PB1976-ND Physical Relay Testing

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Physical Overview

As shown in *Figure 1,* we can view the physical setup of the actual relay.

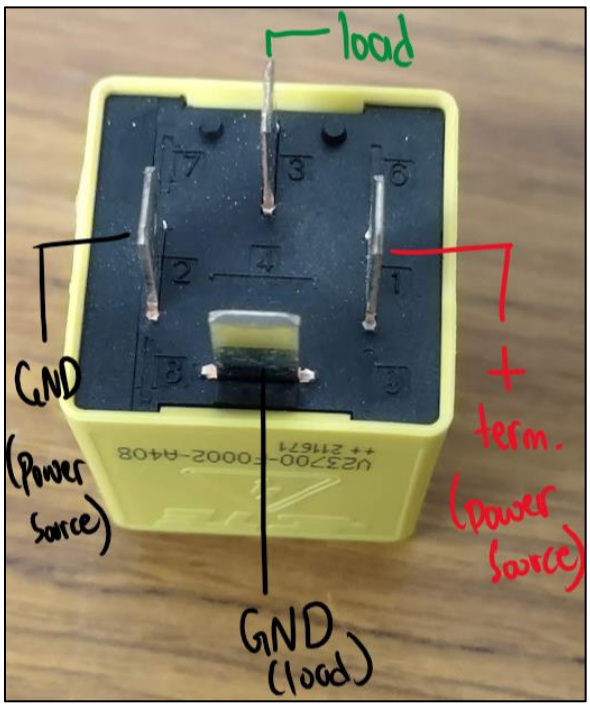

Figure 1 – Physical Diagram of Relay

Viewing the actual physical characteristics of the actual relay as provided in the documentation, the highlighted key factors are shown in *Table 1.*

Factor	Value
Coil Current	288 mA
Coil Voltage	12 V
Must Operate Voltage	6.9 VDC
Must Release Voltage	1.2 VDC
Operate Time	2.5 ms
Release Time	1 ms
Coil Resistance	41.6 Ohms

Table 1 – Key Factors [1]

Testing Using DMM

Resistance:

Now we will measure the actual resistance obtained across the relay, the set up is shown in *Figure 2.*

Figure 2 – Resistance Set up Measurement

Using the HANTEK 2D42 Oscilloscope, we can measure the actual resistance across the power leads. Such that we obtain: $39.8 \pm 0.698\ \Omega$. This measurement is relatively close to the expected value.

Verifying Continuity and Current:

By attaching the power source and measuring the voltage across the load leads, the expected voltage should be zero to show that the actual switch is closed which was achieved in this case. Furthermore, the power supply shows the actual current that is being fed. We can view this in *Figure 3.*

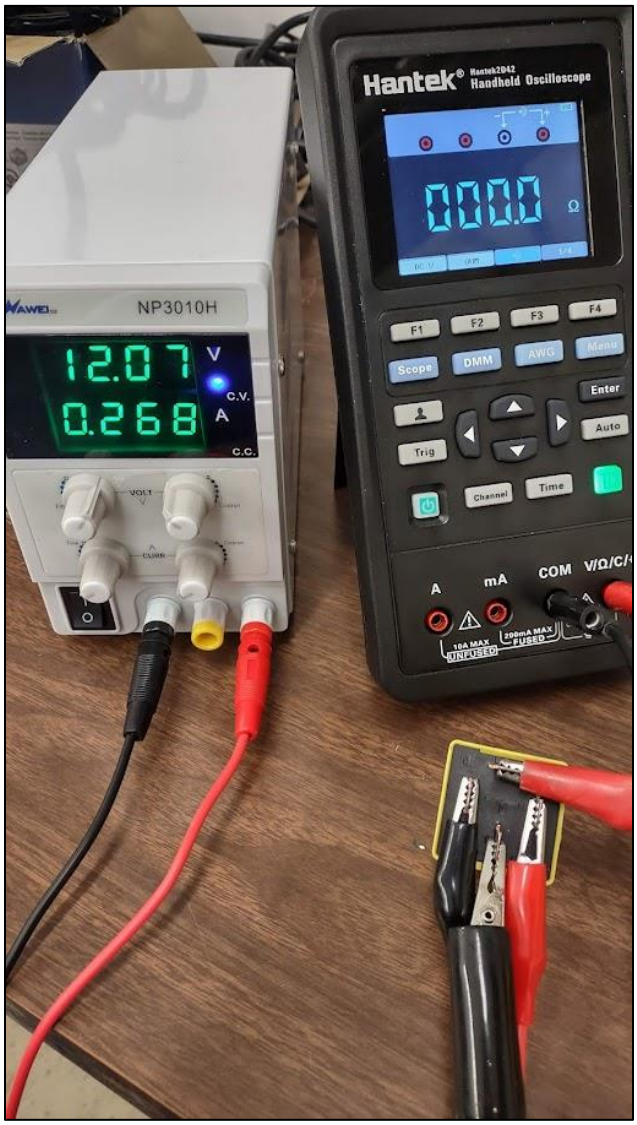

Figure 3

As seen the resistance and the voltage is shown as zero. Furthermore, the current that is being outputted is about 0.268 ± 0.002 A. This is quite close to the actual current value as shown in *Table 1.* This goes to show that the relay functions. By powering this relay on we can also hear it click to show that it does end up working, meaning the contact lead closes the switch.

Testing Charging Time:

In order to test the charging time, two oscilloscopes were used and their cursors were also used. The charging time on both were about 16 milliseconds. This goes to show that this value is quite off compared to the actual given value. However, further tests will be done to verify if this could pose a potential problem or not once the entire board has been assembled. In *Figure 4* – *Figure 5*, the charging graph's are shown:

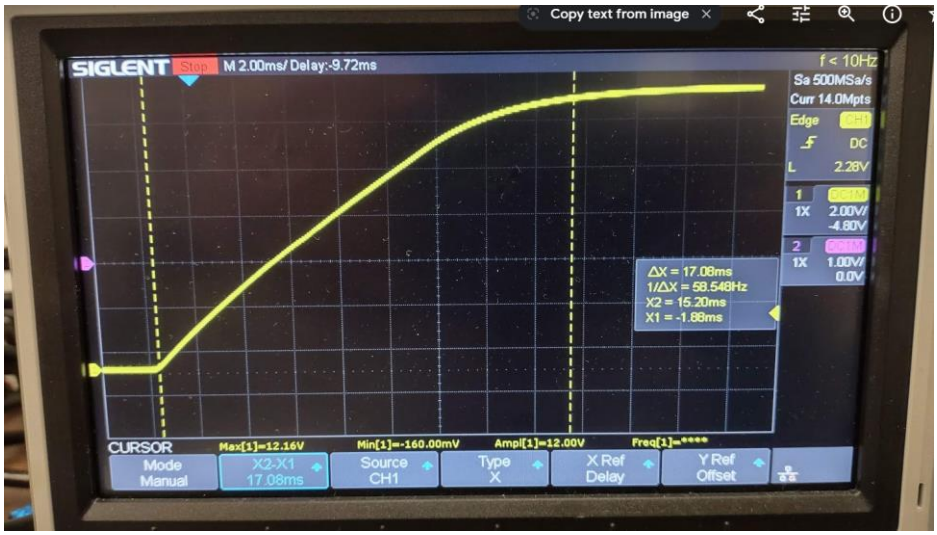

Figure 4

Figure 5

As seen the charging times are on average 16.5 milliseconds.

[1] https://www.digikey.ca/en/products/detail/te-connectivity-potter-brumfield-relays/2-1904058-7/4168712?s=N4IgjCBcoLQBxVAYygMwIYBsDOBTANCAPZQDaIALBALoC%2BthATGSIzGAJwAMFXArHBgB2EHSA

[2] https://www.circuitspecialists.com/content/476383/HANTEK2D72_Manual.pdf

[3] https://manualzz.com/doc/52961177/navitech-np3010-power-supply-user-manual