

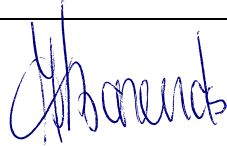




Test Report issued under the responsibility of:



<b>TEST REPORT</b> <b>IEC 62852</b> <b>Connector for DC – application in photovoltaic systems – Safety requirements and tests</b>	
<b>Report Number</b> .....	: 2257968.50
<b>Date of issue</b> .....	: 2021-09-21
<b>Total number of pages</b> .....	: 25
<b>Name of Testing Laboratory preparing the Report</b> .....	: DEKRA Certification B.V.
<b>Applicant's name</b> .....	: Holland Solar
<b>Address</b> .....	: Arthur van Schendelstraat 550, 3511 MH Utrecht, The Netherlands
<b>Test specification:</b>	
<b>Standard</b> .....	: IEC 62852:2014, IEC 62852:2014/AMD1:2020
<b>Test procedure</b> .....	: CB Scheme
<b>Non-standard test method</b> .....	: N/A
<b>TRF template used</b> .....	: IECEE OD-2020-F1:2020, Ed.1.3
<b>Test Report Form No.</b> .....	: IEC62852B
<b>Test Report Form(s) Originator</b> ....	: DEKRA Certification B.V.
<b>Master TRF</b> .....	: Dated 2020-03-13
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<b>This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.</b>	
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<b>Test item description</b> ..... :	Photovoltaic system connectors	
<b>Trade Mark(s)</b> ..... :		
<b>Manufacturer</b> ..... :	Stäubli; Canadian Solar; Longi; Suntech; JA Solar; Sunpower; Trina; Jinko; Weidmüller;	
<b>Model/Type reference</b> ..... :	MC4; T4-PC; PV-LR5; C4; QC4; YS 254/255; TS4; PV-JK03M; PV-STICK	
<b>Ratings</b> ..... :	1000 V, IP67 - IP68 (1 h / 1 m), ULT 100 – 115 °C See page 5 for details	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b>	DEKRA Certification B.V.
<b>Testing location/ address</b> .....:		Meander 1051, 6825 MJ Arnhem The Netherlands
<b>Tested by (name, function, signature)</b> .....:		T. Cai 
<b>Approved by (name, function, signature)</b> ...:		H.R.M. Barends 
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 1:</b>	
<b>Testing location/ address</b> .....:		
<b>Tested by (name, function, signature)</b> .....:		
<b>Approved by (name, function, signature)</b> ...:		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 2:</b>	
<b>Testing location/ address</b> .....:		
<b>Tested by (name + signature)</b> .....		
<b>Witnessed by (name, function, signature)</b> ..:		
<b>Approved by (name, function, signature)</b> ...:		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 3:</b>	

<b>List of Attachments (including a total number of pages in each attachment):</b>	
<b>Summary of testing:</b>	
<b>Tests performed (name of test and test clause):</b> Mechanical test group A: A5, A10 Service life test group B: B1, B2, B3 Thermal test group D: D1, D2, D3, D4 Degree of protection test group F: F1, F2, F3	<b>Testing location:</b> DEKRA Certifications B.V. Meander 1051, 6825 MJ Arnhem, The Netherlands
<b>Summary of compliance with National Differences (List of countries addressed):</b>	
<input type="checkbox"/> The product fulfils the requirements of _____ (insert standard number and edition and delete the text in parenthesis, leave it blank or delete the whole sentence, if not applicable)	
<b>Statement concerning the uncertainty of the measurement systems used for the tests</b> (may be required by the product standard or client)	
<input type="checkbox"/> <b>Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:</b> <b>Procedure number, issue date and title:</b>  Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.	
<input type="checkbox"/> <b>Statement not required by the standard used for type testing</b> (Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)	

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

**STÄUBLI**, MC4;

 **CanadianSolar**, T4-PC;

**LONGI**, PV-LR5;

 **SUNTECH**, C4;

**JA SOLAR**, QC4;

**SUNPOWER**, YS 254/255;

**TrinaSolar**, TS4;

 **Jinko** Solar  
Building Your Trust in Solar, PV-JK03M;

**Weidmüller** , PV-STICK;

+ -



**Do not disconnect under load**

IEC 62852				
Clause	Requirement + Test	Result - Remark	Verdict	
<b>Test item particulars</b> .....: Photovoltaic system connectors				
<b>Classification of installation and use</b> .....: Free connector				
<b>Supply Connection</b> .....: Non-rewirable connector				
<b>Possible test case verdicts:</b>				
- test case does not apply to the test object..... : N/A				
- test object does meet the requirement..... : P (Pass)				
- test object does not meet the requirement..... : F (Fail)				
<b>Testing</b> ..... :				
<b>Date of receipt of test item</b> ..... : 2021-06-23				
<b>Date (s) of performance of tests</b> ..... : 2021-07-19 to 2021-09-20				
<b>General remarks:</b>				
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.				
Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.				
The test of the defined test program did not give rise to remarks				
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60060-2:</b>				
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable	
When differences exist; they shall be identified in the General product information section.				
Name and address of factory (ies)..... : N/A				
<b>General product information and other remarks:</b>				
Combination (types)	Max. Current (A)	ULT (°C)	Ambient (°C)	IP degree
Stäubli + Canadian (MC4 + T4-PC)	34	110	90	IP68
Stäubli + Longi (MC4 + PV-LR5)	34	105	85	IP68
Stäubli + Suntech (MC4 + C4)	28	100	85	IP68
Stäubli + JA (MC4 + QC4)	34	105	85	IP68
Stäubli + Sunpower (MC4 + YS 254/255)	29	105	85	IP67
Stäubli + Trina (MC4 + TS4)	28	105	85	IP68
Stäubli + Jinko (MC4 + PV-JK03M)	26	100	85	IP67

IEC 62852					
Clause	Requirement + Test		Result - Remark		Verdict
Stäubli + Weidmüller (MC4 + PV-STICK)	39	115	85	IP68	

IEC 62852			
Clause	Requirement + Test	Result - Remark	Verdict
<b>5</b>	<b>CONSTRUCTIONAL REQUIREMENTS AND PERFORMANCE</b>		
<b>5.15.2</b>	<b>Contact retention in insert (test phase A5)</b>		
	Test load is three times the specified insertion force (mating) of one contact or the specified insertion force of one contact plus 50N, whichever is less		P
	Contacts safety retained		P
	No axial displacement likely to impair normal operation		P
<b>5.17</b>	<b>Connector with locking device (test phase A10)</b>		
	Connectors with locking device or with snap-in device withstand a load of at least 80N with a rate of 10N/sec withdrawal force		P
	No disengagement of the connectors is possible.		P
5.17	No damage occurred which could impair normal use		P
<b>6</b>	<b>TESTS</b>		
<b>Table 9 B1</b>	<b>Initial measurement (Contact resistance measurement) (test phase B1)</b>		
	Test current: 1 A		
	Reference value for subsequent measurement:	See table B1	P
<b>6.3.5</b>	<b>Mechanical operations (test phase B2)</b>		
	Operating cycles	50	P
	Insertion speed: 0,01 m/s		P
	Rest: 30 s		P
5.11.1	No damage occurred which could impair normal use		P
<b>Table 9 B3</b>	<b>Final measurement (Contact resistance measurement) (test phase B3)</b>		
	Test current: 1 A		
	$R2 \leq 1,5 R1$ or $R2 \leq 5 \text{ mohm} + R1$	See table B3	P
6.3.8.b	Dielectric strength: IEC 60512 / Test 4a		
	Test voltage:	6 000 V	P
5.10	No breakdown or flashover of the test voltage		P
<b>Table 9 D1</b>	<b>Initial measurement (Contact resistance measurement) (test phase D1)</b>		
	Test current: 1 A		
	Reference value for subsequent measurement:	See table D1	P

IEC 62852			
Clause	Requirement + Test	Result - Remark	Verdict
<b>6.3.4</b>	<b>Temperature rise test: IEC 60512 - test 5a (test phase D2)</b>		
	Test conductor length:	550 mm	P
	Test conductor:	4 mm <sup>2</sup> as delivered	P
	Test current:	See table D2	P
	Ambient temperature – components:	See page 5 for details	P
	Upper limit temperature – components:	See page 5 for details	P
5.13	The upper limiting temperature specified for the specimen is not exceeded	See table D2	P
<b>Table 9 D3</b>	<b>Dry heat: IEC 60512 - test 11i (test phase D3)</b>		
	Test duration:	1000 h	P
	Upper temperature limit:	See page 5 for details	P
<b>Table 9 D4</b>	<b>Final measurement (Contact resistance measurement) (test phase D4)</b>		
	No visual damage, no cracks on insulations parts likely to impair safety		P
	Internal insulation doesn't show any damages likely to impair safety		P
	Final measurement: IEC 60512 - test 2b		
	Test current: 1 A		
	$R2 \leq 1,5 R1$ or $R2 \leq 5 \text{ mohm} + R1$	See table D4	P
<b>6.3.3.1</b>	<b>Protection against electric shock (test phase F1)</b>		
	Connectors are tested by the test probe 11 according to IEC 61032 with a test force of 10N. All lids and cover which are remove without a tool are disconnected		P
5.4.1	Connectors are so designed, that after mounting, its live parts are not accessible by the IEC test finger in accordance with IEC 60529. No live parts accessible		P
5.4.2	Protection against electric shock have been ensured also during insertion and withdrawal. This is proved by the IEC test probe 11 in accordance with IEC 61032 with a test force of 10N at disengaged connectors. No live parts accessible		P
<b>6.3.3.2</b>	<b>Degree of protection IP code: IEC 60529 (test phase F2)</b>		
	IP-Degree of protection	See table F2	P
5.9	Maximum and minimum cross- section connected...:	4 mm <sup>2</sup>	P
	No ingress of dust		P
	No ingress of water		P



IEC 62852			
Clause	Requirement + Test	Result - Remark	Verdict
<b>6.3.8 b)</b>	<b>Dielectric strength: IEC 60512 - Test 4a (test phase F3)</b>		
	Dielectric strength: IEC 60512 / Test 4a		
	Test voltage.....:	6 000 V	P
5.10	No breakdown or flashover of the test voltage		P

IEC 62852					
Clause	Requirement + Test	Result - Remark			Verdict
	<b>TABLE B1: Initial measurements (Contact resistance)</b>				P
Test current .....		1 A			—
Combination		Test sample			
MC4 Male + T4-PC Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,18	0,17	0,18	P
	R1 [m $\Omega$ ]	0,18	0,17	0,18	
MC4 Female + T4-PC Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,17	0,16	0,19	P
	R1 [m $\Omega$ ]	0,17	0,16	0,19	
MC4 Male + PV-LR5 Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,28	0,26	0,25	P
	R1 [m $\Omega$ ]	0,28	0,26	0,25	
MC4 Female + PV-LR5 Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,20	0,18	0,19	P
	R1 [m $\Omega$ ]	0,20	0,18	0,19	
MC4 Male + C4 Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,18	0,19	0,18	P
	R1 [m $\Omega$ ]	0,18	0,19	0,18	
MC4 Female + C4 Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,16	0,15	0,17	P
	R1 [m $\Omega$ ]	0,16	0,15	0,17	
MC4 Male + QC4 Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,17	0,19	0,17	P
	R1 [m $\Omega$ ]	0,17	0,19	0,17	
MC4 Female + QC4 Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,15	0,15	0,16	P
	R1 [m $\Omega$ ]	0,15	0,15	0,16	
MC4 Male + YS255 Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,24	0,26	0,27	P
	R1 [m $\Omega$ ]	0,24	0,26	0,27	
MC4 Female + YS254 Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,11	0,13	0,12	P
	R1 [m $\Omega$ ]	0,11	0,13	0,12	

IEC 62852					
Clause	Requirement + Test	Result - Remark			Verdict
MC4 Male + TS4 Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,17	0,19	0,17	P
	R1 [m $\Omega$ ]	0,17	0,19	0,17	
MC4 Female + TS4 Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,14	0,12	0,14	P
	R1 [m $\Omega$ ]	0,14	0,12	0,14	
MC4 Male + JK03M Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,18	0,18	0,17	P
	R1 [m $\Omega$ ]	0,18	0,18	0,17	
MC4 Female + JK03M Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,16	0,15	0,17	P
	R1 [m $\Omega$ ]	0,16	0,15	0,17	
MC4 Male + PV-Stick Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,17	0,18	0,19	P
	R1 [m $\Omega$ ]	0,17	0,18	0,19	
MC4 Female + PV-Stick Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,13	0,15	0,15	P
	R1 [m $\Omega$ ]	0,13	0,15	0,15	
supplementary information:					

IEC 62852					
Clause	Requirement + Test	Result - Remark			Verdict
	<b>TABLE B3: Final measurements (Contact resistance)</b>				P
Test current .....		1 A			—
Number of cycles of B2 .....		50			—
Condition .....		R2max ≤ 1,5R1 or <b>R2max ≤ 5 mΩ + R1</b>			—
Combination		Test sample			
MC4 Male + T4-PC Female	Contact	1	2	3	—
	R2max [mΩ]	5,18	5,17	5,18	P
	ΔU2 [mV]	0,20	0,21	0,19	
	R2 [mΩ]	0,20	0,21	0,19	
MC4 Female + T4-PC Male	Contact	1	2	3	—
	R2max [mΩ]	5,17	5,16	5,19	P
	ΔU2 [mV]	0,18	0,18	0,19	
	R2 [mΩ]	0,18	0,18	0,19	
MC4 Male + PV-LR5 Female	Contact	1	2	3	—
	R2max [mΩ]	5,28	5,26	5,25	P
	ΔU2 [mV]	0,28	0,29	0,27	
	R2 [mΩ]	0,28	0,29	0,27	
MC4 Female + PV-LR5 Male	Contact	1	2	3	—
	R2max [mΩ]	5,20	5,18	5,19	P
	ΔU2 [mV]	0,23	0,21	0,25	
	R2 [mΩ]	0,23	0,21	0,25	
MC4 Male + C4 Female	Contact	1	2	3	—
	R2max [mΩ]	5,18	5,19	5,18	P
	ΔU2 [mV]	0,19	0,21	0,20	
	R2 [mΩ]	0,19	0,21	0,20	
MC4 Female + C4 Male	Contact	1	2	3	—
	R2max [mΩ]	5,16	5,15	5,17	P
	ΔU2 [mV]	0,17	0,17	0,20	
	R2 [mΩ]	0,17	0,17	0,20	
MC4 Male + QC4 Female	Contact	1	2	3	—
	R2max [mΩ]	5,17	5,19	5,17	P
	ΔU2 [mV]	0,19	0,24	0,18	

IEC 62852					
Clause	Requirement + Test			Result - Remark	Verdict
	R2 [mΩ]	0,19	0,24	0,18	
MC4 Female + QC4 Male	Contact	1	2	3	—
	R2max [mΩ]	5,15	5,15	5,16	P
	ΔU2 [mV]	0,19	0,20	0,19	
	R2 [mΩ]	0,19	0,20	0,19	
MC4 Male + YS255 Female	Contact	1	2	3	—
	R2max [mΩ]	5,24	5,26	5,27	P
	ΔU2 [mV]	0,27	0,33	0,32	
	R2 [mΩ]	0,27	0,33	0,32	
MC4 Female + YS254 Male	Contact	1	2	3	—
	R2max [mΩ]	5,11	5,13	5,12	P
	ΔU2 [mV]	0,13	0,15	0,16	
	R2 [mΩ]	0,13	0,15	0,16	
MC4 Male + TS4 Female	Contact	1	2	3	—
	R2max [mΩ]	5,17	5,19	5,17	P
	ΔU2 [mV]	0,18	0,19	0,19	
	R2 [mΩ]	0,18	0,19	0,19	
MC4 Female + TS4 Male	Contact	1	2	3	—
	R2max [mΩ]	5,14	5,12	5,14	P
	ΔU2 [mV]	0,16	0,13	0,16	
	R2 [mΩ]	0,16	0,13	0,16	
MC4 Male + JK03M Female	Contact	1	2	3	—
	R2max [mΩ]	5,18	5,18	5,17	P
	ΔU2 [mV]	0,22	0,20	0,20	
	R2 [mΩ]	0,22	0,20	0,20	
MC4 Female + JK03M Male	Contact	1	2	3	—
	R2max [mΩ]	5,16	5,15	5,17	P
	ΔU2 [mV]	0,18	0,18	0,19	
	R2 [mΩ]	0,18	0,18	0,19	
MC4 Male + PV-Stick Female	Contact	1	2	3	—
	R2max [mΩ]	5,17	5,18	5,19	P
	ΔU2 [mV]	0,18	0,20	0,20	
	R2 [mΩ]	0,18	0,20	0,20	

IEC 62852					
Clause	Requirement + Test			Result - Remark	Verdict
MC4 Female + PV-Stick Male	Contact	1	2	3	—
	R2max [mΩ]	5,13	5,15	5,15	P
	ΔU2 [mV]	0,16	0,17	0,19	
	R2 [mΩ]	0,16	0,17	0,19	

IEC 62852					
Clause	Requirement + Test	Result - Remark			Verdict
	<b>TABLE D1: Initial measurements (Contact resistance)</b>				P
Test current .....		1 A			—
Combination		Test sample			
MC4 Male + T4-PC Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,20	0,19	0,19	P
	R1 [m $\Omega$ ]	0,20	0,19	0,19	
MC4 Female + T4-PC Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,18	0,17	0,17	P
	R1 [m $\Omega$ ]	0,18	0,17	0,17	
MC4 Male + PV-LR5 Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,24	0,26	0,24	P
	R1 [m $\Omega$ ]	0,24	0,26	0,24	
MC4 Female + PV-LR5 Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,15	0,17	0,15	P
	R1 [m $\Omega$ ]	0,15	0,17	0,15	
MC4 Male + C4 Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,19	0,18	0,19	P
	R1 [m $\Omega$ ]	0,19	0,18	0,19	
MC4 Female + C4 Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,17	0,15	0,16	P
	R1 [m $\Omega$ ]	0,17	0,15	0,16	
MC4 Male + QC4 Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,19	0,20	0,19	P
	R1 [m $\Omega$ ]	0,19	0,20	0,19	
MC4 Female + QC4 Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,14	0,14	0,16	P
	R1 [m $\Omega$ ]	0,14	0,14	0,16	
MC4 Male + YS255 Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,19	0,20	0,18	P
	R1 [m $\Omega$ ]	0,19	0,20	0,18	
MC4 Female + YS254 Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,14	0,14	0,13	P
	R1 [m $\Omega$ ]	0,14	0,14	0,13	

IEC 62852					
Clause	Requirement + Test			Result - Remark	Verdict
MC4 Male + TS4 Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,17	0,16	0,19	P
	R1 [m $\Omega$ ]	0,17	0,16	0,19	
MC4 Female + TS4 Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,13	0,13	0,11	P
	R1 [m $\Omega$ ]	0,13	0,13	0,11	
MC4 Male + JK03M Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,17	0,20	0,18	P
	R1 [m $\Omega$ ]	0,17	0,20	0,18	
MC4 Female + JK03M Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,18	0,15	0,14	P
	R1 [m $\Omega$ ]	0,18	0,15	0,14	
MC4 Male + PV-Stick Female	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,18	0,18	0,19	P
	R1 [m $\Omega$ ]	0,18	0,18	0,19	
MC4 Female + PV-Stick Male	Contact	1	2	3	—
	$\Delta U1$ [mV]	0,15	0,16	0,16	P
	R1 [m $\Omega$ ]	0,15	0,16	0,16	
supplementary information:					



IEC 62852				
Clause	Requirement + Test	Result - Remark		Verdict
	<b>TABLE D2: Temperature Rise test</b>			<b>P</b>
	<b>Test Current (A)</b> ..... :	See below		—
	<b>Test Conductor Length(mm)</b> ..... :	550		
	<b>Test Conductor Section(mm<sup>2</sup>)</b> ..... :	4		
	<b>Ambient (°C)</b> ..... :	See below		—
<b>Thermocouple Locations / Combination</b>	<b>Test current (A)</b>	<b>Max. temperature measured, (°C)</b>	<b>Ambient (°C)</b>	<b>Max. temperature limit, (°C)</b>
MC4 Male + T4-PC Female	34	109,0	90	110
MC4 Female + T4-PC Male		106,9		
MC4 Male + PV-LR5 Female	34	104,2	85	105
MC4 Female + PV-LR5 Male		103,2		
MC4 Male + C4 Female	28	99,6	85	100
MC4 Female + C4 Male		99,5		
MC4 Male + QC4 Female	34	104,3	85	105
MC4 Female + QC4 Male		104,1		
MC4 Male + YS255 Female	29	104,4	85	105
MC4 Female + YS254 Male		103,3		
MC4 Male + TS4 Female	28	104,1	85	105
MC4 Female + TS4 Male		100,0		
MC4 Male + JK03M Female	26	99,5	85	100
MC4 Female + JK03M Male		97,5		
MC4 Male + PV-Stick Female	39	114,3	85	115
MC4 Female + PV-Stick Male		113,1		
Supplementary information:				

IEC 62852					
Clause	Requirement + Test			Result - Remark	Verdict
	<b>TABLE D4: Final measurements (Contact resistance)</b>				P
Test current .....			1 A		—
Condition .....			R2max ≤ 1,5R1 or <b>R2max ≤ 5 mΩ + R1</b>		—
Combination		Test sample			
MC4 Male + T4-PC Female	Contact	1	2	3	—
	R2max [mΩ]	5,20	5,19	5,19	P
	ΔU2 [mV]	0,29	0,28	0,35	
	R2 [mΩ]	0,29	0,28	0,35	
MC4 Female + T4-PC Male	Contact	1	2	3	—
	R2max [mΩ]	5,18	5,17	5,16	P
	ΔU2 [mV]	0,22	0,21	0,19	
	R2 [mΩ]	0,22	0,21	0,19	
MC4 Male + PV-LR5 Female	Contact	1	2	3	—
	R2max [mΩ]	5,24	5,26	5,24	P
	ΔU2 [mV]	0,33	0,33	0,31	
	R2 [mΩ]	0,33	0,33	0,31	
MC4 Female + PV-LR5 Male	Contact	1	2	3	—
	R2max [mΩ]	5,15	5,17	5,15	P
	ΔU2 [mV]	0,22	0,19	0,19	
	R2 [mΩ]	0,22	0,19	0,19	
MC4 Male + C4 Female	Contact	1	2	3	—
	R2max [mΩ]	5,19	5,18	5,19	P
	ΔU2 [mV]	0,25	0,22	0,26	
	R2 [mΩ]	0,25	0,22	0,26	
MC4 Female + C4 Male	Contact	1	2	3	—
	R2max [mΩ]	5,17	5,15	5,16	P
	ΔU2 [mV]	0,24	0,19	0,20	
	R2 [mΩ]	0,24	0,19	0,20	
MC4 Male + QC4 Female	Contact	1	2	3	—
	R2max [mΩ]	5,19	5,20	5,19	P
	ΔU2 [mV]	0,23	0,27	0,25	
	R2 [mΩ]	0,23	0,27	0,25	

IEC 62852					
Clause	Requirement + Test			Result - Remark	Verdict
MC4 Female + QC4 Male	Contact	1	2	3	—
	R2max [mΩ]	5,14	5,14	5,16	P
	ΔU2 [mV]	0,16	0,18	0,19	
	R2 [mΩ]	0,16	0,18	0,19	
MC4 Male + YS255 Female	Contact	1	2	3	—
	R2max [mΩ]	5,19	5,20	5,18	P
	ΔU2 [mV]	0,31	0,36	0,29	
	R2 [mΩ]	0,31	0,36	0,29	
MC4 Female + YS254 Male	Contact	1	2	3	—
	R2max [mΩ]	5,14	5,14	5,13	P
	ΔU2 [mV]	0,16	0,18	0,20	
	R2 [mΩ]	0,16	0,18	0,20	
MC4 Male + TS4 Female	Contact	1	2	3	—
	R2max [mΩ]	5,17	5,16	5,19	P
	ΔU2 [mV]	0,24	0,26	0,25	
	R2 [mΩ]	0,24	0,26	0,25	
MC4 Female + TS4 Male	Contact	1	2	3	—
	R2max [mΩ]	5,13	5,13	5,11	P
	ΔU2 [mV]	0,16	0,20	0,14	
	R2 [mΩ]	0,16	0,20	0,14	
MC4 Male + JK03M Female	Contact	1	2	3	—
	R2max [mΩ]	5,17	5,20	5,18	P
	ΔU2 [mV]	0,26	0,26	0,24	
	R2 [mΩ]	0,26	0,26	0,24	
MC4 Female + JK03M Male	Contact	1	2	3	—
	R2max [mΩ]	5,18	5,15	5,14	P
	ΔU2 [mV]	0,19	0,17	0,17	
	R2 [mΩ]	0,19	0,17	0,17	
MC4 Male + PV-Stick Female	Contact	1	2	3	—
	R2max [mΩ]	5,18	5,18	5,19	P
	ΔU2 [mV]	0,22	0,22	0,23	
	R2 [mΩ]	0,22	0,22	0,23	
MC4 Female	Contact	1	2	3	—

IEC 62852						
Clause	Requirement + Test			Result - Remark		Verdict
+ PV-Stick Male	R2max [mΩ]	5,15	5,15	5,16	P	
	ΔU2 [mV]	0,18	0,18	0,19		
	R2 [mΩ]	0,18	0,18	0,19		

TABLE F2: Degree of protection IP test						
Combination	IP degree	Ingress of dust (yes / no)	Ingress of water (yes / no)	Dielectric strength		Verdict
				Test voltage (V)	breakdown or flashover (yes / no)	
MC4 Male + T4-PC Female	IP68 (1 h / 1 m)	no	no	6000	no	P
MC4 Female + T4-PC Male		no	no	6000	no	P
MC4 Male + PV-LR5 Female	IP68 (1 h / 1 m)	no	no	6000	no	P
MC4 Female + PV-LR5 Male		no	no	6000	no	P
MC4 Male + C4 Female	IP68 (1 h / 1 m)	no	no	6000	no	P
MC4 Female + C4 Male		no	no	6000	no	P
MC4 Male + QC4 Female	IP68 (1 h / 1 m)	no	no	6000	no	P
MC4 Female + QC4 Male		no	no	6000	no	P
MC4 Male + YS255 Female	IP67 (0,5 h / 1 m)	no	no	6000	no	P
MC4 Female + YS254 Male		no	no	6000	no	P
MC4 Male + TS4 Female	IP68 (1 h / 1 m)	no	no	6000	no	P
MC4 Female + TS4 Male		no	no	6000	no	P
MC4 Male + JK03M Female	IP67 (0,5 h / 1 m)	no	no	6000	no	P
MC4 Female + JK03M Male		no	no	6000	no	P
MC4 Male + PV-Stick Female	IP68 (1 h / 1 m)	no	no	6000	no	P
MC4 Female + PV-Stick Male		no	no	6000	no	P
Supplementary information:						

Pictures of test samples



MC4 from Stäubli



T4-PC from Canadian Solar



PV-LR5 from Longi



C4 from Suntech



QC4 from JA



Yukita YS 254/255 from Sunpower



TS4 from Trina



JK03M from Jinko





PV-Stick from Weidmuler