

### FEATURES

- Small size and weight
- High-reliability design
- Hermetically sealed
- High transient immunity
- Long life
- Low-power consumption
- Adjustable Time Delays
- Reverse Polarity Protection

### PRINCIPLE TECHNICAL CHARACTERISTICS

|   |  |
|---|--|
| <b>Seal: Hermetically Tested per MIL-STD-883, Method 1014</b>         | 1x10 <sup>-6</sup> atm, cm <sup>3</sup> /s max leakage |
| <b>Finish:</b>  | Tin Lead Plate   |
| <b>Terminals: TDH 7061 (Tin Lead Plate)<br/>TDH 7060 (Gold Plate)</b> | Solder-lug<br>Plug-In                                  |
| <b>Weight</b>   | 3.0 oz. MAX  |

**APPLICATION NOTE :**  
101

**APPLICABLE SOCKETS:**  
SO-1056-8691 (TDH-7060 series only)

### DESCRIPTION

The TDH-7060/61 Time Delay Relays have been designed with thick film hybrid microelectronics timing circuits and MIL-PRF-6106 relays, packaged in a hermetically sealed military style enclosure. The TDH-7060/61 series are designed to withstand severe environmental conditions encountered in military/aerospace applications. These relays are suited for use in power control, communication circuits and many other applications where power switching and high reliability are required over a wide temperature range.

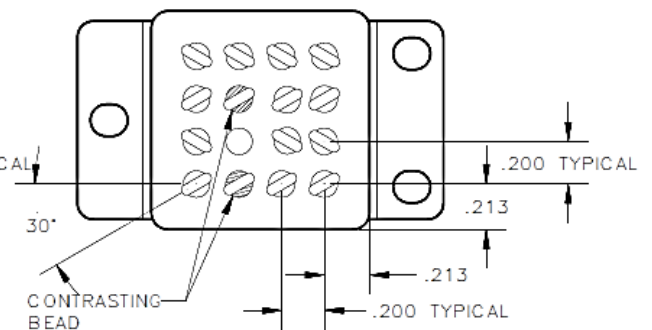
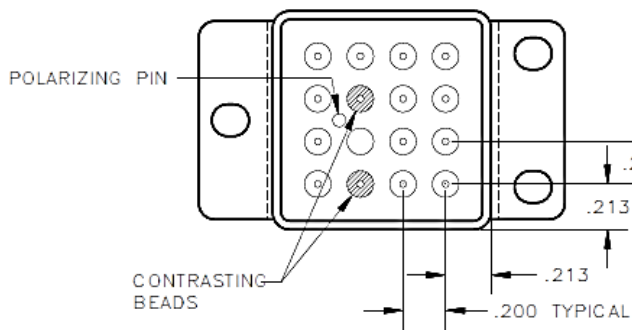
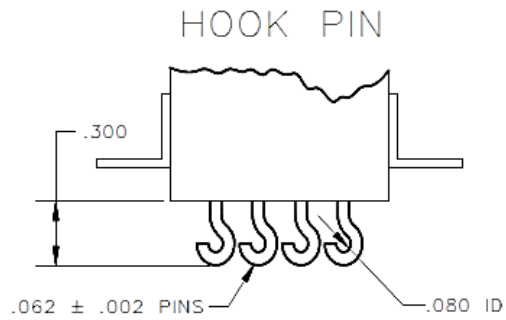
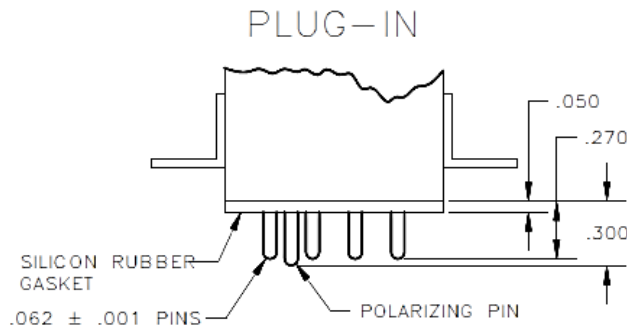
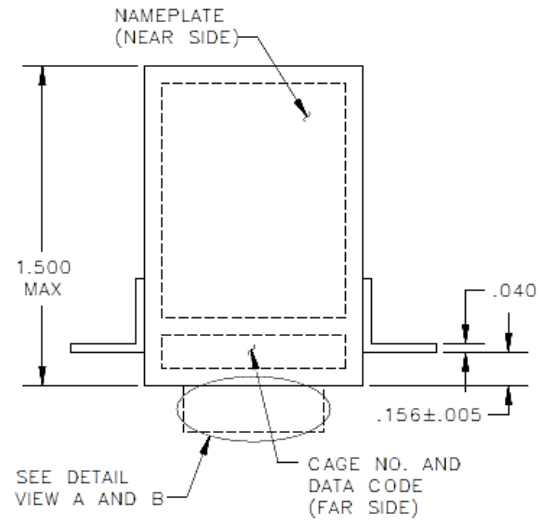
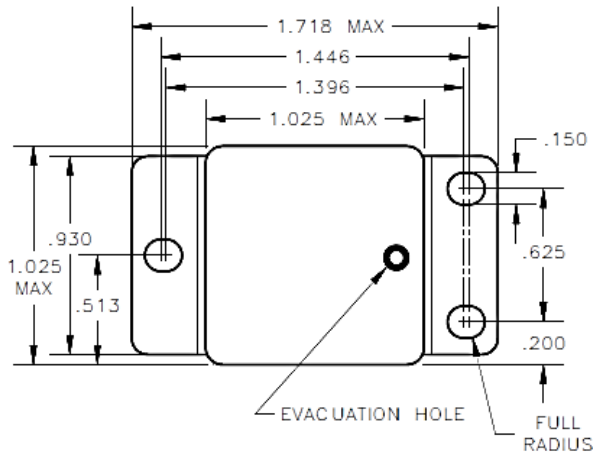
## ELECTRICAL SPECIFICATION

| Input (Control) Parameters                    |                        |
|---|------------------------|
| Timing:                                       |                        |
| a. Operation, Time Delay on                   | Operate                |
| b. Method                                     | Adjustable Period      |
| c. Range                                      | 0.1 to 500 Seconds [6] |
| d. Accuracy                                   | ±10% [1]               |
| Recycle Time                                  | 50 ms, Max [5]         |
| Operations: (X1-X2)                           |                        |
| a. Input & Control Voltage                    | 20-30 Vdc              |
| b. Operating Current                          | 150 mA, Max @ +25° C   |
| Transients:                                   |                        |
| a. Positive, MIL-STD-704A, Figure9, Limit 1   | +80 Volts Max          |
| b. Spike, MIL-STD-704A, 0-10 µs               | ±600 Volts Max         |
| c. Self-Generated                             | ±50 Volts Max          |
| d. Susceptibility                             | +80; -600 Volts Max    |
| Electromagnetic Interference Per MIL-STD-461A | Class 1D [3]           |
| Power Loss                                    | 500 µs [2]             |
| Output (Load) Parameters                      |                        |
| Contact Form                                  | 4 PDT                  |
| Contact Rating:                               |                        |
| a. Resistive                                  | 10A                    |
| b. Inductive                                  | 8A                     |
| c. Motor                                      | 4A                     |
| d. Lamp                                       | 2A                     |
| Dielectric Strength                           |                        |
| a. @ Sea Level, 60 Hz                         | 1,000 Vrms [4]         |
| b. @ 80,000 ft., 60 Hz                        | 350 Vrms               |
| Insulation Resistance @ 500 Vdc               | 1,000 MΩ [4]           |

## GENERAL CHARACTERISTICS

|                                       |                        |
|---------------------------------------|------------------------|
| Ambient Temperatures Range:           |                        |
| a. Operating                          | -55 to +125° C         |
| b. Non-Operating                      | -65 to +125° C         |
| Vibration:                            |                        |
| a. Sinusoidal, 10-2000 Hz             | 30 G                   |
| b. Random: 50-2000 Hz, MIL-STD-810    | 0.4 G <sup>2</sup> /Hz |
| Shock @ 6 ± 1 MS, 1/2 Sine, 3 Axis    | 100 G                  |
| Acceleration, in any Axis             | 20 G                   |
| Life at Rated Resistive Load; Minimum | 100,000 operations     |

## MECHANICAL SPECIFICATIONS

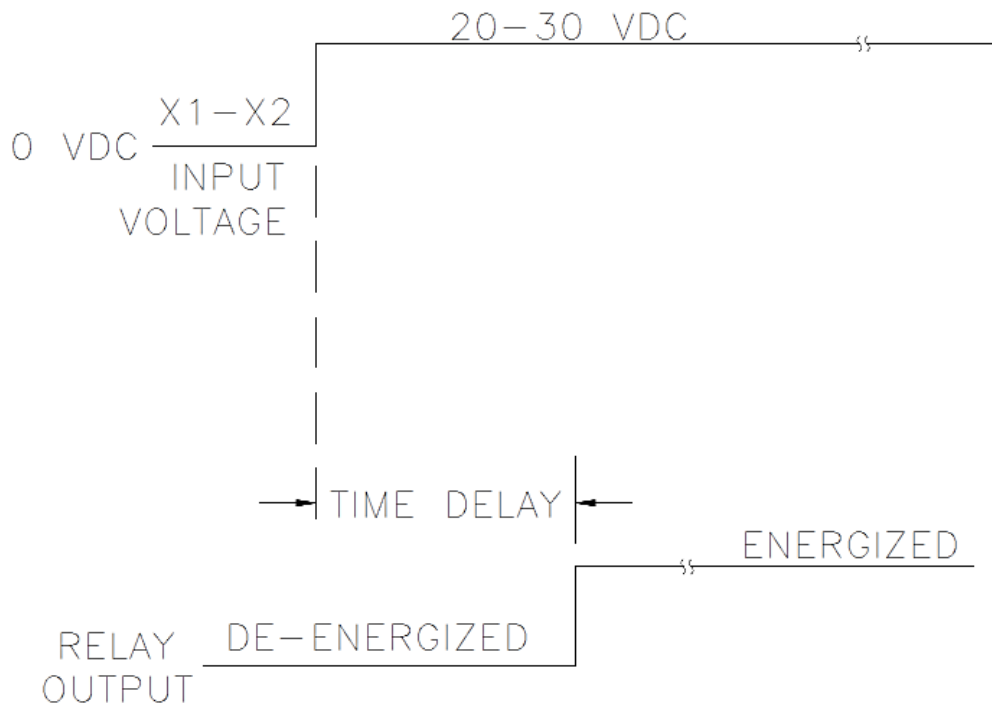
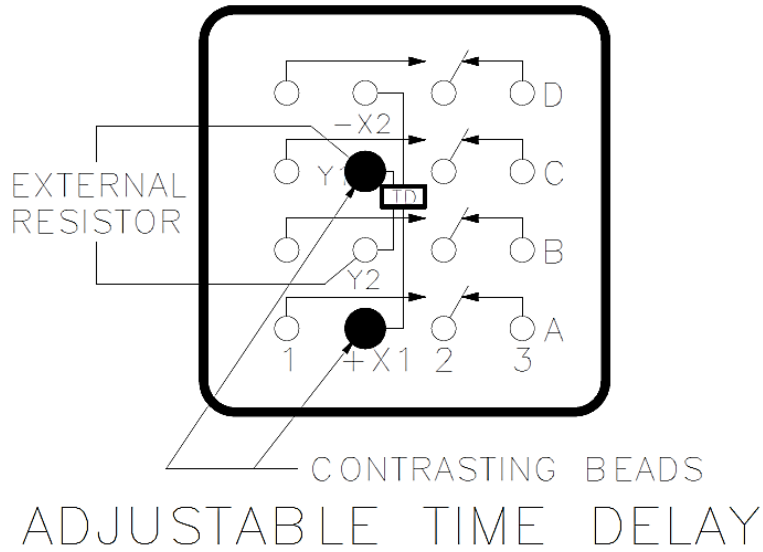


DETAIL VIEW A

DETAIL VIEW B

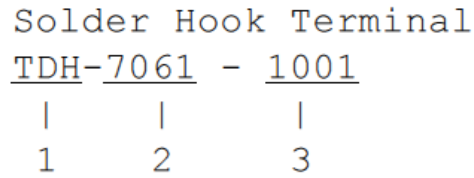
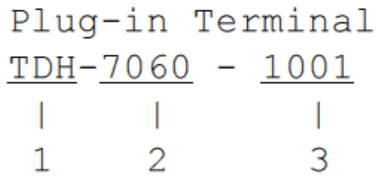
ALL DIMENSIONS SHOWN ARE IN INCHES.

### DIAGRAMS



TIME DELAY ON OPERATE

## NUMBERING SYSTEM



1. Model Number.
2. Pin Style Number.
3. Additional Adjustable Timing Range: 50 milliseconds to 500 seconds. (See Note 6).

## NOTES

- [1] The accuracy specification applies for any combination of operating temperature and voltage.
- [2] The accuracy will not be affected by power interruptions up to 1 millisecond, spaced at least 10 milliseconds apart. Transient and power loss specifications are based on a maximum duty cycle of 1/50.
- [3] EMI test limits will not be exceeded during the timing interval or when continuously energized under steady state conditions, per paragraph 3.23, MIL-PRF-83726B.
- [4] Terminals X1, X2, R1, R2 and L must be connected together during the test. Dielectric withstanding voltage and insulation resistance are measured at sea level between all mutually insulated terminals and between all terminals and case.
- [5] Recycle time is defined as the maximum time power must be removed from terminal X1 to assure that a new cycle can be completed within the specified timing tolerance.
- [6] A four digit number defines the time delay in seconds (or milliseconds). The first three digits are significant figures, used to define the specific time delay. The fourth digit represents the number of zeros to follow the first three digits.

| <u>SPECIFY</u> | <u>STANDARD DECADE RANGE</u>                 |
|----------------|--|
| - 1001         | = 0.1 to 1 second (100 to 1000 milliseconds) |
| - 1002         | = 1.0 to 10 seconds                          |
| - 5002         | = 5 to 50 seconds                            |
| - 5003         | = 50 to 500 seconds                          |

An external resistor is used to obtain a specific time delay within the specified decade range. The formula below provides the proper resistance value to achieve the desired time delay:

$$R_{ext} = \left( \frac{T_1}{T_0} - 1 \right) 100,000 \text{ Ohms}$$

Where:  $R_{ext}$  = External resistance value (Ohms)  
 $T_1$  = Desired time in seconds  
 $T_0$  = Minimum time (low end of the decade range) in seconds.

As an example, if using a 5 to 50 second adjustable timer and a 30 second delay is desired, the calculation is:

$$R_{ext} = \left( \frac{30}{5} - 1 \right) 100,000 \text{ Ohms or } R_{ext} = 500 \text{ K Ohms}$$

Recommended resistors IAW MIL-R-55182 1/8 Watt, 1% (RNC60HXXXXFS).  
External resistor not supplied.