

Prüfbericht-Nr.: <i>Test Report No.:</i>	19630765.004	Auftrags-Nr.: <i>Order No.:</i>	1803364607	Seite 1 von 11 Page 1 of 11
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	410949	Auftragsdatum: <i>Order date:</i>	29/10/2018	
Auftraggeber: <i>Client:</i>	Renewsys India Pvt Ltd.Division: Hyderabad,Fab City (SEZ), Plot No.6,Survey #114/P, Srinagar Village, Maheswaram, R.R District Hyderabad -501359. India			
Prüfgegenstand: <i>Test item:</i>	Photovoltaic (PV) modules			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	DESERV-3S6-355			
Auftrags-Inhalt: <i>Order content:</i>	Testing against PID resistivity			
Prüfgrundlage: <i>Test specification:</i>	Solar Photovoltaic Modules IEC TS 62804 – 1 :Test methods for the detection of potential-induced degradation – Part 1: Crystalline silicon with following severities - Climatic conditions: 85°C and 85% RH - Duration: 288 hours- 3 cycles of 96 hours each			
Wareneingangsdatum: <i>Date of receipt:</i>	30/10/2018	Detaillierte Fotodokumentation siehe Anlage zu diesem Bericht Detailed photo documentation see appendix to this report		
Prüfmuster-Nr.: <i>Test sample No.:</i>	Refer list of test samples			
Prüfzeitraum: <i>Testing period:</i>	12/11/2018 – 27/11/2018			
Ort der Prüfung: <i>Place of testing:</i>	Bangalore			
Prüflaboratorium: <i>Testing laboratory:</i>	TUV Rheinland(India) Pvt. Ltd.,Bangalore,India			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von / tested by:	kontrolliert von / reviewed by:			
18/12/2018	K.Ganesh Kamath/Manager-PV Products	18/12/2018	Kamalaksha CS/AGM -PV Products	
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>
				Unterschrift <i>Signature</i>
Sonstiges / Other:	none			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

Prüfbericht-Nr.: 19630765.004
Test Report No.:

Seite 3 von 11
Page 3 of 11

Produktbeschreibung
Product description

1 Produktdetails
Product details

DESERV-3S6-xxx(xxx = 243-380 in steps of 1, 72 Mono cells)

xxx represents output power in Wp

2 Verwendete Materialien
Used materials

Refer constructional characteristics in the "List of test samples"

3 Adresse(n) der Fertigungsstätte(n)
Address(es) of the manufacturing site(s)

Renewsys India Pvt Ltd.Division: Hyderabad,Fab City (SEZ), Plot No.6,Survey #114/P, Srinagar Village, Maheswaram, R.R District Hyderabad -501359. India

4 Zusammenfassung der Prüfergebnisse
Summary of test results

"According to the enquiry of the manufacturer for a testing against PID resistivity shall be performed according to IEC TS 62804 with following severities –

- Negative potential of the specified maximum system voltage between the shorted output terminals and the frame(ground), - 1000V DC
- Climatic conditions: 85°C and 85% RH
- Duration: 288 hours (3 cycles of 96 hours each)

Before and after the PID test, Visual inspection, maximum power determination, Ground continuity and documentation by electroluminescence imaging shall be performed.

In line with the international standard for PV module type approval testing EN IEC 61215, two modules will be tested. One additional module will be used as a reference sample.

Pass Criteria:

A module design shall be judged to have passed the PID test , if each test sample meets all the following criteria:

- The degradation of maximum output power does not exceed 5%.
- No evidence of a major visual defect (as defined in IEC 61215:2005)

All presented results are only valid for the exact tested module type and design (cell type, encapsulation material, glass type

Prüfbericht-Nr.: 19630765.004
Test Report No.:

Absatz	Solar Photovoltaic Modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

—	Test specification		
Photovoltaic (PV) modules – Test methods for the detection of potential-induced degradation - Part 1: Crystalline silicon	IEC TS 62804-1:2015-08, Edition 1.0	—	

—	Marking		
Name, monogram or symbol of manufacturer	On Type label and on module front	P	
Type or model number	On Type label	P	
Serial number	On laminate from front side	P	
Polarity of terminals or leads	On JB and cable	P	
Maximum system voltage	On Type label	P	
Date and place of manufacture	Date traceable from serial number and Manufacturing address mentioned on type label	P	

-	List of test samples		
Sample No.	Sample S/N	Type/Model	Remarks/constructional characteristics (e.g. cell, back sheet, frame type)
A000830016-060	R1000043181957415	DESERV-3S6-355	Cell: URE(NS6WL) -5bb Mono crystalline Back Sheet: Renewsys - Preserve A-125WN EVA: RenewSys-CONSERV A 360.2 14FC Glass: CSG AR coated 3.2mm JB: Zhejiang Zhonghuan Sunter PV Technology- PV-ZH011-3
A000830016-061	R1000043181957409	DESERV-3S6-355	
A000830016-062	R1000043181957417	DESERV-3S6-355	

Prüfbericht-Nr.: 19630765.004
Test Report No.:

Seite 5 von 11
Page 5 of 11

Absatz	Solar Photovoltaic Modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

10.1	Visual inspection (Initial)		
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings	-
12/11/2018	A000830016-060	No Major visual defects found	P
12/11/2018	A000830016-061	No Major visual defects found	P
12/11/2018	A000830016-062	No Major visual defects found	P
Supplementary information: - None			

10.2	Maximum power determination (Initial)							
Module temperature [°C]	corrected to 25							-
Irradiance [W/m²]	1000							
Test date [DD/MM/YYYY]	Sample No.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	
12/11/2018	A000830016-060	348.36	38.48	9.05	47.66	9.53	76.8	-
12/11/2018	A000830016-061	354.42	38.70	9.16	47.62	9.65	77.1	-
12/11/2018	A000830016-062	352.97	38.71	9.12	47.70	9.63	76.9	-
Supplementary information: - None								

10.3	Insulation test (Initial)						
Maximum system voltage [V _{DC}]	1000						-
High voltage applied [V _{DC}]	6000						
Insulation resistance measured at [V _{DC}]	1000						
Test date [DD/MM/YYYY]	Sample No.	Measured [GΩ]	Area [m²]	Result* [GΩ × m²]	Dielectric breakdown		-
					Yes (description)	No	
12/11/2018	A000830016-060	49.00	1.93	94.57	--	No	P
12/11/2018	A000830016-061	47.99	1.93	90.71	--	No	P
12/11/2018	A000830016-062	46.50	1.93	89.75	--	No	P
*Minimum requirement acc. to the standard is 0.04 GΩ × m².							
Supplementary information: - None							

Prüfbericht-Nr.: 19630765.004			
Test Report No.:			
Absatz	Solar Photovoltaic Modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

10.15	Wet leakage current test (Initial)				
Insulation resistance measured at [V_{DC}]		1000			-
Solution resistivity [Ω cm]		< 3,500			P
Solution temperature [$^{\circ}$ C]		22 \pm 3			P
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	-
		[$M\Omega$]	[m^2]	[$M\Omega \times m^2$]	
12/11/2018	A000830016-060	2300.0	1.93	4439.0	P
12/11/2018	A000830016-061	2000.0	1.93	3860.0	P
12/11/2018	A000830016-062	2800.0	1.93	5432.0	P
* Minimum requirement acc. to the standard is 40 $M\Omega \times m^2$.					
Supplementary information: - None					

10.4	Ground continuity (Initial) - MST 13				
Maximum over-current protection rating [A]		15			-
Current applied [A]		37.5			
Location of designated grounding point		Right side Longer frame			
Location of second contacting point		Opposite frame			
Test date [DD/MM/YYYY]	Sample No.	Voltage [mV]	Resistance [$m\Omega$]		
12/11/2018	A000830016-060	132.0	3.52		P
12/11/2018	A000830016-061	132.0	3.52		P
12/11/2018	A000830016-062	128.0	3.41		P
Supplementary information: - None					

Prüfbericht-Nr.: 19630765.004
Test Report No.:

Absatz	Solar Photovoltaic Modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

Performance of PID Test -1 st Cycle				
Test Method	Chamber			—
Module Temperature [°C]	85			
Relative Humidity [%]	85			
Grounding polarity	+ve			
Test date [DD/MM/YYYY]	Sample No.	Applied Voltage [V]	Duration[Hrs]	
13/11/2018 to 17/11/2018	A000830016-061	-1000	96	P
	A000830016-062	-1000	96	P
Supplementary information: - None				

10.1 Visual inspection after 1 st PID Cycle			
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings	-
17/11/2018	A000830016-061	No Major visual defects found	P
17/11/2018	A000830016-062	No Major visual defects found	P
Supplementary information: - None			

10.2 Maximum power determination - after 1 st PID Cycle									
Module temperature [°C]	corrected to 25								-
Irradiance [W/m ²]	1000								
Test date [DD/MM/YYYY]	Sample No.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	Degradation [%]	
17/11/2018	A000830016-061	350.93	38.84	9.04	47.70	9.58	76.8	-1.0	P
17/11/2018	A000830016-062	349.72	38.89	8.99	47.72	9.57	76.6	-0.9	P
Supplementary information: - Initial measurements were considered for calculating degradation									

Prüfbericht-Nr.: 19630765.004			
Test Report No.:			
Absatz	Solar Photovoltaic Modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

10.3	Insulation test after 1st PID Cycle						
Maximum system voltage [V _{DC}]		1000					
High voltage applied [V _{DC}]		6000					
Insulation resistance measured at [V _{DC}]		1000					
Test date [DD/MM/YYYY]	Sample No.	Measured [GΩ]	Area [m ²]	Result* [GΩ × m ²]	Dielectric breakdown		-
					Yes (description)	No	
17/11/2018	A000830016-061	10.20	1.93	19.69	--	No	P
17/11/2018	A000830016-062	3.60	1.93	6.95	--	No	P
*Minimum requirement acc. to the standard is 0.04 GΩ × m ² .							
Supplementary information: - None							

10.15	Wet leakage current test after 1st PID Cycle						
Insulation resistance measured at [V _{DC}]		1000					-
Solution resistivity [Ω cm]		< 3,500					P
Solution temperature [°C]		22 ± 3					P
Test date [DD/MM/YYYY]	Sample No.	Measured [MΩ]	Area [m ²]	Result* [MΩ × m ²]	-		
17/11/2018	A000830016-061	560.0	1.93	1080.80	P		
17/11/2018	A000830016-062	480.0	1.93	926.60	P		
* Minimum requirement acc. to the standard is 40 MΩ × m ² .							
Supplementary information: - None							

Performance of PID Test – IInd Cycle					
Test Method	Chamber				—
Module Temperature [°C]	85				
Relative Humidity [%]	85				
Grounding polarity	+ve				
Test date [DD/MM/YYYY]	Sample No.	Applied Voltage [V]	Duration[Hrs.]		
17/11/2018 to 21/11/2018	A000830016-061	-1000	96	P	
	A000830016-062	-1000	96	P	
Supplementary information: - None					

Prüfbericht-Nr.: 19630765.004
Test Report No.:

Absatz	Solar Photovoltaic Modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

10.1	Visual inspection after IInd PID Cycle		
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings	-
22/11/2018	A000830016-061	No Major visual defects found	P
22/11/2018	A000830016-062	No Major visual defects found	P
Supplementary information: - None			

10.2	Maximum power determination - after IInd PID Cycle								
Module temperature [°C]	corrected to 25								-
Irradiance [W/m²]	1000								
Test date [DD/MM/YYYY]	Sample No.	P _{max} [W]	V _{mpp} [V]	I _{mp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	Degradation [%]	
22/11/2018	A000830016-061	350.98	38.46	9.13	47.65	9.59	76.8	-1.0	P
22/11/2018	A000830016-062	349.85	38.49	9.09	47.70	9.59	76.5	-0.9	P
Supplementary information: - Initial measurements were considered for calculating degradation									

10.3	Insulation test after IInd PID cycle						
Maximum system voltage [V _{DC}]	1000						-
High voltage applied [V _{DC}]	6000						
Insulation resistance measured at [V _{DC}]	1000						
Test date [DD/MM/YYYY]	Sample No.	Measured [GΩ]	Area [m²]	Result* [GΩ × m²]	Dielectric breakdown		-
					Yes (description)	No	
22/11/2018	A000830016-061	10.60	1.93	20.45	--	No	
22/11/2018	A000830016-062	5.20	1.93	10.04	--	No	P
*Minimum requirement acc. to the standard is 0.04 GΩ × m².							
Supplementary information: - None							

Prüfbericht-Nr.: 19630765.004
Test Report No.:

Absatz	Solar Photovoltaic Modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

10.15	Wet leakage current after IInd PID Cycle				
Insulation resistance measured at [V _{DC}]	1000			-	
Solution resistivity [Ω cm]	< 3,500			P	
Solution temperature [°C]	22 ± 3			P	
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	-
		[M Ω]	[m ²]	[M Ω x m ²]	
22/11/2018	A000830016-061	390.0	1.93	752.7	P
22/11/2018	A000830016-062	450.0	1.93	868.5	P
* Minimum requirement acc. to the standard is 40 M Ω x m ² .					
Supplementary information: - None					

	Performance of PID Test – IIIrd Cycle				
Test Method	Chamber			—	
Module Temperature [°C]	85				
Relative Humidity [%]	85				
Grounding polarity	+ve				
Test date [DD/MM/YYYY]	Sample No.	Applied Voltage [V]	Duration[Hrs.]		
22/11/2018 to 27/11/2018	A000830016-061	-1000	96	P	
	A000830016-062	-1000	96	P	
Supplementary information: - None					

10.1	Visual inspection after IIIrd PID Cycle			
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings		-
27/11/2018	A000830016-061	No Major visual defects found		P
27/11/2018	A000830016-062	No Major visual defects found		P
Supplementary information: - None				

Prüfbericht-Nr.: 19630765.004		Seite 11 von 11	
Test Report No.:		Page 11 of 11	
Absatz	Solar Photovoltaic Modules	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

10.2	Maximum power determination - after IIIrd Cycle								
Module temperature [°C]	corrected to 25								-
Irradiance [W/m ²]	1000								
Test date [DD/MM/YYYY]	Sample No.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	Degradation [%]	
27/11/2018	A000830016-061	349.29	38.91	8.98	47.69	9.51	77.0	-1.4	P
27/11/2018	A000830016-062	348.03	38.46	9.05	47.70	9.52	76.6	-1.4	P
Supplementary information: - Initial measurements were considered for calculating degradation									

10.3	Insulation test after IIIrd Cycle								
Maximum system voltage [V _{DC}]	1000								
High voltage applied [V _{DC}]	6000								
Insulation resistance measured at [V _{DC}]	1000								
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	Dielectric breakdown			-	
		[GΩ]	[m ²]	[GΩ × m ²]	Yes (description)	No			
27/11/2018	A000830016-061	51.20	1.93	98.81	--	No	P		
27/11/2018	A000830016-062	11.40	1.93	22.00	--	No	P		
*Minimum requirement acc. to the standard is 0.04 GΩ × m ² .									
Supplementary information: - None									

10.15	Wet leakage current after IIIrd PID Cycle								
Insulation resistance measured at [V _{DC}]	1000								-
Solution resistivity [Ω cm]	< 3,500								P
Solution temperature [°C]	22 ± 3								P
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*				-	
		[MΩ]	[m ²]	[MΩ × m ²]					
27/11/2018	A000830016-061	410.0	1.93	791.3				P	
27/11/2018	A000830016-062	390.0	1.93	752.7				P	
* Minimum requirement acc. to the standard is 40 MΩ × m ² .									
Supplementary information: - None									

Result:

1. The degradation of maximum output power does not exceed 5%
2. There is no evidence of a major local degradation in electroluminescence inspection.

ANLAGE zum Prüfbericht-Nr.:
APPENDIX to Test Report No.: 19630765.004

Seite 2 von 16
Page 2 of 16

ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

Statement of the estimated uncertainty of the test verdicts

- Electrical performance rating is outside the scope of IEC 61215:2005 qualification testing. The verdicts of performance rating are only related to the test samples that were subjected to the tests. They cannot be generalised to the modules from the series production.
- The calibration to STC was performed with a class AAA solar simulator. The extended measurement uncertainty is:
 - Pmax measurement: 2.12% with a coverage factor $k=2$
 - Current measurement: 1.76% with a coverage factor $k=2$
 - Voltage measurement: 1.57% with a coverage factor $k=2$
- Relative measurements were performed with a flash type solar simulator.
- The accuracy of measurement reproduction with the solar simulator is less than ± 1 %.

ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

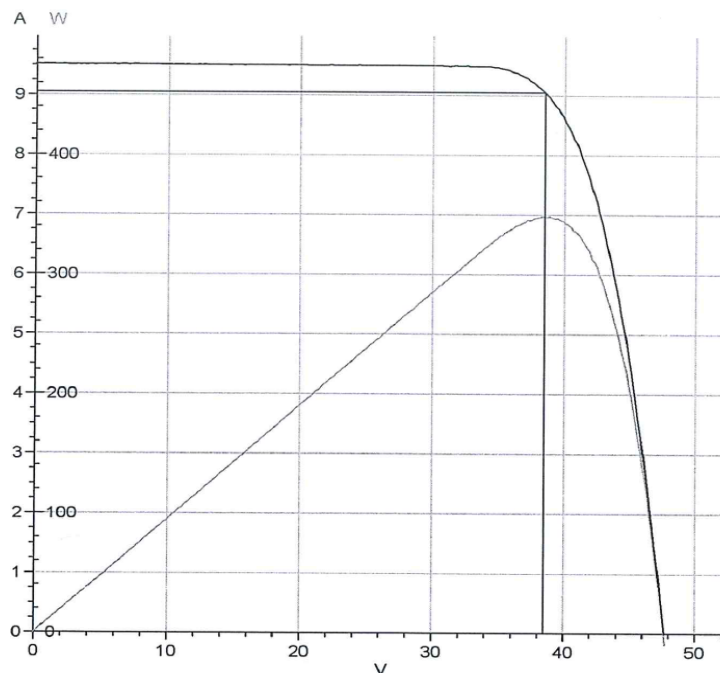
Measurement reports: Initial



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

12-11-18 14:51



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000830016-060 Initi
Module ID Code	R1000043181957415	Serial number	
Standard temperature	25.0 °C	Monitor Cell	002-2010
Mean Irradiance	1.006 kW/m ²	Calibration Value	35.21 mV/(kW/m ²)
Module Temp.	24.8 °C	Mon. Cell Temp.	24.8 °C
Mask	NO-MASK 1.000 -	Cell Area	244.42 cm ²
Module Area	19256.75 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	9.52 A	Voc	47.66 V
Imp	9.05 A	Vmp	38.48 V
Pmax	348.36 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	76.8 %
Cell Efficiency	19.8 %	Module Efficiency	18.1 %
Shunt res.	1695.390 Ohm	Serie res.	0.539 Ohm

*Shannon R
12/11/18*

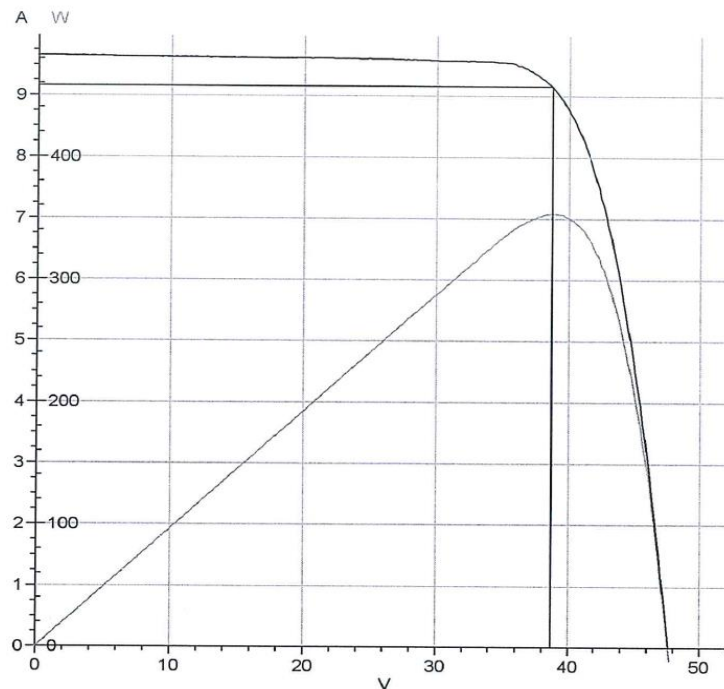
ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

12-11-18 14:56



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000830016-061 Initi
Module ID Code	R1000043181957409	Serial number	
Standard temperature	25.0 °C	Monitor Cell	002-2010
Mean Irradiance	1.006 kW/m ²	Calibration Value	35.21 mV/(kW/m ²)
Module Temp.	24.9 °C	Mon. Cell Temp.	24.9 °C
Mask	NO-MASK 1.000 -	Cell Area	244.42 cm ²
Module Area	19256.75 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	9.65 A	Voc	47.62 V
Imp	9.16 A	Vmp	38.70 V
Pmax	354.42 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	77.1 %
Cell Efficiency	20.1 %	Module Efficiency	18.4 %
Shunt res.	514.656 Ohm	Serie res.	0.512 Ohm

*Shovan R
12/11/18*

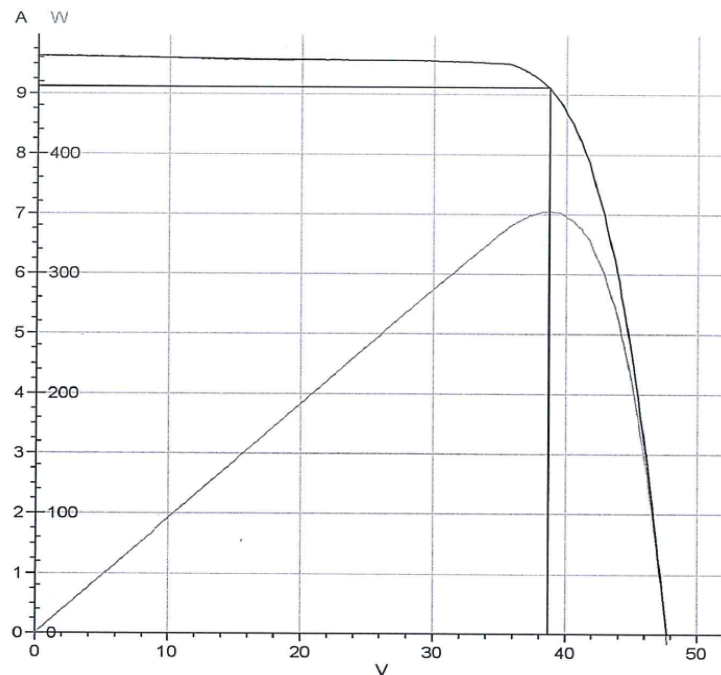
ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

12-11-18 15:14



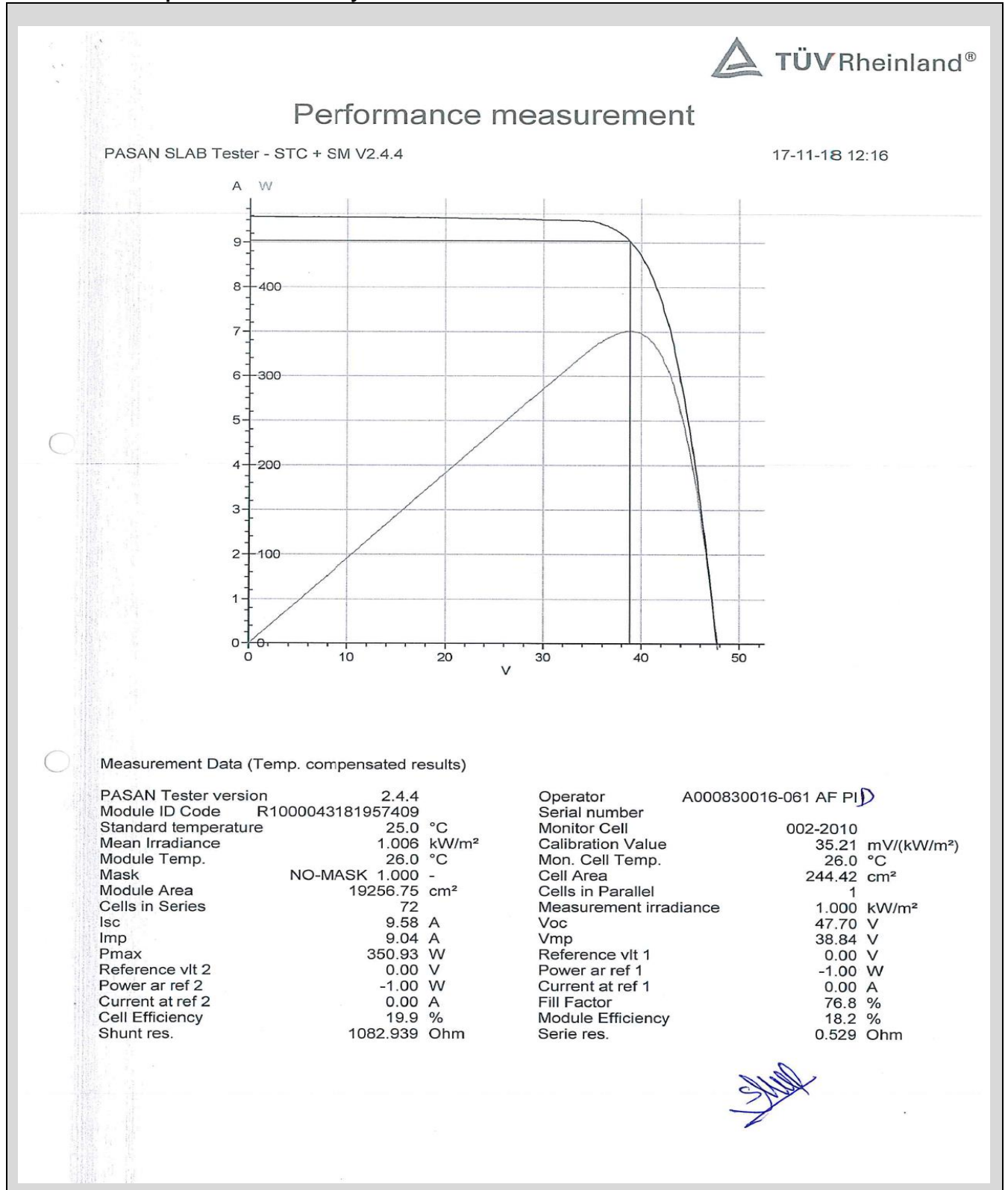
Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000830016-062 Initi
Module ID Code	R1000043181957417	Serial number	
Standard temperature	25.0 °C	Monitor Cell	002-2010
Mean Irradiance	1.006 kW/m ²	Calibration Value	35.21 mV/(kW/m ²)
Module Temp.	24.9 °C	Mon. Cell Temp.	24.9 °C
Mask	NO-MASK 1.000 -	Cell Area	244.42 cm ²
Module Area	19256.75 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	9.63 A	Voc	47.70 V
Imp	9.12 A	Vmp	38.71 V
Pmax	352.97 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	76.9 %
Cell Efficiency	20.1 %	Module Efficiency	18.3 %
Shunt res.	333.444 Ohm	Serie res.	0.529 Ohm

Smawen R
12/11/18

ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

Measurement Reports after 1st PID Cycle:



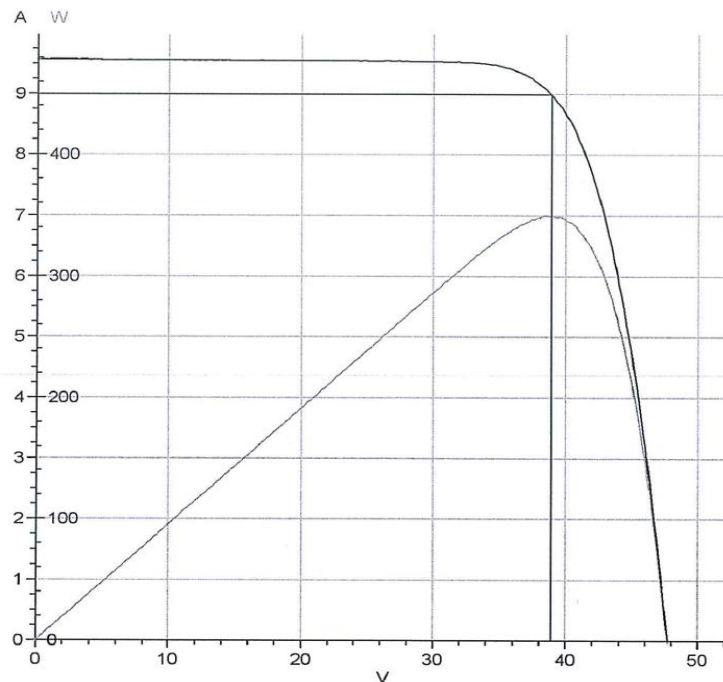
ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

17-11-18 12:21



Measurement Data (Temp. compensated results)

PASAN Tester version 2.4.4
 Module ID Code R1000043181957417
 Standard temperature 25.0 °C
 Mean Irradiance 1.006 kW/m²
 Module Temp. 26.0 °C
 Mask NO-MASK 1.000 -
 Module Area 19256.75 cm²
 Cells in Series 72
 I_{sc} 9.57 A
 I_{mp} 8.99 A
 P_{max} 349.72 W
 Reference v_{lt} 2 0.00 V
 Power at ref 2 -1.00 W
 Current at ref 2 0.00 A
 Cell Efficiency 19.9 %
 Shunt res. 996.288 Ohm

Operator A000830016-062 AF PID
 Serial number
 Monitor Cell 002-2010
 Calibration Value 35.21 mV/(kW/m²)
 Mon. Cell Temp. 26.0 °C
 Cell Area 244.42 cm²
 Cells in Parallel 1
 Measurement irradiance 1.000 kW/m²
 Voc 47.72 V
 V_{mp} 38.89 V
 Reference v_{lt} 1 0.00 V
 Power at ref 1 -1.00 W
 Current at ref 1 0.00 A
 Fill Factor 76.6 %
 Module Efficiency 18.2 %
 Serie res. 0.532 Ohm



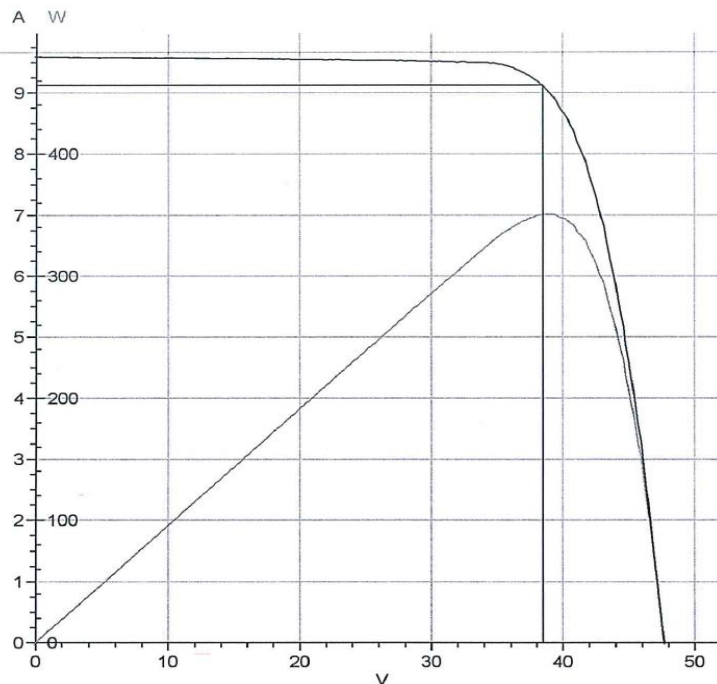
ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

22-11-18 15:23



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000830016-061 AF PI
Module ID Code	R1000043181957409	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean Irradiance	1.006 kW/m ²	Calibration Value	37.47 mV/(kW/m ²)
Module Temp.	24.4 °C	Mon. Cell Temp.	24.4 °C
Mask	NO-MASK 1.000 -	Cell Area	244.42 cm ²
Module Area	19256.75 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	9.59 A	Voc	47.65 V
Imp	9.13 A	Vmp	38.46 V
Pmax	350.98 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	76.8 %
Cell Efficiency	19.9 %	Module Efficiency	18.2 %
Shunt res.	663.245 Ohm	Serie res.	0.526 Ohm

*Simon R
22-11-18*

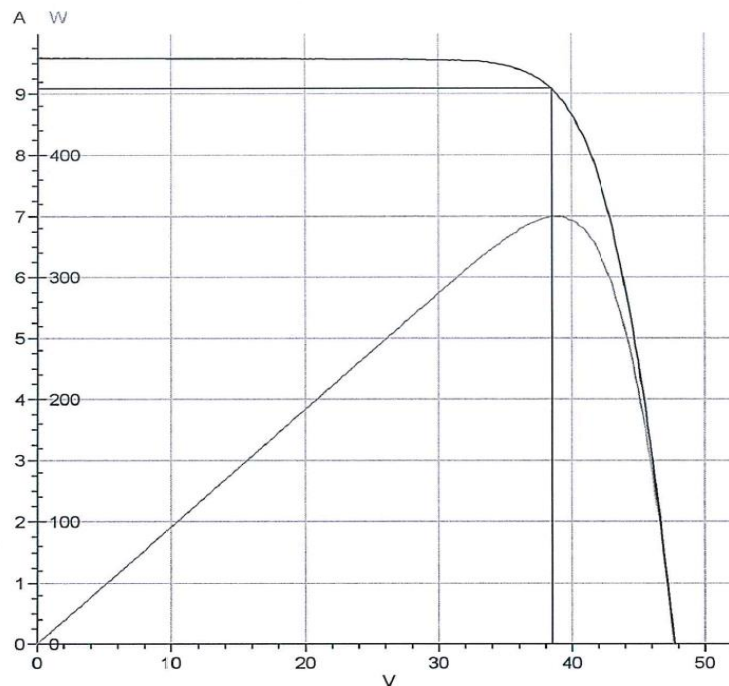
ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

22-11-18 15:27



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000830016-062 AF PI
Module ID Code	R1000043181957417	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean Irradiance	1.006 kW/m ²	Calibration Value	37.47 mV/(kW/m ²)
Module Temp.	24.6 °C	Mon. Cell Temp.	24.6 °C
Mask	NO-MASK 1.000 -	Cell Area	244.42 cm ²
Module Area	19256.75 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	9.59 A	Voc	47.70 V
Imp	9.09 A	Vmp	38.49 V
Pmax	349.85 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	76.5 %
Cell Efficiency	19.9 %	Module Efficiency	18.2 %
Shunt res.	1766.687 Ohm	Serie res.	0.539 Ohm

*Simon R
22/11/18*

ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

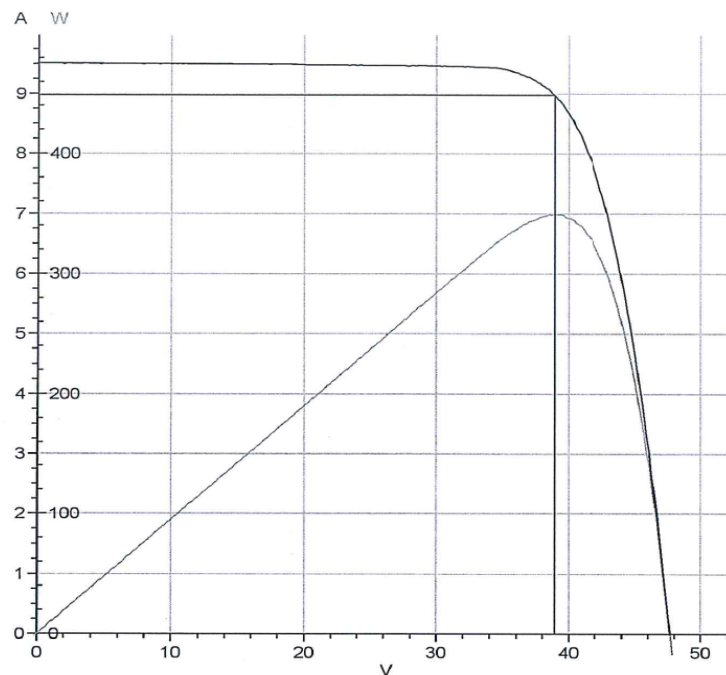
Measurement Reports after Illrd PID Cycle:



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

27-11-18 12:57



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000830016-061 AF PID 288 hrs
Module ID Code	R1000043181957409	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean Irradiance	1.006 kW/m ²	Calibration Value	37.47 mV/(kW/m ²)
Module Temp.	24.3 °C	Mon. Cell Temp.	24.3 °C
Mask	NO-MASK 1.000 -	Cell Area	244.42 cm ²
Module Area	19256.75 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	9.51 A	Voc	47.69 V
Imp	8.98 A	Vmp	38.91 V
Pmax	349.29 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	77.0 %
Cell Efficiency	19.8 %	Module Efficiency	18.1 %
Shunt res.	1162.885 Ohm	Serie res.	0.529 Ohm

Shunt

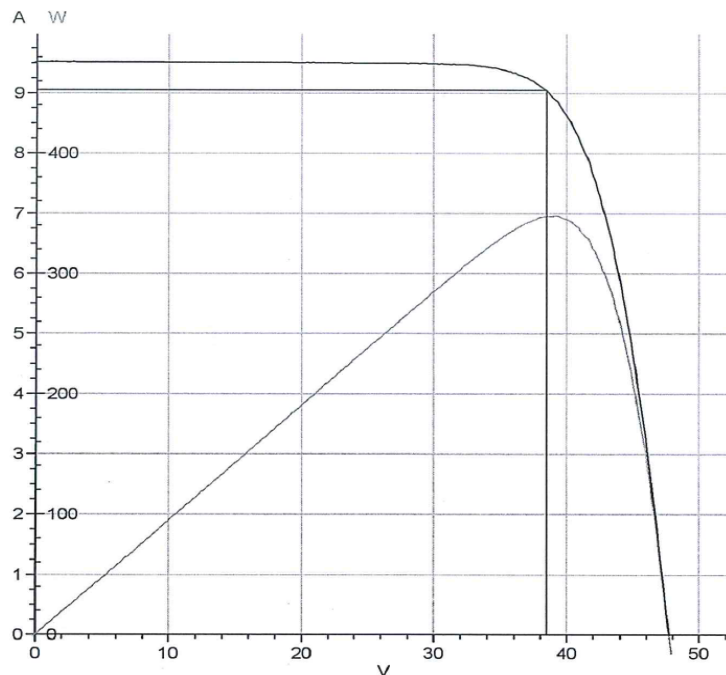
ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

27-11-18 12:48



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000830016-062 AF PID 288 hrs
Module ID Code	R1000043181957417	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean Irradiance	1.006 kW/m ²	Calibration Value	37.47 mV/(kW/m ²)
Module Temp.	24.2 °C	Mon. Cell Temp.	24.2 °C
Mask	NO-MASK 1.000 -	Cell Area	244.42 cm ²
Module Area	19256.75 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	9.52 A	Voc	47.70 V
Imp	9.05 A	Vmp	38.46 V
Pmax	348.03 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	76.6 %
Cell Efficiency	19.8 %	Module Efficiency	18.1 %
Shunt res.	2012.661 Ohm	Serie res.	0.533 Ohm

Shunt

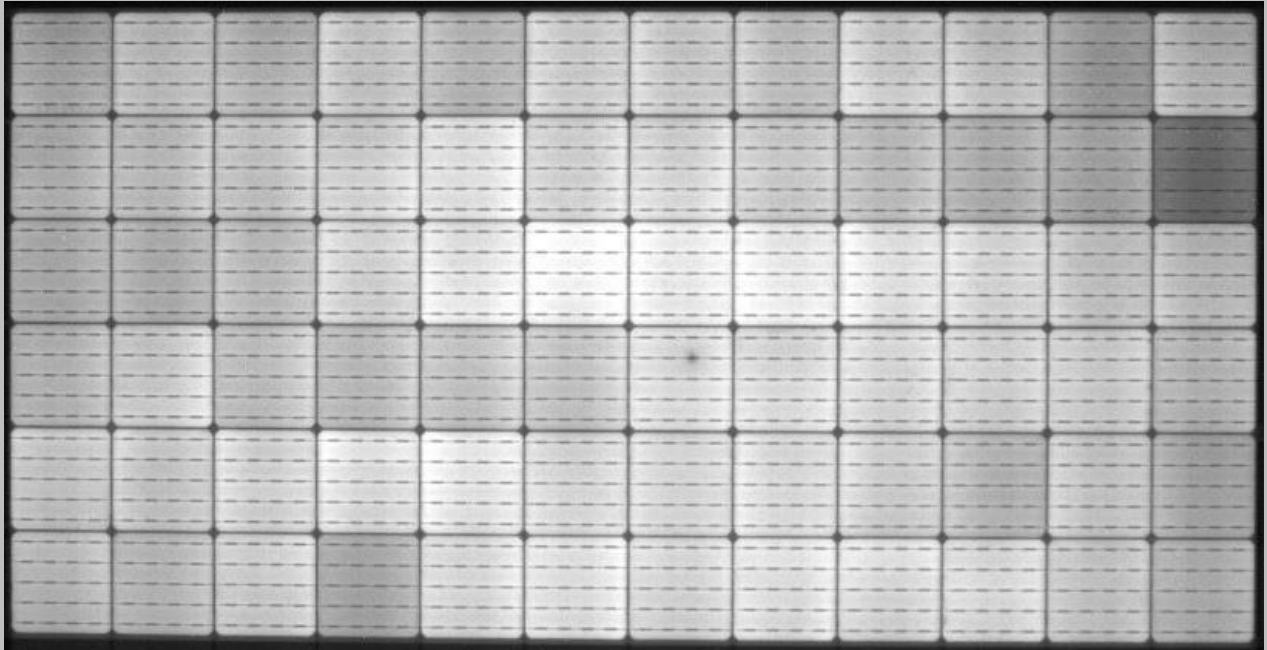
ANLAGE zum Prüfbericht-Nr.:
APPENDIX to Test Report No.: 19630765.004

Seite 12 von 16
Page 12 of 16

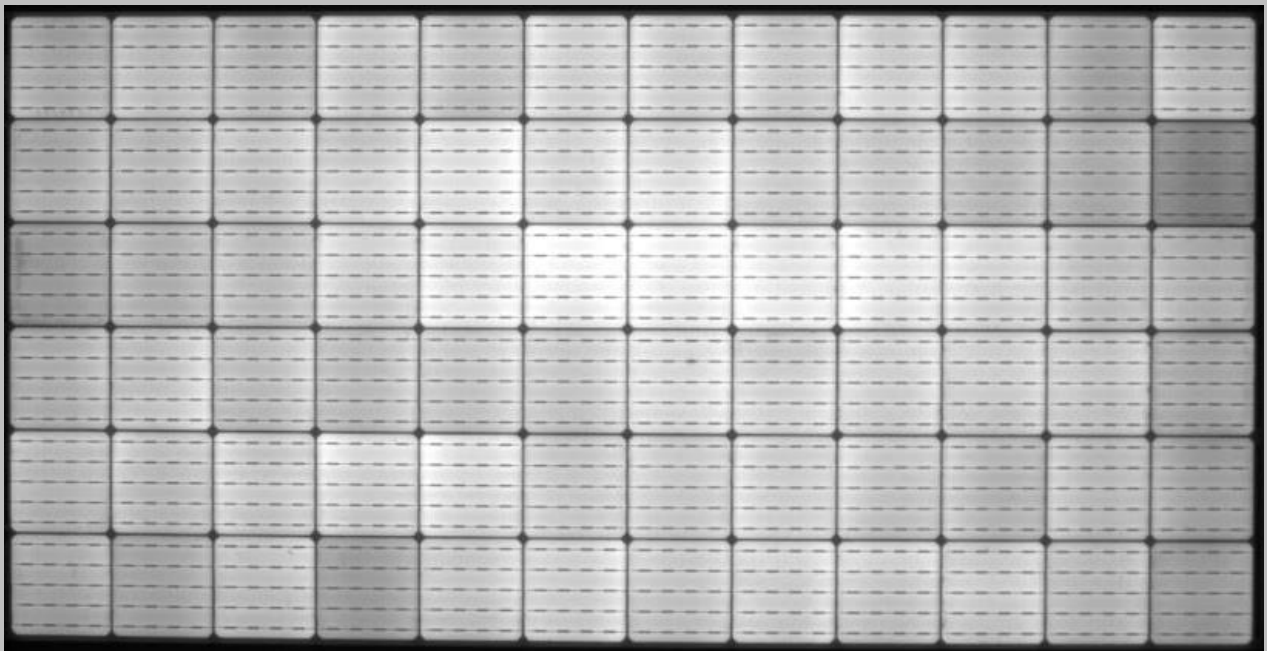
ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

EL Images of Test samples :

A000830016-061(Initial)



A000830016-061(After- 1st PID Cycle)



ANLAGE zum Prüfbericht-Nr.:
APPENDIX to Test Report No.: 19630765.004

Seite 13 von 16
Page 13 of 16

ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

A000830016-061(After- IInd PID Cycle)



A000830016-061(After- IIIrd PID Cycle)

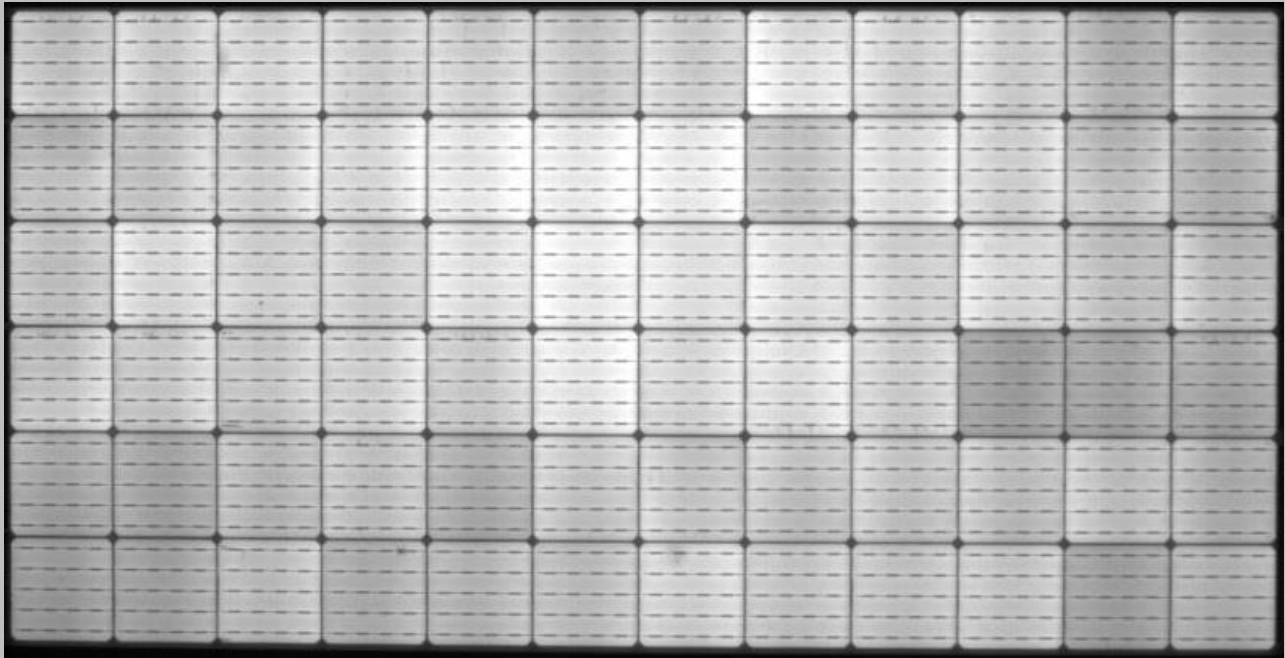


ANLAGE zum Prüfbericht-Nr.:
APPENDIX to Test Report No.: 19630765.004

Seite 14 von 16
Page 14 of 16

ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

A000830016-062(Initial)



A000830016-062(After- 1st PID Cycle)



ANLAGE zum Prüfbericht-Nr.:
APPENDIX to Test Report No.: 19630765.004

Seite 15 von 16
Page 15 of 16

ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

A000830016-062(After- IInd PID Cycle)



A000830016-062(After- IIIrd PID Cycle)



ANLAGE zum Prüfbericht-Nr.:
APPENDIX to Test Report No.: 19630765.004

Seite 16 von 16
Page 16 of 16

ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

A000830016-060(Control module)

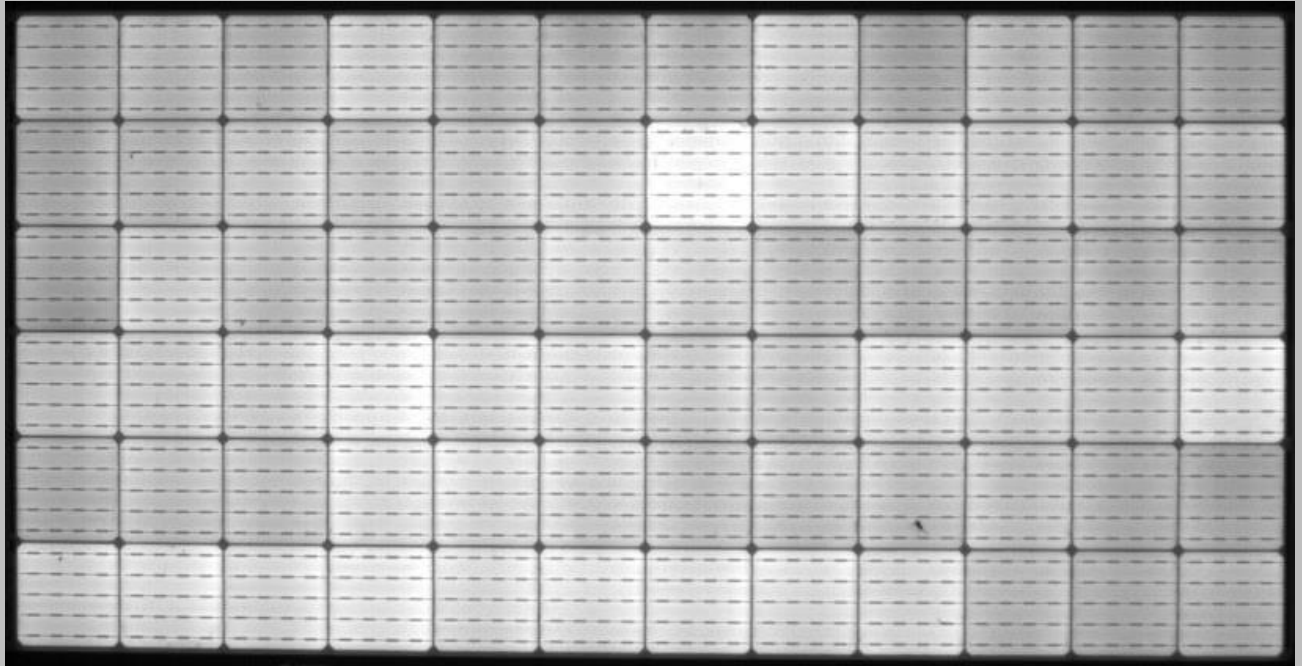


FOTO-DOKUMENTATION
PHOTO-DOCUMENTATION

Pictures of Modules



Fig.1:Front view of the module



Fig.2:Rear view of the module



Fig.3:Detail view of the Solar cell



Fig.4: Detail view of Junction Box




RenewSys <i>for those who love light</i>		RenewSys India Pvt Ltd Sy. No. 114/P, Srinagar (V), Fab City, Maheswaram (M), Ranga Reddy District.					
Model : DESERV-356-355 Wp High Performance Monocrystalline Modules							
Rated Power	Voc	Isc	Vmp	Imp	Max System Voltage	Binning	Weight
355 Wp	48.22 V	9.61 A	39.28 V	9.05 A	1000V (EU)	0 ~ + 4.99 Wp	21.5 Kg
Series Fuse Rating : 15 A				Diode Rating : 15 A			
Application Class : A				Fire Hazard Rating : C			
For field connections use AWG 12 insulated for min. of 90°C							
IEC 61215, IEC 61730 Compliant		IEC 61701, IEC 62716 Compliant		  			
All Technical Data at Standard Test Conditions: AM=1.5, E=1000 W/m ² , T=25° C subject to measurement Uncertainty							
CAUTION !	This unit produces electricity when exposed to light. Cover the front surface of the Module with opaque material during installation and handling.						
WARNING !	Before installing, operating and servicing this unit check installation and operating manual. DO NOT connect or disconnect when system is on load. Failure to comply can be hazardous.						Made in India
www.renewsysworld.com							

Fig.5: detail view of the Type label



Fig.6: detail view of the Serial number