ENGINEERING DATA SHEET

APPLICATION NOTE:
101

FEATURES

- Small size and weight
- High-reliability design
- Hermetically sealed
- High transient immunity
- Qualified to MIL-PRF-83726/20
- Reverse Polarity Protection

PRINCIPLE TECHNICAL CHARACTERISTICS

Seal:Hermetic Tested per MIL-STD-883, Method 1014 Condition B, C	**1×10^{-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.**

DESCRIPTION

The TD-1435 Time Delay Relays are designed with thick film hybrid microelectronics timing circuits and packaged in a hermetically sealed military style enclosure. The TD-1435 series are qualified to MIL-PRF-83726/20 and 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.

Data sheets are for initial product selection and comparison. Contact Esterline Power Systems prior to choosing a component.

| **Input (Control) Parameters**	
Timing: a. Operation, Time Delay on b. Method c. Range d. Accuracy	Operate Fixed 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 Volts Max -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

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     PCB Mount                      Flange Mount
TD-1435    - 1001    W         TD-1435 - 1001    A
   |          |      |            |        |      |
   1          3      4            1        3      4


M83726/20 - 1001    W         M83726/20- 1001    A
   |    |    |       |            |    |    |      |
   1    2    3       4            1    2    3      4
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1. Model Number or Basic "MIL-R" Series number.
2. Military "Slash" number.
3. Timing Range, Fixed: 50 milliseconds to 500 seconds.(See Note 6)

4. Mounting style and quality level (See Note 7).
   W = Printed circuit mountable.
   A = Flange mount with solder hook terminal.

FIXED TIME DELAY

TIME DELAY ON OPERATE

DIMENSIONS ARE SHOWN IN INCHES.
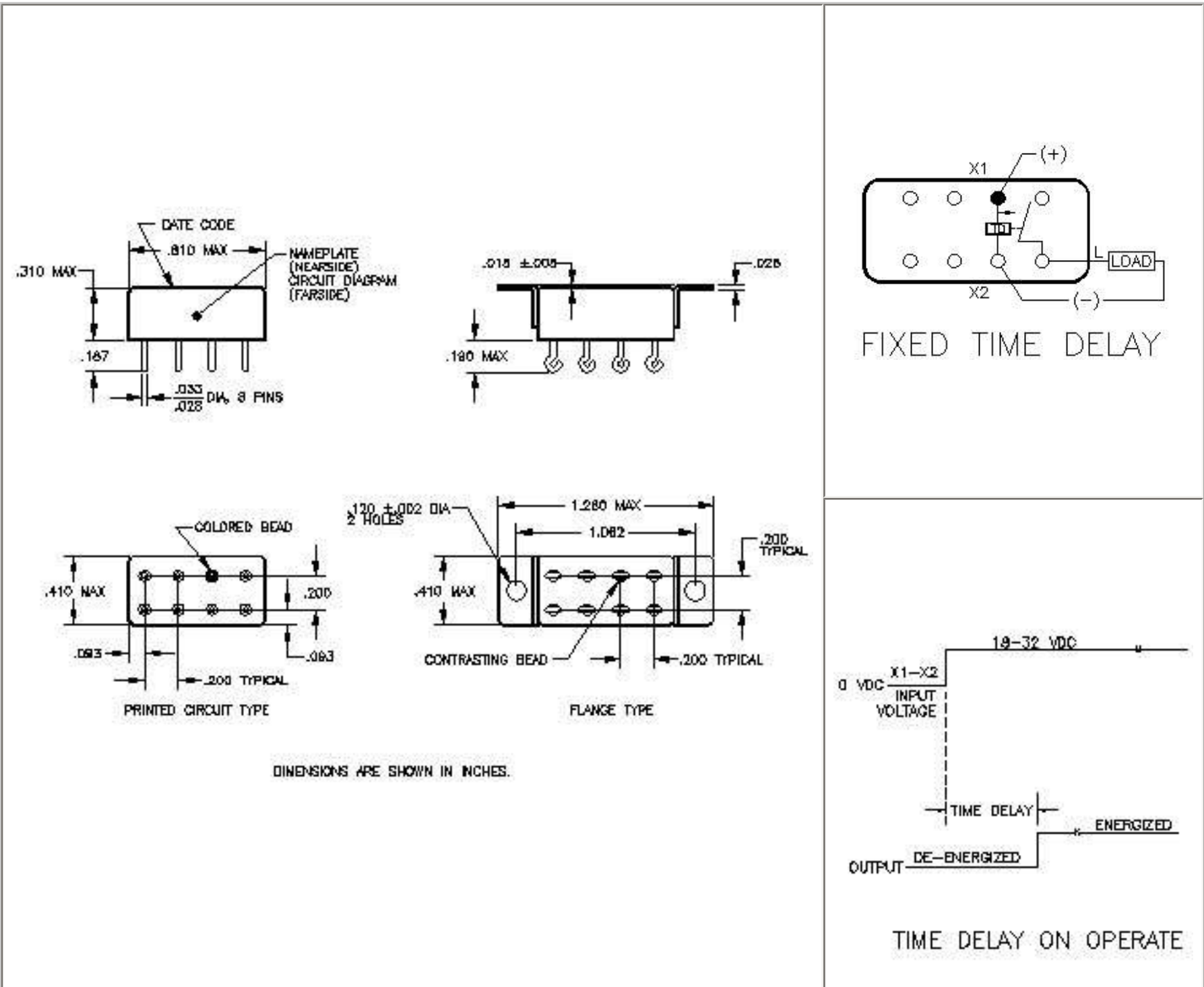
NOTES

[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 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. Examples:

- 1001 = 1 second (1,000 milliseconds)

- 2502 = 25 seconds (25,000 milliseconds)

- 5000 = 0.5 seconds (500 milliseconds)

[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.

$$Power = IE \text{ (Current x Voltage)}$$

$$I_2 E_2 = 2/3\ I_1 E_1$$

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.

$$I_1 = 10 \text{ Amperes}$$
$$E_1 = 28 \text{ VDC}$$
$$E_2 = 55 \text{ VDC}$$
$$I_2 = ? \text{ (Current ratings at 55 VDC Resistive)}$$

$$I_2 E_2 = 2\ I_1\ E_1/3$$

$$I_2 = 2\ I_1\ E_1/E_2 3$$

$$= 2\ (10 \times 28)/55 \times 3$$

$$= 560/165$$

$$I_2 = 3.4 \text{ Amperes at 55VDC}$$

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