

Product Safety Tests

*/Prove e verifiche sulla
sicurezza del prodotto*

Test Report

/Rapporto di prova

Test report no. SFY02 23WC180002

/Rapporto di prova n°.

Customer

/Cliente

Fanton Spa

Viale dell'Industria, 8/10 – 35026 Conselve (PD) Italy

Tested product

/Prodotto in prova

Photovoltaic panel connector

Type-model

/Modello

Couple 1

A99900 Male connector steering wheel (Fanton)

32.0142 Female connector steering wheel (Staubli)

Couple 2

32.0143 Male connector steering wheel (Staubli)

A99901 Female connector steering wheel (Fanton)

The sample of the described product has passed the tests requested by the customer and listed in the test report file considering the declared uncertainties.

The test are performed following the requirements of the standard:

/Il campione del prodotto descritto ha superato i test richiesti dal costruttore ed elencati nel rapporto di prova condotti secondo i requisiti della norma di prodotto, tenendo conto delle incertezze di misura dichiarate:

CEI EN 62852: 2015 + A1:2020

Connettori per applicazione in c.c. nei sistemi fotovoltaici - Prescrizioni di sicurezza e prove

IEC 62852:2014 + A1: 2020; EN 62852:2015 + A1:2020

Connectors for DC-application in photovoltaic systems - Safety requirements and tests

Tribano, 24/03/2023

The laboratory Manager
Ing. Roberto Bolzonaro



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TEST REPORT

IEC - 62852

Connectors for DC-application in photovoltaic systems - Safety requirements and tests

Report Reference No.: **SFY02 23WC180002**

Compiled by (+ signature).....: Samuele Ferrari *Samuele Ferrari*

Approved by (+ signature): Roberto Bolzonaro *Roberto Bolzonaro*

Date of issue.....: 24/03/2023

Testing laboratory Name.....: **WTLab Srl**

Address.....: Via A. Mantegna,3/5 - 35020 Tribano (PD) Italy

Applicant's Name: **Fanton Spa**

Address.....: Viale dell'Industria, 9/10 – 35026 Conselve (PD) Italy


Test specification

Standard: CEI EN 62852: 2015 + A1:2020
 IEC 62852:2014 +A1: 2020; EN 62852:2015 + A1:2020

Test procedure: PPWLVD01

Non-standard test method: N.A.

Test item description.....: Photovoltaic panel connector

Trademark: 

Manufacturer.....: Fanton Spa + Staubli

Model and/or type reference.....: Couple 1
 A99900 Male connector steering wheel (Fanton)
 32.0142 Female connector steering wheel (Staubli)

Couple 2
 32.0143 Male connector steering wheel (Staubli)
 A99901 Female connector steering wheel (Fanton)

Rating(s)		
Connector	A99900 & A99901	32.0143 & 32.0142
Rated voltage:	1500Vdc	1000Vdc
Rated insulation voltage:	10kV	16kV
Rated input current:	40A	39A
Pollution degree:	3	3
OVC III:	CI II	CI II
Ta:	-40°C - +85°C	-40°C - +85°C

EUT's photos: Couple 1



Male and female connector external view



Connector with cable

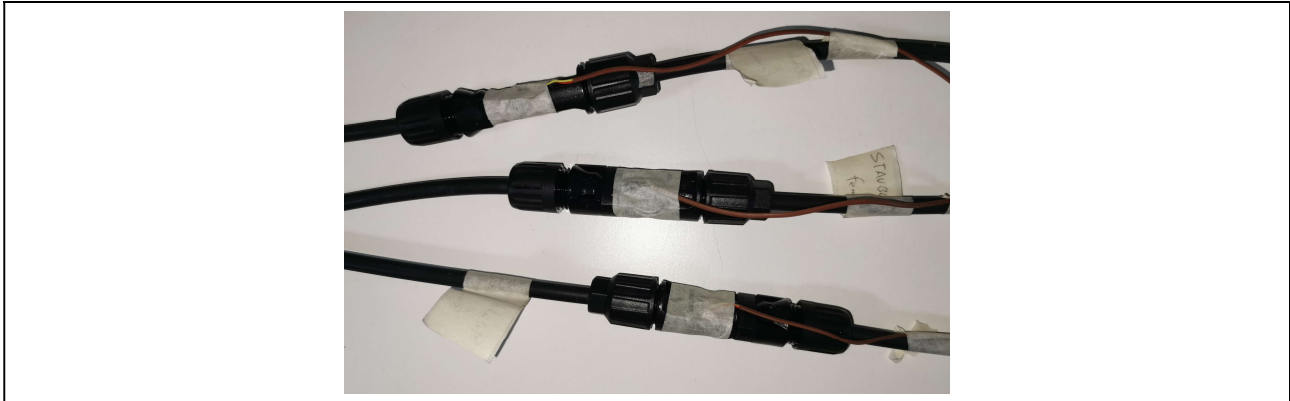
EUT's photos: Couple 2



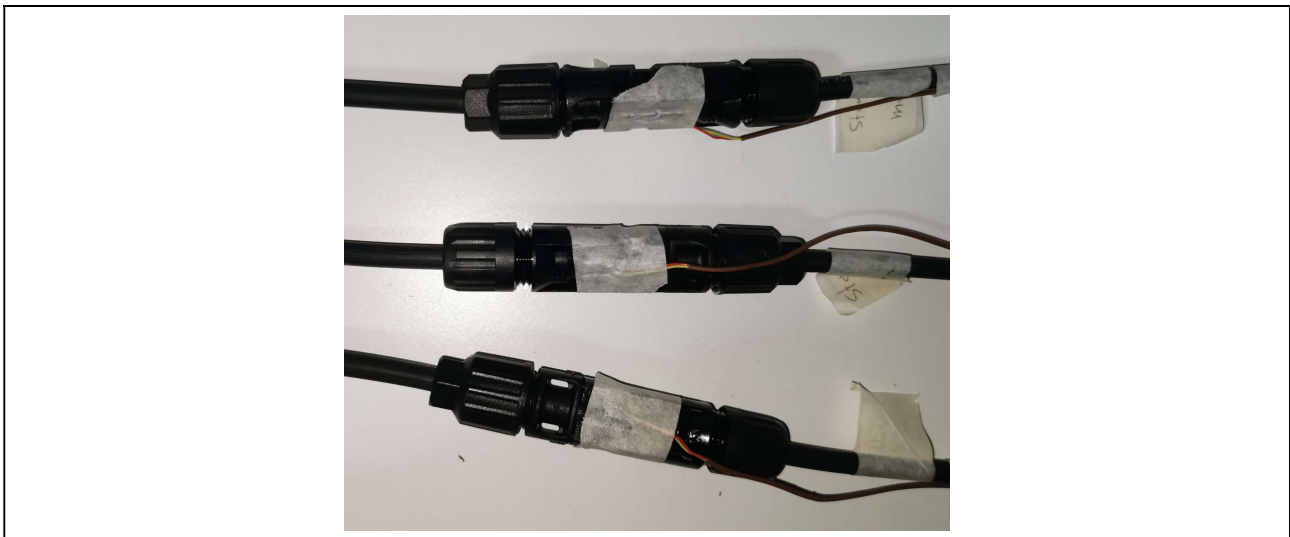
Male and female connector external view



Connector with cable



Couple 1 Photo during temperature test – Thermocouples applied on case of connector
The samples provided are all the same
n.3 samples (male-female combination) identified 1A - 2A - 3A during the tests.
Cable length 1400mm - 6mm²



Couple 2 Photo during temperature test – Thermocouples applied on case of connector
The samples provided are all the same
n.3 samples (male-female combination) identified 1A - 2A - 3A during the tests.
Cable length 1400mm - 6mm²

Test equipment and uncertainty of measurement				
Ref.	Tests	Equipment	Uncertainty of measurement	
6.3.4	Heating <i>/Riscaldamento</i>	Datalogger Agilent 34972A Mpx Board Agilent 340901A Thermocouple (K)	<input checked="" type="checkbox"/> DLOGW001 <input checked="" type="checkbox"/> SWDLW006 <input checked="" type="checkbox"/> TRCPWxxx ⁽¹⁾	1,5°C
		Elspec Blackbox G4500 + Current probes: LEM IT-200S Ultrstb Rogowsky	<input checked="" type="checkbox"/> ELSPW001 <input checked="" type="checkbox"/> SLEMWxxx ^(*)	0,5V _{ac} 0,03A 0,1 kW
		DC Generator	LB15W001 LB15W002 MAGPW001	-

⁽¹⁾xxx indica il numero progressivo del sensore utilizzato /xxx indicates the number of the used sensor probe

Test case verdicts

Test case does not apply to the test object.....: **N(.A.)**

Test item does meet the requirement.....: **P(ass)**

Test item does not meet the requirement: **F(ail)**

Test not requested by customer... ..: **N/R**

Testing

Date of receipt of test item: 06/03/2023

Date(s) of performance of test.....: From 21/03/2023 to 22/03/2023

General remarks / Osservazioni generali

The test results presented in this report relate only to the item tested as received from the customer.

/Il presente rapporto di prova si riferisce esclusivamente al campione sottoposto a prova così come ricevuto dal cliente

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/"vedi allegato #" si riferisce ad un informazione addizionale allegata al report

"(see appended table)" refers to a table appended to the report.

/"vedi tabella allegata" si riferisce ad una tabella allegata al report

Throughout this report a comma is used as the decimal separator.

/In questo report la virgola è utilizzata come separatore decimale

Tests were requested by the customer. *Il test sono stati richiesti dal cliente*

We decline the responsibility for the data provided by the customer that can influence the results

/Si declina la responsabilità sui dati forniti dal cliente che possono influenzare i risultati

"The crimping of the terminals on the test cable leads was performed with Fanton pliers cod. A99990

/il crimpaggio dei terminali sui cavi di prova è stato eseguito con pinza Fanton cod. A99990.

The measurement uncertainties stated in this report are expressed as extended uncertainties and have been calculated multiplying the standard uncertainty by the coverage factor k=2 corresponding to a confidence level of about 95%

/Le incertezze di misura del presente rapporto sono espresse come incertezza estesa ottenuta moltiplicando l'incertezza tipo per il fattore di copertura k = 2 corrispondente ad un livello di fiducia di circa il 95%.

IEC 62852			
Clause	Requirement + Test	Result - Remark	Verdict
4	Classification		—
	Noryl Resin NH6020		P
5	Constructional requirements and performance		—
5.2	Marking and identification		—
5.2.1	Identification		—
	c) rated current in amperes (A);	39A	P
6	Tests		—
6.3.2	Durability of marking		N/R
6.3.3	Protection against electric shock		N/R
6.3.4	Temperature rise	Test performed at 39A (CEI EN 60512-5-1) See tables 6.3.4	P
6.3.5	Mechanical operation		N/R
6.3.6	Bending (flexing) test		N/R
6.3.7	Measurement of clearances and creepage distances		N/R
6.3.8	Dielectric strength		N/R
6.3.9	Corrosion test		N/R
6.3.10	Mechanical strength at lower temperatures		N/R
6.3.11	Change of temperature		N/R
6.3.12	Damp heat test		N/R
6.3.13	Insertion and withdrawal force		N/R
6.3.14	Effectiveness of connector coupling device		N/R
6.3.15	Terminations and connecting methods		N/R

6.3.4a TABLE: Heating test, thermocouples			-
Couple connector	Samples 1A Fanton: M – Staubli: F		
t1 (°C)	13,7°C Laboratory ambient temperature during the test (min)		-
t2 (°C)	14,7°C Laboratory ambient temperature during the test (max)		-
test current(A)	39A		-
test duration(h)	1h from steady thermal condition		
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	16,4	101,4	

6.3.4b TABLE: Heating test, thermocouples			-
Couple connector	Samples 2A Fanton: M – Staubli: F		
t1 (°C)	13,7°C Laboratory ambient temperature during the test (min)		-
t2 (°C)	14,7°C Laboratory ambient temperature during the test (max)		-
test current(A)	39A		-
test duration(h)	1h from steady thermal condition		
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	14,7	99,7	

6.3.4c TABLE: Heating test, thermocouples			-
Couple connector	Samples 3A Fanton: M – Staubli: F		
t1 (°C)	13,7°C Laboratory ambient temperature during the test (min)		-
t2 (°C)	14,7°C Laboratory ambient temperature during the test (max)		-
test current(A)	39A		-
test duration(h)	1h from steady thermal condition		
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	16,6	101,6	

6.3.4d TABLE: Heating test, thermocouples			-
Couple connector		Samples 1A Fanton: F – Staubli: M	
t1 (°C)	:	13,7°C Laboratory ambient temperature during the test (min)	-
t2 (°C)	:	14,7°C Laboratory ambient temperature during the test (max)	-
test current(A)	:	39A	-
test duration(h)	:	1h from steady thermal condition	
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	15,0	100,0	

6.3.4e TABLE: Heating test, thermocouples			-
Couple connector		Samples2A Fanton: F – Staubli: M	
t1 (°C)	:	13,7°C Laboratory ambient temperature during the test (min)	-
t2 (°C)	:	14,7°C Laboratory ambient temperature during the test (max)	-
test current(A)	:	39A	-
test duration(h)	:	1h from steady thermal condition	
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	15,9	100,9	

6.3.4f TABLE: Heating test, thermocouples			-
Couple connector		Samples 3A Fanton: F – Staubli: M	
t1 (°C)	:	13,7°C Laboratory ambient temperature during the test (min)	-
t2 (°C)	:	14,7°C Laboratory ambient temperature during the test (max)	-
test current(A)	:	39A	-
test duration(h)	:	1h from steady thermal condition	
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	13,5	98,5	

TABLE: COMPONENTS						-
Object/part No.	Manufacturer/trademark	Type/model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Male connector	Fanton Spa	A99900	Rated voltage: 1500Vdc Rated impulse voltage: 8kV Rated insulation voltage: 10kV Rated input current: 40A Pollution degree: 3 OVC III – CI II Ta= -40°C - +85°C; IP68	-	-	
Terminal	Fanton Spa	MNT041	Cu-ETP H065 sp. 0.4	UNI EN 1652	-	
Female connector	Fanton Spa	A99901	Rated voltage: 1500Vdc Rated impulse voltage: 8kV Rated insulation voltage: 10kV Rated input current: 40A Pollution degree: 3 OVC III – CI II Ta= -40°C - +85°C; IP 68	-	-	
Terminal	Fanton Spa	MNT042-P	-	-	-	
External plastic enclosure	Fanton Spa	Noryl Resin NH6020	-	-	-	
Male connector	Staubli	32.0143	Rated voltage: 1000Vd Rated insulation voltage: 16kV Rated input current: 39A Pollution degree: 3 Ta= -40°C - +85°C			
Female connector	Staubli	32.0142	Rated voltage: 1000Vd Rated insulation voltage: 16kV Rated input current: 39A Pollution degree: 3 Ta= -40°C - +85°C			

End of Test report