

M151

Current Calibrator



HIGHLIGHTS

- AC/DC current 8 mA...120 A, 15-1000 Hz
- Total accuracy 275-400 ppm in all ranges
- Floating output up to 450 Vpk, compliance voltage 8 Vpk
- Calibration of clamp meters up to 3000 A
- Real and simulated transconductance amplifier
- GPIB and RS-232 come as standard

DESCRIPTION

Model M151 is a stable high current calibrator up to 120 A. Basic accuracy is 275 ppm. Instrument can be controlled via RS232 or GPIB interface. Calibrator can work in a simulated amplifier mode to increase current ranges of any multifunction calibrator. It is suitable for power meter's calibration because M151 can be synchronized with the input signal not only in amplitude but also in frequency and phase. Current terminals are isolated up to 450 Vpk against case (protective earth). M151 is a sophisticated instrument with its own recalibration procedure. The procedure enables to adjust any deviation directly from the front panel. Calibrator is designed for checking parameters of amp meters. With current coil it can be used for calibration of clamp meters.

SPECIFICATION

Specifications below describe 1-year absolute accuracy, including long-term stability, linearity, load and line regulation and reference standard measurement uncertainty as well as ambient conditions within specified limits.

GENERAL DATA

Warm-up time	15 minutes
Reference temperatures	20 °C – +26 °C
Operating temperatures	5 °C – +40 °C
Storage temperatures	-10 °C – +55 °C
Temperature coefficient	10 % of specification / °C (in range 5 °C – 20 °C and 26 °C – 40 °C)
Max humidity	< 90 %
Power supply	115/230 VAC - 50/60 Hz
Dimensions (W x H x D)	538 x 283 x 540 mm
Weight	42 kg
Interfaces	RS232, IEEE488

DC/AC Current (sine amplitude)

Current range summary	8 mA to 120 A
Current resolution	5½ dig
Frequency range	DC, 15 Hz to 1000 Hz
Frequency accuracy	0.005 %
Frequency resolution	0.001 Hz below 500 Hz, 0.01 Hz below 1000 Hz
Frequency synchronization	Internal, external, power supply
Simulated amplifier gain	0.5 – 10 A/V (transconductance amplifier) 50 – 1000 A/A (current amplifier)
Distortion	< 0.1 %
Output terminals isolation:	Up to 450 Vpk against GND

Ranges, resolution, 1 year uncertainty [% of value + % of range]

Range	DC	40 Hz – 70 Hz	DC	Max. compliance voltage		
				DC	15 Hz – 400 Hz	400 Hz – 1 kHz
0.008000 – 0.300000 A	0.0175 + 0.01	0.0175 + 0.01	0.025 + 0.02	8 V	5.5 V	3.5 V
0.300001 – 1.000000 A	0.0175 + 0.01	0.0175 + 0.01	0.025 + 0.02	8 V	5.5 V	3.5 V
1.00001 – 2.000000 A	0.0175 + 0.01	0.0175 + 0.01	0.025 + 0.02	8 V	5.5 V	3.5 V
2.00001 – 5.000000 A	0.0175 + 0.01	0.0175 + 0.01	0.025 + 0.02	5 V	3.5 V	3.5 V
5.0001 – 10.0000 A	0.021 + 0.015	0.021 + 0.015	0.04 + 0.02	5 V	3.5 V	3.5 V
10.0001 – 30.0000 A	0.025 + 0.015	0.025 + 0.015	0.05 + 0.02	5 V	3.5 V	3.5 V
30.0001 – 60.000 A	0.025 + 0.015	0.025 + 0.015	0.05 + 0.02	5 V	3.5 V	3.5 V
60.001 – 120.000 A	0.025 + 0.015	0.025 + 0.015	0.05 + 0.02	5 V	3.5 V	3.5 V

Multimeter

Function	Range	Accuracy (% of value + % of range)
AC voltage < 1 kHz	0 – 20 V	0.02 % + 0.02 %
AC voltage > 1 kHz	0 – 20 V	0.05 % + 0.05 %
DC voltage	± 20 V	0.01 % + 0.01 %
AC current < 1 kHz	0 – 200 mA	0.02 % + 0.02 %
AC current > 1 kHz	0 – 200 mA	0.05 % + 0.05 %
DC Current	± 200 mA	0.01 % + 0.01 %
Frequency	1 Hz – 10 kHz	0.005 % + 0.00 %

Typical RTA phase shift

delay [μ s] = 7 x output voltage x range current / output current + 3,5

Current coil (151-25)



Applicable multiplier	10 - 50
Max. simulated current	multiplier x 120 (3000 A with 151-25 Current Coil)
Frequency range	15 - 100 Hz
Additional uncertainty	0.3 % with 151-25 Current coil