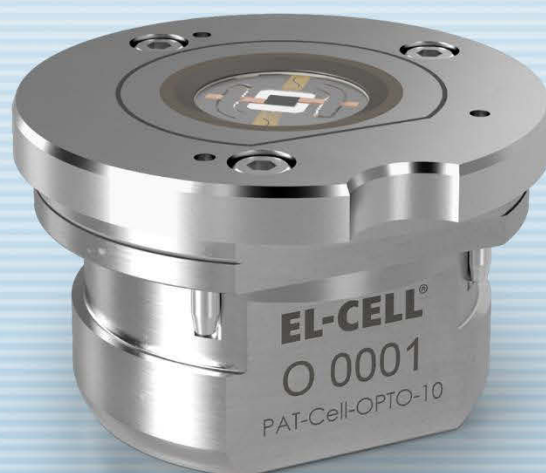


User Manual

Release 1.00

PAT-Cell-Opto-10

Electrochemical test cell



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

EL-Cell GmbH maintains the right to make changes without further notice to products described in this manual to improve reliability, function, or design. EL-Cell GmbH does not assume any liability arising from the use or application of this product.

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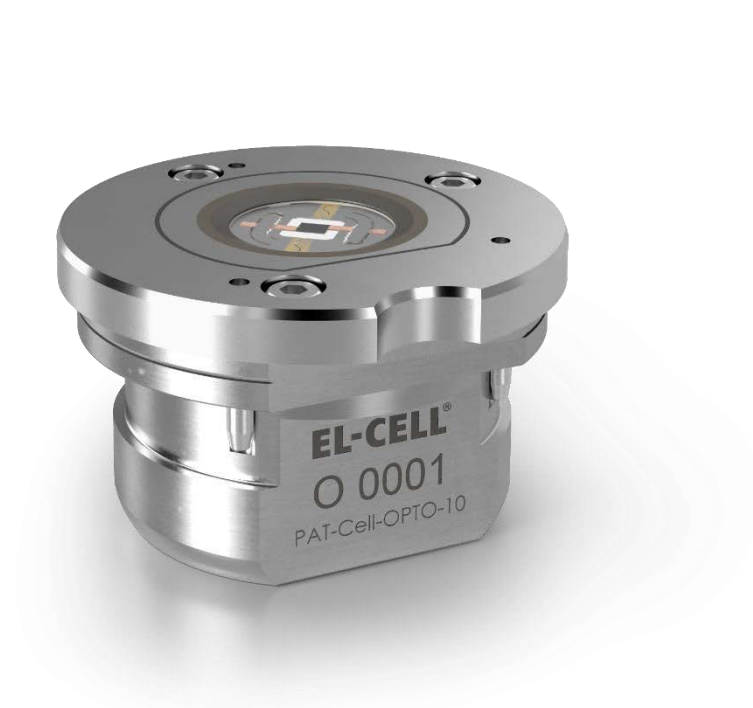
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1 Product Description



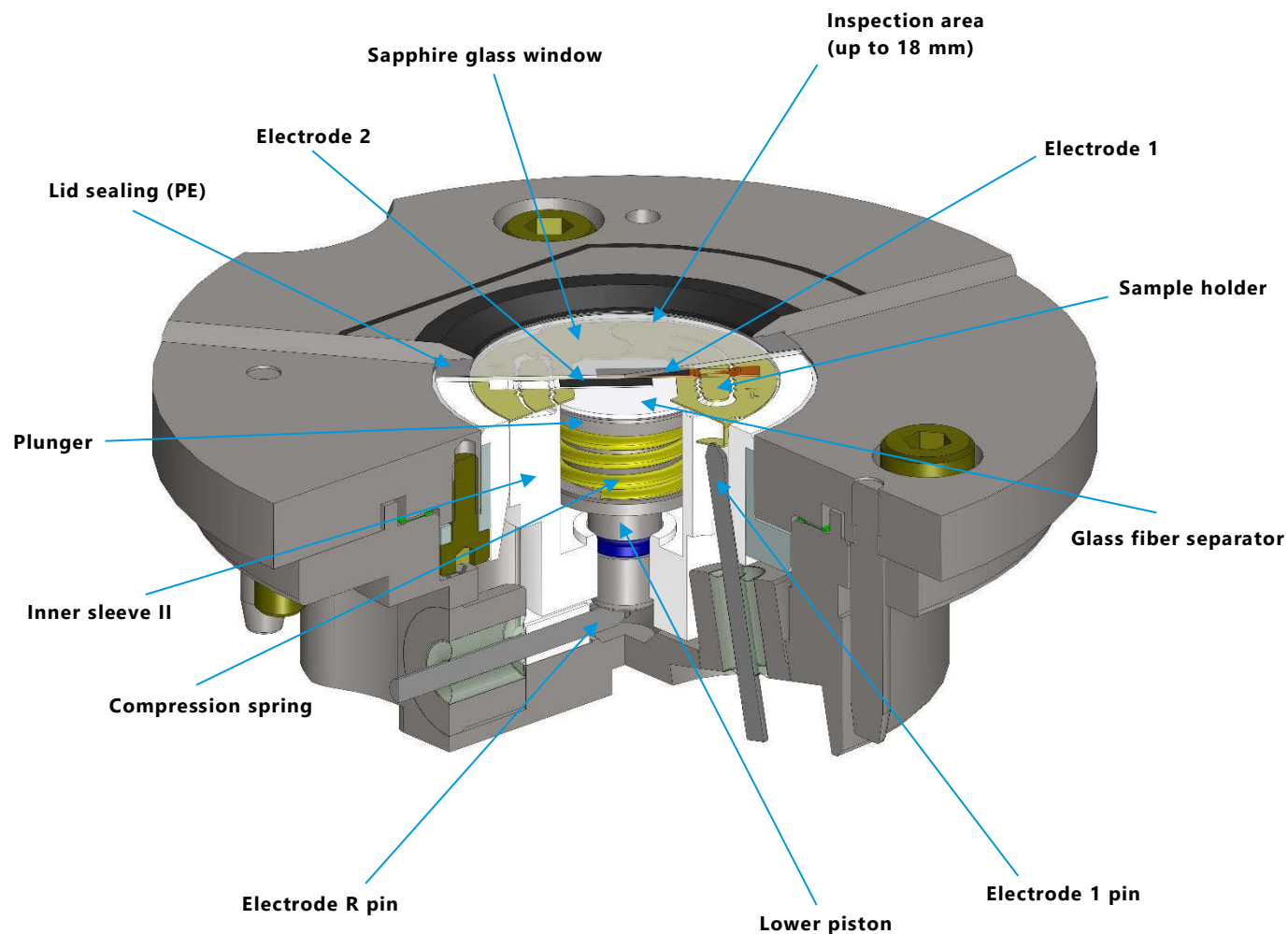
The PATCell-Opto-10 test cell is designed for operando characterization of electrodes using optical methods such as light microscopy or Raman spectroscopy in reflection mode.

The test cell utilizes the cableless PAT socket for cell connection. This way, it can be directly plugged into a PAT battery tester like the PAT-Tester-x-8 or a PAT docking station to connect it to a third-party battery tester.

Features

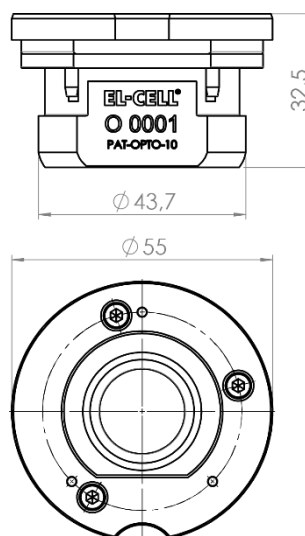
- 2- and 3-electrode cell with optical window for aprotic and aqueous electrochemistry.
- High cycling stability due to glass-to-metal seals
- Suited for light microscopy and Raman spectroscopy
- Cableless cell connection via PAT socket

Working principle of the PAT-Cell-Opto-10 (side-by-side setup of electrodes):



2 Technical data

- Length: 55 mm
- Width: 55 mm
- Height: 32.5 mm
- Weight: 0.3 kg
- Operational temperature: -20° to +70°C
- Electrode R diameter: ≤ 10 mm



3 Intended use

The PAT-Cell-Opto-10 test cell is an electrochemical measuring instrument designed for use in a laboratory environment. It may only be used by trained personnel and only as described in this manual.

4 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 filling and 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.

5 Assembly

Generally, all assembly steps are to be carried out in inert glove box atmosphere. All components used are to be dried upfront in a vacuum oven at 80°C for at least 12 hours. Once fully assembled, the cell is hermetically sealed so that it may be operated in ambient atmosphere.

The test cell can be used in several different configurations, which mainly differ in the type and size of the working electrode used, the charging geometry (the position of working and counter electrode relative to each other), and the connection to the potentiostat (2- or 3-electrode connection). In the following, the cell assembly is described for the side-by-side arrangement of electrodes.

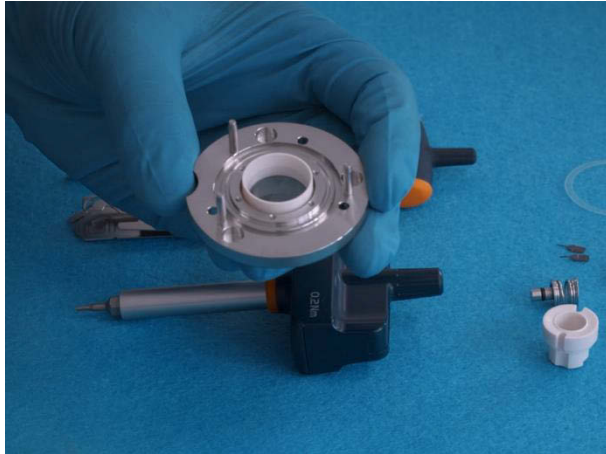
Assembly instructions:



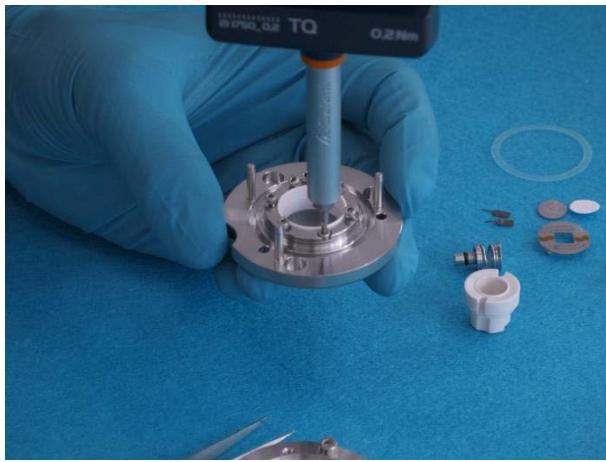
1. Turn the lid upside down. Insert the foil sealing into the lid.



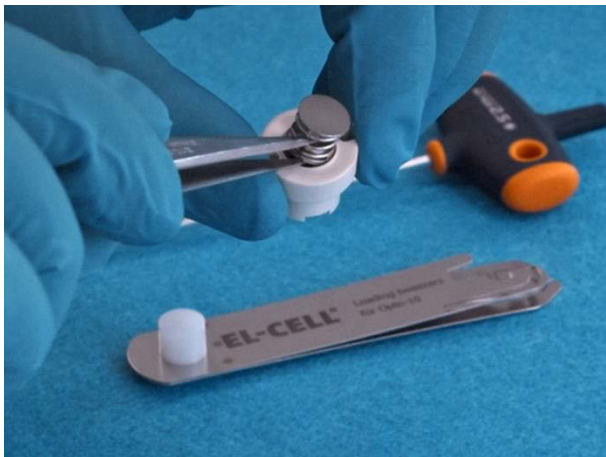
2. Insert the glass window on top.



3. Insert the window thrust ring.



4 Attach the window flange and screw in the screws using the Torque Screwdriver 0.2 Nm.



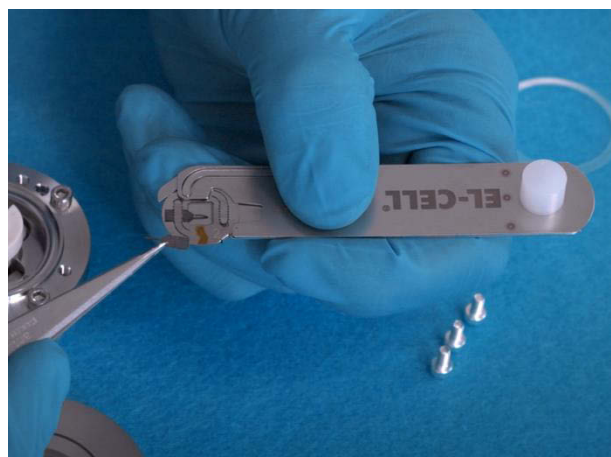
5. Insert the lower piston into the inner sleeve.



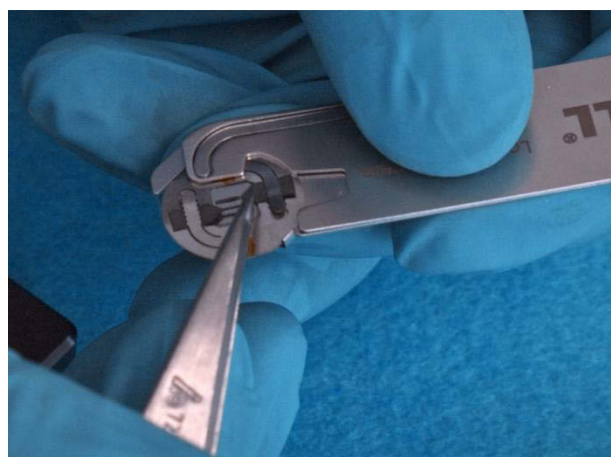
6. Use the loading tweezers to push the piston into the sleeve.



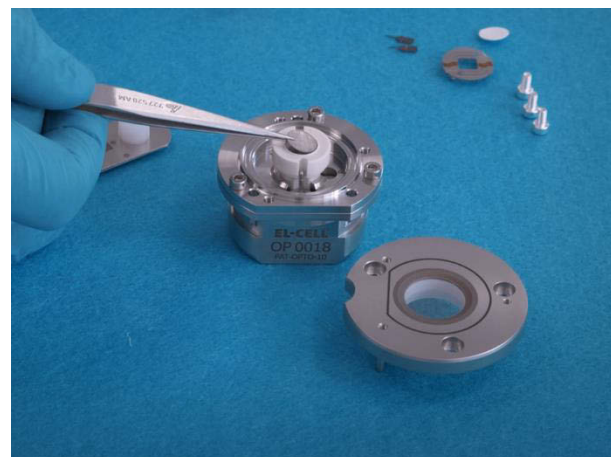
7. Place the assembly into the cell base.



8. Insert the sample holder into the loading tweezers. Squeeze the tweezers together to lift the sample holder bracket. Then attach the first electrode strip to the sample holder.



9. Turn the sample holder around and place the second electrode strip.



10. Put the R electrode disc, lithium metal in this case, on top of the piston.



11. Put the separator on top.



12. Use the loading tweezers again to press the cell stack further into the piston.



13. Attach the sample holder to the assembly. The markings 1 and 2 on sample holder and cell base represent the electrodes. Use them as an aid for correct placement.



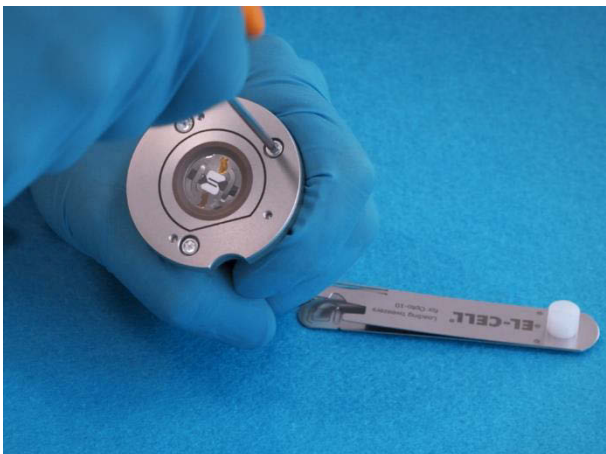
14. Insert the second foil seal.



15. Fill in the electrolyte.



16. Use the straight marking on the lid to align it to the flat side of the cell base and attach it.



17. Finally fix the lid by using the torx screws and the hexagon screw driver 2.5mm.



18. The PAT-Cell-Opto-10 is now ready for testing.

6 Connecting the test cell

The PAT-Cell-Opto-10 is connected via the cableless PAT socket. It can be directly plugged into any EL-Cell PAT-Tester or PAT docking station.

7 Disassembly and Cleaning

Right after use, disassemble the cell in the reverse order of assembly. All chemicals used have to be disposed properly. All wetted parts are to be cleaned with water and/or other appropriate solvents. All parts are to be dried immediately after cleaning at 80°C.

NOTE: Leaving cell parts in contact with ambient atmosphere while still being wetted with electrolyte may result in severe corrosion.

8 Unpacking

Check the contents of the packages against the list given below to verify that you have received all of the components. Contact the factory if anything is missing or damaged.

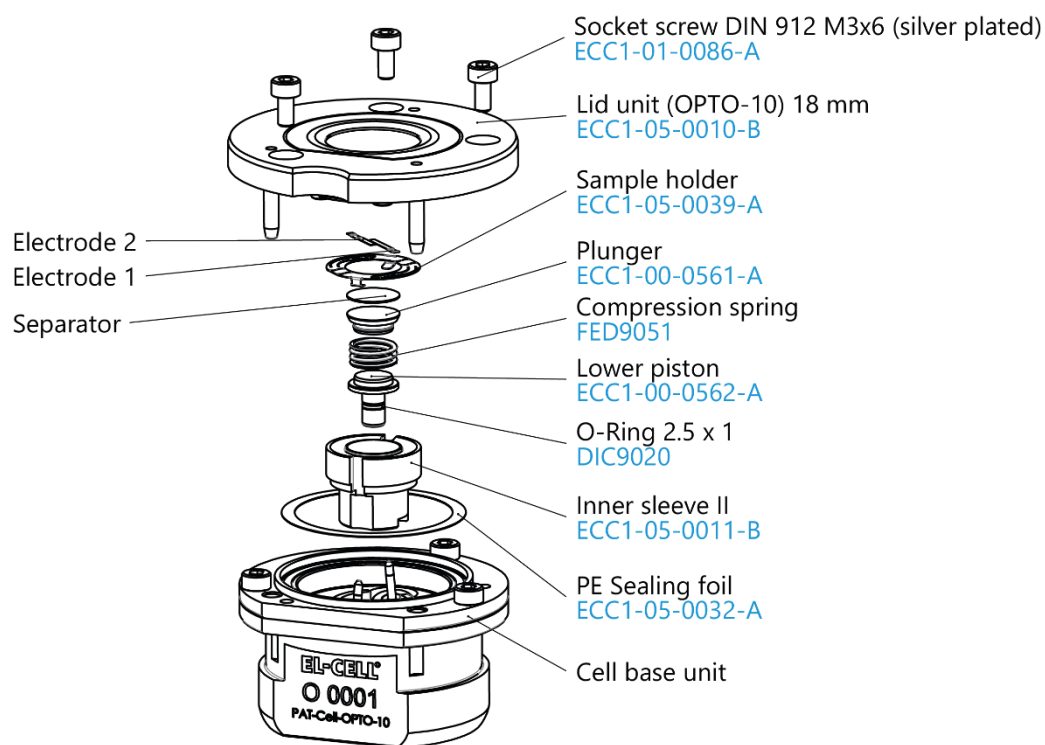
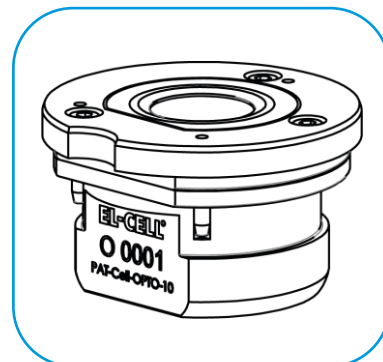
NOTE: Damaged shipments must remain with the original packaging for freight company inspection.

List of Components:

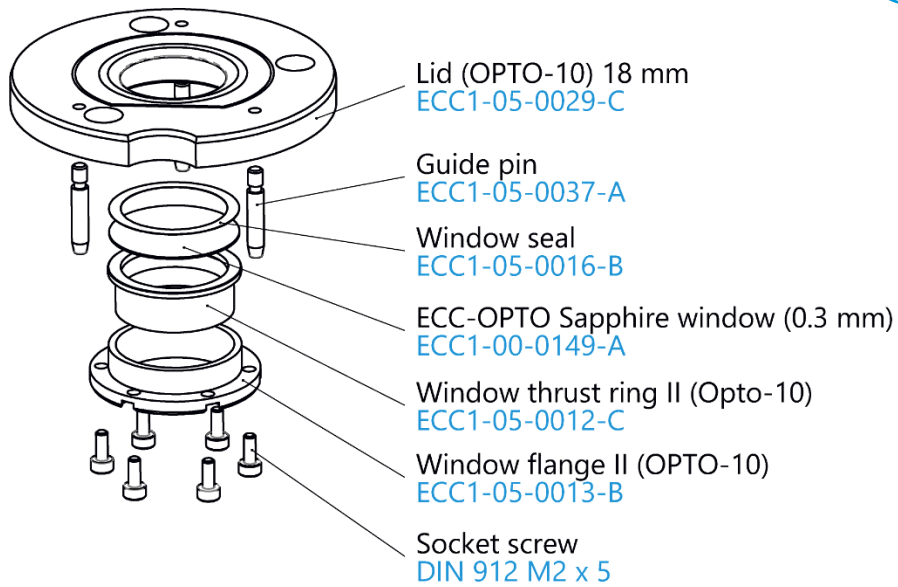
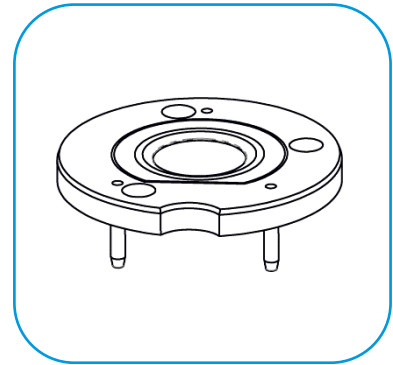
1. **PAT-Cell-Opto-10** test cell with flat socket, fully equipped for use in both 2-electrode and 3-electrode (reference) configuration
2. **Windows seal (10 pcs.)** [ECC1-05-0016-B/X](#)
3. **Separator 10.0 mm x 0.26 mm, GF/A (10 pcs.)** [ECC1-01-0012-R/X](#)
4. **PE Sealing foil (10 pcs.)** [ECC1-05-0032-A/X](#)
5. **Loading tweezer** [ECC1-09-2010-A](#)
6. **Tweezer antiacid / stainless (pointed)** [WZG9020](#)
7. **Torque screwdriver, 0.2 Nm, cross handle** [WZG9021](#)
8. **Inbus bit 1.5 mm x ¼ inch** [WZG9046](#)
9. **Hexagon screwdriver 2.5 mm, cross handle** [WZG9047](#)

9 Components

PAT-Cell-Opto-10



Lid (OPTO-10) 18 mm, assy



10 Technical Support

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

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11 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.