FLUKE®

Instruction Sheet

i400

AC Current Clamp

Introduction

The Model i400 (hereafter called "the Current Clamp") is an ac current clamp that outputs 1 mA/A via safety-shrouded banana plugs; it is designed to extend the measuring capability of an ac current meter to 400 A.

Safety Information

⚠⚠ Read First: Safety Information

To ensure safe operation and service of the Current Clamp, follow these instructions:

- **Read the operating instructions before use and follow all safety instructions.**
- **Use the Current Clamp only as specified in the operating instructions, otherwise the clamp's safety features may not protect you.**
- **Adhere to local and national safety codes. Individual protective equipment must be used to prevent shock and arc blast injury where hazardous live conductors are exposed.**
- **Do not hold the Current Clamp anywhere beyond the tactile barrier, see Figure 1.**
- **Before each use, inspect the Current Clamp. Look for cracks or missing portions of the clamp housing or output cable insulation. Also look for loose or weakened components. Pay particular attention to the insulation surrounding the jaws.**
- **Never use the clamp on a circuit with voltages higher than 1000 V CAT III or 600 V CAT IV.**
  - **CAT III equipment is designed to protect against transients in equipment in fixed-equipment installations, such as distribution panels, feeders and short branch circuits, and lighting systems in large buildings.**
  - **CAT IV equipment is designed to protect against transients from the primary supply level, such as an electricity meter or an overhead or underground utility service.**
- **Use extreme caution when working around bare conductors or bus bars. Contact with the conductor could result in electric shock.**
- **Use caution when working with voltages above 60 V dc or 30 V ac. Such voltages pose a shock hazard.**

Symbols

⚠	Application around and removal from hazardous live conductors is permitted.
⚠	Product is protected by double insulation.
⚠	Risk of Danger. Important information. See Instruction Sheet.
⚠	Hazardous voltage.
SP us	Conforms to relevant Canadian Standards Association directives.
CE	Conforms to relevant European Union directives.

Electrical Specifications

Reference Conditions: 23 ± 5 °C, 20 to 75 % RH; conductor centered in jaw opening; no dc component; no adjacent conductor

Measurement Range: 1 A to 400 A ac rms

Output: 1 mA/A

Accuracy: 2 % + 0.06 A, 45 Hz to 400 Hz

Typical Bandwidth: 5 Hz to 20 kHz

Working Voltage: 1000 V ac rms, in compliance with EN61010

Common Mode Voltage: 1000 V ac rms from earth ground, in compliance with EN61010

Load Impedance: < 10 Ω

Maximum Non-destructive Current: 1000 A

Duty Cycle: 1 A to 400 A continuous

Influence of Adjacent Conductor: < 7.5 mA/A

Influence of Conductor Position in Jaw Opening: ± 1.0 % of reading + 0.05 A

Safety Specifications

Category Rating: CAT III 1000 V and CAT IV 600 V per EN61010-1, Pollution Degree 2 IEC 61010-02-032

EMC: EN 61326-1, FCC for emission and immunity

SP us: Tested to US and Canadian standards for compliance to UL61010-1 and CAN/CSA C22.2 No. 101.1:2004

CE: IEC 61010-1 2nd Edition

General Specifications

Output Cable Length: 1.5 m

Maximum Conductor Size: 32 mm

Storage Temperature: -20 °C to 60 °C

Operating Temperature: 0 °C to 50 °C

Relative Humidity: 10 °C to 30 °C: 95 %
30 °C to 40 °C: 75 %
40 °C to 50 °C: 45 %

Temperature Coefficient: 0.01 X (specified accuracy)/ °C (< 18 °C or > 28 °C)

Altitude: Operating: 2000 m; Non-operating: 12000 m

Dimensions: 150 x 70 x 30 mm

Weight: 114 g

Instrument Compatibility

The i400 is compatible with any Fluke Multimeter or any other current measurement device that has the following features:

- 20 mA ac or greater current range
- Banana inputs
- Input accuracy of 2 % or better to take full advantage of the accuracy of the Current Clamp.
- Input impedance of < 10 Ω

Measurement Considerations

Observe the following guidelines for positioning the Current Clamp jaws:

- Center the conductor inside the Current Clamp jaw.
- Make sure the clamp is perpendicular to the conductor.
- For optimal reading, make sure the conductor is positioned between the alignment marks on the jaw of the Current Clamp.

Observe the following guidelines when making measurements:

- Avoid taking measurements close to other current-carrying conductors.
- The Current Clamp displays current readings at 1/1000 of the actual current on the conductor. For example, a 5 A input current will be transformed into a 5 mA output current.

Low-Level Current Measurements

The Current Clamp is specified to measure currents of 1 A or greater. Measurement accuracy of currents less than 1 A is unspecified.

Operation

To use the i400, (refer to Figure 1):

1. Insert the banana plug into the common and current inputs of a Multimeter and switch the Meter on.
2. Select a 20 mA ac or greater current range.
3. Clamp the i400 around the current-carrying conductor to be measured. Make sure the jaws are tightly closed around the conductor. The Current Clamp is designed for highest accuracy when the conductor is centered on the jaw's alignment marks, see Figure 1.

⚠⚠ Warning

To avoid shock or personal injury, keep fingers behind the tactile barrier, see Figure 1.

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.

Maintenance

⚠⚠ Warning

To avoid possible electric shock or personal injury:

- **Before each use, inspect the Current Clamp. Look for cracks or missing portions of the clamp housing and output cable insulating cover and for loose or weakened components. Pay particular attention to the insulation surrounding the clamp jaws.**
- **Do not use a damaged Current Clamp. If a clamp is damaged, tape it shut to prevent unintended operation. A damaged clamp under warranty will be promptly repaired or replaced (at Fluke's discretion) and returned at no extra charge.**

If the Current Clamp does not work or perform properly, use the following steps to help isolate the problem:

1. Inspect the jaw mating surface for cleanliness. If any foreign material is present, the jaw will not close properly and measurement errors will result.
2. Verify that the function selection and range on the Multimeter are correct and adjusted to the sensitivity of the Current Clamp.
3. Verify the DMM current fuse. If the current fuse is open, the clamp may not function properly.

Cleaning

Periodically wipe the case with a damp cloth and mild detergent.

⚠ Caution

To avoid damaging the Current Clamp, do not use abrasives or solvents to clean the clamp.

Open the jaws and wipe the magnetic pole pieces with a lightly oiled cloth. Do not allow rust or corrosion to form on the magnetic core ends.

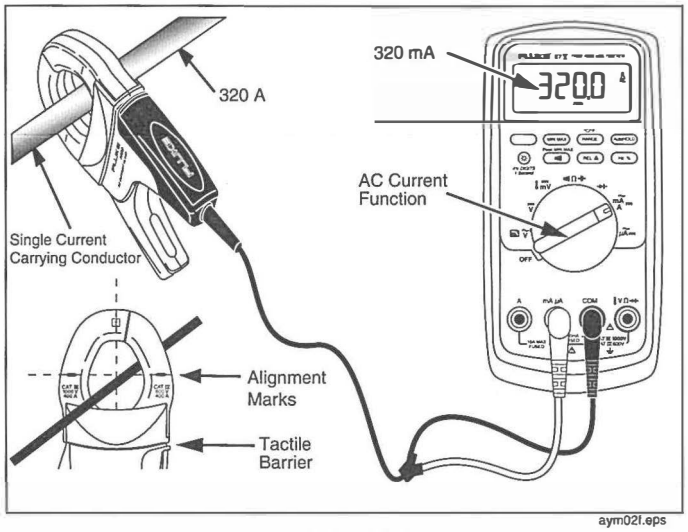

Figure 1. i400 Setup