

Date: 28 AUG 07
Serial No: 0708V
Test:

RoHS - Yes

Details & Options Guide

1. Very Important Note

Never adjust VR2 or VR3. These two potentiometers are factory set and calibration will be lost if adjusted.

2. Power Supply Voltage, V_s.

This can be any value between 9V and 24V.

3. Output signal(s).

This can be NPN, PNP, or both simultaneously.
The NPN output is totally uncommitted and can sink 20mA.
The PNP output is loosely pulled down to ground with a 150k resistor and can source 20mA.
Note: an unused output can be safely left unconnected.

4. Output options

If a SIL relay with volt-free contacts OR an Optoisolator is required, then the PNP output driver becomes dedicated to this purpose, and the PNP output must be left unconnected.
If a SIL relay is required, the coil operating voltage must be selected to match the chosen Power Supply Voltage, V_s, and the coil load current must not exceed 20mA. The suitable SIL relay should be soldered onto the circuit, where the volt-free contacts appear across two conn2 terminals marked RO+ and RO-.
If an Optoisolator is required, then one resistor, R24, must be added to the circuit to suit the particular Optoisolator chosen. The value of R24 is determined with the following equation:

$$R24 = \frac{(V_s - 2.3)}{I_{(LED)}}$$
 Where: V_s is the power supply in Volts
I_(LED) is the Opto LED current in mA
(Note: I_(LED) = 20mA max)
R24 is in kΩ

Choose the nearest preferred value for R24 and solder into the circuit board along with the Optoisolator, preferably in a 6pin socket.
The optoisolator collector appears on conn2 terminal RO+, and the optoisolator emitter appears on conn2 RO-.

A list of suitable devices can be found in “Additional Information”.

5. Input-to-output logic

Refer here to the “Input/Output Truth Table” on page 1, and select TRUE or INV (invert) with Sw4.
Note: Sw4 can be safely toggled with the power on.

6. Input trigger voltage, V_T

Refer here to the “Input Selection” section on page 1, and choose an appropriate input from the three available, either Low, Med or Hi.
If V_T exceeds 32Volts, determined the value of the external resistor, R, with the following equation:

$$R = 80V_T - 2090$$
 Where: V_T is in Volts
R is in kΩ

Choose the nearest preferred value for R, and connect the Input signal via this resistor to the Hi input on the circuit.

7. Hysteresis

Refer here to the “Hysteresis Selection” section on page 1. Choose the Hysteresis value from 5% (the minimum), 10%, 15%, 20% or 35% of V_T. For other values of Hysteresis, place Sw1, Sw2 & Sw3 into their Off positions, and determine R9 from this equation:

$$R9 = \frac{1400}{(h - 5)}$$
 Where: “h” is Hysteresis as a % of V_T
R9 is in kΩ

Choose the nearest preferred value for R9 and solder into the circuit board.
Note: Sw1, 2 & 3 can be safely toggled with the power on.
Hysteresis; what is it? See description in “Additional Information”.

8. Options considered...

...now move onto the “Quick Setup Guide” to finish the job.

Quick Setup Guide

(Using standard Inputs Hysteresis & Outputs, & Nominal Ratings; see p1)

1. Wind VR1 fully clockwise.
Note, VR1 has 24turns end-to-end.
2. Connect a de-energized Power Supply (24V DC max.)
3. Connect a de-energized stable Signal source to the appropriate Input.
4. Connect NPN and/or PNP outputs to follow-on circuits.
5. Set Hysteresis: 5%, 10%, 15%, 20% or 35%.
6. Set “True” or “Inv” for Input-to-Output logic.
7. Energize Power Supply and Signal source.
8. Set Signal source to the required Trigger Voltage.
9. Slowly wind VR1 anticlockwise until the Signal LED1 turns on.
Note again, VR1 has 24turns end-to-end.
10. Check for correct operation.
(Wind the input signal voltage up and down and observe the points at which the Signal LED1 turns on and off.)
11. Setup Complete.

Additional Information

Hysteresis; what is it?

Here is a description by worked example relating directly to this circuit.

Assume:
Required Trigger Point Voltage .. V_T = 10Volts
Required Reset Point Voltage ... V_R = 9Volts
Therefore:
Resulting Hysteresis Voltage V_H = (V_T - V_R)
V_H = (10 - 9) Volts
V_H = 1Volt
...and, % Hysteresis V_{H%} = (100 x V_H/V_T)
V_{H%} = (100 x 1/10) %
V_{H%} = 10%

Now view the “Hysteresis Selection” table on page 1, and set the three Hysteresis switches as indicated.
For 10% Hysteresis, Sw1 is On, Sw2 is Off & Sw3 is Off.

Suitable Optoisolators & SIL Relays

Darlington Transistors	SIL Relays	Chosen dependant upon V_s
4N29 FEC: 102-1162	FEC: 956-1927	
4N30 FEC: 102-1165	FEC: 956-1935	
4N31 FEC: 102-1166	FEC: 956-1943	
4N32 FEC: 102-1106 & series	& others	
4N33 FEC: 102-1107 & series		
Single Transistor		
MCT5200 FEC: 102-1116 & series		

Data Sheet End

IMPORTANT

Axis Ten Products reserve the right to make changes to this product without giving prior notice. See www.axisten.co.uk for possible updates. Every care has been exercised in the preparation of this product. It has been designed, constructed and tested with electrical robustness and reliability in mind. However, incorrect connection to power supplies, signal sources and measuring devices may stress the circuit beyond tolerance. Always double-check before powering this circuit and any other connected devices. All circuit boards are 100% tested.