Qualification Test Report

SOLARLOK PV4 Panel Mounted Connector

1. INTRODUCTION

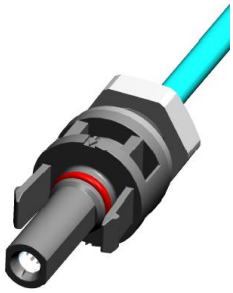
1.1 Purpose

This document provides the qualification summery of TE Connectivity SOLARLOK PV4 PANEL MOUNTED CONNECTOR.

1.2 Scope

This specification covers the electrical, mechanical, and environmental performance of SOLARLOK PV4 PANEL MOUNTED CONNECTOR.

Pin Connector, Male PV4-P…… (PN 1971919)



Socket Connector Female PV4-P…… (PN 1971920)

Fig 1

1.3 Product Description

P/ N (Trade Mark)	Name	Remarks
1971919	PV4-P…	Pin Connector, Male
1971920	PV4-P…	Socket Connector, Female

1.4 Ratings

- Rated Voltage — TUV:1000V DC / UL:600V DC
- Rated Current (at 85°C ambient) — 35A Max. for 4.0mm² / AWG12
- Ambient temperature — -40°C ~+85°C
- Protection Degree — IP68（1m, 24h）
- Protection Class — II
- Cable Wire size — 4.0mm2 / AWG12;
- Cable Jacket Diameter — 4.5mm to 8.0mm
- Overvoltage category — III
- Pollution degree 2

1.5 Qualification Test Sequence

Test or Examination	Test Group			
	A	B	C	D
	Test Sequence			
Visual and dimension examination	1,3	1,5	1,5	1,6
Terminations and connection methods	2			
Contact retention force in insert	2			
Insertion force (mating force)	2			
Withdrawal force (un-mating force)	2			
Effectiveness of connector coupling device (separation force)	2			
Mechanical Operation (Durability)		3		
Mechanical strength impact				
Contact Resistance		2,4	2,4	
Temperature Rise Test			3	
Dielectric Voltage Withstand Test (Voltage Proof)				4
Wet Leakage Current Test				5
Degree of protection (IP20)				2
Degree of protection IP code				3

*** Notes:**.

1) Numbers indicate the sequence in which the tests are performed.
2) Group A are for themselves separate tests

2. TEST PROCEDURE

2.1 Visual and dimension examination

Visual Inspection: appearance and function of specimens pursuant to the applicable inspection plan.
Requirements: Meets requirements of product drawing and no physical damage.
Test Method: IEC 60512-1-1, Test 1a

2.2 Terminations and connection methods (pull out force)

Pull out force test of crimped connections.
Requirements: 310N Min. for 4mm2 Wire.
Test Method: 5.5 of EN 50521-2008 & EN 60352-2.

2.3 Contact retention force in insert

Withstand for 1 min a force of 250 N applied in axis direction permitted by the construction, either directly or through any wire or cable.
Requirements: No axial displacement likely to impair normal operation.
Test Method: 5.15.2 of EN 50521-2008 & EN 60512-15-1 Test 15a.

2.4 Insertion force (Mating force)

The specified force shall be applied in the direction of the insertion of the unmated pair with the rate of 50mm/min.

Requirements: 75N Max.
Test Method: 6.3.13 of EN 50521-2008 & EN 60512-13-2 Test 13b

2.5 Withdrawal force (Un-mating force)
The specified force shall be applied in the direction of the separation of the mated pair with the rate of 50mm/min.
Requirements: 75N Max.
Test Method: 6.3.13 of EN 50521-2008 & EN 60512-13-2 Test 13b

2.6 Effectiveness of connector coupling (Separation force)
The specified force shall be applied in the direction of the separation of the mated pair with the rate of 10 N/sec.
Requirements: 150N ~ 300N.
Test Method: 6.3.14 of EN 50521-2008 & EN 60512-15-6 Test 15f.

2.7 Mechanical operation (Durability)
Shall be engaged and disengaged by manual mating/un-mating for 100 cycles. Speed: 300 Max. cycles per hour.
Requirements: No damage likely to impair function.
Test Method: 6.3.5 of EN 50521-2008 & EN 60512-9-1 Test 9a.

2.8 Mechanical strength impact
Dropping height: 750mm for specimens of mass≤250g, Dropping cycles: 8 cycles. Positions in 45° step, one cycles per position, concrete ground.
Requirements: No physical damage occurred.
Test Method: EN 60512-7-2 Test 7b

2.9 Contact Resistance
Test current: 1A Measure points at the end of the termination.
Requirements: 0.5mΩ Max. (Initial), Deviation of the contact resistance shall be no more than 50% of the initial reference value or 0.75mΩ Max. (Final).
Test Method: EN 60512-2-2 Test 2b

2.10 Temperature rise test
Test shall be carried out with rated current (35ADC) as specified at ambient temperature: 85℃. The test shall be continued until a constant temperature is obtained.
Requirements: Δ30℃Max.(35A for 4.0mm²)
Test Method: 6.3.4 of EN 50521-2008 & EN 60512-5-1 Test 5a.

2.11 Dielectric voltage withstand test (voltage proof)
The voltage proof shall be performed by applying a r.m.s. withstand voltage (50/60 Hz) with a r.m.s. value of 6000 voltage. The test duration shall be 1 min.
Requirements: No flashover or breakdown.
Test Method: 6.3.8 b) of EN50521-2008 & EN 60512-4-1 Test 4a.

2.12 Wet leakage current test
The pigtail-leads are to be maintained above the solution level and are to be thoroughly wetted by pouring the solution over these areas. Apply 1000 Vdc for 2 minutes.
Requirements: $4X10^8\Omega$ Min.
Test method: 10.15 of IEC 61215:2005.

2.13 IP 20 Test
Apply the test finger (IP20) with 10N to the samples in any direction.
Requirements: no live parts shall be accessible by test finger.

Test Method: IP20 of IEC 60529:2001 & 6.3.3.1 of EN 50521-2008.

2.14 IP X8 Test

Immerse the samples such that the lowest point is located at a 1000 mm water depth, for 24hours duration.
Requirements: No accumulated ingress of water within the box.
Test Method: IPX8 of IEC 60529:2001 & 6.3.3.2 of EN 50521-2008.

3. SUMMARY OF TEST RESULTS:

Examination of product – all test groups

	Test Item	N	Test Result	Requirement	Judgment
Group A	Visual and dimension examination	12	No physical damage	No abnormalities	passed
	Terminations and connection methods	2	526.2 Min	310N min.	passed
	Contact retention force in insert	2	No axial displacement likely to impair normal operation	No abnormalities	passed
	Insertion force (mating force)	2	71.8 Max	75NMax.	passed
	Withdrawal force(un-mating force)	2	68.8 Max	75NMax.	passed
	Effectiveness of connector coupling device (separation force)	2	248.9~267.6	150N~300N	passed
	Mechanical strength impact	2	No physical damage	No abnormalities	passed
	Visual and dimension examination	12	No physical damage	No abnormalities	passed
Group B	Visual and dimension examination	3	No physical damage	No abnormalities	passed
	Contact Resistance	3	0.33 Max.	0.5mΩ Max.	passed
	Mechanical operation (Durability)	3	No physical damage	No abnormalities	passed
	Contact Resistance	3	0.36 Max	0.75mΩ Max.	passed
	Visual and dimension examination	3	No physical damage	No abnormalities	passed
Group C	Visual and dimension examination	3	No physical damage	No abnormalities	passed
	Contact Resistance	3	0.34 Max	0.5mΩ Max	passed
	Temperature Rise Test (△T)	3	△T≤14.7	△T≤30℃	passed
	Contact Resistance	3	0.32 Max	0.75mΩ Max	passed
	Visual and dimension examination	3	No physical damage	No abnormalities	passed
Group D	Visual and dimension examination	3	No physical damage	No abnormalities	passed
	IP20	3	No live parts be accessible by test finger	No abnormalities	passed
	IPX8	3	No ingress of water	No abnormalities	passed
	Dielectric Voltage Withstand Test	3	No breakdown or flashover	No abnormalities	passed
	Wet Insulation Resistance Test	3	$>10^{12}$ MΩ	$4X10^{8}$Ω Min	passed
	Visual and dimension examination	3	No physical damage	No abnormalities	passed