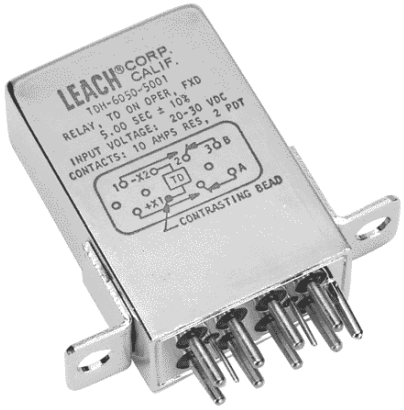
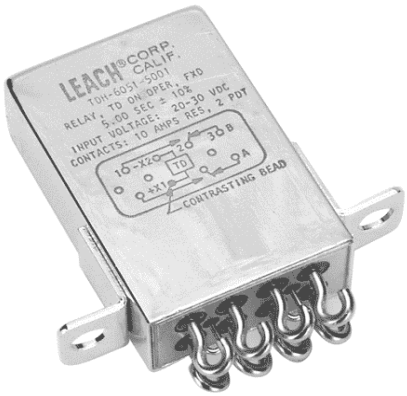
ENGINEERING DATA SHEET

TDH-6050/6051

ON OPERATE-FIXED PERIOD
2 PDT, 10 AMP





APPLICATION NOTES:
101

APPLICABLE SOCKETS:
S302

FEATURES

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

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: TDH 6051 (Tin Plate) TDH 6050 (Gold Plate)	 **Solder-lug** **Plug-In**
Weight	**1.9 Ounce max.**

DESCRIPTION

The TDH-6050/51 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-6050/51 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.

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

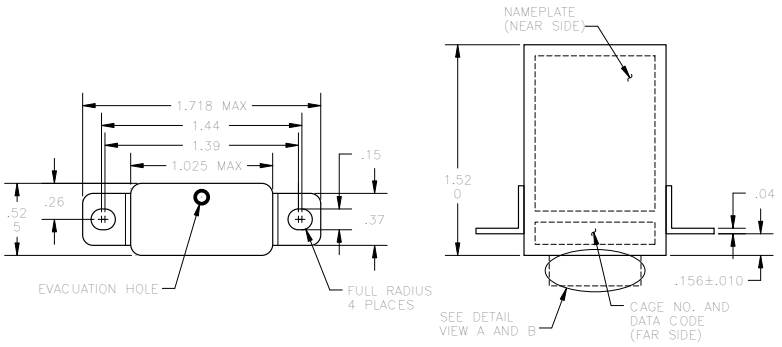
GENERAL CHARACTERISTICS

Ambient Temperatures Range: a. Operating b. Non-Operating	 -55 to +125° C -65 to +125° C
Vibration:	
a. Sinusoidal, 10-2000 Hz	20 G
b. Random: 50-2000 Hz, MIL-STD-810	0.2 G^2/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

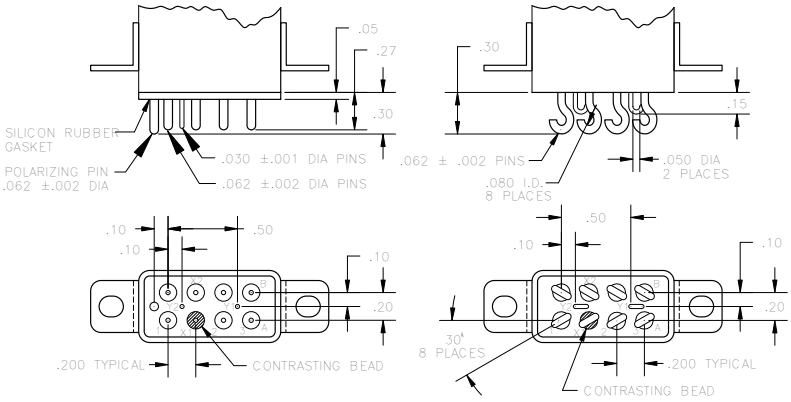
NUMBERING SYSTEM

```
Plug-in Terminal              Solder Hook Terminal
TDH-6050 - 1001               TDH-6051 - 1001
 |    |     |                  |    |     |
 1    2     3                  1    2     3
```

1. Model Number.
2. Pin Style Number.
3. Timing Range, Fixed: 100 milliseconds to 600 seconds. (See Note 6).

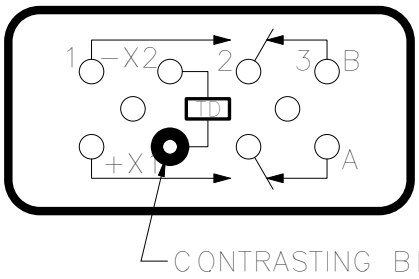


PLUG-IN W/POLARIZING PIN HOOK PIN

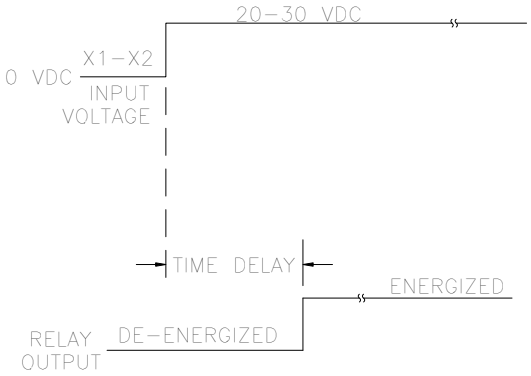


DETAIL VIEW A DETAIL VIEW B

ALL DIMENSIONS SHOWN ARE IN INCHES.



FIXED TIME DELAY



TIME DELAY ON OPERATE

NOTES

[1] The accuracy specification applies for any combination of operating temperature and voltage. For units with a timing range less than 1 second, add ±10 milliseconds to the ±10% tolerance.
[2] Transient and power loss specification 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 and X2 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 minimum 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 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)

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)

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

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

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

$$= 560/165$$

I_2 = 3.4 Amperes at 55VDC

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

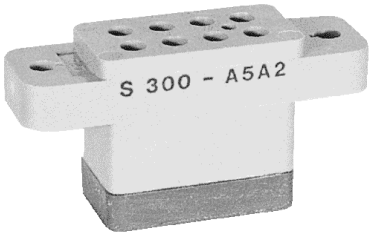
1. Derating contacts that are rated for less than 10 Amperes at nominal voltage.

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

ENGINEERING DATA SHEET

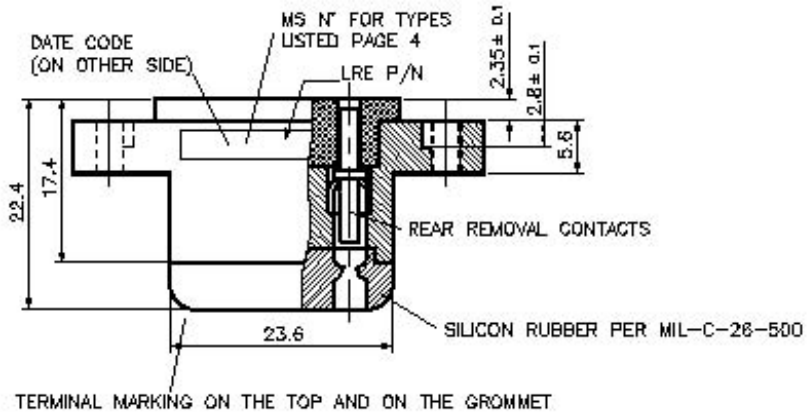
S300, S301, S302

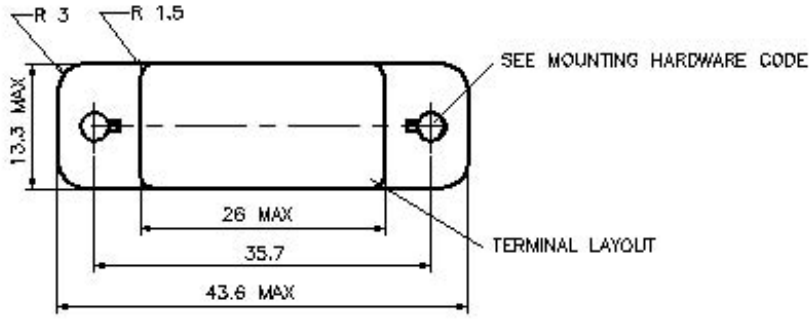
RELAY SOCKET
10 AMP



BASIC SOCKET SERIES DESIGNATION FOR:

Series M300 (DC Coil), M301 (DC Coil), M302 (DC Coil), FD300, FLS300, FLR300





GENERAL CHARACTERISTICS

Crimp tool contact #22	M 22520/2-01 with turret M 22520/2-14.
Insertion and extraction tool #22	M 81969/14-01.
Crimp tool contact #16	M 22520/1-01 with turret M 22520/1-02 or MS 3191-1.
Insertion and extraction tool #16	M 81969/14-03 .
Weight	35g max.
Temperature range	70° C to +125° C.

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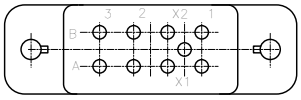
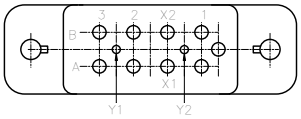
CODE A S300



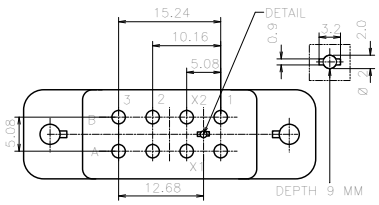
POSITION, TOLERANCE SEE CODE B
FOR M300 RELAY

CODE D S302



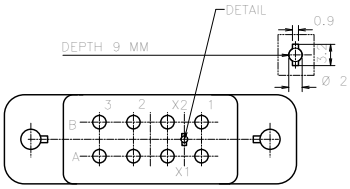
POSITION, TOLERANCE SEE CODE B
FOR M302 RELAY

CODE B S301



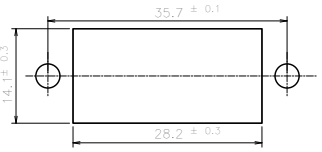
FOR M301 RELAY, FOR K COIL

CODE C S301



FOR M301 RELAY, FOR J COIL

MOUNTING HOLE LAYOUT

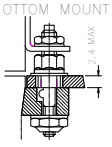


FOR HOLE CLEARANCE,
SEE HARDWARE CODE

MOUNTING HARDWARE

CODE 1 : 05-284-12

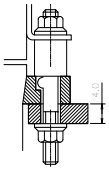
LOOSE UNC HARDWARE
BOTTOM MOUNT



MOUNTING TORQUE
NUT 4/40:0,45 ±0,1 Nm
NUT 10-32:1,2 MAX
:3,6 mm

CODE 2 : 05-284-00

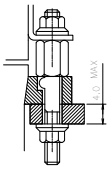
LOOSE METRIC HARDWARE
TOP MOUNT



MOUNTING TORQUE:0,45 ±0,1 Nm
:3,6 mm

CODE 3 : 05-284-07

LOOSE METRIC HARDWARE
TOP MOUNT

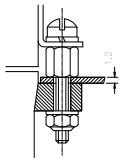


MOUNTING TORQUE:0,45 ±0,1 Nm
:3,6 mm

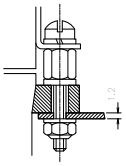
CODE 6 : 05-284-13

LOOSE UNC HARDWARE

BOTTOM MOUNT



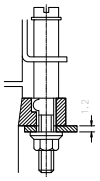
TOP MOUNT



MOUNTING TORQUE:0,45 ±0,1 Nm
MOUNTING HOLE:3,6 mm MOUNTING HOLE:3,6 mm

CODE 7 : 05-284-15

LOOSE METRIC HARDWARE
TOP MOUNT

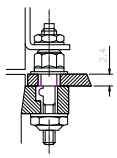


MOUNTING TORQUE:0,45 ±0,1 Nm
FOR RELAYS WITH CODE B TERMINALS
MOUNTING HOLE:3,6 mm

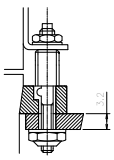
CODE 8 : 05-284-20

LOOSE UNC STUDS MIL-S-12883/41 - EDIT C

BOTTOM MOUNT



TOP MOUNT

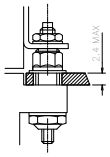


MOUNTIONG TORQUE: NUT 4/40:0,45 ±0,1 Nm - NUT 10-32: 1,2 MAX
MOUNTING HOLE: 5,3 mm MOUNTING HOLE: 3,6 mm

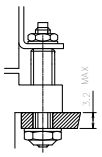
CODE 8 : 05-284-20

FIXED UNC STUDS PER MIL-S-12883/41 - EDIT C

BOTTOM MOUNT



TOP MOUNT



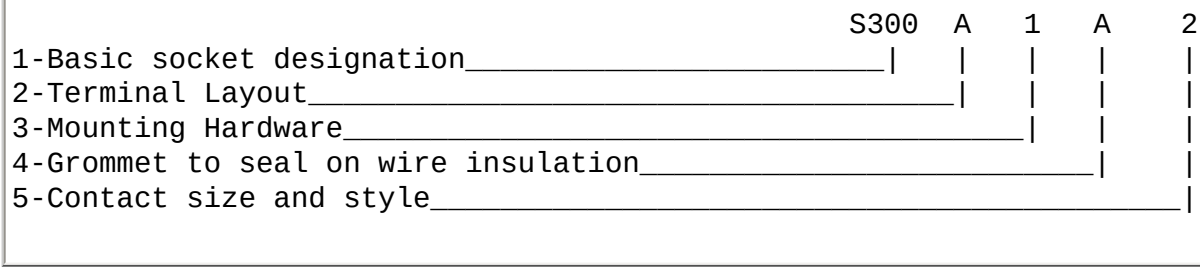
MOUNTING TORQUE: NUT 4/40:0,45 ±0,1 Nm - NUT 10-32: 1,2 MAX
MOUNTING HOLE: 5,3 mm MOUNTING HOLE: 3,6 mm

Code A	Code B
Recommended for contact code 2 contact code 8 **Dia: 1.2 .....2.4mm**	Recommended for contact code 3 contact code 9 **Dia: 0.8 .....1.6mm**

CONTACT SIZE AND STYLE

Y1-Y2 05 912 00 31 036 00	Crimpend to accomodate AWG22 (for product code 2+3) Contact mating end dia 0.8mm (for contact code 8+9) MIL-C-39029/92-531 Bin Code colour bands or Bin Code numbering on crimpside Contact mating end dia 0.8mm	Code 2 05 911 00 Contact mating end #16	Crimpend to accomodate AWG16-18-20	Code 3 05 911 10 Contact mating end #16	Crimpend to accomodate AWG20-22-24		
Code 0	Without contacts	Code 8 30 315 00 Contact mating end #16	Crimpend to accomodate AWG16-18-20 MIL-C-39029/29-533 Bin Code colour bands or Bin Code numbering on crimpside	Code 9 30 315 10 Contact mating end #16	Crimpend to accomodate AWG20-22-24 MIL-C-39029/29-534 Bin Code colour bands or Bin Code numbering on crimpside		

SOCKET NUMBERING SYSTEM



	MS - Number	LEACH P/N	Contacts to accomodate wire #		Applicable for relays
MIL-S-12883/41	-01	S300-A6A2	16-18-20	Loose terminals Above/below panel mounting	M300-D4A /-L/-N/-B/-C
	-04	S300-A6B3	20-22-24		
	-02	S301-B6A2	16-18-20		M 301-D4F/-K
	-03	S301-C6A2	16-18-20		M 301-D4E/-J
	MS - Number	**LEACH P/N**	**Contacts to accomodate wire #**		**Applicable for relays**
MIL-S-12883/41B	-11	S300-A1A2	16-18-20	Loose terminals below panel mounting	M300-D4A /-L/-N/-B/-C
	-14	S300-A1B3	20-22-24		
	-12	S301-B1A2	16-18-20		M 301-D4F/-K
	-13	S301-C1A2	16-18-20		M 301-D4E/-J
	MS - Number	**LEACH P/N**	**Contacts to accomodate wire #**		**Applicable for relays**
MIL-S-12883/41C	-11S	S300-A8A8	16-18-20	Loose terminals Above/below panel mounting	M300-D4A /-L/-N/-B/-C
	-14S	S300-A8B9	20-22-24		
	-12S	S301-B8A8	16-18-20		M301-D4F/-K
	-13S	S301-C8A8	16-18-20		M301-D4F/-J
	-15S	S302-D8A8	16-18-20		M302-D4A/ -L/-N/-B/-C
MIL-S-12883/41C	-16S	S300-A9A8	16-18-20	Fixed terminals Above/below panel mounting	M300-D4A /-L/-N/-B/-C
	-19S	S300-A9B9	20-22-24		
	-17S	S301-B9A8	16-18-20		M 301-D4F/-K
	-18S	S301-C9A8	16-18-20		M 301-D4E/-J
	-20S	S302-D9A8	16-18-20		M 302-D4A/ -L/-N/-B/-C