 <sup>2</sup>           |
| 50.000 kΩ          | 1 Ω        | 51.000          | 45 μA        | 0.1% + 3                        |
| 500.00 kΩ          | 10 Ω       | 510.00          | 4.5 μA       | 0.1% + 3                        |
| 5.0000 MΩ          | 100 Ω      | 5.1000          | 450 nA       | 0.1% + 3                        |
| 50.000 MΩ          | 1 kΩ       | 51.000          | 45 nA        | 0.3% + 3                        |

1. To reduce noise interference that may be induced by the test leads, we recommend using a shielded test cable for measuring resistances above 500 kΩ.
2. Relative (REL) operation is used.

### U3402A 5.5-digit DMM

| Rate   | Range <sup>1</sup> | Resolution | Maximum reading | Test current | Accuracy (1 year; 23 °C ± 5 °C) |                        |
|--------|--------------------|------------|-----------------|--------------|---------------------------------|------------------------|
|        |                    |            |                 |              | 2-wire                          | 4-wire                 |
| Slow   | 120.000 Ω          | 1 mΩ       | 119.999         | 0.5 mA       | 0.1% + 8 <sup>2</sup>           | 0.05% + 8 <sup>2</sup> |
|        | 1.20000 kΩ         | 10 mΩ      | 1.19999         | 0.5 mA       | 0.08% + 5 <sup>2</sup>          | 0.05% + 5 <sup>2</sup> |
|        | 12.0000 kΩ         | 100 mΩ     | 11.9999         | 100 μA       | 0.06% + 5 <sup>2</sup>          | 0.05% + 5              |
|        | 120.000 kΩ         | 1 Ω        | 119.999         | 10 μA        | 0.06% + 5                       | 0.05% + 5              |
|        | 1.20000 MΩ         | 10 Ω       | 1.19999         | 1 μA         | 0.06% + 5                       | 0.05% + 5              |
|        | 12.0000 MΩ         | 100 Ω      | 11.9999         | 100 nA       | 0.3% + 5                        | 0.3% + 5               |
|        | 120.000 MΩ         | 1 kΩ       | 119.999         | 10 nA        | 3% + 8                          | 3% + 8                 |
| Medium | 400.00 Ω           | 10 mΩ      | 399.99          | 0.5 mA       | 0.1% + 5 <sup>2</sup>           | 0.05% + 5 <sup>2</sup> |
|        | 4.0000 kΩ          | 100 mΩ     | 3.9999          | 100 μA       | 0.08% + 3 <sup>2</sup>          | 0.05% + 3              |
|        | 40.000 kΩ          | 1 Ω        | 39.999          | 50 μA        | 0.06% + 3                       | 0.05% + 3              |
|        | 400.00 kΩ          | 10 Ω       | 399.99          | 5 μA         | 0.06% + 3                       | 0.05% + 3              |
|        | 4.0000 MΩ          | 100 Ω      | 3.9999          | 500 nA       | 0.15% + 3                       | 0.15% + 3              |
|        | 40.000 MΩ          | 1 kΩ       | 39.999          | 50 nA        | 1.5% + 3                        | 1.5% + 3               |
|        | 300.00 MΩ          | 10 kΩ      | 299.99          | 10 nA        | 5.0% + 5                        | 5.0% + 5               |
| Fast   | 400.0 Ω            | 100 mΩ     | 399.9           | 0.5 mA       | 0.1% + 2 <sup>2</sup>           | 0.05% + 2              |
|        | 4.000 kΩ           | 1 Ω        | 3.999           | 100 μA       | 0.08% + 2                       | 0.05% + 2              |
|        | 40.00 kΩ           | 10 Ω       | 39.99           | 50 μA        | 0.06% + 2                       | 0.05% + 2              |
|        | 400.0 kΩ           | 100 Ω      | 399.9           | 5 μA         | 0.06% + 2                       | 0.05% + 2              |
|        | 4.000 MΩ           | 1 kΩ       | 3.999           | 500 nA       | 0.15% + 2                       | 0.15% + 2              |
|        | 40.00 MΩ           | 10 kΩ      | 39.99           | 50 nA        | 1.5% + 2                        | 1.5% + 2               |
|        | 300.0 MΩ           | 100 kΩ     | 299.9           | 10 nA        | 5.0% + 2                        | 5.0% + 2               |

1. To reduce noise interference that may be induced by the test leads, we recommend using a shielded test cable for measuring resistances above 100 kΩ.
2. Relative (REL) operation is used.

## Diode test/continuity

### U3401A 4.5-digit DMM

| Range    | Resolution | Maximum reading | Accuracy (1 year; 23 °C ± 5 °C) |
|----------|------------|-----------------|---------------------------------|
| 2.3000 V | 100 µV     | 2.3000 V        | 0.05% + 5                       |

### U3402A 5.5-digit DMM

| Rate   | Resolution | Maximum reading | Accuracy (1 year; 23 °C ± 5 °C) |
|--------|------------|-----------------|---------------------------------|
| Slow   | 1.19999 V  | 10.0000 µV      | 0.012% + 5                      |
| Medium | 2.4999 V   | 100.00 µV       | 0.012% + 5                      |
| Fast   | 2.499 V    | 1.000 mV        | 0.012% + 2                      |

## Frequency

Frequency resolution, full-scale reading and accuracy [ $\pm$  (% of reading + count)]

### U3401A 4.5-digit DMM

| Range      | Measurement range | Resolution | Maximum reading | Accuracy (1 year; 23 °C ± 5 °C) |
|------------|-------------------|------------|-----------------|---------------------------------|
| 500.00 Hz  | 5 Hz to 500 Hz    | 0.01 Hz    | 510.00          | 0.01% + 5                       |
| 5.0000 kHz | 500 Hz to 5 kHz   | 0.1 Hz     | 5.1000          | 0.01% + 3                       |
| 50.000 kHz | 5 kHz to 50 kHz   | 1 Hz       | 51.000          | 0.01% + 3                       |
| 500.00 kHz | 50 kHz to 500 kHz | 10 Hz      | 999.99          | 0.01% + 3                       |

| Range  | Input sensitivity for voltage measurement (sine-wave) |                    |
|--------|---|--------------------|
|        | 5 Hz to 100 kHz                                       | 100 kHz to 500 kHz |
| 500 mV | 35 mV RMS   | 200 mV RMS         |
| 5 V    | 0.25 V RMS  | 0.5 V RMS          |
| 50 V   | 2.5 V RMS   | 5 V RMS            |
| 500 V  | 25 V RMS  | Not specified      |
| 750 V  | 50 V RMS  | Not specified      |

### U3402A 5.5-digit DMM

| Range       | Measurement range | Resolution | Maximum reading | Accuracy (1 year; 23 °C ± 5 °C) <sup>1</sup> | Input sensitivity (sine wave) |
|-------------|-------------------|------------|-----------------|--|-------------------------------|
| 1200.00 Hz  | 5 Hz to 1200 Hz   | 10 mHz     | 1199.99         | 0.005% + 3                                   | 40 mV RMS                     |
| 12.0000 kHz | 10 Hz to 12 kHz   | 100 mHz    | 11.9999         | 0.005% + 2                                   | 40 mV RMS                     |
| 120.000 kHz | 100 Hz to 120 kHz | 1 Hz       | 119.999         | 0.005% + 2                                   | 40 mV RMS                     |
| 1.0000 MHz  | 1 kHz to 1 MHz    | 10 Hz      | 1.1999          | 0.005% + 2                                   | 0.5 V RMS                     |

1. Specified accuracy at input >5% of full scale.

## Decibel (dB) calculation

Range and accuracy ( $\pm$  dB)

### U3401A 4.5-digit DMM

| Voltage range <sup>1,2</sup> | Input voltage   | dBm <sup>3</sup> range at 600 W ref | Accuracy (1 year; 23 °C $\pm$ 5 °C) |                  |                   |
|------------------------------|-----------------|-------------------------------------|-------------------------------------|------------------|-------------------|
|                              |                 |                                     | 30 Hz to 50 Hz                      | 50 Hz to 10 kHz  | 10 kHz to 100 kHz |
| 500.00 mV                    | 20 mV to 500 mV | -29.82 to -3.80                     | 0.3                                 | 0.3              | 0.7               |
| 5.0000 V                     | 5000 mV to 5 V  | -3.80 to 16.20                      | 0.2                                 | 0.2              | 0.5               |
| 50.000 V                     | 5 V to 50 V     | 16.20 to 36.20                      | 0.2                                 | 0.2              | 0.5               |
| 500.00 V                     | 50 V to 500 V   | 36.20 to 56.20                      | 0.2 <sup>4</sup>                    | 0.2              | 0.5 <sup>4</sup>  |
| 1000.0 VDC                   | 500 V to 1000 V | 56.20 to 62.22                      | Not specified                       | 0.2 <sup>5</sup> | Not specified     |
| 750.0 VAC                    | 500 V to 750 V  | 56.20 to 59.72                      | Not specified                       | 0.2 <sup>5</sup> | Not specified     |

1. Auto ranging is used when dBm operation is selected.
2. In VDC 1000 V range, 1200 V is readable. In VAC 750 V range, 1000 V is readable.
3. Reading is displayed in dB when relative (REL) operation is used.
4. Input voltage <200 V RMS.
5. For input voltage within the frequency range of 50 Hz to 1 kHz.

### U3402A 5.5-digit DMM

| Rate   | Voltage range <sup>1,2</sup> | Input voltage   | dBm <sup>3</sup> range at 600 W ref | Accuracy (1 year; 23 °C $\pm$ 5 °C) |                  |                   |
|--------|------------------------------|-----------------|-------------------------------------|-------------------------------------|------------------|-------------------|
|        |                              |                 |                                     | 20 Hz to 45 Hz                      | 45 Hz to 10 kHz  | 10 kHz to 100 kHz |
| Slow   | 120.000 mV                   | 6 mV to 120 mV  | -42.20 to -16.20                    | 1.0                                 | 0.2              | 1.0               |
|        | 1.20000 V                    | 120 mV to 1.2 V | -16.20 to 3.80                      | 0.8                                 | 0.1              | 0.8               |
|        | 12.0000 V                    | 1.2 V to 12 V   | 3.80 to 23.80                       | 0.8                                 | 0.1              | 0.8               |
|        | 120.000 V                    | 12 V to 120 V   | 23.80 to 43.80                      | 0.8                                 | 0.1              | 0.8               |
|        | 1000.00 VDC                  | 120 V to 1000 V | 43.80 to 62.22                      | Not specified                       | 1.0 <sup>4</sup> | Not specified     |
|        | 750.00 V                     | 120 V to 750 V  | 43.80 to 59.72                      | Not specified                       | 1.0 <sup>4</sup> | Not specified     |
| Medium | 400.00 mV                    | 20 mV to 400 mV | -31.76 to -5.74                     | 1.0                                 | 0.2              | 1.0               |
|        | 4.0000 V                     | 400 mV to 4 V   | -5.74 to 14.26                      | 0.8                                 | 0.1              | 0.8               |
|        | 40.000 V                     | 4 V to 40 V     | 14.26 to 34.26                      | 0.8                                 | 0.1              | 0.8               |
|        | 400.00 V                     | 40 V to 400 V   | 34.26 to 54.26                      | 0.8                                 | 0.1              | 0.8               |
|        | 1000.0 VDC                   | 400 V to 1000 V | 54.26 to 62.22                      | Not specified                       | 1.0 <sup>4</sup> | Not specified     |
|        | 750.0 V                      | 400 V to 750 V  | 54.26 to 59.72                      | Not specified                       | 1.0 <sup>4</sup> | Not specified     |
| Fast   | 400.0 mV                     | 20 mV to 400 mV | -31.76 to -5.74                     | 1.0                                 | 0.2              | 1.0               |
|        | 4.000 V                      | 400 mV to 4 V   | -5.74 to 14.26                      | 0.8                                 | 0.1              | 0.8               |
|        | 40.00 V                      | 4 V to 40 V     | 14.26 to 34.26                      | 0.8                                 | 0.1              | 0.8               |
|        | 400.0 V                      | 40 V to 400 V   | 34.26 to 54.26                      | 0.8                                 | 0.1              | 0.8               |
|        | 1000 VDC                     | 400 V to 1000 V | 54.26 to 62.22                      | Not specified                       | 1.0 <sup>4</sup> | Not specified     |
|        | 750 V                        | 400 V to 750 V  | 54.26 to 59.72                      | Not specified                       | 1.0 <sup>4</sup> | Not specified     |

1. Auto ranging is used when dBm operation is selected.
2. In VAC 750 V range, 5% over-range is readable.
3. Reading is displayed in dB when relative (REL) operation is used.
4. For input voltage within the frequency range of 45 Hz to 1 kHz.

## Supplemental Specifications

### Full-scale display counts

| Model  | Reading rate | Display counts |
|--------|--------------|----------------|
| U3401A | N/A          | 51,000         |
| U3402A | Slow         | 120,000        |
|        | Medium       | 40,000         |
|        | Fast         | 4,000          |

### Supplemental measurement specifications

| Measurement |   | Specification  |
|-------------|---|--|
| DC voltage  | Measurement method                                  | Sigma Delta A-to-D converter   |
|             | Input resistance                                    | 10 M $\Omega$ $\pm$ 2% range (typical)   |
|             | Maximum input voltage                               | 1000 VDC or PEAK AC on all ranges  |
|             | Input protection                                    | 1000 V on all ranges   |
|             | Response time                                       | Approximately 1.0 second when the displayed reading reaches 99.9% DC value of the tested input signal at the same range  |
| DC current  | Shunt resistance                                    | U3401A<br>– 0.01 $\Omega$ to 100 $\Omega$ for 500 $\mu$ A to 10 A ranges<br>U3402A<br>– 0.1 $\Omega$ to 10 $\Omega$ for 12 mA to 1.2 A ranges<br>– 0.01 $\Omega$ for 12 A range  |
|             | Maximum input and overload protection (U3402A only) | mA input terminal: 1200 mADC or AC RMS. Protected with 1.25 A/500 V, IEC-127 sheet, FB fuse<br>12 A input terminal: 10 ADC or AC RMS continuous; or 12 ADC or AC RMS for 30 seconds maximum. Protected with 15 A/600 V, breaking capacity 10,000 A FB fuse |
|             | Response time                                       | Approximately 1.0 second when the displayed reading reaches 99.9% DC value of the tested input signal at the same range  |
|             |   |  |
| AC voltage  | Measurement method                                  | AC-coupled true RMS: measures the AC component with up to 400 VDC bias on any range  |
|             | Crest factor  | Maximum 3:0 at full scale  |
|             | Input impedance                                     | U3401A: 1 M $\Omega$ in parallel with <100 pF<br>U3402A: 1 M $\Omega$ $\pm$ 2% in parallel with <120 pF  |
|             | Maximum input voltage                               | U3401A: 1000 V RMS/1400 V PEAK<br>U3402A: 750 V RMS/1200 V PEAK<br>2x10 <sup>7</sup> V-Hz product on any range, normal mode input<br>1x10 <sup>6</sup> V-Hz product on any range, common mode input  |
|             | Overload ranging                                    | Selects higher range if peak input overload is detected during auto range. Overload is reported in manual ranging.   |
|             | Input protection                                    | U3401A: 1000 V RMS on all ranges<br>U3402A: 750 V RMS on all ranges  |
|             | Response time                                       | Approximately 1.5 seconds when the displayed reading reaches 99.9% AC RMS value of the tested input signal at the same range.  |
|             |   |  |

## Supplemental measurement specifications (continued)

| Measurement      | Specification         |  |
|------------------|-----------------------|--|
| AC+DC voltage    | Measurement method    | AC+DC coupled true RMS: measures the AC component with up to 400 VDC bias on any range   |
|                  | Crest factor          | Maximum 3:0 at full scale  |
|                  | Input impedance       | U3401A: 1 M $\Omega$ in parallel with <100 pF<br>U3402A: 1 M $\Omega$ $\pm$ 2% in parallel with <120 pF  |
|                  | Maximum input voltage | U3401A: 1000 V RMS/1400 V PEAK<br>U3402A: 750 V RMS/1100 V PEAK<br>2 x 10 <sup>7</sup> V-Hz product on any range, normal mode input<br>1 x 10 <sup>6</sup> V-Hz product on any range, common mode input  |
|                  | Overload ranging      | Selects higher range if peak input overload is detected during auto range. Overload is reported in manual ranging  |
|                  | Input protection      | U3401A: 1000 V RMS on all ranges<br>U3402A: 750 V RMS on all ranges  |
|                  | Response time         | Approximately 1.5 seconds (2.5 seconds for U3402A) when the displayed reading reaches 99.9% AC RMS value of the tested input signal at the same range  |
|                  | AC current            | Measurement method   |
| Crest factor     |                       | Maximum 3:0 at full scale  |
| Shunt resistance |                       | U3401A<br>– 0.01 $\Omega$ to 100 $\Omega$ for 500 $\mu$ A to 10 A ranges<br>U3402A<br>– 0.1 $\Omega$ to 10 $\Omega$ for 10 mA to 1.2 A ranges<br>– 0.01 $\Omega$ for 12 A range  |
| Input protection |                       | U3401A<br>Front panel fuse 630 mA, 500 V; internal 25 A, 440 V<br>U3402A<br>mA input terminal: 1200 mADC or AC RMS. Protected with 1.25 A/500 V, IEC-127 sheet, FH fuse<br>12 A input terminal: 10 ADC or AC RMS continuous; or 12 ADC or AC RMS for 30 seconds maximum. Protected with 15 A/600 V, breaking capacity 10,000 A FH fuse |
| Response time    |                       | Approximately 1.5 seconds when the displayed reading reaches 99.9% AC RMS value of the tested input signal at the same range   |
| AC+DC current    | Measurement method    | AC+DC coupled to the fuse and current shunt, AC+DC coupled true rms measurement (measures the AC component only)   |
|                  | Crest factor          | Maximum 3:0 at full scale  |
|                  | Measurement range     | Vdc and Vac are automatically set at the same range  |
|                  | Response time         | Approximately 1.5 seconds when the displayed reading reaches 99.9% AC RMS value of the tested input signal at the same range   |
| Resistance       | Measurement method    | U3401A: 2-wire ohms<br>U3402A: 2-wire ohms or 4-wire ohms  |
|                  | Open-circuit voltage  | U3401A: Limited to <+6 VDC<br>U3402A: Limited to <+5 VDC   |
|                  | Zeroing error         | 0.05 $\Omega$ or less (excluding test lead resistance) in each range when Relative operation is used   |

## Supplemental measurement specifications (continued)

| Measurement                                |  | Specification   |
|--|--|---|
| Resistance                                 | Input protection   | 500 V   |
|  | Response time  | U3401A<br>– Approximately 1.5 seconds for 5 MΩ and ranges below 5 MΩ<br>U3402A<br>– Approximately 1.5 seconds for 12 MΩ and ranges below 12 MΩ<br>– Approximately 5 seconds for 40 MΩ<br>– Approximately 10 seconds for 120 MΩ<br>– Approximately 23 seconds for 300 MΩ |
| Diode/continuity                           | Measurement method   | U3401A: 0.5 mA ± 0.2% constant current source, open circuit voltage limited to < 6 V<br>U3402A: 0.5 mA ± 0.2% constant current source, open circuit voltage limited to < 5 V  |
|  | Test current   | Approximately 0.5 mADC  |
|  | Open-circuit voltage   | U3401A: Limited to <+9 VDC<br>U3402A: Limited to <+9 VDC  |
|  | Continuity threshold   | 10 Ω fixed  |
|  | Continuity level   | Approximately <+50 mVDC   |
|  | Audible tone   | Continuous beep for continuity and single tone for normal forward-biased diode or semiconductor junction  |
|  | Input protection   | 500 V   |
| Resistance/<br>continuity<br>(U3402A only) | Measurement method   | 2-wire ohms   |
|  | Test current   | Approximately 0.5 mADC  |
|  | Open-circuit voltage   | Limited to <+5 VDC  |
|  | Audible tone   | Continuous beep for continuity and single tone for normal forward-biased diode or semiconductor junction  |
|  | Zeroing error  | 0.05 Ω or less (excluding test lead resistances) in each range when relative operation is used  |
|  | Input protection   | 500 V   |
| Frequency                                  | Measurement method   | Reciprocal counting technique. AC coupled input using AC voltage function   |
|  | Crest factor   | Maximum 3:0 at full scale   |
|  | Signal level   | 10% of range to full-scale input on all ranges; auto or manual range selection  |
|  | Gate time  | 0.1 second or 1 period of the input signal, whichever is longer   |
|  | Input impedance  | U3401A: 1 MΩ in parallel with <100 pF<br>U3402A: 1 MΩ ± 2% in parallel with <120 pF   |
|  | Maximum input voltage  | U3401A: 1000 V RMS/1400 V PEAK<br>U3402A: 750 V RMS/1100 V PEAK<br>2x10 <sup>7</sup> V-Hz product on any range, normal mode input<br>1x10 <sup>6</sup> V-Hz product on any range, common mode input   |
|  | Input protection   | 750 V RMS on all ranges   |
|  | Response time  | Approximately 1.5 seconds when the displayed reading reaches 99.9% of frequency value   |
| Noise rejection                            | Common mode rejection ratio (CMRR) for 1 kΩ unbalanced LO lead | 50/60 Hz ± 0.1%: DC >90 dB  |
|  | Normal mode rejection ratio (NMRR)                             | 50/60 Hz ± 0.1%: >50 dB   |

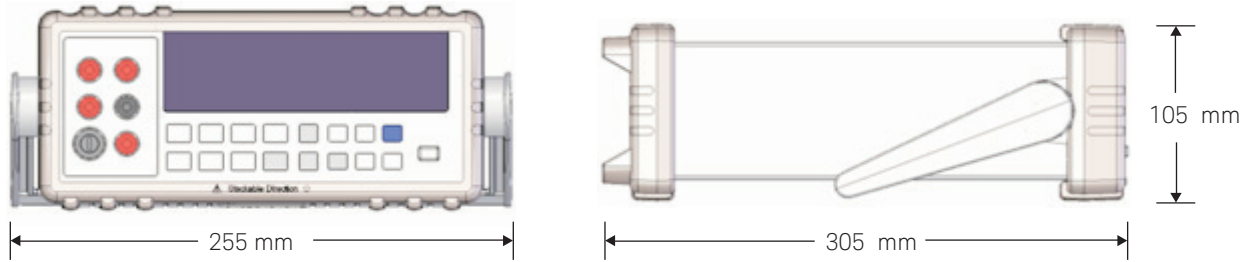


## Supplemental measurement specifications (continued)

| Measurement   |                                  | Specification   |
|---------------|----------------------------------|---|
| dBm operation | 0 dBm                            | 1 mW at 600 $\Omega$ reference impedance  |
|               | Resolution                       | U3401A<br>0.01 dB for all ranges<br>U3402A<br>Slow: 0.01 dB for all ranges<br>Medium: 0.01 dB for all ranges<br>Fast: 0.1 dB for all ranges   |
|               | Reference impedance <sup>1</sup> | 2 $\Omega^2$ , 4 $\Omega^2$ , 8 $\Omega^2$ , 16 $\Omega^2$ , 50 $\Omega$ , 75 $\Omega$ , 93 $\Omega$ , 110 $\Omega$ , 124 $\Omega$ , 125 $\Omega$ , 135 $\Omega$ , 150 $\Omega$ , 250 $\Omega$ , 300 $\Omega$ , 500 $\Omega$ , 600 $\Omega$ , 800 $\Omega$ , 900 $\Omega$ , 1000 $\Omega$ , 1200 $\Omega$ , 8000 $\Omega$ |
|               | Math operation                   | U3401A: dBm, Relative, Min/Max, Compare, Hold, Percentage<br>U3402A: dBm, Relative, Min/Max, Compare, Hold  |
|               | I/O interface                    | RS-232 (for calibration use only)   |

1. Reference impedance is displayed on the secondary display.
2. Reading is displayed in watts (audio power).

## General Characteristics



### Power supply

- 100 V/120 V/220 V/240 V ± 10%
- AC line frequency 50 Hz to 60 Hz

### Power consumption

16 VA maximum

### Input power option

Manual-ranging (100 VAC to 240 VAC ± 10%)

### Fuse

#### U3401A

Terminal: 25 A, 440 V FB fuse; 0.63 A, 500 V FB fuse

Power line: 0.25 A, 250 V SB fuse, or 0.125 A, 250 V SB fuse

#### U3402A

Terminal: 15 A, 600 V FB fuse; 1.25 A, 500 V FB fuse

Power line: 0.25 A, 250 V SB fuse, or 0.125 A, 250 V SB fuse

### Display

Highly visible vacuum fluorescent display (VFD)

### Operating environment

- Operating temperature from 0 °C to +50 °C
- Relative humidity up to 80% at 28 °C RH (non-condensing)
- Altitude up to 2000 meters
- Pollution degree 2
- For indoor use only

### Storage compliance

- -20 °C to 60 °C
- Relative humidity at 5% to 90% RH (non-condensing)

### Safety compliance

- IEC 61010-1:2001/EN61010-1:2001 (2nd Edition)
- Canada: CAN/CSA-C22.2 No. 61010-1-04
- USA: ANSI/UL 61010-1:2004

### EMC compliance

- IEC 61326-1:2005/EN61326-1:2006
- Canada: ICES/NMB-001:2004
- Australia/New Zealand: AS/NZS CISPR11:2004

### Shock and vibration

Tested to IEC/EN 60068-2

### I/O connector

Output connectors

### I/O interface

RS-232 (for calibration use only)

### Dimensions (W × H × D)

255 mm × 105 mm × 305 mm (with bumpers)  
215 mm × 87 mm × 282 mm (without bumpers)

### Weight

3.44 kg (with bumpers)

### Warranty

Three years for U3401A/U3402A  
Three months for standard shipped accessories

### Calibration cycle

One year

### Warm-up time

At least 30 minutes

## Ordering Information

Each U3400 Series includes these standard shipped accessories:

- Quick Start Guide
- Product reference CD
- Certificate of calibration
- 34138A Test lead kit
- AC Power cord

## Accessories



34138A Test lead kit



U1161A Extended test lead kit



34330A Current Shunt (30 A)



34133A Precision electronic testleads



11059A Kelvin probe set



U3400A-1CM Rack mount kit



[www.axistandard.org](http://www.axistandard.org)

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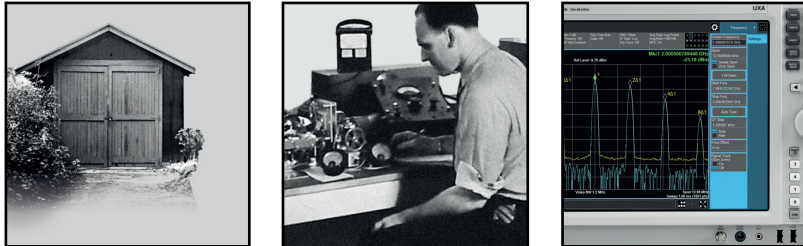
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