

model CCS Constant Current Source

User's Manual

for the

model CCS

Constant Current Source



By:

Tristan Technologies, Inc.

San Diego, California

USA

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1. GENERAL INFORMATION

1.1 REVISION RECORD

Tristan Technologies, Inc. Part Number 2112-E00

<i>Revision Record</i>		
Date	Revision	Description
May 2001	A	Preproduction
March 2006	B	Production

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Tristan Technologies, Inc. reserves the right to change the functions, features, or specifications of its products at any time, without notice.

Any questions or comments in regard to this product and other products from *Tristan Technologies, Inc.*, please contact:

<p><i>TRISTAN TECHNOLOGIES, INC.</i></p> <p>6185 Cornerstone Court Suite 106 San Diego, CA 92121 U. S. A.</p> <p>Technical Support: (858) 550 - 2700 Fax: (858) 550 - 2799 Info@tristantech.com http://www.tristantech.com</p>
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1.2 WARRANTY

Tristan Limited Warranty

Tristan Technologies, Inc. warrants this product for a period of twelve (12) months from date of original shipment to the customer. Any part found to be defective in material or workmanship during the warranty period will be repaired or replaced without charge to the owner. Prior to returning the instrument for repair, authorization must be obtained from Tristan Technologies, Inc. All repairs will be warranted for only the unexpired portion of the original warranty, plus the time between receipt of the instrument at TRISTAN and its return to the owner.

This warranty is limited to TRISTAN's products that are purchased directly from TRISTAN, its OEM suppliers, or its authorized sales representatives. It does not apply to damage caused by accident, misuse, fire, flood or acts of God, or from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for purpose, which are expressly excluded. The owner agrees that TRISTAN's liability with respect to this product shall be as set forth in this warranty, and incidental or consequential damages are expressly excluded.

1.3 RETURN FOR REPAIR

All TRISTAN instruments and equipment are carefully inspected and packaged at TRISTAN prior to shipment. However, if a unit is received mechanically damaged, notify the carrier and the nearest TRISTAN representative, or the factory in San Diego; California. Keep the shipping container and packing material for the carrier and insurance inspections.

If the unit does not appear to be damaged but does not operate to specifications, contact the nearest TRISTAN representative or the TRISTAN factory and describe the problem in detail. Please be prepared to discuss all surrounding circumstances, including installation and connection detail. After obtaining authorization from the TRISTAN spokesperson, return the unit for repair along with a tag to it identifying yourself as the owner. Please enclose a letter describing the problem in as much detail as possible.

Repacking for Return Shipment

Repack the unit in its original container (if available). It is advisable to save the original crate sent by TRISTAN; however, if this is not possible, use the following instructions for repacking.

1. Wrap the unit in either "bubble wrap" or foam rubber.
2. Cover the bottom of a sturdy container with at least 3 inches of Styrofoam pellets or shredded paper.
3. Set the unit down onto the packing material and fill the rest of the container with Styrofoam or shredded paper. The unit must be completely protected by at least 3 inches of packing material on all sides.

Customers Outside of USA

To avoid delays in Customs clearance of equipment being returned, contact the TRISTAN representative in your area, or the TRISTAN factory in San Diego, California, for complete shipping information and necessary customs requirements. Failure to do so can result in significant delays.

2. INTRODUCTION TO THE MODEL CCS Constant Current Source

The model CCS Constant Current Source is designed for use with the Tristan model PMS Picovolt Measurement System, although many other applications are possible.

Ten output current ranges of either polarity are available and selected by means of a selector switch: 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, and 100 mA. Within each range, a ten-turn potentiometer controls the output from zero to full scale. The resolution on the potentiometer is 0.02% of full range. Linearity and resettability are 0.1% of full scale. Accuracy of the current value as designated by the switch and potentiometer is 1%. While the compliance of the supply is about 3.5 volts, the output regulation holds to better than 1 ppm for load voltage changes from zero to 2.5 volts.

The output of the supply is completely floating and is available at the two-pin connector on the front panel. A warning light is also located on the front panel and will flash if either the load resistance is too large (and hence the compliance voltage exceeded) or if the batteries are

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nearly depleted. Do not have the FORWARD/OFF/REVERSE switch set to FORWARD or REVERSE if nothing is connected to the model CCS. Doing so will deplete the batteries.

The model CCS is powered by 4 AA cell NiMH batteries. Any AA cells may be used in their place, but the error indicator LED is only valid for the voltage supplied by the rechargeable batteries provided with the system. Only use the charger with rechargeable NiMH batteries. Access to the batteries is gained by removing the top cover, which is held to the internal side rails by four screws.

The case of the model CCS has been abraded at points of contact to ensure shielding of the supply. A properly shielded twinax cable should be used to connect the model CCS to a SQUID probe. Increased noise pickup by the SQUID system when the model CCS is used indicates that such proper shielding is lacking.

To reduce non-linearity due to backlash in the 10-turn potentiometer, it is suggested that measurements be performed by turning the dial in only one direction at a time.

The following table shows a typical calibration of the offset and full-scale currents for each range setting:

Setting	100 mA	50 mA	20 mA	10 mA	5 mA	2 mA	1 mA	500 μ A	200 μ A	100 μ A
0%	-0.122 mA	-0.073 mA	-0.030 mA	-0.015 mA	-0.0078 mA	-0.0037 mA	-0.0023 mA	-1.2298 μ A	-0.92 μ A	-0.46 μ A
100%	99.895 mA	49.835 mA	20.200 mA	10.088 mA	5.0413 mA	2.0210 mA	1.0054 mA	502.18 μ A	201.90 μ A	100.44 μ A

3. TROUBLESHOOTING

If the red light on the front panel is blinking, first check to see if the twinax connector is connected to a load. Also check to see if the load resistance is too large, that is, that the specified current multiplied by the load resistance exceeds the compliance voltage (3.5 V). Finally, check the voltage (>4.8 V) on the batteries and recharge them if necessary.