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## DEUTSCH\* DRC13-70PX-B027 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) DRC13-70PX-B027 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. Successful qualification testing on the subject product line was completed in 2005. The Qualification Test Report number for this testing is [501-151069](#). These documents are 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
- [408-151007](#) Instruction Guide DEUTSCH Extraction Tools
- [501-151069](#) DRC13-70PX-B027 Qualification Test Report
- [502-151069](#) DRC13-70PX-B027 Ingress Protection Engineering Test Report
- Product Drawings

X refers to A, B, C, D keys. XXXX refers to product modification.

DRC13-70PA-B027	70pin Header Receptacle, 90°
DRC13-70PB-B027	70pin Header Receptacle, 90°
DRC13-70PC-B027	70pin Header Receptacle, 90°
DRC13-70PD-B027	70pin Header Receptacle, 90°
DRC16-70SX-XXXX	70pin 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
- 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 VAC/VDC
- Current (Amp): See Figure 1

Contact Size	Wire Size AWG [mm <sup>2</sup> ]	All Circuits Energized (A)
16	12 [2.5]	13
	14 [2.0]	
	16 [1.5-1.0]	
	18 [0.8-0.75]	10
	20 [0.5]	7.5

Figure 1

- Temperature: -55°C to +125°C
- Ingress Protection (IP): IP6K9K
- Flammability: Not tested

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	Free of defects that could affect the electrical or mechanical performance of the part or degrade the long term performance of the part.	Conduct a visual examination for identification of product, torn seals, cracked plastic, etc.																								
<b>ELECTRICAL</b>																										
Insulation Resistance	≥ 1000 MΩ	Check each contact to all other contacts and the shell, if shell is conductive. Test to be performed using a 500 VDC ±10% Megohmmeter.																								
Dielectric Withstanding Voltage	Current leakage not to exceed 2.0 mA for mated connectors	Check each contact to all other contacts and the shell, if the shell is conductive, for 1 minute minimum. Test to be performed at 1500 VAC ±10%.																								
Low Level Contact Resistance	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Wire Size AWG [mm<sup>2</sup>]</th> <th>Resistance mΩ max</th> </tr> </thead> <tbody> <tr> <td>16 [1.0]</td> <td>6.0</td> </tr> <tr> <td>18 [.80]</td> <td>7.5</td> </tr> <tr> <td>20 [.50]</td> <td>11.0</td> </tr> </tbody> </table>	Wire Size AWG [mm <sup>2</sup> ]	Resistance mΩ max	16 [1.0]	6.0	18 [.80]	7.5	20 [.50]	11.0	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.																
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<b>MECHANICAL</b>																										
Durability	No evidence of damage to the contacts, contact plating, connector housing or seals which may be detrimental to reliable connector performance.	The connector shall be mated and unmated for a total of 100 complete cycles at room temperature. If a connector retaining bolt is utilized, retorque to the recommended torque after each cycle.																								
Vibration	There shall be no discontinuity greater than 1 μs at 20mV and 100 mA during the last hour of each axis.	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 Test Current first 3 hours each axis: 14-16 AWG [2.0-1.0]: 10A 18 AWG [.80]: 8A 20 AWG [.50]: 5A																								
Pin Retention	≥ 25 lbf pushout	Apply a direct axial load at a rate of 1.00 inch per minute until the header pin is pushed out of the housing.																								

Figure 2

Test Description	Requirement	Procedure
Center Threaded Insert Stripping Torque	No signs of damage	Apply a 50 in-lb. torque to the plug center jackscrew. Inspect the receptacle center threaded insert and area around for evidence of cracking or crazing around or stripping of threads within the threaded insert
<b>ENVIRONMENTAL</b>		
Temperature Life	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test.	The wired mated connectors shall be subjected to 1000 hours at +125 ±3 °C without current flowing.
Thermal Cycle	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test.	Cycle mated connectors from -55 ± 3 °C to +125 ±3 °C at a rate of 3 °C ± 1°C per minute. Connectors to remain at each temperature extreme for 1 hour minimum. Mated connectors are to be cycled a total of 20 complete cycles.
Water Immersion	Test samples must meet insulation resistance.	The wired mated connectors shall be placed in an oven at +125 ±3 °C 2 hours minimum then immediately be placed in water with a 5% slat by weight content and 0.1 g/L wetting solution to a depth of 3 feet 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 ±3 °C.

Figure 2 End

**i** **NOTE**

a) *All cavities wired with the minimum approved wire gauge per SAE J1128 suitable for the terminal size and with enough length to accommodate testing. Wire insulation shall be minimum diameter per SAE J1128 and shall be verified to be within the connector wire sealing range. Crimp characteristics (i.e. height, width, etc.) shall be checked prior to testing.*

*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.*

b) *Specimens shall be prepared in accordance with applicable production drawings and shall be selected at random from current production.*

3.4. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)			
	1	2	3	4
	TEST SEQUENCE (b)			
Examination of Product	1,15	1,13	1,4	1,3
Insulation Resistance	2			
Dielectric Withstanding Voltage	3			
Low Level Contact Resistance	4,7,10,13	2,5,8,11		
Contact Resistance	5,8,11,14	3,6,9,12		
Durability	9			
Vibration		7		
Pin Retention			3	
Center Threaded Insert Stripping Torque				2
Temperature Life	6			
Thermal Cycle		4	2	
Water Immersion	12	10		



**NOTE**

(a) Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production.

- Groups 1-2, Specimens shall consist of 70 position connectors with DEUTSCH Stamped & Formed Terminal System size 16 nickel sockets with 16 AWG wire.
- Groups 3-4, Specimens shall consist of 70 position connectors without terminals.

(b) Numbers indicate sequence in which tests are performed.

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### 3.5 Revision History

Rev Ltr	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	14-Oct-2019	DM	DM