

STRIKE Series Connector System

1. SCOPE

1.1. Content

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

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Table 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 in 2016. The Qualification Test Report number for this testing is 501-151026. This documentation 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

- [109-1](#): General Requirements for Testing
- [114-151000](#): Application Specification for DEUTSCH Size 16 S&F Pin & Socket
- [408-151008](#): Instruction Guide DEUTSCH Removal Tool DT-RT1
- 501-151026: STRIKE Qualification Test Report
- Product Drawings

a. X refers to A,B,C,D,E,F,G,H,I,J keys.

SRK02-MDX-32A-001	32pin Receptacle, Flange, Medium
SRK02-FLX-64A-001	64pin Receptacle, Flange, Full

SRK06-MDX-32A-001	32pin Plug, Medium
SRK06-FLX-64A-001	64pin Plug, Full

b. Backshells sold separately. X refers to 1, 2 convoluted tubing types

SRK-BS-MD-90-00X	Medium, 90°
SRK-BS-FL-90-00X	Full, 90°

SRK-BS-MD-ST-00X	Medium, Straight
SRK-BS-FL-ST-00X	Full, Straight

2.2. Industry Documents

- SAE J2030: Heavy-Duty Electrical Connector Performance Standard
- SAE J1455: Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications
- DIN 40050-9: Road Vehicles Degrees of protection (IP Code)
- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- IEC-60529: Degrees of Protection Provided by Enclosures (IP Code)
- 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: 48VDC
- Current (A): See Table 1

Connector Loading	Wire Size AWG [mm ²]	
	All Circuits Energized	16 [1.0]
	13.0	7.5

- Temperature: -55°C to +125°
- Ingress Protection (IP) Level: IPX8 and IPX9K (with rear protection, such as backshell)

A. Test Requirements and Procedures Summary

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

Test Description	Requirement	Procedure
Examination of Product	Meets requirements of product drawing. The connectors shall be correctly constructed, marked, and show good quality and workmanship.	SAE J2030 Visual inspection of product before and after unmating connectors for conditions such as torn seals, cracked plastic, evidence of fluid or dust ingress in sealed connector systems, arcing, charring, melting, or anything that affects the performance or serviceability of the product as deemed by a qualified engineer.

ELECTRICAL

Low-Voltage Resistance	Acceptance criteria		SAE J2030 Test with applied voltage not exceeding 20 mV open circuit and the test current shall be limited to 100 mA. The resistance of a cable equal in length to that of the two measuring points shall be subtracted from the measured values. The cable used shall be from the same batch of cable as used for the connector wiring. Measurements shall be taken after thermal equilibrium at current levels.
	Cable Size	Maximum Resistance	
	AWG [mm ²]	(mΩ max)	
	16 [1.0]	6.0	
	18 [0.80]	7.5	
	20 [0.50]	11.0	
22 [0.35]	17.0		

Table 2

Test Description	Requirement	Procedure
Insulation Resistance	The insulation resistance shall be greater than 20 MΩ.	SAE J2030 Using a 1000 VDC insulation resistance test measurement device or equivalent, check insulation resistance between each contact to each adjacent contact or housing edge.
MECHANICAL		
Connector Retention	The connector shall remain coupled after the specified pulling force is applied. There shall be no evidence of cracking, distortion, or detrimental damage to the connector following the test.	SAE J2030 Apply a pulling force to the wire bundle of the mated connector at 111 N times the number of contacts or a maximum of 444 N. The load shall be applied for 30 seconds. If the connector is designed to uncouple under tension, the maximum force required shall be 222 N.
Drop Test	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.	SAE J2030 The free end of the cord or cable, which shall be 1500 mm ± 25 mm long, shall be fixed to a wall at a height of 750 mm ± 25 mm above a concrete floor. The specimen shall be held so that the cord or cable is horizontal and allowed to fall to a concrete floor eight times. Rotate the specimens through approximately 45 degrees at its fixing each time.
Durability	No evidence of damage to the contacts, contact plating, connector housing, or seals which may be detrimental to reliable connector performance.	SAE J2030 The connector shall be mated and unmated for a total of 20 complete cycles at room temperature.
Maintenance Aging	Shall meet visual requirements and show no physical damage.	SAE J2030 with a deviation using 5 cycles Subject at least 10% of the cavities to 5 cycles of inserting and removing its respective contact. The five cycles shall also include any disassembly required to remove the contacts. The connectors shall be mated and unmated during each cycle. Insertion and removal shall be performed using manufacturer's recommended practice.
Mating / Unmating Forces	Required force to mate the plug and receptacle pair and engage latching mechanism shall not exceed 100 N. Required force to separate the plug and receptacle pair and fully disengage latching mechanism shall not exceed 100 N.	SAE J2030 For connectors without mechanical assist, test the maximum required force to mate the plug and receptacle pair and engage the latching mechanism. The force is not to exceed 100 N. For connectors without mechanical assist, test the maximum force required to separate the plug and receptacle with the latch mechanism fully disengaged. The force is not to exceed 100 N.
Mismatching	Polarization and different keys shall resist a minimum of 178 N axial force without damage.	SAE J2030 Connectors with two or more contacts shall be keyed or of such a design that any intended polarization is not defeated by improper assembly during installation.

Table 2

Test Description	Requirement	Procedure																									
Shock	No discontinuity in excess of 1.0 microsecond 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.	SAE J2030 10 cycles of 1/2 sine pulses, 50 g, 11 millisecond duration X, Y, and Z axis are to be tested. Monitor for discontinuity greater than 10 Ω in excess of 1.0 microsecond at 100 mA. Connector under test to be fixed to the shock plane with the wire harness fixed to non-shocked objects no closer than 100 mm and not farther than 300 mm from the rear of the connector.																									
Terminal Retention in Connector	<p>The terminal shall maintain its original position in the connector throughout the test. The terminals shall withstand the minimum force specified.</p> <table border="1"> <thead> <tr> <th>Contact Size</th> <th>Minimum Pull Out Force lbf [N]</th> </tr> </thead> <tbody> <tr> <td>16</td> <td>25 [111]</td> </tr> <tr> <td>20</td> <td>20 [89]</td> </tr> </tbody> </table>	Contact Size	Minimum Pull Out Force lbf [N]	16	25 [111]	20	20 [89]	<p>SAE J2030 The contacts shall be subjected to a direct pull. The minimum value shall be applied for 1 minute. The pull is to be exerted on the conductor by means of a tension-testing machine or equivalent to prevent sudden or jerking force during test. NOTE: Secondary-locking devices should be utilized if available.</p>																			
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Vibration	There shall be no discontinuity in excess of 1.0 microsecond at 20 mV 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.	<p>Connectors under test shall be fixed to the vibrating plane with the wire harness fixed to non-vibrating objects no closer than 10 cm [4 in.] and not farther than 30 cm [12 in.] from the rear of the connector.</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Requirement</th> </tr> </thead> <tbody> <tr> <td>Sine Sweep</td> <td>10 to 2000 Hz</td> </tr> <tr> <td>Initial Displacement</td> <td>0.07 in [1.78 mm] DA</td> </tr> <tr> <td>Maximum Acceleration</td> <td>20 G's</td> </tr> <tr> <td>Test Duration</td> <td>12 hours</td> </tr> <tr> <td>Time Per Axis X, Y, Z</td> <td>4 hours</td> </tr> <tr> <td>Test Current (first 3 hours each axis)</td> <td>See Following Table</td> </tr> <tr> <td>Monitor for Discontinuity (last hour each axis)</td> <td>-</td> </tr> </tbody> </table> <p>Test Currents</p> <table border="1"> <thead> <tr> <th>Contact Size</th> <th>Wire Gauge AWG [mm²]</th> <th>Test Current (Amps)</th> </tr> </thead> <tbody> <tr> <td>16</td> <td>16 [1.0]</td> <td>10.0</td> </tr> <tr> <td>20</td> <td>20 [0.50]</td> <td>5.0</td> </tr> </tbody> </table>	Parameter	Requirement	Sine Sweep	10 to 2000 Hz	Initial Displacement	0.07 in [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)	See Following Table	Monitor for Discontinuity (last hour each axis)	-	Contact Size	Wire Gauge AWG [mm ²]	Test Current (Amps)	16	16 [1.0]	10.0	20	20 [0.50]	5.0
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Table 2

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ENVIRONMENTAL												
Fluid Immersion	There shall be no evidence of cracking, distortion, or detrimental damage to the connector following the test.	<p>Subject each sample group to one fluid only. The wired mated connectors shall be submerged in the fluids below at the temperatures listed. Each connector shall be submerged for five minutes, then removed from the fluid to air dry for 24 hours. This cycle is to be completed a total of five cycles.</p> <table border="1" data-bbox="889 527 1523 716"> <thead> <tr> <th data-bbox="889 527 1328 590">Fluid</th> <th data-bbox="1331 527 1523 590">Temperature ±3°C (±5°F)</th> </tr> </thead> <tbody> <tr> <td data-bbox="889 594 1328 625">Motor Oil 30 weight</td> <td data-bbox="1331 594 1523 625">+60 [140]</td> </tr> <tr> <td data-bbox="889 627 1328 659">Brake Fluid (disc type 1)</td> <td data-bbox="1331 627 1523 659">+60 [140]</td> </tr> <tr> <td data-bbox="889 661 1328 693">50/50 Antifreeze/Water mixture</td> <td data-bbox="1331 661 1523 693">+60 [140]</td> </tr> <tr> <td data-bbox="889 695 1328 726">Transmission Oil 90 weight</td> <td data-bbox="1331 695 1523 726">+60 [140]</td> </tr> </tbody> </table>	Fluid	Temperature ±3°C (±5°F)	Motor Oil 30 weight	+60 [140]	Brake Fluid (disc type 1)	+60 [140]	50/50 Antifreeze/Water mixture	+60 [140]	Transmission Oil 90 weight	+60 [140]
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Pressure Spray	There shall be no evidence of water ingress into the connector housing.	<p>IPX9K The test specifies a spray nozzle that is fed with 80°C water at 80 to 100 bar and a flow rate of 14 to 16 L/min. The nozzle is held 10 to 15 cm from the tested device at angles of 0°, 40°, 60° and 90° for 30 s each. The test device sits on a turntable that rotates.</p>										
Dust Test	There shall be no evidence of dust ingress into the connector housing.	<p>SAE J1455 The samples are placed about 15 cm (6 in) from one wall in a 91.4 cm (3 ft) cubical box. The box should contain 4.54 kg (10 lbf) of fine powdered cement in accordance with ASTM C 150–56. At intervals of 15 min, the dust must be agitated by compressed air or fan blower. Blasts of air for a 2 s period in a downward direction assure that the dust is completely and uniformly diffused throughout the entire cube. The dust is then allowed to settle. The cycle is repeated for 5 h.</p>										
Temperature Life	There shall be no evidence of cracking, distortion, or detrimental damage.	<p>SAE J2030 The cabled-mated connectors shall be subject to 1000 h at 125 ± 3 °C without current flowing.</p>										
Thermal Shock	Shall show no evidence of cracking, chipping, or other damage detrimental to the normal operation of the connector.	<p>SAE J2030 The cabled-mated connector shall be subjected to 10 cycles of thermal shock. One cycle shall consist of a soak time at –55 °C ambient, then a transition within 2 min to an ambient of 125 °C, with a soak time there and then a transition back to -55 °C ambient within 2 min. The soak times shall be established as the time necessary to bring the internal connector temperature on test to within 5 °C of each of the ambient temperatures.</p>										

Table 2

Test Description	Requirement	Procedure
Water Immersion	Test samples must meet insulation resistance test requirements.	SAE J2030 / IPX8 The wired mated connectors shall be placed in an oven at 125 °C ± 3 °C for 1 h then immediately be placed in water with a 5% salt in weight content and 0.1 g/L wetting agent, to a depth of 1 m for 4 hours. Water temperature is to be 23 °C ± 3 °C. Test samples for insulation resistance per SAE J2030 6.3 and visually inspect for moisture inside the connector. The ends of the cable are to be sealed during this test.
Visual Examination	No evidence of damage to the contacts, contact plating, connector housing, or seals which may be detrimental to reliable connector performance.	SAE J2030 Conduct a visual examination for identification of product such as torn seals, cracked plastic, evidence of fluid or dust ingress in sealed connector systems, arcing, charring, melting, or anything that could affect the performance and serviceability of the product.

3.3. Product Qualification and Requalification Test Sequence

Test samples were subjected to the following tests in the order given. Refer to Section 4 for test or examination. Each test group had one mated pair test sample. Each test sequence was performed twice with the first sequence consisting of 32-pin connectors and the second sequence consisting of 64-pin connectors.

Test or Examination	Test Group (a)						
	1	2	3	4	5	6	7
	Test Sequence (b)						
Examination of Product	1	1	1	1	1	1	1
Fluid Immersion					2		2
Maintenance Aging			2				
Water Immersion				2,5		2	
Insulation Resistance		2,7		3,6		3	
Low-Voltage Resistance	2,4,6,8						
Thermal Shock	3	3	3				
Temperature Life				4		4	
Vibration	5	4					
Mating / Unmating Forces			4,6				
Shock	7	5					
Pressure Spray		6				5	
Durability			5,9				
Dust Test				8			
Terminal Retention in Connector			7				
Connector Retention			8,10	7			
Drop Test		8					
Mismating			11				
Visual Examination	9	9	12	9	3	6	3

- a) *Specimens were prepared in accordance with production drawings and were selected at random from current production.*
- a. *Group 1 consisted of 32 and 64-pin connectors with DEUTSCH Stamped and Formed Size 16 Nickel contacts with 16AWG wire and Size 20 Nickel and Gold contacts with 20AWG wire.*
 - b. *Groups 2, 4, and 6 consisted of 32 and 64-pin connectors with DEUTSCH Stamped & Formed Size 16 and 20 Nickel contacts both with 20 AWG wire.*
 - c. *Group 3 consisted of 32 and 64-pin connectors with DEUTSCH Stamped and Formed Size 16 Nickel contacts with 16AWG wire and Size 20 Nickel contacts with 20AWG wire.*
 - d. *Group 5 consisted of 32 and 64-pin connectors with sealing plugs.*
 - e. *Group 7 consisted of 32-pin connectors with sealing plugs.*
- b) *Numbers indicate sequence in which tests were performed*