

## ⚠⚠ 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.

## 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.

## LIMITED WARRANTY AND LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for one year from the date of purchase. This warranty does not cover fuses, disposable batteries, or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

Fluke Corporation  
P.O. Box 9090  
Everett, WA 98206-9090  
U.S.A.

Fluke Europe B.V.  
P.O. Box 1186  
5602 BD Eindhoven  
The Netherlands

11/99

PN 2282671  
October 2004

© 2004 Fluke Corporation, All rights reserved. Printed in U.S.A.  
All product names are trademarks of their respective companies.

# Instruction Sheet

## i400s

### AC Current Clamp

## Introduction

The i400s (hereafter called "Current Clamp") is compatible with any instrument capable of ac millivolt measurements. It can accept a standard BNC connector, and has an input impedance of greater than or equal to 1 M  $\Omega$  in parallel with a maximum of 47 pF. The Current Clamp can also be used with digital multimeters using a BNC-to-banana jack adapter.

## Contacting Fluke

To contact Fluke, call one of the following telephone numbers:

USA: 1-888-44-FLUKE (1-888-443-5853)  
Canada: 1-800-36-FLUKE (1-800-363-5853)  
Europe: +31 402-675-200  
Japan: +81-3-3434-0181  
Singapore: +65-738-5655  
Anywhere in the world: +1-425-446-5500  
USA Service: 1-888-99-FLUKE (1-888-993-5853)

Or, visit Fluke's Web site at [www.fluke.com](http://www.fluke.com).

To register your product, visit [register.fluke.com](http://register.fluke.com)

## 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.
- Conforms to relevant Canadian Standards Association directives.
- Conforms to relevant European Union directives.

## Safety Specifications

**Category Rating:** CAT III 1000 V and CAT IV 600 V per EN61010-1, Pollution Degree 2

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

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

: IEC 61010-1 2<sup>nd</sup> Edition IEC 61010-02-032

## Electrical Specifications

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

	40 A Range	400 A Range
<b>Measurement Range:</b>	0.5 A to 40 A	5 A to 400 A
<b>Output:</b>	10 mV/A	1 mV/A
<b>Accuracy:</b> 45 Hz to 400 Hz	2 % + 0.015 A	2 % + 0.04 A
<b>Phase Shift:</b> (45 Hz to 400 Hz)		
0.5 A to 1 A	Unspecified	NA
1 A to 5 A	4°	NA
5 A to 10 A	3°	Unspecified
10 A to 20 A	3°	2°
20 A to 40 A	2°	2°
40 A to 400 A	NA	1.5°
<b>Crest Factor:</b>	≤3	≤3 to 300 A ≤2.5 to 400 A

**Typical Bandwidth:** 5 Hz to 10 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

**Input Load Impedance (of host instrument):** > 1 M Ω in parallel with up to 47 pF

**Maximum Non-destructive Current:** 1000 A

**Duty Cycle:** 0.5 A to 400 A continuous

**Influence of Adjacent Conductor:** < 9.0 mA/A

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

## General Specifications

**Output Cable Length:** 2.5 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; 2000 m to 4000 m, derate category rating to 1000 V CAT II/600 V CAT III, Non-operating: 12000 m

**Dimensions:** 150 x 70 x 30 mm

**Weight:** 114 g

## Instrument Compatibility

The i400s is compatible with any Fluke Multimeter or any other current measurement device that has the following features:

- BNC or Banana inputs
- Input accuracy of 2 % or better to take full advantage of the accuracy of the Current Clamp.
- Input impedance of > 1 M Ω in parallel with up to 47 pF

## Measurement Considerations

- 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 jaws of the Current Clamp.

Observe the following guidelines when making measurements:

- Avoid taking measurements close to other current-carrying conductors.

## Operation

To use the i400s, refer to "Measurement Considerations" and Figure 1:

1. If necessary, add a banana plug to the BNC connector on the i400s.
2. Connect the clamp cable to the instrument. If using an adapter, use the common and volts inputs of the meter and switch it on.
3. Make sure the clamp and the measurement instrument are set to the proper range. Use the range select switch on the clamp.
4. The arrow on the top of the clamp must face towards the load of the circuit.
5. Connect the current clamp jaws around the conductor to be measured.

### Warning

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

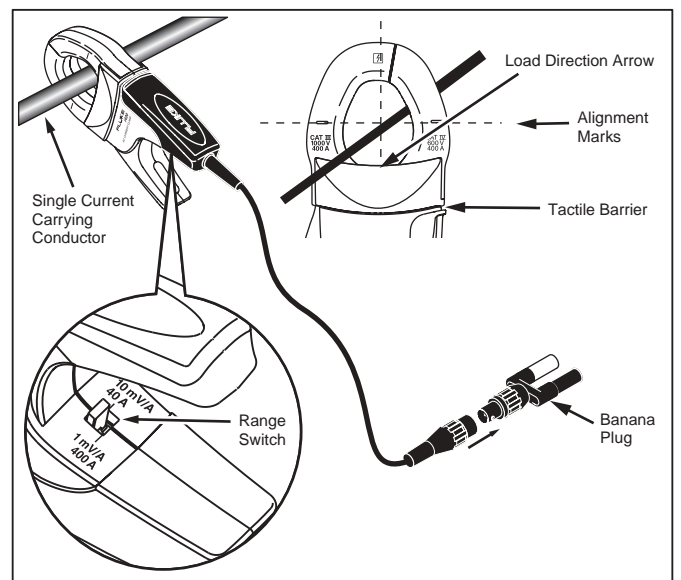


Figure 1. i400s Setup

ayn03.eps