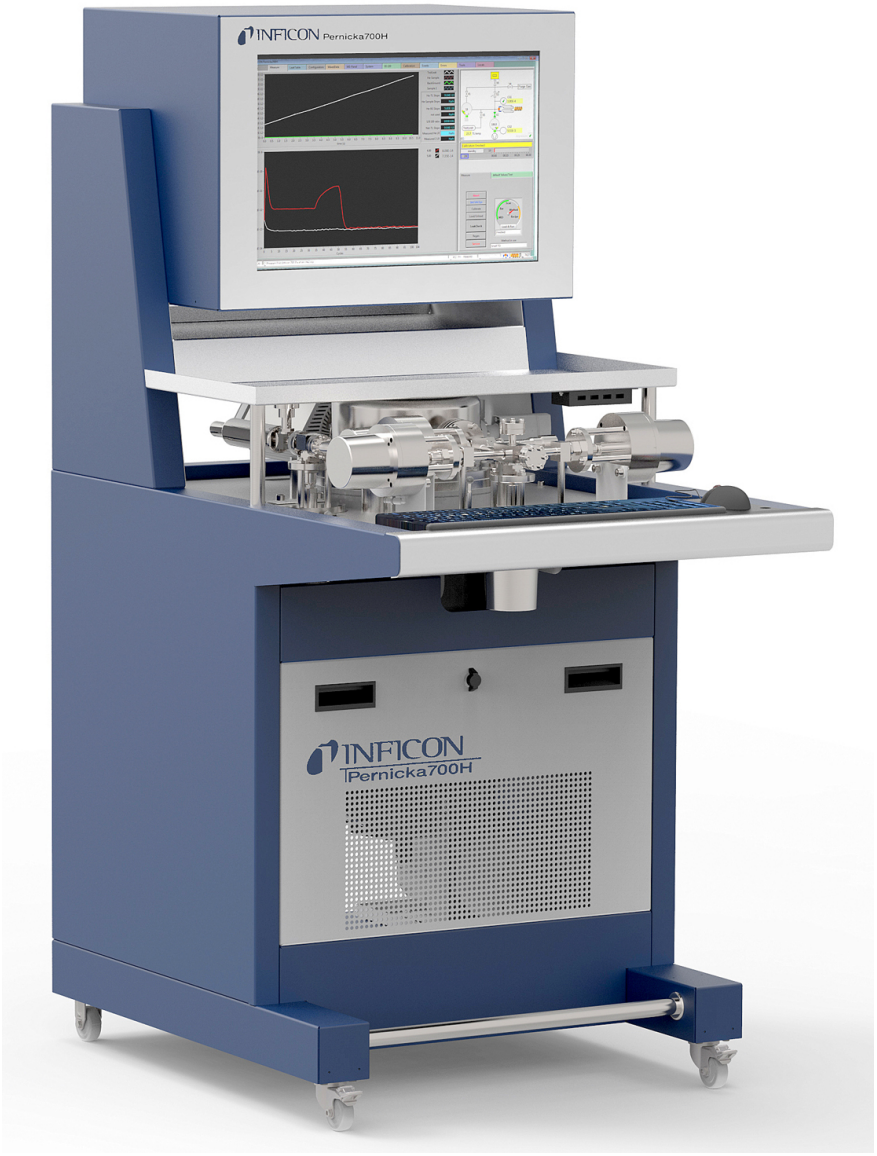


Translation of the original operating instructions

Pernicka 700H CHLD

Leak detector

Catalog No.
550-700, 550-701

From software version
7.01.04

jin76aen1-04-(1911)

INFICON GmbH
Bonner Strasse 498
50968 Cologne, Germany

Table of Contents

1 About these instructions

This document applies to the software version stated on the title page.

Product names may occur in the document, which are added for identification purposes only and belong to the respective owner of the rights.

1.1 Target groups

This instruction manual is aimed at the operator of the device, at technically qualified specialists, and trained personnel.

1.2 Other associated documents

Operating instructions CHLD-Sensor:	Operation Manual CHLD Sensor QME 220
Operating Instructions Turbo Molecular Pump:	Operating Instructions HiPace 300 Turbopump
Operating Instructions Backing Pump:	Operating Instructions GA01601_002_A1
Operating Instructions Compressor:	8200 Compressor Installation, Operation and Service Instructions
Operating Instructions cryogenic pump:	Cryo-Torr Pump Installation, Operation and Maintenance Instructions
Granville-Phillips-Sensor:	Instruction Manual
Spare parts CHLD700H accumulation leak detector:	Spare Parts CHLD700H Accumulation Leak Detector

1.3 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

1.4 Definition of terms

Use of gas types in the device

The device is a helium leak detector. If you want to use a forming gas instead of helium to detect the hydrogen contained therein, the information for helium also applies to hydrogen.

Automatic tuning / mass setting

This function adjusts the mass spectrometer so that a maximum leak rate indicator is achieved. In order to detect a maximum ion current with the ion detector, the control computer adjusts the voltage for accelerating the ions within the selected mass range accordingly.

During each calibration, the mass is adjusted automatically.

Operating mode

The leak detector distinguishes between the operating modes "Standby", "Measurement" and "Regeneration".

The device must be in the operating mode "Standby", before a measurement can begin. If the measurement process is aborted, the device is also in the operating mode "Standby".

With the operating mode "Measurement" tracer gas, which escapes from the test object is measured using a mass spectrometer (CHLD-Sensor). The result is shown as a helium raw signal (current in [A] unit) with the gross leak test and with the fine leak test as a leak rate in the unit [mbar l/s] or [atm cc/s].

In the operating mode "Regeneration", all gases except helium and hydrogen, are frozen out with the cryogenic pump. The frozen gases are separated in the ice state on the inner surface of the cryogenic pump. At regular intervals, these separated gases must be evaporated and removed from the system.

Forming gas

Forming gas is a collective term for gas mixtures of nitrogen and hydrogen.

Gross leak test

Gross leak test refers to a phase of the measuring procedure, in which the device checks the test object for gross leaks.

Accumulation

Accumulation is a phase during the measuring procedure. Tracer gas escaping from the test object is accumulated in the closed measuring system. The change in the tracer gas quantity over time serves to determine the leak rate.

Internal helium background

The measurement system of the leak detector also contains a residual amount of helium. This generates an internal measurement signal component (background signal), which superimposes on the leak display.

So that this background signal can be suppressed, an internal "background suppression" can be activated with the factory settings.

Minimum detectable leak rate

The minimum detectable leak rate which can be detected by the leak detector under ideal conditions (> 4 x 10^{-14} mbar l/s).

Background signal

Helium or hydrogen (as part of water) are natural components of air.

Before any leak detection, an amount of the adjusted tracer gas is already in the volume on the surfaces of the test chamber, supply lines, and even in the leak detector itself. This certain amount of tracer gas generates a measurement signal which is called the "Background signal". The ongoing evacuation of the test chamber continuously reduces this background signal.

Foreline pressure

Pressure of the backing pressure between the turbo molecular pump and the backing pump.

2 Safety

2.1 Intended use

The Pernicka 700H CHLD (Cumulative Helium Leak Detector) is a cumulative helium leak detector for measuring very small leak rates.

Improper use

Avoid the following, non-intended uses:

- Place the unit so that power switches / connections for power supply are not easily accessible
- Operation of the device with impermissible pressures for the pneumatic valves and the purge gas
- Using the compressor as a storage facility
- Using the compressor as a seat
- Using the compressor as a ladder
- Operating the device with untrained personnel
- Operating the device without connected protective conductor cable at the electronics box
- Operating the device with a test chamber into which no grid has been inserted

2.2 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, employee or third party.

Safety conscious operation

- Operate the device only if it is in perfect technical condition and has no damage.
- Only operate the device in accordance with this instruction manual, in a safety and risk conscious manner.
- 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 instructed personnel should be permitted to work with and on the device. The instructed personnel must have received training on the device.
- Make sure that authorized personnel have read and understood the operating instructions and all other applicable documents.

2.3 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, please contact Customer Service.

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 measuring instrument or other property may occur.

Dangers from electric power

There is a danger to life from the contact of conductive parts inside the device.

- Disconnect the device from the power supply prior to any installation and maintenance work. Make sure that the electric power supply cannot reconnected without authorization.

The device contains electric components that can be damaged from high electric voltage.

- Before connecting the device to the power supply, make sure that the supply voltage specified on the device is the same as the local power supply.

Mechanical energy hazards

Jerky movements of the device during operation can lead to blockage of the turbo molecular pump. There is a risk of injury due to the release of rotating energy or by parts moving around.

- Do not jerk the unit during operation.

Hazards due to loss of stability

If the transport rollers of the device are not locked, there is a risk of injury due to loss of the stability.

- Lock the transport rollers of the device.

Hazards due to materials and substances

If the exhaust filter on the backing pump is not checked regularly, there is a danger of poisoning by oil fumes.

- Periodically check the exhaust filter on the backing pump of the unit or connect the unit to an exhaust system.
- Only use the device away from areas with a risk of explosions.

Hazards due to breakage during operation

In the thawing cryogenic pump, a high pressure can develop when the turbo molecular pump stops. There is a risk of injury due to breakage of an unsuitable rupture disk on the cryogenic pump during operation.

- Only use a rupture disk suitable for the cryogenic pump.

3 Shipment, Transport, Storage

Scope of delivery

Item	Quantity
Pernicka 700H CHLD	1
Cryogenic pump compressor	1
Power supply cable	3
Helium-Supply-line	1
Helium-Return-line	1
Toolkit (tool)	1
Protective conductor electronic box	1
Wrist strap, light blue	1
Spiral cable for wrist band	1
Allen wrench, modified 9/64 inch	1
PE bags 100 mm x 150 mm x 0.05 mm	1
PE bags 180 mm x 250 mm x 0.05 mm	1
Transport box for Pernicka 700H CHLD	1
Tilt sensor	4
Shock sensor	4
Double label 110 x 60 mm	1
Original instruction manual	1
Supplier documentation (see Chapter "Other applicable documents")	1

► Check the delivery contents after receiving the product to ensure it is complete.

Transport

⚠ WARNING

Falling loads

The device does not have any crane eyelets. The handle is for only for sliding the device.

► Do not transport the device using lifting tackle.

⚠ CAUTION

Danger of crushing extremities

Feet can be rolled over and crushed.

► Keep feet away from the rollers.

► Do not pull on the device, but push the device.

NOTICE

Damage caused by transport

The unit and the cryogenic pump compressor can be damaged during transport. The delivery consists of a box with the Pernicka 700H CHLD and a cardboard box with the cryogenic pump compressor. The transport box is secured with tilt and shock sensors.

- If one of the indicators of the shock or tilt sensors is red, proceed as follows: Do not refuse to accept the delivery. Note the red indicator on the delivery note and immediately check the delivery for transport damage. If you notice any transport damage, do not open the package. Contact your transport company immediately.

Storage

Store the device and the cryogenic pump compressor observing the technical data, see "Technical data [▶ 26]".

See also

- Other associated documents [▶ 7]

3.1 Unpacking the device and compressor

The delivery consists of the transport box containing the Pernicka 700H CHLD and a carton with the components as supplied, as well as a cardboard box with the cryogenic pump compressor.

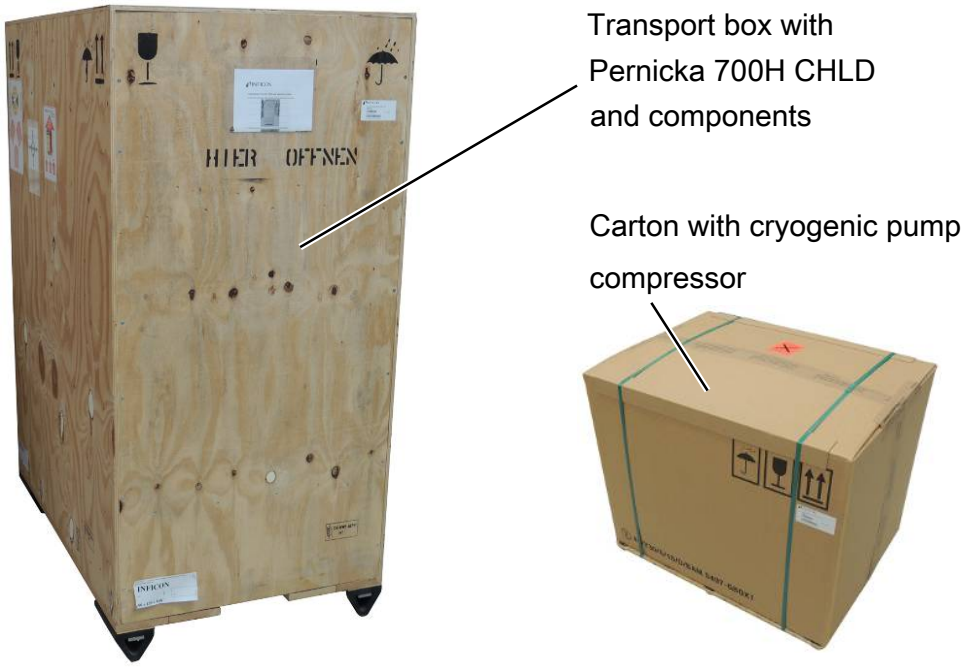
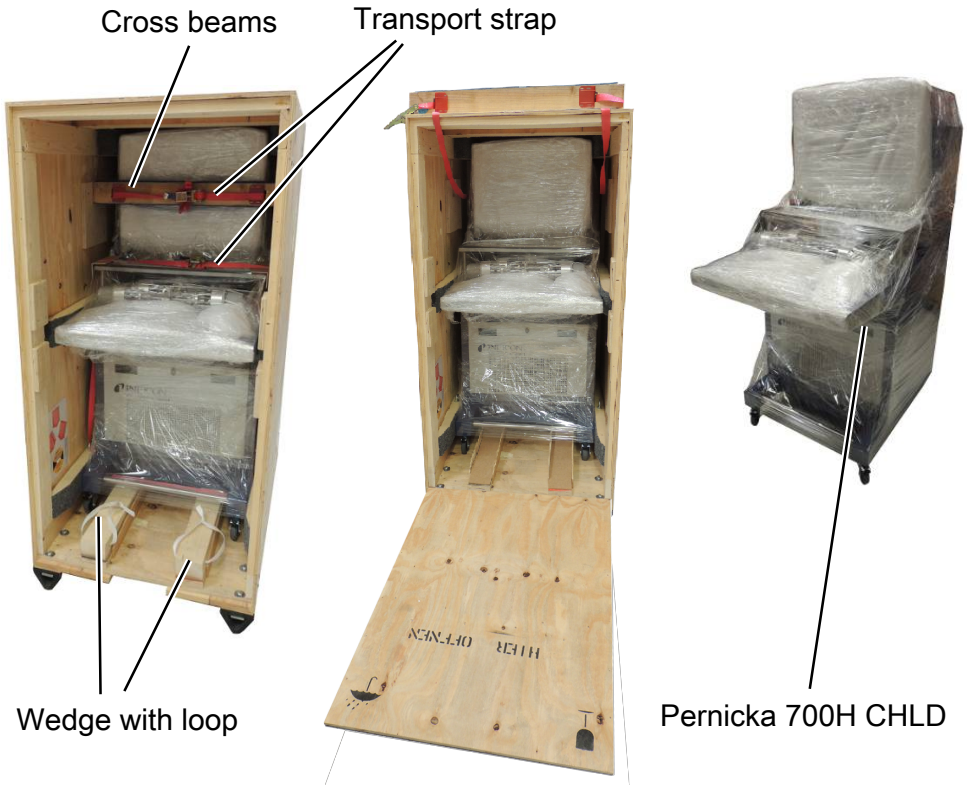


Fig. 1: Components of the delivery

3.1.1 Unpack the device

1. Remove the screws from the front panel of the transport box.
2. Remove the front panel from the transport box.

3. Remove the packing material from the transport box.
4. Remove the carton from the transport box.
5. Open the carton, remove the packaging material and remove the components.



6 Loosen the 2 transport straps.

7 To loosen the 2 wedges, pull on the loops.

8 Remove the cross beam from the transport box.

9 Place the 2 wedges in front of the transport box on the floor.

10 Place the front plate on the wedges, creating a ramp.

11 Loosen the brakes on the transport rollers and carefully pull the device out of the transport box.

⚠ CAUTION

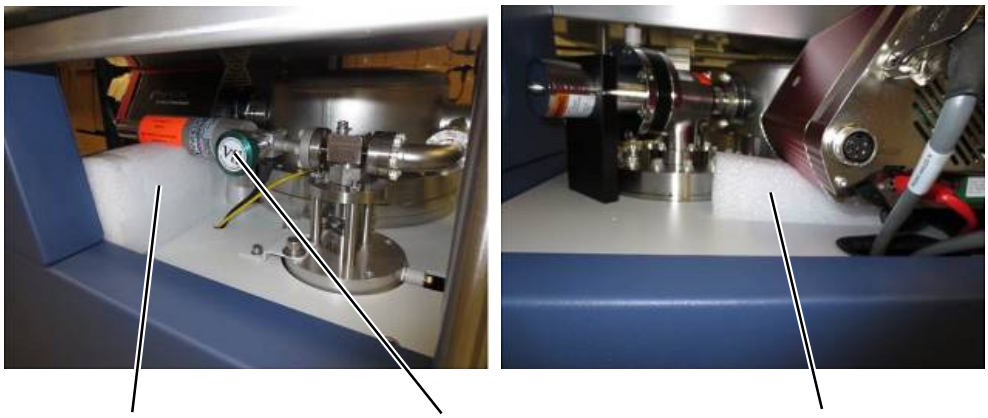
Danger of crushing extremities

Feet can be rolled over and crushed.

- Keep feet away from the rollers.

12 Remove the protective film from the device.

13 Remove the foam sheet from the vacuum components and from the monitor.



14 Remove the 2 foam blocks from under the CHLD-Sensor and from under calibration leak.

15 Remove the adhesive tape from the hand valve of the test leak.

16 Ensure that the hand valve of the test leak is open.

17 Remove all cable ties that secure the cables to the housing.

18 Slide the device to its destination.

3.1.2 Unpack the compressor

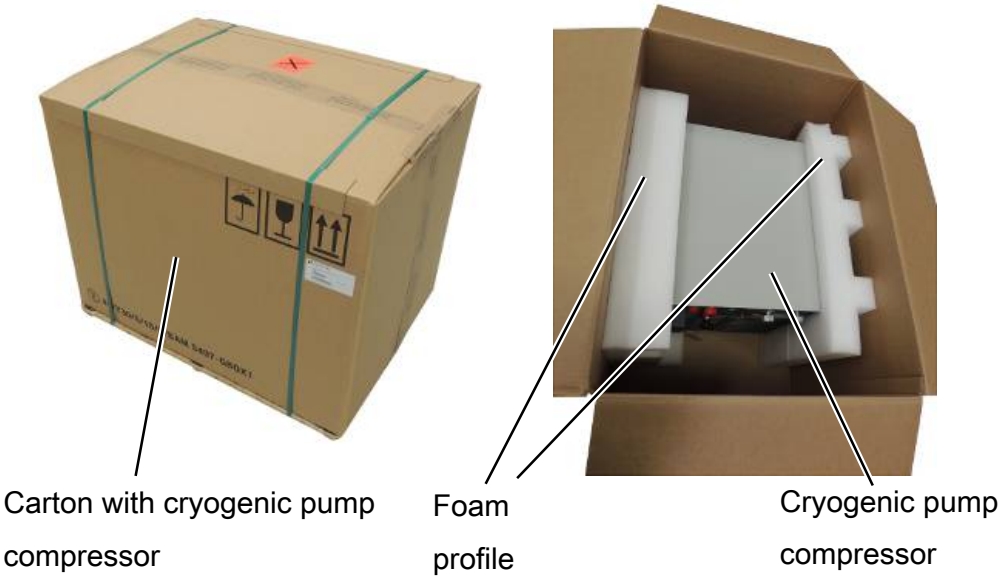
⚠ CAUTION

Danger of injury when lifting the heavy cryogenic pump compressor

The cryogenic pump compressor weighs approx. 68 kg and can slip out of your hands.

► Lift and transport the cryogenic pump compressor only with two people.

► To lift get hold below the floor panel.



1. Open the carton and remove the packaging material.
2. Carefully lift the compressor out of the carton.
3. Remove the foam profiles from the compressor.
4. Move the compressor to its destination.

4 Description

4.1 Function

The device is a leak detector for detecting and measuring leaks in sealed test objects.

Description of the measurement process

The device is in the "Standby" operating mode at the start of the measurement process.

The test chamber for receiving the test object filled with the tracer gas, e.g. helium, is located centrally in front of the device. Insert the test object and close the test chamber lid. Start the measurement process

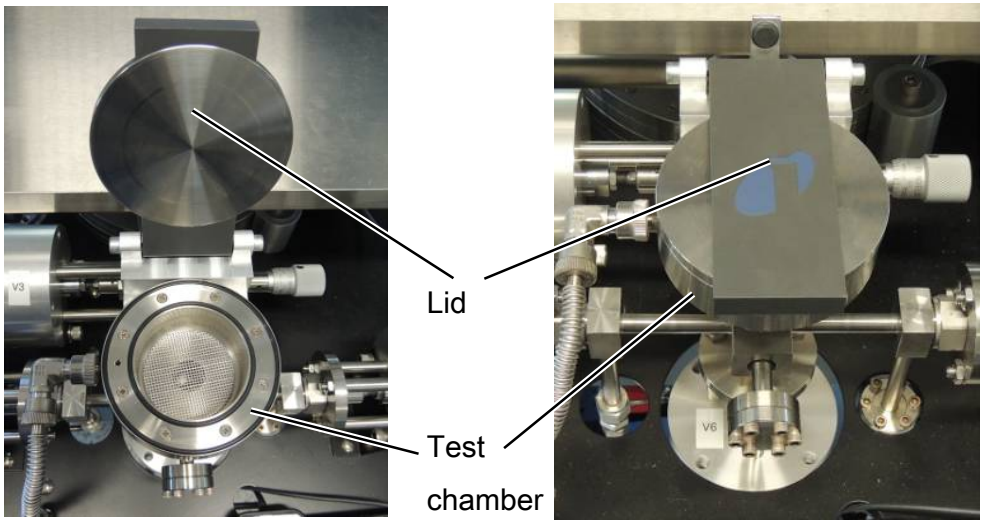


Fig. 2: Test chamber: Lid open (left) and lid closed (right)

During the automatically running measurement process, first the internal volume of the test chamber and the volume between the two sealing rings on the upper side of the test chamber are purged with purge gas, preferably with argon 5.0. After the completed purging process, the purge gas is pumped out of the test chamber, from the volume between the 2 sealing rings as well as from the valve block.

After checking the permissible pressure for the operation of the mass spectrometer (CHLD-Sensor) the valve block is then evacuated. Finally the CHLD-Sensor is switched on. The CHLD-Sensor is switched off before the valve is opened to the test chamber. If the pressure is sufficiently low (in particular, the lid of the test chamber must be closed), the CHLD-Sensor is switched on.

The gross leak test is started. With the gross leak test the current of the helium raw signal is indicated in amps [A]. A setpoint set before the start of measurement is used as the abort criterion for this measurement process (see "Set the setpoint for gross leak test [▷ 55]"). If the helium signal exceeds this setpoint, a fine leak test is not carried out after the gross leak test and the measurement process is terminated. If the

helium signal falls below this setpoint, the helium is removed from the system with the turbo molecular pump and then the measurement process is continued with the fine leak test.

In the fine leak test, the gases escaping from the test object, except for helium, are pumped out with the cryogenic pump. During the accumulation measurement, the quantity of helium escaping from the test object is determined. As a result of the fine leak test, the leak rate is calculated in the unit of measurement [mbar l/s] or [atm cc/s] and displayed on the monitor. The test chamber is purged and the measurement process is terminated.

The measurement process is terminated and the device is again in "Standby" operating mode.

4.2 Operation modes

4.2.1 Operating mode Standby

Before a measurement can be started, the device must be in "Standby" operating mode.

The device is in "Standby" operating mode:

- when the measurement process has been terminated normally after the fine leak test;
- when the measurement process was terminated after the gross leak test;
- after a completed regeneration;
- when the device is switched on.

In the "Standby" operating mode the valves V1, V3, V4, V5, and V6 are closed. The valve V2 is open.

During the "Standby" the test objects can be changed.

4.2.2 Operating mode measurement

If there is a leak, the tracer gas escaping from the test object is measured with the help of a CHLD-Sensor and the leak rate is displayed as a result with the unit [mbar l/s] or [atm cc/s].

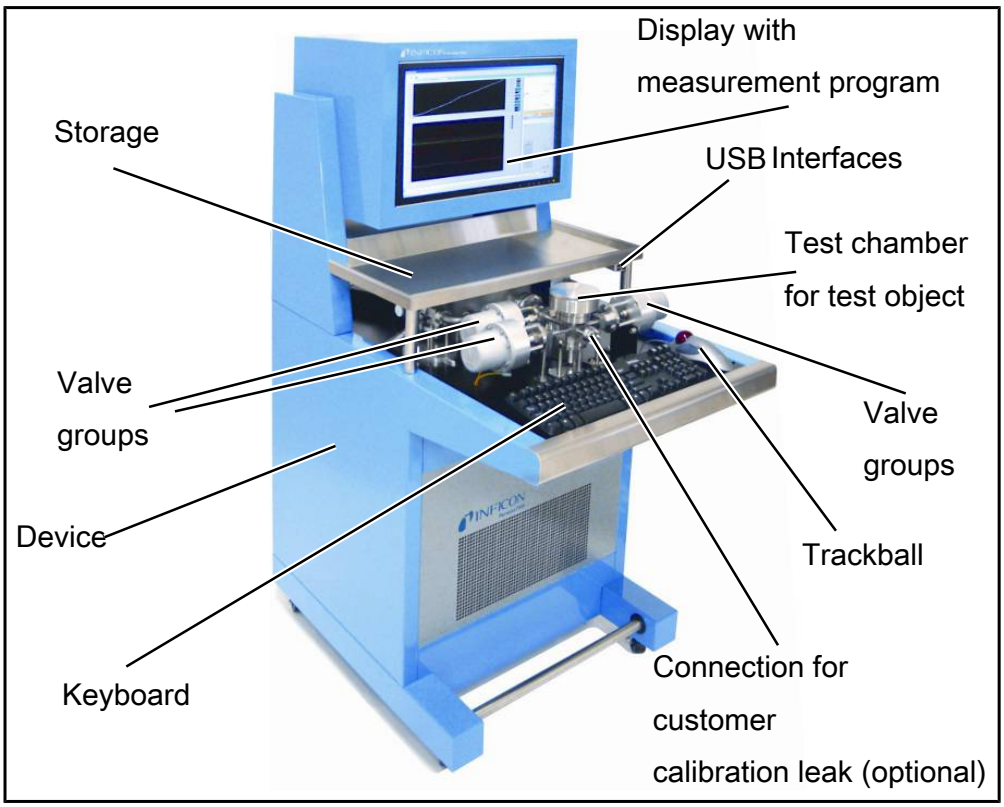
4.2.3 Operating mode regeneration

The device has a cryogenic pump, which freezes all gases except helium and hydrogen. The frozen gases are separated in the ice state on the inner surface of the cryogenic pump. At regular intervals these separated gases must be evaporated in the "regeneration" operating mode and removed from the system.

4.3 Construction

4.3.1 Device and compressor

Device



Cryogenic pump compressor

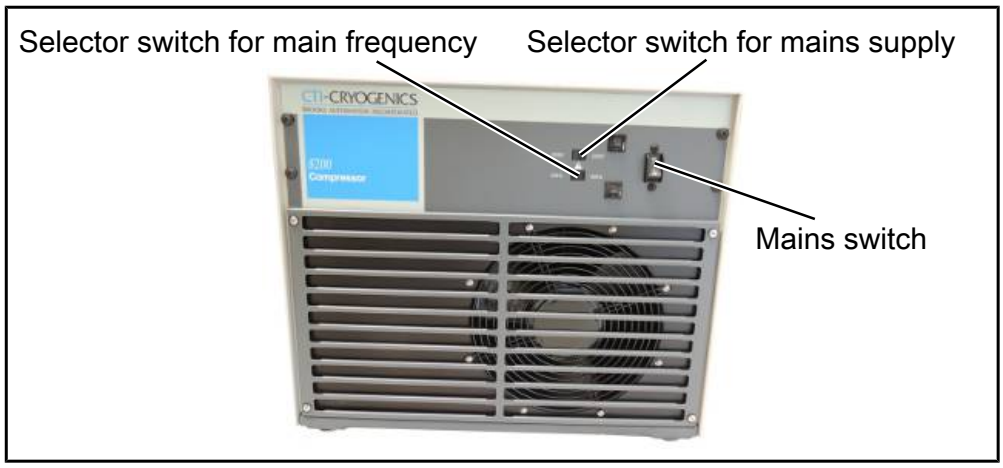


Fig. 3: Device (top) and cryogenic pump compressor (bottom): Front view

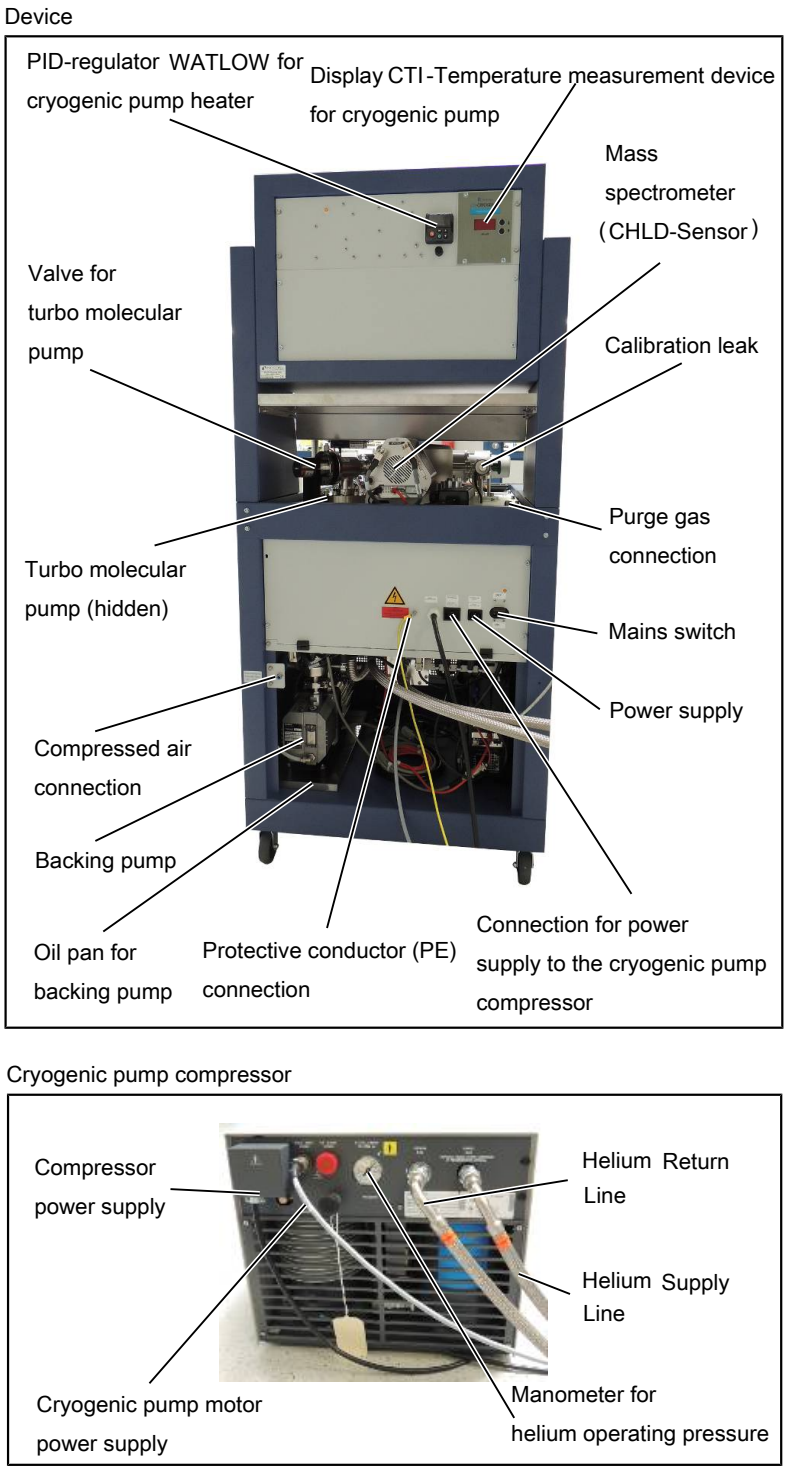


Fig. 4: Device (top) and cryogenic pump compressor (bottom): Back view

4.3.2 Control unit

The control unit consists of a monitor, a keyboard and a Trackball.

USB 2.0 interfaces	For the insertion of a USB flash drive for copying or saving measured data.

	For the insertion of a USB bar code reader for the automatic detection of information of the test objects to be measured. For the insertion of a USB flash drive with Update information or for connecting a USB printer to print out test results.

4.3.2.1 Display

The windows with the necessary setting options for preparing, carrying out and evaluating the measurement process are shown on the monitor.

Design and structure of window is shown as an example with the window "Measure", which appears after switching on the device.

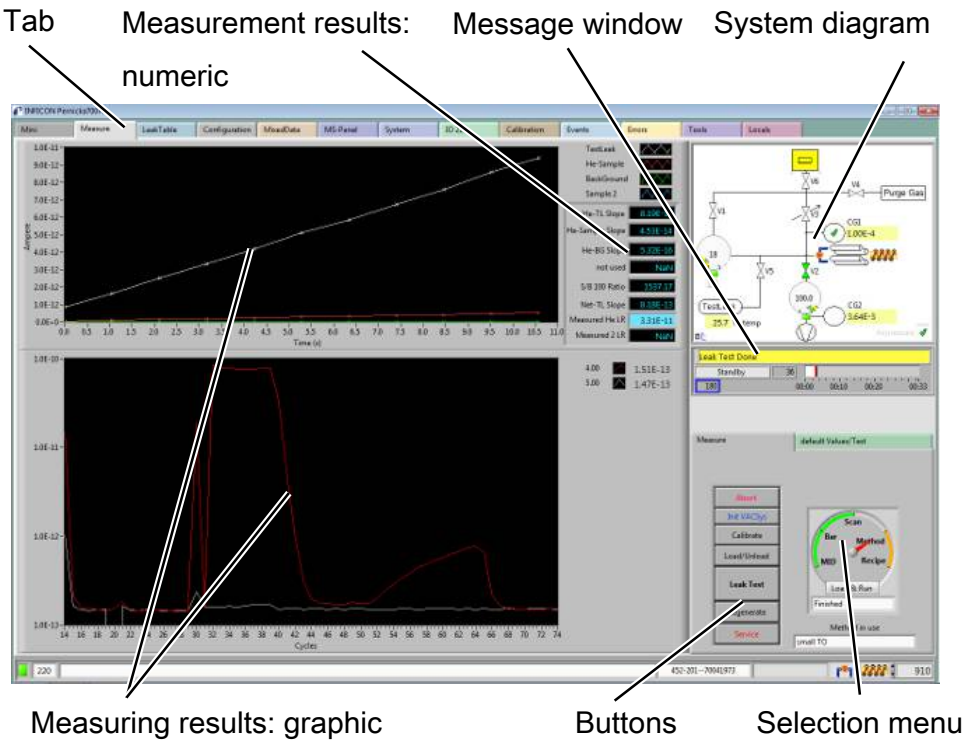


Fig. 5: Design and structure of the window

Tab

► To open a window, press the tab with the same name.

Measurement results: Numeric

To display the measurement results as numerical values.

Message window

Displays status messages and information.

System diagram

Displays the current states of the individual components of the device during a measurement process.

Selection menu

To select modes with expanded functionality.

► To select a mode, click the name of the mode with the left mouse button in the selection menu and then press the "Load & Run" button.

Buttons

► To enter a function, press the corresponding button.

Measurement results: Graphical

To display the measurement results as time-related line graphs.

Line graph in the upper diagram are linearly scaled. Line graph in the lower diagram are logarithmically scaled.

4.3.3 Vacuum connections

4.3.3.1 Exhaust

The device is equipped with an exhaust filter on the backing pump as standard. The exhaust filter is located on the backing pump in the lower area of the device. The evaporated gases are guided out of the device through the exhaust filter.

► When using the device in a clean room connect it to an exhaust system. See "Connecting the device to an exhaust system (optional) [37]".

⚠ WARNING

Hazardous gases

Depending on the connected container and the gas contained therein, harmful gases can get into the ambient air via the exhaust filter of the leak detector.

► Make sure you have protection measure to prevent inhaling hazardous gases.

4.3.3.2 Purge gas connection

The connection for the purge gas is located on the lower side of the device, see "Connections for accessories and control signals [▷ 24]". The connection is a metal crimp screw connection for metal cables made of stainless steel or copper with a diameter of 6.35 mm.

For purging, use a gas without any tracer gas components, this means especially a helium-free gas at atmospheric pressure. Connect a gas supply line (e.g. Argon 5.0) via the hose connection.

The pressure of the gas line should not be more than 50 mBar (overpressure).

4.3.4 Connections for accessories and control signals

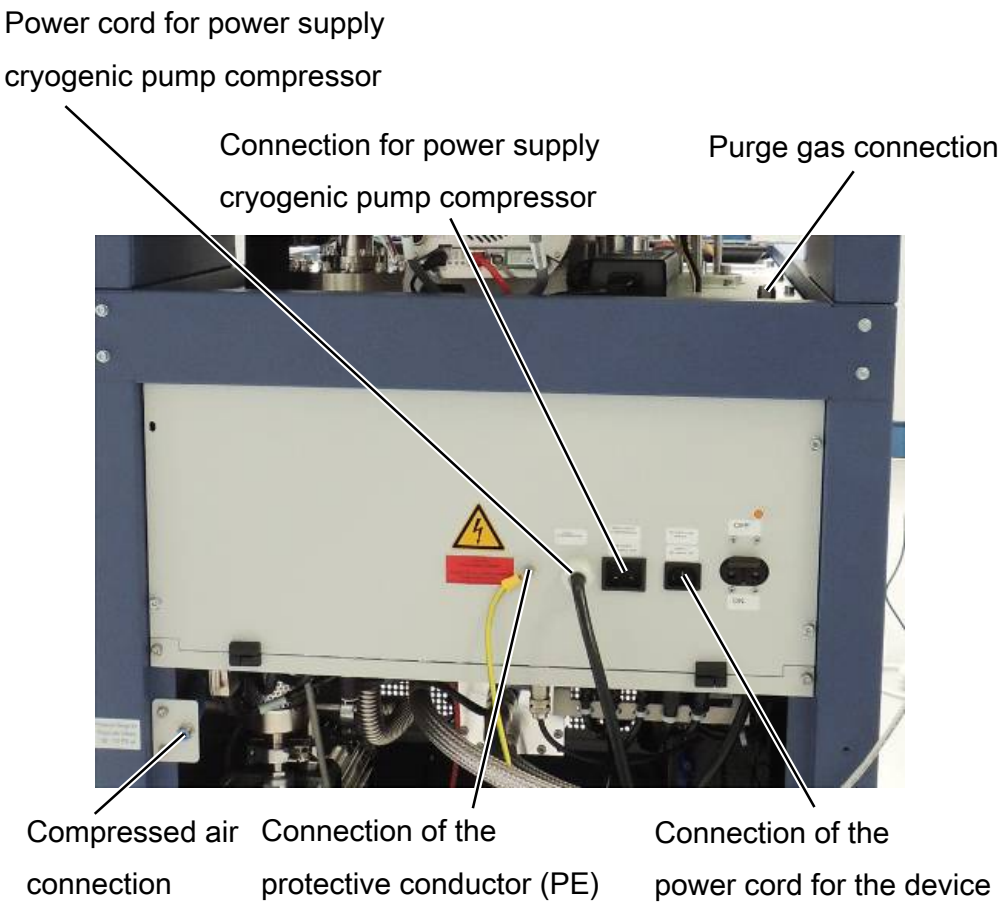


Fig. 6: Connections for control signals and accessories

NOTICE

The electronics of the device can be destroyed

- Only connect devices which are provided for the appropriate interfaces.

The connections for the external devices show a safe disconnection from the mains and are within the range of the safety extra low voltage (SELV).

4.3.4.1 Adjust the filtering of the measuring signals

INFICON GmbH recommends that you do not change the factory settings.

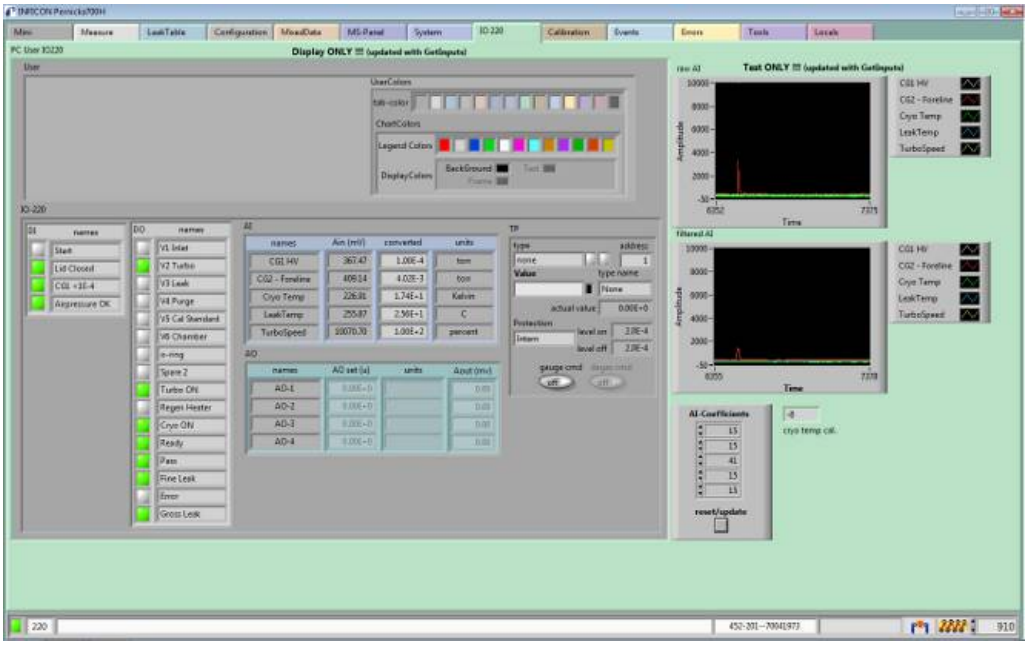


Fig. 7: Window "IO 220"

► To open the "IO 220" window, press the tab "IO 220".

The active digital inputs and outputs are displayed in the "IO 220" window. The same information is also provided for the analog signals. The upper window shows the raw data of the analog signals. The lower window shows the analog signals with the selected filter.

1. To influence the filtering, select the corresponding values in the field "AI Coefficients".
2. Press the "reset/update" button.

⇨ The result of the changed filter is shown directly in the lower window.

4.3.5 Markings on the device

The markings on the device have the following meanings:

	Operate the device only with the protective conductor (PE) connected. Only operate the device with the protective conductor cable connected to the electronics box.

4.3.6 Technical data

4.3.6.1 Mechanical data

Device

Dimensions (W x H x D)	660 mm x 1390 mm x 870 mm
Weight	245 kg

4.3.6.2 Electrical data

Device

Main fuse	Internal over-current protection, resettable
Nominal power	2300 VA
Nominal voltage	110 V, 50/60 Hz (Order number: 550-700) 230 V, 50/60 Hz (Order number: 550-701)
Nominal current	15 A (Order number: 550-700) 10 A (Order number: 550-701)
Protection class	IP 20
Excess voltage category	II
Electronic interfaces	USB, Ethernet interface

Compressor for cryogenic pump

Nominal voltage	208 V ... 240 V, 50/60 Hz
Nominal current	10 A

4.3.6.3 Physical data

Device

Minimum detectable leak rate for helium	> 4 x 10^{-14} mbar l/s
Leak rate internal test leak	approx. 5 x 10^{-10} mbar l/s
Pneumatic pressure valves	7.5 bar - 9 bar
Pressure of the helium supply for the cryogenic pump compressor	16.9 bar - 17.25 bar (over-pressure)

Pressure supply purge gas (Argon 5.0)	35 mbar - 70 mbar (over-pressure)
Vacuum system	Cryogenic pump Turbo molecular pump Backing pump
Detectable masses	2 - 100
Connection of customer test leak	DN 16 CF

4.3.6.4 Ambient conditions

Device

Permissible ambient temperature (during operation)	15 °C ... 28 °C
Permissible storage temperature	10 °C ... 45 °C
Max. relative humidity up to 31 °C	80 %
Max. relative humidity from 31 °C to 40 °C	linearly decreasing from 80 % to 50 %
Max. relative humidity above 40 °C	50 %
Pollution degree	II
Max. altitude above sea level	1000 m

5 Installation

5.1 Prerequisites for the installation

Read and observe the supplied documentation for the compressor "Cryo-Torr Pump Installation, Operation and Maintenance Instructions".

Read and observe the technical data. See original operating instructions, chapter "Technical data [▷ 26]".

✓ The device, the cryogenic pump compressor and all parts included in the scope of delivery have been unpacked and checked for external damage. See original operating instructions, chapter "Shipment, Transport, Storage [▷ 13]".

✓ The prerequisites for a successful measurement operation defined in the following list are met.

► Check.

	Present	Not present
Device footprint: 1 m^2	☐	☐
Compressor footprint: 0.5 m^2	☐	☐
Allowable ambient temperature for the device (when operating): 15 °C ... 28 °C	☐	☐
Allowable ambient temperature for the compressor (when operating): 10 °C ... 38 °C	☐	☐
Max. relative humidity for the device up to 31 °C: 80 %	☐	☐
Device nominal power: 2300 VA	☐	☐
Device nominal voltage: 110 V, 50/60 Hz (Order number: 550-700) Device nominal voltage: 230 V, 50/60 Hz (Order number: 550-701)	☐	☐
Device nominal current: 15 A (Order number: 550-700) Device nominal current: 10 A (Order number: 550-701)	☐	☐
Compressor nominal voltage: 208 V ... 240 V, 50/60 Hz	☐	☐
Compressor nominal current: 10 A	☐	☐
Operate the compressor on a separate electrical circuit	☐	☐
Compressed air supply: 7.5 bar - 9 bar	☐	☐
Compressed air connection: 6 mm hose	☐	☐

	Present	Not present
Purge gas supply: Argon 5.0 or better Alternative purge gases are permissible depending on the application. Please contact INFICON GmbH.	☐	☐
Pressure reducing valve for purge gas supply: < 50 mbar rel., 10 l/min. Recommendation: Use the INFICON pressure reducer, catalog number: 551-700S, available for 4 different bottle threads	☐	☐
Purge gas supply from the pressure reducer to the device: 6.35 mm copper or stainless steel pipe	☐	☐
Helium background in the operating environment of the device: < 6 ppm	☐	☐

- Install the device, the cryogenic pump compressor and all parts included in the scope of delivery. See original operating instructions, chapter "Installation [▷ 28]".

5.2 Setup

⚠ DANGER

Health risk due to exhaust fumes and vapors

Exhaust fumes and vapors from pumps can be a health risk.

- When operating in badly vented rooms connect an exhaust hose onto the exhaust connection when using gases which cause a health risk (see "Connecting the device to an exhaust system (optional) [▷ 37]").

⚠ WARNING

Danger from liquids, moisture and electricity

Moisture entering the device can lead to personal injury due to electric shocks as well as damage to property due to short circuiting.

- Only operate the device in dry environments and only in buildings.
- Operate the device away from sources of liquid and moisture.
- Place the device where you can always reach the mains plug.
- Do not operate the device standing water and do not let even a drop of water or other liquids on the device.
- Prevent the device from coming into contact with bases, acids and solvents.

⚠ CAUTION

There is a danger uncontrolled rolling away

When on an incline the device can roll away uncontrollably.

- Fix the device by latching the front rollers.

NOTICE

Material damage from overheated device

The device and above all the cryogenic pump compressor become warm during operation and can overheat without sufficient ventilation.

- Please note the technical specifications.
- Ensure sufficient ventilation, especially on the ventilation slots on the left and right of the device: Free space in the front, rear and sides of at least 10 cm for the device; 1 m for the cryogenic pump compressor.
- Keep heat sources away from the device and from the cryogenic pump compressor.

Avoiding measurement errors due to helium sources in the device environment

The helium concentration in the region of the Pernicka 700H CHLD may differ only insignificantly from the natural helium concentration of 5 ppm. The detection limit of the Pernicka 700H CHLD is strongly impaired by higher helium concentrations.

5.3 Connecting the compressor

NOTICE

Damage to the cryogenic pump compressor due to incorrect settings

Incorrect setting of mains voltage and mains frequency can damage the cryogenic pump compressor.

To correctly set the cryogenic pump compressor on the device with the order number 550-700, set the cryogenic pump compressor to: 208 V, 60 Hz.

To correctly set the cryogenic pump compressor on the device with the order number 550-701, set the cryogenic pump compressor to: 230 V, 50 Hz.

NOTICE

Damage to the cryogenic pump compressor due to unfavorable installation location

Too small and not sufficiently ventilated location can damage the cryogenic pump compressor.

- ► Choose as a location for the compressor a sufficiently ventilated room and a minimum distance of the compressor to the walls of 1 m.

Cryogenic pump compressor

Read and follow the included documentation "Cryo-Torr Pump Installation, Operation and Maintenance Instructions".

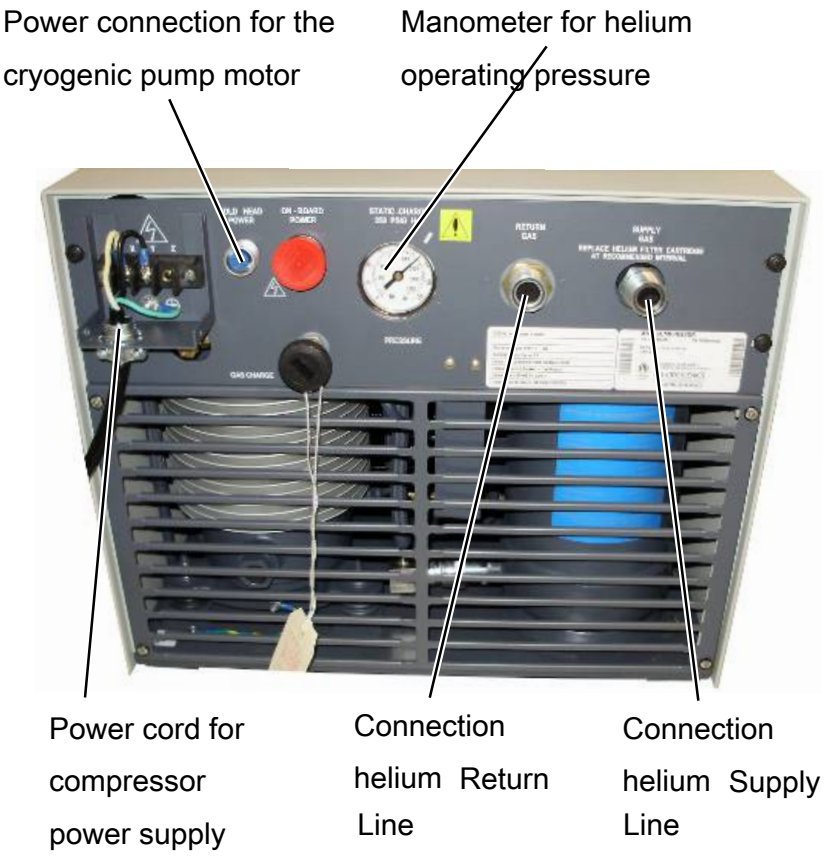


Fig. 8: Connections on the cryogenic pump compressor

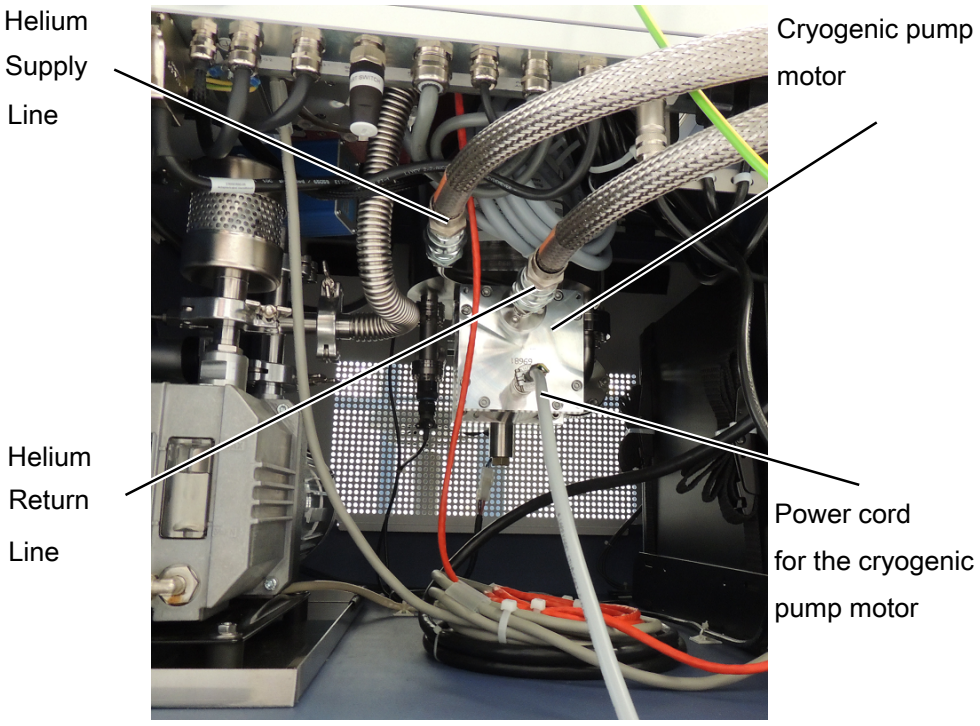


Fig. 9: Connections on the device

Install helium lines

The "Supply" and "Return" helium lines are filled with helium in the delivery state of the device and are under pressure.

1. Remove the blank flanges from the connections of the helium lines and keep the blank flanges in a safe place.
2. Install the helium Return line to the compressor and the device. Use an open-ended wrench to turn the screw connections as far as the stop and then turn 1/4 turn in the opposite direction.
3. Install the helium Supply line to the compressor and the device. Use an open-ended wrench to turn the screw connections as far as the stop and then turn 1/4 turn in the opposite direction.

Install the power cord for the motor of the cryogenic pump

The power cord for the power supply of the cryogenic pump motor is mounted in the delivery state on the device.

► Insert the round connector of the mains cable into the COLD HEAD POWER socket and turn the threaded housing hand-tight.

Install the power cord for the compressor power supply

The power cord for the power supply of the compressor is mounted in the delivery state on the device.

1. Remove the screw with nut from the 3 wires of the power cord and keep the screw with nut in a safe place.
2. To remove the protective cover from the electrical connection of the compressor, loosen the 2 fixing screws.
3. Feed the power cord through the strain relief and clamp the power cord with the 2 screws.
4. Connect the green wire to the protective conductor connection.
5. Clamp the white conductor (neutral conductor) at the terminal marked Y.
6. Clamp the black conductor (phase) at the terminal marked X.
7. Assemble the protective cover with the 2 securing screws.

Fig. 10: Compressor: Terminal points for the connection of the power cord

5.4 Connecting the compressed air

Use a compressed air hose made of polypropylene with a diameter of 6 mm for the compressed air supply.

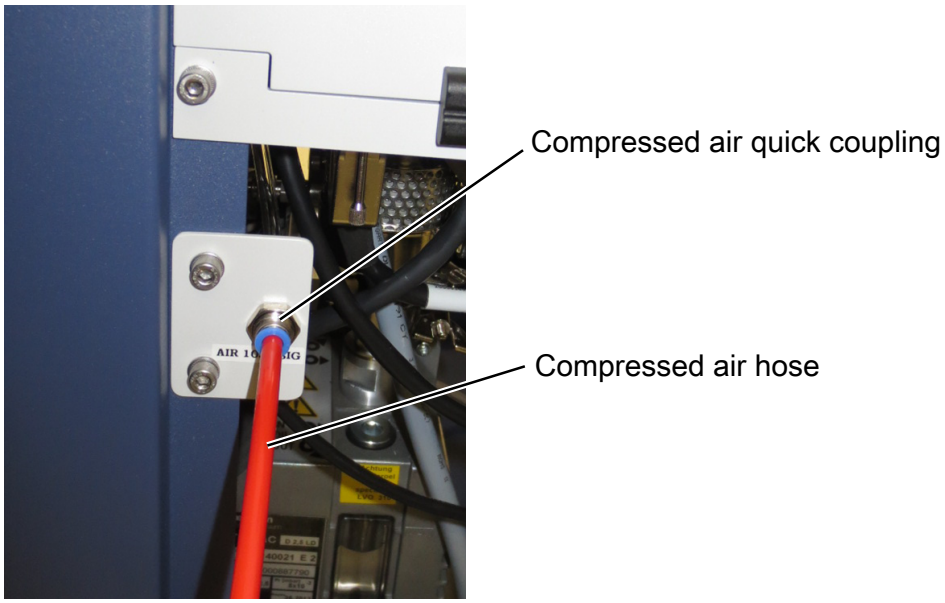


Fig. 11: Connecting the compressed air

1. To establish the compressed air supply for the device, insert the compressed air hose into the air pressure quick coupling of the device until the quick-action quick-release coupling engages.
2. Connect the other end of the compressed air hose to the compressed air supply.
3. Set an operating pressure (relative pressure) > 7.5 bar and < 9 bar. An overpressure valve is integrated, which, when the pressure applied to the device is exceeded, audibly releases pressure.
4. Open the valve on the compressed air supply.

5.5 Connecting the purge gas

Use only Argon 5.0 or better as purge gas.

Use a metal line made of stainless steel or copper with a diameter of 6.35 mm for the purge gas supply.

The sealing elements ferrel and clamping ring remain on the metal line and do not have to be renewed as long as the same metal line is used.

- If you are using a new metal line for the purge gas supply, replace the ferrel and the clamping ring of the compression fitting.

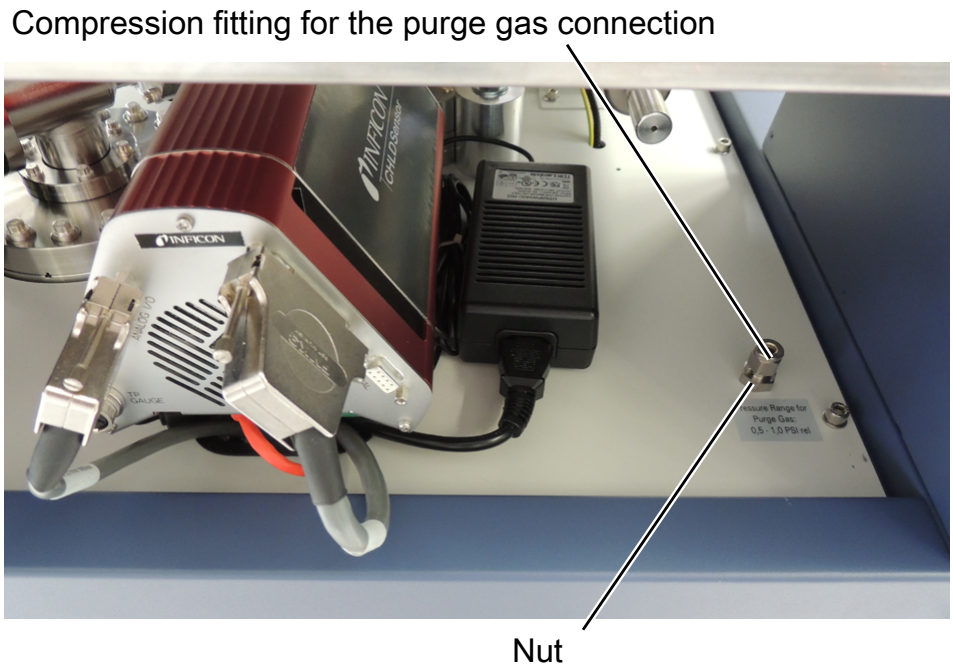


Fig. 12: Connecting the purge gas

1. To install the purge gas supply for the device, plug the metal line of the purge gas supply into the compression fitting of the device.
2. Using an open-ended wrench, hold the nut and tighten the union nut of the compression fitting with an open-ended wrench and sufficient torque.

5.6 Connect the device to the mains power

⚠ WARNING

Danger from electric shock

Improperly earthed or protected products may be dangerous to life in case of a fault. The use of the device is not permitted without a connected protective conductor.

- Only use the included 3-wire power cord provided.

⚠ CAUTION

Danger due to incorrect mains voltage and mains frequency

Incorrect mains voltage and incorrect mains frequency can lead to the destruction of the device and personal injury.

- Check that the mains voltage and mains frequency permissible for the Pernicka 700H CHLD as well as the included cryogenic pump compressor comply with the mains voltage and mains frequency available at the place of use.

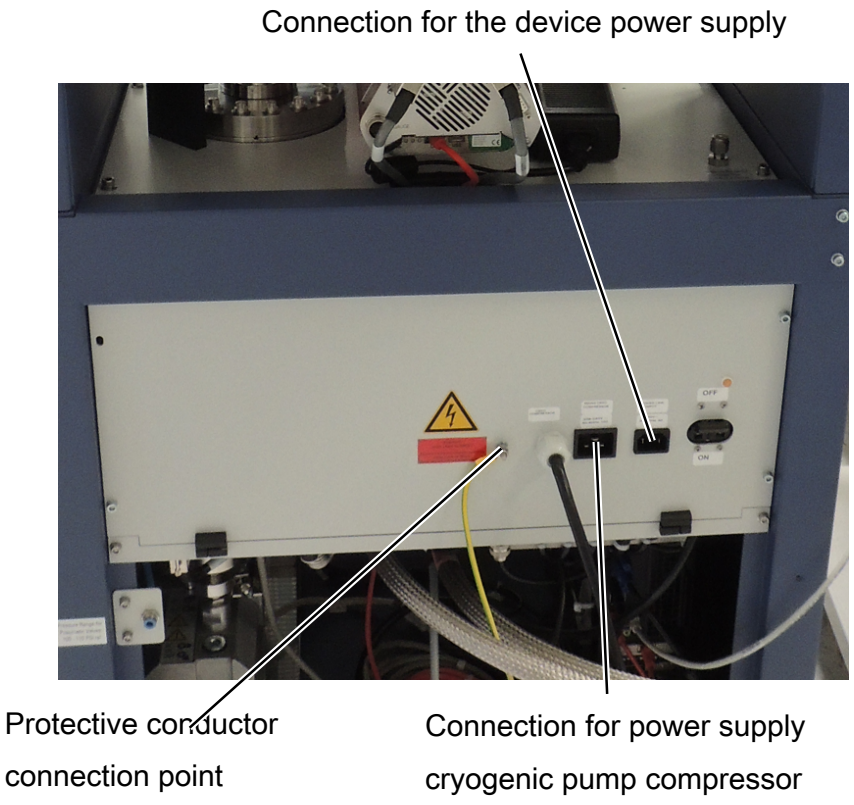


Fig. 13: Connect the device to the mains power

1 Install the protective conductor with a sufficient length and cross-section to the protective conductor connection point of the device.

2 Plug the supplied power cord into the MAINS CRYO COMPRESSOR plug and connect the power cord to the power supply.

3 Plug the supplied power cord into the POWER LINE INPUT plug and connect the power cord to the power supply.

5.7 Connecting the device to an exhaust system (optional)

1 To turn the device off, set the power switch to OFF. Disconnect the device from the power supply and secure the device against re-activation.

2 Switch off the backing pump.

3 Hold the exhaust filter with one hand and loosen the wing nut of the clamping ring.

4 Remove the exhaust filter from the backing pump.

5 Use a suitable connection piece, e.g. a 90-degree hose adapter with KF 16 on the pump side, onto the backing pump.

6 Tighten the wing nut of the clamping ring.

7 Connect the connecting piece to your exhaust system.

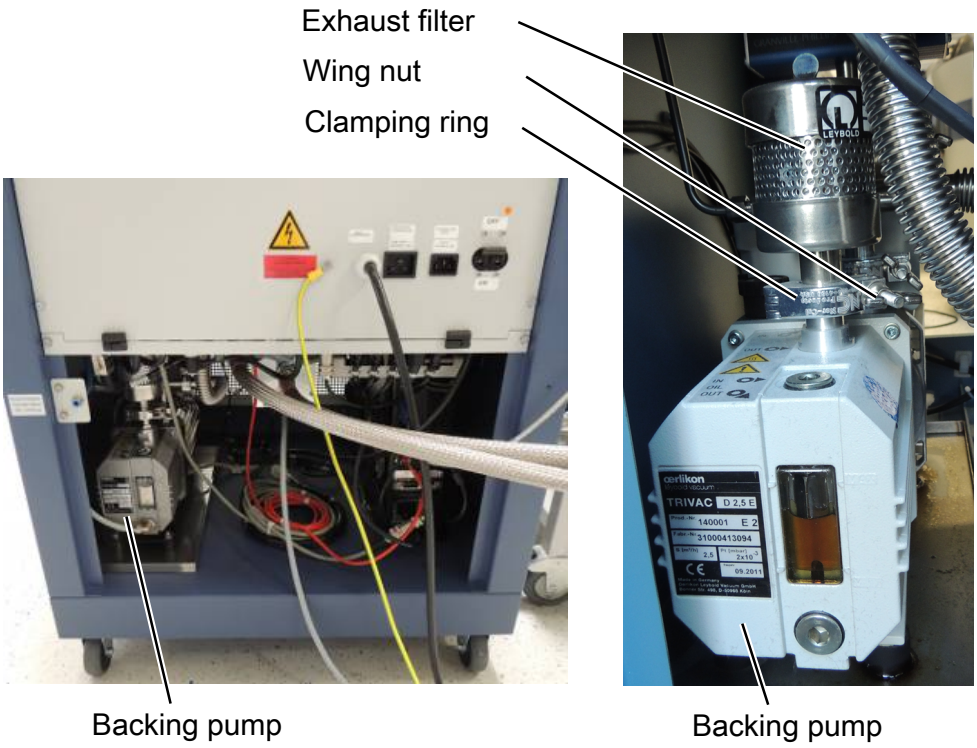


Fig. 14: Connecting the device to an exhaust system

5.8 Mounting the test chamber

- To mount or to change the test chamber, place the device in the "Standby" operating mode and then turn off the device. The device is in the "Standby" operating mode before a measurement process is started and after a completed measurement process.
- To prevent grease deposits on the device, use neoprene or nitrile disposable gloves free of powder during operation.

Accessories required	Test chamber small, medium or large

Required tools

- Allen key, modified, 9/64 inch (included)
- General purpose pliers of small or slip joint pliers

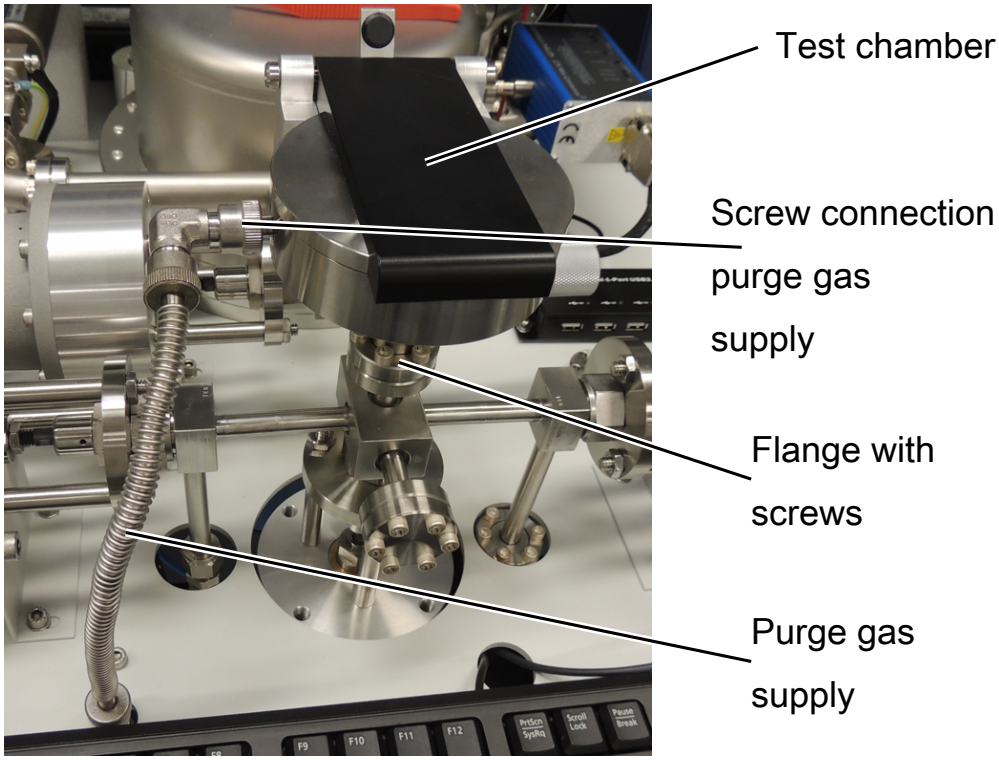


Fig. 15: Test chamber: built-in state

1. If the inlet flange is covered by a dummy flange (normal newly delivered condition), you have to remove the 6 screws of the flange connection and take out the dummy flange.
2. If a test chamber is mounted on the inlet flange, loosen the screws from the purge gas supply and remove it from the test chamber.
   Loosen and remove the 6 screws of the flange connection and carefully remove the test chamber.

3 Carefully remove the copper sealing ring from the flange using the pliers. In order not to damage the underlying sealed cutting edge, lift the copper sealing ring only vertically upwards.

4 Clean the surface of the flange with a dust- and lint-free cloth.

5 Place the new copper O-ring on the flange.

6 Carefully mount the new test chamber.

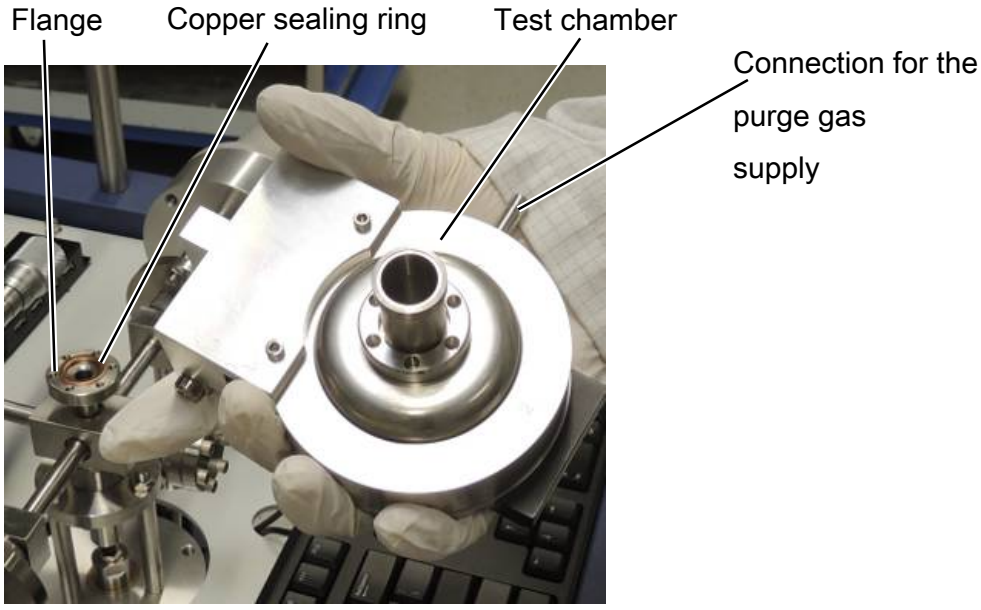


Fig. 16: Test chamber: Install new test chamber

7 Tighten the 6 screws on the flange only slightly.

8 Recommendation: Using the Allen key, tighten the 6 screws on the flange according to the 2-2-3 system. For example: Tighten screw 1. Tighten the screws in the order 3, 5, 2. Tighten the screws in the order 4, 6, 3. Tighten the screws in the order of 5, 1, 4, etc. Repeat this procedure until the gap between both flanges is almost completely closed.

9 Connect the purge gas supply and tighten the screw connection.

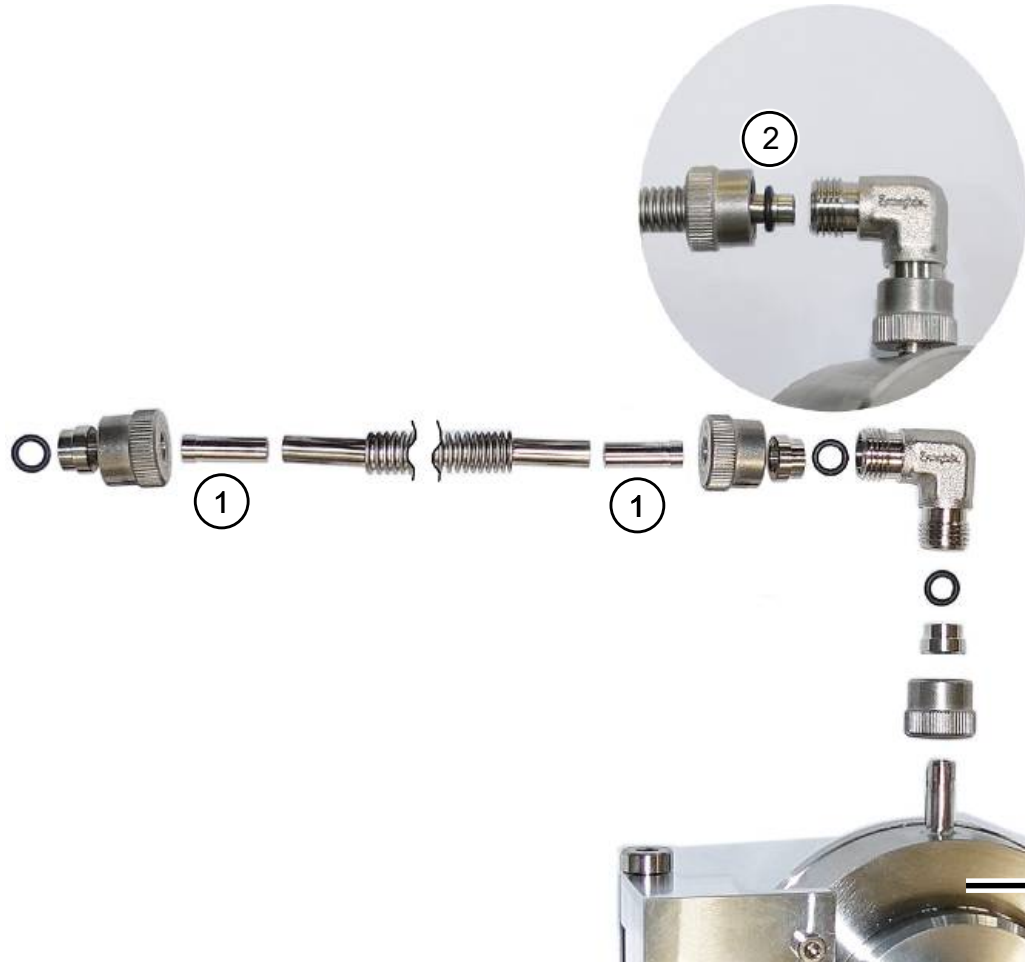


Fig. 17: Build and mount the purge gas supply

1	Reinforcing sleeves: Before continuing to assemble, put the reinforcing sleeves into the intermediate corrugated hose.
2	The O-ring on the reinforcing sleeve seals by screwing.

10 To prevent the test object from being sucked out of the test chamber during the measurement process, place the delivered grid in the test chamber.

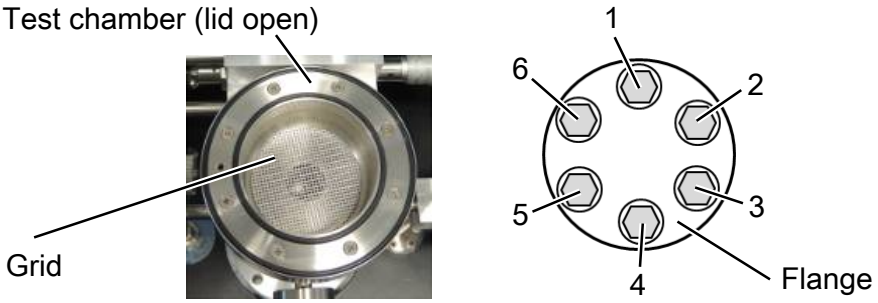


Fig. 18: Test chamber with inserted grid (left) and flange with example numbering of the screws (right)

6 Operation

6.1 Switching the device on

NOTICE

Damage to the cryogenic pump compressor due to incorrect settings

Incorrect setting of mains voltage and mains frequency can damage the cryogenic pump compressor.

To correctly set the cryogenic pump compressor on the device with the order number 550-700, set the cryogenic pump compressor to: 208 V, 60 Hz.

To correctly set the cryogenic pump compressor on the device with the order number 550-701, set the cryogenic pump compressor to: 230 V, 50 Hz.

Cryogenic pump compressor

Read and follow the included documentation "Cryo-Torr Pump Installation, Operation and Maintenance Instructions".

1. Ensure that the correct mains voltage and the correct mains frequency are set on the compressor.
2. To turn the unit on, set the power switch to ON.
   ⇨ The device has a power-on delay and is switched on after approx. 20 s.
3. To turn on the compressor of the cryogenic pump, set the power switch on the compressor to ON.
   ⇨ When delivered the device shows the screen "Measure" after starting. See "Setting the "Measure" window [▶ 44]".

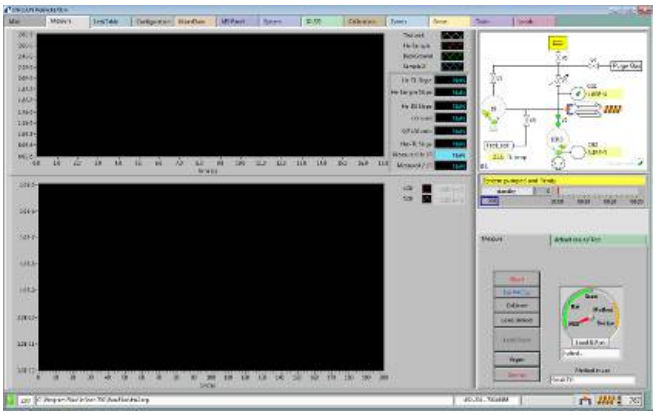


Fig. 19: Window "Measure"

If you cannot start the device without entering a password …

In case of an accidental closing of the user login, it may happen that you are requested to enter a password.

► Do not change the standard user and enter the password “Yes“.

6.2 Basic settings

6.2.1 Setting the measurement window

For operating and configuring the device in the “Measurement” operating mode, you can choose between two windows.

6.2.1.1 Set the "Mini" window

► To open the "Mini” window, press the tab "Mini".

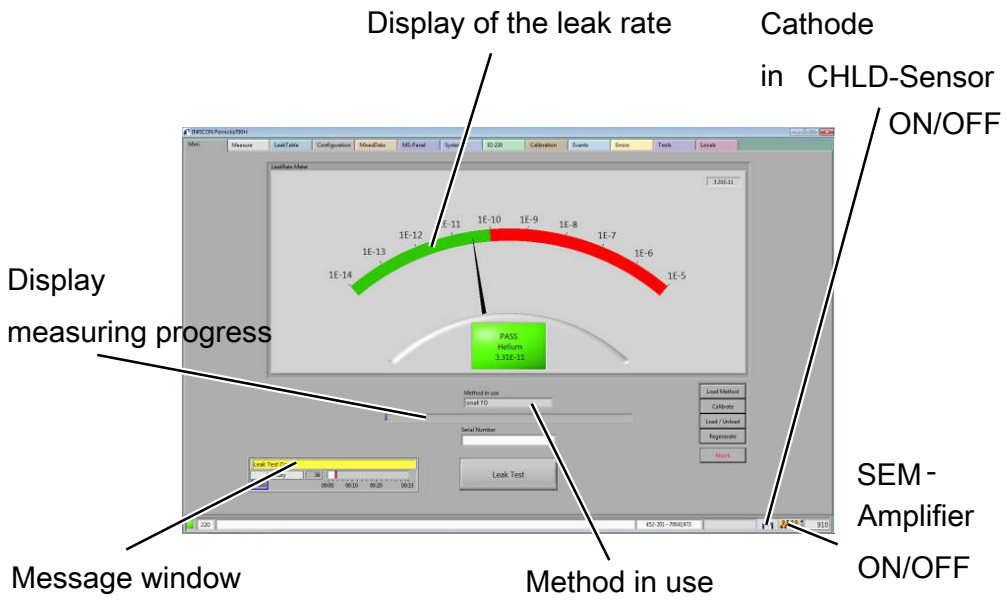


Fig. 20: Window "Mini"

The "Mini" window offers all the settings required for the measurement process and can be used for serial measurements of test objects.

This window is mainly suitable for the operator of the device.

Button	Description
Load Method	► To start the method editor , press this button. See "Select method [49]".

Button	Description
Calibrate	► To start the calibration, press this button. See "Calibrating [▷ 58]".
Load/Unload	The lid of the test chamber can only be opened at atmospheric pressure. ► To prevent the entry of air (and thus the amount of natural helium contained in it) when changing the test object, or to open the lid of the test chamber after an aborted measurement process due to the exceeded setpoint in the gross leak test, press this button. The test chamber is purged for the set time.
Regenerate	► To start the regeneration of the cryogenic pump, press this button. See "Perform regeneration [▷ 72]".
Abort	Aborting the ongoing process. ► For example, to stop regeneration before the end of the set end time, press this button.
Leak Test	► To start the measurement process to determine the leak rate, press this button. See "Preparing the measurement [▷ 60]".

Display of the leak rate

To display the measured leak rate in the units [mbar l/s] or [atm cc/s] in the vector diagram and as a numeric value. The green measuring range defines the good test objects. The red measuring range defines the bad test objects.

► To define the threshold value for the gross leak test, select the method editor, see also Set the setpoint for gross leak test [▷ 55]

Cathode in CHLD-Sensor ON/OFF

To switch the cathode in the CHLD-Sensor on and off.

SEM amplifier ON/OFF

To switch the SEM amplifier (secondary electron multipliers) ON and OFF.

Method in use

Displays the selected method for the current measurement process.

Display measuring progress

To display the relative measuring progress with the progress bar.

Message window

To display status messages in the yellow field, e.g. "Leak Test done" (measurement process completed); the operating mode e.g. "Standby" and the time measuring progress.

6.2.1.2 Setting the "Measure" window

► To open the "Measure" window, press the tab "Measure".

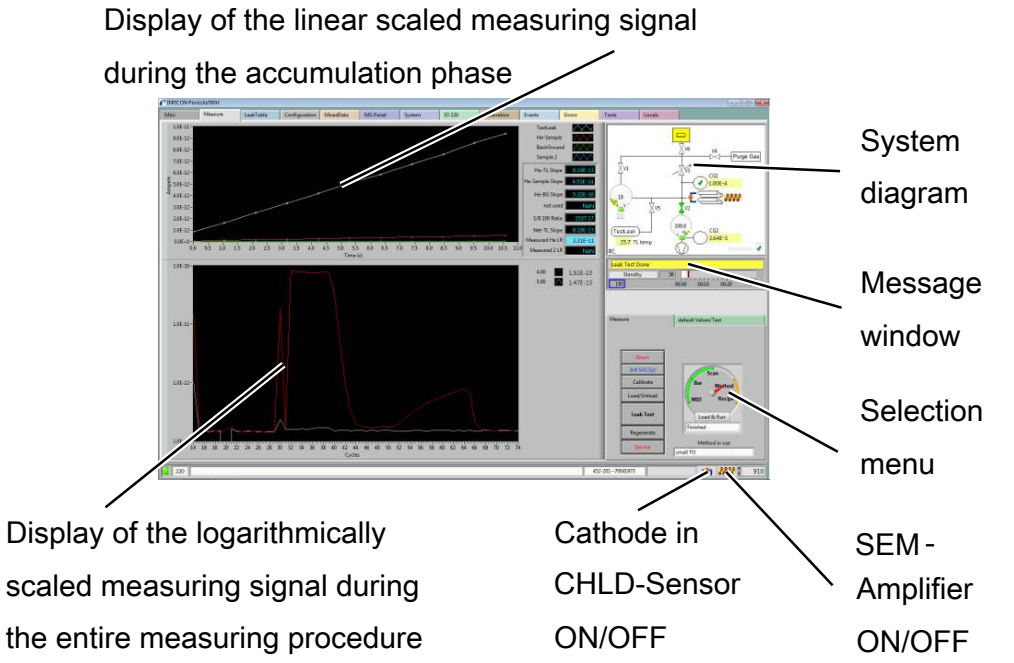


Fig. 21: Window "Measure"

In addition to the standard settings, the "Measure" window offers additional options for configuring the measurement process. At the same time, the current status of the individual components of the device during the measurement are displayed in the system diagram.

This window is suitable for appropriately trained operators and for maintenance and service personnel as well as for measurements with a high configuration requirement.

Button	Description
Abort	Terminating the ongoing process. ► For example, to stop regeneration before the end of the set end time, press this button.
Init VACsys	► To set the device in the "Standby" operating mode, press this button.
Calibrate	► To start the calibration, press this button. See "Calibrating [▷ 58]".
Load/Unload	To purge test chamber with purge gas. This function can also be used to open the lid of the test chamber.

Button	Description
	► To prevent the entry of air (and thus the amount of natural helium contained in it) when changing the test object, or to open the lid of the test chamber after an aborted measurement process due to the exceeded setpoint in the gross leak test, press this button. The test chamber is purged for the set time.
Leak Test	► To start the measurement process to determine the leak rate, press this button. See "Preparing the measurement [▷ 60]".
Regenerate	► To start the regeneration of the cryogenic pump, press this button. See "Perform regeneration [▷ 72]".
Service	► To access the service functions, press this button.
Load & Run	► To start the selected mode from the selection menu, press this button.

Display of the accumulation signal

To display the linear scaled measurement signal during the accumulation phase in amps [A] in the upper diagram. The leak rate is determined from the slope of the signal waveforms shown in the diagram with units [mbar l/s] or [atm cc/s].

► To define the threshold value for the gross leak test, select the method editor, see also Set the setpoint for gross leak test [▷ 55].

Display of the measuring signal

To display the logarithmic scaled measurement signal during the entire measuring procedure in amps [A] in the upper diagram. Red: Helium signal; white: Background signal.

Cathode in CHLD-Sensor ON/OFF

To switch the cathode in the CHLD-Sensor on and off.

SEM amplifier

To switch the SEM amplifier (secondary electron multipliers) ON and OFF.

Method in use

Displays the selected method for the current measurement process.

Message window

To display status messages in the yellow field, e.g. "Leak Test done" (measurement process completed); the operating mode e.g. "Standby" and the time measuring progress.

System diagram

Displays current system conditions and parameters, such as temperature, pressure, leak rate, and system components.

Selection menu

To select the following modes:

- MID

  In the "MID" (Multiple Ion Detection) mode, you can carry out a simultaneous measurement signal acquisition for several masses (= gases) over time.

- Bar

  You can measure the signal intensities of selected masses in "Bar" mode and display them as a bar graph.

- Scan

  In "Scan" mode, you can perform continuous (analog) sampling of the signal intensities across the measuring axis.

- Method

  You can start the method editor . See "Select method [▷ 49]".

- Recipe

  You can start the recipe editor to configure the mass spectrometer (CHLD-Sensor). See "Select method [▷ 49]".

Parameter	Description
He-TL Slope	The test leakage signal slope measured during the calibration in unit of measurement [A/s].
He-Sample Slope	The helium signal slope determined by the measurement of the test object in the unit of measurement [A/s].
He-BG Slope	The measured helium background signal slope during a calibration in unit of measurement [A/s].
Gas 2 amplitude	Signal amplitude of a second measured gas (in multi-gas mode).
S/B 100 ratio	Ratio of helium test leak signal slope to helium background signal slope during the last calibration.
Net-TL Slope	Difference of helium test leak signal slope and helium background signal slope during last calibration in unit of measurement [A/s].

Parameter	Description
Measured He LR	The measured helium leak rate during a measurement process in the unit of measurement [mbar l/s] or [atm cc/s].
Measured 2 LR	The measured leak rate of a second gas (in multi-gas mode) during a measurement process in the unit of measurement [mbar l/s] or [atm cc/s].

6.2.2 Configuring the measurement process

In the "Configuration" window, you perform detailed measurement settings .

► To open the "Configuration" window, press the tab "Configuration".

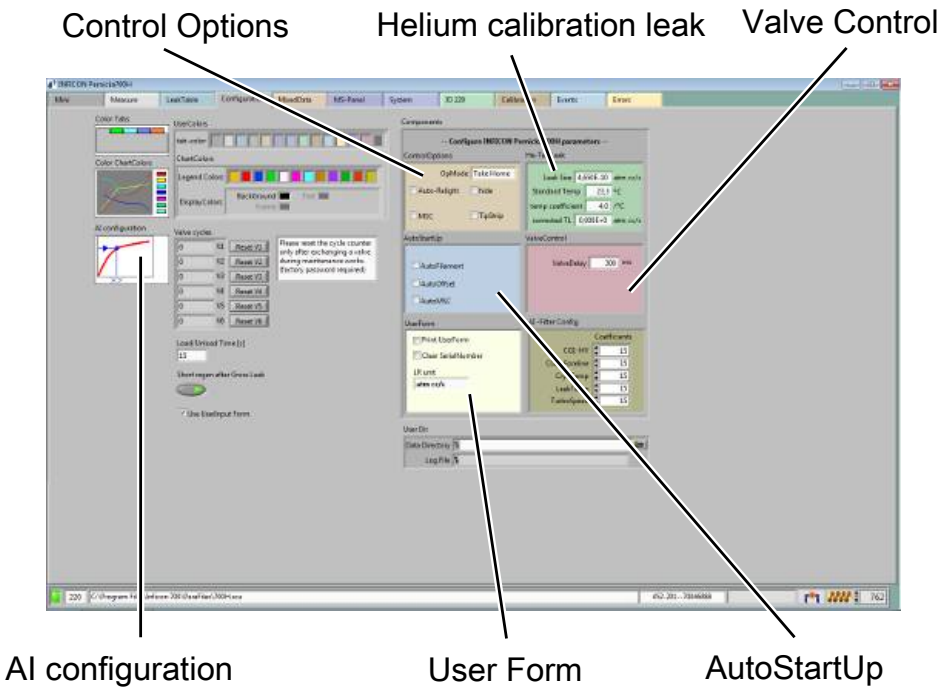


Fig. 22: Window "Configuration"

AI configuration

For assigning the sensor parameters for the corresponding sensors. The curves for the Pirani sensors, the cryogenic temperature, the test leak temperature and the rotational speed of the turbo molecular pump are shown.

Control Options

OpMode: Function for internal use by INFICON GmbH.

► Only use the value "Real Unit" for the "OpMode".

Auto-Relight: For automatic switching on the cathode in the CHLD-Sensor when the target temperature of the cryogenic pump is reached.

► To switch on the cathode automatically in the CHLD-Sensor activate this option.

MSC: The MSC (Mass Scale Correction) function is not used.

hide: To hide the tabs from "Mixed Data".

► To display all tabs from "Mixed Data" in the header, which can be used to open the same window with additional detail information, deactivate this option. This function is protected by the password "Germany".

TipStrip: For displaying an information text, when the mouse pointer points to an operating element, for example, a button for a certain time, for which a corresponding information text has been programmed.

Helium calibration leak

To adjust the parameters of the helium test leak.

► After a changed helium calibration leak, reset the default parameters according to the supplied certificate.

AutoStartUp

Auto Filament: Activate the cathode in the CHLD-Sensor automatically after evacuation.

► To enable the cathode in the CHLD-Sensor automatically after a completed evacuation, activate this option.

Valve Control

Valve Delay: To set the valve delay time. This delay time ensures that two valves do not change their state at the same time.

► Set the value "3000", i.e. a time delay of 3 seconds between the respective start of two valve movements.

User Form

Print User Form: To print the measurement data after the measurement process.

► To print the measurement data after each measurement process, activate this option.

Clear Serial Number: To reset the serial number entered in the "Input" window after a measurement.

► To automatically delete the serial number of the measured object after each measurement process, activate this option.

LR unit: To select the unit of measure for the leak rate.

► Choose between the unit of measurement [mbar l/s] or [atm cc/s].

Load/Unload Time [s]

Duration to purge the test chamber.

► To define the duration in which the test chamber is purged with purge gas, set the time.

Short regen after Gross Leak

Short-term heating of the cryogenic pump after a gross leak test to remove helium from the cryogenic pump. This function is activated by default.

After a gross leak test, helium atoms are located between the purge gas atoms on the surface of the cryogenic pump. In order to avoid increased leakage rates during subsequent measurements by means of this helium fraction, the cryogenic pump is heated up briefly, but only when during the gross leak test a gross leak is detected, so that the helium components can be evaporated and removed from the system.

- To turn on this feature, click the icon. The triangle in the symbol is displayed in green.
- To turn off this feature, click the icon. The triangle in the symbol is displayed in black.

Use User Input Form

"Input" window for detailed information on the test object.

- To enter only the serial number for each test object, deselect the "Use User Input Form" option.
- To enter detailed information for each test object, select the "Use User Input Form" option. The "Input" window opens.

6.3 Select method

The settings and configurations required for measuring the leak rate are summarized in the method editor in a so-called method. Assign a corresponding method before beginning each individual or serial measurement.

You can use preset methods or create new methods yourself.

6.3.1 Select an existing method

Using a method, you define the times and limits to be set over the measurement sequence of a leakage measurement.

1 Mini > Method > Load & Run or Measure > Method > Load & Run.

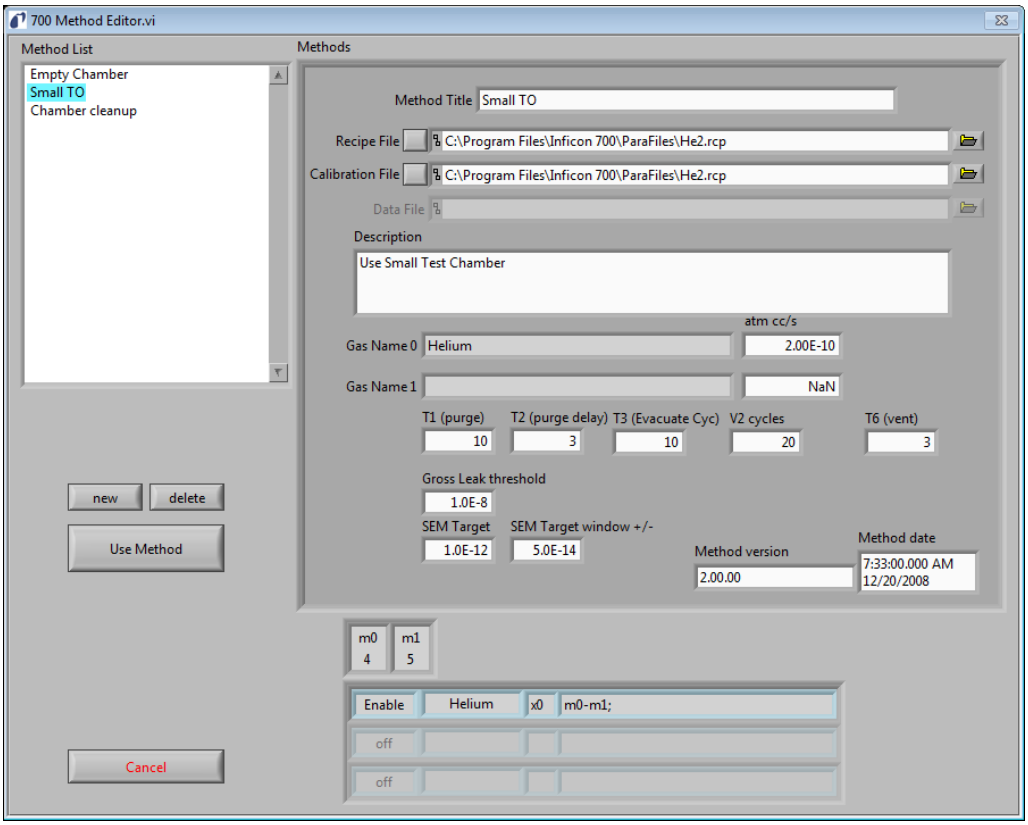


Fig. 23: Methods editor: Select an existing method

2 Select the method to use from the Method list and press the "Use Method" button.

⇨ The pending measurement is / The pending measurements are carried out according to this method.

If you have selected a method, a recipe is automatically assigned to this method. You have the option of assigning a different recipe to your chosen method (see Select existing recipe [▷ 52]") or a new recipe (see Create new recipe [▷ 53]").

6.3.2 Create new method

Using a method, you define the times and limits to be set over the measurement sequence of a leakage measurement.

1 Measure > Method > Load & Run.

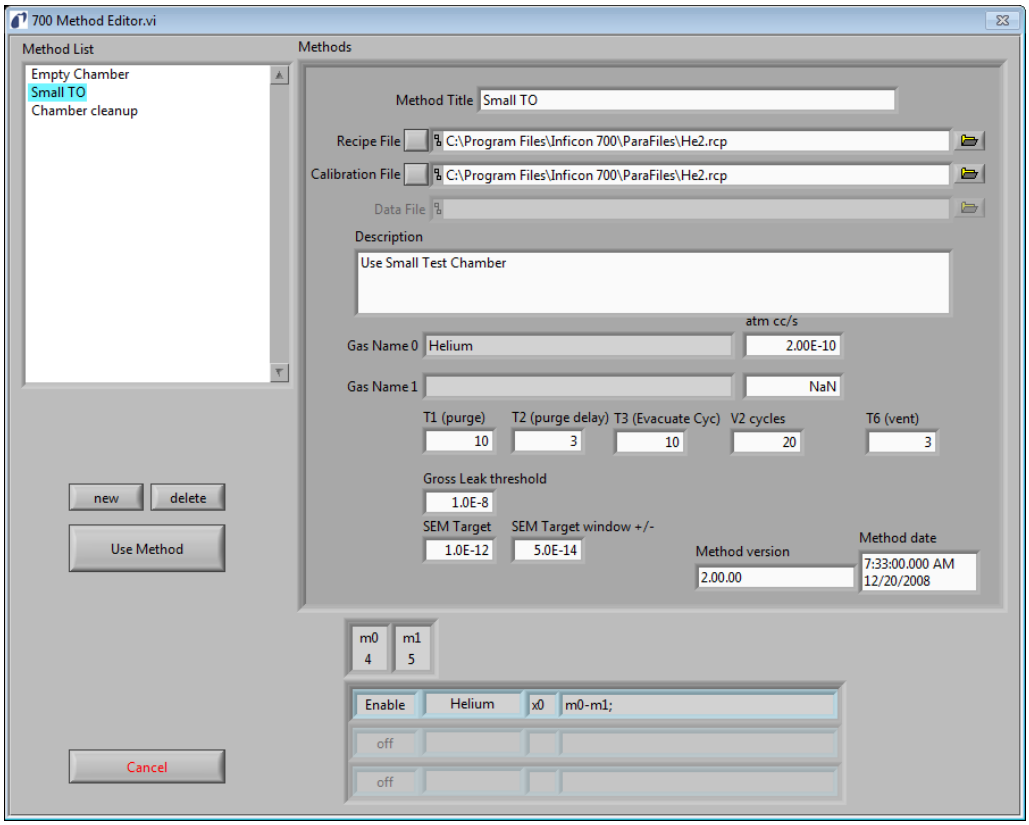


Fig. 24: Methods editor: Create new method

2 Press the "new" button.

⇨ You can create a new method.

3 Select a recipe from the "Recipe File" list box.

4 Type a name for the new method in the "Method Title" input box.

5 In the "Description" text box, type a meaningful description for the new method.

6 Define the parameters, see the second table.

7 Press the "Use Method" button.

⇨ The new method has been created and the upcoming measurement(s) will be carried out according to this method.

Button	Description
new	► To create a new method, press this button.
delete	► To delete a method, press this button.
Use Method	► To perform measurements according to an existing or newly created method, press this button.
Cancel	► To end the method editor, press this button.

Parameter	Description
T1 (purge)	Time in [s]. During this time, the test chamber and the volume between the 2 sealing rings on the test chamber are purged with purge gas at the beginning of the measurement procedure.

Parameter	Description
T2 (purge delay)	Time in [s]. Waiting time between purging and evacuation of the valve block.
T3 (Evacuate Cyc)	Time in [s]. During this time, the purge gases are pumped out of the test chamber, from the volume between the 2 sealing rings of the test chamber and from the valve block, and removed from the system.
V2 cycles	Number of cycles according to recipe used. With 500 ms in the recipe the cycle takes about 1 second. During this time, helium is pumped from all surfaces as well as from the volume between the 2 sealing rings on the test chamber and removed from the system. At the end of this time, only helium is present in the system, which originates mainly from the test object.
T6 (vent)	Time in [s]. During this time, the test chamber and the volume between the 2 sealing rings on the test chamber are purged with purge gas at the end of the measurement procedure.
Gross Leak threshold	Setpoint for the upper limit for the gross leak test. Below this setpoint, the test objects to be measured do not have any gross leaks. This value must be greater than any measured value of test objects without gross leaks. See also "Set the setpoint for gross leak test [▶ 55]".
SEM Target	Parameters related to the SEM amplifier of the CHLD-Sensor. ► Do not change the default setting.
SEM Target window +/-	Parameters related to the SEM amplifier of the CHLD-Sensor. ► Do not change the default setting.

If you have created a new method, a recipe is automatically assigned to this method. You have the option of assigning a different recipe to your chosen method (see Select existing recipe [▶ 52]") or a new recipe (see Create new recipe [▶ 53]").

6.3.3 Select existing recipe

With a recipe you define which masses (= gases) with which measurement settings are used for measuring.

1 Measure > Recipe > Load & Run.

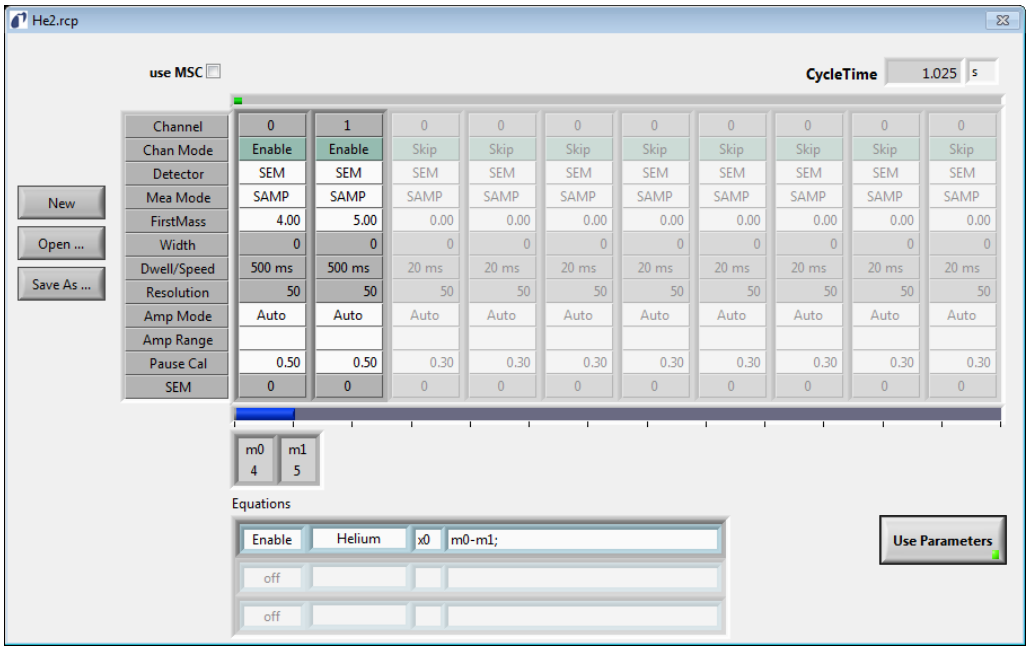


Fig. 25: Window "Recipe-editor": Select existing recipe

2 Press the "Open" button.

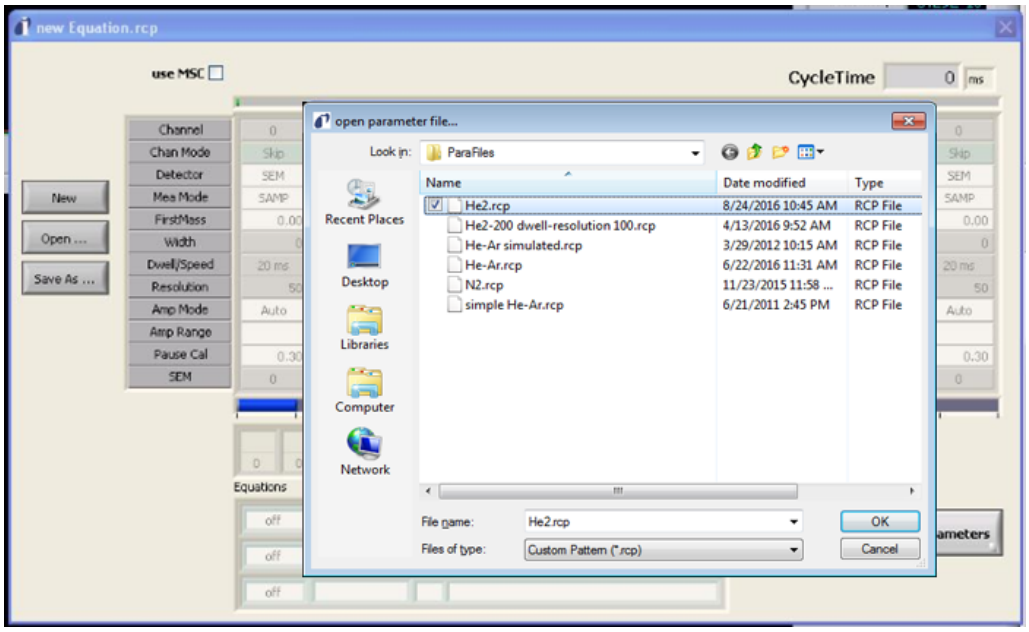


Fig. 26:

3 Select the recipe from the list.

4 To accept the selected recipe, press the OK button.

⇨ The selected recipe has been accepted.

6.3.4 Create new recipe

With a recipe you define which masses (= gases) with which measurement settings are used for measuring.

1 Measure > Recipe > Load & Run.

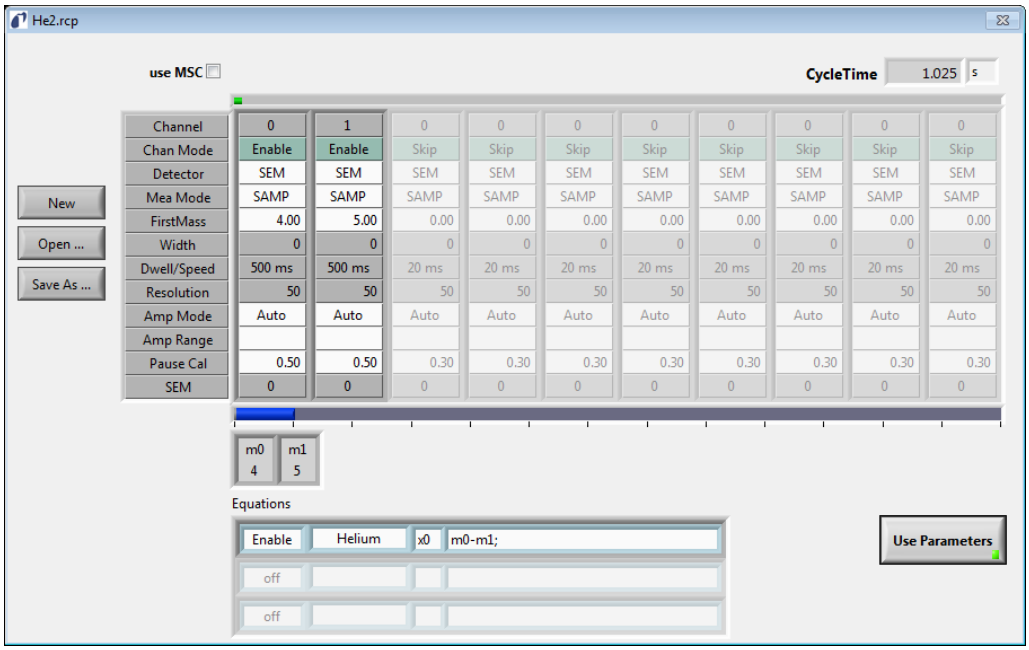


Fig. 27: Window "Recipe-editor": Create new recipe

2. Press the "New" button.
3. Define the parameters, see the following table.
4. To save the settings and close the recipe editor, press the "Use Parameters" button.

⇨ The new recipe is created.

use MSC

The MSC (Mass Scale Correction) function is not used.

Cycle Time

Die Cycle Time results from the sum of the dwell Dwell times plus the changeover times.

Parameter	Description
Channel	Number of the parameter set.
Chan Mode	Number of the parameter sets. 1. To create the parameter set for the gas to be measured and to use the parameter set in a method, select "enable". 2. To create the parameter set for the gas to be measured without using the parameter set in a method, select "skip". 3. To not use the parameter set, select "off".
Detector	Choice of detector. ► Only use the default setting SEM.

Parameter	Description
Mea Mode	Choice of measurement method. ► Only use the default setting SAMP.
FirstMass	Enter the mass to be measured (= gas). *1* For example, to measure helium, enter the value "4.00". *2* For example, to measure the background, enter the value "5.00".
Width	► Use the default setting "0".
Dwell/Speed	Dwell time of the CHLD-Sensor on each mass. The following relationships apply. High expected signal amplitudes require only short dwell times for sufficient measuring sensitivity and thus enable faster measuring times. Small signal amplitudes require longer dwell times in order to increase the measuring sensitivity, resulting in longer measuring times. ► Use the reference value "500" for helium (mass 4) and the reference value "500" for the background (mass 5). For leak rates less than 2 x 10-12 mbar l/s, these values must be correspondingly increased, e.g. "5 s" for a leakage rate of 2 x 10-13 mbar l/s. Shorter measuring times result in larger measured values.
Resolution	How many measuring points per mass (resolution). ► Use the default setting "50".
Amp Mode	Operating mode of the amplifier. ► Use the default setting "Auto".
Amp Range	Area of the preamplifier.
Pause Cal	Settling time after changing the mass. ► Use the default setting "0.50".
SEM	Used preamplifier ► Use the default setting "0".

6.3.5 Set the setpoint for gross leak test

With the setpoint for the gross leak test you define the upper limit for the gross leak test. Below this setpoint, the test objects to be measured do not have any gross leaks.

The setpoint to be set refers to the helium raw signal in the measuring unit [A].

If the measured helium signal is greater than the setpoint after the gross leak test, the measurement process is terminated.

If the measured helium signal is less than the threshold value after the gross leak test, the measurement process is continued with the fine leak test.

1 Mini > Method > Load & Run or Measure > Method > Load & Run.

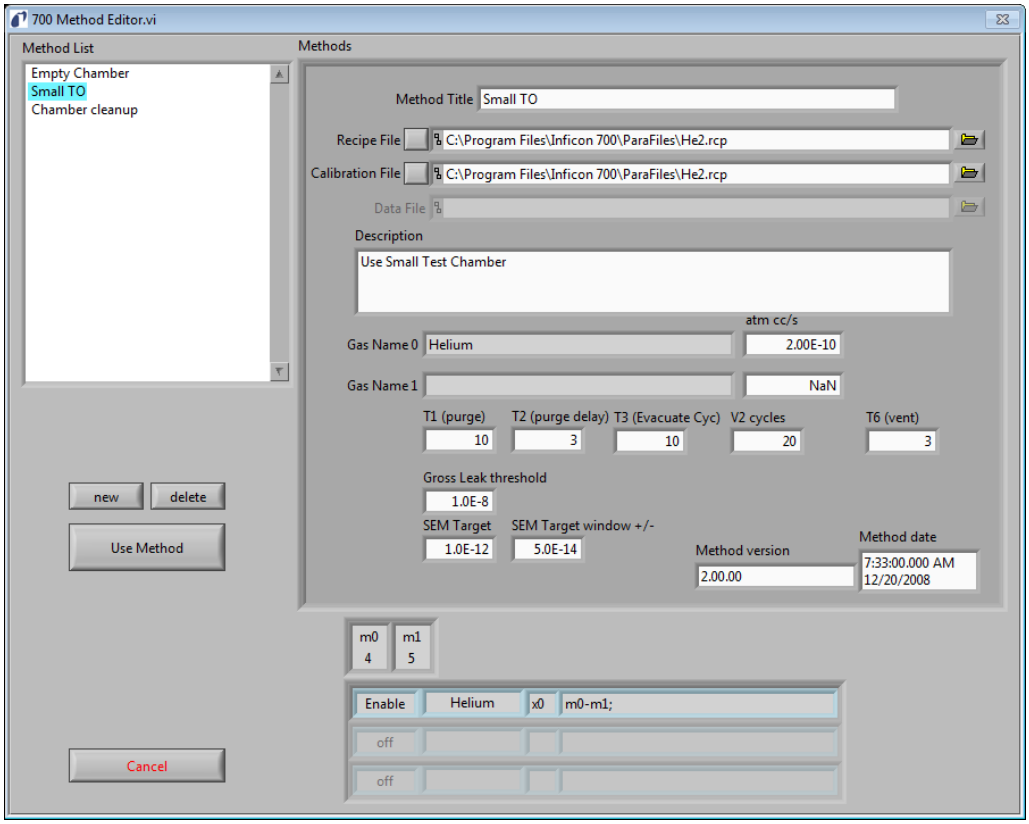


Fig. 28: Editor methods

2 Define the value of the parameter "Gross Leak threshold". This value must be as small as possible for a high sensitivity, but in any case be greater than any measured value of test objects without gross leak.

3 To save the settings, press the "Use Method" button.

⇨ The setpoint for the gross leak test is set.

Procedure for determining an appropriate setpoint

1 Carry out several measurements without a test object or with a known tight test object (depending on the test chamber used and the purge gas Argon 5.0, typically values <1 x 10^{-8} A).

⇨ Following the measurements, the value determined during the gross leak measurement is displayed in the "Gross leak amplitude" column in the "Locals" tab.

2 Evaluate average and spread.

3 Define a limit value, in which the natural scattering of the measured values does not lead to randomly exceeding the gross leak setpoint.

4 Check the setpoint setting with a known leak test specimen.

6.3.6 Select single or multi-gas

⚠ DANGER

Danger from a Hydrogen explosion

Hydrogen is a flammable and explosive gas.

- Use only tracer gas mixtures with a hydrogen concentration which, in combination with oxygen or air, can not ignite or explode.

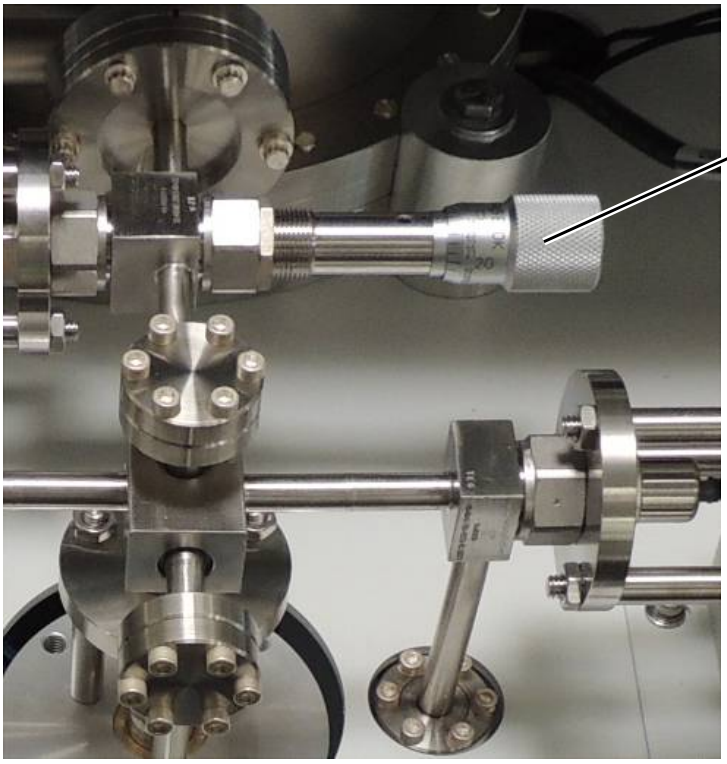


Fig. 29: Flow control valve for Single- or multi-gas measuring

6.3.6.1 Select single-gas

1. Mini > Method > Load & Run or Measure > Method > Load & Run.
2. Select the method with the desired helium setting in the method editor. See "Select method [▷ 49]".
3. Press the "Use Method" button.
4. Adjust the flow control valve. When using the Single-gas measurement, use the thumbscrew to close the flow control valve.

6.3.6.2 Select multi-gas

1. Mini > Method > Load & Run or Measure > Method > Load & Run.

2. Select the method with the desired multi-gas setting in the method editor. See "Select method [▷ 49]".
3. Press the "Use Method" button.
4. Adjust the flow control valve. When using the multi-gas measurement, use the thumbscrew to open the flow control valve.

6.4 Calibrating

Use a calibration test to check if the leak detector is correctly set-up and that leak rates can be correctly measured. This determines the ratio between signal and noise (signal-to-noise ratio).

For proper leak testing regular calibration is absolutely necessary. You can perform the calibration only with the calibration leak mounted on the device.

Without calibration, no measurement process can be started. The "Leak Test" button in the "Mini" and "Measure" measurement windows is not active in this case but is shown in gray.

To carry out measurements, perform a calibration. Perform the calibration once a day or if there is any doubt about the measurement readiness of the device. After a standstill period for the device of more than 12 hours or after regeneration, perform 2 to 3 calibrations in sequence to ensure the required measurement readiness.

- ► Carry out a calibration which results in the value of the parameter "S/B 100 ratio" > 100.

6.4.1 Perform calibration

- ► Mini > Calibrate or Measure > Calibrate.
  - ⇨ The device calibrates. The finished calibration is displayed in the "Measure" window by the yellow message text "Calibration Finished".

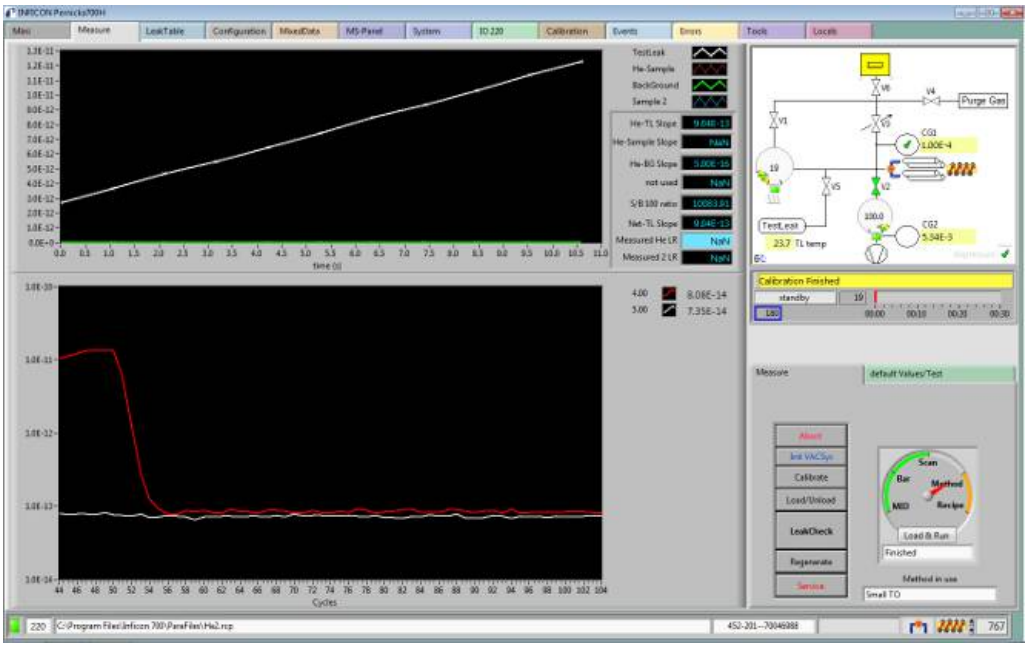


Fig. 30: "Measure" window (presentation of results after calibration)

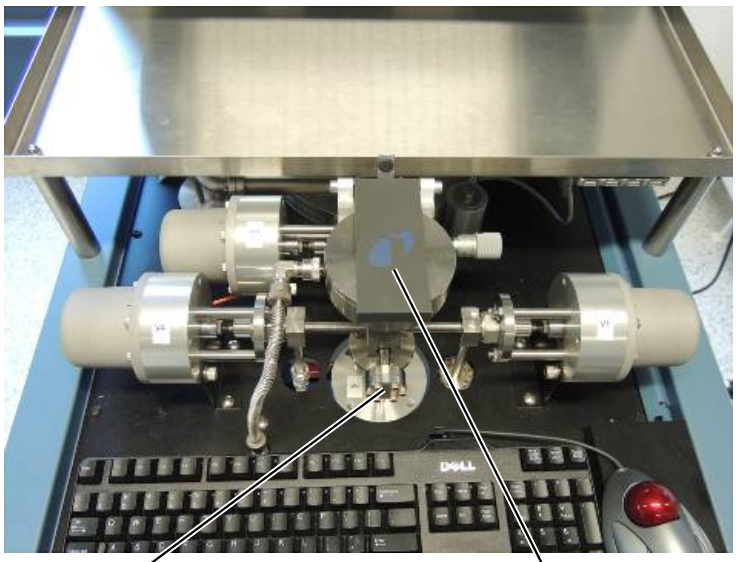
6.4.2 Connect external calibration leak

You have the option of connecting an external calibration leak to the device.

You cannot calibrate the device with the external calibration leak.

You can only calibrate the device with the internal calibration leak.

1. Place the external calibration leak with the copper sealing ring on the flange.
2. Tighten the 6 screws on the flange only slightly.
3. Recommendation: Using the modified Allen key 9/64 inch (included in delivery), tighten the 6 screws on the flange according to the 2-2-3 system. For example: Tighten screw 1. Tighten the screws in the order 3, 5, 2. Tighten the screws in the order 4, 6, 3. Tighten the screws in the order of 5, 1, 4, etc. Repeat this procedure until the gap between both flanges is almost completely closed.



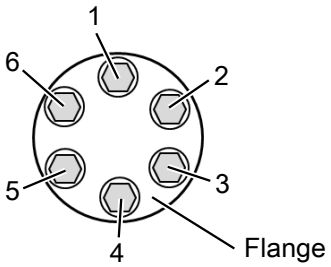


Fig. 31: Connect external calibration leak

4 Close the lid of the empty test chamber.

5 Open the hand valve on the external calibration leak.

6 Mini > Leak Test or Measure > Leak Test.

⇨ The leak rate of the external calibration leak is determined in the measurement unit [mbar l/s] or [atm cc/s].

6.5 Measuring

6.5.1 Preparing the measurement

NOTICE

Material damage due to improper filling of the test chamber

If the test chamber is operated without a grid inserted, test objects from the test chamber can be sucked into the device and cause damage to the device.

- In order to carry out measurements, place the grid that is supplied with the test chamber in the test chamber.
- To remove dirt from the test chamber, vacuum the dirt with a suitable vacuum cleaner and then wipe the test chamber with a cloth soaked in isopropanol.

✓ Possible alternatives to the operating possibilities on the device are set up (optional), e.g. bar code reader for the automatic data acquisition of the test objects.

1 To turn the device on, set the power switch to ON (see "Switching the device on [▷ 41]").

⇨ The device has a power-on delay and is switched on after approx. 20 s.

⇨ The computer and monitor are automatically turned on and started.

⇨ The operating system is started and the "Measure" window is displayed by default.

Idle time

► You must wait for about 2 hours after switching on the device. During this time, the cryogenic pump is cooled down to a temperature < 20 K. If System pumped and Ready" appears in the "Mini" or "Measure" in the yellow highlighted message window, you can proceed to the next step.

2 Perform a calibration. See "Calibrating [▷ 58]".

3 If you want to use only helium as tracer gas, close the flow control valve's knurled screw (see "Select single-gas [▷ 57]"). If you want to use several tracer gases, open the flow control valve's knurled screw (see "Select multi-gas [▷ 57]").

4 Use a suitable tool such as a plastic tweezer to place the test object in the test chamber and close the lid of the test chamber.

5 Make sure that the correct basic settings and the settings for the current measurement are carried out. See "Basic settings [▷ 42]".

6 Make sure that the desired method is set see "Select method [▷ 49]".

7 Set the setpoint for the gross leak measurement, see "Set the setpoint for gross leak test [▷ 55]".

8 Make sure that calibration takes place daily. See "Calibrating [▷ 58]".

9 Ensure that the regeneration of the cryogenic pump is carried out once a day. See "Perform regeneration [▷ 72]".

10 To start the measurement process manually, see "Prepare for manual start [▷ 61]".

6.5.2 Prepare for manual start

You can start the measurement process manually with the round connector inserted.

► The device is factory-set for manual starting of the measurement process. To start the measurement process manually, you can press the "Leak Test" button in the "Mini" or "Measure" windows. See "Select the "Mini" window and start the measurement [▷ 62]" or "Select the "Measure" window and start the measurement [▷ 63]".

6.5.3 Start and perform the measurement

To start the measurement process (only when the device is prepared for manual start), to follow the measurement and to view the results, you can choose between two measurement windows.

- To start and run the measurement with the "Mini" window see "Select the "Mini" window and start the measurement [▷ 62]".
- To start and run the measurement with the "Measure" window see "Select the "Measure" window and start the measurement [▷ 63]".

6.5.3.1 Select the "Mini" window and start the measurement

The "Mini" window provides all settings required for the measurement process. This window is mainly suitable for the operator of the device.

► To open the "Mini" window, press the tab "Mini".

Fig. 32: Window "Mini"

1. To start the measurement process, press the "Leak Test" button. After starting the measurement process, the name of the "Leak Test" button changes to "testing ...".
2. Track the measurement process using the progress bar.

6.5.3.2 Select the "Measure" window and start the measurement

In addition to the standard settings, the "Measure" window offers additional options for configuring the measurement process. At the same time, the current status of the individual components of the device during the measurement are displayed in the system diagram. This window is suitable for appropriately trained operators and for maintenance and service personnel as well as for measurements with a high configuration requirement.

1 To open the "Measure" window, press the tab "Measure".

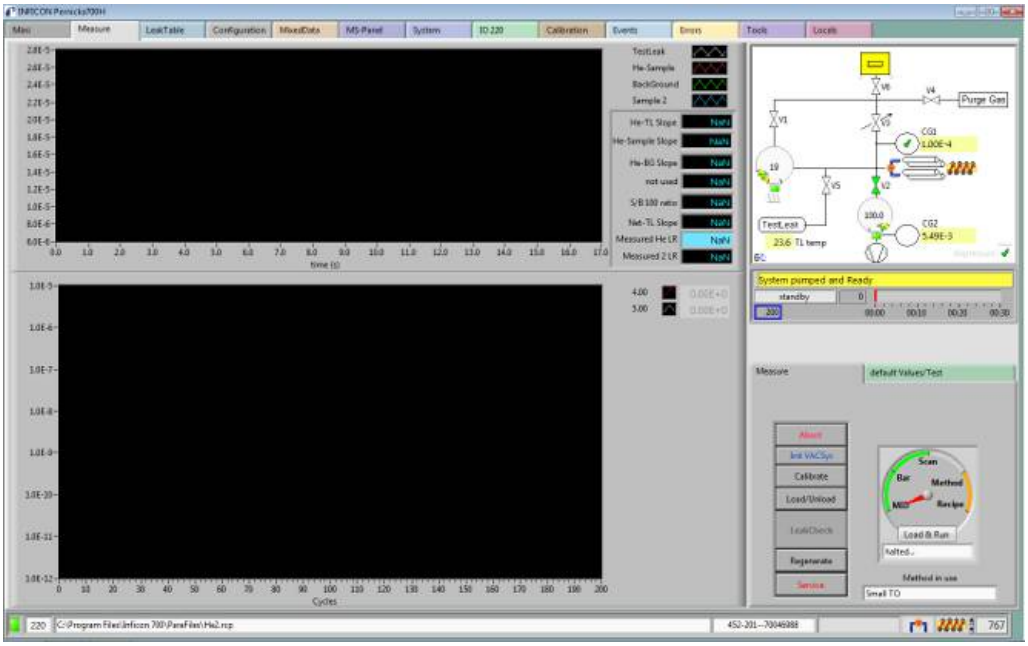


Fig. 33: Window "Measure"

2 To open the "Input" window, press the "Leak Test" button.

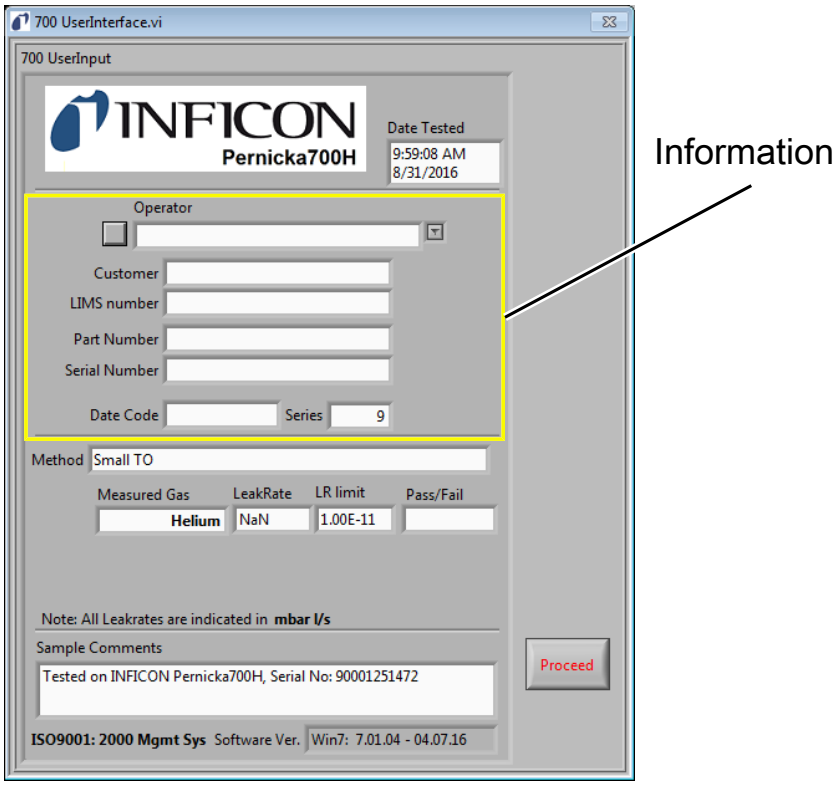


Fig. 34: "Input" window

3 Enter your desired information. Optionally, you can capture the desired information from the test objects with a bar code reader.

4 To start the measurement process, press the "Proceed" button.

5 Track the measurement process using the progress bar.

6.5.3.3 Perform gross leak test

The gross leak test takes place automatically. The previously set setpoint is used as the abort criterion for this measurement process (see Set the setpoint for gross leak test [▶ 55]"). If the helium signal falls below this setpoint, the measurement process is terminated correctly and the measurement process is continued with the fine leak test (see "Carry out a fine leak test [▶ 65]").

If the helium signal exceeds this setpoint, the measurement process is terminated and no fine leak test is performed.
See "Complete the measurement process according to the gross leak and fine leak test [▶ 66]".

6.5.3.4 Terminate the measurement process after gross leak test

1 Press the "Load/Unload" button in the "Mini" measuring window or in the "Measure" measurement window".

2 Remove the test object from the test chamber.

⇨ The measurement process is finished.

You can measure another test object or perform a regeneration of the cryogenic pump (see "Perform regeneration [▷ 72]") and then switch off the device (see "Switching off the device. [▷ 73]").

6.5.3.5 Carry out a fine leak test

If during the gross leak test the result falls below the set setpoint, the fine leak test is carried out automatically.

Fig. 35: Display of the measurement results in the window "Mini"

The measured leak rate is displayed in the "Mini" window in a vector diagram in the measurement unit [mbar l/s] or [atm cc/s]. A colored good / bad display enables the qualitative assignment of the measured test objects.

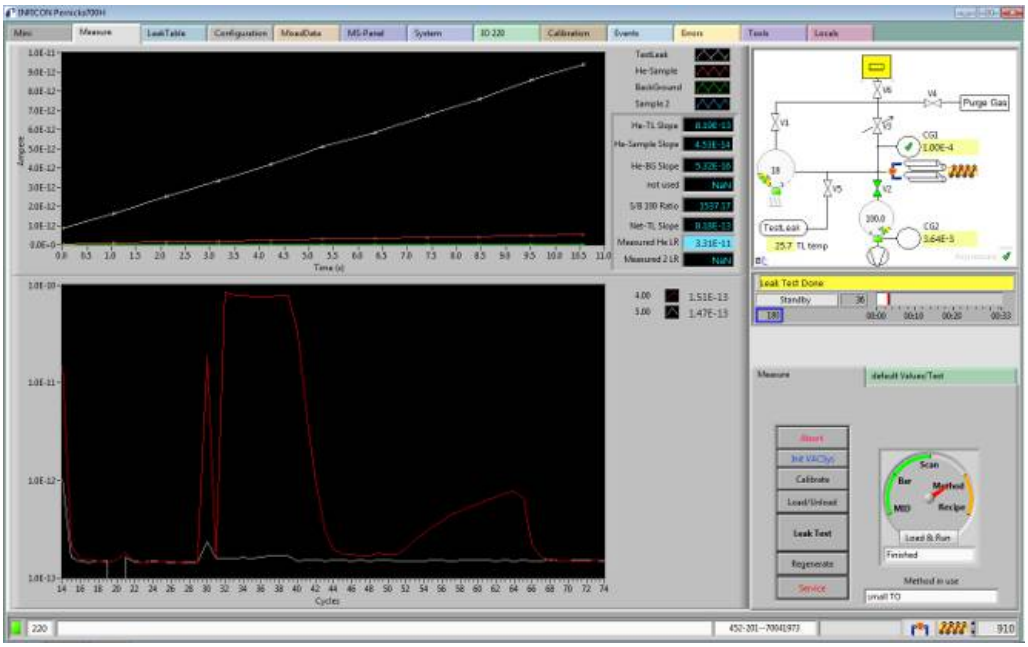


Fig. 36: Display of the measurement results in the window "Measure"

The measured leak rate is displayed in the "Measure" window in a vector diagram in the measurement unit [mbar l/s] or [atm cc/s]. The accumulatively measured signal is displayed graphically in the upper left window. The measuring signals of the CHLD-Sensor are displayed in the lower left window for the measurement process for all measurement processes.

6.5.3.6 Complete the measurement process according to the gross leak and fine leak test

In the "Configuration" window, you can define whether or not the "Print Report" window should be opened after the end of a measurement.

Fig. 37: Window "Print Report"

1. To print the contents of the "Print Report" window, press the "Print" button.
   ⇨ The contents of the "Print Report" window are printed.
2. Remove the measured test object from the test chamber.

⇨ The measurement process is finished.

You can measure another test object or perform a regeneration of the cryogenic pump (see "Perform regeneration [▷ 72]") and then switch off the device (see "Switching off the device. [▷ 73]").

6.5.4 Display information about the measurement

6.5.4.1 Display state time diagrams

► To open the "Mixed Data" window, press the tab "Mixed Data".

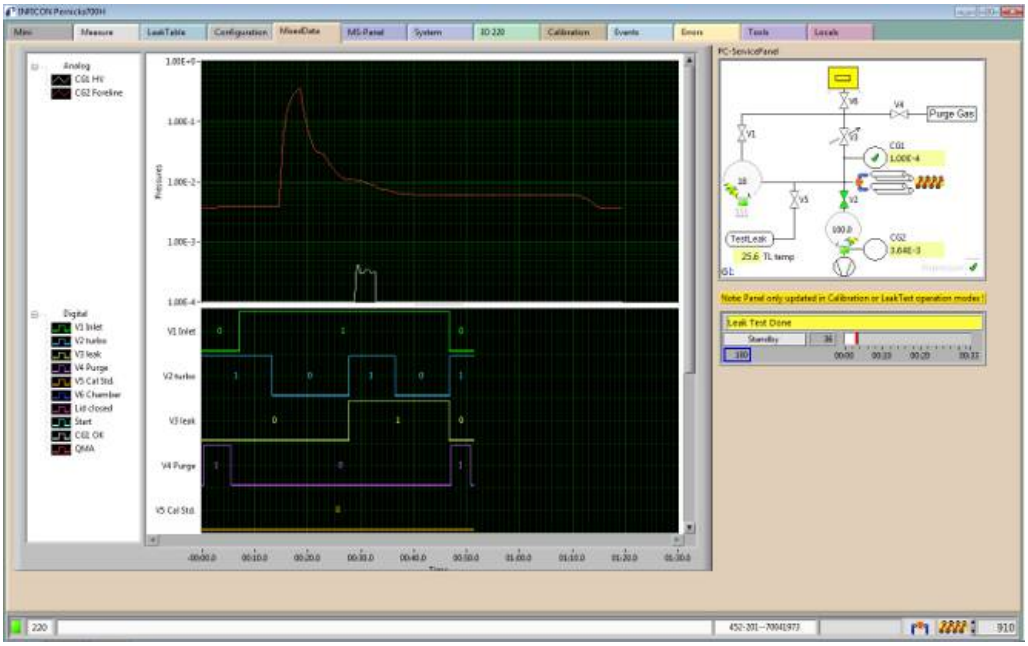


Fig. 38: Window "Mixed Data"

The "Mixed Data" window provides an overview of the timing of all signals during a measurement process.

6.5.4.2 Display measurement parameters

► To open the "MS-Panel" window, press the tab "MS-Panel".

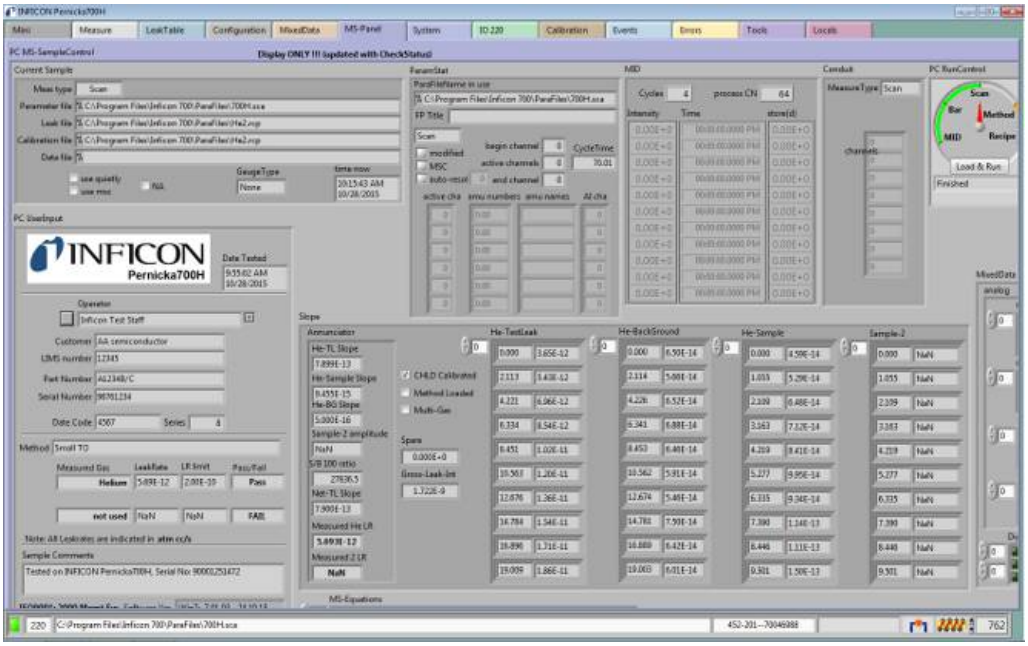


Fig. 39: Window "MS-Panel"

The "MS-Panel" window displays the measured data during a measurement process. The corresponding 10 measured values recorded during an accumulation phase for the different masses are documented.

6.5.4.3 Display current settings

► To open the "System" window, press the tab "System".

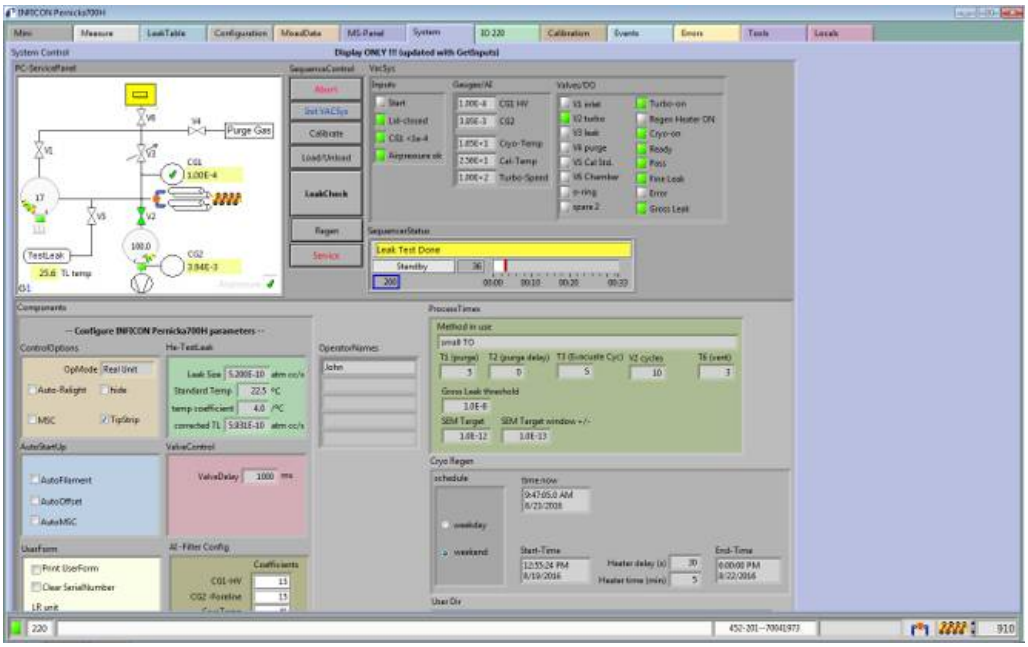


Fig. 40: Window "System"

The current settings for the completed measurement process are displayed in the "System" window. (Pin 17)

Output parameter/ Pin assignment of the digital I/O *)	Status
Ready (Pin 17)	Ready = HIGH: You can start a measurement / calibration.
Pass (Pin 18)	Pass = HIGH: The tested test object is leak-proof.
Fine Leak (Pin 19)	Fine Leak = HIGH and Gross Leak = LOW: Helium fine leak.
Gross Leak (Pin 21)	Fine Leak = LOW and Gross Leak = HIGH: Helium gross leak.
	Fine Leak = HIGH and Gross Leak = HIGH: Gas-2-fine leak.
Error (Pin 20)	Error = HIGH: Error message displayed on the screen.

*) The bushing of the CHLD detector is equipped with a plug by default. If you need to use the output signals, use a Y-cable.

Further explanations: The outputs are open collectors, max. 60 mA per output, Pin 10 is +24 V, Pin 9 is 0 V.

6.5.4.4 Display general information

► To open the "Locals" window, press the tab "Locals".

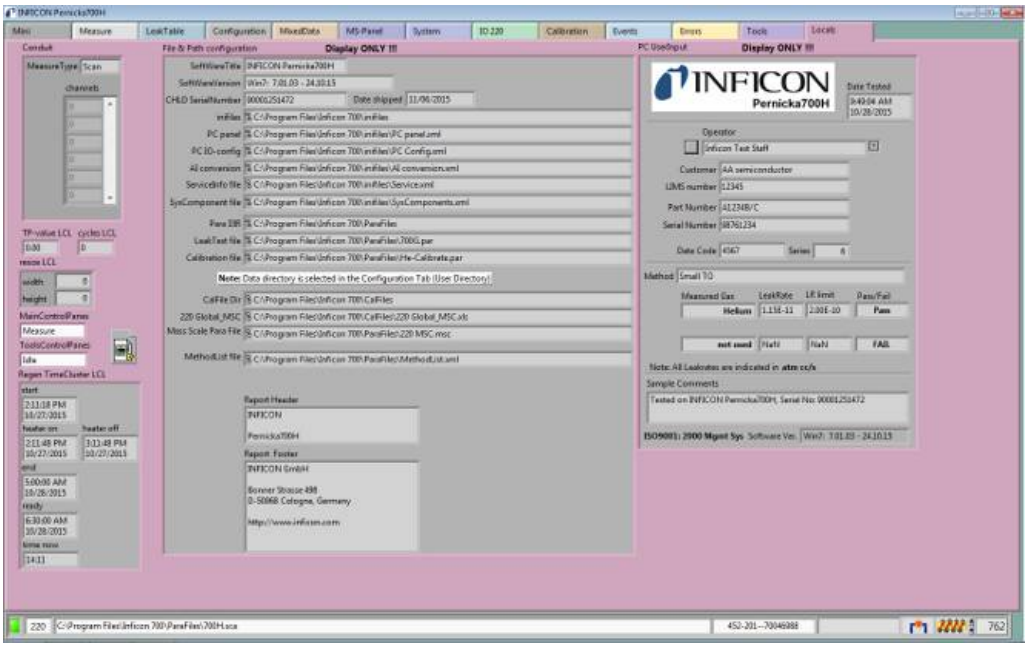


Fig. 41: Window "Locals"

The Locals window displays path and general information, such as the serial number of the device and the software version.

6.5.4.5 Display events

► To open the "Events" window, press the tab "Events".

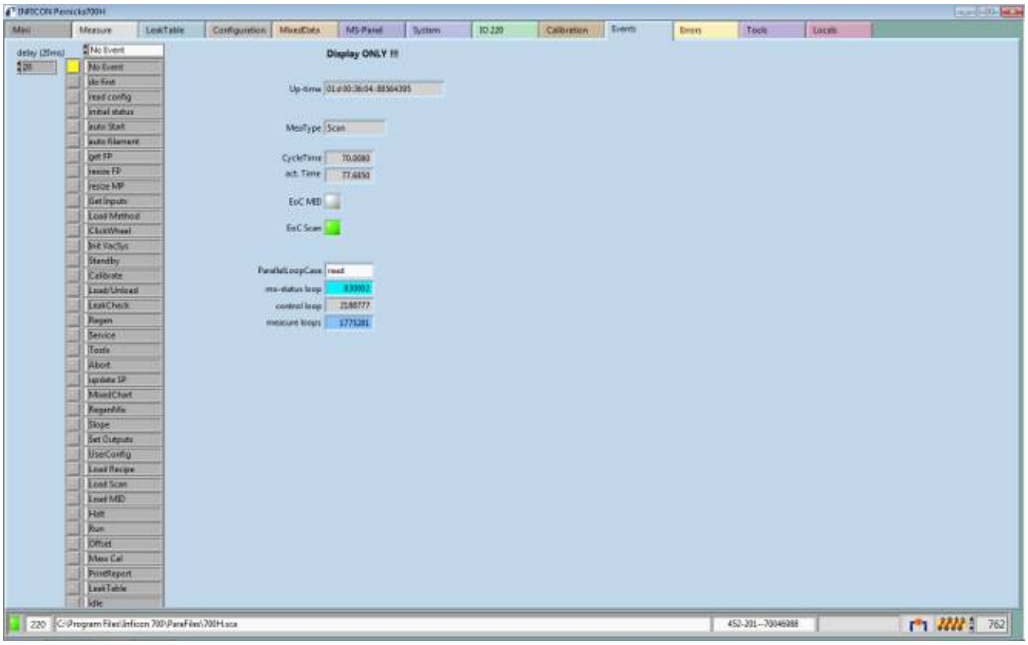


Fig. 42: Window "Events"

In the "Events" window, you will be shown which internal software routine is currently running.

6.6 Measurement data

The measurement data are recorded in a list.

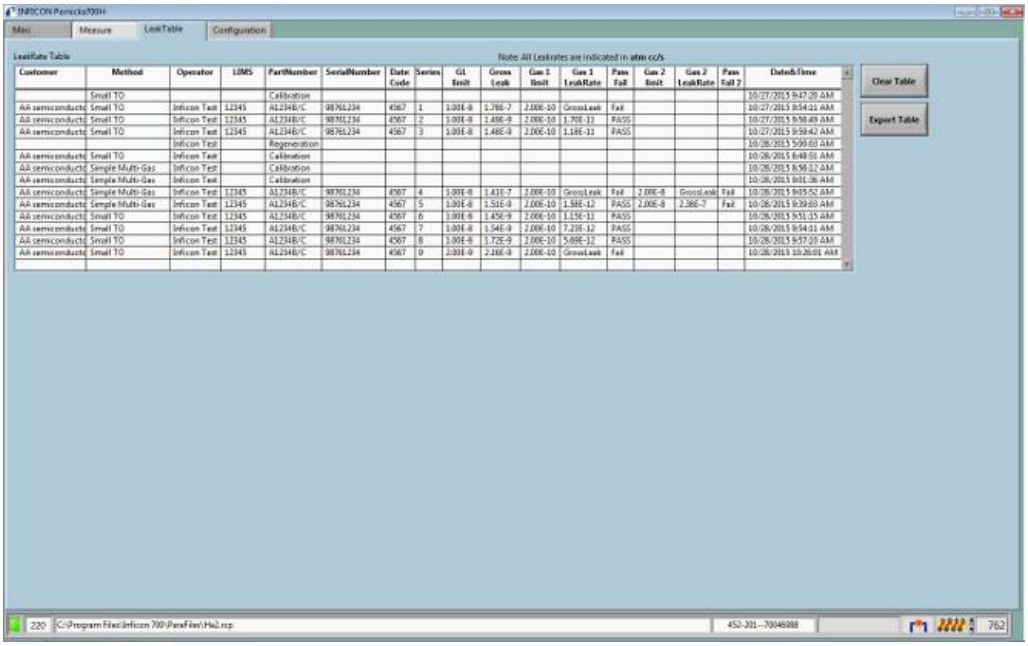


Fig. 43: Window "Leak Table"

Button	Description
Clear Table	► To delete all measurement data in the table, press this button.
Export Table	► To open all measurement data in the preinstalled Open Office press this button. In the Open Office you can store the measurement results at any location, e.g. a USB flash drive (FAT32 formatted). In the "Locals" window, the "log.xls" is stored, in which contains all measurement results (regardless of the export).

6.7 Determine mass spectrometer

In the "Scan" mode, you can use the CHLD-Sensor to measure all the masses present in the system of the device and display them as a mass spectrum in the "Measure" window. With this measurement you can determine which gases are in the system of the device.

1 Measure > Scan > Load & Run.

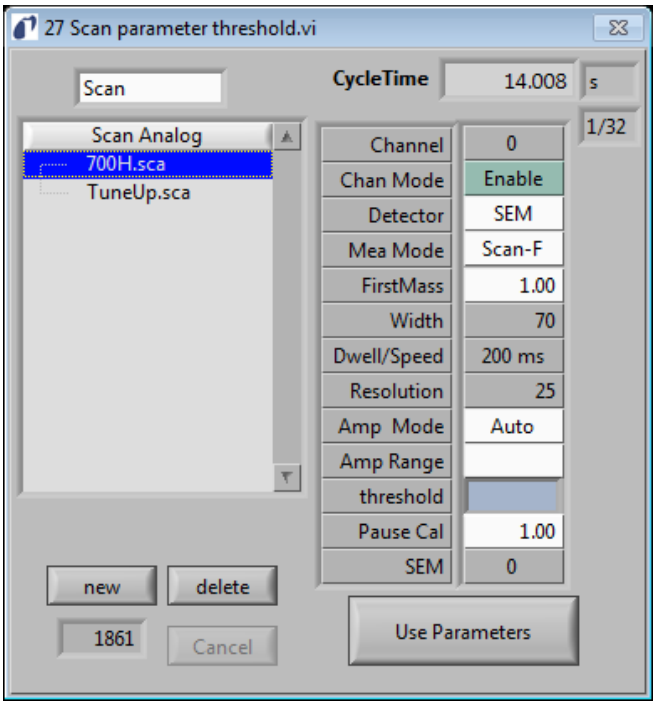


Fig. 44: Editor for Scan parameter to determine the mass spectrum

2 To select the scan procedure from the list, press the "Use Parameters" button.

⇨ The measurement of all masses of the gases present in the system is performed according to this scanning procedure and the result is displayed as a mass spectrum in the "Measure" window.

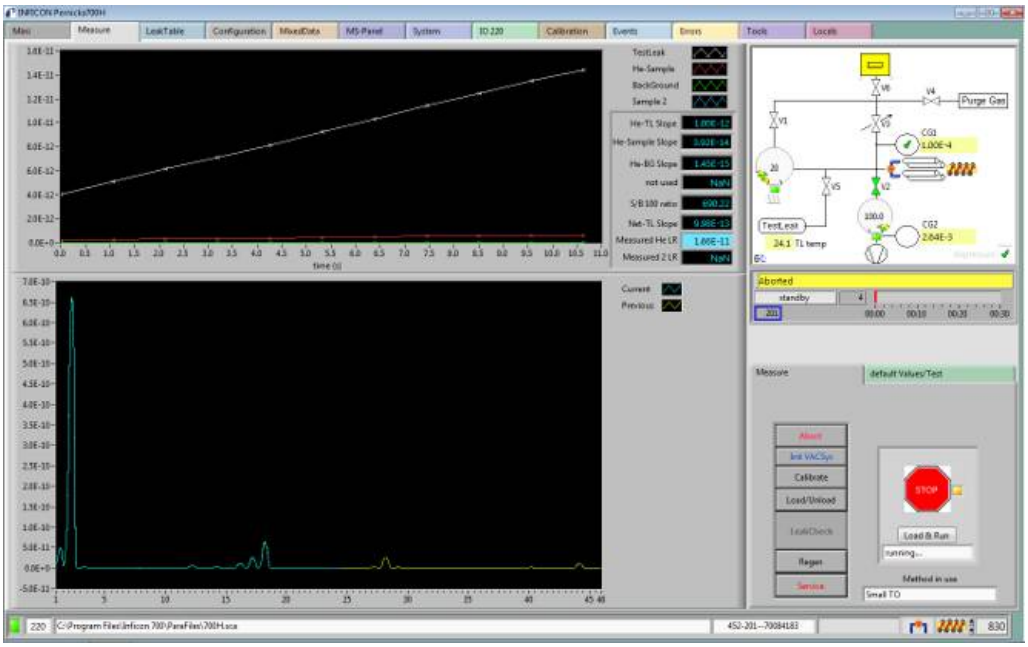


Fig. 45: "Measure" window with determined mass spectrum

► To stop the measurement, press the red STOP button.

6.8 Perform regeneration

On a daily basis, before switching off the device and mainly after a series of successive measurements, the gases frozen in the cryogenic pump must be evaporated and removed from the system.

► Perform daily regeneration of the cryogenic pump.

After the regeneration is started, the heating phase is started after a pre-warning period. The temperature in the cryogenic pump increases and the frozen gases are evaporated and pumped out, depending on their dew point.

1 Mini > Regenerate or Measure > Regenerate.

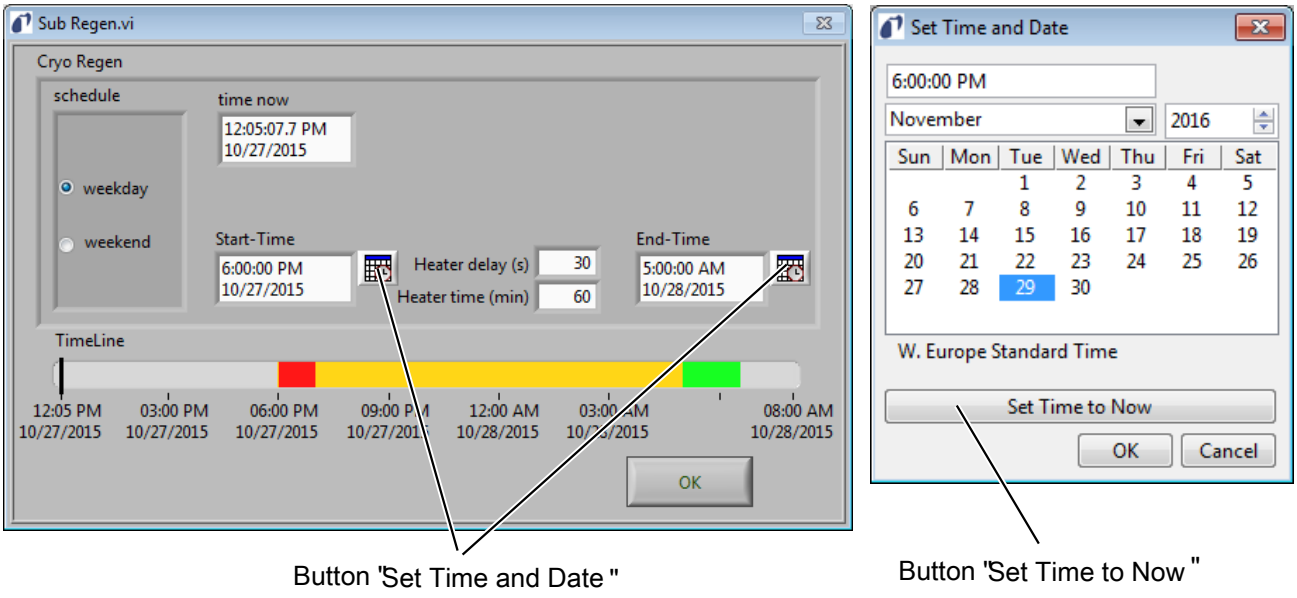


Fig. 46: Input window "Regeneration cryogenic pump"

2 To define the regeneration period, choose between the 2 possibilities.

⇨ To start regeneration on a daily basis with set start time, select "weekday". To set the start time with the "Start-Time" parameter the end time with the "End-Time" parameter press the "Set Time and Date" button. To start the regeneration immediately, press the "Set Time to Now" button.

⇨ To start regeneration before each weekend with set start time, select "weekend". To set the start time with the "Start-Time" parameter the end time with the "End-Time" parameter press the "Set Time and Date" button. To start the regeneration immediately, press the "Set Time to Now" button.

3 To start the regeneration at the preset start time, press the "OK" button.

⇨ The measuring program automatically changes to the "Regeneration cryogenic pump" window.

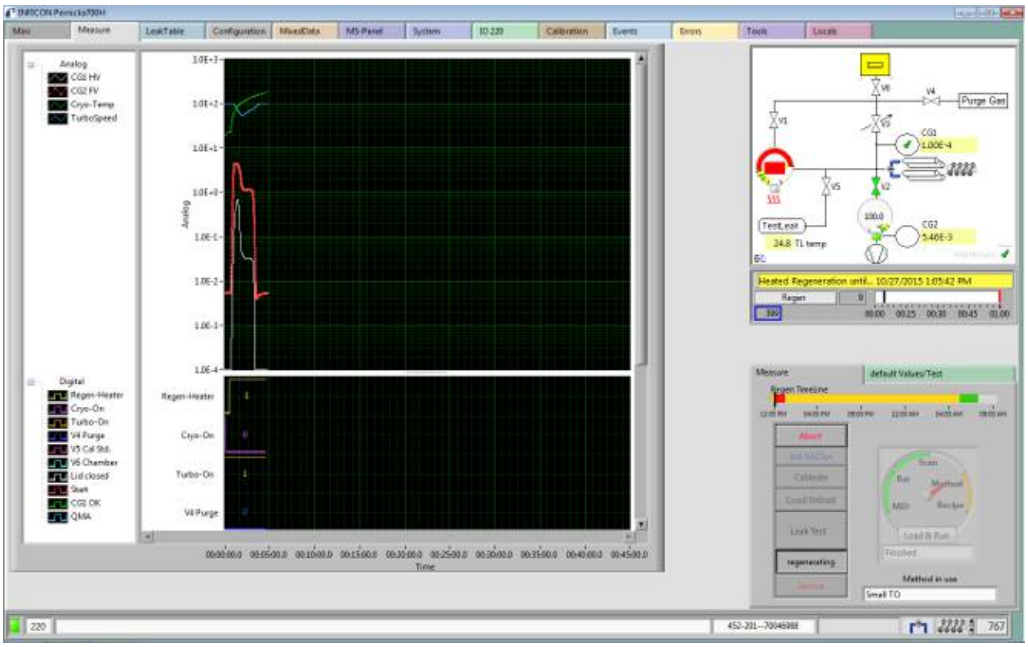


Fig. 47: "Regeneration cryogenic pump" window

The "Regeneration cryogenic pump" window gives you a detailed overview of the regeneration history.

To stop regeneration before the set end time, press the "Abort" button.

6.9 Switching off the device.

NOTICE

Damage to the cryogenic pump

If there are frozen gases in the cryogenic pump and the device is switched off, the gases are evaporated and the rupture disk on the cryogenic pump can rupture as a result of the rising pressure.

- ► Perform a regeneration of the cryogenic pump, at least up to a temperature of 280 K, before you switch off the device.

You can turn the device off with the power switch on the back of the device.
The parameters set in the device remain saved.

1. Stop the Pernicka 700H software.
2. Shut down the computer.
3. To turn the device off, set the power switch to OFF. When the device is switched off, the compressor of the cryogenic pump is also switched off.

7 Warning and error messages

During operation, the display shows information that helps you operate the instrument. Measurement values are displayed along with current device modes, operating instructions as well as warnings and error messages. The instrument is equipped with extensive self-diagnostic functions. If the electronics detect a faulty state, the device will show this as far as possible on the display and will interrupt operation when necessary.

Warnings Warnings warn of instrument modes that can impair the accuracy of measurements. Operation of the instrument is not interrupted.

Error messages Errors are events that force the interruption of the operation. The error message consists of a number and a descriptive text.

7.1 Display warning and error messages

- To open the "Errors" window, press the tab "Errors"."Errors" window"Errors" windowOperationOperation

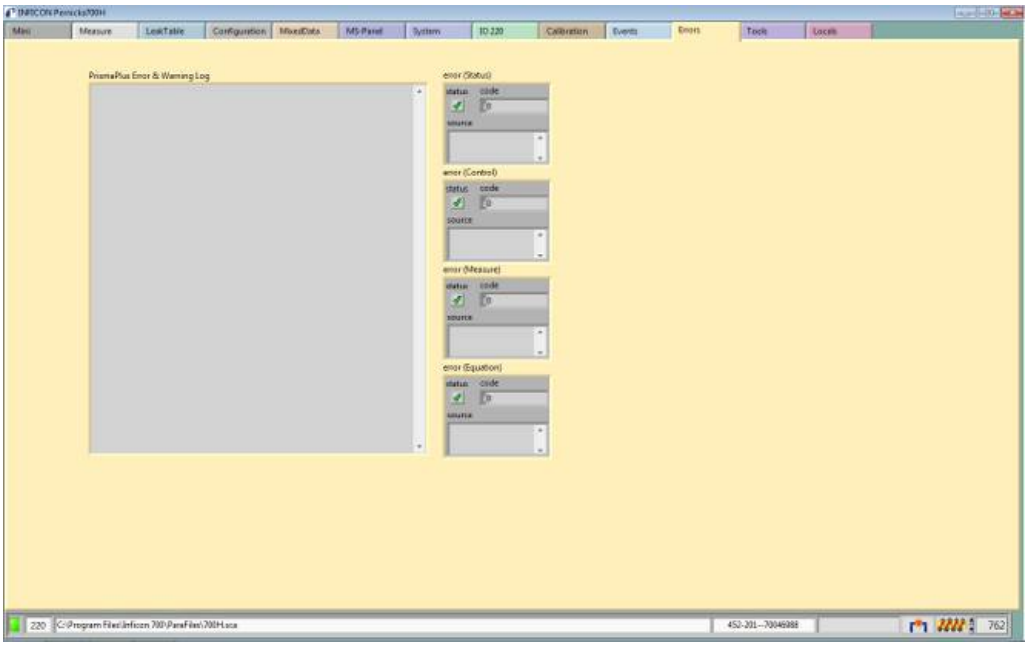


Fig. 48: Window "Errors"

In the "Errors" window, error messages are displayed during a measurement process and recorded in the background.

Warnings

Message	Possible causes	Solution
Emission current > +/- 10 %	HV pressure is too high. Cathode is aged.	Perform a regeneration. See "Perform regeneration [▶ 72]".

Message	Possible causes	Solution
		Change to the other cathode in the "Pernicka 700H" measurement program. See "Select cathode in the CHLD-Sensor [87]".
Emission current > +/- 20 %	HV pressure is too high. Cathode is aged.	Change to the other cathode in the "Pernicka 700H" measurement program. See "Select cathode in the CHLD-Sensor [87]".
RF temperature high > 65 °C ... 80 °C	Filter mat clogged in the CHLD-Sensor. Fan in the CHLD-Sensor defective. RF generator in the CHLD-Sensor is incorrectly calibrated.	Change the filter mat in the CHLD-Sensor. See "Check or change the filter mat [81]". Change the fan in the CHLD-Sensor. Please contact the INFICON service.

Error messages

Message	Possible causes	Solution
External protection triggered	HV pressure is too high.	Check the tightness of the valves.
Emission Error	HV pressure is too high.	Check the tightness of the valves.
Filament 1 defect	Cathode 1 is defective.	Change to the cathode 2 in the "Pernicka 700H" measurement program. See "Select cathode in the CHLD-Sensor [87]". Please contact the INFICON service. The second cathode is equivalent to the first and typically allows for a period of about a month of device operation.
Turning on Analyzer FAILED!	HV pressure is too high. Both cathodes are defective. Internal connection problem in the CHLD-Sensor.	Replace both cathodes in the CHLD-Sensor. Please contact the INFICON service.
An Error occurred (long text)	Internal Windows communication error.	Start the measurement program "Pernicka 700H" once a week.

Message	Possible causes	Solution
Turning on the emission and SEM FAILED and was aborted!	SEM amplifier dirty or defective.	Please contact the INFICON service.
FAILURE: Emission and SEM are OFF!	HV pressure is too high.	Wait until the pressure is small enough to turn on the SEM amplifier.
FAILURE: Air pressure for valve switching is too low!	Air pressure for the valves is less than 7 bar.	Check that the air pressure is greater than 7 bar. Open the pressure valves in the supply lines. Gradually increase the pressure each by 0.5 bar.

Problems

Situation	Possible causes	Solution
The device cannot be switched on.	The power cord for the power supply is not plugged into the device.	Plug the supplied power cord into the POWER LINE INPUT plug and connect the power cord to the power supply.
Red X in the system diagram ("Measure" window) at the point "Air pressure".	The pressure of the compressed air supply is less than 6.9 bar.	Check that the air pressure is greater than 7 bar. Open the pressure valves in the supply lines. Gradually increase the pressure each by 0.5 bar.
The lid of the test chamber cannot be opened.	The test chamber is under vacuum.	In the "Pernicka 700H" measurement program, press the "Measure" tab and then the "Load/Unload" button. Ensure that the pressure of the purge gas supply is between 69 mbar and 71 mbar. Ensure that the pressure of the compressed air supply is between 6.9 bar and 7.59 bar.
Hissing or stuttering sound from the back of the device.	The pressure of the compressed air supply is greater than the factory-set limit for the pressure relief valve.	Check that the pressure of the compressed air supply is less than 9 (consistency!) bar. Lower the pressure by 0.2 bar.

Situation	Possible causes	Solution
	The sound comes from the activated pressure relief valve.	

8 Cleaning and maintenance

8.1 General information

⚠ DANGER

Dangers from electric power

There is a danger to life from the contact of conductive parts inside the device.

- ► Disconnect the device from the power supply prior to any maintenance work. Make sure that the electric power supply cannot reconnected without authorization.

Servicing levels for maintenance work

• I	Service level I	Customer
• II	Service level II	Customer with INFICON training
• III	Service level III	Authorized INFICON service technician

Service level I maintenance work on the Pernicka 700H CHLD may be carried out by the customer. These maintenance procedures are described in this "Original Operating Instructions Pernicka 700H CHLD".

Service level II and II maintenance work on the Pernicka 700H CHLD may only be carried out by authorized INFICON service technicians or by persons authorized by INFICON GmbH Cologne. These maintenance procedures are described in the "Pernicka 700H CHLD Service Documentation".

8.2 Device maintenance

8.2.1 Change O-rings of the test chamber

Carry out the maintenance work according to the maintenance plan, see "Maintenance plan [▷ 87]".

To prevent grease deposits on the device, use neoprene or nitrile disposable gloves free of powder during operation.

Required spare parts

Set of O-rings test chamber, small	Order number: 200004645
Set of O-rings test chamber, middle	Order number: 200004646
Set of O-rings test chamber, large	Order number: 200004647

Required tools Aids for levering the O-rings, e.g. plastic tweezers or forceps

1. Open the lid of the test chamber.
2. Carefully remove the two O-rings from the test chamber using a suitable aid. Lift the O-rings only upwards.
3. Clean the surface of the test chamber with a dust- and lint-free cloth.
4. Insert the two new O-rings into the test chamber.
5. Close the lid of the test chamber.

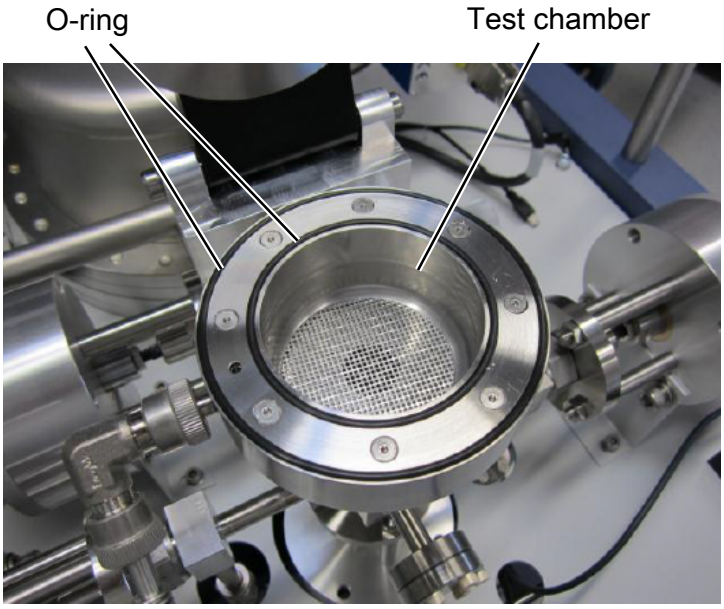


Fig. 49: Test chamber: Lid open

8.3 Maintenance of the CHLD sensor

8.3.1 Check the fan function

Read and follow the included technical documentation "Operation Manual CHLD Sensor QME 220".

The fan is used to cool the internal electronic modules of the CHLD-Sensor.

Required spare parts

See "Check or change the filter mat [▸ 81]"	See "Check or change the filter mat [▸ 81]"

Required tools See "Check or change the filter mat [▸ 81]"

► Check the fan function in the following situations:

The maintenance interval according to the maintenance schedule (see Maintenance plan [▷ 87]) has been reached

1. Perform an acoustic check on the fan function on the QME 220 electronic unit.
2. If you do not hear any fan noise, change the fan. Please contact the INFICON service.
3. If you hear fan noise, check the filter mat. See "Check or change the filter mat [▷ 81]".

The temperature in the QME 220 electronic unit is too high

The temperature in the QME 220 electronic unit, is normally in the range of 20 °C ... 25 °C above the ambient temperature.

1. To open the "Tools" window, press the tab "Tools".
2. Tools > Tune Up.

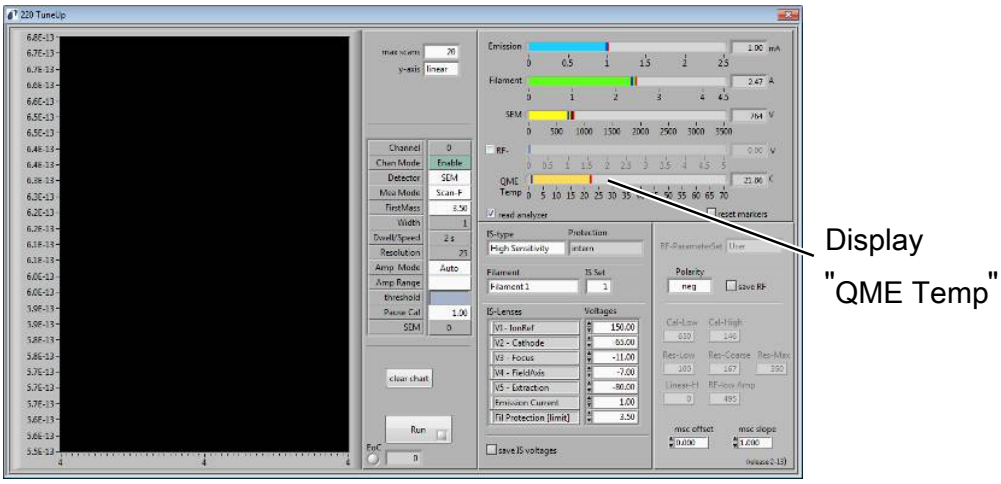


Fig. 50: CHLD-Sensor: Check temperature of the QME 220 electronic unit

3. The current temperature of the QME 220 electronics device of the CHLD-Sensor is displayed in the "QME Temp" field. Check.
4. If the temperature in the QME 220 electronics device is 35 °C above the ambient temperature, perform an acoustic check on the fan function on the QME 220 electronics device.
5. If you do not hear any fan noise, change the fan. Please contact the INFICON service.
6. If you hear fan noise, check the filter mat. See "Check or change the filter mat [▷ 81]".

8.3.2 Check or change the filter mat

Carry out the maintenance work in accordance with the manufacturer's maintenance plan and the manufacturer's technical documentation. See "Operation Manual CHLD Sensor QME 220".

The filter mat serves for dust filtration of the cooling air. To ensure sufficient cooling of the electronic components in the CHLD-Sensor clean the filter mat regularly.

Required spare parts

Filter mats (5 pieces) CHLD 700 Sensor electronics box	Order number: 452-552

Required tools

Screwdriver Torx T10

Separate the connection from the IO 220 module

► Disconnect all electrical connections to the IO 220 module: Power supply, Ethernet cable, analog I/O-cable, digital I/O-cable.

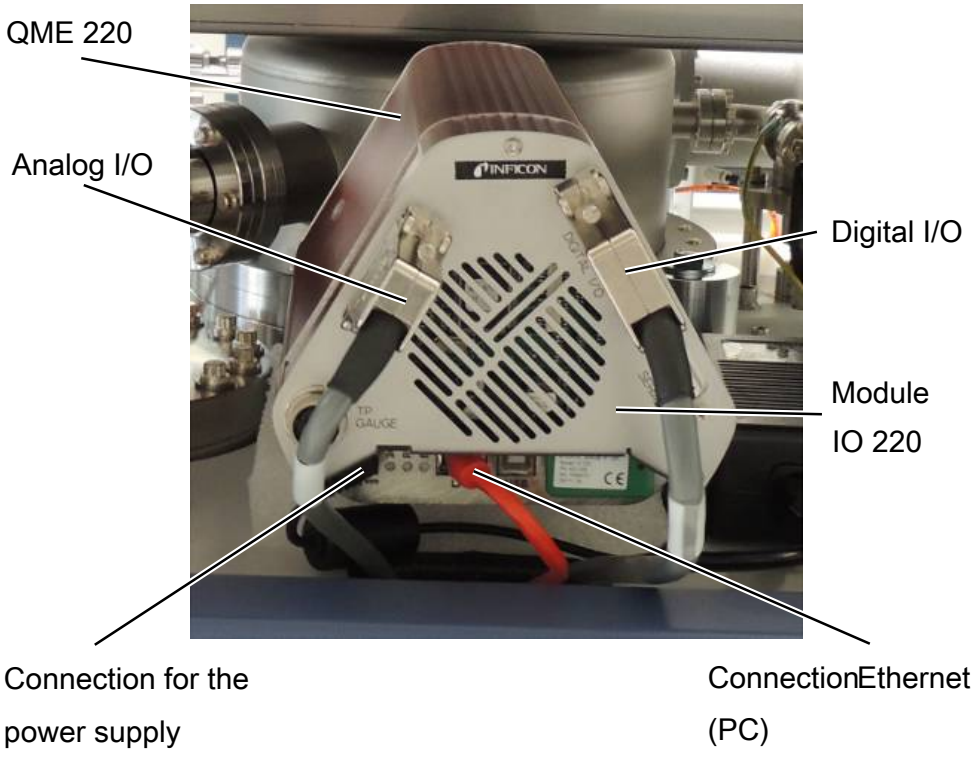


Fig. 51: CHLD-Sensor: Disconnect connections on IO 220 module

Disconnect the QME 220 electronics device from the QMA 220 analyzer

1. Loosen the 2 screws on the QME 220 electronics device.
2. Carefully remove the QME 220 electronics unit from the QMA 220 analyzer.

3 Place the QME 220 electronics device on a suitable base that allows you to work comfortably on the front panel.

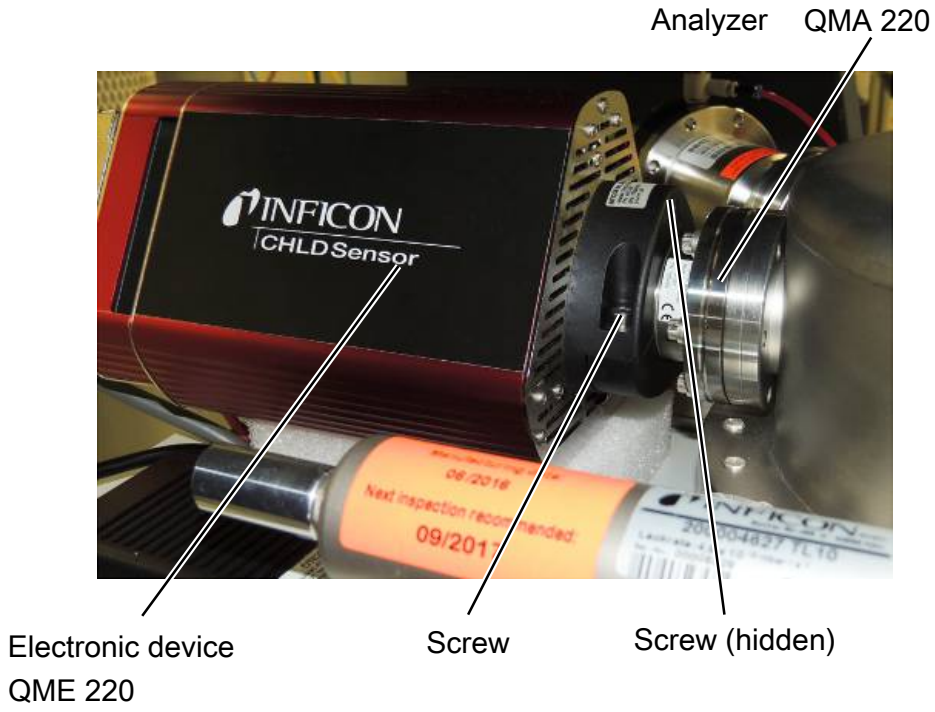


Fig. 52: CHLD-Sensor: Unscrew the QME 220 electronics device

Check or change the filter mat

1 To remove the IO 220 module, loosen the 3 screws.

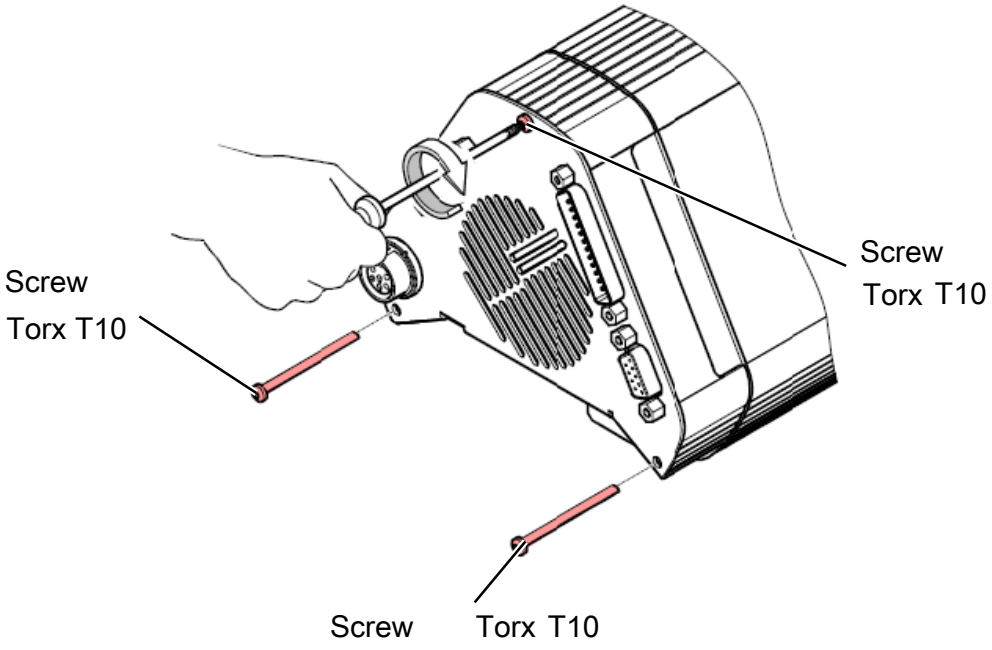


Fig. 53: CHLD-Sensor: Remove the IO 220 module

2 To remove the filter holder cover on the back of the CHLD-Sensor loosen the screw.

3 Remove the filter mat from the filter holder cover.

4 If there is little dirt, clean the filter mat. Use a vacuum cleaner to remove the dust from the filter mat.

5 Insert the cleaned filter mat into the filter holder cover.

6 If there is a lot of dirt, insert a new filter mat into the filter holder cover.

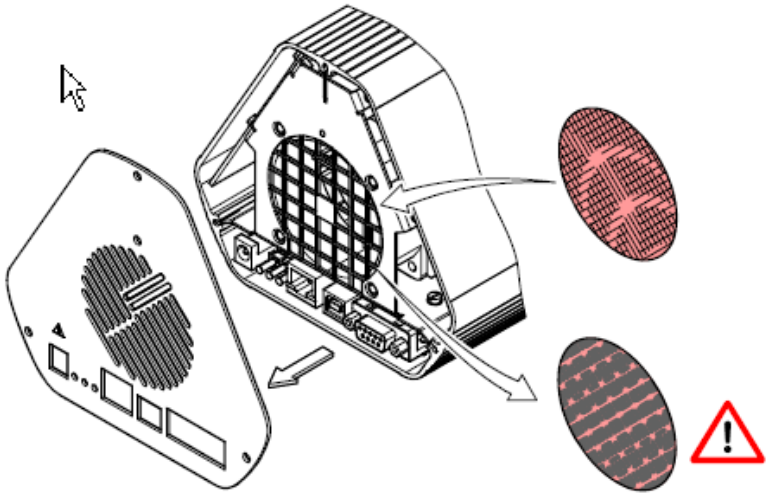


Fig. 54: Check the filter mat and clean if necessary

7 To mount the filter holder cover on the back of the CHLD-Sensor secure the filter holder cover with the screw.

8 Mount the IO 220 module with the 3 screws.

Mount the QME 220 electronic device onto the QMA 220 analyzer

1 Loosen the two screws on the black plastic part of the QME 220 using an Allen key (SW 4) so that the movable part has 2 - 3 mm clearance.

2 Carefully insert the QME 220 up to the indented mark onto the already installed QMA 220. Note the correct positioning on the QME 220 through the earth tongue and the guide groove on the QMA 220.

3 Tighten the two Allen screws securely. These screws are used to mechanically secure the QME 220 and electrical safety as they ensure grounding.

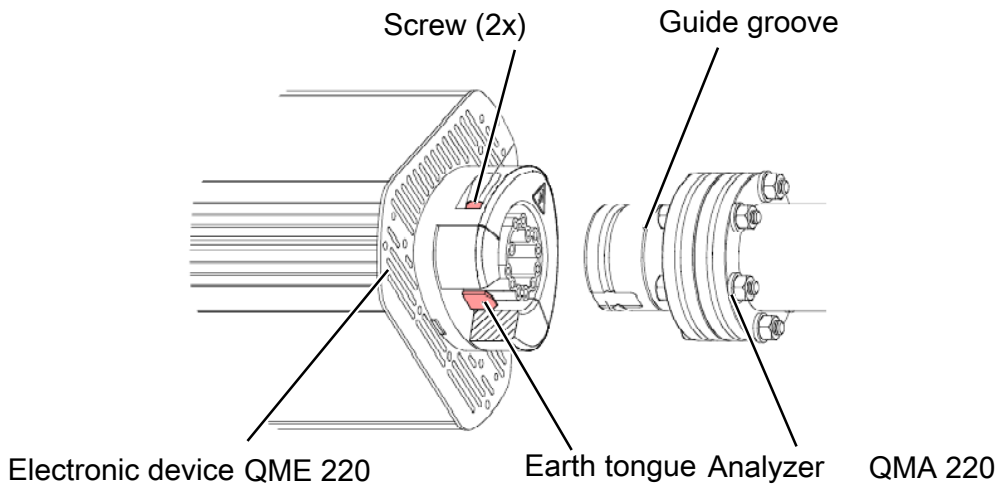


Fig. 55: Mount the QME 220 electronic device onto the QMA 220 analyzer

Connect electrical connections to the IO 220 module

► Reestablish the electrical connections with the IO 220 module: Power supply, Ethernet cable, analog I/O-cable, digital I/O-cable.

8.4 Maintenance of the internal calibration leak

8.4.1 Perform calibration

Carry out the calibration of the device according to the maintenance plan, see "Maintenance plan [▷ 87]". Perform calibration, see "Calibrating [▷ 58]".

Required spare parts	None	
Required tools	None	

8.4.2 Recalibration of the calibration leak by VTI

Carry out the maintenance work according to the maintenance plan, see "Maintenance plan [▷ 87]".

Required spare parts	None	
Required tools	Please contact the INFICON service	

1 Remove the calibration leak. Please contact the INFICON service.

2 Return the calibration leak to the manufacturer for recalibration.

3 Re-install the recalibrated calibration leak into the device. Please contact the INFICON service.

8.5 Maintenance of the backing pump

8.5.1 Check the oil level

Carry out the maintenance work in accordance with the maintenance plan (see "Maintenance plan [▷ 87]") and the manufacturer's technical documentation delivered with the device. See "Operating Instructions GA01601_002_A1".

Required spare parts	None
Required tools	None

The oil level of the backing pump must always be within the "minimum oil level" and "maximum oil level" markings during operation.

► Check that the oil level is approximately in the center of the sight glass when the backing pump is switched off.

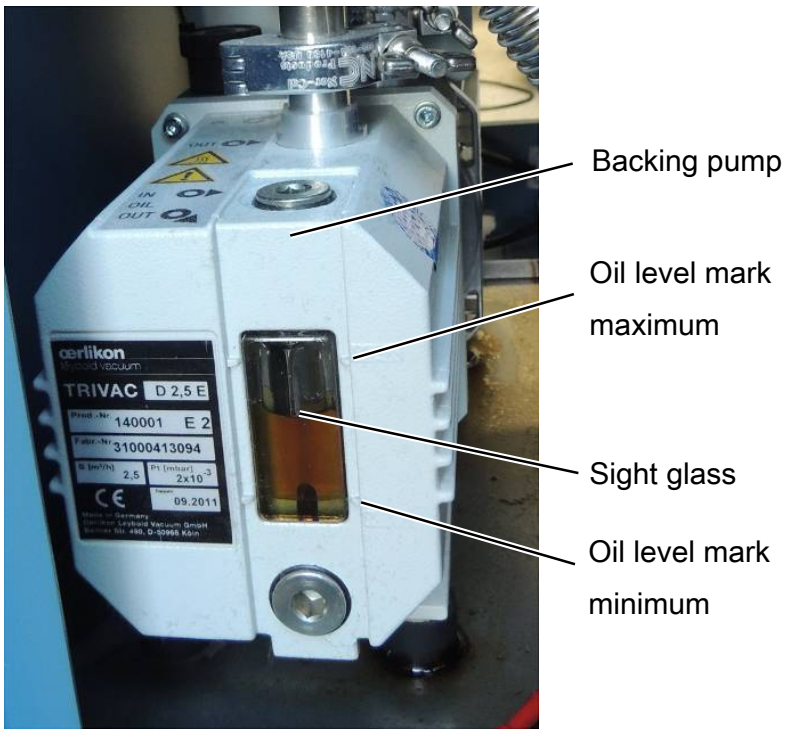


Fig. 56: Backing pump: Check the oil level

8.6 Set CHLD-Sensor

The "Tools" provides functions that allow you to perform settings on the CHLD-Sensor. For example, you can switch to another cathode or change the operating current of the SEM amplifier.

► To open the "Tools" window, press the tab "Tools".

Fig. 57: Window "Tools"

The "Tools" window provides functions for maintenance and diagnostics of the device.

Button	Description
idle	Display of the "Tools" window (see figure above).
About	Displays the software version number and INFICON address information.
Tune Up	► For example, to switch between heating wires 1 and 2 in the CHLD-Sensor press this button. See "Select cathode in the CHLD-Sensor [▷ 87]".
soft emi	Call diagnostic tools for the cathodes. ► You can increase the emission current of the cathode.
degas	► To clean the cathodes of adherent substances, select this function. The emission current for the cathode is increased to 5 mA and the adhered substances are evaporated from the cathode. Note that the operation of the cathode with an increased emission current reduces the service life of the cathode.
EXIT	► To cancel the current process, press this button.
EXIT Tools	► To close the "Tools" window, press this button.

Watchdog LED

Optical display for monitoring system components of the device.

8.6.1 Select cathode in the CHLD-Sensor

The CHLD-Sensor has 2 cathodes. In the "Tune Up" window, you can switch between the 2 cathodes in the CHLD-Sensor if a cathode is defective.

1 Tools > Tune Up.

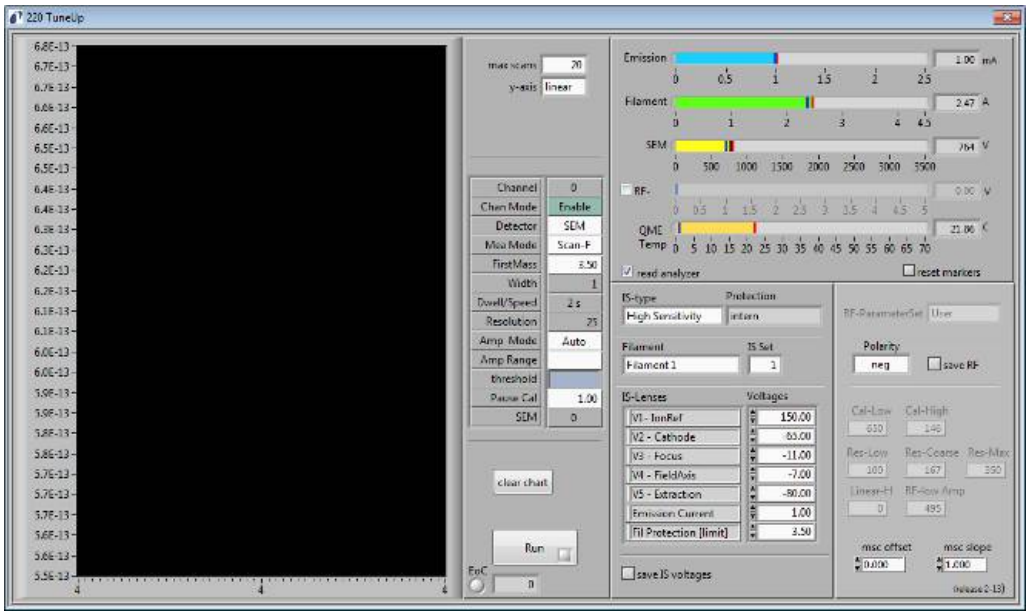


Fig. 58: "Tune Up" Window: Select cathode 1 or 2 in the CHLD-Sensor

2 In the selection field "Filament" choose between Filament 1 and Filament 2.

3 To save the setting, activate the option "save IS voltage".

8.7 Maintenance plan

Regardless of the described maintenance cycles a replacement depends on contamination and wear.

8.7.1 Maintenance table

Maintenance cycle	Personnel	Additional information	
4000 h	Operating personnel	8.3.2	Check or change the filter mat
8000 h	Operating personnel	8.2.1	Change O-rings of the test chamber
		8.3.1	Check the fan function
daily	Operating personnel	8.4.1	Perform calibration
quarterly	Operating personnel	8.5.1	Check the oil level
annually	Operating personnel	8.4.2	Recalibration of the calibration leak by VTI

9 Decommissioning the device

9.1 Deinstallation

- ✓ The device is in "Standby" operating mode.
- ✓ The cryogenic pump regeneration has been carried out. See "Perform regeneration [▶ 72]".
- ✓ The unit has been switched off. See "Switching off the device. [▶ 73]".
- ► Disconnect the device and the cryogenic pump compressor according to the following chapters of the power supply and operating media.

9.1.1 Disconnect the device from the power supply

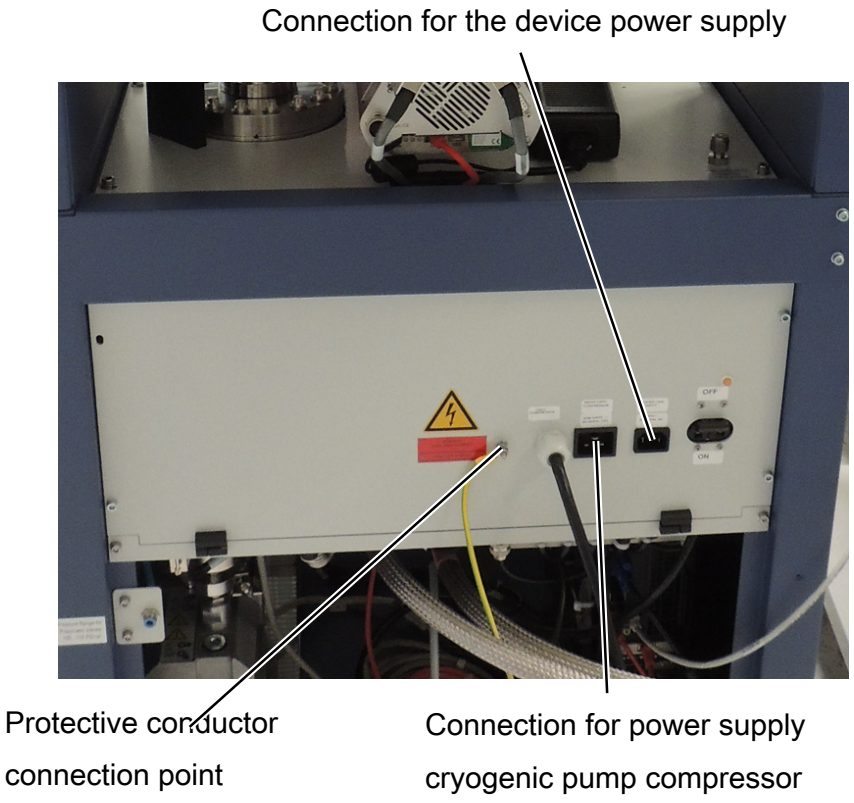


Fig. 59: Disconnect the device from the power supply

1. Disconnect the power cord from the power supply and the POWER LINE INPUT connector.
2. Disconnect the power cord from the power supply and the MAINS CRYO COMPRESSOR connector.
3. Dismantle the protective conductor at the protective conductor connection point of the device.

9.1.2 Separate the purge gas

The sealing elements of the compression fitting, ferrel and clamping ring are intended to be used only once.

- ► Use a new ferrel and a new clamping ring for each installation of the metal tube for the purge gas supply.

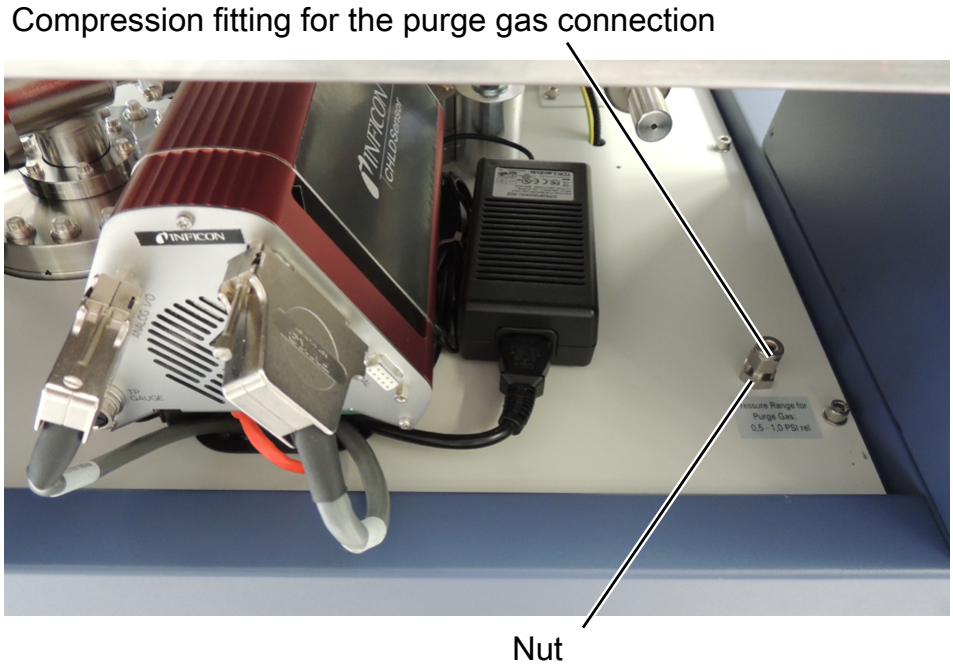


Fig. 60: Separate the purge gas

1. Using an open-ended wrench hold the nut still and loosen the union nut of the compression fitting.
2. Pull the metal line out of the compression fitting.

9.1.3 Separate the compressed air

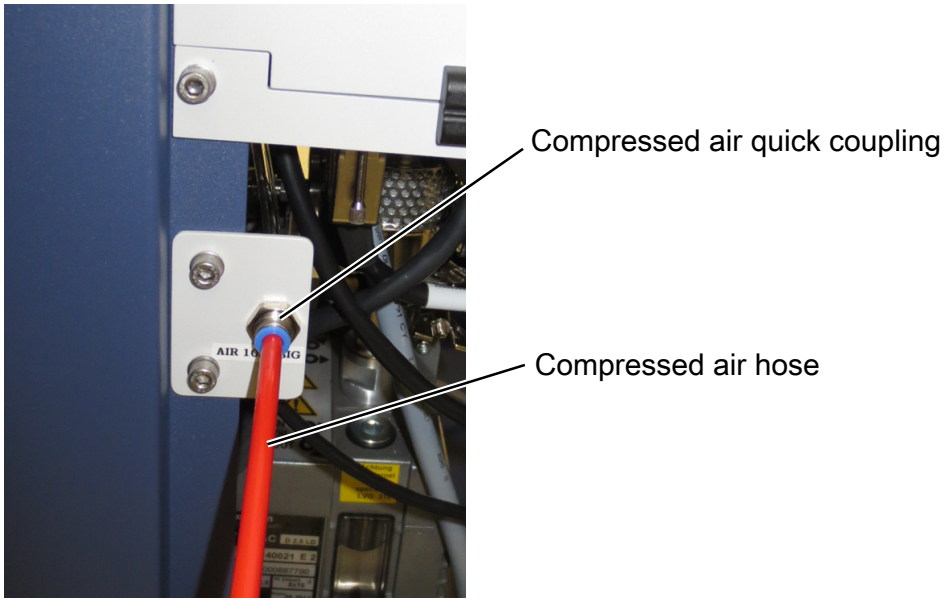


Fig. 61: Separate the compressed air

1. Close the valve on the compressed air supply.
2. To disconnect the compressed air supply for the device, remove the air hose from the compressed air quick coupling of the compressed air supply, such as the compressed air cylinder, and the device. To do so, press the end face of the compressed air quick coupling, pull out the compressed air hose from the compressed air quick coupling and release the end face of the compressed air quick coupling.

9.1.4 Disconnect the compressor

Cryogenic pump compressor

Read and follow the included documentation "Cryo-Torr Pump Installation, Operation and Maintenance Instructions".

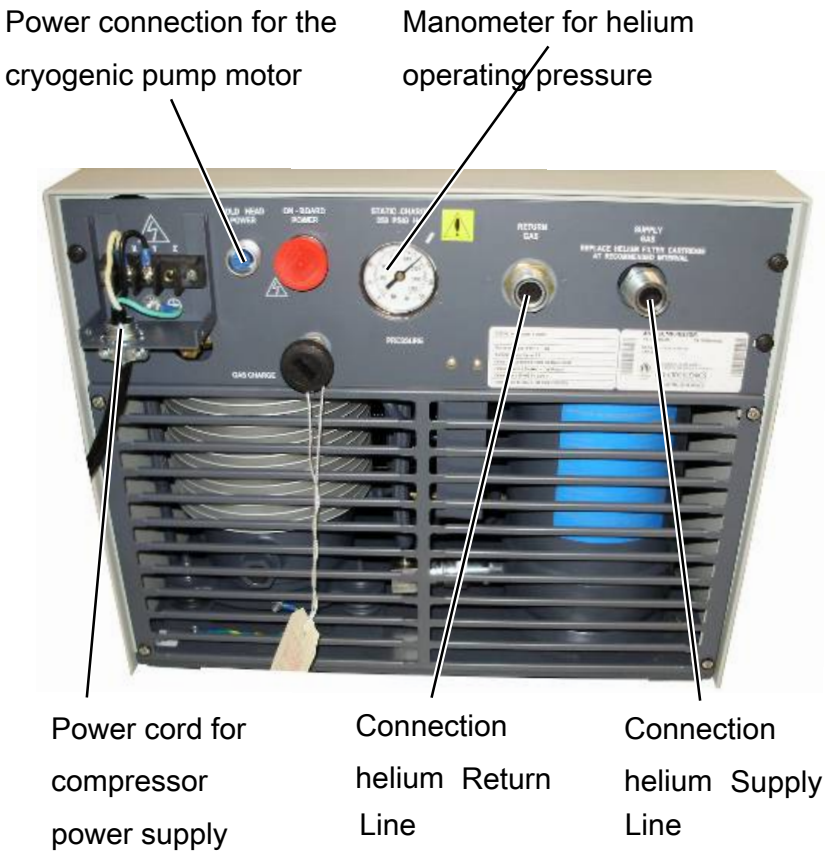


Fig. 62: Connections on the cryogenic pump compressor

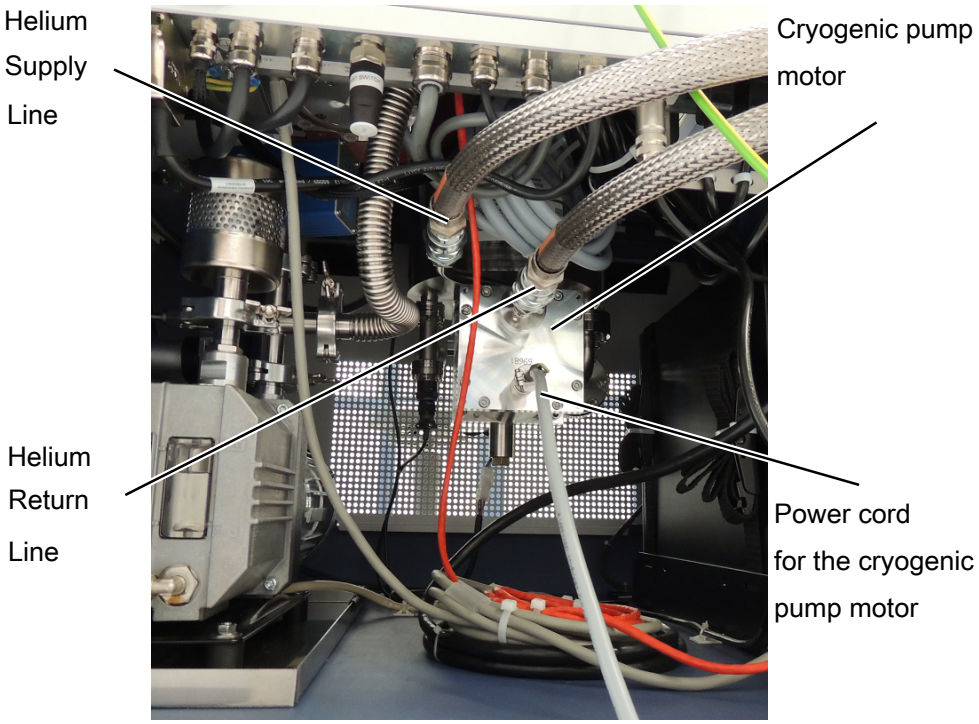


Fig. 63: Connections on the device

Disconnect the power cord for the compressor power supply

1. To remove the protective cover from the electrical connection of the compressor, loosen the 2 fixing screws.
2. To remove the power cord from the strain relief, loosen the 2 screws.
3. Remove the 3 wires from the terminals X, Y and the protective earth connection.
4. Assemble the protective cover with the 2 securing screws.
5. Connect the 3 wires of the power cord to the screw and tighten the nut. The three wires of the power cord were connected to the screw before the installation was started.

Remove the power cord for the motor of the cryogenic pump

► Loosen the threaded housing and remove the circular plug from the COLD HEAD POWER jack.

Remove the helium lines

The "Supply" and "Return" helium lines are filled with helium and are under pressure.

1. Remove the helium Supply line to the compressor and the device.
2. Remove the helium Return line to the compressor and the device.
3. Connect the blank flanges to the connections of the 2 helium lines.

9.2 Sending in the device

⚠ WARNING

Danger due to harmful substances

Contaminated devices could endanger the health. The contamination declaration serves to protect all persons who come into contact with the device.

► Fill in the declaration of contamination completely.

1. Please do not hesitate to contact us and send a completed declaration of contamination before sending anything to us.

   ⇨ You will then receive a return number from us.
2. Use the original packaging when returning.
3. Before sending the device, attach a copy of the completed contamination declaration. See below.

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.

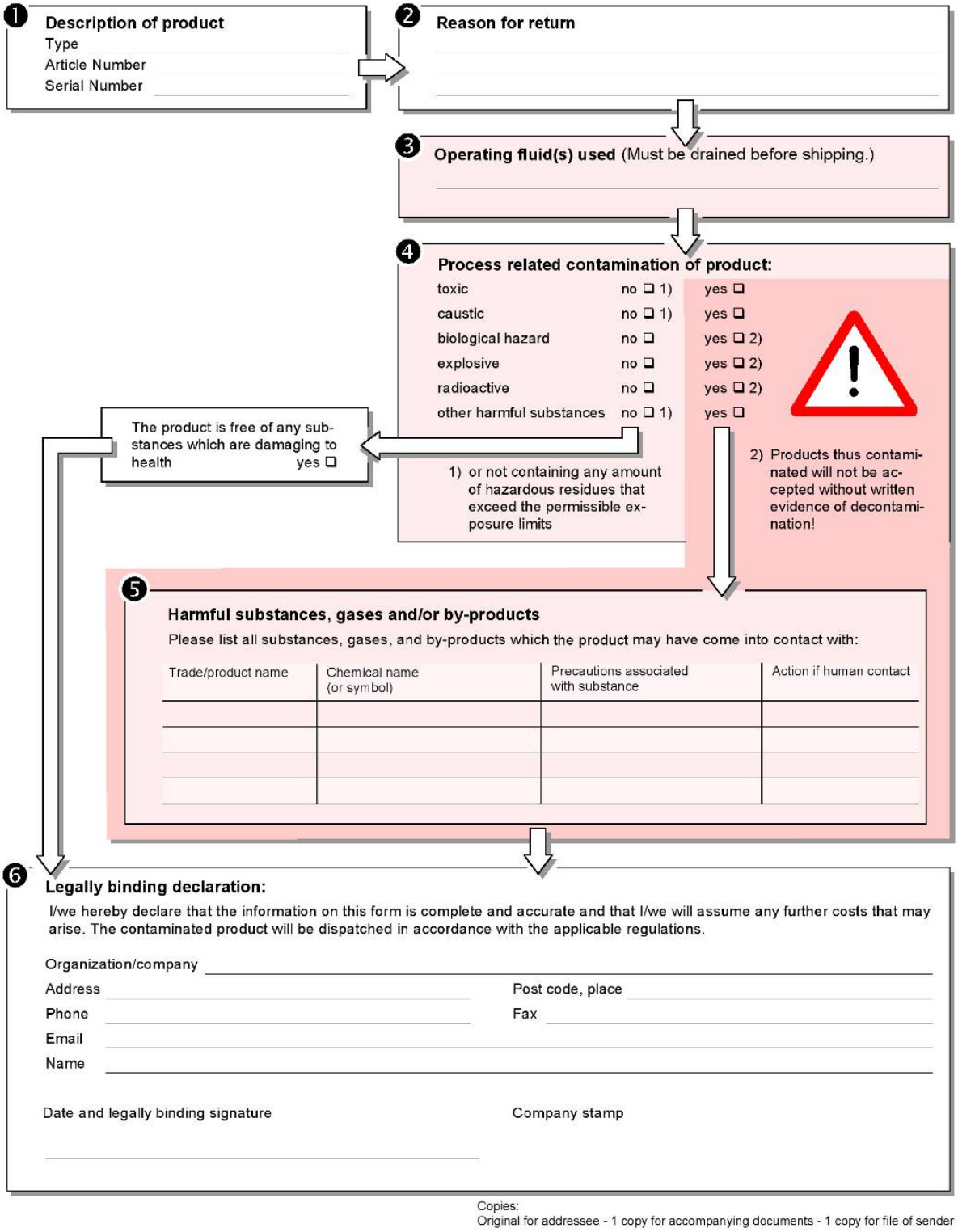


Fig. 64: Declaration of Contamination

9.3 Disposing of the device

The device can either be disposed of by the operator or be sent to the manufacturer. 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.

	Label for the returns to the recycling circuit.
	Instrument cannot be scrapped with the normal domestic waste.

10 Accessories and spare parts

10.1 Accessories

The parts listed below can be additionally ordered.

Designation	Catalog number
Test chamber sealed with 2 O-rings, large	551-710
Test chamber sealed with 2 O-rings, middle	551-711
Test chamber sealed with 2 O-rings, small	551-712
Metal sealed test chamber, small	551-715
Pressure reducing valve for purge gas supply: < 50 mbar rel., 10 l/min, connection to the Pernicka 700H CHLD: ¼ inch, compression fitting	
• for connection to gas cylinder with thread according to CGA 580, alternatively	551-701
• for connection to gas cylinder with thread according to DIN 477, No. 6, alternatively	551-702
• for connection to gas cylinder with thread according to DIN 477, No. 10, alternatively	551-703
• for connection to gas cylinder with thread according to chinese cylinder G518-14 RH-EXT	551-706
Helium calibration leak, air leak rate 10^{-5} mbar l/s	551-720
Helium calibration leak, air leak rate 10^{-6} mbar l/s	551-721
Copper seals DN 16 CF, 10 pieces	213-451

10.2 Spare parts

The spare parts can be found in the technical documentation "Spare Parts CHLD700H Accumulation Leak Detector".

11 CE Declaration of Conformity

INFICON

CE

EC Declaration of Conformity

We – INFICON GmbH - herewith declare that the products defined below meet the basic requirements regarding safety and health of the relevant EEC directives by design, type and the versions which are brought in to circulation by us.

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

Designation of the product:

leak detector

Models: **CHLD Pernicka 700H**

Catalogue numbers:

550-700

550-701

The products meet the requirements of the following directives:

- ***Directive on Low Voltage (2006/95/EC)***
- ***Directive on Electromagnetic Compatibility (2004/108/EC)***
- ***Directive on Machinery (2006/42/EC)***

Applied harmonized standards:

- ***EN 61010 - 1 : 2011***
- ***EN 61326 - 1 : 2006 Class A***
- ***DIN EN ISO 12100 : 2011***

Cologne, May 13, 2013

Dr. Döbler, Manager

Cologne, May 13, 2013

Finke, Research and Development

chld.13.05.2013.engl.doc

INFICON GmbH
Bonner Strasse 498 (Bayenthal)
D-50968 Köln
Tel.: +49 (0)221 56788-0
Fax: +49 (0)221 56788-90
www.inficon.com
E-mail:leakdetection@inficon.com

Fig. 65: CE Declaration of Conformity

Index

INFICON Instruments for Intelligent Control®

www.inficon.com reachus@inficon.com

Due to our continuing program of product improvements, specifications are subject to change without notice.
The trademarks mentioned in this document are held by the companies that produce them.