

User Manual

Release 2.02

Part Kit for Testing Single Crystals/Grains with the ECD-3 and ECD-3-nano

ECD1-00-0018-C

June 2021

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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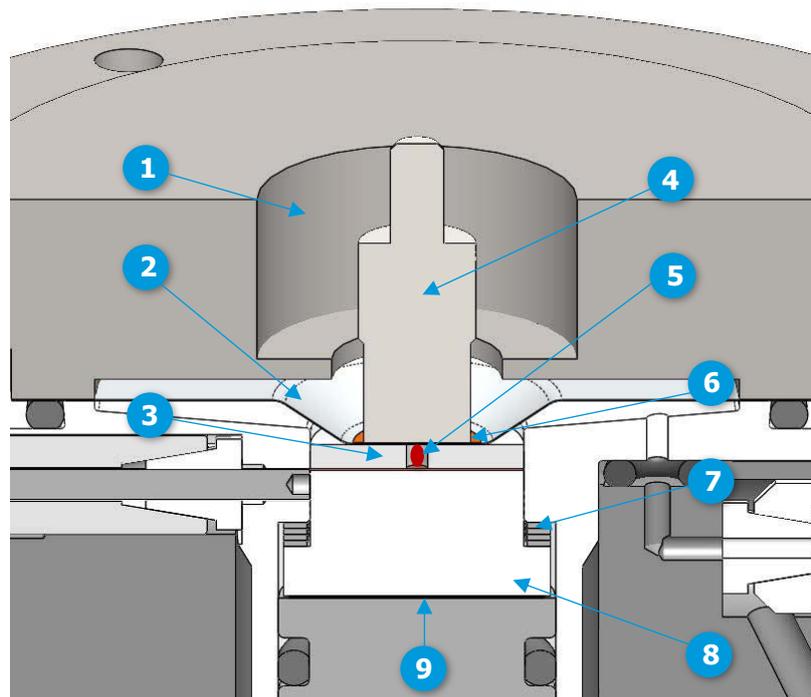
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1 Working principle

The crystal/grain is to be seated into the center position on top of the T-frit. Optionally, a holed glass fiber separator may be used to improve electrolyte contact. A cranked membrane (made of copper or aluminium foil) makes the electronic contact to the crystal. The expansion of the crystal during charge/discharge is transferred through the membrane to the flat tip of the displacement transducer. The initial height of the crystal is to be taken into account by choosing the proper number of distance washers.



- | | | | | | |
|----------|---------------------------|----------|------------------------------------------------------|----------|--------------------------|
| 1 | Cover flange | 5 | Crystal (sample) | 9 | Counter electrode |
| 2 | Cranked membrane | 6 | Insulation foil
(use only for ECD-3-nano) | | |
| 3 | Holed GF separator | 7 | Adjusting washers | | |
| 4 | Flat sensor tip | 8 | T-frit | | |

2 Unpacking

Check the contents of the packages 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 (Part Kit ECD1-00-0018-C)

- Flat sensor tip [VOR9050](#)
- 1 x T-frit, borosilicate glass [ECC1-00-0041-B](#)
- 4 x Adjusting washer, 1.4404 [ECC1-00-0189-A](#)
- 10 x Holed glass fiber separator, 10 mm x 0.65 mm [ECC1-01-0021-E/X](#)
- 10 x Holed glass fiber separator, 10 mm x 1.0 mm [ECC1-01-0021-D/X](#)
- 10 x Holed glass fiber separator, 10 mm x 1.55 mm [ECC1-01-0021-C/X](#)
- 3 x Membrane cranked, copper [ECC1-00-0019-G](#)
- 3 x Membrane cranked, aluminium [ECC1-00-0019-F](#)
- Insulation foil (Kapton) [ECC1-01-0025-A](#) (use only for ECD-3-nano)



Note: The insulation foil serves to insulate the sensor tip of the ECD-3-nano sensor unit from the cranked membrane below. Use only for ECD-3-nano, not for the ECD-3!

3 Safety Precautions

Use proper safety precautions when using hazardous electrode materials and electrolytes. Wear protective glasses and gloves to protect you against electrolyte that may accidentally spill out during disassembly. Upon cell disassembly, dispose all materials properly. Metallic lithium and some insertion compounds may decompose heavily in contact with water and other solvents, and can cause fire.

4 Operating Instructions

1. Exchange the standard ball-tip at the sensor unit with the provided flat tip. The tip is connected by a thread M2.5 with the sensor plunger. For assembly and disassembly, the sensor tip must only be turned with your fingertips. Never use pliers or other tools as this may damage the sensor unit.
2. For cell assembly, refer to the instructions given in the ECD-3 manual in chapter 7 "Assembling the cell inside the glove box". In the following, only those points are addressed where the assembly differs from the standard procedure. Reference is made to the picture (step) numbers.
3. Before step 17, account for the thickness of your sample by placing the provided distance washers into the frit flange. Only then attach the T-frit as shown in at step 17. The upper thickness value in the table below refers to the neutral (straight) position of the membrane. The membrane may be distorted by at least 0.3 mm into vertical direction without causing excessive forces.

# of washers	Sample thickness
0	<0.1 mm
1	0.1 to 0.4 mm
2	0.4 to 0.7 mm
3	0.7 to 1.0 mm

4. At step 22, place one of the provided holed glass fiber separators on top of the glass frit. The thickness of the separator must not exceed the sample thickness. Then put the sample (e.g. a graphite flake) into the separator hole. No spacer disc is to be used, i.e., leave out step 23. The holed glass fiber separator is supposed to improve the wetting of the sample with electrolyte.
5. At step 25, place the provided modified cover flange on top.
6. After fastening the cover flange, place the provided insulation foil on top of the metal membrane (for ECD-3-nano only).

The remaining assembly steps and dilatometer operation are identical with the standard procedure described in the dilatometer manual.

5 Technical Support

Technical support for this product is exclusively handled 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.