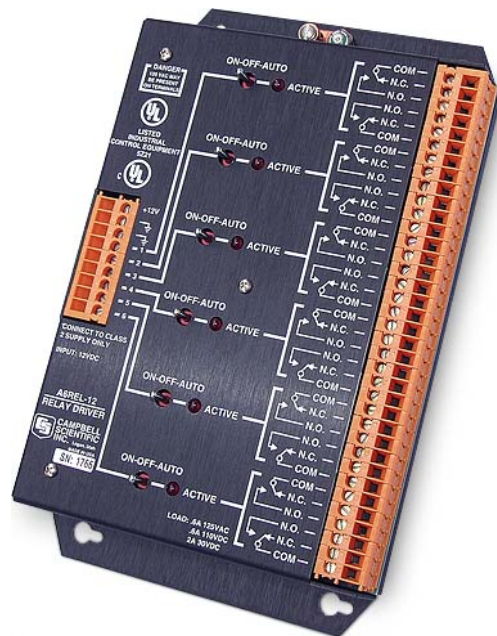


INSTRUCTION MANUAL



A6REL-12 Relay Driver

Revision: 7/09



Copyright © 1985 - 2009
Campbell Scientific, Inc.

Warranty and Assistance

The **A6REL-12 RELAY DRIVER** is 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

For all returns, the customer must fill out a "Declaration of Hazardous Material and Decontamination" form and comply with the requirements specified in it. The form is available from our website at www.campbellsci.com/repair. A completed form must be either emailed to repair@campbellsci.com or faxed to 435-750-9579. Campbell Scientific will not 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.

A6REL-12 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 3
- 3. Powering the A6REL-12 3
- 4. Installation 4
- 5. Example Programs 4
 - 5.1 CRBasic 5
 - 5.2 EDLOG..... 6

Figures

- 1. A6REL-12 Panel View 1
- 2. Position of Contacts When Coil IS Energized (ON) 2
- 3. Position of Contacts When Coil IS NOT Energized (OFF)..... 2

Table

- 1. Recommended Cables to Control Relays 4

A6REL-12 Relay Driver

1. Function

The A6REL-12 (Figure 1) drives six dual single pole double throw internal relays for control of up to 12 external AC or DC devices. Each of the six relays has a three position toggle switch; "on" and "off" for manual override, and "auto" for datalogger control. In the on position, the common and normally open contacts are shorted (Figures 2 and 3). In the auto position, the state of a relay is controlled by a datalogger control port.

Please note that the A6REL-12 is not compatible with our CR200-series dataloggers.

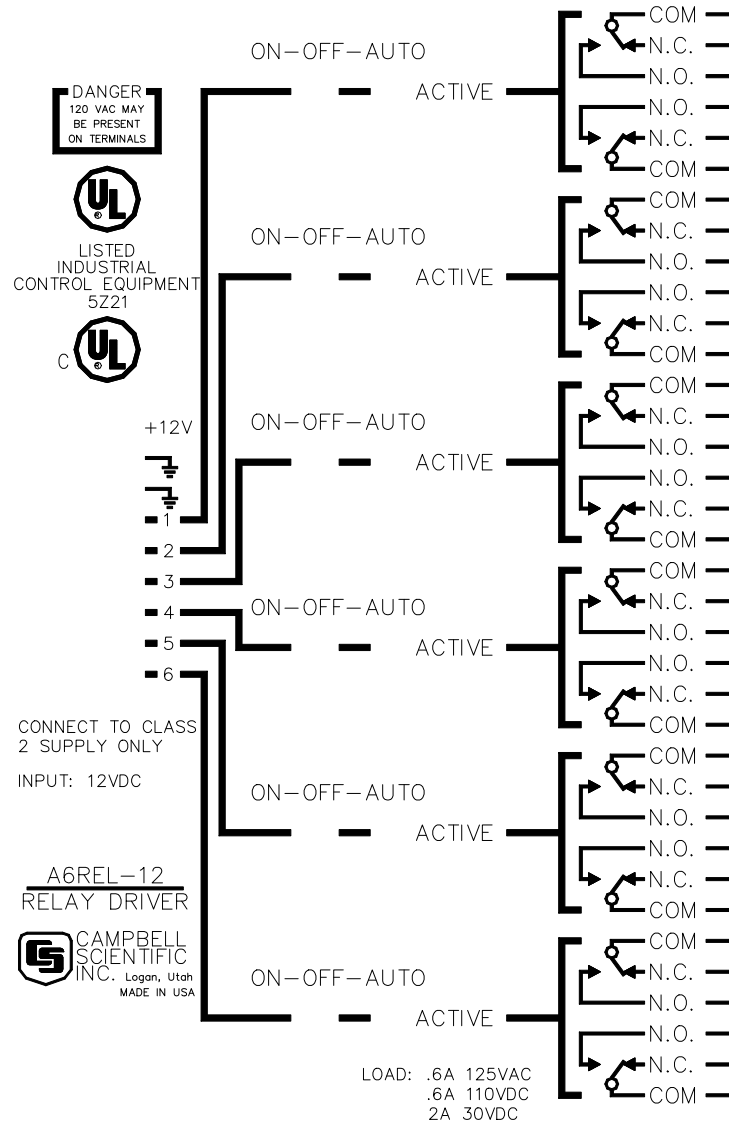


FIGURE 1. A6REL-12 Panel View

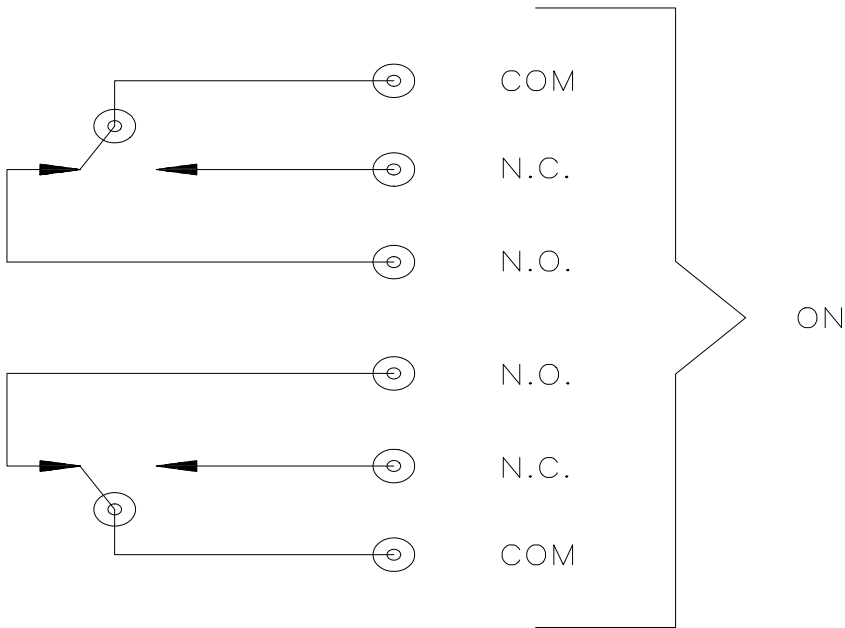


FIGURE 2. Position of Contacts When Coil IS Energized (ON)

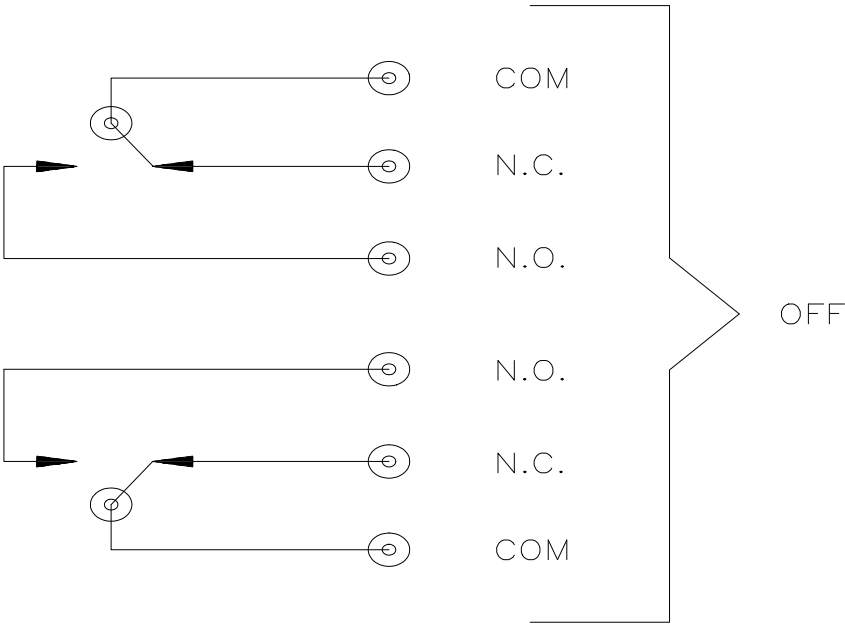


FIGURE 3. Position of Contacts When Coil IS NOT Energized (OFF)

2. Specifications

Operating voltage:	12 VDC nominal (8.4 to 24)
Current drain at 12 VDC:	6 μ A quiescent; 30 mA per active LED (switch ON or AUTO active).
Toggle Switch:	ON/OFF manual override; AUTO for datalogger control.
Underwriters Laboratories (UL) and Canadian Underwriters Laboratories (CUL) listed product. UL and CUL listing number is 5Z21.	

RELAY SPECIFICATIONS

Arrangement:	Dual single pole double throw Break before make	
Contact material:	Gold-clad silver	
Individual contact rating:	2A at 30 VDC 0.6A at 125 VAC	
Coil voltage:	8.4 to 24 VDC	
Coil resistance:	720 Ohms \pm 10%	
Expected life (contact closures):		
Mechanical	10 ⁸	
Electrical	2A at 30 VDC	5x10 ⁵
	1A at 30 VDC	2x10 ⁶
Actuation/release time:	Approx. 3 ms	
Operating temperature:	-40° to 70°C	

NOTE	The A6REL-12 protects each contact against voltage surges of 180 VDC (130 V rms) or greater with a power content of 8 Watts maximum and maximum duration of 0.1 ms.
-------------	---

3. Powering the A6REL-12

The A6REL-12 may be powered by the datalogger power supply or a separate 8.4 to 24 VDC battery.

If the 21X power supply is used to power the A6REL-12, all low level analog measurements (thermocouples, pyranometers, thermopiles, etc.) must be made differentially. This is a result of slight ground potentials created along the 21X analog terminal strip when the 12 volt supply is used to power peripherals. This limitation reduces the number of available analog channels and may require the use of a separate battery to power the A6REL-12.

4. Installation

The A6REL-12 relay driver includes mounting flanges with keyhole slots that attach to the backplate of a Campbell Scientific enclosure.

The A6REL-12 must be in an enclosure that provides a pollution degree 2 environment (normally, only nonconductive pollution. However, a temporary conductivity caused by condensation may be expected). All Campbell Scientific enclosures meet this requirement.

Table 1 shows the cables recommended for connecting the relays. A two-foot length should be sufficient if the datalogger and A6REL-12 are housed in the same enclosure. Tightening torque should be 4.5 in/lb. A user-supplied cable can be used if the cable has:

- only copper conductors
- wire range of 26 to 14 AWG
- minimum 60/75 degree C wire

Input power must be connected to a class 2 supply only. All Campbell Scientific power supplies meet the class 2 supply requirements.

TABLE 1. Recommended Cables to Control Relays	
Number of Relays Controlled	Recommended Cable(s)
1	(1) CABLE3CBL-L
2	(1) CABLE4CBL-L
3	(1) CABLE5CBL-L
4	(2) CABLE3CBL-L
5	(1) CABLE3CBL-L and (1) CABLE4CBL-L
6	(2) CABLE4CBL-L

5. Example Programs

In the following programming examples, temperature is being controlled between 96° and 99°F. A copper-constantan thermocouple is measured to determine the temperature. If the temperature drops below 96 degrees, control port 1 is set high to activate the associated relay and turn the heater on. If the temperature equals or exceeds 99°F, control port 1 is set low to turn the heater off.

5.1 CRBasic

Although the following example is a CR1000 program, other dataloggers that use CRBasic such as the CR800 and CR3000 are programmed similarly.

```
'CR1000 Series Datalogger

'Declare Public Variables
Public PTemp, batt_volt, P, TC

'Define Data Tables
DataTable (Test,1,-1)
    DataInterval (0,15,Sec,10)
    Minimum (1,batt_volt,FP2,0,False)
    Sample (1,PTemp,FP2)
    Sample (1,TC,FP2)

EndTable

'Main Program
BeginProg
    Scan (5,Sec,0,0)
        Battery (Batt_volt)
        'Measure TC reference temperature
        PanelTemp (PTemp,250)
        'Make temperature measurement and convert it to degrees Fahrenheit
        TCDiff (TC,1,mV2_5C,1,TypeT,PTemp,True ,0,250,1.8,32)
        'If temperature is greater than 99 set Port low
        If TC>99 then
            P=0
        'If temperature is less than 96 set Port high
        ElseIf TC<96 then
            P=1
        EndIf
        PortSet (1 ,P)
        'Call Output Tables
        'Example:
        CallTable Test
    NextScan
EndProg
```

5.2 EDLOG

Although the following example is a 21X program, other dataloggers that use Edlog such as the CR10(X) and CR23X are programmed similarly.

*1 Table 1 Program		
01: 5	Sec. Execution Interval	
1: Panel Temperature (P17)		<i>Measure the TC</i>
1: 1		<i>Loc [:REF TEMP] reference temperature</i>
2: Thermocouple Temp (DIFF) (P14)		
1: 1	Rep	<i>Measure</i>
2: 1	5 mV slow Range	<i>temperature</i>
3: 1	IN Chan	
4: 1	Type T (Copper-Constantan)	
5: 1	Ref Temp Loc REF TEMP	
6: 2	Loc [:TEMP]	
7: 1.8	Mult	
8: 32	Offset	
3: If X<=>F (P89)		<i>If temp is greater</i>
1: 2	X Loc TEMP	<i>than or equal to</i>
2: 3	>=	<i>99, set Flag 1 low</i>
3: 99	F	
4: 21	Reset flag 1	
4: If X<=>F (P89)		<i>If temp is less</i>
1: 2	X Loc TEMP	<i>than 96, set</i>
2: 4	<	<i>Flag 1 high</i>
3: 96	F	
4: 11	Set flag 1	
5: Set Port (P20)		<i>Set Port 1</i>
1: 11	Set according to flag 1	<i>according to</i>
2: 1	Port Number	<i>Flag 1</i>
Input Location Labels:		
1:REF TEMP	2:TEMP	

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 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)

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

Campbell Scientific Spain, S. L.

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

Please visit www.campbellsci.com to obtain contact information for your local US or International representative.