

User Manual

Release 1.0

PAT-Dummy-Cell I



The information in this manual has been carefully checked and believed to be accurate; however, no responsibility is assumed for inaccuracies.

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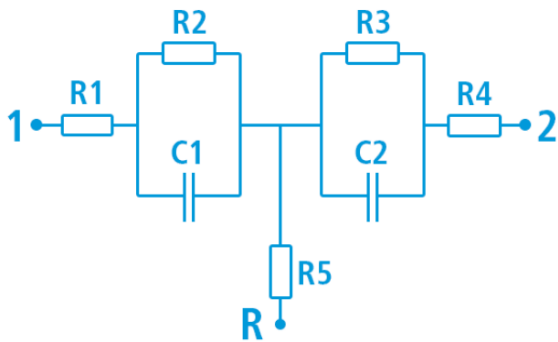
Content

1 Product description.....	4
2 Technical data	4
3 Unpacking	5
4 Test Cases	5
5 Technical support.....	10
6 Warranty.....	10

1 Product description

The PAT-Dummy-Cell I is a passive electric circuit used for performing a quick functional test of your PAT-Tester right out of the box, or in case the tester does not work as expected with your electrochemical test cell, or for learning the basics of your PAT-Tester.

The dummy cell can be considered a simplistic equivalent circuit of the three electrodes of an electrochemical cell. The R2|C1 parallel connection represents the electrode/electrolyte interface of electrode 1. R3|C2 is the same for electrode 2. The bulk (ohmic) resistance contributions between 1 and 2 are represented by R1 and R4. If the current passes between 1 and 2, the voltage drop across R5 is zero. Then the electrode R can be considered the voltage tap between electrodes 1 and 2. In contrast, if the current goes through electrode R, then voltage also drops across R5.



Values:

R1	R2	R3	R4	R5	C1	C2
10 Ω	287 Ω	1000 Ω	1 Ω	1000 Ω	1 μF	10 μF

2 Technical data

- Height: **36 mm**
- Width: **68 mm**
- Depth: **68 mm**

3 Unpacking

Check the contents of the package against the list given below to verify that you have received all of the required components. Contact EL-CELL, if anything is missing or damaged.

Note: Damaged shipments must remain within the original packaging for freight company inspection.

List of components:

PAT-Dummy-Cell I

4 Test Cases

We recommend that you run the following tests with the PAT-Dummy-Cell I to check the channels of your PAT tester for functionality. You can download the required EL-Software scripts from the [product website](#).

If your results differ significantly from those shown here, this may indicate a channel malfunction. In this case, we recommend contacting our support:

web: <https://el-cell.com/support/technical-support/>

e-mail: support@el-cell.com

For information about using test scripts in EL-Software, please refer to the [EL-Software documentation](#).

4.1 DC test with constant current

When applying a constant current, the dummy cell behaves, in steady state, as an ohmic voltage divider. For the test shown below we apply a current of 1 mA between 1 and 2, then between 1 and R, and finally between 2 and R. The three cc steps are separated by rest steps. Each step takes 200 milliseconds. The steady state is reached within a few ms, defined by the time constant of the respective RC element.

EL-Software script: Dummy-I-CC-i12-i1R-i2R.elc

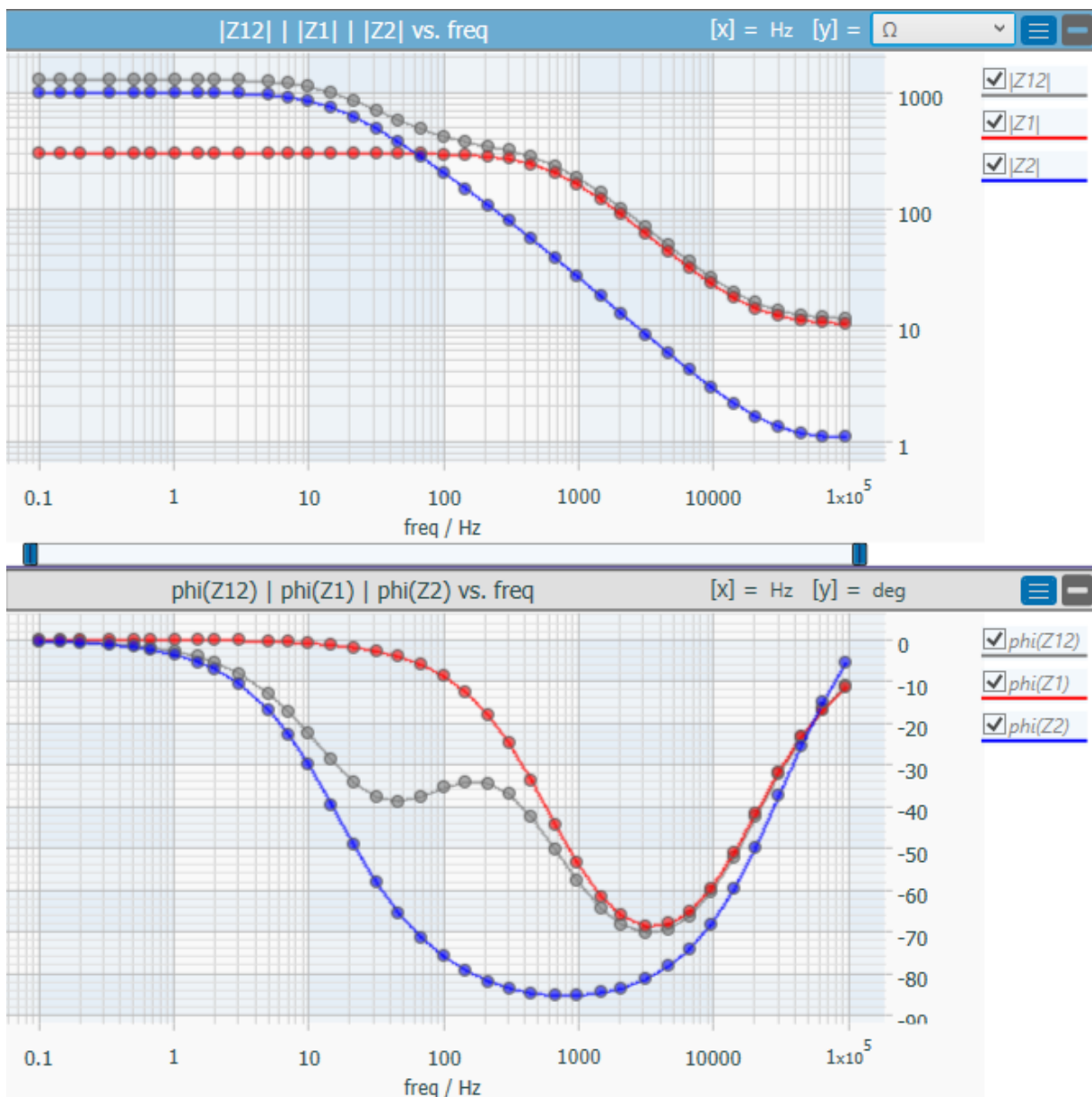


4.2 Impedance (GEIS) tests

The RC elements of the dummy circuit are best characterized by impedance measurements. For the results shown below as Bode plots, we applied a sinusoidal alternating current with an amplitude of 1 mA, with frequencies between 100 kHz and 1 Hz. First, the alternating current was applied between 1 and 2, then between 1 and R and finally between 2 and R.

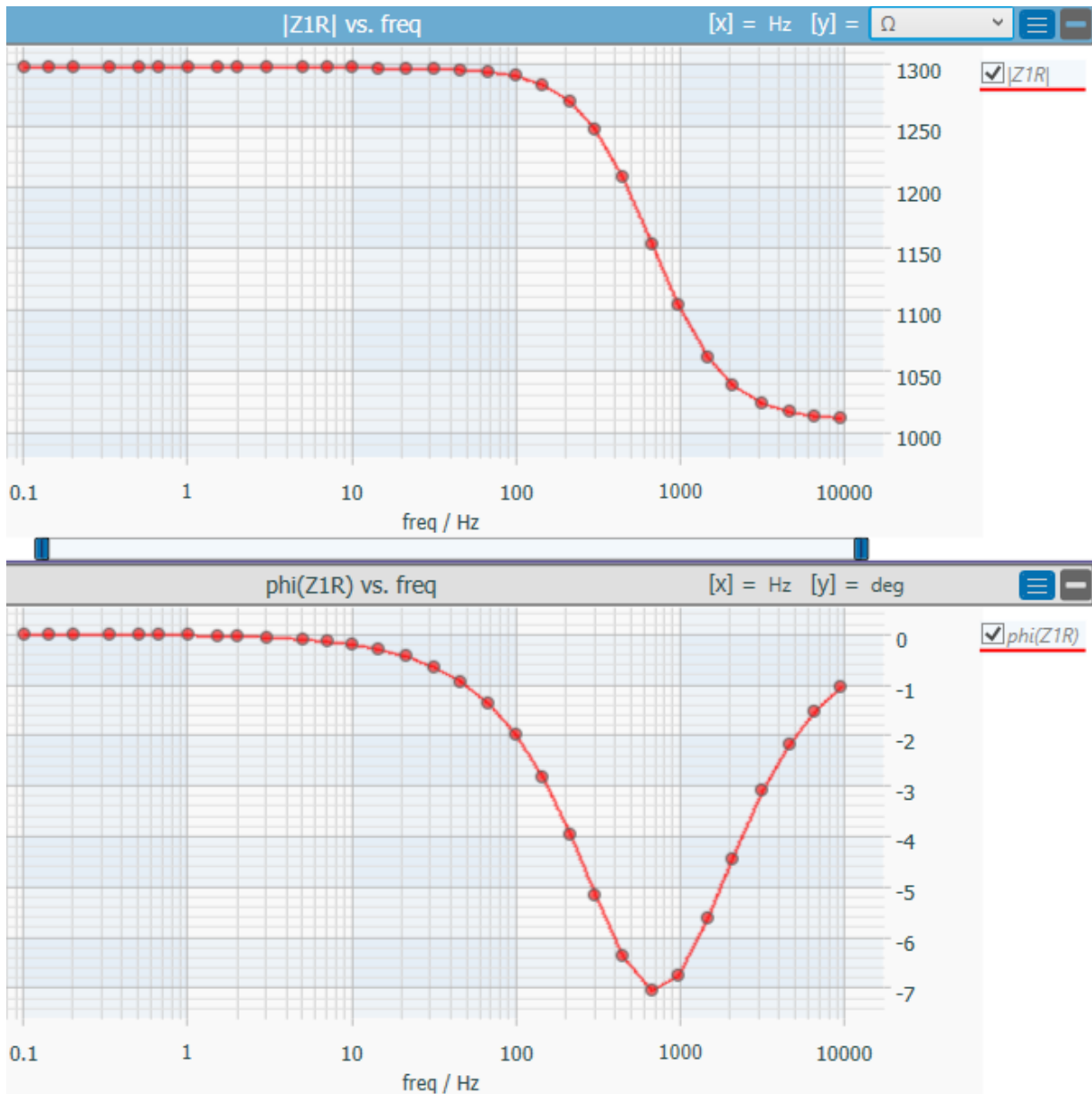
4.2.1. Current flows between 1 and 2

EL-Software script: *Dummy-I-GEIS-i12.elc*



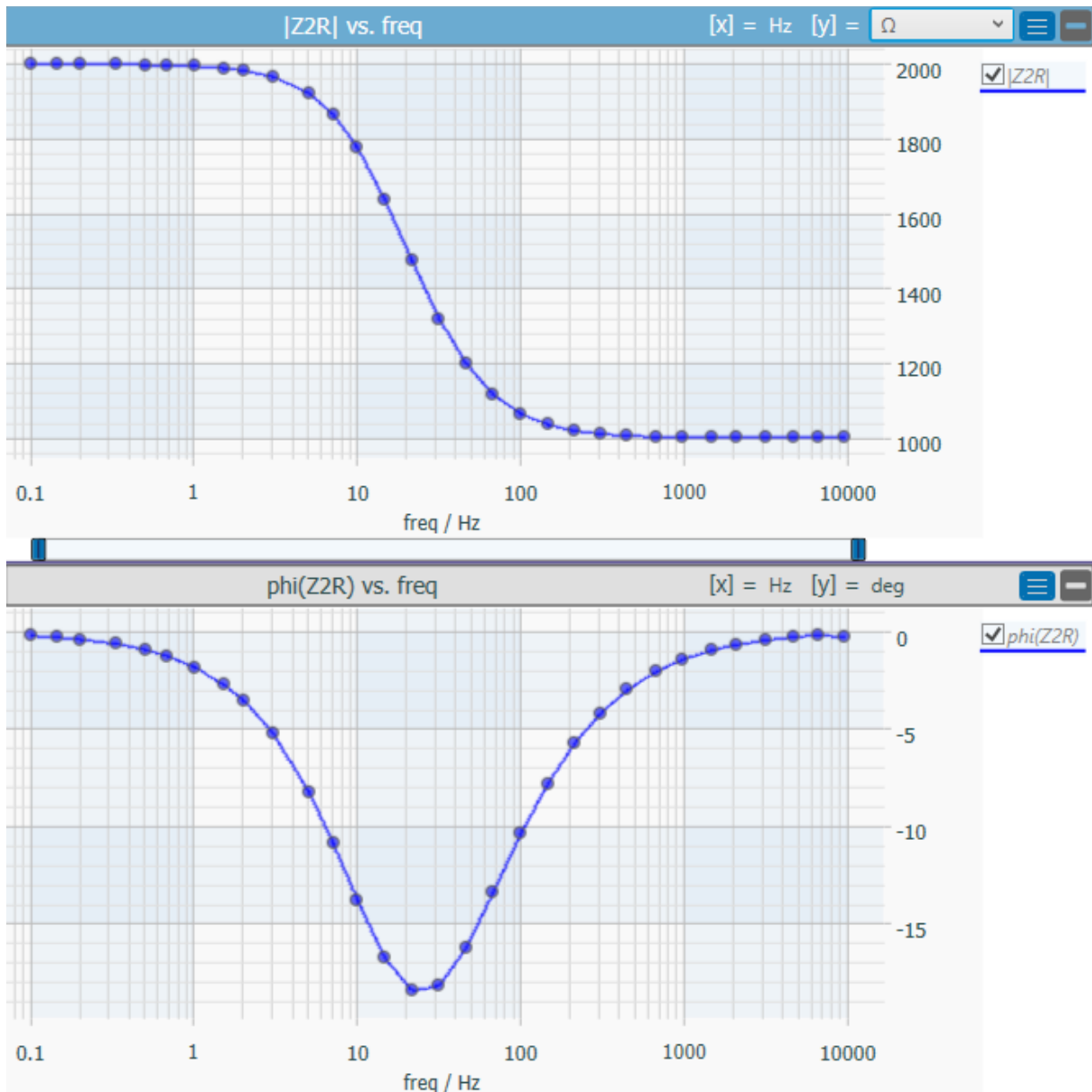
4.2.2 Current flows between 1 and R

EL-Software script: Dummy-I-GEIS-i1R.elc



4.2.3. Current flows between 2 and R

EL-Software script:Dummy-I-GEIS-i2R.elc



5 Technical support

Technical support for this product is exclusively provided by EL-Cell GmbH.

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6 Warranty

For a period of one year from the date of shipment, EL-Cell GmbH (hereinafter Seller) warrants the goods to be free from defect in material and workmanship to the original purchaser. During the warranty period, Seller agrees to repair or replace defective and/or nonconforming goods or parts without charge for material or labor, or, at the Seller's option, demand return of the goods and tender repayment of the price. Buyer's exclusive remedy is repair or replacement of defective and nonconforming goods, or, at Seller's option, the repayment of the price.

Seller excludes and disclaims any liability for lost profits, personal injury, interruption of service, or for consequential incidental or special damages arising out of, resulting from, or relating in any manner to these goods.

This Limited Warranty does not cover defects, damage, or nonconformity resulting from abuse, misuse, neglect, lack of reasonable care, modification, or the attachment of improper devices to the goods. This Limited Warranty does not cover expendable items. This warranty is void when repairs are performed by a non-authorized person or service center. At Seller's option, repairs or replacements will be made on site or at the factory. If repairs or replacements are to be made at the factory, Buyer shall return the goods prepaid and bear all the risks of loss until delivered to the factory. If Seller returns the goods, they will be delivered prepaid and Seller will bear all risks of loss until delivery to Buyer. Buyer and Seller agree that this Limited Warranty shall be governed by and construed in accordance with the laws of Germany.

The warranties contained in this agreement are in lieu of all other warranties expressed or implied, including the warranties of merchantability and fitness for a particular purpose.

This Limited Warranty supersedes all prior proposals or representations oral or written and constitutes the entire understanding regarding the warranties made by Seller to Buyer. This Limited Warranty may not be expanded or modified except in writing signed by the parties hereto.