# 7810 TRANSCONDUCTANCE AMPLIFIER

Low Uncertainty, 100 Ampere, Wideband AC and DC Transconductance Amplifier


**Guildline Instruments 7810 Wideband Transconductance Amplifier** is the latest innovation for High Current, Wide Bandwidth AC Outputs. The 7810 operates from DC to 100 kHz with very low distortion. By connecting the output from a stable voltage source, the 7810 can produce outputs up to 100 A over a calibrated frequency range of DC to 100 kHz; up to 120 kHz uncalibrated at currents > 5 A; and up to 2 MHz uncalibrated at currents ≤ 5 A.

With a touch sensitive screen, the 7810 provides the capability of calibrating any device requiring a known stable source of AC current up to 100 A, manually or via automation.

**GUILDLINE'S NEW 7810 TRANSCONDUCTANCE AMPLIFIER PROVIDES NEW PATENTED TECHNOLOGY AND INNOVATION - WHILE PROVIDING INDUSTRY LEADING MEASUREMENTS!**

## FEATURES

- Calibrated Frequency Range (DC to 100 kHz)!
- 100 A Output at 120 kHz!
- ≤ 5 A Output up to 2 MHz
- High 8-9 V Voltage Compliance!
- Based on Widely Fielded 7620 and New Patented AC Current Source PCB!
- Unique Touch Screen Interface and Embedded Windows Computer!
- Ethernet / IEEE-488.2 and USB Interfaces!
- SCPI Based Programming!
- Excellent Short Term Stability!
- Distortion Below -60 dB!
- Stable with Inductive Loads!
- Buffered Low Input Impedance!
- High Output Impedance!

The 7810 provides up to 100 A output. This is based on a Guildline designed, and patent protected, AC source. The output of the 7810 is based on a unique patented multi cell current source array developed at Guildline Instruments. This output array is extremely stable, with a zero drift of less than 50 ppm/hour at 100 A at 100 kHz. The 7810 also offers an impressive 8 to 9 V output compliance voltage.

To automate testing and calibration setups, the 7810 Series is controllable via the Ethernet / IEEE-488.2 bus interface, or USB interface. Additionally, full manual operation is achieved via the embedded Windows Based Computer. The 7810 has a touch sensitive screen and color display capable of providing input control, output control, overload indication and temporary storage of data.

Uses for the Amplifier include calibration of alternating current (AC) and direct current (DC) shunts and resistors up to 100 A and 100 kHz; and calibration of AC and DC ranges on analogue and digital multi-meters.

Specifications are quoted at a coverage factor of k=2, equivalent to a confidence level of approximately 95 %.
Distortion measurements are based on full range current.

| Accuracy (12 Months) ± (% of Reading + % of Range) 1 Hour Warm-up | | | |
|---|---|---|---|
| **Selected Range ➲** | **100 A** | **50 A** | **5A** |
| **Output Currents ➲** | **50 A to 100 A** | **5 A to 50 A** | **0.5 A to 5 A** |
| DC | ± (0.02 + 0.015) | ± (0.02 + 0.015) | ± (0.02 + 0.015) |
| 10 Hz – 10 kHz | ± (0.05 + 0.04) | ± (0.05 + 0.04) | ±(0.05 + 0.04) |
| 10 kHz – 30 kHz | ± (0.10 + 0.08) | ± (0.10 + 0.08) | ± (0.10 + 0.08) |
| 30 kHz – 50 kHz | ± (0.15 + 0.12) | ± (0.15 + 0.12) | ± (0.15 + 0.12) |
| 50 kHz – 100 kHz | ± (0.30 + 0.24) | ± (0.30 + 0.24) | ±( 0.30 + 0.24) |

| Accuracy (12 Months) ± (% of Reading + % of Range) 1 Hour Warm-up | | | |
|---|---|---|---|
| **Selected Range ➲** | **500 mA** | **50 mA** | **5 mA** |
| **Output Currents ➲** | **5 mA to 500 mA** | **5 mA to 50 mA** | **0.5 mA to 5 mA** |
| DC | ± (0.02 + 0.015) | ± (0.02 + 0.015) | ± (0.02 + 0.015) |
| 10 Hz – 10 kHz | ± (0.05 + 0.04) | ± (0.05 + 0.04) | ± (0.05 + 0.04) |
| 10 kHz – 30 kHz | ± (0.10 + 0.08) | ± (0.10 + 0.08) | ± (0.10 + 0.08) |
| 30 kHz – 50 kHz | ± (0.15 + 0.12) | ± (0.15 + 0.12) | ± (0.15 + 0.12) |
| 50 kHz – 100 kHz | ± (0.30 + 0.24) | ± (0.30 + 0.24) | ± (0.30 + 0.24) |

| Current Range (Full Scale) | Output Current | Transconductance (Siemens) |
|---|---|---|
| 5 mA | 0.5 mA to 5 mA | 1 m |
| 50 mA | 5 mA to 50 mA | 10 m |
| 500 mA | 5 mA to 500 mA | 100 m |
| 5 A | 0.5 A to 5 A | 1 |
| 50 A | 5 A to 50 A | 10 |
| 100 A | 50 A to 100 A | 100 |

| General Specifications | | | |
|---|---|---|---|
| 10 Minute Stability ▶ | Frequency | ± % of Reading + % of Range | |
| | DC | 0.002 + 0.002 | |
| | 10 Hz to 10 kHz | 0.005 + 0.005 | |
| | 10 kHz to 100 kHz | 0.01 + 0.01 | |
| | > 100 kHz | Unspecified | |
| Harmonic Distortion ▶ | 10 Hz to 10 kHz | -60 dB | |
| | 10 kHz to 40 kHz | -50 dB | |
| | 40 kHz to 100 kHz | -40 dB | |
| | > 100 kHz | Unspecified | |
| Inductive Load Stability ▶ | Free of oscillations with inductive loads up to 1 mH | | |
| Compliance Voltage ▶ | Maximum 9 Vdc or 9 Vrms (± 0.1 V) Up ≤ 5 A<br>Maximum 8 Vdc or 8 Vrms (± 0.1 V) > 5 A to 100 A | | |
| Noise ▶ | ± 0.05 % of current range in a band from DC to 100 kHz | | |
| Power Factor Correction ▶ | Power factor corrected with a nominal power factor rating of 0.98 | | |
| Frequency Uncertainty ▶ | 0.01 % of reading over a range of 10 Hz to 100 kHz<br>Unspecified over a range ≥ 100 kHz | | |
| Output Offset ▶ | Less than ± 3 ppm of full scale for each range | | |
| Input Impedance ▶ | ≤ 200 kΩ Buffered | | |
| Communications ▶ | Ethernet / IEEE 488.2 / USB | SCPI Based Instructions | |
| Output Connectors ▶ | 25 - 100 A (LC) | <25 A (Type N) | |
| Dimensions (H x D x W) All Models ▶ | 18" x 22" x 17.25" | 45.7 cm x 55.9 cm x 43.8 cm | |
| Operating Temperature (Full | 22.8 °C ± 3.3 °C | 73 °F ± 6 °F | |
| Maximum Operating Range (<80 % RH) | +18 °C to +28 °C | +64.4 °F to +82.4 °F | |
| Temperature Storage Range ▶ | -20 °C to +60 °C | -4 °F to +140 °F | |
| Operating Humidity 20 % to 65 % | Storage Humidity | 15 % to 80 % RH | |
| Power ▶ | 110, 115, 120, 220, 240 VAC ± 10 % | 50 Hz or 60 Hz ± 5 % | |

## Unparalleled Support

Guildline Instruments provides an industry leading two-year warranty on every 7810 Wideband Transconductance Amplifier. We know that the 7810 will work for you out of the box!


AC Shunts - Our 7340 and 7350 Series of AC/DC Shunts are available in a variety of ohmic and current values and provide the lowest uncertainties found in any commercial AC/DC Shunt. Housed in a ruggedized EMI case, these models provide a calibrated wide frequency bandwidth of up to 100 kHz and with currents to 100 A for the 7340 Series and 25 A for the 7350 Series. These shunts can operate at frequencies > 100 kHz, but are not calibrated above 100 kHz. Adaptors and cable sets are also available.

## APPLICABLE DOCUMENTS

This Transconductance Amplifier is designed for safety and meets the requirements of the following documents:

International Electro-Technical Commission Standards

IEC 61326 Electromagnetic Compatibility, Electrical Equipment for Measurement & Laboratory Use

IEC 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use PART 1: General Requirements

IEEE Standards

ANSI/IEEE Std. 488.2-1992 Standard Codes, Formats, Protocols and Common Commands for use with ANSI/IEEE Std 488.1-1987

USB-2.0 Universal Serial Bus Specification

| ORDERING INFORMATION | |
|---|---|
| **7810-100** | 100 A Wideband Transconductance Amplifier |
| TM7810 | Technical Manual can be downloaded from www.guildline.com |
| /Rack | Rack Mount Kit (supplied with Unit) |

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