




## 2/3/4/5/6P MCON1.2 LL REC HOUSING ASSY SPECIFICATION

## 2/3/4/5/6P MCON1.2 LL REC HOUSING ASSY 产品规范

|     |                                       |     |         |                               |  |      |      |
|-----|---------------------------------------|-----|---------|-------------------------------|--|------|------|
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## CONTENT

|  |   |
|--|---|
| 1. SCOPE 适用范围.....   | 3 |
| 1.1 CONTENT 内容.....  | 3 |
| 1.2 QUALIFICATION .....                                      | 3 |
| 2. APPLICABLE DOCUMENTS 适用文件.....                            | 3 |
| 2.1 USABLE DOCUMENT 使用文件.....                                | 3 |
| 2.2 TE SPECIFICATIONS 泰科电子规范 .....                           | 3 |
| 2.3 OTHER SPECIFICATIONS 其他规范 .....                          | 3 |
| 3. REQUIREMENT 要求.....                                       | 3 |
| 3.1 DESIGN AND CONSTRUCTION 设计和结构 .....                      | 3 |
| 3.2 MATERIAL 材料 .....  | 4 |
| 3.3 TEST PARAMETERS AND TOLERANCES 测试参数与公差 .....             | 4 |
| 3.4 RATINGS 等级 .....   | 4 |
| 3.5 GENERAL PERFORMANCE AND TEST DESCRIPTION 通用性能和试验描述 ..... | 4 |
| 3.6 TESTS REQUIREMENT AND METHOD SUMMARY 测试要求及方法.....        | 4 |
| 3.7 TEST SEQUENCE 试验顺序 .....                                 | 8 |
| 4. QUALITY 质量 .....  | 9 |
| 4.1 QUALIFICATION TEST 鉴定 .....                              | 9 |
| 4.2 REQUALIFICATION TEST 重新鉴定.....                           | 9 |
| 4.3 ACCEPTANCE 验收.....                                       | 9 |
| 4.4 QUALITY CONFORMANCE INSPECTION 质量合格检验.....               | 9 |

## 1. SCOPE 适用范围

### 1.1 Content 内容

This specification covers the performance, test and quality requirements for 2/3/4/5/6P MCON1.2 LL REC HOUSING ASSY.

This specification applies to the product \*-2355506-\*, \*-2355507-\*, \*-2355514-\*, \*-2355515-\*, \*-2355517-\*, but not limited to it.

本规范适用于 2/3/4/5/6P MCON1.2 LL REC HOUSING ASSY 的性能，测试和质量要求。

本规范适用但不仅限于以下零件号：\*-2355506-\*, \*-2355507-\*, \*-2355514-\*, \*-2355515-\*, \*-2355517-\*。

### 1.2 Qualification

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。

## 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.

In the event of conflict between the requirement of this specification and the referenced documents, this specification 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 Test Specifications / 测试通用规范

### 2.3 Other specifications 其他规范

|              |   |
|--------------|---|
| DIN EN 60512 | Connectors For Electronic Equipment - Tests And Measurements<br>电子设备连接器 - 试验和测量 |
| DIN EN 60068 | Basic Environmental Testing Procedures<br>基本环境试验规程                              |
| LV214-2010   | Motor Vehicle Connectors Test Specification<br>汽车连接器测试规范                        |

## 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.

产品必须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。

| Component List | Raw material | Surface Treatment |
|----------------|--------------|-------------------|
| Outer cover    | PA6-GF15     | NA                |
| Inner housing  | PBT-GF30     | NA                |
| TPA            | PA66-GF15    | NA                |
| CPA            | PA46-GF15    | NA                |
| Seal           | MVQ          | NA                |

### 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    | 45% to 75%    |
| Atmospheric pressure 大气压力 | 96kPa ± 10kPa |

### 3.4 Ratings 等级

A. Operating Temperature / 工作温度: -40~130°C

B. Storage Temperature / 储存温度: -40~85°C

C. Rated voltage / 额定工作电压: 12V

### 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.3.6. 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 3.6 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 Tests requirement and method summary 测试要求及方法

| Para.           | Test Item                  | Requirements  | Method  |
|-----------------|----------------------------|---|---|
| Mechanical Test |                            |   |   |
| 3.6.1           | Visual inspection          | No corrosion, discoloration, cracks, etc.   | LV214, E0.1;<br>Visually examine each test specimen of testing.                               |
| 3.6.2           | Function of primary lock   | 1)The contact primary lock must latch audibly;<br>2)The contact should withstand 10N pull force, with primary lock only.                                  | LV 214, E6.2;<br>3 fully equipped housings, manually check function of the primary lock play. |
| 3.6.3           | Function of secondary lock | 1)Secondary lock should close, with all contacts properly inserted test passed;<br>2)Secondly lock shouldn't close, with one contact improperly inserted. | LV214, E6.3;<br>3 fully equipped housing, manually check function of the secondary lock.      |

|        |  |  |  |
|--------|--|--|--|
| 3.6.4  | Drop test                                      | <p>1)The secondary lock in the pre-engagement position must not close in the drop test.</p> <p>2)The secondary lock in the end engagement position must not open in the drop test.</p> <p>3)Only for PG20, Visual inspection, no damage or crack is OK</p> | <p>LV214 B6.1;</p> <p>1)3 fully loaded housings and secondary lock in the pre-engagement position</p> <p>2)3 unequipped housings and secondary lock in the pre-engagement position</p> <p>Refer to Fig. 1.</p> |
| 3.6.5  | Actuation forces for secondary lock            | <p>F close&lt;50N</p> <p>F open=&lt;30N</p> <p>F not ok &gt; F close +50N</p>  | <p>LV 214, E6.4;</p> <p>Measure actuation force for secondary lock by machine, initial parts, 3 unequipped housing, test speed is 50mm/min.</p>  |
| 3.6.6  | Error-proof design of housings                 | <p>1)Polarizing: plug hsg coding A turned 180 of cap hsg coding A hsg;</p> <p>2)Keying: plug hsg coding A of cap hsg coding B hsg</p>  | <p>LV214 E.7.1;</p> <p>Error-proof design of housings (keying/polarizing), 3 unequipped housing.</p>   |
| 3.6.7  | Retention force of the housing lock            | <p>F&gt;60N, in 1mm displacement</p>   | <p>LV214 E.7.2;</p> <p>Measure retention forces of the housing lock, 4 unequipped housings, initial parts, test speed is 50mm/min.</p>   |
| 3.6.8  | CPA function test                              | <p>1)5N≤F≤30N;</p> <p>2)At least 80N.</p>  | <p>LV214 E.7.3;</p> <p>CPA actuation force, from pre-set to lock, test speed is 50mm/min.</p>  |
| 3.6.9  | Insertion force for insertion and removal aids | <p>F≤75N</p>   | <p>LV214 E.7.4;</p> <p>Measure insertion forces or actuation force for insertion and removal aids, 3 fully equipped housings, initial parts, test speed is 50mm/min.</p>                                       |
| 3.6.10 | Contact removal force, primary lock only       | <p>F&gt;55N, test displacement: s ≤1 mm</p>  | <p>LV214 E.8.2.1;</p> <p>Measure contact removal force from the housing, primary lock only, 1 fully equipped housing, initial parts, test speed is 50mm/min.</p>   |
| 3.6.11 | Contact removal force, secondary lock only     | <p>F&gt;55N</p>  | <p>LV214 E.8.2.2;</p> <p>Measure contact removal force from the housing, secondary lock only, 1 fully equipped, initial parts, test speed is 50mm/min.</p>   |
| 3.6.12 | Removal of the contacts three times            | <p>No functional damage</p>  | <p>LV214 B.8.1;</p> <p>Removal of the contacts three times with original release tools, 1 fully equipped housings, initial parts.</p>  |
| 3.6.13 | Contact pullout force from the housing         | <p>Value determination</p>   | <p>LV214 E.8.2;</p> <p>Contact pullout force from the housing, primary lock only, 1 fully equipped housing, test speed is 50mm/min.</p>  |

|                  |  |   |  |
|------------------|--|---|--|
| 3.6.14           | Dynamic load, broad-band random vibration                | $R < 15m \Omega$ , No discontinuity more than 1ms | LV214 B 17.2<br>Severity 3, Body unsealed<br>See table 1   |
| Environment Test |  |   |  |
| 3.6.15           | Aging in dry heat  | No visible damage, crack or defects               | LV214 B20.1<br>DIN EN 60068-2-2<br>Test B, 120 h / 130 °C  |
| 3.6.16           | Humid heat, constant                                     | No visible damage, crack or defects               | LV214 B20.2<br>10 days / 40 °C / 95% Relative humidity   |
| 3.6.17           | Low-temperature aging                                    | No visible damage, crack or defects               | LV214 B20.3<br>48h/-40°C   |
| 3.6.18           | Removal and insertion at -20 °C                          | No visible damage, crack or defects               | LV214 B20.4  |
| 3.6.19           | Aging in dry heat  | No visible damage, crack or defects               | LV214 B20.5<br>48h / 80°C  |
| 3.6.20           | Long-term aging in dry heat (all parts)                  | No visible damage, crack or defects               | LV214 B21.1<br>1000h / 130° / 48h at RT  |
| 3.6.21           | Chemical resistance                                      | No damage, no leakage defected                    | LV214 B22.1A/B<br>List of agents see LV214 annex E   |
| 3.6.22           | Aging in dry heat  | No visible damage, crack or defects               | LV214 B19.3<br>120h/130°C  |
| 3.6.23           | Temperature shock  | No damage, no leakage defected                    | LV214 B19.1<br>144cycles, -40/130°C 15min respectively   |
| 3.6.24           | Immersion with pressure difference                       | No water leakage                                  | LV214 B23.1<br>Immerse the sample in the 5% salt solution, slowly decrease the air pressure. Normal pressure, -10kpa hold 5min, -50kpa hold 5min, normal pressure. Pressure change 10 kpa/min. |
| 3.6.25           | Cable movement during immersion with pressure difference | No water leakage                                  | LV214 B23.2<br>a).deflection of the cable bundle by 100mm at a distance of 100mm from the SWS. b). hold for 10s. c). deflection to the opposite final position. d). hold for 10s.              |
| 3.6.26           | Thermal shock  | No water leakage                                  | LV214 B23.3<br>5cycles, 120°C 30min each, 0°C 15min each   |
| 3.6.27           | Degree of protection test IPX9K                          | No water leakage                                  | LV214 B23.4<br>Pressure 80bar, Temperature 80°C, Time 15s, Nozzle distance 100~150mm, Angle 0° ,30° ,60° ,90° ,Rotate speed 5 revolutions per minute, Perform 3 times.                         |
| Electrical Test  |  |   |  |
| 3.6.28           | Isolation Resistance                                     | Risol > 100MΩ / 500V, t=60s                       | LV214 E.0.3;<br>Measured insulation resistance between all adjacent contacts, 2 samples.   |

|        |                    |                  |              |
|--------|--------------------|------------------|--------------|
| 3.6.29 | Contact Resistance | $R < 15m \Omega$ | LV214 E.0.2; |
|--------|--------------------|------------------|--------------|

With: L1 = 1 200 mm, L2 = 500 mm, L3 = 700 mm, L4 = 500 mm, L5 = 1 000 mm, L6 = L7 = 100 mm

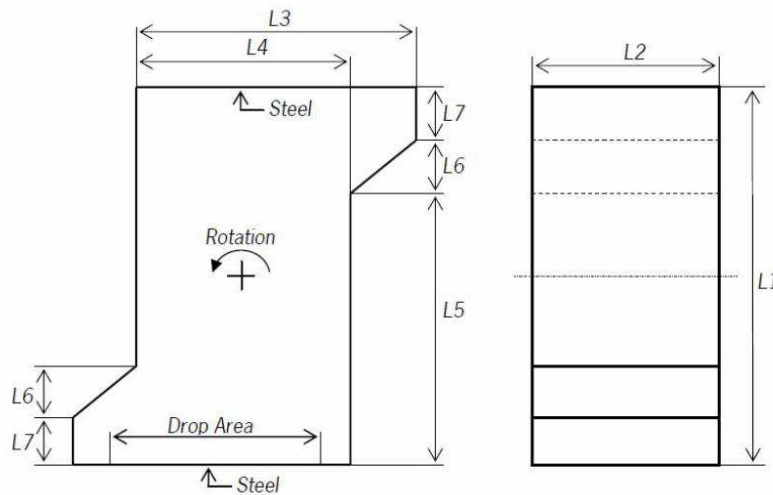


Figure 1 Drop test in drum

| Severity                               | TC (temperature cycle) | Random vibration with TC                            | Sine wave with TC                    | No. of shocks |     |                  |
|--|------------------------|---|--------------------------------------|---------------|-----|------------------|
| 3) "Applications close to power-train" | 0 min/20 °C            | 22 h per axis                                       | 22 h per axis                        |               |     |                  |
|  | 60 min/-40 °C          | RMS value of acceleration<br>105,5 m/s <sup>2</sup> |                                      |               |     |                  |
|  | 90 min/-40 °C          |   |                                      |               |     |                  |
|  | 240 min/120 °C         | Hz  | (m/s <sup>2</sup> ) <sup>2</sup> /Hz |               | Hz  | mm               |
|  | 420 min/120 °C         | 20  | 10                                   |               | 100 | 0,095            |
|  | 480 min/20 °C          | 95  | 10                                   |               | Hz  | m/s <sup>2</sup> |
|  |                        | 110   | 0,01                                 |               | 200 | 150              |
|  |                        | 380   | 0,01                                 |               | 220 | 150              |
|  |                        | 410   | 20                                   |               | 221 | 100              |
|  |                        | 800   | 10                                   |               | 400 | 100              |
|  | 1 500                  | 5   |                                      |               |     |                  |

Table 1 Severity

### 3.7 Test sequence 试验顺序

| 3.7.1 Product Qualification Test and Sequences                  |            |     |     |       |     |       |        |      |             |            |
|---|------------|-----|-----|-------|-----|-------|--------|------|-------------|------------|
| Test or examination   | TEST GROUP |     |     |       |     |       |        |      |             |            |
|   | PG0        | PG6 | PG7 | PG8   |     | PG17  | PG20   | PG21 | PG22<br>A/B | PG23       |
|   |            |     |     | a     | b   |       |        |      |             |            |
| 3.6.1 Visual Inspection   | 1          | 1,6 | 1,6 | 1,3,6 | 1,4 | 1,4,7 | 1,8,11 | 1,7  | 1,5         | 1,4,7,9,12 |
| 3.6.2 Function of primary lock                                  |            | 2   |     |       |     |       |        |      |             |            |
| 3.6.3 Function of secondary lock                                |            | 3   |     |       |     |       |        |      |             |            |
| 3.6.4 Drop test   |            | 4   |     |       |     |       | 10     | 5    |             |            |
| 3.6.5 Actuation forces for secondary lock                       |            | 5   |     |       |     |       |        |      |             |            |
| 3.6.6 Error-proof design of housings                            |            |     | 2   |       |     |       |        |      |             |            |
| 3.6.7 Retention force of the housing lock                       |            |     | 3   |       |     |       |        |      |             |            |
| 3.6.8 CPA function test   |            |     | 4   |       |     |       |        |      |             |            |
| 3.6.9 Insertion force for insertion and removal aids            |            |     | 5   | 2     |     |       |        |      |             |            |
| 3.6.10 Contact removal force, primary lock only                 |            |     |     | 4     |     |       |        |      |             |            |
| 3.6.11 Contact removal force, secondary lock only               |            |     |     | 5     |     |       |        |      |             |            |
| 3.6.12 Removal of the contacts three times                      |            |     |     |       | 2   |       |        |      |             |            |
| 3.6.13 Contact pullout force from the housing                   |            |     |     |       | 3   |       |        | 6    |             |            |
| 3.6.14 Dynamic load, broad-band random vibration                |            |     |     |       |     | 3     |        |      |             |            |
| 3.6.15 Aging in dry heat  |            |     |     |       |     |       | 3      |      |             |            |
| 3.6.16 Humid heat, constant                                     |            |     |     |       |     |       | 4      |      |             |            |
| 3.6.17 Low-temperature aging                                    |            |     |     |       |     |       | 6      |      |             |            |
| 3.6.18 Removal and insertion at -20 °C                          |            |     |     |       |     |       | 7      |      |             |            |
| 3.6.19 Aging in dry heat  |            |     |     |       |     |       | 9      |      |             |            |
| 3.6.20 Long-term aging in dry heat (all parts)                  |            |     |     |       |     |       |        | 3    |             |            |
| 3.6.21 Chemical resistance                                      |            |     |     |       |     |       |        |      | 3           |            |
| 3.6.22 Aging in dry heat  |            |     |     |       |     |       |        |      |             | 2          |
| 3.6.23 Temperature shock  |            |     |     |       |     |       |        |      |             | 3          |
| 3.6.24 Immersion with pressure difference                       |            |     |     |       |     |       |        |      |             | 5          |
| 3.6.25 Cable movement during immersion with pressure difference |            |     |     |       |     |       |        |      |             | 6          |
| 3.6.26 Thermal shock  |            |     |     |       |     |       |        |      |             | 8          |
| 3.6.27 Degree of protection test IPX9K                          |            |     |     |       |     |       |        |      |             | 10         |
| 3.6.28 Isolation Resistance                                     | 2          |     |     |       |     |       | 2,5    |      | 2,4         |            |
| 3.6.29 Contact Resistance                                       |            |     |     |       |     | 2,6   |        | 2,4  |             | 11         |
| <b>Sample Size</b>  | 8          | 21  | 50  | 3     |     | 10    | 5      | 10   | 10          | 2          |



## 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 **Error! Reference source not found.** 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。