NCT instruments

CP2100 Dual DC-10MHz current probe

Operating manual

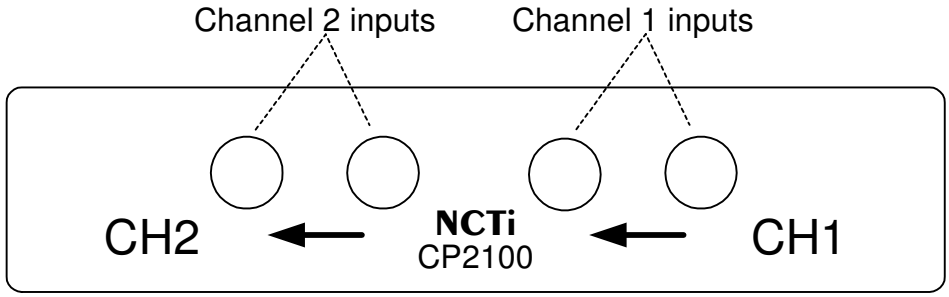
1 Introduction

The NCT instruments CP2100 is a dual channel current probe with a sensitivity of 100mV/A (or 50mV/A when terminated with 50Ω) and a bandwidth of 10MHz. Each channel is fully isolated so two independent currents can be measured at different voltage levels. A current probe is an invaluable piece of equipment when designing (switching) power supplies, power amplifiers, etc. Often the current flowing through a circuit or component offers a great insight in how a circuit works (or why it misbehaves).

2 Connections

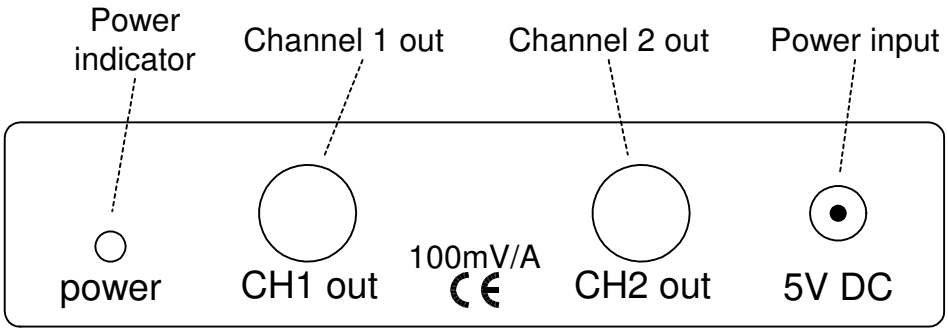
2.1 Front

On the front each channel has two 4mm banana sockets. The sockets have 22mm spacing so a BNC to banana adapter can also be fitted. Current flowing in the direction of the arrow causes a positive output.



2.2 Rear

On the rear there are two BNC sockets for the outputs and a 2.5mm barrel plug for the 5V power input. The power supply is isolated from the internal circuitry in order to avoid ground loops which could introduce noise.



3 Safety

The user should observe the following for safe operation of the CP2100:

- The CP2100 cannot be used to measure current in mains connections!
- When using the CP2100 with voltages over 48V at the inputs the outputs must be grounded by connecting the outer shell of the BNC connectors to ground.

4 Specifications

Parameter	*Worst case*	*Typical (at 25 deg. C)*
Maximum current	10Arms 40Apeak-peak	
DC accuracy [5]	5% +/-10mA	3% +/-5mA
DC resistance	10mΩ	6mΩ
Noise level (20MHz bandwidth)		3mVpeak
Sensitivity		100mV/A (high Z load) 50mV/A (into 50Ω)
Small signal bandwidth [1][2]	10MHz	
Response flatness [1][2]	1dB (DC to 7MHz)	0.5dB (DC to 7MHz)
Output impedance		50Ω
Supply current	100mA	
Maximum voltage between input channels and outputs [3] [4].	400Vpeak	

1) At frequencies over 1MHz it is recommended to keep the connections very short (use multi-stranded wire to reduce skin effect) or use a banana to BNC adapter.
2) DC currents over 1A impair the AC frequency response between 1 kHz and 20 kHz.
3) The CP2100 cannot be used to measure current in mains connections!
4) When using the CP2100 with voltages over 48Vpeak the outputs must be connected to properly grounded equipment.
5) The DC offset may be affected by magnetic fields, location and orientation of the CP2100. It may be necessary to recalibrate the CP2100.

5 DC offset calibration

This calibration requires a DC voltmeter with a resolution better than 100uV and a non-magnetic size 0 flat screw driver. Adjust the offset pot meters inside the CP2100 so the outputs read between -500uV (-5mA) and +500uV (+5mA). Because the current sensors in the CP2100 are susceptible to magnetic fields (including the magnetic field of the earth) it is important to calibrate the CP2100 in the same position as it is going to be used in a test setup. The earth's magnetic field can cause a DC offset error of +/- 10mV at the output.