Timer Connector With Lanceless .125 Inch Blade Receptacle

1. INTRODUCTION

1.1. Purpose

Testing was performed on Tyco Electronics Timer Connector to determine its conformance to the requirements of Product Specification 108-1271 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the Timer Connector manufactured by the Automotive/Consumer Business Group. Testing was performed between 12Aug92 and 05Feb93. The test file number for this testing is CTL2074-103-001. Additional testing was performed between 13Jan09 and 15Jan09. The test file number for this testing is EA20090019T. This documentation is on file at and available from the Engineering Assurance Product Testing Laboratory.

1.3. Conclusion

The Timer Connector meets the electrical, mechanical, and environmental performance requirements of Product Specification 108-1271 Revision A.

1.4. Product Description

This connector is designed to mate directly with a variety of appliance timing mechanisms which incorporate the use of a .125 inch wide by .020/.025 inch thick tab.

1.5. Test Samples

The test samples were randomly selected from normal current production lots, the following part numbers were used for test.

Test Group	Quantity	Part Number	Description
1,2,4	174	770642-1	Timer Receptacle
1,2,3,4	16	770197-1	24 position timer housing
1,2	9	FSP#3349357	Mallory timer assembly

Figure 1

1.6. Qualification Test Sequence

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of product	1,9	1,9	1,8	1
Termination resistance, dry circuit	3,7	2,7		
Dielectric withstanding voltage			3,7	
Insulation resistance			2,6	
Temperature rise vs current		3,8		
Sinusoidal vibration	5	6(c)		
Physical shock	6			
Mating force, initial	2			
Unmating force, final	8			
Contact retention				2
Crimp tensile				3
Durability	4			
Thermal shock			4	
Humidity/temperature cycling		4(d)	5	
Temperature life		5		

NOTE

(a) See paragraph 1.5.
(b) Numbers indicate sequence in which tests are performed.
(c) Discontinuities shall not be measured, energize per Test Specification 109-151.
(d) Precondition with 3 durability cycles.

Figure 2

2. SUMMARY OF TESTING

2.1. Examination of Product - All Groups

All samples submitted for testing were selected from normal current production lots. They were inspected and accepted by the Product Assurance Department of the Automotive/Consumer Business Group.

2.2. Termination Resistance, Dry Circuit - Groups 1 and 2

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage, were less than 3 milliohms initially and less than 4 milliohms maximum change (ΔR) after testing.

Test Group	Number of Samples	Condition	Termination Resistance		
			Min	Max	Mean
1	30	Initial	2.56	2.72	2.68
		After mechanical (ΔR)	0.07	0.39	0.20
2	30	Initial	1.16	2.19	1.87
		After current rating (ΔR)	-0.24	2.28	0.80

NOTE *All values in milliohms.*

Figure 3

2.3. Dielectric Withstanding Voltage - Group 3

No dielectric breakdown or flashover occurred.

2.4. Insulation Resistance - Group 3

All insulation resistance measurements were greater than 1000 megohms.

2.5. Temperature Rise vs Current - Group 2

All samples had a temperature rise of less than 30˚C above ambient when a specified current of 12 amperes DC was applied.

2.6. Sinusoidal Vibration - Groups 1 and 2

No discontinuities of the contacts were detected during vibration (Group 1). Following vibration, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.7. Physical Shock - Group 1

No discontinuities of the contacts were detected during physical shock. Following physical shock testing, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.8. Mating Force - Group 1

All mating force measurements were less than 2 pounds average per contact.

2.9. Unmating Force - Group 1

All unmating force measurements were greater than 0.5 pound average per contact.

2.10. Contact Retention - Group 1

No physical damage occurred to either the contacts or the housing, and no contacts dislodged from the housings as a result of applying a minimum axial load of 9 pounds to the contacts for samples with V-2 material, and a minimum axial load of 7 pounds to the contacts for samples with V-0 material.

2.11. Crimp Tensile - Group 3

All tensile values were greater than 30 pounds for samples crimped on 18 AWG wire, 45 pounds for samples crimped on 16 AWG wire, and 50 pounds for samples crimped on 14 AWG wire.

2.12. Durability - Group 1

No physical damage occurred as a result of mating and unmating the connector 5 times.

2.13. Thermal Shock - Group 3

No evidence of physical damage to either the contacts or the connector was visible as a result of thermal shock testing.

2.14. Humidity/temperature Cycling - Groups 2 and 3

No evidence of physical damage to either the contacts or the connector was visible as a result of humidity/temperature cycling.

2.15. Temperature Life - Group 2

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to an elevated temperature.

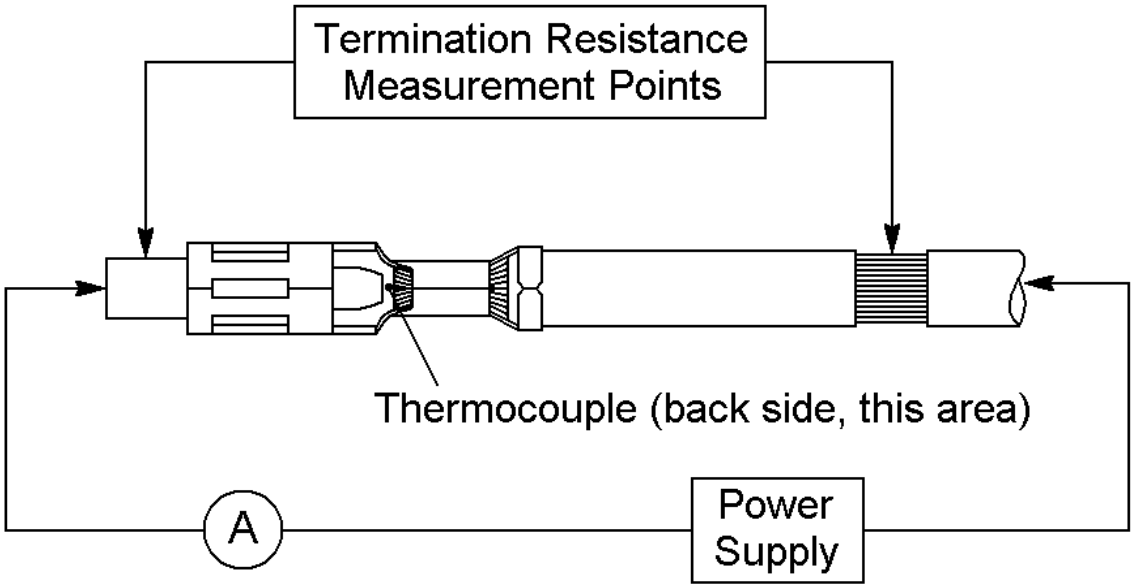
3. TEST METHODS

3.1. Examination of Product

Product drawings and inspection plans were used to examine the samples. They were examined visually and dimensionally.

3.2. Termination Resistance, Low Level

Termination resistance measurements at low level current were made, using a 4 terminal measuring technique (Figure 4). The test current was maintained at 100 milliamperes DC, with an open circuit voltage of 50 millivolts DC.



NOTE *Termination resistance equals total resistance minus the resistance in 3 inches of wire.*

Figure 4
Termination Resistance & Temperature Measurement Points

3.3. Dielectric Withstanding Voltage

A test potential of 1500 volts AC was applied between adjacent contacts of unmated connector assemblies. This potential was applied for 1 minute and then returned to zero.

3.4. Insulation Resistance

Insulation resistance was measured between adjacent contacts of unmated connector assemblies, using a test voltage of 500 volts DC. This voltage was applied for 2 minutes before the resistance was measured.

3.5. Temperature Rise vs Current

Connector temperature was measured, while energized at the specified current of 12 amperes DC. Thermocouples were attached to the connectors to measure their temperatures. The ambient temperature was then subtracted from this temperature to find the temperature rise. When 3 readings at 5 minute intervals were the same, the readings were recorded.

3.6. Sinusoidal Vibration

Connectors, mated with timers, were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied uniformly between the limits of 10 and 55 Hz and returned to 10 Hz in 1 minute. This cycle was performed 120 times in each of 3 mutually perpendicular planes, for a total vibration time of 6 hours. Connectors in Group 1 were monitored for discontinuities greater than 1 microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.7. Physical Shock

Connectors, mated with timers, were subjected to a physical shock test, having a sawtooth waveform of 50 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular planes, for a total of 18 shocks. The connectors were monitored for discontinuities greater than 1 microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.8. Mating Force

The force required to mate a connector with a timer header a was measured using a free floating fixture with the rate of travel at 0.5 inch per minute.

3.9. Unmating Force

The force required to unmate a connector with a timer header was measured using a free floating fixture with the rate of travel at 0.5 inch per minute.

3.10. Contact Retention

An axial load of 9 pounds for samples with V-2 material was applied to each contact and held for 60 seconds. An axial load of 7 pounds for samples with V-0 material was applied to each contact and held for 60 seconds. In both cases, the force was applied in a direction to cause removal of the contacts from the housing.

3.11. Crimp Tensile

An increasing axial load was applied to each sample at a minimum crosshead rate of 1.0 inch per minute. This load was applied until the wire separated from the contact.

3.12. Durability

Connector and timers were mated and unmated 5 times at a rate not exceeding 500 per hour.

3.13. Thermal Shock

Unmated connectors, were subjected to 25 cycles of temperature extremes, with each cycle consisting of 30 minute dwells at -55 and 105˚C. The transition between temperatures was less than 1 minute.

3.14. Humidity/temperature Cycling

Connectors, mated with timers (Group 2), and unmated connectors (Group 3) were exposed to 10 humidity/temperature cycles. Each cycle lasted 24 hours and consisted of cycling the temperature between 25 and 65˚C twice, while the relative humidity was held at 95%.

3.15. Temperature Life

Connectors, mated with timers were exposed to a temperature of 118˚C for 792 hours.