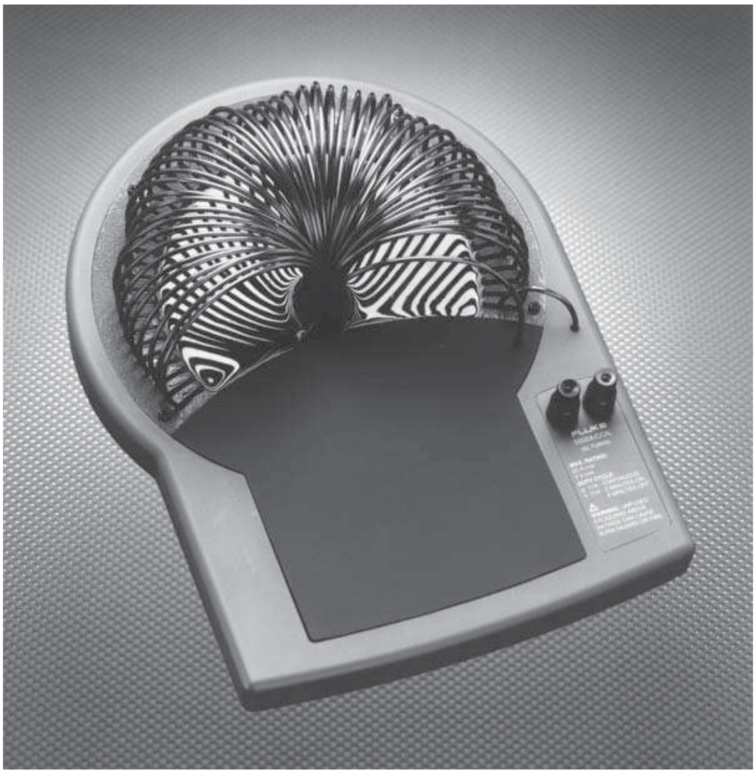
Model 5500A/COIL
50 Turn Current Coil
Technical Data

Introduction

The 50 Turn 5500A/COIL is used as a tool for calibrating clamp type current meters that operate by two different principles—as current transformers (AC only), and by the Hall Effect (Both AC and DC). It is impractical to calibrate 500A rated current clamp meters using a 500A source. However, by using the 50 turns of the 5500A/COIL in conjunction with a current source calibrator one can effectively multiply the current of the current source calibrator by a factor of 50 to support the calibration and verification of these clamp-on type current meters.

Using the Coil

Clamp-on current meters operate as current transformers, with differing degrees of magnetic coupling between primary and secondary that vary from meter to meter. The position of the clamp meter with respect to the cable also affects the magnetic coupling between primary and secondary of the current transformer, which causes variation in reading of the current meter. This is important to understand in order to make the most accurate and repeatable measurements. The base of the 5500A/COIL was designed so the current clamp can be centered carefully on the coil, minimizing operator error for best repeatability. Calibration accuracy to specifications is guaranteed only when proper clamp alignment is made. The clamp current meter should be centered as much as possible on the base during calibration and verification. If the clamp-on current meter has alignment marks, the alignment marks should align the clamp with the center bundled wire of the 50 turn 5500A/Coil.



Specifications

Number of Turns	50
Maximum Current	11A rms, continuous 20A rms, 2 minutes
Maximum Duty Cycle Derating	< 11A, continuous > 11A, 2 minutes ON, 8 minutes OFF
Maximum Voltage	3V rms
Frequency of Operation	DC, 45-440 Hz (should not exceed rms Voltage rating). For the 5500A Current Output: DC, 45-65 Hz, 0-11A 65-440 Hz, 0-4A This specification assumes that a Fluke 80i-600 Clamp Meter or equivalent is attached. Other clamp meters may limit the 5500A Current Output drive capability to less than the above.
Uncertainty Due to Clamp Meter/Coil Interaction	± (0.25% of effective output + 0.05A), for toroidal-wound current clamps, such as the Fluke 80i and 80i-1000. ± (0.50% of effective output + 0.5A, for current clamps like the Fluke 80i-kw, 80i-400, 80i-410, 80i-500, 80i-1010, Fluke 31, Fluke 33, or equivalent.
Minimum Inside Diameter of Clamp Jaws	2.54 cm (1 in.)

Operation with 5500A

Range	1 year Absolute Uncertainty, tcal ±5°C ± (% of effective current + A)			
	Toroidal-Wound Current Clamps		Other Current Clamps	
DC, 0-11A	0.26%	0.05A	0.50%	0.50A
45-65 Hz, 2.2-11A	0.26%	0.11A	0.50%	0.50A
65-440 Hz, < 2.2A	0.27%	0.11A	0.51%	0.51A

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Calculating Uncertainty

The total uncertainty of the effective current that the clamp measures is a function of the clamp/coil interaction and of the current calibrator. To determine the total uncertainty when using an amplifier other than the 5500A, use the following formula:

$$U_{total} = \sqrt{U^2_{coil} + U^2_{source}}$$

Ordering Information

5500A/COIL 50 Turn Current Coil

Example:

Assume we are driving the coil with the Fluke 5500A at 4A, 60 Hz (the clamp meter will see an effective 200A, 60 Hz). The Calibrator 90 day specification at 4A is ±(0.05% + 2 mA), so the effective current in the coil bundle will have an uncertainty of ±(0.05% + 0.1A). Next, we find the total uncertainty by finding the RSS (root sum of squares) of the calibrator uncertainty of the effective output current (effective output current equals 50x the calibrator output current), and the clamp meter coil interaction uncertainty:

Uncertainty of effective calibrator current in coil bundle
= ±(0.05% + 0.1A)

Uncertainty due to clamp Meter/Coil Interaction
= ±(0.25% + 0.05A)

The RSS of these two uncertainties is determined by finding the uncertainty of the floor and the uncertainty of the scale separately:

Scale Uncertainty $= \sqrt{0.25\%^2 + 0.05\%^2} = 0.255\%$

Floor Uncertainty $= \sqrt{0.05A^2 + 0.1A^2} = 0.112A$

Total Uncertainty = ± (0.00255 x 200A + 0.112A= ± 0.622A, or ± 0.311%

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