ENGINEERING DATA SHEET

TD-1436

ON OPERATE-ADJUSTABLE
1PST

FEATURES

- Small size and weight
- High-reliability design
- Hermetically sealed
- High transient immunity
- Qualified to MIL-PRF-83726/21

PRINCIPLE TECHNICAL CHARACTERISTICS

Seal:Hermetic Tested per MIL-STD-883, Method 1014 Condition B, C	**$1x10^{-8}$ atm, cm^3/s max leakage**
Finish: per MIL-T-10727	**Tin Plate**
Terminals: "A" (Tin Plate) "W" (Tin Plate)	 **Solder-lug** **Plug-in PCB mountable**
Weight	**0.5 Ounce max.**

APPLICATION NOTE:
101

DESCRIPTION

The TD-1436 is packaged in a hermetically sealed military style enclosure.|The timing circuits are designed with thick film hybrid microelectronics. The TD-1436 is qualified to MIL-PRF-83726/21 and designed to withstand severe environmental conditions encountered in military/aerospace applications. Our reliable circuit design with state-of-the-art packaging processing and sealing techniques, allow for a very reliable operation over a wide temperature range.

Esterline Power Systems

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ELECTRICAL SPECIFICATION TD-1436

Input (Control) Parameters	
Timing: a. Operation, Time Delay on b. Method c. Range d. Accuracy	 Operate Adjustable Period 0.05 to 500 Seconds ±10% [1]
Recycle Time	10 ms, Max [5]
Operations: (X1-X2) a. Input & Control Voltage b. Operating Current	 18-32 Vdc 5 mA, Max @ +25° C
Transients: MIL-STD-704A, Limit 1 a. Spike Susceptibility b. Self-Generated Spikes	 +80; -600 Volts Max None
Electromagnetic Interference Per MIL-STD-461A	Class 1D [3]
Power Interrupt	1 Millisecond [2]
Output (Load) Parameters	
Contact Form Contact Rating: Voltage Drop, Maximum Leakage Current, Maximum a. at 28 Vdc and 25° C b. at 28 Vdc and 125° C	SPST 250 mA 2 Vdc 1 Microampere 10 Microamperes
Dielectric Strength: a. @ Sea Level, 60 Hz b. @ 80,000 ft., 60 Hz	 1000 Vrms [4] 350 Vrms
Insulation Resistance @ 500 Vdc	1000 M Ω [4]

GENERAL CHARACTERISTICS

Ambient Temperatures Range: a. Operating b. Non-Operating	 -55 to +125° C -55 to +125° C
Vibration: a. Sinusoidal	
10-80 Hz 80-3000 Hz	0.06" DA 30 G
b. Random: 50-2000 Hz, MIL-STD-810	0.4 G^2/Hz
Shock, 0.5 MS, 1/2 Sine, 3 Axis	1,100 G
Acceleration, in any Axis	100 G
Life at Rated Resistive Load; Minimum	1,000,000 operations

NUMBERING SYSTEM

PCB Mount

TD-1436 - 5001 W
| | | |
1 3 4

M83726/21 - 002 W
| | | | |
1 2 3 4

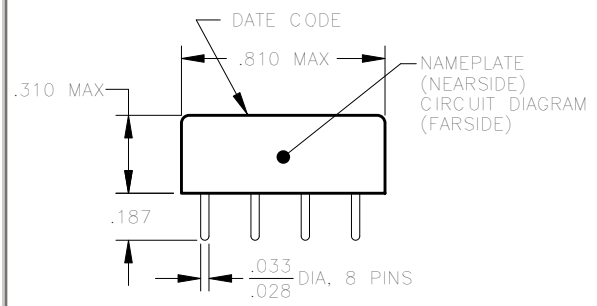
Flange Mount

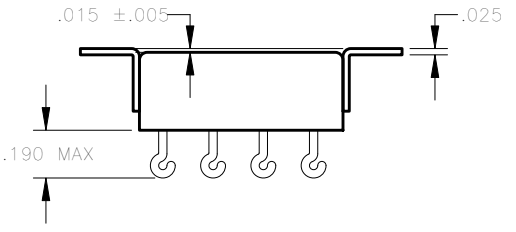
TD-1436 - 5001 AW
| | | |
1 3 4

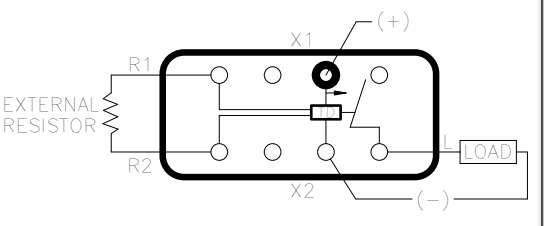
M83726/21 - 006 AW
| | | | |
1 2 3 4

1. Model Number or Basic "MIL-PRF" Series number.
2. Military "Slash" number.
3. Timing Range.
4. Quality level (See Note 7):

PCB MOUNT		FLANGE MOUNT		TIME DELAY
Military	Leach	Military	Leach	Range
Dash No.	Dash No.	Dash No.	Dash No.	(seconds) ±10%
001 W	5000W	005 W	5000AW	0.05-0.5
002 W	5001W	006 W	5001AW	0.5-5
003 W	5002W	007 W	5002AW	5-50
004 W	5003W	008 W	5003AW	50-500

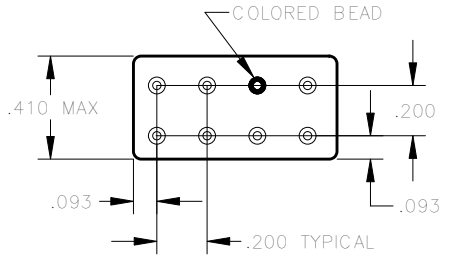




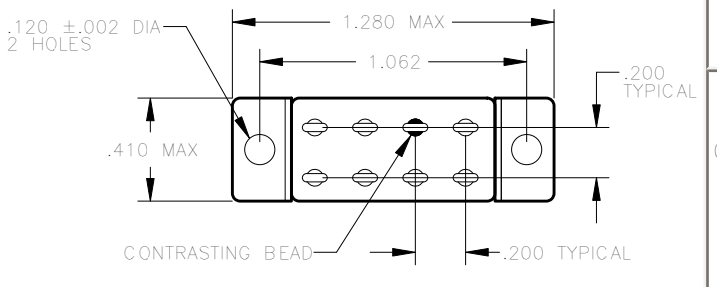


SCHEMATIC DIAGRAM

FIXED TIME DELAY

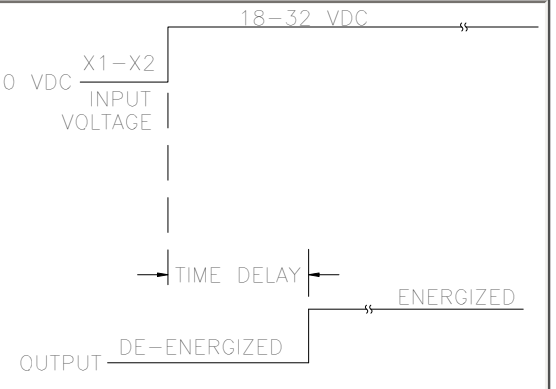


PRINTED CIRCUIT TYPE



FLANGE TYPE

DIMENSIONS ARE SHOWN IN INCHES.



TIME DELAY ON OPERATE

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-83726C.
[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.

SPECIFY	STANDARD DECADE RANGE
- 5000 =	0.05 to 0.5 second (50 to 500 milliseconds)
- 5001 =	0.5 to 5 seconds (500 to 5000 milliseconds)
- 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.
[7] Quality level as specified in MIL-R-83726B, paragraph 3.1.1, 3.1.2 and 3.1.3.

DERATING OF CONTACTS FOR DC VOLTAGES ABOVE NOMINAL RATING

To establish a standard for the derating of relay contacts is, at best, a subjective practice. Limitations are governed by the type of relay, contact gap, maximum voltage capabilities of the relay contact system, and the contact material.

The most common method is to derate the contacts by use of the Power Formula, using the known current and voltage.

This method is valid only for **Resistive Loads**, and is an approximation only; keeping in mind the limitations mentioned above.

Power = IE (Current x Voltage)

$I_2 E_2 = 2/3 I_1 E_1$

Example:
A designer is working with a 55 volt DC system and has a relay rated at 10 amps resistive at 28 volts DC.
What is the maximum current that can be switched at 55 Vdc.

I_1 = 10 Amperes
E_1 = 28 VDC
E_2 = 55 VDC
I_2 = ? (Current ratings at 55 VDC Resistive)

$I_2 E_2 = 2 I_1 E_1/3$

$I_2 = 2 I_1 E_1/E_2 3$

= 2 (10 x 28)/55 x 3

= 560/165

I_2 = 3.4 Amperes at 55VDC

In addition, the user should always be concerned about the following:

1. Derating contacts that are rated for less than 10 Amperes at nominal voltage.

2. Derating contacts for use in system voltages above 130 Volts DC