



## DEUTSCH\* Stamped and Formed (S&F) Contacts

### 1. SCOPE

#### 1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) DEUTSCH Stamped and Formed Contact 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.

### 2. APPLICABLE DOCUMENTS

The following documents 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](#) DEUTSCH Size 16 S&F Pin & Socket (14-01, 14-10, 16-01, 16-06, 16-07, 16-09)
- [114-151001](#) DEUTSCH Size 16 S&F Pin & Socket (16-12, 16-14)
- [114-151002](#) DEUTSCH size 12 S&F Pin & Socket (12-01)
- [114-151003](#) DEUTSCH Size 20 S&F Pin & Socket (20-01, 20-02)
- [114-151006](#) DEUTSCH size 12 S&F Pin & Socket (12-02)
- Product Drawings. XX = plating codes. See individual product drawings for available plating.

Product Drawing Pin	Size	Product Drawing Socket	Size
1060-12-01XX	12	1062-12-01XX	12
1060-12-02XX		1062-12-02XX	
1060-14-01XX	16	1062-14-01XX	16
1060-14-10XX		1062-14-10XX	
1060-16-01XX		1062-16-01XX	
1060-16-06XX		1062-16-06XX	
1060-16-07XX		1062-16-07XX	
1060-16-09XX		1062-16-09XX	
1060-16-12XX	20	1062-16-12XX	20
1060-20-01XX		1062-16-14XX	
1060-20-02XX		1062-20-01XX	
1060-20-06XX		1062-20-02XX	
		1062-20-03XX	
		1062-20-06XX	

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 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: See connector product specification
- Current (Amp): See Figure 1

Contact Size	Wire Size AWG [mm <sup>2</sup> ]	Maximum Current (A)
12	10 [6.0-5.0]	25
	12 [4.0-2.5]	
	14 [2.0]	18
16	12 [2.5]	13
	14 [2.0]	
	16 [1.5-1.0]	16
	18 [0.8-0.75]	10
	20 [0.5]	7.5
20	16 [1.5-1.0]	7.5
	18 [0.8-0.75]	
	20 [0.5]	5
	22 [0.35]	

Figure 1

- Temperature:
  - Nickel -55°C to +125°C
  - Tin -55°C to +125°C
  - Gold -55°C to +150°C
  - Palladium Nickel Gold -55°C to +150°C



**NOTE**

See connector product specification for connector temperature range

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 contacts shall be correctly constructed, marked and shall show good quality and workmanship	SAE J2030 Visually inspected for use of materials, proper construction, correct part number and insert markings and over-all quality of workmanship. Damaged or improperly manufactured contacts, galling of metal parts, nicks and burrs of metal parts were considered adequate basis for rejection.																										
<b>ELECTRICAL</b>																												
Low Level Contact Resistance (Dry Circuit)	<table border="1"> <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 [0.80]</td> <td>7.5</td> </tr> <tr> <td>20 [0.50]</td> <td>11.0</td> </tr> <tr> <td>22 [0.35]</td> <td>17.0</td> </tr> </tbody> </table>	Wire Size AWG [mm <sup>2</sup> ]	Resistance mΩ max	16 [1.0]	6.0	18 [0.80]	7.5	20 [0.50]	11.0	22 [0.35]	17.0	SAE J2030 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. Gold and tin plated contacts.																
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Contact Resistance (Voltage Drop)	<table border="1"> <thead> <tr> <th>Contact Size</th> <th>Wire Size AWG [mm<sup>2</sup>]</th> <th>Test Current Amp</th> <th>Voltage Drop max mV</th> </tr> </thead> <tbody> <tr> <td rowspan="3">12</td> <td>10 [6.0-5.0]</td> <td rowspan="2">25</td> <td rowspan="9">100</td> </tr> <tr> <td>12 [4.0-2.5]</td> </tr> <tr> <td>14 [2.0]</td> <td>18</td> </tr> <tr> <td rowspan="4">16</td> <td>12 [2.5]</td> <td rowspan="2">13</td> </tr> <tr> <td>14 [2.0]</td> </tr> <tr> <td>16 [1.5-1.0]</td> <td>10</td> </tr> <tr> <td>18 [0.8-0.75]</td> <td>7.5</td> </tr> <tr> <td rowspan="4">20</td> <td>20 [0.50]</td> <td rowspan="2">7.5</td> </tr> <tr> <td>16 [1.5-1.0]</td> </tr> <tr> <td>18 [0.8-0.75]</td> <td>5</td> </tr> <tr> <td>22 [0.35]</td> </tr> </tbody> </table>	Contact Size	Wire Size AWG [mm <sup>2</sup> ]	Test Current Amp	Voltage Drop max mV	12	10 [6.0-5.0]	25	100	12 [4.0-2.5]	14 [2.0]	18	16	12 [2.5]	13	14 [2.0]	16 [1.5-1.0]	10	18 [0.8-0.75]	7.5	20	20 [0.50]	7.5	16 [1.5-1.0]	18 [0.8-0.75]	5	22 [0.35]	SAE J2030 Using test currents as defined. The resistance of an equal length wire (reference wire) shall be subtracted from the actual readings to determine the added resistance of the terminal. The reference wire shall be from the same reel as used for the connector wiring.
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Figure 2

Test Description	Requirement	Procedure																							
<b>MECHANICAL</b>																									
Crimp Tensile	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Contact Size</th> <th style="width: 35%;">Wire Size AWG [mm<sup>2</sup>]</th> <th style="width: 50%;">Tensile Strength Minimum lbf [N]</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center;">12</td> <td>10 [6.0-5.0]</td> <td rowspan="3" style="text-align: center;">70 [311]</td> </tr> <tr> <td>12 [4.0-2.5]</td> </tr> <tr> <td>14 [2.0]</td> </tr> <tr> <td rowspan="4" style="text-align: center;">16</td> <td>12 [2.5]</td> <td rowspan="4" style="text-align: center;">25 [111]</td> </tr> <tr> <td>14 [2.0]</td> </tr> <tr> <td>16 [1.5-1.0]</td> </tr> <tr> <td>18 [0.8-0.75]</td> </tr> <tr> <td rowspan="4" style="text-align: center;">20</td> <td>20 [0.50]</td> <td style="text-align: center;">15 [67]</td> </tr> <tr> <td>16 [1.5-1.0]</td> <td style="text-align: center;">20 [89]</td> </tr> <tr> <td>18 [0.8-0.75]</td> <td style="text-align: center;">15 [67]</td> </tr> <tr> <td>22 [0.35]</td> <td style="text-align: center;">10 [45]</td> </tr> </tbody> </table>	Contact Size	Wire Size AWG [mm <sup>2</sup> ]	Tensile Strength Minimum lbf [N]	12	10 [6.0-5.0]	70 [311]	12 [4.0-2.5]	14 [2.0]	16	12 [2.5]	25 [111]	14 [2.0]	16 [1.5-1.0]	18 [0.8-0.75]	20	20 [0.50]	15 [67]	16 [1.5-1.0]	20 [89]	18 [0.8-0.75]	15 [67]	22 [0.35]	10 [45]	<p>SAE J2030</p> <p>The tensile strength of the crimped connection shall be tested by using suitable apparatus at a constant speed within the range of 25 mm/min. If the terminal has a cable insulation crimp it shall be rendered mechanically ineffective. Samples are pulled to destruction.</p> <p>Crimp specifications:            Size 12: 114-151002 or 114-151006            Size 16: 114-151000 or 114-151001            Size 20: 114-151003</p>
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Contact Retention	<p>The terminal shall maintain its original position in the connector throughout the test.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Contact Size</th> <th style="width: 80%;">Pull-Out Force lbf [N] min</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12</td> <td style="text-align: center;">30 [133]</td> </tr> <tr> <td style="text-align: center;">16</td> <td style="text-align: center;">25 [111]</td> </tr> <tr> <td style="text-align: center;">20</td> <td style="text-align: center;">20 [89]</td> </tr> </tbody> </table>	Contact Size	Pull-Out Force lbf [N] min	12	30 [133]	16	25 [111]	20	20 [89]	<p>SAE J2030</p> <p>The contacts shall be subjected to a direct pull. The minimum value specified 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.</p>															
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Durability	<p>No evidence of damage to the contacts, contact plating which may be detrimental to reliable contact performance.</p>	<p>SAE J2030</p> <p>Test samples shall be mated and unmated complete cycles at room temperature.</p> <p>Nickel: = 100 cycles            Gold: = 100 cycles            Palladium Nickel Gold: = 100 cycles            Tin: = 20 cycles</p>																							
Terminal-Terminal Insertion Force	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Contact Size</th> <th style="width: 35%;">Insertion Force max lbf [N]</th> <th style="width: 50%;">Test Pin Ø inch [mm]</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12</td> <td style="text-align: center;">2.50 [11.1]</td> <td style="text-align: center;">.0946 [2.403]</td> </tr> <tr> <td style="text-align: center;">16</td> <td style="text-align: center;">2.80 [12.5]</td> <td style="text-align: center;">.0625 [1.588]</td> </tr> <tr> <td style="text-align: center;">20</td> <td style="text-align: center;">1.50 [6.7]</td> <td style="text-align: center;">.0402 [1.021]</td> </tr> </tbody> </table>	Contact Size	Insertion Force max lbf [N]	Test Pin Ø inch [mm]	12	2.50 [11.1]	.0946 [2.403]	16	2.80 [12.5]	.0625 [1.588]	20	1.50 [6.7]	.0402 [1.021]	<p>Sockets shall be mounted in a suitable fixture for applying gradually increasing loads for the insertion using a test pin. Insert test pin .250 [6.35] deep into socket.</p>											
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Contact Overlap (electrical engagement)	<p>≥ .050 [1.27]. Depends on connector design</p>	<p>Theoretical proof by design calculation</p>																							

Figure 2 Cont.

Test Description	Requirement	Procedure
ENVIRONMENTAL		
Temperature Life	Contact resistance not to exceed 100mV after test	SAE J2030 The wired mated connectors shall be subjected to 1000 hours at +125°C without current flowing
Thermal Cycle	Contact resistance not to exceed 100mV after test	Cycle mated connectors from -55°C to +125°C. Connectors to remain at each temperature extreme for one (1) hour minimum. Mated connectors are to be cycled a total of 20 complete cycles.
Thermal Shock	Contact resistance not to exceed 100mV after test	SAE J2030 Subjected test sample to 10 cycles. One cycle shall consist of a soak time at -55°C 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 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.

Figure 2 End

## 3.4 Revision History

Rev Ltr	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	01-Sept-2018	DM	DM
B	1) Page 2, Section; 3.2, Temperature, changed Tin max to +125°C and added Palladium Nickel Gold. 2) Page 4, Figure 2, Durability row, added Palladium Nickel Gold: = 100 cycles.	07-Sep-2018	DD	DM