

Color Data Software

SpectraMagic™ DX

Ver. 1.2

E Instruction Manual



**Before using this software,
please read this manual.**



KONICA MINOLTA

Formal designations of application software used in this manual

(Designation in this manual) (Formal designation)

Windows, Windows 7 Microsoft® Windows® 7 Professional Operating System

Windows, Windows 8.1 Microsoft® Windows® 8.1 Pro Operating System

Windows, Windows 10 Microsoft® Windows® 10 Pro Operating System

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- Konica Minolta accepts no responsibility for consequences resulting from failure to follow the instructions outlined in this manual, the condition above notwithstanding.
- The screen capture shots in this manual are examples and may be different from actual screens.



Safety Precautions

Before you use the SpectraMagic DX software, we recommend that you thoroughly read this manual as well as the instruction manuals of your PC and the instrument.

Software License Agreement

The terms of the license agreement of the SpectraMagic DX software are provided in the Software License Agreement dialog box displayed on-screen during the installation process. This software can be installed only if you agree to all the terms of the agreement.

Notes on Use

- SpectraMagic DX application software is designed to be used with the Windows 7, Windows 8.1 or Windows 10 operating system. Note that neither operating system is included with this software. One of these operating systems must be installed on the PC before this software can be installed.

Notes Regarding USB Devices (Flash Memory, Protection Key)

- When plugging the USB device into your computer, be sure that it is in the correct orientation. Do not forcibly plug it in.
- Do not touch the contacts of the USB flash drive.
- After using the USB device, return it to its case and store in a safe place.
- Avoid exposing the USB device to rapid temperature changes and condensation.
- Avoid leaving USB device in locations where it may be exposed to high temperatures from direct sunlight or heaters.
- Do not drop the USB device or subject it to strong impact.
- Keep the USB device away from water, alcohol, paint thinners, and other such substances.

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CHAPTER 1

OVERVIEW

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1.1 Introduction

SpectraMagic DX software is color data software designed to connect instruments such as the CM-25cG to a PC (personal computer) to enable the measurement and graphic display of sample data, as well as various other operations.

- For information on system requirements, see p. 236.
- For information on the functions in each edition, see p. 237.

Every effort has been made to ensure the accurate operation of this software. However, should you have any questions or comments, please contact the nearest KONICA MINOLTA authorized service facility.

1.1.1 Data Storage

SpectraMagic DX uses a document : database structure to store all measurement data.

Document:

A document consists of the set of target and/or sample measurements shown in the SpectraMagic DX screen and the various settings, etc. associated with those data.

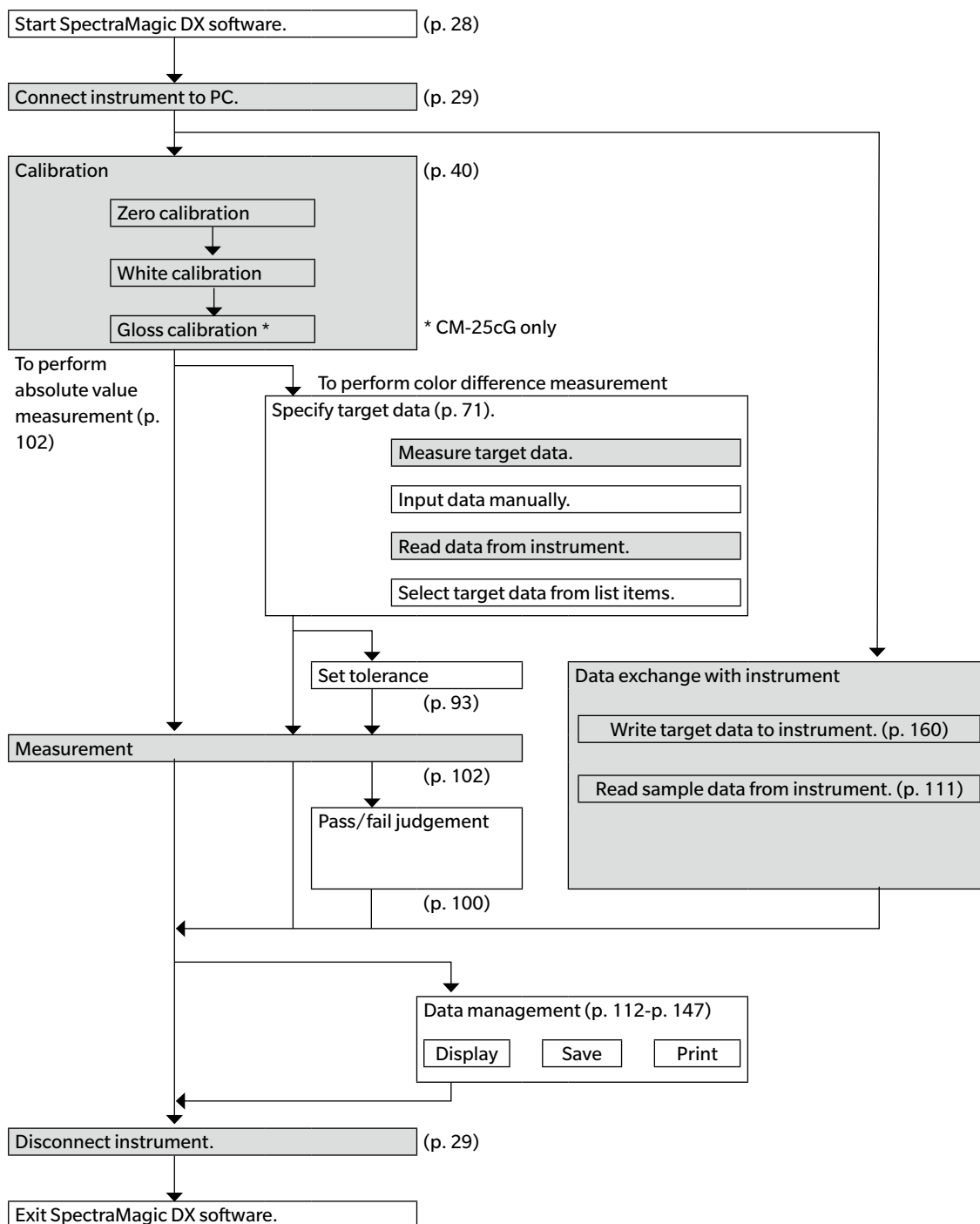
Folder:

For easy management of documents, documents can be organized into folders. A folder can contain numerous documents.

Database:

The database consists of numerous documents. At the time of SpectraMagic DX installation , a default database was created.

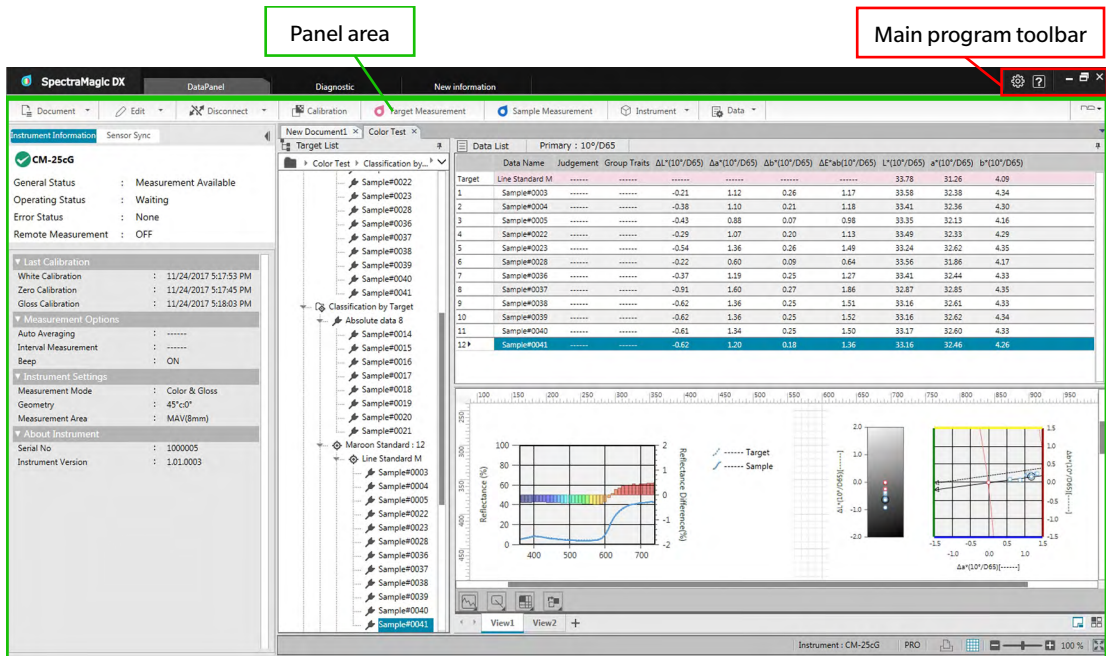
1.2 Operation Flow



The shaded sections indicate functions available only when a instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).

1.3 Screen Configuration

The SpectraMagic DX screen is shown below.



The panel area consists of three panels which can be selected by clicking the desired panel tab:

Data Panel:

The main panel of SpectraMagic DX. The Data Panel is where most operations, such as taking measurements, viewing measurement data, and creating measurement data reports, are performed. See the following page for details.





Diagnosis Panel:

The panel for utilizing SpectraMagic DX's diagnosis function (see p. 209) for checking and tracking instrument performance.

New Information Panel:

This panel provides notification of software updates, etc. Click on the link on this page to get the latest information.

1.3.1 Main Program Toolbar

The main program toolbar at the right end of the title bar includes the following button in addition to the normal Windows minimize (, restore (, maximize (, and exit () buttons.



Opens the **Application Settings** dialog. See. p. 171.



Opens a menu for opening the SpectraMagic DX instruction manual (this file), or the Precise Color Communication tutorial.

1.3.2 Data Panel

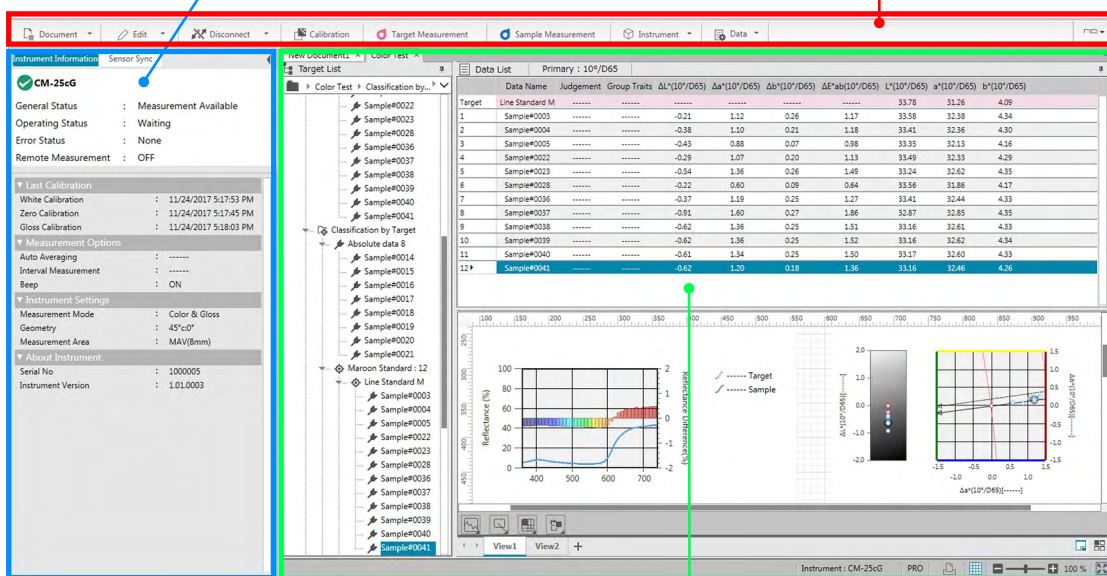
The Data Panel is the main panel of SpectraMagic DX, and is where measurements are taken and measurement data are viewed and utilized. The Data Panel consists of the Data Panel Menu Toolbar, Instrument Window (shown only when an instrument is connected) for instrument status and operations, and Document Windows which contain measurement data, list settings, tolerances, and graphs, and enables printing.

Instrument Window (p. 16)

Includes Instrument Information tab for viewing instrument information and Sensor Sync tab for copying data from instrument.

Data Panel Menu Toolbar (p. 10)

Displays buttons that open menus or perform functions..









Document Window (p. 19)

Shows the content of a document including measurement data according to document settings.

1.3.2.1 Data Panel Menu Toolbar

The Data Panel menu toolbar contains buttons that open menus or perform frequently used functions.

- Place the mouse pointer over a button to display a brief description of its function.

[Document ▼]	Opens the Document menu. See p. 11.
[Connect ▼] (F5) or [Disconnect ▼] (Shift + F5)	<p>Connect (shown only when no instrument is connected): Connects DX to an instrument. See p. 29.</p> <p>Disconnect (shown only when an instrument is connected): Disconnects the connected instrument. See p. 29.</p> <p>▼ : Opens the Communication Settings dialog for setting communication settings. See p. 31.</p>
[Calibration] (F2)	Performs instrument calibration. See p. 41.
[Target Measurement] (F3)	Takes a target measurement. See p. 73.
[Sample Measurement] (F4)	Takes a sample measurement. See p. 103.
[Instrument ▼]	Opens the Instrument menu. See p. 13.
[Data ▼]	Opens the Data menu. See p. 14.
 ▼ or  ▼ or  ▼	<p>Clicking button for current setting opens pulldown for selecting document window arrangement:</p> <p> Show document windows as tabs.</p> <p> Tile document windows.</p> <p> Cascade document windows.</p>

1.3.2.2 Document Menu

The **Document** menu can be opened by clicking on [**Document ▼**] in the Data Panel menu toolbar.

<i>New</i>	Creates a new document. See p. 53.
<i>Open from DB...</i>	Opens the Database View dialog for opening an existing document (see p. 53) or performing various database operations such as creating folders or renaming or deleting documents (see p. 141).
<i>Save to DB...</i>	Saves the existing document to the database under the current name. See p. 139.
<i>Save as...</i>	Opens the Database View dialog for saving the existing document to the database under a new name (see p. 139) or performing various database operations such as creating folders or renaming or deleting documents (see p. 141).
<i>Print...</i>	Prints canvas pane. See p. 146.
<i>Page Settings...</i>	Opens the Page Settings dialog for setting paper size and margins for printing. See p. 145.
<i>Target search from database...</i>	Opens the Target search from database dialog box for searching the entire database for targets meeting specified conditions. The target(s) which are found can then be added to the current document. See p. 88.
<i>Serial Printer Settings...</i>	Opens the Serial Printer Settings dialog for setting serial printer functions. See p. 148.
<i>Export to File...</i>	Opens a dialog for exporting the currently selected document to a SpectraMagic DX *.mesx measurement data export file, or for exporting the current screen layout (list items, canvas layout, etc.) to a SpectraMagic DX *.mtpx template file. See p. 150.
<i>Import from File...</i>	<p>Opens a dialog for importing a SpectraMagic DX *.mesx measurement data export file, a SpectraMagic DX *.mtpx template file, a SpectraMagic NX *.mes measurement data file, a SpectraMagic NX *.mtp template file, or a *.txt or *.csv text file. See p. 150.</p> <ul style="list-style-type: none"> *.txt and *.csv text file import is supported only by SpectraMagic DX Professional Edition.
<i>Application Settings...</i>	Opens the Application Settings dialog. See. p. 171.
<i>Exit</i>	Exits from SpectraMagic DX.

1.3.2.3 Edit Menu

The **Edit** menu can be opened by clicking on [**Edit ▼**] in the Data Panel menu toolbar.

<i>Cut</i>	Cuts the selected targets and samples. See p. 120.
<i>Copy</i>	Copies the selected targets and samples. See p. 120.
<i>Paste</i>	Pastes previously cut or copied targets and samples. See p. 120.
<hr/>	
<i>Delete</i>	Deletes the selected targets and samples. See p. 121.
<hr/>	
<i>Search</i>	Opens the Search dialog box. See p. 125.
<hr/>	
<i>Select All</i>	Selects all targets and samples in the Data Grid.
<i>Unselect All</i>	Deselects all targets and samples in the Data Grid.
<hr/>	
<i>Edit Canvas</i>	Enables/disables editing of the canvas.
<hr/>	
<i>Screen Settings</i>	Opens the Screen Settings dialog box. See p. 113.

1.3.2.4 Instrument Menu

The **Instrument** menu can be opened by clicking on [**Instrument ▼**] in the Data Panel menu toolbar.

<i>Instrument Settings...</i>	Opens the Instrument Settings dialog box. See p. 34.
<i>Calibration... (F2)</i>	Performs instrument calibration. See p. 41.
<i>UV Adjustment...</i>	Opens the UV Adjustment dialog box. See p. 45.
<i>Target Measurement (F3)</i>	Takes a target measurement. See p. 73.
<i>Sample Measurement (F4)</i>	Takes a sample measurement. See p. 103.
<i>Measurement Options...</i>	Opens the Measurement Options dialog box. See p. 66.
Manual Average Measurement	
<i>Target...</i>	Opens the Target Averaged Measurement dialog box and starts the process for manual averaged target measurements. See p. 78.
<i>Sample...</i>	Opens the Sample Averaged Measurement dialog box and starts the process for manual averaged sample measurements. See p. 108.
<i>Option...</i>	Opens the Averaged Measurement : Options dialog box for specifying options for manual averaged measurements. See p. 80 or p. 110
Remote Measurement	
<ul style="list-style-type: none"> It is not possible to enable both <i>Target</i> and <i>Sample</i> for <i>Remote Measurement</i> at the same time. Enabling one will automatically disable the other. 	
<i>Target (F6)</i>	Enables/disables remote target measurements using the instrument's measurement button. See p. 75.
<i>Sample (F7)</i>	Enables/disables remote sample measurements using the instrument's measurement button. See p. 104.
<i>Remote Measurement Option...</i>	(For CM-700d/CM-600d only) Opens dialog for setting remote measurement options. See p. 166.
Read / Write	
<i>Read Sample...</i>	Opens the Read Sample Data dialog box for reading sample data from the instrument memory into the current document. See p. 111.
<i>Read Target...</i>	Opens the Read Target Data dialog box for reading target data from the instrument memory into the current document. See p. 87.
<i>Write Target...</i>	Opens the Write Target dialog box for writing the currently selected target data from the current document into instrument memory. See p. 160.
<i>Clear Stored Data</i>	Clears sample data from the instrument memory. See p. 163.
Calibration setting	
<i>White calibration setting</i>	Opens the White calibration setting dialog box for writing white calibration data to the instrument. See p. 43.
<i>User calibration setting...</i>	Opens the User calibration setting dialog box for writing user calibration data to the instrument. See p. 44.

<i>Standalone Configuration...</i>	Opens the Standalone Configuration dialog box for setting the instrument settings to be used when operating the instrument standalone (without using software). See p. 164.
------------------------------------	--

1.3.2.5 Data Menu

The **Data** menu can be opened by clicking on [**Data ▼**] in the Data Panel menu toolbar.

<i>Export All</i>	Opens a pop-out menu to export all targets and samples shown in the Data List to various file formats.
<i>Export as CSV</i>	(File extension: csv) Data are exported as a text file delimited by the list separator character specified in Windows Regional Settings.
<i>Export as Excel</i>	(File extension: xlsx) Data are exported as an Excel file.
<i>Export as Text</i>	(File extension: txt) Data are exported as a tab-delimited text file.
<i>Export as XML</i>	(File extension: xml) Data are exported as an xml file.
<hr/>	
<i>Export</i>	Opens a pop-out menu to export the selected targets and samples to various file formats.
<i>Export as CSV</i>	(File extension: csv) Data are exported as a text file delimited by the list separator character specified in Windows Regional Settings.
<i>Export as Excel</i>	(File extension: xlsx) Data are exported as an Excel file.
<i>Export as Text</i>	(File extension: txt) Data are exported as a tab-delimited text file.
<i>Export as XML</i>	(File extension: xml) Data are exported as an xml file.
<hr/>	
<i>Tool</i>	
<i>Change Link to Target...</i>	Opens a dialog for changing the link to target. See p. 122.
<i>Change to Target</i>	Changes sample to a target. See p. 88.
<i>Average</i>	Averages the selected targets or samples and adds the average as a new target or sample. See p. 123.
<i>Working Target</i>	Opens a dialog for setting the selected sample as a working target under a master target. See p. 90.
<hr/>	
<i>Tolerance Setting...</i>	Opens the Data Settings dialog box with the Tolerance Setting category selected for setting tolerances for the current target. See p. 96.
<i>Write Target...</i>	Opens the Write Target dialog box for writing the currently selected target data from the current document into instrument memory. See p. 160.
<hr/>	
<i>Observer and Illuminant...</i>	Opens the Observer and Illuminant dialog box for setting observer and illuminant settings. See p. 54.
<hr/>	
<i>List Items...</i>	Opens the Data Settings dialog box with the List Items category selected for setting the items to shown in the Data List. See p. 56.
<i>Decimal Places...</i>	Opens the Decimal Places for List dialog box for setting the number of decimal places to be used for each list item. See p. 65.
<hr/>	

<i>Judgement Format...</i>	Opens the Judgement Format dialog box for setting how judgement results will be shown. See p. 100.
<hr/>	
<i>Target Selection Mode...</i>	Opens the Target Selection Mode dialog box for selecting how target will be selected (manually or automatically based on set criteria). See p. 92.
<hr/>	
<i>Input Target</i>	
<i>Input Spectral Target...</i>	Opens the Input Spectral Target dialog box for setting spectral target data. See p. 81.
<i>Input Colorimetric Target...</i>	Opens the Input Colorimetric Target dialog box for setting colorimetric target data. See p. 84.
<hr/>	
<i>Default Tolerance Setting...</i>	Opens the Data Settings dialog box with the Default Tolerance Settings category selected for setting default tolerances. See p. 93.
<i>Auto Naming...</i>	Opens the Auto Naming dialog box for setting target and sample names to be used automatically. See p. 67.
<i>Supplementary data information...</i>	Opens the Data Info dialog box for setting supplementary data information. See p. 69.
<i>Group Settings...</i>	Opens the Group Settings dialog box for organizing target and sample data into groups. See p. 134.
<hr/>	
<i>Data Property...</i>	Opens the Data Property dialog box for setting and viewing data properties. See p. 136.

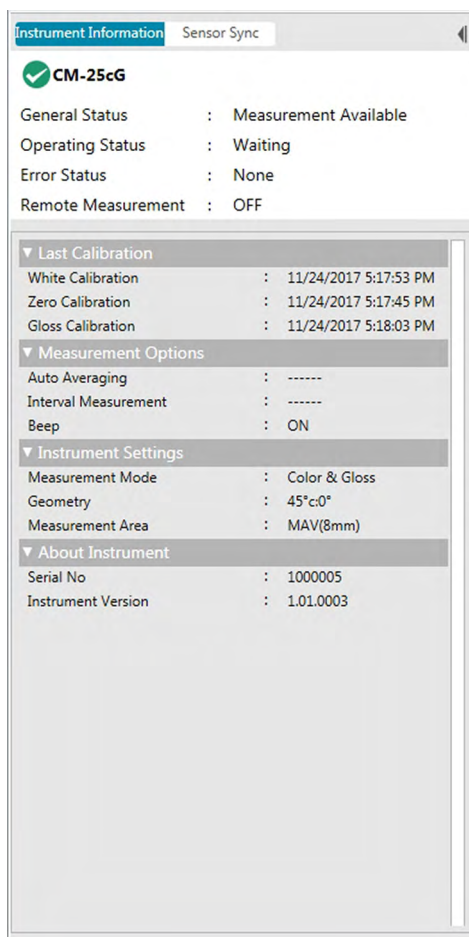
1.3.3 Instrument Window

The Instrument Window shows information regarding the connected instrument and enables instrument -related operations to be performed. It consists of the following two tabs.

1.3.3.1 Instrument Information tab

The Instrument Information tab shows various information about the connected instrument.

Status area	Current instrument status and whether it is ready to take a measurement.
Last Calibration	For calibration procedures, see p. 40.
Measurement Options	For Measurement Options dialog, see p. 66.
Instrument Settings	For Instrument Settings dialog, see p. 34.
About Instrument	Serial number and firmware version information (not changeable)



- To collapse a section, click on ▼ next to the section name. To expand a collapsed section, click on ► next to the section name.

1.3.3.2 Sensor Sync tab

The Sensor Sync tab is shown only for instruments equipped with internal memory. This tab is for reading target and sample data stored in the instrument memory into SpectraMagic DX, and for writing target data to the instrument memory.

- For information on reading target data from the instrument, see p. 87.
- For information on reading sample data from the instrument, see p. 111.
- For information on writing target data to the instrument, see p. 160.
- For more Sensor Sync tab operations see p. 157.

Select the type of data to show:

- All Data
- Target
- Sample (linked to a target)
- Absolute Data (not linked to a target)

Click on checkboxes to select/deselect data.

Reread data stored in instrument memory.

Progress bar when reading data

Read selected stored data into SpectraMagic DX. (See p. 157.)

Delete selected stored data from instrument memory. (See p. 163.)

Input word to search for data by data name or comment.

		10*/D65			
		X	Y	Z	GU
-----		31.27	46.40	46.66	-----

	No	Name	TimeStamp
<input type="checkbox"/>	0012	No Name	26/01/2017 16:55:00
<input type="checkbox"/>	0013	No Name	26/01/2017 16:55:02
<input checked="" type="checkbox"/>	0010	No Name	26/01/2017 17:05:51
<input type="checkbox"/>	0021	No Name	26/01/2017 17:05:55
<input type="checkbox"/>	0022	No Name	26/01/2017 17:05:57
<input type="checkbox"/>	0023	No Name	26/01/2017 17:05:58
<input type="checkbox"/>	0024	No Name	26/01/2017 17:06:00
<input type="checkbox"/>	0025	No Name	26/01/2017 17:06:01
<input type="checkbox"/>	0026	No Name	26/01/2017 17:06:03
<input type="checkbox"/>	0027	No Name	26/01/2017 17:06:04
<input type="checkbox"/>	0028	No Name	26/01/2017 17:06:06
<input type="checkbox"/>	0029	No Name	26/01/2017 17:06:08
<input type="checkbox"/>	0030	No Name	26/01/2017 17:06:09
<input type="checkbox"/>	0031	No Name	26/01/2017 17:06:11
<input checked="" type="checkbox"/>	0032	No Name	26/01/2017 17:06:12

Meaning of symbols:

- Target data
- Sample data

1.3.3.3 Instrument Window Operations

■ Collapsing / Expanding the Instrument Window

To collapse the Instrument Window to a narrow ribbon on the side, click on ◀| in the upper right of the Instrument Window. The Instrument Window will collapse to a narrow ribbon on the left side of the Data Panel with |▶ at the top.

To expand the collapsed Instrument window, click on the |▶ at the top of the collapsed Instrument Window ribbon. The Instrument window will expand to normal width.

■ Resizing Width of the Instrument Window

The width of the Instrument Window can be resized by positioning the cursor over the right-side border of a pane so that the cursor becomes a double-headed arrow, and then dragging the border to the desired position.

1.3.4 Document Window

The Document Window shows the measurement data in the document in various ways: In a tree format by type of data and linked target in the Target List, as a list of numerical data in the Data List, and on various graphs in the Canvas Pane.

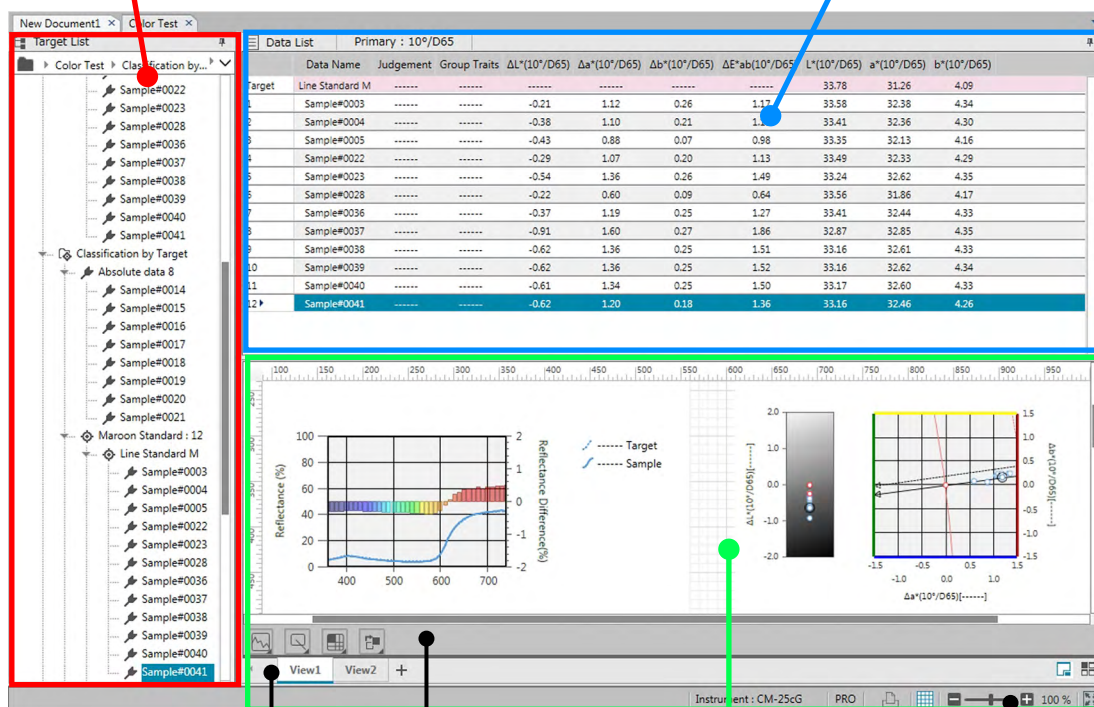
- The maximum number of documents which can be open at one time is 10.

Target List (p. 20)

Shows measurements in tree form.

Data List (p. 21)

Displays sample data.



Canvas View Toolbar (p. 127)

Used to add canvases to Canvas Pane and arrange how they are shown.

Canvas Toolbar (p. 127)

Used to place and arrange graphic objects on canvases.

Canvas Pane Toolbar (p. 128)

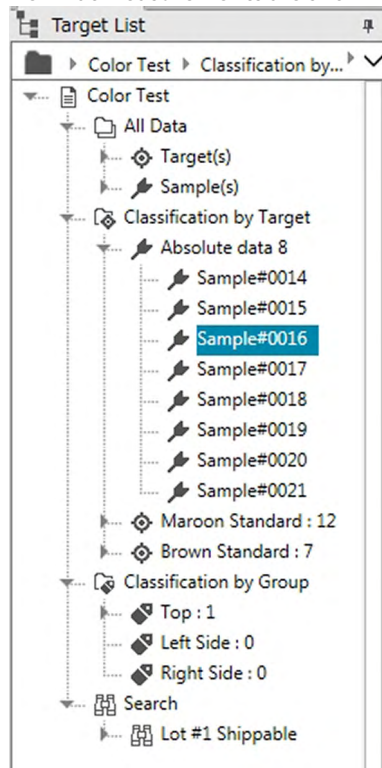
Used to print canvases, enable/disable editing, and adjust canvas magnification.

Canvas Pane (p. 22)

This pane consists of one or more canvases on which graphic objects can be placed. This pane is also used for printing reports.

1.3.4.1 Target List

The Target List organizes measurement data into a tree that includes the following items. The items selected in the Target List determine what measurements are shown in the Data List.



All Data:

Classifies all measurement data in the document as a target or sample.

Classification by Target:

Classifies sample data into groups according to the target data to which sample data are linked.

The Absolute data group contains data that is not linked to any target data. When a document is first created, an "Absolute data" data group is created automatically.

When a new target is registered, a new "Target" data group for that target is created automatically.

Classification by Group:

Classifies targets and their linked sample data into the groups to which the target data belong. A target may belong to up to a maximum of 5 groups. See p. 134.

Search:

Shows a list of searches conducted and the measurements meeting the conditions of each search. See p. 125.

■ Collapsing/Expanding Branches

To collapse a branch in the tree diagram, click on the ▼ next to the branch.

To expand a collapsed branch, click on the ► next to the branch.

1.3.4.2 Data List

The Data List lists the measurement data for the data group selected in the Target List.

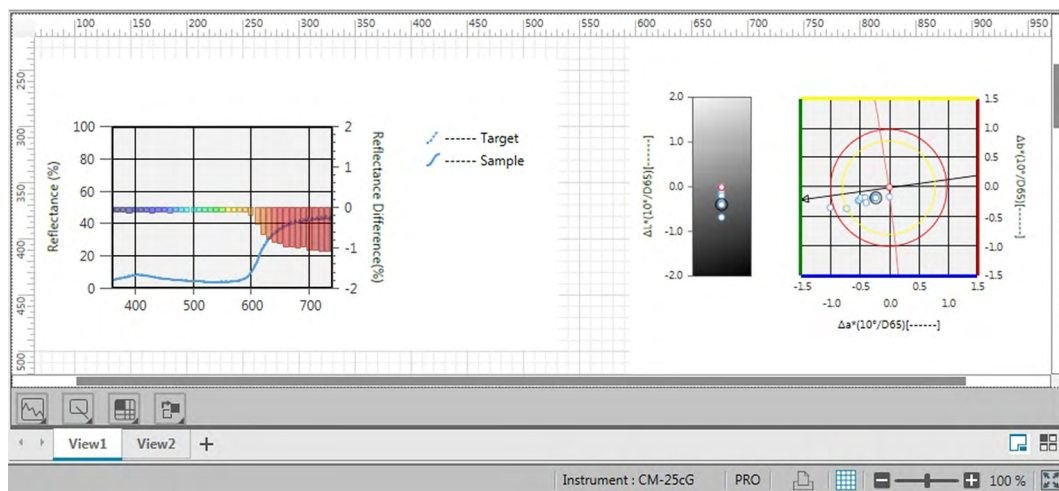
Data List		Primary : 10°/D65										
	Data Name	Judgement	Group Traits	$\Delta L^*(10^\circ/D65)$	$\Delta a^*(10^\circ/D65)$	$\Delta b^*(10^\circ/D65)$	$\Delta E^*_{ab}(10^\circ/D65)$	$L^*(10^\circ/D65)$	$a^*(10^\circ/D65)$	$b^*(10^\circ/D65)$	$C^*(10^\circ/D65)$	h°
Target	Maroon Standard		-----	-----	-----	-----	-----	33.55	32.85	4.51	33.16	
2	Sample#0004	Pass	-----	-0.15	-0.50	-0.21	0.56	33.41	32.36	4.30	32.64	
3	Sample#0005	Warning	-----	-0.20	-0.72	-0.35	0.83	33.35	32.13	4.16	32.40	
4	Sample#0022	Pass	-----	-0.06	-0.52	-0.22	0.57	33.49	32.33	4.29	32.61	
5	Sample#0023	Pass	-----	-0.31	-0.23	-0.16	0.42	33.24	32.62	4.35	32.91	
6	Sample#0028	Fail	-----	0.01	-1.00	-0.34	1.05	33.56	31.86	4.17	32.13	
7	Sample#0036	Pass	-----	-0.14	-0.41	-0.17	0.47	33.41	32.44	4.33	32.73	
8	Sample#0037	Pass	-----	-0.68	0.00	-0.16	0.70	32.87	32.85	4.35	33.14	
9	Sample#0038	Pass	-----	-0.39	-0.24	-0.18	0.49	33.16	32.61	4.33	32.90	
10	Sample#0039	Pass	-----	-0.39	-0.23	-0.17	0.49	33.16	32.62	4.34	32.91	
11	Sample#0040	Pass	-----	-0.38	-0.26	-0.18	0.49	33.17	32.60	4.33	32.88	
12	Sample#0041	Pass	-----	-0.39	-0.39	-0.25	0.61	33.16	32.46	4.26	32.74	

What items (information, values, etc.) will be displayed in the Data List for the measurements can be selected.

For operations in the Data List, see p. 117.

1.3.4.3 Canvas Pane

The Canvas Pane consists of up to 10 canvases on which graphic objects such as graphs, plots, etc. are placed. The graphic objects can be selected from the Canvas Toolbar at the bottom of each canvas. Each canvas can also be printed out.





For operations in the Canvas Pane, see p. 127.

1.3.4.4 Document Window Pane Operations

■ Resizing Panes

The panes in the Document Window can be resized by positioning the cursor over the border of a pane so that the cursor becomes a double-headed arrow, and then dragging the border to the desired position.

■ Auto Hiding Panes



The Target List and Data List of the Document Window can be set to auto hide by clicking on the vertical pin icon  at the upper left of the pane title bar. The pin icon will change to horizontal  and the pane will auto hide.

Panes which are auto hidden will appear as icons in the upper left corner of the Document Window.

Data List icon: 

Target List icon: 

Moving the cursor over the icon for an auto-hidden pane will cause that pane to expand back to its former size and position.

To cancel auto hiding, click on the horizontal pin icon  so that it changes to vertical . The pane will stop auto hiding and stay open at its position.

■ Floating Panes

The Target List and Data List of the Document Window can be floated and freely positioned in front of other panes/windows by clicking on the pane title bar and dragging it out of its normal position. The pane will then become free-floating and can be positioned anywhere within the program window.

- Floated panes will always be displayed in front of the main program window.

■ Docking Floated Panes

When the Target List or Data List have been floated, they can be docked within the Document Window by positioning the cursor over any of the docking icons which are shown. As the cursor is moved over each docking icon, the position of the floating pane if that icon is clicked will be shown by a shaded area.

The docking icons shown individually at the top, sides, and bottom of the Document Window are used for docking the floating pane at that edge of the window.

The cross-shaped docking icons shown at the center of a pane are for docking the floating pane to the respective positions in the fixed pane. Selecting the center icon of the cross-shaped docking icons will cause the floating pane to be shown as a tab within the fixed pane area.

Each docking icon has two sections. Releasing the mouse button when the cursor is over the larger section will dock the pane to the shaded area with the pane open (not auto-hidden). Releasing the mouse button when the cursor is over the narrow section will dock the pane to the shaded area with the pane auto-hidden (only the pane icon will be shown).



CHAPTER 2

OPERATION GUIDE

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2.1 Starting SpectraMagic DX

- For information on installing the SpectraMagic DX software, refer to the Installation Guide.
1. Select the SpectraMagic DX icon in the Windows Start menu or double-click on the icon on the desktop. SpectraMagic DX will start and the following splash screen will appear.



2. After a few seconds, the splash screen will disappear and the SpectraMagic DX panel area will be blank except for the data panel menu toolbar.
 - If this is the first time that the software has been started since installation, a dialog asking what display language to use will appear. Click on the current language, select the desired language from the pull-down list that appears, and click [OK]. SpectraMagic DX will continue starting up in the selected language. The display language can also be changed in the Start Options category of the Application Settings dialog box.
 - If a default template has been set in the Default Template Settings of the Start Options category of the Application Settings dialog box and Open Template file is enabled, a blank document will be opened using that template.
 - If an instrument is connected to the computer and switched on, and Establish Connection with Instrument at Startup is enabled in Instrument Automatic Connection of the Start Options category of the Application Settings dialog box, the software will automatically attempt to connect to the instrument.

For more information on Start Options, see p. 171.

2.2 Connection with an instrument

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).

2.2.1 Connecting to an instrument

- If “Establish Connection with Instrument at Startup” in the Start Options category of the Application Settings dialog (p. 171) is enabled, the software will automatically attempt to connect to the instrument when the software is started and the instrument model will be detected automatically if connection is successful.
- When connecting to an instrument using Bluetooth® communication, you need to establish the connection between the instrument and computer with the driver software supplied with the Bluetooth® adapter before you can connect to the instrument. For the procedure, refer to the instruction manuals of the instrument and Bluetooth® adapter.
- Up to four CM-700d/600d units can be connected by using either USB connection or Bluetooth® communication. If you want to connect several units of the CM-700d/600d, complete the connection for the first unit as described below, and then configure the communication setting for the following units as described on p. 33.

To establish a connection manually, follow the procedure below:

1. Connect the instrument to the computer.
 - For details on how to connect the instrument to a computer, refer to the instrument’s instruction manual.
2. Switch on the instrument power.
 - Depending on the instrument, installation of an instrument driver may be performed if this is the first time the instrument has been connected to the computer. This may require a few minutes. Wait until the driver has finished installing before proceeding.
3. Click [**Connect** ▼] in the Data Panel menu toolbar. SpectraMagic DX will connect to the instrument.

When the connection is successful, the Instrument Window will appear showing the status of the instrument, and the menu toolbar button will change to [**Disconnect** ▼].

If connection fails, see p. 30.

2.2.2 Disconnecting from an instrument

1. Click [**Disconnect** ▼] in the Data Panel menu toolbar. SpectraMagic DX will disconnect from the instrument.
The Instrument Window will close and the menu toolbar button will change to [**Connect** ▼].

2.2.2.1 If the connection fails

If the connection cannot be established, the message “Failed to connect instrument” will appear, followed by “Connection failed. Retry after changing communication setup.” When [**OK**] is clicked in the second message box, the Communication Settings dialog box will appear.

Specify the communication parameters in the Communication Settings dialog box. Be sure to set the correct COM port. (See p. 32 for how to check the COM port.) Then click the [**OK**] button.

SpectraMagic DX will reattempt to establish connection.

If the connection fails again, check the following:

- If the instrument and computer are connected by cable, check that the cable is securely connected to the instrument and PC.
- If the Bluetooth® adapter is being used, check that it is securely connected and that the Bluetooth® driver software is active.
- Check that the instrument is turned on.
- Check that the instrument is set to remote communication mode. (Spectrophotometer CM-2600d, CM-2500d, CM-2500c, and CM-2300d only)
- If the instrument allows the selection of communication settings, check that the communication settings specified in the Communication Settings dialog box are the same as the communication settings specified with the instrument.

After checking all of these, click [**Connect** | ▼] again.

If connection still fails, unplug the connecting cable, switch off the instrument, wait a few seconds, switch it back on, and reconnect the cable. Then click [**Connect** | ▼] again.

2.2.2.2 When the instrument operates on batteries

If you attempt communication with the instrument and the instrument’s remaining battery power is low, SpectraMagic DX may suspend operation when waiting for the response from the instrument. In such a case, turn off the instrument. When a dialog box appears with a message “No response from instrument”, click [**OK**]. Replace the batteries with new ones or connect the AC adapter, and then click [**Connect** | ▼] again.

2.2.2.3 When using a PC with power saving mode, standby settings, or similar

If the PC enters power saving mode when connected to the instrument, it may sometimes not be able to communicate after recovering. In the event that this occurs, first disconnect the instrument using SpectraMagic DX software, then disconnect and reconnect the cable, and click [**Connect** | ▼] again.

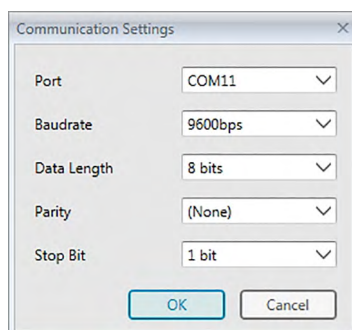
2.2.3 Communication Settings

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).

SpectraMagic DX communicates with the spectrometer through a serial port. You must specify the operating parameters of the serial port before establishing communication with the instrument.

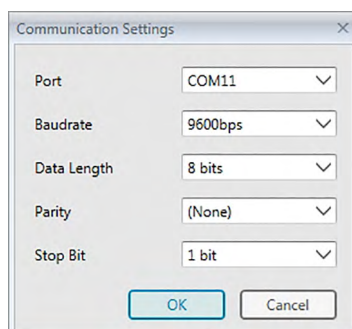
1. Click on the ▼ on the right side of [**Connect** ▼] in the Data Panel menu toolbar and select *Communication Settings* from the menu that appears.

The Communication Settings dialog box appears.



2. Set the communication parameters.

Select the COM port number to which the instrument has been assigned. For the procedure to check the COM port number, see p. 32.



3. Click [OK] to confirm the settings and close the dialog box.

SpectraMagic DX will attempt to connect to the instrument using the new settings.

2.2.3.1 Checking the COM port number

Windows 7:

From the Windows Start menu, right-click “Computer” and select “Properties” and then select “Device Manager” at the left of the screen. Click “Ports (COM & LPT)” to expand the group, and the assigned COM port number will be displayed.

Windows 8.1 or Windows 10:

Point to the lower-left corner of the screen, and then right-click on the “Start” button that appears. In the menu that appears, click “Device Manager” to open Device Manager. Click “Ports (COM & LPT)” to expand the group, and the assigned COM port number will be displayed.

Note (All OS):

If the connected instrument is not shown in “Ports (COM & LPT)” and appears as “Unknown device”, continue from the above procedure by performing the procedure in 2.2.3.2 Manually updating the driver.

2.2.3.2 Manually updating the driver

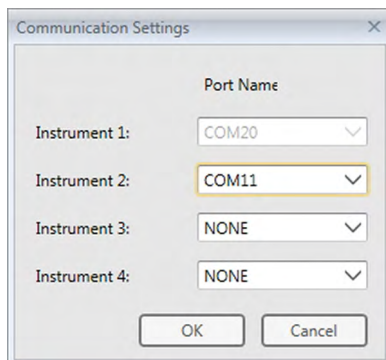
If the instrument is not shown in “Ports (COM & LPT)” and appears as “Unknown device”, right-click on the “Unknown device”, select “Update driver” and select the KMMIUSB subfolder under the folder where SpectraMagic DX has been installed.

2.2.3.3 Connecting multiple CM-700d/600d instruments

Once the communication with the first CM-700d/600d is established, connection with the remaining CM-700d/600d instruments can be performed as described below.

1. Click on the ▼ on the right side of [**Disconnect** | ▼] in the Data Panel menu toolbar and select *Communication Settings* from the menu that appears.

The Communication Settings dialog box similar to the one the below will appear.



2. Select the COM port number of the second and later instruments in this dialog.
3. Click OK to close the dialog and establish connections with the instruments.

When multiple instruments are connected:

- The Instrument Window (Instrument Information and Sensor Sync) will apply only to the first connected instrument.
- Full operation from the toolbars and menus is possible only for the first connected instrument. For the remaining instruments, only Remote Measurement: Target (p. 75), Remote Measurement: Sample (p. 104), and Remote Measurement Option (p. 166; display of measurement results on instrument display) can be used.
- The instrument settings (specular component and measurement area) set for the first instrument will be used for all of the connected instruments.

2.2.4 Setting Instrument Settings

- This procedure is available only when the instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).

1. Select *Instrument Settings* from the **Instrument** menu.

The Instrument Settings dialog for the connected instrument will appear.

2. Specify the settings for the instrument. Only those items that apply to the currently connected instrument are displayed.

CM-25cG:

Setting	Selections available
Measurement Mode:	<i>Color & Gloss</i> <i>Color only</i> <i>Gloss only</i>
Measurement Area*:	<i>SAV(3mm)</i> <i>MAV(8mm)</i>
	* Measurement area will be set to the measurement area set on instrument at the time dialog is opened and cannot be changed in this dialog.

CM-M6:

Setting	Selections available
Measurement Mode:	<i>Reflectance (Unchangeable)</i>
Measurement Area:	<i>6mm (Unchangeable)</i>
Angle:	<i>as: -15, 15, 25, 45, 75, 110 (°) (Unchangeable)</i>
Direction:	<i>Double-Path</i> <i>Left</i> <i>Left + Right</i> <ul style="list-style-type: none">• Performance for Left or Right data may be lower than for Double-Path data. Measurements performed with <i>Left</i> or <i>Left + Right</i> Direction setting should be performed only on flat surfaces and care should be taken to ensure that the instrument is exactly perpendicular to the surface.

If the Sensor Sync tab of the Instrument Window is displayed and the setting for Direction is changed, the Sensor Sync tab will be refreshed to show data stored in the instrument for the new setting. Depending on the number of data in the instrument, this refresh may take a few minutes.

CM-700d / CM-600d:

Setting	Selections available
Measurement Mode:	<i>Reflectance (Unchangeable)</i>
Measurement Area:	<i>SAV(3mm) (for CM-700d only)</i>

	<p><i>MAV(8mm)</i></p> <ul style="list-style-type: none"> • Measurement area will be set to the measurement area set on the instrument at the time the dialog is opened. If measurement area is changed in this dialog, be sure to change it on the CM-700d before clicking [OK].
Specular Component:	<p><i>SCI</i></p> <p><i>SCE</i></p> <p><i>SCI + SCE</i></p>
Opacity/Haze (SpectraMagic DX Professional Edition only)	<p>(Disabled if <u>Specular Component</u> is set to <i>SCI + SCE</i> or if Interval Measurement in Measurement Options dialog box is enabled.)</p> <p>(<i>Not checked</i>) Normal (non-opacity) measurements will be taken.</p> <p>(<i>Checked</i>) Pairs of measurements (over white backing and over black backing) will be taken to enable calculation of opacity</p>
CM-2600d:	
Setting	Selections available
Measurement Mode:	<i>Reflectance</i> (Unchangeable)
Specular Component:	<p><i>SCI</i></p> <p><i>SCE</i></p> <p><i>SCI + SCE</i></p>
Measurement Area:	<p><i>SAV(3mm)</i></p> <p><i>MAV(8mm)</i></p> <ul style="list-style-type: none"> • Measurement area will be set to the measurement area set on the instrument at the time the dialog is opened. If it is changed in this dialog, be sure to change it on the instrument before clicking [OK].
UV Setting	<p><i>100% Full</i></p> <p><i>400nm Cut</i>: Data at wavelengths shorter than 400nm are cut.</p> <p><i>UV Adjustment</i>: Data are adjusted for the effects of UV on fluorescent materials in samples. See p. 45 for performing UV Adjustment.</p> <p><i>100% Full + 400nm Cut</i></p> <p>(Not available when <u>Specular Component</u> is set to <i>SCI + SCE</i>.)</p> <p><i>100% Full + 400nm Cut + UV Adjustment</i></p> <p>(Not available when <u>Specular Component</u> is set to <i>SCI + SCE</i>.)</p>
UV cut	<p>(Disabled when <u>UV Setting</u> does not include <i>400nm cut</i>)</p> <p><i>0 (None)</i>: Data at wavelengths shorter than 400nm are set to 0.</p> <p><i>Cutoff Wavelength Data Copy</i>: Data at wavelengths shorter than 400nm are set to the measured reflectance value at 400nm.</p>
Opacity/Haze (SpectraMagic DX Professional Edition only)	<p>(Disabled if <u>Specular Component</u> is set to <i>SCI + SCE</i>, if <u>UV Setting</u> is set to <i>100% Full + 400nm Cut</i> or <i>100% Full + 400nm Cut + UV Adjustment</i>, or if Interval Measurement in Measurement Options dialog box is enabled.)</p> <p>(<i>Not checked</i>) Normal (non-opacity) measurements will be taken.</p> <p>(<i>Checked</i>) Pairs of measurements (over white backing and over black backing) will be taken to enable calculation of opacity.</p>

CM-2500d / CM-2300d:

Setting	Selections available
Measurement Mode:	<i>Reflectance</i> (Unchangeable)
Specular Component:	<i>SCI</i> <i>SCE</i> <i>SCI + SCE</i>
Measurement Area:	<i>MAV(8mm)</i> (Unchangeable)

CM-2500c:

Setting	Selections available
Measurement Mode:	<i>Reflectance</i> (Unchangeable)
Measurement Area:	<i>7mm</i> (Unchangeable)

CM-3700A / CM-3700A-U / CM-3700d:

Setting	Selections available
Measurement Mode:	<i>Reflectance</i> <i>Transmittance</i> (Not available on CM-3700A-U; <u>Measurement Area</u> will be automatically fixed at LAV(25.4mm))
Specular Component:	<i>SCI</i> <i>SCE</i>
Measurement Area:	CM-3700A-U <i>USAV(1*3mm)</i> (Unchangeable) CM-3700A or <i>SAV(3*5mm)</i> CM-3700d <i>MAV(8mm)</i> <i>LAV(25.4mm)</i> <ul style="list-style-type: none">• Target Mask attached to instrument should match or be larger than <u>Measurement Area</u> setting.
UV Setting	<i>100% Full</i> <i>UV Adjustment</i> (UV cut filter position is adjusted for measurements including the effects of UV on fluorescent materials in samples. See p. 45 for performing UV Adjustment.)
UV Adjust Value	(Disabled when <u>UV Setting</u> is <i>100% Full</i>) <i>0.0 to 99.9</i> (Relative position of UV cutoff filter; Inversely proportional to amount of UV component in illumination not blocked by filter)
Opacity/Haze (SpectraMagic DX Professional Edition only)	(Disabled if Interval Measurement in Measurement Options dialog box is enabled.) (<i>Not checked</i>) Normal (non-opacity/non-haze) measurements will be taken. (<i>Checked</i>) Sets of measurements (with white backing and black backing) will be taken to enable calculation of opacity (<u>Measurement Mode: Reflectance</u>) or haze (<u>Measurement Mode: Transmittance</u>).

CM-3600A/CM-3610A:**Setting****Selections available**

Measurement Mode:

*Reflectance**Transmittance (Measurement Area will be automatically fixed at LAV(25.4mm))*

Measurement Area:

*SAV(4mm)**MAV(8mm)**LAV(25.4mm)*

- Target Mask attached to instrument should match Measurement Area setting.

Specular Component:

*SCI**SCE**SCI + SCE*

UV Setting

*100% Full**400nm Cut: Data at wavelengths shorter than 400nm are cut.**420nm Cut: Data at wavelengths shorter than 420nm are cut.**UV Adjustment (400nm Cut, Normal)^{*1}**UV Adjustment (400nm Cut, Low)^{*1}**UV Adjustment (420nm Cut, Normal)^{*1}**UV Adjustment (420nm Cut, Low)^{*1}**100% Full + 400nm Cut^{*2}**100% Full + 420nm Cut^{*2}**100% Full + 400nm Cut + UV Adjustment (400nm Cut, Normal)^{*1,*2}**100% Full + 400nm Cut + UV Adjustment (400nm Cut, Low)^{*1,*2}**100% Full + 420nm Cut + UV Adjustment (420nm Cut, Normal)^{*1,*2}**100% Full + 420nm Cut + UV Adjustment (420nm Cut, Low)^{*1,*2}*

UV cut

*(Disabled when UV Setting does not include 400nm Cut or 420nm Cut setting.)**0 (None): Data at wavelengths shorter than cutoff wavelength (400nm or (420nm) are set to 0.**Cutoff Wavelength Data Copy: Data at wavelengths shorter than cutoff wavelength (400nm or (420nm) are set to the measured reflectance value at cutoff wavelength (400nm or (420nm) .*

Opacity/Haze

*(SpectraMagic DX Professional Edition only)**(Disabled if Specular Component is set to SCI + SCE, if UV Setting is set to a setting which provides multiple data (for example, 100% Full + 400nm Cut), or if Interval Measurement in Measurement Options dialog box is enabled.)**(Not checked) Normal (non-opacity/non-haze) measurements will be taken.**(Checked) Sets of measurements (with white backing and black backing) will be taken to enable calculation of opacity (Measurement Mode: Reflectance) or haze (Measurement Mode: Transmittance).*

^{*1} *UV Adjustment: Data are adjusted for the effects of UV on fluorescent materials in samples.*

400nm Cut, 420nm Cut: Cutoff wavelength of UV-cut filter used.

Normal: Normal flash mode. May cause in triplet effect on some materials.

Low: Multiple low-power flash mode. For suppressing triplet effect.

See p. 45 for performing UV Adjustment.

- *2 Not available when Specular Component is set to *SCI + SCE*.

CM-5:

Setting

Selections available

Measurement Mode:

Reflectance

Transmittance (Measurement Area will be automatically fixed at LAV(30mm))

Petri Dish (For reflectance measurements of samples in Petri dishes.)

Liquid (For transmittance measurements of liquids. Measurement Area will be automatically fixed at LAV(30mm))

Specular Component:

SCI

SCE

SCI + SCE

Measurement Area:

SAV(3mm)

MAV(8mm) (Not available when Measurement Mode is set to *Petri Dish*.)
LAV(30mm)

- Target Mask attached to instrument should match Measurement Mode and Measurement Area settings.

Opacity/Haze

(Disabled if Interval Measurement in Measurement Options dialog box is enabled.)

(*Not checked*) Normal (non-opacity/non-haze) measurements will be taken.

(*Checked*) Sets of measurements (with white backing and black backing) will be taken to enable calculation of opacity (Measurement Mode: Reflectance or *Petri Dish*) or haze (Measurement Mode: Transmittance or *Liquid*).

CR-5:

Setting

Selections available

Measurement Mode:

Reflectance

Transmittance (Measurement Area will be automatically fixed at LAV(30mm))

Petri Dish (For reflectance measurements of samples in Petri dishes.)

Liquid (For transmittance measurements of liquids. Measurement Area will be automatically fixed at LAV(30mm))

Specular Component:

SCE (Unchangeable)

Measurement Area:	<p>SAV(3mm)</p> <p>MAV(8mm) (Not available when <u>Measurement Mode</u> is set to <i>Petri Dish</i>.)</p> <p>LAV(30mm)</p> <ul style="list-style-type: none"> • Target Mask attached to instrument should match <u>Measurement Mode</u> and <u>Measurement Area</u> settings.
Opacity/Haze	<p>(Disabled if Interval Measurement in Measurement Options dialog box is enabled.)</p> <p>(<i>Not checked</i>) Normal (non-opacity/non-haze) measurements will be taken.</p> <p>(<i>Checked</i>) Sets of measurements (with white backing and black backing) will be taken to enable calculation of opacity (<u>Measurement Mode: Reflectance</u> or <i>Petri Dish</i>) or haze (<u>Measurement Mode: Transmittance</u> or <i>Liquid</i>).</p>

3. Click [OK] to confirm the settings and close the dialog box.

After the settings are entered, the new settings are displayed in the Instrument Information tab of the Instrument Window.

- For details of instrument settings, refer to the instruction manual for the instrument.

2.3 Calibration

To ensure accurate measurement, you must perform calibration after turning the instrument on.

■ Notes regarding Reflectance Calibration

For reflectance calibration, zero calibration and white calibration are performed.

■ About zero calibration:

- For an instrument which retains the zero calibration result while the power is turned off, you do not have to perform zero calibration every time the instrument is turned on. In such case, the Zero Calibration dialog will have a [Skip] button to skip zero calibration during the calibration process.
- Using the Zero Calibration Box (standard accessory for CM-25cG, CM-M6, CM-3700A/CM-3700A-U/CM-3700d, and CM-3600A/CM-3610A; optional accessory for CM-700d/CM-600d, CM-2600d/CM-2500d/CM-2300d, CM-2500c, and CM-5/CR-5) allows more reliable zero calibration unaffected by the surrounding environment.

■ About white calibration:

- For instruments other than the CM-25cG, CM-M6, CM-700d/CM-600d, and CM-5/CR-5, white calibration must be performed every time instrument is turned on.
- White calibration data are stored in the instrument's memory. The white calibration data can be viewed in the White Calibration Setting dialog. See p. 43.
- If a new White Calibration Plate is obtained, the white calibration data for the new plate must be written to the instrument before performing white calibration with the new plate. See p. 43.
- When using the CM-5/CR-5, by default the instrument uses an internal white calibration plate when performing white calibration for reflectance measurements or Petri dish measurements, so there is no need for further preparations for white calibration in step 3.
- User calibration (calibration to a user-supplied white calibration plate) can be performed on all instruments except the CM-M6, CM-3700A/CM-3700A-U/CM-3700d, and CM-2500c. To perform user calibration, it is necessary to set the calibration data for the user calibration plate and to enable user calibration. See p. 44.
- For the CM-25cG, CM-700d/CM-600d, and CM-5/CR-5, when user calibration is enabled, user calibration will be performed instead of white calibration in step 3; for other instruments, user calibration will be performed after white calibration to the Konica Minolta white calibration plate has been performed.

■ Notes regarding Transmittance Calibration

For transmittance calibration, 0% calibration and 100% calibration are performed. In such case, "zero calibration" should be replaced by "0% calibration" and "white calibration" should be replaced by "100% calibration" in the following procedure.

Important:

Before starting transmittance calibration when using the CM-3700A/CM-3700d or CM-3600A/CM-3610A, place the white calibration plate in position in the reflectance sample holder. When performing transmittance measurements, the surface of the white calibration plate acts as part of the integrating sphere surface. When using the CM-5/CR-5, the instrument's internal white calibration plate will be used automatically.

■ About 100% calibration:

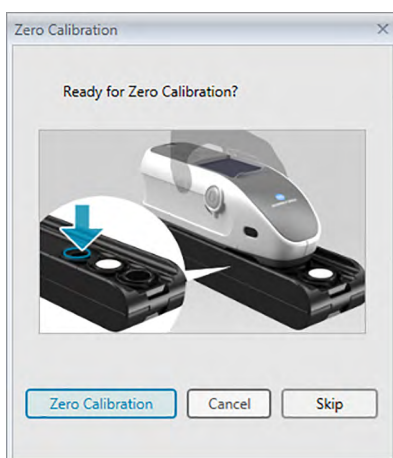
- If the measurement subjects will be solids that can be placed by themselves in the transmittance chamber, 100% calibration should be performed to air (with nothing in the transmittance chamber).
- If the measurement subjects will be liquids in glass cells, 100% calibration should be performed using a cell of the same type and size filled with distilled water.

2.3.1 Calibrating the Instrument

- This procedure is available only when the instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).
- The procedure below shows the dialog boxes for the CM-25cG as examples. The dialog boxes will be different depending on the instrument.
- For details on preparing the instrument for zero calibration and white calibration (0% and 100% calibration for transmittance measurements), refer to the instrument's instruction manual.

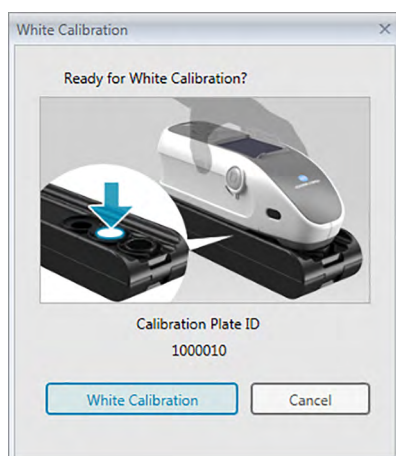
1. Click [**Calibration**] in the Data Panel menu toolbar or select *Calibration* from the **Instrument** menu.

The Zero Calibration dialog box appears.



2. Prepare the instrument for zero calibration and click [Zero Calibration] to perform zero calibration.
 - If [Skip] is enabled and you click [Skip] instead of [Zero Calibration], the zero calibration process is skipped and the White Calibration dialog box appears. If the status window displays "Zero Calibration is required" as the instrument status, do not skip zero calibration.

When zero calibration is completed, the White Calibration dialog box appears.



3. Prepare the instrument for white calibration and click [White Calibration] to perform white calibration.
 - If user calibration is set and the instrument is a CM-25cG, CM-700d/CM-600d, or CM-5/CR-5, the above dialog will show “User Calibration” instead of “White Calibration”. Click [User Calibration] to perform user calibration.

If the CM-25cG is being used with the Measurement Mode set to Color & Gloss, the Gloss Calibration dialog box will appear after white calibration has been completed. Position the instrument for gloss calibration and click [Gloss Calibration] to perform gloss calibration.

If user calibration is being performed and the instrument is a CM-2600d/CM-2500d or CM-3600A/CM-3610A, the User Calibration dialog box will appear. Prepare the instrument for user calibration and click [User Calibration] to perform user calibration.

■ Calibration time displayed in the Instrument Information pane

The calibration status information is retrieved from the instrument and the display in the Instrument Information tab is updated to reflect the change. If the instrument has been calibrated without using the SpectraMagic DX software, the software might not be able to determine the time of the calibration performed by the instrument itself. Consequently, the Instrument Information pane displays the time of the last calibration performed with the SpectraMagic DX software.

2.3.2 Writing White Calibration Data to Instrument

- This procedure is available only when the instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).

The calibration data used for white calibration are stored in the instrument. When a new white calibration plate will be used, it is necessary to write the white calibration data to the instrument before performing white calibration with the new plate.

1. Select *Calibration Setting* in the **Instrument** menu and then select *White Calibration Setting* from the pop-out menu that appears.

The White Calibration Setting dialog box will appear, showing the white calibration data currently stored in the instrument.

2. To read the white calibration data for the new white calibration plate from the disk included with the white calibration plate, click [Read]. An Open dialog box will appear. Browse to the location of the white calibration data files and click [Open]. The white calibration data for all measuring area/specular component combinations will be read from the white calibration files in the selected folder, and the white calibration data shown in the dialog box will be updated.
 - Be sure that all white calibration data files for the instrument are in the selected folder. If the white calibration data file for an instrument setting combination cannot be found, an error message will appear.
 - It is not possible to directly edit the white calibration data in this dialog box.
3. To write the new calibration data to the instrument, click [OK].
 - To close the dialog without writing the data, click [Cancel].
4. A confirmation dialog box will appear, asking whether white calibration data should be written to the instrument. Click [OK] in this dialog to continue and write the white calibration data to the instrument.

2.3.3 User Calibration ⑨

- This procedure is available only when the instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).
- This function is supported by SpectraMagic DX Professional Edition only.

User calibration can be performed when using a reference standard plate other than the white calibration plate supplied by Konica Minolta.

To perform user calibration, it is necessary to input the calibration data for the reference standard plate to be used as the user calibration plate and to enable user calibration in the User Calibration Settings dialog.

1. Select *Calibration Setting* in the **Instrument** menu and then select *User Calibration Setting* from the pop-out menu that appears.

The User Calibration Setting dialog box will appear, showing the user calibration data currently stored in the instrument.

2. If there is a Calibration Plate ID text box, input the Calibration Plate ID. Up to 8 characters can be input. This ID will be shown in the User Calibration dialog during the calibration process.
3. Select the instrument settings (specular component and measurement area) for which calibration data will be written. the instrument settings available depend on the instrument.
4. Input the user calibration data for each wavelength and instrument setting combination.
 - To read user calibration data from a previously saved to a *.ucm (user calibration data) file, click [Open] to open the Open dialog, browse to the *.ucm file to read, and click [Open] to read the user calibration data from the file into the dialog.
 - To save user calibration data to a file, click [Save] to open the Save As dialog, browse to where you want to save the calibration data file, input a file name, and click [Save]. The user calibration data set in the User Calibration Setting dialog for all instrument setting combinations will be saved to the file.
5. To enable user calibration, select the checkbox next to Set to user calibration mode, so that a checkmark is shown in the checkbox.
 - Depending on the instrument, user calibration mode can be enabled separately for each instrument setting combination. In such case, select the checkbox next to each instrument setting combination for which user calibration will be performed so that a checkmark is show in the checkbox.
6. After all user calibration data and settings have been set, click [OK].

A confirmation dialog asking whether to write the changes to the instrument will appear. Click [Yes] to write the changes to the instrument and close the dialog.

- To close the confirmation dialog without writing the data, click [No]. The confirmation dialog will close and the program will return to the User Calibration Setting dialog.

To close the User Calibration Setting dialog without writing the changes to the instrument, click [Cancel]. A confirmation dialog will appear. Click [Yes] to close the User Calibration Setting dialog or [No] to close the confirmation dialog and return to the User Calibration Setting dialog.

2.3.4 UV Adjustment ⑨

- This procedure is available only when a CM-3700A/CM-3700d, CM-3600A/CM-3610A, or CM-2600d is connected, the software license is valid (either electronically or by using a protection key is attached to the computer), and SpectraMagic DX Professional Edition is being used.
- To perform UV adjustment, you must have Administrator privileges on the computer and SpectraMagic DX must be running using those privileges.

2.3.4-a When using CM-3700A, CM-3700A-U, or CM-3700d

1. Check that the Measurement Mode in the Instrument Settings dialog box is set to "Reflectance" and the UV Setting is set to "UV Adjustment".

2. Select *UV Adjustment ...* in the **Instrument** menu.

The UV Adjustment dialog box will appear. The current settings for Specular Component, Measurement Area, and UV Setting will be shown for reference and cannot be changed.

3. Select the desired Adjustment Mode.

Explanations of each mode are shown below.

Mode	Adjustment standard value(s)
WI	Single-point CIE WI (1982) value
Tint	Single-point CIE Tint (1982) value
Ganz&Griesser4, Ganz&Griesser5	4 (Ganz&Griesser4) or 5 (Ganz&Griesser5) UV standards with CIE WI (1982) and CIE Tint (1982) values ranging from low to high are measured and used to provide good UV adjustment over the range of values of the standards.

4. Click [Next>]. The dialog box corresponding to the selected Adjustment Mode will appear. See the following sections for operation in each dialog box.

See p. 46 for performing UV adjustment to WI or Tint.

See p. 48 for performing UV Adjustment to Ganz&Griesser4 or Ganz&Griesser5.

2.3.4-a.1 Adjustment Mode: WI or Tint

Observer/Illuminant: The Observer and Illuminant used for calculations are shown for reference.

Observer: 10°

Illuminant: D65

WI (when Adjustment Mode is set to “WI”) or Tint (when Adjustment Mode is set to “Tint”)

Value: Input the standard value for the UV standard.

WI: 40.00 to 250.00

Tint: -6.00 to 6.00

Tolerance: Select the desired tolerance.

WI: 0.20, 0.30, 0.50, 1.00, 2.00, 3.00

Tint: 0.05, 0.10, 0.30

Last UV Adjust / Filter Position

Date: Date/time of the most recent UV adjustment.

Filter Position: Filter position of the most recent UV adjustment.

Check

WI or Tint: The WI or Tint value when UV adjustment was most recently performed.

Diff: The difference from the results when UV adjustment was most recently performed.

■ When performing UV adjustment to WI or Tint for the first time or when using a new UV standard:

1. Set the UV standard’s Value and the desired Tolerance and click [Execution] to perform UV adjustment.
 - If zero and white calibration has not yet been performed, zero and white calibration will be requested.
 - Since the instrument’s UV filter position will be moved back and forth as UV adjustment is performed, it may take a few minutes to complete UV adjustment.
2. After initial UV adjustment has been performed, zero and white calibration will be performed at the new filter position and fine adjustment of the filter position will be performed. In some cases, several cycles of zero calibration, white calibration and UV standard measurement may be necessary to achieve final UV adjustment.
 - If UV adjustment cannot be successfully performed, an error message will appear.
3. Click [OK] to close the dialog box.

■ If UV to WI or Tint adjustment was performed previously using the same UV standard:

If UV adjustment to WI or Tint was performed previously using the same UV standard, it may be possible to achieve acceptable UV adjustment more quickly by using the previous UV filter position.

1. Click [Check]. The instrument's UV filter will be moved to the position used for the most recent UV adjustment.
2. Perform zero and white calibration at that UV filter position.
3. Measure the UV standard at that UV filter position.
The measurement result and difference from the previous UV adjustment result will be shown.
4. If these results are acceptable, click [OK] to close the dialog box.

2.3.4-a.2 Adjustment Mode: Ganz&Griesser4 or Ganz&Griesser5

Observer/Illuminant: The Observer and Illuminant used for calculations are shown for reference.

Observer: 10°

Illuminant: D65

WI, Tint

1 to 4 (for Ganz&Griesser4) or 1 to 5 (for Ganz&Griesser5): Input the standard WI and Tint values for each of the UV standards in order, starting with the lowest WI value.

WI: 40.00 to 250.00

Tint: -6.00 to 6.00

Last UV Adjust / Check

Date: Date/time of the most recent UV adjustment.

Coefficient

The various Ganz and Griesser equation coefficients calculated when UV adjustment was most recently performed can be shown by clicking [Check].

1. Set the WI and Tint values for each of the 4 (Ganz&Griesser4) or 5 (Ganz&Griesser5) UV standards. The values should be set in ascending WI order, with the lowest WI set for 1.
2. Measure each UV standard by setting the standard in position and clicking the [Measure_x] button where x is the standard number.
 - If zero and white calibration has not yet been performed, zero and white calibration will be requested.
 - The filter position will be moved during measurement. It may take several seconds for each measurement.
3. After all 4 (Ganz&Griesser4) or 5 (Ganz&Griesser5) UV standards have been measured, click [Execution]. The calculations for UV adjustment will be performed and the resulting Coefficients will be shown.
 - If [Execution] is clicked before all necessary standards have been measured, an error message will appear.
4. Click Close to close the dialog box.

2.3.4-b When using CM-3600A, CM-3610A, or CM-2600d

1. Check that the Measurement Mode in the Instrument Settings dialog box is set to “Reflectance” and the UV Setting is set to a setting other than “100% Full”.
2. Select *UV Adjustment ...* in the **Instrument** menu. The UV Adjustment dialog box will appear. The current settings for Specular Component, Measurement Area, and UV Setting will be shown for reference and cannot be changed.
 - To see the UV adjustment coefficients currently stored in the instrument, click [View Coefficient].
3. Select the desired Adjustment Mode.

The modes available depend on the instrument. Explanations of each mode are shown below.

Mode	Adjustment standard value(s)
Profile	Spectral reflectance data at 10nm pitch over instrument’s measurement range
WI	Single-point CIE WI (1982) value
Tint	Single-point CIE Tint (1982) value (not available on CM-2600d)
Tint&WI	Single-point CIE Tint (1982) and CIE WI (1982) values
ISO Brightness	Single-point ISO Brightness value
Ganz&Griesser4, Ganz&Griesser5	4 (Ganz&Griesser4) or 5 (Ganz&Griesser5) UV standards with CIE WI (1982) and CIE Tint (1982) values ranging from low to high are measured and used to provide good UV adjustment over the range of values of the standards.

■ To perform a new UV adjustment

1. Select New and click [Next>]. The dialog box corresponding to the selected Adjustment Mode will appear. See the following sections for operation in each dialog box..

See p. 50 for performing UV Adjustment to Profile.

See p. 51 for performing UV adjustment to WI, Tint, Tint&WI, or ISO Brightness.

See p. 52 for performing UV Adjustment to Ganz&Griesser4 or Ganz&Griesser5.

■ To perform UV adjustment by reading a UV adjustment coefficients file

1. Select Read.
2. Click [Browse] and browse to the previously stored UV adjustment coefficients (*.krd) file.
 - The selected UV adjustment coefficients file must be for the same instrument and the selected Adjustment Mode.
3. Click [Next>]. The Write coefficient file dialog box showing the UV adjustment coefficients read from the file will appear.
4. To write the UV adjustment coefficients to the instrument, click [Write].

When writing has been completed, a message box will appear. Click [OK] to close the message box and click [Cancel] to close the Write coefficient file dialog box and UV Adjustment dialog box.

- To return to the UV Adjustment dialog box and select another UV adjustment coefficients file, click [< Back].
- To cancel UV adjustment, click [Cancel]. The Write coefficient file dialog box and UV Adjustment dialog box will both close.

2.3.4-b.1 Adjustment Mode: Profile

[Load Profile]	Opens an Open dialog box for reading the data in a previously stored profile (*.pri) file into the Profile dialog box.
[Save Profile]	Opens a Save As dialog box to save the profile data currently input in the Profile dialog box to a profile (*.pri) file.
SCI tab, SCE tab	Selects the tab for which to input profile data. For <u>Specular Component</u> : "SCI", only the SCI tab will be active; for <u>Specular Component</u> : "SCE" or "SCI + SCE", both the SCI and SCE tabs will be active.
Save adjustment result	Check this box to open a dialog box for saving the UV adjustment results to a UV adjustment coefficients (*.krd) file after UV adjustment has been completed.

1. Input the spectral reflectance data at each wavelength for the UV standard into the textboxes.
Range: 0.01 to 200
2. After the values at each wavelength have been input, click [Execution].
 - If zero and white calibration has not yet been performed, zero and white calibration will be requested.
3. When requested, set the UV standard in position and click [OK] to take the measurement.
 - If Save adjustment result was checked in the Profile dialog, a Save As dialog box will appear after UV adjustment has been completed. Browse to the folder to save the file to, input the desired file name, and click [Save] to save the file.
4. When UV adjustment has been completed, a message box will appear. Click [OK] to close the message box and return to the Profile dialog box, and then click [Cancel] to close the Profile dialog box.

2.3.4-b.2 Adjustment Mode: WI, Tint, Tint&WI, or ISO Brightness

- Adjustment Mode: Tint is not available on the CM-2600d.

Observer/Illuminant: The Observer and Illuminant used for calculations are shown for reference.

Observer: 10°

Illuminant: D65

WI, Tint, ISO Brightness:

Value: Input the standard value for the UV standard.

WI: 40.00 to 250.00

Tint: -6.00 to 6.00

ISO Brightness: 40.00 to 250.00

Tolerance: Select the desired tolerance.

WI: 0.20, 0.30, 0.50, 1.00, 2.00, 3.00

Tint: 0.05, 0.10, 0.30

ISO Brightness: 0.50, 1.00, 3.00

Save adjustment result: Check this box to open a dialog box for saving the UV adjustment results to a UV adjustment coefficients (*.krd) file after UV adjustment has been completed.

1. Set the UV standard's Value and the desired Tolerance for each active textbox.
 - Only the textboxes corresponding to the selected Adjustment Mode will be active.
 - For Specular Component: SCI, only the SCI textboxes will be active; for Specular Component: SCE or SCI + SCE, both the SCI and SCE textboxes will be active.
2. After all necessary values have been set, click [Execution] to perform UV adjustment.
 - If zero and white calibration has not yet been performed, zero and white calibration will be requested.
3. When requested, set the UV standard in position and click [OK] to take the measurement.
 - If Save adjustment result was checked in the dialog box for the selected Adjustment Mode, a Save As dialog box will appear after UV adjustment has been completed. Browse to the folder to save the file to, input the desired file name, and click [Save] to save the file.
4. When UV adjustment has been completed, a message box will appear. Click [OK] to close the message box and return to the dialog box for the selected Adjustment Mode, and then click [Cancel] to close that dialog box.

2.3.4-b.3 Adjustment Mode: Ganz&Griesser4 or Ganz&Griesser5

Observer/Illuminant: The Observer and Illuminant used for calculations are shown for reference.

Observer: 10°

Illuminant: D65

WI, Tint

1 to 4 (for Ganz&Griesser4) or 1 to 5 (for Ganz&Griesser5): Input the standard WI and Tint values for each of the UV standards in order, starting with the lowest WI value.

WI: 40.00 to 250.00

Tint: -6.00 to 6.00

Coefficient

The various Ganz and Griesser equation coefficients calculated when UV adjustment was most recently performed will be shown.

Save adjustment result: Check this box to open a dialog box for saving the UV adjustment results to a UV adjustment coefficients (*.krd) file after UV adjustment has been completed.

1. Set the WI and Tint values for each of the 4 (Ganz&Griesser4) or 5 (Ganz&Griesser5) UV standards. The values should be set in ascending WI order, with the lowest WI set for 1.
 - For Specular Component: SCI, only the SCI textboxes will be active; for Specular Component: SCE or SCI + SCE, both the SCI and SCE textboxes will be active.
2. Measure each UV standard by setting the standard in position and clicking the [Measure_x] button where x is the standard number.
3. After all 4 (Ganz&Griesser4) or 5 (Ganz&Griesser5) UV standards have been measured, click [Execution]. The calculations for UV adjustment will be performed and the resulting Coefficients will be shown.
 - If [Execution] is clicked before all necessary standards have been measured, an error message will appear.
 - If Save adjustment result was checked in the dialog box for the selected Adjustment Mode, a Save As dialog box will appear after UV adjustment has been completed. Browse to the folder to save the file to, input the desired file name, and click [Save] to save the file.
 - After UV adjustment has been performed, click SCI or SCE in Coefficient to view the coefficients for the respective Specular Component setting.
4. Click the [x] in the upper right corner of the dialog box to close the dialog box.

2.4 Preparing for Measurement

2.4.1 Opening a New or Existing Document

Measurements can be taken only when a document is open.

2.4.1.1 Creating a New Document

To create a new document, select **New** in the **Document** menu. A new document will be created.

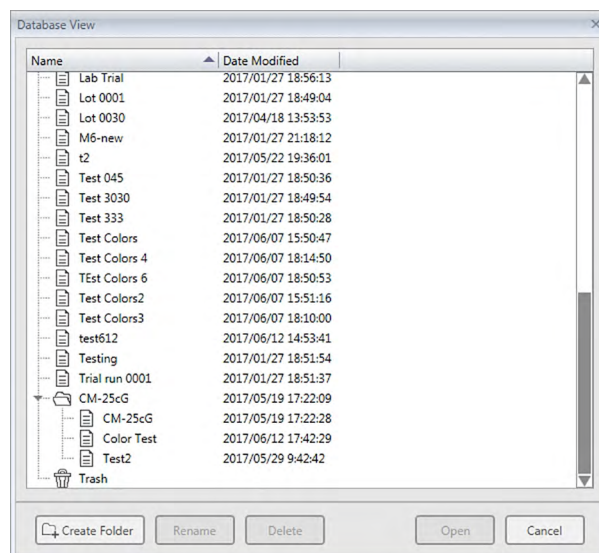
- If a default template file has been defined, the new document will use that template. See p. 171.

2.4.1.2 Opening an Existing Document

You can open an existing document from the database by following the procedure below.

1. Select **Open from DB** in the **Document** menu.

The Database View dialog box will appear.



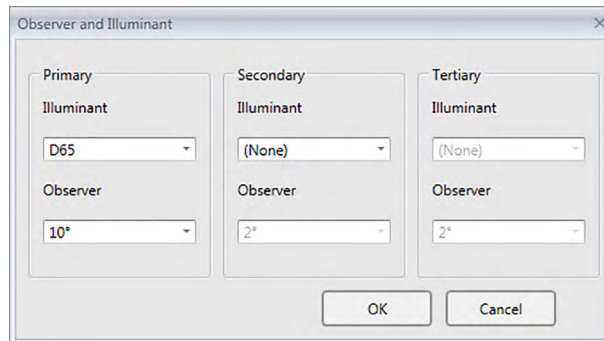
2. Double-click on the document to open or select the document to open and click [Open]. The dialog box will close and the document will be opened.

- For other operations available in the Database View dialog box, such as folder creation or document deletion, see p. 139.

2.4.2 Setting Observer and Illuminant

The observer and illuminant are important items required for converting spectral data into colorimetric data. When comparing colorimetric data from several samples, the observer and illuminant must be identical for all samples. It is recommended that the observer and illuminant be specified beforehand. They should not be changed unnecessarily.

1. Select *Observer and Illuminant ...* from the **Data** menu. The Observer and Illuminant dialog box will appear.
2. Specify the observer and illuminant settings desired.



Three pairs of observer and illuminant can be specified for each document file.

- This setting does not affect the observer and illuminant that have been specified on the instrument.
- Items for which specific observer and illuminant has been defined, such as index values, will be calculated with the defined observer and illuminant regardless of the setting in this dialog box.

■ Observer And Illuminant dialog box

Primary, Secondary, Tertiary

Observer

2°, 10°

Illuminant

None, A, C, D50, D55®, D65, D75®, F2, F6®, F7®, F8®, F10®, F11, F12®, U50®, ID50®, ID65®

(Items marked with ® are supported only by SpectraMagic DX Professional Edition.)

- “(None)” can be selected only for the Secondary and Tertiary conditions. When “(None)” is selected as the Illuminant, the Observer setting for that pair will be disabled.

The settings in this dialog box will be applied to all data in the document file.

- When the observer or illuminant is changed, SpectraMagic DX will recalculate all data. When you attempt to change the observer or illuminant, a warning message appears.

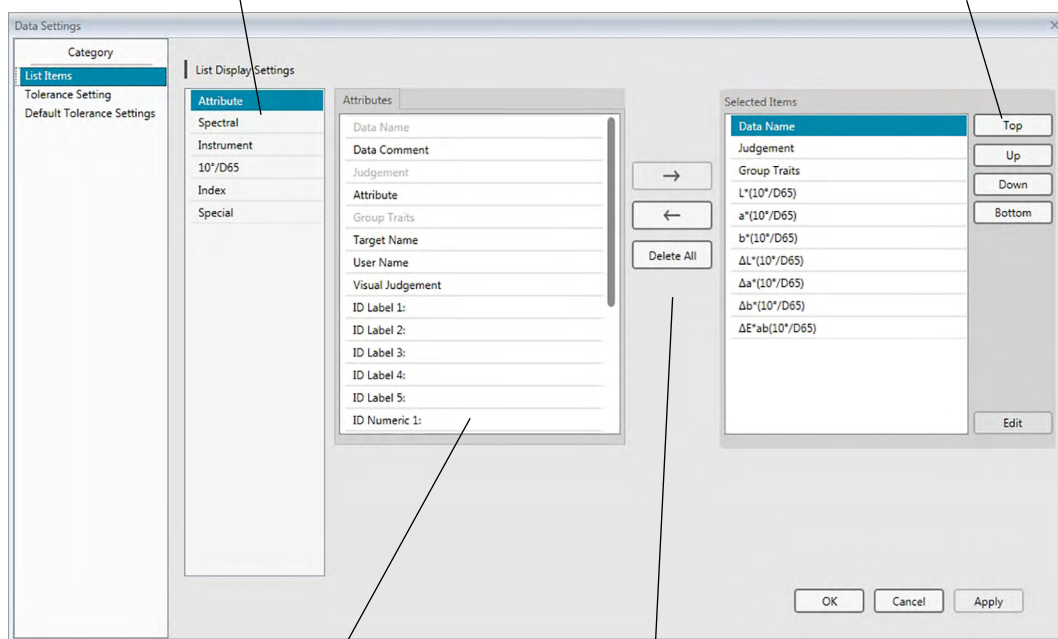
2.4.3 Setting List Items

Set the items to be shown in the Data List such as data names, colorimetric data, etc. and specify the order in which the items are to be listed.

1. Select *List Items ...* from the **Data** menu. The Data Settings dialog box will appear, with List Items as the selected category.
2. Specify the details of the items shown in the Data List.

Groups into which the list items are classified.

Use these buttons to change the order in which items are displayed in the Data List. The order of the items shown in this list from the top will be the display order in Data List starting from the left side. To change the order, select the item in the Selected Items and click the appropriate button.



List items included in the selected group. Items already selected are shown in gray.

Select an item in the left list and click **→** to add the item to the Selected Items list on the right. To delete an item from the Selected Items list, select the item and click **←**. To remove all items, click [Delete All].

3. When all necessary items are specified, click the [OK] button.

■ Data Settings dialog: List Items category

The following tables show the items selectable as list items and the content of each item displayed in the Data List.

- Notes for items marked [*1] to [*12] are shown starting on p. 62.

Attributes

Item	Content displayed in Data List
Data Name	Name of data
Data Comment	Comment
Judgement	"Pass" or "Fail" (Available only for sample data. The string can be changed.)
Attribute	"Measured Spectral Data", "Manually Input Spectral Data", "Manually Input Colorimetric Data"
Group Traits	Group traits corresponding to instrument settings. For example, "-15°(DP)", "15°(DP)", "SCI", "SCE", "UV0", "UV100", etc. Will be "-----" if there is no applicable trait to be shown.
Target name	Name of linked target
User Name	Name of the login user (Applicable only when the security function is enabled)
Visual Judgement	Result of the visual judgement
Supplementary data information	Titles specified for supplementary data information (See p. 69.)
Groups	Names specified for data groups (See p. 134.)

Spectral

Item	Content displayed in Data List
360 to 740 nm	Use the tabs to select wavelengths for which to show Spectral, Spec. Diff., K/S Val, K/S Diff., Absorbance, and Absorbance Diff.

Instrument

Item	Content displayed in Data List
Instrument Name	Name of instrument which measured data. For example, "CM-25cG", "CM-M6", etc. • Not shown if data were input.
Serial No.	Serial number of instrument
Firmware Version	Software version of instrument
Timestamp	Date and time of measurement
Calibrated Date	Date and time of the last white calibration
Measurement Type	"Reflectance", "Transmittance", "Color & Gloss", "Color only", "Gloss only"
Geometry	Geometry of instrument. For example, "45°c:0°", "45°:as -15°, 15°, 25°, 45°, 75°, 110°", "di:8, de:8", etc.
Specular Component	Specular component setting on instrument (applicable only to instruments with di:8, de:8 Geometry): "SCI", "SCE", "SCI+SCE"
Measurement Area	Measurement area set on instrument. For example, "SAV (3 mm)", "6 mm", etc.
UV setting	UV setting of instrument. For example, "100% Full", "100% Full + 400nm Cut + UV Adjustment", "UV Adjustment", etc.
Observer 1	2°, 10°
Observer 2	2°, 10°, (None)
Illuminant 1	A, C, D50, D65, F2, F6, F7, F8, F10, F11, F12, ID50, ID65

Illuminant 2	None, A, C, D50, D65, F2, F6, F7, F8, F10, F11, F12, ID50, ID65
Data Number	Data number specified in the instrument from which the sample data was loaded (when a CM-25cG, CM-M6, CM-700d, CM-2600d, CM-2500d, CM-2500c, or CM-2300d is connected)
Comment	Comments set up to the data in the instrument

- The information shown for the Instrument group is related to the instrument and the instrument's internal settings, and may not be the same as SpectraMagic DX settings.

10°/D65 (or other selected observer/illuminant combination)

Absolute Data	Color Difference	Equation	Others
X	ΔX	ΔE^*_{ab}	[*3] MI (DIN) [*4] Pseudo Color [*4] Pseudo Color (Target) [*5] Strength \oplus [*5] Strength X \oplus [*5] Strength Y \oplus [*5] Strength Z \oplus [*5] Pseudo Strength \oplus [*5] Pseudo Strength X \oplus [*5] Pseudo Strength Y \oplus [*5] Pseudo Strength Z \oplus Dominant Wavelength \oplus Excitation Purity \oplus [*6] 555 \oplus
Y	ΔY	[*1] CMC(l:c)	
Z	ΔZ	[*1] CMC(l)	
L*	ΔL^*	[*1] CMC(c)	
a*	Δa^*	[*1] ΔL -CMC	
b*	Δb^*	[*1] ΔC -CMC	
C*	ΔC^*	[*1] ΔH -CMC	
h	ΔH^*	[*1] ΔE^*_{94} (CIE 1994)< ΔE^*_{94} >	
L99	$\Delta L99$	[*1] $\Delta E^*_{94}(l)$ < $\Delta E^*_{94}(l)$ >	
a99	$\Delta a99$	[*1] $\Delta E^*_{94}(c)$ < $\Delta E^*_{94}(c)$ >	
b99	$\Delta b99$	[*1] $\Delta E^*_{94}(h)$ < $\Delta E^*_{94}(h)$ >	
C99	$\Delta C99$	[*1] ΔL - ΔE^*_{94} (CIE 1994)< ΔL - ΔE^*_{94} >	
h99	$\Delta H99$	[*1] ΔC - ΔE^*_{94} (CIE 1994)< ΔC - ΔE^*_{94} >	
L99o	$\Delta L99o$	[*1] ΔH - ΔE^*_{94} (CIE 1994)< ΔH - ΔE^*_{94} >	
a99o	$\Delta a99o$	[*1] ΔE_{00} (CIE 2000)< ΔE_{00} >	
b99o	$\Delta b99o$	[*1] $\Delta E_{00}(l)$ < $\Delta E_{00}(l)$ >	
C99o	$\Delta C99o$	[*1] $\Delta E_{00}(c)$ < $\Delta E_{00}(c)$ >	
h99o	$\Delta H99o$	[*1] $\Delta E_{00}(h)$ < $\Delta E_{00}(h)$ >	
x	Δx	[*1] $\Delta L'$ - ΔE_{00} (CIE 2000) < $\Delta L'$ - ΔE_{00} >	
y	Δy	[*1] $\Delta C'$ - ΔE_{00} (CIE 2000) < $\Delta C'$ - ΔE_{00} >	
u* \oplus	$\Delta u^* \oplus$	[*1] $\Delta H'$ - ΔE_{00} (CIE 2000) < $\Delta H'$ - ΔE_{00} >	
v* \oplus	$\Delta v^* \oplus$	ΔE_{ab} (Hunter)	
u' \oplus	$\Delta u' \oplus$	ΔE_{99}	
v' \oplus	$\Delta v' \oplus$	ΔE_{99o}	
L (Hunter)	ΔL (Hunter)	FMC2 \oplus	
a (Hunter)	Δa (Hunter)	ΔL (FMC2) \oplus	
b (Hunter)	Δb (Hunter)	ΔCr -g(FMC2) \oplus	
FF	ΔFF	ΔCy -b(FMC2) \oplus	
	[*2] Lightness	NBS100 \oplus	
	[*2] Saturation	NBS200 \oplus	
	[*2] Hue	ΔEc (degree) (DIN 6175-2) \oplus	
	[*2] a* Evaluation	< ΔEc (deg.)>	
	[*2] b* Evaluation	ΔEp (degree) (DIN 6175-2) \oplus	
		< ΔEp (deg.)>	
		ΔEc (Audi2000) \oplus	
		m ΔEc (Audi2000) \oplus	
		ΔEc Max(Audi2000) \oplus	
		ΔEp (Audi2000) \oplus	
		m ΔEp (Audi2000) \oplus	
		ΔEp Max(Audi2000) \oplus	
		[*11] Auto Adjust	

Index

Index	Index Difference
Munsell C Hue (JIS Z8721 1964) <Munsell C Hue>	$\Delta WI(CIE\ 1982) <\Delta WI(CIE)>$
Munsell C Value (JIS Z8721 1964) <Munsell C Value>	$\Delta WI(ASM\ E313-73) <\Delta WI(E313-73)>$
Munsell C Chroma (JIS Z8721 1964) <Munsell C Chroma>	$\Delta WI(Hunter)$
Munsell D65 Hue (JIS Z8721 1993) <Munsell D65 Hue>	$\Delta WI(TAUBE) \textcircled{P}$
Munsell D65 Value (JIS Z8721 1993) <Munsell D65 Value>	$\Delta WI(STENSBY) \textcircled{P}$
Munsell D65 Chroma (JIS Z8721 1993) <Munsell D65 Chroma>	$\Delta WI(BERGER) \textcircled{P}$
WI(CIE 1982) <WI(CIE)>	$\Delta WI(ASM\ E313-98)(C) \textcircled{P} <\Delta WI(E313-98)(C)>$
WI(ASM E313-73) <WI(E313-73)>	$\Delta WI(ASM\ E313-98)(D50) \textcircled{P} <\Delta WI(E313-98)(D50)>$
WI(Hunter)	$\Delta WI(ASM\ E313-98)(D65) \textcircled{P} <\Delta WI(E313-98)(D65)>$
WI(TAUBE) \textcircled{P}	$\Delta WI(Ganz)$
WI(STENSBY) \textcircled{P}	Tint diff.(CIE)
WI(BERGER) \textcircled{P}	Tint diff.(ASM E313-98)(C) $\textcircled{P} <\text{Tint diff. (E313-98)(C)>$
WI(ASM E313-98)(C) $\textcircled{P} <\text{WI(E313-98)(C)>$	Tint diff.(ASM E313-98)(D50) $\textcircled{P} <\text{Tint diff. (E313-98)(D50)>$
WI(ASM E313-98)(D50) $\textcircled{P} <\text{WI(E313-98)(D50)>$	Tint diff.(ASM E313-98)(D65) $\textcircled{P} <\text{Tint diff. (E313-98)(D65)>$
WI(ASM E313-98)(D65) $\textcircled{P} <\text{WI(E313-98)(D65)>$	Tint diff.(Ganz)
WI(Ganz)	$\Delta YI(ASM\ D1925) <\Delta YI(D1925)>$
Tint(CIE)	$\Delta YI(ASM\ E313-73) <\Delta YI(E313-73)>$
Tint(ASM E313-98)(C) $\textcircled{P} <\text{Tint(E313-98)(C)>$	$\Delta YI(ASM\ E313-98)(C) \textcircled{P} <\Delta YI(E313-98)(C)>$
Tint(ASM E313-98)(D50) $\textcircled{P} <\text{Tint(E313-98)(D50)>$	$\Delta YI(ASM\ E313-98)(D65) \textcircled{P} <\Delta YI(E313-98)(D65)>$
Tint(ASM E313-98)(D65) $\textcircled{P} <\text{Tint(E313-98)(D65)>$	$\Delta YI(DIN\ 6167)(C) \textcircled{P}$
Tint(Ganz)	$\Delta YI(DIN\ 6167)(D65) \textcircled{P}$
YI(ASM D1925) <YI(D1925)>	$\Delta B(ASM\ E313-73) \textcircled{P} <\Delta B(E313-73)>$
YI(ASM E313-73) <YI(E313-73)>	[*7] Brightness diff.(TAPPI T452) $\textcircled{P} <\text{Brightness diff. (TAPPI)>$
YI(ASM E313-98)(C) $\textcircled{P} <\text{YI(E313-98)(C)>$	[*7] Brightness diff.(ISO 2470) $\textcircled{P} <\text{Brightness diff. (ISO)>$
YI(ASM E313-98)(D65) $\textcircled{P} <\text{YI(E313-98)(D65)>$	[*8] Opacity diff.(ISO2471) \textcircled{P}
YI(DIN 6167)(C) \textcircled{P}	[*8] Opacity diff.(TAPPI T425 89%) $\textcircled{P} <\text{Opacity diff. (T425)>$
YI(DIN 6167)(D65) \textcircled{P}	[*8] Haze diff.(ASM D1003-97)(A) $\textcircled{P} <\text{Haze diff. (D1003-97)(A)>$
B(ASM E313-73) $\textcircled{P} <\text{B(E313-73)>$	[*8] Haze diff.(ASM D1003-97)(C) $\textcircled{P} <\text{Haze diff. (D1003-97)(C)>$
[*7] Brightness (TAPPI T452) $\textcircled{P} <\text{Brightness (TAPPI)>$	[*7] ISO Status A Density diff. B $\textcircled{P} <\text{Status A diff. (B)>$
[*7] Brightness (ISO 2470) $\textcircled{P} <\text{Brightness (ISO)>$	[*7] ISO Status A Density diff. G $\textcircled{P} <\text{Status A diff. (G)>$
[*8] Opacity (ISO2471) \textcircled{P}	[*7] ISO Status A Density diff. R $\textcircled{P} <\text{Status A diff. (R)>$
[*8] Opacity (TAPPI T425 89%) $\textcircled{P} <\text{Opacity (T425)>$	[*7] ISO Status T Density diff. B $\textcircled{P} <\text{Status T diff. (B)>$
[*8] Haze (ASM D1003-97)(A) $\textcircled{P} <\text{Haze (D1003-97)(A)>$	[*7] ISO Status T Density diff. G $\textcircled{P} <\text{Status T diff. (G)>$
[*8] Haze (ASM D1003-97)(C) $\textcircled{P} <\text{Haze (D1003-97)(C)>$	[*7] ISO Status T Density diff. R $\textcircled{P} <\text{Status T diff. (R)>$
[*7] ISO Status A Density B $\textcircled{P} <\text{Status A(B)>$	$\Delta Rx(C) \textcircled{P}$
[*7] ISO Status A Density G $\textcircled{P} <\text{Status A(G)>$	$\Delta Ry(C) \textcircled{P}$
[*7] ISO Status A Density R $\textcircled{P} <\text{Status A(R)>$	$\Delta Rz(C) \textcircled{P}$
[*7] ISO Status T Density B $\textcircled{P} <\text{Status T(B)>$	$\Delta Rx(D65) \textcircled{P}$
[*7] ISO Status T Density G $\textcircled{P} <\text{Status T(G)>$	$\Delta Ry(D65) \textcircled{P}$
[*7] ISO Status T Density R $\textcircled{P} <\text{Status T(R)>$	$\Delta Rz(D65) \textcircled{P}$
Rx(C) \textcircled{P}	$\Delta Rx(A) \textcircled{P}$
Ry(C) \textcircled{P}	$\Delta Ry(A) \textcircled{P}$
Rz(C) \textcircled{P}	$\Delta Rz(A) \textcircled{P}$
Rx(D65) \textcircled{P}	Std. Depth diff. (ISO 105.A06) $\textcircled{P} <\text{Std. Depth diff.}>$
Ry(D65) \textcircled{P}	Stain Test (ISO 105.A04E)(C) $\textcircled{P} <\text{Stain Test (C)>$
Rz(D65) \textcircled{P}	Stain Test (ISO 105.A04E)(D65) $\textcircled{P} <\text{Stain Test (D65)>$
Rx(A) \textcircled{P}	Stain Test Rating (ISO 105.A04E)(C) $\textcircled{P} <\text{Stain Test Rating (C)>$
Ry(A) \textcircled{P}	Stain Test Rating (ISO 105.A04E)(D65) $\textcircled{P} <\text{Stain Test Rating (D65)>$
Rz(A) \textcircled{P}	Grey Scale (ISO 105.A05)(C) $\textcircled{P} <\text{Grey Scale (C)>$
Standard Depth (ISO 105.A06) $\textcircled{P} <\text{Standard Depth}>$	Grey Scale (ISO 105.A05)(D65) $\textcircled{P} <\text{Grey Scale (D65)>$
GU	Grey Scale Rating (ISO 105.A05)(C) $\textcircled{P} <\text{Grey Scale Rating (C)>$
	Grey Scale Rating (ISO 105.A05)(D65) $\textcircled{P} <\text{Grey Scale Rating (D65)>$

	K/S Strength (ΔE^*)(C)® <K/S (ΔE^*)(C)> K/S Strength (ΔE^*)(D65)® <K/S (ΔE^*)(D65)> K/S Strength (Max Abs)® <K/S (Max Abs)> K/S Strength (Apparent)® <K/S (Apparent)> [*9] K/S Strength (User)® <K/S (User)> K/S Strength (ΔL^*)(C)® <K/S (ΔL^*)(C)> K/S Strength (ΔC^*)(C)® <K/S (ΔC^*)(C)> K/S Strength (ΔH^*)(C)® <K/S (ΔH^*)(C)> K/S Strength (Δa^*)(C)® <K/S (Δa^*)(C)> K/S Strength (Δb^*)(C)® <K/S (Δb^*)(C)> K/S Strength (ΔL^*)(D65)® <K/S (ΔL^*)(D65)> K/S Strength (ΔC^*)(D65)® <K/S (ΔC^*)(D65)> K/S Strength (ΔH^*)(D65)® <K/S (ΔH^*)(D65)> K/S Strength (Δa^*)(D65)® <K/S (Δa^*)(D65)> K/S Strength (Δb^*)(D65)® <K/S (Δb^*)(D65)> K/S Strength (Max Abs)[nm]® <K/S (Max Abs)[nm]> NC# (C)® NC# Grade (C)® NC# (D65)® NC# Grade (D65)® Ns (C)® Ns Grade (C)® Ns (D65)® Ns Grade (D65)® ΔGU
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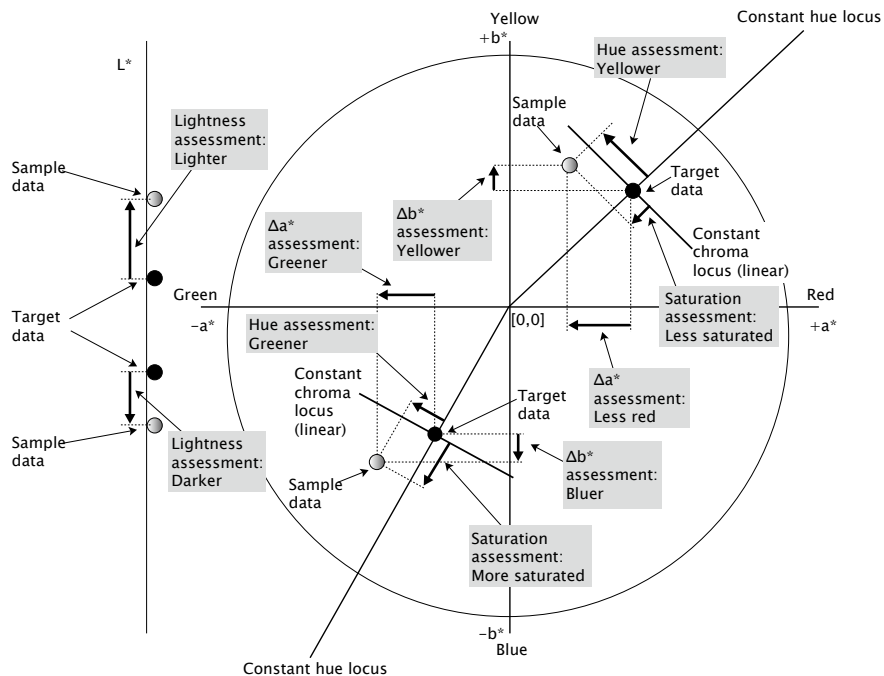
Special

Special
8 degree gloss
[*10] User Equation 1 ®
[*10] User Equation 2 ®
[*10] User Equation 3 ®
[*10] User Equation 4 ®
[*10] User Equation 5 ®
[*10] User Equation 6 ®
[*10] User Equation 7 ®
[*10] User Equation 8 ®

- The characters in < > are the abbreviated names used by the SpectraMagic DX.
- Items marked with ® are supported only by SpectraMagic DX Professional Edition.
- The items x, y, u', v', Δx , Δy , $\Delta u'$ and $\Delta v'$ are expressed to four decimal places. Other colorimetric data is expressed to two decimal places. The number of decimal places can be changed. See p. 65 for details.
- SpectraMagic DX software enhances calculation accuracy by performing internal calculations with numbers having more decimal places than those actually displayed. Consequently, the least significant digit displayed may differ from that of the instrument by one digit due to rounding or color space conversion.

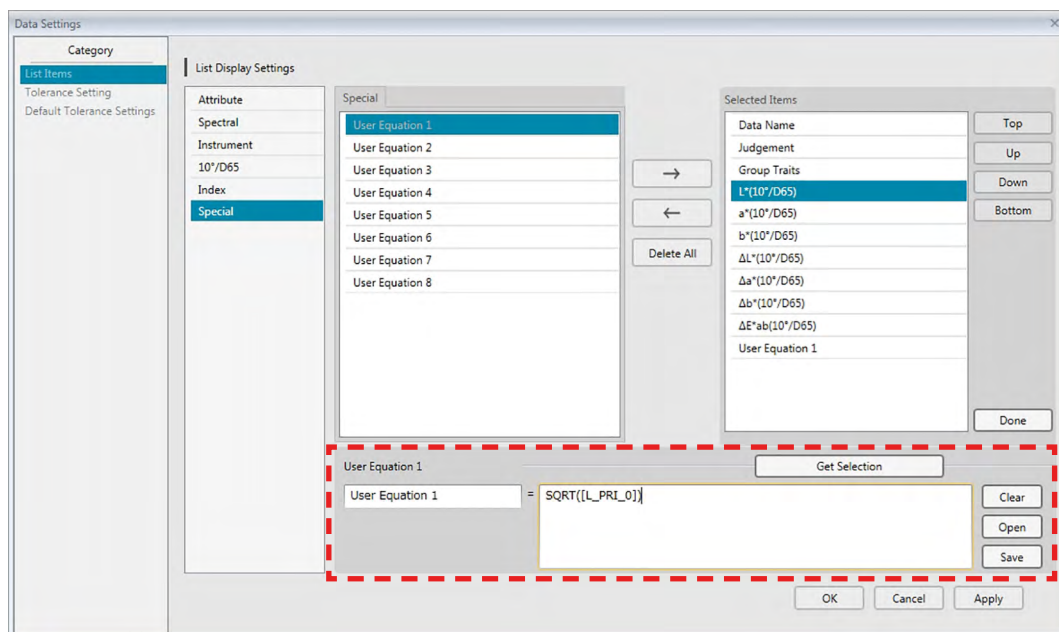
■ Notes on List Items

- [*1] Color difference equation which requires parameter setting. The parameters can be set in the Tolerance Setting category of the Data Settings dialog box. For details, refer to p. 96.
- [*2] The color assessment such as lightness assessment is the description of the differences in hue or other factors from the target color. See the conceptual diagram below.



- [*3] MI is shown in the Others tab for the Secondary or Tertiary observer/illuminant conditions only. The Primary observer/illuminant condition is used as the reference observer/illuminant condition. When using MI, it is recommended that the Observer settings for the Secondary and Tertiary observer/illuminant conditions be set to the same observer as the Primary observer/illuminant condition.
- [*4] Pseudo Color is used to show the color corresponding to the colorimetric values of the sample data or target data. The cell in the Data List is filled with the color. This provides visual feedback on the colorimetric values of the data.
- [*5] The Strength and Pseudo Strength are displayed only when target data and the sample data associated with the target data exist.
- [*6] "555" is recognized as a character, and its statistical value is not calculated. When using "555", be sure to specify dL^* , da^* , and db^* in the text boxes that appear when "555" is selected.
- [*7] Brightness and density (ISO Status A, ISO Status T) are not displayed ("-----" is displayed instead) when sample data and target data include colorimetric values only.
- [*8] Opacity and haze values are displayed only when the opacity measurement mode or haze measurement mode are specified respectively.
- [*9] When using "K/S Strength (User)", be sure to specify the wavelength to use in the text box that appears when "K/S Strength (User)" is selected.

[*10] After a user equation is added, you can change its title. The equation can be specified in the following procedure.



Select the user equation added to the Selected Items pane and click the [Edit] button. The User Equation input box (indicated by the red dashed line rectangle above) will be shown at the bottom of the dialog box, allowing the input of the name and equation.

[Save] and [Open] buttons will also appear. A user equation can be saved to a file (extension: *.uedx) by clicking the [Save] button or loaded from a file by clicking the [Open] button.

The colorimetric and index data that can be used in a user equation are the data shown in the Selected Items list above. Select the item in the pane and click the [Get Selection] button. (The [Get Selection] button will be disabled when you select an item in the Selected Items list that cannot be used in a user equation.)

When [Get Selection] is clicked, the code for the selected item will be added to the end of the equation in the User Equation input box.

The format of the code for a selected item is as follows:

[List Item code_Category code_Group code_Target code (optional)]

List item code: The code for the selected list item. For example, the code for L* is "L".

Category code: The code for which illuminant/observer condition to get data for (Primary: "PRI"; Secondary: "SEC"; Tertiary: "TER"), or in the case of some index items or special items for which illuminant/observer is fixed or irrelevant, "INDEX".

Group code: The code for the group trait to get data for.

Target code (optional): The code "T" to indicate that the target data should be obtained instead of the current row data. If "T" is not added at the end, the current row data for that item will be obtained.

Ex.: Code when “L*(10 degree/D65)” is selected (with 10 degree Observer and D65 Illuminant set as the primary observer/illuminant conditions):

[L_PRI_0]

L: Code for L*

PRI: Code for primary observer/illuminant condition

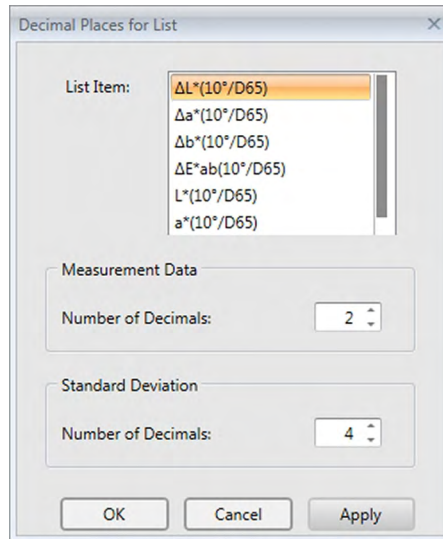
0: Current row data

[*11] Pass/Warn/Fail results for *Auto adjust from sample data distribution* in the Tolerance Setting category of the Data Settings dialog box.

2.4.4 Setting Number of Decimal Places for List Items

For list items that are represented by numbers, the number of decimal places can be specified individually.

1. Select *Decimal Places ...* from the **Data** menu. The Decimal Places for List dialog will appear.
2. Specify the number of decimal places for the applicable list items.



■ Decimal Places for List dialog box

List Item

Items specified as list items are displayed in the pull-down list box. To specify the number of decimal places for an item, select that item.

Measurement Data

Number of Decimals:

Numerical values between 0 and 8 can be entered or selected.

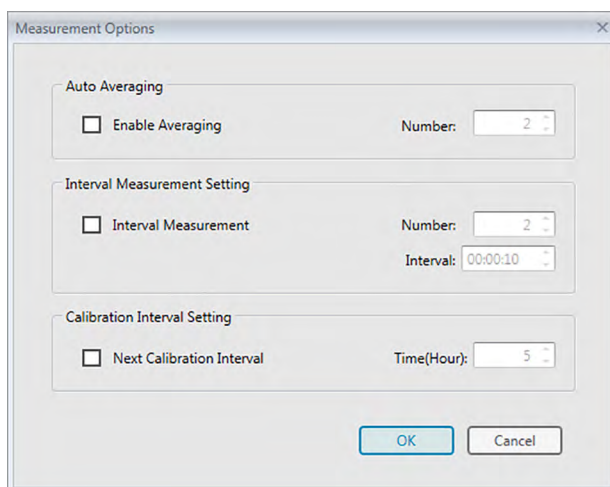
Standard Deviation

Number of Decimals:

Numerical values between 0 and 8 can be entered or selected.

2.4.5 Setting Measurement Options

- This procedure is available only when the instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).
1. Select *Measurement Options ...* from the **Instrument** menu. The Measurement Options dialog box will appear.
 2. Specify the parameters for auto averaging measurement, interval measurement and calibration interval.



■ Measurement Options dialog box

Auto Averaging

Enable Averaging

When this box is checked, SpectraMagic DX performs automatic averaging measurement. See p. 77 (target measurements) or p. 107 (sample measurements) for details of automatic averaging measurement.

- The number that can be set is 2 to 30.

Interval Measurement Setting ⓘ

Interval Measurement

When this box is checked, SpectraMagic DX performs interval measurement. See p. 76 (target measurements) or p. 105 (sample measurements) for details of interval measurement.

Number: A number between 2 and 1000 can be entered or selected.

Interval: A time between 00:00:00 and 12:00:00 can be entered or selected in units of 1 seconds. Move the cursor onto each of hour/minute/second and specify the value respectively.

ⓘ This function is supported by the SpectraMagic DX Professional Edition only.

- Auto Averaging and Interval Measurement can also be combined. Note, however, that you cannot use interval measurement in connection with manual averaging measurement.

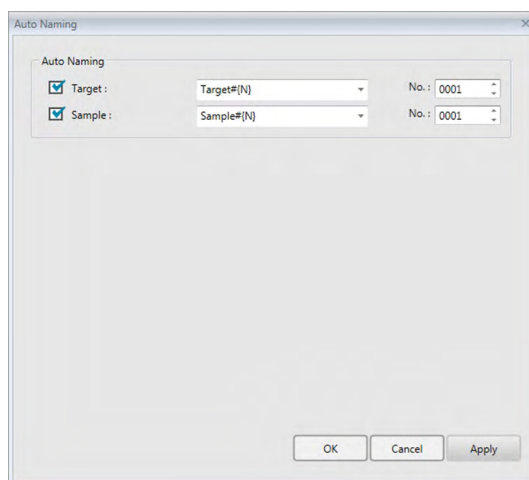
Calibration Interval Setting

Next Calibration Interval

When the time specified here has passed since the last white calibration performed with SpectraMagic DX, a message will appear to recommend performing white calibration. 1 to 24 hours can be set.

2.4.6 Setting Auto-Naming

1. Select *Auto Naming ...* from the **Data** menu. The Auto Naming dialog box will appear.



2. Specify the parameters for auto naming.

■ Auto Naming dialog box

Auto Naming

Target

When this box is checked, the specified Target: name will be assigned automatically during measurement.

Sample

When this box is checked, the specified Sample: name will be assigned automatically during measurement.

■ Name format

Specify the format of the name to be automatically assigned. The strings in the following tables are treated as special symbols. They are replaced with the string indicating the corresponding data.

String	Corresponding data	Example
{N}	Automatically created number (serial number) assigned to a sample. • The first number in the series can be specified between 0001 and 9999.	0001
{D}	Day of measurement	3
{DD}	2-digit day of measurement with zero padding	03
{M}	Month of measurement	9
{MM}	2-digit month of measurement with zero padding	09
{MMM}	3-character abbreviation of month name	Sep
{YYYY}	4-digit year of measurement (Western calendar)	2016
{YY}	2-digit year of measurement (Western calendar)	16
{E}	Year digits (Japanese calendar)	28
{G}	Initial indicating era for year in Japanese calendar	H
{GGG}	Japanese characters for era for year in Japanese calendar	平成
{h}	Hour of measurement	9

String	Corresponding data	Example
{hh}	2-digit hour of measurement with zero padding	09
{AMPM}	AM/PM indication for hour of measurement	AM
{m}	Minute of measurement	3
{mm}	2-digit minute of measurement with zero padding	03
{s}	Second of measurement	7
{ss}	2-digit second of measurement with zero padding	07

Enter a combination of these strings in the text box. Up to 40 alphanumeric characters can be used. The following two strings are provided as sample formats and can be selected from the pull-down combo box.

String	Example of result
Sample#{N}	Sample#0001
{D}/{M}/{YYYY}-{h}:{m}:{s}	3/9/2016-7:7:18

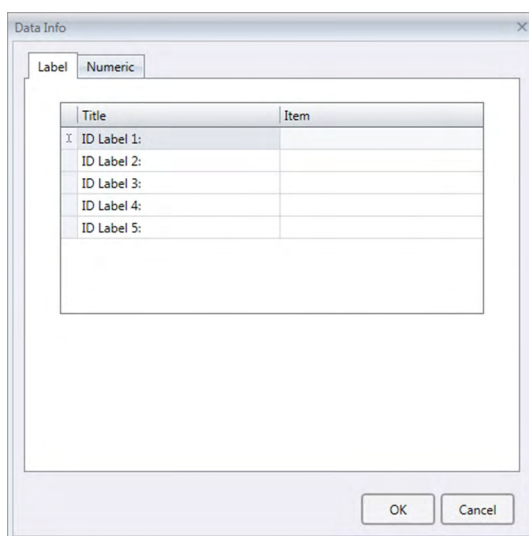
2.4.7 Specifying Supplementary Information of Data ⑨

This function is supported by the SpectraMagic DX Professional Edition only.

You can specify supplementary data information to describe a variety of information that cannot be represented by a data name only. The specified data information can be displayed in the Data List as list items.

This setting is recorded for each document, and is stored in a template file. For details of a template file, refer to p. 169.

1. Select *Supplementary data information ...* from the **Data** menu. The Supplementary Data Information dialog box will appear.
2. Select the Label tab or Numeric tab and specify details for the supplementary information of the data.



■ Supplementary Data Information dialog box

■ Label tab, Numeric tab

Supplementary data information is specified as character strings on the Label tab and as numerical values on the Numeric tab.

Title

When the dialog is first opened, default titles such as “ID Label 1:” or “ID Numeric 1:” will be shown in the Title column. The default title can be edited by clicking and dragging to select it and typing the desired new title. Up to 30 alphanumeric characters can be used.

- The title will be shown in the List Items dialog box for selecting the items to show in the Data List.

Item

To add information for a title, click on the text box in the Item column for that title and input the desired information. Up to 30 alphanumeric characters can be used.

- The information shown in the Item column for each title will be added automatically to all future measurements taken in the document when Auto Naming is used. When Auto Naming is not

used, the information shown in the Item column will be proposed as the default information for that title, but the information can be changed at the time of measurement.

- Information can also be changed at a later time in the Data Property dialog.

2.5 Specifying Target Data/Tolerance

2.5.1 Registering Target Data

Register the target data to be used for color difference measurement. When only absolute values will be measured, it is unnecessary to register target data.

The various methods available for registering target data are shown below:

■ Registering target data by performing a measurement

- **Target measurement** (p. 73)

Perform a measurement by triggering SpectraMagic DX to take a measurement and register the measurement data as target data.

- **Remote target measurement** (p. 75)

Enable *Remote Measurement: Target* and perform measurement by pressing the measuring button of the instrument. SpectraMagic DX will register the measurement data as target data.

- **Interval target measurement** ⓘ (p. 76)

Enable interval measurement and start target measurement by triggering SpectraMagic DX once to take measurements using the interval time and number of measurements specified in advance. The measured data are registered as target data after every measurement.

ⓘ This function is supported by SpectraMagic DX Professional Edition only.

- **Automatic averaging target measurement** (p. 77)

Enable automatic averaging measurement and start target measurement by triggering SpectraMagic DX once to begin measurements. After the specified number of measurements has been performed, the collected measurement data are averaged and the average is registered as target data.

- **Manual averaging target measurement** (p. 78)

Select *Manual Average Measurement: Target*. Take repeated measurements for the desired number of times and exit the mode. The measurement data collected during the period are averaged and the average is registered as target data.

- The above methods can also be combined to obtain target data.
- Note that you cannot use target interval measurement in connection with target manual averaging measurement.

■ Manual data input (p. 81)

Input data manually and register them as the target data.

■ Read target data from the instrument (p. 87)

Read target data stored in the memory of the instrument and register them as target data in SpectraMagic DX.

■ Copying target data from existing data

Copy sample data or target data in the same or different document and register them as target data.

■ **Changing existing sample to target** (p. 88)

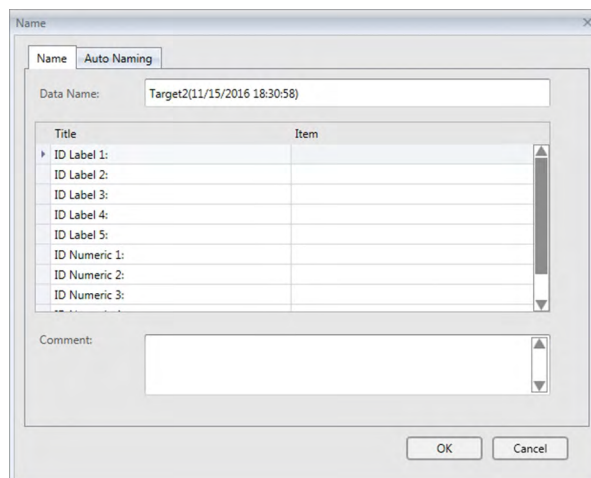
Select sample data in the document and change it to register as target data.

■ **Searching for a Target in the Database** (p. 88)

Search the database for targets meeting certain conditions and add them to the current document as targets.

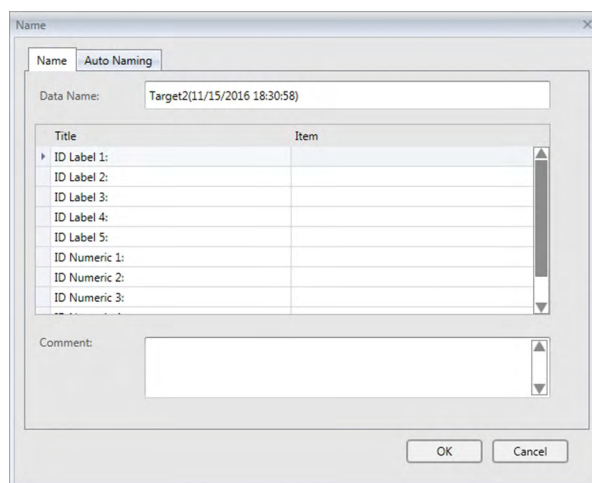
2.5.1-a Performing Target Measurement

- This procedure is available only when the instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).
1. Click [**Target Measurement**] in the Data Panel menu toolbar or select *Target Measurement* from the **Instrument** menu. The Name dialog box will appear.



- If auto-naming is activated, the Name dialog box will not appear. Skip step 2 and go to step 3.
2. Enter the name of the data and click [OK].
 - You can assign a name, supplementary data information ⓘ and a comment for each piece of data. (See p. 74.) Supplementary data information items can be selected every time you measure.
 - Items marked with ⓘ are supported only by SpectraMagic DX Professional Edition.
 3. The measurement will be taken and the measurement data will be added to the document as a target.

■ Name dialog box



Name tab

Data Name:

Up to 64 alphanumeric characters can be used for the name.

Supplementary Data Information ⓘ

The titles and any default item data specified on the Label and Numeric tabs of the Supplementary Data Information dialog box are displayed. Item data can be changed or added if desired, but titles cannot be changed here. (See p. 69.)

Comment:

Up to 256 alphanumeric characters can be used for the comment.

2.5.1-b Performing Remote Target Measurement

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).
1. Select *Remote Measurement* in the **Instrument** menu and then select *Target* from the pop-out menu that appears. Remote target measurement will be enabled, the measurement icon next to *Target* in the *Remote Measurement* pop-out menu will be highlighted, and Remote Measurement in the Instrument Window's Instrument Information tab will change to "Target".

Setting this mode enables remote measurement of target data. When this mode is set, the measurement can be triggered either with the measuring button of the instrument or with the **Instrument** menu: *Target Measurement* or Document Window toolbar button of SpectraMagic DX.

- When a CM-2600d, CM-2500d, CM-2500c, or CM-2300d is connected:
If the instrument's Communication Mode is canceled and then set again using instrument controls, remote measurement mode will be canceled on the instrument. When this occurs, uncheck Remote Measurement: Target and then check it again to re-enable Remote Measurement: Target.
 - Remote Measurement: Target and Remote Measurement: Sample cannot be selected simultaneously. If you select Remote Measurement: Sample while Remote Measurement: Target is enabled, Remote Measurement: Target will be disabled and Remote Measurement: Sample will be enabled.
2. Position the instrument on the target to measure and press the instrument's measuring button. The measurement will be taken and the measurement data will be added to the document as a target.

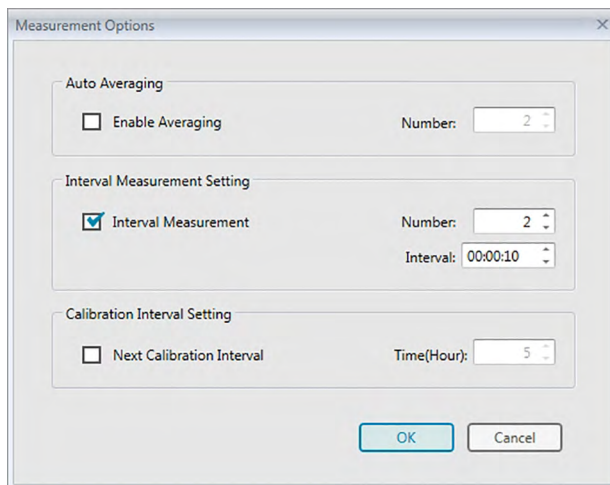
■ Canceling Remote Target Measurement mode

To cancel remote target measurement mode, select *Remote Measurement* in the **Instrument** menu and select *Target* again from the pop-out menu that appears. The measurement icon next to *Target* will become normal (not highlighted) and Remote Measurement in the Instrument Information tab will change to "OFF".

2.5.1-c Performing Interval Target Measurement ⑨

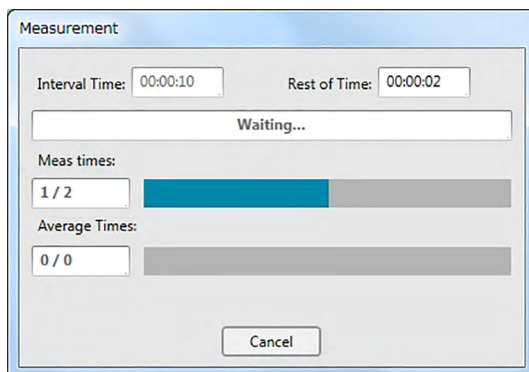
- This procedure is available only when the instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).
- This function is supported by SpectraMagic DX Professional Edition only.

1. Select *Measurement Options ...* from the **Instrument** menu. The Measurement Options dialog box will appear.



2. Check Interval Measurement and specify the options for Interval Measurement Setting.
 - For information on settings in the Measurement Options dialog, see p. 66.
3. Click the [OK] button to confirm the settings and close the Measurement Options dialog box.
4. Perform the measurement as described on p. 73.

The Measurement dialog box appears and interval measurement is performed.

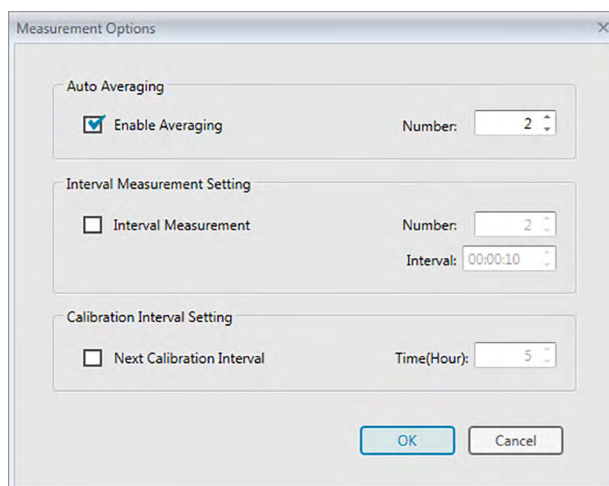


During interval measurement, the measurement data are added to the document as targets after every measurement.

- When interval measurement is performed, the measurement name will be formatted as follows:
(Specified measurement name)_(Interval measurement number)
Specified measurement name: The name specified in the Name dialog (if auto naming is disabled) or in the Auto Naming dialog (if auto naming is enabled)
Interval measurement number: The number of the measurement in this measurement sequence, starting with 0001.

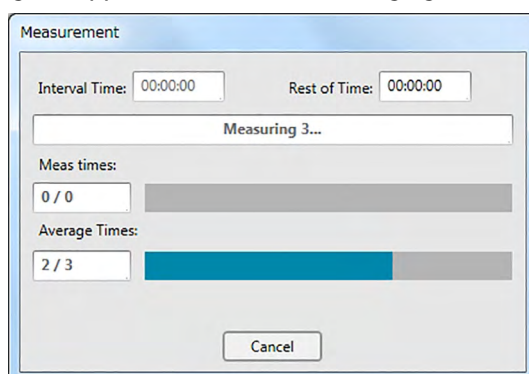
2.5.1-d Performing Automatic Averaging Target Measurement

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).
1. Select *Measurement Options ...* from the **Instrument** menu. The Measurement Options dialog box will appear.



2. Check Enable Averaging and specify the options for Auto Averaging.
 - For information on settings in the Measurement Options dialog, see p. 66.
3. Click the [OK] button to confirm the settings and close the Measurement Options dialog box.
4. Perform the measurement as described on p. 73.

The Measurement dialog box appears and automatic averaging measurement is performed.



During automatic averaging measurement of target data, measurements are repeated the specified number of times. When all specified measurements have been completed, the collected measurement data are averaged and added to the document as one target.

2.5.1-e Performing Manual Averaged Target Measurement

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).
1. Select *Manual Average Measurement* in the **Instrument** menu and then select *Target ...* from the pop-out menu that appears. The Target Averaged Measurement dialog box will appear.

Target Averaged Measurement

L*a*b*

☐ Retrieve checked data besides averaged result

Item	Group Traits	L*	a*	b*
Mean	<input checked="" type="checkbox"/>	-----	-----	-----
Std.Dev.		-----	-----	-----

Select All Unselect All Measure OK Cancel

2. Repeatedly position the instrument on the target to measure and click the [Measure] button in the Target Averaged Measurement dialog box to perform the desired number of measurements.

Target Averaged Measurement

L*a*b*

☐ Retrieve checked data besides averaged result

Item	Group Traits	L*	a*	b*
Mean	<input checked="" type="checkbox"/>	-----	83.66	-6.83
Std.Dev.		-----	0.0431	0.0095
1	<input checked="" type="checkbox"/>	-----	83.62	-6.83
2	<input checked="" type="checkbox"/>	-----	83.61	-6.84
3	<input checked="" type="checkbox"/>	-----	83.68	-6.81
4	<input checked="" type="checkbox"/>	-----	83.66	-6.83
5	<input checked="" type="checkbox"/>	-----	83.72	-6.84

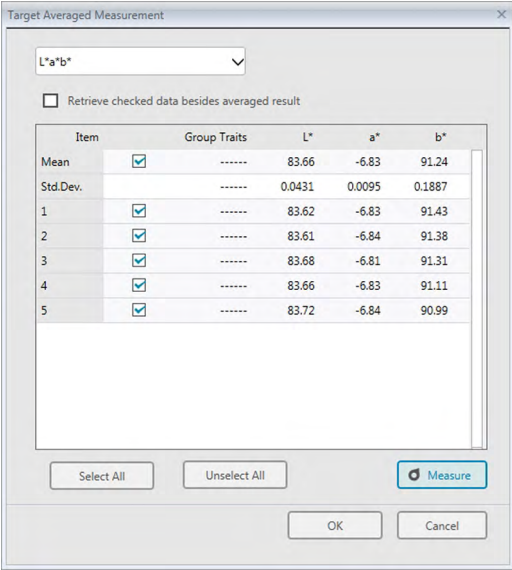
Select All Unselect All Measure OK Cancel

The measurement data are displayed in the dialog box after each measurement, and the average and standard deviation for the measurements taken so far are calculated and displayed.

- The data with check marks will be used for the calculation of the average.
- Uncheck data that you do not want to include in the average calculation, such as abnormal values.

3. Click the [OK] button. The average is added to the document as one target.

■ Target Averaged Measurement dialog box



The dialog box titled "Target Averaged Measurement" features a dropdown menu at the top set to "L*a*b*". Below it is an unchecked checkbox labeled "Retrieve checked data besides averaged result". The main area contains a table with columns: Item, Group Traits, L*, a*, and b*. The table lists a Mean row, a Std.Dev. row, and five numbered items (1-5), all of which have checkmarks in the Item column. At the bottom are buttons for "Select All", "Unselect All", "Measure" (with a target icon), "OK", and "Cancel".

Item	Group Traits	L*	a*	b*
Mean	✓	83.66	-6.83	91.24
Std.Dev.		0.0431	0.0095	0.1887
1	✓	83.62	-6.83	91.43
2	✓	83.61	-6.84	91.38
3	✓	83.68	-6.81	91.31
4	✓	83.66	-6.83	91.11
5	✓	83.72	-6.84	90.99

Color space drop-down list box

Select from L*a*b*, XYZ, L*c*h, Hunter Lab, Yxy, L*u*v*, and L*u'v' as the color space to be displayed in the dialog box list.

Retrieve checked data besides averaged result

When this option is checked, the data with a check mark will also be added to the Data List as individual targets.

[Select All]

Selects (puts a check mark next to) all of the measurements.

[Unselect All]

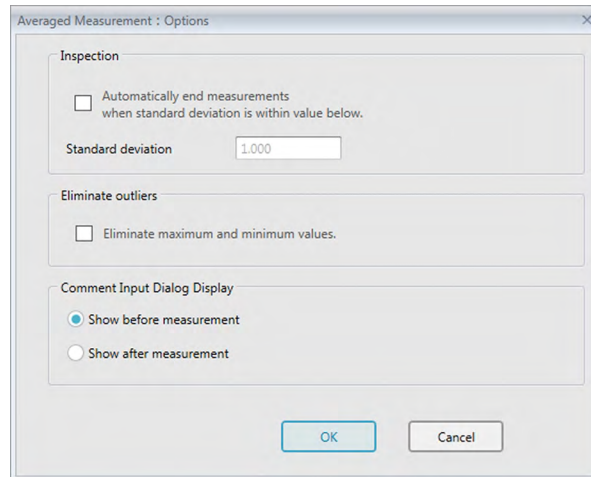
Unselects (removes the check mark next to) all of the measurements.

[Measure]

Takes a measurement.

■ Averaged Measurement : Options dialog box

The Averaged Measurement: Options dialog box can be opened by selecting *Manual Average Measurement* in the **Instrument** menu and then selecting *Options ...* from the pop-out menu that appears.



Inspection

Automatically end measurements when standard deviation is within value below.

When this option is checked, the measurement is terminated automatically when the standard deviation becomes lower than the threshold value.

The input range is between 0.001 and 1.

- When Eliminate outliers has been specified, the standard deviation is determined after the Eliminate outliers operation.

Eliminate outliers

Eliminate maximum and minimum values.

When this option is checked, the maximum and minimum values are monitored during the manual averaging measurement, and the averaging sample data is determined after the maximum and minimum values are deleted from the result of the averaging measurement.

- When this option is specified, manual averaging measurement will be ended only after measurement has been repeated at least three times. The data of the maximum and minimum values cannot be checked.

Comment input dialog display

Specify whether to display the comment input screen before or after the measurement.

2.5.1-f Registering Target by Manual Data Input

2.5.1-f.1 Inputting spectral data

1. Select *Input Target* in the **Data** menu and then select *Input Spectral Target ...* from the pop-out menu that appears. The Input Spectral Target dialog box will appear.

(nm)	Reflectance
360	100.00
370	100.00
380	100.00
390	100.00
400	100.00
410	100.00
420	100.00
430	100.00
440	100.00
450	100.00
460	100.00
470	100.00
480	100.00

2. Set the ChannelID and Group Trait.
 - Set the desired ChannelID (Single, SCI+SCE, Multi UV (SCI), Multi UV (SCE), 6 Angle (L), 6 Angle (L+R), or 6 Angle (DP)).
 - After setting the desired ChannelID, set the desired Group Trait.
3. Type the spectral data for all wavelengths.
 - If the ChannelID is set to a setting other than Single, set another Group Trait and repeat step 3 until spectral data have been set for all wavelengths for all Group Traits for the specified ChannelID.
4. Click [OK].

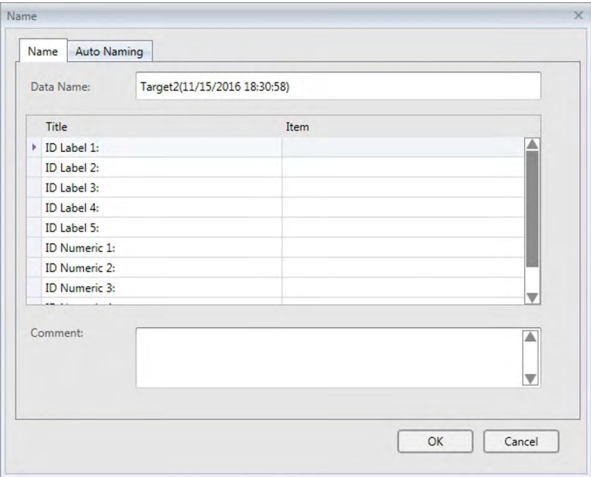
The Name dialog box will appear.

- If auto-naming is activated, the Name dialog box will not appear. The target data will be added to the Data List and registration is complete.

5. Enter the name of the data.

You can assign a name, supplementary data information ⓘ and a comment for each piece of data. (See p. 74.)

Items marked with ⓘ are supported only by SpectraMagic DX Professional Edition.



The image shows a 'Name' dialog box with two tabs: 'Name' and 'Auto Naming'. The 'Auto Naming' tab is active. It contains a 'Data Name' field with the text 'Target2(11/15/2016 18:30:58)'. Below this is a table with two columns: 'Title' and 'Item'. The table has 10 rows, with the first five rows labeled 'ID Label 1' through 'ID Label 5' and the last three rows labeled 'ID Numeric 1' through 'ID Numeric 3'. The 'Item' column is empty. Below the table is a 'Comment' field. At the bottom right are 'OK' and 'Cancel' buttons.

Title	Item
ID Label 1:	
ID Label 2:	
ID Label 3:	
ID Label 4:	
ID Label 5:	
ID Numeric 1:	
ID Numeric 2:	
ID Numeric 3:	

6. Click [OK]. The name dialog will close and the target data will be added to the Data List.

■ Input Spectral Target dialog box

ChannelID drop-down list box

Select from Single, SCI+SCE, Multi UV (SCI), Multi UV (SCE), 6 Angle (L), 6 Angle (L+R), or 6 Angle (DP).

Group Traits

Available settings depend on ChannelID.

Channel ID	Available settings
Single	SCI, SCE, 45/0
SCI+SCE	SCI, SCE
Multi UV (SCI)	UV100, UV0
Multi UV (SCE)	UV100, UV0
6 Angle (L)	-15°(L), 15°(L), 25°(L), 45°(L), 75°(L), 110°(L)
6 Angle (L+R)	-15°(L), 15°(L), 25°(L), 45°(L), 75°(L), 110°(L), -15°(R), 15°(R), 25°(R), 45°(R), 75°(R), 110°(R)
6 Angle (DP)	-15°(DP), 15°(DP), 25°(DP), 45°(DP), 75°(DP), 110°(DP)

Input Data

Reflectance: 0.01 to 999.99

GU

Gloss Units: 0.00 to 200.00

2.5.1-f.2 Inputting colorimetric data

1. Select *Input Target* in the **Data** menu and then select *Input Colorimetric Target ...* from the pop-out menu that appears. The Input Colorimetric Target dialog box will appear.

Input Colorimetric Target

Color Space Selection: L*a*b*

ChannelID: Single

Group Traits: 45/0

Input Data

	Primary	Secondary	Tertiary
L*	0.00		
a*	0.00		
b*	0.00		

☒ GU 0.00

OK Cancel

2. Select the Color Space, ChannelID and Group Trait.

Set the Color Space (XYZ, L*a*b*, Hunter Lab).

- Set the desired ChannelID (Single, SCI+SCE, Multi UV (SCI), Multi UV (SCE), 6 Angle (L), 6 Angle (L+R), or 6 Angle (DP)).
- After setting the desired ChannelID, set the desired Group Trait.

3. Type the colorimetric data for all three illuminant/observer conditions (Primary, Secondary, Tertiary).

If the ChannelID is set to a setting other than Single, set another Group Trait and repeat step 3 until colorimetric data have been set for all Group Traits for the specified ChannelID.

4. Click [OK].

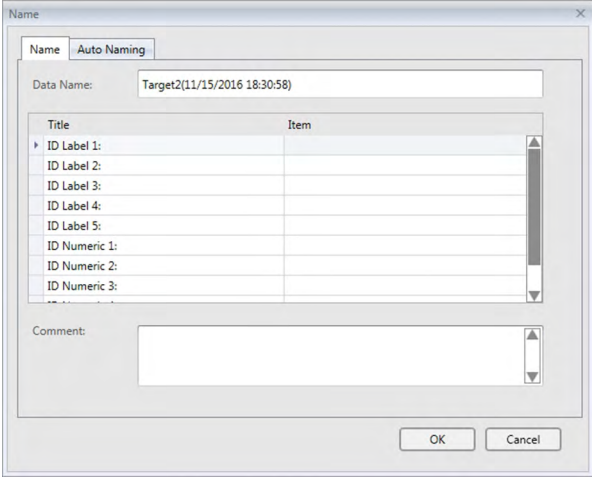
The Name dialog box will appear.

If auto-naming is activated, the Name dialog box will not appear. The target data will be added to the Data List and registration is complete.

5. Enter the name of the data.

You can assign a name, supplementary data information ® and a comment for each piece of sample data. (See p. 74.)

Items marked with ® are supported only by SpectraMagic DX Professional Edition.



The image shows a 'Name' dialog box with two tabs: 'Name' and 'Auto Naming'. The 'Auto Naming' tab is selected. It contains a 'Data Name' field with the text 'Target2(11/15/2016 18:30:58)'. Below this is a table with two columns: 'Title' and 'Item'. The table has eight rows, with the first five rows under 'Title' and the last three rows under 'Item'. The first row is expanded, showing 'ID Label 1:' in the 'Title' column and an empty 'Item' column. The other rows are 'ID Label 2:', 'ID Label 3:', 'ID Label 4:', 'ID Label 5:', 'ID Numeric 1:', 'ID Numeric 2:', and 'ID Numeric 3:'. Below the table is a 'Comment' field. At the bottom right are 'OK' and 'Cancel' buttons.

Title	Item
ID Label 1:	
ID Label 2:	
ID Label 3:	
ID Label 4:	
ID Label 5:	
ID Numeric 1:	
ID Numeric 2:	
ID Numeric 3:	

6. Click [OK]. The name dialog will close and the target data will be added to the Data List.

■ Input Colorimetric Target dialog box

Color Space Selection drop-down list box

Specify the color space to be used for manual data input. Selectable color spaces are L*a*b*, Hunter Lab, and XYZ only.

ChannelID drop-down list box

Select from Single, SCI+SCE, Multi UV (SCI), Multi UV (SCE), 6 Angle (L), 6 Angle (L+R), or 6 Angle (DP).

Group Traits

Available settings depend on ChannelID.

Channel ID	Available settings
Single	SCI, SCE, 45/0
SCI+SCE	SCI, SCE
Multi UV (SCI)	UV100, UV0
Multi UV (SCE)	UV100, UV0
6 Angle (L)	-15°(L), 15°(L), 25°(L), 45°(L), 75°(L), 110°(L)
6 Angle (L+R)	-15°(L), 15°(L), 25°(L), 45°(L), 75°(L), 110°(L), -15°(R), 15°(R), 25°(R), 45°(R), 75°(R), 110°(R)
6 Angle (DP)	-15°(DP), 15°(DP), 25°(DP), 45°(DP), 75°(DP), 110°(DP)

Input Data

Target data of primary/secondary/tertiary observer/illuminant/observer conditions
Type the values for the selected colorimetric data.

Note: The illuminant/observer conditions cannot be changed after the target colorimetric data is manually input.

GU

Gloss Units: 0.00 to 200.00

2.5.1-g Reading Target Data from the Instrument

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).

The target data stored in the memory of the instrument can be read into SpectraMagic DX by following the procedure below.

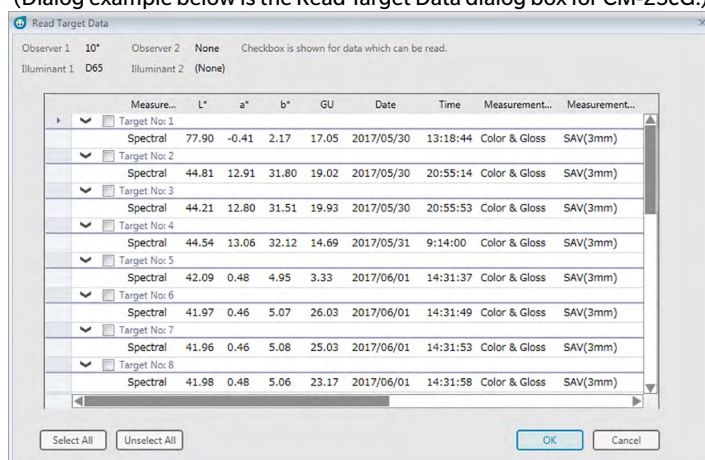
- Data can also be read using the Sensor Sync tab. See p. 159.

1. Select *Read/Write* in the **Instrument** menu and then select *Read Target* from the pop-out menu that appears.

A Reading Data dialog box will appear showing the progress as information on the target data stored in the instrument are read.

When information on all stored target data have been read, the Read Target Data dialog box will appear.

(Dialog example below is the Read Target Data dialog box for CM-25cG.)



2. Select the target(s) that you want to read from the instrument into SpectraMagic DX by clicking on the checkbox next to the target name to make it checked.
 - To select all targets, click [Select All].
 - To unselect all targets, click [Unselect All].
3. When all targets to be read into SpectraMagic DX have been selected, click [OK]. The selected targets will be read into the current document as targets.

2.5.1-h Copying Target from the Existing Data

For data copy and paste procedures, see p. 120.

2.5.1-i Changing Existing Sample to Target

An existing sample can be changed to a target by following the procedure below.

1. Select a sample in the Data List.
2. Select *Tool* from the **Data** menu and then select *Change to Target* from the pop-out menu that appears, or right-click on the sample, select *Tool* from the context menu that appears, and then select *Change To Target* from the pop-out menu that appears. The sample will be changed to a target.

2.5.1-j Searching for a Target in the Database

The database can be searched for targets meeting certain conditions, and the targets found by the search can be added to the current document.

1. Select *Target search from database...* in the **Document** menu. The Target search from database dialog box will appear.
2. Input the desired search conditions.

Instrument Name	Click on the current setting and select the desired instrument name from the drop-down list that appears. Only a single setting can be selected. To search for all targets regardless of the instrument, select "All".
Date	Input the start date and end date for the period to be searched. Dates can be input directly or selected from the calendar that appears when the down arrow to the left of the date is clicked.
Data Name	Input the data name or partial data name to be searched for. Any target names which include the input characters will be found by the search.
Group Name	Input the group name or partial group name to be searched for. Any group names which include the input characters will be found by the search.

3. Click [Search]. All documents in the database will be searched for targets meeting the conditions which were set.
 - Only measurements which have been set as targets will be searched. Samples will not be searched.
4. When the search has been completed, a list of the targets found will be shown in the dialog box, with a checkbox next to each target.
5. Click on the checkbox to select each target to be added to the current document.
6. Click [Add]. Each checked target will be read into the currently open document.
7. Click [Close] to close the dialog box.

2.5.2 Specifying the Target Data

Specify the target data to be used for color difference measurement from the target data stored in the document file.

- When only absolute values are measured, it is not necessary to specify target data.

2.5.2-a Selecting Specific Target Data

Select the specific target data from the *Classification by Target* folder or in a group in the *Classification by Group* folder in the Target List.

2.5.2-b Specify No Target (to take absolute measurements)

Select *Classification by Target - Absolute data* in the Target List.

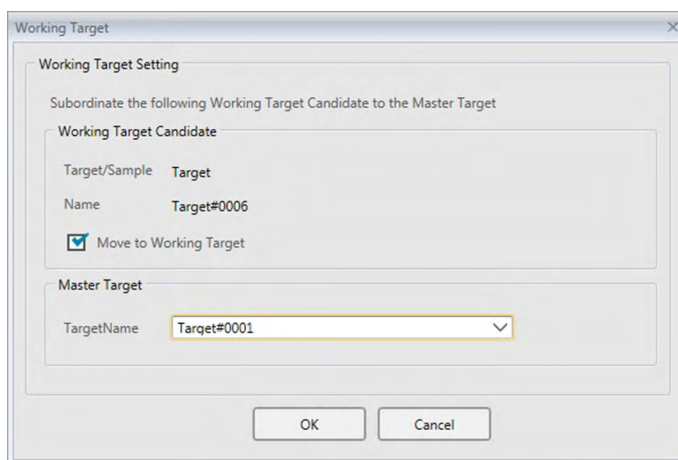
2.5.2-c Specifying Working Target ㊦

- This function is supported by SpectraMagic DX Professional Edition only.

You can organize several target data into a group and specify all of them as target data for color difference measurement. A group consists of several working targets under one master target. Sample measurements taken when the master target or any of the working targets in the group will be linked to that group. You can then perform various evaluations using the group, such as showing the working target data and master target data simultaneously together with samples in a color difference graph or absolute graph, easily switching between comparing samples to the master target or a working target by selecting the master target or working target in the Target List, or fixing the position of the origin point of the graph at the master target data.

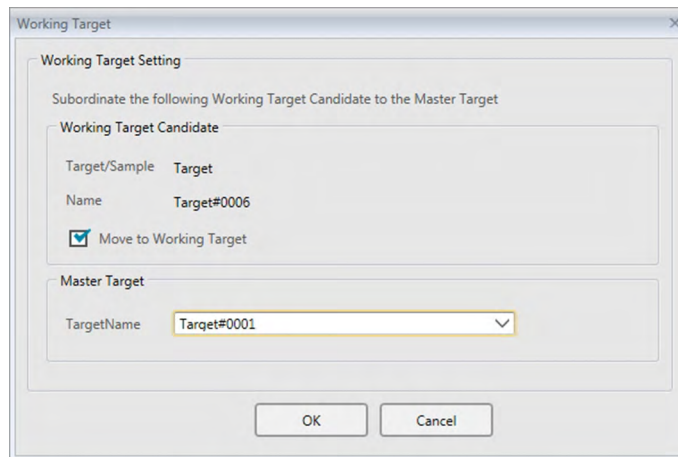
1. Select the sample or target to be used as a working target in the Data List.
 - Select only a single sample or target. This operation cannot be performed if multiple data are selected.
2. Select *Tool* from the **Data** menu and then select *Working Target...* from the pop-out menu that appears, or right-click on the sample, select *Tool* from the context menu that appears, and then select *Working Target...* from the pop-out menu that appears.

The Working Target dialog box will appear.



3. Specify the necessary items and click [OK].

■ Working Target dialog box



Working Target candidate

The name of the data selected in step 1 is displayed.

Move to Working Target

When this option is checked, the data is specified as new working target data and is deleted from the original folder selected in step 1.

When this option is not checked, the data is copied and specified as new working target data while it remains in the original folder.

Master Target

Select the master target to which the selected working target will belong.

2.5.2-d Target Selection Mode

Target selection mode allows the target to be specified manually or to be selected automatically from among the targets in the current document according to user-specified parameters.

1. Select *Target Selection Mode* in the **Data** menu. The Target Selection Mode dialog box will appear.
2. Select the desired Mode:

- | | |
|--------------------|--|
| Normal | The target specified at the time of sample measurement is used. |
| Auto Target | The target is selected from among the targets in the current document based on the parameters set in the Details section.
If no target meeting the parameters can be found, the sample will be set as absolute data and will not be linked to any target. |

When Auto Target is selected, the Details section will be active.

- | | |
|------------------------------------|---|
| Group Traits | Click on the current setting and select the group trait to be used for automatic target selection from the drop-down list which appears. Only targets including data for this group trait will be considered during automatic target selection. Group traits available depend on the instrument and instrument settings |
| Color Difference Equation | Click on the current setting and select the color difference equation to be used for automatic target selection from the drop-down list which appears. Any of the color difference equations shown can be used, even if they are not included in the Data List. |
| Selection Range (Max Value) | Set the maximum value to be used for automatic target selection. If no applicable target within this color difference value from the measured sample can be found in the current document, the sample will be set as absolute data and will not be linked to any target. |

3. Click [OK] to confirm the settings and close the dialog.
 - The target selection mode settings will be stored together with the document, so if the document is closed and then opened again later, the same settings will be applied.

When Auto Target is set, sample measurements will be automatically linked to the target with the smallest value for the selected Color Difference Equation, regardless of the target currently selected in Data List or Target List. If no target within the Selection Range value can be found, the sample will be set as absolute data and will not be linked to any target.

2.5.3 Setting the Tolerance

To perform judgement based on color difference measurement, it is necessary to set the tolerance.

2.5.3-a Setting the Default Tolerance

The default tolerance is the value which is automatically set when a target is registered by measurement or other operations. To always perform judgement with the same tolerance, you can specify the tolerance in advance to save performing the tolerance setting operation every time targets are changed.

1. Select *Default Tolerance Setting ...* from the **Data** menu. The Data Settings dialog box will appear, with Default Tolerance Settings as the selected category.

The screenshot shows the 'Data Settings' dialog box with the 'Default Tolerance Settings' category selected. The 'Instrument' is set to 'CM-2600d'. The 'Tolerance Data' table is displayed with columns for Group, Upper Limit, Lower Limit, and various color difference metrics (SCI, SCE, UV100, UV0, UVAdj, White). The 'Warning Level' is set to 80.

Group	Upper Limit	Lower Limit	SCI	SCE	UV100	UV0	UVAdj	White
$\Delta L^*(10^\circ/D65)$	<input type="checkbox"/>	<input type="checkbox"/>	0.80	0.80	0.80	0.80	0.80	0.80
	<input type="checkbox"/>	<input type="checkbox"/>	-0.80	-0.80	-0.80	-0.80	-0.80	-0.80
$\Delta a^*(10^\circ/D65)$	<input type="checkbox"/>	<input type="checkbox"/>	0.80	0.80	0.80	0.80	0.80	0.80
	<input type="checkbox"/>	<input type="checkbox"/>	-0.80	-0.80	-0.80	-0.80	-0.80	-0.80
$\Delta b^*(10^\circ/D65)$	<input type="checkbox"/>	<input type="checkbox"/>	0.80	0.80	0.80	0.80	0.80	0.80
	<input type="checkbox"/>	<input type="checkbox"/>	-0.80	-0.80	-0.80	-0.80	-0.80	-0.80
$\Delta E^*_{ab}(10^\circ/D65)$	<input type="checkbox"/>	<input type="checkbox"/>	1.00	1.00	1.00	1.00	1.00	1.00
Auto Adjust(10°/D65)	<input type="checkbox"/>	<input type="checkbox"/>	1.00	1.00	1.00	1.00	1.00	1.00
ΔE_{00} (CIE2000)(10°/D65)	<input type="checkbox"/>	<input type="checkbox"/>	1.00	1.00	1.00	1.00	1.00	1.00
$\Delta L^*(10^\circ/F11)$	<input type="checkbox"/>	<input type="checkbox"/>	0.80	0.80	0.80	0.80	0.80	0.80
	<input type="checkbox"/>	<input type="checkbox"/>	-0.80	-0.80	-0.80	-0.80	-0.80	-0.80

Warning Level: 80

Buttons: OK, Cancel, Apply

2. Specify the values and parameters for the default tolerances for each list item.

3. When all default tolerances have been set, click [OK].

The specified default tolerances will be applied to newly added target data.

■ Data Settings dialog: Default Tolerance Settings category

Data Settings

Category
List Items
Tolerance Setting
Default Tolerance Settings

Tolerance Data
Instrument
CM-2600d

		Tolerance									
Group		SCI	SCE	UV100	UV0	UVAdj	White				
$\Delta L^*(10^\circ/D65)$	Upper Limit	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80
	Lower Limit	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80
$\Delta a^*(10^\circ/D65)$	Upper Limit	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80
	Lower Limit	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80
$\Delta b^*(10^\circ/D65)$	Upper Limit	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80
	Lower Limit	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80
$\Delta E^*_{ab}(10^\circ/D65)$	Upper Limit	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00
Auto Adjust(10°/D65)	Upper Limit	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00
ΔE_{00} (CIE2000)(10°/D65)	Upper Limit	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00	<input type="checkbox"/>	1.00
$\Delta L^*(10^\circ/F11)$	Upper Limit	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80	<input type="checkbox"/>	0.80
	Lower Limit	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80	<input type="checkbox"/>	-0.80

Warning Level
80

OK Cancel Apply

Instrument

Click on the Instrument box and select the instrument for which default tolerance will be set from the drop-down list which appears.

Tolerance

The top row of the tolerance table shows all possible group traits for the selected instrument. The default tolerances set for a group trait in this table will be applied when a target measurement is taken with the selected instrument model set to a setting which includes the selected group trait.

The left column of the table shows the List Items shown in the Data List for which tolerances can be set.

For color difference equations which require parametric coefficients (such as ΔE_{00} (CIE2000)), the parametric coefficients can be set in the lower part of the table by scrolling down. The parametric coefficients set here are used for calculating the color difference equation value shown in the Data List, in graphs, etc. when the default tolerance values are used.

The upper limit and lower limit can be specified separately for each of the list items, together with whether or not the limit will be used for judgement. For color difference equations, only the upper limit can be set and used for judgement.

The checkboxes to the left of each value determine whether or not that value will be used for judgement. When the check box is checked, the measured value of the list item will be judged against the tolerance values. List items for which the check box is left unchecked will not be judged.

The numerical values can be set directly by clicking on the value, or by using the up/down arrows to the right of the value.

- Numerical values can be edited regardless of the status of the checkbox.

Warning Level

Set the Warning Level (the percentage of the tolerance value at which the judgement will become Warning instead of Pass).

Range: 1 to 100

2.5.3-b Setting the Tolerance for Each Target

The tolerance specified by the default tolerance setting during target registration can be changed for each target.

1. Select *Tolerance Setting ...* from the **Data** menu. The Data Settings dialog box will appear, with Tolerance Setting as the selected category and the most recently used target selected in the Target drop-down list.

2. Specify the values and parameters for the tolerances for each list item.

For **Auto Fitting**, click on the radio button next to the group trait to auto fit to in the top row of the Tolerance table to select it, select the Item (Equation) and Method to use for auto fitting, and click [Update]. The equation ellipse which will enclose all samples linked to the target will be calculated and set.

Item (Equation)		Select the color difference equation data list item to use for auto fitting.
Method	Fit the tolerance value	Calculates equation ellipse. If the selected Item (Equation) uses parametric coefficients, equation ellipse will be calculated using the parametric coefficients set in the Parametric Coefficient section of Tolerance Data.
	Fit the equation parameter	(Active only if selected Item (Equation) uses parametric coefficients) Calculates and sets the equation parameters for the smallest equation ellipse that will fit all samples.

For **Auto adjust from sample data distribution**, click on the radio button next to the group trait to auto adjust to in the top row of the Tolerance table to select it and click [Update]. The size, angle, and offset position of the smallest possible ellipse that will enclose all sample data will be calculated.

- **Auto adjust from sample data distribution** will be active only if Auto Adjust is included in the List Items shown in the Data List.
- [Update] will be active only if there are at least 10 samples linked to the selected target.

- If All tab is selected, ellipse will be calculated based on primary illuminant/observer combination.
- Depending on the sample distribution relative to the target, the ellipse might not include the target in some cases.

3. When all tolerances have been set, click [OK].

■ Data Settings dialog: Tolerance Setting category

Data Settings

Category: **Tolerance Setting**

Target: Target#0004 | Warning Level: 80

Tolerance Data

Tab: All | Primary | Secondary | Tertiary

Group	Upper Limit	Lower Limit	SCI	SCE
$\Delta L^*(10^\circ/D65)$	0.80	-0.80	0.80	-0.80
$\Delta a^*(10^\circ/D65)$	0.80	-0.80	0.80	-0.80
$\Delta b^*(10^\circ/D65)$	0.80	-0.80	0.80	-0.80
$\Delta E^*ab(10^\circ/D65)$	1.00		1.00	
Auto Adjust(10°/D65)	1.00		1.00	
$\Delta E00 (CIE2000)X10^\circ$			1.00	1.00

Auto Fitting: Item (Equation): $\Delta E00 (CIE2000)X10^\circ$ / Method: ☒ Fit the tolerance value / ☐ Fit the equation parameter / Update

Auto adjust from sample data distribution: Item: Auto Adjust(10°/D65) / Update

Buttons: OK, Cancel, Apply

Target

Click on the current target and select the target for which tolerances will be set.

Warning Level

Set the Warning Level (the percentage of the tolerance value at which the judgement will become Warning instead of Pass).

Range: 1 to 100

Tolerance Data

All tab

Shows all list items for which tolerance can be set for all illuminant/observer conditions.

Primary, Secondary, Tertiary tabs

Shows the list items for which tolerance can be set for the selected illuminant/observer condition (Primary, Secondary, Tertiary)

- Only tabs for which target data for that illuminant/observer condition exists and for which list items are included in the Data List will be shown.

Tolerance

The top row shows the group traits which are set for the target and for which tolerance values can be set. The group trait selected in this row is the group trait for which Auto Fitting or Auto adjust from sample data distribution will be performed.

The List Items shown in the Data List for which tolerances can be set are shown in this table, together with the currently set tolerance values.

When an item is selected, the tolerance values for that item will be shown under Tolerance. For color difference equations which requires parametric coefficients (such as $\Delta E00$ (CIE2000)), the parametric coefficients can be set in the lower part of the table by scrolling down. The parametric coefficients set here are used for calculating the color difference equation value shown in the Data List, in graphs, etc. for the selected target. When any of the parameters are

changed, all the displayed data will be calculated again.

The upper limit and lower limit can be specified separately for each of the list items, together with whether or not the limit will be used for judgement. For color difference equations, only the upper limit can be set and used for judgement.

The checkboxes to the left of each value determine whether or not that value will be used for judgement. When the check box is checked, the measured value of the list item will be judged against the tolerance values. List items for which the check box is left unchecked will not be judged.

The numerical values can be set directly by clicking on the value, or by using the up/down arrows to the right of the value.

- Numerical values can be edited regardless of the status of the checkbox.

Auto Fitting

<i>Item (Equation)</i>		Select the color difference equation data list item to use for auto fitting.
<i>Method</i>	<i>Fit the tolerance value</i>	Calculates equation ellipse. If the selected <i>Item (Equation)</i> uses parametric coefficients, equation ellipse will be calculated using the parametric coefficients set in the Parametric Coefficient section of Tolerance Data.
	<i>Fit the equation parameter</i>	(Active only if selected <i>Item (Equation)</i> uses parametric coefficients) Calculates and sets the equation parameters for the smallest equation ellipse that will fit all samples.
[Update]		Updates the tolerance values or parametric coefficients according to the <i>Item (Equation)</i> and <i>Method settings</i> .

Auto adjust from sample data distribution

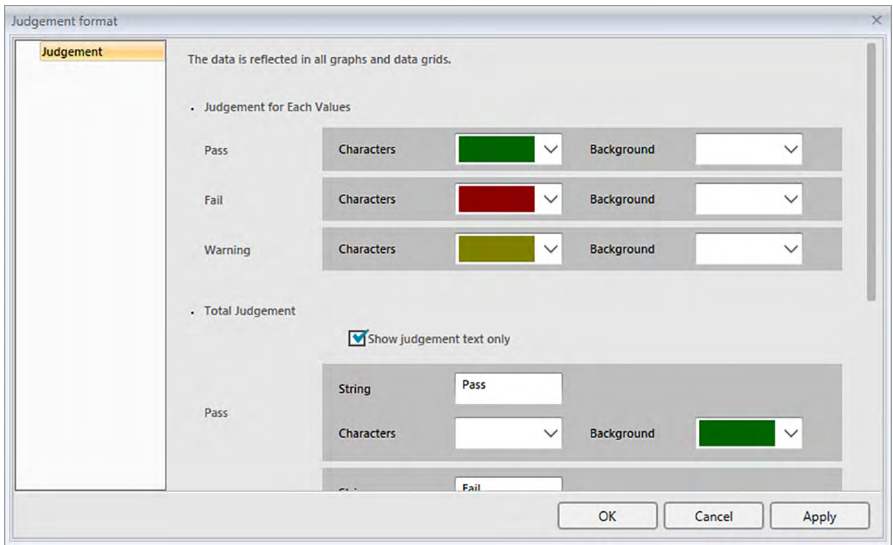
(Active only if there are at least 10 samples.)

[Update] Calculates the size, angle, and position of the smallest possible ellipse that will enclose all sample data.

- If All tab is selected, ellipse will be calculated based on primary illuminant/observer combination.

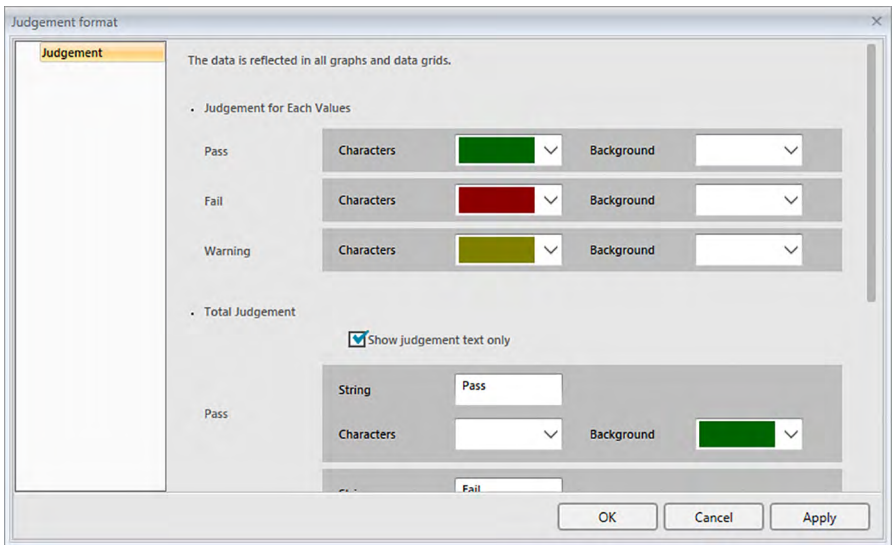
2.5.3-c Specifying the Judgement Display Format

1. Select *Judgement Format ...* from the **Data** menu. The Judgement format dialog box will appear.



2. Specify the parameters of the judgement format and click [OK].

■ Judgement format dialog box



Judgement for Each Value

The following settings are applied to the individual list items to be judged.

- Pass
- Characters Specify the color of the numerical value in the Data List when the value is judged as passed.
 - Background Specify the background color of the numerical value in the Data List when the value is judged as passed.

Fail

- | | |
|------------|--|
| Characters | Specifies the color of the numerical value in the Data List when the value is judged as failed. |
| Background | Specifies the background color of the numerical value in the Data List when the value is judged as failed. |




Warning

- | | |
|------------|--|
| Characters | Specify the color of the numerical value in the Data List when caution is required. |
| Background | Specify the background color of the numerical value in the Data List when caution is required. |

Total Judgement

The following settings are applied to the judgement results following judgement of all the target items in the Data List for which tolerances have been set and enabled.

Show judgement text only:

When checked, only the specified text (label) for the judgement results will be shown, without the  (Pass),  (Warning), and  (Fail) icons.

Pass

- | | |
|------------|--|
| String | Specifies the wording to be displayed when the result is judged as passed. |
| Characters | Specifies the color of the string displayed in the Data List when the result is judged as passed. |
| Background | Specifies the background color of the string displayed in the Data List when the result is judged as passed. |

Fail

- | | |
|------------|--|
| String | Specifies the wording to be displayed when the result is judged as failed. |
| Characters | Specifies the color of the string displayed in the Data List when the result is judged as failed. |
| Background | Specifies the background color of the string displayed in the Data List when the result is judged as failed. |

Warning

- | | |
|------------|---|
| String | Specify the text to be displayed as a caution message. |
| Characters | Specify the color of the text in the Data List when warning is required. |
| Background | Specify the background color of the text in the Data List when caution is required. |

Visual Judgement

Data is judged based on the visual judgement information appended to the data.

Include Visual Judgement results into the Total Judgement.

When this option is checked, the visual judgement affects the total judgement result.

Priority on Visual Judgement

When this option is checked, the total judgement depends on the visual judgement:

- When the data passes the visual judgement, it passes the total judgement.
- When the data fails the visual judgement, it will fail the total judgement even if it passes all of the other judgements.

2.6 Sample Measurement

The various methods for performing sample measurement are shown below.

■ Sample measurement (p. 103)

Perform a measurement by triggering SpectraMagic DX software to take a measurement and obtain the sample data.

■ Remote sample measurement (p. 104)

Enable *Remote Measurement: Sample* and perform measurement by pressing the measuring button of the instrument. SpectraMagic DX will register the measurement data as sample data.

■ Interval sample measurement ⓘ (p. 105)

Enable interval measurement and start sample measurement by triggering SpectraMagic DX once to take measurements using the interval time and number of measurements specified in advance. The measured data are registered as sample data after every measurement.

ⓘ This function is supported by SpectraMagic DX Professional Edition only.

■ Automatic averaging sample measurement (p. 107)

Enable averaging measurement and start sample measurement by triggering SpectraMagic DX once to begin measurements. After the specified number of measurements has been taken, the collected sample data are averaged and the averaged is registered as sample data.

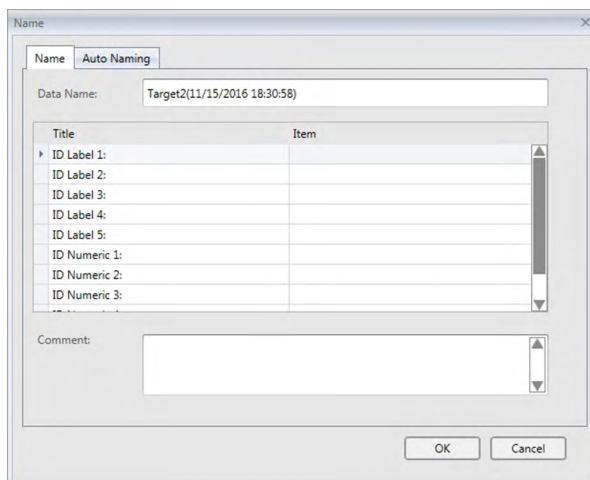
■ Manual averaging sample measurement (p. 108)

Select *Manual Average Measurement: Sample*. Take repeated measurements for the desired number of times and exit the mode. The sample data collected during the period are averaged and the average is registered as sample data.

- The above methods can also be combined to obtain sample data.
- Note that you cannot use sample interval measurement in connection with sample manual averaging measurement.
- When Auto Target is enabled, sample measurements will be automatically linked to the target with the smallest value for the selected Color Difference Equation, regardless of the target currently selected in Data List or Target List. If no target within the Selection Range value can be found, the sample will be set as absolute data and will not be linked to any target.

2.6.1 Performing Sample Measurement

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).
1. Click [**Sample Measurement**] in the Data Panel menu toolbar or select *Sample Measurement* from the **Instrument** menu. The Name dialog box will appear.



If auto-naming is activated, the Name dialog box does not appear. Skip step 2 and go to step 3.

2. Enter the name of the data and click [OK].
 - You can assign a name, supplementary data information ⓘ and a comment for each piece of sample data. (See p. 74.) Supplementary data information items can be selected every time you measure.
 - Items marked with ⓘ are supported only by SpectraMagic DX Professional Edition.
3. The measurement will be taken and the measurement will be added to the document as a sample.
 - When Auto Target is enabled, sample measurements will be automatically linked to the target with the smallest value for the selected Color Difference Equation, regardless of the target currently selected in Data List or Target List. If no target within the Selection Range value can be found, the sample will be set as absolute data and will not be linked to any target.

2.6.2 Performing Remote Sample Measurement

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).
1. Select *Remote Measurement* in the **Instrument** menu and then select *Sample* from the pop-out menu that appears. Remote sample measurement will be enabled, the measurement icon next to *Sample* in the *Remote Measurement* pop-out menu will become highlighted, and Remote Measurement in the Instrument Window's Instrument Information tab will change to "Sample".

Setting this mode enables remote measurement of sample data. When this mode is set, the measurement can be triggered either with the measuring button of the instrument or with the Measure command or Document Window toolbar buttons of SpectraMagic DX.

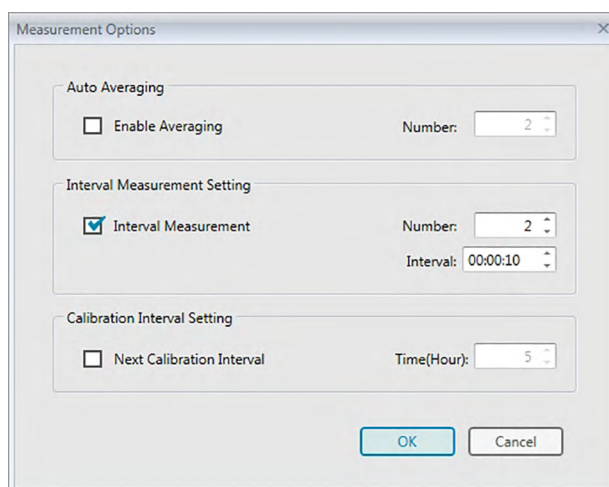
- When a CM-2600d, CM-2500d, CM-2500c, or CM-2300d is connected:
If the instrument's Communication Mode is canceled and then set again using instrument controls, remote measurement mode will be canceled on the instrument. When this occurs, uncheck Remote Measurement: Sample and then check it again to re-enable Remote Measurement: Sample.
 - Remote Measurement: Target and Remote Measurement: Sample cannot be selected simultaneously. If you select Remote Measurement: Sample while Remote Measurement: Target is enabled, Remote Measurement: Target will be disabled and Remote Measurement: Sample will be enabled.
2. Position the instrument on the sample to measure and press the instrument's measuring button. The measurement will be taken and the measurement data will be added to the document as a sample.
 - When Auto Target is enabled, sample measurements will be automatically linked to the target with the smallest value for the selected Color Difference Equation, regardless of the target currently selected in Data List or Target List. If no target within the Selection Range value can be found, the sample will be set as absolute data and will not be linked to any target.

■ Canceling Remote Sample Measurement mode

To cancel remote sample measurement mode, select *Remote Measurement* in the **Instrument** menu and select *Sample* again from the pop-out menu that appears. The measurement icon next to *Sample* will become normal (not highlighted) and Remote Measurement in the Instrument Information tab will change to "OFF".

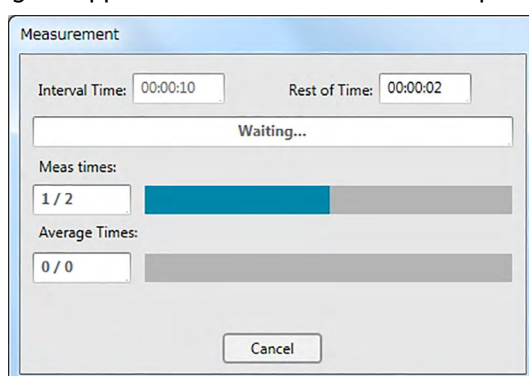
2.6.3 Performing Interval Sample Measurement ㊦

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).
 - This function is supported by SpectraMagic DX Professional Edition only.
1. Select *Measurement Options ...* from the **Instrument** menu. The Measurement Options dialog box will appear.



2. Check Interval Measurement and specify the options for the interval measurement.
 - For information on settings in the Measurement Options dialog, see p. 66.
3. Click the [OK] button to confirm the settings and close the Measurement Options dialog box.
4. Perform sample measurement as described on p. 103.

The Measurement dialog box appears and interval measurement is performed.



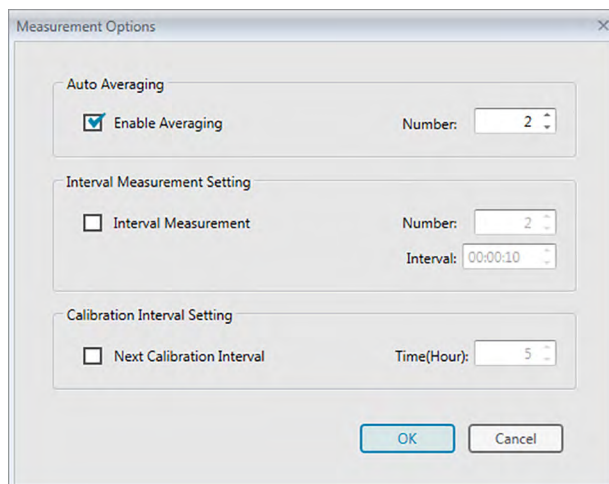
During interval measurement, the measurement data are added to the document as samples after every measurement.

- When interval measurement is performed, the measurement name will be formatted as follows:
(Specified measurement name)_(Interval measurement number)
Specified measurement name: The name specified in the Name dialog (if auto naming is disabled) or in the Auto Naming dialog (if auto naming is enabled)
Interval measurement number: The number of the measurement in this measurement sequence, starting with 0001.

- When Auto Target is enabled, sample measurements will be automatically linked to the target with the smallest value for the selected Color Difference Equation, regardless of the target currently selected in Data List or Target List. If no target within the Selection Range value can be found, the sample will be set as absolute data and will not be linked to any target.

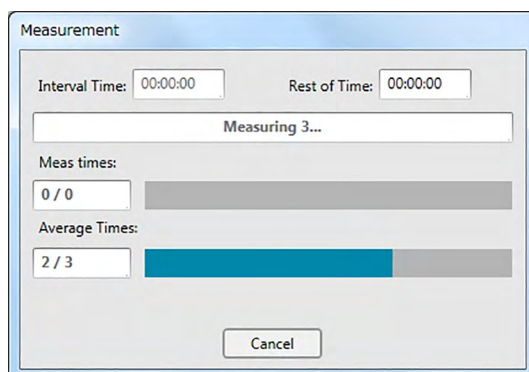
2.6.4 Performing Automatic Averaging Sample Measurement

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).
1. Select *Measurement Options ...* from the **Instrument** menu. The Measurement Options dialog box will appear.



2. Check Enable Averaging to enable automatic averaging measurement of sample data.
 - For information on settings in the Measurement Options dialog, see p. 66.
3. Click the [OK] button to confirm the settings and close the Measurement Options dialog box.
4. Perform sample measurement as described on p. 103.

The Measurement dialog box appears and automatic averaging measurement is performed.



During automatic averaging measurement of sample data, measurements are repeated the specified number of times. When all specified measurements have been completed, the collected measurement data are averaged and added to the document as one sample.

- When Auto Target is enabled, sample measurements will be automatically linked to the target with the smallest value for the selected Color Difference Equation, regardless of the target currently selected in Data List or Target List. If no target within the Selection Range value can be found, the sample will be set as absolute data and will not be linked to any target.

2.6.5 Performing Manual Averaged Sample Measurement

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).
1. Select *Manual Average Measurement* in the **Instrument** menu and then select *Sample ...* from the pop-out menu that appears. The Sample Averaged Measurement dialog box appears.

Item	Group Traits	L*	a*	b*
Mean	<input checked="" type="checkbox"/>	-----	-----	-----
Std.Dev.		-----	-----	-----

2. Repeatedly position the instrument on the sample to measure and click the [Measure] button in the Sample Averaged Measurement dialog box to perform the desired number of measurements.

Item	Group Traits	L*	a*	b*
Mean	<input checked="" type="checkbox"/>	83.57	-6.84	90.56
Std.Dev.		0.1689	0.0841	0.5994
1	<input checked="" type="checkbox"/>	83.42	-6.73	90.22
2	<input checked="" type="checkbox"/>	83.36	-6.79	89.73
3	<input checked="" type="checkbox"/>	83.77	-6.87	91.08
4	<input checked="" type="checkbox"/>	83.65	-6.93	90.66
5	<input checked="" type="checkbox"/>	83.63	-6.90	91.16

The measurement data are displayed in the dialog box after each measurement, and the average and standard deviation for the measurements taken so far are calculated and displayed.

- The data with check marks will be used for the calculation of the average.
- Uncheck any data that you do not want to include in the average calculation, such as abnormal values.

3. Click the [OK] button. The average is added to the document as one sample.

- When Auto Target is enabled, sample measurements will be automatically linked to the target with the smallest value for the selected Color Difference Equation, regardless of the target currently selected in Data List or Target List. If no target within the Selection Range value can be found, the sample will be set as absolute data and will not be linked to any target.

■ Sample Averaged Measurement dialog box

Item	Group Traits	L*	a*	b*
Mean	<input checked="" type="checkbox"/>	83.57	-6.84	90.56
Std.Dev.		0.1689	0.0841	0.5994
1	<input checked="" type="checkbox"/>	83.42	-6.73	90.22
2	<input checked="" type="checkbox"/>	83.36	-6.79	89.73
3	<input checked="" type="checkbox"/>	83.77	-6.87	91.08
4	<input checked="" type="checkbox"/>	83.65	-6.93	90.66
5	<input checked="" type="checkbox"/>	83.63	-6.90	91.16

Color space drop-down List box

Select from L*a*b*, XYZ, L*c*h, Hunter Lab, Yxy, L*u*v* or L*u'v' as the color space to be displayed in the dialog box list.

Retrieve checked data besides averaged result

When this option is checked, the data with a check mark is added to the Data List and to the graphic object in the canvas pane as an individual piece of sample data.

[Select All]

Selects (puts a check mark next to) all of the measurements.

[Unselect All]

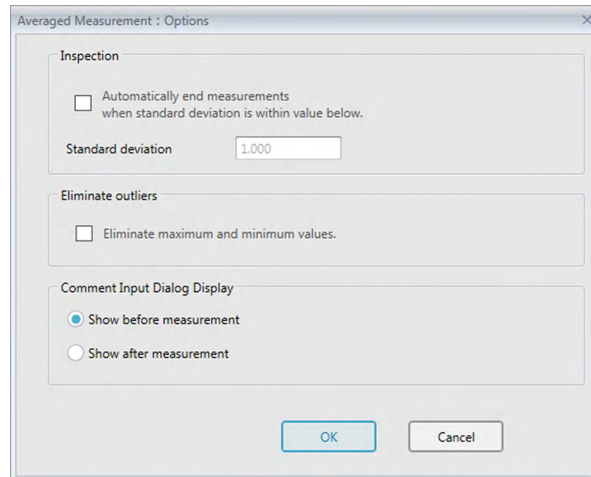
Unselects (removes the check mark next to) all of the measurements.

[Measure]

Takes a measurement.

■ Averaged Measurement : Options dialog box

The Averaged Measurement: Options dialog box can be opened by selecting *Manual Average Measurement* in the **Instrument** menu and then selecting *Options ...* from the pop-out menu that appears.



Inspection

Automatically end measurements when standard deviation is within value below.

When this option is checked, the measurement is terminated automatically when the standard deviation becomes lower than the threshold value.

The input range is between 0.001 and 1.

- When Eliminate outliers has been specified, the standard deviation is determined after the Eliminate outliers operation.

Eliminate outliers

Eliminate maximum and minimum values.

When this option is checked, the maximum and minimum values are monitored during the manual averaging measurement, and the averaging sample data is determined after the maximum and minimum values are deleted from the result of the averaging measurement.

- When this option is specified, manual averaging measurement will be ended only after measurement has been repeated at least three times. The data of the maximum and minimum values cannot be checked.

Comment Input Dialog Display

Specify whether to display the comment input screen before or after the measurement.

2.6.6 Reading Sample Data from the Instrument

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).

The sample data stored in the memory of the instrument can be read into SpectraMagic DX by following the procedure below.

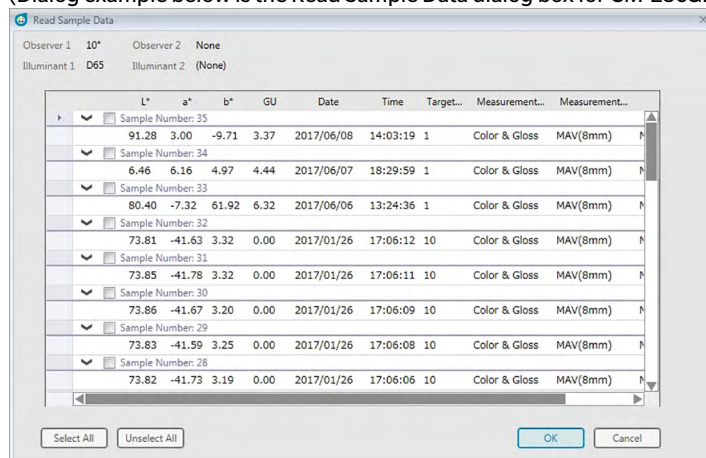
- Data can also be read using the Sensor Sync tab. See p. 157.
- If any target data are linked to the sample data to be read, that target data will also be read.
- To refer to the measurement numbers set by the instrument at the time of measurement, be sure that "Data number" from the Instrument group is included as one of the Selected Items in the List Items dialog box. (See p. 58.)

1. Select *Read/Write* in the **Instrument** menu and then select *Read Samples* from the pop-out menu that appears.

A Reading Data dialog box will appear showing the progress as information on the sample data stored in the instrument are read.

When information on all stored sample data have been read, the Read Sample Data dialog box will appear.

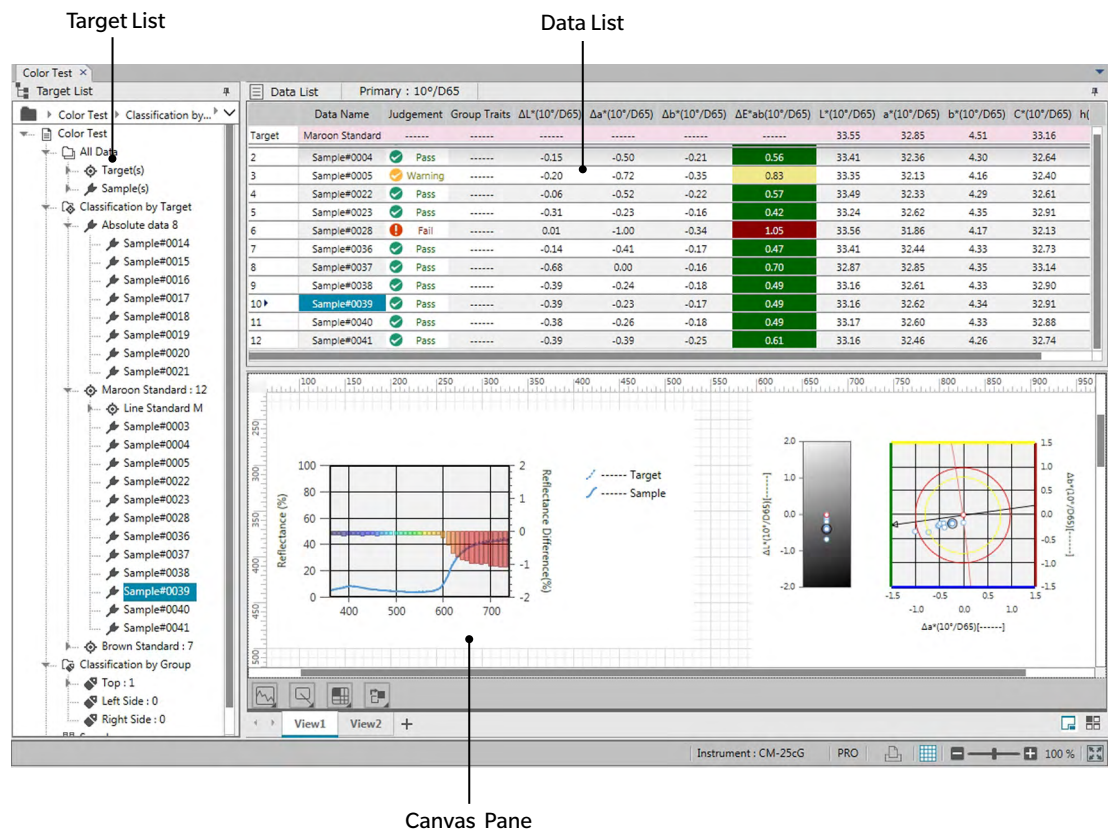
(Dialog example below is the Read Sample Data dialog box for CM-25cG.)



2. Select the sample(s) that you want to read from the instrument into SpectraMagic DX by clicking on the checkbox next to the sample name to make it checked.
 - To select all samples, click [Select All].
 - To unselect all samples, click [Unselect All].
3. When all samples to be read into SpectraMagic DX have been selected, click [OK]. The selected samples will be read into the current document as samples.
 - If any of the samples being read are linked to a target, that target will also be read into the current document and the link between target and sample will be maintained.

2.7 Document Window Operation

The Document Window shows the measurement data in the document. It is divided into the Target List, the Data List, and the Canvas Pane.



2.7.1 Screen Settings Dialog Box

The Screen Settings dialog box can be opened by selecting *Screen Settings(S)...* in the **Edit** menu or by right-clicking in the Canvas Pane and selecting *Screen Settings(S)...*

The Screen Settings dialog box has two categories. The settings available for each category are described below. To select a category, click on the category in the Category list.

■ List Screen Settings

Default Grid Size

Sets the size of the grid and data in the Data Grid.

Settings available: 80%, 90%, 100%, 110%, 120%

Auto adjust column width

When checked, the column width will be automatically adjusted according to the longest content in that column.

When not checked, the column width will be a fixed value regardless of the content.

Categorized List

(effective only when data under Classification by Target or Classification by Group are selected in the Tree List)

Show Linked Target

Selects whether or not the linked target will be shown in the data grid.

Pull-down color selector

Selects the cell fill color for the linked target.

Freeze target display

When checked, keeps the linked target row shown at the top of the visible area of the data grid. When not checked, the target data will scroll out of the top of the data grid when scrolling down though data in large documents.

■ Canvas Screen Settings

Color Setting

Background

Sets the background color for the canvas screen. Selected color is applicable to all canvases.

Grid

Show Grid

When checked, a grid will be shown on the canvas when editing is enabled.

Color

Selects the grid line color for the canvas screen.

Interval

Sets the interval between grid lines.

Range: 1 to 10.

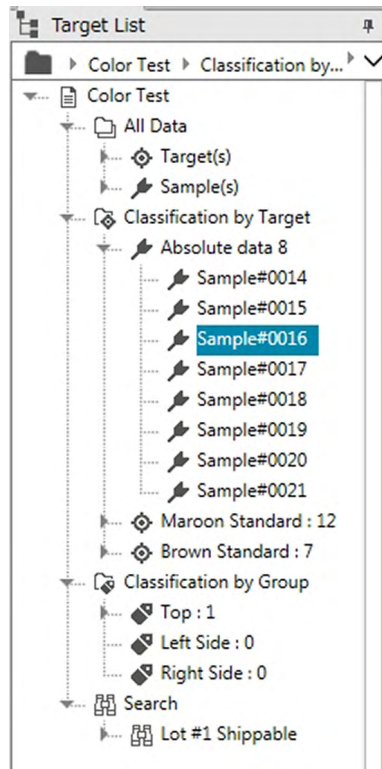
Allow Edit Mode

When checked, editing of the canvas screen can be enabled/disabled by clicking the grid button in the Canvas Pane toolbar. When not checked, the Canvas Pane will be locked and editing cannot be performed even if the grid button is clicked.

- [OK] Applies the settings and closes the dialog.
- [Cancel] Closes the dialog without applying the settings.
- [Apply] Applies the settings without closing the dialog.

2.7.2 Target List

The Target List includes the following items:



All Data

All data contained in the document are classified according to whether each data is a target or sample.

- Target(s)* All target data contained in the document
- Sample(s)* All sample data contained in the document

Classification by Target

All sample data are classified into data groups according to which target they are linked to.

If the sample data is not linked to any target, it will be put in the Absolute data group.

- Absolute data* (Created automatically when the document was created.)
All sample data not linked to any target.
The number after *Absolute data* is the number of sample data not linked to any target.
- (Target xxx)* (Created at the time Target xxx was registered.)
All sample data linked to this target.
The number after target name is the number of sample data linked to that target.
- (Working target zzz)* (Created when a working target is set subordinate to the target)
Sample data linked to the working target will be the same as the sample data linked to the master target under which the working target is placed.
- (Target yyy)* (Created at the time Target yyy was registered.)
All sample data linked to this target.

etc.

Classification by Group

If named groups have been created (see p. 134), the group names will be listed in the *Classification by Group* section.

(Group name 1) (Created automatically when a group is created.)

Selecting a group will not cause any change in the Data List display.

If the group contains targets, the number after the group name indicates the number of targets within the group, and the target will be shown as a branch under the group name.

(Target xxx) (Created at the time Target xxx was added to the group.)

All sample data linked to this target.

The number after target name is the number of sample data linked to that target.

Search

If search has been performed (see p. 125), the name of the search will be listed in the *Search* section.

(Search name 1) (Created automatically when a search is performed.)

1) Selecting a search will cause the measurements found by that search to be shown in the Data List display.

The data group selected in the Target List determines which measurements will be shown in the Data List and Canvas Pane.

2.7.2.1 Target List Navigation

The various sections (*All Data*, *Classification by Target*, *Classification by Group*, *Search*) and subsections (*Target(s)*, *Sample(s)*, *Absolute data*, (*Target name*), etc.) in the Target List can be collapsed and expanded for easy navigation.

►: Expands a collapsed section/subsection.

▼: Collapses an expanded section/subsection.

Selecting *Target(s)* or *Sample(s)* in *All Data* will show the corresponding measurements to be shown in the Data List window.

Selecting *Absolute data* or any of the target names in *Classification by Target* will show the measurements in that data group to be shown in the Data List window.

Selecting a named group in *Classification by Group* will not cause any change in the Data List window, but selecting any of the target names within a named group will cause the measurements linked to that target to be shown in the Data List window.

Selecting a sample or target in the rightmost branch within a subsection will cause the data group containing that sample or target to be opened and the sample or target selected in the Target List will also be selected in the Data List window.

2.7.2.2 Target List Right-Click Menu

Right-clicking on *Target(s)* or *Sample(s)* in *All Data* will cause a context menu with the following operation to appear.

Search... See p. 125.

Right-clicking on *Classification by Target* will cause a context menu with the following operation to appear.

Target Selection Mode... See p. 92.

Right-clicking on a target or working target in *Classification by Target* or in a named group under *Classification by Group* will cause a context menu with the following operations to appear. Each operation will be performed on the right-clicked target or working target.

Tolerance Setting... See p. 96.

Write Target... See p. 160.

Data Property... See p. 137.

Search... See p. 125.

Right-clicking on *Classification by Group* will cause a context menu with the following operation to appear.

Group Settings... See p. 134.

Right-clicking on *Search* will cause a context menu with the following operation to appear.

Search... See p. 125.

2.7.3 Data List

The Data List lists the data included in the data group selected in the Target List. Each item is displayed according to the list items specified on p. 56.

- The items x , y , u' , v' , Δx , Δy , $\Delta u'$ and $\Delta v'$ are expressed to four decimal places. Other colorimetric data is expressed to two decimal places. The number of decimal places can be changed. See p. 65 for details.
- SpectraMagic DX software enhances calculation accuracy by performing internal calculations with numbers more precise than those actually displayed. Consequently, the least significant digit displayed may differ from that of the instrument display by one digit due to rounding or color space conversion.
- For instruments which provide data with multiple group traits (such as the data with 6 or 12 group traits from the CM-M6), a single measurement will be displayed using the required number of rows of data (one for each group trait).

The content of the Data List and the function of the graphic objects in the Canvas Pane vary depending on the data group selected in the Target List as follows:

■ All Data - Target(s)

All target data in the document file are listed.

Functions of graphic objects

Absolute value graph	The most recently selected single target is displayed.
Color difference graph	The most recently selected single target is displayed.
Spectral graph	The most recently selected single target is displayed (without difference indication).
Trend graph	All target data in the list are displayed.
2-axis graph	The most recently selected single target is displayed.
Numerical object with target display attribute	The numerical value of the most recently selected single target is displayed.
Numerical object with sample display attribute	Not displayed.

■ All Data - Sample(s)

All sample data in the document file are listed.

Functions of graphic objects

Absolute value graph	The distribution of all data in the list is displayed.
Color difference graph	Not displayed.
Spectral graph	The selected data are displayed (without difference indication).
Trend graph	All data in the list are displayed.
2-axis graph	All data in the list are displayed.
Numerical object with target display attribute	Not displayed.
Numerical object with sample display attribute	The numerical value of the selected data (the first data in the list when two or more data are selected) is displayed.

■ **Classification by Target - Absolute data**

Of all sample data in the document file, only the sample data not linked to any target data (i.e. absolute value sample data) are listed.

Functions of graphic objects

Absolute value graph	The distribution of all data in the list is displayed.
Color difference graph	Not displayed.
Spectral graph	The selected data is displayed (without difference indication).
Trend graph	All data in the list are displayed.
2-axis graph	All data in the list are displayed.
Numerical object with target display attribute	Not displayed.
Numerical object with sample display attribute	The numerical value of the selected data (the first piece of data in the list when two or more pieces of data are selected) is displayed.

■ **Classification by Target - Target ** or Classification by Group - Target ****

Of all sample data in the document file, only the sample data linked to the selected target data are listed.

Functions of graphic objects

Absolute value graph	The distribution of all data in the list is displayed.
Color difference graph	The distribution of all data in the list is displayed. (In $\Delta L^*a^*b^*$ graph, contrast hue locus and contrast chroma locus are displayed.)
Spectral graph	The target data and selected data are displayed (with difference indication). <ul style="list-style-type: none"> If multiple data are selected, difference indication will not be shown.
Trend chart	All data in the list are displayed (with reference line display).
2-axis graph	All data in the list are displayed.
Numerical object with target display attribute	The target data is displayed.
Numerical object with sample display attribute	The numerical value of the selected data (the first data in the list when two or more data are selected) is displayed.

2.7.3.1 Data List Right-Click Menu

Right-clicking in the Data List will cause the context menu with the following operations to appear. The operations available will depend on whether a target or sample is selected, and the number of data selected.

<i>Export All</i>	Opens a pop-out menu to export all targets and samples in the Data List to various file formats.
<i>Export as CSV</i>	(File extension: csv) Data are exported as a text file delimited by the list separator character specified in Windows Regional Settings.
<i>Export as Excel</i>	(File extension: xlsx) Data are exported as an Excel file.
<i>Export as Text</i>	(File extension: txt) Data are exported as a tab-delimited text file.
<i>Export as XML</i>	(File extension: xml) Data are exported as an xml file.
<hr/>	
<i>Export</i>	Opens a pop-out menu to export the selected targets and samples to various file formats.
<i>Export as CSV</i>	(File extension: csv) Data are exported as a text file delimited by the list separator character specified in Windows Regional Settings.
<i>Export as Excel</i>	(File extension: xlsx) Data are exported as an Excel file.
<i>Export as Text</i>	(File extension: txt) Data are exported as a tab-delimited text file.
<i>Export as XML</i>	(File extension: xml) Data are exported as an xml file.
<hr/>	
<i>Cut</i>	Cuts the selected samples. See p. 120.
<i>Copy</i>	Copies the selected targets and samples. See p. 120.
<i>Paste</i>	Pastes previously cut or copied targets and samples. See p. 120.
<hr/>	
<i>Delete</i>	Deletes the selected targets and samples. See p. 121.
<hr/>	
<i>Tool</i>	
<i>Change Link to Target ...</i>	Opens a dialog for changing the link to target. See p. 122.
<i>Change to Target</i>	Changes sample to a target. See p. 88.
<i>Average</i>	Averages the selected targets or samples and adds the average as a new target or sample. See p. 123.
<i>Working Target</i>	Opens a dialog for setting the selected sample as a working target under a master target. See p. 90.
<hr/>	
<i>Tolerance Settings...</i>	Opens the Data Settings dialog box with the Tolerance Setting category selected for setting tolerances for the current target. See p. 96.
<i>Write Target</i>	(Shown only when an instrument is connected.) Writes the selected data to the instrument memory as target data. See p. 160.
<hr/>	
<i>Serial PrintOut</i>	(Enabled only when one or more samples are selected.) Prints out the selected sample(s) to a serial printer See p. 148.
<hr/>	
<i>Zoom In List</i>	Increases the magnification of the list sheet.
<i>Zoom Out List</i>	Reduces the magnification of the list sheet.
<i>Restore List size</i>	Resets the magnification of the list sheet to the default value.
<hr/>	
<i>Data Property ...</i>	Opens the Data Property dialog for the selected targets or samples. See p. 137.

2.7.3.2 Working with List Data

■ Selecting list data

To select a single measurement, click on the leftmost cell of the row containing the measurement. For measurements having multiple group traits and consisting of multiple rows of data (such as measurements taken with the CM-M6), selecting the leftmost cell for any row of data in a measurement will select all rows of data for the measurement.

To select multiple sequential measurements, click on the leftmost cell for the first or last measurement and drag to select the desired remaining measurements while keeping the left mouse button pressed, or click on the leftmost cell for the first measurement, hold Shift on your keyboard pressed, and click on the leftmost cell for the last measurement.

To select multiple separated measurements, click on the leftmost cell for a desired measurement, press and hold Ctrl on your keyboard pressed, and click on the leftmost cell for each additional desired measurement.

To select all data shown in the Data List, click on the leftmost cell in the top row of the Data List (the row containing column labels).

Data List		Primary : 10°/D65										
	Data Name	Judgement	Group Traits	$\Delta L^*(10^\circ/D65)$	$\Delta a^*(10^\circ/D65)$	$\Delta b^*(10^\circ/D65)$	$\Delta E^*_{ab}(10^\circ/D65)$	$L^*(10^\circ/D65)$	$a^*(10^\circ/D65)$	$b^*(10^\circ/D65)$	$C^*(10^\circ/D65)$	h^*
Target	Maroon Standard	-----	-----	-----	-----	-----	-----	33.55	32.85	4.51	33.16	
2	Sample#0004	Pass	-----	-0.15	-0.50	-0.21	0.56	33.41	32.36	4.30	32.64	
3	Sample#0005	Warning	-----	-0.20	-0.72	-0.35	0.83	33.35	32.13	4.16	32.40	
4	Sample#0022	Pass	-----	-0.06	-0.52	-0.22	0.57	33.49	32.33	4.29	32.61	
5	Sample#0023	Pass	-----	-0.31	-0.23	-0.16	0.42	33.24	32.62	4.35	32.91	
6	Sample#0028	Fail	-----	0.01	-1.00	-0.34	1.05	33.56	31.86	4.17	32.13	
7	Sample#0036	Pass	-----	-0.14	-0.41	-0.17	0.47	33.41	32.44	4.33	32.73	
8	Sample#0037	Pass	-----	-0.68	0.00	-0.16	0.70	32.87	32.85	4.35	33.14	
9	Sample#0038	Pass	-----	-0.39	-0.24	-0.18	0.49	33.16	32.61	4.33	32.90	
10	Sample#0039	Pass	-----	-0.39	-0.23	-0.17	0.49	33.16	32.62	4.34	32.91	
11	Sample#0040	Pass	-----	-0.38	-0.26	-0.18	0.49	33.17	32.60	4.33	32.88	
12	Sample#0041	Pass	-----	-0.39	-0.39	-0.25	0.61	33.16	32.46	4.26	32.74	

■ Copying list data

With one or more measurements selected (highlighted), select **Copy** from the **Edit** menu or right-click the selected (highlighted) data and select **Copy** from the displayed context menu. The copied data can be pasted into another document or into spreadsheet software such as Excel.

■ Cutting list data

With one or more measurements selected (highlighted), select **Cut** from the **Edit** menu or right-click the selected (highlighted) data in the list of data displayed by selecting **Target(s)** or **Sample(s)** in the **All Data** section and select **Cut** from the displayed context menu.

If the data is pasted to a different place in the document or to a different document, the previously cut data is deleted from the list.

The cut data can be pasted into spreadsheet software such as Excel.

■ Pasting list data

Click in the document where you want to paste the data.

To paste the copied/cut data as a target, click on **Target(s)** in the **All Data** section of the Target List and select **Paste** from the **Edit** menu or right-click in the Data List and select **Paste** from the displayed context menu.

To paste the copied/cut data as a sample, click on **Sample(s)** in the **All Data** section of the Target List and select **Paste** from the **Edit** menu or right-click in the Data List and select **Paste** from the displayed

context menu.

- It is not possible to paste copied/cut data as a sample into the same document file from which the data was copied or cut.
- It is not possible to paste copied/cut data as a sample under a target.

■ **Deleting list data**

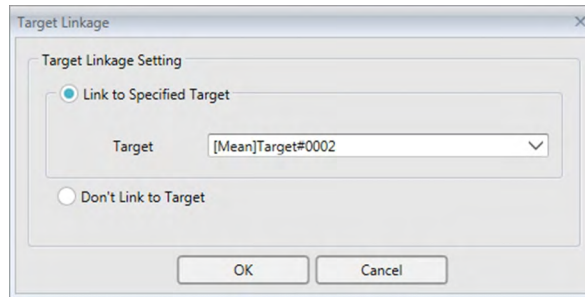
With one or more measurements selected (highlighted), select *Delete* from the **Edit** menu or right-click the selected (highlighted) data and select *Delete* from the displayed context menu. If more than one piece of data is selected, all the selected data will be deleted simultaneously. When target data is deleted, the sample data linked to the target data loses its attribute and becomes absolute data.

2.7.3.3 Changing the Linkage with Target Data

Any and all pieces of sample data can be linked to any target data. The linkage can be changed any time.

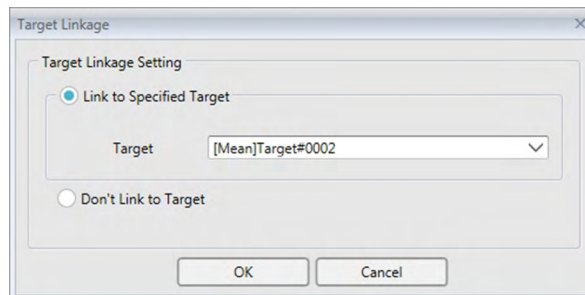
1. With the sample data whose link is to be changed selected (highlighted), select **Tool** from the **Data** menu and then select **Change Link to Target...** from the pop-out menu that appears, or right-click the selected (highlighted) list data, select **Tool** from the context menu that appears, and then select **Change Link to Target** from the displayed context menu.

When the command is selected, the Target Linkage dialog box appears.



2. Specify the linkage to target data.

■ Target Linkage dialog box



Target Linkage Setting

Link to Specified Target

When Link to Specified Target is selected, click the ▼ button in the Number text box and select the target from the displayed window. The selected target will be specified as the target data to be used for color difference measurement for that sample.

Don't Link to Target

Linkage of the selected data to any target data is removed, and the data becomes absolute data.

2.7.3.4 Adding Averaged Data

You can select several desired data from the list data, obtain the average and add the result as new data.

1. After selecting several data, select *Tool* from the **Data** menu and then select *Average* from the pop-out menu that appears, or right-click the selected (highlighted) list data, select *Tool* from the context menu that appears, and then select *Average* from the displayed context menu.

A dialog box with the following message appears: "Are you sure to add averaged data?"



2. Click the [Yes] button.

The averaged data is added to the list.

- The averaging calculation performed here first averages spectral reflectance or XYZ data to obtain data that is then used in the calculation of colorimetric data.


2.7.3.5 Filtering Data

Data in the Data List can be filtered to show only data meeting a certain condition for a data list item.

1. Hover over the header cell for the data list item to be filtered. A small filter icon  will appear.
2. Click . The filter dialog box will open, showing a list of all values for the data list item with a checkbox next to each value.

When the checkbox is checked, the measurement(s) corresponding to that value will be shown; when the checkbox is unchecked, the measurement(s) corresponding to that value will not be shown.

Clicking the checkbox next to All will select/unselect all checkboxes in the list.

Selecting all values can also be done by clicking [Clear filter].
3. Filter measurements in the Data List screen by checking/unchecking the checkbox next to each value.
4. When the filter has been set as desired, click  again. The filter dialog for the data list item will close.
 - Filter conditions will be shown in the status bar at the bottom of the Data List window.
 - Filters of multiple data list items can be combined. When multiple filters are set, only those measurements corresponding to all filters will be shown.

2.7.3.6 Searching for data

You can search the document for measurements which satisfy specific conditions to show only those measurements in the Data List window.

1. Select *Search...* from the **Edit** menu. The Search dialog box will appear
 - The Search dialog box can also be opened by right-clicking in Target List and selecting *Search...* from the context menu that appears, or by pressing **Ctrl + F** on the computer keyboard.
2. Specify the search conditions and click [Search].
 When search is completed, the Search dialog box will close, the search will be added to the *Search* section of the Target List window, and the measurements which satisfy the search conditions will be shown in the Data List window.

■ Search dialog box

- Name:** Input a name for the search. This name will be displayed in the *Search* section of the Target List window.
- Scope**
- Search Scope:** Select a data group for the scope of the search. Only a single data group can be selected.
- Instrument:** Select the instrument(s) for the scope of the search. If the document contains measurements taken with multiple instruments, multiple instruments can be selected.
- Group Traits:** Select the group traits for the scope of the search. The traits available depend on the document. Multiple traits can be selected.
- Condition** Set the condition(s) for the search.
1. Click on the leftmost combination box and select the List Item to be used as a search condition from the drop-down list that appears.
 2. Click on the middle combination box and select the condition (Includes, Not includes, Equal to, Not equal to) which will be applied to the text input in the rightmost textbox for the search.
 3. Click on the rightmost textbox and input the text to be used as a condition for the search.
 4. To add a second search condition, repeat the above 1 through 3 and select whether the conditions should be combined using AND (only measurements satisfying both conditions will be selected) or OR (measurements satisfying either of the two conditions will be selected).
- If no conditions are specified, measurements satisfying the Scope will be selected.

■ Editing a search

To edit a search, right-click on the name of the search to be edited, and select *Edit...* from the context menu that appears. The Search dialog box will appear, with the previous search settings. Change the search settings as desired and click [Search].

■ Deleting a search

To delete a search, right-click on the name of the search to be edited, and select *Delete* from the context menu that appears. The selected search will be deleted.

2.7.3.7 Adjusting Column Width

The width of columns in the Data List can be adjusted as follows:

■ Adjusting Column Width Manually

Move the cursor to the border between two columns in the header bar of the Data List. The cursor changes to a double-headed arrow, and the column width can then be adjusted by clicking and dragging the border to the desired width.

■ Automatically Adjusting Width of Single Column

The width of a single column can be automatically adjusted to fit the data it contains.

Right-click on the header bar of the Data List and select *Best Fit* from the context menu that appears. The width of the currently selected column will be automatically adjusted.

■ Automatically Adjusting Widths of All Columns

The widths of all columns can be automatically adjusted to fit the data that each column contains.

Right-click on the header bar of the Data List and select *Best Fit (all columns)* from the context menu that appears. The widths of all columns will be automatically adjusted.

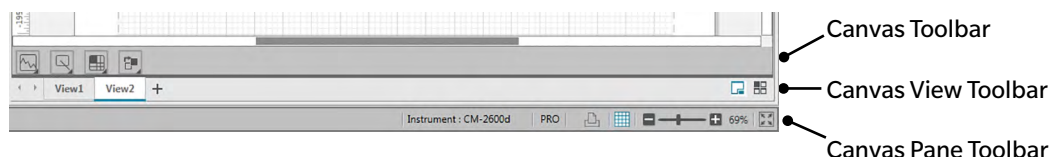
2.7.4 Canvas Pane

The Canvas Pane displays one or up to 10 canvases on which objects such as graphs, labels, etc. have been placed. SpectraMagic DX provides various types of objects that can be placed on the canvases as desired.

- See p. 175 for details of the graphic objects.

2.7.4.1 Canvas Pane Toolbars

The Canvas Pane has 3 toolbars at the bottom that provide different functions.



■ Canvas Toolbar

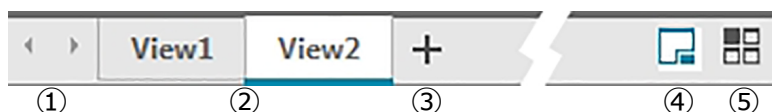
The Canvas Toolbar is shown at the bottom of each canvas when canvas editing is enabled, and allows various objects to be placed on the canvas.



- ① Graph object category
Select from spectral graph, $L^*a^*b^*$ graph, Hunter Lab graph, $\Delta L^*a^*b^*$ color-difference graph, Δ Hunter Lab color-difference graph, trend graph, multi-channel graph, 2-axis graph or histogram objects.
- ② Shape/label object category
Select from line, rectangle, image, text label, or pseudo color objects.
- ③ Data object category
Select from data list, data label, or statistics objects.
- ④ Object arrangement
Arrange the order of overlapped objects.

■ Canvas View Toolbar

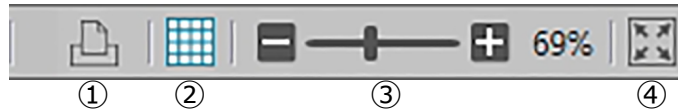
The Canvas View toolbar is located at the bottom of the Canvas Pane, and is used to add/delete canvases or to select whether they are shown as tabs or tiled.



- ① For moving between canvas tabs if Canvas View Toolbar space is too narrow to show all canvas tabs
- ② Canvas tabs (when canvases are shown as tabs)
- ③ Add a canvas.
- ④ Show canvases as tabs.
- ⑤ Show canvases tiled.

■ Canvas Pane Toolbar

The Canvas Pane Toolbar is shown at the right end of the Document Window status bar, and is used for printing canvases, enabling/disabling canvas editing, and adjusting canvas magnification.



- ① **Print functions**
Set print settings or perform printout.
- ② **Enable/disable editing**
Click once to enable Canvas Pane editing. (Button will become green and grid and rulers will be shown on the currently selected canvas.)
Click again to disable Canvas Pane editing. (Canvas toolbar will not be shown in canvases.)
- ③ **Magnification slider**
Slide to adjust the magnification of the currently selected canvas. Magnification value is shown at right of slider.
- ④ **Fit canvas to window**
Adjusts magnification of currently selected canvas so that the entire canvas fits inside the window containing that canvas.

2.7.4.2 Adding/Deleting Canvases

When a document is open, a minimum of one canvas will be shown.

To add a canvas, click on [+] in the Canvas View Toolbar, or right-click on any of the canvas tabs or title bars and select Add Canvas from the context menu that appears.


- The maximum number of canvases which can be open is 10.

To delete a canvas, right-click on the canvas to be deleted, and select Delete from the context menu that appears. A confirmation dialog box will appear. Click [Yes] to confirm canvas deletion or [No] to cancel canvas deletion

2.7.4.3 Renaming a Canvas

1. Right-click on the tab (if canvases are shown as tabs) or title bar (if canvases are tiled) of the canvas to be renamed and select Rename from the context menu that appears.
The current canvas name will become highlighted.
2. Input the desired canvas name and click [OK].
The new name will be applied to the canvas and the name will no longer be highlighted.

■ Graph objects


When the graph object button  is clicked, the following graph object selection panel will appear.

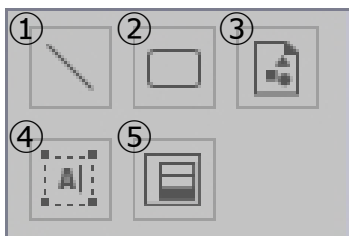


- ① Spectral graph object [Spectral]
- ② Absolute graph [L^* , $a^* - b^*$] object
- ③ Absolute graph [$L(\text{Hunter})$, $a(\text{Hunter}) - b(\text{Hunter})$] object
- ④ Color difference graph [ΔL^* , $\Delta a^* - \Delta b^*$] object
- ⑤ Color difference graph [$\Delta L(\text{Hunter})$, $\Delta a(\text{Hunter}) - \Delta b(\text{Hunter})$]
- ⑥ Trend chart object [Trend]
- ⑦ Multi-channel graph object [MultiChannel Graph]
- ⑧ 2-axis graph object [2Axis]
- ⑨ Histogram

To add a graph object, click on the button for the desired object, drag it to the Canvas Pane, and drop it in the desired position. The Group Traits dialog will appear. Select the instrument and group traits to be used for the graph object.

■ Shape/label objects

When the shape/label object button  is clicked, the following shape/label object selection panel will appear.



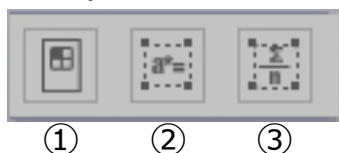
- ① Line object
- ② Rectangle object
- ③ Image object
- ④ Label object
- ⑤ Pseudo color object

To add a shape/label object, click on the button for the desired object, drag it to the Canvas Pane, and drop it in the desired position.

- When the pseudo color object is added, the Group Traits dialog will appear. Select the instrument and group traits to be used for the pseudo color object.

■ Data objects

When the data object button  is clicked, the following data object selection panel will appear.



- ① Data list object
- ② Data label object
- ③ Statistics object

To add a data object, click on the button for the desired object, drag it to the Canvas Pane, and drop it in the desired position.


- When the data label or statistics object is added, the Group Traits dialog will appear. Select the instrument and group traits to be used for the data object.

2.7.4.4 Enabling/Disabling Editing of Canvas Pane


Graphs, charts and their components are called graphic objects.

Adding graphic objects to the Canvas Pane or editing their settings can be performed only when the Canvas Pane is set to edit mode. When edit mode is disabled, the graphic objects cannot be moved and their settings cannot be changed.

■ Enabling edit mode

In the Canvas Pane toolbar, click . The button will change to green and a grid and rulers will be shown in the Canvas Pane to indicate that edit mode has been enabled.

■ Disabling edit mode

In the Canvas Pane toolbar, click . The button will change from green to gray and the grid and rulers in the Canvas Pane will not be shown.

2.7.4.5 Adding an Object to the Canvas Pane

1. With Canvas Pane editing enabled, click on the button in the Canvas toolbar for the desired type of graphic object.

An object selection panel with buttons for the various graphic objects in the selected category will appear.

2. Click on the button for the desired object, click on the desired type for that object in the pop-out, that appears, drag the pop-out item to the Canvas Pane, and drop it in the desired location. The graphic object will be placed at that location at the default size, and a frame with handles will be shown around the graphic object. Drag the appropriate handle to change the size of the object as desired.



2.7.4.6 Editing Graphic Objects

■ Selecting a Graphic Object

When you click the inside of the frame of a graphic object that has been pasted in the canvas pane, the graphic object is selected. You can select two or more objects by selecting them while holding down the Shift key.

When you drag the mouse pointer to enclose a graphic object, the object is also selected. If you enclose two or more graphic objects, all the graphic objects involved are selected.

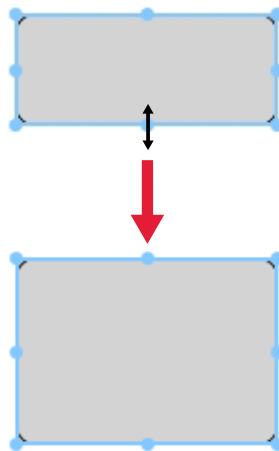
- When a single graphic object is selected, a properties button bar will appear to the upper right of the object. For details on the properties button bar, see the details for each graphic object starting on p. 177.
- It is not possible to select graphic objects in more than one document file.

■ Deselecting a Graphic Object

Click inside any area other than that of the pasted graphic objects or click the ESC key. When two or more graphic objects are selected, clicking an object while holding down the Shift key deselects only that object.

■ Changing the Size of a Graphic Object

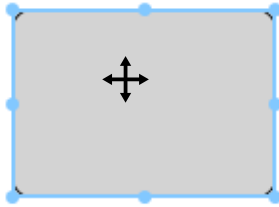
Click and select a graphic object and move the mouse pointer over one of the handles on the frame. When the shape of the pointer changes into a double-headed arrow, drag the handle and change the size of the object.



When resizing an object, green guidelines will be shown to help with alignment to the edge or center of other objects, or for matching object size.

■ Moving a Graphic Object

Click and select a graphic object and move the mouse pointer to any point inside the frame. The cursor will change to crossed double-ended arrows. Drag the object to the desired location.



When moving an object, green guidelines will be shown to help with alignment to the edge or center of other objects.

■ Copying a Graphic Object

Click and select a graphic object. Right-click the object and select *Copy* from the displayed context menu. You can also copy it by pressing the C key while holding down the Ctrl key. When you drag an object while holding down the Ctrl key, a copy of the object is dragged and pasted. When two or more objects are selected, all the selected objects are copied simultaneously.

- When Canvas Pane edit mode is disabled and objects are copied, the copied objects can also be pasted to other software, such as word-processing or spreadsheet software.

■ Cutting a Graphic Object


Click and select a graphic object. Right-click the object and select *Cut* from the displayed context menu. You can also cut the object by pressing the X key while holding down the Ctrl key. When two or more objects are selected, all the selected objects are cut simultaneously.

- Cut objects can also be pasted to other software, such as word-processing or spreadsheet software.

■ Pasting a Graphic Object

Right-click and select *Paste* from the displayed context menu. You can also paste it by pressing the V key while holding down the Ctrl key. When two or more document files are open, you can copy an object from one open document and paste it in the canvas pane of another document file.

■ Changing Order of Graphic Objects

When graphic objects overlap on the canvas, the order of the objects can be changed by selecting an object, clicking the object arrangement button , and selecting the desired operation from the pop-out menu that appears.

- Bring Forward: Move object up one layer.
- Send Backward: Move object down one layer.
- Bring to Front: Move object to the topmost layer.
- Send to Back: Move object to the bottommost layer.

■ Deleting a Graphic Object

Click and select a graphic object, and press the Delete key. When two or more objects are selected, all the selected objects are deleted simultaneously.

2.7.5 Arranging Windows with/without Overlapping

When two or more documents are opened, you can select whether the document windows are to be displayed in a tabbed, overlapping or tiled arrangement.

1. At the right end of the Data Panel toolbar, click on the button for the way you want the document windows to be displayed.



Show document windows as tabs.



Tile document windows.



Cascade document windows.

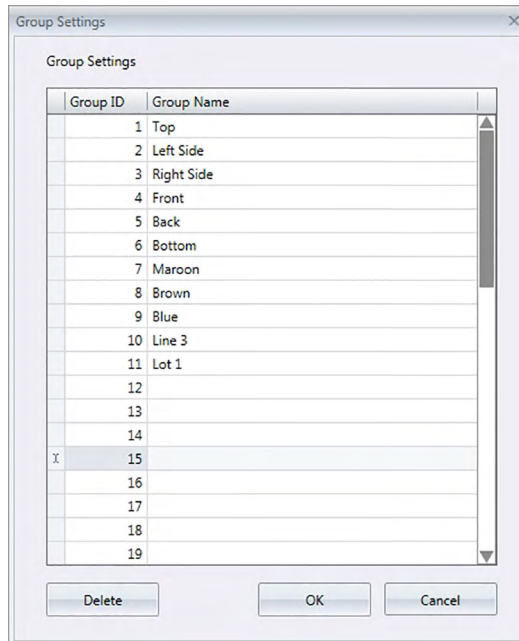
2.8 Data Management

2.8.1 Data Groups

Targets can be assigned to groups to enable easy management of measurement data. Each target can be a member of up to 5 groups, and it is possible to create 50 groups within a document.

2.8.1.1 Creating Groups

1. Select *Group Settings* in the **Data** menu. The Group Settings dialog box will appear.



2. Click in the Group Name column for the group number to set or change the name of. The cursor will change to a blinking line, indicating that the name text can be edited.
3. Input the desired name for the group.
4. Repeat steps 2 and 3 to set the desired names for all groups.
5. After all desired group names have been set, click [OK]. The group names will be set and the dialog box will close.

2.8.1.2 Editing Group Names

1. Select *Group Settings* in the **Data** menu. The Group Settings dialog box will appear.
2. Click in the Group Name column for the group number to change the name of. The cursor will change to a blinking line, indicating that the name text can be edited.
3. Change the group name as desired.
4. Repeat steps 2 and 3 to edit other group names.
5. After all group names have been edited as desired, click [OK]. The group names will be stored and

the dialog box will close.

2.8.1.3 Deleting a Group

- Deleting a group does not delete the data which belonged to the group.
- 1. Select *Group Settings* in the **Data** menu. The Group Settings dialog box will appear.
- 2. Click on the name or number of the group to delete.
- 3. Click [Delete]. The selected group will be deleted and the group name will become blank.
- 4. Repeat steps 2 and 3 to delete other groups if desired.
- 5. After all desired groups have been deleted, click [OK]. The dialog box will close.

2.8.1.4 Adding a Target to a Group

1. In the Target List, right-click on the name of the target to add to a group and select *Data Property...* from the context menu that appears. The Data Property dialog box will appear.
 - The Data property dialog box can also be opened by selecting Targets in the All Data section of the Target List and then double-clicking on the name of the desired target in the Data List or right-clicking on the name of the desired target in the Data List and selecting *Data Property...* from the context menu that appears.
2. In the Group: section of the Data Property dialog box, click on any group box and select the group to add the target to from the pull-down list that appears.
3. Selecting the blank row in the pull-down list will set no group for that group box.
 - A group can be selected for each of the 5 group boxes, so a target can be added to up to 5 groups.
4. After the groups have been selected as desired, click [Close]. The dialog box will close, the target will be added to the selected groups, and the target will appear in each selected group in the Classification by Group section of the Target List.

2.8.1.5 Removing a Target from a Group

1. In the Target List, right-click on the name of the target to remove from a group and select *Data Property...* from the context menu that appears. The Data Property dialog box will appear.
 - The Data property dialog box can also be opened by selecting *Targets in All Data* and then double-clicking on the name of the desired target in the Data List or right-clicking on the name of the desired target in the Data List and selecting *Data Property...* from the context menu that appears.
2. In the Group: section of the Data Property dialog box, click on the group box for the group to remove the target from and select the blank row in the pull-down list that appears.
3. Click [Close]. The dialog box will close and the group membership of the target will be updated in the Classification by Group section of the Target List.

2.8.2 Data Properties

2.8.2.1 Displaying Data Properties

You can display the properties of the data selected in the Data List.

1. Select data in the Data List.

- To select the data to be listed, see p. 120. To select the target data, select All Data - Target(s) from the tree and choose the data in the displayed data group.
- When two or more pieces of data have been selected in the Data List, you can navigate among the selected pieces of data one by one with the [<Previous] and [Next>] buttons in the Data Property dialog box.

2. Select *Data Property* in the **Data** menu. The Data Property dialog box appears.

The screenshot shows the 'Data Property' dialog box with the 'Data' tab selected. The 'Attribute' is set to 'Target' and 'Measured Spectral Data'. The 'Timestamp' is '25/05/2017 13:32:10'. The 'Name' field contains 'Maroon Standard'. The 'Comment' field is empty. Below these are two dropdown menus: 'Group' (set to 'Top') and 'Back' (set to 'Back'). At the bottom, there is a table with 5 rows and 2 columns. The first column is 'Title' and the second is 'Item'. The rows are labeled 'ID Label 1:', 'ID Label 2:', 'ID Label 3:', 'ID Label 4:', and 'ID Label 5:'. The bottom of the dialog shows 'No: 1 pages: 1/1' and buttons for '<Previous', 'Next>', and 'Close'.

- The Data Property dialog box can also be opened by right-clicking on the data in the Data List and selecting *Data Property...* from the displayed context menu, or by double-clicking on the data in the Data List.

3. Check or specify the data properties as required, and click [Close] to close the dialog box.

■ Data Property dialog box

Property

Attribute: Target

Measured Spectral Data

Timestamp: 25/05/2017 13:32:10

Name :
Maroon Standard

Comment:

Group: Top Back
Maroon Lot 1

Title	Item
ID Label 1:	
ID Label 2:	
ID Label 3:	
ID Label 4:	
ID Label 5:	

No: 1 pages: 1/1 <Previous Next> Close

- Items marked with ® are supported only by SpectraMagic DX Professional Edition.

Data tab

The Data tab shows information about the current data.

The following information can be edited or changed.

Name

Comment

Group: (Shown only for targets) Click on each group selector and select the desired group from the drop-down list that appears. See p. 134 for more information on groups.

Item (of supplementary data information) ®

- Only the Item information can be changed. The Title cannot be changed here.

Color tab ®

The Color tab shows information about the target (if any) linked to the current data, visual judgement, and the pseudocolor for the current data.

The following information can be edited or changed.

Visual Judgement (See p. 138.)

Pseudo Color: When a measurement with multiple group traits (such as multiple angles) is selected, the pseudocolor for each group trait can be seen by clicking on the current pseudocolor and selecting the desired group trait from the pull-down list that appears.

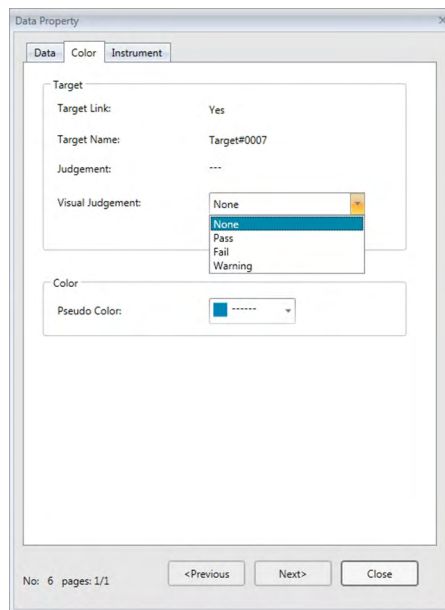
Instrument tab

The Instrument tab shows information about the instrument used for measurement. The information shown in this tab cannot be changed.

2.8.2.2 Setting the Visual Judgement of Data ②

- This function is supported by SpectraMagic DX Professional Edition only.

1. Select the Color tab of the Data Property dialog box.



2. In the Target frame, click on the current setting for Visual Judgement and select the desired value from *None* (No visual judgement), *Pass*, *Fail*, or *Warning*.

- To set whether or not the selected visual judgement result affects the total judgement, see p. 100.

2.9 Document / Database Operations

2.9.1 Creating a new document

To create a new document, select *New* in the **Document** menu. A new document will be created.

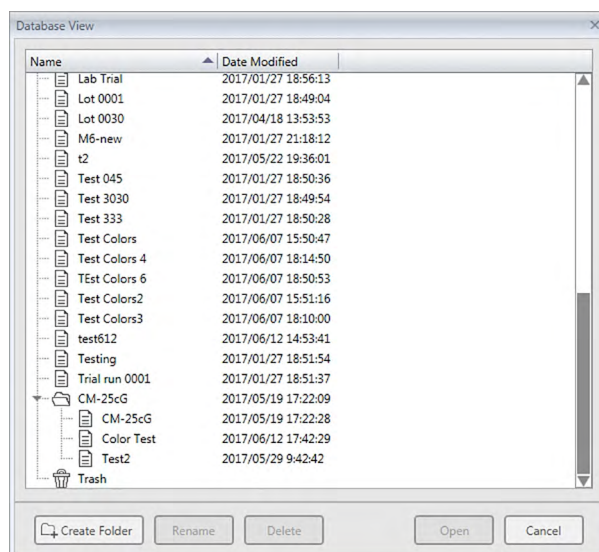
- If a default template file has been defined, the new document will use that template.

2.9.2 Opening an existing document

You can open an existing document from the database by following the procedure below.

1. Select *Open from DB* in the **Document** menu.

The Database View dialog box will appear.



2. Double-click on the document to open or select the document to open and click [Open]. The dialog box will close and the document will be opened.

2.9.3 Saving a document to the database under the same name

To save the currently active document to the database under its current name, select *Save to DB* in the **Document** menu. The document will be saved.

- If the document has not been previously saved to the database, the Database View dialog will appear. Continue with step 2 in Saving the Document to the Database Under a Different Name below.

2.9.4 Saving a document to the database under a different name

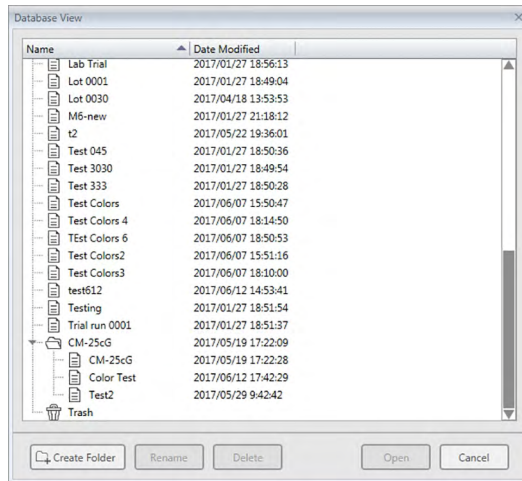
To save a newly created document to the database for the first time, or to save the currently active document to the database under a different name, follow the procedure below.

1. Select *Save As* in the **Document** menu. The Database View dialog box will open.

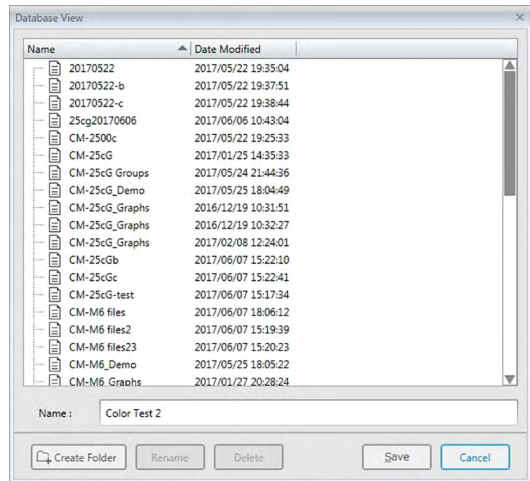
- 2.** Input the desired document name in the Name textbox.
 - To save the document to a folder other than the database root folder, select the folder to which the document should be saved.
- 3.** Click [Save] The document will be saved and the dialog box will close.

2.9.5 Database View Dialog

The Database View dialog is opened when *Open from DB* or *Save As* is selected in the **Document** menu.



For *Open from DB*



For *Save As* or *Save to DB*

[Create Folder]

Opens a dialog box for creating a folder.

[Rename]

Opens a dialog box for renaming the currently selected document or folder.

[Delete]

Deletes the currently selected document or folder.

- Disabled if selected folder is not empty.

[Open]

(Shown when dialog box is entered using *Open from DB*)

Opens the selected document.

[Save]

(Shown when dialog box entered using *Save As*, or using *Save to DB* if document has never been saved)

Saves the document under the name input in the Name edit box.

■ Database Dialog Box Right-Click Menus

■ When a document is selected

<i>Delete</i>	Moves the currently selected document to the Trash folder after confirmation. <ul style="list-style-type: none">• If selected document is in the Trash folder, deletes the selected document from the database.
<i>Rename</i>	Opens a dialog box for renaming the selected document.
<i>Move To</i>	Opens a dialog box for moving the selected document to a different folder.

■ When a folder is selected

<i>Delete</i>	Deletes the selected folder from the database. <ul style="list-style-type: none">• Disabled if currently selected folder is not empty.
<i>Rename</i>	Opens a dialog box for renaming the selected folder.

2.9.6 Creating a folder

Folders can be created in the Database View dialog box to organize documents within the database.

1. In the Database View dialog box, click [Create Folder]. The Create Folder dialog box will appear.
2. Input the desired folder name.
 - Maximum folder name length: 20 characters.
3. Click [OK]. The dialog will close and the folder will be added to the database and appear in the Database View dialog box.

2.9.7 Renaming a document or folder

1. Select the document or folder to rename in the Database View dialog box.
2. Click [Rename]. The Rename dialog box will appear, showing the current name of the selected document or folder.
 - or
 - Click on the document or folder name again (the color will change).
 - or
 - Right-click on the document or folder name and select *Rename* from the pop-out menu that appears.
3. Change the name as desired.
 - Maximum name length: 20 characters.
4. Click [OK]. The new name will be applied to the selected document or folder.

2.9.8 Deleting a document or folder

1. Select the document or folder to delete in the Database View dialog box.
 - If the selected folder contains documents, the [Delete] button will be disabled and it will not be possible to delete the folder.
2. Click [Delete]. A confirmation message box will appear.
3. Click [OK] to confirm deletion. The message box will close and the selected document or folder will be deleted.
 - To cancel deletion, click [Cancel].

2.9.9 Moving a document between folders



Documents can be moved between the root folder and named folders or from one named folder to another.

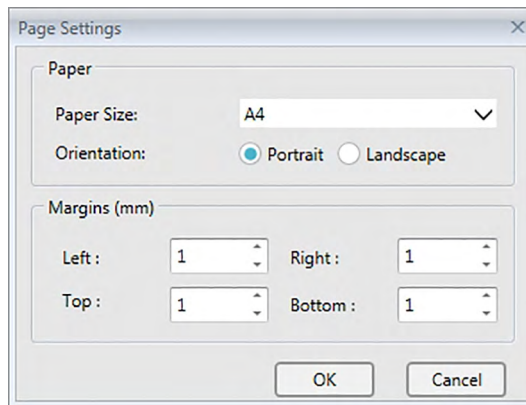
1. Right-click on the document to move between folders and select *Move To* from the context menu that appears. The Move to dialog box will appear.
2. Click on the current folder name and select the folder to move the document to from the pull-down list that appears.
 - Select “(None)” to move the document from a named folder to the root folder.
3. Click [OK]. The document will be moved to the selected folder.

2.10 Printing

The Canvas Pane can be printed from the **Document** menu or from the Canvas Pane toolbar.

2.10.1 Page Settings

1. Select *Page Settings...* from the **Document** menu. The Page Settings dialog box appears.
 - The Page Settings dialog box can also be opened by clicking on the print button  in the Canvas Pane toolbar and then clicking on  in the selection pane that appears.
2. Specify the necessary settings in the Page Settings dialog.



3. Click [OK] to confirm the settings and close the dialog.

■ Page Settings dialog box

Paper

Paper size

Click on the down arrow next to the current paper size setting and select the paper size to use from the pull-down list that appears.

Orientation

Click on the radio button for the desired orientation: Portrait or Landscape.

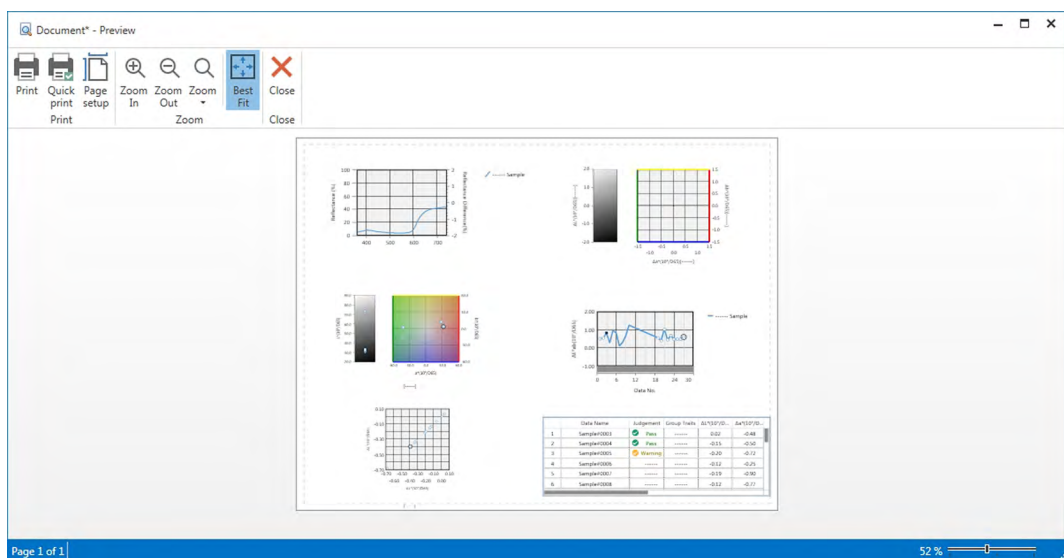
Margins

Specify the Left, Right, Top and Bottom margins. The margins can be specified within the range of 0 to 50 (mm). A dotted line showing the position of the margin will be shown in the canvas pane. Use the line as a guide when placing graphic objects.

2.10.2 Printing from Menu



1. Select **Print** from the **Document** menu. The Document Preview dialog will appear, showing how the Canvas Pane will be printed.
2. Click [Print]. The standard Windows Print dialog will open, showing the currently selected printer and various print settings.
After checking settings and making any necessary changes, click [Print] in the standard Windows Print dialog.
 - Clicking [Quick Print] instead of [Print] in the Document Preview dialog box will bypass the Windows Print dialog and start printing immediately.

■ Print Preview dialog

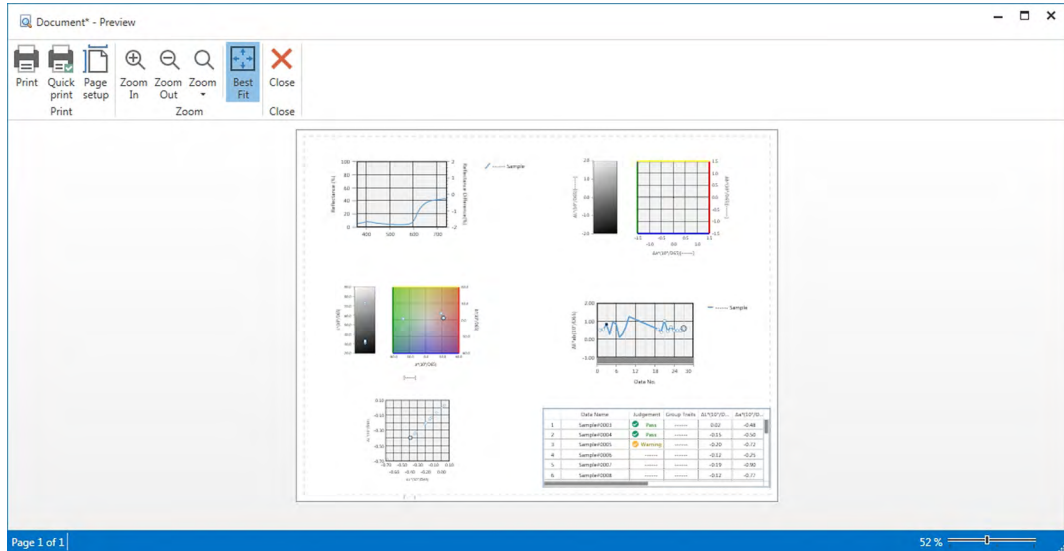


- | | |
|--------------------|---|
| Print | Opens standard Windows Print dialog. |
| Quick print | Bypasses Windows Print dialog and prints at current settings. |
| Page setup | Opens Page Settings dialog. |
| Zoom In | Increases magnification of preview image. |
| Zoom Out | Decreases magnification of preview image. |
| Zoom ▼ | Opens pulldown of magnifications for preview image. |
| Best Fit | Fits entire printout preview image to preview window. |
| Close | Closes preview without printing. |

2.10.3 Printing from Canvas Pane

1. Click on the print button  in the Canvas Pane toolbar, and then click on  in the selection pane that appears.

The Print Preview dialog will appear, showing how the Canvas Pane will be printed.



2. Click [Print]. The standard Windows Print dialog will open, showing the currently selected printer and various print settings.
After checking settings and making any necessary changes, click [Print] in the standard Windows Print dialog.
- Clicking [Quick Print] instead of [Print] in the Print Preview dialog box will bypass the Windows Print dialog and start printing immediately.

2.10.4 Using a Serial Printer

A serial printer can be used to print out measurement data on demand or automatically after each measurement.

The data to be printed out and the format of the printout (header/footer content) as well as printer communication settings can be set in the Serial Printer Settings dialog box.

2.10.4.1 Setting Serial Printer Communication Settings

1. Select Serial Printer Setting... from the Document menu. The Serial Printer Settings dialog box will appear.
2. Click [Communication Setup]. The Communication Settings dialog box will appear.
3. Set the appropriate settings for communicating with the serial printer.
4. Click [OK] to confirm the settings and close the dialog box.

2.10.4.2 Setting Up Serial Printer Printout.

1. Select Serial Printer Setting... from the Document menu. The Serial Printer Settings dialog box will appear.
2. Set the various dialog box settings as desired.
3. Click [OK] to confirm the settings and close the dialog box.

■ Serial Printer Settings dialog box

Header

Print Check this checkbox to print a header with the serial printout.

When **Print** is checked, the header content textbox and header No. combo box will become active. Set the desired contents for each box.

- The special strings for setting date, time, etc. in header content are shown after this section.

Target Print Items

Print target items Check this checkbox to print target items.

- When **Print target items** is checked, the target item drop-down boxes will become active. Select the desired items to print. Items available for printing will be the items shown in the Data List, with the exception of difference items.

Printer Setting

[Print] Prints the currently selected sample(s). Target data will also be printed if Print target items is checked.

[Communication Setup] Opens the dialog for setting serial printer communication settings.

Auto printing after measurement

Check this checkbox to print out data automatically after each measurement.

Sample Print Items

Select the desired items to print. Items available for printing will be the items shown in the Data List.

Footer

Print Check this checkbox to print a footer with the serial printout.

When **Print** is checked, the footer content textbox and footer No. combo box will become active. Set the desired contents for each box.

The special strings for setting date, time, etc. in footer content are shown after this section.

■ Special Strings for Header/Footer

The characters in the table below are recognized as special symbols and are replaced by the corresponding values during printout.

Enter a combination of these characters in the header content or footer content textbox. Up to 27 alphanumeric characters can be used.

String	Corresponding data
\$N	Number specified in the No. box to the right of the content textbox
\$D	Day of measurement
\$M	Month of measurement
\$Y	Year of measurement
\$h	Hour of measurement
\$m	Minute of measurement
\$s	Second of measurement

2.11 Exporting/importing Files

2.11.1 SpectraMagic DX Files

SpectraMagic DX stores data in a document to the database.

However, for the purposes of transferring documents containing data, SpectraMagic DX has its own mesx file format.

2.11.1.1 Exporting a Document to a SpectraMagic DX File

To export a document to a separate file (*.mesx format), follow the procedure below.

1. Select *Export to File...* from the **Document** menu. The File Export dialog box will appear.
2. Select SpectraMagic DX Data File (*.mesx) in the Save as type: pulldown.
3. Specify the filename and click [Save] to export the document to the file.
The document is saved as a data file in the original file format of SpectraMagic DX software (with the ".mesx" file extension).

The document file contains the following data:

- Sample data
- Target data
- Observer and illuminant settings
- Default tolerances
- Tolerances for each target
- Judgement display settings
- List items specified in the Data List
- Graphic objects pasted in the canvas pane and their size and position information
- View setting parameters

2.11.1.2 Importing a SpectraMagic DX File

To import a document from a file (*.mesx format), follow the procedure below.

1. Select *Import from File...* from the **Document** menu. The File Import dialog box will appear.
2. Select SpectraMagic DX Data File (*.mesx) from the pulldown at the lower right of the dialog.
3. Select the desired file and click [Open] to import the data.

The selected document is imported to SpectraMagic DX.

2.11.2 Importing a SpectraMagic NX (CM-S100w) File

In addition to document files created with the SpectraMagic DX, you can open data files (*.mes files) created with the previous color data software SpectraMagic NX (CM-S100w) Ver. 2.0 or later and import the data to a new document by following the procedure below.

1. Select *Import from File...* from the **Document** menu. The File Import dialog box will appear.
2. Select SpectraMagic NX Data File (*.mes) from the pulldown at the lower right of the dialog.
3. Select the desired file and click [Open]. A dialog for selecting the locale used when the MES file was created will appear.
4. Select the locale and click [OK]. The selected file will be imported to SpectraMagic DX as a new document.
 - "English" means the "English (United States)" locale.


2.11.3 Importing a Text Data File ⓘ

- This function is supported by SpectraMagic DX Professional Edition only.










A text format data file (*.txt or *.csv) can be imported into a new document by following the procedure below.

1. Select *Import from File...* from the **Document** menu. The File Import dialog box will appear.
2. Select text (*.txt) or text (*.csv) from the pulldown at the lower right of the dialog.
3. Select the desired file and click [Open] to import the data. The selected file will be imported to SpectraMagic DX as a new document.
 - Data imported from a text format data file will be treated as manually entered data, and the data attribute of each measurement will be either "Manually Input Spectral Data" or "Manually Input Colorimetric Data".

■ File Format for Text Data Files

- Data files must have the following file format.
- The  mark represents a CR (carriage return) code.

Format for spectral reflectance data

100 	Version No.
REF 	A string which indicates that this is spectral reflectance data.
### 	Start wavelength (360 or 400)
### 	End wavelength (700 or 740)
10 	Wavelength pitch (10)
39 	No. of reflectance wavelengths (31 for 400 to 700nm or 39 for 360 to 740nm including the start and end wavelengths)
# 	No. of banks (1 or 6)
#### 	No. of data pieces (1 to 5000) When the number of data pieces actually entered is less than this value, a reading error occurs. When the number of data pieces actually entered is more than this value, the excessive data will not be read.
###.### ###.### ~ ###.### ###.### Data name 	Spectral reflectance, data name Spectral data consist of three integer digits, a decimal point and three decimal-place digits. When the integer section has less than three digits, fill in the blank with 0 (zero) or a space. Data name: A name of up to 64 characters can be input. 2-byte characters can also be used. (Name can be omitted.) The spectral reflectance data and data name are delimited with a tab character when it is in text format (.txt), and with the delimiter specified in the Control Panel when it is in csv format (.csv).
[EOF]	

Format of colorimetric data

100↵	Version No.																																			
XYZ↵	A string which indicates that this is colorimetric data.																																			
##↵	Observer (2 or 10)																																			
#↵	No. of illuminants (1, 2 or 3)																																			
##↵	Illuminant 1	<div>Enter the following string corresponding to the illuminant.</div> <table><thead><tr><th>Illuminant</th><th>String</th></tr></thead><tbody><tr><td>A</td><td>1</td></tr><tr><td>C</td><td>2</td></tr><tr><td>D50</td><td>3</td></tr><tr><td>D65</td><td>4</td></tr><tr><td>F2</td><td>5</td></tr><tr><td>F6</td><td>6</td></tr><tr><td>F7</td><td>7</td></tr><tr><td>F8</td><td>8</td></tr><tr><td>F10</td><td>9</td></tr><tr><td>F11</td><td>10</td></tr><tr><td>F12</td><td>11</td></tr><tr><td>D55</td><td>12</td></tr><tr><td>D75</td><td>13</td></tr><tr><td>U50</td><td>14</td></tr><tr><td>ID₅₀</td><td>15</td></tr><tr><td>ID₆₅</td><td>16</td></tr></tbody></table>	Illuminant	String	A	1	C	2	D50	3	D65	4	F2	5	F6	6	F7	7	F8	8	F10	9	F11	10	F12	11	D55	12	D75	13	U50	14	ID ₅₀	15	ID ₆₅	16
Illuminant	String																																			
A	1																																			
C	2																																			
D50	3																																			
D65	4																																			
F2	5																																			
F6	6																																			
F7	7																																			
F8	8																																			
F10	9																																			
F11	10																																			
F12	11																																			
D55	12																																			
D75	13																																			
U50	14																																			
ID ₅₀	15																																			
ID ₆₅	16																																			
##↵	Illuminant 2 Omit this line when illuminant 2 is not used.																																			
##↵	Illuminant 3 Omit this line when illuminant 3 is not used.																																			
↵																																				
#↵	No. of banks (1, 2 or 3)																																			
####↵	No. of data pieces (1 to 5000) When the number of data pieces actually entered is less than this value, a reading error occurs. When the number of data pieces actually entered is more than this value, the excessive data will not be read.																																			
###.### ~ ###.###↵	Data name Colorimetric data, data name Colorimetric data consist of three integer digits, a decimal point and three decimal-place digits. When the integer section has less than three digits, fill in the blank with 0 (zero) or a space. Data name: A name of up to 64 characters can be input. 2-byte characters can also be used. (Name can be omitted.) The colorimetric data and data name are delimited with a tab character when it is in text format (.txt), and with the delimiter specified in the Control Panel when it is in csv format (.csv).																																			
[EOF]																																				

List of error codes

An error code on the table below is displayed when an error occurs while opening a text data file.

	Description
ERR 01	The version is not "100".
ERR 02	The fixed character is not correct. The fixed character is not "REF" or "XYZ".
ERR 03	The start wavelength is not correct.
ERR 04	The end wavelength is not correct.
ERR 05	The wavelength pitch is not correct.
ERR 06	The number of reflectance wavelengths is not correct.
ERR 07	The bank number is not correct.
ERR 08	The number of illuminants is not correct.
ERR 09	Illuminant 1 is not correct.
ERR 10	Illuminant 2 is not correct.
ERR 11	Illuminant 3 is not correct.
ERR 12	The observer is not correct.
ERR 13	The number of data pieces is not sufficient.
ERR 14	The number of data pieces is not sufficient. (The data number is less than 31 (400 to 700nm) or 39 (360 to 740nm) for the spectral reflectance data, or less than 3 for colorimetric data.)
ERR 15	The data contains characters other than "0" to "9" and a decimal point.

2.12 Instrument Memory Operations

For instruments equipped with memory for storing target and sample data, the target and sample data stored in memory when measurements were taken with the instrument standalone (not connected to a computer) can be read into documents for use within SpectraMagic DX, measurement data can be written from SpectraMagic DX to the instrument memory as target data, and data stored in the instrument memory can be deleted.

In addition, for instruments that can be used without being connected to a computer, the instrument settings (type of display, display color space, etc.) to be used during standalone operation of the instrument can also be set.

2.12.1 Reading Data from Instrument using Instrument menu

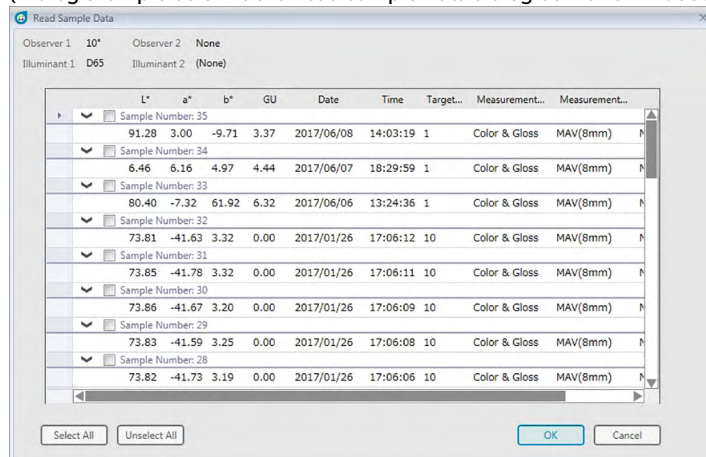
- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).
- Data can also be read using the Sensor Sync tab. See p. 157.
- To refer to the measurement numbers set by the instrument at the time of measurement, be sure that "Data number" from the Instrument group is included as one of the Selected Items in the List Items dialog box. (See p. 58.)

1. Select *Read/Write* in the **Instrument** menu and then select *Read Target* (to read target data) or *Read Samples* (to read sample data) from the pop-out menu that appears.

A Reading Data dialog box will appear showing the progress as information on the target or sample data stored in the instrument are read.

When information on all stored data have been read, the Reading Target Data or Reading Sample Data dialog box will appear.

(Dialog example below is the Read Sample Data dialog box for CM-25cG.)



2. Select the targets or sample(s) that you want to read from the instrument into SpectraMagic DX by clicking on the checkbox next to the target or sample name to make it checked.
 - To select all targets or samples, click [Select All].
 - To unselect all targets or samples, click [Unselect All].
3. When all targets or samples to be read into SpectraMagic DX have been selected, click [OK]. The selected targets or samples will be read into the current document as the same type of data (target or sample).

- When reading sample data, if any of the samples being read are linked to a target, that target will also be read into the current document and the link between target and sample will be maintained.

2.12.2 Reading Data from Instrument using Sensor Sync tab

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).

The Sensor Sync tab of the Instrument Window shows the data stored in the instrument's memory as a list with the name and time stamp of each measurement as it is stored in the instrument, along with whether the measurement is a target or sample.

Since the data are displayed in a list, it is easy to select only necessary data and read them into the current document or delete selected data from the instrument memory.

2.12.2.1 Displaying the Sensor Sync tab

1. With the instrument connected, click on the Sensor Sync tab.

The Sensor Sync tab is displayed.

- If this is the first time the Sensor Sync tab has been displayed since connecting the instrument, the data stored in the instrument will be automatically read and displayed. A progress bar will show the progress of reading the data.
- If the connected instrument is a CM-M6, the data read will be the data for the current Direction setting in the Instrument Settings dialog. If this setting is changed, the Sensor Sync tab will be refreshed to show data stored in the instrument for the new setting. Depending on the number of data in the instrument, this refresh may take a few minutes.

■ Sensor Sync tab

Select the type of data to show:

- All data
- Target data
- Sample data (linked to a target)
- Absolute data (not linked to a target)

Click here to select/deselect all data.

Click on checkboxes to select/deselect data.

Reread list of stored data.

Progress bar when reading data

Read selected stored data into SpectraMagic DX.

Delete selected stored data from instrument memory.

Click column headers to sort data in column ascending/descending.

Input word to search for data by data name or comment.

Colorimetric data for selected sample.

Instrument Information				
Sensor Sync				
Sample 0032		CM-25cG		
10°/D65				
	X	Y	Z	GU
-----	31.27	46.40	46.66	-----

No	Name	TimeStamp
<input type="checkbox"/>	0012 No Name	26/01/2017 16:55:00
<input type="checkbox"/>	0013 No Name	26/01/2017 16:55:02
<input checked="" type="checkbox"/>	0010 No Name	26/01/2017 17:05:51
<input type="checkbox"/>	0021 No Name	26/01/2017 17:05:55
<input type="checkbox"/>	0022 No Name	26/01/2017 17:05:57
<input type="checkbox"/>	0023 No Name	26/01/2017 17:05:58
<input type="checkbox"/>	0024 No Name	26/01/2017 17:06:00
<input type="checkbox"/>	0025 No Name	26/01/2017 17:06:01
<input type="checkbox"/>	0026 No Name	26/01/2017 17:06:03
<input type="checkbox"/>	0027 No Name	26/01/2017 17:06:04
<input type="checkbox"/>	0028 No Name	26/01/2017 17:06:06
<input type="checkbox"/>	0029 No Name	26/01/2017 17:06:08
<input type="checkbox"/>	0030 No Name	26/01/2017 17:06:09
<input type="checkbox"/>	0031 No Name	26/01/2017 17:06:11
<input checked="" type="checkbox"/>	0032 No Name	26/01/2017 17:06:12

Meaning of symbols:


- Target data
- Sample data


- When data is read from the instrument to create the Sensor Sync tab list, the last data will be automatically selected and the colorimetric data for the last data will be shown at the top of the Sensor Sync tab.
- To reread data at any time, click

2.12.2.2 Reading data using the right-click menu

1. Select the target or sample to read from the list in the Sensor Sync tab.
 - Only one target or sample can be selected. Even if the checkboxes for multiple targets or samples are checked, only the currently highlighted target or sample will be read into the document.
2. Right-click on the target or sample and open the right-click menu.
3. Select *Read*.
 - If a measurement of the same type (target or sample) and with the same name already exists in the document, Read in the right-click menu will be disabled.
4. The selected target or sample will be read into the document.

2.12.2.3 Using the read button

The read button  can be used to read multiple selected targets and samples into the document at one time. When the read button is used, all checked measurements (both targets and samples) will be read into the document.

1. Select the targets and samples to read from the list in the Sensor Sync tab.
 - Multiple targets and samples can be selected by checking the checkboxes next to the targets and samples.
2. Click . The selected targets and samples will be read into the document.
 - If a measurement of the same type (target or sample) and with the same name as measurements being read already exists in the document, a confirmation dialog box appears.
 - If samples were selected and the selected samples were linked to targets in the instrument, the linked targets will also be read into the document.

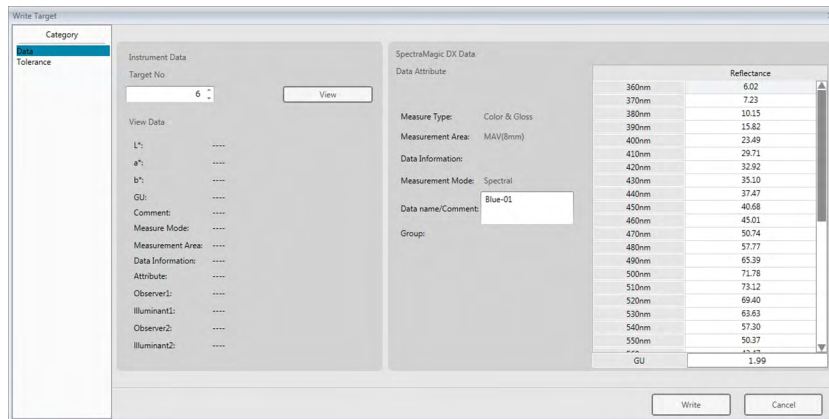
2.12.3 Writing target data from the document to the instrument

- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).
- When using an instrument with a data protect function, perform this procedure after turning off the instrument's data protection function.
- Data cannot be written to the instrument when the number of group traits is different (for example, data with a single group trait cannot be written to the 6-angle CM-M6).
- When writing data to the CM-M6, the data which can be written to the instrument depends on the instrument firmware version as follows. (Instrument version can be checked in the Instrument Information tab of the Instrument Window. See p. 16.)

Instrument version	Document target data type	Target/tolerance data type written to instrument
1.10 or later	Double-path (DP)	Double-path (DP)
	Left (L)	Left (L)
	Left + Right (L+R)	<ul style="list-style-type: none"> • Right (R) data cannot be written to instrument.
Prior to 1.10	Double-path (DP)	Double-path (DP) <ul style="list-style-type: none"> • Left (L) or Left + Right (L+R) data cannot be written to the instrument.

- Sample data cannot be written to the instrument. Such data must be changed to target data before writing the data to the instrument as target data.
1. Select the target data to write to the instrument:
 - To select multiple targets, select All Data - Target(s) in the Target List and select the desired target or targets in the Data List.
 - To select a single target, select the desired target or working target in Classification by Target or Classification by Group in the Target List.
 - When a target or working target is selected in Classification by Target or Classification by Group in the Target List, the target will be written to the instrument even if the Data List shows a sample selected.
 2. Select *Write Target*:
 - Select *Write Target...* in the Data menu.
 - Select *Read/Write* in the **Instrument** menu and then select *Write Target...* from the pop-out menu that appears.
 - If targets were selected in step 1 by selecting All Data - Target(s) in the Target List and selecting the desired target or targets in the Data List, right-click in the Data List and select *Write Target...* from the context menu that appears.
 - If multiple targets were selected, a dialog box asking whether to perform batch write (writing of all selected targets at their current settings without opening the Write Target dialog box) will appear. To perform batch write, click [OK]; the selected targets will all be written to the instrument at their current settings and the procedure is complete. To continue to the Write Target dialog box to confirm the settings for each target before writing them, click [No]. To cancel writing of targets, click [Cancel].
 - If a target was selected in Classification by Target or Classification by Group in the Target List, right-click on the target in the Target List or right-click in the Data List select *Write Target...* from the context menu that appears.

The Write Target dialog box appears.



3. Confirm the details and the tolerances of the target data to be written to the instrument.

■ Data category

Instrument Data

Target No.

Specify the target number in the instrument to which the data is to be downloaded. The number displayed when you open the dialog box is the highest target number stored in the instrument + 1. Click [View] to see the details of the target with the specified number stored in the instrument.

- When using a CM-2600d, CM-2500d, CM-2500c, or CM-2300d, the target numbers must be sequential with no empty target numbers. Be sure to write target data to a currently used target number or the highest target number stored in the instrument + 1.

SpectraMagic DX Data

Data Attribute

The attributes of the target data to be written are displayed. For measured target data, all attributes are shown for reference only and cannot be changed, with the exception of Comment. For input target data, when using the CM-700d, CM-600d, CM-2600d, CM-2500d, CM-2500c, or CM-2300d, some attributes such as Measurement Area, etc. will be enabled and can be changed

If you want to input a comment for the target being written, input the comment in the Data name/Comment text box. (The number of characters which can be input for Name / Comment depends on the particular instrument.)

■ Tolerance category

Instrument Data

The same Instrument Data as shown for Data category are shown.

SpectraMagic DX Data

Tolerance

The tolerances specified for the selected list items are displayed. For instruments with multiple group attributes (such as the CM-M6), the tolerances for each available group attribute are shown. To enable a tolerance when writing the target data to the instrument, click on the checkbox next to the tolerance.

Tolerance values shown are the values set in SpectraMagic DX for the target. The values can be changed using the up/down arrows next to each value, or by double-clicking on the current value and inputting the desired value directly.

4. When all settings (Target No. on instrument, tolerance settings) have been set as desired, click [Write]. The target data will be written to the instrument.

- If multiple targets were selected in step 1, the Write Target dialog box for the next selected target will appear. Repeat steps 2 and 3 to complete writing of target for all selected targets.


2.12.4 Deleting Data Stored in the instrument

2.12.4.1 Clearing All Data from Instrument

1. Select *Read/Write* in the **Instrument** menu and then select *Clear Stored Data* from the pop-out menu that appears. A confirmation message box will appear.
2. Click [OK] to delete all data from the instrument.
 - To cancel deletion, click [Cancel].

2.12.4.2 Deleting Data from Instrument using Sensor Sync tab

When using the CM-25cG, CM-M6, CM-700d/CM-600d, or CM-5/CR-5, it is possible to delete selected measurements from the instrument memory.

- For the CM-2600d, CM-2500d, CM-2500c, or CM-2300d, all data will be deleted.
1. Select the measurements to delete in the list in the Sensor Sync tab.
 - Multiple measurements can be selected by checking the checkboxes next to the measurements.
 2. Click .
 3. A confirmation dialog box will appear.

Click the [OK] button to delete the data.
Click the Cancel button to cancel the deletion.

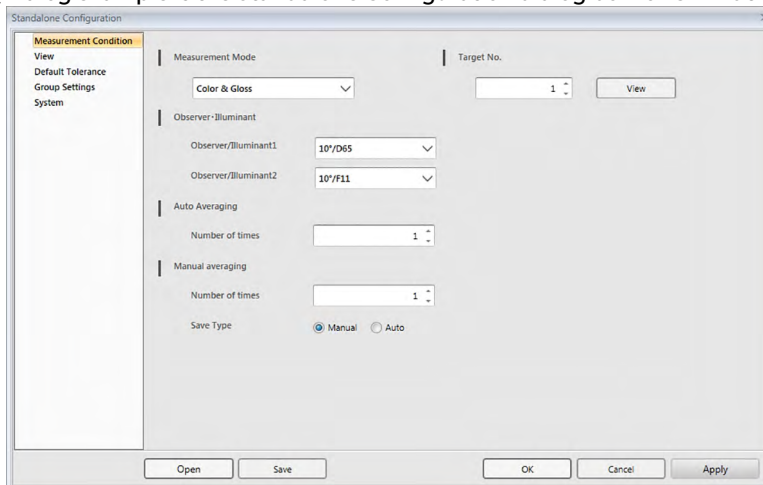
If a target is deleted from the instrument memory using the Sensor Sync tab, samples linked to the deleted target will become absolute measurements.

2.12.5 Setting Instrument Standalone Configuration

For instruments which can be used standalone without being connected to a computer, it is possible to set the various settings to be used for standalone operation on the instrument.

- For the CM-5 or CR-5, a standalone settings file can be created even without being connected to the instrument. The file can then be transferred to the instrument using a USB flash memory.
1. Select *Standalone Configuration* from the **Instrument** menu. The current standalone settings will be read from the instrument and standalone configuration dialog box will appear.
 - If no instrument is connected, a message box asking whether to create a standalone configuration file for the CM-5 or CR-5 will appear. To create a standalone configuration file for either instrument, click on the button for that instrument and continue with the steps below; to cancel the process, click [Cancel].

(Dialog example is the Standalone Configuration dialog box for CM-25cG.)



- Settings available in the Standalone Configuration dialog box will vary according to the instrument model. For details of the various settings, refer to the instrument's instruction manual.
 - Click on the categories in the left side of the dialog box to go to the dialog box screen for that category.
 - When using a CM-25cG, CM-2600d, CM-2500d, or CM-2500c, settings can be set from a previously saved configuration file. To set the settings from a file, click [Open]. An Open dialog box will appear. Browse to the configuration file, and click [Open]. The Open dialog box will close and the Standalone Configuration dialog box settings will be set to the settings stored in the file.
2. After all settings have been set as desired, click [OK]. The settings will be sent to the instrument and the dialog box will close.
 - When creating a standalone configuration file for the CM-5 or CR-5 without the instrument connected, a Save As dialog box will appear when [OK] is clicked. Input the desired file name and click [Save] to save the file.
 - To send the settings to the instrument without closing the dialog box, click [Apply].
 - To close the dialog box without sending the settings, click [Cancel].

2.12.5.1 Saving standalone configuration settings to a file

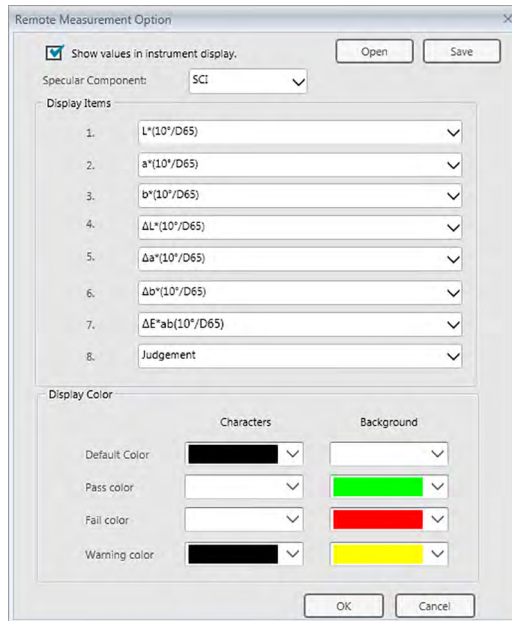
- This procedure is available only when using a CM-25cG, CM-2600d, CM-2500d, CM-2500c, or CM-5.
1. After all settings in the Standalone Configuration dialog box have been set as desired, click [Save]. The Save As... dialog box will open.
 2. Input a file name and click [Save]. The settings will be changed and the Save As dialog box will close.

2.12.6 Remote Measurement Option (Displaying measurement results on CM-700d/CM-600d instrument screen)

- This procedure is available only when the CM-700d/600d is connected.

When the CM-700d/600d is connected and used for remote target measurement or remote sample measurement, the results of the measurement (such as measurement data or pass/fail judgement) can be displayed on the LCD screen of the instrument so that the results can be seen even when the instrument is operated away from the computer.

1. Select *Remote Measurement* in the **Instrument** menu and then select *Remote Measurement Option* from the pop-out menu that appears. The Remote Measurement Option dialog box will appear.



2. Select the various settings such as display items, colors, etc. in the Remote Measurement Option dialog box (see next page).
3. After all settings have been set as desired, click [OK]. The settings will be saved and the dialog box will close.
 - To cancel settings and close the dialog box, click [Cancel].

■ Remote Measurement Option dialog box



[Open]

Opens a dialog for opening a Remote Measurement Option settings file.

- If any of the display items specified in the opened file are not currently shown in the document's Data List, a warning message will appear listing which items are not in the Data List and the affected item settings will be changed to "None".

[Save]

Opens a dialog for saving the Remote Measurement Option settings to a file.

Show values in instrument display.

When this box is checked, the items specified in this dialog box will be displayed on the instrument screen after each measurement.

Specular Component

Select for which specular component setting (SCI or SCE) data will be shown in the instrument screen.

- It is not possible to show the results for both SCI and SCE simultaneously on the instrument screen.

Display Items

Click on the current setting for any of the 8 Display Items and select the desired item from the pull-down list that appears.

- To not shown anything for an item, select "None" at the bottom of the pull-down list.
- Items shown in the pull-down list will be Judgement (Pass/Warn/Fail) and the items in the Observer/Illuminant (such as "10°/D65") category, Index category, and Special category of the List Display Settings screen of the Application Settings dialog box, except for the following items: FF, ΔFF, Lightness, Saturation, Hue, a* Evaluation, b* Evaluation, Pseudo Color, Pseudo Color (Target), Opacity (ISO 2471), Opacity Difference (ISO 2471), Opacity (TAPPI T425 89%), Opacity Difference (TAPPI T425 89%), Haze (ASTM D1003-97), Haze Difference (ASTM D1003-

97), GU, and Δ GU.

- When items are shown on the instrument screen, the item name may be abbreviated.
- Only items which are currently shown in the document's Data List can be displayed on the instrument screen. If an item which is not shown in the document's Data List is selected, a warning message listing the items which are selected but are not in the Data List will be shown, the affected items will be set to "None", and no data for that item will be shown in the instrument screen.
- If a selected item is later removed from the document's Data List, the next time a measurement is taken, the data for that item will be shown as "-----" in the instrument screen.

Display Color

Specify the colors for Characters and Background to be displayed on the instrument screen by clicking on the current setting for any color and selecting the desired color from the pull-down list that appears.

Judgement items will be displayed with the colors assigned to Pass color, Fail color, and Warning color. The remaining items will be displayed with the colors assigned to Default Color.

2.13 Other Functions

2.13.1 Template Files

SpectraMagic DX software provides template files in its original file format (with the “.mtpx” file extension). A template file contains the following data:

- Observer and illuminant settings
- Default tolerances
- Judgement display settings
- List items specified in the Data List
- Information specified for supplementary data information
- Graphic objects pasted in the Canvas Pane as well as their size and position information

At the time of installation, several template files are saved in the “C:\Users\Public\Documents\SpectraMagic DX\Templates\” folder.

The folder where new template files will be saved will be the folder specified for File Paths: Template File in Application Settings: Start Options category. See p. 171.

2.13.1.1 Exporting a SpectraMagic DX Template File

Once you have saved the template files with the procedure described below, you can simply open the template file with SpectraMagic DX software and the settings will be applied consistently to the currently active document.

1. Select *Export to File...* from the **Document** menu. The File Export dialog box will appear.
2. Select SpectraMagic DX Template File (*.mtpx) in the Save as type: pulldown.
3. Specify the filename and click [Save] to export the current settings as a template.
The document is saved as a SpectraMagic DX template file (with the “.mtpx” file extension).

2.13.1.2 Importing a SpectraMagic DX Template File

You can change the way a document looks by importing a template file previously created or included with SpectraMagic DX software.

1. Select *Import from File...* from the **Document** menu. The File Import dialog box will appear.
2. Select SpectraMagic DX Template File (*.mtpx) from the pulldown at the lower right of the dialog.
3. Select the desired file and click [Open] to open the template and apply the template settings to the currently active document.


2.13.1.3 Importing a SpectraMagic NX (CM-S100w) Template File

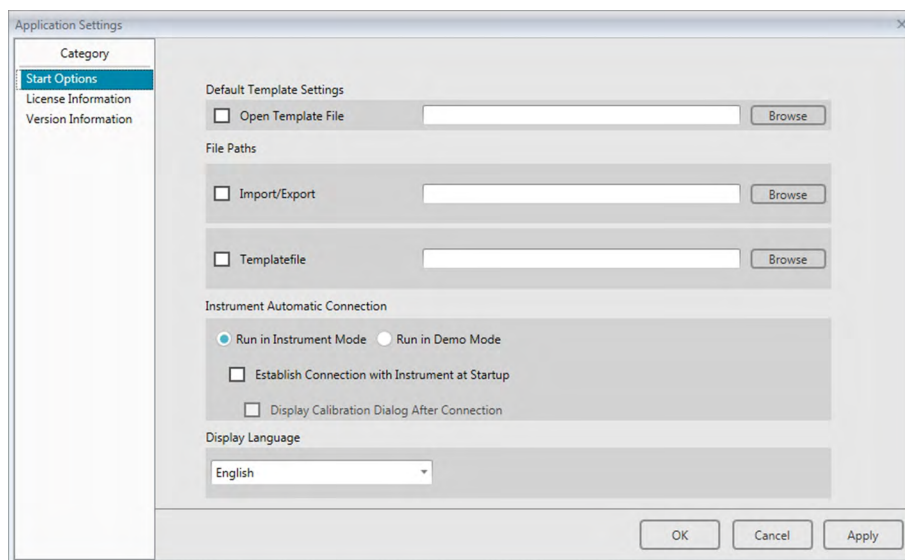
Templates created and used with the previous software SpectraMagic NX (CM-S100w) can also be imported and used in SpectraMagic DX.

1. Select *Import from File...* from the **Document** menu. The File Import dialog box will appear.
2. Select SpectraMagic NX Template File (*.mtp) from the pulldown at the lower right of the dialog.
3. Select the desired file and click [Open] to open the template and apply the template settings to the currently active document.
 - The folder where the template file will be saved will be the folder specified for File Paths: Template File in Application Settings: Start Options category. See p. 171.

2.13.2 Setting Startup Options

You can specify whether to open a template file, whether to connect to an instrument when the SpectraMagic DX software is started, and what display language to use.

1. Select *Application Settings...* from the **Document** menu or click  in the main program toolbar. The Application Settings dialog box will appear, with the Start Options category selected.



2. Specify the start options and click [OK] to close the dialog box.

Your selection will take effect at the next startup.

■ Application Settings Dialog: Start Options category

Default Template Settings

Open Template File

When this option is checked, a blank document will be opened at startup using the specified template file.

In addition, the specified template file will be used whenever a new document is created.

Browse button

Click the [Browse] button to open the Data File dialog and select a template file.

File Paths

Import/Export

When this option is checked, the file path specified will be used as the default path when importing or exporting data files.

Browse button

Click the [Browse] button to open the Browse for Folder dialog to select the folder.

Template File

When this option is checked, the file path specified will be used as the default path when importing or exporting template files.

Browse button

Click the [Browse] button to open the Browse for Folder dialog to select the folder.

Instrument Automatic Connection

Run in Instrument Mode

When this option is checked, SpectraMagic DX starts in instrument mode, which is used to connect and operate an instrument.

Establish Connection with Instrument at Startup

When this option is checked, a connection with the instrument is automatically established at startup.

Display Calibration Dialog After Connection

When this option is checked, the calibration dialog box appears after the connection is established.

Run in Demo Mode

When this option is checked, SpectraMagic DX starts in demo mode. In demo mode, SpectraMagic DX can be operated as if an instrument were connected even when the instrument is not actually connected. When you attempt to take a measurement, random measurement results will be displayed.

Display Language


Select the display language to use by clicking on the down arrow next to the current language setting and select the desired language from the pull-down list.

Available choices are:

Japanese, English, German, French, Spanish, Italian, Simplified Chinese, Traditional Chinese, Portuguese, Russian, Turkish, and Polish.


2.13.3 Viewing License Information

The current license status of the SpectraMagic DX installed on your computer can be checked in the License Information screen of the Application Settings dialog.


1. Select *Application Settings...* from the **Document** menu or click  in the main program toolbar. The Application Settings dialog box will appear, with the Start Options category selected.
2. Select the License Information category. The License Information screen will appear, showing the current license Version of SpectraMagic DX in use.
 - To view license information details, or to perform user registration, click on the URL shown in the screen.

2.13.4 Viewing Version Information

The version information of the SpectraMagic DX installed on your computer can be checked in the Version Information screen of the Application Settings dialog.

1. Select *Application Settings...* from the **Document** menu or click  in the main program toolbar. The Application Settings dialog box will appear, with the Start Options category selected.
2. Select the Version Information category. The SpectraMagic DX splash screen image will appear, showing the version of SpectraMagic DX in use.

2.13.5 Viewing the Instruction Manual

1. Click  in the main program toolbar. A pop-out menu will appear.
2. Select Open SpectraMagic DX manual from the pop-out menu.
The instruction manual is displayed in PDF format.

CHAPTER 3

GRAPHIC OBJECT PROPERTIES

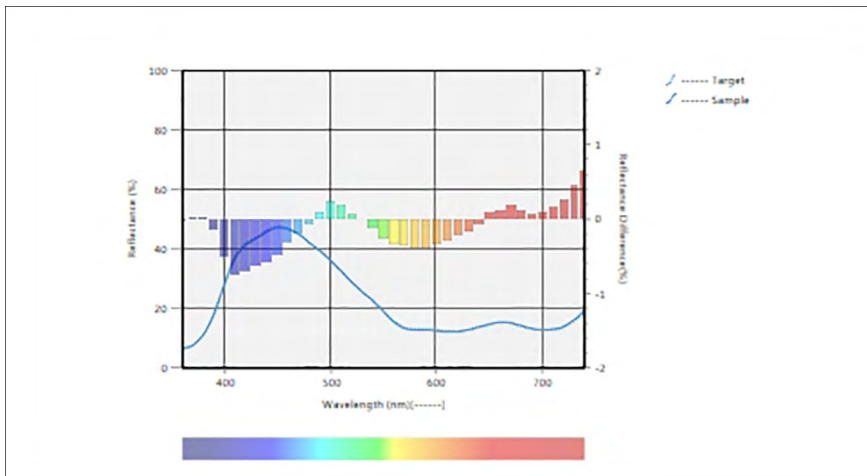
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3.1 Spectral Graph

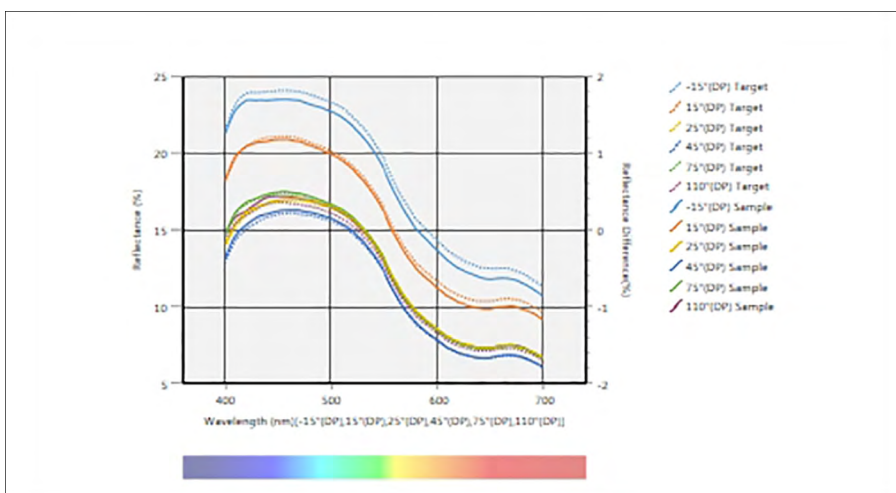
3.1.1 Overview

The spectral graph object is used to view spectral data (reflectance, K/S, absorbance, or transmittance). The horizontal axis of the graph represents the wavelength (nm) and the vertical axis represents the spectral value on the left and the spectral value difference on the right.



Spectral graph








if the measurement data includes data for multiple group traits (such as data measured with the CM-M6), multiple lines (one for each group trait) can be displayed on the same graph, and the display of the lines for each group trait can be enabled/disabled.



Spectral graph showing data for multiple group traits

3.1.2 Button bar (Spectral Graph)

When the graph is selected, the button bar will appear to the right of the graph with the following buttons:


	Opens a sub-menu with the following choices:	
	<i>Zoom IN</i>	When checked, the button will change to  . When the graph is clicked on while this is enabled, the graph will be zoomed in. Clicking and dragging on the graph will zoom in on the selected area.
	<i>Zoom OUT</i>	When checked, the button will change to  . When the graph is clicked on while this is enabled, the graph will be zoomed out.
	<i>Reset</i>	Resets the graph zoom level to 0.
	<i>Hand Tool</i>	When clicked, the button will change to  . When the graph is clicked on while this is enabled, the hand can be used to click and drag on a zoomed graph to slide the graph and view a different part of the graph.
	Enable/disable automatic scaling to include all graphed sample data. Button will be  when automatic scaling to include all graphed sample data is enabled.	
	Opens the Properties dialog box. See p. 179.	

3.1.3 Right-click menu (Spectral Graph)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the spectral graph object.

<i>Cut</i>	Cuts the graph to the clipboard.
<i>Copy</i>	Copies the graph to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers.
<i>Group Settings</i>	Opens a submenu for enabling/disabling display of the line graph for each group trait. (Which traits can be selected depends on the Instrument and Group Traits selected in the Group Traits dialog.) If only a single group trait is available, "-----" will be shown. <ul style="list-style-type: none"> If multiple traits are selected, spectral value difference will not be shown.
<i>Group Traits Selection</i>	Opens the Group Traits dialog for selecting which instrument and set of group traits will be used for the data to display on the graph.
<i>Data Type</i>	Opens a submenu for selecting the type of data to display. Available selections: Reflectance (%), K/S, Absorbance, or Transmittance (%)
<i>Properties</i>	Opens the Properties dialog. See p. 179.

3.1.4 Properties Dialog (Spectral Graph)

Clicking on the Properties button , selecting Properties... from the right-click menu, or double-clicking on the graph object opens the Spectral Graph Properties dialog for specifying the properties of the graph.

- To expand a category in the category list on the left side, click [+] next to the category name.
- To contract an expanded category, click [-] next to the category name.

Category	Properties included in category	
Marker/Legend	Subcategories:	
	Data with single group trait:	-----
	Data with multiple group traits:	Each group trait (for example, for CM-M6: -15°(DP), 15°(DP), 25°(DP), 45°(DP), 75°(DP), and 110°(DP))
	Sample Data: Shape, size, and color of markers Target: Enable/disable display and shape, size, and color of markers Legend: Text to be used in the graph legend for each data group setting	
Font	Font used for data number and legend. See p. 207.	
Vertical Axis	Subcategories: Data (absolute data); Data Difference	
	Scale: Minimum/maximum/scale interval, number of decimal places for scales	
	Label: Enable/disable display, label text, and font/font color of text	
	Whether or not to show all sample data (Data subcategory) Whether or not to show difference (Data Difference subcategory)	
Horizontal Axis	Scale: Auto/Manual (manual scale interval), number of decimal places for scale values	
	Label: Display enable/disable, label text, and font/font color to use	
Title	Graph title: Enable/disable display, text and font/font color of graph title	
	Channel information: Display enable/disable	
Background	Background colors for entire graph area and graph plot area, grid color and outline color for graph plot area	

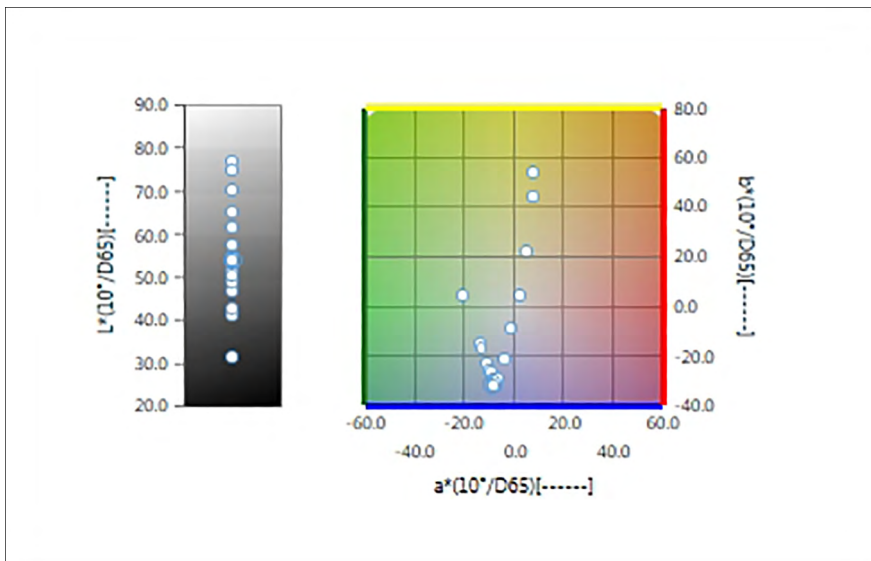
- For the items which allow the font to be set, the font button will be enabled only if display of the item is enabled. For the settings available in the Font dialog, see p. 207.

3.2 L*a*b* or Hunter Lab Graph

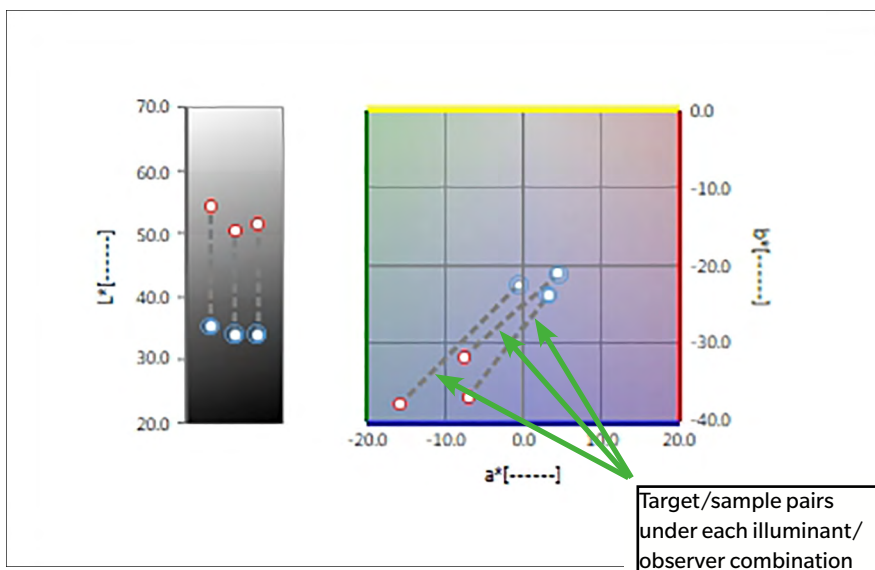
3.2.1 Overview

The L*a*b* or Hunter Lab graph object is used to view absolute colorimetric values plotted respectively in the L*a*b* or Hunter Lab color space.

The default plot type (the type shown when the absolute graph object is first placed on the Canvas Pane) shows a bar graph of the brightness (L^* or L) values on the left side of the object, and a two-dimensional plot of the chromaticity values (a^*-b^* or $a-b$ values) on the right side. (Plot type can be changed using the right-click menu.)










For Illuminant Settings: Single Illuminant



For Illuminant Settings: Multiple Illuminants (Primary, Secondary, and Tertiary selected)

3.2.2 Button bar (L*a*b* or Hunter Lab Graph)

When the graph is selected, the button bar will appear to the right of the graph with the following buttons:

	Opens a sub-menu with the following choices:	
<i>Zoom IN</i>		When checked, the button will change to  . When the graph is clicked on while this is enabled, the graph will be zoomed in. Clicking and dragging on the graph will zoom in on the selected area.
<i>Zoom OUT</i>		When checked, the button will change to  . When the graph is clicked on while this is enabled, the graph will be zoomed out.
<i>Reset</i>		Resets the graph zoom level to 0.
<i>Hand Tool</i>		When clicked, the button will change to  . When the graph is clicked on while this is enabled, the hand can be used to click and drag on a zoomed graph to slide the graph and view a different part of the graph.
	Enable/disable automatic scaling to include all plotted sample data. Button will be  when automatic scaling to include all plotted sample data is enabled.	
	Opens the Properties dialog box. See p. 182.	


3.2.3 Right-click menu (L*a*b* or Hunter Lab Graph)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the L*a*b* or Hunter Lab graph object.

<i>Cut</i>	Cuts the graph to the clipboard.	
<i>Copy</i>	Copies the graph to the clipboard.	
<i>Paste</i>	Pastes previously cut/copied graphic object.	
<i>Sequence</i>	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers.	
<i>Group Settings</i>	Opens a submenu for selecting the group trait for which to display data. (For single-channel instruments, "-----" will be shown.)	
<i>Plot Type</i>	Opens a submenu for selecting the type of plot to display. Available selections:	
	L*a*b* Graph:	L*; L*, a*-b*; a*-b*; a*-L*; b*-L*
	Hunter Lab Graph:	L; L, a-b; a-b; a-L; b-L

Illuminant Settings (See p. 54 for setting illuminant/observer combinations.)	Single Illuminant: Selects the single illuminant/observer combinations based on which the displayed plot data will be calculated. Available selections: Primary; Secondary; Tertiary
	Multiple Illuminants: Selects the illuminant/observer combinations based on which the displayed color plot data will be calculated. When using multiple illuminant mode, set the observer for Secondary and Tertiary illuminant observer conditions to the same observer as Primary illuminant/observer condition. Available selections: Primary; Secondary; Tertiary <ul style="list-style-type: none"> • Tertiary can be selected even if Secondary has not been selected. • When Secondary, Secondary and Tertiary, or Tertiary are selected, graph will change to show multiple illuminant plot for a single measurement, regardless of “Display all sample data” setting in Properties dialog.
Group Traits Selection	Opens the Group Traits dialog for selecting which instrument and set of group traits will be used for the data to display on the graph.
Properties	Opens the Properties dialog. See p. 182.

3.2.4 Properties Dialog (L*a*b* or Hunter Lab Graph)

Clicking on the Properties button , selecting Properties... from the right-click menu, or double-clicking on the graph object opens the L*a*b* Graph or Hunter Lab Graph Properties dialog for specifying the properties of the graph.

- To expand a category in the category list on the left side, click [+] next to the category name.
- To contract an expanded category, click [-] next to the category name.

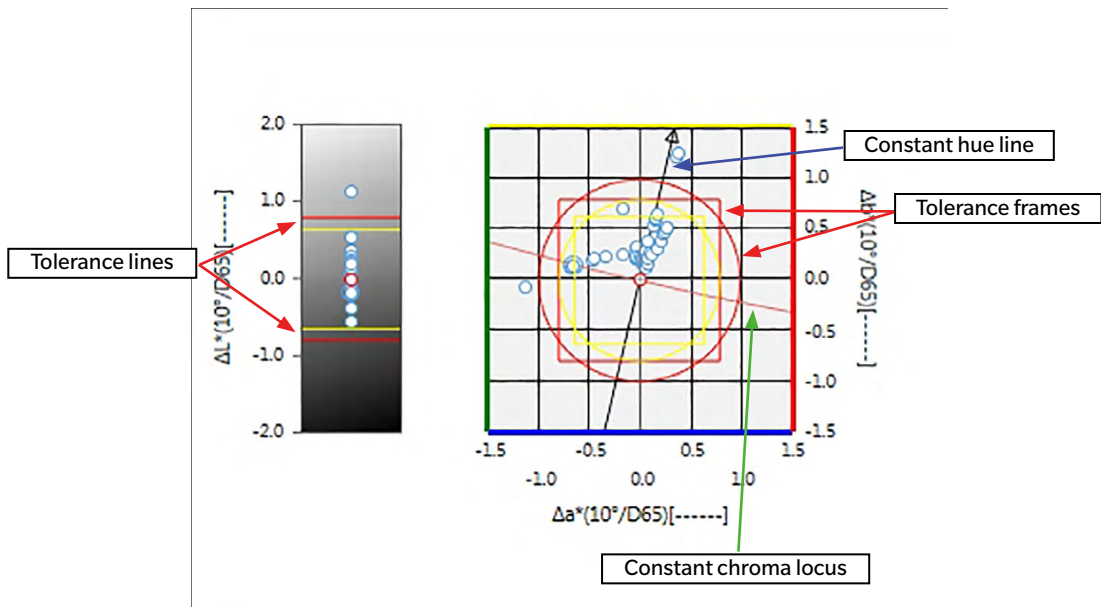
Category	Properties included in category
Marker	Sample Data: Connect markers with lines; Shape, size, and color of markers Target: Connect markers with lines; Enable/disable display and shape, size, and color of marker Data number: Enable/disable, and font/font color of text
Brightness Axis	Scale: Minimum/maximum/scale interval, number of decimal places for scales Label: Display enable/disable, label text, and font/font color to use Whether or not to show all sample data
Horizontal and Vertical Axes	Scale: Center/minimum/maximum/scale interval, number of decimal places for scales Label: Enable/disable display, label text, and font/font color of text Whether or not to show all sample data
Title	Graph title: Enable/disable display, text and font/font color of graph title Channel information: Display enable/disable
Background	Background colors for entire graph area and graph plot area, grid color and outline color for graph plot area

- For the items which allow the font to be set, the font button will be enabled only if display of the item is enabled. For the settings available in the Font dialog, see p. 207.

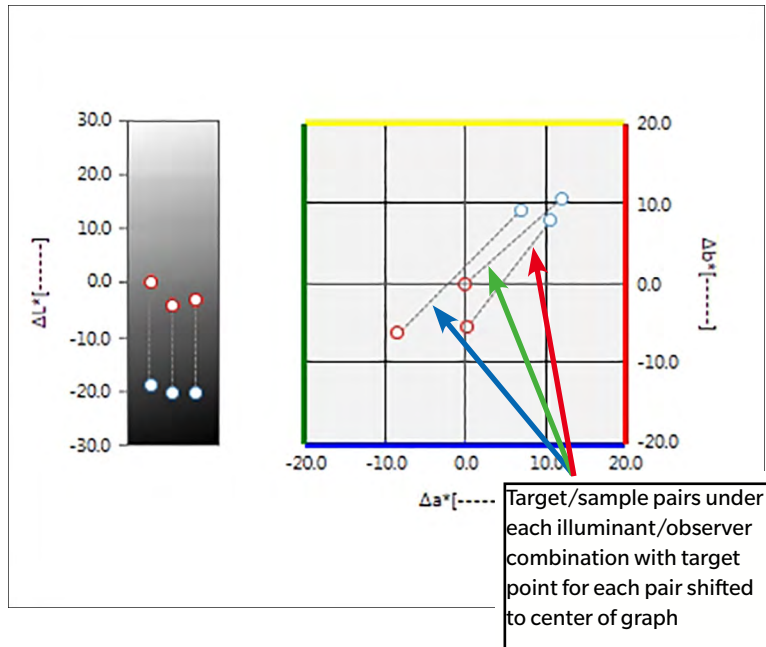
3.3 $\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ Graph

3.3.1 Overview

The $\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ graph object is used to view color difference values plotted respectively in the $L^* a^* b^*$ or Hunter Lab color space. The default plot type (the type shown when the $\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ graph object is first placed on the Canvas Pane) shows a bar graph of the brightness difference (ΔL^* or ΔL) values on the left side of the object, and a two-dimensional plot of the color-difference ($\Delta a^* - \Delta b^*$ or $\Delta a - \Delta b$) values on the right side. (Plot type can be changed using the right-click menu.) Property settings allow display of the constant hue locus and constant chroma locus for the target and frames to indicate tolerances to be enabled or disabled.



For Illuminant Settings: Single Illuminant



For Illuminant Setting: Multiple Illuminants (Primary, Secondary, and Tertiary selected)

3.3.2 Button bar ($\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ Graph)

When the graph is selected, the button bar will appear to the right of the graph with the following buttons:


	Opens a sub-menu with the following choices:	
	Zoom IN	When checked, the button will change to . When the graph is clicked on while this is enabled, the graph will be zoomed in. Clicking and dragging on the graph will zoom in on the selected area.
	Zoom OUT	When checked, the button will change to . When the graph is clicked on while this is enabled, the graph will be zoomed out.
	Reset	Resets the graph zoom level to 0.
	Hand Tool	When clicked, the button will change to . When the graph is clicked on while this is enabled, the hand can be used to click and drag on a zoomed graph to slide the graph and view a different part of the graph.
	Enable/disable automatic scaling to tolerance. Button will be when automatic scaling to tolerance is enabled.	
	Enable/disable automatic scaling to include all plotted sample data. Button will be when automatic scaling to include all plotted sample data is enabled.	
	Enable/disable display of tolerance frames. Button will be when display of tolerance frames is enabled.	
	Opens the Properties dialog box. See p. 186.	

3.3.3 Right-click menu ($\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ Graph)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the $\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ graph object.

<i>Cut</i>	Cuts the graph to the clipboard.	
<i>Copy</i>	Copies the graph to the clipboard.	
<i>Paste</i>	Pastes previously cut/copied graphic object.	
<i>Sequence</i>	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers.	
<i>Group Settings</i>	Opens a submenu for selecting the group trait for which to display data. (For single-channel instruments, "-----" will be shown.)	
<i>Plot Type</i>	Opens a submenu for selecting the type of plot to display. Available selections:	
	$\Delta L^* \Delta a^* \Delta b^*$ Graph:	ΔL^* ; ΔL^* , $\Delta a^* - \Delta b^*$; $\Delta a^* - \Delta b^*$; $\Delta a^* - \Delta L^*$; $\Delta b^* - \Delta L^*$
	Hunter $\Delta L \Delta a \Delta b$ Graph:	ΔL ; ΔL , $\Delta a - \Delta b$; $\Delta a - \Delta b$; $\Delta a - \Delta L$; $\Delta b - \Delta L$
<i>Illuminant Settings</i> (See p. 54 for setting illuminant/observer combinations.)	Single Illuminant: Selects the single illuminant/observer combinations based on which the displayed plot data will be calculated. Available selections: Primary; Secondary; Tertiary	
	Multiple Illuminants: Selects the illuminant/observer combinations based on which the displayed color plot data will be calculated. When using multiple illuminant mode, set the observer for Secondary and Tertiary illuminant observer conditions to the same observer as Primary illuminant/observer condition. Available selections: Primary; Secondary; Tertiary <ul style="list-style-type: none"> • Tertiary can be selected even if Secondary has not been selected. • When Secondary, Secondary and Tertiary, or Tertiary are selected, graph will change to show multiple illuminant plot for a single measurement, regardless of "Display all sample data" setting in Properties dialog. 	
<i>Group Traits Selection</i>	Opens the Group Traits dialog for selecting which instrument and set of group traits will be used for the data to display on the graph.	
<i>Properties</i>	Opens the Properties dialog. See p. 186.	

3.3.4 Properties Dialog ($\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ Graph)

Clicking on the Properties button , selecting Properties... from the right-click menu, or double-clicking on the graph object opens the $\Delta L^* \Delta a^* \Delta b^*$ Graph or Hunter Lab Graph Properties dialog for specifying the properties of the graph.

- To expand a category in the category list on the left side, click [+] next to the category name.
- To contract an expanded category, click [-] next to the category name.

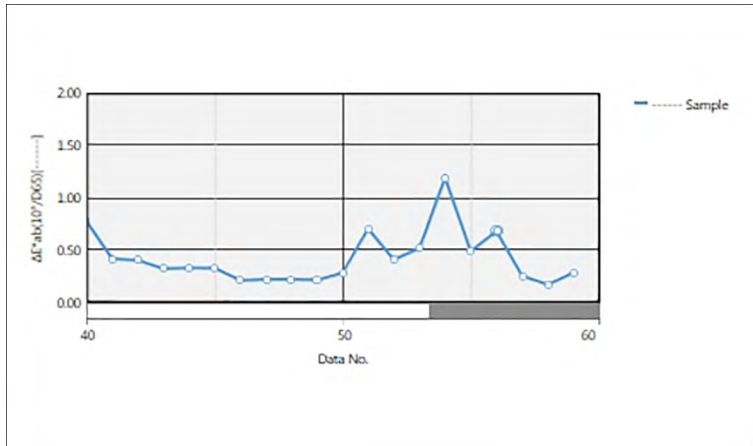
Category	Properties included in category
Marker	Sample Data: Shape, size, and color of markers Target: Enable/disable display and shape, size, and color of marker Tolerance: Enable/disable display of tolerance, master tolerance, and projection tolerance Constant Hue Locus: Enable/disable and shape, size, and color of display Constant Chroma Locus: Enable/disable and shape, size, and color of display Data number: Enable/disable, and font/font color of text
Brightness Axis	Scale: Minimum/maximum/scale interval, number of decimal places for scales Label: Enable/disable display, label text, and font/font color of text Whether or not to show all sample data
Horizontal and Vertical Axes	Scale: Maximum range/scale interval, number of decimal places for scales Label: Display enable/disable, label text, and font/font color to use for each axis Whether or not to show all sample data
Title	Graph title: Enable/disable display, text and font/font color of graph title Channel information: Display enable/disable
Background	Background colors for entire graph area and graph plot area, grid color and outline color for graph plot area

- For the items which allow the font to be set, the font button will be enabled only if display of the item is enabled. For the settings available in the Font dialog, see p. 207.

3.4 Trend Graph

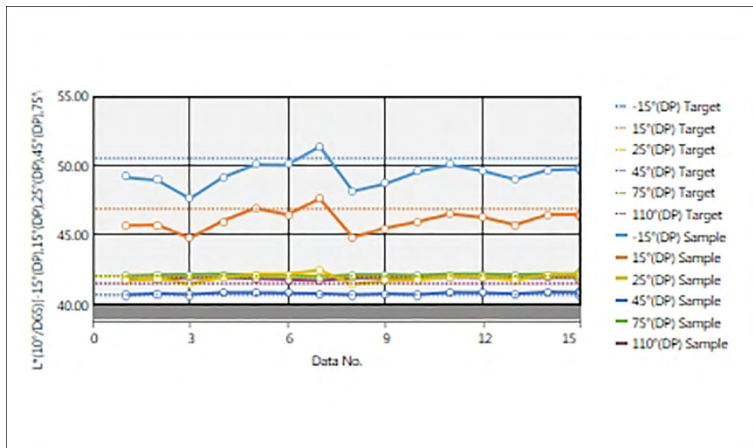
3.4.1 Overview

The trend graph object is used to view the trend of the specific color value or color difference value over a series of measurements.












Trend graph

if the measurement data includes data for multiple group traits (such as data measured with the CM-M6), multiple lines (one for each group trait) can be displayed on the same graph, and the display of the lines for each group trait can be enabled/disabled.



3.4.2 Button bar (Trend Graph)

When the graph is selected, the button bar will appear to the right of the graph with the following buttons:


	Opens a sub-menu with the following choices:	
	<i>Zoom IN</i>	When checked, the button will change to  . When the graph is clicked on while this is enabled, the graph will be zoomed in. Clicking and dragging on the graph will zoom in on the selected area.
	<i>Zoom OUT</i>	When checked, the button will change to  . When the graph is clicked on while this is enabled, the graph will be zoomed out.
	<i>Reset</i>	Resets the graph zoom level to 0.
	<i>Hand Tool</i>	When clicked, the button will change to  . When the graph is clicked on while this is enabled, the hand can be used to click and drag on a zoomed graph to slide the graph and view a different part of the graph.
	Enable/disable automatic scaling to include all graphed sample data. Button will be  when automatic scaling to include all graphed sample data is enabled.	
	Enable/disable display of tolerance lines. Button will be  when display of tolerance lines is enabled.	
	Opens the Properties dialog box. See p. 189.	

3.4.3 Right-click menu (Trend Graph)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the trend graph object.

<i>Cut</i>	Cuts the graph to the clipboard.
<i>Copy</i>	Copies the graph to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers.
<i>Group Settings</i>	Opens a submenu for enabling/disabling display of the line graph for each group trait. (Which traits can be selected depends on the Instrument and Group Traits selected in the Group Traits dialog.) If only a single group trait is available, "-----" will be shown.
<i>Group Traits Selection</i>	Opens the Group Traits dialog for selecting which instrument and set of group traits will be used for the data to display on the graph.
<i>Display Items</i>	Opens a submenu for selecting the list item to show in the graph. Available selections will be the colorimetric list items shown in the Data List (list items selected in the observer/illuminant categories). <ul style="list-style-type: none"> Some list items may not be selectable.
<i>Properties</i>	Opens the Properties dialog. See p. 189.

3.4.4 Properties Dialog (Trend Graph)

Clicking on the Properties button , selecting Properties... from the right-click menu, or double-clicking on the graph object opens the Trend Graph Properties dialog for specifying the properties of the graph.

- To expand a category in the category list on the left side, click [+] next to the category name.
- To contract an expanded category, click [-] next to the category name.

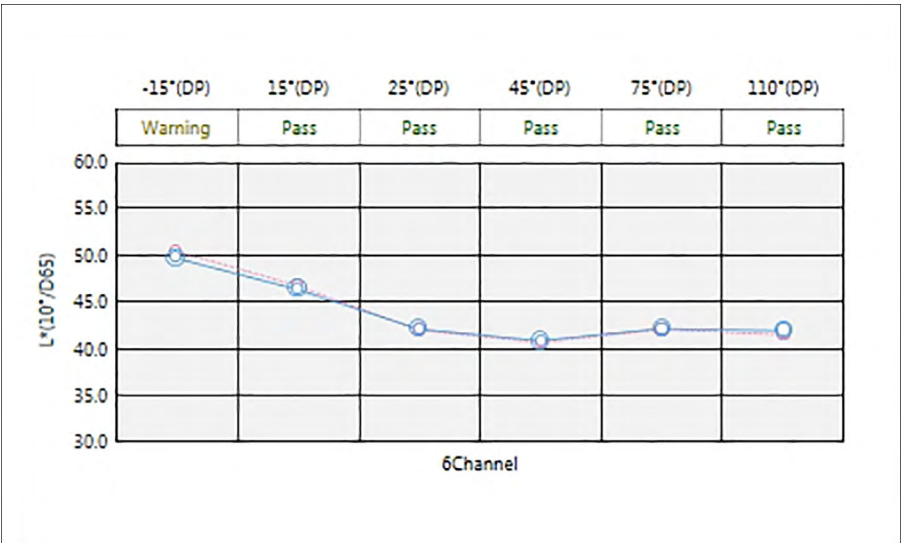
Category	Properties included in category	
Marker/Legend	Subcategories:	
	Data with single group trait:	-----
	Data with multiple group traits:	Each group trait (for example, for CM-M6: -15°(DP) , 15°(DP) , 25°(DP) , 45°(DP) , 75°(DP) , and 110°(DP))
	Sample Data: Shape, size, and color of markers Legend: Text to be used in the graph legend for each data group setting	
Font	Font used for data number and legend. See p. 207.	
Vertical Axis	Scale: Minimum/maximum/scale interval, number of decimal places for scales Label: Enable/disable display, label text, and font/font color of text	
Horizontal Axis	Scale: Auto/Manual (manual scale interval), number of decimal places for scale values Label: Display enable/disable, label text, and font/font color to use Whether or not to show all data	
Title	Graph title: Enable/disable display, text and font/font color of graph title Channel information: Display enable/disable	
Background	Background colors for entire graph area and graph plot area, grid color and outline color for graph plot area	
Show tolerance	Line type, color, and width for tolerance lines	

- For the items which allow the font to be set, the font button will be enabled only if display of the item is enabled. For the settings available in the Font dialog, see p. 207.

3.5 MultiChannel Graph

3.5.1 Overview

The multichannel graph object is used to view the measurement data for a specific color value or color difference value grouped by the measurement group trait on instruments which provide data for multiple group traits.



3.5.2 Button bar (MultiChannel Graph)

When the graph is selected, the button bar will appear to the right of the graph with the following buttons:


	Enable/disable automatic scaling to include all graphed sample data. Button will be when automatic scaling to include all graphed sample data is enabled.
	Enable/disable display of tolerance lines. Button will be when display of tolerance lines is enabled.
	Opens the Properties dialog box. See p. 193.

3.5.3 Right-click menu (MultiChannel Graph)

Right-clicking a graphic object opens a context menu showing the available menu items. Table below shows the menu items available for the multichannel graph object.

<i>Cut</i>	Cuts the graph to the clipboard.
<i>Copy</i>	Copies the graph to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers.
<i>Display Items</i>	Opens a submenu for selecting the list item to show in the graph. Available selections will be the colorimetric list items shown in the Data List (list items selected in the observer/illuminant categories). <ul style="list-style-type: none"> Some list items may not be selectable.
<i>Group Traits Selection</i>	Opens the Group Traits dialog for selecting which instrument and set of group traits will be used for the data to display on the graph.
<i>Properties</i>	Opens the Properties dialog. See p. 193.

3.5.4 Properties Dialog (MultiChannel Graph)

Clicking on the Properties button , selecting Properties... from the right-click menu, or double-clicking on the graph object opens the MultiChannel Graph Properties dialog for specifying the properties of the graph.

- To expand a category in the category list on the left side, click [+] next to the category name.
- To contract an expanded category, click [-] next to the category name.

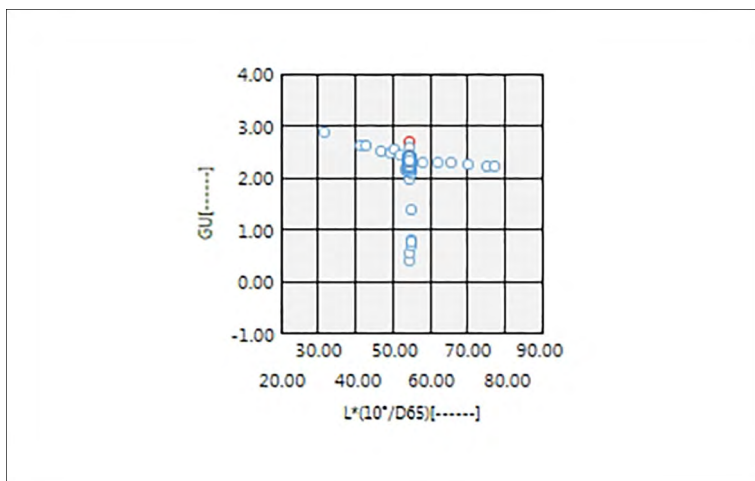
Category	Properties included in category
Marker	Sample Data: Shape, size, and color of markers Target: Enable/disable display and shape, size, and color of markers Tolerance: Enable/disable display of upper and lower limit lines Data number: Enable/disable, and font/font color of text
Vertical Axis	Scale: Minimum/maximum/scale interval, number of decimal places for scales Label: Enable/disable display, label text, and font/font color of text Whether or not to show all data
Horizontal Axis	Label: Display enable/disable, label text, and font/font color to use
Title	Graph title: Enable/disable display, text and font/font color of graph title
Background	Background colors for entire graph area and graph plot area, grid color and outline color for graph plot area
Show tolerance	Line type, color, and width for tolerance lines for each group trait

- For the items which allow the font to be set, the font button will be enabled only if display of the item is enabled. For the settings available in the Font dialog, see p. 207.

3.6 2-Axis Graph









3.6.1 Overview

The 2-axis graph object is used to view the measurement values for two items (for example, two colorimetric values or indexes) on a graph.



3.6.2 Button bar (2-Axis Graph)

When the graph is selected, the button bar will appear to the right of the graph with the following buttons:


	Opens a sub-menu with the following choices:	
	<i>Zoom IN</i>	When checked, the button will change to  . When the graph is clicked on while this is enabled, the graph will be zoomed in. Clicking and dragging on the graph will zoom in on the selected area.
	<i>Zoom OUT</i>	When checked, the button will change to  . When the graph is clicked on while this is enabled, the graph will be zoomed out.
	<i>Reset</i>	Resets the graph zoom level to 0.
	<i>Hand Tool</i>	When clicked, the button will change to  . When the graph is clicked on while this is enabled, the hand can be used to click and drag on a zoomed graph to slide the graph and view a different part of the graph.
		Enable/disable automatic scaling to include all plotted sample data. Button will be  when automatic scaling to include all plotted sample data is enabled.
	Opens the Properties dialog box. See p. 193.	

3.6.3 Right-click menu (2-Axis Graph)

Right-clicking a graphic object opens a context menu showing the available menu items.

<i>Cut</i>	Cuts the graph to the clipboard.
<i>Copy</i>	Copies the graph to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers.
<i>Group Settings</i>	Opens a submenu for enabling/disabling display of data for each group trait. (Which traits can be selected depends on the Instrument and Group Traits selected in the Group Traits dialog.) If only a single group trait is available, “-----” will be shown.
<i>Item Setting</i>	Opens a dialog for selecting the list items to show in the graph. Available selections will be the colorimetric list items shown in the Data List (list items selected in the observer/illuminant categories). <ul style="list-style-type: none"> Some list items may not be selectable.
<i>Group Traits Selection</i>	Opens the Group Traits dialog for selecting which instrument and set of group traits will be used for the data to display on the graph.
<i>Properties</i>	Opens the Properties dialog. See p. 193.

3.6.4 Properties Dialog (2-Axis Graph)

Clicking on the Properties button , selecting Properties... from the right-click menu, or double-clicking on the graph object opens the 2-Axis Graph Properties dialog for specifying the properties of the graph.

- To expand a category in the category list on the left side, click [+] next to the category name.
- To contract an expanded category, click [-] next to the category name.

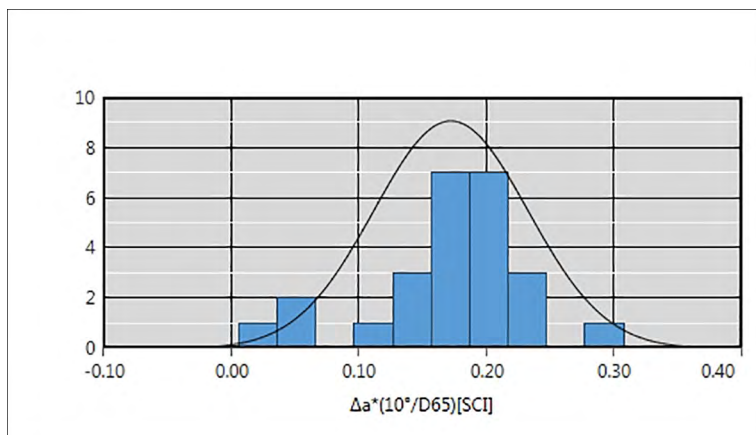
Category	Properties included in category
Marker	Sample Data: Shape, size, and color of markers; Connect with lines Target: Enable/disable display and shape, size, and color of markers; Connect with lines Data number: Enable/disable, and font/font color of text
Vertical Axis	Scale: Minimum/maximum/scale interval, number of decimal places for scales Label: Enable/disable display, label text, and font/font color of text Display all sample data.
Horizontal Axis	Scale: Minimum/maximum/scale interval, number of decimal places for scales Label: Display enable/disable, label text, and font/font color to use Channel information: Display enable/disable
Title	Graph title: Enable/disable display, text and font/font color of graph title
Background	Background colors for entire graph area and graph plot area, grid color and outline color for graph plot area

- For the items which allow the font to be set, the font button will be enabled only if display of the item is enabled. For the settings available in the Font dialog, see p. 207.

3.7 Histogram

3.7.1 Overview

The histogram graph object is used to view the distribution of a specific color value, color-difference value, or index on a graph.



3.7.2 Button bar (Histogram)

When the graph is selected, the button bar will appear to the right of the graph with the following buttons:


	Opens a sub-menu with the following choices:	
	<i>Zoom IN</i>	When checked, the button will change to . When the graph is clicked on while this is enabled, the graph will be zoomed in. Clicking and dragging on the graph will zoom in on the selected area.
	<i>Zoom OUT</i>	When checked, the button will change to . When the graph is clicked on while this is enabled, the graph will be zoomed out.
	<i>Reset</i>	Resets the graph zoom level to 0.
	<i>Hand Tool</i>	When clicked, the button will change to . When the graph is clicked on while this is enabled, the hand can be used to click and drag on a zoomed graph to slide the graph and view a different part of the graph.
	Enable/disable automatic scaling to include all graphed sample data. Button will be when automatic scaling to include all graphed sample data is enabled.	
	Enable/disable display of tolerance lines. Button will be when display of tolerance lines is enabled.	
	Opens the Properties dialog box. See p. 196.	

3.7.3 Right-click menu (Histogram)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the Histogram object.

<i>Cut</i>	Cuts the graph to the clipboard.
<i>Copy</i>	Copies the graph to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers.
<i>Group Settings</i>	Opens a submenu for enabling/disabling display of the line graph for each group trait. (Which traits can be selected depends on the Instrument and Group Traits selected in the Group Traits dialog.) If only a single group trait is available, “-----” will be shown.
<i>Group Traits Selection</i>	Opens the Group Traits dialog for selecting which instrument and set of group traits will be used for the data to display on the graph.
<i>Display Items</i>	Opens a submenu for selecting the list item to show in the graph. Available selections will be the colorimetric list items shown in the Data List (list items selected in the observer/illuminant categories). <ul style="list-style-type: none"> • Some list items may not be selectable.
<i>Properties</i>	Opens the Properties dialog. See p. 196.

3.7.4 Properties Dialog (Histogram)

Clicking on the Properties button , selecting Properties... from the right-click menu, or double-clicking on the graph object opens the Histogram Properties dialog for specifying the properties of the graph.

- To expand a category in the category list on the left side, click [+] next to the category name.
- To contract an expanded category, click [-] next to the category name.

Category	Properties included in category
Marker	Histogram: Color and number of histogram bars; Width of bars calculated from number of bars and is not editable. Normal Distribution: Enable/disable display of normal distribution curve Reference Data (Enabled in Absolute Value Display): Enable/disable display and color, and line thickness of target line Tolerance Data (Enabled in Color Difference Display): Enable/disable display of upper and lower limit lines
Vertical Axis	Label: Enable/disable display, label text, and font/font color of text
Horizontal Axis	Scale: Auto/Manual (manual scale interval), number of decimal places for scale values Label: Display enable/disable, label text, and font/font color to use
Title	Graph title: Enable/disable display, text and font/font color of graph title Channel information: Enable/disable display of group trait of data
Background	Background colors for entire graph area and graph plot area, grid color and outline color for graph plot area

- For the items which allow the font to be set, the font button will be enabled only if display of the item is enabled. For the settings available in the Font dialog, see p. 207.

3.8 Line Object

3.8.1 Overview

The line object is used to add a straight line to the Canvas Pane. The angle of the line can be changed by clicking and dragging either end of the line.

3.8.2 Right-click menu (Line Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the line object.

<i>Cut</i>	Cuts the object to the clipboard.
<i>Copy</i>	Copies the object to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers
<i>Properties</i>	Opens the Properties dialog. See below.

3.8.3 Properties Dialog (Line Object)

Selecting Properties... from the right-click menu or double-clicking on the object opens the Line Properties dialog for specifying the properties of the object.

General	Set the type (solid, dot, dash), color, and width of the line.
---------	--

3.9 Rectangle Object

3.9.1 Overview

The rectangle object is used to add a rectangle to the Canvas Pane.

3.9.2 Right-click menu (Rectangle Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the rectangle object.

<i>Cut</i>	Cuts the object to the clipboard.
<i>Copy</i>	Copies the object to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers.
<i>Properties</i>	Opens the Properties dialog. See below.

3.9.3 Properties Dialog (Rectangle Object)

Selecting Properties... from the right-click menu or double-clicking on the object opens the Rectangle Properties dialog for specifying the properties of the object.

General	Outline	Set the type (solid, dot, dash), color, and width of the rectangle outline.
	Background	Set the fill color of the rectangle
	Round off corners	Set the degree of rounding of the rectangle corners from 0 (no rounding; right angle) to 5.

3.10 Image Object

3.10.1 Overview

The image object is used to add an image to the Canvas Pane. The image file can be in gif, jpg, jpeg, png, or bmp format.

3.10.2 Right-click menu (Image Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the image object.

<i>Cut</i>	Cuts the object to the clipboard.
<i>Copy</i>	Copies the object to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers.
<i>Properties</i>	Opens the Properties dialog. See below.

3.10.3 Properties Dialog (Image Object)

Selecting Properties... from the right-click menu or double-clicking on the object opens the Image Object Properties dialog for specifying the properties of the object.

General	Image file Click [Browse] and browse to the desired image file. (Acceptable file formats: gif, jpg, jpeg, png, bmp)
---------	---

3.11 String Label Object

3.11.1 Overview

The string label object is used to add text to the Canvas Pane.

3.11.2 Right-click menu (String Label Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the string label object.

<i>Cut</i>	Cuts the object to the clipboard.
<i>Copy</i>	Copies the object to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers.
<i>Properties</i>	Opens the Properties dialog. See below.

3.11.3 Properties Dialog (String Label Object)

Selecting Properties... from the right-click menu or double-clicking on the object opens the String Label Properties dialog for specifying the properties of the object.

General	Caption	Input the desired text in the Caption text box.
		Click [Font] to select the desired font. See p. 207. Set the font color and display position of the text within the string label object frame .
	Outline	Set the type (solid, dot, dash), color, and width of the rectangle outline.
	Background	Set the background color of the string label object.

3.12 Pseudo Color Object

3.12.1 Overview

The pseudo color object is used to view pseudo color patches of the selected sample or samples.




Pseudo color object

3.12.2 Right-click menu (Pseudo Color Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the pseudo color object.

<i>Cut</i>	Cuts the graph to the clipboard.	
<i>Copy</i>	Copies the graph to the clipboard.	
<i>Paste</i>	Pastes previously cut/copied graphic object.	
<i>Sequence</i>	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers.	
<i>Group Traits Selection</i>	Opens the Group Traits dialog for selecting which instrument and set of group traits will be used for the data to display on the graph.	
<i>Group Settings</i>	Opens a submenu for enabling/disabling display of data for each group trait. (Which traits can be selected depends on the Instrument and Group Traits selected in the Group Traits dialog.) If only a single group trait is available, "-----" will be shown.	
<i>Illuminant Settings</i> (See p. 54 for setting illuminant/observer combinations.)	Single Illuminant: Selects the single illuminant/observer combinations based on which the displayed plot data will be calculated. Available selections: Primary; Secondary; Tertiary	
<i>Data Type</i>	Sample	Enables/disables color patch display for selected sample(s).
	Target	Master Target: Shows color patche(s) for master target. Working Target: Shows color patche(s) for working target.
<i>Properties</i>	Opens the Properties dialog. See p. 202.	

3.12.3 Properties Dialog (Pseudo Color Object)

Clicking on the Properties button , selecting Properties... from the right-click menu, or double-clicking on the object opens the Pseudo Color Properties dialog for specifying the properties of the object.

General	Enable/disable display of caption for each color patch, and set the font, font color and display position of captions.
---------	--

- For the items which allow the font to be set, the font button will be enabled only if display of the item is enabled. For the settings available in the Font dialog, see p. 207.

3.13 Data List Object

3.13.1 Overview

The data list object is used to add a table of the Data List data for selected measurements to the Canvas Pane.

	Data Name	Judgement	Group Traits	$\Delta L^*(10^\circ/D_{90})$	$\Delta a^*(10^\circ/D_{90})$
47	Sample#0088	Pass	-----	0.07	-0.02
48	Sample#0089	Pass	-----	0.09	-0.02
49	Sample#0090	Pass	-----	0.10	-0.02
50	Sample#0091	Pass	-----	0.02	-0.15
51	Sample#0092	Warning	-----	-0.20	-0.67
52	Sample#0093	Pass	-----	-0.06	-0.34
53	Sample#0094	Pass	-----	-0.11	-0.47

3.13.2 Right-click menu (Data List Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the data list object.

<i>Cut</i>	Cuts the object to the clipboard.
<i>Copy</i>	Copies the object to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers.
<i>Properties</i>	Opens the Properties dialog. See below.

3.13.3 Properties Dialog (Data List Object)

Selecting Properties... from the right-click menu or double-clicking on the object opens the Data List Object Properties dialog for specifying the properties of the object.

General	Borders	Set the type (solid, dot, dash), color, and width of the lines in the data list table.
	Background	Set the background color of the data list table.
		Click [Font] to select the desired font. See p. 207. Set the font color and display position of the text within the data list table.

3.14 Numeric Label Object

3.14.1 Overview

The numeric label object is used to show the value for a single data item from among the list items shown in the Data List.

3.14.2 Right-click menu (Numeric Label Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the numeric label object.

<i>Cut</i>	Cuts the object to the clipboard.	
<i>Copy</i>	Copies the object to the clipboard.	
<i>Paste</i>	Pastes previously cut/copied graphic object.	
<i>Sequence</i>	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers.	
<i>Group Traits Selection</i>	Opens the Group Traits dialog for selecting which instrument and set of group traits will be used for the data to display on the graph.	
<i>Group Settings</i>	Opens a submenu for enabling/disabling display of data for each group trait. (Which traits can be selected depends on the Instrument and Group Traits selected in the Group Traits dialog.) If only a single group trait is available, “-----” will be shown.	
<i>Data Type</i>	Sample	Enables/disables color patch display for selected sample(s).
	Target	Master Target: Shows color patche(s) for master target. Working Target: Shows color patche(s) for working target.
<i>Display Items</i>	Opens a submenu for selecting the list item to show in the graph. Available selections will be the list items shown in the Data List.	
<i>Properties</i>	Opens the Properties dialog. See p. 205.	

3.14.3 Properties Dialog (Numeric Label Object)

Selecting Properties... from the right-click menu or double-clicking on the object opens the Numeric Label Properties dialog for specifying the properties of the object.

General	Caption	<p>(The caption itself is set automatically and cannot be changed.) Click [Font] to select the desired font. See p. 207. Set the font color and display position of the text within the data list table. Show numerical value and assessment only: Value will be shown without caption. Display with the judgement display settings: Value will be shown with the font color specified in Judgement Settings (see p. 100).</p>
	Outline	<p>Line: Set the type (solid, dot, dash), color, and width of the outline of the data label object.</p>
	Background	<p>Set the color of the background of the data label object using the pulldown. Display with the judgement display settings: Background color will be as specified in Judgement Settings (see p. 100).</p>
	Display format	<p>Data: Show the numerical data for the selected display item. Pass/Warn/Fail: Show the judgment results.</p>

3.15 Statistics Object

The statistics object is used to add a table of statistics values for the data for a selected list item to the Canvas Pane. What list item to show statistics for and which statistics values to show can be set.

3.15.1 Right-click menu (Statistics Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the statistics object.

<i>Cut</i>	Cuts the object to the clipboard.
<i>Copy</i>	Copies the object to the clipboard.
<i>Paste</i>	Pastes previously cut/copied graphic object.
<i>Sequence</i>	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers.
<i>Group Traits Selection</i>	Opens the Group Traits dialog for selecting which instrument and set of group traits will be used for the data to display on the graph.
<i>Group Settings</i>	Opens a submenu for enabling/disabling display of data for each group trait. (Which traits can be selected depends on the Instrument and Group Traits selected in the Group Traits dialog.) If only a single group trait is available, "-----" will be shown.
<i>Display Items</i>	Available selections will be the colorimetric list items shown in the Data List (list items selected in the observer/illuminant categories). <ul style="list-style-type: none"> Some list items may not be selectable.
<i>Properties</i>	Opens the Properties dialog. See p. 206.

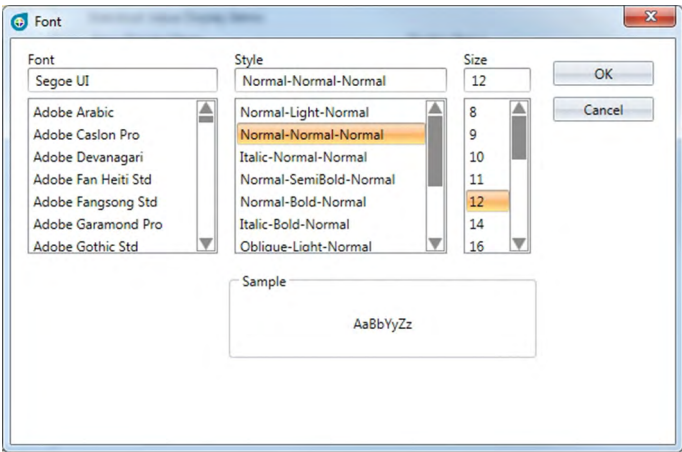
3.15.2 Properties Dialog (Statistics Object)

Selecting Properties... from the right-click menu or double-clicking on the object opens the Statistical Value Properties dialog for specifying the properties of the object.

General	Statistical Value Display Items: Select which items to display/not display by moving items between the two lists. All items are initially displayed by default. Click [Font] to select the desired font. See p. 207. Set the font color and display position of the text within the statistics area.	
	Outline	Set the type (solid, dot, dash), color, and width of the outline of the statistics object.
	Background	Set the color of the background of the statistics object.

3.16 Font Dialog

Clicking [Font] in the Properties dialog of a graphic object opens the Font dialog.



■ Font

The currently selected font is shown above the font list. To select a different font, scroll down through the list and click on the desired font.

■ Style

The currently selected font style is shown above the style list.
The style is specified as follows:

Character style-Character thickness-Character width

Character style	The shape of the character: Normal, Italic, Oblique, etc.
Character thickness	How thick the lines of the character are: Normal, Bold, Semi-bold, Light, etc.
Character width	How wide the character will be: Normal, Condensed, ExtraCondensed, etc.

- Which combinations of the above styles will be available depends on the font.

■ Size

The currently selected font size is shown at the top of the list. To select a different size, scroll down through the list and click on the desired size, or input the desired size directly.

■ Sample

Sample text in the selected font, style, and size will be shown.

CHAPTER 4

DIAGNOSIS FUNCTION

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4.1 Introduction

The diagnosis function can be used to perform a simple check of your instruments condition.

The diagnosis function measures various performance factors, and compares them to previous measurements of such factors.

On-screen guidance is provided throughout the diagnosis function.

Periodic use of this function will help to assure you and your customers that the instrument is operating properly and taking accurate measurements, and since trends are monitored, it can help you to forecast when servicing by a Konica Minolta authorized facility will be needed in the future.

4.1.1 Diagnosis Function Operation Flow

Create Diagnosis Project

- Select instrument.

- Select test items.

- Select test configuration.

 - Measurement conditions

 - Viewing conditions

 - Test conditions (number of measurements, number of samples)

 - Calibration requirements

- Set threshold values for warning and severe levels.

- Confirm all selections and save project.

Initialize values.

- Measure white calibration plate and standard tiles to set initial baseline reference values

- Display report of initial values

Run diagnosis function

- Measure white calibration plate and standard tiles.

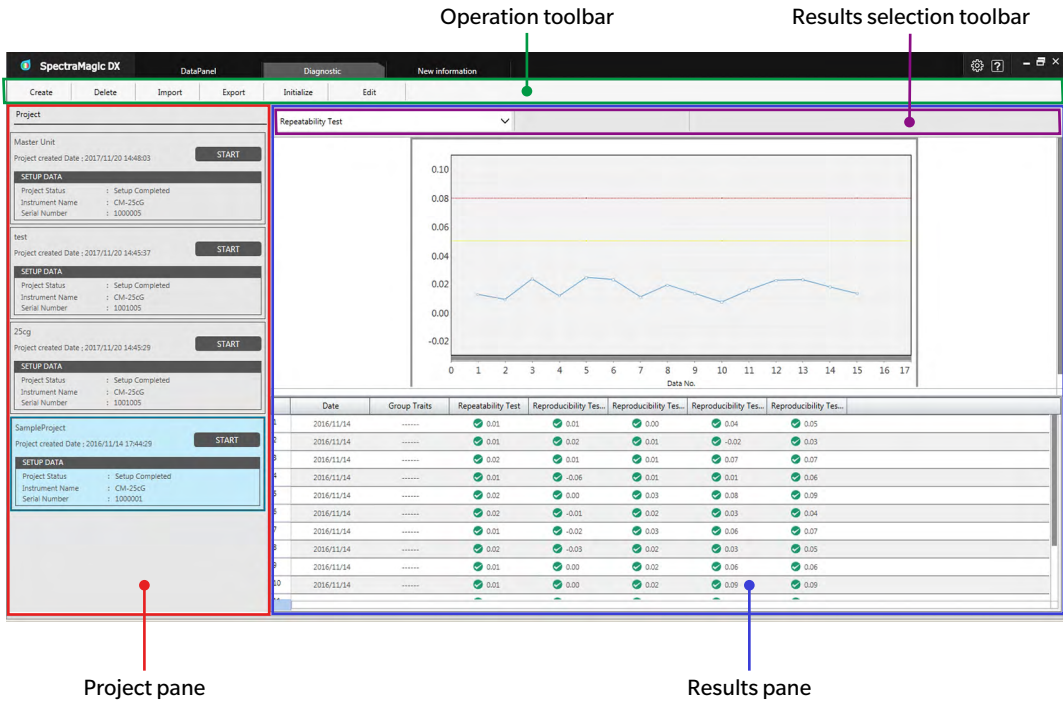
- View results against threshold values.

 - If results are outside of threshold value, consider having your instrument inspected.

- View trend of measurement values against previous values.

- Display report of results.

4.1.2 Diagnosis Panel



■ Project pane

Shows a list of created projects and their current status.

■ Results pane

Shows the results of project execution on a graph and in a list. The results to show on the graph can be selected with the Results selection toolbar.

■ Diagnosis operation toolbar

The operation toolbar is used to select which operation to perform with projects.

- Create: Creates a new project. See p. 213.
- Delete: Deletes an existing project and all diagnosis data associated with it. See p. 231.
- Import: Imports a previously saved diagnosis project (*.dec) file. See p. 232.
- Export: Exports the selected project to a *.dec file. Which data associated with the project should be exported can be selected. See p. 232.
- Initialize: Initializes the settings for a project. See p. 220.
- Edit: Edits an existing project. See p. 233.

■ Results Selection Toolbar

The results selection toolbar is shown only when there are results for the selected project (when the selected project has been executed at least once).

The results selection toolbar consists of the following three pull-down lists (starting from the left). The selections made in the results selection toolbar determine which data will be shown in the graph.

- | | |
|-------------------------------|--|
| Test selection pulldown list | Select the test to be shown in the graph from among the tests included in the project. |
| Group trait selection toolbar | (Shown only for diagnosis projects for instruments with multiple group traits) Selects the group trait (for example, angle or SCI / SCE setting) for which data will be shown. |
| Value selection toolbar | (Shown only for the Reproducibility test) Selects the value to be shown in the graph. Select from ΔL^* , Δa^* , Δb^* , or ΔE^*ab . |

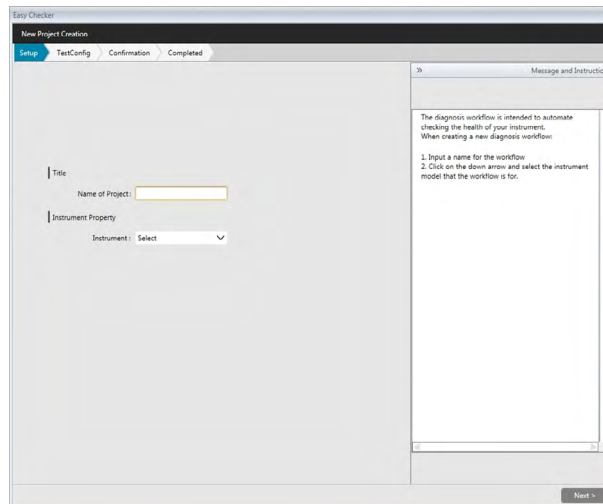
4.2 Working with Diagnosis Projects

4.2.1 Creating a Project

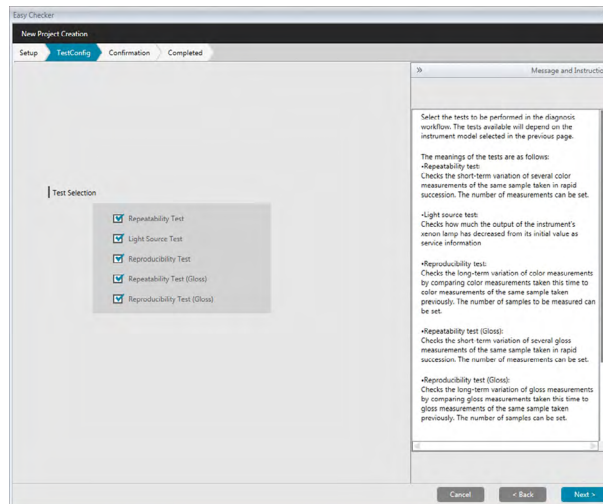
Creating a project consists of selecting which instrument to use, which instrument settings to use, and which tests to perform as well as the settings for the selected tests.

- It is not necessary to have the instrument connected when creating a project. It is possible to make all the selections and save the project without the instrument.
- The following example shows the maximum selectable tests. The tests actually available depend on the instrument for which the project is being created.

1. Click on the Diagnosis panel tab. The SpectraMagic DX screen will change to the Diagnosis panel.
2. Click [Create] in the diagnosis operation toolbar. The New Project Creation dialog will appear, with Setup highlighted in the procedure bar.



3. Input a name for the project.
4. Click on the down arrow next to Instrument: and select the instrument to be used from the pulldown list.
5. Click [Next >]. The New Project Creation dialog will proceed to the next screen, with TestConfig highlighted in the procedure bar.



6. Select the desired tests to be performed for the project. The tests which can be selected depend on the instrument selected in step 4.

Repeatability Test: Checks the short-term stability of several color measurements of the same sample taken in succession.

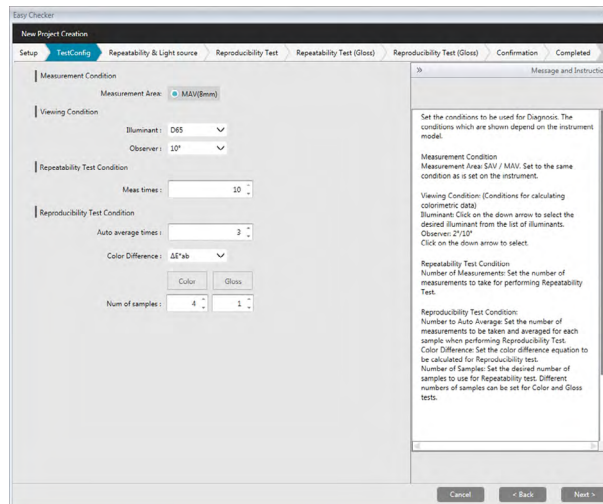
Light Source Test: Checks how much the output of the instrument's light source has decreased from its initial value.

Reproducibility Test: Checks the long-term stability of color measurements by comparing color measurements taken this time to color measurements taken during initialization.

Repeatability Test (Gloss): Checks the short-term stability of several gloss measurements of the same sample taken in succession.

Reproducibility Test (Gloss): Checks the long-term stability of gloss measurements by comparing gloss measurements taken this time to gloss measurements taken during initialization.

7. Click [Next >]. The New Project Creation dialog will proceed to the next TestConfig screen.



8. Set the conditions for the tests selected in step 6. Items and settings available depend on the instrument and tests selected in steps 4 and 6.

Measurement Condition

items and settings available depend on the instrument and tests selected previously.

Viewing Condition

Illuminant

Click on the down arrow next to the setting and select from the list that appears. Available settings:

D65, D50, D55, D75, A, C, F2, F6, F7, F8, F10, F12, U50, ID50, ID65

Observer

Click on the down arrow next to the setting and select from the list that appears. Available settings:

2°, 10°

Repeatability Test Condition

Meas times

Input directly or use the up/down arrows next to the current setting to increase/decrease the number. Range: 5 to 30

Reproducibility Test Condition

Auto Average times

Input directly or use the up/down arrows next to the current setting to increase/decrease the number. Range: 1 to 5

Color Difference

Select the color difference equation to use.

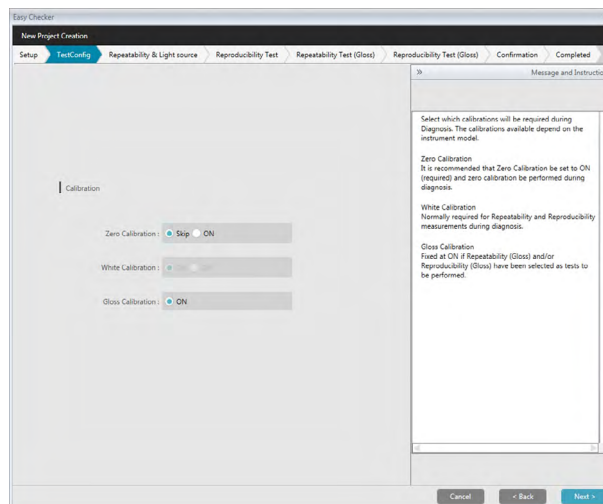
Available settings: ΔE^*ab

Number of samples

Input directly or use the up/down arrows next to the current setting to increase/decrease the number.

Range: 1 to 14 (Color); 1 to 4 (Gloss)

9. Click [Next >]. The New Project Creation dialog will proceed to the next TestConfig screen.



10. Select calibration requirements.

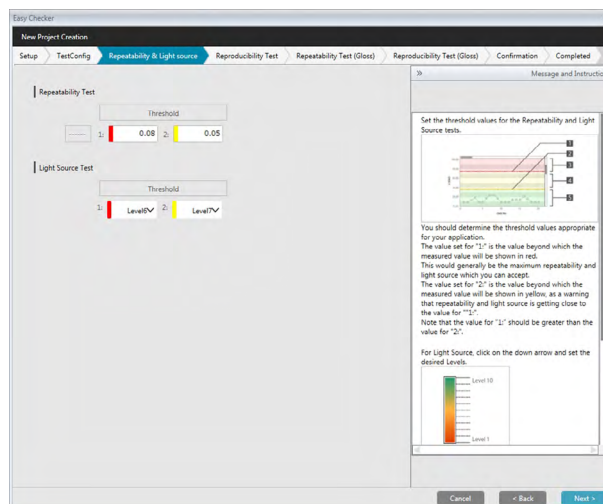
Zero Calibration Skip or ON (required)

White Calibration Fixed at ON (always required)

Gloss Calibration (CM-25cG only)

Fixed at ON (required) if Repeatability Test (Gloss) or Reproducibility Test (Gloss) were selected in step 6.

11. Click [Next >]. The New Project Creation dialog will proceed to the next screen, with Repeatability & Light source highlighted in the procedure bar.



12. Set the threshold values for the Repeatability and Light Source tests.

Repeatability Test Input number directly.

Range: 0.01 to 10.00

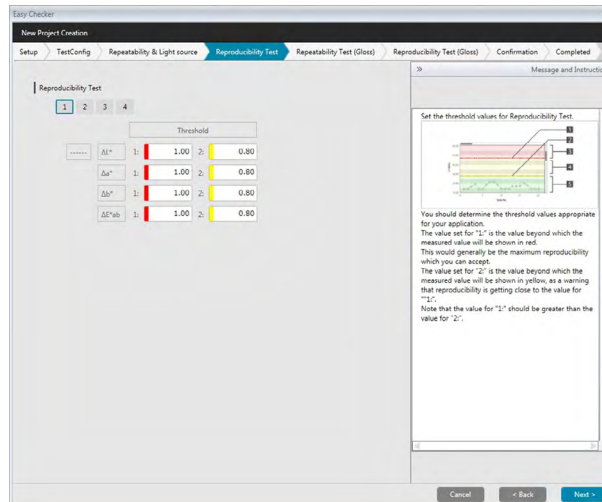
Light Source Test

Click on down arrow next to current setting and select from pulldown list.

Range: Level 1 (lowest lamp output) to Level 10 (highest lamp output)

- The threshold values for 1 are usually the maximum acceptable values for repeatability and light source tests, and the measured values will be shown in red when these values are exceeded.
- The threshold values for 2 are the values beyond which the measured values will be shown in yellow, indicating that the values are getting close to the threshold values for 1.
- The threshold value for 1 should always be values indicating a worse condition than the value for 2.

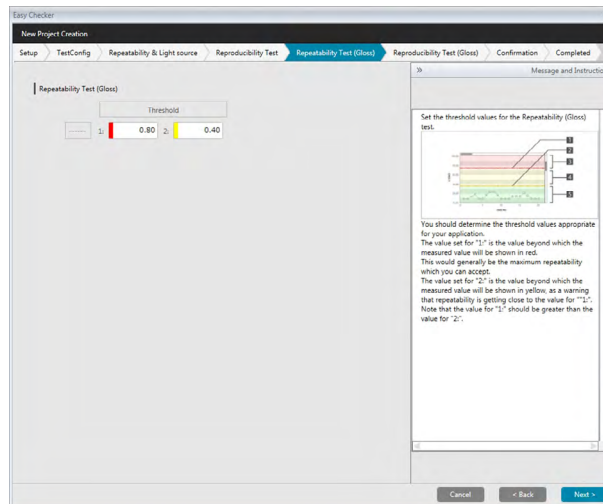
13. Click [Next >]. The New Project Creation dialog will proceed to the next screen, with Reproducibility Test highlighted in the procedure bar.



14. Select the threshold values for Reproducibility for each of the tiles to be used for the reproducibility test. The number of tiles for which threshold values can be set will be the number of samples set in step 8. Click on the tile number to set the threshold for that tile, or click [Next >] to proceed to the next tile. Range: 0.10 to 20.00

- The threshold values for 1 are usually the maximum acceptable values for reproducibility, and the measured values will be shown in red when these values are exceeded.
- The threshold values for 2 are the values beyond which the measured values will be shown in yellow, indicating that the values are getting close to the threshold values for 1.
- The threshold value for 1 should always be values larger than the value for 2.

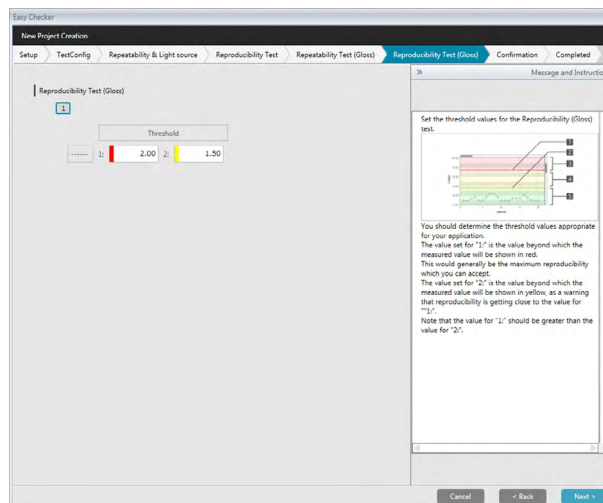
15. After threshold values have been set for all tiles, click [Next >]. The New Project Creation dialog will proceed to the next screen, with Repeatability Test (Gloss) highlighted in the procedure bar.



16. Set the threshold values for the Repeatability Test (Gloss). Input number directly. Range: 0.01 to 10.00

- The threshold values for 1 are usually the maximum acceptable values for repeatability (gloss), and the measured values will be shown in red when these values are exceeded.
- The threshold values for 2 are the values beyond which the measured values will be shown in yellow, indicating that the values are getting close to the threshold values for 1.
- The threshold value for 1 should always be values indicating a worse condition than the value for 2.

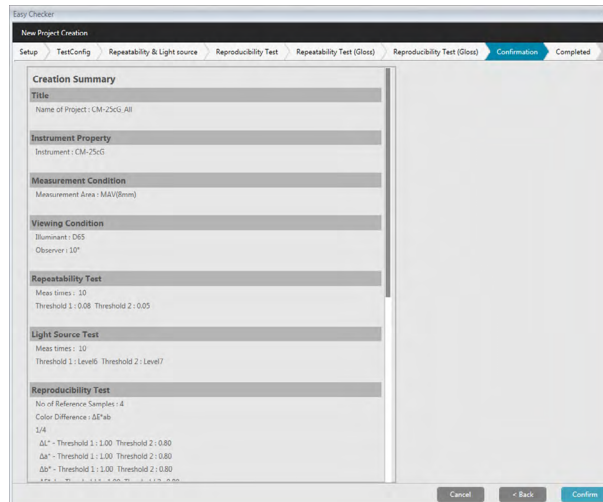
17. Click [Next >]. The New Project Creation dialog will proceed to the next screen, with Reproducibility Test (Gloss) highlighted in the procedure bar.



18. Select the threshold values for Reproducibility Test (Gloss) for each of the tiles to be used for the gloss reproducibility test. The number of tiles for which threshold values can be set will be the number of samples set in step 8. Click on the tile number to set the threshold value for that tile, or click [Next >] to proceed to the next tile. Range: 0.10 to 20.00

- The threshold values for 1 are usually the maximum acceptable values for reproducibility (gloss), and the measured values will be shown in red when these values are exceeded.
- The threshold values for 2 are the values beyond which the measured values will be shown in yellow, indicating that the values are getting close to the threshold values for 1.
- The threshold value for 1 should always be values larger than the value for 2.

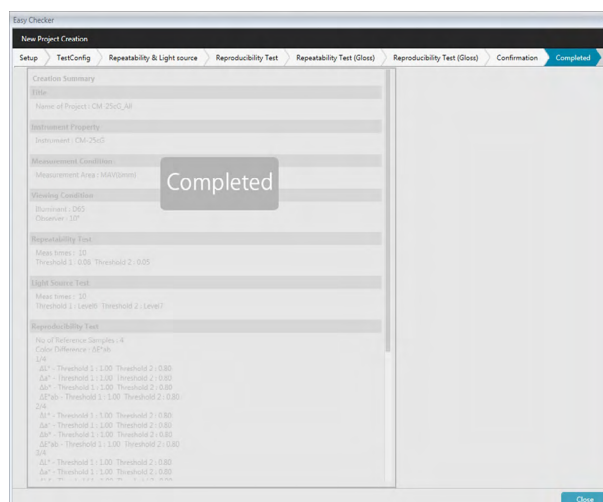
19. After threshold values have been set for all tiles, click [Next >]. The New Project Creation dialog will proceed to the Confirmation screen, with Confirmation highlighted in the procedure bar.



20. Check that all settings have been set correctly.

- If corrections are necessary, click [< Back] repeatedly to move back to the screen where corrections are necessary, make the correction, and then proceed through the screens again.

21. Click [Confirm]. The project settings will be saved and “Completed” will be shown.



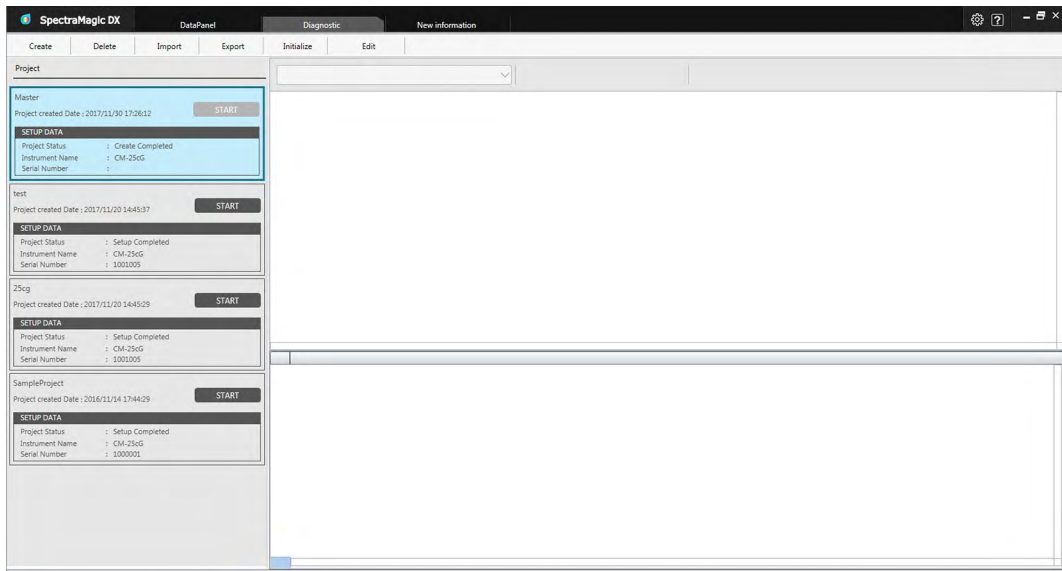
22. Click [Close] to close the New Project Creation dialog. The project will be added to the Project list in the Diagnosis panel.

4.2.2 Initializing a Project

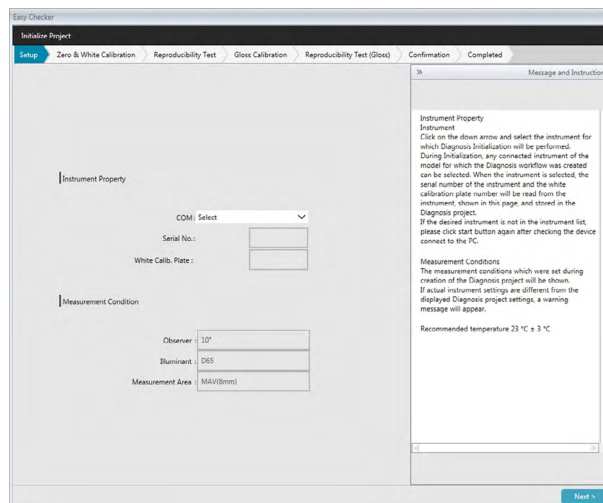
Initializing a project consists of taking the various measurements for the tests defined during project creation. The results of these measurements will be the reference values used to monitor the status of the instrument.

- For Light Source Test (available for CM-25cG, CM-700d/CM-600d, CM-3600A/CM-3610A, or CM-5/CR-5 only), the reference values are the values stored in the instrument as initial values.
- For best results, initialization measurements and all future diagnosis measurements should be taken under the same temperature and humidity conditions.

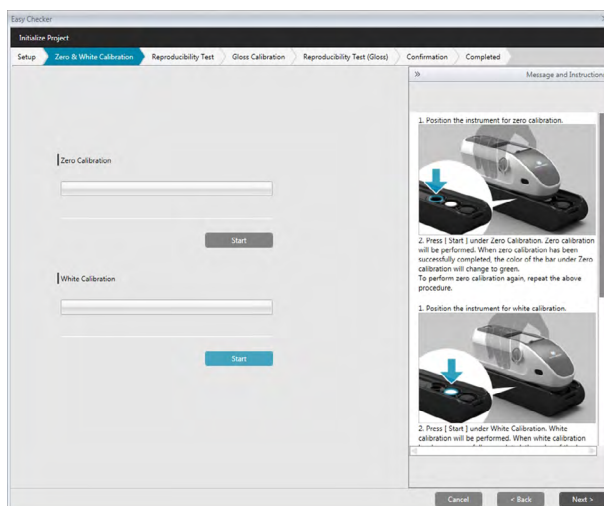
1. Click on the Diagnosis panel tab. The SpectraMagic DX screen will change to the Diagnosis panel. Previously created projects will be shown in the Project column. The Project Status for projects which have not yet been initialized will be “Create Completed”.



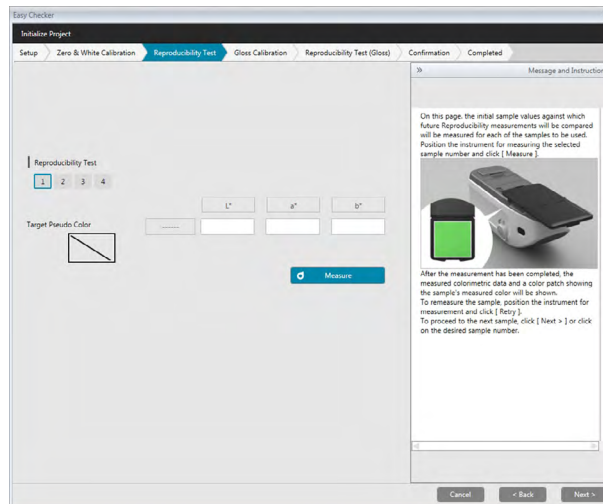
2. Click [Initialize] in the diagnosis operation toolbar. The Initialize Project dialog will appear, with Setup highlighted in the procedure bar.



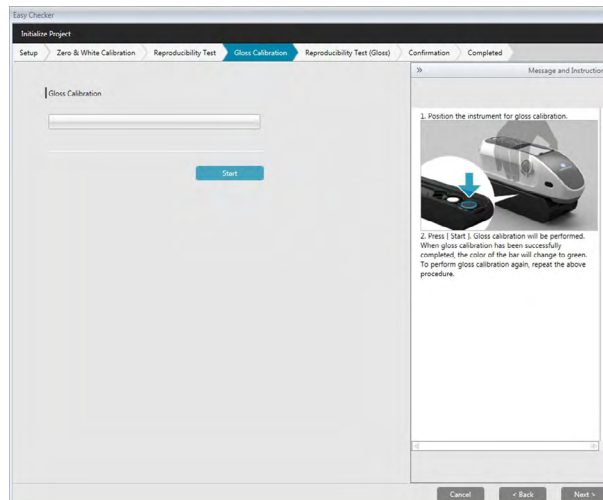
3. Click on the down arrow next to the COM port setting and select the COM port to which the instrument to initialize the project for is connected. The serial numbers of the instrument and its white calibration plate will be shown when connection is successful.
 - Only instruments which are of the model for which the project was created will be shown in the list, even if other instrument models are connected.
4. Click [Next >]. The Initialize Project: Zero & White Calibration screen will be shown.



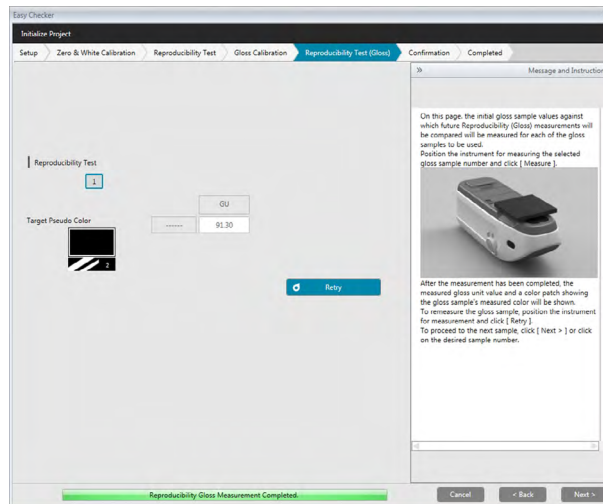
5. Position the instrument for zero calibration and click [Start] in the Zero Calibration section. Zero calibration will be performed (a progress bar will show the progress), and the bar will change to green with “Zero Calibration Completed.” when zero calibration is finished.
 - If “Skip” was selected for Zero Calibration during project creation, it is possible to proceed to white calibration without performing zero calibration.
6. Position the instrument for white calibration and click [Start] in the White Calibration section. White calibration will be performed (a progress bar will show the progress), and the bar will change to green with “White Calibration Completed.” when white calibration is finished.
 - It is not possible to proceed without performing calibration.
7. Click [Next >]. The Initialize Project: Reproducibility Test screen will be shown, with the first tile number selected.



8. Position the instrument for measuring the first tile and click **Measure**. The number of measurements specified for Auto average times during project creation will be taken, the average measurement results will be shown, and the pseudo color patch will change to the color of the tile.
 - If an error was made during measurement, click **Retry** and repeat the measurements.
 - If the Number of samples for Color was set to more than one during project creation, click [Next >] or the color sample number, and repeat step 8 until all color samples have been measured.
9. Click [Next >]. The Initialize Project: Gloss Calibration screen will be shown.



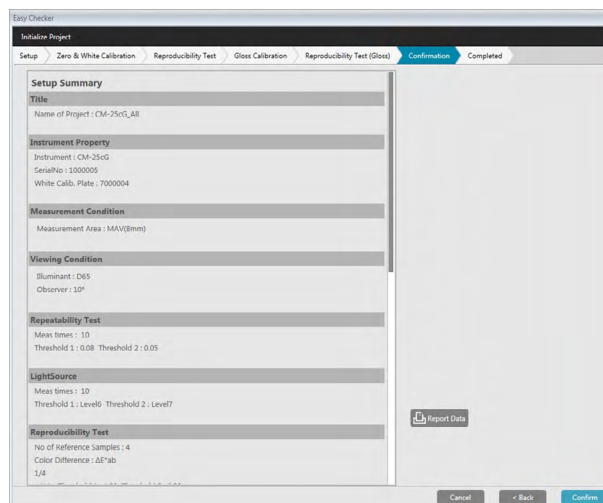
10. Position the instrument for gloss calibration and click [Start]. Gloss calibration will be performed (a progress bar will show the progress), and the bar will change to green with "Gloss Calibration Completed." when gloss calibration is finished.
 - It is not possible to proceed without performing calibration.
11. Click [Next >]. The Initialize Project: Reproducibility Test (Gloss) screen will be shown, with the first gloss standard selected.



12. Position the instrument on the first gloss standard and click **Measure**. The number of measurements specified for Auto average times during project creation will be taken, the average measurement results will be shown, and the pseudo color patch will change to the color of the gloss standard.

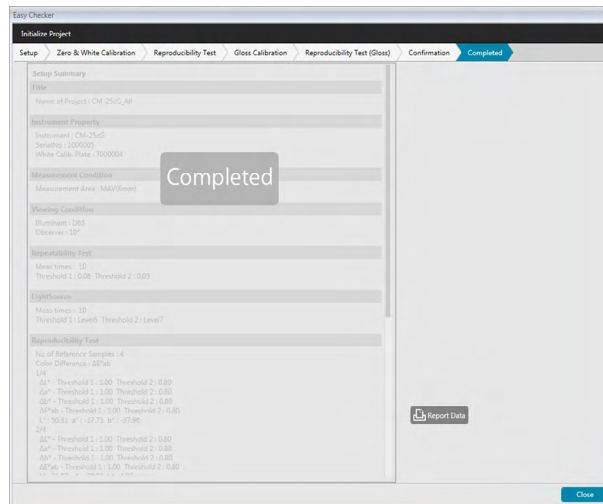
- If an error was made during measurement, click **Retry** and repeat the measurements.
- If the Number of samples for Gloss was set to more than one during project creation, click [Next >] or the gloss standard number, and repeat step 12 until all gloss samples have been measured.

13. Click [Next >]. The Initialize Project: Confirmation screen will be shown. Check the Setup Summary showing the results of initialization (scroll down if necessary).



- To print the report, click **Report Data**. A Print Preview dialog will be shown, showing how the printout will appear. To print, click ; to export the printout as a file in pdf format, click .

14. Click [Confirm]. The initialization data for the project for this instrument will be saved, and the Initialize Project: Completed screen will be shown.



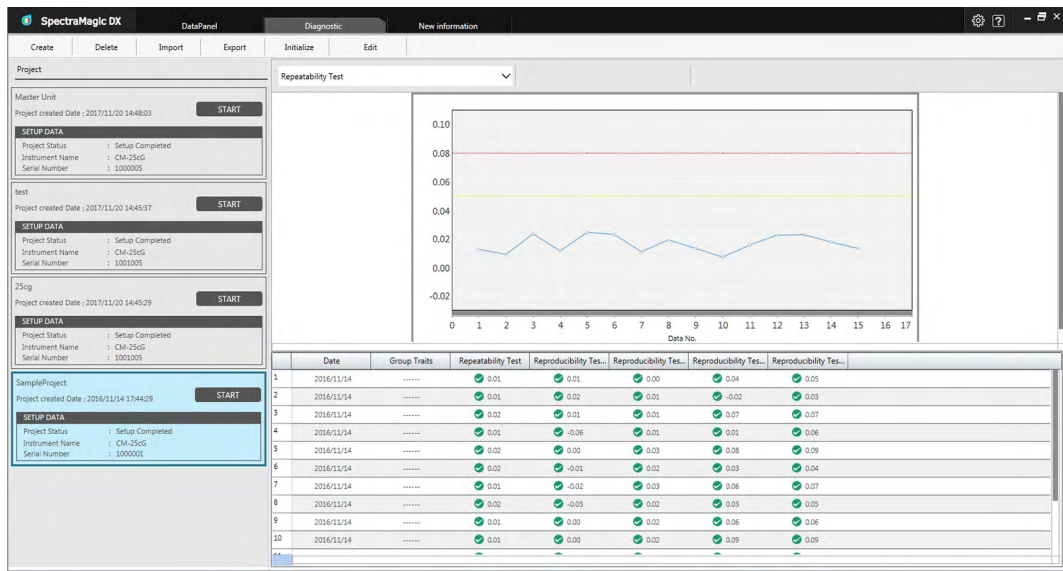
15. Click [Close] to close the Initialize Project dialog.
16. The Project Status of the project in the Project column will change to “Setup Completed”, and the [START] button for the project will be enabled.

4.2.3 Executing a Project

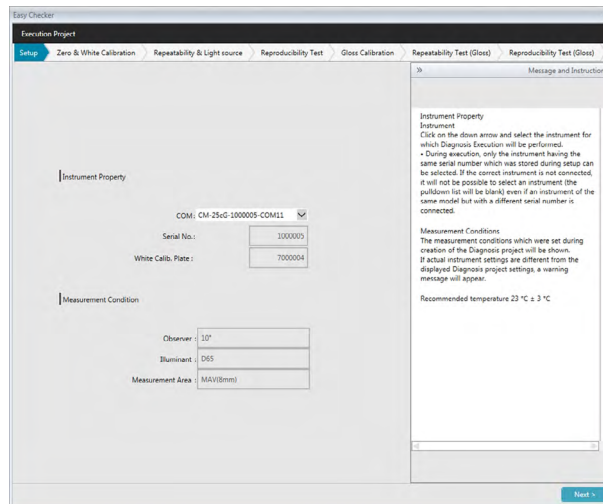
When a project is executed, measurements similar to those taken for project initialization will be taken, and the results compared to the project initialization results to monitor the status of the instrument.

- For best results, initialization measurements and all future diagnosis measurements should be taken under the same temperature and humidity conditions.

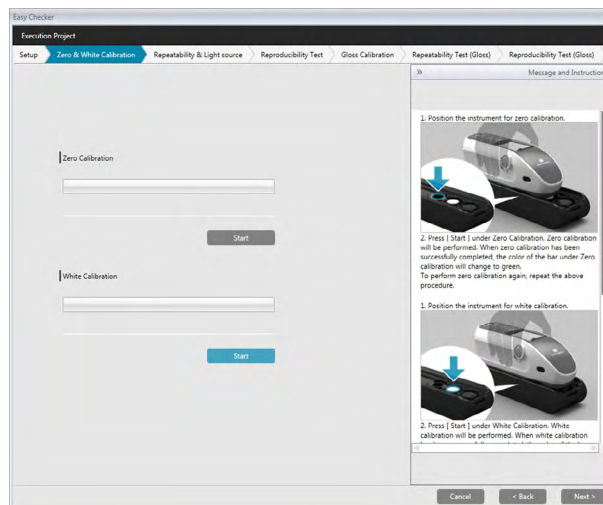
1. Click on the Diagnosis panel tab. The SpectraMagic DX screen will change to the Diagnosis panel. Previously created projects will be shown in the Project column. The Project Status for projects which have been initialized and can be executed will be “Setup Completed”.



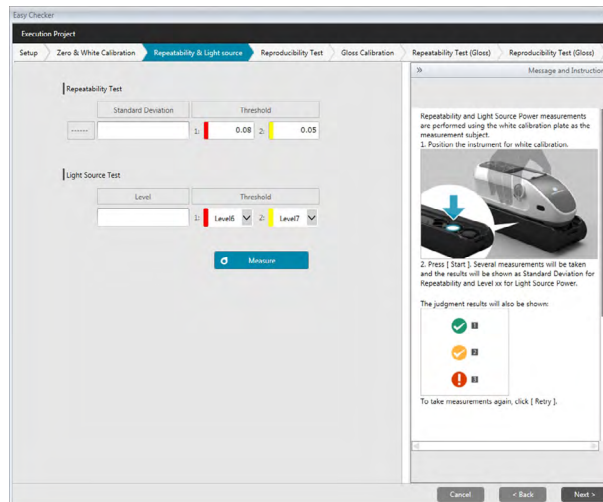
2. Select a project from the Project list by clicking on it (the project frame will turn blue when selected), and click **START** in the project frame. The Execution Project dialog will appear, with Setup highlighted in the procedure bar. If the instrument for which the project was initialized is connected, it will be automatically selected in the COM setting.
 - If the instrument is not connected, an error message will appear. Connect the instrument and switch it on, and repeat step 2.



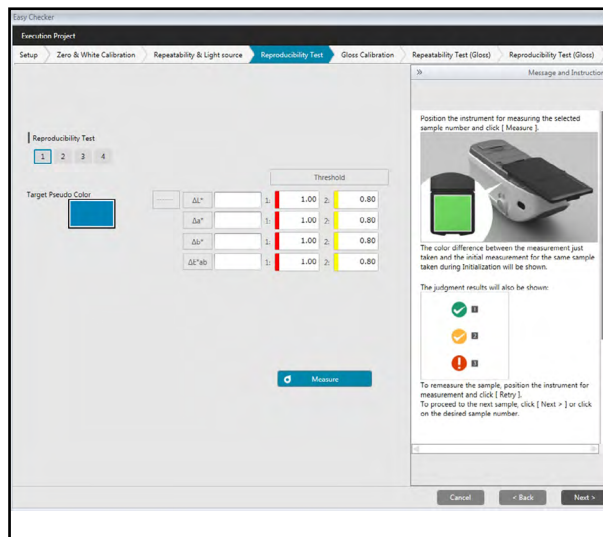
3. Click [Next >]. The Execution Project: Zero & White Calibration screen will be shown.



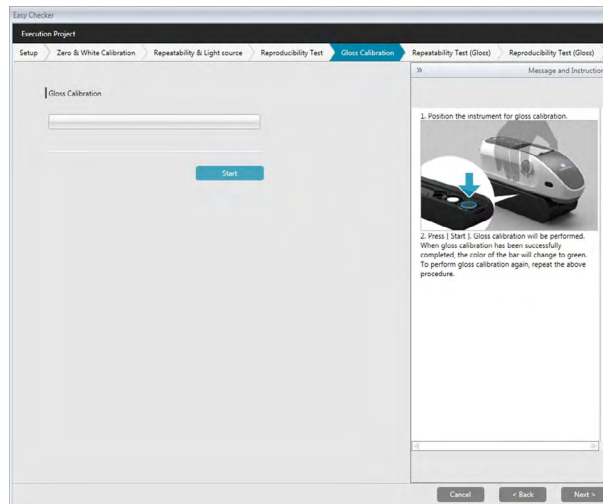
4. Position the instrument for zero calibration and click [Start] in the Zero Calibration section. Zero calibration will be performed (a progress bar will show the progress), and the bar will change to green with “Zero Calibration Completed.” when zero calibration is finished.
 - If “Skip” was selected for Zero Calibration during project creation, it is possible to proceed to white calibration without performing zero calibration.
5. Position the instrument for white calibration and click [Start] in the White Calibration section. White calibration will be performed (a progress bar will show the progress), and the bar will change to green with “White Calibration Completed.” when white calibration is finished.
 - It is not possible to proceed without performing calibration.
6. Click [Next >]. The Repeatability & Light Source screen will be shown.



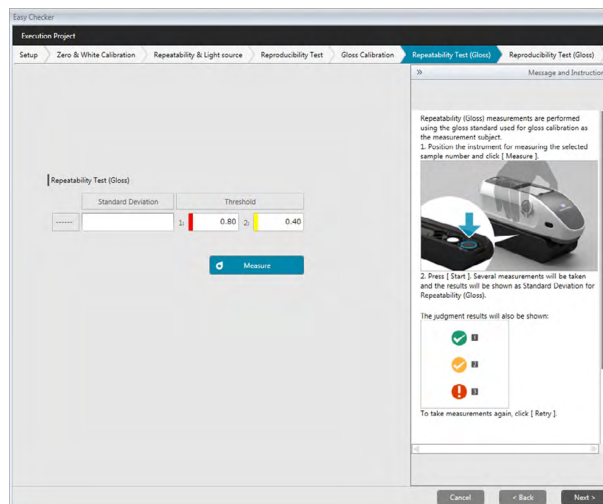
7. With the instrument positioned for white calibration, click **Measure**. The number of measurements set for repeatability and light source test will be taken, and the results will be shown.
 - If an error was made during measurement, click **Retry** and repeat the measurements.
8. Click [Next >]. The Execution Project: Reproducibility Test screen will be shown, with the first tile number selected.





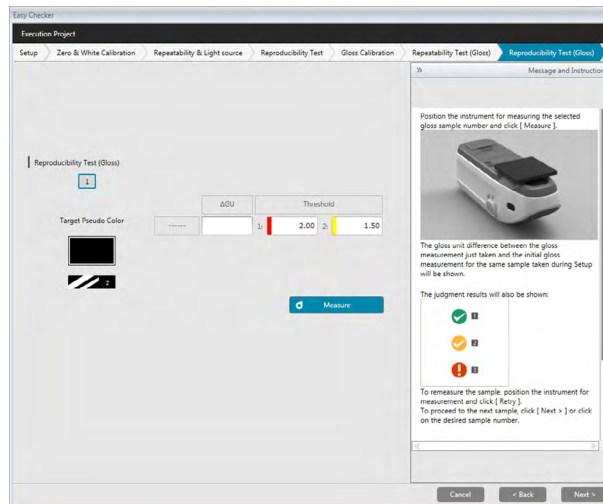
9. Position the instrument for measuring the first tile and click **Measure**. The number of measurements specified for Auto average times during project creation will be taken and the average measurement results will be shown.
 - If an error was made during measurement, click **Retry** and repeat the measurements.
 - If the Number of samples for Color was set to more than one during project creation, click [Next >] or the color sample number, and repeat step 8 until all color samples have been measured.
10. Click [Next >]. The Execution Project: Gloss Calibration screen will be shown.

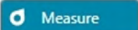


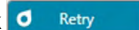
11. Position the instrument for gloss calibration and click [Start]. Gloss calibration will be performed (a progress bar will show the progress), and the bar will change to green with “Gloss Calibration Completed.” when gloss calibration is finished.
 - It is not possible to proceed without performing calibration.
12. Click [Next >]. The Execution Project: Repeatability Test (Gloss) screen will be shown, with the first gloss standard selected.



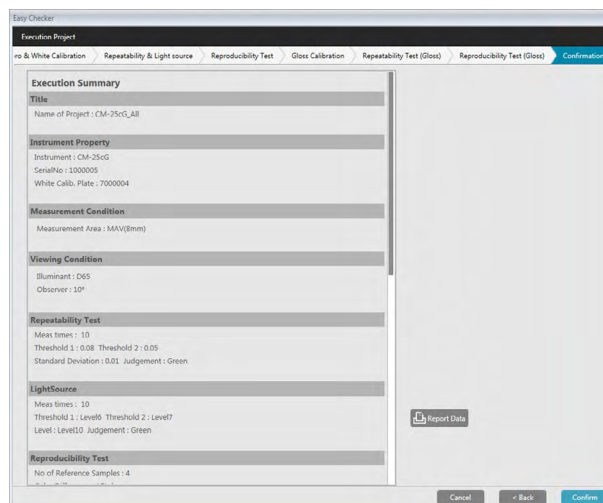
13. With the instrument positioned for white calibration, click  **Measure**. The number of measurements set for repeatability and light source test will be taken, and the results will be shown.
 - If an error was made during measurement, click  **Retry** and repeat the measurements.
14. Click [Next >]. The Execution Project: Reproducibility Test (Gloss) screen will be shown, with the first gloss standard selected.






15. Position the instrument on the first gloss standard and click . The number of measurements specified for Auto average times during project creation will be taken and the average measurement results will be shown.

- If an error was made during measurement, click  and repeat the measurements.
- If the Number of samples for Gloss was set to more than one during project creation, click [Next >] or the gloss standard number, and repeat step 12 until all gloss samples have been measured.

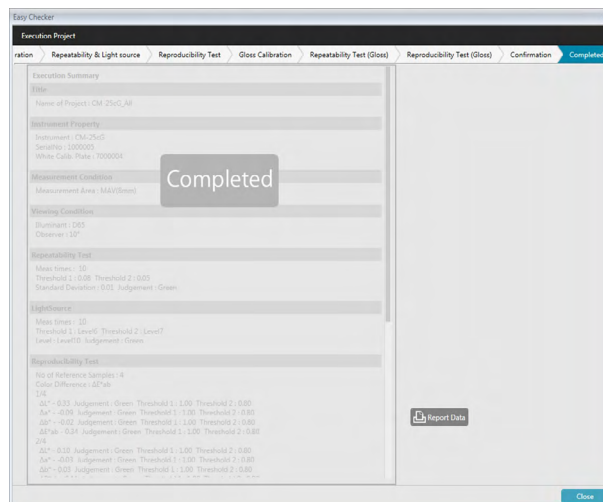
16. Click [Next >]. The Execution Project: Confirmation screen will be shown. Check the Execution Summary showing the results of execution including trends of measurements (scroll down if necessary).



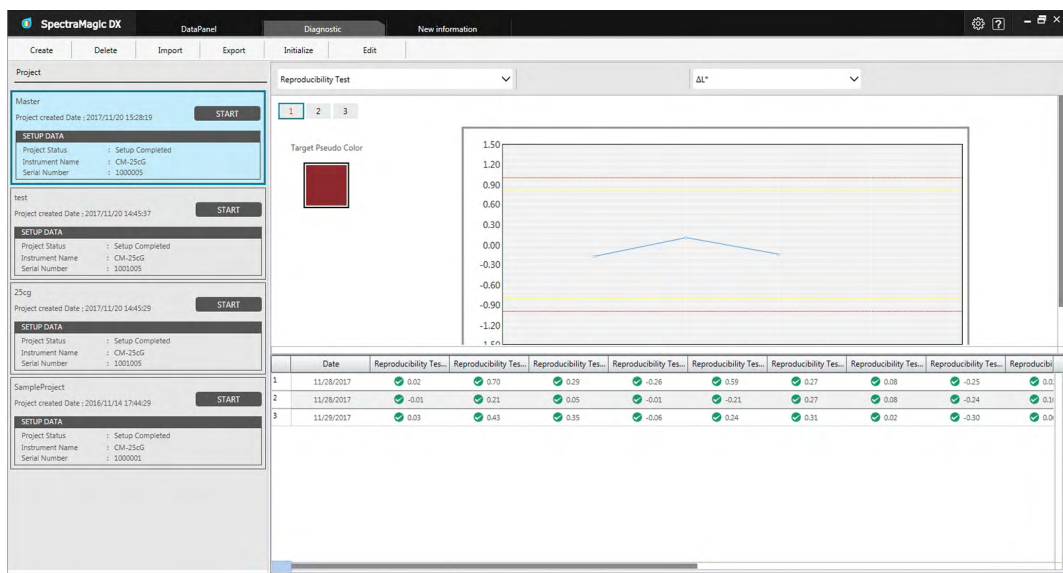
- To print the report, click . A Print Preview dialog will be shown, showing how the printout will appear. To print, click ; to export the printout as a file in pdf format, click .

17. Click [Confirm]. The execution data for the project will be saved, and the Execution Project:

Completed screen will be shown.



18. Click [Close] to close the Execution Project dialog.
The execution results will be added to the graph and to the list in the Results pane.



- You can select which results to view using the results selection bar.

4.2.4 Deleting a Project

To delete a project, follow the procedure below.

- Warning: When a project is deleted, all data associated with that project will also be deleted.
1. Select the project to delete from the Project list (the project frame will turn blue), and click [Delete] in the diagnosis operation toolbar.
 2. A confirmation dialog will appear, asking you to confirm that you want to delete the selected project.
 3. To delete the selected project, click [Yes]. The project will be deleted immediately.
 - Even if there are data associated with the selected project, there will not be any further confirmation. Clicking [Yes] in this step will delete the project and all data associated with it.
 - To not delete the project, click [No].

4.2.5 Importing/Exporting a Project

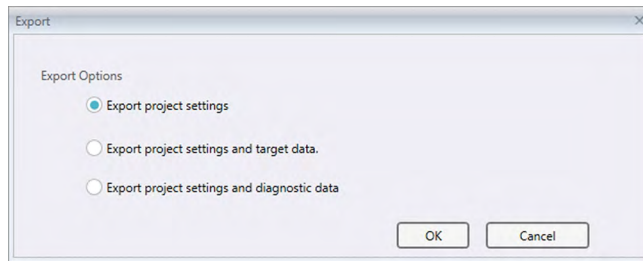
Projects can be exported and imported as files. The data which can be exported with a project will be the data up to the last completed project stage (creation, initialization, or execution).

4.2.5.1 Importing a project

1. Click [Import] in the diagnosis operation toolbar. The Import dialog box will appear.
2. Browse to the folder containing the project (*.dec) file to import.
3. Select the desired project file and click [Open]. The selected file will be imported and added to the project list.

4.2.5.2 Exporting a project

1. Click [Export] in the diagnosis operation toolbar. The Export dialog box will appear.



2. Select the desired Export Option.

Export project settings	Exports the project settings (the tests, configuration settings, and threshold values set during project setup).
Export project settings and target data	Exports the project settings and the data measured during initialization.
Export project settings and diagnosis data	Exports the project settings, the data measured during initialization, and the diagnosis data measured during each project execution.

3. Browse to the folder to which to export the project (*.dec) file.
4. Input the desired project file name and click [Save]. The selected project data will be saved to the specified file name.

4.2.6 Editing a Project

A project can be edited to add or remove tests or to change configuration settings or threshold values.

- If the project is saved under the same name after editing, any initialization data and diagnosis data measured using that project will be deleted. If editing is performed, it is recommended that the project be saved under a different name.

1. Select the project to edit from the Project list (the project frame will turn blue), and click [Edit] in the diagnosis operation toolbar.
2. The first screen in the Edit Project dialog will appear. The screen is the same as the first screen of the Initialize Project dialog, except that the Instrument cannot be changed.
3. Proceed through each of the screens in the same way as for Initialize Project.
4. When the Confirmation screen is reached and [Confirm] is clicked, the Confirm Project dialog will appear, warning that overwriting the project file will delete all stored diagnostic data for the project.
5. To keep the existing diagnostic data, click [Save As] and save the project under a different name. To overwrite the project and delete all stored initialization and diagnostic data associated with it, click [Save].
To cancel editing, click [Cancel] in the Confirm Project dialog, and then click [Cancel] in the Edit Project dialog.

CHAPTER 5

SPECIFICATIONS

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5.1 System Requirements

5.1.1 System Requirements

OS	Windows 7 Professional 32-bit (SP1) Windows 7 Professional 64-bit (SP1) Windows 8.1 Pro 32-bit Windows 8.1 Pro 64-bit Windows 10 Pro 32-bit Windows 10 Pro 64-bit <ul style="list-style-type: none">• English, Japanese, German, French, Spanish, Italian, Portuguese, Russian, Turkish, Polish, Simplified Chinese, and Traditional Chinese versions• The hardware of the computer system to be used must meet or exceed the greater of the recommended system requirements for the compatible OS being used or the following specifications.
Computer	PC equipped with a processor equivalent to Intel Core i5 2.7GHz or better
Memory	At least 2 GB (4 GB or more recommended)
Hard disk drive	20 GB of available hard disk space At least 10 GB of available disk space is required on the system drive (drive where the OS is installed) for database.
Display	Display hardware capable of displaying 1280 x 768 pixels / 16-bit color or better
USB or serial port	Required for connection to instrument
Additional USB port	Required for protection key if used. Not necessary for electronic license.

5.1.2 Compatible Instruments

CM-M6, CM-25cG, CM-700d, CM-600d, CM-2600d, CM-2500d, CM-2500c, CM-2300d, CM-3700A, CM-3700A-U, CM-3700d, CM-3600A, CM-3610A, CM-5, CR-5

5.1.3 Language

Display language	English, Japanese, German, French, Spanish, Italian, Portuguese, Russian, Turkish, Polish, Simplified Chinese, and Traditional Chinese (Selectable after installation.)
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5.2 Major Functions

Color space	<p>All Editions: $L^*a^*b^*$, L^*C^*h, Lab99, LCh99, Lab99o, LCh99o, Hunter Lab, XYZ, Yxy, and their color differences; Munsell C, Munsell D65</p> <p>Professional Edition only: $L^*u^*v^*$, $L^*u^*v^*$, and their color differences</p>
Index	<p>All Editions: MI, Color assessment, Gloss (CM-25cG), FF (CM-M6), WI (CIE1982, ASTM E313-73, Hunter), Tint (CIE 1982), YI (ASTM E313-73, ASTM D1925), and their differences; 8° gloss</p> <p>Professional Edition only: WI (ASTM E313-98, Berger, Taube, Stensby, Ganz), Tint (ASTM E313-98, Ganz), YI (ASTM E313-98, DIN 6167), WB (ASTM E313-73), Opacity (ISO 2471, TAPPI T425 89% White Plate), Haze (ASTM D1003-97), and their differences; User equations; Standard Depth (ISO 105.A06); Brightness (TAPPI T452, ISO 2470); Density (Status A, Status T); Dominant Wavelength, Excitation Purity; RXRYRZ; Shade Sorting 555; Strength (Tristimulus, Pseudo tristimulus); Staining degree (ISO 105.A04E), Staining degree rating (ISO 105.A04E); NC#, NC# Grade; Ns, Ns Grade; Grey scale (ISO 105.A05), Grey Scale Rating (ISO 105.A05); K/S strength (Apparent (ΔE^*_{ab}, ΔL^*, ΔC^*, ΔH^*, Δa^*, Δb^*) maximum absorption, total wavelength, user wavelength)</p> <p>Note on Haze (ASTM D1003-97): As some instrument types may not satisfy the exact definitions of ASTM D1003-97 in terms of illumination/observation, the displayed values are for relative usage only.</p>
Color difference equation	<p>All Editions: ΔE^*_{ab} (CIE 1976), ΔE^*_{94} (CIE 1994) and each component of lightness, saturation and hue, ΔE_{00} (CIE 2000) and each component of lightness, saturation and hue, ΔE_{99} (DIN99), ΔE_{99o}, ΔE (Hunter), CMC (l:c) and each component of lightness, saturation and hue</p> <p>Professional Edition only: ΔE_c (degree) (DIN 6175-2), ΔE_p (degree) (DIN 6175-2), ΔE_c(Audi2000), $m\Delta E_c$(Audi2000), ΔE_c Max(Audi2000), ΔE_p(Audi2000), $m\Delta E_p$(Audi2000), ΔE_p Max(Audi2000), FMC-2, NBS 100, NBS 200</p>
Spectral data	<p>All Editions: Spectral reflectance/Spectral transmittance</p> <p>Professional Edition only: K/S, Absorbance</p>
Observer	2°, 10° (Multiple observer settings possible)
Illuminants	<p>All Editions: A, C, D₅₀, D₆₅, F₂, F₁₁</p> <p>Professional Edition only: D₅₅, D₇₅, F₆, F₇, F₈, F₁₀, F₁₂, U₅₀, ID₅₀, ID₆₅</p> <p>Up to three illuminants can be displayed simultaneously.</p>
Graphs	<p>All Editions: Spectral reflectance/transmittance and its difference, $L^*a^*b^*$ absolute value, $\Delta L^*a^*b^*$ (color difference distribution, MI), Hunter Lab absolute value, Hunter ΔLab (color difference distribution), Trend graph of each numerical value, Histogram, 2-axis graph of any 2 numerical values, Pseudo color display</p> <p>Professional Edition only: K/S and its difference, Absorbance and its difference</p>

Instrument control functions	<ul style="list-style-type: none"> • Measurement/calibration • UV adjustment (CM-2600d, CM-3600A/CM-3610A, CM-3700A/CM-3700A-U/CM-3700d only) • Automatic averaging measurement: 2 to 30 measurements • Manual averaging measurement: User-determined number of times (The standard deviation and average for the color space selected for measurement are displayed.) <p>CM-M6, CM-25cG, CM-700d/CM-600d, CM-2600d/CM-2500d/CM-2300d, CM-2500c, CM-5/CR-5 only:</p> <ul style="list-style-type: none"> • Remote measurement • List display/reading of sample/target data from instrument memory • Writing of target data to instrument memory
Instrument diagnosis function	Checked characteristics: Repeatability, reproducibility, lamp output (CM-25cG, CM-700d, CM-600d only)
Target data	<ul style="list-style-type: none"> • Target data can be registered. • Master target and working targets under master targets can be used. (Professional Edition only) • Manual input of colorimetric or spectral target data possible. • Automatic selection of target closest to measured values • Database target search
Data list	<ul style="list-style-type: none"> • Listing of target data and sample data • Editing (delete, average, copy & paste, search) • Display of pass/fail ratio • Visual judgement result input function • Additional data information input/listing function • Data grouping by target
Data storage	All data stored in database. Creation of folders in database possible
External I/O	<ul style="list-style-type: none"> • Importing/exporting of data file(s) in original formats (with "mesx" file extension) • Importing/exporting of template file(s) in original format (with "mtpx" file extension) • Importing of SpectraMagic NX data files (with "mes" extension) • Importing of SpectraMagic NX template files (with "mtp" extension) • Importing/exporting of data in text format (Professional Edition only) • Saving of data in XML format • Exporting of data in Excel format • Copying of lists to clipboard
Help	Manual, "Precise Color Communication" Tutorial

< CAUTION >

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