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## DEUTSCH\* DRC23-64P 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) DRC23-64P 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 1997. The Qualification Test Report number for this testing is [501-151029](#). 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
- [501-151029](#) DRC23-64P Qualification Test Report
- Product Drawings

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

DRC23-64PAA	64-pin Receptacle, Black
DRC23-64PBB	64-pin Receptacle, Black
DRC23-64PBB-E009	64-pin Receptacle, Gray
DRC26-24SX	24-pin Plug, Black
DRC26-40SX	40-pin Plug, Black

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
- J-STD-002: Solderability Tests
- SAE J1128: Low Voltage Primary Cable
- SAE USCAR-2: Performance Specification for Automotive Electrical Connector Systems

**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)
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): Not Applicable
- Flammability: UL Recognized. Parts have been successfully tested to the 20 mm 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										
Visual Inspection	No physical defects detrimental to product performance.	SAE USCAR-2 Perform prior to testing, noting in detail any manufacturing or material defects such as cracks, tarnishing, deformities, etc.										
<b>ELECTRICAL</b>												
Dry Circuit	$\leq 20 \text{ m}\Omega$	SAE USCAR-2 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.										
Voltage Drop	$\leq 10 \text{ mV/A}$	SAE USCAR-2 Using 7.5A test current, the resistance of an equal length wire shall be subtracted from the actual readings to determine the added resistance of the terminal.										
Isolation Resistance	$\geq 20 \text{ M}\Omega$	SAE USCAR-2 Check each contact to all other contacts and the shell. Test to be performed using a 500 VDC megohmmeter.										
Solderability	The soldered area shall be at least 95% covered with a smooth, uniform coating when viewed at 10X magnification. The balance shall only show non-concentrated pin-holes or de-wetting spots.	Coat the solderable are of 15 samples with flux and drain vertically for 60 seconds. Dip the solderable area into a 63/37 solder bath heated to $+232 \pm 6^\circ\text{C}$ for 3-5 seconds. After removal from the solder bath, allow the samples to solidify by air drying vertically. Remove excess flux with a non-abrasive solvent flux remover.										
<b>MECHANICAL</b>												
Vibration	Connector and terminal shall not show any evidence of deterioration, cracks, deformities, etc. that could affect their functionality. There shall be no loss of electrical continuity ( $\geq 7 \Omega$ ) for more than 1 microsecond on any terminal pair.	SAE USCAR-2 Test duration is 8-hours per axis  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Breakpoint Frequency (Hz)</th> <th style="text-align: center;">Magnitude (G sqrd./Hz)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">60.0</td> <td style="text-align: center;">0.00100</td> </tr> <tr> <td style="text-align: center;">200.0</td> <td style="text-align: center;">1.50000</td> </tr> <tr> <td style="text-align: center;">210.0</td> <td style="text-align: center;">0.10000</td> </tr> <tr> <td style="text-align: center;">1000.0</td> <td style="text-align: center;">0.10000</td> </tr> </tbody> </table> Total Spectral content = 11.20 G(rms)	Breakpoint Frequency (Hz)	Magnitude (G sqrd./Hz)	60.0	0.00100	200.0	1.50000	210.0	0.10000	1000.0	0.10000
Breakpoint Frequency (Hz)	Magnitude (G sqrd./Hz)											
60.0	0.00100											
200.0	1.50000											
210.0	0.10000											
1000.0	0.10000											
Mechanical Shock	Connector and terminal shall not show any evidence of deterioration, cracks, deformities, etc. that could affect their functionality. There shall be no loss of electrical continuity ( $\geq 7 \Omega$ ) for more than 1 microsecond on any terminal pair.	SAE USCAR-2 10 shocks are applied along the three mutually perpendicular axis. The pulse shall be approximately half sine wave of 35G magnitude with a duration of 10-20ms. Test at room temperature.										

Figure 2

**ENVIRONMENTAL**

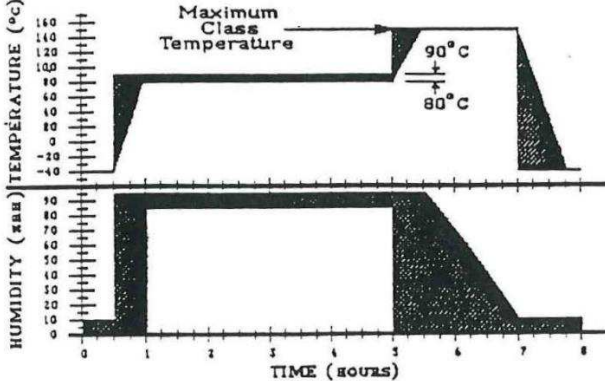
Test Description	Requirement	Procedure
High Temperature Exposure	Connector and terminal shall not show any evidence of deterioration, cracks, deformities, etc. that could affect their functionality.	SAE USCAR-2 The wired mated connectors shall be subjected to 1008 hours at +125°C without current flowing.
Thermal Shock	Connector and terminal shall not show any evidence of deterioration, cracks, deformities, etc. that could affect their functionality. There shall be no loss of electrical continuity ( $\geq 7 \Omega$ ) for more than 1 microsecond on any terminal pair.	SAE USCAR-2 Place the assembly in a chamber set to -40°C for 2 hours. In less than 5 minutes transfer the assembly to another chamber set to +125°C for 2 hours. Perform 50 cycles
Temperature/Humidity Cycling	Connector and terminal shall not show any evidence of deterioration, cracks, deformities, etc. that could affect their functionality. There shall be no loss of electrical continuity ( $\geq 7 \Omega$ ) for more than 1 microsecond on any terminal pair.	SAE USCAR-2 See below for profile using maximum class temperature +125°C and minimum temperature: -20°C. Perform 40 cycles.
		 <p>The graph shows two stacked plots over an 8-hour period. The top plot is Temperature (°C) on the y-axis, ranging from -40 to 160. The temperature starts at -20°C, ramps up to 125°C by 1 hour, stays constant until 5.5 hours, then ramps down to 90°C, stays constant until 7 hours, and finally ramps down to -20°C. The bottom plot is Humidity (%) on the y-axis, ranging from 0 to 100. Humidity starts at 0%, ramps up to 100% by 1 hour, stays constant until 5.5 hours, then ramps down to 0% by 7 hours, and stays at 0% until 8 hours. A label 'Maximum Class Temperature' points to the 125°C plateau. Specific points are marked at 90°C and 80°C on the temperature curve.</p>
Immersion	Isolation resistance $\geq 20 \text{ M}\Omega$ before and after each cycle	SAE USCAR-2 Place the test connector in a +125°C thermal chamber for 2 hours. Immediately immerse the samples in a +25°C, 5% salt water solution to a depth of 30-40 cm for 2 hours. A dye may be used to assist visual inspection of water ingress. Test isolation resistance before and after immersion test. Perform 5 cycles.
Fluid Resistance	Connector and terminal shall not show any evidence of deterioration, cracks, deformities, etc. that could affect their functionality.	SAE USCAR-2 Completely immerse 3 samples in each fluid listed in Figure 6 for 5 minutes. Samples are to be immersed in one fluid only.
		<ul style="list-style-type: none"> <li>- Brake Fluid                      SAE RM66-04                      @ 50°C</li> <li>- Oil                                      ASTM IRM-902                      @ 100°C</li> <li>- Gasoline                              ASTM Ref. Fuel C                      @ 25°C</li> <li>- Engine Coolant                      ASTM Serv. Fluid 104                      @ 100°C</li> <li>- Automatic Trans. Fluid              SAE J311                              @ 100°C</li> <li>- Windshield Washer Fluid                      @ 25°C</li> <li>- Power Steering Fluid                      ASTM IRM-903                      @ 100°C</li> <li>- Diesel Fuel                              ASTM Ref. Fuel F                      @ 25°C</li> <li>- M85 Methanol Fuel                      ASTM Ref. Fuel K                      @ 25°C</li> </ul>

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	5	6	7	8	9	10
	TEST SEQUENCE (b)									
Visual Inspection	1,6	1,6	1,6	1,6	1,4	1,5	1,5	1,5	1,5	1,3
Dry Circuit	2,4	2,4	2,4	2,4						
Voltage Drop	5	5	5	5						
Isolation Resistance					3	3	3	3	3	
Vibration/Mechanical Shock	3					2				
High Temperature Exposure				3					2	
Thermal Shock		3					2			
Temperature/Humidity Cycling			3					2		
Immersion						4	4	4	4	
Fluid Resistance					2					
Solderability										2

**i** **NOTE**

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

- Groups 1-0, Specimens shall consist of 64 position connectors with DEUTSCH Solid Terminal System size 20 gold sockets with 20 AWG wire.

(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	04-Oct-2019	DM	DM