OPERATION MANUAL

High-Precision Resistance Decade
1406, 1407

Manufacturer:
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EU-Declaration of conformity (in accordance with EN ISO/IEC 17050-1:2010)

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Issuer’s name: burster präzisionsmesstechnik gmbh & co kg

Anschrift des Ausstellers: Talstr. 1-5
Issuer’s address: Talstr. 1-5 76593 Gernsbach, Germany

Gegenstand der Erklärung: Präzisions-Widerstands-Dekade
Object of the declaration: High-Precision Resistance Decade and Calibrator

Modellnummer(n) (Typ): 1406; 1407
Model number / type: 1406; 1407

Diese Erklärung beinhaltet obengenannte Produkte mit allen Optionen
This declaration covers all options of the above product(s)

Das oben beschriebene Produkt ist konform mit den Anforderungen der folgenden Dokumente:
The object of the declaration described above is in conformity with the requirements of the following documents:

<table>
<thead>
<tr>
<th>Dokument-Nr.</th>
<th>Titel</th>
<th>Ausgabe</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011/65/EU</td>
<td>Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten</td>
<td>2011</td>
</tr>
<tr>
<td>2014/35/EU</td>
<td>Richtlinie zur Harmonisierung der Rechtsvorschriften der Mitgliedsstaaten über die Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt</td>
<td>2014</td>
</tr>
<tr>
<td>2014/30/EU</td>
<td>Richtlinie zur Harmonisierung der Rechtsvorschriften der Mitgliedsstaaten über die Elektromagnetische Verträglichkeit</td>
<td>2014</td>
</tr>
<tr>
<td>EN 61010-1</td>
<td>Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte – Teil 1: Allgemeine Anforderungen</td>
<td>2010 + Cor.:2011</td>
</tr>
</tbody>
</table>

This document is valid without a signature.

Gernsbach 20.04.2016 i.V. Christian Karius
Ort / place Datum / date Quality Manager

Dieses Dokument ist entsprechend EN ISO/IEC 17050-1:2010 Abs. 6.1g ohne Unterschrift gültig
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Table of contents

1. Application .................................................................................................................. 5
2. Description .................................................................................................................. 6
3. Technical data ............................................................................................................. 7
4. Error tolerance, load ............................................................................................... 8
5. Manufacturer Calibration Certificate ....................................................................... 9
6. Housing ...................................................................................................................... 10
7. Maintenance ............................................................................................................... 10
1. Application

The field of application of the precision decade models 1406 and 1407 reaches from general precision measuring to simulation of a variety of measuring transducers. They can be used to control complex applications, for the development in resistance networks and in circuits and also as a reproducible variable in the laboratory and test applications. These decades meet the requirements of all those diverse functions and the resulting demands. Traceability according to DIN ISO 9000 is therefore guaranteed.
2. Description

The decade resistors are wire-wound resistors and consist of low-capacity and low-conductivity wire coiling made of MANGANIN® resp. ISAOHM®. An especially developed precision stepping switch with high-quality contact materials and optimal brush construction guarantees very good reproducibility.

Please note, that the rotary switch before starting a calibration measurement a number of times have to be moved to the left and right stops.

The high-precision resistance decades model 1406, 1407 are designed to meet the highest demands with regard to precision, temperature and long-term stability.
3. Technical Data

Resistance ranges:  
model 1406  10 x 10 mΩ ... 10 x 10 kΩ  
model 1407  10 x 100 mΩ ... 10 x 100 kΩ  

Zero resistance of the complete resistance box:  < 10 mΩ  

Resistance tolerance:  ± 0.02 % in the main steps, see table below  

Please note, that the rotary switch before starting a calibration measurement a number of times have to be moved to the left and then the right stops.  

Resolution model 1406:  approx. 0.025 °C  
Resolution model 1407:  approx. 0.250 °C  

Calibration:  in Ohm absolute at 23 °C  

Resistance material:  MANGANIN® or ISAOHM®  

Temperature coefficient:  < 10 ppm/K  

Construction of winding:  according Chaperon  

Zero point (model 1406, 1407):  400 ppm/K  

Long-term stability (model 1406, 1407):  < 0.02 % over years  

Power dissipation:  0.4 W/per step = 4 W/decade  

Operating voltage:  max. 500 V  

Test voltage:  2800 V DC  

Design and construction:  according to DIN EN 60477  

Switching arrangement:  short-circuiting between two neighbouring  

Switch positions:  T = 12, limited to 11 steps  

Contact material:  Ag plated on E-Cu, slider pack, solid silver  

Operating moment:  approx. 0.1 Nm  

Dimensions (L x H x D):  433 x 95 x 120 [mm]  

Weight:  approx. 2.8 kg
4. Error tolerance, load

<table>
<thead>
<tr>
<th>Model 1406</th>
<th>Model 1407</th>
<th>Value</th>
<th>Tolerance</th>
<th>Nominal current</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>no</td>
<td>10 x 0.01 Ω</td>
<td>± 5 %</td>
<td>2000 mA</td>
</tr>
<tr>
<td>x</td>
<td>x</td>
<td>10 x 0.1 Ω</td>
<td>± 0.5 %</td>
<td>2000 mA</td>
</tr>
<tr>
<td>x</td>
<td>x</td>
<td>10 x 1 Ω</td>
<td>± 0.1 %</td>
<td>600 mA</td>
</tr>
<tr>
<td>x</td>
<td>x</td>
<td>10 x 10 Ω</td>
<td>± 0.05 %</td>
<td>200 mA</td>
</tr>
<tr>
<td>x</td>
<td>x</td>
<td>10 x 100 Ω</td>
<td>± 0.02 %</td>
<td>60 mA</td>
</tr>
<tr>
<td>x</td>
<td>x</td>
<td>10 x 1 kΩ</td>
<td>± 0.02 %</td>
<td>20 mA</td>
</tr>
<tr>
<td>x</td>
<td>x</td>
<td>10 x 10 kΩ</td>
<td>± 0.02 %</td>
<td>6 mA</td>
</tr>
<tr>
<td>no</td>
<td>x</td>
<td>10 x 100 kΩ</td>
<td>± 0.02 %</td>
<td>2 mA</td>
</tr>
</tbody>
</table>
5. Manufacturer Calibration Certificate

DAkkS Calibration Certificate

The calibration laboratory D-K-15141-01-00 from burster präzisionsmess-
technik is accredited and monitored by the office DAkkS (Deutsche Akkreditierungsstelle) according ISO 17025. It can prove his status by an accreditation certificate and is authorized to issue a calibration certificate with the logo DAkkS and with the logo DKD (Deutscher Kalibrierdienst).

The Calibration Certificate shows the values for the resistance a total of 56/70 values in 10 switch positions of each decade and the inherent relative uncertainty. As experience has show, the relative uncertainty in the upper decades amounts to only 1/5 resp. 1/10 to 1/20 of the respective error tolerance. More precise knowledge of resistance values thus means a veritable increase in value of the instrument.

Order code 14 DKD-1406
Order code 14 DKD-1407

Manufacturer Calibration Certificacte
Please refer to DAkkS Calibration, but with a higher uncertainly.

Order code 14WKS-1406
Order code 14WKS-1407
6. Housing

For the preservation the small contact resistance and to the prolongation of service life should the switch contacts from time to time be cleaned. After this should be cared with contact protective fat.

7. Maintenance