

GEL CONNECTOR IDC / WIRE TO WIRE



- NOT IN SCALE -

C	Modified P/N (page2) and 3.2 req. value (page4)	PPo	06 Aug 10	EDe	9aug10
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1. SCOPE

1.1 Content

This specification covers performances, tests and quality requirements for the: "GEL CONNECTOR; IDC / WIRE TO WIRE" in the versions listed below:

- Standard version (transparent, no color) – *customer restricted* : **P/N X-293521-1;**
- End version with bridge (transparent, light blue color) – *customer restricted*: **P/N X-293522-1;**
- End version no bridge (transparent, light green color) – *customer restricted*: **P/N X-293522-2;**

1.2 Qualification

Products manufactured according the appropriate drawings (including work instructions, QIP, etc) and meeting the requirements according this specification, are qualified towards this specification.

2. APPLICABLE – REFERENCED DOCUMENTS

The following documents form a part of this specification to the extent specified herein.

Unless otherwise specified, the latest edition of the document applies.

In the event of conflict between requirements of this Specification and Product Inspection Drawings, Product Inspection Drawings shall take precedence.

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2.1 Tyco Electronics documents

- Tyco Electronics Product Drawings
- Tyco Electronics Spec. 109-1 : *General Requirements for Test Specifications*

2.2 Other documents

- IEC 60529 *Degrees of protection provided by enclosures (IP Code)*
- IEC 60068 *Environmental testing (IEC 68-1; IEC 68-2; IEC68-3; IEC68-14)*
- IEC 60512 *Connectors for Electronic Equipment, Tests & Measurements*
- IEC 60998 *Connecting devices for low-voltage circuits for household and similar purposes*

3. REQUIREMENTS

3.1 Design and Construction

Product shall be of design, construction and physical dimensions specified on the applicable production drawings.

3.2 Materials

Materials used in the construction of this product shall be as specified on the applicable production drawings.

3.3 Ratings

3.3.1 Electrical parameters

Voltage: 0 ÷ 35 V d.c.

Current: 1,5 A d.c. (26 AWG flat ribbon cable) ; 6,0 A d.c. (single wire 18AWG or 20AWG or 0,75mm² or 0,50mm² ; all wires must have insulation diameter not exceeding 2,2mm)

3.3.2 Environmental parameters

Range Temperature: -40°C to +100°C (increase due to current load included)

Degree of protection: IP66

4. REQUIREMENTS AND TESTING PROCEDURES

Product is designed to meet the performance requirements according to the test conditions specified at §4.1.

4.1 Quality assurance description

SAMPLES PREPARATION

The samples for testing must be selected at random from the current production and in accordance with relevant inspection drawings. All samples must be stored for 1 day at 50% Relative Humidity. All used samples for testing must not be used again, unless otherwise specified.

SAMPLES COMPOSITION

Unless otherwise specified each group to be tested shall be composed at least by 5 connectors MIN per version (sufficient to test P/N 293521-1 and P/N 293522-1 ; 293522-2 shall be tested according 2.1 Cable retention force only).

ENVIRONMENTAL TEST CONDITIONS

Unless otherwise specified, and according to IEC 60068 Part 1, all tests shall be conducted at:

- Temperature: 25±10°C
- Relative humidity: 45÷75%
- Pressure: 860÷1060 mbar

4.2 Test requirements and Procedures Summary

1. PRODUCT EXAMINATION		
<i>TEST</i>	<i>REQUIREMENT</i>	<i>PROCEDURE</i>
1.1 Product Confirmation	The product must meet the requirements of related drawings.	Visual, dimensional and functional inspection, according to the Quality Inspection Plan.
1.2 Visual Examination	The product must not have visible marks of damage, break or defect before and after the execution of the tests.	(Acc. to IEC 60512-1-1) Visual inspection

2. MECHANICAL REQUIREMENTS		
<i>TEST</i>	<i>REQUIREMENT</i>	<i>PROCEDURE</i>
2.1 Cable retention force	RIBBON CABLE (4x24/4x26AWG) 36 N MIN. SINGLE WIRE (20AWG/18AWG/0,50mm²/0,75mm²) 89 N MIN.	Acc. to IEC 60512-13-1 Testing speed 25,4mm/min.
2.2 Vibration Test	Contact resistance: difference between initial and final value must be $\leq 10 \text{ m}\Omega$	Total excursion: 1,0mm Frequency: 10-200-10 Hz Speed: 1 octave/min. Acceleration: 5 g Duration: 8 hours for each axis (x, y, z). (Acc. to IEC 60068-2-6)

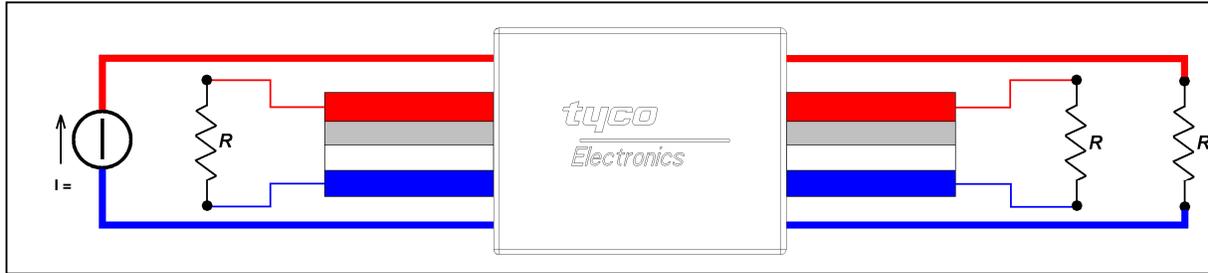
3. ELECTRICAL REQUIREMENTS		
<i>TEST</i>	<i>REQUIREMENT</i>	<i>PROCEDURE</i>
3.1 Voltage proof	Value and nature of test voltage: 500V	Acc. to IEC 60512-4-1, Test 4a Duration: 60 s
3.2 Insulation Resistance	$10^9 \Omega \text{ min.}$	Acc. to IEC 60998 Part 1 Test 13.3 Duration: 60 s
3.3 Contact Resistance	Initial value: $\leq 5 \text{ m}\Omega$. (this value include n°2 IDC terminations + the contact bulk)	Acc. to IEC 60512-2-2 Current: 1 A
3.4 Current Temperature Rise / Derating	$\Delta T < 30^\circ\text{C}$ with $I = 6.0 \text{ A d.c.}$ referring to the schematic in Fig. 1	(Acc. to IEC 60512-5-1/2, test 5a & 5b) Test on n°1 sample (ref. fig 4.1)

4. ENVIRONMENTAL REQUIREMENTS		
<i>TEST</i>	<i>REQUIREMENT</i>	<i>PROCEDURE</i>
4.1 Degree of protection	IP66	Acc. to IEC 60529
4.2 Cold	No physical damages. <u>Contact resistance:</u> difference between Initial and Final value must be $\leq 10 \text{ m}\Omega$.	Acc. to IEC 60068-2-1 Temperature: -40°C Duration: 2h
4.3 Dry Heat	No physical damages. <u>Contact resistance:</u> difference between Initial and Final value must be $\leq 10 \text{ m}\Omega$.	Acc. to IEC 60068-2-2 Temperature: $+100^\circ\text{C}$ Duration: 2h
4.4 Damp Heat	No physical damages. <u>Contact resistance:</u> difference between Initial and Final value must be $\leq 10 \text{ m}\Omega$.	Acc. to IEC 60068-2-3 Temperature: $+40 \pm 2^\circ\text{C}$ Relative humidity: 93 ± 3 / -2 % Duration: 4 days

4.5 Thermal shock	No physical damages. <u>Contact resistance:</u> difference between Initial and Final value must be $\leq 10 \text{ m}\Omega$.	Acc. to IEC 60068-2-14, Test Na; 100 cycles $T_A = -40^\circ\text{C}$; $T_B = +100^\circ\text{C}$ $t_1 = 30 \text{ min.}$; $t_2 = 2\div 3 \text{ min}$
4.6 Thermal cycles	No physical damages. <u>Contact resistance:</u> difference between Initial and Final value must be $\leq 10 \text{ m}\Omega$.	$T_A = +20^\circ\text{C}$ (t=30 min. including transition) $T_B = +50^\circ\text{C}$ (t=30 min. including transition) Temperature transition rate: $5^\circ\text{C}/\text{min}$. Total cycle duration: 1h Number of cycles: 192 (Acc. to IEC 60068-2-14, test Nb) Current (for power wires, every cycle): 7.5 A for 45min. / 0A for the last 15 min. Current (for ribbon cable, every cycle): 1,9A for 45min. / 0A for the last 15 min. Ref. to the schematics in fig 4.2

5. SAFETY REQUIREMENTS		
TEST	REQUIREMENT	PROCEDURE
5.1 Glow wire	Burning duration $\leq 30\text{s}$ No ignition of underlying parts (or tissue paper) due to the burning drops.	Acc. to IEC 60695-2-10 (with reference in IEC 60598-1, section 13.3.2) Temperature: $+650^\circ\text{C}$.
5.2 Needle flame test	Burning duration $\leq 30\text{s}$ No ignition of underlying parts (or tissue paper) due to the burning drops.	Acc. to IEC 60695-2-2 (with reference in IEC 60598-1, section 13.3.1) Test flame applied to the sample for 10s.

Fig. 4.1 : Test 3.4 - Current Temperature Rise / Derating – SCHEMATIC SAMPLE CONFIGURATION

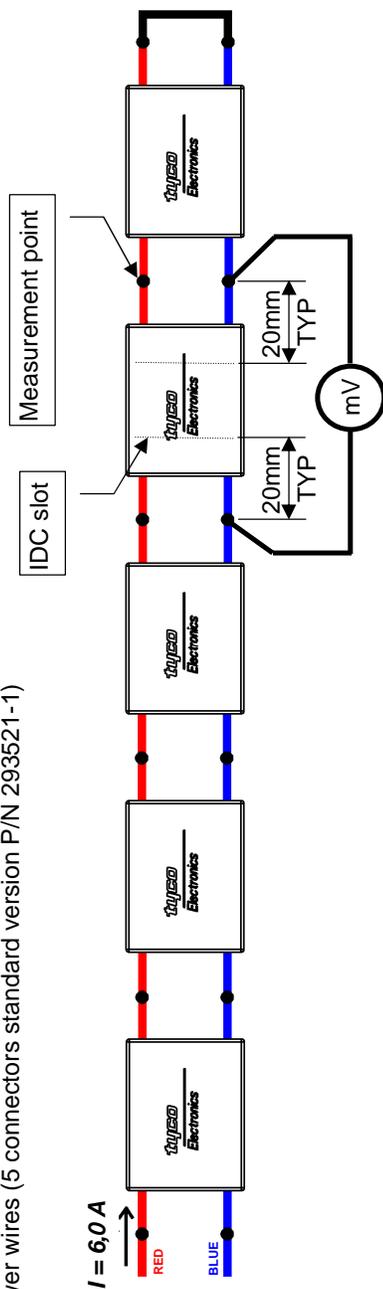


I = 6.0 A ; R= 1 Ω (P=3W min.)

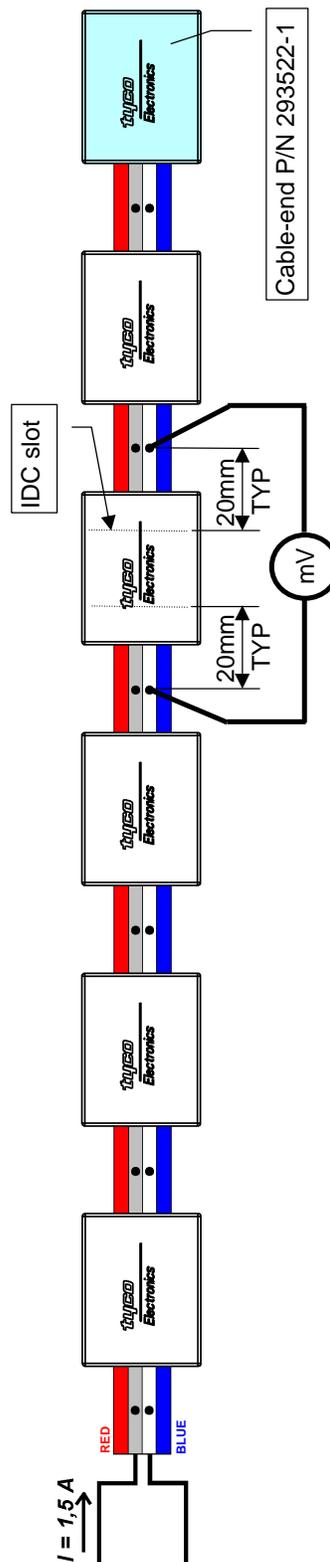
Fig 4.2 : Test 4.6 - Thermal cycles - SAMPLES CONFIGURATION

Will be tested two chains, as below described:

- 1st chain: power wires (5 connectors standard version P/N 293521-1)



- 2nd chain: ribbon cable (5 connectors standard version P/N 293521-1 + 1 connector cable-end version P/N 293522-1)



For every chain, the contact resistance has to be measured between the measurement point, and the cable contribution has to be subtracted. For the last connector, cable-end P/N 293522-1 the contact resistance will be measured between the gray and white ways.

NOTE: the contact resistance as found, will include 2 IDC resistances + the contact bulk resistance.

5. TEST SEQUENCES

TEST	DESCRIPTION	TEST GROUPS								
		A	B	C	D	E	F	G	H	I
1	PRODUCT EXAMINATION	1,3	1,5	1,4	1,11	1,5	1,3	1,5	1,3	1,3
2.1	Cable retention force	2								
2.2	Vibration test		3							
3.1	Voltage Proof				4,10					
3.2	Insulation resistance			2,4	3,9					
3.3	Contact Resistance		2,4		2,8	2,4		2,4		
3.4	Temperature Rise / Derating						2			
4.1	Degree of Protection			3						
4.2	Cold				5					
4.3	Dry Heat				6					
4.4	Damp Heat				7					
4.5	Thermal Shock					3				
4.6	Thermal Cycling							3		
5.1	Glow Wire								2	
5.2	Needle Flame									2