2M Series Performance Specifications

Materials and Finishes

PERFORMANCE SPECIFICATIONS	
Current Rating (Maximum)	Size #23 contact: 5 AMPS. Size #20 contact: 7.5 AMPS. Size #16 contact: 13 AMPS. Size #12 contact: 23 AMPS.
Test Voltage (Dielectric Withstanding Voltage) Mated Connectors	Size #23 contacts: 750 VAC RMS sea level, 400 VAC RMS 40,000 feet Size #20 contacts: 1000 VAC RMS sea level, 400 VAC RMS 40,000 feet Size #20HD contacts: 1000 VAC RMS sea level, 400 VAC RMS 40,000 feet Size #16 contacts: 1800 VAC RMS sea level, 1000 VAC RMS 40,000 feet Size #12 contacts: 1800 VAC RMS sea level, 1000 VAC RMS 40,000 feet
Insulation Resistance	5000 megohms minimum
Contact Resistance	Size #23 contact: 73 millivolt drop at 5 AMPS. test current Size #20 contact: 55 millivolt drop at 7.5 AMPS. test current Size #16 contact: 49 millivolt drop at 13 AMPS. test current Size #12 contact: 42 millivolt drop at 23 AMPS. test current
Operating Temperature	-65° C. to +175° C.
Immersion, Mated	1 meter water immersion for 1 hour (2M803 Series splash proof only)
Magnetic Permeability	2.0 μ maximum

MATERIALS AND FINISHES	
Aluminum Shell, Barrel, and Coupling Nut	Aluminum alloy 6061 T6
Stainless Steel Shell, Barrel Coupling Nut	Passivated Stainless Steel, 200° C
Front and Rear Inserts	Polyphenylene Sulfide (PPS)
Contact Retention Clip	Beryllium copper, heat-treated
Grommet, Peripheral Seal and Interfacial Seal	Fluorosilicone Rubber
Contacts	Gold Plated Copper alloy
Socket Contact Hood	Passivated Stainless steel
Adhesives	Various Epoxies & RTV's
Potting Compound, PCB and Solder Cup Versions	High Strength Epoxy

Please refer to the comprehensive 2M Series Product Specification for additional parameters and test methods.
Filter and Hermetic designs have different specifications. (Please refer to individual sections)

2M Series Performance Specifications

Complete Product Specifications

DESCRIPTION	REQUIREMENT	PROCEDURE
	ELECTRICAL	
Contact resistance	SAE AS39029 Table V Wire Size / Test Current / Max Voltage Drop 12 / 23 / 42 14 / 17 / 40 16 / 13 / 49 20 / 7.5 / 55 22 / 5 / 73 24 / 3 / 45 26 / 2 / 52 28 / 1.5 / 54	EIA-364-06 Test current in amperes. Voltage drop in millivolts. Silver-coated copper wire, +25°C.
Low level contact resistance	Wire Size / Max. Milliohms 16 / 5 20 / 9 22 / 15 24 / 20 26 / 31 28 / 50	EIA-364-23 100 milliamperes maximum and 20 millivolts maximum open circuit voltage
Insulation resistance	5000 megohms minimum	EIA-364-21 500 volts DC ± 50 volts. Test between adjacent contacts and contacts to shell.
Dielectric withstanding voltage, sea level	No breakdown or flashover #23 contacts 750 volts #20HD contacts 750 volts #16 contacts 1800 volts #12 contacts 1800 volts	EIA-364-20 AC RMS 60 Hz. One minute dwell. Unmated or mated
Dielectric withstanding voltage, 40,000 feet altitude	No breakdown or flashover #23 contacts 100 volts #20HD contacts 150 volts #16 contacts 1000 volts #12 contacts 1000 volts	EIA-364-20 AC RMS 60 Hz. One minute dwell. mated condition
Current carrying capacity	Contact Size / Max Current 12 / 23 16 / 13 20 / 7.5 23 / 5	EIA-364-70 Method 1

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2M Series Performance Specifications

Complete Product Specifications

DESCRIPTION	REQUIREMENT	PROCEDURE
Shell-to-shell conductivity, Initial	The maximum voltage drop across a mated pair shall not exceed the values shown. Series — Voltage Drop 2M801 — 2.5 2M803 — 100 2M804 — 2 2M805 — 2	EIA-364-83 Electroless Nickel Plated Connectors
Shell-to-shell conductivity, after conditioning (48 hours salt spray)	The maximum voltage drop across a mated pair shall not exceed the values shown. Series — Voltage Drop 2M801 — 2.5 2M803 — 200 2M804 — 4 2M805 — 2	EIA-364-83 Electroless Nickel Plated Connectors
Shielding effectiveness, low frequency (100MHz-1000 MHz)	dB Min. Attenuation Frequency / Series 2M801 / Series 2M803 / Series 2M804, 2M805 100 MHz: 75 / 60 / 90 200 MHz: 70 / 55 / 88 300 MHz: 65 / 55 / 88 400 MHz: 63 / 50 / 87 800 MHz: 58 / 45 / 85 1000 MHz: 55 / 40 / 85	EIA-364-21 Electroless Nickel Plated Connectors
Shielding effectiveness, high frequency (1GHz-10GHz)	dB Min. Attenuation Frequency / Series 2M801, 2M804 / Series 2M805 1 GHz: 55 / 85 3 GHz: 50 / 69 5 GHz: 45 / 66 19 GHz: 40 / 65	EIA-364-66 Electroless Nickel Plated Connectors

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2M Series Performance Specifications

Complete Product Specifications

DESCRIPTION	REQUIREMENT	PROCEDURE
	MECHANICAL	
Vibration, Sine	No discontinuity of greater than 1 microsecond, no cracking, breaking or loosening of parts, plug shall not become disengaged from receptacle. Connectors shall meet electrical requirements after vibration test.	MIL-STD-202 Method 204, test Condition G 12 sweep cycles per axes, 20 min. per 10-2000-10Hz @ temp. 2M801/2M805 - 60 g 2M803/2M804 - 30 g
Vibration, Random	No discontinuity of greater than 1 microsecond, no cracking, breaking or loosening of parts, plug shall not become disengaged from receptacle. Connectors shall meet electrical requirements after vibration test.	EIA-364-28 Test Condition V Letter I 100 milliamp test current 50- 2,000 Hz @ temp. 2M801/2M805 - 43.9 g RMS 2M803/2M804 - 37.80 g RMS
Gunfire Vibration	No discontinuity of greater than 1 microsecond, no cracking, breaking or loosening of parts, plug shall not become disengaged from receptacle. Connectors shall meet electrical requirements after vibration test.	MIL-STD-810F Method 519.5
Mechanical Shock	No discontinuity of greater than 1 microsecond, no cracking, breaking or loosening of parts, plug shall not become disengaged from receptacle. Connectors shall meet electrical requirements after shock test.	EIA-364-27 Condition D 300 G, halfsine, 3ms, 3 axes
Mechanical durability, at ambient temperature	No deterioration which will adversely affect the connector after 2000 cycles (where applicable) of mating and unmating. Connectors shall meet contact resistance, insulation resistance, shell-to-shell resistance, DWV, and mating and unmating force.	EIA-364-09
Solderability, PC tail contacts	95% solder coverage. Smooth, bright and even finish.	EIA-364-52 Category 3 8 hours steam aging prior to test 245° C, 4-5 sec. dwell 10X magnification
Resistance To Soldering Heat	No damage to connector. Connectors shall meet insulation resistance and waterproof sealing requirements.	EIA-364-56 260° C, 10 seconds (PC tail)

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2M Series Performance Specifications

Complete Product Specifications

DESCRIPTION	REQUIREMENT	PROCEDURE
Impact	No impairment of function. Connector shall meet contact resistance, insulation resistance and waterproof sealing.	EIA-364-42 1 meter 8 drops
Contact retention	Contact Size / Min. Pounds / Min. Newtons 23 / 10 / 45 20 / 15 / 67 20HD / 10 / 45 16 / 25 / 111 12 / 25 / 111	EIA-364-29
Contact separation force	Contact Size / Min. Ounces / Min. Newtons 23 / 0.5 / 0.14 20 / 0.7 / 0.19 16 / 2.0 / 0.56 12 / 3.0 / 0.83	SAE AS39029
Coupling torque	Threaded coupling connector coupling torque shall not exceed the following requirements.	
Unmating force (Series 2M804)	Series 2M804 push/pull connectors	

Coupling torque

Shell Size		
Series 2M801	**Series 2M805**	**Inch Pounds**
5, 6, 7	8, 9	8
8, 9	10, 11	9
10	12	12
12, 13	15	16
14, 15	18	28
16, 17	19	24
21		32
	23	36

Unmating force (Series 2M804)

Contact Arrangement	Pounds
5-3	10.6
6-4	10.8
6-7	11.4
7-10	12.0
8-13	12.6
9-19	13.8
10-26	15.2
12-37	17.4
14-55	21.0

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2M Series Performance Specifications

Complete Product Specifications

<table>
<tr><th>DESCRIPTION</th><th>REQUIREMENT</th><th>PROCEDURE</th></tr>
<tr><td>Insert retention</td><td>No impairment of function. Connector shall meet contact resistance, insulation resistance and waterproof sealing.
<table>
<tr><th colspan="3">Shell Size</th><th></th></tr>
<tr><th>Series 2M803, 2M804</th><th>Series 2M801</th><th>Series 2M805</th><th>Min. Force in Pounds</th></tr>
<tr><td>5</td><td>5</td><td></td><td>100</td></tr>
<tr><td>6</td><td>6</td><td>8</td><td>100</td></tr>
<tr><td>7</td><td>7</td><td>9</td><td>100</td></tr>
<tr><td>8</td><td>8</td><td>10</td><td>100</td></tr>
<tr><td>9</td><td>9</td><td>11</td><td>100</td></tr>
<tr><td>10</td><td>10</td><td>12</td><td>100</td></tr>
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<tr><td>14</td><td>16</td><td>18</td><td>100</td></tr>
<tr><td>15</td><td>17</td><td>19</td><td>100</td></tr>
<tr><td></td><td>21</td><td>23</td><td>100</td></tr>
</table></td><td>EIA-365-35</td></tr>
<tr><td>Magnetic Permeability</td><td>2 µ maximum.</td><td>EIA-364-54</td></tr>
<tr><td colspan="3">ENVIRONMENTAL</td></tr>
<tr><td>Operating temperature</td><td>-65° to +175°C</td><td></td></tr>
<tr><td>Water immersion, mated</td><td>No evidence of water penetration into mated connectors. ≥100Ω insulation resistance.</td><td>MIL-STD-810F Method 512.4
1 meter immersion
1 hour</td></tr>
<tr><td>Water immersion, open face panel mount receptacles with non-removable printed circuit board or solder cup contacts</td><td>Connectors with waterblock potting process.

1 X 10^{-4} cc/second maximum helium leak rate at 1 atmosphere pressure differential following thermal shock conditioning.</td><td>EIA-365-02
3 cycles thermal shock
-57°C to +71°C
75 min. dwell
5 minute transfer rate</td></tr>
<tr><td>Humidity, cyclic (damp heat, cyclic) (moisture resistance)</td><td>No deterioration which will adversely affect the connector. 100 megohms minimum insulation resistance during the final cycle. Following the recovery period, connectors shall meet contact resistance, shell-to-shell resistance and DWV requirements.</td><td>EIA-364-31 Condition B Method III
80-98% RH
10 cycles (10 days)
+25° C to +65° C
Step 7b vibration deleted.
24 hour recovery period.</td></tr>
</table>

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2M Series Performance Specifications

Complete Product Specifications

DESCRIPTION	REQUIREMENT	PROCEDURE
21 day humidity (damp heat, long term)	No deterioration which will adversely affect the connector. Following the drying period, connectors shall meet 100 megohms minimum, contact resistance, shell-to-shell resistance, DWV, mating and unmating requirements.	EIA-364-31 Condition C Method II 90-95% RH 40° C Apply 100 volts DC during test. 4 hours drying time at ambient temperature prior to final measurements.
Thermal shock	No mechanical damage or loosening of parts. Following thermal shock, connector shall meet contact resistance, DWV, insulation resistance and shell-to-shell resistance requirements.	EIA-364-32 Test Condition IV 5 cycles consisting of -65° C 30 minutes, +25° C 5 minutes max., +150° C 30 minutes, +25° C 5 minutes max.
Corrosion (salt mist)	No exposure of base metal. Connectors shall meet DWV and contact resistance requirements following the test.	EIA-364-26 5% salt solution 35° C Unmated connectors Code C: 48 hours Code M: 48 hours Code MT: 500 hours Code NF: 500 hours Code 500 hours Code ZNU: 500 hours
Sand and dust	Mated connectors shall withstand the effects of blowing sand and dust	MIL-STD-810F, Method 510.4
Fungus	Connector materials shall be fungus inert.	MIL-STD-810F, Method 508.5
Fluid immersion	No visible damage from immersion in various fuels and oils. Connector shall meet coupling torque and dielectric withstanding voltage requirements.	EIA-364-10 Unmated connectors
Altitude immersion	No evidence of moisture on connector interface or contacts. Connector shall meet dielectric withstanding voltage.	EIA-364-03

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