

# Manual Supplement

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This supplement contains information necessary to ensure the accuracy of the above manual. This manual is distributed as an electronic manual on the following CD-ROM:

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## Change #1, 48297, 49879, 49900

On page 68, replace the ***AC Voltage Specifications*** table with the one shown below.

On page 74, replace the ***Frequency Counter Specifications*** table with the one shown below.

On page 77, replace the ***Input Characteristics*** table with the one shown below.

**AC Voltage Specifications**

| Function                          | Range                        | Resolution | Accuracy    |             |                                    |              |                           |
|-----------------------------------|------------------------------|------------|-------------|-------------|------------------------------------|--------------|---------------------------|
|                                   |                              |            | 20 to 45 Hz | 45 to 65 Hz | 65 Hz to 10 kHz                    | 10 to 20 kHz | 20 to 100 kHz             |
| AC mV                             | 50 mV <sup>[1]</sup>         | 0.001 mV   | 1.5 % + 60  | 0.3 % + 25  | 0.4 % + 25                         | 0.7 % + 40   | 3.5 % + 40 <sup>[5]</sup> |
|                                   | 500 mV                       | 0.01 mV    | 1.5 % + 60  | 0.3 % + 25  | 0.4 % + 25                         | 0.7 % + 40   | 3.5 % + 40                |
| AC V                              | 5 V <sup>[1]</sup>           | 0.0001 V   | 1.5 % + 60  | 0.3 % + 25  | 0.6 % + 25                         | 1.5 % + 40   | 3.5 % + 40 <sup>[5]</sup> |
|                                   | 50 V <sup>[1]</sup>          | 0.001 V    | 1.5 % + 60  | 0.3 % + 25  | 0.4 % + 25                         | 0.7 % + 40   | 3.5 % + 40                |
|                                   | 500 V <sup>[1]</sup>         | 0.01 V     | 1.5 % + 60  | 0.3 % + 25  | 0.4 % + 25                         | Not Spec'd   | Not Spec'd                |
|                                   | 1000 V                       | 0.1 V      | 1.5 % + 60  | 0.3 % + 25  | 0.4 % + 25                         | Not Spec'd   | Not Spec'd                |
| dBV                               | -70 to -62 dB <sup>[3]</sup> | 0.01 dB    | 3 dB        | 1.5 dB      | 2 dB                               | 2 dB         | 3 dB                      |
|                                   | -62 to -52 dB <sup>[3]</sup> | 0.01 dB    | 1.5 dB      | 1.0 dB      | 1 dB                               | 1 dB         | 2 dB                      |
|                                   | -52 to -6 dB <sup>[3]</sup>  | 0.01 dB    | 0.2 dB      | 0.1 dB      | 0.1 dB                             | 0.2 dB       | 0.8 dB                    |
|                                   | -6 to +34 dB <sup>[3]</sup>  | 0.01 dB    | 0.2 dB      | 0.1 dB      | 0.1 dB                             | 0.2 dB       | 0.8 dB                    |
|                                   | 34 to 60 dB <sup>[3]</sup>   | 0.01 dB    | 0.2 dB      | 0.1 dB      | 0.1 dB                             | Not Spec'd   | Not Spec'd                |
| Low pass filter <sup>[4]</sup>    |                              |            | 2 % + 80    | 2 % + 40    | 2 % +10<br>-6 % -60 <sup>[2]</sup> | Not Spec'd   | Not Spec'd                |
| $\frac{L_{oz}}{V}$ <sup>[4]</sup> | 1000 V                       | 0.1 V      | 2 % + 80    | 2 % + 40    | 2 % + 40 <sup>[6]</sup>            | Not Spec'd   | Not Spec'd                |

[1] Below 5 % of range, add 20 counts.  
 [2] Specification increases linearly from -2 % at 200 Hz to -6 % at 440 Hz. Range is limited to 440 Hz.  
 [3] dBm (600 Ω) is specified by adding +2.2 dB to the dBV range values.  
 [4] 289 only.  
 [5] Add 2.5 % above 65 kHz.  
 [6] Range is limited to 440 Hz.  
 See Detailed Specifications introduction for additional information.

**Frequency Counter Specifications**

| Function  | Range             | Resolution | Accuracy              |
|---|-------------------|------------|-----------------------|
| Frequency<br>(0.5 Hz to 999.99 kHz, pulse width >0.5 $\mu$ s)   | 99.999 Hz         | 0.001 Hz   | 0.02 % + 5            |
|   | 999.99 Hz         | 0.01 Hz    | 0.005 % + 5           |
|   | 9.9999 kHz        | 0.0001 kHz | 0.005 % + 5           |
|   | 99.999 kHz        | 0.001 kHz  | 0.005 % + 5           |
|   | 999.99 kHz        | 0.01 kHz   | 0.005 % + 5           |
| Duty Cycle <sup>[1][2]</sup>  | 1.00 % to 99.00 % | 0.01 %     | 0.2 % per kHz + 0.1 % |
| Pulse Width <sup>[1][2]</sup>   | 0.1000 ms         | 0.0001 ms  | 0.002 ms + 3 counts   |
|   | 1.000 ms          | 0.001 ms   | 0.002 ms + 3 counts   |
|   | 10.00 ms          | 0.01 ms    | 0.002 ms + 3 counts   |
|   | 1999.9 ms         | 0.1 ms     | 0.002 ms + 3 counts   |
| [1] For rise times <1 $\mu$ s. Signals centered around trigger levels.                                      |                   |            |                       |
| [2] 0.5 to 200 kHz, pulse width >2 $\mu$ s. Pulse width range is determined by the frequency of the signal. |                   |            |                       |

**Input Characteristics**

| Function   | Overload Protection <sup>[1]</sup> | Input Impedance                     | Common Mode Rejection Ratio (1 k $\Omega$ unbalance) | Normal Mode Rejection        |                               |              |               |                |              |               |                |
|--|------------------------------------|-------------------------------------|--|------------------------------|-------------------------------|--------------|---------------|----------------|--------------|---------------|----------------|
| $\bar{V}$  | 1000 V                             | 10 M $\Omega$ <100 pF               | >120 dB at dc, 50 Hz or 60 Hz                        | >60 dB at 50 Hz or 60 Hz     |                               |              |               |                |              |               |                |
| $\bar{mV}$   | 1000 V <sup>[2]</sup>              | 10 M $\Omega$ <100 pF               | >120 dB at dc, 50 Hz or 60 Hz                        | >60 dB at 50 Hz or 60 Hz     |                               |              |               |                |              |               |                |
| $\tilde{V}$  | 1000 V                             | 10 M $\Omega$ <100 pF (ac-coupled)  | >60 dB, dc to 60 Hz                                  |                              |                               |              |               |                |              |               |                |
| $\text{LoZ}$<br>$\tilde{V}$  | 1000 V                             | 3.2 k $\Omega$ <100 pF (ac-coupled) | Not specified  | Not specified                |                               |              |               |                |              |               |                |
| Function   | Overload Protection <sup>[1]</sup> | Open Circuit Test Voltage           | Full Scale Voltage                                   |                              | Typical Short Circuit Current |              |               |                |              |               |                |
|  |                                    |                                     | To 500 k $\Omega$                                    | $\geq 5$ M $\Omega$ or 50 nS | 500 $\Omega$                  | 5 k $\Omega$ | 50 k $\Omega$ | 500 k $\Omega$ | 5 M $\Omega$ | 50 M $\Omega$ | 500 M $\Omega$ |
| $\Omega$   | 1000 V <sup>[2]</sup>              | 5 V dc                              | 550 mV   | <5 V                         | 1 mA                          | 100 $\mu$ A  | 10 $\mu$ A    | 1 $\mu$ A      | 0.3 $\mu$ A  | 0.3 $\mu$ A   | 0.3 $\mu$ A    |
| 50 $\Omega$  | 1000 V <sup>[2]</sup>              | 20 V decreasing to 2.5 V            | 500 mV   |                              | 10 mA                         |              |               |                |              |               |                |
| $\rightarrow$  | 1000 V <sup>[2]</sup>              | 5 V dc                              | 3.1 V dc   |                              | 1 mA                          |              |               |                |              |               |                |
| <p>[1] Input is limited to the product of a V rms sinewave times frequency of <math>2 \times 10^7</math> V-Hz.</p> <p>[2] For circuits &lt;0.5 A short circuit. 660V for high energy circuits.</p> |                                    |                                     |  |                              |                               |              |               |                |              |               |                |