

INJECTION UNIT FOR THERMAL DESORPTION TUBES

USER MANUAL

214.5.885.023UM

P/N 400-1931

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1 Important notes

This User Manual (UM) is intended to get familiar with the Injection unit for thermal desorption tubes (hereinafter – IUTD) and contains all necessary instructions to ensure its correct operation and maintenance.

Before using the equipment accurately read the present User Manual.

Instructions marked by this box are necessary for carrying out in order to avoid injuries sustaining at working with IUTD and to avoid IUTD damage.

Two marking types of parts are used in this and accompanied documents:

XXX-XXXX – Part number or Cat. Number referred to ordering documents;

214.X.XXX.XXX(-XX) or simplified X.XXX.XXX(-XX) – Cross ID referred to internal manufacturer documents.

Both can be used for ordering parts.

2 Description

2.1 General

The IUTD, P/N 400-1931, is designed for GC calibration when operated with a thermal desorber. The calibration method consists in injecting a certain amount of calibration solution into the sampling tube with a syringe and further solvent purge. IUTD provides the gas flow during injection the standard into the sorbent tube.

IUTD operation is carried out in closed laboratory premises, provided that combustible gases and highly inflammable liquids may be present in volume insufficient to create the explosion and fire hazardous mixture. Environmental conditions:

- Ambient temperature from 10 to 35 °C.
- Relative humidity not more than 80 %.
- Atmospheric pressure from 84 to 107 kPa (from 630 to 800 mm Hg).

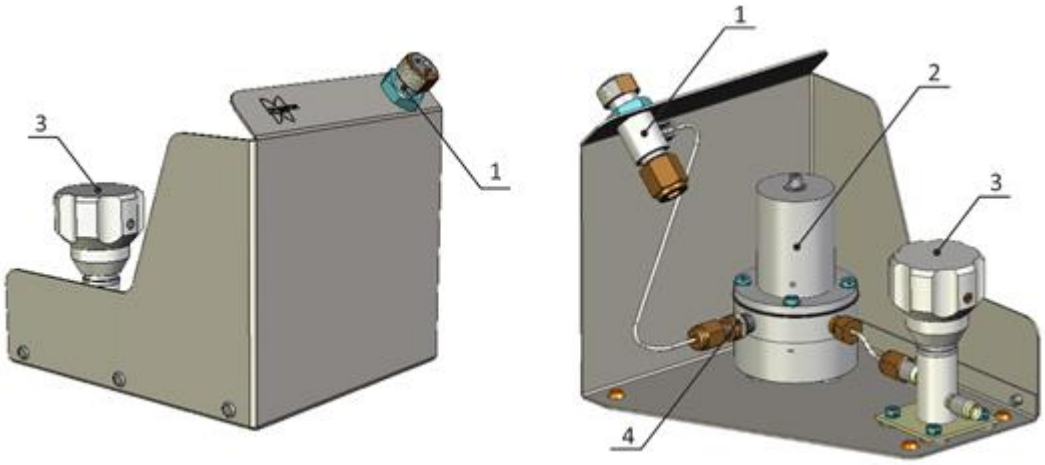
2.2 Specifications and Delivery Set

Technical specifications and delivery set are according to Passport 214.5.885.023PS.

2.3 Overview

Items produced by Chromatec may contain updated parts following new developments or may be undergone to non-essential modernization, not specified in this User manual.

IUTD is shown in Figure 1.



1 – Adapter; 2 – Pressure regulator; 3 – Input valve; 4 – Restrictor

Figure 1 – IUTD. Overview

IUTD consists of the following basic components: adapter for the sorbent tube, mechanical pressure regulator and input valve to close the gas flow.

The pneumatic principal drawing is given in Figure 2.

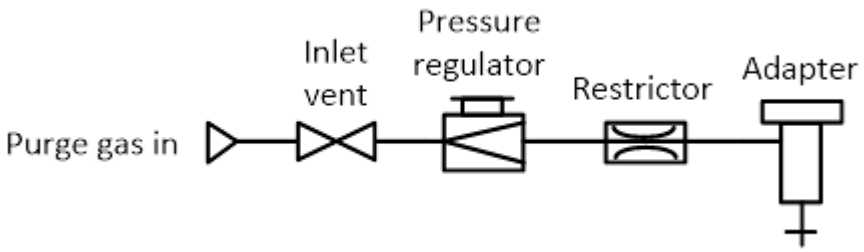


Figure 2 – Pneumatic principal drawing

The standard is injected into a sorbent tube with a syringe. After that the solvent is purged. Then the sorbent tube is installed into the thermal desorber for analysis.

3 Operation

3.1 Safety Provisions

IUTD can be used by person familiar with the present manual and having adequate skills and knowledge to operate this device.

Maintenance is only allowed when the gas line is closed.

When IUTD will not be used for a long-time close gas line.

3.2 Installation

Place IUTD on a laboratory bench.

Connect the inert gas line to the input valve connector. Set inlet pressure 0.4 – 0.6 MPa (60 – 90 psi).

Adjust the purge gas flow rate.

- Attach the sample tube into the adapter as described in Section 4.
- Connect the flow meter to the sample tube output.
- Turn on the input valve by turning it counterclockwise.
- Set the required purge gas flow rate by turning the adjusting screw and checking it with a flow meter.

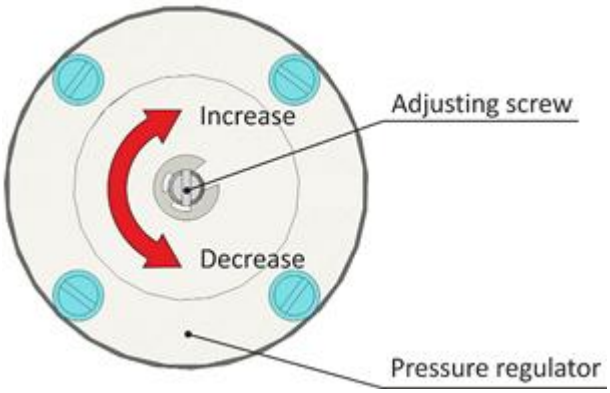


Figure 3 – Purge gas flow rate setting

The recommended purge gas flow rate is 100 mL/min.

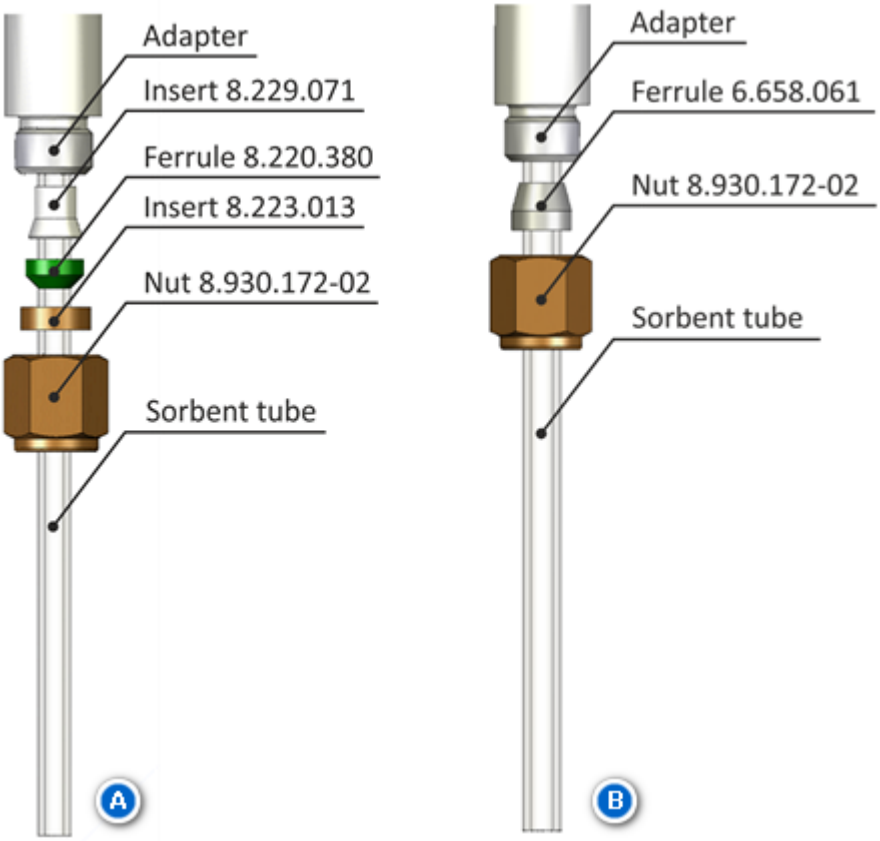
Before calibration calculate the analyte concentration in the standard solution. The analyte mass injected into the sorbent tube complies with the mass during sampling.

The calculation example of the analyte concentration in the standard solution is given below:

- The estimated concentration of the analyte in the air 10 µg/m^3.
- 1 L of a sample is pumped during sampling.
- 1 L of gas contains 10 ng of the analyte.
- 1 µL of solution is injected to the sorbent tube during the calibration.
- The analyte concentration in the standard solution is 10 ng/µL or 10 µg/mL.

3.3 Operating procedure

Connect the sorbent tube to the apadtor. The seals to be used depending on the size of the sorbent tube are shown in figure 4.



A – O.D. 5 mm, B – O.D. 6 mm or 1/4

Figure 4 – Sorbent tube connection

- Turn on the input valve by turning it counterclockwise.
- Insert the syringe into the adapter and inject the standard.

To avoid syringe damaging the needle has to be 50–51 mm long. Recommended syringe types: SGE-Chromatec-02, Hamilton 701 Series.

- Remove the syringe out of the adapter and purge the solvent from the sorbent tube. The purge time depends on the solvent used as well as on the type of the adsorbent. The purge time some solvents for Tenax TA sorbent tube are given in Table 1.

Table 1 – Solvent purge time

Solvent	**Time, min**
Acetone	5
1,2-Dichloroethane	5
Ethanol	3
n-Hexane	10
Methanol	1
n-Pentane	5

Note. Purge time is specified for the purge gas flow 100 mL/min.

When purging the solvent consider a possible breakthrough of volatile compounds. Therefore, when the standard contains compounds with boiling points close to the solvent boiling point, the purge time should be reduced.

After purging remove the sorbent tube from the adapter and turn off the input valve by turning it clockwise.

4 Maintenance

Maintenance is performed in the absence of reproducibility.

The maintenance procedure covers the following operations:

- Septum replacement.
- Leak check.

The septum requires replacement if there is a leak, which cannot be eliminated by tightening the nut.

Actions:

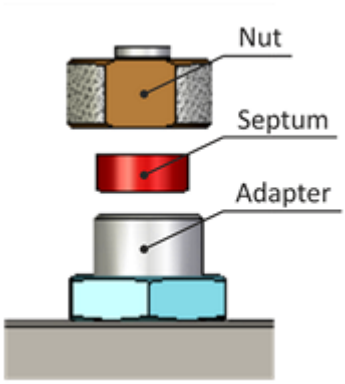


Figure 5 – Septum replacement

- Remove the nut.
- Remove the old septum.
- Install a new septum.
- Tighten the nut.

Leak check is performed with using a leak detector.

The leak is eliminated by tightening the appropriate connections. If necessary, replace the ferrules.

5 Transportation and Storage

At transportation protection of transport container against atmospheric precipitations should be provided.

Transportation conditions:

- Ambient temperature from minus 50 to plus 50 °C.
- Relative air humidity up to 98 % at 35 °C.
- Presence in air of dust and aggressive admixtures vapors is not allowed.

Keep the package until the warranty period expires.

Keep the package for at least 4 hours in operation conditions before removing the package after transportation or storage at negative temperatures.

6 Claims

In case of failure within warranty period it is necessary to:

- draw up a technically reasoned act of defects concerning its incompliance with technical requirements, specified in the passport;
- make abstracts from section "Acceptance certificate";
- specify performed maintenance procedures.

The claim should be sent to the address:

Special Design Office "Chromatec", 94 Stroiteley Str., Yoshkar-Ola, Russian Federation 424000; or at Correspondence address: Central post office, P.O. box 84, Yoshkar-Ola, Mari-El republic, Russian Federation 424000. Fax: +7.8362.685916, E-mail: mail@chromatec.ru

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