Relay with Current Sense   BV110
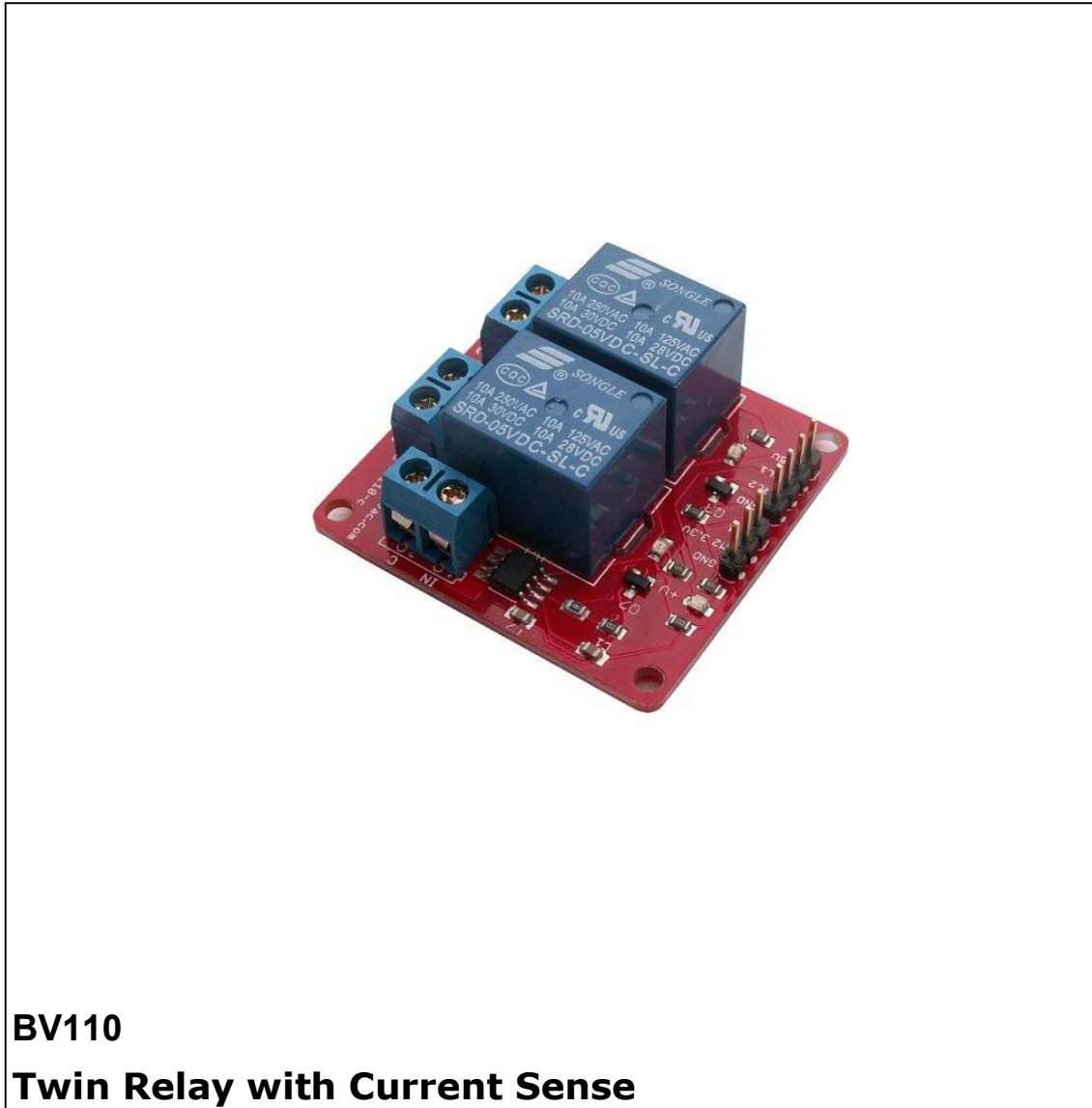

BV110

Twin Relay with Current Sense

Product specification   February 2015

Relay with Current Sense   **BV110**

Contents

Relay with Current Sense   BV110

Rev	Change
February 2015	Preliminary

1. Introduction

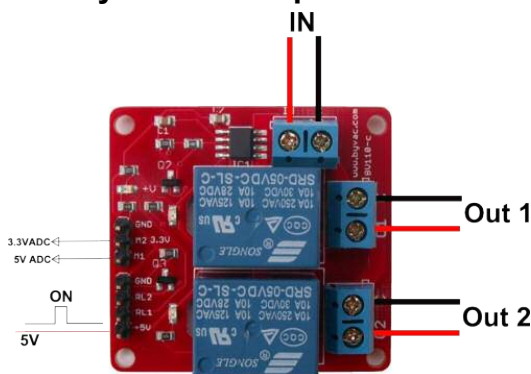This is a twin 10A relay with an ACS712, 20A current sensing device.

This is intended for switching two loads with verifiable feedback that the loads have been activated.

WARNING: The relays are capable of handling 250V at 10A AC which is lethal. As such this device must not be used on lethal voltages except by the use of a qualified practitioner.

2. Features

- 2 x 10A relays
- 20A current sense
- Output for 5V and 3.3V ADC
- Relays operate down to 3V

3. Physical Description

3.1. Power side

The relays are wired as single pole single throw and are intended to take power from one point an distribute it to either of the two outputs.

The connection marked C on the PCB is common to all terminals. The other connection is the switch wire.

3.2. Control Side

The relays operate on 5V DC and consume about 40mA each when on. Lower voltages will produce poor switching and possible ware of the contacts.

Pin	Description
GND	Ground
RL1	Relay 1
RL2	Relay 2
5V	5V supply to relay

Relay Control

The set of 4 pins are the control to the relay. 5V is the supply required to operate the relay. The control lines are normally low for off. Taking them to between 3V and 5V will operate the relay.

NOTE: The relays require a supply of 5V but will operate from 3.3V logic if required.

Pin	Description
GND	Ground
M2	3.3V output
M1	5V output

Current Sense

The current sense can be connected to a 5V ADC or a 3.3V ADC. It monitors the current flowing through **both** relays up to a maximum of 20A.

Current Sensing

The output is an analogue voltage with a neutral (zero current) output at about half the output voltage so for the M1 pin this about 2.5V and for the M2 pin this is about 2V.

The device is fitted with the 20A version of the ACS712 and so the sensitivity is 100mV per Amp. The device can measure current flowing either way, a negative going current will reduce the analogue voltage and a positive going current will increase the analogue voltage.

Using a 10bit ADC a resolution and taking into account that ½ of the voltage is used this will give a resolution of approximately 0.08A (80mA).

4. Tips

The zero value when no current is flowing should be established and this should be subtracted from the result.

noCurrent = reading when no current flowing. This reading should be kept as a base point.

When current is flowing the result will be:

Result = reading − noCurrent

4.1. AC

To get the approximate current from an AC reading take several reading that should last for more than 20mS (for 50Hz) and use the maximum reading.

This value will be a bit too big as it does not take into account the cyclic nature of AC which really requires an RMS value. If you have a more powerful microcontroller then simply multiply the value by 0.707

Relay with Current Sense

BV110

IN1-2

IN1-1

O1-2

O1-1

O2-2

O2-1

+5V

1	IP+ VCC	8
2	IP+1 VOUT	7
3	IP- FLTR	6
4	IP_1 GND	5

CS1

10nF
C1

R1 2k

CS1A

R2 10k

GND

K1
11 14 12

K2
11 14 12

JP1
+5V 1
RL1 2
RL2 3
GND 4

JP2
CS1 1
CS1A 2
GND 3

+5V

RL1 LED805

R8 4K7

K1 AZNS55-1
A1 A2

Q2 BSS138

RL1

R12 100k

GND

K2 AZNS55-1
A1 A2

+5V

Q3 BSS138

R13 100k

GND

RL2

+5V

RL2 LED805

R9 4K7

+5V

+V LED805

0,1uF
C2

R0 4K7

GND