5017-Series Delay Line

With Fully Integrated Fiber Optics



The 5017-Series Delay System delivers unmatched performance for radar testing, signal processing, phased antenna array, and phase noise testing. The 5017 also provides unmatched convenience and robustness because of its fully integrated fiber optics. All the fiber interfaces are reliably fusion spliced internal to the box, thus eliminating any handling and maintenance of optical connectors. The user only needs to provide +5 and +15 volts, then plug in his RF connectors.

Emcore's fiber-optic transceivers provide bandwidth that is essentially independent of fiber length, loss or delay, and triple transit signals that are immeasurable. In addition to enhanced electrical performance, the delay lines provide several mechanical advantages. The small size of these components allows for a long delay in a compact package with the superior temperature stability of fiber. Emcore's technology takes advantage of the rigid yet flexible properties of fiber-optic cable to provide repeatable enhanced phase and group delay characteristics.

Emcore's Model 5017 consists of directly modulated DFB lasers and photodiodes fabricated with mature, field-proven Ortel technology.

Applications

- **Radar testing/calibration**
- **Signal processing**
- **Phased array antennas**
- **Phase noise testing**

Features

- **Bandwidth to 18 GHz**
- **High dynamic range**
- **Built-in optical isolator**
- **1310 nm**
- **Up to 110 µ-sec**
- **Integrated fiber**

Performance Highlights

	Min	Typical	Max	Units
Wavelength Options	1290		1580	nm
Internal Delay Spool			110	µ-sec
Temperature Range	-25	-	+65	°C
Frequency Range	0.1	-	10 - 18	GHz

See following pages for complete specifications and conditions.

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Condition	Min	Max	Units
Operating Temperature Range of Baseplate:	T_{OP}	continuous	-55	+75	°C
Storage Temperature	T_{STG}	-	-55	+85	°C
RF Input Power	P_{IN}	60 seconds	-	20	dBm
ESD, module	-	HBM: R = 1500 Ohm, C = 100 pF	-500	500	V
TEC Current, module	I_{TEC}	continuous	-1.9	1.9	A

RF Characteristics

Parameter	5017A	5017B	5017C	5017D	5017E	5017F	5017G	5017H	Unit
Upper Band Edge Frequency	4	10	15	18	4	10	15	18	GHz
Lower Band Edge Frequency	0.1				0.1				GHz
Amplitude Flatness	± 1.5	± 2.0	± 2.5	± 3.5	± 1.5	± 2.0	± 2.5	± 3.5	dB
Noise Figure	49	54	64	69	59	64	74	79	dB
Max Delay Time	8				110				µ-sec
Insertion Loss	28			36	50			56	dB
Input / Output Return Loss	9		6		9		6		dB
Input Third Order Intercept	+30			+25	+30			+25	dBm
Impedance	50								Ω
Input 1 dB Compression	+20								dBm
Triple Transit Response	<-75								dBc

Connector Options

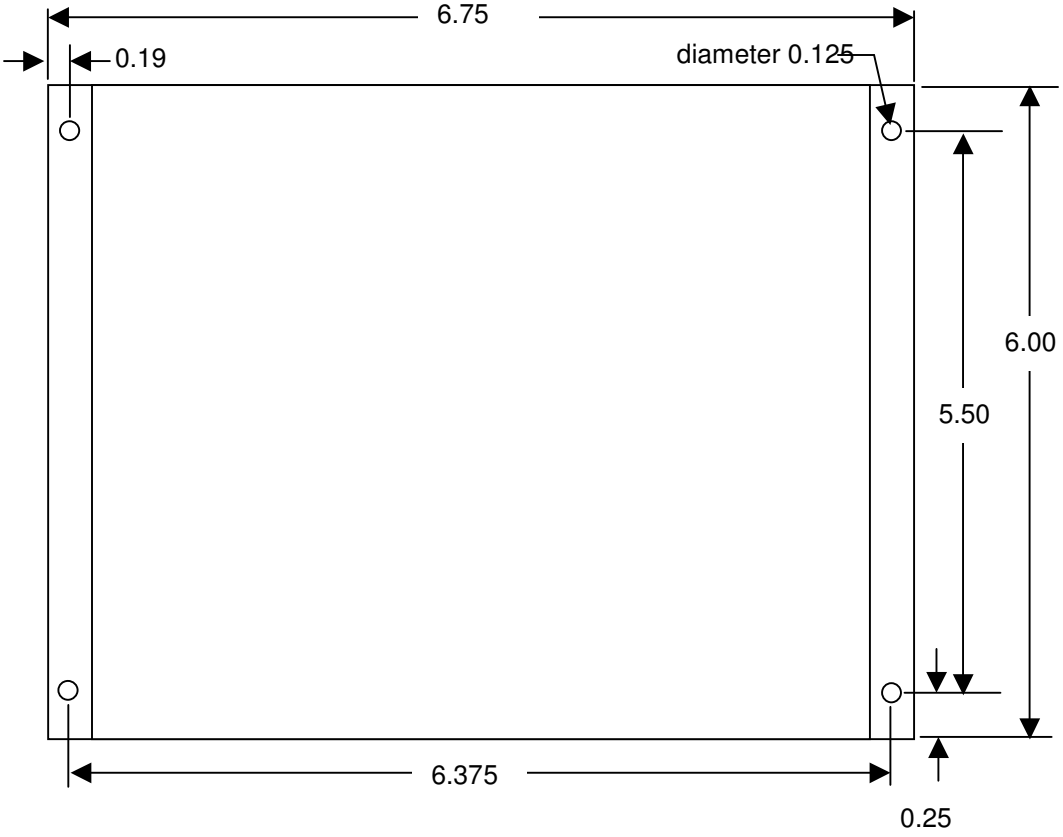
Parameter	Specifications			
Model Number	5017A/E	5017B/F	5017C/G	5017D/H
RF Connector	SMA (f)			

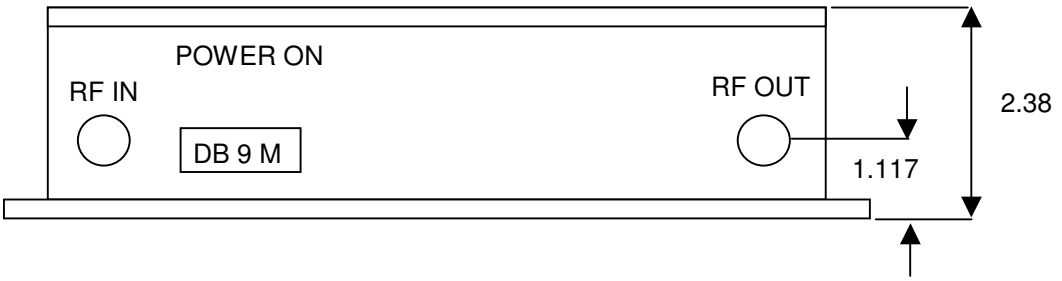
dc Interface Characteristics

Pin Number	Min	Typ	Max	Max Ripple	Current
1	14V	15V	16V	100 mV p-p	0.3 A max
2	4.75V	5V	5.5V	200 mV p-p	1.6 A max

Outline Diagram Model 5017A/B/C/B

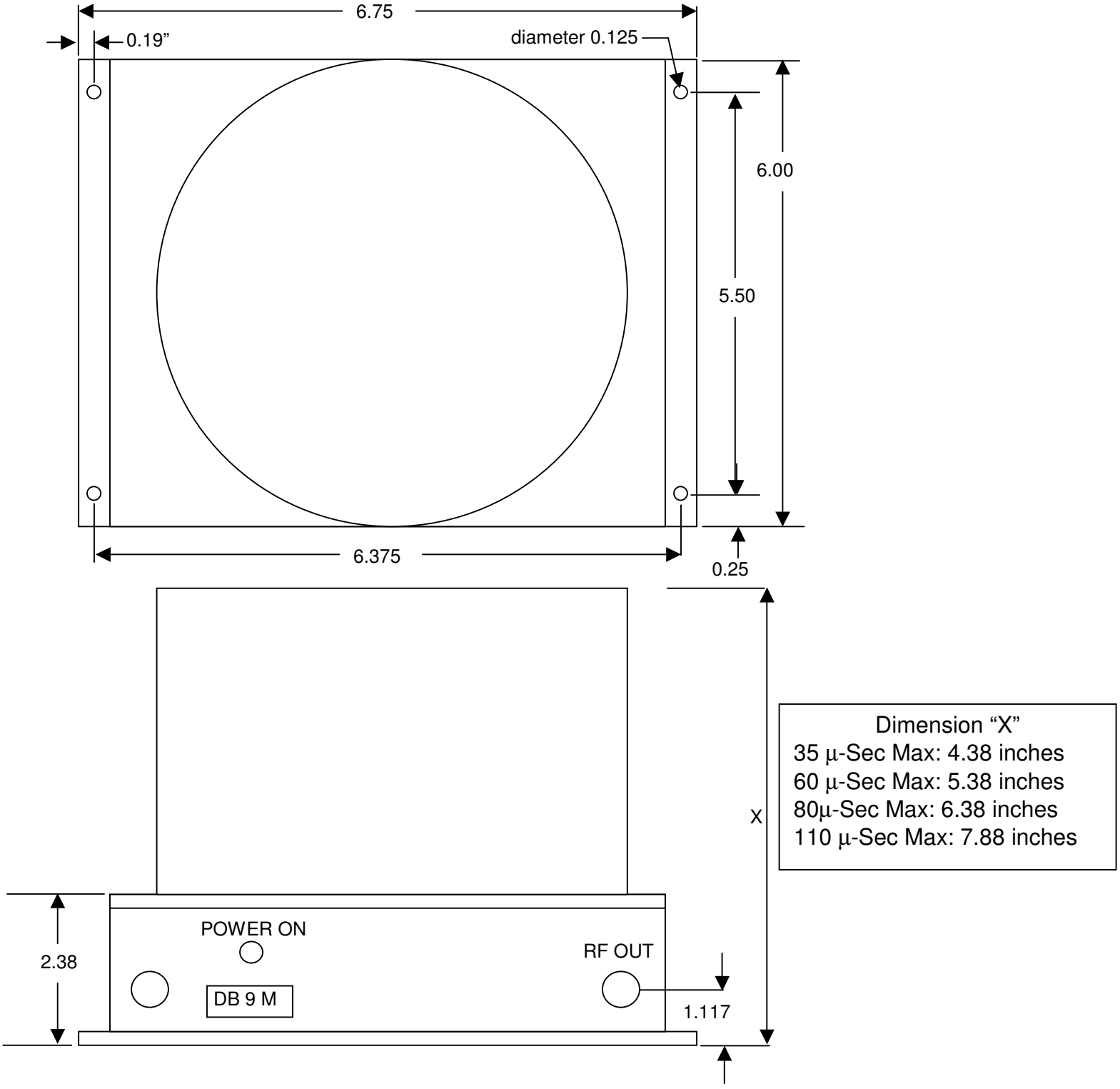
Dimensions are in inches.





Outline Diagram 5017E/F/G/H

Dimensions are in inches.



Pin/Package Information

Nine-Pin D-sub Connector

Pin	Description
1	+15 Vdc
2	+5 Vdc
3	NC
4	Power Ground
5	Reference Ground
6	Laser Photodiode Current Monitor
7	Received Optical Power
8	Laser Current Monitor
9	Laser Over-temperature Alarm[1]

1: Open collector outputs

Ordering Options Delay Line (For example, 5017A-0060)

5017	n-	XXXX
	Frequency	Delay (Internal)

A	0.1 GHz to 4 GHz	8 µ-sec max
B	0.1 GHz to 10 GHz	
C	0.1 GHz to 15 GHz	
D	0.1 GHz to 18 GHz	

Ordering Options Delay Line (For example, 5017E-0850)

5017	n-	XXXX
	Frequency	Delay (External)

E	0.1 GHz to 4 GHz	110 µ-sec max
F	0.1 GHz to 10 GHz	
G	0.1 GHz to 15 GHz	
H	0.1 GHz to 18 GHz	

Front Panel LEDs

- Power on

dc Monitor Voltages

- Laser Photodiode current, pin6
  - 1V/100mA ±2% accuracy (into 1 MΩ load). Proportional to laser power at beginning of fiber.
- Photodiode current, pin7
  - 1V/mA ±2% accuracy (into 1 MΩ load). Proportional to photodiode input power end of fiber.
- Laser dc current, pin 8:
  - 1V/100mA ±2% accuracy (into 1 MΩ load).

Alarm Circuits

The alarms are open-collector outputs capable 20 mA when active and with standing +15 VDC when off.

- Laser over temperature alarm, pin 9
  - Laser Temperature. This alarm is ON (sinks current) if the laser substrate temperature is more than 2°C higher than the factory setpoint. The alarm is not activated if the temperature is LOWER than the setpoint.

Delay Time

The delay time is shown as “XXXX”.

X (hundreds) X (tens) X (ones) X (tenths)
A 5017C with a delay time of 15.5 µ-sec would be shown as 5017C-0155

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