

High Performance Liquid Chromatograph

# i-Series



Advanced

# i-Series

High Performance Liquid Chromatograph

## Finally, an LC as Smart and Flexible as You.

Amid increasing calls for improved work efficiency and a more flexible working style, ideas of LC analysis are changing. The time has come for an HPLC that delivers rugged, reliable results with less frequent interaction by the analyst. The new, integrated i-Series LC system maintains the excellent performance of its predecessor while addressing the need for automation efficiency.

### innovative

Remote instrument operation and monitoring allow analyses to be performed remotely, thereby reducing the time spent in the laboratory.

### intelligent

Software integration ensures both data reliability and improved work efficiency.

### intuitive

Intuitive operation ensures an efficient workflow.

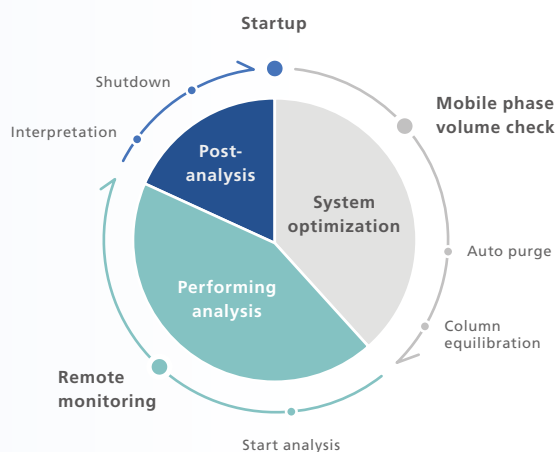




## Automation and Remote Operation/Monitoring Encourage a New Style of Work

Analytical Intelligence functions, such as FlowPilot and mobile phase monitoring, and LabSolutions™ Direct can provide an automated workflow together with remote operation and monitoring from instrument startup to analysis completion.

Automated workflows incorporate the work-style habits of experienced analysts. The result is reliable data collected over extended periods.



## Using Networks for More Improvements in Work Efficiency

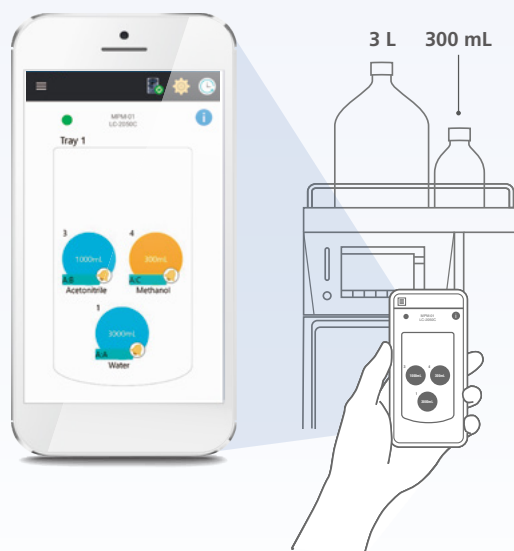
LabSolutions CS allows remote operation and monitoring of all instruments on the analytical network from any locations, even from home.\* Analysis data and reports are managed on a centralized database where administrative authorization allows managers to assign appropriate operational restrictions to operators, depending on their expertise and rank.

\* Must have a network in place that is appropriate for the workflow.



- Automated support functions utilizing digital technologies, such as M2M, IoT, and Artificial Intelligence (AI), that enable higher productivity and maximum reliability.
- Allows a system to monitor and diagnose itself, handle any issues during data acquisition without user input, and automatically behave as if it were operated by an expert.
- Supports the acquisition of high quality, reproducible data regardless of an operator's skill level for both routine and demanding applications.





## Mobile Phase Monitoring

### Advanced Real-Time Mobile Phase Monitoring

Making sure you have sufficient mobile phase in the system—before batch analysis—is critical to keeping your lab running smoothly. If you run out of mobile phase mid-batch, you have to stop the batch and take corrective action, resulting in costly workflow delays and potential loss of samples.

To overcome this challenge, the Mobile Phase Monitor\*<sup>1</sup> enables real-time, gravimetric monitoring of mobile phase levels to ensure maximum uptime. Levels for mobile phase or autosampler rinse solution may be monitored in up to six containers\*<sup>2</sup>. A large bottle version is also available. The containers can also be checked remotely from a smart device (PC/iOS/Android).

\*<sup>1</sup> Optional

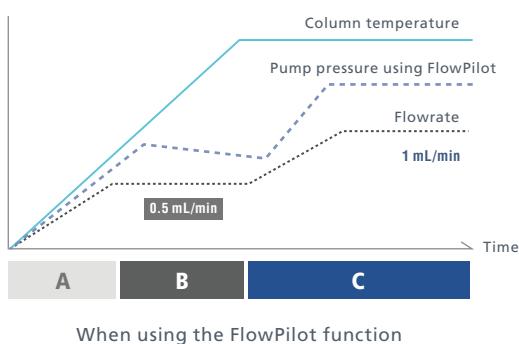
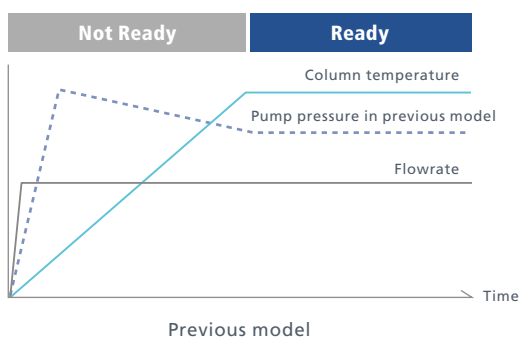
\*<sup>2</sup> Monitors up to 6 liquids when using 1-liter bottles, and up to 3 liquids when using large-volume bottles (2- to 5-liter bottles).



## Mobile Phase Flowrate Control Function

### Smart Flow Control Protects Columns

UHPLC columns can be damaged by sudden pump starts and extreme gradient changes, especially true with polymeric packings. Smart Flow Control (FlowPilot) increases the flow rate gradually to the method set point according to the status of the column oven, extending the life of your columns.



#### FlowPilot

(Patent pending)

The pump controls the flowrate based on oven temperature

- A** Gradually increasing the flowrate
- B** Maintaining the flowrate at half the method flowrate
- C** When the oven temperature reaches the configured temperature, the flowrate is gradually increased up to the configured flowrate



LabSolutions Direct

Web monitoring

### Remote Operation/Monitoring Function Take Control of Instruments from Outside the Laboratory

Using LabSolutions Direct, analysts can operate instruments remotely and implement pre-configured methods and batch analyses using the web browser of a computer or a smart device. Instrument status and chromatograms can also be monitored remotely to reduce the time and labor required to travel to and from the laboratory for improved work efficiency.





# intelligent

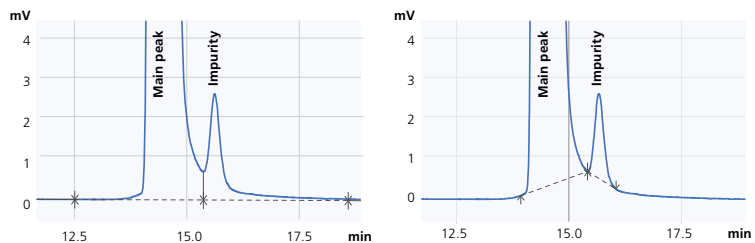
Analytical Intelligence is not limited to automating an analytical workflow or remote operations. By aggregating and automating the knowledge and skills of experienced analysts, Analytical Intelligence enables anyone to obtain reliable data and analytical results. Analytical Intelligence is also designed for high levels of compatibility with other instruments and comes with a method migration function, thereby providing an environment where anyone is equally able to obtain data without the need for complex procedures related to data compatibility between different systems.



## i-PeakFinder Automatic Peak Integration Function

### Process Large Volumes of Data with High Precision in a Single Step

The manual integration of un-resolved peaks is a labor-intensive process and prone to inconsistent results depending upon the experience level of the user. Shimadzu's proprietary i-PeakFinder peak integration algorithm is perfect for such situations. i-PeakFinder processes large volumes of data with high precision in a single step, saving a lot of time and increasing the consistency of results.



Baseline processing with no parameters specified

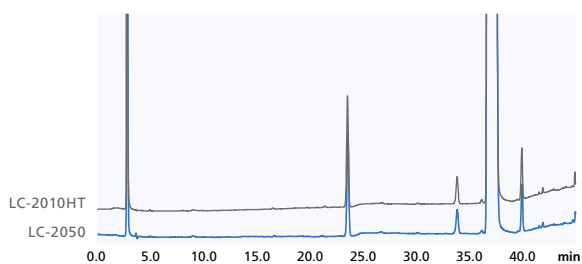
Baseline processing with complete separation

## ACTO Method Migration Support Function

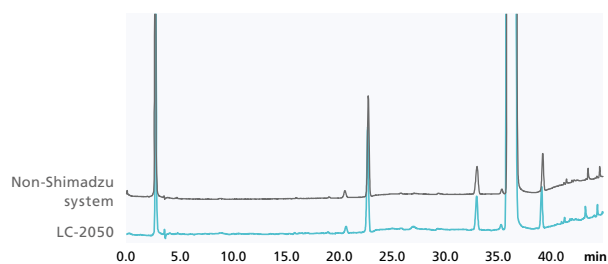
### Considering Instrument Replacement and Method Migration

Migrating a test method (analytical conditions or method) from one instrument to another while obtaining the same chromatogram can be a challenging process. The i-Series is designed with the same internal system volumes as previous Shimadzu systems and competitor systems to ensure system compatibility and data reproducibility. An Analytical Condition Transfer and Optimization (ACTO) function also adjusts gradient start time automatically, so analysts can make adjustments to separations obtained by gradient analysis easily.

\* Using the delay volume conversion system kit



Migrating an analytical method from a previous Shimadzu system (LC-2010HT) to the LC-2050



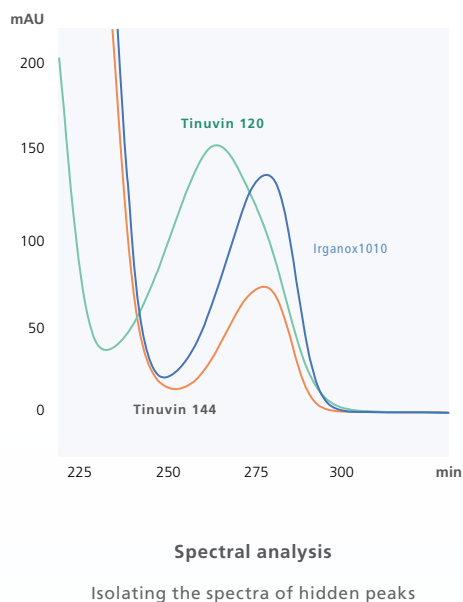
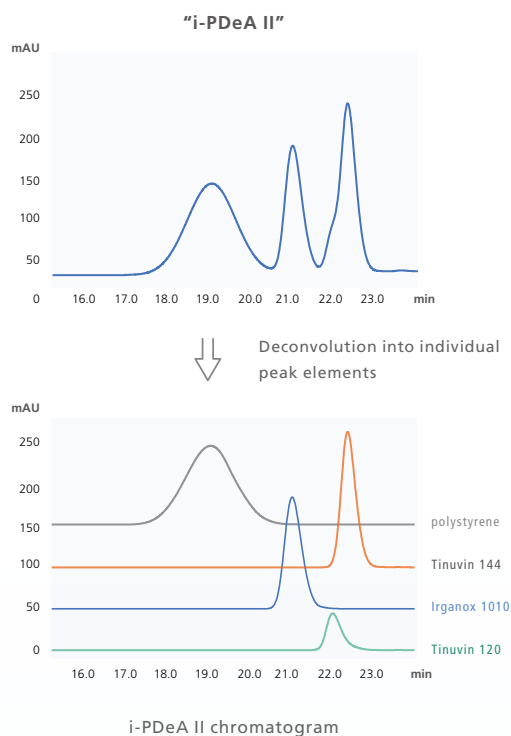
Migrating an analytical method from a non-Shimadzu system to the LC-2050



## i-PDeA II Peak Deconvolution Function

### Tools to Help in Dealing with Difficult Separations

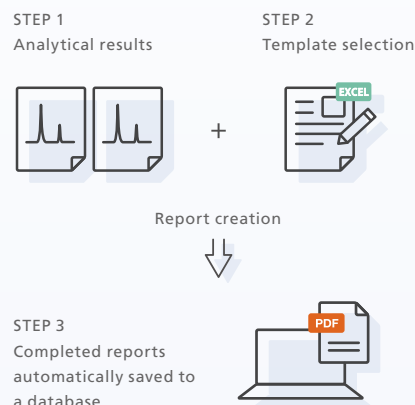
The i-PDeA II peak deconvolution function uses a multivariate curve resolution alternating least squares (MCR-ALS) method to enable qualitative and quantitative analysis of peaks not fully separated by the column. The i-PDeA II can also be used to check the purity of target peaks. (Only available when using a PDA detector and LabSolutions.)



## Automatic Report Creation Function

### Streamlining the Transfer of Results

An automatic report creation function in LabSolutions automatically compiles analytical results and presents the data on pre-prepared report templates. This function not only reduces the work involved in report creation but also prevents errors and data manipulation associated with manual entry and creates well-made reports. By setting up a network environment, reports can even be created, checked and approved from any location.





i-Series  
**intuitive**

### User Interface

#### Simple in Operation

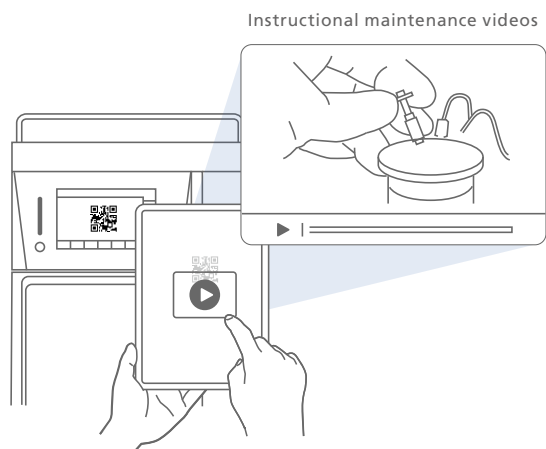
The user interface replicates the system flow channel and is used to visually check the operating status of the system. Method editing can also be performed from the same screen. With its intuitive design, even users who are completely new to liquid chromatography can navigate the user interface with minimal training.



### Maintenance Videos

#### Supporting the Replacement of Consumables

Reading a QR Code® shown on the touch panel directs the user to a website with instructional videos on maintenance. This feature helps improve system availability and increases efficiency.





## Auto-Validation Function

### Stable Operation Assured with Smart System Startup

An auto-validation function means anyone can follow a set procedure and verify the instrument condition easily. The auto-validation function examines solvent delivery stability, wavelength accuracy, absorbance accuracy, gradient accuracy, the presence of any drift/noise, and other parameters. Also, an instrument check function automatically carries out the routine inspections performed before instrument operation and creates a report showing system self-diagnostic results along with a record of consumables usage, including total solvent volume delivered by the delivery pump, total number of injections performed by the autosampler, and the number of hours the lamp has been illuminated. The system check function also manages auto-validation results, making it easy to accurately determine the operating status of the instrument.



#### Starting Auto-validation

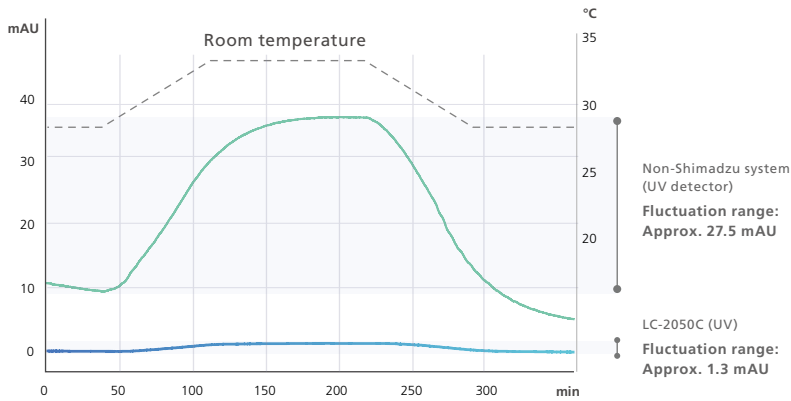
Procedures, mobile phases, and other information necessary for validation are displayed on the screen, allowing you to perform inspections by simply following the instructions.

#### Creating a System Check Report

Validation results can be viewed from the i-Series main unit. Validation results can also be output in a report format from a workstation.

## Dual-Temperature Control with TC-Optics and Flow Cells

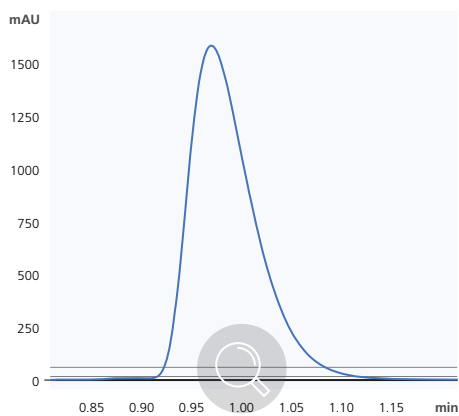
### Excellent Baseline Stability



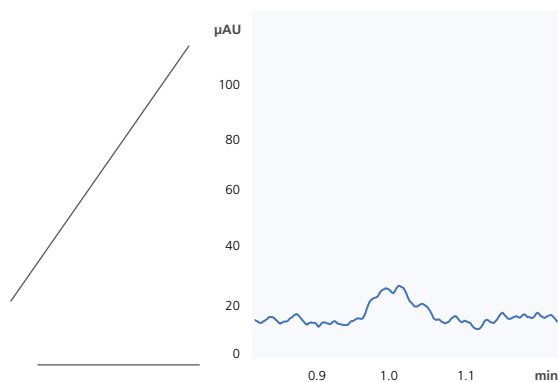
In addition to the temperature control function for flow cells, the i-Series employs new temperature control technology for detector optical systems, known as TC-Optics (Temperature Controlled Optics). This ensures a more stable baseline that is less susceptible to room temperature variation and increased precision during verification testing and quantitative testing of trace components.

### Ultra-Low Carryover Performance Enables High-Sensitivity Analysis Improved Reliability of Trace Component Analysis

Shimadzu's proprietary flow channel design, parts, and materials reduce the carryover effects of sample residue to almost zero. Ultra-low carryover performance has been improved to 0.0025% (chlorhexidine, assigned conditions), thereby providing highly precise quantitative performance when analyzing complex samples.



Chromatogram after injecting chlorhexidine



Chromatogram after injecting a blank sample (mobile phase)

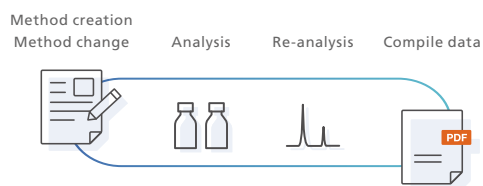
# Data management

## Compliant with ER/ES Guidelines and Data Integrity

LabSolutions has a variety of functions to ensure compliance with FDA 21 CFR Part 11 and Japanese Ministry of Health, Labour and Welfare guidelines on electronic records and electronic signatures. LabSolutions also includes functions that address and support data integrity.

## Centralized Management of Data and User Information

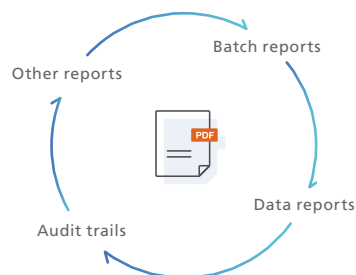
Data and user information are managed on a database with restrictions on data file deletion and a version number management function that ensures safe storage. Furthermore, fine-grained division of operational restrictions allows optimum user management based on role, such as system administrator, analysis operator, etc. LabSolutions records the access status of the system, changes to data and methods, operations performed during analysis and re-analysis, changes to system settings, etc.



An "audit trail" that records all operations

## Review of Operation Logs

A report set function compiles analytical conditions or analytical results/conditions for sets of analysis (batch analysis) and also compiles operation logs from start to completion of analysis. The report set function automatically collects information, prevents the accumulation of arbitrary reports and prevents operational errors.



## Seamless Integration of Testing and Analysis

LabSolutions i-QLinks™ can create test plans and test items, incorporate results from tests performed on HPLC systems and other analytical instruments, automatically create test reports based on test results from all kinds of analytical instruments and manage the progress status of quality testing.

The Analytical Intelligence logo, LabSolutions and i-QLinks are trademarks of Shimadzu Corporation.  
QR Code is a registered trademark of Denso Wave Inc.



Shimadzu Corporation  
[www.shimadzu.com/an/](http://www.shimadzu.com/an/)

**For Research Use Only. Not for use in diagnostic procedures.**

This publication may contain references to products that are not available in your country. Please contact us to check the availability of these products in your country.

Company names, products/service names and logos used in this publication are trademarks and trade names of Shimadzu Corporation, its subsidiaries or its affiliates, whether or not they are used with trademark symbol "TM" or "®".

Third-party trademarks and trade names may be used in this publication to refer to either the entities or their products/services, whether or not they are used with trademark symbol "TM" or "®".

Shimadzu disclaims any proprietary interest in trademarks and trade names other than its own.

The contents of this publication are provided to you "as is" without warranty of any kind, and are subject to change without notice. Shimadzu does not assume any responsibility or liability for any damage, whether direct or indirect, relating to the use of this publication.