



Thermo Scientific

Compact Aux Oven

Instruction Manual

Additional Section of the TRACE 1300/1310 Gas Chromatographs Hardware Manual & User Guide

P/N 31715012 Revision A January 2016

Thermo
SCIENTIFIC

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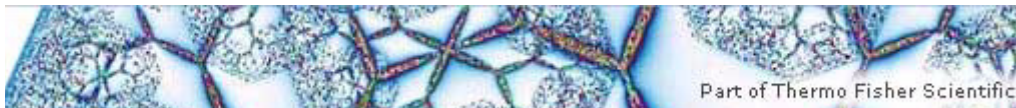
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Release history:

Revision A, January 2016 *“Original Instructions”*

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Compact Aux Oven Instruction Manual, PN 31715012, Revision A

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The manual is well organized.	1	2	3	4	5
The manual is clearly written.	1	2	3	4	5
The manual contains all the information I need.	1	2	3	4	5
The instructions are easy to follow.	1	2	3	4	5
The instructions are complete.	1	2	3	4	5
The technical information is easy to understand.	1	2	3	4	5
Examples of operation are clear and useful.	1	2	3	4	5
The figures are helpful.	1	2	3	4	5
I was able to operate the system using this manual.	1	2	3	4	5

fold — — **If not, please comment below.** Attach additional sheets if necessary.

_____	_____
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Declaration

Manufacturer: **Thermo Fisher Scientific**

Thermo Fisher Scientific is the manufacturer of the instrument described in this manual and, as such, is responsible for the instrument safety, reliability and performance only if:

- installation
- re-calibration
- changes and repairs

have been carried out by authorized personnel and if:

- the local installation complies with local law regulations
- the instrument is used according to the instructions provided and if its operation is only entrusted to qualified trained personnel

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Regulatory Compliance

Thermo Fisher Scientific performs complete testing and evaluation of its products to ensure full compliance with applicable domestic and international regulations.

When the system is delivered to you, it meets all pertinent electromagnetic compatibility (EMC) and safety standards.

Safety

This device complies with the following safety standards according to Machinery Directive 2006/42/EC and Low Voltage Directive 2006/95/EC.

- International Electrotechnical Commission (IEC): 61010-1:2001 (Second edition) - 61010-2-010:2003 (Second edition) - 61010-2-081:2001 (First edition) + A1:(2003)
- National differences: CAN/CSA C22.2 No. 61010-1 (2nd Edition) - UL 61010-1 (2nd Edition)
- EuroNorm (EN): 61010-1:2001 (2nd Edition) – 61010-2-010:2004 (2nd Edition) - 61010-2-081:2002 (1st Edition)

Electromagnetic Compatibility

This device complies with the following regulations on Electromagnetic Compatibility (EMC) and Radio Frequency Interference (RFI) according to directive 2004/108/EC:

- CISPR 11/EN 55011: Group 1 Class A
- IEC/EN 61326-1:2012



IMPORTANT: Class A equipment is intended for use in an industrial environment. In others environments there may be potential difficulties in ensuring electromagnetic compatibility, due to the conducted as well as radiated disturbances.

FCC Compliance Statement

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.



CAUTION Read and understand the various precautionary notes, signs, and symbols contained inside this manual pertaining to the safe use and operation of this product before using the device.

Notice on Lifting and Handling of Thermo Scientific Instruments

For your safety, and in compliance with international regulations, the physical handling of this Thermo Fisher Scientific instrument *requires a team effort* to lift and/or move the instrument. This instrument is too heavy and/or bulky for one person alone to handle safely.

Notice on the Proper Use of Thermo Scientific Instruments

In compliance with international regulations: Use of this instrument in a manner not specified by Thermo Fisher Scientific could impair any protection provided by the instrument.

Notice on the Susceptibility to Electromagnetic Transmissions

Do not use radio frequency transmitters, such as mobile phones, in close proximity to the instrument.

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Preface

This manual is an additional section of the TRACE 1300/1310 gas chromatographs Hardware Manual (PN 31715002) and User Guide (P/N 31715003).

This manual contains information for installing and using the Compact Aux Oven.

About Your System

Thermo Scientific systems provide high-caliber gas chromatography (GC) instrumentation.

GC represents a powerful analytical separation technique. Complex mixtures of individual compounds can be injected into the GC, either manually or by using an autosampler, and then separated the eluate for presentation to the detector. The detector generates signals of the GC eluate and its components. These signals are then processed by a Thermo Scientific Chromatography Data System for qualitative identification, as well as accurate and precise quantification of the individual compounds present in the sample.

IMPORTANT Thermo Scientific systems are designed to optimize the separation and detection capabilities of GC by providing high performance analytical capabilities for both research and routine applications. More information on the use of this system can be found in related documentation sources and by using the provided contact information.



WARNING Thermo Scientific systems operate safely and reliably under carefully controlled environmental conditions. Using the equipment in a manner not specified by the manufacturer might impair the protections provided by the equipment. If you maintain a system outside the specifications listed in this guide, failures of many types, including personal injury or death, might occur. The repair of instrument failures caused by operation in a manner not specified by the manufacturer is specifically excluded from the Standard Warranty and service contract coverage.



WARNING Operation of this system requires the use of chemical substances with different hazard specifications. Before using any chemicals, please read the hazard indications and information reported in the Safety Sheet supplied by the manufacturer referring to the relevant CAS (Chemical Abstract Service) number.

Contacting Us

Thermo Fisher Scientific provides comprehensive technical assistance worldwide and is dedicated to the quality of our customer relationships and services.

Use <http://www.thermoscientific.com> address for products information.

Use <http://www.gc-gcms-customersupport.com/WebPage/Share/Default.aspx> address to contact your local Thermo Fisher Scientific office or affiliate GC-GC/MS Customer Support.

Safety Alerts and Important Information

Make sure you follow the precautionary notices presented in this guide. Safety and other special notices appear in boxes and include the following:

WARNING Highlights hazards to humans or the environment. This is the general warning safety symbol and safety alert word to prevent actions that could cause personal injury. Each **WARNING** safety alert is preceded with this safety symbol and another appropriate safety symbol (see “[Safety Symbols and Signal Words](#)” on [page xi](#)) Then it is followed with an appropriate safety precautionary message. When you see a safety alert on your instrument or in the publications, please carefully follow the safety instructions before proceeding.

CAUTION Highlights actions that might cause personal injury or instrument damage. We use it to highlight information necessary to prevent personal injury or damage to software, loss of data, invalid test results, or to information that is critical for optimal system performance. A **CAUTION** safety alert is always preceded with an appropriate safety symbol (see “[Safety Symbols and Signal Words](#)” on [page xi](#)). It is followed with an appropriate safety precautionary message. When you see a safety alert on your instrument or in the publications, please carefully follow the safety instructions before proceeding.

IMPORTANT Highlights information necessary to prevent damage to software, loss of data, or invalid test results, or it might contain information that is critical for optimal performance of the system.


Note Emphasizes important information about a task.

Tip Provides information that can make a task easier.

Safety Symbols and Signal Words

All safety symbols are followed by **WARNING** or **CAUTION**, which indicates the degree of risk of personal injury and/or instrument damage. Cautions and warnings are followed by a descriptor, such as **BURN HAZARD**. A **WARNING** is intended to prevent improper actions that could cause personal injury. A **CAUTION** is intended to prevent improper actions that might cause personal injury and/or instrument damage. You find the following safety symbols on your instrument and/or in this guide:

Symbol	Descriptor
	BIOHAZARD: Indicates that a biohazard <i>will, could, or might</i> occur.
	BURN HAZARD: Alerts you to the presence of a hot surface that <i>could or might</i> cause burn injuries.
	ELECTRICAL SHOCK HAZARD: Indicates that an electrical shock <i>could or might</i> occur.
	FIRE HAZARD: Indicates a risk of fire or flammability <i>could or might</i> occur.
	EXPLOSION HAZARD. Indicates an explosion hazard. This symbol indicates this risk <i>could or might</i> cause physical injury.
	FLAMMABLE GAS HAZARD. Alerts you to gases that are compressed, liquefied or dissolved under pressure and can ignite on contact with an ignition source. This symbol indicates this risk <i>could or might</i> cause physical injury.
	GLOVES REQUIRED: Indicates that you must wear gloves when performing a task or physical injury <i>could or might</i> occur.
	CLOTHING REQUIRED. Indicates that you should wear a work clothing when performing a task or else physical injury <i>could or might</i> occur.
	BOOTS REQUIRED. Indicates that you must wear boots when performing a task or else physical injury <i>could or might</i> occur.
	MATERIAL AND EYE HAZARD. Indicates you must wear eye protection when performing a task.
	HAND AND CHEMICAL HAZARD: Indicates that chemical damage or physical injury <i>could or might</i> occur.
	HARMFUL. Indicates that the presence of harmful material <i>will, could, or might</i> occur.

	INSTRUMENT DAMAGE: Indicates that damage to the instrument or component <i>might</i> occur. This damage might not be covered under the standard warranty.
	LIFTING HAZARD. Indicates that a physical injury <i>could</i> or <i>might</i> occur if two or more people do not lift an object.
	MATERIAL AND EYE HAZARD: Indicates that eye damage <i>could</i> or <i>might</i> occur.
	READ MANUAL: Alerts you to carefully read your instrument's documentation to ensure your safety and the instrument's operational ability. Failing to carefully read the documentation <i>could</i> or <i>might</i> put you at risk for a physical injury.
	TOXIC SUBSTANCES HAZARD: Indicates that exposure to a toxic substance could occur and that exposure <i>could</i> or <i>might</i> cause personal injury or death.
	LASER HAZARD. Indicates that exposure to a laser beam <i>will</i> , <i>could</i> , or <i>might</i> cause personal injury.
	RADIOACTIVE HAZARD. Indicates that the presence of radioactive material <i>could</i> or <i>might</i> occur.
	For the prevention of personal injury, this general warning symbol precedes the WARNING safety alert word and meets the ISO 3864-2 standard. In the vocabulary of ANSI Z535 signs, this symbol indicates a possible personal injury hazard exists if the instrument is improperly used or if unsafe actions occur. This symbol and another appropriate safety symbol alerts you to an imminent or potential hazard that <i>could cause personal injury</i> .













Instrument Markings and Symbols

The following table explains the symbols used on Thermo Fisher Scientific instruments. Only a few of them are used on the TRACE 1310 Auxiliary Oven. Those that are used are designated by an asterisk.

Table 1. Instrument Marking and Symbols (Sheet 1 of 2)

Symbol	Description
===	Direct current
* ~	Alternating current
≍	Both direct and alternating current
3 ~	Three-phase alternating current
⏏	Earth (ground) terminal

Table 1. Instrument Marking and Symbols (Sheet 2 of 2)

Symbol	Description	
	Protective conductor terminal	
	Frame or chassis terminal	
	Equipotentiality	
*		On (supply)
*	○	Off (supply)
	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION (Equivalent to Class II of IEC 536)	
*		Instruction manual symbol affixed to product. Indicates that the user must refer to the manual for specific WARNING or CAUTION information to avoid personal injury or damage to the product.
	Caution, risk of electric shock	
*		Caution, hot surface
*		Caution, biohazard
	In-position of a bistable push control	
	Out-position of a bistable push control	
	Jack socket	
*		Symbol in compliance to the Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) placed on the European market after August, 13, 2005.

Hydrogen Safety Precautions

Hydrogen is a colorless, odorless, highly flammable gas with the molecular formula H_2 and an atomic weight of 1.00794, making it the lightest element. Hydrogen gas presents a hazard as it is combustible over a wide range of concentrations; at ambient temperature and pressure, this ranges from about 4% to 74.2% by volume.

Hydrogen has a flash point of - 423 °F (- 253 °C) and an auto-ignition temperature of 1,040 °F (560 °C). It has a very low ignition energy and the highest burning velocity of any gas. If hydrogen is allowed to expand rapidly from high pressure, it can self-ignite. Hydrogen burns with a flame that can be invisible in bright light.



WARNING - EXPLOSION HAZARD The use of hydrogen as a carrier gas is dangerous. Hydrogen is potentially explosive and must be used with extreme care. Any use of hydrogen gas must be reviewed by appropriate health and safety staff and all installations of hydrogen systems must be performed to applicable codes and standards. Thermo Fisher Scientific assumes no liability for the improper use of hydrogen as a carrier gas.

Before you begin using hydrogen, you should conduct a risk assessment based on the quantity of hydrogen to be used and the conditions of your laboratory. You should ask yourself:

“What hydrogen hazards associated with this project are most likely to occur?”

“What hydrogen hazards associated with this project have the potential to result in the worst consequences?”

- Try to reduce or eliminate the higher risks by using the proper ventilation to remove hydrogen gas before an ignitable concentration can accumulate. You should also consider purging the hydrogen to further reduce hazards and ensure anyone who will be working with hydrogen has basic hydrogen safety training.
- As with laboratory safety in general, be sure to wear safety glasses, laboratory coats, gloves, etc. Typically there are no specific requirements for gaseous hydrogen, other than eye protection when working with a compressed gas. If working with liquid (cryogenic) hydrogen, insulated gloves and protective shoes should be worn in addition to eye protection.
- You should post “No Smoking” and “No Open Flames” signs to identify hydrogen sources and cylinders. Maintain, inspect and leak-test all hydrogen sources regularly.
- All hydrogen shutoff valves should be clearly marked and permanent hydrogen piping should be labeled as such at the supply or discharge point and at regular intervals along its length. Where hydrogen gas piping passes through a wall, the piping should be labeled on both sides of the wall.
- There should also be contingency plans in place should an incident occur.
- The site emergency response team, as well as the local fire department, should know the location of all hydrogen storage tanks.

Using Hydrogen with TRACE 1300/TRACE 1310

The use of hydrogen as a carrier gas or as fuel gas for certain flame detectors requires the operator’s strict attention and compliance with special precautions due to the hazards involved.

WARNING - EXPLOSION HAZARD Hydrogen is a dangerous gas that, when mixed with air, might create an explosive mixture. The use of hydrogen as a carrier gas requires the operator's extreme caution. Special precautions must be taken because of the risk of explosion. The gas chromatograph must be equipped with a hydrogen sensor if you use hydrogen as a carrier gas.



Never use hydrogen as carrier gas in your TRACE 1300/TRACE 1310 system unless your oven has a hydrogen sensor installed. Thermo Fisher Scientific FSEs are not authorized to install or repair any instrument using hydrogen as a carrier gas unless the instrument is equipped with the appropriate sensor.

If your oven does not have a hydrogen sensor already installed, contact your Thermo Fisher Scientific sales representative. To comply with instrument safety requirements, a Thermo Fisher Scientific FSE or authorized service personnel should install the sensor into your TRACE 1300/TRACE 1310.

Hydrogen is a dangerous gas, particularly in an enclosed area when it reaches a concentration corresponding to its lower explosion level (4% in volume). An explosion hazard could develop in the oven when hydrogen is used as a carrier gas if oven elements are not perfectly connected to each other, or if the connection materials are worn out, broken, or otherwise faulty.

Use the following safety precautions when using hydrogen:

- Ensure that all hydrogen cylinders comply with the safety requirements for proper use and storage. Hydrogen cylinders and delivery systems must comply with local regulations.
- Make sure the gas supply is turned completely off when connecting hydrogen lines.
- Perform a leak test to ensure that the hydrogen lines are leak-tight before using the instrument. Repeat this test to eliminate all leaks.
- Ensure your TRACE 1300/TRACE 1310 has a Thermo Fisher Scientific hydrogen sensor installed. A hydrogen sensor continuously monitors the hydrogen level in the oven.

Hydrogen Connection Guidelines

Use the following guidelines to safely connect hydrogen to your system:

- **Piping**—Hydrogen must be delivered to equipment using appropriate piping and be done in such a way as to pose essentially no hazard to end-users. Piping systems for the delivery of hydrogen should be designed and installed by a person qualified by specific training and experience with hydrogen piping systems.

Stainless steel is usually recommended because it is a safe, cost-effective material. Piping of *black iron* or copper must not be used, as the pipe can become brittle with age.

Elastomeric/plastic tubing of various plastics and polymers should not be used, unless the

tubing is approved for use with hydrogen. If elastomeric/plastic tubing is used for hydrogen gas delivery, the tubing should be tested for hydrogen permeability to minimize leakage.

The hydrogen piping system must be flexible enough to endure routine thermal expansion and contraction. The system should also include considerations for the most severe condition of temperature and pressure expected during service. Piping and supports must be able to withstand static loading introduced by such things as ice and snow; and dynamic loading from high wind and earthquake.

Caution should be used if burying hydrogen piping. Proper controls should be used to protect against damage and corrosion, and also to prevent Hydrogen from entering a building if there is any leakage.

- **Fittings**—All fittings must be of the proper type approved or designed for use with hydrogen gas. Use as few fittings as possible to minimize the potential for leaks. After installation, ensure that leak testing is carried out prior to system use, and on a regular basis.

There must be no PTFE tape or other things like *plumber's putty* used to enhance a seal, as this actually is a detriment to a good seal. Ideally the best installation would use stainless steel tubing with appropriate gas-tight fittings.

Welding is usually preferred for joints in hydrogen piping systems since welding provides a better connection and reduces the potential for leaks compared to mechanical fittings. Soft solder joints are not permitted for hydrogen systems (due to the low melting point of soft solder and its potential for brittle failure at cryogenic temperatures). Braze joints are permitted, but such joints should be protected against the possibility of external fire.

Tubing connections should be clamped to barbed or press-fit type connections. Hose clamps or *jubilee clamps* must not be used.

- **Valves**—All valves must be suitable for hydrogen service and for the specific operating conditions. Valves, including regulators, must not be used for hydrogen, unless they are designed and identified for such a use. Ball valves are often chosen because of their superior leak tightness through the valve seat. Pneumatic operators are usually chosen for remotely operated valves so that potential ignition sources (electricity) are remote from the valve.

Manual shutoff valves should be provided near each point of use, within immediate reach. If a hydrogen cylinder or hydrogen generation system is located within immediate reach, a separate point-of-use shutoff valve is usually not necessary.

Line regulators that have their source away from the point of use should have a manual shutoff valve near the point of use.

An emergency gas shutoff device in an accessible location outside the use area should be provided in addition to the manual point-of-use valve in each educational and instructional laboratory space that has a piped gas supply system.

If necessary, the piping system should have uninterrupted pressure relief. The pressure relief system should be designed to provide a discharge rate sufficient to avoid further pressure increase and should vent to a safe location outside or to a ventilation system exhaust.

Purchasing Hydrogen

Use the following guidelines when purchasing hydrogen:

- **Hydrogen Generator**—Because it minimizes the amount of hydrogen present and reduces the degree of hazard, a hydrogen generator (also called an electrolyzer) is the safest way to purchase hydrogen in the quantity used in gas chromatography/mass spectroscopy systems.

However, to minimize the degree of hazard, operate the hydrogen generator only in a non-explosive environment because hydrogen buildup can be ignitable. Thus, your ventilation system for the room or lab hood where the hydrogen generator operates must maintain an air exchange rate at least two orders of magnitude greater than the maximum hydrogen production rate of the hydrogen generator. Follow the manufacturers' directions about proper use and maintenance of the regulator.

To prevent the possibility of releasing hydrogen, set the hydrogen generator to shut down if:

- There is a loss of flow to the ventilation system
- A hydrogen detector alarms at 25% of the lower flammable limit of hydrogen in air.

Vent the oxygen exhausted by the electrolyzer to the outside as well.

- **Hydrogen Cylinder**—Hydrogen can be delivered in standard laboratory gas bottles or cylinders. These cylinders have a limited amount of hydrogen in them and are a safe way to transport and store hydrogen. Always secure, compressed hydrogen gas cylinders, like all compressed gas cylinders, in an upright position, ideally with a non-combustible chain or cable. If the cylinder falls over, the valve can fall off, causing the pressurized cylinder to take off like a rocket, leading to the release of hydrogen and possibly an explosion, severe injury, or death. Never crack a hydrogen cylinder valve to remove dust or dirt from fittings prior to attaching a regulator, as there is a risk of self-ignition.

Properly Storing Hydrogen

Storing and handling compressed hydrogen gas and cryogenic liquid hydrogen present potential health and safety hazards. Using proper storage and handling techniques is essential to maintaining a safe work environment.

Use the following guidelines when storing hydrogen:

- Store spare hydrogen gas cylinders outside and away from doors, windows, building air intake vents, structures, and vehicle routes. This precaution applies when the hydrogen is or is not in use. Indoor storage of spare hydrogen cylinders has special requirements, which are beyond the scope of this document. Documentation for each vessel should include a description of the vessel, a list of available drawings or other documents, the most recent inspection results, and the responsible person's name.
- Prevent spare cylinders from toppling by wrapping them with chains. The chains should also be protected against corrosion and excessive heat.
- Separate spare hydrogen cylinders from oxidizing gases (such as oxygen) with a 5 ft. (1.5 m) tall fire barrier with a half-hour fire rating or place the cylinders at least 20 ft. (6 m) apart.
- When moving hydrogen cylinders:
 - Remove the regulator and replace the cylinder valve cap before moving.
 - Move cylinders on cylinder carts or with other appropriate transport devices.
 - Never roll or drop a cylinder and never lift a cylinder by its protective cap.
- Bulk hydrogen systems include either gaseous or liquid hydrogen in fixed installations; in some gas systems a semi-permanent trailer (tube trailer) can be used. Storage vessels for compressed hydrogen gas or liquid hydrogen should be designed, constructed, tested, and maintained in accordance with applicable codes and standards. Bulk hydrogen systems represent a level of complexity again which is beyond the scope of this document; however some general guidelines are provided.
- The bulk hydrogen storage system should not be located beneath electric power lines, close to other flammable gases/liquids, or close to public areas. It should be readily accessible to authorized personnel and delivery equipment, but protected from physical damage or tampering.
- As liquid hydrogen systems also have a cryogenic hazard, additional safety considerations for the use of cryogenic liquids might be necessary.

Hydrogen Safety Codes, Standards and References

The following list of safety codes, standards, and references is in no way an exhaustive list. In fact, there may be federal, state, or local codes that apply to your specific location. Check with all appropriate agencies with jurisdiction before installing or using a hydrogen system.

- Air Products Safetygram #4 Gaseous Hydrogen
- ANSI/AIAA standard for hydrogen safety guidelines is AIAA G-095-2004, Guide to Safety of Hydrogen and Hydrogen Systems
- ASME B31.1, Power Piping Code
- ASME B31.3, Process Piping Code

- ASME B31.8, Gas Transmission and Distribution Systems
- BCGA Code Of Practice CP4 Industrial Gas Cylinder Manifolds and Gas Distribution Pipework
- BCGA Code Of Practice CP33 The Bulk Storage of Gaseous Hydrogen at Users' Premises
- CGA G-5, Hydrogen
- CGA G-5.4, Standard for Hydrogen Piping Systems at Consumer Locations
- CGA G-5.5, Hydrogen Vent Systems
- CGA G-5.6, Hydrogen Pipeline Systems
- CGA G-5.8, High Pressure Hydrogen Piping Systems at Consumer Locations.
- FM Global Property Loss Prevention Data Sheets 7-50: Compressed Gases in Cylinders
- FM Global Property Loss Prevention Data Sheets 7-91: Hydrogen
- IGC Doc 121/04/E, Hydrogen Transportation Pipelines System Design Features
- NASA
- NSS 1740.16 Safety Standard For Hydrogen And Hydrogen Systems Guidelines for Hydrogen System Design, Materials Selection, Operations, Storage, and Transportation
- NFPA 52, Vehicular Fuel Systems Code
- NFPA 55, Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks, 2005 Edition
- NFPA 68, Standard on Explosion Protection by Deflagration Venting
- NFPA 70, National Electrical Code
- NFPA 497, Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
- NFPA 13, Standard for the Installation of Sprinkler Systems
- NFPA 45, Standard on Fire Protection for Laboratories Using Chemicals
- NFPA 55, Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks
- NFPA 68, 2007 Standard on Explosion Protection by Deflagration Venting
- NFPA 69, Standard on Explosion Prevention Systems
- NFPA 91, Standard for Exhaust Systems for Air Conveying of Vapors

Preface

Hazardous Substances Precautions

- NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials
- OSHA 29CFR1910.103 1910.103 Hydrogen

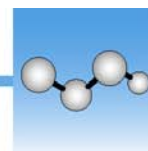
Hazardous Substances Precautions



WARNING Before using hazardous substances (toxic, harmful, etc.), please read the hazard indications and information reported in the applicable Material Safety Data Sheet. Use Personal protection according to the safety requirements.

Venting Toxic Gases

When analyzing toxic compounds be aware that during the normal operation of the GC some of the sample may be vented outside the instrument through the inlet and detector exits; therefore the exhaust gases must be vented to a fume hood. Consult local Environmental and Safety Regulations for instructions in exhausting fumes from your system.



Compact Aux Oven Installation and Use

This manual provides a detailed instructions for installing and using the Compact Aux Oven.

Contents

- Overview
- Assembling the Compact Aux Oven
- Heater Box Assembly
- Installing a Heated Rotary Valve Into the Basic Unit
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- Installing an Unheated Valve for Liquid Samples into the Basic Unit
- Coupling the Compact Aux Oven to the GC
- Operation
- Ordering Parts

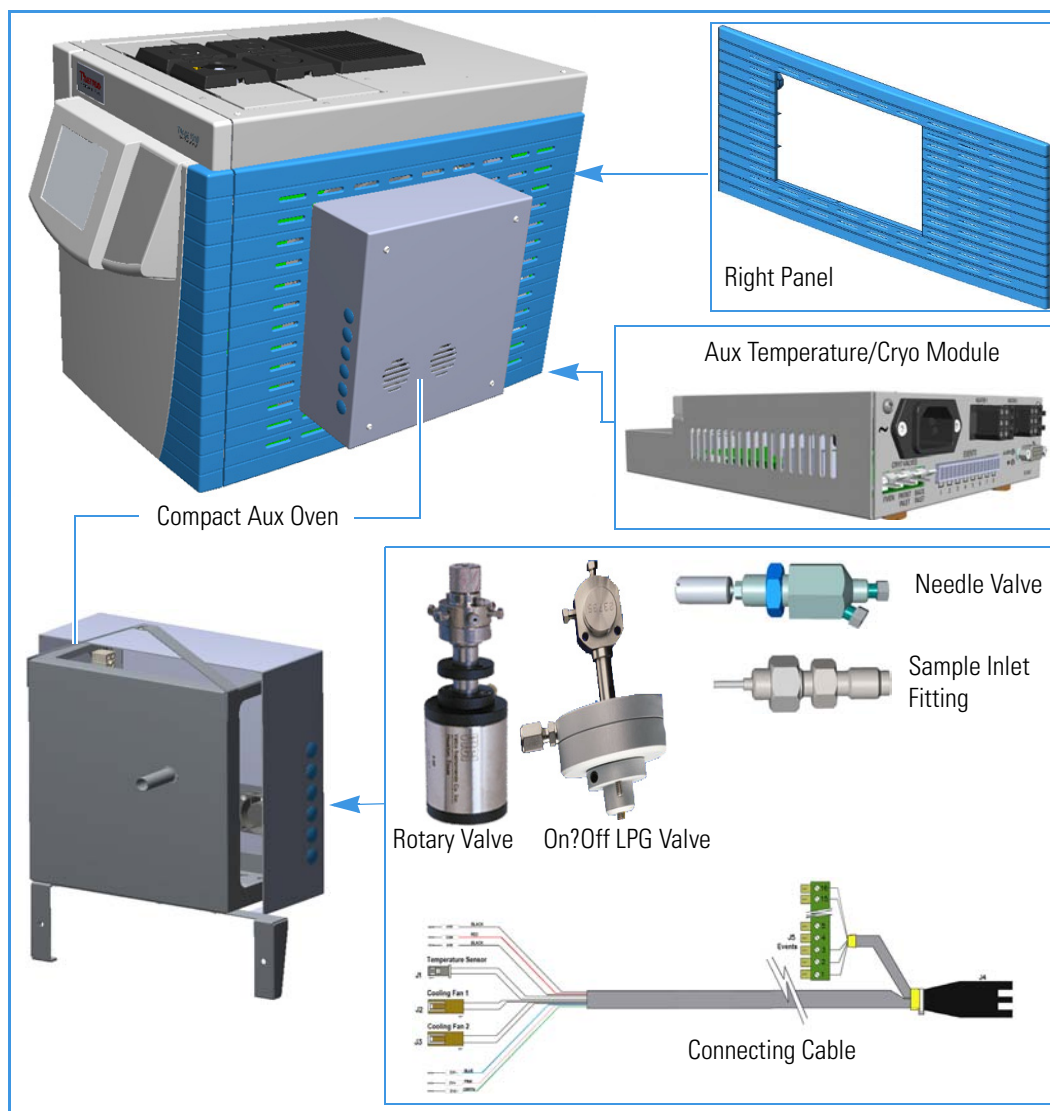
Overview

This sections provides a detailed overview of the Compact Aux Oven.

Introduction

The Compact Aux Oven consists of a metal structure that houses up to two heated rotary valves or an On/Off LPG valve with actuator. Sample inlet fittings and needle valves can also be mounted according to your needs. See [Figure 1](#).

Figure 1. TRACE 1300/TRACE1310 GC with the Compact Aux Oven



When all the required components are installed, the Compact Aux Oven is attached to the right side of the TRACE 1300/1310 GC. The Aux Temperature/Cryo module is required for operation with the Compact Aux Oven.

The electrical connections between the Compact Aux Oven and the Aux Temperature/Cryo module are carried out using the dedicated multi-contact connecting cable provided.

Figure 2 and Figure 3 shown respectively the electrical connections wiring diagram and the connecting cable diagram.

Figure 2. Electrical Connections Wiring Diagram

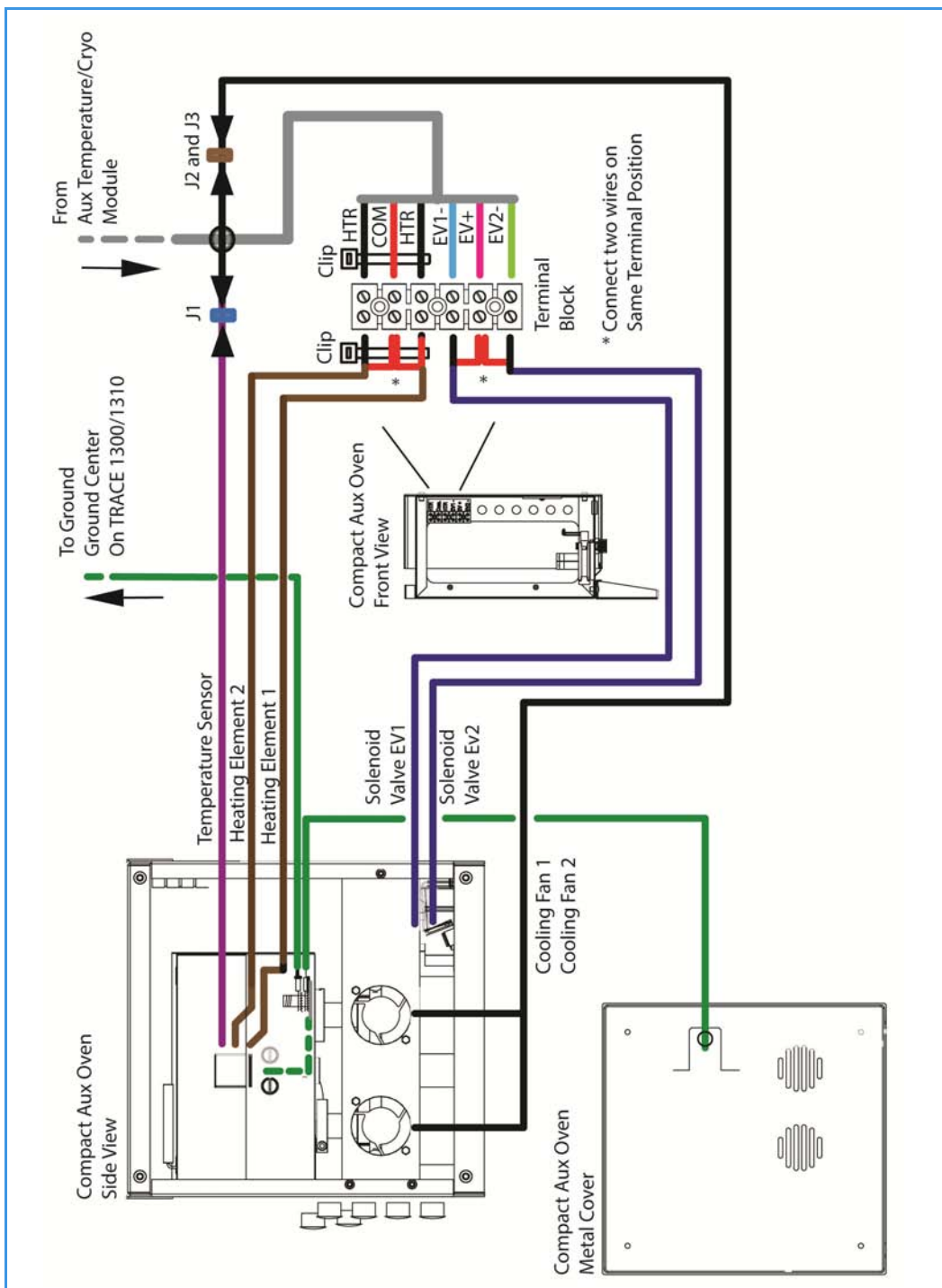
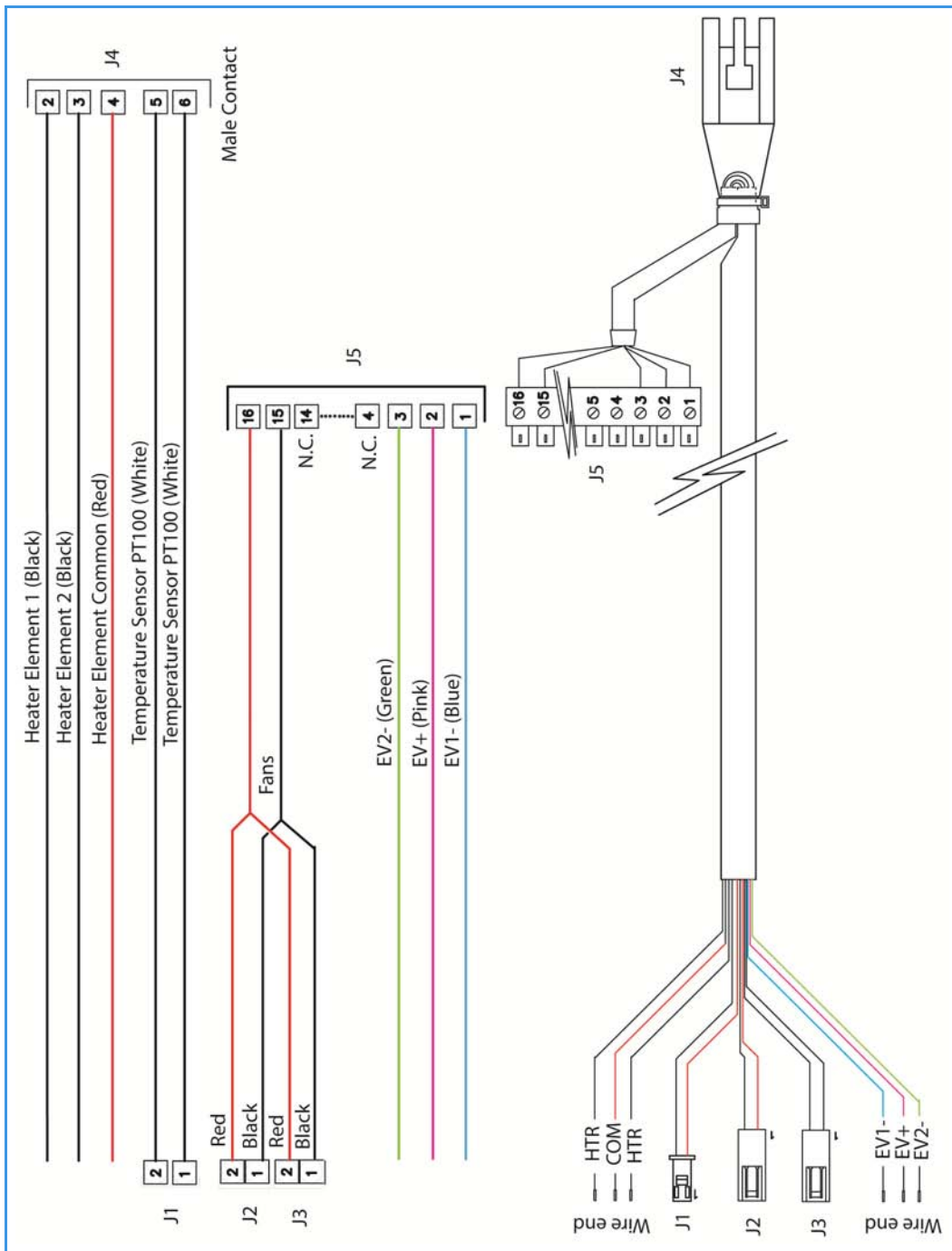


Figure 3. Connecting Cable Diagram



Basic Unit

Figure 4 shows the basic unit of the Compact Aux Oven.

Figure 4. Compact Aux Oven Basic Unit

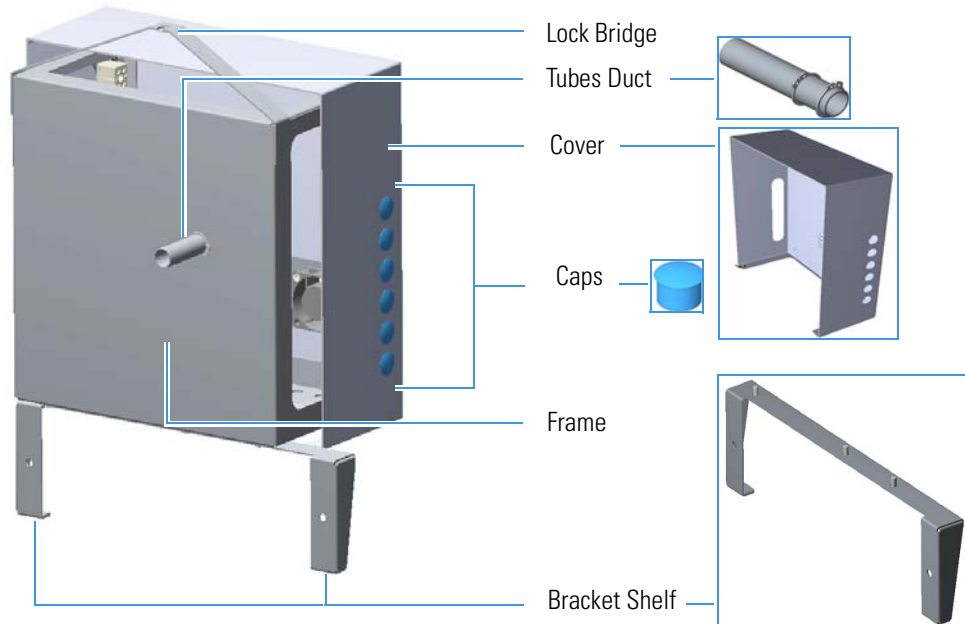


Figure 5 shows the internal view of the basic unit of the Compact Aux Oven equipped with the basic components, and the seats where the valves can be mounted.

Figure 5. Compact Aux Oven Basic Unit Internal View

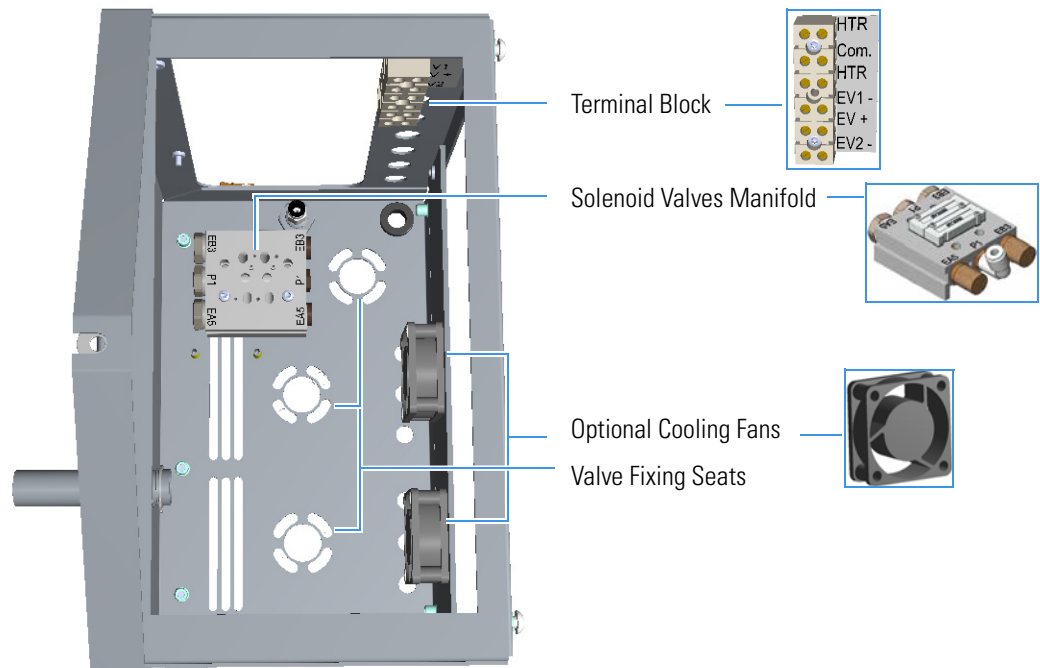
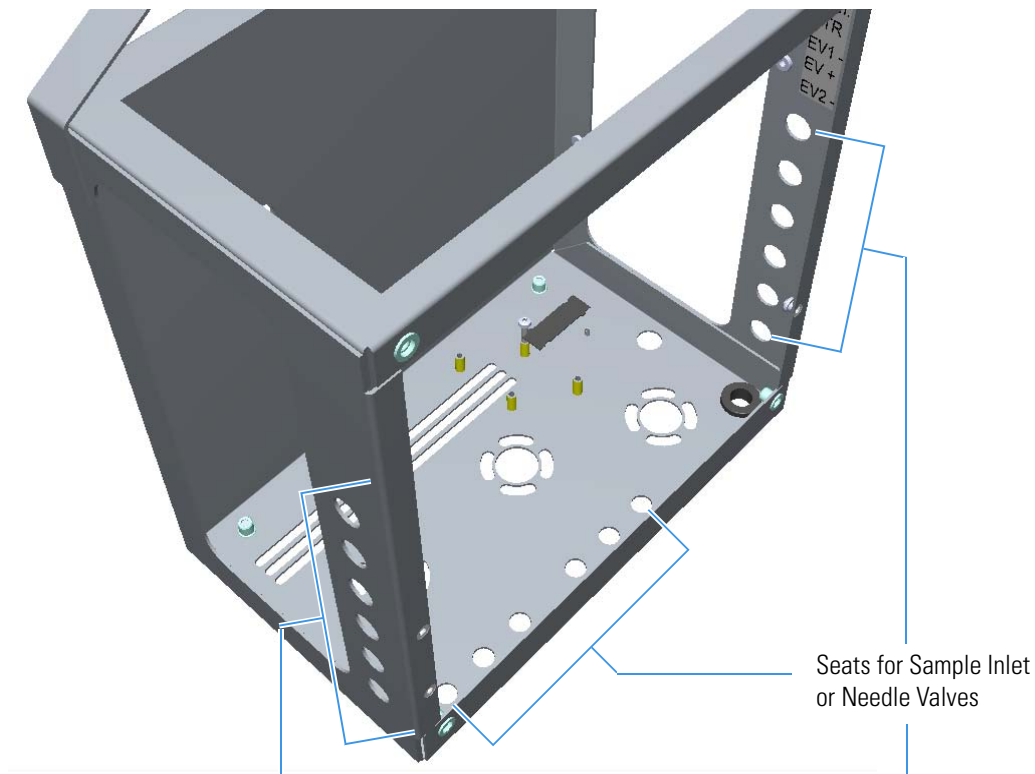


Figure 6 shows the seats for sample inlet fittings and needle valves. There are six seats on the left and on right vertical bar, and six seats on the floor of the Compact Aux Oven.

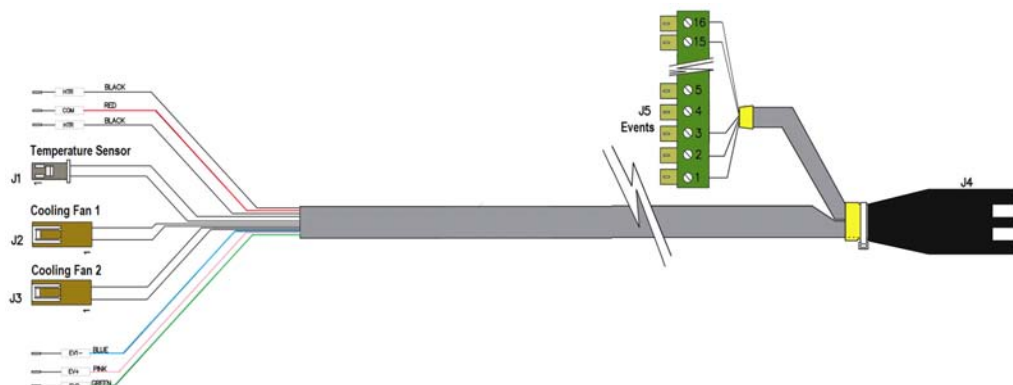
Figure 6. Seat Holes



CAUTION You can install the sample inlet fittings and the needle valves into the seats on the left bar, on the right bar, or on the floor. We suggest installing the components into the seats on the right side or on the floor for convenience.

The electrical connections between the Compact Aux Oven and the Aux Temperature/Cryo module are carried out using the dedicated multi-contact connecting cable provided. See Figure 7.

Figure 7. Connecting Cable



Compact Aux Oven Assemblies

Figure 8, Figure 10, and Figure 9, show examples of the Compact Aux Oven assembled for housing the following valves.

- A single heated rotary valve with standoff. The kit including the heating block assembly is required.
- Two heated rotary valves with standoff. The kit including the heating block assembly is required.
- A LPG valve for liquid samples with its own actuator.

Figure 8. Single a Heated Rotary Valve with Standoff

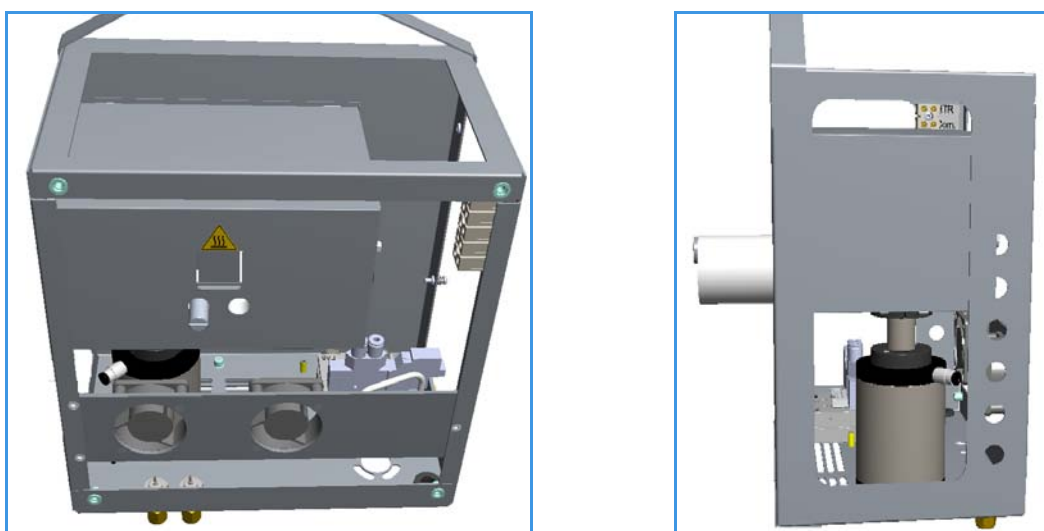


Figure 9. Two Heated Rotary Valve with Standoff

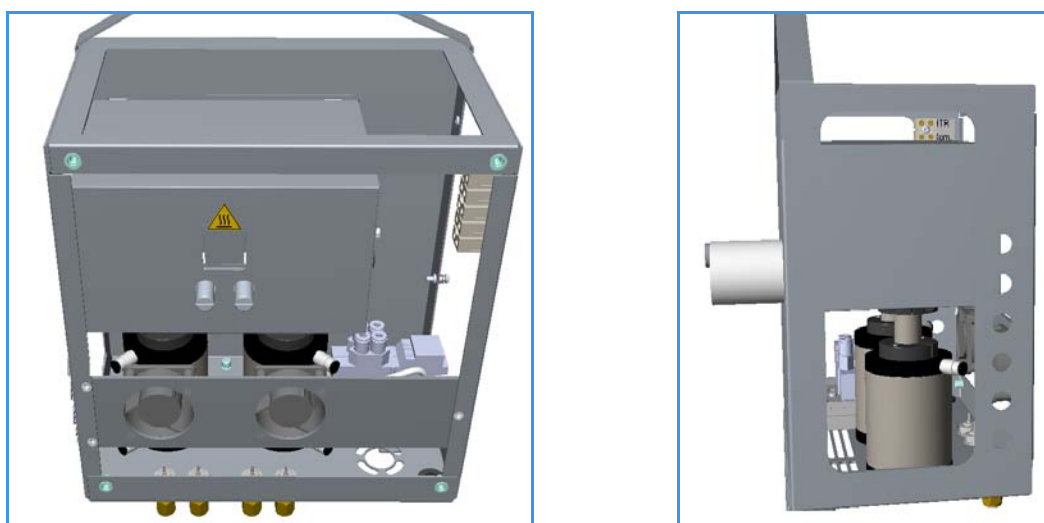
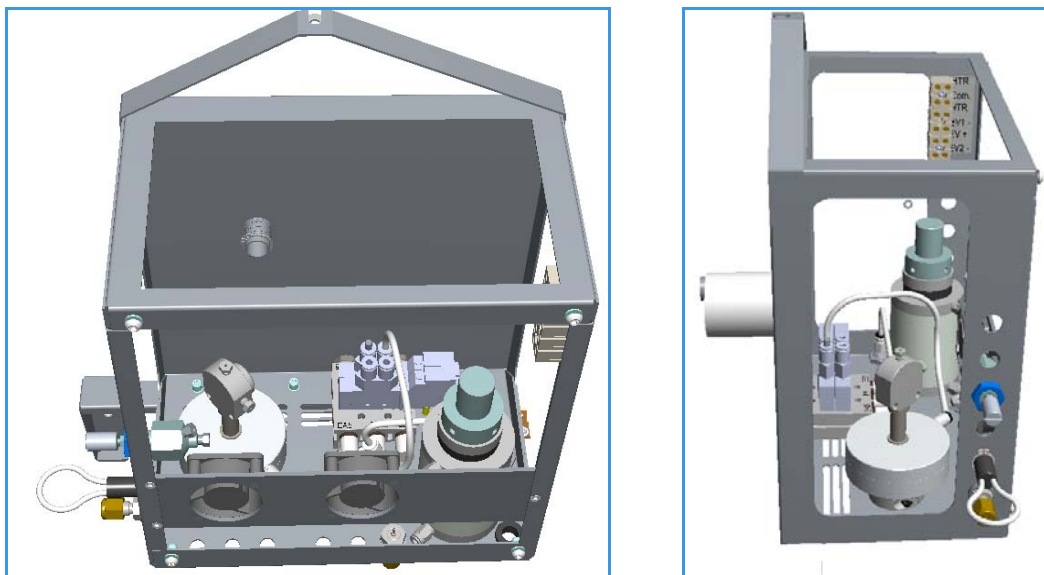


Figure 10. LPG Valve for Liquid Samples with Actuator.



The valves in the Compact Aux Oven are gas-actuated and controlled by solenoid valves that are turned on and off by timed events. Each solenoid valve uses one timed event. Once a valve occupies a timed event, this timed event is removed from the list of external events that can be added to a run table.

Assembling the Compact Aux Oven

This section contains the instructions for assembling the Compact Aux Oven.

WARNING These operations must be carried out by authorized and trained Thermo Fisher Scientific technical personnel.

WARNING COMPLETELY STUDY THE FULL INSTALLATION PROCEDURE BEFORE STARTING THE ASSEMBLY.



Ensure you have adequate workbench space. It is easier to mount all the components into the Compact Aux Oven **OUT** the TRACE 1300/TRACE 1310 GC. The coupling and the connections of the Compact Aux Oven to the GC will be the last operation to do.

Tools Needed



IMPORTANT Ensure you have all the tools (wrenches, screwdrivers, pliers, and so on) suitable for the installation of all the components you want assemble into the Compact Aux Oven.

Table 2 lists some tools needed.

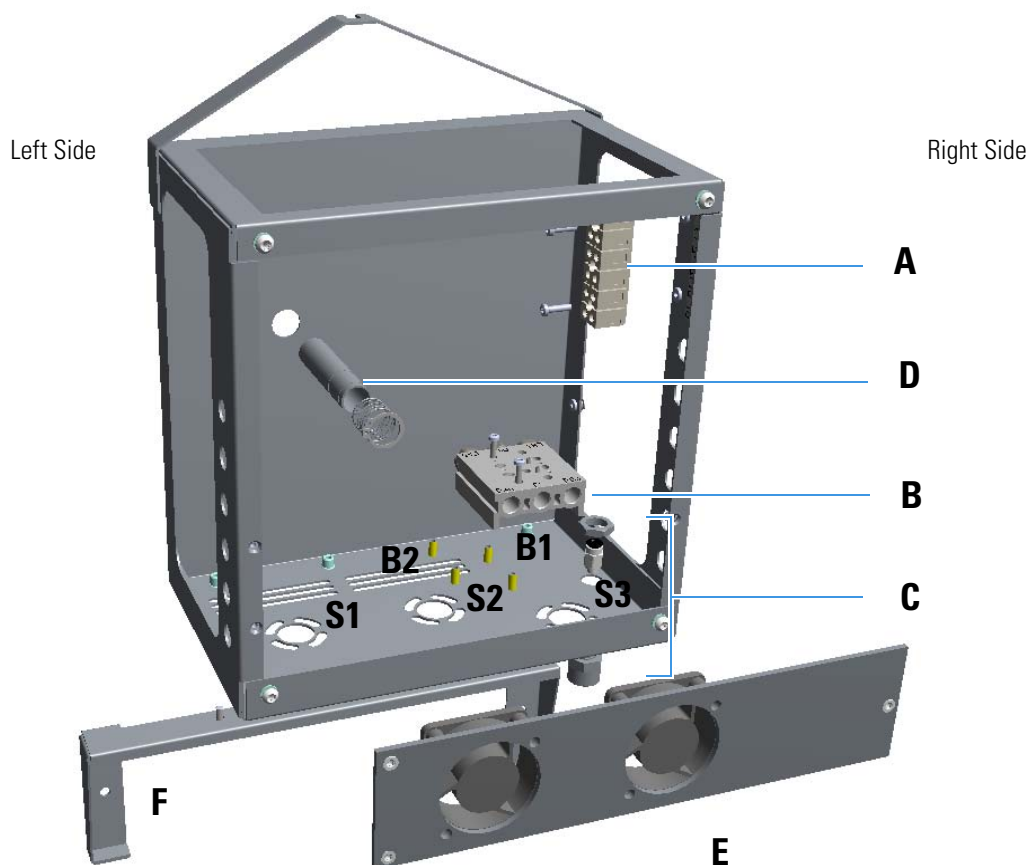
Table 2. Tools Required

Tool	Interested Components
T20 Torxhead screwdriver	All the accessible M4 screws
T20 Torxhead L-shape wrench	All the inaccessible M4 screws.
1/4- 5/16-in. open-end wrench	Valve head nuts
5/8-in. open-end wrench	Valco® needle valves
3/8-in. Allen wrench	Actuator of the rotary valve
3/16-in. Allen wrench	Dowel of the clamp ring for the valve for liquid sample
9/64-in. Allen wrench	Clamp ring of the valve for liquid sample
Seeger Ring Pliers	Tubes Duct
Phillips screwdriver	Solenoid Valves

Assembling the Basic Components

This section provides instructions for assembling the basic components into the Compact Aux Oven.

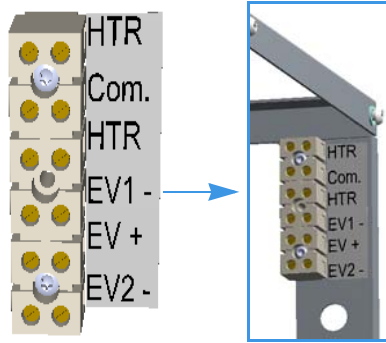
Figure 11. Basic Components Assemble



❖ **To assemble the basic components**

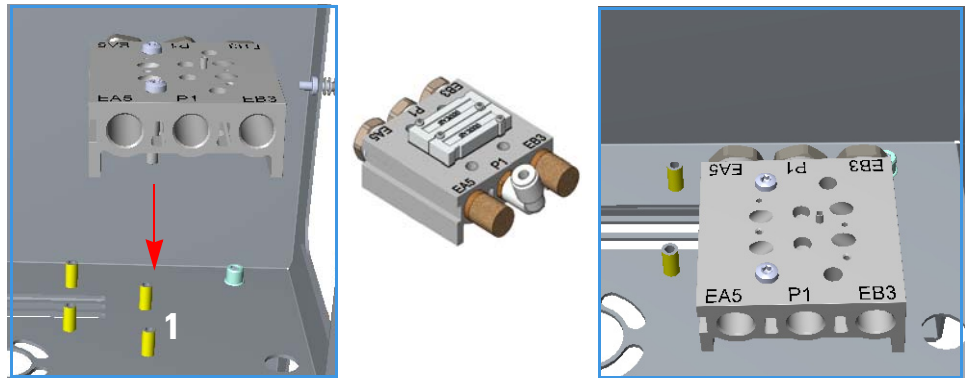
Referring to [Figure 11](#) on [page 9](#), proceed as follows.

1. Place and fix the terminal block for the electrical connections on the upper corner of the drilled vertical bar on the right side of the Compact Aux Oven. See **A** of [Figure 11](#). Use the fixing screws provided.

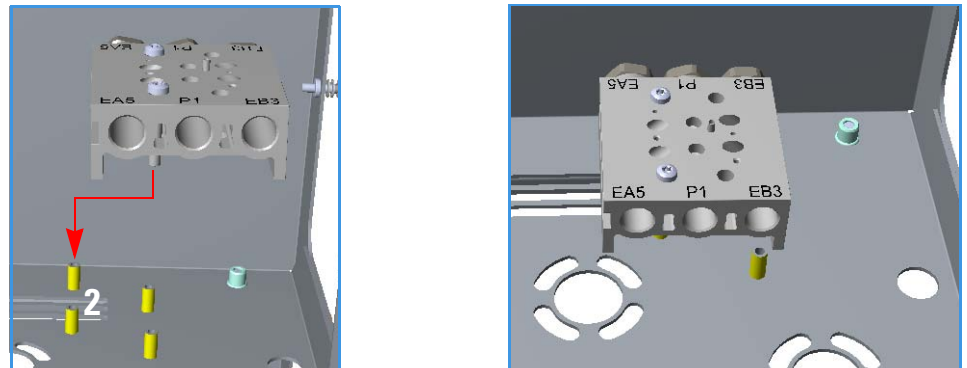


2. Place and fix the solenoid valve manifold on the floor of the Compact Aux Oven paying attention to choose the correct position 1 or 2 according to the type of valve you must install. See **B1**, and **B2** of [Figure 11](#). Use the fixing screws provided.

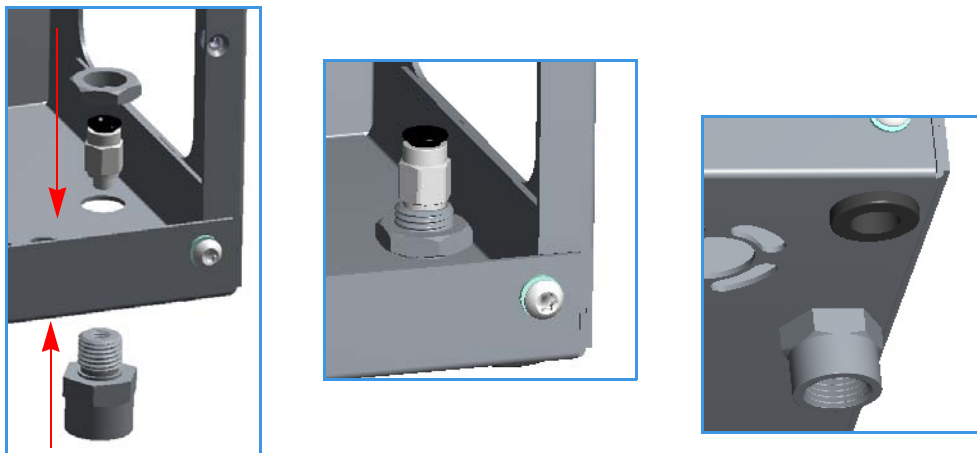
- In case of rotary valves in the seats **S1** and/or **S2** of [Figure 11](#), install the solenoid valve manifold on the position 1.



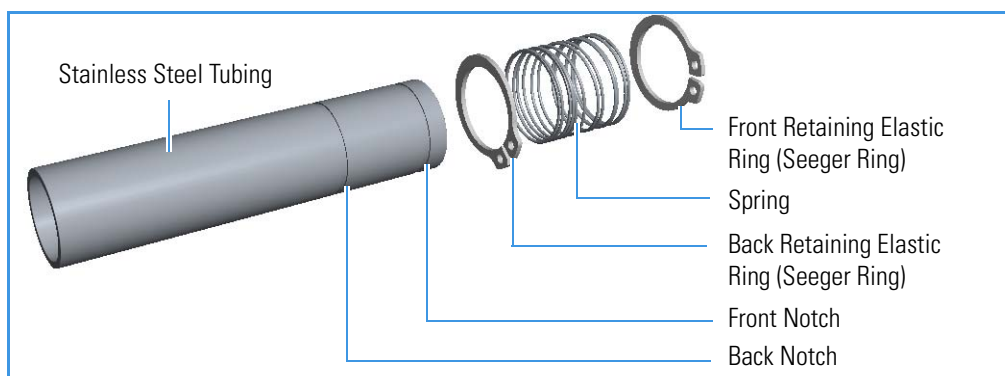
- In case of LPG valve, or of a not-heated rotary valve in the seat **S3** of [Figure 11](#), install the solenoid valve manifold on the position 2.



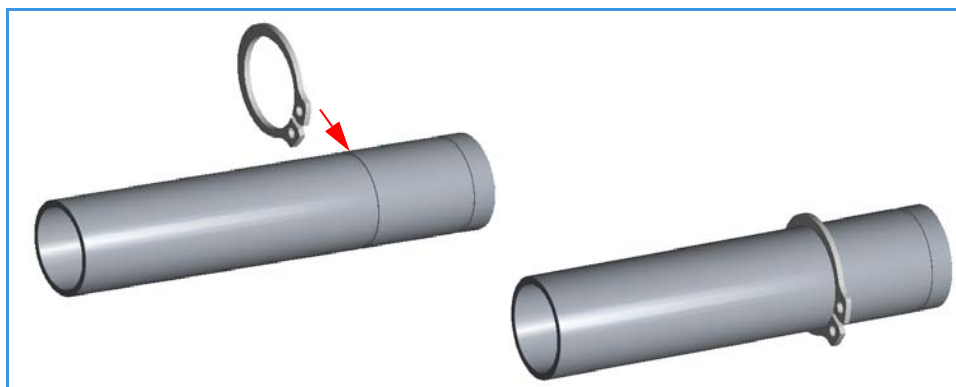
3. Mount and fix the air supply fitting for the actuation of the valves. See C of [Figure 11](#).



4. Install and fix the tubes duct into the passing hole provided in the wall of the Compact Aux Oven. The tubes duct consists of stainless steel tubing (14 mm OD; 12 mm ID), two retaining elastic rings (seeger rings), and a spring. See D of [Figure 11](#).



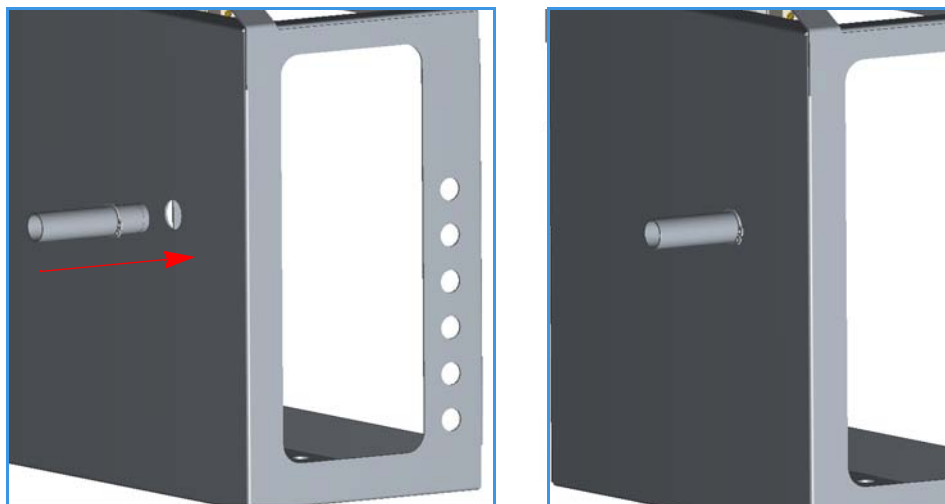
- a. Using a suitable seeger ring pliers place the back retaining elastic ring on the back notch on the stainless steel tubing.



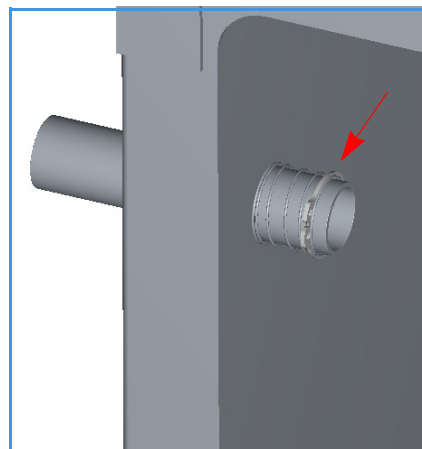
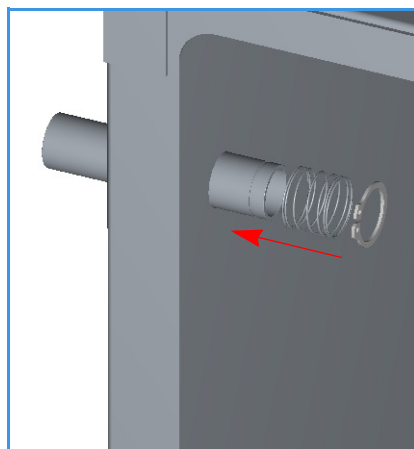
- b. Insert the stainless steel tubing into the passing hole provided in the wall of the Compact Aux Oven until the back seeger ring touches the wall.

Compact Aux Oven Installation and Use

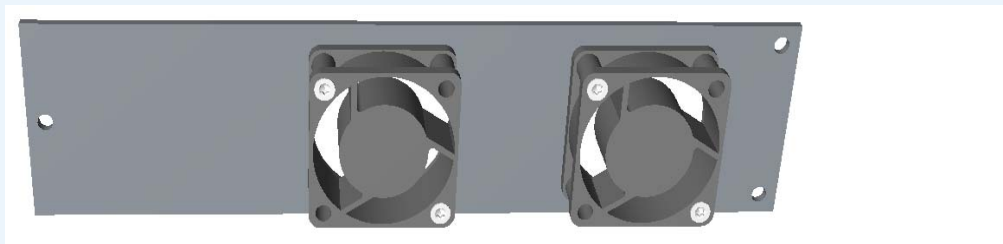
Assembling the Compact Aux Oven



- c. On the internal part of the wall slide the duct spring on the stainless steel tubing and fix it placing the front retaining elastic ring on the front notch on the tubing.



IMPORTANT When the Compact Aux Oven is used at high temperatures, between 150 °C and 180 °C, we recommend the installation of the optional cooling fans to preserve maximum actuators lifetime.



Install the optional cooling fans at the end of the complete assembly of the Compact Aux Oven.

IMPORTANT DO NOT INSTALL the bracket shelf. See F of [Figure 11](#).

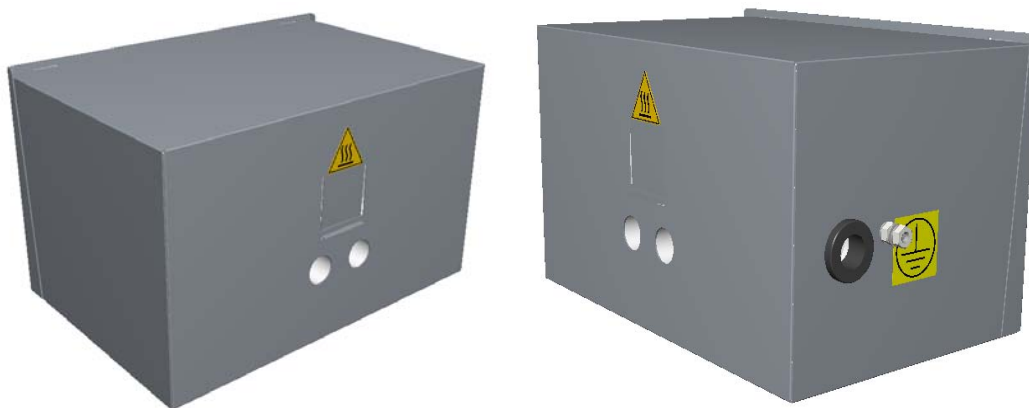
The installation the bracket shelf (see See of [Figure 11](#)) will be carried out before coupling the Compact Aux Oven to the TRACE 1300/TRACE 1310 GC.



Heater Box Assembly

The heater box is required for heating the rotary valve. See [Figure 12](#).

Figure 12. Heater Box Assembly (1)



Consists of two main parts. See [Figure 13](#).

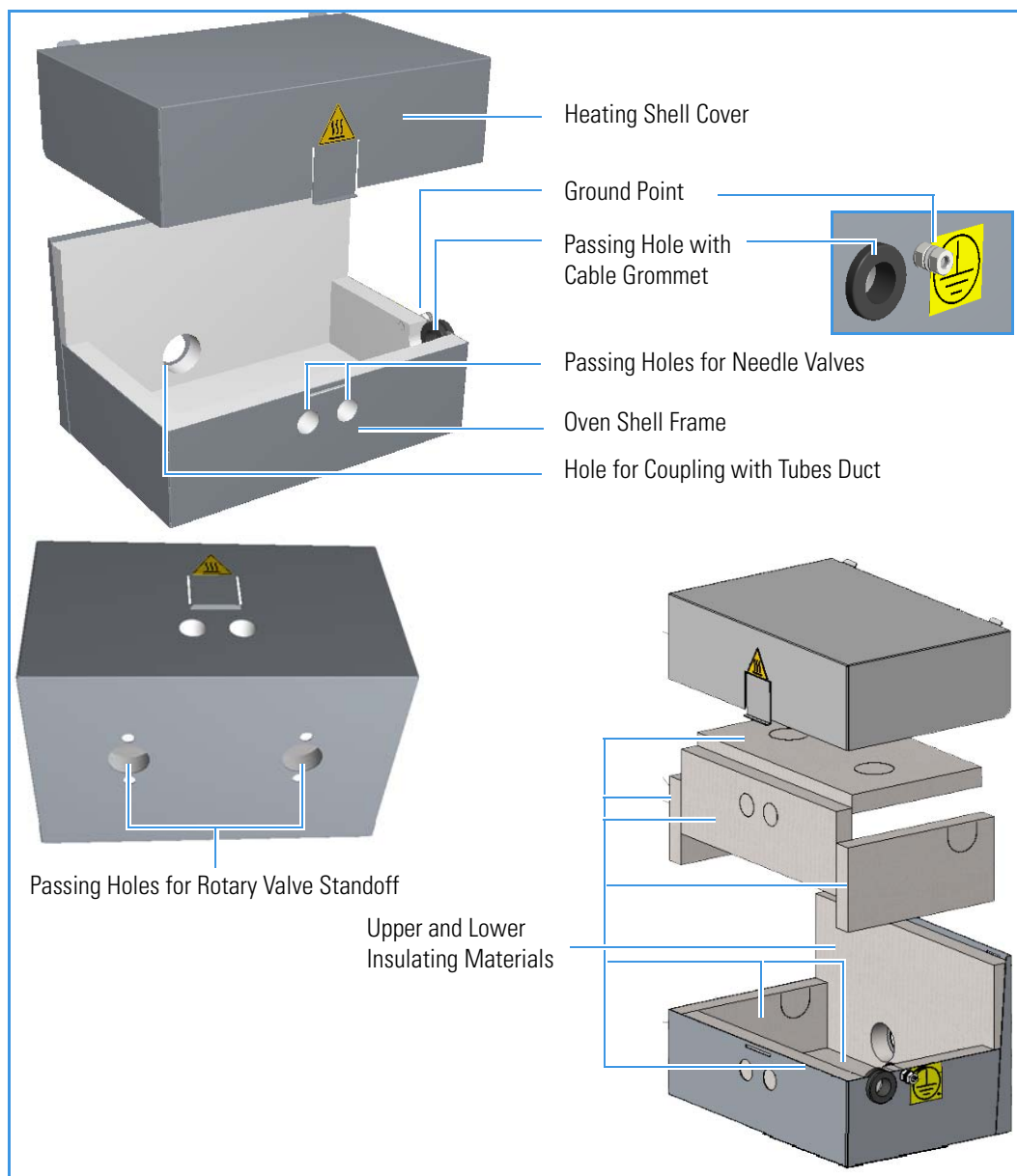
Heating shell cover — A cover lined with insulator material.

Oven shell frame — A housing for up two rotary valve standoffs lined with insulator material. This part includes:

- A passing hole on the back side for coupling the heater box assembly with the tubes duct.
- Two passing holes on the front side for the optional installation of up to two needle valves.
- A passing hole on the right side with a cable grommet for tubings and the of heating elements and temperature sensor.

- Two passing holes on the bottom for the insertion of the valve standoff.

Figure 13. Heater Box Assemble (2)



The heating of the upper section of the rotary valve is performed through a heater block.

- In the case of two rotary valves, two heater blocks are coupled through two coupling screws.
- In the case of a single heater block, both the heating elements must be installed in the same block.
- In the case of a double heater block, one heating elements must be installed in each block.

The temperature sensor (PT100 inserted only in a heater block) and the ground cable are common for both the blocks. See [Figure 14](#).

Figure 14. Heater Blocks Components (1)

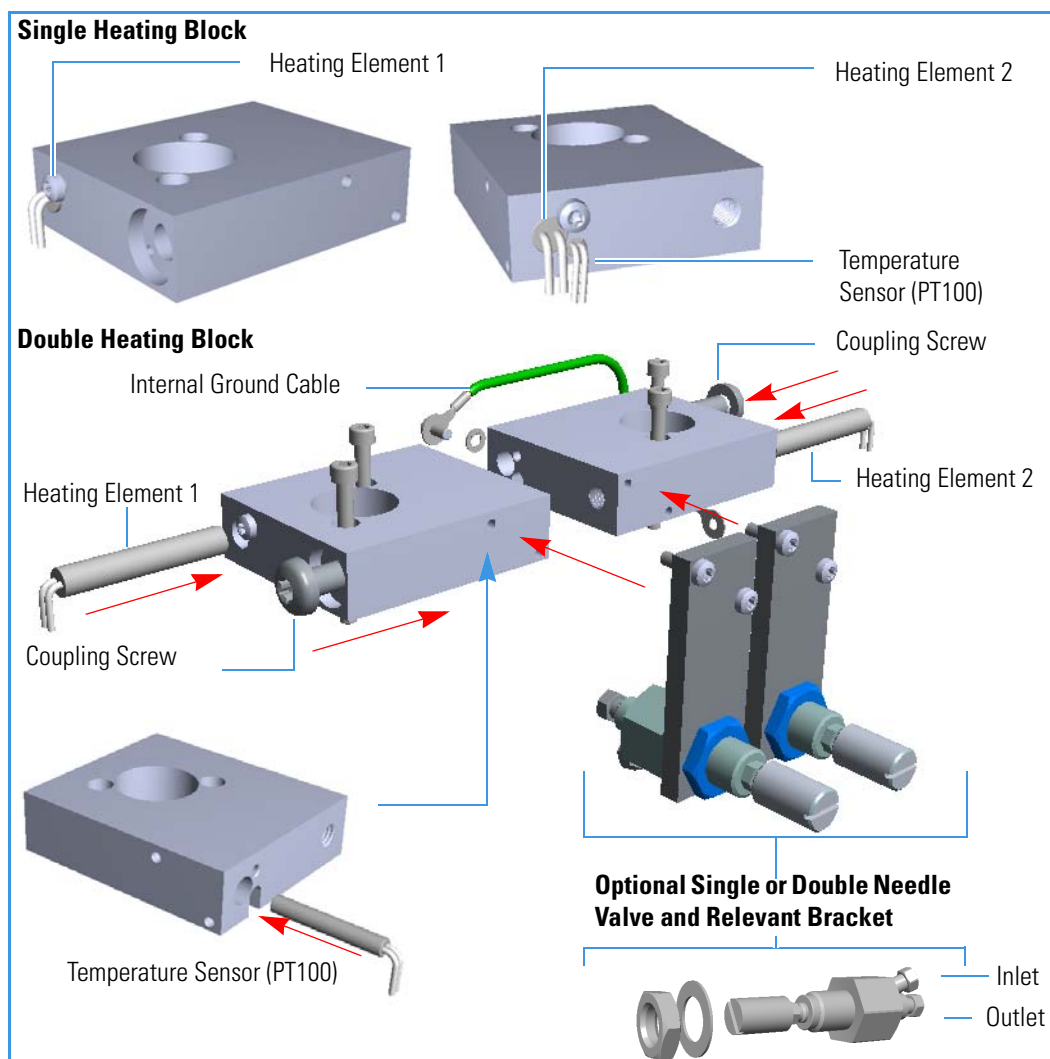


Figure 15 and Figure 16 shown an example of single and double heating blocks mounted on the top of a single and on two rotary valves. A single and a double needle valve are also visible as an option.

Figure 15. Single Heating Block on a Heated Rotary Valve - Front and Back View

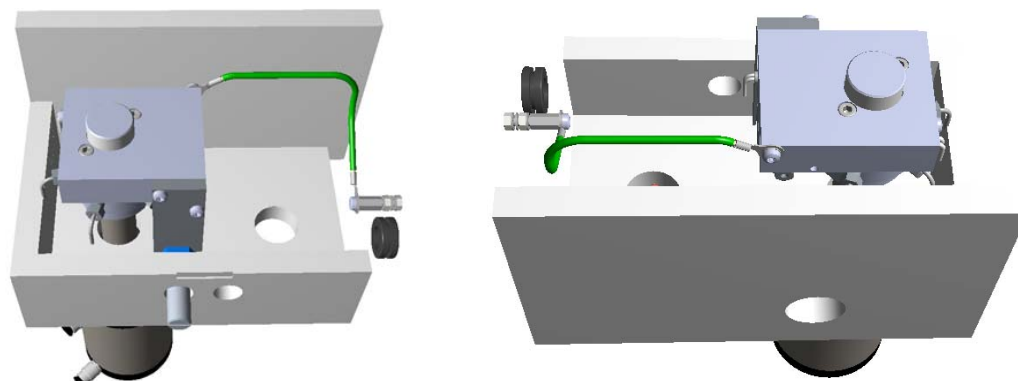
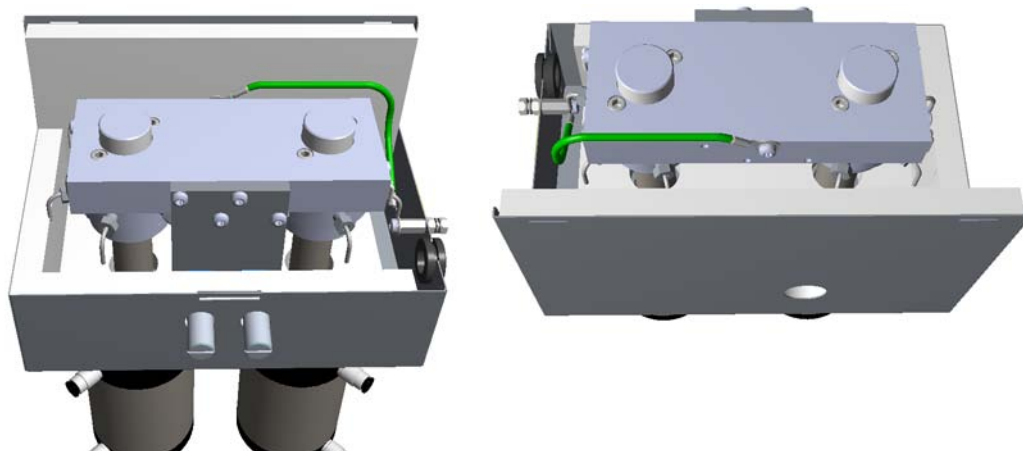


Figure 16. Double Heating Block on Two Heated Rotary Valves - Front and Back View



Note Figure 15 shows a single heated rotary valve mounted on the left side. This is only for graphic convenience.

Installing a Heated Rotary Valve Into the Basic Unit

❖ To install a heated rotary valve into the basic unit

The installation of the heated rotary valve consists of the following steps:

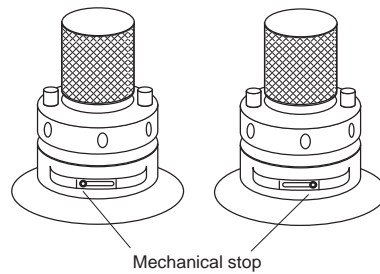
- Disassembling the rotary valve and actuator
- Installing the rotary valve actuator into the basic unit
- Installing the standoff of the rotary valve into the heater block
- Coupling standoff and actuator
- Installing and connecting the solenoid valve
- Connecting gas lines from the solenoid valve to the actuator
- Plumbing the system
- Installing and connecting the heater block

Proceed as follows:

1. Disassemble the rotary valve and actuator.
 - a. Inspect the valve and actuator making sure the valve is in the counter clock wise (CCW) position. The CCW position is when the mechanical stop is in the position noted in Figure 17.

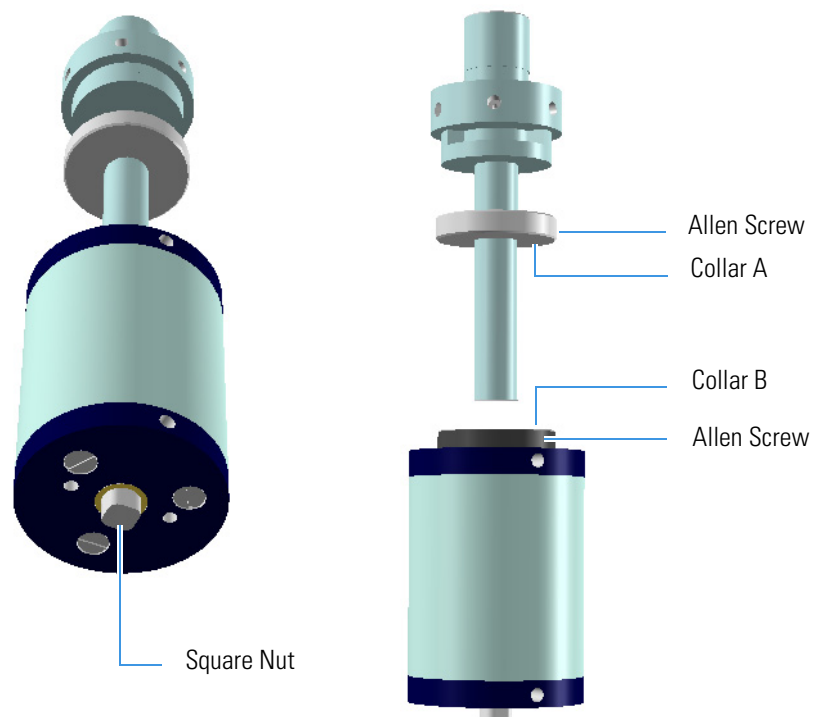
Figure 17. Mechanical Stop Positions for both CW and CCW

Clockwise (CW) Position Counterclockwise (CCW) Position



If the valve is not in the CCW position, locate the **square nut** on the opposite end of the actuator. See [Figure 18](#).

Figure 18. Valve Separation



- b. Using a 5/16-in. or 8-mm wrench, rotate the nut to the CCW position. Once the valve is in the CCW position, separate the actuator from the valve and standoff by loosening the Allen screw in **collar B**. See [Figure 18](#).



CAUTION Be careful to pull the actuator away from the valve standoff by gripping the standoff but without rotating the actuator or the valve.

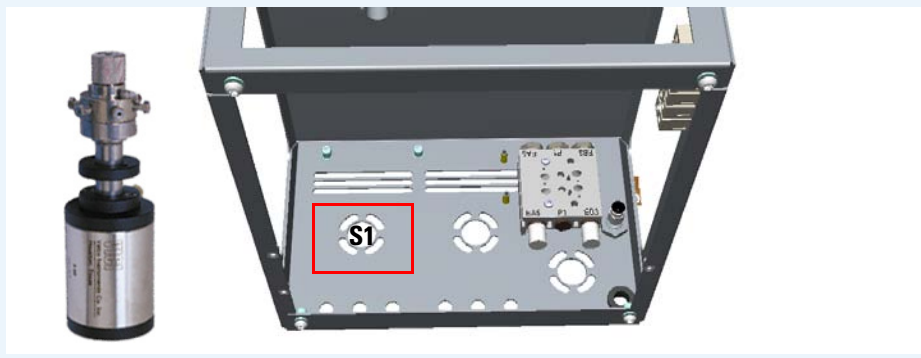
Note Handle the valve and standoff with care so the two pieces do not separate.

Compact Aux Oven Installation and Use

Installing a Heated Rotary Valve Into the Basic Unit

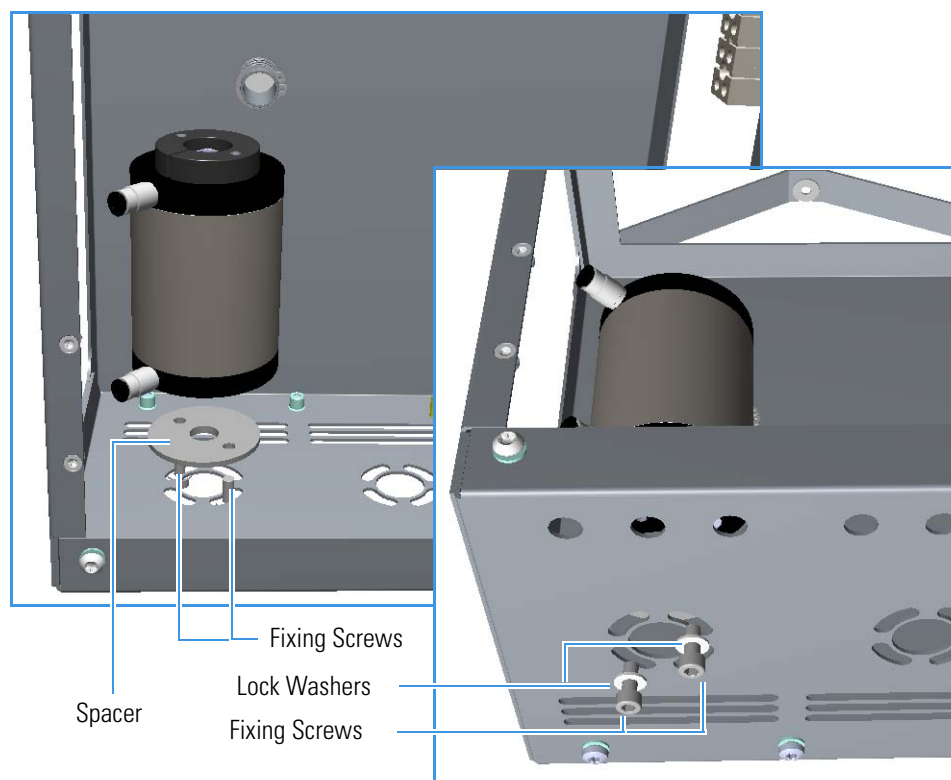
- c. Remove the **collar A** attached to the valve standoff by loosening the screw that secures the collar to the valve standoff.
2. Install the rotary valve actuator into the basic unit.
 - a. On the floor the basic unit locate the desired valve fixing seat where placing the actuator valve.

Note In the following example the valve position S1 on the left side is considered.



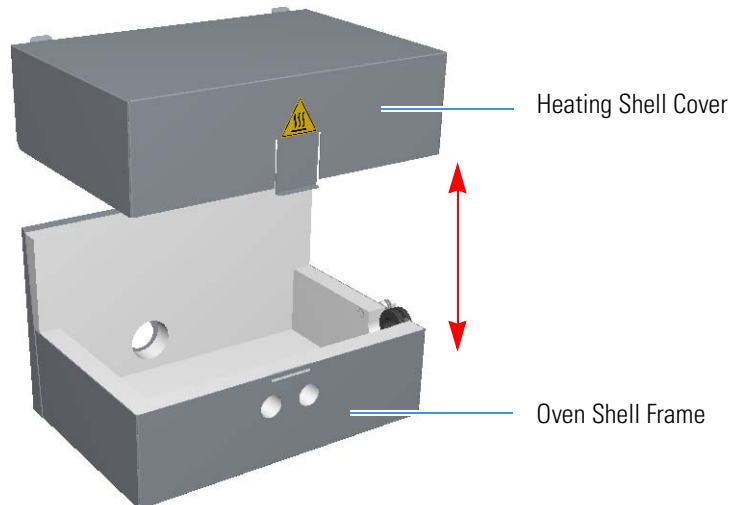
- b. Place the rotary valve actuator on the fixing seat on the floor of the basic unit interposing the spacer, then fix the actuator by using the two fixing screws and relevant lock washers. See [Figure 19](#).

Figure 19. Rotary Valve Actuator Installation



3. Install the valve standoff into the heater box.
 - a. Separate the heating shell cover from the oven shell frame of the heater box. See [Figure 20](#).

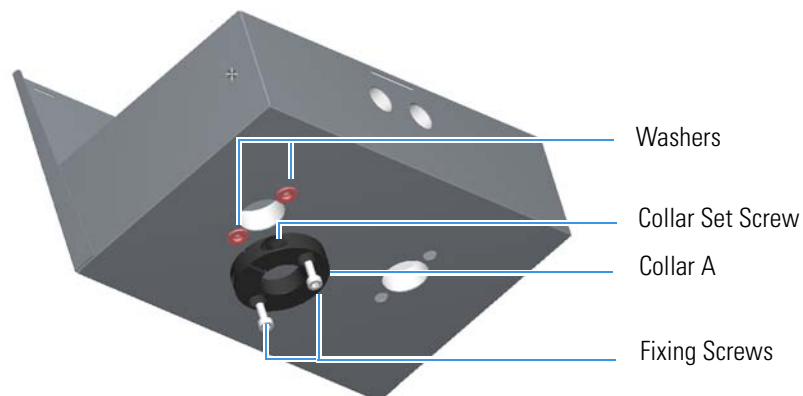
Figure 20. Heater Block



- b. Locate the valve position in the heater box according to the position of the valve actuator previously installed. See [Figure 19](#) on [page 18](#).
 - c. Place the **collar A** below the hole on the bottom of the heater box. See [Figure 21](#).

Note In the example of [Figure 21](#) the valve position is on the left side.

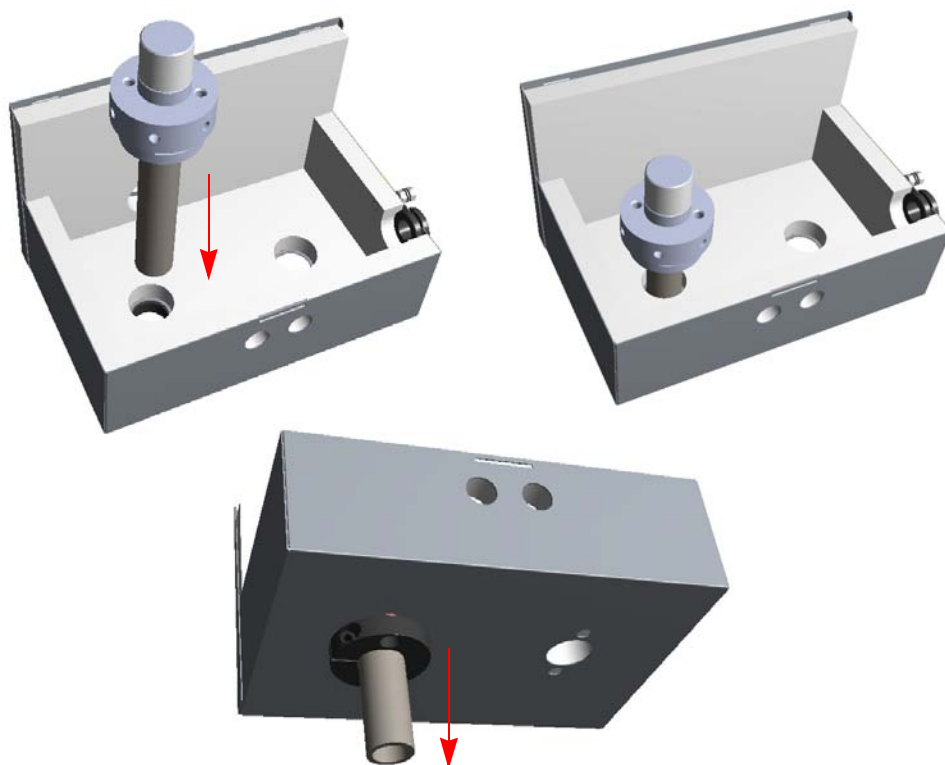
Figure 21. Place the Valve Standoff (1)



Secure the collar using two M4x10-mm screws interposing the proper washer. Be sure the 7/64-in. set screw in the collar is accessible from the outer edge of the basic unit.

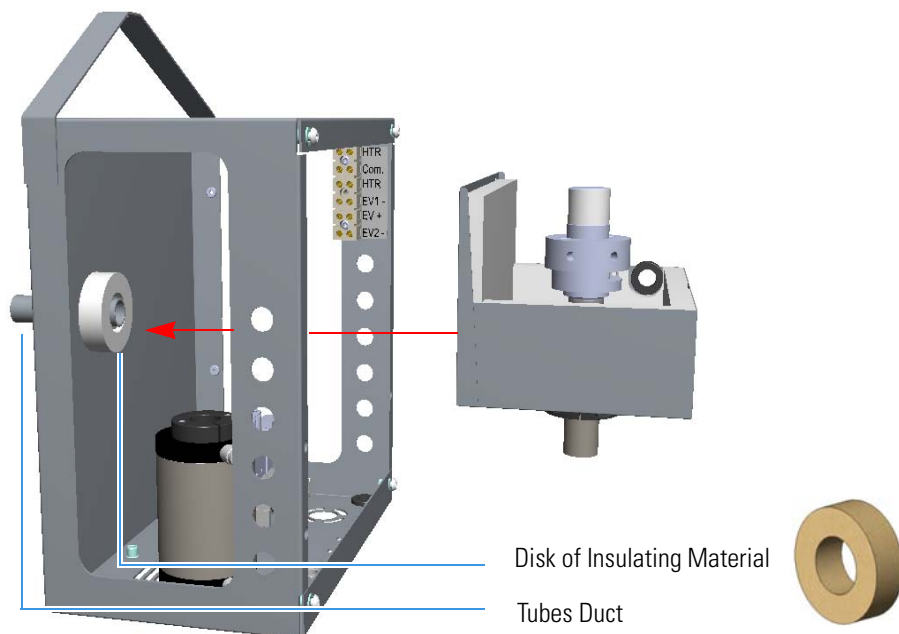
- d. Grip the valve standoff by the standoff only, and slide it through the passing hole on the bottom of the heater box, and through the collar allowing it to extend into out the heater box. See [Figure 22](#).

Figure 22. Place the Valve Standoff (2)



4. Couple the valve standoff and actuator.
 - a. Place the disk of insulating material on the internal portion of the tubes duct. See [Figure 23](#).

Figure 23. Couple Valve Standoff and Actuator (1)

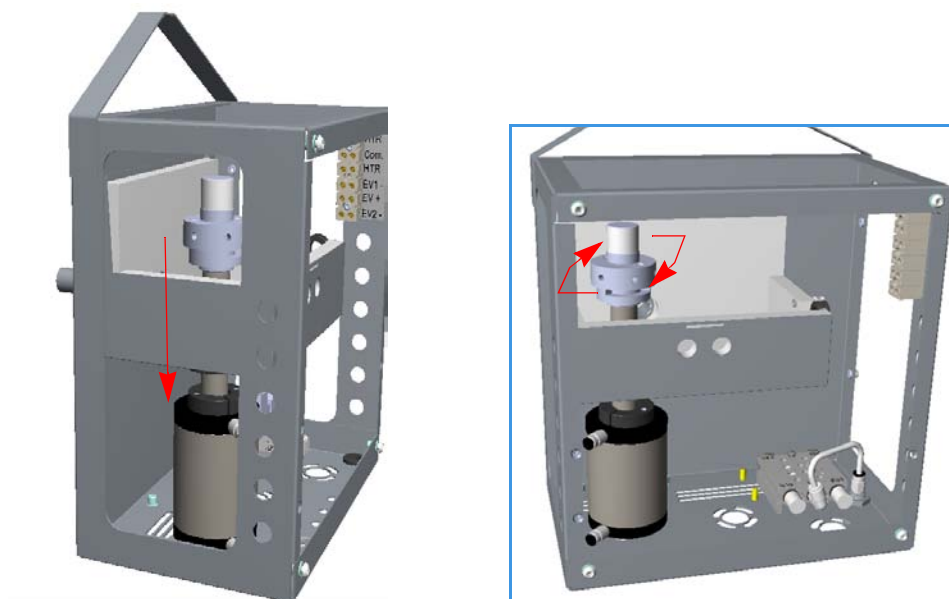


- b. Insert the heated block with the valve standoff into the basic unit paying attention to insert the internal portion of the tubes duct into the coupling hole of the heated block. See [Figure 23](#).

Note To make the operation easier, carefully slide the valve standoff up little if necessary.

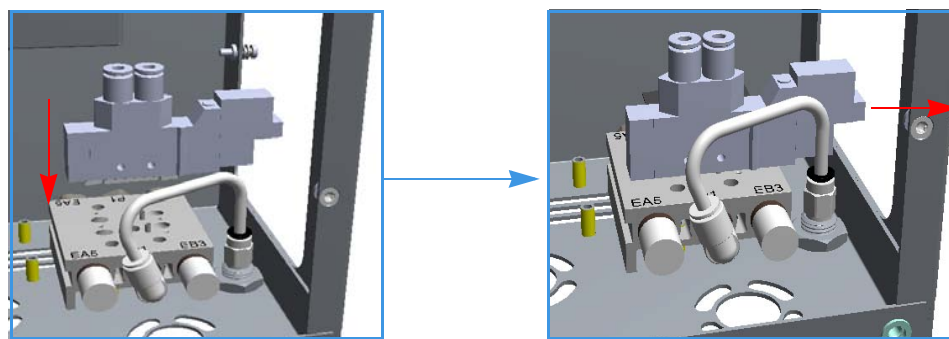
- c. Carefully slide down the standoff into the valve actuator. For a correct coupling turn the standoff a little to the left and/to the right if necessary. See [Figure 24](#).

Figure 24. Couple Valve Standoff and Actuator (2)



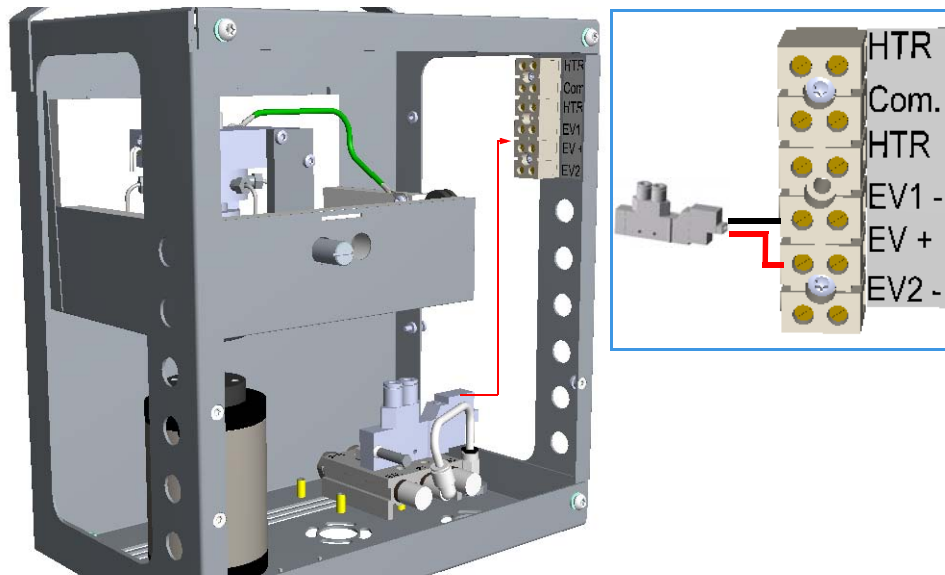
- d. Once the two square fittings on the valve standoff and valve actuator are coupled, tighten the **collar A** on the valve standoff to hold the valve and actuator in place.
5. Install the solenoid valve on the solenoid valve manifold.
 - a. Remove the rectangular-shaped cap from the manifold using the Phillips screwdriver. Secure the solenoid valve to the under plate using the two screws supplied with the solenoid valve. See [Figure 25](#).

Figure 25. Solenoid Valve Installation and Connection



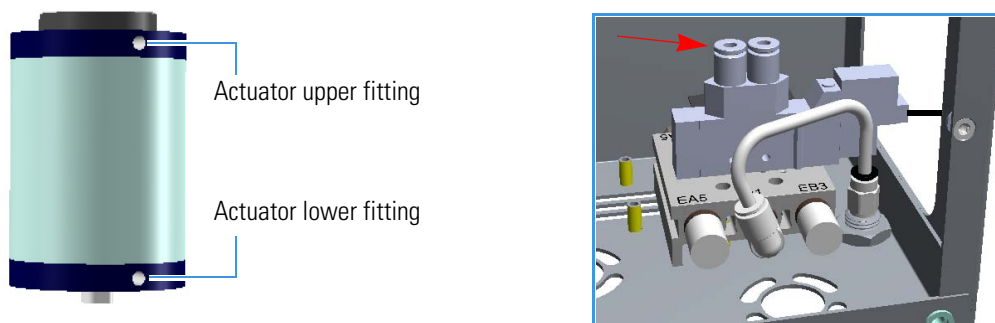
- b. Connect the cables from the solenoid valve to the pins marked EV1- and EV+ on the terminal block. See [Figure 6](#).

Figure 26. Solenoid Valve Connection



6. Connect gas lines from the solenoid valve manifold to the actuator.

Figure 27. Actuator and Solenoid Valves Manifold Edges



With reference to [Figure 27](#) proceed as follows:

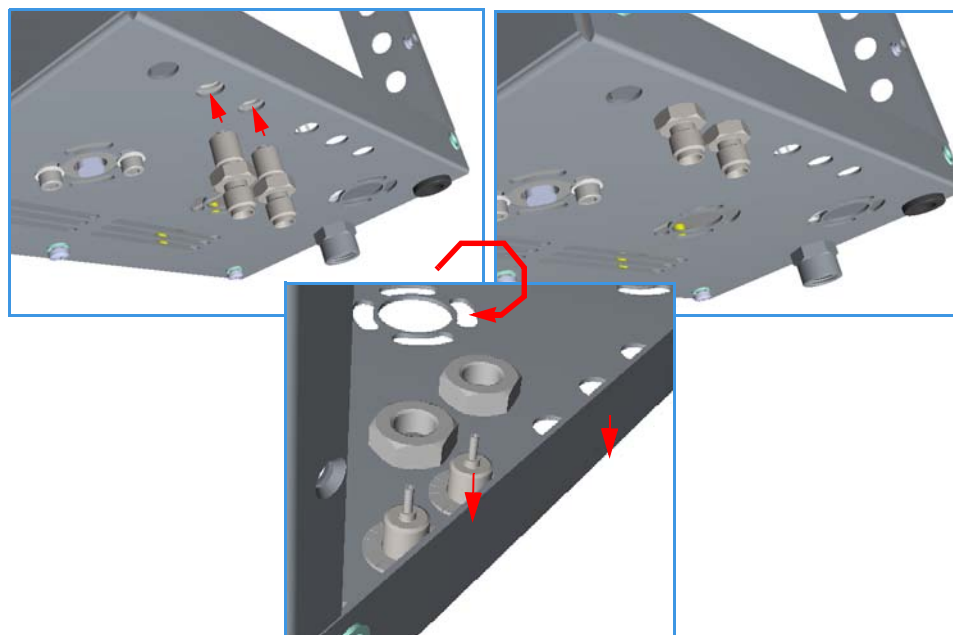
- a. Locate the nylon tubing supplied in the kit and cut it into two equal 12-in. pieces.
- b. Push one of the tube pieces into the lower fitting on the actuator assembly, making sure it passes through the ferrule in the actuator fitting. Tighten the nut and ferrule using a 3/8-in. open-ended wrench. Use a backup 3/8-in. open-ended wrench on the mating piece that is screwed into the actuator.
- c. Place the other end of the tubing into the solenoid valve fitting located on the outside edge of the solenoid manifold by pushing the tubing firmly into the fitting. It should automatically seal in place.
- d. Take the other piece of nylon tubing and place it in the upper fitting on the actuator. Be sure the tube passes through the ferrule in the fitting. Tighten the fitting using the 3/8-inch open-ended backup wrench.

- e. Connect the opposite end to the solenoid valve fitting.

Note The tubing can be released from the solenoid valve by pushing down on the solenoid valve fitting and pulling out on the tubing at the same time.

7. Connect the proper outlet port of the actuator gas (air) to the inlet port of the actuator gas of the valve.
8. Plumb the system.
 - a. Carry out the valve and system plumbing (sample inlet fittings, needle valves, and so on) according to the appropriate plumbing diagram for your system setup. Pay attention to guide through the tubing duct the tubings that must be connected into the GC oven, and to guide tubings and cables through the passing hole with cable grommet. [Figure 28](#) shows an example of sample inlet fittings mounted on the floor of the basic unit.

Figure 28. Example of Sample Inlet Fittings



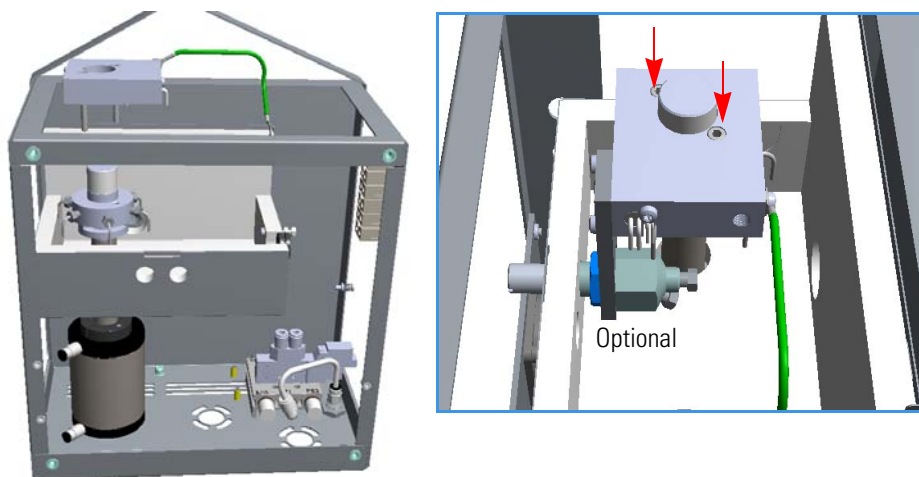
9. Install and connect the heater block.
 - a. Remove the two screws on the top of the rotary valve.



CAUTION Before starting, make sure that the heater block has been previously assembled with the heating elements, the temperature sensor PT100, and the internal ground view. If you also need to place a needle valve into the heater box, fix it on the proper plate, then fix the plate on the heater block using the two fixing screws provided. See [Figure 14](#) on [page 15](#) for details.

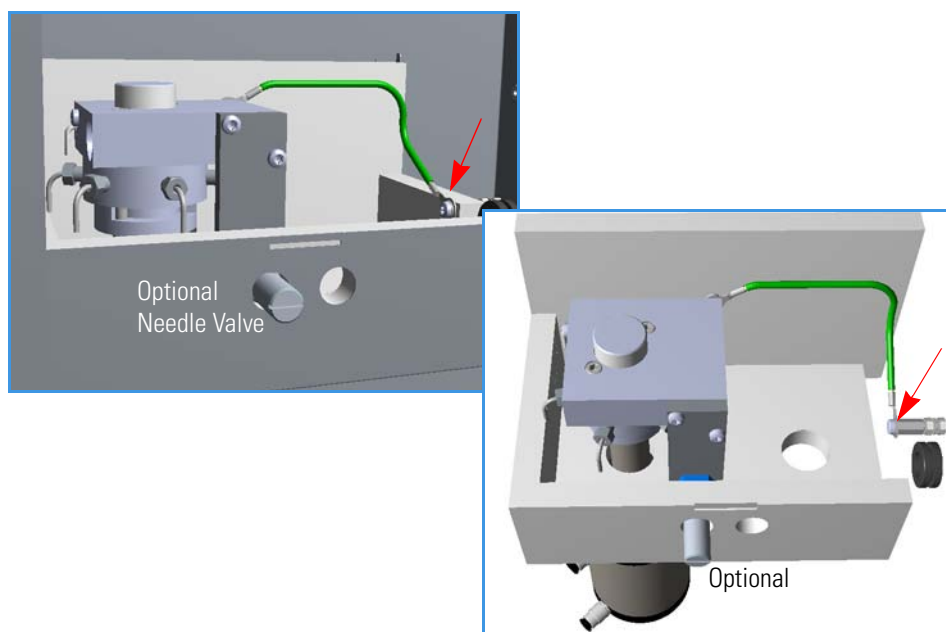
- b. Place the heater block on the top of the rotary valve and fix it by using the longer screws provided. See [Figure 29](#). The presence of the needle valve is optional.

Figure 29. Heater Block Installation



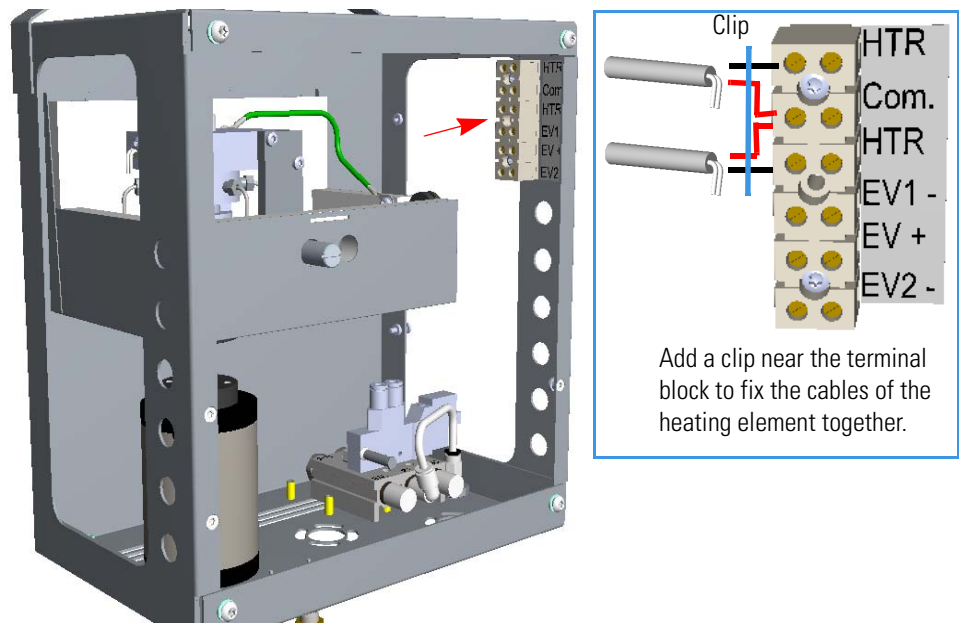
- c. Connect the internal ground cable to the ground point on the heater block. See [Figure 30](#). The presence of the needle valve is optional.

Figure 30. Internal Ground Cable Connection



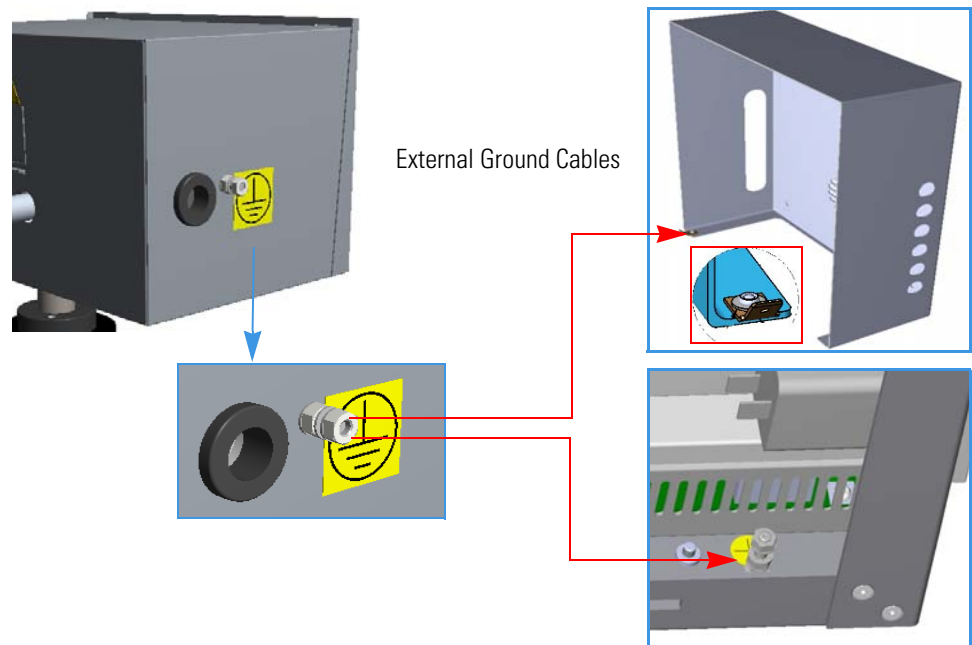
- d. Guide the cables of the heating element and temperature sensor through the passing holes with the cable grommet up to reach the terminal block.
- e. Connect the cables of the first heating element to the upper pin marked **HTR** and the pin **COM** of the terminal block. See [Figure 31](#).
- f. Connect the cables of the second heating element to the lower pin marked **HTR** and the pin **COM** of the terminal block. See [Figure 31](#).

Figure 31. Heating Element Connection



Note The cables of the temperature sensor will be connected afterward.

10. Connect the external ground cables.
 - a. Connect the ground cable provided between the ground point on the heater block and the ground point on the cover of the Compact Aux Oven.
 - b. Connect the ground cable provided between the ground point on the heater block and the ground point on the TRACE 1300/1310.



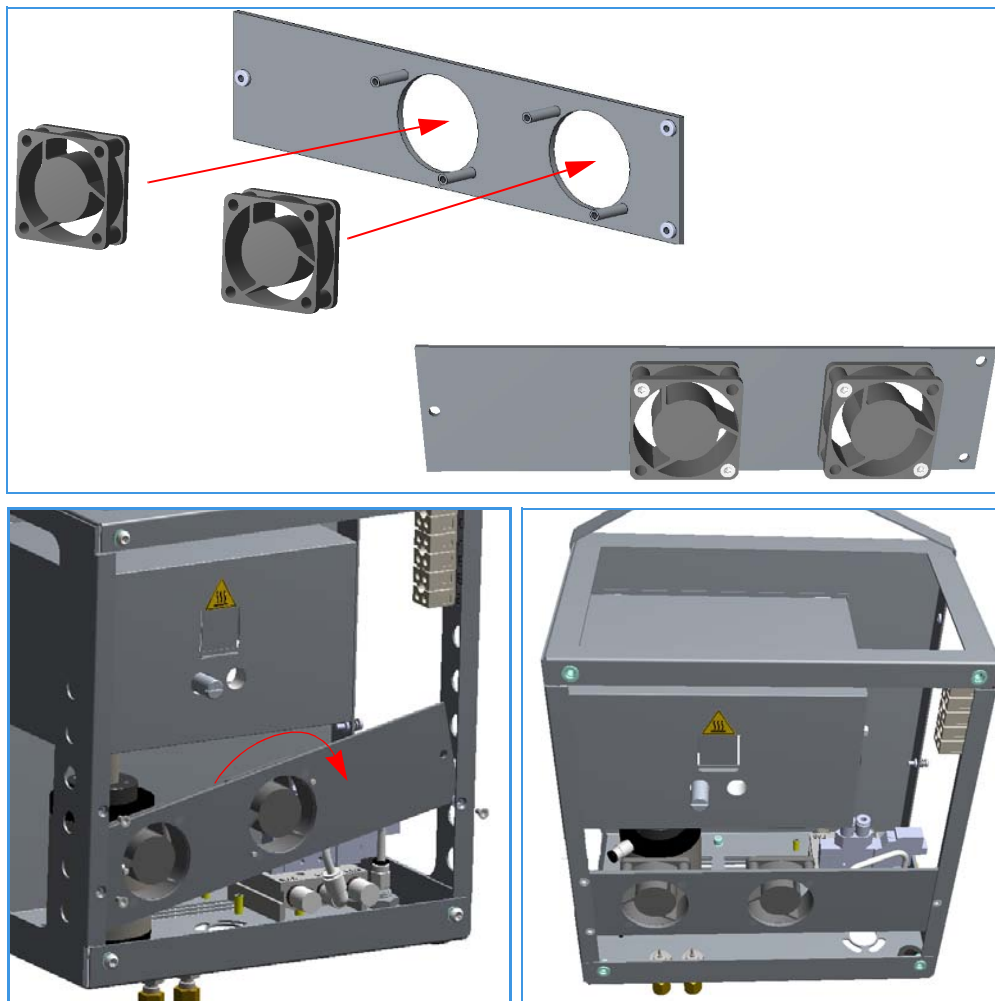
11. Place the heating shell cover of the heater block.



IMPORTANT When the Compact Aux Oven is used at high temperature, between 150 °C and 180 °C, we recommend the installation of the optional cooling fans to preserve maximum actuators lifetime.

12. Install and fix the optional cooling fans if required. See the example in [Figure 32](#) where the plate with two cooling fans is installed.

Figure 32. Optional Fans

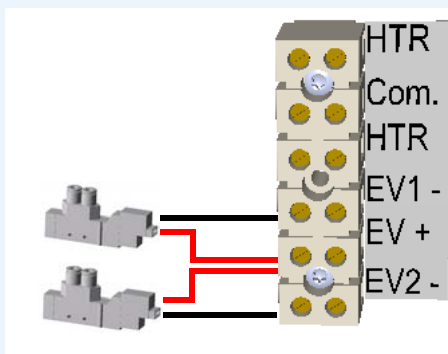


Note The cables of the fans will be connected afterward.

Installing Two Heated Rotary Valves Into the Basic Unit

IMPORTANT For installing two heated rotary valves into the Compact Aux Oven follow the same procedure used for installing a single heated rotary valve. See “Installing a Heated Rotary Valve Into the Basic Unit” on page 16. Apply the following changes:

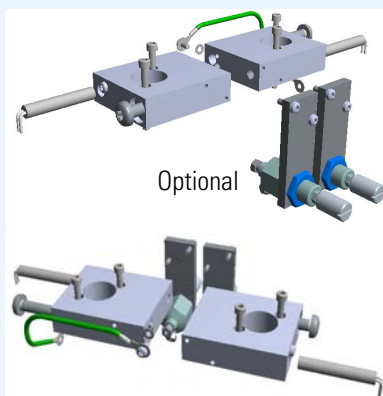
- Use and connect two solenoid valves. Connect the cables of the solenoid valves to the terminal block as follows.



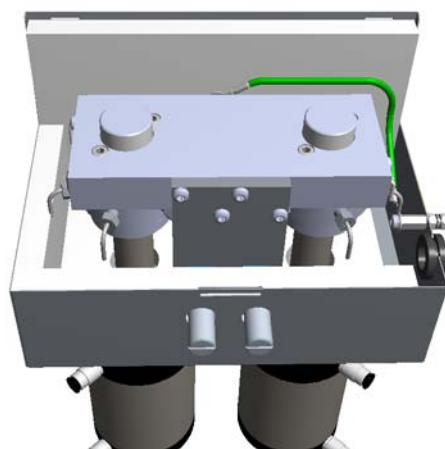
Connect the cables of the first solenoid valve to the pins marked **EV1-** and **EV+**.

Connect the cables of the second solenoid valves to the pins marked **EV2 -** and **EV+**.

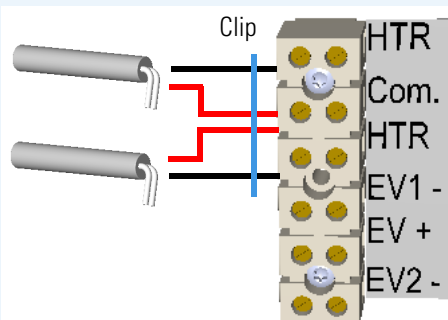
- Use the double heater block as described in the scheme of Figure 14 on page 15.



The needle valves shown in figure are optional.



- The cables of the heating elements 1 and 2 are already connected to the terminal block as shown in Figure 31 on page 25.



The cables of the first heating element are connected to the upper pin marked **HTR** and to the pin **COM**.

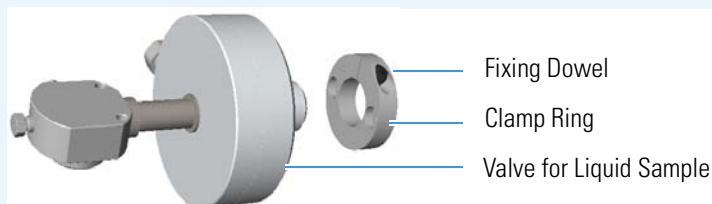
The cables of the second heating element are connected to the lower pin marked **HTR** and to the pin **COM**.

A clip is added near the terminal block to fix the heating element cables together.

Installing an Unheated Valve for Liquid Samples into the Basic Unit

❖ To install a valve for liquid samples into the basic unit

Note The installation of the On/Off valve for liquid samples requires the use of the fixing clamp ring and the proper rotary valve for the actuation.

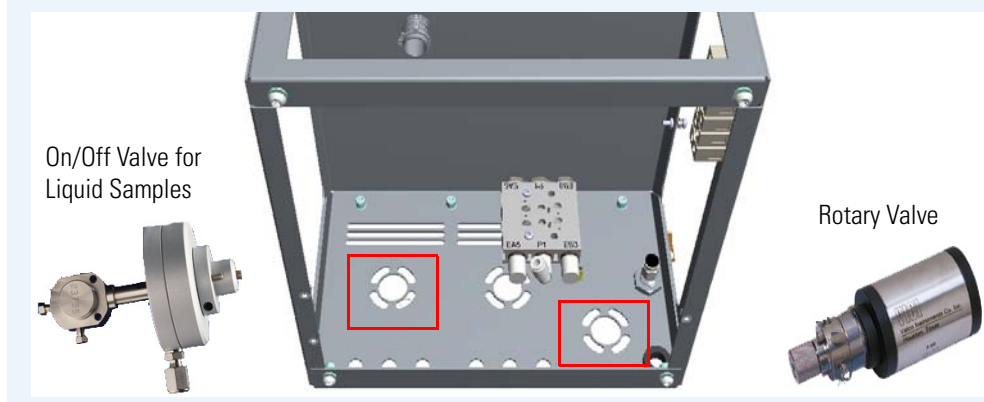


Make sure that the solenoid valve manifold is installed on the position 2. See the section “Assembling the Basic Components” on page 9.

The installation of the valve for liquid samples consists of the following steps:

- Installing the rotary valve
- Installing the On/Off valve for liquid samples
- Installing and connecting the solenoid valves
- Connecting gas lines from the solenoid valve manifold to the actuator of the rotary valve
- Connecting gas lines from the solenoid manifold to the valve for liquid sample.
- Plumbing the system

Note The On/Off valve must be installed on the left side while the rotary valve on the right side.

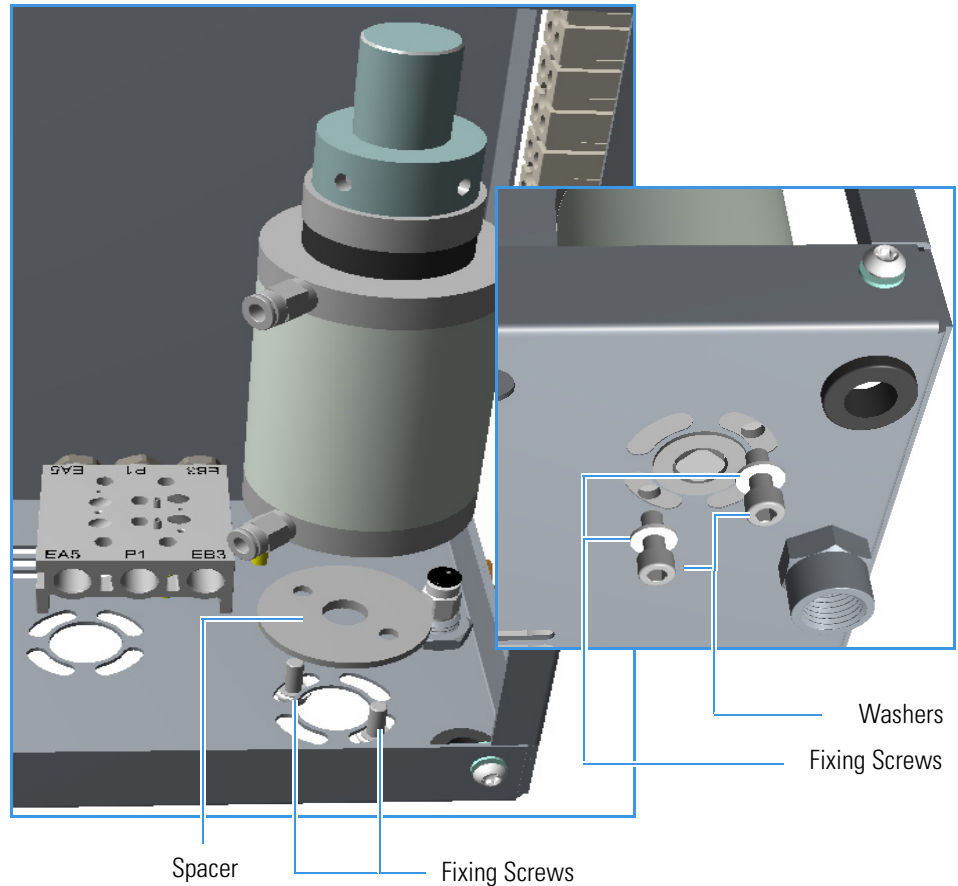


Proceed as follows:

1. Install the rotary valve into the basic unit.
 - a. On the floor of the basic unit locate the valve fixing seat where the actuator valve will be placed.

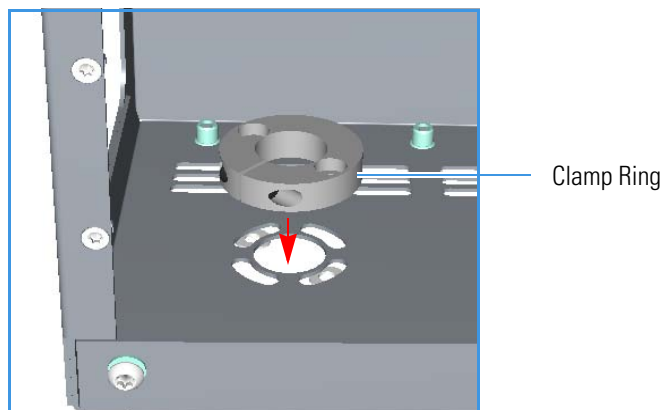
- b. Place the rotary valve on the fixing seat on the floor of the basic unit interposing the spacer, then fix the valve by using the two fixing screws and washers. See [Figure 33](#).

Figure 33. Rotary Valve Installation



2. Install the On/Off valve for liquid samples.
 - a. Place the **clamp ring** over the hole on the floor of the basic unit, then secure the clamp ring using the two screws and nuts provided. See [Figure 34](#).

Figure 34. Valve for Liquid Sample Installation (1)

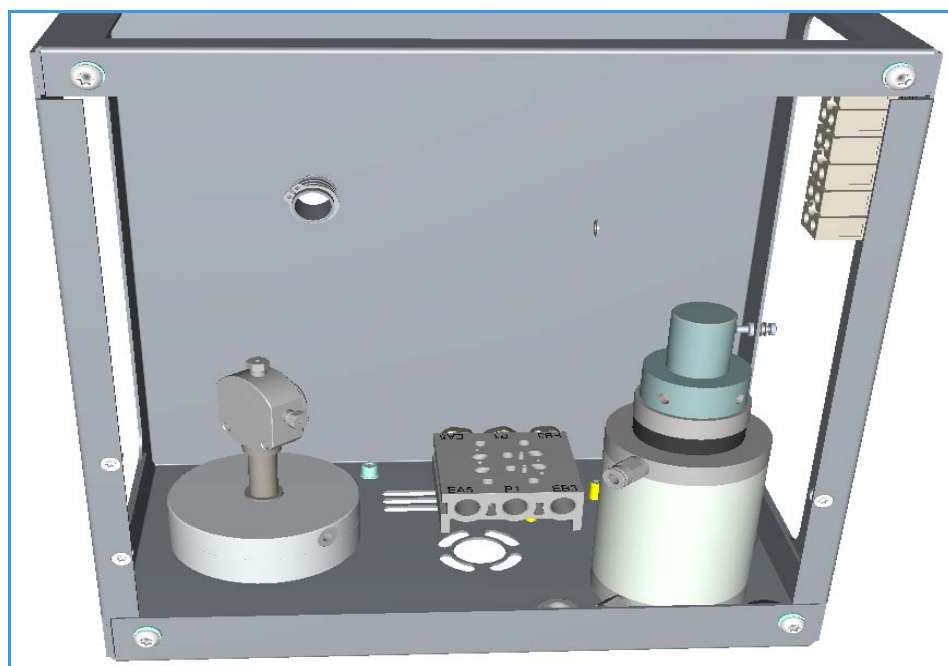
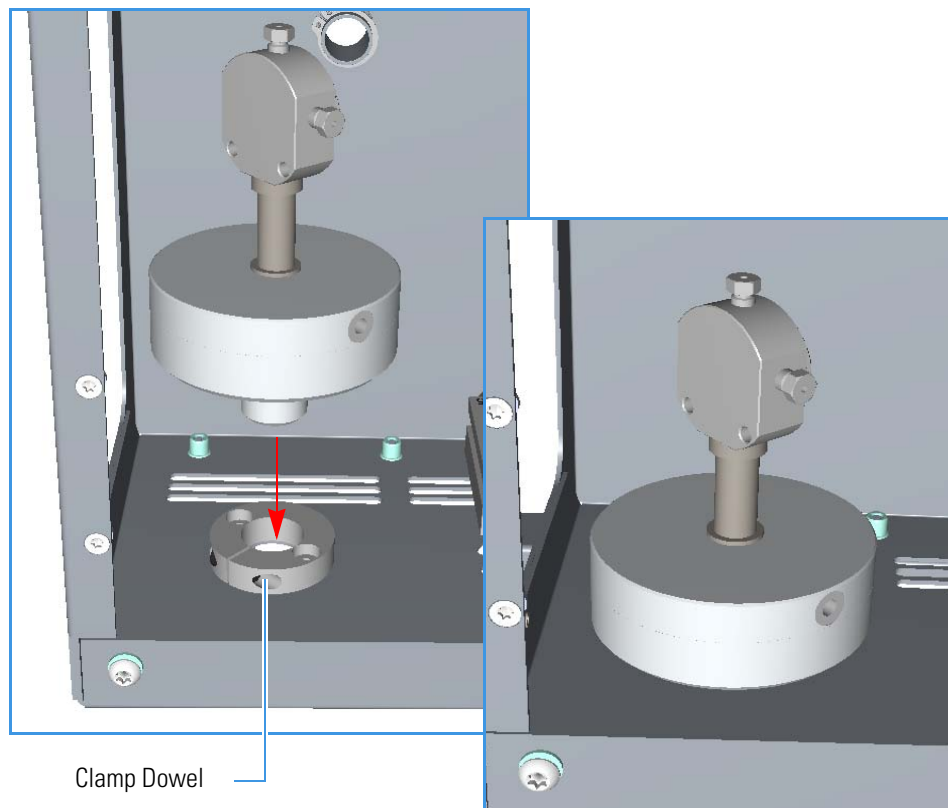


Compact Aux Oven Installation and Use

Installing an Unheated Valve for Liquid Samples into the Basic Unit

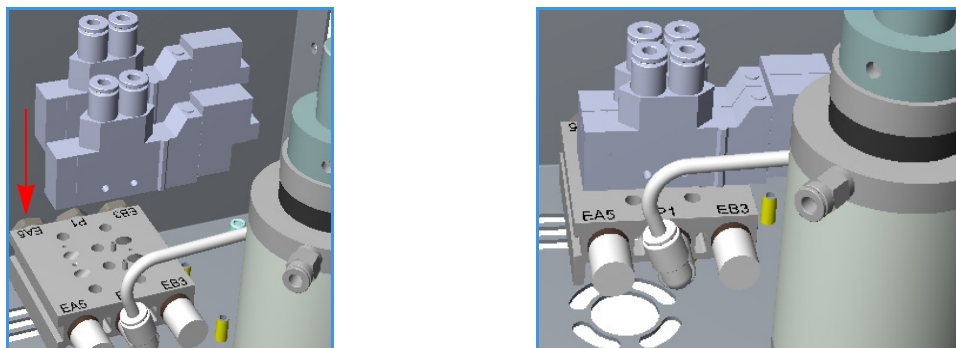
- b. Loosen the dowel on the clamp ring then insert the On/Off valve into the clamp ring. Secure the valve by tightening the dowel. See [Figure 35](#).

Figure 35. Valve for Liquid Sample Installation (2)



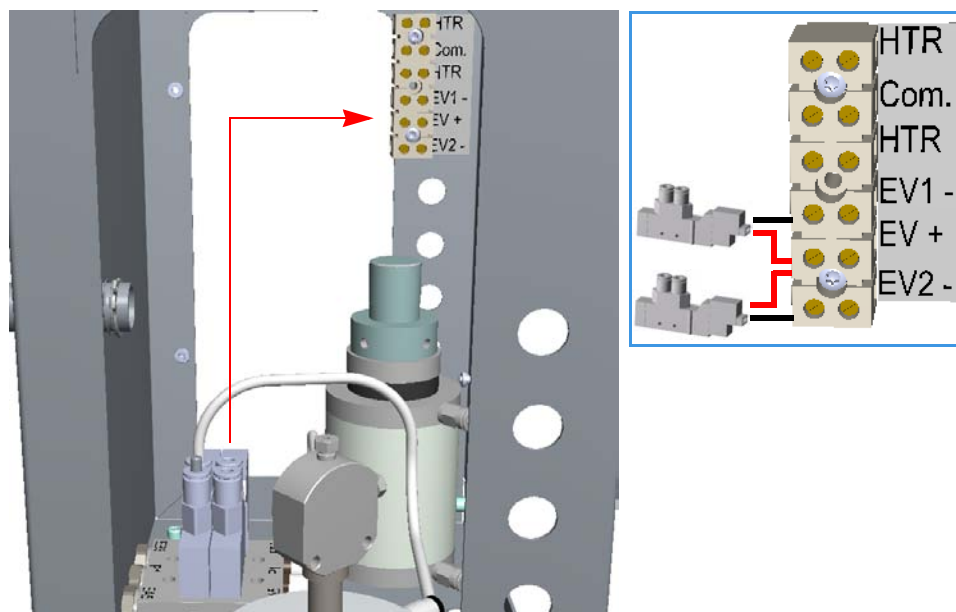
3. Install the solenoid valves on the solenoid valve manifold.
 - a. Remove the rectangular-shaped cap from the manifold using the Phillips screwdriver. Secure the solenoid valves to the under plate using the two screws supplied with the valve. See [Figure 25](#).

Figure 36. Solenoid Valves Installation and Connection



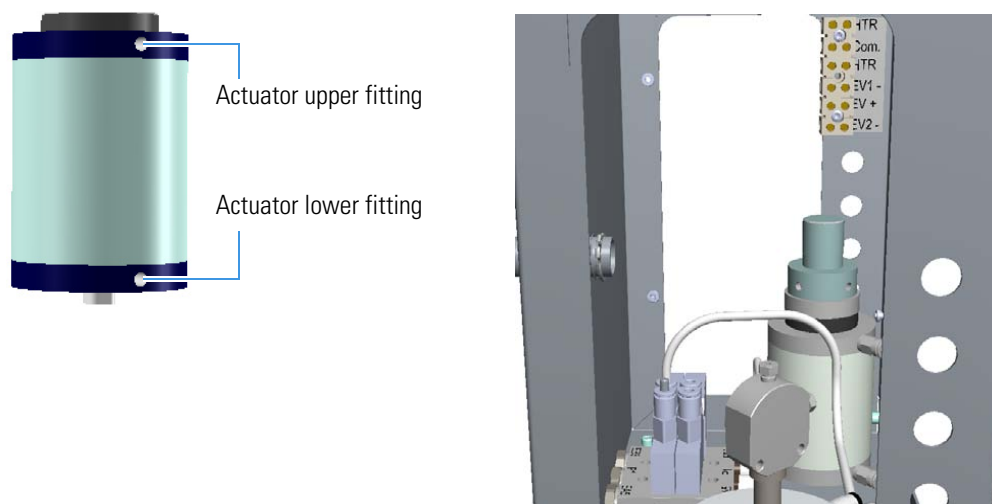
- b. Connect the first solenoid valve cables to the pins marked EV1- and EV+ of the terminal block. See [Figure 37](#).
 - c. Connect the second solenoid valve cable to the pins marked EV2- and EV+ of the terminal block. See [Figure 37](#).

Figure 37. Solenoid Valve Connection



4. Connect the gas lines from the solenoid valve manifold to the rotary valve.

Figure 38. Actuator and Solenoid Valves Manifold Edges



With reference to [Figure 38](#) proceed as follows:

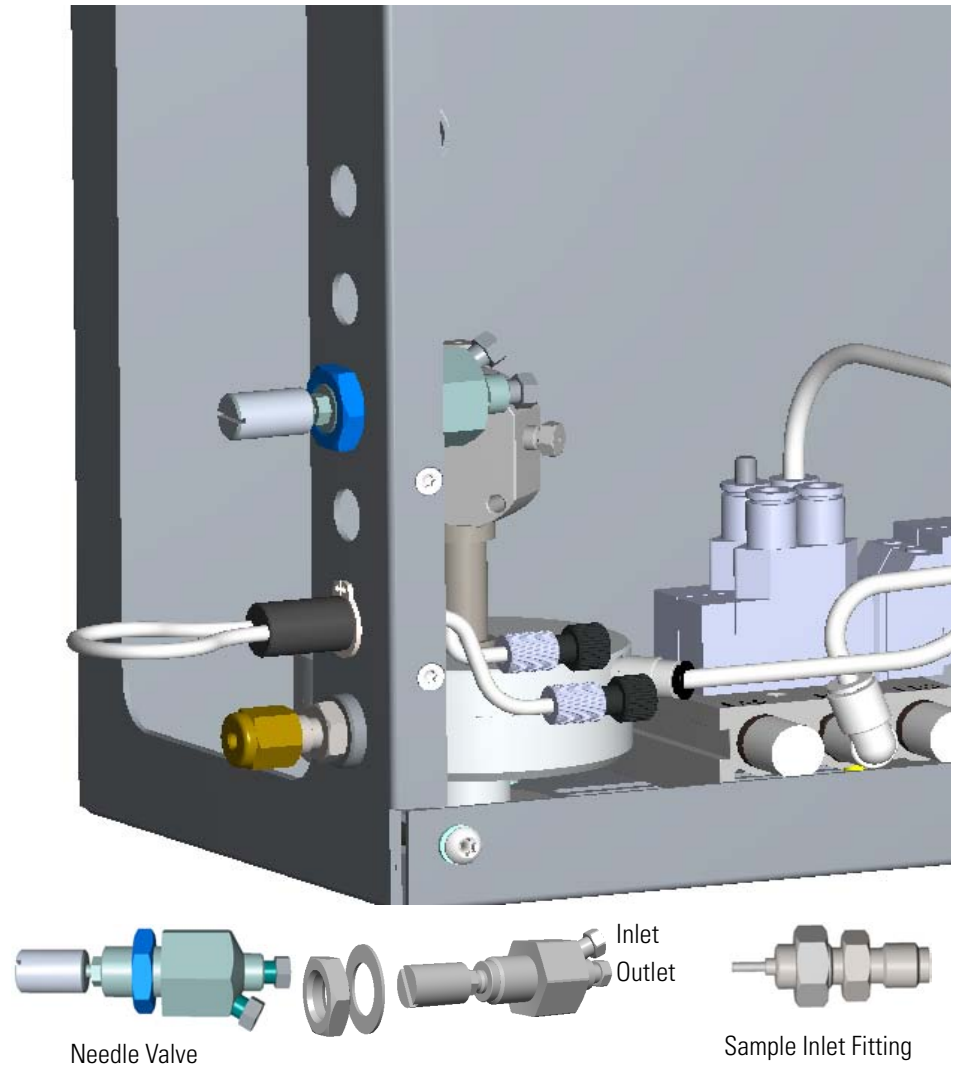
- a. Locate the nylon tubing supplied in the kit and cut it into two equal 12-in. pieces.
- b. Push one of the tube pieces into the lower fitting on the actuator assembly, making sure it passes through the ferrule in the actuator fitting. Tighten the nut and ferrule using a 3/8-in. open-ended wrench. Use a backup 3/8-in. open-ended wrench on the mating piece that is screwed into the actuator.
- c. Place the other end of the tubing into the solenoid valve fitting located on the outside edge of the solenoid valve manifold by pushing the tubing firmly into the fitting. It should automatically seal in place.
- d. Take the other piece of nylon tubing and place it in the upper fitting on the actuator. Be sure the tube passes through the ferrule in the fitting. Tighten the fitting using the 3/8-inch open-ended backup wrench.
- e. Connect the opposite end to the solenoid valve fitting.

Note The tubing can be released from the solenoid by pushing down on the solenoid fitting and pulling out on the tubing at the same time.

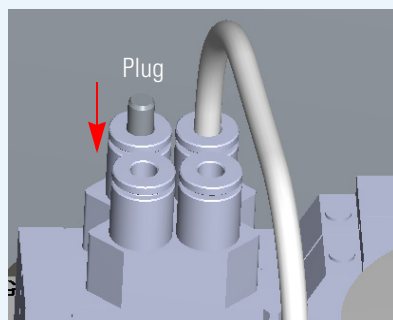
5. Connect the gas lines from the solenoid valve manifold to the valve for liquid sample.
 - a. Connect the gas lines from the solenoid valve manifold to the valve for liquid sample by using a piece of 1/8-in. tubing.
 - b. Connect the proper outlet port of the actuator gas (air) to the inlet port of the actuator gas of the valve.
6. Plumb the system.
 - a. Carry out the valve and system plumbing (sample inlet fittings, needle valves, and so on) according to the appropriate plumbing diagram for your system setup paying attention to guide the tubings that must be connected into the GC oven through the tubing duct, and to guide tubings.

Figure 39 shows an example of sample inlet fittings and a needle valve mounted on the basic unit.

Figure 39. Example of Sample Inlet Fittings and Needle Valve



IMPORTANT For the correct functioning of the valve for liquid samples, the relevant solenoid valve must be plugged.



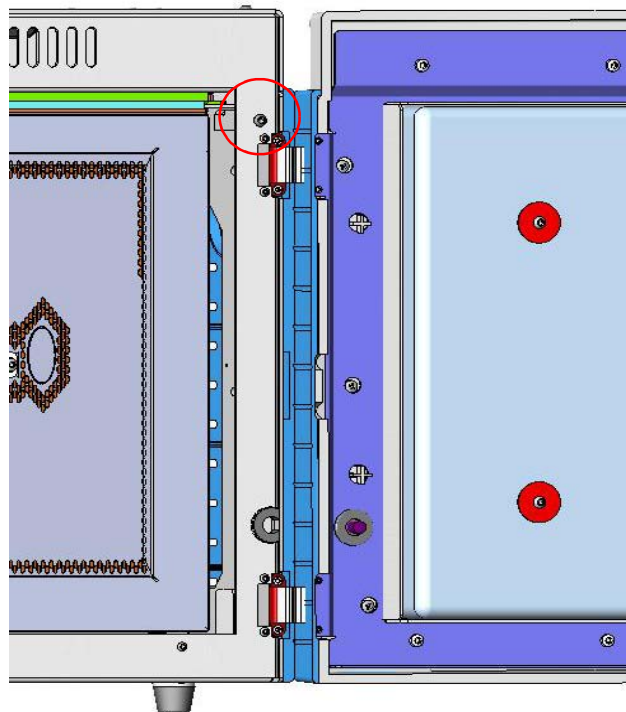
Coupling the Compact Aux Oven to the GC

This section provides the instructions for coupling the Compact Aux Oven to the TRACE 1300/1310 GC.

❖ To couple the Compact aux oven to the GC

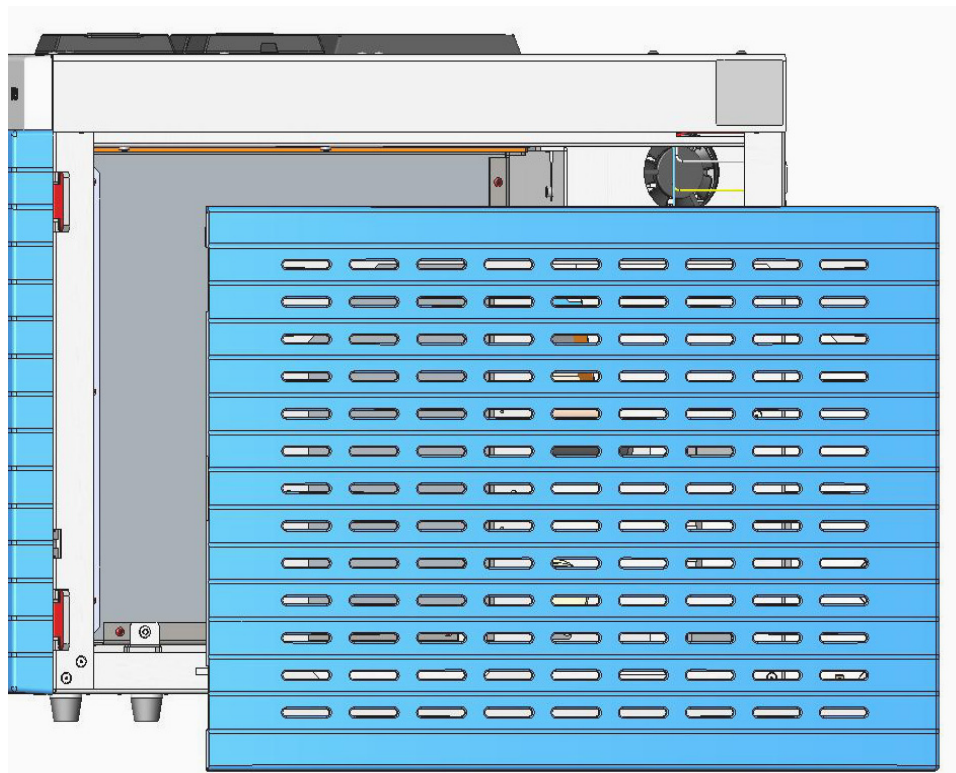
1. Remove the right side panel.
 - a. Open the front door of the GC.
 - b. Using a T20 Torxhead screwdriver, unscrew the right side panel screw from the interior front panel. See [Figure 40](#). Save the screw because it will be reused later.

Figure 40. Right Side Panel Fixing Screw



- c. Slide the panel towards the back of the instrument up to the stop.
 - d. Remove the panel by pulling it outward, being aware that the ground cable is attached to the panel. See [Figure 41](#).
 - e. Unplug the ground cable from the panel.

Figure 41. Right Side Panel Removal

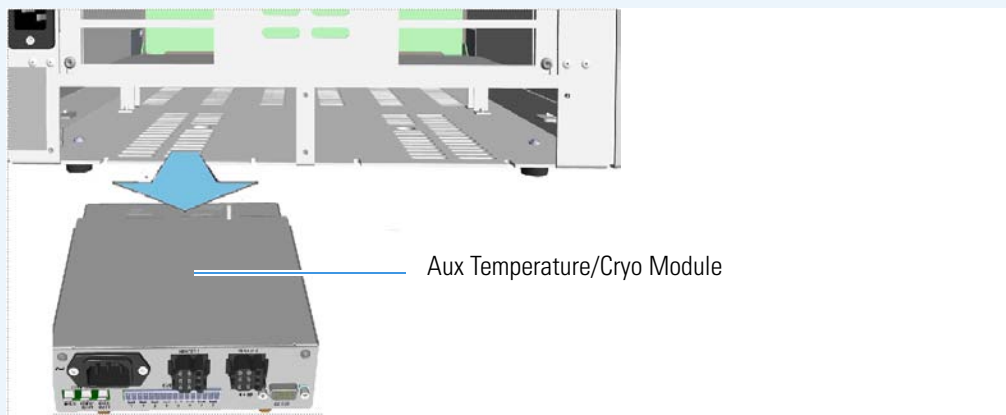


2. Set the dip switch SW1 on the board of the Aux Temperature/Cryo module.



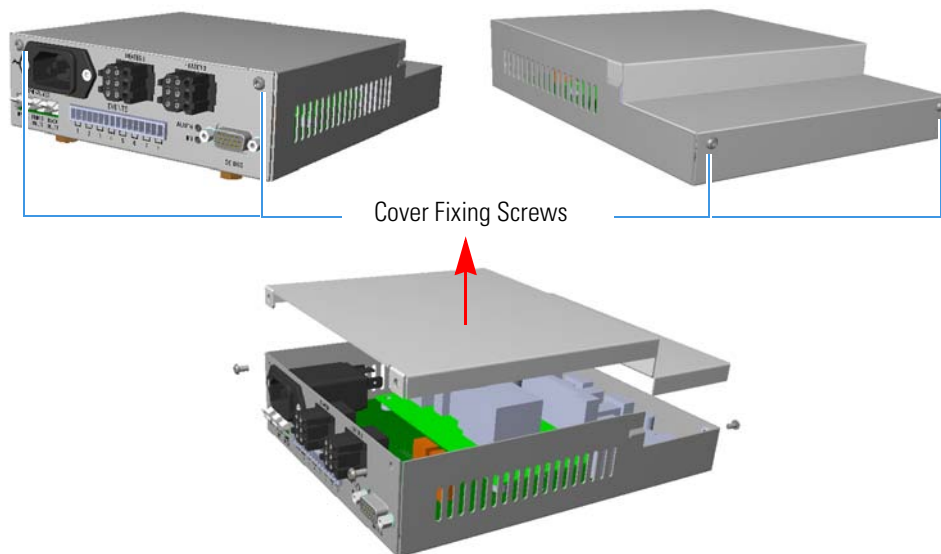
CAUTION This operation requires access into the Aux Temperature/Cryo module.

WARNING If the Aux Temperature/Cryo module is already present into the GC, it must be removed from the housing on the back of the GC. Before operation make sure that the power cord is disconnected.



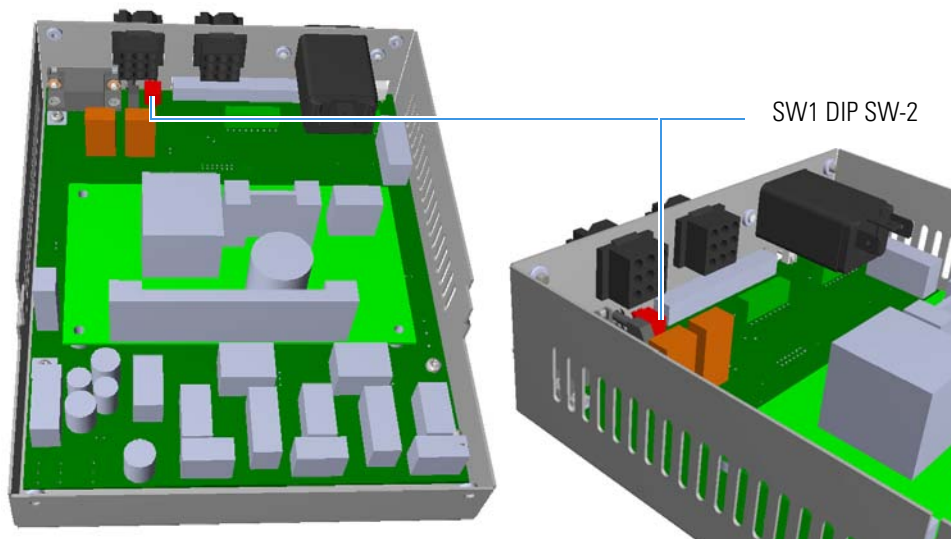
- a. Remove the cover of the Aux Temperature/Cryo module using the two fixing screws on the front and on the back, then slip off the cover.
See [Figure 42](#).

Figure 42. Dip Switch SW1 Setting (1)



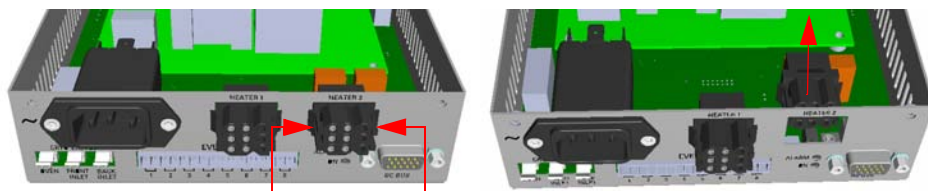
- b. Look for the dip switch marked SW1 on the board of the module. It is located in correspondence of the 6-pin connector marked **Heater 2** on the front of the module.
See [Figure 43](#).

Figure 43. Dip Switch SW1 Setting (2)



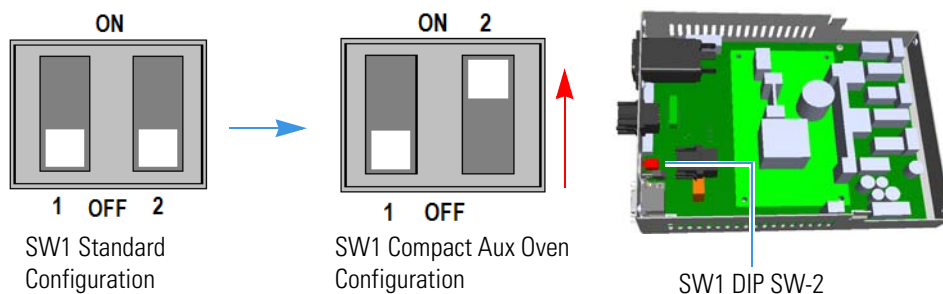
- c. To give to access the SW1 dip switch we suggest temporarily removing the 6-pin connector marked **Heater 2** on the front of the module.
With your thumb and the forefinger press simultaneously the slap-locks on the sides of the connector, and keeping them pressed slip off the connector off the module.
See [Figure 44](#).

Figure 44. Dip Switch SW1 Setting (3)



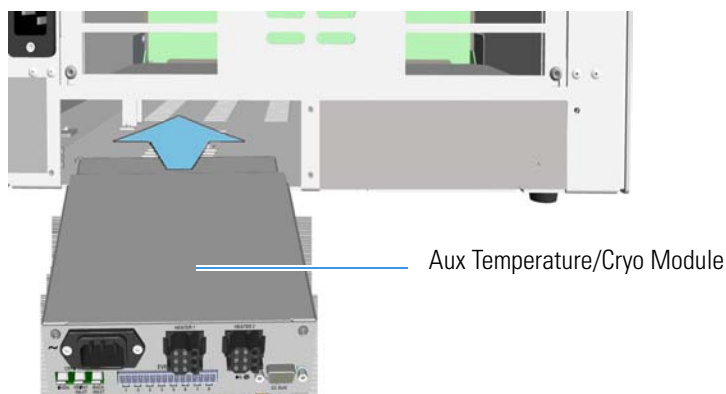
- d. Verify the configuration for Compact Aux Oven of the SW1 dip switch. In the configuration for **Compact Aux Oven** the position 1 of the SW1 dip switch is set to **Off** and the position 2 is set to **On**. In the case you find a different setting of the SW1 dip switch, you **MUST** reconfigure it using a tool such as a small screwdriver. See [Figure 45](#).

Figure 45. Dip Switch SW1 Setting (4)



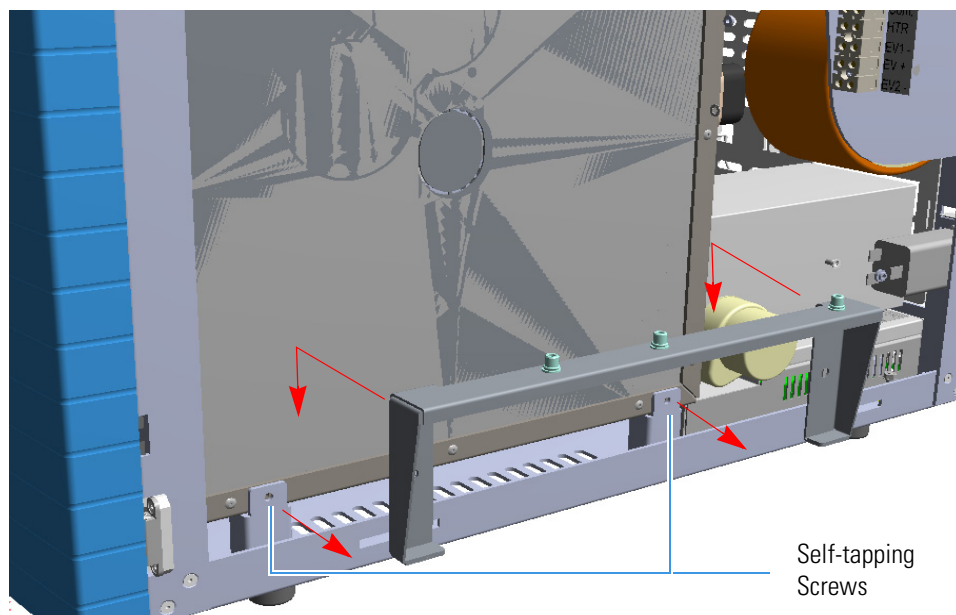
IMPORTANT With the SW1 dip switch configured for the **Compact Aux Oven** the firmware of the Aux Temperature/Cryo module limits the maximum temperature of the first heated zone 180 °C. If the temperature exceeds 180 °C the module goes into alarm condition (or just not ready). The firmware of the Aux Temperature/Cryo module keeps event 8 always active to power the cooling fans. Although apparently available, event 8 cannot be used for programming with the GC local user interface (touchscreen), or with a Thermo Scientific Chromatography Data System.

- e. Reinstall the 6-pin connector marked **Heater 2**, then reinstall and fix the cover of the Aux Temperature/Cryo module.
3. Place the Aux Temperature/Cryo module into the housing on the back of the GC.



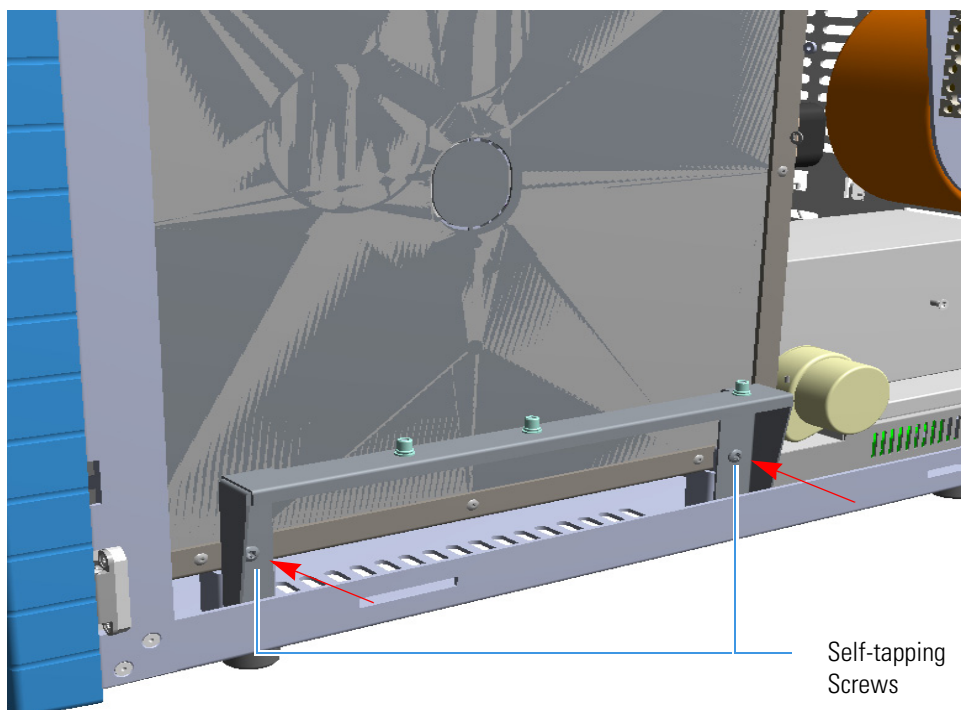
4. Install the bracket shelf.
 - a. Remove the two self-tapping screws from the lower border of the external wall of the oven. See [Figure 46](#).

Figure 46. Bracket Shelf Installation (1)



- b. Place the bracket shelf on the floor of the GC and fix the bracket against the external wall of the oven by using the two self-tapping screws. See [Figure 47](#).

Figure 47. Bracket Shelf Installation (2)



5. Insert the connecting cable into the GC.
 - a. Carefully guide the connecting cable through a slot of the cable holder on the back panel of the GC up to reach the external right wall of the GC oven. See [Figure 48](#).

Note The cables and the wires of the connecting cable must be connected after the coupling of the Compact Aux Oven to the GC.

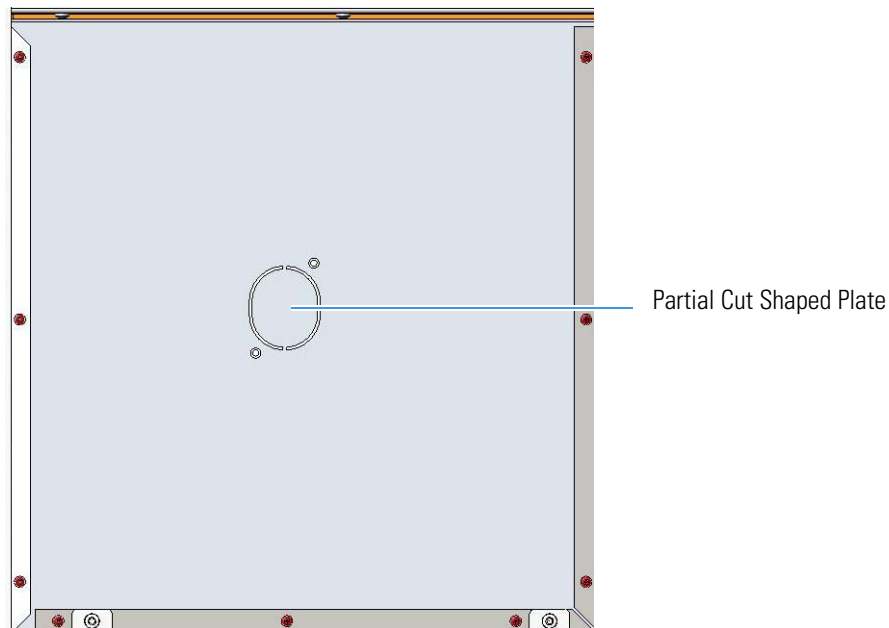
Figure 48. Connecting Cable Installation



6. Prepare the duct for tubes duct of the Compact Aux Oven.

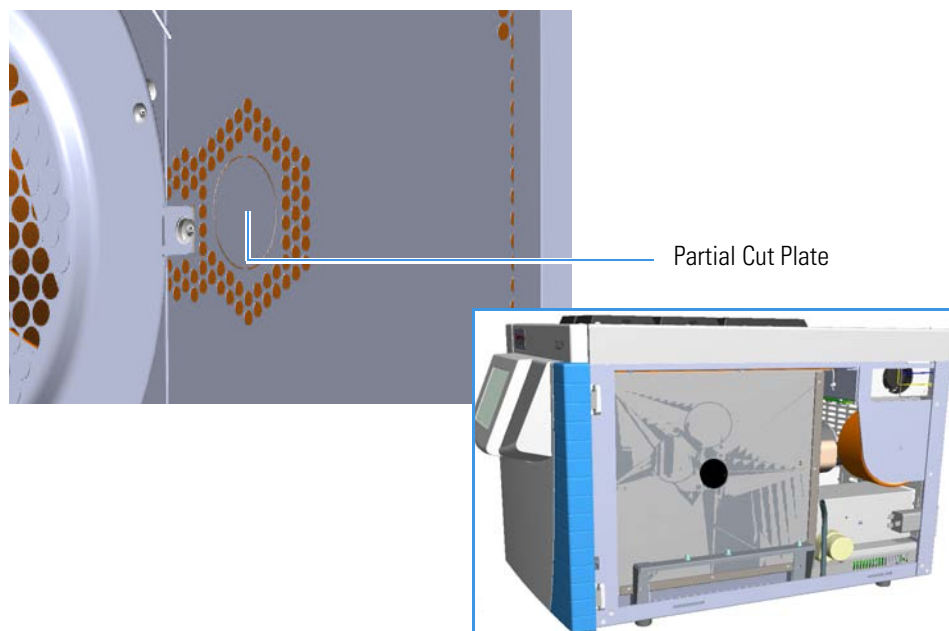
- a. Remove the partial cut shaped plate from the exterior wall of the oven box to access the insulating material. See [Figure 49](#).

Figure 49. Perform the Duct for Compact Aux Oven



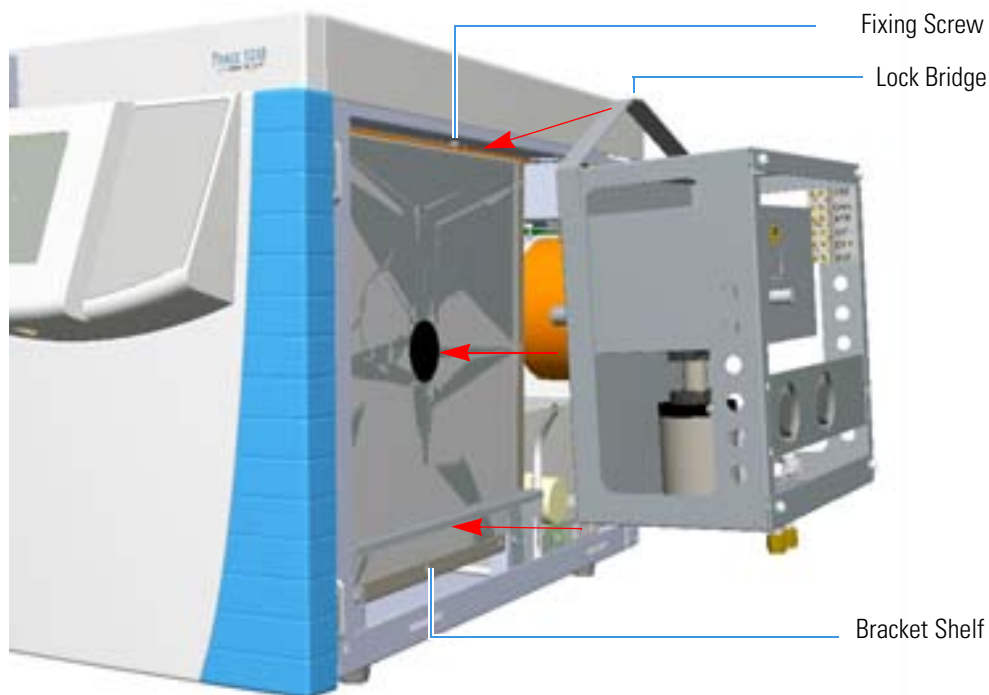
- b. Using a knife or similar tool, gently cut the insulating material following the track.
- c. Save the removed insulating material in a safe place because it can be reused.
- d. On the right side wall in the interior of the oven, remove the partial cut plate from the corresponding duct. See [Figure 50](#).

Figure 50. Perform the Duct into the Oven

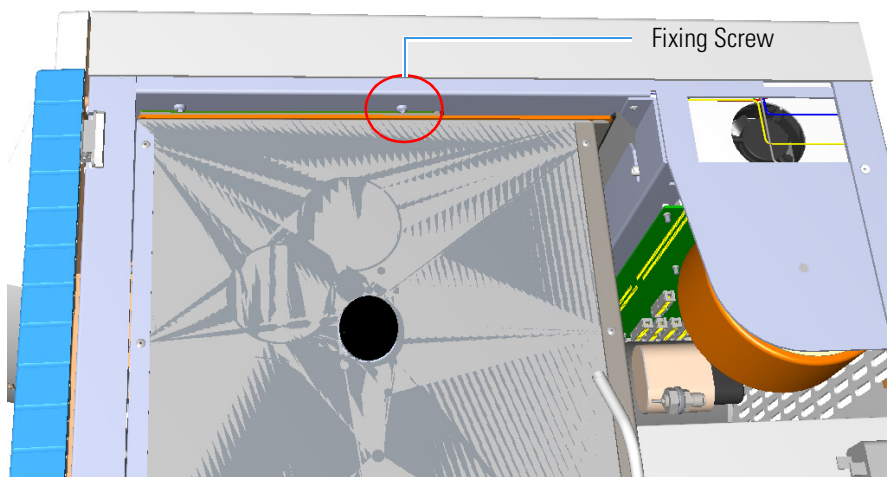


7. Couple the Compact Aux Oven to the GC. See [Figure 51](#)

Figure 51. Coupling Compact Aux Oven and GC (1)



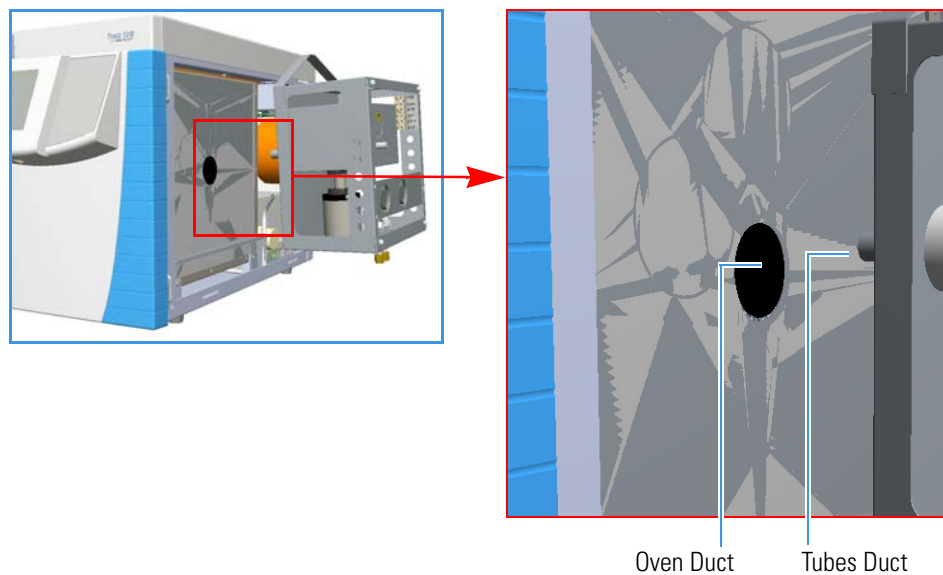
a. Loosen the fixing screw in the middle of the upper border of the GC.



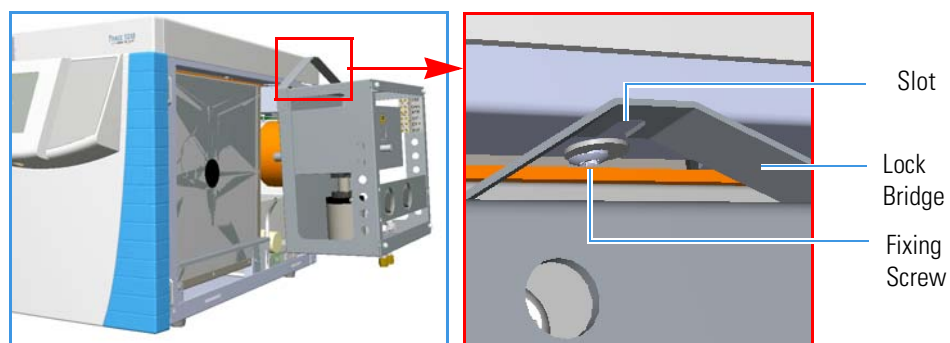
- b. Carefully couple the Compact Aux Oven ensuring that the following operations are carried out:
- i. The tubes duct penetrates into the right wall of the GC oven through the duct previously prepared into the oven walls.

Compact Aux Oven Installation and Use

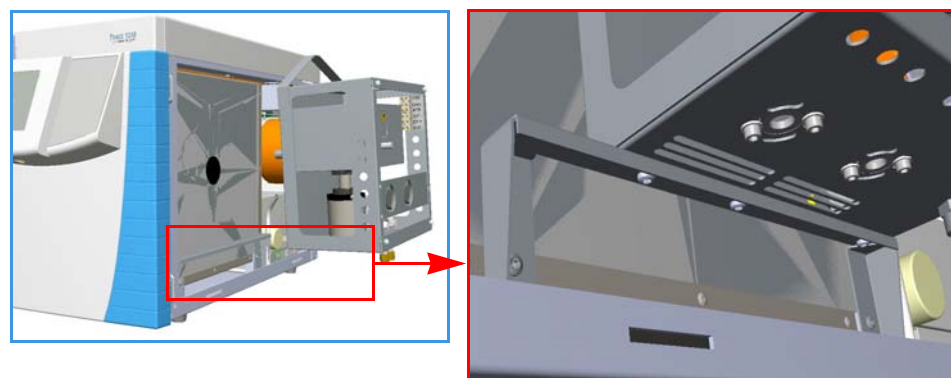
Coupling the Compact Aux Oven to the GC



- ii. The slot on the top of the lock bridge hooks the fixing screw on the upper border of the GC.



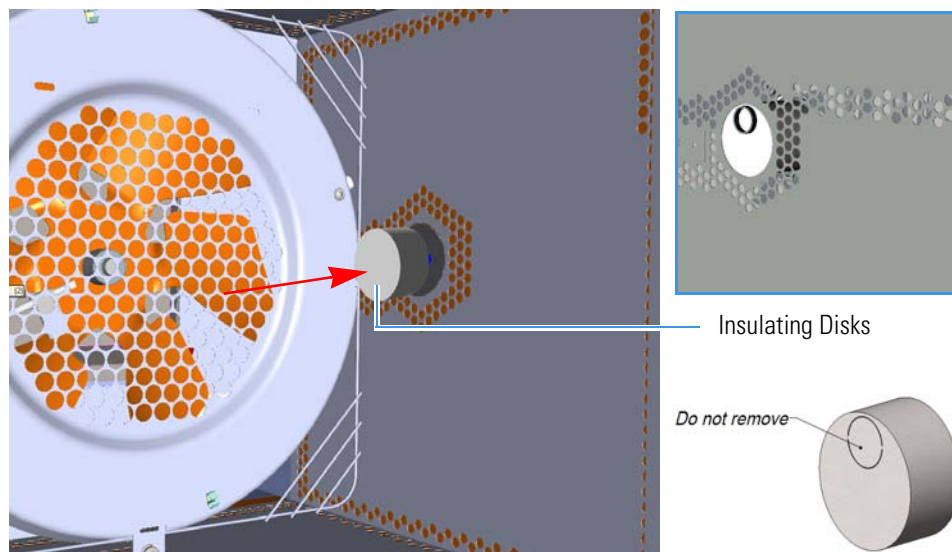
- iii. The bottom section of the Compact Aux Oven is put on the bracket shelf paying attention to meet the fixing holes of both the parts.



- c. Tighten the fixing screw of the lock bridge and the fixing screws that secure the Compact Aux Oven to the bracket shelf.

- d. From the interior of the GC oven, place the smallest insulating disk on the tubes duct, then push the insulating disk into the duct. See [Figure 52](#).

Figure 52. Coupling Aux Oven Module and GC (2)



- 8. Connect electrically the connecting cable to the Compact Aux Oven.
 - a. Connect the heater elements and solenoid valves wires of the connecting cable to the relevant pins of the terminal block on the Compact Aux Oven. See [Figure 53](#) and [Figure 54](#).

Figure 53. Connecting Cable Connection (1)

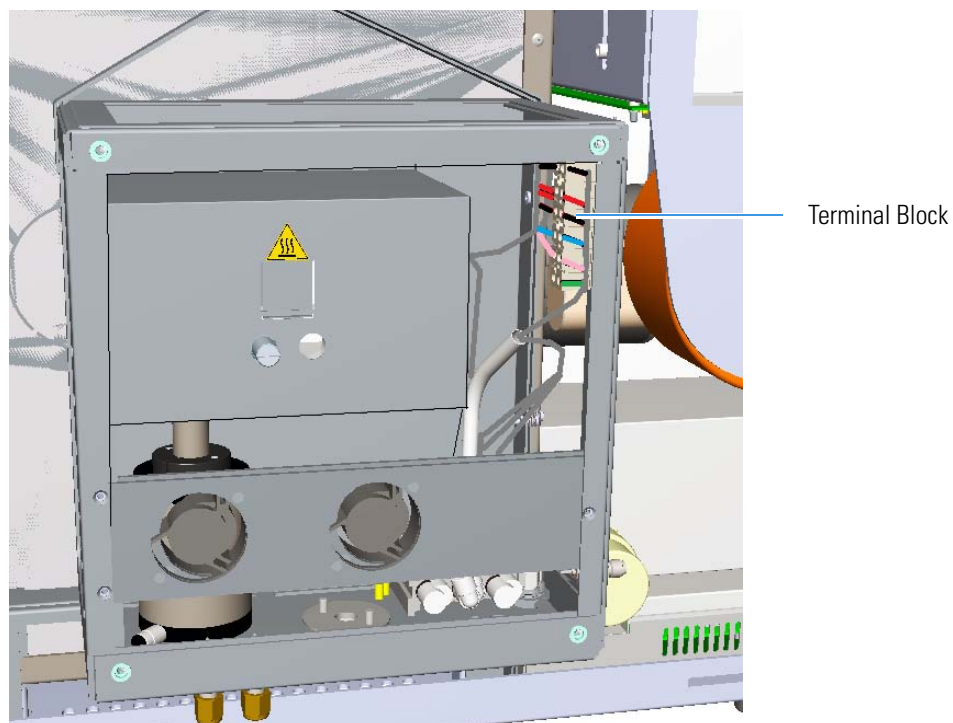
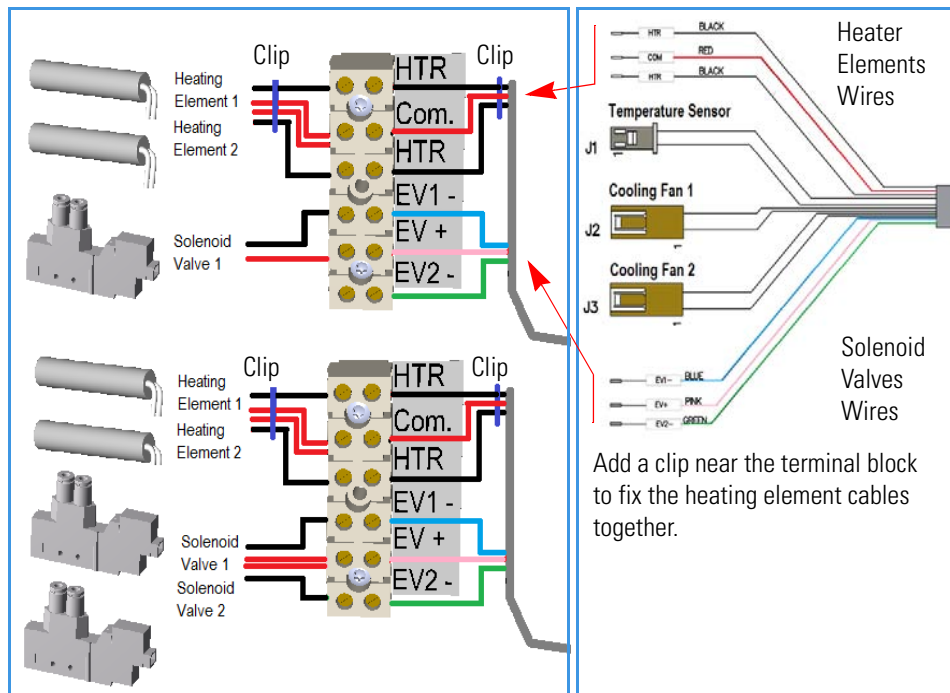
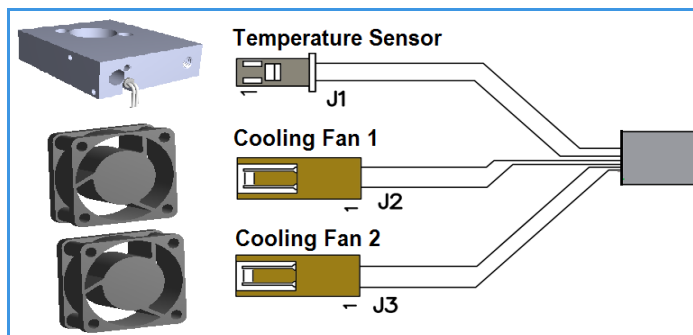


Figure 54. Connecting Cable Connection (2)



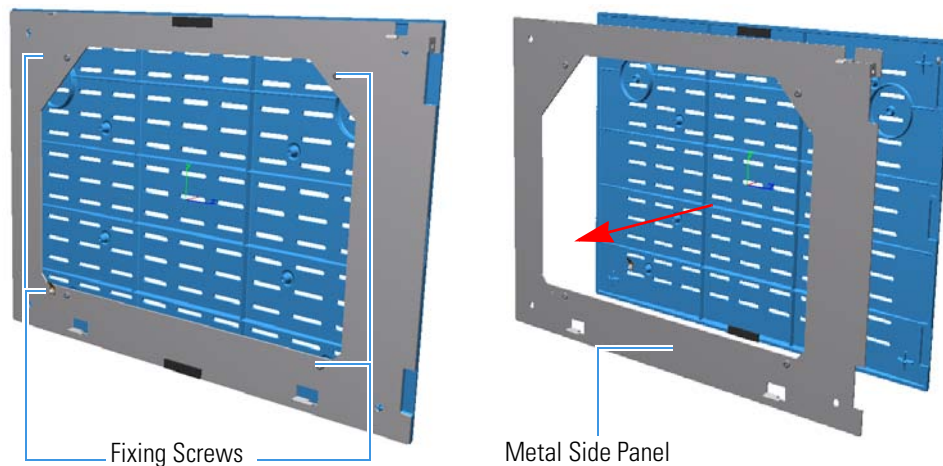
- b. Connect the wires of the temperature sensor (PT100) to the connector J1 of the connecting cable. See [Figure 55](#).
- c. If the optional cooling fans are installed, connect the cable of the first fan to the connector J2, and the cable of the second fan to the connector J3 of the connecting cable. See [Figure 55](#).

Figure 55. Connecting Cable Connection (3)



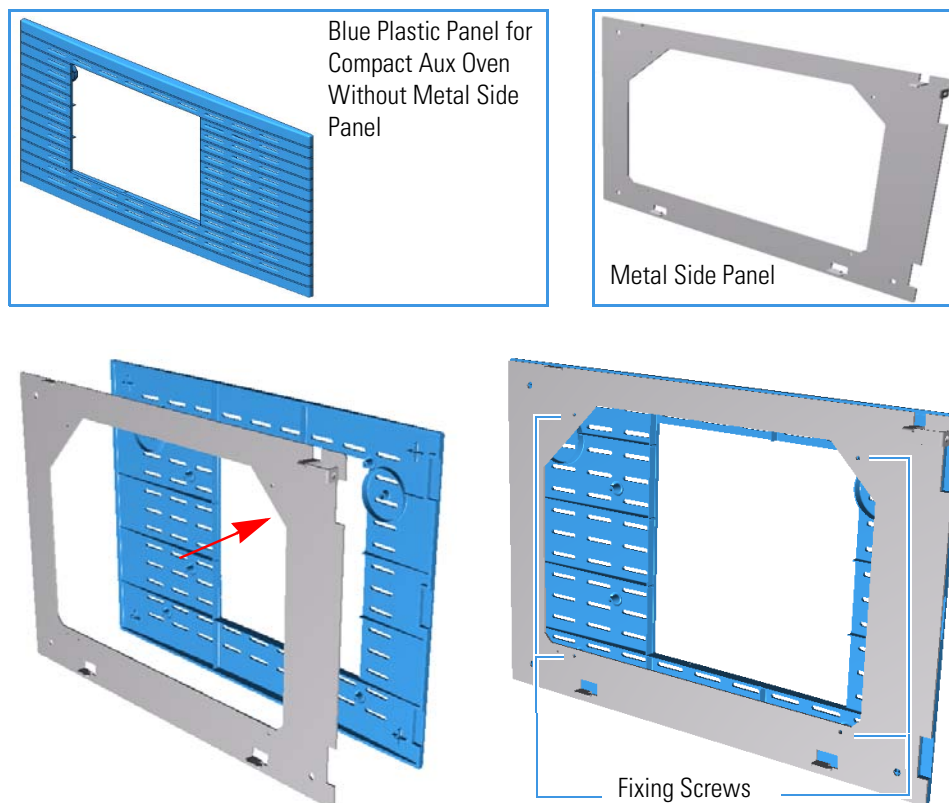
9. Replace the blue right side panel with the blue right panel provided.
 - a. From the original right side panel remove the metal side panel from the blue plastic side panel by unscrewing the four fixing screws. See [Figure 56](#).

Figure 56. Right Panel Replacement (1)



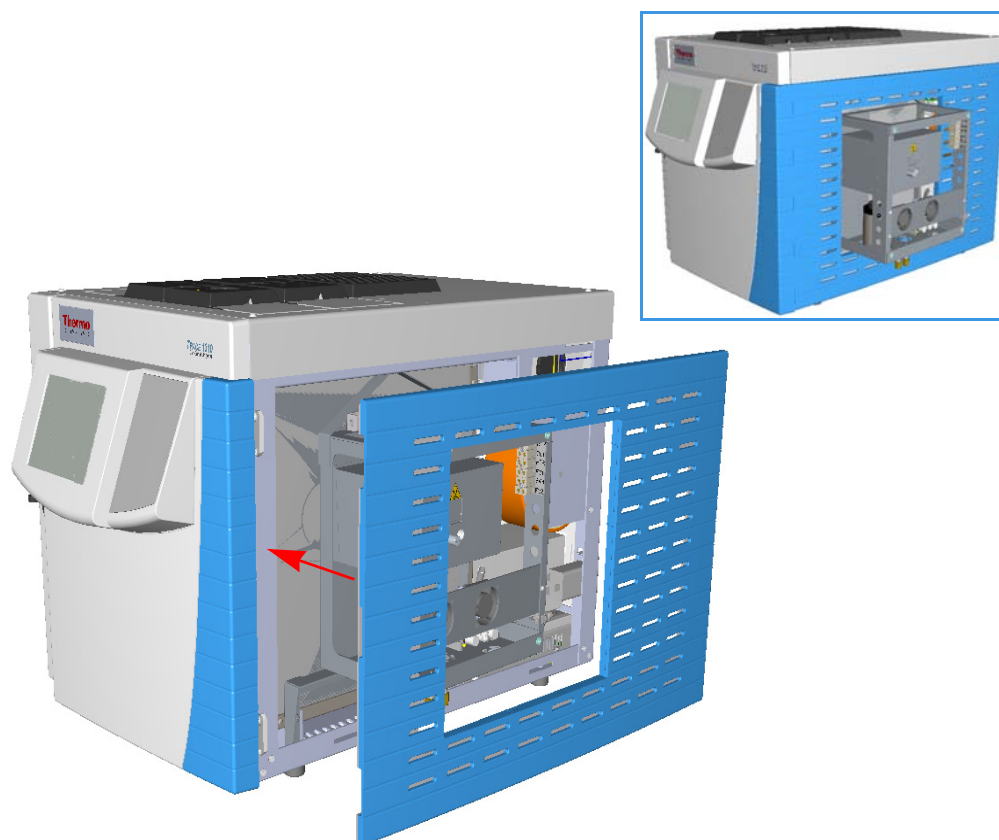
- b. Mount and fix the metal side panel on the blue right panel provided for the Compact Aux Oven by using the same four fixing screws. See [Figure 57](#).

Figure 57. Right Panel Replacement (2)



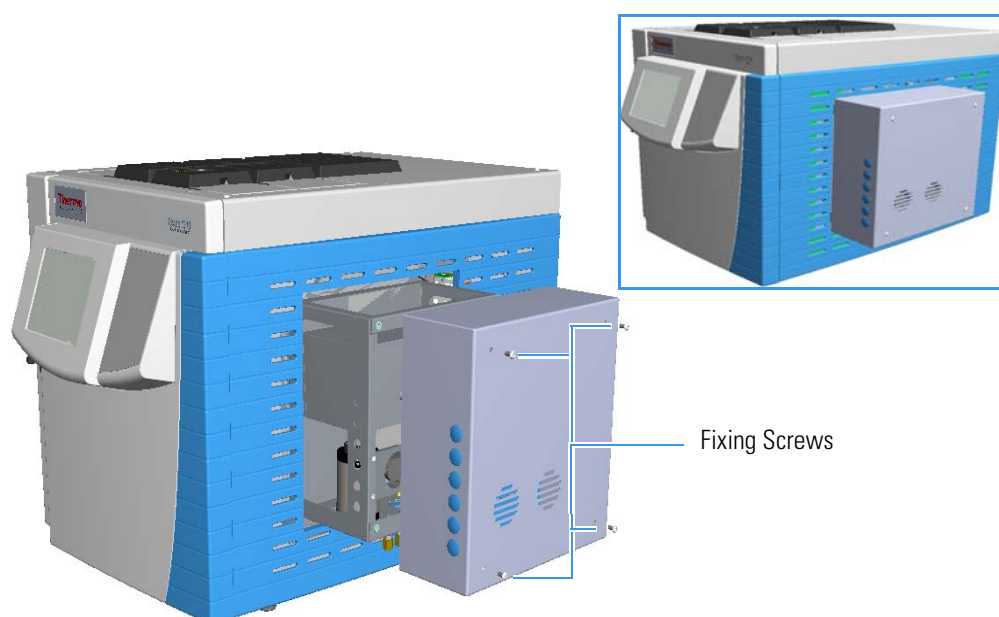
- c. Plug the ground cable previously removed to the right panel.
- d. Place the right panel and attach the screw holding it in place. See [Figure 58](#).

Figure 58. Right Panel Replacement (3)



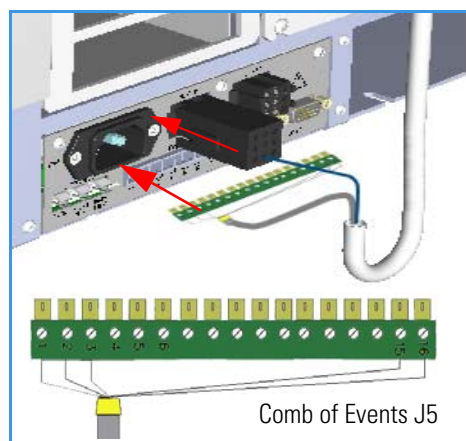
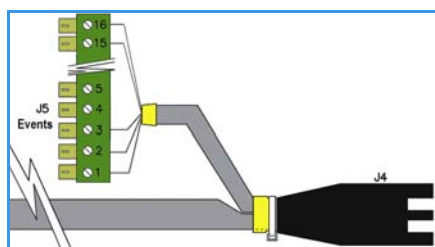
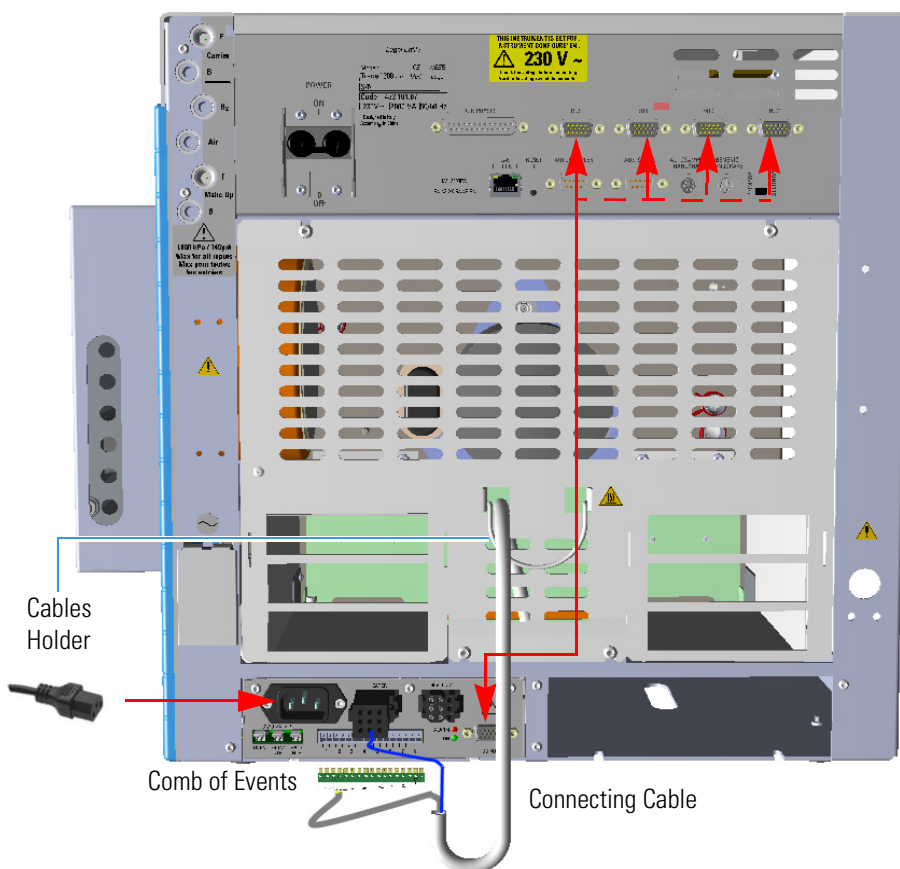
10. Place and fix the cover of the Compact Aux Oven using the four screws provided.
See [Figure 59](#).

Figure 59. Compact Aux Oven Cover Installation



11. Make the electrical connections. See [Figure 60](#).

Figure 60. Electrical Connections



- a. Connect the 6-pin connector **J4** of the connecting cable to the connector marked **Heater 1** on the front of the Aux Temperature/Cryo module. **DO NOT** connect the connector **J4** to the connector marked **Heater 2**.
- b. Insert the 16-pin **Comb of the Events J5** of the connecting cable into the 16-pin connector marked **Events** of the Aux Temperature/Cryo module.



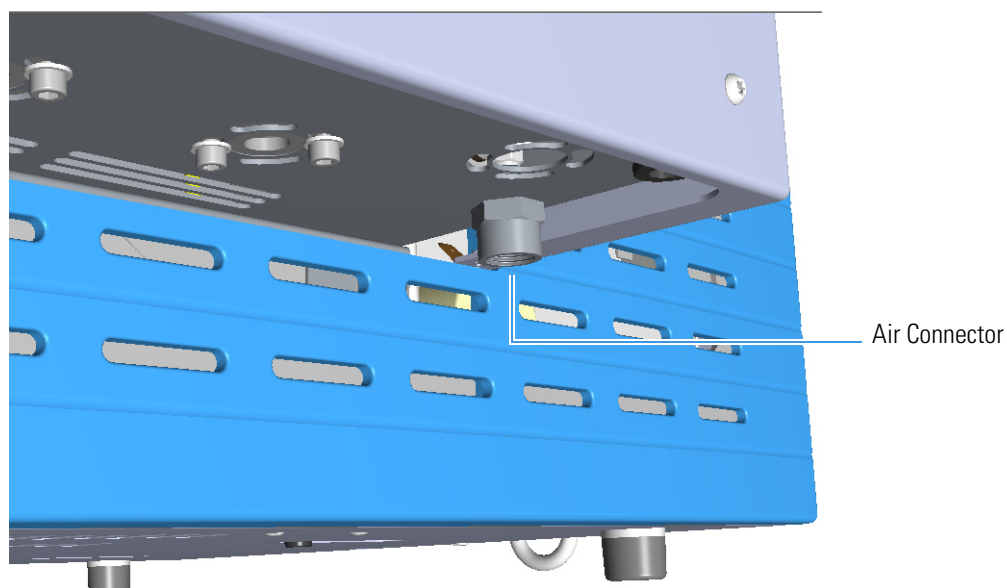
IMPORTANT The Compact Aux Oven uses the On/Off events 1, 2 and 3. The event 8 is always active to power the cooling fans. Although apparently available, the event 8 cannot be programmed.

- c. Using the cable provided, connect the 15-pin female connector marked **GC Bus** on the Aux Temperature/Cryo module to a **Bus** interface on the back of the GC.

Tip To avoid contact with the hot air from the vents gather the electrical cables into the cables holder.

- d. Plug the power cable to the AC Input connector on the front of the module and to the wall outlet. The LED marked **On** lights up.
12. Close the front door of the GC.
 13. Connect the air supply for the actuation of the rotary valves, and valve for liquid sample to the air connection on the bottom of Compact Aux Oven. The inlet pressure is 450 kPa; 65 psi. See [Figure 61](#).

Figure 61. Air Connection



14. Open the gas supplies.
15. If other external modules are present, plug the power cable to the AC Input connector of each external module, and to the wall outlet.
16. Power on the GC.
 - a. Plug the power cable to the AC Input connector into the back of the GC and to the wall outlet.
 - b. Flip up the power switch (breaker), located at the back of the instrument, to the position I.

Operation

This section provides brief instructions for configuring and operating with the Compact Aux Oven through the GC touch screen and the chromatography data system.

See the following sections:

- “Operating Through the GC Touch Screen” on page 49
- “Operating Through the CDS” on page 52

Operating Through the GC Touch Screen

This section contains instructions to configure your Valve Oven and to edit the parameters through the touch screen of the GC. For more details refer the *TRACE 1300/TRACE 1310 User Guide*.

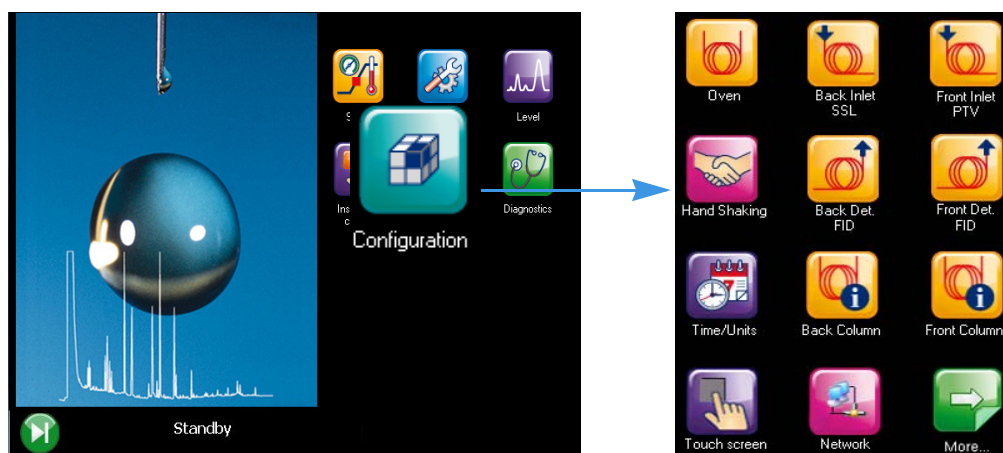
See the related operating sequences:

- To configure the Compact Aux Oven through the GC touch screen
- To edit Compact Aux Oven parameters through the GC touch screen

❖ To configure the Compact Aux Oven through the GC touch screen

1. Press the **Configuration** icon on the touch screen main menu to configure the TRACE 1310. See Figure 62.

Figure 62. Touch Screen Main Menu: Configuration




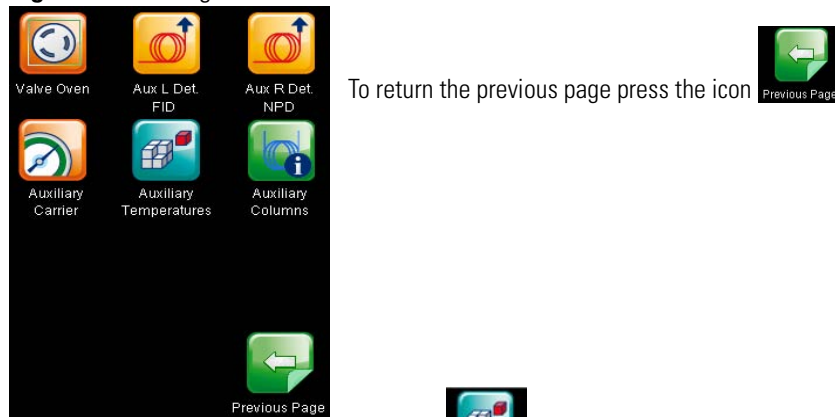

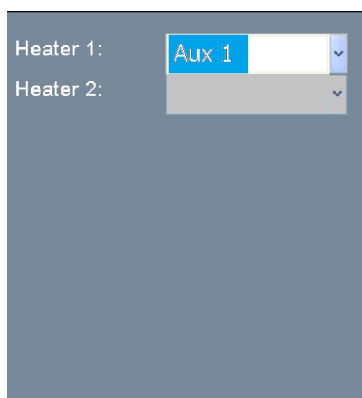
The icon  appears to allow access to the second page of the Configuration menu when additional modules are installed. See Figure 63.

Figure 63. Configuration Menu



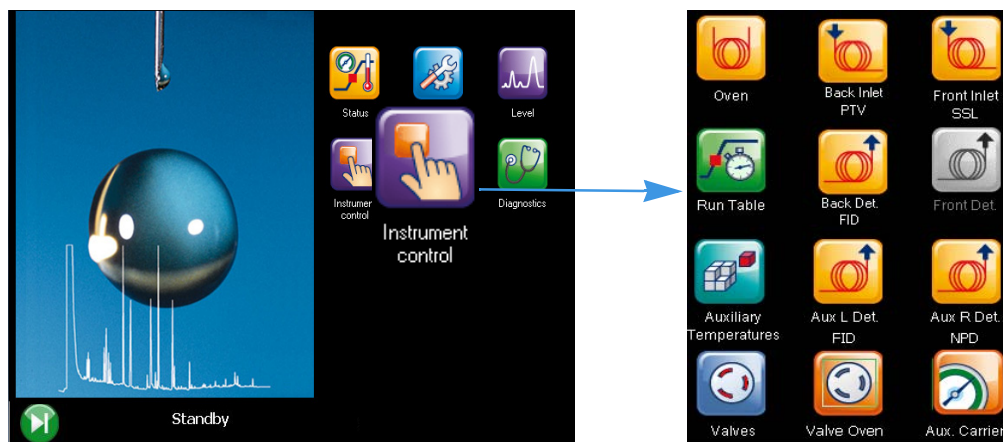
2. Press the **Auxiliary Temperature** icon  for configuring the heater zones of the Auxiliary Temperature/Cryo module. In the line **Heater 1** select **Aux 1**.



❖ **To edit Compact Aux Oven parameters through the GC touch screen**

1. Press the **Instrument Control** icon on the touch screen main menu for programming the parameters in the analytical method. See [Figure 64](#).

Figure 64. Touch Screen Main Menu: Instrument Control





2. Press the **Auxiliary Temperature** icon for defining the temperature parameters for the external auxiliary temperature module set in the configuration.



3. Press the **Valves** icon for turning On or Off the external valves connected to the Aux Temperature Module according to your pneumatic circuit. The next figure shows an example.



4. Press the **Run Table** for setting detectors, valves, and external events to occur at the Prep-run or during a run.



IMPORTANT Although apparently available, the event 8 cannot be used for programming with the GC local user interface (touchscreen).

Events displayed on the Run Table page are from selections made in the **Run-Time Event** screen. The **Add** button opens the **Run-Time Event** screen.

Operating Through the CDS

This section contains instructions for configuring your Valve Oven and editing the parameters through Xcalibur, Chrom-Card, ChromQuest, or the Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System. For more details refer the relevant Manuals and Help Files.

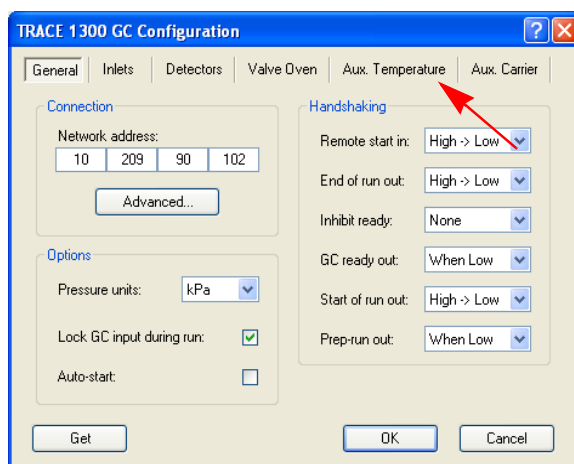
See the related operating sequences:

- [To configure the Compact Aux Oven through the CDS](#)
- [To edit Compact Aux Oven parameters through the CDS](#)

❖ To configure the Compact Aux Oven through the CDS

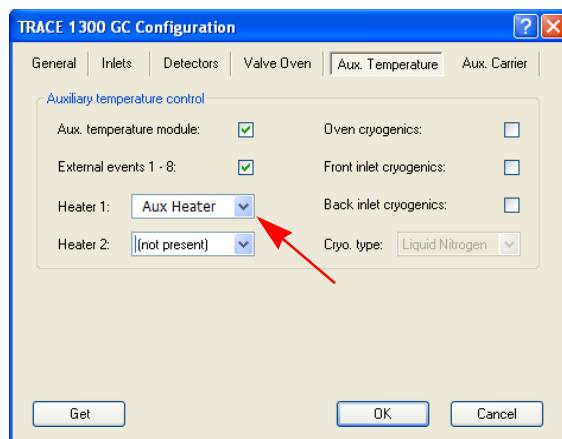
1. Run your Chromatography Data System, then open the TRACE 1300 Configuration window. See the example of [Figure 65](#).

Figure 65. Example of Configuration Window



2. Select the **Auxiliary Temperature** tab for configuring and use the auxiliary temperature of your Compact Aux Oven. In **Heater 1** select **Aux Heater**. See the example of [Figure 66](#).

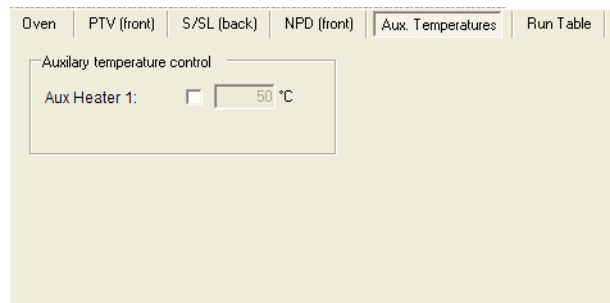
Figure 66. Configuration Window: Aux Temperature Tab



❖ **To edit Compact Aux Oven parameters through the CDS**

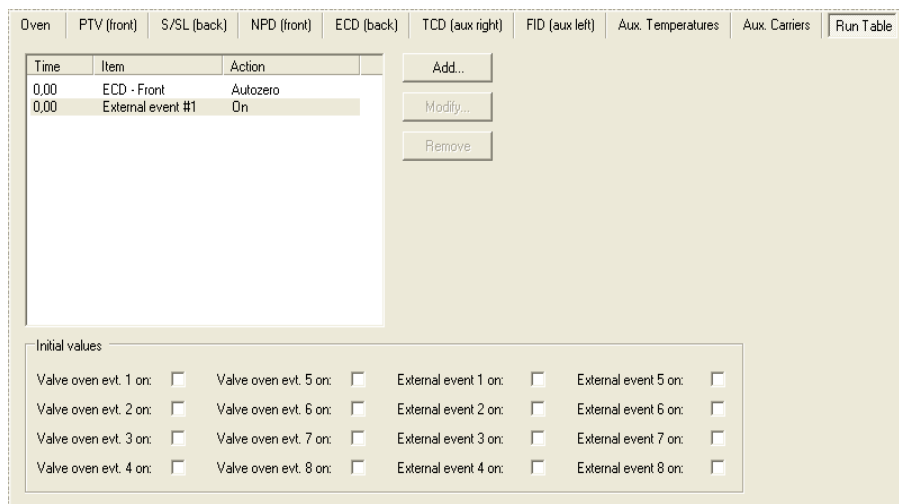
1. Select the **Auxiliary Temperature** page for defining the temperature parameters of the external auxiliary temperature modules selected in the Instrument Configuration. See the example of [Figure 67](#).

Figure 67. Auxiliary Temperature Page



2. Select the check box **Aux Temp 1** to enable the adjacent field. In the field enter a temperature in the range 0-450 °C.
3. Select the **Run Table** page for setting up detector, valve, and external events to occur at the Prep-run or during a run. See the example of [Figure 68](#).

Figure 68. Run Table Page



The events displayed on the Run Table page are from selections made in the **Run-Time Event** screen.



IMPORTANT Although apparently available, the event 8 cannot be used for programming with a Thermo Scientific Chromatography Data System.

Ordering Parts

This chapter contains part numbers for all the kits, rotary valves, and spare parts available for your Compact Aux Oven.

Use [Table 3](#) to order the material needed for your Compact Aux Oven.

Table 3. Ordering information for kits, Rotary Valves, and Spare Parts (Sheet 1 of 2)



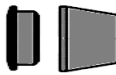



Description	Part number
Kits	
Compact Aux Oven Kit	19070120
Valves Heater Kit	19070121
Solenoid Valve Kit for Valco® Rotary Valve	19071011
Needle Valve Kit	19005800
In or Out Fittings Kit	19071024
LPG Valves Installation Kit	19070123
The kit includes also the following kits:	
<ul style="list-style-type: none"> • PN 19071011 Solenoid Valve Kit for Valco® Rotary Valve • PN 19071016 Monitor Tube for On/Off LPG Valve • PN 19071024 In or Out Fittings Kit 	
Rotary Valves	
4-port Valco® Rotary Valve with Air Actuator for Wide-Bore Column	40524182
6-port Valco® Rotary Valve with Air Actuator for Wide-Bore Column	40524183
8-port Valco® Rotary Valve with Air Actuator for Wide-Bore Column	40524184
10-port Valco® Rotary Valve with Air Actuator for Packed Column	40524185
4-port Valco® Rotary Valve with Air Actuator for Packed Column	40524186
6-port Valco® Rotary Valve with Air Actuator for Packed Column	40524187
8-port Valco® Rotary Valve with Air Actuator for Packed Column	40524188
10-port Valco® Rotary Valve with Air Actuator for Packed Column	40524189
Spare Parts	
PT100 200 mm	23043723
	
Cooling Fan	23043729
	

Table 3. Ordering information for kits, Rotary Valves, and Spare Parts (Sheet 2 of 2)

Description	Part number
Back/Front Ferrule 1/8-in.	 29004632
Bulkhead Fitting 5/16-20	 35008441
5-way Solenoid Valve	 40519029
Needle Valve 1/16-in.	 40527097