

No. 2740_BML

- Test object: **SUNKON Connector BP3 (105008001) (more details on page 9)**
Manufacturer SUNKON
- Applicant: SUNKON GmbH
Dühlfeld 26
31553 Sachsenhagen
Germany
- Type of testing:
➤ Test of the lightning impulse current carrying capability of the test classification N (50 kA 10/350) following the principles of DIN EN IEC 62561-1:2024-05
- Conditioning and aging; Section 6.5
 - Electrical testing; Section 6.6
 - Contact resistance; Section 6.6.2 a)
 - Visual inspection; Section 6.6.2 b)
 - Loosening Torque; Section 6.6.2 d)
- Test result:
➤ **The SUNKON Connector BP3 passed the criteria of test class N of DIN EN IEC 62561-1:2024-05 Chapter 6.6.2 a)/b)/d).**
- **Detailed results on page 12.**
- Contents: 24 pages test report including 19 figures and 3 oscillograms.

Neumarkt, 14.10.2025

Tested by



Julian Süß

Senior Technician

Reviewed by



Daniel Wagner

Senior Technician

Revision: 0

Approved by



Tobias Meyer

Head of DEHN Test Centre



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General Remarks

- This test report only provides information on the test samples submitted for the test and does not examine the lasting quality of the series production.
- This test report does not give the right to use any kind of approval symbol.

Laboratory

Name and address:

DEHN SE
DEHN Test Centre
Hans-Dehn-Str. 1
92318 Neumarkt
Germany

Measurement uncertainty:

The statements of conformity are made, considering the measurement uncertainty for the relevant measurement parameters on basis of ILAC G8:2019 cl. 4.2.1. The information on the measurement uncertainty can be provided on request.

DEHN Test Centre accreditation:



DEHN Test Centre is an accredited test laboratory by German Accreditation Body (DAkkS) according to DIN EN ISO/IEC 17025. The accreditation is valid for the scope listed in the annex of the accreditation certificate D-PL-22157-01-00. www.dakks.de

DEHN Test Centre is a qualified third-party test facility for testing of products under UL's Third-Party Test Data Program.

Further certifications:

- DEKRA Certificate of approval for Customer's Test Facility.
- VDE Certificate of acceptance for the Test Data Acceptance Program (TDAP).

For further information about accreditation, see <https://www.dehn-international.com/en/centre-test-dehn> (QR-Code).

Test record

General information

Test date: 05.09.2025 to 23.09.25

tested by: Mr Michael Bell
Mr Julian Süß

witnessed by: N/A

Test object

Provided by, manufacturer: SUNKON

No. of test objects: 3

Date of receipt of test objects: 04.09.2025

Condition of test objects: The received test objects were new and in a good condition

Description of the test objects: Profile connector for the PV mounting system
SUNKON BP3

- Figure 1 shows the simplified schematic diagram of the test setup.
- Figure 2 shows the test sample with component designations.
- The test samples were subjected to artificial ageing before the electrical test (see test specifications and Figures 3 to 8).
- The figures 9 and 10 show the test setup with the 50 kA 10/350 µs impulse generator.
- The figures 11 to 16 show the test samples before and after the tests.
- Figure 17 shows the measurement of the temperature.
- Figure 18 shows the measurement of the contact resistance.
- Figure 19 shows the measurement of the torque.

Test specification

Test following the principles of IEC 62561-1 Edition 3.0 (2023-03) "Lightning protection system components (LPSC) – Part 1: Requirements for connection components" chapter listed below

- Chapter 6.1 a)/c) – Tests for connection components, on 3 new test samples according to IEC 62561-1, Annex C, Figure C.1.
- Chapter 6.1 b) – The test objects shall be assembled *to the manufacturer instructions / in accordance with the manufacturer instructions* (arrangement, tightening torques).
- Chapter 5.3 → Chapter 6.3 – The marking test for the photovoltaic mounting system is not applied, due to absent markings / the marking is made by moulding, pressing or engraving.
- Chapter 6.4 a) – If not otherwise specified, the conductors and connections of the photovoltaic mounting system must be cleaned with a suitable degreasing agent followed by cleaning in demineralized water and dried.
Deviation: The cleaning of the connections was not applied.
- Chapter 6.4 b) – The used conductors comply with IEC 62561-2. The photovoltaic mounting system are classified as metal installation.
- Chapter 6.4 e) – The test arrangement described in the test report corresponds to the intended use. The tested conductors and connection components shall be used by the customer. The test with the smallest and largest conductor size is not applied.
- Chapter 4.2 → Chapter 6.5 – Conditioning/ageing of the test samples for general use:
Annex D.2 – Salt mist treatment in accordance with IEC 60068-2-52:2017, except clause 7, 10 and 11 which are not applicable → 3 cycles: 2 h spraying at 35° C with salt solution followed by 22 h recovery at 40 °C.
Annex D.3 – Treatment with humid sulphurous atmosphere in accordance with ISO 22479:2019 Method B with a sulphur dioxide volume concentration of 667×10^{-6} → 7 cycles: 8 h heating time at 40 °C in humid atmosphere followed by 16 h recovery.

- Chapter 4.1 → Chapter 6.6.1 – Test with three 10/350 μ s lightning impulse current with following parameters for class N – Normal duty:
 $I_{imp} = 50 \text{ kA} \pm 10 \%$
 $W/R = 625 \text{ kJ}/\Omega -10 \% / +45 \%$
The impulse current reaches the value $I_{imp} \leq 50 \mu\text{s} (T_{imp})$
 $t_d = <5 \text{ ms}$
- The impulse parameters are also defined in the following standard:
IEC 62305-1 Edition 2.0 (2010-12).
- Chapter 6.6.1 – The objects must cool down to approximately ambient temperature before each impulse current load.
- Chapter 6.6.2 a) – Measurement of the contact resistance with a source of at least 5 A, using voltmeter-ammeter method after the last load. The contact resistance after the last impulse current load must be equal or less than 3 m Ω .
- Chapter 6.6.2 b) – Evaluation of the mechanical strength of the test sample: Visual inspection of the test samples for damages, cracks, loose parts or deformation, which would be impairing its normal use.
- Chapter 4.4 b) → Chapter 6.6.2 d) – Determination of the loosening torque after the last 10/350 μ s impulse current. The loosening torque must be greater than 0,25 times and less than 1,5 times of the tightening torque.
- Chapter 4.3 a) → Chapter 6.6.2 g) – The photovoltaic mounting system are not intended to withstand a static-mechanical stress according to IEC 62561-1:2023-03.
- Chapter 4.4 b) → Chapter 6.6.2. g) – The static-mechanical test is not applied for screwing or bolting connection components.

Test setup

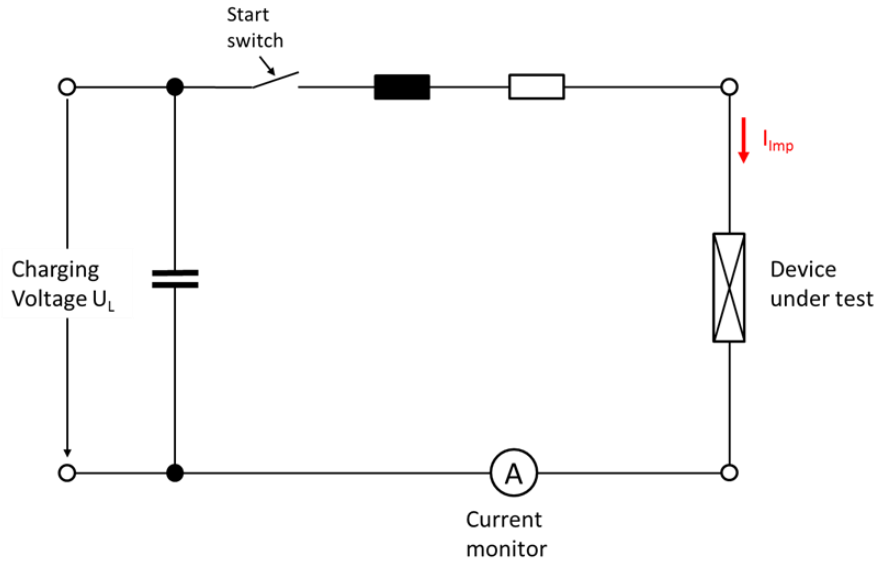


Figure 1: Simplified circuit diagram of the test set-up.

Test-specific remarks

- The mechanical forces acting on the connecting leads may result in loosening terminals. Therefore, it is recommended to check all connections after a direct lightning strike.
- In the test, only the lightning-current capability of the arrangement was tested. All other specifications and wiring regulations are carried out according to the technical specification of the applicant.
- An assessment of the applicability as an air termination system according to IEC 62305-3:2010 „Protection against lightning – Part 3: Physical damage to structures and life hazard“ is not part of this test service.
- An assessment of the separation distance of the down conductor to any near parts according to IEC 62305-3:2010 „Protection against lightning – Part 3: Physical damage to structures and life hazard“ is not part of this test service.
- An assessment of the influence of the lightning current load on the safety function of the test objects is not part of this test service. This assessment will be carried out by applicant.
- When installing the PV system with the tested connecting elements to an existing or surrounding lightning protection system, the requirements of the current standards IEC 62305-3 and IEC 62305-4 must also be observed. If necessary, further measures must be taken. Consultation/close talking with an expert in lightning protection (lightning protection specialist, surveyor, etc.) may be necessary.

Connection components

Connection 1:		SUNKON Connector BP3 (105008001)	Pos. in Figure 2
Components	4 x Self-tapping screw 6 x 25 1 x Connector BP3 (105008001)		1 2
Conductor 1:	Profile BP3-3610 (105007002/exemplary BP3 section) material: aluminium		3
Conductor 2:	Profile BP3-3610 (105007002/exemplary BP3 section) material: aluminium		4

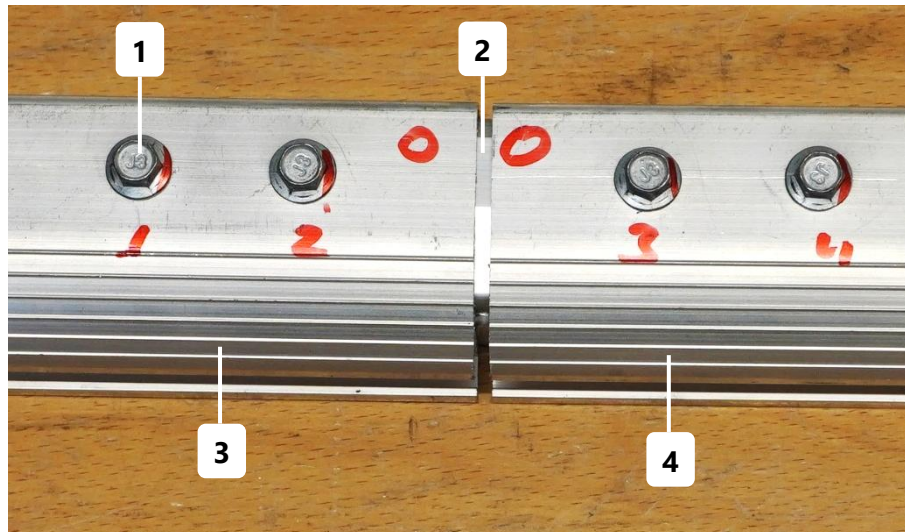


Figure 2: Connection 1 with component designations.

Measurement data

Tolerance ranges

Class N – Normal duty				
Parameter	Unit	min.	target	max.
I	[kA]	45	50	55
W/R	[kJ/Ω]	406,25	625	906,25

Electrical test

Test sample	Impulse no.	I _{imp} [kA]	W/R [kJ/Ω]	T ₁ [μs]	T ₂ [μs]	I _{imp} ≤ 50 μs	W/R _{Td} < 5 ms
TS01 S01	1x 50 kA	50,8	658,8	9,8	350,8	OK	OK
	2x 50 kA	50,7	657,2	9,8	351,9	OK	OK
	3x 50 kA	50,8	657,5	10,0	352,0	OK	OK
TS02 S01	1x 50 kA	50,8	658,0	9,9	352,3	OK	OK
	2x 50 kA	50,8	658,3	9,8	352,4	OK	OK
	3x 50 kA	50,8	659,3	9,9	352,8	OK	OK
TS03 S01	1x 50 kA	50,3	648,0	9,9	353,3	OK	OK
	2x 50 kA	50,8	658,8	9,8	352,7	OK	OK
	3x 50 kA	50,8	658,9	9,8	352,1	OK	OK

Temperature

Test sample	Measurement point/ Connection	before imp. 1	before imp. 2	before imp. 3
		[°C]	[°C]	[°C]
TS01 S01	1	22,5	22,8	22,9
TS02 S01	1	23,1	23,3	23,2
TS03 S01	1	22,9	23,4	23,6

Contact resistance

Test sample	Measurement point/ Connection	After assembly R _ü [mΩ] (informative)	After imp. 3 R _ü [mΩ] (≤ 3)
TS01 S01	1	0,016	0,014
TS02 S01	1	0,016	0,015
TS03 S01	1	0,018	0,017

Torque

Test sample	Measurement point	Tightening torque [Nm]	Loosening torque [Nm]
TS01 S01	Screw 1	13,5	9,1
	Screw 2	12,3 ¹⁾	8,2
	Screw 3	13,5	7,3
	Screw 4	13,5	7,3
TS02 S01	Screw 1	13,5	7,8
	Screw 2	13,5	7,7
	Screw 3	13,5	6,8
	Screw 4	13,5	7,4
TS03 S01	Screw 1	12,9 ¹⁾	7,7
	Screw 2	13,5	7,2
	Screw 3	13,5	5,5
	Screw 4	13,5	7,6

1) Target torque of 13,5 Nm can not be achieved. (over-torque has been exceeded)

Test result

SUNKON Connector BP3 (105008001) (more details on page 9)

Manufacturer SUNKON

➤ **Test sample TS01 S01:**

- The figures 11 and 12 show the test sample before and after the test with 3x 50 kA (10/350 µs).
- After the electrical test, no loose parts or deformation are visible, which would impairing its normal use.
- The contact resistances R_c after the last impulse current were $\leq 3 \text{ m}\Omega$.
- The loosening torque of the screw-connections is greater than 0,25 times and less than 1,5 times of the tightening torque.

The test object **passed** the criteria based on DIN EN IEC 62561-1 chapter 6.6, Class N with 3x 50 kA (10/350 µs) and chapter 6.6.2 a)/b)/d).

➤ **Test sample TS02 S01:**

- The figures 13 and 14 show the test sample before and after the test with 3x 50 kA (10/350 µs).
- After the electrical test, no loose parts or deformation are visible, which would impairing its normal use.
- The contact resistances R_c after the last impulse current were $\leq 3 \text{ m}\Omega$.
- The loosening torque of the screw-connections is greater than 0,25 times and less than 1,5 times of the tightening torque.

The test object **passed** the criteria based on DIN EN IEC 62561-1 chapter 6.6, Class N with 3x 50 kA (10/350 µs) and chapter 6.6.2 a)/b)/d).

➤ **Test sample TS03 S01:**

- The figures 15 and 16 show the test sample before and after the test with 3x 50 kA (10/350 µs).
- After the electrical test, no loose parts or deformation are visible, which would impairing its normal use.
- The contact resistances R_c after the last impulse current were $\leq 3 \text{ m}\Omega$.
- The loosening torque of the screw-connections is greater than 0,25 times and less than 1,5 times of the tightening torque.

The test object **passed** the criteria based on DIN EN IEC 62561-1 chapter 6.6, Class N with 3x 50 kA (10/350 µs) and chapter 6.6.2 a)/b)/d).

➤ **Remark:**

The measurement of contact resistance R_c was informative performed also before the conditioning/ageing process.

Figures



Figure 3: Test sample in the salt mist treatment device.

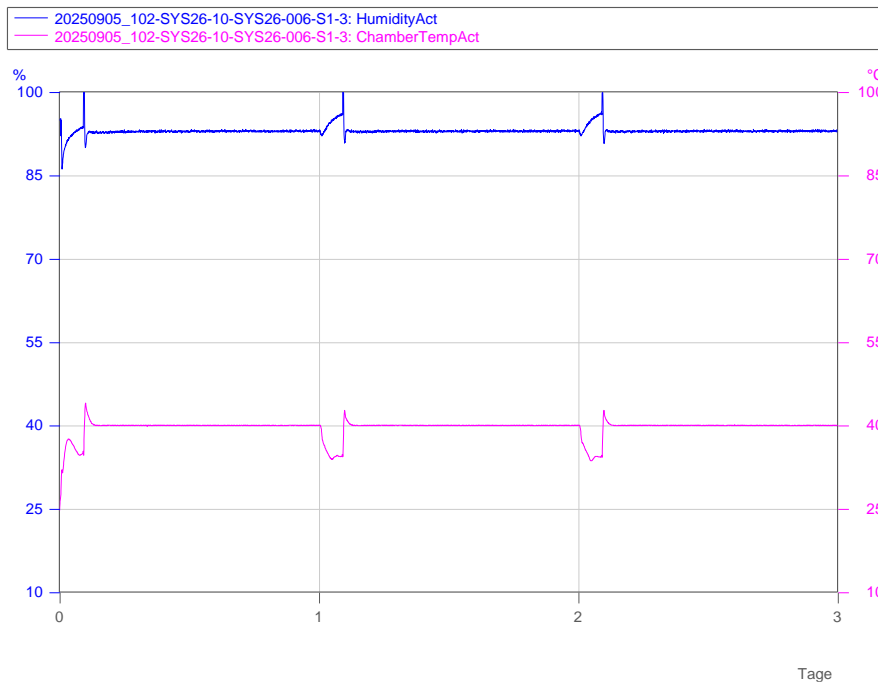


Figure 4: Profile of the salt mist treatment.



Figure 5: Test samples in the humid sulphurous atmosphere device.

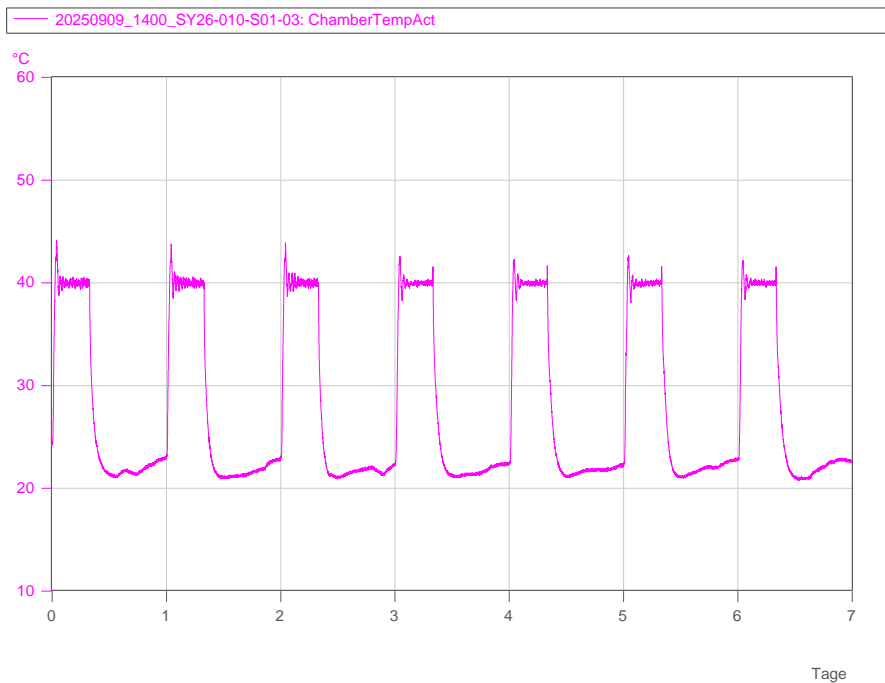


Figure 6: Temperature diagram of the humid sulphurous atmosphere treatment.



Figure 7: Test samples before the conditioning/ageing process.



Figure 8: Test samples after the conditioning/ageing process.



Figure 9: Electrical test – Overall view of the test set-up in the 50 kA (10/350 μ s) Impulse Current Generator.

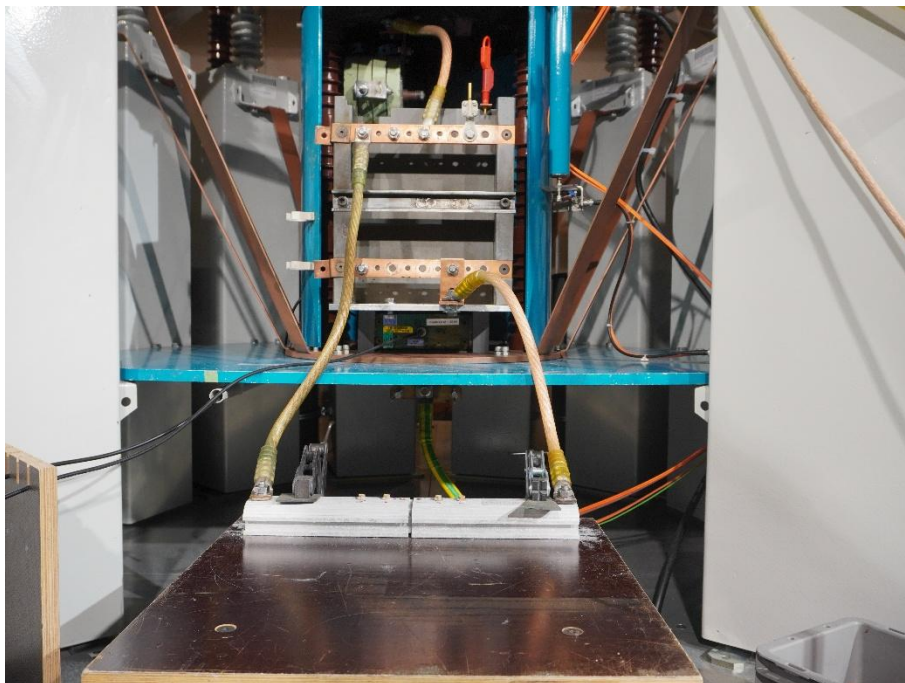


Figure 10: Connection of the generator and the grounded cable.

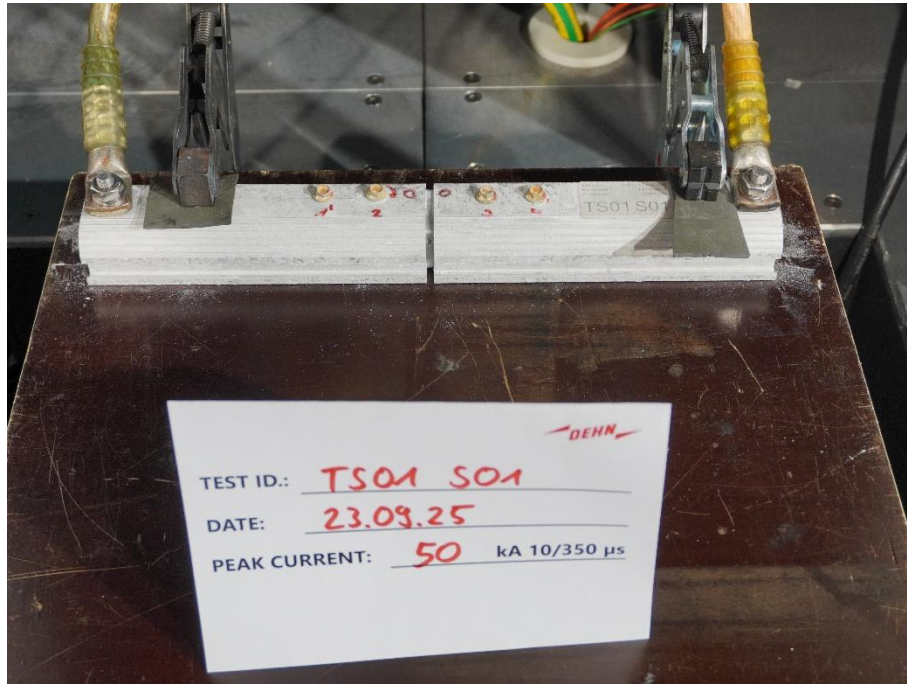


Figure 11: Test sample TS01 S01 before test with 3x 50 kA (10/350 μ s).

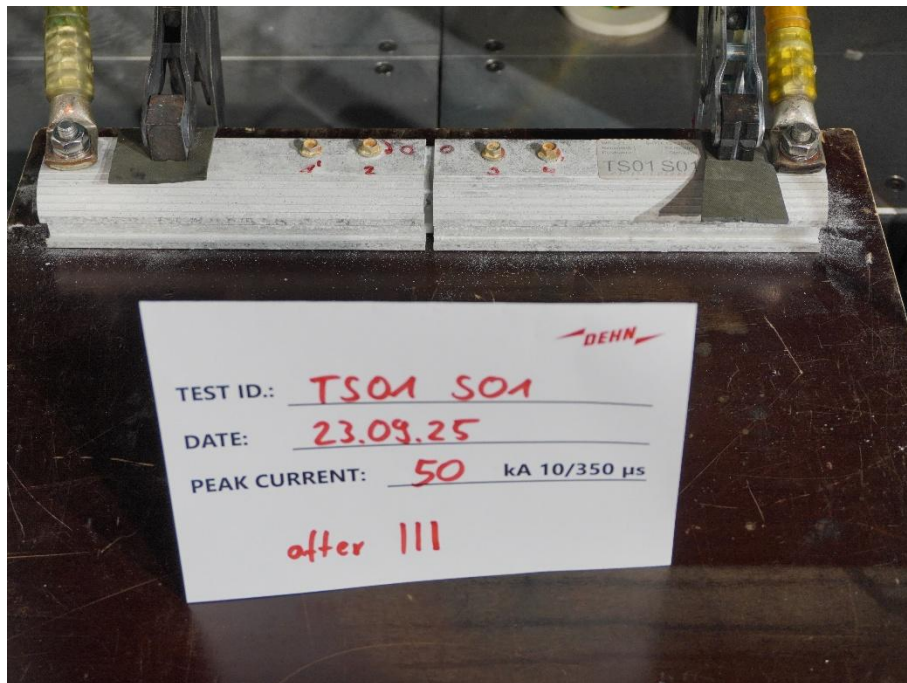


Figure 12: Test sample TS01 S01 after test with 3x 50 kA (10/350 μ s).

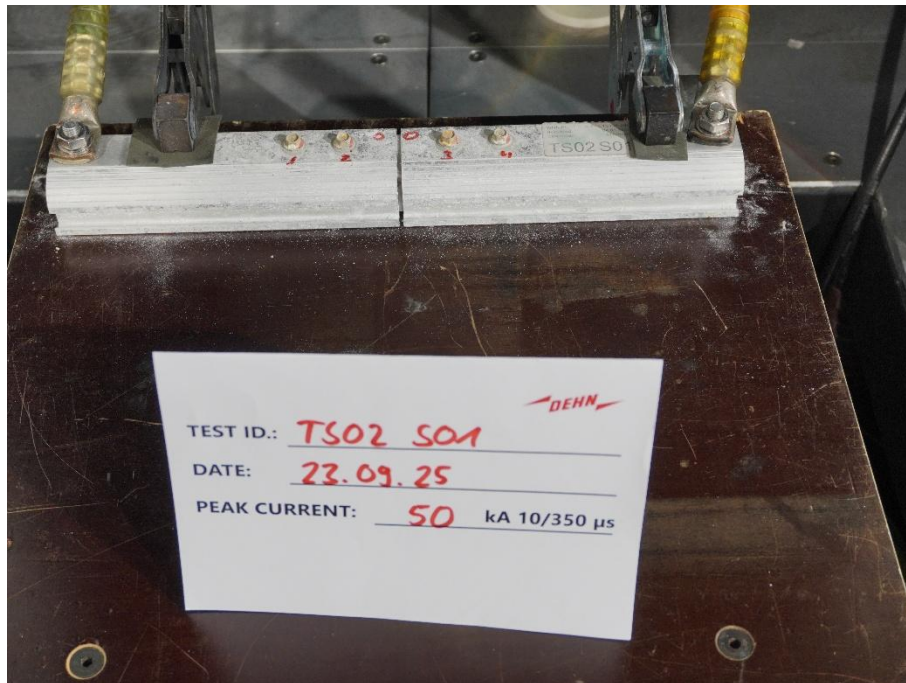


Figure 13: Test sample TS02 S01 before test with 3x 50 kA (10/350 μ s).

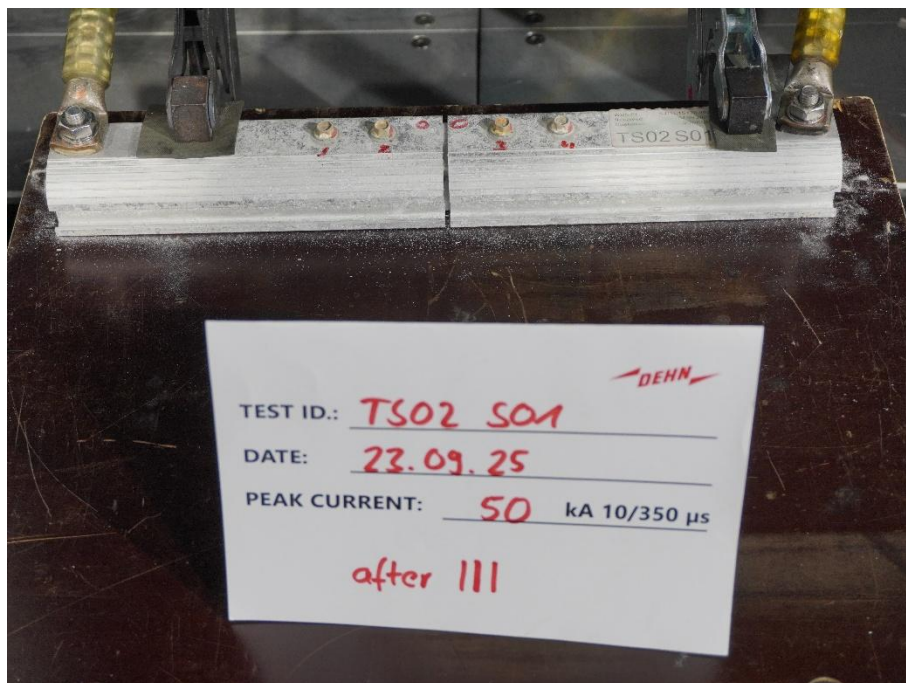


Figure 14: Test sample TS02 S01 after test with 3x 50 kA (10/350 μ s).

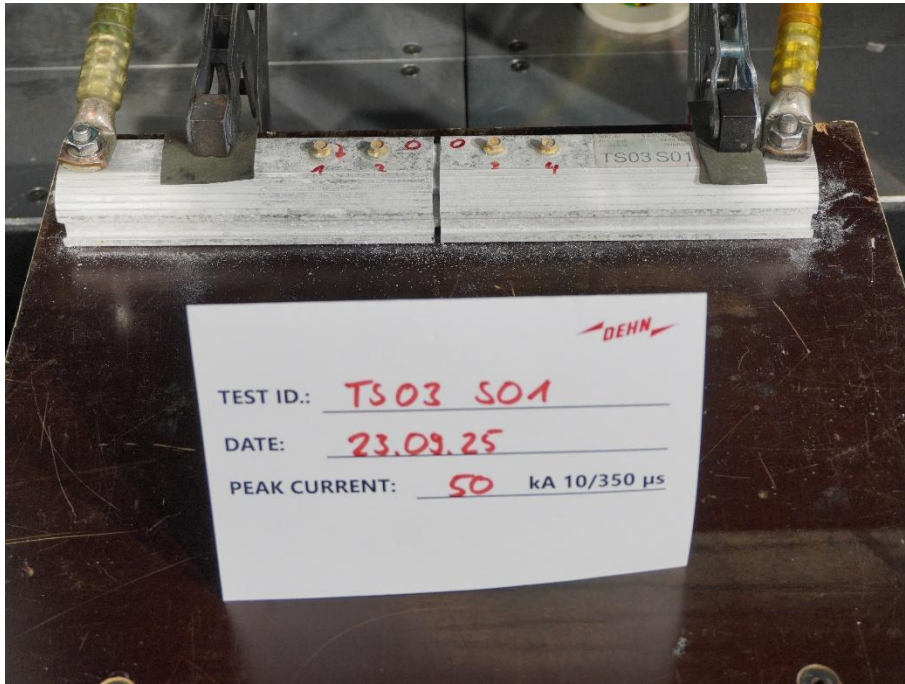


Figure 15: Test sample TS03 S01 before test with 3x 50 kA (10/350 μ s).



Figure 16: Test sample TS03 S01 after test with 3x 50 kA (10/350 μ s).

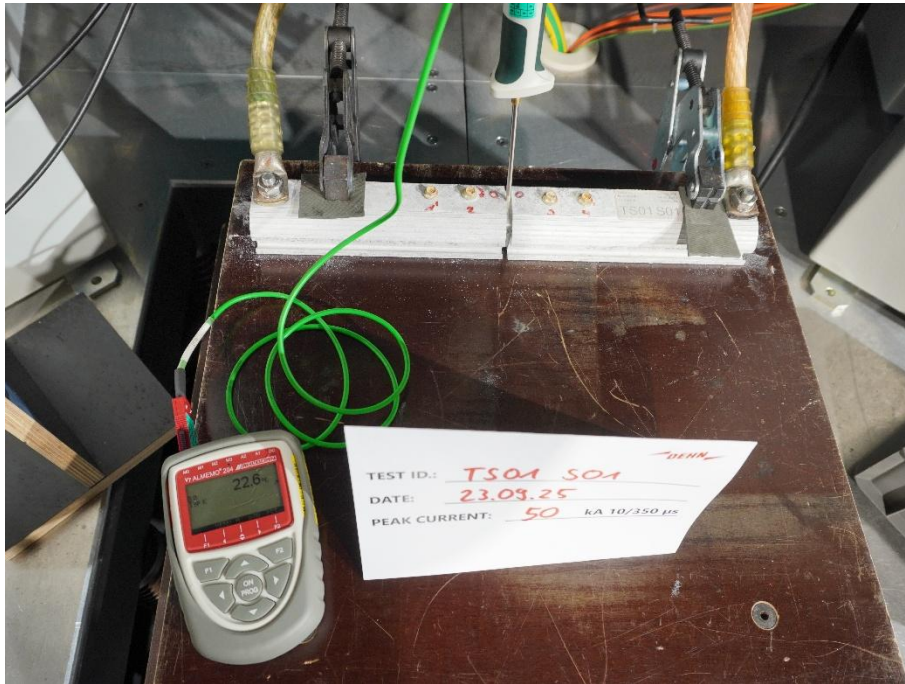


Figure 17: Measurement of test sample temperature.

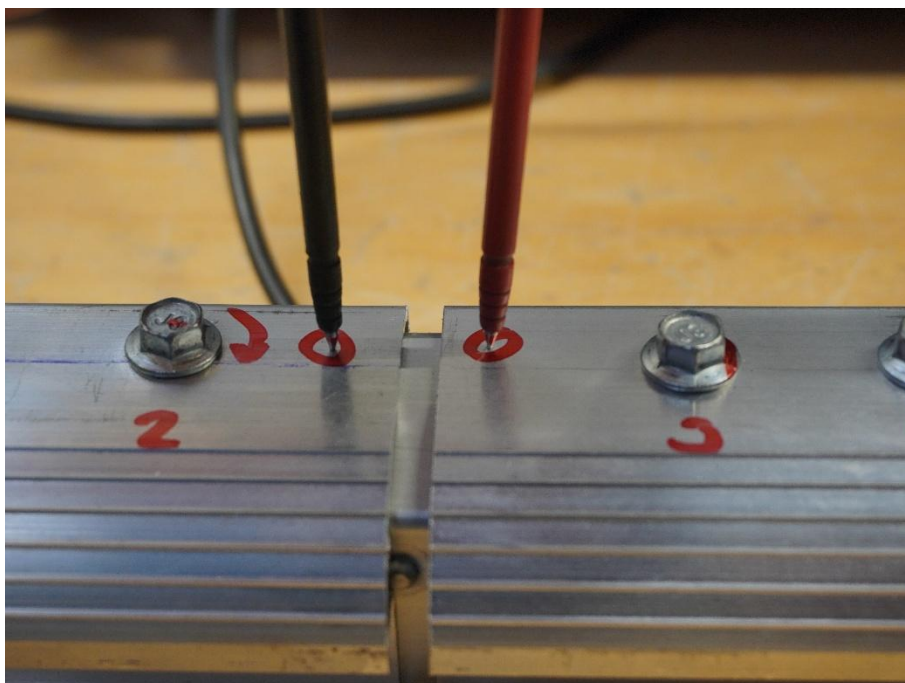
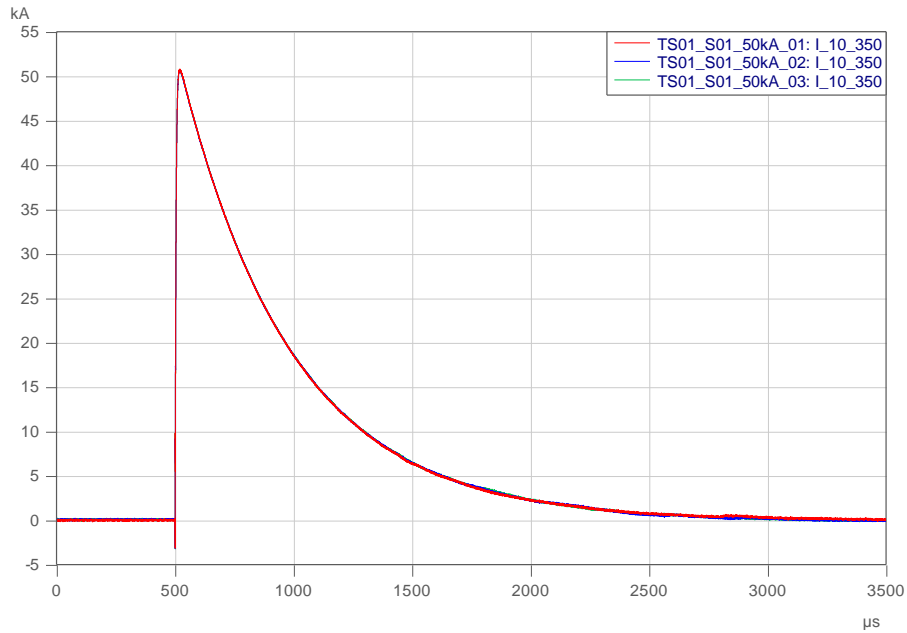


Figure 18: Measurement of contact resistance.

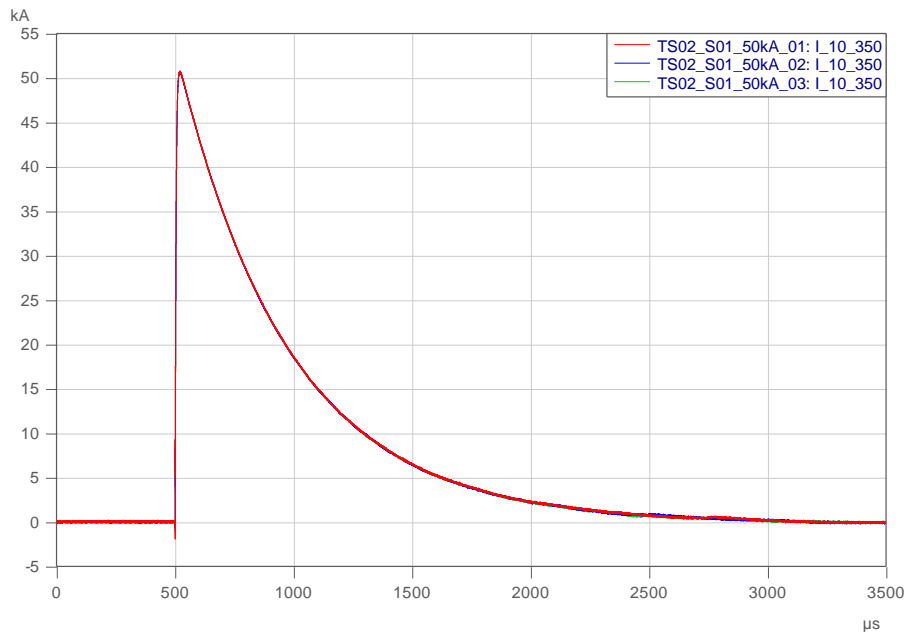


Figure 19: Measurement of torque – exemplary for all screws.

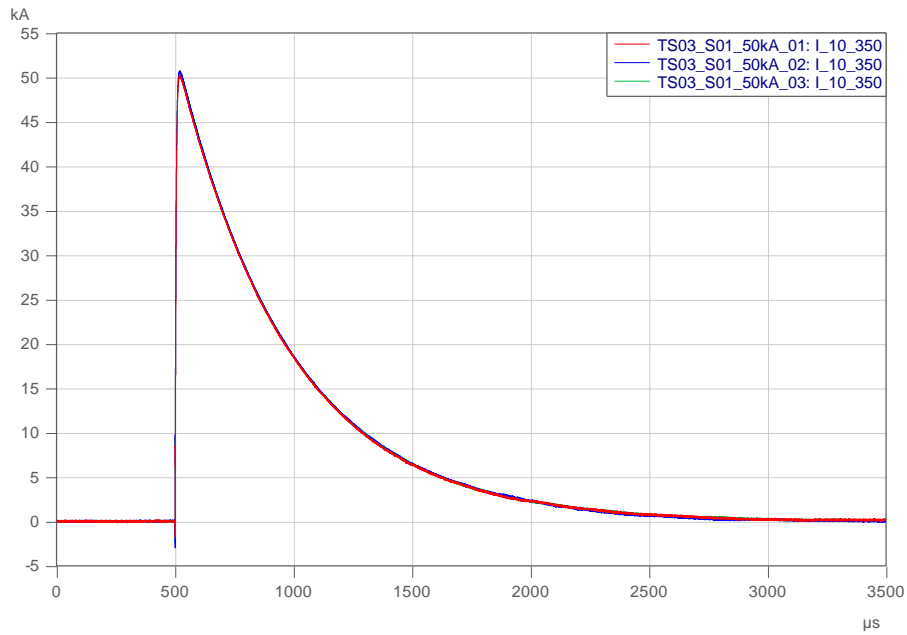
Oscillograms



Oscillogram 1: Test sample TS01 S01: 3x 50 kA (10/350 µs).



Oscillogram 2: Test sample TS02 S01: 3x 50 kA (10/350 µs).



Oscillogram 3: Test sample TS03 S01: 3x 50 kA (10/350 µs).



Test conditions

Date:	Ambient temperature:	Air Humidity (rel.):	Atmospheric Pressure (abs.):
23.09.2025	23,8 °C	40,9 %	968,2 hPa

Measuring equipment

The tests were carried out at the test laboratories of DEHN, Neumarkt.

Type:	Manufacturer:	Model:	ID No.:	Last Cal. / Ver. Date:	Next Cal. / Ver. Date:
Ohmmeter	Megger Group Limited	DLRO100HB-LG1-P2	B4 46119	23.07.2025	23.07.2026
Torque measuring device	JETCO Torque Tools LLC	IL-250I-G2/28 Nm	B4 44691	14.05.2025	14.05.2026
Torque measuring device	JETCO Torque Tools LLC	TTS-2000	B4 45115	N/A ¹⁾	N/A ¹⁾
Salt spray chamber	RSI TestSysteme GmbH & Co.KG	TLC 2000	B4 41995	03.04.2025	03.04.2026
Kesternich chamber	RSI TestSysteme GmbH & Co.KG	Cab 1000	B4 46309	N/A	N/A
Impulse generator	HIGHVOLT Prüftechnik Dresden GmbH	IP 288/24 S	B4 27584	N/A	N/A
Environment gauge	G. Lufft Mess- und Regeltechnik GmbH	OPUS 20 THIP	B4 29472	16.01.2025	16.01.2026
Ohmmeter	Megger Group Limited	DLRO100HB-LG1-P2	B4 45918	21.03.2025	21.03.2026
Temperature sensor	Ahlborn Mess- und Regelungstechnik GmbH	FT01535L0100 / ZTD7 00-FS	B4 46256	03.03.2025	03.03.2026
Oscilloscope	Tektronix GmbH	MSO56	B4 41988	16.12.2024	16.12.2025
Data logger	Ahlborn Mess- und Regelungstechnik GmbH	ALMEMO 204 KSU	B4 40845	N/A	N/A
Current monitor	Pearson Electronics	1423	B4 11858	08.10.2024	09.10.2025

1) The device functions purely as a display, calibration is included in the connected sensor.

End of test report