



Time Electronics
Calibration, Test and Measurement

User Manual

1065 Power Resistance Decade Box

Version 1.2
11-22

Time Electronics Ltd

Unit 5, TON Business Park, 2-8 Morley Road,
Tonbridge, Kent, TN9 1RA, United Kingdom.

T: +44 (0) 1732 355993 | F: +44 (0) 1732 350198
mail@timeelectronics.co.uk | www.timeelectronics.com

© 2022 Time Electronics Ltd.

All rights reserved.

Nothing from this manual may be multiplied, or made public in any form or manner, either electronically or hard copy, without prior written consent from Time Electronics Ltd.

This also applies to any schematics, drawings and diagrams contained herein.

This manual provides operating and safety instructions for the Time Electronics product.

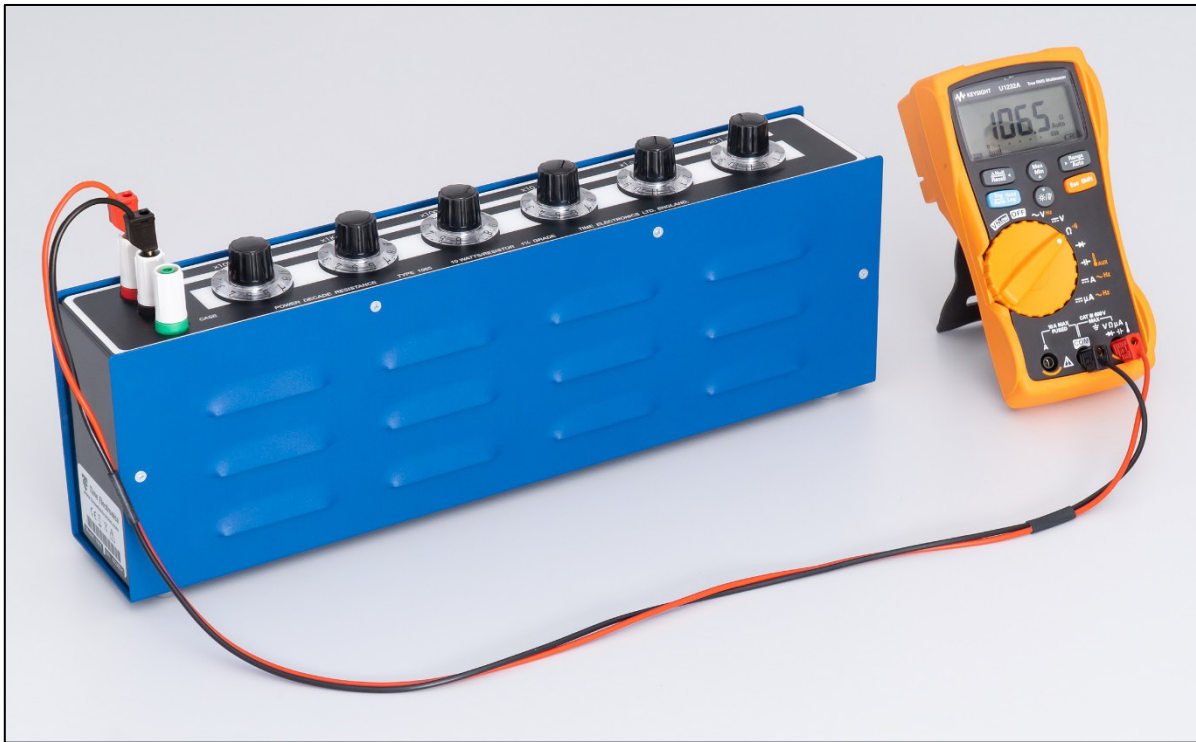
To ensure correct operation and safety, please follow the instructions in this manual.

Time Electronics reserves the right to change the contents, specifications and other information contained in this manual without notice.

Contents

1	Introduction.....	2
2	Specifications	3
3	Operation.....	4
3.1	Safety Precautions	4
3.2	Front Panel Controls and Connections.....	4
3.3	Situating the Instrument.....	5
3.4	Operating Guidelines – Power Rating	6
3.5	Operating Instructions	7
3.6	Resistance Setting Table.....	9
4	Warranty and Servicing.....	10

1 Introduction



A power resistance decade box designed to meet the standard for industrial use and technical education purposes. Housed in a robust ventilated case, the 1065 can withstand arduous use whilst maintaining accuracy and reliability.

The slimline design means it takes up minimum bench space and is easily transportable. The high dissipation of 10 watts make the 1065 suitable for power electronics applications. The 500 V maximum working voltage is ideal for select-on-test use in high voltage circuits.

Features

- 0.1 Ω to 122 k Ω
- 1 % accuracy
- 10 W total dissipation for any setting
- 500 V maximum working voltage
- In-line readout
- Mechanically and electrically robust
- Fully screened
- Safety terminals
- For resistance substitution in high voltage circuits
- Suitable for testing and checking meters

2 Specifications

Range / Resolution0 to 122 k Ω / 0.1 Ω steps.

Number of decades6. Each settable from 1 to 11.

Accuracy0.1 Ω decade: $\pm 5\%$.
1 Ω , 10 Ω , 100 Ω , 1 k Ω , 10 k Ω decades: $\pm 1\%$.

Residual resistanceLess than 20 m Ω (< 3.3 m Ω / decade).

Voltage ratingMaximum 500 V DC, 353.55 V AC RMS.

Power rating10 W total for any setting.

Temperature coefficient200 ppm/ $^{\circ}$ C.

Connections2 x 4 mm active safety terminals. A third safety terminal is to enable the case to be earthed or connected to either output.

FeaturesVentilated robust metal case and multi-wafer switches for low switch contact resistance.

DimensionsW 390 x H 80 x D 150 mm.

Weight2 kg.

OptionsCalibration certificates:
Traceable (factory) and accredited (ISO 17025).

Country of originUnited Kingdom.

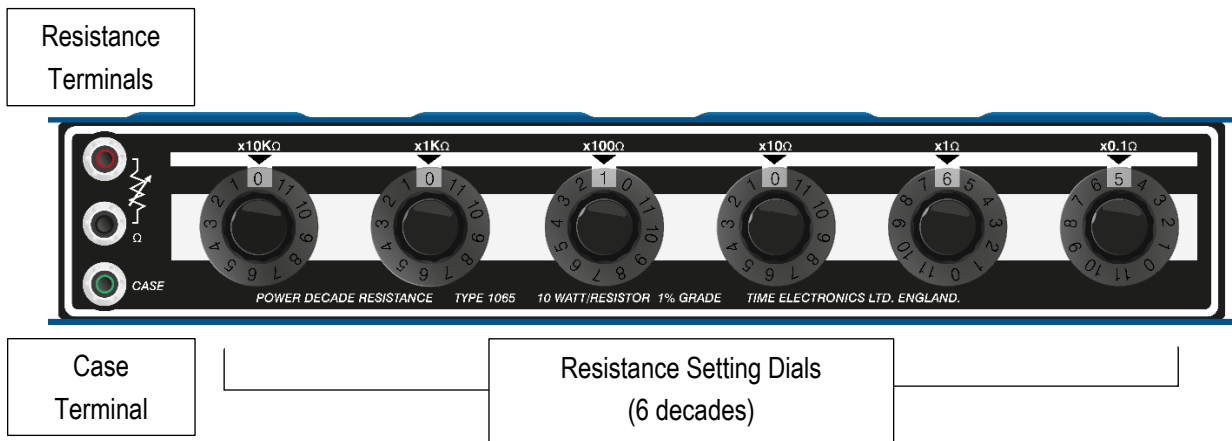
3 Operation

3.1 Safety Precautions



Observe proper safety operational guidelines when working with high voltages. To minimize shock hazard connect the case terminal to an electrical ground. Always take precautions to avoid and prevent contact with live components. Handle the unit with care and use as per the instructions in this manual.

3.2 Front Panel Controls and Connections



- **Resistance Terminals:** Resistance is connected via the safety terminal binding posts that are suitable for twisted stripped wire compression connection, spade terminals, or by 4 mm shrouded or normal plug insertion.
- **Case Terminal:** The case terminal is isolated from the two active resistance terminals. When connected to ground/earth, it may be used as a guard or shield connection, this can help to reduce unwanted electrical noise pickup, and help maintain the case at a safe voltage in certain modes of use.
- **Resistance Setting Dials:** Used for selecting the required resistance by setting the dial to the value of the decade range. Each dial can be set from 0 to 11. The value is clearly displayed in the white setting window below the decade range.

3.3 Situating the Instrument

The 1065 has a ventilated case and should be stored and used in a dry and dust-free environment.

When used, situate the instrument so it has clear non-obstructed space around it on the benchtop. The 1065 features rubber feet on the rear for positioning it with the front panel facing upwards. This is the optimal operating position, allowing ventilation to the unit.

If used on it's side or as a rack mount unit, there must be a minimum clearance of 2 cm around the case slots to ensure adequate ventilation to the instrument.



3.4 Operating Guidelines – Power Rating

The 1065 power rating refers to the fact that all decades are assembled using 10 W wire wound resistors. It does not mean that for a given setting, all resistors can dissipate 10 W each. The maximum dissipation of all resistors selected for a required value of resistance is 10 W in total, this does limit the maximum voltage that can be applied for a given setting.

Example 1:

500 V DC (maximum allowed), resistance 100 k Ω , setting 10 x 10 k Ω , = 0.005A (5 mA).
Power $I^2R = 0.005 \times 0.005 = 0.000025 \times 100,000 = 2.5 \text{ W total or } 0.25 \text{ W per resistor.}$

Example 2:

500 V DC (maximum allowed), resistance 10 k Ω , setting 10 x 1 k Ω , = 0.05 A (50 mA).
Power $I^2R = 0.05 \times 0.05 = 0.0025 \times 10,000 = 25 \text{ W total or } 2.5 \text{ W per resistor.}$

Looking at example 1, the total resistor wattage dissipation amounts to 2.5 W in total, this is below the allowed total of 10 W, so is within the box specification.

So, in example 2, the total wattage dissipation amounts to 25 W, this is above the 10 W total maximum allowed, and is therefore **not** allowed, even though the dissipation of each resistor is 2.5 W.

To bring example 2 into permitted specification, the applied DC voltage is reduced as follows:

Applied voltage = 316.23 V DC.

Current = 0.031623 A (31.623mA)

Power $I^2R = 0.031623 \times 0.031623 = 0.001000 \times 10000 = 10.0 \text{ W total or } 1 \text{ W per resistor,}$
within specification of the 1065.

3.5 Operating Instructions

3.5.1 Connections



Connection to the decade box is via 4 mm safety terminal posts, using 4 mm shrouded or standard plugs. Alternatively, crocodile clips or stripped wire connections can be used.

If the applied voltages exceed 70 V DC, or 30 V AC RMS, then 4mm shrouded safety plugs must be used.

Whatever method is used, the connection must be tight to the terminal posts to avoid introducing unwanted additional resistance.

The red and black active terminals connect to the resistance elements, and the green terminal is connected to the case for screening purposes.



For certain applications, the user may want to connect the case terminal to either of the active terminals. This can be done, but the case would then be at the same potential as the active terminals. The user should be aware that this could be hazardous and safety precautions must be taken to prevent electric shock.

3.5.2 Setting Resistance

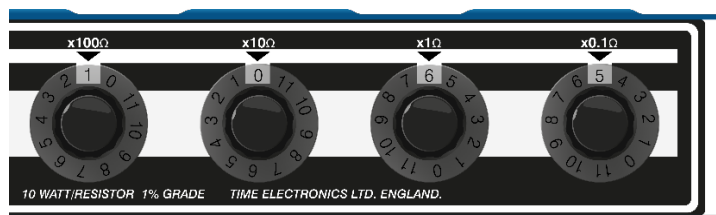


Switch contact resistance has been kept to a minimum by the use of multi-wafer switches, each with four parallel, silver plated, self-wiping contacts. Each range is scaled from 0 to 11, the maximum settable resistance is 122,222.1 Ω .

Use the front panel dials to set the required values according to the decade ranges. The selected value shown in the white setting window under the range arrow. This enables precise setting with a clear unambiguous indication.

For example, to select 1065 Ω :

- Set the 10 k Ω & 1 k Ω dials to 0.
- Set the 100 Ω dial to 1.
- Set the 10 Ω dial to 0.
- Set the 1 Ω dial to 6.
- Set the 0.1 Ω dial to 5.



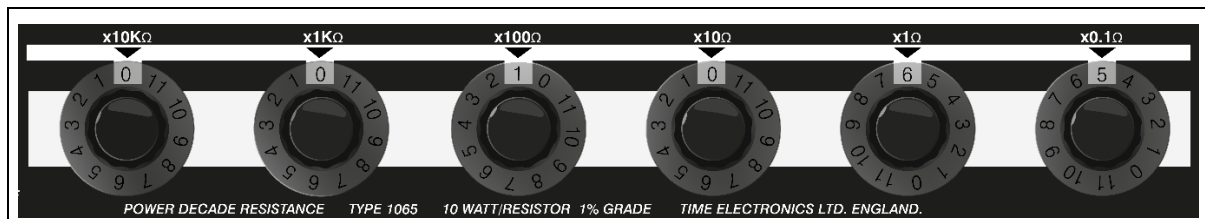
For a quick reference to the setting values of the 1065, please see the Resistance Setting Table on the following page.

Note: All resistance boxes have a residual resistance, meaning that when the dials are set to zero a small resistance remains. If you are making precision measurements or recalibrating the instrument, this residual value must be subtracted from all measurements.

Typical values of residual resistance are shown in the specifications.
For precise values relating to your specific unit, refer to calibration certificate (if ordered).

3.6 Resistance Setting Table

The below table shows the settings of each resistance decade using the dials.



10 kΩ Decade		1 kΩ Decade		100 Ω Decade		10 Ω Decade		1 Ω Decade		0.1 Ω Decade	
Dial	Ω	Dial	Ω	Dial	Ω	Dial	Ω	Dial	Ω	Dial	Ω
0	0 Ω	0	0 Ω	0	0 Ω	0	0 Ω	0	0 Ω	0	0 Ω
1	10 kΩ	1	1 kΩ	1	100 Ω	1	10 Ω	1	1 Ω	1	0.1 Ω
2	20 kΩ	2	2 kΩ	2	200 Ω	2	20 Ω	2	2 Ω	2	0.2 Ω
3	30 kΩ	3	3 kΩ	3	300 Ω	3	30 Ω	3	3 Ω	3	0.3 Ω
4	40 kΩ	4	4 kΩ	4	400 Ω	4	40 Ω	4	4 Ω	4	0.4 Ω
5	50 kΩ	5	5 kΩ	5	500 Ω	5	50 Ω	5	5 Ω	5	0.5 Ω
6	60 kΩ	6	6 kΩ	6	600 Ω	6	60 Ω	6	6 Ω	6	0.6 Ω
7	70 kΩ	7	7 kΩ	7	700 Ω	7	70 Ω	7	7 Ω	7	0.7 Ω
8	80 kΩ	8	8 kΩ	8	800 Ω	8	80 Ω	8	8 Ω	8	0.8 Ω
9	90 kΩ	9	9 kΩ	9	900 Ω	9	90 Ω	9	9 Ω	9	0.9 Ω
10	100 kΩ	10	10 kΩ	10	1 kΩ	10	100 Ω	10	10 Ω	10	1.0 Ω
11	110 kΩ	11	11 kΩ	11	1.1 kΩ	11	110 Ω	11	11 Ω	11	1.1 Ω

4 Warranty and Servicing

Warranty

Time Electronics products carry a one-year manufacturer's warranty as standard.

Time Electronics products are designed and manufactured to the highest standards and specifications to assure the quality and performance required by all sectors of industry. Time Electronics products are fully guaranteed against faulty materials and workmanship.

Should this product be found to be defective, please contact us using the below details. Inform us of the product type, serial number, and details of any fault and/or the service required. Please retain the supplier invoice as proof of purchase.

This warranty does not apply to defects resulting from action of the user such as misuse, operation outside of specification, improper maintenance or repair, or unauthorized modification. Time Electronics' total liability is limited to repair or replacement of the product. Note that if Time Electronics determine that the fault on a returned product has been caused by the user, we will contact the customer before proceeding with any repair.

Product Registration

You can register your product at: www.timeelectronics.com/contact/product-registration. Registering your product will enable us to maintain a record of purchase for your warranty. You can also use the web form to provide feedback about our products and services.

Calibration and Repair Services

Time Electronics offers repair and calibration services for all the products we make and sell. Routine maintenance by the manufacturer ensures optimal performance and condition of the product. Periodic traceable or accredited calibration is available.

Contacting Time Electronics

Online:

Please visit www.timeelectronics.com and select Technical Support from the Contact links. From this page you will be able to send information to the Time Electronics service team who will help and support you.

By phone:

+44 (0) 1732 355993

By email:

mail@timeelectronics.co.uk

Returning Instruments

Prior to returning your product please contact Time Electronics. We will issue a return merchandise authorization (RMA) number that is to accompany the goods returning. Further instructions will also be issued prior to shipment. When returning instruments, please ensure that they have been adequately packed, preferably in the original packing supplied.

Time Electronics Ltd will not accept responsibility for units returned damaged.

Please ensure that all units have details of the service required and all relevant paperwork.

Send the instrument, shipping charges paid to:

Time Electronics Ltd

Unit 5, TON Business Park, 2-8 Morley Road,
Tonbridge, Kent, TN9 1RA.
United Kingdom.

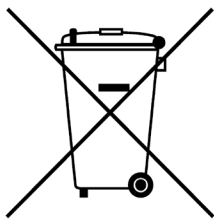
Tel: +44(0)1732 355993

Fax: +44(0)1732 350198

Email: mail@timeelectronics.co.uk

Web Site: www.timeelectronics.com

Disposal of your old equipment



1. When this crossed-out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2002/96/EC.
2. All electrical and electronic products should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities.
3. The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.
4. For more detailed information about disposal of your old appliance, please contact your city office, waste disposal service or return to Time Electronics.