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Instruction Sheet

80i-400

AC Current Probe

Introduction

The Model 80i-400 is a clamp-on ac current probe designed to extend the current measuring capability of an ac current meter to 400 amperes. A clamp-on, 1000-turn coil designed into the probe allows measurements to be made without breaking the circuit under test. The coil serves as the secondary of a current transformer. The current carrying conductor being measured serves as the primary.

Electrical Symbols

-  See explanation in manual.
-  Double insulation for protection against electric shock.

Specifications

Input Current Range: 1A to 400A

Output: 1 milliamp per ampere of input current (1mA/A)

Accuracy: $\pm(3\% + 0.4A)$ 48 Hz to 440 Hz

$\pm(4\% + 0.4A)$ 440 Hz to 1000 Hz

Working Voltage: 600V ac rms maximum

Output Cable Isolation: The output cable may be connected directly to a grounded input or floated to a 42V dc or 30V ac rms maximum from earth ground.

Output Cable Length: 5 ft (152 cm).

Maximum Conductor Size: 1 ea. 750 MCM (30 mm (1.18" diameter) or 2 ea. 500 MCM (25 mm (0.98") diameter) or 2.5" x 0.2" Bus Bar (65 mm x 5 mm) (0.98")

Shunt (load) Resistance: less than 12 ohms at multimeter input to maintain specified accuracy

Typical Bandwidth: -10% at 40 Hz and 5 kHz (1A, 400 Hz reference, excludes multimeter response)

Usable Current Range: 0.1A to 600A, 5 seconds maximum above 400A

Safety: Complies with EN 61010-1 August 1993

Multimeter Compatibility

The 80I-400 is compatible with any multimeter capable of reading ac current equal to 1/1000 of the current to be measured, and equipped with input jacks compatible with Fluke safety-designed test lead connectors. To take full advantage of the probe's accuracy, a multimeter ac current accuracy of $\pm 0.75\%$ or better is recommended. A voltmeter fitted with an external shunt will qualify as a suitable current meter. However, to ensure the probe's accuracy, the shunt (or multimeter input resistance in ac current) should be less than 12 ohms. This requirement is met on Fluke DMMs when using a current range of 20 mA or greater.

When making a measurement, the current-carrying conductor is not broken, and remains electrically isolated from the current meter input terminals. As a result, the current meter's INPUT LO or COM terminal may be either floated (isolated) or grounded.

Meter Readings

When the 80i-400 is connected to a compatible current meter and clamped around a single current-carrying conductor, the meter reading will be 1/1000th of the actual current in the conductor. For example, a 5-ampere (A) input current will be transformed into a 5-milliamper (mA) output current (see Figure 1).

When measuring current in an ac line cord, the jaws should be clamped around only one conductor (the black or hot wire in a three-wire cord). If the jaws are clamped around both current carrying conductors, the currents will cancel and produce a zero reading.

If the probe is clamped around two wires carrying current in the same direction, the sum will be read. Reversing one of the wires causes the difference to be read.

Low-Level Current Measurements

The 80i-400 AC Current Probe is specified to measure currents of 1A or greater. Currents less than 1A will produce

meter readings that are below the true value. Low-level currents can be measured by looping the input wire through the jaws so that the sum of the current through the jaws is greater than 1A. The actual current can then be calculated by dividing the meter reading by the number of turns looped through the jaws.

For example, to measure a current of 400 mA (0.4A), form a 10-turn loop and clamp the jaws of the 80i-400 around all 10 turns. The meter reading will be 4 mA, which corresponds to a primary current of 4A. The actual current in the conductor is 4A divided by 10-turns, or 400 mA.

Note

The range selection on the meter should always be 20 mA or greater (12 ohm shunt or lower). Lower ranges with higher shunt values will cause reading errors.

Operation

1. Connect the 80i-400 output connectors between the common and the appropriate current input jack of a suitable meter, then switch the meter on.

Note

Refer to Table 1 to determine the appropriate input jack and proper function setting for use with a Fluke handheld DMM.

2. Select a 20 mA ac or greater current range.
3. Clamp the probe around the current-carrying conductor to be measured (see Figure 1). Make sure the probe jaws are tightly closed around the conductor. The probe is designed for highest accuracy when the conductor is centered on the jaw alignment marks.
4. Multimeter readings displayed in milliamps (mA) can be read directly as amperes of input current. Readings displayed in amperes (A) must be multiplied times 1000 to obtain the amperes of input current.

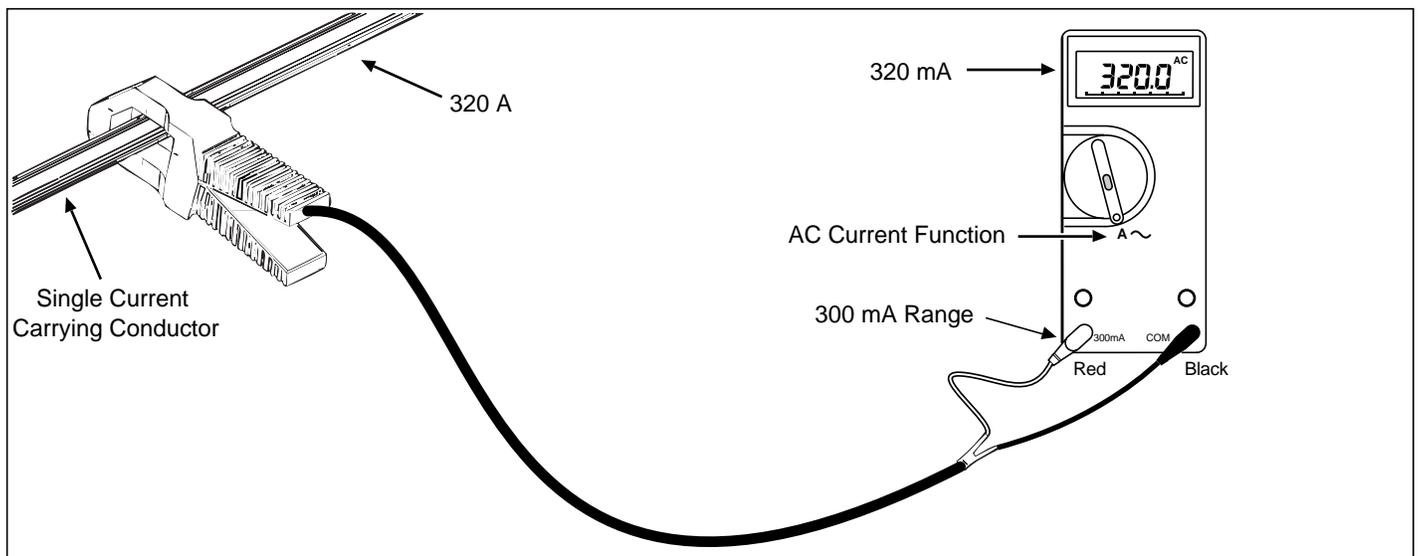


Figure 1. Typical 80i-400 Using a Typical Meter

Maintenance

Performance Test

Verify the probe accuracy by measuring the output of a 20A ($\pm 0.2\%$), 60 Hz current source (Fluke 5700A and 5220A or equivalent). When used with a compatible DMM with $\pm 0.75\%$ or better ac current accuracy (Fluke 8060A, 85, or equivalent), the probe should measure $20.00A \pm 1.00A$ ($20.00\text{ mA}, \pm 1.00\text{ mA}$) with the conductor centered on the jaw alignment marks. No calibration adjustments are provided.

Cleaning

Use a soft cloth dampened in a mild solution of detergent and water to clean the 80i-400. Do not use solvents. A light coating of dripless oil on the jaw surfaces will prevent corrosion.

Table 1. Clamp/Meter Setup Guide

Fluke Model	Input Jack (for red lead)	Function
21	10A (limited to 320A)	A~
23, 21 Series II, 23 Series II	300 mA (10A for > 320A)	A~
25,27	mA μ A	mA/A~
75,77, 75 Series II, 77 Series II	300 mA (10A On Models 75, & 77 for > 320A)	A~
29,79 Series II, 76	40 mA (10A for $\geq 40A$)	A~
83,85,87	mA μ A	mA/A~
863,865,867	320 mA (10A for >320A)	mA μ A~ A~
8060A,8062A	A	AC~,mA*
8020A, 8020B, 8021A, 8022B, 8024A, 8024B 8026B	mA	AC~, mA*
* 20mA range for up to 20A 200mA range for up to 200A 2000mA range for up to 400A		