

# **Color Data Software**

# **SpectraMagic™ DX**

**Professional/Lite**

**Ver. 1.0**

**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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# CONTENTS

---

<b>CHAPTER 1 OVERVIEW .....</b>	<b>5</b>
1.1 Introduction.....	6
1.2 Operation Flow .....	7
1.3 Screen Configuration .....	8
<b>CHAPTER 2 OPERATION GUIDE .....</b>	<b>19</b>
2.1 Starting SpectraMagic DX .....	21
2.2 Connection with an instrument .....	22
2.3 Calibration .....	28
2.4 Preparing for Measurement .....	32
2.5 Specifying Target Data/Tolerance .....	51
2.6 Sample Measurement .....	83
2.7 Document Window Operation.....	98
2.8 Printing .....	114
2.9 Exporting/Importing Documents .....	116
2.10 Other Functions .....	121
<b>CHAPTER 3 GRAPHIC OBJECT PROPERTIES .....</b>	<b>141</b>
3.1 Spectral Graph .....	143
3.2 L*a*b* or Hunter Lab Graph.....	146
3.3 $\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ Graph.....	149
3.4 Trend Graph .....	153
3.5 Multichannel Graph .....	156
3.6 Line Object .....	158
3.7 Rectangle Object .....	159
3.8 Image Object .....	160
3.9 String Label Object .....	161
3.10 Pseudo Color Object .....	162
3.11 Data List Object .....	164
3.12 Numeric Label Object .....	165
3.13 Statistics Object .....	167
3.14 Font Dialog .....	169
<b>CHAPTER 4 DIAGNOSIS FUNCTION.....</b>	<b>171</b>
4.1 Introduction.....	172
4.2 Working with Diagnosis Projects .....	175

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**CHAPTER 5 SPECIFICATIONS.....197**

5.1 System Requirements ..... 198

5.2 Major Functions ..... 199

# CHAPTER 1

## OVERVIEW

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<b>1.1</b>	<b>Introduction .....</b>	<b>6</b>
1.1.1	Data Storage.....	6
<b>1.2</b>	<b>Operation Flow .....</b>	<b>7</b>
<b>1.3</b>	<b>Screen Configuration .....</b>	<b>8</b>
1.3.1	Main Program Toolbar .....	8
1.3.2	Data Panel .....	9
1.3.2.1	Data Panel Toolbar .....	10
1.3.2.2	Data Panel Menu.....	11
1.3.3	Instrument Window.....	12
1.3.3.1	Instrument Info tab .....	12
1.3.3.2	SensorSync tab .....	13
1.3.3.3	Instrument Window Menu .....	14
1.3.4	Document Window.....	15
1.3.4.1	Tree Pane .....	16
1.3.5	List Pane .....	17
1.3.5.1	List Pane Menu .....	17
1.3.6	Canvas Pane .....	18

# 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.

SpectraMagic DX is available as two types: The Professional Edition, which features a variety of functions, and the Lite Edition, which features only basic functions.

- For information on system requirements, see p. 198.
- For information on the functions in each edition, see p. 199.

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.

Clicking [ New ] creates a new document in the database; clicking [ Open ] opens a dialog with a list of the documents in the database so that the desired document can be opened.

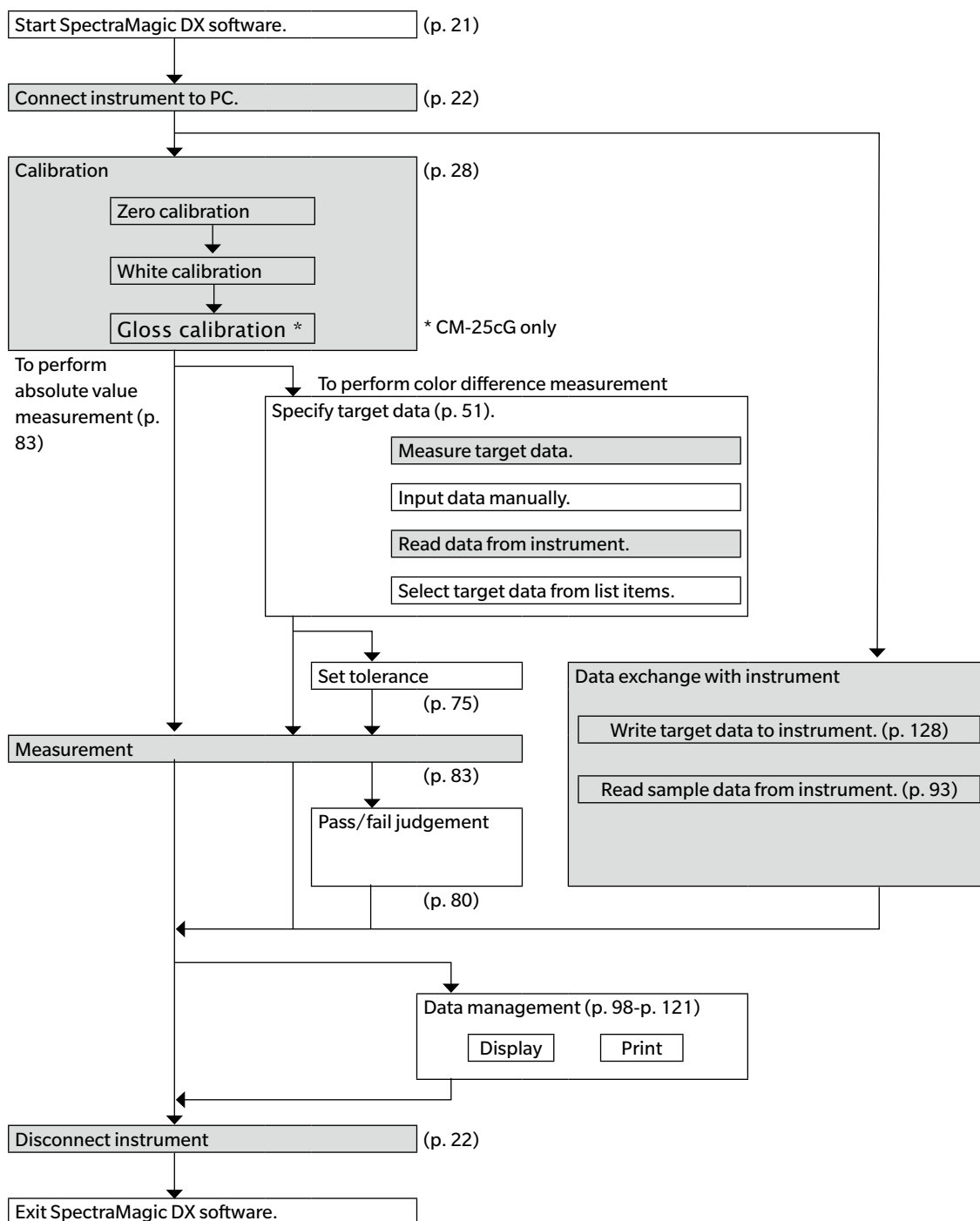
When a measurement is taken, data are read from the instrument, or a file from the previous software SpectraMagic NX is opened, the data are saved immediately to the document in the database.

### Database:

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



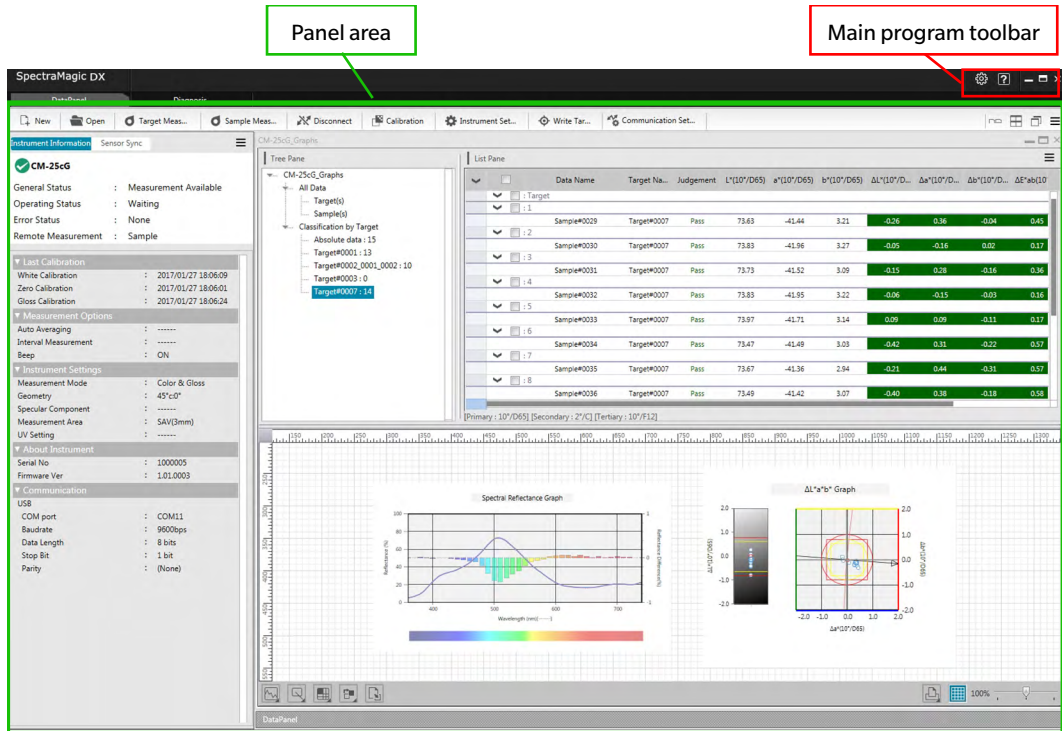
## 1.2 Operation Flow



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 two 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. 171) for checking and tracking instrument performance.

### 1.3.1 Main Program Toolbar

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

 Opens the Application Settings dialog. See. p. 123.

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

## 1.3.2 Data Panel

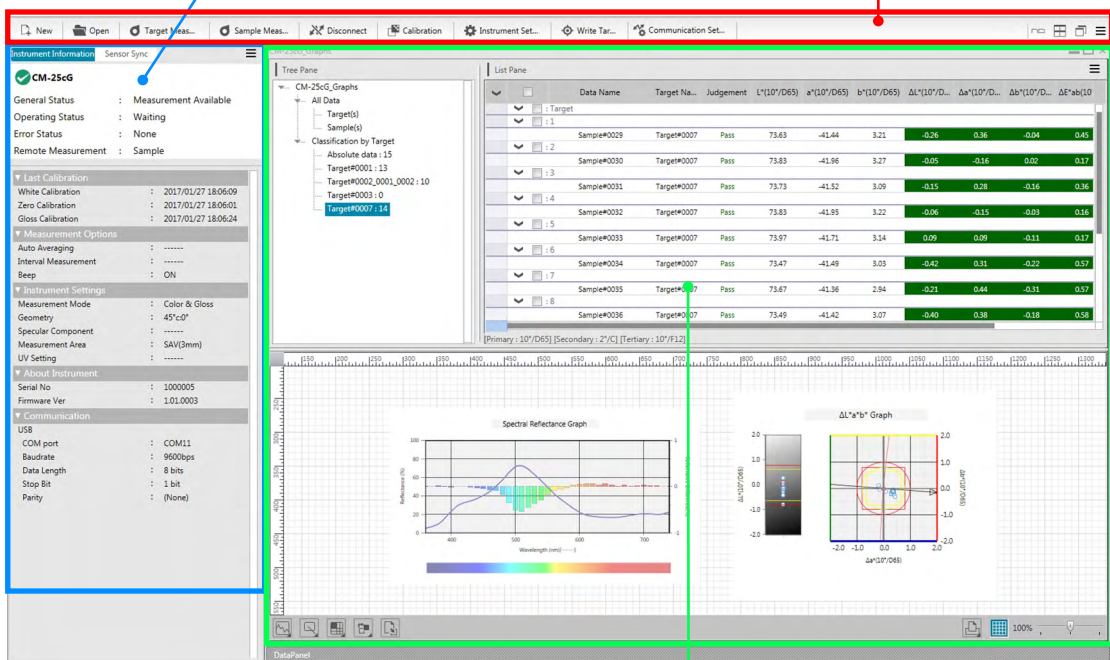
The Data Panel is the main panel of SpectraMagic DX, and is where measurements are taken and measurement data are viewed and utilized. The Data Panel consists of the Data Panel Toolbar, Instrument Window (shown only when an instrument is connected) for instrument status and operations, and Document Windows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

### Instrument Window (p. 12)

Includes Instrument Info tab for viewing instrument information, Sensor Sync tab for copying data from/to instrument, and a menu for performing instrument operations.

### Data Panel Toolbar (p. 10)

Displays icons corresponding to frequently used functions and Document Window operations.



### Document Window (p. 15)

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

### 1.3.2.1 Data Panel Toolbar

The left side of the data panel toolbar contains buttons corresponding to frequently used functions, and the right side has document window arrangement buttons and the data panel menu button. To invoke the command, simply click the button with the mouse.



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

#### ■ Buttons for frequently used functions

	New	Creates a new document. See p. 32.
	Open	Opens an existing document. See p. 32.
	Target Meas...	Takes a target measurement. See p. 53.
	Sample Meas...	Takes a sample measurement. See p. 84.
	Connect	(Shown only when no instrument is connected) Connects DX to an instrument. See p. 22.
	Disconnect	(Shown only when an instrument is connected) Disconnects the connected instrument. See p. 22.
	Calibration	Performs instrument calibration. See p. 28.
	Instrument Set...	Opens the dialog for performing instrument settings. See p. 26.
	Write Tar...	Writes the target or sample data selected in the List Pane to the instrument as target data. See p. 128.
	Communication Set...	Opens the dialog for setting communication settings. See p. 24.

#### ■ Window arrangement buttons

	Show document windows as tabs.
	Tile document windows.
	Cascade document windows.

### 1.3.2.2 Data Panel Menu

The Data Panel menu can be opened by clicking on  at the right end of the Data Panel toolbar. The Data Panel menu has the following items:

- |        |  |
|--------|--|
| Import | 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. 116. <ul style="list-style-type: none"><li>• *.txt and *.csv text file import is supported only by SpectraMagic DX Professional Edition.</li></ul> |
| Export | 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. 116.   |

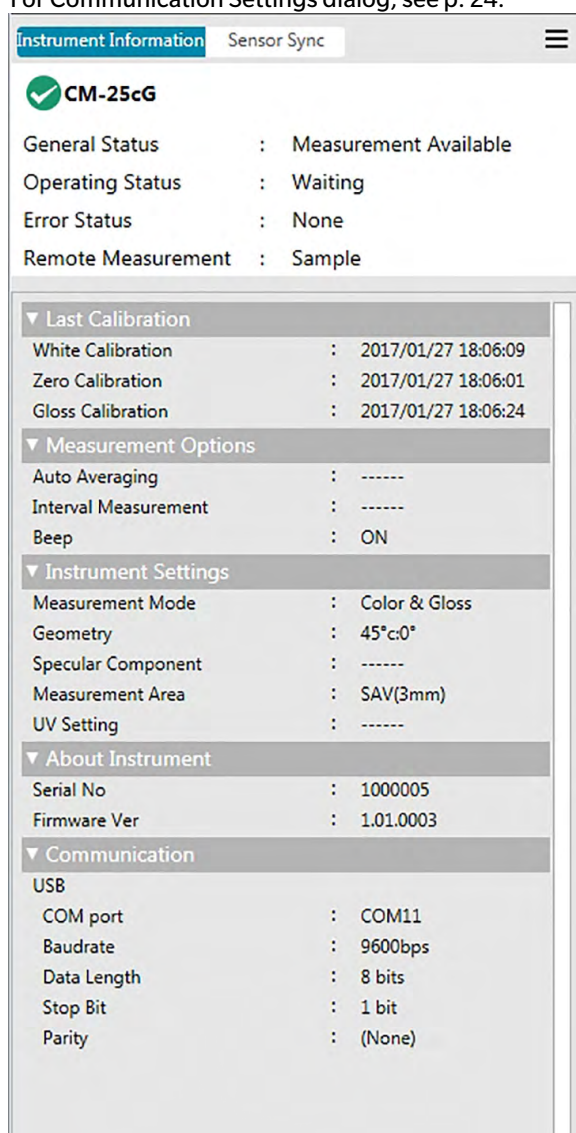
### 1.3.3 Instrument Window

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 Info tab

The Instrument Info 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. 28.
Measurement Options	For Measurement Options dialog, see p. 45.
Instrument Settings	For Instrument Settings dialog, see p. 26.
About Instrument	Serial number and firmware version information (not changeable)
Communication	For Communication Settings dialog, see p. 24.



- 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 SensorSync tab

The SensorSync 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. 69.
- For information on reading sample data from the instrument, see p. 93.
- For information on writing target data to the instrument, see p. 139.
- For more SensorSync tab operations see p. 135.

**Instrument Information** **Sensor Sync**

Sample 0032 CM-25cG

10\*/D65

	X	Y	Z	GU
-----	31.27	46.40	46.66	-----

All Data ☐ Search word

<input type="checkbox"/>	No	Name	TimeStamp
<input type="checkbox"/>	0017	No Name	2017/01/26 16:55:28
<input type="checkbox"/>	0018	No Name	2017/01/26 16:55:30
<input type="checkbox"/>	0019	No Name	2017/01/26 16:55:32
<input checked="" type="checkbox"/>	0009	No Name	2017/01/26 16:54:45
<input type="checkbox"/>	0010	No Name	2017/01/26 16:54:52
<input type="checkbox"/>	0011	No Name	2017/01/26 16:54:58
<input type="checkbox"/>	0012	No Name	2017/01/26 16:55:00
<input type="checkbox"/>	0013	No Name	2017/01/26 16:55:02
<input checked="" type="checkbox"/>	0010	No Name	2017/01/26 17:05:51
<input type="checkbox"/>	0021	No Name	2017/01/26 17:05:55
<input type="checkbox"/>	0022	No Name	2017/01/26 17:05:57
<input type="checkbox"/>	0023	No Name	2017/01/26 17:05:58
<input type="checkbox"/>	0024	No Name	2017/01/26 17:06:00
<input type="checkbox"/>	0025	No Name	2017/01/26 17:06:01
<input type="checkbox"/>	0026	No Name	2017/01/26 17:06:03
<input type="checkbox"/>	0027	No Name	2017/01/26 17:06:04
<input type="checkbox"/>	0028	No Name	2017/01/26 17:06:06
<input type="checkbox"/>	0029	No Name	2017/01/26 17:06:08
<input type="checkbox"/>	0030	No Name	2017/01/26 17:06:09
<input type="checkbox"/>	0031	No Name	2017/01/26 17:06:11
<input checked="" type="checkbox"/>	0032	No Name	2017/01/26 17:06:12

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 on checkboxes to select/deselect data.

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

Reread data stored in instrument memory.

Progress bar when reading data

Delete selected stored data from instrument memory.

Read selected stored data into SpectraMagic DX.

Meaning of symbols:




Target data



Sample data

### 1.3.3.3 Instrument Window Menu

The Instrument Window menu can be opened by clicking on  at the upper right of the Instrument Window. The Instrument Window menu has the following items (please refer to the indicated pages for further information):

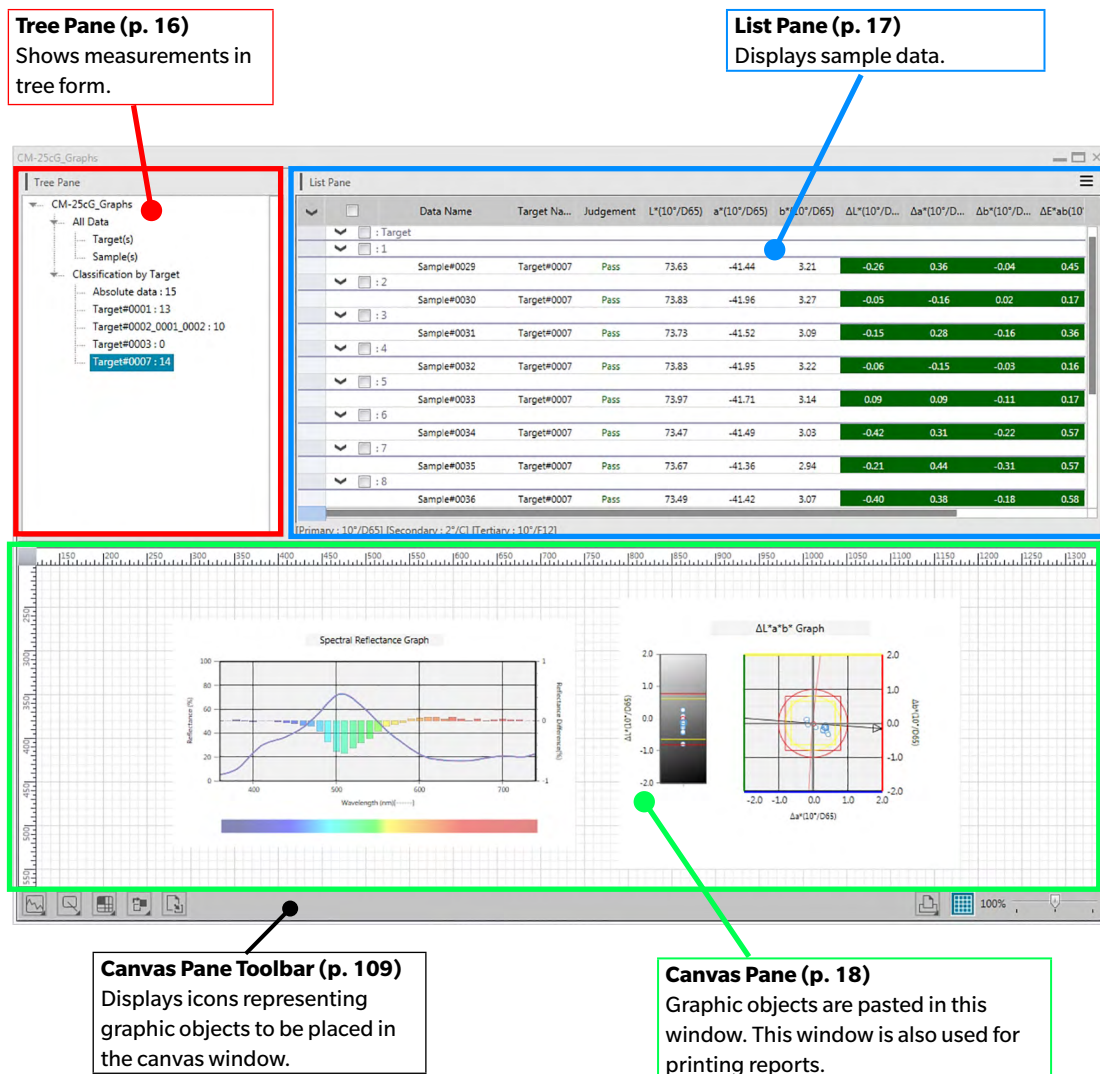
Disconnect   Shift + F5.....	p. 22
Communication Setup .....	p. 24
Instrument Settings .....	p. 26
Calibration   F2 .....	p. 28
Target Measurement   F3.....	p. 53
Sample Measurement   F4.....	p. 84
Measurement Options .....	p. 45
Averaged Measurement	
Target.....	p. 60
Sample.....	p. 90
Remote Measurement	
Target   F6 .....	p. 55
Sample   F7.....	p. 85



### 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 Tree Pane, as a list of numerical data in the List Pane, and on various graphs in the Canvas Pane.

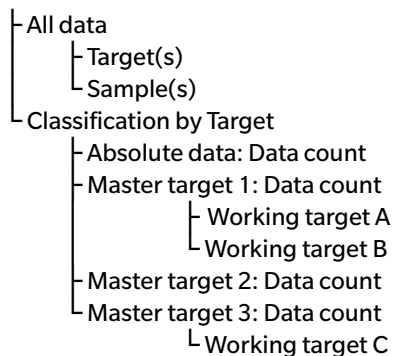
- The maximum number of documents which can be open at one time is 10.



### 1.3.4.1 Tree Pane

The Tree Pane organizes measurement data into a tree that includes the following items.

**Document filename**



**All data:**

Organizes all measurement data in the document into data groups according to whether the measurement is a target or a sample.

**Classification by Target:**

Organizes data into data groups that have been classified by 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.

The items selected in the Tree Pane determine what measurements are shown in the List Pane.

## 1.3.5 List Pane

The List Pane lists the measurement data for the data group selected in the Tree Pane.


	Data Name	Target Na...	Judgement	L*(10°/D65)	a*(10°/D65)	b*(10°/D65)	$\Delta L^*(10^\circ/D...$	$\Delta a^*(10^\circ/D...$	$\Delta b^*(10^\circ/D...$	$\Delta E^*_{ab}(10^\circ/$
▼ : 10	Sample#0039	Target#0007	Pass	73.77	-41.43	3.15	-0.11	0.37	-0.10	0.40
▼ : 11	Sample#0040	Target#0007	Pass	73.71	-41.41	3.13	-0.17	0.39	-0.12	0.44
▼ : 12	Sample#0041	Target#0007	Pass	73.74	-41.41	3.12	-0.14	0.39	-0.13	0.44
▼ : 13	Sample#0042	Target#0007	Pass	73.79	-41.49	3.06	-0.09	0.31	-0.19	0.37
▼ : 14	Sample#0046	Target#0007	Pass	74.16	-41.98	3.36	0.27	-0.18	0.11	0.35

[Primary: 10°/D65] [Secondary: 2°/C] [Tertiary: 10°/F12]

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

For operations in the List Pane, see p. 100.

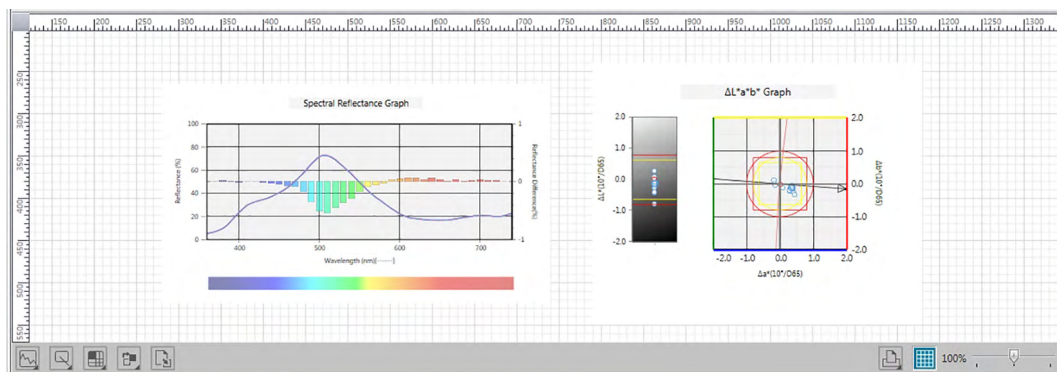
### 1.3.5.1 List Pane Menu

The List Pane menu can be opened by clicking on  at the upper right of the List Pane. The List Pane menu has the following items (please refer to the indicated pages for further information):

Tolerance Setting .....	p. 77
Judgement Format .....	p. 80
Default Tolerance Setting .....	p. 75
Supplementary data information .....	p. 49
Auto Naming .....	p. 47
Input Spectral Target .....	p. 63
Input Colorimetric Target .....	p. 66
Observer and Illuminant .....	p. 34
List Items .....	p. 36
Decimal Places .....	p. 44
Data Property .....	p. 95

### 1.3.6 Canvas Pane

The Canvas Pane is the pane in which graphic objects such as graphs, plots, etc. are pasted. The graphic objects can be selected from the Canvas Pane Toolbar at the bottom of the Canvas Pane. The Canvas Pane can also be printed out.



For operations in the Canvas Pane, see p. 108.



# CHAPTER 2

## OPERATION GUIDE

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

<b>2.1</b>	<b>Starting SpectraMagic DX .....</b>	<b>21</b>
<b>2.2</b>	<b>Connection with an instrument .....</b>	<b>22</b>
2.2.1	Connecting to an instrument .....	22
2.2.2	Disconnecting from an instrument.....	22
2.2.3	Communication Settings .....	24
2.2.4	Setting Up the Instrument.....	26
<b>2.3</b>	<b>Calibration .....</b>	<b>28</b>
2.3.1	Calibrating the Instrument.....	28
<b>2.4</b>	<b>Preparing for Measurement .....</b>	<b>32</b>
2.4.1	Opening a New or Existing Document.....	32
2.4.2	Setting the Observer and Illuminant .....	34
2.4.3	Setting the List Items .....	36
2.4.4	Setting the Number of Decimal Places for List Items .....	44
2.4.5	Setting the Measurement Options .....	45
2.4.6	Setting Auto-Naming.....	47
2.4.7	Specifying Supplementary Information of Data ®.....	49
<b>2.5</b>	<b>Specifying Target Data/Tolerance.....</b>	<b>51</b>
2.5.1	Registering Target Data .....	51
2.5.1-a	Performing Target Measurement .....	53
2.5.1-b	Performing Remote Target Measurement.....	55
2.5.1-c	Performing Interval Target Measurement ® .....	56
2.5.1-d	Performing Automatic Averaging Target Measurement .....	58
2.5.1-e	Performing Manual Averaged Target Measurement.....	60
2.5.1-f	Registering Target by Manual Data Input.....	63
2.5.1-g	Reading Target Data from the Instrument.....	69
2.5.1-h	Copying Target from the Existing Data .....	71
2.5.1-i	Changing Existing Sample to Target.....	71
2.5.2	Specifying the Target Data .....	72
2.5.2-a	Selecting Specific Target Data .....	72
2.5.2-b	Specify No Target (to take absolute measurements) .....	72
2.5.2-c	Specifying Working Target ® .....	73
2.5.3	Setting the Tolerance .....	75
2.5.3-a	Setting the Default Tolerance .....	75
2.5.3-b	Setting the Tolerance for Each Target.....	77
2.5.3-c	Specifying the Judgement Display Format.....	80
<b>2.6</b>	<b>Sample Measurement .....</b>	<b>83</b>
2.6.1	Performing Sample Measurement.....	84

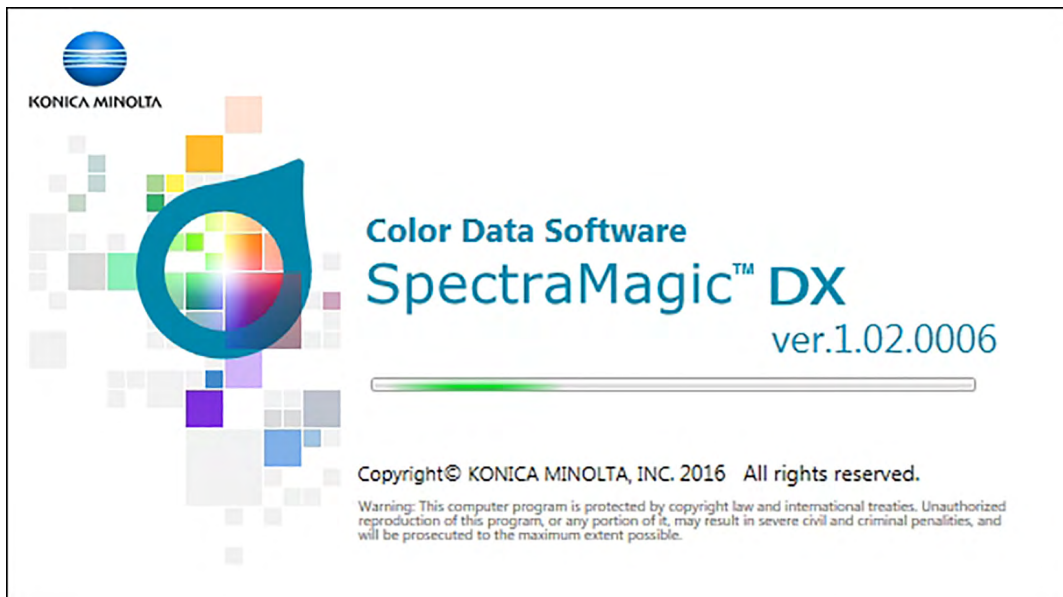
2.6.2	Performing Remote Sample Measurement.....	85
2.6.3	Performing Interval Sample Measurement ®.....	86
2.6.4	Performing Automatic Averaging Sample Measurement .....	88
2.6.5	Performing Manual Averaged Sample Measurement.....	90
2.6.6	Reading the Sample Data from the Instrument .....	93
2.6.7	Displaying Data Properties .....	95
<b>2.7</b>	<b>Document Window Operation .....</b>	<b>98</b>
2.7.1	Tree Pane.....	99
2.7.2	List Pane.....	100
2.7.3	Canvas Pane Operation.....	108
<b>2.8</b>	<b>Printing .....</b>	<b>114</b>
2.8.1	Printing from Canvas Pane.....	114
<b>2.9</b>	<b>Exporting/Importing Documents.....</b>	<b>116</b>
2.9.1	Exporting a Document to a SpectraMagic DX File .....	116
2.9.2	Importing a SpectraMagic DX File .....	116
2.9.3	Importing a SpectraMagic NX (CM-S100w) File.....	117
2.9.4	Importing a Text Data File ® .....	117
<b>2.10</b>	<b>Other Functions .....</b>	<b>121</b>
2.10.1	Template Files.....	121
2.10.2	Setting Startup Options .....	123
2.10.3	Viewing License Information.....	125
2.10.4	Viewing Version Information.....	125
2.10.5	Arranging Windows with/without Overlapping .....	126
2.10.6	Viewing the Instruction Manual .....	127
2.10.7	Writing Target Data to the Instrument .....	128
2.10.8	SensorSync tab functions .....	135

## 2.1 Starting SpectraMagic DX


- For information on installing the SpectraMagic DX software, refer to the Installation Guide.

Select the SpectraMagic DX icon registered in the Start menu. When the SpectraMagic DX software starts, the following splash screen appears.

### ■ Splash screen



### ■ Version information

You can also display the splash screen by clicking on  in the main program toolbar to open the Application Settings dialog and then selecting Version Information from Category




## 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 Applications Settings dialog (p. 124) 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.



To establish a connection manually, follow the procedure below:

1. Connect a USB cable to the instrument and to the computer.
  - When using the Spectrophotometer CM-2500c, connect the USB-Serial Converter Cable to the instrument, and then connect a USB cable to the USB-Serial Converter Cable and to the computer.
2. Switch on the instrument power.
  - If this is the first time the instrument has been connected to the computer, the instrument driver will automatically be installed. This may require a few minutes. Wait until the driver has finished installing before proceeding.
3. Click  **Connect** in the Data Panel 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 toolbar button will change to  **Disconnect** .

If connection fails, see p. 24.

### 2.2.2 Disconnecting from an instrument

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


### 2.2.2.1 If the connection fails


If the connection cannot be established, the message “No response from instrument” will appear, followed by “Connection failed. Retry after changing communication setup.” When [ OK ] is clicked in the second message box, the Serial Port Settings dialog box will appear.

Specify the communication parameters in the Serial Port Settings dialog box (particularly the COM port) and click the OK button. The system 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-2500c only)
- If the instrument allows the selection of communication settings, check that the communication settings specified in the Serial Port 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 power supply voltage applied to the instrument is low, SpectraMagic DX may suspend the 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.

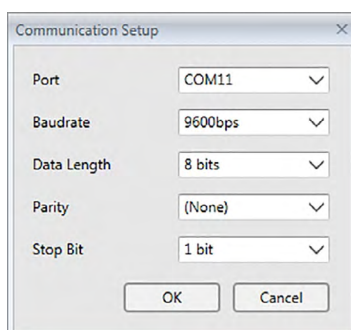
## 2.2.3 Communication Settings

- 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.

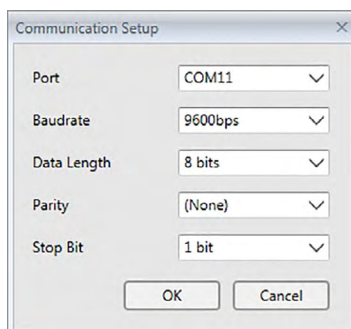
1. Click  Communication Set... in the Data Panel toolbar.

The Serial Port 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. 26.



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 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.

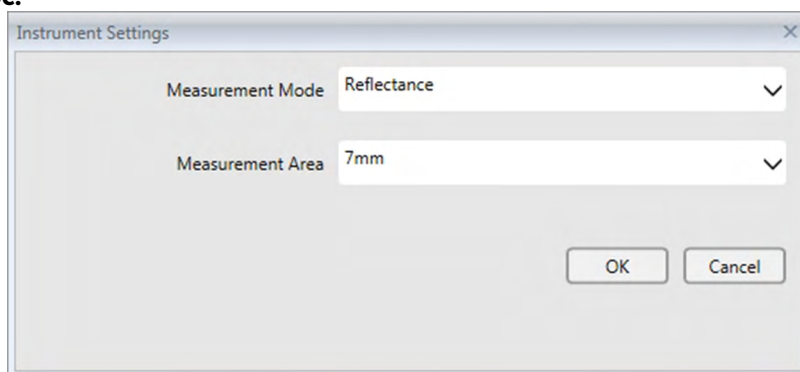
### 2.2.3.2 Manually updating the driver

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.

## 2.2.4 Setting Up 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).
1. Click  in the Data Panel toolbar or click  in the Instrument Window and select Instrument Settings from the Instrument Window menu that appears.  
The Instrument Settings dialog will appear.
  2. Specify the settings for the instrument. Only those items that can be specified for the instrument are displayed.

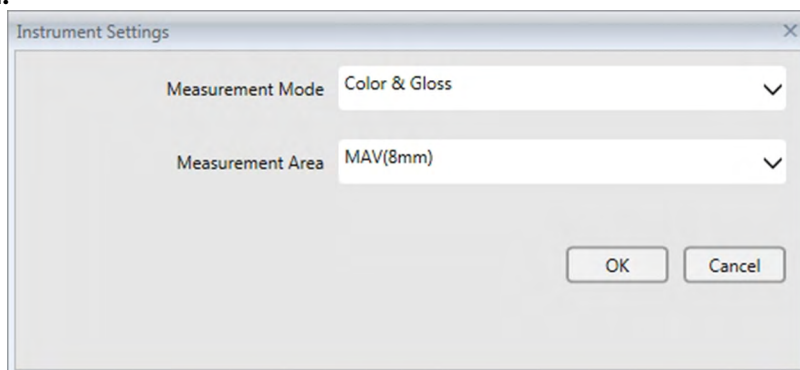
### CM-2500c:



Settings are fixed and cannot be changed:

Measurement Mode: Reflectance  
Measurement Area: 7mm

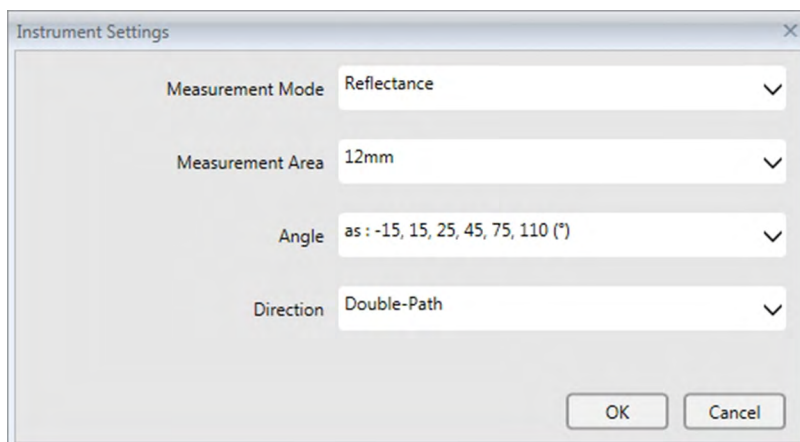
### CM-25cG:



Settings available:

Measurement Mode: Color & Gloss  
Color only  
Gloss only  
Measurement Area: MAV(8mm)  
SAV(3mm)

- Measurement area will be the measurement area currently set on the instrument.

**CM-M6:**

Settings available:

Measurement Mode: Reflectance (fixed)

Measurement Area: 12mm (fixed)

Angle: as: -15, 15, 25, 45, 75, 110 (°) (fixed)

Direction: Double-Path

Left + Right + Double-Path

- Performance for Left or Right data may be lower than for Double-Path data. Measurements performed with “Left/Right/Double-Path” instrument setting should be performed only on flat surfaces and care should be taken to ensure that the instrument is exactly perpendicular to the surface.

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 Info 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.



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, zero calibration can be skipped during the calibration process.

- For the CM-2500c, the optional Zero Calibration Box allows more reliable zero calibration because it is not affected by the surrounding environment. (Zero calibration boxes are included with the CM-25cG and CM-M6 as standard accessories.)

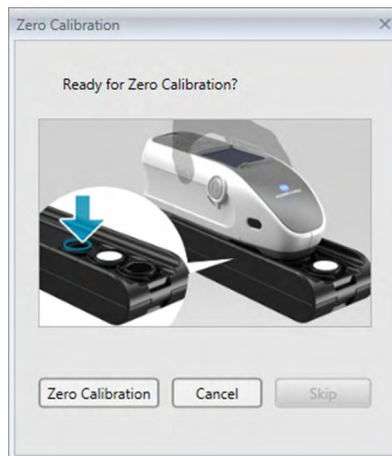
White calibration, however, must be performed every time the instrument is turned on.

### 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. For the sequence of dialog boxes for each instrument, see p. 31.

1. Click  Calibration in the Data Panel toolbar or click  in the Instrument Window and select *Calibration* from the menu that appears.

The Zero Calibration dialog box appears.



2. Position the instrument as shown 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. Position the instrument as shown for white calibration and click [ White Calibration ] to perform white calibration.

When white calibration is completed and the instrument being used is an instrument other than the CM-25cG, the entire calibration process is completed.

When white calibration is completed and the CM-25cG is being used with the Measurement Mode set to Color & Gloss, the Gloss Calibration dialog box will appear.



4. Position the instrument as shown for gloss calibration and click [ Gloss Calibration ] to perform gloss calibration.

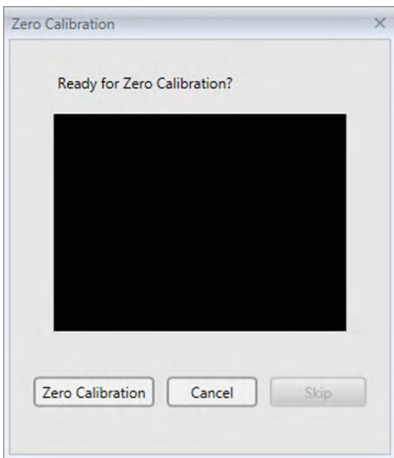
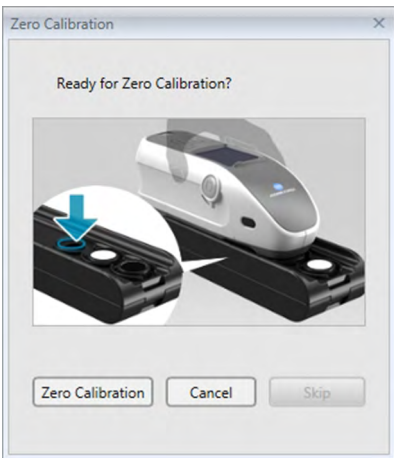
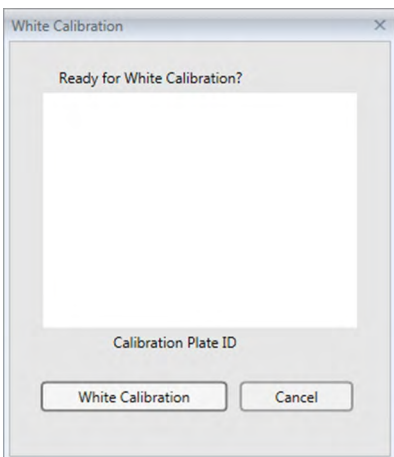

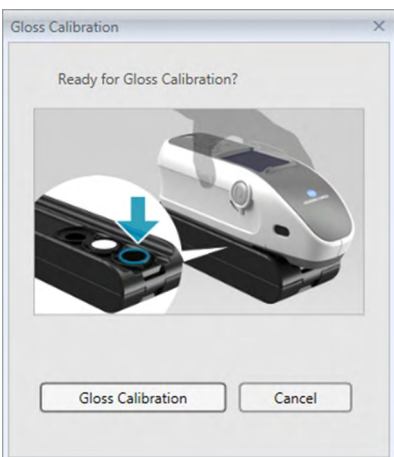
When gloss calibration is completed, the entire calibration process is completed.

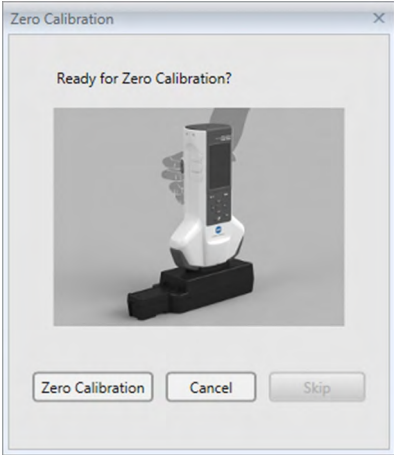
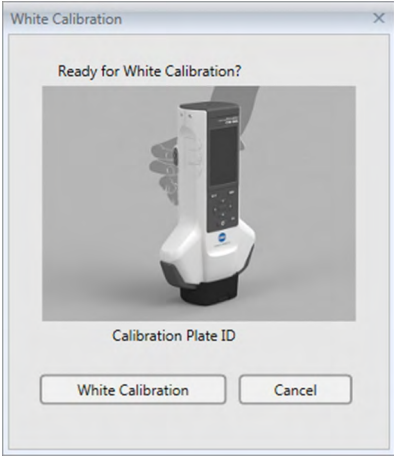
#### ■ Calibration time displayed in the Instrument Info pane

The calibration status information is retrieved from the instrument and the display in the Instrument Info pane 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 Info pane displays the time of the last calibration performed with the SpectraMagic DX software.



### ■ Sequence of calibration dialog boxes for each instrument

Instrument	CM-2500c	CM-25cG
Zero calibration		
White calibration		
Gloss calibration	(Not applicable)	

Instrument	CM-M6
Zero calibration	 A screenshot of a software dialog box titled "Zero Calibration". It contains the text "Ready for Zero Calibration?" above a 3D image of the CM-M6 instrument on a black base. At the bottom are three buttons: "Zero Calibration", "Cancel", and "Skip".
White calibration	 A screenshot of a software dialog box titled "White Calibration". It contains the text "Ready for White Calibration?" above a 3D image of the CM-M6 instrument. Below the image is the text "Calibration Plate ID". At the bottom are two buttons: "White Calibration" and "Cancel".
Gloss calibration	(Not applicable)


## 2.4 Preparing for Measurement

### 2.4.1 Opening a New or Existing Document

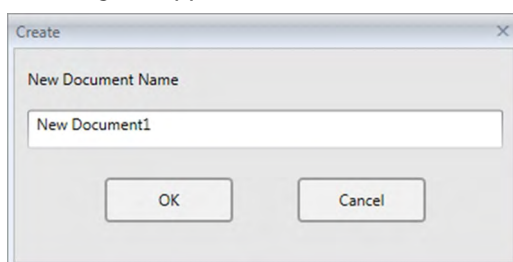
When SpectraMagic DX is started for the first time, it will open a blank document. Thereafter, SpectraMagic DX will open the document (if any) which was active the last time SpectraMagic DX was exited from.

#### 2.4.1.1 Creating a New Document

You can create a new document by following the procedure below.

1. Click  New in the Data Panel toolbar.


The Create New Document dialog box appears.



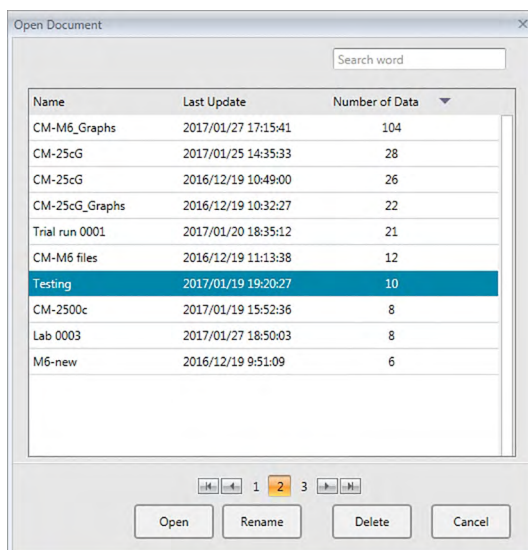
2. Input the name of the new document and click [ OK ]. The dialog will close and the new document will be created.

#### 2.4.1.2 Opening an Existing Document

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

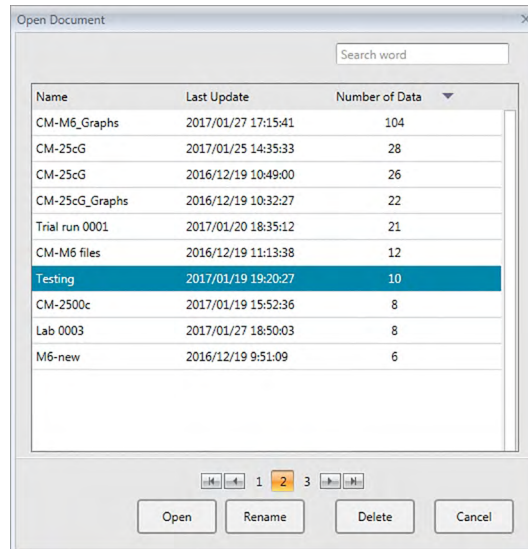
1. Click  Open in the Data Panel toolbar.

The Open Document dialog box appears.



2. Select the document to open and click [ Open ]. The dialog will close and the document will be opened.

### ■ Open Document dialog



#### Search box:

To search document titles for a specific word or string of characters, input the search string here. The list of documents shown will be filtered to the documents with titles containing the string. To clear the filter, delete the string in the search box.

#### Document list:

Shows the documents in the database, together with the time and date of the last change to the document and the number of data contained in the document.

#### List navigation buttons:

If the number of documents in the database exceeds the number that can be shown at one time in the document list, these buttons can be used to move through the entire list of documents.




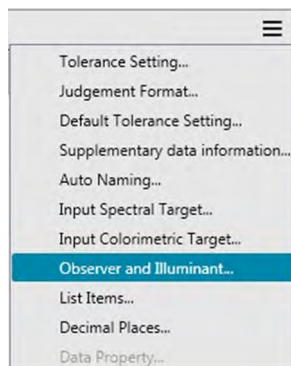
- ① Jump to top of list of all documents.
- ② Jump to previous page of list of all documents.
- ③ Pages in list of all documents. Click on a page number to jump to that page.
- ④ Jump to next page of list of all documents.
- ⑤ Jump to last page of list of all documents.

- [ Open ] Opens selected document and closes dialog.  
 [ Rename ] Opens a dialog for renaming the selected document.  
 [ Delete ] Deletes selected document after confirmation. Dialog will remain open.

## 2.4.2 Setting the Observer and Illuminant

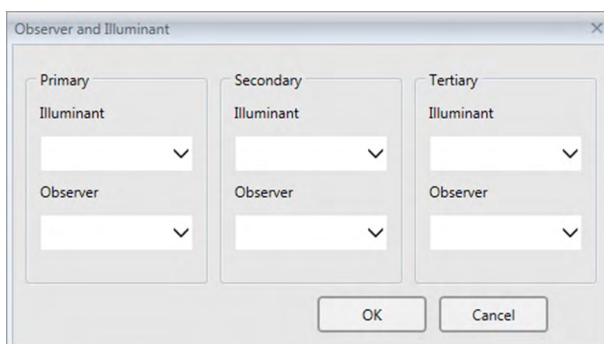
The observer and illuminant are important items required for converting spectral data into colorimetric data. When comparing colorimetric data from several samples, the observer and illuminant must be identical for all samples. It is recommended that the observer and illuminant be specified beforehand.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

1. Click  in the List Pane of the Document Window and select *Observer and Illuminant ...* from the menu that appears.



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 degree, 10 degree.

#### Illuminant

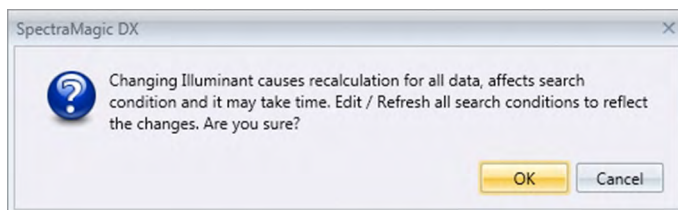
None, A, C, D50, D55®, D65, D75®, F2, F6®, F7®, F8®, F10®, F11, F12®, U50®, ID50®, ID65®

(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.

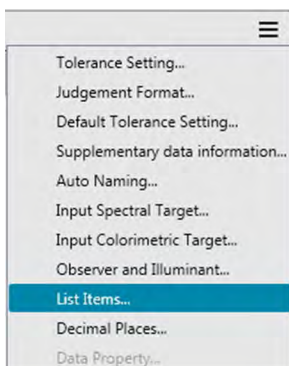
- When the observer or illuminant is changed, SpectraMagic DX will recalculate all data. When you attempt to change the observer or illuminant, the following message appears.



## 2.4.3 Setting the List Items

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

1. Click  in the Document Window List Pane and select *List Items ...* from the menu that appears.

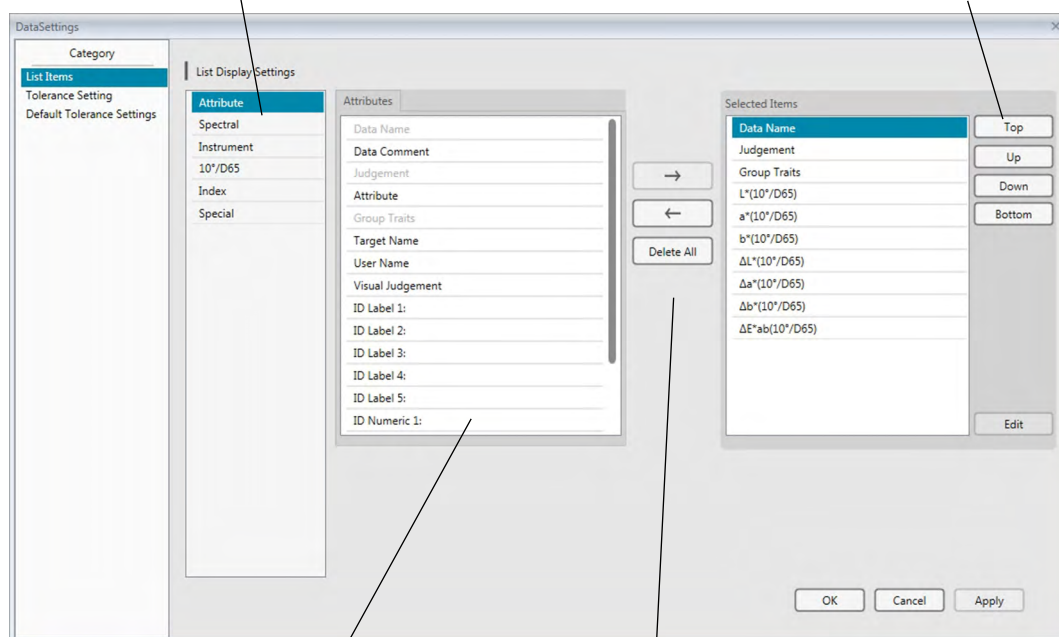


The Data Settings dialog box will appear, with List Items as the selected category.



2. Specify the details of the items shown in the List Pane.

Groups into which the list items are classified.

Use these buttons to change the order in which items are displayed in the List Pane. The item at the top of this list is displayed at the left side of the List Pane. 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 Setting dialog: List Items category

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

- Notes for items marked [\*1] to [\*12] are shown starting on p. 42.

### Attributes

Item	Content displayed in List Pane
<b>Data Name</b>	Name of data
<b>Data Comment</b>	Comment
<b>Judgement</b>	"Pass" or "Fail" (Available only for sample data. The string can be changed.)
<b>Attribute</b>	"MeasuredSpectral Data", "Manually Input Spectral Data", "Manually Input Colorimetric Data"
<b>Group Traits</b>	"-15°", "15°", "25°", "45°", "75°", or "110°" "-----" if there is no applicable trait to be shown.
<b>Target name</b>	Name of linked target
<b>User Name</b>	Name of the login user (Applicable only when the security function is enabled)
<b>Visual Judgement</b>	Result of the visual judgement
<b>Supplementary data information</b>	Title specified for supplementary data information (See page 65.)

### Spectral

Item	Content displayed in List Pane
<b>360 to 740 nm</b>	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 List Pane
<b>Instrument Name</b>	CM-2500c, CM-25cG, CM-M6
<b>Serial No.</b>	Serial No. of instrument
<b>Firmware Version</b>	ROM version of instrument
<b>Timestamp</b>	Date and time of measurement
<b>Calibrated Date</b>	Date and time of the last white calibration
<b>Measurement Type</b>	Reflectance, Transmittance
<b>Geometry</b>	45a:0; 45c:0°; 45°:as -15°, 15°, 25°, 45°, 75°, 110°
<b>Measurement Area</b>	SAV (3 mm), 7 mm, MAV (8 mm), 12 mm
<b>Observer</b>	2 degree, 10 degree
<b>Illuminant 1</b>	A, C, D50, D65, F2, F6, F7, F8, F10, F11, F12, ID50, ID65
<b>Illuminant 2; Illuminant 3</b>	None, A, C, D50, D65, F2, F6, F7, F8, F10, F11, F12, ID50, ID65
<b>Data Number</b>	Data number specified in the instrument from which the sample data was loaded (when a CM-2500c, CM-25cG, or CM-M6 is connected)
<b>Comment</b>	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.



**D65 (or other selected illuminant)**

Absolute Data	Color Difference	Equation	Others
X	$\Delta X$	$\Delta E^*_{ab}$	[*3] MI (DIN)
Y	$\Delta Y$	[*1] CMC(l:c)	[*4] Pseudo Color
Z	$\Delta Z$	[*1] CMC(l)	[*4] Pseudo Color (Target)
L*	$\Delta L^*$	[*1] CMC(c)	[*5] Strength $\oplus$
a*	$\Delta a^*$	[*1] $\Delta L$ -CMC	[*5] Strength X $\oplus$
b*	$\Delta b^*$	[*1] $\Delta C$ -CMC	[*5] Strength Y $\oplus$
C*	$\Delta C^*$	[*1] $\Delta H$ -CMC	[*5] Strength Z $\oplus$
h	$\Delta H^*$	[*1] $\Delta E^*_{94}$ (CIE 1994)< $\Delta E_{94}$ >	[*5] Pseudo Strength $\oplus$
L99	$\Delta L_{99}$	[*1] $\Delta E^*_{94}$ (CIE 1994)(l)< $\Delta E^*_{94}(l)$ >	[*5] Pseudo Strength X $\oplus$
a99	$\Delta a_{99}$	[*1] $\Delta E^*_{94}$ (CIE 1994)(c)< $\Delta E^*_{94}(c)$ >	[*5] Pseudo Strength Y $\oplus$
b99	$\Delta b_{99}$	[*1] $\Delta E^*_{94}$ (CIE 1994)(h)< $\Delta E^*_{94}(h)$ >	[*5] Pseudo Strength Z $\oplus$
C99	$\Delta C_{99}$	[*1] $\Delta L$ - $\Delta E^*_{94}$ (CIE 1994)< $\Delta L$ - $\Delta E^*_{94}$ >	Dominant Wavelength $\oplus$
h99	$\Delta H_{99}$	[*1] $\Delta C$ - $\Delta E^*_{94}$ (CIE 1994)< $\Delta C$ - $\Delta E^*_{94}$ >	Excitation Purity $\oplus$
x	$\Delta x$	[*1] $\Delta H$ - $\Delta E^*_{94}$ (CIE 1994)< $\Delta H$ - $\Delta E^*_{94}$ >	[*6] 555 $\oplus$
y	$\Delta y$	[*1] $\Delta E_{00}$ (CIE 2000)< $\Delta E_{00}$ >	
u* $\oplus$	$\Delta u^* \oplus$	[*1] $\Delta E_{00}(l)$ < $\Delta E_{00}(l)$ >	
v* $\oplus$	$\Delta v^* \oplus$	[*1] $\Delta E_{00}(c)$ < $\Delta E_{00}(c)$ >	
u' $\oplus$	$\Delta u' \oplus$	[*1] $\Delta E_{00}(h)$ < $\Delta E_{00}(h)$ >	
v' $\oplus$	$\Delta v' \oplus$	[*1] $\Delta L'$ - $\Delta E_{00}$ (CIE 2000) < $\Delta L'$ - $\Delta E_{00}$ >	
L (Hunter)	$\Delta L$ (Hunter)	[*1] $\Delta C'$ - $\Delta E_{00}$ (CIE 2000) < $\Delta C'$ - $\Delta E_{00}$ >	
a (Hunter)	$\Delta a$ (Hunter)	[*1] $\Delta H'$ - $\Delta E_{00}$ (CIE 2000) < $\Delta H'$ - $\Delta E_{00}$ >	
b (Hunter)	$\Delta b$ (Hunter)	$\Delta E_{ab}$ (Hunter)	
	[*2] Lightness	$\Delta E_{99}$	
	[*2] Saturation	FMC2 $\oplus$	
	[*2] Hue	$\Delta L$ (FMC2) $\oplus$	
	[*2] a* Evaluation	$\Delta Cr$ -g(FMC2) $\oplus$	
	[*2] b* Evaluation	$\Delta Cy$ -b(FMC2) $\oplus$	
		NBS100 $\oplus$	
		NBS200 $\oplus$	
		$\Delta E_c$ (degree) (DIN 6175-2) $\oplus$	
		< $\Delta E_c$ (deg.)>	
		$\Delta E_p$ (degree) (DIN 6175-2) $\oplus$	
		< $\Delta E_p$ (deg.)>	

## 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>	$\Delta WI(BERGER) \textcircled{P}$
$WI(CIE 1982) <WI(CIE)>$	$\Delta WI(ASM E313-96)(C) \textcircled{P} <\Delta WI(E313-96)(C)>$
$WI(ASM E313-73) <WI(E313-73)>$	$\Delta WI(ASM E313-96)(D50) \textcircled{P} <\Delta WI(E313-96)(D50)>$
$WI(Hunter)$	$\Delta WI(ASM E313-96)(D65) \textcircled{P} <\Delta WI(E313-96)(D65)>$
$WI(TAUBE) \textcircled{P}$	Tint diff.(CIE)
$WI(STENSBY) \textcircled{P}$	Tint diff.(ASM E313-96)(C) $\textcircled{P} <\text{Tint diff. (E313-96)(C)>$
$WI(BERGER) \textcircled{P}$	Tint diff.(ASM E313-96)(D50) $\textcircled{P} <\text{Tint diff. (E313-96)(D50)>$
$WI(ASM E313-96)(C) \textcircled{P} <WI(E313-96)(C)>$	Tint diff.(ASM E313-96)(D65) $\textcircled{P} <\text{Tint diff. (E313-96)(D65)>$
$WI(ASM E313-96)(D50) \textcircled{P} <WI(E313-96)(D50)>$	$\Delta YI(ASM D1925) <\Delta YI(D1925)>$
$WI(ASM E313-96)(D65) \textcircled{P} <WI(E313-96)(D65)>$	$\Delta YI(ASM E313-73) <\Delta YI(E313-73)>$
Tint(CIE)	$\Delta YI(ASM E313-96)(C) \textcircled{P} <\Delta YI(E313-96)(C)>$
$Tint(ASM E313-96)(C) \textcircled{P} <Tint(E313-96)(C)>$	$\Delta YI(ASM E313-96)(D65) \textcircled{P} <\Delta YI(E313-96)(D65)>$
$Tint(ASM E313-96)(D50) \textcircled{P} <Tint(E313-96)(D50)>$	$\Delta YI(DIN 6167)(C) \textcircled{P}$
$Tint(ASM E313-96)(D65) \textcircled{P} <Tint(E313-96)(D65)>$	$\Delta YI(DIN 6167)(D65) \textcircled{P}$
$YI(ASM D1925) <YI(D1925)>$	$\Delta B(ASM E313-73) \textcircled{P} <\Delta B(E313-73)>$
$YI(ASM E313-73) <YI(E313-73)>$	[*7] Brightness diff.(TAPPI T452) $\textcircled{P} <\text{Brightness diff. (TAPPI)}>$
$YI(ASM E313-96)(C) \textcircled{P} <YI(E313-96)(C)>$	[*7] Brightness diff.(ISO 2470) $\textcircled{P} <\text{Brightness diff. (ISO)}>$
$YI(ASM E313-96)(D65) \textcircled{P} <YI(E313-96)(D65)>$	[*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.(ASTM D1003-97)(A) $\textcircled{P} <\text{Haze diff. (D1003-97)(A)}>$
$B(ASM E313-73) \textcircled{P} <B(E313-73)>$	[*8] Haze diff.(ASTM 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 (ASTM 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 (ASTM 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 (CM-25cG only)	Grey Scale Rating (ISO 105.A05)(C) $\textcircled{P} <\text{Grey Scale Rating (C)}>$
FF (CM-M6 only)	Grey Scale Rating (ISO 105.A05)(D65) $\textcircled{P} <\text{Grey Scale Rating (D65)}>$
	K/S Strength ( $\Delta E$ )(C) $\textcircled{P} <K/S (\Delta E)(C)>$
	K/S Strength ( $\Delta E$ )(D65) $\textcircled{P} <K/S (\Delta E)(D65)>$

	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 ( $\Delta L^*$ )(C)Ⓟ <K/S ( $\Delta L^*$ )(C)>
	K/S Strength ( $\Delta C^*$ )(C)Ⓟ <K/S ( $\Delta C^*$ )(C)>
	K/S Strength ( $\Delta H$ )(C)Ⓟ <K/S ( $\Delta H$ )(C)>
	K/S Strength ( $\Delta a$ )(C)Ⓟ <K/S ( $\Delta a$ )(C)>
	K/S Strength ( $\Delta b$ )(C)Ⓟ <K/S ( $\Delta b$ )(C)>
	K/S Strength ( $\Delta L$ )(D65)Ⓟ <K/S ( $\Delta L$ )(D65)>
	K/S Strength ( $\Delta C$ )(D65)Ⓟ <K/S ( $\Delta C$ )(D65)>
	K/S Strength ( $\Delta H$ )(D65)Ⓟ <K/S ( $\Delta H$ )(D65)>
	K/S Strength ( $\Delta a$ )(D65)Ⓟ <K/S ( $\Delta a$ )(D65)>
	K/S Strength ( $\Delta b$ )(D65)Ⓟ <K/S ( $\Delta b$ )(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)Ⓟ

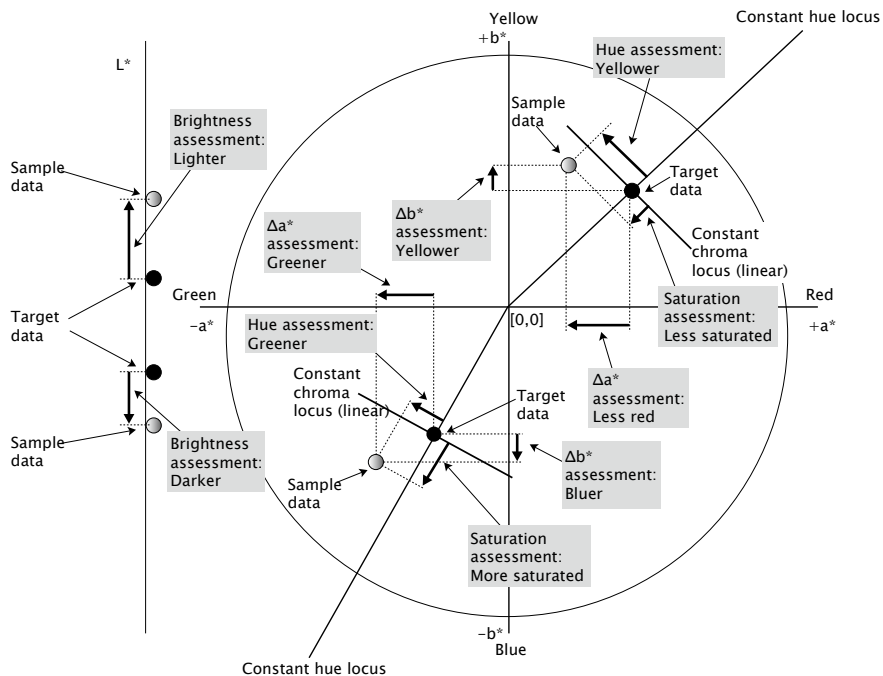
## Special

Special	
[*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',  $\Delta x$ ,  $\Delta y$ ,  $\Delta u'$  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. 45 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.

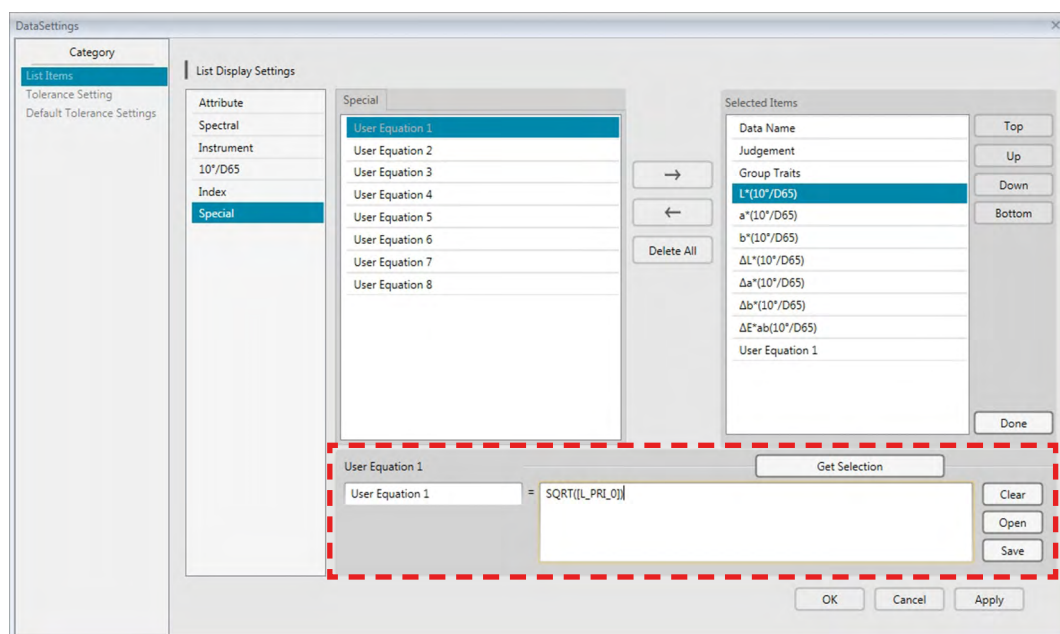
## ■ Notes on List Items

- [\*1] Color difference equation which requires parameter setting. The parameters can be set in the Tolerance Settings category of the Data Setting dialog box. For details, refer to p. 78.
- [\*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 List Pane 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 are displayed only when the opacity measurement mode or haze measurement mode are specified respectively. (Opacity measurement mode and haze measurement mode are not available on SpectraMagic DX Ver. 1.0.)
- [\*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 [ Load ] 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 [ Load ] button.

The spectral, 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 Selected ] 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, or in the case of some index items or special items for which illuminant/observer is fixed or irrelevant, an indicator of that.

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

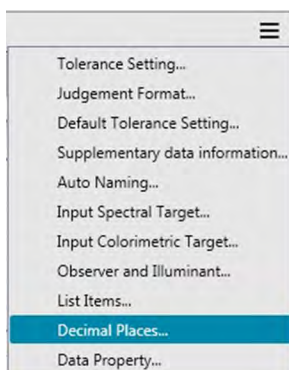
0: Current row data

For a full description of user equation parameters, functions, etc. see Appendix.

## 2.4.4 Setting the Number of Decimal Places for List Items

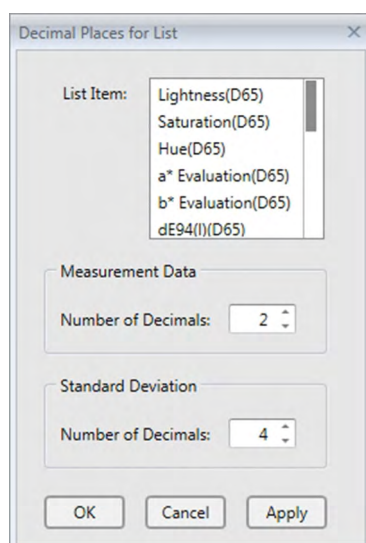
For list items that are represented by numbers, the number of decimal places can be specified individually.

1. Click  in the Document Window List Pane and select *Decimal Places ...* from the menu that appears.



The Decimal Places for List dialog appears.

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

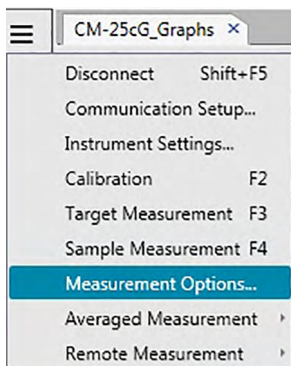
##### Number of Decimals

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

## 2.4.5 Setting the Measurement Options

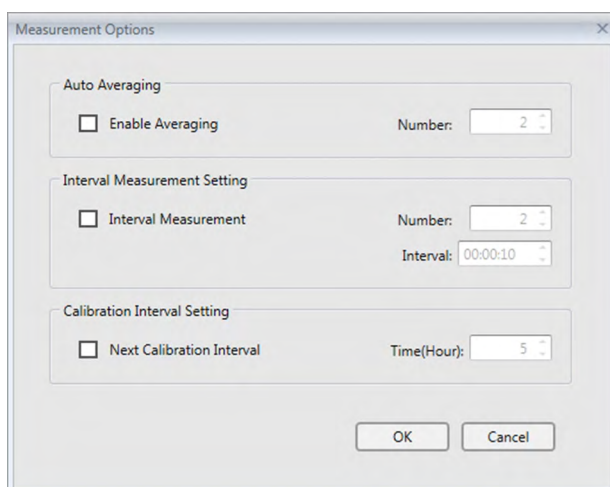
- This procedure is available only when the instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).

1. Click  in the Instrument Window and select *Measurement Options ...* from the menu that appears.



The Measurement Options dialog box appears.

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. 59 (target measurements) or p. 89 (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. 57 (target measurements) or p. 87 (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.

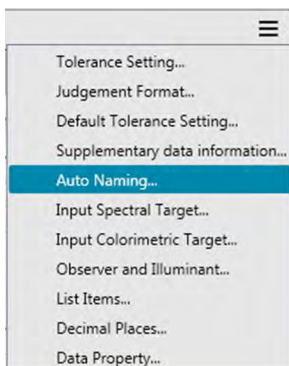
### **Calibration Interval Setting**

#### **Next Calibration Interval**

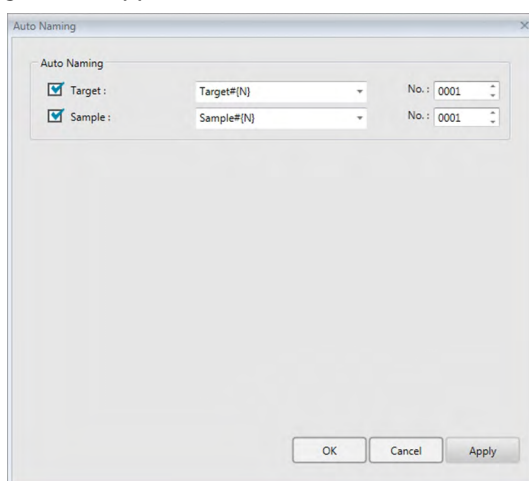
When the time specified here has passed since the last white calibration performed with SpectraMagic DX, a message will appear to recommend performing white calibration. A time between 01:00 (1 hour) to 24:00 (24 hours) can be entered.

## 2.4.6 Setting Auto-Naming

1. Click  in the Document Window List Pane and select *Auto Naming ...* from the menu that appears.



The Auto Naming dialog box will appear.



2. Specify the parameters for auto naming.

### ■ Auto Naming Dialog

#### 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
{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

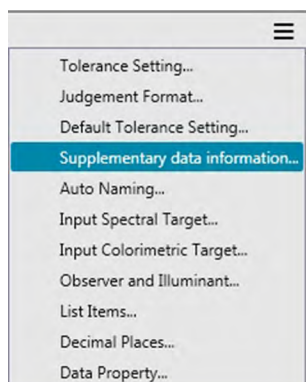
## 2.4.7 Specifying Supplementary Information of Data ⑨

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 List Pane as list items.

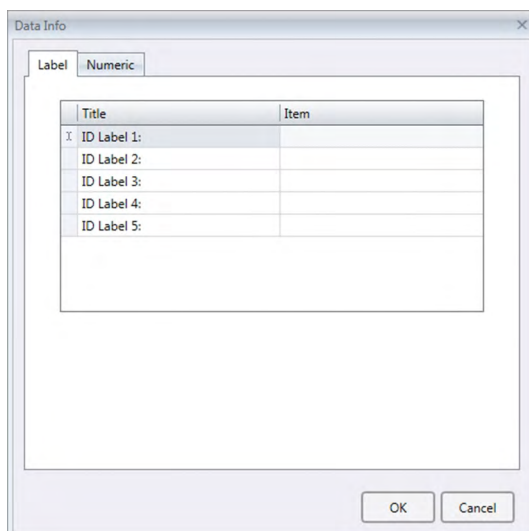
This setting is recorded for each document, and is stored in a template file. For details of a template file, refer to p. 122.

1. Click  in the Document Window List Pane and select **Supplementary data information ...** from the menu that appears.



The Supplementary Data Information dialog box appears.

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 Numerical tab.

#### **Title**

When the dialog is first opened, default titles such as “ID Label 01:” or “ID Numeric 01” 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 List Pane.

#### **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. 54)

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

- **Remote target measurement** (p. 56)

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. 57)

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. 59)

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. 61)

Select Averaged 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

Input data manually and register them as the target data.

#### ■ Read target data from the instrument

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

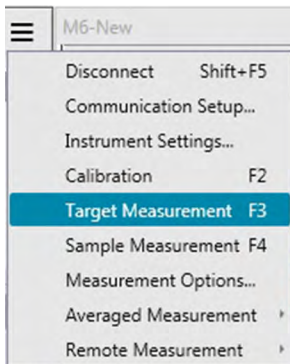
Copy sample data or target data in the same or different document and register them as target data.

#### ■ Changing existing sample to target

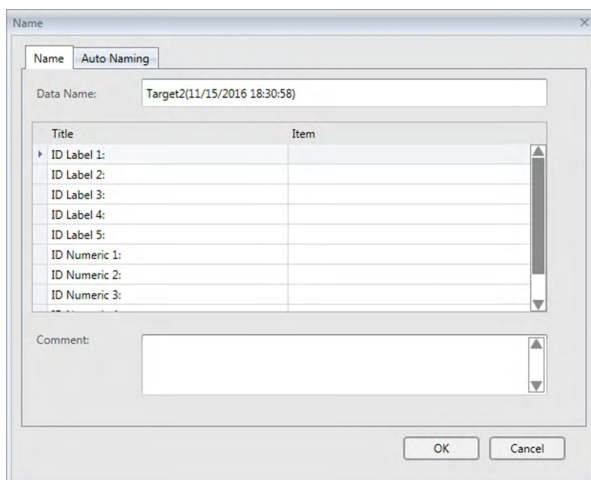
Select sample data in the document and change it to register as target data.

## 2.5.1-a Performing Target Measurement

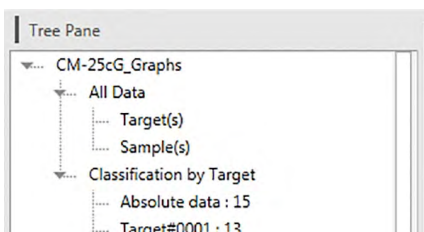
- This procedure is available only when the instrument is connected and the software license is valid (either electronically or by using a protection key is attached to the computer).
1. Click  Target Meas... in the Data Panel toolbar or click  in the Instrument Window and select *Target Measurement* from the menu that appears.



The Name dialog box appears.

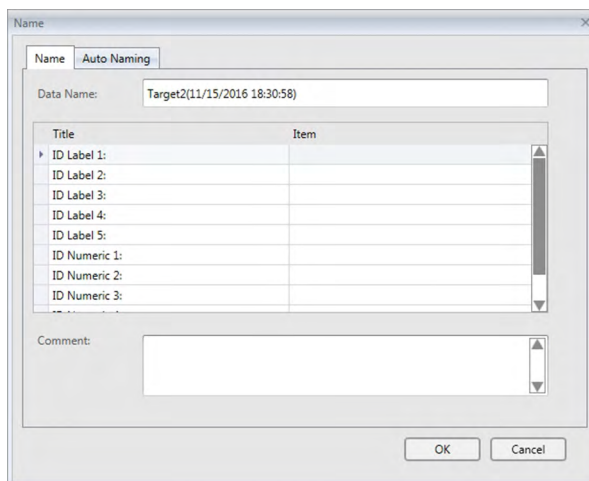


- If auto-naming is activated, the Name dialog box will not appear. Skip this process and go to step 3.
2. Enter the name of the data and click [ OK ].
    - You can assign a name, supplementary data information ⓘ and a comment for each piece of sample data. (See page 70.) Select a supplementary data information item 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 Numerical tabs of the Data Information dialog box are displayed. Item data can be changed or added if desired, but titles cannot be changed here. (See p. 50.)

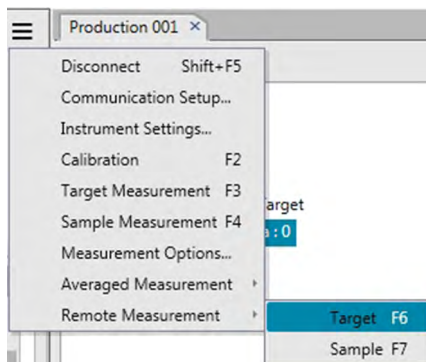
#### Data Comment

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. Click  in the Instrument Window and select *Remote Measurement: Target* from the menu that appears.




Remote target measurement will be enabled and Remote Measurement of 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 Measure command or Document Window toolbar buttons of SpectraMagic DX.

- When a CM-2500c 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.

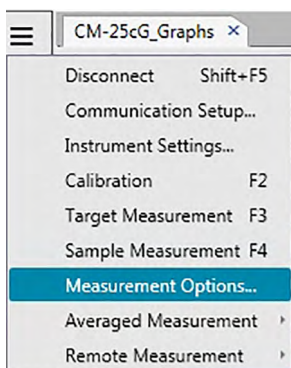
#### ■ Canceling Remote Target Measurement mode

To cancel remote target measurement mode, click  in the Instrument Window and select *Remote Measurement: Target* again from the menu that appears. Remote Measurement: Target will be canceled and Remote Measurement in the Instrument Information tab will change to "OFF".

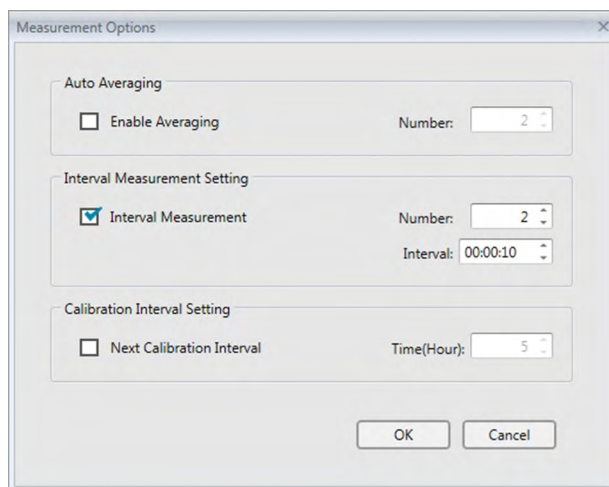
### 2.5.1-c Performing Interval Target Measurement ⑨

- 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. Click  in the Instrument Window and select *Measurement Options ...* from the menu that appears.

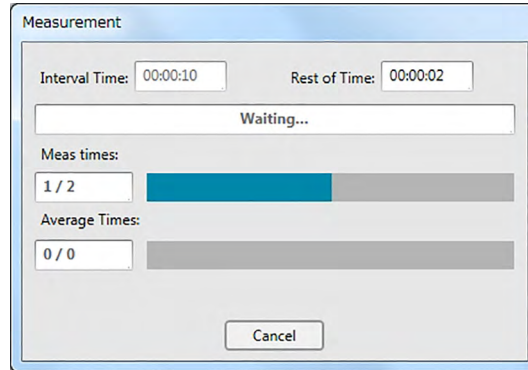


The Measurement Options dialog box appears.



2. Check Interval Measurement and specify the options for Interval Measurement Settings.
  - For information on settings in the Measurement Options dialog, see p. 46.
3. Click the OK button to confirm the settings and close the Measurement Options dialog box.
4. Perform the measurement as described on p. 54.

The Measurement dialog box appears and interval measurement is performed.



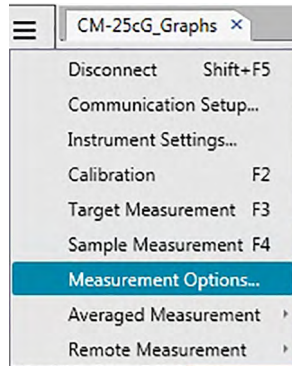
During interval measurement, the measurement data are added to the document as targets after every measurement.

- When interval measurement is performed, the measurement name will be formatted as follows:  
(Specified measurement name)\_(Interval measurement number)\_(Total measurements in document)  
*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.

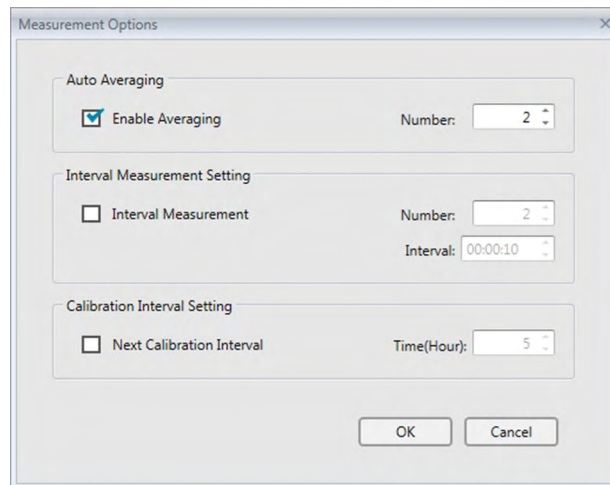
### 2.5.1-d Performing Automatic Averaging Target Measurement

- 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. Click  in the Instrument Window and select *Measurement Options ...* from the menu that appears.

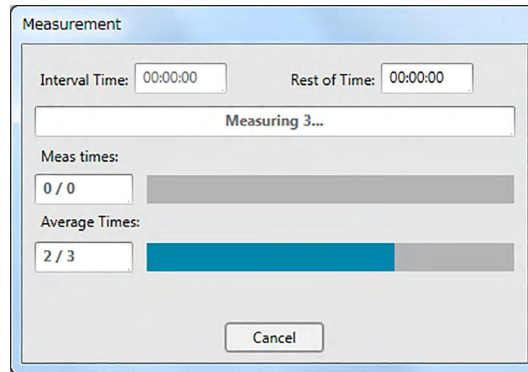


The Measurement Options dialog box appears.




2. Check Enable Averaging and specify the options for Auto Averaging.
  - For information on settings in the Measurement Options dialog, see p. 46.
3. Click the OK button to confirm the settings and close the Measurement Options dialog box.
4. Perform the measurement as described on p. 54.

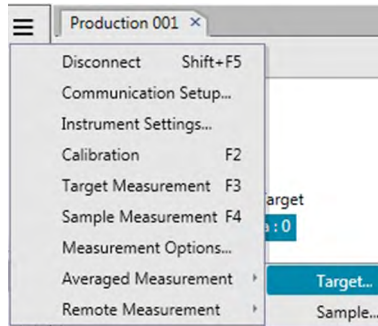
The Measurement dialog box appears and automatic averaging measurement is performed.



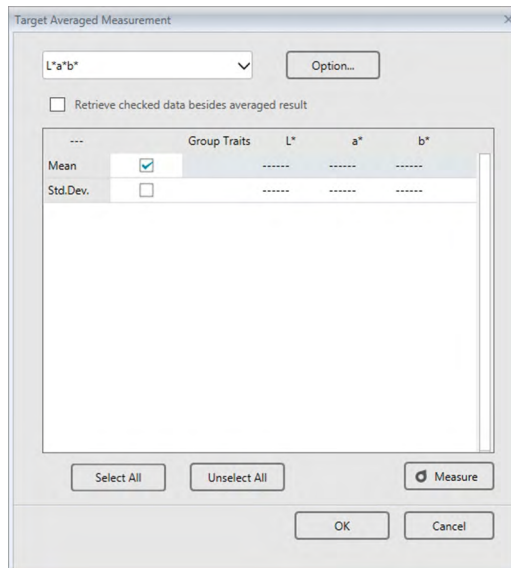
During automatic averaging measurement of target data, measurements are repeated the specified number of times. When all specified measurements have been completed, the collected measurement data are averaged and added to the document as one target.

### 2.5.1-e Performing Manual Averaged Target Measurement

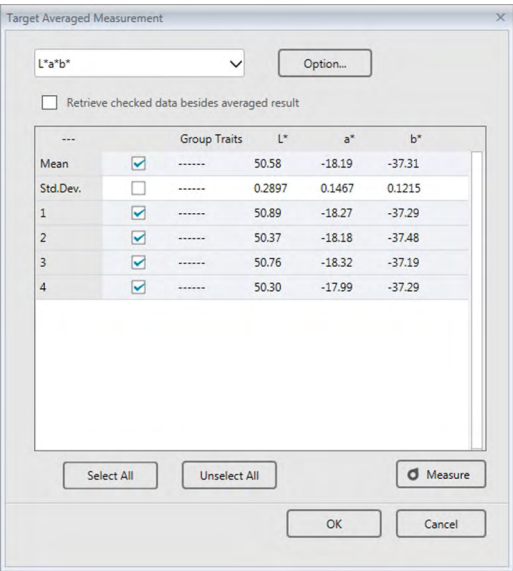
- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).
- Click  in the Instrument Window and select *Averaged Measurement: Target* from the menu that appears.



The Target Averaged Measurement dialog box appears.



- 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.



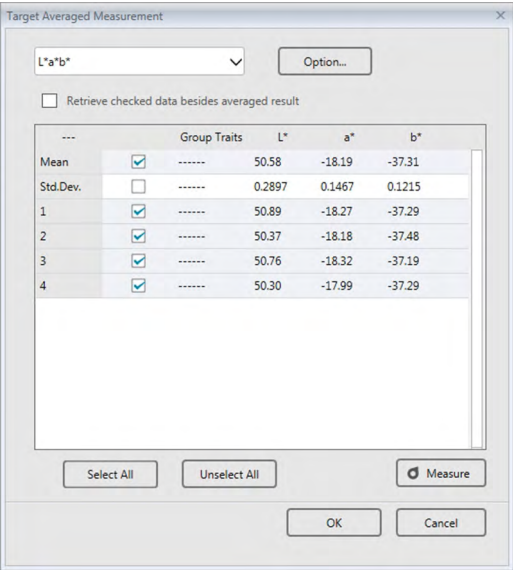
The measurement data are displayed in the dialog box after each measurement, and the average and standard deviation for the measurements taken so far are calculated and displayed.

- 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**



**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 List Pane as individual targets.

**Select All**

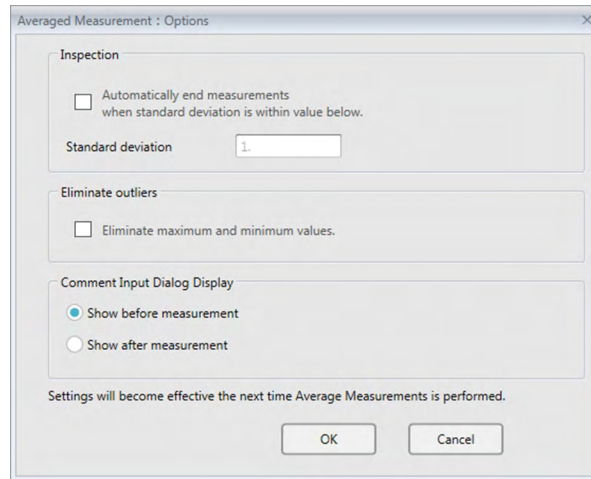
Clicking this button selects (puts a check mark next to) all of the measurements.

**Unselect All**

Clicking this button unselects (removes the check mark next to) all of the measurements.

**Option**

Clicking this button displays a dialog box used for specifying options for the averaging measurement.

**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 are displayed in red, and they cannot be checked.

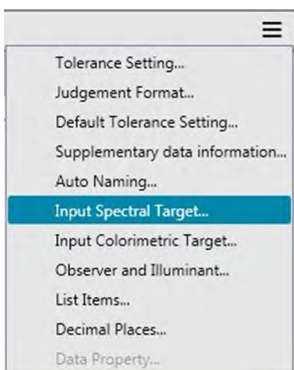
**Comment input dialog display**

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. Click  in the Document Window List Pane and select *Input Spectral Data ...* from the menu that appears.



The Input Spectral Target dialog box appears.

(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
GU	0.00

2. Set the ChannelID and Group Trait.

If the current document already contains data:

- The ChannelID (Single or 6 Angle) will be automatically set to match the number of channels in the current document.
- If the ChannelID is automatically set to Single, the Group Trait will be automatically set to match the group trait of the current document.

If the current document does not contain data:

- Set the desired ChannelID (Single or 6 Angle).
- After setting the desired ChannelID, set the desired Group Trait.

**3. Type the spectral data for all wavelengths.**

- If the ChannelID is set to 6 Angle, 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 List Pane 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 page 70.)

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

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 List Pane.

## ■ Input Spectral Target dialog box

Input Data	
(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

☒ GU 0.00

### ChannelID drop-down list box

Select from Single or 6 Angle.

### Group Trait

Available settings depend on ChannelID.

ChannelID = Single: 45/0

ChannelID = 6 Angle: -15 degree, 15 degree, 25 degree, 45 degree, 75 degree, 110 degree

- If current document already contains data, the ChannelID matching the current document will be set automatically. For ChannelID = Single, the Group Trait matching the current document will also be set automatically.


### Input Data

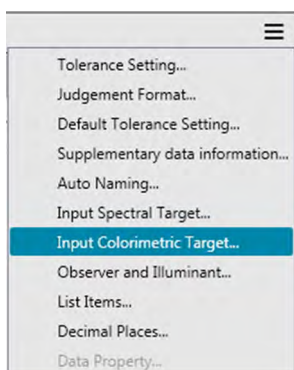
Reflectance: 0.01 to 999.99

### GU

Gloss Units: 0.00 to 200.00

### 2.5.1-f.2 Inputting colorimetric data

1. Click  in the Document Window List Pane and select *Input Colorimetric Data ...* from the menu that appears.



The Input Colorimetric Target dialog box appears.

	Primary	Secondary	Tertiary
X	0.00		
Y	0.00		
Z	0.00		

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

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

If the current document already contains data:

- The ChannelID (Single or 6 Angle) will be automatically set to match the number of channels in the current document.
- If the ChannelID is automatically set to Single, the Group Trait will be automatically set to match the group trait of the current document.

If the current document does not contain data:

- Set the desired ChannelID (Single or 6 Angle).
- 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 6 Angle, 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 List Pane 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 page 70.)

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

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 List Pane.

## ■ Input Colorimetric Target dialog box

Input Colorimetric Target

Color Space Selection: XYZ

ChannelID: Single

Group Traits: 45/0

Input Data

	Primary	Secondary	Tertiary
X	0.00		
Y	0.00		
Z	0.00		

☒ GU: 0.00

OK Cancel

### Color Space drop-down list box

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

### ChannelID drop-down list box

Select from Single or 6 Angle.

### Group Trait

Available settings depend on ChannelID.

ChannelID = Single: 45/0

ChannelID = 6 Angle: -15 degree, 15 degree, 25 degree, 45 degree, 75 degree, 110 degree

- If current document already contains data, the ChannelID matching the current document will be set automatically. For ChannelID = Single, the Group Trait matching the current document will also be set automatically.

### 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

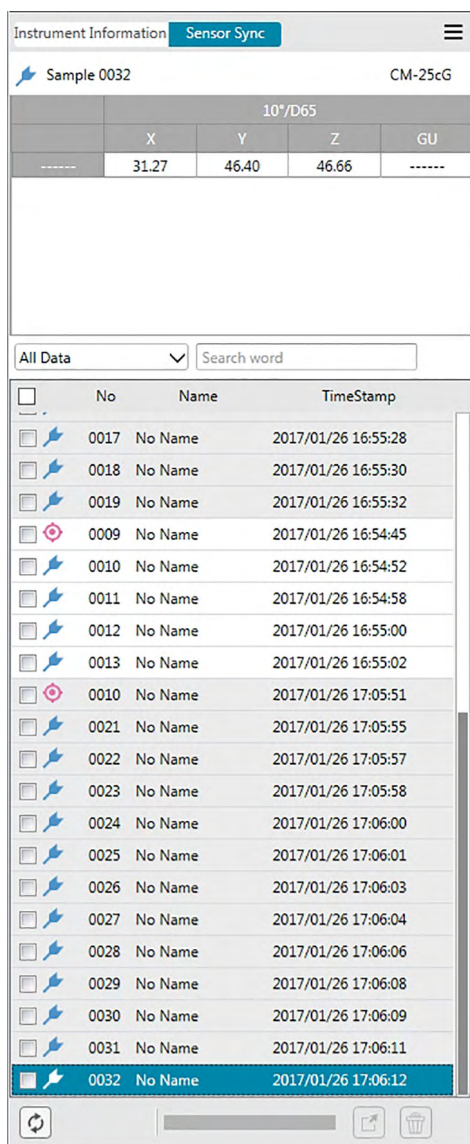
## 2.5.1-g Reading Target Data from the Instrument

- 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 using the Sensor Sync tab of the Instrument Window.




- For all Sensor Sync tab operations, see p. 136.

1. Click on the Sensor Sync tab of the Instrument Window. The Sensor Sync tab will be shown.



- If this is the first time the Sensor Sync tab has been accessed since the instrument was connected, all of the data in the instrument's memory will be read. This may take some time, depending on the number of data in the instrument's memory. A progress bar will be shown while data are being read to indicate the current status.



2. When reading of the instrument memory data is complete, the data which were read will be shown in the Sensor Sync tab.
  - When data is selected in the Sensor Sync tab list, the colorimetric data for the measurement selected will be shown in the top area of the Sensor Sync tab.
  - The icon in front of the measurement name indicates whether a measurement is a target or a sample.  indicates a target, and  indicates a sample.
3. You can 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.
4. When all targets to be read into SpectraMagic DX have been selected, click on  at the bottom of the Sensor Sync tab. The selected targets will be read into the current document as targets.
  - Target data can also be read into the document by right-clicking on the target in the Sensor Sync tab list and selecting Read from the context menu that appears.

### **2.5.1-h Copying Target from the Existing Data**

For data copy and paste procedures, see p. 105.

### **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 List Pane..
2. Right-click on the sample, select Tool from the context menu that appears, and then select Change To Target from the pop-out Tool menu that appears. The sample will be changed to a target.

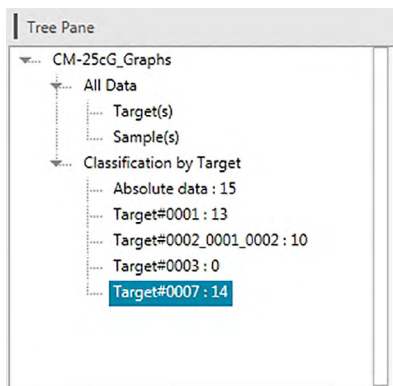
## 2.5.2 Specifying the Target Data

Specify the target data 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.

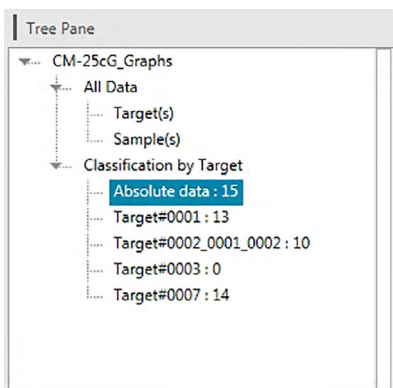
### 2.5.2-a Selecting Specific Target Data

Select the specific target data from the Classification by Target folder in the Tree pane.



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

Select Classification by Target - Absolute Data in the Tree Pane.



## 2.5.2-c Specifying Working Target ㊦

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

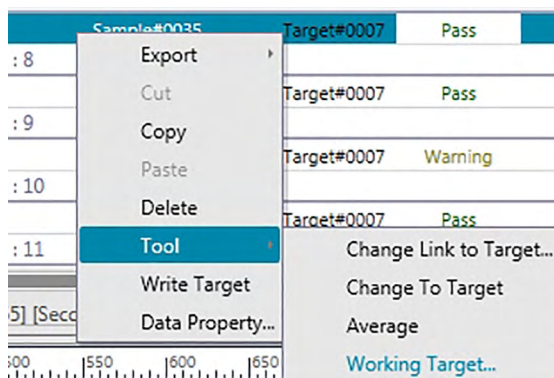
You can organize several target data into a group and specify all of them as target data for color difference measurement. A group consists of several working targets under one master target. Sample measurements taken when the master target or any of the working targets in the group will be linked to 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 Tree Pane, or fixing the position of the origin point of the graph at the master target data.

1. In the Tree Pane, select a measurement under *All data - Target(s)* or *All data - Sample(s)*, or select Absolute data or a target in the Classification by Target folder. Then, select the sample or target to be used as a working target in the List Pane.
  - Select only a single sample or target. This operation cannot be performed if multiple data are selected.

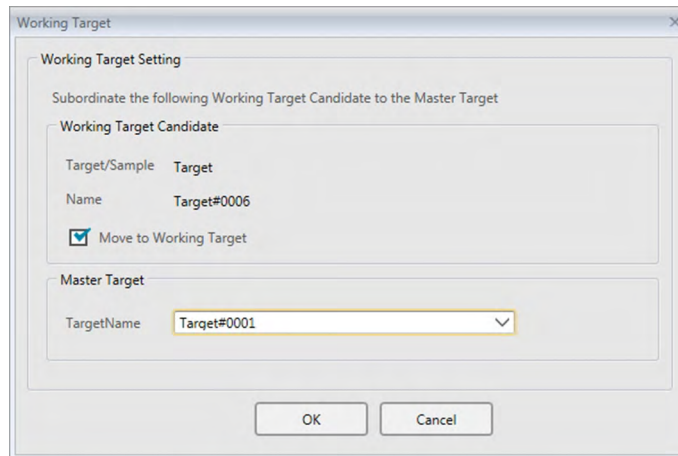
	Data Name	Target No...	Judgement	L*(10°/D65)	a*(10°/D65)	b*(10°/D65)	ΔL*(10°/D...	Δa*(10°/D...	Δb*(10°/D...	ΔE*ab(10°/...	450nm	Pseudo Co...
8												
9	Sample#0036	Target#0007	Pass	73.49	-41.42	3.07	-0.40	0.38	-0.18	0.58	44.44	
10	Sample#0037	Target#0007	Warning	73.11	-41.38	2.98	-0.78	0.42	-0.27	0.92	43.94	
11	Sample#0036	Target#0007	Pass	73.71	-41.41	3.13	-0.11	0.37	-0.10	0.40	44.44	
12	Sample#0040	Target#0007	Pass	73.71	-41.41	3.13	-0.17	0.39	-0.12	0.44	44.74	

Primary: 10°/D65 Secondary: 2°/C Tertiary: 10°/P12

2. Right-click on the sample, select Tool from the menu that appears, and then select *Working Target* from the pop-out Tool menu that appears.

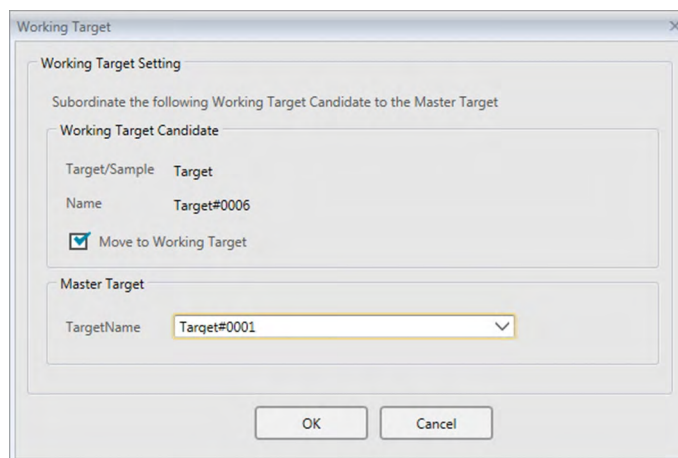


The Working Target dialog box appears.



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.

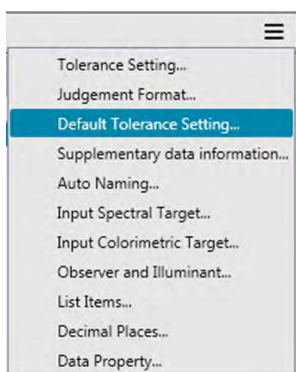
## 2.5.3 Setting the Tolerance

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

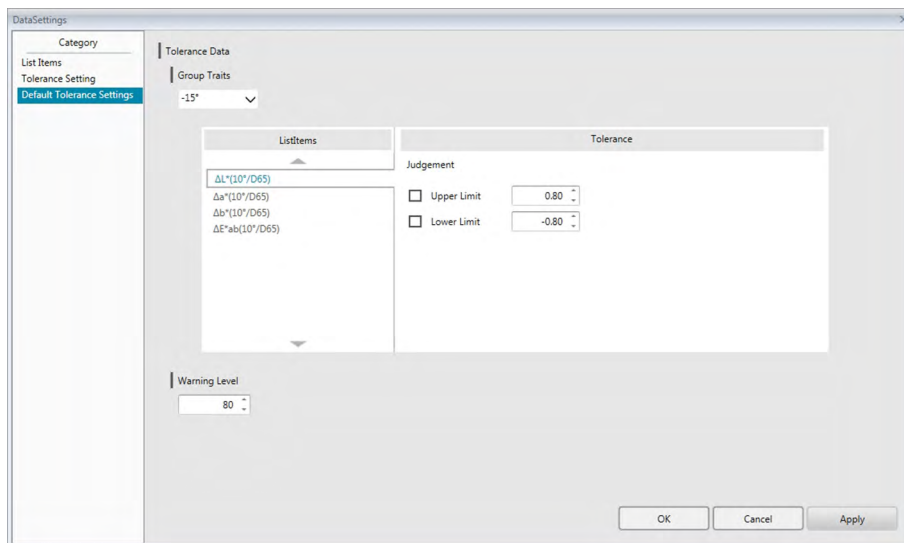
### 2.5.3-a Setting the Default Tolerance

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. Click  in the Document Window List Pane and select *Default Tolerance Setting ...* from the menu that appears.



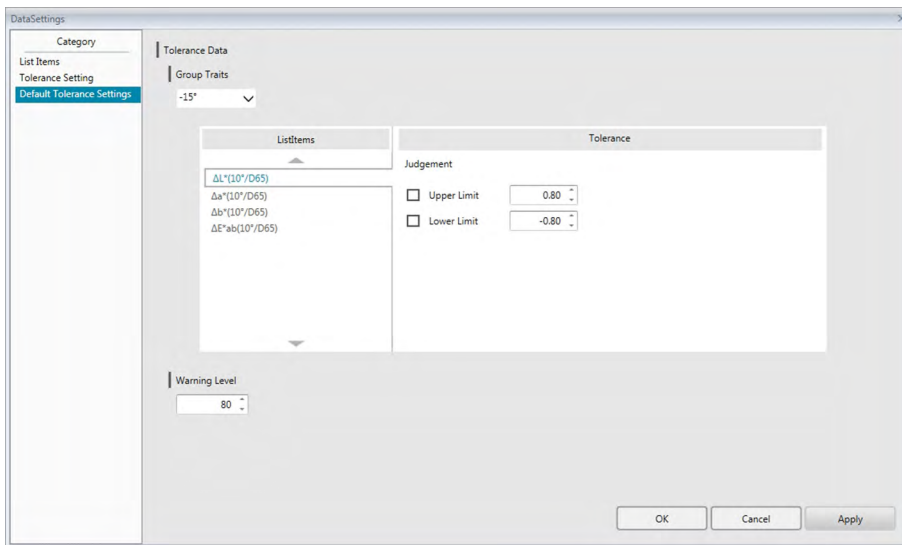
The Data Settings dialog box will appear, with Default Tolerance Settings as the selected category.



2. Specify the parameters for the default tolerances and click [ OK ].

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

## ■ Data Setting Dialog: Default Tolerance Settings category



### Group Trait

Select the Group Trait for which default tolerance will be set.

Select from 15 degree, 15 degree, 25 degree, 45 degree, 75 degree, 110 degree or -----.

### Warning Level

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

Range: 1 to 100

### Tolerance Data

#### List Items

The items shown here will be the List Items shown in the List Pane for which tolerances can be set.

When an item is selected, the tolerance values for that item will be shown under Tolerance.

When a color difference equation which requires parameter settings (such as dE00 (CIE2000)) is selected, boxes for setting those parameters will appear. The parameters set here are used for calculating the color difference equation value shown in the List Pane, in graphs, etc. when the default tolerance values are used.

#### Tolerance

##### Judgement

When the check box under Judgement is checked, the value of the list item will be judged with the tolerance values. List items for which the check box is left unchecked will not be judged.

- Numerical values can be edited regardless of the status of the check mark.


##### Upper Limit; Lower Limit

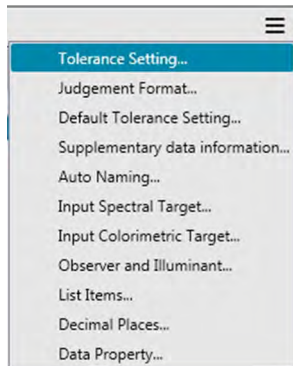
The upper limit and lower limit can be specified separately for each of the list items.

- For color difference equations, only the upper limit can be set.

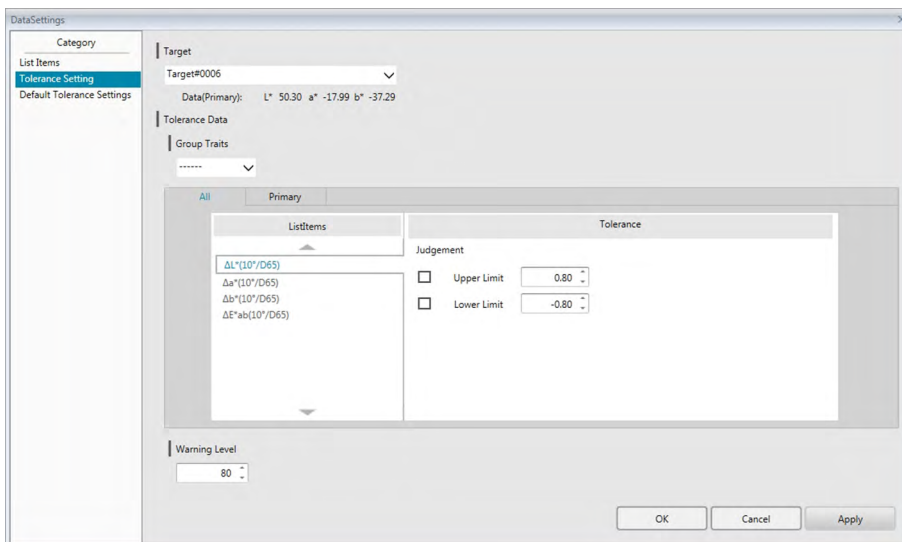
### 2.5.3-b Setting the Tolerance for Each Target

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

1. In the Tree Pane, select a data group under *All data - Target(s)* and then select the target data in the List Pane.
2. Click  in the Document Window List Pane and select *Tolerance Setting ...* from the menu that appears.



The Data Settings dialog box will appear, with Tolerance Settings as the selected category.

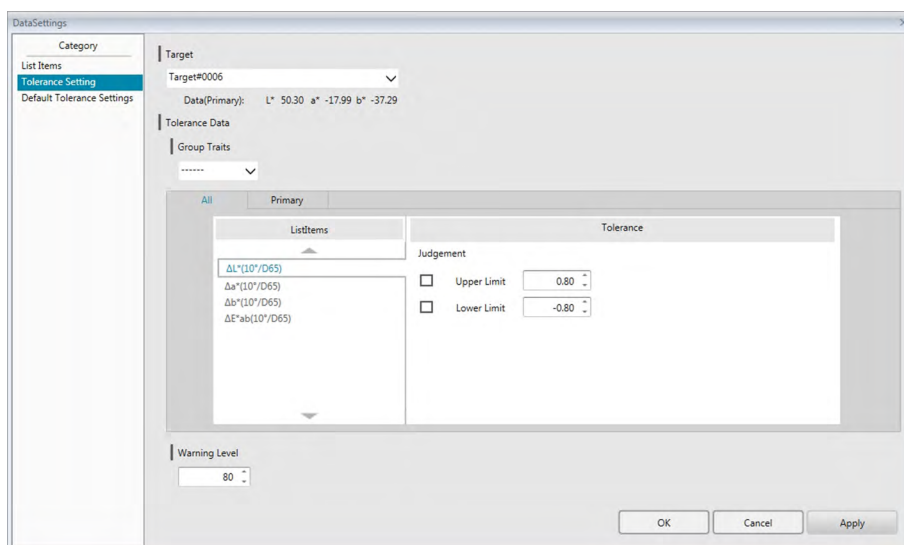


3. Specify the necessary parameters for the tolerances and click [ OK ].

For targets with multiple channels (such as targets measured with the CM-M6), each channel can be selected from the Group Traits dropdown and then you can specify the tolerances respectively for each channel.



## ■ Data Setting Dialog: Tolerance Settings category



### Target

The name of the target selected in step 1 and its  $L^*a^*b^*$  values are displayed.

- For targets with multiple channels (such as targets measured with the CM-M6), the  $L^*a^*b^*$  values shown will be the values for the group trait selected in the Group Traits dropdown.
- Other targets within the current document can be selected here to set their tolerance values.

### Group Trait

Select the Group Trait for which default tolerance will be set. Each group trait available for the selected target can be selected, and the tolerances set will be for the selected group trait.

### Warning Level

Set the Warning Level (the percentage of the tolerance value at which the judgement will become Warn 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 List Pane will be shown

### List Items

The items shown here will be the List Items shown in the List Pane for which tolerances can be set.

When an item is selected, the tolerance values for that item will be shown under Tolerance.

When a color difference equation which requires parameter settings (such as dE00 (CIE2000)) is selected, boxes for setting those parameters will appear. The parameters set here are used for

calculating the color difference equation value shown in the List Pane, in graphs, etc. for the selected target. When any of the parameters are changed, all the displayed data will be calculated again.

### **Tolerance**

#### **Judgement**

When the check box under Judgement is checked, the value of the list item will be judged with the tolerance values. List items for which the check box is left unchecked will not be judged.


- Numerical values can be edited regardless of the status of the check mark.

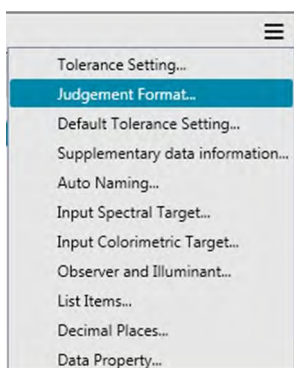
#### **Upper Limit; Lower Limit**

The upper limit and lower limit can be specified separately for each of the list items.

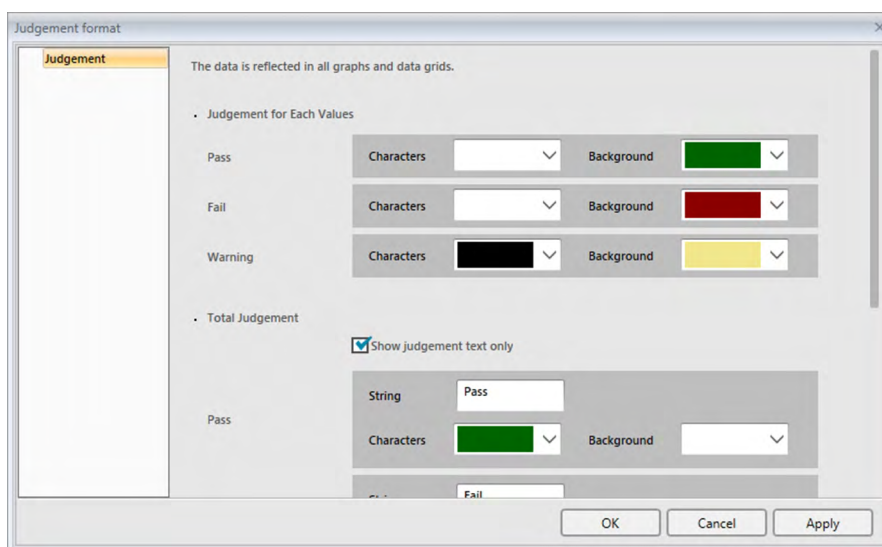
- For color difference equations, only the upper limit can be set.

### 2.5.3-c Specifying the Judgement Display Format

1. Click  in the Document Window List Pane and select *Judgement Format ...* from the menu that appears.

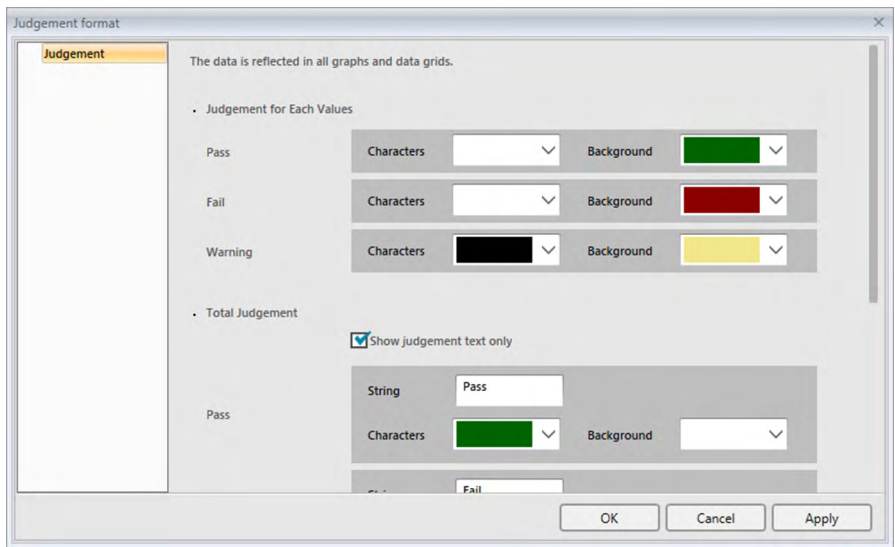


The Judgement Formant dialog box will appear.



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

■ **Data Setting Dialog: Judgement Format category**



**Judgement for Each Values**

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

**Pass**

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

**Fail**

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

**Warning**

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

- These settings are also applied to the pass/fail judgement colors for graphic objects.

## Total Judgement

The following settings are applied to the judgement results following judgement of all the target items in the List Pane 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 characters or background color applied.

### 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 List Pane when the result is judged as passed.
Background	Specifies the background color of the string displayed in the List Pane 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 List Pane when the result is judged as failed.
Background	Specifies the background color of the string displayed in the List Pane 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 List Pane when warning is required.
Background	Specify the background color of the text in the List Pane when caution is required.

- These settings are also applied to the pass/fail judgement color in the absolute value graph and color difference graph of the object.
- 

## 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. 85)**

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

### ■ **Remote sample measurement (p. 86)**

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. 87)**

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. 89)**

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. 91)**

Select Averaged 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.

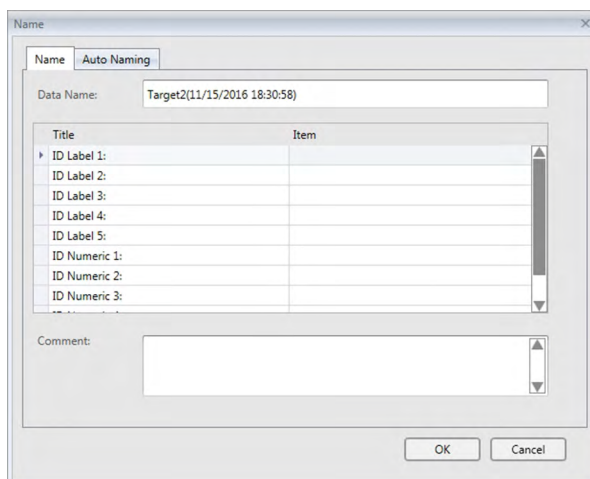
- The above methods can also be combined to obtain sample data.
- Note that you cannot use sample interval measurement in connection with sample manual averaging measurement.

## 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 Meas... in the Data Panel toolbar or click  in the Instrument Window and select *Measure Sample* from the menu that appears.


The Name dialog box appears.

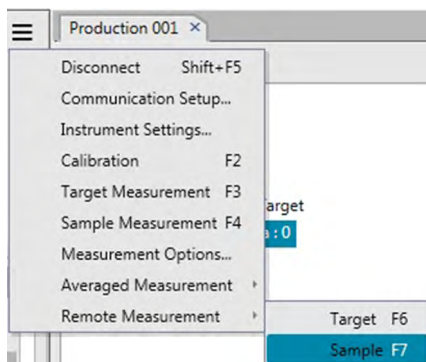


If auto-naming is activated, the Name dialog box does not appear. Skip this process and go to step 3.

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 page 70.) Select a supplementary data information item 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.

## 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).
- Click  in the Instrument Window and select *Remote Measurement: Sample* from the menu that appears.




Remote sample measurement will be enabled and Remote Measurement of 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-2500c 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.
- 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.

### ■ Canceling Remote Sample Measurement mode

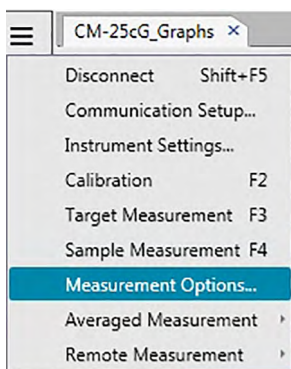
To cancel remote sample measurement mode, click  in the Instrument Window and select *Remote Measurement: Sample* again from the menu that appears. Remote Measurement: Sample will be canceled and Remote Measurement in the Instrument Information tab will change to "OFF".



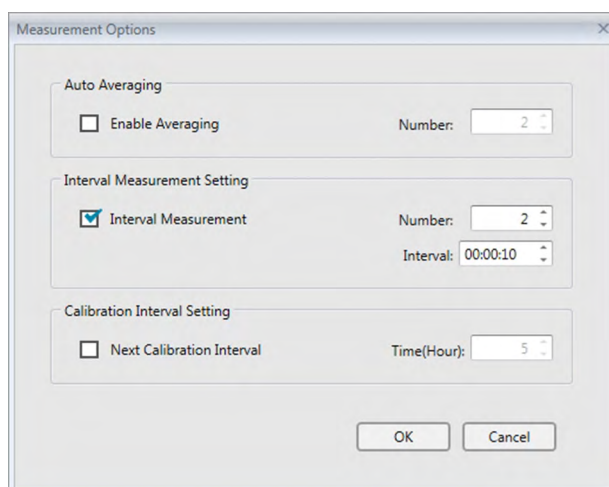
### 2.6.3 Performing Interval Sample Measurement ⑨

- 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. Click  in the Instrument Window and select *Measurement Options...* from the menu that appears.

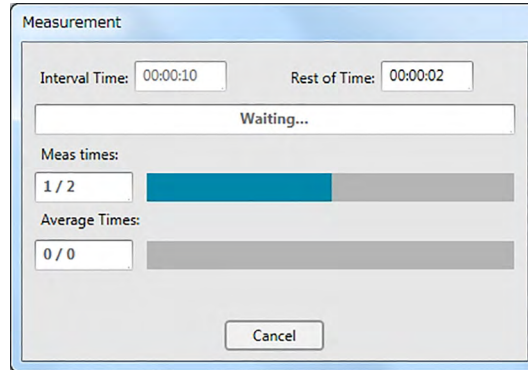


The Measurement Options dialog box appears.



2. Check Interval Measurement and specify the options for the interval measurement.
  - For information on settings in the Measurement Options dialog, see p. 46.
3. Click the OK button to confirm the settings and close the Measurement Options dialog box.
4. Perform sample measurement as described on p. 85.

The Measurement dialog box appears and interval measurement is performed.



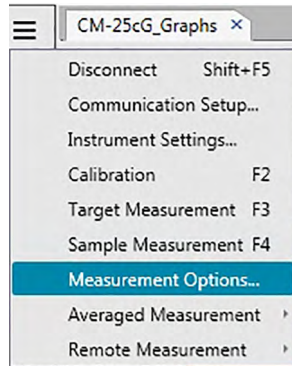
During interval measurement, the measurement data are added to the document as samples after every measurement.

- When interval measurement is performed, the measurement name will be formatted as follows:  
(*Specified measurement name*)\_(*Interval measurement number*)\_(*Total measurements in document*)  
*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.

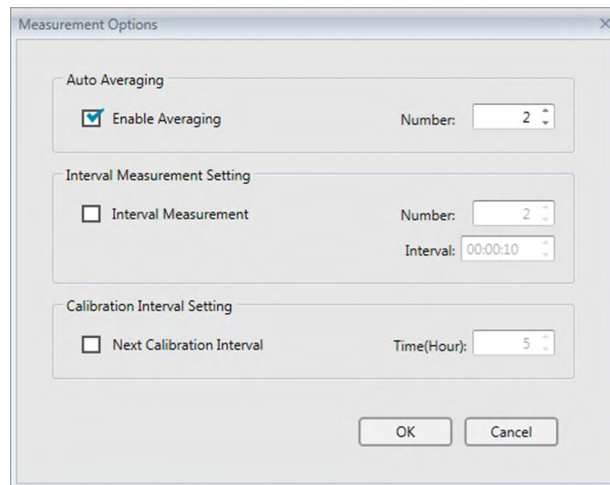
## 2.6.4 Performing Automatic Averaging Sample Measurement

- 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. Click  in the Instrument Window and select *Measurement Options ...* from the menu that appears.

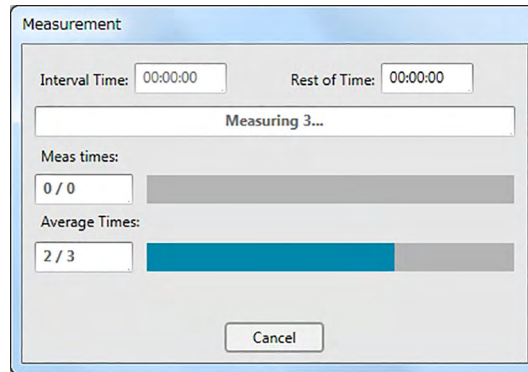


The Measurement Mode dialog box appears.




2. Check "Enable Averaging" to enable automatic averaging measurement of sample data.
  - For information on settings in the Measurement Options dialog, see p. 46.
3. Click the OK button to confirm the settings and close the Measurement Options dialog box.
4. Perform sample measurement as described on p. 85.

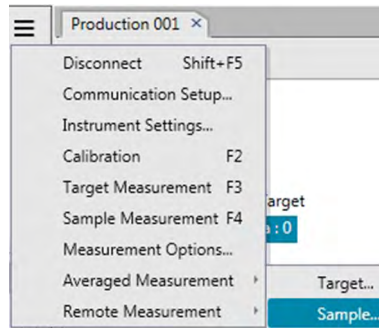
The Measurement dialog box appears and automatic averaging measurement is performed.



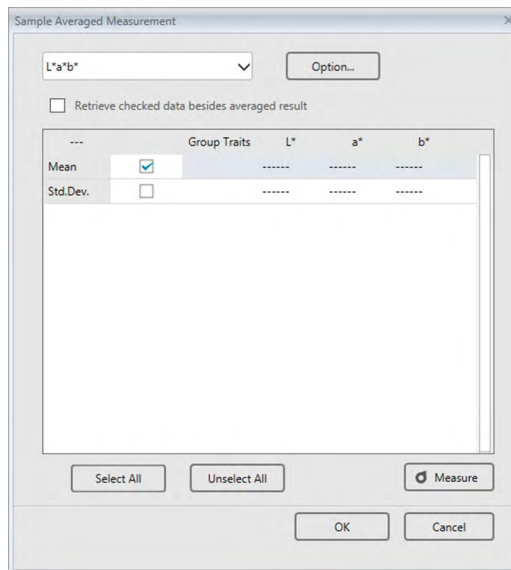
During automatic averaging measurement of sample data, measurements are repeated the specified number of times. When all specified measurements have been completed, the collected measurement data are averaged and added to the document as one sample.

## 2.6.5 Performing Manual Averaged Sample Measurement

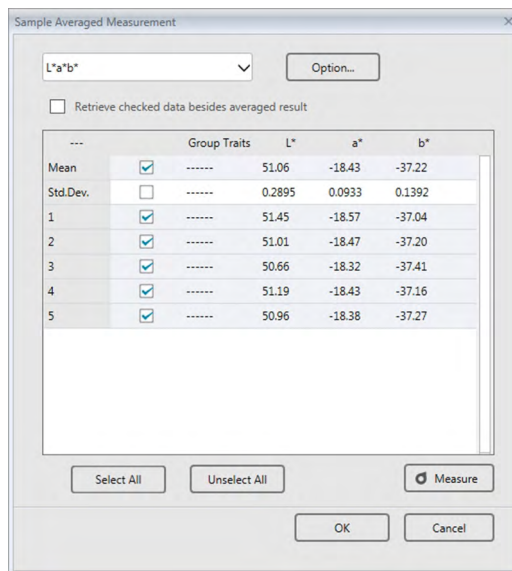
- This procedure is available only when an instrument is connected and the software license is valid (either electronically or by using a protection key attached to the computer).
1. Click  in the Instrument Window and select *Averaged Measurement - Sample Averaged Measurement* from the menu that appears.



The Sample Averaged Measurement dialog box appears.



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



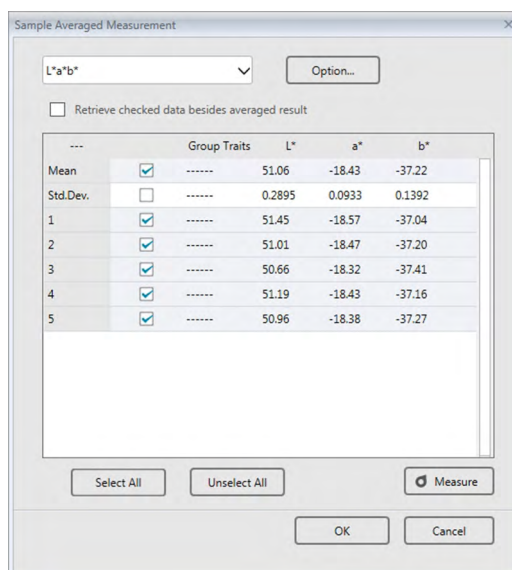
The measurement data are displayed in the dialog box after each measurement, and the average and standard deviation for the measurements taken so far are calculated and displayed.

- 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.

## ■ Sample Averaged Measurement dialog box



### 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 List Pane and to the graphic object in the canvas pane as an individual piece of sample data.

**Select All**

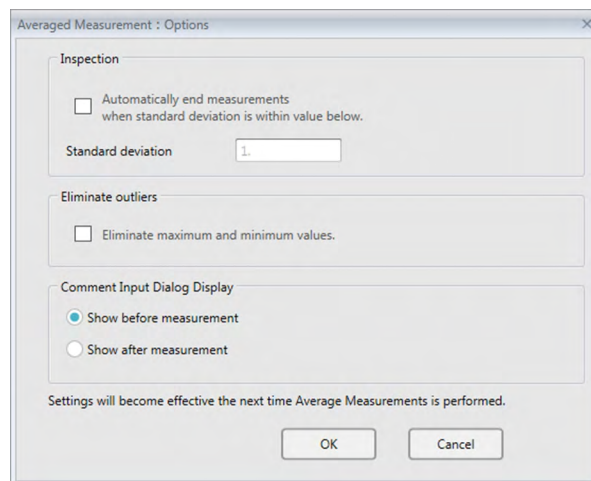
Clicking this button selects (puts a check mark next to) all of the measurements.

**Unselect All**

Clicking this button unselects (removes the check mark next to) all of the measurements.

**Option**

Clicking this button displays a dialog box used for specifying options for the averaging measurement.

**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 are displayed in red, and they cannot be checked.

**Comment input dialog display**

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

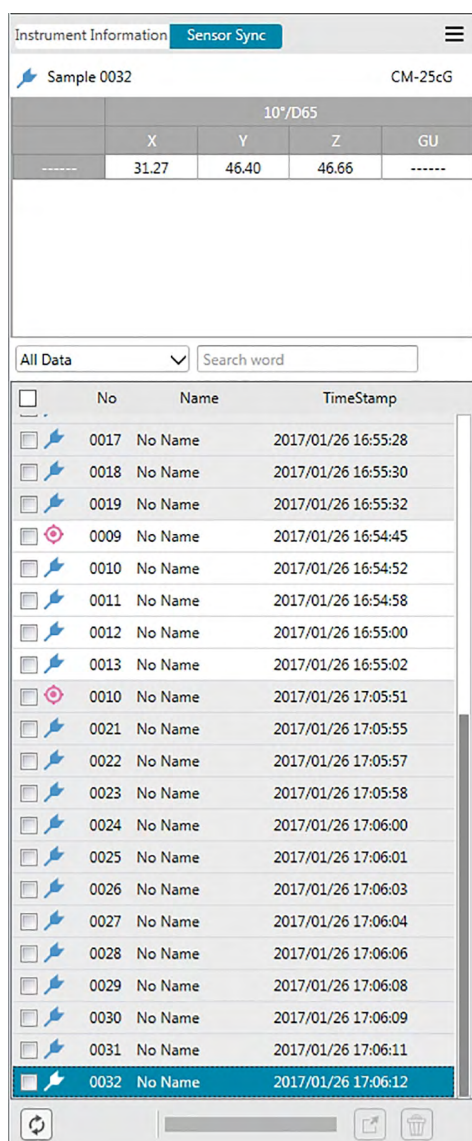
## 2.6.6 Reading the Sample Data from the Instrument

- 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 using the Sensor Sync tab of the Instrument Window.

- For all Sensor Sync tab operations, see p. 136.
- If any target data are linked to the sample data to be uploaded, that target data will also be uploaded.
- 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 page 47.)

1. Click on the Sensor Sync tab of the Instrument Window. The Sensor Sync tab will be shown.





- If this is the first time the Sensor Sync tab has been accessed since the instrument was connected, all of the data in the instrument's memory will be read. This may take some time, depending on the number of data in the instrument's memory. A progress bar will be shown while data are being read to indicate the current status.
2. When reading of the instrument memory data is complete, the data which were read will be shown in the Sensor Sync tab.
    - When data is selected in the Sensor Sync tab list, the colorimetric data for the measurement selected will be shown in the top area of the Sensor Sync tab.
    - The icon in front of the measurement name indicates whether a measurement is a target or a sample.  indicates a target, and  indicates a sample.
  3. 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.
  4. When all samples to be read into SpectraMagic DX have been selected, click on  at the bottom of the Sensor Sync tab. The selected samples will be read into the current document as samples.
  5. If any of the uploaded samples 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.
    - Sample data can also be read into the document by right-clicking on the sample in the Sensor Sync tab and selecting Read from the context menu that appears.

## 2.6.7 Displaying Data Properties

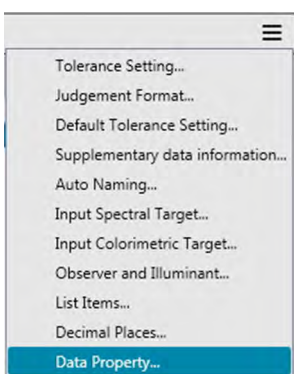
You can display the properties of the data selected in the List Pane.

### 1. Select data in the List Pane.

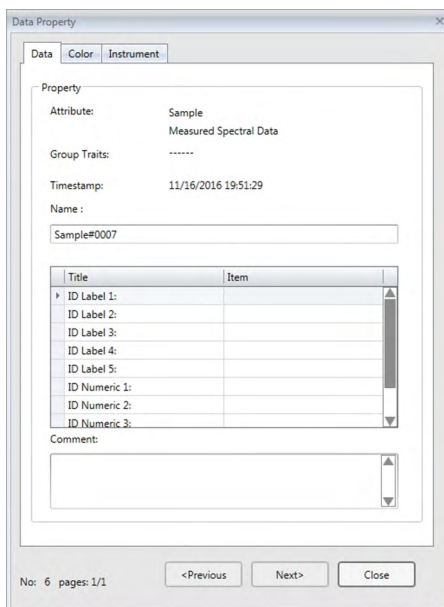
- To select the data to be listed, see page 112. To select the target data, select All Data - Target(s) from the tree and choose the data in the displayed data group.
- When two or more pieces of data have been selected in the List Pane, you can navigate among the selected pieces of data one by one with the Previous and Next buttons.

### 2. Click in the Document Window List Pane and select *Data Property* in the menu that appears.

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



The Data Property dialog box appears.



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

## ■ Data Property dialog box

The screenshot shows the 'Data Property' dialog box with the 'Data' tab selected. The 'Property' section contains the following information:

- Attribute: Sample
- Group Traits: Measured Spectral Data
- Timestamp: 11/16/2016 19:51:29
- Name: Sample#0007

Below the property section is a table with two columns: 'Title' and 'Item'.

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:	

At the bottom of the dialog is a 'Comment' text area. The bottom of the dialog features navigation buttons: '<Previous', 'Next>', and 'Close'. The status bar at the bottom left indicates 'No: 6 pages: 1/1'.

- Items marked with ⑨ 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

Item (of supplementary data information) ⑨

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

Comment

### Color tab ⑨

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

The following information can be edited or changed.

Visual Judgement (See p. 98.)

PseudoColor

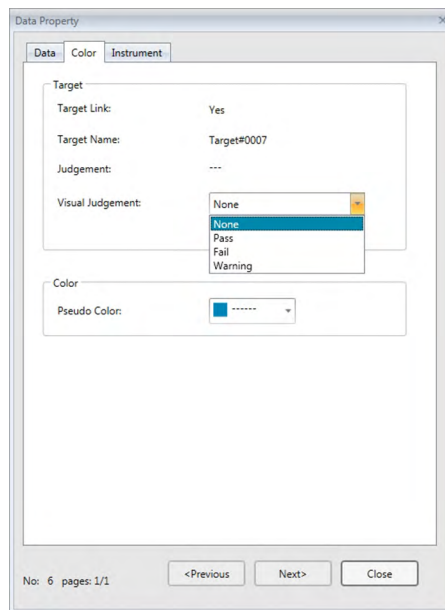
### Instrument tab

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

### 2.6.7.1 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.

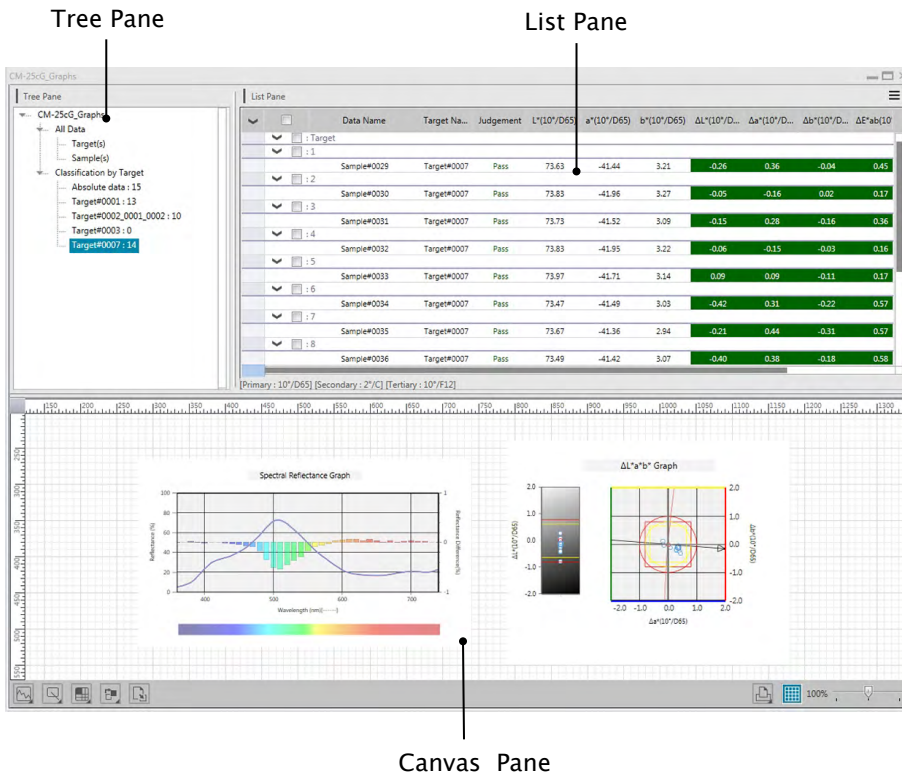


2. In the Target frame, click on the current setting for Visual Judgement and select the desired value from None (No visual judgement), Pass, Fail, or Warning.

- To whether or not the selected visual judgement result affects the total judgement, see p. 81.

## 2.7 Document Window Operation

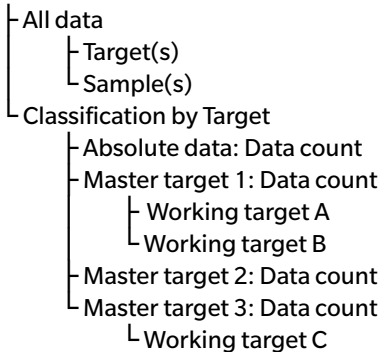
The Document Window shows the measurement data in the document. It is divided into the Tree Pane, the List Pane, and the Canvas Pane. You can show or hide the List Pane by selecting **View - List Pane** from the menu bar.



## 2.7.1 Tree Pane

The Tree Pane includes the following items:

**Document filename**



**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 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.
- Target xxx      (Created at the time Target xxx was registered.)  
All sample data linked to this target.
- Target yyy      (Created at the time Target yyy was registered.)  
All sample data linked to this target.
- etc.

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

### 2.7.1.1 Tree Pane Right-Click Menu

Right-clicking on a target or working target in the Classification by Target will cause the 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. 78.
- Write Target      See p. 129

## 2.7.2 List Pane

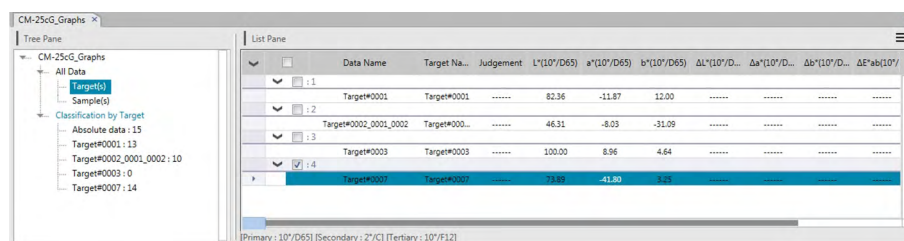
The List Pane lists the data included in the data group selected in the Tree Pane. Each item is displayed according to the list items specified on p. 37.

- The items  $x$ ,  $y$ ,  $u'$ ,  $v'$ ,  $\Delta x$ ,  $\Delta y$ ,  $\Delta u'$  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. 45 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 by one digit due to rounding or color space conversion.
- For the CM-M6 which takes measurements at 6 angles, a single measurement will be displayed as 6 lines of data (one for each angle).

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

### ■ All Data - Target(s)

All target data in the document file are listed.

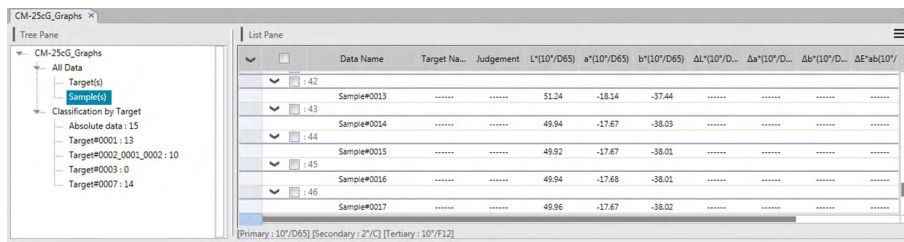


### Functions of graphic objects

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

## ■ All Data - Sample(s)

All sample data in the document file are listed.

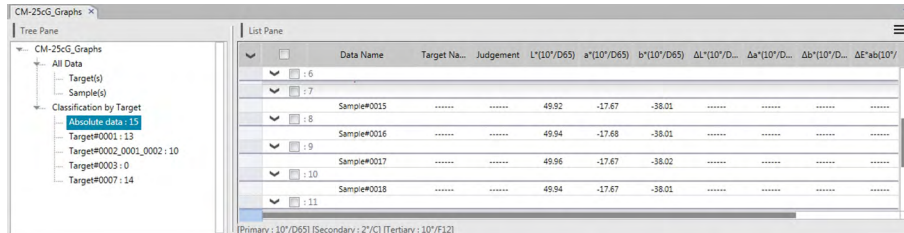


### Functions of graphic objects

<b>Absolute value graph</b>	The distribution of all data in the list is displayed.
<b>Color difference graph</b>	Not displayed.
<b>Spectral graph</b>	The selected data are displayed (without difference indication).
<b>Trend graph</b>	All data in the list are displayed.
<b>Numerical object with target display attribute</b>	Not displayed.
<b>Numerical object with sample display attribute</b>	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

<b>Absolute value graph</b>	The distribution of all data in the list is displayed.
<b>Color difference graph</b>	Not displayed.
<b>Spectral graph</b>	The selected data is displayed (without difference indication).
<b>Trend graph</b>	All data in the list is displayed.
<b>Numerical object with target display attribute</b>	Not displayed.
<b>Numerical object with sample display attribute</b>	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 \*\*

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

Data Name	Target Na...	Judgement	L*(10°/D65)	a*(10°/D65)	b*(10°/D65)	ΔL*(10°/D...	Δa*(10°/D...	Δb*(10°/D...	ΔE*ab(10°/
Sample#0033	Target#0007	Pass	73.97	-41.71	3.14	0.09	0.09	-0.11	0.17
Sample#0034	Target#0007	Pass	73.47	-41.49	3.03	-0.42	0.31	-0.22	0.57
Sample#0035	Target#0007	Pass	73.67	-41.36	2.94	-0.21	0.44	-0.31	0.57
Sample#0036	Target#0007	Pass	73.49	-41.42	3.07	-0.40	0.38	-0.18	0.58
Sample#0037	Target#0007	Warning	73.11	-41.38	2.98	-0.78	0.42	-0.27	0.92

(Primary : 10°/D65) [Secondary : 2°/C] [Tertiary : 10°/F32]

## Linked target data

The linked target data are displayed. The lines of the linked target data cannot be scrolled.

## Functions of graphic objects

<b>Absolute value graph</b>	The distribution of all data in the list is displayed.
<b>Color difference graph</b>	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.)
<b>Spectral graph</b>	The target data and selected data are displayed (with difference indication). <ul style="list-style-type: none"> <li>If multiple data are selected, difference indication will not be shown.</li> </ul>
<b>Trend chart</b>	All data in the list are displayed (with reference line display).
<b>Numerical object with target display attribute</b>	The target data is displayed.
<b>Numerical object with sample display attribute</b>	The numerical value of the selected data (the first data in the list when two or more data are selected) is displayed.

### 2.7.2.1 List Pane Right-Click Menu

Right-clicking in the List Pane 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.

Export	Exports selected targets and samples to a file. See p. 105.
Cut	Cuts the selected samples. See p. 105.
Copy	Copies the selected targets and samples. See p. 105.
Paste	Pastes previously cut or copied targets and samples. See p. 105.
Delete	Deletes the selected targets and samples. See p. 105.
Tool	
Change Link to Target ...	Opens a dialog for changing the link to target. See p. 106.
Change to Target	Changes sample to a target. See p. 72.
Average	Averages the selected targets or samples and adds the average as a new target or sample. See p. 107.
Working Target	Opens a dialog for setting the selected sample as a working target under a main target. See p. 74.
Write target	(Shown only when an instrument is connected.) Writes the selected data to the instrument memory as target data. See p. 129.
Data Property ...	Opens the Data Property dialog for the selected targets or samples. See p. 96.

## 2.7.2.2 Editing the List Data

### ■ Selecting the list data

To select data, click on the checkbox so that a check is shown. To deselect data, click on the checkbox again.

To select all data shown in the List Pane, click on the checkbox at the top of the List Pane next to All.

- Data in different folders cannot be selected.



	Data Name	Target No.	Judgement	L*(10°/D65)	a*(10°/D65)	b*(10°/D65)	ΔL*(10°/D...	Δa*(10°/D...	Δb*(10°/D...	ΔE*ab(10°/...	450nm	Pseudo Co...
1:8	Sample#0036	Target#0007	Pass	73.49	-41.42	3.07	-0.40	0.38	-0.18	0.58	44.44	
1:9	Sample#0037	Target#0007	Warning	73.11	-41.38	2.98	-0.78	0.42	-0.27	0.92	43.94	
1:10	Sample#0038	Target#0007	Pass	73.77	-41.43	3.15	-0.11	0.37	-0.10	0.40	44.50	
1:11	Sample#0040	Target#0007	Pass	73.71	-41.41	3.13	-0.17	0.39	-0.12	0.44	44.74	

Primary: 10°/D65 [Secondary: 2°/C] [Tertiary: 10°/F12]

### ■ Copying the list data

Right-click the selected (highlighted) data and select *Copy* from the displayed context menu. The copied data can be pasted into spreadsheet software such as Excel.

### ■ Cutting the list data

In the list of data displayed by selecting All Data - Target(s) or All Data - Sample(s), right-click the selected (highlighted) data and select *Cut* from the displayed context menu.

The cut data is shown in a dotted line on the list. If the data is pasted to somewhere, the previously cut data is deleted from the list.

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

### ■ Pasting the list data

Click in the location where you want to paste the data. Right-click on this location and select *Paste* from the displayed context menu. You can paste data only if you have copied data beforehand. Data cannot be pasted into the same document file from which the data was copied.

### ■ Deleting the list data

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.

### ■ Exporting the list data

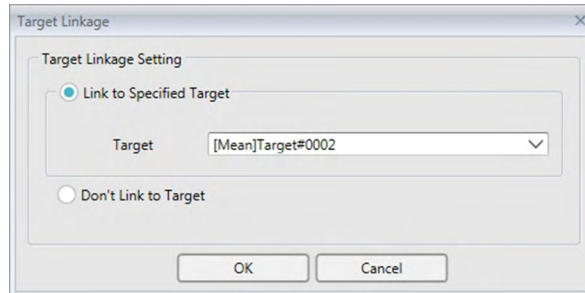
The selected list data can be exported to a csv, Excel, pdf, txt, or XML file. Right-click the selected (highlighted) data, select *Export ...* from the displayed context menu, and select the desired file type for export. When Export as Text is selected, the data are exported as tab-delimited text to a text file with the extension ".txt". When Export as CSV is selected, the data are exported to a file using the delimiter specified in the Windows Control Panel (extension: csv).

### 2.7.2.3 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.

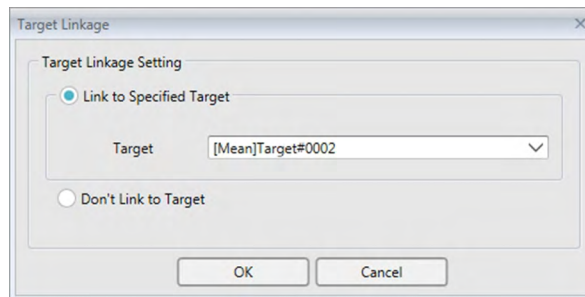
1. Right-click the selected (highlighted) list data and select *Tool - Change Link to Target* from the displayed context menu.

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.

#### 2.7.2.4 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, right-click the selected (highlighted) list data and select *Tool - 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.

### 2.7.2.5 Searching for Data

You can search the list of data for data which contains specific text or numbers and highlight that text or numbers in the List Pane.

- The Search function operates on the data displayed in the List Pane. If the search text or numbers are not included in the displayed list items, it will not be found. For example, if Data Comment is not included in the list items, text input for data comment will not be included in the search.

1. Right-click on the header bar of the List Pane and select Show Search Panel from the context menu that appears.

The Search Panel will open at the top of the List Pane.

2. Input the text or numbers to search for in the text box of the Search Panel. Text or numbers matching the search text or numbers will be highlighted in yellow in the List Pane.

- To clear the Search Panel text box, click  at the right end of the textbox.

3. After search has been completed, click [ Close ] to close the Search Panel.

### 2.7.2.6 Adjusting Column Width

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

#### ■ Adjusting Column Width Manually

Move the cursor to the border between two columns in the header bar of the List Pane. 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 List Pane 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 List Pane and select Best Fit (all columns) from the context menu that appears. The widths of all columns will be automatically adjusted.

## 2.7.3 Canvas Pane Operation

The canvas pane displays data on objects such as graphs, labels, etc. SpectraMagic DX provides various types of objects that can be placed in the window as desired.

- See page 199 for details of the graphic objects.

### 2.7.3.1 Canvas Pane Toolbar


The Canvas Pane toolbar is shown below the Canvas Pane.

- Buttons 1 to 4 are shown only when Canvas Pane editing is enabled.



- 1 Graph object category**  
Select from spectral graph, L\*a\*b\* graph, Hunter Lab graph, DL\*a\*b\* color-difference graph, Hunter DLab color-difference graph, trend graph, or multi-channel graph 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.
- 5 Change canvas**  
Opens a template and applies the canvas settings (objects, object positions/sizes, etc) of that template.
- 6 Print functions**  
Set print settings or perform printout.
- 7 Enable/disable editing**  
Click once to enable Canvas Pane editing (button will become green and grid and rulers will be shown on Canvas Pane).  
Click again to disable Canvas Pane editing. (Buttons 1 through 5 will not be shown.)
- 8 Magnification slider**  
Slide to adjust the Canvas Pane magnification.

## ■ Graph objects


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

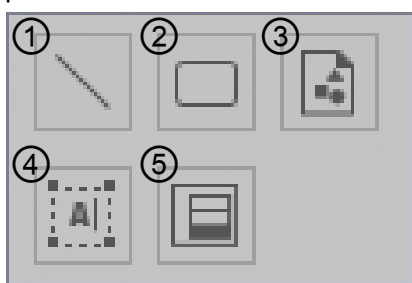


- ① Spectral graph object (with popout to select Spectral or Spectral/Multi angle)
- ② Absolute graph ( $L^*$ ,  $a^*b^*$ ) object
- ③ Absolute graph (Hunter  $L$ ,  $ab$ ) object
- ④ Color difference graph ( $DL^*$ ,  $\Delta a^*\Delta b^*$ ) object
- ⑤ Color difference graph (Hunter  $\Delta L$ ,  $\Delta a\Delta b$ ) object
- ⑥ Trend chart object (with popout to select Trend or Trend/Multi Angle)
- ⑦ Multi-channel (6-angle) graph object

To add a graph object, click on the button for the desired object, click on the desired object type in the popout that appears, drag it to the Canvas Pane, and drop it in the desired position.

## ■ Shape/label objects

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

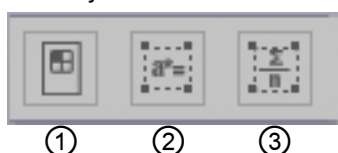


- ① Line object
- ② Rectangle object
- ③ Image object
- ④ Label object
- ⑤ Pseudo color object

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.

## ■ 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.




### 2.7.3.2 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

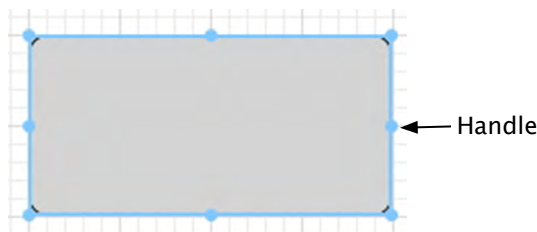
In the Canvas Pane toolbar, click . The button will change from green to gray and the grid and rulers in the Canvas Pane will not be shown.

### 2.7.3.3 Adding an Object to the Canvas Pane

1. With Canvas Pane editing enabled, click on the button in the Canvas Pane 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 popout, that appears, drag the popout 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.



### 2.7.3.4 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. (You can select an object by enclosing either all or part of it.) 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. 141.

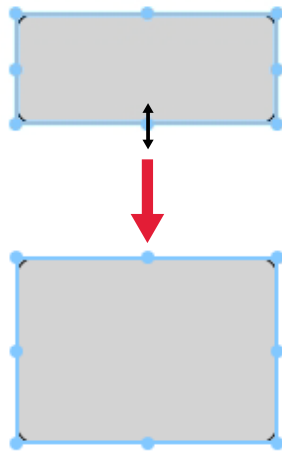
- It is not possible to select graphic objects in more than one document file.

### ■ 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

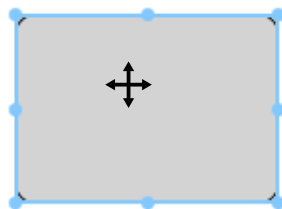
Click and select a graphic object and move the mouse pointer over one of the handles on the frame. When the shape of the pointer changes into a double-headed arrow, drag the handle and change the size of the object.



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.


### ■ 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.

### ■ 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 popout 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.

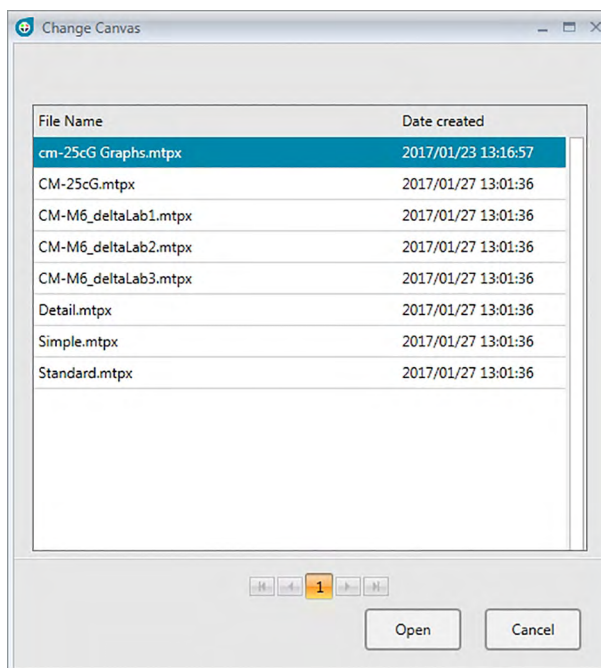
### ■ Deleting a Graphic Object

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.

### 2.7.3.5 Changing the Canvas

The canvas settings (objects, object settings, object positions/sizes, etc.) of a template file can be applied to the current document by following the procedure below.

- Before performing the following procedure, set the Import/Export Template Files file path in the Application Settings dialog. See p. 124.
1. Click on the change canvas button  and click on Change Canvas in the popout that appears. The Change Canvas dialog will appear.





2. Select the desired template file and click [ Open ]. The template file will be opened and the canvas settings of that template will be applied to the current document.

## 2.8 Printing

You can print the Canvas Pane.

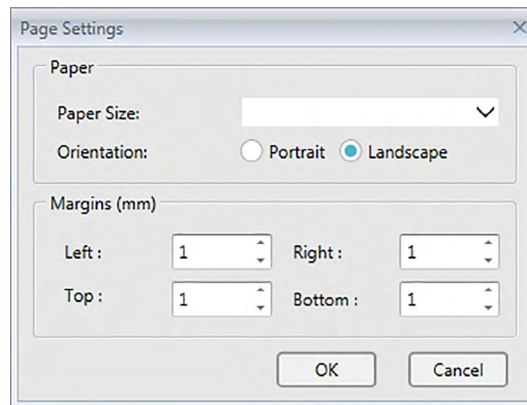
### 2.8.1 Printing from Canvas Pane

#### 2.8.1.1 Page Settings

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

The Page Settings dialog box 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.

### 2.8.1.2 Printing

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

A preview window appears showing the actual appearance of the page to be printed as specified in the Page Setup dialog box.


2. Click on the print button at the upper right of the preview window. The standard Windows Print dialog will appear. Verify the settings and make any changes if necessary, and then click [ Print ] to print the Canvas Pane.

## 2.9 Exporting/Importing Documents

Data in a document is automatically saved to the database at the time a measurement is taken or modifications to data-related settings are performed. There is no need for performing a special operation to save the data. However, for the purposes of transferring documents containing data, SpectraMagic DX has its own MesX file format.

### 2.9.1 Exporting a Document to a SpectraMagic DX File

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

1. Click on  at the right end of the Data Panel toolbar, and select **Export ...** from the menu that appears.

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
- Tolerances for each target
- Judgement display settings
- List items specified in the List Pane
- Graphic objects pasted in the canvas pane and their size and position information
- View setting parameters

### 2.9.2 Importing a SpectraMagic DX File

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

1. Click on  at the right end of the Data Panel toolbar, and select Import ... from the menu that appears.


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.

### 2.9.3 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) and import the data to a new document by following the procedure below.

1. Click on  at the right end of the Data Panel toolbar, and select Import ... from the menu that appears.


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 ] to import the data. The selected file will be imported to SpectraMagic DX as a new document.
  - If the selected file contains more than one canvas view, the first canvas view will be imported into the document with the measurement data, and the remaining views will be saved as SpectraMagic DX template files (\*.mtpx files) under sequential names.

### 2.9.4 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. Click on  at the right end of the Data Panel toolbar, and select Import ... from the menu that appears.

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

<b>100</b> 	Version No.
<b>REF</b> 	A string which indicates that this is spectral reflectance data.
<b>###</b> 	Start wavelength (360 or 400)
<b>###</b> 	End wavelength (700 or 740)
<b>10</b> 	Wavelength pitch (10)
<b>39</b> 	No. of reflectance wavelengths (31 for 400 to 700nm or 39 for 360 to 740nm including the start and end wavelengths)
<b>#</b> 	No. of banks (1 or 6)
<b>####</b> 	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.
<b>###.### ###.###</b> <b>~</b> <b>###.### ###.### Data name</b> 	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).
<b>[EOF]</b>	

**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>ID<sub>50</sub></td><td>15</td></tr><tr><td>ID<sub>65</sub></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 <sub>50</sub>	15	ID <sub>65</sub>	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 <sub>50</sub>	15																																			
ID <sub>65</sub>	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.

	<b>Description</b>
<b>ERR 01</b>	The version is not "100".
<b>ERR 02</b>	The fixed character is not correct. The fixed character is not "REF" or "XYZ".
<b>ERR 03</b>	The start wavelength is not correct.
<b>ERR 04</b>	The end wavelength is not correct.
<b>ERR 05</b>	The wavelength pitch is not correct.
<b>ERR 06</b>	The number of reflectance wavelengths is not correct.
<b>ERR 07</b>	The bank number is not correct.
<b>ERR 08</b>	The number of illuminants is not correct.
<b>ERR 09</b>	Illuminant 1 is not correct.
<b>ERR 10</b>	Illuminant 2 is not correct.
<b>ERR 11</b>	Illuminant 3 is not correct.
<b>ERR 12</b>	The observer is not correct.
<b>ERR 13</b>	The number of data pieces is not sufficient.
<b>ERR 14</b>	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.)
<b>ERR 15</b>	The data contains characters other than "0" to "9" and a decimal point.

## 2.10 Other Functions


### 2.10.1 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 List Pane
- Graphic objects pasted in the Canvas Pane as well as their size and position information

#### 2.10.1.1 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. Click on  at the right end of the Data Panel toolbar, and select **Export ...** from the menu that appears.

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).

#### 2.10.1.2 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. Click on  at the right end of the Data Panel toolbar, and select Import ... from the menu that appears.


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.

### 2.10.1.3 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. Click on  at the right end of the Data Panel toolbar, and select Import ... from the menu that appears.

The File Import dialog box will appear.

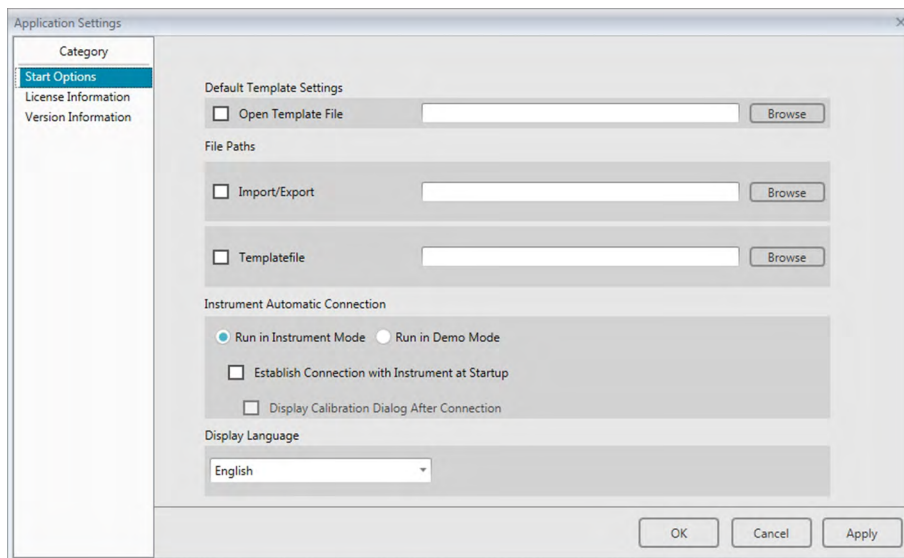
2. Select SpectraMagic NX Template File (\*.mtp) from the pulldown at the lower right of the dialog.
3. Select the desired file and click [ Open ] to open the template and apply the template settings to the currently active document.
  - If the selected SpectraMagic NX template consists of multiple views, the settings for the first view will be applied to the currently active document, and the remaining views will be saved as individual SpectraMagic DX template files (\*.mtpx files) having sequential numbers. The folder where the template files will be saved will be the folder specified for File Paths: Template File in Application Settings: Start Options category. See p. 124.

## 2.10.2 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. Click  in the main program toolbar.

The Application Settings dialog box will appear, with the Start Options category selected.



2. Specify the start options.

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, the file specified will be open at startup.

##### 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. This folder is also used by [ Change Canvas ] in the Canvas Pane.

##### 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.

### 2.10.3 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. 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 information (Client ID, Computer Name, and Version) of the SpectraMagic DX in use.
  - To view license information details, or to perform user registration, click on the URL shown in the screen.

### 2.10.4 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. 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.



### 2.10.5 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.

## 2.10.6 Viewing the Instruction Manual

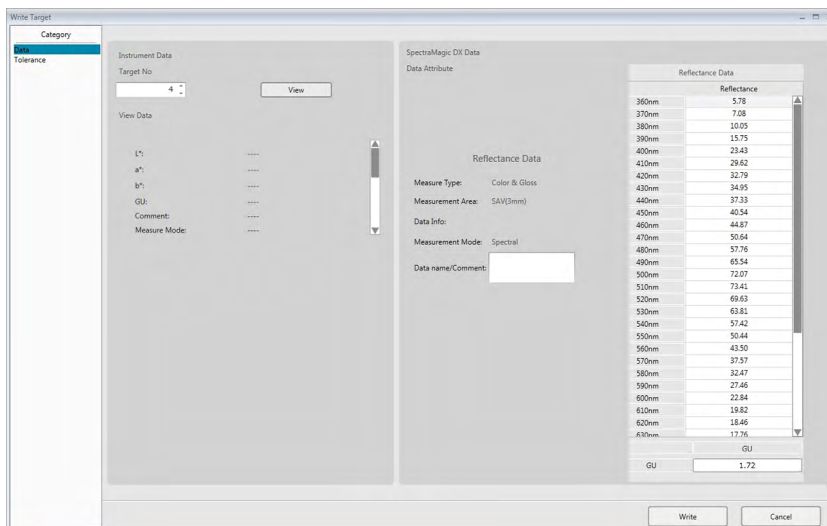
1. Click  in the main program toolbar. A popout menu will appear
2. Select Open SpectraMagic DX manual from the popout menu.  
The instruction manual is displayed in PDF format.

## 2.10.7 Writing Target Data 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.
  - Target data can also be written to the instrument using the Sensor Sync tab. See p. 140.
1. In the Tree Pane, select All Data - Target(s), select the target or targets to write to the instrument, right-click the target data and select *Write Target* from the displayed context menu. You can select multiple targets and download them in succession.

Writing a single target can also be performed by right-clicking on a single target in Classification by Target and selecting Write Target from the context menu that appears, or by selecting a target in Classification by Target and clicking  Write Tar...

The Target Download dialog box appears.



The 'Write Target' dialog box is shown with the following sections:

- Category:** Tolerance
- Instrument Data:** Target No. 4, View button
- View Data:** L\*, a\*, b\*, GU, Comment, Measure Mode
- SpectraMagic DX Data:** Data Attribute
- Reflectance Data:**

Reflectance	
360nm	5.78
370nm	7.28
380nm	10.05
390nm	15.75
400nm	23.43
410nm	29.62
420nm	32.79
430nm	34.95
440nm	37.33
450nm	40.54
460nm	44.87
470nm	50.64
480nm	57.76
490nm	65.54
500nm	72.07
510nm	73.41
520nm	69.63
530nm	63.81
540nm	57.42
550nm	50.44
560nm	43.50
570nm	37.57
580nm	32.47
590nm	27.46
600nm	22.84
610nm	19.82
620nm	18.46
630nm	17.76
GU	1.72
- Measure Type:** Color & Gloss
- Measurement Area:** SAV(3mm)
- Data Info:**
- Measurement Mode:** Spectral
- Data name/Comment:**
- Buttons:** Write, Cancel

2. Specify the details of the target data downloaded to the instrument.  
For the procedure for the individual models, refer to p. 130 to p. 134.

■ **Target Download dialog box (when the CM-25cG is connected)**

**Data category**

**Write Target**

Category: **Data**

Instrument Data

Target No.: 4 [View]

View Data

L\*: .....  
a\*: .....  
b\*: .....  
GU: .....  
Comment: .....  
Measure Mode: .....

SpectraMagic DX Data

Data Attribute

Reflectance Data

Wavelength (nm)	Reflectance
360nm	5.78
370nm	7.08
380nm	10.05
390nm	15.75
400nm	23.43
410nm	29.62
420nm	32.79
430nm	34.95
440nm	37.33
450nm	40.54
460nm	44.87
470nm	50.64
480nm	57.76
490nm	65.54
500nm	72.07
510nm	73.41
520nm	69.63
530nm	63.81
540nm	57.42
550nm	50.44
560nm	43.30
570nm	37.57
580nm	32.47
590nm	27.46
600nm	22.84
610nm	19.82
620nm	18.46
630nm	17.76

Measure Type: Color & Gloss  
Measurement Area: SAV(3mm)  
Data Info:  
Measurement Mode: Spectral  
Data name/Comment: [ ]

GU: 1.72

[Write] [Cancel]

**Instrument Data**

**Target No.**

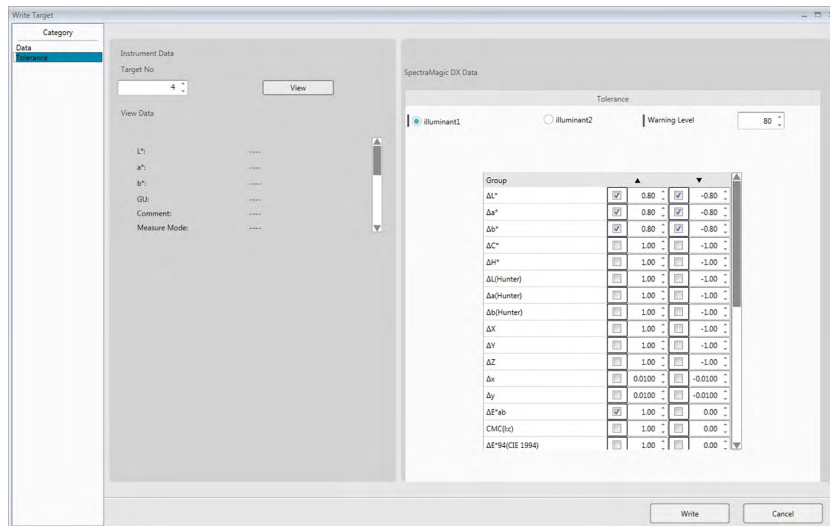
Specify the target number in the instrument to which the data is to be downloaded. The number displayed when you open the dialog box is the highest target number stored in the instrument + 1. Click [ View ] to see the details of the target with the specified number stored in the instrument.

**SpectraMagic DX Data**

**Data Attribute**

The attributes of the target data to be written are displayed. All attributes are shown for reference only and cannot be changed, with the exception of Comment.  
If you want to input a comment for the target being written, input it (up to 30 characters) in the Comment text box.

## 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.

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.

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.

## ■ Target Download dialog box (when the CM-M6 is connected)

### Data category

(nm)	-15°	15°	25°	45°
L*	----	----	----	----
a*	----	----	----	----
b*	----	----	----	----
Comment	----	----	----	----
Geometry	----	----	----	----
Data Info	----	----	----	----
Direction	----	----	----	----

(nm)	-15°	15°	25°
400nm	-0.03	0.00	0.02
410nm	-0.01	-0.01	0.00
420nm	0.00	0.01	0.00
430nm	0.00	0.01	0.00
440nm	0.01	0.00	0.00
450nm	0.01	0.00	0.00
460nm	0.01	0.00	0.00
470nm	0.01	0.00	0.00
480nm	0.01	0.00	0.00
490nm	0.01	0.00	0.01
500nm	0.01	0.00	0.00
510nm	0.01	0.00	0.00
520nm	0.01	0.00	0.00
530nm	0.01	0.00	0.00
540nm	0.03	0.00	0.00
550nm	0.04	0.00	0.01
560nm	0.04	0.01	0.01
570nm	0.04	0.00	0.01
580nm	0.05	0.00	0.01
590nm	0.05	0.01	0.01
600nm	0.04	0.01	0.01
610nm	0.03	0.00	0.01
620nm	0.02	0.00	0.01
630nm	0.02	0.00	0.01
640nm	0.02	0.00	0.01
650nm	0.01	0.00	0.01
660nm	0.00	0.00	0.01
670nm	0.00	0.00	0.01
680nm	0.00	0.00	0.00
690nm	0.00	0.01	0.00

### 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.

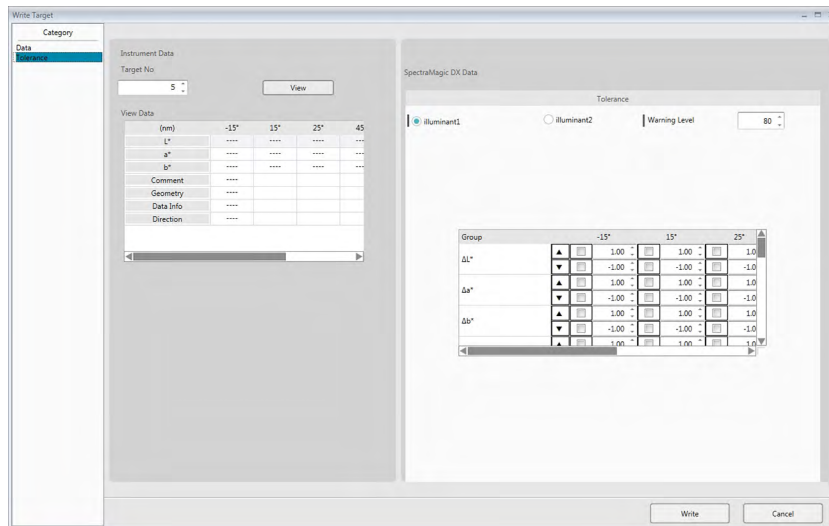
### SpectraMagic DX Data

#### Data Attribute

The attributes of the target data to be written are displayed. All attributes are shown for reference only and cannot be changed, with the exception of Comment.

If you want to input a comment for the target being written, input it (up to 16 characters) in the Comment text box.

## Tolerance category



## Instrument Data

The same Instrument Data as shown for Data category are shown.

## SpectraMagic DX Data

### Tolerance

The tolerances specified for each angle for the selected list items are displayed.

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.

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.

## ■ Target Download dialog box (when the CM-2500c is connected)

### Data category

The 'Write Target' dialog box is shown with the 'Data' category selected. It contains sections for 'Instrument Data' (Target No. 6, View button), 'View Data' (table of attributes), and 'SpectraMagic DX Data' (Measure Mode: Color & Gloss, Measurement Area: 7mm, and a list of wavelength data).

nm	
360nm	100.00
370nm	100.00
380nm	100.00
390nm	100.00
400nm	100.00
410nm	100.00
420nm	100.00
430nm	100.00
440nm	100.00
450nm	100.00
460nm	100.00
470nm	100.00
480nm	100.00
490nm	100.00
500nm	100.00
510nm	100.00
520nm	100.00
530nm	100.00
540nm	100.00
550nm	100.00
560nm	100.00
570nm	100.00
580nm	100.00
590nm	100.00
600nm	100.00
610nm	100.00
620nm	100.00
630nm	100.00
640nm	100.00
650nm	100.00
660nm	100.00
670nm	100.00
680nm	100.00

### 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.

- The target numbers in the CM-2500c 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

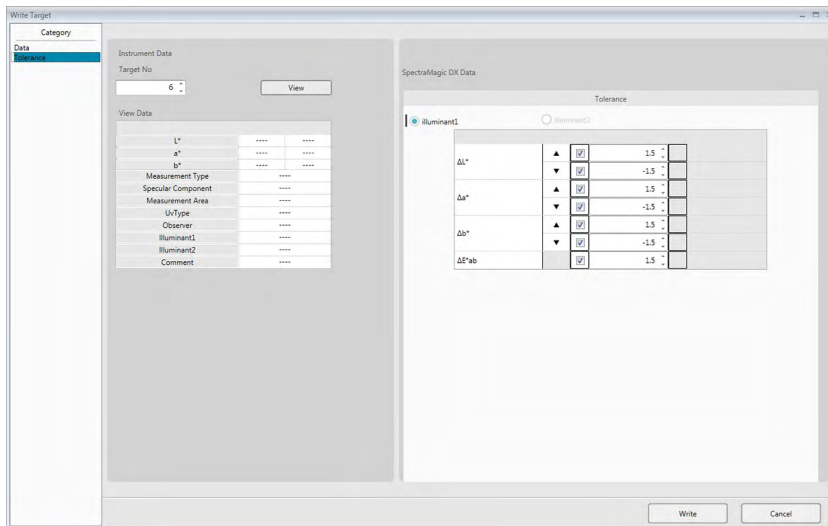
#### Data Attribute

The attributes of the target data to be written are displayed. All attributes are shown for reference only and cannot be changed, with the exception of Comment.

If you want to input a comment for the target being written, input it (up to 16 characters) in the Comment text box.



## 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.

- If tolerance for a selected list item cannot be set on the CM-2500c, that tolerance will not be 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.

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.

## 2.10.8 SensorSync tab functions

- 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 SensorSync 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, write target data from SpectraMagic DX to the instrument, or delete selected data from the instrument memory.

### 2.10.8.1 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.

## ■ 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.

Colorimetric data for selected sample.

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

Click column headers to sort data in column ascending/descending

Delete selected stored data from instrument memory.

Instrument Information **Sensor Sync**

Sample 0032 CM-25cG

10"/D65

	X	Y	Z	GU
-----	31.27	46.40	46.66	-----

All Data

<input type="checkbox"/>	No	Name	TimeStamp
<input type="checkbox"/>	0017	No Name	2017/01/26 16:55:28
<input type="checkbox"/>	0018	No Name	2017/01/26 16:55:30
<input type="checkbox"/>	0019	No Name	2017/01/26 16:55:32
<input type="checkbox"/>	0009	No Name	2017/01/26 16:54:45
<input type="checkbox"/>	0010	No Name	2017/01/26 16:54:52
<input type="checkbox"/>	0011	No Name	2017/01/26 16:54:58
<input type="checkbox"/>	0012	No Name	2017/01/26 16:55:00
<input type="checkbox"/>	0013	No Name	2017/01/26 16:55:02
<input type="checkbox"/>	0010	No Name	2017/01/26 17:05:51
<input type="checkbox"/>	0021	No Name	2017/01/26 17:05:55
<input type="checkbox"/>	0022	No Name	2017/01/26 17:05:57
<input type="checkbox"/>	0023	No Name	2017/01/26 17:05:58
<input type="checkbox"/>	0024	No Name	2017/01/26 17:06:00
<input type="checkbox"/>	0025	No Name	2017/01/26 17:06:01
<input type="checkbox"/>	0026	No Name	2017/01/26 17:06:03
<input type="checkbox"/>	0027	No Name	2017/01/26 17:06:04
<input type="checkbox"/>	0028	No Name	2017/01/26 17:06:06
<input type="checkbox"/>	0029	No Name	2017/01/26 17:06:08
<input type="checkbox"/>	0030	No Name	2017/01/26 17:06:09
<input type="checkbox"/>	0031	No Name	2017/01/26 17:06:11
<input checked="" type="checkbox"/>	0032	No Name	2017/01/26 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 .


## 2.10.8.2 Reading target data from instrument

### ■ Using the right-click menu

1. Select the target to read from the list in the SensorSync tab.
  - Only one target can be selected. Even if the checkboxes for multiple targets are checked, only the currently highlighted target will be read into the document.
2. Right-click on the target and open the right-click menu.
3. Select Read.
  - If a target with the same name already exists in the document, Read in the right-click menu will be disabled.
4. The selected target will be read into the document.

### ■ Using the read button

The read button  can be used to read multiple selected targets 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 to read from the list in the SensorSync tab.
  - Multiple targets can be selected by checking the checkboxes next to the targets. If samples are also checked, the samples will also be read into the document.
2. Click . The selected measurements will be read into the document.
  - If a target with the same name as measurements being read already exists in the document, a confirmation dialog box appears.


### 2.10.8.3 Reading sample data from instrument

#### ■ Using the right-click menu

1. Select the sample to read from the list in the SensorSync tab.
  - Only one sample can be selected. Even if the checkboxes for multiple samples are checked, only the currently highlighted sample will be read into the document.
2. Right-click the sample and open the right-click menu.
3. Select Read.
  - If a sample with the same name already exists in the document file, Read in the right-click menu will be disabled.
4. The selected sample will be read into the document.
  - If the sample was linked to a target in the instrument, the linked target will also be read into the document.
  - If the sample was absolute data, it will be read into the document as absolute data.

#### ■ Using the read button

The read button  can be used to read multiple selected 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 samples to read from the list in the SensorSync tab.
  - Multiple samples can be selected by checking the checkboxes next to the samples. If targets are also checked, the targets will also be read into the document.
2. Click . The selected measurements will be read into the document.
  - If data with the same name already exists in the document file, 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.

#### 2.10.8.4 Writing target data from the document to the instrument using Sensor Sync

- Data cannot be written to the instrument when the number of channels is different (for example, single-channel data cannot be written to the 6-angle CM-M6).
- 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.

##### ■ Using the right-click menu

1. Select the targets to write into the instrument from the List Pane.

**Note:** One or more targets can be selected as long as the targets are selected from All data - Target(s) data folder.

2. Right-click the target data and open the right-click menu.

3. Select Write Target.

A dialog box appears and the selected targets are written to the instrument. The written targets will be added as the last targets in the instrument.

#### 2.10.8.5 Deleting data stored in the instrument

Selected data can be deleted from the instrument memory.

- It is not possible to delete individual targets when using the CM-2500c.

1. Select the measurements to delete in the list in the SensorSync tab.

- Multiple measurements can be selected by checking the checkboxes next to the measurements.

2. Click .

3. A confirmation dialog box appears showing a message “Are you sure you want to clear the stored data?”.

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 SensorSync tab, samples linked to the deleted target will become absolute measurements.



## CHAPTER 3

# GRAPHIC OBJECT PROPERTIES

<b>3.1</b>	<b>Spectral Graph .....</b>	<b>143</b>
3.1.1	Overview .....	143
3.1.2	Button bar (Spectral Graph) .....	144
3.1.3	Right-click menu (Spectral Graph) .....	144
3.1.4	Properties Dialog (Spectral Graph) .....	145
<b>3.2</b>	<b>L*a*b* or Hunter Lab Graph .....</b>	<b>146</b>
3.2.1	Overview .....	146
3.2.2	Button bar (L*a*b* or Hunter Lab Graph) .....	147
3.2.3	Right-click menu (L*a*b* or Hunter Lab Graph) .....	147
3.2.4	Properties Dialog (L*a*b* or Hunter Lab Graph) .....	148
<b>3.3</b>	<b><math>\Delta L^* \Delta a^* \Delta b^*</math> or Hunter <math>\Delta L \Delta a \Delta b</math> Graph .....</b>	<b>149</b>
3.3.1	Overview .....	149
3.3.2	Button bar ( $\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ Graph) .....	150
3.3.3	Right-click menu ( $\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ Graph) .....	151
3.3.4	Properties Dialog ( $\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ Graph) .....	152
<b>3.4</b>	<b>Trend Graph .....</b>	<b>153</b>
3.4.1	Overview .....	153
3.4.2	Button bar (Trend Graph) .....	154
3.4.3	Right-click menu (Trend Graph) .....	154
3.4.4	Properties Dialog (Trend Graph) .....	155
<b>3.5</b>	<b>Multichannel Graph .....</b>	<b>156</b>
3.5.1	Overview .....	156
3.5.2	Button bar (Multichannel Graph) .....	156
3.5.3	Right-click menu (Multichannel Graph) .....	157
3.5.4	Properties Dialog (Multichannel Graph) .....	157
<b>3.6</b>	<b>Line Object .....</b>	<b>158</b>
3.6.1	Overview .....	158
3.6.2	Right-click menu (Line Object) .....	158
3.6.3	Properties Dialog (Line Object) .....	158
<b>3.7</b>	<b>Rectangle Object .....</b>	<b>159</b>
3.7.1	Overview .....	159
3.7.2	Right-click menu (Rectangle Object) .....	159
3.7.3	Properties Dialog (Rectangle Object) .....	159
<b>3.8</b>	<b>Image Object .....</b>	<b>160</b>
3.8.1	Overview .....	160
3.8.2	Right-click menu (Image Object) .....	160
3.8.3	Properties Dialog (Image Object) .....	160



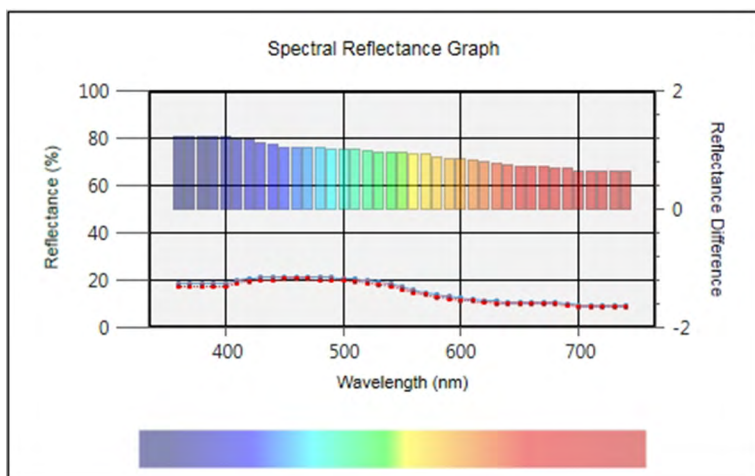
<b>3.9 String Label Object .....</b>	<b>161</b>
3.9.1 Overview .....	161
3.9.2 Right-click menu (String Label Object) .....	161
3.9.3 Properties Dialog (String Label Object) .....	161
<b>3.10 Pseudo Color Object.....</b>	<b>162</b>
3.10.1 Overview .....	162
3.10.2 Button bar (Pseudo Color Object) .....	162
3.10.3 Right-click menu (Pseudo Color Object) .....	162
3.10.4 Properties Dialog (Pseudo Color Object) .....	163
<b>3.11 Data List Object .....</b>	<b>164</b>
3.11.1 Overview .....	164
3.11.2 Right-click menu (Data List Object) .....	164
3.11.3 Properties Dialog (Data List Object) .....	164
<b>3.12 Numeric Label Object .....</b>	<b>165</b>
3.12.1 Overview .....	165
3.12.2 Right-click menu (Numeric Label Object) .....	165
3.12.3 Properties Dialog (Numeric Label Object) .....	166
<b>3.13 Statistics Object .....</b>	<b>167</b>
3.13.1 Right-click menu (Statistics Object) .....	167
3.13.2 Properties Dialog (Statistics Object) .....	168
<b>3.14 Font Dialog .....</b>	<b>169</b>

## 3.1 Spectral Graph

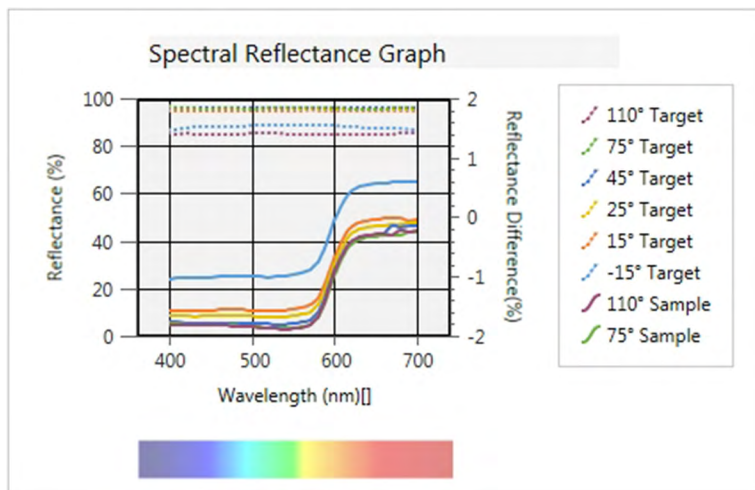
### 3.1.1 Overview

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.

Two types of spectral graph objects are available: One to show single-channel data, and one to show multi-angle data (display of line for measured data can be enabled/disabled for each angle).



Spectral graph






Multi-angle spectral graph

### 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:

- 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 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. 146.

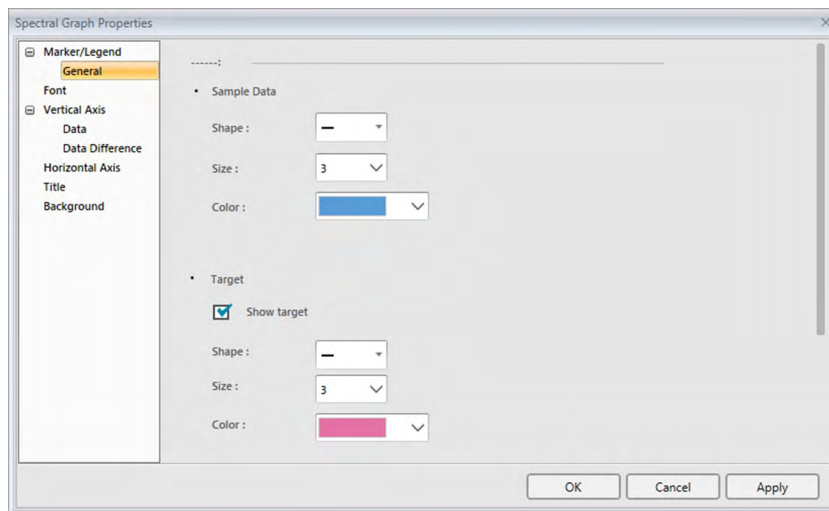
### 3.1.3 Right-click menu (Spectral Graph)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the spectral graph object.

Cut	Cuts the graph to the clipboard.
Copy	Copies the graph to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers
Group Settings	For spectral graphs (single-channel graphs) in multi-angle documents, opens a submenu for selecting the angle for which to display data on the line graph. (For single-channel instruments, "-----" will be shown.) For multi-angle graphs, opens a submenu for enabling/disabling display of the line graph for each angle
Data Type	Opens a submenu for selecting the type of data to display. Available selections: <b>Reflectance (%)</b> , <b>K/S</b> , <b>Absorbance</b> , or <b>Transmittance (%)</b>
Properties	Opens the Properties dialog. See p. 146.

### 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: For single-channel graph: <b>General</b> For multi-angle graph: Each angle (for example, for CM-M6: <b>-15°, 15°, 25°, 45°, 75°, and 110°</b> ) Samples: 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 used for data number and legend. See p. 170.
Font	
Vertical Axis	Subcategories: <b>Data</b> (absolute data); <b>Data Difference</b> <b>Scale</b> : Minimum/maximum/scale interval, number of decimal places for scales Labels: 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 Labels: 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

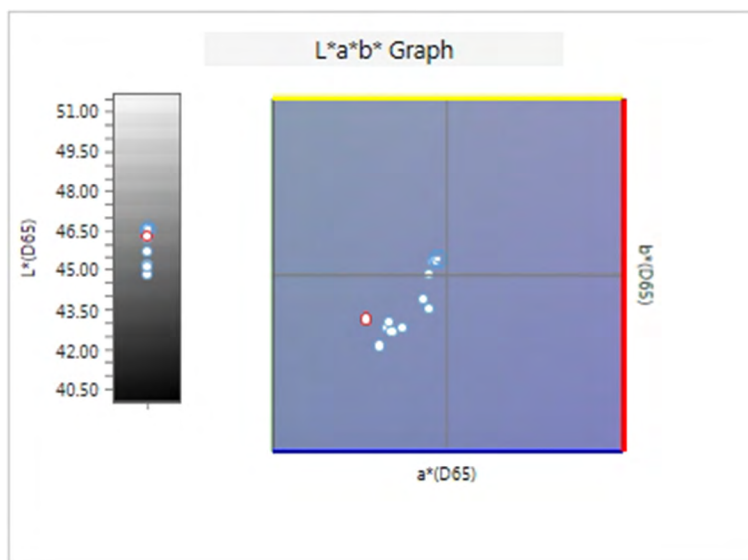
- For the items which allow the font to be set, the font button will be enabled only if display of the item is enabled. For the settings available in the Font dialog, see p. 170.

## 3.2 L\*a\*b\* or Hunter Lab Graph

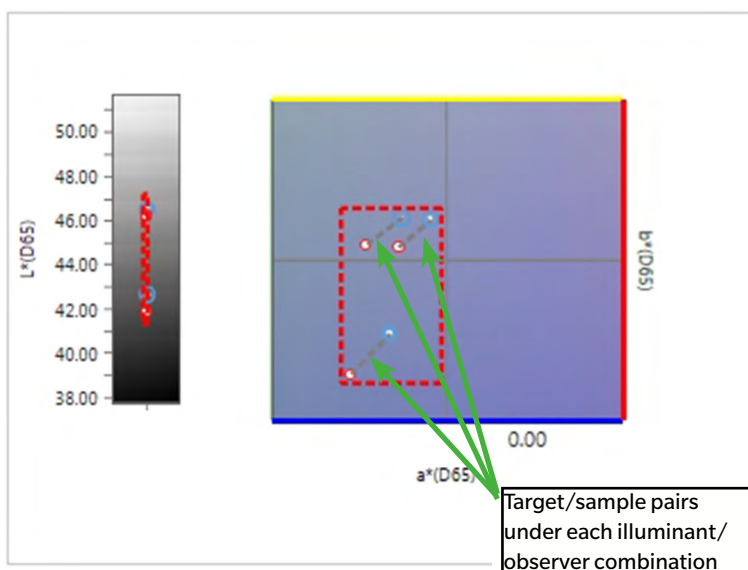
### 3.2.1 Overview

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 Setting: Single Illuminant



For Illuminant Setting: Multiple Illuminant (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:

- 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 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. 149.

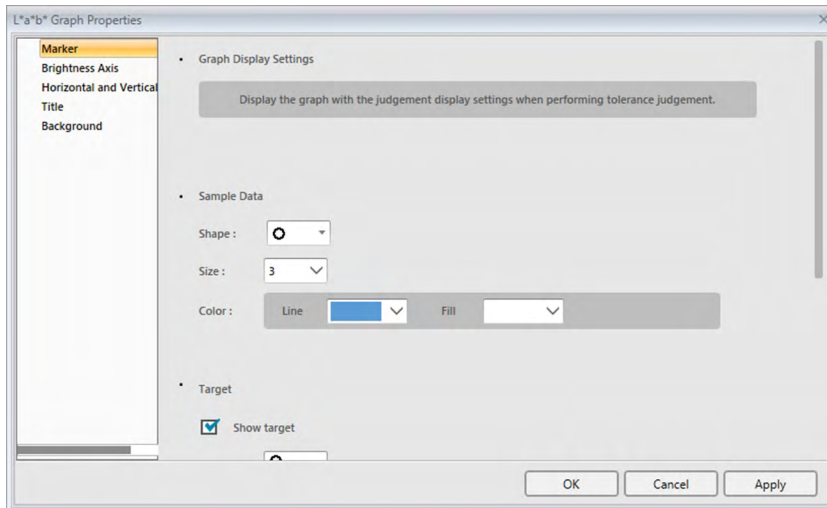
### 3.2.3 Right-click menu (L\*a\*b\* or Hunter Lab Graph)

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.

Cut	Cuts the graph to the clipboard.
Copy	Copies the graph to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers
Group Settings	Opens a submenu for selecting the angle for which to display data. (For single-channel instruments, “-----” will be shown.)
Plot Type	<p>Opens a submenu for selecting the type of plot to display.</p> <p>Available selections:</p> <p>L*a*b* Graph: L*; L*, a*-b*; a*-b*; a*-L*; b*-L*</p> <p>Hunter Lab Graph: L; L, a-b; a-b; a-L; b-L</p>
Illuminant Settings	<p><b>Single Illuminant:</b></p> <p>Selects the single illuminant/observer combinations based on which the displayed plot data will be calculated.</p> <p>Available selections: Primary; Secondary; Tertiary</p> <p><b>Multiple Illuminants:</b></p> <p>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.</p> <p>Available selections: Primary; Secondary; Tertiary</p> <ul style="list-style-type: none"> <li>• Tertiary can be selected even if Secondary has not been selected.</li> <li>• 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.</li> </ul>
(See p. 34 for setting illuminant/observer combinations.)	
Properties	Opens the Properties dialog. See p. 149.

### 3.2.4 Properties Dialog (L\*a\*b\* or Hunter Lab Graph)

Clicking on the Properties button  or selecting Properties... from the right-click menu opens the L\*a\*b\* Graph or Hunter Lab Graph Properties dialog for specifying the properties of the graph.



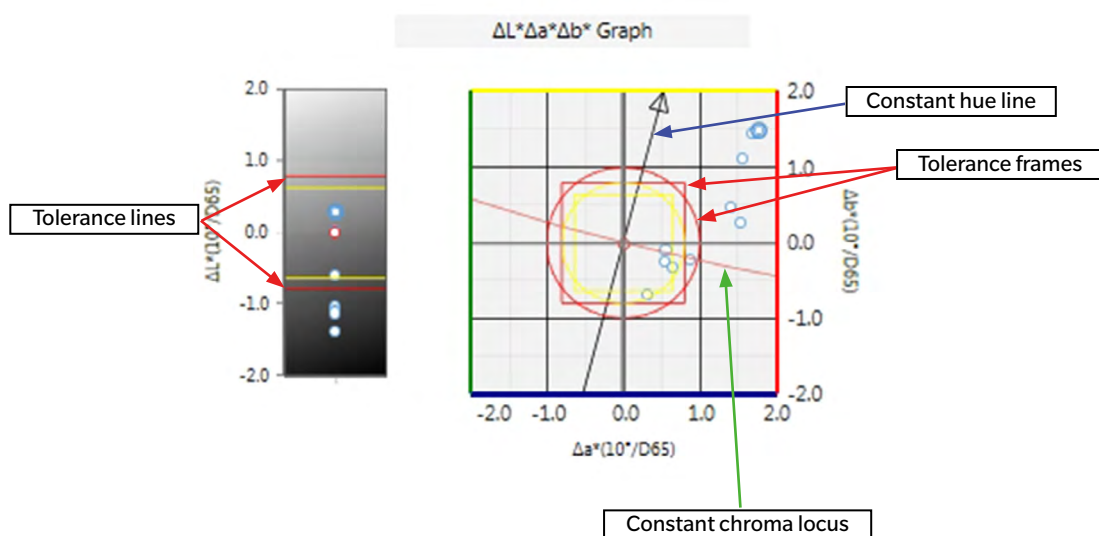
Category	Properties included in category
Marker	<p>Sample point: Shape, size, and color of markers</p> <p>Target point: Enable/disable display and shape, size, and color of marker</p> <p>Data number: Enable/disable, and font/font color of text</p>
Brightness Axis	<p><b>Scale:</b> Minimum/maximum/scale interval, number of decimal places for scales</p> <p><b>Labels:</b> Display enable/disable, label text, and font/font color to use</p> <p>Whether or not to show all sample data</p>
Horizontal and Vertical Axes	<p><b>Scale:</b> Center/minimum/maximum/scale interval, number of decimal places for scales</p> <p><b>Labels: Enable/disable display, label text, and font/font color of text</b></p> <p>Whether or not to show all sample data</p>
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. 170.

## 3.3 $\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ Graph

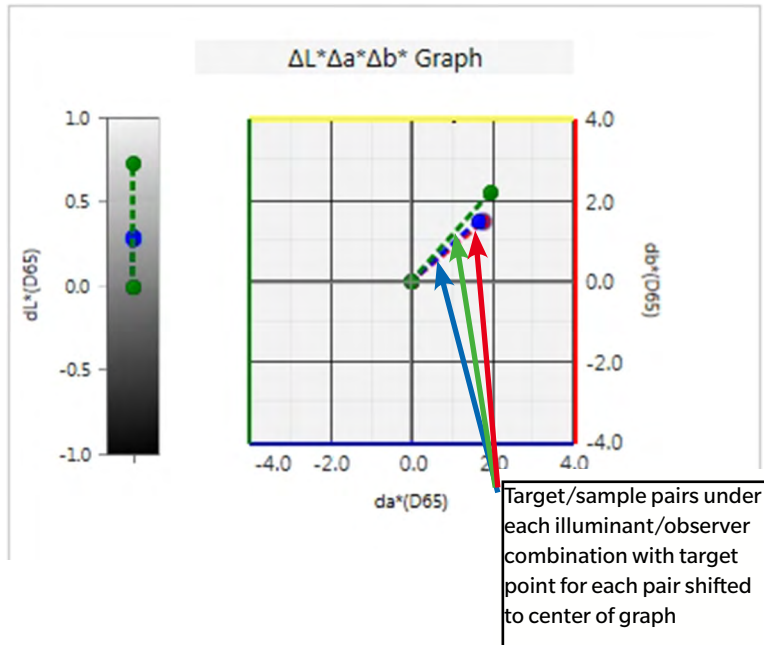
### 3.3.1 Overview

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 ( $\Delta L^*$  or  $\Delta L$ ) 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 Setting: Single Illuminant





For Illuminant Setting: Multiple Illuminant (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. 153.

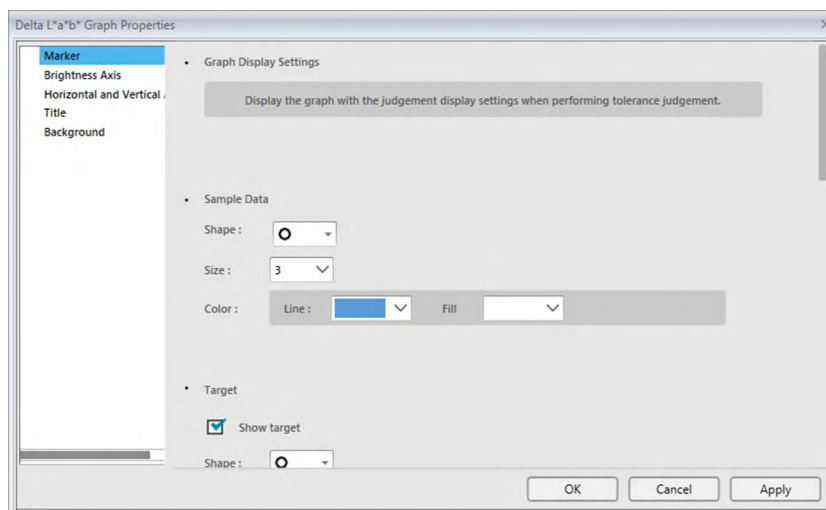
### 3.3.3 Right-click menu ( $\Delta L^* \Delta a^* \Delta b^*$ or Hunter $\Delta L \Delta a \Delta b$ Graph)

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.

Cut	Cuts the graph to the clipboard.
Copy	Copies the graph to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers
Group Settings	Opens a submenu for selecting the angle for which to display data. (For single-channel instruments, “-----” will be shown.)
Plot Type	<p>Opens a submenu for selecting the type of plot to display.</p> <p>Available selections:</p> <p><math>\Delta L^* \Delta a^* \Delta b^*</math> Graph: <math>dL^*</math>; <math>dL^*</math>; <math>da^*-db^*</math>; <math>da^*-db^*</math>; <math>da^*-dL^*</math>; <math>db^*-dL^*</math></p> <p>Hunter <math>\Delta L \Delta a \Delta b</math> <math>dL</math>; <math>dL</math>, <math>da-db</math>; <math>da-db</math>; <math>da-dL</math>; <math>db-dL</math></p> <p>Graph:</p> <p><b>Single Illuminant:</b></p> <p>Selects the single illuminant/observer combinations based on which the displayed plot data will be calculated.</p> <p>Available selections: Primary; Secondary; Tertiary</p> <p><b>Multiple Illuminants:</b></p> <p>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.</p> <p>Available selections: Primary; Secondary; Tertiary</p> <ul style="list-style-type: none"> <li>• Tertiary can be selected even if Secondary has not been selected.</li> <li>• 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.</li> </ul>
Illuminant Settings	
(See p. 34 for setting illuminant/observer combinations.)	
Properties	Opens the Properties dialog. See p. 153.

### 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  or selecting Properties... from the right-click menu opens the  $L^*a^*b^*$  Graph or Hunter Lab Graph Properties dialog for specifying the properties of the graph.



#### Category

#### Properties included in category

##### Marker

Sample point: Shape, size, and color of markers

Target point: Enable/disable display and shape, size, and color of marker

Tolerances: 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

**Labels:** 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

**Labels:** 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

##### Background

Background colors for entire graph area and graph plot area, grid color and outline color for graph plot area

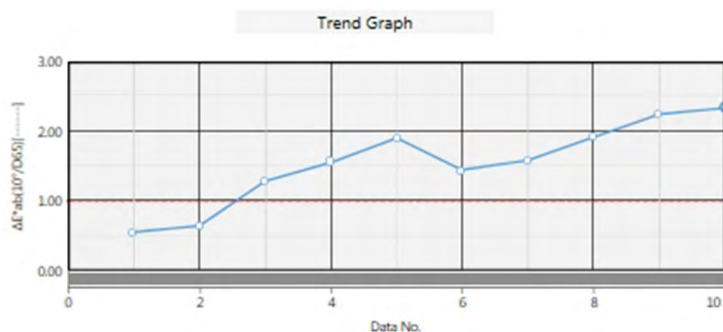
- For the items which allow the font to be set, the font button will be enabled only if display of the item is enabled. For the settings available in the Font dialog, see p. 170.

## 3.4 Trend Graph

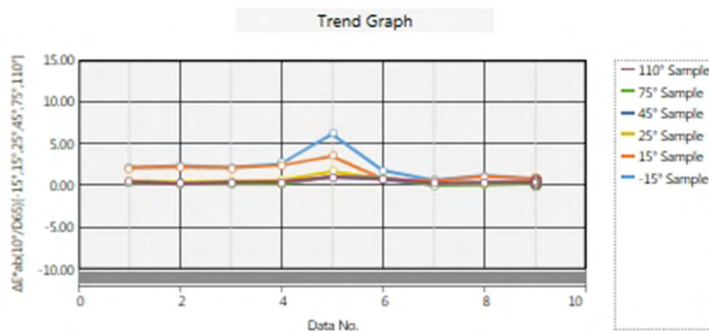
### 3.4.1 Overview

The trend graph object is used to view the trend of the specific color value or color difference value over a series of measurements.

Two types of trend graph objects are available: One to show single-channel data, and one to show multi-angle data (display of line for measured data can be enabled/disabled for each angle).



Trend graph



Multi-angle trend graph

### 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:

- 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 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. 156.

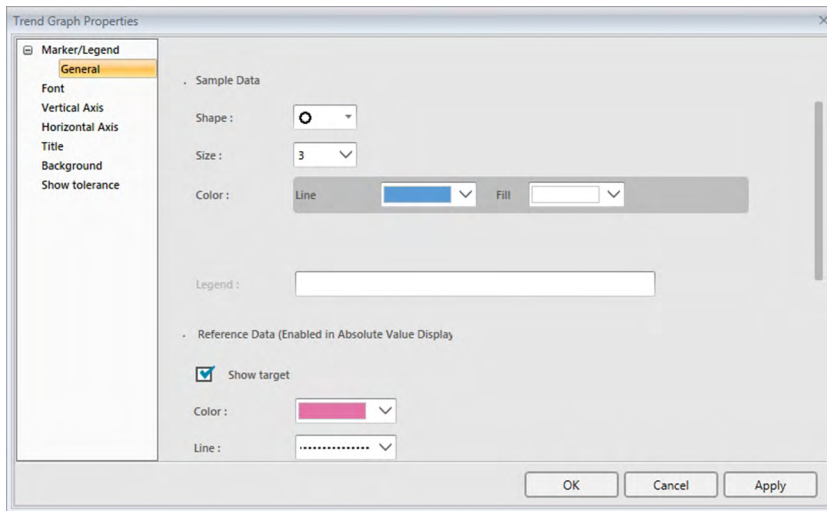
### 3.4.3 Right-click menu (Trend Graph)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the trend graph object.

Cut	Cuts the graph to the clipboard.
Copy	Copies the graph to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers
Group Settings	For trend graphs (single-channel graphs) in multi-angle documents, opens a submenu for selecting the angle for which to display data on the line graph. (For single-channel instruments, "-----" will be shown.) For multi-angle graphs, opens a submenu for enabling/disabling display of the line graph for each angle
Display Items	Opens a submenu for selecting the list item to show in the graph. Available selections will be the colorimetric list items shown in the List Pane (list items selected in the observer/illuminant categories). <ul style="list-style-type: none"> <li>Some list items may not be selectable.</li> </ul>
Properties	Opens the Properties dialog. See p. 156.

### 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.

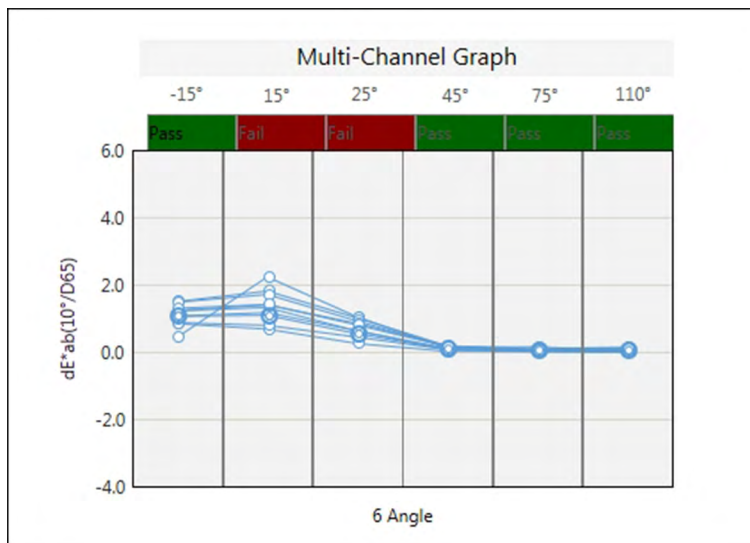
Category	Properties included in category
Marker/Legend	Subcategories: For single-channel graph: <b>General</b> For multi-angle graph: Each angle (for example, for CM-M6: <b>-15°, 15°, 25°, 45°, 75°, and 110°</b> ) Samples: Shape, size, and color of markers Target: Enable/disable display and shape, size, 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. 170.
Vertical Axis	Subcategories: <b>Data</b> (absolute data); <b>Data Difference</b> <b>Scale</b> : Minimum/maximum/scale interval, number of decimal places for scales Labels: 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 Labels: 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
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. 170.

## 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 channel (measurement angle on multi-angle instruments).




### 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. 158.

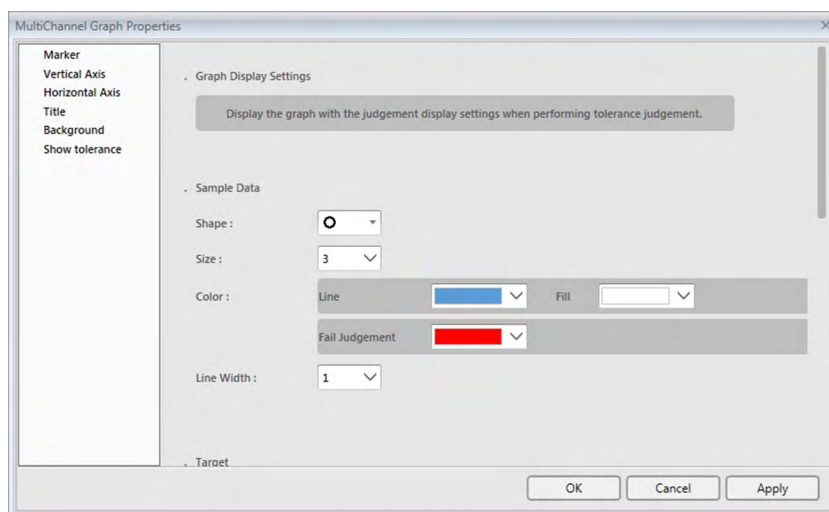
### 3.5.3 Right-click menu (Multichannel Graph)

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.

Cut	Cuts the graph to the clipboard.
Copy	Copies the graph to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers
Display Items	Opens a submenu for selecting the list item to show in the graph. Available selections will be the colorimetric list items shown in the List Pane (list items selected in the observer/illuminant categories). <ul style="list-style-type: none"> <li>Some list items may not be selectable.</li> </ul>
Properties	Opens the Properties dialog. See p. 158.

### 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.



Category	Properties included in category
Marker/Legend	Samples: 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.
Vertical Axis	Data number: Enable/disable, and font/font color of text <b>Scale:</b> Minimum/maximum/scale interval, number of decimal places for scales
Horizontal Axis	Label: Enable/disable display, label text, and font/font color of text
Title	Label: Display enable/disable, label text, and font/font color to use 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 angle (each channel). <ul style="list-style-type: none"> <li>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. 170.</li> </ul>



## 3.6 Line Object

### 3.6.1 Overview

The line object is used to add a straight line to the Canvas Pane.

When the line object is first placed on the Canvas Pane, it is shown as a line at an angle in a rectangular space. The line can be made vertical by minimizing the horizontal dimension, and the line can be made horizontal by minimizing the vertical dimension.

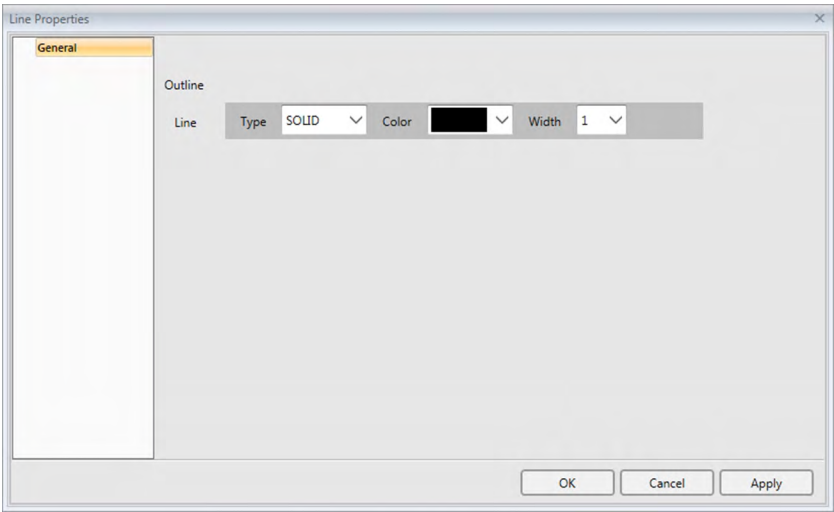
### 3.6.2 Right-click menu (Line Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the line object.

Cut	Cuts the object to the clipboard.
Copy	Copies the object to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers
Flip horizontally	Flips the line object horizontally.
Properties	Opens the Properties dialog. See below.

### 3.6.3 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.



<u>Category</u>	<u>Properties included in category</u>
General	Set the type (solid, dot, dash), color, and width of the line.

# 3.7     Rectangle Object

## 3.7.1     Overview

The rectangle object is used to add a rectangle to the Canvas Pane.

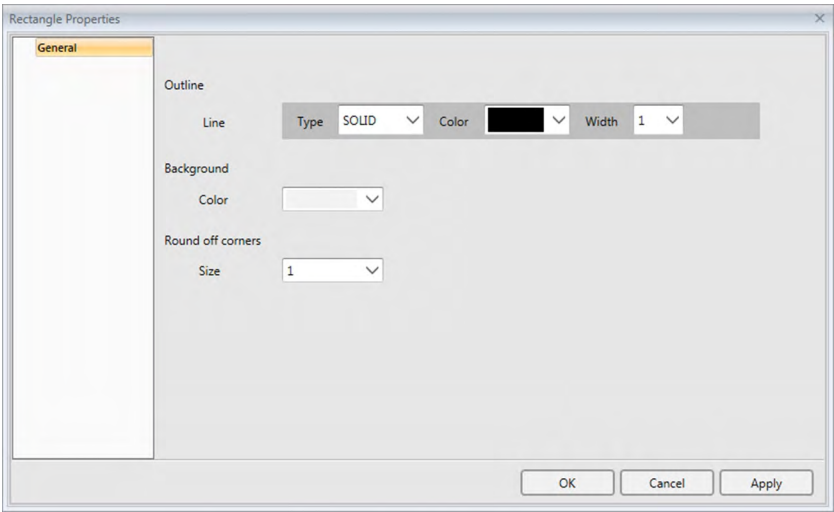
## 3.7.2     Right-click menu (Rectangle Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the rectangle object.

Cut	Cuts the object to the clipboard.
Copy	Copies the object to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers
Properties	Opens the Properties dialog. See below.

## 3.7.3     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.



<u>Category</u>	<u>Properties included in category</u>	
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.

# 3.8 Image Object

## 3.8.1 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.

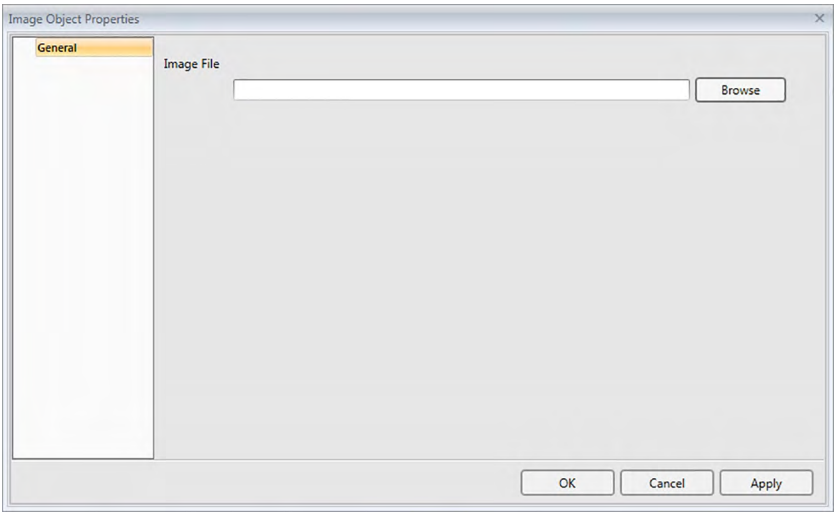
## 3.8.2 Right-click menu (Image Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the image object.

Cut	Cuts the object to the clipboard.
Copy	Copies the object to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers
Properties	Opens the Properties dialog. See below.

## 3.8.3 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.



Category  
General

Properties included in category  
**Image file**  
**Click [ Browse ] and browse to the desired image file.**  
**(Acceptable file formats: gif, jpg, jpeg, png, bmp)**

# 3.9 String Label Object

## 3.9.1 Overview

The string label object is used to add text to the Canvas Pane.

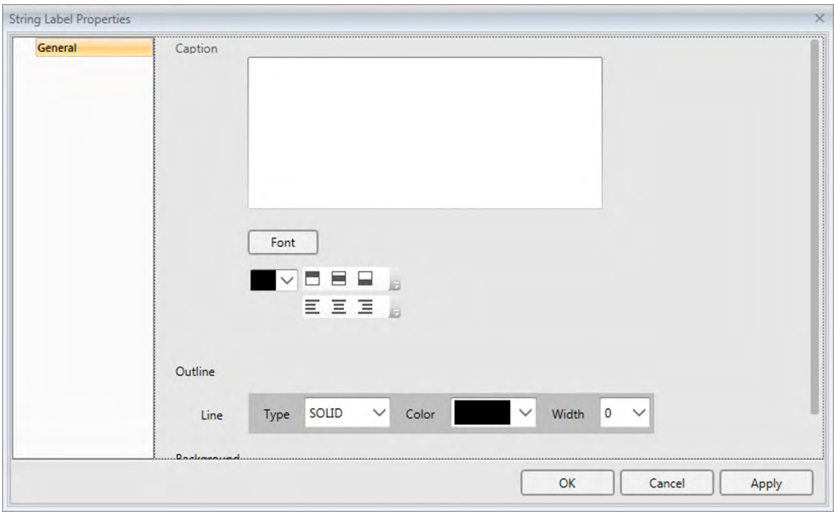
## 3.9.2 Right-click menu (String Label Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the string label object.

Cut	Cuts the object to the clipboard.
Copy	Copies the object to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers
Properties	Opens the Properties dialog. See below.

## 3.9.3 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.



Category  
General

Properties included in category

<b>Caption</b>	Input the desired text in the Caption text box. Click [ Font ] to select the desired font. See p. 170. 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.

# 3.10 Pseudo Color Object

## 3.10.1 Overview

The pseudo color object is used to view pseudo color patches of the selected sample or samples.



Pseudo color object

## 3.10.2 Button bar (Pseudo Color Object)

When the graph is selected, the button bar will appear to the right of the object with the following buttons:




Opens the Properties dialog box. See p. 164.

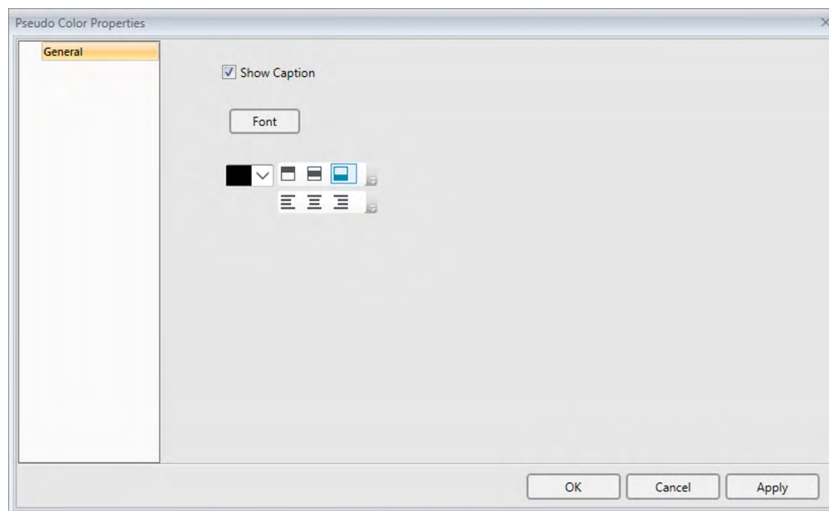
## 3.10.3 Right-click menu (Pseudo Color Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the pseudo color object.

Cut	Cuts the graph to the clipboard.
Copy	Copies the graph to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this graph forward or backward in the order of Canvas Pane layers
Group Settings	For single-channel instruments, “-----” will be shown. For multi-angle graphs, opens a submenu for enabling/disabling display of the color patch for each angle.
Illuminant	<b>Single Illuminant:</b>
Settings (See p. 34 for setting illuminant/ observer combinations.)	Selects the single illuminant/observer combinations based on which the displayed plot data will be calculated. Available selections: Primary; Secondary; Tertiary
Data Type	Sample Enables/disables color patch display for selected sample(s). Target Target: Shows color patche(s) for master target. Working Target: Shows color patche(s) for working target.
Properties	Opens the Properties dialog. See p. 164.

### 3.10.4 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.



<u>Category</u>	<u>Properties included in category</u>
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. 170.

# 3.11 Data List Object

## 3.11.1 Overview

The data list object is used to add a table of the List Pane data for selected measurements to the Canvas Pane.

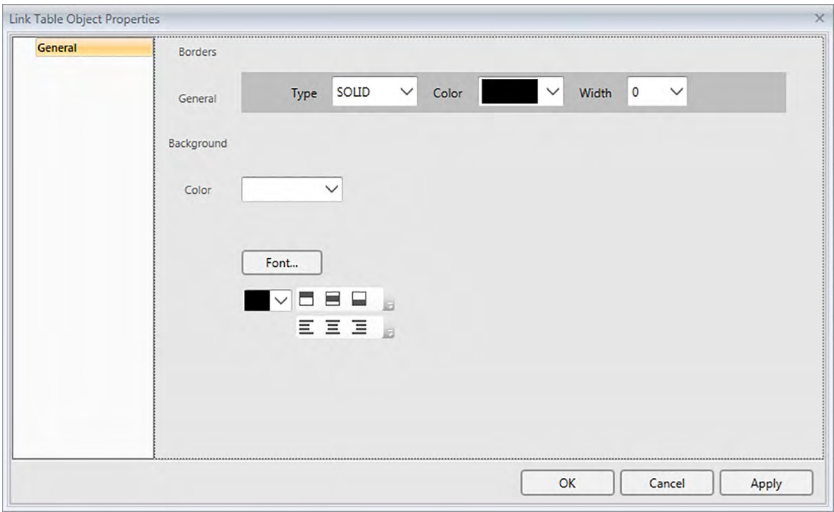
## 3.11.2 Right-click menu (Data List Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the data list object.

Cut	Cuts the object to the clipboard.
Copy	Copies the object to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers
Properties	Opens the Properties dialog. See below.

## 3.11.3 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.



<u>Category</u>	<u>Properties included in category</u>
Table	
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. 170. Set the font color and display position of the text within the data list table.

## 3.12 Numeric Label Object

### 3.12.1 Overview

The numeric label object is used to show the value for a single data item from among the list items shown in the List Pane.

### 3.12.2 Right-click menu (Numeric Label Object)

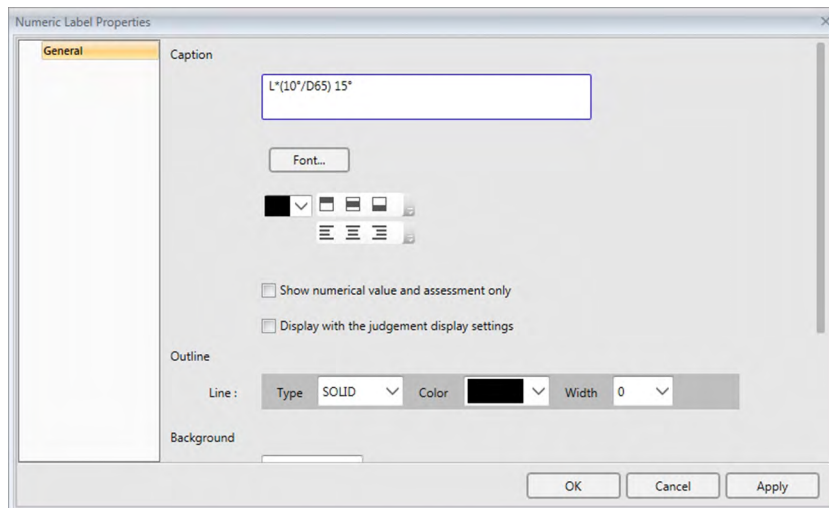
Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the numeric label object.

Cut	Cuts the object to the clipboard.
Copy	Copies the object to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers
Group Settings	For single-channel instruments, “-----” will be shown. For multi-angle graphs, opens a submenu for selecting the angle for which to display data..
Display Items	Opens a submenu for selecting the list item to show in the graph. Available selections will be the list items shown in the List Pane
Data Type	Sample Enables/disables color patch display for selected sample(s).
	Target Target: Shows color patche(s) for master target.
	Working Target: Shows color patche(s) for working target.
Properties	Opens the Properties dialog. See p. 167.



### 3.12.3 Properties Dialog (Numeric Label Object)

Selecting Properties... from the right-click menu or double-clicking on the object opens the Numeric Label Object Properties dialog for specifying the properties of the object.



#### Category Properties included in category

General	Caption	(The caption itself is set automatically and cannot be changed.) Click [ Font ] to select the desired font. See p. 170. 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. 80).
	Outline	Line: Set the type (solid, dot, dash), color, and width of the outline of the data label object.
	Background	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. 80).
	Display format	Data: Show the numerical data for the selected display item. Pass/Warn/Fail: Show the judgment results

## 3.13 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.

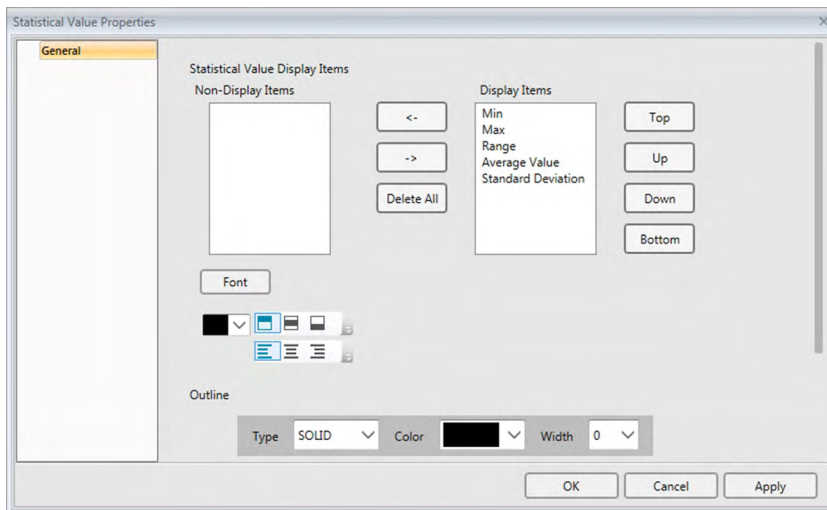
### 3.13.1 Right-click menu (Statistics Object)

Right-clicking on a graphic object opens a context menu. The table below shows the menu items available for the statistics object.

Cut	Cuts the object to the clipboard.
Copy	Copies the object to the clipboard.
Paste	Pastes previously cut/copied graphic object.
Sequence	Opens a submenu for moving this object forward or backward in the order of Canvas Pane layers
Group Settings	For single-channel instruments, “-----” will be shown. For multi-angle graphs, opens a submenu for selecting the angle for which to display data.
Display Items	Available selections will be the colorimetric list items shown in the List Pane (list items selected in the observer/illuminant categories). <ul style="list-style-type: none"><li>• Some list items may not be selectable.</li></ul>
Data Type	Select whether to show the data for the sample or the master target.
Properties	Opens the Properties dialog. See p. 167.

### 3.13.2 Properties Dialog (Statistics Object)

Selecting Properties... from the right-click menu or double-clicking on the object opens the Statistics Object Properties dialog for specifying the properties of the object.



#### Category Properties included in category

#### 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. 170.

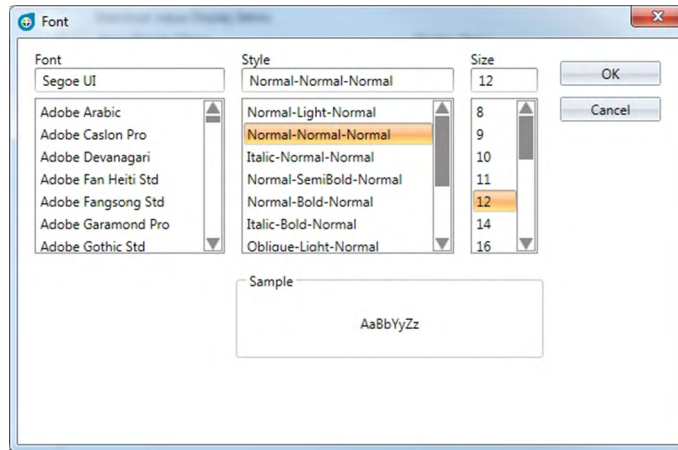
Set the font color and display position of the text within the statistics area.

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.

## 3.14 Font Dialog

The Font dialog When [ Font ] is clicked in the Properties dialog of the graphic objects.



### ■ 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 .....172**
  - 4.1.1 Diagnosis Function Operation Flow.....172
  - 4.1.2 Diagnosis Panel .....173
- 4.2 Working with Diagnosis Projects .....175**
  - 4.2.1 Creating a Project .....175
  - 4.2.2 Initializing a Project .....182
  - 4.2.3 Executing a Project .....187
  - 4.2.4 Deleting a Project .....193
  - 4.2.5 Importing/Exporting a Project.....194
  - 4.2.6 Editing a Project .....195

## 4.1 Introduction

- The diagnosis function can be used only with the Spectrophotometer CM-25cG or the Spectrophotometer CM-M6.

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.

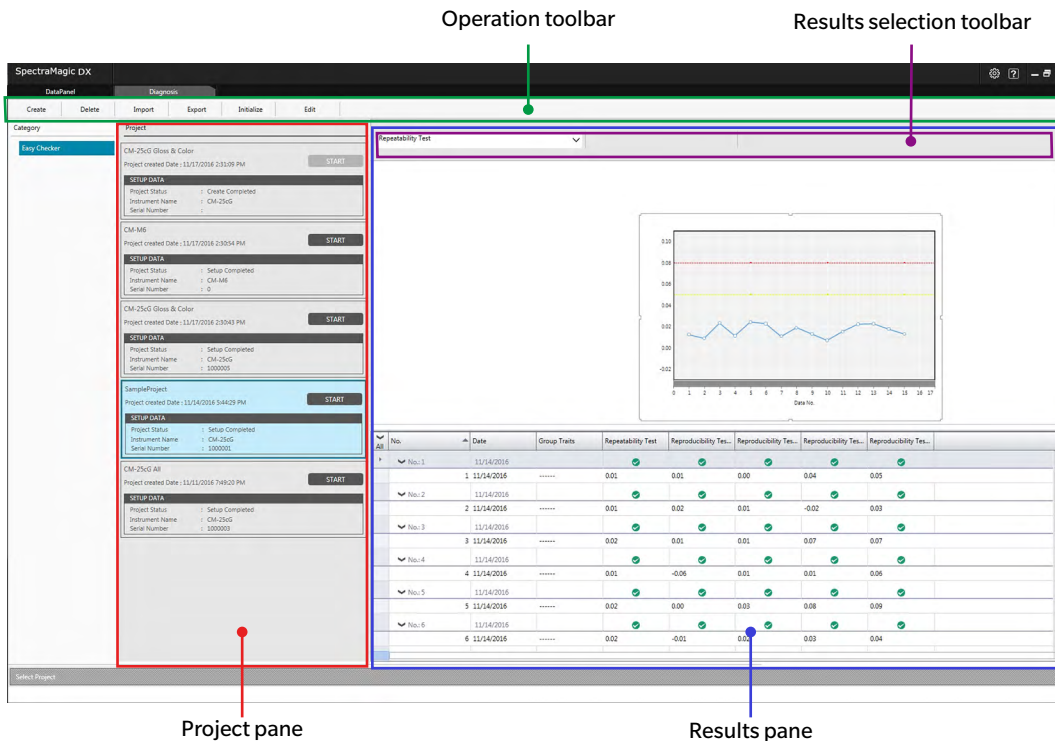
- View results against threshold values.

  - 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. 176.
- Delete:** Deletes an existing project and all diagnosis data associated with it. See p. 194.
- Import:** Imports a previously saved diagnosis project (\*.dec) file. See p. 195.
- Export:** Exports the selected project to a \*.dec file. Which data associated with the project should be exported can be selected. See p. 195.
- Setup:** Initializes the settings for a project. See p. 183.
- Edit:** Edits an existing project. See p. 196.



## ■ 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.

**Angle selection toolbar**     (Shown only for diagnosis projects for the CM-M6) Selects the angle 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  $\Delta L^*$ ,  $\Delta a^*$ ,  $\Delta b^*$ , or  $\Delta E^*ab$

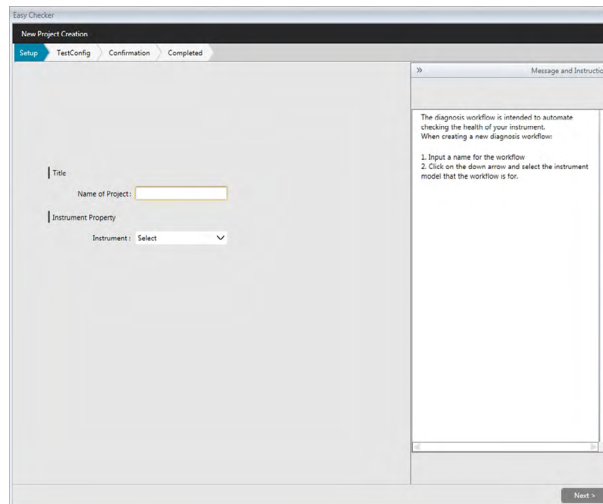
## 4.2 Working with Diagnosis Projects

### 4.2.1 Creating a Project

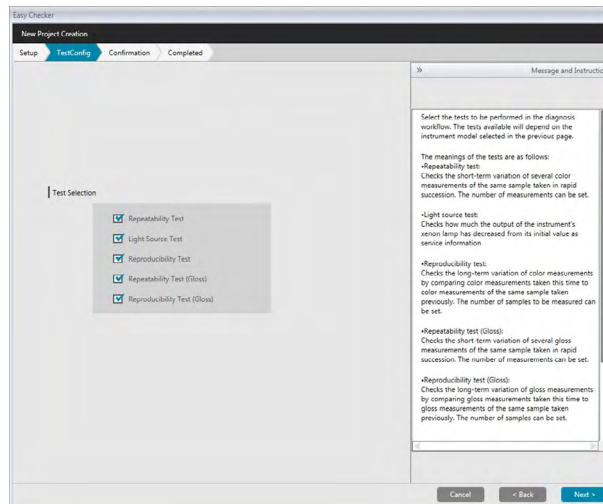
Creating a project consists of selecting which instrument to use, which instrument settings to use, and which tests to perform as well as the settings for the selected tests.

- 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 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 pull-down list.  
Selectable instruments: CM-25cG, CM-M6
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.

CM-25cG 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.

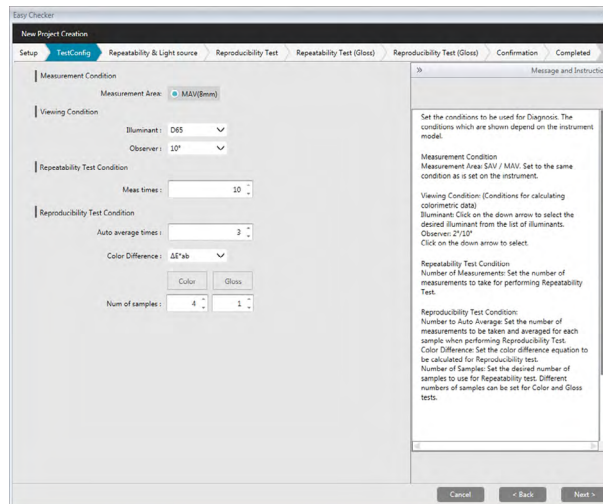
Repeatability Test (Gloss): Checks the short-term stability of several gloss measurements of the same sample taken in succession.

Reproducibility Test (Gloss): Checks the long-term stability of gloss measurements by comparing gloss measurements taken this time to gloss measurements taken during initialization.

CM-M6 Repeatability Test: Checks the short-term stability of several color measurements of the same sample taken in succession.

Reproducibility Test: Checks the long-term stability of color measurements by comparing color measurements taken this time to color measurements taken during initialization.

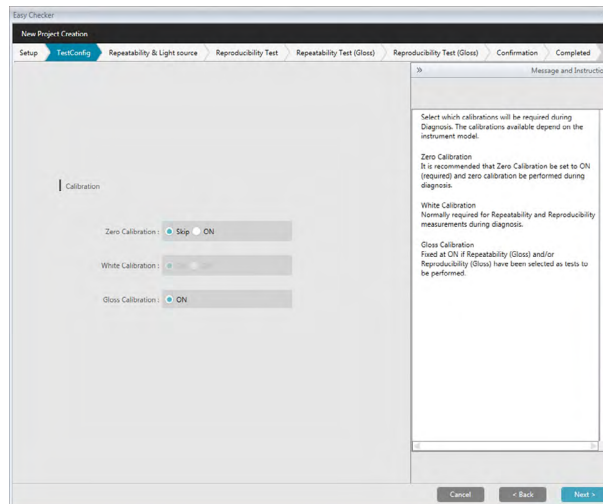
7. Click [ Next ]. The New Project Creation dialog will proceed to the next TestConfig screen.



**8. Set the conditions for the tests selected in step 6.**

Measurement area	Available settings depend on instrument.
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 degree, 10 degree
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: $\Delta E^*ab$
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)

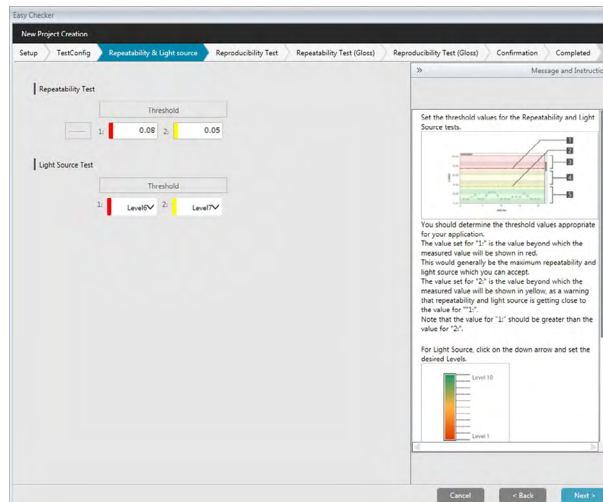
**9. Click [ Next ]. The New Project Creation dialog will proceed to the next TestConfig screen.**



**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.**

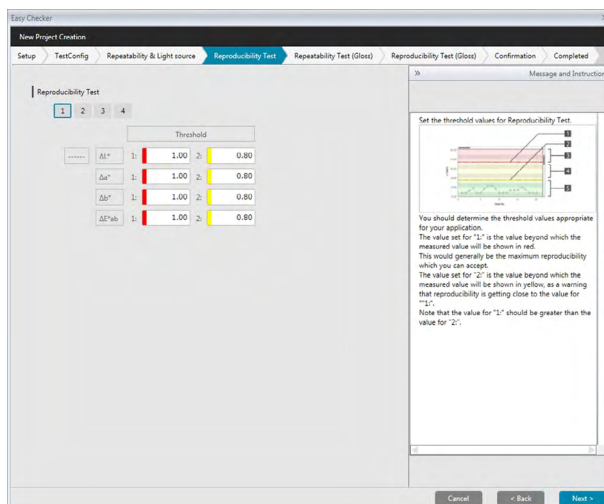


**12. Set the threshold values for the Repeatability and Light Source tests.**

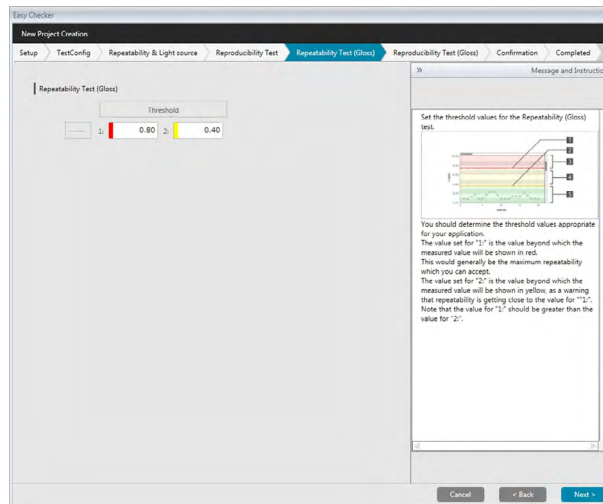
- |                    |   |
|--------------------|---|
| Repeatability Test | Input number directly.<br>Range: 0.00 to 99.99  |
| Light Source Test  | Click on down arrow next to current setting and select from pulldown list.<br>Range: Level 1 (lowest lamp output) to Level 10 (highest lamp output) |

- 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.

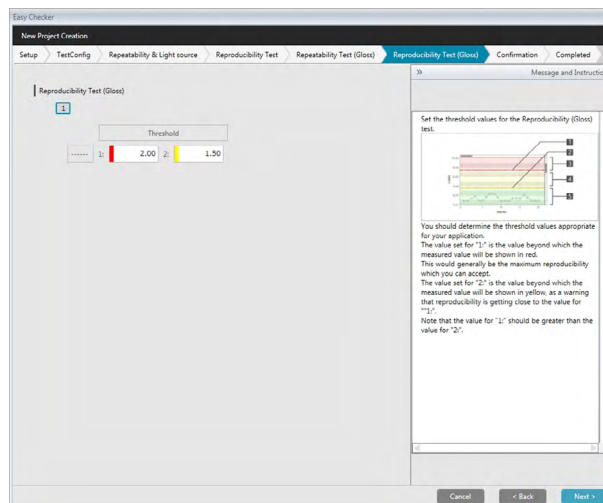
- 13.** Click [ Next ]. The New Project Creation dialog will proceed to the next screen, with Reproducibility highlighted in the procedure bar.



- 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: 0.00 to 99.99
- 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 Gloss highlighted in the procedure bar.



16. Set the threshold values for the Repeatability Test (Gloss). Input number directly. Range: 0.00 to 99.99
  - 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 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: 0.00 to 99.99

- 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.

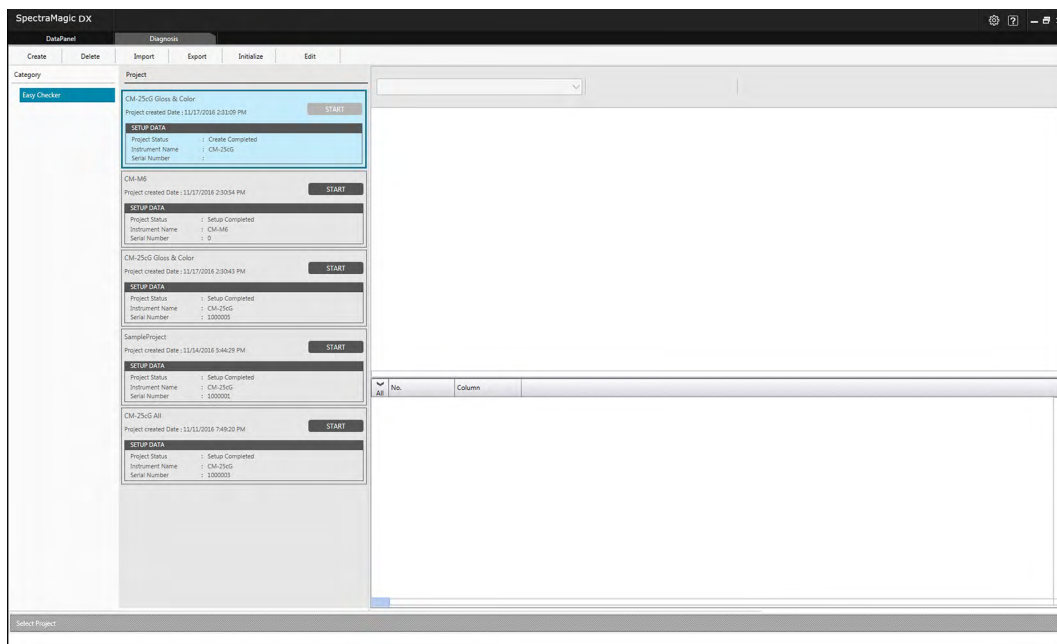
**22.** Click [ Close ] to close the New Project Creation dialog. The project will be added to the Project list in the Diagnosis panel.



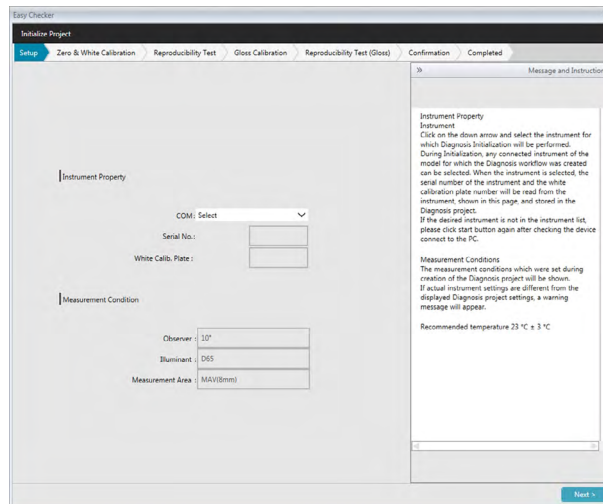
## 4.2.2 Initializing a Project

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.

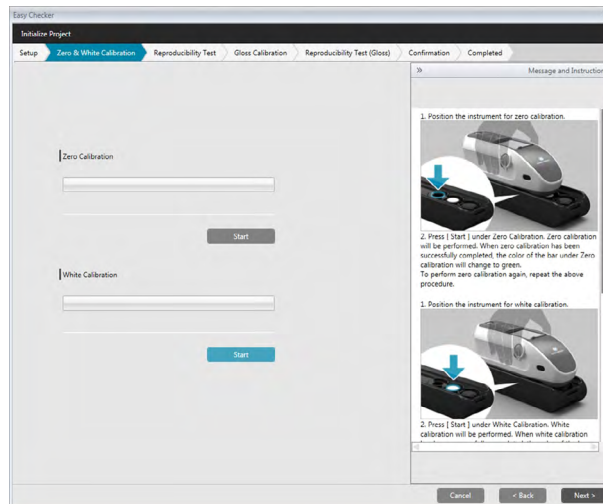
- For Light Source Test (available for CM-25cG only), the reference values are the values stored in the instrument as initial values.
  - For best results, initialization measurements and all future diagnosis measurements should be taken under the same temperature and humidity conditions.
1. Click on 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.

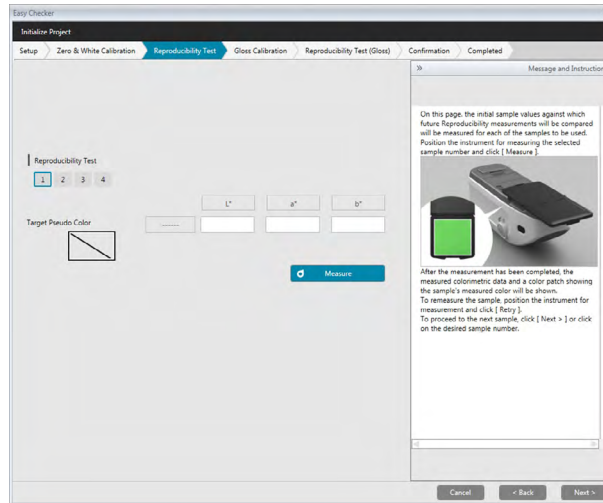


3. Click on the down arrow next to the COM port setting and select the COM port to which the instrument to initialize the project for is connected. The serial numbers of the instrument and its white calibration plate will be shown when connection is successful.
  - Only instruments which are of the model 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.

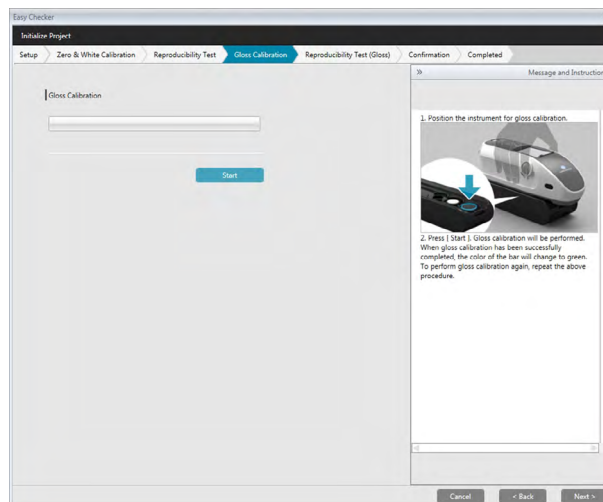


5. Position the instrument for zero calibration and click [ Start ] in the Zero Calibration section. Zero calibration will be performed (a progress bar will show the progress), and the bar will change to green with "Zero Calibration Completed." when zero calibration is finished.
6. Position the instrument 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.

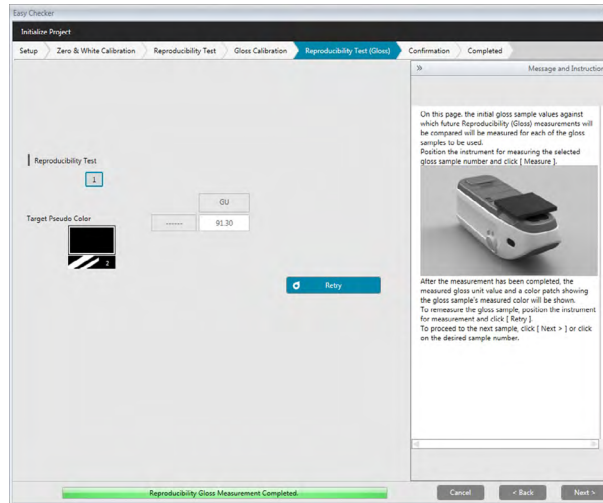


8. Position the instrument for measuring the first tile and click **Measure**. The number of measurements specified for Auto average times during project creation will be taken, the average measurement results will be shown, and the pseudo color patch will change to the color of the tile.
- If an error 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.

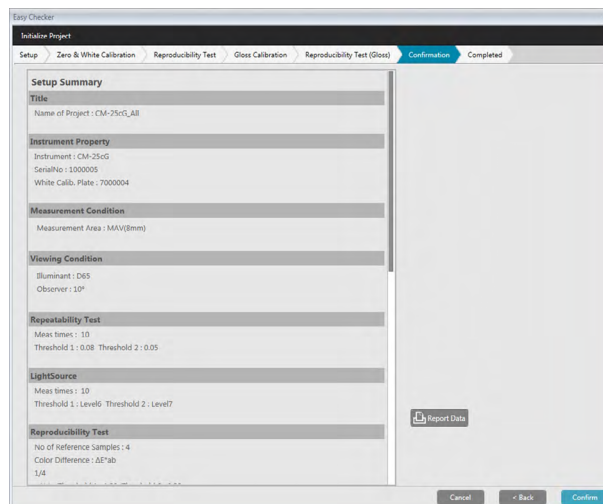


10. Position the instrument for gloss calibration and click [ Start ]. Gloss calibration will be performed (a progress bar will show the progress), and the bar will change to green with "Gloss Calibration Completed." when gloss calibration is finished.
- It is not possible to proceed without performing calibration.

11. Click [ Next ]. The Initialize Project: Reproducibility Test (Gloss) screen will be shown, with the first gloss standard selected.

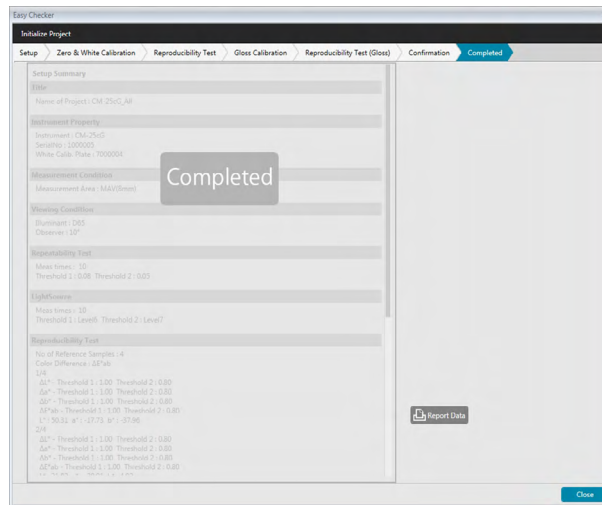


12. Position the instrument on the first gloss standard and click **Measure**. The number of measurements specified for Auto average times during project creation will be taken, the average measurement results will be shown, and the pseudo color patch will change to the color of the gloss standard.
- 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.



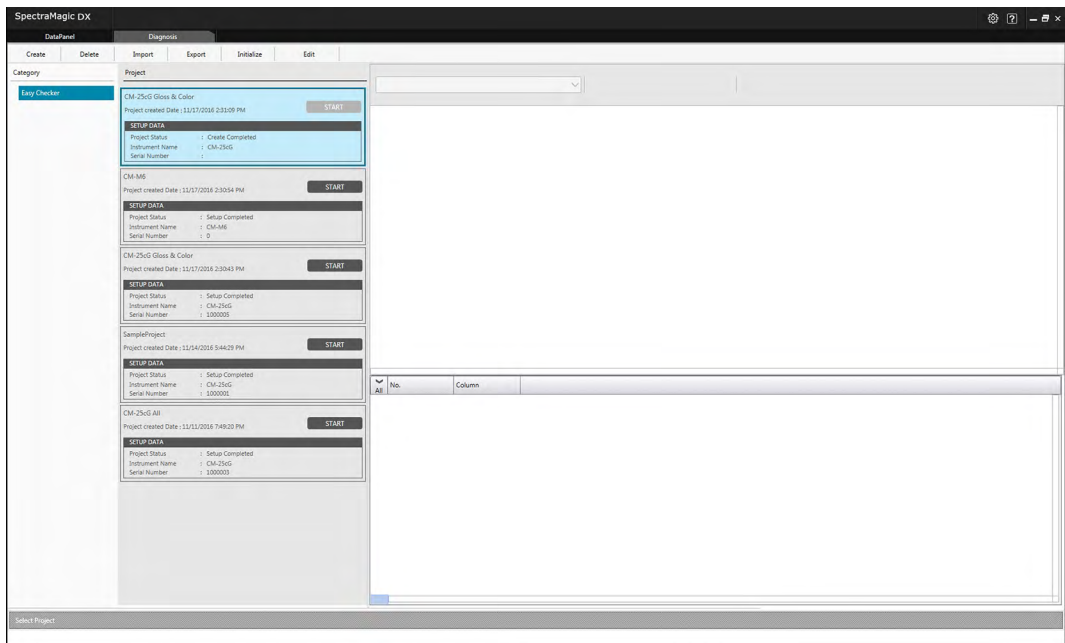
15. Click [ Close ] to close the Initialize Project dialog.
16. The Project Status of the project in the Project column will change to “Setup Completed”, and the [ START ] button for the project will be enabled.

### 4.2.3 Executing a Project

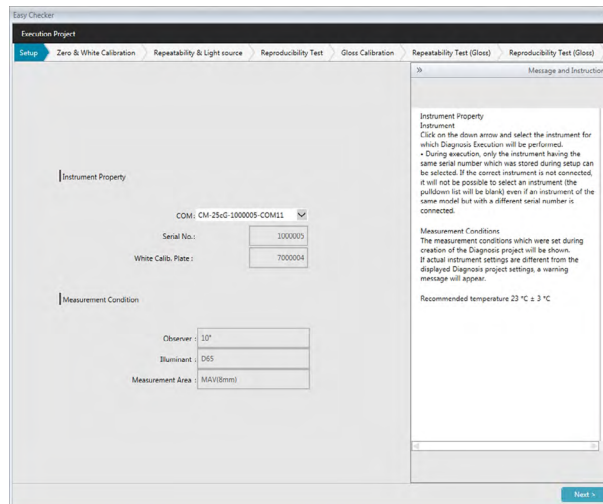
When a project is executed, measurements similar to those taken for project initialization will be taken, and the results compared to the project initialization results to monitor the status of the instrument.

- For best results, initialization measurements and all future diagnosis measurements should be taken under the same temperature and humidity conditions.

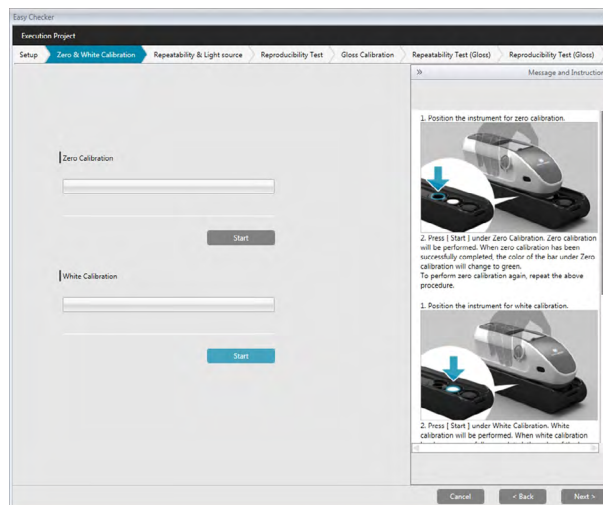
1. Click on the Diagnosis panel tab. The SpectraMagic DX screen will change to the Diagnosis panel. Previously created projects will be shown in the Project column. The Project Status for projects which have been initialized and can be executed will be “Setup Completed”.



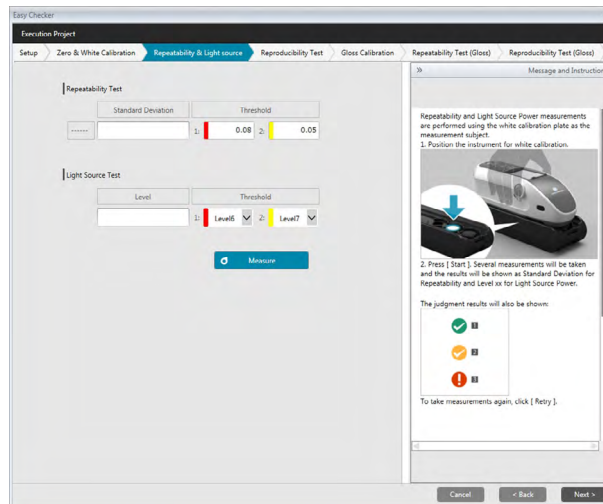
2. Select a project from the Project list by clicking on it (the project frame will turn blue when selected), and click **START** in the project frame. The Execution Project dialog will appear, with Setup highlighted in the procedure bar. If the instrument for which the project was initialized is connected, 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.

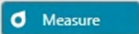
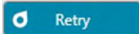


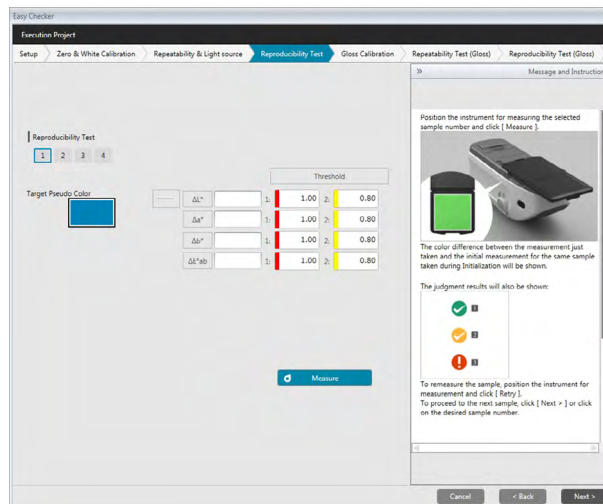
3. Click [ Next ]. The Execution Project: Zero & White Calibration screen will be shown.





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.
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.

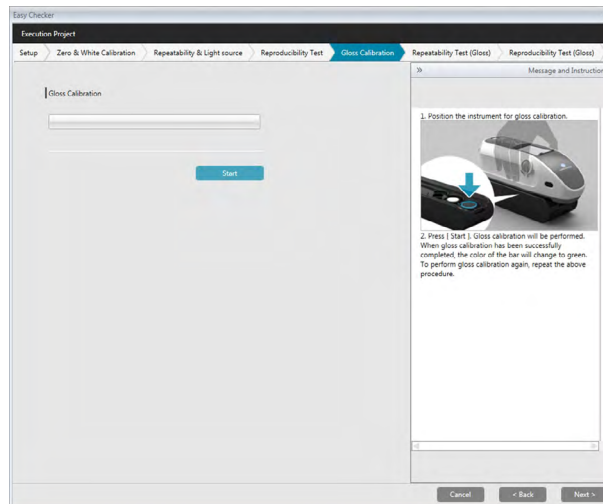


7. With the instrument positioned for white calibration, click . The number of measurements set for repeatability and light source test will be taken, and the results will be shown.
  - If an error was made during measurement, click  and repeat the measurements.
8. Click [ Next ]. The Execution Project: Reproducibility Test screen will be shown, with the first tile number selected.

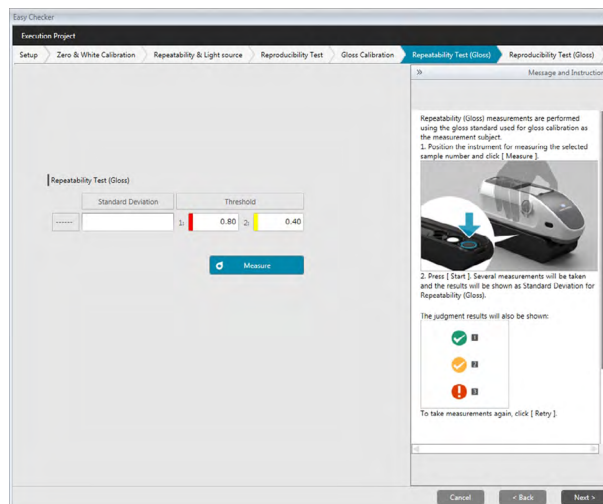



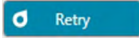
9. Position the instrument for measuring the first tile and click . The number of measurements specified for Auto average times during project creation will be taken, the average measurement results will be shown.
  - If an error was made during measurement, click  and repeat the measurements.
  - If the Number of samples for 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.

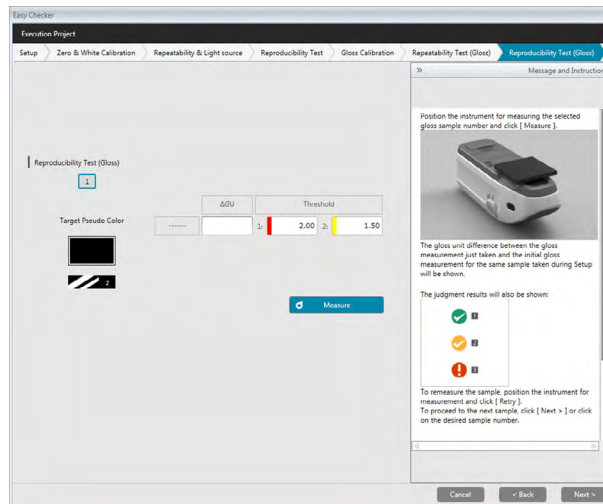






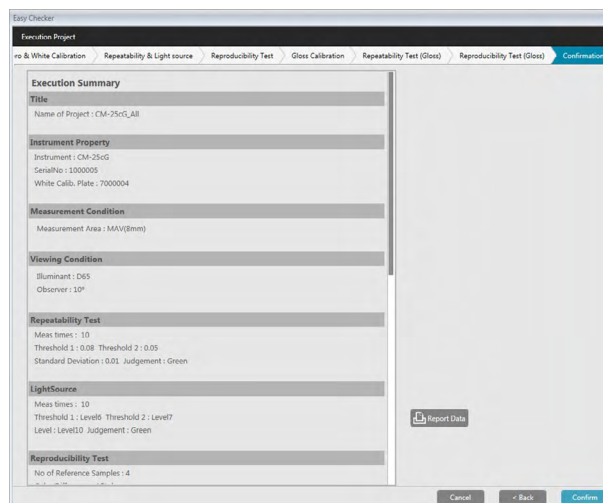
11. Position the instrument for gloss calibration and click [ Start ]. Gloss calibration will be performed (a progress bar will show the progress), and the bar will change to green with “Gloss Calibration Completed.” when gloss calibration is finished.
  - It is not possible to proceed without performing 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 . 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  and repeat the measurements.
14. Click [ Next ]. The Execution Project: Reproducibility Test (Gloss) screen will be shown, with the first gloss standard selected.



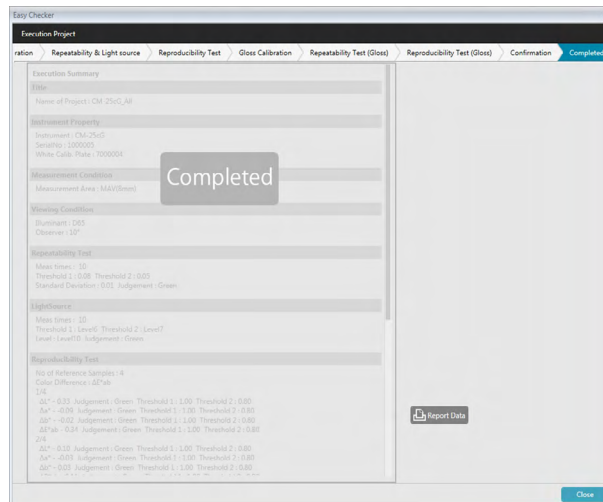
15. Position the instrument on the first gloss standard and click  **Measure**. The number of measurements specified for Auto average times during project creation will be taken, the average measurement results will be shown, and the pseudo color patch will change to the color of the gloss standard.
  - 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.
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  **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 .

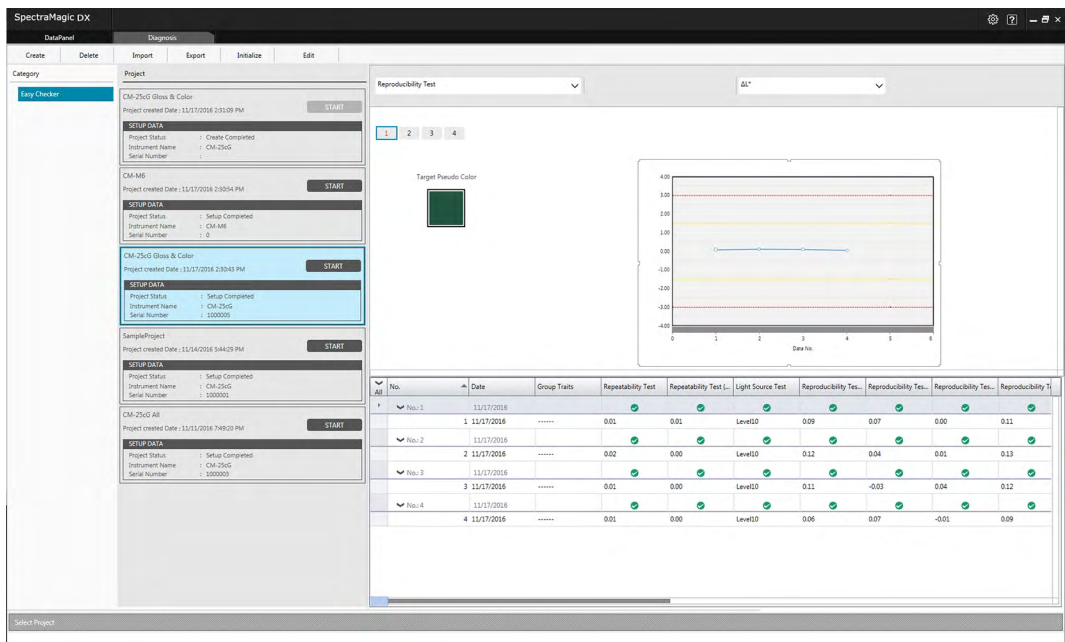
17. Click [ **Confirm** ]. The execution data for the project will be saved, and the Execution Project:

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

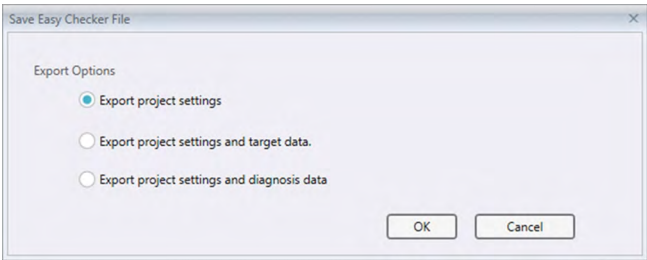
Projects can be exported and imported as files. The data which can be exported with a project will be the data up to the last completed project stage (creation, initialization, or execution).

### 4.2.5.1 Importing a project

1. Click [ Import ] in the diagnosis operation toolbar. The Open Easy Checker File 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 Save Easy Checker File 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 Setup Project dialog, except that the Instrument cannot be changed.
3. Proceed through each of the screens in the same way as for Setup 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.



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# CHAPTER 5

## SPECIFICATIONS

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**5.1 System Requirements .....198**

5.1.1 System Requirements.....198

5.1.2 Compatible Instruments.....198

5.1.3 Language .....198

**5.2 Major Functions .....199**



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## 5.1 System Requirements

### 5.1.1 System Requirements

<b>OS</b>	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"><li>• English, Japanese, German, French, Spanish, Italian, Portuguese, Russian, Turkish, Polish, Simplified Chinese, and Traditional Chinese versions</li><li>• 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.</li></ul>
<b>Computer</b>	PC equipped with a processor equivalent to Intel Core i5 2.7GHz or better
<b>Memory</b>	At least 2 GB (4 GB or more recommended)
<b>Hard disk drive</b>	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..
<b>Display</b>	Display hardware capable of displaying 1280 x 768 pixels / 16-bit color or better
<b>USB port</b>	Required for protection key if used. Not necessary for electronic license.
<b>USB or serial port</b>	Required for connection to instrument

### 5.1.2 Compatible Instruments

CM-M6, CM-25cG, CM-2500c

### 5.1.3 Language

<b>Display language</b>	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

<b>Color space</b>	<p>All Editions: <math>L^*a^*b^*</math>, <math>L^*C^*h</math>, Lab<sub>99</sub>, LCh<sub>99</sub>, Hunter Lab, XYZ, Yxy, and their color differences; Munsell C, Munsell D65</p> <p>Professional Edition only: <math>L^*u^*v^*</math>, <math>L^*u^*v^*</math>, and their color differences</p>
<b>Index</b>	<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</p> <p>Professional Edition only: WI (ASTM E313-98, Berger, Taube, Stensby), Tint (ASTM E313-96), 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 (<math>\Delta E^*_{ab}</math>, <math>\Delta L^*</math>, <math>\Delta C^*</math>, <math>\Delta H^*</math>, <math>\Delta a^*</math>, <math>\Delta b^*</math>) 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>
<b>Color difference equation</b>	<p>All Editions: <math>\Delta E^*_{ab}</math> (CIE 1976), <math>\Delta E^*_{94}</math> (CIE 1994) and each component of lightness, saturation and hue, <math>\Delta E_{00}</math> (CIE 2000) and each component of lightness, saturation and hue, <math>\Delta E_{99}</math> (DIN99), <math>\Delta E</math> (Hunter), CMC (l:c) and each component of lightness, saturation and hue</p> <p>Professional Edition only: <math>\Delta E_c</math> (degree) (DIN 6175-2), <math>\Delta E_p</math> (degree) (DIN 6175-2), FMC-2, NBS 100, NBS 200,</p>
<b>Spectral data</b>	<p>All Editions: Spectral reflectance/Spectral transmittance</p> <p>Professional Edition only: K/S, Absorbance</p>
<b>Observer</b>	2 degree , 10 degree (Multiple observer settings possible)
<b>Illuminants</b>	<p>All Editions: A, C, D<sub>50</sub>, D<sub>65</sub>, F<sub>2</sub>, F<sub>11</sub></p> <p>Professional Edition only: D<sub>55</sub>, D<sub>75</sub>, F<sub>6</sub>, F<sub>7</sub>, F<sub>8</sub>, F<sub>10</sub>, F<sub>12</sub>, U<sub>50</sub> , ID<sub>50</sub>, ID<sub>65</sub></p> <p>Up to three illuminants can be displayed simultaneously.</p>
<b>Graphs</b>	<p>All Editions: Spectral reflectance/(transmittance) and its difference, <math>L^*a^*b^*</math> absolute value, <math>\Delta L^*a^*b^*</math> (color difference distribution, MI), Hunter Lab absolute value, Hunter <math>\Delta Lab</math> (color difference distribution), Trend chart of each color space and color difference equation, Pseudo Color display</p> <p>Professional Edition only: K/S and its difference, Absorbance and its difference</p>

<b>Instrument control functions</b>	<ul style="list-style-type: none"> <li>• Measurement/calibration</li> <li>• Automatic averaging measurement: 2 to 30 measurements</li> <li>• Manual averaging measurement: Optional (user-determined) number of times (The standard deviation and average for the color space selected for measurement are displayed.)</li> <li>• Remote measurement</li> <li>• Reading of sample/target data from instrument memory</li> <li>• Writing of target data to instrument memory</li> </ul>
<b>Instrument diagnosis function</b>	<p>Applicable instruments: CM-25cG, CM-M6</p> <p>Checked characteristics: Repeatability, reproducibility, lamp output (CM-25cG only)</p>
<b>Target data</b>	<ul style="list-style-type: none"> <li>• Target data can be registered.</li> <li>• Colorimetric target data or spectral target data can be input manually.</li> <li>• Main target and working targets under main targets can be used. (Professional Edition only)</li> </ul>
<b>Data list</b>	<ul style="list-style-type: none"> <li>• Listing of target data and sample data</li> <li>• Editing (delete, average, copy &amp; paste, search)</li> <li>• Display of pass/fail ratio, visual judgement result input function, Additional data information input/listing function</li> </ul>
<b>Data storage</b>	All data stored in database with data changes applied instantly.
<b>External I/O</b>	<ul style="list-style-type: none"> <li>• Importing/exporting of data file(s) in original formats (with “mesx” file extension)</li> <li>• Importing/exporting of template file(s) in original format (with “mtpx” file extension)</li> <li>• Importing of SpectraMagic NX data files (with “mes” extension)</li> <li>• Importing of SpectraMagic NX template files (with “mtp” extension)</li> <li>• Importing/exporting of data in text format</li> <li>• Saving of data in XML format</li> <li>• Exporting of data in Excel or PDF format</li> <li>• Copying of lists in clipboard</li> </ul>
<b>Help</b>	Manual, “Precise Color Communication” Tutorial





KONICA MINOLTA