

TYPE 4720/4 & 4721

DECADE RESISTANCE BOXES



INSTRUCTION MANUAL



SUBJECT TO CHANGE WITHOUT NOTICE

This manual supersedes all previous versions – please keep for future reference

Revision History	
Revision Date	Description of change
14.6.2020	New issue
30.6.30	Minor corrections
9.8.21	Minor corrections
17.8.21	Minor changes to tolerances
14.2.23	1T Resistor power reduced to 1 W
2.6.26	Accuracies updated.

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1. INTRODUCTION

The Tinsley 4720/4 and 4721 series are a range of high resistance precision decade boxes. Featuring 9 dials on the 4720/4 and 1 dial on the 4721, they offer resistance's up to 1 Tera-ohms. Each instrument is built using specially aged precision metal film resistors that are mounted directly onto the purpose designed decade switches.

The decade boxes are useful as a laboratory tool or reference standard wherever low current and high resistance's are encountered. A typical application would be in the calibration of insulation testers.

Models Available

Type	Number of Decades / Resistance
4720/4	9 Decade Box 1 k Ω TO 1 T Ω
4721	1 Decade Box 1 Kk Ω TO 1 T Ω

Items Supplied:-

Decade Box

HV test leads (pair) part number TINS-4720-21LEADS1 (also available separately).

Manual

Calibration certificate (in house)

Note: UKAS calibration certificate is available at additional cost if required.

PRECAUTIONS FOR USING DECADE BOX

When using the decade box on high voltage equipment, for example Insulation Test Sets, please observe the following precautions:

1. Connect the test leads with the correct polarity, i.e. "Hi" and "Lo"
2. Always earth (ground) the unit using the "Earth" terminal provided or connect to guard terminal on UUT if appropriate.
3. Observe the voltage maximum rating on the front panel for each decade. Exceeding these voltages will damage the internal resistors.

UNPACKING INSTRUCTIONS

Your Tinsley 4720/4 or 4721 has been thoroughly tested and inspected before shipping. Unless a special (UKAS) calibration has been requested a standard Tinsley "In-house" calibration certificate will be provided. Therefore, the instrument is ready for use after unpacking. However, it is recommended that the instrument is checked for any damage that may have occurred in transit. In the unlikely event that damage has occurred, all packing materials should be retained and Tinsley Precision Instruments or the local agent should be contacted for further instructions.

2. SPECIFICATIONS

2.1 Reference and Nominal Temperatures

Reference Range	Operational Range (TC to be applied)
20°C – 24°C	10°C – 20°C & 24°C – 30°C

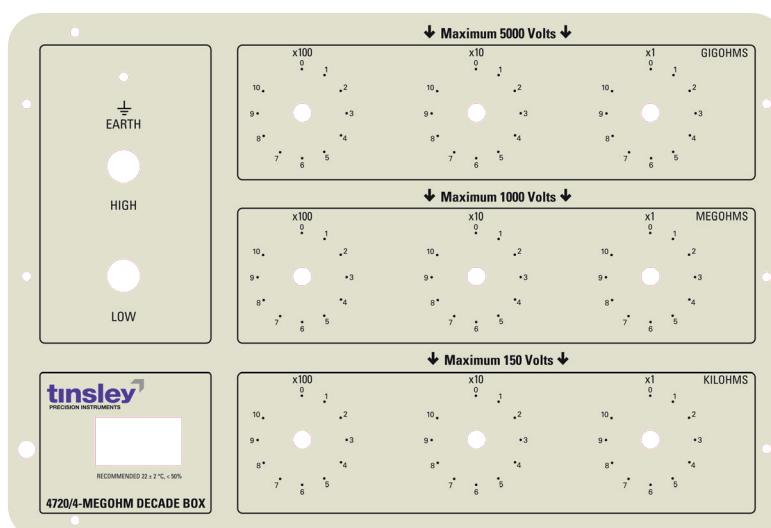
2.2 Relative Humidity

Maximum	Storage
50%	<70%

2.3 Measuring Range and Step Resolution

Model 4720/4

SPECIFICATION					
Decade	Value	Accuracy	Max. Power (Watts)	Max. V/Step	Temp. Coeff.
1	10 x 1K Ω	$\pm 0.15\%$	2	10	$\pm 15\text{ppm./}^\circ\text{C}$
2	10 x 10K Ω	$\pm 0.15\%$	2	50	$\pm 15\text{ppm./}^\circ\text{C}$
3	10 x 100K Ω	$\pm 0.15\%$	2	150	$\pm 15\text{ppm./}^\circ\text{C}$
4	10 x 1M Ω	$\pm 0.15\%$	2	300	$\pm 25\text{ppm./}^\circ\text{C}$
5	10 x 10M Ω	$\pm 0.25\%$	2	500	$\pm 50\text{ppm./}^\circ\text{C}$
6	10 x 100M Ω	$\pm 1.5\%$	7.5	1000	$\pm 100\text{ppm./}^\circ\text{C}$
7	10 x 1G Ω	$\pm 2.0\%$	7.5	5000	$\pm 100\text{ppm./}^\circ\text{C}$
8	10 x 10G Ω	$\pm 4.0\%$	7.5	5000	$\pm 100\text{ppm./}^\circ\text{C}$
9	10 x 100G Ω^*	$\pm 5.0\%$	7.5	5000	$\pm 200\text{ppm./}^\circ\text{C}$



Model 4721

SPECIFICATION					
Decade	Value	Accuracy	Max. Power (Watts)	Max. V/Step	Temp. Coeff.
1	1k Ω	$\pm 0.15\%$	2	10	$\pm 15\text{ppm./}^\circ\text{C}$
2	10k Ω	$\pm 0.15\%$	2	50	$\pm 15\text{ppm./}^\circ\text{C}$
3	100k Ω	$\pm 0.15\%$	2	150	$\pm 15\text{ppm./}^\circ\text{C}$
4	1M Ω	$\pm 0.15\%$	2	300	$\pm 25\text{ppm./}^\circ\text{C}$
5	10M Ω	$\pm 0.25\%$	2	500	$\pm 50\text{ppm./}^\circ\text{C}$
6	100M Ω	$\pm 1.0\%$	7.5	1000	$\pm 100\text{ppm./}^\circ\text{C}$
7	1G Ω	$\pm 2.0\%$	7.5	5000	$\pm 100\text{ppm./}^\circ\text{C}$
8	10G Ω	$\pm 4.0\%$	7.5	5000	$\pm 100\text{ppm./}^\circ\text{C}$
9	100G Ω	$\pm 5.0\%$	7.5	5000	$\pm 2000\text{ppm./}^\circ\text{C}$
10	1T Ω	$\pm 5.0\%$	1	5000	$\pm 2000\text{ppm./}^\circ\text{C}$

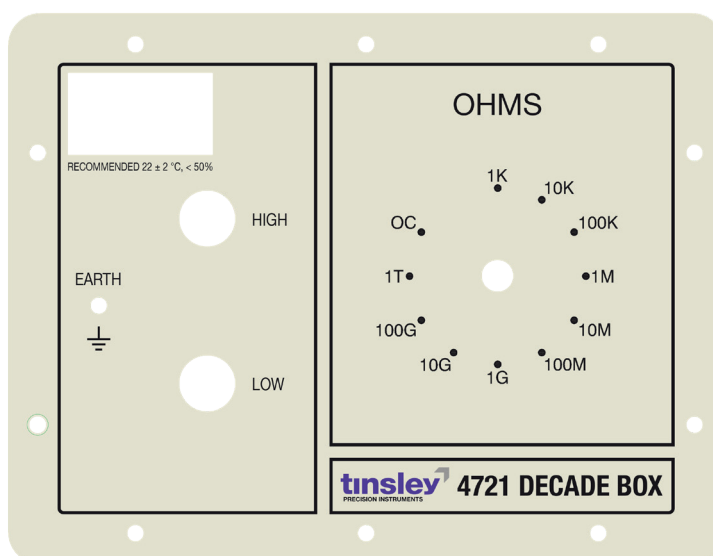
2.4 Dimensions and Weights

Type	Number of Decades	Dimensions (mm)	Weight (kg)
4720/4	9	460 x 380 x 160	9
4721	1	270 x 250 x 180	2.5

2.5 Terminals

2 Off HV (Max 5 KV) Coaxial Shrouded Plug sockets.Hi and Lo connections

1 Off Binding post – 4mm. Ground or unit under test (UUT) guard connection.



3. MAINTENANCE AND OPERATION

- 3.1 Whilst using the decade resistors, the applied power should be within the nominal power rating value.
- 3.2 Prior to use, it is recommended to rotate the decade switches several times to ensure the best contact on the contact wiper blades.
- 3.3 It is recommended that the unit is returned for recalibration on an annual basis.
- 3.4 The units are fitted with a temperature/humidity indicator (note this is not a calibrated item). The batteries will require changing from time to time by carefully pulling up the unit from the panel i.e. there is no need to unscrew the faceplate) to expose the battery compartment on the rear of the sensor. The unit takes two off LR44 1.5 V button cells.

4. SERVICE INFORMATION

The instrument (unless agreed otherwise) is covered by a 12-month warranty on parts and labour from the date of dispatch from Tinsley Precision Instruments (provided it has not been damaged in use or tampered with). This warranty does not include costs incurred in returning the equipment to the factory for repair or any duties or taxes which may be incurred as part of this process.

Warning: There are no user serviceable parts inside the instrument. Any service procedure **MUST** only be carried out by suitably trained personnel.

Please note that opening the instrument will invalidate the warranty

5. DISPOSAL/END OF LIFE

The materials the units are made of can be recycled. Please dispose of the unit responsibly according to local and national guidelines.

6. SUPPORT

For all technical support, repair, warranty and service inquiries please contact:



Tinsley Instrumentation Ltd
1 Warner Drive
Springwood Industrial Estate
Braintree, Essex
CM7 2YW

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