Translation of the original operating instructions

Adjustable Helium Test Leak TL3-5 / TL4-6

Test leak

Catalog No.
15580, 15581

From software version
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linc84en1-05-(2105)

INFICON

INFICON GmbH

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50968 Cologne, Germany

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1 Notes

INFICON Service

If you send a device to INFICON, indicate whether the device is free of harmful substances or whether it is contaminated. If it is contaminated, also indicate the type of hazard. Use the attached form Sending in the device [▷ 35] for this purpose.

Devices without a declaration of contamination must be returned by INFICON to the sender.

General information

We reserve the right to make technical changes without prior notice. The illustrations are provided without obligation.

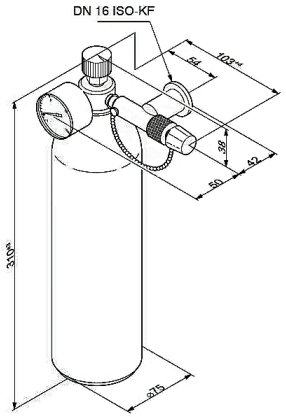
2 Technical data

Calibration leak	
Leak rate adjustment range TL3-5	10^{-3} ... 10^{-5} mbar l/s
Leak rate adjustment range TL4-6	10^{-4} ... 10^{-6} mbar l/s
Nominal leak rate TL 3-5	5 x 10^{-5} mbar l/s
Nominal leak rate TL 4-6	5 x 10^{-6} mbar l/s
Uncertainty of nominal leak rate[1)]	± 10 %
Temperature coefficient	Negligible
Leak type	Capillary
Calibrated for	Helium
Connection flange	DN 16 ISO-KF
Pressure gauge display	-1 ... +15 bar (overpressure)
Helium supply bottle	
Test gas	Helium 5.0
Purity	99.999 Vol.-%
Volume	1 l
Fill pressure	12 bar
Filling capacity	12 l

Inlet pressure	max. 12 bar
Weight	
With supply bottle:	425 g
Without supply bottle:	300 g

[1] With pressure gauge display 0 bar and p < 1 mbar at connection flange

Dimensions



3 Scope of delivery

- 1 calibration leak complete with pressure gauge, supply shutoff valve and leak shutoff valve
- 1 helium supply bottle (HE 5.0; 12 bar; 1 l)
- 1 holder for installing the helium supply bottle with calibration leak
- 1 installation instructions for holder

4 Operation

⚠ CAUTION

The supply bottle is under pressure.

Protect it from direct sunlight, temperatures above 50 °C and damage.

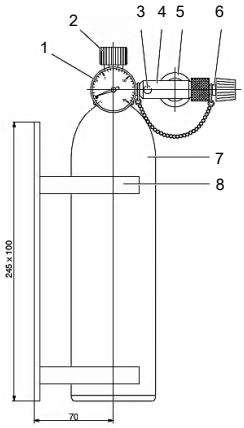
Make sure that the small flange is not blind-flanged during operation, otherwise the connection will be under pressure.

Only ever unscrew the valve briefly. The leak outlet surface on the valve should not be touched, especially not with fingers or greasy objects.

Keep the protective cap of the flange in a safe place and replace it after each removal.

Calibration leak holder

The supplied calibration leak holder is used for safe storage of the calibration leak. It is installed according to the supplied installation instructions.



1	Overpressure gauge for test gas pressure	5	Connection flange DN 16 ISO-KF
2	Supply shutoff valve	6	Shutoff valve for leak outlet opening
3	Vent screw	7	Supply bottle
4	Calibration leak body with leak capillary	8	Calibration leak holder

4.1 Commissioning

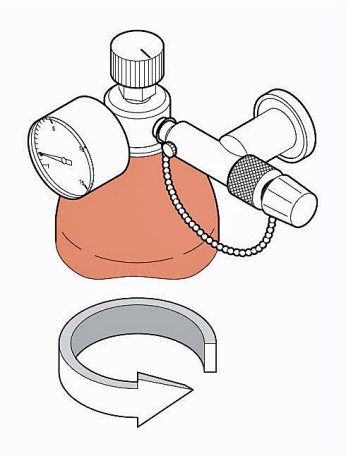


Fig. 1: 1-7

1. Close all valves and the vent screw.
2. Unscrew the old supply bottle.
3. Remove protective cap from new supply bottle.
4. Screw in the new supply bottle as far as it will go (finger-tight).

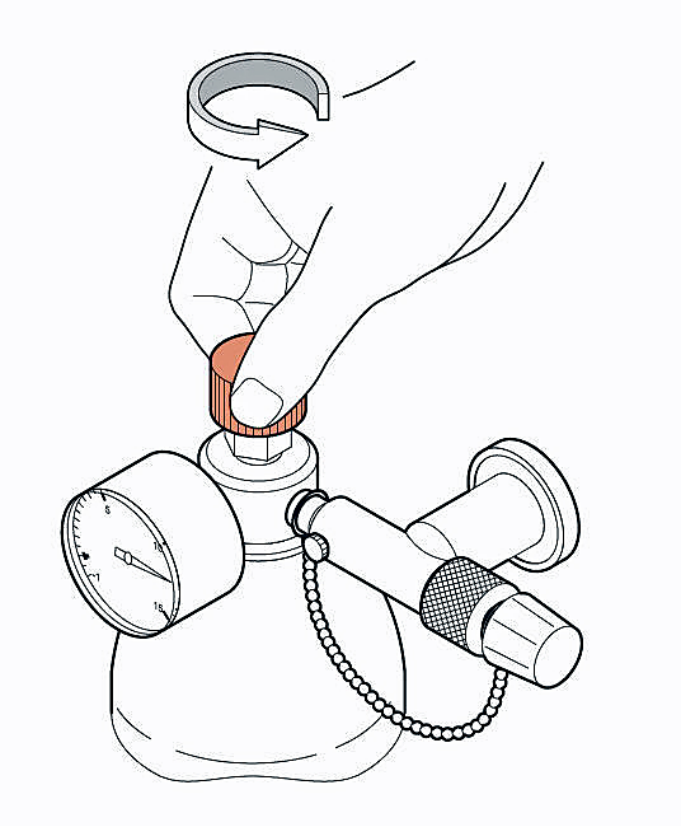


Fig. 2: 2-7

5. Open supply shutoff valve (rotary knob goes down!).

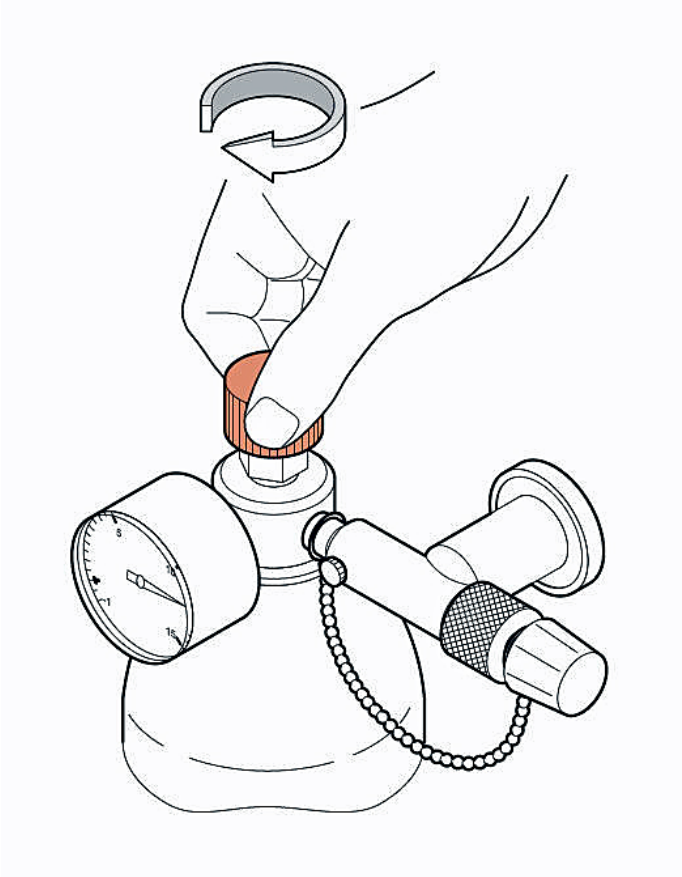


Fig. 3: 3-7

6. Close supply shutoff valve (rotary knob goes up!).

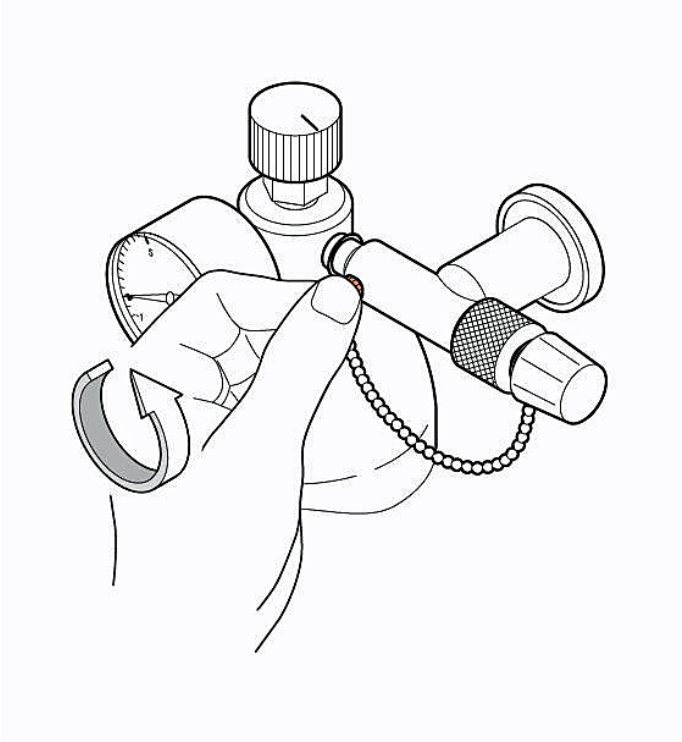


Fig. 4: 4-7

7. Open vent screw until the pressure drops to 0 bar (purge).

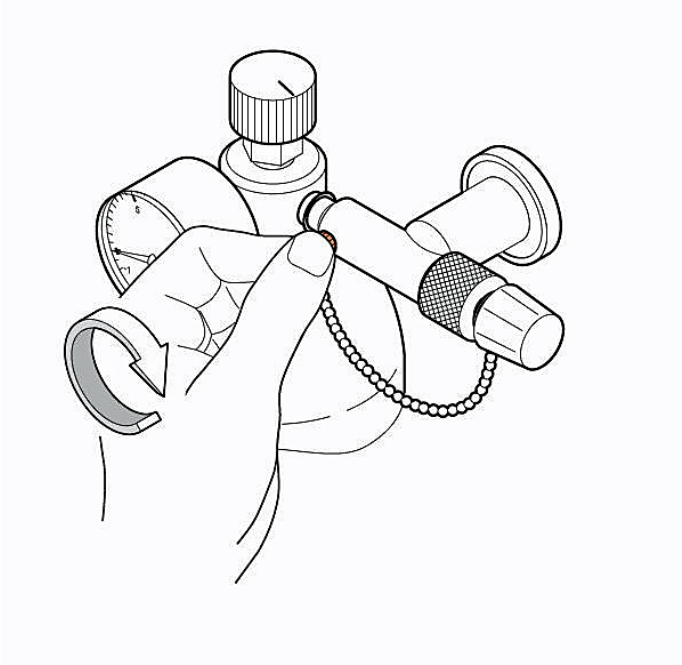


Fig. 5: 5-7

8. Close vent screw.

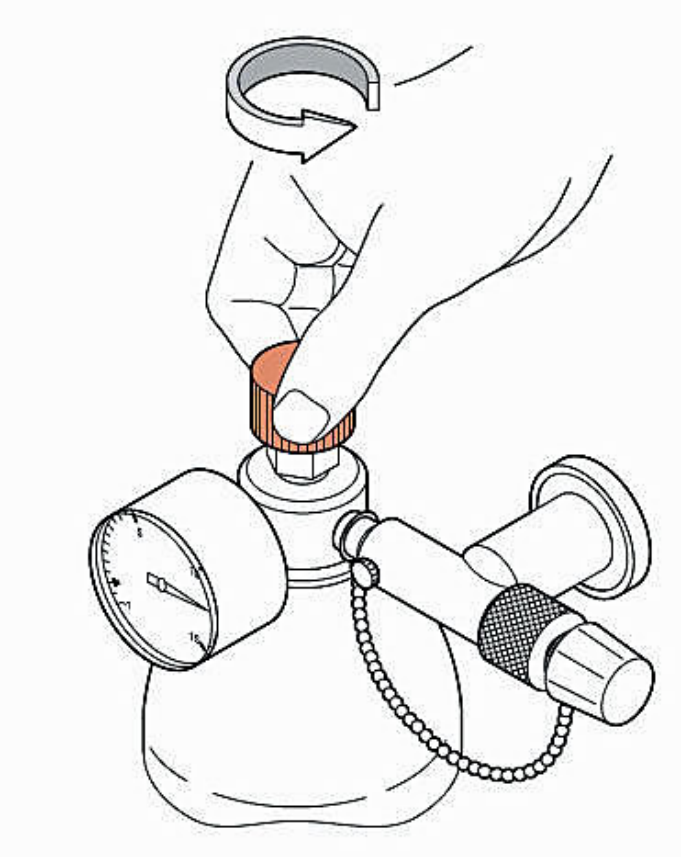


Fig. 6: 6-7

9. Open supply shutoff valve so that the pressure rises to the supply bottle pressure.

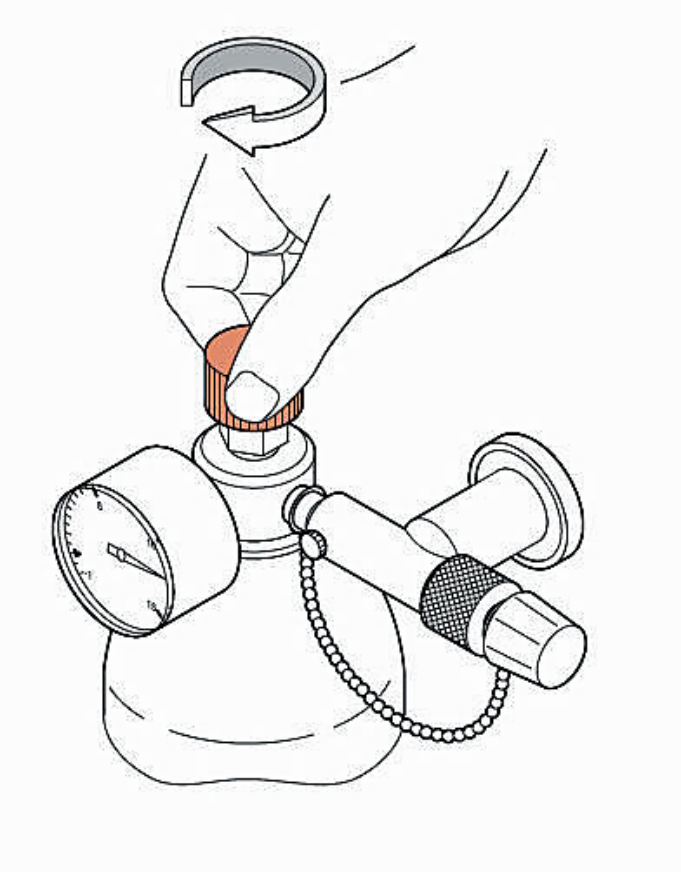


Fig. 7: 7-7

10. Close supply shutoff valve.

To ensure that the gas supply has been completely replaced, repeat steps 6 to 10 two more times. The calibration leak is now ready for operation. The desired pressure can be set with the vent screw.

4.1.1 Changing the type of gas

4.2 Changing the supply bottle without changing the gas type

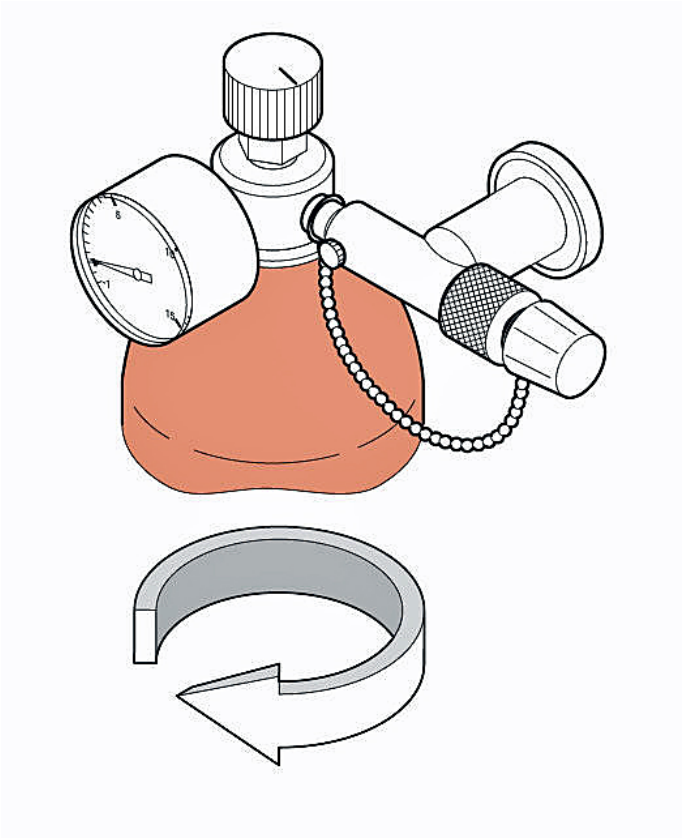


Fig. 8: 1-6

1. Close all valves. (Rotary knob goes up!)
2. Unscrew the old supply bottle.

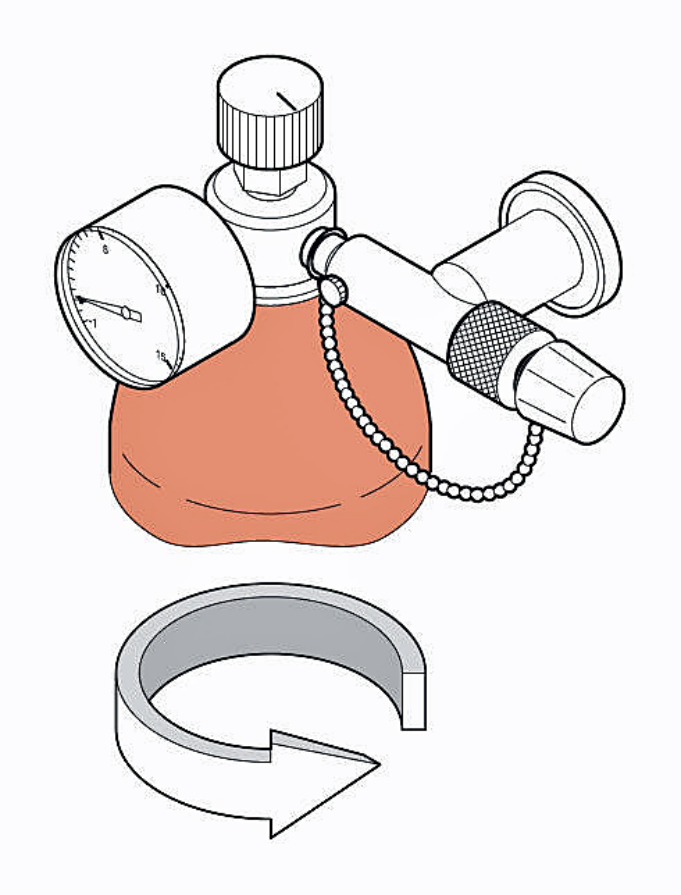


Fig. 9: 2-6

3. After removing the protective cap, screw on a new supply bottle.

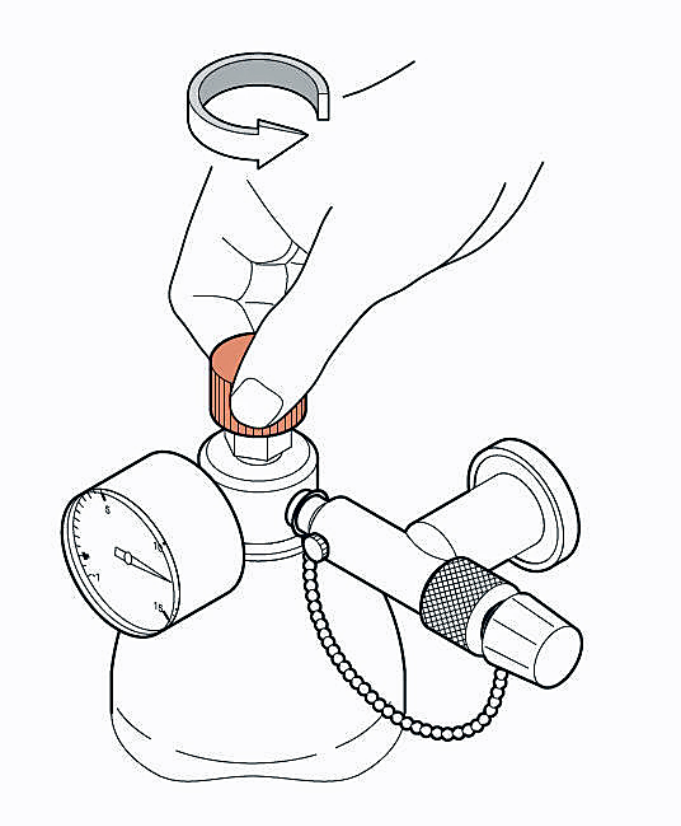


Fig. 10: 3-6

4. Open supply shutoff valve. The pressure gauge must now indicate the supply bottle pressure.

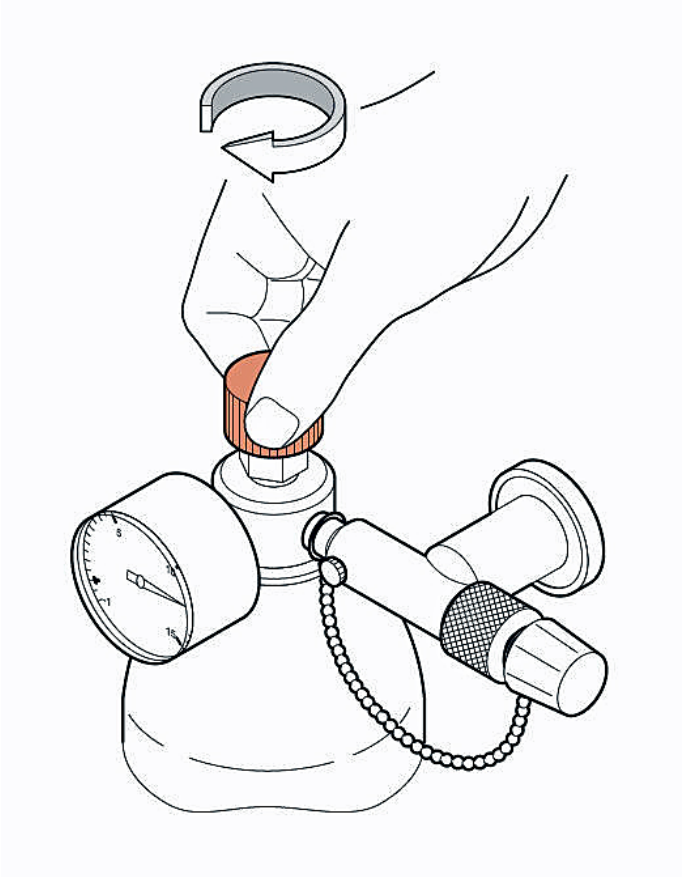


Fig. 11: 4-6

5. Close supply shutoff valve.

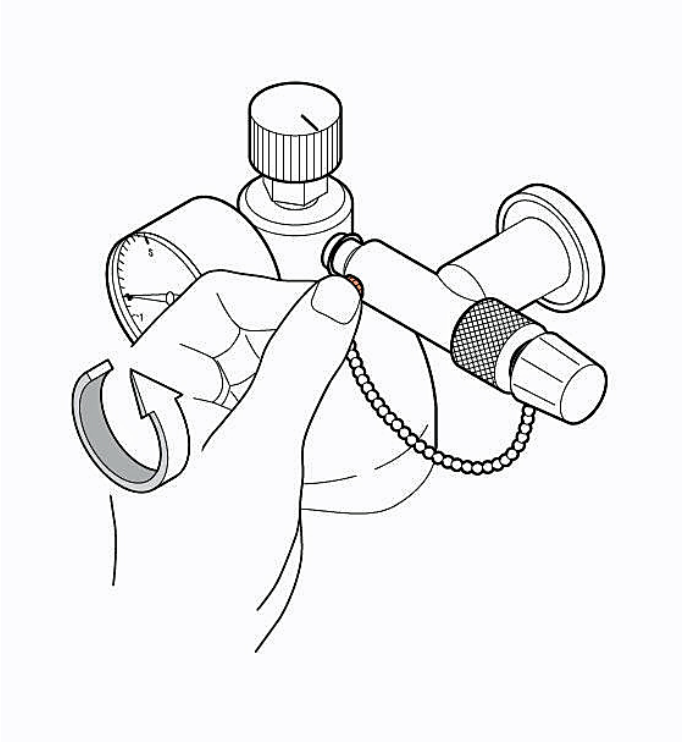


Fig. 12: 5-6

6. Open vent screw until the pressure drops to the desired pressure.

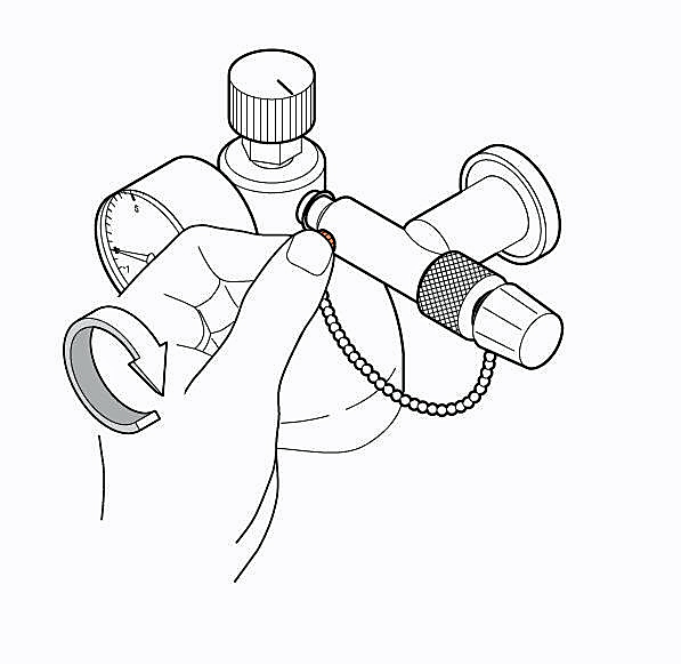


Fig. 13: 6-6

7. Close vent screw.

The helium calibration leak is now ready for operation.

4.3 Storage when not in use

Place protective cap on klein flange connection and ensure that all valves and the vent screw are closed. Store the helium calibration leak horizontally or upright in the calibration leak holder supplied, in a place where it is protected against impacts and elevated temperatures (> 50 °C).

4.4 Maintenance

It is recommended to tighten the union nut of the valve Operation [▷ 8] from time to time (depending on the frequency of operation) with 2.5 Nm clockwise. After that, it must still be possible to adjust the rotary knob easily with two fingers.

5 Application

5.1 Use for vacuum leak detection

The TL4-6 calibration leak can be attached to any leak detector or vacuum apparatus with its klein flange connection and then used to adjust the mass spectrometer and test response time and detection sensitivity.

For setting the calibration leak rate, see Chap. 6, Fig. 1-20 or Fig. 1-21. When used for vacuum leak detection, the valve must be screwed on with a union nut (see also Chap. 4.2).

5.2 Use for sniffer leak detection

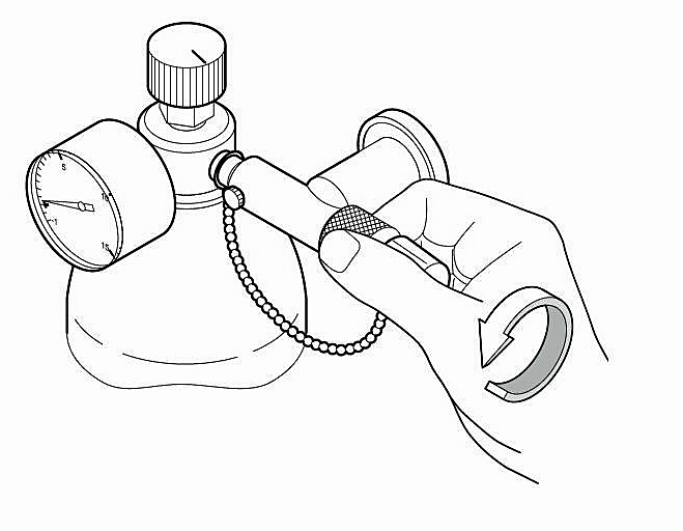


Fig. 14: 4.2-1

The TL4-6 helium calibration leak is installed with the holder (see Fig. 1-1/2). Unscrewing the valve at its union nut makes the helium calibration leak accessible for a sniffer tip.

The actual leak opening is located on the face of the cast pipe, which now becomes visible.

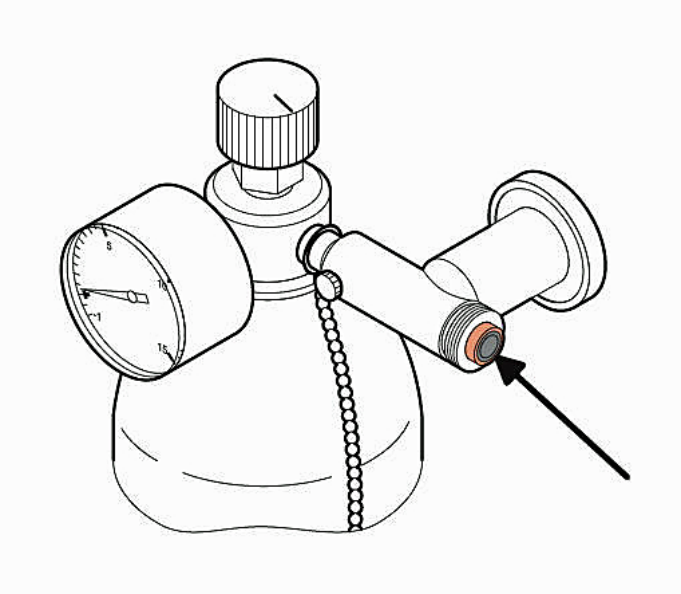


Fig. 15: 4.2-2

⚠ CAUTION

Blockage of the leak capillary

The size of the leak opening may change or close due to contamination.

Never touch the leak opening with your fingers or with greasy objects.

When not in use, always close the leak with the valve.

NOTICE

The measured leak rate depends on the distance between the sniffer tip and the leak and on the speed with which the sniffer tip is moved past the leak. The size of the leak depends on the pressure gauge pressure and can be determined from the supplied adjustment curves.

6 Use of tracer gases other than helium

The leak rates when using gases other than helium can only be determined approximately. This is due to the fact that the range of 10^{-8} to 10^{-4} mbar l/s represents the transition region between molecular and laminar flow. In addition, the individual flow profile of each capillary has an influence. In the molecular flow range (leak rates < 1 · 10^{-5} mbar l/s), the following applies to the leak rate q of different gases under otherwise identical conditions:

$$\frac{q_x}{q_{He}} = \sqrt{\frac{M_{He}}{M_x}}$$

M= Molecular weight

In the laminar flow range (leak rates > 1 · 10-5 mbar l/s) the following applies:

$$\frac{q_x}{q_{He}} = \frac{\eta_{He}}{\eta_x}$$

η = Dyn. viscosity

Some values of dynamic viscosity η in 10^{-5} Pa•s.

	He	R134a	Air	Ar	H_2
η	1.96	1.36	1.82	2.21	0.88

M	4	102	28	40	2

The resulting values must be applied according to the predominant flow type, i.e. for leak rates lower than 10^{-5} mbar l/s, predominantly molecular flow is assumed, and greater than 10^{-5} mbar l/s, predominantly laminar flow is assumed.

7 Pressure dependence of the leak rate

The nominal leak rate was determined during manufacture at a tracer gas pressure of 1 bar (abs) against a pressure at the connecting flange of less than 1 mbar and is noted on the affixed label.

The adjustment curves apply to nominal leak rates in the range of 5 x 10^{-5} mbar l/s ± 10% for the TL 3-5 calibration leak and in the range of 5 x 10^{-6} mbar l/s ± 10% for the TL 4-6 calibration leak. The leak rate is pressure-dependent and can be read off the valid pressure curve (Fig. 1-18 to Fig. 1-21) depending on the operation mode.

If there is a suspicion of a change in the nominal leak rate after extended use, a factory check of the nominal leak rate value can also be carried out subject to a charge. This factory check should be carried out annually and one year after initial commissioning for the first time.

If a test certificate is required, this can be issued at our Cologne factory. Factory checks and the issue of certificates are carried out subject to a charge.

The calibration leak rates shown in the following figures are related to the pressure gauge pressure [bar rel].

If the nominal leak rate deviates significantly from 5 x 10^{-5} or 5 x 10^{-6} mbar l/s, a factor must be determined from the pressure dependence curves and multiplied by the calibration leak nominal leak rate.

Calculation of factor:

$$F = \frac{\text{Druckabh. Leckrate}}{5 \cdot 10^{-5} \text{ bzw. } 5 \cdot 10^{-6}}$$

Adjustment curve for sniffing mode

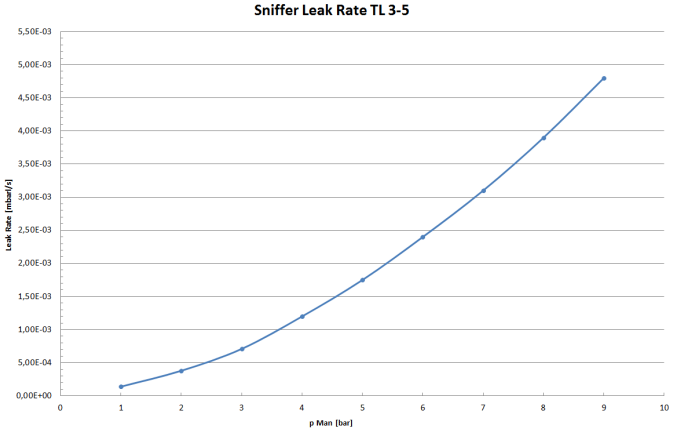


Fig. 16: Adjustment curve for TL3-5 test leak

Adjustment curve for sniffing mode

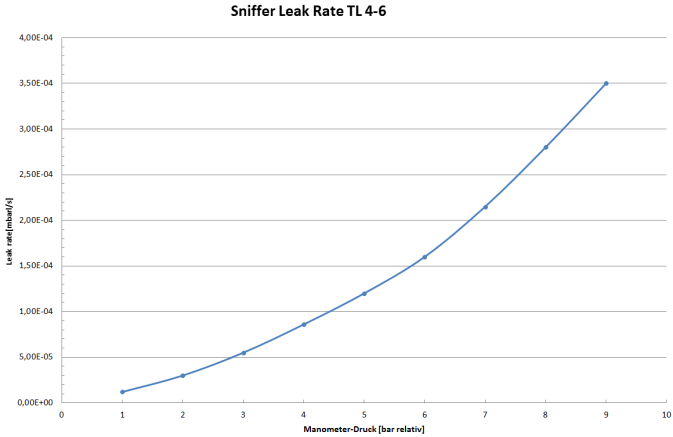


Fig. 17: Adjustment curve for TL4-6 test leak

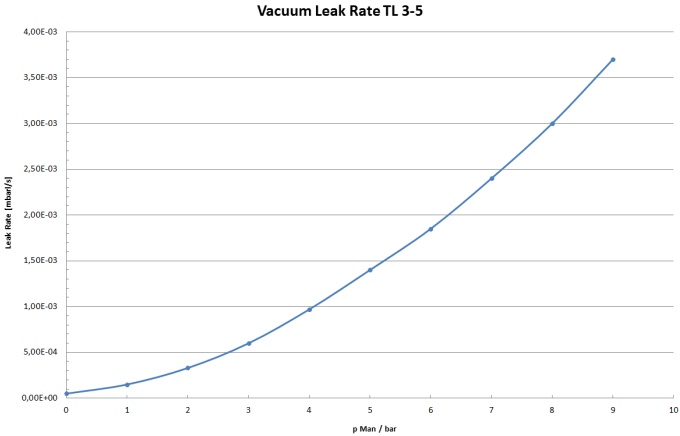


Fig. 18: Adjustment curve for TL3-5 test leak

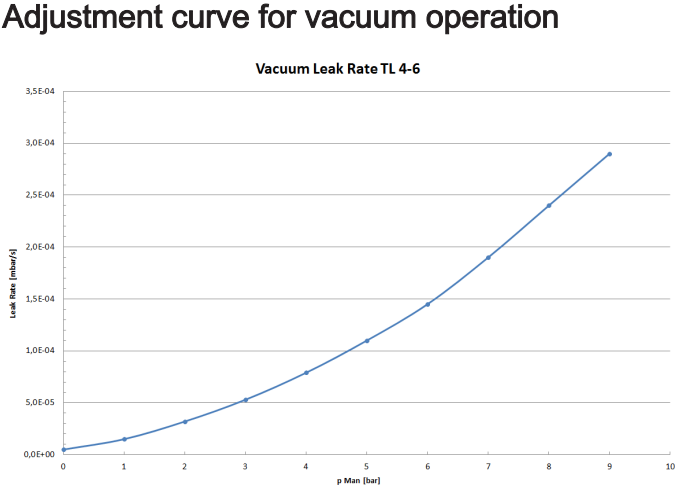


Fig. 19: Adjustment curve for TL4-6 test leak

8 Spare parts

Item	Order number
Helium supply bottle (12 bar, 1 l)	200 003 342

9 Decommissioning

9.1 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.

9.2 Sending in the device

⚠ WARNING

Danger due to harmful substances

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

► Fill in the declaration of contamination completely.

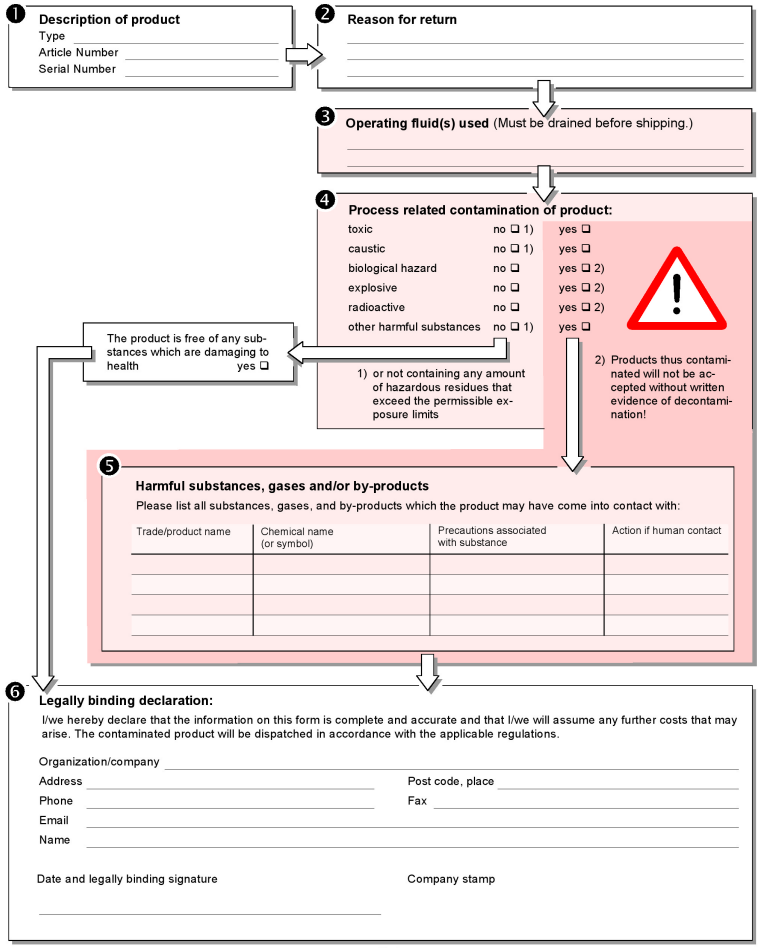
1. Please to get in touch with us and send a completed declaration of contamination before sending anything to us.

   ⇨ 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.



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