

# LABORATORY TEST REPORT

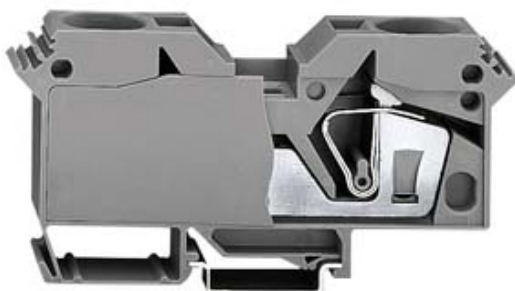
Re: Rail-Mounted Terminal Block, Series 285,  
wired with Sector-Shaped Aluminum Conductor,  
25 mm<sup>2</sup>, from Hong Kong

**1. Vibration test**

**2. Current cycling test acc. to IEC 61545**

Specifications applied: IEC 60068-2-6, 1995; IEC 61545, 01.96

Front-entry 2-conductor through terminal block, for DIN 35 rail, grey, item-No. 285-601



Technical data:

Rated cross section: 35 mm<sup>2</sup>  
Cross section area: 6 mm<sup>2</sup> - 35 mm<sup>2</sup>  
Rated voltage: 800 V / 8 kV / 3  
Rated current: 125 A  
Terminal block width: 16 mm

Sector-Shaped Aluminum Conductor: 25 mm<sup>2</sup> solid  
Tensile strength = 67.4 N/mm

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TESTER: Schönbohm

SGD.: \* **authorized copy**

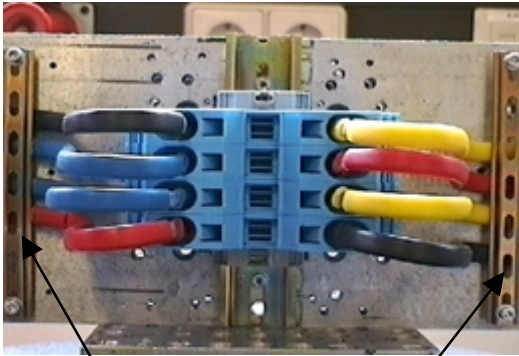
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\* Document created by EDP. Valid without signature.

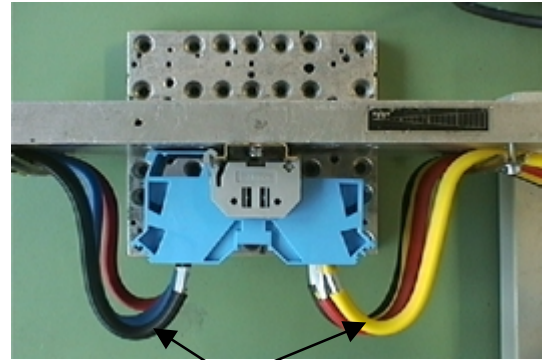
Standard form 4/10

# 1. Vibration test similar to IEC 60068-2-6, 1995

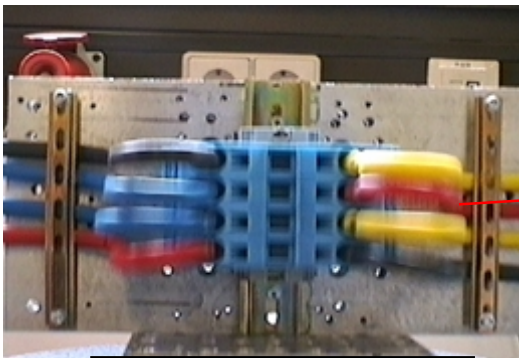
Test arrangement:



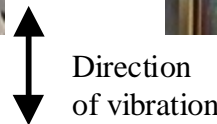
Fixing points of the test conductors



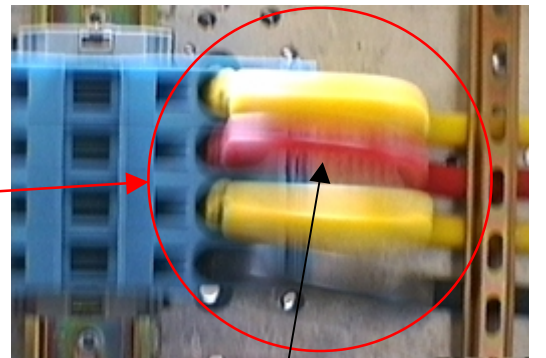
Extra long conductor loops which make possible an extremely wide movement of the conductors in case of high acceleration.



Vibration tabl



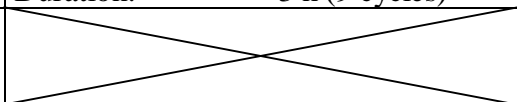
Direction of vibration



**Extreme movement of the aluminium conductors (> 7 mm)**

The terminal blocks are wired by means of conductors and, according to the test arrangement described above, fixed to the vibration table.

Use WAGO contact paste „Alu-Plus“ (item-No. 249-130) when connecting aluminium wires in WAGO spring clamp terminal blocks.

Test arrangement	Vibration stress	
	at fixed frequency	by sweeping
CAGE CLAMP connections of the terminal blocks	Frequency: 50 Hz Amplitude: 1 mm Acceleration: 100 m/s <sup>2</sup> (10 g) Duration: 10 h	Frequency range: 5 Hz - 2000 Hz 1 cycle: (5 - 2000 - 5 Hz) duration: 20 min. Acceleration: 100 m/s <sup>2</sup> (10 g) Duration: 3 h (9 cycles)
I) * without „Alu-Plus“ contact paste	Terminal block: Item-No. 285-604 Test conductor: 25 mm <sup>2</sup> solid	
II) filled with „Alu-Plus“ contact paste	Terminal block: Item-No. 285-604 Test conductor: 25 mm <sup>2</sup> solid	

\* Only for comparison.

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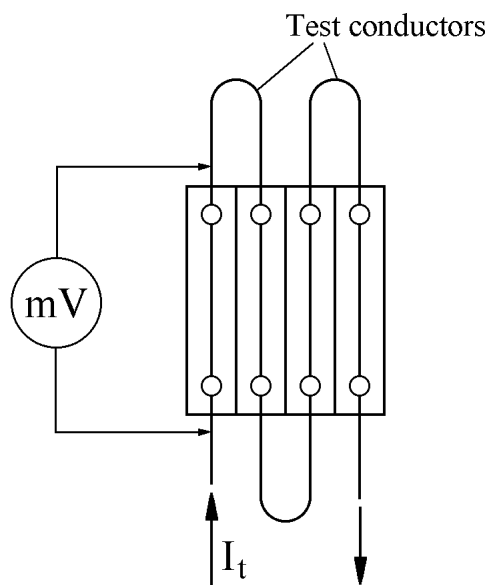
Before and after

- 1 h, 2 h, 5 h, 10 h vibration stress at fixed frequency (test arrangement I)
- 10 h vibration stress at fixed frequency and afterwards 3 h vibration stress by sweeping (test arrangement II)

the voltage drop  $\Delta U$  per through connection is measured.

After the vibration stress a visual control of the conductor at the clamping unit of the CAGE CLAMP is carried out.

Test arrangement for the voltage drop measurement:



Voltage drop measurement similar to EN 60947-7-1, 1991, clause 8.3.2.

Test current  $I_t$ : 9,9 A (1/10 rated current of the conductor acc. to IEC 61545, 01.96, table 8)

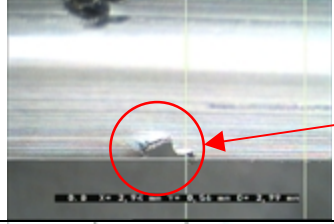




The test is considered to be successfully completed, if the voltage drop after the test is not higher than 50 % compared to the voltage drop before the vibration test and if the value of 3,2 mV per through connection is not exceeded.

After the test no conductor shall be damaged in such a way as to render it unfit for further use.

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Test result: Test arrangement I) CAGE CLAMP connections of terminal blocks blocks without „Alu-Plus“ contact paste

Terminal block Item-No.	Test conductor Aluminium	Test current [A]	Vibration stress	Test sample No.		Voltage drop $\Delta U$ per through connection [mV]	Visual control of the depth of the imprint left by the CAGE CLAMP in the conductor	Depth of the notch [mm]
285-604	25 mm <sup>2</sup> solid	9.9	fixed frequency 50 Hz  10 g	1	when new	2.4		
				2		2.3		
				3		2.5		
				4		1.8		
				1	after 1 h	1.7		0.56
				2		1.7		
				3		2.0		
				4		1.7		
				1	after 2 h	1.8		0.56
				2		1.7		
				3		2.1		
				4		1.8		
				1	after 5 h	2.3		0.60
				2		1.6		
				3		2.2		
				4		1.8		
1	after 10 h	2.3		0.61				
2		1.6						
3		2.2						
4		1.8						

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TESTER: Schönbohm

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Test arrangement II) **CAGE CLAMP connections of terminal blocks filled with „Alu-Plus“ contact paste**

Terminal block Item-No.	Test conductor Aluminium	Test current [A]	Vibration stress	Test sample No.	Duration of test	Voltage drop $\Delta U$ per through connection [mV]
285-604	25 mm <sup>2</sup> solid	9.9	<b>fixed frequency</b>  50 Hz  10 g	1	when new	1.3
				2		1.5
				3		1.5
				4		1.6
			1	after 10 h	1.2	
			2		1.3	
			3		1.3	
			4		1.3	
			<b>by sweeping</b>  5 Hz - 2000 Hz  10 g	1	after 13 h	1.1
				2		1.2
				3		1.1
				4		1.3

**Visual control of the depth of the imprint left by the CAGE CLAMP in the conductor:**



Depth of the notch after 13 h vibration stress: 0.34

**Result:**

The maximum voltage drop of 3.2 mV per through connection at 1/10 rated current admissible acc. to IEC 60 947-7-1, 1989, clause 8.3.2, is not exceeded.

The increase of voltage drop after the vibration test compared to the value before the vibration test is in all cases much less than 50 %.

After the test no conductor is damaged in such a way as to render it unfit for further use.

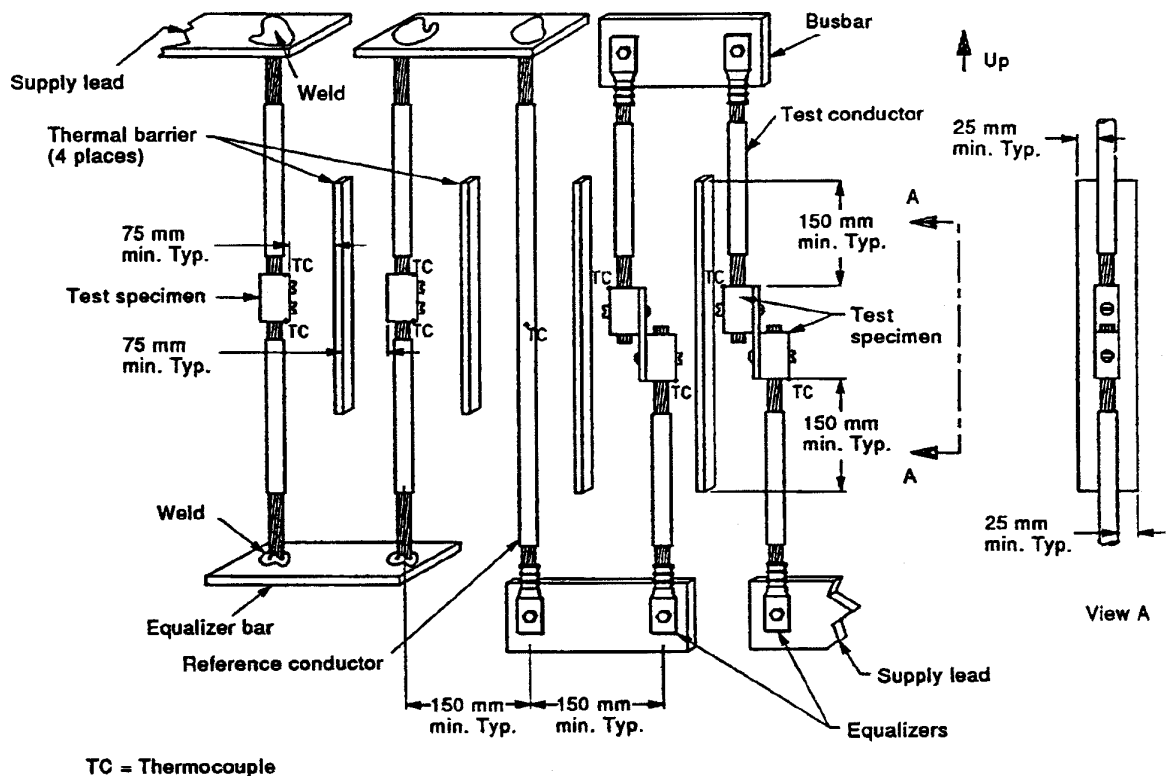
**The vibration test similar to IEC 60068-2-6, 1995, is passed.**

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## 2. Current-cycling test similar to IEC 61545, 01.96, clause 11.7

Test arrangement:



4 test samples are wired with aluminium conductors corresponding the above test arrangement.

2-conductor-through  
terminal block: Item-No.: 285-601

Test conductor: 25 mm<sup>2</sup> sector-shaped aluminium conductor, solid

Length of the  
test conductor: 300 mm (From the point of entry to the clamping unit until to the equalizer bar.)  
600 mm (Reference conductor)

The temperature rise  $\Delta T_{\max}$  is measured at each clamping unit of the test samples and at the midpoint of the reference conductor.

Number of cycles: 500

Ambient temperature:  $(20 \pm 5) ^\circ\text{C}$

1 cycle: 1 h test current „ON“ / 1 h test current „OFF“

Test current: 99 A

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Temperatures shall be recorded for at least one cycle of each working day, and after approximately 25, 50, 75, 100, 125, 175, 225, 275, 350, 425 and 500 cycles.

The test is considered to be successfully completed when  
 - the temperature rise  $\Delta T_{\max}$  does not exceed 110 K and  
 - the stability factor S does not exceed  $\pm 10$  K.

Test result:

Note: Before the conductor connection the opening clamping units are filled with „Alu-Plus“ contact paste.

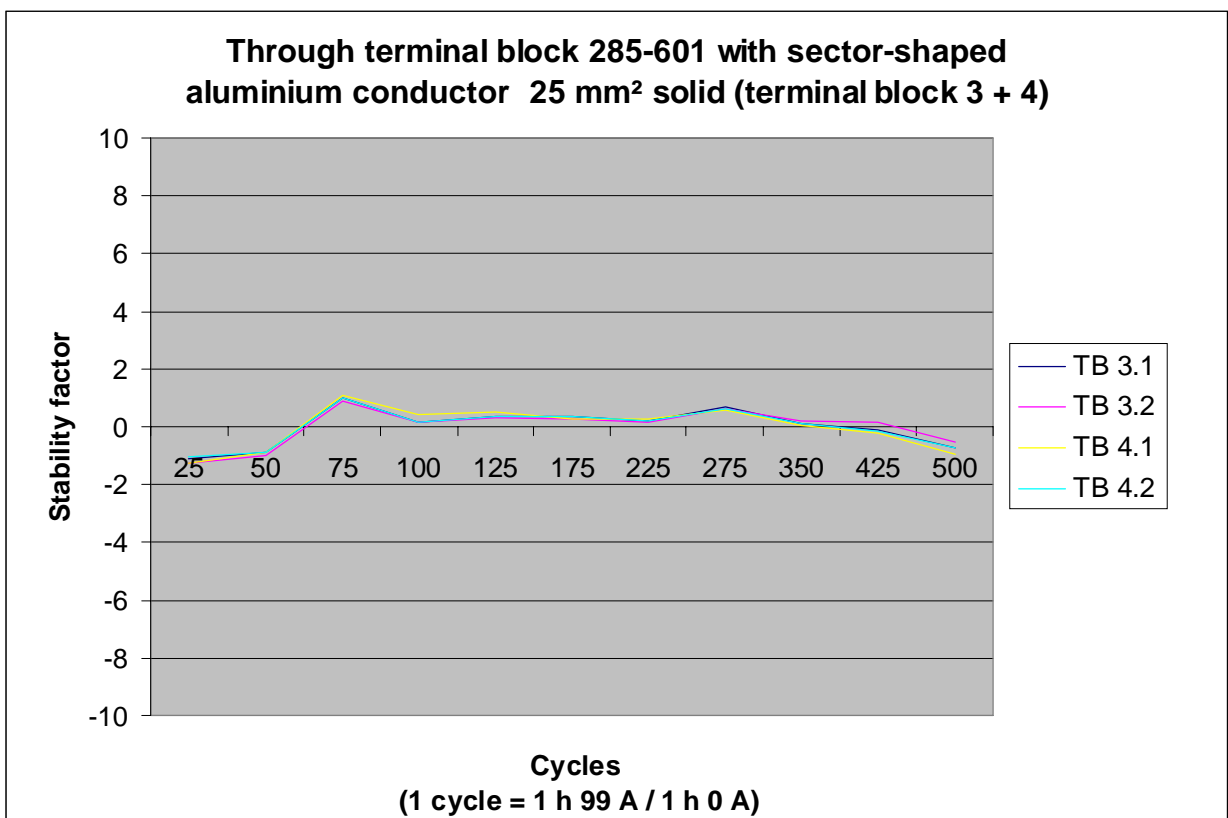
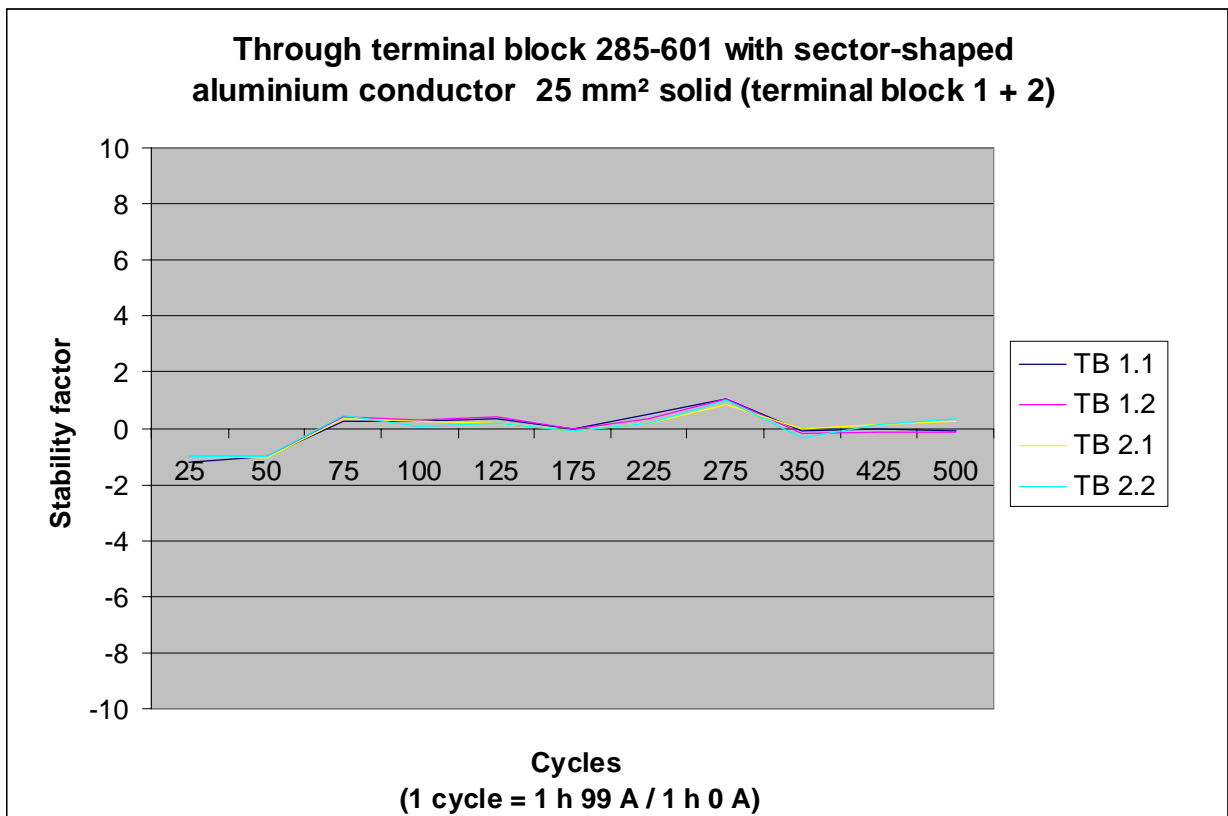
Through terminal block	Conductor cross section solid	Test current $I_t$	Test sample		Maximum temperatur during the test (25 – 500 cycle) [°C]	Stability factor S during the test (25 – 500 cycle)									
			No.:	Clamping unit		min.-value [K]	max.-value [K]								
Item-No.:	[mm <sup>2</sup> ]	[A]	No.:	Clamping unit	[°C]	min.-value [K]	max.-value [K]								
								285-601	25	99	1	1 2	46.9 47.1	- 1.20 - 0.98	1.03 1.03
								2	1 2	46.9 47.7	- 1.06 - 1.01	0.83 0.98			
								3	1 2	46.7 47.9	- 1.09 - 1.25	0.98 0.91			
								4	1 2	46.5 46.8	- 1.24 - 1.17	1.10 1.09			

The course of the stability factor on each test sample between the 25. cycle and 500. cycle is reproduced on the following pages in form of graphs.

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Course of the stability factor of the test samples between the 25. cycle and the 500. cycle:



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Result:

The maximum admissible temperature rise  $\Delta T_{\max} \leq 110 \text{ K}$  are met by all test samples with a sufficient safety margin.

The maximum admissible stability factor  $S \pm 10 \text{ K}$  are met by all test samples with a sufficient safety margin.

**The current-cycling test** similar to IEC 61545, 01.96, Pkt. 11.7, **is passed.**

Findings:

All test results are satisfactory.

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