

INSTRUCTION MANUAL



VDIV10.1, VDIV2.1 Voltage Divider Terminal Input Modules

Revision: 5/07



Copyright © 1996-2007
Campbell Scientific, Inc.

Warranty and Assistance

The **VDIV10.1, VDIV2.1 VOLTAGE DIVIDER TERMINAL INPUT MODULES** are warranted by CAMPBELL SCIENTIFIC, INC. to be free from defects in materials and workmanship under normal use and service for twelve (12) months from date of shipment unless specified otherwise. Batteries have no warranty. CAMPBELL SCIENTIFIC, INC.'s obligation under this warranty is limited to repairing or replacing (at CAMPBELL SCIENTIFIC, INC.'s option) defective products. The customer shall assume all costs of removing, reinstalling, and shipping defective products to CAMPBELL SCIENTIFIC, INC. CAMPBELL SCIENTIFIC, INC. will return such products by surface carrier prepaid. This warranty shall not apply to any CAMPBELL SCIENTIFIC, INC. products which have been subjected to modification, misuse, neglect, accidents of nature, or shipping damage. This warranty is in lieu of all other warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose. CAMPBELL SCIENTIFIC, INC. is not liable for special, indirect, incidental, or consequential damages.

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 to determine which Campbell Scientific company serves your country. To obtain a Returned Materials Authorization (RMA), contact CAMPBELL SCIENTIFIC, INC., phone (435) 753-2342. 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

CAMPBELL SCIENTIFIC, INC. does not accept collect calls.

VDIV10.1, VDIV2.1 Table of Contents

PDF viewers note: These page numbers refer to the printed version of this document. Use the Adobe Acrobat® bookmarks tab for links to specific sections.

1. Function	1
2. Specifications	1
2.1 VDIV10.1	1
2.2 VDIV2.1	2
3. Wiring	2
4. Programming	3
4.1 Example	3
4.1.1 CR1000, CR800, CR850.....	4
4.1.2 CR3000, CR5000.....	4
4.1.3 CR9000(X).....	4
4.1.4 CR7	4
4.1.5 CR10(X).....	4
4.1.6 CR23X	4
4.1.7 21X	5

Figures

1-1. Terminal Input Module	1
2-1. Voltage Divider Module Schematic	2
3-1. Wiring for Differential Voltage Measurement	2
3-2. Wiring for Single-Ended Voltage Measurements	3

Table

3-1. VDIV10.1 or VDIV2.1 Connections to Campbell Scientific Dataloggers	3
--	---

VDIV10.1, VDIV2.1 Voltage Divider Terminal Input Modules

1. Function

Terminal input modules connect directly to the datalogger's input terminals to provide completion resistors for resistive bridge measurements, voltage dividers, and precision current shunts. Voltage dividers are used to divide a voltage to provide a reduced voltage output that is a fraction of the original voltage. The VDIV10.1 is a 10:1 voltage divider, the output voltage is one tenth the input voltage, and allows a voltage up to ± 25 volts to be measured on a ± 2500 mV range (CR10(X)) and up to ± 50 volts to be measured on a ± 5000 mV range (21X, CR7, CR9000(X), CR23X, CR1000, CR800, CR850, CR3000, CR5000). The VDIV2.1 is a 2:1 voltage divider, the output voltage is one half the input voltage, and allows a voltage up to ± 5 volts to be measured on a ± 2500 mV range (CR10(X)) and up to ± 10 volts to be measured on a ± 5000 mV range (21X, CR7, CR9000(X), CR23X, CR1000, CR800, CR850, CR3000, CR5000).

Each voltage divider module may be used to measure one differential voltage or two single-ended voltages.

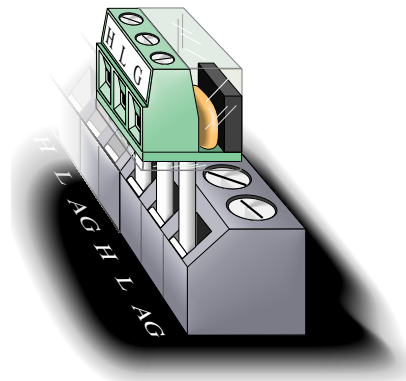


FIGURE 1-1. Terminal Input Module

2. Specifications

2.1 VDIV10.1

10:1 Resistive Divider	
Resistors	90 k Ω /10 k Ω
Ratio Tolerance @ 25 °C	$\pm 0.02\%$
Ratio Temperature coefficient	2 ppm/ $^{\circ}$ C
Power rating	0.25 W
Maximum Input Voltage	50 volts

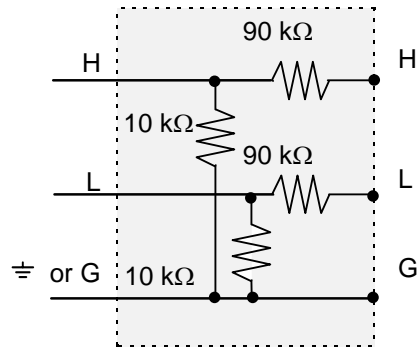


FIGURE 2-1. Voltage Divider Module Schematic

2.2 VDIV2.1

2:1 Resistive Divider	
Resistors	10 kΩ/10 kΩ
Ratio Tolerance @ 25 °C	±0.02%
Ratio Temperature coefficient	2 ppm/°C
Power rating	0.25 W
Maximum Input Voltage	10 volts

3. Wiring

Each voltage divider module may be used to measure one differential voltage (Figure 3-1) or two single-ended voltages (Figure 3-2).

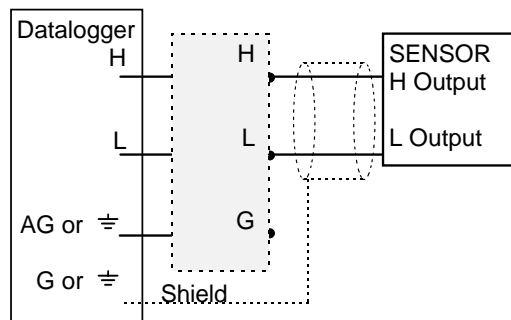


FIGURE 3-1. Wiring for Differential Voltage Measurement

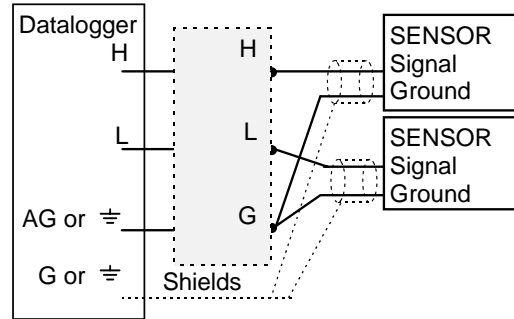


FIGURE 3-2. Wiring for Single-Ended Voltage Measurements

TABLE 3-1. VDIV10.1 or VDIV2.1 Connections to Campbell Scientific Dataloggers

Function	Label/Lead	CR10X, CR510	CR800, CR850, CR3000, CR5000, CR23X, CR1000	21X/CR7
Output High	H	1H	1H	1H
Output Low	L	1L	1L	1L
Ground	G	AG	⊕	⊕

4. Programming

The output of the voltage divider is measured with the appropriate voltage measurement instruction. A differential input is measured with the differential voltage instruction (P2 with the CR23X, CR10(X), 21X, or CR7; VoltDiff with the CR800, CR850, CR3000, CR5000, CR9000(X), CR1000). A single-ended input is measured with the single-ended voltage instruction (P1 with the CR23X, CR10(X), 21X, or CR7; VoltSE with the CR800, CR850, CR3000, CR5000, CR9000(X), CR1000). Select the smallest input voltage range that will accommodate the maximum expected output. The smallest possible range will provide the best resolution.

4.1 Example

For example, suppose we want to measure the voltage of a 12 volt battery system that may actually experience voltages in excess of 14 volts. Using the VDIV10.1 10:1 voltage divider, the 14 volt output will be divided to $14/10 = 1.4$ volts or 1400 mV. Thus the voltage range on which to make the measurement is the ± 2500 mV range on the CR10(X), CR800, CR850, and CR1000, the ± 5000 mV range on the CR23X, 21X, CR3000, CR5000, and CR9000(X), and the ± 1500 mV range on the CR7.

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. In this example, voltage is divided by 10 and read by the datalogger as millivolts (i.e., $(V/10) \times 10^3 = V \times 10^2$). To output directly in volts, we use a multiplier of 0.01.

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

4.1.1 CR1000, CR800, CR850

```
Public BattVolt
VoltDiff (BattVolt,1,mV2500,1,True ,0,250,0.01,0)
```

4.1.2 CR3000, CR5000

```
Public BattVolt
VoltDiff (BattVolt,1,mV5000,1,True ,0,250,0.01,0)
```

4.1.3 CR9000(X)

```
VoltDiff(BattVolt, 1, mV5000, 5, 1, 1, 0, 0, 0.01, 0)
```

4.1.4 CR7

1:	Volt (Diff) (P2)	
1:	1	Reps
2:	7	± 1500 mV Slow Range
3:	1	In Card
4:	1	DIFF Channel
5:	1	Loc [BattVolt]
6:	0.01	Mult
7:	0	Offset

4.1.5 CR10(X)

1:	Volt (Diff) (P2)	
1:	1	Reps
2:	25	± 2500 mV 60 Hz Rejection Range
3:	1	DIFF Channel
4:	1	Loc [BattVolt]
5:	0.01	Mult
6:	0	Offset

4.1.6 CR23X

1:	Volt (Diff) (P2)	
1:	1	Reps
2:	15	5000 mV, Fast Range
3:	1	DIFF Channel
4:	1	Loc [BattVolt]
5:	0.01	Multiplier
6:	0	Offset

4.1.7 21X

1: Volt (Diff) (P2)

1:	1	Reps
2:	5	± 5000 mV Slow Range
3:	1	DIFF Channel
4:	1	Loc [BattVolt]
5:	0.01	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 444
Thuringowa Central
QLD 4812 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 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)

Miniparc du Verger - Bat. H
1, rue de Terre Neuve - Les Ulis
91967 COURTABOEUF CEDEX
FRANCE
www.campbellsci.fr
campbell.scientific@wanadoo.fr

Campbell Scientific Spain, S. L.

Psg. Font 14, local 8
08013 Barcelona
SPAIN
www.campbellsci.es
info@campbellsci.es