FLUKE®

Instruction Sheet

Model 5500A/COIL

50-Turn Current Coil

Introduction

The 5500A/COIL is a 50-Turn Current Coil 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 1000A rated current clamp meters using a 1000A 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-type current meters.

⚠WARNING

UNFUSED. Exceeding current and voltage ratings can cause burn or fire hazard.

Using the Coil

Clamp-type 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-type current meter has alignment marks, the alignment marks should align the clamp with the center bundled wire of the 50-Turn 5500A/COIL. (See Figure 1).

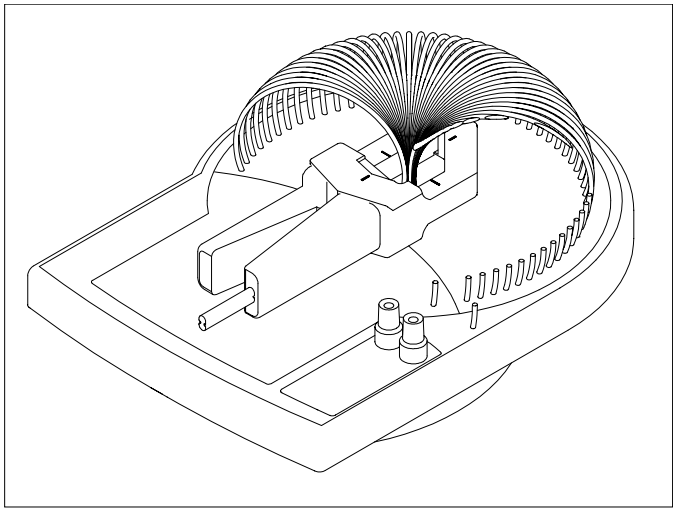

Figure 1. Positioning the Clamp

PN 600616 August 1995 Rev.6, 12/02

Specifications

Number of Turns	50
Maximum Current	11A rms, continuous 20.5A rms, 2 minutes
Maximum Duty Cycle Derating	< 11A, continuous > 11A, 2 minutes ON, 8 minutes OFF
Maximum Voltage	3V rms
Minimum Inner Diameter of Clamp Jaws	2.54 cm [1"]

Specification for Clamp Meter/Coil interaction

Specification for 5500A/COIL

Calibrator Output		Effective Current Output	Coil Specifications [clamp/coil interaction]			
			Toroidal-type Clamps [such as the Fluke 80i-600 and 80I-1000]		'other-type' of Clamps [such as the Fluke 80i-KW, -400, 80i-410, -500, -1010 and 30-series]	
Magnitude	Frequency	Amp-turns	±(% of output + Amps)		±(% of output + Amps)	
0.2 - 0.33 A	DC	10 - 16.4999	0.25	0.002	0.50	0.02
0.33 - 2.9999 A	DC	16.5 - 149.999	0.25	0.015	0.5	0.14
3.0 - 20.5 A	DC	150 - 1025	0.25	0.05	0.5	0.5
0.2 - 0.33 A	45 Hz to 65 Hz	10 - 16.4999	0.28	0.003	0.56	0.03
0.33 - 2.9999 A	45 Hz to 65 Hz	16.5 - 149.999	0.28	0.025	0.56	0.25
3.0 - 20.5 A	45 Hz to 65 Hz	150 - 1025	0.28	0.09	0.56	0.9
0.2 - 0.33 A	65 Hz to 440 Hz	10 - 16.4999	0.79	0.003	1.00	0.03
0.33 - 2.9999 A	65 Hz to 440 Hz	16.5 - 149.999	0.79	0.027	1.00	0.25
3.0 - 20.5** A	65 Hz to 440 Hz	150 - 1025	0.79	0.1	1.00	0.9

Calculating Total Specification

The total specification of the effective current that the clamp-type meter measures is a function of the clamp/coil interaction and of the current calibrator. To determine the total specification use the following formula:

$$S_{\text{total}} = \sqrt{S^2_{\text{coil}} + U^2_{\text{source}}}$$

Example:

Assume we are driving the coil with the Fluke 5500A at 4A, 60 Hz (the clamp meter will see an effective current of 200A, 60 Hz) and we are calibrating a toroidal-type clamp meter. The Calibrator's 1 year specification at 4 Amps is ± (0.06% + 2 mA), so the effective current in the coil bundle will have a specification of ± (0.06% + 0.1A). Next, we find the total specification of the calibrator and the coil as a percentage of the output:

Specification of effective calibrator current in coil bundle = ± (0.06% + 0.1A) = 0.11%
Specification due to clamp Meter/Coil Interaction = ± (0.28% + 0.09A) = 0.325%

The RSS of these two specifications determines the total specification of the clamp/source combination:

$$S_{\text{total}} = \sqrt{0.325\%^2 + 0.11\%^2} = 0.343\%$$