

PURSPEC

清 谱 科 技



NAVIGATOR

Lipid Analysis System

User Manual

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Contact Us

If you have new requirements for our products or technical inquiries related to the use, transportation, or disposal, we welcome you to contact us at any time. You can reach out to us through the internet, by phone, or via traditional mail. All contact information is provided in detail on the back cover of this manual

1. Introduction

Heartfelt thanks for choosing our company's product!

Our product is a high-precision instrument, and to ensure its proper functioning, as well as the safety of both operators and the instrument itself, please carefully read this manual before use.

In order to continuously improve the quality and operability of the product, there may be occasional adjustments to specific details in aspects such as appearance, structure, and software operations. If there are any discrepancies between the actual product and the illustrations in this manual, please refer to the actual product.

If the instrument experiences abnormalities, please consult the "Troubleshooting Guide" for fault diagnosis. Do not attempt to disassemble the equipment for repairs without proper guidance. The company reserves the right to disclaim responsibility for property damage or personal injury resulting from failure to follow the instructions in this manual.

This manual contains crucial information regarding the installation, operation, maintenance, and troubleshooting of the instrument. Please ensure it is stored securely for future reference.

2. Accessories

◆Ω Navigator	1	◆Spare Reaction Tubes	1
◆Power Adapter	1	◆PEEK Tube Connectors	8
◆Communication Adapter	1	◆Leakage Tube	1
◆External Antenna	1	◆Stainless Steel Capillary Connectors	2
◆User Manual	1	◆Pressure Relief Valve	1
◆Software USB Drive	1	◆Product Qualification Certificate	1

3. Safety Precautions

Please read the manual thoroughly before performing any operations, and follow the guidelines provided in the manual.

3.1 Warning

Be aware that some samples and chemical reagents used with the instrument may pose chemical hazards. Understand all potential hazardous effects before using these substances.

Always adhere to Good Laboratory Practice (GLP) to ensure that your experimental processes comply with standards, enhancing the reliability and repeatability of experiments.

When working with unknown substances or materials with potential hazards, it is recommended to consult with the safety department of your institution or organization for professional safety guidance.

3.2 Notice

- **Storage Environment:** Store in a dry and cool place with a temperature range between 15 to 35 °C (59-95 °F).
- **Usage Environment:** Maintain an operating environment temperature of 23 to 30 °C (73.4-80.6 °F), with relative humidity not exceeding 75%, and avoid interference from strong electromagnetic fields.
- **Power Supply:** Ensure that the instrument's power supply remains stable within the specified range (100-240V AC, 50/60Hz).
- **General Information of Communication:** The host and the software communicate via RF (zigbee), Operating Band /Frequency (2405-2480 MHZ), Maximum Output Power (-1.25 dBm).
- **Handling Hazardous Substances:** If the tested samples contain toxic, harmful, or corrosive substances, handle them with reasonable caution to prevent harm to operating personnel.
- **Transportation Considerations:** When transporting the instrument, avoid severe impacts and vibrations. Also, protect it from rain and exposure to maintain the stability and integrity of the instrument.
- **Internal Safety:** Do not insert hands into the interior of the instrument to prevent harm to personnel.

3.3 Hazards Related to Instrument Use



UV Lamp Hazard

To avoid exposure to ultraviolet light, do not open the reaction tube rack when the PB mode is on or when the UV lamp status indicator is active. Ensure the system is powered off before replacing reaction tubes.



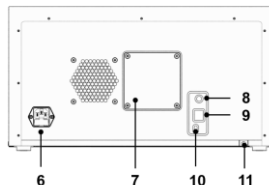
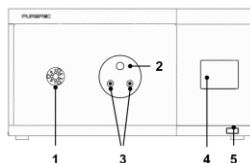
Solvent Leakage Hazard

1. Specially Designed Ports: The system's ports are specially designed to prevent leakage. Before using the instrument, ensure that all interfaces are hand-tightened to guarantee sealing.
2. Check Before Tube Replacement: Before replacing reaction tubes, make sure internal interfaces are hand-tightened and then place the tube rack back into the instrument. This step is crucial to ensuring system integrity.
3. Monitor Initial Run: After replacing reaction tubes, monitor the initial run to ensure all joints are secure and there is no leakage. This helps detect potential issues promptly.
4. Compatibility Check: To avoid chemical degradation of components exposed to solvents, ensure that all provided components are compatible with the specified photochemical workflow. For replacement components not included or differently specified, verify the compatibility of solvents used in the workflow.

3.4 Hazards Related to Instrument Removal

To avoid exposure to biological hazards or toxic materials, wear gloves at all stages when removing the instrument.

4. Schematic Sketch



- | | | |
|---------------------|------------------------------|-------------------------|
| 1. Six-Port Valve | 2. Reaction Tube Lock Switch | 3. Reagent Inlet/Outlet |
| 4. Touch Screen | 5. Power Switch | 6. Power Interface |
| 7. Maintenance Port | 8. External Antenna Port | 9. RJ45 Port |
| 10. USB-C | 11. Reagent Leak Outlet | |

5. Specification

Power Supply 100~240 V AC, 50/60 Hz

Size 46.1 × 43.3 × 24.7 cm
18.15 × 17.05 × 9.72 "

Weight < 20 kg (44.09 lbs)

Ambience 23~30°C (73.4-86 °F), relative humidity < 75%.
No strong electromagnetic field interference.

Functions Adjustable UV Lamp Intensity and Power with Light Feedback
Reaction Tube Lifespan Tracking
Leak Alarm System
Suitable for 1/16-inch Tubing and Traditional PEEK Tubing Systems
Temperature Stability Control
Supports Fine Structural Lipidome Analysis

6. Installation



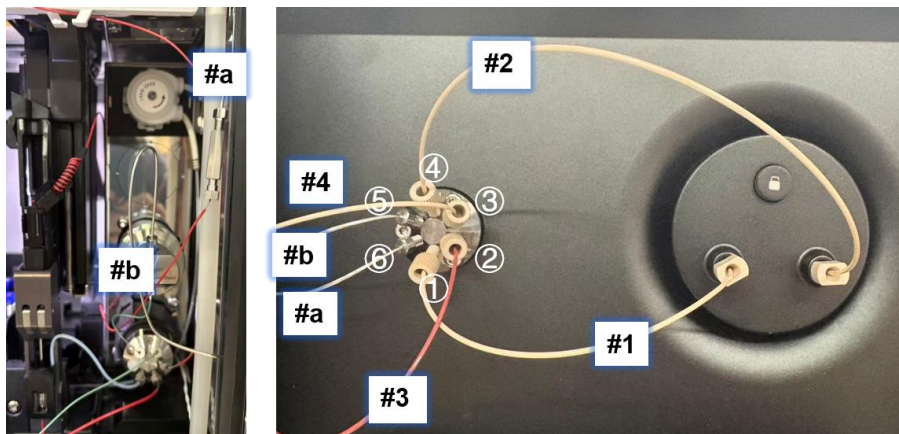
This product is a high-precision analysis instrument, so violent vibrations and collisions should be avoided during installation



The installation instructions shall be strictly followed. Do not plug in the power cord before the completion of instrument installation.

6.1 Unpacking and Installation

- 1) Open the shipping carton and remove the upper foam insert.
- 2) Verify that all components are present. Remove all accessories from the carton and place them in a safe location. For clarity in the installation procedure, label the stainless-steel capillary assemblies as #1 and #2, and the PEEK tubing assemblies as #1–#5.
- 3) Remove the instrument from the shipping carton. Install the external antenna onto the antenna connector located on the rear panel of the instrument. Position the antenna above the mass spectrometer, ensuring that it is aligned with the edge of the ion source.
- 4) After confirming the final installation position of the instrument, disconnect the sample loop from the LC metering pump and proceed with the fluidic connections as follows:
 - **Stainless-steel capillary assembly #a:** Connect the sample loop to **Port 5** of the instrument six-port valve.
 - **Stainless-steel capillary assembly #b:** Connect the metering pump to **Port 6** of the instrument six-port valve.
 - **PEEK tubing assembly #1:** Connect the reagent inlet port to **Port 1** of the instrument six-port valve.
 - **PEEK tubing assembly #2:** Connect the reagent outlet port to **Port 4** of the instrument six-port valve.
 - **PEEK tubing assembly #3:** Connect the mass spectrometry outlet to **Port 2** of the instrument six-port valve.
 - **PEEK tubing assembly #4:** Connect the chromatographic column outlet to **Port 3** of the instrument six-port valve.
- 5) Insert the power cord into the power inlet and connect the instrument to an appropriate power source.



6.2 Host Software Installation

1. Before installing the Omega Navigator software (Omega Explorer), ensure that the computer running the instrument operates on the Windows 11 operating system. If uncertain about the OS version, contact our support. If the computer lacks internet connectivity, also contact technical support.
2. Insert the Omega Explorer installation USB drive and run the Setup installation file. Follow the prompts of the installation wizard to complete the installation process.
3. Insert the communication adapter into a USB slot to initiate the connection between the computer and the Omega Explorer. The drivers associated with the communication adapter will be automatically installed.
4. Download and install MSConvert, an open-source software available at <https://proteowizard.sourceforge.io/>. Follow the installation guide provided by MSConvert.
5. Run the Omega Explorer and proceed with registration. Fill in your information and send the '.lrf' file to service@purspec.com via email. Within 24 hours, you will receive a '.lic' file to activate the Omega Explorer.

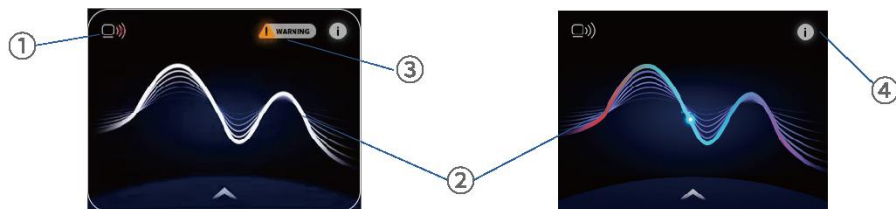
7. Operation

7.1 Power On

1. Make sure that the instrument is installed correctly, and the power cord is already supplied with operating voltage.
2. After confirming that all previous steps have been executed correctly, turn on the main power switch located above the power connector to allow the instrument to start automatically.
3. During the instrument startup process, observe the Omega Navigator logo on the touchscreen. This indicates that the instrument is starting up normally.

7.2 Operation Interface Explanation

Touchscreen Interface



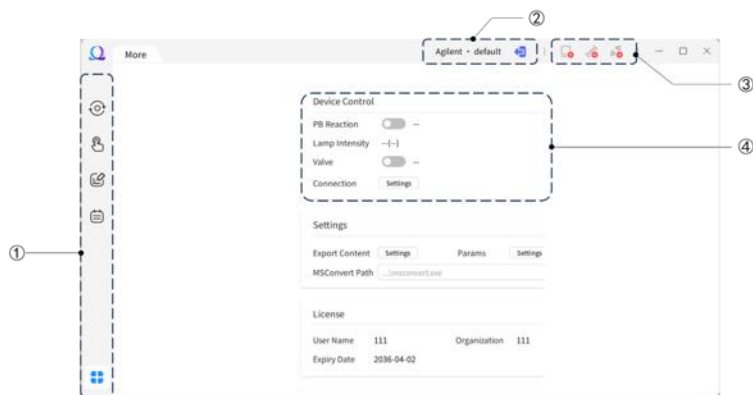
1. Connection Status

2. PB Mode Status (Figure 8.2b)

3. Warning Area

4. Information Icons

Omega Software Interface



1. Function Navigation Bar

2. Sample Name and Mass Spectrometer

3. System Status

4. Detection Settings

7.3 Power Off

1. Before powering down the instrument, ensure that both the liquid chromatography (LC) and mass spectrometry (MS) systems are in standby mode and that no analytical runs are in progress.
2. In the Lipid Analysis Workstation, verify whether any sample sequence is currently running. If an active sequence is detected, wait for the sequence to complete, or manually stop the sequence only after confirming that it is safe to do so, in order to prevent abnormal instrument operation.
3. After confirming that no sample sequences are running, shut down the Omega Explorer software.
4. Once the workstation has been closed, locate the power switch at the lower-right corner of the instrument and switch it to the OFF position



All instrument controls and status information can be accessed through the Omega Explorer. Before shutting down the instrument, ensure that the PB mode has been turned off for at least half an hour. If the PB mode is still active, refrain from shutting down the instrument to prevent potential irreparable damage. Do not move the instrument during operation to avoid accidental reagent leakage or LC tube compression.

8. Usage Declaration

8.1 Use Statement

- Omega Navigator is designed as a professional research tool, intended to provide the capability for fine lipid structures analysis.
- The Omega Navigator is **Only for Research**.

8.2 Maintenance Instructions

Reaction Tube Replacement

To prevent chemical leaks, follow these steps for replacing reaction tubes:

1. Use the sample pump to clear any residual liquid from the reaction tube before replacement. Ensure the sample pump's outlet is connected to the liquid chromatography solvent waste container.
2. During residual liquid clearance, use low flow rates to avoid excessive pressure and reduce the risk of leaks.
3. After visually confirming that the reaction tube is essentially empty, ensure no liquid residue remains.
4. Once it's confirmed that the reaction tube is empty, attempt to loosen the internal PEEK connectors. Exercise caution during this step to prevent unnecessary leaks.

PB Reaction Tube Replacement Procedure

1. Set the system to standby mode: Place both the liquid chromatography (LC) and mass spectrometry (MS) systems into standby mode.
2. Power down the instrument: Shut down the instrument according to the procedure described in Section 7.4, Power Off.
3. Remove the reaction tubing assembly: Unscrew the two PEEK fittings connected to the reagent inlet/outlet ports and place them in a safe location. Press the reaction tubing locking switch (Unlock) and carefully remove the reaction tubing assembly from the instrument.
4. Loosen the internal fittings: After confirming that the reaction tubing has been completely drained, carefully loosen the internal PEEK fittings. Exercise caution during this operation to avoid unnecessary leakage.
5. Install the new reaction tubing holder: Remove the retaining screws and replace the existing reaction tubing holder with a new one. Reinstall and tighten the retaining screws, then securely tighten the internal PEEK fittings.
6. Perform a leak test: Reconnect the two PEEK fittings to the reagent inlet/outlet ports. Power on the instrument according to the procedure described in Section 7.4, Power On. Launch the LC control

software, adjust the mobile-phase flow rate, and inspect the reaction tubing assembly for any signs of leakage.

7. Reinstall the reaction tubing assembly: Carefully insert the reaction tubing assembly back into the instrument and press the reaction tubing locking switch (Lock) to secure it in place.

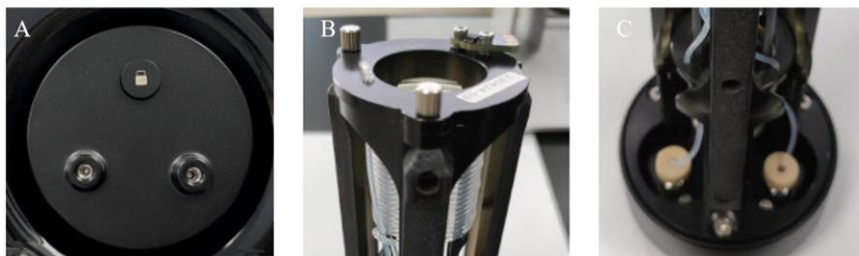


Figure 8.2. Reaction Tubing Locking Switch; Reagent Inlet/Outlet Ports (A); Reaction Tubing Holder Mounting Screws (B); Internal PEEK Fittings (C).

8.3 Quality Control Recommendations

Routine Quality Control

Perform routine analysis of quality control (QC) samples, including samples containing target analytes at low, normal, and high concentration levels.

Ensure that QC results fall within established acceptance criteria, and assess both within-run and between-run precision. If QC results fall outside the acceptable limits, data generated during the affected analytical run should be reviewed carefully and investigated according to laboratory procedures.

Matrix Effects

When analyzing samples with complex matrices, such as soil, tissue, serum, plasma, whole blood, and other biological specimens, matrix components may adversely affect analytical performance through ionization enhancement or ionization suppression.

To minimize matrix-related interference, the following practices are recommended:

- Employ appropriate sample preparation techniques, such as protein precipitation (PPT), liquid-liquid extraction (LLE), or solid-phase extraction (SPE), to reduce matrix interferences prior to analysis.
- Consider using established lipid extraction procedures, such as the Folch extraction method, during sample preparation.
- Whenever possible, use matrix-matched calibration standards and matrix-matched quality control samples to verify analytical accuracy and precision.

8.4 Instrument Removal Recommendations

When transporting, servicing, or disposing of the instrument, observe the following safety precautions:

- Wear chemically resistant gloves whenever handling or disposing of chemicals to ensure adequate personal protection.
- Before disassembling the instrument, decontaminate all areas that have been exposed to solvents to minimize potential hazards during removal and maintenance procedures.
- During the decontamination process, pay particular attention to the following components, which present the highest risk of contamination:
 - PB Reaction tube assembly
 - Solvent leak collection tray
 - Leakage Tube
- When handling these components, be aware that they may contain residues of carcinogenic, toxic, or biohazardous substances. Appropriate precautions should be taken to prevent direct exposure to or contact with such hazardous materials.

8.5 Storage Recommendations

- The instrument does not affect the normal operation of a conventional LC–MS/MS system. Unless otherwise required, it is recommended that the instrument remain connected to the LC–MS/MS system to facilitate rapid startup and minimize potential issues associated with disconnecting and reconnecting fluidic connections.
- Maintain the instrument in a clean operating and storage environment. Prevent excessive dust accumulation and keep all external surfaces clean. Protect the instrument from excessive vibration, mechanical shock, and accidental tipping, as these conditions may result in equipment damage or degraded performance.
- If the instrument will not be used for an extended period, remove all solvents from the fluidic pathways. Using the sample pump at a low flow rate, flush any remaining solvent into the LC waste container to prevent solvent residue accumulation and blockage of the tubing.
- Package and store the instrument in accordance with the storage requirements specified in this manual. Ensure that the storage environment complies with the recommended temperature, humidity, and other environmental specifications to maintain instrument performance, reliability, and long-term operational stability.

9 Troubleshooting

9.1 Common problems

Problem	Suggested Solution
"Replace reaction tube!"	Replace with a new reaction tube.
"Low UV lamp intensity!"	• Restart the instrument power switch. • If the problem persists after restarting, please contact technical support.
"Solvent leak detected!"	• Check if the PEEK fittings and tubing are intact, replace PEEK fittings or tubing if necessary. • Inspect the reaction tube fittings and tubing for integrity, replace the reaction tube. • Wipe off the liquid in the leakage tray, observe for 1 hour after the leakage alert disappears, and check if the leakage alert reoccurs.
"Communication error!"	• Restart the software. • Replug the USB connector. • Restart the power switch of the instrument.
"Temperature too high!"	• Check if the ambient temperature meets the requirements in the manual. • After shutting down to cool, restart the instrument. • Check if you can hear the instrument fan noise, if not, please contact customer service.

9.2 Other Problems

If the problem observed is not within the faults listed above, or the operation problem cannot be solved using the suggested solution, please contact the service engineers in time. Do not attempt to disassemble or repair the instrument by yourself.

FCC Statement

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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 undesired operation.

RF warning for device:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

Note : This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates,uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.