

## Side, Vertical and Rear Exit CCJ (Crown Clip Junior) Cable Assembly

### System

#### 1. SCOPE

##### 1.1. Content

This product specification covers performance, tests and quality requirements for the TE Connectivity Side, Vertical and Rear Exit CCJ (Crown Clip Junior) Cable Assembly System.

##### 1.2. Qualification

When tests are performed on the subject product line, procedures specified in this specification shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

#### 2. APPLICABLE 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 the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

##### 2.1. Tyco Electronics Documents

- 109-5000: Test Specification, General Requirement for Test Methods
- 109-197: Test Specification (Tyco Electronics Test Specifications vs EIA and IEC Test Methods)
- 114-152042: Application Specification (Side and Rear Exit CCJ cable assemblies)
- 501-152050: Qualification Report (Side, and Rear Exit CCJ cable assemblies)
- 501-152050-2: Qualification Report (Side Exit CCJ (Crown Clip Junior) Power cable assemblies)
- 501-152050-3: Qualification Report (Vertical Exit CCJ (Crown Clip Junior) Power cable assemblies)
- 501-152050-4: Qualification Report (Side Exit CCJ (Crown Clip Junior) with 6pcs AWG #6 wire and with Upgrade Contact)

##### 2.2. Industry Standard

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications  
MIL-STD-202: Electronic and Electrical Component Parts, Test Method Standard

#### 3. REQUIREMENTS

##### 3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

##### 3.2. Materials

Materials used in the construction of this product is Side, Vertical and Rear exit CCJ cable assembly.



3±0.3mm silver plated copper BusBar.

### 3.3. Ratings

- Voltage : 15V
- Current : Up to 200 A (based on cable size applied)
  - Up to 250 A ( Loading with 6 AWG#6 wire, refer to qualification report 501-152050-2)
  - Up to 300 A ( Loading with 6 AWG#6 wire, with Upgrade Contact, refer to qualification report 501-152050-4)
- Operating Temperature: -40°C to 105°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in paragraph 3.5. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per EIA-364.

3.5. Test Requirements and Procedures Summary

| Test Description                    | Requirement   | Procedure   |
|-------------------------------------|---|---|
| Initial examination of product      | Meets requirements of product drawing, and visual requirements.                             | EIA-364-18.<br>Visual and dimensional (C of C) inspection per product drawing.  |
| Final examination of product        | Meets visual requirements.  | EIA-364-18.<br>Visual inspection.   |
| ELECTRICAL                          |   |   |
| Low level contact resistance        | 0.3 milliohms maximum (initial)<br>0.5 milliohms maximum (final)<br>For CCJ cable connector | EIA-364-23.<br>Subject mated specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage.                                |
| Contact resistance at rated current | 0.3 milliohms maximum (initial and final) for CCJ cable connector                           | EIA-364-6.<br>Resistance should be measured after the CCJ has reached thermal equilibrium, after carrying Rated load at 25°C ambient temperature. |
| Insulation resistance.              | 1000 megaohms minimum   | EIA-364-21.<br>500 volts DC, 1 minute duration.<br>Test between adjacent contacts of mated specimens.   |
| Withstanding voltage.               | No breakdown or flashover.  | EIA-364-20, Condition I.<br>1000 volts AC at sea level for power contacts. 1 minute duration.<br>Test between adjacent contacts of specimens.     |
| Temperature rise vs current.        | Temperature rise not exceed 30°C at rated current.  | EIA-364-70, Method II.<br>Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C.                              |

| Test Description          | Requirement  | Procedure   |
|---------------------------|--|---|
| MECHANICAL                |  |   |
| Vibration, random         | No discontinuities of 1 microsecond or longer duration, no crack, break, or loose part.<br>See Note. | EIA364-28, Condition V, letter C.<br>Subject mated specimens to 9.26g rms between 50-2000Hz, 120 minutes in total three mutually perpendicular planes.  |
| Mechanical shock          | No discontinuities of 1 microsecond or longer duration, no crack, break, or loose part.<br>See Note. | EIA-364-27, Method A.<br>Subject mated specimens to 50G's half-sine shock pulses of 11 milliseconds duration.<br>Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. |
| Durability (Precondition) | See Note   | EIA-364-09.<br>Mate and Un-mate specimens with a bus bar conductor for 5 cycles at a maximum rate of 200 cycles per hour.   |
| Durability                | See Note   | EIA-364-09.<br>Mate and Un-mate specimens with a bus bar conductor for 50 cycles at a maximum rate of 200 cycles per hour.  |
| Mating force              | 80 N maximum per connector   | EIA-364-13.<br>Measure force necessary to mate specimens at a maximum rate of 12.7 mm [.5 in] per minute.   |
| Un-mating force           | 12 N minimum per connector   | EIA-364-13.<br>Measure force necessary to Un-mate specimens at a maximum rate of 12.7 mm [.5 in] per minute.  |
| Welding peel force        | See section 3.5.1  | EIA-364-29<br>Mount sample with fixture, apply normal load to wire until wire is peeled off from contact, record the peel off force   |

|                                      |  |   |
|--------------------------------------|--|---|
| Contact retention, straight pull     | 30 lbf minimum for CCJ contact, no dislodging.<br>See Note.  | EIA-364-29<br>Mount sample with fixture, apply axial load to wire, as crimped to contacts. To last 6±1 sec.   |
| Contact retention, angled pull       | 30 lbf minimum for CCJ contact, no dislodging.<br>See Note.  | EIA-364-29<br>Mount sample with fixture, apply load to single wires at a 45-degree angle in 4 directions from normal exit plane of cable. To last 6±1 sec.                    |
| Housing lock strength, straight pull | 16.8 lbf minimum for CCJ housing, no dislodging.<br>See Note | EIA-364-29<br>Mount sample with panel via attached screw/washer, apply axial load to housing, to last 6±1 sec.  |
| Housing lock strength, angled pull   | 16.8 lbf minimum for CCJ housing, no dislodging.<br>See Note | EIA-364-29<br>Mount sample with panel via attached screw/washer, apply load to housing at a 45 Degree angle in 4 directions from normal exit plane of panel, to last 6±1 sec. |

| Test Description             | Requirement | Procedure  |
|------------------------------|-------------|--|
| ENVIRONMENTAL                |             |  |
| Salt Spray Test              | See Note.   | EIA364-26<br>Subject mated specimens to test for 72 hours, with a 5% solution salt spray, 35 +1/-2°C             |
| Thermal Shock                | See Note.   | EIA-364-32, test condition VII<br>Subject mated specimens to 10 cycles (30-minute dwells) between -55 and 105°C. |
| Temperature life             | See Note.   | EIA-364-17, Condition 4.<br>Subject mated specimens to 105°C for 1000 hours or 115°C for 265 hours               |
| Humidity-Temperature cycling | See Note.   | EIA-364-31, Method III.<br>Subject mated specimens to 10 cycles (10days) between 25 and 65°C at 80 to 98% RH.    |

**NOTE**

*Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in paragraph 3.6.*

3.5.1 Welding Peel Force Reference US-CAR38

| Wire Size<br>(mm <sup>2</sup> ) | Tensile Strength<br>LSL (N Min.) | Peel Strength<br>(N Min.) |
|---------------------------------|----------------------------------|---------------------------|
| 0.22                            | 50                               | 10                        |
| 0.35                            | 55                               | 11                        |
| 0.5                             | 80                               | 17                        |
| 0.75                            | 120                              | 24                        |
| 1                               | 170                              | 34                        |
| 1.5                             | 225                              | 45                        |
| 2                               | 250                              | 50                        |
| 2.5                             | 275                              | 55                        |
| 3                               | 350                              | 70                        |
| 4                               | 375                              | 75                        |
| 5                               | 400                              | 80                        |
| 6                               | 435                              | 87                        |
| 8                               | 500                              | 100                       |
| 10                              | 800                              | 160                       |
| 12                              | 1000                             | 200                       |
| 14                              | 1025                             | 205                       |
| 16                              | 1050                             | 210                       |
| 18                              | 1100                             | 220                       |
| 20                              | 1200                             | 240                       |
| 25                              | 1350                             | 270                       |
| 30                              | 1500                             | 300                       |
| 35                              | 1700                             | 340                       |
| 40                              | 1850                             | 370                       |
| 50                              | 2000                             | 400                       |
| 55                              | 2200                             | 440                       |
| 60                              | 2200                             | 440                       |
| 70                              | 2400                             | 480                       |

3.6. Product Qualification and Requalification Test Sequence

| Test or Examination                  | Test Group       |     |     |       |   |   |
|--------------------------------------|------------------|-----|-----|-------|---|---|
|                                      | 1                | 2   | 3   | 4     | 5 | 6 |
|                                      | Test sequence(a) |     |     |       |   |   |
| Initial examination of product       | 1                | 1   | 1   | 1     | 1 | 1 |
| Low level contact resistance         | 3,7              | 2   |     | 2,4,6 |   |   |
| Contact resistance at rated current  |                  | 5,8 |     |       |   |   |
| Temperature rise vs. Current         |                  | 4   |     |       |   |   |
| Welding peel force                   |                  |     |     |       | 2 |   |
| Mating force                         | 2                |     |     |       |   |   |
| Un-mating force                      | 8                |     |     |       |   |   |
| Durability (Precondition)            |                  | 3   |     | 3     |   |   |
| Durability                           | 4                |     |     |       |   |   |
| Contact retention, straight pull     |                  |     |     |       |   | 2 |
| Contact retention, angled pull       |                  |     |     |       |   | 3 |
| Housing lock strength, straight pull |                  |     |     |       |   | 4 |
| Housing lock strength, angled pull   |                  |     |     |       |   | 5 |
| Vibration, random                    | 5                | 7   |     |       |   |   |
| Mechanical shock                     | 6                |     |     |       |   |   |
| Salt Spray Test                      |                  |     |     | 5     |   |   |
| Insulation resistance                |                  |     | 2,6 |       |   |   |
| Withstanding voltage                 |                  |     | 3,7 |       |   |   |
| Thermal shock                        |                  |     | 4   |       |   |   |
| Temperature life                     |                  | 6   |     |       |   |   |
| Humidity-temperature cycling         |                  |     | 5   |       |   |   |
| Final examination of product         | 9                | 9   | 8   | 7     |   |   |
| Sample Size per Test Group           | 5                | 5   | 5   | 5     | 5 | 5 |

**NOTE**

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

**4. QUALITY ASSURANCE PROVISIONS**

4.1. Qualification Testing

A. Specimen Selection

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

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in paragraph 3.6.

4.2. Requalification Testing

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

4.3. Acceptance

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

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall 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.

**REVISION RECORD**

| Rev | Page | Description  | Date       |
|-----|------|--|------------|
| A   | All  | RELEASE  | 2018-12-03 |
| A1  | 3    | Add peel force and Rear Exit CCJ application   | 2019-09-29 |
| A2  | 2    | Add Vertical Exit CCJ product Type in specification, add in 501-152050-2 and -3 qualified test report. | 2021-1-27  |
| A3  | 2    | Add in 501-152050-4 qualified test report for current 300 A  | 2021-7-27  |
|     |      |  |            |
|     |      |  |            |
|     |      |  |            |