Limited Warranty

“Products manufactured by CSI are warranted by CSI to be free from defects in materials and workmanship under normal use and service for twelve months from the date of shipment unless otherwise specified in the corresponding product manual. (Product manuals are available for review online at www.campbellsci.com.) Products not manufactured by CSI, but that are resold by CSI, are warranted only to the limits extended by the original manufacturer. Batteries, fine-wire thermocouples, desiccant, and other consumables have no warranty. CSI’s obligation under this warranty is limited to repairing or replacing (at CSI’s option) defective Products, which shall be the sole and exclusive remedy under this warranty. The Customer assumes all costs of removing, reinstalling, and shipping defective Products to CSI. CSI will return such Products by surface carrier prepaid within the continental United States of America. To all other locations, CSI will return such Products best way CIP (port of entry) per Incoterms ® 2010. This warranty shall not apply to any Products which have been subjected to modification, misuse, neglect, improper service, accidents of nature, or shipping damage. This warranty is in lieu of all other warranties, expressed or implied. The warranty for installation services performed by CSI such as programming to customer specifications, electrical connections to Products manufactured by CSI, and Product specific training, is part of CSI’s product warranty. CSI EXPRESSLY DISCLAIMS AND EXCLUDES ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CSI hereby disclaims, to the fullest extent allowed by applicable law, any and all warranties and conditions with respect to the Products, whether express, implied or statutory, other than those expressly provided herein.”
**Assistance**

Products may not be returned without prior authorization. The following contact information is for US and international customers residing in countries served by Campbell Scientific, Inc. directly. Affiliate companies handle repairs for customers within their territories. Please visit [www.campbellsci.com](http://www.campbellsci.com) to determine which Campbell Scientific company serves your country.

To obtain a Returned Materials Authorization (RMA), contact CAMPBELL SCIENTIFIC, INC., phone (435) 227-9000. After an application engineer determines the nature of the problem, an RMA number will be issued. Please write this number clearly on the outside of the shipping container. Campbell Scientific’s shipping address is:

**CAMPBELL SCIENTIFIC, INC.**  
RMA#_____  
815 West 1800 North  
Logan, Utah 84321-1784

For all returns, the customer must fill out a “Statement of Product Cleanliness and Decontamination” form and comply with the requirements specified in it. The form is available from our website at [www.campbellsci.com/repair](http://www.campbellsci.com/repair). A completed form must be either emailed to repair@campbellsci.com or faxed to (435) 227-9106. Campbell Scientific is unable to process any returns until we receive this form. If the form is not received within three days of product receipt or is incomplete, the product will be returned to the customer at the customer’s expense. Campbell Scientific reserves the right to refuse service on products that were exposed to contaminants that may cause health or safety concerns for our employees.
DANGER — MANY HAZARDS ARE ASSOCIATED WITH INSTALLING, USING, MAINTAINING, AND WORKING ON OR AROUND TRIPODS, TOWERS, AND ANY ATTACHMENTS TO TRIPODS AND TOWERS SUCH AS SENSORS, CROSSARMS, ENCLOSURES, ANTENNAS, ETC. FAILURE TO PROPERLY AND COMPLETELY ASSEMBLE, INSTALL, OPERATE, USE, AND MAINTAIN TRIPODS, TOWERS, AND ATTACHMENTS, AND FAILURE TO HEED WARNINGS, INCREASES THE RISK OF DEATH, ACCIDENT, SERIOUS INJURY, PROPERTY DAMAGE, AND PRODUCT FAILURE. TAKE ALL REASONABLE PRECAUTIONS TO AVOID THESE HAZARDS. CHECK WITH YOUR ORGANIZATION'S SAFETY COORDINATOR (OR POLICY) FOR PROCEDURES AND REQUIRED PROTECTIVE EQUIPMENT PRIOR TO PERFORMING ANY WORK.

Use tripods, towers, and attachments to tripods and towers only for purposes for which they are designed. Do not exceed design limits. Be familiar and comply with all instructions provided in product manuals. Manuals are available at www.campbellsci.com or by telephoning (435) 227-9000 (USA). You are responsible for conformance with governing codes and regulations, including safety regulations, and the integrity and location of structures or land to which towers, tripods, and any attachments are attached. Installation sites should be evaluated and approved by a qualified engineer. If questions or concerns arise regarding installation, use, or maintenance of tripods, towers, attachments, or electrical connections, consult with a licensed and qualified engineer or electrician.

General
- Prior to performing site or installation work, obtain required approvals and permits. Comply with all governing structure-height regulations, such as those of the FAA in the USA.
- Use only qualified personnel for installation, use, and maintenance of tripods and towers, and any attachments to tripods and towers. The use of licensed and qualified contractors is highly recommended.
- Read all applicable instructions carefully and understand procedures thoroughly before beginning work.
- Wear a hardhat and eye protection, and take other appropriate safety precautions while working on or around tripods and towers.
- Do not climb tripods or towers at any time, and prohibit climbing by other persons. Take reasonable precautions to secure tripod and tower sites from trespassers.
- Use only manufacturer recommended parts, materials, and tools.

Utility and Electrical
- You can be killed or sustain serious bodily injury if the tripod, tower, or attachments you are installing, constructing, using, or maintaining, or a tool, stake, or anchor, come in contact with overhead or underground utility lines.
- Maintain a distance of at least one-and-one-half times structure height, 20 feet, or the distance required by applicable law, whichever is greater, between overhead utility lines and the structure (tripod, tower, attachments, or tools).
- Prior to performing site or installation work, inform all utility companies and have all underground utilities marked.
- Comply with all electrical codes. Electrical equipment and related grounding devices should be installed by a licensed and qualified electrician.

Elevated Work and Weather
- Exercise extreme caution when performing elevated work.
- Use appropriate equipment and safety practices.
- During installation and maintenance, keep tower and tripod sites clear of un-trained or non-essential personnel. Take precautions to prevent elevated tools and objects from dropping.
- Do not perform any work in inclement weather, including wind, rain, snow, lightning, etc.

Maintenance
- Periodically (at least yearly) check for wear and damage, including corrosion, stress cracks, frayed cables, loose cable clamps, cable tightness, etc. and take necessary corrective actions.
- Periodically (at least yearly) check electrical ground connections.

WHILE EVERY ATTEMPT IS MADE TO EMBODY THE HIGHEST DEGREE OF SAFETY IN ALL CAMPBELL SCIENTIFIC PRODUCTS, THE CUSTOMER ASSUMES ALL RISK FROM ANY INJURY RESULTING FROM IMPROPER INSTALLATION, USE, OR MAINTENANCE OF TRIPODS, TOWERS, OR ATTACHMENTS TO TRIPODS AND TOWERS SUCH AS SENSORS, CROSSARMS, ENCLOSURES, ANTENNAS, ETC.
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A300 Power and Signal Converter

1. Overview

The A300 is a logic level shifter and voltage converter. It provides two level shifting channels; the first converting 5 V to 3.3 V, and the second converting 3.3 V to 5 V. Additionally, it provides a regulated 3.3 V power output.

2. Precautions

- READ AND UNDERSTAND the Safety section at the front of this manual.
- The black outer jacket of the cable is Santoprene® rubber. This compound was chosen for its resistance to temperature extremes, moisture, and UV degradation. However, this jacket will support combustion in air. It is rated as slow burning when tested according to U.L. 94 H.B. and will pass FMVSS302. Local fire codes may preclude its use inside buildings.

3. Initial Inspection

- Upon receipt of the A300, inspect the packaging and contents for damage. File damage claims with the shipping company.

4. Specifications

- **Dimensions:** 78 x 46 x 9.3 mm (3.08 x 1.8 x 0.36 in)
- **Cable:** 30.48 cm (12 in), 4 conductor, 22 AWG, Santoprene
- **Terminals:** 4 screw terminals, 12-24 AWG, 0.2 inch pitch
- **Mounting:** 2 mounting holes (1 in on center), 1.9 mm (0.075 in) diameter
- **Packaging:** Wide temperature polyamide over-mold
- **Temperature:** –40 to 70 °C
- **Supply Voltage:** 9 to 16 Vdc, for 12 Vdc nominal systems
- **Supply Current:** 100 µA quiescent
- **Power Output:** 3.3 Vdc, ±3%, up to 20 mA guaranteed
- **5 V Signal Input:** 0 to 6 Vdc, logic low ≤ 1.4 V, logic high ≥ 3.4 V
- **5 V Signal Output:** 5 Vdc, ±3%, 600 Ohms output impedance
- **3 V Signal Input:** 0 to 6 Vdc, logic low ≤ 0.8 V, logic high ≥ 2 V
- **3 V Signal Output:** 3 Vdc ±3%, 600 Ohms output impedance
- **Maximum Voltage Translation Rate:** 210 Mbps
5. Installation

5.1 A300 Cable and Terminal Description

<table>
<thead>
<tr>
<th>Cable Wire Color</th>
<th>Cable Wire Function</th>
<th>Direction</th>
<th>Terminal Label</th>
<th>Terminal Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>+12 Vdc Power Input</td>
<td></td>
<td>3.3V Power</td>
<td>+3.3 Vdc Power Output</td>
</tr>
<tr>
<td>Black</td>
<td>Ground</td>
<td></td>
<td>G</td>
<td>Ground</td>
</tr>
<tr>
<td>Green</td>
<td>5 V Signal Input</td>
<td></td>
<td>3.3V OUT</td>
<td>+3.3 Vdc Signal Output</td>
</tr>
<tr>
<td>White</td>
<td>5 V Signal Output</td>
<td></td>
<td>3.3V IN</td>
<td>+3.3 Vdc Signal Input</td>
</tr>
</tbody>
</table>

5.2 Using With GPS16X-HVS

In 2014, Garmin changed the pulse-per-second (PPS) output of the GPS16X-HVS from 5 V to 3 V. Units with a serial number 1A4189318 or greater have a PPS output of 0 to 3 V. For those units, an A300 is needed to connect the PPS output to a CR800-series, CR1000, or CR3000 datalogger. Those dataloggers require the PPS line to have a voltage of 3.8 V or greater.

<table>
<thead>
<tr>
<th>GPS16X-HVS Wire Color</th>
<th>GPS16X-HVS Wire Function</th>
<th>A300 Terminal</th>
<th>Datalogger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>12 V</td>
<td></td>
<td>12V</td>
</tr>
<tr>
<td>Black</td>
<td>Ground</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td>Enable</td>
<td></td>
<td>Ground (or Control Port)</td>
</tr>
<tr>
<td>White</td>
<td>TXD (Output)</td>
<td></td>
<td>Control Port (Rx)</td>
</tr>
<tr>
<td>Gray</td>
<td>PPS</td>
<td>3.3V IN</td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td>RXD (Input)</td>
<td></td>
<td>Ground</td>
</tr>
<tr>
<td>Shield</td>
<td>Shield</td>
<td></td>
<td>Ground</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A300 Wire Color</th>
<th>A300 Wire Function</th>
<th>Datalogger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>12 V</td>
<td>12V</td>
</tr>
<tr>
<td>Black</td>
<td>Ground</td>
<td>Ground</td>
</tr>
<tr>
<td>Green</td>
<td>5 V Signal Input</td>
<td>Ground</td>
</tr>
<tr>
<td>White</td>
<td>5 V Signal Output</td>
<td>Control Port (Tx)</td>
</tr>
</tbody>
</table>
5.3 Using With 3.3 V Serial Sensor

The A300 can be used to provide data line level shifting and a regulated 3.3 V power supply for some serial devices such as serial sensors that need to be connected to a datalogger that does not support 3.3 V power or communication levels. Example dataloggers include the CR800-series, CR1000, and CR3000.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>A300 Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3 V Power In</td>
<td>3.3V PWR</td>
</tr>
<tr>
<td>Ground</td>
<td>G</td>
</tr>
<tr>
<td>TxD (Output)</td>
<td>3.3V IN</td>
</tr>
<tr>
<td>RxD (Input)</td>
<td>3.3V OUT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A300 Wire Color</th>
<th>A300 Wire Function</th>
<th>Datalogger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>12 V</td>
<td>12V</td>
</tr>
<tr>
<td>Black</td>
<td>Ground</td>
<td>Ground</td>
</tr>
<tr>
<td>Green</td>
<td>5 V Signal Input</td>
<td>Tx (Output)</td>
</tr>
<tr>
<td>White</td>
<td>5 V Signal Output</td>
<td>Rx (Input)</td>
</tr>
</tbody>
</table>

5.4 Mounting

The A300 provides several features to aide in installation. It provides a tie-down loop for securing the sensor cable to the A300 with a zip tie. It also provides two mounting holes for securing the A300 to the backplate of an enclosure.
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