

1 Introduction

Thank you for purchasing the LabSolutions RF software.

Read the help manual and instruction manual thoroughly before using the software and operate the software in accordance with the instructions and precautions described in these manuals.

This help manual assumes that the user already possesses a certain degree of knowledge regarding Windows operations.

As explanations make extensive use of special names and vocabulary regarding Windows operations, refer to the manual provided with your Windows system if any of these terms are unclear.

If you are using Windows for the first time, consult the manual provided with your Windows system before reading this help manual.

The following pictorial symbols are used in this help with the following meanings.

Indication	Meaning
	Emphasizes additional information that is provided to ensure the proper use of this product.
	Indicates information provided to improve product performance.
	Indicates the location of related reference information.

Window operations are explained by using the following descriptive rules.

Indication	Meaning
Click	Indicates placing the mouse pointer over a target and pressing the left button once on the mouse.
Right-click	Indicates placing the mouse pointer over a target and pressing the right button once on the mouse.
Double-click	Indicates placing the mouse pointer over a target and pressing the left button twice on the mouse.
Drag	Indicates placing the mouse pointer over a target and holding down the left button or wheel button on the mouse while moving the mouse.
Text enclosed in []	Names of buttons and windows displayed on screen are described enclosed in square brackets. Example: <ul style="list-style-type: none"> • Click [Save]. • The [Properties] window is displayed.
	Input values, text, names of keys on the keyboard, and

Text enclosed in " "	<p>emphasized text are described enclosed in double quotation marks.</p> <p>Example:</p> <ul style="list-style-type: none"> • Enter "2" for [Sample Height]. • Press the "N" key while holding down the "Ctrl" key.
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- [1.1 Application Types](#)
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1.1 Application Types

LabSolutions RF comprises various applications for performing instrument control and data analysis using the Shimadzu Spectrofluorophotometer series as well as software and tools used for instrument management.

■ Basic analysis

Applications for performing basic measurement and related data analysis

Application	Specification
Spectrum	<p>Scan the emission (excitation) monochromator using any excitation (emission) wavelength to capture a emission (excitation) side monochromator.</p> <p>Synchronized scanning, which captures data by scanning the excitation and emission monochromators at the same time while keeping the interval between the excitation wavelength and emission wavelength constant, is also supported.</p>
3D Spectrum	<p>Repeated measurement of excitation (emission) spectrum at any time interval and capturing fluorescence (excitation) spectrum in 3D is also supported.</p> <p>Repeated measurement of fluorescence spectrum at any excitation wavelength interval is also supported.</p>
Quantitation	<p>Create a calibration curve from the fluorescence intensity captured from the standard sample to determine the concentration of unknown samples.</p> <p>Quantitation using peak values and areas within a specific wavelength range is also supported.</p>
Photometric	<p>Capture fluorescence intensity at any fixed wavelength (multiple wavelengths can be set).</p> <p>Calculation results and pass/fail judgments can be obtained in conjunction with measurement by using captured data to create/register arithmetic expressions with the four basic arithmetic operators as well as judgment criteria.</p>
Time course	<p>Capture changes in fluorescence intensity over time at any fixed wavelength. (Up to four wavelengths can be set.)</p> <p>Calculation of enzyme reaction activity values based on the gradient of the change in fluorescence intensity over time is also supported.</p>

■Special analysis

Applications for performing specific analysis

Application	Specification
Quantum yield	Determine the quantum yield of an unknown sample by using the fluorescence spectrum of a standard sample (with a known quantum efficiency) and the fluorescence spectrum of the unknown sample. <div style="border: 1px solid black; padding: 5px;">  NOTE Unavailable on the RF-5300PC/5301PC models. </div>
Quantum efficiency	Use an integrating sphere to determine the quantum efficiency from the fluorescence spectrum in the blank state and the fluorescence spectrum of the sample. <div style="border: 1px solid black; padding: 5px;">  NOTE Unavailable on the RF-5300PC/5301PC models. </div>

■Management tools

Tools used for instrument management

Tool	Specification
RF Performance Validation Software	Check instrument performance (such as wavelength accuracy and S/N ratio). <div style="border: 1px solid black; padding: 5px;">  NOTE The only test item that is available on the RF-5300PC/5301PC is S/N ratio. </div>
Instrument Registration Tool	Register instruments (spectrofluorophotometer and integrating spheres) that connect to LabSolutions RF.
Correction Function Measurement Tool	Create correction functions used in spectrum correction when an integrating sphere is installed. <div style="border: 1px solid black; padding: 5px;">  NOTE Unavailable on the RF-5300PC/5301PC models. </div>

1.2 File Types

The following files can be used with LabSolutions RF.

- [1.2.1 Data Files](#)
- [1.2.2 Measurement Parameter Files](#)
- [1.2.3 Template Files](#)
- [1.2.4 Log File](#)

1.2.1 Data Files

■Application files

These dedicated data files are created by each application and cannot be opened for other applications.

Name	Extension	Description
Spectrum file	fs2f	Data file created in the spectrum application. This file contains spectrum (waveform) data, measurement parameter information, file information (summary), data history, peak pick data, point pick data, and Peak Area data.
3D spectrum file	fs3f	Data file created in the 3D spectrum application. This file contains 3D spectrum data, measurement parameter information, file information (summary), and data history.
Calibration curve file	fqcqf	Calibration curve data file created in the quantitation application. This file contains standard table data, measurement parameters * ¹ , calibration curve parameters, file information (summary), and data history.
Quantitation file	fqqf	Quantitation result data created in the quantitation application. This file contains standard sample/sample table data, measurement parameters * ¹ , calibration curve parameters, file information (summary), and data history.
Photometric file	fquf	Measurement result data created in the photometric application. This file contains sample table data, measurement parameters * ¹ , file information (summary), and data history.
Time course file	fttc	Data of changes in fluorescence intensity over time created in the time course application. This file contains time course (waveform) data, measurement parameter information, file information (summary), data history, peak pick data, point pick data, and Peak Area data.
Quantum yield data file	fqty	This measurement result data is created in quantum yield measurement. This file contains standard/unknown sample spectrum (waveform) data, analysis results, and file information (such as summary information and measurement conditions).
Quantum efficiency data file	fqte	This measurement result data is created in quantum efficiency measurement. This file contains blank/sample spectrum (waveform) data, analysis results, and file information (summary, measurement conditions, etc.).
Validation file	fpvr	This test result data is created by the RF performance validation software. This file contains waveform data, test conditions, test results, and file information (such as

		summary information) for each test item.
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*1 Configured as the application's measurement parameters when the data file is loaded.

■Text files

Name	Extension	Description
Text file (spectrum)	txt	Data file created (output to text file) in the spectrum application (can be loaded). This text format file contains horizontal axis values (wavelength) and the corresponding vertical axis values (such as fluorescence intensity) delimited with commas or other characters ^{*2} .
Text file (3D spectrum)	txt	Data file created (output to text file) in the 3D spectrum application (cannot be loaded). This text format file contains X-axis values (fluorescence wavelength) ^{*3} , Y-axis values (excitation wavelength or time) ^{*3} , and Z-axis values (such as fluorescence intensity) delimited with commas or other characters ^{*2} .
Text file (quantitation)	txt	Data file created (output to text file) in the quantitation application (cannot be loaded). This text format file contains standard sample/sample table titles (items) and all standard sample data delimited with commas or other characters ^{*2} .
Text file (photometric)	txt	Data file created (output to text file) in the photometric application (cannot be loaded). This text format file contains sample table titles (items) and all standard sample data delimited with commas or other characters ^{*2} .
Text file (time course)	txt	Data file created (output to text file) in the time course application (cannot be loaded). This text format file contains horizontal axis values (time) and the corresponding vertical axis values (fluorescence intensity) delimited with commas or other characters ^{*2} .
Text file (quantum yield)	txt	Result file created (output to text file) in the quantum yield application (cannot be loaded). This text format file contains horizontal axis values (time) and the corresponding vertical axis values (fluorescence intensity) delimited with commas or other characters ^{*2} . When saving, any of the following three types can be selected: standard sample, any unknown sample, or all unknown samples.
Text file (quantum efficiency)	txt	Result file created (output to text file) in the quantum efficiency application (cannot be loaded). This text format file comprises the waveform data of blank spectra and sample spectra and contains horizontal axis values (wavelength) and

		corresponding vertical axis values (fluorescence intensity) delimited with commas.
Data print table	txt	Data processing result file created in the spectrum/time course application (cannot be loaded). This text format file contains data print table items and data delimited with commas or other characters *2.
Point pick table	txt	Data processing result file created in the spectrum/time course application (cannot be loaded). This text format file contains point pick table items and data delimited with commas or other characters *2.
Peak pick table	txt	Data processing result file created in the spectrum/time course application (cannot be loaded). This text format file contains peak pick table items and data delimited with commas or other characters *2.
Peak Area table	txt	Data processing result file created in the spectrum/time course application (cannot be loaded). This text format file contains Peak Area table items and data delimited with commas or other characters *2.
Main table	txt	Data processing result file created in the time course application (cannot be loaded). This text format file contains main table items and data delimited with commas or other characters *2.
Intensity difference table	txt	Data processing result file created in the time course application (cannot be loaded). This text format file contains intensity difference table items and data delimited with commas or other characters *2.

*2 Depends on the application setting when saving. Measurement parameters and summary information can be included when saving.

*3 The X axis and Y axis can be selected when performing text conversion from the application.

■RFPC software data files

Name	Extension	Description
RFPC spectrum file	spc	This is an RFPC software file format. This file can be loaded into the spectrum application.
RFPC time course file	tmc	This is an RFPC software file format. This file can be loaded into the time course application.

1.2.2 Measurement Parameter Files

Application	Extension	Description
Spectrum	fm2f	This file stores measurement, instrument, and attachment parameters.
3D Spectrum	fm3f	This file stores measurement, instrument, and attachment parameters.
Quantitation	fmqf	This file stores wavelength, calibration curve, measurement (standard sample), measurement (sample), instrument, attachment, calculation, and pass/fail parameters.
Photometric	fmff	This file stores wavelength, measurement (sample), instrument, attachment, calculation, and pass/fail parameters.
Time course	fmtc	This file stores wavelength, measurement, instrument, and attachment parameters.

1.2.3 Template Files

Name	Extension	Description
Spectrum Peak Area template	fsta	Template file for the Peak Area table that contains the wavelength range and coefficients used in area calculation.
Spectrum point pick template	fstp	Template file for the point pick table that contains the wavelengths used in point picking.
Time course Peak Area template	ftta	Template file for the Peak Area table that contains the time range and factors used in area calculation.
Time course point pick template	fttp	Template file for the point pick table that contains the times used in point picking.
Quantitation template	fqtq	Quantitation measurement file that contains standard sample/sample table information with no data as well as measurement parameters and calibration curve parameters.
Photometric template	futf	Photometric measurement file that contains sample table information with no data as well as measurement parameters.
Report template (report file)	frpt	Template file for printing that contains printable items.

1.2.4 Log File

Name	Extension	Description
Log	log	This file contains the history of operations performed using the software. The contents of this file can be checked via [System Log] - [View] on the [Tools] menu.

1.3 Starting LabSolutions RF

Start LabSolutions RF by either double-clicking the  (LabSolutions RF) on the desktop or clicking the [Start] button, navigating to [All Programs] - [Shimadzu], and clicking [LabSolutions RF].
The LabSolutions RF launcher window is displayed first. Each application is started from the launcher window.

1.4 LabSolutions RF Launcher

- [1.4.1 \[Fluorescence\] Tab](#)
- [1.4.2 \[Manage\] Tab](#)
- [1.4.3 \[Configuration\]](#)

1.4.1 [Fluorescence] Tab

Start analysis applications for fluorescence measurement and any registered external applications from this tab.



[Fluorescence] Tab in the Launcher

Name	Function
Basic Analysis	
[Spectrum]	Start the application for performing spectrum measurement, data processing, and printing the results.

		▶▶ Reference "3 Spectrum Application"
[3D Spectrum]	Start the application for performing 3D spectrum measurement and printing the results.	▶▶ Reference "4 3D Spectrum Application"
[Quantitation]	Start the application for performing quantitation using a calibration curve and printing the results.	▶▶ Reference "5 Quantitation Application"
[Photometric]	Start the application for performing fluorescence intensity measurement at any wavelength and printing the results.	▶▶ Reference "6 Photometric Application"
[Time course]	Start the application for measuring changes in fluorescence intensity over time, performing data processing, and printing the results.	▶▶ Reference "7 Time Course Application"
Special Analysis		
[Quantum yield]	Start the application for determining the quantum yield of a sample using the fluorescence spectrum of the sample and the fluorescence spectrum of a standard sample (with a known quantum efficiency).	▶▶ Reference "10 Quantum Yield Application"
[Quantum efficiency]	Start the application for determining the quantum efficiency from the fluorescence spectrum in the blank state and the fluorescence spectrum of the sample using an integrating sphere.	▶▶ Reference "11 Quantum Efficiency Application"
[Application]	Frequently used external applications can be started from this tab by registering them. Application registration is performed in the [Configuration] window. (Maximum number of registrations: 7)	▶▶ Reference "1.4.3 [Configuration]"

1.4.2 [Manage] Tab

Start the RF performance validation software, instrument registration tool, correction function measurement tool, and any registered external applications from this tab.

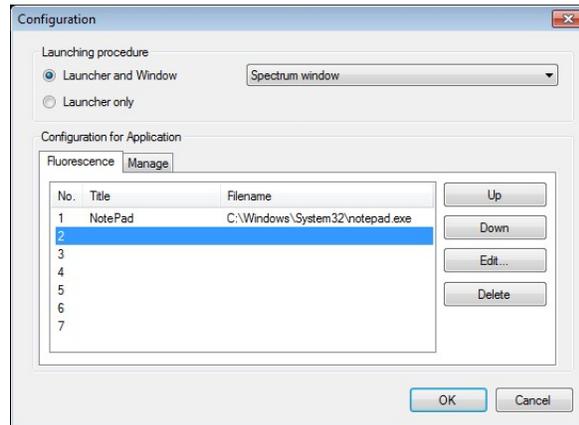


[Manage] Tab in the Launcher

Name	Function
[Management Tool]	
	[Validation] Start the RF performance validation software used for checking instrument performance (such as wavelength accuracy and S/N ratios).
	[Register Device] Start the instrument registration tool for registering instruments (spectrofluorophotometers and integrating spheres) that connect to LabSolutions RF.
	[Correction] Start the correction function measurement tool for creating correction functions used in spectrum correction when an integrating sphere is installed.
[Application]	Frequently used external applications can be started from this tab by registering them. Application registration is performed in the [Configuration] window. (Maximum number of registrations: 7) ▶▶ Reference "1.4.3 [Configuration]"

1.4.3 [Configuration]

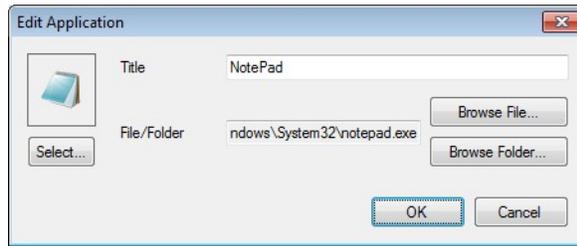
Register any external application to the launcher.



[Configuration] Window

Item	Description
[Launching procedure]	Select whether to start applications together with the launcher when starting LabSolutions RF.
[Launcher and Window]	Start the selected LabSolutions RF measurement application together with the launcher.
[Launcher only]	Start the launcher only.
[Configuration for Application]	Register external applications to start from the launcher on each of the following tabs. <ul style="list-style-type: none"> • [Fluorescence] tab • [Manage] tab
[Up]	Move the selected external application up one position in the list.
[Down]	Move the selected external application down one position in the list.
[Edit]	Click to display the [Edit Application] window. Configure the selected external application and title name that is displayed in the launcher. ▶▶ Reference "[Edit Application] window"
[Delete]	Delete the selected external application from the list. A confirmation dialog box is displayed to confirm whether to delete the selected external application.
[OK]	Apply any changes and close the [Configuration] window.
[Cancel]	Cancel any changes and close the [Configuration] window.

■ [Edit Application] window



[Edit Application] Window

Item	Description
[Select]	<p>Change the application icon.</p>  <p>[Change Icon] Window</p>
[Title]	Enter the application title.
[Browse File]	Select the file of the application to register.
[Browse Folder]	<p>A folder can be registered by clicking [Browse Folder] instead of [Browse File]. This allows registration and collective management of programs and files of the same type that are stored in the same folder.</p>