



# DT-XT SERIES PRODUCT SPECIFICATION

## DT-XT系列产品规范

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## 1. SCOPE 适用范围

### 1.1. Content 内容

This Product Specification relates to the DT-XT Commercial Vehicle (CV), Power and/or Signal wire-to-wire connector system. This system consists of 7 circuit sizes: 2, 3, 4, 6, 8, 12 and 18cct. The product terminals terminate with 20 to 12AWG wires using crimp technology.

Note: Product Qualification of the connector series was determined by testing of the 2cct connector. Individual tests and partial test sequences for remaining circuit sizes are available on request.

This specification applies but is not limited to the following part numbers, X =1, 2, 3...,9 refers to different colors and keys.

本规范适用但不仅限于以下零件号, X =1, 2, 3...,9 表示不同的颜色或键位.

	DESCRIPTION	TE PN
2CCT	DT-XT receptacle assembly	X-2600022-X
	DT-XT plug assembly	X-2600023-X
	DT-XT receptacle wedgelock	2600024-X
	DT-XT plug wedgelock	2600025-X
3CCT	DT-XT receptacle assembly	X-2600026-X
	DT-XT plug assembly	X-2600027-X
	DT-XT receptacle wedgelock	2600028-X
	DT-XT plug wedgelock	2600029-X
4CCT	DT-XT receptacle assembly	X-2600030-X
	DT-XT plug assembly	X-2600031-X
	DT-XT receptacle wedgelock	2600032-X
	DT-XT plug wedgelock	2600033-X
6CCT	DT-XT receptacle assembly	X-2600034-X
	DT-XT plug assembly	X-2600035-X
	DT-XT receptacle wedgelock	2600036-X
	DT-XT plug wedgelock	2600037-X
8CCT	DT-XT receptacle assembly	X-2600038-X
	DT-XT plug assembly	X-2600039-X
	DT-XT receptacle wedgelock	2600040-X
	DT-XT plug wedgelock	2600041-X
12CCT	DT-XT receptacle assembly	X-2600042-X
	DT-XT plug assembly	X-2600043-X
	DT-XT receptacle wedgelock	2600044-X
	DT-XT plug wedgelock	2600045-X
18CCT	DT-XT receptacle assembly	X-2600046-X
	DT-XT plug assembly	X-2600047-X
	DT-XT Blind cavity plug	2600048-1

## 1.2. Qualification 鉴定

When tests are performed, the following specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

本测试规范依照下面的规范及标准执行。所有的检验应依照合适的检验计划及产品图纸执行。

## 1.3. Safety agency approvals 安全认证

UL File Number:	Not Applicable
CSA File Number:	Not Applicable
TÜV License Number:	Not Applicable

## 2. APPLICABLE DOCUMENTS 适用文件

### 2.1. Usable document 使用文件

In the event of conflict between the requirements of this specification and the drawing, the drawing shall take precedent.

在本规范的要求与图纸发生冲突时，以产品图纸为准。在本规范的要求与参考文件发生冲突时，以本规范为准。

### 2.2. TE specifications 泰科电子规范

- 109-1: General Requirements for Testing

### 2.3. Other specifications 其他规范

- SAE J2030: Heavy-Duty Electrical Connector Performance Standard
- USCAR-2 REVISION 6

## 3. REQUIREMENT 要求

### 3.1. Design and Construction 设计和结构

Products must meet the design, construction and physical dimensions specified in the applicable product drawings.

产品满足产品图纸上的设计，结构和尺寸要求。

### 3.2. Material 材料

Description of the material sees the related product drawings.

材料描述见相关产品图纸。

### 3.3. Test parameters and tolerances 测试参数与公差

Table 1: Test parameters and tolerances

Requirement 要求	Tolerance 公差
Ambient temperature 环境温度	23°C ± 5°C
Relative humidity 相对湿度	30% to 70%
Atmospheric pressure 大气压	96kPa ± 10kPa

### 3.4. Ratings 等级

A. Operating Temperature / 工作温度: -55~125°C

B. Current and applicable wires

AWG	Amps
20	7.5
18	10
16	13
14	13

### 3.5. General Performance and Test description 通用性能和试验描述

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Para.4. All testes must be performed at the test condition of the TE test specification 109-1 unless otherwise specified.

产品应能满足段落4中的电气，机械和环境等性能要求。所有试验均需按照TE规范109-1中的测试条件进行，除非另有说明。

### 3.6. Test Requirements and Procedures Summary 测试要求及方法

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

**Table 2**

Item	Test Description	TEST CONDITION	REQUIREMENT
3.6.1	Examination of Product SAE J2030, 6.1	Parts checked for: Identification, Workmanship Finish, Markings, Cosmetic issues, Tool marks, Torn seals etc.	Meets requirements of product drawing. All parts shall be free of hazardous substances. All parts to be free of dirt and grease. No Defects
3.6.2	Visual Examination SAE J2030, 6.27	Conduct a visual examination for identification of product such as torn seals, cracked plastic, evidence of fluid or dust ingress in sealed connector systems, arcing, charring, melting, or anything that could affect the performance and serviceability of the product.	No Visual Defects as per Section 6.27 SAE J2030

**ELECTRICAL**

3.6.3	Low voltage Resistance SAE J1614, 4.3.6	Test with applied voltage not exceeding 20mV open circuit and the test current shall be limited to 100mA.	Maximum Resistance 10.0mOhms initial 20.0mOhms post endurance testing
3.6.4	Insulation Resistance SAE J2030, 6.3	Apply a voltage of 1000 VDC between adjacent terminals and between terminals to ground.	20 MegaOhms Minimum
3.6.5	Connection Resistance @ Rated Current SAE J2030, 6.4	Mate connectors: Measurements shall be taken after thermal equilibrium at rated current level.	Voltage Drop not to Exceed levels in Table 1 (See Appendix 3)
3.6.6	Current Test @ Rated Current SAE J2030, 6.22	Apply maximum rated current to all terminals. Ambient temperature: 125°C +/-3°C for 24H	Voltage Drop not to Exceed levels in Table 3 of Section SAE J2030 6.4.1 (Use PS Rated Current: See Appendix 3)

**Table 2**

Item	Test Description	TEST CONDITION	REQUIREMENT
3.6.7	Current Cycling Test @Rated Current  SAE J2030, 6.25	a. 200 off/on cycles, at ambient of 125 °C ± 3 °C, each cycle to consist of 45 min on, 15 min off. b. 50 cycles of following: 20 min on at 125 °C ± 3 °C, 60 off at 21 °C ± 1 °C. Transition rate is to be 3 °C/ min +3/-0 °C/min without current applied. c. Repeat a. and b. to complete 500 cycles	Acceptance criteria per section 6.4 of SAE J2030. (Use PS Rated Current: See Appendix 3)
<b>MECHANICAL</b>			
3.6.8	Connector Mating Force  SAE J2030, 6.9	Mate the male and female connectors. (Latches included)	135 N Maximum
3.6.9	Connector Unmating Forces  SAE J2030, 6.10	Unmate the male and female connector. (Latches disengaged)	135 N Maximum
3.6.10	Terminal Retention in Connector  SAE J2030, 6.18	Apply 110N load to the terminals in the connector housing for 1 minute.	No Terminal Unmating
3.6.11	Shock (Mechanical)  SAE J2030, 6.16	Mate connectors and shock at 50 g with ½ sine wave (11 milliseconds) shocks in the X,Y,Z axes (10 shocks per axis total).	10 Ohms Maximum No discontinuity > 1 microsecond at 100 mA
3.6.12	Vibration  SAE J2030, 6.15	Mate connectors; Sine sweep of 10 Hz to 2,000 Hz, back to 10 Hz in 20min, Test duration 24hrs 1.78 mm displacement, 20 g acceleration. 12 cycles in each of the 3 mutually perpendicular axis. Apply the rated current per table 3 of SAE J2030 for the first 3 hours in each axis.	10 Ohms Maximum No discontinuity > 1 microsecond at 100 mA for the last hour of vibration in each axis.
3.6.13	Drop Test  SAE J2030, 6.17	8 Drops from a height of 750 +/-25mm onto a concrete floor while attached to a cord 1500 +/- 25mm long. Rotate the connector through 45 degrees for each drop.	See Section 6.17 of SAE J2030

**Table 2**

Item	Test Description	TEST CONDITION	REQUIREMENT
3.6.14	Durability between Male and Female connectors SAE J2030, 6.11	Mate and unmate the connectors by hand at 10 cycles per minute for 50 cycles.	See Section 6.11 of SAE J2030
3.6.15	Connector Retention SAE J2030, 6.20	Apply an axial pulling force to the mated connectors for 30s.	222N applied to the 2cct
			333N applied to the 3cct
			350N applied to the 4cct and 6cct. Deviation from SAE J2030, 6.20 due to plug design constraints.
3.6.16	Connector Mismatching SAE J2030, 6.21	Apply an axial force to same circuit size connectors with various keying options	444N applied to the 8cct, 12cct and 18cct.
			Polarization to resist 178N minimum mating force without change.
3.6.17	Terminal Crimp Strength SAE J2030, 6.26.	The tensile strength of the crimped connection shall be tested within the range of 20 mm to 100 mm/ min. If the terminal has a cable insulation crimp it shall be rendered mechanically ineffective.	See Table 6 of SAE J2030, 6.26.
<b>ENVIRONMENTAL</b>			
3.6.18	Thermal Shock SAE J2030, 6.13	Cabled & mated connectors subjected to 10 cycles of thermal shock (soak @ -55°C ambient then transition within 2 minutes to 125°C ambient & soak before transition back to -55°C. Soak time to ensure internal connector temp is within 5 C of ambient. No evidence of cracking or chipping or other damage / impaired operation allowed.	No evidence of cracking, chipping or other detrimental damage to normal operation.
3.6.19	Temperature/Humidity(Cyclic) SAE J2030, 6.24	See Appendix 2	Tested per SAE J2030 6.4 (Use PS Rated Current: See Appendix 3) for power circuit, SAE J1614 4.3.6 for signal circuits (dependent upon power level requirements of contacts), and insulation resistance per SAE J2030 6.3. Visual: No Damage

**Table 2**

Item	Test Description	TEST CONDITION	REQUIREMENT
3.6.20	Salt Spray SAE J2030, 6.12	Mated connectors Duration: 96 hours exposure; Atmosphere: salt spray from a 5% by weight solution; Temperature: 35 +/-3°C; Allow to dry for 4 hours.	Visual: No Detrimental evidence of corrosion on the connector or contacts.
3.6.21	Fluid Resistance	Submerge mated connectors for 5 cycles of 5 minutes at the specified temperature in the following fluids: motor oil, brake fluid, diesel fuel, 50/50 anti-freeze mixture, Roundup original and aqueous urea.	Visual: No Damage Post Test
3.6.22	Water Immersion SAE J2030, 6.19	Place wired connectors in oven at 125°C +/-3°C for 1H and immediately place in 5% salt solution by weight content and 0.1g/L wetting agent to 1m for 4H. Water temp 23°C +/-3°C. Test for insulation resistance.	Insulation Resistance 20 MegaOhms Minimum. Visual: No moisture inside.
3.6.23	Dust Test SAE J2030, 6.23	Expose mated connectors to dust equivalent to air cleaner fine dust defined by SAEJ726. Minimum suspension concentration: 0.88g/m <sup>3</sup> for 24H.	No impairment of function, performance and serviceability per Severity Level 2 of ASABE EP455 Item 5.3.1
3.6.24	Pressure Washing SAE J2030, 6.5	The test apparatus should be designed to provide 100% coverage of the exposed surface of the mated and cabled connectors using flat fan spray nozzles located 20 cm to 30 cm away. The test should be run at 40 °C	An Insulation Resistance test (see SAE J2030 section 6.3) shall be conducted after this test.
3.6.25	Maintenance Aging SAE J2030, 6.6	Subject 10% of the cavities to ten cycles of inserting and removing its respective contact. The ten cycles shall also include any disassembly required to remove the contacts. The connectors shall be mated and unmated during each cycle.	See Section 6.6 of SAE J2030
3.6.26	Temperature Life SAE J2030, 6.7	The cabled-mated connectors shall be subject to 1000 h at 125 °C ± 3 °C without current flowing.	There shall be no evidence of cracking, distortion, or detrimental damage.



**Table 2**

Item	Test Description	TEST CONDITION	REQUIREMENT
3.6.27	Ultraviolet Effects SAE J2030, 6.8	Expose the mated connectors for 1000 h per ASTM G 155 with extended U.V filter or ASTM G 154 using an unfiltered UVA 340 lamp with 20 h UV and 4 h of condensation for each cycle.	See section 6.8 of SAE J2030

### 3.7. Product Qualification and Requalification Test Sequence 试验顺序

Test samples were subjected to the following tests in the order given. Each test group had five mated pair test samples.

Test or Examination	Test Group				
	1	2	3	4	5
	Test Sequence (b)				
Examination of Product	1	1	1	1	1
Low-Voltage Resistance	2,14	2,11,16			
Insulation Resistance	3,6,8,17,19	3,14	2		2, 13
Connection Resistance	4	4	3		3, 15
Pressure Washing	5				
Maintenance Aging				2	
Temperature Life		5	4		4
Ultraviolet Effects				3	
Mating Forces		6		4	5
Unmating Forces		7		5	6
Durability		8		6	7
Salt Fog	7				
Thermal Shock	9	9	5		8
Fluid Immersion	10				
Vibration	12	10			9
Shock	13	12			10
Drop Test	15		6		
Terminal Retention in Connector				7	
Water Immersion	16				
Connector Retention			7	8	

Mismatching				9	
Current Test					11
Dust Test		15			16
Temperature/Humidity	18	13			12
Current Cycling					14
Terminal Crimp Strength				10	
Visual Examination	11,20	17	8	11	17

Test Groups 1, 2, 3, and 4 are for sealed signal level connectors.

Test Groups 3, 4 and 5 are for sealed power level connectors.

Test Groups 2, 3, and 4 are for unsealed signal level connectors.

Test Groups 3, 4, and 5 are for unsealed power level connectors

## 4. QUALITY 质量

### 4.1. Qualification test 鉴定

Samples must be in accordance with drawings and be taken in a random way in the production in progress.

样件必须与产品图纸一致，并且是生产过程中随机选取的。

### 4.2. Requalification test 重新鉴定

If changes significantly affecting form, fit, or function are made to the product or to the manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by product engineering.

如果产品或者制造过程中有显著影响外观，装配和功能的设变，质保需要协调按照原先工程部定义的测试顺序，重新验证全部或者部分测试项目。

### 4.3. Acceptance 验收

Acceptance is based on verification that the product meets the requirements of section 3.6. Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

归咎于测试设备，样件安装或者操作员的失误的失效不应判定产品不合格。当产品失效发生时，需要有纠正措施以及重新提交样件进行验证。在重新验证前，需确认已有纠正措施。

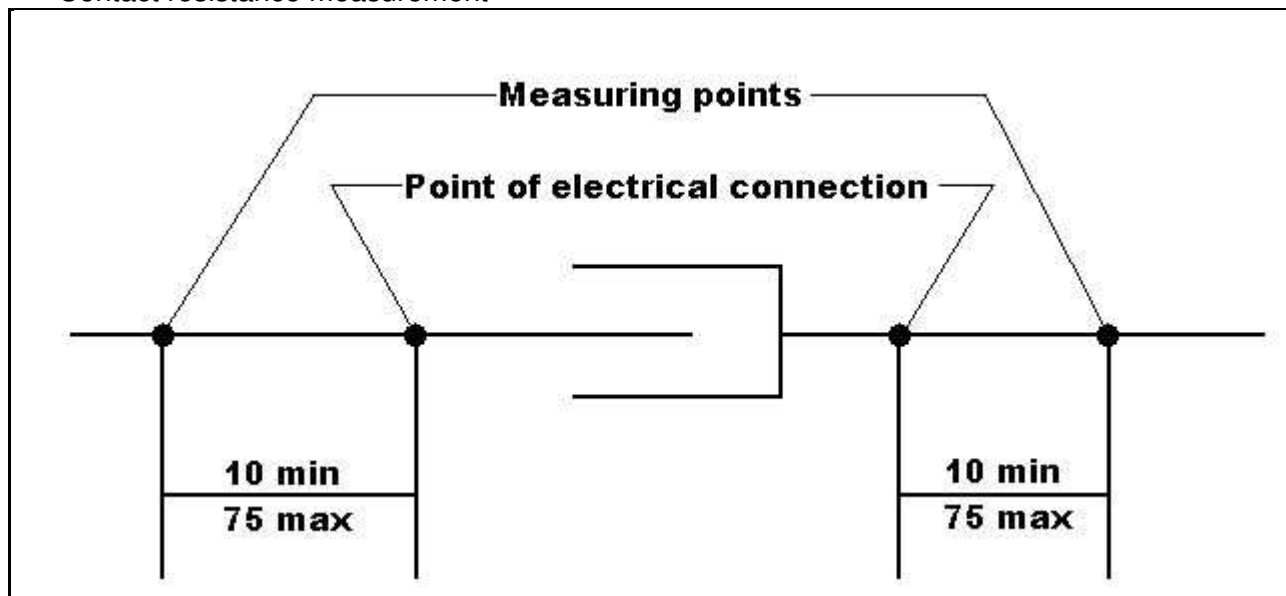
### 4.4. Quality conformance inspection 质量合格检验

The applicable TE Connectivity quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification

TE Connectivity 的质量检验计划将指定适用的质量标准。尺寸和功能要求，应按照适用的产品图纸和本规范。

### APPENDIX 1

#### Contact resistance measurement



Notes:

1. All dimensions are in millimetres
2. Measuring points are on the cable
3. Points of electrical connection are typically the joint of the cable to the terminal

### APPENDIX 2

Test samples to be placed in a temperature/humidity chamber and shall be subjected to 42 cycles described as follows:

- a. Chamber temperature raised to + 55°C at 3°C/min ± 1°C/min.
- b. Chamber held for 16 hours at a relative humidity of 95 % ± 5%
- c. Chamber temperature lowered to - 55°C at 3°C/min ± 1°C/min.
- d. Chamber held for 2 hours
- e. Chamber temperature raised to + 125°C at 3°C/min ± 1°C/min.
- f. Chamber held for 2 hours
- g. Chamber temperature lowered to + 25°C at 3°C/min ± 1°C/min.
- h. Chamber held for remainder of 24 hours cycle

### APPENDIX 3

Measurements at specified Current:

Cable Size mm <sup>2</sup> (AWG)	Test Current Amps	Maximum Millivolt Drop (cable to device) (cable to cable)
14	13	100
16	13	100
18	10	100
20	7.5	100

Table 1: Measurements at Specified Current