

Instruction Sheet

Model 52120A/COIL3KA

25-Turn, 3000 Amp Current Coil

Introduction

The 52120A/COIL3KA (the Product or Coil) is a 25-Turn Current Coil used to calibrate clamp-type current meters. It is impractical to calibrate 3000 A rated clamp meters with a 3000 A source. With 25 turns of the Product in conjunction with a 52120A Transconductance Amplifier, you can multiply the current of the current source by 25. This configuration supplies sufficient current to calibrate and verify these clamp-type current meters.





Warning

To prevent possible electrical shock, fire, or personal injury:

- Use the Product only as specified, or the protection supplied by the Product can be compromised.
- Do not connect the Coil to voltages more than 4.5 V rms to earth.
- Do not touch the Coil while in use.
- Do not use, and disable the Product if it is damaged.

Table 1 is a list of symbols used on the Product and in this instruction sheet.

Table 1. Symbols

Symbol	Description	Symbol	Description
	Risk of Danger. Important information. See manual.		Hazardous voltage
	Do not dispose of this product as unsorted municipal waste. Go to Fluke's website for recycling information.		Caution. Hot surface.

How to Use the Coil

Always connect the Product to a 12 V dc source when the Product is in operation. When used with a 52120A, connect the power cable to the Option Power Outlet on the front panel of the 52120A. When not used with a 52120A, connect to power with a Fluke 52120A/COIL12V dc supply.

Clamp-type current meters operate as current transformers, with different degrees of magnetic coupling between primary and secondary that change from meter to meter. The position of the clamp meter with respect to the cable has an effect on the magnetic coupling between primary and secondary of the current transformer. This causes variation in the measurement of the current meter. This is important to understand in order to make the most accurate and repeatable measurements. The bottom of the Product lets you carefully center the current clamp on the coil so operator errors are kept to a minimum. Calibration accuracy to specifications is guaranteed only when you align the clamp correctly. You must center the clamp as much as possible on the coil during calibration and verification. See Figure 1.

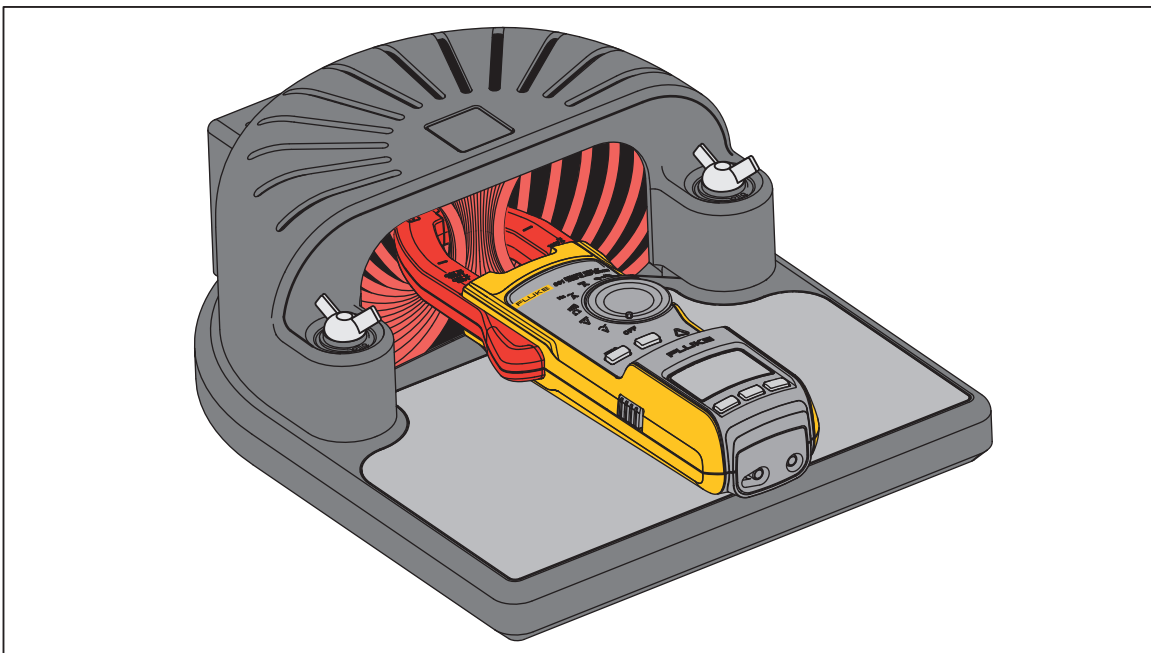


Figure 1. Clamp Position

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Specifications

Number of turns 25
Minimum internal jaw dimension to clear wires 26 mm (width) x 36 mm (length)
Maximum input current 120 A continuous with built-in 12 V fan on
Maximum voltage 4.5 V rms

Table 1. Accuracy Specifications

Input Current ^[1]	Frequency	Effective Current Amp-turns	52120A + Coil Accuracy ^[2]	
			±(% of Amp-turns + % of 52120A range)	
			% of Amp-turns	% of 52120A Range
0 A to 100 A	DC	0 to 2500	0.7 %	0.7 %
0 A to 120 A	10 Hz to 65 Hz	0 to 3000	0.7 %	0.7 %
0 A to 120 A	65 Hz to 300 Hz	0 to 3000	0.7 %	0.7 %
0 A to 40 A	300 Hz to 1 kHz	0 to 1000	0.7 %	0.7 %
0 A to 12 A	1 kHz to 3 kHz	0 to 300	0.8 %	1.0 %
0 A to 3 A	3 kHz to 6 kHz	0 to 75	1.5 %	1.0 %
0 A to 1 A	6 kHz to 10 kHz	0 to 25	5.0 %	1.0 %

[1] The inductance and mutual inductance of the 25 turn coil and clamp that is measured causes a frequency dependent compliance voltage across the coil. The length and configuration of the cables that connect the current to the coil also have an effect. Maximum input current is 120 A input at approximately 100 Hz. Maximum current input decreases to approximately 0.8 A at 10 kHz.
 [2] Includes coil/clamp interaction..

Note

The specifications for the Product are at 99 % confidence level and are the combined accuracy of the coil and a 52120A. If the coil is used with other current sources the calibration uncertainty of the coil alone is 0.65 % (99 % confidence level) from 0 Hz to 10 kHz.

How to Calculate Total Specification

The total specification of the current the coil meter measures is a function of the clamp/coil interaction, the current calibrator, and the 52120A amplifier. To find the total specification, use:

$$S_{\text{total}} = \sqrt{S_{\text{coil}}^2 + S_{\text{source}}^2 + S_{\text{amplifier}}^2}$$

Example:

A Fluke 5522A calibrator supplies 4 A at 60 Hz to the Product (the clamp meter will see an effective current of 100 A (25 x 4 A), 60 Hz) with a toroidal-type clamp meter around the Coil. The 1-year specification of the Calibrator at 4 Amps is $\pm(0.06\% + 2 \text{ mA})$, so the effective current in the coil bundle will have a specification of $\pm(0.06\% + 0.05 \text{ A})$. The total specification of the calibrator and the coil as a percentage of the output:

Specification of effective calibrator current in coil bundle = $\pm(0.06\% + 0.05 \text{ A}) = 0.11\%$
Specification due to the Product = 0.65%

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

$$S_{\text{TOTAL}} = \sqrt{0.11^2 + 0.65^2} = 0.66\%$$

Maintenance

Use only a soft damp cloth to clean the Product. Use only water on the cloth. Do not use abrasives or solvents.