

**Product Safety Tests**

*/Prove e verifiche sulla  
sicurezza del prodotto*

## Test Report

*/Rapporto di prova*

**Test report no. SFY1 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)**

**IS24241N Female connector steering wheel (Cabur)**

**Couple 2**

**IS14240N Male connector steering wheel (Cabur)**

**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. ....: **SFY01 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 .....:   
 FABBRICA MATERIALE ELETTRICO

Manufacturer.....: Fanton Spa + Cabur

Model and/or type reference.....: Couple 1  
 A99900 Male connector steering wheel (Fanton)  
 IS24241N Female connector steering wheel (Cabur)

Couple 2  
 IS14240N Male connector steering wheel (Cabur)  
 A99901 Female connector steering wheel (Fanton)

**Rating(s)**

Connector	A99900 & A99901	IS14240N & IS24241N
Rated voltage:	1500Vdc	1500Vdc
Rated insulation voltage:	10kV	10kV
Rated input current:	40A	35A
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

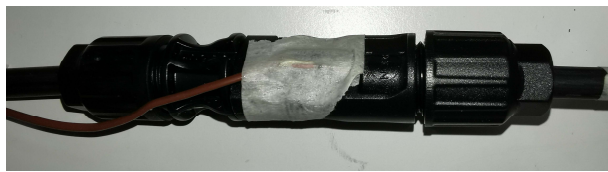
EUT's photos: Couple 2



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 - 6mm<sup>2</sup>



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 - 6mm<sup>2</sup>

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 <sup>(1)</sup>	1,5°C
		Elspec Blackbox G4500 + Current probes: LEM IT-200S Ultrstb Rogowsky	<input checked="" type="checkbox"/> ELSPW001 <input checked="" type="checkbox"/> SLEMWxxx <sup>(*)</sup>	0,5V <sub>ac</sub> 0,03A 0,1 kW
		DC Generator	LB15W001 LB15W002 MAGPW001	-

<sup>(1)</sup>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*  
 This test report shall not be reproduced except in full, without the written approval of the issuing testing laboratory, WTLab Srl.  
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 "(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	<b>Classification</b>		—
	Noryl Resin NH6020		P
5	<b>Constructional requirements and performance</b>		—
5.2	<b>Marking and identification</b>		—
5.2.1	Identification		—
	c) rated current in amperes (A);	35A	P
6	<b>Tests</b>		—
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 35A (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



<b>6.3.4a TABLE: Heating test, thermocouples</b>			-
Couple connector	Samples 1A Fanton: M – Cabur: 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) .....	35A		-
test duration(h) .....	1h from steady thermal condition		
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	12,9	97,9	

<b>6.3.4b TABLE: Heating test, thermocouples</b>			-
Couple connector	Samples 2A Fanton: M – Cabur: 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) .....	35A		-
test duration(h) .....	1h from steady thermal condition		
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	12,8	97,8	

<b>6.3.4c TABLE: Heating test, thermocouples</b>			-
Couple connector	Samples 3A Fanton: M – Cabur: 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) .....	35A		-
test duration(h) .....	1h from steady thermal condition		
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	13,1	98,1	

<b>6.3.4d TABLE: Heating test, thermocouples</b>			-
Couple connector	Samples 1A Fanton: F – Cabur: 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) .....	35A		-
test duration(h) .....	1h from steady thermal condition		
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	15,3	100,3	

<b>6.3.4e TABLE: Heating test, thermocouples</b>			-
Couple connector	Samples 2A Fanton: F – Cabur: 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) .....	35A		-
test duration(h) .....	1h from steady thermal condition		
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	13,6	98,6	

<b>6.3.4f TABLE: Heating test, thermocouples</b>			-
Couple connector	Samples 3A Fanton: F – Cabur: 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) .....	35A		-
test duration(h) .....	1h from steady thermal condition		
Thermocouple locations	dT (K)	T@85°C	
External enclosure case temperature Connection point of connector couple	11,9	96,9	

TABLE: COMPONENTS						-
Object/part No.	Manufacturer/trademark	Type/model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>	
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	Cabur	IS14240N	Rated voltage: 1500Vd Rated input current: 35A Pollution degree: 3 Ta= -40°C - +85°C			
Female connector	Cabur	IS24241N	Rated voltage: 1500Vd Rated input current: 35A Pollution degree: 3 Ta= -40°C - +85°C			

**End of Test report**