
DRC26-38SXX / DRC20-75PXXXX Connector System

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) DRC26-38SXX / DRC20-75PXXXX 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. Successful qualification testing on the subject product line was completed in 2003. The Qualification Test Report number for this testing is 501-151025. 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

- [109-1](#) General Requirements for Testing
- [114-151003](#) Application Specification for DEUTSCH Size 20 S&F Pin & Socket
- [114-151004](#) Application Specification for DEUTSCH Solid Pin & Socket Contacts
- [408-151007](#) DEUTSCH Extraction Tools for Rear-Release Connectors
- [501-151025](#) Qualification Test Report
- Product Drawings
XX refers to 01 thru 10 keys.

DRC26-38SXX-P017	38pin Plug
DRC20-75PXXXX	75pin Receptacle, 180°
0528-004-3805	38pin Backshell, 90°
0528-005-3805	38pin Backshell, 90°, Low Profile

2.2. Industry Documents

- DIN 72551-6: Road Vehicles—Low-Tension Cables—Part 6: Single-Core, Unscreened with Thin Insulation Wall; Dimensions, Materials, Marking
- ISO 6722: Road Vehicles—60 V and 600 V Single-Core Cables—Dimensions, Test Methods, and Requirements
- SAE J1128: Low Voltage Primary Cable
- SAE J1455: Recommended Environmental Practices for Electronic Equipment Design
- SAE J2030: Heavy-Duty Electrical Connector Performance Standard

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 VAC/DC
- Current (Amp): See Figure 1

Contact Size	Wire Size AWG [mm ²]	All Circuits Energized (A) max
12	12 [2.5-3.0]	25
	14 [2.0]	18
20	16 [1.5-1.0]	7.5
	18 [0.80-0.75]	
	20 [0.50]	5
	22 [0.35]	

Figure 1

- Temperature: -55°C to +125°C
- Flammability: UL Recognized. Parts have been successfully tested to the 20mm Flame Test per Standard UL-94.

3.3. Test Requirements and Procedures Summary.

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

Test Description	Requirement	Procedure
Examination of Product	The connectors shall be correctly constructed, marked and shall show good quality and workmanship.	SAE J2030 Conduct a visual examination only for identification of product, torn seals, cracked plastic, etc.
ELECTRICAL		
Low Voltage Resistance	11 mΩ max. (20 AWG / 0.50mm ²)	SAE J2030 Test current shall be 100 mA max with an open circuit test voltage of 20 mV maximum. The resistance of an equal length of wire shall be subtracted from all readings to determine the added resistance of the terminal.
Contact Resistance	60 mV max (solid contact) 100 mV max (S&F contact)	SAE J2030 Test current per below with applied voltage of 12 VDC max open circuit. The resistance of an equal length of wire shall be subtracted from all readings to determine the added resistance of the terminal. Size 12 (12 AWG [2.5-3.0mm ²]): 25A Size 12 (14 AWG [2.0mm ²]): 18A Size 20 (16-20 AWG [1.50-0.50mm ²]): 7.5A Size 20 (22 AWG [0.35mm ²]): 5A
Insulation Resistance	20 MΩ min.	SAE J2030 Check each contact to all other contacts and the shell, if the shell is conductive. Performed using a 1000 VDC megohmmeter.
Current Test	60mV max. overall contact resistance between initial and final readings	SAE J2030 Apply maximum rated current per below to all terminals. Ambient test temperature shall be 125°C ± 3°C for 24 hours. Measure initial and final overall contact resistance and compare. Size 12 (12 AWG [2.5-3.0mm ²]): 25A Size 12 (14 AWG [2.0mm ²]): 18A Size 20 (16-20 AWG [1.50-0.50mm ²]): 7.5A Size 20 (22 AWG [0.35mm ²]): 5A

Figure 2 Cont.

MECHANICAL

Test Description	Requirement	Procedure																										
Maintenance Aging	There shall be not visible change or damage to the contact cavities.	SAE J2030 Subject 10% of the cavities to 10 cycles of inserting and removing its respective contact. Insert by hand, remove using removal tool.																										
Terminal Retention	The terminal shall maintain its original position in the connector throughout the test.	SAE J2030 Subject the same cavities used in maintenance aging test. The contacts shall be subjected to a direct pull per below 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. Size 12: 133 N [30 lbf] Size 20: 89 N [20 lbf]																										
Vibration	No discontinuity in excess of 1.0 μ 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.	SAE J1455 Connectors shall be fixed to a vibrating plane with the wire harness fixed to non-vibrating object 100-300 mm from the back of the connector. Random Vibration: 17G Max acceleration: 17g Test duration (X,Y,Z axis): 20 hours Total test duration: 60 hours Jackscrew torque: 25-28 in-lbf <table border="1" data-bbox="1101 1031 1354 1392"> <thead> <tr> <th>Frequency (Hz)</th> <th>Power (G²/Hz)</th> </tr> </thead> <tbody> <tr><td>20</td><td>.008</td></tr> <tr><td>65</td><td>.003</td></tr> <tr><td>120</td><td>.07</td></tr> <tr><td>170</td><td>.07</td></tr> <tr><td>210</td><td>.005</td></tr> <tr><td>270</td><td>.07</td></tr> <tr><td>550</td><td>.07</td></tr> <tr><td>650</td><td>.003</td></tr> <tr><td>1000</td><td>.60</td></tr> <tr><td>1600</td><td>.60</td></tr> <tr><td>1700</td><td>.10</td></tr> <tr><td>2000</td><td>.08</td></tr> </tbody> </table>	Frequency (Hz)	Power (G ² /Hz)	20	.008	65	.003	120	.07	170	.07	210	.005	270	.07	550	.07	650	.003	1000	.60	1600	.60	1700	.10	2000	.08
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Connector Retention	The mated connectors shall remain together and show no signs of cracking, distortion or detrimental damage.	SAE J2030 Apply a pulling force to the wire bundle of 444 N [100 lbf]. The load shall be applied for 30 seconds.																										
Mismatching	No physical damage to connector, keying feature, pins that will affect product performance.	SAE J2030 Apply an axial force of 178 N [40 lbf] in such a way to attempt to overcome the polarization keying feature without damage. Attempt to bend pins by intentional Mismatching and misalignment of plug connector.																										
Durability	No evidence of damage to the contacts, the contact plating, the connector housing, seals which may be detrimental to reliable connector performance. Must meet functional tests.	SAE J2030 Connectors shall be subjected to 50 cycles of mating and unmating at room temperature.																										

ENVIRONMENTAL

Test Description	Requirement	Procedure
Temperature Life	No evidence of physical damage which may be detrimental to reliable connector performance.	SAE J2030 Subject the wired mated connectors to 1000 hours at +125°C without current flowing.
Thermal Cycle	No evidence of physical damage which may be detrimental to reliable connector performance.	SAE J1455 The wired and mated connector shall be thermal cycled from -55±3°C to +125±3°C at a rate of 3°C per minute. Connectors to remain at each temperature extreme for 1 hour min. Repeat for 30 cycles
Thermal Shock	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test.	SAE J2030 The wired and mated connector shall be subjected the following. One cycle is -55°C soak for 1 hour then transition within 2 minutes to +125°C soak for 1 hour then transition back to -55°C within 2 minutes. Repeat for 10 cycles.
Water Immersion	Insulation resistance 20 MΩ min and no moisture inside of the connector	SAE J2030 The wired mated connectors shall be placed in an oven at +125±3°C for 1 hour 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 meter for 4 hours. Water temperature is to be 23±3°C. The free wire ends of the cable must not enter the water.
Pressure Washing	Insulation resistance 20 MΩ min and no moisture inside of the connector	J2030 The mated and cabled connectors under test shall be mounted in its normal operating position with drain holes, if used, open. The test apparatus should be designed to provide 100% coverage of the exposed surface of the mated and cabled connectors using flat fan spray nozzles located 20-30 cm away. Test conditions: 1. High Pressure Spray Wash - Water/detergent temp: 40°C - Source pressure: 10,300 kPa - Flow rate: 9,460 cm ³ /min - Exposure: 3 sec of a 6 sec period - Cycles: 375 2. Steam Cleaning - Water temp: 93°C - Source pressure: 1,400 kPa - Flow rate: 9,460 cm ³ /min - Exposure: 3 sec of a 6 sec period - Cycles: 375 3. Low Pressure Spray Wash - Garden hose with hot water for 20 minutes.

Figure 2 Cont.

Test Description	Requirement	Procedure																											
Fluid Immersion	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test.	<p data-bbox="820 195 1458 342">SAE J2030 Subject each wired and mated connectors to one fluid only per table below. Submerge sample for 5 minutes then remove and allow to air dry for 24 hours. Repeat for 5 cycles.</p> <table border="1" data-bbox="841 373 1466 541"> <thead> <tr> <th data-bbox="841 373 1057 415">Fluid</th> <th data-bbox="1060 373 1182 415">Concentration %</th> <th data-bbox="1185 373 1235 415">Temp °C</th> <th data-bbox="1239 373 1466 415">Specification</th> </tr> </thead> <tbody> <tr> <td data-bbox="841 417 1057 443">Motor Oil 30wt</td> <td data-bbox="1060 417 1182 443">100</td> <td data-bbox="1185 417 1235 443">85</td> <td data-bbox="1239 417 1466 443">ASTM D471, IRM-902</td> </tr> <tr> <td data-bbox="841 445 1057 470">Brake Fluid (disc type 1)</td> <td data-bbox="1060 445 1182 470">100</td> <td data-bbox="1185 445 1235 470">85</td> <td data-bbox="1239 445 1466 470">SAE RM66-04</td> </tr> <tr> <td data-bbox="841 472 1057 497">Diesel Fuel #2</td> <td data-bbox="1060 472 1182 497">90/10</td> <td data-bbox="1185 472 1235 497">60</td> <td data-bbox="1239 472 1466 497">IRM-903/T-Xylene</td> </tr> <tr> <td data-bbox="841 499 1057 525">Antifreeze Mixture</td> <td data-bbox="1060 499 1182 525">50/50</td> <td data-bbox="1185 499 1235 525">85</td> <td data-bbox="1239 499 1466 525">ASTM Service Fluid 104</td> </tr> <tr> <td data-bbox="841 527 1057 552">Gear Oil 90 wt</td> <td data-bbox="1060 527 1182 552">100</td> <td data-bbox="1185 527 1235 552">85</td> <td data-bbox="1239 527 1466 552">ASTM STP 512, API GL-5</td> </tr> </tbody> </table>				Fluid	Concentration %	Temp °C	Specification	Motor Oil 30wt	100	85	ASTM D471, IRM-902	Brake Fluid (disc type 1)	100	85	SAE RM66-04	Diesel Fuel #2	90/10	60	IRM-903/T-Xylene	Antifreeze Mixture	50/50	85	ASTM Service Fluid 104	Gear Oil 90 wt	100	85	ASTM STP 512, API GL-5
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Figure 2 end

3.4. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)					
	A	B	C	D	E	F
	TEST SEQUENCE (b)					
Examination of Product	1,17	1,8	1,4	1,4	1,5	1,5
Insulation Resistance	3,6,9,11					
Low Voltage Resistance		2,6				
Connection Resistance		3,7				
Current Test			3			
Maintenance Aging	13					
Terminal Retention	16					
Vibration					4	4
Connector Retention	15					
Mismating	14					
Durability	12					
Temperature Life	7	5			2	
Thermal Cycle	4	4	2	2		2
Thermal Shock					3	3
Water Immersion	2,5,8					
Pressure Wash	10					
Fluid Immersion				3		


NOTE

- a) *Specimens were prepared in accordance production drawings and were selected at random from current production.*
- b) *Numbers indicate sequence that tests were performed.*
- c) *Groups A – F specimens consisted of DEUTSCH stamped and formed terminal system size 12 nickel/tin sockets with 12 AWG SXL wire and DEUTSCH stamped and formed terminal system size 20 gold sockets with 20 AWG SXL wire.*
- d) *Crimp characteristics (i.e. height, width, etc.) shall be checked prior to testing.*
- e) *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.*

4. REVISION HISTORY

Rev	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	30-May-19	DM	DM
A1	Corrected document number. (is) 108-151025 (was) 108-151052	30-May-19	DM	DM