

**MODEL 7620**

**WIDE BAND TRANSCONDUCTANCE AMPLIFIER**

*"SATISFYING THE NEED FOR AC CURRENT MEASUREMENT OF POWER HARMONICS IN POWER DISTRIBUTION SYSTEMS"*



**G**uildline Model 7620 is a very wide band transconductance amplifier. By connecting the output from a stable voltage source to the 7620, it is capable of producing outputs up to 20 amps over a specified frequency range of DC to 100 kHz, and a usable frequency range extending to 1 MHz.

The 7620 provides the capability of calibrating any device requiring a known stable source of current up to 20 amps, such as current shunts and current meters. The transconductance amplifier has been designed to satisfy a growing need for AC current measurement of power harmonics in power distribution systems.

The output of the 7620 uses a unique patented multi cell array, developed at The National Institute of Standards and Technology (NIST). This output array is extremely stable, with a zero drift of less than 50 ppm/hour at 20 amps at 30 kHz.

The 7620 offers an impressive 10 volts output compliance voltage at D.C. and low frequencies, reducing to 5 volts at 100 kHz. A front panel display indicates the compliance voltage existing at the output at all times. Three compliance LEDs indicate the operating output current and frequency band in use.

***The 7620 is intended to calibrate devices requiring a known stable source of current up to 20 amps.***

**7620 FEATURES**

- > Stability <10 ppm/hour @ 30 kHz
- > Ranges, (6) 200 $\mu$ A to 20A
- > Frequency DC to 1 MHz
- > Compliance 10 volts
- > Guarded output
- > IEEE 488 Interface
- > Over voltage & over current protection

Input errors have been eliminated by providing the unit with a four terminal input. This enables the 7620 to be easily connected to most accurate 4-wire sensing voltage sources.

One of the main sources of error in making current measurements is the leakage between the HI and LO terminals of the current source. To alleviate this condition, the 7620 has a driven output guard which provides a buffered signal whose potential follows that of the output HI.

The 7620 is fully programmable over the IEEE 488 General Purpose Interface Bus. The Bus address is selectable from the rear panel, and all front panel controls can be duplicated over the Bus with the exception of power on/off.

A sophisticated overload detection system is implemented on the unit to control and indicate when the 7620 is operating within its specified limits. It is also possible to operate the unit outside the specification but within its safe limits by disabling part of the protection system. In this case, information is still provided to the front panel and over the Bus as to the status of the instrument.

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## 7620 SPECIFICATIONS

### Noise and Distortion

| Range | Frequency ≤ 100 Hz       |                     | Frequency 100Hz – 1kHz   |                     | Frequency 1kHz – 5kHz    |                     | Frequency 5kHz – 10kHz   |                     | Frequency 10kHz – 20kHz  |                     | Frequency 20kHz – 100kHz |                     |
|-------|--------------------------|---------------------|--------------------------|---------------------|--------------------------|---------------------|--------------------------|---------------------|--------------------------|---------------------|--------------------------|---------------------|
|       | Noise (dB of full scale) | Distortion (% rdg.) | Noise (dB of full scale) | Distortion (% rdg.) | Noise (dB of full scale) | Distortion (% rdg.) | Noise (dB of full scale) | Distortion (% rdg.) | Noise (dB of full scale) | Distortion (% rdg.) | Noise (dB of full scale) | Distortion (% rdg.) |
| 200μA | -50                      | 0.15                | -50                      | 0.3                 | -50                      | 0.3                 | -25                      | 5.0                 |                          |                     |                          |                     |
| 2mA   | -60                      | 0.06                | -60                      | 0.06                | -60                      | 0.06                | -60                      | 0.1                 | -50                      | 0.3                 | -30                      | 4.0                 |
| 20mA  | -70                      | 0.03                | -70                      | 0.03                | -60                      | 0.1                 | -50                      | 0.3                 | -40                      | 1.0                 | -30                      | 2.0                 |
| 200mA | -75                      | 0.02                | -75                      | 0.02                | -75                      | 0.02                | -70                      | 0.03                | -60                      | 0.1                 | -50                      | 0.3                 |
| 2A    | -70                      | 0.03                | -70                      | 0.03                | -60                      | 0.08                | -50                      | 0.3                 | -40                      | 1.0                 | -30                      | 3.0                 |
| 20A   | -60                      | 0.15                | -60                      | 0.1                 | -50                      | 0.2                 | -50                      | 0.3                 | -50                      | 0.3                 | -40                      | 0.7                 |

### Gain Stability

| Range | Temp. Coeff. (ppm/°C) | Drift            |                   |
|-------|-----------------------|------------------|-------------------|
|       |                       | @ 30kHz (ppm/hr) | @ 100kHz (ppm/hr) |
| 200μA | < 10                  | < 20             |                   |
| 2mA   | < 10                  | < 10             | < 100             |
| 20mA  | < 15                  | < 10             | < 40              |
| 200mA | < 25                  | < 10             | < 40              |
| 2A    | < 30                  | < 10             | < 40              |
| 20A   | < 50                  | < 50             | < 50              |

### Phase Input to Output

| Range | Output Delay 5kHz – 10kHz (ns) | Output Jitter 10kHz – 20kHz (ns) |
|-------|--------------------------------|----------------------------------|
| 200μA | 2000                           |                                  |
| 2mA   | 300                            | 1                                |
| 20mA  | 300                            | 1                                |
| 200mA | 300                            | 1                                |
| 2A    | 300                            | 1                                |
| 20A   | 500                            | 5                                |

### Accuracy (24 hrs) @ 23 °C ± 2 °C 1V input ≤ 5 V output compliance

| Range | ± (% of reading + % of range) |                     |                       |                        |                         |                          |
|-------|-------------------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
|       | Frequency DC                  | Frequency DC – 1kHz | Frequency 1kHz – 5kHz | Frequency 5kHz – 10kHz | Frequency 10kHz – 20kHz | Frequency 20kHz – 100kHz |
| 200μA | 0.02 + 0.01                   | 0.15 + 0.02         | 0.15 + 0.05           | 10.0 + 0.1             |                         |                          |
| 2mA   | 0.015 + 0.01                  | 0.08 + 0.01         | 0.1 + 0.05            | 0.2 + 0.1              | 1.0 + 0.1               | 10.0 + 0.4               |
| 20mA  | 0.01 + 0.01                   | 0.2 + 0.01          | 0.2 + 0.05            | 0.15 + 0.1             | 0.3 + 0.1               | 1.0 + 0.4                |
| 200mA | 0.01 + 0.01                   | 0.15 + 0.01         | 0.15 + 0.05           | 0.15 + 0.1             | 0.15 + 0.1              | 1.0 + 0.2                |
| 2A    | 0.01 + 0.01                   | 0.15 + 0.01         | 0.15 + 0.05           | 0.15 + 0.1             | 0.15 + 0.1              | 1.0 + 0.2                |
| 20A   | 0.01 + 0.01                   | 0.15 + 0.01         | 0.15 + 0.1            | 0.4 + 0.1              | 1.0 + 0.25              | 4 + 0.5                  |

# 7620 WIDE BAND TRANSCONDUCTANCE AMPLIFIER

Accuracy (1 year) @ 23 °C ± 2 °C 1V input ≤ 5 V output compliance

| Range  | ± (% of reading + % of range) |                     |                       |                        |                         |                          |
|--------|-------------------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
|        | Frequency DC                  | Frequency DC – 1kHz | Frequency 1kHz – 5kHz | Frequency 5kHz – 10kHz | Frequency 10kHz – 20kHz | Frequency 20kHz – 100kHz |
| 200 µA | 0.03 + 0.01                   | 0.15 + 0.02         | 0.15 + 0.05           | 10.0 + 0.1             |                         |                          |
| 2 mA   | 0.025 + 0.01                  | 0.08 + 0.01         | 0.1 + 0.05            | 0.2 + 0.1              | 1.0 + 0.1               | 10.0 + 0.4               |
| 20 mA  | 0.02 + 0.01                   | 0.2 + 0.01          | 0.2 + 0.05            | 0.15 + 0.1             | 0.3 + 0.1               | 1.0 + 0.4                |
| 200 mA | 0.02 + 0.01                   | 0.15 + 0.01         | 0.15 + 0.05           | 0.15 + 0.1             | 0.15 + 0.1              | 1.0 + 0.2                |
| 2 A    | 0.02 + 0.01                   | 0.15 + 0.01         | 0.15 + 0.05           | 0.15 + 0.1             | 0.15 + 0.1              | 1.0 + 0.2                |
| 20 A   | 0.02 + 0.01                   | 0.15 + 0.01         | 0.15 + 0.1            | 0.4 + 0.1              | 1.0 + 0.25              | 4 + 0.5                  |

## Maximum Compliance

|  |  |
|--|--|
| <b>Voltage:</b>                                | 10V at DC, 5V RMS at 100kHz  |
| <b>Peak Output Current (DC):</b>               | 35A  |
| <b>Maximum Continuous Output Current (DC):</b> | 20A  |
| <b>Maximum AC RMS Output Current:</b>          | 20A at 100 kHz   |
| <b>Bandwidth:</b>                              | DC – 100kHz at 20A<br>DC – 300kHz at 10A<br>DC – 1 MHz at 8A   |
| <b>Settling Time:</b>                          | 1s to full specification   |
| <b>Input Voltage:</b>                          | 1V input max. = 1V RMS, 10V input max. = 10V RMS   |
| <b>Offset Current:</b>                         | 0.01% of range   |
| <b>Input Impedance:</b>                        | 100k Ω   |
| <b>Load Compliance:</b>                        | Resistive & Capacitive Loads to full V-1 compliance<br>Inductive Loads to 125µH  |
| <b>Short Term DC Stability:</b>                | ±100 ppm over a 30 minute period, where the absolute value is defined as 2 times the standard deviation of the measurement at full scale, excluding noise, at 10 samples maximum per second. |

## 7620 ORDERING INFORMATION

|        |                                       |
|--------|---------------------------------------|
| 7620   | Wide Band Transconductance Amplifier  |
| TM7620 | Technical Manual (included)           |
|        | Certificate of Calibration (included) |
|        | Report of Calibration (extra charge)  |

## ACCESSORIES:

|       |                       |
|-------|-----------------------|
| 73201 | Cable and Adapter Kit |
|-------|-----------------------|

## GENERAL SPECIFICATIONS

|                                       |                           |                          |
|---------------------------------------|---------------------------|--------------------------|
| <b>Power Supply</b>                   | Voltage                   | 100, 120, 220, 240 ± 10% |
|                                       | Frequency                 | 50/60Hz                  |
|                                       | Consumption               | 600VA                    |
| <b>Environment</b>                    | Operating                 | 18 °C to 28 °C           |
|                                       |                           | < 70% RH non-condensing  |
|                                       | Non Operating             | 28 °C to 40 °C           |
|                                       |                           | < 50% RH non-condensing  |
| <b>Dimensions</b>                     | 178 H x 438 W x 457 D mm  |                          |
|                                       | (7 H x 17.25 W x 18 D in) |                          |
| <b>Weight</b>                         | 20.5 KG (45 lbs)          |                          |
| <b>Rack Mounting Version Standard</b> | 19 in                     |                          |

## GUILDLINE IS DISTRIBUTED BY:

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