



Description

A high accuracy AC and DC power calibrator suitable for calibrating single-phase watt-meters, power meters, and kW-Hr meters. The 5077 is a practical solution to precision power simulation, providing a simultaneous supply of voltage and current with phase control. The unit is operated via a virtual control software application allowing the user full control via laptop or PC.

The 5077 voltage range is 20 mV to 1050 V, with current from 20 mA to 22 A. Frequency can be set in 0.01 Hz steps from 40 to 400 Hz, and phase in 0.1° steps. Alternatively power factor (PF) can be set in steps of 0.01. The output can be displayed as VA or Watts. The wide current and voltage ranges enable verification of power meters on either the primary side of the CT / VT or directly connected to the meter (secondary side).

The standard maximum AC current output (22 A) can be extended to 100 A by using an optional 100 A current transformer. This extends the maximum power to 0.1 MW/MVA. A single and 50-turn current clamp adaptor is available for clamp sensor and meter calibration up to 1100 A.

PC/Laptop Virtual Control Panel

A simple user interface application that enables the operator to control the 5077. Select functions, set and output values as required.



Features

- Single-phase power simulation
- Simultaneous supply of voltage and current
- Up to 1050 V AC/DC
- Up to 22 A AC/DC
- Up to 22 kVA or 22 kW
- Phase angle $\pm 90^\circ$
- Power factor 0.00 to 1.00
- 40 to 400 Hz in 0.01 Hz steps
- 100 A AC current transformer option
- Single/50-turn current clamp adaptor option
- RS-232, GPIB, and USB interfaces
- Operation via virtual control software

EasyCal Calibration Software

The 5077 can be controlled via Time Electronics EasyCal software to automate the calibration process. This provides increased speed of calibration and consistency of results. Produce traceable calibration certificates and test reports for quality standards with additional uncertainty information for ISO 17025 conformance.





Technical Specifications

Specifications apply to 5077 models that feature both low and high current terminals (year 2020 onwards).

Accuracy specifications are shown as \pm (% of output + floor). Specifications apply at 23 °C \pm 5 °C. All values are relative to calibration standards.

DC Voltage

Range	Accuracy 1 year	Output resistance	Max output current	Resolution
20 to 200 mV	0.01 % + 125 μ V	10 Ω	-	1 μ V
0.2 to 2 V	0.01 % + 250 μ V	< 0.5 Ω	20 mA	1 μ V
2 to 20 V	0.01 % + 500 μ V	< 0.5 Ω	20 mA	10 μ V
20 to 200 V	0.02 % + 30 mV	< 5 Ω	20 mA	100 μ V
200 to 1050 V	0.05 % + 50 mV	< 10 Ω	10 mA	1 mV

DC Current

Range	Accuracy 1 year	Compliance voltage	Resolution
2 to 20 mA	0.015 % + 10 μ A	10 V	1 μ A
20 to 200 mA	0.015 % + 100 μ A	10 V	10 μ A
0.2 to 2 A	0.03 % + 500 μ A	5 V	100 μ A
2 to 22 A	0.05 % + 6 mA	4 V	1 mA

AC Voltage (40.00 Hz to 400.00 Hz, 0.02 % Accuracy)

Range	Accuracy 1 year	Output resistance	Max output current	Resolution
20 to 200 mV	0.03 % + 250 μ V	10 Ω	-	100 μ V
0.2 to 2 V	0.03 % + 500 μ V	< 0.5 Ω	20 mA	100 μ V
2 to 20 V	0.03 % + 2 mV	< 1 Ω	20 mA	1 mV
20 to 200 V	0.06 % + 30 mV	< 5 Ω	20 mA	10 mV
200 to 300 V	0.06 % + 30 mV	< 5 Ω	10 mA	10 mV
300 to 1050 V	0.08 % + 90 mV	< 10 Ω	10 mA	100 mV

AC Current (40.00 Hz to 400.00 Hz 0.02 % accuracy)

Range	Accuracy 1 year	Compliance voltage	Resolution
2 to 20 mA	0.1 % + 20 μ A	10 V	1 μ A
20 to 200 mA	0.1 % + 200 μ A	10 V	10 μ A
0.2 to 2 A	0.1 % + 2 mA	3.5 V	100 μ A
2 to 22 A	0.1 % + 20 mA	3 V	1 mA

Phase Angle

Frequency	Range	Accuracy 1 year	Resolution
40 to 99.99 Hz	-90.0° to 90.0°	\pm 0.3°	0.1°
100 Hz to 400 Hz	-90.0° to 90.0°	\pm 1°	0.1°

Power Factor

Frequency	Range	Resolution
40 to 400 Hz	0.00 to 1.00	0.01

The accuracy of the power is complex and is determined by using a formula, which combines the errors due to Voltage, Current, and Phase.

Power Accuracy (%) = $\sqrt{\text{Voltage Accuracy}^2 + \text{Current Accuracy}^2 + \text{Phase Correction}^2}$. Where Phase Correction (%) = $100 \times (1 - \cos(\text{Phase} + \text{PhaseAcc})) / \cos(\text{Phase})$

General Specifications

Warm up	1 hour to full accuracy.
Settling time	Less than 5 seconds.
Standard interfaces	GPIOB (IEEE-488), RS-232, USB.
Operating temperature	10 to 40 °C.
Storage temperature	-10 °C to 50 °C.
Operating humidity / Altitude	< 80 % non condensing. Altitude: 0 to 3 km. Non operating: 3 to 12 km.
Line power	100 to 230 V AC 50/60 Hz. Power consumption: 60 W typical, 80 W maximum.
Dimensions / Weight	W 440 x H 198 x D 480 mm (17.6 x 7.8 x 32.8 ") / 25 kg (36 lbs).
Supplied with	Virtual control software, user manual, RS-232 cable, USB adaptor/cable.

Ordering Information

5077.....	Power Calibrator	
9790.....	100 Amp AC current transformer	C160.....Traceable calibration certificate (Factory)
9780.....	Single/50-turn current clamp adaptor	C124.....Accredited calibration certificate (ISO 17025)
9735.....	Test lead set	ECFLA.....EasyCal Software (see separate datasheet for options)

Due to continuous development Time Electronics reserves the right to change specifications without prior notice.