



## DEUTSCH\* DRC16 Series Connector System

### 1. SCOPE

#### 1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) DRC16 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 1986. The Qualification Test Report number for this testing is [501-151018](#). 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
- [501-151018](#) DRC16 Qualification Test Report
- [502-151018](#) DRC16 Ingress Protection Engineering Test Report
- Product Drawings

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

DRC10-24PX-XXXX	24pin Header Receptacle, 180°
DRC10-40P-XXXX	40pin Header Receptacle, 180°
DRC12-24PX-XXXX	24pin Flange Receptacle
DRC12-40PX-XXXX	40pin Flange Receptacle
DRC13-24PX-XXXX	24pin Header Receptacle, 90°
DRC13-40PX-XXXX	40pin Header Receptacle, 90°
DRC14-24PX-XXXX	24pin Inline Receptacle
DRC14-40PX-XXXX	40pin Inline Receptacle
DRC16-24SX-XXXX	24pin Plug
DRC16-40S-XXXX	40pin Plug
DRC18-40SX-XXXX	40pin 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
- 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)
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): IP68 and IP6K9K
- Flammability (Inline): UL Recognized. Parts have been successfully tested to the 20 mm Flame Test per Standard UL-94
- Flammability (Header): V-0

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	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 megohmmeter 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 89mV max for 16AWG	MIL-STD-1344, Method 3004.1 13A for size 16 (16 and 18 AWG)
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 25 lbf 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: 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.
External Bending Moment	No discontinuity in excess of 1.0 $\mu$ s at 100 mA during the test.	Mount the Receptacle panel mounted in normal service to a rigid plane. Apply a 50 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.
<b>ENVIRONMENTAL</b>		
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 1000 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 hours.
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.

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.	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
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.

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
	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	6	6
Fluid Immersion	6	7	8	7	7	7
Thermal Shock	7	8				8
Vibration	8		9	8		
Shock	9		10	9		
External Bending Moment		9	11			9
Insert Retention	10			10	8	
Low Voltage Resistance		10	12			
Contact Resistance	11	11	13	11	9	10
Final Examination	12	12	14	12	10	11



**NOTE**

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

- Groups 1-6, Specimens shall consist of 40 position connectors with DEUTSCH Solid Terminal System size 16 nickel sockets with 16 AWG wire.

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

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#### 4. REVISION HISTORY

Rev Ltr	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	09-Oct-2019	DM	DM
B	Page 2, Sec 3.2. Clarified Flammability Inline and Header Page 2, Sec 3.2. Added Flammability (Header): V-0	11-Oct-2022	DM	IG