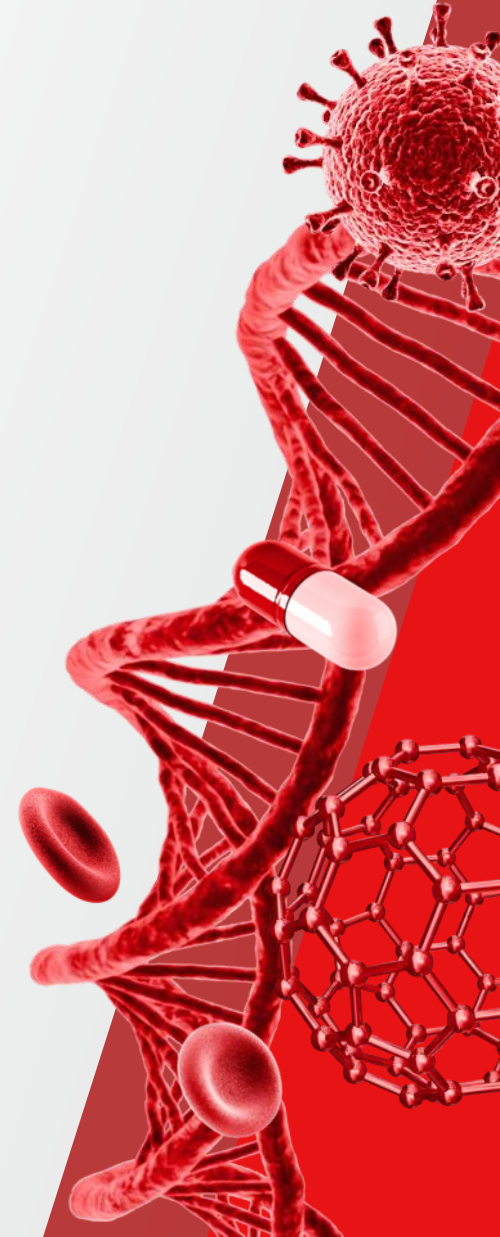


Thermo Scientific Orbitrap Astral 1.1 Instrument Control Software (AST 1.1 ICSW) –

Overview

September 2024

 The world leader in serving science



Software Release

Flexera Orbitrap Astral Series ICSW 1.1 is available to customers using Flexera software distribution site.

Customers new to the Flexera site should use the following link:

<https://thermo.flexnetoperations.com/control/thmo/RegisterMemberToAccount>

After setting up an account, customers can access the site using the following link:

<https://thermo.flexnetoperations.com/control/thmo/login>

In the 'Product List' page, find 'Instrument – Orbitrap Astral Series' and identify Orbitrap Astral Series 1.1 in the subfolder.

The screenshot shows the ThermoFisher Scientific website interface. The top navigation bar includes the ThermoFisher Scientific logo, the text 'Life Sciences Mass Spectrometry Software Download and Licensing Portal', and a 'Home' link. A globe icon is visible in the top right corner. The left sidebar contains a menu with categories: Software & Services, Licensing, Administration, Information, and Sessions. The main content area is titled 'Product Information' and 'Instrument - Orbitrap Astral Series'. It features a 'Select a version.' section with two tabs: 'New Versions' (selected) and 'Release Archive'. Below this is a table listing software versions with columns for Version, Description, Date Available, and a Download Log link.

Version	Description	Date Available	
	Orbitrap Astral Series 1.0 SP3	Mar 28, 2024	Download Log
	Orbitrap Astral Series 1.0 SP2	Jan 23, 2024	Download Log
	Orbitrap Astral Series 1.0 SP1	Aug 22, 2023	Download Log
	Orbitrap Astral Series 1.0	Jul 26, 2023	Download Log

The screenshot shows the ThermoFisher website interface. At the top, there is a navigation bar with the ThermoFisher logo, a search bar, and links for 'Statut des commandes', 'Commande rapide', and 'Se connecter'. Below the navigation bar, there is a section titled 'Learn more about LC-MS Data Acquisition software'. This section includes a yellow 'In' icon, a paragraph describing the software's use for collecting high-quality mass spectrometry data, and a link to request features or report defects. Below this, there are four tabs: 'Orbitrap Astral MS', 'Orbitrap Tribrid MS', 'Orbitrap Exploris MS', and 'Exactive MS'. The 'Orbitrap Astral MS' tab is selected, leading to a page titled 'Orbitrap Astral MS series instrument control software version 1.0 SP3'. This page features a table with columns for 'Release date', 'Build number', 'Instruments', and 'Software requirements'. Below the table, there are links for 'Follow the upgrade instructions' and 'Download the software'. The page also includes sections for 'New features', 'Known issues', and 'Fixed detects in Orbitrap Astral MS series instrument control software version 1.0 SP3'.

Release date	Build number	Instruments	Software requirements
April 10, 2024	1.0.100.40	Orbitrap Astral MS	Microsoft™ Windows™ 10 Enterprise 2021 LTSC Thermo Scientific Xcalibur 4.7

New features
The Orbitrap Astral MS series instrument control software version 1.0, 1.0 SP1, 1.0 SP2, and 1.0 SP3 incorporates the following new and improved features:

- Support for the Orbitrap Astral mass spectrometer (Tune and Method Editor)

Known issues

See Orbitrap Astral MS series ICSW v.1.0 SP3 [Release notes](#)

Fixed detects in Orbitrap Astral MS series instrument control software version 1.0 SP3

- Large Time Gap between MS1 and data-dependent MS2 scan
- Insufficient IRM settling time causing instable fragmentation pattern in Orbitrap MS2 scans
- Ion Control not working well under low intensity, high background conditions
- False positive initial bus error warnings from DPRTrap Board
- Detector Calibration failing with "Too few ions in focused peak"

- Information: [Thermofisher.com](https://www.thermofisher.com)
 - Software information
 - Links for download
 - New Features
 - Known Issues
 - Discovered issues
 - Fixed Defects

Thermo Scientific Orbitrap Astral Series 1.1 Instrument Control Software Release Notes

Supported instruments



This document lists installation notes, new features and improvements regarding the Thermo Scientific™ Orbitrap Astral Series 1.1 Instrument Control Software release. For information regarding the installation, features, functionality, and use of this product, refer to the following sources of information: *Orbitrap Astral Operating Manual*

The instruments listed in table below are supplied and supported in this release.

Table 1 Supported instruments

Instrument	Instrument Control Software Version	Version No.
Orbitrap Astral MS	1.0	1.0.100.11
Orbitrap Astral MS	1.0 SP1	1.0.100.14
Orbitrap Astral MS	1.0 SP2	1.0.100.28
Orbitrap Astral MS	1.0 SP3	1.0.100.40
Orbitrap Astral MS	1.1	1.1.477.46

Source: Release Notes for AST 1.1 ICSW

System Requirements

Thermo Scientific Orbitrap Astral Series 1.1 Instrument Control Software Release Notes

Installation notes

This section describes the supported target systems and the system requirements.

Supported target systems

Thermo Scientific™ Orbitrap Astral™ mass spectrometer

System requirements

The minimum hardware and software configurations required for Orbitrap Astral Series 1.1 Instrument Control Software operation are as follows:

System	Requirements
PC	3.0 GHz Quad Core Intel™ Processor 32 GB RAM 512 GB SSD Hard Drive DVD-ROM Drive Display Monitor Resolution of 1920 × 1080 Two Network Interface Cards (NIC), 1000 MBit/s
Software	Microsoft™ Windows™ 10 Enterprise 2021 LTSC Thermo Scientific™ Xcalibur™ 4.7

TIP: The Orbitrap Astral Series 1.1 Instrument Control Software was only tested within the delivered composition.

Note:
Xcalibur 4.7 software applies
Foundation 3.1 SP9.

Source: Release Notes for AST 1.1 ICSW

List of New Features and Improvements Realized With AST 1.1 ICSW

- **New Features**

- Stepped Collision Energy Astral: The user needs the ability to perform the acquisition of single MS2 scan with multiple Collision Energy values when using Astral detector Type
- Full Profile Orbitrap: The user needs the ability to perform Orbitrap MS1 and MS2 acquisition with Full Profile in Intact Protein Mode

- **Improvements**

- NSI: The user needs an updated default value of Positive Spray Voltage for NSI in ME and Tune
- Orbitrap Astral shall automatically correct the ion foil voltage using the ICS
- FAIMS CV switching performance shall be improved
- The user needs the "Lock mass injection" to be a parameter in the scan properties for each scan type
- Method Editor: The System Templates must be saved in "Astral" folder
- The user needs the possibility to choose "Use EASY-IC" On/Off for each experiment/scan type in Timed Mode
- The user needs to be able to see the displayed absolute AGC target values
- Tune: Favorites/User Settings and History information must be saved in "Astral" folders
- The user needs the ability to monitor pressure readbacks for Astral Analyzer in Tune

Stepped Collision Energy for MS2 acq. with Astral Analyzer

- Method Editor and Tune User Interface

< AST 1.1

Data-Dependent MS ² Scan Properties		Show Favorites
Isolation Window (m/z)	2	★
Isolation Offset	Off	★
Collision Energy Type	Normalized	★
HCD Collision Energies (%)	30,40	★
Detector Type	Astral	★
TMT	Off	★
Scan Range (m/z)	100-1000	★
AGC Target	Standard	★
Maximum Injection Time (ms)	10	★
Microscans	1	★
Data Type	Centroid	★
Scan Description		★



AST 1.1

Data-Dependent MS ² Scan Properties		Show Favorites
Isolation Window (m/z)	2	★
Isolation Offset	Off	★
Collision Energy Type	Normalized	★
HCD Collision Energies (%)	30,40,35	★
Detector Type	Astral	★
TMT	Off	★
Scan Range (m/z)	100-1000	★
AGC Target	Standard	★
Maximum Injection Time (ms)	10	★
Microscans	1	★
Data Type	Centroid	★
Scan Description		★

Orbitrap Astral Tune Application 1.1.477.36

thermo scientific
Orbitrap Astral

ION SOURCE DEFINE SCAN CALIBRATION

Scan Type	MS ² Scan
Precursor (m/z)	262.636
Precursor Charge State	2
Isolation Width (m/z)	2
Collision Energy Type	Normalized
HCD Collision Energies (%)	30,25,35,22,28
Detector Type	Astral
Scan Range (m/z)	100 - 1000
RF Lens (%)	50
AGC Target	Standard
Time (ms)	10
Microscans	1
Source Fragmentation	<input type="checkbox"/>

Stepped Collision Energy for MS2 acq. with Astral Analyzer

- Process

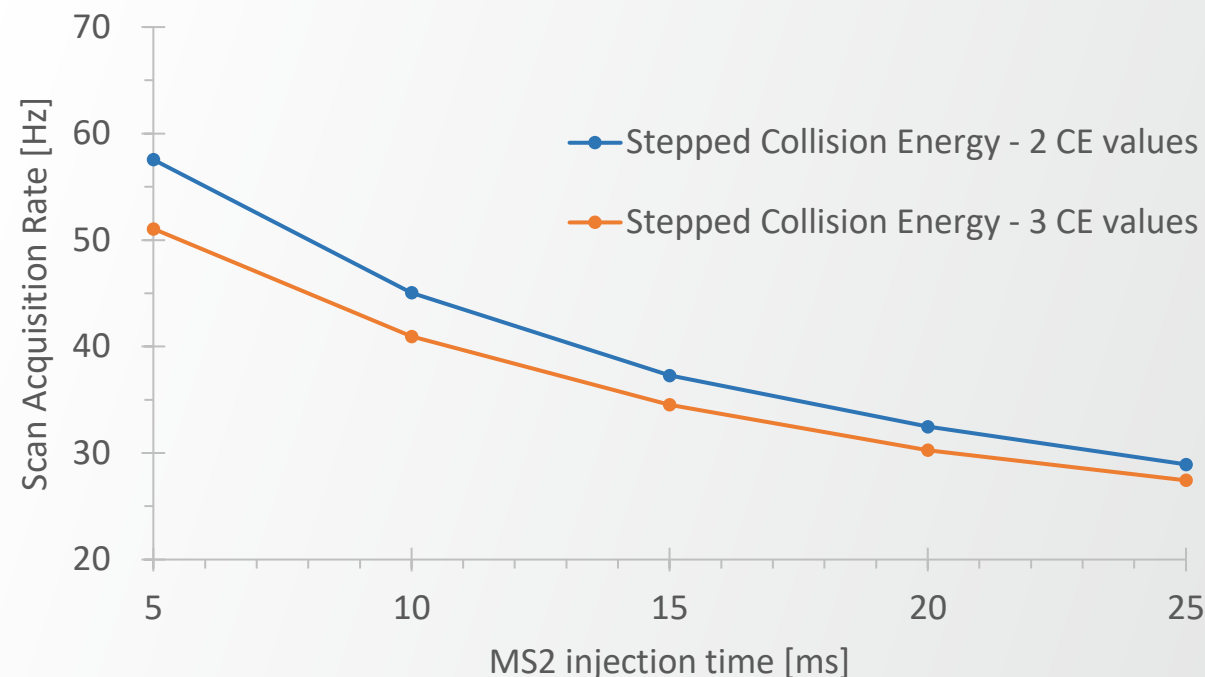
1. Isolated precursor ions are injected into the IRM in multiple steps, each with a different collision energy
2. Multiple ion packets are collected in the Ion Processor
3. Combined group of ions are mass analyzed in a single Astral scan.

- DDA scan acquisition rate

- Two stepped collision energy values
- Three stepped collision energy values

- Benefits

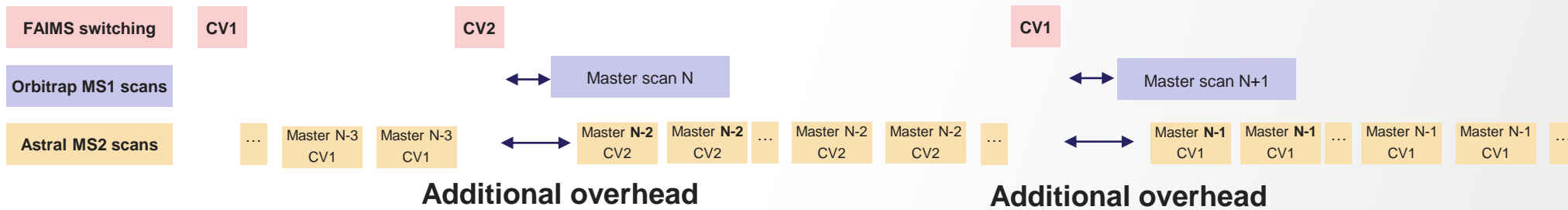
- More straightforward visualization of data
- Accelerated data processing
 - Gains dependent on processing software
 - Processing time of DDA data with Proteome Discover is significantly reduced (Spectrum Grouper node not needed)



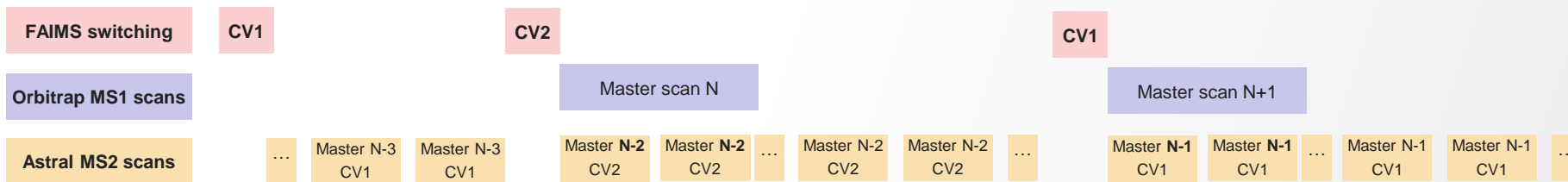
FAIMS CV Switching

Switching and Queuing Scheme (e.g. DDA with 2 CVs)

ICSW <AST 1.1



ICSW AST 1.1



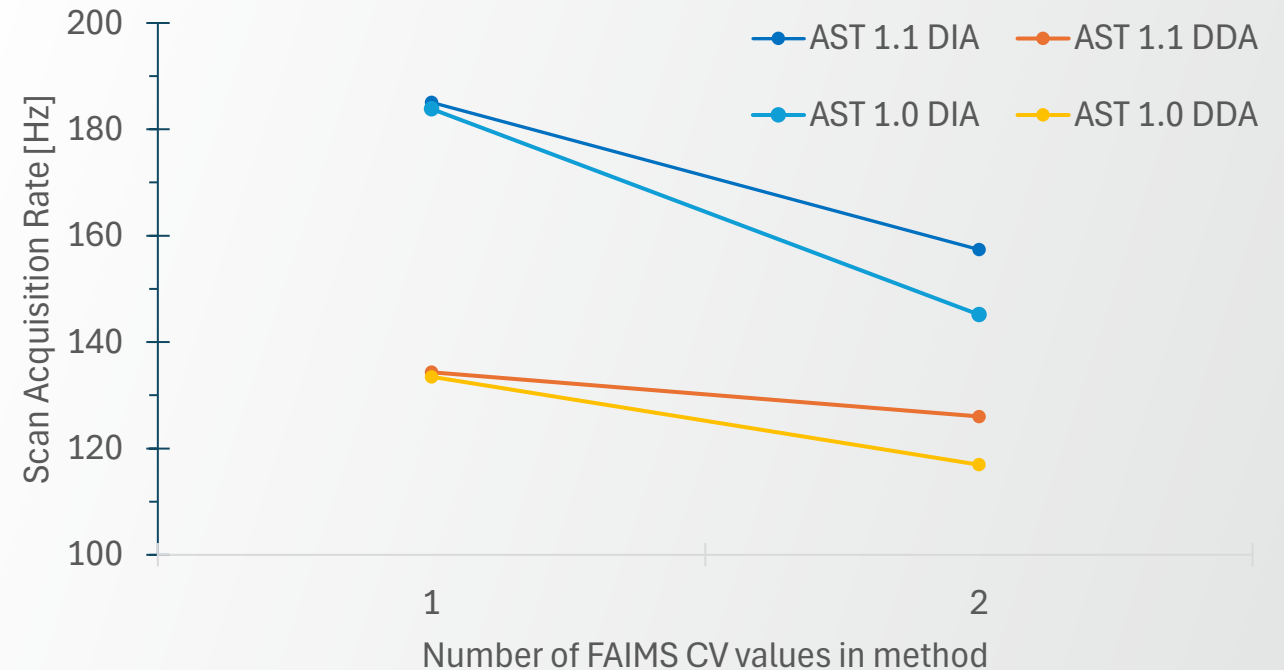
FAIMS CV Switching

Performance Gain Assessment

- Experiments
 - DDA - Full scan MS w/ Orbitrap resolution 240k; Cycle time 0.6 s; ddMS2 scans w/ 3 ms Max IT
 - DIA – Full scan MS w/ Orbitrap resolution 240k, DIA scans w/ 3ms Max IT
 - 1, 2, or 3 FAIMS CV values

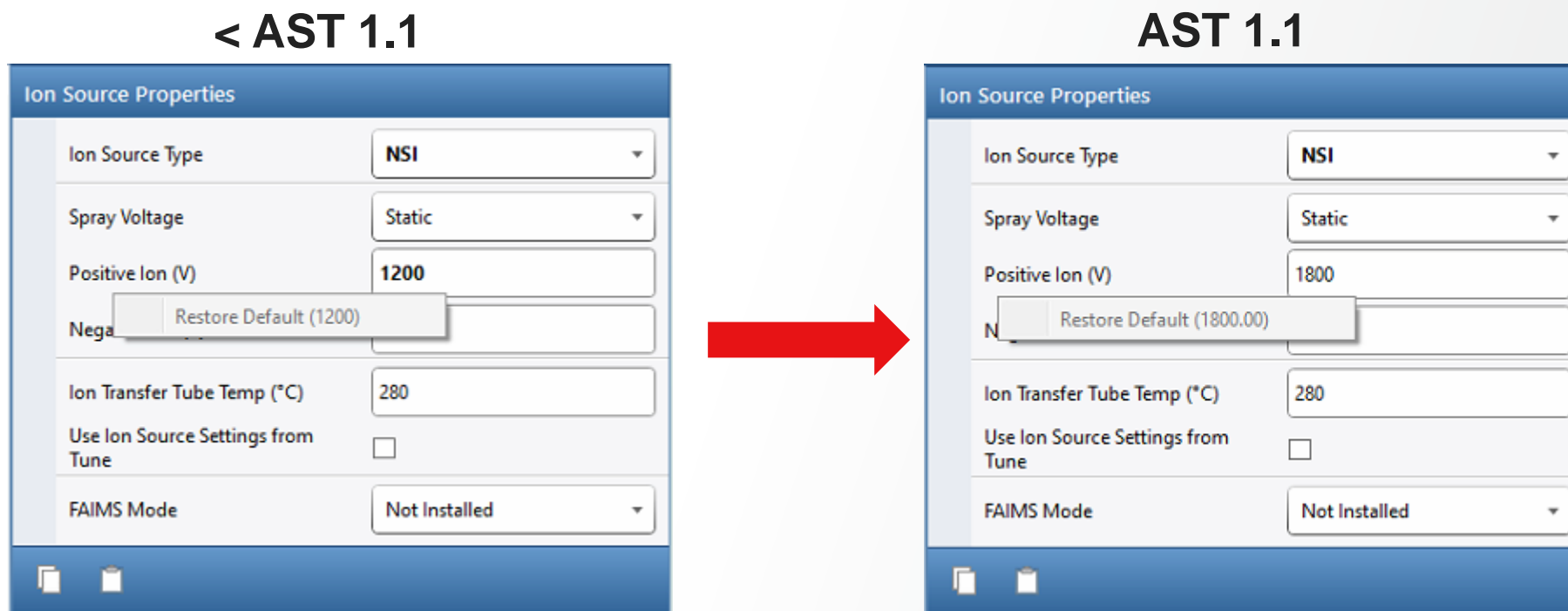
- Results

- Acquisition rate decrease due to FAIMS CV switching mitigated with AST 1.1
- Two times lower acquisition rate decrease in DDA acquisition with AST 1.1



Updated default value of Positive Spray Voltage for NSI

In Method Editor and Tune



- The user is guided to more optimal settings
- In case « Use Ion source Settings from Tune » is used in the method and the instrument has rebooted, optimal default values will be employed

“Use EASY-IC” On/Off

Improvement: for EACH experiment

Orbitrap Lock Mass Correction	EASY-IC™
Mode	Scan-to-Scan

Targeted MS ² Scan Properties		Show All
Isolation Window (m/z)	2	
Collision Energy Type	Normalized	
HCD Collision Energy (%)	30	
Detector Type	Orbitrap	
Orbitrap Resolution	15000	
Scan Range Mode	Auto	
RF Lens (%)	50	
Polarity	Positive	
Use EASY-IC™	On	

- If “On” is selected, it provides an internal reference mass that is used for Orbitrap Lock Mass Correction during a run (Orbitrap Lock Mass Correction: EASY-IC™, Mode ≠ RunStart)
- Now available for each experiment in the timeline – here displayed for a tMS2 experiment
- This provides the possibility in mixed experiments to perform Scan-to-Scan EASY-IC only in the FullScan experiment and e.g. not in an additional tMS2 experiment
- If no lock mass is found in one scan, the system will apply the last successful locking information to this scan. Time duration of last locking and lock mass correction are provided in the scan header of the individual scan.

“Use EASY-IC” On/Off - Timed

Improvement: also for Timed EASY-IC “On/Off” can be chosen

Orbitrap Lock Mass Correction	EASY-IC™
Mode	Timed

Targeted MS ² Scan Properties Show All	
Isolation Window (m/z)	2
Collision Energy Type	Normalized
HCD Collision Energy (%)	30
Detector Type	Orbitrap
Orbitrap Resolution	15000
Scan Range Mode	Auto
RF Lens (%)	50
Polarity	Positive
Use EASY-IC™	On

- If “On” is selected, it provides an internal reference mass that is used for mass correction during the defined time window
- If no lock mass is found in one scan, the system will apply the last successful locking information to this scan. Time duration of last locking and lock mass correction are provided in the scan header of the individual scan.

Lock Mass Injection Parameter Moved to Scan Properties

< AST 1.1

Settings

Infusion Mode: Liquid Chromatography

Expected LC Peak Width (s): 10

Advanced Peak Determination:

Default Charge State: 2

Orbitrap Lock Mass Correction: User-defined Lock Mass

Mode: Scan-to-Scan

Mass Tolerance (ppm): 15

Lock Mass Injection: (marked with a red X)

Current Lock Mass: Current

Save Save As Delete

Targeted MS² Scan Properties [Show All](#)

Isolation Window (m/z)	2
Collision Energy Type	Normalized
HCD Collision Energy (%)	30
Detector Type	Orbitrap
Orbitrap Resolution	15000
Scan Range Mode	Auto
RF Lens (%)	50
Polarity	Positive
Time Mode	Retention Time Window

AST 1.1

Settings

Infusion Mode: Liquid Chromatography

Expected LC Peak Width (s): 10

Advanced Peak Determination:

Default Charge State: 2

Orbitrap Lock Mass Correction: User-defined Lock Mass

Mode: Scan-to-Scan

Mass Tolerance (ppm): 15

Current Lock Mass: Current

Save Save As Delete

Targeted MS² Scan Properties [Show All](#)

Isolation Window (m/z)	2
Collision Energy Type	Normalized
HCD Collision Energy (%)	30
Detector Type	Orbitrap
Orbitrap Resolution	15000
Scan Range Mode	Auto
RF Lens (%)	50
Polarity	Positive
Lock Mass Injection	<input type="checkbox"/>
Time Mode	Retention Time Window

- Lock Mass Injection function available for every experiment in the timeline
- Whereas a Full Scan might not need the custom lock mass to be injected (no time penalty) the lock mass could be injected for tMS2 experiments.
- Please Note: EASY-IC™ injects the lock mass to every chosen experiment (see previous slide)

Display of the Absolute AGC Value

AGC Target	Custom	★
Normalized AGC Target (%)	100	★
Absolute AGC Value	1.000e6	★

- If the user chooses AGC Target “Custom“, the absolute AGC Value will be displayed underneath.
- The absolute AGC target value is a conversion of the AGC percentage target set in the method into absolute values. This read-only value will be automatically updated according to the scan type and the target percentage.
- It applied to both Orbitrap and Astral detectors

Pressure Readback for Astral Analyzer in Tune

STATUS		By Function
Current Scan		
Total Ion Current	1.66 E6 ions/sec	
TIC Variation	34 %	
Ion Injection Time	0.29 ms	
Scan Rate	23.3 scans/sec	
Lock mass found	0	
Lock mass m/z correction	0.00 ppm	
Ion Source		
Vacuum System		
Fore Vacuum Pressure	3.680 mbar	
IF Region Pressure	0.140 mbar	
HCD Cell Pressure	1.100e-002 mbar	
Ion Processor Pressure	1.000e-002 mbar	
Orbitrap UHV Pressure	2.387e-011 mbar	
Astral UHV Pressure	5.632e-009 mbar	
Turbo Pump - Orbitrap		
Status	Running	
Life Time	22462 hours	
Speed	1000 Hz	
Power	74.0 W	
Turbo Pump - Astral - HV		
Status	Running	
Life Time	21800 hours	
Speed	1500 Hz	
Power	18.0 W	
Turbo Pump - Astral - UHV		
Status	Running	
Life Time	21806 hours	
Speed	1000 Hz	
Power	20.0 W	
Internal Calibration		
Alerts		
Peripheral Devices		

- Readbacks added for
 - Ion Processor Pressure
 - Astral UHV Pressure
- Reabacks added for
 - Turbo Pump – Astral – HV
 - Turbo Pump – Astral – UHV

Manuals for Orbitrap Astral Series

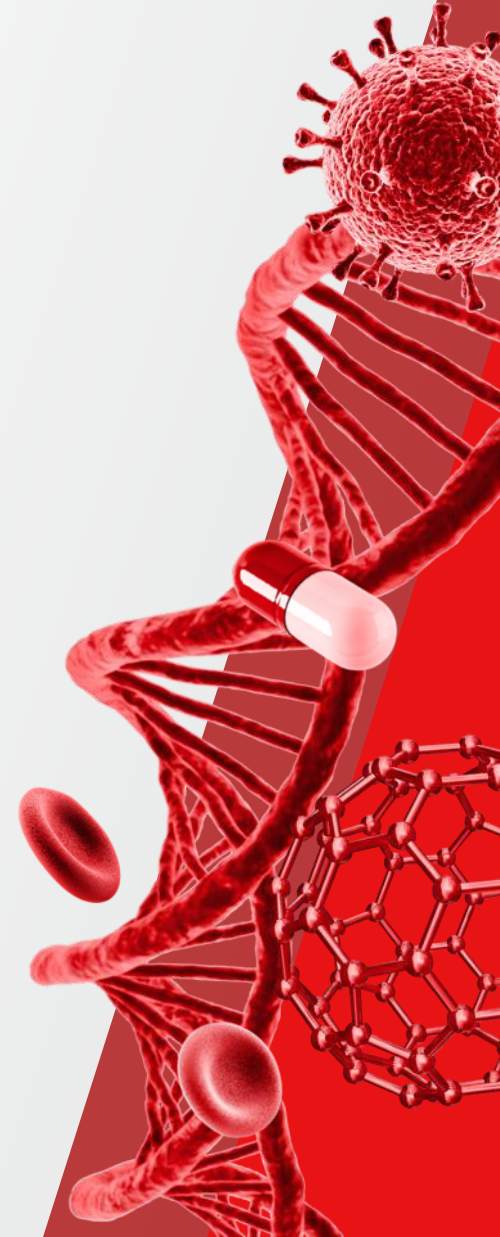
[Pre-Installation Requirements Guide](#)

[Operating Manual](#)

[Performance Maintenance Manual](#)

[Updated Software Manual and online help](#)

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Pre-Installation Requirements Guide And Operating Manual

Pre-Installation Requirements Guide



Operating Manual



Pre-Installation Requirements Guide And Operating Manual

Updated with AST 1.1

Software Manual



Display Online Help – of Tune – and – of Method Editor - via Fct F1 Key

Orbitrap Astral Tune Application

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- Welcome to the Orbitrap Astral Tune H
- Tune Application
- Glossary
- Legal Notices

Welcome to the Orbitrap Astral Tune Help!

This Help describes how to use the Tune application to control, monitor, tune, and calibrate the Thermo Scientific™ Orbitrap™ Astral™ mass spectrometer (MS). You can also optimize the instrument for your specific compounds, perform method development, and run real-time mass spectrometry experiments one analysis at a time.

The Tune application organizes its functions in panes and on pages. To display the panes and pages, click the associated buttons and tabs. If information about setting the parameters for a specific view, page, or dialog box is available, click Help or press the F1 key.

For information about the operating procedures for the Orbitrap Astral mass spectrometer, we recommend that you read the *Orbitrap Astral Operating Manual* in its entirety.

Helpful Links

- [Tune Application](#)
- [Contacting Us](#)

Accessing other Documents

In addition to this Help, Thermo Fisher Scientific provides the following documents for the Orbitrap Astral mass spectrometer:

- [Orbitrap Astral Preinstallation Requirements Guide](#)
- [Orbitrap Astral Operating Manual](#)
- [Orbitrap Astral Performance Maintenance Manual](#)
- [Orbitrap Astral Software Manual](#)

You can access PDF files of the documents listed above from the data system computer.

To view product manuals

From the Microsoft™ Windows™ taskbar, choose **Start > All Apps > Thermo Instruments** (or **Thermo model**), and then open the applicable PDF file.

To open Help

- If available for a specific window or dialog box, click **Help** or press **F1** for information about setting parameters.

For more information, including upcoming application notes, visit www.thermofisher.com.

- Preferences
- Load Standard Diagnostics
- Load service diagnostics
- View Calibration Reports...
- View Other Reports...
- View Instrument
- Tune Help
- Instrument Manuals
- Instrument Web Page
- About Tune

Untitled - Thermo Xcalibur Instrument Setup

File Orbitrap Astral Help

Method Editor

Global Parameters Scan Parameters Summary

Method Timeline

Application Mode: Peptide

Method Duration (min): 60

Experiment #1 Time Range (min): 0-60

Settings

- Infusion Mode: Liquid Chromatography
- Expected LC Peak Width (s): 10
- Advanced Peak Determination:
- Default Charge State: 2

Orbitrap Astral Method Editor

System Templates

- Crosslinking
- Immunopeptidomics
- Label-Free Quan
- LSC
- Plasma Profiling
- SureQuant
- System Evaluation
- TMT

Custom Templates

- My Experiments

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- Welcome to the Orbitrap Astral Method Editor Help!
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Welcome to the Orbitrap Astral Method Editor Help!

This Help describes how to use the Method Editor application with the Thermo Scientific™ Orbitrap™ Astral™ mass spectrometer (MS). You create an MS instrument method (combined with the optional autosampler and liquid chromatograph instrument methods) by defining the experiment type and setting various parameters. These include settings for the MS, syringe pump, and divert valve; and the mass ranges and fragmentation transitions for the experiments.

For information about the operating procedures for the Orbitrap Astral mass spectrometer, we recommend that you read the *Orbitrap Astral Operating Manual* in its entirety.

Helpful Links

- [Configuring the Instrument in Thermo Foundation](#)
- [Method Editor Application](#)
- [Contacting Us](#)

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