

DOUBLE BARREL OVEN DBO-TF-FIS

Analytics

Operators Manual



**CE-Konformitätserklärung
CE Declaration of Conformity
CE Déclaration de Conformité
CE Dichiarazione di Conformità**



Der Hersteller / The manufacturer / Le fabricant / Il fabbricante

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erklärt hiermit, dass die Produkte
herewith declares that the products
déclare par la présente que le produits
dichiara che il prodotti

DBO-TF-FIS

den Anforderungen der folgenden EG-Richtlinien entspricht.

meets the provisions of following EC-Directives.

remplit les exigences des Directives CE suivantes.

soddisfa tutte le disposizioni dalle Direttive CE.

Richtlinie Directive Directive Direttiva	gültig bis valid until valable jusqu'à con validità fino al	gültig ab valid after valable à partir de applicabile dal
2006/95/EG, EC, CE	19.04.2016	
2014/35/EU		20.04.2016
2004/108/EG, EC, CE	19.04.2016	
2014/30/EU		20.04.2016
2011/65/EU		03.01.2013

Angewandte Normen: Applied standards: Normes appliquées: Norme applicate :	EN 61326-1:2013 - Basic requirements EN 61010-1 :2010 + Cor. :2011
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Diese Erklärung gilt für die oben genannten Produkte ab dem Unterzeichnungsdatum.

This declaration is valid for the above mentioned products after the signature date below.

La présente déclaration est valable à partir de la date de signature.

Questa dichiarazione vale per il suddetto prodotti dalla data di firma.

Biberach 04. Dec. 2020

Ort / place / lieu / luogo
Datum / date / date / data


Unterschrift / signature / signature / firma

Name / name / nom / nome: Christof Völkle
(Geschäftsführer / management / directeur / delegato)

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1 Safety

1.1 Important safety instructions

- Please read these operating instructions carefully before using the product. It contains important notes on Installation and usage.
- The user manual is part of the product. Keep it in a safe place. If the product is sold, rented or passed on in any other way, the user manual must be included.
- Heed all warnings. These point out dangers and give recommendations for accident prevention.
- Only install the unit in locations expressly recommended by the manufacturer.
- If condensation forms after unpacking, allow at least 2 hours for the unit to acclimatize.
- This device may only be operated at sockets with protective earth.
- Make sure that you cannot trip over the mains cable and that the cable is not disconnected, is pinched, torn off or squeezed.
- Only use accessories expressly recommended by the manufacturer.
- Leave all maintenance work to an experienced service technician. Servicing or repairs are required if there is visible damage, if the power cord or plug is damaged, if liquid has been spilled inside the apparatus, if the apparatus has been exposed to rain, if it does not perform as expected, or if it has fallen.
- Only use connection cables or extension cables that are approved for the maximum permissible total current or power.
- Operation of the device in a manner not intended by the manufacturer may affect the protection provided by the device.

1.2 Intended use

- The oven is exclusively designed for the heating and tempering of separation columns in nano-ESI applications.
- The oven is a product according to the Machinery Directive 2006/42/EC (complete machine).
- The oven must be installed as described in this manual.
- The fan must be able to turn free and may not be blocked.
- Do not use any adhesive tape or other non-heat-resistant materials inside the oven.
- The oven is constructed as technical work equipment and not intended for private use.
- The device may only be used in clean and dry rooms.
- The limit values for temperature and humidity during transport, storage and operation specified under 6 „Technical data“ on page 12 must not be exceeded or undercut.
- The oven must not be used in potentially explosive atmospheres, especially in areas enriched with oxygen, combustible anesthetics (class AP) or combustible anesthetics with oxidizing agents (class APG).
- The oven must be kept away from easily inflammable and combustible liquids.
- If a liquid should penetrate the electrical part of the oven or regulator it is to be set immediately out of operation and must be checked by a specialist.
- Use the oven only within the specifications specified in this manual.
- The valid accident guarding regulations according to each country must be considered.
- The device may only be repaired by a specialist.

1.3 Non-intended use

- A non-intended use is given when the equipment is treated in any way that is contrary to any of the points from the chapter 1.2 „Intended use“ on page 4.
- If the oven is not used as intended, handled improperly and used, assembled or handled by untrained personnel, hazards may arise for personnel from the oven.

1.4 Examples of foreseeable misuse

- Use in environments with high humidity > dew point.
- Use in rooms with explosive atmospheres according to ATEX directive.

- Use with damaged supply lines.
- Outdoor use.

1.5 Who may use and operate the column oven

- Physically and mentally healthy persons who have fully read and understood the instructions for use may use and operate the column oven as long as they are not affected by medication or drugs.

1.6 Safety signs and symbols

Safety symbols on the device and in the user manual



The “general mandatory sign” indicates that you should behave attentively. Marked information in this user manual is intended to draw your particular attention. You will receive important information on functions, settings and procedures. Failure to do so may result in malfunction of the equipment or its surroundings.



▪ The “general warning sign” indicates danger points or possible dangerous situations. Marked information in this user manual applies to your special attention. You will receive important information on safety-relevant matters. Failure to do so may result in personal injury, malfunction of the device or the environment.



▪ The warning sign “Hot surface” indicates a potentially hot surface. Non-observance may cause burns. It is essential that you observe the safety instructions in the operating instructions.



▪ The warning sign “Warning of electrical voltage” indicates potential hazards due to electrical voltage. The positions on the device marked with this symbol and the information in these operating instructions are intended to draw your particular attention. You will receive important information on safety-relevant matters. Failure to do so may result in personal injury, malfunction of the device or the surrounding area.

Symbols on the nameplate



Conformity to low voltage and EMC directives



Do not dispose of in household waste



Indoor use only



Appliance class I

2 Product description

2.1 Overview

The double barrel oven DBO-TF-FIS allows the parallel usage of two independent analytical columns. As loading, equilibration and washing steps can be alternated, the utilization and throughput of the mass spectrometer can be significantly increased.

Column Oven (upper and lower part)

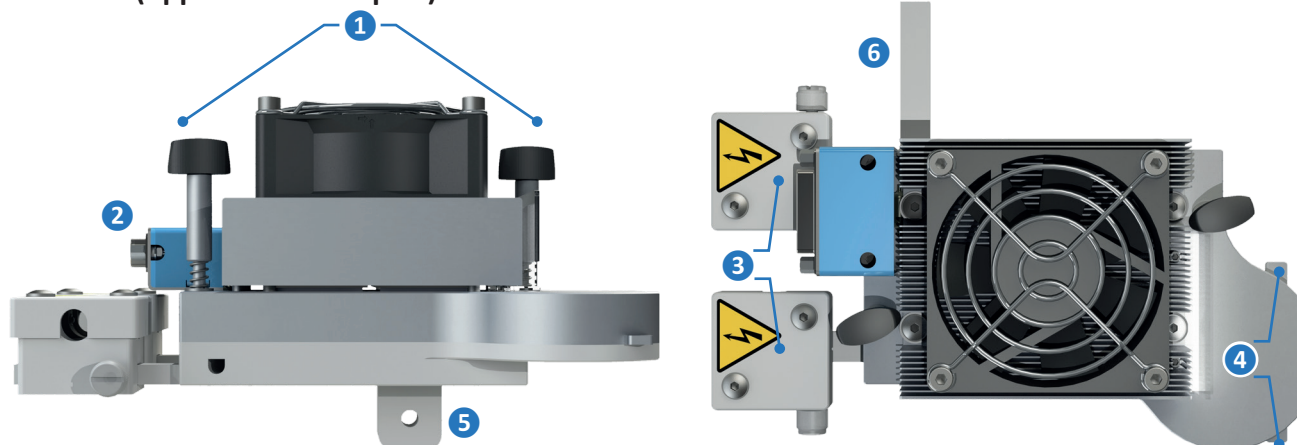


Fig. 1: Column oven (top and bottom part)

- 1 Locking bars
- 2 Receptacle for oven control cable
- 3 Cross / T-holders on sliding rails
- 4 Column clamp handles
- 5 Mounting bar
- 6 Lateral sliding rail

Regulator



Fig. 2: Regulator - front and back view

- 1 "Oven control" connector
- 2 High voltage switch input
- 3 High voltage switch output
- 4 "RS232/Contact closure" connector
- 5 Power in connector

HV-Switch

- 1 High voltage input from Flex Ion source
- 2 High voltage output to column 1
- 3 High voltage output to column 2
- 4 Mounting plate with screws and sleeves
- 5 Control input (bottom side, not visible on illustration)

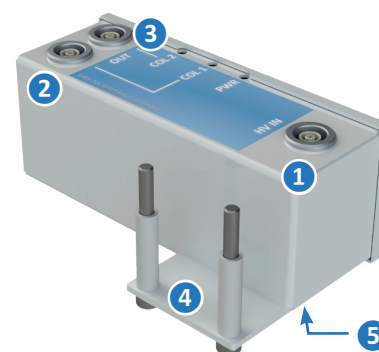


Fig. 3: HV-Switch with screws and sleeves

2.2 Scope of delivery

Double Barrel Oven DBO-TF-FIS

- 1 x Column oven (top and bottom part with 4 column pins)
- 1 x Regulator
- 1 x HV-switch with 2 x M4x40 mounting screws and 2 x 24mm plastic sleeves
- 1 x HV-cable: Source to HV-switch
- 1 x Oven control cable: Regulator to oven
- 1 x HV control cable: Regulator to HV-switch
- 1 x Data cable for RS232 and contact closure
- 1 x USB to serial adapter
- 1 x 24V power supply with wide range input and power cable (with EU, CH, UK or US plug)
- 2 x Crossholder with crossholder lid, 2 x M4x6 screw and 1 x nylon thumb screw M4x16 each
- 1 x Countersunk head screw M5x20 with M5 locking nut for mounting the oven to the source
- 1 x USB flash drive with software
- 1 x This manual

2.3 Available accessories

Mounting Kit for Thermo Fisher Flex Ion Source ES071

Allows the oven to be mounted on a Thermo Fisher Flex Ion Source ES071. Consists of:

- 1 x Acrylic shield
- 1 x Modified upper camera holder
- 1 x Distance block for left camera holder
- 2 x Screw M5x20 Allen head

Order code: PRSO-V2-KES71

Mounting Kit for Thermo Fisher Flex Ion Source ES072

Allows the oven to be mounted on a Thermo Fisher Flex Ion Source ES072. Consists of:

- 1 x Acrylic shield
- 1 x Upper camera holder
- 1 x Left camera holder
- 1 x Oven holder
- 1 x Acrylic shield holder

Order code: PRSO-V2-KES72

Micro-Tee with HV-connector



Micro T-piece with 3 x 360µm connectors and 2mm HV connector for spray voltage feed (liquid junction).
Order code: PRSO-V2-MT

HV-cable with 2mm connector



Connection cable between the HV output of the Flex Ion Source respectively the HV output of the HV switch and a 2mm plug.

Order code: PRSO-HV-LE-HI

Installation

2.4 Hardware



- Before installing the oven make sure the high voltage (spray voltage) has been turned off.

The oven can be used with the ES071 and the ES072 version of the Thermo Fisher Flex Ion Source. To be able to use the oven at the respective source, the corresponding mounting kit is required (see „2.3 Available accessories“).

Installation of the ES071 mounting kit

- First the original acrylic safety shield has to be removed. After removing the two screws on the shield clamp it can be dismounted.
- Also the two camera holders have to be dismantled by removing the corresponding screws. The upper camera holder has to be replaced by the one in the conversion kit. Please use the original screws to fix the modified camera holder.
- The distance block has to be mounted between the left camera holder and the source. To fix the left camera holder please use the provided M5x20 screws as the original screws are too short.
- Now mount the provided safety shield instead of the original one. Please see Fig. 4 for reference.

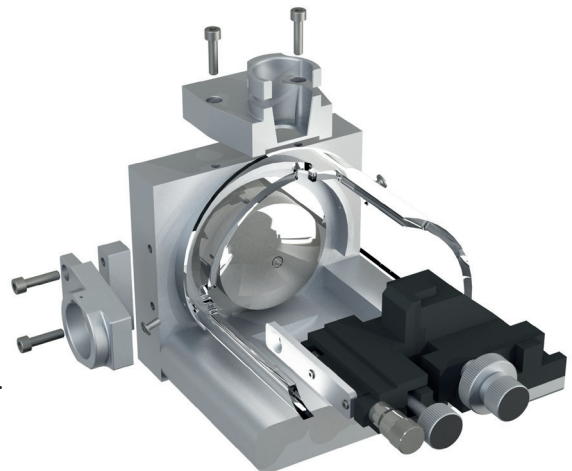


Fig. 4: Installation of the ES071 mounting kit

Installation of the ES072 mounting kit

- Remove the shield clamp, the upper and left camera holder, the acrylic shield, the XYZ-manipulator and the attached mounting bar by loosening the screws marked in Fig. 5.
- Slide the modified acrylic shield from the conversion kit onto the source. You might have to bend it carefully to make it slip over the flange.
- Install the oven holder onto the XYZ-manipulator.
- Reinstall the XYZ-manipulator onto the source by putting the shield holder between the manipulator and the manipulator holder using the original screws.
- Install the modified left and upper camera holders by reusing the original screws.

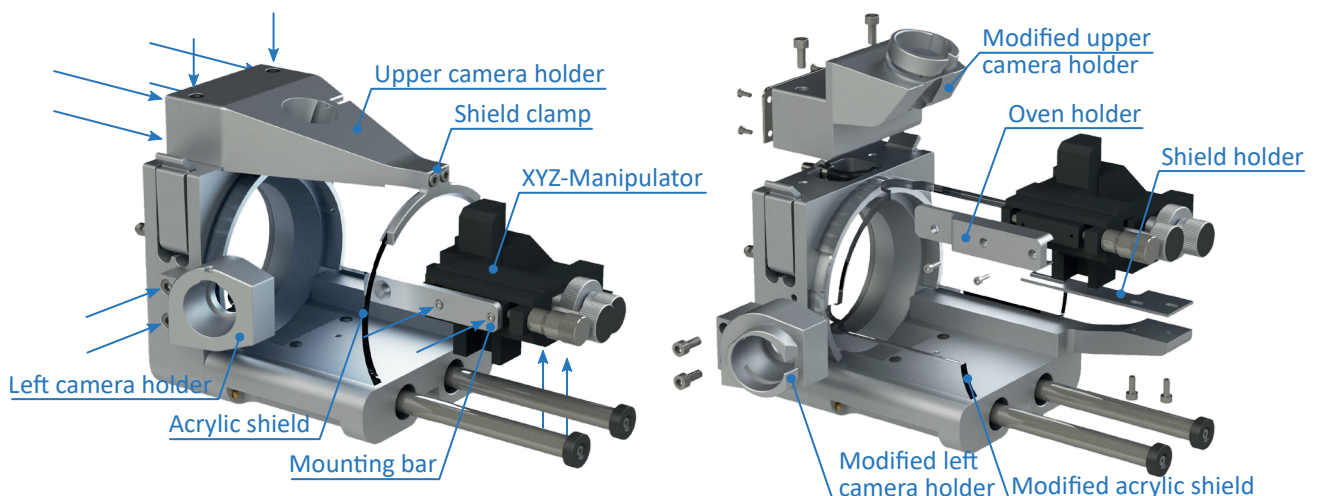


Fig. 5: Installation of the ES072 mounting kit

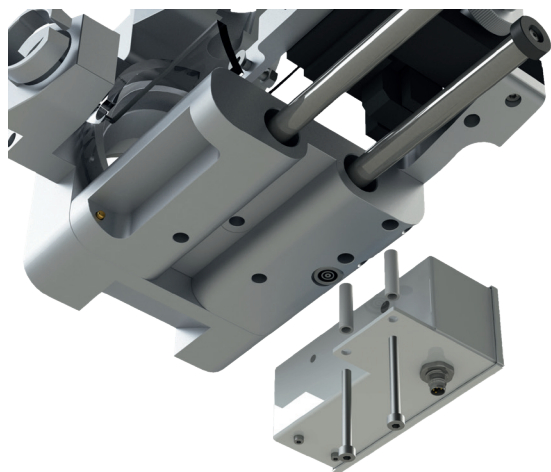


Fig. 6: Mounting the HV-switch to the source

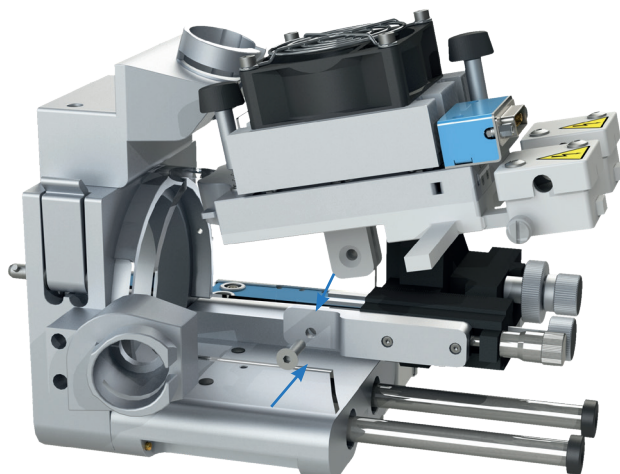


Fig. 7: Attaching the oven to the source

Installation of the HV-switch

The HV switch has to be attached to the source as shown on Fig. 6. To do so, first remove the original screws from the bottom of the source, then insert the sleeves and mount the HV-switch with the provided screws.

Attaching the oven to the source

Place the mounting bar of the oven onto the XYZ-manipulator and fix it with the provided screw and nut as shown on Fig. 7. If the XYZ-manipulator won't stay in place, this is due to the weight of the oven. The friction of the manipulator can be regulated with adjusting screws. So just increase the friction until the oven stays in position.

Connecting the cables

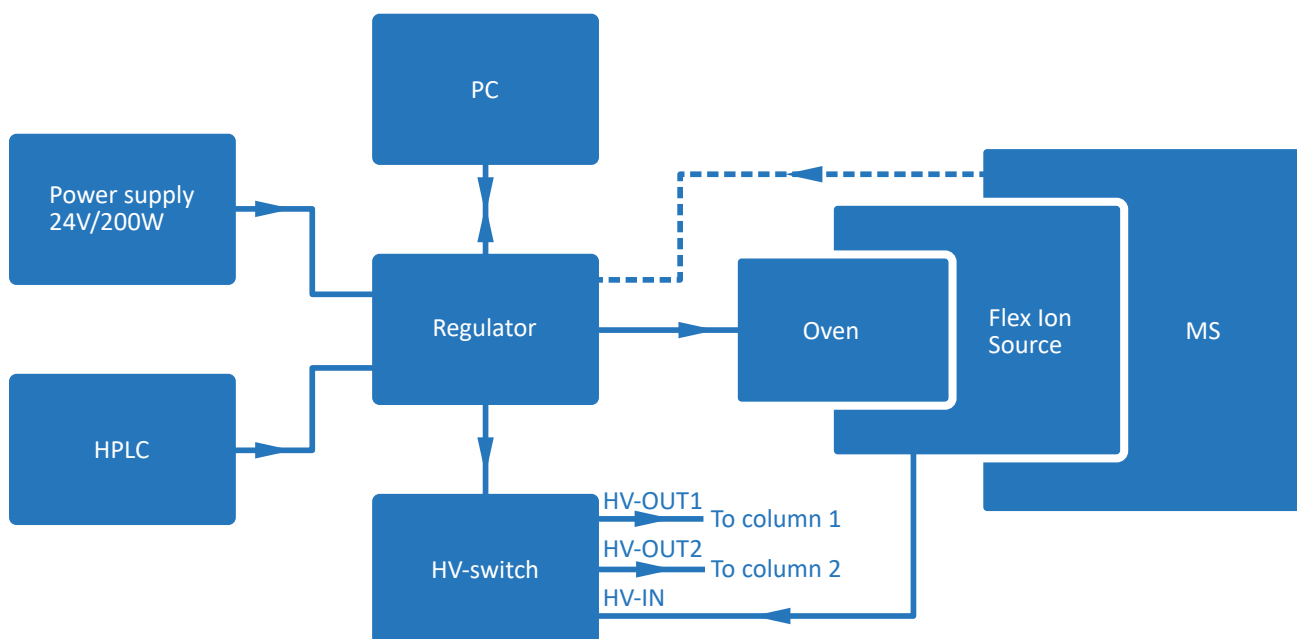


Fig. 8: Wiring scheme

- Connect the regulator with the provided data cable to an available com-port on your instrument PC. If there is no com-port available, please use the provided USB to serial adapter.
- The remaining two open leads of this cable can be connected to the “contact closure out” of your instrument to switch between two preset temperatures. This is only needed if you want to switch automatically between two preset temperatures. Switching can also be done with the provided oven control software.
- Connect the oven to the controller with the provided oven control cable.
- Connect the HV cable from the HV output of your Flex Ion Source to “HV IN” on the HV switch.

- Connect the two high voltage cables (2 x Sonation P/N PRSO-HV-LE-HI) to the “COL1 OUT” and “COL2 OUT” of the HV switch. The other ends are connected later to the columns using the micro T-pieces with HV connector. If you use the Thermo liquid junction kit (P/N ES269) the HV cables are already installed to the also included cross pieces. In this case connect them later as described in 3.1 „Column loading and applying the HV via liquid junction“ on page 10.
- Connect the contact closure cable (Thermo P/N 6000.1004) between the HPLC and the “CC HV” input on the regulator. Please see Thermo Fisher tech note 73671 for detailed information.
- Connect the 24-Volt power supply to the power connector on the regulator. **The wide side of the plug faces the top of the control module, do not force it in twisted.** The power supply will be connected to a wall outlet later.

2.5 Software

Installing CO-Control

To install the oven control software, execute setup.exe in the directory COControl on the provided USB flash drive. Follow the steps of the setup wizard. The software needs an installed Microsoft.NET. If the software won't start and throws an error message showing .NET is missing, install it from the provided USB flash drive.

3 Usage

3.1 Column loading and applying the HV via liquid junction



- Make sure that the high voltage (spray voltage) is switched off during the installation of the columns and during any subsequent plugging or unplugging of high voltage cables.
- Make sure that you have installed the cross holder lids before switching on the high voltage.



- Do not use any adhesive tape or other temperature sensitive materials inside the oven.
- The tip of the emitter is very sensitive. Be careful not to hit anything when inserting the columns.



- During operation the surface of the oven can get very hot!

- Open the oven by turning the locking bars at the front and back of the oven. The top part can now be removed.
- Remove the cross holders from the sliding rails by loosening the thumb screws.
- Remove the screws on top of the cross holders and take off the covers. Use a 2.5mm Allen screwdriver.
- Connect the columns to the T-pieces with the high voltage connectors (Sonation P/N PRSO-V2-MT) or to the cross pieces included in the Thermo liquid junction kit (P/N ES269). Use a connector next to the high voltage plug and not the one opposite.
- Insert the T- or cross pieces into the provided cross holders and remount the lids.
- Connect the high voltage cables coming from “COL1 OUT” and “COL2 OUT” from the HV switch to the T-pieces. If you use the Thermo liquid junction kit (P/N ES269) connect the plugs of the high voltage cables connected to the cross pieces to “COL1 OUT” and “COL2 OUT” at the HV switch.

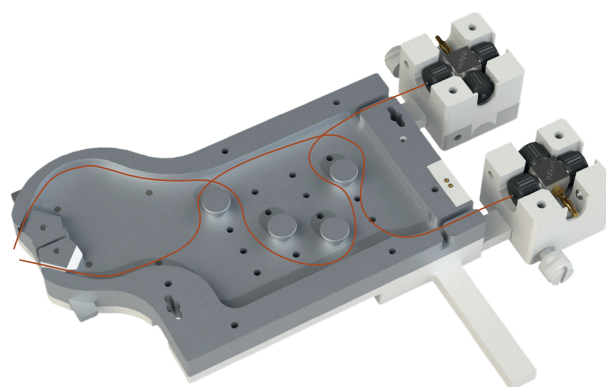


Fig. 9: Column loading

- Slide the cross holders onto the sliding rails with the columns facing the inlets of the oven. In most cases it works best to use the lateral and one of the frontal rails. When using the two frontal mounting rails, make sure that the high-voltage connectors point outwards, otherwise there is not enough space to connect the high-voltage cables.
- Now place the columns inside the oven. Longer columns can be wound around the column pins as needed. Therefore the column pins can be placed in any of the designated positions.
- The end of each column is led out at one outlet each and held in position by the clamping mechanism. Place the columns in a way that the tips are about 5mm apart.
- Now reinstall the top part of the oven and plug in the power cord from the power supply to a wall outlet.
- The oven is now ready to use.

3.2 Using CO-Control

After starting the software it comes up with the main view (Fig. 10).

On the “COM Ports” tab choose the port the controller is connected to and click „connect“. Now you should see the current temperature of the oven in the display in the upper right. If no temperature is displayed, please ensure that the top part of the oven sits proper on the bottom part. If the oven is not properly closed, the temperature readout will show -999°C.

In the main view you can adjust the two temperature setpoints „Temp. normal“ and „Temp. high“. By clicking „Switch regulator on“ the regulator starts to heat or cool the oven to one of these setpoints, depending on the state of the contact closure input. To visualize the temperature profile, a graph window can be displayed. To show it up, chose „Options > Show Graph“ from the main menu. In the settings window under „Options > Settings“ the graph window can be shown automatically on startup.

It is possible to unlock an extended temperature range. If your application requires higher or lower temperatures, please ask Sonation for an option code. But also keep in mind that a higher temperature range is stress for the Peltier-modules and can lead to a shorter lifetime.

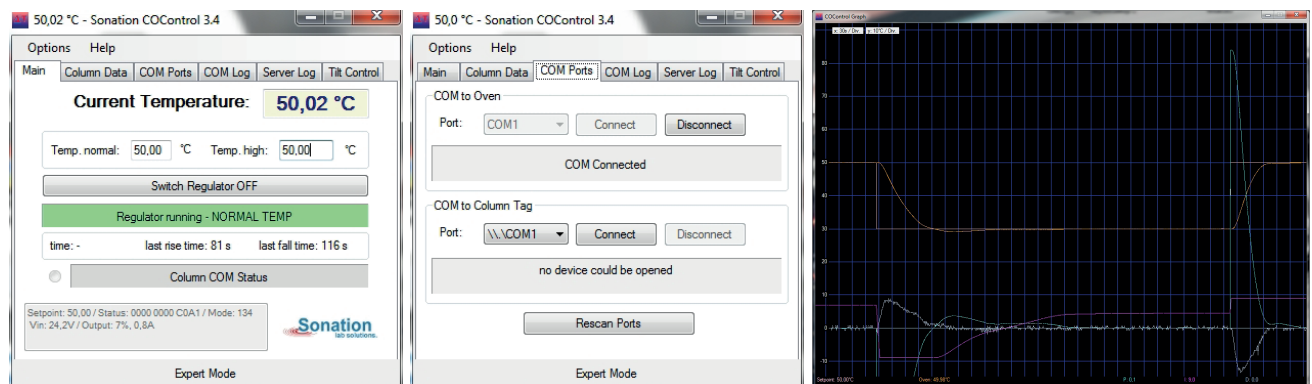


Fig. 10: Oven control software co-control

4 Maintenance and Care

Maintenance

The product is basically maintenance-free but not wear-free. If a wear-related defect should occur, please contact your dealer or Sonation directly to clarify the further steps.

Cleaning

Use a soft, damp cloth to clean the surfaces. Aggressive solvents, bases or acids must not be used for cleaning.

5 Final Disposal

Dispose the product in accordance with local and national safety and environmental regulations.

The product contains electronic components, cables, metals, plastics, etc. and has to be disposed in accordance with applicable environmental regulations of the respective country. The disposal of the product in Germany is subject to the Elektro-G (RoHS) and in the European area of the EU Directive 2002/95/EC or the respective national legislation.

The product can also be returned to the seller for disposal. In this case the cost of transport, including the packaging costs shall be borne by the buyer. Please notify the seller of the return within 14 days before the expected arrival.

6 Technical data

Temperature control range		
Standard range:	15°C - 60°C (59°F - 140°F)	
Extended range:	15°C - 80°C (59°F - 176°F)	
Temperature control rate		
Heating:	30°C to 50°C: Less than 90s	
Cooling:	50°C to 30°C: Less than 180s	
Control accuracy	±0,1°C	
Usable column lengths	From 130mm	
Usable column diameter	Up to 2mm	
Oven weight	0,9kg	
Permissible ambient conditions	Temperature	Humidity
Transport	-20 - 60°C / -4 - 140°F	5-90% (non-condensing)
Storage	10 - 40°C / 50 - 104°F	10-80% (non-condensing)
Operation	10 - 30°C / 50 - 86°F	20-80% (non-condensing)
Power cable		
EU	CEE 7/4 plug (Schuko plug) to IEC 60320 C13, length: 1,8m	
CH	T12 plug (according to SEV 1011:2009) to IEC 60320 C13, length: 1,8m	
UK	Type G plug (BS 1363) to IEC 60320 C13, length: 1,8m	
US	NEMA-5 plug to IEC 60320 C13, length: 1,8m	
Supply voltage	100-240VAC / 50-60Hz	
Max power input	200W	
Appliance class	Class I (earth conductor)	

7 FAQ - Frequently Asked Questions

My PC does not have any COM ports / no available COM ports. Can I run the oven anyhow?

Yes. Please use the provided USB to serial converter to install a virtual com-port.

I've successfully connected to the oven but can still see no temperature. What is wrong?

Please ensure that your oven is closed properly. When the oven is open or even not properly closed, the temperature sensor cannot be read.

Is it possible to set up higher temperatures than 60°C or lower temperatures than 15°C?

Yes, it is possible. Please ask Sonation for an option code, but remember that the lifetime of the Peltier-elements will be lowered because of the additional thermal stress.

The temperature of the oven fluctuates / oscillates some degrees around the setpoint. What's wrong?

The most common cause is that the upper part of the oven sits not properly on the lower part, so the thermal connection is bad. Please check if the column or other things are trapped between the upper and lower part.

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