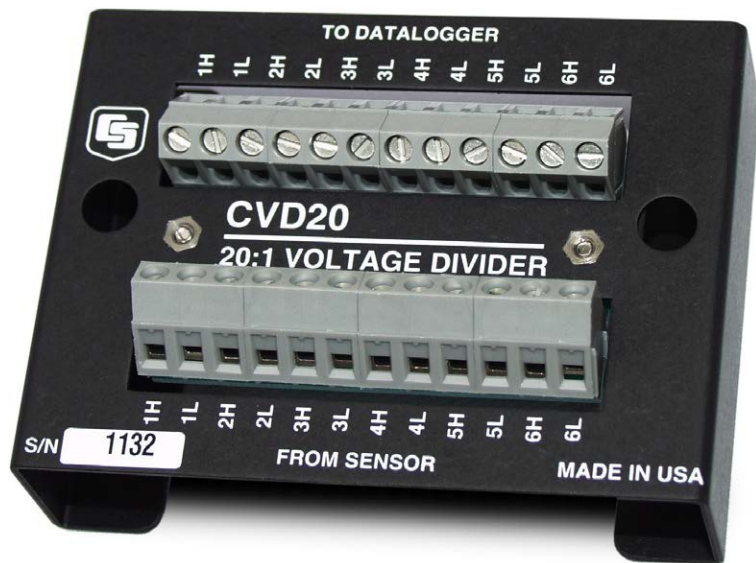


# INSTRUCTION MANUAL



## CVD20 20:1 Voltage Divider

Revision: 5/12



Copyright © 1990-2012  
Campbell Scientific, Inc.



# Warranty

---

“PRODUCTS MANUFACTURED BY CAMPBELL SCIENTIFIC, INC. are warranted by Campbell Scientific, Inc. (“Campbell”) to be free from defects in materials and workmanship under normal use and service for twelve (12) months from date of shipment unless otherwise specified in the corresponding Campbell pricelist or product manual. Products not manufactured, but that are re-sold by Campbell, are warranted only to the limits extended by the original manufacturer. Batteries, fine-wire thermocouples, desiccant, and other consumables have no warranty. Campbell's obligation under this warranty is limited to repairing or replacing (at Campbell's option) defective products, which shall be the sole and exclusive remedy under this warranty. The customer shall assume all costs of removing, reinstalling, and shipping defective products to Campbell. Campbell will return such products by surface carrier prepaid within the continental United States of America. To all other locations, Campbell will return such products best way CIP (Port of Entry) INCOTERM® 2010, prepaid. 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 Campbell such as programming to customer specifications, electrical connections to products manufactured by Campbell, and product specific training, is part of Campbell's product warranty. **CAMPBELL EXPRESSLY DISCLAIMS AND EXCLUDES ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** Campbell is not liable for any special, indirect, incidental, and/or consequential damages.”

# 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 applications 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 web site at [www.campbellsci.com/repair](http://www.campbellsci.com/repair). A completed form must be either emailed to [repair@campbellsci.com](mailto: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.

# CVD20 Table of Contents

---

*PDF viewers: These page numbers refer to the printed version of this document. Use the PDF reader bookmarks tab for links to specific sections.*

<b>1. Introduction</b> .....	1
<b>2. Cautionary Statements</b> .....	1
<b>3. Initial Inspection</b> .....	1
<b>4. Specifications</b> .....	1
<b>5. Installation</b> .....	1
5.1 Mounting .....	1
5.2 Wiring.....	1
<b>6. Programming</b> .....	2
6.1 Examples .....	3
6.1.1 CR1000, CR800, CR850.....	3
6.1.2 CR3000, CR5000.....	3
6.1.3 CR10(X).....	3

## **Figures**

1. Single-ended measurement.....	2
2. Differential measurement .....	2

## **Tables**

1. Recommended Cables for Datalogger Connection.....	2
--	---



# CVD20 20:1 Voltage Divider

---

## 1. Introduction

The CVD20 provides six single-ended or six differential channels for connecting sensors that have a higher voltage output than what a datalogger can measure. Resistors in the CVD20 divide the sensor's signal voltage by a factor of 20.

## 2. Cautionary Statements

The CVD20 is rugged, but it should be handled as a precision scientific instrument.

## 3. Initial Inspection

Upon receipt of the CVD20, inspect the packaging and contents for damage. File damage claims with the shipping company.

## 4. Specifications

<b>Compatibility:</b>	CR800, CR850, CR1000, CR3000, CR5000, CR9000(X), CR7, CR10(X), CR23X, 21X.
<b>Number of Channels:</b>	6 single-ended or 6 differential
<b>Division Ratio:</b>	20:1
<b>Resistors:</b>	1 kohm and 19 kohm
<b>Ratio Tolerance (@ 25°C):</b>	±0.1%
<b>Weight:</b>	91 g (3 oz)
<b>Dimensions:</b>	9.4 x 6.9 x 3.8 cm (3.7 x 2.7 x 1.5 in.)
<b>Temperature Coefficient:</b>	10 ppm/°C from -20° to +85°C

## 5. Installation

### 5.1 Mounting

The base of the voltage divider has keyed slots for two screws. The slots are spaced for mounting the prepunched holes on the back plate of a Campbell Scientific enclosure.

### 5.2 Wiring

Figures 1 and 2 show the wiring for single-ended and differential measurements, respectively. The CVD20 connects to the sensor via the sensor's cable. The cable used to connect the CVD20 to the datalogger depends on the number of single-ended or differential channels used (see Table

1). A two-foot length should be sufficient if the datalogger and CVD20 are housed in the same enclosure.

TABLE 1. Recommended Cables for Datalogger Connection	
Number of Single-ended or Differential Channels Connected	Recommended Cable(s)
1	(1) CABLE2CBL-L
2	(1) CABLE4CBL-L
3	(1) CABLE2CBL-L and (1) CABLE4CBL-L
4	(2) CABLE4CBL-L
5	(1) CABLE2CBL-L and (2) CABLE4CBL-L
6	(3) CABLE4CBL-L

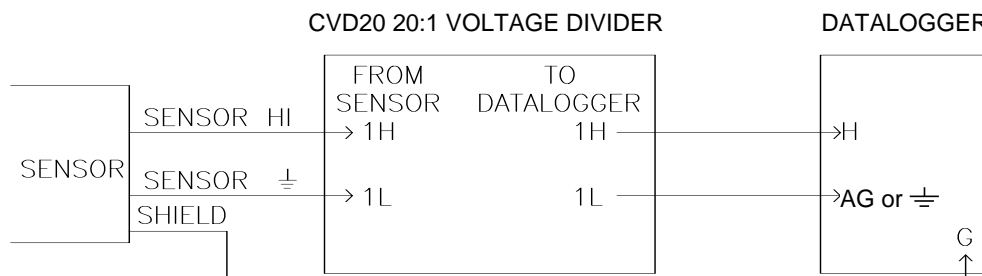


FIGURE 1. Single-ended measurement

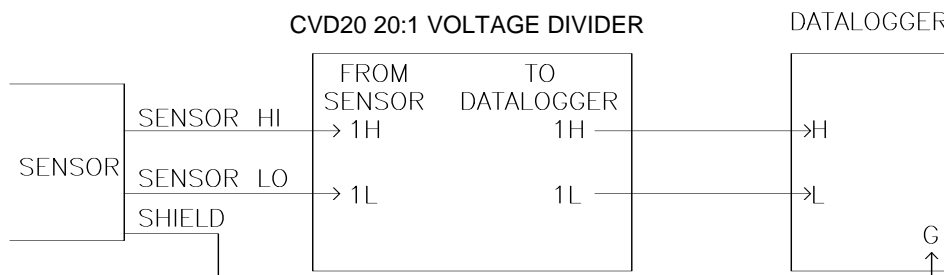


FIGURE 2. Differential measurement

## 6. Programming

The output of the voltage divider can be measured with a differential voltage instruction (**VoltDiff**) in CRBasic or Instruction 2 (P2) in Edlog) or a single-ended voltage instruction (**VoltSe**) in CRBasic or Instruction 1 (P1) in Edlog). Select the smallest input voltage range that will accommodate the maximum expected output. The smallest possible range will provide the best resolution.



The multiplier to use with the voltage measurement must take into account the divisor, the calibration of the sensor, and the units desired for the result.

## 6.1 Examples

Suppose the user wants to measure a sensor with a 0 to 5 V output. Using the CVD20 20:1 voltage divider, the 5 volt output will be divided to  $5/20 = 0.25$  V or 250 mV. Thus the voltage range on which to make the measurement is the  $\pm 250$  mV range for the CR800, CR850, CR1000, and CR10(X) and the  $\pm 1000$  mV range on the CR3000 and CR5000.

The CVD20 divides the voltage by 20 and the datalogger reads it as millivolts (i.e.,  $(V/20) \times 10^3 = V \times 50$ ). Therefore, to output directly in volts, use a multiplier of 1/50 or 0.02.

The following examples show the measurement instruction for each of the different dataloggers to measure the sensor described above.

### 6.1.1 CR1000, CR800, CR850

```
Public SensVolt
VoltDiff (SensVolt,1,mV250,1,True,0,250,0.02,0)
```

### 6.1.2 CR3000, CR5000

```
Public SensVolt
VoltDiff (SensVolt,1,mV1000,1,True,0,250,0.02,0)
```

### 6.1.3 CR10(X)

```
1: Volt (Diff) (P2)
  1: 1          Repr
  2: 24         ± 250 mV 60 Hz Rejection Range
  3: 1          DIFF Channel
  4: 1          Loc [SensVolt]
  5: 0.02       Mult
  6: 0          Offset
```





## **Campbell Scientific Companies**

---

### **Campbell Scientific, Inc. (CSI)**

815 West 1800 North  
Logan, Utah 84321  
UNITED STATES  
www.campbellsci.com • info@campbellsci.com

### **Campbell Scientific Africa Pty. Ltd. (CSAf)**

PO Box 2450  
Somerset West 7129  
SOUTH AFRICA  
www.csafrica.co.za • cleroux@csafrica.co.za

### **Campbell Scientific Australia Pty. Ltd. (CSA)**

PO Box 8108  
Garbutt Post Shop QLD 4814  
AUSTRALIA  
www.campbellsci.com.au • info@campbellsci.com.au

### **Campbell Scientific do Brazil Ltda. (CSB)**

Rua Luisa Crapsi Orsi, 15 Butantã  
CEP: 005543-000 São Paulo SP BRAZIL  
www.campbellsci.com.br • suporte@campbellsci.com.br

### **Campbell Scientific Canada Corp. (CSC)**

11564 - 149th Street NW  
Edmonton, Alberta T5M 1W7  
CANADA  
www.campbellsci.ca • dataloggers@campbellsci.ca

### **Campbell Scientific Centro Caribe S.A. (CSCC)**

300 N Cementerio, Edificio Breller  
Santo Domingo, Heredia 40305  
COSTA RICA  
www.campbellsci.cc • info@campbellsci.cc

### **Campbell Scientific Ltd. (CSL)**

Campbell Park  
80 Hathern Road  
Shepshed, Loughborough LE12 9GX  
UNITED KINGDOM  
www.campbellsci.co.uk • sales@campbellsci.co.uk

### **Campbell Scientific Ltd. (France)**

3 Avenue de la Division Leclerc  
92160 ANTONY  
FRANCE  
www.campbellsci.fr • info@campbellsci.fr

### **Campbell Scientific Spain, S. L.**

Avda. Pompeu Fabra 7-9, local 1  
08024 Barcelona  
SPAIN  
www.campbellsci.es • info@campbellsci.es

*Please visit [www.campbellsci.com](http://www.campbellsci.com) to obtain contact information for your local US or International representative.*