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## HD30 Series Connector System

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### 1. SCOPE

#### 1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) HD30 Series Connector System.

#### 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 2 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

#### 1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed. The Qualification Test Report number for this testing is 501-151036\_DTR-HD30. This document is on file at and available from Product Engineering, Industrial Commercial Transportation (ICT).

### 2. APPLICABLE DOCUMENTS AND FORMS

The following documents and forms constitute a part of this specification to the extent specified herein. Unless otherwise indicated, the latest edition of the document applies.

#### 2.1. TE Connectivity (TE) Documents

- [0425-013-1800](#): Arrangement of Contact Locations for size 18 HD30
- [0425-014-2400](#): Arrangement of Contact Locations for size 24 HD30
- [0425-016-0000](#): HD30 Series Performance and Application Characteristics
- [109-1](#): General Requirements for Testing
- [114-151000](#): Application Specification for DEUTSCH Size 16 S&F Pin & Socket
- [408-151007](#): Instruction Guide DEUTSCH Extraction Tools
- [501-151036](#): HD30 Qualification Test Report

- Product Drawings

[HD34-18-XXP/SX](#) – Size 18 Receptacles

[HD34-24-XXP/SX](#) – Size 24 Receptacles

[HD36-18-XXP/SX](#) – Size 18 Plugs

[HD36-24-XXP/SX](#) – Size 24 Plugs

- Product Part Numbers

X refers to N, T, E seal type. XXXX refers to special modification.

HD34-18-6PX-XXXX	6 pin Receptacle	HD36-18-6PX-XXXX	6 pin Plug
HD34-18-6SX-XXXX	6 socket Receptacle	HD36-18-6SX-XXXX	6 socket Plug
HD34-18-8PX-XXXX	8 pin Receptacle	HD36-18-8PX-XXXX	8 pin Plug
HD34-18-8SX-XXXX	8 socket Receptacle	HD36-18-8SX-XXXX	8 socket Plug
HD34-18-14PX-XXXX	14 pin Receptacle	HD36-18-14PX-XXXX	14 pin Plug
HD34-18-14SX-XXXX	14 socket Receptacle	HD36-18-14SX-XXXX	14 socket Plug
HD34-18-20PX-XXXX	20 pin Receptacle	HD36-18-20PX-XXXX	20 pin Plug
HD34-18-20SX-XXXX	20 socket Receptacle	HD36-18-20SX-XXXX	20 socket Plug
HD34-18-21PX-XXXX	21 pin Receptacle	HD36-18-21PX-XXXX	21 pin Plug
HD34-18-21SX-XXXX	21 socket Receptacle	HD36-18-21SX-XXXX	21 socket Plug
HD34-24-7PX-XXXX	7 pin Receptacle	HD36-24-7PX-XXXX	7 pin Plug
HD34-24-7SX-XXXX	7 socket Receptacle	HD36-24-7SX-XXXX	7 socket Plug
HD34-24-9PX-XXXX	9 pin Receptacle	HD36-24-9PX-XXXX	9 pin Plug
HD34-24-9SX-XXXX	9 socket Receptacle	HD36-24-9SX-XXXX	9 socket Plug
HD34-24-14PX-XXXX	14 pin Receptacle	HD36-24-14PX-XXXX	14 pin Plug
HD34-24-14SX-XXXX	14 socket Receptacle	HD36-24-14SX-XXXX	14 socket Plug
HD34-24-16PX-XXXX	16 pin Receptacle	HD36-24-16PX-XXXX	16 pin Plug
HD34-24-16SX-XXXX	16 socket Receptacle	HD36-24-16SX-XXXX	16 socket Plug
HD34-24-18PX-XXXX	18 pin Receptacle	HD36-24-18PX-XXXX	18 pin Plug
HD34-24-18SX-XXXX	18 socket Receptacle	HD36-24-18SX-XXXX	18 socket Plug
HD34-24-19PX-XXXX	19 pin Receptacle	HD36-24-19PX-XXXX	19 pin Plug
HD34-24-19SX-XXXX	19 socket Receptacle	HD36-24-19SX-XXXX	19 socket Plug
HD34-24-21PX-XXXX	21 pin Receptacle	HD36-24-21PX-XXXX	21 pin Plug
HD34-24-21SX-XXXX	21 socket Receptacle	HD36-24-21SX-XXXX	21 socket Plug
HD34-24-23PX-XXXX	23 pin Receptacle	HD36-24-23PX-XXXX	23 pin Plug
HD34-24-23SX-XXXX	23 socket Receptacle	HD36-24-23SX-XXXX	23 socket Plug
HD34-24-29PX-XXXX	29 pin Receptacle	HD36-24-29PX-XXXX	29 pin Plug
HD34-24-29SX-XXXX	29 socket Receptacle	HD36-24-29SX-XXXX	29 socket Plug
HD34-24-31PX-XXXX	31 pin Receptacle	HD36-24-31PX-XXXX	31 pin Plug
HD34-24-31SX-XXXX	31 socket Receptacle	HD36-24-31SX-XXXX	31 socket Plug
HD34-24-33PX-XXXX	33 pin Receptacle	HD36-24-33PX-XXXX	33 pin Plug
HD34-24-33SX-XXXX	33 socket Receptacle	HD36-24-33SX-XXXX	33 socket Plug
HD34-24-35PX-XXXX	35 pin Receptacle	HD36-24-35PX-XXXX	35 pin Plug
HD34-24-35SX-XXXX	35 socket Receptacle	HD36-24-35SX-XXXX	35 socket Plug
HD34-24-47PX-XXXX	47 pin Receptacle	HD36-24-47PX-XXXX	47 pin Plug
HD34-24-47SX-XXXX	47 socket Receptacle	HD36-24-47SX-XXXX	47 socket Plug
HD34-24-91PX-XXXX	9 pin Receptacle	HD36-24-91PX-XXXX	9 pin Plug
HD34-24-91SX-XXXX	9 socket Receptacle	HD36-24-91SX-XXXX	9 socket Plug

2.2. Industry Documents

- DIN 40050-9: Road Vehicles Degrees of Protection (IP Code)
- DIN 72551-6: Road Vehicles—Low-Tension Cables—Part 6: Single-Core, Unscreened with Thin Insulation Wall; Dimensions, Materials, Marking
- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- IEC-60512: Electronic Equipment - Tests and Measurements
- IEC-60529: Degrees of Protection Provided by Enclosures (IP Code)
- ISO 6722: Road Vehicles—60 V and 600 V Single-Core Cables—Dimensions, Test Methods and Requirements
- SAE J1128: Low Voltage Primary Cable

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

3.2. Ratings

- Voltage: 250 V AC/DC, except 24-29, 24-31, 24-47 arrangements are 200 V AC/DC
- Current (Amp): See Figure 1

Contact Size	Wire Size AWG [mm <sup>2</sup> ]	All Circuits Energized (A)
4	4 [25.0-21.0]	100
	6 [16.0-13.0]	
8	8 [10.0-8.0]	60
	10 [6.0-5.0]	40
12	10 [6.0-5.0]	25
	12 [4.0-2.5]	
	14 [2.0]	18
16	12 [2.5]	13
	14 [2.0]	
	16 [1.5-1.0]	
	18 [0.8-0.75]	10
	20 [0.5]	7.5
20	16 [1.5-1.0]	7.5
	18 [0.8-0.75]	
	20 [0.5]	
	22 [0.35]	5

Figure 1

- Temperature: -55°C to +125°C
- Ingress Protection (IP) Level: IP67
- Flammability: Not Applicable

### 3.3. Test Requirements and Procedures Summary

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

See Appendix A for additional test requirements

See Appendix B for Test Procedure Comparison Chart

Test Description	Requirement	Procedure
Examination of Product	The connectors shall be correctly constructed, marked and shall show good quality and workmanship	EIA-364-18. Visually inspected for use of materials, proper construction, correct part number and insert markings and over-all quality of workmanship. Poor molding fabrication, loose materials, damaged or improperly manufactured contacts, galling of metal parts, nicks and burrs of metal parts, torn seals or cracked plastic were considered adequate basis for rejection.
<b>ELECTRICAL</b>		
Insulation Resistance	1000 MΩ minimum at 25°C	MIL-STD-1344, Method 3003.1 Using a 500 VDC megaohmmeter check each contact to all other contacts and the shell electrically connected together.
Dielectric Withstanding Voltage	No evidence of breakdown or flashover or current leakage in excess of 2.0 milliamps.	MIL-STD-1344, Method 3001.1 Check each contact to all other contacts and the shell electrically connected together for breakdown / flashover when subjected to a 1500 VAC test potential for a period of 1 minute.
Contact Resistance	Maximum voltage drop across a 6 inch wire/contact assembly shall be 77 mV max for 12AWG and 89mV max for 16AWG	MIL-STD-1344, Method 3004.1 23A for size 12 (12AWG) 13A for size 16 (16AWG)
Low Level Contact Resistance	Calculated resistance across mated contact pair shall not exceed 6 mΩ using 100 mA current.	MIL-STD-1344, Method 3002.1 The resistance of an equal length of wire shall be subtracted from all readings to determine the added resistance of the terminal.
<b>MECHANICAL</b>		
Maintenance Aging	There shall be not visible change or damage to the contact cavities	MIL-STD-1344, Method 2002.1 Subject 10% of the cavities to 10 cycles of inserting and removing its respective contact. Insert by hand, remove using removal tool.
Contact Retention	The contact shall remain in place	MIL-STD-1344, Method 2007.1 Subject each wired contact to an applied load of 30 lbf (size 12) and 25 lbf (size 16) for a period of 15 seconds in a direction tending to push the contact or of the rear of the connector.
Durability	No evidence of damage to the contacts, contacting plating, connector housing or seals detrimental to reliable connector performance. Coupling torque must not increase as a result of cycling past the point where it can reasonably be done by hand.	MIL-STD-1344, Method 2016 The connector shall be mated and unmated for a total of 100 complete cycles at room temperature

Figure 2

Test Description	Requirement	Procedure
Tool Abuse	There shall be no visible damage to the connector seals or contact cavities.	Use the applicable removal tool shall be inserted into the connector. With an axial load of 5 lbf applied, the tool shall be rotated 180° and then removed, also removing the terminal. Repeat 3 times.
Vibration	No discontinuity in excess of 1.0 $\mu$ s at 100 mA during the last hour of each axis. Shall meet visual requirements, show no physical damage and meet requirements of additional tests as needed.	MIL-STD-1344, Method 2005.1 Sine Sweep: 10 to 2000 Hz Sweep Cycle: 20 minutes Initial Displacement: .07 inch DA Maximum Max Acceleration: 20G's Test Duration: 12 hours Time Per Axis X, Y, Z: 4 hours Test Current first 3 hours each axis: 12AWG = 23A, 16AWG = 13A
Shock	No discontinuity in excess of 1.0 $\mu$ s at 100 mA during the last hour of each axis. Shall meet visual requirements, show no physical damage and meet requirements of additional tests as needed.	MIL-STD-1344, Method 2004.1 10 cycles of ½ sine pluses, 50g $\pm$ 15%, 11 $\pm$ 1 ms duration X and Z axis are to be tested.

## ENVIRONMENTAL

Temperature Life	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test. Meet 500 M $\Omega$ minimum.	MIL-STD-1344, Method 1005.1 The wired mated connectors shall be subjected to 100 hours at 125°C. Insulation resistance shall be measured immediately after removing sample from oven.
Salt Spray	There should be no evidence of corrosion on the connector or terminals after the connector is removed from the test and cleaned with tap water.	MIL-STD-1344, Method 1001.1 Connector shall be fully mated, then submerged in a fine mist of 5% by weight of salt solution for 96 hour.
Altitude Immersion	Standard pressure is 32.68 torr. The wire mated connectors shall be immersed in a container of tap water, placed in an altitude chamber such that the water covers the connector being tested.	MIL-STD-1344, Method 1004.1 Chamber pressure reduced to 32.68 torr and maintained for 30 minutes, then returned to atmospheric pressure within 1 minute and maintained for another 30 minutes. Test repeated for three times.
Fluid Immersion	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test.	MIL-STD-1344, Method 1016 Subject each connector to one fluid only. The wired mated connectors shall be submerged in the fluids below at ambient temperature. Each connector shall be submerged for 5 minutes, then removed from the fluid to air dry for 24 hours. This cycle is to be completed a total of 5 cycles. -Motor Oil 30 weight -Brake Fluid (disc type 1) -Gasoline -Diesel Fuel #2 -Antifreeze Solution (max protection) -Gear Oil 90 weight

Test Description	Requirement	Procedure									
Thermal Shock	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test. Meet insulation resistance 500 MΩ minimum.	MIL-STD-1344, Method 1003.1 Cycle mated connectors for 30 minutes at -67°F followed by 30 minutes at +257°F with 2 minute max transfer time. Repeat for 5 cycles. Insulation resistance measured during last heat cycle.									
External Bending Moment	No discontinuity in excess of 1.0 μs at 100 mA during the test.	Mount the Receptacle panel mounted in normal service to a rigid plane. Apply a 250 in-lbf bending moment at a rate of 1.0 lbf per second for 60 seconds									
Insert Retention	The inserts shall retain their proper location inside the housing. There shall be no evidence of cracking, breaking, separation from housing or loose parts.	MIL-STD-1344, 2010.1 Apply a pulling force of 100 lbf at a rate of 10 lbf per second to the wire bundle that exist the rear of the connector for a period of 30 seconds.									
Coupling/ Uncoupling Torque	Coupling torque for mating and unmating connectors to be <table border="1" data-bbox="505 730 886 842"> <thead> <tr> <th>Shell Size</th> <th>Min Uncoupling Torque</th> <th>Max Coupling Torque</th> </tr> </thead> <tbody> <tr> <td>18</td> <td>4 in-lbf</td> <td>26 in-lbf</td> </tr> <tr> <td>24</td> <td>7 in-lbf</td> <td>48 in-lbf</td> </tr> </tbody> </table>	Shell Size	Min Uncoupling Torque	Max Coupling Torque	18	4 in-lbf	26 in-lbf	24	7 in-lbf	48 in-lbf	MIL-STD-1344, Method 2013.1 The Receptacle connector of each sample mated pair shall be mounted on a torque testing fixture and stay stationary.
Shell Size	Min Uncoupling Torque	Max Coupling Torque									
18	4 in-lbf	26 in-lbf									
24	7 in-lbf	48 in-lbf									

Figure 2 end

### 3.4. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group No. (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Examination of Product	1	1	1	1	1	1
Insulation Resistance	2	2	2	2	2	2
Dielectric Withstanding Voltage	3	3	3	3	3	3
Maintenance Aging	4		4			
Temperature Life		4		4		4
Contact Retention	5		5			
Durability		5	6		4	
Tool Abuse				5	5	
Salt Spray		6	7			5
Altitude Immersion	6	7	8	6		
Fluid Immersion	7	8	9	7	6	6
Thermal Shock	8					7
Vibration	9		10	8		
Shock	10		11	9		
External Bending Moment		9	12			8
Insert Retention	11			10	7	
Low Level Contact Resistance		10	13			
Coupling/Uncoupling Torque	12	11			8	
Contact Resistance	13	12	14	11	9	9
Final Examination	14	13	15	12	10	10



#### NOTE

- (a) Specimens shall be prepared in accordance with applicable product drawings and shall be selected at random from current production.
- (b) All cavities use wire gauge per SAE J1128 suitable for the terminal size and with sufficient length to accommodate testing. The wire insulation shall be within the connector wire sealing range. Crimp characteristics (i.e. crimp height, crimp width, etc.) shall be checked prior to testing.
- (c) Specimen shall consist of 24-19 arrangement connectors with DEUTSCH Solid Terminal System size 12 and 16 nickel plated pins and sockets on 12 AWG GXL and 16 AWG GXL wire.
- (d) All unsealed cavities shall be secured with sealing Plugs. To prevent capillary action on the sealed connector, all free wire ends and test points (i.e. millivolt test connection) shall be sealed with alcohol-based RTV silicone or equivalent and covered with heat shrink tubing
- (e) Numbers indicate sequence in which tests are performed.

3.5. Appendix A Additional Test Requirements

Test Description	Requirement	Procedure																																									
<b>ELECTRICAL</b>																																											
<p>Low Level Contact Resistance</p>	<table border="1" data-bbox="505 331 885 604"> <thead> <tr> <th>Wire Size</th> <th>Resistance</th> </tr> <tr> <th>AWG [mm<sup>2</sup>]</th> <th>(mΩ max)</th> </tr> </thead> <tbody> <tr> <td>16 [1.0]</td> <td>6.0</td> </tr> <tr> <td>18 [0.80]</td> <td>7.5</td> </tr> <tr> <td>20 [0.50]</td> <td>11.0</td> </tr> <tr> <td>22 [0.35]</td> <td>17.0</td> </tr> </tbody> </table>	Wire Size	Resistance	AWG [mm <sup>2</sup> ]	(mΩ max)	16 [1.0]	6.0	18 [0.80]	7.5	20 [0.50]	11.0	22 [0.35]	17.0	<p>EIA-364-23            Test with applied voltage not to exceed 20 mV open circuit and the test current shall be limited to 100 mA. The resistance of an equal length of wire (reference wire) shall be subtracted from the same reel as used for the connector wiring.</p>																													
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<p>Contact Resistance</p>	<table border="1" data-bbox="472 642 917 1157"> <thead> <tr> <th rowspan="2">Contact Size</th> <th>Wire Size</th> <th rowspan="2">Test Current</th> <th colspan="2">Voltage Drop (mV max)</th> </tr> <tr> <th>AWG [mm<sup>2</sup>]</th> <th>Solid</th> <th>S&amp;F</th> </tr> </thead> <tbody> <tr> <td rowspan="2">4</td> <td>4 [25.0-21.0]</td> <td rowspan="2">100</td> <td rowspan="10">60</td> <td rowspan="10">100</td> </tr> <tr> <td>6 [16.0-13.0]</td> </tr> <tr> <td rowspan="2">8</td> <td>8 [10.0-8.0]</td> <td>60</td> </tr> <tr> <td>10 [6.0-5.0]</td> <td>40</td> </tr> <tr> <td rowspan="3">12</td> <td>10 [6.0-5.0]</td> <td rowspan="3">25</td> </tr> <tr> <td>12 [4.0-2.5]</td> </tr> <tr> <td>14 [2.0]</td> <td>18</td> </tr> <tr> <td rowspan="4">16</td> <td>12 [2.5]</td> <td rowspan="4">13</td> </tr> <tr> <td>14 [2.0]</td> </tr> <tr> <td>16 [1.5-1.0]</td> </tr> <tr> <td>18 [0.8-0.75]</td> <td>10</td> </tr> <tr> <td rowspan="4">20</td> <td>20 [0.50]</td> <td>7.5</td> </tr> <tr> <td>16 [1.5-1.0]</td> <td rowspan="4">7.5</td> </tr> <tr> <td>18 [0.8-0.75]</td> </tr> <tr> <td>20 [0.50]</td> </tr> <tr> <td>22 [0.35]</td> <td>5</td> </tr> </tbody> </table>	Contact Size	Wire Size	Test Current	Voltage Drop (mV max)		AWG [mm <sup>2</sup> ]	Solid	S&F	4	4 [25.0-21.0]	100	60	100	6 [16.0-13.0]	8	8 [10.0-8.0]	60	10 [6.0-5.0]	40	12	10 [6.0-5.0]	25	12 [4.0-2.5]	14 [2.0]	18	16	12 [2.5]	13	14 [2.0]	16 [1.5-1.0]	18 [0.8-0.75]	10	20	20 [0.50]	7.5	16 [1.5-1.0]	7.5	18 [0.8-0.75]	20 [0.50]	22 [0.35]	5	<p>EIA-364-06            Using test currents as defined. The resistance of an equal length wire (reference wire) shall be subtracted from the actual readings to determine the added resistance of the terminal. The reference wire shall be from the same reel as used for the connector wiring.</p>
Contact Size	Wire Size		Test Current		Voltage Drop (mV max)																																						
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Test Description	Requirement	Procedure																																					
<b>MECHANICAL</b>																																							
Vibration	There shall be no discontinuity in excess of one (1) $\mu$ s at 20mV and 100 mA during the last hour of each axis. Shall meet visual requirements, show no physical damage and meet requirements of additional tests as needed.	EIA-364-28 Sine Sweep: 10 to 2000 Hz Initial Displacement: 1.78 mm DA Maximum Acceleration: 20 G's Test Duration: 12 hours Time Per Axis X, Y, Z: 4 hours Test Current first 3 hours each axis: <table border="1" data-bbox="951 501 1433 1341" style="margin-left: 20px;"> <thead> <tr> <th data-bbox="951 501 1081 636">Contact Size</th> <th data-bbox="1081 501 1271 636">Wire Size</th> <th data-bbox="1271 501 1433 636">Test Current</th> </tr> <tr> <td></td> <td data-bbox="1081 636 1271 678">AWG [mm<sup>2</sup>]</td> <td data-bbox="1271 636 1433 678">Amp</td> </tr> </thead> <tbody> <tr> <td data-bbox="951 678 1081 758" rowspan="2">4</td> <td data-bbox="1081 678 1271 720">4 [25.0-21.0]</td> <td data-bbox="1271 678 1433 758" rowspan="2">46</td> </tr> <tr> <td data-bbox="1081 720 1271 758">6 [16.0-13.0]</td> </tr> <tr> <td data-bbox="951 758 1081 840" rowspan="2">8</td> <td data-bbox="1081 758 1271 800">8 [10.0-8.0]</td> <td data-bbox="1271 758 1433 800">33</td> </tr> <tr> <td data-bbox="1081 800 1271 840">10 [6.0-5.0]</td> <td data-bbox="1271 800 1433 840">23</td> </tr> <tr> <td data-bbox="951 840 1081 968" rowspan="3">12</td> <td data-bbox="1081 840 1271 882">10 [6.0-5.0]</td> <td data-bbox="1271 840 1433 882" rowspan="2">17</td> </tr> <tr> <td data-bbox="1081 882 1271 924">12 [4.0-2.5]</td> </tr> <tr> <td data-bbox="1081 924 1271 968">14 [2.0]</td> <td data-bbox="1271 924 1433 968">14</td> </tr> <tr> <td data-bbox="951 968 1081 1178" rowspan="5">16</td> <td data-bbox="1081 968 1271 1010">12 [2.5]</td> <td data-bbox="1271 968 1433 1178" rowspan="5">10</td> </tr> <tr> <td data-bbox="1081 1010 1271 1052">14 [2.0]</td> </tr> <tr> <td data-bbox="1081 1052 1271 1094">16 [1.5-1.0]</td> </tr> <tr> <td data-bbox="1081 1094 1271 1136">18 [0.8-0.75]</td> <td data-bbox="1271 1094 1433 1136">8</td> </tr> <tr> <td data-bbox="1081 1136 1271 1178">20 [0.50]</td> <td data-bbox="1271 1136 1433 1178">5</td> </tr> <tr> <td data-bbox="951 1178 1081 1341" rowspan="4">20</td> <td data-bbox="1081 1178 1271 1220">16 [1.5-1.0]</td> <td data-bbox="1271 1178 1433 1341" rowspan="4">5</td> </tr> <tr> <td data-bbox="1081 1220 1271 1262">18 [0.8-0.75]</td> </tr> <tr> <td data-bbox="1081 1262 1271 1304">20 [0.50]</td> </tr> <tr> <td data-bbox="1081 1304 1271 1341">22 [0.35]</td> <td data-bbox="1271 1304 1433 1341">3</td> </tr> </tbody> </table>	Contact Size	Wire Size	Test Current		AWG [mm <sup>2</sup> ]	Amp	4	4 [25.0-21.0]	46	6 [16.0-13.0]	8	8 [10.0-8.0]	33	10 [6.0-5.0]	23	12	10 [6.0-5.0]	17	12 [4.0-2.5]	14 [2.0]	14	16	12 [2.5]	10	14 [2.0]	16 [1.5-1.0]	18 [0.8-0.75]	8	20 [0.50]	5	20	16 [1.5-1.0]	5	18 [0.8-0.75]	20 [0.50]	22 [0.35]	3
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	18 [0.8-0.75]		8																																				
	20 [0.50]		5																																				
20	16 [1.5-1.0]	5																																					
	18 [0.8-0.75]																																						
	20 [0.50]																																						
	22 [0.35]		3																																				
Impact	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test. Small chips and dents that do not adversely affect the connector shall be disregarded.	Wired mated connector shall be dropped from a height of 1.2m on a cement floor. This action is to be completed a total of five (5) times.																																					
Connector Retention	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test	Apply a pulling force to the wire bundles that exit the rear of the connector for a period of one (1) minute. The amount of load is to be 111N, times the number of cavities, up to a maximum of 445N.																																					

Test Description	Requirement	Procedure												
Contact Retention	The contact shall remain in place.	<p>EIA-364-29 Using same cavities from for maintenance aging, subject to a direct load as specified below for 15 seconds in a direction tending to push the contact out of the rear of the connector. Either a Tension Testing Machine or equivalent weights may be used.</p> <table border="1"> <thead> <tr> <th>Contact Size</th> <th>Pull-Out Force N [lbf]</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>156 [35]</td> </tr> <tr> <td>8</td> <td>156 [35]</td> </tr> <tr> <td>12</td> <td>133 [30]</td> </tr> <tr> <td>16</td> <td>111 [25]</td> </tr> <tr> <td>20</td> <td>89 [20]</td> </tr> </tbody> </table>	Contact Size	Pull-Out Force N [lbf]	4	156 [35]	8	156 [35]	12	133 [30]	16	111 [25]	20	89 [20]
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4	156 [35]													
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ENVIRONMENTAL

Temperature Life	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test.	<p>EIA-364-17 The wired mated connectors shall be subjected to 1000 hours at +125°C without current flowing as per MIL-STD-202, Method 108, Test Condition D.</p>
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ELECTRICAL

Thermal Cycle	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test.	<p>Cycle mated connectors from -55°C to +125°C. Connectors to remain at each temperature extreme for one (1) hour minimum. Mated connectors are to be cycled a total of 20 complete cycles.</p>
Water Immersion	Test samples must meet insulation resistance.	<p>The wired mated connectors shall be placed in an oven at +125°C for two (2) hours minimum then immediately be placed in water with a 5% salt by weight content and 0.1 g/L wetting solution to a depth of 914mm for four (4) hours minimum. The free ends of the mated connectors must remain out of the water to prevent wicking of the water through the open wires. Water temperature to be +23°C.</p>

## 3.6. Appendix B Test Procedure Comparison Chart

Test	MIL-STD-1344 Method	EIA-364 Dash No.	Similar to SAE J2030 Paragraph	Similar to ISO 8092-2 Paragraph
Examination of Product	-	18	6.1	4.2
Insulation Resistance	3003.1	21	6.3	4.12
Dielectric Withstanding Voltage	3001.1	20	-	4.13
Low Level Contact Resistance	3002.1	23	6.2	4.8
Contact Resistance	3004.1	06	6.4	4.8
Maintenance Aging	2002.1	24	6.6	-
Contact Retention	2007.1	29	6.18	4.7
Durability	2016	09	6.11	4.3
Vibration	2005.1	28	6.15	-
Shock	2004.1	27	6.16	-
Impact	-	42	6.17	4.20
Connector Retention	-	-	6.20	-
Temperature Life	1005.1	17	6.7	4.18
Salt Spray	1001.1	26	6.12	4.16
Fluid Immersion	1016	10	6.14	4.23
Thermal Cycle	-	-	-	-
Thermal Shock	1003.1	32	6.13	4.22
Moisture	-	-	-	-
Water Immersion	-	-	6.19	4.9
Altitude Immersion	1004.1	-	-	-
External Bending Moment	-	-	-	-
Insert Retention	2010.1	-	-	-
Coupling/Uncoupling Torque	2013.1	-	-	-

3.7. Revision History

Rev Ltr	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	25-Oct-2017	PV	DM
B	General Specification clarification to reflect actual product specification, updated Figure 1 to include 4AWG and other missing wire gage specs, updated durability requirement to match actual, added missing MIL-STD-1344 test procedures as needed, Appendix A added. 22AWG to LLCR Table, updated requirement CR Table, updated vibration test current, added missing contact retention	19-Dec-2017	VNB	DM
B1	Page 5, Fluid Immersion row, Procedure column; Changed Transmission Oil to Gear Oil.	12-Sep-2018	DD	DM