

Kalibrierlaboratorium für elektrische, mechanische und dimensionelle Größen  
Calibration laboratory for electrical, mechanical and dimensional measurand

## Kalibrierschein Calibration Certificate

Kalibrierscheinnummer  
Number of Calibration Certificate

6708050286

<b>Auftraggeber</b> <i>Customer</i>	<b>Trescal TIS MOTROLOGIE SLG</b> <b>26 Avenue Champollionin BP 118</b> <b>FR-31037 Toulouse</b>	Die Kalibrierung erfolgt durch den Vergleich mit Normalen oder Messung auf Normalmesseinrichtungen, die auf die Nationalen Normale zurückgeführt sind, mit denen die physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI) dargestellt werden. Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.
<b>Auftragsnummer</b> <i>Order No.</i>	<b>ES 91424</b>	
<b>Gegenstand</b> <i>Object</i>	<b>Accelerationsensor</b>	
<b>Hersteller</b> <i>Manufacturer</i>	<b>PCB</b>	
<b>Typ</b> <i>Type</i>	<b>M350D02</b>	Dieser Kalibrierschein wurde elektronisch erstellt und ist ohne Unterschrift und Stempel gültig.
<b>Fabrikat/Seriennummer</b> <i>Serial number</i>	<b>43988</b>	Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung des ausstellenden Kalibrierlaboratoriums.  The calibration is performed by comparison with standards or measurement on instruments that are traceable to National Standards which realize the units of measurement according to the International System of Units (SI).  The user is obliged to have the object recalibrated at appropriate intervals.
<b>Nutzer-ID</b> <i>User-ID</i>	<b>43988</b>	
<b>Inventarnummer</b> <i>Stock number</i>		
<b>Schlüsselnummer</b> <i>Key number</i>	<b>008037430300</b>	
<b>Standort</b> <i>Location</i>		This calibration certificate may not be reproduced other than in full except with the permission of the issuing laboratory. This calibration certificates is produced with and electronic system. This calibration certifacte without signature and seal are valid.
<b>Prüfauftragsnummer</b> <i>Test Order No.</i>	<b>6708050286</b>	
<b>Datum der Kalibrierung</b> <i>Date of calibration</i>	<b>16.10.2017</b>	
<b>Seitenanzahl des Kalibrierscheins</b> <i>Number of pages of the certificate</i>	<b>5</b>	

State of reception: The measured values were within the range of the specification

Statement: Equipment may be used without exception

<b>Ausstellungsdatum</b> <i>Print Date</i>	<b>Sachbearbeiter</b> <i>Person in charge</i>	<b>Leiter des Kalibrierlabor</b> <i>Head of the calibration laboratory</i>
16.10.2017	Dietz	Markovic
Trescal GmbH Tel (0711) 553651-0	Limburgstraße 6 Fax (0711) 553651-51	D-73734 Esslingen

Barcode



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Sensor:	Manufacturer	PCB	Typ	M350D02	
	Serial-Nr.	43988			

### 1. Object

The calibration device is an **Accelerationsensor**.

### 2. Measurement procedure

The calibration is based on a compare between calibration device and the standard.

### 3. Equipment

The following equipment was used for the calibration:

Verwendete Normale <i>Standards used</i>	Hersteller <i>Manufacturer</i>	Typ <i>Type</i>	Serien/Inv.-Nr. <i>Serial/ Inv. No.</i>	Kalibriert am <i>Calibration at</i>	Kalibrierschein-Nr. <i>Calibration Cert. No.</i>
Shock calibrator	Endevco	2925	AB92	23.02.2017	0698 D-K-15183-01-00 2017-02
Acceleration standard	Endevco	2270	10355	21.02.2017	0697 D-K-15183-01-00 2017-02
Amplifier	Spektra GmbH	SRS 35	200427	22.02.2017	WK Spektra GmbH 17-0356
Scope	National Instruments	NI 5114	-	23.02.2017	0698 D-K-15183-01-00 2017-02

Used software CS18 Schockkal Version 1.2

### 4. Conditions

During the calibration the following conditions was actual:

Umgebungsbedingungen <i>Environmental conditions</i>	Temperatur <i>Temperature</i>	20,2 °C	Rel. Feuchte <i>Rel. Humidity</i>	54 %	Luftdruck <i>Air Pressure</i>	981 hPa
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1. Position of the calibration device in the earth field: **Vertikal**

2. Mounting of calibration device:

Screw adapter: torque **Nm**  
 Additive glue: glue: **Loctite**  
 Other:

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### 3. Technical details of the connecting cable:

Manufacturer:

Typ:

Length: **m**

Capacity: **pF**

Connector: **Microdot**

### 4. Sensitivity was calculated at following values (Gravitational acceleration $g_n = 9,80665 \text{ m/s}^2$ )

Acceleration peak in g: **760,7**

Pulse duration  $t_{1, 10\%}$  : **0,556 ms**

### 5. Measured voltage: **10,255 V**

### 6. Amplifier

#### 6.1. Charge amplifier of the standard

Channel of standard: **1**

Amplified factor: **16**

#### 6.2. Amplifier calibration device

Channel of calibration device: **2**

Amplified factor: **32**

Current: **4 mA**

### 8. Scope

Channel from standard: **1**

Channel from calibration device: **2**

Measuring range channel 1: **10 V**

Measuring range channel 2: **10 V**

Frequency of measure: **2,9 MHz**

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## 5. Results of measurement

The calibrated value is sensitivity.  
Following results were measured:

### Sensitivity

Average value (from 5 values): **0,1025 mV/g**

Standard deviation in %: **0,135**

Calibration Nr.	Shock amplitude in g	Sensitivity S in mV/g	Pulse duration in ms
1	744,2	0,1025	0,556
2	744,4	0,1032	0,585
3	750,2	0,1011	0,554
4	760,7	0,1023	0,555
5	758,0	0,1036	0,584

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## 6. Uncertainty of measurement

The uncertainty of measurement is: 5,0 %.

The uncertainty of the used normals, is the standard deviation with (k=2) and P=95%.

## 7. Statement of conformity

The statement of conformity is in following to the DIN EN ISO 14253-1 according to Trescal-KUNO variant D.

## 8. Remarks