



Orbitrap Exploris 480 Familiarization

Revision 00 – July 2019

Objective

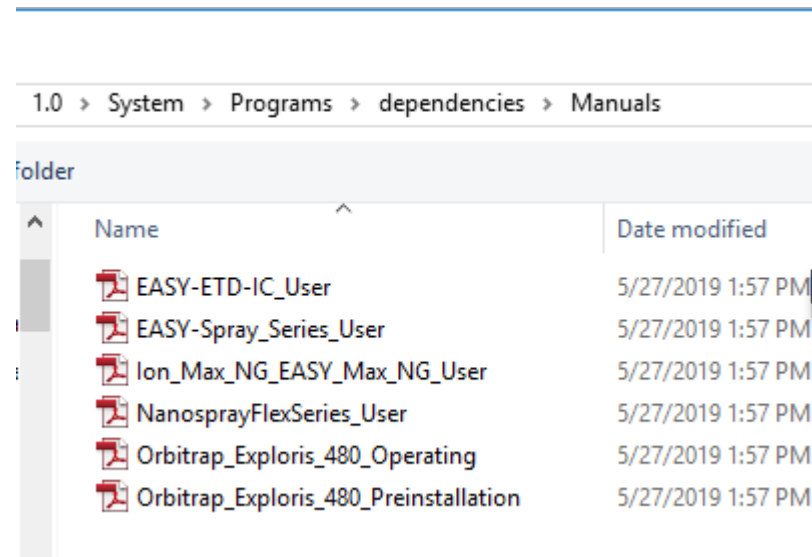
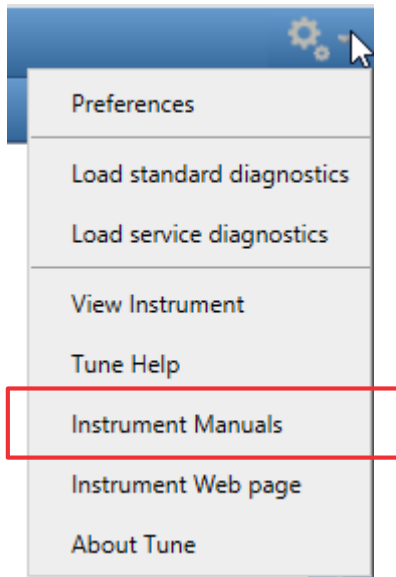
- Training document for FSE, not to be shared with customer
- Guide: what needs to be shown the customer during familiarization
- **direct to customer facing documentation:**
 - Quick user guides
 - Operating manuals
 - Knowledgebase
 - Extended Maintenance manual

☐	☐	Customer has contact information for each of the following areas						
☐		Knowledge-base/Website	☐		Tech Support	☐		Customer Service
☐		Training	☐		Spare Parts	☐		Field Service
F. Customer Familiarization								
<i>Review Hardware modules that were installed (from section A above)</i>								
Yes	No	TASK	Yes	No	TASK	Yes	No	TASK
☐	☐	System Start Up	☐	☐	Daily Maintenance	☐	☐	
☐	☐	System Shut down	☐	☐	Monthly Maintenance	☐	☐	
☐	☐	Sample Flow	☐	☐	Sample Injection	☐	☐	
<i>Review Software/System Operation (based on section C above)</i>								
Yes	No	TASK	Yes	No	TASK	Yes	No	TASK
☐	☐	Software Start Up	☐	☐	Saving Method	☐	☐	Saving Data
☐	☐	Sample Set Up	☐	☐	Data Reporting	☐	☐	Software Shut Down
☐	☐	How to run Samples	☐	☐	Data Collection	☐	☐	

- [Where to find information](#)
- [Overview of the instrument](#)
- [System start-up](#)
 - [Safety](#)
 - [System pump-down and bake out procedure](#)
 - [Instrument configuration and integration in system](#)
- [System shut-down](#)
- [Software](#)
- [Maintenance](#)
- [Consumables](#)

Where to find information

- In tune:
 - Orbitrap Exploris manuals
 - Source manuals



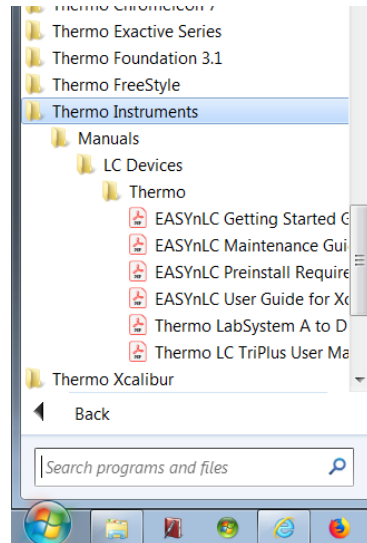
- Hardcopy: Pump manuals

Where to find information

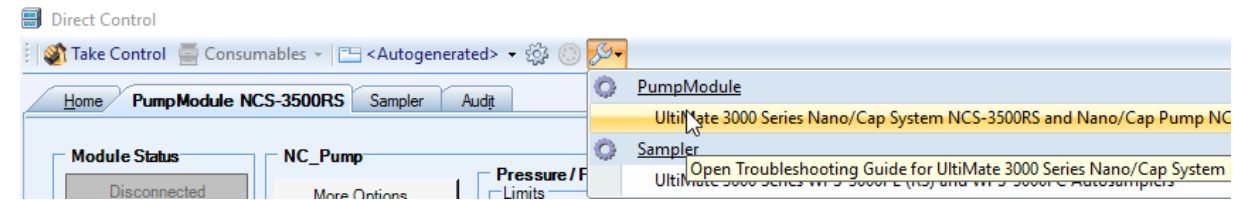
- EASY-nLC

OS (C:) > Thermo > Instruments > LC Devices > Thermo EASY-nLC Xcalibur VI			
Name	Date modified	Type	Size
EASynLC_Maintenance	8/25/2015 5:05 PM	Adobe Acrobat D...	47,664 KB
EASynLC_Preinstall	8/25/2015 5:05 PM	Adobe Acrobat D...	1,908 KB
EASynLC_Start	8/25/2015 5:05 PM	Adobe Acrobat D...	12,606 KB
EASynLC_Xcalibur_User	8/25/2015 5:05 PM	Adobe Acrobat D...	1,367 KB

Or via windows start



- [UltiMate RSLC nano](#)



Where to find information

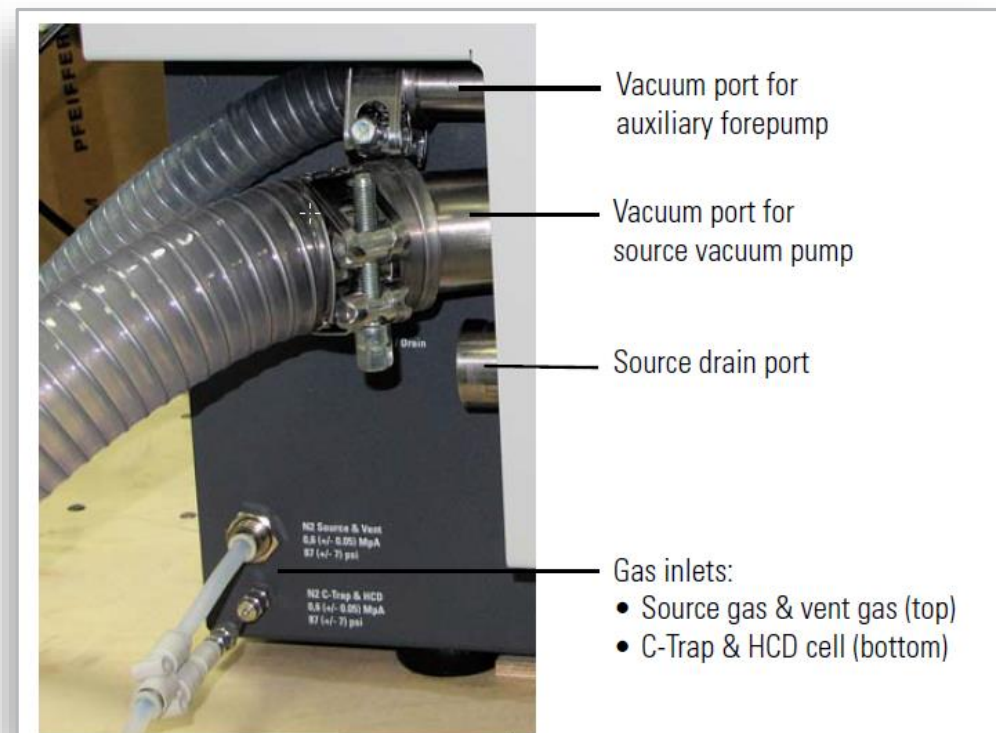
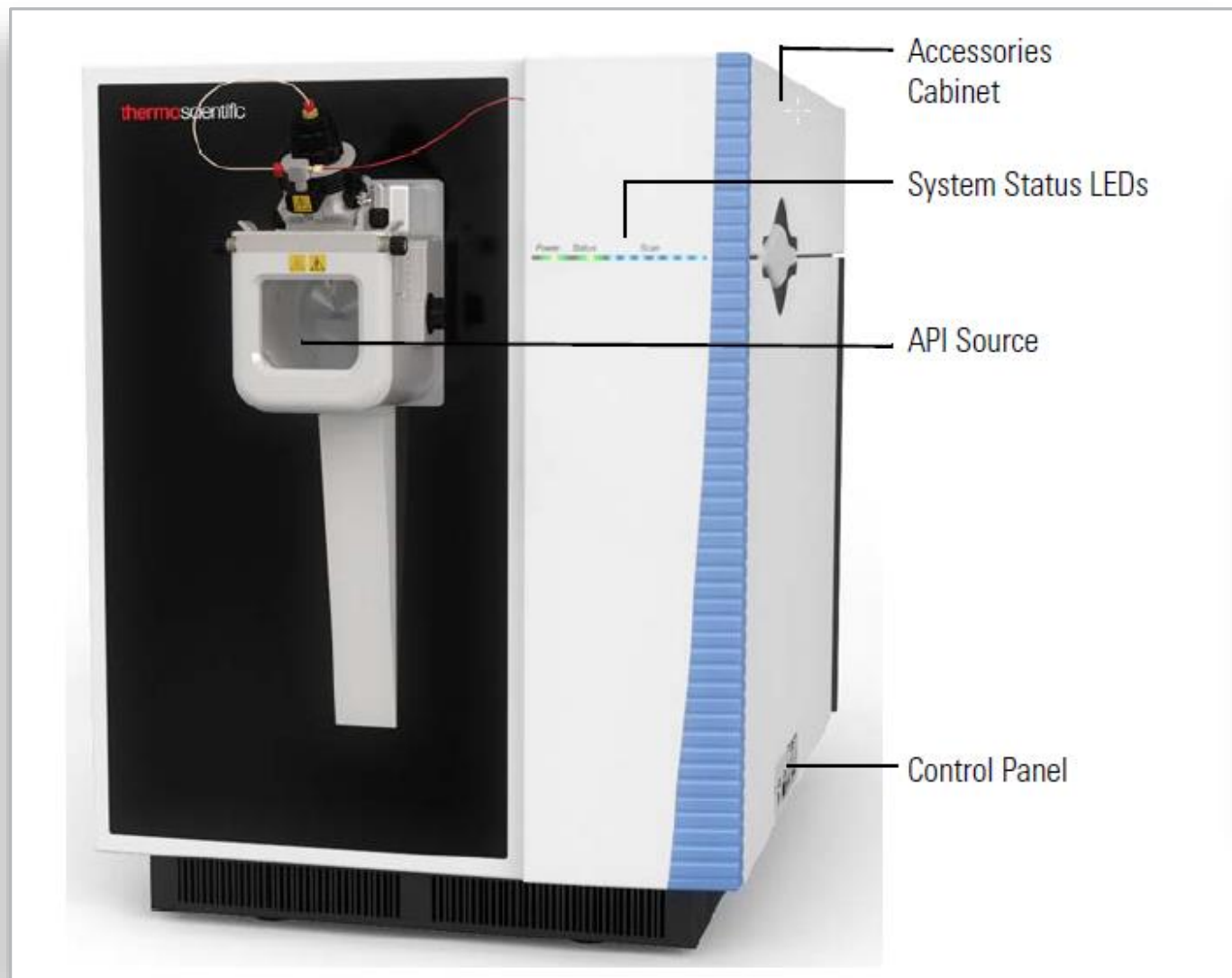
Contacting Us

There are several ways to contact Thermo Fisher Scientific. You can use your smartphone to scan a QR Code, which opens your email application or browser.

Contact	Link / Remarks	QR Code
Brochures and Ordering Information	www.thermofisher.com/orbitrap	
Patent Information	www.thermofisher.com/ms-patents	
Service Contact	www.unitylabservices.com	
Technical Documentation SharePoint	◆ To get user manuals for your product 1. With the serial number (S/N) of your instrument, request access on our customer SharePoint as a customer at www.thermoscientific.com/TechnicalDocumentation 2. For the first login, you have to create an account. Follow the instructions given on screen. Accept the invitation within six days and log in with your created Microsoft™ password. 3. Download current revisions of user manuals and other customer-oriented documents for your product. Translations into other languages may be available there as well.	
Customer Feedback	◆ To suggest changes to this manual You are encouraged to report errors or omissions in the text or index. Send an email message to the Technical Editor at documentation.bremen@thermofisher.com.	

- [ULS Knowledgebase](#)
- [Planet Orbitrap](#)
- www.thermofisher.com
- [Software Download and Licensing Portal](#)
- [Bremen Technical Documentation](#)

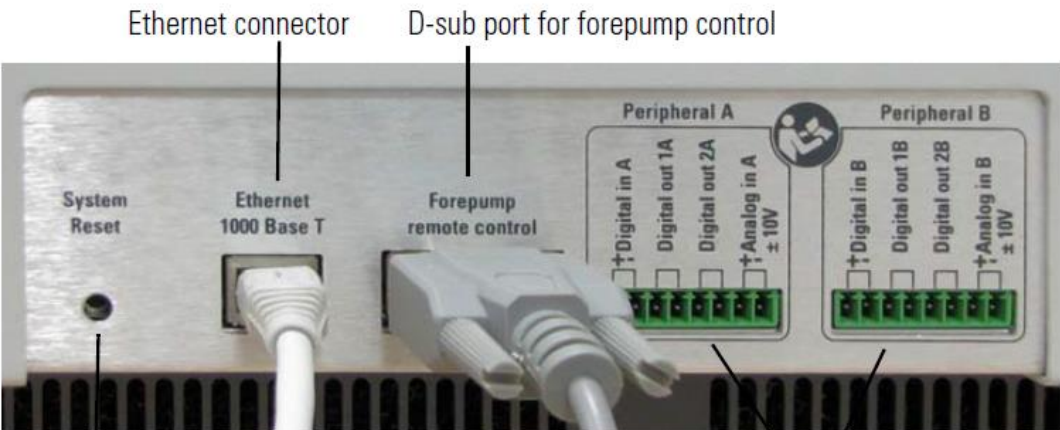
Orbitrap Exploris 480: layout



Orbitrap Exploris 480: layout

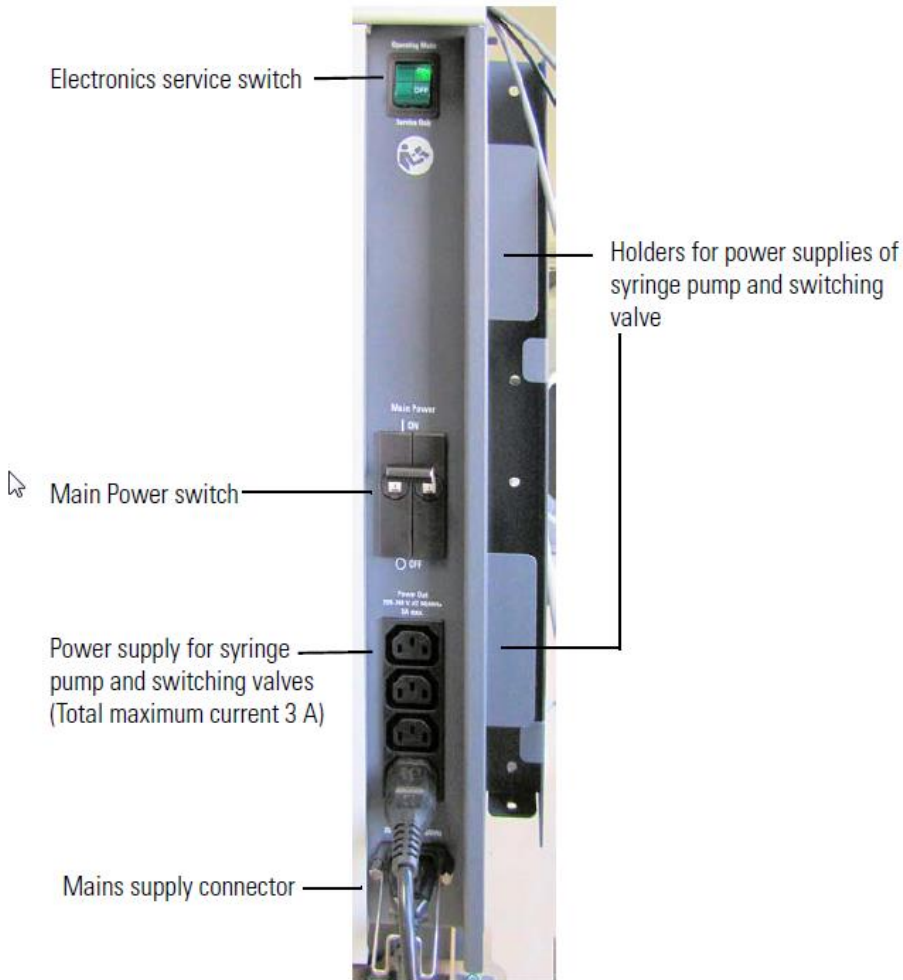


Ventilation Slots Control Panel Power Column



Ethernet connector D-sub port for forepump control

System reset Peripheral control connectors



Electronics service switch

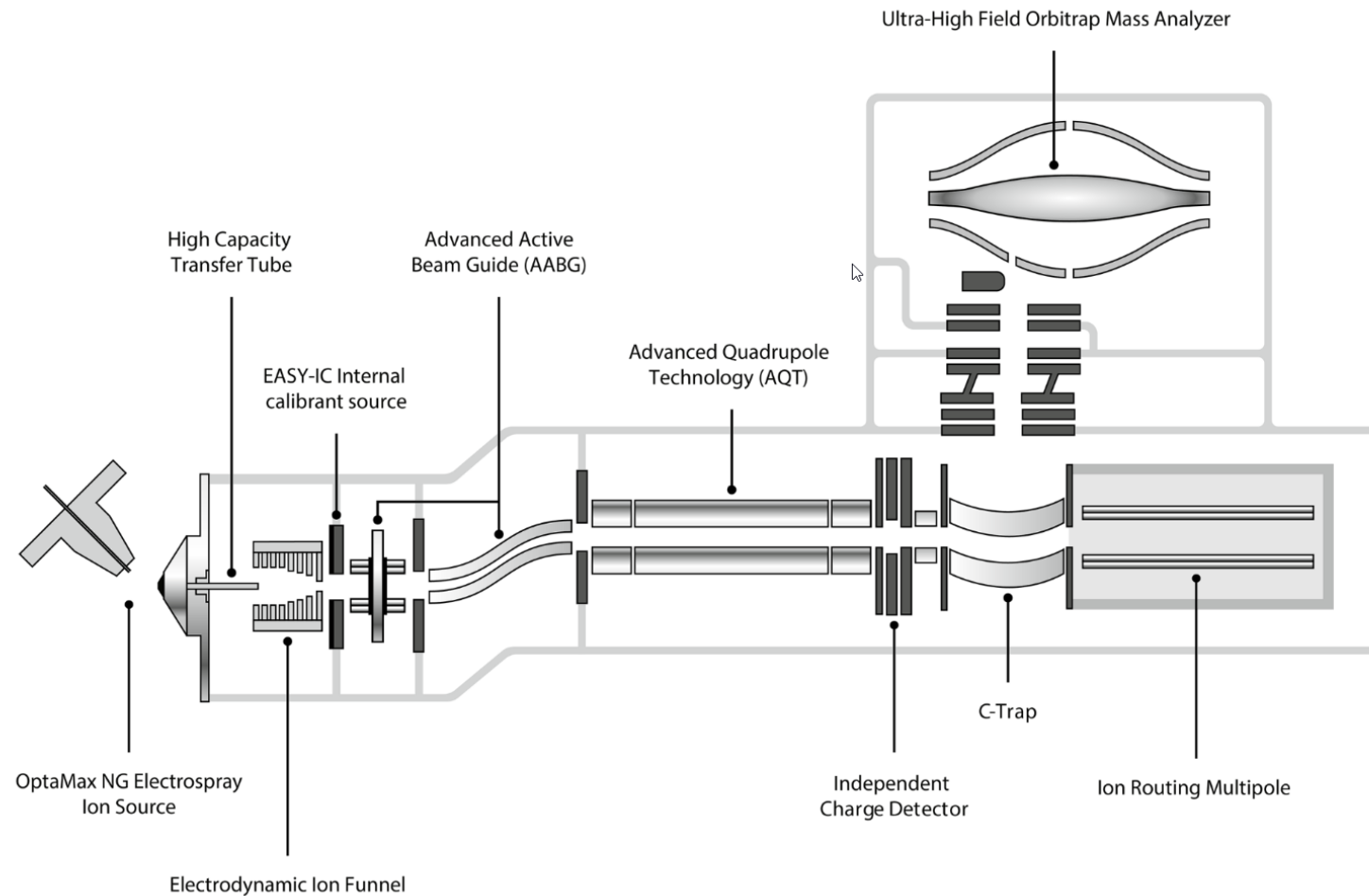
Main Power switch

Power supply for syringe pump and switching valves (Total maximum current 3 A)

Mains supply connector

Holders for power supplies of syringe pump and switching valve

Orbitrap Exploris 480



[Animation](#)

- [Safety](#)
- [System pump-down and bake out procedure](#)
- [Instrument configuration and integration in system](#)
 - [Optamax Ion Source](#)
 - [Peripherals](#)

- Depending on Configuration:
 - [IC option](#)
 - [EASY-nLC](#)
 - [UltiMate 3000](#)
 - [EASY Spray Ion Source](#)
 - [Nano Spray Flex Ion Source](#)
 - [FAIMS](#)



Orbitrap Exploris 480 Operating Manual



Contents

- Safety Symbols and Signal Words in this Manual on page 4-2
- Safety Symbols on the Instrument on page 4-3
- Intended Use on page 4-5
- Electric Safety Precautions on page 4-8
- In Case of an Emergency on page 4-9
- Residual Hazards on page 4-10
- Personal Protective Equipment on page 4-12

Pump down and Baking

Starting Up the System after a Shutdown

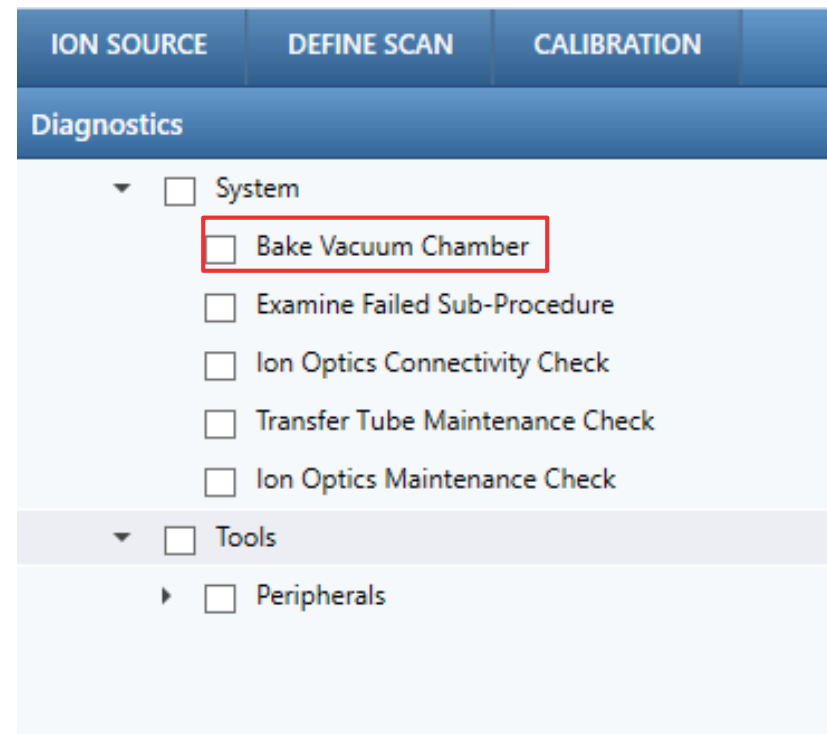


To start up the Orbitrap Exploris 480 mass spectrometer after it has been shut down (and vented), you must do the following:

1. Start up the instrument
2. Set up conditions for operation

- The instrument will start an automatic bake-out when the turbomolecular pump is at nominal speed
 - typically 10–15 minutes after power up of the instrument.
 - Please note that the data acquisition PC needs to be up and running and connected to the instrument

Also possible to trigger bake-out manually from the diagnostics in Tune



Configuring the Ion Source

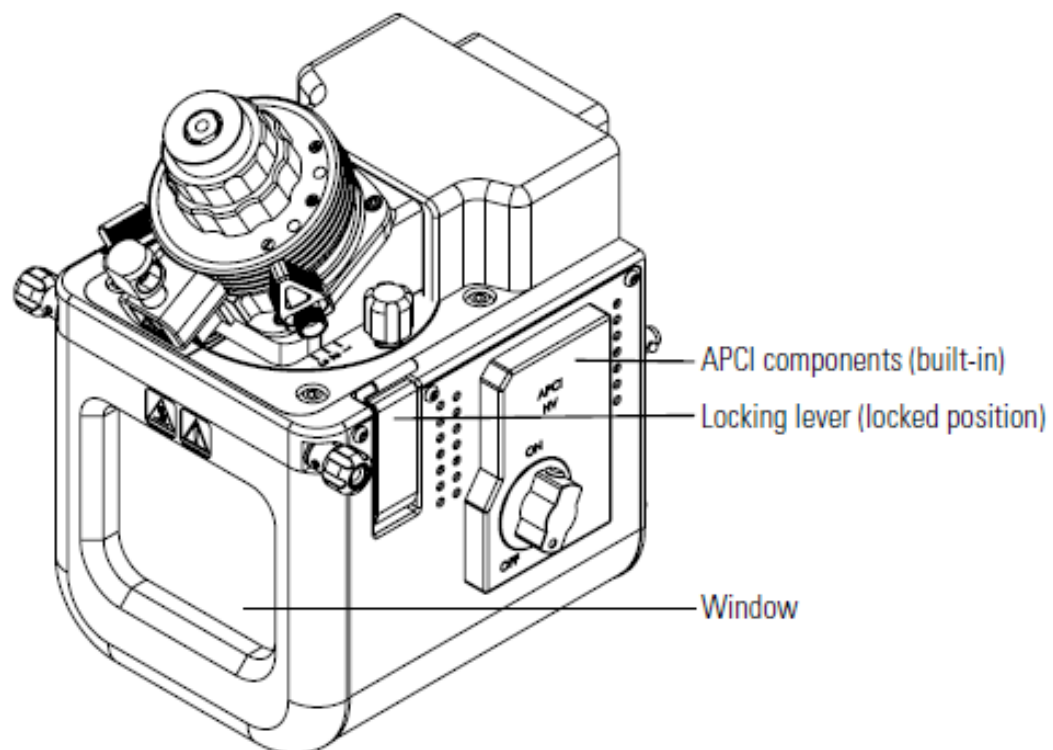
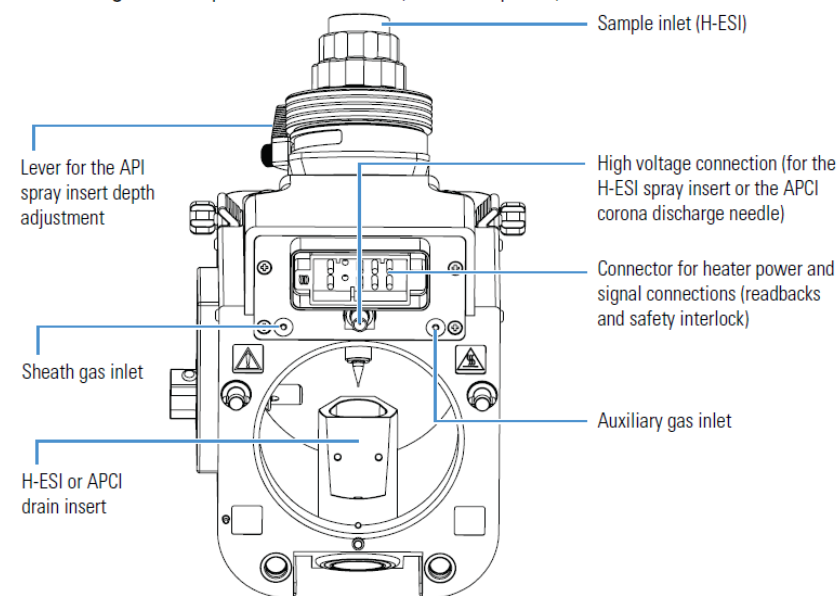


Figure 3-4. OptaMax NG API source (H-ESI mode)

Figure 8. OptaMax NG ion source (back and top view)



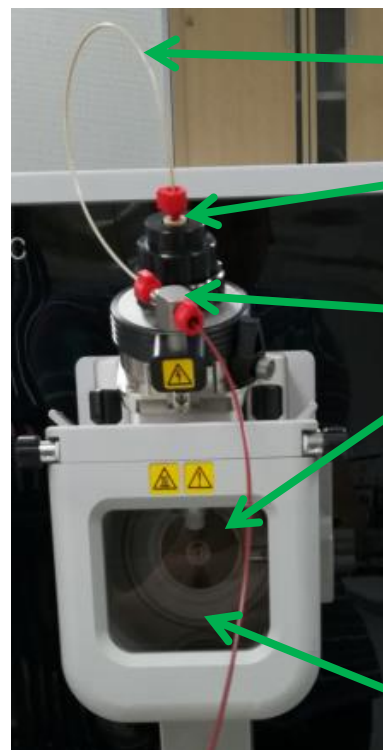
Three valid configurations of the Optamax Source

High flow application



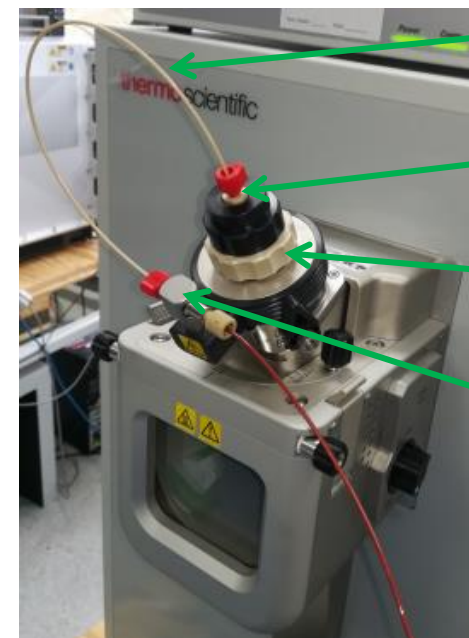
- Red short PEEK tubing
- High flow needle insert
- Grounding union
- Spray cone (suitable version)
- Drain Insert

Low flow application



- Beige long PEEK tubing
- Low flow needle insert „L“
- Grounding union
- Spray cone (optional)
- No Drain Insert

Calibration only



- Beige long PEEK tubing
- Low flow needle insert „L“
- ESI calibration probe (beige nut)
- Grounding union
- No Spray cone
- No Drain Insert

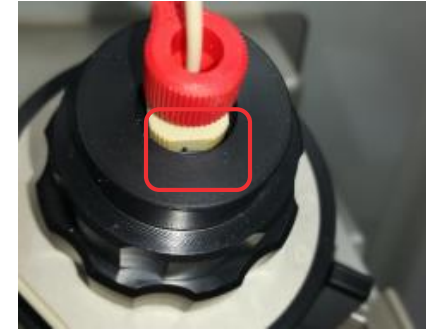
Needle assemblies and probe types



Low-flow needle (two piece)
(OPTON-30139)

High flow needle (single piece)

„L“



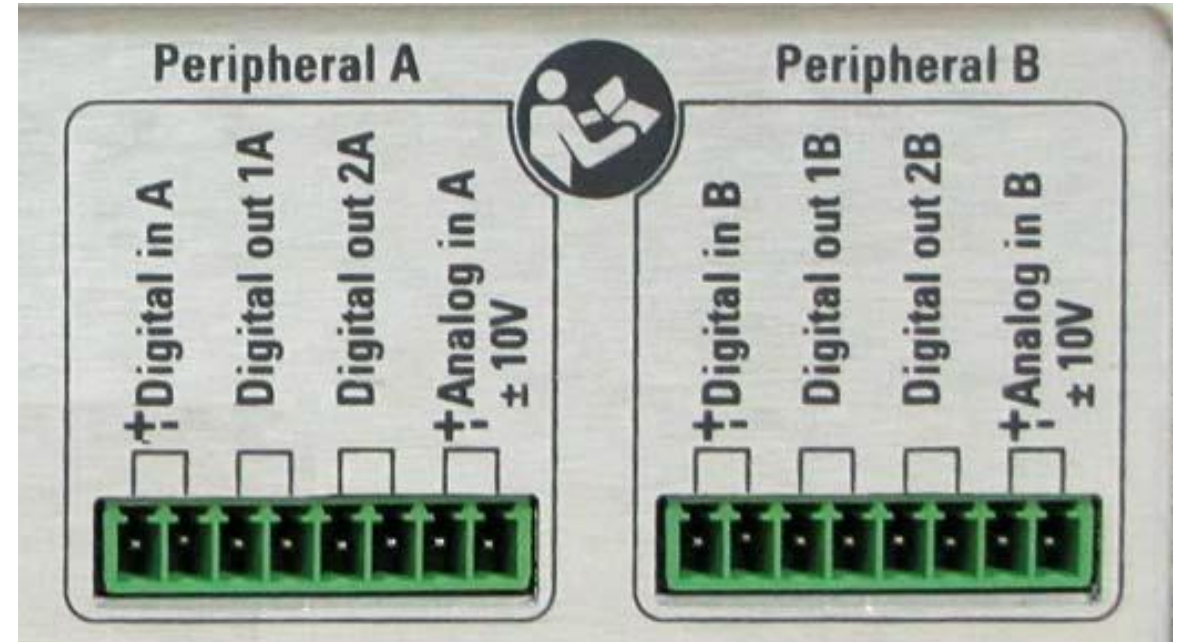
ESI calibration probe
(always low-flow)

HESI probe

- default with high-flow needle
- can be changed to low-flow needle, with OPTON-30139)

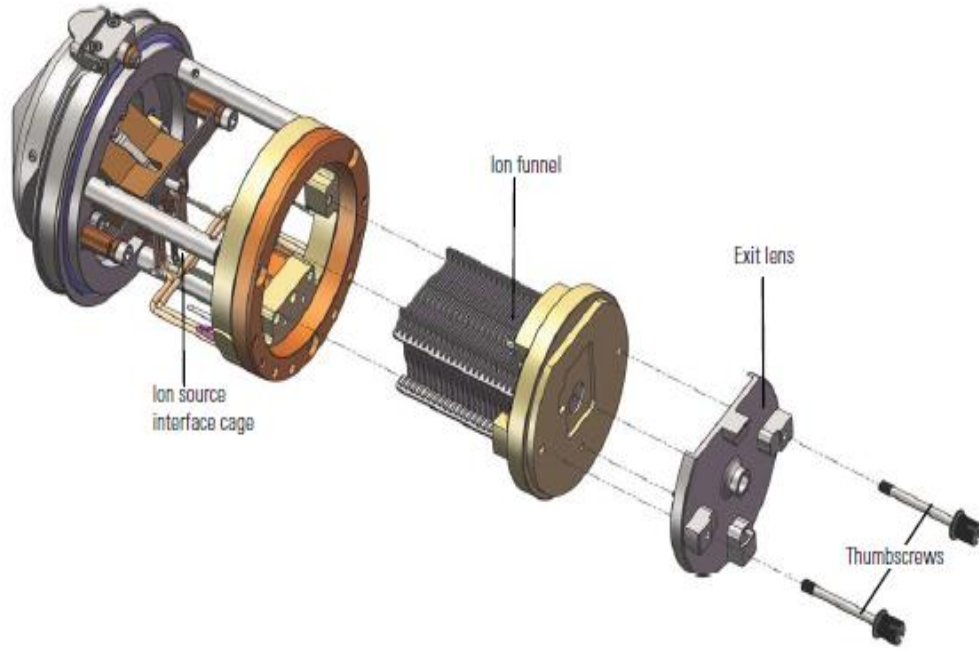
User I/O Connections

- Peripheral A, Peripheral B
- identical connectors
- communicate with two peripherals (LCs, for example) by digital and analog signals.

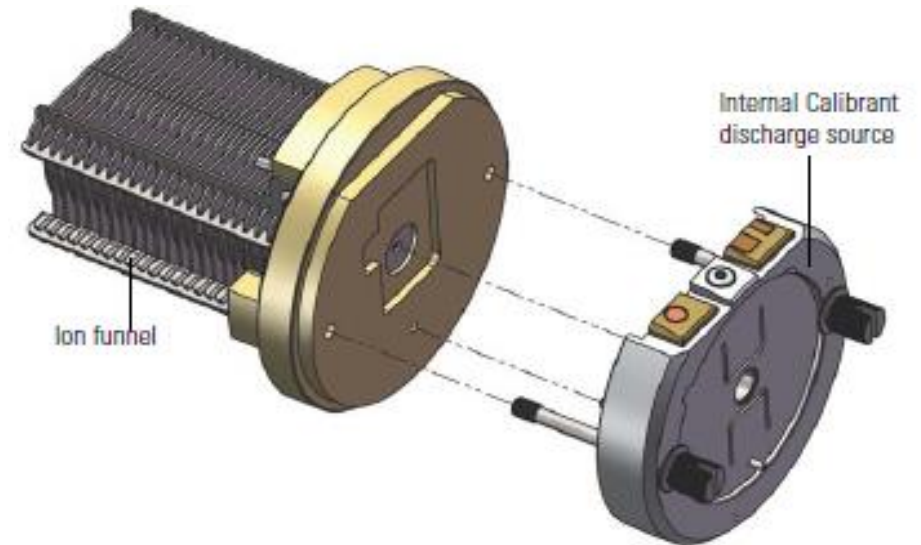


Orbitrap Exploris 480 Option: Internal Calibration

- Without IC option

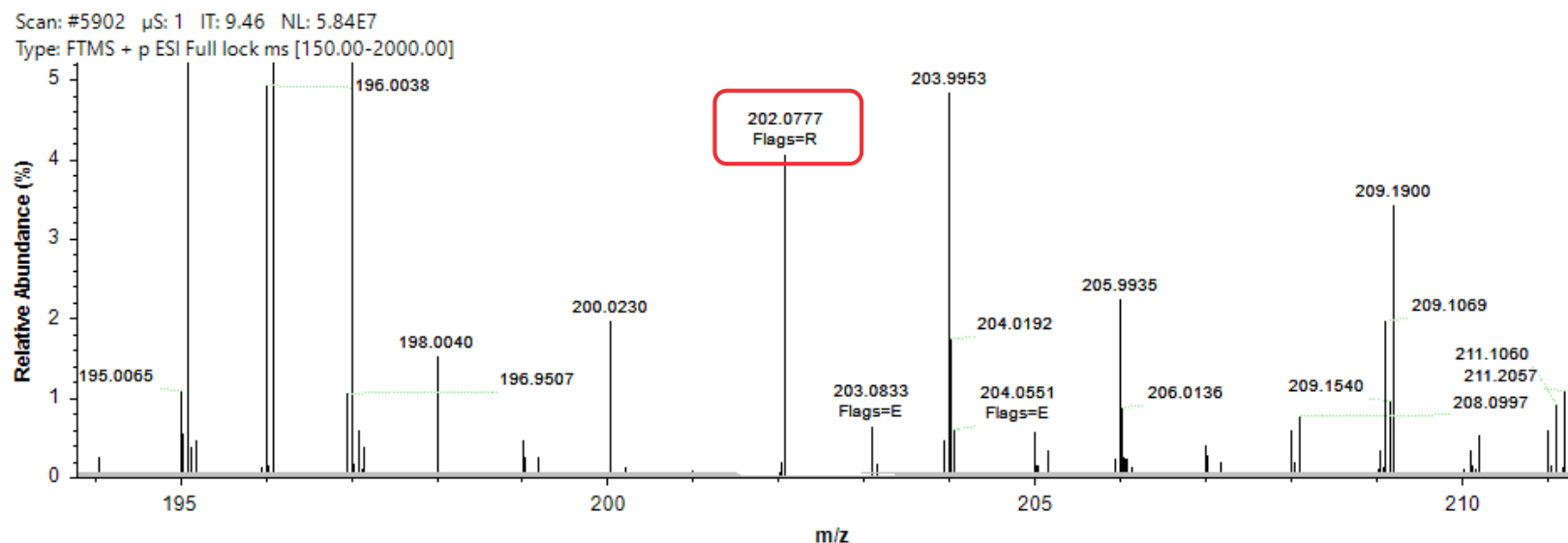
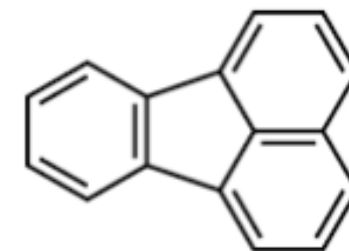


- With IC option



Orbitrap Exploris 480 Option: Internal Calibration

- Additional mass calibration with one mass ($m/z = 202$, Fluoranthene)
- Fluoranthene is already filled in and will last for 1 year



Thermo Scientific Dionex UltiMate 3000 Series

Nano/Cap System NCS-3500RS

Nano/Cap Pump NCP-3200RS

Operating Instructions
(Original Operating Instructions)



UltiMate 3000 Series:
NCS-3500RS and NCP-3200RS

3.4 Connecting the Module

Thermo Scientific SII for Xcalibur Quick Start Guide

You can use Thermo Scientific™ Standard Instrument Integration (SII) for Xcalibur™ software to acquire data and control a wide range of instruments via the Thermo Scientific™ Xcalibur™ data system. SII for Xcalibur is based on the Thermo Scientific™ Dionex™ Chromeleon™ 7 Chromatography Data System and uses certain key Chromeleon features. This guide provides an overview of operation when SII for Xcalibur is installed.

Note For access to Chromeleon features other than those required by SII for Xcalibur, you must purchase the appropriate licenses. Contact your local Thermo Scientific sales representative for details.

Contents

- Overview
- Starting the Software
- Equilibrating the System
- Direct Control of the System
- Automated Control of the System
- Viewing Chromatographic Data
- Troubleshooting



Thermo

EASY-nLC Series

User Guide for LC Devices

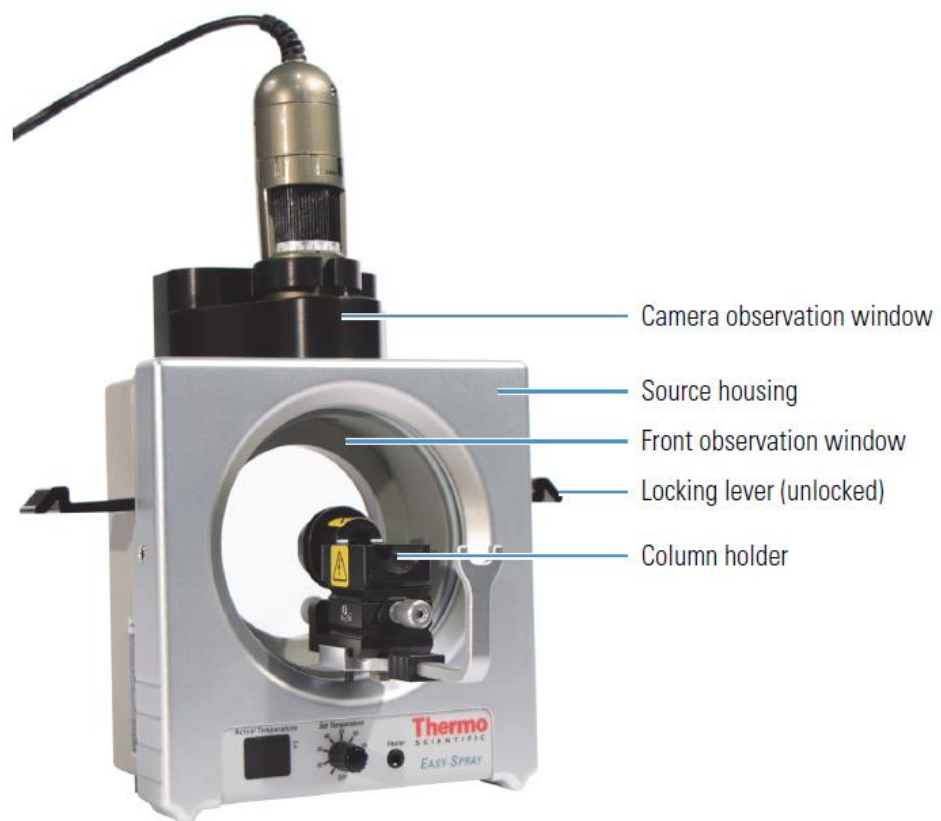
- 2 Setting Up the Foundation Instrument Configuration**
Adding the System Devices to the Instrument Configuration

Thermo

EASY-nLC Series

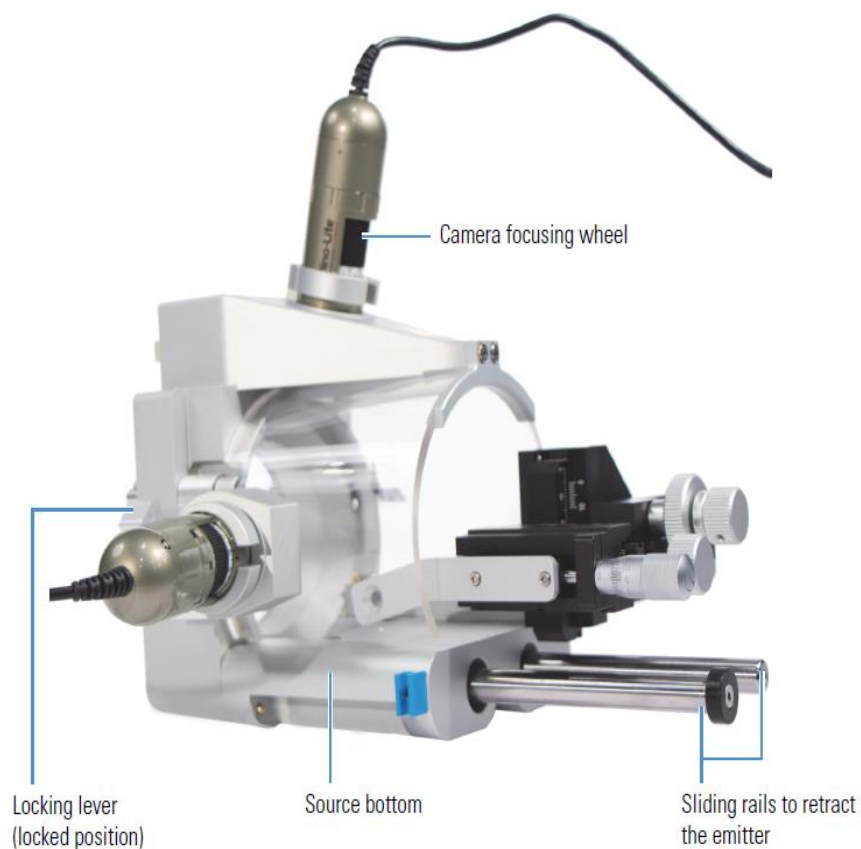
Getting Started Guide

- 4 Configuring the EASY-nLC System**
Setting Up Communication with the Mass Spectrometer



EASY-Spray Series Ion Source

User Guide



Nanospray Flex Series Ion Source

User Guide



[FAIMS User Guide](#)

FAIMS Pro System

User Guide

High-Field Asymmetric Waveform Ion Mobility Spectrometry System

System shut down

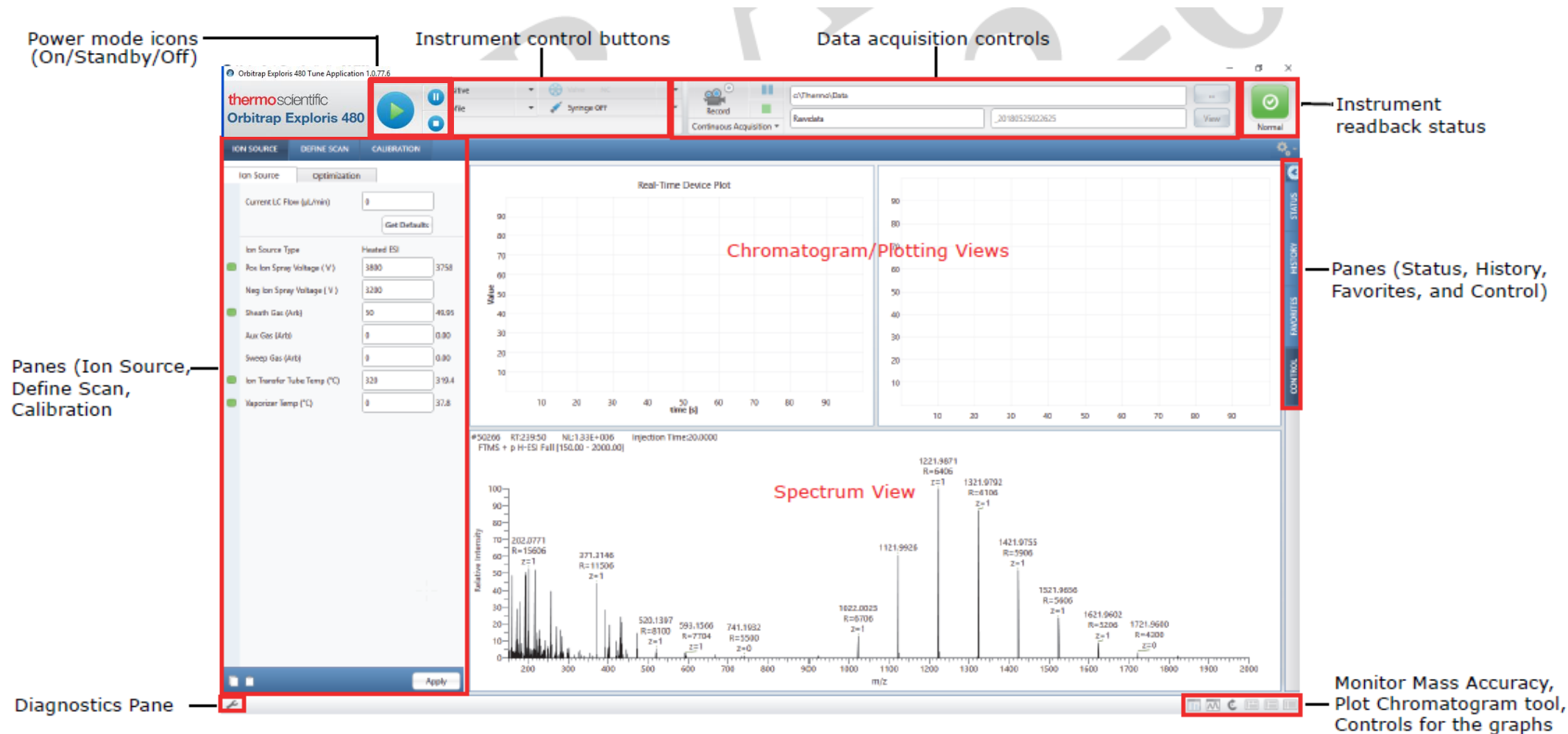
- Shutdown: For service or maintenance
 - If not acquiring over short periods of time place instrument in standby
- Wait until data acquisition, if any, is complete.
- Turn off the flow of sample solution from the LC (or other sample introduction device).
- In the Tune window, click the System Off button.
 - All high voltages are shut off, as are the sheath and sweep gas.
- Put the main power circuit breaker switch of the mass spectrometer in the Off position.
 - When the rotational speed of the TMP is reduced sufficiently, power to the vent valve solenoid is shut off. The vent valve opens and the manifold is vented with nitrogen.
 - Keeping on the nitrogen flow prevents humidity from contaminating the vacuum system of the mass spectrometer. You may however switch off the nitrogen if your supply is limited.
- Dust can be sucked in through the ion inlet system. To reduce this risk to a minimum, keep an ion source housing installed on the mass spectrometer also during off and standby times.



Basic functions in Orbitrap Exploris tune

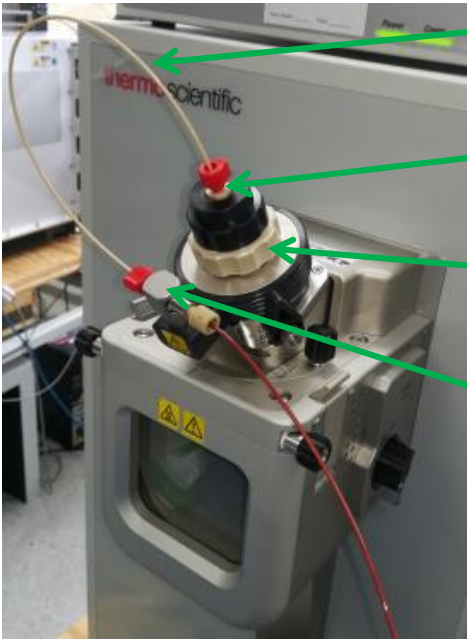
- [Orbitrap Exploris tune overview](#)
 - [Calibrations](#)
 - [Evaluations](#)
 - [Diagnostics](#)
- [Basic Method set up in Xcalibur](#)
- [Setting up a sequence in Xcalibur](#)

Orbitrap Exploris tune overview



Setting up for calibration

- Calibration set up



- Beige long PEEK tubing
- Low flow needle insert „L“
- ESI calibration probe (beige nut)
- Grounding union
- No Spray cone
- No Drain Insert

suggested position: down halfway between M and L; forward 1.2; sideways visually in the middle
Place a clean 500 µL syringe with 450 µL of calibration solution in the syringe pump.
Remove any air bubbles.

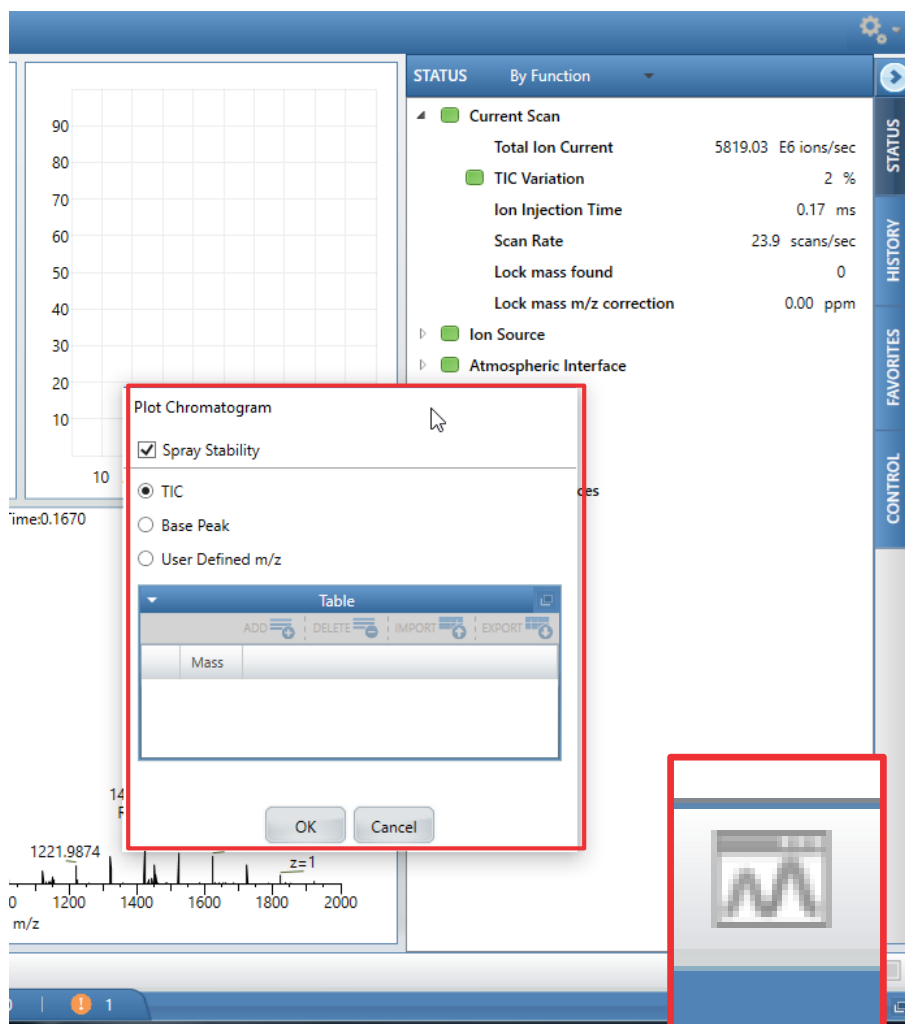
	Positive ion mode
Pos Ion Spray Voltage (V)	2500 to 3500
Ion Spray Current Readback*	0.4-0.5 µA
Sheath Gas (Arb)	0
Aux Gas (Arb)	7
Sweep Gas (Arb)	0
Ion Transfer Tube Temp (°C)	320
Funnel RF (%)	50
	Negative ion mode
Neg Ion Spray Voltage (V)	2000 to 3500
Ion Spray Current Readback*	0.2-0.3 µA

Ion Source and Define Scan panes

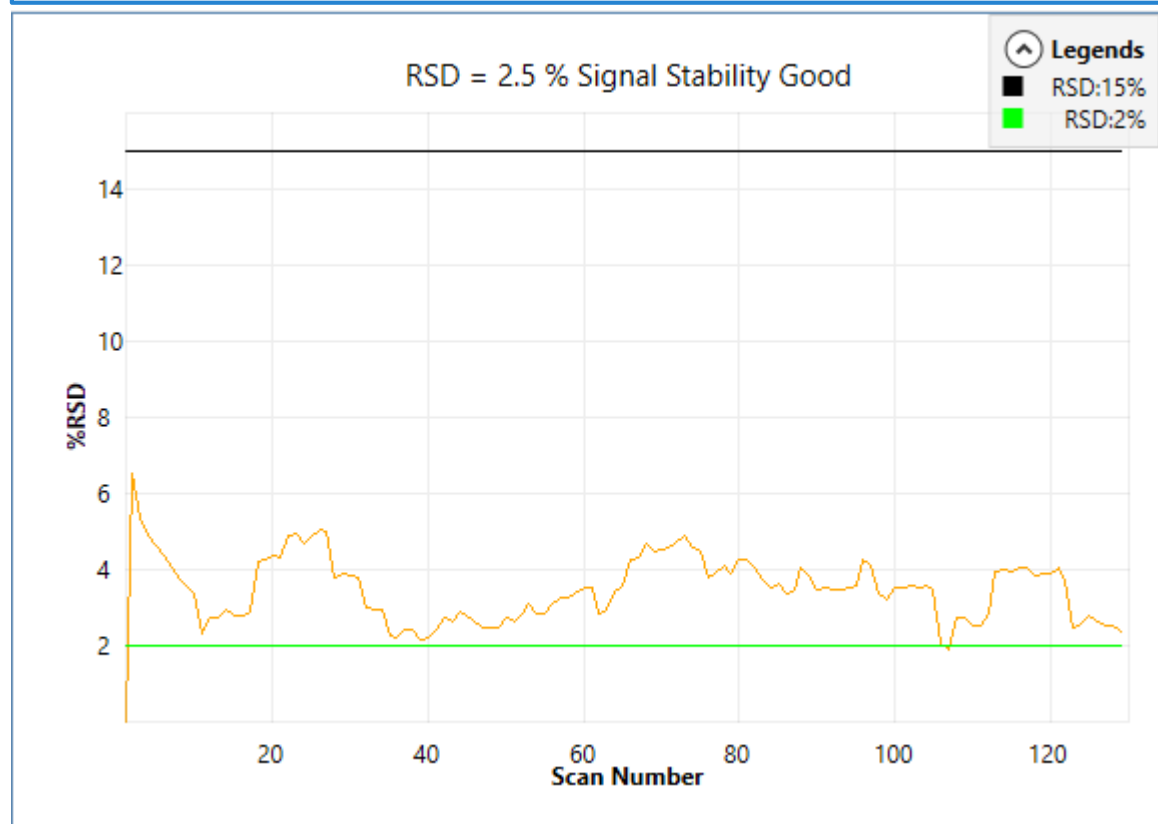
ION SOURCE		DEFINE SCAN		CALIBRATION	
Ion Source		Optimization			
Current LC Flow (μL/min)		0			
		<button>Get Defaults</button>			
Ion Source Type		ESI			
☒	Pos Ion Spray Voltage (V)	3000	▲▼	2964	
	Neg Ion Spray Voltage (V)	2200	▲▼		
	Sheath Gas (Arb)	0	▲▼	0.00	
☒	Aux Gas (Arb)	7	▲▼	7.01	
	Sweep Gas (Arb)	0	▲▼	0.00	
☒	Ion Transfer Tube Temp (°C)	320	▲▼	320.3	

ION SOURCE		DEFINE SCAN		CALIBRATION	
Scan Type		Full Scan			
Orbitrap Resolution		15000			
Scan Range (m/z)		150	-	2000	
RF Lens (%)		50			
AGC Target		Standard			
Maximum Injection Time		Custom			
Time (ms)		50			
Microscans		1			
Source Fragmentation		☐			

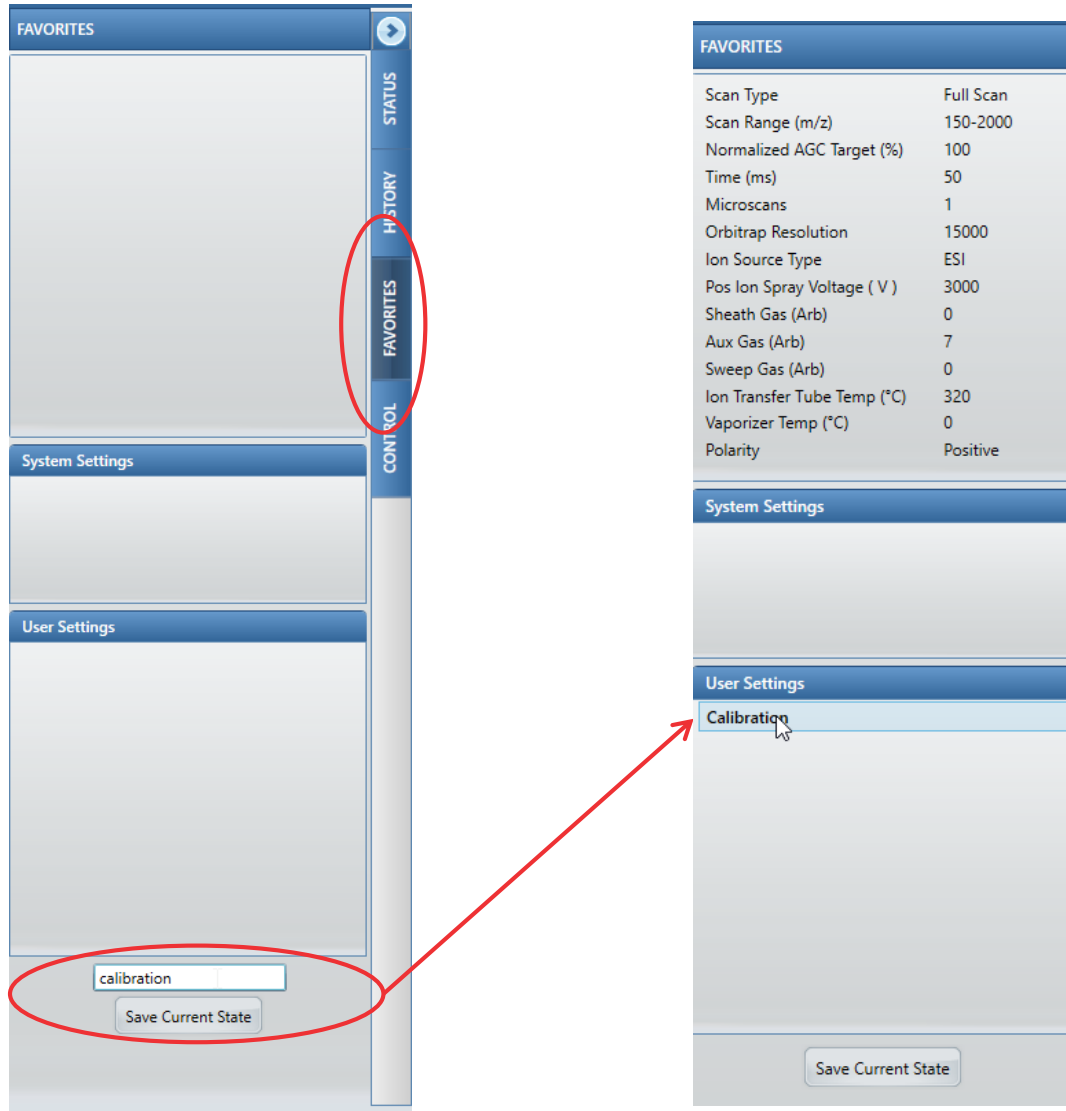
Checking for stable spray



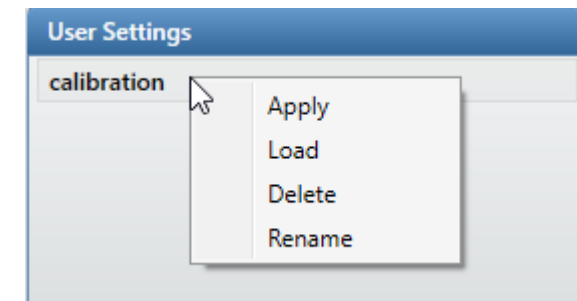
Note: set resolution at 15k



Saving Favorites



- Ion Source settings are a global instrument method parameter
- Favorites allow for saving, deleting, loading, applying ion source and scan settings



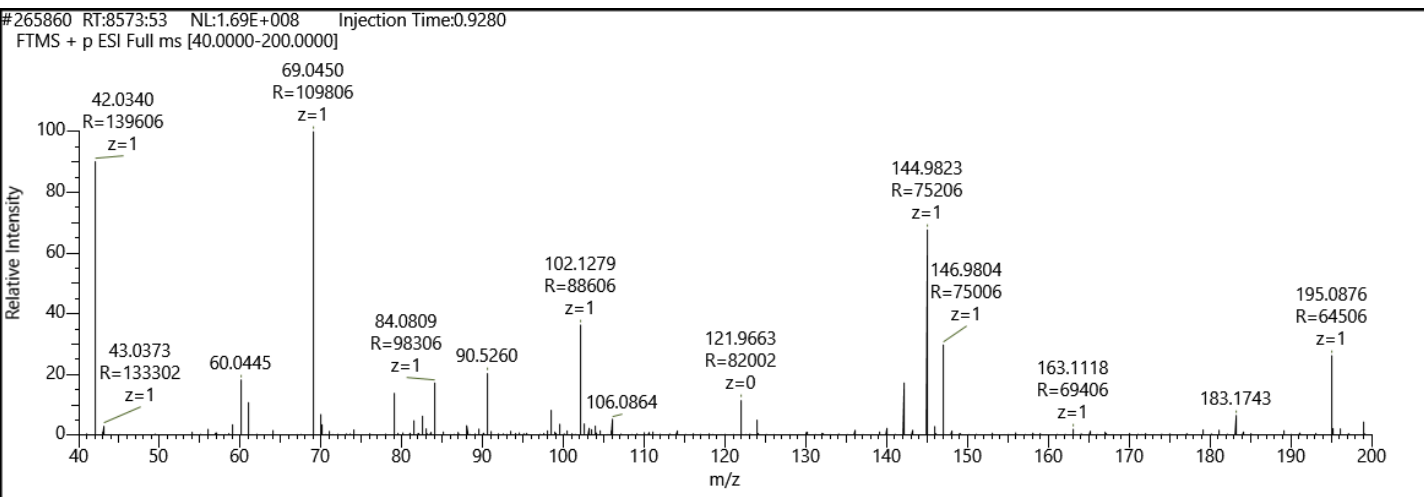
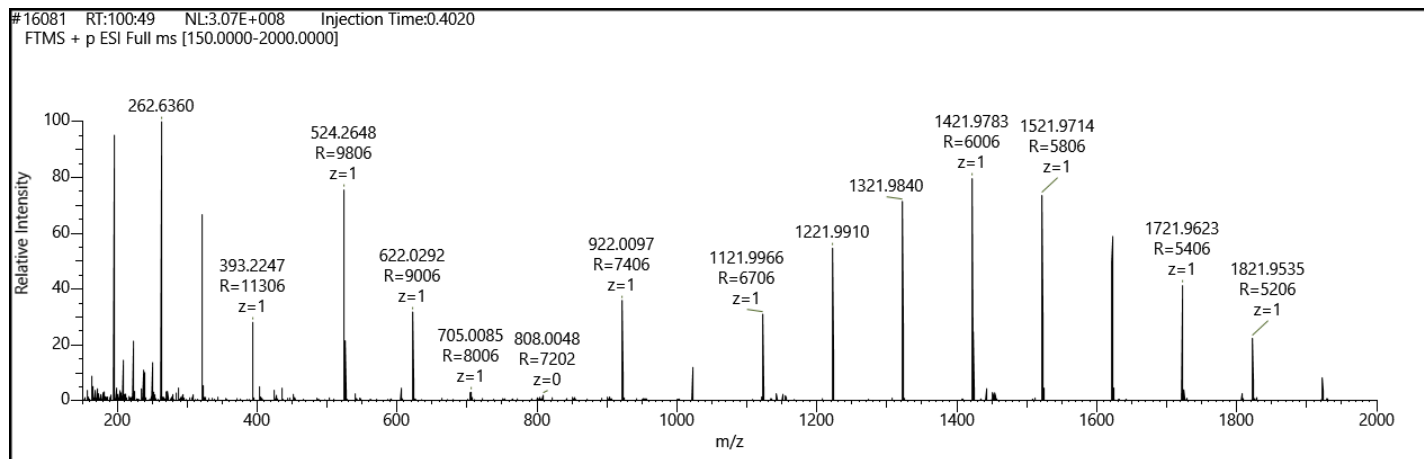
Enable hotlink

The image shows the ThermoFisher Tune Preferences dialog box overlaid on the main software interface. The dialog box has a red border and contains the following sections:

- General**
 - ☒ Clear Calibration check boxes when complete
 - ☒ Clear Diagnostics check boxes when complete
 - ☒ Enable Hotlink for Define Scan and Ion Source Panel
- Report Options**
 - ☒ Show Report Generation Options dialog box
 - ☐ Automatically generate reports
 - ☐ Do not generate reports
- Report Content Options**
 - ☒ Show Console
 - ☒ Show graph
 - ☒ Show spectrum
 - ☒ Show system configuration
 - ☒ Show embedded system configuration
- Alerts Console Options**
 - ☒ Show warnings
 - ☐ Show recovered errors and warnings
 - ☐ Show information
 - 300 Minutes included in the log file before error detected
 - 300 Minutes included in the log file after error detected

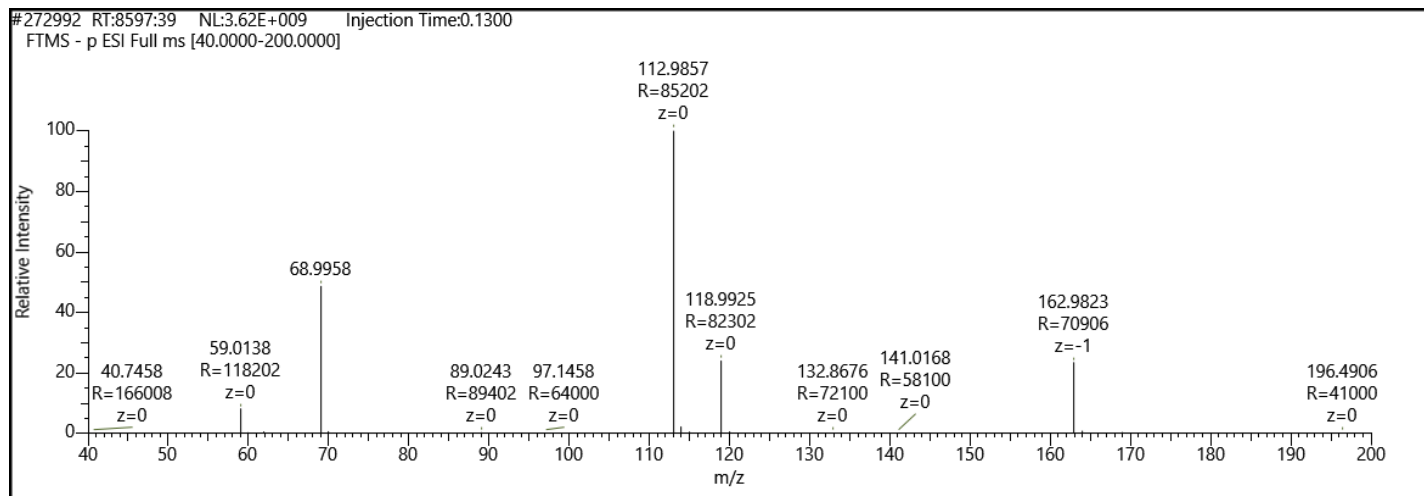
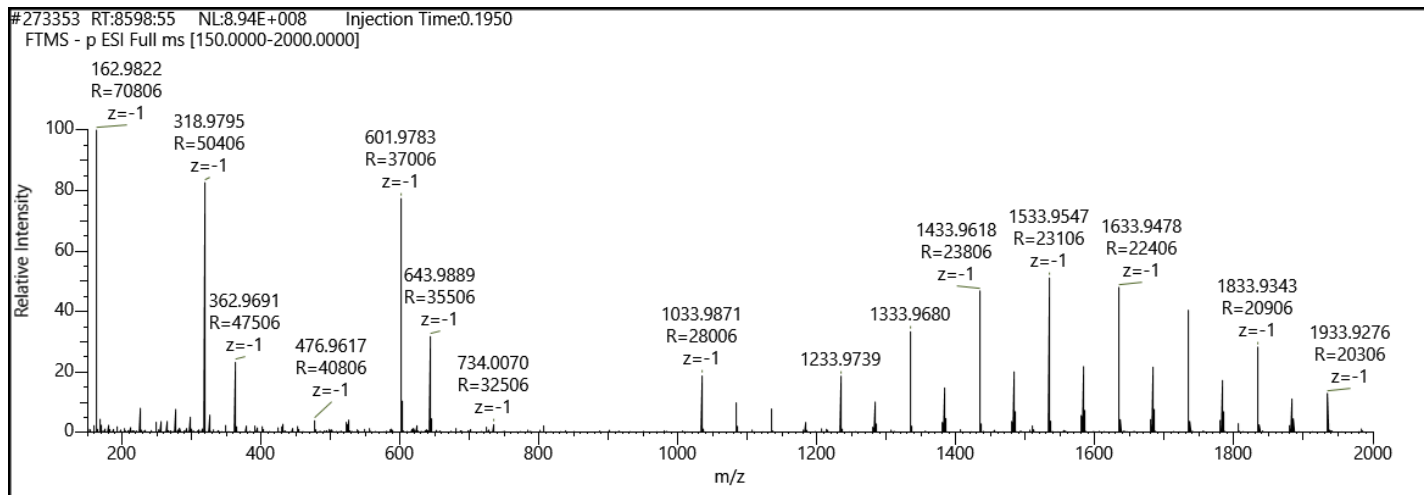
At the bottom of the dialog box are 'OK' and 'Cancel' buttons. In the background, the main software interface is visible, showing a 'CALIBRATION' tab with a 'Get Defaults' button and a mass spectrum plot. A 'Preferences' menu is also visible in the top right corner of the background interface.

Flexmix – pos Ion Mode



Components:	Accurate Mass (m/z)	Ion Type
Imidazole	69.04472	[M+H] ⁺
Triethylamine	102.12773	[M+H] ⁺
Tetramethylpiperidine	142.15903	[M+H] ⁺
Caffeine	195.08765	[M+H] ⁺
MRFA 2+	262.63612	[M+2H] ²⁺
Hexamethoxyphosphazene	322.04812	[M+H] ⁺
MRFA	524.26496	[M+H] ⁺
Hexakis(2,2-difluoroethoxy)phosphazene	622.02896	[M+H] ⁺
Hexakis(2,2,3,3-tetrafluoropropoxy)phosphazene	922.00980	[M+H] ⁺
Ultramark	1022.00341	[M+H] ⁺
	1121.99702	[M+H] ⁺
	1221.99064	[M+H] ⁺
	1321.98425	[M+H] ⁺
	1421.97786	[M+H] ⁺
	1521.97147	[M+H] ⁺
	1621.96509	[M+H] ⁺
	1721.95870	[M+H] ⁺
	1821.95231	[M+H] ⁺
	1921.94593	[M+H] ⁺
Hexakis(1h,1h,7h-perfluoroheptoxy)phosphazene	2121.93315	[M+H] ⁺
Hexakis(1h,1h,9h-perfluorononyloxy)phosphazene	2721.89483	[M+H] ⁺
	2721.89445	

Flexmix – neg Ion Mode



Components:	Accurate Mass (m/z)	Ion Type
LC-MS grade acetic acid	59.01385	[M-H] ⁻
Trifluoroacetic acid (TFA)	112.98559	[M-H] ⁻
Pentafluoropropionic acid	162.98239	[M-H] ⁻
Perfluoroheptanoic acid	362.96962	[M-H] ⁻
2,4,6-Tris(heptafluoropropyl)-1,3,5-triazine	601.97898	[M+OH] ⁻
Hexakis(2,2,3,3-tetrafluoropropoxy)phosphazene	1033.98811	[M+TFA] ⁻
	1133.98172	[M+TFA] ⁻
	1233.97533	[M+TFA] ⁻
	1333.96895	[M+TFA] ⁻
	1433.96256	[M+TFA] ⁻
	1533.95617	[M+TFA] ⁻
	1633.94979	[M+TFA] ⁻
	1733.94340	[M+TFA] ⁻
	1833.93701	[M+TFA] ⁻
Ultramark	1933.93062	[M+TFA] ⁻
Hexakis(1h,1h,7h-perfluoroheptoxy)phosphazene	2233.91146	[M+TFA] ⁻
Hexakis(1h,1h,9h-perfluorononyloxy)phosphazene	2833.87314	[M+TFA] ⁻

Mass Calibration

ION SOURCE DEFINE SCAN **CALIBRATION**

Calibration Options

☐ Skip Spray Stability Evaluation

☐ Check Only

☐ Set System to Standby on Completion

▼ ☒ **Mass Calibration**

☐ Positive ion mode

☐ Negative ion mode

▼ ☐ System Calibration

☐ Positive ion mode

☐ Negative ion mode

- MS should be calibrated to ensure the mass accuracy of the results.
- Before you start the calibration check that you have a **stable spray**
- If the system has been in Off mode before, put the instrument into On mode or Standby mode for at least 90 minutes before you start a mass calibration procedure.
- Evaluate daily/weekly if it fails, calibrate. Good idea to calibrate before every sequence of important experiments.
- Calibrate unused polarity modes (e.g. neg) at least every 3 months.

System Calibration

ION SOURCE DEFINE SCAN **CALIBRATION**

Calibration Options

☐ Skip Spray Stability Evaluation

☐ Check Only

☐ Set System to Standby on Completion

▼ ☐ Mass Calibration

☐ Positive ion mode

☐ Negative ion mode

▼ ☐ **System Calibration**

☐ Positive ion mode

☐ Negative ion mode

- **Always** run the positive ion polarity calibration procedure before the negative ion polarity calibration procedure
- Before you start the calibration check that you have a **stable** spray
- Calibrate monthly

	Recommended	Last Calibrated
▼ ☐ Mass Calibration		
✓ ☐ Positive ion mode	Jun 08, 2019	Jun 07, 2019
✓ ☐ Negative ion mode	Jun 08, 2019	Jun 07, 2019
▼ ☐ System Calibration	Jun 07, 2019	
✓ ☐ Positive ion mode	Jul 07, 2019	Jun 07, 2019

- Calibration/evaluation

ION SOURCE DEFINE SCAN **CALIBRATION**

Calibration Options

☐ Skip Spray Stability Evaluation

☐ Check Only

☐ Set System to Standby on Completion

▼ ☐ Mass Calibration

☐ Positive ion mode

☐ Negative ion mode

▼ ☐ System Calibration

☐ Positive ion mode

☐ Negative ion mode

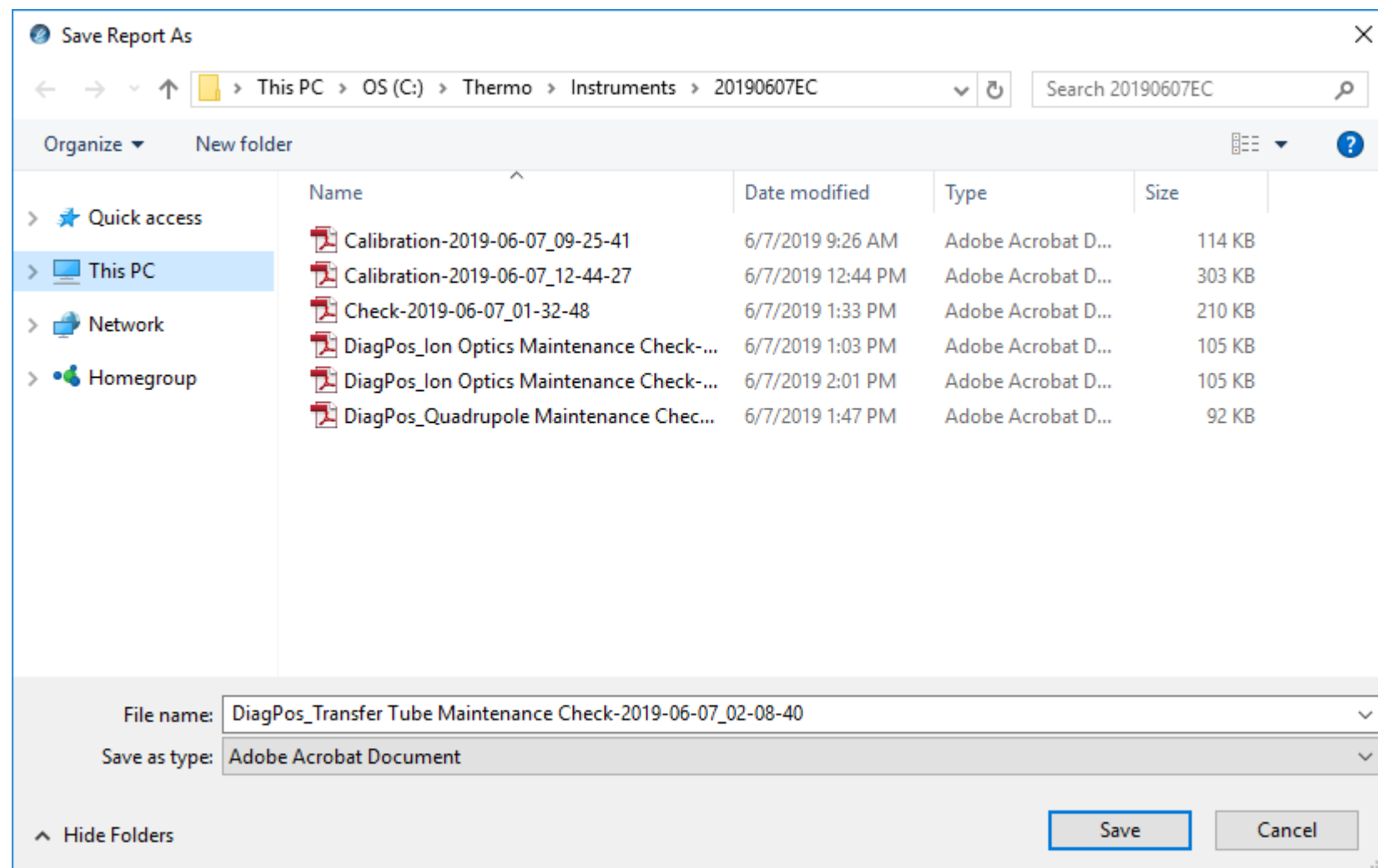
- Each Tune Calibration is accompanied by a Check procedure
- „Check Only“ toggle enables Evaluation only, skips Calibration

Saving a report

Report Generation Options

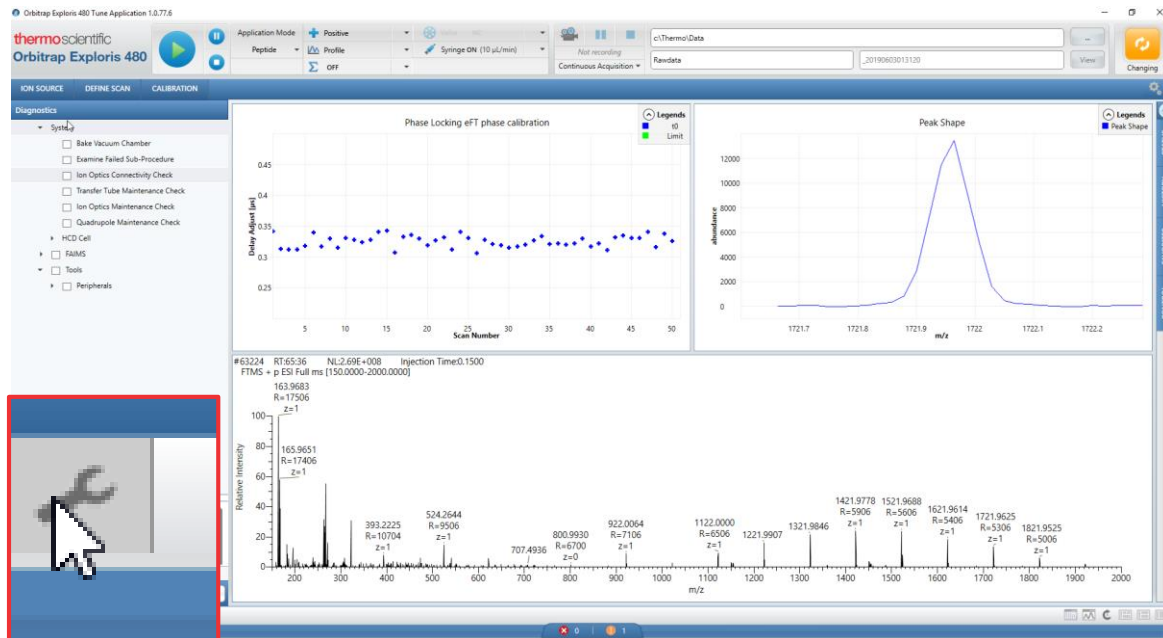
- ☒ Generate Report Now
- ☐ Save For Later
- ☐ Discard Report(s)

OK



Evaluation Results

Name	Result	Value	Minimum	Maximum	Comment
Check Signal Stability	Passed	-	-	-	good signal stability 5.5 %
System Calibration - Positive ion mode	Passed	-	-	-	
eFT Phase Check	true	-	-	-	Delta t0=-0.02 +/- 0.01
PhiSDM Hi-Speed TMT Phase Check	true	-	-	-	-
Spectral Mass Accuracy Check	true	-	-	-	External Calibration Error rms = 1.0 ppm (Acceptance limit = 3.0 ppm). Internal Calibration Error rms = 0.1 ppm (Acceptance limit = 1.0 ppm).
Low m/z Spectral Mass Accuracy Check	true	-	-	-	External Calibration Error rms = 0.8 ppm (Acceptance limit = 3.0 ppm). Internal Calibration Error rms = 0.2 ppm (Acceptance limit = 1.0 ppm).
Mass Accuracy Transient Length Dependency Check	true	-	-	-	Maximum mass accuracy deviation is 0.5 ppm.
Mass Accuracy Space Charge Dependency Check	true	-	-	-	Maximum mass accuracy deviation is 0.3 ppm.
ICD ProSA Scaling Check	true	-	-	-	-
Injection Filter Isolation Check	true	-	-	-	-
Quadrupole Isolation Check	true	-	-	-	Quadrupole isolation check passed in both rod orientations.
Quadrupole Transm./Rod Config. Check	true	-	-	-	Passed: Transmission of m/z [69, 195, 524, 1622] meet specifications for both rod configurations. Both rods meet transmission equivalence specifications for rod switching.
HCD Fragmentation and Trapping Efficiency Check	true	-	-	-	All measurements within specifications.



ION SOURCE
DEFINE SCAN
CALIBRATION

Diagnostics

System

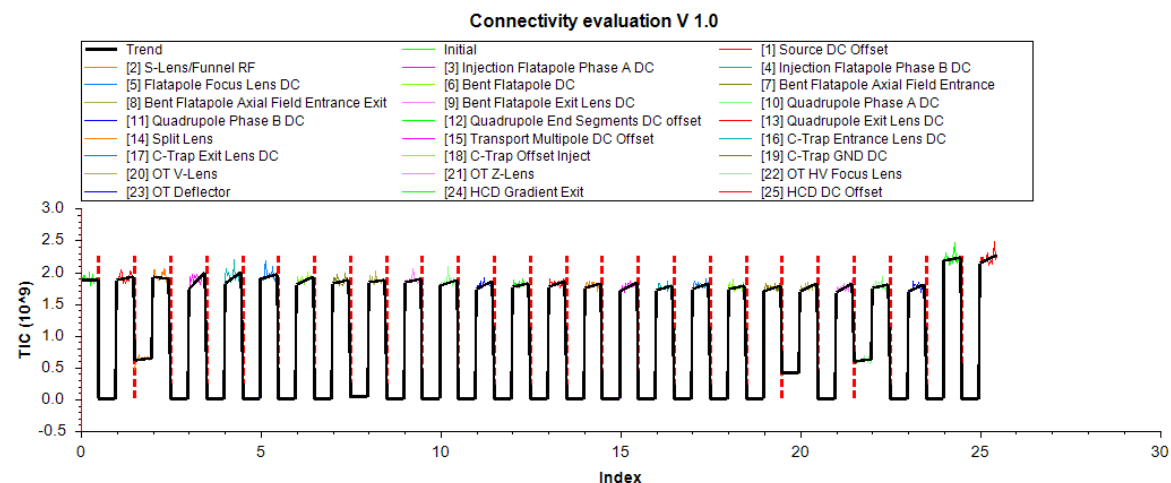
☐ Bake Vacuum Chamber
☐ Examine Failed Sub-Procedure
☐ Ion Optics Connectivity Check
☐ Transfer Tube Maintenance Check
☐ Ion Optics Maintenance Check
☐ Quadrupole Maintenance Check

HCD Cell

☐ FAIMS
☐ Tools

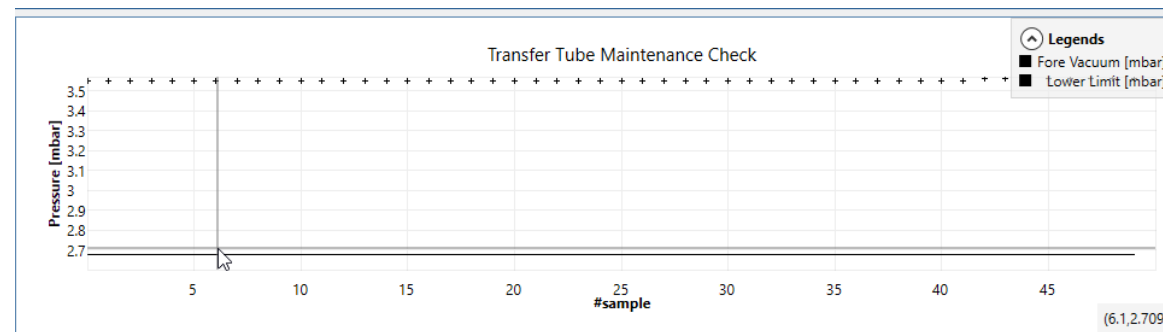
Diagnostics: Ion optics connectivity check

- Evaluates connectivity of ion optical elements
- Switches each element to operating state and to deflecting state
- In some cases signal will not be fully lost
- Good result show a change in each step
- Requires stable ion signal.



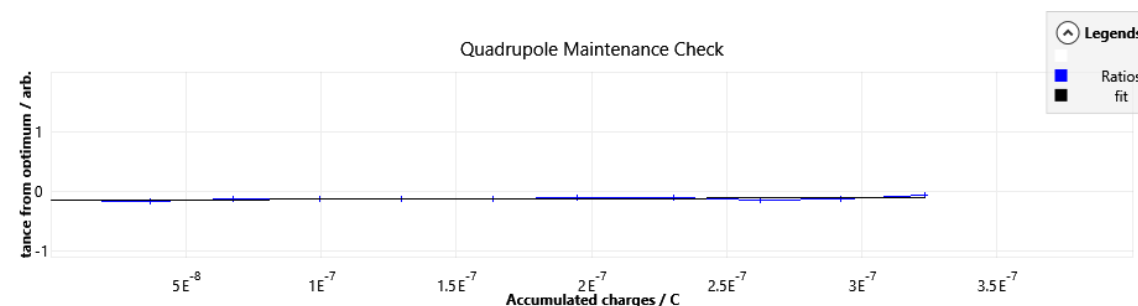
Diagnostics: Transfer tube maintenance check

- Checks if the transfer tube needs cleaning by measuring the fore vacuum.
- If the fore vacuum is below a (temperature dependent) threshold, the transfer tube might be blocked and cleaning is recommended.



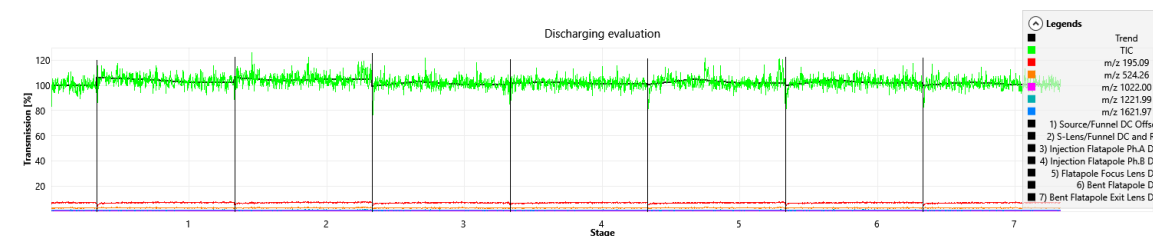
Diagnostics: Quadrupole Maintenance Check

- This check tries to charge up potential contamination inside the quadrupole.
- It uses ions of both polarities, so:
 - a stable and bright spray is required on both polarities.
 - Recommended to set the source gases and temperatures to the same levels in positive and negative ion mode.
- On a clean quadrupole, no charge can be deposited, so the plot will show a straight line. With increasing contamination of the quadrupole, the plot will start showing a slope. This is expected and to a certain level tolerated by the instrument.
- Once the fail threshold is reached the quadrupole should be cleaned.
- The cycle time between two cleanings depends strongly on the sample type and the sample amount injected. .

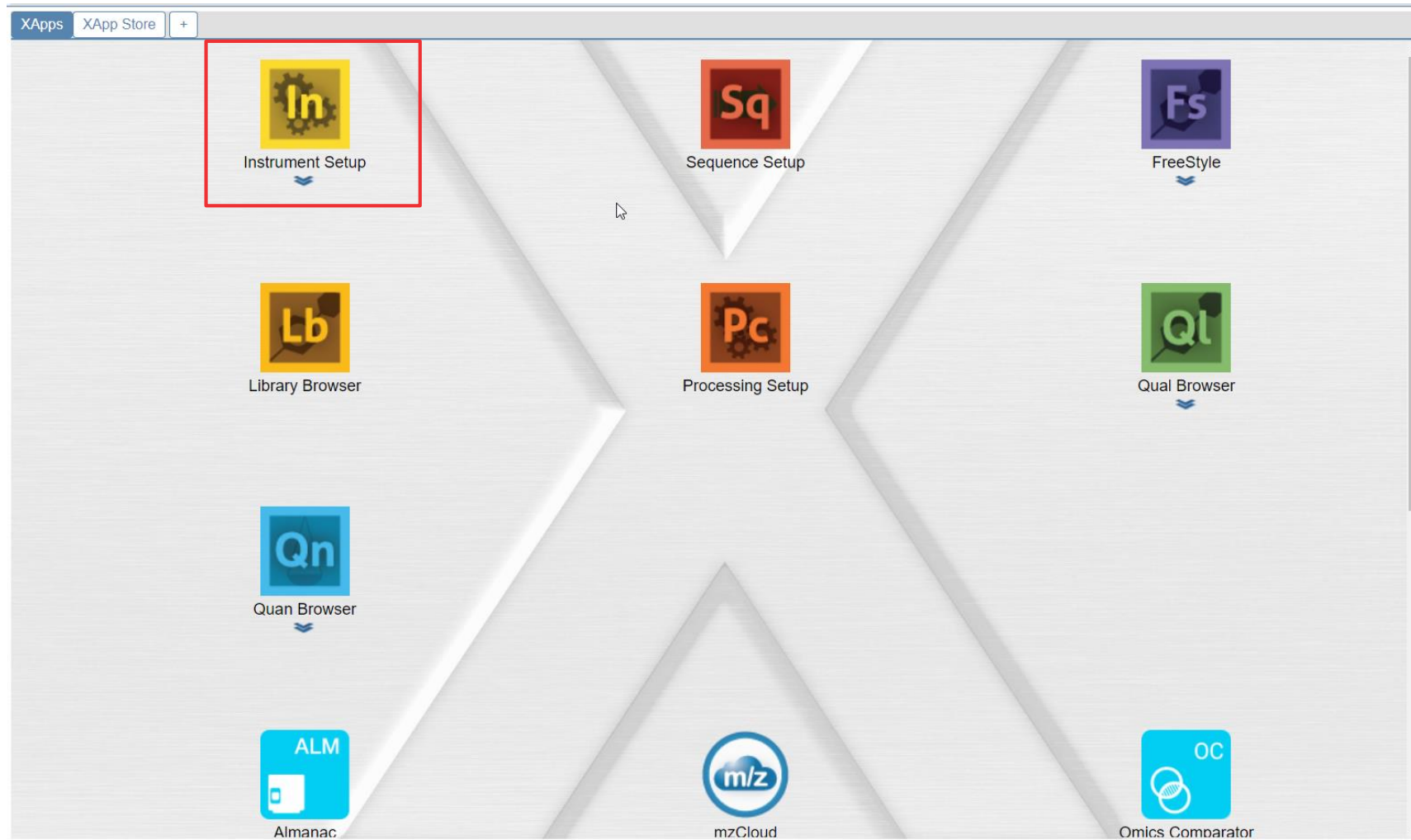


Diagnostics: Ion optics maintenance check

- From Source to Bent flatapole Exit lens:
- actively discharges ion optical element (neg. ions) and subsequently evaluates transmission trend.
- It is recommended:
 - a stable and bright spray on both polarities.
 - Recommended to set the source gases and temperatures to the same levels in positive and negative ion mode.
 - Recommended to set negative ion mode voltage to low values (range 2.2 kV)



Creating a method



Method Editor: Overview

Method Editor 1 2 3

Method Editor tabs:

1. Global Parameters
2. Scan Parameters
3. Summary Page

Method Editor Interface Overview:

The interface is divided into several sections:

- Global Parameters:** Includes Application Mode (Peptide), Method Duration (min) (60), and a Method Timeline.
- Experiment:** Includes a timeline and a list of components (Ion Source, Syringe, Divert Valve A, Divert Valve B, Contact Closure) with checkboxes.
- Settings:** Includes Infusion Mode (Liquid Chromatography), Expected LC Peak Width (s) (30), Advanced Peak Determination (checked), Default Charge State (1), and Internal Mass Calibration (Off).
- Ion Source Properties:** Includes Ion Source Type (H-ESI), Spray Voltage (Static), Positive Ion (V) (3200), Negative Ion (V) (2200), Sheath Gas (Arb) (0), Aux Gas (Arb) (5), Sweep Gas (Arb) (0), Ion Transfer Tube Temp (°C) (320), Vaporizer Temp (°C) (0), APPI Lamp (Not in Use), Use Ion Source Settings from Tune (unchecked), and FAIMS Mode (Not Installed).

Method Editor: Global Parameters

Method Editor | Global Parameters | Scan Parameters | Summary

Method Timeline | Experiment | ACTIONS | Settings

Application Mode: Peptide
Method Duration (min): 60

Global Parameters

1. Ion Source
2. Syringe
3. Divert Valve A
4. Divert Valve B
5. Contact Closure

Ion Source Properties

- Ion Source Type: H-ESI
- Spray Voltage: Static
- Positive Ion (V): 3200
- Negative Ion (V): 2200
- Sheath Gas (Arb): 0
- Aux Gas (Arb): 5
- Sweep Gas (Arb): 0
- Ion Transfer Tube Temp (°C): 320
- Vaporizer Temp (°C): 0
- APPI Lamp: Not in Use
- Use Ion Source Settings from Tune: ☐
- FAIMS Mode: Not Installed

Global Parameters:

1. Ion Source Properties
2. Syringe Properties
3. Divert Valve A Properties
4. Divert Valve B Properties
5. Contact Closure Properties

Ion source

Global Parameters

10 20 30 40 50 60

Ion Source

Syringe

Divert Valve A

Divert Valve B

Contact Closure

Ion Source Properties

Ion Source Type: H-ESI

Spray Voltage: Static

Positive Ion (V): 3200

Negative Ion (V): 2200

Sheath Gas: Range: 0-5500 0

Aux Gas (Arb): 5

Sweep Gas (Arb): 0

Ion Transfer Tube Temp (°C): 320

Vaporizer Temp (°C): 0

APPI Lamp: Not in Use

Use Ion Source Settings from Tune: ☐

FAIMS Mode: Not Installed

Copy Paste Icons

Ion Source:
copy and paste available

Scan Parameters

1

Meth Editor | Global Parameters | Scan Parameters | Summary

Method Timeline

Application Mode: Peptide
Method Duration (min): 60

Scans: MS, MS²

Filters: Precursor Selection Range, MIPS, Intensity, Precursor Fit, Charge State, Dynamic Exclusion, Targeted Inclusion, Targeted Exclusion, Apex Detection

Triggers

Time Range (min): 0-60

Place Scan Here

Settings:

- Infusion Mode: Liquid Chromatography
- Expected LC Peak Width (s): 30
- Advanced Peak Determination: ☒
- Default Charge State: 1
- Internal Mass Calibration: Off

Properties: Show All

1: Global Method Settings:

- Method Duration (min)
- Application mode
- Method Timeline
- Infusion Mode
- Expected LC Peak Width (s)
- Internal Mass Calibration

Scan Parameters

The screenshot displays the 'Method Editor' interface with the 'Scan Parameters' tab selected. The 'Method Timeline' is visible at the top, showing a duration of 60 minutes. On the left, the 'Application Mode' is set to 'Peptide' and the 'Method Duration (min)' is 60. The 'Experiment' section on the right contains an 'ACTIONS' dropdown menu with 'Add New Experiment' highlighted. A red box highlights the 'Add New Experiment' button, and a text box labeled 'Adding a new experiment' points to it. The 'Settings' section on the right includes options for 'Liquid Chromatography', 'Width (s)' (30), 'Advanced Peak Determination' (checked), 'Default Charge State' (1), and 'Internal Mass Calibration' (Off).

Method Editor | Global Parameters | **Scan Parameters** | Summary

Method Timeline

Application Mode: Peptide

Method Duration (min): 60

Experiment: ACTIONS | Settings

Add New Experiment

Adding a new experiment

Liquid Chromatography

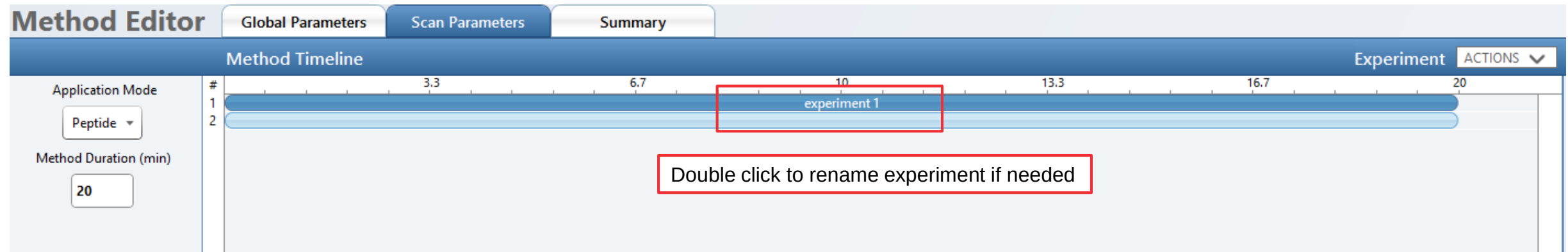
Width (s): 30

Advanced Peak Determination: ☒

Default Charge State: 1

Internal Mass Calibration: Off

Scan Parameters



Internal mass calibration

Method Editor | Global Parameters | **Scan Parameters** | Summary

Method Timeline | Experiment | ACTIONS | Settings

Application Mode: Peptide
Method Duration (min): 60

Method Timeline: # 1, 2 | 10, 20, 30, 40, 50, 60

Settings:

- Infusion Mode: Liquid Chromatography
- Expected LC Peak Width (s): 30
- Advanced Peak Determination: ☒
- Default Charge State: 1
- Internal Mass Calibration: Off (dropdown menu open)

Internal Mass Calibration dropdown options:

- Off
- Off
- EASY-IC™
- User-defined Lock Mass

Experiment Pane View Types

The screenshot displays the 'Method Editor' interface with three tabs: 'Global Parameters', 'Scan Parameters', and 'Summary'. The 'Scan Parameters' tab is active, showing a 'Method Timeline' at the top. Below the timeline, there are three experiment pane view types highlighted with red circles and labels:

- a. Quan View:** Shows a list of scan types (SRM Scan, Full Scan, Product Ion Scan, SIM Scan, DIA Scan) under the 'Scans' section.
- b. Qual View:** Shows a list of filter types (MS, MS², Precursor Selection Range, MIPS, Intensity, Precursor Fit, Charge State, Dynamic Exclusion, Targeted Inclusion, Targeted Exclusion) under the 'Filters' section.
- c. Template View:** Shows a 'Save as Template' button, 'System Templates', 'Custom Templates', and 'My Experiments' buttons.

A red box labeled '2' highlights the left sidebar menu, which contains a 'Scans' section with 'MS' and 'MS²' buttons, and a 'Filters' section with various filter types. The right sidebar contains 'Settings' and 'Properties' sections.

2. Experiment Pane View Types:
- a. Quan View
 - b. Qual View
 - c. Template View

Example: Create a Full Scan data-dependent MS² method in Qual View

Method Editor | Global Parameters | **Scan Parameters** | Summary

Method Timeline | Experiment | ACTIONS

Application Mode: Peptide
Method Duration (min): 20

1

3.3 6.7 10 13.3 16.7 20

1. Go to MS Scans, click on Full scan
2. Drag and drop the Full Scan to the experiment pane.

Experiment # 1 | Time Range (min) 0-20 | CLEAR

1 Scans

MS

MS²

Filters

Precursor Selection Range

MIPS

Intensity

Scans

MS

Full Scan

MS²

SIM Scan

Place Scan Here

Example: Create a Full Scan data-dependent MS² method in Qual View

The screenshot displays the 'Method Editor' interface with the 'Scan Parameters' tab selected. The 'Method Timeline' at the top shows a single 'MS' scan from 0 to 20 minutes. A red box highlights the following instructions:

3. Go to MS² Scans, click on MS²
4. Drag and drop the MS² Scan to the experiment

Below the timeline, the 'Experiment # 1' section shows a 'Time Range (min)' of 0-20. On the left, a sidebar contains 'Scans' and 'Filters' sections. The 'Scans' section has buttons for 'MS' and 'MS²'. The 'MS²' button is circled with a red '3'. A red box highlights the 'MS²' button in the 'Scans' section, which is also circled with a red '4'. A red arrow points from this button to a 'Place Scan Here' button in the experiment area, which is currently showing a 'Full Scan' button.

Scan properties

The screenshot displays the 'Method Editor' software interface. At the top, there are tabs for 'Global Parameters', 'Scan Parameters', and 'Summary'. The 'Scan Parameters' tab is active. Below the tabs is a 'Method Timeline' showing a sequence of scans from 0 to 20 minutes. A 'Full Scan' is highlighted at 10 minutes, and a 'ddMS²' scan is shown at 13.3 minutes. A red box highlights the 'Full Scan' data-dependent MS² method. To the right, the 'Full Scan Properties' pane is open, showing various parameters for the selected scan. The 'Scan Properties' pane is also visible on the left side of the interface.

Method Editor | Global Parameters | Scan Parameters | Summary

Method Timeline

Application Mode: Peptide
Method Duration (min): 20

Experiment # 1 | Time Range (min): 0-20

Scans

- MS
- MS²

Filters

- Precursor Selection Range
- MIPS
- Intensity
- Precursor Fit
- Charge State
- Dynamic Exclusion
- Targeted Inclusion
- Targeted Exclusion
- Apex Detection

Full Scan Properties | Show Favorites

- Orbitrap Resolution: 60000
- Scan Range (m/z): 100-1000
- RF Lens (%): 50
- AGC Target: Standard
- Maximum Injection Time Mode: Auto
- Microscans: 1
- Data Type: Profile
- Polarity: Positive
- Source Fragmentation: ☐
- Use EASY-IC™: On
- Scan Description:

A new Full Scan data-dependent MS² method is created
Scan parameters can be changed on properties pane

Go to Scan Filters and add an Intensity Filter to the experiment pane.

Intensity Properties:

- Intensity Threshold : The minimum signal intensity required to trigger a data dependent scan.

The screenshot displays the 'Method Editor' interface. On the left, the 'Filters' panel lists various filter types, with 'Intensity' highlighted by a red box. A red arrow points from this box to the 'Intensity' filter icon in the 'Experiment # 1' pane. The 'Intensity Properties' panel on the right shows the 'Filter Type' set to 'Intensity Threshold' and the 'Intensity Threshold' value set to '5.0e3'. The 'Experiment # 1' pane shows a sequence of filters: 'Full Scan', 'Intensity', and 'ddMS²', with a '20 scans' box indicating the number of scans for the 'Intensity' filter.

Holistic Test

Method Editor | Global Parameters | Scan Parameters | Summary

Method Timeline | Experiment | ACTIONS | Settings

Application Mode: Peptide | Method Duration (min): 131

Experiment # 1 | Time Range (min): 0-131 | CLEAR

Scans

- MS
- MS²

Filters

- Precursor Selection Range
- MIPS
- Intensity
- Precursor Fit
- Charge State
- Dynamic Exclusion
- Targeted Inclusion
- Targeted Exclusion
- Apex Detection

Triggers

- Targeted Mass Trigger

Method Flowchart:

```
graph TD; A[Full Scan] --> B[MIPS]; B --> C[Intensity]; C --> D[Charge State]; D --> E[Dynamic Exclusion]; E --> F["10 scans  
ddMS2"]; E --> G[Targeted Mass]; G --> H["1 scans  
ddSIM"];
```

Targeted Mass Properties

MASS LIST

Mass List Type: m/z | Time Mode: Unscheduled | Include Intensity Threshold: ☐

	Compound	m/z	
1	LTILEELR	498.8018	
2	NGFILDGFPR	573.3025	
3	ELASGLSPVGFK	680.3735	
4	GISNEGQNASIK	613.3167	

Mass Tolerance: ppm

Low: 10 | High: 10

Set Collision Energy per Compound: ☐

Perform dependent scan on most intense ion if no targets are found: ☐

Summary pane

Method Editor

Global ParametersScan ParametersSummary

Document ViewTree View

Method Summary

Method Settings

Application Mode: **Peptide**
Method Duration (min): **131**

Global Parameters

Ion Source

Ion Source Type: **NSI**
Spray Voltage: **Static**
Positive Ion (V): **2300**
Negative Ion (V): **600**
Sweep Gas (Arb): **0**
Ion Transfer Tube Temp (°C): **270**
Use Ion Source Settings from Tune: **False**
FAIMS Mode: **Not Installed**

MS Global Settings

Infusion Mode: **Liquid Chromatography**
Expected LC Peak Width (s): **15**
Advanced Peak Determination: **True**
Default Charge State: **2**
Internal Mass Calibration: **User-defined Lock Mass**
Current Lock Mass: **Current**

Positive Ion

Positive Ion
m/z
445.12003

Experiment#1 [MS]

Start Time (min): **0**
End Time (min): **131**

Master Scan:

Full Scan

Orbitrap Resolution: **120000**
Scan Range (m/z): **375-1500**
RF Lens (%): **40**
AGC Target: **Custom**
Normalized AGC Target (%): **300**
Maximum Injection Time Mode: **Custom**
Maximum Injection Time (ms): **60**
Microscans: **1**
Data Type: **Profile**
Polarity: **Positive**
Source Fragmentation: **Disabled**
Scan Description:

Filters:

MIPS

Monoisotopic peak determination: **Peptide**
Relax restrictions when too few precursors are found: **True**

Intensity

Filter Type: **Intensity Threshold**
Intensity Threshold: **5.0e3**

Charge State

Include charge state(s): **2-5**
Include undetermined charge states: **False**

Dynamic Exclusion

Dynamic Exclusion Mode: **Custom**
Exclude after n times: **1**
Exclusion duration (s): **30**
Mass Tolerance: **ppm**
Low: **10**
High: **10**
Exclude isotopes: **True**

Perform dependent scan on single charge state per precursor only: **False**

Data Dependent

Data Dependent Mode: **Scans Per Outcome**

Scan Event Type 1:

Scan:

ddMS²

Scan Priority: **1**
Multiplex Ions: **False**
Isolation Window (m/z): **2**
Isolation Offset: **Off**
Collision Energy Mode: **Fixed**
Collision Energy Type: **Normalized**
HCD Collision Energy (%): **30**
Orbitrap Resolution: **30000**
TurboTMT: **Off**
Scan Range Mode: **Define First Mass**
First Mass (m/z): **120**
AGC Target: **Custom**
Normalized AGC Target (%): **100**
Maximum Injection Time Mode: **Custom**
Maximum Injection Time (ms): **60**
Microscans: **1**
Data Type: **Profile**
Scan Description:
Number of Dependent Scans: **10**

Scan Event Type 2:

Targeted Mass

Mass List

Mass List Type: **m/z**
Time Mode: **Unscheduled**
Include Intensity Threshold: **False**

Compound	m/z
LTILEELR	498.8018
NGFILDGFPR	573.3025
ELASGLSPVGFK	680.3735
GISNEGQNASIK	613.3167
SSAAPPPPPR	493.7683
HVLTSIGEK	496.2867
DIPVPKPK	451.2834
IGDYAGIK	422.7363
TASEFDSAIAQDK	695.8324
SAAGAFGPESLR	586.8003
ELGQSGVDVTLQTK	773.8955
GLILVGGYGTR	558.3259
GILFVGSGVSGGEEGAR	801.4115
SFANQPLEVVYSK	745.3924
LSSEAPALFQFDLK	787.4212

Mass Tolerance: **ppm**
Low: **10**
High: **10**
Set Collision Energy per Compound: **False**
Perform dependent scan on most intense ion if no targets are found: **False**

Scan:

ddSIM

Scan Priority: **2**
Multiplex Ions: **False**
Isolation Window (m/z): **2**
Orbitrap Resolution: **15000**
AGC Target: **Custom**
Normalized AGC Target (%): **50**
Maximum Injection Time Mode: **Custom**
Maximum Injection Time (ms): **60**
Microscans: **1**
Data Type: **Profile**

Scan Description:
Number of Dependent Scans: **1**

1 of 1

Note on Mass ranges

Mass Range for Full Scans

m/z 40–6000 (8000 with BioPharma option)

Recommended settings:

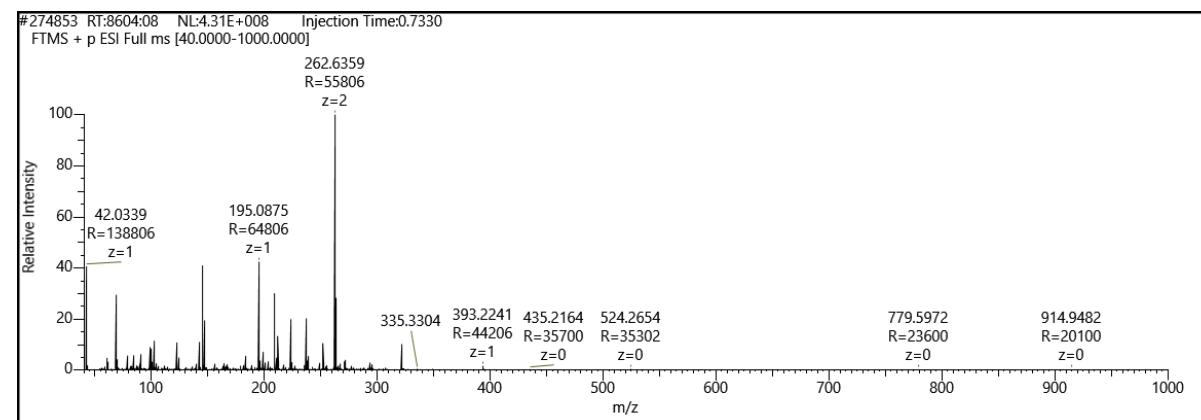
- If first mass is $\geq m/z$ 150, set last mass $\leq 15\times$ first mass.
- If first mass is $50 \leq m/z < 150$, set last mass $\leq 10\times$ first mass.
- If first mass is $40 < m/z < 50$, set last mass $\leq 5\times$ first mass.

if factor 5-10-15 rule is violated the fields to enter the scan range are highlighted in yellow

Full Scan Properties		Show Favorites
Orbitrap Resolution	60000	★
Scan Range (m/z)	40-1000	★
RF Lens (%)	50	★

⚠ It is recommended that Last Mass should be 5x of First Mass or less when First Mass is between 40-50 m/z

The instrument conducts the experiment, However, the larger masses (above the recommended scan range) will be discriminated



Setup LC method

Method01.meth - Thermo Xcalibur Instrument Setup

File EASY-LC Xcalibur VI Help

Thermo EASY-nLC

*Orbitrap Exploris 480

Sample pickup and loading

Sample pickup

Volume: μl (Max. is "loop size - 2 μl ")

Flow: $\mu\text{l} / \text{min}$

Sample loading

Volume: μl

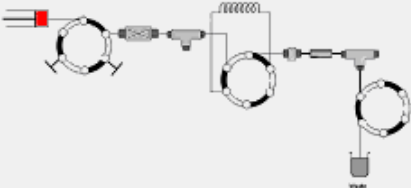
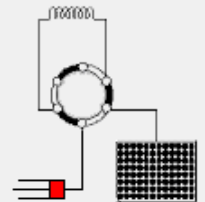
Flow: $\mu\text{l} / \text{min}$

Max. pressure: Bar

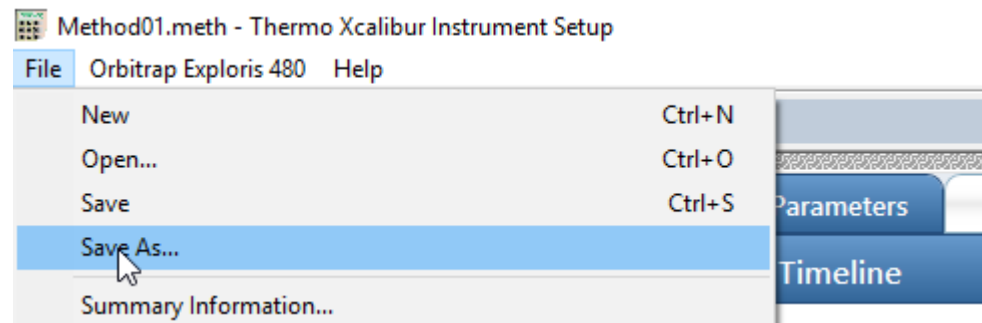
Solvents

A: water B: acetonitrile

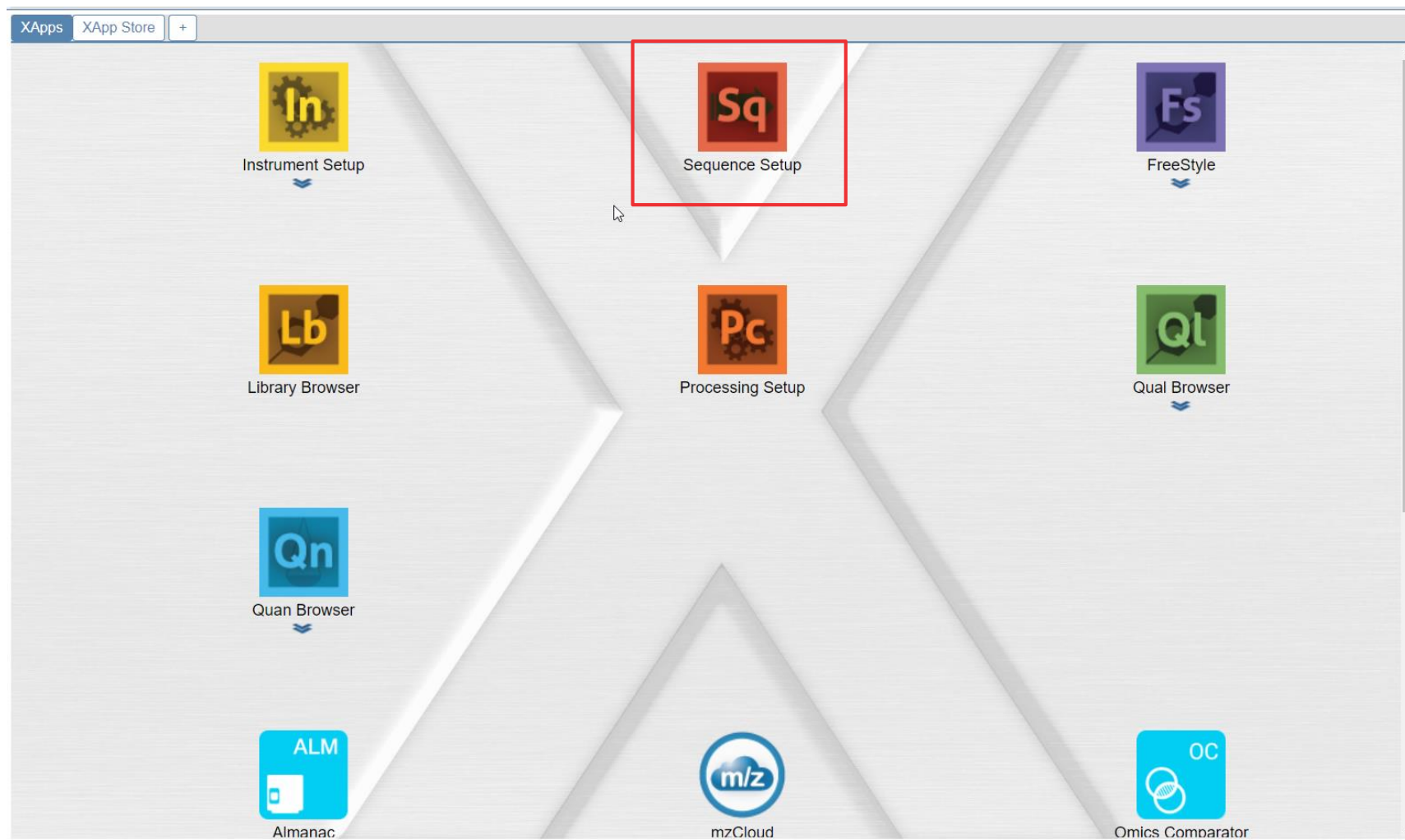
< Back Next >



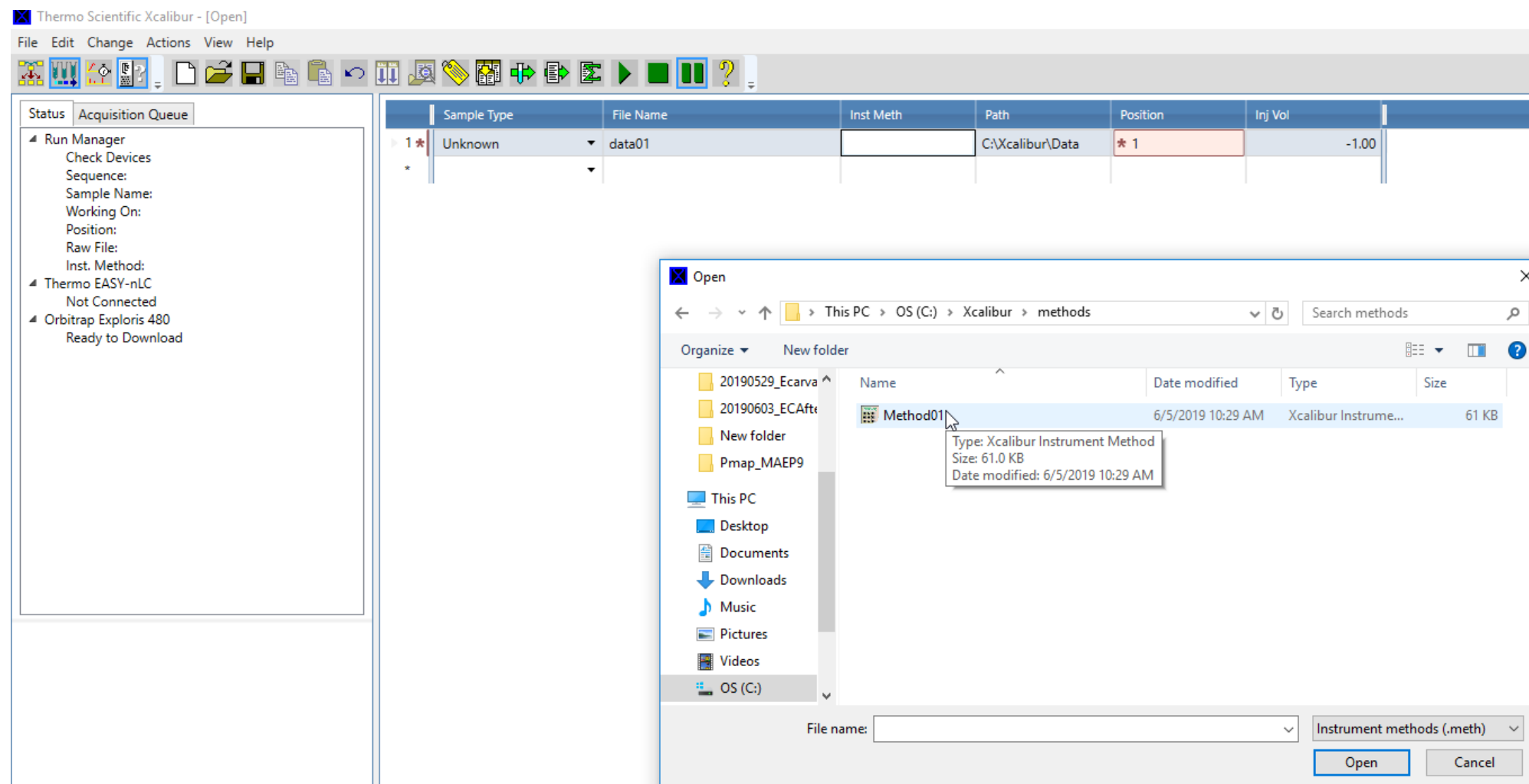
Save the method



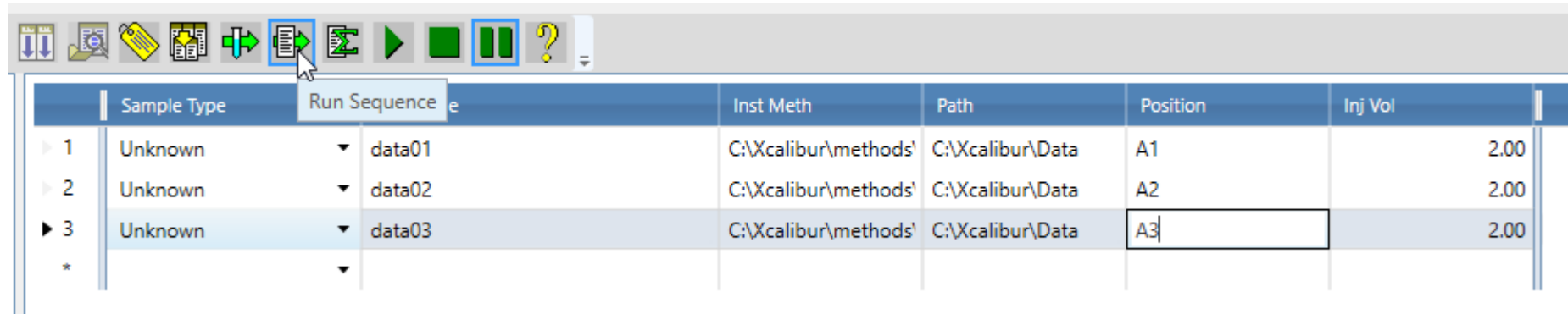
Setting up a sequence



Setting up a sequence



Running a sequence



The screenshot shows a software interface for running a sequence. At the top is a toolbar with various icons. The 'Run Sequence' icon, which depicts a document with a green arrow, is highlighted with a blue border and a mouse cursor. Below the toolbar is a table with the following columns: Sample Type, Run Sequence, Inst Meth, Path, Position, and Inj Vol. The table contains three rows of data, with the third row selected. A fourth row with an asterisk (*) is also visible.

	Sample Type	Run Sequence	Inst Meth	Path	Position	Inj Vol
▶ 1	Unknown	▼ data01	C:\Xcalibur\methods\	C:\Xcalibur\Data	A1	2.00
▶ 2	Unknown	▼ data02	C:\Xcalibur\methods\	C:\Xcalibur\Data	A2	2.00
▶ 3	Unknown	▼ data03	C:\Xcalibur\methods\	C:\Xcalibur\Data	A3	2.00
*		▼				

- Overview
- [Orbitrap Exploris User Maintenance](#)
 - [Flush Sample lines and API probe](#)
 - [Check pump oil](#)
 - [Purge pump oil](#)
 - [Air filters](#)
 - [Sweep cone and ITT](#)
 - [API Source interface maintenance](#)
 - [Bent Flatapole and Quad maintenance](#)

- Depending on Configuration:
 - [EASY-nLC](#)
 - [UltiMate](#)
 - [FAIMS](#)
 - [PNs of recommended consumables](#)

- Orbitrap Exploris 480 empowers the user to perform their own performance maintenance as required
- Service Plans
 - Preferred Service plan
 - Corrective maintenance
 - Parts, labor, and travel
 - Annual PM
 - does not provide a Performance Maintenance service.
 - Elective Performance Maintenance Package
 - Customer may elect to purchase a Performance Maintenance Package if desired and IES will perform the service.
- Standard Factory one-year warranty:
 - Performance Maintenance **Training** (~2 months after install)
 - Preventative Maintenance (~11 months after install)

User Maintenance

Table 8-1. User maintenance procedures

MS Component	Procedure	Frequency	Procedure Location
Instrument	System bake-out	After the system was vented (even partially by a short power outage).	page 8-12
	Check warning labels on instrument	Annually	page 8-6
	Leak check gas lines	Annually	page 8-6
	Check condition of tubings and hoses	Annually	page 8-7
Cooling fans	Check fan filters	Every four weeks.	page 8-14
	Clean fan filters	If necessary.	
Ion optics	Clean flatapole focus lens	If necessary.	page 8-29
	Clean injection filter	If necessary.	page 8-28
API source	Tip For instructions about performing maintenance on the quadrupole and the bent flatapole, refer to the <i>Orbitrap Exploris Extended Maintenance Manual</i> .		
	Flush (clean) sample transfer line, metal needle, and API probe	Daily	page 6-14
	Clean the sweep cone and the spray cone	Daily	page 6-15
	Remove and clean ion transfer tube	Daily, or if ion transfer tube bore is contaminated (chemical noise) or obstructed (pressure decrease).	page 8-20
	Replace ion transfer tube	If ion transfer tube bore is corroded.	page 8-20
	Clean exit lens ^a and ion funnel	Check bi-weekly. Clean as needed. ^b	page 8-30
HESI probe	Replace needle insert	If metal needle is blocked.	
APCI, ESI, or HESI probe	Replace metal needle	If metal needle is broken or obstructed.	See manufacturer's documentation.
Calibration ESI probe	Replace low-flow needle assembly	If metal needle is blocked.	

MS Component	Procedure	Frequency	Procedure Location
Forepumps	Purge (decontaminate) oil	Daily ^c	page 6-17 , see also manufacturer's documentation
	Check oil level	Daily	page 8-10 , see also manufacturer's documentation
	Check oil condition	Depends on process.	
	Add oil (requires venting)	If oil level is close to minimum.	
	Check filter insert of external oil mist filter	Daily	
	Check gas ballast valve	Monthly	
	Change oil	Every 8000 h (~one year) of operation.	
	Replace exhaust filter	If oil mist appears at exhaust or annually.	
	Check anti-suckback valve	Annually	
	Clean fan cover	Annually	

^a The exit lens is not installed in instruments with the Internal Calibration (IC) option.

^b The frequency of cleaning the components of the mass spectrometer depends on the types and amounts of samples and solvents that are introduced into the instrument.

^c Depends on the types and amounts of samples and solvents that are introduced into the instrument. For low flow applications, purging the forepump is rarely necessary.



[Diagnostics](#) to help assess the need for maintenance

Flushing the Sample Transfer Line, the Metal Needle, and the API Probe

Flush the sample transfer line, the metal needle, and the API probe at the end of a working day or a series of measurements (or more often if you suspect they are contaminated) by flowing a 50:50 methanol:distilled water solution from the LC through the API source.

Tip You do not need to flush the inlet components daily. However, if a mass spectrum shows unwanted contamination peaks, flush the inlet components.

❖ **To flush the sample transfer line, the metal needle, and the API probe**

1. Wait until the data acquisition, if any, is complete.
2. Open the Tune application by choosing **Start > All Apps > Thermo Instruments > model x.x > model Tune**.
3. From the Tune software window, click the **System On** button to toggle it from Standby to On. The voltages and gas flows to the API source are switched on.
4. Set up the HESI probe as follows:
 - a. In the Tune software window, display the HESI Source window.
 - b. In the HESI Source window, enter **30** in the Sheath Gas Flow Rate text box.
 - c. In the HESI Source window, enter **5** in the Aux Gas Flow Rate text box.
 - d. In the HESI Source window, enter **0** in the Sweep Gas Flow Rate text box.

After Operating the System

- e. In the HESI Source window, enter **0** in the Spray Voltage text box.
 - f. Click **Apply**.
5. Set up and start a flow of 50:50 methanol:water solution from the LC to the API source:
- Set the Flow Rate to a value that is typical for your experiments.
 - Set the solvent proportions to 50% methanol and water.
6. Let the solution flow through the sample transfer line, the metal needle, and the API probe for 15 minutes. After 15 minutes, switch off the flow of liquid from the LC to the API source. Keep the API source (including the APCI vaporizer, the sheath gas, and the auxiliary gas) on for additional 5 minutes. Stop the LC pump.
7. After 5 minutes, place the system in Standby condition as described on [page 6-6](#).

CAUTION

Hazardous Substance. Methanol is highly flammable and noxious. Keep away from heat, sparks, and flame. Avoid accidental exposure. Use with adequate ventilation. When possible, dilute it with 50% water. Refer to your supplier's Material Safety Data Sheet (MSDS) for proper handling of methanol.

Check oil on the forepumps

Refer to Operating and pump manual for further instructions



Purging the Oil in the Forepumps

Purge (decontaminate) the oil in the forepumps on a regular basis to remove water.

❖ To purge the oil in a forepump

1. Turn off the flow of liquid from the LC (or other sample introduction device) to the API source.
2. From the Tune software window, click the **System Standby** button to put the mass spectrometer in Standby.
3. Open the gas ballast valve on the forepump. Refer to the manual that came with the pump for the location and handling of the gas ballast valve.
4. Let the pump run for 30 minutes with the gas ballast valve open.
5. After 30 minutes, close the gas ballast valve.

NOTICE

Forgetting to close the gas ballast valve increases the risk of either running dry the oil pump or, upon venting, getting oil into the vacuum system!



^c Depends on the types and amounts of samples and solvents that are introduced into the instrument. For low flow applications, purging the forepump is rarely necessary.

Maintenance of Fan Filters

- Check every four weeks and clean them if they are dirty.
- Beginning at the front side of the instrument, insert a finger into the recess in the bracket and pull at the fan filter bracket to open it.
- Pull each fan filter out of the filter bracket and check it for dust.
- If the fan filters are covered with dust:
 - wash the fan filters in a solution of soap and water.
 - Rinse with tap water.
 - Squeeze the water and let them air dry.
- Reinstall





Maintenance Maintenance of the API Source

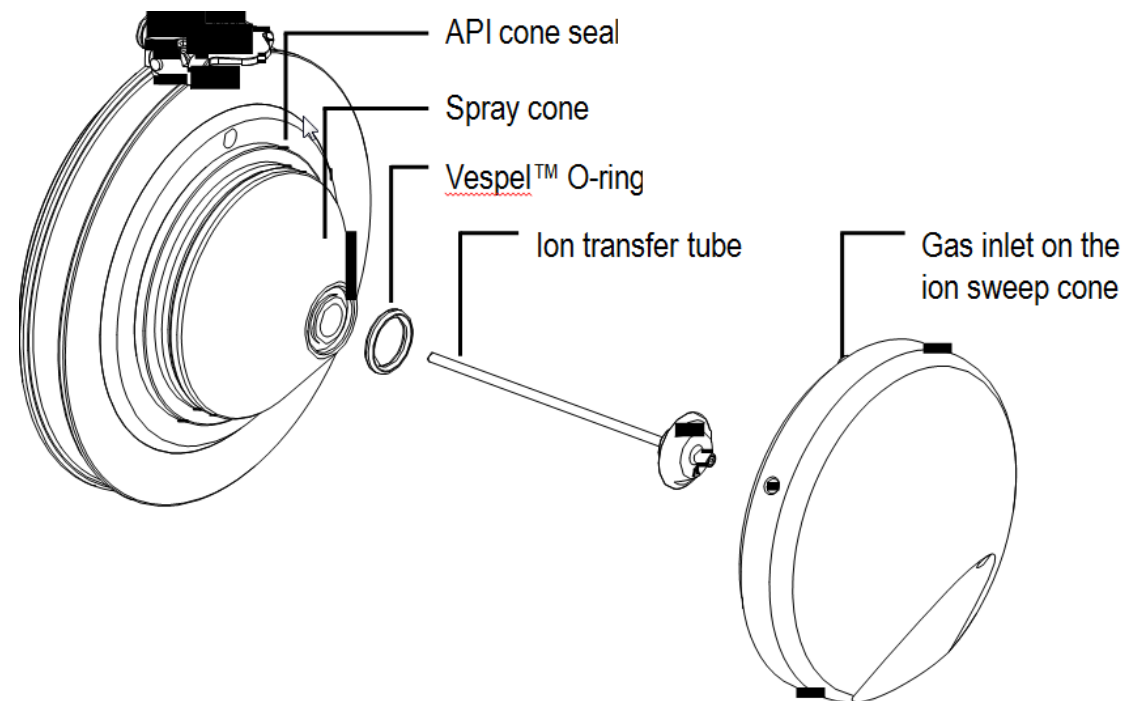
Maintenance of the Ion Transfer Tube and the Sweep Cone

Make sure that you do not accidentally lift the release lever that is located at the top of the API source interface, which will vent the MS.

To avoid contaminating the ion transfer tube, do not touch its exposed entrance.

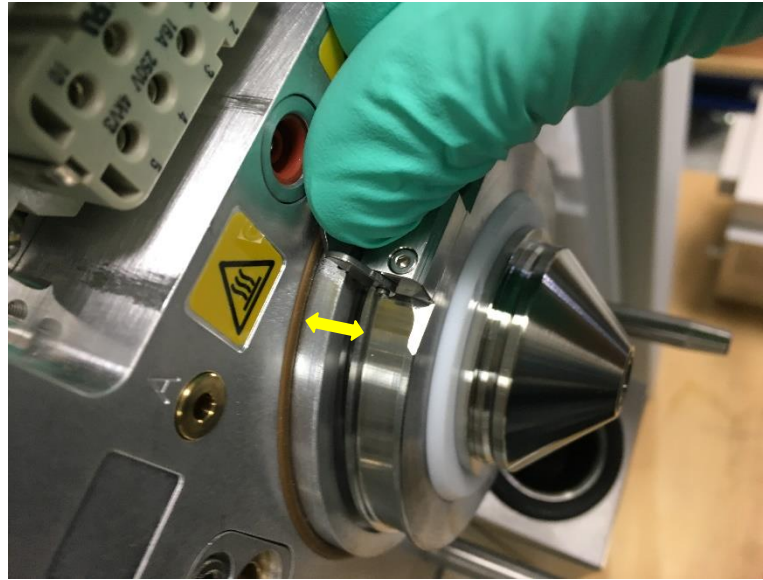
NOTICE

To prevent mechanical damage to the transfer tube, make sure that the tube temperature is well below 200 °C. Let the spray cone cool down for at least 60 minutes to allow safe handling by laboratory personnel. See the safety information on [page 8-20](#).



- Wait until data acquisition, if any, is complete.
- Turn off the flow of sample solution from the LC (or other sample introduction device).
- In the Tune software window, put the instrument in Off condition.
- Shut down and vent the system by setting the Main Power switch to the OFF position.
- After 5 minutes, disconnect the power cable to prevent the system from being turned on in the opened state.
- Prepare a clean surface on the bench or ideally in a fume hood, e.g. place some clean aluminum foil on the bench.
- Wait 10 min for the instrument to vent before beginning any maintenance.
- For opening the main chamber: Disconnect and remove all items that are in the accessories cabinet (for example, the syringe pump). Make sure that nothing is plugged into the USB ports at the right side of the compartment.

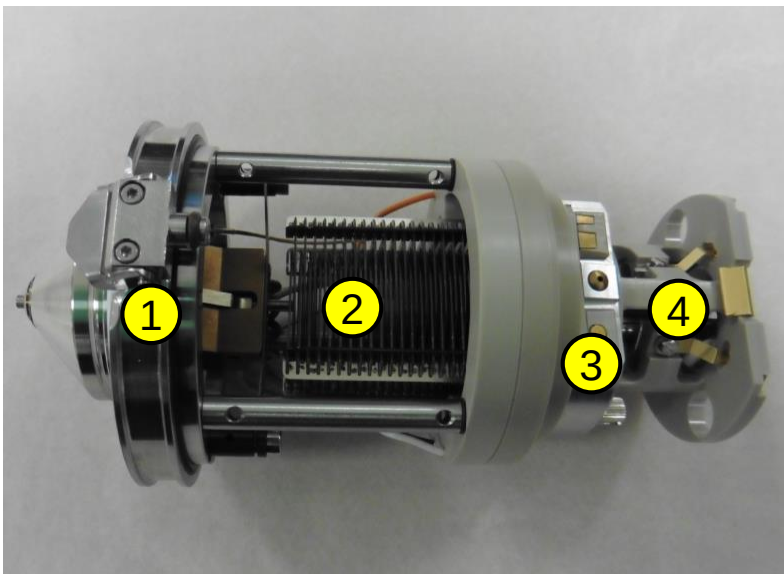




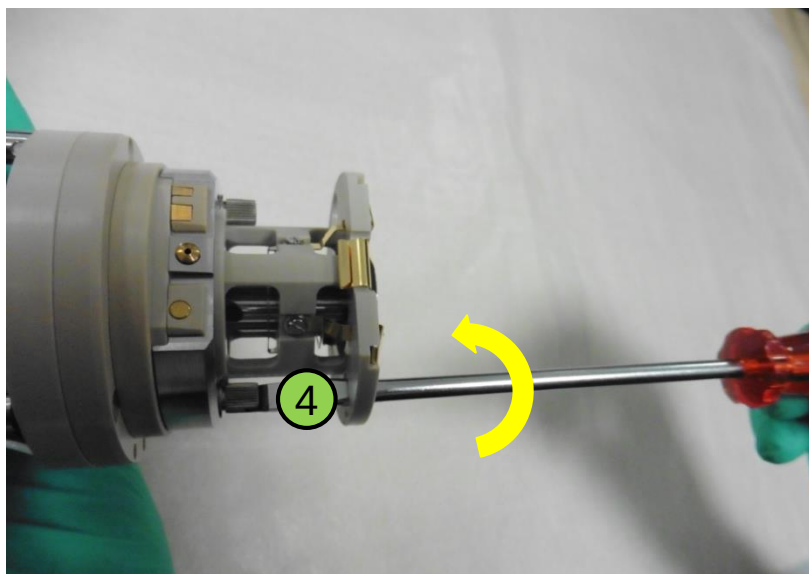
- After fully **venting** the system remove the **cooled** inlet stack by pushing the release latch up.

- Pull the inlet stack straight out and store it in a clean area.
- Block the opening to the analyzer chamber to prevent dust contamination

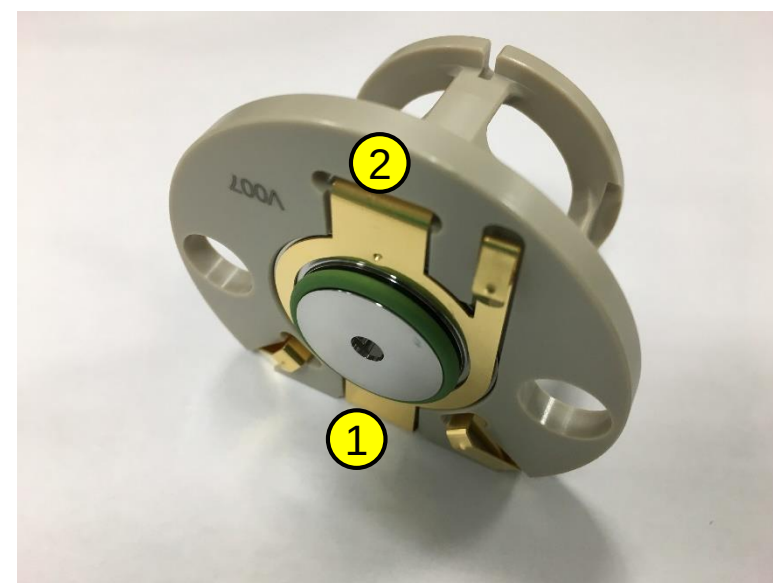




- Inlet stack components:
 1. Source cage
 2. Ion funnel
 3. Internal calibration unit
 4. Injection filter

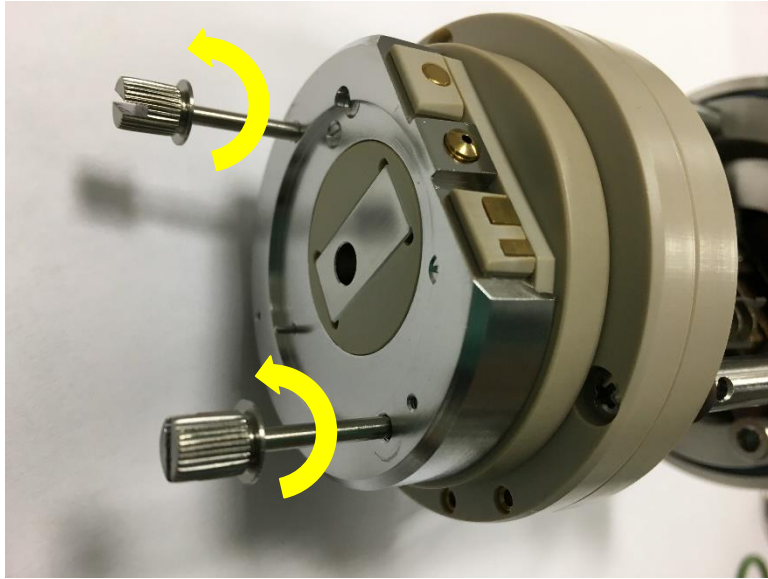


- Insert a flat head screwdriver through the holes in the injection filter PEEK holder to loosen the screws.

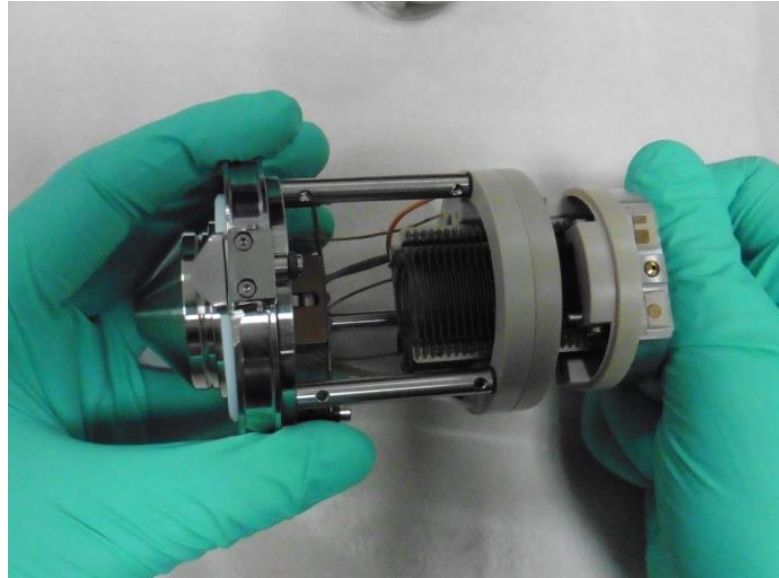


- Pull up tab 1 of the metal retainer for the focus lens until it is freed from the PEEK holder. Unhook tab 2 and remove the lens.

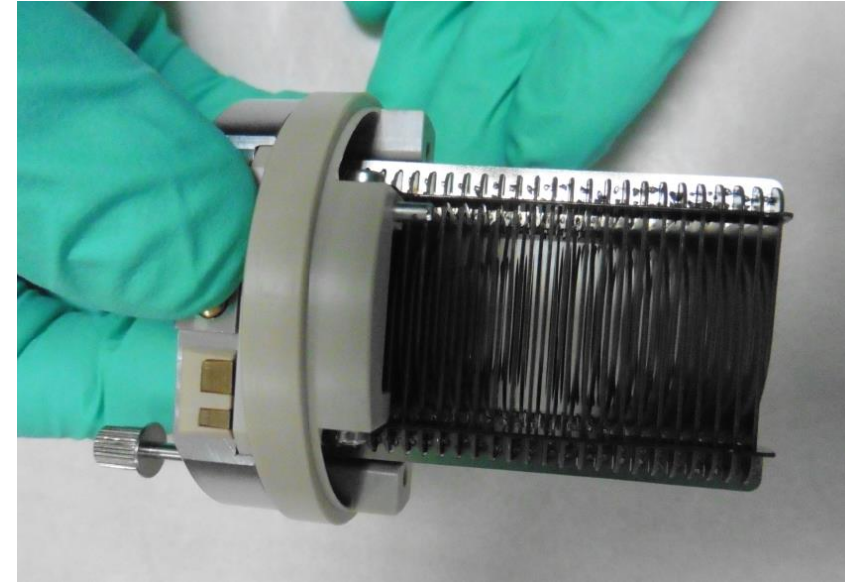
④ Flat head screwdriver

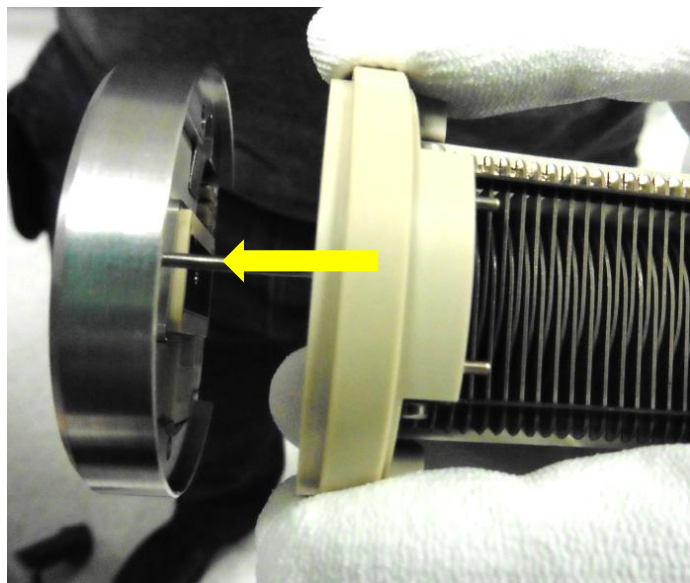


- By hand, continue to unscrew the long screws until the second set of windings is free.



- Pull the entire Ion Funnel and IC unit assembly straight out of the source cage.





- Separate the IC unit from the Ion funnel being sure not to bend the long metal pin extending through the PEEK holder of the S-lens.



- Wipe clean with wet lint-free wipes soaked in Isopropanol:Water and purge with N₂.



- For cleaning instructions see Operating manual.
 1. Source Cage
 2. Ion Funnel
 3. Internal Calibration Unit
 4. Exit Lens
 5. Injection Filter
 6. Flatapole Focus Lens

Removal of the top cover

Refer to Extended Maintenance Manual for further instructions



- With the accessory compartment open, loosen the 3 mm hex screws in the accessories cabinet that connect the top cover to the instrument frame
- Remove all equipment located in the accessory compartment. Make sure nothing is plugged into the USB ports



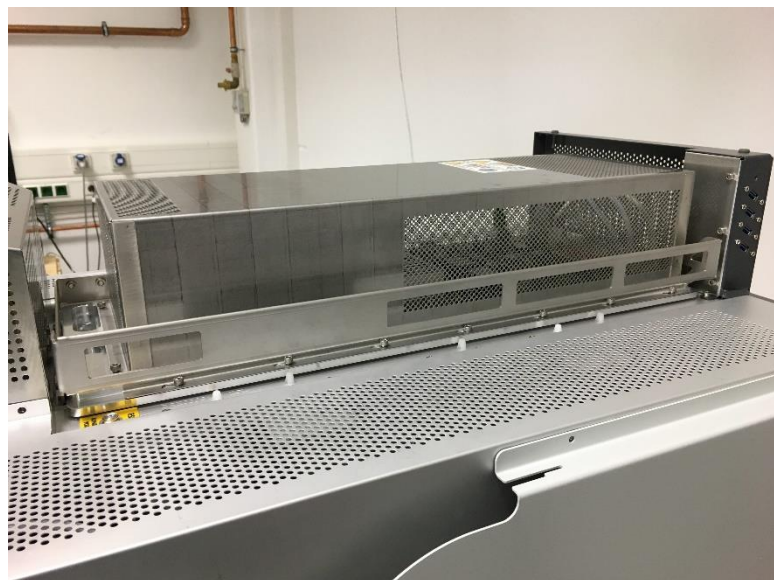
- Grab the front of the top cover of the instrument with both hands and push it a small distance toward the rear side of the instrument.



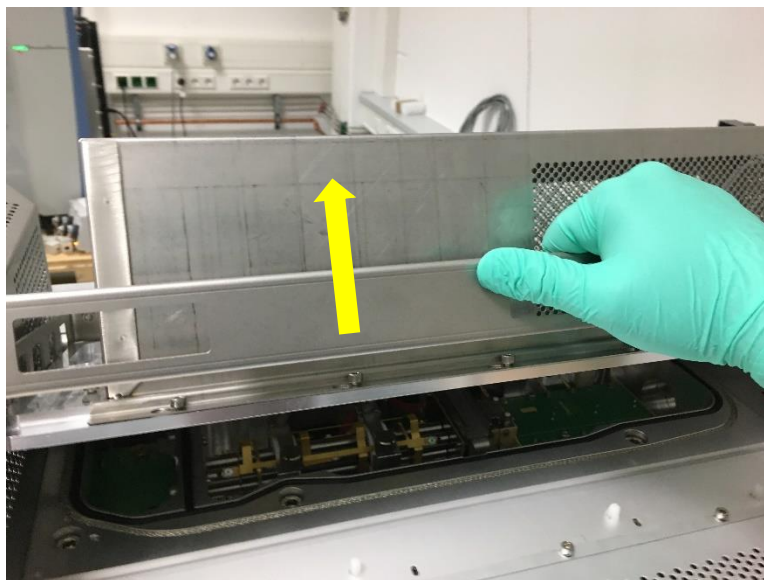
- Grab the Orbitrap-shaped handles of the cover with both hands and lift it off. Store the cover in a safe place.

Opening the main chamber

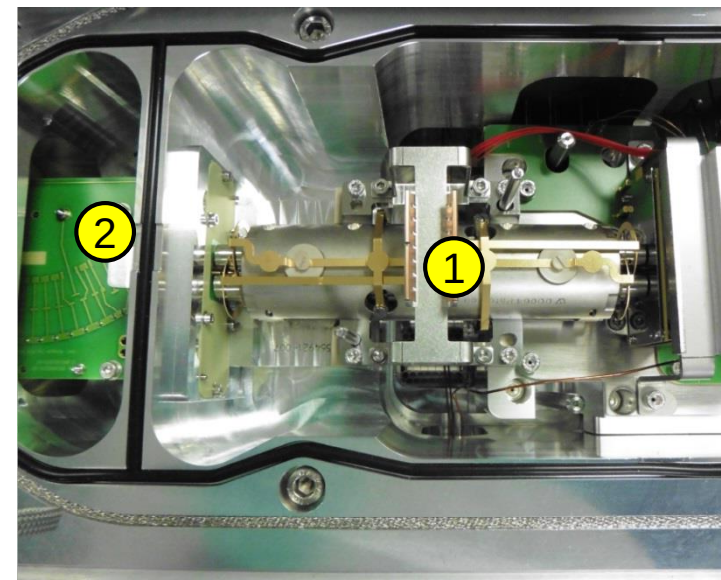
Refer to Extended Maintenance Manual for further instructions



- **Important:**
Wait until instrument is fully **vented**
- Make sure that the chamber is open only when you do work on the components inside



- Use the handle to open the lid of the quadrupole chamber.



- Customer-accessible parts:
1. Quadrupole
2. Bent Flatapole



Thermo

EASY-nLC 1200

Troubleshooting and Maintenance Guide

Touch-screen application version 4.1

60053-97274 Revision B 2016

thermo
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Thermo Scientific Dionex UltiMate 3000 Series

Nano/Cap System NCS-3500RS

Nano/Cap Pump NCP-3200RS

Operating Instructions
(Original Operating Instructions)



*UltiMate 3000 Series:
NCS-3500RS and NCP-3200RS*

5.8 Recommendations for Optimally Running Systems (Best Practice)



FAIMS User Guide

FAIMS Pro System

User Guide

High-Field Asymmetric Waveform Ion Mobility Spectrometry System

Maintaining the FAIMS Pro System

Contents

- Maintenance Schedule
- Guidelines
- Tools and Supplies
- Shutting Down the LC/MS/FAIMS Pro System
- Flushing the Inlet Components
- Removing Components
- Cleaning Components
- Fixing a Gas Leak Between the MS and the Electrodes
- Reassemble Components

For a list of replaceable parts, see Chapter 9, "Replaceable Parts."

PN of recommended consumables: LC-MS

Product Name	Unit Size	Product Number
Pierce™ HeLa Protein Digest Standard	1x 20 µg dry pellet	88328
PRTC: Pierce™ Peptide Retention Time Calibration Mixture	0.5 µM, 50 µl frozen aliquot	88320
99.9% Water, 0.1% FA Optima LCMS grade	500 mL	LS118-500
80% ACN, 0.1% FA Optima LCMS grade	500 mL	LS122-500
99.9% ACN, 0.1% FA Optima LCMS grade	500 mL	LS120-500
EASY-Spray Column	15 cm x 75 µm ID, PepMap C18 3 µm particles, 100 Å pore size	ES800A

PN of recommended consumables: maintenance

Product Name	Unit Size	Product Number
Pierce™ FlexMix™ Calibration Solution	10 mL	A39239
Performance Maintenance Starter Kit - Exploris		BRE0021873
Maintenance Consumables Kit		BRE0021372
DUO 11 Oil P3	0.5L	BRE0015107
SOGEVAC oil LVO700	2L	BRE0019927
Ion transfer tube, high capacity	1	80500-20045

Further information on replaceable parts in operating manual