Translation of the original operating instructions

TC3000S

Small rigid test chamber for ELT3000

Catalog No.
600-100

mimb95en1-12-(2501)

From software version
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Table of Contents

1 About this Manual

1.1 General information

The test chamber must only be operated in the proper condition and in the condition described in the instruction manual, and used by trained personnel.

Follow the local regulations for the use of the test chamber.

Follow the instructions in this document as well as the operating instructions of the battery leak detector.

1.2 Warnings

⚠ DANGER

Imminent hazard resulting in death or serious injuries

⚠ WARNING

Hazardous situation resulting in potential death or serious injuries

⚠ CAUTION

Hazardous situation resulting in minor injuries

NOTICE

Hazardous situation resulting in damage to property or the environment

2 Safety

2.1 Intended use

The test chamber is designed for leak testing of Li-ion cells and Li-ion batteries. Uncharged cells / batteries can be tested safely. For testing charged cells / batteries, further safety measures must be taken to avoid personal injury and damage to property.

- For validation of the test, cells prepared as leaky are placed in the chamber. The preparation of the cells, which creates further hazards, is performed by the operator and is not an integral part of the test or the device. Testing of leaking cells will result in soiling of the test chamber and possibly "contamination". Cells to be tested with the test chamber must be pre-qualified. For this purpose, uncharged cells are examined, for example, to determine whether they can withstand the stresses of the leak testing. Suitable measures for the safety of man and machine must be taken by the operator.
- The test objects must be filled with an electrolyte in which one solvent component ideally consists of dimethyl carbonate (DMC, CAS No. 616-38-6).
- Depending on the internal structure of the test objects and the external geometries, local mechanical stresses can occur on the test objects. This can damage the test objects themselves, but also other components located in the test chamber.
- Make sure that the test chamber and the outer wall of the test objects are clean. Leak testing with charged test objects represents an additional safety risk and should only be carried out by appropriately trained personnel and with the installation of further safety measures.
- To avoid short circuits between the test object and chamber wall, use the insulator included in the scope of delivery.
- An external pump may optionally be connected to the ISO-KF16 connection in accordance with the requirements from the documentation. The pump is not included in the scope of delivery. The pump capacity must be at least 40 L/min to 1000 L/ min. The optional external pump must be connected via an electrically switchable valve, a corrugated tube and, if necessary, a suitable adapter.

Incorrect usage

Avoid the following unintended uses:

- Testing of partially or fully charged cells and batteries without further safety measures
- Use outside the technical specifications, see "Technical Data".
- Testing of non-vacuum-tight Li-ion cells, batteries or other test objects.

- Testing of Li-ion cells, batteries or other test objects that do not withstand the loads that occur during testing. Depending on the internal structure of the test objects and the external geometries, local mechanical stresses can occur on the test objects. This can damage the test objects themselves, but also other components located in the test chamber.
- Testing of test objects whose current collectors may be short-circuited via the test chamber (e.g. the lid or other conductive points).
- Testing of test objects that come into contact with the sealing lips of the chamber.
- Testing of wet or damp test objects.
- Test of test objects with significant differences in temperature to the environment.
- Testing of damaged test objects, batteries or other test objects.
- Testing of test objects without insulators.
- Testing of other components or substances than lithium-ion batteries.
- Testing of dirt test objects, operation of a dirty test chamber.
- Setup and operation in explosive atmospheres.
- Setup and operation in locations with very low humidity.
- Operation of the chamber by insufficiently trained personnel.
- Use outside the technical specifications.
- Insufficient spacing between the test objects in the test chamber.
- Use in radioactive areas.
- Closing the test chamber while your fingers are in the swivel range of the test chamber.
- Use of impermissible accessories or spare parts.
- Installation by untrained or unauthorized personnel. Only installation by trained personnel or Inficon employees is permitted.
- Swapping of the exhaust air ("INLET") and supply air ("VENT") lines.
- Pumping out condensable liquids or vapors.
- Use of an incorrectly dimensioned optional external pump.
- Use of the optional pump connection for sudden ventilation.
- Testing of excessively small or excessively light test objects that can move in an uncontrolled manner during ventilation.
- Use of tools that may damage the sealing surfaces of the test chamber during mechanical cleaning.

The test chamber is not intended to be used in residential areas and cannot ensure adequate protection of radio reception in such environments. The battery leak detector does not perform a safety function. In the event of strong electromagnetic interference, measured values could be falsified. It is recommended to check the function of the test chamber regularly (e.g. with a calibration leak).

2.2 Duties of the Operator

- Read, observe, and follow the information in this manual and in the work instructions provided by the owner. This concerns in particular the safety and warning instructions.
- Always observe the complete operating instructions for all work.
- If you have any questions about operation or maintenance that are not answered in this manual, contact customer service.

2.3 Owner Requirements

The following notes are for companies or any person who is responsible for the safety and effective use of the product by the user, employees or third parties.

Safety-conscious operation

- Only operate the test chamber and the battery leak detector if it is in technically perfect condition and shows no signs of damage.
- Only operate the test chamber and the battery leak detector as intended, in a safety-conscious and hazard-conscious manner and in compliance with these operating instructions.
- Provide ambient conditions that are suitable for operating staff, the test chamber and the test specimen.
- Adhere to the following regulations and observe their compliance:
  - Intended use
  - General applicable safety and accident prevention regulations
  - International, national and local standards and guidelines
  - Additional device-related provisions and regulations
- Only use original parts or parts approved by the manufacturer.
- Keep this instruction manual available on site.

Personnel qualifications

- Only allow instructed personnel to work with the test chamber and the battery leak detector. The instructed personnel must have received appropriate training. This includes knowledge of the dangers posed by leaking electrolyte/solvent.
- Make sure that authorized personnel have read and understood the instruction manual and all other applicable documents.

2.4 Dangers

The measuring instrument was built according to the state-of-the-art and the recognized safety regulations. Nevertheless, improper use may result in risk to life and limb on the part of the user or third parties, or damage to the unit or other property may occur.

⚠ WARNING

Danger to health due to hazardous materials and substances

Test specimens are usually filled with substances that are hazardous to health. If these substances leak during the test, they are freely accessible to the operator after the test.

- ► Wear appropriate protective clothing, especially gloves, gowns, and face shields.
- ► Ensure sufficient ventilation at the installation location.
- ► Avoid contact with skin, eyes, or clothing.
- ► Avoid inhaling these substances.
- ► Only test specimens for leak tightness that do not show any damage or smell of electrolyte or solvent after initial inspection.
- ► Before removing the test specimen (visual check and smell test), check whether any contents of the test specimen have leaked out.
- ► Pay attention to the risks posed by released electrolyte components and their reaction products.
- ► Defective test specimens can develop gross leaks during the leak testing. In the case of test specimens with gross leaks, observe the company's internal regulations for handling electrolyte and the safety instructions in the safety data sheets.
- ► Do not pump out toxic or corrosive gases.
- ► Clean the device regularly and keep it clean at all times.
- ► Observe the safety instructions in the safety data sheets for the test objects.
- ► Operate the device only with a connected exhaust air connection and in well-ventilated rooms. Alternatively, the device may be used in rooms where hazardous substances under test are monitored.
- ► When nitrogen or argon is used as a purge gas, it can cause asphyxiation at dangerous room concentrations. Suitable measures must be taken. The pressure in the gas line to the purge gas connection must not exceed 100 mbar over atmospheric pressure. An exhaust gas line must be connected.

⚠ WARNING

Fire and explosion hazard

Reaction products during combustion can lead to further health risks.

► Do not operate the device unattended.

► Only operate the device with the exhaust hose connected.

► Do not pump off explosive gases.

⚠ CAUTION

Warning about hand injuries

Danger of crushing by opening the flap if the clearance is too small at the top and rear.

Danger of crushing when closing the test chamber lid in the gap between the test chamber lid and the test chamber, or between the test chamber rings.

► Ensure that there is sufficient space where the devices are located, see also "Setup".

► Only open and close the test chamber when your fingers are outside the test chamber halves and outside the pivoting range of the test chamber.

► Do not touch the hinge when closing the test chamber.

Measurement inaccuracies due to dirty test chamber

Escaping electrolyte can contaminate the test chamber.

► After detecting leakage, check the elastomer films of the test chamber for contamination caused by escaping electrolyte.

► Avoid inhaling harmful gases or vapors.

► Keep the gaskets for Test chamber clean. Do not use grease or lubricants.

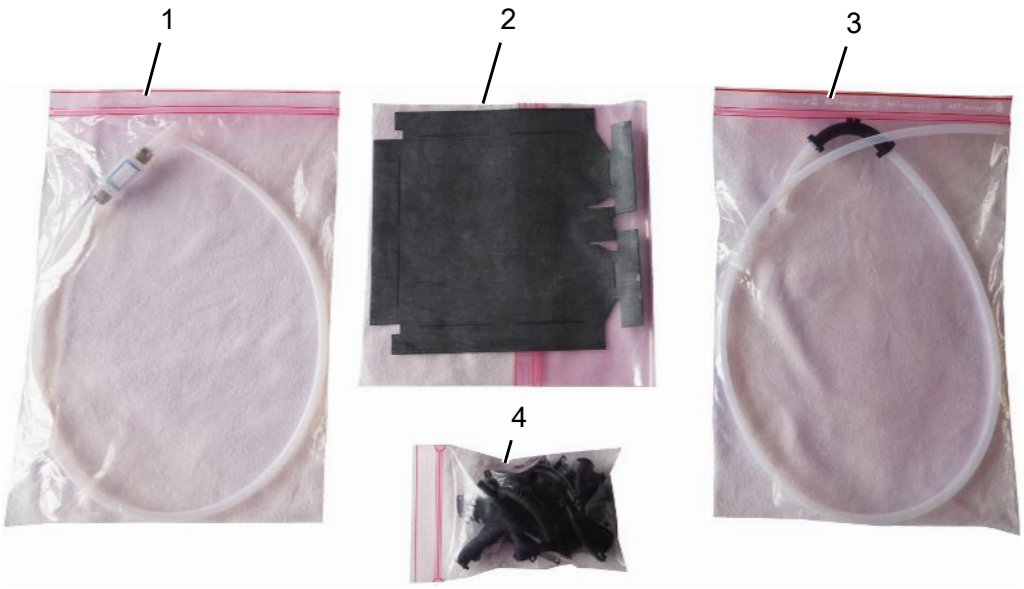
► Remove coarse soiling with a dust-free cloth. This soiling can falsify the measurement results. The device has a purging function that can be used for light contamination, see the operating instructions for the leak detector “Purging the device”. Use personal protective equipment.

3 Scope of delivery, transport

Scope of delivery

Item	Quantity
Test chamber TC3000S	1
Instruction manual	1
Insulator	5
VENT hose Ø 8 mm, length 3 m (GDU)	1
Inlet hose with inline filter	1
Angle clip DA 8 mm, as pair	10

► Check the scope of delivery after receipt of the product to make sure it is complete.



1	Inlet hose with inline filter	3	VENT hose
2	Insulator	4	Angle clips

Transport

NOTICE

Damage caused by transport

Transport in unsuitable packaging material can damage the device.

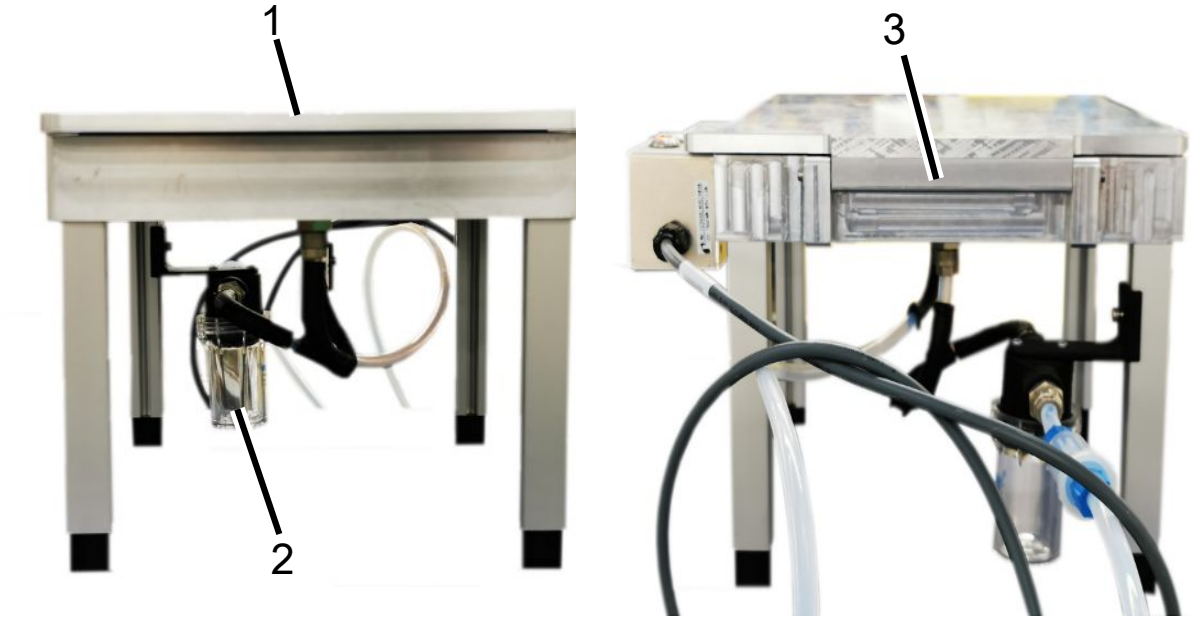
► Keep the original packaging.

► Only transport the device in its original packaging.

4 Description

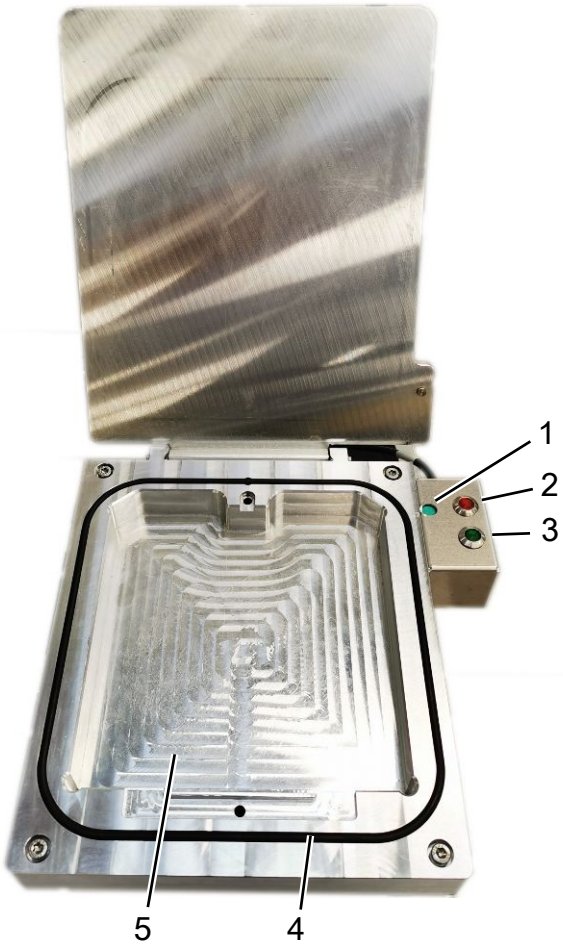
4.1 Description of equipment

Small rigid test chamber TC3000S



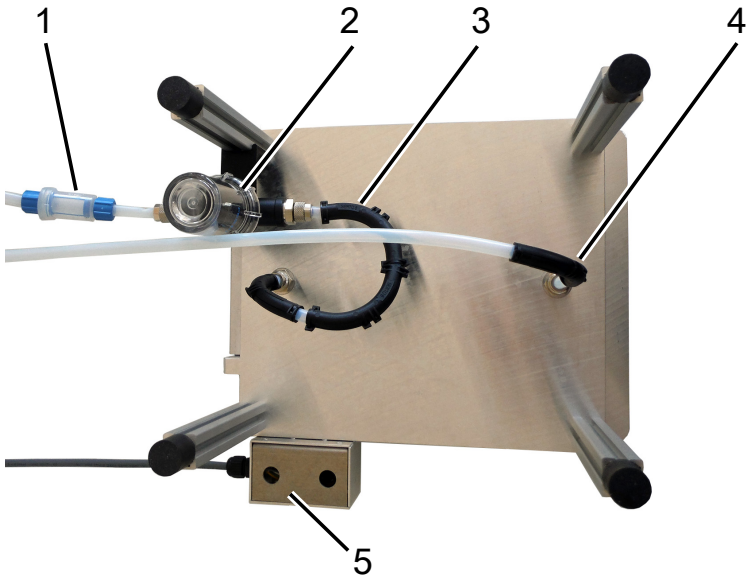
1	front view	2	rear view
3	Liquid separator		

Test chamber TC3000S - top side



1	Proximity switch	2	status LED red
3	status LED green	4	test room
5	o-rings 250x5 mm		

Test chamber TC3000S - bottom side



1	Particle filter	4	Supply air ("VENT")
2	Liquid separator	5	Proximity switch with red-green display
3	Exhaust air ("INLET")		

4.2 Technical Data

Mechanical data

Dimensions (L × W × H)	350mm x 280mm x 200mm
Installation depth (with filter)	450 mm
Weight	5.4 kg

Electrical data

Operating voltage	24 V DC
Power consumption	5 VA

Physical data

Pressure range	1080 hPa to 1 hPa

Ambient conditions

Temperature range (°C)	10 °C to 40 °C

Relative humidity (%)	80 % at 30 °C, linear decrease to 50 % at 40 °C
Height above sea level (m)	2000 m
Pollution degree	2

4.3 Markings on the device

The markings on the device have the following meanings:

	Note: Only put objects that are obviously undamaged and vacuum-tight in the device.
	Warning about hand injuries
	Device cannot be disposed of as normal domestic waste.

5 Installation

⚠ WARNING

Risk of injury from escaping electrolytes

If the exhaust and vent lines of the liquid separator are reversed, the liquid separator will no longer protect against solvent or electrolyte entering the battery tester.

► Make sure that you do not incorrectly swap the vent line and the inlet line when connecting the lines on the leak detector battery tester.

⚠ CAUTION

Risk of injury from falling or tipping device

If the device slips off its surface, it can fall down and crush your feet.

► Only place the test chamber on a horizontal, non-slip and vibration-free surface.

► Do not place the test chamber on the gas control unit.

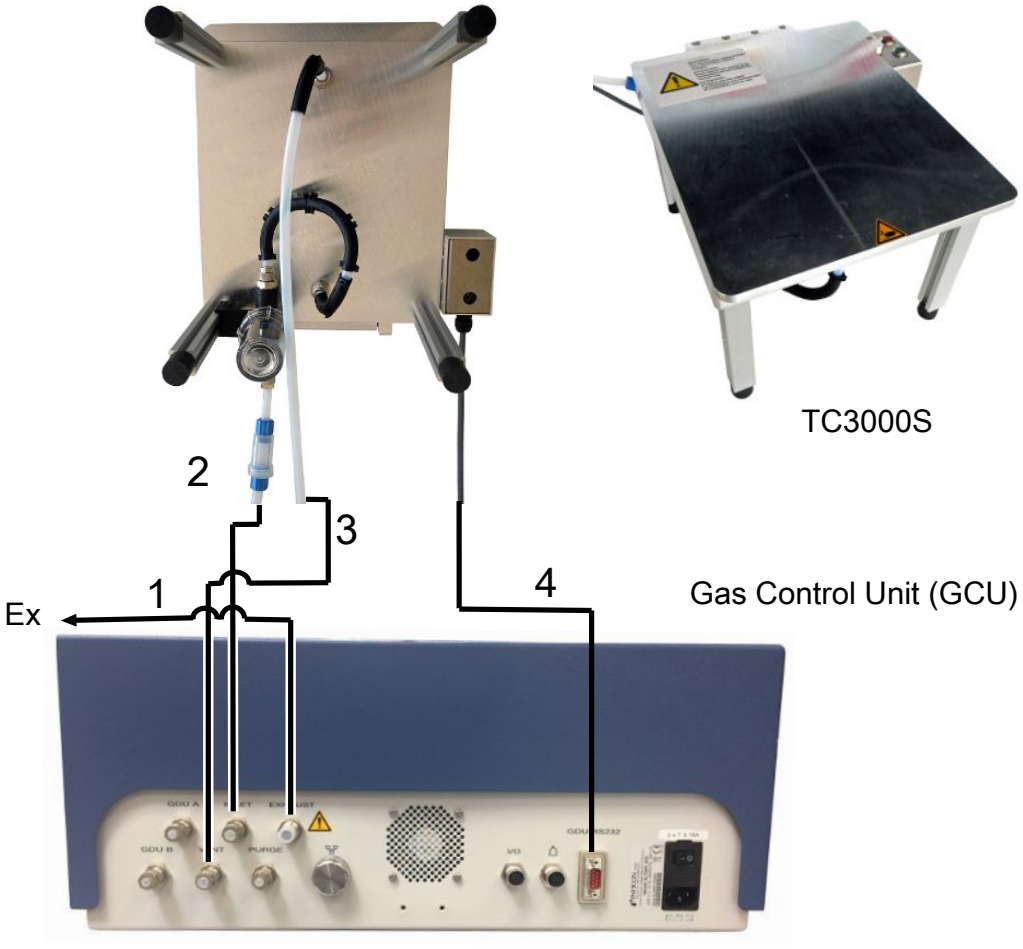
► Use non-slip rubber bumpers for the device feet.

NOTICE

Property damage due to improper installation

It is recommended to have the installation carried out by INFICON or by trained personnel.

Installation scheme



1	Gas control unit exhaust air	3	Supply air ("VENT" connection)
2	Exhaust air ("INLET" connection)	4	Proximity switch connection

connection for potential equalization

⚠ DANGER

Danger due to electric shock

Risk of bodily injury due to dangerous electric shock when operating the test chamber without connected potential equalization.

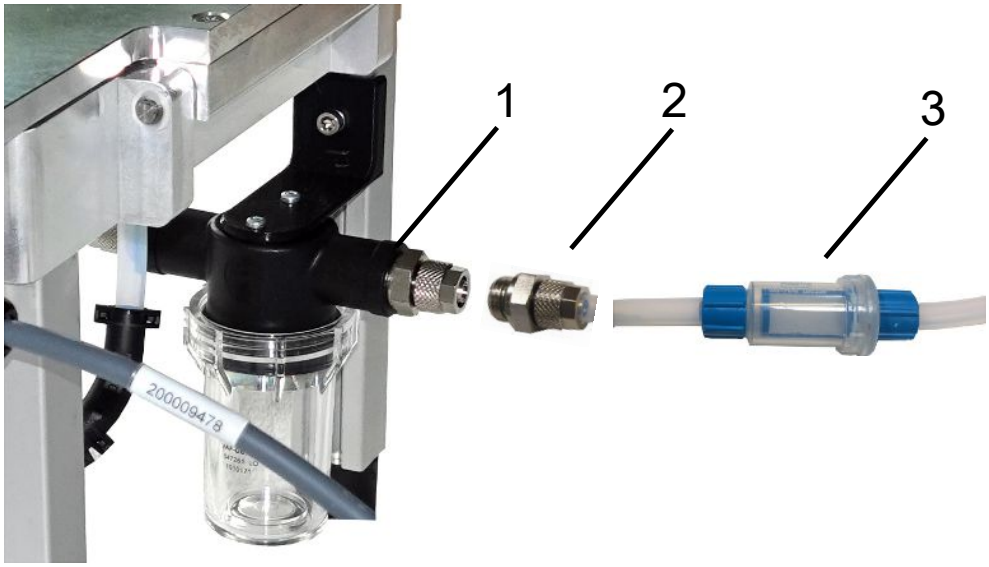
► Connect the test chamber to an equipotential bonding system.

► Do not operate the test chamber in the immediate vicinity of dangerous electrical voltages.

► Connect all test chambers to the equipotential bonding during integrated operation. This prevents uncontrolled electrostatic discharge when opening and closing the test chambers.

1	Potential equalization connection on the rear of the test chamber

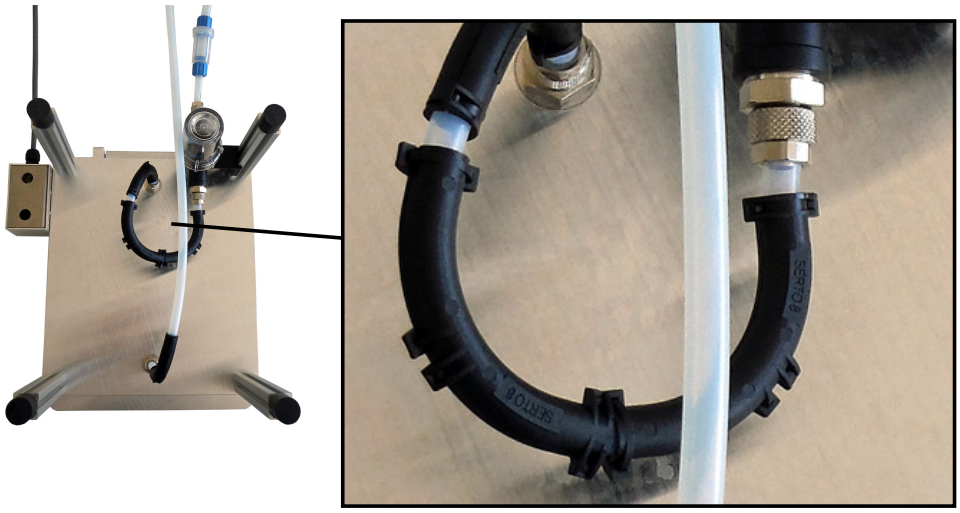
Hose connection



1	Preassembled union nut	3	Exhaust air hose with particle filter
2	Union nut		

1. Loosen the pre-assembled union nut from the liquid separator.
2. Push the union nut over the supplied exhaust air hose with particle filter and fasten it finger-tight.
3. Mount the exhaust air hose with the particle filter finger-tight on the liquid separator.
4. To lay the hoses without kinks, use the angle clips provided.

Angle clips



6 Operation

⚠ WARNING

Risk of injury from explosion

If both battery poles come into contact with the electrically conductive test chamber, a short circuit and thus high temperatures can occur in the tested battery.

► Do not perform a battery test without the original insulator.

► Only test obviously undamaged battery cells in this test chamber.

► Make sure that there is no material in the test chamber that could damage the battery (e.g. pointy, sharp objects).

► Leave batteries in the chamber only during the test period, and not permanently.

► Keep the test chamber clean and wash it regularly.

► No smoking.

► Keep ignition sources away from the test chamber.

⚠ WARNING

Respiratory tract irritation

The solvents in lithium-ion batteries can cause respiratory irritation and loss of consciousness if they leak from the battery.

► Avoid contact with irritating electrolytes.

► Only place vacuum-tight and obviously undamaged battery cells in this test chamber.

⚠ CAUTION

Warning about hand injuries

► Only open and close the test chamber when your fingers are outside the test chamber halves and outside the pivoting range of the test chamber.

⚠ CAUTION

Danger due to physical stress / ergonomics

Continuous opening and closing of the test chamber cover can result in fatigue of the arm muscles.

Incorrect setup of the test chamber can impair its moving parts.

► Plan enough breaks to avoid fatigue.

► Set up the test chamber so that there is no impairment of its moving parts.

► When setting up the test chamber, pay attention to the height and distance from the operator.

► Pay attention to the arrangement of the test object trays.

NOTICE

Property damage due to accumulation or blockage in detachable parts with solvents

Accumulation or blockage in detachable parts due to solvents lead to functional problems.

► Replace the liquid separator and particle filter as needed, otherwise annually.

► Replace all gaskets and hoses as necessary, otherwise annually.

6.1 Test procedure

This test chamber is used to perform leak tests on vacuum-tight and undamaged test objects (lithium-ion batteries).

Place the test object in the test chamber. By closing the cover you actuate the proximity switch and the measurement is started. The result of the test is shown on the display of the gas control unit.

By pumping out the air from the test chamber, a pressure gradient between test object and test chamber is generated. Due to this pressure gradient, gas flows through leakages out of the test object and into the test chamber. This gas is sent to the Gas Detection Unit (GDU) for analysis.

After the analysis, the result is compared with the configured setpoint. A distinguishable leak-proof/leaky signal is output.

You can now open the cover and remove the test object. Skin contact with electrolyte when cleaning the test chamber or removing leak-tested test object should be avoided.

The red LED lights up when a leak greater than the configured setpoint has been detected.

The green LED lights up when a leak less than the configured setpoint has been detected.

The two LEDs flash simultaneously during startup.

Both LEDs light up when there is a failure.

7 Maintenance

⚠ WARNING

Burns to the skin

Leaking batteries can release electrolyte, which in combination with water becomes hydrofluoric acid and is highly corrosive.

► Carefully remove minor, visible contamination of the test chamber with alcohol.

► Avoid contact with the electrolyte.

⚠ CAUTION

Risk of injury from contamination

Crystalline deposits or liquids in the system pose an increased risk of contamination.

► Always wear personal protective equipment during maintenance work.

Particle filter

► Replace the particle filter annually or as needed, e.g. noticeable solvent accumulation or blockage.

Liquid separator

► Replace the liquid separator annually and empty it as needed.

O ring

► Replace the O-ring of the test chamber in case of functional problems and external damage.

Insulator

► Replace the insulator in case of mechanical damage and wear.

8 Decommissioning

8.1 Disposal of test chamber

The owner can dispose of the device or it can be sent to INFICON.

The device consists of materials that can be recycled. This option should be exercised to prevent waste and also to protect the environment.

► During disposal, observe the environmental and safety regulations of your country.

8.2 Returning test chamber for maintenance, repair or disposal

⚠ WARNING

Danger due to harmful substances

Contaminated devices could endanger health. The contamination declaration serves to protect all persons who come into contact with the device. Devices sent in without a return number and completed contamination declaration will be returned to the sender by the manufacturer.

► Fill in the declaration of contamination completely.

1. Contact the manufacturer and send in a completed declaration of contamination before return shipment.

   ⇨ You will then receive a return number and the shipping address.

2. Use the original packaging when returning.
3. Before shipping the device, attach a copy of the completed contamination declaration to the outside of the package.

For contamination declaration see below.

9 Declaration of Contamination

Declaration of Contamination

The service, repair, and/or disposal of vacuum equipment and components will only be carried out if a correctly completed declaration has been submitted. Non-completion will result in delay.
This declaration may only be completed (in block letters) and signed by authorized and qualified staff.

1 Description of product
Type
Article Number
Serial Number

2 Reason for return

3 Operating fluid(s) used (Must be drained before shipping.)

4 Process related contamination of product:

toxic	no ❑ 1)	yes ❑
caustic	no ❑ 1)	yes ❑
biological hazard	no ❑	yes ❑ 2)
explosive	no ❑	yes ❑ 2)
radioactive	no ❑	yes ❑ 2)
other harmful substances	no ❑ 1)	yes ❑

The product is free of any substances which are damaging to health yes ❑

1) or not containing any amount of hazardous residues that exceed the permissible exposure limits

2) Products thus contaminated will not be accepted without written evidence of decontamination!

5 Harmful substances, gases and/or by-products
Please list all substances, gases, and by-products which the product may have come into contact with:

Trade/product name	Chemical name (or symbol)	Precautions associated with substance	Action if human contact

6 Legally binding declaration:
I/we hereby declare that the information on this form is complete and accurate and that I/we will assume any further costs that may arise. The contaminated product will be dispatched in accordance with the applicable regulations.

Organization/company
Address Post code, place
Phone Fax
Email
Name

Date and legally binding signature

Company stamp

Copies:
Original for addressee - 1 copy for accompanying documents - 1 copy for file of sender

10 CE Declaration of Conformity

EU Declaration of Conformity

We – INFICON GmbH - herewith declare that the products defined below meet the basic requirements regarding safety and health, and relevant provisions of the relevant EU Directives by design, type and the versions, which are brought into circulation by us. This declaration of conformity is issued under the sole responsibility of INFICON GmbH.

In case of any products changes made without our approval, this declaration will be void

Designation of the product:

Chamber for battery leak detector as interchangeable equipment for Battery leak detector ELT3000

Models: **TC3000S**

Catalogue numbers:

600-100

The products meet the requirements of the following Directives:

- ***Directive 2006/42/EC (Machinery)***
- ***Directive 2014/30/EU (EMC)***
- ***Directive 2011/65/EC (RoHS)***

Applied harmonized standards:

- ***EN ISO 12100:2010***
- ***EN 61326-1:2013***
  Class A according to EN 55011:2016+A1:2017
- ***EN IEC 60204-1:2016***
- ***EN IEC 63000:2018***

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Cologne, April 5th, 2022

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